CARDINIA SHIRE COUNCIL

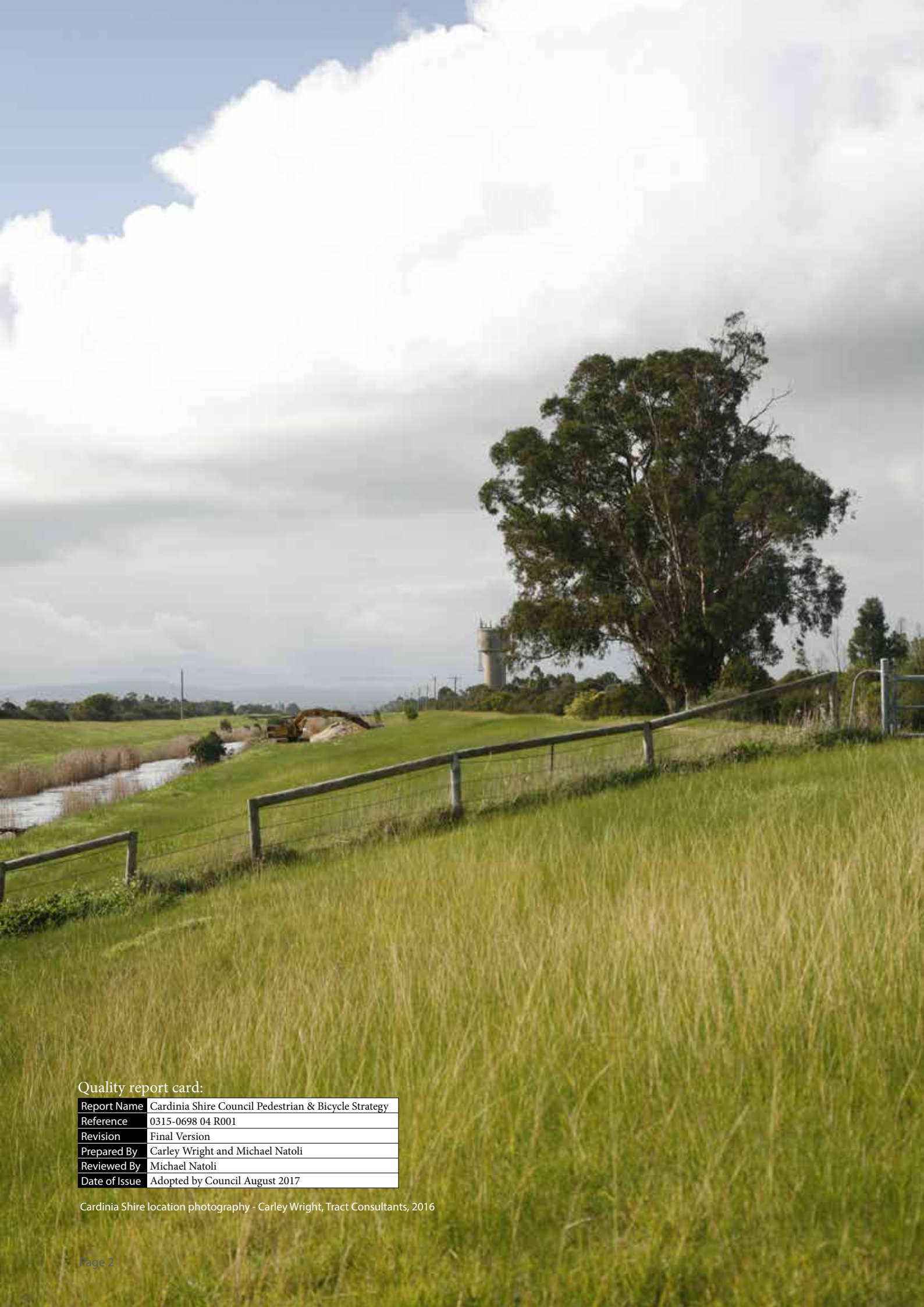
PEDESTRIAN & BICYCLE STRATEGY

AUGUST 2017

Tract

Cardinia

VICTORIA State Government



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Cardinia Shire location photography - Carley Wright, Tract Consultants, 2016

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EXECUTIVE SUMMARY

The Cardinia Shire Council Pedestrian and Bicycle Strategy sets out a vision to provide the premier trail network in Victoria, connecting people to their daily destinations and to the spectacular tourism and landscape features of the Shire. The aim of this strategy is to provide a guiding framework for Council for the incremental development of a comprehensive walking and cycling network throughout the Shire. The strategy will link in with Councils existing Footpath Priority List to help guide the development of an integrated path network. As part of this, Council will seek to provide a high level of service for all ages, parents and carers with prams, people in wheelchairs and people traveling on mobility scooters.

Further work will be required when implementing the proposed route network identified in this strategy to consider the detailed design of each of the paths. This detailed design phase will determine the final alignment of the trail and will consider the location of supporting infrastructure such as car parking, seating, shade, toilet blocks and other amenities.

The Strategy is supported by and builds on a number of Council studies and policies. The 2017-18 Cardinia Shire Council Plan provides high level support through its objectives to improve health and wellbeing for all, and to provide a variety of recreation and leisure opportunities and transport linkages between townships.

The Strategy builds on the existing 2007 Pedestrian and Bicycle Strategy which identified a preferred network across the Shire, as well as minimum standards for the network infrastructure. It also integrates key walking and cycling paths that have been identified in Precinct Structure Plans and township strategies.

Council is faced with several key challenges in providing walking and cycling infrastructure across the Shire. The large physical separation between townships and destinations, steep topography, a lack of dedicated infrastructure, connectivity to public transport stops, and many vehicle-dominated streets are common issues across the Shire. For the growth townships of Pakenham and Officer, a major challenge is the inconsistent provision of walking and cycling infrastructure across residential developments, and large gaps in the delivery of the shared path network.

The Shire is experiencing changes in its population, particularly the ageing and young family demographics. This changing population is another challenge that needs to be considered. Whilst the population is growing marginally, the proportion of population over 60 years old is forecast to increase significantly. Ensuring appropriate infrastructure for these groups is important in developing a responsive walking and cycling network.

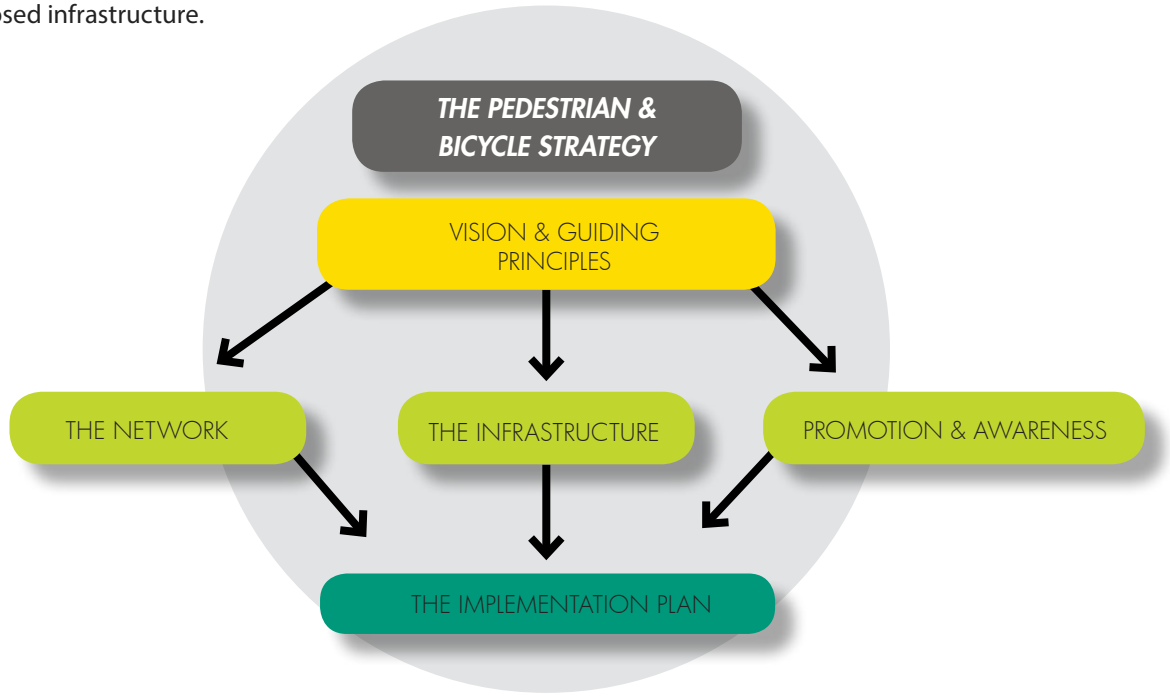
There are significant opportunities for walking and cycling in Cardinia Shire. It has diverse, scenic landscape settings including the forested hills, foothills and waterways that could provide high quality experiences for residents

and visitors. It has major employment, community services and shops that provide important strategic destinations within townships and beyond. In addition, there are a number of existing regional trails that are ready to be integrated into a broader walking and cycling network.

The Strategy identifies and maps the following categories of walking and cycling across Cardinia Shire;

- Regional trails – Regionally significant links between townships and beyond the Shire providing access to major recreation and tourism destinations, employment nodes and services. These trails are for multi-purpose use are and provided along major open space corridors or separated within key road reservations. The delivery of a regional trail network is the focus of this strategy.
  See Figure 19 for the Regional Trails Plan
- Strategic links – Major links across townships connecting people to key destinations such as shops, schools, community facilities, employment nodes and open space. These trails are generally for multi-purpose use or provided as dedicated bikeways.
  See Appendix 2 for the Township Plans that identify the strategic links for each township
- Pedestrian priority areas (high pedestrian activity areas) – Key streets within and around town centers where increased pedestrian priority is provided to encourage walking trips for transport to shops, public transport stops, schools, community facilities and open space. Improvements could include increased priority at intersections, additional shade and lighting, and street activation.
  See Appendix 2 for the Township Plans that identify the high pedestrian activity areas. Shortest route analysis was undertaken to determine where the high pedestrian activity areas are located. This analysis can be found in Appendix 3 - Pedestrian Access Analysis.

A summary of the recommended regional trails is provided in Appendix 1. The purpose of the summary table is to outline the key components and considerations in delivering each trail and implementing the wider network to help ensure the network is delivered in stages, aligning with Council's priorities and related capital works. The summary table outlines the trail type, surface, key constraints as well as a priority rating and estimated cost. The regional trail network proposed in this strategy is comprehensive. Council will use this strategy as strategic justification to seek funding to assist in the delivery of the proposed infrastructure.



PART A - BACKGROUND

Part A of the Pedestrian and Bicycle Strategy contains Sections 1 - 3. These sections outline the background and context to the Pedestrian and Bicycle Strategy.

Section 1 describes the purpose of the Pedestrian and Cycling Strategy

Section 2 outlines the background context, discussing demographics, existing activity and summarises the relevant strategies and plans

Section 3 provides the understanding of the needs and behaviours of walkers and cyclists to ensure the provision of future infrastructure meets user's requirements

For network information and detail see Part B, sections 4-6.

1.1 INTRODUCTION

Cardinia Shire has an existing broad network of shared paths, trails, footpaths and bicycle lanes.

Although Councils existing pathway network has been somewhat guided by Council's existing Pedestrian and Bicycle Strategy, a large proportion of the network has been developed in a relatively ad-hoc manner with differing standards. Throughout new development areas the focus has been on internal links in localized estates and as a result there are lots of missing pieces of infrastructure.

The location of community facilities with both local and regional catchments (such as schools, parks, sporting facilities and shopping areas) has also influenced priorities, particularly where such facilities have been recently provided and have little to no connection with broader catchment areas.

The Pedestrian and Bicycle Strategy provides the guiding framework to identify a connected network of trails and paths that looks beyond township boundaries and provides an implementation plan to ensure the network is delivered in a coordinated way.

1.2 BENEFITS OF WALKING AND CYCLING

Walking and cycling provides a range of health, social, environmental and economic benefits to individuals and the community. Increased pedestrian and cycling activity within a community can have other positive benefits such as leading to behavioral change. The promotion of walking and cycling will help normalise these activities in the Shire, leading to mutual recognition between pedestrians, cyclists and vehicles.

1.2.1 HEALTH

Physical activity such as walking and cycling has been shown to provide physical health benefits such as lowering blood pressure and improving heart health, reducing weight levels and obesity and reducing the risk of heart disease and stroke.

In terms of mental health benefits, walking and cycling has been proven to reduce the incidences of anxiety, stress and depression, and improve individual happiness and well-being.

Compared to all Victorians (18.9%), a higher proportion of residents in Cardinia engaged in no physical activity during the week (22.8%) (source: Cardinia Shire Council).

1.2.2 SOCIAL

The presence of walkers and cyclists in an area can contribute to social well-being of a place in a number of ways. It provides increased opportunities for social connections, gatherings and informal interaction, as well as enhancing community pride by encouraging people to engage with their local environment and community. It can also increase independence, particularly for school aged children and the elderly.

Walking and cycling can improve personal security and deter crime by having more 'eyes on the street' and improve road safety through increased street activity which encourages drivers to slow down and be more alert.

1.2.3 ENVIRONMENT

Walking and cycling are the most energy efficient forms of transport available. The provision of walking and cycling paths make it easier for people to move around, and provides an alternative to the use of private motor vehicles. Walking and cycling paths are also generally associated with infrastructure such as landscaping and trees that provide amenity and biodiversity benefits.

1.2.4 ECONOMY

Walking and cycling can contribute to the economy in a number of ways. Providing recreational opportunities for both local residents and tourists will encourage people to stop, stay and spend money within a local community. Popular trails usually support the local economy and often trail based businesses are generated by the activity of people using the trails.

Less direct benefits include reducing;

- The economic costs associated illness
- Road congestion and costs associated with travel time
- The maintenance of road infrastructure (if there are less vehicles on the road).

1.3 THE CARDINIA SHIRE

Cardinia Shire Council is located on the fringe of the Melbourne metropolitan area, 55 kilometres south-east of Melbourne. The Beaconsfield to Pakenham growth corridor is the main urban area of the municipality. The Shire encompasses an area of 1,280 km2 and spans a distance of 53km from its northern to southern boundary, and 35km from eastern to western boundary.

There are three distinct landscape character areas in the Shire. The first comprises the northern part of the Shire which is set in the foothills of the Dandenong Ranges, an area with significant environmental values. The second is the growth corridor that runs east west adjacent to the Princes Highway through the centre of the municipality and captures a number of creek corridors and undulating topography. The third landscape character area is the Koo Wee Rup swamp, Western Port and surrounding agricultural areas. These southern landscapes are characterized by long vistas to the open agricultural landscape and distance views north to the foothills.

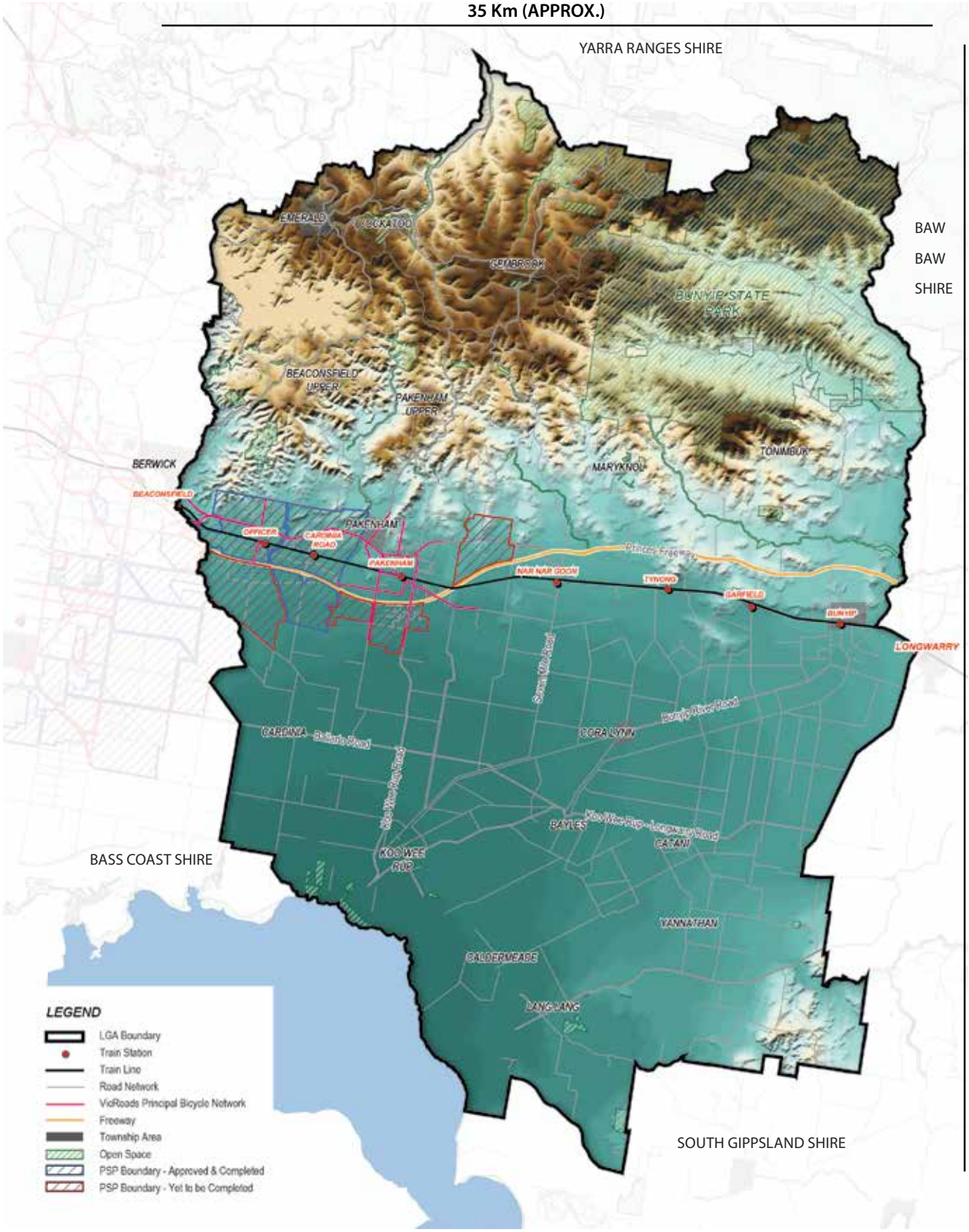
The Shire shares its western boundary along Cardinia Creek with the City of Casey. This area along the creek corridor will see major population growth in the future. There is opportunity for the development of a major open space situated on Cardinia Creek, making this riparian asset even more important.

Other bordering municipalities are the Yarra Ranges to the north, Baw Baw Shire to the east and South Gippsland Shire and Bass Coast Shire to the south.

The scale and settings of townships is diverse across the Shire, and each has varied walking and cycling environments. Smaller towns benefit from lower traffic volumes, and destinations, such as schools and shops are generally within walking distance of most residents. In comparison, larger towns have more roads with higher volumes of traffic, but provide a greater amount of dedicated walking and cycling infrastructure such as shared paths.

The steep topography in the northern townships can be challenging for some walkers and cyclists, (but is sought as a challenge by more experience riders) whilst the flat terrain in the southern townships is much more suitable to walkers and cyclists of all abilities.

Distances between townships are significant, and present a challenge for creating a truly connected municipality where residents can walk or cycle from town to town. However these regional links are considered important and could create a point of difference to attract future residents and visitors to the Shire.


35 Km (APPROX.)
YARRA RANGES SHIRE
BAW
BAW
SHIRE
53 Km (APPROX.)
EMERALD
COCKATOO
CHIRNSIDE
BUNYIP STATE PARK
BEACONSFIELD UPPER
PAKENHAM UPPER
BERWICK
BEACONSFIELD
OFFICER
CARDINIA ROAD
PAKENHAM
TONIMBUK
MARYKNOLL
NAR NAR GOON
TYNONG
GARFIELD
BUNYIP
LONGWARRY
CARDINIA
CORA LYNN
BAYLES
KOO WEE RUP
CATANI
YANNATHAN
CALDERMEADE
LANG LANG
BASS COAST SHIRE
SOUTH GIPPSLAND SHIRE
LEGEND
LGA Boundary
Train Station
Train Line
Road Network
VicRoads Principal Bicycle Network
Freeway
Township Area
Open Space
PSP Boundary - Approved & Completed
PSP Boundary - Yet to be Completed

2. SETTING THE SCENE

2.1 POPULATION FORECASTS

2.1.1 POPULATION

Population across Cardinia is expected to grow from 75,818 at 2011 to 175,562 in 2036. Population increase is focused primarily across the townships of Officer and Pakenham (within the identified Precinct Structure Plan areas).

In the south population growth is anticipated in Koo Wee Rup (78.6% increase) and Lang Lang (97.7% increase). Within the railway township corridor, Garfield (65.9% increase) and Bunyip (75.0%) are expected to see the greatest amount of growth. Population growth in the north is limited with Gembrook (27.5% increase) expected to experience the greatest amount of growth.

The Pedestrian and Bicycle Strategy provides the opportunity to ensure appropriate walking and cycling infrastructure is provided and connected to existing infrastructure in townships.

2.1.2 AGE PROFILE

In terms of age profile, the growth area townships will experience relatively even growth across most age cohorts. However townships in the north such as Emerald will experience negative growth across most age cohorts except for 60 years +, where the proportion of people will grow significantly. The table below (Figure 1) highlights the forecast population changes for each area within Cardinia Shire. The largest increase is planned to occurs in the planned PSP areas of Cardinia Road Employment Areas, Officer and Pakenham East areas.

Cardinia Shire	2011	2036	Change between 2011 and 2036	
Area	Number	Number	Number	%
Cardinia Shire	75,818	175,562	99,744	131.6%
Beaconsfield Precinct	4,218	5,024	806	19.1%
Beaconsfield Upper & District	4,335	4,628	293	6.8%
Bunyip	2,220	3,886	1,665	75.0%
Cardinia Road Employment	6	5,890	5,885	98083.3%
Cardinia Road Precinct	8,330	28,308	19,978	239.8%
Cockatoo - Nangana	4,451	4,465	14	0.3%
Emerald - Clematis - Avonsleigh - Menzies Creek	6,932	7,084	152	2.2%
Garfield	1,655	2,746	1,091	65.9%
Gembrook	2,098	2,675	577	27.5%
Koo Wee Rup	2,931	5,236	2,305	78.6%
Lang Lang	1,379	2,726	1,347	97.7%
Nar Nar Goon - Tynong area	1,507	1,917	410	27.2%
Northern Rural	3,542	4,070	528	14.9%
Officer Precinct	1,860	34,043	32,183	1730.3%
Pakenham Balance	1,045	1,229	184	17.6%
Pakenham East Precinct	76	16,445	16,369	21538.2%
Pakenham Precinct	26,103	41,626	15,523	59.5%

Figure 1 - Cardinia Population Change by Suburb: 2011 - 2036 (Source: Profile.Id)

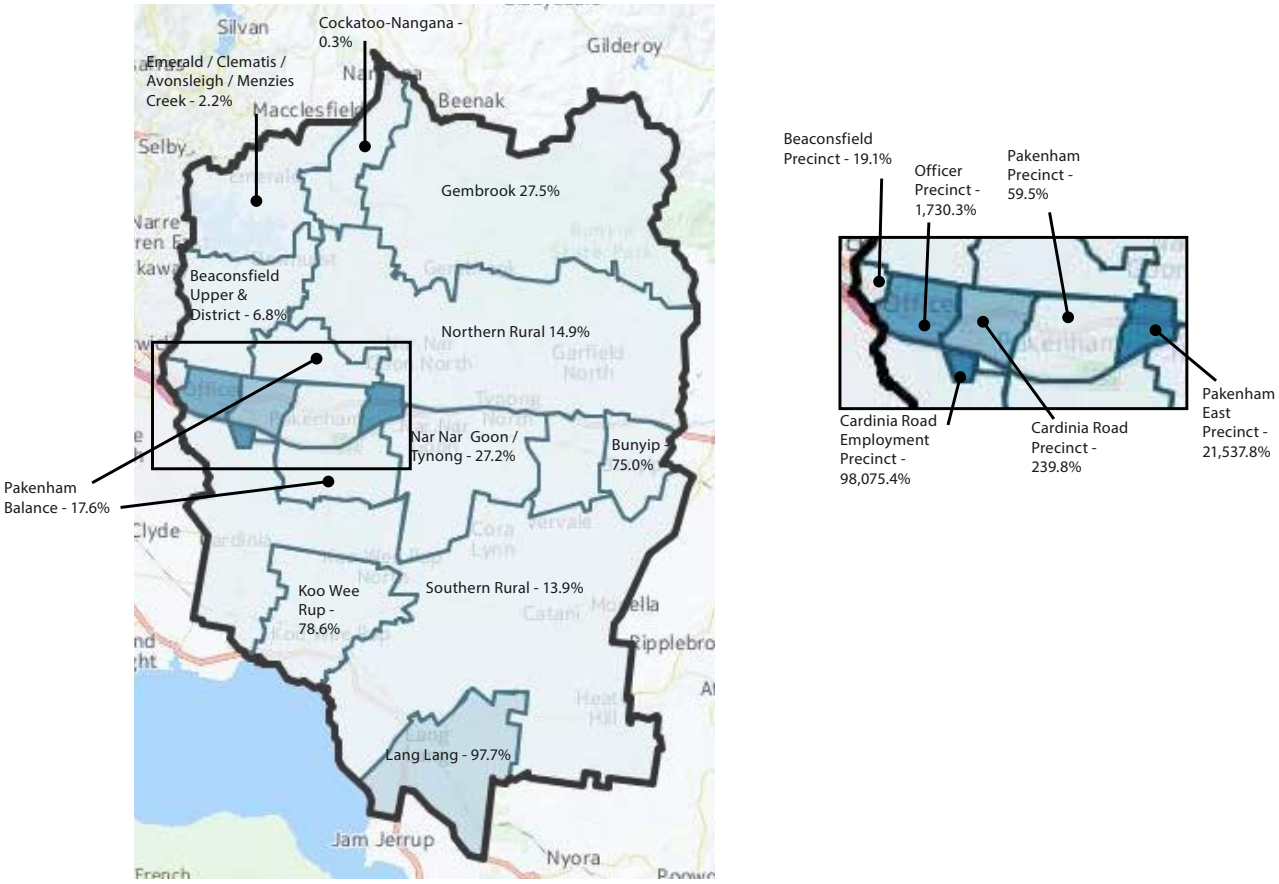


Figure 2 - Cardinia Population Growth Maps: 2011 - 2036 (Source Profile.Id)

Cardinia Shire is experiencing a large increase in population growth. Figure 2 highlights expected regional population growth. The table below (Figure 3) outlines the expected population increase in regards to the age profile of Cardinia Shire residents. The largest population increase is expected to be in seniors and the elderly (70 -85+). The needs of this group, as well as the significant increase in the young workforce (25 to 34) and the independent group (18 - 24) should be considered to ensure active transport is an appealing and viable mode of transport for these groups.

Cardinia Shire - Total persons	2011		2036		Change between 2011 and 2036	
Age group (years)	Number	%	Number	%	Number	%
Babies and pre-schoolers (0 to 4)	6,058	8.0	14,590	8.3	8,531	140.8%
Primary schoolers (5 to 11)	8,035	10.6	19,560	11.1	11,525	143.4%
Secondary schoolers (12 to 17)	6,755	8.9	14,910	8.5	8,155	120.7%
Tertiary education and independence (18 to 24)	7,284	9.6	16,392	9.3	9,108	125.0%
Young workforce (25 to 34)	10,466	13.8	25,071	14.3	14,606	139.5%
Parents and homebuilders (35 to 49)	16,736	22.1	35,012	19.9	18,276	109.2%
Older workers and pre-retirees (50 to 59)	8,804	11.6	17,829	10.2	9,024	102.5%
Empty nesters and retirees (60 to 69)	6,560	8.7	14,535	8.3	7,975	121.6%
Seniors (70 to 84)	4,280	5.6	14,231	8.1	9,951	232.5%
Elderly aged (85 and over)	838	1.1	3,432	2.0	2,594	309.5%
Total persons	**75,818**	**100.0**	**175,562**	**100.0**	**99,744**	**131.6%**

Figure 3 - Cardinia Age Profile: 2011 - 2036 (Source: Profile.Id)

2.1.3 RESIDENTIAL DEVELOPMENT ACTIVITY

The Department of Environment, Land, Water and Planning (DELWP) provides the Urban Development Program (UDP) which identifies timing of development in greenfield areas. The 2015 UDP is mapped below (Refer Figure 4).

The map demonstrates the rapid development that greenfield areas are experiencing. It reveals that walking and cycling infrastructure can take a significant amount of time to be delivered and the delivery is not always sequential. This is a particular issue for development of regional links such as the Princes Highway Trail, which is important in the short term.

Figure 4 - UDP 2015 - Broad Hectare Residential Estates - Plan (top) Detail (Bottom)

2.2 WALKING AND CYCLING ACTIVITY

2.2.1 METHOD OF TRAVEL TO WORK

In Cardinia Shire in 2011, 646 people walked or cycled to work, approximately 1.9% of all workers. Of this, 592 (1.7%) walked and 54 (0.2%) cycled.

The cycling figures are relatively low in comparison to the south east metropolitan region where 1.2% of workers cycled to work and the Greater Melbourne Region where 1.3% of workers cycled to work.

For walking, the figures are slightly higher than the south east region where 1.6% of workers walked to work, however lower than the Greater Melbourne Region where 2.9% of workers walked to work. (Refer to Figure 5 below for all Method of Travel to Work data).

Major employment areas are proposed south of Princes Freeway in Officer and Pakenham. It will be important to create safe and convenient walking and cycling links between these employment areas, residential areas and public transport stops.

Main method of travel	2011			2006			
	Cardinia Shire		South East Metropolitan Region	Cardinia Shire		South East Metropolitan Region	Cardinia Shire
	Number	%	%	Number	%	%	2006 to 2011
Bicycle	**54**	**0.2**	**1.2**	**72**	**0.3**	**1.1**	**-18**
Walked only	**592**	**1.7**	**1.6**	**556**	**2.1**	**1.6**	**36**
Train	1652	4.6	6.9	956	3.6	4.0	696
Bus	163	0.5	4.7	103	0.4	5.5	60
Tram or Ferry	18	0.1	0.1	11	0.0	0.1	7
Taxi	17	0.0	0.2	10	0.0	0.2	7
Car - as driver	24997	69.9	62.6	17812	66.4	63.1	7185
Car - as passenger	1656	4.6	5.5	1197	4.5	6.0	459
Truck	587	1.6	0.8	574	2.1	1.1	13
Motorbike	116	0.3	0.6	136	0.5	0.5	-20
Other	321	0.9	1.5	265	1.0	1.0	56
Worked at home	1818	5.1	2.8	1760	6.6	3.0	58
Did not go to work	3304	9.2	10.2	2844	10.6	11.2	460
Not stated	473	1.3	1.3	513	1.9	1.8	-40
Total employed persons aged 15+	**35768**	**100**	**100**	**26809**	**100**	**100**	**8959**

Figure 5 - Method of Travel to Work - 2011 Census (Source: Profile Id and ABS)

2.2.2 METHOD OF TRAVEL TO EDUCATION

The Victorian Integrated Survey of Travel & Activity 2012-13 (VISTA) is based on household surveys across Victoria to understand how people travel to education and work, amongst other things.

The survey shows that for the outer region of Melbourne, 13.6% of people travelling to primary school walked and 0.7% of people cycled. For people travelling to secondary schools, 17.3% of people walked and there were no respondents who had cycled to secondary school. (Refer to Figure 6 below)

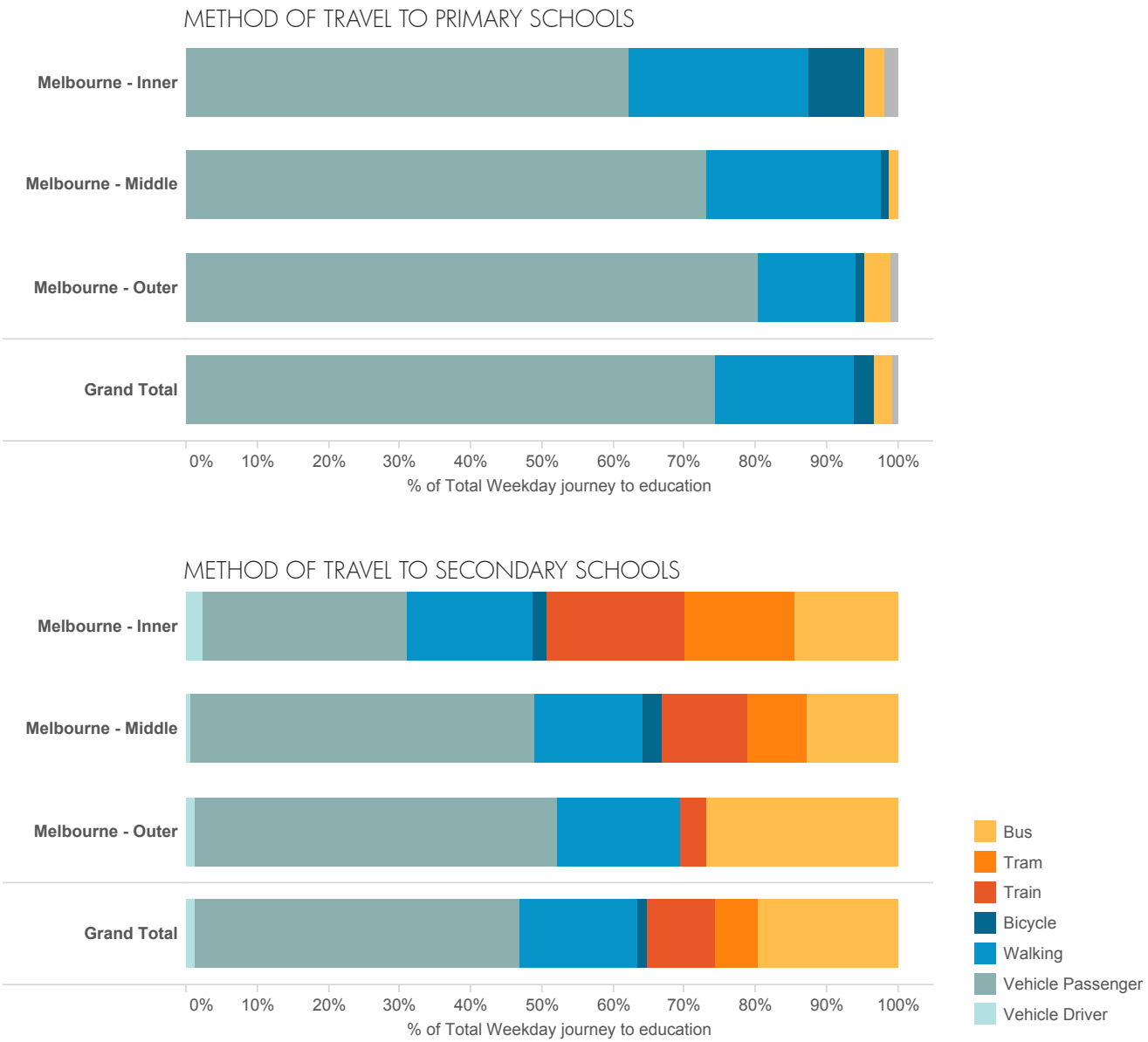


Figure 6 - Method of Travel to Education (Source: VISA 2013)

2.2.3 RUNNING AND CYCLING ACTIVITY IN THE CARDINIA SHIRE

The maps below (Figure 7) have been derived from Strava data which captures a snapshot of people's runs and rides through GPS tracking on their mobile phones. The data was captured in 2015.

For running, it reveals a number of key routes including parts of the existing shared path network in Pakenham, the Aqueduct trail, the Emerald to Menzies Creek trail, and Garfield North Road in the east. Sections of the South Gippsland Highway between Koo Wee Rup and Lang Lang show a moderate amount of running activity.

For cycling, the Strava mapping shows a number of on-road cycle routes, which reflects the cycling patterns of a typical Strava user. There is a concentration of cycling activity around Pakenham utilising the Princes Highway, Henry Road and Bald Hill Road. Several routes head north into the hills are notable including Officer Road and Emerald - Beaconsfield Road. Belgrave-Gembrook Road in the north shows as a popular east-west route.

In the east, Nar Nar Goon - Longwarry Road is revealed as a popular route and heading south along Seven Mile Road and Koo Wee Rup - Longwarry Road also appear as popular routes.

STRAVA RUNNING ACTIVITY

STRAVA CYCLING ACTIVITY

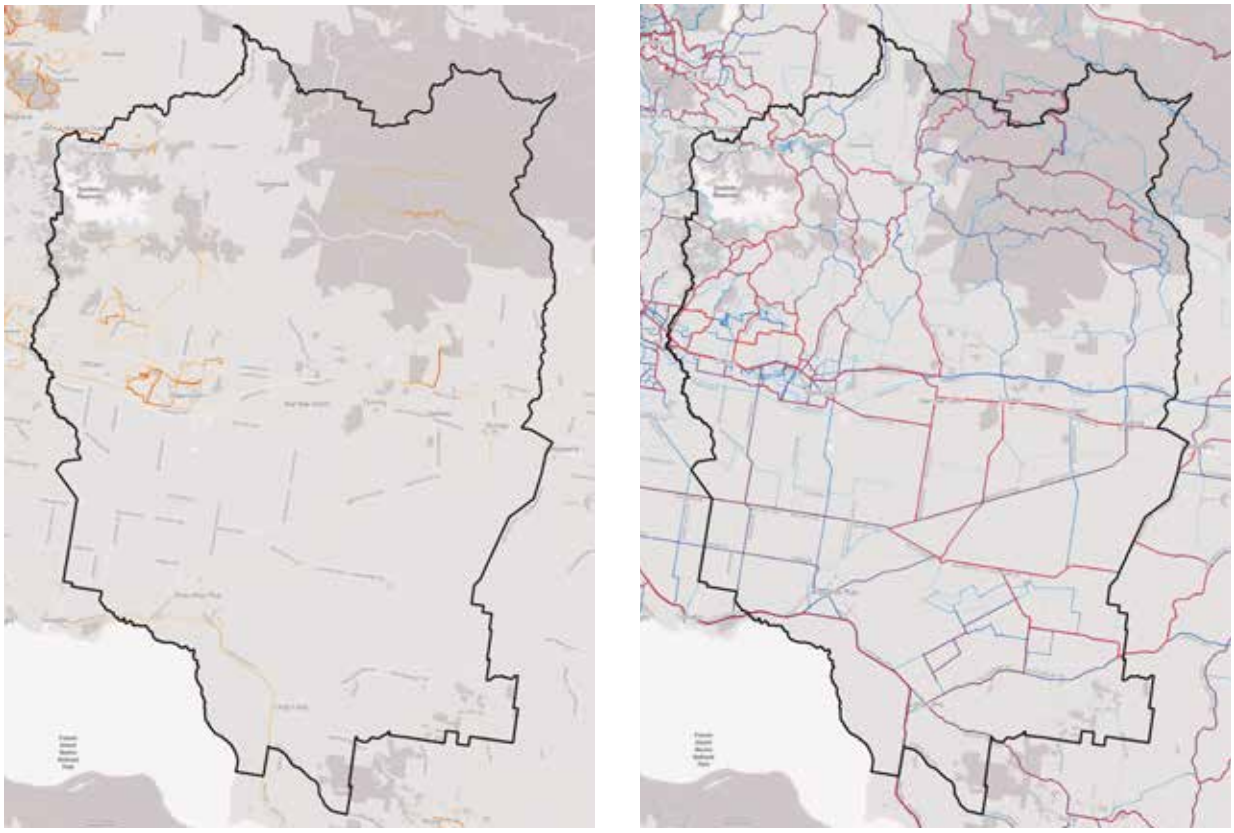


Figure 7 - STRAVA Running and Cycling Activity Maps (source: STRAVA)

2.3 EXISTING WALKING AND CYCLING FRAMEWORKS

2.3.1 CARDINIA SHIRE PEDESTRIAN AND BICYCLE STRATEGY REVIEW, 2007

The 2007 Pedestrian and Bicycle Strategy Review was the starting research point, forming the basis of this Pedestrian and Bicycle Strategy.

The 2007 study provided a review of the recommendations outlined in the 2002/03 Pedestrian and Bicycle Strategy. The review focused on bicycle paths only (pedestrian paths within townships were out of the study scope) and identified a priority list of works which were considered affordable and complimentary to other priority Council infrastructure projects.

The review also provided a breakdown of projects by year and by township as well as construction guidelines for on and off road bicycle routes. It provided a short term implementation program for high priority projects within a five year timeframe.

The 2007 Review provides a good starting point for this current study.

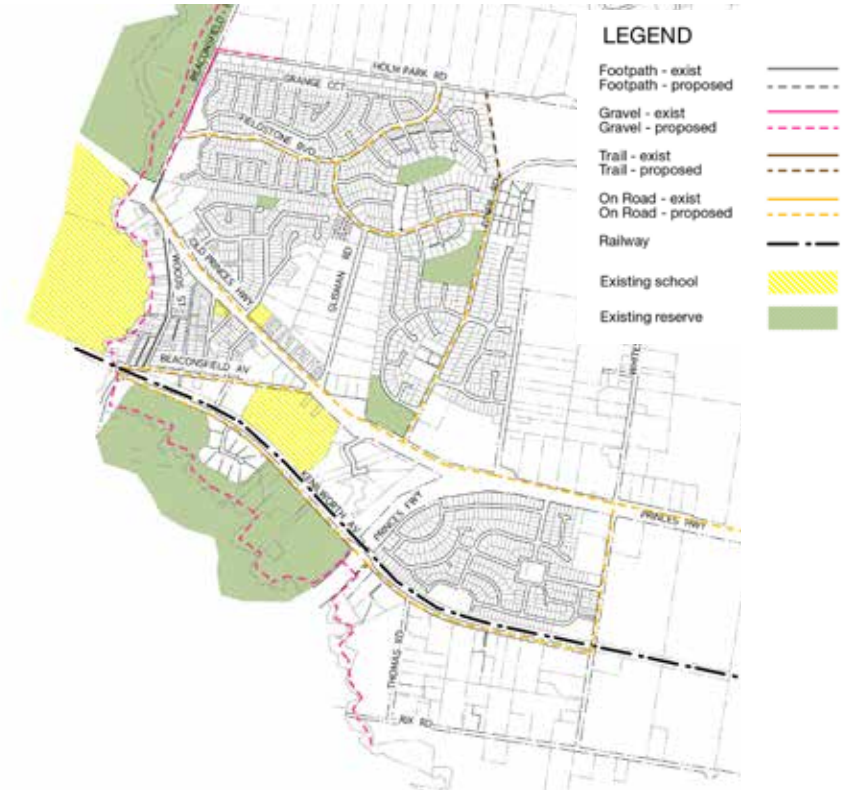


Figure 8 - Beaconsfield Pedestrian and Bicycle Paths Plan, Extract from the Cardinia Shire Pedestrian and Bicycle Strategy Review, 2007

2.3.2 PRINCIPAL BICYCLE NETWORK (PBN)

The PBN is a network of existing and proposed cycle routes identified to help people ride to major destinations around metropolitan Melbourne. The PBN has been developed by VicRoads in conjunction with local Councils.

For the Cardinia Shire, on-road bike lanes are proposed extensively through the growth areas and through to Bunyip along the rail line. The network extends south to the rail trail and in the north the PBN extends along Belgrave-Gembrook Road. (Refer to Figure 9 below).

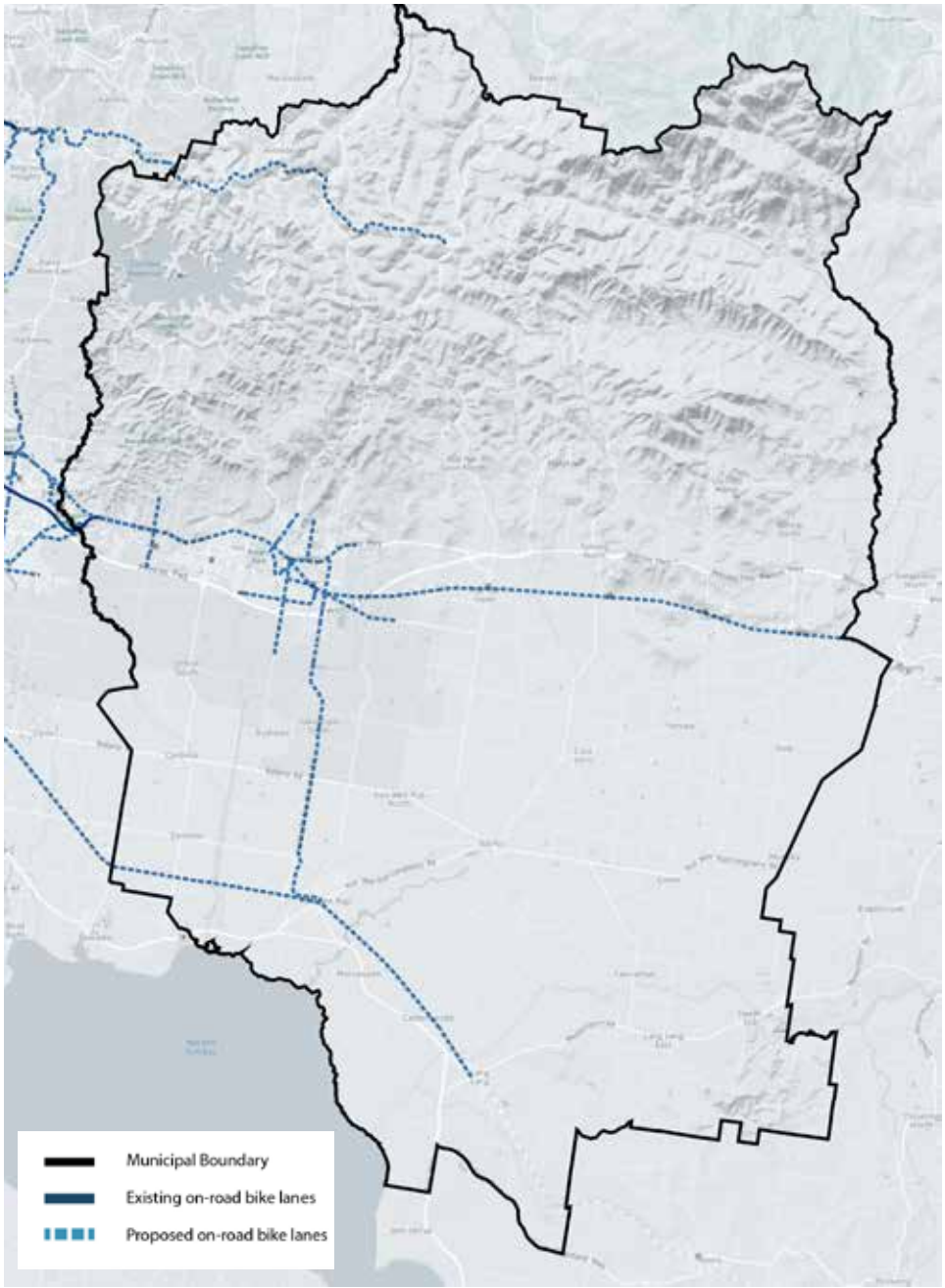


Figure 9 - Principal Bike Network, Cardinia Shire Extract, 2016

2.3.3 VICROADS SMARTROADS NETWORK OPERATING PLANS

SmartRoads is an approach that manages competing interests for limited space and time in the road network by giving priority use of the road to different transport modes, both to different parts of the network and at different times of the day. VicRoads currently manages the development of the SmartRoads Network Operating Plans and have identified a road use hierarchy for the study area.

Figure 10 shows the limits of the pedestrian priority areas (thick magenta line), as well as the bicycle priority areas (thin dark purple line) . The pedestrian priority areas are situated around the immediate shopping strips in each township. The priority bicycle areas focus along the Princes Highway in Pakenham.

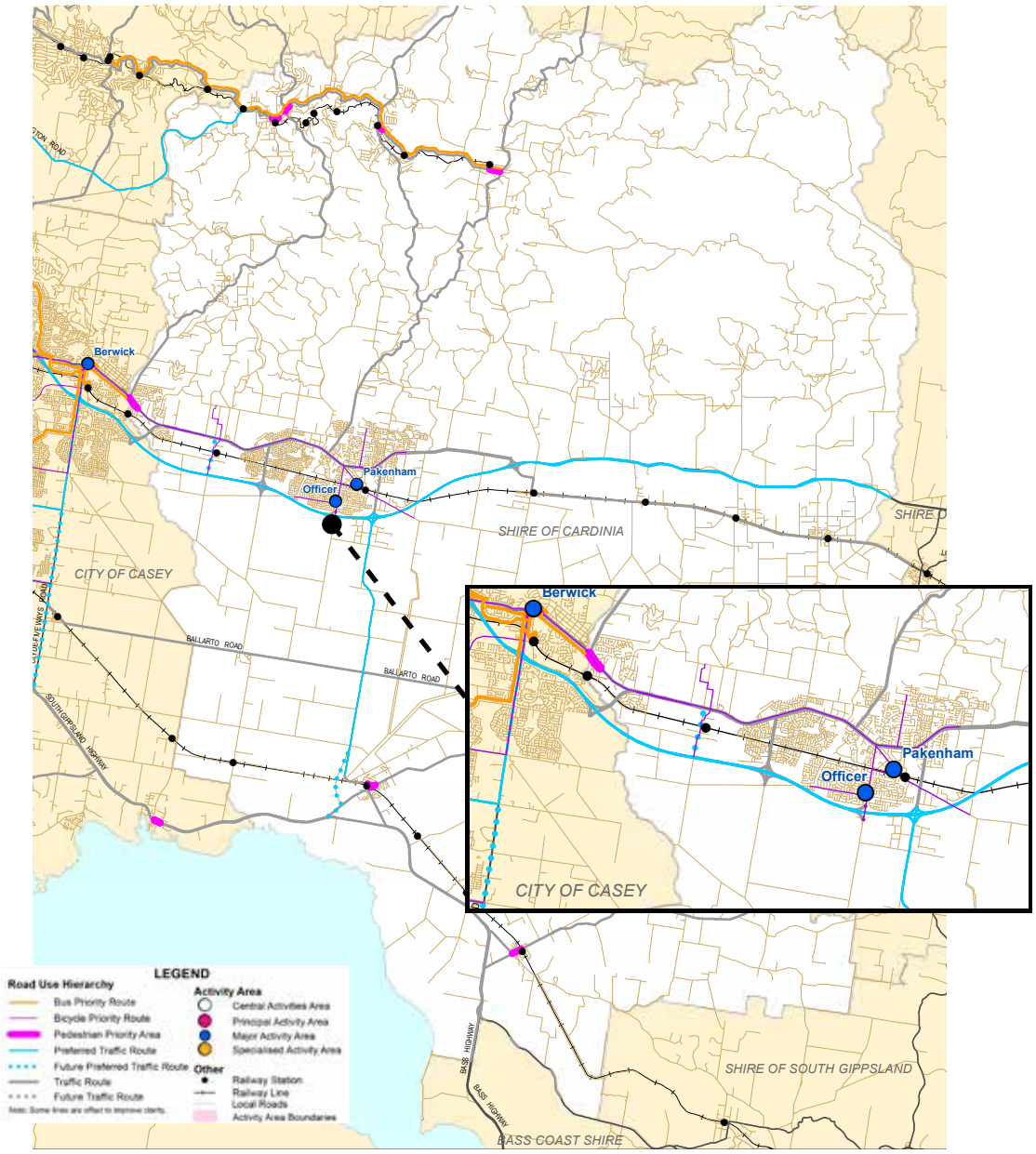


Figure 10 - VicRoads SmartRoads Network Operating Plan - Shire of Cardinia Road Use Hierarchy

2.4 RELEVANT STRATEGIES AND PLANS

2.4.1 MUNICIPAL - WIDE STRATEGIES AND PLANS

There are a number of shire-wide strategies that provide overarching support and guidance for the Pedestrian and Bicycle Strategy.

Document	Implications for the Pedestrian and Bicycle Strategy
Cardinia Shire Council Plan 2015	Provides high level support through its objectives to improve health and well being, providing a range of recreation and leisure opportunities, increase the level of community participation and provide transport linkages between towns.
Cardinia Shire Tourism Strategy, 2013	A set of initiatives and objectives were developed to capitalise on local tourism opportunities, over a three year timeframe. It recommends that Council reviews the existing Cardinia Shire Pedestrian and Bicycle Strategy within the next two years to take into account the needs of the Visiting Friends and Relatives (VFR) market and changing consumer trends.
Cardinia Shire Growth Area Social Research, 2015	This research is based on a December 2014 telephone survey exploring the social health of residents living in Cardinia Shire's growth corridor. Of particular interest to the Walking and Bicycle Strategy was the conclusion that residents would be encouraged to walk more if there was more and/or better footpaths, more/safer pedestrian crossings and more services and facilities were available locally. Also worth noting was at the time of the survey the most commonly enjoyed activity within Cardinia Shire was walking or running (43.9% compared to cycling at 9.4%).
Cardinia Shire Council Municipal Public Health and Wellbeing Plan, 2013 – 2017	The plan aims to improve the health and wellbeing of the Cardinia Shire community in all areas of life. The plan seeks to support healthy urban and rural townships and environments. Priority issues identified that are relevant to the Pedestrian and Bicycle Strategy include increasing physical activity, promoting community safety, improving social connection and increasing awareness of climate change.

Document	Implications for the Pedestrian and Bicycle Strategy
Healthy by Design Guidelines - Cardinia Shire	The Healthy by Design Guidelines were produced by the Heart Foundation to assist planners in delivering built environments that support active and healthy lifestyles. The guidelines are structured around a range of design considerations including supporting active modes of transport and providing an inclusive public realm that supports walking, cycling and community participation. Cardinia Shire has adopted these guidelines, creating a checklist of design considerations in the key areas which should be considered in the Pedestrian and Bicycle Strategy.
Integrated Water Management Plan	The Integrated Water Management Plan identifies targets and actions that aim to develop a vision for the green and connected corridors in Cardinia Shire (such as waterways, trails, walking paths and bike paths)
Aspirational Energy Transition Plan	The Aspirational Energy Transition Plan identifies as a key target and action an aim to achieve a 36% reduction in community greenhouse gas emissions on a per capita basis by 2024.

2.4.2 TOWNSHIP STRATEGIES AND STRUCTURE PLANS

The township strategies and structure plans provide detailed guidance on the provision of walking and cycling links within townships, including recommended networks.

These recommendations have been considered and in many cases adopted in the Pedestrian and Bicycle Strategy.

The following strategies were reviewed:

- Pakenham Structure Plan 2017
- Beaconsfield Structure Plan 2013
- Bunyip Township Strategy 2009
- Cockatoo Township Strategy 2008
- Emerald District Strategy 2009
- Garfield Township Strategy 2002
- Gembrook Township Strategy 2011
- Koo Wee Rup Township Strategy 2014
- Lang Lang Township Strategy 2009
- Upper Beaconsfield Township Strategy 2009

2.4.3 GROWTH AREA PRECINCT STRUCTURE PLANS

The PSPs focus on the townships of Officer and Pakenham providing plans for new residential estates, town centres and employment precincts. Some of the PSPs are currently being delivered and others are just commencing. Figure 11 (below) outlines the status of PSPs in the south east region.

Importantly, the PSPs outline preferred walking and cycling networks in each growth area. These networks have been integrated into the Pedestrian and Bicycle Strategy.

The following PSPs and associated documents were reviewed:

- Officer Precinct Structure Plan, 2011
- Officer Development Contributions Plan, 2009-11
- Cardinia Road Employment Precinct Structure Plan, 2010
- Cardinia Road Precinct Structure Plan, 2008

Additional PSPs will be undertaken in Cardinia:

- Officer Employment PSP (commenced)
- Pakenham South PSP (commenced)
- Pakenham East PSP Area (commenced)

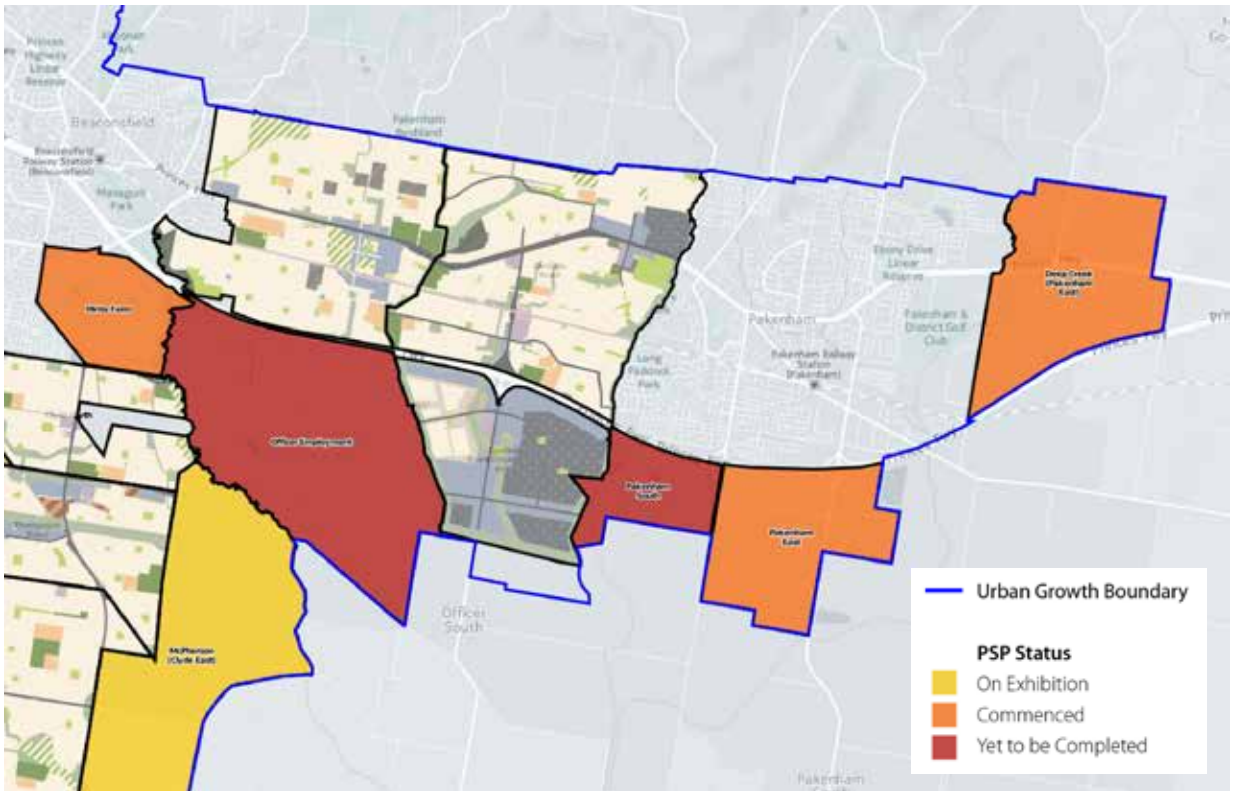


Figure 11 - PSP Status Map

2.4.4 OTHER STRATEGIES AND PLANS

A number of reserve master plans were reviewed to understand future linkages and how each reserve should be enhanced as a walking and cycling destination. The reviewed master plans included:

- Pepi's Land Emerald Master Plan (2012)
- Arena at Officer District Sports Reserve (2008)
- Henry Road Reserve Master Plan 2009
- Holm Park Road Reserve Master Plan (2008)
- Koo Wee Rup Recreational Reserve Master Plan (2015)
- Officer Recreational Reserve Master Plan (2012)
- P.B Ronald Reserve Concept Master Plan 2010
- Lang Lang Community and Sporting Precinct Draft Master Plan
- Draft Worrell Reserve Master Plan
- Garfield Recreation Reserve Master Plan

2.4.5 ACCESS STANDARDS & GUIDELINES

The following standards and guidelines were reviewed and considered in the development of the Pedestrian and Bicycle Strategy:

- MPA Engineering Design and Construction Manual 2011
- Austroads Guide to Road Design - Part 6A: Pedestrian and Cyclists
- Austroads Pedestrian-Cyclist Conflict Minimization on Shared Paths and Footpaths
- Universal Design Principles

2.4.6 OVERLAYS

- Cardinia Shire has several areas covered by the Comprehensive Development Zone (CDZ) and the Development Plan Overlay (DPO).

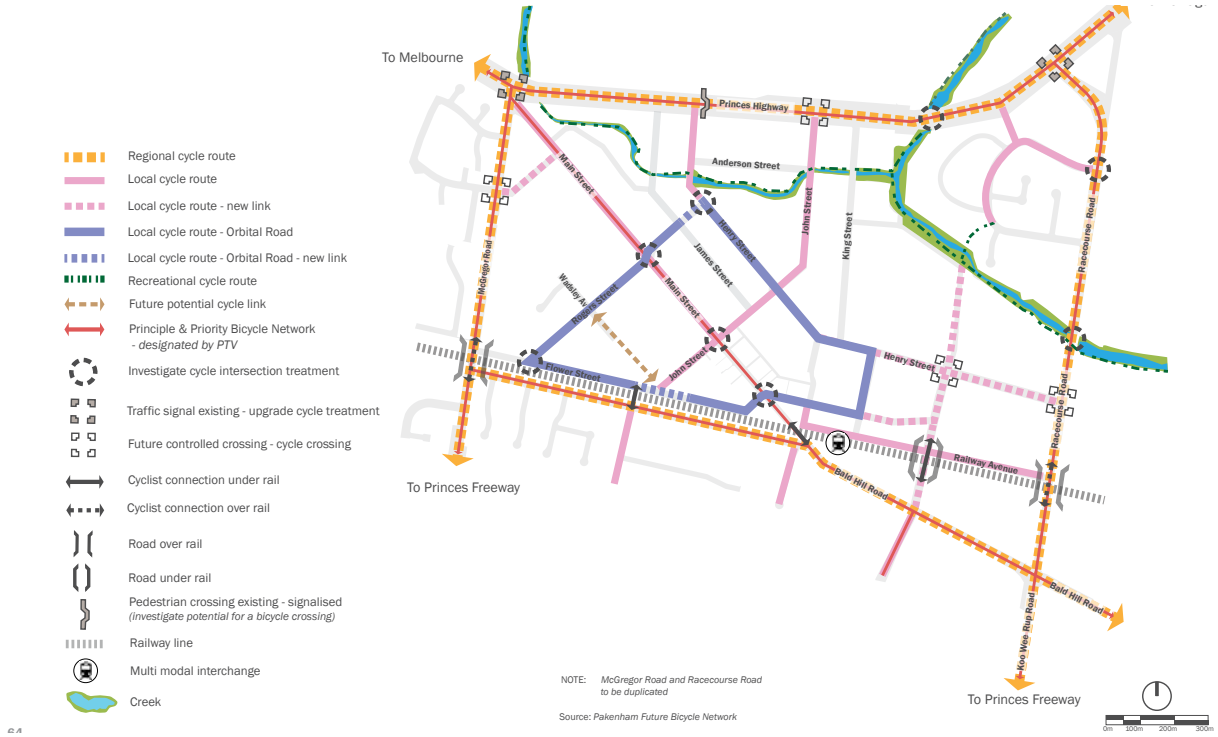


Figure 12 - Cycling Network Plan, Extract from the Pakenham Structure Plan 2017

Figure 13 - Walking and Trails Plan, Extract from Cardinia Road Employment Precinct Structure 2010

3. WALKING & CYCLING OPPORTUNITIES

3.1 UNDERSTANDING THE NEEDS OF PEDESTRIANS AND CYCLISTS

People walk and cycle for different reasons so it is important to ensure future infrastructure is appropriately designed and located to support the varied needs of everyone in the community. Consideration should be given to accommodate people of all abilities, where possible. The Pedestrian and Bicycle Strategy identifies the following potential categories of active transport users:

3.1.1 WALKING FOR TRANSPORT

When walking for transport pedestrians will primarily take the most direct route available along pedestrian paths. Pedestrian paths should be sealed and provide a comfortable walking experience.

- Generally based on the shortest route between origin and destination – not necessarily the most scenic route
- Primarily used for daily needs, such as traveling to and from the railway station or bus stop, getting to school or the shops
- Undertaken on local footpaths with minimal disruption along the route such as intersections. Too many disruptions and uninviting walking environments will encourage people to get in a car
- Generally the maximum time limit for a trip for transport is around 10 minutes (800m), depending on the destination
- People in wheel chairs or people on mobility scooters require DDA compliant kerb ramps and wider paths
- There should be consideration of the width of the road pavement, as well as footpath treatment to ensure walking and crossing the road is a comfortable, safe and pleasant experience for the community

3.1.2 WALKING FOR HEALTH AND RECREATION (INCLUDES JOGGING)

Recreational walkers seek trails that offer a safe and scenic journey, often off road and through picturesque landscapes. As recreational trails tend to be longer and through rural landscapes they are often unsealed, and should be constructed as shared paths to safely accommodate cyclists as well.

- Prefer scenic routes through parks and along creek corridors and as such, will generally utilize trails and shared paths
- Travel distances can range from 1km up to 10kms
- Often a social experience as well as physical
- Users will utilize additional infrastructure such as seating and drinking fountains
- Wider paths and flatter topography are required for parents / carers with prams, people in wheel chairs or on mobility scooters

3.1.3 CYCLING FOR HEALTH AND RECREATION (OFF-ROAD)

Recreational cyclists seek a range of experiences, from scenic, leisurely rides to longer, challenging trails. It is important to provide trails that are suitable for, and will accommodate cyclists of varying abilities. Consideration should be given to providing paths over a long distance, with good clearance, appropriate path surface and clear sight lines.

- Prefer scenic experiences through parks or along creek corridors and will generally utilize a shared path network where it exists
- Travel distances can range from 5km up to 50kms
- A variety of ages can participate when shared path network is utilized
- Less experienced riders prefer flatter topography

3.1.4 CYCLING FOR HEALTH AND RECREATION (ON-ROAD)

Recreational cyclists who choose to ride on road are usually experienced riders seeking a fast and challenging ride. A key consideration for on road cyclists is provide separated bike lanes to minimize the risk of conflict between cyclists, pedestrians and vehicles.

- Generally travel large distances and at considerable speed so prefer to use existing, sealed roads as they provide the most even surface
- Like to be challenged therefore they are not deterred by steep topography and long distances

3.1.5 CYCLING FOR DAILY TRANSPORT NEEDS, INCLUDING COMMUTING

People who cycle as their preferred mode of transport will usually prefer to take the most efficient and safest route available. Commuting cyclists will favor a route that is efficient, has the least amount of potential stops and is separated from vehicles.

- Similar destinations for walking for transport however can travel larger distances, generally up to 5km. For commuters travel distances can vary between 5km to 20kms
- These cyclists could use shared path networks, on-street bike lanes and local roads, depending on level of experience
- Less experienced cyclists require a higher level of safety and prefer shared path networks that lead directly to the destination (such as schools)
- Require minimal disruption to their journey to minimize travel times
- Tend to prefer bike lanes or bikeways to minimize conflicts with pedestrians and vehicles

3.2 BARRIERS TO WALKING AND CYCLING

There are a number of barriers that discourage people from walking and cycling within the Shire. There are opportunities to design-out some of these barriers and deliver the infrastructure needed to create a high quality walking and cycling environment.

- Incomplete infrastructure – The footpath network across the Shire is relatively complete however dedicated trails and shared paths are limited, reducing opportunities for recreational walking and cycling. As a result of new residential areas not being developed in sequence, significant gaps are occurring in the shared path network
- Quality of infrastructure - Where footpaths and bike lanes have been provided often the quality of the path surface is substandard. When specifying new paths consideration needs to be given to the most appropriate path surface, width, drainage, as well as sight distances, intersection treatments and connectivity into the wider network and to public transport stops. These elements are critical in the successful provision of walking and cycling paths
- Vehicle dominated streets – This issue is more prevalent in Pakenham, Officer and to some extent, Beaconsfield. Wide streets with a number of lanes and high volumes of traffic contribute to an environment where people may feel threatened by vehicles and as a result are deterred from walking and cycling
- Lack of physical safety – The crash stats mapping opposite identifies a number of vehicle collisions involving pedestrians and cyclists around the Pakenham Town Centre and a small number in other locations. Reduced physical safety becomes an issue when there is inappropriate infrastructure for the speed and volume of traffic. Also trip hazards, inadequate width of paths and lack of kerb ramps can impede pedestrian mobility
- Lack of personal safety and comfort – People can feel unsafe when there is no passive surveillance from nearby buildings or activities and where there is inadequate lighting. Personal comfort is diminished when there is limited seating and shade, or where priority is given to vehicles over walkers and cyclists (even along key routes)
- Lack of awareness - Often people are not aware of the walking and cycling options nearby. A lack of signage reduces awareness of the paths destination and other destinations in the vicinity
- Community Perception - Parents and carers are often reluctant to allow their children to walk and/or cycle because of concerns regarding children's safety. This concern prevents children from learning how to safely walk and cycle and developing an awareness of walking and cycling as an enjoyable mode of transport
- Topography – Whilst the steep topography provides dramatic and scenic experiences it can be challenging for some walkers and cyclists, particularly young people and those with limited mobility
- Geographical separation– The large distances between townships limits opportunities and inter-township journeys. However a number of the roads around Cardinia have been popular with on-road cyclists as demonstrated in Figure 7

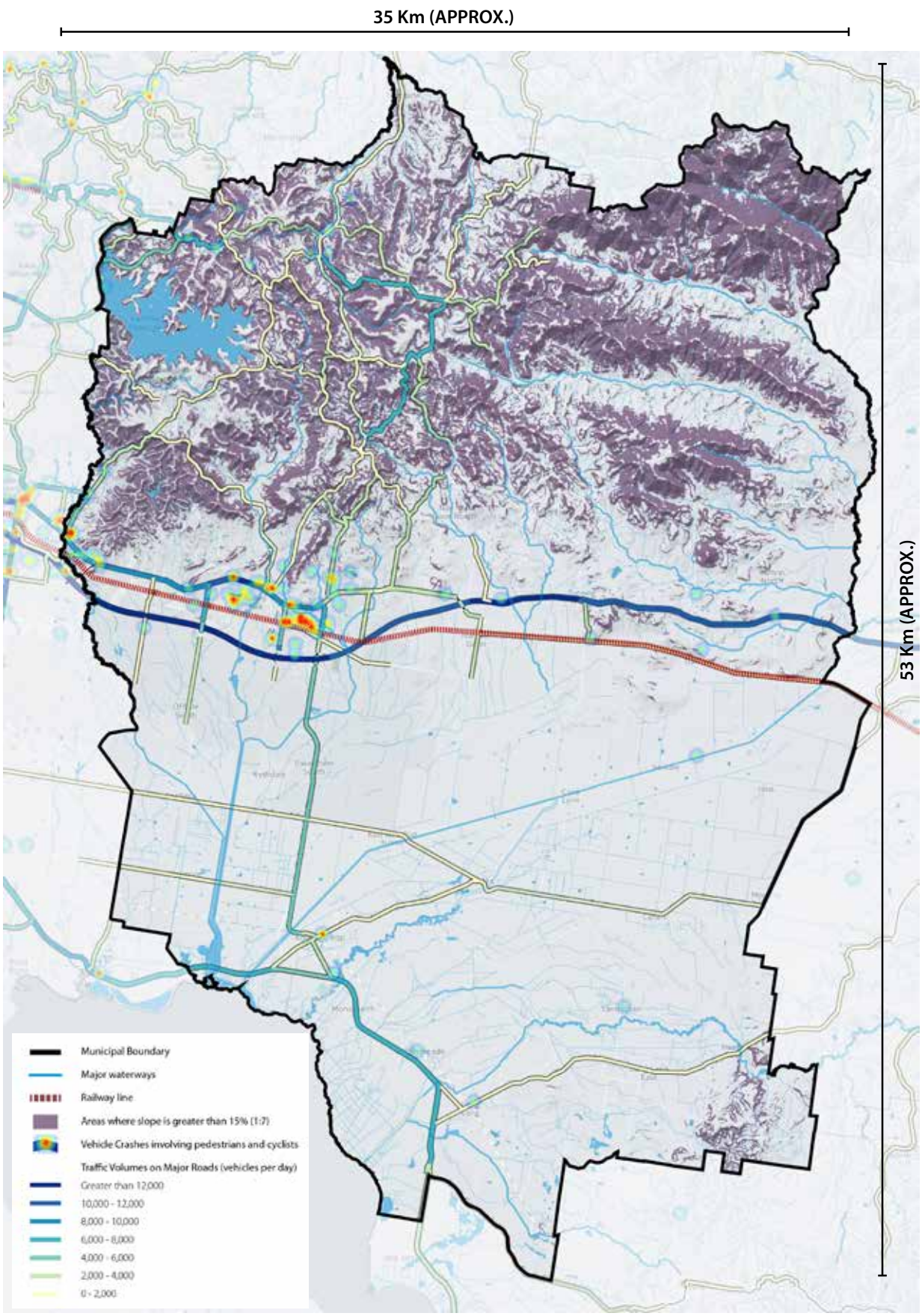


Figure 14 - Crash Statistics Map

3.3 WALKING AND CYCLING OPPORTUNITIES

Significant opportunities exist across the Cardinia Shire to improve walking and cycling networks and create a truly connected municipality. These opportunities focus on connecting into the Shire's existing assets from its trails, landscape features, to its employment nodes and regional services. The following broad opportunities have been identified:

- A diversity of landscape experiences – There are opportunities to enable residents and visitors to experience Cardinia Shire's diverse landscape settings and tourism attractions. The forested foothills, undulating landscapes, waterways and reservoirs could be connected along a continuous, scenic trail network
- Local connections for daily needs – Providing safe and convenient connections to shops, public transport stops, schools, community facilities and open space will encourage people to walk or ride for daily transport needs rather than using motor vehicles. This will need to be combined with promotion and awareness of the connections to maximize usage
- Township links – Creating links between townships enables all residents to have access to regional services and employment opportunities as well as recreational destinations
- Growth areas – Precinct Structure Planning in the identified growth areas will ensure a higher level of walking and cycling infrastructure is provided than historically required. Connections into these PSP areas are important so that surrounding areas have access to future shared path networks
- Existing regional trails – Cardinia Shire is home to a number of regional quality trails such as the Eastern Dandenong trail and the Cardinia Aqueduct trail. Opportunities exist to better integrate surrounding areas into existing trails and also connect into trails beyond the municipality
- Existing parks and reserves – The Shire has a significant number of local and regional parks that could become destinations and experiences, as well as providing supporting amenities throughout the walking and cycling network

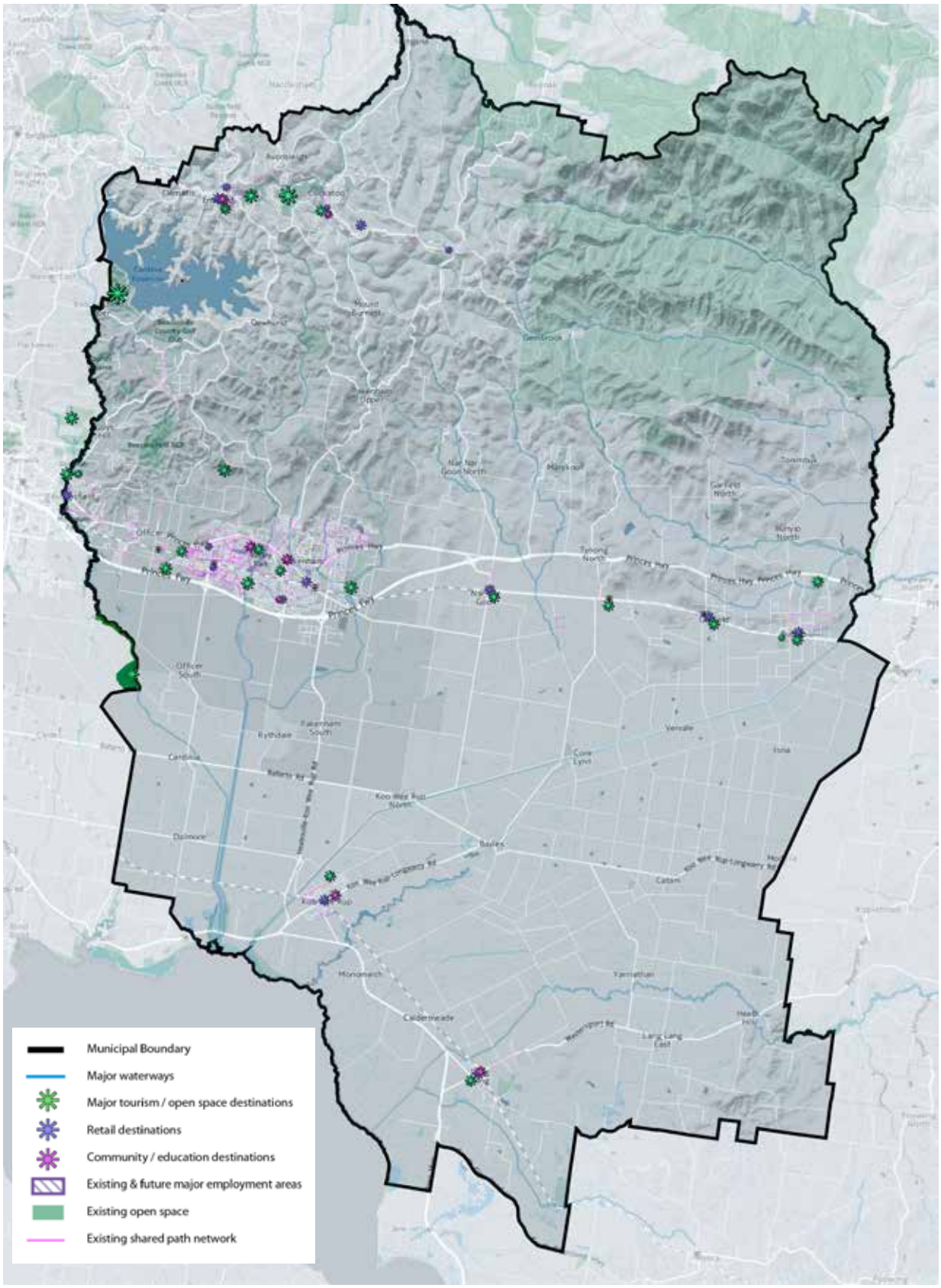


Figure 15 - Walking and Cycling Opportunities

3.4 PEDESTRIAN ACCESS ANALYSIS

The pedestrian access analysis was undertaken for every township in the Shire. The analysis shows the likely pedestrian trips from surrounding residential areas to various destinations including:

- Train stations
- Bus stops
- Retail
- Primary and Secondary Schools
- Community Health Services
- Kindergartens
- Child Care
- Community Facilities
- Open Space

The increase in colour intensity indicates a greater number of potential pedestrian trips along a section of the street. This analysis is based on the Department of Transport, Planning and Local Infrastructure Principal Pedestrian Network Methodology.

This analysis is useful in determining the key routes that connect the surrounding residential areas to the various town centres across the Shire. A number of the key routes identified in the mapping analysis have been designated as the focus for future pedestrian priority improvements. This aims to encourage a greater amount of short trips to be taken by foot rather than motor vehicle.

Appendix 3 provides a detailed analysis of pedestrian access in each township across the Shire. See plans extracts on the opposite page as an example of the Pedestrian Access Mapping analysis for Pakenham.

PAKENHAM PEDESTRIAN ACCESS ANALYSIS

WALKING TO PRIMARY SCHOOLS

WALKING TO OPEN SPACE

WALKING TO THE TRAIN STATION

WALKING TO RETAIL

COMBINED WALKING ANALYSIS

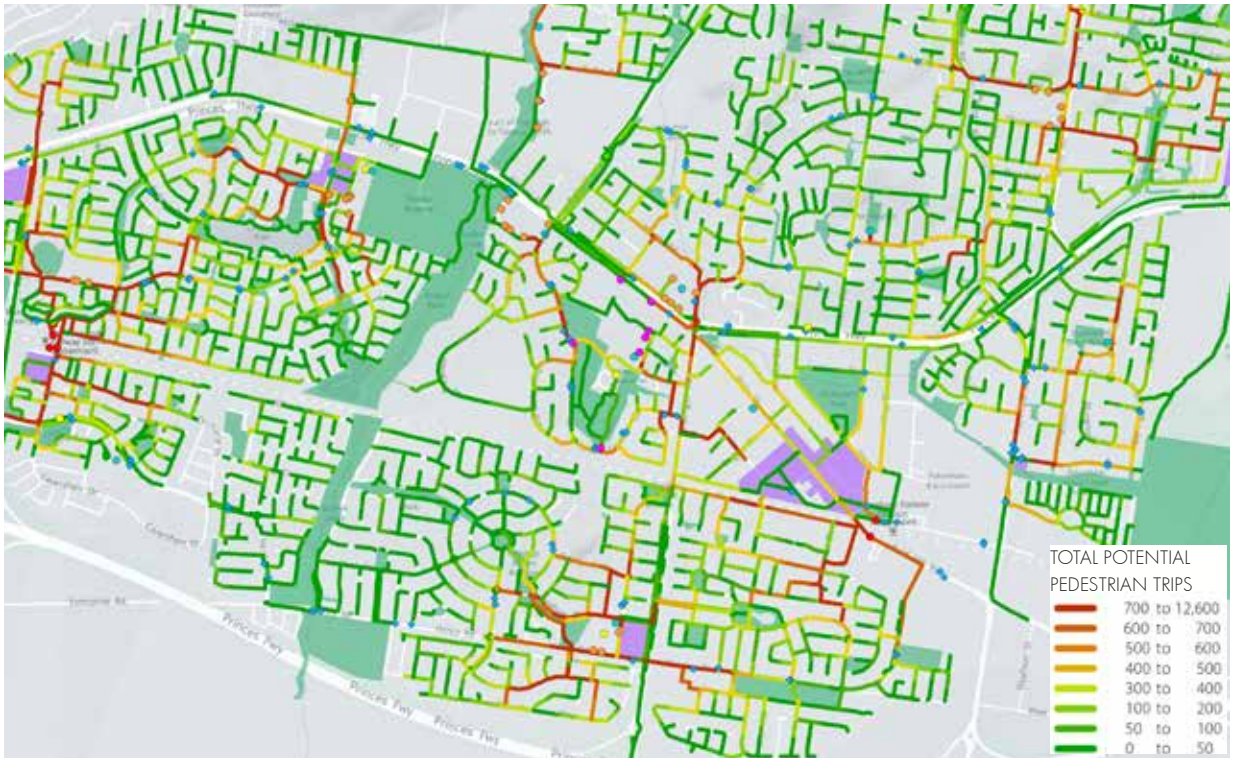


Figure 16 - Pakenham Pedestrian Access Analysis

PART B - STRATEGY

Part B of the Pedestrian and Bicycle Strategy contains Sections 4 - 6. These sections outline the detail of the Regional Trail Network.

Section 4 provides the detail of the proposed network, including the vision, guiding principles and the network hierarchy. A summary table of the key details and a plan are provided for each of the proposed trails.

Section 5 provides the detail around the network infrastructure.

Section 6 outlines the implementation considerations and priorities for the proposed network.

(For background and supporting information on the Strategy see Part A of this document).

4. VISION AND NETWORK

4.1 VISION

To develop Victoria's premier shared pathway network for all abilities where practicable to connect Cardinia's residents, businesses and visitors to town centers, schools, and main tourist attractions.

4.2 GUIDING PRINCIPLES

To achieve this vision six principles provide a guiding framework for the development and implementation of a successful walking and cycling network. The six principles are not listed in order of priority. They have equal weighting. Each principle will be applied equally in the implementation of the proposed trail network.

PRINCIPLE 1 - THE CARDINIA ENVIRONMENT

Promote Cardinia's unique natural environment whilst ensuring environmentally significant areas are respected and preserved. The proposed regional network will draw visitors to Cardinia to experience range of unique journeys through its diverse landscapes. Regional trails will traverse the irrigation waterways, flood plains, wetlands farmland, rolling hills, natural bushland and scenic hills.

PRINCIPLE 2 - HEALTH & WELLBEING

Enhance the health and wellbeing of the community by providing the safe environment and infrastructure that supports participation in local recreational experiences. Being active supports good physical and mental health. The walking and cycling network will create walkable neighbourhoods, enjoyable recreational experiences, as well as an increased sense of social connectedness within the local community.

PRINCIPLE 3 - ALL ABILITIES ACCESS

The walking and cycling network will be inclusive of people with mobility difficulties including people in wheelchairs, prams and mobility scooters. Infrastructure such as DDA compliant paths and ramps, charging points for mobility scooters, and rest areas will be prioritised on appropriate trails.

PRINCIPLE 4 - SAFETY & PERCEPTION

Create a safe and comfortable walking and cycling environment for all users. Priority will be provided to walkers and cyclists, over motor vehicles along key routes, and within town centres. People will feel safer using the streets and trails that have increased passive surveillance and improved lighting.

PRINCIPLE 5 - CONNECTING PEOPLE & PLACES

The proposed regional trail network will transform Cardinia into walking and cycling destination. An integrated and more accessible network will provide convenient access to town centres and key destinations. Strategic links and pedestrian priority routes will support walking and cycling as the preferred transport option when moving through town centres. By connecting townships across the Shire, the regional trail network will attract visitors to Cardinia's activity centres and townships.

PRINCIPLE 6 - AWARENESS & EDUCATION

Create an environment in Cardinia Shire where walking and cycling are logical and enjoyable travel options. Break down the social and psychological barriers that prevent walking and cycling by raising awareness of the many benefits of being active. Support community events, education programs, as well as a comprehensive signage and wayfinding strategy to promote local opportunities.

4.3 NETWORK HIERARCHY

Paths in the walking & cycling network have been classified according to their function and scale at which they operate. The strategy provides the following network hierarchies:

- Regional trails – Regionally significant links between townships and beyond the shire providing access to major recreation and tourism destinations, employment nodes and services, as well as key public transport stops. These trails are for multi-purpose use and provided along major open space corridors or separated within key road reservations. The regional trail network is the focus of this Strategy.
- Strategic links – Major links across townships connecting people to key destinations such as shops, schools, community facilities, employment nodes, open space and key public transport stops. These trails are generally for multi-purpose use or provided as dedicated bikeways.
- Pedestrian priority areas – Key streets within and around town centers where increased pedestrian priority is provided to encourage walking trips for transport to shops, public transport stops, schools, community facilities and open space. Improvements could include increased priority at intersections, additional shade and lighting, and street activation.

Cardinia Shire has several footpath programs that manage the different types of paths throughout the Shire;

- Cardinia Shire Councils Footpath Priority List manages the missing footpath connections across the Shire
- Cardinia Shire Councils township Strategies manage local level connections within townships
- The Cardinia Shire Council Pedestrian and Bicycle Strategy manages the regional connections and the strategic connections linking township to township

This strategy deals with the prioritisation and implementation of the Regional Trails Network. These are aspirational, recreational trails that will provide the community and visitors to Cardinia Shire with a premier shared pathway network that provides connections between the northern hills townships, the central growth corridor areas and the southern townships.

The proposed regional trail network is comprehensive, this strategy will be used as strategic justification to assist Council in securing funding to help with the delivery of the required infrastructure.


Nobelius Heritage Park
Emerald Museum 100m
Emerald Lake Park 1040m

4.4 PATH HIERARCHIES

The Pedestrian and Bicycle Strategy recommends a combination of shared paths (sealed and unsealed) and bikeways (sealed). The following provides guidance on each path type:

4.4.1 SHARED PATHS

Shared paths allow pedestrians and cyclists to utilise the same path infrastructure. They are generally found in verges (off road, with verge separating the carriageway and the pathway) and within parks and linear reserves. 'Sharing' between two different user groups (pedestrians and cyclists) on the same path is generally accepted and can be encouraged through simple line marking/signage. Shared paths are not legally shared paths unless they are signed as being so.

Shared Paths improve cyclist safety on high traffic speed/volume roads by providing a higher degree of separation between vehicles and the cyclists.

WHERE ARE SHARED PATHS LOCATED

- Typically they run adjacent to busy roads with high speeds and/or volumes of traffic
- They often link major public spaces and cycle routes through open spaces, such as waterways and public parks

KEY ISSUES

- Conflicts between pedestrians and cyclists who travel at high speeds on the shared paths
- Groups of people walking together and not giving way to cyclists
- Lack of signage on a shared path means that it can't legally function as a shared path

Figure 17 - Typical Shared Path cross section

Note: The majority of existing paths in Cardinia Shire are pedestrian only paths. Many are the recommended 2.5m wide but do not have the required advisory signage of a shared path.

4.4.2 SEPARATED BIKEWAY

Separated Bike Paths are for the exclusive use of cyclists. They increase safety for cyclists by providing separation between cyclists and vehicles, usually via a parking bay, vertical separation and buffer separation. This separation provides protection so less experienced cyclists feel more comfortable, as well minimising the need to interrupt the journey.

WHERE ARE SEPARATED BIKEWAYS LOCATED

- Adjacent to roads, nestled in between pedestrian only footpaths and parking bays
- Where there is a high volume of cyclist movements at higher speeds
- Along roads with few cross intersections
- Generally located at footpath level (not road level, which is typically 150mm below the level of the footpath)
- Generally there is a small grassed/ landscaped buffer between the Separated Bike Network and the pedestrian path, and the vehicle parking bay

KEY ISSUES

- Can reduce pedestrian footpath space
- More expensive than other cycle lane options
- Difficult to implement where frequent intersections and driveway crossovers occur

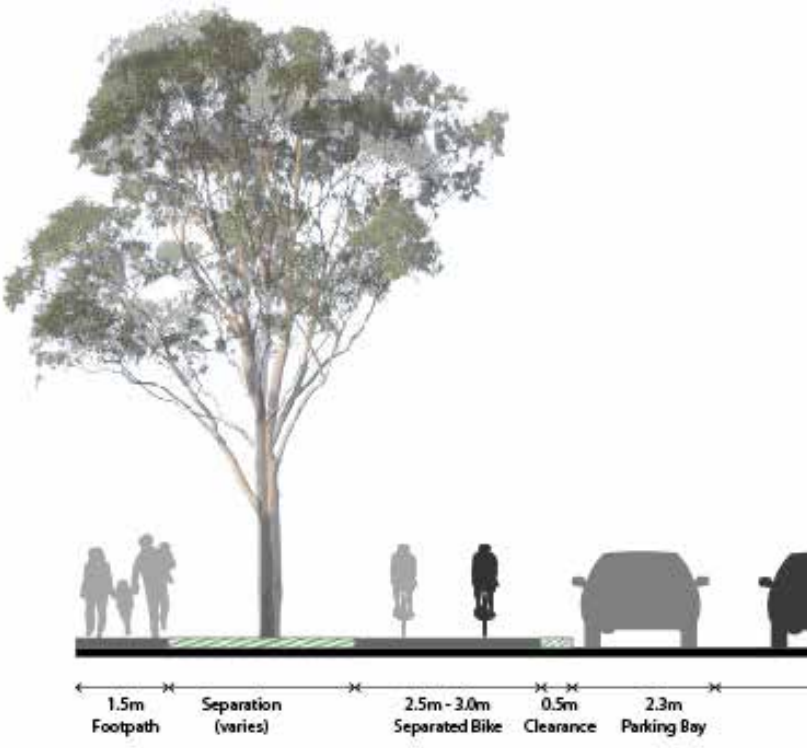


Figure 18 - Typical Bikeway cross section

Note: Example of a separated bike way that has been designed and constructed on Timbertop Boulevard, Officer.

4.5 REGIONAL TRAILS

The Pedestrian and Bicycle Strategy proposes 11 regional trails that connect the northern hills to Pakenham, Officer and Beaconsfield, the Railway Towns and the southern townships (figure 19).

The Cardinia Aqueduct Trail Loop connects the residents of Pakenham, Officer and Beaconsfield to the existing Cardinia Aqueduct Trail. Gum Scrub Creek, Toomuc Creek and Deep Creek provide picturesque corridors connecting the Aqueduct Trail to Office and Pakenham. The creek trails form a safe, scenic, off road circuit between Officer, the Aqueduct Trail, Pakenham and Pakenham East.

The Beaconsfield to Emerald trail connects Pakenham, Officer and Beaconsfield to the northern townships. The majority of Cardinia's population is located in the growth region of Pakenham and Officer and this trail connects them to the attraction and key destinations in Emerald. The Eastern Dandenong Ranges trail extends the scenic journey through the Dandenong foothills to the townships of Cockatoo and Gembrook.

Utilising the railway reserve the Railway Towns Trail will provide an enjoyable journey from Pakenham to the townships of Bunyip, Garfield, Nar Nar Goon and Tynong. This trail will connect locals to the major services and employment opportunities in Pakenham.

Linking Pakenham to the south, the Growth Corridor to South Trail connects to Residents of Koo Wee Rup and Lang Lang to Pakenham's facilities. From Koo Wee Rup walkers and cyclists have the option of embarking on a leisurely journey along the Southern Rail Trail (south to Lang Lang or west to Clyde) or east to Bunyip and the railway towns along the Main Drain Trail.

From the elevated aspect sweeping views across the agricultural landscape reveals itself along the Main Drain Trail between the townships of Koo Wee Rup and Bunyip.

Cardinia Creek located along the western boundary of Cardinia Shire is a major waterway with high scenic and ecological value. The growth corridor planning identifies the potential to develop a major regional park along the creek (which could become a significant destination for all residents). Aligned along the creek corridor, the Cardinia Creek Trail provides an off-road trail between Officer, Clyde and Beaconsfield.

Linking into the Cardinia Creek Trail, is the Princes Freeway Trail. This link will provide a major east-west connection between the growth area townships of Pakenham and Officer along the Princes Freeway reserve and potential longer term connection into the city.

To the north of the Princes Freeway Trail is the Princes Highway Trail which provides a link between the newly developing Pakenham East, through Pakenham, Officer and up to Beaconsfield.

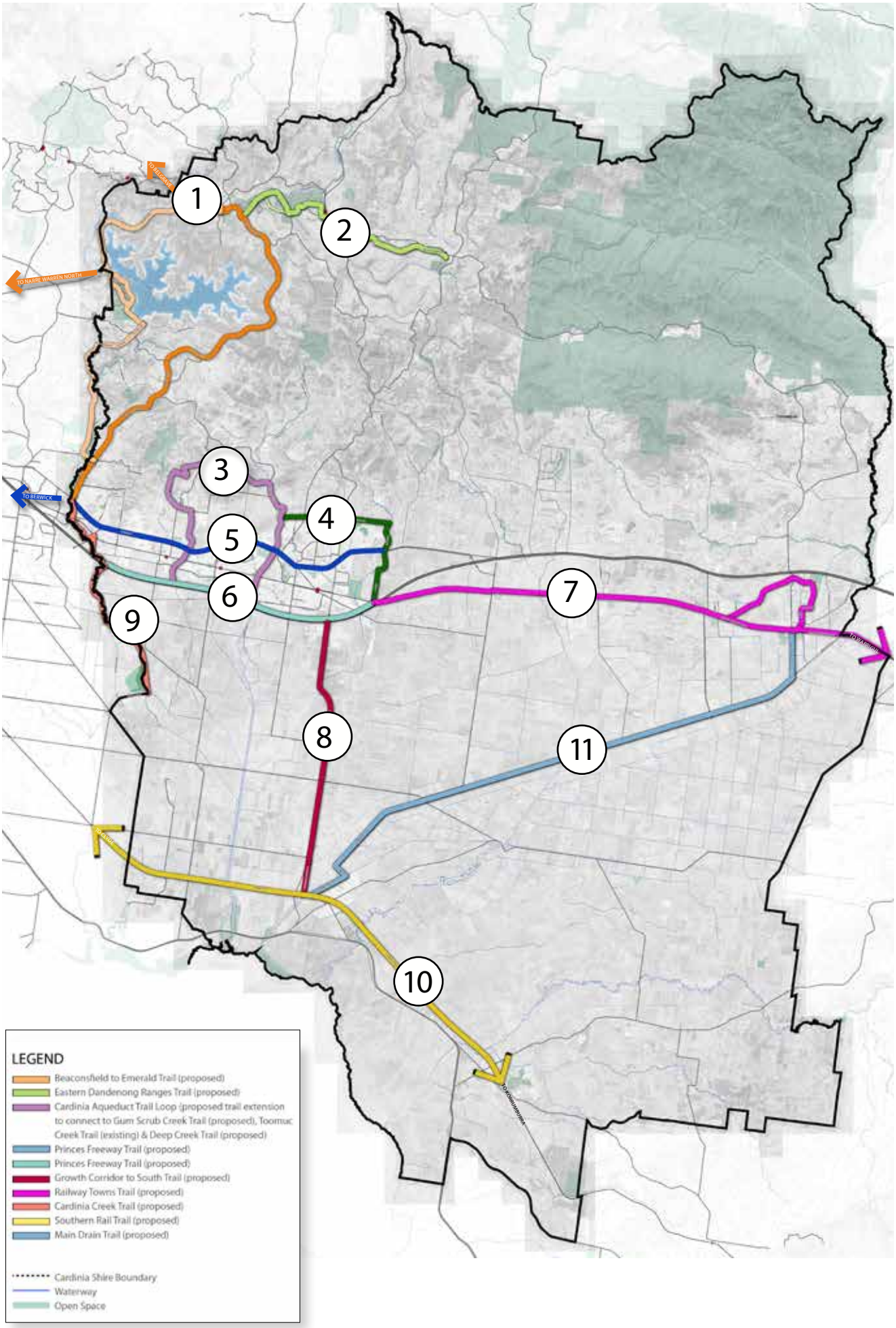
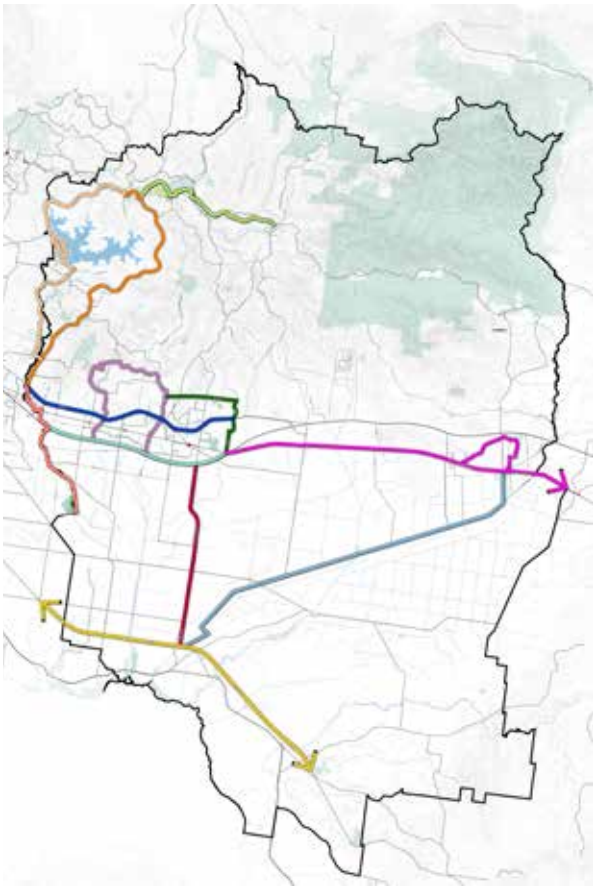


Figure 19 - Regional Trails Network

BEACONSFIELD TO EMERALD TRAIL



Proposed Beaconsfield to Emerald Trail Alignment - Option 1

Proposed Beaconsfield to Emerald Trail Alignment - Option 2

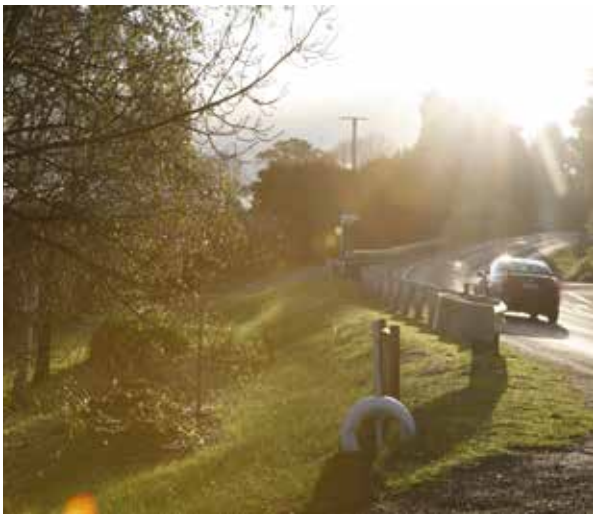
The Beaconsfield to Emerald Trail will provide a significant north-south connection in Cardinia Shire. The trail will provide the majority of the population, situated in the growth corridor areas, with a safe walking and cycling trail to the hills. The trail route will provide a scenic journey as walkers and cyclists experience the stunning transition from farmland around Pakenham and Officer, to natural bushland and rolling green hills in the north of the Shire. The change in elevation between Beaconsfield and Emerald provides dramatic, sweeping views and a unique walking/cycling experience, however the steep grade may not be suitable for all walkers/cyclists. There are opportunities for less steep circuits within sections of the Beaconsfield to Emerald Trail.

There are two alignment options for the proposed Beaconsfield to Emerald Trail. Alignment option 1 links Cardinia Parklands and Cardinia Reservoir to Beaconsfield and Emerald. The second alignment option uses the Beaconsfield to Emerald Road reserve alignment.

ACTIONS

The steep topography of the hills townships in Cardinia Shire provides some challenging sections in the Beaconsfield to Emerald Trail. The majority of the trail is characterised by undulating hills with moderate gradients (up to 10%). Both alignment options will require further investigation, particularly in areas of steep grade, limited space in the road reservation and access to private property.

- Investigate the feasibility of a connection between Chadwick Road and Foott Road
- Investigate the feasibility of the Inglis Road reservation accommodating a shared path
- Investigate the potential partnership with City of Casey to deliver an off road trail through the Cardinia Parklands
- Determine if it is feasible to align a shared path in the Beaconsfield to Emerald Road reserve through the northern areas
- Liaise with Melbourne Water to see if it possible to gain public access through the Cardinia Reservoir for the provision of an off-road shared path



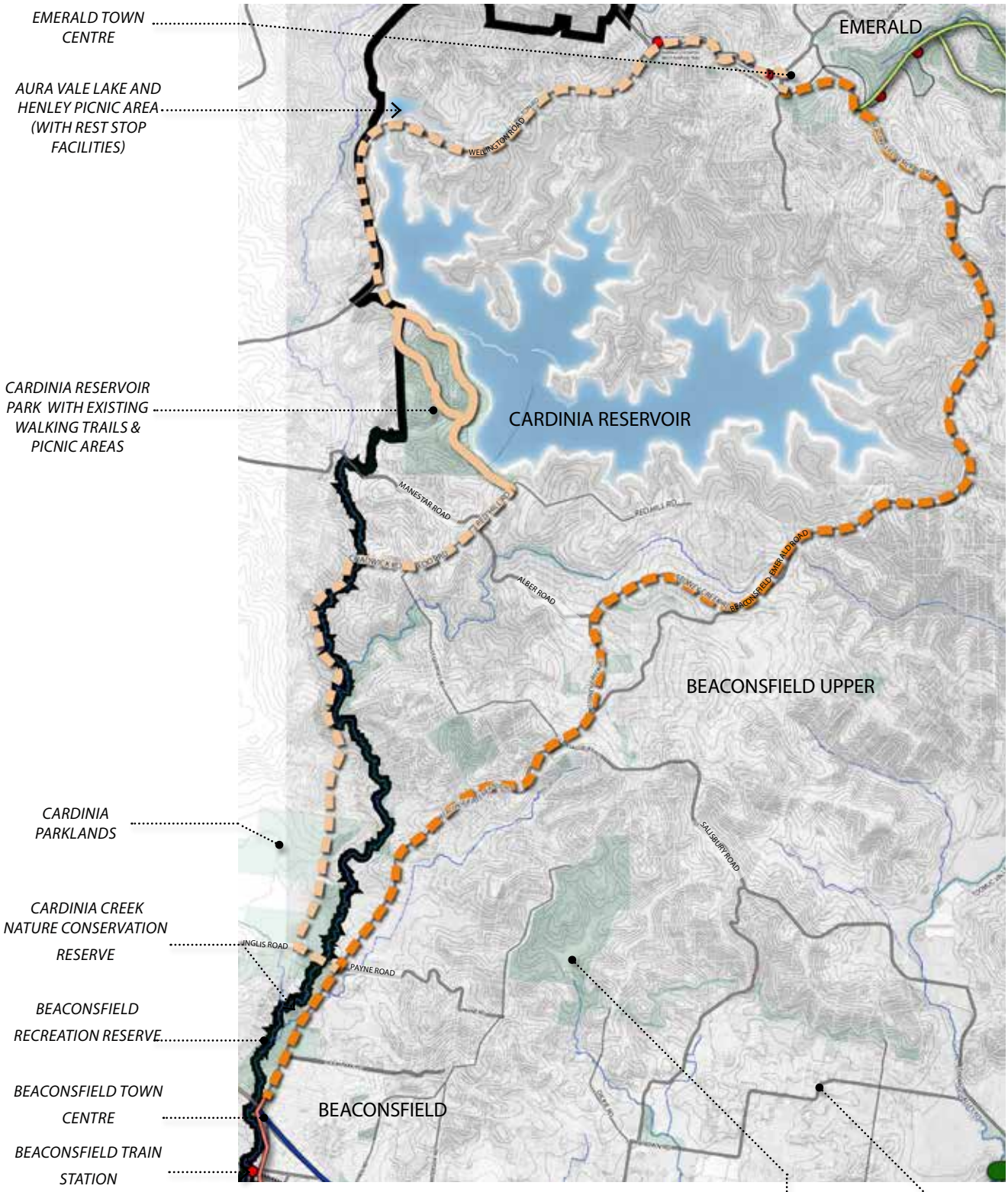
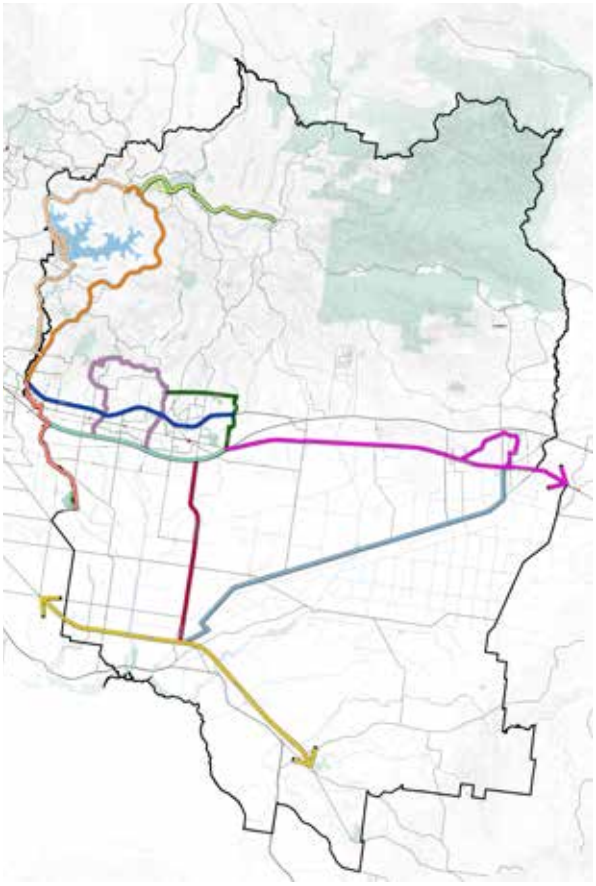


Figure 20 - Beaconsfield to Emerald Trail alignment

BEACONSFIELD TO EMERALD TRAIL SUMMARY	
Origin to Destination	Beaconsfield Reserve to Emerald Township
Purpose	Provides a link between the northern hills townships and the central growth corridor
Trail Type Shared Path or Bikeway	Shared path
Material (sealed or unsealed)	Combination of sealed & unsealed paths
Constraints	• Topography ranges from medium to extreme average slope • Creek crossing required across Cardinia Creek at Inglis Road & Chadwick Road
Length (km)	30km* *Length is an indicative guide only and doesn't consider constructions constraints such as topography. Detailed design of path alignments will need to be undertaken as part of a feasibility study
Approximate Cost	$15 - 20 million* *Costing is an indicative guide based on length of path. Costing does not consider constructions constraints such as topography. Detailed costings will need to be undertaken as part of a feasibility study
Priority low = 15 years+ medium = 10 -15 years high = 5 - 10 years very high = 0 - 5 years	Medium
Land Acquisition	N/A
Wider Network Connectivity	Potential future link to Belgrave Railway Trail (via Clematis and Menzies Creek)
Detailed Design Considerations	• Finalise route alignment • Provision of seating, shade, lighting, car parking, toilet blocks and other amenities • Including plantings or artwork to ensure the walk or cycle is pleasant • Way finding signage • Interpretive signage • DDA compliance (if only part of the path can be compliant, prioritise sections close to existing activity centres and services) • Consideration of all user groups paths • Councils Access and Inclusion Advisory Committee • Pedestrian and Bicycle strategy paths will be designed in accordance with the future paths performance standard articulated in the Pedestrian and Cycle DDA framework endorsed by Councils Access and Inclusion Advisory Committee

EASTERN DANDENONG RANGES TRAIL



Proposed Eastern Dandenong Ranges Trail Alignment

The Eastern Dandenong Ranges Trail (via Cockatoo) encompasses the scenic beauty and panoramic vistas through the Dandenong Ranges foothills. Walkers and cyclists have the choice of connections to many existing trails that connect to surrounding places of interest including Emerald Lake Park and the iconic tourist attraction, Puffing Billy.

The trail starts in the township of Emerald connecting into the existing trail that runs adjacent to the Puffing Billy rail reserve and through Emerald Lake Park. Walkers and cyclists have the choice of a northern alignment through Avonsleigh to Cockatoo where the Emerald to Cockatoo section connects Emerald Lake to Wright Forest via the Wright and Boundary Tracks (multi-use the entire length). This alignment runs north to Cockatoo. The gradient ranges from 7.6 to over 16% along this trail.

The alternative route runs via the Nobellius Loop trail from Lake Treganowan to Majestic Drive and has an average slope of 14%.

ACTIONS

The Emerald to Cockatoo section of the trail utilises and fills in the gaps in the existing network. The steep topography throughout Emerald, Cockatoo and Gembrook provide some challenging sections in the trail but the majority of the trail is characterised by undulating hills with moderate gradients of up to 10%. Key priorities for further investigation include:

- Determine the feasibility of both a north and south option through Wright Forest
- Investigate the viability of a strategic connection from Emerald to Belgrave to link to the existing network of trails throughout the Dandenong Ranges

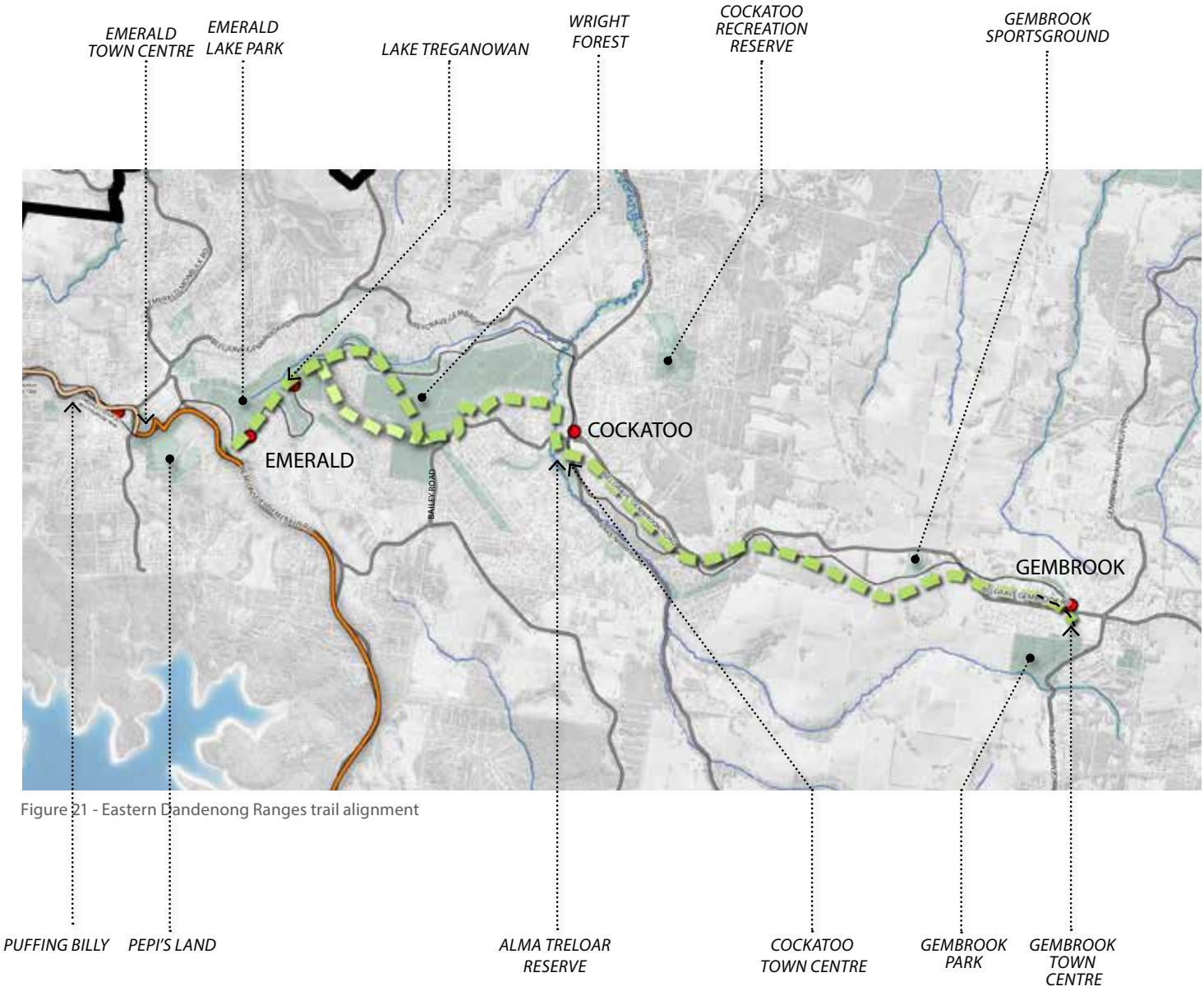
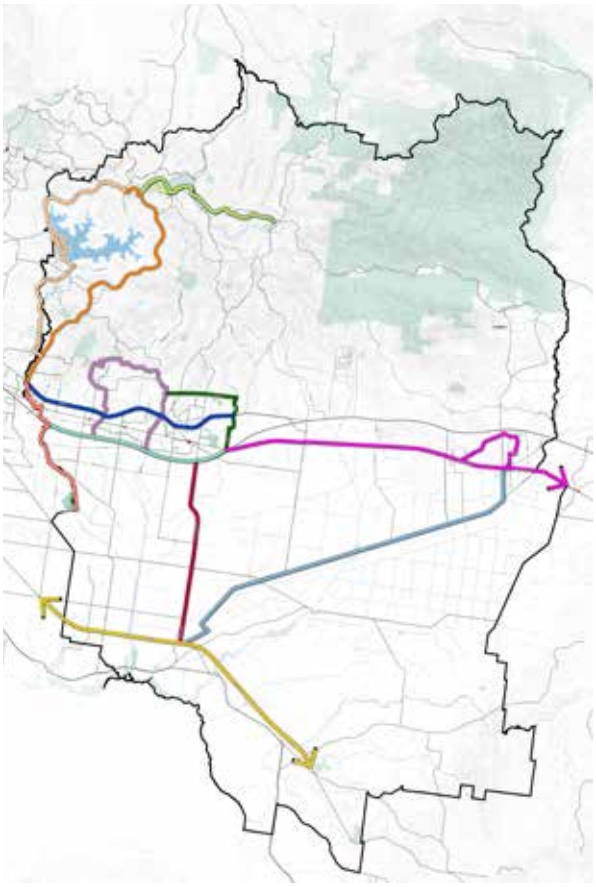


Figure 21 - Eastern Dandenong Ranges trail alignment

EASTERN DANDENONG RANGES TRAIL SUMMARY	
Origin to Destination	Emerald Township to Gembrook Township
Purpose	Connects Emerald to Gembrook via Cockatoo by a scenic trail that passes through features such as Emerald Lake Park and Wright forest
Trail Type Shared Path or Bikeway	Shared Path
Material (sealed or unsealed)	Combination of sealed & unsealed paths
Constraints	Topography ranges from medium to high average slope
Length (km)	11km* *Length is an indicative guide only and doesn't consider constructions constraints such as topography. Detailed design of path alignments will need to be undertaken as part of a feasibility study
Approximate Cost	$2.5 million* *Costing is an indicative guide based on length of path. Costing does not consider constructions constraints such as topography. Detailed costings will need to be undertaken as part of a feasibility study
Priority low = 15 years+ medium = 10 -15 years high = 5 - 10 years very high = 0 - 5 years	Very high (Costings complete, detailed design currently being completed, construction expected to commence 2017/2018)
Land Acquisition	Acquisition of private land will be necessary
Wider Network Connectivity	Potential to link to Menzies Creek and Belgrave (dependent on discussions with Yarra Ranges Shire Council). This path will link with the proposed Emerald to Beaconsfield trail.
Detailed Design Considerations	• Finalise route alignment • Provision of seating, shade, lighting, car parking, toilet blocks and other amenities • Including plantings or artwork to ensure the walk or cycle is pleasant • Way finding signage • Interpretive signage • DDA compliance (if only part of the path can be compliant, prioritise sections close to existing activity centres and services) • Consideration of all user groups • Councils Access and Inclusion Advisory Committee • Pedestrian and Bicycle strategy paths will be designed in accordance with the future paths performance standard articulated in the Pedestrian and Cycle DDA framework endorsed by Councils Access and Inclusion Advisory Committee

CARDINIA AQUEDUCT LOOP TRAIL



Proposed Cardinia Aqueduct Trail Alignment

The Cardinia Aqueduct Trail is recognised as being part of a regional ecological corridor. The trail follows the old aqueduct, decommissioned in 1998, and as it passes through eucalyptus landscapes and grassy woodlands it provides breathtaking views across the Toomuc Valley. It's a 5km journey (one way) along a smooth, unsurfaced track and with parking facilities close by.

The existing Cardinia Aqueduct is a popular recreational trail. There is opportunity to link the trail to Pakenham and Officer. The creek corridors along Upper Gum Scrub Creek and Toomuc Creek provide north/south links between Pakenham, Offcer and the existing Aqueduct Trail. Walkers and cyclists can follow the Toomuc Creek Trail along Toomuc Valley Road connecting into the Aqueduct Trail (accessing the eastern side). In the west walkers and cyclists will follow a proposed alignment along Dickie Road, Brown Road and connect into the Upper Gum Scrub Creek Trail. The circuit could be extended to the east, via the transmission easement (that runs between Toomuc Valley Road and Army Road) and Mullane Road, connecting to Deep Creek in Pakenham East. The Deep Creek Trail will be delivered as part of the Pakenham East PSP and will provide a southern link to the Princes Highway Trail and an east west connection across to the Toomuc Creek Trail.

The Aqueduct Trail is predominantly flat with just one steep hill but in the proposed loop there are some sections of steep grade. The majority of the new circuit will be suitable to families and casual recreational users and those interested in bird watching and scenic views.

ACTIONS

- Investigate the most appropriate trail alignment within the creek corridors with consideration of environmental sensitivity
- Investigate the feasibility of the proposed link between Toomuc Valley Road and the Aqueduct Trail through private property with consideration of the direct access but steep grade
- Investigate the feasibility of continuing the current alignment from where it currently ends on Dickie Road with consideration that some sections of the road reserve have more than a 10% slope
- Investigate the feasibility of the Dickie Road reservation accommodating a 2.5m trail, with consideration of the potential need for some tree clearing
- Investigate the feasibility of the proposed east west link along Mullane Road and the transmission easement, connecting Tommuc Creek and Deep Creek. This connects people in Pakenham East to the Aqueduct Trail and proposed Aqueduct Circuit
- Investigation is occurring into a link from the Aqueduct trail into a potential pedestrian path within the Melbourne Water owned Beaconsfield Reservoir land
- Investigate the most appropriate car park location on the western side of the trail (and any additional car parking requirements)

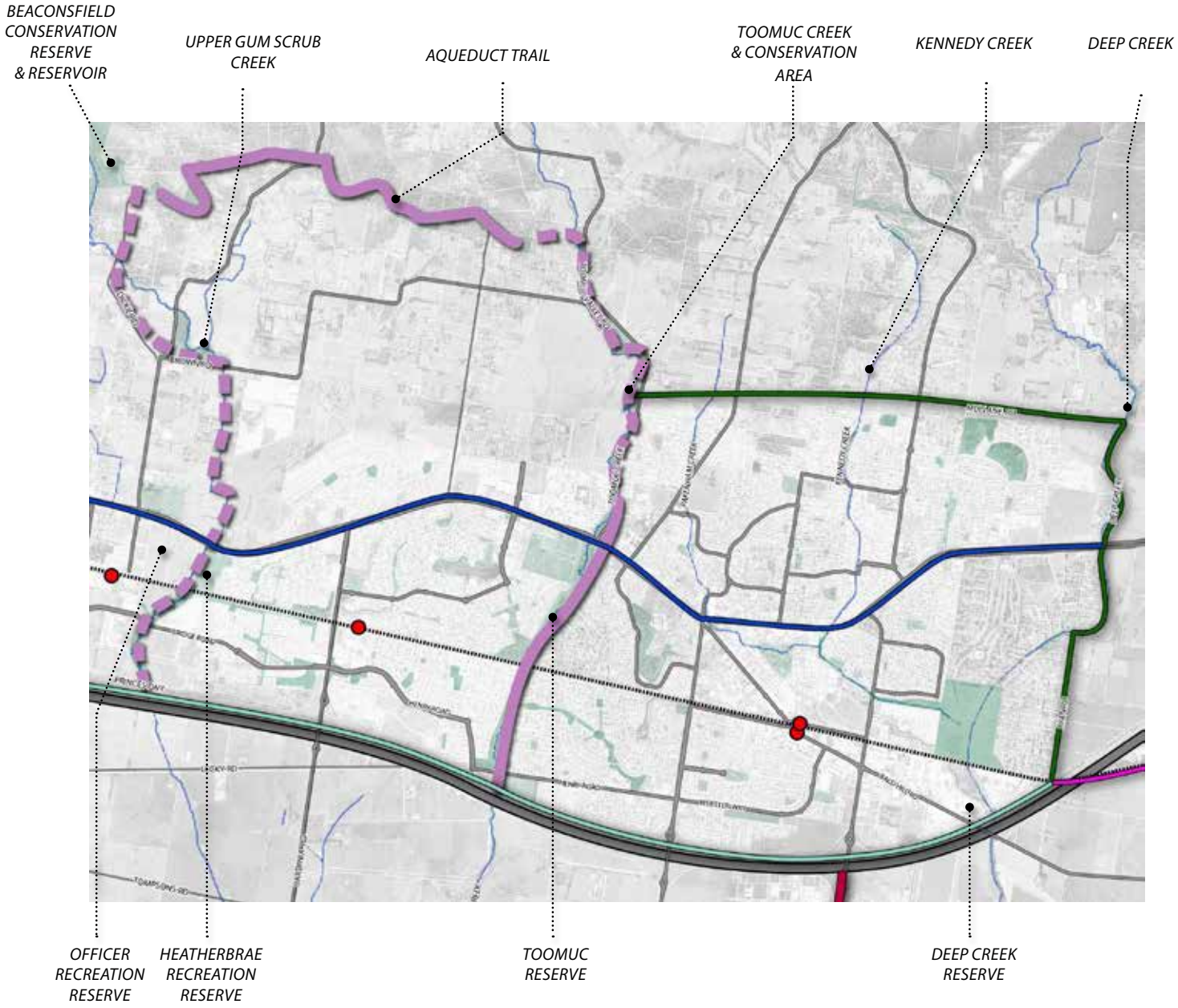
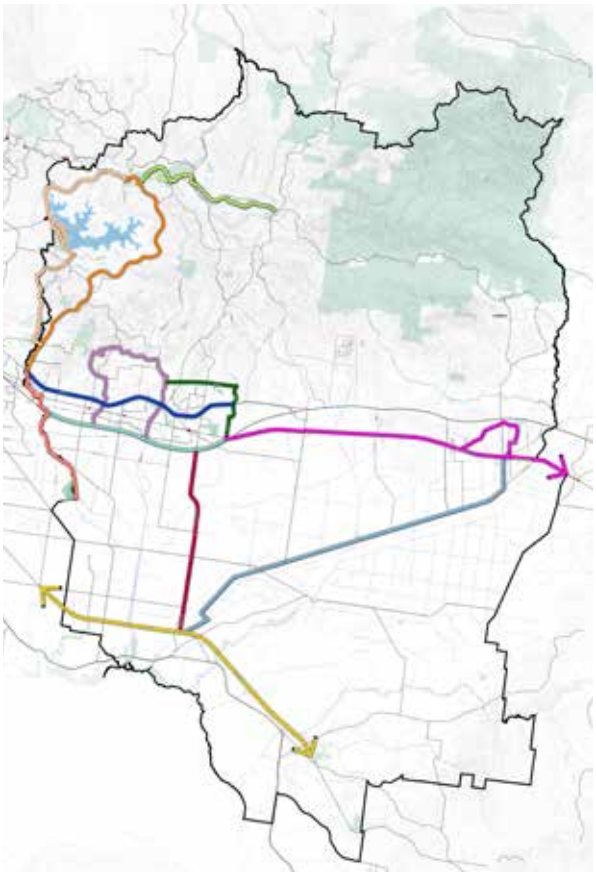


Figure 22 - Cardinia Aqueduct Loop alignment

CARDINIA AQUEDUCT LOOP TRAIL SUMMARY

Origin to Destination	The Cardinia Aqueduct loop creates a circuit that connects Officer the proposed Princes Freeway Trail, the proposed Princes Highway Trail the Proposed Deep Creek Trail and the existing Aqueduct trail
Purpose	The trail connects the central growth areas of Pakenham and Officer creating a recreational circuit for cyclists and keen walkers
Trail Type Shared Path or Bikeway	Shared Path
Material (sealed or unsealed)	Combination of sealed & unsealed paths
Constraints	• Rail & Watercourse crossing at Lower Gum Scrub Creek at Bellerive Ave, Officer • Road & Watercourse crossing over Princes Highway, between Arena Parade and Heatherbrae Recreation Reserve • Watercourse crossing over Toomuc Creek at entrance to Cardina Aqueduct Trail at Toomuc Valley Road • Road crossing across Toomuc Valley Road when coming from the east along the transmission easement to the north of Pomegranate Way • Road crossing over Brown Road • On the Cardinia Aqueduct Trail the average slope ranges from 2.2% to 10% • The average slope of connecting trails ranges from flat to an average slope of 11.5%
Length (km)	5.5km* *Length is an indicative guide only and doesn't consider constructions constraints such as topography. Detailed design of path alignments will need to be undertaken as part of a feasibility study
Approximate Cost	Between $5 - 8 million* *Costing is an indicative guide based on length of path. Costing does not consider constructions constraints such as topography. Detailed costings will need to be undertaken as part of a feasibility study
Priority low = 15 years+ medium = 10 -15 years high = 5 - 10 years very high = 0 - 5 years	High
Land Acquisition	Acquisition of private land will be necessary to provide access from Toomuc Valley Road to Cardinia Aqueduct Trail via existing trails
Wider Network Connectivity	Provides the growth corridor with a scenic walking or cycling loop. Will also connect to the proposed Princes Highway, Princess Freeway and Deep Creek trails
Detailed Design Considerations	• Finalise route alignment • Provision of seating, shade, lighting, car parking, toilet blocks and other amenities • Including plantings or artwork to ensure the walk or cycle is pleasant • Interpretive & Wayfinding signage • DDA compliance (if only part of the path can be compliant, prioritise sections close to existing activity centres and services) • Consideration of all user groups • Councils Access and Inclusion Advisory Committee • Pedestrian and Bicycle strategy paths will be designed in accordance with the future paths performance standard articulated in the Pedestrian and Cycle DDA framework endorsed by Councils Access and Inclusion Advisory Committee

DEEP CREEK TRAIL



Proposed Deep Creek Trail Alignment

The Deep Creek Trail extends the proposed Cardinia Aqueduct Loop east, providing a connection between the Aqueduct Loop, the Pakenham East PSP area, the Railway Towns Trail and the Princes Freeway Trail.

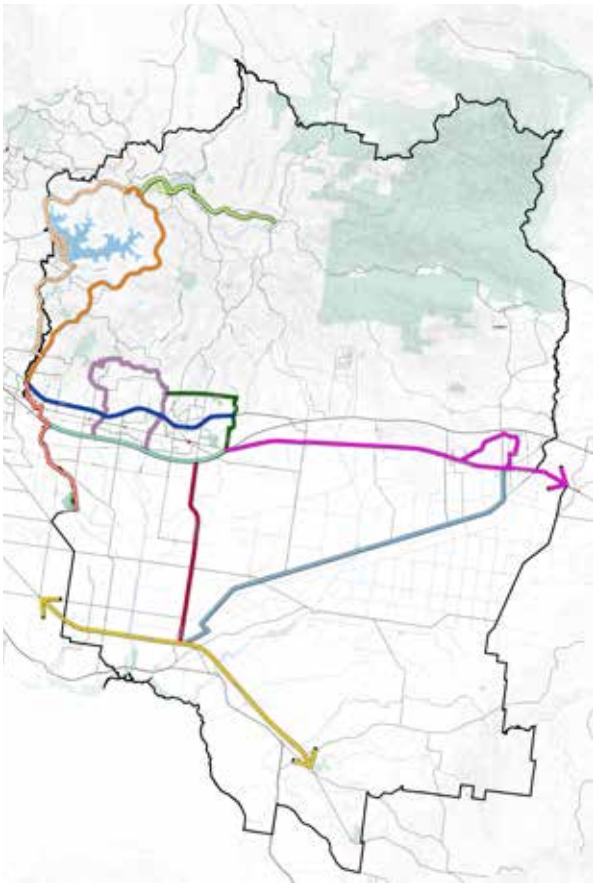
KEY CONSIDERATIONS

- Investigate the feasibility of an east west connection between Toomuc Creek and Deep Creek utilising the transmission easement
- Road crossing over Toomuc Valley Road, Pakenham Road, Ahearn Road and Army Road
- Investigate the feasibility of building a pedestrian crossing over the Princes Freeway
- Investigate the feasibility of a rail crossing to connect the Deep Creek Trail to the Railway Towns Trail and the Princes Freeway Trail

Figure 23 - Deep Creek Trail alignment

DEEP CREEK TRAIL SUMMARY	
Origin to Destination	Aqueducts trail to Pakenham East and Princes Highway
Purpose	The trail extends the proposed Cardinia Aqueduct Loop east, connecting the Aqueduct Loop, the Pakenham East PSP area, the Railway Towns Trail and the Princes Freeway Trail
Trail Type Shared Path or Bikeway	Shared Path
Material (sealed or unsealed)	Combination of sealed and unsealed paths
Constraints	• Creek crossing over Kennedy Creek • Road Crossing Army Road • Road Crossing Princess Highway • Creek Crossing Deep Creek • Steep topography constraints
Length (km)	10km* *Length is an indicative guide only and doesn't consider constructions constraints such as topography. Detailed design of path alignments will need to be undertaken
Approximate Cost	$8 -12 million* *Costing is an indicative guide based on length of path. Costing does not consider constructions constraints such as topography. Detailed costings will need to be undertaken as part of a feasibility study
Priority low = 15 years+ medium = 10 -15 years high = 5 - 10 years very high = 0 - 5 years	Medium
Land Acquisition	Property acquisition required. Part delivered by Pakenham East PSP
Wider Network Connectivity	Links to Aqueduct loop, Princes Highway, Princes Freeway and Pakenham East PSP
Detailed Design Considerations	• Finalise route alignment • Provision of seating, shade, lighting, car parking, toilet blocks and other amenities • Including plantings or artwork to ensure the walk or cycle is pleasant • Way finding signage • Interpretive signage • DDA compliance (if only part of the path can be compliant, prioritise sections close to existing activity centres and services) • Consideration of all user groups • Councils Access and Inclusion Advisory Committee • Pedestrian and Bicycle strategy paths will be designed in accordance with the future paths performance standard articulated in the Pedestrian and Cycle DDA framework endorsed by Councils Access and Inclusion Advisory Committee.

PRINCES HIGHWAY TRAIL



Proposed Princes Highway Trail Alignment

The Princes Highway Trail (located to the north of the Princes Freeway Trail) is an important strategic east west connection between the Pakenham East PDSP area and the regional trails along Deep Creek, Kennedy Creek, Toomuc Creek, Gum Scrub Creek and Cardinia Creek. Parts of this trail exist but delivery has been ad-hoc. The priority should be on constructing the missing pieces of the shared path trail and ensuring there is appropriate signage along the length of the trail.

The Princes Highway Trail connects to many of the major strategic paths in the established parts of Pakenham and Officer, as well as the newly developing PSP areas.

KEY CONSIDERATIONS

- Prioritise the construction of the missing pieces of shared path trail along the Princes Highway
- Prioritise the implementation of signage to inform users of the status of the path
- Investigate the feasibility of starting the trail at Deep Creek to provide a link between the Pakenham East PSP area and Pakenham

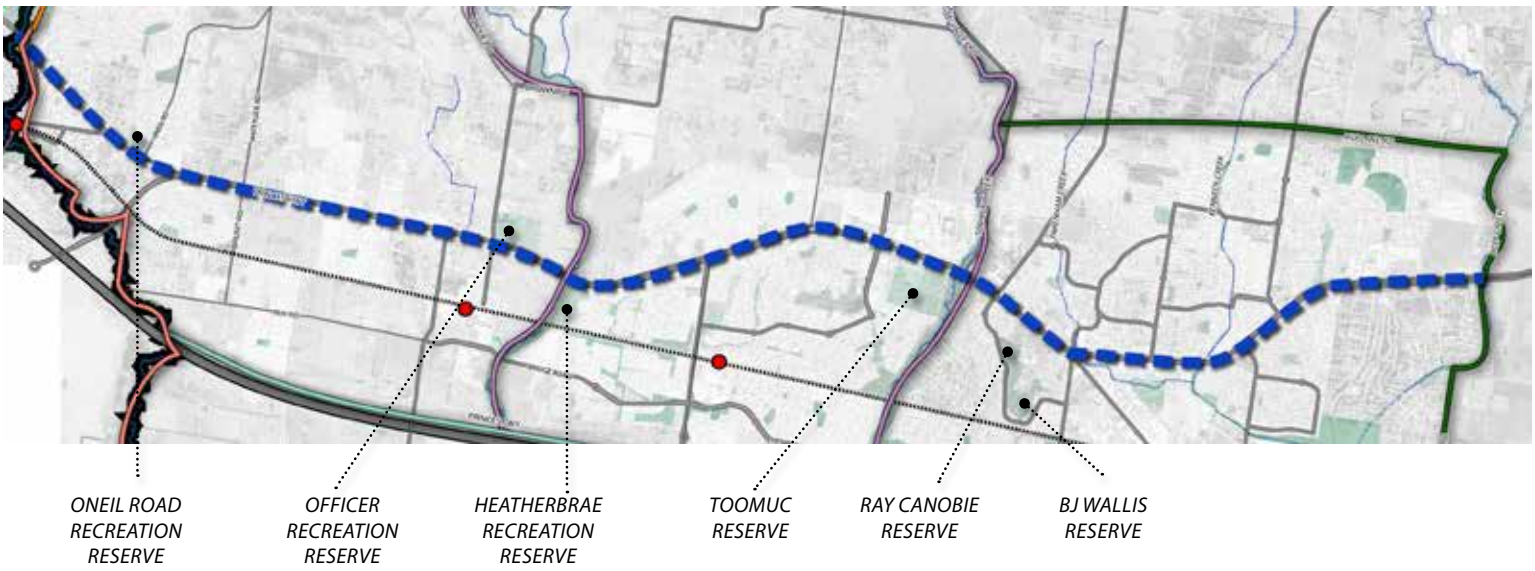
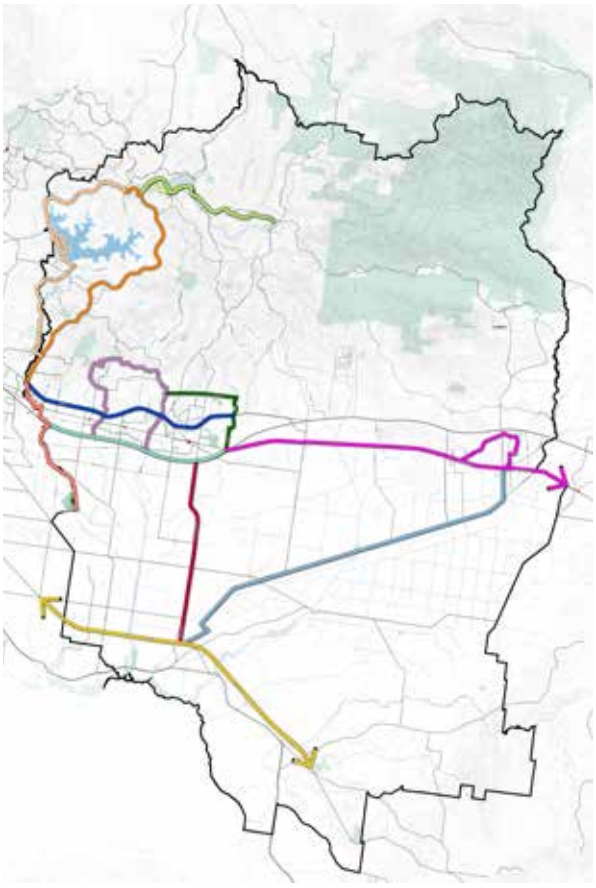


Figure 24 - Princes Highway Trail alignment

PRINCES HIGHWAY TRAIL SUMMARY	
Origin to Destination	Beaconsfield to Pakenham East
Purpose	Adding the missing sections to this trail will provide walkers and cyclists with a continuous connection between Deep Creek, Pakenham East PSP in the east, through Pakenham to Beaconsfield and Berwick in the west and therefore connections through to the city
Trail Type Shared Path or Bikeway	Shared path
Material (sealed or unsealed)	Sealed path
Constraints	• Water course crossing over; Deep Creek, Lower Gum Scrub Creek, Officer Creek • Road crossings at; Army Road, Ahearn Road, Deveney Street, O'Shanessy Street, Guest Street, Thewlis Road, Majestic Drive, Bayview Road, May Road, O'Neil Road, Glismann Road, Lyle Avenue, Ann Street, George Street, Stella Street • Road crossing upgrade at Beaconsfield - Emerald Road
Length (km)	15km* *Length is an indicative guide only and doesn't consider constructions constraints such as topography. Detailed design of path alignments will need to be undertaken as part of a feasibility study
Priority low = 15 years+ medium = 10 -15 years high = 5 - 10 years very high = 0 - 5 years	Very high
Approximate Cost	Between $1.5 - 6 million* *Costing is an indicative guide based on length of path. Costing does not consider constructions constraints such as topography. Detailed costings will need to be undertaken as part of a feasibility study
Land Acquisition	Alignment primarily through the Princes Highway corridor will require discussions with VicRoads. Some sections will require upgrading existing footpath to shared path
Wider Network Connectivity	Potential to extend the trail to the west to Berwick and further west to existing trail that link to the CBD
Detailed Design Considerations	• Finalise route alignment • Provision of seating, shade, lighting, car parking, toilet blocks and other amenities • Including plantings or artwork to ensure the walk or cycle is pleasant • Way finding signage • Interpretive signage • DDA compliance (if only part of the path can be compliant, prioritise sections close to existing activity centres and services) • Consideration of all user groups • Councils Access and Inclusion Advisory Committee • Pedestrian and Bicycle strategy paths will be designed in accordance with the future paths performance standard articulated in the Pedestrian and Cycle DDA framework endorsed by Councils Access and Inclusion Advisory Committee.

PRINCES FREEWAY TRAIL



Proposed Princes Freeway Trail Alignment

The Princes Freeway Trail is a significant strategic east west connection running along the southern sections of Pakenham, Officer and Beaconsfield. The 12km alignment runs between Ryan Road, Pakenham East and Cardinia Creek. The Princes Freeway Trail connects into the Cardinia Creek Trail providing connection to Beaconsfield. It also provides an east west connection to users coming from the south, connecting Deep Creek, Toomuc Creek, Gum Scrub Creek and Cardinia Creek.

KEY CONSIDERATIONS

- Investigating the feasibility of continuing the trail from Beaconsfield further west to Berwick. This would provide a western connection into Melbourne, possibly via the Monash Freeway and onto the Scotchman's Creek Trail and the Gardner's Creek Trail.
- Investigate the funding opportunities for the provision of new pedestrian crossings with consideration of using adjacent PSP areas as the triggering mechanism for funding.
- Liaise with VicRoads to coordinate the upgrading of existing pedestrian infrastructure along regional and strategic path routes

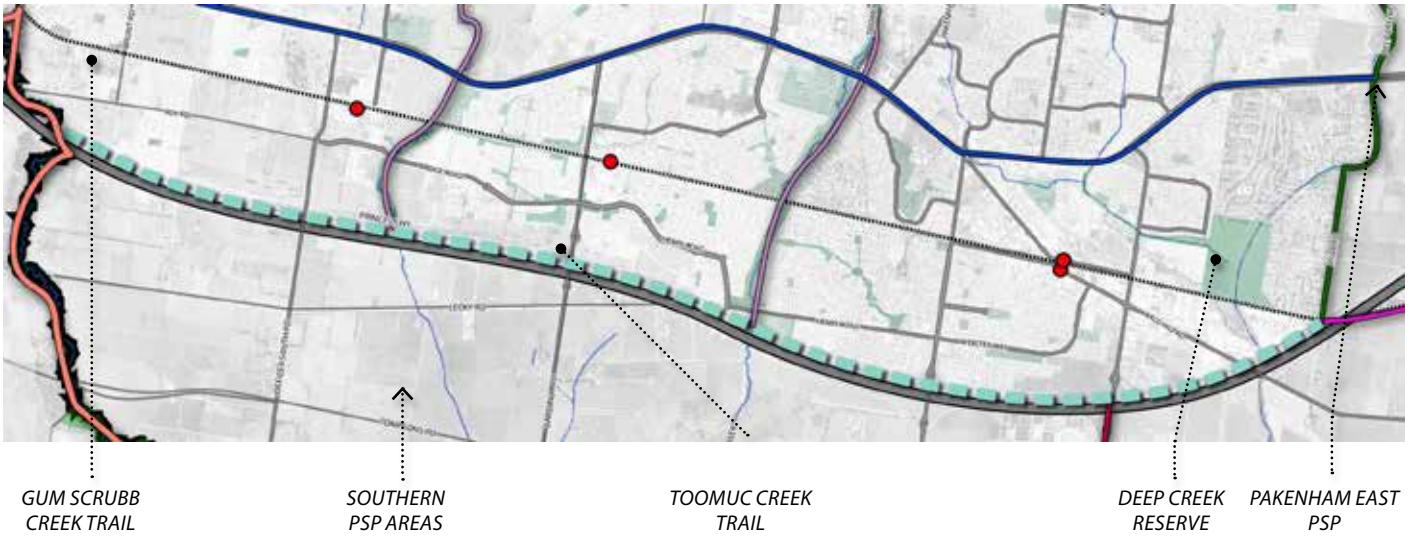
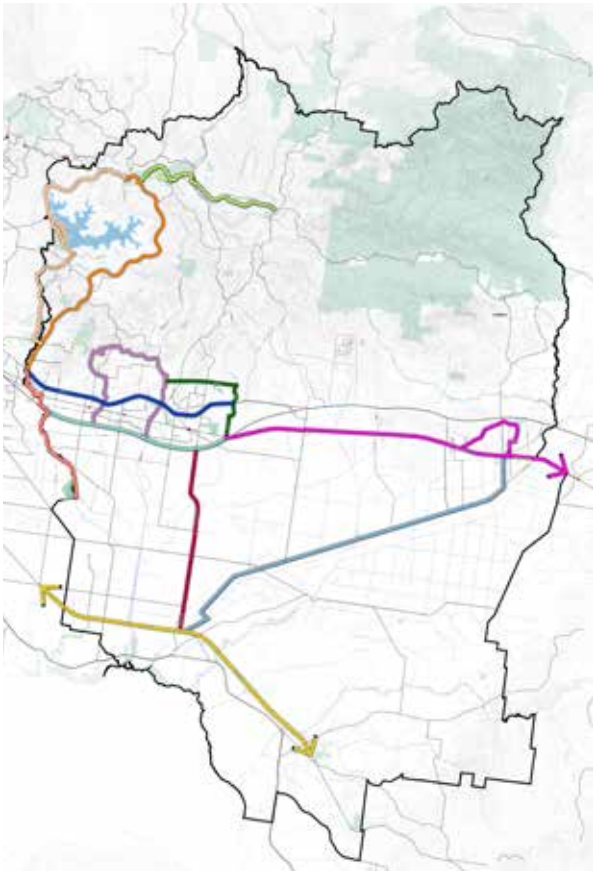


Figure 25 - Princes Freeway Trail alignment

PRINCES FREEWAY TRAIL SUMMARY	
Origin to Destination	Cardinia Creek Trail to Ryan Road
Purpose	The trail provides walkers and cyclists with a safe connection through the growth corridor areas. The trail connects the Railway Towns Trail to the Cardinia Aqueduct Trail and the Cardinia Creek Trail. It will also support the Cardinia Road Employment Precinct and Pakenham East areas as these areas develop
Trail Type Shared Path or Bikeway	Shared Path
Material (sealed or unsealed)	Sealed path
Constraints	• Road crossing over Bald Hill Road, Healesville - Koo Wee Rup Road, McGregor Road, Cardinia Road and over Officer Road South • Water course crossings at; Lower Gum Scrub Creek to the north west of the Cardinia Road Employment Precinct, Toomuc Creek
Length (km)	14km* *Length is an indicative guide only and doesn't consider constructions constraints such as topography. Detailed design of path alignments will need to be undertaken as part of a feasibility study
Approximate Cost	Between $7 - 10 million* *Costing is an indicative guide based on length of path. Costing does not consider constructions constraints such as topography. Detailed costings will need to be undertaken as part of a feasibility study
Priority low = 15 years+ medium = 10 -15 years high = 5 - 10 years very high = 0 - 5 years	High
Land Acquisition	Alignment primarily along the Princes Freeway corridor will require discussions with VicRoads. Some sections will be delivered as part of existing PSP
Wider Network Connectivity	Potential to extend the trail west to Berwick providing a connection to the CBD via the Monash Freeway, Scotchman's Creek Trail and the Gardner's Creek Trail. The trail also connects Pakenham to the Railway Towns Trail and various strategic trails including the Princes Highway Trail and the Pakenham East PSP bikeways and shared paths
Detailed Design Considerations	• Finalise route alignment • Provision of seating, shade, lighting, car parking, toilet blocks and other amenities • Including plantings or artwork to ensure the walk or cycle is pleasant • Way finding signage • Interpretive signage • DDA compliance (if only part of the path can be compliant, prioritise sections close to existing activity centres and services) • Consideration of all user groups • Councils Access and Inclusion Advisory Committee • Pedestrian and Bicycle strategy paths will be designed in accordance with the future paths performance standard articulated in the Pedestrian and Cycle DDA framework endorsed by Councils Access and Inclusion Advisory Committee.

RAILWAY TOWNS TRAIL



Proposed Railway Towns Trail Alignment

In the centre of Cardinia Shire are the railway towns of Nar Nar Goon, Tynong, Garfield and Bunyip. Each of these picturesque townships is unique and has interesting places to visit.

The Pakenham to Railway Towns Trail will be a significant recreational trail providing a scenic connection between Pakenham and each of the Railway Townships. Cyclists (and keen walkers) will enjoy a safe, leisurely off road experience along the edge of the rail corridor through varying agricultural landscapes, and waterways. At approximately 20km in length, it's a leisurely trail for the casual cyclist, that can be extended into a 40km loop for those seeking a greater challenge.

Additionally a township circuit is proposed around the township of Bunyip so walkers and cyclists can experience Bunyip's scenic value.

The regional trail provides a circuit connecting the Bunyip Sanctuary, Tea Tree Creek and Bunyip Township. The circuit can be extended west to the township of Garfield, via the creek corridor and along the gas easement, connecting to Railway Avenue.

KEY CONSIDERATIONS

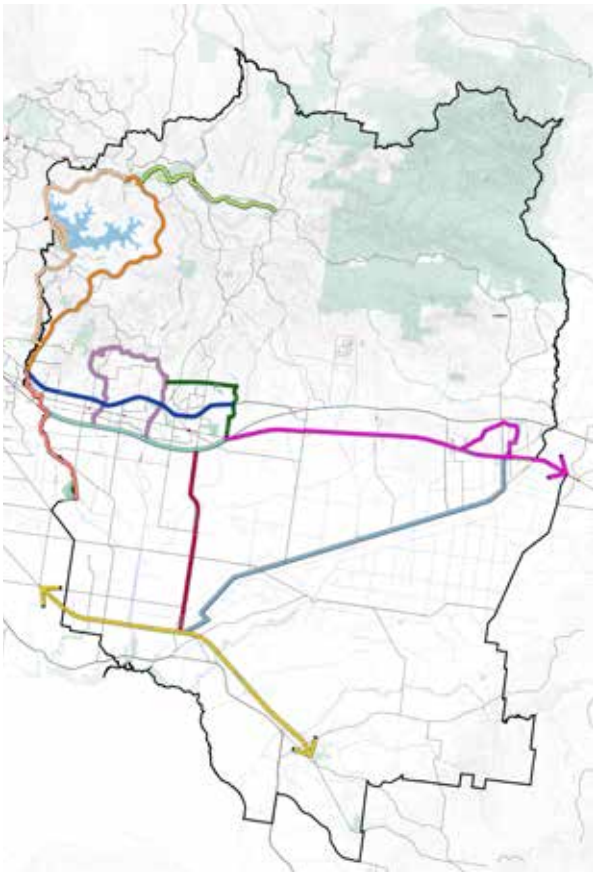
- Investigate the alignment of the trail along the railway with consideration of the northern side providing elevated views across the southern agricultural landscape, as well as a more cycle friendly experience (lower order road) and limitations in the southern road reservation
- Provision of signage along the trail informing users of the approximate distances to next attraction and town center
- Investigate the feasibility of a connection running between Hope Street and McNamara Road along Tea Tree Creek with consideration of access to private land and the potential for land acquisition
- Determine whether there is the potential for future demand to continue the trail further east to Longwarry and Warrigal

Figure 26 - Pakenham to Railway Towns Trail alignment

Proposed Alignment
Princes Highway Trail
Deep Creek Trail
Princes Freeway Trail
Main Drain Trail

PAKENHAM TO RAILWAY TOWNS TRAIL SUMMARY	
Origin to Destination	Pakenham to Bunyip
Purpose	The trail provides a scenic journey between Pakenham and the townships of Nar Nar Goon, Tynong, Garfield and Bunyip
Trail Type Shared Path or Bikeway	Shared Path
Material (sealed or unsealed)	Unsealed
Constraints	• Road crossings across Oakview Lane, Nar Nar Goon, Tynong Road, Jefferson Road, Garfield, Ti Tree Road, Bunyip, Wattletree Road, Bunyip, Nash Road, Bunyip, Wattletree Road and Nash Road intersection, Nash Road and A'Beckett Road intersection, Pearson Street, Bunyip • Road & Rail crossing at Railway Avenue, Bunyip • Rail crossing at Nar Nar Goon Road (upgrade) • Water course crossing over Ararat Creek
Length (km)	21km *Length is an indicative guide only and doesn't consider constructions constraints such as topography. Detailed design of path alignments will need to be undertaken as part of a feasibility study
Approximate Cost	$12 - 20 million* *Costing is an indicative guide based on length of path. Costing does not consider constructions constraints such as topography. Detailed costings will need to be undertaken as part of a feasibility study
Priority low = 15 years+ medium = 10 -15 years high = 5 - 10 years very high = 0 - 5 years	High
Land Acquisition	Discussions required with Vic Track as the proposed path is located in the existing rail corridor
Wider Network Connectivity	Potential for future connection to Longwarry, Druin and Warragul
Detailed Design Considerations	• Finalise route alignment • Provision of seating, shade, lighting, car parking, toilet blocks and other amenities • Including plantings or artwork to ensure the walk or cycle is pleasant • Way finding signage • Interpretive signage • DDA compliance (if only part of the path can be compliant, prioritise sections close to existing activity centres and services) • Consideration of all user groups • Councils Access and Inclusion Advisory Committee • Pedestrian and Bicycle strategy paths will be designed in accordance with the future paths performance standard articulated in the Pedestrian and Cycle DDA framework endorsed by Councils Access and Inclusion Advisory Committee.

GROWTH CORRIDOR TO SOUTH TRAIL



Proposed Growth Corridor to South Trail Alignment

The Growth Corridor to South Link runs along Healesville - Koo Wee Rup Road from Pakenham to Koo Wee Rup. The link provides connection between Pakenham and the township of Koo Wee Rup in the south, and is most likely to be used by commuting cyclists. Recreational cyclists can continue their journey south to the township of Lang Lang, with the potential for further connection into the Southern Rail Trail, or heading east via the Main Drain Trail and continuing on to the Pakenham to Railway Towns Trail.

KEY CONSIDERATIONS

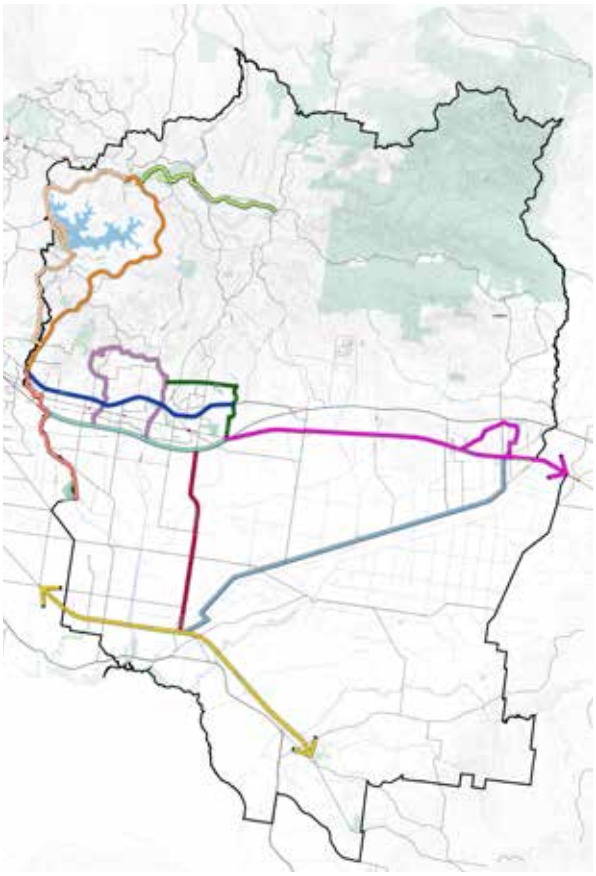
- Investigate how the alignment between Pakenham Town Centre and Koo Wee Rup (approximately 16kms) can be enriched, possibly through landscape features, as a long, straight alignment along Koo Wee Rup Road may be perceived as uninteresting
- If the alignment remains along Koo Wee Rup Road investigate the feasibility of a constructing a path adjacent to the drainage corridor with consideration of the difference in levels between corridor and road which has high volumes of high speed, heavy vehicle traffic

Figure 27 - Growth Corridor to South Trail alignment

Proposed Alignment
Princes Freeway Trail
Main Drain Trail
Southern Rail Trail

GROWTH CORRIDOR TO SOUTH TRAIL SUMMARY	
Origin to Destination	Connects Pakenham and Koo Wee Rup via Healesville Koo Wee Rup Road
Purpose	The trail provides a safe, separated path from the high speed and heavy vehicles along Koo Wee Rup Road between Pakenham and Koo Wee Rup
Trail Type Shared Path or Bikeway	Shared Path
Material (sealed or unsealed)	Unsealed
Constraints	• Water course crossing over the Bunyip River along the Koo Wee Rup Road, as well as across Deep Creek • Road crossings at Railway Roads, through the Koo Wee Rup Bypass intersection, at the South East Boulevard intersection, at Island Road, Ballarto Road and across Green Hill Road
Length (km)	14km* *Length is an indicative guide only and doesn't consider constructions constraints such as topography. Detailed design of path alignments will need to be undertaken as part of a feasibility study
Approximate Cost	$5 - 8 million* *Costing is an indicative guide based on length of path. Costing does not consider constructions constraints such as topography. Detailed costings will need to be undertaken as part of a feasibility study
Priority low = 15 years+ medium = 10 -15 years high = 5 - 10 years very high = 0 - 5 years	Low
Land Acquisition	The construction of this path is dependent on VicRoads duplication of Healesville-Koo Wee Rup Road including suitable road reserve allocation
Wider Network Connectivity	This trail will link in with the proposed Southern Rail Trail
Detailed Design Considerations	• Finalise route alignment • Provision of seating, shade, lighting, car parking, toilet blocks and other amenities • Including plantings or artwork to ensure the walk or cycle is pleasant • Way finding signage • Interpretive signage • DDA compliance (if only part of the path can be compliant, prioritise sections close to existing activity centres and services) • Consideration of all user groups • Councils Access and Inclusion Advisory Committee • Pedestrian and Bicycle strategy paths will be designed in accordance with the future paths performance standard articulated in the Pedestrian and Cycle DDA framework endorsed by Councils Access and Inclusion Advisory Committee.

CARDINIA CREEK TRAIL



Proposed Cardinia Creek Trail Alignment

The Cardinia Creek trail is located along the western boundary of Cardinia Shire. it offers a scenic connection from Beaconsfield south along the Cardinia Creek. There is an opportunity for this connection to link into Clyde and the future community proposed by the McPherson PSP.

The proposed trail along Cardinia Creek is just over 13kms long. The trail begins at the Beaconsfield Recreation Reserve and heads south. The McPherson PSP identifies the potential for a major regional park to be developed along the creek. This could become a significant destination for residents and visitors and would be accessible via the Cardinia Creek Trail.

The creek corridor provides habitat for a range of native animals. Walking along the trail you might be lucky enough to see a platypus, river blackfish or the threatened southern brown bandicoot.

KEY CONSIDERATIONS

- Ensuring the development and maintenance of the trail doesn't impact on the sensitive conservation areas and the habitat of all species is protected
- Coinciding the development of the trail with that of the regional park in the south
- Investigate where to locate pedestrian and cycling crossing points between City of Casey and Cardinia Shire

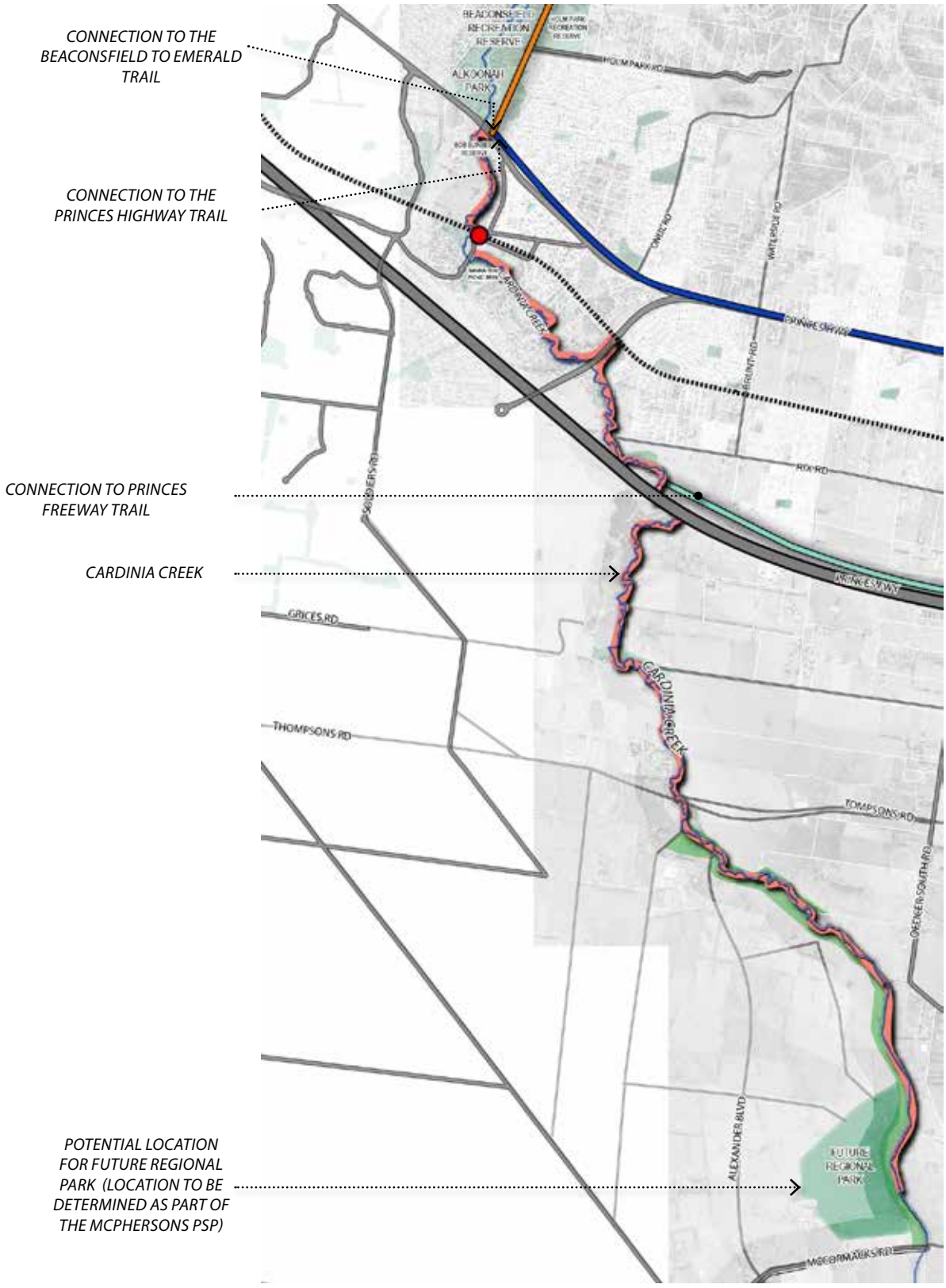
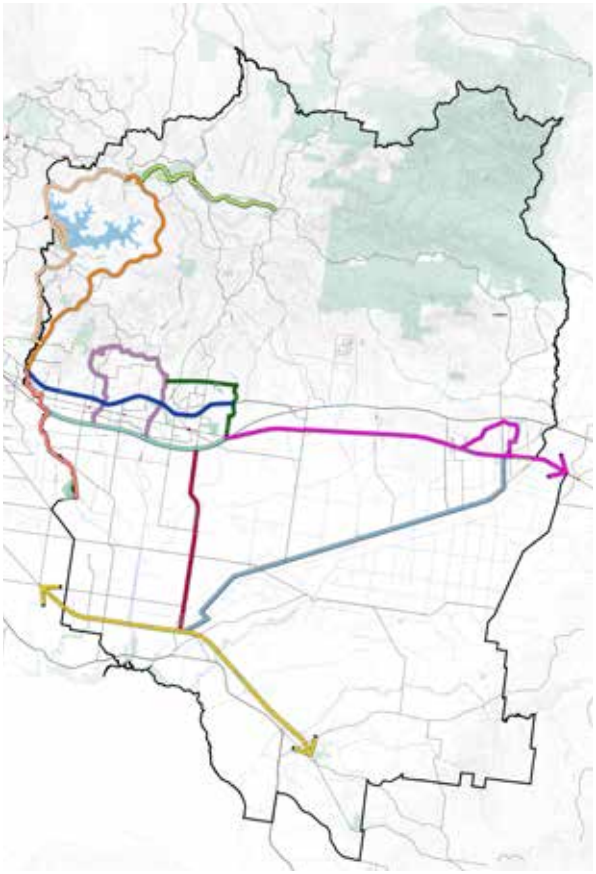


Figure 28 - Cardinia Creek Trail alignment

CARDINIA CREEK TRAIL SUMMARY	
Origin to Destination	Beaconsfield Reserve to Emerald Township
Purpose	The trail provides a scenic journey along Cardinia Creek and links to the proposed path network in the McPherson PSP. To start of the trail, in the north, connects into the southern end of the Beaconsfield to Emerald trail.
Trail Type Shared Path or Bikeway	Shared Path
Material (sealed or unsealed)	Combination of sealed & unsealed paths
Constraints	The location of the future regional park is yet to be determined and will be finalised as part of the development of the McPherson PSP
Length (km)	13km's* *Length is an indicative guide only and doesn't consider constructions constraints such as topography. Detailed design of path alignments will need to be undertaken as part of a feasibility study
Priority low = 15 years+ medium = 10 -15 years high = 5 - 10 years very high = 0 - 5 years	Medium
Approximate Cost	To be delivered as part of the McPhersons PSP and DCP
Land Acquisition	N/A
Wider Network Connectivity	Connects to the proposed Beaconsfield to Emerald trail, Princes Highway trail and Princes Freeway Trail. There is the opportunity to connect into The City of Casey and the proposed McPhersons PSP area
Detailed Design Considerations	• Finalise route alignment • Provision of seating, shade, lighting, car parking, toilet blocks and other amenities • Including plantings or artwork to ensure the walk or cycle is pleasant • Way finding signage • Interpretive signage • DDA compliance (if only part of the path can be compliant, prioritise sections close to existing activity centres and services) • Consideration of all user groups • Councils Access and Inclusion Advisory Committee • Pedestrian and Bicycle strategy paths will be designed in accordance with the future paths performance standard articulated in the Pedestrian and Cycle DDA framework endorsed by Councils Access and Inclusion Advisory Committee.

SOUTHERN RAIL TRAIL



Proposed Southern Rail Trail Alignment

The Southern Rail Trail utilises the existing rail trail in Koo Wee Rup and proposes to continue the rail trail experience further south, to the township of Lang Lang. The trail will be aligned in the existing rail reserve, but will consider the potential for the existing rail infrastructure to be activated in the future.

Only 13kms in length and with a reasonably flat terrain this trail makes for a leisurely off road rail trail experience. With cafés and places of interesting in both townships the circuit offers walkers and cyclists the potential of an all-day recreational experience.

There is potential for the rail trail to extend further west and extend into the City of Casey and connect to Korrumburra in the east.

KEY CONSIDERATIONS

- Investigate the potential to attract visitors from the Great Southern Trail (which starts further south in Leongatha) to Cardinia via the Southern Rail Trail
- Alignment of the Southern Rail Trail along the existing rail reserve should take into consideration the potential for the existing rail infrastructure to be utilised if plans for an airport in the region proceed.

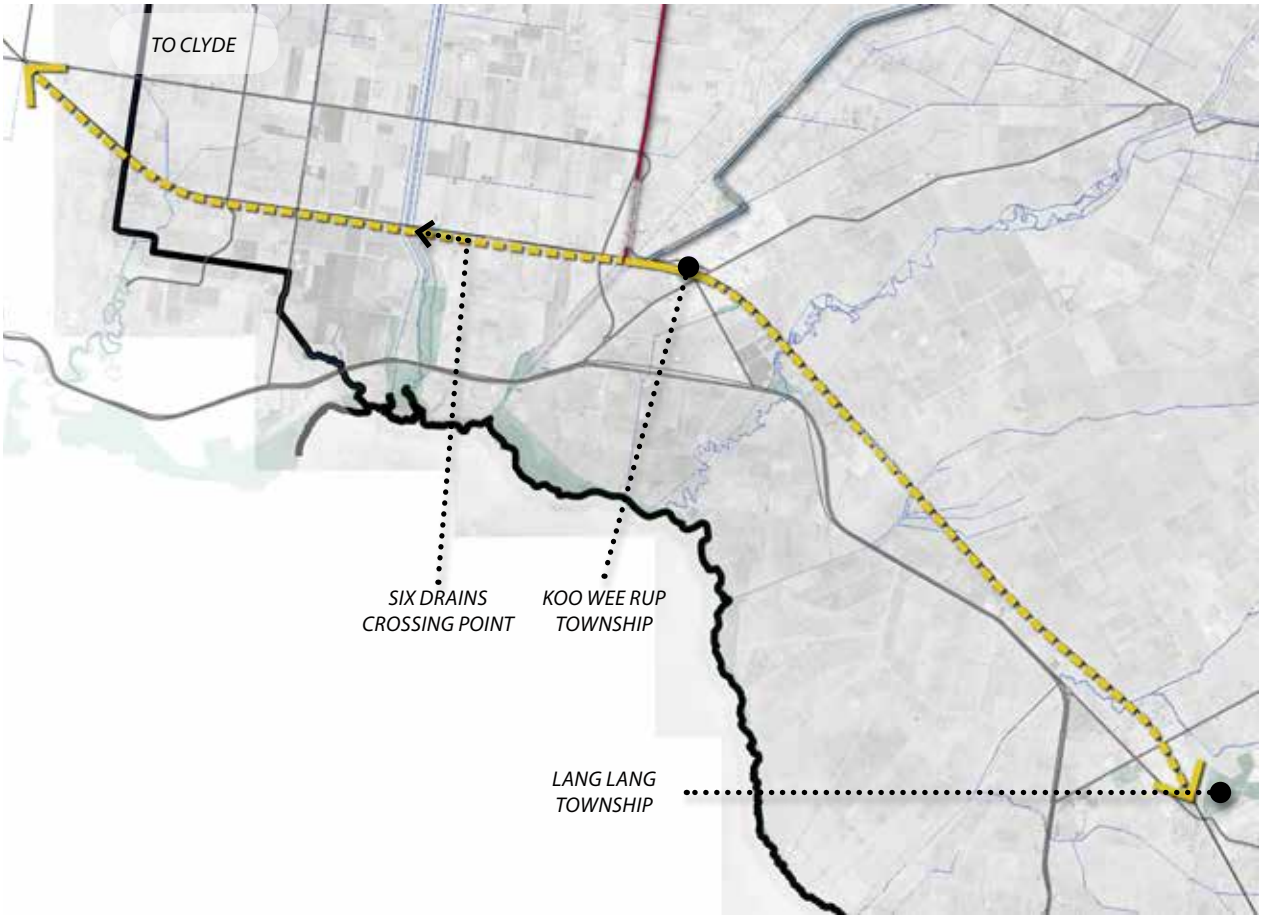
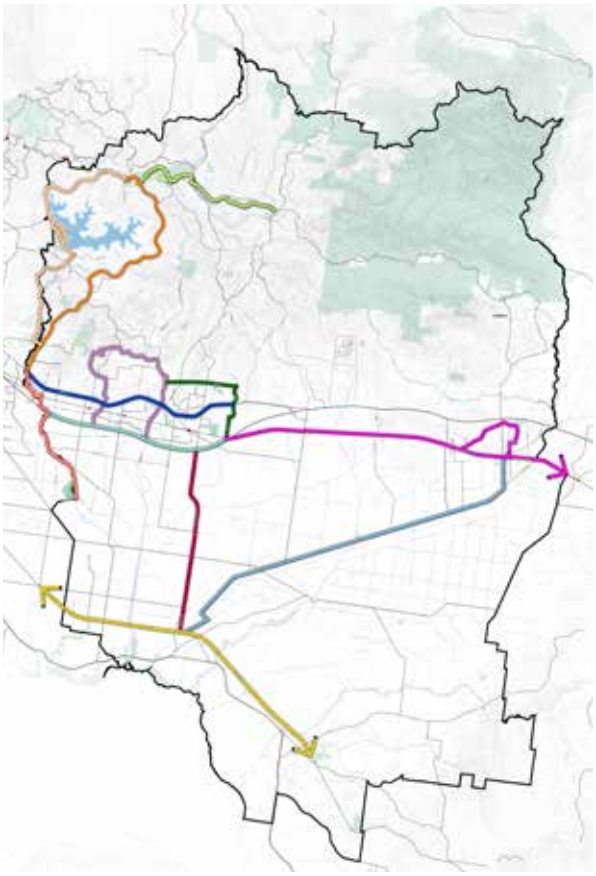


Figure 29 - Southern Rail Trail alignment

SOUTHERN RAIL TRAIL SUMMARY	
Origin to Destination	Koo Wee Rup township to Lang Lang township
Purpose	Create a scenic and safe recreational intra-town link, as well as key north, south link regional link (when connected to the Growth Corridor to South Trail)
Trail Type Shared Path or Bikeway	Shared Path
Material (sealed or unsealed)	Unsealed Path
Constraints	• Water course crossing at Yallock Creek • Road crossing at Monomeith Road • Water course crossings across Monomeith Drain • Water course crossing at Lang Lang River • Road crossing at Caldermeade Road • Road crossing at Westernport Road
Length (km) *Length is an indicative guide only and doesn't consider constructions constraints such as topography. Detailed design of path alignments will need to be undertaken as part of a feasibility study	10km* *Length is an indicative guide only and doesn't consider constructions constraints such as topography. Detailed design of path alignments will need to be undertaken as part of a feasibility study
Approximate Cost	$7 - 10 million* *Costing is an indicative guide based on length of path. Costing does not consider constructions constraints such as topography. Detailed costings will need to be undertaken as part of a feasibility study
Priority low = 15 years+ medium = 10 -15 years high = 5 - 10 years very high = 0 - 5 years	Low
Land Acquisition	The existing rail infrastructure could potentially be activated if an airport is built in the region. Any future rail trail alignment should take this into consideration
Wider Network Connectivity	Investigate the potential to attract visitors from the Great Southern Trail in the south and future connection to Clyde in the west, via Tooradin
Detailed Design Considerations	• Finalise route alignment • Provision of seating, shade, lighting, car parking, toilet blocks and other amenities • Including plantings or artwork to ensure the walk or cycle is pleasant • Way finding signage • Interpretive signage • DDA compliance (if only part of the path can be compliant, prioritise sections close to existing activity centres and services) • Consideration of all user groups • Councils Access and Inclusion Advisory Committee • Pedestrian and Bicycle strategy paths will be designed in accordance with the future paths performance standard articulated in the Pedestrian and Cycle DDA framework endorsed by Councils Access and Inclusion Advisory Committee.

MAIN DRAIN TRAIL



Proposed Main Drain Trail Alignment

The Main Drain Trail runs along the Main Drain Corridor, connecting Koo Wee Rup to Bunyip. At just under 30kms in length one way, the trail is an ideal for intermediate and experienced cyclists. The Main Drain Trail runs through the unique agricultural landscapes of southern Cardinia Shire. Running along the drain, the trail will provide elevated views over the surrounding landscape.

KEY CONSIDERATIONS

- Investigate the optimal location for the trail along the corridor. Needs to consider flooding constraints and optimal locations for sweeping views
- Consider meandering trail through existing vegetation to create a diversity of views and experiences

Figure 30 - Main Drain Trail alignment

Proposed Alignment

Growth Corridor to South Trail

Southern Rail Trail

Railway Towns Trail

Cardinia Shire Boundary

MAIN DRAIN TRAIL SUMMARY	
Origin to Destination	Koo Wee Rup township to Bunyip township
Purpose	Creates a recreational trail through the unique, agricultural landscape between the townships of Koo Wee Rup and Bunyip
Trail Type Shared Path or Bikeway	Shared Path
Material (sealed or unsealed)	Unsealed
Constraints	• Road crossing at Nar Nar Goon - Longwarry Road, Bunyip • Water course crossing over Longwarry Drain/Bunyip Modella Road • Road crossing around bridge on Little Road • Road crossing at Nine Mile Road and Main Drain Road intersection • Road crossing around bridge on Thirteen Mile RoadRoad crossing around bridge on Eleven Mile Road • Road crossing at Ballarto Road
Length (km)	24km* *Length is an indicative guide only and doesn't consider constructions constraints such as topography. Detailed design of path alignments will need to be undertaken as part of a feasibility study
Approximate Cost	$5 - 8 million* *Costing is an indicative guide based on length of path. Costing does not consider constructions constraints such as topography. Detailed costings will need to be undertaken as part of a feasibility study
Priority low = 15 years+ medium = 10 -15 years high = 5 - 10 years very high = 0 - 5 years	Low
Land Acquisition	Discussions with Melbourne Water will be required
Wider Network Connectivity	Connects at Bunyip to the Railway to Pakenham trail. Connects at Koo Wee Rup to the Southern Rail Trail and the Growth Corridor to South Link
Detailed Design Considerations	• Finalise route alignment • Provision of seating, shade, lighting, car parking, toilet blocks and other amenities • Including plantings or artwork to ensure the walk or cycle is pleasant • Way finding signage • Interpretive signage • DDA compliance (if only part of the path can be compliant, prioritise sections close to existing activity centres and services) • Consideration of all user groups • Councils Access and Inclusion Advisory Committee • Pedestrian and Bicycle strategy paths will be designed in accordance with the future paths performance standard articulated in the Pedestrian and Cycle DDA framework endorsed by Councils Access and Inclusion Advisory Committee.

5. SUPPORTING NETWORK INFRASTRUCTURE & IMPLEMENTATION


Nobelius Heritage Park/
Emerald Museum 100m
Emerald Lake Park 1040m

5.1 NEXT STEPS

Cardinia Shire Council will use the Pedestrian & Bicycle Strategy to seek funding for the proposed infrastructure. Funding will be sought in order of priority as outlined in the Action Tables in Section 5.6.

This Pedestrian and Bicycle Strategy;

- Is a tool to advocate for funding from State and Federal governments.
- Is a tool to move forward with detailed design of each of the proposed paths.
- Forms strategic guidance for spending of Council funds.

5.2 SIGNAGE & WAYFINDING STRATEGIES

5.2.1 OVERVIEW

Community awareness, understanding and support for the Walking and Cycling Network is fundamental to its successful implementation. The following guidelines provide a strategic outline of the key considerations of successfully communicating the locations, distances, and benefits of the network to the community. The principles aim to create a unified, visually appealing, and improved walking and cycling experience in Cardinia Shire.

This strategy recommends the development of a comprehensive Signage and Way-finding Strategy that considers the relationship between the network infrastructure, place character and accessibility in Cardinia Shire. The signage strategy should focus on walking and cycling wayfinding in the context of unifying Cardinia's varied townships and diverse landscape areas.

5.2.2 PLACEMAKING AND WAYFINDING

KEY CONSIDERATIONS

- Consider aligning paths to capture key views of landmarks and landscapes
- Where possible provide a diversity of experiences within the one trail in order to provide variation and interest; i.e. change in views, landscape variation and meandering alignments along creek corridors and waterways
- Consider interpretive signage where appropriate, that educates, informs and entertains through interpretation of local history, flora, fauna, cultural heritage, etc.
- Consider public art along key journeys that is relevant to, and enhances the specific setting
- Work with local artists and community groups to deliver wayfinding and legibility at key locations in interesting and site specific ways

5.2.3 SIGNAGE

Signage is a key component in creating a legible public realm and a positive user experience of the network. Good signage is intuitive, informative and consistent. Signage is a fundamental part of creating a well utilised and easily accessible walking and cycling network.

A co-ordinated and comprehensive signage strategy should provide safety and regulatory, education and awareness directional, and interpretive information.

KEY CONSIDERATIONS

Style considerations include;

- To create a consistent graphic branding and style across the entire network that also allows place specific variations, relating to local place identity and type of linkage - regional, strategic, local, etc.
- Signage should be of a limited number of types and styles, making maintenance and replacement easier, and assisting in creating a sense of place
- Signage material should be designed to be robust for longevity and to avoid vandalism
- Use simple and concise information and language to guide both locals and visitors
- Text and imagery should be large, clear and legible for all users
- Information shown on signage should be at a height that is easy to read for walkers, cyclists and people in wheelchairs
- Signage should display the name of the path as well as the direction and distance to particular destinations along the path - landmarks, major community destinations, parklands, suburbs, waterways, public toilets and trails and public transport

Placement & Purpose considerations include;

- Consider opportunities to incorporate technology such as wi-fi zones, phone charge stations (solar), scannable information (QR codes) to tell users about the network, as well as recording their experiences
- Directional signage is particularly important on off-road networks where street signs and other navigational landmarks may not be present.
- All off road path networks should have directional signage incorporated into the design
- Locate directional information at regular intervals as well as at key junctions between paths and at intersections with roads

5.3 AWARENESS, PROMOTION AND EDUCATION

In addition to providing the trails and infrastructure there should be a considered strategy to strengthening walking and cycling participation in Cardinia Shire. Getting people active requires active promotion and education of the opportunities available for local participation.

5.3.1 PROMOTION

KEY CONSIDERATIONS

- Use Council's marketing resources (including Council's Connect magazine and website) to promote walking and cycling to local residents and visitors
- Educate and regularly updating the community about new or upgraded walking and cycling facilities
- Explore new-technology opportunities such as smart-phones, Google maps and GPS to promote walking and cycling routes
- Integrate walking and cycling network promotion with an overall tourism strategy
- Develop and promote the diversity of different trail themes or features of local landscape settings
- Link with cycling event support in Victoria including: Ride to Work and Ride to School events, annual Bike Week events, racing events in both rural and urban areas, and organised bicycle tours and rides
- Expand the promotional program to encourage different demographics and abilities into regular walking and cycling
- Prepare and distribute easy to follow route maps/ brochures (also online),identifying distance, likely travel times, accommodation options, shops, points of interest, interpretation of the culture, history, and environment, the grade/ standard of the trail, car parking, as well as public transport options for accessing the routes

5.3.2 EDUCATION

- Continue to implement, evaluate and update regular 'Share the Road' activities to encourage mutual respect among road users
- Foster increased walking and cycling to schools through education programs with parents and students, including school based bike education programs and existing programs such as the 'Ride2School Day' and the use of Stop and Drop Zones. These zones allow parents to drop their children off at a safe spot. The child can then walk independently along a safe, supervised route to school. (There are 20 Stop & Drop Zones across Cardinia Shire)
- Integrate with programs run by the State Government and walking and cycling agencies such as Victoria Walks and the Bicycle Network

5.4 ALL ABILITIES ACCESS

5.4.1 ALL ABILITIES ACCESS

The vision for the Pedestrian and Bicycle Strategy outlines the importance of providing opportunities for people of all physical abilities to utilise the trail network.

Given the sections of steep topography in the Shire, not all paths will be suitable for all abilities access. However a higher level of supporting infrastructure should be considered elsewhere and developed accordingly.

KEY ACTIONS

- When undertaking detailed design of the proposed trails considered suitable for all ability access, engage a qualified consultant to review all documents in conjunction with the Pedestrian and Cycle DDA framework endorsed by Councils Access and Inclusion Advisory Committee
- Identify opportunities within the existing trail network to create circuits for people with limited mobility. Implement improvements to create these circuits and provide appropriate promotion material to the community
- In town centres and along key strategic and regional routes, provide traffic signals that sense when people are crossing. The Puffin is such a system and by sensing when people are on the crossing, ensures users are given enough time to safely clear the crossing
- Review streetscapes within the priority pedestrian areas to ensure footpaths, kerb ramps and other infrastructure meet DDA compliance
- Provide increased directional and distance information, giving people with limited mobility the information they need to make choices about using the network
- Signage design should consider users on mobility scooters and wheelchairs by providing information at the right height
- Provide more frequent seating along identified routes
- Provide wheelchair friendly furniture and park equipment at locations along this network, such as BBQ's, picnic tables, swings, drinking fountains, play equipment, etc.
- Consider scooter and wheelchair charge stations in appropriate locations in town centres

5.5 OTHER ACTIONS

The following table identifies the actions required to implement the infrastructure that supports the walking and cycling network These actions are categorised under network and infrastructure elements outlined in Chapter's 4 and 5.

ACTION	ACTION DESCRIPTION	CONSIDERATION(S)	PRIORITY	RESPONSIBLE AGENCY
NETWORK				
Pedestrian Priority Area Assessments	Undertake assessment of Priority Pedestrian Areas to identify key issues for pedestrian access and potential projects	The audit should focus on; ■ Footpath width and quality ■ DDA compliance ■ Shade and shelter ■ Surveillance ■ Vehicle speed and separation ■ Intersection priority and waiting times	High	Cardinia Shire Council
Growth Areas	Undertake assessment of Growth Areas to identify key issues for pedestrian and bike access, movement and connectivity	■ Ensure links within Precinct Structure Plan areas are integrated into existing network ■ Ensure consistency of infrastructure between growth areas ■ Investigate opportunities to bring forward funding for high priority sections of the network that have an existing demand i.e. Princes Highway shared path	High	Cardinia Shire Council
Wider network integration		■ Liaise with neighbouring municipalities to investigate feasibility of network integration i.e. connections in Berwick and Belgrave ■ Work with neighbouring Councils and advocacy bodies to develop funding proposals for trails that traverse municipal boundaries and provide regional connections	Medium	Cardinia Shire Council
Detailed design	In order to implement the proposed paths detailed design of the paths will need to occur	■ Detailed design of the path ■ Appropriate location of water fountains, shading, seating and safe crossing points ■ Community consultation will be undertaken to seek community feedback on suggested locations	Medium	Cardinia Shire Council

ACTION	ACTION DESCRIPTION	CONSIDERATION(S)	PRIORITY	RESPONSIBLE AGENCY
SIGNAGE & WAYFINDING				
Signage & Wayfinding Strategy	Develop a signage and wayfinding strategy for the walking and cycling network.	■ Approaches to signage for different path hierarchies i.e. Regional Trails, Strategic Links, Pedestrian Priority Areas ■ Opportunities for signage to express local sense of place ■ Integration of signage between Council managed land and State Government land ■ Opportunities for public art and interpretive signage along particular trails	Medium	Cardinia Shire Council
COMMUNICATION & PROMOTION				
Signage & Wayfinding Strategy	Develop a Walking and Cycling Trail Strategy to promote and education the community about the walking & cycling opportunities within Cardinia Shire	■ Develop brochures outlining walking and cycling routes across the shire. Building on the existing Cardinia Shire Walk Guide. ■ Consider promotion of routes on other websites such as walkingmaps.com.au	Medium	Cardinia Shire Council
ALL ABILITIES ACCESS				
DDA Compliance	Undertake a review of existing trails across the Shire to identify the trails that could be improved to become destinations for all abilities access.	The review should consider: ■ Topography ■ Opportunities to re-grade paths and ramps ■ Existing path surfaces ■ Opportunities to create circuits of suitable distances ■ Provision of other infrastructure that supports all abilities access	Medium	Cardinia Shire Council
DDA Compliance Advice	Engagement of a DDA compliance expert to assess projects proposed by Council and developers	■ Assessment will be based on outcomes of DDA Compliance Review	Low (DDA review & detailed design to be undertaken first)	Cardinia Shire Council

ACTION	CONSIDERATIONS	PRIORITY	RESPONSIBLE AGENCY
BEACONSFIELD TO EMERALD TRAIL			
Investigate the feasibility of the design and construction of the Beaconsfield To Emerald Trail	Investigate the viability of a connection between Chadwick Road and Foott Road	Medium	Cardinia Shire Council
	Investigate the feasibility of accommodating a shared path within the Inglis Road reservation	Medium	Cardinia Shire Council
	Investigate a potential partnership with City of Casey to deliver an off road trail through the Cardinia Parklands	Medium	Cardinia Shire Council & City of Casey
	Investigate the feasibility of an alignment of a shared path in the Beaconsfield to Emerald Road reserve in the areas of steep grade in the northern part of the Shire	Medium	Cardinia Shire Council
	Investigate the potential for public access through the Cardinia Reservoir, as well as the provision of an off road shared path through the Reservoir	Medium	Melbourne Water
EASTERN DANDENONG RANGES TRAIL			
Undertake detailed design for the Eastern Dandenong Ranges Trail	Investigate if north and south options through Wright Forest are necessary	Very high	Cardinia Shire Council
	Investigate if there is a need to provide a connection from Emerald to Belgrave (to link to the existing network of trails throughout the Dandenong Range)	Very high	Cardinia Shire Council
CARDINIA AQUEDUCT TRAIL			
Undertake the feasibility of the design and construction of the proposed sections of the Cardinia Aqueduct Trail	Investigate the most appropriate trail alignment within the creek corridors with consideration of environmental sensitivity	High	Cardinia Shire Council
	Investigate the feasibility of the proposed link between Toomuc Valley Road and the Aqueduct Trail through private property with consideration of the provision of direct access and the steep grade	High	Cardinia Shire Council
	Investigate the feasibility of continuing the current alignment from where it currently ends on Dickie Road with consideration that some sections of the road reserve have more than a 10% slope	High	Cardinia Shire Council
	Investigate the feasibility of the Dickie Road reservation accommodating a 2.5m trail, with consideration of the potential need for some tree clearing	High	Cardinia Shire Council
	Investigate the feasibility of the east west connection along Mullane Road and the transmission easement	High	Cardinia Shire Council
	Investigate the most appropriate car park location on the western side of the trail (and any additional car parking requirements)	High	Cardinia Shire Council

ACTION	CONSIDERATIONS	PRIORITY	RESPONSIBLE AGENCY
PRINCES FREEWAY TRAIL			
Investigate the feasibility of the design and construction of the Princes Freeway Trail	Investigate the feasibility of continuing the trail from Beaconsfield further west to Berwick. This would provide a western connection into Melbourne, possibly via the Monash Freeway and onto the Scotchman's Creek Trail and the Gardner's Creek Trail.	High	Cardinia Shire Council
	Investigate the funding opportunities for the provision of new pedestrian crossings over the Freeway with consideration of using adjacent PSP areas as the triggering mechanism for funding	High	Cardinia Shire Council
	Liaise with VicRoads to coordinate the upgrading of existing pedestrian infrastructure along regional and strategic path route	High	Vic Roads
	Investigate the potential to attract visitors from the Great Southern Trail (which starts further south in Leongatha) to Cardinia via the Southern Rail Trail	High	Cardinia Shire Council & South Gippsland Council
PRINCES HIGHWAY TRAIL			
Investigate the feasibility of the design and construction of the trail along the Princes Highway	Prioritise the construction of the missing pieces of shared path trail along the Princes Highway	Very high	Cardinia Shire Council
	Prioritise the implementation of signage to inform users of the status of the path	Very high	Cardinia Shire Council
	Investigate the feasibility of starting the trail at Deep Creek to provide a link between the Pakenham East PSP area and Pakenham	Very high	Cardinia Shire Council
GROWTH CORRIDOR TO SOUTH LINK			
Investigate the feasibility of the design and construction of the link between Pakenham and the southern townships	Investigate how the alignment between Pakenham Town Centre and Koo Wee Rup (approximately 16kms) can be enriched, possibly through landscape features, as a long, straight alignment along Koo Wee Rup Road may be perceived as uninteresting	Low	Cardinia Shire Council
	If the alignment remains along Koo Wee Rup Road investigate the feasibility of a constructing a path adjacent to the drainage corridor with consideration of the difference in levels between corridor and road which has high volumes of high speed, heavy vehicle traffic	Low	Cardinia Shire Council

ACTION	CONSIDERATIONS	PRIORITY	RESPONSIBLE AGENCY
PAKENHAM TO RAILWAY TOWNS TRAIL			
Investigate the feasibility of the design and construction of the Pakenham to Railway Towns Trail	Investigate the alignment of the trail along the railway with consideration of; - the northern side providing elevated views across the southern agricultural landscape - a better cycle friendly experience on a lower order road	High	Cardinia Shire Council
	The need for signage along the trail informing users of the approximate distances to next attraction and town centre	High	Cardinia Shire Council
	Investigate the feasibility of a connection running between Hope Street and McNamara Road along Tea Tree Creek with consideration of access to private land and the potential for land acquisition	High	Cardinia Shire Council
	Determine whether there is the potential for future demand to continue the trail further east to Longwarry and Warrigal	High	Cardinia Shire Council
CARDINIA CREEK TRAIL			
Investigate the feasibility of the design and construction of the Cardinia Creek Trail	Design, development, construction and maintenance of the trail should not impact on the sensitive conservation areas and the habitat of all species located along the creek corridor	Medium	Cardinia Shire Council
	Confirm the location of the proposed regional park to be delivered as part of the McPhersons PSP to ensure there is connection between the park and the trail	Medium	Cardinia Shire Council/VPA
	Investigate where to locate pedestrian and cycling crossing points between City of Casey and Cardinia Shire	Medium	Cardinia Shire Council
	Determine whether there is the potential for future demand to continue the trail further east to Longwarry and Warrigal	Medium	Cardinia Shire Council
SOUTHERN RAIL TRAIL			
Investigate the feasibility of the design and construction of the Southern Rail Trail	Investigate the potential to attract visitors from the Great Southern Trail (which starts further south in Leongatha) to Cardinia via the Southern Rail Trail	Low	Cardinia Shire Council
MAIN DRAIN TRAIL			
Investigate the feasibility of the design and construction of the Main Drain Trail	Investigate the optimal location for the trail along the drain corridor, with particular consideration of potential flooding constraints, as well as using alignments that capture the sweeping views across the surrounding agricultural landscapes	Low	Cardinia Shire Council
	Consider meandering the trail through existing vegetation to create a diversity of views and experiences	Low	Cardinia Shire Council

6. APPENDIX

Appendix 1

Network Summary Table

Appendix 2

Strategic Township Maps

Appendix 3

Pedestrian Access Analysis

APPENDIX 1 - REGIONAL NETWORK SUMMARY TABLE

The Regional Network Summary Table identifies the proposed Regional Trails required to implement the walking and cycling network. The table identifies the link name and location, the hierarchy of path, the type of path, surface, width and indicative costs.

A number of the projects are included within Precinct Structure Plan areas. It is expected these links will be delivered over time and funded by developers through the Development Contributions Plan associated with the Precinct Structure Plan.

It is important to note that a number of the projects will require further investigation to determine their feasibility. The costings opposite only represent indicative constructions costs. Feasibility studies, including detailed costings will need to be undertaken as the next stage of implementation, particularity in the north of Cardinia Shire where there are areas of challenging topography.

All costs identified in the table are indicative only and based on similar construction costs of projects undertaken by Council.

The paths proposed in this strategy will require funding from Council for ongoing maintenance after they have been constructed. For gravel paths the approximate cost is 10% of the initial capital cost per annum. For concrete paths the approximate cost is 5% of the initial cost per annum.

CRITERIA FOR ALLOCATING PRIORITY

The Network Summary Table identifies the new network links and upgrades required to implement the proposed walking and cycling network. Each project is allocated a priority which is based on how the proposed link responds to the following criteria:

- Strategic Importance - The value of the link in connecting major destinations and facilities locally, and across the Shire
- Safety - Likely improvements to pedestrian and cyclist safety when the new link is provided
- Usage - Whether there is an existing need for the link based on surrounding population of residents and workers or visitors
- Community - The potential social benefits arising from the implementation of the connection and the community demand for the link
- Cost-benefit - The likely cost of the project and the potential benefit to the community based the elements above

(See over page for Regional Network Summary Table)

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Path Number	Path Name	Origin to Destination	Purpose	Trail Type	Material	
1	**Beaconsfield to Emerald Trail**	Beaconsfield Reserve to Emerald Township	Provides a link between the northern hills townships and the central growth corridor areas	Shared path	Combination of sealed & unsealed	1) ***Topogr*** 2) ***Creek c*** Chadwick
2	**Eastern Dandenong Ranges Trail**	Emerald Township to Gembrook Township	The trail provides the missing sections between the existing Eastern Dandenong Ranges Trail, the Emerald Lake Park walking trails, Avonsleigh, Cockatoo Wright Forest, the Boundary Tracks and the proposed Cockatoo to Gembrook Open Space linkage.	Shared path	Combination of sealed & unsealed	1) ***Topogr***
3	**Cardinia Aqueduct Trail Loop**	The Cardinia Aqueduct Trail creates a circuit that connects the Princes Freeway Trail, Officer, the existing Cardinia Aqueduct Trail, Upper & Lower Gum Scrub Creek Trails, Toomuc Creek Trail, Kennedy Creek Trail and the Deep Creek Trail	The trail connects the central growth areas of Pakenham and Officer creating a recreational circuit for cyclists and keen walkers.	Shared path	Combination of sealed & unsealed	1) ***Rail &*** Ave, Offic 2) ***Road &*** Parade an 3) ***Waterc*** Aqueduct 4) ***Road cr*** east along Way 5) ***Road cr*** 6) On the to 10% 7) The ***ave*** slope of 1
4	**Deep Creek Trail**	Aqueducts trail to Pakenham East and Princes Highway	The trail extends the proposed Cardinia Aqueduct Loop east, connecting the Aqueduct Loop, the Pakenham East PSP area, the Railway Towns Trail and the Princes Freeway Trail	Shared path	Combination of sealed and unsealed	1) Creek c 2) Road Cr 3) Road Cr 4) Creek C High topo
5	**Princes Highway Trail**	Beaconsfield to Pakenham East	Adding the missing sections to this trail will provide walkers and cyclists with a continuous connection between Deep Creek, Pakenham East PSP in the east, through Pakenham to Beaconsfield and Berwick in the west and therefore connections through to the city.	Shared path	Sealed	1) ***Water*** 2) ***Road cr*** 3) ***Road cr*** 4) ***Road cr*** 5) ***Road cr*** 6) ***Road cr*** 7) ***Road cr*** 8) ***Road cr*** 9) ***Water*** 10) ***Water*** 11) ***Road*** 12) ***Road*** 13) ***Road*** 14) ***Road*** 15) ***Road*** 15) ***Road*** 16) ***Road*** 17) ***Road*** 18) ***Road***

Constraints (Topography & Crossings)	Length (approx km)	Approximate Cost	Priority low = 15 years+ medium = 10 -15 years high = 5 - 10 years very high = 0 - 5 years	Land Acquisition	Wider Network Connectivity
aphy ranges from medium to extreme average slope ***rossing*** required across Cardinia Creek at Inglis Road & Road	30km	$15 - 20 million*	Medium	N/A	Potential future link to Belgrave Railway Trail (via Clematis and Menzies Creek)
aphy ranges from medium to high average slope	11km	$2.5 million*	Very high (Costings complete, detailed design currently being completed, construction expected to commence 2017/2018)	Acquisition of private land will be necessary	Potential to link to Menzies Creek and Belgrave (dependant on discussions with Yarra Ranges Shire Council). This path will link with the proposed Emerald to Beaconsfield trail.
Watercourse crossing at Lower Gum Scrub Creek at Bellerive er ***Watercourse crossing*** over Princes Highway, between Arena d Heatherbrae Recreation Reserve ***ourse crossing*** over Toomuc Creek at entrance to Cardina Trail at Toomuc Valley Road ***rossing*** across Toomuc Valley Road when coming from the g the transmission easement to the north of Pomegranate ***rossing*** over Brown Road Cardinia Aqueduct Trail the average slope ranges from 2.2% ***erage slope*** of connecting trails ranges from flat to an average 1.5%	5.5km	Between $5 - 8 million*	High	Acquisition of private land will be necessary to provide access from Toomuc Valley Road to Cardinia Aqueduct Trail via existing trails	Connects to the Princes Freeway Trail, Pakenham to Railway Towns Trail, the Deep Creek trail and various strategic trails including the Princes Highway Trail and the Pakenham East PSP bikeways and shared paths
rossing over Kennedy Creek rossing Army Road rossing Princess Highway Crossing Deep Creek. graphy constraints.	10km	$8 - 12 million*	Low	Property acquisition required. Part delivered by Pakenham East PSP.	Links to Aqueduct loop, Princes Highway, Princes Freeway and Pakenham East PSP.
course crossing over Deep Creek ***rossing*** at Army Road ***rossing*** at Ahearn Road ***rossing*** at Deveney Street ***rossing*** at O'Shanessy Street ***rossing*** at Guest Street ***rossing*** at Thewlis Road ***rossing*** at Majestic Drive ***course crossing*** at Lower Gum Scrub Creek ***r course*** crossing at Officer Creek ***crossing*** at Bayview Road ***crossing*** at May Road ***crossing*** at O'Neil Road ***crossing*** at Glismann Road ***crossing*** at Lyle Avenue ***crossing*** at Ann Street ***crossing*** at George Street ***crossing*** at Stella Street ***crossing*** upgrade at Beaconsfield - Emerald Road	15km	Between $1.5 - 6 million*	Very high	Alignment primarily through the Princes Highway corridor will require discussions with VicRoads. Some sections will require upgrading existing footpath to shared path.	Potential to extend the trail to the west to Berwick and further west to existing trail that link to the CBD

Path Number	Path Name	Origin to Destination	Purpose	Trail Type	Material	
6	**Princes Freeway Trail**	Cardinia Creek Trail to Ryan Road	The trail provides walkers and cyclists with a safe connection through the growth corridor areas. The trail provides a connects the Railway Towns Trail to the Cardinia Aqueduct Trail and the Cardinia Creek Trail. It will also support the Cardinia Road Employment Precinct and Pakenham East areas as they develop	Shared path	Sealed	1) ***Road cr*** 2) ***Water*** of the Car 3) ***Water*** Cardinia R 4) ***Water*** 5) ***Road cr*** 6) ***Road cr*** 7) ***Road cr*** 8) ***Road cr***
7	**Railway Towns to Pakenham Trail**	Pakenham to Bunyip	The trail provides a scenic journey between Pakenham and the townships of Nar Nar Goon, Tynong, Garfield and Bunyip	Shared path	Unsealed	1) ***Road cr*** 2) ***Rail cro*** 3) ***Water*** 4) ***Road c*** 5) ***Road c*** 6) ***Road cr*** 7) ***Road cr*** 8) ***Road cr*** 9) ***Road cr*** 10) ***Road*** 11) ***Road*** 12) ***Road***
8	**Growth Corridor to South Trail**	Connects Pakenham and Koo Wee Rup via Healesville Koo Wee Rup Road	The trail provides a safe, separated path from the high speed and heavy vehicles along Koo Wee Rup Road between Pakenham and Koo Wee Rup.	Shared path	Unsealed	1) ***Water*** Road 2) ***Road cr*** 3) ***Road cr*** 8) Road cr 4) ***Road cr*** 5) ***Road cr*** 6) ***Water*** 7) ***Road cr***
9	**Cardinia Creek Trail**	Beaconsfield Reserve to Emerald Township	The trail provides a scenic journey along Cardinia Creek and links to the proposed path network in the McPherson PSP. To start of the trail, in the north, connects into the southern end of the Beaconsfield to Emerald trail.	Shared path	Combination of sealed & unsealed	The locati there is p

Constraints (Topography & Crossings)	Length (approx km)	Approximate Cost	Priority low = 15 years+ medium = 10 -15 years high = 5 - 10 years very high = 0 - 5 years	Land Acquisition	Wider Network Connectivity
rossing over Bald Hill Road ***course crossing*** at Lower Gum Scrub Creek to the north west rdinia Road Employment Precinct ***course crossing*** at Toomuc Creek to the east of of the Road Employment Precinct ***course crossing*** over Deep Creek ***rossing*** over Healesville - Koo Wee Rup Road ***rossing*** over McGregor Road ***rossing*** over Cardinia Road ***rossing*** over Officer Road South	14km	Between $7 - 10 million*	High	Alignment primarily along the Princes Freeway corridor will require discussions with VicRoads. Some sections will be delivered as part of existing PSP.	Potential to extend the trail west to Berwick providing a connection to the CBD via the Monash Freeway, Scotchman's Creek Trail and the Gardner's Creek Trail. The trail also connects Pakenham to the Railway Towns Trail and various strategic trails including the Princes Highway Trail and the Pakenham East PSP bikeways and shared paths
rossing across Oakview Lane, Nar Nar Goon ***ssing*** at Nar Nar Goon Road (upgrade) ***course*** crossing over Ararat Creek ***crossing*** at Tynong Road ***crossing*** at Jefferson Road, Garfield ***rossing*** at Ti Tree Road, Bunyip ***rossing*** at Wattletree Road, Bunyip ***rossing*** at Nash Road, Bunyip ***rossing*** at Wattletree Road and Nash Road intersection ***crossing*** at Nash Road and A'Beckett Road intersection ***crossing*** at Pearson Street, Bunyip ***& Rail crossing*** at Railway Avenue, Bunyip	21km	$12 - 20 million*	High	Discussions required with Vic Track as the proposed path is located in the existing rail corridor.	Potential for future connection to Longwarry, Drain and Warragul
course crossing over the Bunyip River along the Koo Wee Rup ***rossing*** at Railway Road ***rossing*** through the Koo Wee Rup Bypass intersection rossing at South East Boulevard intersection ***rossing*** at Island Road ***rossing*** at Ballarto Road ***course*** crossing over Deep Creek ***rossing*** at Green Hills Road	14km	$5 - 8 million*	Low	The construction of this path is dependant on VicRoads duplication of Healesville-Koo Wee Rup Road including suitable road reserve allocation.	The southern end of this trail will link to the proposed Southern Rail Trail. The northern end of the trail will connect to the Princes Freeway Trail. The Main Drain trail starts close by in Koo Wee Rup.
on of the future regional Park is yet to be determined so otential that the location may not be aligned with the trail	13km	To be funded by future Macphersons PSP DCP - currently being finalised.	Medium	N/A	Various paths as part of the McPherson PSPCity of Casey

Path Number	Path Name	Origin to Destination	Purpose	Trail Type	Material	
10	**Southern Rail Trail**	Koo Wee Rup township to Lang Lang township	Create a scenic and safe recreational intra-town link, as well as key north, south link regional link (when connected to the Growth Corridor to South Trail)	Shared path	Unsealed	1) ***Water*** 2) ***Road cr*** 3) ***Water*** 4) ***Water*** 5) ***Road cr*** 6) ***Road cr***
11	**Main Drain Trail**	Koo Wee Rup township to Bunyip township	Creates a recreational trail through the unique, agricultural landscape between the townships of Koo Wee Rup and Bunyip	Shared path	Unsealed	1) Road cr 2) ***Water*** 3) ***Road cr*** 4) Road cr 4) ***Road cr*** 5) ***Road cr*** 5) ***Road cr***

Costing is an indicative guide based on length of path. Costing does not consider construction constraints such as topography. Detailed costings will need to be undertaken as part

Constraints (Topography & Crossings)	Length (approx km)	Approximate Cost	Priority low = 15 years+ medium = 10 -15 years high = 5 - 10 years very high = 0 - 5 years	Land Acquisition	Wider Network Connectivity
course crossing at Yallock Creek ***rossing*** at Monomeith Road ***course*** crossings across Monomeith Drain ***course*** crossing at Lang Lang River ***rossing*** at Caldermeade Road ***rossing*** at Westernport Road	10km	$7 - 10 million*	Low	The existing rail infrastructure could potentially be activated if an airport is built in the region. Any future rail trail alignment should take this into consideration	Investigate the potential to attract visitors from the Great Southern Trail in the south and future connection to Clyde in the west
rossing at Nar Nar Goon - Longwarry Road, Bunyip ***course*** crossing over Longwarry Drain/Bunyip Modella Road ***rossing*** around bridge on Little Road rossing at Nine Mile Road and Main Drain Road intersection ***rossing*** around bridge on Thirteen Mile Road ***rossing*** around bridge on Eleven Mile Road ***rossing*** at Ballarto Road	24km	$5 - 8 million*	Low	Discussions with Melbourne Water will be required.	Connects at Bunyip to the Railway to Pakenham trail. Connects at Koo Wee Rup to the Southern Rail Trail and the Growth Corridor to South Link.

t of a future feasibility study.

APPENDIX 2 - WALKING & CYCLING NETWORKS

Appendix 2 contains the Township Plan. These plans map the strategic walking and cycling networks within the Cardinia's townships. Strategic links are the major connections across townships linking people to key destinations. These plans will inform future reviews of township strategies and structure plans.

6.5.1 PAKENHAM

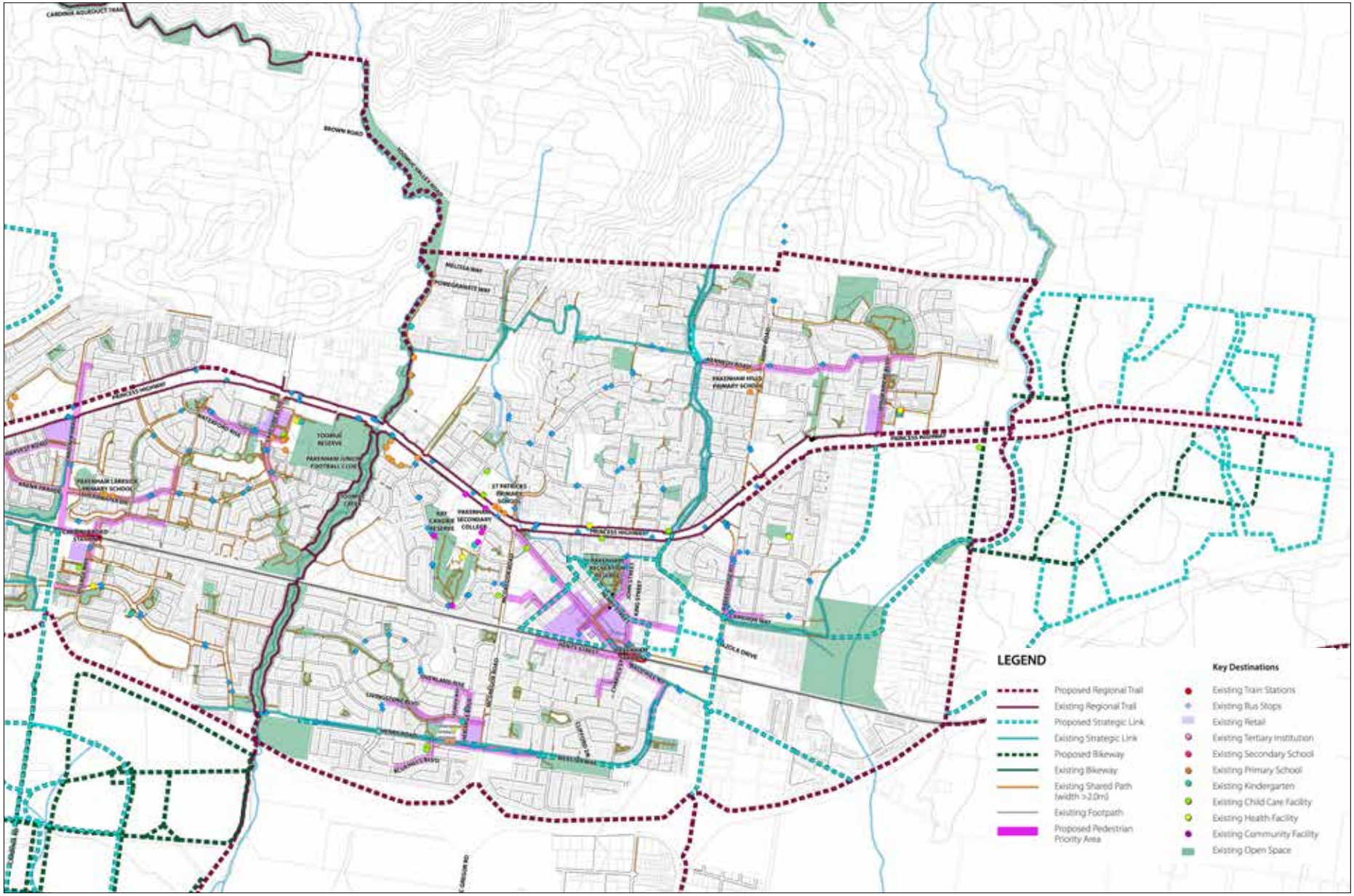

Figure 31 - Pakenham Walking & Cycling Network, January 2017.

6.5.2 OFFICER

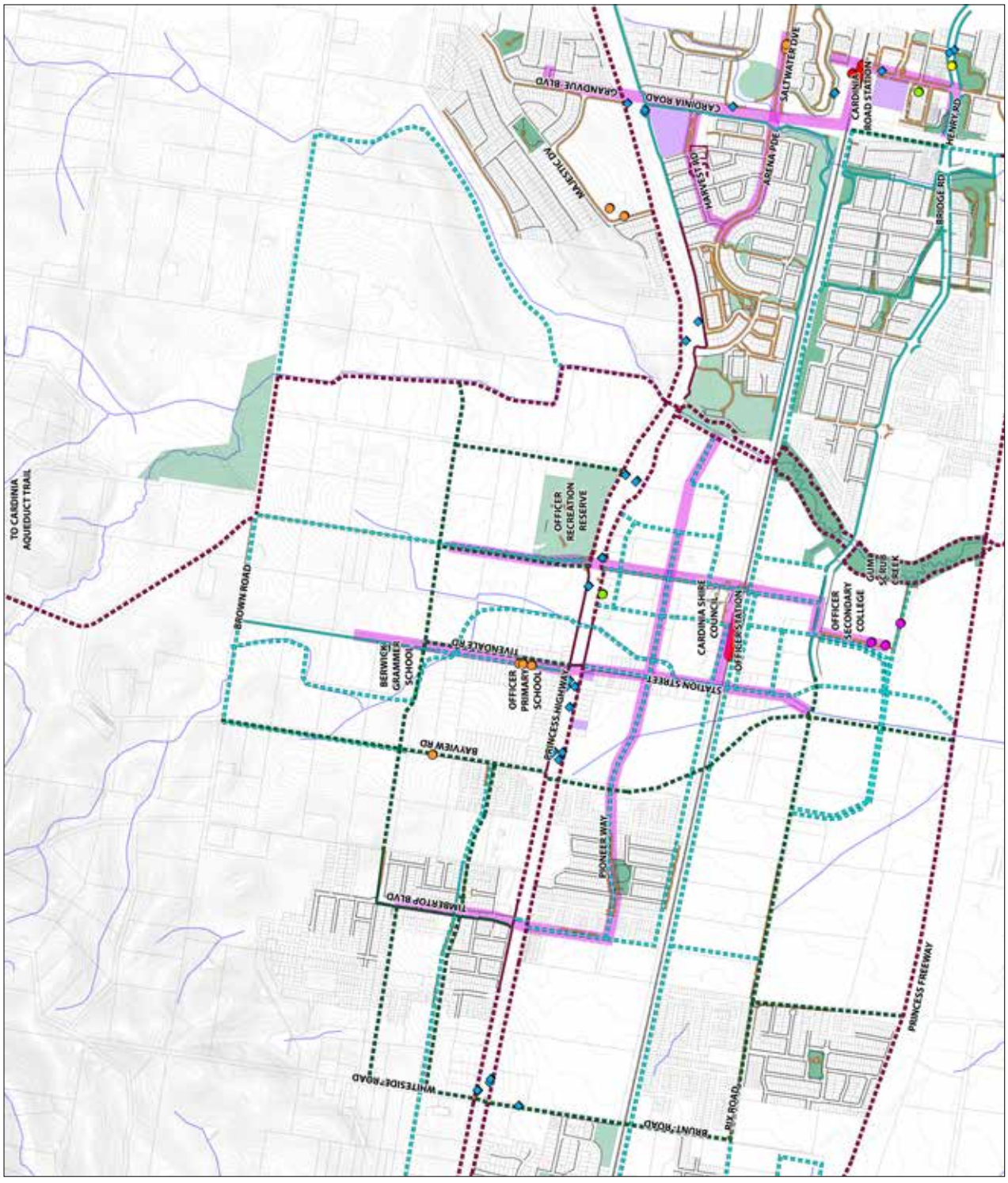

Figure 32 - Officer Walking & Cycling Network, January 2017.

6.5.3 BEACONSFIELD

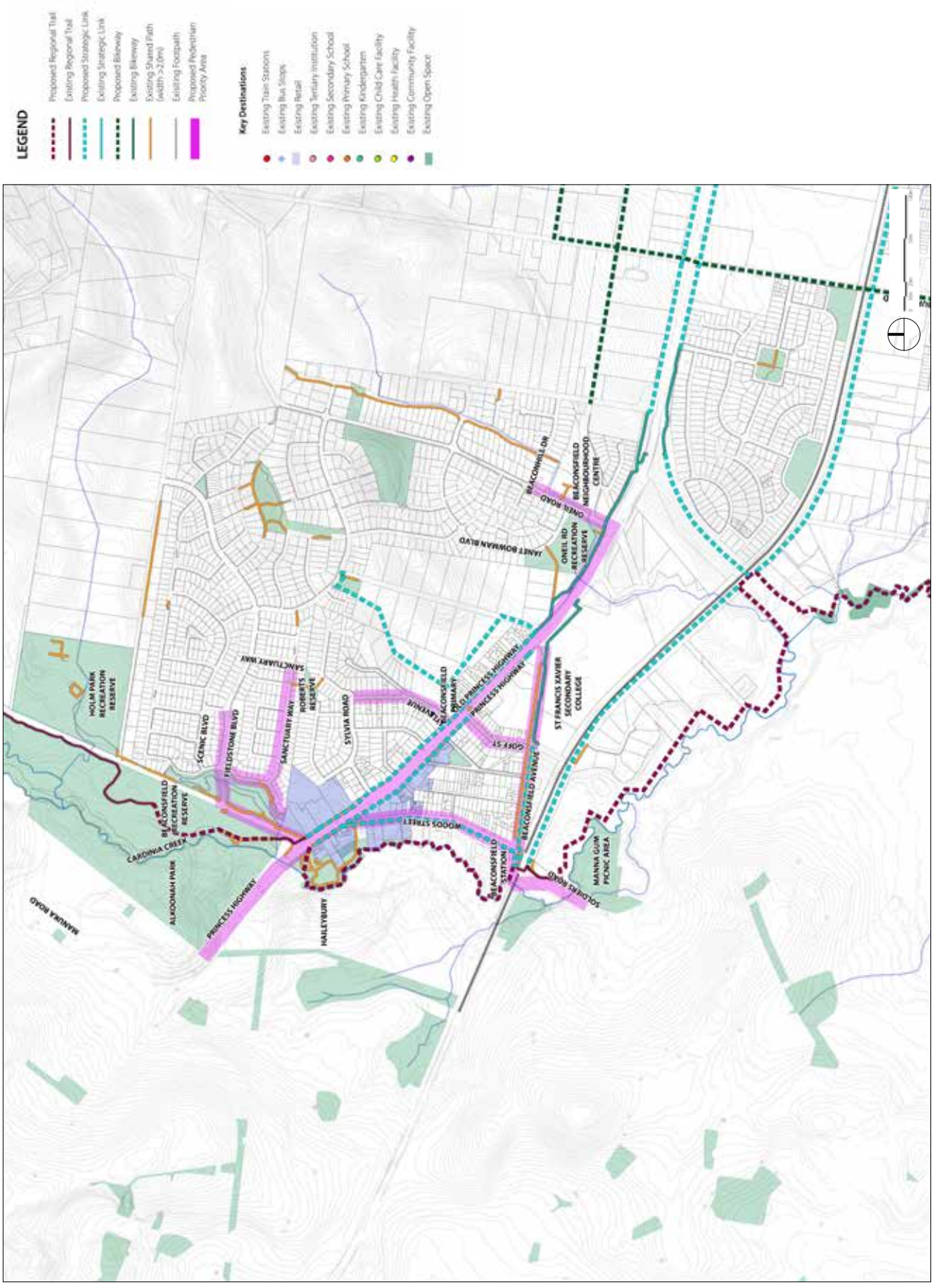

Figure 33 - Beaconsfield Walking & Cycling Network, January 2017.

6.5.4 UPPER BEACONSFIELD

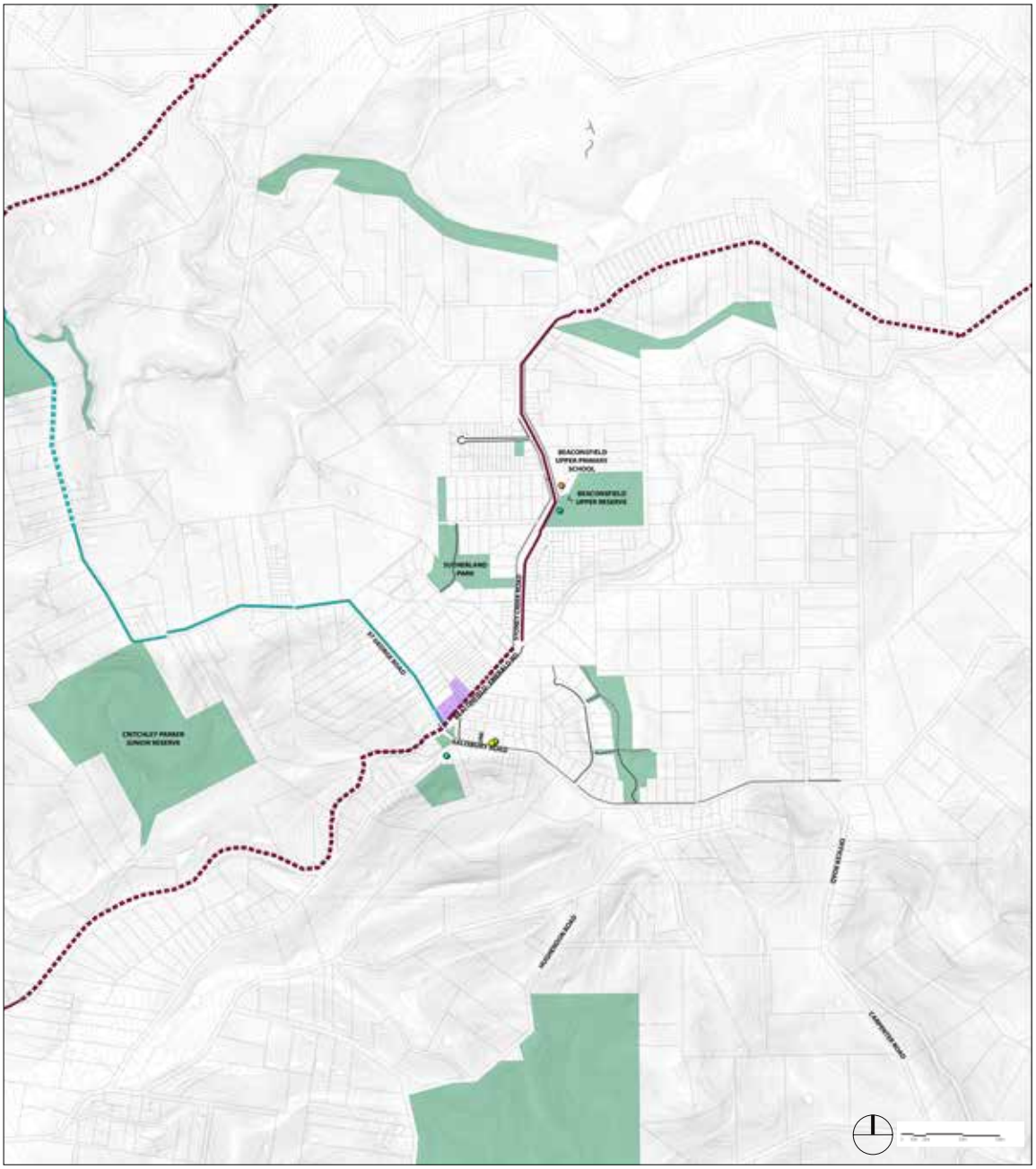

Figure 34 - Upper Beaconsfield Walking & Cycling Network, January 2017.

6.5.5 EMERALD

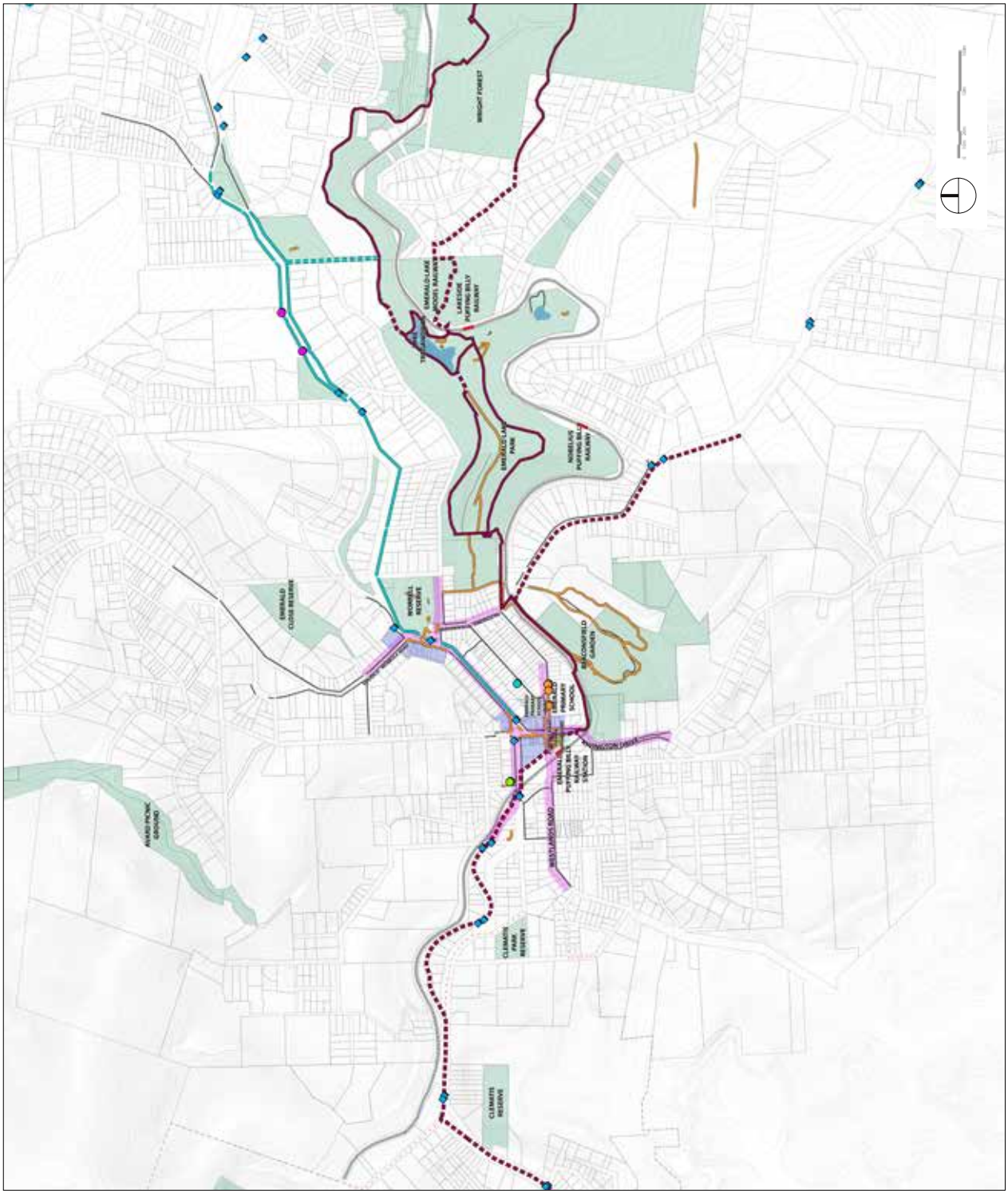

Figure 35 - Emerald Walking & Cycling Network, January 2017.

6.5.6 COCKATOO

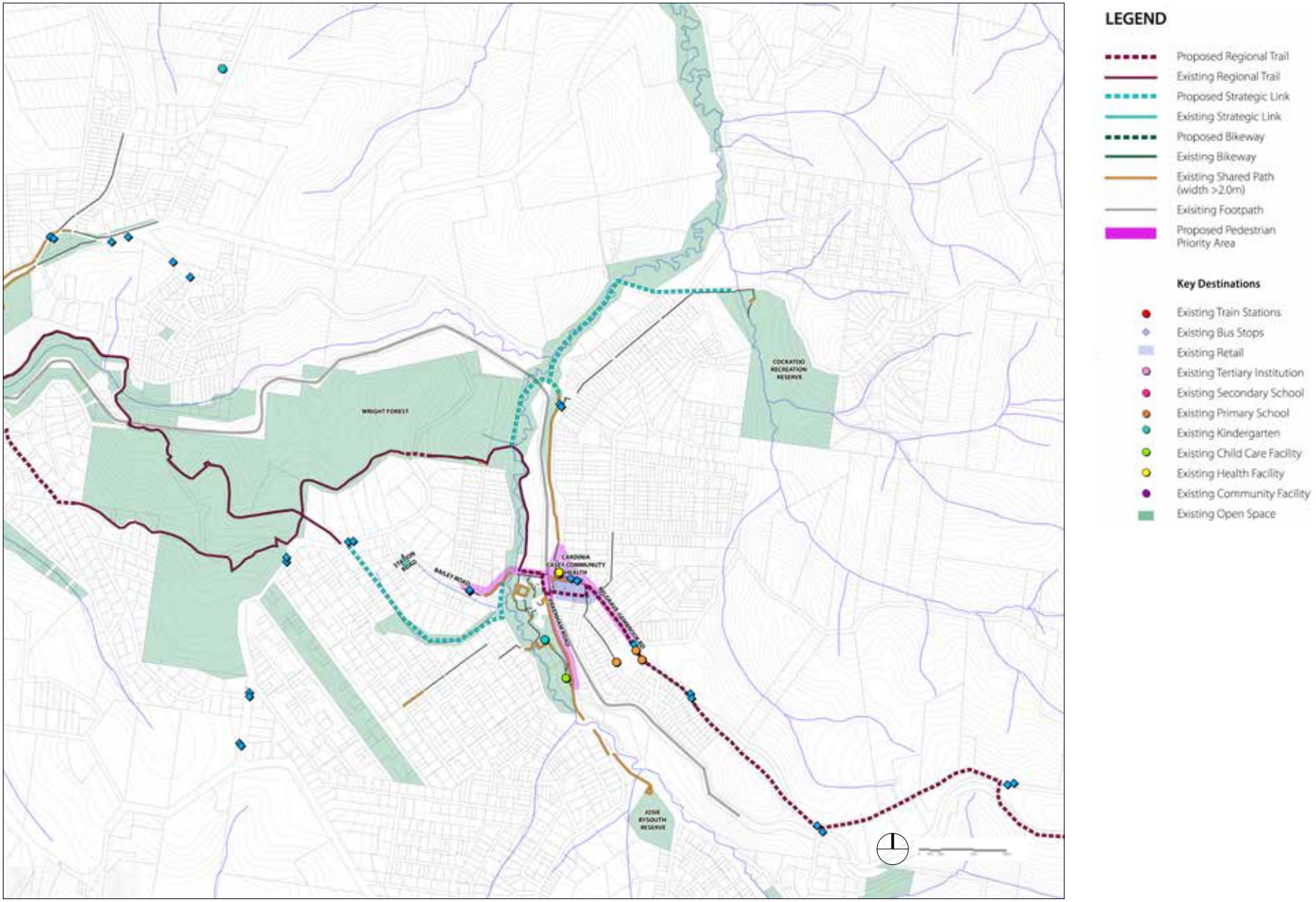

Figure 36 - , Cockatoo Walking & Cycling Network, January 2017.

6.5.7 GEMBROOK

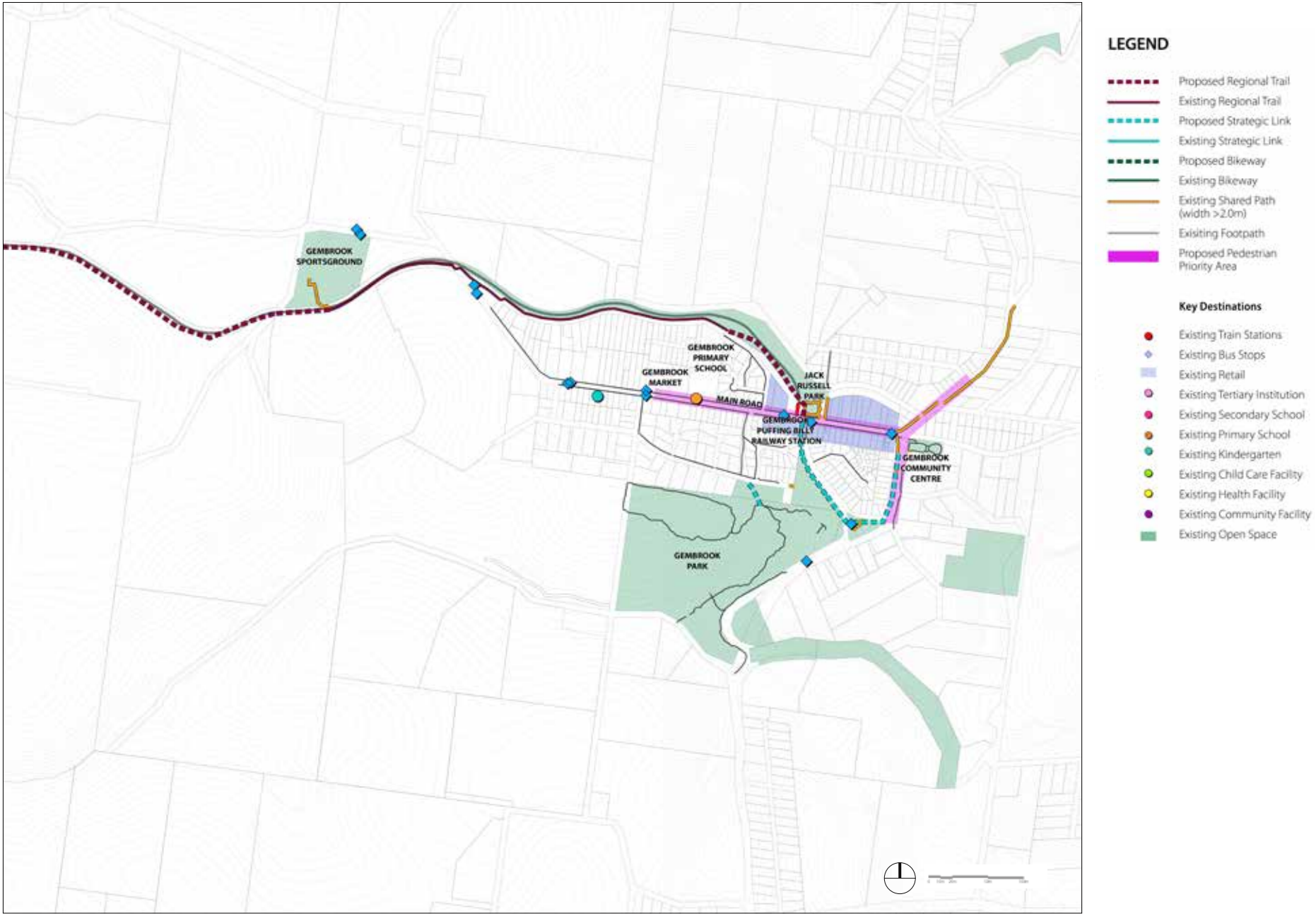

Figure 37 - Gembrook Walking & Cycling Network, January 2017.

6.5.8 NAR NAR GOON

Figure 38 - Nar Nar Goon Walking & Cycling Network, January 2017.

LEGEND

- Proposed Regional Trail
- Existing Regional Trail
- Proposed Strategic Link
- Existing Strategic Link
- Proposed Bikeway
- Existing Bikeway
- Existing Shared Path (width >2.0m)
- Exisiting Footpath
- Proposed Pedestrian Priority Area

Key Destinations

- Existing Train Stations
- Existing Bus Stops
- Existing Retail
- Existing Tertiary Institution
- Existing Secondary School
- Existing Primary School
- Existing Kindergarten
- Existing Child Care Facility
- Existing Health Facility
- Existing Community Facility
- Existing Open Space

6.5.9 BUNYIP

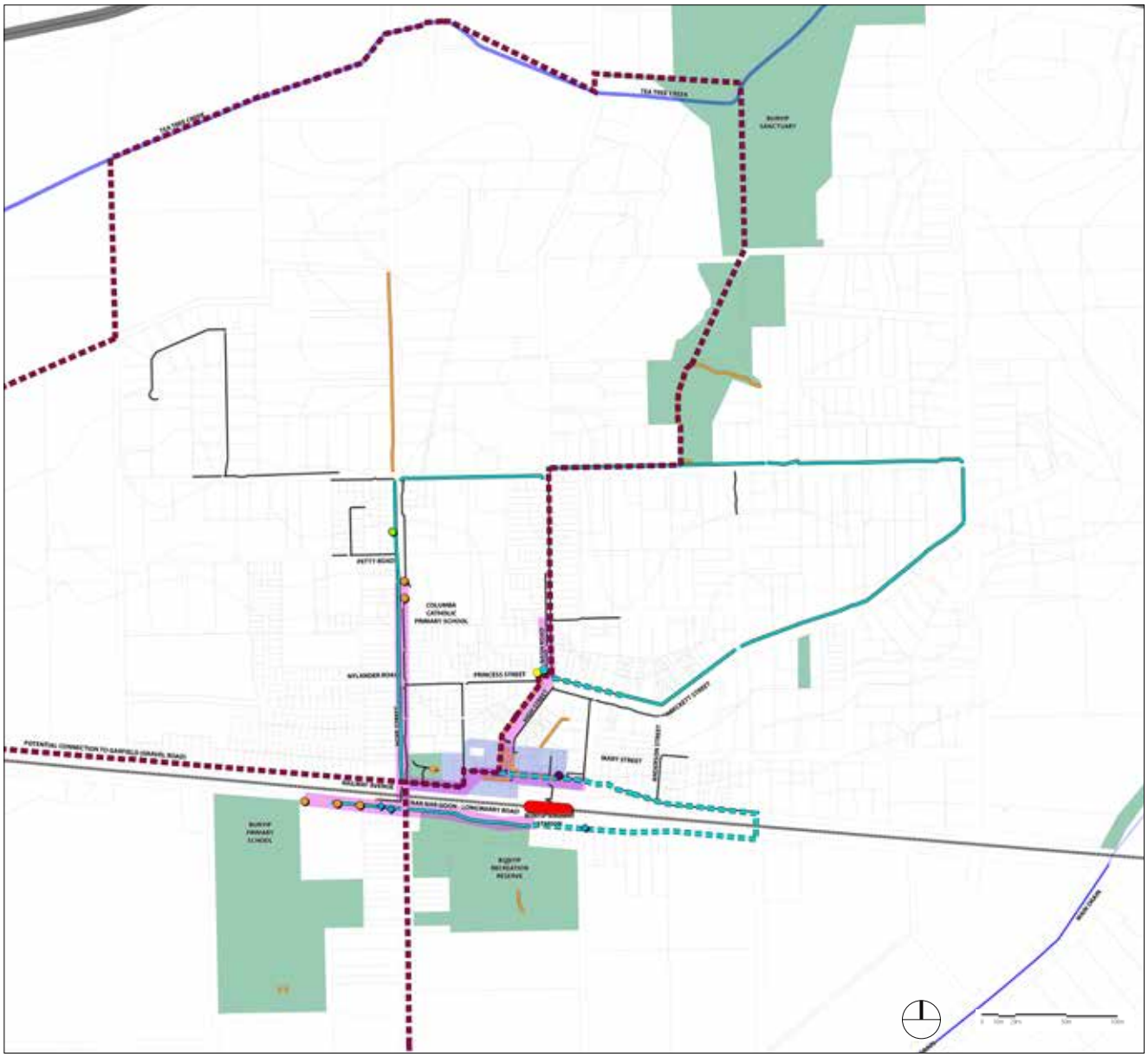

Figure 39 - Bunyip Walking & Cycling Network, January 2017.

6.5.10 KOO WEE RUP

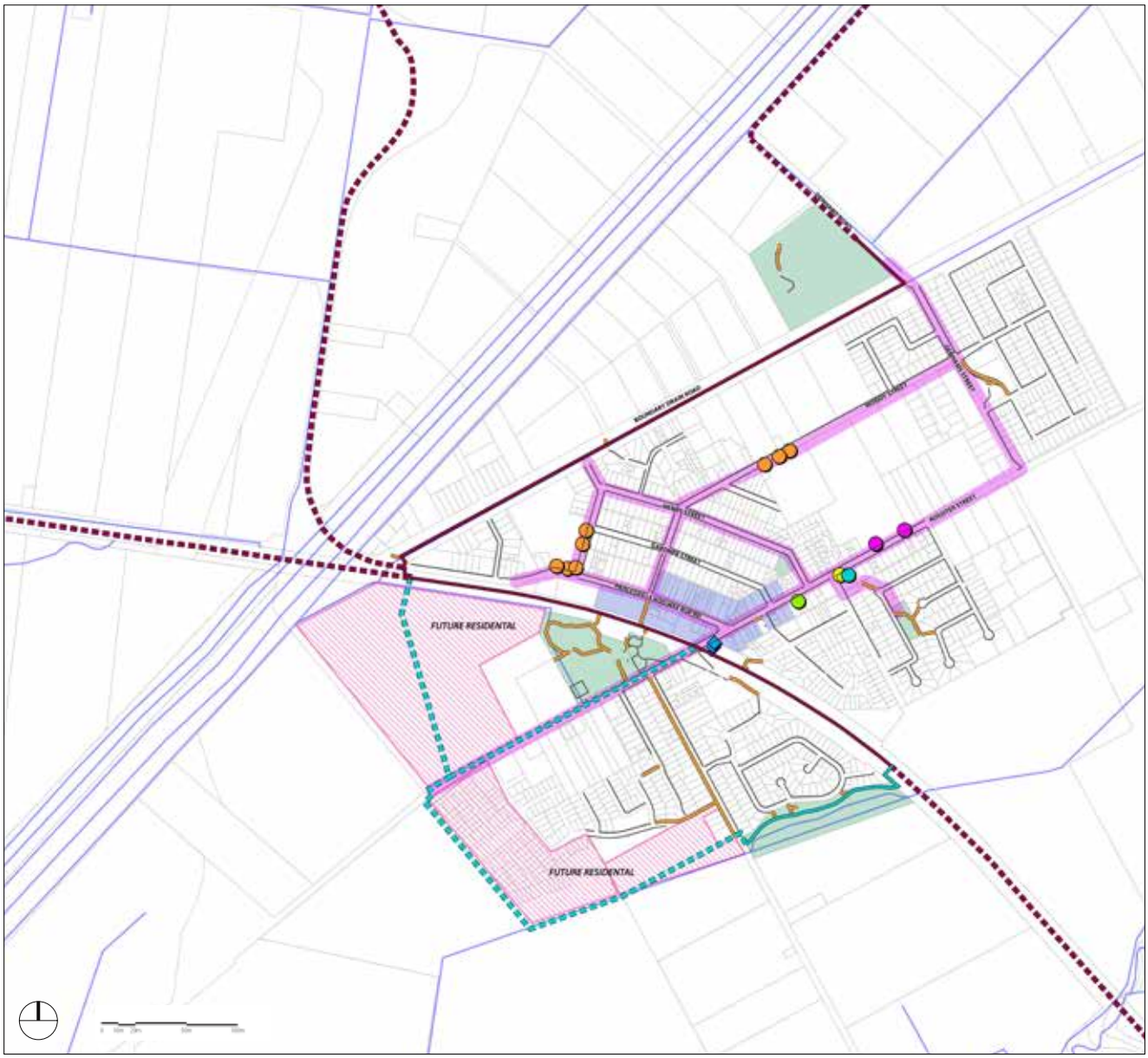

Figure 40 - Koo Wee Rup Walking & Cycling Network, January 2017.

6.5.11 LANG LANG

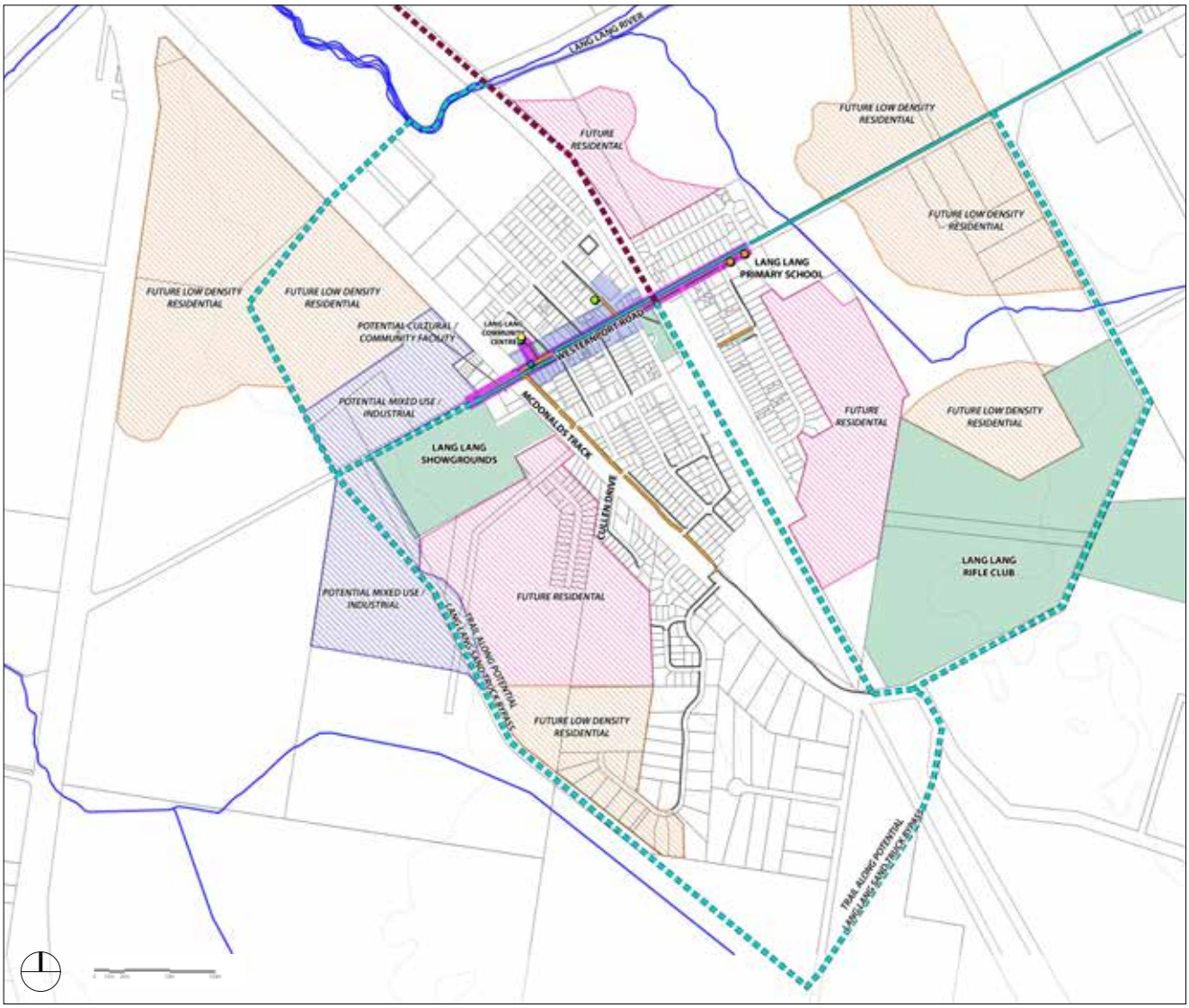

Figure 41 - Lang Lang Walking & Cycling Network, January 2017.

LEGEND

- Proposed Regional Trail
- Existing Regional Trail
- Proposed Strategic Link
- Existing Strategic Link
- Existing Shared Path (width >2.0m)
- Exisiting Footpath
- Proposed Pedestrian Priority Area

Key Destinations

- Existing Train Stations
- Existing Bus Stops
- Existing Retail
- Existing Tertiary Institution
- Existing Secondary School
- Existing Primary School
- Existing Kindergarten
- Existing Child Care Facility
- Existing Health Facility
- Existing Community Facility
- Existing Open Space

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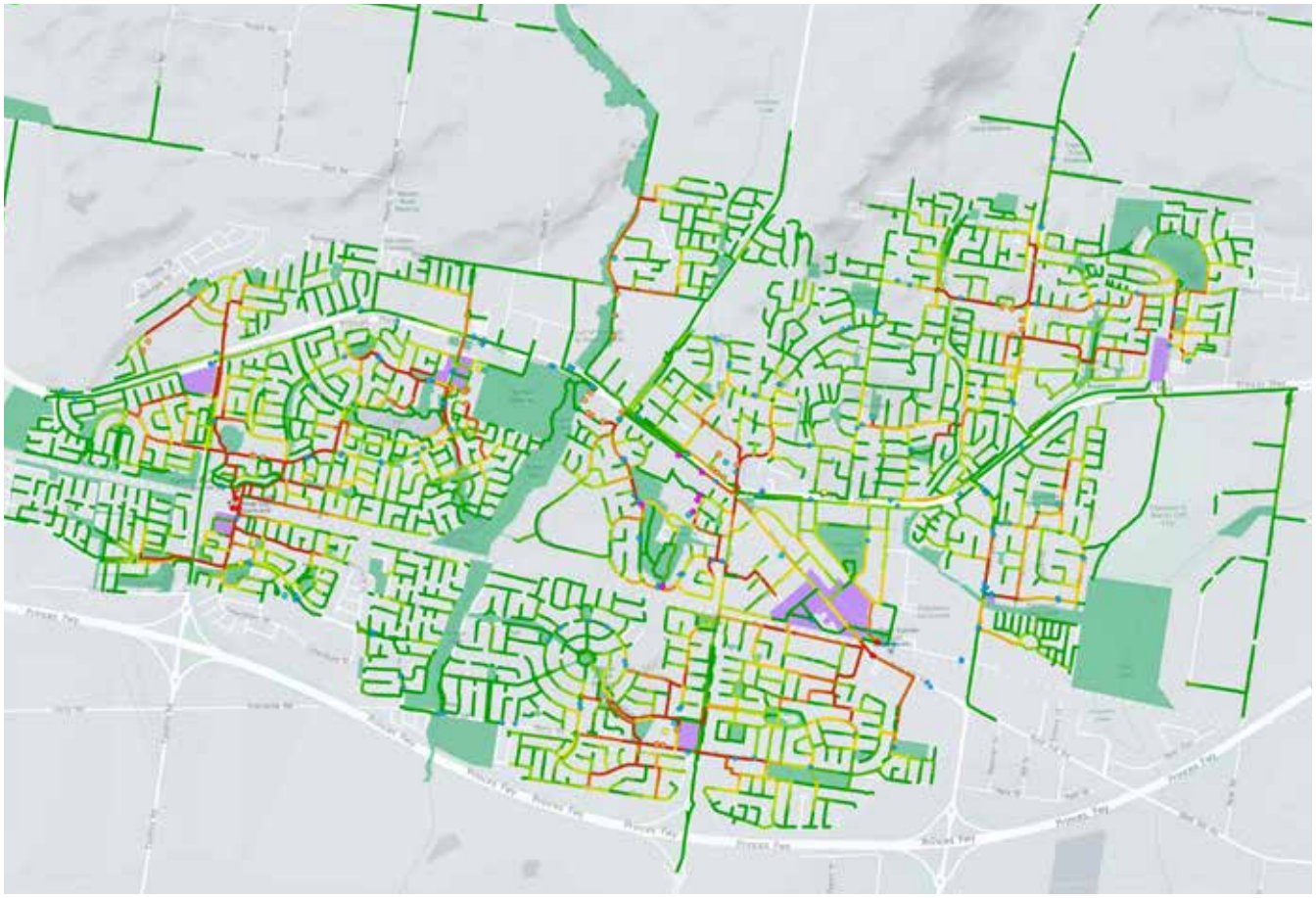
APPENDIX 3 - PEDESTRIAN ACCESS ANALYSIS

The Township Plans (Appendix 2) identify the high pedestrian activity areas for each township. The Pedestrian Access Analysis focused on these areas to show the likely pedestrian trips from surrounding residential areas to various destinations around Cardinia. The analysis has measured the numbers of potential trips along each street to all of the destinations outlined below. It is based on the shortest route between the origin (residential address) and each of the destinations.

The maps on the following pages combine and weight the routes to each destination to create an overall number of potential pedestrian trips along each street. The following weightings and walking catchments have been applied:

- Retail (1km catchment) – 100% weighting
- Train Station (1km catchment) – 100% weighting
- Bus Stops (400m catchment) – 66% weighting
- Open Space (1km catchment) – 66% weighting
- Primary Schools (1km catchment) - 100% weighting
- Secondary Schools (1km catchment) – 100% weighting
- Community Facilities (1km catchment) – 33% weighting
- Child Care (1km catchment) - 33% weighting
- Kindergartens (1km catchment) - 33% weighting
- Community health (1km catchment) -16.5% weighting.

PAKENHAM



OFFICER

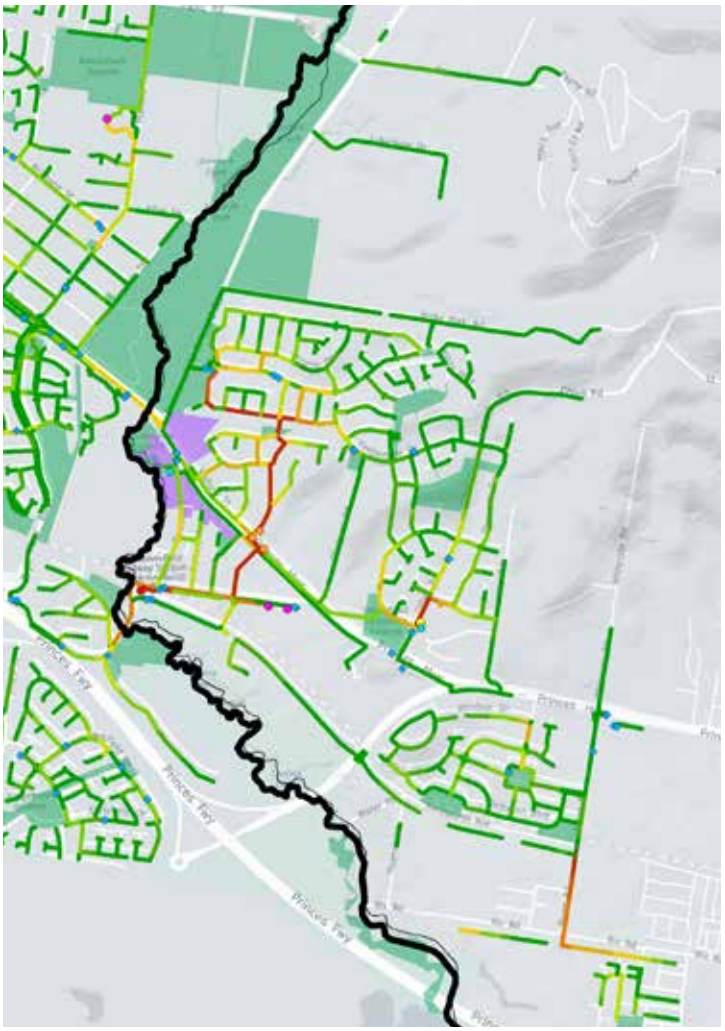
Key Destinations

- Existing Train Stations
- Existing Bus Stops
- Existing Retail
- Existing Tertiary Institutions
- Existing Secondary School
- Existing Primary School
- Existing Kindergarten
- Existing Child Care Facilities
- Existing Health Facilities
- Existing Community Facility
- Existing Open Space

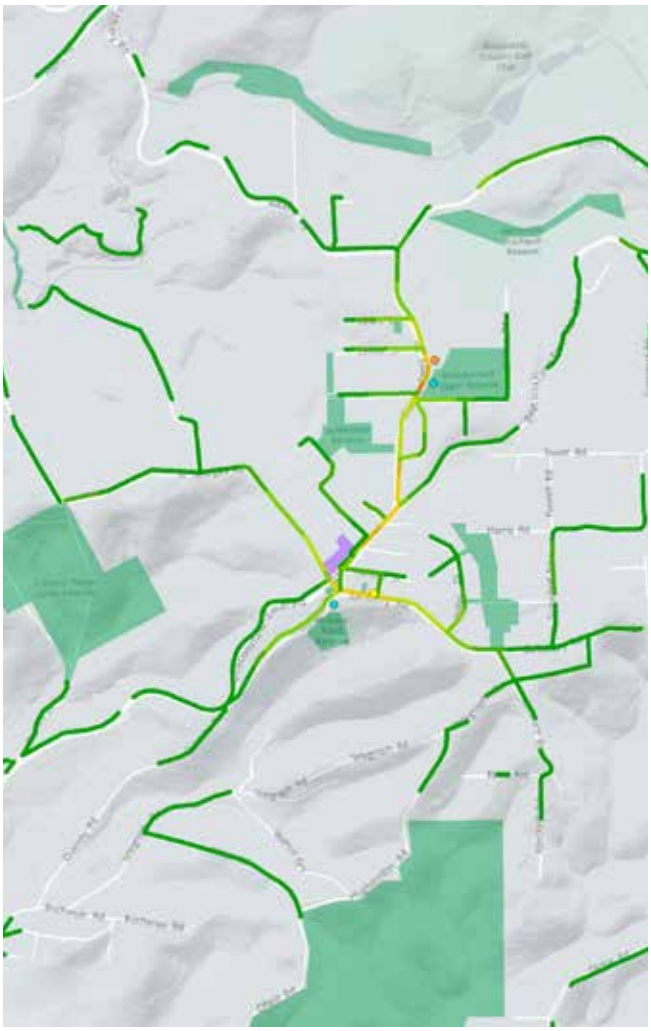
Pedestrian Access Analysis
Total potential pedestrian trips

- 700 to 12,600
- 600 to 700
- 500 to 600
- 400 to 500
- 300 to 400
- 100 to 200
- 50 to 100
- 0 to 50

BEACONSFIELD



UPPER BEACONSFIELD



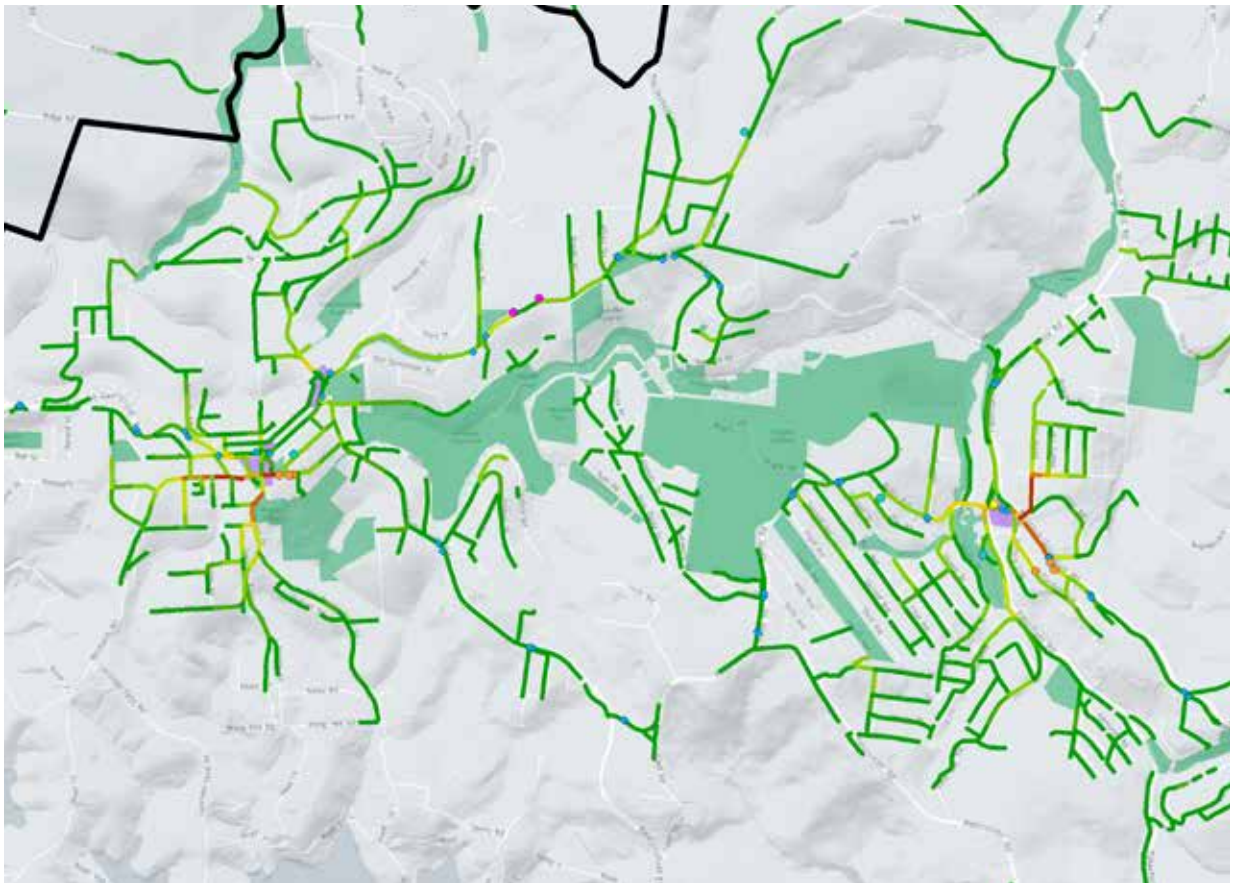
Key Destinations

- Existing Train Stations
- Existing Bus Stops
- Existing Retail
- Existing Tertiary Institutions
- Existing Secondary School
- Existing Primary School
- Existing Kindergarten
- Existing Child Care Facilities
- Existing Health Facilities
- Existing Community Facility
- Existing Open Space

Pedestrian Access Analysis
Total potential pedestrian trips

- 700 to 12,600
- 600 to 700
- 500 to 600
- 400 to 500
- 300 to 400
- 100 to 200
- 50 to 100
- 0 to 50

EMERALD AND COCKATOO



GEMBROOK

Key Destinations

- Existing Train Stations
- Existing Bus Stops
- Existing Retail
- Existing Tertiary Institutions
- Existing Secondary School
- Existing Primary School
- Existing Kindergarten
- Existing Child Care Facilities
- Existing Health Facilities
- Existing Community Facility
- Existing Open Space

Pedestrian Access Analysis
Total potential pedestrian trips

- 700 to 12,600
- 600 to 700
- 500 to 600
- 400 to 500
- 300 to 400
- 100 to 200
- 50 to 100
- 0 to 50

6.5.12 TYNONG

Figure 42 - Tynong Walking & Cycling Network, January 2017.

6.5.13 GARFIELD

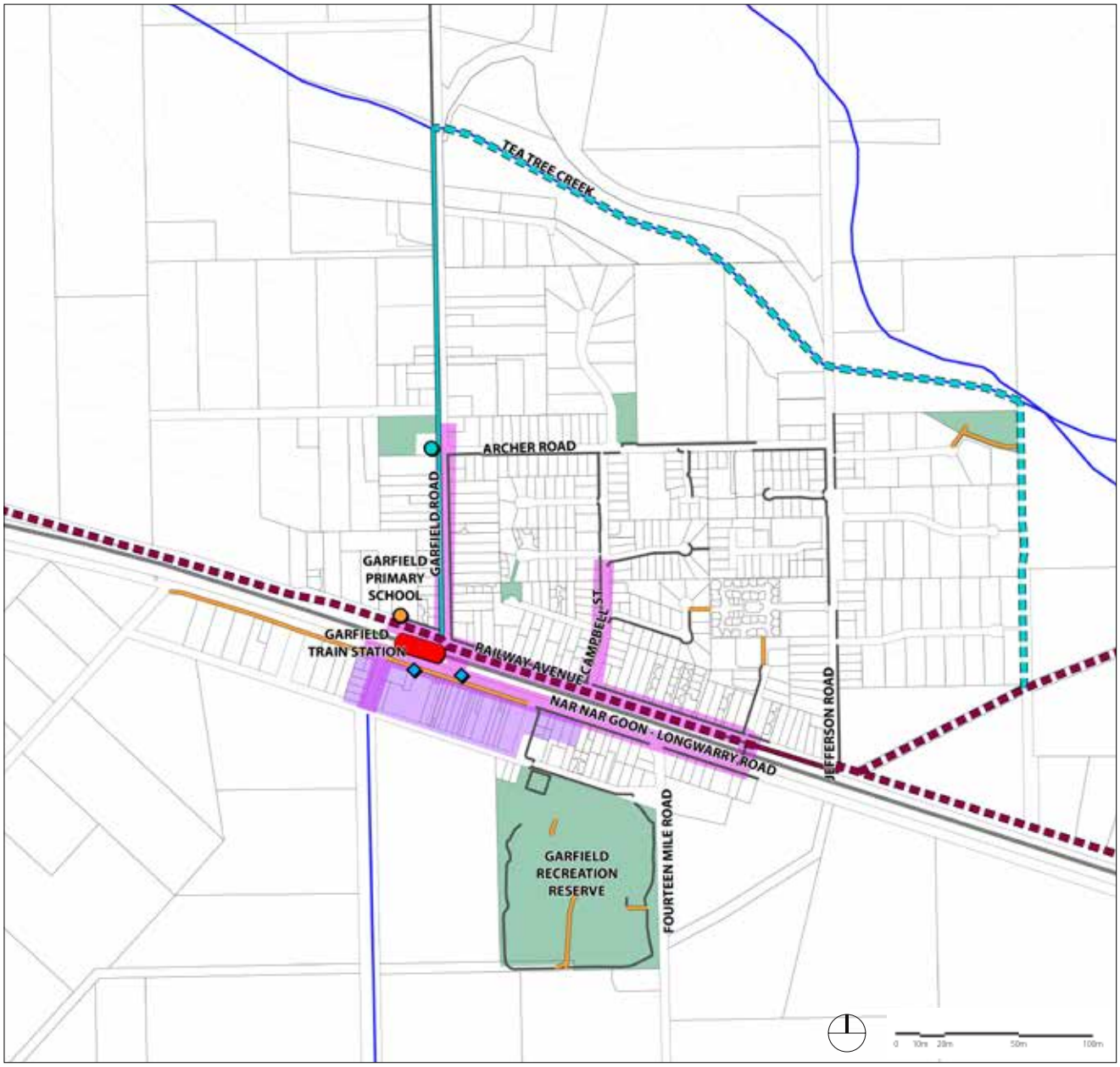


Figure 43 - Garfield Walking & Cycling Network, January 2017.

GARFIELD AND BUNYIP

NAR NAR GOON

TYNONG

KOO WEE RUP

LANG LANG

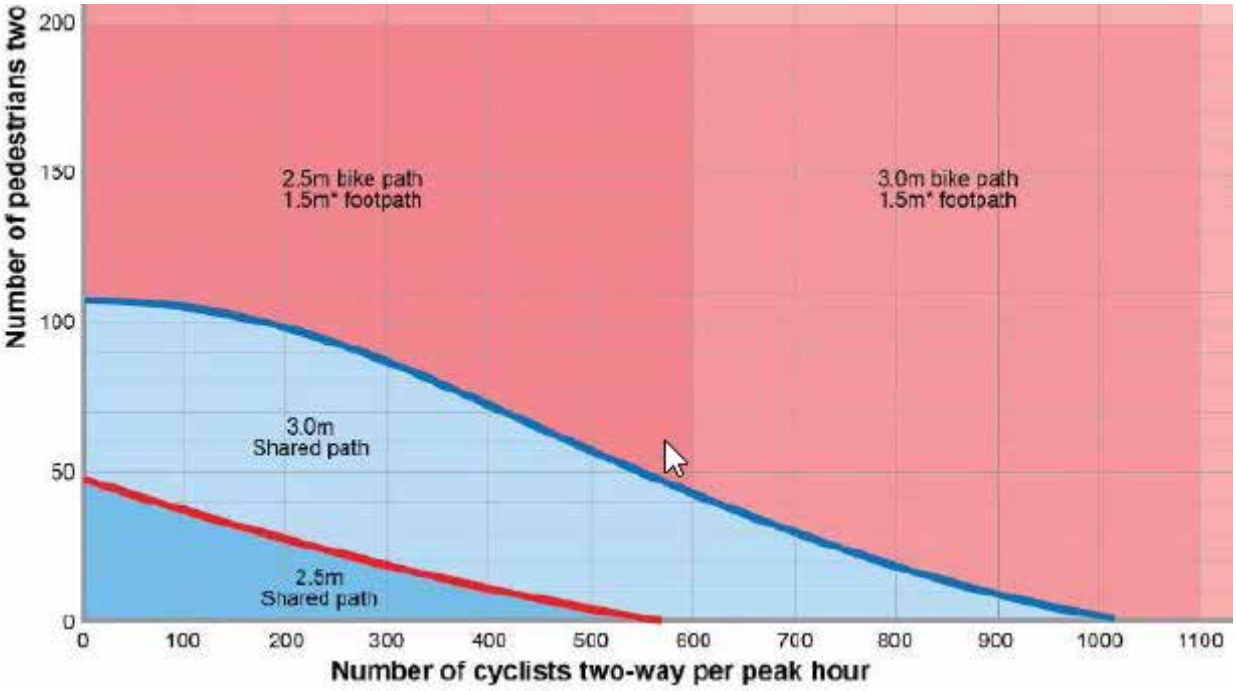
APPENDIX 4 - ALL ABILITIES SHARED PATHWAYS/TRAILS FRAMEWORK

ALL ABILITIES DESIGN STANDARD	COMMENTS
WIDTH	
Shared Pathways/Trails designed to Regional Standards. Desirable 3m width with minimum 2.5m where achievable	Shared pathway/trails in accordance with AustRoads Standards, Table 5.3 and 5.4 Austroads Standard
GRADIENT	
Desirable DDA compliance for pathways is 1:20. Max grade is 1:14. Where grade is between 1:14 and 1:20, 2m long landings to be provided periodically as resting points.	Refer to Universal Access Design Guidelines and Austroads Standards
CROSS FALL/SIDE SLOPE	
Pathway crossfall to be a maximum of 1:40	Refer to Universal Access Design Guidelines and Austroads Standards
SURFACE TREATMENT	
All pathways shall consist of all weather surfaces. This will include Concrete / Asphalt with the additional option of Compacted Crushed Rock in rural or natural environmental areas.	Refer to the Disability, Access and Inclusion Plan and Universal Access Design Guidelines. Access Institute approves crushed rock treatment in an external environment, where the following considerations are adhered to: • The crushed rock must be of a grade which does not create sharp edges, limiting the potential for a user to puncture the wheel of a mobility aid, or break skin; • The crushed rock must be of a grade which limits the possibility of a foot or mobility aid 'sliding across the top' of the surface; • The crushed rock access way must be well maintained to ensure no furrows are created at times of inclement weather
SIGNAGE & INDICATORS	
Appropriate signage and guidance treatments including hazard tactile surface indicators are to be provided.	Refer to Universal Access Design Guidelines, in particular International Signal Standards
HORIZONTAL ALIGNMENT	
Alignment to provide for good sight distance, minimising sharp bends and potential conflict points.	Refer to section 5.3 Austroads standards
CPTED	
CPTED principles to be incorporated into the design of all pathways.	CPTED is a multi-disciplinary approach to deterring criminal behaviour through environmental design. The six main concepts are territoriality, surveillance, access control, image/maintenance, activity support and target hardening. In terms of pathways and/or trails consideration should always be given to: location of paths to improve natural surveillance and lines of sight, provision of adequate lighting, maintained landscaping and the placement of amenities such as seating to attract larger numbers of desired users.

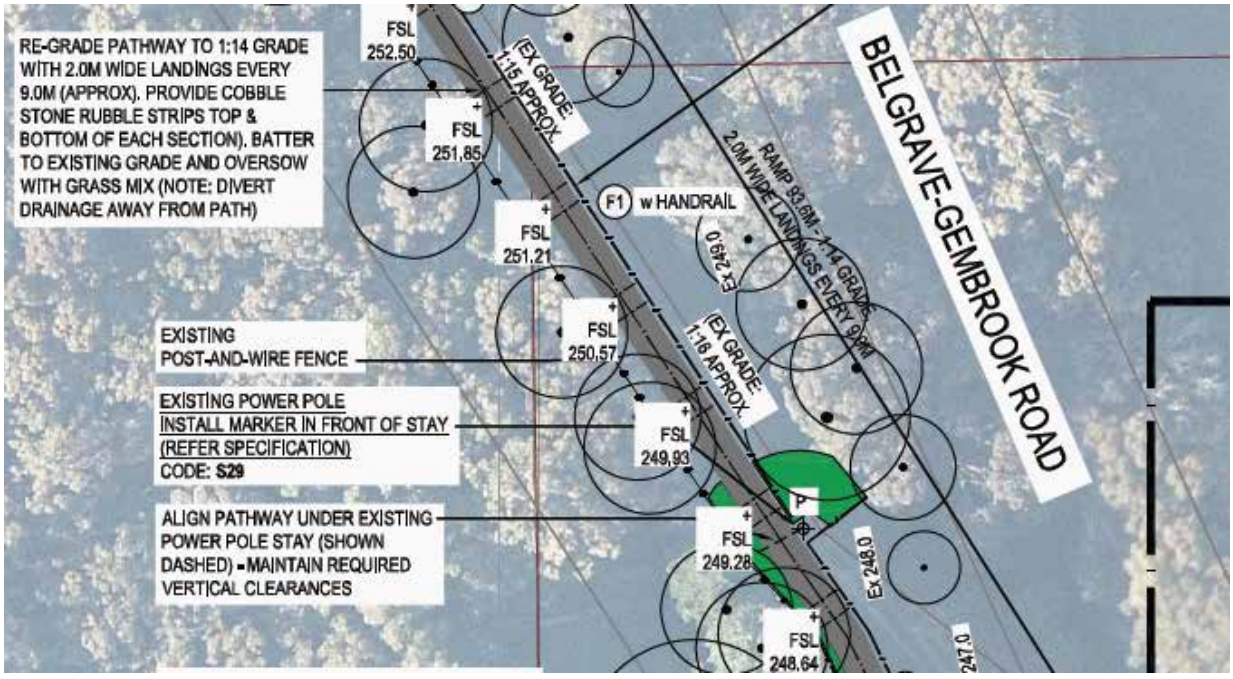
ADDITIONAL REQUIREMENTS & CONSIDERATIONS FOR TRAILS & PATHWAYS

- Provision of seating and shelters at regular intervals
- Disability parking adjacent to pathway
- Accessible path of travel from carpark/facility to shared path
- Turning spaces at end of access ways and on pathways
- Bicycle parking adjacent to pathway, for variety of bikes including tandem and handcycles
- Provision of seating and shelters at regular intervals
- Provision of unisex designated accessible toilets
- Spacing of fences, bollards, chicanes to provide for all ability accesS
- Access and egress points to be considered, including ramps and handrails to comply with standards
- Clearly defined crossing points with contrasting colour surfaces
- Clear directional and warning signage to international signal standards
- Vegetation to provide shading and landscape benefits without impinging on the pathway
- Lighting options to be considered at potential conflict points and where suggested through CPTED considerations

PATHWAY DIMENSIONS RELATING TO PEDESTRIAN & CYCLIST VOLUMES



TYPICAL SECTION SHOWING LANDINGS



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Tract
Landscape Architects
Urban Designers
Town Planners

195 Lennox Street, Richmond 3121
phone (03) 9429 6133
www.tract.com.au

Prepared by
Tract Consultants
for
Cardinia Shire Council

Cardinia

Cardinia Shire Council

Civic Centre

20 Siding Avenue, Officer

PO Box 7

Pakenham 3810 (DX 81006 Pakenham)

Phone: 1300 787 624

Email: mail@cardinia.vic.gov.au

Web: cardinia.vic.gov.au

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