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**INTRODUCTION**

Cycling, like walking, is an important travel mode. Cycling is a popular recreational activity in Hume, but it also plays a crucial role in a sustainable and equitable transport system by providing affordable access to a range of services and links to public transport. Increasing the amount of cycling trips in Hume will help to reduce traffic congestion, result in healthier residents and more active, vibrant and safer public spaces.

Hume currently has low cycling participation rates, especially as a form of transport. According to the Victorian Integrated Survey of Travel and Activity (VISTA) 2007, Hume residents make 1% of their daily trips by bicycle and cycling accounts for less than 0.1% of the distance travelled. Given the high proportion of relatively local journey to work trips in Hume there is potential to increase the level of cycling throughout the municipality.

One of the main objectives of the Hume Integrated Land Use and Transport Strategy (HILATS) adopted in 2011 is to encourage cycling for local transport and recreation trips by providing safe, connected and enjoyable cycling environments. In order to achieve this, HILATS recognises the need to develop a continuous, direct and legible local bicycle network to link Hume residents to key destinations such as activity centres, schools, employment areas, recreation facilities and public transport nodes.

**The Project**

The aim of the Hume Bicycle Network Project is to define a comprehensive cycling network of off-road and on-road paths that provides a range of routes to suit different cycling needs. The development of a local cycling network in Hume will legitimise the importance of cycling as mode of transport and recreation and will provide a supportive environment and infrastructure for all types of cycling trips.

This project has the following objectives:

- Identify and develop a comprehensive municipal wide Bicycle Network Plan for Hume that connects residential areas with key destinations and the wider regional cycling network.
- Identify the priority cycling routes to inform Council's capital works program and future grant applications in order to deliver bicycle infrastructure.
- Provide an update to the Walking and Cycling Strategy Implementation Plan. The outcomes of this project will inform the prioritisation of the construction or upgrade of the cycling paths that are part of this plan.
- Inform the designation of an on-road bicycle network in areas to be redeveloped and subject to future road reconstructions.
- Identify the required locations for cycling support facilities in the municipality.
1 Background

Hume is facing major challenges and opportunities to increase the uptake of cycling as a transport mode. In order to increase the cycling participation in Hume from its current levels to participation levels observed in metropolitan Melbourne. A comprehensive bicycle network is required that provides all potential users with access to bicycle infrastructure that suits their needs. The first step in delivering such a network is the development of a plan of the desired bicycle network that guides future planning and investment.

This Bicycle Network Plan provides this network, clear guidance of user needs and their infrastructure requirements as well as target projects for delivery and funding.

Policy Framework

Cycling is widely recognised across all government levels as a legitimate mode of transport and an effective way to ease traffic congestion, reduce car dependency and reduce greenhouse emissions. The National Cycling Strategy (2011-2016) provides a consistent national approach to cycling as both a mode of transport and a recreational activity. The Victorian Cycling Strategy (2013-2023) aims to take an integrated approach to planning and delivery of cycling infrastructure in Victoria, identifying the need for better connectivity and better targeted investments complementing the operational improvements aimed by SmartRoads (VicRoads, 2012).

At a local level, the Hume Integrated Land Use and Transport Strategy - HILATS (2011-2020) aims to improve transport options for residents and visitors of the municipality with an integrated land use and transport approach, and the Hume Walking and Cycling Strategy (2010-2015) provide a framework to develop bicycle paths as part of daily recreation, health and commuter routines.

The Bicycle Network Plan is one of the main actions of HILATS to encourage sustainable transport modes for local transport and recreation trips by providing safe, connected and enjoyable cycling environments.

Current Situation in Hume

There are low cycling participation rates in Hume, with cycling representing only 1% of the daily trips in Hume. This very low indicator compared to other Melbourne municipalities and it is explained by multiple factors including: lack of understanding about the cycling demand; unsafe riding conditions and perceptions; a strong focus on off-road recreational paths that do not cater for commuter trips; lack of priority for cyclists at intersections; a lack of convenient bicycle parking facilities; lack of direct, integrated and connected bicycle networks; and low levels of investment in bicycle infrastructure, especially on-road bicycle infrastructure.

The key findings outlined below summarise the current situation in Hume relating to bicycle users, bicycle infrastructure and bicycle network. Detailed information regarding these findings is outlined in the Background Paper (2013).

Users - Key findings:

A review of cycling participation rates data in VISTA (2007), Census (2011), Super Tuesday Counts and targeted bicycle surveys identified the following:
• Hume has very low cycling participation levels that are comparable with neighbouring outer metropolitan Council areas but below inner areas where there has been a greater level of implementation of sustainable transport initiatives and promotion of cycling as a mode of transport over the last 10 years.

• The number of people cycling to work has decreased marginally since 2006 despite strong population growth. Many inner metropolitan areas have seen an increase.

• There is insufficient long term data to identify spatial variations in cycling but surveys record higher counts where there is a good variety of infrastructure and a more complete network.

• The lack of existing data and scale of growth means that a predict and provide approach is required in network planning.

• Both safe riding conditions and negative perceptions of road safety are the major barriers to the uptake of cycling in Hume.

The bicycle network plan provides an important first step in increasing cycle participation by identifying the network and infrastructure required by current and potential cyclists. Over time, improved data collection will increase the understanding of cyclists needs in Hume – who is riding, where and for what purpose – that can inform future reviews to this plan.

**Infrastructure - Key findings:**

Analysis of the current cycling infrastructure within Hume identified the following:

• Existing cycling infrastructure in the municipality varies in terms of standards, surface, path widths, materiality and line marking.

• Existing cycling infrastructure mostly caters for recreational cyclists on off-road paths and varies across the municipality.

• Opportunities for commuters are much more limited and on road facilities are not currently integrated. There are also safety concerns on some of the on-road facilities, particularly at intersections and in areas where cyclists are encouraged to utilise parking lanes.

• A high proportion of the existing shared paths are not designated as such, and lack the directional signage required to make it safe for cyclists.

• There is a lack of bicycle parking and end of trip facilities at key destinations in Hume to encourage cycling to local destinations. To this end Hume need to establish a clear process to identify, install and replace bike parking and end of trip facilities.

The Bicycle Network Plan will assist in addressing the challenges identified with the current planning and delivery of infrastructure by:

• Clearly identifying where new bicycle infrastructure is required in the growth areas.

• Ensuring that new roads and bicycle infrastructure is designed to better meet the intended bicycle users of that part of the network.

• Identifying where cycling infrastructure should be considered in the upgrade or improvement to any existing roads.

• Informing the prioritisation of routes for future maintenance.

The following map shows the existing bicycle infrastructure in Hume, both off-road paths and on-road bicycle lanes:
Network - Key findings:

Analysis of the current and proposed network identified that:

- The current network comprises mainly off road paths that suit leisure and recreation cycling trips well but are less convenient to commuter trips
- Most of the on-road bicycle routes are non-continuous that are disconnected from the wider network
- The future bicycle network needs to include a greater mix of on-road and off-road facilities that cater for all riders independently of the level of confidence, and for all trip purposes;
- There are a variety of agencies responsible for planning, funding and delivering bicycle networks across the local, regional and metropolitan network;
- Although 30% of the Principal Bicycle Network (PBN) has been completed in Hume, further work is required to complete the nearly 70% that is still missing, which accounts for approximately 200 km.

The Bicycle Network Plan will assist in addressing the challenges identified with the current planning and delivery of the bicycle network by:

- Guiding the future planning and prioritisation of the identification of the bicycle network and future infrastructure delivery.
• Providing a network that delivers opportunities for all bicycle users and improving the connectivity legibility and integration of existing and future paths and regional and metropolitan networks
• Identifying priorities for investment by the different agencies responsible for delivering the network

Conclusions

The Background Paper identified the importance of developing a bicycle network plan and its value in addressing the challenges of increasing cycling participation in Hume. Key implications from the Background Paper for how the Bicycle Network Plan is prepared are:

• Hume requires a greater range of cycle route options to attract potential cyclists that ride for different purposes other than recreation, and that will contribute to reduce traffic congestion and air pollution.
• A predict-and-provide approach is required in Hume for the growth areas and to overcome the data constraints on existing cycling participation and cyclist needs in established areas. Such an approach will give the best opportunity to cater for a broader range of cyclists.
• Hume needs a cycling plan to ensure coordinated planning and implementation of cycling in infrastructure that is adequate to the different rider profiles in the municipality.
• Hume’s bicycle network needs to aim to be connected with other on-road cycle lanes and off-street paths; legible for cyclists; and integrated in terms of land use and transport.
• The prioritisation of routes and funding will ensure an appropriate level of investment in bicycle infrastructure. Hume will be able to set a short, medium and long term projects priority list that can be easily presented to a broader audience and stakeholders.
2 METHODOLOGY

The methodology process used to develop the bicycle network plan in Hume was based mainly on the methodology proposed by the Cycle Network and Route Planning Guide (New Zealand). The methodology was also adapted and complemented with information found in the best practice review that was done as part of the development of the Background Paper.

2.1 Overview

The figure below summarises the process followed to define the network:

![Figure 2. Methodology Process](image)

The development of Bicycle Network Plan is based on a methodology that considers meeting the needs of all cycling users and the opportunities and constraints within Hume. Specifically, it has sought to identify the different users, where they wish to ride, for what purpose they ride and their skills to deal with a variety of conditions.

2.1.1 Consultation

This Hume Bicycle Network Plan has been informed by internal and external consultation on a series of technical documents and maps during each phase of the project. The overall consultation process is shown in the figure below:

![Figure 3. Consultation Process Overview](image)
a. Internal Stakeholders Consultation

Six internal workshops were undertaken with the internal working group that includes representatives from Strategic Planning, Leisure, Engineering and Assets, Subdivisions Engineering and Landscape, Urban Places and Capital Works departments.

b. External Stakeholders Consultation

The consultation with Bicycle User Groups (BUGs) consisted of a one-to-one meeting with representatives of each group and the distribution of an Initial Bicycle Network Plan to provide feedback to Council.

Two meetings were held with Bicycle Network Victoria (BV) in order to present the project and to discuss the Bicycle Network Plan.

c. Schools Consultation

A consultation process was set up to consult with schools in collaboration with Council’s Health Promotions Team.

- A consultation letter and a survey were sent to all schools in Hume to determine their level of engagement in this project and to gather information regarding current cycling participation and issues at each school.
- 30% (19) of schools in Hume responded to the survey. Council officers from the Health Promotions Team undertook five classroom activities in primary schools in Broadmeadows, Greenvale, Craigieburn and Sunbury.
- The information collected from the survey and classroom activities has informed the development of the Bicycle Network Plan. The key findings of this consultation regarding cycling to school are that there are safety concerns among parents and teachers and many schools do not currently participate in any cycling programs or have not identified “safe routes to cycle to school”.

Page 11
• Additional work with schools regarding cycling routes to school will be undertaken as part of the “Safer Routes to School Program” identified in Council’s Sustainable Transport Education and Promotion Plan (STEPP).

2.2 Users

During the best practice review, seven types of cyclists were identified that have different characteristics and requirements. A detailed description of these types of users can be found in Appendix 1. Following discussions with internal and external stakeholders, these types of users were grouped in four main categories: novice, commuter, recreational and primary school children.

Given the complexity and need for consultation with school principals, parents and school children, it was agreed that the development of the primary school children’ bicycle network will require a more detailed process and it will need to be done in a case by case project. The final bicycle network does not have detailed network around primary schools, but the feedback and comments received during the consultation sessions at schools were taken into account in developing the wider network.

Therefore, three types of user groups were considered to develop Hume’s bicycle network. The table below shows these users, their characteristics and infrastructure requirements:

<table>
<thead>
<tr>
<th>User Type</th>
<th>Key Characteristics</th>
<th>Infrastructure Requirements</th>
<th>Example of user type and Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commuter</td>
<td>Confident riders</td>
<td>Prefer: On-Road Paths</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Commuting trips</td>
<td>− Off-road: some prefer this type of infrastructure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Long distances trips</td>
<td>− On-road: some prefer low-stress roads, but others want quick trips regardless of traffic conditions.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Primarily require space to ride, smooth riding surface and ability to maintain speed.</td>
<td></td>
</tr>
<tr>
<td>Novice</td>
<td>Non-confident riders</td>
<td>Prefer: Exclusive Bicycle Paths</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Secondary School Children (over 12 y)</td>
<td>− On-road: facilities are used</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Local trips</td>
<td>− Off-road: paths are used where available as even if it take longer to get to destination.</td>
<td></td>
</tr>
<tr>
<td>Recreational</td>
<td>Recreational and touring riders</td>
<td>Prefer: Off-Road Paths</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Leisure trips</td>
<td>− Off-road: desire off-road paths</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sport trips</td>
<td>− On-road: desire quiet local streets, avoid heavily trafficked routes, and more experienced will prefer to use road system for long journeys</td>
<td></td>
</tr>
</tbody>
</table>
2.3 Principles

The development of the six principles that guide the development and delivery of the bicycle network plan was based on a review of best practice documents and the feedback received during the first meetings with internal and external stakeholders. A detailed description of the six principles can be found in Appendix 2. The sections below define each principle and describe how those principles are to be achieved in the development of the bicycle network plan and how they can be used during its future implementation.

2.3.1 Connectivity

“All bicycle routes should connect to each other and to the wider bicycle network”

To achieve this principle, the development of the Bicycle Network Plan has focussed on:

- Linking the residential area with identified destinations
- Ensuring that the ultimate network is continuous with minimal gaps
- Combining on and off road facilities
- Providing a choice of route options to cater for the different potential bicycle users and their specific needs

2.3.2 Directness

“The bicycle network should provide the most direct possible routes to key destinations”.

To achieve this principle, the development of the Bicycle Network Plan has focussed on:

- Ensuring that the network balances the level of directness and perceptions of safety appropriate to the intended user with more direct routes for commuters
- Minimising travel distances by limiting deviations and circuitous routes
- Improving permeability in the existing network through provision on new routes

2.3.3 Legibility

“Bicycle routes should be legible, continuous and recognisable”

To achieve this principle, the development of the Bicycle Network Plan has focussed on:

- Identifying options where signage could be introduced to improve legibility and fill gaps in the network

2.3.4 Pleasantness

“The bicycle network should provide a good level of comfort for cyclists along routes”

To achieve this principle, the development of the Bicycle Network Plan has focussed on:

- Identifying potential for scenic, quiet and pleasant environments where possible, particularly for recreation and novice cyclists
- Identifying destinations that could be attractive to cyclists for the provision of end of trip facilities
2.3.5 Safety

“The bicycle network should provide safe routes for cyclists”

To achieve this principle, the development of the Bicycle Network Plan has focussed on:

- Assigning routes to a specific user so that their differing perceptions of safety and confidence can be considered in determining the required level of separation from pedestrians and motor vehicles, the future infrastructure that is delivered and the design of intersections and roundabouts.

2.3.6 Integration

“Cycling infrastructure should be integrated with key destinations, public transport and other transport projects”

To achieve this principle, the development of the Bicycle Network Plan has focussed on:

- Linking the residential area with key destinations, notably activity centres and public transport nodes
- Connecting new routes into the existing network

2.4 Initial Bicycle Network Plan

An Initial Plan was developed using information collected during the assessment of potential demand of bicycle trips and through the identification of bicycle route options in Hume for the different user types.

2.4.1 Assessing Cycle Demand

The assessment of the cycle demand creates an understanding of what to provide for different cyclists, and where they wish to ride, for what purpose they ride, and how confident they are to handle a variety of conditions.

This demand assessment was undertaken only in existing developed areas and did not include the growth areas because there was not enough information regarding the land use outcomes or planned infrastructure in all parts of the growth areas to perform this assessment.

Given the constraints in information for Hume, and the lack of a method to measure demand for bicycle trips in growth areas, the demand assessment was qualitative and focused on areas with potential to attract more bicycle trips. The assessment identified the location of key origins and destinations, known transport patterns, and the current use of bicycle paths observed in surveys. A description of the information used in this process can be found in the following table:

<table>
<thead>
<tr>
<th>Origins</th>
<th>Destinations</th>
<th>Transport Patterns</th>
<th>Use of Paths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Zones</td>
<td>Schools</td>
<td>Desire Lines</td>
<td>Bicycle Counts and Surveys</td>
</tr>
<tr>
<td>Population Data</td>
<td>Employment</td>
<td>Car Ownership</td>
<td>On-Road Bicycle Lanes</td>
</tr>
<tr>
<td></td>
<td>Facilities</td>
<td>Method of Travel to Work</td>
<td>Off-Road Bicycle Paths</td>
</tr>
<tr>
<td></td>
<td>Activity Centres</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tourist sites</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The information collected provided characteristics of each area of Hume. This information provided the location where the main target groups of cyclists (people aged between 4 and 45 years old) currently live, the location of key destinations like train stations and activity centres, location of areas of high car ownership where mode share change could be possible and patterns of users on existing paths.

The demand assessment that was carried out provided important background information and maps that informed the development of the network plan throughout the whole process. This information was used to map the bicycle networks and support the decision making when identifying bicycle routes.

### 2.4.2 Identifying Bicycle Route Options

As a starting point for developing the Initial map, the existing and proposed bicycle infrastructure was mapped. The proposed routes were found in different sources such as the Walking and Cycling Strategy action plan, structure and master plans and other known Council’s projects planned for the existing areas, and for the growth areas the proposed cycle paths were obtained from Precinct Structure Plans, Development Plans, Local Structure Plans, Concept Plans and other known projects.

These existing and proposed bicycle routes were then included into one of three networks: commuter, novice and recreational. Routes were allocated by considering whether the infrastructure and destination satisfied the user requirements identified in Table 1 and Table 3.

In order to ensure adequate access to the bicycle network for the three different types of users, a coverage buffer was mapped along each of the existing and proposed routes. A 400 metres buffer was considered appropriate for commuter cyclists as this type of cyclist is willing to travel longer distances in the local road network to get to a formal bicycle path. Novice and recreational riders prefer to avoid mixing with traffic and therefore a 200 metre buffer was considered more appropriate for these types of users.

Using these buffers, the gaps in cycling infrastructure for each type of users were then identified. These gaps in infrastructure were reviewed and new cycle route options were identified, focussing on connecting key origins to key destinations for each type of user. Table 3 shows the key destinations identified per type of user.

<table>
<thead>
<tr>
<th>Type of User</th>
<th>Key Destinations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commuter</strong></td>
<td>Activity centres, Train stations, Employment areas</td>
</tr>
<tr>
<td><strong>Novice</strong></td>
<td>Secondary schools, Activity centres, Train stations, Community facilities, Sport and recreation facilities</td>
</tr>
<tr>
<td><strong>Recreational</strong></td>
<td>Creeks, Parks, Reserves, Open spaces, Sport grounds</td>
</tr>
</tbody>
</table>
To create a complete network, the remaining gaps were filled adding new routes in areas where there was no proposed infrastructure in the planning documents reviewed; and using the local road network and open space availability.

As a result of this process, the Initial Plan consisted of three combined bicycle networks: commuter, novice and recreational that served each type of user respectively, with routes that could be part of two or more different networks. A map of the Initial Plan can be found in Figure 4.

The following figure shows a map of the Initial Plan, a more detailed map can be found in Appendix 3.

Figure 4. Map of Initial Plan
2.5 Final Bicycle Network Plan

The Final Plan was developed by evaluating and comparing the options for satisfying the needs of the three types of bicycle users: commuter, novice and recreational, and trip purposes likely on each cycle route.

2.5.1 Evaluating Cycle Route options

The Initial plan was presented during the first round of consultation to share the initial findings and gather local knowledge from internal and external stakeholders. The main purpose of this consultation was to test the proposed route options for the three different types of users, to identify known constraints and opportunities in the network and to fill the existing gaps.

This process resulted in three combined proposed network with new route options being added and others being removed due to feasibility constraints.

2.5.2 Overlapping Cycle Routes

The combined network had some sections which there was an overlap between the commuter, novice and recreational routes. In order to ensure the provision of a mix of route options for all type of users and to inform the future infrastructure options (on-road vs. off-road) for each route; an additional step was incorporated to the process for identifying which type of user should have priority in each bicycle route.

A rating process was developed to determine the priority in those sections of the network that presented overlaps between the three bicycle users' networks: commuter, novice and recreational. Using the profile of each user identified in Table 1, the matrix in Table 4 was developed to assign each route to the most appropriate user. A description of the rating process developed is outlined below:

a. Relevance and importance of route to each type of user:

The level of importance of all bicycle routes to each type of user was evaluated. This criteria assigned a score if the route was located in an environment where each type of user was expected to ride. For example, a high score was given to bicycle routes that run along an arterial road or a railway line for the commuter cyclists.

b. Part of a regional network:

In this step of the process, routes were prioritised depending on whether the route was part of the following regional and metro bicycle networks: Principal Bicycle Network (PBN), Bicycle Priority Route (BPR) or Metropolitan Trail Network (MTN). The PBN and BPR are the main regional networks for commuter cyclists and MTN is the main network for recreational cyclists.

c. Number of relevant destinations that connects to

The main destinations for each type of user were identified in order to connect the residential areas to these locations; a description of these destinations can be seen in Table 3. This step also helped to ensure that the bicycle routes cater for each different purpose trips.

d. Review of gaps - Is there an alternative route?

Finally, in order to select a priority user for each route, it was necessary to review the availability of alternative routes that each type user had at that particular location in the surrounding bicycle network. This also allowed identifying the need to prioritise a bicycle
route for a particular user by considering the needs of the other types of users and distributing them in an equitable way.

Table 4. Rating process to resolve overlapping routes

<table>
<thead>
<tr>
<th>Rating Criteria</th>
<th>Commuter</th>
<th>Novice</th>
<th>Recreational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relevance and importance of link to each type of user</td>
<td>Arterial Road</td>
<td>Connector Road</td>
<td>Creek</td>
</tr>
<tr>
<td></td>
<td>Train Line</td>
<td>Creek or Reserve</td>
<td>Open Space</td>
</tr>
<tr>
<td>Part of a regional network</td>
<td>Principal Bicycle Network – PBN</td>
<td>N/A</td>
<td>Metropolitan Trail Network - MTN</td>
</tr>
<tr>
<td></td>
<td>Bicycle Priority Route - BPR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of relevant destinations that connects to</td>
<td>Activity Centre</td>
<td>School</td>
<td>Reserve</td>
</tr>
<tr>
<td></td>
<td>Train Station</td>
<td>Community Centre</td>
<td>Park</td>
</tr>
<tr>
<td></td>
<td>Employment Area</td>
<td>Activity Centre</td>
<td>Sport Ground</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Train Station</td>
<td></td>
</tr>
<tr>
<td>Review of gaps - Is there an alternative route?</td>
<td>Only one route</td>
<td>Only one route</td>
<td>Only one route</td>
</tr>
<tr>
<td></td>
<td>Alternative route</td>
<td>Alternative route</td>
<td>Alternative route</td>
</tr>
</tbody>
</table>

The methodology outlined before enabled the delineation of a comprehensive bicycle network for Hume that will guide the delivery of a supportive environment and infrastructure for all types of cycling trips.

2.6 Final Hume Bicycle Network

The Final Hume Bicycle Network is a network of well-connected and continuous bicycle routes that connect residential areas to key destinations. This network is a combination of existing and proposed off-road and on-road bicycle paths that provides a choice of routes and caters for all type of users: commuter, novice and recreational.

The bicycle network identified for Hume considers that each type of cycle user has different needs in regards to directness and safety. Therefore, it provides more direct routes to commuter cyclists and safer routes for novice cyclists. The diversity of cycle routes in the network supports permeability and increases opportunities for multi-purpose trips as all users can choose to use any route in the network.

As cyclists value safety and comfort, this network aims to provide an appropriate cycling environment in each route and per different type of user. This network encourages separation between cyclists, pedestrians and motor vehicles in order to improve safety and where possible, routes for recreational and novice riders are located along quiet and scenic environments.

Below are the Final Bicycle Network Plans for the Hume Corridor and Sunbury areas. Larger versions are provided in Appendix 4.

The following sections prioritise this network to identify Target Projects that Council will aim to deliver and the Advocacy Projects that Council will be advocating for in the coming years.
Figure 5. Final Bicycle Network Plans
3 PRIORITISING THE BICYCLE NETWORK

The Final Bicycle Network Plan showed that the amount of growth and change together with the limited existing network makes the scale of the proposed additional bicycle network in Hume very large and extensive. Therefore, it was important that a hierarchy of priority routes and priority projects were identified to implement overtime. This stage of the process aimed to prepare a program of projects for future detailed investigation, design and implementation.

The prioritisation process described in this section for Council projects was applied to established areas of Hume only as it was assumed that the bicycle routes planned in growth areas will be delivered overtime principally by developers as part of their land development.

Although priority routes are identified below, it is important to recognise that the complete network identified in the Final Plan will inform future planning decisions and should be implemented overtime by developers, State Government as well as by Council. Further, some routes that may not be the highest priorities should be delivered as part of associated duplications or other works where this is cost effective.

3.1.1 Prioritisation of Cycle Routes

The prioritisation of the cycle routes was determined by defining a rating system with two separate components: importance of each cycle route to the overall network; and ease of delivery.

a. Importance to the network

In order to establish the priority in which the cycle routes should be rolled out, first it was necessary to determine how important each route is to the network. This was achieved by using a criteria system that assigned a level of importance (high, medium or low) and a score (3, 2 or 1 respectively) to each route as follows:

- **Number of Destinations** – A level of importance was assigned to the whole network considering how many key destinations are served by each route. The key destinations used to undertake this assessment are divided in three groups as described in Table 3.

- **Importance of Destinations** – This criterion assessed the significance of the destinations served by the route as it may serve only a few destinations but each one could be a very important bicycle trip attractor e.g. a town centre or a leisure centre.

- **Metro or Regional Network** – The level of importance in this case was assigned by reviewing if the route is part of any metropolitan, regional or other municipal network as described in Table 4. Given that these networks already have a defined level of priority, the level of importance was assigned in accordance to it as follows: high score for BPR or MTM, medium score for PBN and low score for routes that connect to neighbour municipalities.

- **Contribution to the Network** – This criterion evaluated the contribution of each route to improving connectivity and its capacity to remove gaps in the network.

- **Potential Demand** – This criterion assessed the capacity that each route has to satisfy the potential demand generated in the study area (coverage). This level was defined using the outcome of the qualitative assessment of demand for bicycle routes described in section 2.4.1.

- **Importance to Users** - This criterion assessed the number of different type of users that could potentially use the route by using the information collected for the overlapping routes assessment described in section 2.5.2.
The criteria used is summarised in Table 5 below and the assessment table used is shown in Figure 6.

**Table 5. Importance to network criteria**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>High (Score 3)</th>
<th>Medium (Score 2)</th>
<th>Low (Score 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of destinations</strong></td>
<td>The highest score is given to a route that serve 7 or more key destinations listed in Table 3</td>
<td>The medium score is given to a route that serve between 4 and 6 key destinations listed in Table 3</td>
<td>The lowest score is given to a route that serve 3 or less key destinations listed in Table 3</td>
</tr>
</tbody>
</table>
| Importance of destinations| The highest score was given to routes that had at least one of the following key destinations:  
  • Town Centre (TC)  
  • Principal Activity Centre (PAC)  
  • Train Station (TS)  
  • Open Space (OS)  
  • Leisure Centre (LC) | The medium score was given to routes that had at least one of the following key destinations:  
  • School (Sch)  
  • Reserve (Res)  
  • Community Centre (CC)  
  • Major Activity Centre (MAC) | The lowest score was given to routes that had at least one of the following key destinations:  
  • Neighbourhood Activity Centre (NAC)  
  • Park  
  • Neighbourhood Centre (NC) |
| Metro or regional network  | The highest score was given to routes that are part of the Bicycle Priority routes (BPR) or Metropolitan Trail network (MTN) | The medium score was given to routes that are part of the Principal Bicycle Network (PBN) | The lowest score was given to routes that connect directly to a neighbour municipality |
| Contribution to the network | The highest score was given to routes that remove a very significant gap in the network | The medium score was given to routes that remove a gap in the network | The lowest score was given to routes that remove a small gap in the network |
| Potential demand          | The highest score was given to routes that had a high level of coverage | The medium score was given to routes that had a good level of coverage | The lowest score was given to routes that had a small level of coverage |
| Importance to users       | The highest score was given to routes that could cater for the three type of users based on the type of infrastructure | The medium score was given to routes that could cater for the two type of users based on the type of infrastructure | The lowest score was given to routes that could cater for only one type of users based on the type of infrastructure |
b. Ease of delivery

Given that some projects will be more difficult to deliver than others and to provide a more realistic approach to the prioritisation of bicycle routes, the level of complexity of the implementation of each route was estimated. As in the previous step, a rating system was formulated to establish the ease to deliver routes based on the following criteria:

- **Infrastructure Change** – The level of ease was assigned by reviewing the type of works that are required to deliver each bicycle route. A description of the different levels of ease assigned to each route can be found in Table 6.

- **Road Reserve or Open Space Capacity** – With this criterion the existing capacity in the road reservation or the land availability to deliver each route was evaluated.

- **Future Project or Road Upgrade** – A level of ease was assigned considering the knowledge of existing projects where there is already a budget commitment from Council or others to deliver them and bicycle routes are planned as part of other known projects.

- **Land Ownership Issues** – The level of ease was defined by the known or expected land ownership issues to deliver each route.

- **Physical Barriers** – This criterion assessed the significance of physical barriers to be overcome in order to deliver each route.

Table 6 describes this criteria process and Figure 7 shows the assessment table used.

![Figure 7. Example of ease of deliver assessment](image)

Understanding that the purpose of the Bicycle Network Plan is to develop a network of efficient routes even if in some cases routes may not be easy to deliver, the route importance component was given a weighting of 2 and the ease to deliver component a weighting of 1. This meant, the Final Priority was calculated using the following function:

\[
\text{Final Priority of Cycle Route} = 2 \times \text{Importance to Network} + 1 \times \text{Ease to Deliver}
\]
<table>
<thead>
<tr>
<th>Criteria</th>
<th>High Level (Score 3)</th>
<th>Medium Level (Score 2)</th>
<th>Low Level (Score 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrastructure Change</td>
<td>The high level represents: in the case of off-road routes, routes that were already constructed and need signage to be improved. For on-road routes, the assumption was that these routes will use existing road space (with no road space reallocation) and will only require line marking or signage to operate, usually novice routes on local roads.</td>
<td>A medium score was assigned when: an off-road route will require an upgrade, usually to increase its width to 2.5m; and it is proposed to widen an on-road route or make it an exclusive bicycle lane.</td>
<td>The low level was assigned to routes that required construction of sections in order to fill the gaps on them. A very low category (score 0) was created to assess new routes as they will require a more significant investment to be delivered.</td>
</tr>
<tr>
<td>Road Reserve or Open Space Capacity</td>
<td>A high score was given to routes that in the assessment appear to have enough space be constructed or there are no any issues identified to date</td>
<td>This level was assigned to routes that will need a low reallocation of space to be delivered, especially on-road routes. This assessment was done based on the width of the road reservation available.</td>
<td>A low level of ease was assigned to routes that will require a significant reallocation of space to be constructed. Most of the routes identified in this level are on-road routes that run along narrow road reservations.</td>
</tr>
<tr>
<td>Future Project or Road Upgrade</td>
<td>The higher score was assigned to routes that had already Council’s budget allocated to be delivered or there were part of other projects already funded by other organisations.</td>
<td>A medium score was given to routes that have been identified in a known project. Some of these routes are part of a bigger scale projects e.g. a reserve master plan or a road redevelopment.</td>
<td>This level was assigned to routes that are not part of any known project and therefore, it will be more difficult to deliver.</td>
</tr>
<tr>
<td>Land Ownership Issues</td>
<td>A high level was assigned to routes that did not have any issues identified with land ownership.</td>
<td>This level was assigned to routes where a land ownership issue has been identified but a solution has also been found. For instance, Council is already discussing with the land owner or it is formalising an agreement.</td>
<td>This score was applied to routes that are located in land that is owned by others and there were some issues identified in the past such as an agreement with other agency is needed or Council will require buying the land.</td>
</tr>
<tr>
<td>Physical Barriers</td>
<td>This score was applied to routes that were located in areas without any identified physical barriers.</td>
<td>The medium level was assigned to routes that will need to cross a major physical barrier such as an arterial road or hill.</td>
<td>A low score was given to routes that will need to cross a significant physical barrier e.g. a freeway, a creek or a railway line. Therefore, it will require a significant piece of infrastructure to be delivered such as a bridge or a traffic light.</td>
</tr>
</tbody>
</table>
3.1.2 Funding Prioritisation

The prioritisation of cycle routes provided a ranking for each route in the network but the implementation of these projects cannot be guided solely by the priority in the network. A more balanced approach is needed to ensure that funding is directed to routes which benefit all users all across the municipality. The approach also needs to recognise the different agency responsibilities for delivery, notably State Government’s responsibility for the Principal Bicycle Network (PBN) and Metropolitan Trail Network (MTN).

There is no fixed methodology to prioritise funding of cycling infrastructure within best practice though key considerations are identified in Appendix 5. These considerations were combined to identify two lists:

- Target projects – projects that Council will aim to deliver
- Advocacy projects – projects that Council will be advocating for to State Government during the coming years.

The Target Projects list identified the top 10 priority projects for the three users: novice, commuter and recreation cyclists. These were verified to ensure that they provided a good spatial distribution across the municipality and provided a good mix of infrastructure typologies reflective of community aspirations and Council’s budget allocation. Specifically, the Target List was tested to ensure it included a mix of projects that both extended the network and filled gaps in the existing network.

The Advocacy Projects list was identified by selecting the top 10 priority projects for the three users: novice, commuter and recreation cyclists.

Figure 8. Process to find Target and Advocacy Project Lists
3.1.3 Target Projects

The Target projects are a list of projects that Council will aim to deliver in the coming years. They include the Top 10 Target Projects per users type: commuter, novice and recreational.

The following figures show a map of the target projects in Sunbury and the Hume Corridor respectively.
Figure 9. Map of Bicycle Network Plan – Target Projects in Sunbury
Figure 10. Map of Bicycle Network Plan - Target Projects in Hume Corridor
<table>
<thead>
<tr>
<th>Rank</th>
<th>Code</th>
<th>Suburb</th>
<th>Cycle Route</th>
<th>Section (from)</th>
<th>Section (to)</th>
<th>Network</th>
<th>Project Works</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HCC_C_2051</td>
<td>Roxburgh Park</td>
<td>Shankland Reserve trail</td>
<td>Somerton Road</td>
<td>Bridgewater Road</td>
<td>Recreational</td>
<td>Gap in network</td>
</tr>
<tr>
<td>2</td>
<td>HCC_B_1009</td>
<td>Meadow Heights</td>
<td>Yuroke Creek</td>
<td>Broadmeadows Valley Park Trail</td>
<td>Somerton Road</td>
<td>Recreational</td>
<td>Gap in network</td>
</tr>
<tr>
<td>3</td>
<td>HCC_C_2002</td>
<td>Craigieburn</td>
<td>Aitken Creek Trail</td>
<td>Craigieburn Road</td>
<td>Merri Creek</td>
<td>Recreational</td>
<td>Gap in network</td>
</tr>
<tr>
<td>4</td>
<td>HCC_C_2015</td>
<td>Craigieburn</td>
<td>Malcolm Creek</td>
<td>Merri Creek</td>
<td>Mount Ridley Road</td>
<td>Recreational</td>
<td>Gap in network</td>
</tr>
<tr>
<td>5</td>
<td>HCC_B_1041</td>
<td>Jacana</td>
<td>Moonee Ponds Creek (East)</td>
<td>Western Ring Road</td>
<td>Johnstone Street</td>
<td>Commuter</td>
<td>New bike path</td>
</tr>
<tr>
<td>6</td>
<td>HCC_B_1013</td>
<td>Dallas</td>
<td>Merlynnston Creek</td>
<td>Western Ring Road</td>
<td>Upfield Train Line</td>
<td>Novice</td>
<td>Gap in network</td>
</tr>
<tr>
<td>7</td>
<td>HCC_B_1042</td>
<td>Broadmeadows</td>
<td>Pearcedale Parade/Fern Close</td>
<td>Johnstone Street</td>
<td>Riggall Street</td>
<td>Novice</td>
<td>Gap in network</td>
</tr>
<tr>
<td>8</td>
<td>HCC_B_1044</td>
<td>Broadmeadows</td>
<td>Tanderrum Way</td>
<td>Johnstone Street</td>
<td>Pascoe Vale Road</td>
<td>Novice</td>
<td>Line marking</td>
</tr>
<tr>
<td>9</td>
<td>HCC_B_1047</td>
<td>Broadmeadows</td>
<td>Meadow Link</td>
<td>Craigieburn Train Line</td>
<td>Upfield Train Line</td>
<td>Novice</td>
<td>New bike path</td>
</tr>
<tr>
<td>10</td>
<td>HCC_B_1034</td>
<td>Tullamarine</td>
<td>Melrose Drive</td>
<td>Western Ring Road</td>
<td>Centre Road</td>
<td>Commuter</td>
<td>Upgrade</td>
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<td>Recreational</td>
<td>Signage</td>
</tr>
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<td>Western Ring Road Crossing</td>
<td>Western Ring Road</td>
<td>Merlynnston Creek</td>
<td>Recreational</td>
<td>Upgrade</td>
</tr>
<tr>
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<td>Craigieburn Road</td>
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</tr>
<tr>
<td>16</td>
<td>HCC_C_2043</td>
<td>Craigieburn</td>
<td>Windrock Avenue/Grandview Boulevard</td>
<td>Lygon Drive</td>
<td>Mount Ridley</td>
<td>Novice</td>
<td>Signage</td>
</tr>
<tr>
<td>17</td>
<td>HCC_B_1023</td>
<td>Broadmeadows</td>
<td>Widford Street/Blair Street</td>
<td>Western Ring Road</td>
<td>Barry Road</td>
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<td>Upgrade</td>
</tr>
<tr>
<td>18</td>
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<td>Barry Road</td>
<td>Aitken Boulevard</td>
<td>Merri Creek</td>
<td>Commuter</td>
<td>New bike path</td>
</tr>
<tr>
<td>19</td>
<td>HCC_B_1005</td>
<td>Jacana</td>
<td>Jacana Reserve</td>
<td>Moonee Ponds Creek</td>
<td>Johnstone Street</td>
<td>Novice</td>
<td>Upgrade</td>
</tr>
<tr>
<td>20</td>
<td>HCC_C_2056</td>
<td>Roxburgh Park</td>
<td>Woodworth Park/Manley Park/Murchison Square/Sherwin Place</td>
<td>Shankland Drain</td>
<td>Craigieburn Train Line</td>
<td>Novice</td>
<td>Upgrade</td>
</tr>
<tr>
<td>21</td>
<td>HCC_C_2087</td>
<td>Craigieburn</td>
<td>Leigh Banbury Walkway/Leigh Court</td>
<td>Clarendon Avenue</td>
<td>Leigh Court Reserve</td>
<td>Novice</td>
<td>Upgrade</td>
</tr>
<tr>
<td>22</td>
<td>HCC_B_1046</td>
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<td>Riggall Street</td>
<td>Nathalia Street</td>
<td>Dallas Drive</td>
<td>Commuter</td>
<td>Upgrade</td>
</tr>
<tr>
<td>23</td>
<td>HCC_C_2009</td>
<td>Roxburgh Park</td>
<td>Woodlands Park</td>
<td>Aitken Boulevard</td>
<td>Coopers Road Drain</td>
<td>Recreational</td>
<td>Gap in network</td>
</tr>
<tr>
<td>Rank</td>
<td>Code</td>
<td>Suburb</td>
<td>Cycle Route</td>
<td>Section (from)</td>
<td>Section (to)</td>
<td>Network</td>
<td>Project Works</td>
</tr>
<tr>
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<td>------------</td>
<td>-----------</td>
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<td>24</td>
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<td>Dimboola Road</td>
<td>Erinbank Crescent</td>
<td>Pascoe Vale Road</td>
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<td>Upgrade</td>
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<td>25</td>
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<td>Bridgewater Road</td>
<td>Walters Street</td>
<td>Commuter</td>
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<td>26</td>
<td>HCC_B_1124</td>
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<td>Pascoe Vale Road</td>
<td>Recreational</td>
<td>Signage</td>
</tr>
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<td>27</td>
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<td>N-S Linear Park</td>
<td>Mount Ridley Conservation Reserve</td>
<td>Grand Boulevard</td>
<td>Recreational</td>
<td>Gap in network</td>
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<td>Melrose Drive</td>
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<td>29</td>
<td>HCC_C_2001</td>
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<td>Greenvale Reservoir Park Trail (West)</td>
<td>Venezia Promenade</td>
<td>Somerton Road</td>
<td>Recreational</td>
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<td>30</td>
<td>HCC_B_1084</td>
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<td>Somerset Road</td>
<td>Sydney Road</td>
<td>Merri Creek</td>
<td>Commuter</td>
<td>Line marking</td>
</tr>
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</table>

Table 8. Target Projects List - Sunbury

<table>
<thead>
<tr>
<th>Rank</th>
<th>Code</th>
<th>Suburb</th>
<th>Cycle Route</th>
<th>Section (from)</th>
<th>Section (to)</th>
<th>Network</th>
<th>Project Works</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HCC_S_002</td>
<td>Sunbury</td>
<td>Blind Creek</td>
<td>UGB West</td>
<td>Sunbury Train Line</td>
<td>Recreational</td>
<td>Extension</td>
</tr>
<tr>
<td>2</td>
<td>HCC_S_090</td>
<td>Sunbury</td>
<td>Horne Street</td>
<td>Mitchells Lane</td>
<td>Gap Road</td>
<td>Commuter</td>
<td>New bike path</td>
</tr>
<tr>
<td>3</td>
<td>HCC_S_058</td>
<td>Sunbury</td>
<td>Station Street</td>
<td>Sunbury Train Line</td>
<td>Barkly Street</td>
<td>Commuter</td>
<td>Extension</td>
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<td>Mitchells Lane</td>
<td>Wilsons Lane</td>
<td>Horne Street</td>
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</tr>
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<td>5</td>
<td>HCC_S_009</td>
<td>Sunbury</td>
<td>Elizabeth Drive</td>
<td>Racecourse Road</td>
<td>Vineyard Road</td>
<td>Commuter</td>
<td>Extension</td>
</tr>
<tr>
<td>6</td>
<td>HCC_S_093</td>
<td>Sunbury</td>
<td>Shields Street Crossing</td>
<td>Mitchells Lane</td>
<td>Shields Street</td>
<td>Novice</td>
<td>New bike path</td>
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<tr>
<td>7</td>
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<td>Sunbury</td>
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<td>Shields Street</td>
<td>Gap Road</td>
<td>Novice</td>
<td>New bike path</td>
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<td>Riddell Road</td>
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<td>Commuter</td>
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</tr>
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<td>HCC_S_052</td>
<td>Sunbury</td>
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<td>Sunbury Road</td>
<td>Sunningdale Avenue</td>
<td>Commuter</td>
<td>Gap in network</td>
</tr>
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<td>HCC_S_037</td>
<td>Sunbury</td>
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<td>Sunbury Train Line</td>
<td>Harker Street</td>
<td>Novice</td>
<td>New bike path</td>
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<td>11</td>
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<td>Sunbury Train Line</td>
<td>Jacksons Creek</td>
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<tr>
<td>12</td>
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<td>Kismet Creek</td>
<td>UGB West</td>
<td>Blind Creek</td>
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<td>Extension</td>
</tr>
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<td>Upgrade</td>
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<td>Wanginu Park</td>
<td>Holden Flora Fauna Reserve</td>
<td>Recreational</td>
<td>Gap in network</td>
</tr>
</tbody>
</table>
3.1.4 Advocacy Projects

The Advocacy Projects are a list of projects that Council will be advocating to State Government to be delivered in the coming years. The following figures show a map of the advocacy projects in Sunbury and the Hume Corridor.
Figure 11. Map of Bicycle Network Plan – Advocacy Projects in Sunbury
Figure 12. Map of Bicycle Network Plan – Advocacy Projects in Hume Corridor
<table>
<thead>
<tr>
<th>Rank</th>
<th>Code</th>
<th>Suburb</th>
<th>Cycle Route</th>
<th>Section (from)</th>
<th>Section (to)</th>
<th>Network</th>
<th>Hierarchy</th>
<th>Works</th>
</tr>
</thead>
<tbody>
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<td>HCC_C_2020</td>
<td>Roxburgh Park</td>
<td>Aitken Boulevard</td>
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<td>Mount Ridley Road</td>
<td>Commuter</td>
<td>BPR</td>
<td>New path</td>
</tr>
<tr>
<td>2</td>
<td>HCC_C_2027</td>
<td>Craigieburn</td>
<td>Craigieburn Road</td>
<td>Mickleham Road</td>
<td>Merri Creek</td>
<td>Commuter</td>
<td>BPR</td>
<td>Bike lanes</td>
</tr>
<tr>
<td>3</td>
<td>HCC_S_005</td>
<td>Sunbury</td>
<td>Sunbury Train Line</td>
<td>Macedon Street</td>
<td>UGB North</td>
<td>Commuter</td>
<td>BPR</td>
<td>New path</td>
</tr>
<tr>
<td>4</td>
<td>HCC_B_1001</td>
<td>Broadmeadows</td>
<td>Moonee Ponds Creek</td>
<td>Western Ring Road</td>
<td>Woodlands Historic Park</td>
<td>Recreational</td>
<td>BPR</td>
<td>Gap &amp; part upgrade</td>
</tr>
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<td>Craigieburn Train Line</td>
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<td>Craigieburn Road</td>
<td>Commuter</td>
<td>BPR</td>
<td>Bike lanes</td>
</tr>
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<td>6</td>
<td>HCC_B_1014</td>
<td>Campbellfield</td>
<td>Merri Creek</td>
<td>Western Ring Road</td>
<td>Cooper Street</td>
<td>Recreational</td>
<td>PBN</td>
<td>New/extended Shared Path</td>
</tr>
<tr>
<td>7</td>
<td>HCC_B_1031</td>
<td>Greenvale</td>
<td>Mickleham Road</td>
<td>Melrose Drive</td>
<td>Somerton Road</td>
<td>Commuter</td>
<td>BPR</td>
<td>Bike lanes</td>
</tr>
<tr>
<td>8</td>
<td>HCC_B_1036</td>
<td>Somerton</td>
<td>Somerton Road</td>
<td>Merri Creek</td>
<td>Section Road</td>
<td>Commuter</td>
<td>BPR</td>
<td>Bike lanes</td>
</tr>
<tr>
<td>9</td>
<td>HCC_S_028</td>
<td>Sunbury</td>
<td>Macedon Street</td>
<td>Sunbury Train Line</td>
<td>Powlett Street</td>
<td>Commuter</td>
<td>BPR</td>
<td>Bike lanes</td>
</tr>
<tr>
<td>10</td>
<td>HCC_B_1025</td>
<td>Broadmeadows</td>
<td>Craigieburn Train Line</td>
<td>Western Ring Road</td>
<td>Somerton Road</td>
<td>Commuter</td>
<td>BPR</td>
<td>New path</td>
</tr>
</tbody>
</table>

Projects that are outside of this list still priorities and the full project list should be considered in determining future funding opportunities.

New cycle paths on arterial roads that support new development areas are significant priorities and should be delivered with new development and certainly as part of any road upgrades. These include cycle paths on Donnybrook Road, Mickleham Road (north of Somerton Road), Sunbury Road and Lancefield Road.
3.2 Implementing the Bicycle Network Plan

The development of a municipal wide bicycle network for Hume is the starting point to better deliver future cycling infrastructure. The delivery of bicycle infrastructure is a joint responsibility that includes Council, developers, the Victorian Government and other agencies.

The following are recommendations to implement the bicycle network plan in future:

- Use the Target Projects list to inform the next update of the Walking and Cycling Strategy and Hume Integrated Land Use and Transport Strategy (HILATS).
- Ensure the use of the bicycle network plan in all Council’s planning processes.
- Ensure that all projects delivered by Council (community facilities, libraries, activity centres, etc) make provision for bicycle infrastructure including paths, parking and other end-of-trip facilities.
- Use the advocacy projects list created as part of the Bicycle Network Plan to advocate to Victorian Government.
- Develop concept plans and costs for regional or metro bicycle projects so when funding becomes available they can be timely presented for consideration.

3.3 Considerations for Detailed Design and Delivery

The following considerations are recommended to be taken into account when planning and delivering the bicycle network plan projects in future:

- Ensure adequate access to all bicycle routes. The infrastructure delivered needs to help achieve **connectivity**, for example ramps at grade changes and facilities at intersections and roundabouts should be provided.
- During the design of bicycle routes, a balance must be found between providing a **direct** route and providing an alternative route free of delays or safety issues.
- The provision of a high level of consistency and **legibility** in future cycle infrastructure will support an increase in the usage of cycle routes and will avoid unsafe transitions for users.
- Provide more dedicated cycle paths as they minimise the conflicts with other users. Design paths to avoid narrow sections, poor visibility, unnecessary widening and degraded surfaces will create a **pleasant** experience for cyclists. Cyclists should also be provided with effective and convenient end of trip facilities at key destinations.
- **Safety** can be improved significantly during the design of cycle infrastructure. In order to minimise the risk of traffic and hazard related injuries appropriate treatments should be provided along routes, especially at intersections and roundabouts. Passive surveillance and lighting need to be considered along cycle routes and at end-of-trip facilities.
- A key part of the implementation of this bicycle network plan will be achieved through future planning processes. This plan will allow improving **integration** between bicycle facilities in existing and growth areas and it will ensure that bicycle facilities are provided by developers as part of their land development.
- Include signage as part of the delivery of the infrastructure in existing and growth areas. Especially in existing areas, the installation of signage will allow designating some cycle routes in the network and will improve navigability in the existing infrastructure.
REFERENCES


## APPENDIX 1. CATEGORIES OF CYCLISTS AND THEIR CHARACTERISTICS

<table>
<thead>
<tr>
<th>Category</th>
<th>Photo</th>
<th>Rider characteristics</th>
<th>Required riding environment</th>
</tr>
</thead>
</table>
| Primary school children   |       | Cognitive skills not developed, little knowledge of road rules, require supervision.         | − Footpaths (where permitted)  
− Off-road: all paths  
− On-road: very low volume residential streets |
| Secondary school children |       | Skill varies, developing confidence.                                                        | − On-road: facilities are generally used  
− Off-road: paths where available |
| Recreational              |       | Experience, age, skills vary greatly.                                                       | − Off-road: desire off-road paths  
− On-road: desire quiet local streets, avoid heavily trafficked routes, and  
more experienced will prefer to use road system for long journeys |
| Commuter                  |       | Vary in age, skill and fitness, some highly skilled and able to handle a variety of traffic conditions. | − Off-road: some prefer paths, willing to take longer to get to destination,  
− On-road: some prefer low-stress roads, but others want quick trips regardless of traffic conditions.  
Primarily require space to ride, smooth riding surface and speed maintenance. |
<table>
<thead>
<tr>
<th>Category</th>
<th>Photo</th>
<th>Rider characteristics</th>
<th>Required riding environment</th>
</tr>
</thead>
</table>
| Utility    | ![Utility Category](image) | Ride for specific purposes (shopping), short length trips, routes unpredictable.     | − On-road: not on highly trafficked roads, needs include comprehensive and low-stress routes.  
− It requires appropriate end of trip facilities.                                          |
| Touring    | ![Touring Category](image) | Long distance journeys, may be heavily equipped, some travelling in groups.          | − Often route is similar to that of other tourists.                                           |
| Sporting   | ![Sporting Category](image) | Often in groups, two abreast occupying left lane, needs similar to commuters.       | − On-road: travel long distances in training on arterials, may include challenging terrain in outer urban or rural areas  
− Of-road: generally do not use off-road routes because of high speed and conflict with other users. |

Source: Austroads 2011
APPENDIX 2. HUME BICYCLE NETWORK PLAN - PRINCIPLES

1. Connectivity

*All bicycle routes should connect to each other and to the wider bicycle network*

**Key features:**

*Link origins and destinations* - Cyclists need to be able to undertake and complete meaningful trips by bicycle to all potential origins and destinations.

*Continuous network* - A route for cyclists should not start and end abruptly to avoid safety issues, especially for novice riders.

*Combination of on-road and off-road* - A linked network should be achieved by integrating existing off-road with on-road routes that connect to key destinations.

*Route options* - A choice of routes should be provided in order to increase the number of cycle trips, as origins and destinations are diverse.

*Crossing points* - Adequate access to bicycle routes should be provided, for instance provide ramps at grade changes and provide facilities at intersections and roundabouts.

2. Directness

*The bicycle network should provide the most direct possible routes to key destinations*

**Key features:**

*Fit by purpose and type of user* - Cycle routes should be direct for commuter cyclists as they can ride along the fastest and most direct route available. Instead, children will tend to use the footpath and be happy to take a less direct route to remain safe.

*Balance between direct and safety* - Balance must be found between providing a direct route and providing an alternative route free of delays or safety issues.

*Minimise travel distances* - Distances between key destinations should be minimised to encourage bicycle usage. This can increase opportunities for multi-purpose trips.

*Improve permeability* - The bicycle network should be permeable to allow for the easiest and most direct routes to a destination.

*Short and Direct Route* - Deviations or circuitous routes should be avoided as they provide a barrier to people choosing to cycle compared with other transport modes.
3. Legibility

*Bicycle routes should be legible, continuous and recognisable*

**Key features:**

*Consistency* - Bicycle routes should to be consistent in quality so they are easy to follow.

*Recognisable* - To be recognisable, cycling routes should use consistent standards, signage and design of infrastructure.

*Avoid unexpected changes* - Unexpected changes in the type of bicycle infrastructure along a bicycle route reduce legibility and potentially create an unsafe transition.

*Intersection treatments* - The cycling route across an intersection should be clearly defined to ensure that cyclists follow the route.

*Information and signage* - Signage needs to be located at decision points, in transport stops, and in station exits and platforms to minimise confusion to cyclists.

4. Pleasantness

*The bicycle network should provide a good level of comfort for cyclists along routes*

**Key features:**

*Scenic and quiet routes* – The bicycle routes should be scenic, quiet and provided in a pleasant environment.

*Design* – Provide paths that are easy to use and avoid narrow paths, blind corners, poor visibility, squeeze points, steepness and unnecessary winding.

*Quality surface* – Bumpy or degraded path surfaces should be avoided.

*Dedicated cycling paths* – This type of infrastructure offer the best cycling environment as minimise the conflicts with other users.

*End of trip facilities* – Cyclists should be provided with effective and convenient end of trip facilities at key destinations.

5. Safety

*The bicycle network should provide safe routes for cyclists*

**Key features:**

*Routes free of traffic* - The bicycle route should ideally be free of heavy traffic and traffic travelling at high speeds.

*Separation from pedestrians* - Provide separation from pedestrians in high pedestrian movement areas.
Design of intersections – Appropriate treatments should be provided at intersections and roundabouts, especially on priority bicycle routes.

Free of hazards – Minimise the risk of traffic and hazard related injuries.

Passive surveillance and lighting - Opportunities for passive surveillance and lighting along cycle routes or at end-of-trip facilities should be provided.

6. Integration

Cycling infrastructure should be integrated with key destinations, public transport and other transport projects

Key features:

Key destinations – Bicycle routes should be developed linking residential areas with activity centres and employment areas.

New developments – The provision of bicycle facilities should be part of all planning processes and especially in new residential and mixed use developments.

Growth areas - Connect bicycle facilities in the new areas with the infrastructure provided in existing areas.

Public transport – Cycling infrastructure should be integrated with public transport nodes.

Transport infrastructure projects – Bicycle facilities must be included in the development of all major transport projects.
APPENDIX 3. INITIAL PLAN

Legend
- Green: Recreational Network_Existing
- Green: Recreational Network_Proposed
- Orange: Novice Network_Existing
- Orange: Novice Network_Proposed
- Blue: Commuter Network_Existing
- Blue: Commuter Network_Proposed
- Purple: Local Government Boundary
- Railway Line
- Main Roads
- Reserves
## APPENDIX 5. FUNDING CRITERIA PRIORITY OPTIONS

### Table 5a. Criteria Options - Best Practice

<table>
<thead>
<tr>
<th>Possible Criteria</th>
<th>Description</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Area Consolidation</strong></td>
<td>Spreading cycling provision across a substantial area. Once a consistent usage has been achieved in one area, provision is spread to another.</td>
<td>Consolidation may increase cycling and be more clearly demonstrable achievement. If the whole area has achieved a satisfactory standard, cycling promotion can take place without undue concerns about safety.</td>
<td>A focus on a single area over several years may lead to charges of inequitable treatment in relation to areas that do not enjoy this investment.</td>
</tr>
</tbody>
</table>
| **Usage numbers**                  | This approach assigns priorities to existing routes with the most cyclists, which can be based on counts at peak times. | It is sound business practice to retain existing customers before seeking to attract new ones. Observing cyclists’ preferred routes tends to be a sounder measure of their attractiveness than theoretical models. | This approach does not consider:  
  - Demand suppressed by traffic dangers, physical barriers or personal safety concerns that most affect more timid cyclists  
  - Route elements that do not yet exist, such as a path or bridge yet to be constructed. |
| **Easiest or Cheapest first**      | The easiest and cheapest elements of a program are given priority.           | A simple achievement measure, such as the total length of a cycle route meeting standards, gives an impression of achievement. | The easiest or cheapest elements are not always the most needed. The importance of the different elements also needs to be considered.  
  There is a risk that such a short-term approach will lead to lower-quality outcomes in the longer term. |
| **Quality demonstration projects** | Priority is given to flagship projects to showcase attractive and high quality facilities that others will want to emulate in their own community. | This can build community support for providing quality facilities of which they can be proud. | It may be expensive and use up all the budget. |

Source: Cycle Network and Route Planning Guide, NZ
<table>
<thead>
<tr>
<th>Possible Criteria</th>
<th>Description</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Priority Routes Only</strong></td>
<td>Priority is given to the Top 30 projects from the Priority Routes list.</td>
<td>The main bicycle routes are delivered.</td>
<td>Priority list dominated by regional links so may not prioritise sufficient local links. May be beyond budget.</td>
</tr>
<tr>
<td><strong>Links by User Type</strong></td>
<td>This approach assigns priority to the Top 10 projects per user from the Priority Routes list.</td>
<td>Consideration is given to the different user’s requirements. Therefore, a mix of routes (regional and local) as well as routes with different purposes is delivered.</td>
<td>May not deliver a connected network.</td>
</tr>
<tr>
<td><strong>Local Links</strong></td>
<td>Priority is given to local routes with higher scores in the Priority Routes list.</td>
<td>More projects could be delivered if it is assumed that the length and cost per project is less.</td>
<td>Long bicycle trips may not be catered for.</td>
</tr>
<tr>
<td><strong>Metro/Regional Networks</strong></td>
<td>This approach gives priority to deliver bicycle routes that are part of the main cycle corridors (BPR, PBN, MTN)</td>
<td>It provides a better network for longer trips, especially to commuter and recreational cyclists.</td>
<td>This approach does not include main local routes and funds other’s network (i.e. VicRoads - PBN)</td>
</tr>
<tr>
<td><strong>Missing Links</strong></td>
<td>Allocate main resources to remove gaps in the existing network.</td>
<td>This approach optimises the current network and improves connectivity.</td>
<td>The development of new bicycle routes is disregarded. The need for these projects is not considered.</td>
</tr>
<tr>
<td><strong>Geographically located links</strong></td>
<td>This approach focuses on delivering projects equally distributed in Hume (i.e. by suburb)</td>
<td>It provides equal investment of bicycle infrastructure in different areas of Council.</td>
<td>This approach does not consider the importance of projects to the wider network.</td>
</tr>
</tbody>
</table>