City of Kalamunda

Bicycle Plan 2017 Technical Report

Prepared for
City of Kalamunda

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Document History

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1	16 November 2017	Minor Text Revision	Sam Laybutt	Ray Cook
2	22 November 2017	Minor Revision to Schedule of Works	Sam Laybutt	Ray Cook
3	23 November 2017	Minor Revision to Schedule of Works	Sam Laybutt	Ray Cook
4	13 April 2018	Training Routes Update	Sam Laybutt	Ray Cook

Executive Summary

Vision

Our vision is:

"Connected Communities, Valuing Nature and Creating our Future Together"

One of the key aspects of the vision story is for the City to be "easily accessible to and from Perth City, and around the City" – this Bike Plan supports this vision by setting out a clear way forward for investment in the active transport network.

Strategic Opportunities

This Bicycle Plan has been developed to integrate and maximise strategic opportunities including:

> Forrestfield Airport Link

> Forrestfield North Transit Oriented Development (TOD)

> Roe Highway PSP

> Tonkin Highway PSP

> Connections to Midland

> Cycle Tourism

> Safe Active Streets Program

Consultation

Key stakeholders as well as the wider community have been consulted as part of the development of the Bicycle Plan, with over 200 responses to the survey and over 30 attendees across two public workshops. The community expressed a strong preference for safer cycling routes with greater separation from motor vehicles, particularly on major roads, increasing the connectivity of the network and increased maintenance of existing facilities.

Ultimate Network Plan

The Ultimate Network Plan has been developed in accordance with the route hierarchy developed by the Department of Transport, aligning the City's network with the strategic planning undertaken for the *Perth & Peel @ 3.5 Million Transport Plan*.

Primary Routes

The function of Primary Routes is to provide safe, prioritised and uninterrupted facilities, which form the spine of a cycle network. They are conducive to medium and long distance commuting, recreational and tourism trips. Within the City of Kalamunda, Primary Routes generally take the form of Principal Shared Paths (PSP) – e.g. Roe Highway, Tonkin Highway and a future PSP along the Dundas Road/Freight Railway corridor.

Secondary Routes

Secondary Routes are intended to provide safe and direct connections, typically between Primary routes and major trip generators such as shopping centres, industrial areas or major health, education, sporting and civic facilities.

The proposed Secondary Routes in this Bicycle Plan are:

> **Hills Spine** – linking Midland with Kalamunda and Lesmurdie via the Zig Zag Scenic Drive and Canning Road

> **Kalamunda Road** – the primary connection between the Hills and Foothills portions of the City

> **Forrestfield Station Connections** – including Maida Vale Road, TOD Connector Road and Milner Road

> **Lesmurdie to Maddington** – a future route to serve the south western part of the City

Local Routes

Local Routes provide safe cycling conditions in local (predominantly residential) areas, collecting cycling traffic from local roads within suburbs and distributing it to the Primary and Strategic Networks. Local Routes can take a number of forms including Safe Active Streets, quiet suburban streets and shared paths.

The proposed Local Routes in this Bicycle Plan are:

> **Foothills Spine** – a link serving Wattle Grove, Forrestfield and Maida Vale Central with connections to the Primary Route network.

> **High Wycombe Local Route** – a link connecting Forrestfield Station with its closest residential catchment

> **Berkshire and Dundas Roads** – a link between Forrestfield and Forrestfield Station

> **Hale / Hawtin Roads** – a link between Wattle Grove, Forrestfield and Maida Vale, primarily for confident commuter and recreational cyclists

> **Midland Road** – a link between Maida Vale and Midland, primarily for confident commuter and recreational cyclists

> **Lesmurdie Local Route**s – a collection of links serving the numerous schools and neighbourhood shopping precincts within Lesmurdie

> **Forrestfield to Lesmurdie** – a future local connection between the Hills and Foothills.

Safe Active Streets

The development of Safe Active Streets has been specifically considered as part of this Bicycle Plan, with potential locations identified in High Wycombe, Forrestfield, Wattle Grove and Kalamunda.

Training Routes

The function of Training Routes is to provide training or sports cyclists with designated routes in which to undertake long distance rides in on-road environments. Training routes are mainly located in the rural and semi-rural portions of the City, including links such as Canning Road (south), Pickering Brook Road, Aldersyde Road and Mundaring Weir Road. Welshpool Road East is also included as a Training Route as it is the primary connection for training cyclists between the Hills and the Foothills.

Specific recommendations for Training Routes include:

> Undertake formal Road Safety Audits of Mundaring Weir Road and Cannig Road (Pomeroy Road to City Boundary) to identify the level of risk associated with conflicts between cyclists and other vehicles, including particular locations of concern.

> Targeted widening of Welshpool Road East, Mundaring Weir Road and Canning Road to provide more frequent, safer overtaking opportunities for motorists.

> Safety improvements to the Welshpool Road East / Lesmurdie Road intersection which has the highest number of bicycle crashes in the City

> A signage strategy to inform road users of the likelihood of encountering cyclists and encouraging safe driving and riding behaviour.

> Review of 1m Safe Passing Law and identify areas of concern within the City (primarily on training routes)

Infrastructure Implementation

A prioritised Schedule of Works for a budget of $500,000 per annum has been developed and is outlined in the table below.

No.	Routes	Description	Start	End	Cost Estimate
0-5 Years					
80a	**Roe Highway**	PSP Completion Part of Roe Highway/Kalamunda Road Upgrade	Berkshire Road	Kalamunda Road	$2,260,000
81a	**Tonkin Highway**	PSP Extension on the Southern Side (including link to Hartfield Park)	Roe Highway	Welshpool Road East	$1,430,000
82a	**Freight Railway / Dundas Road**	Dundas Road PSP	Tonkin Highway	Forrestfield Station	$2,580,000
82b	**Freight Railway / Dundas Road**	Dundas Road PSP	Forrestfield Station	Wittenoom Road	$730,000
1a	**Hills Spine**	Zig Zag Option A	Ridge Hill Road	Ocean View Parade	$35,000
1d	**Hills Spine**	Kalamunda Town Centre Section Options Study	Canning Road	Elizabeth Street	$50,000
2c	**Kalamunda Road**	Sealed Shoulder	Fernan Road	Abernethy Road	$560,000
3d	**Forrestfield Station Connection**	Milner Road Protected Cycle Lanes	Maida Vale Road	Dundas Road	$620,000
20a	**Foothills Spine**	Welshpool Road East Shared Path (including to connection from Puddy lane to Hale Road)	Roe Highway (City Boundary)	Puddy Lane	$130,000
20b	**Foothills Spine**	Puddy Lane Shared Path	Welshpool Road East Shared Path	Hale Road	$170,000
20c	**Foothills Spine**	Hale Road Shared Path Extension	Extensa Road	Puddy Lane	$50,000
20d	**Foothills Spine**	Hale Road Existing Shared Path Upgrade (Western Side)	Extensa Road	Lenihan Corner	$320,000
21d	**High Wycombe Local Route**	Public Access Way Upgrades (through McLarty Way, and Walker Crescent)	Kiandra Way	Newburn Road	$95,000
21e	**High Wycombe Local Route**	Butcher Road & Palmer Crescent Safe Active Street	Newburn Road	Palmer Crescent	$390,000
21f	**High Wycombe Local Route**	Everitt Place Shared Path	Palmer Crescent	Maida Vale Road	$85,000
22a	**Berkshire & Dundas Road**	Berkshire Road (West of Roe Highway) Shared Path Upgrade	Roe Highway	Dundas Road	$460,000
22c	**Berkshire & Dundas Road**	Dundas Road Shared Path	Berkshire Road	Forrestfield Station	$360,000
44	**Forrestfield (Gala Way)**	Gala Way Safe Active Street	Fruit Tree Crescent	Hawtin Road	$50,000
61a	**Canning Road**	Road Safety Audit	-	-	$25,000
61b	**Canning Road**	Targeted Shoulder Widening Stage 1	Pickering Brook Road	City Boundary	$450,000

No.	Routes	Description	Start	End	Cost Estimate
63	**Welshpool Road East**	Lesmurdie Road Intersection Safety Improvement	-	-	$40,000
64a	**Mundaring Weir Road**	Road Safety Audit	-	-	$15,000
64b	**Mundaring Weir Road**	Targeted Shoulder Widening Stage 1	Railway Road	City Boundary	$450,000
65	**Training Routes**	Safe Passing Law Review	-	-	$10,000
			TOTAL COST ESTIMATE (0-5 Years)		$11,365,000
			CITY FUNDED		$2,710,000
		5-10 Years			
80b	**Roe Highway**	Roe Highway PSP Completion	Kalamunda Road	Brinsmead Road	$660,000
81b	**Tonkin Highway**	PSP Completion	Welshpool Road East	Kelvin Road	$1,310,000
1b	**Hills Spine**	Lascelles Parade / William Street Safe Active Street	Zig Zag Scenic Drive	Hill Street	$640,000
1c	**Hills Spine**	Kalamunda Railway Heritage Trail Sealed Path	Hill Street	Elizabeth Street	$300,000
1e	**Hills Spine**	Canning Road Buffered Bike Lanes Stage 1	Kalamunda Road	Railway Road	$760,000
1f	**Hills Spine**	Canning Road Buffered Bike Lanes Stage 2	Railway Road	Lesmurdie Road	$1,200,000
3a	**Forrestfield Station Connection**	Maida Vale Road Protected Cycle Lanes Stage 1	Forrestfield Station	Priory Road	$1,090,000
3b	**Forrestfield Station Connection**	Forrestfield Station TOD Connector Road Protected Cycle Lanes Stage 1	Forrestfield Station	Roe Highway	$1,460,000
21c	**High Wycombe Local Route**	Kiandra Way Safe Active Street	Western Avenue	Norling Road	$660,000
41a	**Forrestfield (Hibiscus Drive)**	Hale Road Shared Path	Hannover Street	Hibiscus Drive	$430,000
41b	**Forrestfield (Hibiscus Drive)**	Hibiscus Drive SAS	Bougainvillea Avenue	Strelitzia Avenue	$330,000
41c	**Forrestfield (Hibiscus Drive)**	Bougainvillea Avenue Shared Path	Hibiscus Drive	Dawson Avenue	$240,000
41e	**Forrestfield (Hibiscus Drive)**	Pavetta Crescent SAS	Dawson Avenue	Roe Highway	$200,000
61c	**Canning Road**	Targeted Shoulder Widening Stage 2	Pomeroy Road	Pickering Brook Road	$500,000
64c	**Mundaring Weir Road**	Targeted Shoulder Widening Stage 2	Railway Road	City Boundary	$500,000
			TOTAL COST ESTIMATE (5-10 Years)		$10,280,000
			CITY FUNDED		$2,620,000

Action Plan

A comprehensive Action Plan has been developed to document the numerous recommendations made within the report.

Category	No.	Action
Infrastructure	1	Upgrade and expand cycling network as per the Schedule of Works (refer to **Section 8**)
Maintenance	2	Regularly maintain roads and path to ensure facilities are in good condition.
	3	Regularly prune vegetation to ensure that facilities are accessible
Advocacy	4	Advocate the State Government agencies or elected members for funding of major projects (e.g. Forrestfield Airport Link, PSPs)
	5	Participate in the planning and design process of major projects (e.g. Roe Highway PSP) and ensure connections to local neighbourhood are included within the scope
	6	Assign resource time to implement advocacy actions
Behaviour Change and Awareness	7	Raise awareness of cycling by including information regarding cycling related activities on the City's website, newsletter, and social media
	8	Make cycling related information such as route maps, road rules, safety, and cycling etiquette easily accessible, either electronically or in print form.
	9	Communicate new cycling infrastructure concepts (e.g. Safe Active Street) to residents through easily accessible means.
	10	Promote the completion of new cycling infrastructure or routes through related community or cycling events.
	11	Provide cycling education courses and lead rides to encourage inexperience riders to ride more often
	12	Participate in Super Tuesday annual bike count event and Bike Week to promote cycling and provide positive reinforcement to existing bike riders.
	13	Investigate the feasibility of a bicycle library scheme, potentially in libraries at Kalamunda, Forrestfield, and High Wycombe.
	14	Provide drivers education for City staff to encourage better road use behaviour, including sharing the road with cyclists.
	15	Collaborate with WestCycle to lobby MRWA and the Road Safety Commission to implement a Targeted Driver Education Program.
	16	Assign resource time (e.g. TravelSmart officer) to implement the Behaviour Change and Awareness actions.
School Programs	17	Conduct programs, such as cycling lessons and sport events, at schools within the City to encourage cycling uptake
	18	Encourage schools to participate in Your Move program.
Cycling Tourism	19	Commission a detailed investigation into the opportunities and benefits of promoting cycling tourism in the City and develop an Action Plan
	20	Establish a funding stream to assist businesses in becoming 'Bicycle Friendly Businesses' – e.g. by part-funding additional bicycle parking
End-of-trip (EoT) facilities	21	Conduct an audit of existing EoT facilities to identify and create/update an inventory and map of EoT facilities within the City. Provide updated inventory to DoT for inclusion in the Comprehensive Bike Maps.
	22	Provide suitable EoT facilities at public lands (parks, library) that are managed by the City
	23	Update the Local Planning Scheme to include requirements for EoT facilities for new developments or create a new bicycle parking policy

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1 Introduction and Background

1.1 Vision

Our vision is:

"Connected Communities, Valuing Nature and Creating our Future Together"

One of the key aspects of the vision story is for the City to be "easily accessible to and from Perth City, and around the City" – this Bike Plan supports this vision by setting out a clear way forward for investment in the active transport network.

This Bicycle Plan will assist the City to achieve the transport aspect of the above vision, particularly with regard to bike paths, by setting the direction for investment in cycling infrastructure over the next 10-20 years, informing Council's forward works and budgeting processes.

1.2 Objectives

This Bicycle Plan was developed to assist the City through the following objectives:

> To improve the safety of the cycling environment by providing better cycling paths, shared paths, and road treatments, after considering crash history and community feedback on cycling safety.

> To provide more paths and road spaces that are suited to the design needs of cyclists, and that accommodate the different types of cycling users such as shared path users, commuters, recreational cyclists, and competitive cyclists. This includes consideration of shorter and longer travel distances, path geometry, travel routes, convenience, and connectivity.

> To increase the use of public transport, by providing more cycling options for people to use public transport, providing better end of trip facilities, and improving connections to the cycling network.

> To improve cycling access to the Forrestfield Train Station and the use of the public transport system associated with the train station.

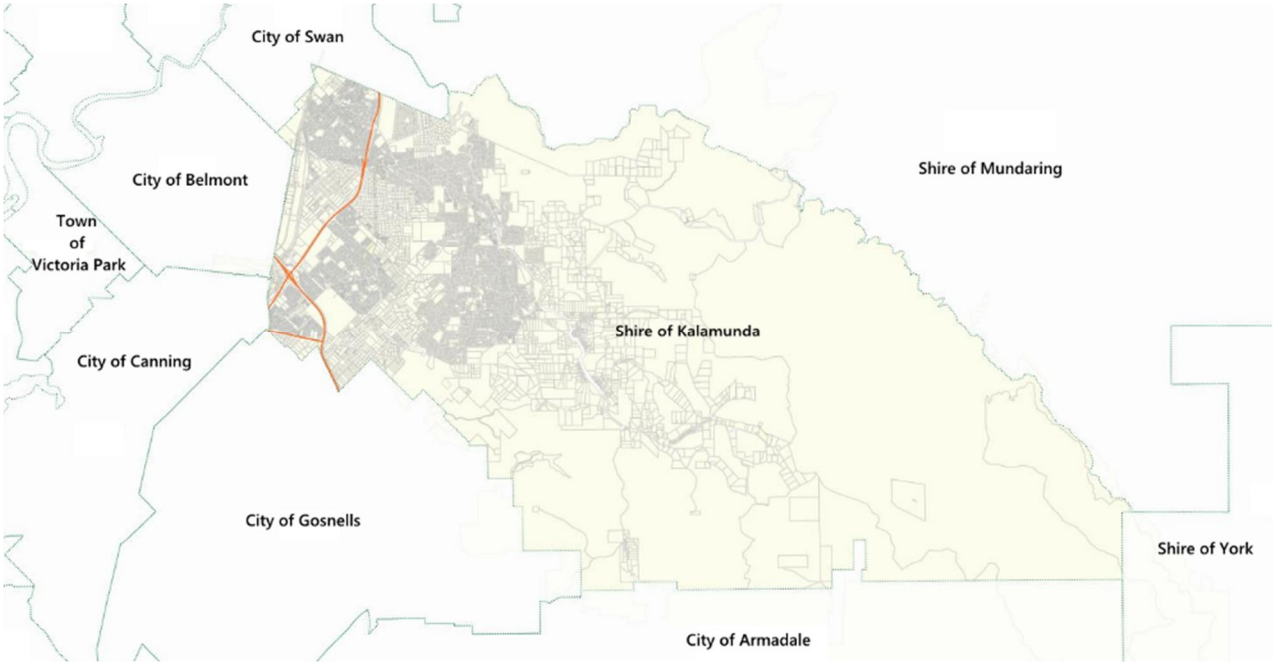
> To promote and educate in cycling, and thus improve cycling participation for the flow-on effects such as improvements in health and social values, and economic development and tourism.

> To provide the research and strategy that will enable planning for cycling works and applying for funding for cycling infrastructure and programs.

1.3 Study Area

The City of Kalamunda LGA is located in the Perth Metropolitan Region in Western Australia, approximately 20km east from the Central Business District (CBD) of Perth, as shown in **Figure 1-1.** The LGA covers an area of approximately 324km² with the population concentrated in the north-western third of the City. The eastern and south-eastern portions of the City are largely undeveloped forest area. The City of Kalamunda borders City of Swan to the north-east, Shire of Mundaring to the north, Shire of York to the east, City of Armadale to the south, City of Gosnells to the southwest, and the Cities of Canning and Belmont to the west.

Figure 1-1 City of Kalamunda – Location



Source: City of Kalamunda

1.4 Demography and Mode Share

The Estimated Residential Population (ERP) for the City in 2016 was 60,830 people. The population has increased to this ERP from 51,500 in a ten-year period which is a growth of over 18%. In terms of service age groups, the majority of the population (21%) are “parents and homebuilders”, and the region has seen larger numbers of “empty nesters and retirees” (aged 60-69) settling there over the period between 2006-2011.

In terms of cycling this demography represents different opportunities; parents and homebuilders are in a position to raise awareness of cycling as a viable transport mode to younger generations while the empty nesters and retirees are perhaps more interested in cycling as a form of low-impact exercise as part of a healthy lifestyle.

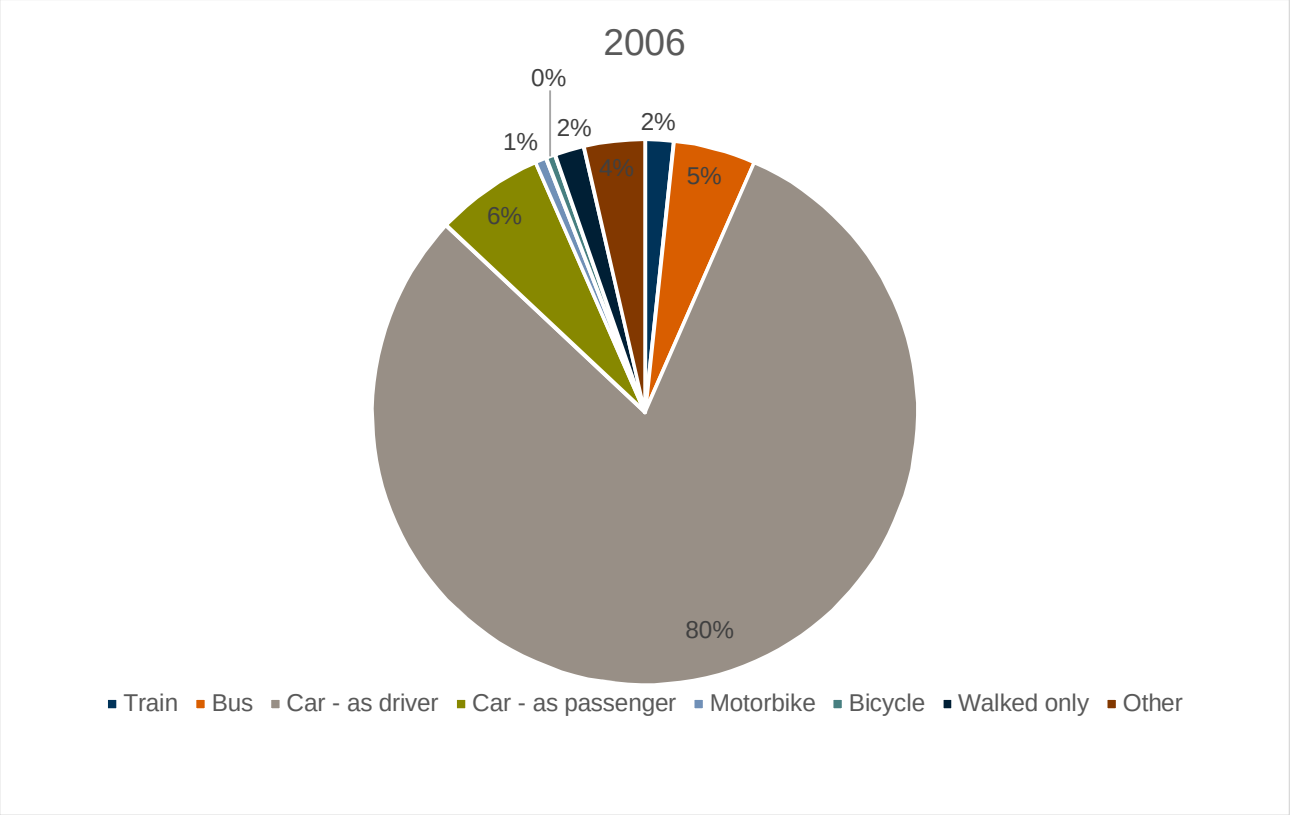
Cycling is a relatively underutilised form of transportation in the City (as shown in **Figure 1-2** and **Figure 1-3**) with 0.5% of residents travelling to work by bicycle. This is lower than the average 1.1% bicycle mode share for Greater Perth. Other than slight increases in car as driver and bus modes, all other modes have retained the same mode share between 2006 and 2011.

While there are currently no established mode share for the City, it is stated in numerous policy documents that active modes such as cycling should be encouraged with the aim of increasing mode share (see **section 1.5** and **Appendix A**).

There is therefore significant scope to build upon this level of cycling in the City, particularly in the foothills suburbs of Forrestfield, Wattle Grove, and High Wycombe, due to recent and future expansion of the Roe Highway Principal Shared Path (PSP) and the opportunity presented by the new Forrestfield Train Station and Transit Oriented Development (TOD).

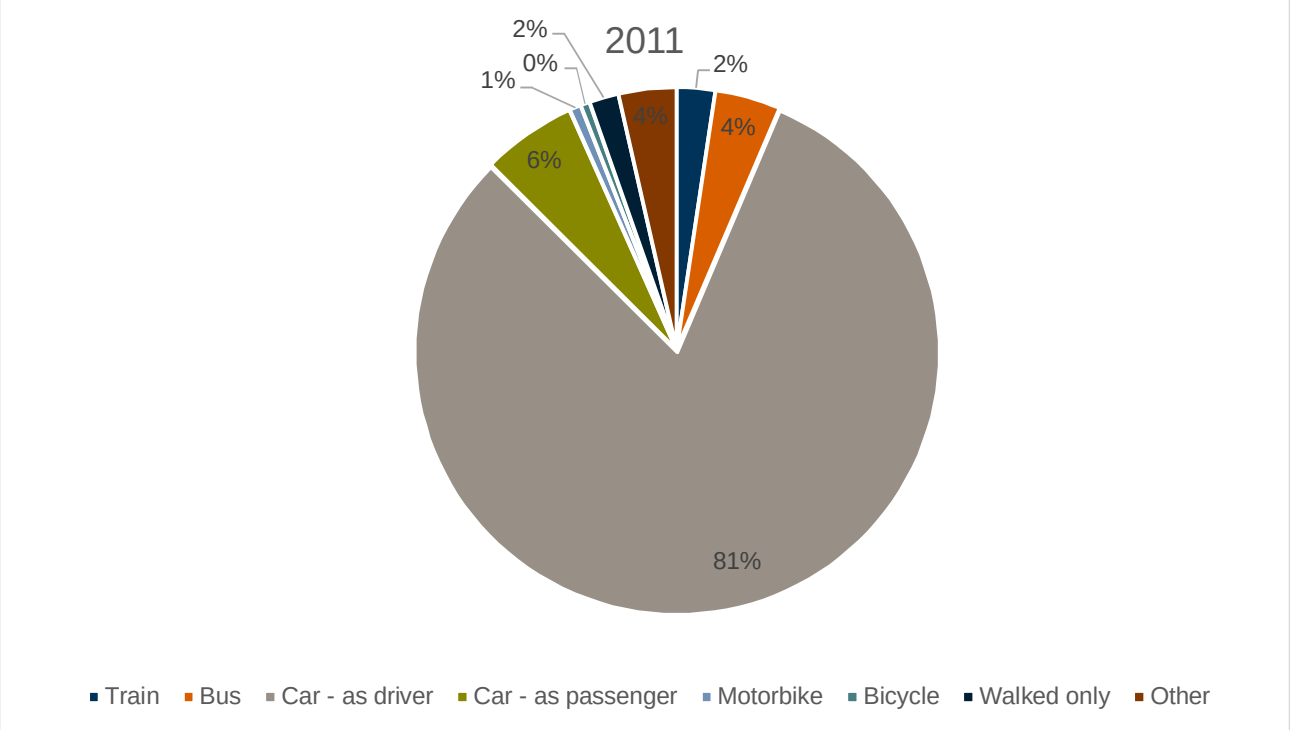
In the hills, there are opportunities for the City to capitalise on its status as the premium destination for training riders and mountain bikers by improving safety and amenity for these types of riders, and encouraging corresponding greater economic benefits to the City.

Figure 1-2 Method of travel to work 2006



Source: Australian Bureau of Statistics, Census of Population and Housing 2006 and 2011. Compiled and presented by .id, the population experts.

Figure 1-3 Method of travel to work 2011



Source: Australian Bureau of Statistics, Census of Population and Housing 2006 and 2011. Compiled and presented by .id, the population experts.

1.5 Policy Context

As part of the Bicycle Plan, Cardno reviewed existing local, state, and federal policies related to cycling in order to formulate a plan that is consistent with initiatives and directions set out by these policies. **Table 1-1** shows the relevant policies and planning documents that Cardno reviewed. **Appendix A** provides detail on each of the policies with relation to cycling.

Table 1-1 Policies Relevant to the Bicycle Plan

Policy	Federal	State	Local
National Urban Policy: Our Cities, Our Future (2011)	✓		
Moving Australia 2030 (2013)	✓		
National Cycling Strategy (2010)	✓		
Walking, Riding and Access to Public Transport (2013)	✓		
Western Australian Bicycle Network (WABN) Plan 2014-2031		✓	
Perth Metropolitan Transport Strategy 1995-2029		✓	
WAPC Development Control Policy 1.5 – Bicycle Planning (1998)		✓	
Bike Ahead: Bicycle Strategy for the 21st Century		✓	
Liveable Neighbourhoods (2009)		✓	
Main Roads WA Policy for Cycling Infrastructure (2000)		✓	
Activity Centres for Perth and Peel		✓	
Our Bike Path 2014-2020		✓	
Perth and Peel Transport Plan for 3.5 Million People and Beyond		✓	
Transport Plan @ 3.5 Million Cycle Network (2016)		✓	
Perth and Peel Mountain Bike Master Plan (2016)		✓	
Kalamunda Local Planning Scheme No. 3			✓
Kalamunda Advancing: Strategic Community Plan to 2023			✓
Shire of Kalamunda Bike Plan (2009)			✓
EMRC Regional Cycle Network Masterplan (2011) & Report Card (2016)			✓
Zig Zag Community Action Plan (2012/13)			✓
Shire of Kalamunda Health and Wellbeing Plan (2013-16)			✓
Perth Hills Trail Master Plan (2013)			✓
Perth Hills Trail Loop Concept Design Report (2016)			✓
Forrestfield North District Structure Plan (2016)			✓
North-East Sub-regional Planning Framework: Towards Perth and Peel @3.5 Million (2016)			✓
2016 Community Scorecard			✓

The key messages contained within these policy documents highlight the need for:

> Safety

> Integrated land use and transport planning for new developments and renewal of existing centres

> Comprehensive and convenient cycle networks for all cyclists

> Connectivity

> Sustainable infrastructure and high quality facilities

> The promotion of cycling and associated benefits

> Supporting policy and funding opportunities

> A reduction in the reliance on private car trips.

1.6 Strategic Opportunities

There are a number of major infrastructure projects being developed which present strategic opportunities for significantly increasing the accessibility, attractiveness and uptake of cycling within the City.

1.6.1 Forrestfield Airport Link

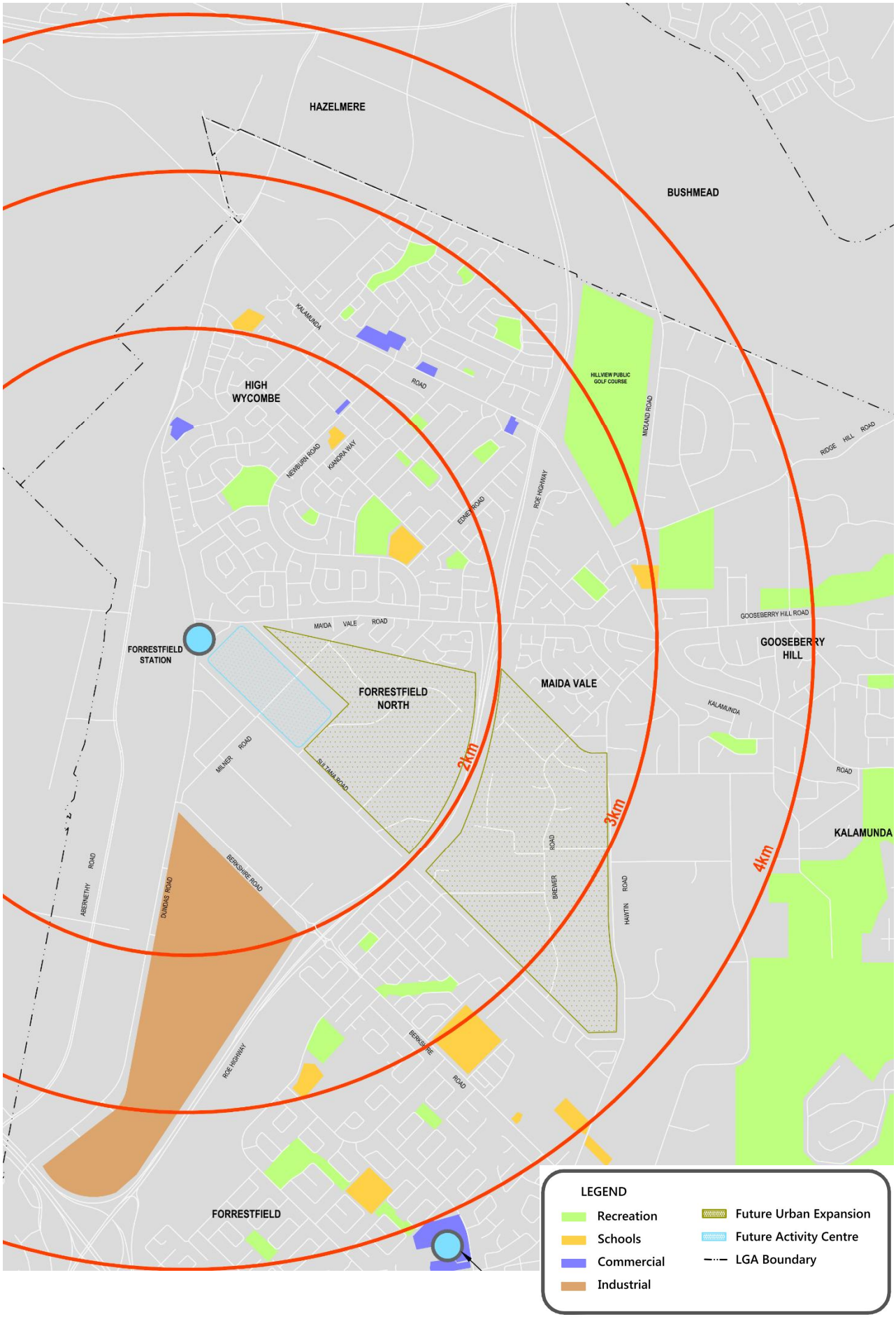
The Forrestfield Airport Link (FAL) is a new passenger railway line currently under construction and due to open in 2020. It will revolutionise commuter transport in the foothills, providing a fast, high-capacity public transport connection to the Airport and a 20min journey from Forrestfield to Perth CBD (compared to 45min by car currently).

Forrestfield Station is planned to include parking for 2500 vehicles and an extensive bus interchange. For cyclists, up to 180 bicycle parking bays will be provided from opening, along with multiple safe cycling routes approaching the station forecourt.

One of the most difficult aspects of encouraging greater uptake of cycling is creating an incentive for people with long-seated habitual travel patterns to try something new and different. FAL presents a significant incentive of travel time savings which would encourage mode shift and, with that change, comes the opportunity to encourage commuters to ride to the station rather than drive.

As shown in **Figure 1-4**, presently the main residential area within 2-3km of Forrestfield Station is High Wycombe. A safe cycling link to and through High Wycombe from the Forrestfield Station is a critical opportunity to encourage cycling to the station from opening day and in the first few years. A substantial portion of Forrestfield is also located within 4km of the Train Station. If a suitable safe and convenient link is provided (e.g. Berkshire or Sultana Roads), this could generate additional demand for cycling to the station.

Figure 1-4 Forrestfield Station Catchment



1.6.2 Forrestfield North Development

The Forrestfield North District Structure Plan is being developed to capitalise on the development of FAL, and the opportunities it brings to the surrounding area. This meant moving away from the industrial land uses, previously proposed, and focusing on urban uses more suitable for a train station precinct. The new focus resulted in planning for the delivery of high density residential, a new activity centre and a commercially focused Transit Oriented Development (TOD) precinct based around the new train station.

Key elements of the Forrestfield North District Structure Plan include:

> **Mixed Use Transit Oriented Development**

- A highly accessible area via all transport modes. Land uses will provide opportunities for active and recreational requirements as well as retail, entertainment and food and beverage needs of residents, visitors and employees.

> **Activity Centre**

- A new main street connecting to Forrestfield Station, which will be highly accessible to all transport modes, providing a node for the provision of community facilities for a growing population. This will be located adjacent to Forrestfield Train Station.

> **High and medium density residential precincts**

- A new permeable street and pedestrian/cycle network will provide convenient access to the train station and activity centre for all modes of transport. These precincts will be located generally between Maida Vale Road and Sultana Road West.

> **Light Industrial Precinct**

- This area will include large industrial and commercial buildings. Design guidelines will support access to business by all modes and connect to the new train station. New buildings will be expected to provide quality end of trip facilities for active commuters. This area will generally be located south of Sultana Road.

> **New road connections** including cycle lanes and shared paths, e.g. Berkshire Road, Milner Road and Sultana Road.

A copy of the District Structure Plan map is included at **Appendix B**.

Development of the residential precincts within the Forrestfield North precinct will bring a significant number of new residents within easy cycling distance of the Forrestfield Train Station, as well as local shops, cafes and employment. With the significant new and upgraded roads required to support the new land uses, there is a strategic opportunity to provide high-quality cycling facilities from the start to encourage active transport before commuting patterns become habitual.

1.6.3 Roe Highway PSP

As part of the Gateway WA project, over 21km of Principal Shared Path (PSP) was constructed along Tonkin, Leach and Roe Highways near the Airport. Further extensions of the Roe Highway PSP from Tonkin Highway to Berkshire Road (2016) and Orrong Road (2017) have brought foothills residents within comfortable cycling distance of many workplaces in Kewdale, Welshpool and the Airport Commercial Centre. Longer distance commuters also now have much safer and more convenient access to Perth CBD, Canning Vale and Jandakot Airport.

Following the 2017 election, the grade-separation of Roe Highway and Kalamunda Road intersection was announced as a priority. This project is likely to include the construction of a further section of the Roe Highway PSP that, when complete, would serve as a north-south cycling spine for the foothills suburbs, an area with very poor cycling access.

1.6.4 Tonkin Highway PSP completion

Main Roads Western Australia (MRWA) is planning to upgrade Tonkin Highway between Hale Road and Welshpool Road East to freeway standard with Tonkin Highway passing over Hale Road and an interchange Welshpool Road East. This project will significantly improve convenience and safety for pedestrians and

cyclists crossing Tonkin Highway at both these intersections, completing missing links in the path network. The opportunity also exists for a further pedestrian and cyclist connection from Wattle Grove (east) to Hartfield Park, providing access directly to the foothills most important recreational facility without any interaction with motorised traffic.

Beyond Welshpool Road East, further upgrades to Tonkin Highway should also include a PSP, which will facilitate connections from the foothills to employment centres at Maddington-Kenwick, Gosnells and Forestdale. Completing such a long section of PSP will also increase the accessibility of Kalamunda for recreational / training riders from the southern suburbs of Perth.

1.6.5 Connections to Midland

Midland is the closest major Activity Centre to the City and is located within 5km of the City boundary. Cycle access is poor, with no dedicated facilities and cyclists required to mix with heavy traffic through Hazelmere or with high-speed traffic on the shoulders of Roe Highway or Bushmead Road.

The City of Swan is currently designing and constructing an extension of Lloyd Street, Midland, from Clayton Street to Great Eastern Highway, connecting directly into Abernethy Road. This road extension has the potential to provide a safe cycling route connecting Midland directly with High Wycombe.

1.6.6 Cycle Tourism

Cycling Tourism is a growing market in Australia and one that is yet to be fully capitalised up on in Western Australia. Research and market analysis has shown that cycle tourists often spend significantly more than the average tourist, delivering significant benefits to the local economy.

Kalamunda is already home to world-class mountain biking facilities which already attract visitors from all over the state and country. The Munda Biddi Trail, the long distance touring route from Mundaring to Albany, passes through the City as well. The Darling Range provides relatively rare opportunities for sweeping city views – e.g. at Zig Zag.

This Bicycle Plan presents the opportunity to effectively plan to overcome one of the key barriers to encouraging greater cycle tourism in the City, which is the condition of the cycling network and the lack of clearly defined, high-quality touring routes.

1.6.7 Safe Active Streets

The Safe Active Street program has successfully completed several pilot trials in Western Australia, with the first three projects completed in Bayswater, Belmont and Vincent in 2016 and 2017. With State Government support and funding, the program is continuing with planning and design underway for Safe Active Streets in other Local Government Areas including Bassendean, Kalgoorlie, Melville, and Victoria Park.

While this type of infrastructure has strong State Government support there is an opportunity for the City to also benefit from the funding to implement Safe Active Streets at suitable locations within the City.

2 Benefits of Cycling

Cycling can be undertaken for commuting, recreational and casual purposes. Given the many benefits of cycling activities, there is considerable potential to increase the uptake of active transport modes as a viable choice for commuting, particularly in the foothills with the opening of Forrestfield Station. Uptake of recreational cycling and cycling tourism in general also have the potential to grow, particularly when considering the extent of local and regional trail networks, and natural heritage.

The benefits of cycling to both the individual and the wider community include:

> ***Social Benefits***

- Riding to work, school, or college, or taking your bike on short neighbourhood trips, is a convenient and practical way to incorporate regular exercise into your busy day
- A safe cycling trip is a healthy lifestyle choice that improves aerobic fitness and reduces stress levels
- A cyclist has many chances for social interaction during their trip
- Many opportunities to passively survey the street, increasing neighbourhood security.
- Improves the liveability and vibrancy of an area
- For people that do not have a driver's licence or vehicle (for example children and seniors) cycling provides a means of independent transport. This is extremely important to maintain social connectivity especially if there is a lack of public transport in the area.
- The more people cycle, the safer cycling becomes (safety in numbers) and also has the effect of a general slowing down of traffic, which improves overall road safety.

> ***Personal Economic Benefits***

- A bicycle trip is a low cost alternative to driving a car
- Having access to a bike reduces the need for a second family car, savings from which can be diverted to other aspects of the household budget
- Financial returns in dollar terms are nearly twice the costs incurred because people who cycle more will spend less on travel costs and gains in health and fitness will result in savings on health services[1]

> ***Commercial Economic Benefits***

- Cycling tourism provides a new demographic and increased business opportunities
- Benefits to businesses of cycling, both as a utility and leisure mode, as well as the benefit of running a business in an area which is conducive to cycling[2]
- Businesses with staff who cycle are potentially more likely to have healthier, happier and more productive employees
- Business are better able to attract and retain staff where on-site cycling facilities are of a high quality, and within easy access by bike; and reduces exclusion of potential employees to jobs who do not have access to a car (Rajé & Saffrey, 2016)
- Bikes have a much lower impact on road surfaces due to wear and tear, and contribute to a longer lifecycle of road infrastructure
- The demand for parking decreases and land can be redeveloped for more community-focused purposes, such as parks and public spaces which accommodate the needs of people rather than motor vehicles.

[1] *Source: RAC (2012) The Economic Cycle: A Business Case for Investment in Cycling in Western Australia*
[2] *Source: Rajé, F. & Saffrey, A. (2016) The Value of Cycling, Department for Transport, London UK*

> ***Environmental Benefits***

- Reduced consumption of petrol and dependency on fossil fuels
- A reduction of vehicles on the road results in less congestion
- Fewer car trips (and less congestion) result in fewer greenhouse gases being emitted
- Local air quality is better and this has a beneficial impact on health
- Noise levels are reduced
- The “heat island” effect (where impermeable roads and surfaces contribute to a heating of the temperature in urban areas) may reduce if larger numbers of people choose active modes, as some surfaced areas are returned to a greener or vegetated state (e.g. tree planting as part of Safe Active Streets treatment).
- Roads take up space and accelerate urban sprawl. Less driving results in less demand for roads. Cycling and walking both benefit from a more compact urban design, which also reduces urban sprawl and allows the City to retain more of its bushland into the future.

3 Consultation

3.1 Methodology

Community and stakeholder consultation was a major component of the Bicycle Plan, allowing cycling organisations and members of the public to provide input to the design and implementation of the final plan.

A wide range of consultative methods were utilised to enable visitors, residents and other stakeholders to voice their concerns, put forward ideas and provide information on their personal experiences of cycling throughout the City.

> **Public Surveys** – Public consultation was conducted by distributing online and hard copy surveys for members of the public to provide detail on the purpose of their cycling trips, as well as the frequency of their journeys. An open-ended section was included to:
  - Allow participants to state what they enjoy about cycling in the City;
  - Determine in which locations they experienced discomfort or avoided; and
  - Encourage participants to suggest ways in which the network could be improved

> **Stakeholder Consultation –** A number of key stakeholders were consulted as part of the Bicycle Plan, including the City's officers, neighbouring local government councils, state government agencies, WestCycle, and local sports clubs.

  Consulting with neighbouring local government was important in formulating this Bicycle Plan as the City shares borders with multiple councils and knowledge of other council's plans and priorities is important in order to establish a connected strategic network between and through neighbouring Local Government areas.

  State government agencies were also engaged to ensure that the proposed infrastructure within this bike plan is consistent with the existing State planning and policy.

3.2 Community Consultation

Community consultation was a critical component of developing this Bicycle Plan. The feedback received from the community and stakeholders informed the Project Team's understanding of the key issues for existing and potential cyclists within the City and helped guide the focus of the Bicycle Plan to best meet the needs of existing cyclists and encourage a greater uptake of cycling.

A 'blank slate' public consultation process was undertaken during March and April 2017. This process consisted of a survey questionnaire, which was available both in hard copy and on the City's website. The City and key stakeholders distributed the survey via the City's website, newsletters, social media as well as other advertising channels. Over 200 responses were received, 64% of which were from residents of the Hills portion of the City. Over 20% of the responses were from non-residents of the City, indicating strong interest from cyclists who visit the City from other parts of Perth.

To complement the survey questionnaire, two community workshops were held as follows:

> 21 March, at Woodlupine Community Centre, **Forrestfield**

> 28 March, at Zig Zag Cultural Centre, **Kalamunda**

Over 30 community members attended the two workshops where they were able to discuss their issues, concerns and ideas with the Project Team and other members of the community. The feedback received at the workshops, and through the survey, is an extremely valuable contribution to the development of this Bicycle Plan.

The following section summarises the responses received from the survey.

3.3 Survey Results

3.3.1 Demographics

The majority of the respondents were male (65%) and from the 30 to 49 age group (62%). A total of 85% of the respondents reside in the City of Kalamunda, 64% of whom are from the Perth Hills suburbs and 21% from the Foothills suburbs. The remaining 15% are visitors to the City who reside in other parts of Perth.

High response rates from the Perth Hills area indicates a strong interest for cycling in the area, given its popularity as a 'training ground' for sport cyclists, as well as being the prime destination for mountain bike trails in the Perth Metropolitan Area.

Seventy-three percent of respondents stated that at least 2 people in their household ride and 90% reported to have more than two bicycles at home.

3.3.2 Attitudes, trip purpose, and frequency

The majority of respondents ride for recreational purposes with survey results showing combined responses for 'often' and 'almost always' exceeding 87%. Social is the second most popular trip purpose followed by commuting. The survey also shows that 70.1% respondents ride a bike at least 1-2 time per week. This is reflective of the current infrastructure and land use, which is not conducive to commuter cycling but is very attractive for recreational riders, particularly more confident riders.

40% of the respondents state that they are confident riders that are comfortable riding in mixed traffic situations, while 19% prefer to ride on designated on-road bike lanes. This shows that the majority of the respondents are experienced cyclists. There is also a significant number of respondents (28%) who prefer to only ride along off-road paths.

3.3.3 Route Types

The survey results show that quiet roads are the most used route type in the City, with 63% of respondents riding through them at least 1-2 times a week. This result however does not indicate that roads in the City are suitable for all cyclists as a significant proportion of the respondents are experienced sport cyclists who regularly train in the City. Shared paths are the second most used cycling infrastructure in the City. 40% of respondents using PSPs at least weekly is interesting given the only PSP presently within the City is a short section of the Roe Highway PSP between Tonkin Highway and Berkshire Road. This indicates that there is a demand for additional high quality infrastructure within the City.

Footpaths are the least popular infrastructure in the City, which is consistent with Cardno's findings for other Local Governments. This is likely due to sub-standard width and alignment of many footpath sections in the network, which are not convenient for cycling, particularly at road crossings.

3.3.4 Visitors to the City

Questions 11 to 13 were targeted towards non-residents who currently cycle within the City, in order to understand the frequency of riding and the extent to which these riders visit local businesses and contribute to the City's economy.

Weekends were the most popular time to ride for the respondents of the survey with 40% claiming to 'almost always' ride through the City on the weekends. Sixty percent of respondents stated that they stopped within the City during their ride to buy food and/or drinks. The overwhelming majority of respondents stop at shops and cafes around the Kalamunda Town Centre. For people who did not stop, better and safer bike parking was an improvement they would most like to see around the City, especially at the Kalamunda Town Centre. The City could assist local businesses in this regard by providing 50-50 funding for bike parking to eligible businesses. Other preferred improvements include safer paths and improved path connectivity towards the shops.

3.3.5 Less Frequent Riders

Respondents who rarely cycle were asked to nominate the main reasons for not currently riding. The main reasons respondents listed for not riding a bike were “don’t feel safe riding”, “unsafe road conditions”, “speed and volume of traffic” and “lack of bicycle lanes or path.” These results indicate a definite need for the City to invest in providing dedicated on-road cycling facilities to create a safer cycling environment. Over 35% of respondents to these questions listed “do not own a bike” as a key reason they do not ride – this indicates that a Kalamunda Bike Hire or Bike Library could be effective at encouraging uptake of cycling in the City.

3.3.6 Issues and Suggestions

Respondents were also asked to identify issues they encountered along their route or within the City in general and improvements they like to see. See **Table 3-1** for a summary of these responses.

Table 3-1 Summary of Complaints/Issues and Suggestions Submitted by Survey Respondents

Category	Issues	Suggestions
Infrastructure	▪ Lack of cycle lanes on major roads. Welshpool Road, Mundaring Weir Road, Canning Road, and Kalamunda Road have the highest number of mentions ▪ Traffic calming treatments are not suitable for cyclists, particularly treatments which narrow the road and make it more difficult for drivers to safely overtake cyclists ▪ Poor path quality along Welshpool Road east of Hale Road. ▪ Lack of secure bike parking	▪ Cycle lanes along Major roads around the Hills area. Mundaring Weir Road, Welshpool Road, Kalamunda Road, and Canning Road ▪ Convert Zig Zag Scenic Drive to uphill only. Additional suggestion to ban vehicular traffic to improve safety further. ▪ More off-road paths around the Hills to provide safe routes for children to go to schools. ▪ Additional bike parking
Safety	▪ Unsafe crossing at busy roads due to traffic volumes and speeds. Hale Road near Forrestfield Shopping Centre and Canning Road are some of the locations mentioned. ▪ Lack of shoulder along truck routes. ▪ Cars passing too closely ▪ Poor behaviour from some drivers and cyclists.	▪ Install islands at busy intersections for staged crossings ▪ Widen roads where possible and install cycle lanes ▪ More driver and cyclists awareness education initiatives
Connectivity	▪ Very limited cycling options to go from the foothills to the hills and vice versa ▪ Connection from Wattle Grove (south of Hale Road) to the wider network is very poor. ▪ Lack of shared path and discontinuous footpath.	▪ Provide more cycling connections from Wattle Grove Area to amenities around Forrestfield, including to Roe Highway PSP and Tonkin Highway PSP ▪ Alternative connection(s) between the Hills and the Foothills other than Kalamunda Road and Welshpool Road. ▪ Improved connection to Midland and Guildford.
Maintenance	▪ Debris, such as glass and gravel on the side of the road and path forces cyclists to ride closer to the centre of the carriageway, which further aggravates drivers.	▪ Regular debris removal and sweeping

3.3.7 Popular Routes

Respondents were asked to nominate the routes they regularly cycled to and through the City. A map compiling the routes nominated by survey respondents is shown in **Figure 3-1.**

Most respondents noted that their route selection was based on traffic volumes (with a preference for lower volumes), and related perceptions of safety. It should be noted that the map is likely to reflect the route choices of recreational and training riders more than commuter cyclists due to the current composition of cyclist types within the City as outlined in **Section 3.3.2**.

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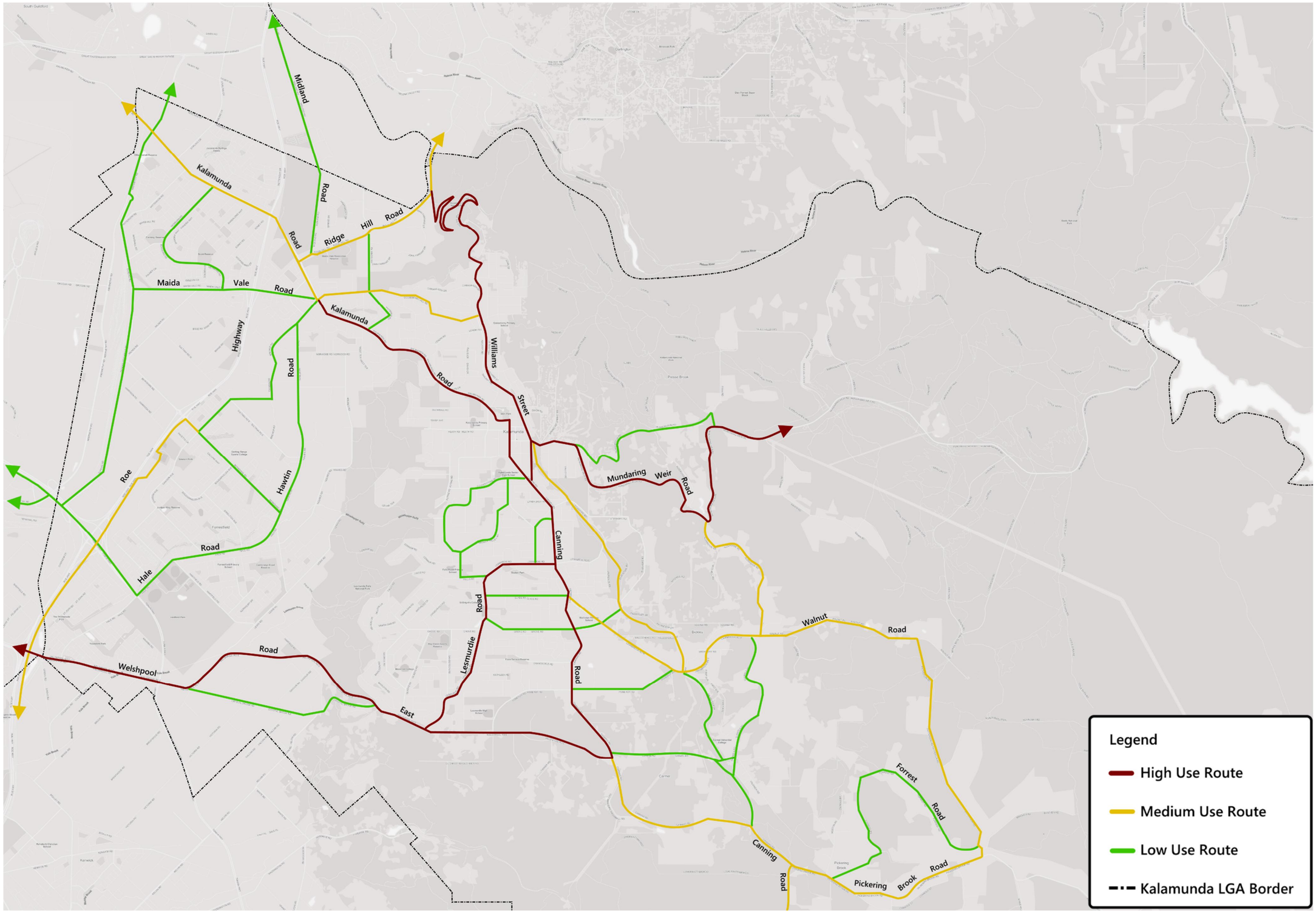
Figure 3-1 Popular Cycling Routes



Source: Compiled from community survey responses

4 Bicycle Counts and Crashes

Data regarding the existing cycling patterns and facilities within the City was obtained from a variety of sources and used to inform the development of the Ultimate Network Plan. Some of the data sources utilised are outlined in the following sections.

4.1 Bicycle Counts

Video surveys were undertaken at 18 strategic intersection locations within the City over two days, on Thursday, 6 April 2017 and Sunday, 9 April 2017. These counts provide a snapshot of current cycling demand within the City as well as a baseline from which to measure the anticipated growth in cycling demand as this Bicycle Plan is implemented. The survey days were selected in order to capture a typical commuter day as well as a typical recreational / training ride day.

The results of the survey are tabulated in **Table 4-1** and illustrated in **Figure 4-1** and **Figure 4-2**. The results of the bicycle counts give several insights into the current demand for cycling within the City:

> Sunday demand was observed to be approximately 2.5 times higher than Thursday demand, indicating that there is currently much higher demand for recreational and training type riding than for commuter or utility cycling. However even on the Thursday count there was demand observed at locations typically associated with training riders – e.g. Mundaring Weir Road and Zig Zag.

> On Thursday, the highest demand entering the City was recorded at the Roe Highway/Tonkin Highway PSP intersection. Other entry routes (Kalamunda Road, Zig Zag, and Welshpool Road East) were observed to be significantly lower. The single most highly trafficked road section was Railway Road, north of Mead Street, closely followed by Welshpool Road East at Lesmurdie and Canning Road near the town centre.

> On Saturday the busiest entry point to the City was Welshpool Road East, followed closely by Zig Zag. The single most highly trafficked road section was Railway Road, north of Mead Street, in Kalamunda town centre, which recognises the concentration of riders passing through the town centre.

It must be noted that the count is only a snapshot in time, taken towards the end of the peak riding season. The Sunday count was taken the weekend after the 3 Dams/5 Dams cycling event which may also contribute to lower numbers of recreational riders compared to typical Sundays between October and April.

4.2 Saddle Surveys

Site inspections and saddle surveys were undertaken by the project team in order to inspect the existing cycling environment from a rider's perspective, identify missing links and undertaken preliminary investigations into potential projects for the ultimate cycling network.

4.3 Strava Data

The Strava 'Heat Map' is a one-off visualisation of aggregated data from users of the Strava mobile phone app, which is used by walkers, runners and cyclists to track their trips. The 'Heat Map' provides a visual snapshot of the most popular riding routes for users of the app.

Whilst the Strava data is from 2015, and only represents part of the total cycling demand, it is a useful dataset for identifying popular riding routes and barriers to cycling. The dataset is particularly useful for identifying the most popular riding routes in the semi-rural parts of the City where reliable bicycle count data does not exist.

An excerpt from the Strava 'Heat Map' showing the City of Kalamunda and surrounds is presented in **Figure 4-3**.

Table 4-1 Summary of Bicycle Counts

Location		Number of Cyclists per day	
		Thursday	**Sunday**
1	Kalamunda - Railway Rd/Mead St	90	360
2	Kalamunda - Kalamunda Rd/Canning Rd	19	73
3	Kalamunda - Canning Rd/Recreation Rd	56	93
4	Lesmurdie - Canning Rd/Lesmurdie Rd	54	179
5	Lesmurdie - Canning Rd/Pomeroy Rd	41	63
6	Lesmurdie - Canning Rd/Welshpool Rd	2	75
7	Carmel - Welshpool Rd/Crystal Brook Rd	62	222
8	Wattle Grove - Tonkin Hwy/ Welshpool Rd	40	122
9	Wattle Grove - Welshpool Rd/Hale Rd	51	164
10	Wattle Grove - Tonkin Hwy/Hale Rd	27	19
11	Forrestfield - Roe Hwy/Tonkin Hwy PSP	63	64
12	Forrestfield - Hawtin Rd/Berkshire Rd	23	47
13	Forrestfield - Roe Hwy/Berkshire Rd	51	43
14	Maida Vale - Maida Vale Rd/Priory Rd	34	33
15	Maida Vale - Kalamunda Rd/Gooseberry Hill Rd	48	63
16	Maida Vale - Roe Hwy/Kalamunda Rd	11	35
17	Gooseberry Hill - Zig Zag Scenic Dr/Ridge Hill Rd	37	168
18	Piesse Brook - Mundaring Weir Rd/Aldersyde Rd	36	154
	TOTAL*	**745**	**1977**

** The total number of cyclists is provided purely to compare total demand between the Thursday and Sunday counts. It is likely that the same individual cyclists pass through at least two or three of the intersections and therefore the aggregate totals may double or triple count the actual number of cyclists on a given day.*

Figure 4-1 Bicycle Counts – Thursday

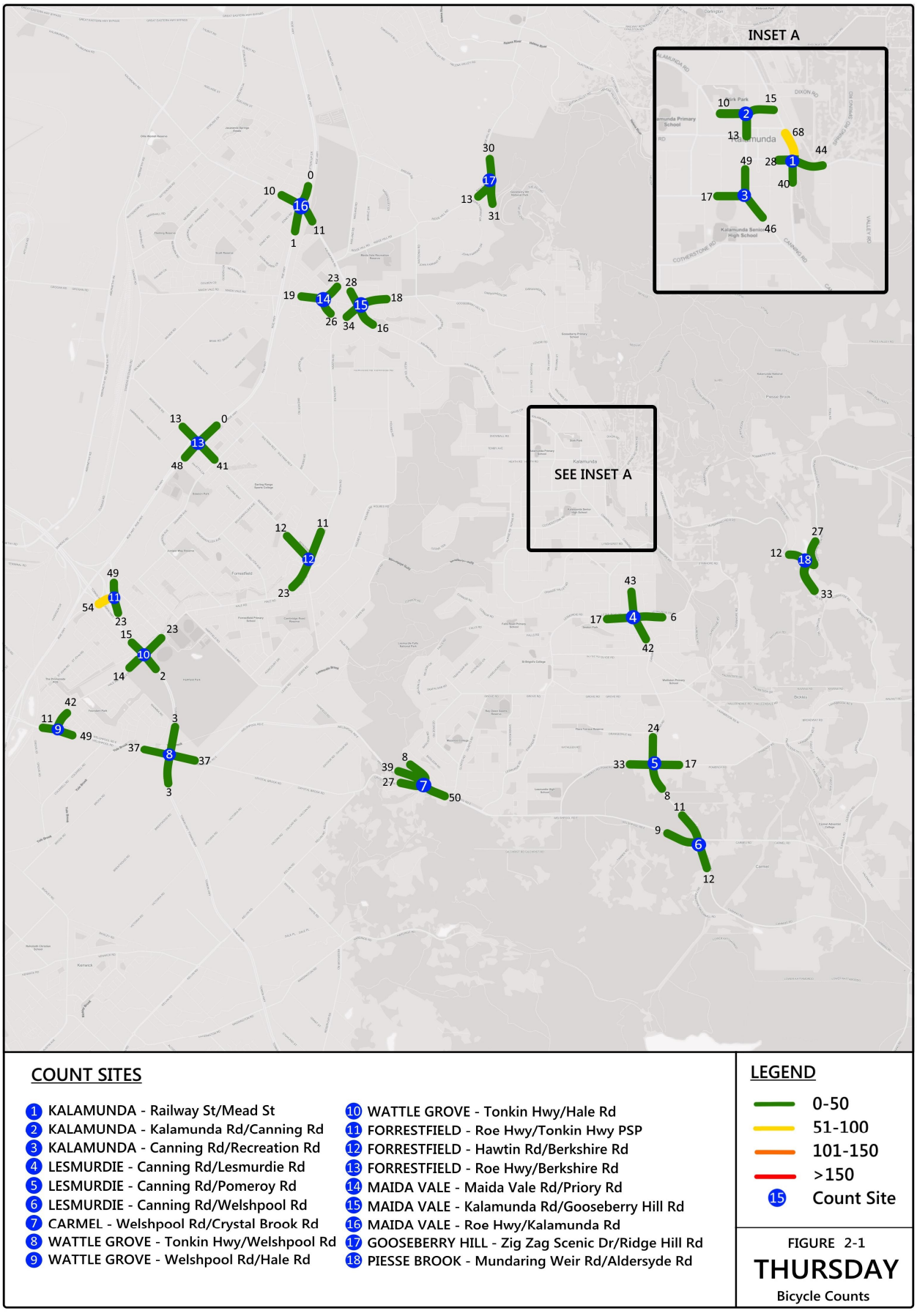


Figure 4-2 Bicycle Counts – Sunday

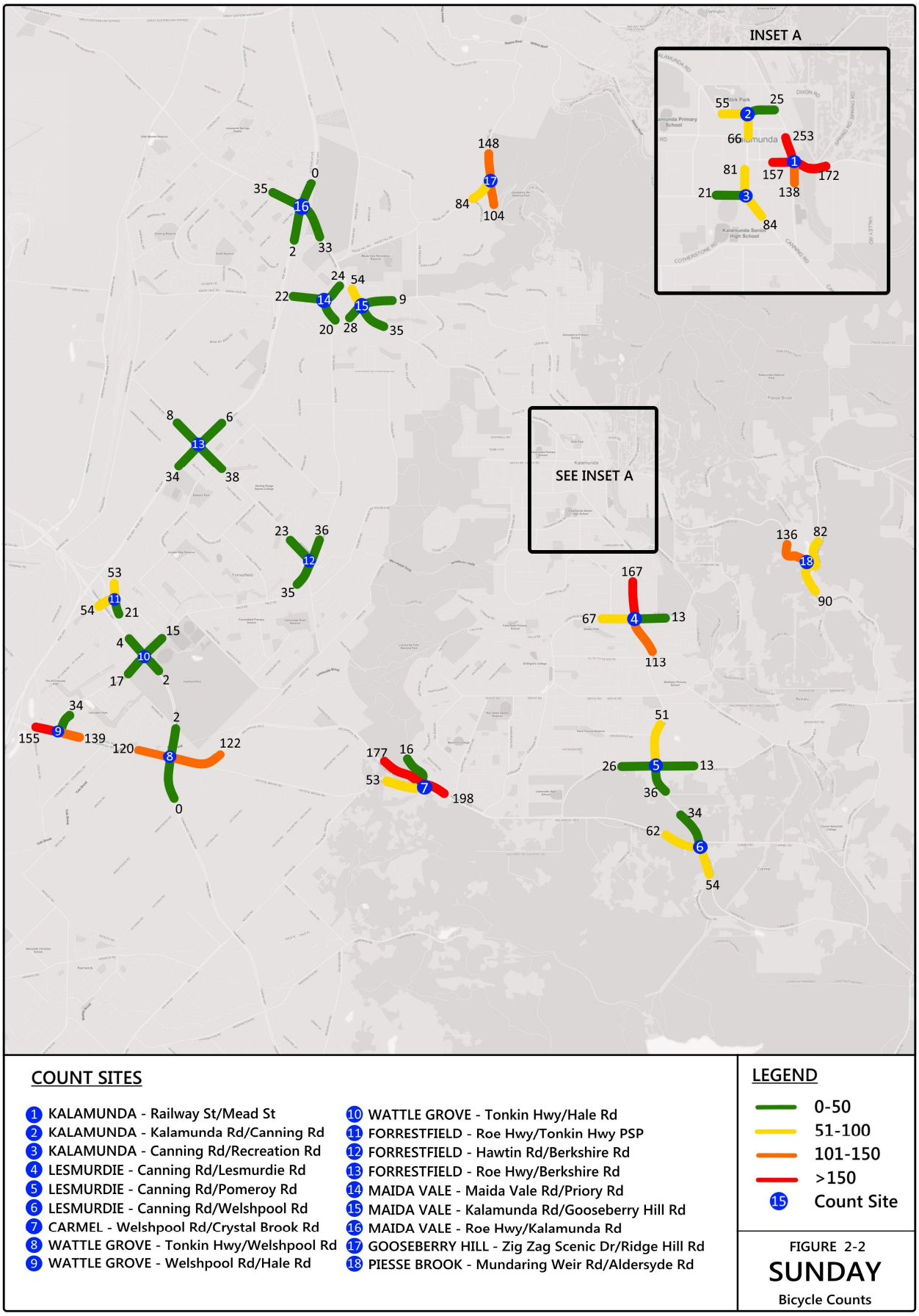
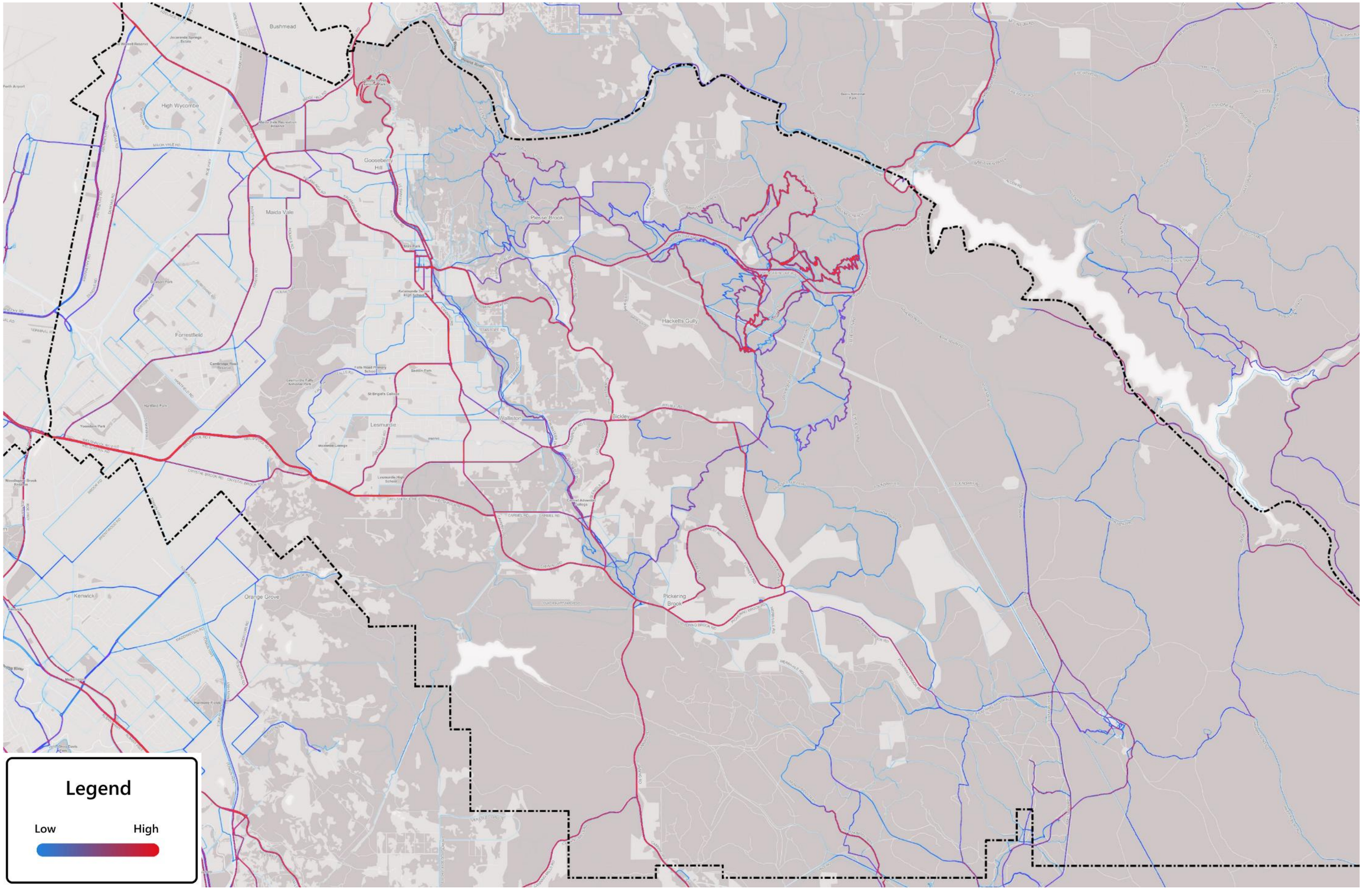


Figure 4-3 Strava Heat Map (2015)

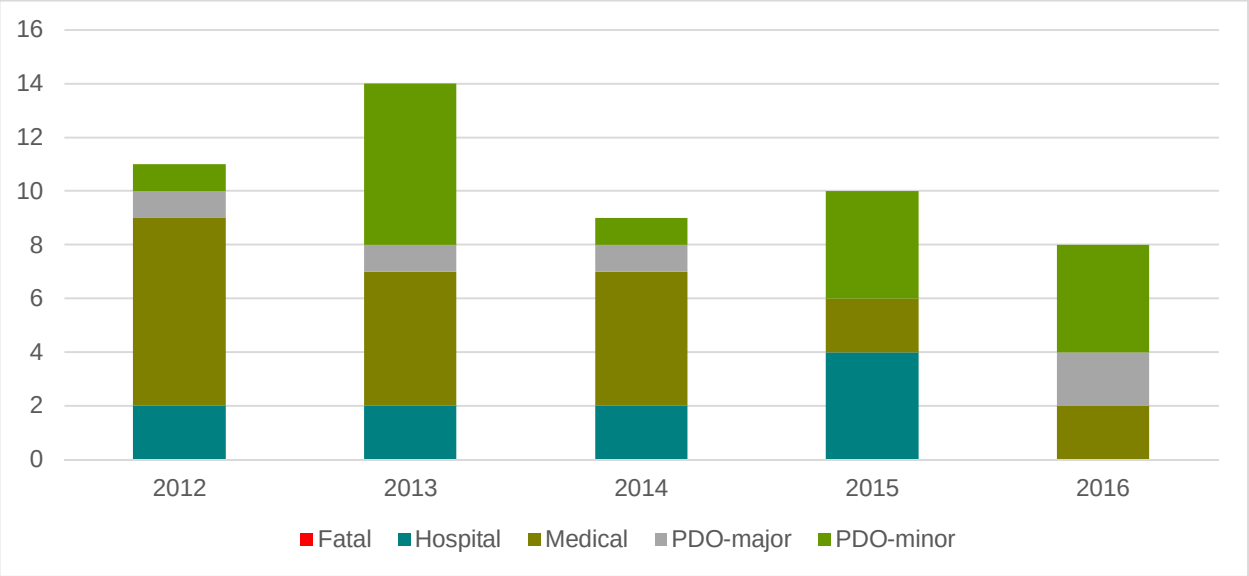


4.4 Bicycle Crash Data

A review of reported bicycle crashes from the Main Roads crash database was undertaken to identify particular locations of concern for cycling safety. Over the past five-year period from 1 January 2012 to 31 December 2016, approximately 3,300 crashes have occurred within the City, with approximately 1.6% (52 crashes) involving cyclists. The number and severity of crashes involving cyclists per year is shown in **Figure 4-4.**

Out of a total of 52 crashes, 60% of crashes required medical attention or hospital treatment. No fatalities were recorded in the five-year period from 1 January 2012 to 31 December 2016.

Figure 4-4 Number and Severity of Crashes Involving Bicycles



The number of crashes over the five-year period do not fluctuate significantly. With the exception of the year 2013, the total number of crashes have remained relatively stable, although it is noted that there were no crashes requiring hospitalisation in 2016.

The number of reported crashes includes only 3 single-vehicle (i.e. bicycle only) crashes – i.e. 49 of the 52 crashes involved motor vehicles. It is likely that other single-vehicle (bicycle only) crashes may not have been reported, particularly if hospitalisation was not required.

The locations of reported bicycle crashes are plotted in **Figure 4-5**. This location plan illustrates one very significant crash cluster at the Welshpool Road East / Lesmurdie Road intersection and several smaller clusters at the following locations:

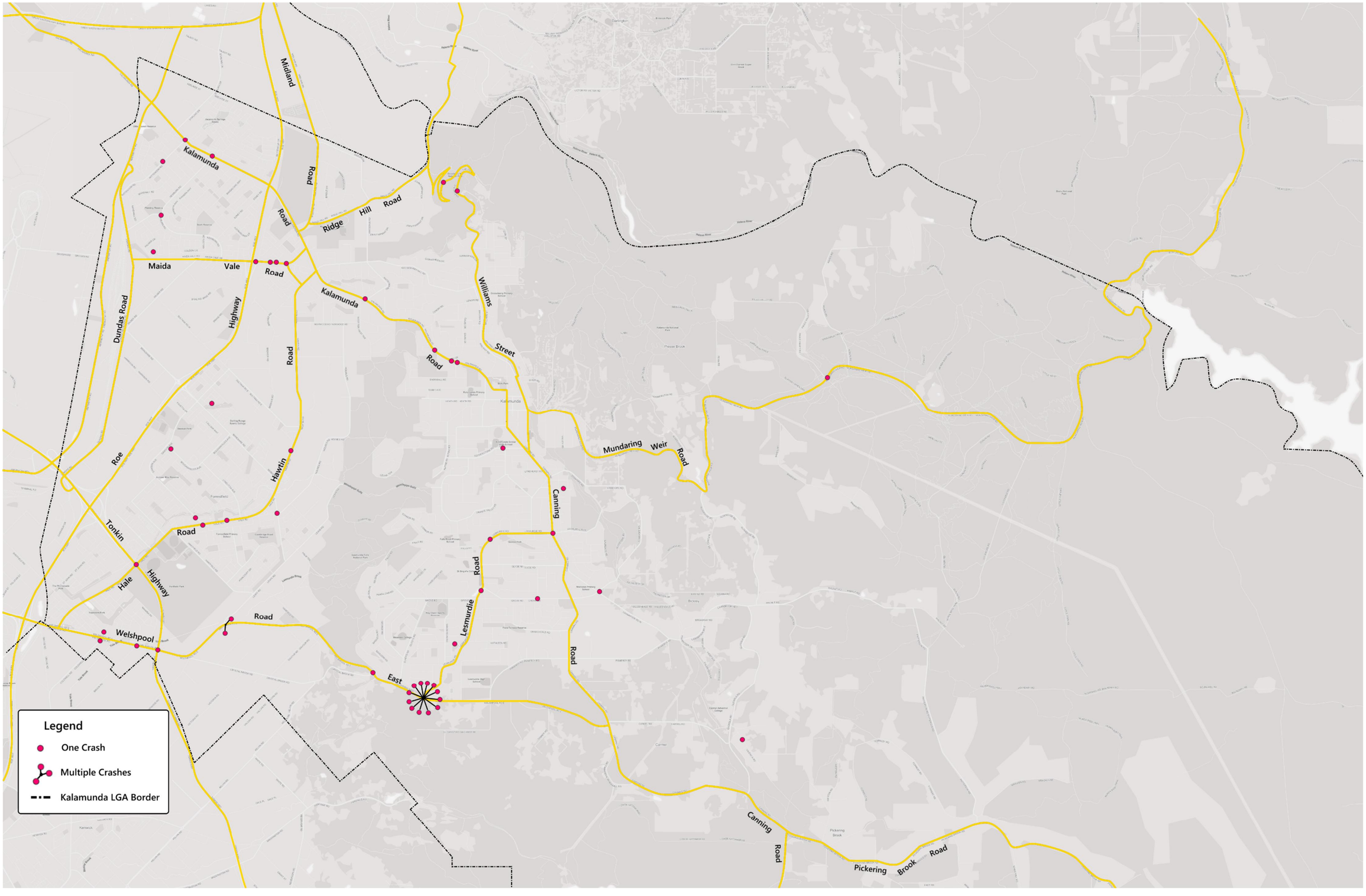
> Welshpool Road East between Coldwell Road and Tonkin Highway

> Maida Vale Road between Roe Highway and Priory Road

> Kalamunda Road between Fayes Crescent and Mt Emilies Road

The most significant crash cluster at Welshpool Road East / Lesmurdie Road intersection includes 12 crashes, which is nearly 25% of the total reported bicycle crashes in the entire City. A reconfiguration of this intersection was undertaken in 2014/15 with the aim of improving safety for cyclists using the intersection; however 5 crashes have occurred since the works were completed in March 2015 which indicates that the works were not effective at addressing the safety risks. Further discussion of this location is included at **Section 7.6.2**.

Figure 4-5 Location of Bicycle Crashes



5 Site Analysis

5.1 Land Use and Attractors

The main land use and attractors within the City are summarised in **Table 5-1** and illustrated in **Figure 5-1**. Key land uses and attractors outside of the City are summarised in **Table 5-2**.

Table 5-1 Key Attractors within Kalamunda

Key Attractor	Description
Kalamunda town centre	The City's major centre
Forrestfield	Major local attractor including town centre, industrial area (west of Roe Highway) and major high school.
Forrestfield North	New railway station and future TOD.
Kalamunda Mountain Bike Trails Hub	Located between Kalamunda and Mundaring is a series of mountain bike trail hubs which are significant attractors of cyclists from outside the LGA. While most mountain bikers would not ride all the way to the trail hubs, there is the opportunity to encourage local residents and cycle tourists to do so.
Bickley Valley / Pickering Brook	Semi-rural / rural type local roads with low traffic volumes and hills, which attract training riders.

Table 5-2 Key Attractors outside Kalamunda

Key Attractor	Description
Midland	The closest major Activity Centre to the City. Includes major retail, employment, health and education facilities.
Kewdale / Welshpool	Major industrial employment centre.
Perth Airport	Major industrial employment centre.
Perth CBD	Major office-based employment centre. Located beyond the 5-10km comfortable cycling distance, however cycling can be used as part of a trip-chain via the future Forrestfield Station.
Maddington / Kenwick	A future major industrial area located adjacent to the City's southern boundary – potential significant employer within comfortable cycling distance from residents of Forrestfield and Wattle Grove

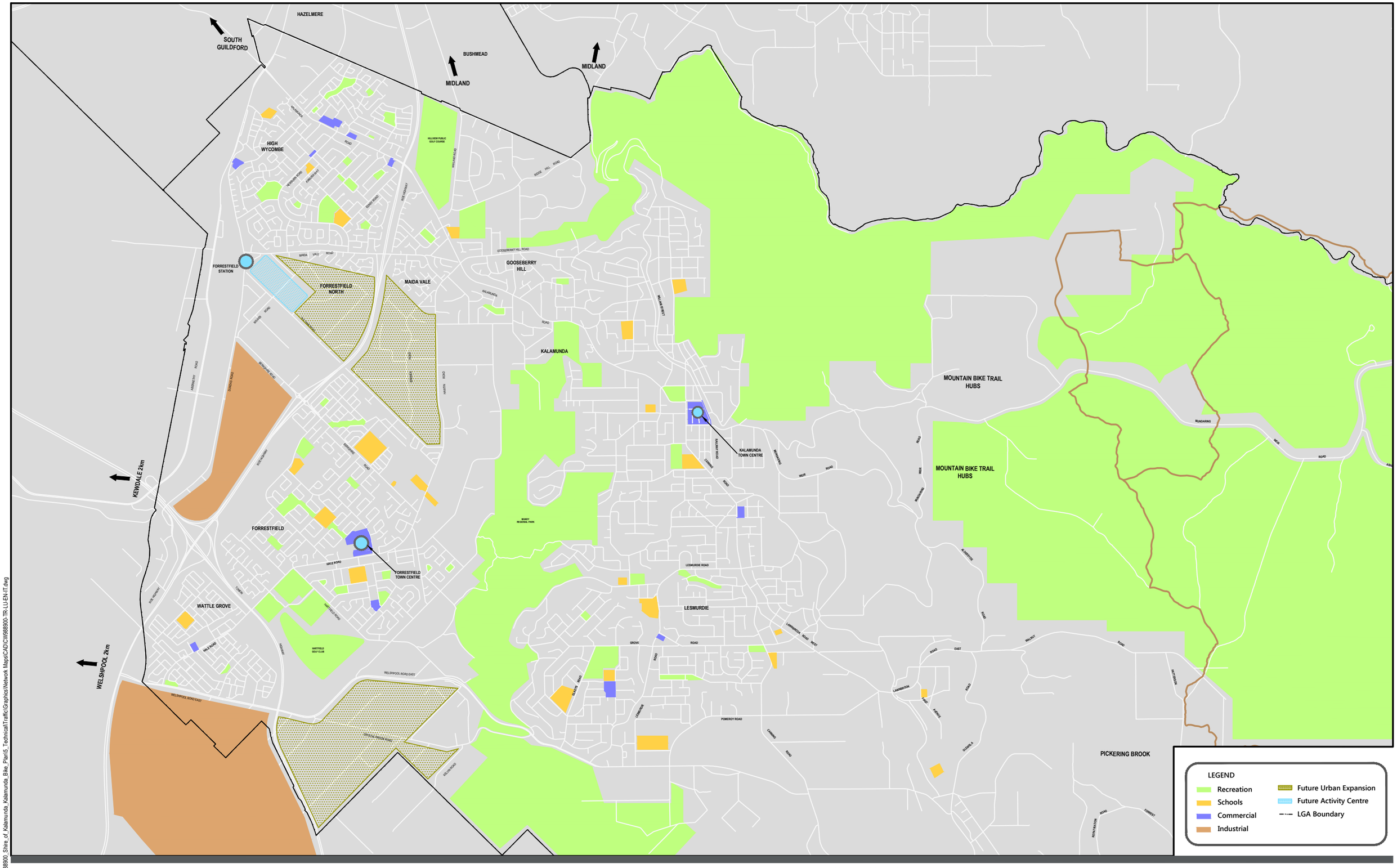
Several significant land uses changes are planned in the City. These include:

> Forrestfield North District Structure Plan and Transit Oriented Development (TOD) for the Forrestfield Train Station

> Maida Vale South future urban expansion area

> Wattle Grove East future urban expansion area

These changes are being developed over the next 20 years with planning currently underway for the Forrestfield North District Structure Plan.



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CITY OF KALAMUNDA
BICYCLE PLAN
FIGURE 5-1
LAND USE AND ATTRACTORS

Date	Scale	Size
13.11.2017	NTS	A3
CW988900-TR-LU		B
Drawing Number		Revision

5.2 Previous Network Planning

The Eastern Metropolitan Regional Council (EMRC) prepared a comprehensive Regional Cycle Network Masterplan in 2010/11, which included the City of Kalamunda, sitting within the context of the Eastern Metropolitan Region as a whole.

The underlying analysis in this document is still valid and has been used as a basis for informing the development of this Bicycle Plan, updated as necessary to account for significant changes in transport and land use planning which have arisen over the past 5 years.

The most significant change between 2010 and 2017 has been a marked improvement in design standards and the quality of infrastructure proposed, funded and constructed in Perth, as well as the emergence of concepts such as Safe Active Streets. This Bicycle Plan builds on the previous work but approaches the provision of infrastructure from a best practice perspective.

5.3 Existing Cycling Infrastructure

The existing walking and cycling infrastructure within the City is presented in **Figure 5-2** through to **Figure 5-6**. These plans show all existing footpaths, shared paths and on-road facilities (typically sealed shoulders) as noted in the City's asset database.

Comprehensive desktop and field reviews were undertaken of the existing cycling infrastructure that confirmed that the existing level of provision is very low when compared to best practice, as well as in comparison to other Local Governments in Perth.

Particular issues with the existing network include:

> Narrow footpaths and shared paths, typically located at the back of kerb with no separation from traffic.

> Paths have been constructed to follow the edge of the road kerb and kerb ramps are typically provided at the narrowest crossing point, which is often 10-12m back from the intersection (and from the desire lines). This type of path and crossing alignment is undesirable for cyclists as they must take their eyes off approaching traffic in order to navigate the tight bends in the path and often cannot clearly see approaching traffic due to the angle of approach to the crossing points. The constant tight bends also make riding along such paths very slow and hard to ride, discouraging less confident cyclists from taking up cycling.

> Minimal on-road dedicated space for cyclists, both on urban roads and rural-type roads. Many of the rural-type roads (e.g. Hawtin Road) lack sealed shoulders, which make them intimidating for less confident or solo cyclists.

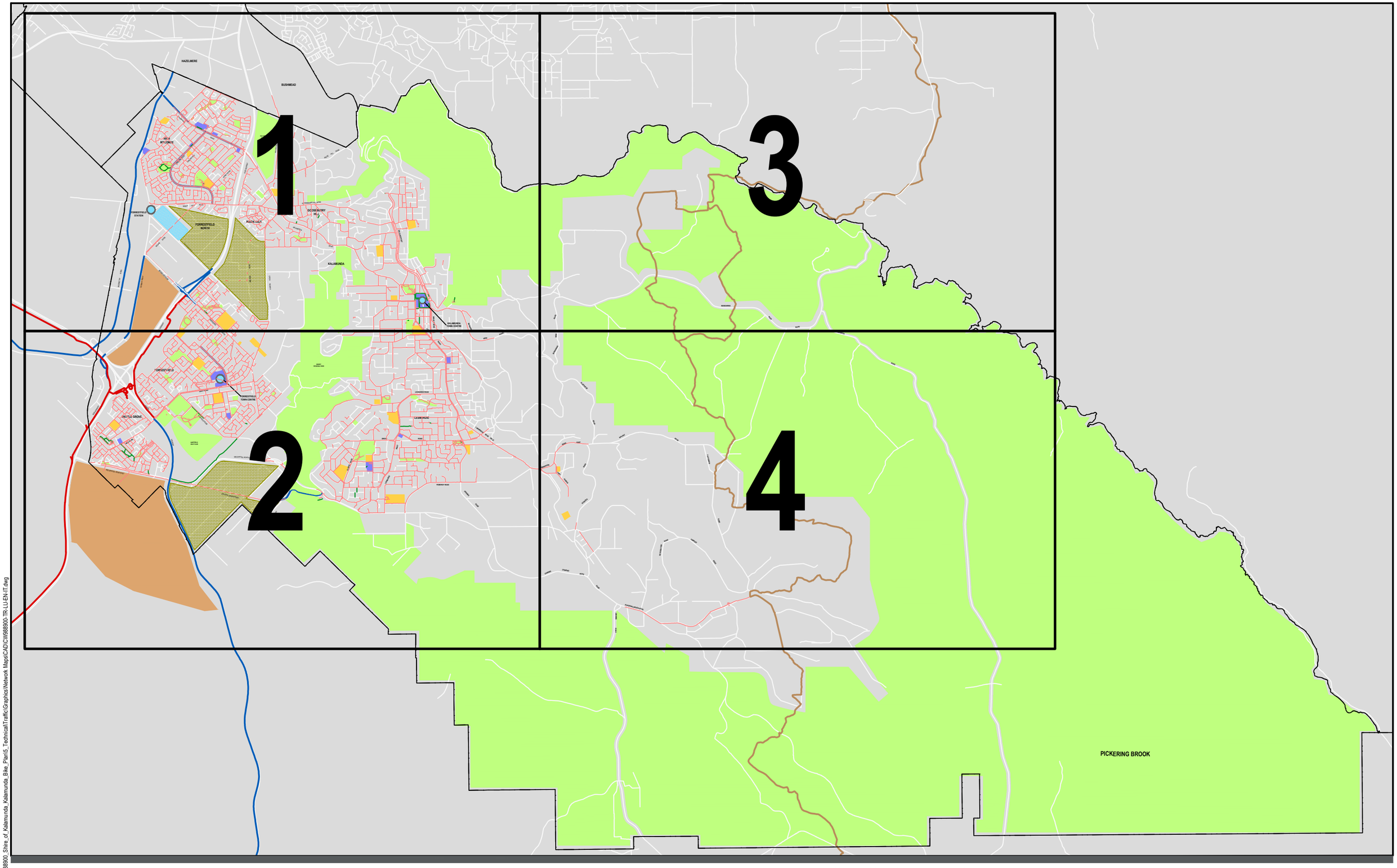
> Traffic calming measures on many streets (e.g. Lillian Road, Brewer Road) push drivers further to the edge of the carriageway where cyclists are riding and make it difficult to safely overtake cyclists.

Some sections of the existing cycling network are of a medium to high standard, or offer significant opportunities for conversion into high quality routes by implementing best practice types of treatments. These include:

> Roe Highway and Tonkin Highway (existing and future PSPs).

> Zig Zag (opportunity for two-way cycling access to create a Secondary Route between Midland and Kalamunda)

> Training routes in the Pickering Brook and Bickley Valley areas (existing rural roads with low traffic volumes)



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CITY OF KALAMUNDA

BICYCLE PLAN

FIGURE 5-2

EXISTING WALKING & CYCLING NETWORK

OVERALL MAP

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13.11.2017	NTS	A3
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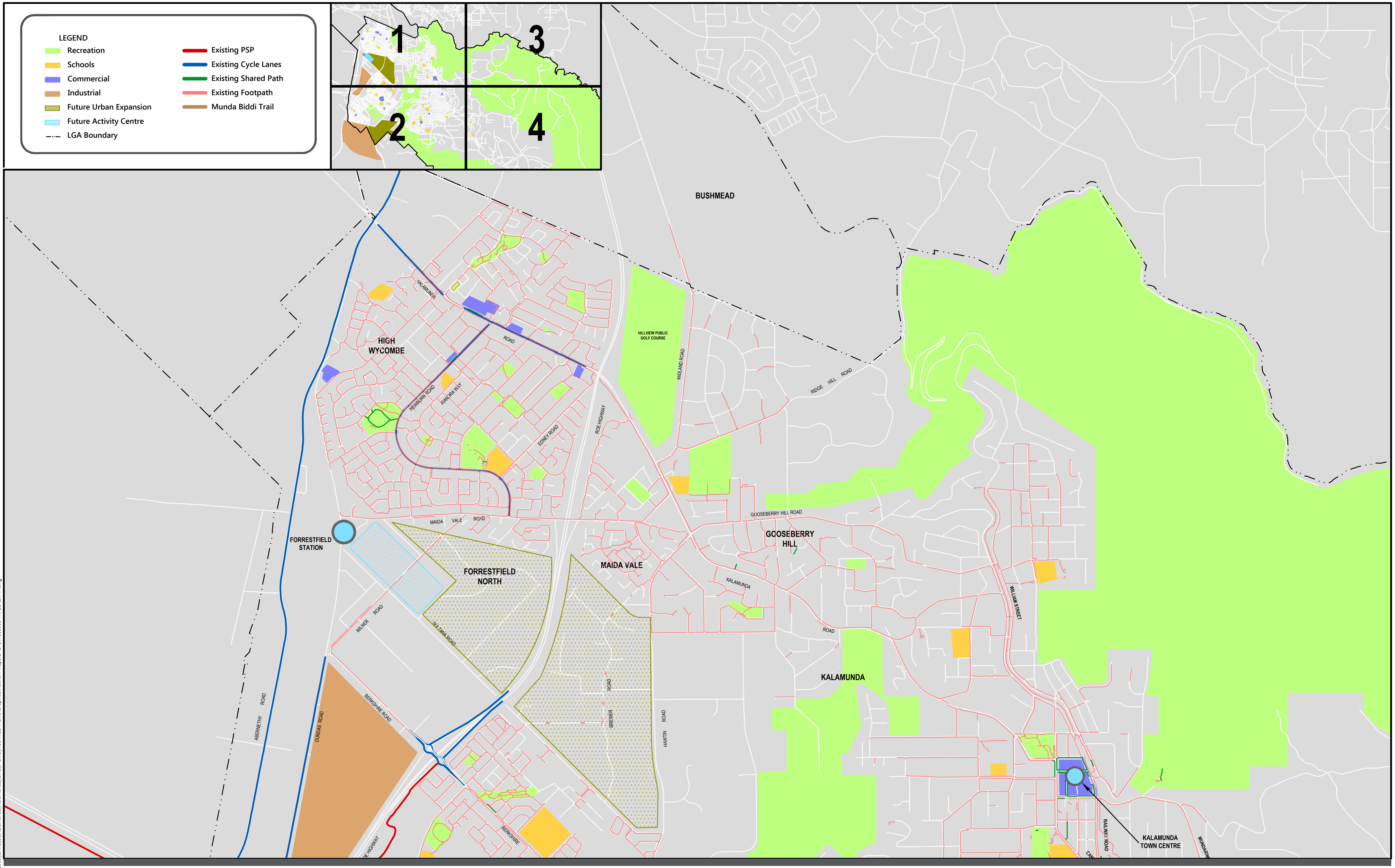
Drawing Number		Revision


LEGEND
Recreation
Schools
Commercial
Industrial
Future Urban Expansion
Future Activity Centre
LGA Boundary
Existing PSP
Existing Cycle Lanes
Existing Shared Path
Existing Footpath
Munda Biddi Trail
1
2
3
4
BUSHMEAD
HIGH WYCOMBE
HILLVIEW PUBLIC GOLF COURSE
MIDLAND ROAD
RIDGE HILL ROAD
ROE HIGHWAY
KALAMUNDA ROAD
NEWBURN ROAD
KIANDRA WAY
EDNEY ROAD
MAIDA VALE ROAD
GOOSEBERRY HILL ROAD
GOOSEBERRY HILL
FORRESTFIELD STATION
FORRESTFIELD NORTH
MAIDA VALE
KALAMUNDA
WILLIAM STREET
MILNER ROAD
SULTANA ROAD
BERKSHIRE ROAD
ABERNETHY ROAD
DUNDAS ROAD
BREWER ROAD
HAWTIN ROAD
RAILWAY ROAD
KALAMUNDA TOWN CENTRE

CITY OF KALAMUNDA

BICYCLE PLAN

FIGURE 5-3

EXISTING WALKING & CYCLING NETWORK

QUADRANT 1

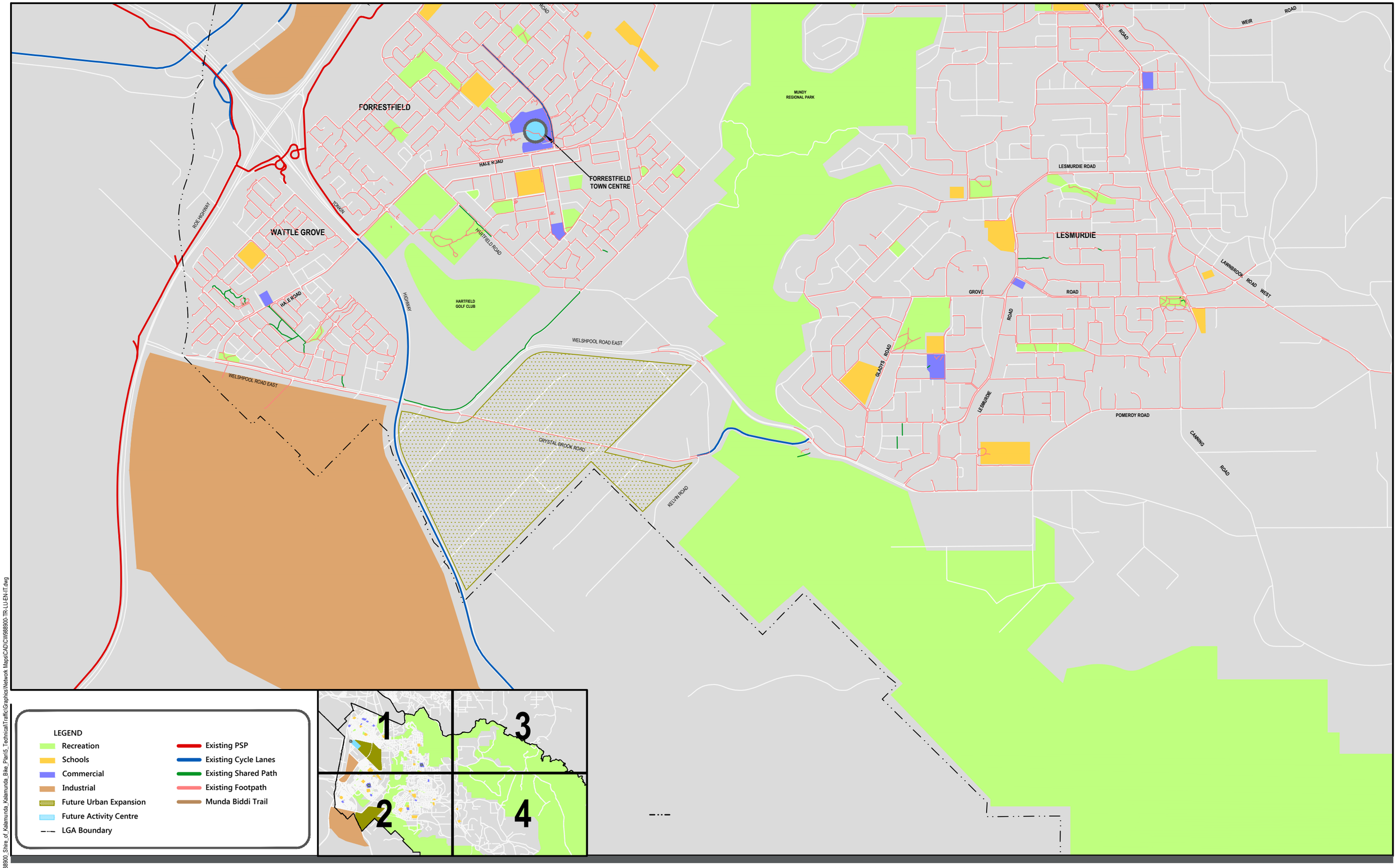
Date	Scale	Size
13.11.2017	NTS	A3

CW988900-TR-EN1

Drawing Number

B

Revision



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CITY OF KALAMUNDA
BICYCLE PLAN
FIGURE 5-4
EXISTING WALKING & CYCLING NETWORK
QUADRANT 2

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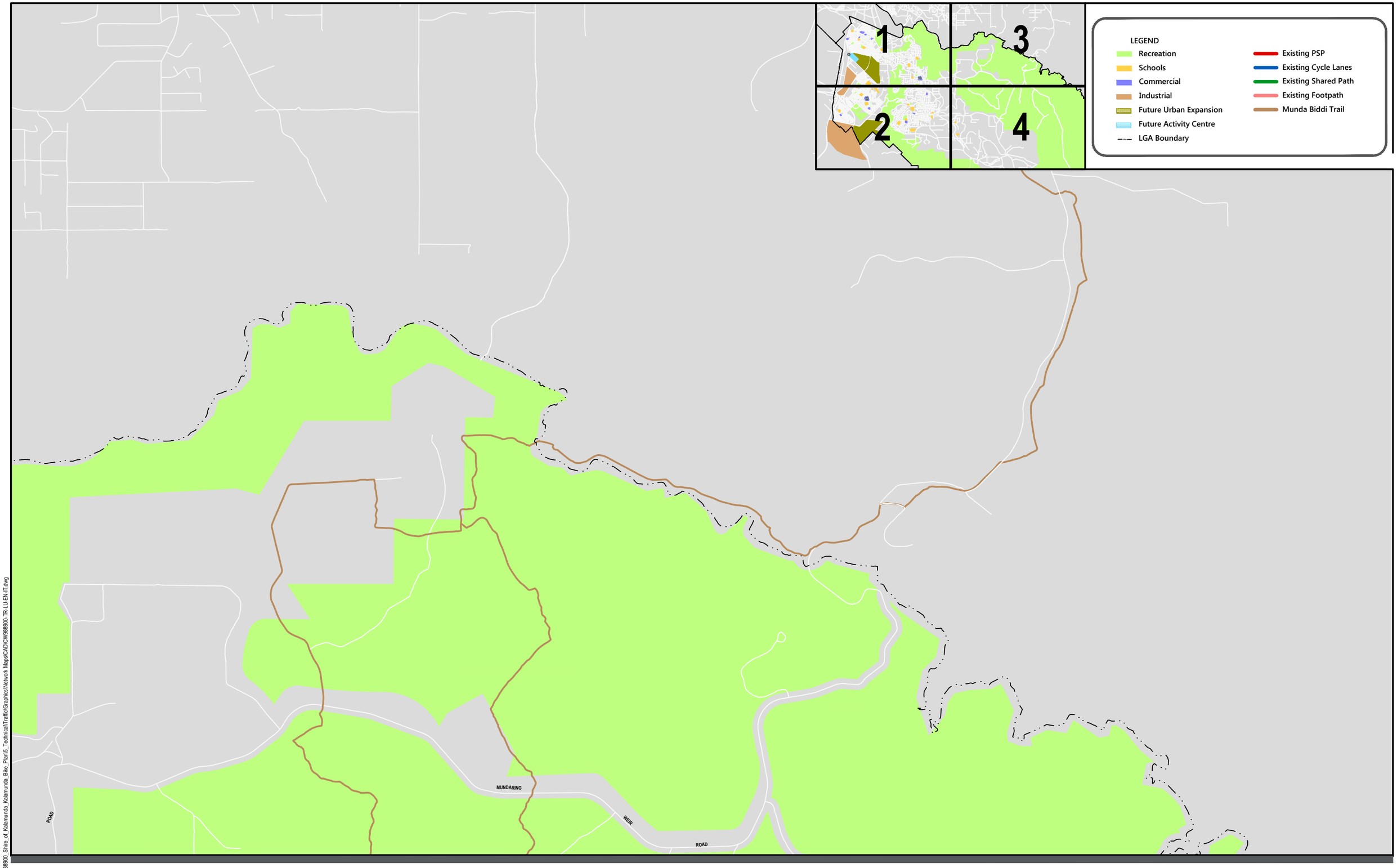
Drawing Number		Revision



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CITY OF KALAMUNDA
BICYCLE PLAN
FIGURE 5-5
EXISTING WALKING & CYCLING NETWORK
QUADRANT 3

Date	Scale	Size
13.11.2017	NTS	A3
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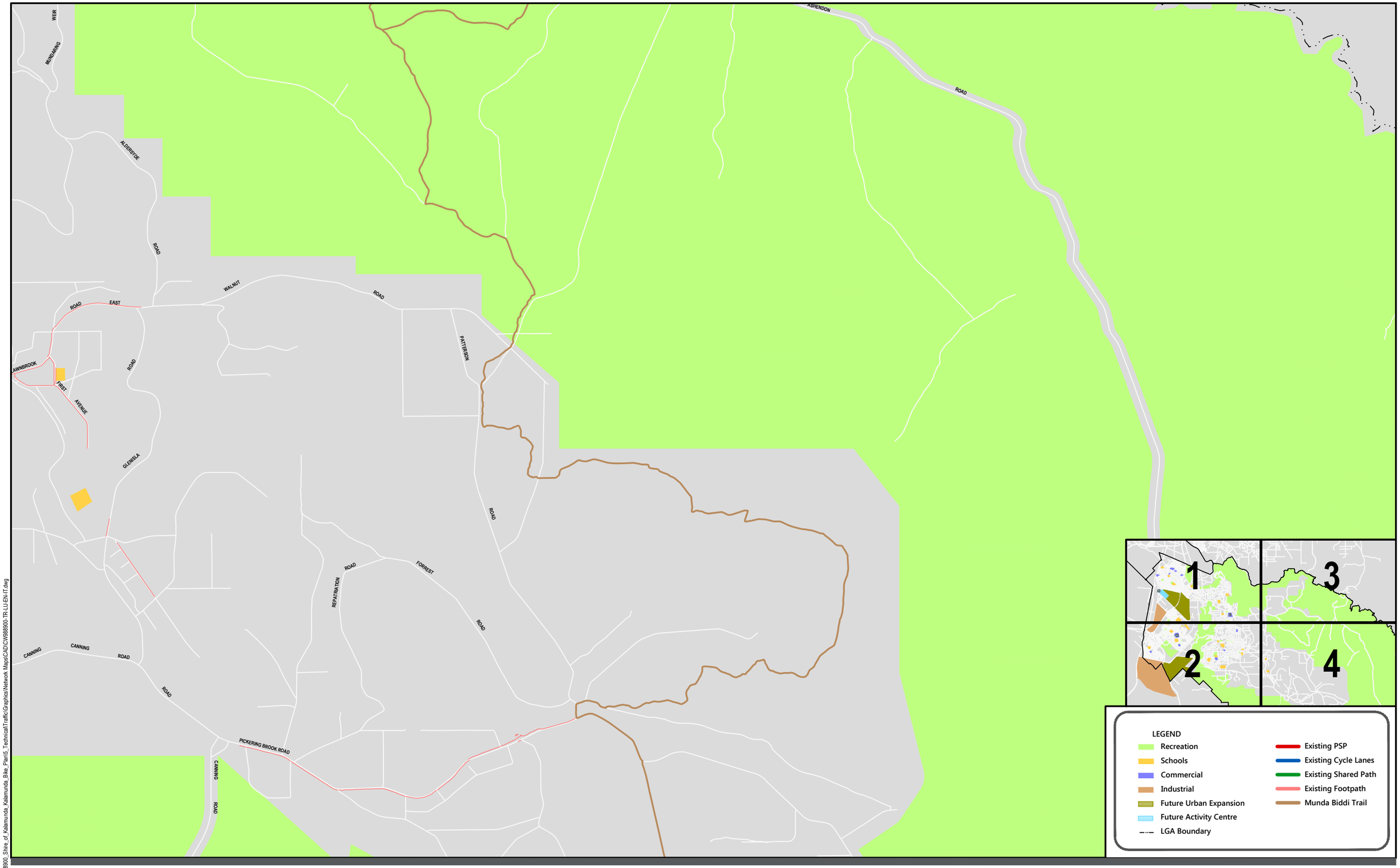

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CITY OF KALAMUNDA

BICYCLE PLAN

FIGURE 5-6

EXISTING WALKING & CYCLING NETWORK

QUADRANT 4

Date	Scale	Size
13.11.2017	NTS	A3

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Drawing Number

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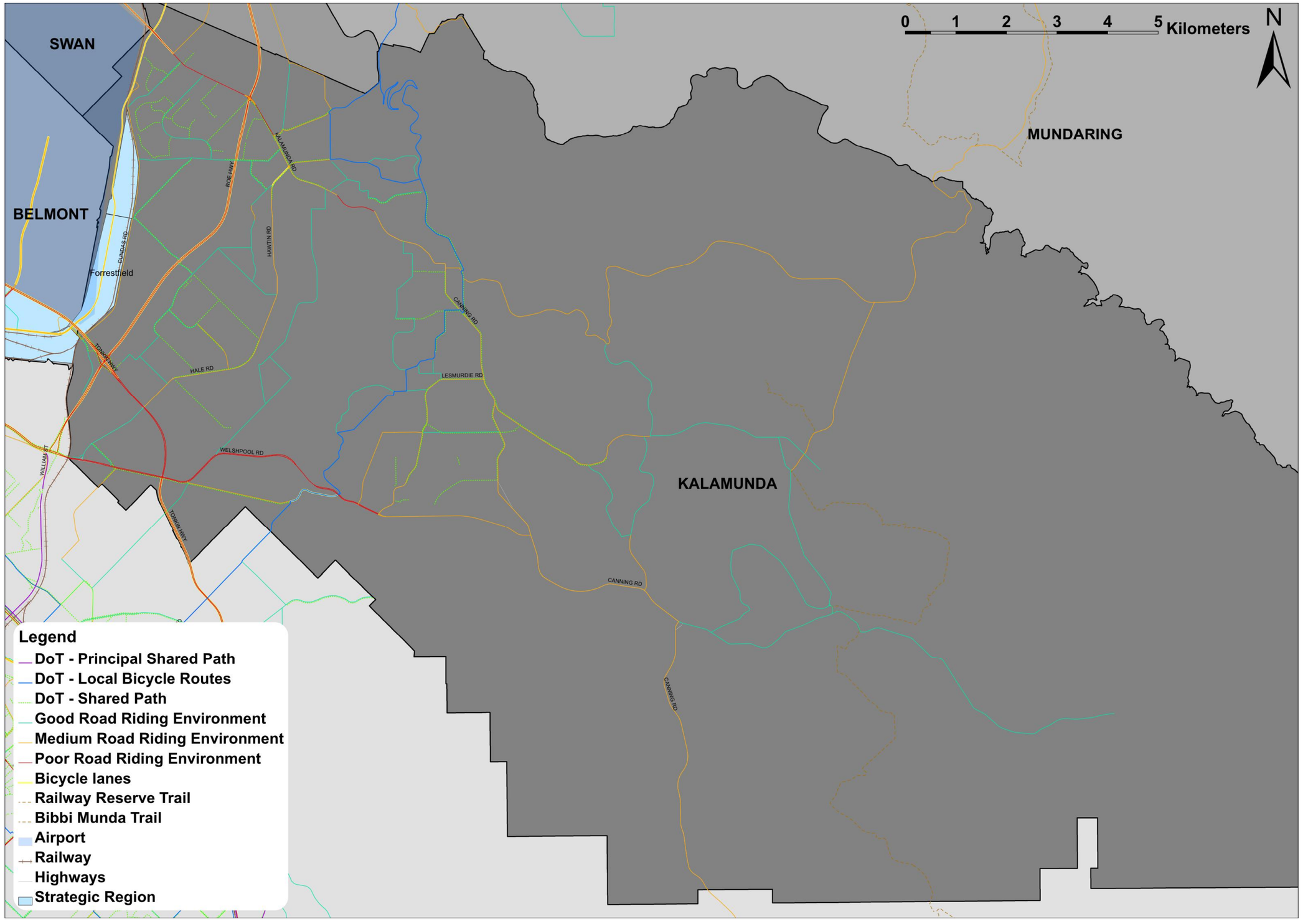
Revision

As part of the Regional Cycle Network Masterplan, EMRC identified a network of Strategic Cycling Links within the City, as shown in **Figure 5-7**. These links were revised as part of the development of this Plan and compared against existing infrastructure and land use patterns. The revised list of existing Strategic Cycling Links is summarised in **Table 5-3**.

Table 5-3 Existing Strategic Cycling Links

Route	Description
Roe Highway and Tonkin Highway PSPs	New facilities located at the far south western edge of the LGA with planned extensions south towards Gosnells and north towards Midland.
Midland – Helena Valley – Zig Zag – Kalamunda	No bicycle facilities. Mainly used by training riders and only in a northbound direction (Zig Zag is one-way northbound). Significant opportunities to develop this route for two-way commuter, recreation, tourism and training cycling.
Canning Road (Kalamunda – Carmel)	Central spine for the Hills section of the City. No dedicated facilities.
Kalamunda Road	Mainly used by training riders to access the Hills section of the City. Heavy traffic volumes and no dedicated facilities.
Welshpool Road East / Canning Road	Mainly used by training riders to access the Hills section of the City. RAV route with passing lanes on Lesmurdie Hill but no shoulders on other sections of the route.
Mundaring Weir Road	No Facilities. Mainly used by training riders. Connects Kalamunda with the mountain bike trail hubs, Beelu National Park picnic sites, and the Mundaring Weir Dam.
Bickley Valley / Pickering Brook	A series of local rural-type roads with low traffic and hills which are heavily used by training riders.
PBN Route SE3	Connection between Maddington and Midvale via Lesmurdie, Kalamunda and Zig Zag. Has never been developed with dedicated infrastructure and is not heavily used, particularly through Lesmurdie section.

Figure 5-7 Existing Strategic Cycling Links



Source: EMRC Regional Cycle Network Masterplan

5.4 Network Planning

Planning of the ultimate cycling network in the City has been guided by best practice principles of planning transport networks of identifying key trip attractors and generators and linking them together with infrastructure types suitable for the target demographics.

Once the main cycling corridors were identified, the route hierarchy and a gap analysis of the existing network informed the determination of appropriate infrastructure types for each corridor. The infrastructure types are intended to match the needs of the 'Interested but Concerned' segment of the cycling population (refer to Roger Geller's Cycling Segmentation in **Section 11.1**) for whom a safety and separation from vehicles, except at low speed, is of critical importance. The network plan also caters for the ongoing needs of training riders who cycle throughout the City and the nominated infrastructure types are selected so as not to exclude these groups from using the routes.

The proposed Ultimate Cycling Network Route Hierarchy for the City is illustrated in **Figure 7-1** This Network is presented in a Route Hierarchy format that is consistent with the strategic planning work being undertaken by Department of Transport (DoT). This ensures that the Kalamunda Bicycle Plan sits neatly within the overall network planning for the Perth and Peel Region. The Transport Plan @ 3.5 Million Cycle Network will be updated with the endorsed routes outlines in this bike plan.

The corridors that form part of the Ultimate Cycling Network are outlined in detailed in **Section 6**.

6 Route Hierarchy

Cycling infrastructure proposed for the City of Kalamunda will be categorised under the hierarchy shown in **Table 6-1.** Infrastructure for all route hierarchy should be designed for the 8 to 80 age group, except for training circuit, which should be designed for confident cyclists. Examples are provided for context only and the preferred built form will be determined following detailed analysis of each route.

Table 6-1 Route Hierarchy

Hierarchy	Colour Coding	Function	Built Form	Design Infrastructure For:	Examples
Primary Route	RED	Primary routes are high demand corridors that connect to major destinations. They provide high quality, safe, convenient (and where possible uninterrupted) routes that form the spine of the cycle network. These routes are conducive to medium or long distance commuting/utility, recreational, training and tourism trips	Primary routes are high quality cycle only or shared paths, located adjacent to major roads, rail corridors, rivers and ocean foreshores. Where the environment allows, these are in the form of a Principal Shared Path (PSP). A PSP is a fully lit and separated facility. In locations where vehicles have been grade separated the cycle route will also be grade separated. PSPs are to be designed in accordance with the WA Transport Portfolio's PSP Policy.	'8-80' group	    
Secondary Route	BLUE	Secondary routes have a lower demand than primary routes, but provide similar levels of quality, safety and convenience. These routes provide connections between primary routes and major activity centres such as shopping precincts, industrial areas or major health, education, sporting and civic facilities.	Secondary routes can take on a number of forms and are designed to suit the environment in which they are located. These forms include: ▪ High quality shared paths; ▪ Bi-directional protected bike lanes; ▪ Protected on-road bike lanes; and Safe Active Streets (Bicycle Boulevards).	'8-80' group	    
Local Routes	GREEN	Local routes are low demand and are predominantly located in local residential areas. They provide access to higher order routes and local amenities and recreational spaces.	Local routes can take on various forms depending on the environment in which they are located. These forms include: ▪ Shared paths; ▪ Bi-directional protected bike lanes; ▪ Protected on road bike lanes; and Safe Active Streets (Bicycle Boulevards).	'8-80' group	    

Hierarchy	Colour Coding	Function	Built Form	Design Infrastructure For:	Examples
Training Route	**YELLOW**	Training routes are designated routes for training, sports or recreational cyclists to undertake long distance rides in on-road environments	Training routes are normally located on rural or semi-rural roads on the outskirts of cities and towns. These routes support cyclists undertaking challenging longer distance rides by raising awareness and encouraging safe behaviour by all road users. This is achieved through advisory signage, warning technology and other road safety initiatives.	Confident Cyclists	    
Tourist Trail	**BROWN**	Tourist trails provide long-distance, off-road (unsealed) riding experiences through natural settings, away from motorised traffic. They often support recreational and tourism trips between regions.	Trails are typically located within underutilised transport and service corridors in rural areas. Due to their relatively gentle gradients, former railways make excellent candidates for trails. Purpose built trails may be constructed to connect existing corridors. Trails should be constructed from well drained, compacted gravel with supporting infrastructure such as way-finding signage. They can be sealed when they run through towns, busy road crossings or in special circumstances.	'8-80' group	    

7 Ultimate Network Plan

The Ultimate Network Plan for the City of Kalamunda is set out in **Figure 7-1.** The following sections outline the recommended development for each segment of the Ultimate Network.

7.1 Primary Routes

Primary Routes within the City of Kalamunda are present in the form of Principal Shared Paths (PSPs), which are also the backbone of the cycling network in Perth Metropolitan Area. These paths generally follow major controlled-access roads and railway corridors, providing high-quality direct cycling connections completely separated from road traffic.

PSPs are the construction and maintenance responsibility of MRWA, however the City has a key role in contributing to the design process to ensure optimum integration to the local cycling network. The City also has an important advocacy role in persuading the State Government to invest in extensions and upgrades.

7.1.1 Roe Highway

The Roe Highway PSP currently extends 21km from the Kwinana Freeway to Berkshire Road, with grade-separation at all intersecting roads. From Berkshire Road northward, cyclists are permitted to use the shoulder of Roe Highway however this is a very intimidating and hazardous environment for cyclists with narrow shoulders and high speed heavy vehicles. The Strava 'Heat Map' shows that even the most confident cyclists rarely use this section of Roe Highway.

Completing the Roe Highway PSP from Berkshire Road to Midland would be a game-changer for cycling transport in the foothills area, providing a safe cycling connection to the nearest Activity Centre, as well as further loop for longer distance riders travelling through the City.

It is understood that the Roe Highway / Kalamunda Road intersection will be grade-separated in the near future and this project presents an important opportunity for the completion of further sections of the Roe Highway PSP. It is recommended that the City advocate and work with the State Government to ensure that the following is included in the project:

> Grade-separation of the PSP under Kalamunda Road

> Extension of the PSP from Berkshire Road to Kalamunda Road, including an underpass at Maida Vale Road

> Extension of the PSP north from Kalamunda Road to the Brinsmead Road area, subject to a suitable connection being available to Midland Road

If these sections were completed, they would open up a significant north-south spine through the foothills, enabling easy access to the Tonkin Highway PSP and significant employment centres in the Welshpool/Kewdale/Airport area. If these sections are not included as part of the Roe Highway / Kalamunda Road interchange project, separated State Government funding would need to be obtained.

The priority of the remaining sections would be as follows:

1. Bushmead Road to Midland section – in the City of Swan but forms part of the Secondary Route from Midland to Kalamunda
2. Kalamunda Road to Bushmead Road section – in the City of Swan but would complete the link from Maida Vale to Midland.

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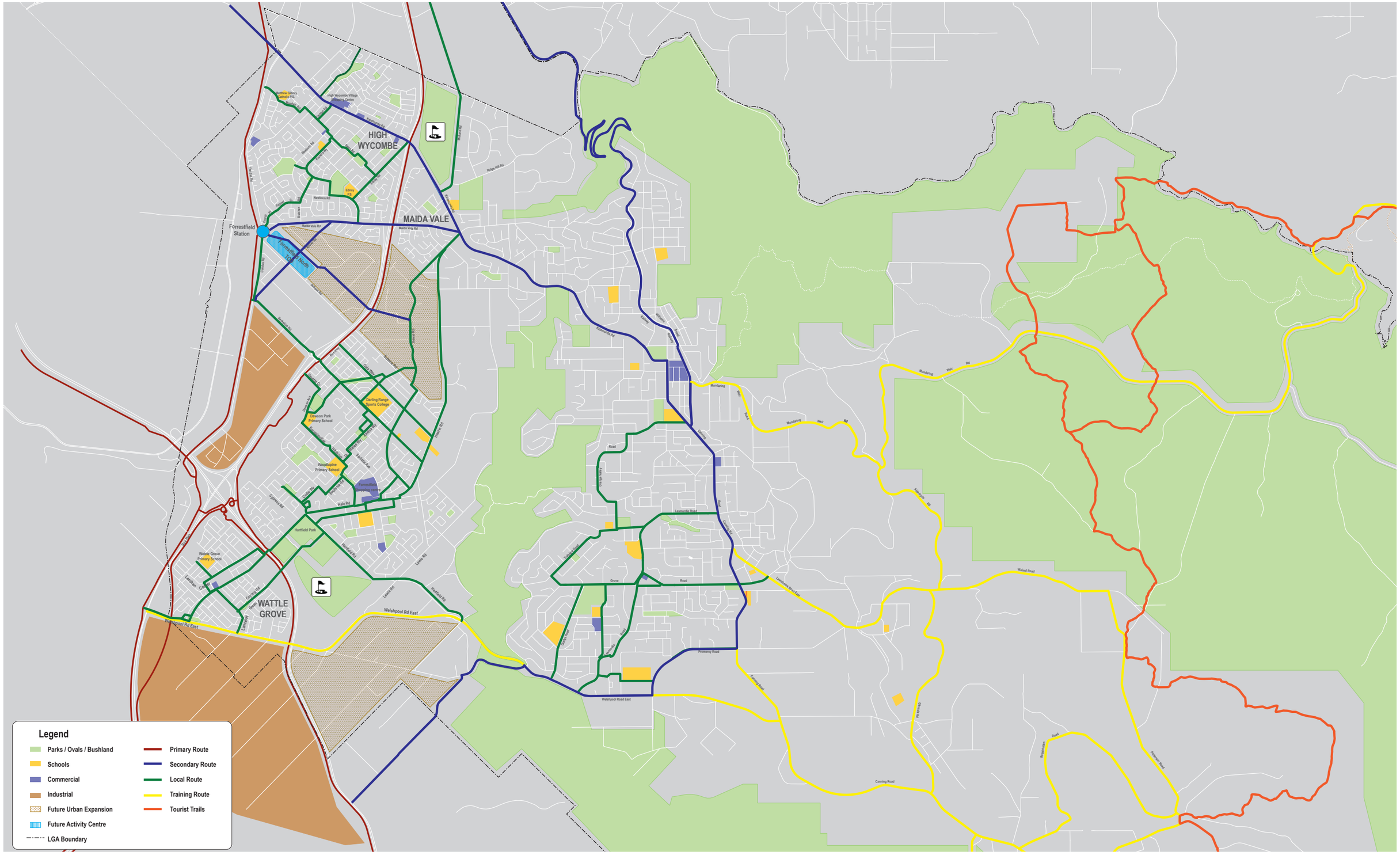


CITY OF KALAMUNDA - ULTIMATE CYCLING NETWORK (ROUTE HIERARCHY)

DATE: 15.11.2017 FIGURE: 7-1 REV B

7.1.2 Tonkin Highway

Figure 7-2 Tonkin Highway PSP – Recommended Arrangement

Tonkin Highway PSP will be a significant connection for the southern edge of the City, connecting Wattle Grove with the wider network and the significant employment areas in Maddington and Gosnells. The priorities for extension are as follows:

1. PSP along the southern side of Tonkin Highway from Roe Highway to Hale Road (parallel to Hardey East Road)
2. PSP along the southern side of Tonkin Highway connecting to the Coyong Road/Maamba Road shared paths in Wattle Grove
3. Connection across Tonkin Highway between Coyong Road/Maamba Road and Hartfield Park
4. Extension of PSP from Hale Road to Welshpool Road East
5. Extension of PSP from Welshpool Road East to Kelvin Road and beyond

The recommended arrangement for the Tonkin Highway PSP between Roe Highway and Welshpool Road East is shown in **Figure 7-2**.

7.1.3 Freight Railway / Dundas Road

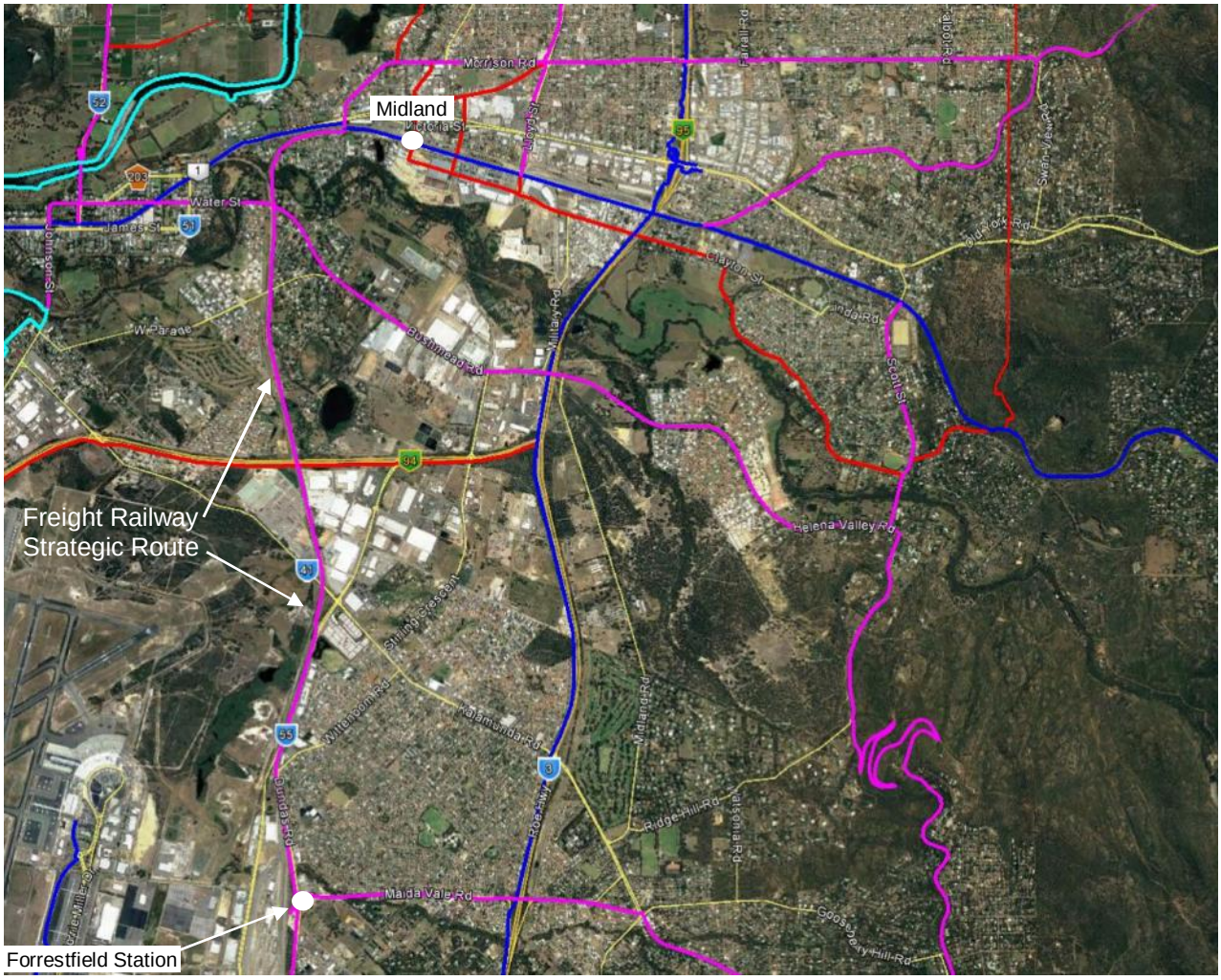
The main freight railway runs north-south along the western edge of the City, parallel to Abernethy and Dundas Roads and passing the new Forrestfield Station. Both Abernethy and Dundas Roads are heavily used by confident road cyclists at the moment; however the lack of protected infrastructure and the heavy volumes of trucks makes it a very intimidating riding environment for less confident cyclists. This is particularly the case during weekdays when most of the industrial business are operating.

With the development of the Forrestfield North TOD, there will be a significant increase in the residential population near Dundas Road and therefore a safe, convenient cycling link to the Tonkin Highway PSP and the major employment centres at Welshpool/Kewdale/Airport will be critical.

As part of the State Government's METRONET plan, a passenger railway line is identified as linking the new Forrestfield Station with the Thornlie spur and its future extension to Cockburn Central. The timing of this project is not known, however it is desirable that plans for a PSP along this rail corridor be included in any planning and design.

To the north of Forrestfield Station, the Department of Transport has included the freight railway corridor as a Secondary Route in its future planning, as shown in **Figure 7-3**. This corridor would provide a convenient link to Midland and Guildford, although is longer than a route following Abernethy Road and Lloyd Street would be. The State Government is planning for the long-term relocation of the freight railway to bypass Midland, which could open up the existing railway corridor for partial or full use for alternative transport modes such as cycling. While this section of the railway is located outside the City boundary, it is recommended that the City liaise with the City of Swan and Department of Transport to ensure that future planning takes into account the needs of Kalamunda residents and visitors.

Figure 7-3 Freight Railway Secondary Cycling Route



Source: Department of Transport

7.2 Secondary Routes

Four Secondary Routes have been nominated as the key corridors for cycling to and through the City. These routes connect the key destinations within the City with the wider cycling network and nearby Activity Centres.

7.2.1 Hills Spine (Midland – Kalamunda – Lesmurdie)

The key component of the cycling network for the hills portion of the City is a north-south spine linking Midland, Kalamunda and Lesmurdie. This spine was selected as the preferred route for many reasons, including:

> Midland is the closest major Activity Centre to the hills portion of the City, located just 11km north of Kalamunda. Midland provides employment, education and shopping facilities for City residents, as well as access to inner Perth via the Perth-Midland PSP.

> The Zig Zag is the only available crossing of the escarpment with reasonable grades for cyclists. The grades on alternative routes such as Gooseberry Hill Road, Kalamunda Road and Welshpool Road East are steep which would deter most casual and potential commuter cyclists.

> The scenic views at the Zig Zag would be a significant drawcard for recreational, training and tourist cyclists, and the ability to ride up the Zig Zag would encourage additional tourism spending within the town centre.

> Canning Road runs north-south along the main ridgeline and could generally be widened to provide buffered bike lanes at a feasible cost. The Canning Road corridor also serves Kalamunda State High School, Kalamunda Christian School and Lesmurdie State High School (via Pomeroy Road).

> It would allow mountain-bikers a convenient, safe route to access the mountain bike trails without having to mixing with heavy traffic on Kalamunda Road.

The recommended concept for the Hills Spine is shown in **Figure 7-4** and includes the following key elements within the City:

> Two-way bicycle access via Zig Zag Scenic Drive;

> Safe Active Street treatment between the top of Zig Zag and Hill Street;

> Upgrade of the Kalamunda Railway Heritage Trail to a high-quality shared path standard from Hill Street to Elizabeth Street;

> Multiple options for the link through Kalamunda Town Centre between Elizabeth Street and the southern end of Railway Road;

> Protected cycle lanes along Railway Road from Mead Street to Canning Road;

> Buffered cycle lanes along Canning Road from Railway Road to Pomeroy Road;

> Existing shared path on Pomeroy Road to connect to Lesmurdie State High School.

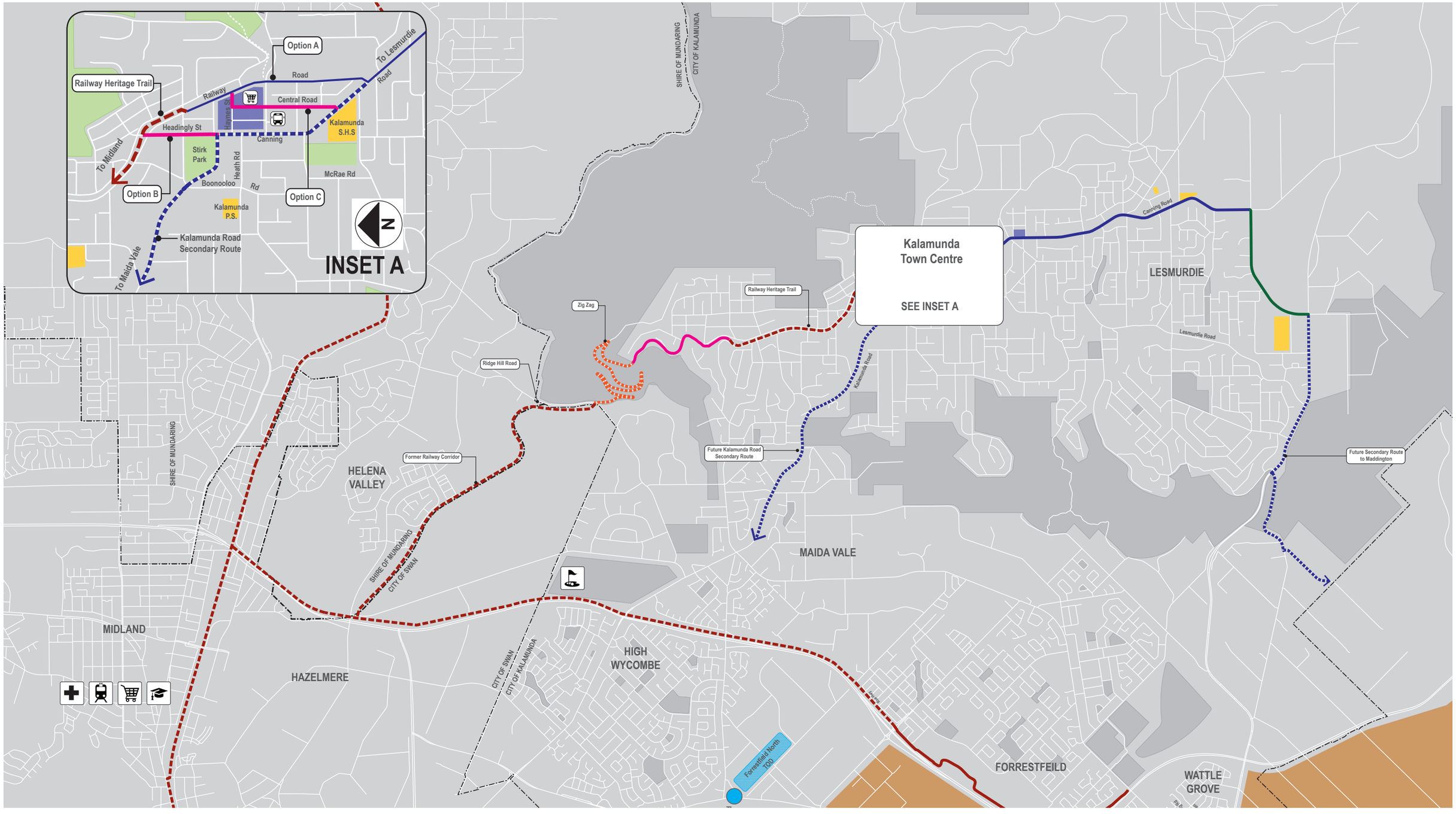
Each of these elements is discussed in more detail in the following sections.

7.2.1.1 Midland to Zig Zag

This portion of the route is located outside the City of Kalamunda and will be the primary responsibility of the Department of Transport, Main Roads (for the PSP portion) and City of Swan to develop. However, its existence is critical for the success of the route as a whole. City of Swan has been consulted and preliminary indication shows that the City of Swan do not object the proposal, however support would be contingent on their own cycle network review that is slated to start in the 2017 -2018 timeframe.

Commencing from Midland Train Station, the indicative route follows the proposed PSP extension along the railway line to Roe Highway, then following the proposed Roe Highway south to the Bushmead Road / Helena Valley Road / Midland Road intersection.

From this point, the former railway reserve (Lots 7894 and 6726 – owned by the State Government and under the management of the City of Swan) could be utilised to develop a PSP-standard link to Ridge Hill



Infrastructure Type

- Existing PSP
- Future PSP
- Proposed Protected Bike Lane
- Existing 1.8m - 2m Wide Footpath
- Proposed Safe Active Street

Connecting Routes

- Future Secondary Route
- Zig Zag

Land Use

- Shopping Centre
- Schools
- Parks / Oval / Bushland
- Industrial

Kalamunda Town Centre Options

- (A) Railway Road
- (B) Headingly Street
- (C) Central Road / Central Mall

CITY OF KALAMUNDA - HILLS SPINE SECONDARY ROUTE (Midland - Kalamunda - Lesmurdie)

DATE: 15.11.2017 FIGURE: 7-4 REV B

Road, which would save 1.0-1.2km in distance compared to following Helena Valley Road. This link would serve both Bushmead and Helena Valley residential areas with appropriate connections to existing streets.

Where the former railway reserve meets Ridge Hill Road, the PSP-standard path could utilise an existing cleared power line corridor parallel to the road, then cross Ridge Hill Road near the bottom of Zig Zag.

7.2.1.2 Zig Zag

Zig Zag Scenic Drive is currently a one-way downhill roadway constructed mostly on the old zig zag railway formation. The pavement is generally 3.0-3.2m wide with some wider sections such as at the hairpin bends. Cycling up the hill is permitted only during special events although some unsanctioned 'wrong-way' cycling does occur outside of these times. Being an old railway alignment with low gradient, it is an ideal cycling route for all ages and abilities.

Formalised two-way cycling on the Zig Zag is absolutely essential to the functioning of the Hills Spine corridor. There are multiple ways in which this can be achieved; several options are presented below in **Table 7-1**.

Photograph 1 – Zig Zag Scenic Drive

Photograph 2 – Zig Zag Scenic Drive

Table 7-1 Zig Zag Scenic Drive Treatment Options

	Treatment Option	Order of Cost	Advantages	Disadvantages
A	Close Zig Zag to motorised traffic and permit two-way pedestrian and cyclist traffic	Low	▪ Full-time safe access for cyclists and pedestrians as part of a Secondary Cycling Route. ▪ Eliminates risk of head-on conflicts between cyclists and motorised traffic. ▪ Eliminates conflicts between pedestrians and motorised traffic. ▪ Significant cycle tourism potential with safer access to Zig Zag views. Motorised traffic would still have access to top car park and be able to walk to see more views. ▪ Significant reduction in traffic and anti-social behaviour for residents in Lascelles Parade. ▪ Zig Zag would remain available as an evacuation route for bushfires, if/when required. ▪ No impact on heritage values.	▪ Local commuter traffic would need to divert via Gooseberry Hill Road. ▪ Reduction in access for tourists and residents in motorised vehicles as direct connection into Ridge Hill Road is removed.
B	Permit two-way cycling traffic on existing pavement with one-way uphill motorised traffic	Low	▪ Full-time access for cyclists and pedestrians as part of a Secondary Cycling Route. ▪ Significant cycle tourism potential with safer access to Zig Zag views. ▪ Local commuter traffic would need to divert via Gooseberry Hill Road in the AM Peak but could use Zig Zag in the PM Peak. ▪ Motorised tourist traffic would be more likely to spend money in the City after visiting Zig Zag compared to the current situation. ▪ Zig Zag would remain available as an evacuation route for bushfires, if/when required. ▪ No impact on heritage values.	▪ Likely head-on conflicts between motorised traffic and cyclists (and pedestrians) in some locations due to the narrow pavement width. Higher risk to cyclists due to the potential steep fall on the downhill side. ▪ Local commuter traffic would need to divert via Gooseberry Hill Road in the AM Peak but could use Zig Zag in the PM Peak. ▪ No reduction in anti-social behaviour for residents on Lascelles Parade. ▪ Driving uphill is not attractive as there are less opportunity to view the scenery in comparison to driving downhill.
C	Widen carriageway to permit one-way uphill traffic flow and two-way cycling in a 'Safe Active Street' type environment	High	▪ Full-time access for cyclists and pedestrians as part of a Secondary Cycling Route. ▪ Significant cycle tourism potential with safer access to Zig Zag views. ▪ Local commuter traffic would need to divert via Gooseberry Hill Road in the AM Peak but could use Zig Zag in the PM Peak. ▪ Motorised tourist traffic would be more likely to spend money in the City after visiting Zig Zag compared to the current situation. ▪ Zig Zag would remain available as an evacuation route for bushfires.	▪ Likely head-on conflicts between motorised traffic and cyclists (and pedestrians) in some locations due to the narrow pavement width. Higher risk to cyclists due to the potential steep fall on the downhill side. ▪ Potential impact on heritage values due to widening of cuttings and sideling sections. ▪ No reduction in anti-social behaviour for residents on Lascelles Parade.

	Treatment Option	Order of Cost	Advantages	Disadvantages
D	Widen carriageway to permit one-way downhill traffic flow and two-way cycling in a 'Safe Active Street' type environment	High	▪ Full-time access for cyclists and pedestrians as part of a Secondary Cycling Route. ▪ Significant cycle tourism potential with safer access to Zig Zag views. ▪ No inconvenience to local commuter traffic. ▪ Zig Zag would remain available as an evacuation route for bushfires.	▪ Likely head-on conflicts between motorised traffic and cyclists (and pedestrians) in some locations due to the narrow pavement width. Higher risk to cyclists due to the potential steep fall on the downhill side. ▪ Potential impact on heritage values due to widening of cuttings and sideling sections. ▪ No reduction in anti-social behaviour for residents on Lascelles Parade.
E	Timed closure – night-time access for motorised traffic (e.g. from 5PM to 10PM)	Medium	▪ Daytime access for cyclists and pedestrians, serving 99% of cycling and walking demand. ▪ Retains motorised vehicle access at night-time to view the city lights.	▪ Active management required – e.g. a ranger to open and close gates or bollards. ▪ No reduction in anti-social behaviour for residents on Lascelles Parade.
F	Timed closure – weekday access for motorised traffic	Medium	▪ Weekend access for cyclists and pedestrians, serving mainly recreational riders. ▪ Significant cycle tourism potential with safer access to Zig Zag views on weekends only. ▪ Local commuter traffic is low on weekends, so only a minor inconvenience for local residents.	▪ Would not serve commuter cyclists and therefore the overall Secondary Route would not achieve its objectives. ▪ Active management required – e.g. a ranger to open and close gates or bollards. ▪ No reduction in anti-social behaviour for residents on Lascelles Parade.

Following discussion with the City, Option A is the preferred option for Zig Zag Scenic Drive as it provides the best outcomes in terms of safety and is relatively simple to implement compared to other options. The City would need to consult with the community before implementing any treatment to Zig Zag Scenic Drive.

7.2.1.3 Lascelles Parade / William Street (Zig Zag to Hill Street)

This section carries relatively low traffic volumes of traffic, which may reduce further in the future, depending on the final arrangement provided at Zig Zag Scenic Drive. The terrain makes it difficult to construct a shared path of suitable standard so a Safe Active Street style treatment is the preferred option. This treatment would be consistent with the existing traffic calming devices and the intent to slow traffic through the area.

The vicinity of Hill Street a new, high-quality connection to the railway reserve is proposed.

7.2.1.4 Kalamunda Railway Heritage Trail (Hill Street to Elizabeth Street)

The Railway Heritage Trail is currently unsealed and this would need to be updated to high-quality shared path standards similar to a PSP. The type of crossings to be provided at Gooseberry Hill Road, Noel Road and Headingly Road would need to be investigated in more detail; raised crossings with pedestrian and cyclist priority should be considered for the ultimate development of this route.

The anticipated volume of pedestrian and cyclist traffic on this section indicates that a shared pedestrian and cyclist facility will be adequate; it is likely that more confident, faster cyclists will prefer to use Williams Street.

7.2.1.5 Kalamunda Town Centre (Elizabeth Street to Canning Road)

South of Elizabeth Street the railway reserve has been built over; therefore an alternative route through the town centre is required. Given the verge constraints and volume of pedestrians in the Kalamunda town centre, an on-road cycling environment is preferred over a shared path; however the on-road facility will need to cater for a wide range of ages, abilities and confidence levels.

Multiple options for the route through the Kalamunda town centre have been developed, as follows:

> **Option A: Railway Road** – a combination of slow-speed, mixed traffic environment and protected bicycle lanes, pending more detailed investigation and consultation. This route would provide access to the top of Haynes Street, the start of the Zig Zag Cultural Centre and the start of the Mundaring Weir Road cycling route.

> **Option B: Headingly Street** – a Safe Active Street treatment along Headingly Street connecting to the proposed buffered bicycle lanes along Canning Road. This option results in an overall lower cost network for the town centre, avoiding duplicated routes on Canning and Railway Roads, however it does not provide convenient access to the start of Mundaring Weir Road. The route also places cyclists at the bottom of Haynes Street.

> **Option C: Central Road / Central Mall** – a Safe Active Street treatment along Central Road and a low-speed cycling route through Central Mall. This route would be attractive to less confident cyclists; however the training riders are likely to continue using Canning or Railway Roads.

Further investigations will be required to determine which of the above options is preferred for the town centre, including preferred treatments for the Mead Street / Railway Street roundabout which carries the largest number of cyclists in the City.

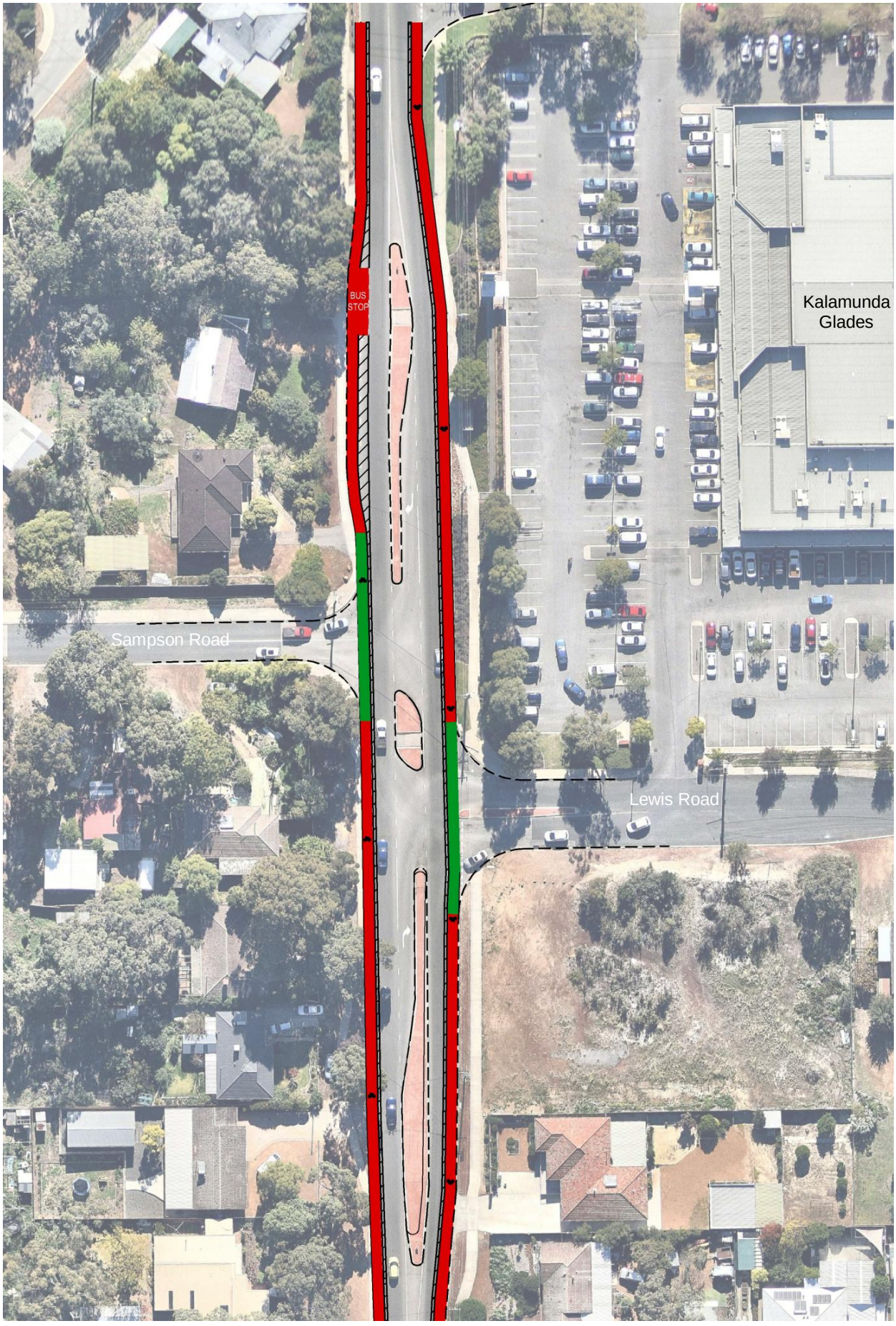
7.2.1.6 Canning Road

Buffered bicycle lanes in each direction are proposed for Canning Road between Railway Road and Pomeroy Road. Painted separation rather than physical separation between the bicycle lanes and general traffic lanes is recommended given that this route is heavily used by riding groups who prefer to travel 2-abreast and/or overtake.

Between Railway Road and Lawnbrook Road, Canning Road is typically 9.0m wide. South of Lawnbrook Road the carriageway narrows to between 7.2 and 7.5m in width.

Widening will be required over the full length to achieve an ultimate form of 2.0m wide cycle lane and 0.5m wide painted buffer (refer to typical section in **Figure 7-5)**, however 1.5m wide sealed shoulders with no buffer could be implemented in the short term with minimal widening required north of Lawnbrook Road. South of Lawnbrook Road, widening will be required to achieve even the minimum standard of sealed shoulders. It should be noted that DoT's minimum standard for on-road bicycle lanes includes a 300mm painted buffer which cannot be achieved without widening of the carriageway.

Figure 7-5 Canning Road Cycle Lanes – Typical Arrangement



7.2.1.7 Pomeroy Road

There is an existing 2m wide path along Pomeroy Road, which allows high school students to connect from the Canning Road corridor to Lesmurdie State High School. During the community consultation, existing cyclists expressed satisfaction with the current arrangements on Pomeroy Road, indicating no need for widening or dedicated cycle lanes in the short-to-medium term.

In the long term, Pomeroy Road should be widened to provide 1.5-2.0m wide sealed shoulders with painted buffer to provide additional separation from traffic, thus improving safety for High School students as well as providing space for sport cyclists to be able to ride 2 abreast.

7.2.1.8 Future Extension: Lesmurdie to Maddington

Refer to **Section 7.2.4**.

7.2.2 Kalamunda Road

Kalamunda Road is the primary traffic route to the hills and one of only two two-way traffic routes ascending the escarpment. It is marked for a single lane of traffic in each direction on the escarpment section with a carriageway width of between 10.5 and 12.0m. It carries regular bus services but does not carry Restricted Access Vehicles (RAVs) which are required to use Welshpool Road East.

Kalamunda Road is regularly used by training groups generally travelling from South Guildford right through to the hills. Use of the road by other cyclist types is very low given the steep grades on the escarpment, high traffic volumes and lack of cycle lanes. There are discontinuous sections of sealed shoulders through High Wycombe however these do not present connect to other cycling facilities and are therefore of limited use.

The development of Forrestfield Station presents a significant opportunity for encouraging commuter cycling in the hills. Kalamunda town centre is located only 6.5km east of Forrestfield Station via Maida Vale and Kalamunda Roads – this is close to comfortable cycling distance, and significantly shorter than the distance between Midland Station and Kalamunda Town Centre (11km). Kalamunda Road is also the only direct link between the hills and the foothills, serving internal commuter and recreational trips within the City.

Kalamunda Road, along with Maida Vale Road, forms a Secondary Route between Kalamunda town centre and Forrestfield Station. The section of Kalamunda Road from Maida Vale through High Wycombe towards South Guildford is also a Secondary Route but of lesser importance. This section of the Secondary Route will mainly serve training riders, as well as a smaller catchment of commuters in High Wycombe.

The recommended strategy for the Kalamunda Road Secondary Route is shown in **Figure 7-6** and outlined below:

> Implement 2.0m wide buffered bicycle lanes from **Canning Road to Hawtin Road** generally using the existing carriageway with minor widening where required. A typical plan and section is shown in **Figure 7-7**.

> Install 1.5m wide sealed shoulders between **Hawtin Road and Roe Highway**.

> Maintain the existing sealed shoulders between **Roe Highway and Fernan Road**, and include 1.5m wide sealed shoulders in the future upgrade between **Fernan Road and Abernethy Road**.

> Maintain a continuous 2.5m wide shared path between **Hawtin Road and Abernethy Road**.

> Work with the City of Swan and Main Roads to implement sealed shoulders over the railway bridge immediately **west of Abernethy Road**.

Buffered bicycle lanes – with a painted buffer rather than a raised island – are recommended so that the large groups can make use of these lanes while riding two-abreast and/or overtaking.

Figure 7-6 Kalamunda Road Secondary Route

Figure 7-7 Kalamunda Road – Typical Plan and Section

TYPICAL CROSS SECTION – HAWTIN ROADTO KALAMUNDA TOWN CENTRE

7.2.3 Forrestfield Station Connections

The Forrestfield Station presents a significant opportunity to encourage greater uptake of cycling in the life of this Bicycle Plan and therefore the links to and through the station are critical to the Plan's success. As the station is located in a largely undeveloped or lightly developed area, there are minimal to no cycling facilities. With the anticipated growth in population in Forrestfield North and corresponding changes to the road environment, there is a significant opportunity to provide high-quality cycling facilities from the beginning, encouraging new residents to establish sustainable travel behaviours from the day they move in rather than trying to change established behaviours at a later date.

Within the Ultimate Network Plan, Forrestfield Station is served by two Secondary Routes and two Local Routes:

> **Maida Vale Road Secondary Route** – the primary connection from the areas east of Roe Highway to the train station, and the strategic connection to Kalamunda and the hills part of the City.

> **New TOD Connector Road Secondary Route** – Connecting Forrestfield Station through Forrestfield North and over Roe Highway to Maida Vale

> **High Wycombe Local Route –** connection to the nearest existing residential area to the station.

> **Berkshire Road Local Route –** a short-term connection to Forrestfield residential area pending completion of the New TOD Connector Road bridge over Roe Highway.

The proposed infrastructure types of these routes are shown on the map at **Figure 7-8** and outlined in the following sections.

7.2.3.1 Maida Vale Road

As shown in **Figure 4-5**, Maida Vale Road is a significant bicycle crash cluster, particularly near the Roe Highway interchange. It currently has no dedicated cycling facilities and has fast-moving traffic with frequent crossovers and intersections. Traffic volumes can be expected to increase further upon opening of the station, as 2,500 commuter vehicles from all parts of the City are expected to park at the station.

Taking into consideration the available road reserve width, the existing and likely future traffic volumes, and the frequent crossovers, it is recommended that protected bicycle lanes be provided between Forrestfield Station and Priory Road. Low-speed mixed traffic cycling is considered suitable along Old Maida Vale Road, with appropriate connections to Kalamunda Road at the Hawtin Road/Gooseberry Hill Road intersection.

An indicative cross section for Maida Vale Road is shown in **Figure 7-9**, utilising the existing road reserve width of 20m. This cross section has been prepared primarily to illustrate the preferred cycling infrastructure and should, as far as possible, be used as part of the detailed design process for this road.

As this Secondary Route is critical to the success of the Forrestfield Train Station and the Forrestfield North Structure Plan as a whole, the City should seek funding support from the State Government for the upgrade of Maida Vale Road.

Figure 7-8 Forrestfield Station Connections

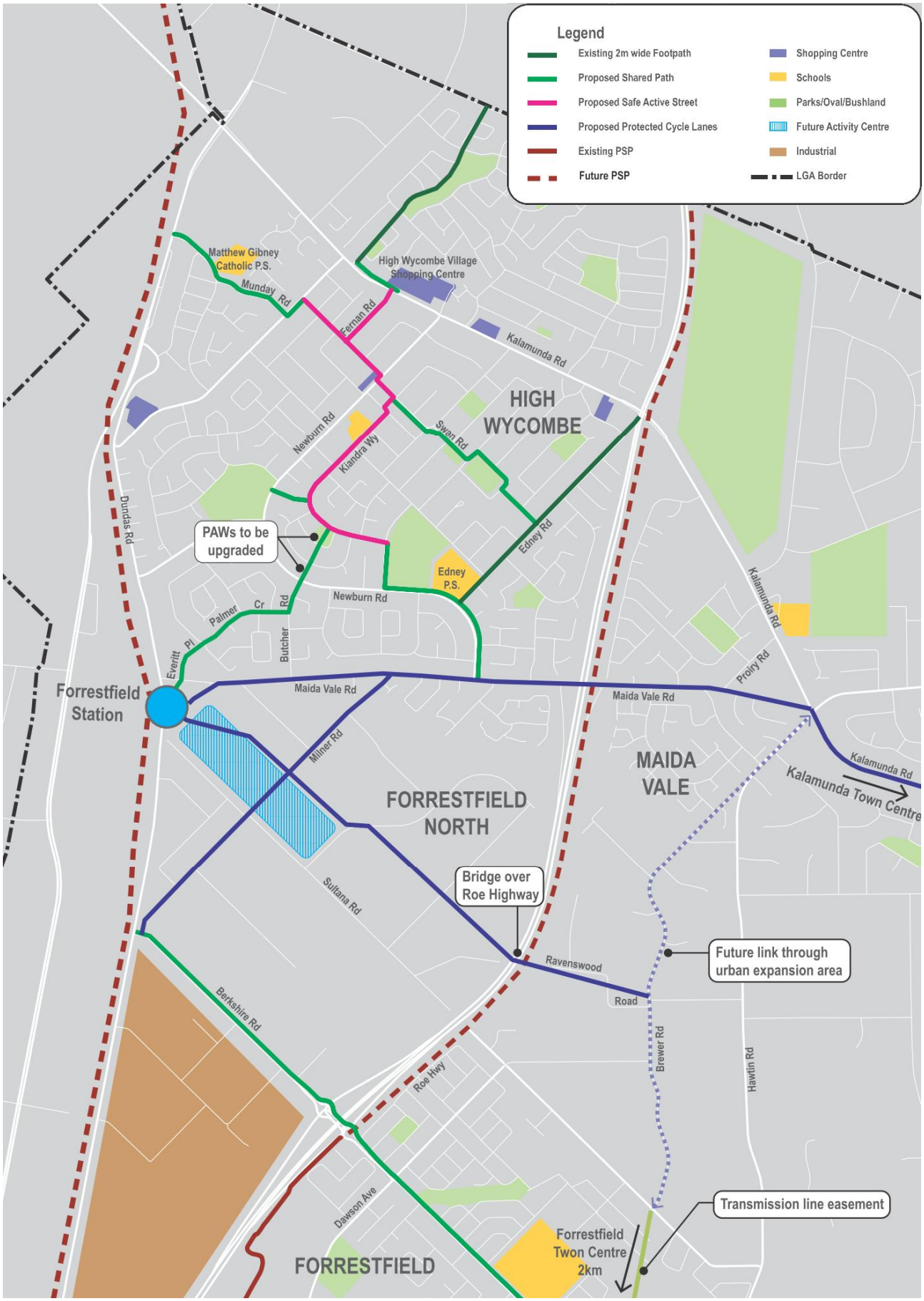


Figure 7-9 Recommended Cross Section – Maida Vale Road

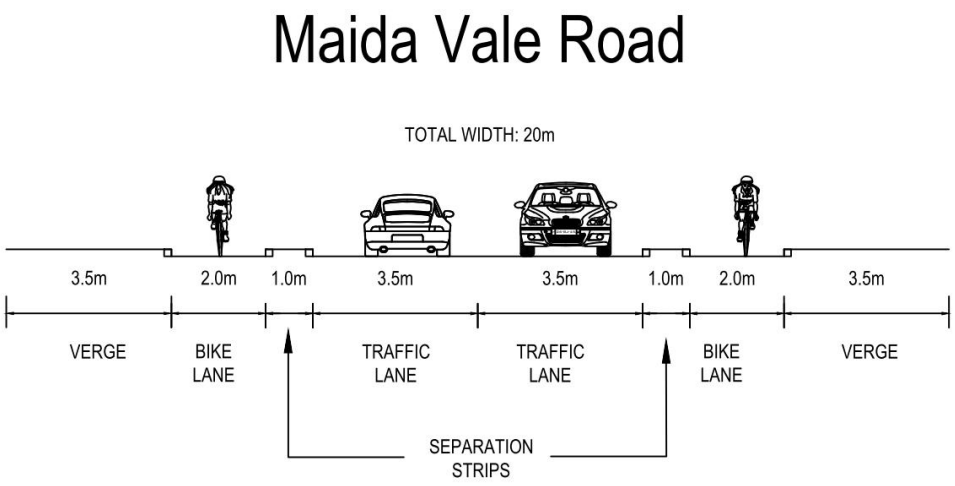
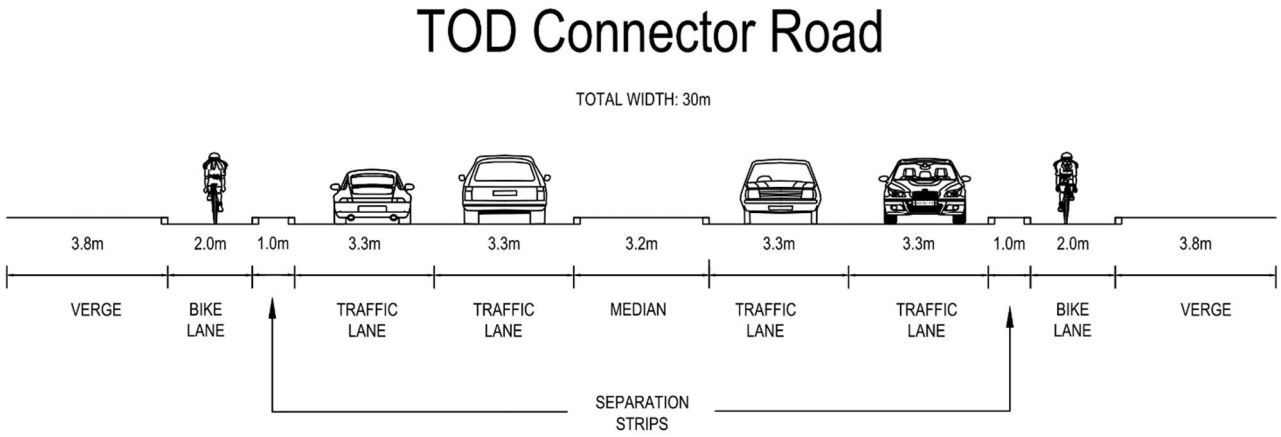


Figure 7-10 Recommended Cross Sections – TOD Connector Road



7.2.3.2 TOD Connector Road

TOD Connector Road is nominated as the Secondary Route connection between Forrestfield Station and the Roe Highway PSP for several reasons:

> It is the shortest link between the Forrestfield Train Station and the Roe Highway PSP.

> It will bisect the Forrestfield North Activity Centre and serve the adjacent higher density residential areas.

> It does not connect directly to Roe Highway and therefore will only carry local motorised traffic rather than through traffic (which will use Berkshire Road).

With construction of a bridge over Roe Highway, the route can link directly into the extension of the Foothills Spine Local Route, which is proposed run along Brewer Road Transmission Line easement into Forrestfield town centre, almost free from traffic. It will also provide a link to Darling Range Sports College, which is likely to be the local high school for Forrestfield North residents. As a Secondary Route, the recommended infrastructure type for TOD Connector Road is protected bicycle lanes. Indicative cross sections for TOD Connector Road are shown in **Figure 7-10**.

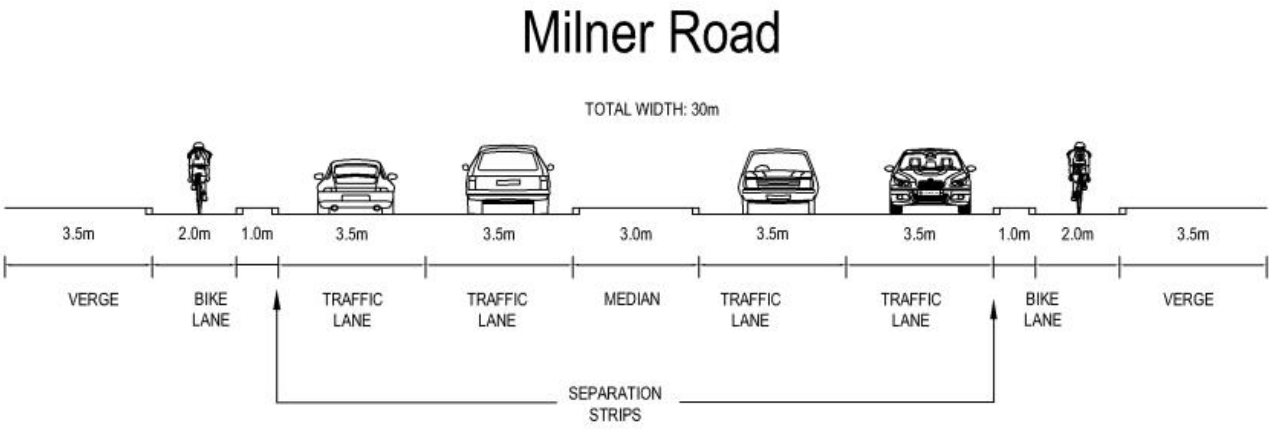
The TOD Connector Road connection across (but not to) Roe Highway will be critical to the success of this Secondary Route and critical to encouraging residents of Forrestfield to cycle to Forrestfield Station. Accordingly, the City should seek State Government funding support for construction of the bridge and approaches.

7.2.3.3 Milner Road

Milner Road does not connect directly to the Forrestfield Station but serves as a connection between the Maida Vale Road, Sultana Road and Berkshire Road corridors, serving the heart of the Forrestfield North Activity Centre. Due to the importance of this road as the only connection between Forrestfield North and Maida Vale Road, protected bicycle lanes should be provided as part of any future upgrading.

An indicative cross section for Milner Road is shown in **Figure 7-11**, based on the road reserve widths nominated in the District Structure Plan.

Figure 7-11 Recommended Cross Section – Milner Road



7.2.4 Lesmurdie to Maddington

In the future (beyond the life of this Bicycle Plan), the Hills Spine Secondary Route should be further developed to connect to Maddington, via Welshpool Road East, Crystal Brook Road and Kelvin Road. This would provide an entry to the hills area from the southern part of the metropolitan area and facilitate commuting to the growing employment centres in Maddington and Gosnells.

In the meantime, any upgrades to these roads should provide for the future Secondary Route, e.g. through the provision of sealed shoulders on Kelvin Road.

7.3 Local Routes

7.3.1 Foothills Spine (Wattle Grove – Forrestfield – Forrestfield North)

This route has been developed as a spine linking the Roe Highway PSP at Orrong Road with Wattle Grove, Forrestfield, and then to both to Roe Highway PSP and Forrestfield North via Sultana Road. It is intended to serve local demand through the suburbs of Wattle Grove and Forrestfield, as well as commuters from these suburbs accessing the wider cycling network. A future extension through the Maida Vale South urban expansion area is also proposed to provide a continuous link through to Maida Vale and the Kalamunda Road Secondary Route.

The overall route concept is shown in **Figure 7-12** and comprises the type of infrastructure that is suited to an '8 to 80' demographic – i.e. school students, parents, casual cyclists in order to maximise the potential uptake in cycling generated. The key elements of the route are as follows:

> New shared path along the northern side of **Welshpool Road East from Roe Highway to Hale Road** – this is the critical link from Wattle Grove to the Roe Highway PSP and the wider cycling network – refer to **Figure 7-14**.

> An upgrade to the existing shared path along **Hale Road**, including improvements to the crossings of Extensa Road, Sheffield Road and Lenihan Corner to remove the right-angle bends and path deviations. Priority crossings or potential raised threshold crossings should be considered for these locations.

> Through Wattle Grove, the route splits in two. The **western route** consists of a shared path parallel to The Promenade, serving Wattle Grove Primary School, then rejoining Hale Road at Tonkin Highway. The **eastern route** utilises the existing shared path through public open space parallel to Kalari Drive and Coyong Road, then continues via a new crossing of Tonkin Highway into Hartfield Park. Both routes combined again at the intersection of Hartfield Road and Sussex Road.

> **Sussex Road** was selected as the preferred route through Forrestfield as it serves Forrestfield Primary School and avoids the heavy traffic and constrained road reserve on Hale Road. A Safe Active Street treatment is proposed for this section. Extensive consultation will be required with the community to manage accessibility to the school for motorised traffic while still providing a safe environment for primary school-aged students to ride to school.

> From **Sussex Road to the Transmission Line Easement,** east of Strelitzia Avenue, there are two route options (see **Figure 7-13**). One option is to continue east along Sussex Road, Coburg Street and Holmes Road to near Mallow Way, where the route would transition into a shared path and cross Hale Road into the transmission line easement. The other option is to use Hanover Road (Safe Active Street) then run along an upgraded shared path on the southern side of Hale Road to Strelitzia Avenue. At Strelitzia Avenue the existing signalised intersection would facilitate crossing Hale Road, and the route would run as a shared path from Strelitzia Avenue along Woodlupine Brook to the transmission line easement. Only minor upgrades to the existing shared path in this section would be required.

> The preferred route then follows the **Transmission Line Easement** to Sultana Road East. Shared path branch connections would be provided to each of the local streets adjacent to the corridor. The route is envisaged to continue through Brewer Road and split in two at Ravenswood Road – one branch uses protected bicycle lanes along the TOD Connector Road to reach the Forrestfield North TOD and Forrestfield Station, the other branch largely follows Brewer Road to Maida Vale. The Maida Vale branch would be refined as part of the Structure Planning for this urban expansion area with a view to providing either a high-quality shared path through public open space or protected bicycle lanes.

Completion of the Foothills Spine would create a continuous, mostly traffic-free cycling route through Wattle Grove and Forrestfield, linking to both Forrestfield Station and Maida Vale. The Foothills Spine would serve as the main cycling route for Darling Range Sports College, as well as a local route for students attending Wattle Grove and Forrestfield Primary Schools, and commuters and shoppers accessing the Forrestfield town centre.

Figure 7-12 Wattle Grove – Forrestfield Spine

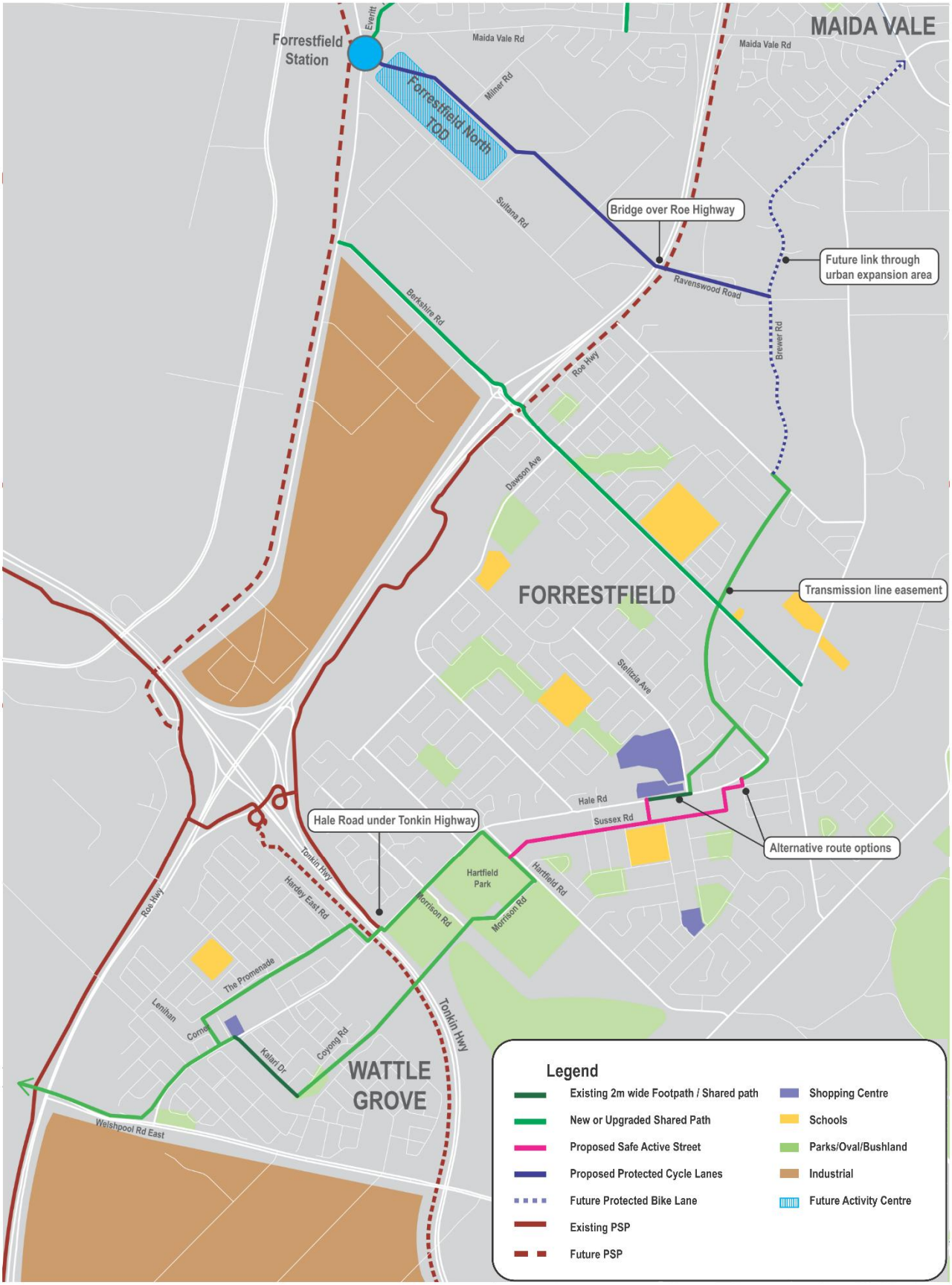


Figure 7-13 Sussex Road to Transmission Line Eastment Route Options

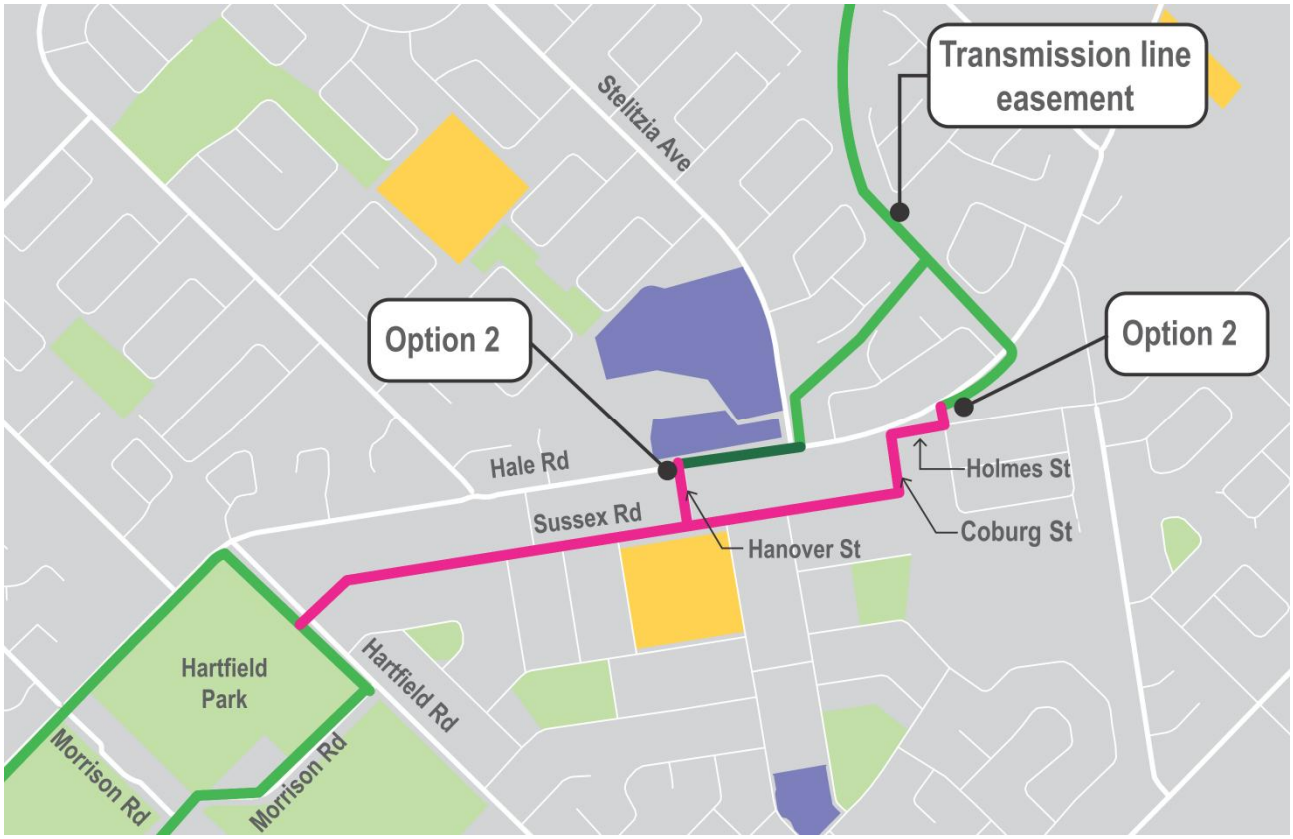
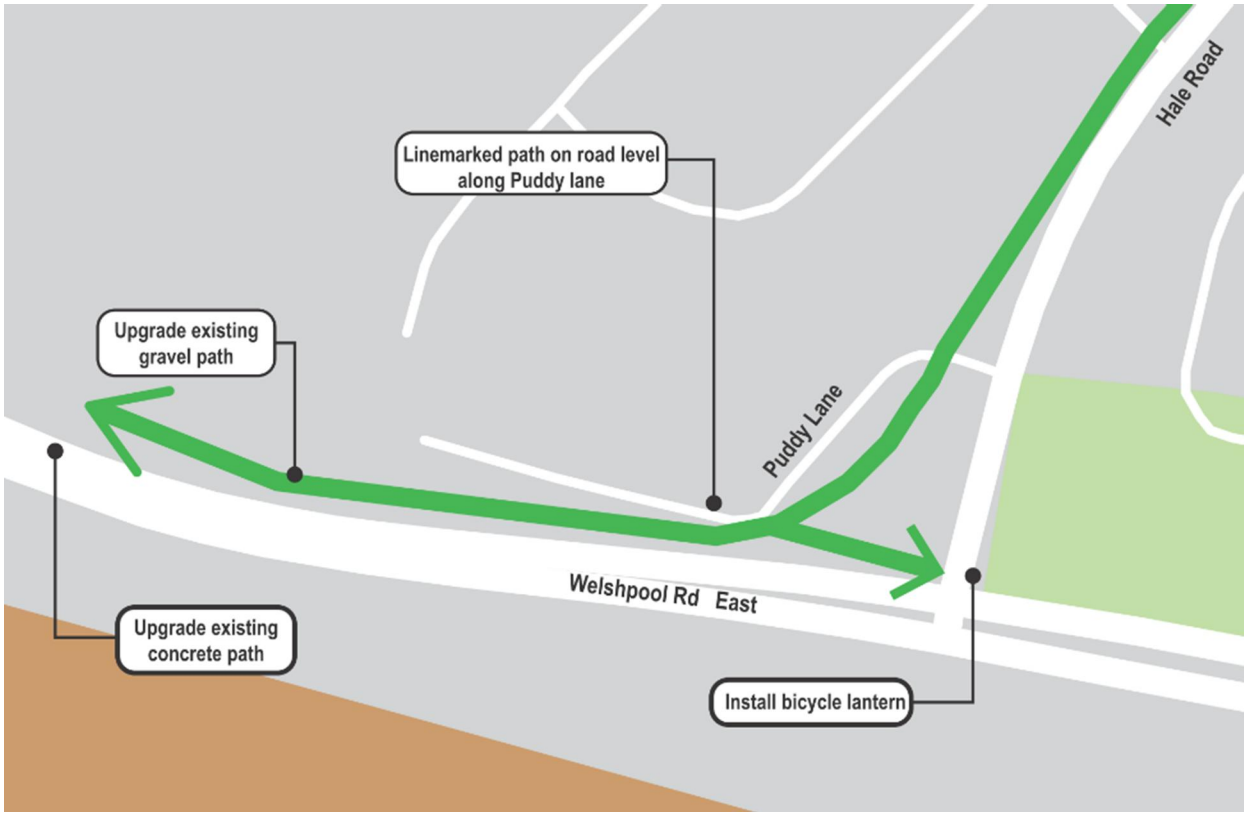


Figure 7-14 Foothills Spine – Welshpool Road East / Hale Road intersection



7.3.2 High Wycombe Local Route

The High Wycombe Local Route has been developed to link Forrestfield Station with its closest residential catchment, as well as serve the three primary schools located in the suburb – Edney, Matthew Gibney and High Wycombe. With the focus on school students and local commuters travelling short distances to the train station, the selected infrastructure types reflect low-speed mixed traffic cycling environments and/or path-based links. Cyclists that are more confident may elect to use the existing sealed shoulders on Newburn Road in preference to the Safe Active Streets.

As shown in **Figure 7-15**, the spine of the route follows Everitt Place, Palmer Crescent and Butcher Road to Newburn Road. North of Newburn Road, it is proposed to upgrade two Public Access Ways (PAWs) and a path through a small park to reach Kiandra Way. Kiandra Way would then be developed as a Safe Active Street to High Wycombe Primary School. From the end of Kiandra Way, the route follows Hamilton Road and Fernan Road, both of which would be developed as Safe Active Streets.

Three spurs along this route are proposed in order to serve the primary schools:

> **Matthew Gibney Catholic Primary School** – a continuation of the Hamilton Road Safe Active Street then an upgraded shared path connection to the school. Beyond the school, the path should connect to the future Freight Railway PSP to provide connectivity to the wider network.

> **High Wycombe Primary School** – an upgraded shared path link along Swan Road, connecting to the Edney Road shared path.

> **Edney Primary School** – a new shared path link via Norling and Newburn Roads, connecting to Maida Vale Road.

The highest priority section of this route is from Forrestfield Station to Kiandra Way, as this would serve the station's main residential catchment from opening day. Given its importance to the station and the FAL project, the City should seek State Government funding support for this first stage.

7.3.3 Berkshire and Dundas Roads

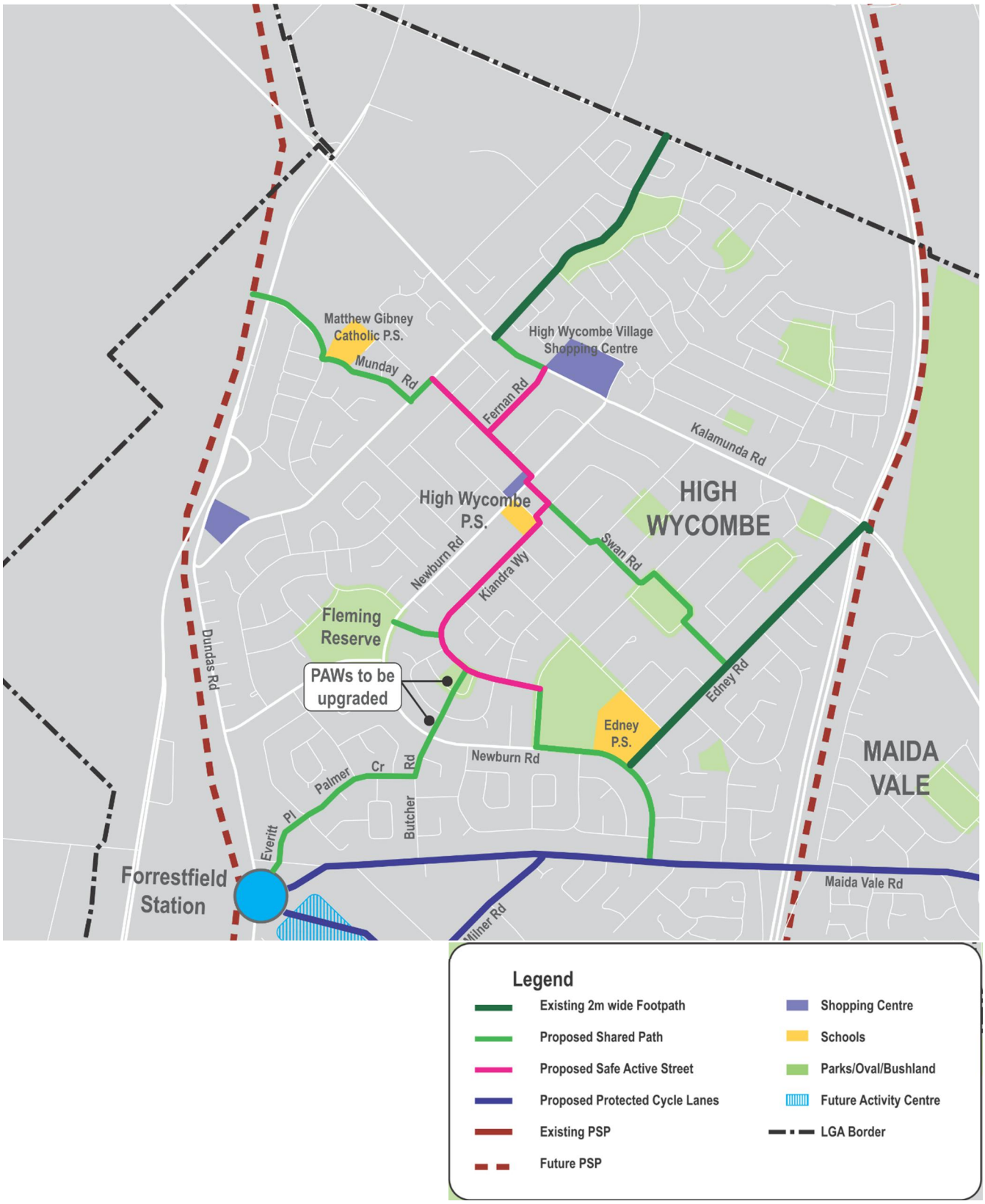
Berkshire Road connects the residential and industrial segments of Forrestfield, providing the only crossing of Roe Highway south of Maida Vale Road. MRWA has provided sealed shoulders and shared paths through the Roe Highway interchange as part of upgrade works, and there is a footpath along most of its length on the northern verge. At the western end, Berkshire Road intersects with Dundas Road, which is links into the Forrestfield Station.

Until the TOD Connector Road bridge can be constructed, indicatively within the next 20 years, and the Dundas Road PSP is built, Berkshire Road will be the only cycling connection between Forrestfield Station and the Forrestfield residential areas. Therefore, in the interim, a high quality shared path is proposed along Berkshire Road. The shared path is recommended to continue along Dundas Road until Forrestfield Station, given that the timeframe of the future Dundas Road PSP is not known. The shared path should be built close or within the completion timeframe of the Forrestfield Station. Alternatively, the City could advocate for the section of the future Dundas Road PSP from Berkshire Road to the Forrestfield Station be completed alongside the opening of the station.

Once TOD Connector Road bridge is completed, Berkshire Road will revert to being a community route for local connections to the proposed Dundas Road and Roe Highway PSP and to Darling Range Sports College.

In addition, it is recommended that any upgrade works on Berkshire Road include sealed shoulders in both directions, including a minimum 300mm painted buffer where practical.

Figure 7-15 High Wycombe Local Route



7.3.4 Hale / Hawtin Roads

Hale Road and Hawtin Road form a continuous connection between Wattle Grove, Forrestfield and Maida Vale. As there are limited available routes in this area, there is likely to be demand for using these roads by more confident cyclists who find the alternatives too slow and/or indirect. Accordingly, a minimum of 1.5m wide sealed shoulders should be provided continuously along this route as any upgrade works are undertaken. The use of roundabouts should also be minimised along this route to maximise safety for cyclists.

A continuous shared path along one side of this route should also be provided to cater for local cycling traffic – e.g. children riding to school.

7.3.5 Midland Road

Midland Road connects Maida Vale with Midland and the new Bushmead development in the City of Swan. The Roe Highway PSP will serve as the main connection between Maida Vale and Midland, however Midland Road will still attract some cycling demand from existing and future residential land uses in the area.

As per the Hale / Hawtin Road corridor, 1.5m wide sealed shoulders should be provided on the section within the City of Kalamunda. The City should also encourage the City of Swan to provide a similar level of infrastructure on their section of the road. A continuous shared path along one side of this route should also be provided to cater for local cycling traffic – e.g. children riding to school.

7.3.6 Lesmurdie Local Routes

The hilly terrain and irregular road network in the Lesmurdie area makes it difficult to identify and develop high-quality cycling links. The number of schools in this area justify the provision of shared paths to facilitate students riding to school and the more important of these links have been identified as Local Routes as shown in **Figure 7-16**.

> ***Lesmurdie Road*** – is the main north-south spine through Lesmurdie, serving Lesmurdie Senior High School, St Brigid's College and Falls Roads Primary School. There is a continuous shared path from Canning Road to Rootes Road but only narrow footpaths continuing to Welshpool Road East. In the medium to long term at least one of these paths will need widening to shared path standard to provide a function connection to Welshpool Road East.

> ***Kalamunda – Falls Road – Lesmurdie*** – This route follows Cotherstone Road, Betti Road, Orange Valley Road, Burma Road, Trafalgar Road, part of Grove Road, and Gladys Road, connecting the western residential areas of Kalamunda and Lesmurdie with schools and shops. There are several missing links in this route, including:

- ***Burma Road, Orange Valley Road to Connor Road*** – narrow footpath
- ***Trafalgar Road and Kimbarlee Way, Waterloo Crescent to Falls Road***– narrow footpath
- ***Grove Road, George Road to Gladys Road*** – missing section of shared path on north verge
- ***Gladys Road*** – narrow footpath

> ***Grove Road*** – this east-west link connects the Gladys Road, Lesmurdie Road and Canning Road routes as well as serving three schools.

7.3.7 Forrestfield to Lesmurdie

Following an extensive review of route options up and down the escarpment, a future Local Route has been nominated from Forrestfield to Lesmurdie via Hartfield Road and Welshpool Road East. This route is intended to provide a local commuter and utility cyclist connection between the hills and the foothills, as well as connecting to the wider cycling network via the Tonkin Highway PSP. Indicatively, the route would consist of:

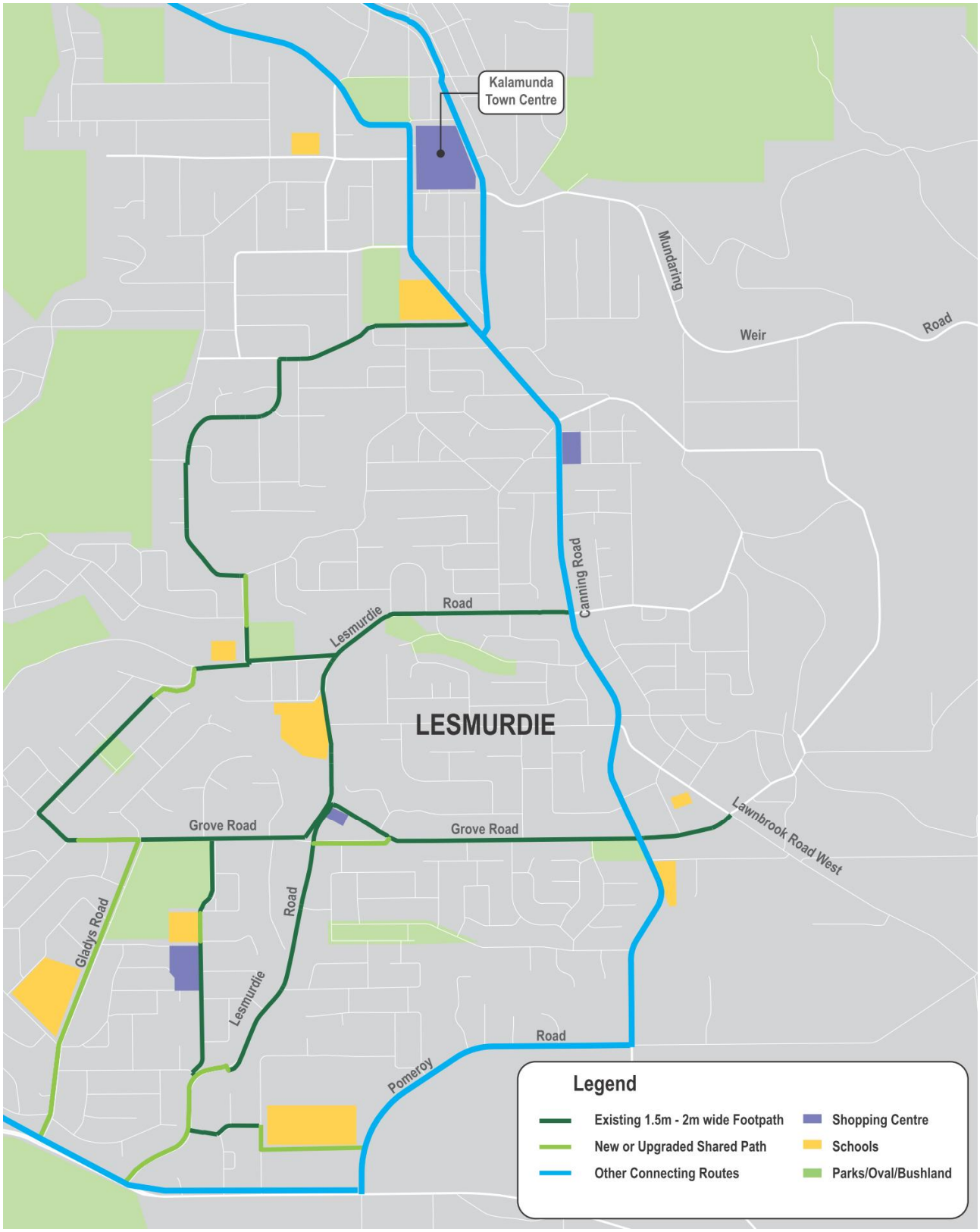
> A high-quality shared path along the southern verge of Hartfield Road from Morrison Road (junction with Foothills Spine Local Route) to Lewis Road;

> Improvements to the on-road environment along Hartfield Road from Lewis Road to Welshpool Road East to encourage low-speed mixed traffic cycling, with the potential for a shared path in the long term; and

> Construction of a shared path along the northern side of Welshpool Road East, from Hartfield Road to Lesmurdie Road.

The latter section will be an expensive, long-term project involving extensive cutting into rock and treatment of the cuttings to prevent loose rocks from falling onto the pathway. During the preparation of this Bicycle Plan, a number of existing walking and management trails within Mundy Regional Park were reviewed as possible alternatives to constructing a shared path on Welshpool Road East. Each trail that was reviewed was constrained by very steep grades, however it was noted that could be the potential to develop a 'zig zag type alignment to ease the grades. It is recommended that the City consult with the Parks and Wildlife Service (DPAW) to understand their attitude towards providing a shared path type facility through the park. If DPAW is favourable to the idea, more detailed investigations of grades and potential alignments should be undertaken with a view to identifying one or more feasible route options to compare against the cost and feasibility of constructing a shared path along Welshpool Road East.

Figure 7-16 Local Routes – Lesmurdie



Photograph 3 – Example of the steep grades encountered on existing trails in Mundy Regional Park

Photograph 4 – Challenging terrain on Welshpool Road East at Lesmurdie Hill

Source: Google Street View

7.4 Safe Active Streets

This Section outlines recommended Safe Active Street infrastructure that is not part of a Local Route discussed in **Section 7.3.**

As previously described in **Section 6**, Safe Active Streets are cycle routes on quiet local streets, where speeds have been reduced to 30 km/h to allow people in cars and on bikes to share the street safely. With lower traffic speeds, streets are also much safer for pedestrians and children, and additional tree planting and landscaping make them more attractive places to walk or ride. Safe Active Streets are designed to create safe and comfortable riding environments for bike riders with all levels of experience. People on bikes can ride closer to the middle of the lane, with cars passing only if there is enough space to do so safely.

Along the routes, bike symbols and red asphalt are typically used to mark out bike boulevards and suggest where bikes should ride. Various measures may be used to slow traffic, discourage through-travel by cars, and improve bike flow, including, for example:

> Single-lane slow points, where approaching vehicles should give way to any car or bike already at or passing through the slow point;

> Raised platforms at intersections;

> Narrowing carriageway widths by introducing on-street parking and plantings

The Safe Active Street program has successfully completed several pilot trials in Western Australia, with the first three projects completed in Bayswater, Belmont and Vincent in 2016 and 2017. With State Government support and funding, the program is continuing with planning and design underway for Safe Active Streets in other Local Government Areas including Bassendean, Kalgoorlie, Melville, Stirling and Victoria Park.

There several locations in the City that may be suitable for Safe Active Street development, either as part of a continuous local route or as a safe route to school. Some of these locations are outlined below.

7.4.1 Forrestfield

The locations of proposed Safe Active Streets in Forrestfield are shown in **Figure 7-17** and described below:

> ***Sussex Road*** forms part of the Wattle Grove to Forrestfield North Local Route discussed in **Section 7.3.1** and would also serve students attending Forrestfield Primary School.

> ***Hibiscus Drive and Pavetta Crescent*** form part of a connection from Forrestfield town centre to the Roe Highway PSP near Berkshire Road, utilising existing Public Open Space corridors and an existing shared path on Dawson Avenue. This route serves Woodlupine and Dawson Park Primary Schools, as well as connecting residents to the PSP.

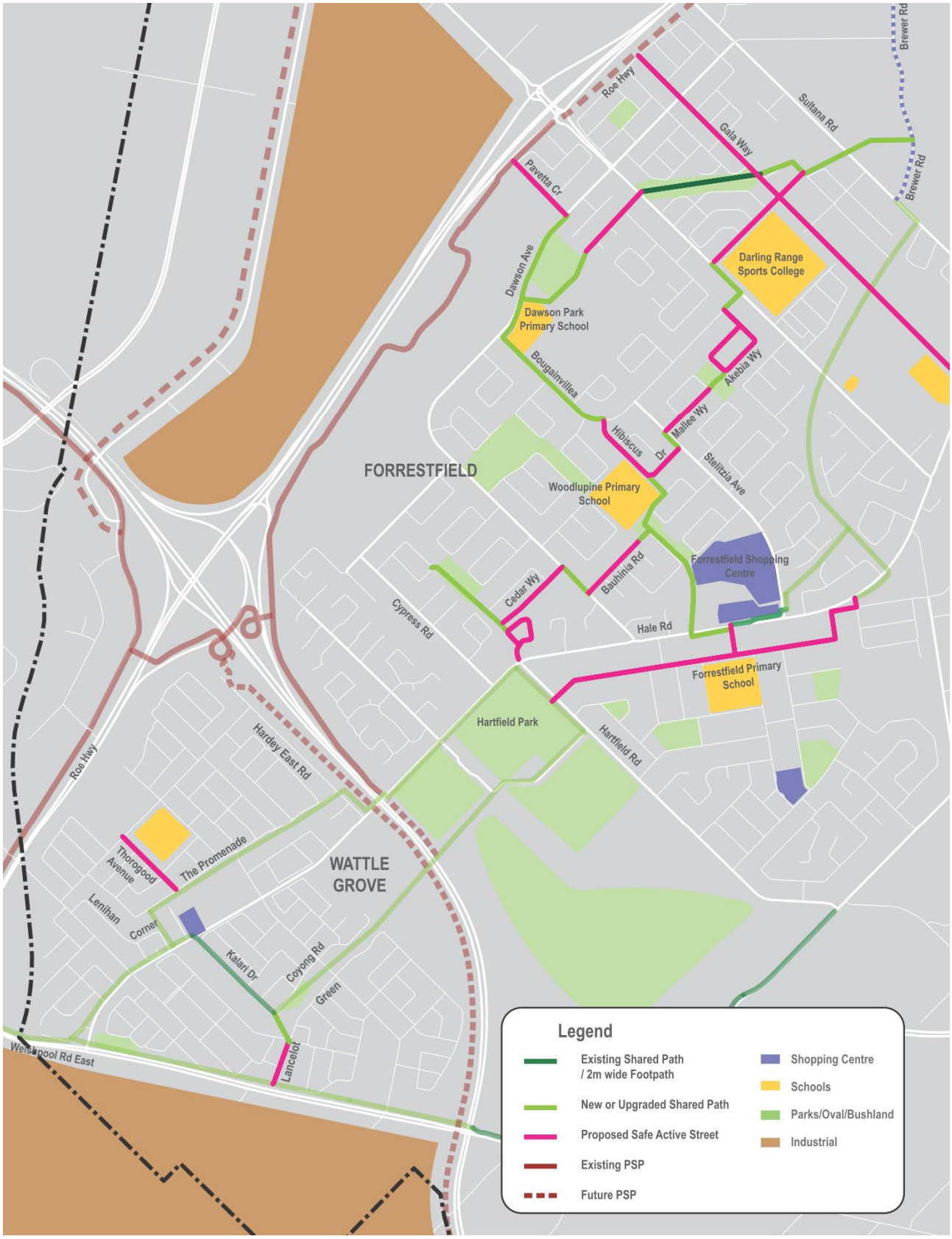
> ***Peach Tree Way, Cedar Way and Bauhinia Road*** form a connection from Hartfield Park and Cypress Road through to Woodlupine Primary School. This link would be a combination of Safe Active Streets and shared path links through Public Open Space. A safer crossing of Hale Road to access Hartfield Park would be required to complete the route.

> ***Hibiscus Drive, Mallee Way and Akebia Way*** form a connection between Woodlupine Primary School and Berkshire Road, utilising the existing school crossing on Strelitzia Avenue. This route would also serve local students riding to Darling Range Sports College.

> ***Ilex Way*** as part of continuous route between Dawson Park Primary School and Brewer Road. The Safe Active Street would link to shared paths through Public Open Space at each end of Ilex Way.

> ***Gala Way,*** once completed, would form a continuous link for the residential area between Sultana and Berkshire Roads that stretch from Roe Highway to Hawtin Road. The Safe Active Street, can link into the transmission line as well as the future Roe Highway PSP extension. This Safe Active Street is proposed to be constructed along with the residential area (known as the Hales Estate) and to be funded under the Developer Contribution Plan.

Figure 7-17 Safe Active Streets – Forrestfield and Wattle Grove



7.4.2 Wattle Grove

Two potential Safe Active Streets in Wattle Grove are shown in **Figure 7-17:**

> ***Thorogood Avenue*** would form a key active transport corridor accessing Wattle Grove Primary School, linking into the extensive existing and proposed shared path networks through the open space corridors. Combined with these shared paths, parents would be able to ride with their children to the school from most parts of Wattle Grove with minimal interaction with traffic.

> ***Lancelot Green*** would form a link between the main Public Open Space corridor and the future signalised intersection of Welshpool Road East / Coldwell Road. This would provide access to the Maddington-Kenwick Strategic Industrial Area as well as the main shared path along Welshpool Road East.

Photograph 5 – Safe Active Street Example – May Street, Bayswater

Source: Department of Transport

7.4.3 Kalamunda

Opportunities for Safe Active Streets in the hills are limited due to the hilly terrain and impermeable road network. Potential Safe Active Streets locations are shown in **Figure 7-18**:

> ***Williams Street / Lascelles Parade*** – this section from Hill Street to the top of Zig Zag forms part of the Midland – Kalamunda – Lesmurdie Secondary Route. Due to the terrain, a Safe Active Street type treatment is preferred.

> ***Headingly Street*** – a potential route option for the Midland – Kalamunda – Lesmurdie Secondary Route, connecting the Railway Heritage Trail to the proposed Canning Road protected bicycle lanes.

> ***Central Road / Central Mall*** – – a potential route option for the Midland – Kalamunda – Lesmurdie Secondary Route, providing a link between the Railway Heritage Trail, Kalamunda State High School, and Canning Road corridor. Careful design would be required for the section through the mall.

> ***Lindsay Street / Boonooloo Road / McRae Road*** – this north-south link would connect the Midland – Kalamunda – Lesmurdie Secondary Route with Kalamunda Primary School and Kalamunda State High School, linking to the residential catchment west of the town centre. A preliminary review of this route indicates that the grades may be prohibitive, however further investigation is warranted.

Figure 7-18 Safe Active Streets – Kalamunda

7.5 Other Shared Paths

In addition to the nominated Secondary Routes, Local Routes and Safe Active Streets outlined in the preceding sections of this report there are many other missing links in the City's shared path network. While these missing links may not form part of major continuous cycling routes they can be the difference between encouraging a parent to ride to school with their child or take up cycling as part of a more active lifestyle.

A review of missing links within the City has been undertaken and the sections listed in **Table 7-2** have been identified for future shared path funding. These links are considered to be a lower priority than the links to Forrestfield Station and the Safe Active Streets program.

Table 7-2 Shared Path Expansion Program

Suburb	Street	From	To	Comments
Bickley	First Ave	Nairn Rd	Lawnbrook Rd E	Serves Carmel Adventist College (Primary), replacing narrow footpath.
Gooseberry Hill	Ledger Rd	Huntley St	Aboyne Rd	Serves Gooseberry Hill Primary School, replacing narrow footpath in front of school.
Kalamunda	Burma Rd	Connor Rd	Orange Valley Rd	Serves Falls Road Primary School, replacing narrow footpath.
Lesmurdie	Albert Rd	Reid Rd	Arthur Rd	Serves Lesmurdie Senior High School, replacing narrow footpath.
Lesmurdie	Gladys Rd	Welshpool Rd E	Grove Rd	Serves Mazenod College and Lesmurdie Primary School, replacing narrow footpaths.
Lesmurdie	Grove Rd	George Rd	Chislehurst Rd	Missing link in a continuous shared path route.
Lesmurdie	Lesmurdie Rd	Welshpool Rd E	Rootes Rd	Missing link in a continuous shared path route, replacing a narrow footpath.
Lesmurdie	Reid Rd	Albert Rd	Pomeroy Rd	Serves Lesmurdie Senior High School, replacing narrow footpath.
Lesmurdie	Sanderson Rd	Wiloughby Rd	Gilroy Rd	Serves Lesmurdie Primary School, replacing narrow footpath in front of school.
Lesmurdie	Trafalgar Road - Kimbarlee Way	Waterloo Cres	Falls Road	Serves Falls Road Primary School, replacing narrow footpath.

7.6 Training Routes

7.6.1 Background

The City of Kalamunda is a premium destination for recreational / training riders; both for single riders and for group / club rides. These types of riders are attracted to relatively low traffic volumes, uncongested riding environments, scenery and the hills, which suit the desired training patterns.

These riders generally do not require dedicated or protected infrastructure and are satisfied to ride in low levels of mixed traffic; most of the perception of safety or congested comes from frustrated motorists who are not able to easily and safely overtake cyclists on many sections of the rural and semi-rural road network.

Accordingly, the recommended strategy for the training routes is to manage the conflicts between cyclists and motorised traffic, mainly through signage and other behavioural strategies, while also implementing certain minor infrastructure improvements where warranted and feasible. The nominated projects provide benefits to both cyclists and other road users – drivers will be able to more easily overtake in a safe manner, reducing delays and frustrations and correspondingly improving safety for riders.

The following sections outline the recommended actions for the key training routes.

7.6.2 Welshpool Road East

Welshpool Road East is the primary access point for training riders entering the City; however, it is also the Restricted Access Vehicle (RAV) route to/from the Brookton Highway, which is major grain haulage corridor to the CBH Metro Grain Centre at Forrestfield and the ports at Kwinana. As a result, there is a mix of local commuter traffic, cyclists and road trains using the route – this leads to conflicts in certain sections and at certain times of day.

> From **Tonkin Highway to Lesmurdie Road** – the route is a four-lane divided road with 70-80km/h speed zones and a very steep climb up the Darling Range. The second lane in each direction allows drivers to easily overtake cyclists in each direction. Additional signage to provide advance warning to drivers is recommended – e.g. ‘Steep Climb Ahead – Watch for Slow-Moving Cyclists’ or ‘Cyclists Ahead – Change Lanes to Overtake’.

> The **Lesmurdie Road intersection** is the location of nearly 25% of bicycle crashes in the entire City, most of which are ‘through-right’ crashes where a driver exiting Lesmurdie Road collides with a cyclist continuing east on Welshpool Road East. Works were undertaken in 2014/15 to address the crash problem however these works have not been effective as a further 5 crashes were reported in the 21 months between the completion of works and the end of the reporting period (April 2015-December 2016). Further works are recommended as shown in **Figure 7-19**. These works may be eligible for Black Spot funding given the crash record at this location.

> From **Lesmurdie to Canning Road** the route is a single lane in each direction with several short, steep sections in a rural-type cross-section. Many cyclists turn off the route onto Pomeroy Road, while others continue to Canning Road and on to Pickering Brook. On this section the main issue is the speed differential between slow-moving uphill cyclists and light vehicles travelling at 70km/h+, with very few opportunities for safe passing. Downhill cyclists are less of a perceived issue, as travel speeds are generally higher.

In the long term it is recommended that Welshpool Road East be widened to provide 2.0m wide sealed shoulders – or an additional traffic lane – in each direction. This would have significant benefits for road users on this route, allowing easy overtaking of slow-moving cyclists, heavy vehicles and other traffic.

Figure 7-19 Lesmurdie Road Intersection – Recommended Improvements

In the short-to-medium term, it is recommended that widening of targeted sections be undertaken, in order to reduce the conflicts between slow moving and fast moving traffic and create a 'release valve' where drivers can safely overtake. On Welshpool Road East, the recommended sections are:

1. Eastbound – Lesmurdie Road (SLK 4.96) to Albert Road (SLK 5.62) – length 600m
2. Eastbound – SLK 6.52 to SLK 6.79 – length 270m
3. Eastbound – Tanner Road (SLK 7.11) to SLK 7.50 – length 400m

The recommended width of shoulders on these sections is 2.0m, which is sufficient for a group riding 2-abreast to ride completely out of the general traffic lane and maximise the safe overtaking opportunities. In some locations, it may be prohibitively expensive to achieve full width shoulders and therefore a reduced width of at least 1.5m could be considered. Shoulder widths below 1.5m are not likely to be effective and may have a negative road safety outcome by encouraging drivers to overtake when not safe to do so.

7.6.3 Canning Road (south of Pomeroy Road)

Canning Road, south of Pomeroy Road, is a two-lane typical rural type road. It is constructed to older design standards with no sealed shoulders and with many crests and curves which makes the safe overtaking of cyclists difficult in many locations. Power poles are located close to the road along most of the length of this road which makes sealing of shoulders and widening of the carriageway difficult in many locations.

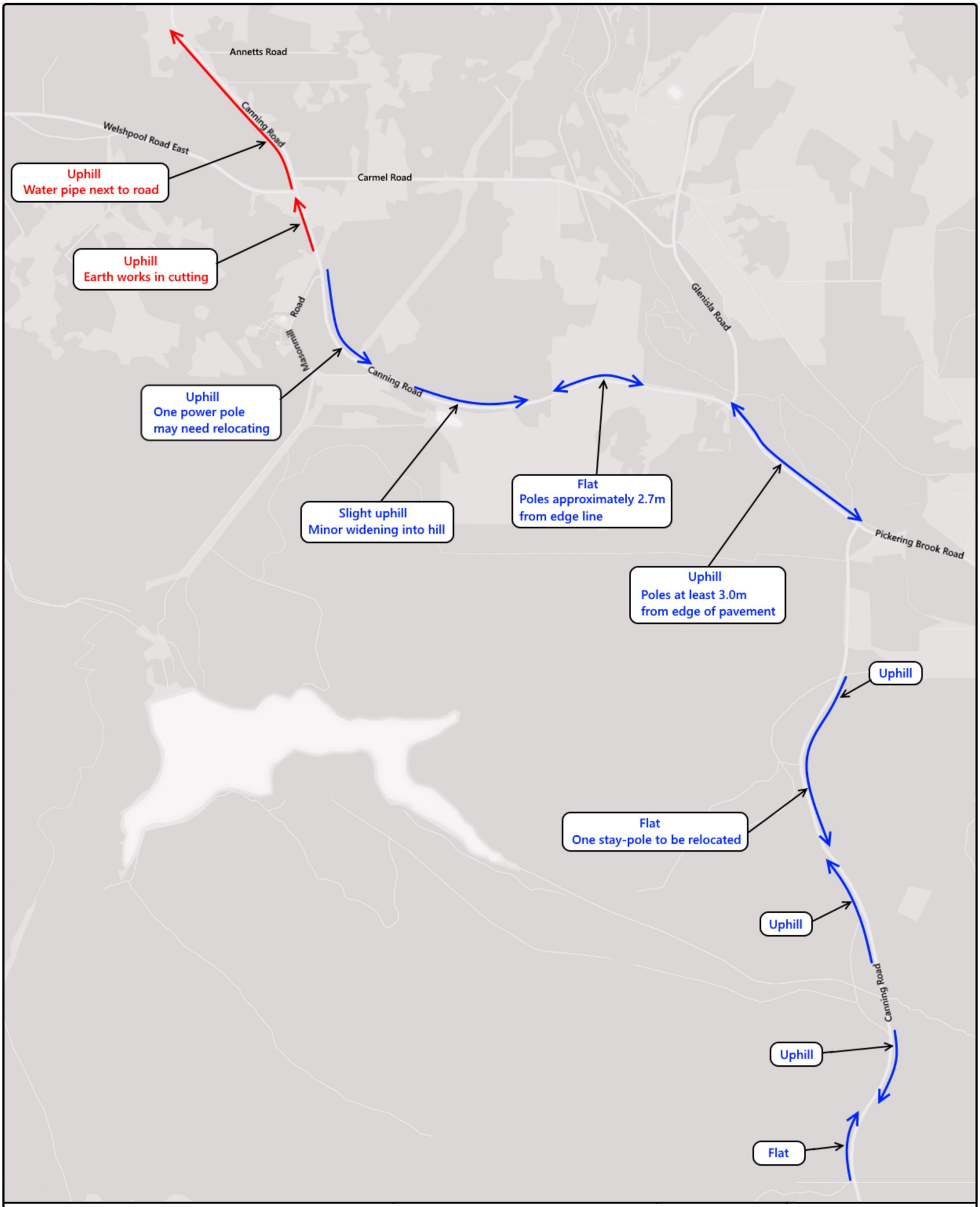
Canning Road is heavily used by training cyclists along its full length. The section between Welshpool Road East and Pickering Brook Road provides access to the training routes in the Pickering Brook area. The section south of Pickering Brook Road provides access to other popular training routes such as Canning Mills Road and the Canning Dam area. Sections of Canning Road have been identified by the public as high-risk areas as a result of the combination of steep grades, restricted visibility, vehicle speeds and heavy haulage.

In the long term, it is recommended that Canning Road be widened to provide 2.0m sealed shoulders in each direction between Welshpool Road East and the City Boundary. Due to the earthworks required and the cost of relocating power poles, this is likely to be an expensive project requiring State or Federal Government funding support given the strategic importance of Canning Road as a heavy vehicle route.

In the short term, a Road Safety Audit should be undertaken to identify the level of risk and assist the City in applying for State and Federal funding assistance. The Audit should identify the highest risk locations and present recommendations for staged improvements to the level of road safety along the corridor.

In the short-to-medium term, it is recommended that widening of targeted section be undertaken in order to reduce the conflicts between slow moving and fast moving traffic and create a 'release valve' where drivers can safely overtake. A preliminary review of Canning Road identified that widening was desirable, and could be undertaken at relatively low cost, at the locations shown in **Figure 7-20**. More detailed investigations would need to be undertaken to determine the feasibility and priority of widening at these locations.

Also shown on **Figure 7-20** is the long uphill climb from Welshpool Road East northbound towards Kalamunda. This section has a large water supply pipeline located very close to the edge of the road on the western side and a narrow road reserve; detailed investigations of this section should also be carried out to determine the feasibility of future widening.



Legend

High difficulty or cost

Low difficulty or cost

(Shoulder widening in the direction shown by the arrow)

Figure 7-20

Canning Road
Preliminary Widening Locations

7.6.4 Mundaring Weir Road

Mundaring Weir Road is a popular training route as part of a loop through Greenmount, Darlington, Mundaring and Kalamunda. It is also a very popular route for recreational driving and motorcycle riding and there has been some public frustration expressed at the conflicts between the various user groups in recent years.

Mundaring Weir Road does not serve any significant commuter function, nor does it carry any appreciable volume of heavy vehicle traffic – it is essentially a tourist and local access route as well as access to many Mountain Bike Trails Hub in the hills. Traffic data sourced from MRWA shows that Mundaring Weir Road carries in the order of 1,500 vehicles per day (vpd) with 7% being heavy vehicles (approximately 100 vpd). Therefore, targeted widening of the route to the same standards recommended for Welshpool Road East and Canning Road cannot be justified based on the volume and type of traffic currently using the route, however there is still a need for some targeted improvements to be undertaken to address higher risk sections of the road.

There are a number of steep and winding sections which are popular with riders, including the climb from Aldersyde Road to Kalamunda and from Aldersyde Road eastbound towards Mundaring. Both of these sections are located in sideling country and would be very expensive to widen to provide significant additional pavement width. The current 60km/h speed limit is appropriate for the winding alignment and slow-moving traffic.

During the community consultation, the key issues raised by existing cyclists included:

> Near misses with drivers overtaking on uphill sections

> Edge of seal in poor condition so cyclists ride further to the centre of the lane than desirable

> A desire for additional warning and behavioural signage such as ‘Shared the Road’ messages.

The recommended strategy for Mundaring Weir Road is three-fold:

> Undertake a Road Safety Audit to identify high risk areas and to inform the scope of the widening.

> Identify flat and straight sections of the road where widening of the seal could be achieved, to increase the safety of overtaking manoeuvres.

> Develop a comprehensive warning and behaviour signage program, targeting the narrow, steep and winding sections of the road where drivers should expect to encounter slow-moving cyclists. The signs could include messages to expect slow-moving cyclists (including activated warning signs) or information as to how far away the next safe passing opportunity is.

7.6.5 Signage and Behavioural Strategies

Behavioural strategies will be critical to the ongoing management of competing road user groups in the hills. The focus should be on informing road users to expect to see cyclists, particularly on the popular training routes, and encourage safe and courteous behaviour from all road users.

The recommended strategy contains a number of elements, including:

1. ‘Entry Statement’ or ‘Welcome’ signage at key entrance points to the training routes, clearly informing road users that they are entering a road network which is shared between multiple user groups, each with the right to use the road safely. Such signage could incorporate either ‘City of Kalamunda’ or ‘Perth Hills’ tourism branding, to clearly link the road safety message with the other information given to tourists. An example of such a sign is shown on **Figure 7-21**, based on similar signage entering the Ferguson Valley in the Shire of Dardanup or **Figure 7-22** for an example of a ‘Welcome’ sign at a local level.

2. Local ‘Gateway’ warning signage at locations where road users enter a designated training route, such as the example shown in **Figure 7-23**. This type of signage is a reminder to road users to anticipate training riders on the road ahead. It should be used on the more lightly trafficked training routes such as in the Bickley Valley and Pickering Brook areas.

3. ‘Behavioural’ signage located at regular intervals along the busier training routes – i.e. Welshpool Road East, Canning Road and Mundaring Weir Road. Some examples of behavioural signage is

shown in **Figure 7-24** and **Figure 7-25**. The purpose of these signs is to encourage safe overtaking manoeuvres and these could be accompanied by supplementary plates that indicate the distance to the next safe passing place – i.e. the widened shoulders sections recommended in **Sections 7.6.2 and 7.6.3**.

4. Warning signs, including activated (via sensors that are triggered by a passing cyclists) warning signs, placed on targeted locations where significant speed differentials can be expected, or there are sight distance restrictions, and insufficient room for drivers to safely overtake in typical conditions. Some examples of these signs are shown in **Figure 7-26**, **Figure 7-27**, and **Figure 7-28**.

A Strategy Plan, incorporating indicative locations for the above sign types, is presented in **Figure 7-29**. This should form the basis of discussions with Main Roads as the approval authority for signs and lines.

Figure 7-21 Possible 'Entry Statement' signage style

Figure 7-22 Example of a Locality Sign

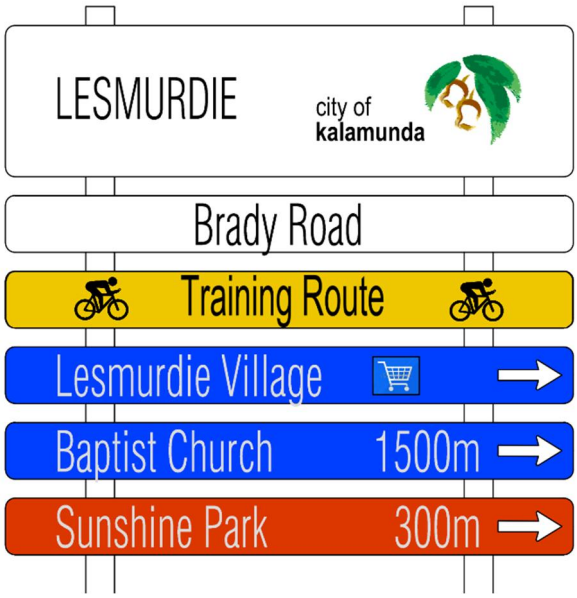


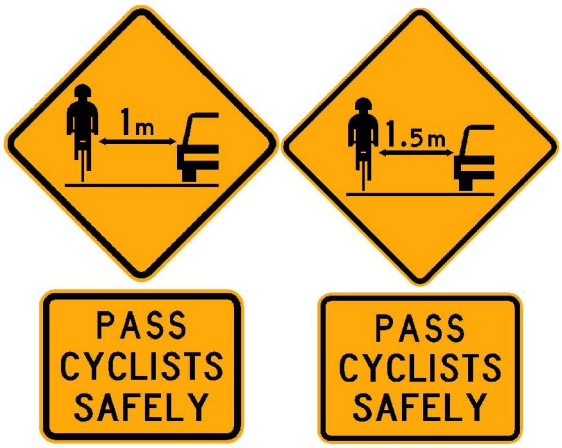
Figure 7-23 Example of Informative Warning Signage – Queensland

Source: www.glasshouse-mountains.com

Figure 7-24 Example of behavioural signage – Kansas, USA

Source: Kansas Cyclist

Figure 7-25 Example of behavioural signage – Tasmania



Source: Department of State Growth | Transport

Figure 7-26 Examples of activated warning signs - Queensland

Source: TMR Technical Note 137 Bicycle Activated Warning Signs, March 2015

Figure 7-27 Examples of activated warning sign – Victoria

Source: Amy Gillett Foundation

Figure 7-28 Examples of activated warning sign – Cootamundra NSW

Source: Cootamundra Herald

FORRESTFIELD NORTH
FORRESTFIELD
WATTLE GROVE
KALAMUNDA
LESMURDIE
BICKLEY
PICKERING BROOK
MUNDARING WEIR

CLIMB FROM MUNDARING WEIR FOR 2.5KM

CLIMBS FROM ALDERSYDE ROAD TOWARDS KALAMUNDA AND MUNDARING

LESMURDIE HILL

STEEP PINCH AND CORNER

POOR SIGHT DISTANCE, CURVES AND CRESTS

Sign Types

ES	Entry Statement	Primary Routes	
GW	Gateway	Secondary Routes	
B	Behavioural	Training Routes	
AW	Activated Warning		

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CITY OF KALAMUNDA
BICYCLE PLAN
FIGURE 7-29
PRELIMINARY TRAINING ROUTE
SIGNAGE AND BEHAVIOURAL STRATEGY

Date	Scale	Size
10.04.2018	NTS	A3
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Drawing Number		Revision

7.6.6 Safe Passing Distance Law Review

The State Government has recently implemented a minimum passing distance law that requires a driver of a motor vehicle, when passing a bicycle travelling in the same direction, to do so at a safe distance, being:

> 1 metre on roads where the posted speed limit is 60 km/h or less;

> 1.5 metres on roads where the posted speed limit is more than 60km/h.

The law also allows drivers to cross centre line markings including single and double white lines, as well as painted medians, to overtake cyclists when safe to do so.

Community feedback has indicated that the new law may have changed driver behaviour and potentially increased the level of risk at some locations on some trainings. It is recommended that the City undertake a review of the Safe Passing Distance Law relative to the Training Routes and identify any high-risk locations and remedial measures. This review should include consultation with road users, including cyclists.

7.7 Schools Analysis

Schoolchildren are a key element of the 'Interested but Concerned' cycling demographic and a key target market for any Bicycle Plan. It well documented that if schoolchildren can develop a habit of cycling to school they are more likely to continue cycling into adulthood even after obtaining a driving licence.

To ensure the Bicycle Plan targets this demographic, the schools within the City have been analysed to identify gaps in the existing path network that may be barriers to children cycling to school. In addition, schools have been identified as key traffic generators for the Local Routes developed in the foothills portion of the City. A distinction has been made in the network planning process between local intake schools whose students generally live within easy cycling distance and semi-rural communities and specialist schools where a much higher proportion of students travel long distances to school. High schools have also been prioritised over primary schools as students of high school age are more likely to be travelling to school alone and their parents are generally more comfortable letting them ride to school if the infrastructure is suitable.

Table 7-3 presents a summary of the issues identified for each school and the components of the network plan that serve each school. It should be noted that very few responses to the surveys were received from the schools and/or school students. The City should consider a targeted consultation strategy in the future to encourage a greater interest in the Bicycle Plan from these important stakeholders.

Table 7-3 Schools Analysis – Summary

Suburb	School	Issues	Proposals
Bickley	Carmel Adventist College (Primary)	Independent specialised school with a wide student catchment.	Widen existing footpath on First Avenue to shared path standards.
Carmel	Carmel Adventist College (Secondary)	Independent specialised school with a wide student catchment.	Maintain existing path links.
Forrestfield	Darling Range Sports College	Lack of safe and convenient cycling routes through Forrestfield, connecting to the school. No cycling infrastructure connecting school to Maida Vale and High Wycombe residential areas.	Foothills Spine Local Route, with future extension through Maida Vale South urban expansion area. Sultana Road Secondary Route to connect residents of Forrestfield North with the school.
	Dawson Park Primary School	Low quality footpaths and shared paths	Forrestfield Safe Active Streets
	Forrestfield Primary School	Low quality footpaths and shared paths	Forrestfield Safe Active Streets
	Hill Side Christian College	Independent specialised school with a wide student catchment.	Foothills Spine Local Route, with future extension through Maida Vale South urban expansion area. Sultana Road Secondary Route
	Woodlupine Primary School	Low quality footpaths and shared paths	Forrestfield Safe Active Streets with path connections through public open space.
Gooseberry Hill	Gooseberry Hill Primary School	Low quality footpaths and shared paths.	New shared path along Ledger Road to replace existing narrow footpath in front of school.
	Mary's Mount Primary School	Low quality footpaths and shared paths.	Maintain and improve existing path links.
High Wycombe	Edney Primary School	Low quality footpaths and shared paths.	Safe Active Street along Kiandra Way and path connection to school as part of High Wycombe Local Route.
	High Wycombe Primary School	Low quality footpaths and shared paths.	Safe Active Street along Kiandra Way and Hamilton Road, plus improved path link along Swan Road as part of High Wycombe Local Route.
	Mathew Gibney Primary School	Low quality footpaths and shared paths.	Safe Active Street along Hamilton Road with improved shared path link along Munday Road as part of High Wycombe Local Route.
Kalamunda	Kalamunda Primary School	Low quality footpaths and shared paths.	Safe Active Street along Boonooloo Road.
	Kalamunda Senior High School	Low quality footpaths and shared paths.	Canning Road buffered cycle lanes as part of the Hills Spine Secondary Route. Central Road/Central Mall Safe Active Street

Suburb	School	Issues	Proposals
Lesmurdie	Falls Road Primary School	Low quality footpaths and shared paths. Missing link in continuous shared path route along Trafalgar Road. Some quiet streets missing footpaths	Construct missing link in shared path on Trafalgar Road. Construct missing link in shared path on Burma Road.
	Lesmurdie Primary School	Low quality footpaths and shared paths.	Replace narrow footpath in front of school with a shared path. Construct shared path along Gladys Road to replace narrow footpaths.
	Lesmurdie Senior High School	Low quality footpaths and shared paths.	Canning Road buffered bicycle lanes. Reid Road shared path to replace narrow footpath.
	Mazenod College	Independent specialised school with a wide student catchment.	Construct shared path along Gladys Road to replace narrow footpaths.
	St Brigid's College	Independent specialised school with a wide student catchment.	Maintain existing path links.
Maida Vale	Maida Vale Primary School	Low quality footpaths and shared paths.	Maintain existing path links.
Pickering Brook	Pickering Brook Primary School	Semi-rural school with a wide catchment and low population density.	Maintain and improve existing path links
Walliston	Kalamunda Christian School	Independent specialised school with a wide student catchment.	Canning Road buffered cycle lanes as part of the Hills Spine Secondary Route.
	Walliston Primary School	Low quality footpaths and shared paths.	Maintain and improve existing path links.
Wattle Grove	Wattle Grove Primary School	Low quality footpaths and shared paths Disconnected path network due to development of suburb not yet being completed	Thorogood Avenue Safe Active Street Connected path network as part of Foothills Spine Local Route

8 Infrastructure Upgrade Implementation Plan

8.1 Network Plan

The recommended Infrastructure Upgrades, as summarised in the Schedule of Works, are illustrated alongside the existing cycling infrastructure on **Figures 8-1 to 8-5**.

8.2 Schedule of Works

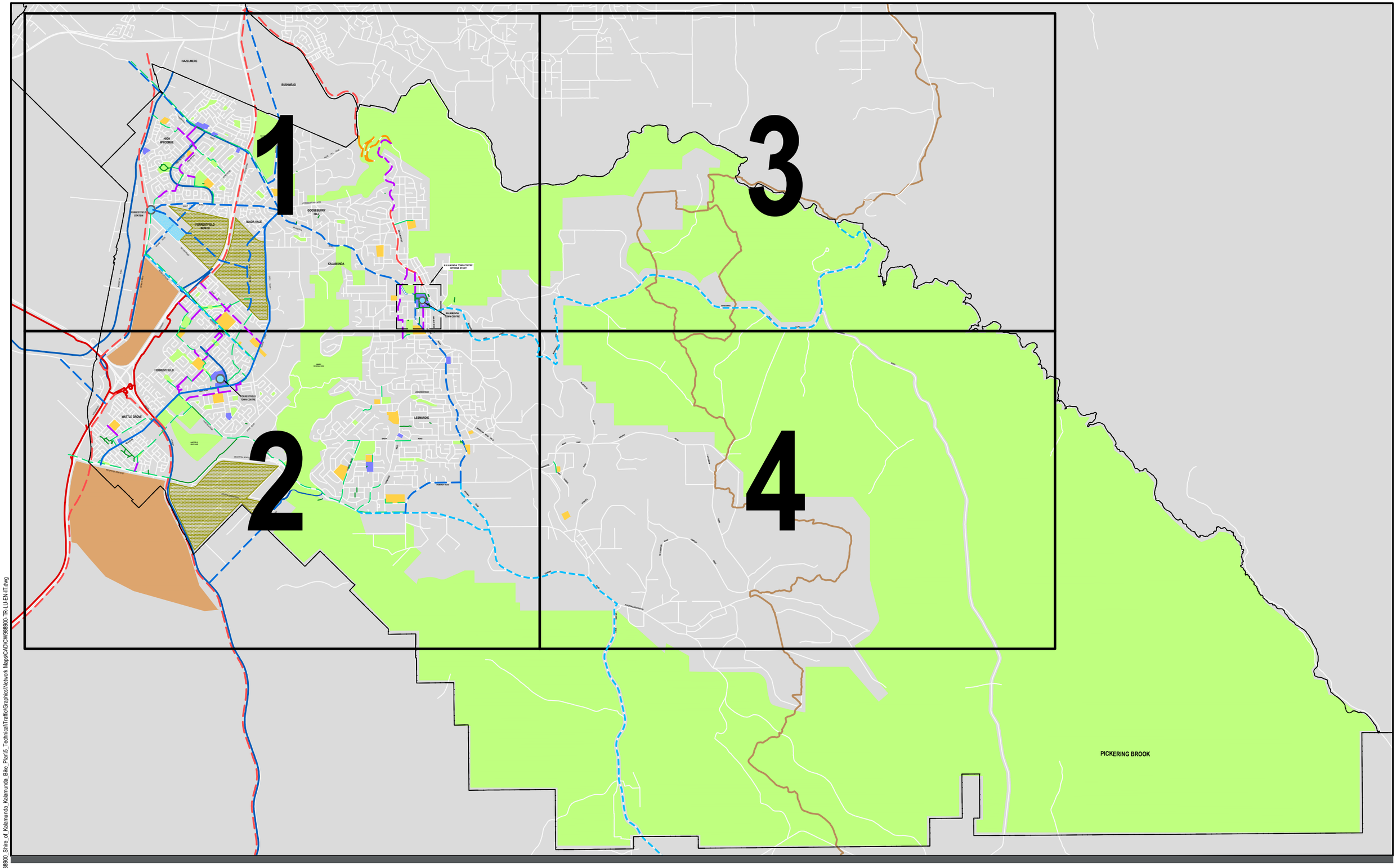
A Schedule of Works has been prepared for two budgeting scenarios: $500,000 per annum and $1,000,000 per annum; and the breakdown of proposed annual spending is shown in **Table 8-1** and **Table 8-2** for the $500,000 per annum and $1,000,000 per annum scenarios respectively. A full Schedule of Works and Maps illustrating the timing for both scenarios are provided in **Appendix C** and **Appendix D.** It should be noted that these estimates are preliminary in nature and will need to be verified after all the required works have been identified following the detailed design phase.

Table 8-1 Cost Allocations based on Indicative Timing - $500,000 per year

Period	Indicative Costs		
	City Funded	Potential External Funding	Total Cost
0-5 years	$2,710,000	$8,655,000	$11,365,000
5-10 years	$2,620,000	$7,660,000	$10,280,000
10-15 years	$2,688,000	$4,467,000	$7,155,000
15-20 years	$2,720,000	$3,085,000	$5,805,000
Beyond 20 years	$13,805,000	$1,030,000	$14,835,000

Table 8-2 Cost Allocations based on Indicative Timing - $1,000,000 per year

Period	Indicative Costs		
	City Funded	Potential External Funding	Total Cost
0-5 years	$4,900,000	$8,805,000	$13,705,000
5-10 years	$5,023,000	$8,392,000	$13,415,000
10-15 years	$5,065,000	$5,355,000	$10,420,000
15-20 years	$5,000,000	$2,210,000	$7,210,000
Beyond 20 years	$4,690,000	$-	$4,690,000



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CITY OF KALAMUNDA

BICYCLE PLAN

FIGURE 8-1

EXISTING & PROPOSED INFRASTRUCTURE

OVERALL MAP

Date	Scale	Size
10.04.2018	NTS	A3
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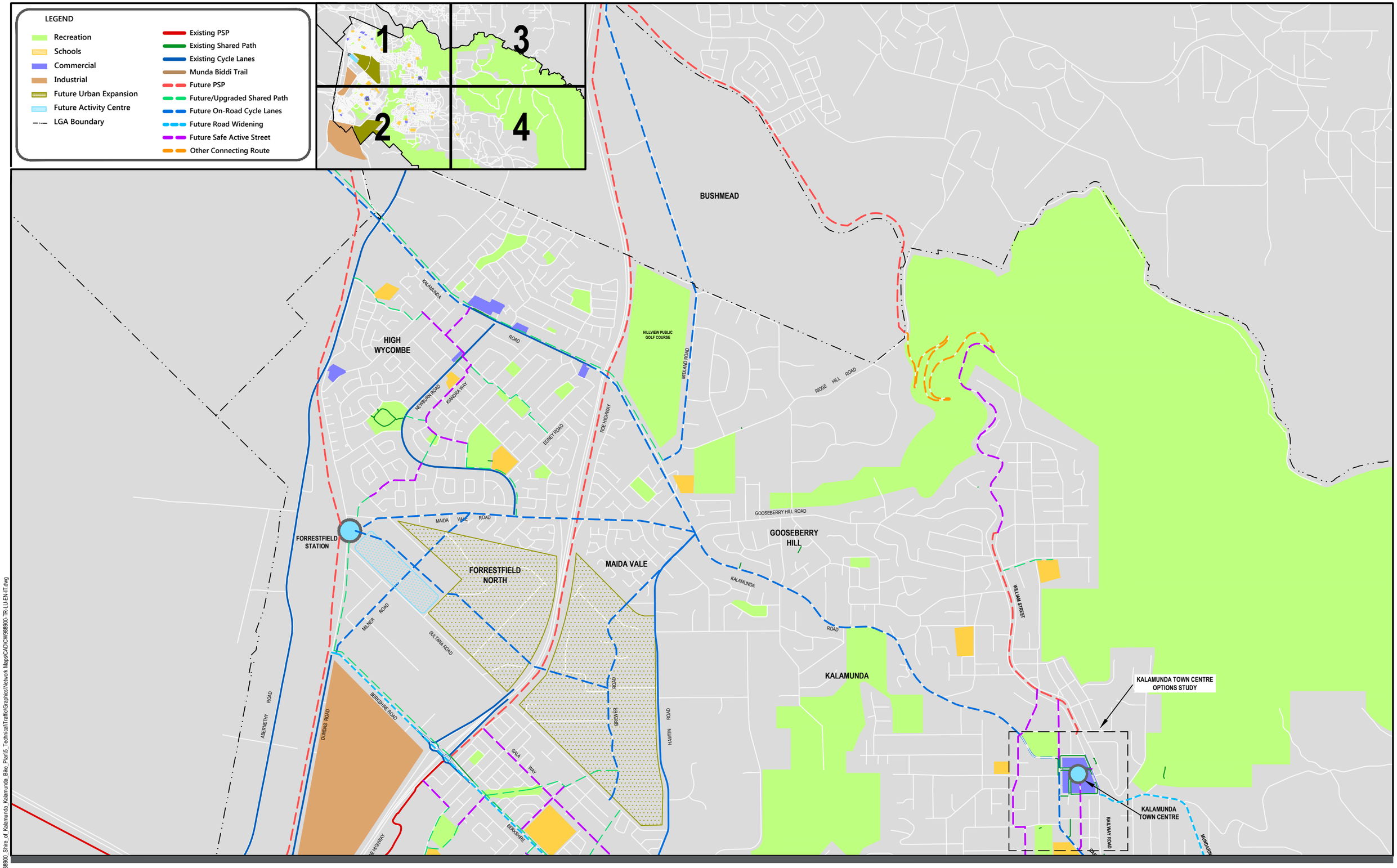
Drawing Number		Revision



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CITY OF KALAMUNDA
BICYCLE PLAN
FIGURE 8-2
EXISTING & PROPOSED INFRASTRUCTURE
QUADRANT 1

Date	Scale	Size
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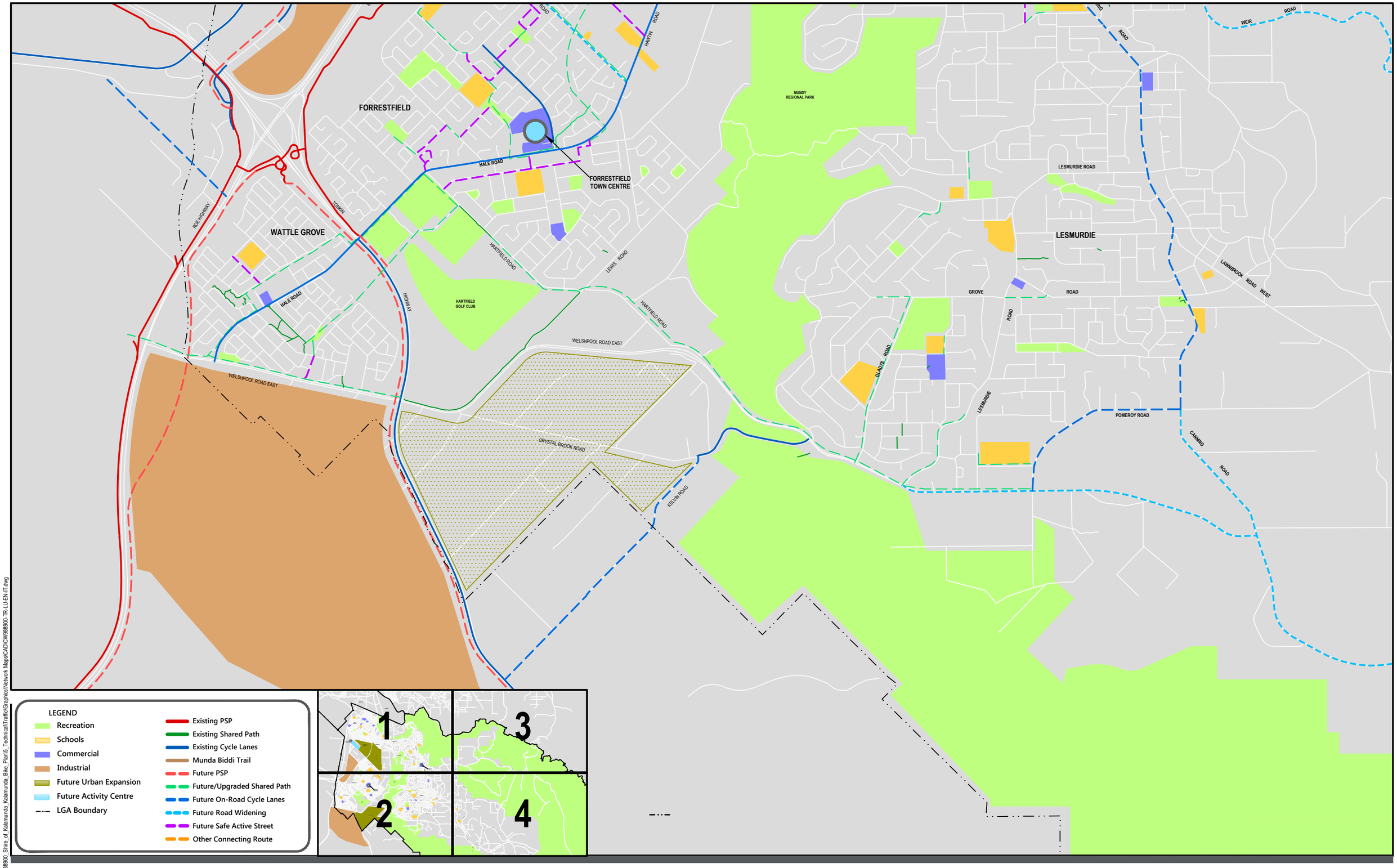
Drawing Number		Revision



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CITY OF KALAMUNDA
BICYCLE PLAN
FIGURE 8-3
EXISTING & PROPOSED INFRASTRUCTURE
QUADRANT 2

Date	Scale	Size
10.04.2018	NTS	A3

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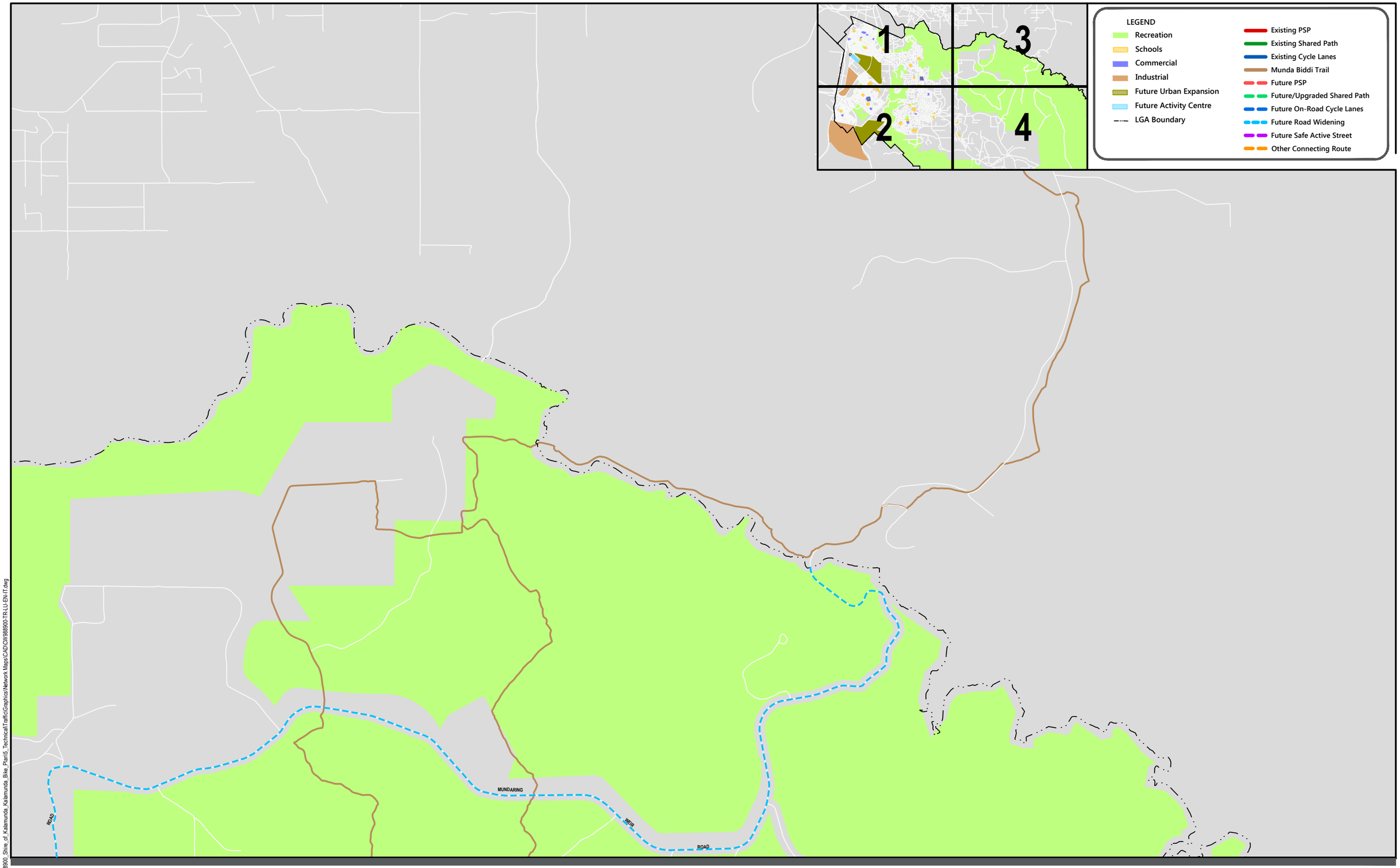

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CITY OF KALAMUNDA

BICYCLE PLAN

FIGURE 8-4

EXISTING & PROPOSED INFRASTRUCTURE

QUADRANT 3

Date	Scale	Size
10.04.2018	NTS	A3

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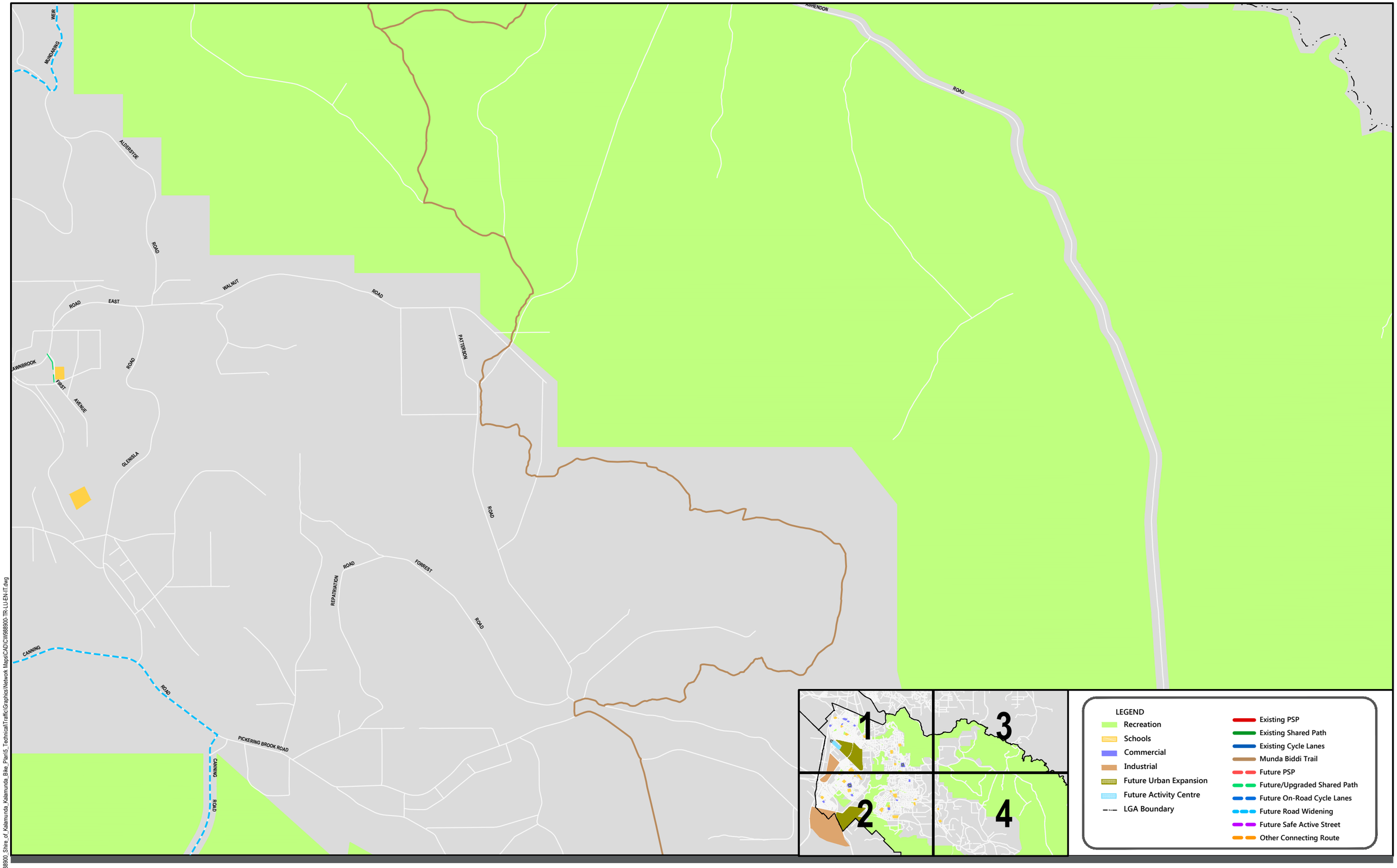
Revision



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CITY OF KALAMUNDA
BICYCLE PLAN
FIGURE 8-5
EXISTING & PROPOSED INFRASTRUCTURE
QUADRANT 4

Date	Scale	Size
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Drawing Number		Revision

Table 8-3 Schedule of Works - $500,000 per annum

Project No.	Routes	Description	Start	End	City Funded	Potential External Funded	Total Project Cost Estimate	Comment
0-5 Years								
80a	**Roe Highway**	PSP Completion Part of Roe Highway/Kalamunda Road Upgrade	Berkshire Road	Kalamunda Road		$2,260,000	$2,260,000	State Government Funded
81a	**Tonkin Highway**	PSP Extension on the Southern Side (including link to Hartfield Park)	Roe Highway	Welshpool Road East		$1,430,000	$1,430,000	State Government Funded
82a	**Freight Railway / Dundas Road**	Dundas Road PSP	Tonkin Highway	Forrestfield Station		$2,580,000	$2,580,000	State Government Funded
82b	**Freight Railway / Dundas Road**	Dundas Road PSP	Forrestfield Station	Wittenoom Road		$730,000	$730,000	State Government Funded Review priority when Forrestfield Station design is released
1a	**Hills Spine**	Zig Zag Option A	Ridge Hill Road	Ocean View Parade	$35,000		$35,000	
1d	**Hills Spine**	Kalamunda Town Centre Section Options Study	Canning Road	Elizabeth Street	$25,000	$25,000	$50,000	Potential WABN Grant Funding
2c	**Kalamunda Road**	Sealed Shoulder	Fernan Road	Abernethy Road	$560,000		$560,000	Include as part of existing planned upgrade
3d	**Forrestfield Station Connection**	Milner Road Protected Cycle Lanes	Maida Vale Road	Dundas Road		$620,000	$620,000	To be funded and constructed as part of the Forrestfield North District Structure Plan
20a	**Foothills Spine**	Welshpool Road East Shared Path (including to connection from Puddy lane to Hale Road)	Roe Highway (City Boundary)	Puddy Lane	$65,000	$65,000	$130,000	Potential WABN Grant Funding
20b	**Foothills Spine**	Puddy Lane Shared Path	Welshpool Road East Shared Path	Hale Road	$85,000	$85,000	$170,000	Potential WABN Grant Funding
20c	**Foothills Spine**	Hale Road Shared Path Extension	Extensa Road	Puddy Lane	$50,000		$50,000	
20d	**Foothills Spine**	Hale Road Existing Shared Path Upgrade (Western Side)	Extensa Road	Lenihan Corner	$320,000		$320,000	
21d	**High Wycombe Local Route**	Public Access Way Upgrades (through McLarty Way, and Walker Crescent)	Kiandra Way	Newburn Road	$95,000		$95,000	Potential external funding (non WABN)
21e	**High Wycombe Local Route**	Butcher Road & Palmer Crescent Safe Active Street	Newburn Road	Palmer Crescent	$390,000		$390,000	Potential external funding (non WABN)
21f	**High Wycombe Local Route**	Everitt Place Shared Path	Palmer Crescent	Maida Vale Road	$85,000		$85,000	Potential external funding (non WABN)
22a	**Berkshire & Dundas Road**	Berkshire Road (West of Roe Highway) Shared Path Upgrade	Roe Highway	Dundas Road	$230,000	$230,000	$460,000	Potential WABN Grant Funding
22c	**Berkshire & Dundas Road**	Dundas Road Shared Path	Berkshire Road	Forrestfield Station	$180,000	$180,000	$360,000	Potential WABN Grant Funding
44	**Forrestfield (Gala Way)**	Gala Way Safe Active Street	Fruit Tree Crescent	Hawtin Road	$50,000		$50,000	Allowance to supplement existing traffic calming
61a	**Canning Road**	Road Safety Audit	-	-	$25,000		$25,000	
61b	**Canning Road**	Targeted Shoulder Widening Stage 1	Pickering Brook Road	City Boundary	$225,000	$225,000	$450,000	Black Spot Funding
63	**Welshpool Road East**	Lesmurdie Road Intersection Safety Improvement	-	-	$40,000		$40,000	
64a	**Mundaring Weir Road**	Road Safety Audit	-	-	$15,000		$15,000	
64b	**Mundaring Weir Road**	Targeted Shoulder Widening Stage 1	Railway Road	City Boundary	$225,000	$225,000	$450,000	Black Spot Funding
65	**City of Kalamunda**	Safe Passing Law Review	-	-	$10,000		$10,000	
					TOTAL COST ESTIMATE (0-5 Years)		$11,365,000	
					CITY FUNDED		$2,710,000	

Project No.	Routes	Description	Start	End	City Funded	Potential External Funded	Total Project Cost Estimate	Comment
5-10 Years								
80b	**Roe Highway**	Roe Highway PSP Completion	Kalamunda Road	Brinsmead Road (Northern City Boundary)		$660,000	$660,000	State Government Funded
81b	**Tonkin Highway**	PSP Completion	Welshpool Road East	Kelvin Road/Mills Road		$1,310,000	$1,310,000	State Government Funded
1b	**Hills Spine**	Lascelles Parade / William Street Safe Active Street	Zig Zag Scenic Drive	Hill Street	$320,000	$320,000	$640,000	Potential WABN Grant Funding
1c	**Hills Spine**	Kalamunda Railway Heritage Trail Sealed Path	Hill Street	Elizabeth Street	$150,000	$150,000	$300,000	Potential WABN Grant Funding
1e	**Hills Spine**	Canning Road Buffered Bike Lanes Stage 1	Kalamunda Road	Railway Road	$380,000	$380,000	$760,000	Potential WABN Grant Funding
1f	**Hills Spine**	Canning Road Buffered Bike Lanes Stage 2	Railway Road	Lesmurdie Road	$600,000	$600,000	$1,200,000	Potential WABN Grant Funding
3a	**Forrestfield Station Connection**	Maida Vale Road Protected Cycle Lanes Stage 1	Forrestfield Station	Priory Road		$1,090,000	$1,090,000	To be funded and constructed as part of the Forrestfield North Developer Contributions Plan
3b	**Forrestfield Station Connection**	Forrestfield Station TOD Connector Road Protected Cycle Lanes Stage 1	Forrestfield Station	Roe Highway		$1,460,000	$1,460,000	Include as part of Forrestfield North District Structure Plan
21c	**High Wycombe Local Route**	Kiandra Way Safe Active Street	Western Avenue	Norling Road		$660,000	$660,000	SAS Program Funding
41a	**Forrestfield (Hibiscus Drive)**	Hale Road Shared Path	Hannover Street	Hibiscus Drive	$430,000		$430,000	
41b	**Forrestfield (Hibiscus Drive)**	Hibiscus Drive SAS	Bougainvillea Avenue	Strelitzia Avenue		$330,000	$330,000	SAS Program Funding
41c	**Forrestfield (Hibiscus Drive)**	Bougainvillea Avenue Shared Path	Hibiscus Drive	Dawson Avenue	$240,000		$240,000	
41d	**Forrestfield (Hibiscus Drive)**	Dawson Avenue Shared Path Upgrade	Bougainvillea Avenue	Pavetta Crescent	$260,000		$260,000	
41e	**Forrestfield (Hibiscus Drive)**	Pavetta Crescent SAS	Dawson Avenue	Roe Highway		$200,000	$200,000	SAS Program Funding
61c	**Canning Road**	Targeted Shoulder Widening Stage 2	Pomeroy Road	Pickering Brook Road	$250,000	$250,000	$500,000	Black Spot Funding
64c	**Mundaring Weir Road**	Targeted Shoulder Widening Stage 2	Railway Road	City Boundary	$250,000	$250,000	$500,000	Black Spot Funding
					TOTAL COST ESTIMATE (5-10 Years)		$10,280,000	
					CITY FUNDED		$2,620,000	

Table 8-4 Schedule of Works - $1,000,000 per annum

Item	Route	Primary Route	Start	End	City Funded	Potential External Funded	Total Project Cost Estimate	Comment
0-5 Years								
80a	**Roe Highway**	PSP Completion Part of Roe Highway/Kalamunda Road Upgrade	Berkshire Road	Kalamunda Road		$2,260,000	$2,260,000	State Government Funded
81a	**Tonkin Highway**	PSP Extension on the Southern Side (including link to Hartfield Park)	Roe Highway	Welshpool Road East		$1,430,000	$1,430,000	State Government Funded
82a	**Freight Railway / Dundas Road**	Dundas Road PSP	Tonkin Highway	Forrestfield Station		$2,580,000	$2,580,000	State Government Funded
82b	**Freight Railway / Dundas Road**	Dundas Road PSP	Forrestfield Station	Wittenoom Road		$730,000	$730,000	State Government Funded Review priority when Forrestfield Station design is released
1a	**Hills Spine**	Zig Zag Option A	Ridge Hill Road	Ocean View Parade	$35,000		$35,000	
1c	**Hills Spine**	Kalamunda Railway Heritage Trail Sealed Path	Hill Street	Elizabeth Street	$150,000	$150,000	$300,000	Potential WABN Grant Funding
1d	**Hills Spine**	Kalamunda Town Centre Section Options Study	Canning Road	Elizabeth Street	$25,000	$25,000	$50,000	Potential WABN Grant Funding
1f	**Hills Spine**	Canning Road Buffered Bike Lanes Stage 2	Railway Road	Lesmurdie Road	$1,200,000		$1,200,000	
2c	**Kalamunda Road**	Sealed Shoulder	Fernan Road	Abernethy Road	$560,000		$560,000	Include as part of existing planned upgrade
3d	**Forrestfield Station Connection**	Milner Road Protected Cycle Lanes	Maida Vale Road	Dundas Road		$620,000	$620,000	To be funded and constructed as part of the Forrestfield North District Structure Plan
20a	**Foothills Spine**	Welshpool Road East Shared Path (including to connection from Puddy lane to Hale Road)	Roe Highway (City Boundary)	Puddy Lane	$65,000	$65,000	$130,000	Potential WABN Grant Funding
20b	**Foothills Spine**	Puddy Lane Shared Path	Welshpool Road East Shared Path	Hale Road	$85,000	$85,000	$170,000	Potential WABN Grant Funding
20c	**Foothills Spine**	Hale Road Shared Path Extension	Extensa Road	Puddy Lane	$50,000		$50,000	
20d	**Foothills Spine**	Hale Road Existing Shared Path Upgrade (Western Side)	Extensa Road	Lenihan Corner	$320,000		$320,000	
20g	**Foothills Spine**	Hartfield Road Shared Path	Hale Road or Morrison Road	Sussex Road	$85,000		$85,000	
21d	**High Wycombe Local Route**	Public Access Way Upgrades (through McLarty Way, and Walker Crescent)	Kiandra Way	Newburn Road	$95,000		$95,000	Potential external funding (non WABN)
21e	**High Wycombe Local Route**	Butcher Road & Palmer Crescent Safe Active Street	Newburn Road	Palmer Crescent	$390,000		$390,000	Potential external funding (non WABN)
21f	**High Wycombe Local Route**	Everitt Place Shared Path	Palmer Crescent	Maida Vale Road	$85,000		$85,000	Potential external funding (non WABN)
21i	**High Wycombe Local Route Spurs**	Norling Road & Newburn Road Shared Path	Kiandra Way/Norling Road	Maida Vale Road	$320,000		$320,000	
21j	**High Wycombe Local Route**	Crake Court Public Access Way Upgrade	Kiandra Way	Newburn Road	$25,000		$25,000	Potential external funding (non WABN)

Item	Route	Primary Route	Start	End	City Funded	Potential External Funded	Total Project Cost Estimate	Comment
22a	**Berkshire & Dundas Road**	Berkshire Road (West of Roe Highway) Shared Path Upgrade	Ashby Close	Dundas Road	$230,000	$230,000	$460,000	Potential WABN Grant Funding
22c	**Berkshire & Dundas Road**	Dundas Road Shared Path	Berkshire Road	Forrestfield Station	$180,000	$180,000	$360,000	Potential WABN Grant Funding
25b	**Lesmurdie Local Routes**	Burma Road Shared Path Extension	Orange Valley Road	Connor Road	$70,000		$70,000	
25c	**Lesmurdie Local Routes**	Trafalgar Road - Kimbarlee Way Path Upgrade	Waterloo Crescent	Falls Road	$110,000		$110,000	
25d	**Lesmurdie Local Routes**	Grove Road Shared Path Missing Link 1	George Road	Gladys Road	$110,000		$110,000	
25e	**Lesmurdie Local Routes**	Grove Road Shared Path Missing Link 2	Lesmurdie Road	Rooth Road	$120,000		$120,000	
44	**Forrestfield (Gala Way)**	Gala Way Safe Active Street	Fruit Tree Crescent	Hawtin Road	$50,000		$50,000	Allowance to supplement existing traffic calming
63	**Welshpool Road East**	Lesmurdie Road Intersection Safety Improvement	-	-	$40,000		$40,000	
61a	**Canning Road**	Road Safety Audit	-	-	$25,000		$25,000	
61b	**Canning Road**	Targeted Shoulder Widening Stage 1	Pickering Brook Road	City Boundary	$225,000	$225,000	$450,000	Black Spot Funding
64a	**Mundaring Weir Road**	Road Safety Audit	-	-	$15,000		$15,000	
64b	**Mundaring Weir Road**	Targeted Shoulder Widening Stage 1	Railway Road	City Boundary	$225,000	$225,000	$450,000	Black Spot Funding
65	**City of Kalamunda**	Safe Passing Law Review	-	-	$10,000		$10,000	
					TOTAL COST ESTIMATE (0-5 Years)		**$13,705,000**	
					CITY FUNDED		**$4,900,000**	
5-10 Years								
80b	**Roe Highway**	Roe Highway PSP Completion	Kalamunda Road	Brinsmead Road (Northern City Boundary)		$660,000	$660,000	State Government Funded
81b	**Tonkin Highway**	PSP Completion	Welshpool Road East	Kelvin Road/Mills Road		$1,310,000	$1,310,000	State Government Funded
1b	**Hills Spine**	Lascelles Parade / William Street Safe Active Street	Zig Zag Scenic Drive	Hill Street	$320,000	$320,000	$640,000	Potential WABN Grant Funding
1e	**Hills Spine**	Canning Road Buffered Bike Lanes Stage 1	Kalamunda Road	Railway Road	$380,000	$380,000	$760,000	Potential WABN Grant Funding
3a	**Forrestfield Station Connection**	Maida Vale Road Protected Cycle Lanes Stage 1	Forrestfield Station	Priory Road		$1,090,000	$1,090,000	To be funded and constructed as part of the Forrestfield North Developer Contributions Plan
3b	**Forrestfield Station Connection**	Forrestfield Station TOD Connector Road Protected Cycle Lanes Stage 1	Forrestfield Station	Brewer Road		$1,460,000	$1,460,000	Include as part of Forrestfield North District Structure Plan
20i	**Foothills Spine**	Transmission Line Easement Shared Path	Berkshire Road	Sultana Road East	$340,000	$340,000	$680,000	Potential WABN Grant Funding
20j	**Foothills Spine**	Transmission Line - Strelitzia Avenue Shared Path Link	Strelitzia Avenue	Proposed Transmission	$170,000		$170,000	

Item	Route	Primary Route	Start	End	City Funded	Potential External Funded	Total Project Cost Estimate	Comment
				Line Shared Path				
21a	**High Wycombe Local Route**	Fernan Road Safe Active Street	Kalamunda Road	Hamilton Road	$80,000	$120,000	$200,000	60% funding from SAS Program
21b	**High Wycombe Local Route**	Hamilton Street Safe Active Street	Wittenoom Road	Kiandra Way	$188,000	$282,000	$470,000	60% funding from SAS Program
21c	**High Wycombe Local Route**	Kiandra Way Safe Active Street	Western Avenue	Norling Road		$660,000	$660,000	SAS Program Funding
21g	**High Wycombe Local Route Spurs**	Munday Road Shared Path	Wittenoom Road/Hamilton Street	Dundas Road	$270,000		$270,000	
22b	**Berkshire & Dundas Road**	Berkshire Road (East of Roe Highway) Shared Path Upgrade	Apricot Street	Hawtin Road	$890,000		$890,000	Timing will be influenced by the Forrestfield North District Structure Plan
25f	**Lesmurdie Local Routes**	Gladys Road Shared Path Section 1	Grove Road	George Road	$370,000		$370,000	
40a	**Forrestfield (Bauhinia Road)**	Bauhinia Road SAS	Dawson Avenue	Magnolia Way		$240,000	$240,000	SAS Program Funding
40b	**Forrestfield (Bauhinia Road)**	Dawson Ave Shared Path	Cedar Way	Bauhinia Road	$65,000		$65,000	
40c	**Forrestfield (Bauhinia Road)**	Cedar Way SAS	Cedar Way	Dawson Avenue		$240,000	$240,000	SAS Program Funding
40d	**Forrestfield (Bauhinia Road)**	Shared Path Upgrade - Bridge Over Woodlupine Brook	Cedar Way	Peach Tree Way	$270,000		$270,000	
40e	**Forrestfield (Bauhinia Road)**	Peach Tree Way SAS	-	-		$260,000	$260,000	SAS Program Funding
41a	**Forrestfield (Hibiscus Drive)**	Hale Road Shared Path	Hannover Street	Hibiscus Drive	$430,000		$430,000	
41b	**Forrestfield (Hibiscus Drive)**	Hibiscus Drive SAS	Bougainvillea Avenue	Strelitzia Avenue		$330,000	$330,000	SAS Program Funding
41c	**Forrestfield (Hibiscus Drive)**	Bougainvillea Avenue Shared Path	Hibiscus Drive	Dawson Avenue	$240,000		$240,000	
41e	**Forrestfield (Hibiscus Drive)**	Pavetta Crescent SAS	Dawson Avenue	Roe Highway		$200,000	$200,000	SAS Program Funding
47b	**Kalamunda Township**	Central Road / Central Mall Option	Canning Road	Railway Road	$510,000		$510,000	SAS Program Funding
61c	**Canning Road**	Targeted Shoulder Widening Stage 2	Pomeroy Road	Pickering Brook Road	$250,000	$250,000	$500,000	Black Spot Funding
64c	**Mundaring Weir Road**	Targeted Shoulder Widening Stage 2	Railway Road	City Boundary	$250,000	$250,000	$500,000	Black Spot Funding
					TOTAL COST ESTIMATE (5-10 Years)		$13,415,000	
					CITY FUNDED		$5,023,000	

8.3 Maintenance

Regular maintenance is required to keep cycling facilities in a reasonable condition. Cyclists are particularly vulnerable to punctures and crashes caused by broken glass, loose gravel and vegetation. Regular maintenance activities should include the following:

> Regular sweeping of paths to remove gravel, sand/earth, broken glass and vegetation;

> Targeted sweeping of known problem areas – e.g. paths through parks after a Saturday night;

> Prompt clean up from storms, fires and other one-off events which cause damage to paths;

> Regular pruning of vegetation to ensure the full path width is available; and

> A regular, documented system of visual path inspections to identify surface or structural defects. An allocation should be made in each financial year for preventative or remedial maintenance to address this type of issue.

9 Funding Opportunities

There are a number of funding opportunities available for implementing cycling facilities within Western Australia. **Table 9-1** shows funding streams that are relevant to the City of Kalamunda.

Table 9-1 Funding Opportunities

Funding Opportunities	Description
Western Australia Bicycle Network (WABN) Grants Program	> State funding initiative to assist local governments in Western Australia. > Funding for the design and implementation of bicycle network infrastructure and programs in accordance with the State's priorities set out in the WABN Plan. > Funding is available for up to 50 per cent of the total project cost. > Projects are encouraged to be spread over two financial years to facilitate high quality planning and design.
Connecting Schools Program (Local Government Based Grant)	> Grants for Local Government Area (LGA) to connect schools to cycling infrastructures and fill missing links in the path network around schools. > Application needs to submitted through the WABN Grants Program
Your Move Program	> Schools can receive grants for end of trip facilities and bike education programs from the DoT's Your Move Program for schools
Safe Active Street Program	> A new initiative by the DoT to fund and develop Bicycle Boulevard Projects in Western Australia > Application needs to submitted through the WABN Grants Program
Bikeweek Grants	> Community groups, organisations and local governments can apply to share in $30,000 in grants to support local cycling events and activities as part of Bikeweek.
Healthier Workplace WA	> Healthier Workplace WA offer small grants of up to $10 000 for workplaces to implement projects that promote and support workers' health and wellbeing.
RAC Community Sponsorships	> The program has a range of sponsorship categories for community groups to access including Grass Roots, Project and Partnership categories.
Office of Road Safety Community Grants	> To encourage community groups to participate in road safety, the Road Safety Community Grant Program provides from $50 to $1000 in event grants.
Black Spot Program	> National funding initiative to assist in implementing measures at roads with proven history of crashes. > Subject road would need to be nominated as a 'black spot' to be considered for funding. > Project proposals should be able to demonstrate a benefit to cost ratio of at least 2 to 1
Lotterywest Trail Grants	> A partnership between Lotterywest and the Department of Sport and Recreation to assist in developing trails in WA. The grant categories are planning, construction, and trail promotion.

10 Advocacy

The City has an important role to play in advocating for improvements to the cycling network that might be outside of its control or funding ability but are likely to bring significant benefits for the City's residents and visitors. This role includes two distinct elements:

> **Advocating** the State Government agencies and elected members to allocate funding for major projects, such as the Roe Highway upgrades (including the PSP) and Forrestfield Airport Link.

> **Participating** in the planning and design process to ensure that major projects are planned and designed to maximise the benefits for active transport within the City, and ensure that appropriate local connections are included within the scope.

The following is a summary of the major projects that it is recommended the City both advocate for and participate in the planning and design process.

Table 10-1 Major Projects

Project	Priority	Objective
Roe Highway PSP		
Berkshire Road to Kalamunda Road	High	Ensure that the PSP extension is included in the Roe Highway / Kalamunda Road interchange project, including grade-separation at Maida Vale and Berkshire Roads.
Kalamunda Road to City Boundary	Medium	Encourage the State Government to include an extension of the PSP from Kalamunda Road to connect to Midland Road near Brinsmead Road (City of Swan)
City Boundary to Midland	Medium	Advocate for early completion of the PSP to connect the foothills with Midland
Forrestfield Airport Link		
Maida Vale Road Protected bicycle lanes	High	Seek State Government funding support for the construction of protected bicycle lanes on Maida Vale Road to maximise the benefits of Forrestfield Station and encourage sustainable commuting behaviour from opening day
Sultana Road Bridge over Roe Highway	High	Seek State Government funding support for the construction of a bridge on Sultana Road over Roe Highway, including protected bicycle lanes, to encourage access by bicycle to Forrestfield North and Forrestfield Station
Midland to Kalamunda Secondary Route		
All sections	High	Seek State Government and City of Swan support for the route as a whole and collaborate with the City of Swan to seek State Government funding support to implement key sections.
Tonkin Highway PSP		
Roe Highway to Welshpool Road East Extend PSP along southern side	High	Participate in the planning and design process to ensure that the extension of the PSP on the southern side of Tonkin Highway is included within the scope of the Tonkin Highway upgrade. Seek State Government support for including the pedestrian and cyclist crossing under or over Tonkin Highway between Coyong Road and Hartfield Park.
Welshpool Road East to City Boundary	Low	Participate in the planning and design process
Welshpool Road East		
Hale Road to Tonkin Highway	Medium	Advocate for cycle lanes to be included in any upgrade works on Welshpool Road East.
Lewis Road to Lesmurdie Road	Low	Seek State Government funding support for future construction of a shared path on the Lesmurdie Hill section.

11 Encouragement and Education

While constructing new infrastructure is crucial to the promotion of cycling in the City, it is imperative to engender usage of new infrastructure through encouraging behaviour change. The following sections outline a variety of factors that influence cycling behaviour. In addition, methods to stimulate cycling change by encouraging those who do not currently cycle to take up cycling, as well as ensuring that existing cyclists will continue to ride throughout the City, will be outlined.

11.1 Cycling Segmentation

To achieve the City's strategic target to increase cycling activity within the LGA, segments of the population should be identified that may be more likely to cycle, cycle more often or to take up cycling for specific trips (to work, school or for recreation). When reviewing information regarding the City of Kalamunda's mode choices by residents and visitors, consideration should be made of those:

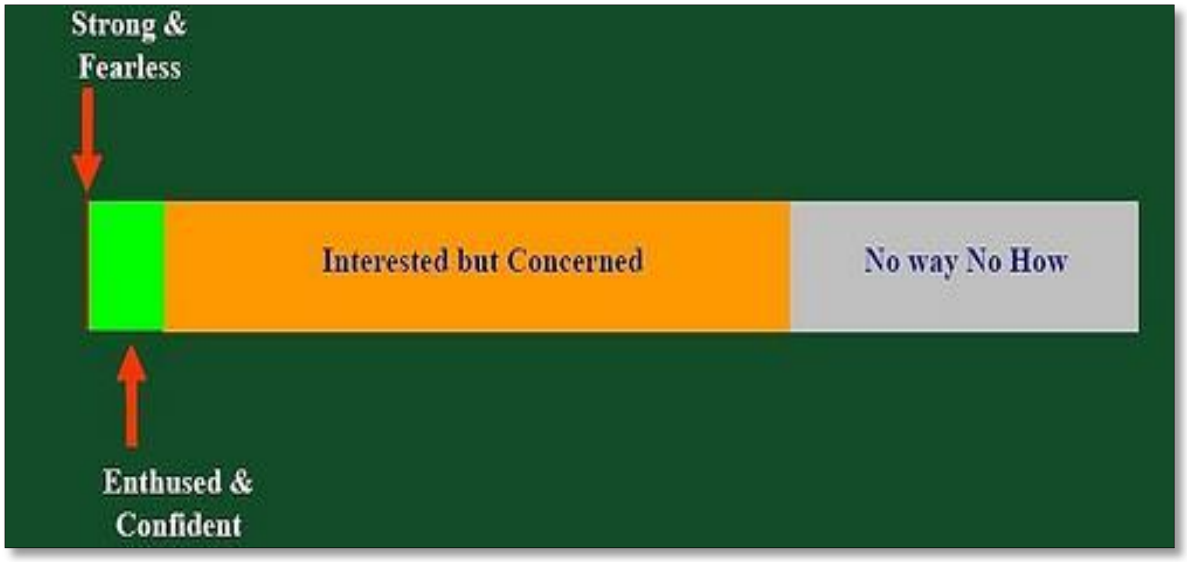
> travelling distances or journeys that could be made by bike;

> that own a bicycle (or have access to one); and

> that have a willingness to cycle.

Roger Geller's cycling segmentation (as illustrated in **Figure 11-1** below with the segments described in **Table 11-1)** is a best practice model for identifying the type and needs of existing and potential cyclists. Geller proposed this cycling segmentation during his work with the City of Portland in Oregon, which has since been supported through surveys and adopted as a schematic model for the purposes of cycling development.

Figure 11-1 Geller's Cycling Segmentation



Source: http://web.pdx.edu/~jdill/Dill_VeloCity_Types_of_Cyclists.pdf

Table 11-1 Geller's Cycling Segmentation – Descriptions

Type	Approximate Proportion	Description
Strong and Fearless	1%	Will ride anywhere and in any weather conditions.
Enthused and Confident	6%	Relatively comfortable on busy roads with bike lanes
Interested but Concerned	60%	Uncomfortable around traffic, feel unsafe.
No way, no how	33%	Not interested in cycling for transport

As it is recognised that the 'Strong and Fearless' group will likely cycle with or without specific behaviour change activities or infrastructure, and represent only a small proportion of the population of the City, an

emphasis for activities has therefore been placed on encouraging the remaining portion of the population that may cycle occasionally or for recreation. Cycling participation survey results estimate that approximately 77% of the population cycle at least occasionally for recreation. This proportion is likely to make up the 'Interested but Concerned' segment and even some of those who would never consider themselves "cyclists".

This segment will require the implementation of cycling infrastructure to start cycling, but holds the most potential for increasing cycling mode share. The purpose of behaviour change activities for this group is therefore to encourage the development of an appreciation of the benefits, provision of the tools and culture of support for cycling while the network develops.

This research and methodology has informed the proposed approach and activities for the City of Kalamunda.

11.2 Recommended Behaviour Change Approach and Activities

There are many models for using promotion to encourage behaviour change. **Table 11-2** provides an overview of the considerations based on Prochaska's model of the Stages of Change. This model is considered appropriate for the City, and provides a clear framework for identifying suitable promotional activities in order to increase the uptake of cycling for transport purposes. Specifically, for the 'Enthused and Confident' and 'Interested but Concerned' segments it provides focus on activities that promote 'everyday' cycling in a positive manner and focuses on tools to overcome identified barriers to cycling.

Table 11-2 Behaviour Change Approach

Stage of Change	Individuals Perception	Potential Activities and Interventions
Pre-contemplation	Not considering bike riding	**Raising the awareness of cycling** Introduce messages that portray riding as an activity that individuals associate with in a positive manner.
Contemplation	Aware of bike riding, the benefits and interested in finding out more	Ensure that **tools and resources are available** to support potential riders seeking *information*.
Preparing	Would like to give riding a go	**To be able to ride appropriately**, have access to a bicycle, to know how to ride it and have the relevant resources and facilities provided.
Action	Riding for the first time	Ensure **infrastructure and supporting facilities** are well maintained, safe, legible and convenient so that the new rider has a positive initial experience.
Maintaining	Riding again	**Positive reinforcement** – or the rider may not choose to ride again and relapse into their old behaviour (non-bike riding).
Relapse	Stopping riding	The rider may re-enter the stages of change at any of the above steps.

Source: Gatersleben and Appleton 2007, Contemplating cycling to work: Attitudes and perceptions in different stages of change, Transportation Research Part A: Policy and Practice, Vol.41, No.4, pp.302-312.

11.2.2 Raising the Awareness of Cycling

These activities ensure that positive messages regarding cycling are included wherever possible in order to raise awareness of cycling throughout the community. Particularly for the City, celebrating the introduction of new infrastructure should provide an important opportunity to raise awareness of cycling and encourage the wider public to give the new infrastructure a go.

Examples: Information regarding cycling related activities being included on the Council website, newsletters and community events. Opportunities to capture and promote feedback from riders regarding why they enjoy riding in the City of Kalamunda could also be included within this material. Positive imagery of cycling, and local infrastructure where possible, should be included in Council publications, plans and reports whenever appropriate.

11.2.3 Tools and Resources

In order to support those who may be considering cycling, knowledge of the provision of infrastructure through route maps, visible bicycle parking in convenient locations, guidance on cycling etiquette, road rules and cycling safely is recommended to help encourage and equip them to take action.

Examples: Relevant information could be supplied electronically in downloadable format from the Council's website, made available in printed format from the Library and Community Centre. As the Council will be looking to introduce new types of cycling and road user infrastructure, it is recommended that additional education and promotion is associated with these changes to ensure all users are informed and advised of appropriate use of the new facilities.

11.2.4 To be Able to Ride Appropriately

In order to ride a bike, you must have access to a bike to ride, and know how to ride it appropriately. Several councils within Western Australia work to address this barrier through providing cycle training courses, in order to introduce new riders or increase confidence for the inexperienced rider.

Some councils also provide cycling training specifically for women. These initiatives have been proven successful in getting the 'interested and concerned' group into cycling.

Examples: Cycling education courses and lead rides could be provided.

11.2.5 Infrastructure and Supporting Facilities

This Bike Plan provides a detailed list of recommendations regarding potential cycling infrastructure requirements, supporting facilities (such as bike racks) and the importance of maintenance. Cycling and other community events could be associated with the opening of specific bicycle routes and facilities as completion of the recommended infrastructure programs occurs, alongside ensuring appropriate promotion and education regarding the new facilities. Other supporting infrastructure could include signage and wayfinding tools, bicycle maintenance facilities such as air pumps and so on.

11.2.6 Positive Reinforcement

To encourage those who start riding, to continue riding, infrastructure must continue to meet users' needs and provide for a positive experience. To further reinforce this behaviour, opportunities to recognise and/or reward bike riders should be considered.

Examples: Cycling surveys and counts to demonstrate and promote improvements to the wider public, alongside using community events to recognise bike riders. Several authorities also participate in Super Tuesdays, which is a national annual bike count event. Others use Bike Week to provide an opportunity to both promote cycling and recognise existing riders, often through cycling breakfasts.

11.3 Bicycle Library

One of the major barriers to encouraging residents to take up cycling is not owning a bicycle. Purchasing a bicycle is a significant investment for many people and one which is unlikely to be made without some confidence that it will be frequently used.

To help overcome the barrier of "no bike" in getting people cycling, the City of Vincent invested in 10 bicycles with funding assistance from the Royal Automobile Club (RAC) and Zap Electric Vehicles, and set up a 'Bike Library" at the City's Beatty Park Library. Vincent residents are permitted to borrow the bicycles for a few hours at no cost, whilst longer riders attract a nominal fee. Non-residents with appropriate ID are also able to avail themselves of the scheme for a higher fee. The City of Vincent reports that the scheme has been a success, with the bicycle booked out most weekends and many weekdays – particularly the cargo bike, which allows car-less households to do shopping that would otherwise be prohibitive on foot or a regular bicycle.

The City should investigate the feasibility of a Bicycle Library scheme, potentially based at the Kalamunda, Forrestfield and High Wycombe libraries. The launch of the scheme could be tied to the opening of significant sections of Secondary Routes and Local Routes – e.g. the Hills Spine and the Foothills Spine – or the opening of Forrestfield Station as a way to encourage residents to ride to the station.

11.4 Targeted Driver Education

Driver education, when targeted properly, can be an effective tool in encouraging better road user behaviour. Safety focused industries, such as mining, focus significant training resources on driver education in order to protect the safety of employees, contractors and the public, forming a key component of their obligations under Occupational Health and Safety legislation. As a major employer, the City of Kalamunda has a responsibility to ensure that staff who are required to drive or cycle as part of their employment, are educated in appropriate road user behaviour, including sharing the road with cyclists.

It is recommended that the City to work with WestCycle to lobby MRWA and the Road Safety Commission (RSC) to implement a targeted driver education program.

11.5 School Programs

School children are a critically important component of the cycling community; they are the next generation of cyclists. The early exposure of children to cycling as an enjoyable way to spend their leisure time and to get to/from school has been proven to contribute significantly to children continuing to cycle into adulthood.

The major opportunities for encouraging school children to ride bicycles include:

> Cycling to/from school – the majority of children live within 5km of their school which is a comfortable cycling distance

> Cycling lessons at school – teaching children the basics of riding a bicycle and safety on and around the roads

> Organised cycling sport, either at school or on weekends, ranging from simple leisurely rides, to road riding and mountain biking

> 'Your Move' Program – participating schools can earn points by share stories regarding active transport. Points can be redeemed for items and services such as bike racks and bike education sessions.

The City, in conjunction with State Government agencies and community groups, could undertake programs to encourage school students to take up cycling. These initiatives should be continued at least once every two years, with different schemes targeting different age groups. A key focus should be children in the 10-14 age bracket, who are reaching the age where they may consider and are permitted by their parents to cycle to school.

A separate school program to target kindergarten or early primary school students (5-9 age bracket) can also be provided. The goal is to instil a good travel behaviour early in the student's life, with the hope that they would continue through to adulthood.

12 End of Trip Facilities

12.1 Background

EoT facilities are a critical, but often forgotten, component of the cycling network. The presence and/or quality of EoT facilities can often be the deciding factor for many cycling trips. Different trip purposes would have different needs when it comes to EoT facilities. For example:

> A commuter may want a secure place to park their bicycle inside their workplace, along with showers, lockers and ironing facilities to enable them to freshen up before commencing work for the day.

> A shopper may only want a secure short stay place to park their bicycle, conveniently located to their destination (e.g. close to the entrance of a shopping centre, or on the footpath in a 'main street' environment) which is ideally protected from wet weather.

> A recreational rider generally has EoT facilities at their own home but may require a secure place to park their bicycle at an intermediate destination, such as a cafe or a park.

Long stay EoT facilities for commuters should generally be provided by the employer. Council's involvement in the provision of end of trip facilities should be in the form of:

> Requiring, through its Town Planning Scheme, new developments to provide a certain standard of end of trip facilities for both employees and visitors.

> Providing suitable EoT facilities for employees and visitors at its offices, depots, library etc.

Short stay EoT facilities should generally be in the form of simple u-rails or other design, which facilitates the secure parking of a bicycle. In accordance with Austroads Guidelines, these should be located approximately every 30 metres along 'main street' type shopping strips and in small clusters at the entrances to shopping centres and other significant destinations.

Photograph 6 – End of Trip Facility – Cottesloe Beach

12.2 Locations

The City is responsible for providing bicycle parking on public land such as road reserves, parks, recreational facilities and City buildings. U-rails, with capacity for a minimum of 10 bicycles, should be provided at all major recreational facilities and City buildings. EoT facilities, such as showers, lockers, secure parking and washing/drying/ironing facilities should also be provided at workplaces for use by staff. Public bicycle parking in the form of U-rails should also be progressively installed in front of shops, businesses, cafes etc. across the urban area.

Bicycle parking adjacent to land uses should consider both the type of destination and the adjacent cycling infrastructure. Where cyclists are encouraged to ride in mixed traffic or within cycle lanes, on-street bike parking is particularly important. This can be provided in attractive 'bike corrals' which provide a high volume of bike parking within a small space, often a single car parking bay. This type of bike parking is ideally suited to main street environments.

One of the key locations with a shortage of bicycle parking is Haynes Street in Kalamunda town centre. It is recommended that at least 30 stylish U-rails be installed along the street, particularly adjacent to cafes that are frequented by training riders.

It is recommended that the City add locations of EoT to cycling related maps and brochures as well as inform DoT of any new additions to allow DoT's Comprehensive Bike Maps to be updated.

12.3 Development Provisions

The City of Kalamunda Local Planning Scheme 3 and relevant Planning Policies do not currently include requirements for long-stay bicycle parking or provision of EoT facilities for new developments.

It is recommended that the City either update Local Planning Scheme 3, or create a new Planning Policy which provides the required parking provision rates for various land use classifications. It is recommended that the bicycle parking requirements include provisions for long and short stay parking:

> Long stay bike parking is provided for all-day parking (e.g. for employees, students) would need to be of higher quality, secure (via bike cage or fully enclosed bike lockers) and would require an accompanying end-of-trip facilities such as lockers and showers.

> Short stay bike parking is for visitors and are usually in the form of a bike rails. As it is less secure than a bike cage or a bike locker, short stay bike rails need to be place close to the building and in well-lit areas where it can be easily seen.

Refer to **Table 12-1** for an example of bicycle parking requirements for various land uses and **Table 12-2** for the recommended quantum of showers and lockers.

Table 12-1 Example of Bicycle Parking Provisions

Land use	Long Stay (e.g. employee/resident)	Short Stay (Visitor/shopper)
Amusement parlour	-	2 plus 1 per 50 m^2 gfa
Apartment house	1 per 4 habitable rooms	1 per 16 habitable rooms
Art gallery	1 per 1500 m^2 gfa	2 plus 1 per 1500 m^2 gfa
Bank	1 per 200 m^2 gfa	2
Café	1 per 25 m^2 gfa	2
Community centre	1 per 1500 m^2 gfa	2 plus 1 per 1500 m^2 gfa
Consulting rooms	1 per 8 practitioners	1 per 4 practitioners
Drive-in shopping centre	1 per 300 m^2 sales floor	1 per 500 m^2 sales floor
Flat	1 per 3 flats	1 per 12 flats
General hospital	1 per 15 beds	1 per 30 beds
General industry	1 per 150 m^2 gfa	
Health centre	1 per 400 m^2 gfa	1 per 200 m^2 gfa
Hotel	1 per 25 m^2 bar floor area 1 per 100 m^2 lounge beer garden	1 per 25 m^2 bar floor area 1 per 100 m^2 lounge beer garden
Indoor recreation facility	1 per 4 employees	1 per 200 m^2 gfa
Library	1 per 500 m^2 gfa	4 plus 2 per 200 m^2 gfa
Light industry	1 per 1000 m^2 gfa	-
Major sports ground	1 per 1500 spectator places	1 per 250 spectator places
Market	-	1 per 10 stalls
Motel	1 per 40 rooms	
Museum	1 per 1500 m^2 gfa	2 plus 1 per 1500 m^2 gfa
Nursing home	1 per 7 beds	1 per 60 beds
Office	1 per 200 m^2 gfa	1 per 750 m^2 over 1000 m^2
Place of assembly	-	-
Public hall	-	-
Residential building	1 per 4 lodging rooms	1 per 16 lodging rooms
Restaurant	1 per 100 m^2 public area	2
Retail show room	1 per 750 m^2 sales floor	1 per 1000 m^2 sales floor
School	1 per 5 pupils over year 4	-
Service industry	1 per 800 m^2 gfa	-
Service premises	1 per 200 m^2 gfa	-
Shop	1 per 300 m^2 gfa	1 per 500 m^2 over 1000 m^2
Swimming pool	-	2 per 20 m^2 of pool area
Take-away	1 per 100 m^2 gfa	1 per 50 m^2 gfa
University/Inst. of Tech	1 per 100p/t students 2 per 100f/t students	-

Source: Austroads Guide to Traffic Management Part 11: Parking

Table 12-2 End of Trip Facilities Requirements

No. of long-stay bicycle spaces provided	No. of Lockers[1]	No. of Showers [2]
1-2	1-2	0
3-5	3-5	1
6-10	6-10	2 (one male, one female)
11-20	11-20	4 (two male, two female)
More than 20	20 or more	4 (two male, two female) **Plus** Additional showers at the rate of 2 showers (one male, one female) for every 10 long-stay parking spaces over 20 provided thereafter

Source: Austroads Guide to Traffic Management Part 11: Parking

Notes:

To be of suitable volume and dimensions to allow storage of clothing, towels, cycling helmets and footwear; well ventilated, secure and lockable; and located close to shower and change room facilities (where provided). A ratio of one locker to one bicycle space is to be provided.

Change room facilities must also be provided and may be either a combined shower and change cubicle or communal change room for each gender directly accessible from the showers.

13 Action Plan

The Action Plan shown below in **Table 13-1** summarises all the recommendations provided in this Bicycle Plan.

Table 13-1 Action Plan

Category	No.	Action
Infrastructure	1	Upgrade and expand cycling network as per the Schedule of Works (refer to **Section 8**)
Maintenance	2	Regularly maintain roads and path to ensure facilities are in good condition.
	3	Regularly prune vegetation to ensure that facilities are accessible
Advocacy	4	Advocate the State Government agencies or elected members for funding of major projects (e.g. Forrestfield Airport Link, PSPs)
	5	Participate in the planning and design process of major projects (e.g. Roe Highway PSP) and ensure connections to local neighbourhood are included within the scope
	6	Assign resource time to implement advocacy actions
Behaviour Change and Awareness	7	Raise awareness of cycling by including information regarding cycling related activities on the City's website, newsletter, and social media
	8	Make cycling related information such as route maps, road rules, safety, and cycling etiquette easily accessible, either electronically or in print form.
	9	Communicate new cycling infrastructure concepts (e.g. Safe Active Street) to residents through easily accessible means.
	10	Promote the completion of new cycling infrastructure or routes through related community or cycling events.
	11	Provide cycling education courses and lead rides to encourage inexperience riders to ride more often
	12	Participate in Super Tuesday annual bike count event and Bike Week to promote cycling and provide positive reinforcement to existing bike riders.
	13	Investigate the feasibility of a bicycle library scheme, potentially in libraries at Kalamunda, Forrestfield, and High Wycombe.
	14	Provide drivers education for City staff to encourage better road use behaviour, including sharing the road with cyclists.
	15	Collaborate with WestCycle to lobby MRWA and the Road Safety Commission to implement a Targeted Driver Education Program.
	16	Assign resource time (e.g. TravelSmart officer) to implement the Behaviour Change and Awareness actions.
School Programs	17	Conduct programs, such as cycling lessons and sport events, at schools within the City to encourage cycling uptake
	18	Encourage schools to participate in Your Move program.
Cycling Tourism	19	Commission a detailed investigation into the opportunities and benefits of promoting cycling tourism in the City and develop an Action Plan
	20	Establish a funding stream to assist businesses in becoming 'Bicycle Friendly Businesses' – e.g. by part-funding additional bicycle parking
End-of-trip (EoT) facilities	21	Conduct an audit of existing EoT facilities to identify and create/update an inventory and map of EoT facilities within the City. Provide updated inventory to DoT for inclusion in the Comprehensive Bike Maps.
	22	Provide suitable EoT facilities at public lands (parks, library) that are managed by the City
	23	Update the Local Planning Scheme to include requirements for EoT facilities for new developments or create a new bicycle parking policy

APPENDIX A

POLICY CONTEXT

Cardno
Shaping the Future

A. Policy Context

A.1 National Policies

A.1.1 National Urban Policy: Our Cities, Our Future (2011)

Our Cities, Our Future is the guiding national framework for shaping the future of our cities, focusing on improving their productivity, sustainability and liveability. The report identifies that although nearly 40% of Australians commute less than 10km to work or study, less than 1.6% cycle (p. 55). The absence of safe and convenient cycling routes is a major contributor to this low mode share. The report also notes that the infrastructure must meet the needs of its target users (p. 63), a key component of the network design philosophy for this Bike Plan.

A.1.2 Moving Australia 2030 (2013)

Moving Australia 2030 – A Transport Plan for a Productive and Active Australia was produced in 2013 by the Moving People 2030 Taskforce. The report outlines a whole-of-system approach to how we fund transport infrastructure, how we move people, how we move goods, and how we better integrate our spatial planning systems with effective transport networks.

Cycling is addressed within the report mainly in the context of a healthy and active Australia. The key relevant recommendation for this Bike Plan is to "Provide sustainable infrastructure funding that supports active travel". This Bike Plan supports this recommendation by identifying the highest priorities for allocating funding to cycling and a clear message that funding needs to be provided in all future years.

A.1.3 National Cycling Strategy (2010)

The Australian National Cycling Strategy 2011-2016 (NCS) was prepared by Austroads and the Australian Bicycle Council in September 2010. The purpose of this strategy is to double the existing rates of cycling in a holistic manner by supporting its myriad of benefits through promotion, infrastructure provision, integrated planning and safety improvements.

Benefits identified in the NCS (pp. 8-11) include:

- Societal Benefits - reduced traffic congestion as a result of commuters shifting to cycling modes, as well as increasing the land area available for urban activity
- Environmental Benefits - reduced carbon footprint as a result of a transition to active, zero-carbon transport
- Health Benefits - increased fitness has both a social and economic benefit to the community by encouraging interaction, improving quality of life and reducing health care costs arising from a sedentary lifestyle
- Equity Benefits - a comprehensive cycling network reduces the proportion of household income necessary to provide mobility. This is particularly beneficial for low income families and households located near the urban fringe, where public transport may be lacking
- Convenience - where cycling infrastructure provides a safe, comprehensive network for access to education, employment and entertainment precincts, cycling presents an efficient travel mode. Short trips are most affected by good cycling facilities.

A series of actions have been identified (pp. 27-29) to achieve the goal of doubling cycling mode share. This implementation framework focuses on the following priorities and objectives:

- Cycling Promotion - Promote cycling as both a viable and safe mode of transport and an enjoyable recreational activity
- Infrastructure and Facilities - Create a comprehensive network of safe and attractive routes to cycle and end-of-trip facilities
- Integrated Planning - Consider and address cycling needs in all relevant transport and land use planning activities
- Safety - Enable people to cycle safely

- > Monitoring and Evaluation - Improve monitoring and evaluation of cycling programs and develop a national decision-making process for investment in cycling
- > Guidance and Best Practice - Develop nationally consistent technical guidance for stakeholders to use and share best practice across jurisdictions.

This Bike Plan incorporates all the key actions listed above. In addition, the Bike Plan aligns with the NCS objective of "creating a comprehensive network of safe and attractive routes to cycle and end of trip facilities" (p. 22).

A.1.4 Walking, Riding and Access to Public Transport (2013)

This document is a Ministerial Statement from the Australian Government, setting out how the Government will increase the proportion of people walking and riding for short trips, and accessing public transport, in our communities. The document provides a summary of the benefits of greater use of active transport and guidelines for the coordination of land use and transport planning and development to achieve high quality outcomes.

There are no direct actions involving Local Government, however this Bike Plan is generally consistent with the aims and objectives of the document.

A.2 State Policies

A.2.1 Western Australian Bicycle Network (WABN) Plan 2014-31

The Western Australian Bicycle Network (WABN) Plan was released by the Department of Transport in 2014. This plan replaces the Perth Bicycle Network (PBN) and provides a framework for infrastructure improvements across Western Australia including Metropolitan and Regional areas.

The WABN Plan focuses on network improvements as a way of creating attractive and safe cycling corridors. The key aspects of this plan are as follows:

- > Implementation - Coordination between Government and non-Government Groups to ensure that the proposed infrastructure is delivered in an effective manner and to identify opportunities to integrate delivery across jurisdictions
- > Principal Shared Path Network Expansion - The Principal Shared Path network forms the backbone of the cycle network through Perth. The WABN focuses on funding improvements within 15km of the CBD to create safe and efficient links along major cycling routes to maximise the benefit of infrastructure funding
- > Perth and Regional Bicycle Network Grants - Additional funding to LGAs to plan and provide cycling infrastructure within their jurisdictions. This includes funding of Local Bike Plans, path infrastructure, signage and line marking
- > Connecting Schools Grant Program – Specific funding to LGAs for projects that improve bicycle access and end of trip facilities for schools, as well as providing behaviour change initiatives to promote cycling.
- > Network Focus - Improvements to the network will be prioritised to promote strategic connections to schools, major rail/bus stations and activity centres. To assist this process, Department of Transport is undertaking studies in consultation with Local Government to identify gaps and potential route alignments which would tend to attract funding
- > Review of Traffic Management on Local Roads- Local Government has a role in undertaking road works to reduce vehicle volumes and speeds through built-up areas. Some of the measures implemented through these programs have resulted in a reduction of on-road cyclist safety and an increase in conflict. The review will include a mix of what is seen as best practice and situations of reduced cycling safety, and consider safety aspects for all roads users, in keeping with the state road safety strategy 'Towards Zero'.

Significant increases in Local Government Regional Bicycle Network Grants funding for bicycle facilities were recommended in the WABN and committed to by the State Government. Many of the projects recommended as part of this Bike Plan will be eligible for grant funding and the City should apply for grants each year.

A.2.2 Perth Metropolitan Transport Strategy 1995-2029

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

> increased co-ordination of the development and use of the transport system as a whole;

> greater integration and mutual support between the transport system and land uses and;

> improved efficiency in the use of transport infrastructure and services.

The main elements provide a strong basis for the direction of transport management within Perth by ensuring that future development will be more efficient and integrated. The strategy also recommends an objective and target that is applicable to the Bike Plan.

Objective	Target
Promote walking and cycling	Incorporate walking and cycling guidelines in all metropolitan local authority town planning and transport planning schemes by 2000.

A further objective of the MTS is to more than double the non-commercial mode share of cycling trips to 11.5% of non-commercial trips by 2029. Current trends indicate that if no action is taken, cycling mode share will not reach this target.

A.2.3 Western Australia Planning Commission Development Control Policy 1.5 – Bicycle Planning (1998)

This policy describes the planning considerations which should be taken into account in order to improve the safety and convenience of cycling. Both State and Local Government agencies have been encouraged to promote cycling as a mode of transport because of:

> recognition of the adverse environmental effects of motor vehicles, particularly the private car
> moves towards the development of low-energy lifestyles, initially as a response to the “energy crisis” of the mid-1970s
> the need to make more efficient use of transport infrastructure
> increasing awareness that cycling reduces congestion and the need for car parks.

The policy sets out a requirement to ensure cycling is considered in all aspects of land use and transport planning. In particular, the policy recommends (pp. 5-6) that a cycling network should be developed for urban areas by:

> improving the existing road network and new subdivisional roads to meet the needs of cyclists more effectively
> providing off-road facilities of adequate standard where there is a strong demand (such as near schools) and where the opportunity exists
> providing information to enable cyclists to make the most effective use of the network
> ensuring that the needs of cyclists are adequately catered for in the planning, design and construction of extensions to the existing road network.

This Bike Plan has been prepared in accordance with these principles. The Bike Plan contains proposals to improve the existing road network, provide off-road facilities, provide information (by way of pavement markings and signs) to enable cyclists to use the network and ensure that cyclists are adequately catered for in future infrastructure projects.

The policy also supports the provision of appropriate end of trip facilities through the imposition of development conditions dealing with such matters as the type, number and location of bicycle parking facilities, and the installation of showers and change rooms with an emphasis on locations including:

> shopping centres
> factories
> offices
> educational establishments
> sport, leisure and entertainment centres
> health centres and hospitals
> libraries and other public
> buildings
> rail and bus stations
> major places of employment
> parks
> beaches and recreation venues
> tourist attractions

Recommendations for the location of future end-of-trip facilities have been included in this Bike Plan.

A.2.4 Bike Ahead: Bicycle Strategy for the 21st Century

The Bike Ahead plan recognises the significance of cycling to minimise the reliance people have towards using their cars as a sole mode of transport. According to the plan, an interconnected cycling network has the capacity to vastly enhance accessibility, which is an increasingly salient facet given the displacement of the growing population to the urban fringe. The Bike Ahead strategy emphasises a network of cycle facilities which:

> is convenient, accessible and safe;

> is comprehensive, providing access to most destinations for most cyclists;

> establishes connectivity; and

> has regional coverage.

The Perth Bike plan approach strategies are also covered within this document, with a broad array of information relating to cycling behaviour outlined.

> 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 cyclists have never been taught to ride a bicycle as a vehicle.

> 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.

> The majority of bicycle/motor vehicle accidents have, as one contributory factor, poor cyclist behaviour or, in the case of adult cyclists' accidents, poor motorist behaviour.

> Bicycle/motor vehicle accidents represent only 1 in 5 serious injury accidents and only 1 in 30 injury accidents for cyclists.

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

1. Bikewest to continue to be an advocate for cycling facilities and services and to co-ordinate cycling programs.
2. Review legislative basis for cycling and cycling facilities as a recognised transport mode.
3. Establish more effective links with road safety programs.
4. Introduce safe cycling programs target at motor vehicle users and pedestrians.

5. Identify, develop and signpost safe routes to defined local destinations including schools and commuter routes.
6. Encourage bicycle-friendly local area traffic management.
7. Provide appropriate on-road and published information and traffic signing.
8. Integrate bicycle use with public transport.
9. Promote design standards which encourage cycling without the need for totally separate facilities.
10. Define, establish and maintain continuous local cycling routes.
11. Define, protect and implement a regional cycle network.
12. Incorporate cycle requirements in local government planning schemes and policies.
13. Educate cyclists and other road users about rights, needs and responsibilities of cyclists.
14. Ensure bicycle facilities serve the needs of all cycle users.
15. Continue to implement the Perth Bikeplan of 1985.

The Perth Bicycle Network Plan (PBNP), which was produced as a supplementary document to Bike Ahead, expands upon the Perth Bikeplan by setting out the proposed cycle network for the Perth Metropolitan Region, to serve regional and, wherever possible, local cycle trips. Additional strategies are also covered throughout the Perth Bikeplan, and these include;

> public transport integration is primarily addressed in Bike Ahead, but the PBNP will ensure good cyclist access to train stations and other major public transport interchanges;

> local area traffic management is a key issue in the specific design of on-road bicycle routes, but needs to be addressed on the broader basis that 'every street is a bicycle street'.

In addition to maintaining the approach that every street is a bicycle street, opportunities for the development of the Perth Bicycle Network include;

> On-Road Bicycle Routes- linked local streets with special provision for and priority to cyclists;

> Principal Transport Routes- high standard bicycle facilities along the alignments of suburban railways and freeways; and

> Regional Recreational Paths- combined recreational and commuter cycle facilities following linear areas of public open space, such as river and coastal foreshores.

A.2.5 Liveable Neighbourhoods (2009)

Liveable Neighbourhoods was produced to implement the objectives of the previous State Planning Strategy which guides the sustainable development of Western Australia to 2029. Its primary function is as a guide to more sustainable structure planning and subdivision, applicable to new urban areas and large urban infill sites.

The key element of Liveable Neighbourhoods relevant to, and consistent with, this Bike Plan is Element 2, Objective 9:

> To provide a safe, convenient and legible bike movement network to meet the needs of both experience and less experienced cyclists, including on-street and off-street routes.

A.2.6 Main Roads WA (MRWA) Policy for Cycling Infrastructure (2000)

This document sets out MRWA's policies for the provision of cycling infrastructure on its network. All new road works and upgrades involving road widening will meet the requirements of these guidelines. Existing roads and cycling facilities that do not meet the above requirements will be progressively upgraded. The timing of retrofit work will be determined by the availability of funds and priorities.

Key elements of this policy relevant to the Shire of Kalamunda include:

On-Street Facilities

- New urban roads will be constructed with an edge line separated sealed shoulder in accordance with the desirable standards within Austroads' Guide to Traffic Engineering Practice "Bicycles" Part 14 (1999). Where this cannot be achieved, a shared path will be constructed adjacent to the road.
- On existing highways and main roads, the facility described above for new roads, will only be provided in conjunction with any upgrades involving widening the road where land is available within the existing road reserve or, if land is being resumed for other purposes, the cost of acquiring the additional land is not proportionately higher than that for the other purpose.
- Sections of rural main roads that are regularly used by more than 25 cyclists per day will comply with urban area guidelines indicated above. Roads not used regularly by cyclists will comply with MRWA Technical Standards for the provision of shoulders.

Off-Street Facilities

- Main Roads will provide shared paths adjacent to highways and main roads which are not considered appropriate for cyclists or where the lane widths required by these guidelines cannot be achieved.
- Path widths and layouts will generally be in accordance with Austroads Part 14 (1999), with the use of red oxide coloured asphalt for the path surface.

Note that the previous Austroads Guide to Traffic Engineering Practice Part 14 - Bicycles has now been integrated throughout the new Austroads series of guides.

A.2.7 Activity Centres for Perth and Peel

The State Planning Policy 4.2- Activity Centres for Perth and Peel made under part 3 of the Planning and Development Act 2005 describes the Perth and Peel regional planning framework. The policy provides an overview of the requirements for the planning and development of new activity centres and the redevelopment and renewal of existing centres in Perth and Peel. It is mainly concerned with the distribution, function, broad land use and urban design criteria of activity centres, and with coordinating their land use and infrastructure planning.

Section 5.3.2: Traffic and parking: General requirements (2) states that the planning of activity centres should:

- take account of the need for access and parking priority accorded to different users and modes including public transport, freight/delivery, people with a disability, bicycles, pedestrians and private cars, and balance competing user needs such as workers and visitors; and
- identify necessary improvements to public transport, walking and cycling infrastructure and capital and recurrent service funding needs.

Appendix 2: Model Centre Framework within the policy engenders a framework that incorporates planning considerations and activity centre structure plan requirements in the development phase of works. Section 3.4 within Appendix 2 covers the cycling guidelines for activity centres and outlines planning considerations. The planning considerations include:

Network Provision	To promote cycling as a viable mode of transport provision should be made for a comprehensive network that connects the Centre safely and conveniently to other local destinations. This includes dedicated or shared paths and the reallocation of road space to provide more space for cyclists, such as cycle lanes or bus lanes where cyclists are permitted.
End of trip facilities	Facilities should be provided to cater for and promote cycling within commercial and community developments such as showers, change rooms and lockers.
Cycle Parking	Standards to ensure the supply of adequate cycle parking for public and private use should be adopted and mandated as part of the development control process.

A.2.8 Our Bike Path 2014-2020

This document is published by WestCycle and provide a strategic framework to guide the future and growth of cycling in Western Australia. The document envisaged Western Australia as a state that embraces all forms of cycling with safe cycling environment and strong cycling culture with targets set out below:

Category	Description
Participation	Over 1 million Western Australians regularly riding by 2020.
Transport	5% transport mode share for cycling.
Female Participation	Reduce disparity between men's and women's participation in cycling.
Children's Participation	Increasing the percentage of kids riding to school closer to 1970 levels (84% of children walked, cycle or used public transport in 1970).
Safety	Reduce the number of serious bicycle injuries every year.
Image	Dramatically improve community perceptions of cycling as a safe and enjoyable activity.
Sporting Success	Increase the number of Western Australian cyclists winning gold at national championships.
Infrastructure	increase the number of cycling infrastructure facilities in metropolitan and regional WA (includes cycle paths, mountain bike trails and cycle sport facilities) every year

To achieve its vision, the document focuses on 5 key actions that are described below:

Action	Description
Grow a cycling culture	Creating a place where riding is encouraged, supported, and celebrated by creating an environment where cycling is free from negative association and embraced as a normal activity.
Create a bike friendly communities	Transform the streets, roads, and local communities into a place where cycling is safe for adult and children
Build the capability of our community	Support and build the capacity and capability of cycling groups and organisations to effectively deliver cycling initiatives in communities
Strengthen our sporting pathway	Develop pathway structure that enables all Western Australian to achieve their full potential
Develop a cycling economy	Maximise the economic benefits of cycling in Western Australia.

A.2.9 Perth Transport Plan for 3.5 Million People and Beyond

Perth Transport Plan provides long term vision for Perth's transport network as its population grow to 3.5 million people published by the Department of Transport. The plan covers 4 major transport network: Public Transport, Road, Active Transport, and Freight.

The plan recognised that Perth has the attributes for a great cycling city and cycling will be a big part in reducing congestion, air pollution, and encourage more people to live a healthy and active lifestyle.

The emphasis of the plan for cycling in Perth is to provide high quality, safe, and comfortable cycling infrastructure, especially around activity centres, as well as high quality end-of-trip facilities with a broad objective of increasing cycling trips from 100,000 per day (2011 Census Data) to 500,000 and to extend the off-road cycle network from 172km to 850km when the population of Perth reaches 3.5 Million in 2050. On-road cycling routes will be assessed on a case-by-case basis and developed as appropriate to the local road environment, e.g. bike boulevards for older suburbs with grid-like road network.

Objectives from the plan that can be applied directly to the bike plan include:

> Gaps in the current off-road cycle network will be filled

> End-of-trip facilities will be available at all major centres

> Strengthen on-road strategic network

The document proposes new (or formalised) routes for the Shire including:

> Guildford to Kalamunda Town Centre via Bushmead Road, Helena Valley Road, Zig Zag Scenic Drive, and Railway Road

> Kalamunda Town Centre to future Forrestfield Train Station via Maida Vale Road and Kalamunda Road.

> Kalamunda to Stoneville in the Shire of Mundaring via Mundaring Weir Road and Stoneville Road

A.2.10 Cycling Network Plan Transport at 3.5 Million

This document informs the Perth Transport Plan (section A.2.9). It identifies a number of cycling related projects in the Kalamunda area:

> Roe Highway PSP – Berkshire Road to Great Eastern Highway

> Tonkin Highway PSP – Mills Road West to Hale Road

> Darling Scarp training circuit review to ensure it meets the aspirations of sports cyclists.

A.2.11 Perth and Peel Mountain Bike Master Plan 2016 – 2026

The Perth and Peel Mountain Bike Master Plan is developed to guide future strategic investment in mountain bike recreation, tourism, and event development across the Perth and Peel regions of Western Australia.

In the context of the Shire of Kalamunda, Perth Hills Trails are identified as a high priority location of national significance. The plan envisions Perth Hills as a mountain bike precinct and the primary recreational mountain biking destination for the Perth and Peel region.

The strategic objectives of the Master Plan are presented below:

Objectives	Description
Economic Benefits	▪ Identify the economic outcomes to meet with the wider objectives of the Perthand Peel regions ▪ Identify the right trail models to generate income and potentially secure significant economic benefits ▪ Identify diversity of land tenure (including private)
Tourism	▪ Develop mountain biking experiences to meet with the wider objectives for the Perth and Peel regions ▪ Provide product to cater for domestic tourism - day visitors and short breaks
Environmental	▪ Maintain a sense of place Conduct a best practice trail demonstration project ▪ Build a sustainable gravity-focused trail project with land manager support to demonstrate mitigation measures and what can be achieved ▪ Reduce the impacts of unsanctioned trails in the region
Social	▪ Provide trail diversity, enabling access for all ▪ Consider heritage (Indigenous and non-Indigenous) and local culture ▪ Consider integration with and potential conflict with other user groups ▪ Facilitate broad societal community benefits ▪ Provide suitable and accessible facilities for underrepresented groups including young people and families
Recreation	▪ Provide a diversity of accessible trails types and experiences ▪ Increase trail quality ▪ Provide trail networks accessible by bike ▪ Identify locations and networks that facilitate community ownership (both local and club)
Events	▪ Identify sites suitable for national and international events, and any associated constraints ▪ Identify suitable locations for local events ▪ Provide accessible facilities for events.

A.3 Local Policies and Planning Documents

A.3.1 Shire of Kalamunda Local Planning Scheme No.3

The Local Planning Scheme No.3 (LPS No.3) for the Shire of Kalamunda acts an instrument to control, regulate and co-ordinate public and private development, the use of land and buildings and other activities to improve the amenity, convenience, economy and attractiveness of the environment within the municipality. The document provides direction for the implementation of future infrastructural works, encompassing a broad scope of development which includes buildings, roads and paths.

The LPS does not currently have requirements for bicycle parking or end of trip facility requirements, which is a key gap identified in this policy. Future revision of the LPS should include requirements for bicycle parking facility by land use.

A.3.2 Kalamunda Advancing: Strategic Community Plan to 2023

Kalamunda Advancing: Strategic Community Plan to 2023 outlines the overriding direction and framework for the Shire. Key objectives and strategy of the plan that are related to cycling are as follow:

Strategic Priority	Objective	Strategy
Strategic Priority 2 Kalamunda Interacts: Providing Our People with Enjoyment	**2.3** To encourage and facilitate healthy lifestyles through regular participation in recreational and leisure oriented activities.	**2.3.3** Plan for the improvement and expansion of the existing shared pathways network to ensure a high quality and consistent network is provided for walking, cycling and recreational hiking.
Strategic Priority 4 Kalamunda Develops: Using Our Land and Assets Diversely and Effectively	**4.7** To ensure the selection, maintenance, inspection, renewal and disposal of all categories of assets within the Shire is managed efficiently.	**4.7.1** Maintain, refurbish or upgrade existing infrastructure, including public buildings, parks, reserves, local roads, footpaths, cycle ways, verges and drainage networks to encourage increased utilisation and extension of asset life.
Strategic Priority 5 Kalamunda Employs: Supporting Our Industries And Businesses	**5.5** To be courageous and tenacious in the pursuit of benefits from the State and Federal Governments through effective advocacy.	**5.5.1** Continue to advocate to all levels of government for the delivery of appropriate public transport options including cycling and walkways for the Shire and the region.

A.3.3 Shire of Kalamunda Bike Plan 2009

The 2009 Bike Plan was developed to assist the Shire in planning for future infrastructure needs, to maximise the efficiency and effectiveness of the existing bicycle network and to enhance bicycle facilities for all users. Existing road and path network were audited to determine the scope for future upgrades to the cycle network.

The proposed cycling network within the 2009 bike plan was designed to enhance connectivity between higher order commuter routes. Key activity nodes within the Shire are also proposed to be connected by a legible, off-street path network.

A review of the bike plan showed that most of the proposed infrastructure upgrades have not been implemented. Refer to the table below for completed or partially completed recommendations.

Action	Location	Description	Completion
Install Shared Path	Welshpool Road East	Install 4000m of 3.0m bitumen path north side of Welshpool East between Tonkin and Crystal Brook. Signpost and line markings	Complete Welshpool East to Lewis Street
Install Shared Path	Hale Road	Install 1500m section of 2.3m concrete path, between Hardey East and Tonkin Signpost and centre line markings	Complete between Hardey East Road and Sheffield Road
Install PSP Link	Tonkin Highway	After initial designation to sealed shoulder, install 2700m of 3.5m Principal Shared Path (PSP) between Welshpool and Roe along west side of Tonkin Hwy.	Complete between Roe Highway and Hale Road on the eastern side

A.3.4 EMRC Regional Cycle Network Masterplan 2011 – Report Card 2016

The EMRC Regional Cycle Network Masterplan was created to improve the planning and development of cycling infrastructure of Perth's Eastern Region. A report card released in 2016 provides progress update to the 20-year works program featured in the Masterplan. The following table provide a list of works within the Shire and its status.

Corridor	Works	Status
Roe Highway	Principal Shared Path – Orrong Road / Welshpool Road to Tonkin Highway	Under Construction
	Principal Shared Path – Tonkin Highway to Berkshire Road	Completed
	Principal Shared Path – Berkshire Road to Kalamunda Road	Not Completed
	Principal Shared Path – Kalamunda Road to Great Eastern Highway Bypass	Not Completed
Tonkin Highway	Welshpool Road East to Kelvin Road	Not Completed
	Principal Shared Path – Hale Road, Forrestfield to Victoria Street, Redcliffe	Completed
Welshpool Road East	Roe Highway to Tonkin Highway	Not Completed
	Shared Path – Tonkin Highway to Lewis Road	Completed

A.3.5 Zig Zag Community Action Plan (2012/2013)

This document summarises findings from community consultation which originally set out to combat antisocial behaviour in the area but the scope widened to general improvements which would benefit users of the zone.

Four recommendations were made one of which related specifically to cycling (create and promote a walking, hiking and cycling zone along the whole Lower Zig Zag section), and required the closure of the existing one way road to motor vehicles.

A.3.6 Shire of Kalamunda Health and Wellbeing Plan 2013-2016

This document recognises the need to encourage physical activity of residents and visitors. It references the 2009 Bike Plan and the need to support active living by providing "well linked and attractive cycle and walk ways"

A.3.7 Perth Hills Trail Master Plan (2013)

This purpose of this document is to prepare a Master Plan for all trails within the boundaries of the Shire of Kalamunda and the Shire of Mundaring, which are collectively referred to as the Perth Hills Trails. The Master Plan provides an overview of the existing trail network, which include audit, assessment, analysis, and mapping of the network to identify opportunities and provide strategic direction over the next 15 – 20 years.

The Strategy and Action Plan within the document has four key strategic themes:

> Integrated Planning and Management

> Sustainable Trail Provision and Enhancement

> Participation and Utilisation

> Economic, Tourism, and Community Development

A.3.8 Perth Hills Trail Loop Concept Design Report (2016)

The Perth Hills Trail Loop Concept Design Report was commissioned to achieve two recommendations in the Perth Hills Trail Master Plan:

> Improve the link between Kalamunda, Bickley, and Pickering Brook areas for both walkers and cyclists

> Create a link through the western end of the Helena Valley between the northern area of Kalamunda and Railway Reserves Heritage Trail to enable a complete Mundaring to Kalamunda Loop Trail

The main outcome of this report is the development of the above trail links alignment, development details, costing, and implementation plan.

A.3.9 Forrestfield North District Structure Plan (2016)

The Forrestfield North District Structure Plan (DSP) was developed in order to provide strategic guidance for the development of the Forrestfield North Area into a Transit Oriented Development with the future Forrestfield Train Station as its focus. The structure plan would include medium to high density housing, employment opportunities, and new parklands.

As part of the DSP, a network of shared paths and cycle lanes are proposed to be built throughout major roads within the Structure Plan area, providing connectivity from the station to future developments in the area and the future Roe Highway Principal Shared Path (PSP) extension.

Sultana Road East and West is also proposed to be connected and grade separated from Roe Highway, providing an additional link into the future station. This future upgrade presents an opportunity to incorporate cycling facility along Sultana Road with connection with the future Roe Highway PSP extension

A.3.10 North-East Sub-regional Planning Framework: Towards Perth and Peel @3.5 Million

This document was created to establish a long-term and integrated planning framework for land use and infrastructure provision for the North-East planning sub-region, comprising of City of Swan, Shire of Kalamunda, and Shire of Mundaring.

Urban expansion areas currently proposed within the Shire of Kalamunda include the Wattle Grove South District Centre located south of Crystal Brook Road, and Forrestfield North District Centre.

With regards to cycling, the framework supports the provision of comprehensive path networks to provide an alternative to private car use. The State Government will continue to deliver Principal Shared Path Network within the North-East sub-region, including along the Midland Rail Line, Roe Highway and Reid Highway.

A.3.11 2016 Community Scorecard

The 2016 Community Scorecard for the Shire of Kalamunda presents the results of community perception survey to evaluate community priorities and to measure the Shire's performance on various aspects, such as governance, economic development, built environment, and natural environment.

In relation to the bike plan, the Shire's footpaths and cycleways were rated. 63% of the respondents gave a performance rating of either 'okay', 'good', and 'excellent' to the Shire's footpath and cycleways. While this a positive result, the Shire's performance index score of 44 (out of 100) is currently lower than the average of 60 of all participating Local Governments and below the highest performance index score of 72.

Improving the footpaths and cycleways, are one of the top 4 priorities for the Shire to address moving forward. The community would like to see more and better quality footpaths, better cycleways connection to adjacent suburbs, more on-road cycle lanes, as well as safety improvement for cyclists on major roads.

APPENDIX

B

FORRESTFIELD NORTH DISTRICT STRUCTURE PLAN

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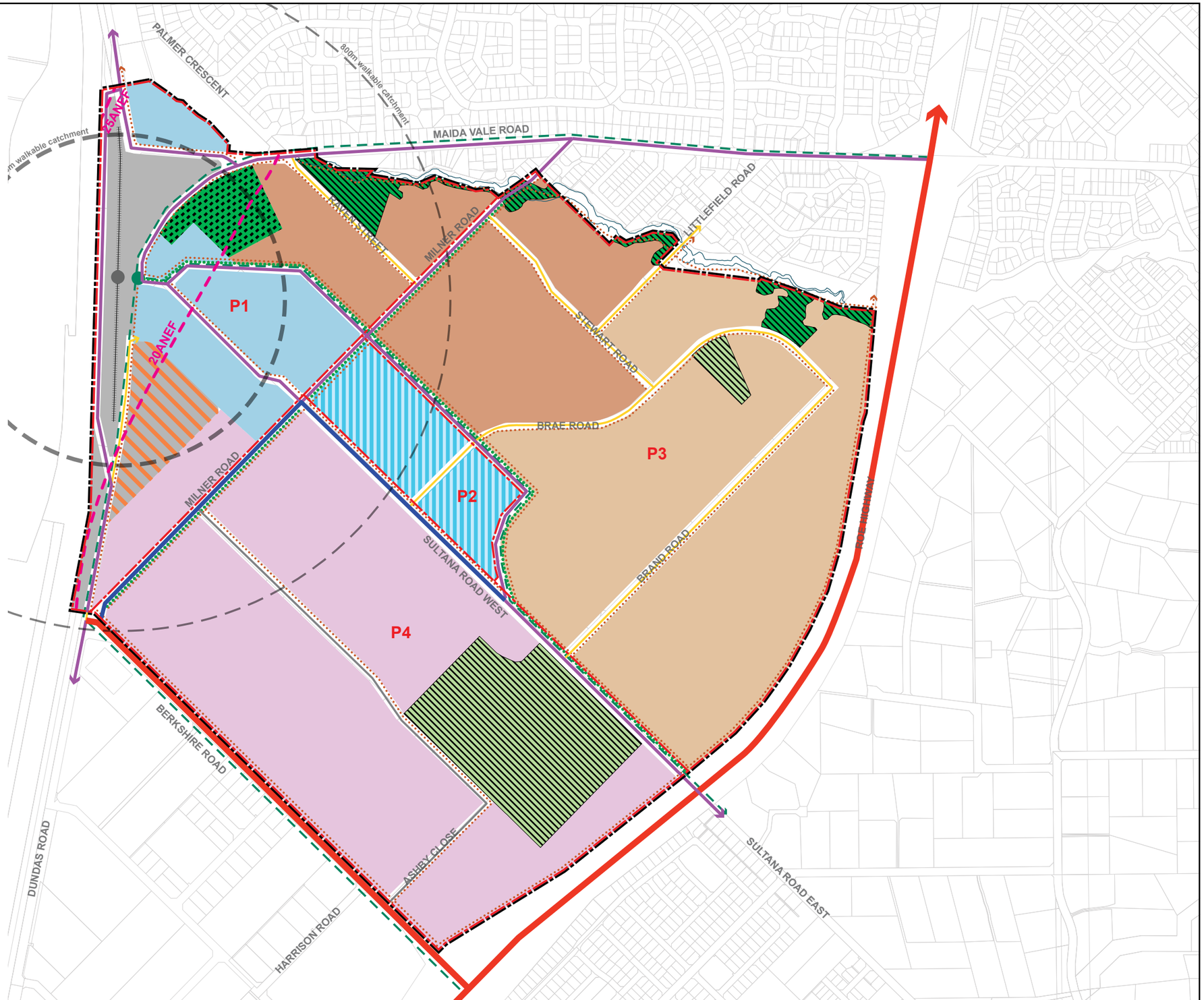
LEGEND

- Medium Density Residential
- High Density Residential
- Activity Centre
- Mixed Use
- Light industry
- Parks and Recreation - Local
- Parks and Recreation - Regional
- Bush Forever
- Conservation
- Railway
- ANEF Contour
- Primary distributor road
- District distributor integrator A
- District distributor integrator B
- Neighbourhood connector
- Industrial road
- Shared Path
- On-road cycle paths
- Railway Line
- Bus route
- Transit station
- Railway station
- Walkable catchment (400m)
- Walkable catchment (800m)
- Precinct boundary

P1	Forrestfield Station TOD Precinct
P2	Forrestfield North Activity Centre Precinct
P3	Forrestfield North Residential Precinct
P4	Forrestfield / High Wycombe Light Industrial Area

- Structure plan boundary
- Existing cadastre
- Preferred ultimate permanent parking location (subject to further investigation).

It is noted that Precinct 3 features a concentration of Threatened Ecological Communities and Declared Rare Flora sites which may affect development potential. Refer to Figure 7 of the District Structure Plan report.



Structure Plan

Forrestfield North District Structure Plan

0 50 100m

N

Project Manager: MC Date: 24 Aug 2016
Drawn: OP Scale: 1:5,000 @ A3
Checked: MC Drawing No. 714-504 ST-12A

TOWN PLANNING
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The Planning Group WA Pty Ltd
ABN 36 097 273 222

Bicycle Plan 2017

APPENDIX C

COMMUNITY SURVEY RESULTS

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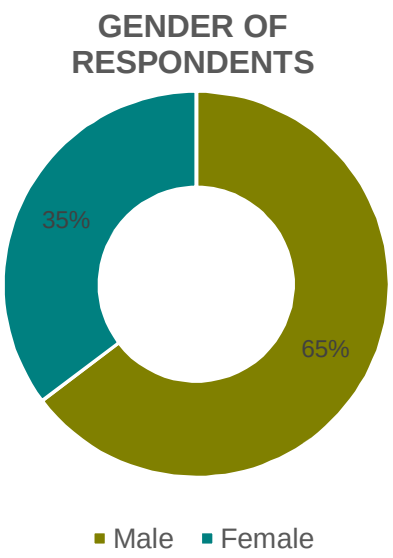
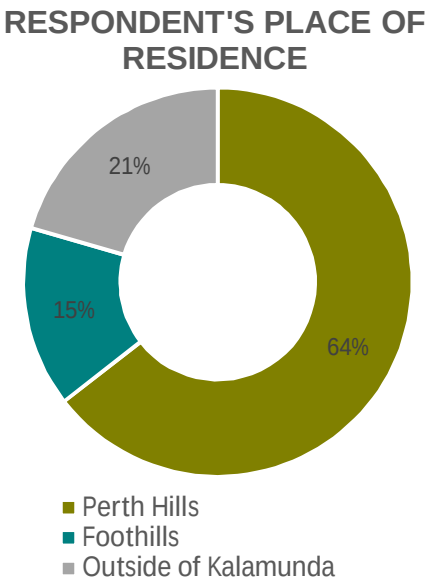
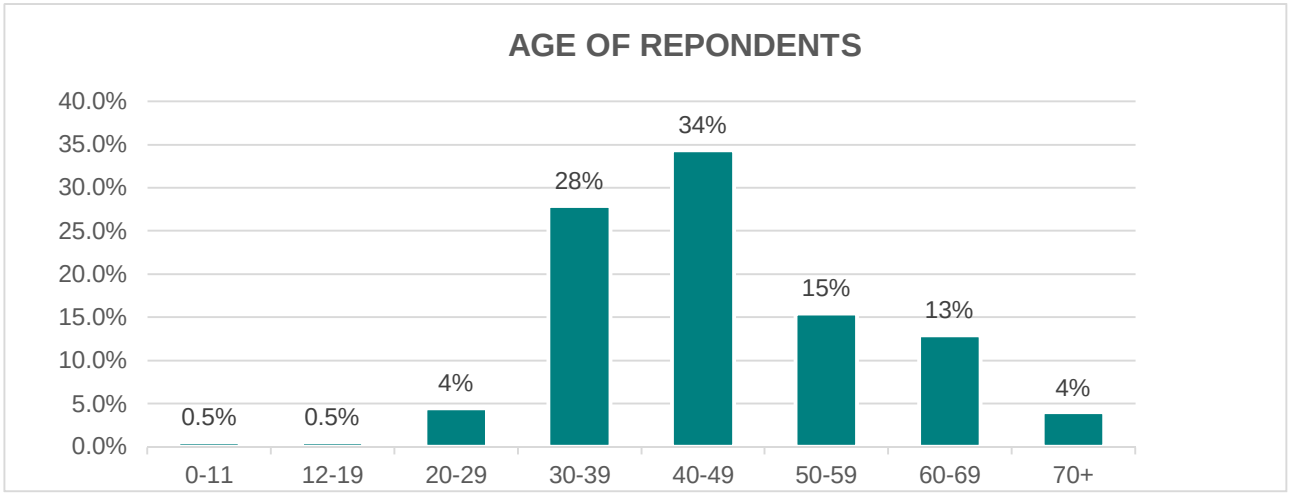
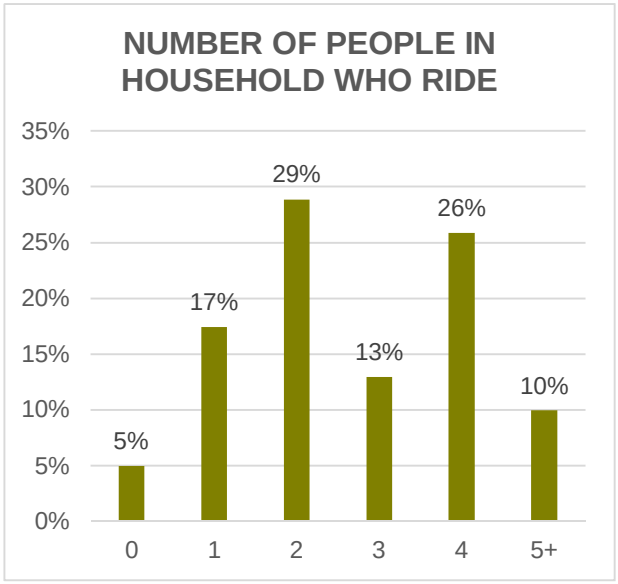
Figure 13-2 Demographics (Questions 1 to 5)









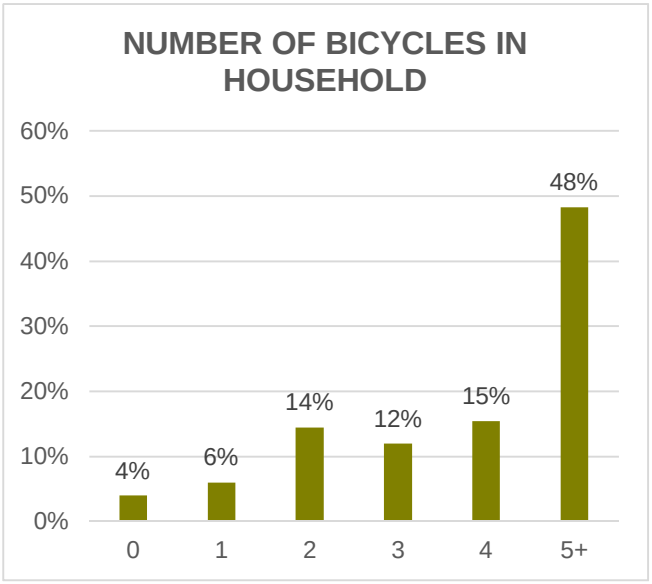
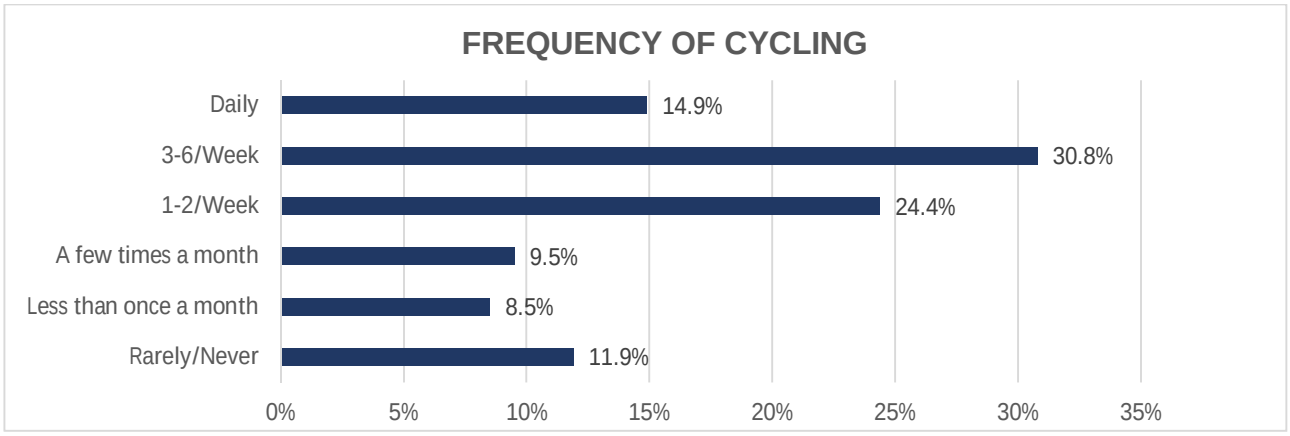
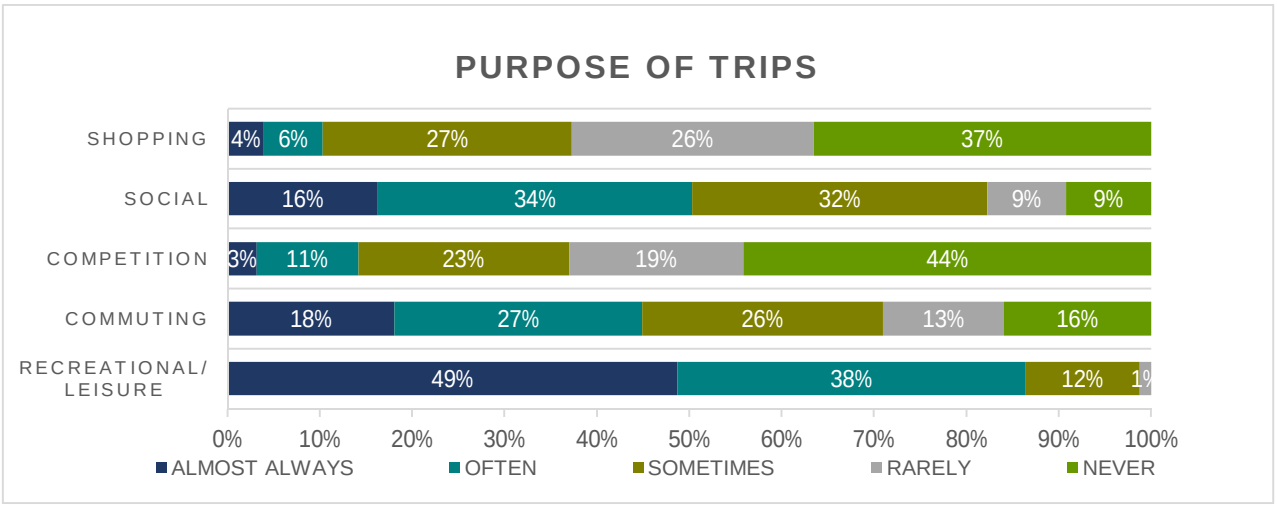


Figure 13-3 Attitudes, trip purpose and trip frequency (Questions 6, 10 & 14)





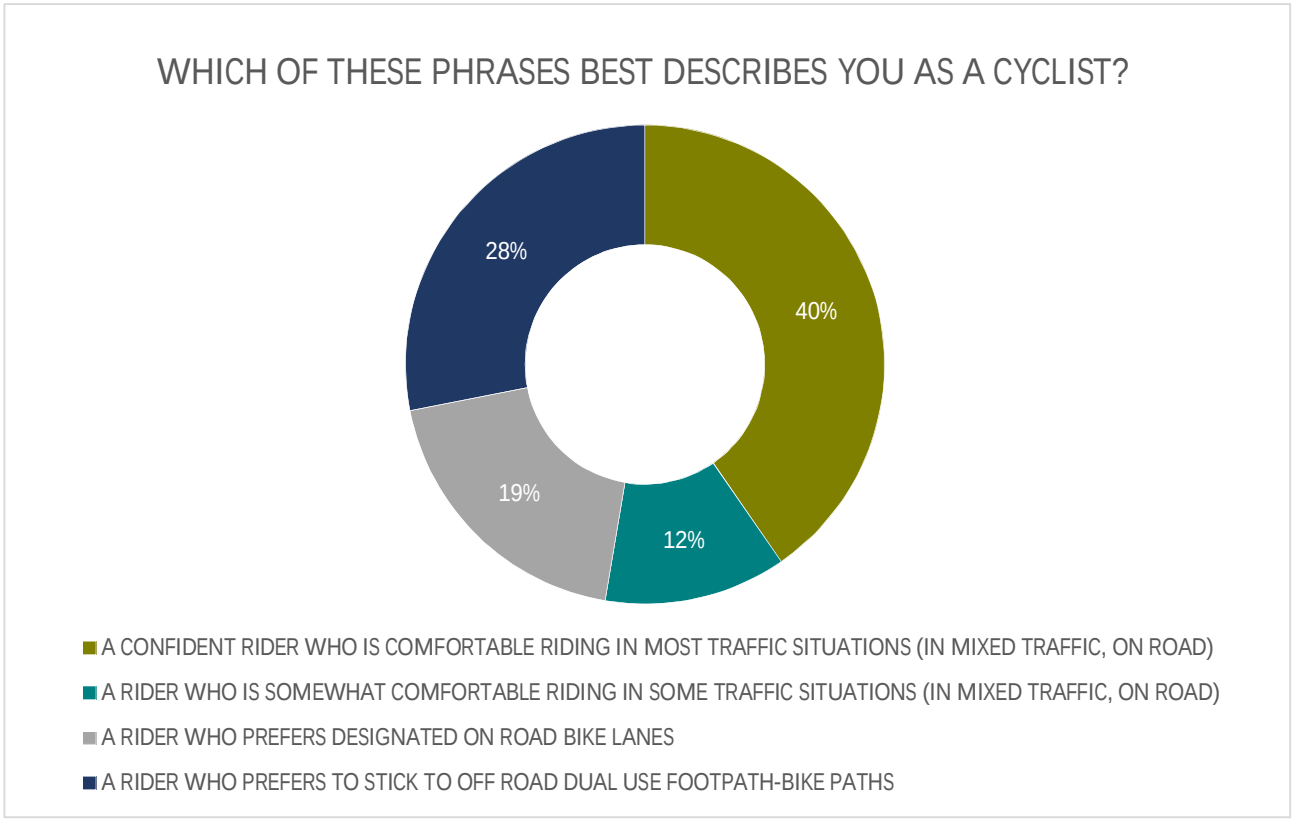


Figure 13-4 Route Types (Q15)

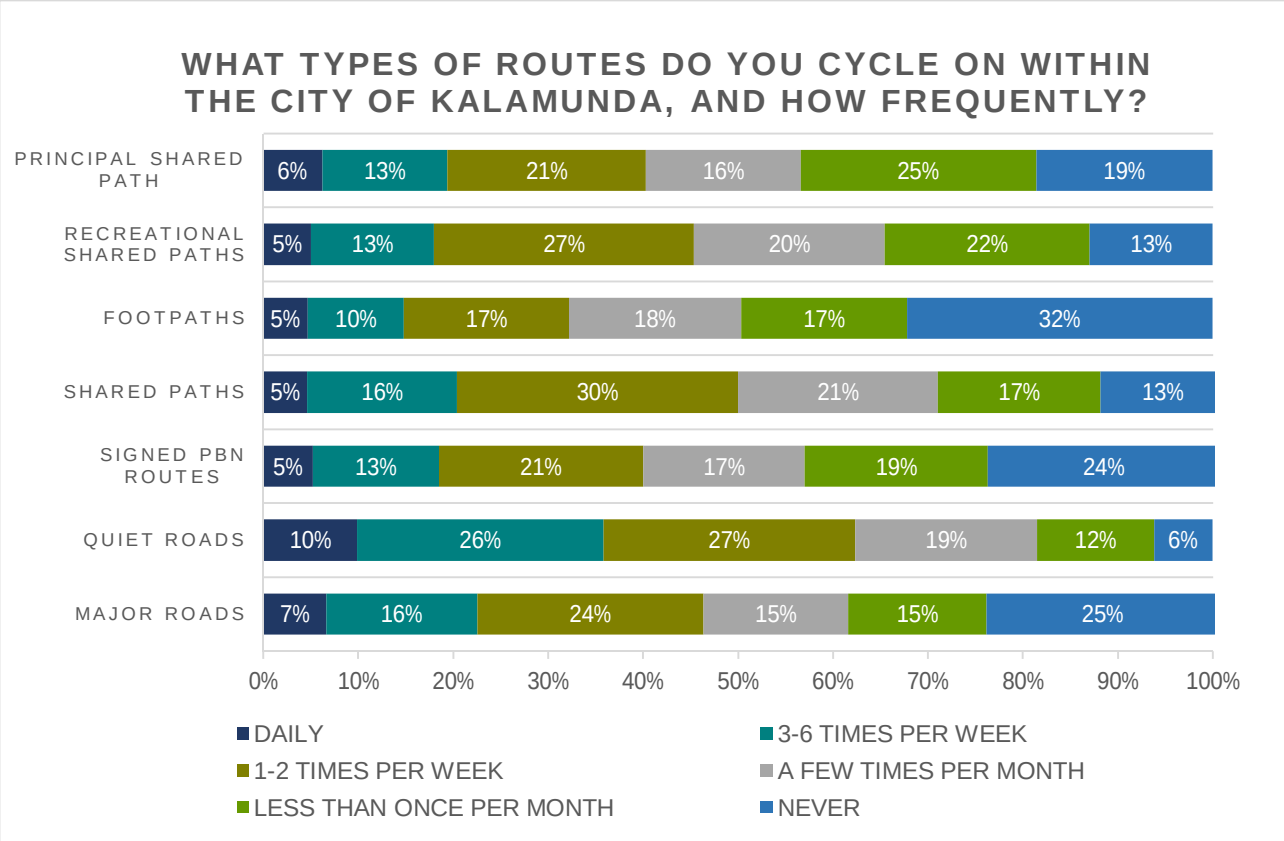
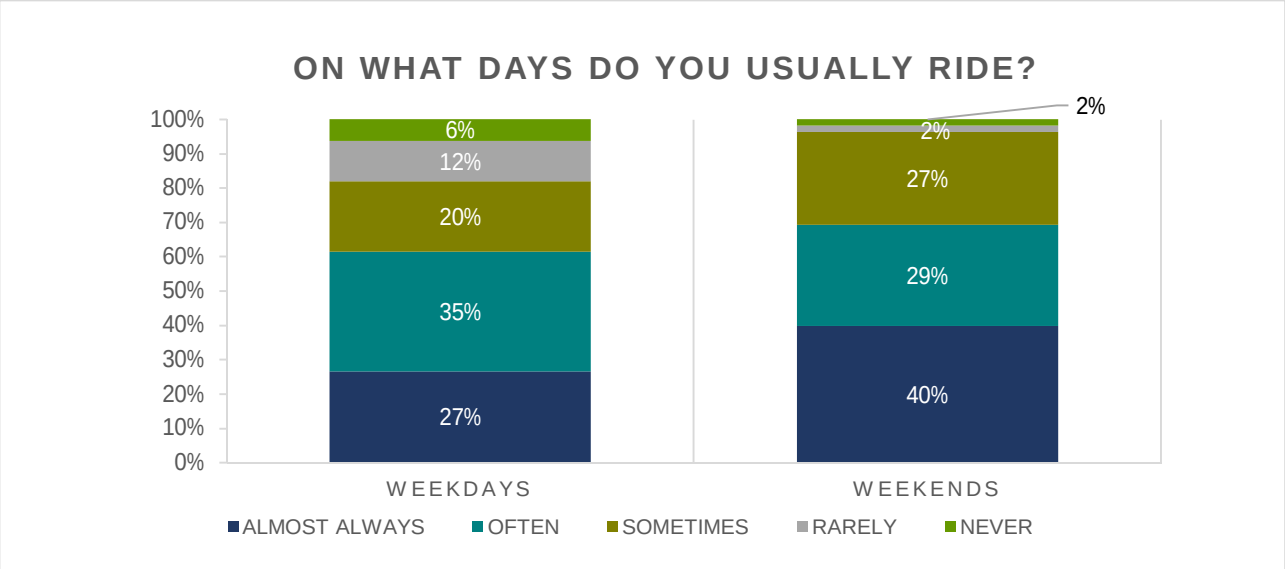


Figure 13-5 Visitors to the City (Q11 Q12 Q13)



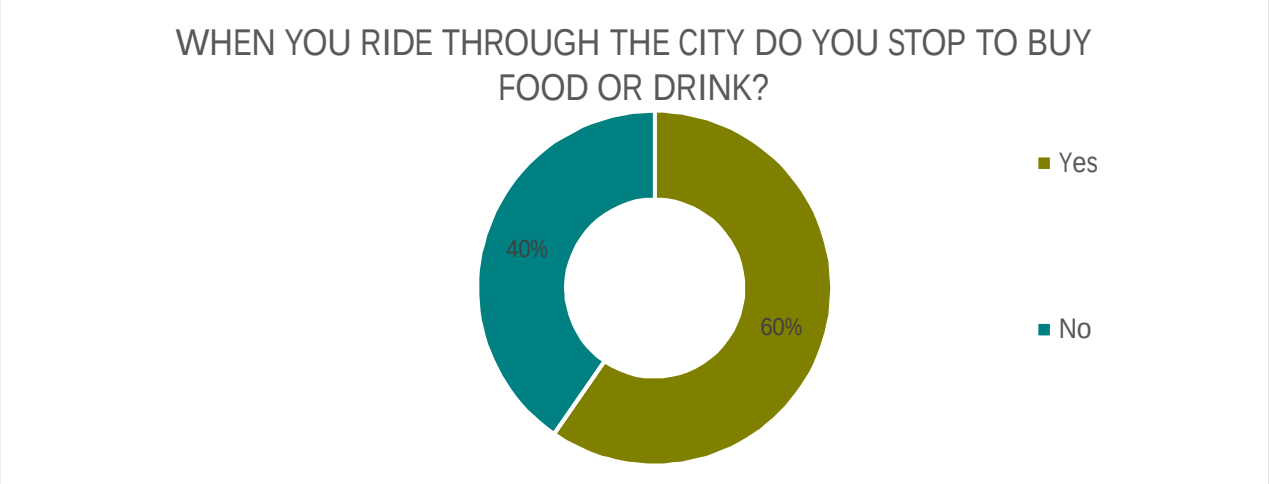
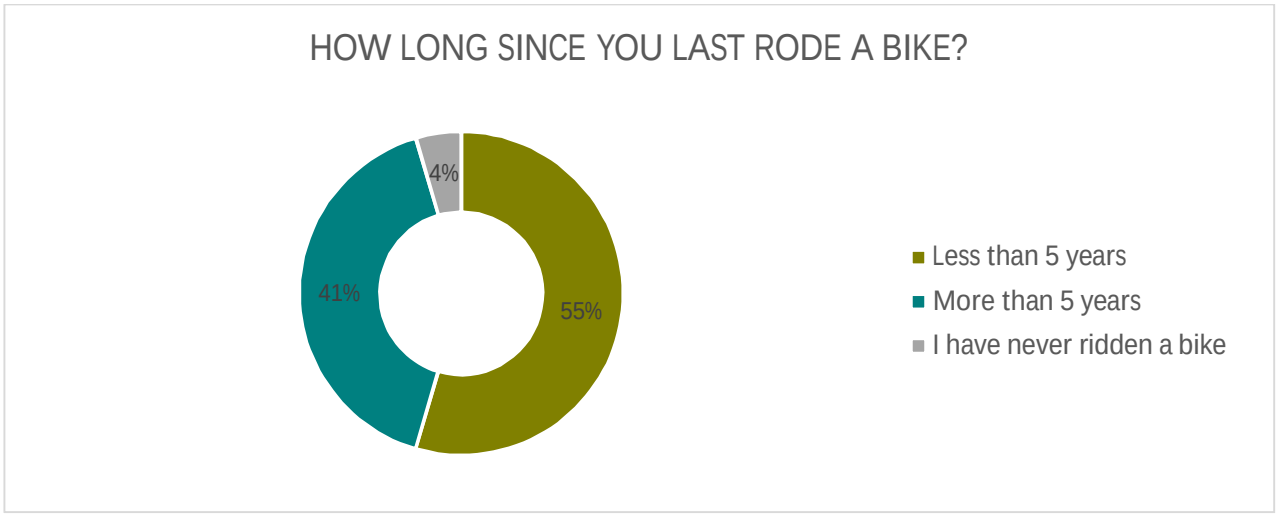
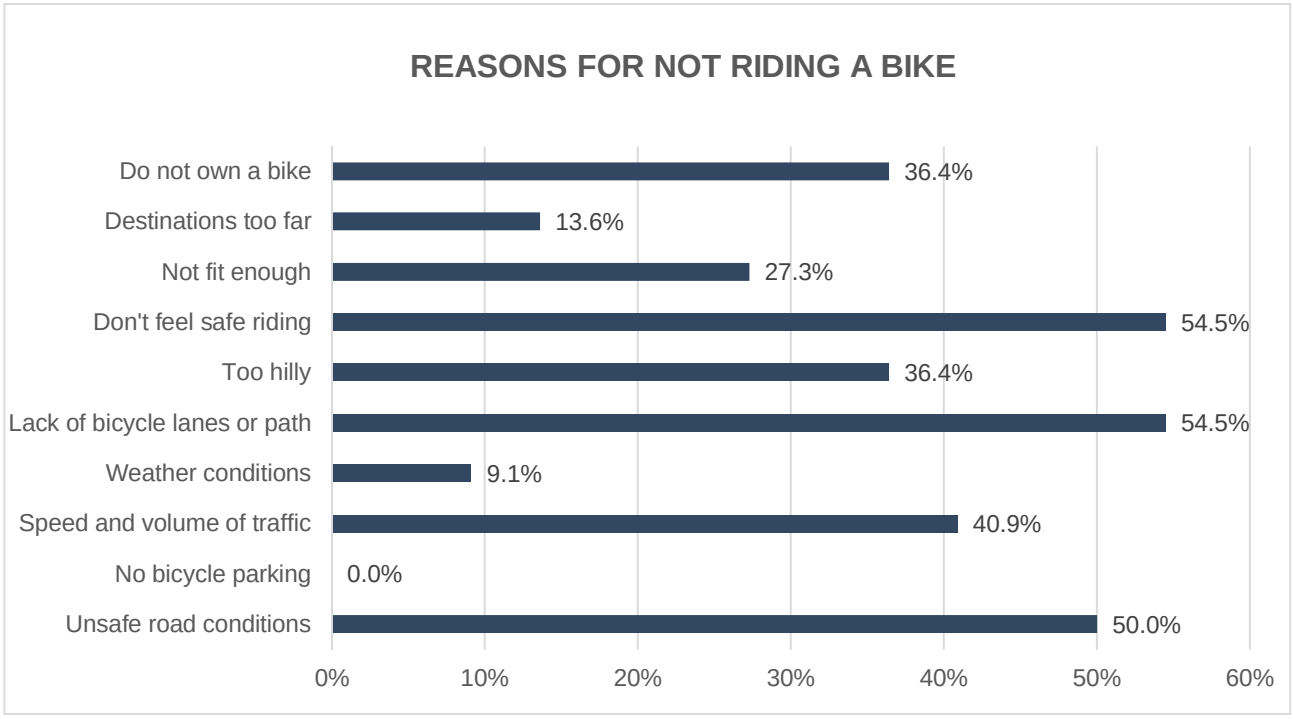


Figure 13-6 Less Frequent Riders (Q7-9)





APPENDIX

D

WORKS SCHEULDE & MAP - $500,000

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City of Kalamunda Bicycle Plan 2017 - Project Schedule $500,000 per Annum Scenario

0-5 Years

Project No.	Primary Route	Description	Start	End	Timing (500k per Year Scenario)	City Funded	Potential External Funded	Total Project Cost Estimate	Comment
80a	Roe Highway	PSP Completion Part of Roe Highway/Kalamunda Road Upgrade	Berkshire Road	Kalamunda Road	0-5		$ 2,260,000	$ 2,260,000	State Government Funded
81a	Tonkin Highway	PSP Extension on the Southern Side (including link to Hartfield Park)	Roe Highway	Welshpool Road East	0-5		$ 1,430,000	$ 1,430,000	State Government Funded
82a	Freight Railway / Dundas Road	Dundas Road PSP	Tonkin Highway	Forrestfield Station	0-5		$ 2,580,000	$ 2,580,000	State Government Funded
82b	Freight Railway / Dundas Road	Dundas Road PSP	Forrestfield Station	Wittenoom Road	0-5		$ 730,000	$ 730,000	State Government Funded Review priority when Forrestfield Station design is released
	Secondary Route								
1a	Hills Spine	Zig Zag Option A	Ridge Hill Road	Ocean View Parade	0-5	$ 35,000		$ 35,000	
1d	Hills Spine	Kalamunda Town Centre Section Options Study	Canning Road	Elizabeth Street	0-5	$ 25,000	$ 25,000	$ 50,000	Potential WABN Grant Funding
2c	Kalamunda Road	Sealed Shoulder	Fernan Road	Abernethy Road	0-5	$ 560,000		$ 560,000	Include as part of existing planned upgrade
3d	Forrestfield Station Connection	Milner Road Protected Cycle Lanes	Maida Vale Road	Dundas Road	0-5		$ 620,000	$ 620,000	To be funded and constructed as part of the Forrestfield North District Structure Plan
	Local Route								
20a	Foothills Spine	Welshpool Road East Shared Path (including to connection from Puddy lane to Hale Road)	Roe Highway (City Boundary)	Puddy Lane	0-5	$ 65,000	$ 65,000	$ 130,000	Potential WABN Grant Funding
20b	Foothills Spine	Puddy Lane Shared Path	Welshpool Road East Shared Path	Hale Road	0-5	$ 85,000	$ 85,000	$ 170,000	
20c	Foothills Spine	Hale Road Shared Path Extension	Extensa Road	Puddy Lane	0-5	$ 50,000		$ 50,000	
20d	Foothills Spine	Hale Road Existing Shared Path Upgrade (Western Side)	Extensa Road	Lenihan Corner	0-5	$ 320,000		$ 320,000	
21d	High Wycombe Local Route	Public Access Way Upgrades (through McLarty Way, and Walker Crescent)	Kiandra Way	Newburn Road	0-5	$ 95,000		$ 95,000	Potential external funding (non WABN)
21e	High Wycombe Local Route	Butcher Road & Palmer Crescent Safe Active Street	Newburn Road	Palmer Crescent	0-5	$ 390,000		$ 390,000	Potential external funding (non WABN)
21f	High Wycombe Local Route	Everitt Place Shared Path	Palmer Crescent	Maida Vale Road	0-5	$ 85,000		$ 85,000	Potential external funding (non WABN)
22a	Berkshire & Dundas Road	Berkshire Road (West of Roe Highway) Shared Path Upgrade	Roe Highway	Dundas Road	0-5	$ 230,000	$ 230,000	$ 460,000	Potential WABN Grant Funding
22c	Berkshire & Dundas Road	Dundas Road Shared Path	Berkshire Road	Forrestfield Station	0-5	$ 180,000	$ 180,000	$ 360,000	Potential WABN Grant Funding
	Safe Active Street								
44	Forrestfield (Gala Way)	Gala Way Safe Active Street	Fruit Tree Crescent	Hawtin Road	0-5	$ 50,000		$ 50,000	Allowance to supplement existing traffic calming
	Traning Route								
63	Welshpool Road East	Lesmurdie Road Intersection Safety Improvement	-	-	0-5	$ 40,000		$ 40,000	
61a	Canning Road	Canning Road Road Safety Audit	-	-	0-5	$ 25,000		$ 25,000	
61b	Canning Road	Targeted Shoulder Widening Stage 1	Pickering Brook Road	City Boundary	0-5	$ 225,000	$ 225,000	$ 450,000	Black Spot Funding
64a	Mundaring Weir Road	Mundaring Weir Road Road Road Safety Audit	-	-	0-5	$ 15,000		$ 15,000	
64b	Mundaring Weir Road	Targeted Shoulder Widening Stage 1	Railway Road	City Boundary	0-5	$ 225,000	$ 225,000	$ 450,000	Black Spot Funding
65	City of Kalamunda	Safe Passing Law Review	-	-	0-5	$ 10,000		$ 10,000	
					TOTAL	$ 2,710,000	$ 8,655,000	$ 11,365,000	

5-10 Years

Project No.	Primary Route	Description	Start	End	Timing (500k per Year Scenario)	City Funded	Potential External Funded	Total Project Cost Estimate	Comment
80b	Roe Highway	Roe Highway PSP Completion	Kalamunda Road	Brinsmead Road (Northern City Boundary)	5-10		$ 660,000	$ 660,000	State Government Funded
81b	Tonkin Highway	PSP Completion	Welshpool Road East	Kelvin Road/Mills Road	5-10		$ 1,310,000	$ 1,310,000	State Government Funded
	Secondary Route								
1b	Hills Spine	Lascelles Parade / William Street Safe Active Street	Zig Zag Scenic Drive	Hill Street	5-10	$ 320,000	$ 320,000	$ 640,000	Potential WABN Grant Funding
1c	Hills Spine	Kalamunda Railway Heritage Trail Sealed Path	Hill Street	Elizabeth Street	5-10	$ 150,000	$ 150,000	$ 300,000	Potential WABN Grant Funding
1e	Hills Spine	Canning Road Bufferred Bike Lanes Stage 1	Kalamunda Road	Railway Road	5-10	$ 380,000	$ 380,000	$ 760,000	Potential WABN Grant Funding
1f	Hills Spine	Canning Road Bufferred Bike Lanes Stage 2	Railway Road	Lesmurdie Road	5-10	$ 600,000	$ 600,000	$ 1,200,000	Potential WABN Grant Funding
3a	Forrestfield Station Connection	Maida Vale Road Protected Cycle Lanes Stage 1	Forrestfield Station	Priory Road	5-10		$ 1,090,000	$ 1,090,000	To be funded and constructed as part of the Forrestfield North Developer Contributions Plan
3b	Forrestfield Station Connection	Forrestfield Station TOD Connector Road Protected Cycle Lanes Stage 1	Forrestfield Station	Roe Highway	5-10		$ 1,460,000	$ 1,460,000	Include as part of Forrestfield North District Structure Plan
	Local Route								
21c	High Wycombe Local Route	Kiandra Way Safe Active Street	Western Avenue	Norling Road	5-10		$ 660,000	$ 660,000	SAS Program Funding
	Safe Active Street								
41a	Forrestfield (Hibiscus Drive)	Hale Road Shared Path	Hannover Street	Hibiscus Drive	5-10	$ 430,000		$ 430,000	
41b	Forrestfield (Hibiscus Drive)	Hibiscus Drive SAS	Bougainvillea Avenue	Strelitzia Avenue	5-10		$ 330,000	$ 330,000	SAS Program Funding
41c	Forrestfield (Hibiscus Drive)	Bougainvillea Avenue Shared Path	Hibiscus Drive	Dawson Avenue	5-10	$ 240,000		$ 240,000	
41e	Forrestfield (Hibiscus Drive)	Pavetta Crescent SAS	Dawson Avenue	Roe Highway	5-10		$ 200,000	$ 200,000	SAS Program Funding
	Traning Route								
61c	Canning Road	Targeted Shoulder Widening Stage 2	Pomeroy Road	Pickering Brook Road	5-10	$ 250,000	$ 250,000	$ 500,000	Black Spot Funding
64c	Mundaring Weir Road	Targeted Shoulder Widening Stage 2	Railway Road	City Boundary	5-10	$ 250,000	$ 250,000	$ 500,000	Black Spot Funding
					TOTAL	$ 2,620,000	$ 7,660,000	$ 10,280,000	

10 - 15 Year

Project No.	Secondary Route	Description	Start	End	Timing (500k per Year Scenario)	City Funded	Potential External Funded	Total Project Cost Estimate	Comment
1g	Hills Spine	Canning Road Bufferred Bike Lanes Stage 3	Lesmurdie Road	Pomeroy Road	10-15	$ 850,000	$ 850,000	$ 1,700,000	Potential WABN Grant Funding
2a	Kalamunda Road	Bufferred Cycle lanes	Canning Road	Hawtin Road	10-15	$ 275,000	$ 275,000	$ 550,000	Potential WABN Grant Funding
3a	Forrestfield Station Connection	Maida Vale Road Protected Cycle Lanes Stage 2	Forrestfield Station	Priory Road	10-15		$ 1,090,000	$ 1,090,000	To be funded and constructed as part of the Forrestfield North Developer Contributions Plan
	Local Route								
20e	Foothills Spine	Wattle Grove Option 1 (The Promenade & Hale Road Shared Path)	Lenihan Corner	Hartfield Road	10-15	$ 310,000	$ 310,000	$ 620,000	Potential WABN Grant Funding
20g	Foothills Spine	Hartfield Road Shared Path	Hale Road or Morrison Road	Sussex Road	10-15	$ 85,000		$ 85,000	
20h	Foothills Spine	Sussex Road Safe Active Street	Hartfield Road	Hale Road/Mallow Way	10-15		$ 920,000	$ 920,000	SAS Program Funding
21b	High Wycombe Local Route	Hamilton Street Safe Active Street	Wittenoom Road	Kiandra Way	10-15	$ 188,000	$ 282,000	$ 470,000	60% funding from SAS Program
21j	High Wycombe Local Route	Crake Court Public Access Way Upgrade	Kiandra Way	Newburn Road	10-15	$ 25,000		$ 25,000	Potential external funding (non WABN)
22b	Berkshire & Dundas Road	Berkshire Road (East of Roe Highway) Shared Path Upgrade	Apricot Street	Hawtin Road	10-15	$ 890,000		$ 890,000	Timing will be influenced by the Forresfield North District Structure Plan
	Safe Active Street	Safe Active Street							
40a	Forrestfield (Bauhinia Road)	Bauhinia Road SAS	Dawson Avenue	Magnolia Way	10-15		$ 240,000	$ 240,000	SAS Program Funding
40b	Forrestfield (Bauhinia Road)	Dawson Ave Shared Path	Cedar Way	Bauhinia Road	10-15	$ 65,000		$ 65,000	
40c	Forrestfield (Bauhinia Road)	Cedar Way SAS	Cedar Way	Dawson Avenue	10-15		$ 240,000	$ 240,000	SAS Program Funding
40e	Forrestfield (Bauhinia Road)	Peach Tree Way SAS	-	-	10-15		$ 260,000	$ 260,000	SAS Program Funding
					TOTAL	$ 2,688,000	$ 4,467,000	$ 7,155,000	

15 - 20 Year

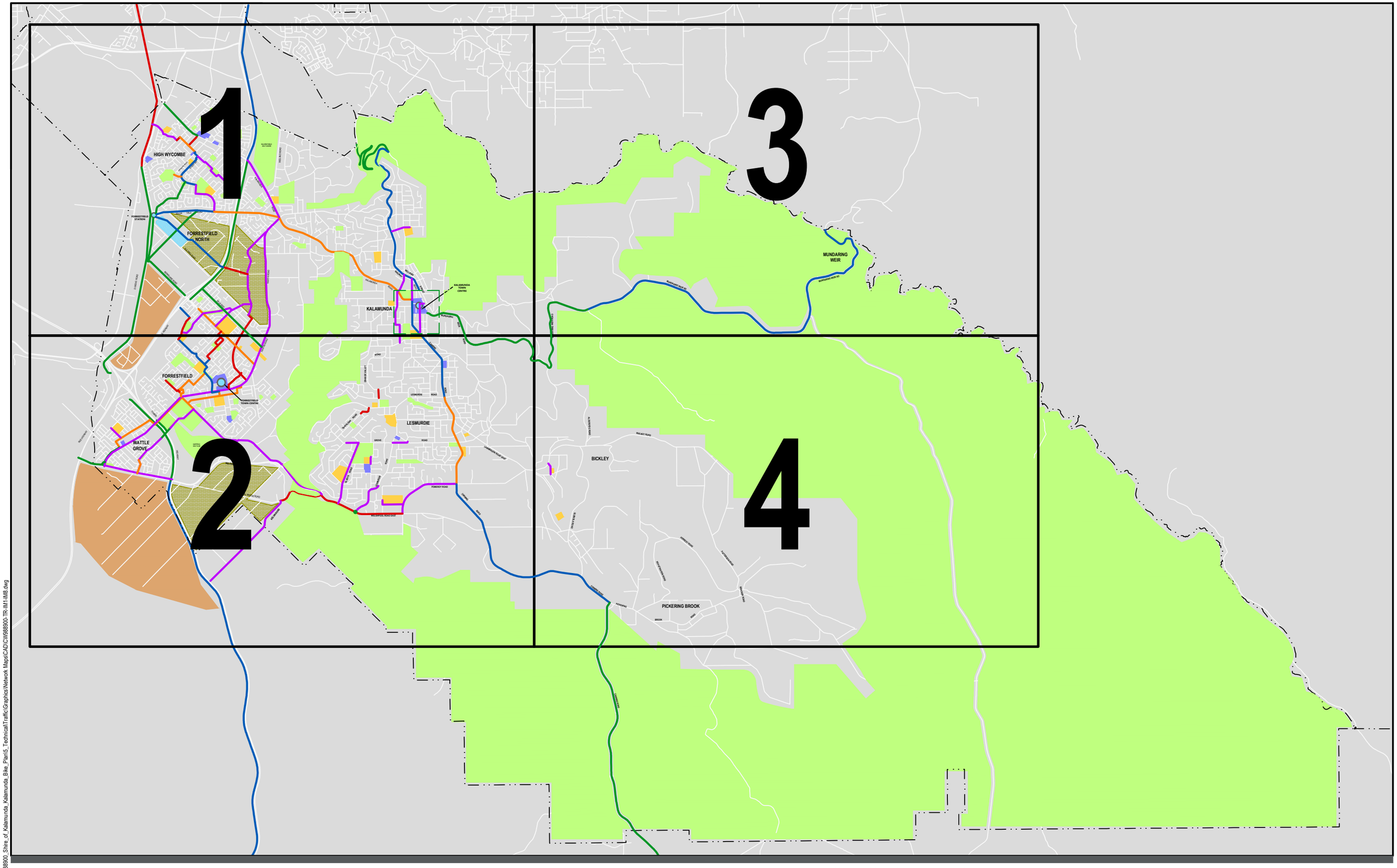
Project No.	Primary Route	Description	Start	End	Timing (500k per Year Scenario)	City Funded	Potential External Funded	Total Project Cost Estimate	Comment
82c	Freight Railway / Dundas Road	Dundas Road PSP	Wittenoom Street	City Boundary	15-20		$ 1,050,000	$ 1,050,000	State Government Funded
	Secondary Route								
3c	Forrestfield Station Connection	Forrestfield Station TOD Connector Road Protected Cycle Lanes Stage 2	Roe Highway	Brewer Road	15-20		$ 560,000	$ 560,000	Include as part of Forrestfield North District Structure Plan
4a	Lesmurdie to Maddington	Welshpool Road East Shared Path	Pomeroy Road	Crystal Brook Road	15-20	$ 455,000	$ 455,000	$ 910,000	Potential WABN Grant Funding
4b	Lesmurdie to Maddington	Crystal Brook Road Shared Path	Welshpool Road East	Kelvin Road	15-20	$ 570,000		$ 570,000	
	Local Route								
20i	Foothills Spine	Transmission Line Easement Shared Path	Hale Road	Berkshire Road	15-20	$ 340,000	$ 340,000	$ 680,000	Potential WABN Grant Funding
20j	Foothills Spine	Transmission Line - Strelitzia Avenue Shared Path Link	Strelitzia Avenue	Proposed Transmission Line Shared Path	15-20	$ 170,000		$ 170,000	
21a	High Wycombe Local Route	Fernan Road Safe Active Street	Kalamunda Road	Hamilton Road	15-20	$ 80,000	$ 120,000	$ 200,000	60% funding from SAS Program
25b	Lesmurdie Local Routes	Burma Road Shared Path Extension	Orange Valley Road	Connor Road	15-20	$ 70,000		$ 70,000	
25c	Lesmurdie Local Routes	Trafalgar Road - Kimbarlee WayPath Upgrade	Waterloo Crescent	Falls Road	15-20	$ 110,000		$ 110,000	
	Safe Active Street								
40d	Forrestfield (Bauhinia Road)	Shared Path Upgrade - Bridge Over Woodlupine Brook	Cedar Way	Peach Tree Way	15-20	$ 270,000		$ 270,000	
40f	Forrestfield (Bauhinia Road)	Cedar Way New Shared Path	Peach Tree Way	Poplar Court	15-20	$ 100,000		$ 100,000	
40g	Forrestfield (Bauhinia Road)	Virgillia Way Reserve Path Upgrade	Poplar Court	Linden Way	15-20	$ 85,000		$ 85,000	
41d	Forrestfield (Hibiscus Drive)	Dawson Avenue Shared Path Upgrade	Bougainvillea Avenue	Pavetta Crescent	15-20	$ 260,000		$ 260,000	
42a	Forrestfield (Mallee Way)	Strelitzia Avenue Shared Path	Hibiscus Drive	Mallee Way	15-20	$ 40,000		$ 40,000	
42b	Forrestfield (Mallee Way)	Mallee Way SAS	Strelitzia Avenue	Mallee Way	15-20		$ 170,000	$ 170,000	SAS Program Funding
42c	Forrestfield (Mallee Way)	POS Shared Path Connection	Mallee Way	Akebia Way	15-20	$ 50,000		$ 50,000	
42d	Forrestfield (Mallee Way)	Akebia Way SAS			15-20		$ 390,000	$ 390,000	SAS Program Funding
42e	Forrestfield (Mallee Way)	Bougainvillea Avenue Shared Path	Akebia Way	Berkshire Road	15-20	$ 40,000		$ 40,000	
42f	Forrestfield (Mallee Way)	Berkshire Road Upgraded Shared Path	Bougainvillea Avenue	Moonbooli Street	15-20	$ 80,000		$ 80,000	
					TOTAL	$ 2,720,000	$ 3,085,000	$ 5,805,000	

20+ Years

Project No.	Secondary Route	Description	Start	End	Timing (500k per Year Scenario)	City Funded	Potential External Funded	Total Project Cost Estimate	Comment
1h	Hills Spine	Pomeroy Road Sealed Shoulders	Canning Road	Welshpool Road	20+	$ 1,090,000		$ 1,090,000	
2b	Kalamunda Road	Sealed Shoulder	Hawtin Road	Roe Highway	20+	$ 1,030,000		$ 1,030,000	
4c	Lesmurdie to Maddington	Kelvin Road Sealed Shoulders	Crystal Brook Road	Southern City Boundary	20+	$ 410,000		$ 410,000	
	Local Route								
20f	Foothills Spine	Wattle Grove Option 2 (Kalari Drive Existing Path and Morrison Road New Shared Path)	Lenihan Corner	Hartfield Road	20+	$ 520,000		$ 520,000	
20k	Foothills Spine	Brewer Road Protected Bike Lanes Stage 1	Sultana Road East	Raveswood Road	20+	$ 830,000		$ 830,000	
20l	Foothills Spine	Brewer Road Protected Bike Lanes Stage 2	Raveswood Road	Maida Vale	20+	$ 1,120,000		$ 1,120,000	
21g	High Wycombe Local Route Spurs	Munday Road Shared Path	Wittenoom Road/Hamilton St	Dundas Road	20+	$ 270,000		$ 270,000	
21h	High Wycombe Local Route Spurs	Swan Road Shared Path	Kiandra Way	Edney Road	20+	$ 370,000		$ 370,000	
21i	High Wycombe Local Route Spurs	Norling Road & Newburn Road Shared Path	Kiandra Way/Norling Road	Maida Vale Road	20+	$ 320,000		$ 320,000	
23a	Hale/Hawtin Roads	Hale/Hawtin Roads Sealed Shoulders	Welshpool Road	Berkshire Road	20+	$ 290,000		$ 290,000	
23b	Hale/Hawtin Roads	Hale/Hawtin Roads Sealed Shoulders	Berkshire Road	Kalamunda Road	20+	$ 1,030,000		$ 1,030,000	
25a	Lesmurdie Local Routes	Lesmurdie Road Shared Path Extension	Welshpool Road East	Rootes Road	20+	$ 470,000		$ 470,000	
25d	Lesmurdie Local Routes	Grove Road Shared Path Missing Link 1	George Road	Gladys Road	20+	$ 110,000		$ 110,000	
25e	Lesmurdie Local Routes	Grove Road Shared Path Missing Link 2	Lesmurdie Road	Rooth Road	20+	$ 120,000		$ 120,000	
25f	Lesmurdie Local Routes	Gladys Road Shared Path Section 1	Grove Road	George Road	20+	$ 370,000		$ 370,000	
25g	Lesmurdie Local Routes	Gladys Road Shared Path Section 2	George Road	Welshpool Road East	20+	$ 190,000		$ 190,000	
25h	Lesmurdie Local Routes	Reid Road Shared Path	Albert Road	Pomeroy Road	20+	$ 170,000		$ 170,000	

25i	Lesmurdie Local Routes	Albert Road Shared Path	Reid Road	Arthur Road	20+	$ 40,000		$ 40,000	
25j	Lesmurdie Local Routes	Sanderson Road	Wiloughby Road	Gilroy Road	20+	$ 55,000		$ 55,000	
26a	Forrestfield to Lesmurdie	Hartfield Road Shared Path	Morrison Road	Lewis Road	20+	$ 450,000		$ 450,000	
26b	Forrestfield to Lesmurdie	Hartfield Road On-street Cycling	Lewis Road	Welshpool Road East	20+	$ 120,000		$ 120,000	
26c	Forrestfield to Lesmurdie	Welshpool Road East Shared Path	Hartfield Road	Crystal Brook Road	20+	$ 890,000		$ 890,000	
	Safe Active Street								
42g	Forrestfield (Mallee Way)	Moonbooli Street SAS	Berkshire Road	Setosa Drive	20+	$ 350,000		$ 350,000	
43a	Forrestfield (Ilex Way)	Dawson Park Shared Path	Dawson Avenue	Ilex Way	20+	$ 180,000		$ 180,000	
43b	Forrestfield (Ilex Way)	Ilex Way SAS	Dawson Park	Berkshire Road	20+		$ 220,000	$ 220,000	SAS Program Funding
43c	Forrestfield (Ilex Way)	Crumpet Creek Upgraded Shared Path	Berkshire Road	Mandon Street	20+	$ 200,000		$ 200,000	
43d	Forrestfield (Ilex Way)	Crumpet Creek New Shared Path	Mandon Street	Brewer Road	20+	$ 300,000		$ 300,000	
45	Wattle Grove	Thorogood Avenue Safe Active Street	The Promenade	St John Road	20+	$ 220,000		$ 220,000	
46a	Wattle Grove	Lancelot Green SAS	Welspool Road East	Kalari Drive	20+	$ 140,000		$ 140,000	
46b	Wattle Grove	Shared Path connection	Lancelot Green	Kalari Drive	20+	$ 50,000		$ 50,000	
47a	Kalamunda Township	Headingly Street Option	Canning Road	Railway Road	20+		$ 300,000	$ 300,000	SAS Program Funding
47b	Kalamunda Township	Central Road / Central Mall Option	Canning Road	Railway Road	20+		$ 510,000	$ 510,000	SAS Program Funding
47c	Kalamunda Township	Lindsay-Boonoloo-McRae Rad SAS	Railway Road	Cotherstone Road	20+	$ 1,110,000		$ 1,110,000	
	Other Shared Path								
90	First Avenue	First Avenue Shared Path	Nairn Road	Lawnbrook Road East	20+	$ 120,000		$ 120,000	
91	Welshpool Road	Welshpool Road Upgraded Shared Path	Hale Road	Tonkin Highway	20+	$ 680,000		$ 680,000	
92	Ledger Road	Ledger Road Shared Path	Williams Street	Waljerin Road	20+	$ 190,000		$ 190,000	
					TOTAL	$ 13,805,000	$ 1,030,000	$ 14,835,000	

Summary $500k Funding Target	City Funded	Potential External Funded	Total Project Cost Estimate
0-5 Years	$ 2,710,000	$ 8,655,000	$ 11,365,000
5-10 Years	$ 2,620,000	$ 7,660,000	$ 10,280,000
10-15 Years	$ 2,688,000	$ 4,467,000	$ 7,155,000
15-20 Years	$ 2,720,000	$ 3,085,000	$ 5,805,000
20+ Years	$ 13,805,000	$ 1,030,000	$ 14,835,000
	$ 24,543,000	$ 24,897,000	$ 49,440,000



CITY OF KALAMUNDA
BICYCLE PLAN
APPENDIX D
IMPLEMENTATION PLAN - OVERALL MAP
$500,000/YEAR SCENARIO

Date	Scale	Size
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CW988900-TR-OA3		C
Drawing Number		Revision

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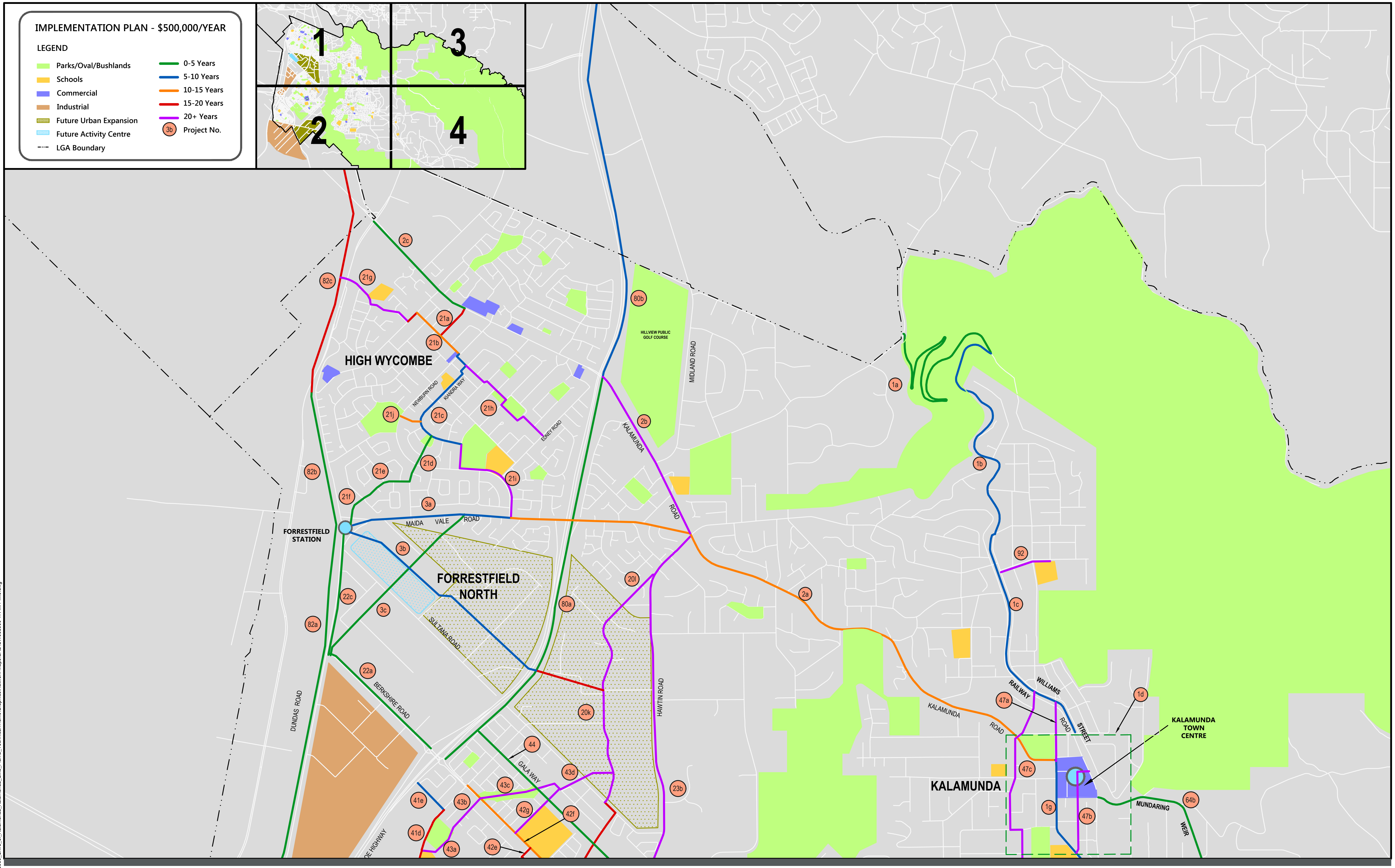
IMPLEMENTATION PLAN - $500,000/YEAR
LEGEND
Parks/Oval/Bushlands
Schools
Commercial
Industrial
Future Urban Expansion
Future Activity Centre
LGA Boundary
0-5 Years
5-10 Years
10-15 Years
15-20 Years
20+ Years
Project No.
1
2
3
4
HIGH WYCOMBE
FORRESTFIELD NORTH
FORRESTFIELD STATION
KALAMUNDA
KALAMUNDA TOWN CENTRE
HILLVIEW PUBLIC GOLF COURSE
MIDLAND ROAD
KALAMUNDA ROAD
MAIDA VALE ROAD
SULTANA ROAD
BERKSHIRE ROAD
DUNDAS ROAD
HAWTIN ROAD
GALA WAY
NEWBURN ROAD
KIANDRA WAY
EDNEY ROAD
RAILWAY ROAD
WILLIAMS STREET
MUNDARING WEIR
2c
82c
21g
21a
21b
80b
1a
21j
21c
21h
2b
1b
82b
21e
21d
21i
21f
3a
3b
92
20l
2a
1c
22c
3c
80a
82a
22a
1d
47a
20k
44
47c
43d
23b
43c
41e
43b
42g
42f
64b
1g
47b
41d
43a
42e

CITY OF KALAMUNDA

BICYCLE PLAN

APPENDIX D

IMPLEMENTATION PLAN - QUADRANT 1

$500,000/YEAR SCENARIO

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CW988900-TR-IM1			C
Drawing Number			Revision

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FORRESTFIELD

FORRESTFIELD TOWN CENTRE

WATTLE GROVE

HARTFIELD GOLF CLUB

LESMURDIE

ROE HIGHWAY

TONKIN HIGHWAY

HAWTIN ROAD

ORANGE VALLEY ROAD

LESMURDIE ROAD

CANNING ROAD

TRAFALGAR ROAD

GROVE ROAD

GLADYS ROAD

LESMURDIE ROAD

LAWNBROOK ROAD EAST

POMEROY ROAD

WELSHPOOL ROAD EAST

CRYSTAL BROOK ROAD

KELVIN ROAD

41c 42d 42b 42c 41b 42a 20i 22b 20j 23a 40g 40c 40b 40a 40f 40e 41a 40d 20h 20g 26a 45 20e 81a 20d 20f 26b 20c 20a 20b 46b 46a 91 26c 4b 81b 4c 25b 25c 25d 25e 25f 25j 25g 25a 25i 25h 63 4a 1f 1e 1h 64b 61c

IMPLEMENTATION PLAN - $500,000/YEAR

LEGEND

- Parks/Oval/Bushlands
- Schools
- Commercial
- Industrial
- Future Urban Expansion
- Future Activity Centre
- LGA Boundary
- 0-5 Years
- 5-10 Years
- 10-15 Years
- 15-20 Years
- 20+ Years
- 3b Project No.

1 2 3 4

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CITY OF KALAMUNDA

BICYCLE PLAN

APPENDIX D

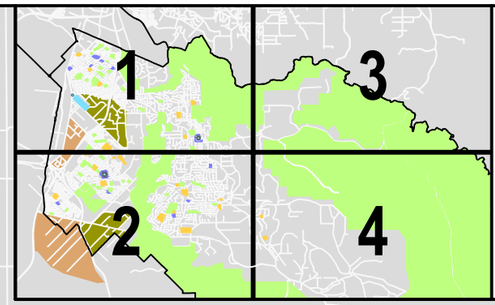
IMPLEMENTATION PLAN - QUADRANT 2

$500,000/YEAR SCENARIO

Date	Scale	Size
10.04.2018	NTS	A3

CW988900-TR-IM2
Drawing Number

C
Revision



IMPLEMENTATION PLAN - $500,000/YEAR

LEGEND

- Parks/Oval/Bushlands
- Schools
- Commercial
- Industrial
- Future Urban Expansion
- Future Activity Centre
- LGA Boundary
- 0-5 Years
- 5-10 Years
- 10-15 Years
- 15-20 Years
- 20+ Years
- 3b Project No.

MUNDARING WEIR

MUNDARING WEIR RD

MUNDARING WEIR RD

MUNDARING WEIR ROAD

64b

64c

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CITY OF KALAMUNDA

BICYCLE PLAN

APPENDIX D

IMPLEMENTATION PLAN - QUADRANT 3

$500,000/YEAR SCENARIO

Date	Scale	Size
10.04.2018	NTS	A3

CW988900-TR-IM3
Drawing Number

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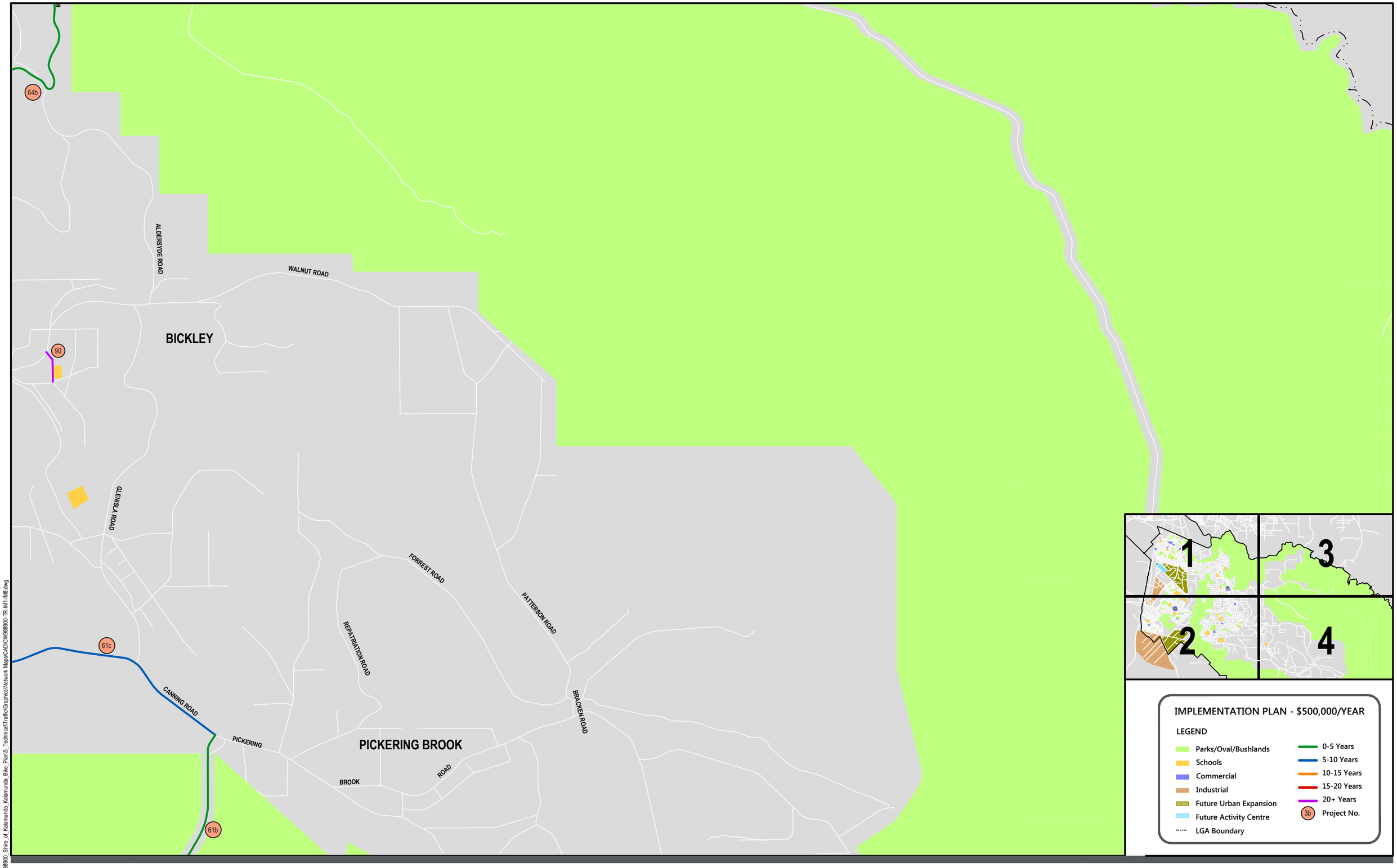
Revision



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CITY OF KALAMUNDA
BICYCLE PLAN
APPENDIX D
IMPLEMENTATION PLAN - QUADRANT 4
$500,000/YEAR SCENARIO

Date	Scale	Size
10.04.2018	NTS	A3

CW988900-TR-IM4
Drawing Number

C
Revision

APPENDIX

E

WORKS SCHEDULE & MAP - $1,000,000

Cardno
Shaping the Future

City of Kalamunda Bicycle Plan 2017 - Project Schedule based on $1,000,000 per Annum Scenario

0-5 Years

Project No.	Primary Route	Description	Start	End	Timing (1M per Year Scenario)	City Funded	Potential External Funded	Total Project Cost Estimate	Comment
80a	Roe Highway	PSP Completion Part of Roe Highway/Kalamunda Road Upgrade	Berkshire Road	Kalamunda Road	0-5		$ 2,260,000	$ 2,260,000	State Government Funded
81a	Tonkin Highway	PSP Extension on the Southern Side (including link to Hartfield Park)	Roe Highway	Welshpool Road East	0-5		$ 1,430,000	$ 1,430,000	State Government Funded
82a	Freight Railway / Dundas Road	Dundas Road PSP	Tonkin Highway	Forrestfield Station	0-5		$ 2,580,000	$ 2,580,000	State Government Funded
82b	Freight Railway / Dundas Road	Dundas Road PSP	Forrestfield Station	Wittenoom Road	0-5		$ 730,000	$ 730,000	State Government Funded Review priority when Forrestfield Station design is released
	Secondary Route								
1a	Hills Spine	Zig Zag Option A	Ridge Hill Road	Ocean View Parade	0-5	$ 35,000		$ 35,000	
1c	Hills Spine	Kalamunda Railway Heritage Trail Sealed Path	Hill Street	Elizabeth Street	0-5	$ 150,000	$ 150,000	$ 300,000	Potential WABN Grant Funding
1d	Hills Spine	Kalamunda Town Centre Section Options Study	Canning Road	Elizabeth Street	0-5	$ 25,000	$ 25,000	$ 50,000	Potential WABN Grant Funding
1f	Hills Spine	Canning Road Buffered Bike Lanes Stage 2	Railway Road	Lesmurdie Road	0-5	$ 1,200,000		$ 1,200,000	
2c	Kalamunda Road	Sealed Shoulder	Fernan Road	Abernethy Road	0-5	$ 560,000.00		$ 560,000	Include as part of existing planned upgrade
3d	Forrestfield Station Connection	Milner Road Protected Cycle Lanes	Maida Vale Road	Dundas Road	0-5		$ 620,000	$ 620,000	To be funded and constructed as part of the Forrestfield North District Structure Plan
	Local Route								
20a	Foothills Spine	Welshpool Road East Shared Path (including to connection from Puddy lane to Hale Road)	Roe Highway (City Boundary)	Puddy Lane	0-5	$ 65,000	$ 65,000	$ 130,000	Potential WABN Grant Funding
20b	Foothills Spine	Puddy Lane Shared Path	Welshpool Road East Shared Path	Hale Road	0-5	$ 85,000	$ 85,000	$ 170,000	Potential WABN Grant Funding
20c	Foothills Spine	Hale Road Shared Path Extension	Extensa Road	Puddy Lane	0-5	$ 50,000		$ 50,000	
20d	Foothills Spine	Hale Road Existing Shared Path Upgrade (Western Side)	Extensa Road	Lenihan Corner	0-5	$ 320,000		$ 320,000	
20g	Foothills Spine	Hartfield Road Shared Path	Hale Road or Morrison Road	Sussex Road	0-5	$ 85,000		$ 85,000	
21d	High Wycombe Local Route	Public Access Way Upgrades (through McLarty Way, and Walker Crescent)	Kiandra Way	Newburn Road	0-5	$ 95,000		$ 95,000	Potential external funding (non WABN)
21e	High Wycombe Local Route	Butcher Road & Palmer Crescent Safe Active Street	Newburn Road	Palmer Crescent	0-5	$ 390,000		$ 390,000	Potential external funding (non WABN)
21f	High Wycombe Local Route	Everitt Place Shared Path	Palmer Crescent	Maida Vale Road	0-5	$ 85,000		$ 85,000	Potential external funding (non WABN)
21i	High Wycombe Local Route Spurs	Norling Road & Newburn Road Shared Path	Kiandra Way/Norling Road	Maida Vale Road	0-5	$ 320,000		$ 320,000	Potential external funding (non WABN)
21j	High Wycombe Local Route	Crake Court Public Access Way Upgrade	Kiandra Way	Newburn Road	0-5	$ 25,000		$ 25,000	Potential external funding (non WABN)
22a	Berkshire & Dundas Road	Berkshire Road (West of Roe Highway) Shared Path Upgrade	Ashby Close	Dundas Road	0-5	$ 230,000	$ 230,000	$ 460,000	Potential WABN Grant Funding
22c	Berkshire & Dundas Road	Dundas Road Shared Path	Berkshire Road	Forrestfield Station	0-5	$ 180,000	$ 180,000	$ 360,000	Potential WABN Grant Funding
25b	Lesmurdie Local Routes	Burma Road Shared Path Extension	Orange Valley Road	Connor Road	0-5	$ 70,000		$ 70,000	
25c	Lesmurdie Local Routes	Trafalgar Road - Kimbarlee Way Path Upgrade	Waterloo Crescent	Falls Road	0-5	$ 110,000		$ 110,000	
25d	Lesmurdie Local Routes	Grove Road Shared Path Missing Link 1	George Road	Gladys Road	0-5	$ 110,000		$ 110,000	
25e	Lesmurdie Local Routes	Grove Road Shared Path Missing Link 2	Lesmurdie Road	Rooth Road	0-5	$ 120,000		$ 120,000	
	Safe Active Street								
44	Forrestfield (Gala Way)	Gala Way Safe Active Street	Fruit Tree Crescent	Hawtin Road	0-5	$ 50,000		$ 50,000	Allowance to supplement existing traffic calming
	Traning Route								
63	Welshpool Road East	Lesmurdie Road Intersection Safety Improvement	-	-	0-5	$ 40,000		$ 40,000	
61a	Canning Road	Canning Road Road Safety Audit	-	-	0-5	$ 25,000		$ 25,000	

61b	Canning Road	Targeted Shoulder Widening Stage 1	Pickering Brook Road	City Boundary	0-5	$ 225,000	$ 225,000	$ 450,000	Black Spot Funding
64a	Mundaring Weir Road	Mundaring Weir Road Road Road Safety Audit	-	-	0-5	$ 15,000		$ 15,000	
64b	Mundaring Weir Road	Targeted Shoulder Widening Stage 1	Railway Road	City Boundary	0-5	$ 225,000	$ 225,000	$ 450,000	Black Spot Funding
65	City of Kalamunda	Safe Passing Law Review	-	-	0-5	$ 10,000		$ 10,000	
					TOTAL	$ 4,900,000	$ 8,805,000	$ 13,705,000	

5-10 Years

Project No.	Primary Route	Description	Start	End	Timing (500k per Year Scenario)	City Funded	Potential External Funded	Total Project Cost Estimate	Comment
80b	Roe Highway	Roe Highway PSP Completion	Kalamunda Road	Brinsmead Road (Northern City Boundary)	5-10		$ 660,000	$ 660,000	State Government Funded
81b	Tonkin Highway	PSP Completion	Welshpool Road East	Kelvin Road/Mills Road	5-10		$ 1,310,000	$ 1,310,000	State Government Funded
	Secondary Route								
1b	Hills Spine	Lascelles Parade / William Street Safe Active Street	Zig Zag Scenic Drive	Hill Street	5-10	$ 320,000	$ 320,000	$ 640,000	Potential WABN Grant Funding
1e	Hills Spine	Canning Road Buffered Bike Lanes Stage 1	Kalamunda Road	Railway Road	5-10	$ 380,000	$ 380,000	$ 760,000	Potential WABN Grant Funding
3a	Forrestfield Station Connection	Maida Vale Road Protected Cycle Lanes Stage 1	Forrestfield Station	Priory Road	5-10		$ 1,090,000	$ 1,090,000	To be funded and constructed as part of the Forrestfield North Developer Contributions Plan
3b	Forrestfield Station Connection	Forrestfield Station TOD Connector Road Protected Cycle Lanes Stage 1	Forrestfield Station	Roe Highway	5-10		$ 1,460,000.00	$ 1,460,000	Include as part of Forrestfield North District Structure Plan
	Local Route								
20i	Foothills Spine	Transmission Line Easement Shared Path	Berkshire Road	Sultana Road East	5-10	$ 340,000	$ 340,000	$ 680,000	Potential WABN Grant Funding
20j	Foothills Spine	Transmission Line - Strelitzia Avenue Shared Path Link	Strelitzia Avenue	Proposed Transmission Line Shared Path	5-10	$ 170,000		$ 170,000	
21a	High Wycombe Local Route	Fernan Road Safe Active Street	Kalamunda Road	Hamilton Road	5-10	$ 80,000	$ 120,000	$ 200,000	60% funding from SAS Program
21b	High Wycombe Local Route	Hamilton Street Safe Active Street	Wittenoom Road	Kiandra Way	5-10	$ 188,000	$ 282,000	$ 470,000	60% funding from SAS Program
21c	High Wycombe Local Route	Kiandra Way Safe Active Street	Western Avenue	Norling Road	5-10		$ 660,000	$ 660,000	SAS Program Funding
21g	High Wycombe Local Route Spurs	Munday Road Shared Path	Wittenoom Road/Hamilton Street	Dundas Road	5-10	$270,000		$270,000	
22b	Berkshire & Dundas Road	Berkshire Road (East of Roe Highway) Shared Path Upgrade	Apricot Street	Hawtin Road	5-10	$ 890,000		$ 890,000	Timing will be influenced by the Forresfield North District Structure Plan
25f	Lesmurdie Local Routes	Gladys Road Shared Path Section 1	Grove Road	George Road	5-10	$ 370,000		$ 370,000	
	Safe Active Street								
40a	Forrestfield (Bauhinia Road)	Bauhinia Road SAS	Dawson Avenue	Magnolia Way	5-10		$ 240,000	$ 240,000	SAS Program Funding
40b	Forrestfield (Bauhinia Road)	Dawson Ave Shared Path	Cedar Way	Bauhinia Road	5-10	$ 65,000		$ 65,000	
40c	Forrestfield (Bauhinia Road)	Cedar Way SAS	Cedar Way	Dawson Avenue	5-10		$ 240,000	$ 240,000	SAS Program Funding
40d	Forrestfield (Bauhinia Road)	Shared Path Upgrade - Bridge Over Woodlupine Brook	Cedar Way	Peach Tree Way	5-10	$ 270,000		$ 270,000	
40e	Forrestfield (Bauhinia Road)	Peach Tree Way SAS	-	-	5-10		$ 260,000	$ 260,000	SAS Program Funding
41a	Forrestfield (Hibiscus Drive)	Hale Road Shared Path	Hannover Street	Hibiscus Drive	5-10	$ 430,000		$ 430,000	
41b	Forrestfield (Hibiscus Drive)	Hibiscus Drive SAS	Bougainvillea Avenue	Strelitzia Avenue	5-10		$ 330,000	$ 330,000	SAS Program Funding
41c	Forrestfield (Hibiscus Drive)	Bougainvillea Avenue Shared Path	Hibiscus Drive	Dawson Avenue	5-10	$ 240,000		$ 240,000	
41e	Forrestfield (Hibiscus Drive)	Pavetta Crescent SAS	Dawson Avenue	Roe Highway	5-10		$ 200,000	$ 200,000	SAS Program Funding
47b	Kalamunda Township	Central Road / Central Mall Option	Canning Road	Railway Road	5-10	$ 510,000		$ 510,000	SAS Program Funding
	Traning Route								
61c	Canning Road	Targeted Shoulder Widening Stage 2	Pomeroy Road	Pickering Brook Road	5-10	$ 250,000	$ 250,000	$ 500,000	Black Spot Funding
64c	Mundaring Weir Road	Targeted Shoulder Widening Stage 2	Railway Road	City Boundary	5-10	$ 250,000	$ 250,000	$ 500,000	Black Spot Funding
					TOTAL	$ 5,023,000	$ 8,392,000	$ 13,415,000	

10 - 15 Year

Project No.	Primary Route	Description	Start	End	Timing (500k per Year Scenario)	City Funded	Potential External Funded	Total Project Cost Estimate	Comment
82c	Freight Railway / Dundas Road	Dundas Road PSP	Wittenoom Street	City Boundary	10-15		$ 1,050,000	$ 1,050,000	State Government Funded
	Secondary Route		Start	End	Timing (500k per Year Scenario)	City Funded	Potential External Funded	Total Project Cost Estimate	Comment
1g	Hills Spine	Canning Road Buffered Bike Lanes Stage 3	Lesmurdie Road	Pomeroy Road	10-15	$ 850,000	$ 850,000	$ 1,700,000	Potential WABN Grant Funding
2a	Kalamunda Road	Bufferred Cycle lanes	Canning Road	Hawtin Road	10-15	$ 275,000	$ 275,000	$ 550,000	Potential WABN Grant Funding
3a	Forrestfield Station Connection	Maida Vale Road Protected Cycle Lanes Stage 2	Forrestfield Station	Priory Road	10-15		$ 1,090,000	$ 1,090,000	To be funded and constructed as part of the Forrestfield North Developer Contributions Plan
	Local Route								
20e	Foothills Spine	Wattle Grove Option 1 (The Promenade & Hale Road Shared Path)	Lenihan Corner	Hartfield Road	10-15	$ 310,000	$ 310,000	$ 620,000	Potential WABN Grant Funding
20f	Foothills Spine	Wattle Grove Option 2 (Kalari Drive Existing Path and Morrison Road New Shared Path)	Lenihan Corner	Hartfield Road	10-15	$ 520,000		$ 520,000	
20h	Foothills Spine	Sussex Road Safe Active Street	Hartfield Road	Hale Road/Mallow Way	10-15		$ 920,000	$ 920,000	SAS Program Funding
25a	Lesmurdie Local Routes	Lesmurdie Road Shared Path Extension	Welshpool Road East	Rootes Road	10-15	$ 470,000		$ 470,000	
25g	Lesmurdie Local Routes	Gladys Road Shared Path Section 2	George Road	Welshpool Road East	10-15	$ 190,000		$ 190,000	
25h	Lesmurdie Local Routes	Reid Road Shared Path	Albert Road	Pomeroy Road	10-15	$ 170,000		$ 170,000	
25i	Lesmurdie Local Routes	Albert Road Shared Path	Reid Road	Arthur Road	10-15	$ 40,000		$ 40,000	
25j	Lesmurdie Local Routes	Sanderson Road	Wiloughby Road	Gilroy Road	10-15	$ 55,000		$ 55,000	
	Safe Active Street								
40f	Forrestfield (Bauhinia Road)	Cedar Way New Shared Path	Peach Tree Way	Poplar Court	10-15	$ 100,000		$ 100,000	
40g	Forrestfield (Bauhinia Road)	Virgillia Way Reserve Path Upgrade	Poplar Court	Linden Way	10-15	$ 85,000		$ 85,000	
41d	Forrestfield (Hibiscus Drive)	Dawson Avenue Existing Path	Bougainvillea Avenue	Pavetta Crescent	10-15	$ 260,000		$ 260,000	
42a	Forrestfield (Mallee Way)	Strelitzia Avenue Shared Path	Hibiscus Drive	Mallee Way	10-15	$ 40,000		$ 40,000	
42b	Forrestfield (Mallee Way)	Mallee Way SAS	Strelitzia Avenue	Mallee Way	10-15		$ 170,000	$ 170,000	SAS Program Funding
42c	Forrestfield (Mallee Way)	POS Shared Path Connection	Mallee Way	Akebia Way	10-15	$ 50,000		$ 50,000	
42d	Forrestfield (Mallee Way)	Akebia Way SAS			10-15		$ 390,000	$ 390,000	SAS Program Funding
42e	Forrestfield (Mallee Way)	Bougainvillea Avenue Shared Path	Akebia Way	Berkshire Road	10-15	$ 40,000		$ 40,000	
42f	Forrestfield (Mallee Way)	Berkshire Road Existing Shared Path	Bougainvillea Avenue	Moonbooli Street	10-15	$ 80,000		$ 80,000	
42g	Forrestfield (Mallee Way)	Moonbooli Street SAS	Berkshire Road	Setosa Drive	10-15	$ 350,000		$ 350,000	
46a	Wattle Grove	Lancelot Green SAS	Welspool Road East	Kalari Drive	10-15	$ 140,000		$ 140,000	
46b	Wattle Grove	Shared Path connection	Lancelot Green	Kalari Drive	10-15	$ 50,000		$ 50,000	
47a	Kalamunda Township	Headingly Street Option	Canning Road	Railway Road	10-15		$ 300,000	$ 300,000	SAS Program Funding
	Other Shared Path								
90	First Avenue	First Avenue Shared Path	Nairn Road	Lawnbrook Road East	10-15	$ 120,000		$ 120,000	
91	Welshpool Road	Welshpool Road Upgraded Shared Path	Hale Road	Tonkin Highway	10-15	$ 680,000		$ 680,000	
92	Ledger Road	Ledger Road Shared Path	Williams Street	Waljerin Road	10-15	$ 190,000		$ 190,000	
					TOTAL	$ 5,065,000	$ 5,355,000	$ 10,420,000	

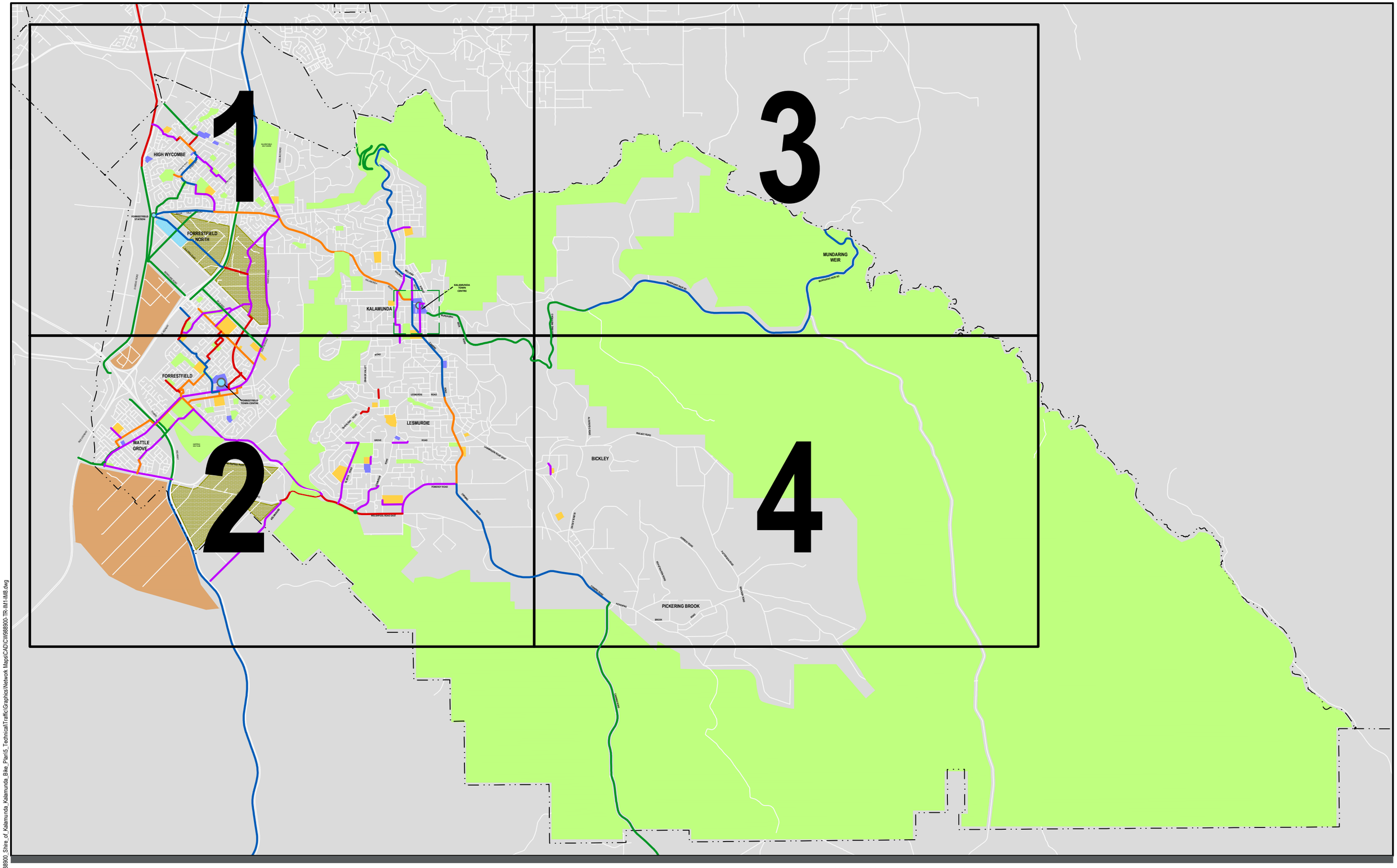
15 - 20 Year

Project No.	Secondary Route	Description	Start	End	Timing (500k per Year Scenario)	City Funded	Potential External Funded	Total Project Cost Estimate	Comment
3c	Forrestfield Station Connection	Forrestfield Station TOD Connector Road Protected Cycle Lanes Stage 2	Roe Highway	Brewer Road	15-20		$ 560,000	$ 560,000	Include as part of Forrestfield North District Structure Plan
4a	Lesmurdie to Maddington	Welshpool Road East Shared Path	Pomeroy Road	Crystal Brook Road	15-20	$ 455,000	$ 455,000	$ 910,000	Potential WABN Grant Funding
4b	Lesmurdie to Maddington	Crystal Brook Road Shared Path	Welshpool Road East	Kelvin Road	15-20	$ 570,000		$ 570,000	
4c	Lesmurdie to Maddington	Kelvin Road Sealed Shoulders	Crystal Brook Road	Southern City Boundary	15-20	$ 410,000		$ 410,000	
	Local Route								
20k	Foothills Spine	Brewer Road Protected Bike Lanes Stage 1	Sultana Road East	Roe Highway (via Ravenswood Road)	15-20	$ 415,000	$ 415,000	$ 830,000	Potential WABN Grant Funding
20l	Foothills Spine	Brewer Road Protected Bike Lanes Stage 2	Raveswood Road	Maida Vale	15-20	$ 560,000	$ 560,000	$ 1,120,000	Potential WABN Grant Funding
21h	High Wycombe Local Route Spurs	Swan Road Shared Path	Kiandra Way	Edney Road	15-20	$ 370,000		$ 370,000	
23a	Hale/Hawtin Roads	Hale/Hawtin Roads Sealed Shoulders	Welshpool Road	Berkshire Road	15-20	$ 290,000		$ 290,000	
23b	Hale/Hawtin Roads	Hale/Hawtin Roads Sealed Shoulders	Berkshire Road	Hawtin Road	15-20	$ 1,030,000		$ 1,030,000	
	Safe Active Street								
43a	Forrestfield (Ilex Way)	Dawson Park Shared Path	Dawson Avenue	Ilex Way	15-20	$ 180,000		$ 180,000	
43b	Forrestfield (Ilex Way)	Ilex Way SAS	Dawson Park	Berkshire Road	15-20		$ 220,000	$ 220,000	SAS Program Funding
43c	Forrestfield (Ilex Way)	Crumpet Creek Upgraded Shared Path	Berkshire Road	Mandon Street	15-20	$ 200,000		$ 200,000	
43d	Forrestfield (Ilex Way)	Crumpet Creek New Shared Path	Mandon Street	Brewer Road	15-20	$ 300,000		$ 300,000	
45	Wattle Grove	Thorogood Avenue SAS	The Promenade	St John Road	15-20	$ 220,000		$ 220,000	
					TOTAL	$ 5,000,000	$ 2,210,000	$ 7,210,000	

20+ Years

Project No.	Secondary Route		Start	End	Timing (500k per Year Scenario)	City Funded	Potential External Funded	Total Project Cost Estimate	Comment
1h	Hills Spine	Pomeroy Road Sealed Shoulders	Canning Road	Welshpool Road	20+	$ 1,090,000		$ 1,090,000	
2b	Kalamunda Road	Sealed Shoulder	Hawtin Road	Roe Highway	20+	$ 1,030,000		$ 1,030,000	
	Local Route								
26a	Forrestfield to Lesmurdie	Hartfield Road Shared Path	Morrison Road	Lewis Road	20+	$ 450,000		$ 450,000	
26b	Forrestfield to Lesmurdie	Hartfield Road On-street Cycling	Lewis Road	Welshpool Road East	20+	$ 120,000		$ 120,000	
26c	Forrestfield to Lesmurdie	Welshpool Road East Shared Path	Hartfield Road	Crystal Brook Road	20+	$ 890,000		$ 890,000	
	Safe Active Street								
47c	Kalamunda Township	Lindsay-Boonoloo-McRae Rad SAS	Railway Road	Cotherstone Road	20+	$ 1,110,000		$ 1,110,000	
					TOTAL	$ 4,690,000	$ -	$ 4,690,000	

Summary $500k Funding Target	City Funded	Potential External Funded	Total Project Cost Estimate
0-5 Years	$ 4,900,000	$ 8,805,000	$ 13,705,000
5-10 Years	$ 5,023,000	$ 8,392,000	$ 13,415,000
10-15 Years	$ 5,065,000	$ 5,355,000	$ 10,420,000
15-20 Years	$ 5,000,000	$ 2,210,000	$ 7,210,000
20+ Years	$ 4,690,000	$ -	$ 4,690,000
	$ 24,678,000	$ 24,762,000	$ 49,440,000



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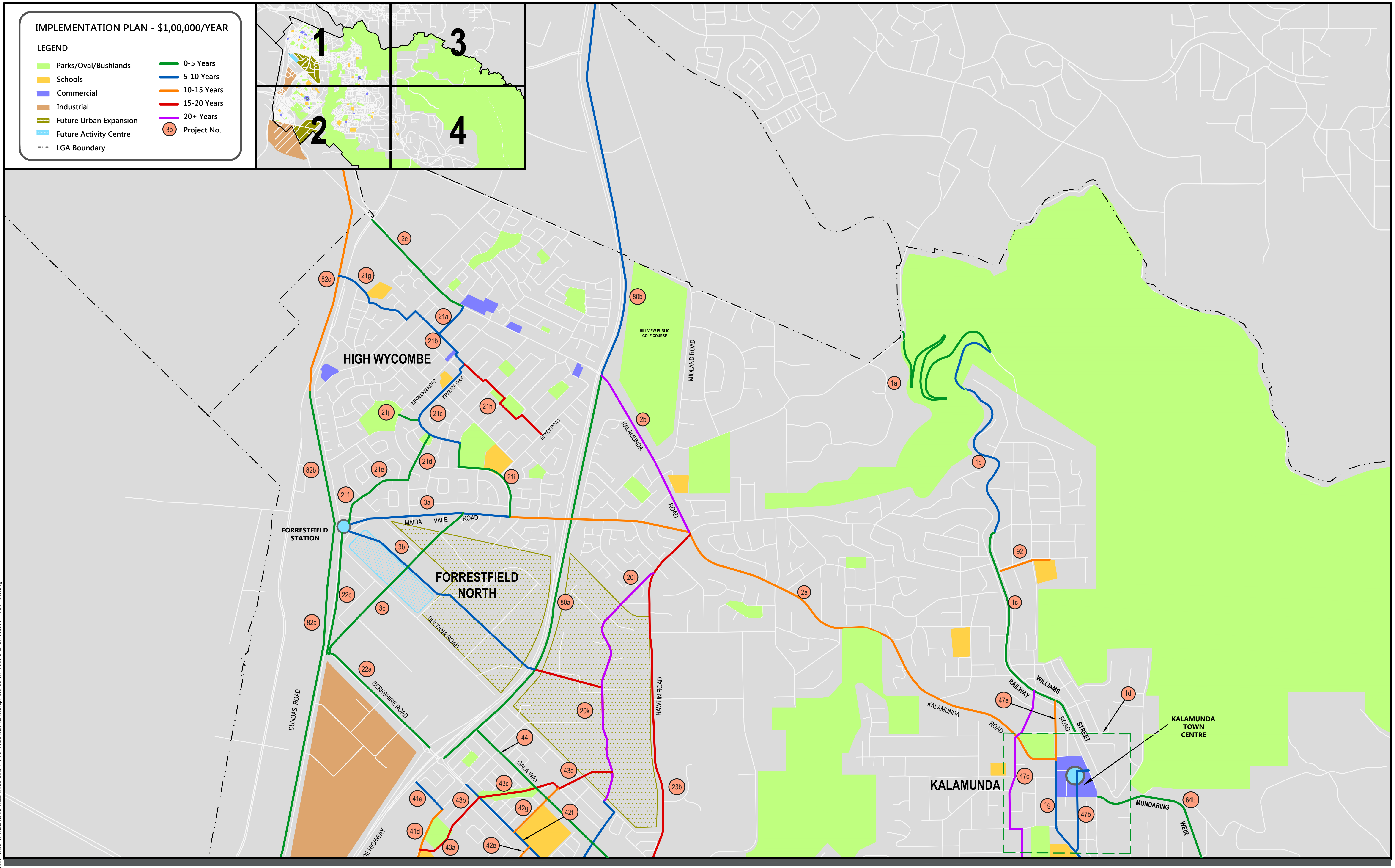
CITY OF KALAMUNDA
BICYCLE PLAN
APPENDIX E
IMPLEMENTATION PLAN - OVERALL MAP
$1,000,000/YEAR SCENARIO

Date	Scale	Size
10.04.2018	NTS	A3
CW988900-TR-OA4		C
Drawing Number		Revision


IMPLEMENTATION PLAN - $1,00,000/YEAR
LEGEND
Parks/Oval/Bushlands
Schools
Commercial
Industrial
Future Urban Expansion
Future Activity Centre
LGA Boundary
0-5 Years
5-10 Years
10-15 Years
15-20 Years
20+ Years
Project No.
1
2
3
4
HIGH WYCOMBE
FORRESTFIELD STATION
FORRESTFIELD NORTH
KALAMUNDA
KALAMUNDA TOWN CENTRE
HILLVIEW PUBLIC GOLF COURSE
MIDLAND ROAD
KALAMUNDA ROAD
MAIDA VALE ROAD
NEWBURN ROAD
KIANDRA WAY
EDNEY ROAD
SULTANA ROAD
BERKSHIRE ROAD
DUNDAS ROAD
HAWTIN ROAD
GALA WAY
RAILWAY ROAD
WILLIAMS STREET
MUNDARING WEIR
82c 21g 2c 21a 21b 80b 21h 21c 21j 2b 1a 21d 21e 82b 21i 1b 21f 3a 3b 92 20l 80a 22c 3c 2a 1c 82a 22a 1d 47a 20k 44 43d 43c 23b 47c 41e 43b 42g 42f 1g 47b 64b 41d 43a 42e

CITY OF KALAMUNDA

BICYCLE PLAN

APPENDIX E

IMPLEMENTATION PLAN - QUADRANT 1

$1,000,000/YEAR SCENARIO

Date	Scale	Size
10.04.2018	NTS	A3

Drawing Number	Revision
CW988900-TR-IM5	C

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FORRESTFIELD

FORRESTFIELD TOWN CENTRE

WATTLE GROVE

HARTFIELD GOLF CLUB

LESMURDIE

WELSHPOOL ROAD EAST

CRYSTAL BROOK ROAD

KELVIN ROAD

HAWTIN ROAD

TONKIN HIGHWAY

ROE HIGHWAY

ORANGE VALLEY ROAD

TRAFALGAR ROAD

GROVE ROAD

GLADYS ROAD

LESMURDIE ROAD

POMEROY ROAD

LAWNBROOK ROAD EAST

CANNING ROAD

IMPLEMENTATION PLAN - $1,000,000/YEAR

LEGEND

- Parks/Oval/Bushlands
- Schools
- Commercial
- Industrial
- Future Urban Expansion
- Future Activity Centre
- LGA Boundary
- 0-5 Years
- 5-10 Years
- 10-15 Years
- 15-20 Years
- 20+ Years
- 3b Project No.

1 2 3 4

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CITY OF KALAMUNDA

BICYCLE PLAN

APPENDIX E

IMPLEMENTATION PLAN - QUADRANT 2

$1,000,000/YEAR SCENARIO

Date	Scale	Size
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Drawing Number

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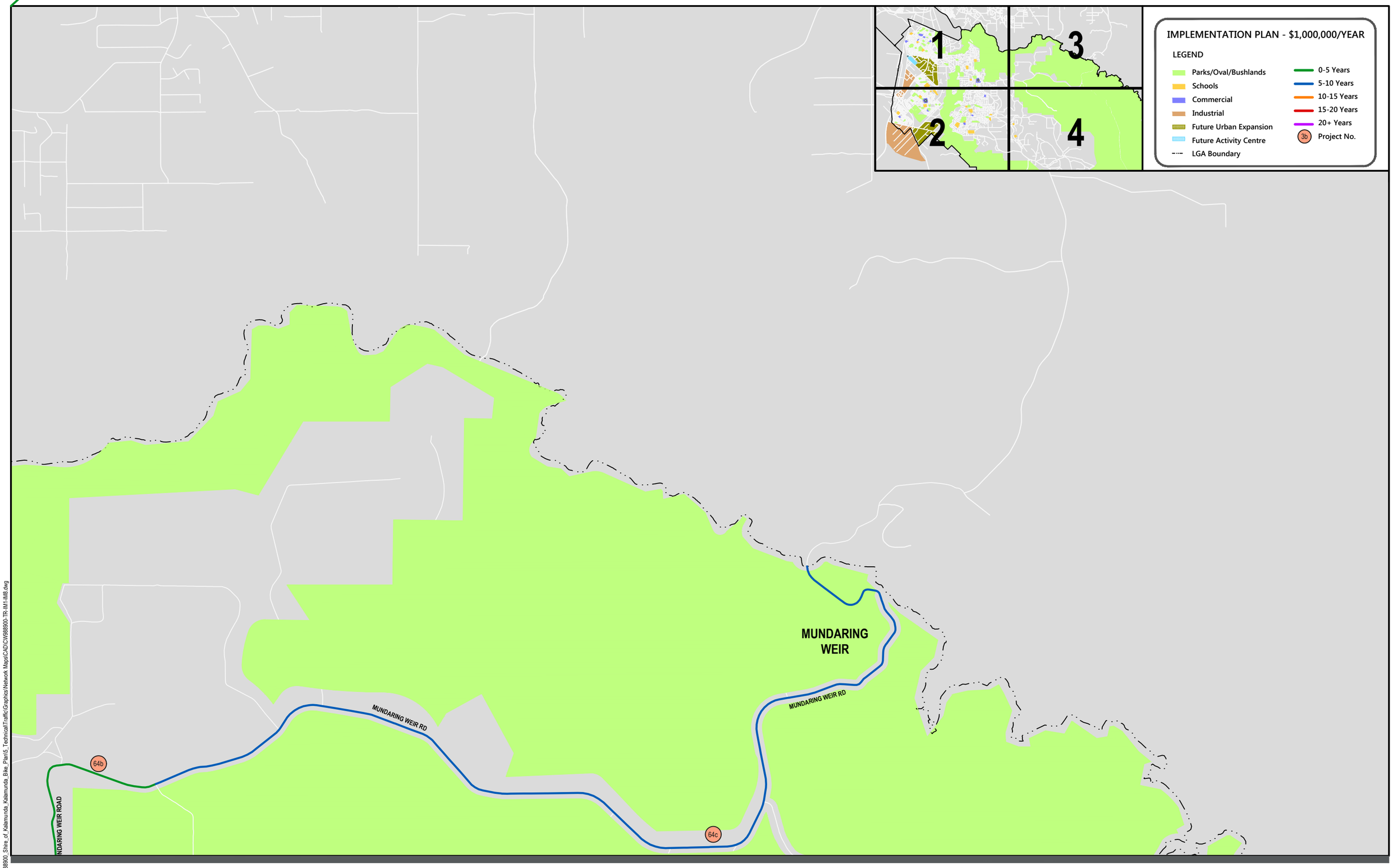
Revision



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CITY OF KALAMUNDA
BICYCLE PLAN
APPENDIX E
IMPLEMENTATION PLAN - QUADRANT 3
$1,000,000/YEAR SCENARIO

Date	Scale	Size
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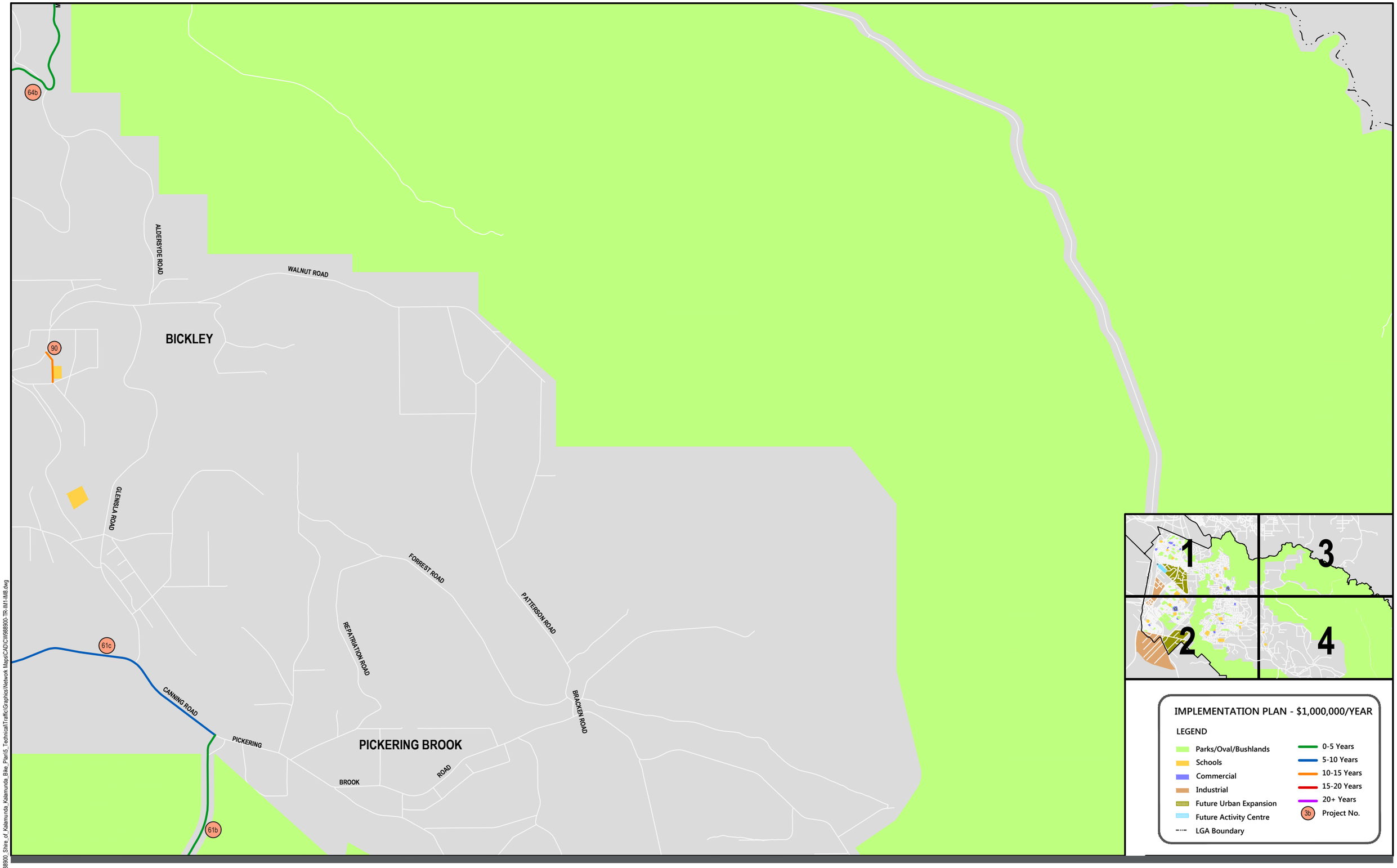
CW988900-TR-IM7
Drawing Number

C
Revision



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CITY OF KALAMUNDA
BICYCLE PLAN
APPENDIX E
IMPLEMENTATION PLAN - QUADRANT 4
$1,000,000/YEAR SCENARIO

Date	Scale	Size
10.04.2018	NTS	A3

CW988900-TR-IM8
Drawing Number

C
Revision