Rockbank North MTC UDF – Technical Traffic Report - FINAL

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Institute for Sensible Transport

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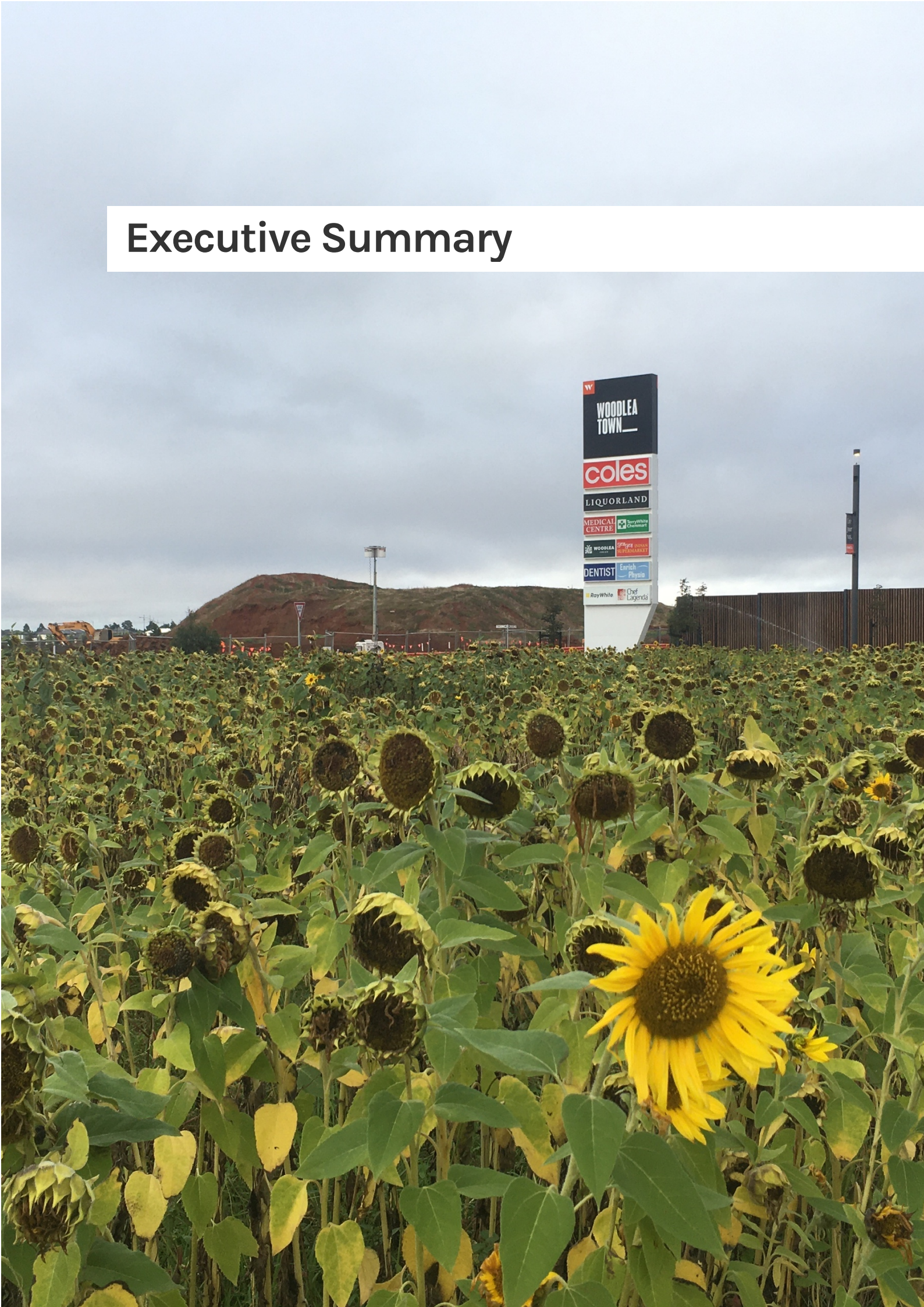
Executive Summary



This report provides a review of transport considerations to assist with the development of an Urban Design Framework for the Rockbank North Major Town Centre (MTC). This MTC will serve the western metro Melbourne region. The site is located approximately 3km north of Rockbank Railway Station and the Western Freeway.

A comparative analysis of existing transport trends of the surrounding area and comparable existing activity centres was undertaken. This found that car use to these activity centres, such as Watergardens and Woodgrove SC makes up roughly 90% of trips. For Woodgrove, 54% of car trips are less than 3km and that 77% are less than 5km.

Despite the high levels of car use, many car trips are short, indicating that providing suitable walking and cycling infrastructure would develop a more diversified mix of transport options. This analysis highlights that a *business-as-usual* approach to Rockbank North MTC is likely to generate similar travel patterns.

For Woodgrove, 54% of car trips are less than 3km and that 77% are less than 5km.

Demographics analysis shows that Rockbank North and the surrounding areas is expected to grow substantially in the coming years. The existing population is estimated at 3,000 residents, increasing to 15,000 residents in the next decade.

Anecdotal observations by developers working in the area suggest a higher level of multi-generational families are choosing to live in these new areas, which is not yet captured by the latest available demographic data.

An analysis of road crash data shows that most crashes are occurring on the Western Highway. This also reflects the newness of existing residential areas. Consideration of the design of new roads and their speed limits will be crucial to ensuring road crashes do not increase in the new developments, including Rockbank North MTC.

A site assessment of the existing Rockbank North residential area and local activity centre (Woodlea) was undertaken with Council officers. The local activity centre was found to have high-quality urban design elements, such as active street frontages, integration of open space, and a continuity of building frontage. Parking was accessible without detracting from the public realm. Footpaths and shared paths were well-constructed; however, intersection design reduced the attractiveness of active travel. Of note, the school drop-off highlighted the need for infrastructure investment and behaviour change programs to reduce local road congestion and improve social and health outcomes for the community. Creating high quality, safe and attractive walking and cycling connections to and within the Rockbank North MTC will improve transport choice, urban vibrancy and the overall liveability of the area.

Ensuring that walking and cycling connections to the Rockbank North MTC will improve local access to the MTC from the existing residential catchment.

An important component of this report included a critical review of previous transport analysis undertaken for Rockbank North MTC. The *Rockbank North Town Centre Technical Transport Report (2021)* was found to deviate from best-practice methodologies for estimating future mode share for the Rockbank North MTC. This led to an unrealistic appraisal of the future transport mix. In particular, there was a significant underestimating of the car mode share and a corresponding overestimation of public and active transport use. The Movement and Place Classification also mis-classified several proposed streets in the MTC as being at a higher function than is likely to exist. A more realistic appraisal has been provided.

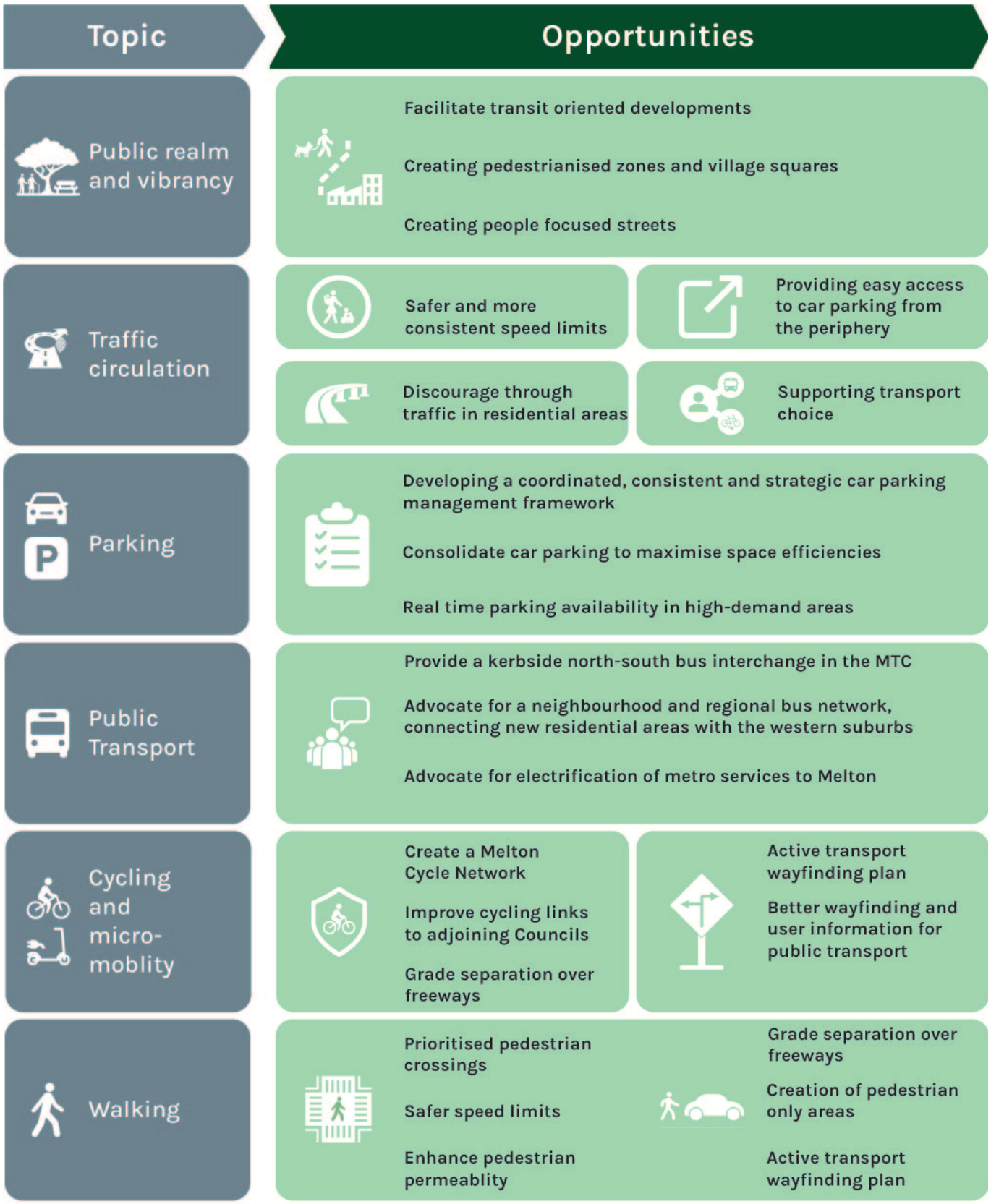
The Rockbank North Town Centre Technical Transport Report (2021) was found to deviate from best-practice methodologies for estimating future mode share for the Rockbank North MTC.

Clarity Consult have recently developed a Strategic Transport Model for Melton. A review of its development thus far was undertaken. It showed that key data for Rockbank North MTC was lacking, preventing final numbers to be calculated at the time of writing. In particular, VITM and SALUP figures are not yet available. Once these are included in the Strategic Transport Model, a high-level traffic impact assessment will be completed for the MTC.

Transport design considerations for each mode of transport was included in this report to help guide best-practice design of the future MTC. This included examples from existing local, interstate, and international street design guidelines. Overall, separation of cyclists from traffic and a focus on safe pedestrian crossings was highlighted. The need for a kerb-side bus interchange emerged, integrated with the surrounding streetscape.

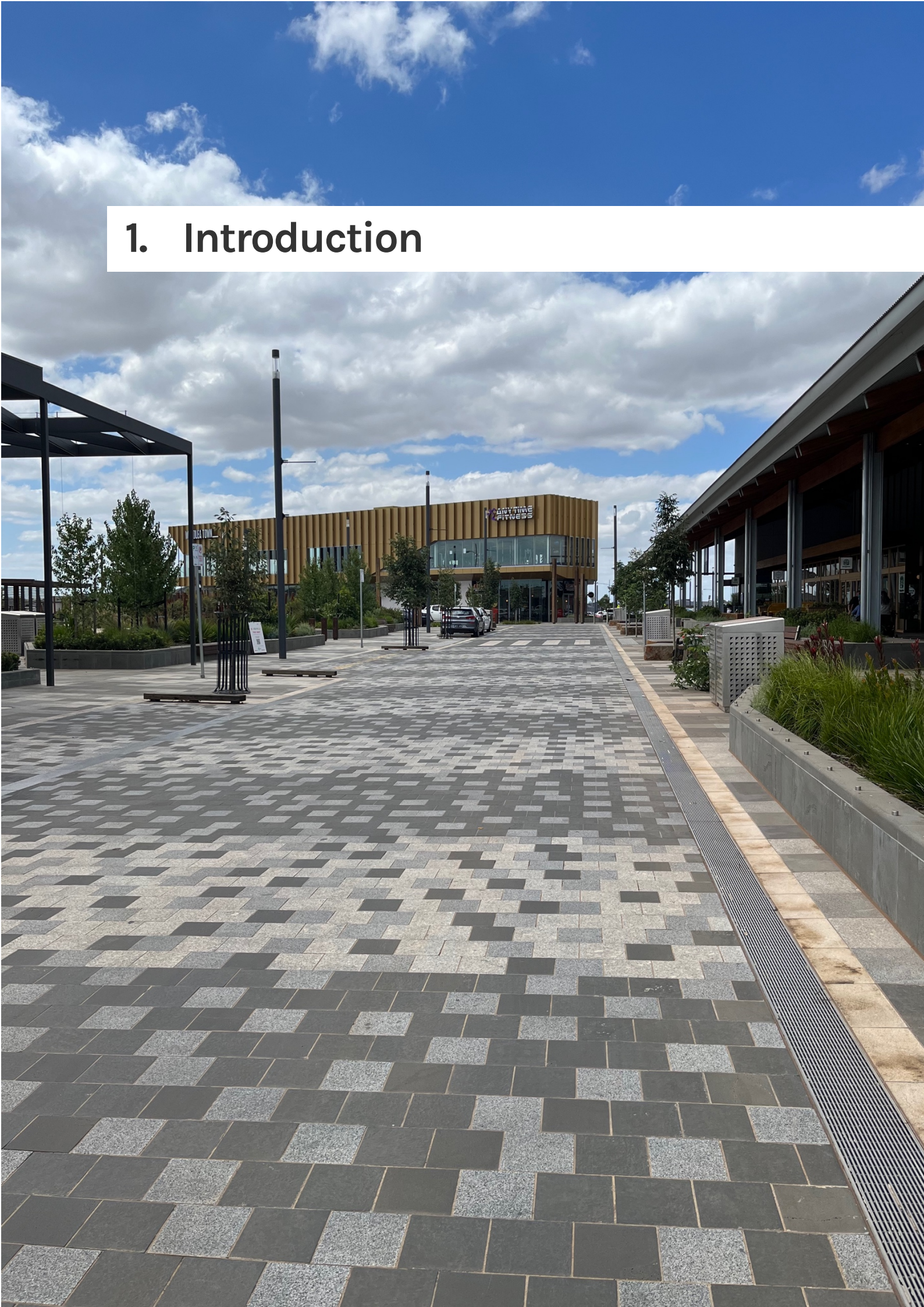
This technical report has identified a number of key opportunities to increase the transport choice and meet the strategic ambitions for Rockbank North. These opportunities, linked to topics, are captured in the figure on the right.

Finally, a high-level opportunities table was provided to guide transport decision-making during the development of the MTC and provide Council with a series of actions and advocacy items to pursue in the broader area.



Rockbank North MTC Transport Opportunities

1. Introduction



Melton City Council are preparing the Urban Design Framework (UDF) for the Rockbank North Major Town Centre. The previous, 2021 *Technical Transport Report* was not considered sufficient for the current UDF process and this report is designed to enhance the transport and mobility assessment and outcomes for the Rockbank North Town Centre.

This report covers the following areas of relevance to the future success of the Rockbank North Town Centre:

- Updates the Strategic Transport Model for Rockbank North Major Town Centre. This will provide a better understanding of future demand. Council is however in a strong position to influence future transport demand, through the implementation of the design considerations included in this report.
- Provides a comparative assessment of travel patterns across existing town centres within Melton City Council. It is noted that there is a high level of car dependency within existing town centres in the Melton LGA and this provides a useful basis for understanding plausible future mode share for those in Rockbank North.
- Offers an overview and analysis of the existing and planned transport networks, across all modes of land transport. This will also include key transport policies influencing the project and land use in the Rockbank North Major Town Centre.
- Provides a detailed Traffic Impact Assessment based on the updated demand forecast.
- Provides a critical analysis of the *Rockbank North Town Centre Technical Transport Report* including the gaps or changes that have occurred since the report was prepared.
- Considers the existing and future demographics and land uses for the study area in terms of transport needs. As will be discussed in Section 4, in order to ensure Rockbank North does not *'build in'* the level of transport dependency of other town centres, a departure from the *predict and provide* (see Section 2.1) approach will be necessary, in order to align outcomes with Melton's strategic objectives.
- Develops a high-level Staging Plan aligned to population growth. This will identify the transport requirements necessary for Melton's strategic objectives to be met.
- Provides advice on high level transport design considerations and implications for the UDF. This will include the relationships with the existing Rockbank Train Station, access to the Rockbank Major Town Centre (MTC) to south of the Western Freeway, and remainder of the Rockbank North Precinct Structure Plan (PSP) area.
- Explores transport issues and opportunities, including measures that boost the level of attractiveness and safety for sustainable forms of transport. This will include measures that prioritise pedestrian movements, provide a cohesive, connected network of high-quality cycling infrastructure, linked to key destinations, and enhance the quality of the bus network. Additionally, the report seeks to minimise the provision of off-street car parking and provide streets where vehicles move at a speed that is safe for people on foot or bicycles.
- Provides some general commentary on public transport services, including buses and connections to the Rockbank Train Station, as well as pedestrian and cycling infrastructure. Commentary is also provided regarding the design and location of car parking within the Rockbank North town centre.

1.1 Study area

The Rockbank North Precinct boundary was defined in the 2012 Rockbank North precinct Structure Plan but the area remained part of Rockbank until 2017 when the new suburb of Aintree was gazetted. The broken red line in Figure 1 shows the Rockbank North PSP boundary. Currently, most of Rockbank North Precinct sits within the suburb of Aintree, with part of the north-east extending into Bonnie Brook. Suburbs are defined by the grey lines, and the orange lines illustrate the state suburb during the ABS 2016 Census. Woodlea Estate, the pink area, is the largest development site in the suburb and expected to accommodate approximately 20,000 residents upon completion[1].

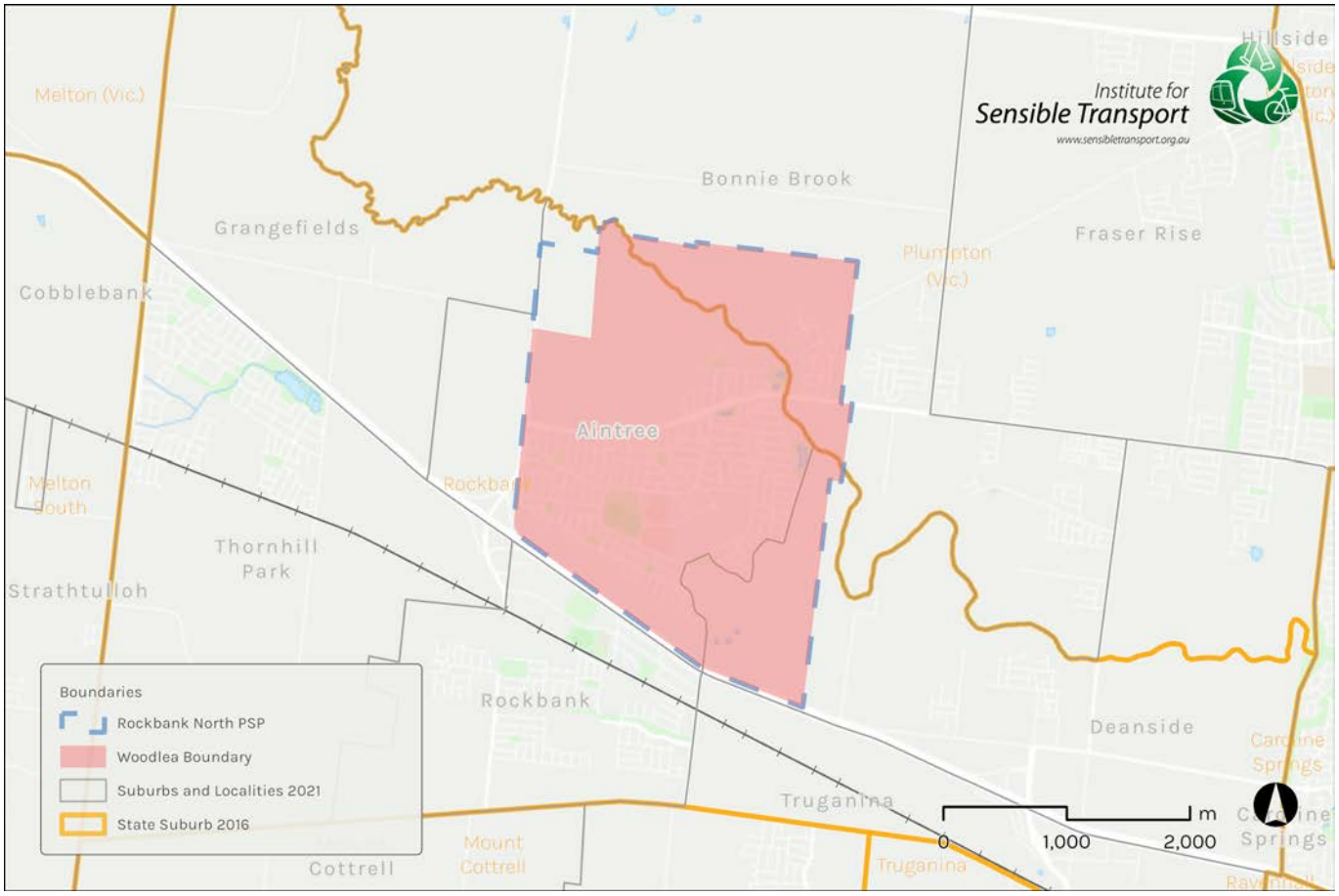


Figure 1 Study area

Source: ABS Census, Melton City Council, Woodlea Master Plan

[1] FY21 Mirvac Property Compendium. 2021.

Figure 2 shows the hierarchy of the road network in Rockbank North, from freeways and highways down to walking and cycling trails. The Western Freeway, the Melbourne – Ballarat corridor, borders the PSP in the south. Leakes Rd, a north-south arterial road, runs along the western boundary of the PSP, connecting onto Greigs Rd, an east-west arterial road, in the south. It also connects onto Melton Hwy further in the north, out of the extent of the map.

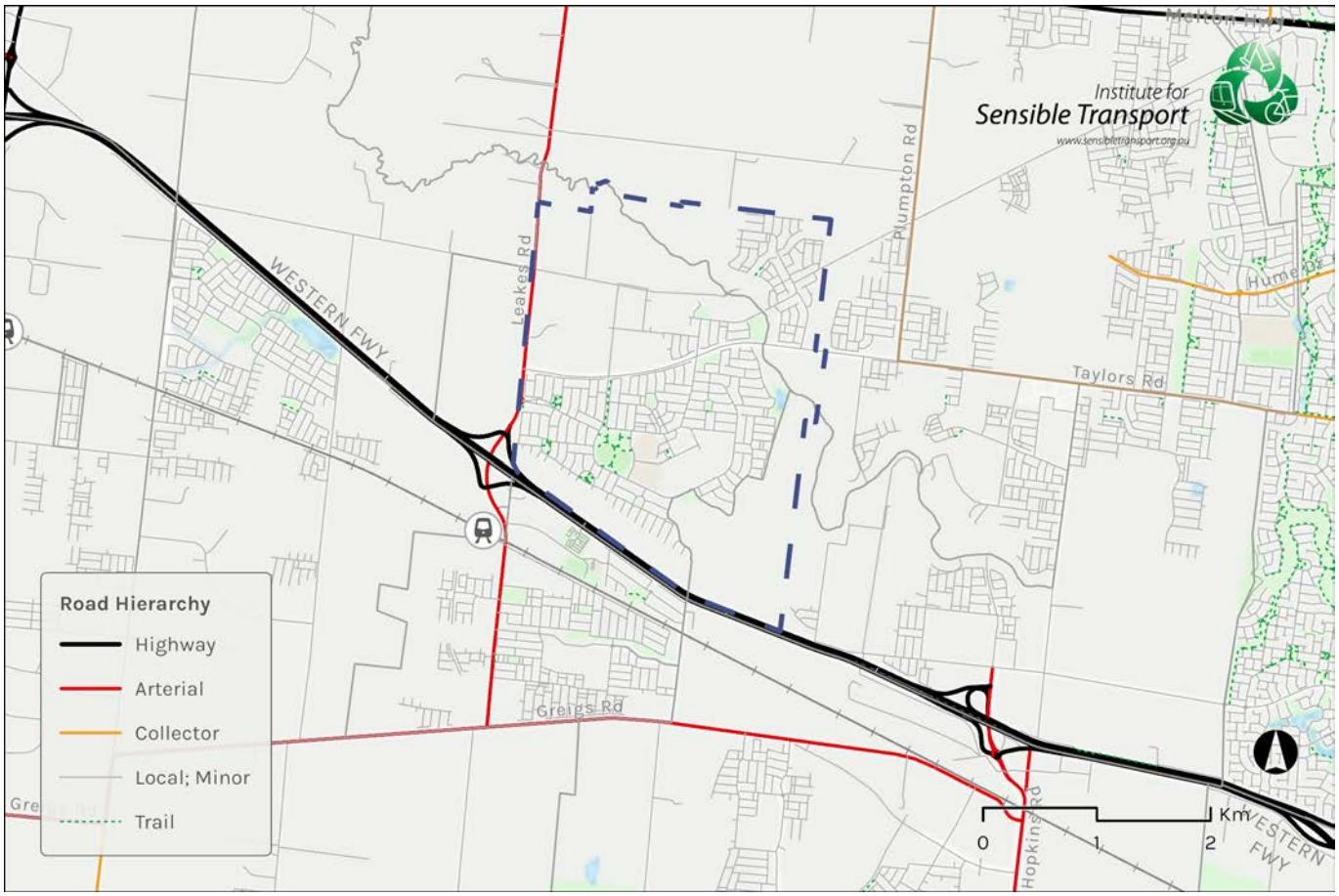


Figure 2 Road network of Rockbank North, by classification

Source: Department of Transport

2. Contemporary Transport Planning Concepts

This section describes some important concepts in transport planning of relevance to the Rockbank North Town Centre.

2.1 Evolving from *'predict and provide'* to *'debate and decide'*

In the decades following WWII, the conventional approach to transport planning was to forecast population and economic growth, increases in car ownership and then determine the road-based infrastructure required to accommodate the forecast scenario. The road building constructed under the predict and provide mentality have resulted in a narrow set of transport options that can limit sustainable transport options.

The growing realisation of the limitations of predict and provide transport planning and the negative impacts of heavy car use have led to the emergence of a fundamentally different approach to transport planning, known as debate and decide[2]. 'Debate and decide' involves a discussion and analysis on what city and transport system is desirable in the future and develops a strategic plan to achieve that goal. Typically, this process would include an analysis of evidence-based transport policy; looking at what has and has not worked in the past, both in the geographic area in question, as well as in other cities. Mode share targets and strategies designed to achieve these targets are very often a core component of the debate and decide approach to transport planning and tend to offer a wider range of policy tools beyond infrastructure, including pricing strategies, behaviour change principles and other Travel Demand Management techniques.

Box 1 provides a summary of the Marchetti Constant, which helps in understanding travel time budgets that influence mobility choices.

Marchetti Constant

The Marchetti constant (Marchetti, 1994) describes the phenomenon that regardless of the speed of transport, humans have, throughout history, exhibited a tendency to travel for about 30 minutes to work each way. As human travel has evolved over centuries, from almost entirely pedestrian, to horse and cart, rail, and car, daily travel time has remained fairly constant. The reason this is an important concept for the Melton Town Centre Revitalisation Plan is because it helps to inform the community and policy makers on the limitations of building additional road capacity to 'speed up' traffic. The evidence suggests this simply increases travel distance rather than reduce travel time. Road building exercises, especially duplications of existing roads, whilst initially presenting a tempting policy option, tend to induce traffic, which erodes any travel time saving that initially motivated the duplication, as well as causing congestion in other areas of the road network[2].

Box 1 Understanding travel time budgets

2.2 Pedestrian orientated development

Pedestrian oriented development relates to the design and presentation of public spaces, and the provision for associated facilities to encourage walking and cycling. The intensification of developments and improving the public realm experience along transit corridors makes it possible to reduce trips made by private motorised vehicle. It is essential to apply the principles of Transit Oriented Development (TOD) and Pedestrian Oriented Design (POD) to ensure optimal results. This is achieved through these key principles:

- Fostering human scaled development that emphasises the pedestrian and cyclist rather than vehicular prioritisation.

[2] Schiller, P., Bruun, E., & Kenworthy, J. (2010). An Introduction to Sustainable Transportation: Policy, Planning and Implementation. London: Earthscan.

- Promoting pedestrian oriented buildings, pedestrian amenities and landscaping that contribute positively to an appealing streetscape.
- Promoting an environment where developed areas, recreational areas and pedestrian/ bike paths are accessible to all.
- Promote pedestrian safety by increasing the visibility and vitality of pedestrian areas.
- Providing a connected network of footpaths and multi-purposed paths.
- Encouraging street activity to support liveable neighbourhoods and vital commercial areas.
- Encourage designs that reduce crime (e.g. passive surveillance), personal and community safety.

2.3 Transit orientated development

Transit Oriented Development (TOD) is the functional integration of land use and transit through the creation of compact, walkable, mixed-use communities within walking distance of transit corridors or nodes. TOD brings together people, jobs, and services and is designed in a way that makes it efficient, safe, convenient, and attractive to travel on public transport in a sustainable way. This is achieved through these key principles:

- Creating compact development in easily walkable radius of 400-800m easy walk of public transit.
- Ensuring improved access to and cross connections with transit routes at regular intervals.
- Attracting redevelopment on key sites along and around transit routes and transit stops to capture increased land values.
- Ensuring compatibility and connectivity with surrounding neighbourhoods.
- Including quality civic spaces as organizing features within neighbourhoods.
- Encouraging a variety of housing types with higher densities near transit facilities.
- Incorporating a vertical use mix of retail and offices at ground level (active street frontages) with housing above.
- Extending transit services to new and existing high-density residential developments, major employment areas and major concentrations of health services, shops and education.

If Rockbank North had been designed in a manner consistent with transit-oriented development, it would have been located closer to a train station. Given Rockbank North's location, some 2 km from the closest railway station, the provision of frequent bus connections integrated with the rail services are imperative to its success. Additional detail on public transport elements related to Rockbank North is provided in Section 3.5.

2.4 Complete Streets

A complete street is one that provides a high level of service to multiple modes of transport, often with an emphasis on a high-quality pedestrian environment. The concept of 'Complete streets' originated in North America, however the concept of reallocating road space to ensure high levels of amenity and safety for pedestrians, cyclists, and public transport users, has been popular in Dutch and Danish cities since at least the 1980s. These designs emerged in response to heavily trafficked arterial road networks that failed to produce vibrant, safe streetscapes that serve a multitude of roles (e.g. transport commercial, social, environmental). Several Australian states have begun developing their own Complete Streets design guides.

In addition to the appreciation of modes of transport other than private motorised vehicles, complete streets also recognise the social and retail dimensions of streets and seek to build in features that encourage people to linger, such as shade trees, active street frontages, wider footpaths, textured pavements, seating and street designs that reduce traffic speeds (Figure 3 offers a conceptual example).

Figure 3 A typical 'complete streets' design
Source: http://completestreetsprince.org/

The San Francisco Municipal Transportation Agency highlight some of the elements that make up a complete street, including:

- Curb extensions, to minimise crossing distance for pedestrians.
- Mid-block crossings, to increase opportunities for pedestrians to cross at a formal crossing. This would typically include surface treatments to increase visibility.
- Raised crossings to increase the profile of the pedestrian while crossing, and to act as a speed bump to lower vehicle speeds.
- Paved surfaces in replacement of asphalt, to increase audibility for motorised, vehicles, helping to "design in" safer speeds.
- Planter boxes and shade trees and other foot path landscaping.
- Facilitation of temporary use activities, such as markets and street fairs.
- Reductions in curb radii, encouraging vehicles to travel at safer speeds, increasing pedestrian visibility and reducing the pedestrian cross distance.
- Footpath parklets, on street bike parking, and street furniture, even when it involves reclaiming street space previously used for motor vehicle storage.

Rockbank North does have the potential to integrate Complete Street principles into its design. This will also help support many of the objectives Council has for fostering an urban design outcome that has vibrancy and people focus as core elements, as well as *Safe System* outcomes.

2.5 Movement and Place

The Victorian government have developed the *Movement and Place* framework. This will be discussed with application to Rockbank North streets in Section 8.3, however it is useful to provide a brief introduction to the concept here. Movement and Place (M&P) frameworks are becoming increasingly common across several states in Australia. They function to enable state and local government to understand the dual role that streets perform in terms of being a movement corridor and a place in itself. Streets provide for movement of people and goods, but also serve as places in their own right.

2.6 Safe Systems

The *Safe Systems* approach refers to a transport planning/road safety theory in which the fallibility of the road user is acknowledged, with the intention of designing a system that is forgiving. Such an approach has received widespread policy approval in terms of its ability to reduce the risk of road traffic injury and has now been adopted by all Australian road authorities, including by the Victorian government. The Safe Systems approach is highly complementary to Vision Zero – in which any fatality or serious injury is unacceptable, and road agencies aim to bring road death and serious injury to zero. The underlying philosophy behind these approaches and the practical policy implications of this will be embedded in the subsequent stages of this project.

The Victorian government has adopted the Victorian Road Safety Strategy 2021 – 2030, which aims to halve road deaths and reduce serious injuries by 2030 and eliminate road deaths by 2050.

The Victorian government aims to eliminate deaths on our roads by 2050.

2.7 Active transport and intersections

Traditional roundabouts are generally considered to have poor safety outcomes for pedestrians and cyclists, compared to other types of intersections. This is because roundabouts are mostly designed to improve vehicle flow, thus maintaining vehicle priority through the intersection.

Newer roundabout designs, particularly those in local street or activity centre settings, now feature elements that improve the safety and comfort of vulnerable road users, such as pedestrians and people on bikes. Some of these elements are already evident in Melton, such as the raised zebra crossings at the Patterson / McKenzie Streets roundabout. This provides priority to pedestrians at the crossing points.

Other examples exist elsewhere in Melbourne that also provide safety enhancements to cyclists. Figure 4 is one example on Moray Street, South Melbourne. This design also gives priority for cyclists, as well as pedestrians. This design is a variation of a common roundabout design found in The Netherlands.

Figure 4 Protected roundabout, South Melbourne

An example of a typical Dutch roundabout is shown below in Figure 5. It has higher comfort for cyclists than the South Melbourne example as the circular track allows for a smoother turning movement through the intersection.

Figure 5 Dutch roundabout

These examples offer improved pedestrian and cyclist safety and comfort improvements while maintaining the structure of a roundabout. They would be applicable for roundabouts in Rockbank North that are one lane in each direction. Roundabouts with two lanes are not suitable.

2.7.1.1 Signalised intersections

Improvements to safety can also be made at signalised intersections. Figure 6 shows an example from Whittlesea, where the intersection has been made into a raised platform. The crossing legs also have medians that extend beyond the pedestrian path, providing an extra level of protection against drivers turning right over the pedestrian crossing leg.

Figure 6 Safer signalised intersection

3. Comparative Analysis

To gain an understanding of the potential travel patterns for future residents, workers and visitors in Rockbank North Major Town Centre (MTC), it is useful to examine the mobility patterns of other town centres that have similar land use contexts. Caroline Springs, Woodgrove Shopping Centre and Watergardens have been selected as useful guides for comparison purposes and the remainder of this section highlights existing transport data from these areas, as well as implications for Rockbank North MTC.

3.1 Methodology

We have used Victorian Integrated Survey of Travel and Activity (VISTA) and ABS Census data to compare the projected Rockbank North MTC mode share and travel behaviour against existing and comparable activity centres in outer Melbourne.

VISTA data from 2012-2016 was utilised as this older dataset allows for a more granular analysis compared to the most recent one (2018).

Woodgrove Shopping Centre and Caroline Springs Square were chosen as comparable sites due to their proximity to the Rockbank North MTC. Watergardens was added to the list as Caroline Springs does not have VISTA trips. It is also an interesting comparator due to its location at a railway station and integration with a bus interchange.

3.2 Journey to work

Using the most recent ABS Journey to Work data from 2016 to compare journeys to work for each of the sites, Figure 7 shows the recorded mode share to DZNs[3] that contained Rockbank North MTC, Woodgrove shopping centre, Caroline Springs Square, and Watergardens town centre. Car dependency is highest in Caroline Springs, with the lowest at Watergardens. The difference for Watergardens can be attributed to the proximity of the train station, which corresponds with the highest public transport usage at 9%. Travelling by bicycle remains the least used mode of transport, with 0.5% at Caroline Springs being the highest record. In contrast the estimated mode share for Rockbank North is shows in Figure 7, where cycling and walking have been approximated, as the 2021 UDF report combines both modes as *'active transport'*.

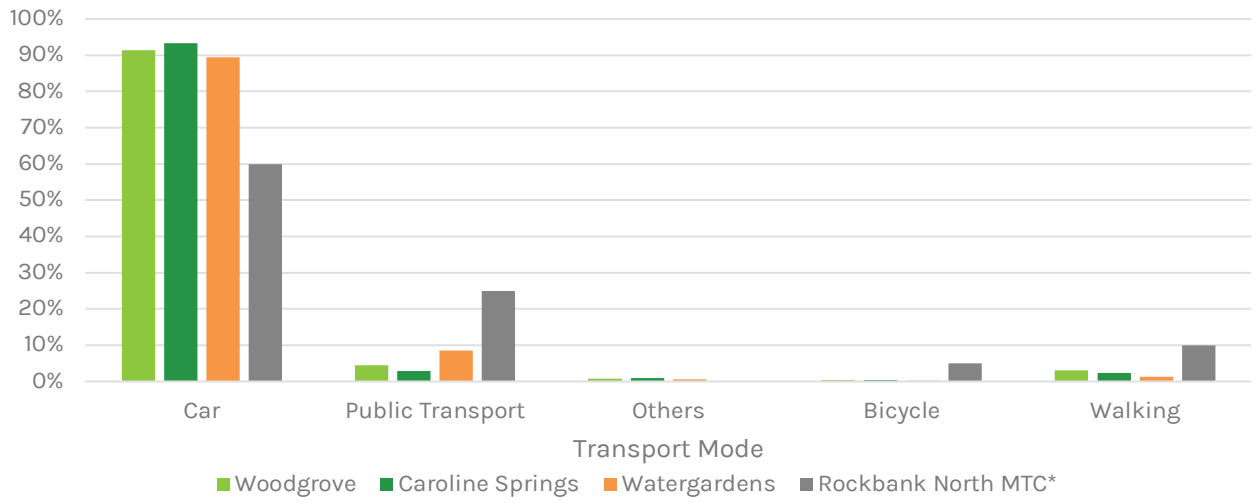


Figure 7 Comparison of mode share for journey to work

Source: ABS Census 2016

* GTA estimate (note Train = Public transport, Cycling and Walking = Active Transport for Rockbank North MTC)

[3] DZN, or Destination Zone, is a spatial unit used to code Place of Work (POW). While Mesh Blocks are smaller, random adjustments to small numbers decrease reliability

Table 1 compares the job density among the three Activity Centres. Caroline Springs is made up of two DZNs, making it the largest area. While the high concentration of jobs in Watergardens can be attributed to the commercial zoning of the whole DZN, it also indicates the attractiveness of public transport, with a train station and bus interchange in close proximity. The forecasted jobs in the Rockbank North MTC is more than twice the number of jobs available in Woodgrove, and job density is expected to be 55% denser than Watergardens. As highlighted in Section 8, the jobs density estimate appears unlikely and raises questions about the subsequent mode share forecasts from the 2021 report.

Table 1 Job density in comparable areas

Activity Centre	No. of jobs	DZN Area (km^2)	Job density (per km^2)
Woodgrove SC	1,880	1.0273	2,186
Caroline Springs SC	1,489	1.1491	1,650
Watergardens SC	1,595	0.5744	3,288
Rockbank North MTC*	3,900	0.7639	5,105

Source: ABS Census, Rockbank North PSP

3.2.1 Origin destination analysis

As Aintree was gazetted after the 2016 Census, there is insufficient data to accurately analyse trip patterns using journey to work data at a granular level. Commuter numbers from the 2016 SA2 division for Rockbank – Cottrell was used to show the relationship between origin and destinations for residents in that area travelling to work. Figure 8 is a visual representation of the number of people travelling from/to Rockbank – Cottrell. The line thickness represents the number of people. The extent of the map includes the western and northern LGAs of Melbourne, with Macedon Ranges and Ballarat being the furthest LGAs that residents are travelling to.

Internal trips within Rockbank-Cottrell to Melton are the most common commuter connection. The analysis finds there are:

- 718 residents in the Rockbank – Cottrell SA2 division in 2016.
- Residents working within the City of Melton made up the largest group at 31%.
- The cities of Brimbank (13%) and Wyndham (11%) made were also significant employment areas.
- 18% of residents travel to the IMAP LGAs for work (Melbourne 9%, Maribrynong 6%, Yarra 2%, Yarra 1%).

Almost one third of residents in the study area work within the Melton LGA

Figure 8 shows that the most important home-workplace connection is within the Melton LGA itself, and highlights the importance of providing high quality sustainable travel options to enable local residents to commute to work within the LGA itself. It is important to also recognised better connections to adjoining municipalities. In particular, cycling and public transport connections (either in combination or as a stand-alone mode) has the potential to enhance transport choices.

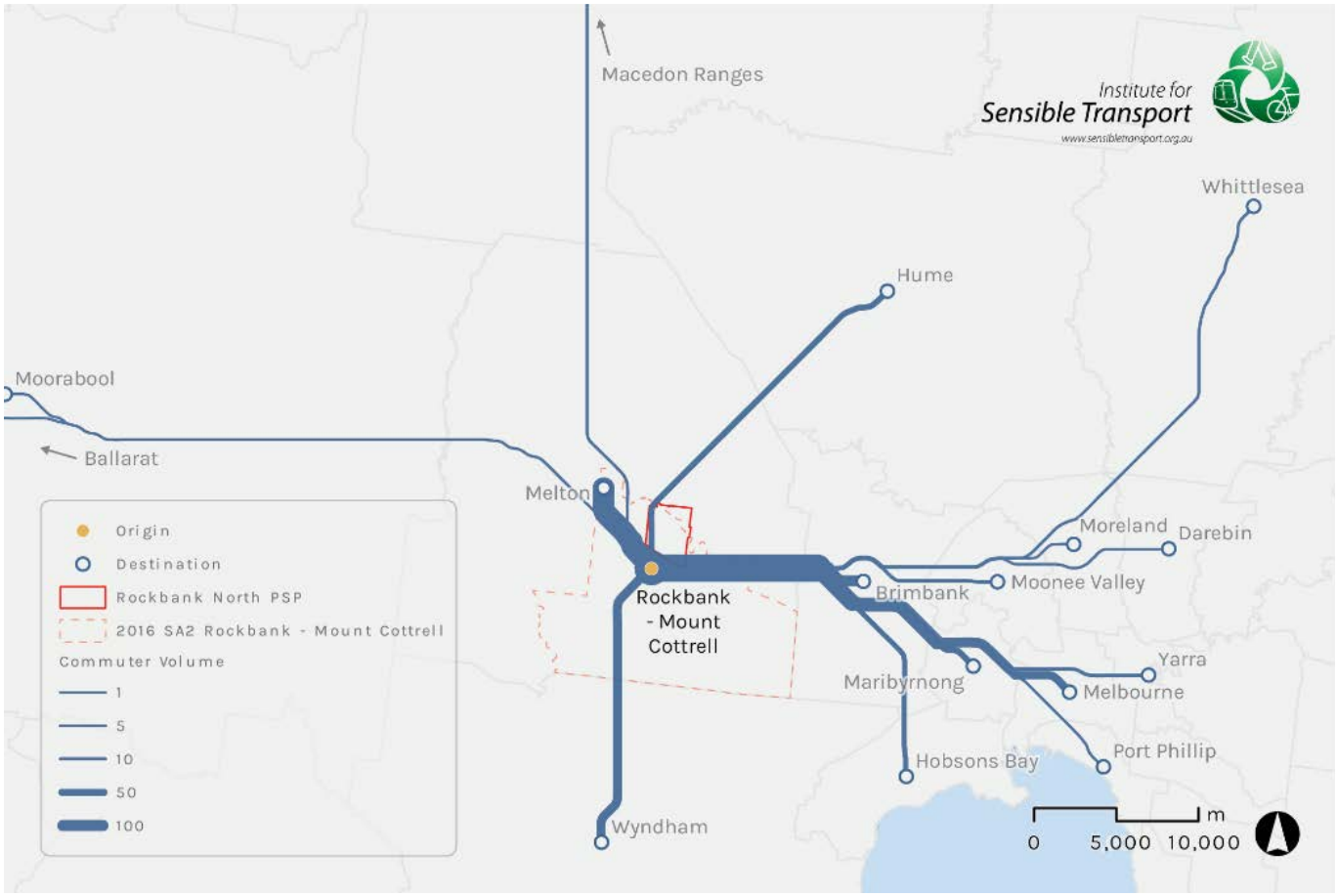


Figure 8 Commuter trip patterns to and from Rockbank – Mount Cottrell

Source: ABS Census 2016

3.3 All purpose journeys

VISTA (2016) data was used to analyse all trip types to the SA1 that encompasses both Woodgrove and Watergardens against the mode share projected in the 2021 GTA report for Rockbank North.

Figure 9 shows the recorded mode share to the SA1s that contains Woodgrove and Watergardens. It shows that, for Woodgrove, 95% of all trips are by car (59% as driver and 36% as passenger). Only 2% are by walking.

For Watergardens, the results are similar. This is despite Watergardens being located next to, and integrated with, the railway station. The railway station serves regional and metro rail services. In addition, there are 8 bus services and 3 night bus services that stop at Watergardens.

The forecasts included in the 2021 GTA report for Rockbank North, shown in Figure 9 are in stark contrast to the travel patterns in Woodgrove and Watergardens, and will be critiqued in Section 8.2.

Figure 10 shows the cumulative trip distance for trips to the SA1s that contain Woodgrove and Watergardens Shopping Centres. For Woodgrove, it shows that 54% of car trips are less than 3km and that 77% are less than 5km.

For Woodgrove, 54% of car trips are less than 3km and that 77% are less than 5km.

For Watergardens, trip distances are generally longer, though many trips are still within comfortable active transport distances. Of the recorded car trips, 16% are less than 3km and 40% are less than 5km.

These data show that for people trips, distance is not the barrier to active travel.

Watergardens and Woodgrove are designed as car-oriented destinations, with large swathes of car parking between the buildings and the large arterial roads bordering each site. Despite close proximity to residential areas, the design of the road environment and each shopping centre restrict active transport use. The relative ease of accessing each site by car is likely too great for many travellers to be tempted to leave the car at home

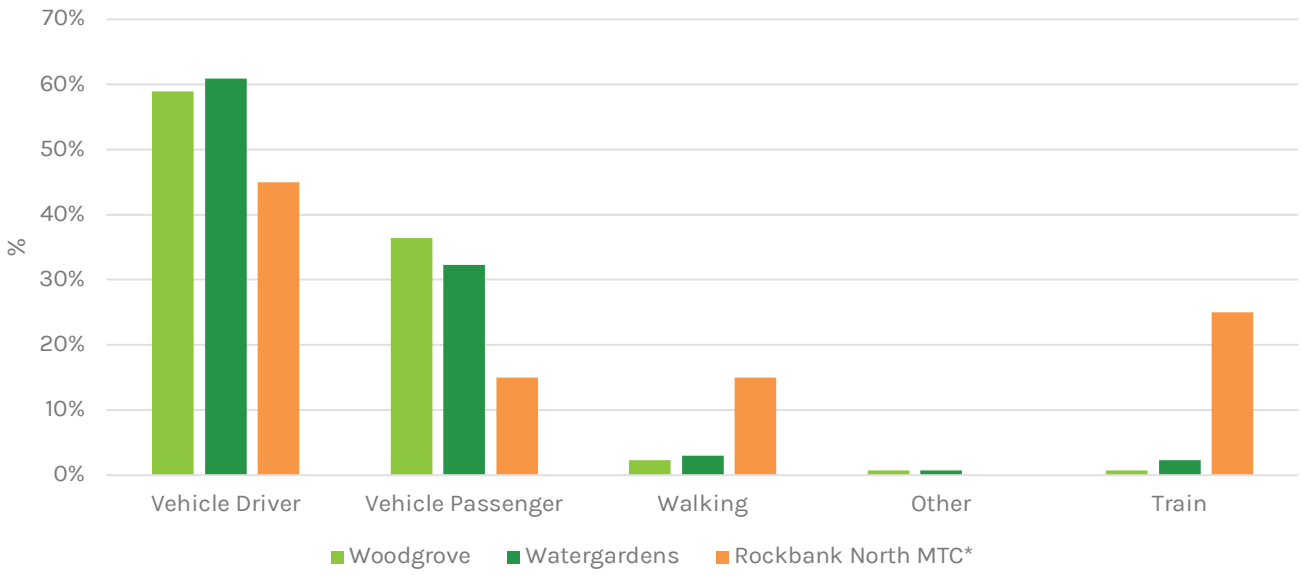


Figure 9 Mode share for all trips

Source: VISTA 2016

* The UDF mode share estimate (note Train = Public transport and Walking = Active Transport for Rockbank North MTC)

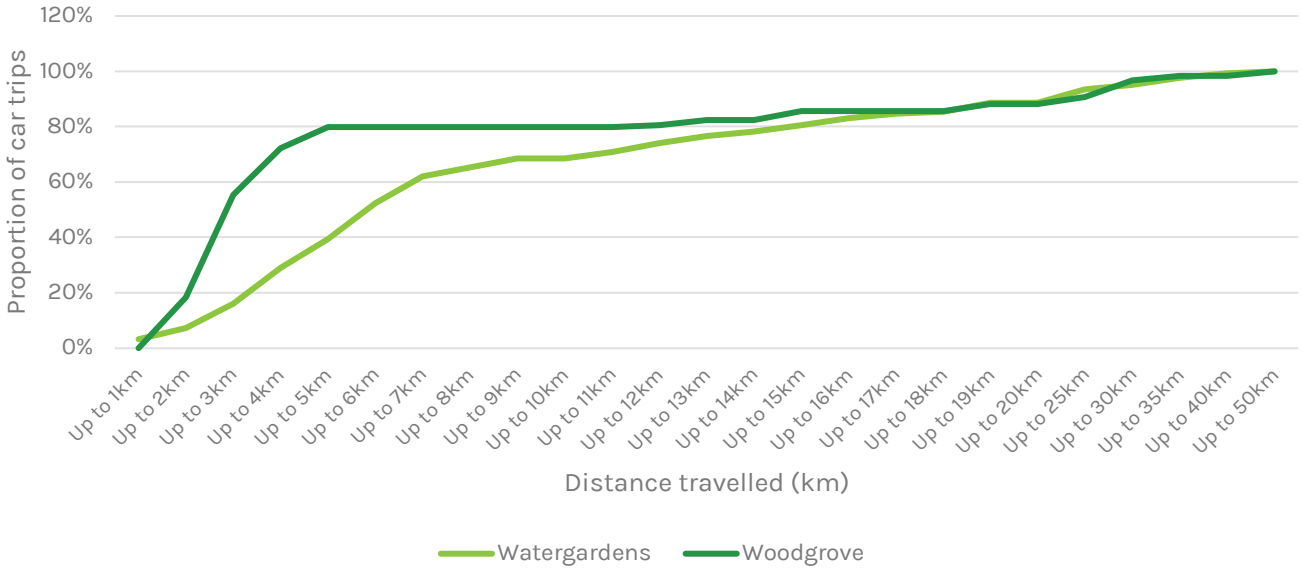


Figure 10 Cumulative distance of car trips

Source: VISTA 2016

3.4 Walking and cycling in Melbourne

VISTA can be used to determine how far people are willing to travel for a trip to an activity centre. Figure 11 shows the distance people have travelled in Melbourne for shopping and personal business trips. It shows that 90% of walking trips are less than 2km (60% are 1km or less). For cycling, 73% are 3km or less.

In comparison, journeys to work can be slightly longer for walking and cycling, compared to non-work trips.

Figure 12 shows commutes from 2016. It shows that in Greater Melbourne, 69% of walking commutes were less than 2km while 55% of commutes were 6km or less.

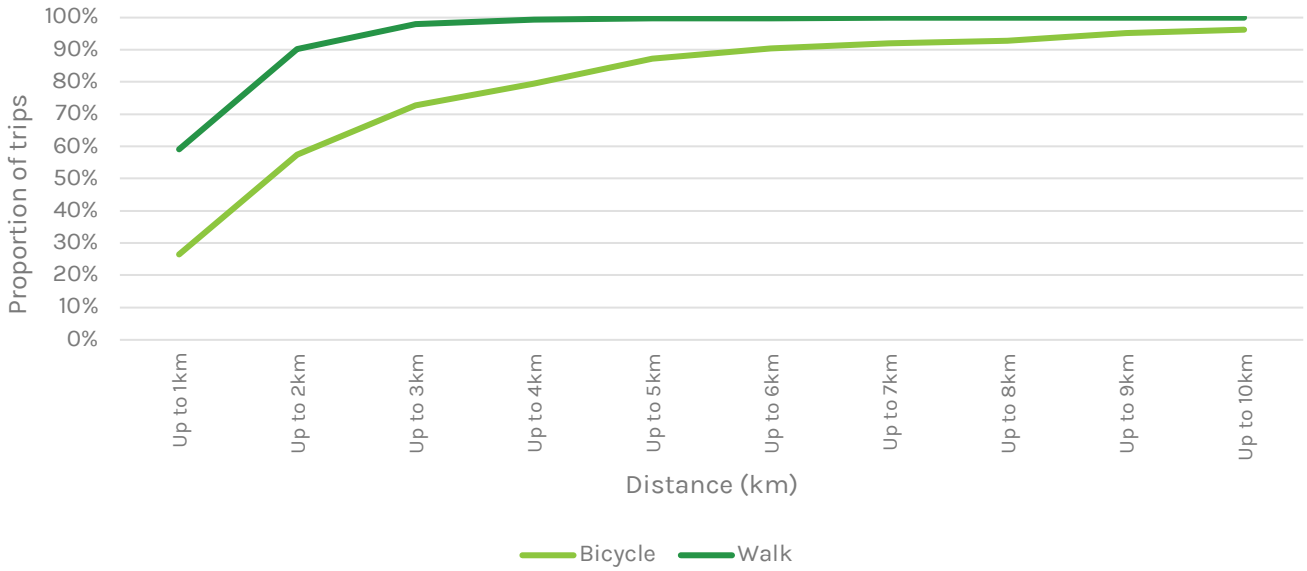


Figure 11 Cumulative distance for shopping and personal business trips, 2018

Source: VISTA 2018

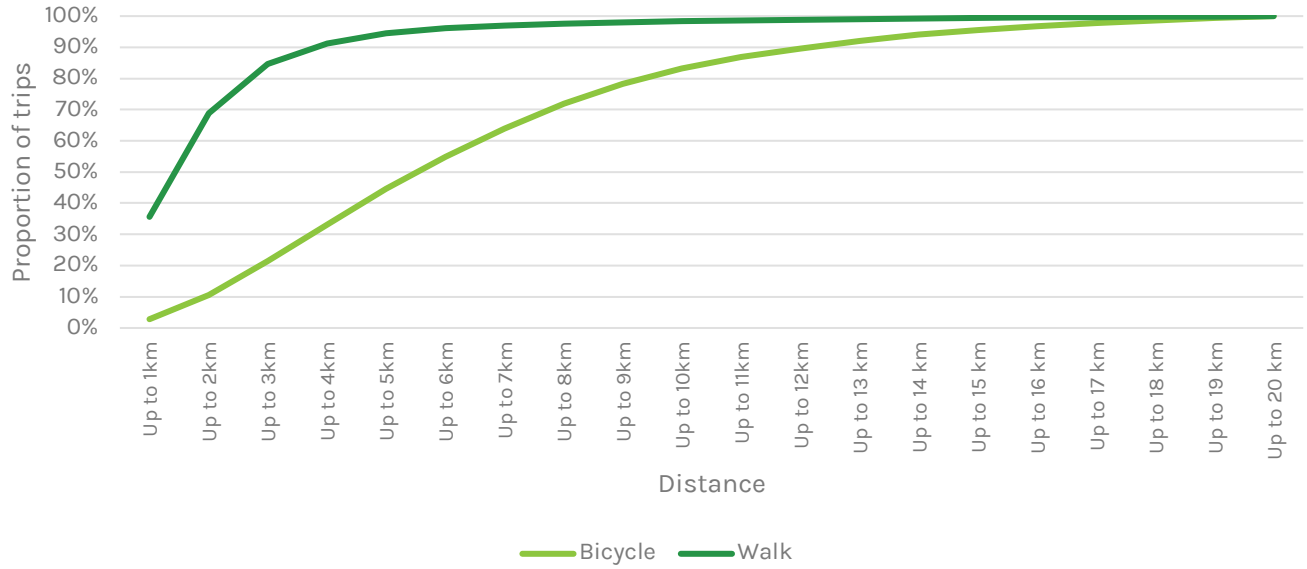


Figure 12 Cumulative distance of active transport to work, 2016

Source: ABS 2016

Taking 1km and 3km as the upper bands for most walking and cycling trips, respectively, it should be noted that the mode share for these distances will still contain high levels of car use.

Figure 13 shows the mode share for all trip types (including work) within Greater Melbourne for 1km and 3km or less. It shows that in general, walking is most popular for trips less than 1km. However, 35% of trips under 1km are still by car. This increases to 58% car mode share for trips less than 3km. Bicycle use is likely lower than what is possible, due to the general lack of safe cycling infrastructure across most of Greater Melbourne. Where cycling infrastructure is provided, cycling mode share could increase substantially for short trips.

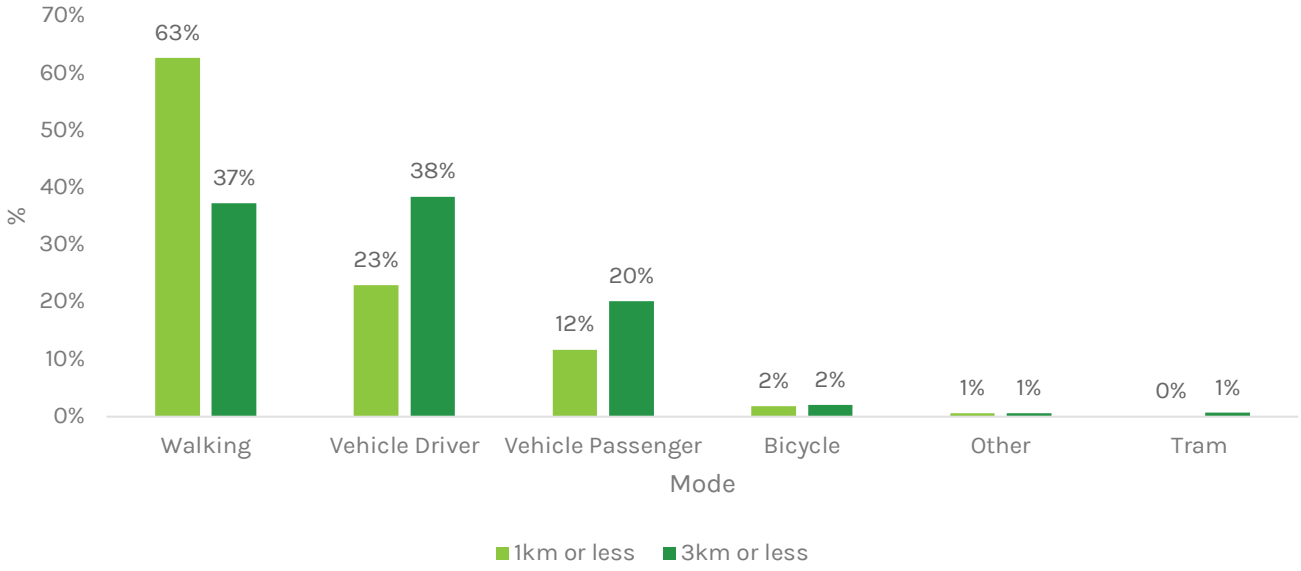


Figure 13 Mode share for short distances

Source: VISTA 2018

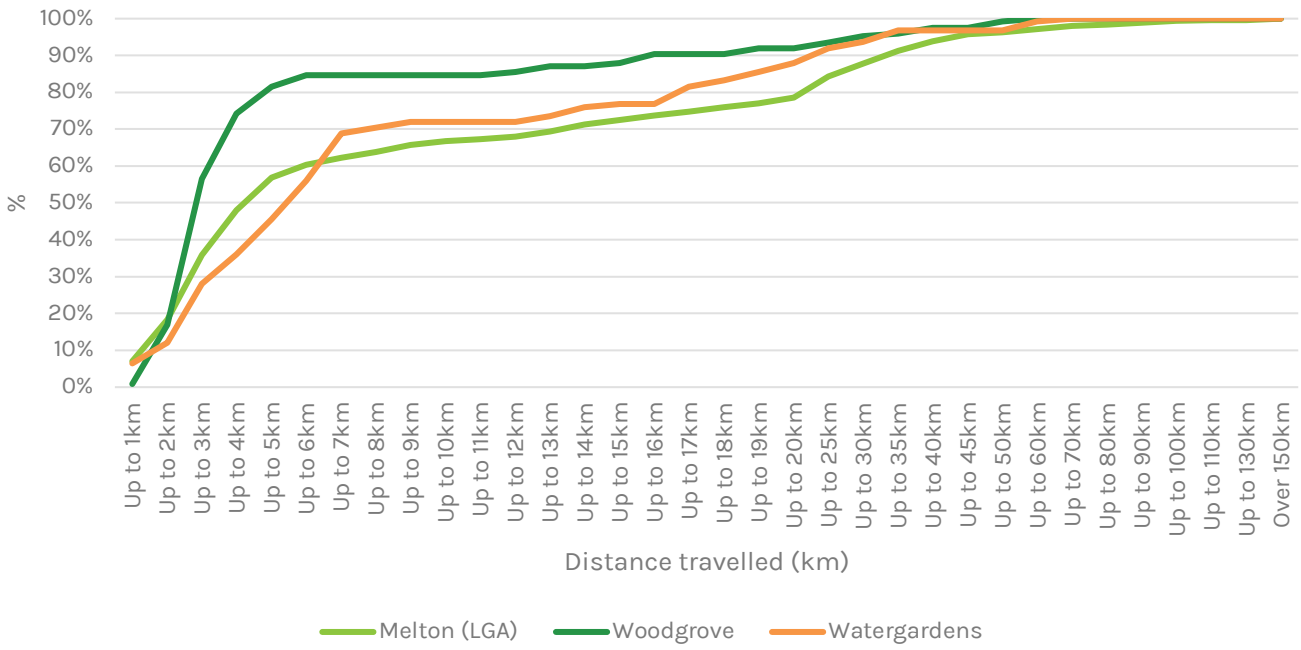


Figure 14 Cumulative distance of car trips

Source: VISTA 2016

Figure 15 shows the walking catchment of the planned activity centres for Rockbank North in 400m grades. The major town centre is located approximately 2.5km from Rockbank train station with the nearest bus stop currently just over 1km away.

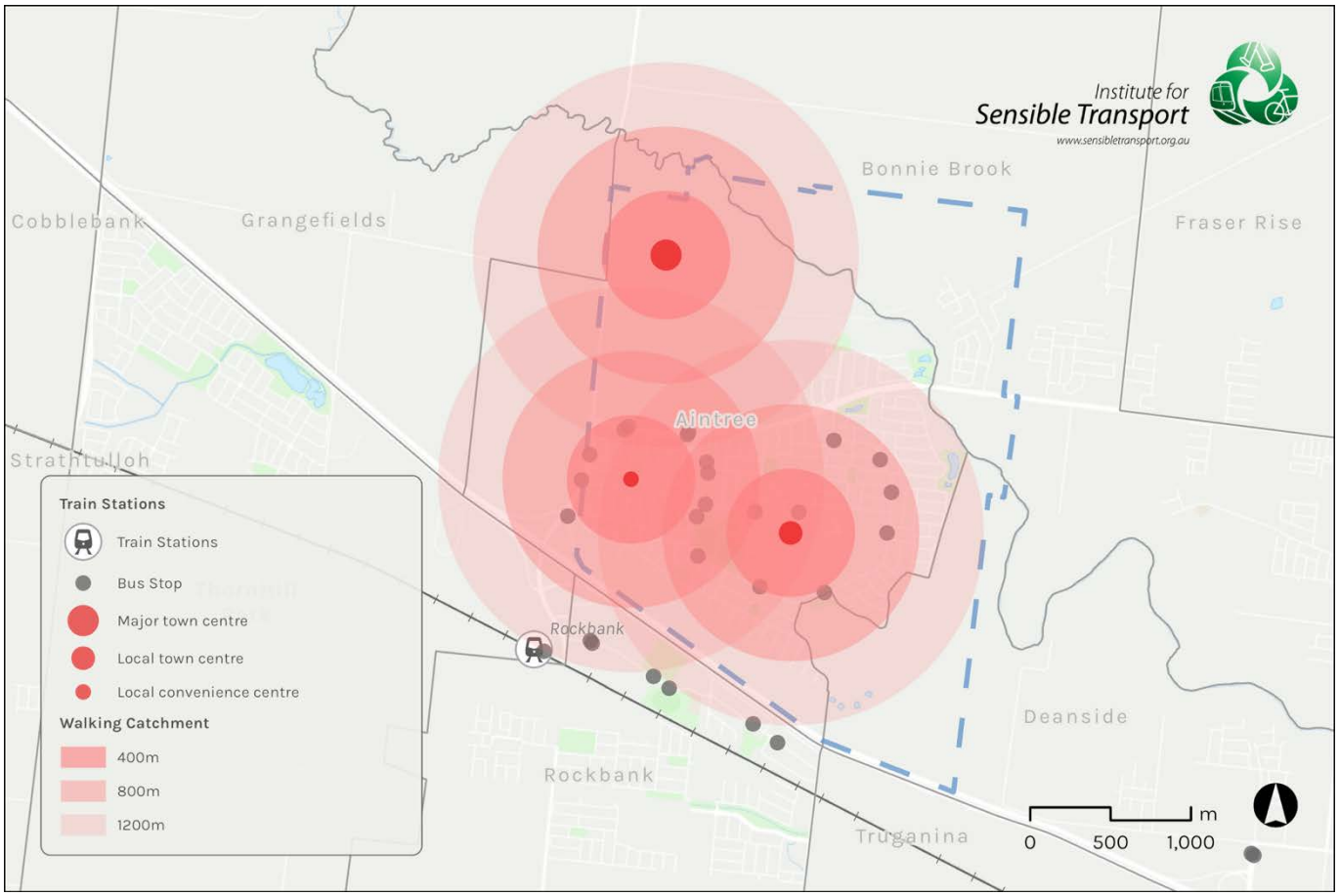


Figure 15 Walking catchment from activity centres

Source: Department of Transport, Rockbank North PSP

3.5 Public transport

Public transport options are limited in Rockbank North. This section details the existing challenges and opportunities for public transport in the area. Figure 16 shows the simplified bus and rail network currently servicing Rockbank North. The limited service focuses on the newly built up area of Woodlea.

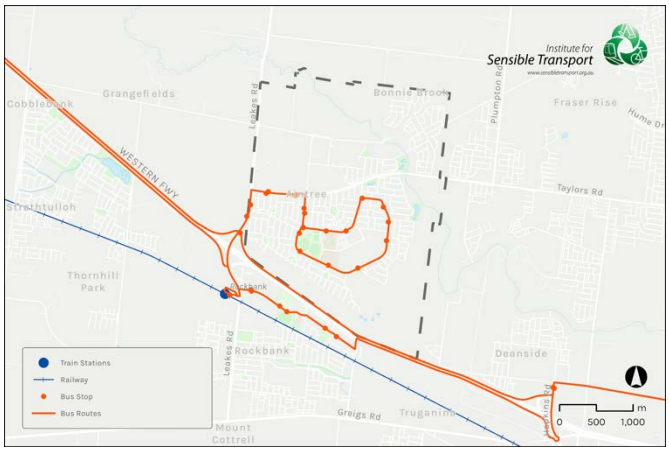


Figure 16 Rockbank North bus and rail network, simplified

Source: PTV 2021

Rockbank Railway Station is at least 1km from all properties in Rockbank North, and is served by V/Line trains on the Ballarat and Ararat lines. As shown in Figure 17 the 444 bus route runs through the area, linking it to the railway station.

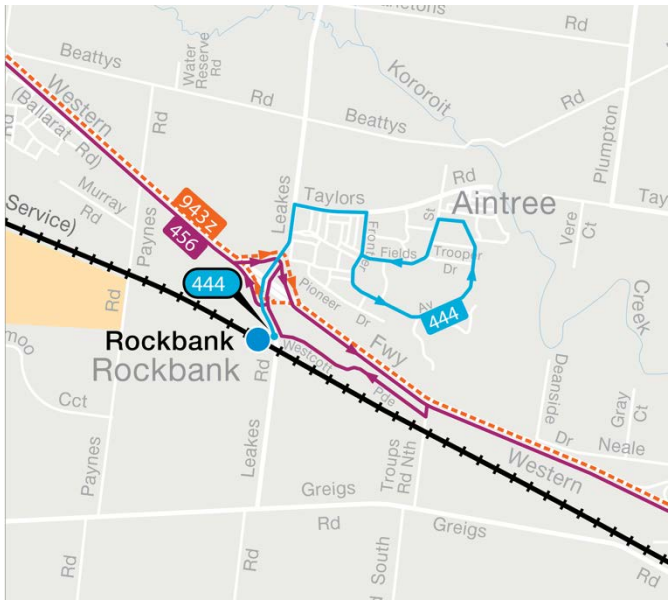


Figure 17 Zoomed in Melton bus network

Source: PTV 2021

Another bus service, the 456 bus route, provides a link to Sunshine Railway Station and Woodgrove SC (Melton), and Night bus route 943 provides all night services on weekends. However, both 456 and 943 stop at the Western Freeway – Leakes Road on and off-ramps, which is a considerable distance from residential and activity development and the proposed Rockbank North Town Centre.

In the current context, bus route 444 is the only public transport option viable for most residents in the Rockbank North area. Those with access to a motor vehicle can drive to Rockbank Railway Station, which has recently had 210 car parking spaces added.

Bus route 444 is the only public transport option for most residents in the Rockbank North area

In 2018-19, 41,450 passengers used Rockbank Railway Station, rising to 57,650 in 2019-20, and 57,900 in 2020-21. On average, this equates to 158 to 159 passenger movements per day in 2020-21. The 2020-21 figures are likely impacted negatively due to COVID-19.

Bus 444 operates from 6am to 9:30pm Monday to Friday and 7am to 10pm on weekends. Frequency is generally 20 to 30 minutes on weekdays and hourly on weekends. V/Line trains operate from before 6am to around midnight on weekdays, between 7:30am and after midnight on Saturdays and 8am and after midnight on Sundays. There are 44 trains into Melbourne each weekday. For much of the day, there is a train roughly every 20 minutes.

There is poor coordination between the timetables of route 444 buses and V/Line trains, as shown in Table 2. While some connections are timely, others are not, with passengers subject to potentially long waiting times.

There is poor coordination between the timetables of route 444 buses and V/Line trains.

Table 2 Timetable coordination at Rockbank Station in the morning peak

Train to Melbourne arrives	444 arrives	Time until train'	444 departs	Interchange time
6:24am	6:14am	10 minutes until 6:24	6:24am	0 minutes after 6:24 (37 minutes after 5:47)
6:50am	6:44am	6 minutes before 6:50	6:55am	5 minutes after 6:50
7:11am	7:21am	10 minutes before 7:31	7:25am	14 minutes after 7:11
7:31am				
7:51am	7:45am	6 minutes until 7:51	7:55am	4 minutes after 7:51
8:13am	8:22am	11 minutes until 8:33	8:22am	9 minutes after 8:13
8:33am				

The Rockbank North Precinct Structure Plan shows that most main roads should be capable of having bus services, as shown in Figure 19. It is also envisaged that the Rockbank North Major Town Centre will contain a bus interchange. This supports a vision that:

- *'Bus services running through the Precinct will connect residents to a range of employment, community and transport destinations within the corridor and with the existing Rockbank Township south of the Western Freeway.'*

While the Precinct Structure Plan clearly indicates that stop infrastructure is the responsibility of the City of Melton, the Department of Transport is responsible for funding bus services. Current bus services operate on around 25% of capable streets. While there is potential for expansion of services, and 95% of the population will live within 400m of a bus capable street, this requires funding. It is imperative that bus services not only be accessible, but are also frequent enough to be attractive, and go places people want to go in a timely manner.

It is notable that bus coverage is less extensive than that available to Woodgrove Shopping Centre (6 services) and Caroline Springs (5 services), and is also not part of the FlexiRide service being trialled in Melton.

An analysis of activity centres and other suburban developments in the surrounding area and across Melbourne is shown in Figure 18. Public transport ranges between 0.9% and 6% in these areas. Other locations on the Ballarat/Ararat railway line have an average public transport mode share of 2.4%, which ranges between 1.9% and 3.6%, excluding Aintree in Rockbank North which is zero, but likely due to low sample size. Other large activity centres in Melbourne's growing west have an average public transport mode share of 3.6%, ranging between 2.8% and 6%, but are adjacent to Metro Trains Melbourne (MTM) railway services with a higher level of service.

Werribee and St Albans have the highest public transport mode share, at 3.5% and 6% respectively have higher levels of public transport than Rockbank North. Werribee has six trains arriving at Flinders St between 8am and 9am, while St Albans has 10. In addition, Werribee has 12 bus routes, with 36 services arrive between 7:30am and 9am, a time period suitable for those commuting by train or to Werribee for work. St Albans has seven bus routes, with 22 services arrive between 7:30am and 9am.

Electrification to Melton is proposed in the PTV *Network Development Plan*, with six services per hour, running through the Melbourne Metro Tunnel. It is unlikely that any additional services could be run due to overall line capacity.

It likely that Rockbank North would have a public transport mode share of between 2% and 4%, consistent with comparable areas.

It likely that Rockbank North would have a public transport mode share of between 2% and 4%, consistent with comparable areas. This is in sharp contrast to the target mode share for public transport listed in the 2021 GTA report, of 25%. For a mode share above this, public transport provision would need to be far higher than comparable areas, with trains every six minutes or less, and a comprehensive bus network, in addition to constrained car parking, at both the origin (home) and destination. For reference, the suburbs with the

highest public transport mode shares outside the City of Melbourne are Cremorne, St Kilda West and Fitzroy, at 21%, 20% and 19% respectively; all three areas have substantial public transport provision, high residential density, significantly less car parking and paid public car parking.

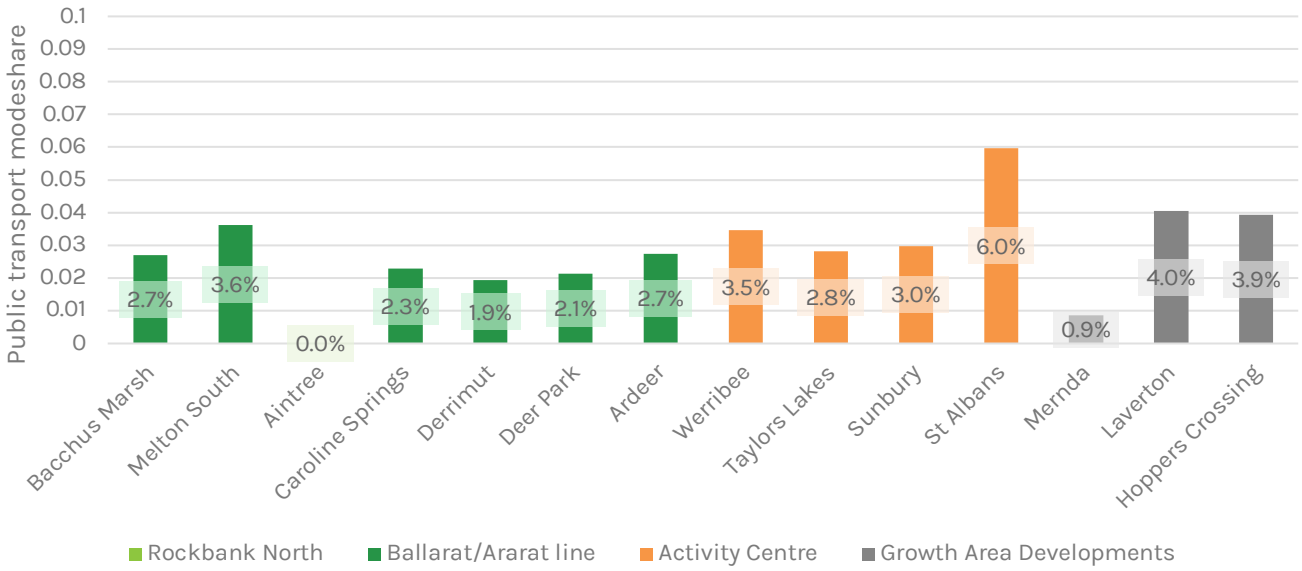


Figure 18 Comparison of mode share in similar suburbs

Source: VISTA 2012-2016, ABS

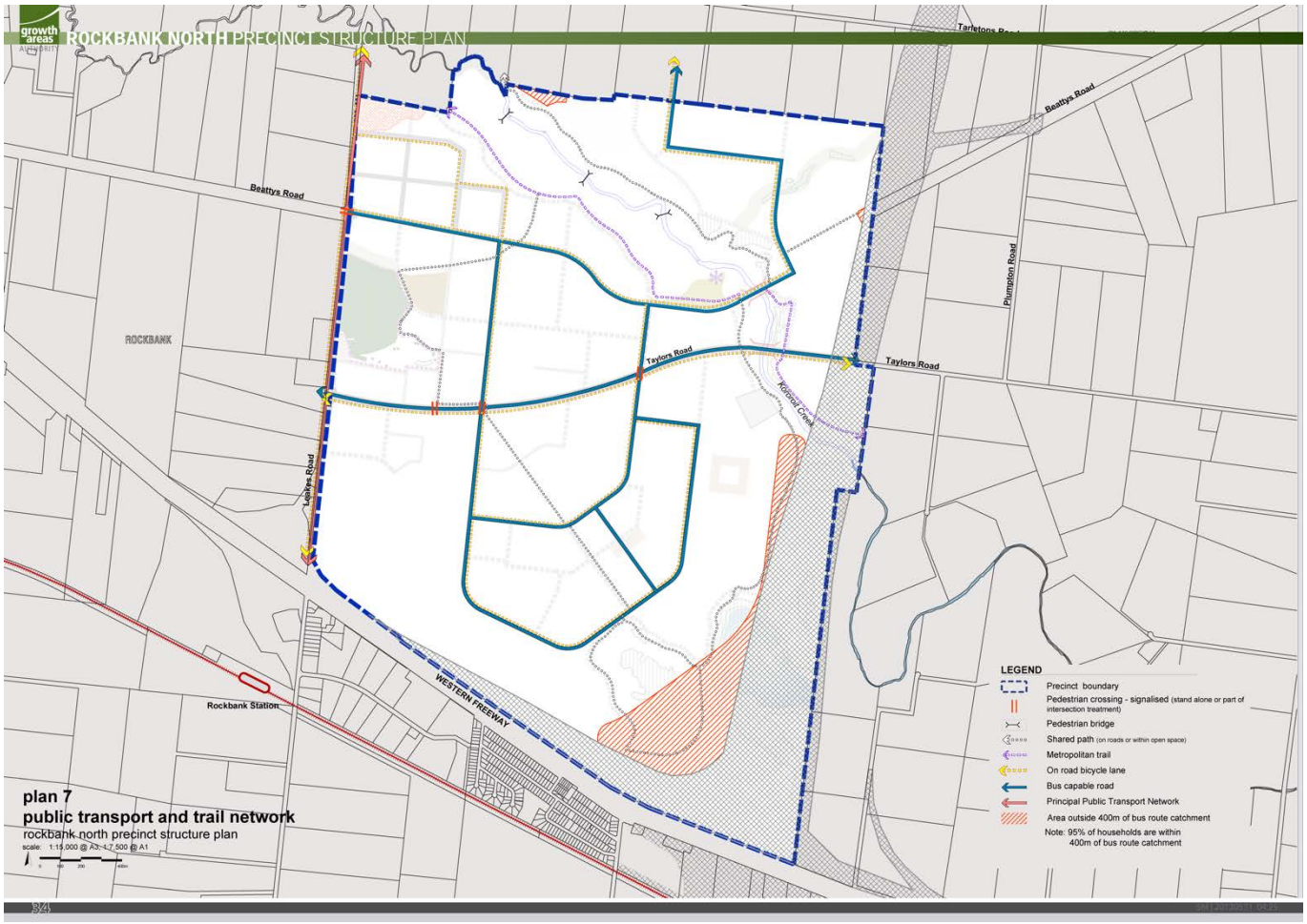


Figure 19 Rockbank North public transport and trail network

Source: Rockbank North Precinct Structure Plan 2012

Note: Blue indicates bus capable roads

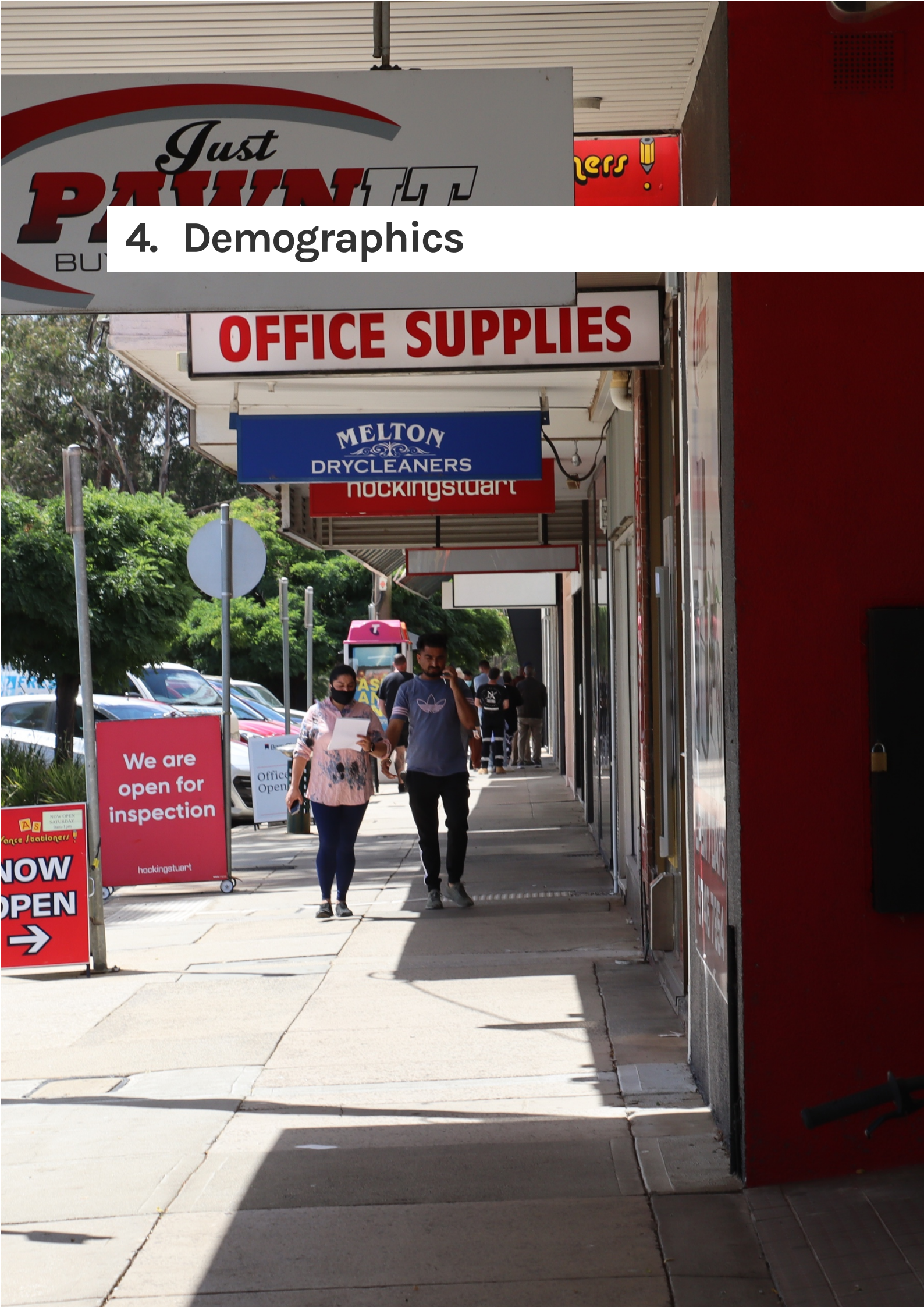
3.6 Implications for Rockbank North

This section has highlighted that the current provision of public transport in Rockbank North is insufficient to provide a compelling alternative to car use. The bus services are limited in terms of coverage, frequency and destinations. The distance is too great between the bus route (444) and the future population of Rockbank North. The connection between the 444 and the VLine service is poorly coordinated, meaning greater transfer penalties, which is a known barrier to public transport use.

The target mode share for public transport highlighted in the 2021 GTA report is well above the plausible mode share and orders of magnitude higher than comparable areas of Melbourne.

Each of the above factors will result in many people choosing the car, as it provides a more convenient door-to-door experience. Section 11 will provide a set of recommendations to enhance public transport opportunities for Rockbank North.

4. Demographics



Forecast population figures are critical to adequately planning for infrastructure and services in growth areas, including transport. The following briefly describes the forecast figures for Rockbank North and compares them against other, similar, growth areas.

The estimated resident population for Aintree was 7,077 in 2021. As the suburb was only gazetted in 2017, Aintree was accounted in Rockbank's figures for the 2016 Census.

Rockbank North MTC is situated within the suburb of Aintree, one of 11 new suburbs gazetted in 2017. At that time, it was estimated that the suburb would have a population of 2,358[4] in 2021.

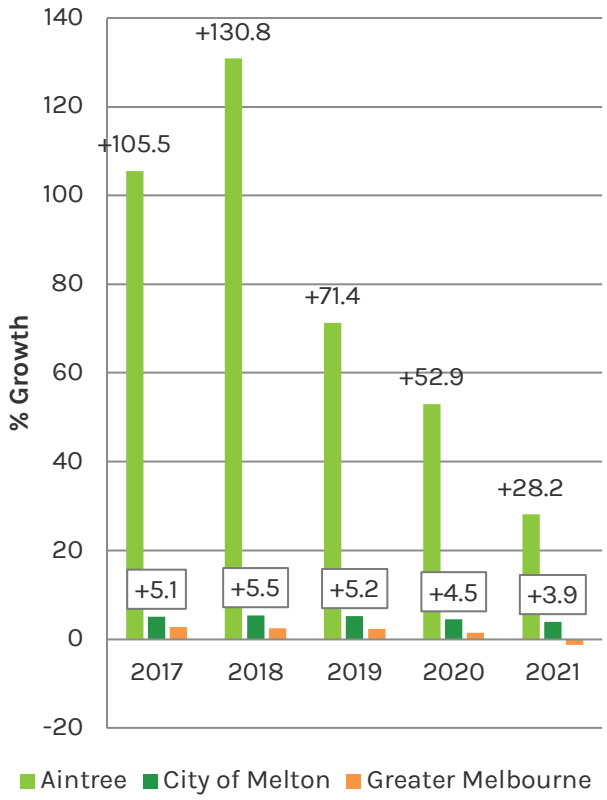


Figure 20 Estimated resident population growth
Source: .id (informed decisions)

At the ABS 2016 Census, there were 1,536 people recorded for the suburb of Rockbank with males accounting for 51.9% and females making up the remaining 48.1%. Figure 21 shows the age-sex pyramid, the inconsistency between the age groups could be due to the high migration into the new suburb.

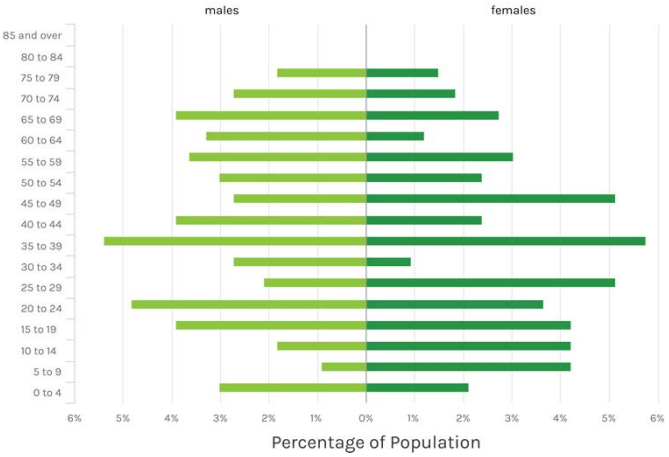


Figure 21 Age-sex pyramid
Source: .id and ABS 2016 Census

Since 2017, Aintree has seen population growth that dwarfs both the City of Melton, and Greater Melbourne. Population forecasting by .id[5] projects Aintree to grow to 12,586 by 2051, a 57.4% increase from the 2022 population of 7,999. This figure is significantly more modest compared to the projections provided by Council in Table 3 as the factors used in .id's forecasting do not include proposed dwellings.

[4] Estimated resident population compiled by .id (informed decisions).

Figure 22 Projected population growth from 2022 to 2036

Source: .id[5]

The Rockbank North PSP estimates a resident population of 20,400 within its boundaries, given the Small Area Land Use Projections (SALUP) trend, this target would be achieved by 2036. Regardless of the different projections, Aintree will see significant growth in the coming years.

Table 3 Population projections

Projection	2021	2026	% Change	2031	% Change
Rockbank North – SALUP	3,000	8,047	168%	14,879	85%
Rockbank North – Urbis	10,030	15,460	54%	21,200	37%

Source: City of Melton

The impact of COVID-19 restrictions has created a demand for lower density housing, with Melbourne recording the largest population decline, yet regional areas have gained high levels of internal migration[6]. With a large proportion of the Rockbank North PSP still being developed, there is greater necessity to rely on the ABS 2021 Census or Council's own collection of data for accurate projections.

[5] . id 2022, City of Melton, Population forecast - https://forecast.id.com.au/melton

[6] Centre for Population, Regional Population - https://population.gov.au/data-and-forecasts/key-data-releases/regional-population-2020-21

5. Road Safety

Road crashes remain a major cause of death, serious injury and trauma. The repercussions of road crashes are multi-faceted and cause social and economic harms that can continue decades after the incident occurred.

The State Government has adopted a *Vision Zero* approach to road safety and the target is to '*...eliminate all road deaths by 2050, while also reducing serious injuries on our roads'.* For this to be achieved, and for Rockbank North to support this goal, streets will need to be designed with a Vision Zero mindset, including dedicate infrastructure for vulnerable modes (e.g. protected bike lanes, paths) and speed limits that minimise the potential for harm. Figure 23 illustrates the relationship between the speed a vehicle is travelling when it hits a pedestrian and the pedestrian's chance of survival. This includes that there is only a 1.5/10 chance of survival when the vehicle is travelling 50km/h and a 90% chance of survival when the vehicle is travelling 30km/h.

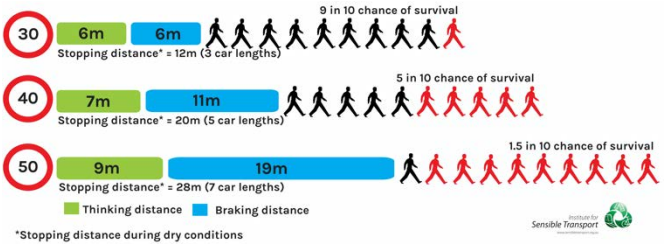


Figure 23 Relationship between speed and fatality rate

Source: World Health Organisation

Crash statistics are recorded by the State Government, with five years of data beginning in July 2015 made publicly available. Analysis for Rockbank North is limited by the data available for the new suburb and therefore crashes in the wider area have been included.

Figure 24 shows the year-to-year crash trend between 2015-2020 for the Melton LGA. Prior to the COVID-19 pandemic, a slight downward trend in crashes was recorded between 2015/16 and 2018/19; however, crashes increased to 301 in 2019/2020 and surpassed crashes in in 2015/16.

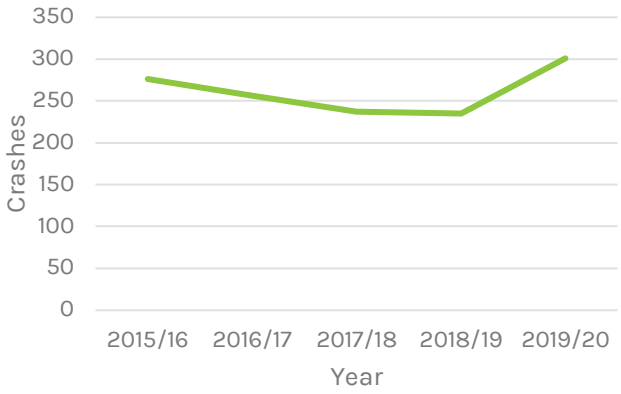


Figure 24 Crashes per year, Melton LGA

Source: Victorian Government

Table 4 shows the crashes by their location within the road network. Table 5 tallies the crashes by severity. It shows that there have been two fatal crashes, both of which occurred on the Western Freeway. Within the established development area, two crashes have occurred, one serious and one other.

Table 4 Crashes by location

Location	Number of crashes
Off-road	4
Mid-block	55
Intersection	65
Other	124

Table 5 Crashes by severity

Crash Severity	Number of Injuries
Fatal	2
Serious injury	11
Other injury	26

Figure 25 shows the location of all crashes in and around Rockbank North for the last five years by severity. Within the PSP boundary, only three crashes were recorded between 2015 – 2020. Most occurred on the periphery of the boundary, along the Western Fwy.

Figure 26 shows the crashes by travel mode. It shows that one of the crashes, recorded as a serious injury, involved a pedestrian. Another crash on the Western Freeway involved a motorcycle. The

remaining crashes only involved motor vehicles. As the population of Rockbank North grows, it is likely more crashes will occur, including a across a more diversified mix of modes.

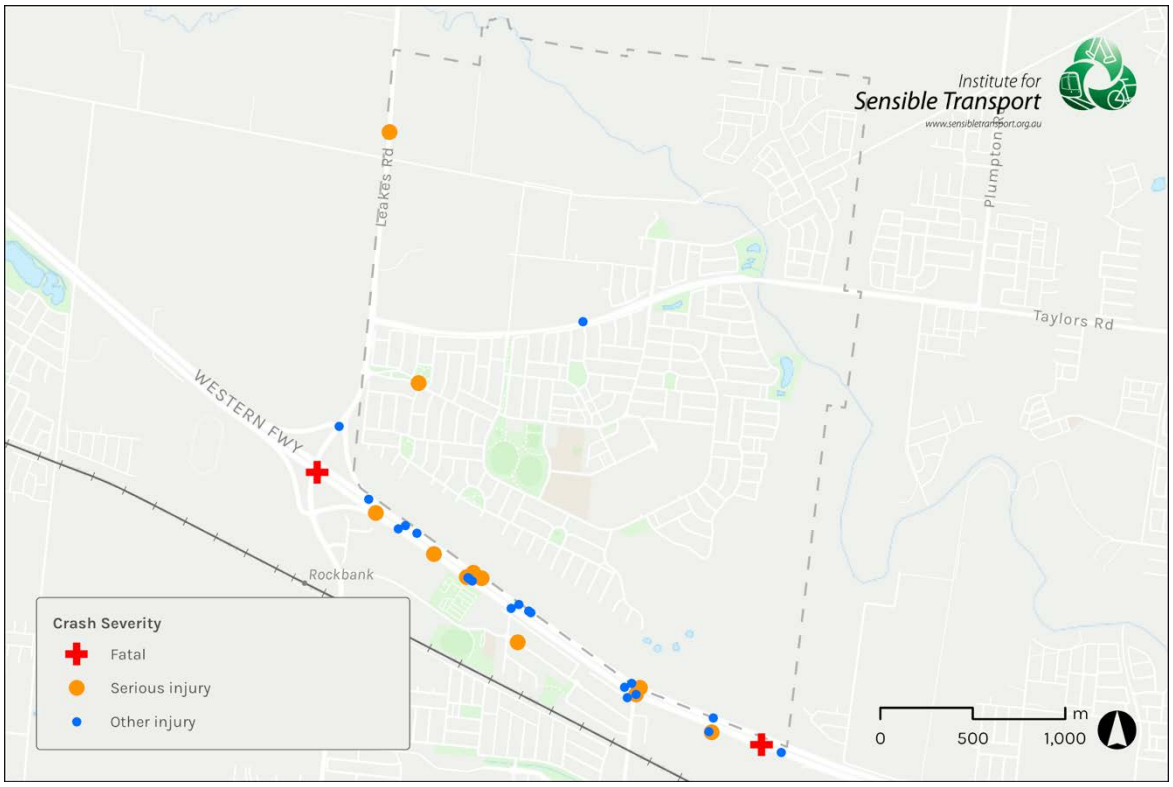


Figure 25 Crashes in last 5 years by severity

Source: Department of Transport 2021

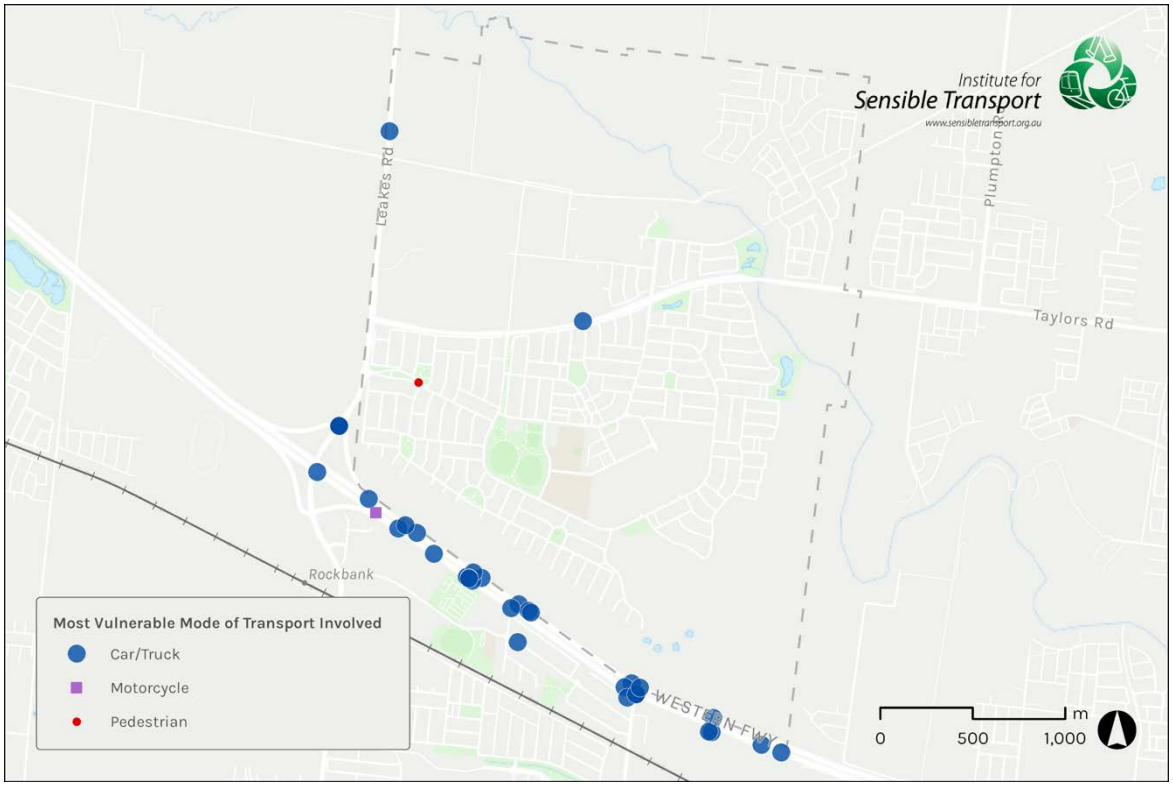


Figure 26 Crashes by mode of travel, 2015-2020

Source: Department of Transport 2021

6. Bike Use Propensity Index and Public Transport Accessibility Levels

This section assesses latent demand for cycling and variation in levels of public transport accessibility within the Rockbank North Town Centre.

6.1 Bike Use Propensity Index

High quality bicycle infrastructure can be expensive and government budgets are limited. It is therefore important, when planning a future cycling network, to determine spatial variation in the latent demand for cycling. Through peer reviewed research[7], a number of Census collected variables have been isolated, in order to provide an indication of latent demand for cycling, known as the *Bike Use Propensity Index*.

The Index is based on seven Census collected variables that are statistically significant predictors of bike use. The Census collected variables used to create the *Bike Use Propensity Index* include:

1. Residential population density, measured as people per hectare
2. Employment density measured as number of people working per hectare
3. Density of young adults measured as number of people aged 15 – 34 per hectare.
4. Low motor vehicle ownership measured as number of households with zero or one cars per hectare.
5. Bicycle use - origin measured as number of people riding to work per hectare.
6. Bicycle use – destination measured as number of people riding to work per hectare (weighted x3).
7. City-based employment – people who work within the Melbourne CBD per hectare (weighted x3).
8. Short car trips– destination measured as number of people driving to work between 0 and 5 km per hectare.

The *Bike Use Propensity Index* has been designed to show the variation in the relative propensity to cycle, at the highest possible level of spatial detail. The resultant map is shown in Figure 27.

Due to the data limitations for Aintree in the latest available Census (2016), these maps cannot accurately provide an illustration of the spatial variation in latent demand for cycling. It is recommended that as Rockbank North continues to develop and more recent Census data becomes available, the Index can be updated to provide more insight into the areas in which investment in cycling infrastructure may provide the greatest returns. Additionally, it may be useful for Council to examine the seven variables used in the Index and assess which measures they are able to take to enhance Rockbank North's performance on these measures. Such an approach is likely to increase the level of cycling. Section 11.4 provides specific recommendations to increase cycling.

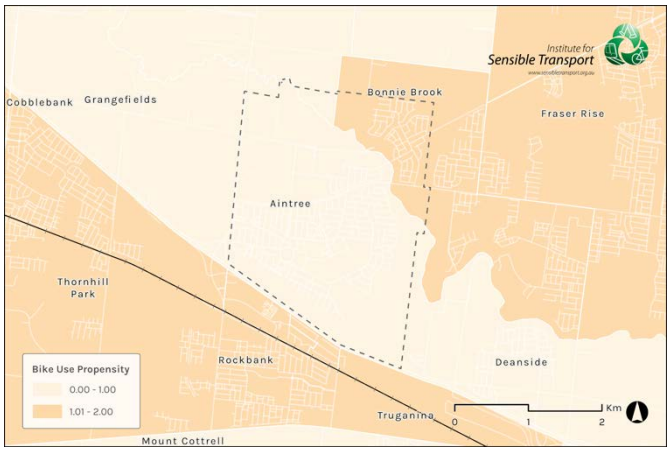


Figure 27 Bike Use Propensity Index Overall – Aintree

The Bike Use Propensity Index score for Aintree is expected to change significantly with the release of the latest ABS Census data, particularly in the south of the suburb where existing cycling infrastructure provides good connections between Woodlea Shopping Centre and residential areas. There is a large network of shared paths that will enable cycling from less confident riders.

Figure 28 provides an overlay of the bicycle infrastructure with the Index. The connections to adjoining suburbs and the railway station could be improved. On-road cycling lanes are unavailable for cyclists to travel to Caroline Springs or Melton South.

[7] https://www.routledge.com/Bike-Share/Fishman/p/book/9781138682498

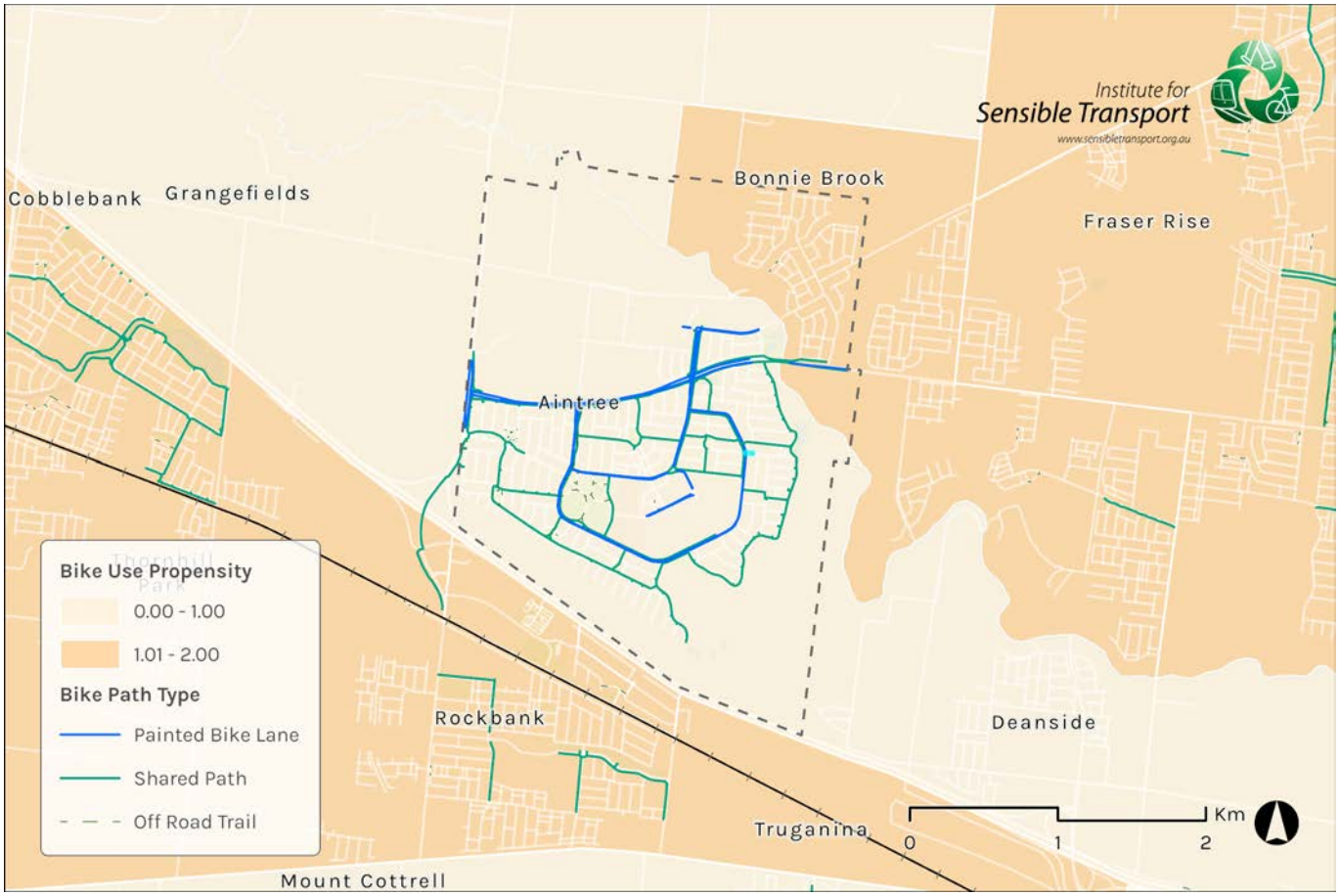


Figure 28 Bike Use Propensity Index with existing infrastructure

6.1 Public Transport Accessibility Index

A Public Transport Accessibility Index (PTAI) provides an indication of the variation in level of public transport accessibility for a given area. It accounts for the number of services and the average daily frequency available at each bus stop. To account for ease of access, areas closer to stops were weighted more favourably. For bus stops, this was done at intervals of 400, 600 and 800 metres distance.

The PTAI of bus services for Rockbank North is shown in Figure 29, fixed rail is not included in this analysis, as Rockbank North MTC is outside of an acceptable walking distance, leaving buses as the only viable form of public transport for the Rockbank North MTC. There are two bus routes that service Rockbank Railway Station and the existing Woodlea residential area. However, no public transport is provided within the Rockbank North MTC, nor travels past it.

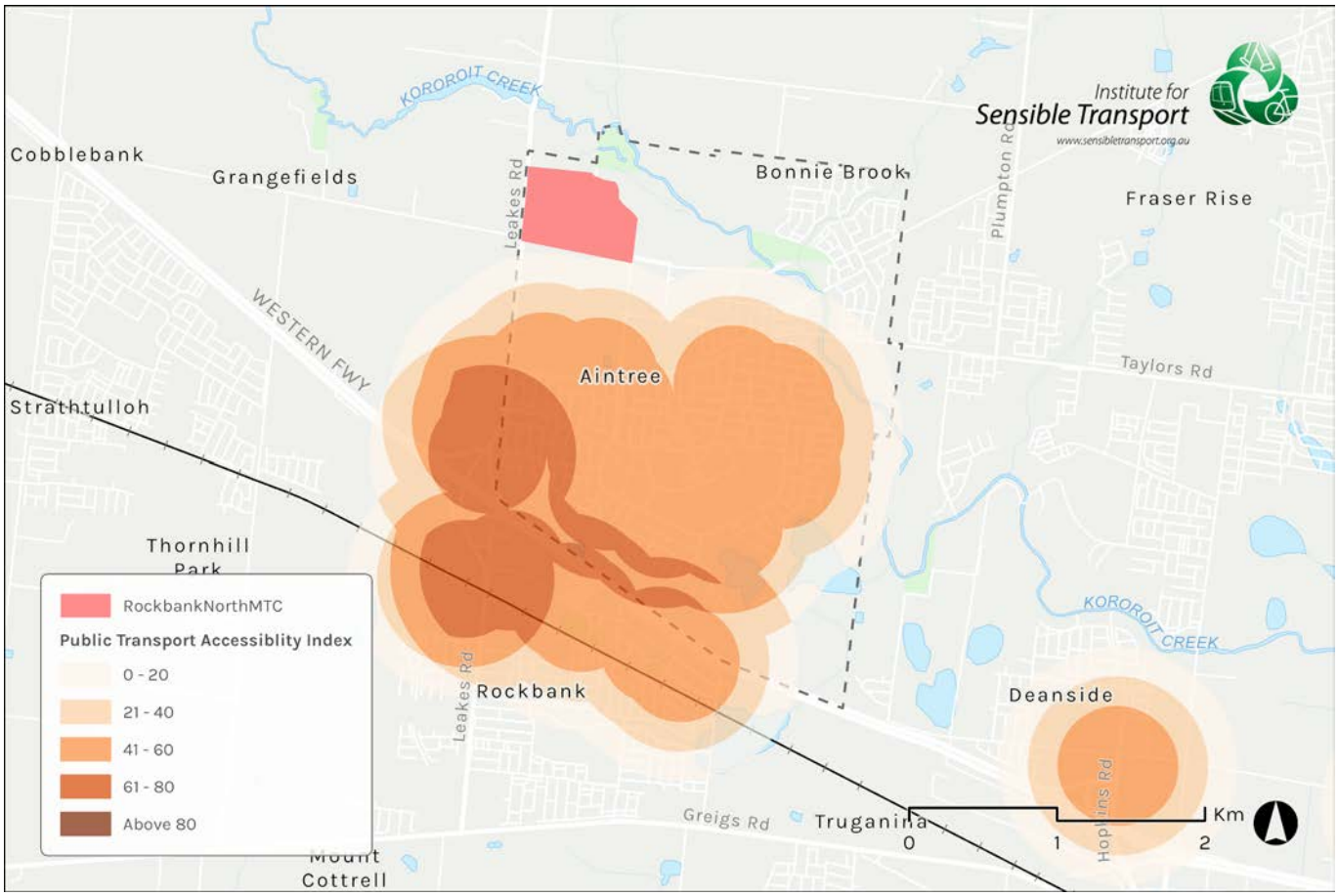
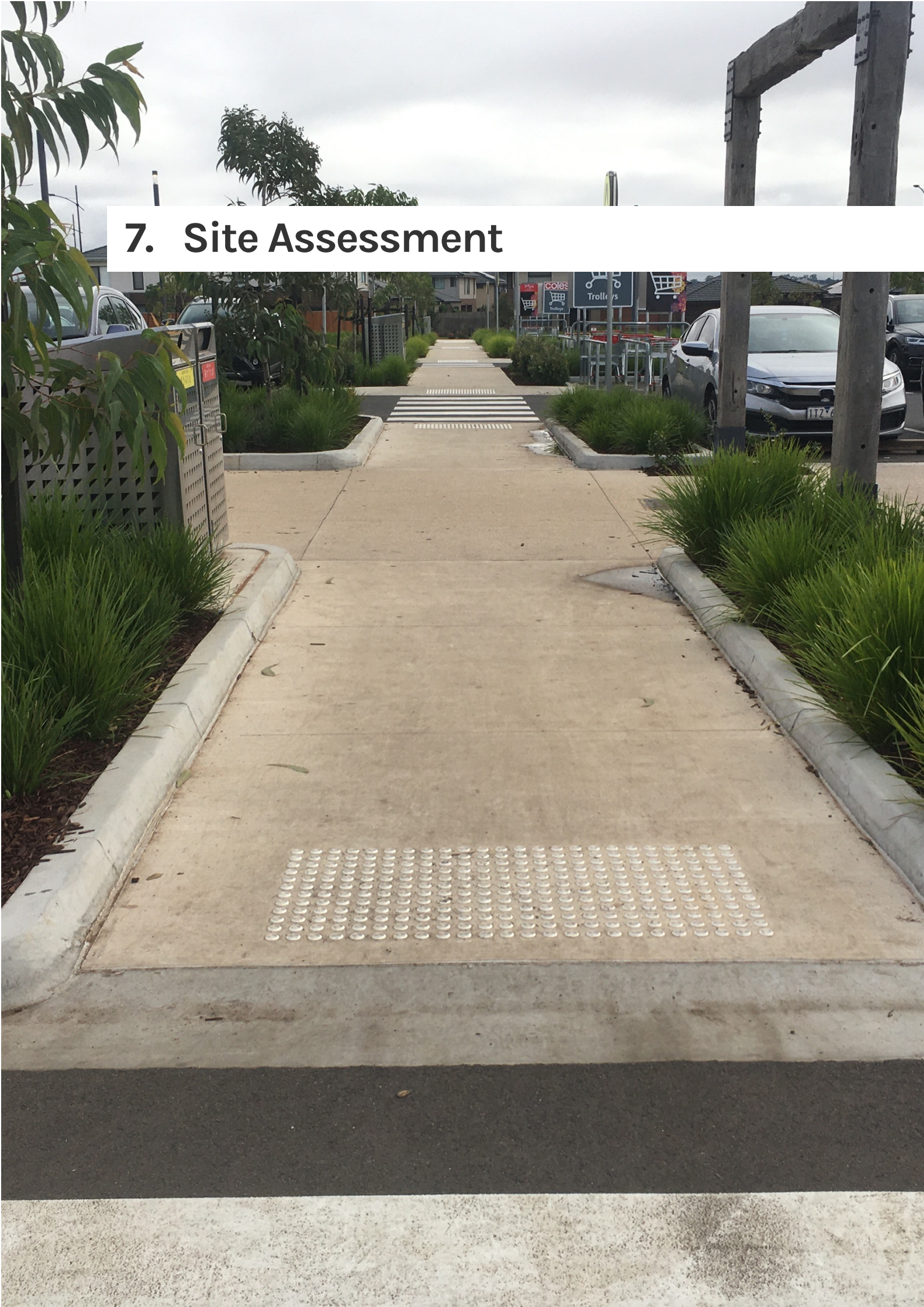


Figure 29 Public Transport Accessibility Index

7. Site Assessment



A site assessment with Council staff was undertaken in early April. This included a walk around the existing Woodlea development and a drive out to the proposed MTC site.

The site assessment provided an opportunity to appreciate barriers and opportunities for enhancing transport choice and enhance links between the existing development, the MTC and the railway station.

7.1 Site assessment

Woodlea was found to have several design elements that could enhance transport and urban realm outcomes for the proposed Rockbank North MTC. These include attractive and prioritised paths through car parks, high-quality street furniture, activated street frontages, with large retail 'sleeved' by smaller retail shops, and slow shared zones in high pedestrian areas.

While the shared paths and footpaths are high-quality, consideration of safer crossing points would make Woodlea safer and more attractive for walking and cycling trips.

Large intersections that prioritise vehicle flow are likely to be built in the future MTC. Alternative crossing points for active transport should be considered, as these complex intersections are barriers to active travel.

7.1.1 Woodlea

The Woodlea activity centre was found to be well-designed, with buildings fronting onto a high-quality open space. Smaller shops with outdoor dining allow for space activation. Street furniture is of a high quality, as seen in Figure 30.

The shared zone street has several good urban design elements (textured paving, kerb elimination, street furniture integration). The existence of zebra crossings does however complicate the space and undermines the streets function as a shared space. Recognising that this street is a critical road link will help to achieve a truly shared zone. Closing through access to cars would not impact on vehicle access; there is a large, underused car park to the rear, which also provides loading access for the shops.

Figure 30 Woodlea activity centre

The walking paths through the rear car park are wide, provide priority at crossing points, as well as shade and greenery. Figure 31 shows the main path to the shops on top, with the secondary path on bottom.

Figure 31 Car park paths

Walking and cycling connections from the surrounding residential areas could be improved. Figure 32 shows one of the crossing points near the shops and school. Limited crossing opportunities over busy roads decreases the walkability of the area. As a result, car trips are encouraged as the default travel mode.

Figure 32 Missing street crossing

Existing crossing points, such as Figure 33, provide decent access, but fall short of giving priority to pedestrians.

Figure 33 Key crossing points

Having raised zebra crossings at these locations would improve pedestrian safety and improve walkability for the neighbourhood.

Woodlea was found to have some rows of townhouses that had rear-loaded car parking, shown in Figure 34. Rear-loaded buildings provide for more consistent street frontages. They also reduce interactions between active transport modes and cars turning in or out of properties. Rear-loaded buildings, especially along key pedestrian and cyclist corridors should prioritised when planning new residential streets within the study area.

Figure 34 Rear-loaded properties

7.1.2 School drop-off

The site visit coincided with the school drop-off run. It was found to be very busy, with most parents driving and parking on-street. Figure 35 shows double-parking occurring, as was parking on nature strips.

Figure 35 Double-parking school drop-off

Greater focus on improving pedestrian safety and active travel behaviour change programs would reduce the school run pressure already found in this new development. Based on previous studies, it is likely that the school catchment is small for a significant proportion of students (i.e. a large percentage live within 2km of school).

7.1.3 Cycle lanes

Woodlea has a network of shared paths and on-road cycle lanes in and around the development. This contrasts to the development to the south of the railway line, which has been developed with more emphasis on separated bike lanes and priority at crossing points.

Some elements, such as providing separated paths at the roundabout in Figure 36 will be effective at encouraging safe cycling, but the treatment is only provided on one side of the roundabout.

Figure 36 Separation at roundabout

Shared paths all end at each side street, reducing the effectiveness of the infrastructure to encourage safe cycling. Having raised priority crossings, particularly along the main shared path routes, would improve the cyclability of Woodlea.

7.1.4 Intersections

Woodlea is bound by large, complex intersections, with multiple lanes on each leg as well as slip lanes (e.g. see Figure 37). As Rockbank develops, these roads will become high-speed, high-volume corridors. Despite the presence of painted on-road bike lanes, only the *'strong and fearless*[8] would feel comfortable riding a bike in such an environment.

Figure 37 Large, complex intersections

[8] https://www.portlandoregon.gov/transportation/article/158497

The large and complex intersections within the study area are a significant barrier for walking and cycling. They feel isolating and unsafe, especially for children, elderly, and those with a disability. These types of intersections need alternatives for key walking and cycling links, such as mid-block and potentially grade separated crossings.

The Leakes Road crossing of the Western Freeway is an example of where large, complex crossings limit active transport opportunities. It is currently the only way to access the railway station from the north. There is currently a shared path on the eastern side, but due to the high traffic speed and volume, limited protection, and long crossing distance, it is unlikely to be used except for those with a high tolerance for risk. A new crossing, separate from the road network, is required to provide safe and comfortable crossing opportunities to the railway station.

7.2 Movement and Place

A Movement and Place Assessment was undertaken as part of the site assessment. This included a critique of the assessment undertaken in the *Technical Report* (detailed in Section 8.3) and our own assessment of the proposed MTC, provided below.

7.2.1 Methodology

The Movement and Place (M&P) Framework, developed jointly by VicRoads and Transport for Victoria enables Council and the community to understand the dual role that streets perform in terms of being a *movement* corridor and a *place* in itself. There is a natural tension between these two functions. Careful consideration is required to determine a street's level of priority, from a movement and place perspective.

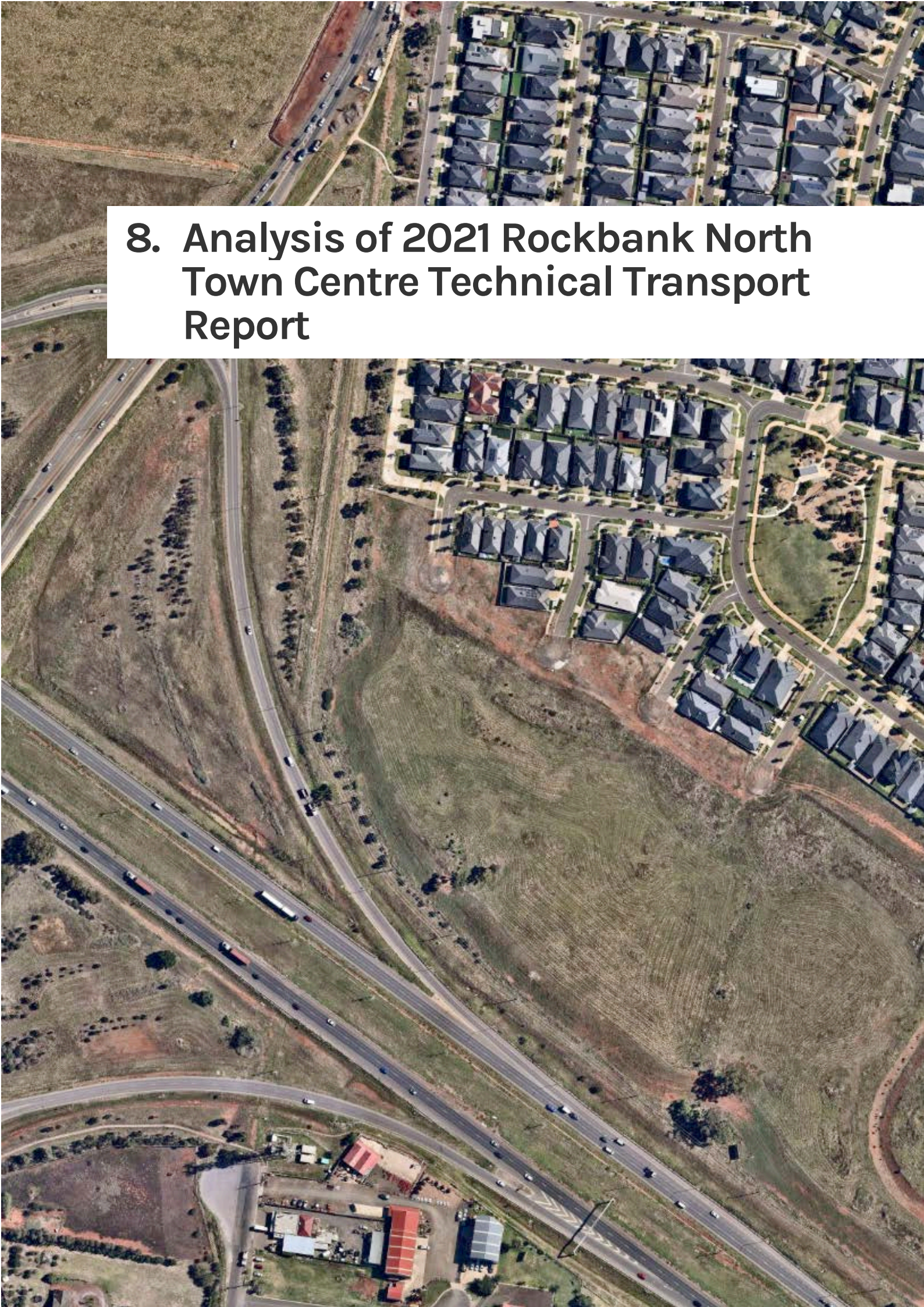
7.2.2 Results

Figure 38 shows the proposed Movement and Place classifications for Rockbank North MTC. The *City Places, local streets,* and *connector* for Leakes Road remain the same as they were classified by GTA. Beatties Road and the northern east-west through road have been classified as a mix between *connectors* and *activity streets and boulevards.* While possible, it is unlikely that the building interfaces on these roads will enhance the place function to justify a higher place classification.

The internal streets have all been reclassified as *activity streets and boulevards.* This is because the MTC will, at most, serve a regional place function rather than be places of state significance. This is not to say that it shouldn't, or couldn't, include high-quality urban design into the streets, rather that the *reach* this activity centre will have won't draw from the entire state in the same way that the Melbourne CBD does.

Figure 38 Proposed Movement and Place classification

8. Analysis of 2021 Rockbank North Town Centre Technical Transport Report



This section offers a critique of the Rockbank North Town Centre Technical Transport Report (2021). Included in the analysis are gaps and limitations that may have an impact on mobility outcomes in Rockbank North.

This section examines mode share forecasts and discuss whether these are justified, in part on our comparison with similar areas outlined in Section 3.

The objectives of the Rockbank North Town Centre Technical Transport Report 2021 (hereafter *Technical Transport Report 2021*) are captured below:

- Public transport and active transport modes have to be integrated with existing and proposed land uses.
- Frequent and reliable public transport link between the town centre and Rockbank railway station is necessary.
- Active transport should be prioritised for short multi-purpose trips, and to achieve a more desirable level of amenity, build social cohesion and facilitate sustainable and efficient travel habits.

8.1 Overall

The *Technical Transport Report 2021* for Rockbank North MTC provides technical advice on behalf of the developer (First Urban). The report provides estimates of future transport mode share and trip patterns. Where applicable, conventional traffic modelling and assumptions are used to derive forecast figures for Rockbank North MTC.

A *mode hierarchy* is offered, in which the order to priority for different modes is:

1. Active transport (walking and cycling)
2. Public transport
3. Deliveries (loading)
4. Car parking
5. Traffic impacts.

The *Technical Transport Report 2021* highlights the challenges of planning for a desired mode share split within a *'predict and provide'* framework that seeks to satiate demand for car use. The conflicting objectives of accommodating growth in car use and achieving sustainable transport goals is not adequately addressed in the *Technical Transport Report 2021*. The approach attempts to meld both together by adopting a desired mode share for the MTC while estimating and accommodating increased demand for car use. Questionable methods have been used to arrive at the mode share estimates in the report, as discussed below.

The *Technical Transport Report 2021* highlights the relationship between employment density and car mode share. This however fails to account for the other, important variables such as public and active transport service levels, and their network reach, population within acceptable travel distances, and the relative attractiveness between car use and other modes (e.g. congestion and car parking).

8.2 Mode share and underlying variables

The mode share ambitions included in the *Technical Transport Report 2021*, highlighted in Section 3 are in sharp contrast to comparable areas of outer Melbourne. The mode share used in the *Technical Transport Report 2021* are shown in Figure 39, as the *Town Centre UDF* columns.

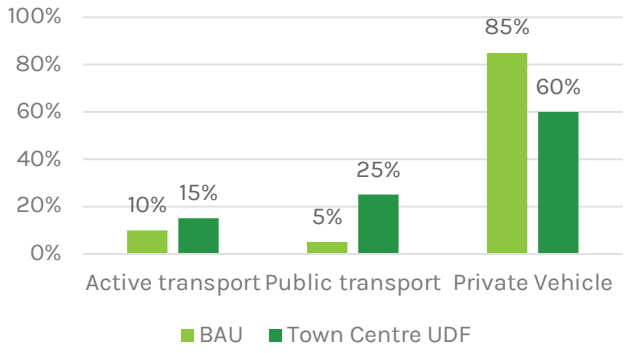


Figure 39 Mode Share Assumptions, Rockbank North Town Centre Technical Transport Report 2021

A comparison of all Local Government Areas (LGA) in Metropolitan Melbourne mode shares from VISTA, and the mode share assumptions of the *Technical Transport Report 2021* is shown in Table 6.

Table 6 Mode share comparison for all metro LGA to UDF target

LGA	Car	Public Transport	Others	Bicycle	Walking
Banyule (C)	80%	5%	1%	1%	13%
Bayside (C)	72%	5%	1%	2%	20%
Boroondara (C)	70%	7%	1%	1%	20%
Brimbank (C)	81%	5%	1%	1%	13%
Cardinia (S)	84%	3%	0%	0%	13%
Casey (C)	85%	3%	0%	1%	10%
Darebin (C)	71%	8%	1%	3%	16%
Frankston (C)	83%	3%	1%	1%	13%
Glen Eira (C)	71%	7%	1%	2%	20%
Greater Dandenong (C)	84%	4%	1%	1%	10%
Hobsons Bay (C)	73%	5%	1%	2%	19%
Hume (C)	84%	4%	2%	0%	10%
Kingston (C)	79%	4%	1%	2%	14%
Knox (C)	85%	3%	0%	1%	10%
Manningham (C)	83%	4%	1%	1%	12%
Maribyrnong (C)	72%	8%	1%	3%	16%
Maroondah (C)	84%	4%	1%	1%	11%
Melbourne (C)	35%	32%	2%	3%	28%
Melton (S)	83%	3%	1%	1%	13%
Monash (C)	79%	6%	1%	1%	13%
Moonee Valley (C)	76%	6%	1%	1%	16%
Moreland (C)	65%	9%	1%	5%	20%
Mornington Peninsula (S)	82%	2%	0%	1%	14%
Nillumbik (S)	80%	4%	0%	2%	14%
Port Phillip (C)	56%	9%	2%	4%	28%
Stonnington (C)	66%	10%	1%	2%	21%
Whitehorse (C)	79%	6%	1%	1%	14%
Whittlesea (C)	85%	4%	1%	1%	10%
Wyndham (C)	82%	4%	0%	2%	12%
Yarra (C)	52%	12%	2%	5%	29%
Yarra Ranges (S)	86%	3%	0%	1%	10%
GTA BAU	85%	5%	0%	3%	7%
GTA UDF Target	60%	25%	0%	5%	10%

Source: VISTA 2018

As can be seen from Table 6, there is only one LGA which has a public transport mode share of 25% or more (City of Melbourne), and only three that have car mode shares of 60% or less (Cities of Port Phillip, Melbourne, and Yarra).

Table 6 also indicates that the business-as-usual public transport mode share of 5% may be optimistic. Outer urban growth area LGAs typically have public transport mode shares of between 3% and 4%, such as Cardinia (3%), Casey (3%), Melton (3%), Whittlesea (4%), and Hume (4%). A public transport mode share of around 3% to 4% is a much more likely outcome for Rockbank North.

However, these same areas typically have car mode shares approximating 85%, such as Cardinia (84%), Casey (85%), Melton (83%), Whittlesea (85%), and Hume (84%). For all trips, a car mode share of approximately 85% is a likely outcome for Rockbank North. Similarly, active transport of approximately 10% is a likely outcome, under a business-as-usual situation (although the skew towards cycling is potentially unrealistic, with more walking likely).

The mode share in *Technical Transport Report 2021* is estimated based on the relationship between car mode share and job density, shown in Figure 40. By siting the estimated job density range for Rockbank North MTC along the trendline, a car mode share similar to Collingwood and North Melbourne is used. Comparing the future Rockbank North MTC with these inner-city suburbs is problematic for a number of reasons. Firstly, these inner-city areas have a dense network of high-frequency public transport and high-quality active transport connections. Secondly, they have a large labour force catchment within a short distance. Finally, and perhaps most importantly, these inner-city areas have major constraints on car use through congestion and highly restricted parking that are almost entirely absent in Rockbank North. Specifically, inner city suburbs like Collingwood have a much lower ratio of car parking to jobs that can be expected in Rockbank North, as well as higher levels of traffic congestion. Much of the public car parking in places like Collingwood are also severely time restricted, and/or paid, meaning they are less attractive for all day, commuter parking. Ultimately, people do not make transport choices in isolation; they weigh the pros and cons of the different modes available and select a mode on the basis of convenience, time, cost and safety. For this reason, the approach taken in the *Technical Transport Report 2021* is likely to have dramatically overstated the public and active transport mode share for Rockbank North.

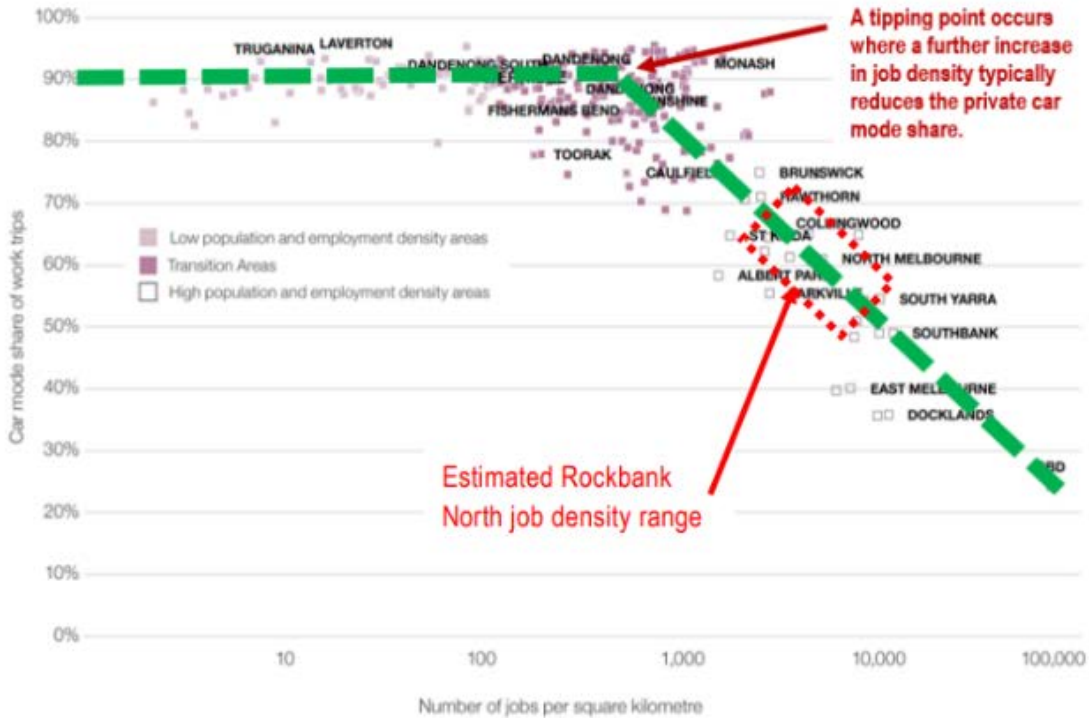


Figure 40 Mode share and job density

It is also unclear at what scale job density has been measured. It appears that the comparison areas are at a suburb wide level, while the job density of Rockbank North is only for the town centre. This is not a like-for-like comparison, as suburbs include significant non-jobs land uses (such as residential and parks or open space).

As part of this review, an independent analysis of job density and mode share was completed. A regression analysis of all Destination Zones[9] with more than 100 jobs per km^2 was undertaken. This analysis revealed that the 'tipping point' is at a much higher density, closer to 10,000 jobs per km^2. However, the analysis had an R^2 of 0.52, which means that it is statistically unreliable. Based on this regression analysis, an estimated mode share for an area with 5,000 jobs would be approx. 81% car.

A *Business-as-usual* mode share is provided in Figure 40, which has a car mode share of 85%. It is not known what reference point is being used to determine this mode share for Rockbank North MTC. Given that no other suburban area has a car mode share as low as 60%, it is implausible that the UDF car mode share targets of 60% would be realised.

8.2.1 Public transport mode share

The *Technical Transport Report 2021* suggests that the public transport mode share will be 25% of all trips, accounting for approximately 1,236 trips in the PM peak hour.

This assumption is underpinned by Rockbank North having a high-capacity public transport link between Rockbank Station and the Rockbank North Town Centre. As of April 2022, the only mention of such a service is in the *Technical Transport Report 2021* with no announcements of such a service being made by the Department of Transport, the funding authority under the PSP.

An assessment has been undertaken determining total patronage and total resources required to provide services. The daily public transport use profile for entirety of metropolitan Melbourne, for weekdays and weekends is shown in Figure 41. This VISTA data shown in Figure 41 can be used to provide a generalised extrapolation of daily public transport passenger figures for Rockbank North MTC, as shown in Table 7. This indicates that based on an estimated 1,236 passengers during the busiest PM peak hour, there would be 8,903 passengers on the average weekday, or around 2.6 million annually.

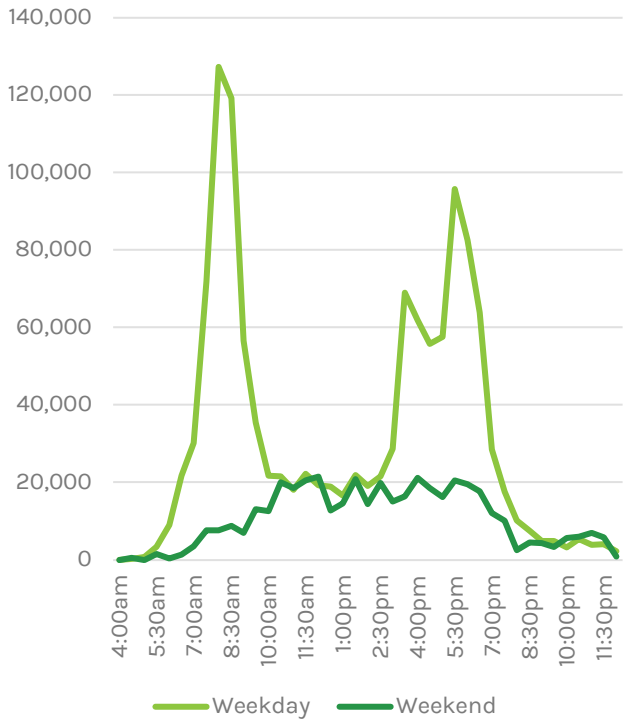


Figure 41 Public transport use profile across metropolitan Melbourne

Source: VISTA

Table 7 Estimated extrapolated passenger figures from the *Rockbank North Town Centre Technical Transport Report*

Time period	Passengers
PM Peak hour	1,236
Extrapolated week day	8,903
Extrapolated weekend day	3,021
Extrapolated weekly	50,557
Average day	7,222
Annual	2,636,186

With 2.3 million annual trips, this bus service (between Rockbank North and Rockbank Station) would be the third busiest bus route in

[9] an ABS statistical area looking at employment.

Melbourne, with only the three Orbital SmartBus routes (901, 902 and 903) carrying more passengers. It is noteworthy that this would be more than twice as many passengers as the route 601 shuttle from Huntingdale Station to Monash University.

The railway line also acts as a considerable constraint on potential. There are only three trains per hour, per direction (six in total), each with a capacity of less than 600 (444 seated), which is about half that of a Metro Trains Melbourne train.

A more modest mode share, of around 10% public transport would be consistent with the passenger movements on bus route 601 (a 2.5km shuttle). However, even this would be ambitious, given the different dynamics between Monash University, which has a captive audience of mainly students, on the largest campus in Australia (who typically have lower car ownership rates), while the Rockbank Town Centre will be competing with other centres in the region.

Lastly, there is the issue of who would pay. A 2.5km bus route, with 14 buses per hour during peak periods (5 hours per day), 6 services per hour during other times (13 hours per day) and 6 services per hour on weekends (18 hours per day), would cost around $1.6 million per year (based on the average cost of $6.30 per km which the Department of Transport pays, according to annual reports). This level of service is what would be required to move 2.6 million passengers per year, in either articulated or double decker buses.

The public transport patronage assumptions appear overly generous given the current context of Rockbank North. If, in future, significant changes to land-use, the cost of private transport, the availability and cost of car parking and the provision of public transport were to occur, it is possible that a more modest mode share of around 10% may be possible. However, 25% is highly unrealistic in the short to medium term (next 5-10 years).

8.2.2 Active transport mode share

The active transport mode share target of 15% is highly implausible. There are no instances in which a township with the land use and transport infrastructure profile of Rockbank North has achieved a mode for walking and cycling of 15%. As highlighted in Section 3, cycling mode share in outer suburban contexts, with limited supportive infrastructure, few constraints on car use and a likely cultural bias away from cycling is unlikely to achieve more than 1 or 2% cycling mode share. For walking, the limited number of destinations within a typical walking catchment of 800m, as well as major transport barriers (e.g. Western Freeway), as well as the aforementioned lack of constraints on car use all point towards a low walking mode share.

8.3 Movement and Place

Movement and Place is used to classify future streets within the MTC. Figure 42 shows the results from the assessment in the *Technical Transport Report 2021.*

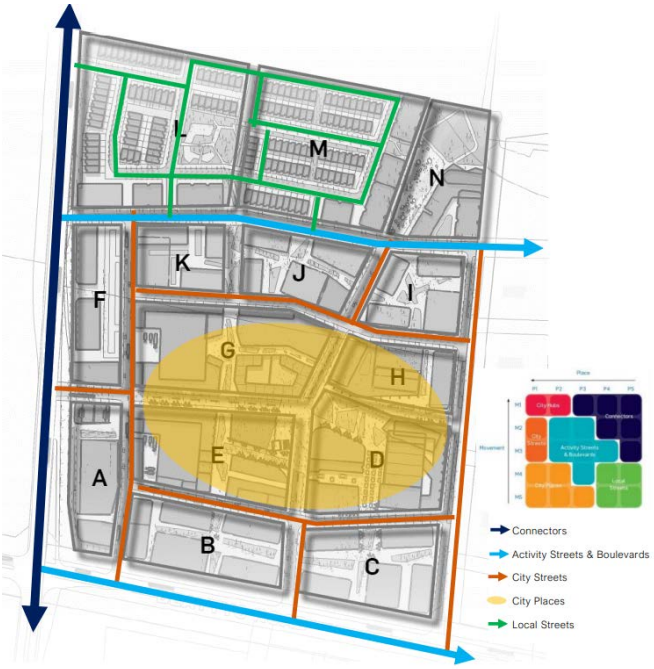


Figure 42 *Technical Transport Report 2021* Movement and Place assessment

The *Technical Transport Report 2021* identifies Leakes Road as a *connector* road along the western boundary of the activity centre. Residential streets to the north are listed as *local streets*. The two east-west through roads are shown as *activity streets and boulevards.* Key streets within the heart of the MTC are shown as *City Streets*, with the very core shown as a *City Place.*

While some of these classifications are consistent with the Movement and Place Framework

guidelines, there are others which are problematic. Firstly, the *City Streets* classification of key streets within the MTC is problematic because this classification suggests they are of 'State significance', similar to Collins Street or Bourke Street in the Melbourne CBD. While the final classification is highly dependent on the design of the street and their building interface, these streets are most likely to fall within *Activity Streets and Boulevards.* This would likely result in a P3 (municipal) place classification and an M3 movement classification.

We agree that the core could fit within a *City Places* classification. Restricted vehicle access and a highly pedestrianised space would warrant a P2 and M4/5 classification.

We also agree with the *local streets* classification for the residential area to the north, as well as the *Connector* classification for Leakes Road.

The two east-west through roads, while they could fit within an *Activity Streets and Boulevards* classification, these would need to be actively designed as such. Without careful consideration of the street design and intersection treatments, these streets are more likely to take on a *Connector* function.

8.4 Car parking rates

The *Technical Transport Report 2021* correctly highlights the challenges of approaching car parking with a '*predict and provide'* mindset. Put simply, such an approach results in a self-fulfilling prophesy, in which high levels of parking draws people to drive, even those travelling a very short distance, limiting the likelihood of achieving a more sustainable transport outcome. It is well established that parking needs are insatiable; providing more encourages more people to depend on it.[10]

Reducing parking rates is one way to better match parking supply with demand. However, without maximum rates, there is limited scope for ensuring that the supply meets Council's target for car use.

Reducing parking rates is one way to better match parking supply with demand.

Table 6.1 of the *Technical Transport Report 2021* also highlights the variances in demand likely to exist across the site for different uses. Office use will have peak use during the day, with those spaces likely to be unused in the evening or on weekends. While no evidence to support the proportion identified in Table 6.1 of the *Technical Transport Report 2021* is provided, the general trend indicated by the rates is logical.

There are some uses, however, where demand may also vary, but is not indicated as such in Table 6.1 of the *Technical Transport Report 2021*.. This includes housing uses, including apartments. These parking spaces will also see reduced demand, depending on the mode share of the residents. Assuming a mode share of 60% car for residents surrounding Rockbank North MTC (as the consultant has for the MTC), then weekday daytime parking demand should be reduced to 40%.

8.5 Traffic generation and mitigation

Based on the updated trip generation rates, and an estimate of the direction of trips into the MTC, the consultant identifies that the updated trip estimates are above those first modelled for the Rockbank North PSP. Several recommendations are made to increase capacity at several points in the road network to accommodate this increased demand. However, no evidence is provided to justify the increase in road capacity; a justification for why satiating that demand is necessary, especially given the target car mode share of 60%.

Implicitly, the rationale is to ensure traffic congestion is minimised and a higher level of service for vehicles maintained. However, no indication is given that the growth in forecast trips *will* reduce the Level of Service, nor what Level of

[10] https://www.routledge.com/Parking-and-the-City/Shoup/p/book/9781138497122

Service is deemed acceptable for Rockbank North MTC.

The State Government have provided recent guidance on the aspirational Level of Service for different street types, based on the Movement and Place framework (Figure 43). Siting the justification for road capacity provision within this Framework would align the MTC with State policy.

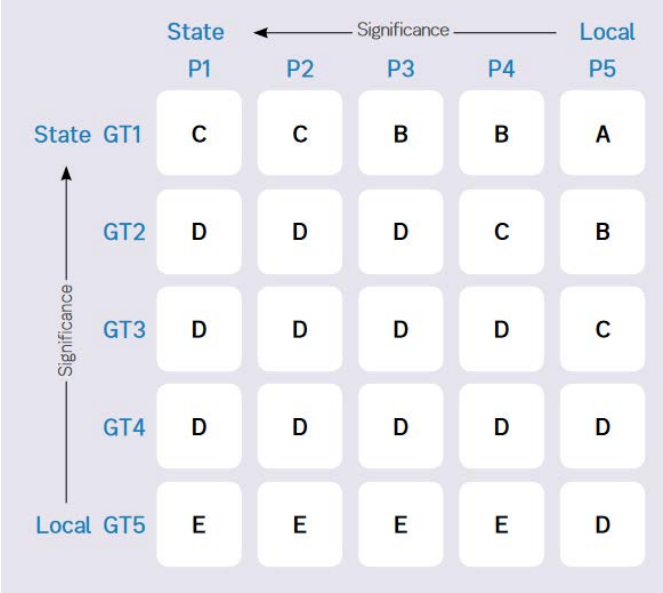


Figure 43 Movement and Place Level of Service

This approach still creates tensions between the ability to achieve the MTC's mode share target and maintaining vehicle level of service standards. They may also conflict with other objectives for the MTC, such as a sustainable, *place-based* and *open space* outcome.

It should also be noted that much of Collingwood's road network, which the *Technical Transport Report 2021* highlights that Rockbank North MTC will have similar mode share, would likely have a Level of Service score of F across much of the general traffic network during peak periods.

8.5.1 Impact on active transport

Table 6.3 of the *Technical Transport Report 2021* highlights indicative intersection layouts from the Rockbank North PSP. This includes additional changes recommended to accommodate the forecast increase in car trips above what was forecast in the PSP. The layouts shown in Figure 44 will likely be barriers to walking and cycling trips and should be factored into any modelling that considers active transport trips across these intersections. Due to their size, and level of traffic, only a small proportion of the community would consider these intersections acceptable to cross, on foot or bicycle.

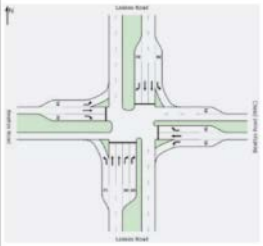
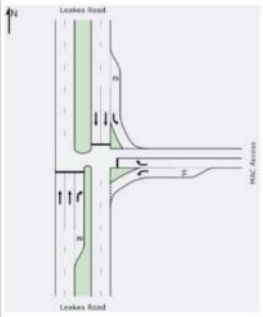
Intersection	PSP Layout	Indicative Potential Additional Mitigation
Leakes Road / Beattys Road		• Additional right turn lane on the east approach • Lengthen the right turn lanes on the south approach • Potential short through lane on the east approach to the west
Leakes Road / Activity Centre Access		• Additional right turn lane on the east approach • Additional right turn lane on the south approach and lengthen right turn lanes (and capture lane on the east approach)

Figure 44 Proposed intersection layouts

8.6 Critique of modelling approach

This section provides a brief critique of the approach to modelling contained in the report. It is grouped into two categories:

1. limitations of previous modelling work conducted (noting none was done explicitly for the MTC)
2. An outline of a simplified approach adopted for the transport assessment in lieu of modelling.

8.6.1 Previous modelling

Initial PSP modelling (SMEC, 2012) assumed Rockbank North MTC to be a very small town centre – significantly less than what is proposed in the UDF, meaning the network hasn't been designed to cater for the notable land use intensification.

Melton Transport Network Plan Modelling (GTA, 2019) had very limited significance to Rockbank North MTC, with limited land use growth in this area.

Several transport interventions have been proposed, from bus feeder services to the Rockbank train station to several road upgrades, however no transport investment has been directly modelled for demand uptake and optimisation.

Outer Metropolitan Ring (OMR) implications have not been assessed in detail, noting OMR forms the eastern boundary of the PSP and will likely have an interchange along this section proving direct access from the PSP, with potentially significant implications for Rockbank North.

Access options to MTC and intersection configurations haven't been modelled to any degree (based on what is in the report).

Section 6.5.1 of the *Technical Transport Report 2021* suggests initial modelling undertaken for Rockbank North has sufficient road network to cater for growth, which is vague and contradictory to previous statements which identified that this hasn't been assessed in a modelling framework.

8.6.2 Transport assessment

- *Trip Generation*: Number of trips in area has been generated using standard form trip rate tables, instead of sourced from outcomes of land use inputs to model
- *Trip Distribution*: Traffic distribution from area simply assumed instead of sourced from model, without any context as to where people are travelling
- *Mode Share*: Mode share has been assumed (instead of sourced from model) to be similar to inner city urban areas like St Kilda or Collingwood based solely on proposed job densities, without any consideration for regional context overlay, socio-economic circumstances in Melton or associated pressures on car use (car parking scarcity and price and congestion).

In summary, the transport assessment has been based on superseded modelling, inferences from areas of inner city Melbourne and generic traffic impact assessment principles/assumptions.

8.7 Conclusion

The questionable use of key assumptions and modelling methods cast considerable doubt on the reliability of the *Technical Transport Report 2021*.

Incorrectly linking job density and car mode share as a significant causal relationship, upon which the split in trip generation rates are then derived, makes mode share targets unreliable. In reality, the car mode share is likely to be much higher than the target mode share. The lack of appreciation of the relationship between the ease of car use and high car mode share has resulted in a report that provides a weak evidence base for informed decision making.

9. Strategic Transport Modelling Review

Clarity Consult have developed a Strategic Transport Model for Melton. This section includes initial analysis of Rockbank North MTC and other relevant transport projects in the region.

Final outputs of the model, including up-to-date forecasts for Rockbank North MTC are yet to be complete. This section will be updated in the coming weeks once the requisite data is available.

This will also allow for the Traffic Impact Assessment section of this report to be completed.

9.1 Assessment of previous modelling

Figure 45 provides a synthesis of the relevant modelling undertaken for these projects. The approach undertaken is shown in the box on top and the limitations of that approach outlined underneath.

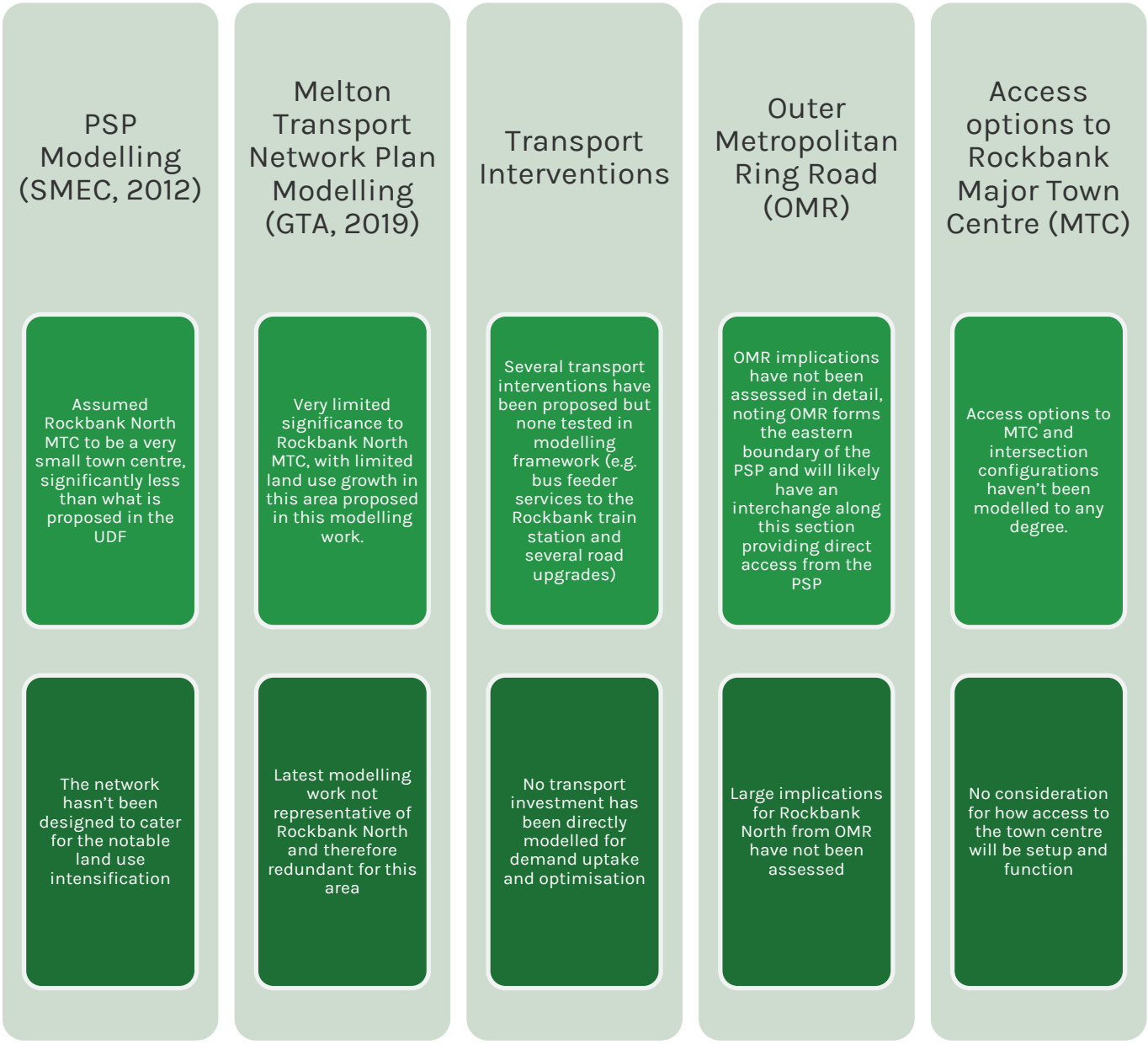


Figure 45 Previous modelling

Nb. Approach adopted is on top and limitations underneath

9.2 Technical Report Review

As part of the technical report, a transport assessment was undertaken. A simplified approach was adopted in lieu of completing detailed transport modelling. Figure 46 outlines the approach adopted in the technical report while Figure 47 details *best practice* for each of the key elements.

Overall, the assessment to date is not representative of current planning for the Rockbank North Major Town Centre, centred on the following three points:

- Superseded modelling references based on work completed a decade ago with assumptions that have fundamentally changed over the preceding years.
- Inferences from other areas of inner-city Melbourne that do not suitably account for the outer suburban context of Rockbank North and socio-demographics of the region.
- Generic traffic impact assessment principles/assumptions that are based on 'back of the envelope' calculations rather than a detailed modelling exercise.

A more thorough assessment is recommended based on current aspirations and thinking for the town centre. This would ensure adequate provision of transport services and infrastructure are provided, enabling transport outcomes more consistent with Melton's longer term strategic goals.

Figure 46 Approach adopted

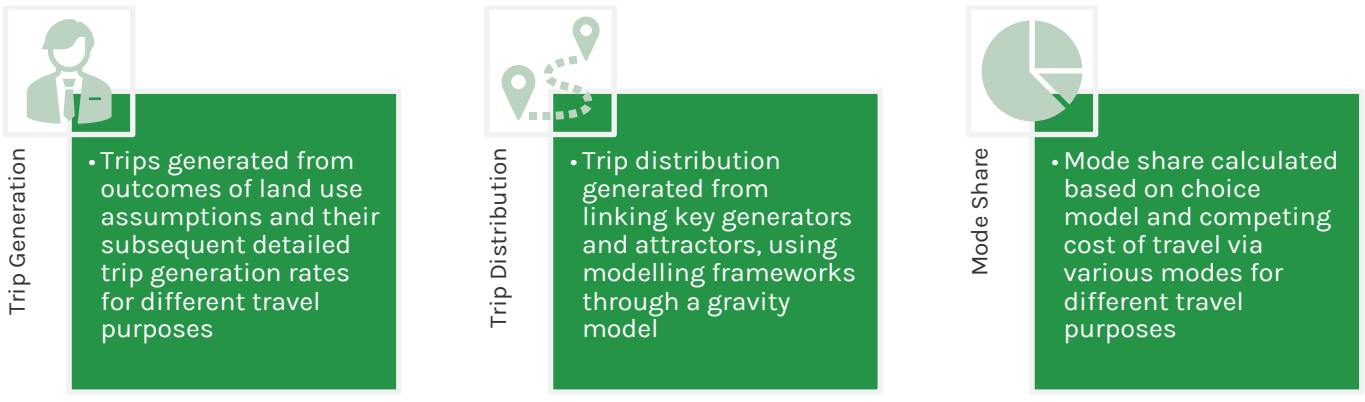


Figure 47 Best practice

9.3 Lane Use Forecast Review

Forecast land use for the Rockbank North MTC was sourced from state government detailed Small Area Land Use Projection data (SALUP). This data was collated for zone 5870, inclusive of the proposed Major Town Centre, as outlined in the Figure 48. This shows an uplift in population in the Rockbank North MTC to 2041. Current state government projections for the area showed ***negligible employment forecast in the MTC of less than 10 jobs and no retail jobs, inconsistent with the vision for the town centre***.

Table 8 Population / Households

Precinct	Year	Population	Household
Rockbank North MTC	2019	139	35
	2026	990	157
	2031	2,032	332
	2041	3,709	636

Table 9 Employment (Jobs)

Precinct	Year	Employment Total	Employment Retail
Rockbank North MTC	2019	5	0
	2026	5	0
	2031	6	0
	2041	8	0

Table 10 School enrolments

Precinct	Year	Enrolment Primary	Enrolment Secondary
Rockbank North MTC	2019	0	0
	2026	0	0
	2031	0	0
	2041	0	0

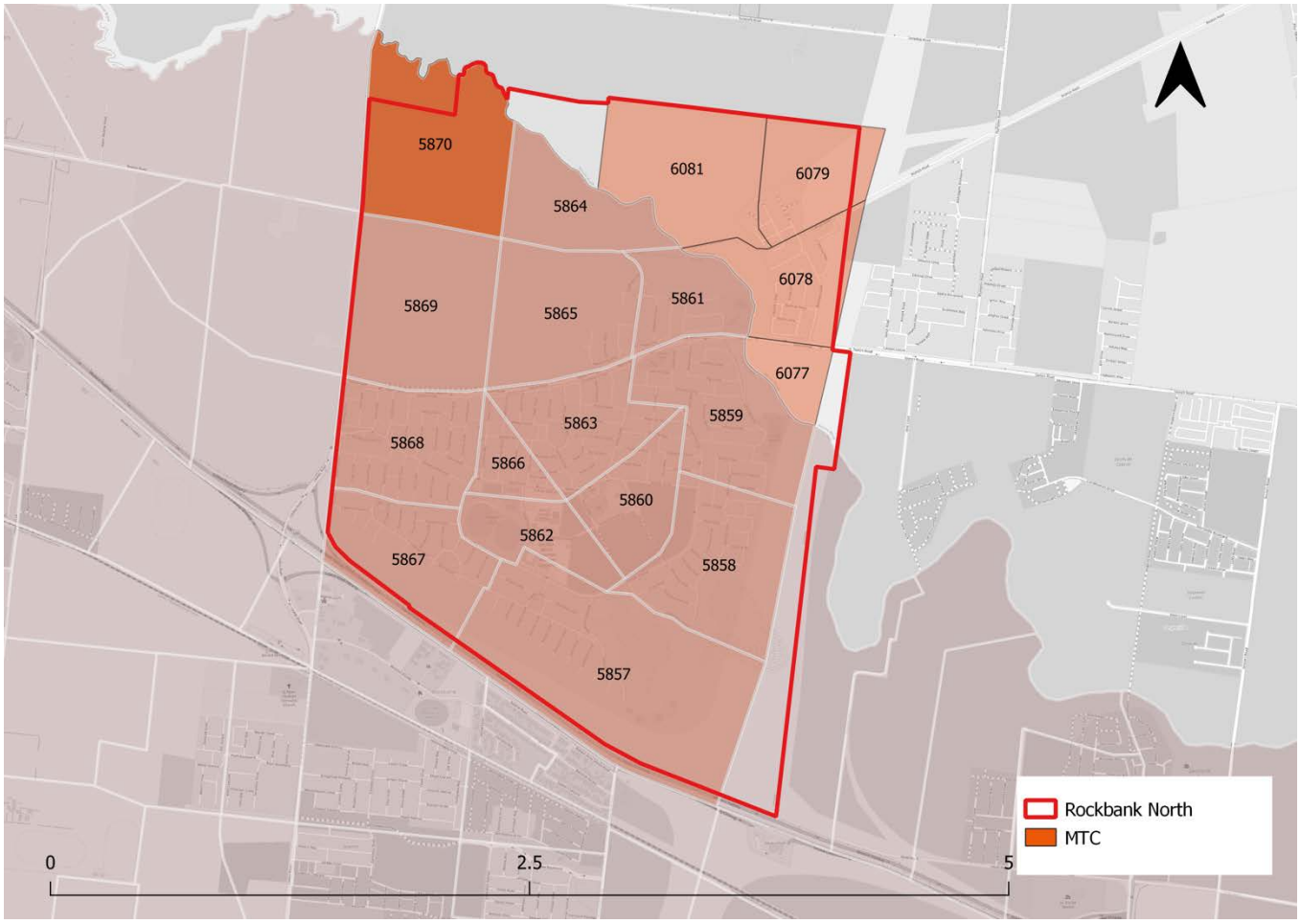


Figure 48 Rockbank North SALUP

9.4 Transport Investment Review

Transport network assumptions for both roads and public transport in the vicinity of Rockbank have been extracted from the ***Victorian Integrated Transport Model (VITM).***

This outlines the transport investment envisaged for Rockbank are shown in Figure 49.

Additional granularity of future transport network detail will be able to be provided on completion of the Melton Integrated Transport Model (MITM) in April/May 2022. This is a separate but concurrent transport modelling project undertaken by Clarity Consult for Melton City Council.

Figure 49 Envisaged transport investment

9.4.1 Roads

The base year 2018 road network shows limited road infrastructure in Rockbank North, with only one rural standard east-west road traversing the study area.

In 2026, several roads in the region are upgraded from rural standard. The Taylors Road east-west corridor is extended to travel through the Rockbank North study area and connect to Leakes Road to the west. The Hopkins Road north-south corridor is now also extended north of the Western Freeway up to Melton Highway.

By 2031, multiple road upgrades are implemented around the region, consisting of new north-south and east-west corridors.

Taylors Road is extended further west past Leakes Road and upgraded to a primary arterial divided carriageway to the east. A new east-west connection is also provided to the north of Rockbank North, just north of the Major Town Centre.

By 2041, the road network is significantly enhanced with many of the surrounding corridors up to arterial standards, shown in Figure 50. More significantly though, the Outer Metropolitan Ring Road (OMR) comes online on the eastern border of Rockbank North, providing an interchange at Taylors Road and direct access from Rockbank North to a second freeway at the OMR.

9.4.2 Public Transport

The base year 2018 public transport network shows no public transport services in Rockbank North.

By 2026, bus feeder services are provided connecting Rockbank North and the MTC to the Rockbank Railway Station. These feeder services are relatively high frequency, ensuring strong connections. The Melton rail line also has a notable increase in V/Line services.

In 2031 there is limited change from 2026, with bus services largely unchanged and an increase in rail services along the Melton line.

By 2041, an increase in the number of bus feeder services is provided between Rockbank North/MTC and the Rockbank Railway Station, shown in Figure 51. More notable however is the electrification of the Melton Rail line all the way to Melton.

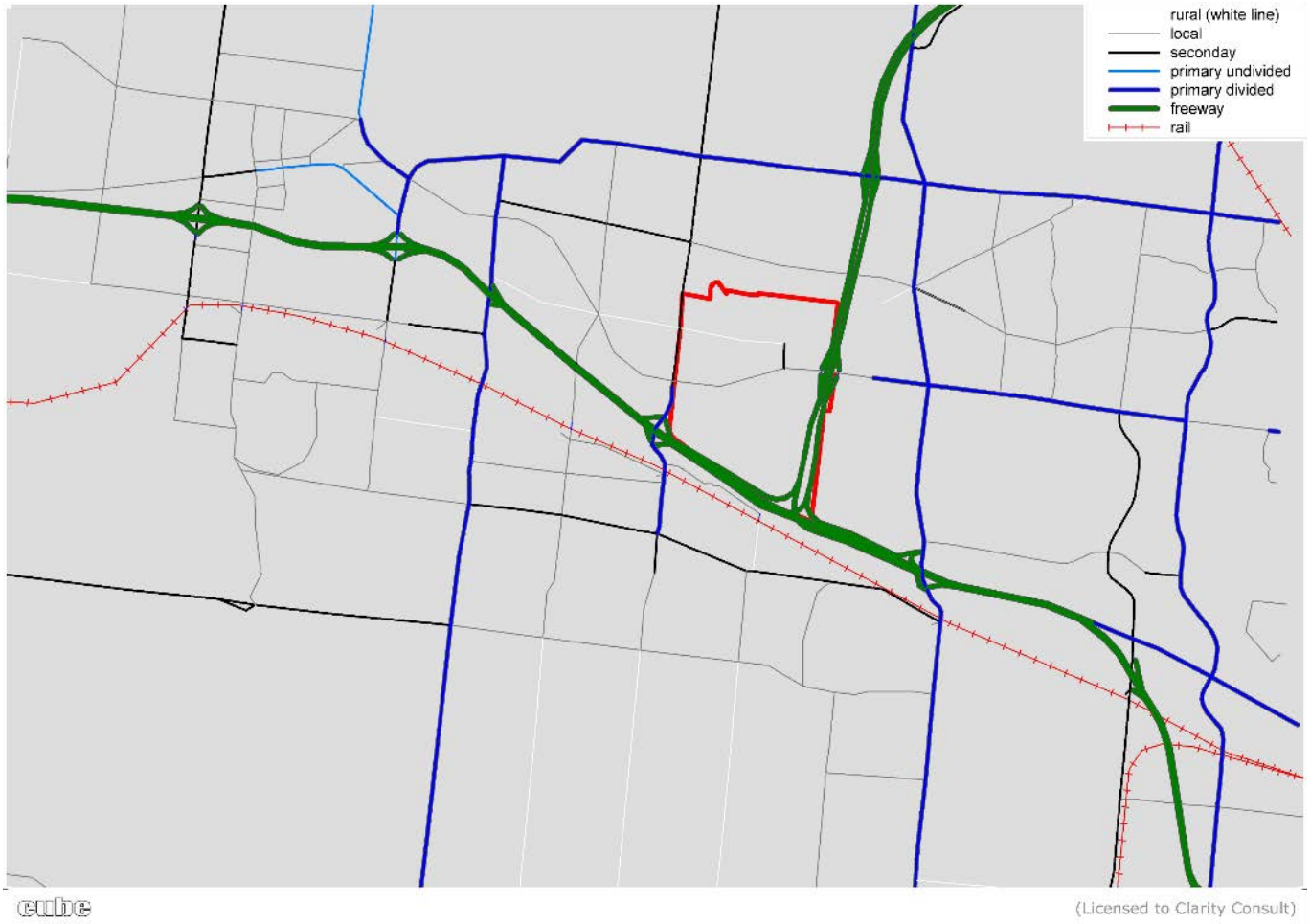


Figure 50 VITM review (Roads 2041)

Figure 51 VITM review (Public Transport 2041)

10. Traffic Impact Assessment

Using the results of the updated Strategic Transport Model, a Traffic Impact Assessment will be undertaken. This assessment will be guided by Austroads *Guide To Traffic Management Part 12: Integrated Transport Assessments for Developments*.

Traffic Impact Assessments are undertaken to understand the impact a development may have on the road network, and mitigate negative consequences. A Traffic Impact Assessment is required under Austroads *Guide To Traffic Management Part 12: Integrated Transport Assessments for Developments* that developments over 100 dwellings; or entertainment venues over 2,000m^2; or offices over 5,000m^2.

Traffic Impact Assessments are commonly undertaken when there is a proposed development, attempting to measure how the development will impact the transport system. In this case, however, there is not yet a specific development design, and the area is yet to be developed.

10.1 Methodology

A Traffic Impact Assessment will be undertaken following completion of the transport modelling (discussed in Section 9). To assess what traffic impact development of the area may have, three scenarios will be investigated:

- No build scenario – Based on the existing SALUP projections (shown in Figure 48, and Table 8, Table 9 and Table 10).
- Buildout scenario – Based on MTC population, employment and schooling figures.
- Sustainable transport buildout scenario – Based on the Buildout scenario, with increased provision of active and public transport.

The difference in traffic projections between the No build and Buildout scenarios will be assumed to be the impact of the development. The difference between the No build and Sustainable transport buildout scenarios will present an alternative impact.

The infrastructure required to accomplish the sustainable transport buildout scenario will be within the MTC and into the broader area. High-level costings of this infrastructure will be undertaken, attempting to provide estimates on mitigation costs.

Finally, a discussion of the traffic impacts between the three scenarios will be made. This will include assessment of road network performance against acceptable levels of service (shown in Figure 43). Recommendations for the road network and broader transport network, aimed at mitigating negative traffic impacts will be made.

10.1.1 Land use assumptions

All modelling is assumed to follow SALUP projections for final dwelling numbers, however, the buildout has been modified to better represent current development patterns. While the SALUP envisioned all areas growing at the same rate, it observed development pattern is with growth being earlier in the Aintree area and south of the PSP, then radiating counter-clockwise round to the proposed Major Town Centre.

The initial SALUP growth projections are shown in Figure 52, while the updated staging projections are shown in Figure 53.

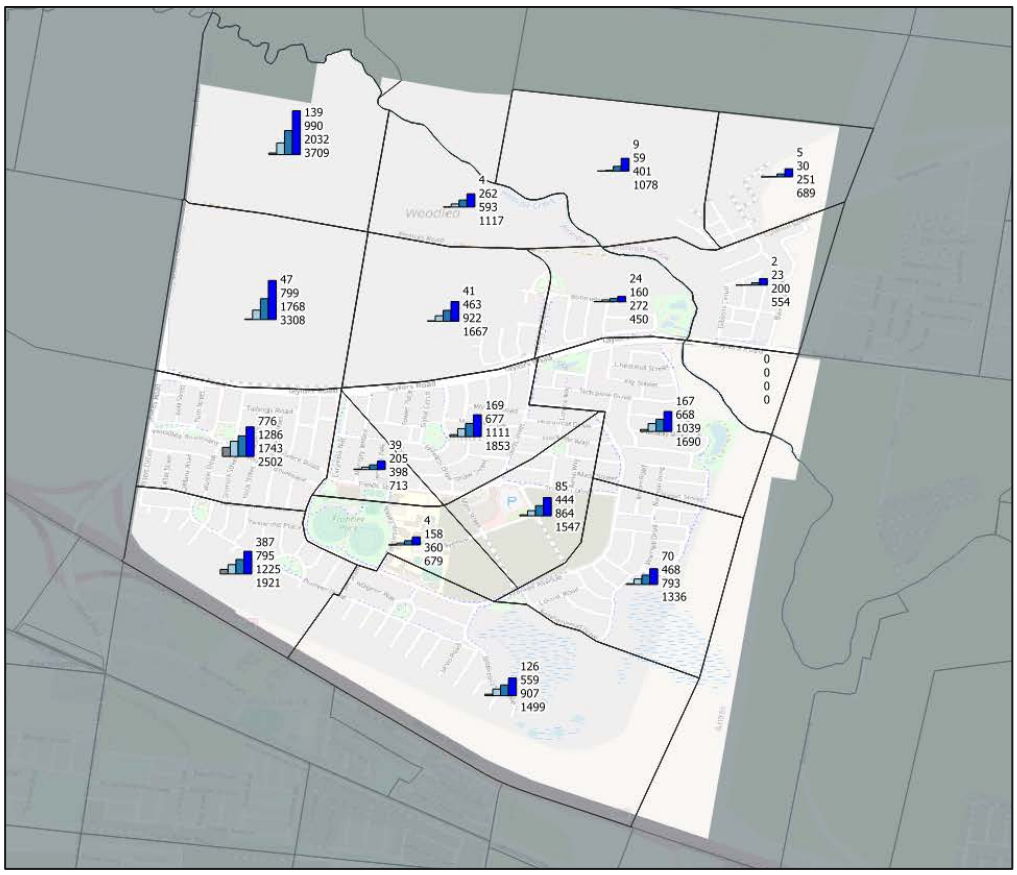


Figure 52 Initial SALUP Projections

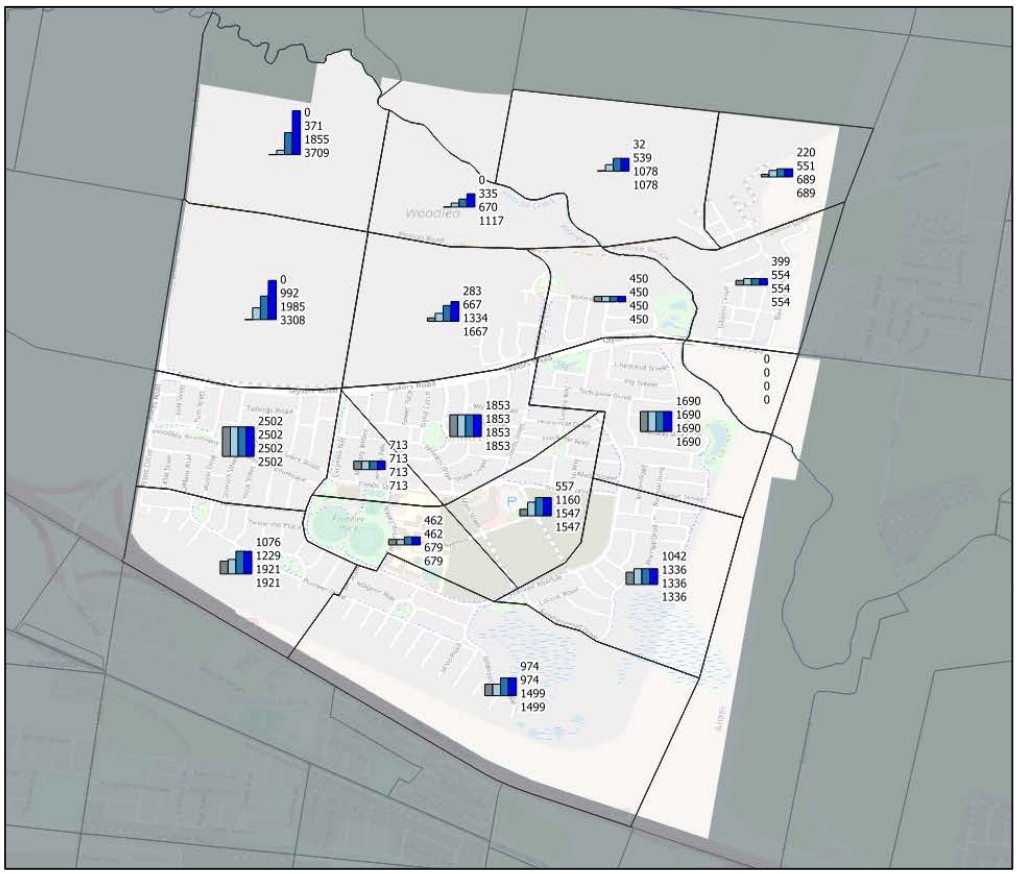


Figure 53 Updated Staging of development

10.2 Modelled congestion

10.2.1 No build scenario

The no build scenario represents a continuation of existing development patterns.

The modelled network performance under a no build scenario is shown in Figure 54 for the AM peak and Figure 55 for the PM peak, both in 2031.

The modelling reveals heavy congestion along Leakes Road (particularly around the Western Freeway) and along Taylors Road. Traffic is modelled to be heavier in the morning that afternoon peaks.

It is further noted that traffic congestion is highest around intersections. This is discussed in more detail later.

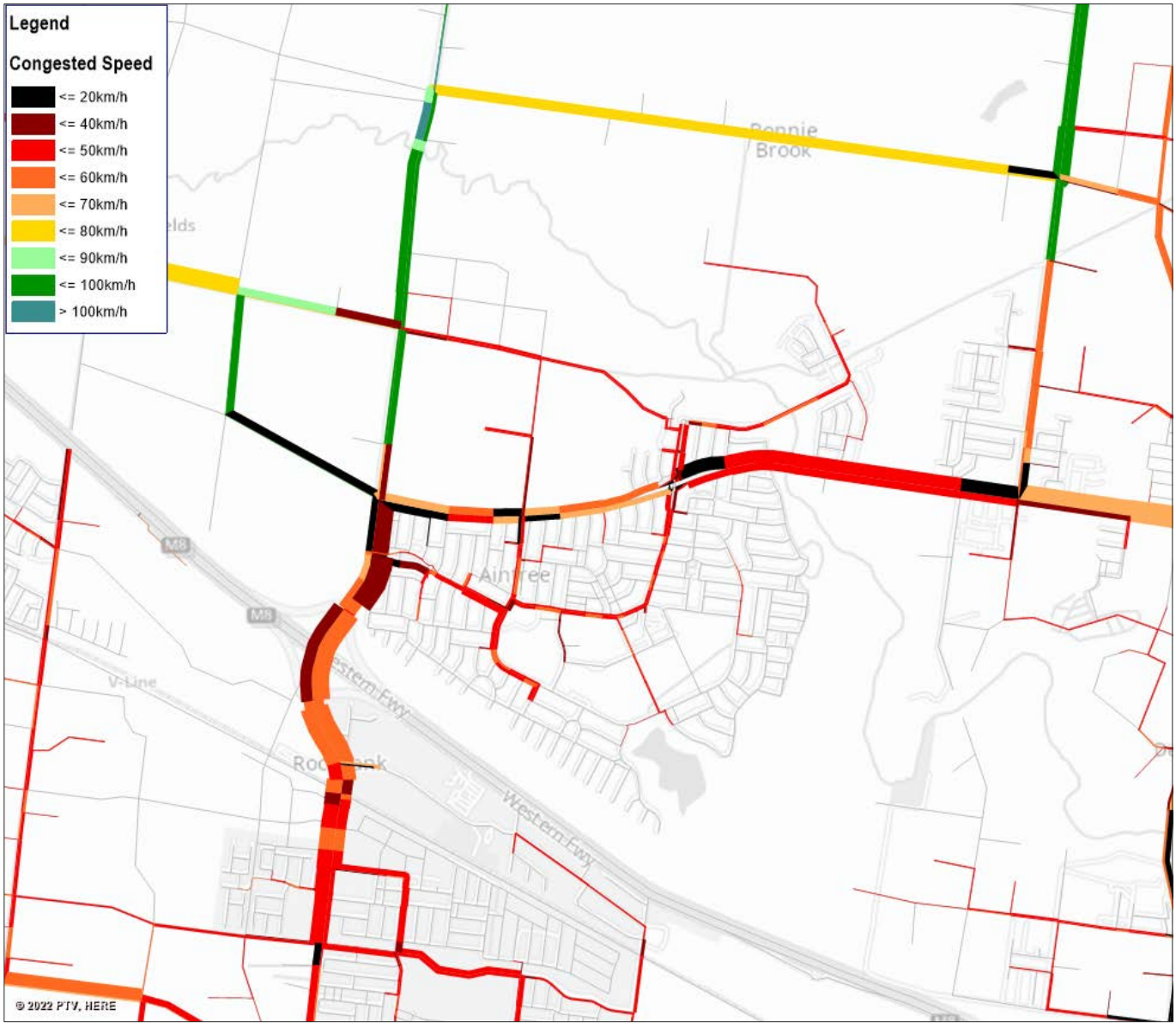


Figure 54 No build scenario 2031 AM congested speed

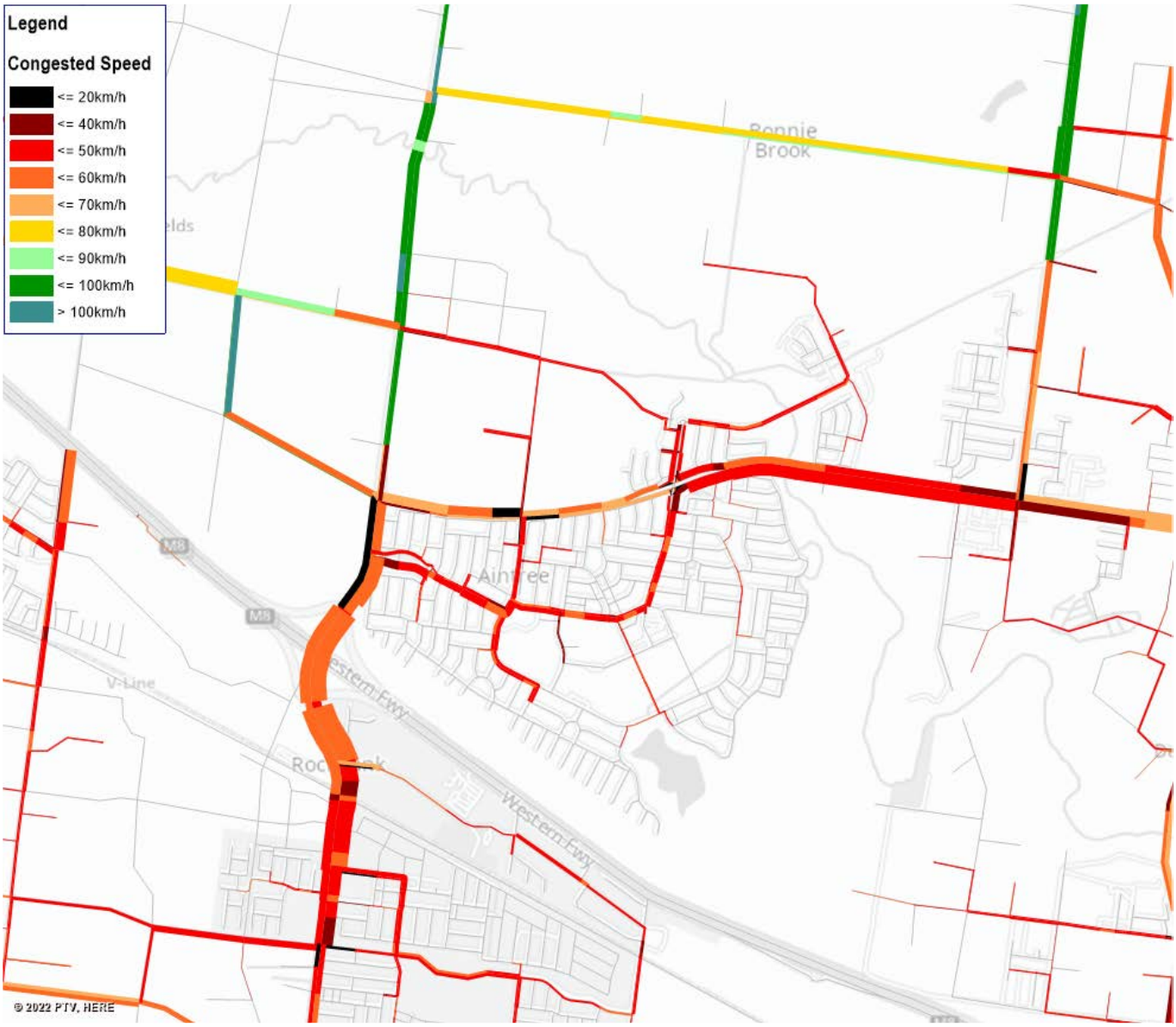


Figure 55 No build scenario 2031 PM congested speed

10.2.2 Buildout scenario

The buildout scenario includes updated employment in the Major Town Centre, but no changes to the transport network, to assess how traffic could be impacted against the base case. Residential development staging remains the same as in the no build scenario above. The results of modelling the buildout scenario are shown in Figure 56 for the AM peak and Figure 57 for the PM peak, again both in 2031.

The modelling reveals that if no changes were made to the transport network, and the MTC was built out, there would be localised traffic congestion, particularly on Leakes Road, Taylors Road and parts of Beattys Road. This congestion would be more acute in the morning peak, but still be present in the afternoon peak.

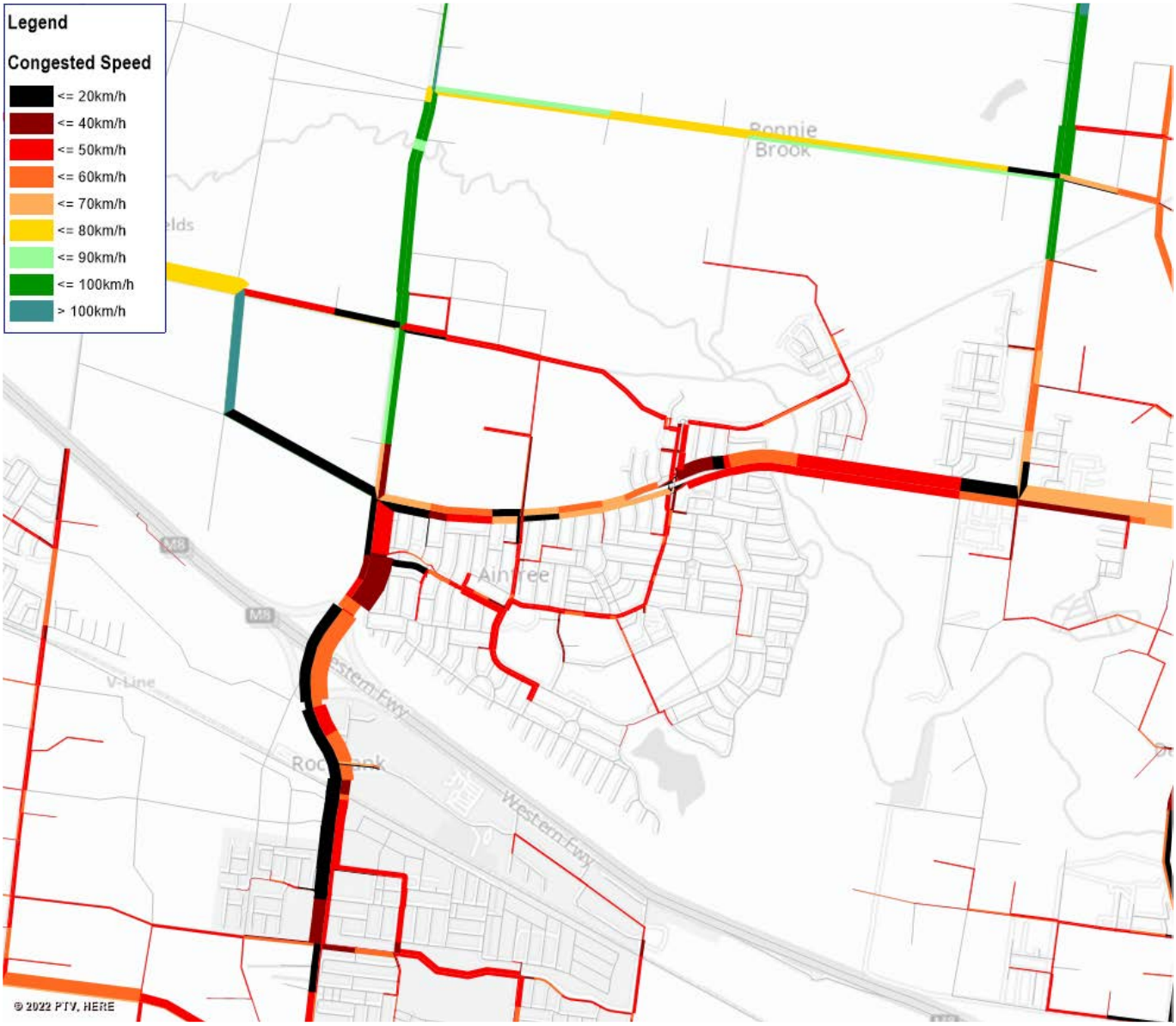


Figure 56 Buildout scenario 2031 AM congested speed

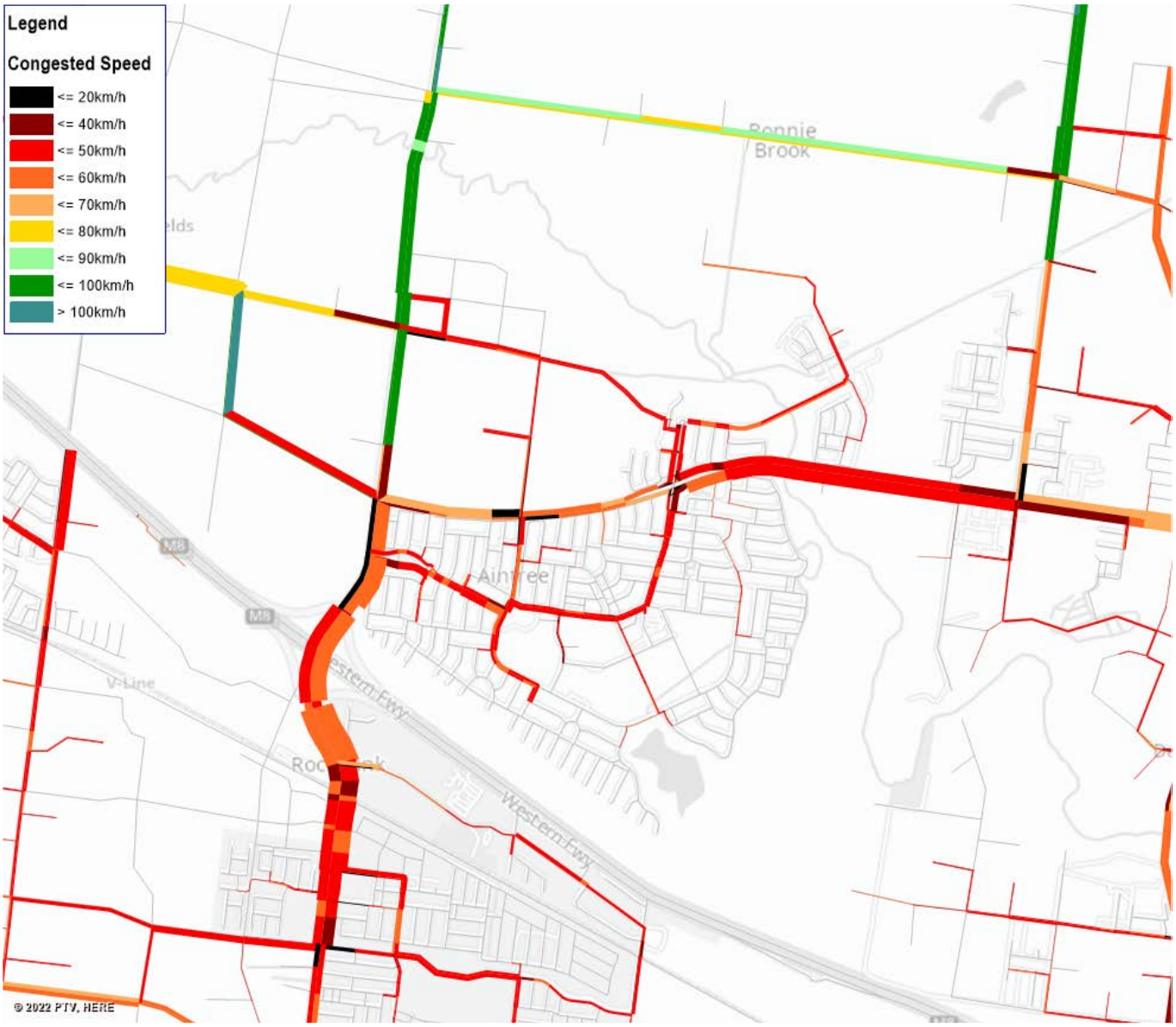


Figure 57 Buildout scenario 2031 PM congested speed

10.2.3 Sustainable transport buildout scenario

A sustainable transport buildout scenario used the same land-use assumptions as the buildout scenario, but modelled the provision four bus routes, shown in Figure 58. These bus routes, which are proposed in section *11.5.1 A potential network*, link Rockbank North MTC with the surrounding areas. They have been designed to connect with all nearby activity centres contained in the *West Growth Corridor Plan*. It has been modelled that they would run every 20 minutes, which is consistent with many trunk or connector routes in Melbourne. The route layout and frequency also provides a five minute frequency between Rockbank North MTC and Rockbank, facilitating movement between both activity centres and Rockbank station.

The modelling of this scenario shows a significant uptake in public transport across the Rockbank North MTC and broader area. Patronage along each network segment in the AM peak is shown in Figure 59. This shows heavy use in the western part of Melton, with many people using new buses to access Sydenham station, and the suburbs along the way. There is also strong patronage through Rockbank North and between Rockbank North MTC and Rockbank. The total number of trips is shown in Table 11, which demonstrates significant increase in bus use when compared to the base case. It is modelled that in 2041 there could be 545 trips to the MTC by bus in the morning peak, which represents 14% of all trips.

Patronage along each network segment in the PM peak is shown in Figure 60. Again, this shows significant bus patronage in the western part of Melton. Patronage is higher across the four routes in the PM peak than the AM. The total number of trips is shown in Table 12. It is modelled that in 2041 there could be 800 trips to the MTC by bus in the evening peak, representing 12.1% of all trips.

The modelled network performance under a sustainable transport buildout scenario is shown in Figure 61 for the AM peak and Figure 62 for the PM peak, both in 2031. The modelling reveals similar congestion levels to the no-build scenario, and lower levels than the buildout scenario. This indicates that much of the traffic impact from the development of the MTC can be mitigated through the provision of public transport.

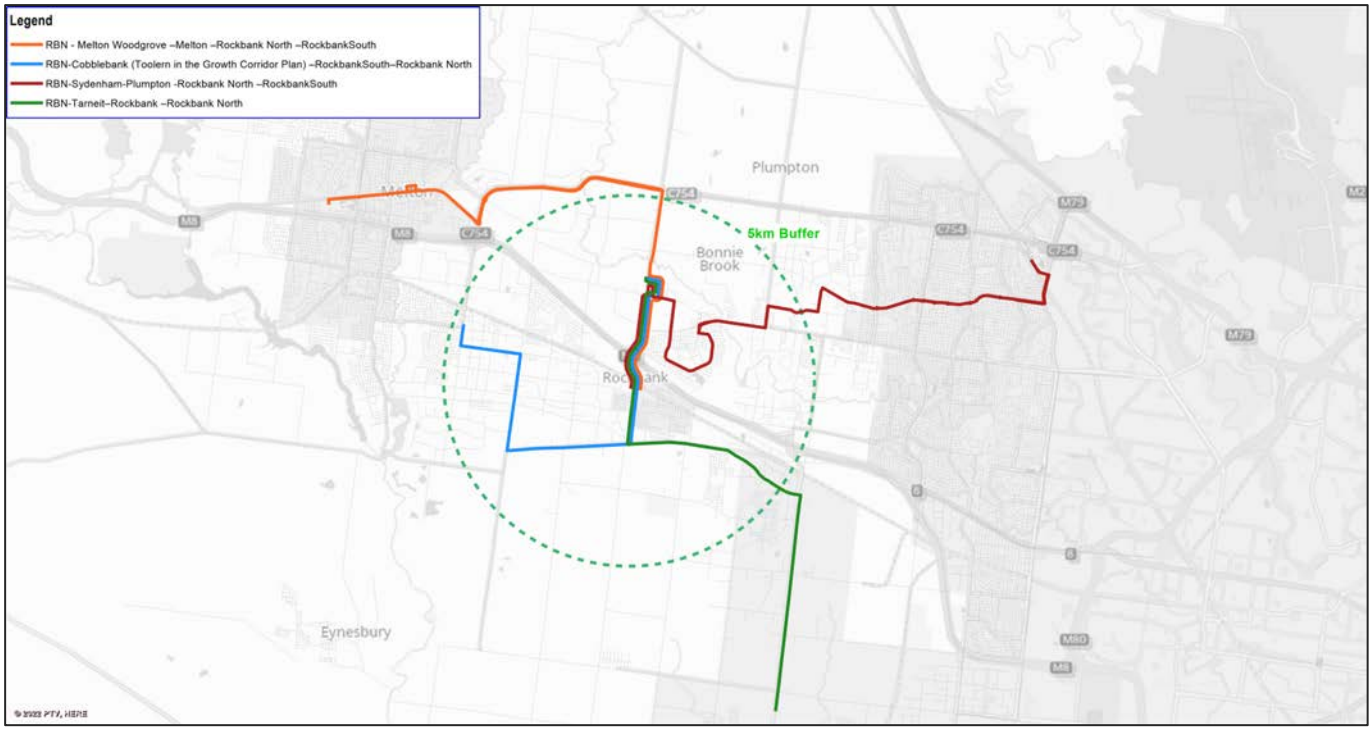


Figure 58 Bus routes proposed in the sustainable transport buildout scenario

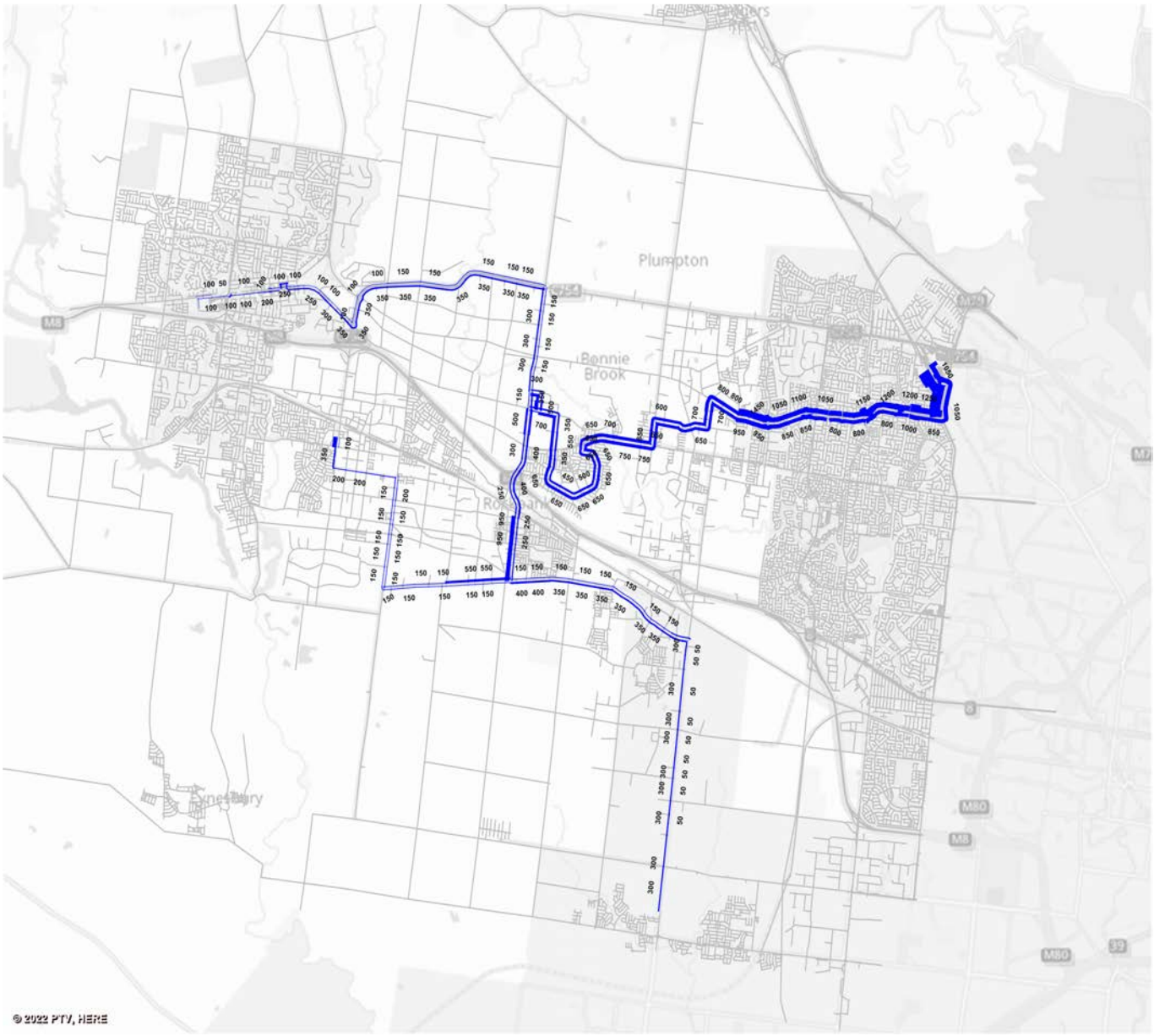


Figure 59 Sustainable transport buildout scenario AM bus patronage

Table 11 Sustainable transport buildout scenario AM bus patronage

Area	Year	MTC Base Case		+ Bus Investment		Change
		PT Trips	Mode Share	PT Trips	Mode Share	
Rockbank North	2026	141	1.7%	550	6.5%	4.8%
	2031	209	1.8%	834	7.3%	5.5%
	2041	268	1.9%	1,128	8.1%	6.1%
Rockbank North MTC	2026	-	-	154	12.8%	12.8%
	2031	-	-	316	13.6%	13.6%
	2041	-	-	545	14.0%	14.0%

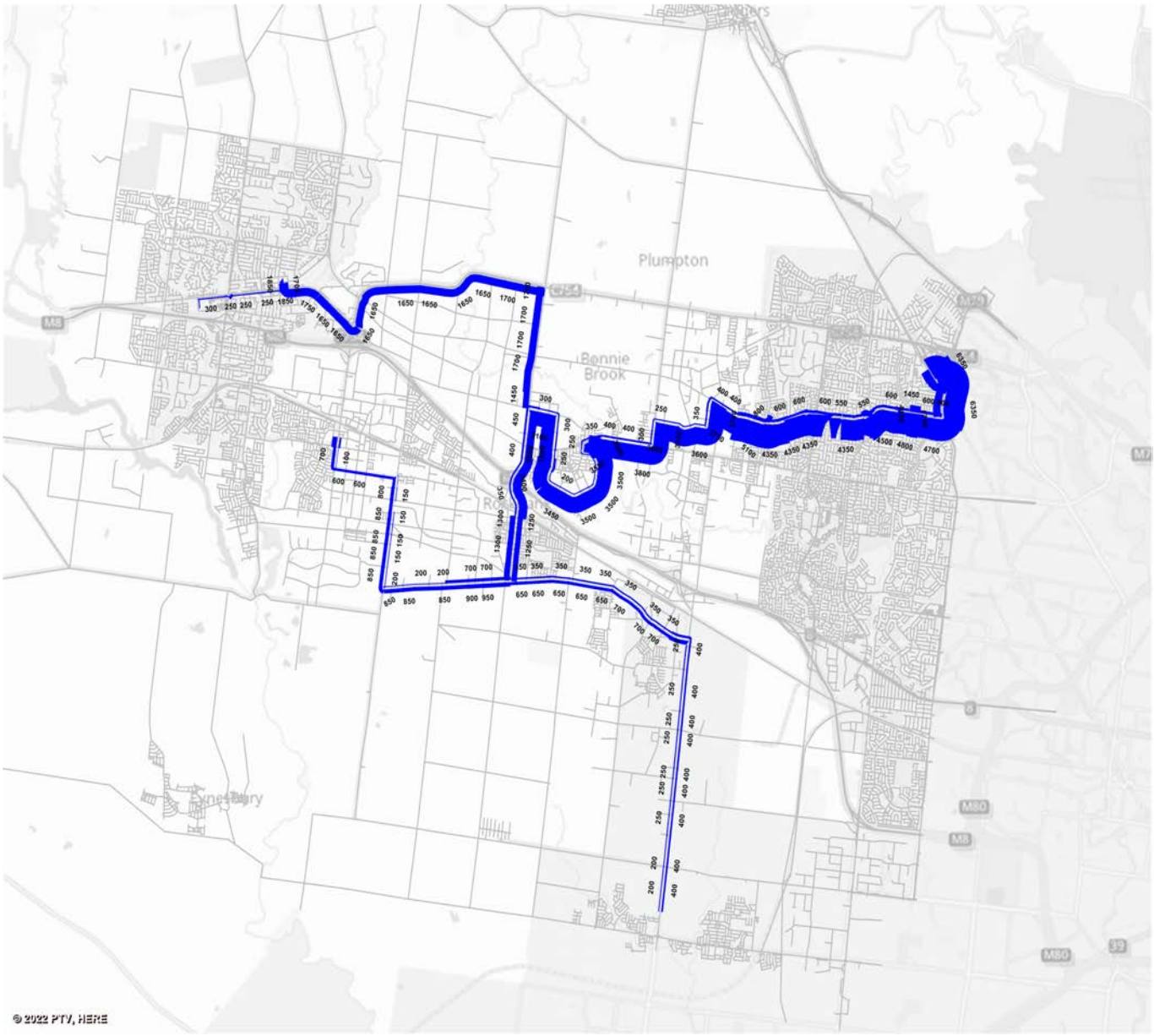


Figure 60 Sustainable transport buildout scenario PM bus patronage

Table 12 Sustainable transport buildout scenario PM bus patronage

Area	Year	MTC Base Case		+ Bus Investment		Change
		PT Trips	Mode Share	PT Trips	Mode Share	
Rockbank North	2026	184	1.3%	796	5.5%	4.3%
	2031	273	1.4%	1,221	6.2%	4.8%
	2041	355	1.5%	1,652	6.8%	5.4%
Rockbank North MTC	2026	-	-	241	12.1%	12.1%
	2031	-	-	486	12.2%	12.2%
	2041	-	-	800	12.1%	12.1%

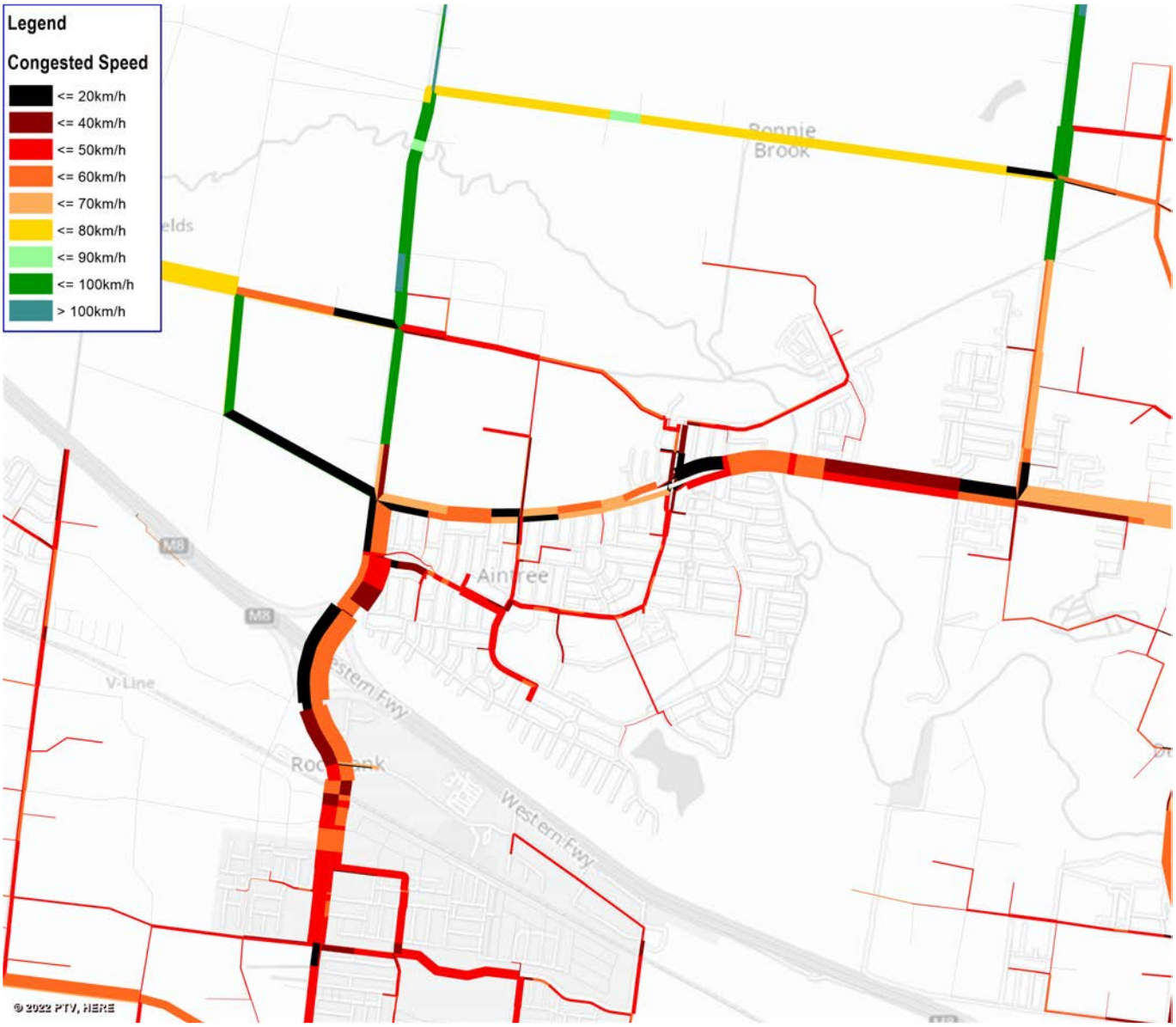


Figure 61 Sustainable transport buildout scenario AM congested speed

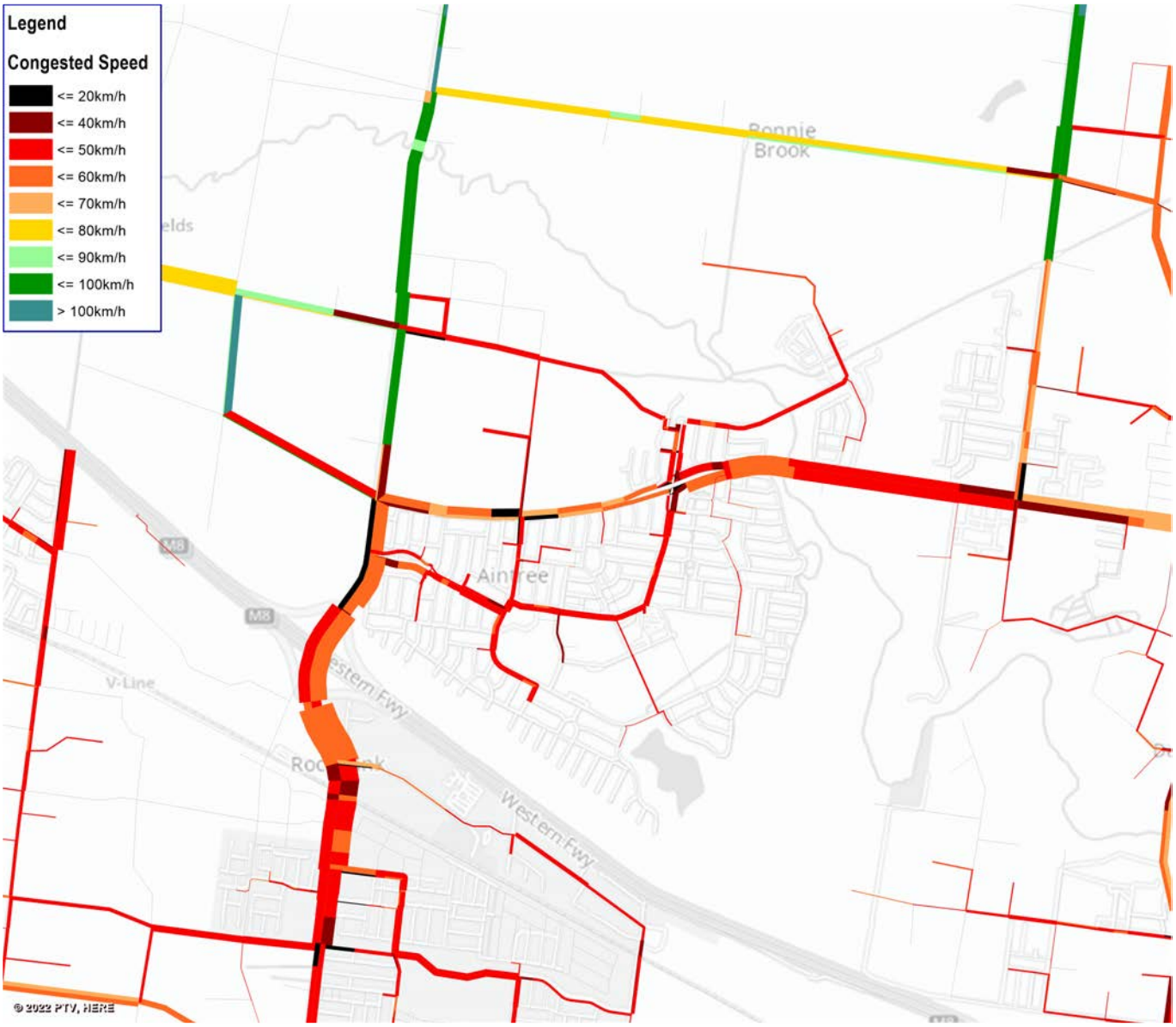


Figure 62 Sustainable transport buildout scenario PM congested speed

10.2.3.1 The potential role of cycling

An assessment of the potential role of cycling was also undertaken. This analysis was undertaken as a sensitivity test, where walking links were modified to facilitate faster speeds. This simulates what level of activity a widescale dedicated cycling/micromobility network could encourage.

In 2041 it is estimated that a maximum of 625 people could be induced to cycle to Rockbank Station. This is not to say that 625 people will cycle to the station, but that if a comprehensive network was established, and that policies and supports were in place, up to 625 people may consider cycling as a realistic option. This could mean an increasing public transport mode share from ~7%-8% during peak periods to ~9%-11%; a ~2.5% shift.

Halving this figure may represent a more realistic outcome from cycling infrastructure. However, this indicates that investment in cycling infrastructure could lead to around 200 people choosing to cycle to Rockbank Station, or around 1% of trips. A substantial increase in public transport and cycling participation (notably, from a low base).

10.3 Network traffic difference

Total traffic levels under each scenario were modelled in 2026, 2031 and 2041. This allows the difference in traffic levels between scenarios to be estimated.

The difference between the no buildout and buildout scenarios are shown in Figure 63 for the AM peak and Figure 64 for the PM peak. In both cases there are higher amounts of traffic of the major roads throughout the area, and surrounding the MTC.

The impact of public transport investment on the MTC buildout scenario of shown in Figure 65 for the AM peak and Figure 66 for the PM peak. In both periods there is a reduction in traffic across the network. While this may not reduce traffic to the no build scenario in all cases, when viewed in combination with the congestion plots, it demonstrates that a significant amount of the traffic impact from the MTC can be mitigated by public transport investment.

Figure 63 AM peak traffic impact of buildout scenario, 2041

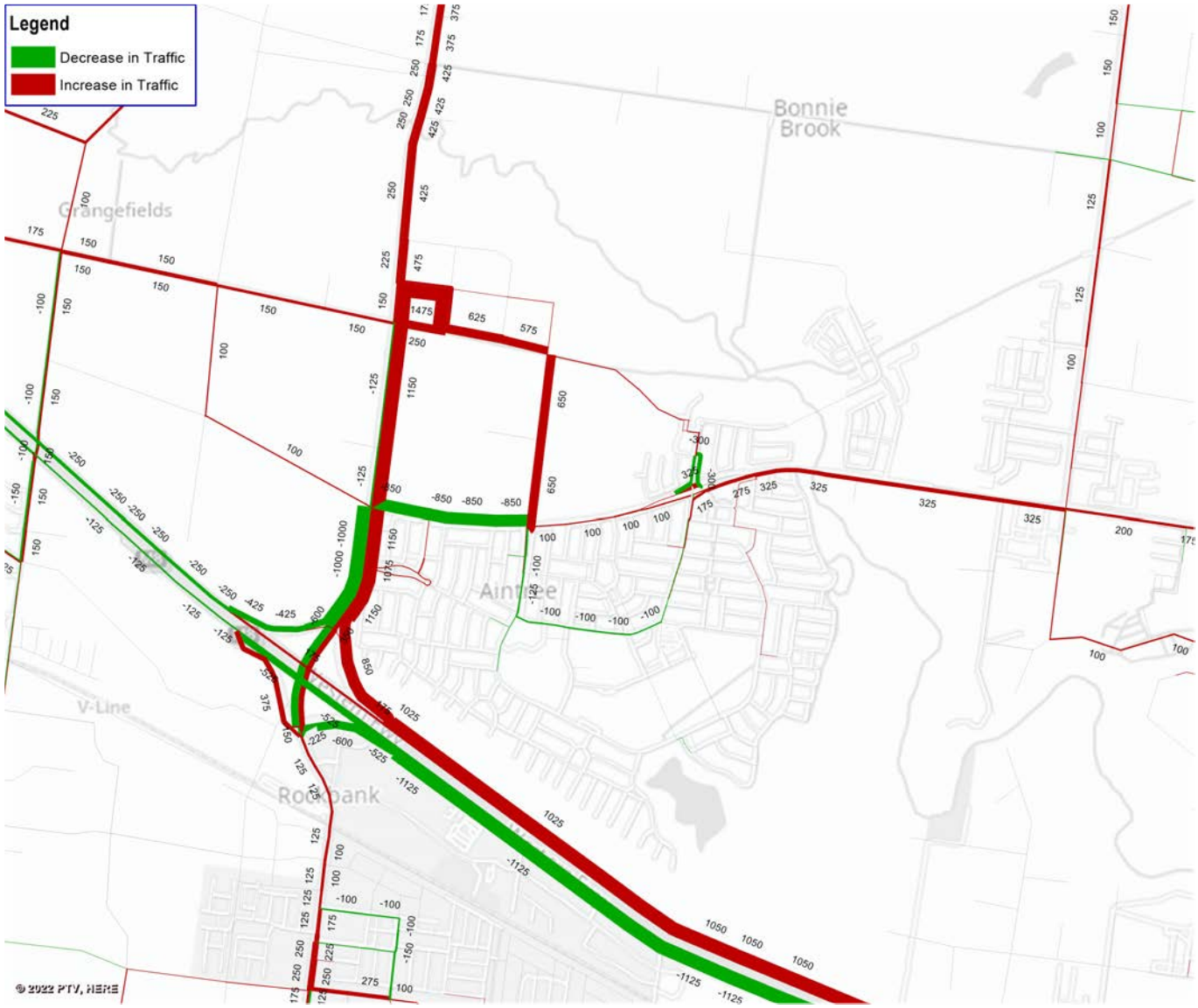


Figure 64 PM peak traffic impact of buildout scenario, 2041

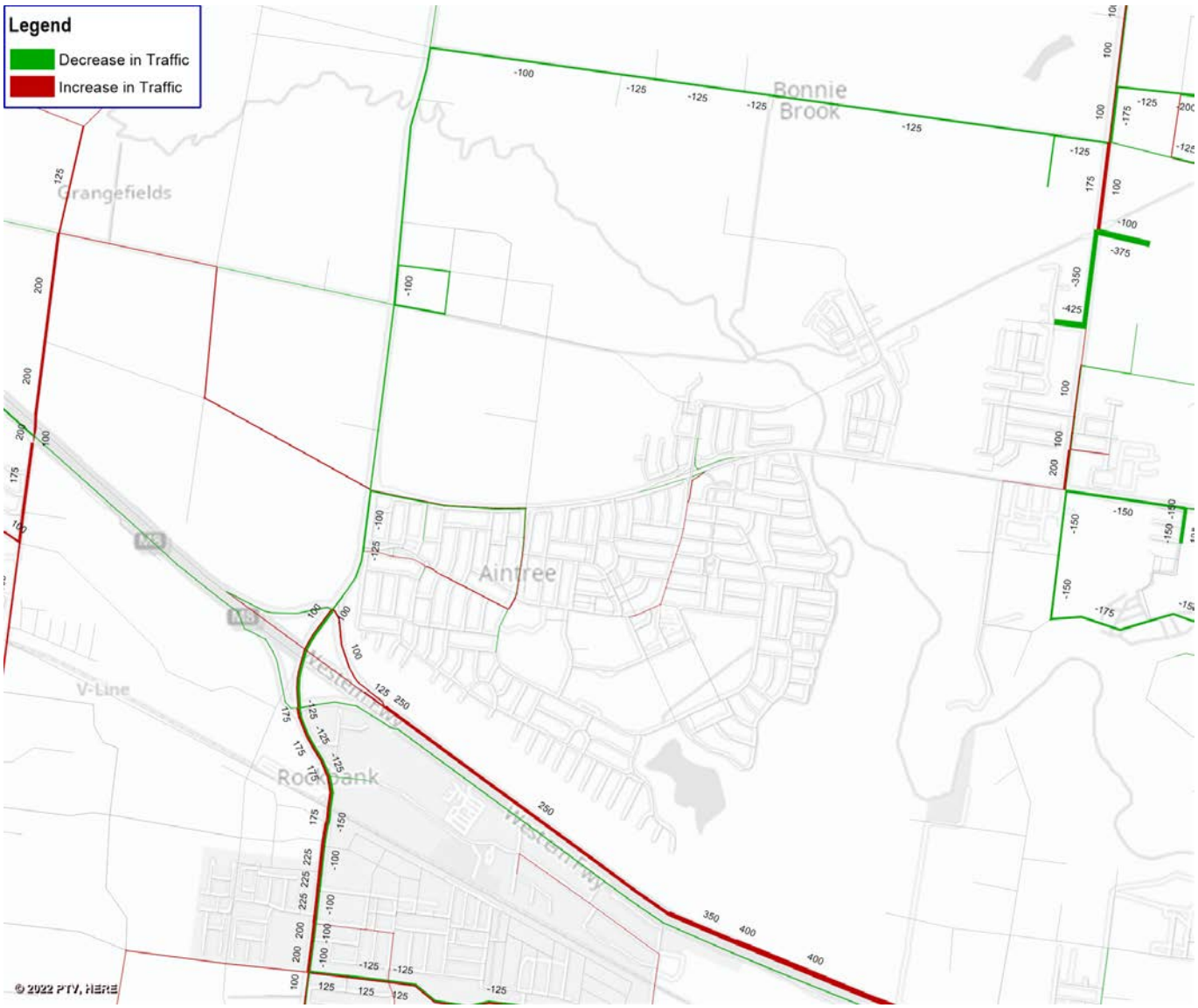


Figure 65 AM peak traffic impact public transport on the buildout scenario, 2041

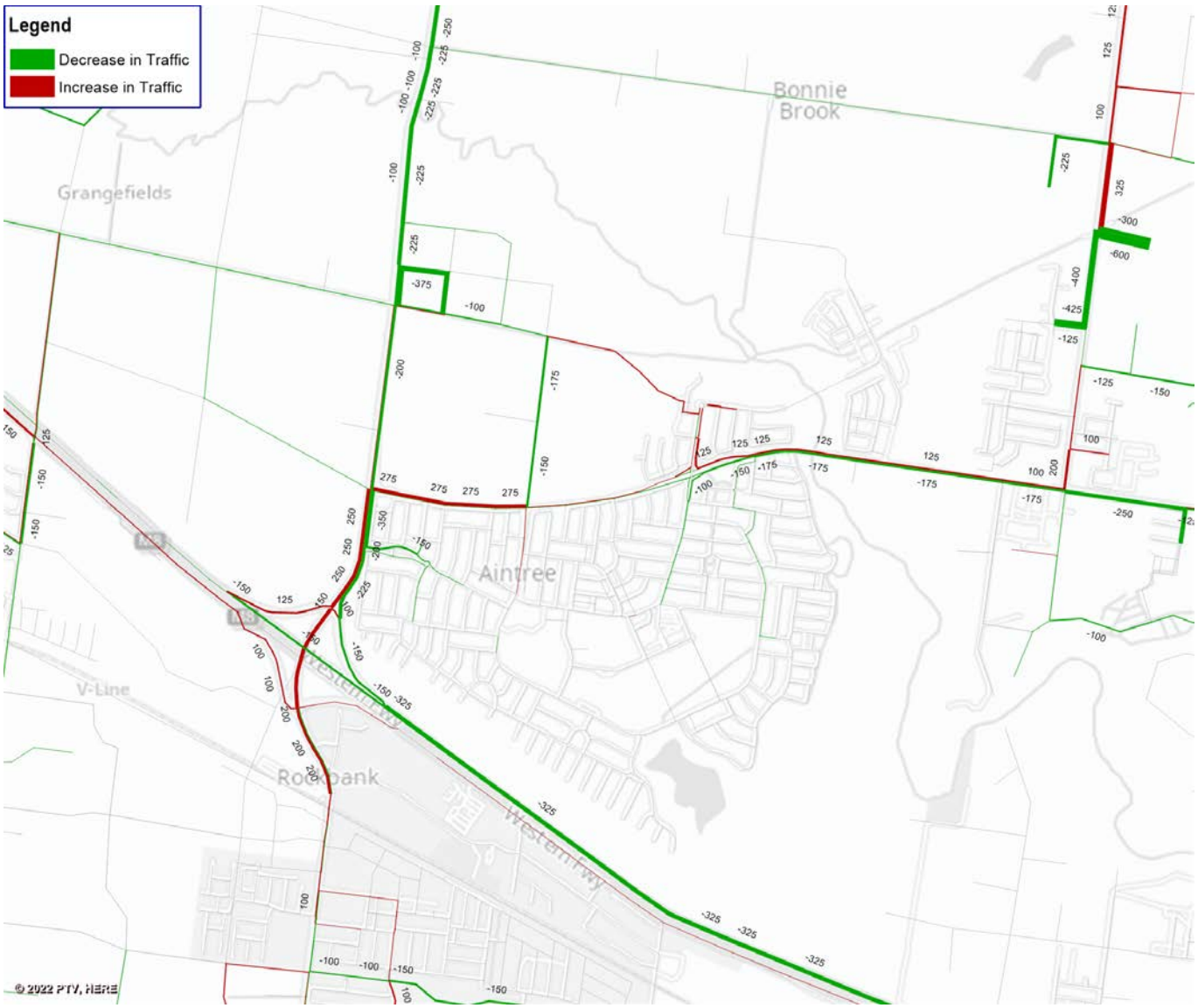


Figure 66 PM peak traffic impact public transport on the buildout scenario, 2041

10.4 Intersection performance assessment

Modelling assessed the performance, measuring level of service and delay at six intersections across the PSP area, as shown in Figure 67. The Movement and place classification and aspirational level of service ratings for the streets connected to these intersections are shown in Table 13.

Table 13 Movement and Place network type and aspirational level of service

Street	Classification	Aspirational Level of Service
Leakes Road	Connector	C
Taylors Road	Connector	C
Frontier Avenue	Local	D
Aintree Boulevard	Local	D
Plumpton Road	Local	D
Beattys Road	Activity	D
Tarletons Road	Connector	C

Figure 67 Intersections assessed for delay and level of service

The delay and level of service for each intersection, under each scenario in 2041 is shown in Table 14 for AM peak and Table 15 for PM peak. This demonstrates that development of the MTC has the potential to increase delay and lower the level of service at many intersections in the study area. It also shows that the sustainable transport buildout scenario reduces both delay and increases level of service. In the case of Leakes Road and Taylors Road, the sustainable transport investment has the potential to increase performance of the intersection in PM periods above a no build scenario.

In most cases the sustainable transport buildout scenario levels of service are acceptable with those outlined in Table 13. Further, in cases where the level of service is not acceptable, this is generally also true in the no build scenario.

Table 14 Comparison of delay and level of service at intersections in the AM peak, 2041

Intersection	Type	2041 Base		2041 MTC		2041 PT	
		Delay	LoS	Delay	LoS	Delay	LoS
1 - Leakes Road / Taylors Road	Signalised	48	D	64	E	64	E
2 - Taylors Road / Frontier Avenue	Signalised	27	C	29	C	26	C
3 - Taylors Road / Aintree Boulevard	Signalised	25	C	22	C	22	C
4 - Taylors Road / Plumpton Road	Signalised	80	F	82	F	83	F
5 - Leakes Road / Beattys Road	Give way	14	B	61	E	51	D
6 - Leakes Road / Tarletons Road	Give way	7	A	43	D	26	C

Table 15 Comparison of delay and level of service at intersections in the PM peak, 2041

Intersection	Type	2041 Base		2041 MTC		2041 PT	
		Delay	LoS	Delay	LoS	Delay	LoS
1 - Leakes Road / Taylors Road	Signalised	170	F	161	F	152	F
2 - Taylors Road / Frontier Avenue	Signalised	31	C	28	C	29	C
3 - Taylors Road / Aintree Boulevard	Signalised	26	C	22	C	23	C
4 - Taylors Road / Plumpton Road	Signalised	74	E	77	E	76	E
5 - Leakes Road / Beattys Road	Give way	16	B	16	B	13	B
6 - Leakes Road / Tarletons Road	Give way	6	A	14	B	7	A

10.5 Managing traffic Impact

Modelling has revealed that development of the MTC has the potential to increase traffic volumes through the study area, while reducing vehicle speeds and increasing congestion. The sustainable transport buildout scenario mitigates much of these negative impacts, returning congestion, traffic speeds, and intersections to a state closer to the no build scenario.

It is recommended that rather than increasing road capacity, investment be made in public transport. The four bus routes modelled not only reduce traffic and congestion while increasing speed, but they also have broader social and transport benefits. Linking every activity centre in the VPA *West Growth Corridor Plan* will increase connectivity at not just Rockbank North, but throughout the west. The modelling has revealed that this will have substantial benefits in Melbourne's existing western suburbs, increasing access to Sydenham Station and emerging activity centres. As such, the positive traffic impacts are likely to be much greater than those assessed here, lowering traffic across the western corridor. Providing buses will also increase transport options for those who cannot drive, increasing quality of life.

It is further recommended that active transport investment be prioritised. Active transport options can reduce the need for short trips, further reducing strain on our road network. While this may not radically decrease traffic, it will make a meaningful difference when combined with public transport investment, but increasing the catchment of the rail network and facilitating more people to catch the train without the need to build more car parking.

The overall traffic impact of the MTC can be reduced by public and active transport investment. While some impact will remain, this impact is still within an acceptable level of service. Further, we believe that the positive social impacts of increased amenity and activity near dwellings will outweigh any negative impacts on the transport network. Development of the MTC should be able to proceed, without the need for major road investment in addition to what is already planned, so long as adequate public and active transport is provided.

11. Transport Design Considerations

This section provides a broad outline of best-practice transport design considerations to support the development of the Rockbank North MTC Urban Design Framework. These elements draw from existing street design guidelines via local, interstate, and international sources. Guidance on how each element may enhance the Rockbank North MTC is provided.

11.1 Benefits of sustainable transport

Sustainable transport provides benefits to the community, Council, and developers. Figure 68 provides an overview of the main benefits that arise when communities are planned with integrated, sustainable mobility as a priority.

For the community, they get improved travel choice; the ability to engage in healthier and environmentally friendly practices; reduced transport costs; higher levels of independence for children, elderly, and people with a disability; and a more attractive and connected neighbourhood.

Council's benefit by having a community that is healthier and more sustainable, lower capital and operational costs for road infrastructure, and higher Council rates yield from denser residential areas.

Developers benefit from having a higher amenity product to sell, less need to fund road and parking infrastructure, and higher yield from land that can be funnelled back into improving the commercial attractiveness of the urban environment.

Figure 68 Benefits of sustainable mobility for Rockbank North

11.2 Mode hierarchy

Mode hierarchies will assist in determining how space is allocated between modes in situations in which there is insufficient space to cater to every mode of transport. Figure 69 and Figure 70 are the proposed mode hierarchies for urban streets and regional roads respectively. While motor vehicles may have priority on the main carriageway on regional roads, providing a safe, separated pathway for active modes should be a priority for streets in the town centre. These road use hierarchies act as a practical guide to allocate priority in instances in which competition for scarce road space results in having to make trade-offs between one mode and another.

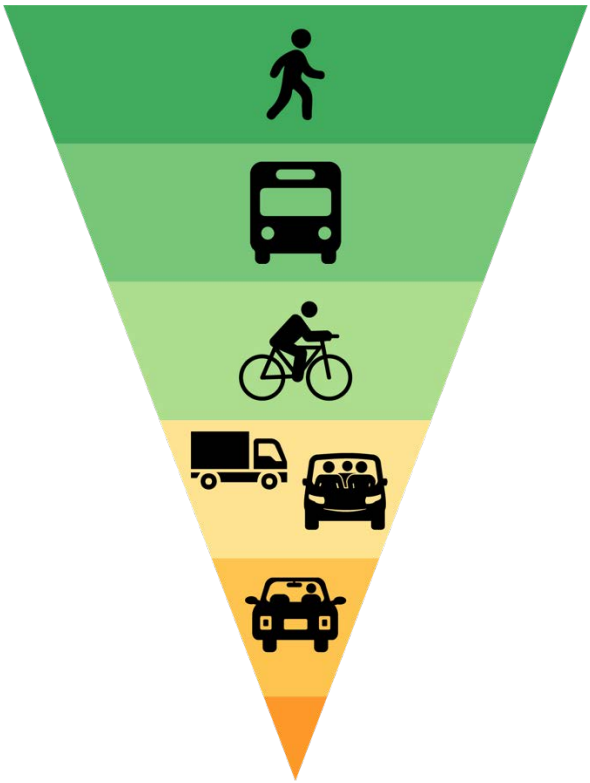


Figure 69 Mode hierarchy - Urban streets

The mode hierarchy for regional roads, shown in Figure 70 has walking and cycling to the side because the higher speed and volume of motor vehicle traffic on these roads generally require physically separate infrastructure for active modes. The priority of these regional roads is motor vehicles.

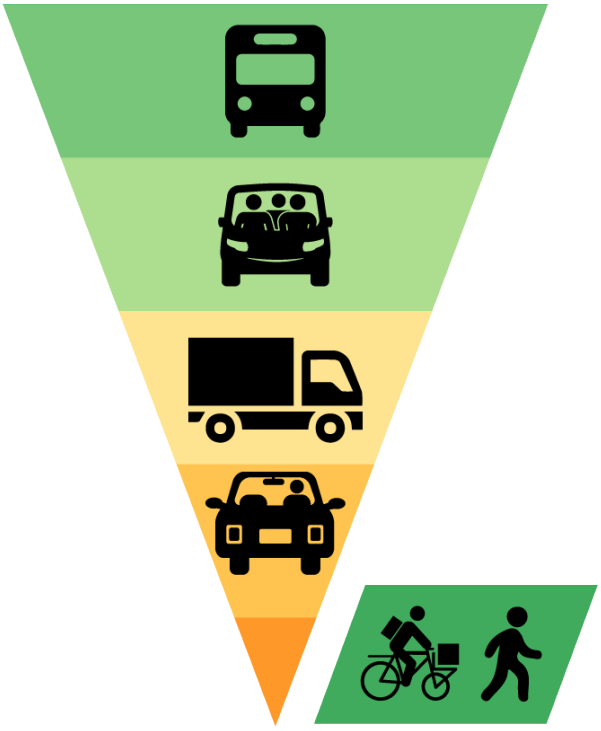


Figure 70 Mode Hierarchy - Regional Roads

11.3 Walking

In Victoria, walking is a common mode of transport and one of the most popular forms of recreation. More people walk in Victoria than catch public transport.[11]. People walk for a myriad of reasons; every road user is a pedestrian at one stage of their journey, even if it is only walking from their parked car to their final destination. Having walkable destinations and suitable infrastructure to reach these destinations is critical to a sustainable community. Figure 71 gives a visual representation of the type of trips pedestrians generally make.

[11] https://public.tableau.com/app/profile/vista/viz/VISTA-Trips-timeseriesAccess/Trips-methodoftravel

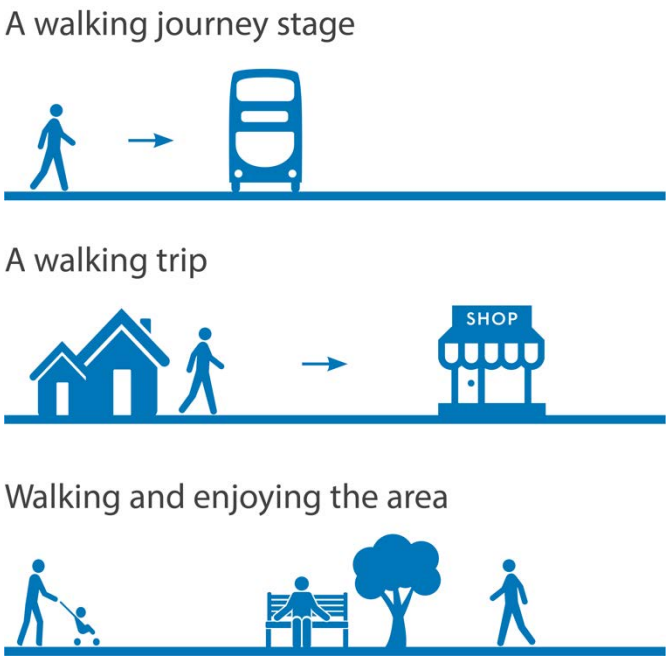


Figure 71 Type of walking trip

Source: *Walking action plan*. Transport for London. 2018.

The Healthy Street Indicator, shown in Figure 72, is designed to act as a performance indicator for authorities designing streets, to ensure they have all the right ingredients to make a successful street.

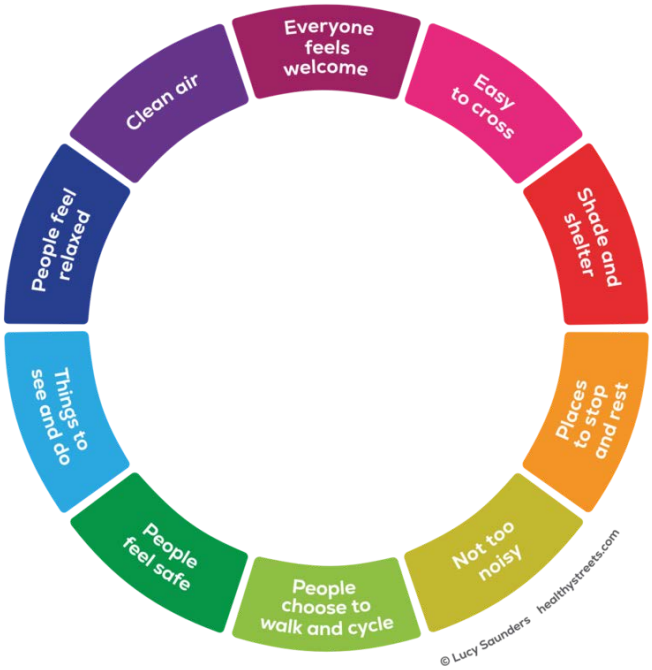


Figure 72 Healthy Street indicators

Source: healthystreets.com

Transport for London adopted similar themes for its *Pedestrian Network Design Principles*[12] and are listed below:

- Safe
- Inclusive
- Comfortable
- Direct
- Legible
- Connected
- Attractive.

Each of these principles should be considered, and provided for, as part of the streets being designs in Rockbank North.

One of the most important determinants of walking is *having somewhere to walk.* Studies have shown that the most important predictor of how much walking occurs in a suburb is *how many places* people can walk to within a 10 – 15 minutes.[13] From a practical perspective, what this means for Rockbank North is that a *diversity of destinations* (shops, schools, parks, medical services, cafes) will need to be planned, all within a 10 minute walk of people's homes in order to create an environment in which walking becomes a common, popular choice.

Figure 73 shows a fine-grained approach to designing walkability in urban centres where large block lengths impede access to destinations. By limiting block lengths to a maximum of 70 metres, pedestrians will have more options to access key destinations (i.e. pedestrian permeability will be maximised).

Studies have shown that the most important predictor of how much walking occurs in a suburb is *how many places* people can walk to within a 10 – 15 minutes

[12] https://content.tfl.gov.uk/the-planning-for-walking-toolkit.pdf
[13] https://tinyurl.com/cxjus6jw

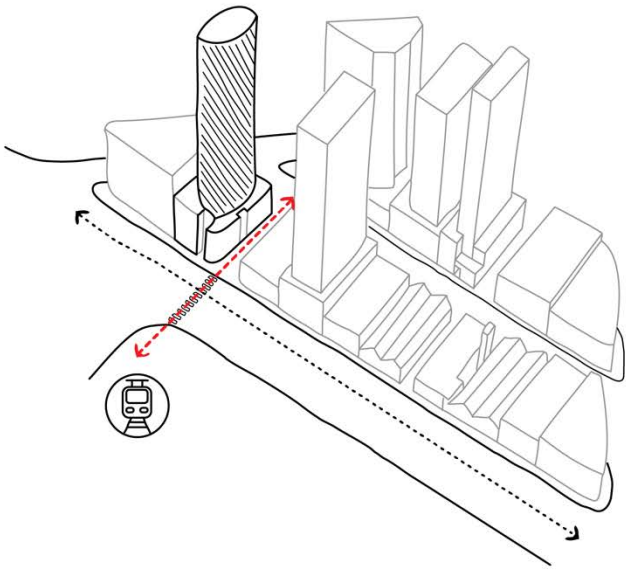


Figure 1 Where large block lengths exist, and within 200m of a rail station, new connections enable a more efficient network for pedestrian movement contributing to the reduction of congestion.

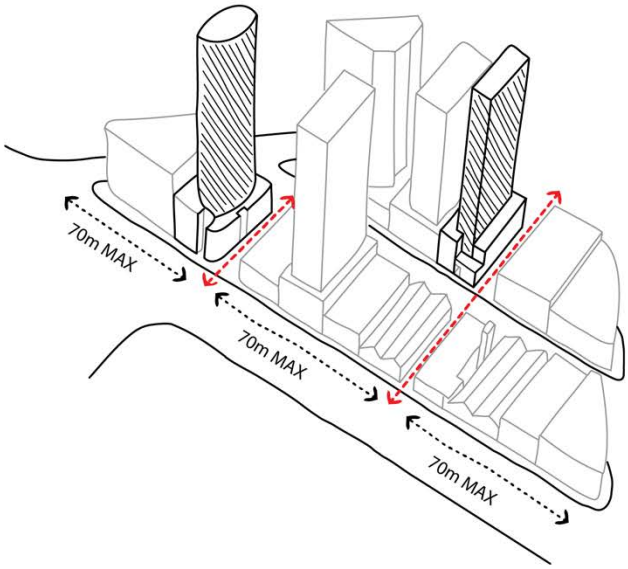


Figure 2 Providing pedestrian connections at maximum intervals of 70m significantly improves the walkability of the urban block structure.

Figure 73 Fine grained urban block structure to improve pedestrian accessibility

Source: Draft Central Melbourne Design Guide (City of Melbourne)

11.3.1 Crossings and intersections

The level of protection desired by pedestrians increases with traffic speeds and volumes. Careful consideration of the type of crossing and the associated treatments is essential when designing pedestrian crossings.

11.3.1.1 Mid-block

Similar to cycling, the provision of footpath infrastructure should be considered in relation to the function of the street and the incorporation of other transport uses.

In general, pedestrians could share the road space with other modes of transport, including cars, where the speed limit is 10km/h or less. In some instances, where pedestrian and traffic volumes are low and the use of the street is predictable, such as a residential street, 20km/h may be suitable. In an urban street setting, such as an activity centre street, shared zones should not exceed 10km/h. Figure 74 shows a shared zone in Little Malop Street, Geelong. The design of the street encourages pedestrian activity while providing limited vehicle access. The textured paving, and kerb elimination provide the road user with the signals they need to share this space safely, while also enhancing the vibrancy of the street.

For all other instances, separated footpaths should be provided on both sides of the street. The distance from the kerb should increase where the speed and volume of traffic increases. The width of the footpath should be a minimum of 1.8m. However, where pedestrian volumes are higher than a suburban residential street, this width should be 2m or greater.

Figure 74 Shared zone, Little Malop Street

Source: Forte Mag

Figure 75 shows concept footpath designs for different street types. It also includes consideration for trees, seating, lighting, and shade. These elements are also important for walkability, as shown earlier in the Healthy Streets wheel (Figure 72). It should be noted that different trees may require different amounts of space than those listed in Figure 75.

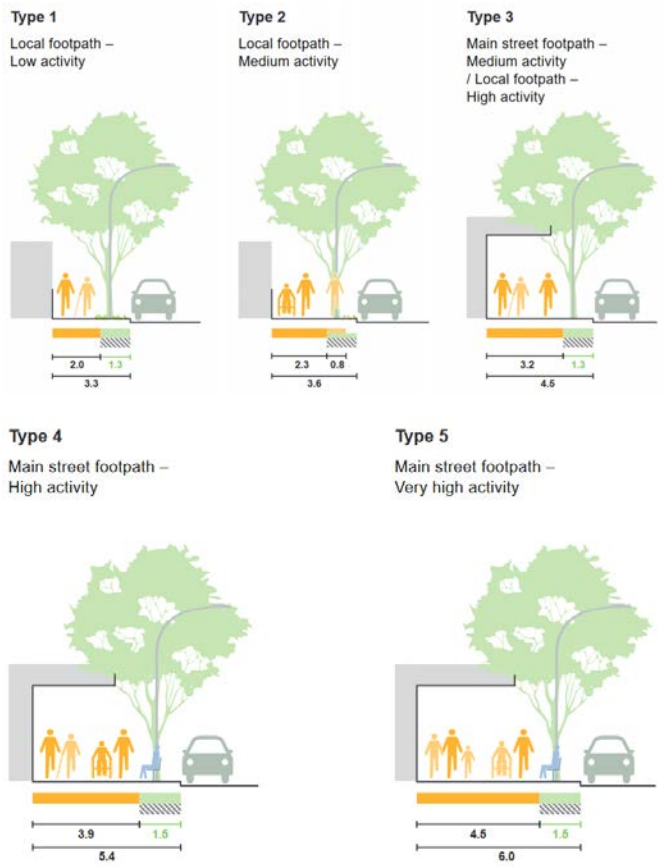


Figure 75 Footpath types

Source: NSW Walking Space Guide

11.3.1.2 Intersections

Pedestrians are highly sensitive to their environment and intersections and crossing points are often the areas that present the greatest barriers to pedestrian safety.

Some of the most common issues impacting pedestrians at intersections include:

- Having to cross multiple lanes without any pedestrian refuge
- Navigating slip lanes
- Delay at traffic lights and having to cross using two sets of light sequences
- High speed traffic
- High traffic volume
- Poor sight lines
- Missing pram ramp
- Limited cross legs at intersections that have been designed to maximise throughput of motor vehicles.

The distance required to cross is a significant barrier to many pedestrians. Figure 76 shows the size of a walkable urban intersection compared to a standard suburban intersection. This is particularly important for Rockbank North, where large arterial road intersections into the MTC will create barriers for pedestrians.

Making intersections as compact as possible will ensure crossings are traversable and do not become barriers.

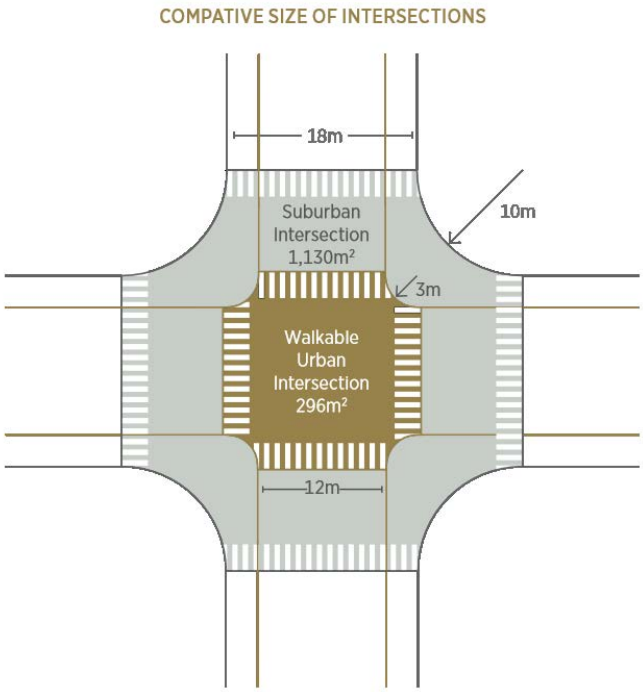


Figure 76 Walkable intersection sizes

Source: Auckland Urban Street and Road Design Guideline[14]

Figure 77 shows different pedestrian crossings. Selecting the most appropriate design out of the options shown in Figure 77 will depend on the context of the street. Where possible, priority

[14] https://at.govt.nz/media/1987453/urban-street-and-road-design-guide.pdf

should be provided to pedestrians via zebra crossings. This will not always be possible however. For instance, if the road holds regional function and motor vehicle traffic is the priority, zebra crossings will not be able to be installed and a signalised intersections will be more appropriate. Where a side street intersects with a pedestrian priority route, continuous footpath design should be used. This maintains a continuity of the street for the pedestrian; it is cars crossing the footpath rather than pedestrians crossing the side street.

Pedestrian refuge islands may be appropriate at minor crossing points where access is desirable and it is deemed safe to have an uncontrolled crossing.

Where a major highway or railway line intersects with a pedestrian priority route, grade separation is likely the only safe way to provide pedestrian access across the intersecting corridor. Where possible, well-designed underpasses are preferred. This requires wide openings at each end, lighting (including natural lighting from light wells), and gentle gradients for DDA compliance. Where this is not possible, or due to local characteristics, overpasses may be preferred.

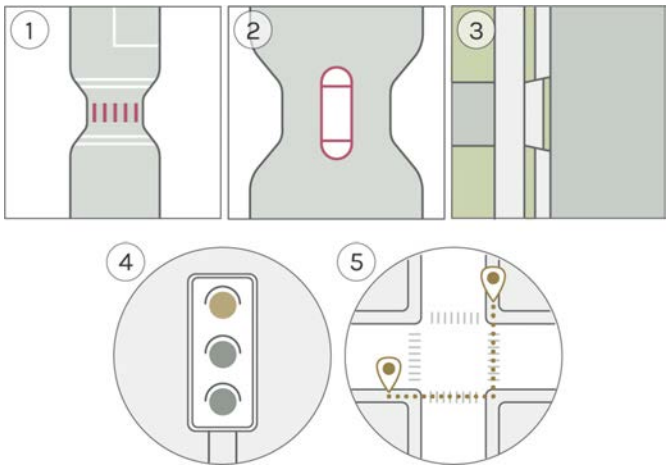


Figure 77 Pedestrian crossing types

Source: Auckland Urban Street and Road Design Guideline

11.4 Cycling

Creating a town centre in which cycling is an attractive, safe option requires the implementation of a set of design principles that are focused on user experience outcomes.

The emergence of e-bikes, and e-scooters has resulted in a jump in the number of people interested in two wheeled mobility (the term '*micro mobility*' is now frequently used). It is therefore important that a much wider spectrum of users be considered when designing bike infrastructure. In fact, *micro mobility lanes* is an appropriate term to cover the spectrum of different two and three wheeled devices that can be expected to use this infrastructure in the future. Figure 78 provides an illustration of the diversity of different forms of *micro mobility* that Rockbank North should be catering for to maximise the diversity, sustainability and safety of the transport system.

Figure 78 Micro mobility lanes

11.4.1 Cycling design principles

The Dutch cycling design guidelines are now used internationally, including in Australia, and consistent of the following five principles:

- Cohesion: Connecting origins and destinations.
- Directness: Creating short and fast routes between point A and Point B
- Safety: Avoid mixing with other traffic where there is a large difference in *speed* and *mass.*
- Comfort: Ensure there are minimal stops or nuisance issues along the route.
- Attractiveness: Plan cycling routes that have green canopy cover, quiet, and an outlook onto a natural environment (water, parkland etc).

The above five principles, in addition to those illustrated in Figure 81 can be used as a checklist when designing streets to ensure that cycling becomes a viable option for current and future residents of Rockbank North.

11.4.2 Mid-block

Figure 79 provides a guideline on what cycling infrastructure may be appropriate for a given street, based on the number of cars that street has per day and the posted speed limit. At speed limits above 40km/h, full separation from motor vehicles is recommended. A connected network, that is direct

and comfortable for all ages and abilities is key to fostering a cycle culture in Rockbank North.

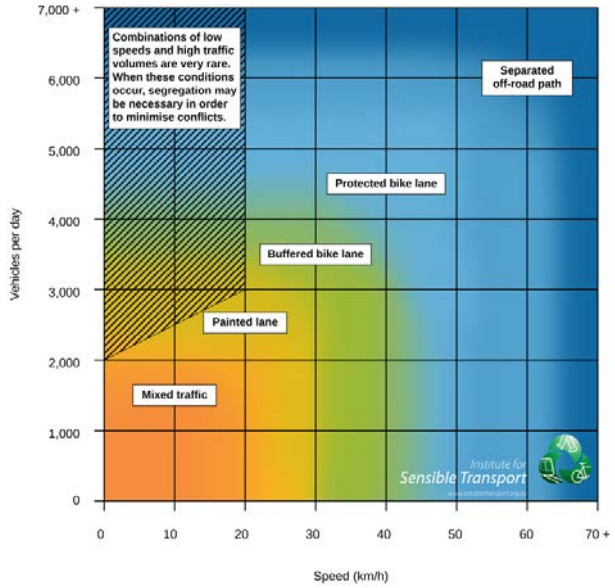


Figure 79 Road characteristics and cycling infrastructure

Figure 80 provides a conceptual layout for a separated (also known as a protected) bike lane. A 600mm separator provides a safe distance between the bike lane and the parking lane, with sufficient distance for the passenger car door to open safely and for passengers to alight the vehicle.

Minimising driveway crossovers is important for the safety and effectiveness of a separated bike lane. For example, a residential street with crossovers for each house does not fit with a separated bike lane design. Instead, focusing on reducing vehicle volumes and speed will deliver a better outcome, such as a shared zone or an on road buffered bike lane.

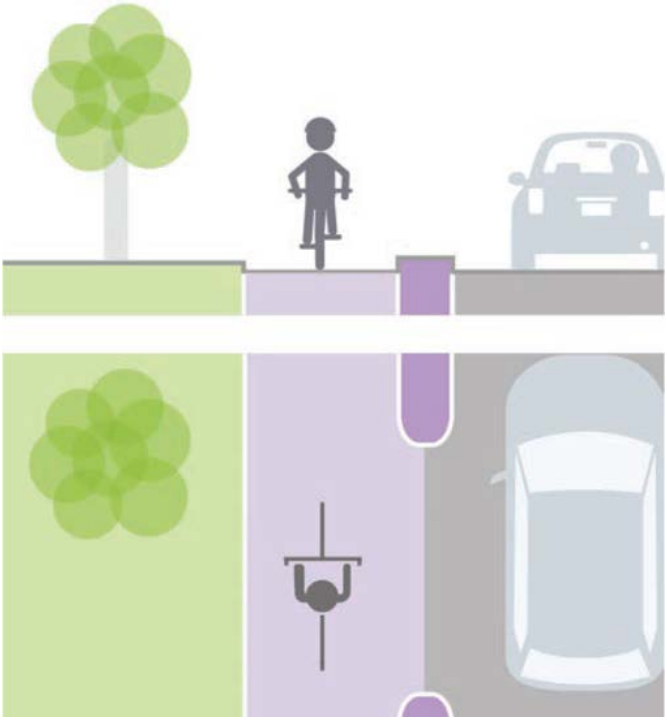


Figure 80 Separated bike lane

Source: Draft Victorian Cycling Guide

Key design principles

Institute for Sensible Transport
www.sensibletransport.org.au

Cycling is a space and energy efficient transport mode that has an important role to play in urban transport systems. Routes must be designed to appeal to a broad section of the community and be capable of accommodating ridership growth.

Cyclists must be treated as vehicles, not pedestrains.

Cyclists must be separated from heavy traffic both at intersections and on the stretches of road between them.

Cyclists must be separated from pedestrains.

Routes must join together; isolated stretches of quality infrastructure are of little value.

Routes must feel direct, logical and be intuitively understandable by all road users.

Routes and schemes must take account of how users actually behave.

Quality cycling infrastructure requires more than purely cosmetic alterations.

Chicane barriers and dismount signs are impediments to cycling and should be avoided.

Desiging a route requires field investigations and equal input from cyclists and engineers alike.

Source: UK Government, 2020

Figure 81 Key design principles

Source: Adapted from work produced by the UK Government, 2020

11.4.3 Intersections

Intersections are often overlooked for their importance to ensuring cycling infrastructure is safe and comfortable.

Figure 82 provides an example of a protected roundabout, which provides priority crossings for pedestrians and cyclists. A circular path for cyclists provides a smooth riding experience through the intersection and is preferred to the more angular layouts, such as Moray Street, South Melbourne or Hollingsworth Drive, Cobblebank.

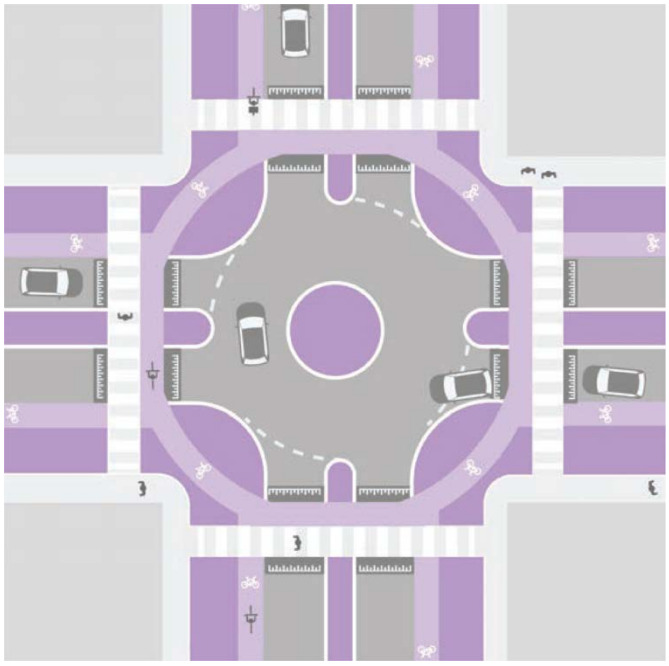


Figure 82 Protected roundabout

Source: Draft Victorian Cycling Guide

Figure 83 provides a conceptual layout when signalisation of an intersection is required. This provides secure passage through the intersection for cyclists without needing to transition into mixed traffic.

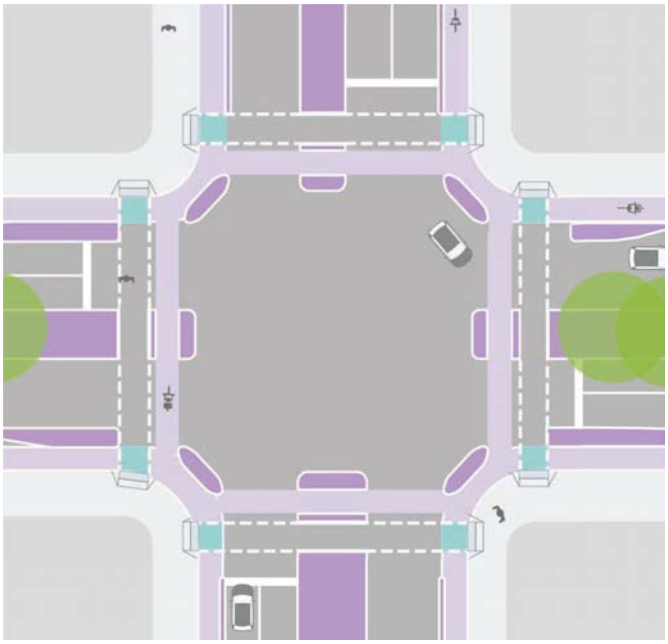


Figure 83 Protected intersection

Source: Draft Victorian Cycling Guide

Where a cycling corridor crosses a side street, maintaining a consistent cycling experience that keeps priority for the cycle path is required. Figure 84 shows how to provide priority over side streets, where the cycle lane or footpath have a higher level of importance compared to the side street. The left image shows an on-road environment while the right image shows how an off-road path crosses a side street.

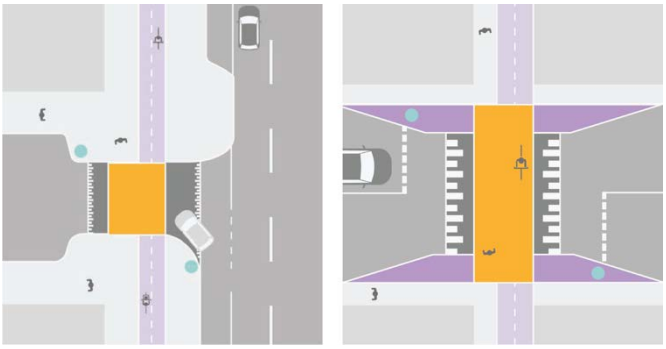


Figure 84 Priority at side streets

Source: Draft Victorian Cycling Guide

11.4.4 Overcoming barriers to cycling

Rockbank North MTC and Rockbank Railway station will be approximately 2.5km apart. While this may be a comfortable cycling distance, there are physical barriers that will reduce the attractiveness of cycling between the two locations.

The Western Freeway is a significant barrier to active travel. Even with improvements to Leakes

Road, the level of comfort when interacting with freeway on and off ramps, and the feeling of being exposed while traversing the bridge, is likely to significantly detract most people from considering active travel to or from the railway station.

Figure 85 shows an example of a pedestrian / cycling bridge over a freeway with a relatively high level of comfort. Soft gradients onto the bridge and bike-friendly end points, in addition to the meshed enclosure, ensure that the long distance travelled over the freeway does not feel unsafe.

Figure 85 Pedestrian bridge over freeway, Albury

Source: Wikipedia

Underpasses, when designed right, offer a more comfortable way to traverse a large barrier, such as a freeway. The example in Figure 86 shows that a soft gradient, flared openings, and light wells help make the underpass safe and attractive. The key reason an under pass offers higher levels of usability for a person cycling is because they are able to carry the momentum they build up going downhill to help them up the incline at the other end.

Figure 86 Walking and cycling underpass, The Netherlands

Source: European Cyclists' Federation

11.4.5 Example street cross sections that support sustainable mobility in Rockbank North MTC

Incorporating the right cycle design considerations into the future transport system for Rockbank North MTC is important for creating a vibrant, multi-modal activity centre.

The following cross-sections provide indicative layouts for key streets in the MTC. They are considered as reinterpretations to the cross-sections shown in the Rockbank North PSP.

Figure 87 shows an example of a 25m street, such as the one that will be built for the internal MTC streets rated *activity streets and boulevards.* Figure 88 is a 34m *connector* road that could be replicated for Beatties Road or the northern east-west through road. Where additional vehicle lanes or turn lanes are required, it is recommended that the centre median be reduced.

For both of these layouts, it is recommended to have rear-loaded buildings to reduce crossovers. This would improve the street frontage and make for safer, more efficient streets.

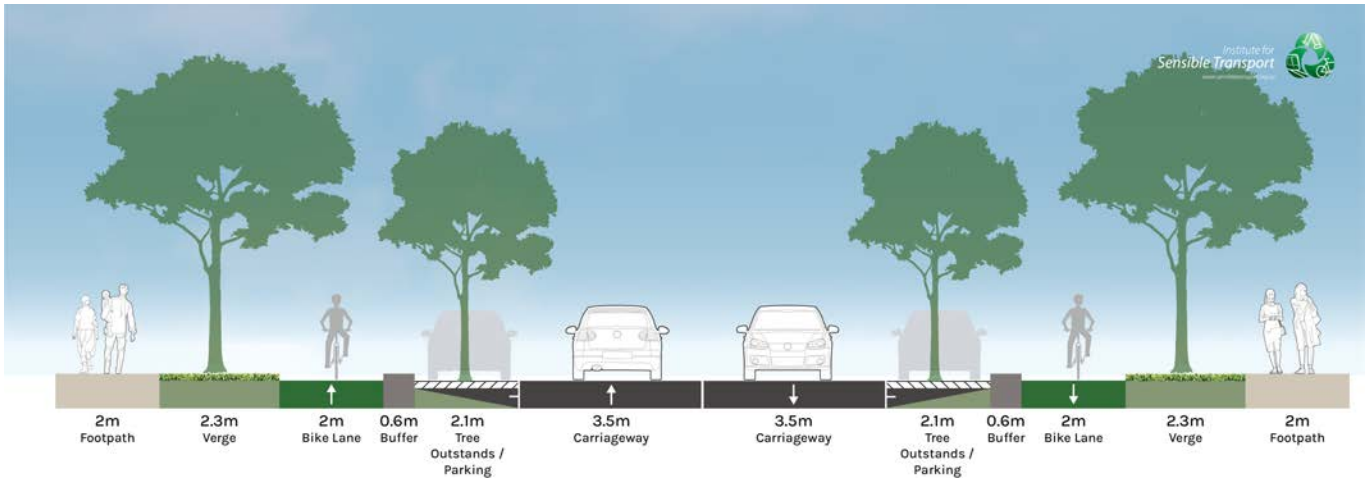


Figure 87 Street 25m cross section

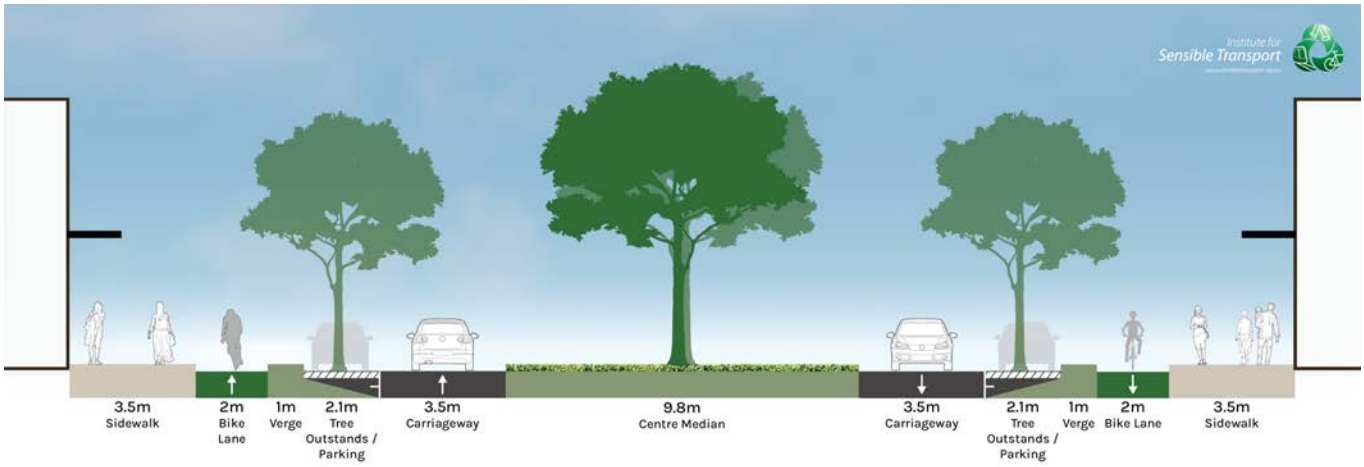


Figure 88 Street 34m cross section

11.5 Public Transport

Public transport needs to be easy and convenient compared to other motorised modes. To achieve this, there are several design principles which make for a good a public transport network.

- **Legible** – Easy to use, with clear information and wayfinding.
- **Accessible** – Accessible to all members of the community, with stepless entry for those with low mobility and wayfinding elements which assist those with low-vision and poor hearing.
- **Coverage and connection** – Stations and stops should be close to people's origins and destinations, with routes connecting people to key attractions.
- **Direct** – Services should take a direct route between destinations, not wind through suburbs, which increases travel time.
- **Frequent** – Services should run frequently, minimising waiting time and allowing people to travel when they want, not just when public transport operates.
- **Reliable** – Services should be reliable in two ways, they should run close to the timetable and they should offer reliable connections to other services.

11.5.1 A potential network

Rockbank North should be connected to its surrounding neighbourhood and broader region by public transport. Given the context and proximity to the Rockbank railway station, buses are likely to be the public transport mode for the foreseeable future.

The 2012 PSP shows buses being able to operate on many streets local to Rockbank North (as shown in Figure 19). Services would be required along these roads to form the neighbourhood network.

A broader, regional network will be required for public transport levels to exceed a marginal mode share of around 2% (the current average for many similar areas). The West Growth Corridor Plan[15] shows a regional public transport concept plan. This plan could form a conceptual basis for regional public transport connections to Rockbank North.

Key regional connections which would support public transport use could be:

- Sydenham - Plumpton - Rockbank North – Rockbank South
- Melton Woodgrove – Melton – Rockbank North – Rockbank South
- Cobblebank (Toolern in the Growth Corridor Plan) – Rockbank South – Rockbank North
- Tarneit – Rockbank – Rockbank North

Services connecting places along these four alignments would create a connected and legible public transport network.

Further, all four alignments would connect Rockbank North with Rockbank South and Rockbank Railway Station. This could allow for a very high frequency service between Rockbank North and the railway station, if services were timed in a coordinated manner. For example, four routes running at a 40-minute frequency, but evenly spaced would allow a 10-minute frequency along the corridor; while a 20-minute frequency on each route could allow for a 5-minute frequency along the corridor.

These levels of service are comparable to outer suburban regional buses, and would provide a capacity of approx. 600-900 passengers per hour, per direction, between Rockbank North and Rockbank Railway Station.

The location and design of bus stops and more importantly the Rockbank North bus interchange is critical to unlocking this potential. The interchange should be in the heart of the town centre, and have easy access from arterial routes and major public transport corridors. The current design frameworks do not highlight any potential location.

Figure 89 shows a potential location for the bus interchange, shown in red, on top of the 2012 Rockbank North Precinct Structure Plan. This location is conducive to public transport users' needs and meets operational requirements. Buses on the north south alignment along Leakes Road would be able to enter the town centre from the

[15] https://vpa.vic.gov.au/wp-content/uploads/2012/11/GCP-Chapter-4-West-Corridor-Plan.pdf

north, use the interchange, then continue back onto Leakes Road along Beattys Road, heading south towards Rockbank South (and vice versa for buses from the south). Terminating buses would also be able to loop around, and return in the direction they came from. Buses along Beattys road would be able to enter the interchange, then either continue along Leakes Road, or perform a loop and return back. This layout would therefore support through buses and terminating services, offering a high level of service flexibility and adaptability. Leakes Road and Beattys Roads are shown as being bus capable, but the other two, unnamed, roads are not, and would need to be built to a standard that permits operation of buses.

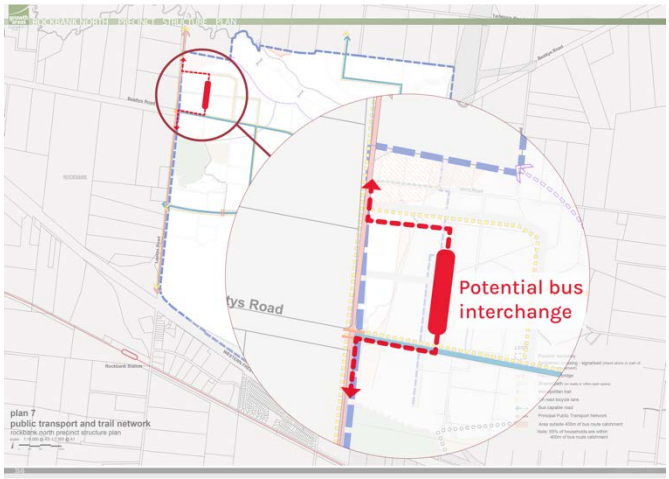


Figure 89 Close-up Rockbank North public transport and trail network

Source: Rockbank North Precinct Structure Plan 2012

Note: Blue lines indicate bus capable roads. Markup in red by Institute for Sensible Transport.

11.5.2 Bus interchange design

The potential bus interchange location highlighted in Figure 89 would be in the centre of the town centre. This would mean it is most attractive to a larger number of users, as most of the town centre would be within 400m.

The location is also on a street which is unlikely to have high amounts of motor vehicle traffic. Given this location, and the role of the street, a kerbside bus interchange would be an appropriate design response. Palmerston Street in Melton, shown in Figure 90, offers a good example of how this layout may work. Bus bays could be located on either sides of the street, allowing to flexibility in bus operations. Determining the final number of bays requires a more in-depth analysis. Any space not required for buses could be used for loading zones, taxi ranks, parking spaces, etc, ensuring the space is available in the future.

Figure 90 Melton Bus Interchange in Palmerston St

11.5.3 Stop design principles

Bus stops should offer a level of amenity commensurate to their use and role in the network. A framework for considering stop amenity has been developed. Four categories of stop are proposed:

- Tier 1 – local stops for infrequent services, which play a social role
- Tier 2 – local stops for more frequent services which play a commuter services
- Tier 3 – minor interchange/destination stops, where two or three services meet, or there are key destinations
- Tier 4 – major interchange stops, such as Rockbank North Town Centre; Rockbank Railways Station,

The vast majority of stops on any town bus network will be Tier 1 or Tier 2, with only some Tier 3 or 4, but if the bus system were to grow, more higher amenity stops would be required. Appropriate infrastructure and amenity levels for each tier are shown in Table 16.

Table 16 Matrix of amenity appropriate for stop tier

	Tier 1	Tier 2	Tier 3	Tier 4
Level footpath, connected to bus stop pad for level boarding	✓	✓	✓	✓
DDA compliant tactile marking	✓	✓	✓	✓
Route(s) information and a timetable (accessible)	✓	✓	✓	✓
Seating	✓	✓	✓	✓
Shelter	?	?	✓	✓
Waste bins	✗	?	✓	✓
Toilet	✗	✗	✗	✓

11.5.3.1 Accessibility

It is important to provide basic amenities to meet *Disability Discrimination Act 1992* requirements for accessibility. The guidelines for accessible transport, adopts the *'social model of disability'* which argues that people are not disabled, but rather it is the environment that disables people.

Transport should not disable people, and the ultimate goal for the public transport network should be ensuring that all elements that make public transport disabling are removed, ensuring all those who want to use public transport can.

...people are not disabled, but rather it is the environment that disables people.

To be boardable, stops should have level access to low floor buses, and be connected to footpaths which meet *Disability Discrimination Act 1992* standards for accessibility. Information provided at bus stops should include the routes which service a bus stop, timetables, and wayfinding. This information should be available in a variety of formats, including visual, audible, and tactile forms. Together, these basic provisions will significantly reduce the ways in which public transport infrastructure can be disabling and undesirable.

11.6 Roads and Parking

The following provides some design principles intended to accommodate motor vehicles while also ensuring the streets maintain a *'people first'* approach.

11.6.1 Turning radius

Turning radius should be minimised to slow vehicles and increase pedestrian safety at intersections. Slip lanes should be avoided as they create unsafe environments for pedestrians and cyclists.

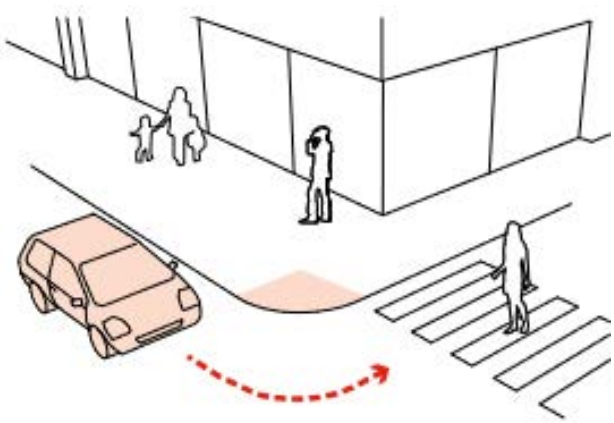


Figure 91 Turn radius

Source: Victorian Urban Design Guidelines

11.6.2 Crossovers

Vehicle crossovers are required to provide access to off-street parking from the road network. The design and location of crossovers can have implications for road network performance, walking and cycling safety, and the urban realm.

Crossovers should be minimised on key activity streets to maintain a consistent and attractive street frontage. Where possible, it is best practice to locate crossovers on straight sections of street with good sightlines. Pedestrian and cycling paths should maintain their path and design to indicate priority. Road markings and street signs should also be placed at locations where crossovers cross shared paths, reinforcing the need for motorists to give way to pedestrians and cyclists. Flares on crossovers should be minimised to reduce vehicle speed.

11.6.3 On-street parking

On-street parking occupies kerbside space in cities. This is often valuable space, with limited supply. Allocation of this scarce resource should be managed carefully to ensure the best outcomes can be achieved.

While it is recognised that some level of on-street parking will be required, there are other uses for kerbside space that may better align with Council's strategic objectives for Rockbank North. A conceptual hierarchy for considering the use of kerbside space is shown in Figure 92.

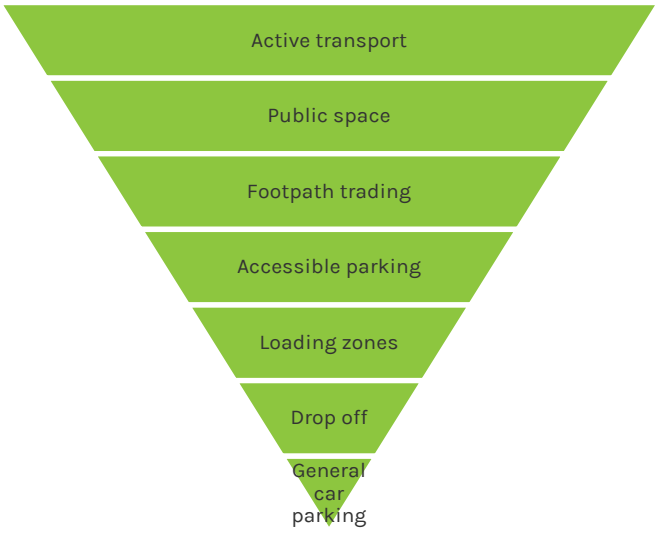


Figure 92 Hierarchy of kerbside space use

The following provides a set of steps that can be following when determining the best use of kerbside space. Firstly, it should be assessed if the kerbside space is necessary for active transport, either in wider footpaths to support pedestrians, or for cycling and micro-mobility lanes. It is assumed that in most greenfields areas, such as Rockbank North, these should already be provided in the transport network.

Next, consideration should be given to whether the kerbside space could improve the urban realm, either through public space or through footpath trading which can enhance the local economy.

If these uses of kerbside space are not deemed appropriate, then parking could be considered. However, consideration as to what type of parking is important. Accessibility parking should be more highly prioritised than general access parking, up until the point that there is sufficient coverage of accessible parking in high value locations. Freight

and deliveries are also critical to the economic performance of an area, and as such, loading zones should be appropriately located to ensure they are convenient, and plentiful enough to avoid delay.

In remaining spaces, general access kerbside parking could be considered. Again, there is a need to understand visitor duration and needs. Some areas may have quicker turnover, and shorter time limits may be appropriate (such as drop off zones), while other areas may require longer for small shopping errands. As a general principle, any parking which is likely to be several hours in duration should be encouraged to use off-street parking, rather than on-street.

11.6.4 Off-street parking lots

Locate off-street parking lots behind the main street frontages. Provide pedestrian access paths through to the main street, away from the car park crossovers. Provide pedestrian paths along desire line paths, such as shown in Figure 93. Use wheel stops where car overhang may protrude onto pedestrian paths or landscaped areas; provide at least 1 metre clearance. Ensure good lighting is provided throughout the site.

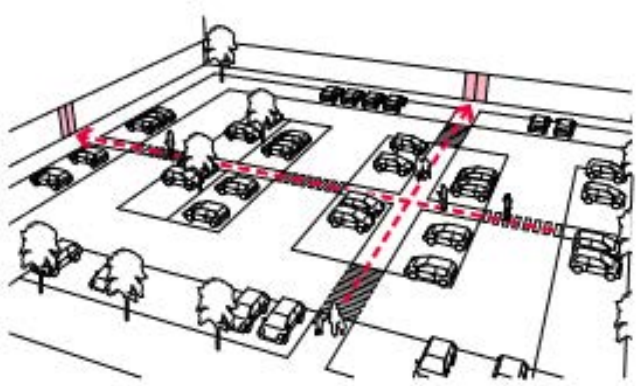


Figure 93 Pedestrian path through car park

11.6.4.1 Consolidated parking

Consolidated parking across the activity centre increases the efficiency of the car parking space provided. Parking demand varies across large sites and across the different uses contained within it. Residential parking is often busiest at night, while office and retail uses are busiest during the day. Traditionally, each land use might provide the number of parking bays that meet the forecast demand. This often leads to the paradoxical situation where some uses have more demand than parking while adjacent land uses have parking bays sitting empty. Having consolidated parking allows for those empty spaces to be used. This more efficient allocation reduces the overall number of parking spaces.

11.7 Freight

Freight and heavy vehicle access will be important for the MTC to facilitate deliveries. While access may be required from time-to-time, the MTC is unlikely to regularly require access for B-Double trucks or heavier. The most common are likely to be garbage trucks (Figure 94) and supermarket delivery trucks (Figure 95).

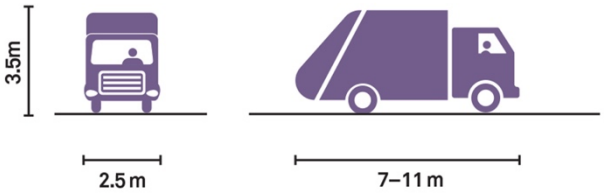


Figure 94 Garbage truck

Source: Global designing cities initiative

Figure 95 Supermarket delivery truck

Source: Global designing cities initiative

11.7.1.1 Building access

Consider providing service access to buildings that minimise conflict with the main street frontage. Service lanes, such as Figure 96, can ensure convenient loading capacity away from busy areas.

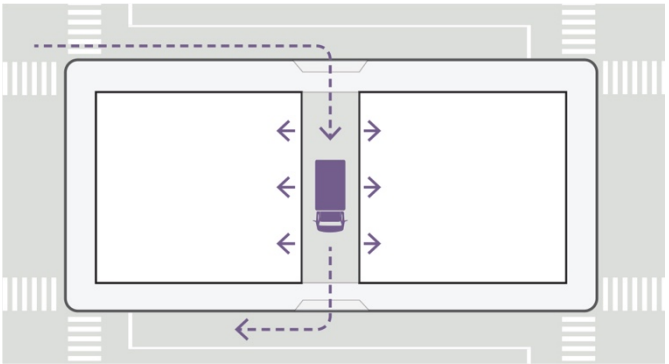


Figure 96 Service lane

Source: Global designing cities initiative

Truck loading bays should be away from main pedestrian entry points and walkways.

11.7.2 Other freight design considerations

Figure 97 provides a snapshot of other key design considerations that should be factored into designing freight movements into Rockbank North MTC.

Signage

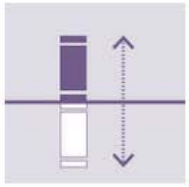
Designated routes for trucks and large vehicles should be clearly marked to minimize undesirable traffic on neighborhood streets. Signage may include weight limits and height and width restrictions.

Dedicated Parking

Dedicated parking spaces for large vehicles avoid conflicts with other users. Durable materials may be selected to support heavy loads.

Turning Lanes

On wide streets, central lanes or medians can operate as turning lanes for large vehicles. Where large vehicles turn on or off smaller streets, greater minimum radii may necessitate use of both lanes. Recessed stop bars or daylighting intersections can ease difficult turns while maintaining clear visibility for all users.



Retractable or Removable Bollards

When loading vehicles and city services require access to areas that restrict regular vehicular traffic, retractable or removable bollards should be installed to facilitate access.

Curb Cuts

Curb cuts that allow large vehicles to access loading bays should be carefully coordinated with other uses and should not diminish universal accessibility. Regulate minimum spacing between multiple curb cuts and limit their overall width to minimize the impact of blank garage doors on a streetscape. Balance loading needs with active ground floors, trees, and other uses that support a bustling street. Restrict curb cuts on streets with high pedestrian flows and designate certain streets as service corridors.

Speed Cushions and Tables

Speed cushions and tables can assist in calming truck traffic. On narrow streets, speed cushions provide a short grade increase, similar to a speed table, without interacting with the wider wheel base of buses and emergency vehicles.

Paving Materials

Large vehicles apply increased force on the street, especially when starting, stopping, and turning. For designated loading zones, it is preferable to employ durable paving materials such as concrete pads or block pavers, which can withstand greater forces without buckling than can asphalt.

Time Restrictions

Freight vehicle access to dense urban areas should be restricted to off-peak periods such as early mornings or late evenings. Time restrictions limit conflicts with other street users, increase safety, reduce congestion, and ultimately facilitate better delivery operations and increased efficiency.

Figure 97 Freight design considerations

Source: Global designing cities initiative

12. Staged high level implementation plan

This technical report has identified a number of key opportunities to increase the transport choice and meet the strategic ambitions for Rockbank North. These opportunities, linked to topics, are listed in Figure 98.

A high-level assessment of the priority, timeframe, and cost of these opportunities is shown in Table 17.

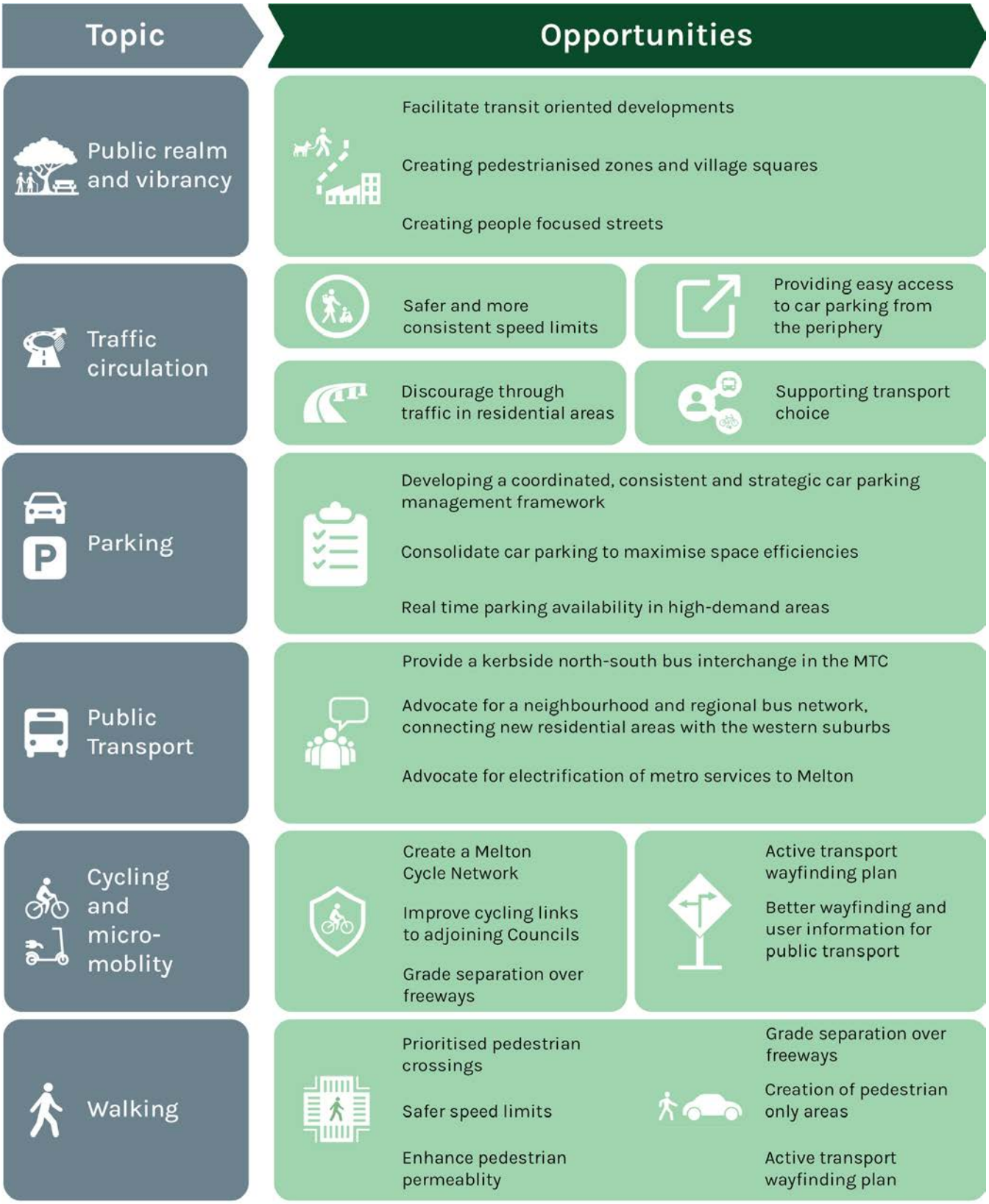


Figure 98 Rockbank North MTC Transport Opportunities

Table 17 Assessments of Rockbank North MTC Transport Opportunities

Opportunity	Description	Priority / Importance	Time frame	Cost[16]
Facilitate transit-oriented developments	Co-locating high density land uses near high-capacity transport nodes such as railway stations and bus interchanges.	Moderate	Medium	NIL (Policy)
Creating pedestrianised zones and village squares	Create high-quality public spaces that act as civic hubs	High	Short - ongoing	High
Creating people focused streets	Create streets that have a high-quality environment with active street frontages	High	Long	NIL (Policy)
Safer and more consistent speed limits	Speed limits that adhere to vision zero (DOT) and street design to match the speed limits	Moderate	Short	Low
Providing easy access to car parking from the periphery	Providing precinct parking outside the town centre will encourage higher active transport usage	Moderate	Long	Moderate
Discourage through traffic in residential areas	Traffic calming measures such as speed humps and modal filters	High	Short - ongoing	Moderate
Supporting transport choice	Provision of public and active transport infrastructure	High	Medium	Moderate
Developing a coordinated, consistent, and strategic car parking management framework	Council policy/strategy that delivers consistent guidelines when resolving parking issues	High	Short - ongoing	Low
Consolidating car parking to maximise space efficiencies	Co-locating complementary parking uses together to more efficiently provide for parking demand	Moderate	Short	High
Real time parking availability in high-demand areas	Direct visitors to available parking spaces	Low	Short	Low

[16] Where N/A is due to design principle or policy; Low is less than $50,000; Medium is between $50K to $1M; and High is more than $1M

Opportunity	Description	Priority / Importance	Time frame	Cost[16]
Provide a kerbside north-south bus interchange in the MTC	Bringing public transport users into the heart of the MTC, by providing an attractive and integrated bus interchange	High	Medium	High
Advocate for a neighbourhood bus network	Build on the existing bus network to ensure surrounding residential areas are connected to the town centre	High	Short	N/A
Advocate for a regional bus network, connecting new areas with the western suburbs	Build on the existing bus network to ensure surrounding areas are connected to western metro Melbourne region	High	Medium	N/A
Advocate for the electrification of metro services to Melton	Advocate for electrification of the Melton service and ensure that these opportunities are embodied into local planning	High	Medium (Short if intention is for population growth)	N/A
Create a Melton Cycle Network	Connect the MTC with surrounding residential areas and key destinations with a high-quality cycle network	High	Short	Moderate
Improving cycling links to adjoining Councils	Connect the MTC to the broader cycle network in adjoining council areas	Moderate	Long	High (dependent on length)
Grade separation over freeways	Overcome the physical barrier that the freeway poses to vulnerable road users such as pedestrians and cyclists	High	Medium	High
Active transport wayfinding plan	Provide clear and simple signage to help pedestrians and cyclists access key destination in the MTC	High	Short term (easy and builds habits early on)	Low
Better wayfinding and user information for public transport	Provide clear and simple signage to help public transport users access key destination in the MTC	High	Short term and continuous	Low
Prioritised pedestrian crossing	Prioritising pedestrian safety at intersections	High	Medium	Moderate

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