



Movement, Transport and Parking Strategy

KELMSCOTT ACTIVITY CENTRE PRECINCT PLAN

PROJECT	Kelmscott Activity Centre Precinct Plan – Movement, Transport and Parking Strategy			
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1. Introduction and Background

1. INTRODUCTION AND BACKGROUND

1.1 Movement, Transport and Parking Strategy

The Movement, Transport and Parking Strategy report has been completed to inform the development of a Precinct Plan for the Kelmscott Activity Centre. This report addresses the requirements of the following two State guidelines:

- Western Australia Planning Commission (WAPC) *Transport Impact Assessment Guidelines – Volume 2 Planning Schemes, Structure Plan and Activity Centre Plans* (2016).
- State Planning Policy 7.2 (SPP 7.2) *Precinct Design Guidelines* (2020).

1.1.1 WAPC Transport Impact Assessment Guidelines

As set out in Section 7 of the WAPC *Transport Impact Assessment Guidelines*, the key objectives of this report are:

- “assess the proposed internal transport networks with respect to accessibility, circulation and safety for all modes, that is, vehicles, public transport, pedestrians and cyclists;
- assess the level of transport integration between the structure plan area and the surrounding land uses;
- determine the impacts of the traffic generated by the structure plan area on the surrounding land uses; and
- determine the impacts of the traffic generated by the structure plan area on the surrounding transport networks”.

1.1.2 SPP 7.2 Precinct Design Guidelines

The SPP 7.2 *Precinct Design Guidelines* set out a process to prepare a Precinct Plan – whereby a performance-based approach is applied through a set of interrelated design elements to enable precinct-specific design outcomes to be achieved.

‘Movement’ is one of six design elements to be considered when developing a Precinct Plan – the SPP 7.2 *Precinct Design Guidelines* outline the intent for Movement as a design element:

- “A well-integrated movement network should be developed that responds to the identified movement and place function of the precinct and that provides for a range of transport modes including walking, cycling, public transport, on-demand services, cars and delivery vehicles”.

1.2 Scope of Movement, Transport and Parking Strategy

The overall scope of works in relation to the movement, transport, and parking strategy to inform the planning and development of the Kelmscott Activity Centre Precinct Plan includes developing the following outputs:

- Precinct Plan Transport Assessment
 - Covering movement/transport from a regional perspective, public transport, pedestrian movement and amenity, bicycle riding and vehicle movement and access.
- Parking Strategy
 - Covering parking use, allocation, design, short-stay, and parking ratios for land use.

1.3 Background

In March 2021 the City of Armadale resolved to prepare a Precinct Plan for the Kelmscott Activity Centre (the Precinct).

The Precinct is located along two sides of a 1.5km length of Albany Highway and contains a diverse range of uses including residential, retail, office, commercial, restaurants, cafes, medical and community type uses in a core area and fringing highway development.

As dwellings and population numbers grow within the Precinct’s catchment area, the number and extent of businesses within the Precinct is expected to grow and undergo renewal.

Planning for the Precinct is required to accommodate not only future growth of the Activity Centre, but also a changing appreciation for the urban form of the Precinct, with a greater emphasis on inner city and higher density living near to public transport, commercial precincts, and Town Centre locations.

The study area boundary for the Kelmscott Activity Centre Precinct Plan is shown in Figure 1.

The study area includes a combination of zones under the City of Armadale (the City) Town Planning Scheme No.4 – such as the District Centre zone, Special Residential zone (possible future Residential zone) and Residential zone (with various density codes). The centre of the District Centre (including Kelmscott Station) is a combination of District Centre zone land and area under the jurisdiction of Development WA – which is anticipated to be normalised back to City control in the short term.

Development WA (previously the Metropolitan Redevelopment Authority) has undertaken work in recent times over the land under its planning jurisdiction in conjunction with the State Government’s METRONET (Public Transport Authority, PTA) Team in its planning for the Denny Avenue Level Crossing removal. The METRONET project resulted in the closure of the at-grade rail crossing at Denny Avenue in April 2021, and progressively over the remainder of 2021 saw the establishment of the rail underpass at Davis Road along with streetscape improvements and upgrade to the ‘Station Masters House’ and adjoining Station Plaza.

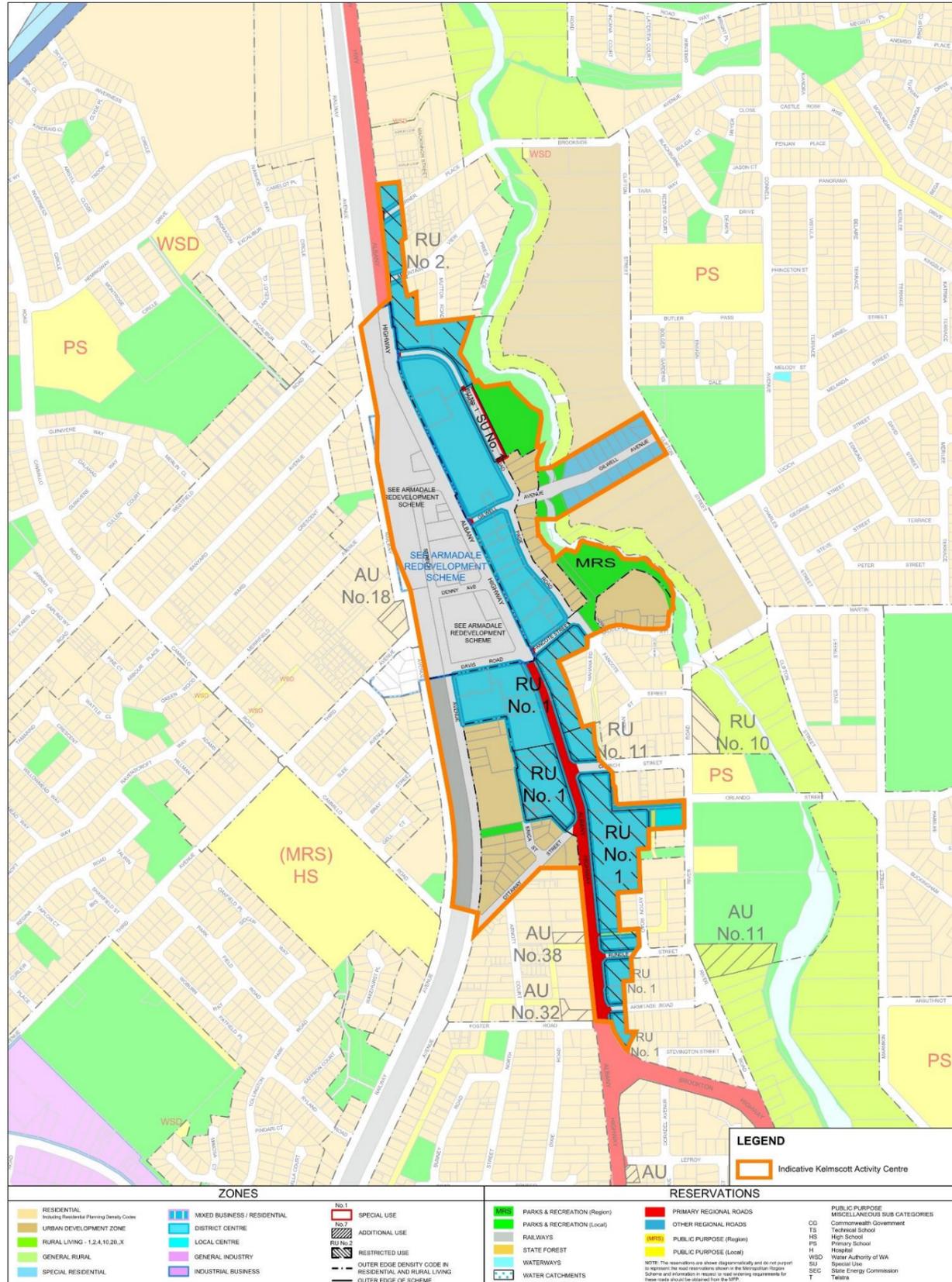


Figure 1 Kelmscott Activity Centre Precinct Plan – Study Area Boundary (source: City of Armadale)

1.4 Content of Movement, Transport and Parking Strategy Report

The Movement, Transport and Parking Strategy report has been completed to inform the development of a Precinct Plan for the Kelmscott Activity Centre. The report is structured as per the requirements of the WAPC *Transport Impact Assessment Guidelines* (2016), this introduction and background section forms the first of seven sections, which cover:

- Precinct Plan outline (Section 2).
- Existing situation (Section 3).
- Internal and external transport networks (Section 4).
- Integration with surrounding area (Section 4).
- Analysis of transport networks (Section 5).
- Parking strategy (Section 6).
- Report summary (Section 7).

1.5 Addressing Requirements of SPP 7.2 Precinct Design Guidelines

The State Planning Policy 7.2 (SPP 7.2) *Precinct Design Guidelines* (2020) set out the process to prepare a Precinct Plan – whereby a performance-based approach is applied through a set of interrelated design elements to enable precinct-specific design outcomes to be achieved.

‘Movement’ is one of six design elements to be considered when developing a precinct plan – the *SPP 7.2 Precinct Design Guidelines* (2020) outline the intent for Movement as a design element.

Table 1 provides an overview of the four objectives and their underlying considerations relating to the movement network as outlined in the Guidelines – along with a brief comment in relation to how each objective/consideration is addressed in this Movement, Transport and Parking Strategy report.

Table 1 – SPP 7.2 Precinct Design Guidelines ‘movement’ related objectives and considerations summary table

Objective (SPP 7.2)	Considerations (SPP 7.2)	Addressed in Movement, Transport and Parking Strategy report
O4.1 – To ensure the movement network supports the function and ongoing development of the precinct.	C4.1.1 – Address the current and future access needs of the precinct through an integrated transport planning and land use assessment process.	Current and future access through integrated transport and land use planning addressed in Section 3 and Section 4.
	C4.1.2 – Design the movement network in balance with place considerations, local access and neighbourhood/district/regional access requirements for travel to, through and around the precinct.	Future network post-METRONET and Main Roads WA works, addressed in Section 4. Movement network balance with place considerations also addressed in Section 4.

Objective (SPP 7.2)	Considerations (SPP 7.2)	Addressed in Movement, Transport and Parking Strategy report
	C4.1.3 – Develop a movement network that enables convenient and comfortable travel and access for users of all ages and abilities.	Future network post-METRONET and Main Roads WA works, addressed in Section 4. Mobility design considerations in Section 4.6.
	C4.1.4 – Design transport infrastructure that provides a safe network for all users.	Future network post-METRONET and Main Roads WA works, addressed in Section 4. Mobility design considerations in Section 4.6.
O4.2 – To ensure a resilient movement network that prioritises affordable, efficient, sustainable and healthy modes of transport.	C4.2.1 – Prioritise walking, cycling, public transport and shared mobility, to minimise car dependency.	Context to Precinct sustainable transport outlined in Sections 4.2, 4.3 and 4.4. Precinct Plan to address sustainable transport objectives outlined in Sections 2.3 and 2.4.
	C4.2.2 – Establish mode share targets for the precinct.	Context to mode share targets outlined in Sections 3.5 and 4.5. Mode share targets also assessed in Section 5.
O4.3 – To enable a range of transport choices that meet the needs of residents, workers and visitors.	C4.3.1 – Prioritise provision of direct and legible pedestrian routes within the precinct and to adjacent areas.	Context to Precinct pedestrian routes outlined in Section 4.3. Precinct Plan to address pedestrian network connectivity outlined in Section 2.4.
	C4.3.2 – Provide a bicycle network within the precinct that integrates with the broader cycle network and connects safely and conveniently to key destinations.	Context to Precinct bicycle network outlined in Section 4.4. Precinct Plan to address bicycle network connectivity outlined in Section 2.4.
	C4.3.3 – Identify public transport services and infrastructure to be upgraded or established to improve coverage, frequency, connection and user choice.	Context to Precinct public transport network outlined in Section 4.2. Precinct Plan to address public transport network connectivity outlined in Section 2.3.
	C4.3.4 – Design public transport infrastructure to integrate with and be appropriate for the intended mode share, patronage and place character of the precinct.	Future network post-METRONET and Main Roads WA works, addressed in Section 4.

Objective (SPP 7.2)	Considerations (SPP 7.2)	Addressed in Movement, Transport and Parking Strategy report
	C4.3.5 – Consider access requirements for service vehicles and logistical freight movements within the precinct.	High-level service vehicle requirements addressed in Section 4.1.4.
	C4.3.6 – Design the movement network to allow for private vehicle access and movement that is appropriate to the precinct function.	Future network post-METRONET and Main Roads WA works, addressed in Section 4.
O4.4 – To ensure the quantity, location, management and design of parking supports the vision of the precinct.	C4.4.1 – Provide the minimum amount of car parking appropriate for the precinct.	High-level parking strategy outlined in Section 6.
	C4.4.2 – Manage and locate car parking to prioritise access according to the needs of different user groups.	High-level parking strategy outlined in Section 6.
	C4.4.3 – Design parking to be integrated with the urban form.	High-level parking strategy outlined in Section 6.
	C4.4.4 – Design parking for adaptability over time to accommodate potential future change of use.	High-level parking strategy outlined in Section 6.
	C4.4.5 – Consider parking requirements and end of trip facilities for other transport modes.	High-level parking strategy outlined in Section 6.



2. Outline of Kelmscott Activity Centre Precinct Plan

2. OUTLINE OF KELMSCOTT ACTIVITY CENTRE PRECINCT PLAN

2.1 Overview of Kelmscott Activity Centre Precinct Plan

The Kelmscott Activity Centre Precinct Plan has been prepared by Taylor Burrell Barnett with support from the wider consultant team- and is shown in Figure 2. The distribution of land uses across the Precinct Plan is summarised below.

- Core area of Precinct activity:
 - Primarily mixed-use residential development along the Albany Highway corridor between Streich Avenue (to the west), Page Road (to the east) and Davis Road/Fancote Street (to the south).
 - Mixed-use residential development to a 6-storey maximum across the majority of the core area of Precinct activity.
 - Mixed-use residential development to a 9-storey maximum across the area between Streich Avenue (to the north and west), Albany Highway (to the east) and Davis Road (to the south) – the areas covered by the former unofficial car park site, KFC Kelmscott site, Spudshed site and Kelmscott Plaza Shopping Mall site.
- Residential fringe to core area of Precinct activity:
 - Pocket of mixed-use residential development to a 3-storey maximum between Mountain View and Page Road – to the east of Albany Highway.
 - Pocket of mixed-use residential development to a 3-storey maximum between Albany Highway to River Road – to the south of Fancote Street.
 - Large area of mixed-use residential development to a 3-storey maximum between Davis Road to the Good Shepherd Catholic Church – to the east of Streich Avenue.
 - Pockets of mixed-use residential development to a 3-storey maximum at the intersection of Albany Highway and Ottaway Street – and along the Albany Highway corridor (to the east of Albany Highway) between Rundle Street and Brookton Highway.
- Centres of commercial activity:
 - Pocket of commercial activity fronting the Albany Highway corridor at the north of the Kelmscott Activity Centre – between Turner Place and Mountain View.
 - Large area of commercial activity fronting the Albany Highway corridor between Davis Road/Fancote Street and Rundle Street.

The Kelmscott Activity Centre Precinct Plan includes the following key movement design responses and connections:

- Retains the road network arrangements as delivered by Main Roads WA and the METRONET teams as part of the Denny Avenue Level Crossing removal project.
- Seeks to create a strong east-west pedestrian connection between Kelmscott Station and Fancote Park.
- Seeks to create a shared space street along Denny Avenue to connect the adjacent sites of future activity.
- Seeks to create sufficient space alongside major roads and local streets for additional tree planting and shade.

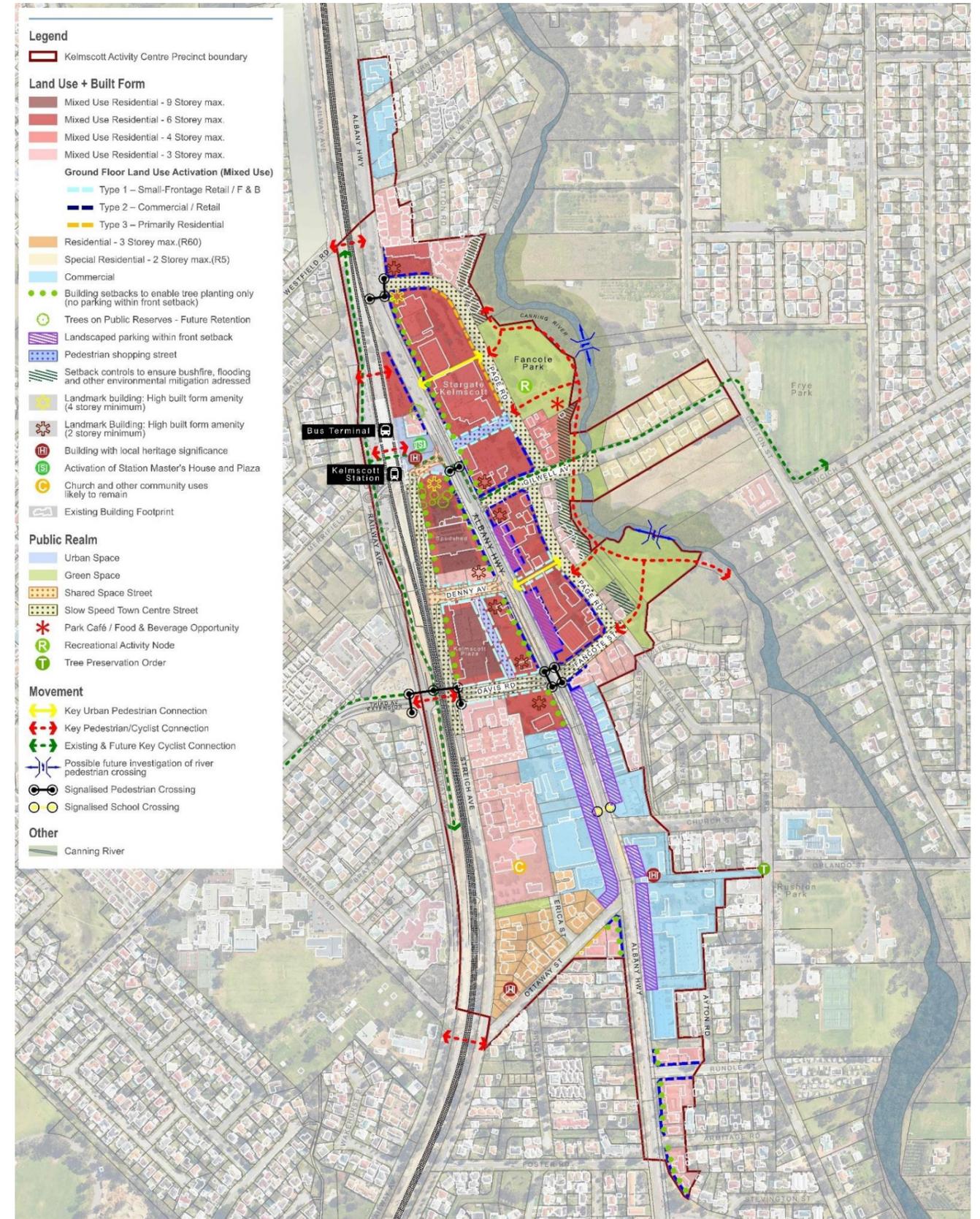


Figure 2 Kelmscott Activity Centre Precinct Plan (source: TBB, 2022)

2.2 Overview of Precinct Plan Road Transport Network

The Kelmescott Activity Centre Precinct Plan retains the road network arrangements as delivered by Main Roads WA and the METRONET teams as part of the Denny Avenue Level Crossing removal project. The Denny Avenue Level Crossing removal project is discussed in detail in Section 4.5.1 – below is a summary of the projects impact on the road network:

- Removal of the Denny Avenue Level Crossing.
- Creation of an underpass (rail-over-road) at Davis Road.
- Third Avenue realigned to connection into the new Davis Road underpass.
- Davis Road widened from 1 lane in each direction to 2 lanes in each direction.
- New signalised intersection between Davis Road/Third Avenue and Railway Avenue with pedestrian crossing facilities across northern and western arms of the intersection.
- New signalised intersection between Davis Road and Streich Avenue with pedestrian crossing facilities across northern and eastern arms of the intersection.
- New signalised intersection between Davis Road/Fancote Street and Albany Highway with pedestrian crossing facilities across all four arms of the intersection.

The Precinct Plan builds on the road network arrangements delivered as part of the wider Denny Avenue Level Crossing removal project. The following vehicle network opportunities are created by both the Precinct Plan and the delivered road network arrangements (as shown in Figure 3):

Streich Avenue (north of Denny Avenue)

Redesigned to calm traffic, with access to the Transperth passenger car park from Albany Highway (no longer from Streich Avenue in order to create a continuous pedestrianised Station Plaza) – passenger drop-off facilities will remain on Streich Avenue. Drivers will not be able to:

- Turn right into Streich Avenue from Albany Highway.
- Turn right onto Albany Highway from Streich Avenue – the right turn into Albany Highway via Davis Road.

Former unofficial car park site

Closed in August 2020 to facilitate future development (landmark building).

Denny Avenue and Streich Avenue Intersection

The Denny Avenue and Streich Avenue signalised intersection removed and replaced with a priority-controlled intersection (Streich Avenue to have priority) – with the closure of the level crossing a new right turn from Denny Avenue into Streich Avenue is provided (a movement not previously permitted).

Third Avenue cul-de-sac

The realignment of Third Avenue to the Davis Road underpass will result in Third Avenue being a cul-de-sac at the realigned Third Avenue with vehicle access from Railway Avenue.

Davis Road

To be widened to 2 lanes in each direction – with a new right turn pocket into Kelmescott Plaza Shopping Mall.

Albany Highway and Davis Road/Fancote Street Intersection

The intersection will be signalised with all movements permitted. An additional two turning lanes on Albany Highway to allow for a double right turn into Davis Road and Fancote Street will have 2 lanes on approach to the intersection.

Davis Road and Streich Avenue Intersection

A new rail-over-road underpass will be created along Davis Road with 2 lanes in each direction. No right turn from Davis Road into Streich Avenue north.

Railway Avenue

To be widened from 1 lane in each direction (2 lanes in total) to 2 lanes in each direction (4 lanes in total) either side of the new Davis Road/Third Avenue road connection. Additional right turn pockets are facilitated at the Davis Road intersection for both eastbound and westbound movements.

2.3 Overview of Precinct Plan Public Transport Network

The Denny Avenue Level Crossing removal project includes upgrades of key public transport infrastructure within the Kelmescott Activity Centre Precinct – below is a summary of the public transport upgrades:

- Small increase in car parking bay capacity at Kelmescott Station.
- The changes to the road network within the Precinct due to the closure of the Denny Avenue Level Crossing and creation of an underpass at Davis Road, results in a provision of bus stops in central areas of the Town Centre.
- Public realm improvements around Kelmescott Station and Station Master House heritage building – including a Station Plaza.

The Precinct Plan builds on the public transport upgrades delivered as part of the wider Denny Avenue Level Crossing removal project and creates the following public transport network opportunities (as shown in Figure 3):

Improved bus route access to the Town Centre

Improved bus route access to the Town Centre through the provision of bus stops in central areas of the Town Centre and along key movement corridors.

Transperth passenger car park extension

The Transperth passenger car park accessed off Railway Avenue to be expanded by approximately 40 bays.

Station Plaza

Upgrades to include new landscaping and refurbishing the Station Masters House. This will create a more pedestrian friendly space and connection between Kelmescott Station and Stargate Shopping Centre – as well as improving the pedestrian amenity of the area and creating a more inviting public transport hub.

Bus to train transfers

The public transport data shows that there is an existing high level of bus to train transfers occurring through Kelmscott Station. Increased local amenity to the station and an improved retail and entertainment offering across the Kelmscott Activity Centre Precinct – may encourage people to break their direct bus to train transfer and do a bus-shop-train transfer instead – and spend more time and money in the Precinct.

2.4 Overview of Precinct Plan Pedestrian and Bicycle Networks

The Denny Avenue Level Crossing removal project includes upgrades of key pedestrian and bicycle infrastructure within the Kelmscott Activity Centre Precinct – below is a summary of the pedestrian and bicycle network upgrades:

- New grade-separated shared path over the new Davis Road overpass.
- Public realm improvements around Kelmscott Station and Station Master House heritage building – including a Station Plaza.

The Precinct Plan builds on the pedestrian and bicycle network upgrades delivered as part of the wider Denny Avenue Level Crossing removal project. The following pedestrian and bicycle network opportunities are created by both the Precinct Plan and the delivered pedestrian and bicycle network arrangements (as shown in Figure 3):

Station Plaza

Upgrades to include new landscaping and refurbishing the Station Masters House. This will create a more pedestrian friendly space and connection between Kelmscott Station and Stargate Shopping Centre – as well as improving the pedestrian amenity of the area.

Albany Highway pedestrian crossing

A new signalised pedestrian crossing will be installed across Albany Highway to the south of the Streich Avenue intersection – this will provide a safe form of pedestrian crossing between Kelmscott Station and the Stargate Shopping Centre.

Denny Avenue traffic lane reduction

Denny Avenue reduced from 2 lanes in each direction (4 lanes in total) to 1 lane in each direction (2 lanes in total) – to be redesigned with traffic calming features to ensure it becomes a more pedestrian friendly environment and easier for people to cross the street.

Street tree canopy

Retaining street trees and planting additional green landscaping through the centre of the Precinct would reduce the heat throughout summer and create a more inviting and pleasant pedestrian environment.

Albany Highway and Davis Road/Fancote Street Intersection

The Albany Highway and Davis Road/Fancote Street intersection will be signalised with pedestrian crossing facilities on all four arms of the intersection.

Kelmscott Station to Fancote Park path network

In the future a formal path network should be provided between Kelmscott Station-Albany Highway-Stargate Shopping Centre-Page Road-Fancote Park/Canning River. This path network should feature appropriate pram ramps with tactile ground surface indicators (TGSIs) and be legible to users and clearly signed.

Continuous shared path route

The continuous shared path bicycle route alongside the Armadale Line is nearing completion. This will provide strategic access from the north and south into Kelmscott Town Centre.

Local route connection to be investigated

The Council endorsed Long Term Cycle Network will enable Council to consider improvements of the local bicycle route network – to particularly address east-west routes to and through the Town Centre. The Council endorsed Long Term Cycle Network will enable the City to seek State grant funding to co-fund these critical local access bicycle routes.

Secure bicycle parking at Kelmscott Station

PTA have confirmed that whilst existing weekday use of the bike shelter at Kelmscott Station might be running at 20% utilisation – once levels consistently get close to 80% utilisation then additional capacity of secure bicycle parking would be provided at the station.

The Precinct Plan proposed land use yields and associated traffic generation are discussed in Section 5.2.

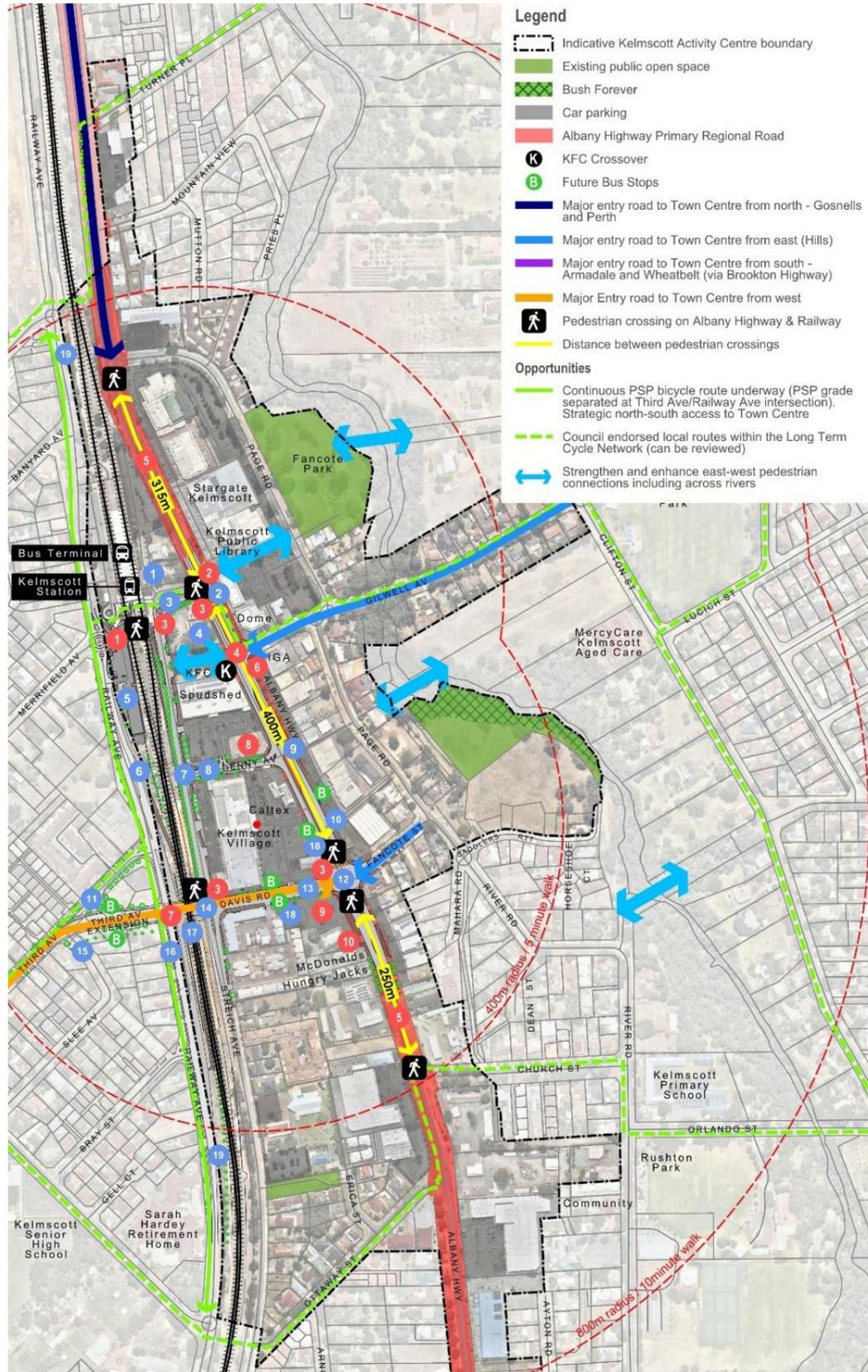


Figure 3 Kelmscott Activity Centre Precinct – movement network opportunities (source: TBB and Flyt, 2021)



3. Existing Situation

The demographics across Kelmscott have remained steady over the 5-year period 2011-2016 – Figure 6 shows a comparison of the ABS census data for 2011 and 2016 for the broader statistical area of Kelmscott.

The largest change in demographics between 2011 and 2016 has been amongst the 10-19 years age bracket – which has declined between 2011 and 2016. However, there have been increase in the 0-9 years, 30-39 years and 40-49 years age brackets – indicating that families with pre-school and primary school age children have become more common in Kelmscott.

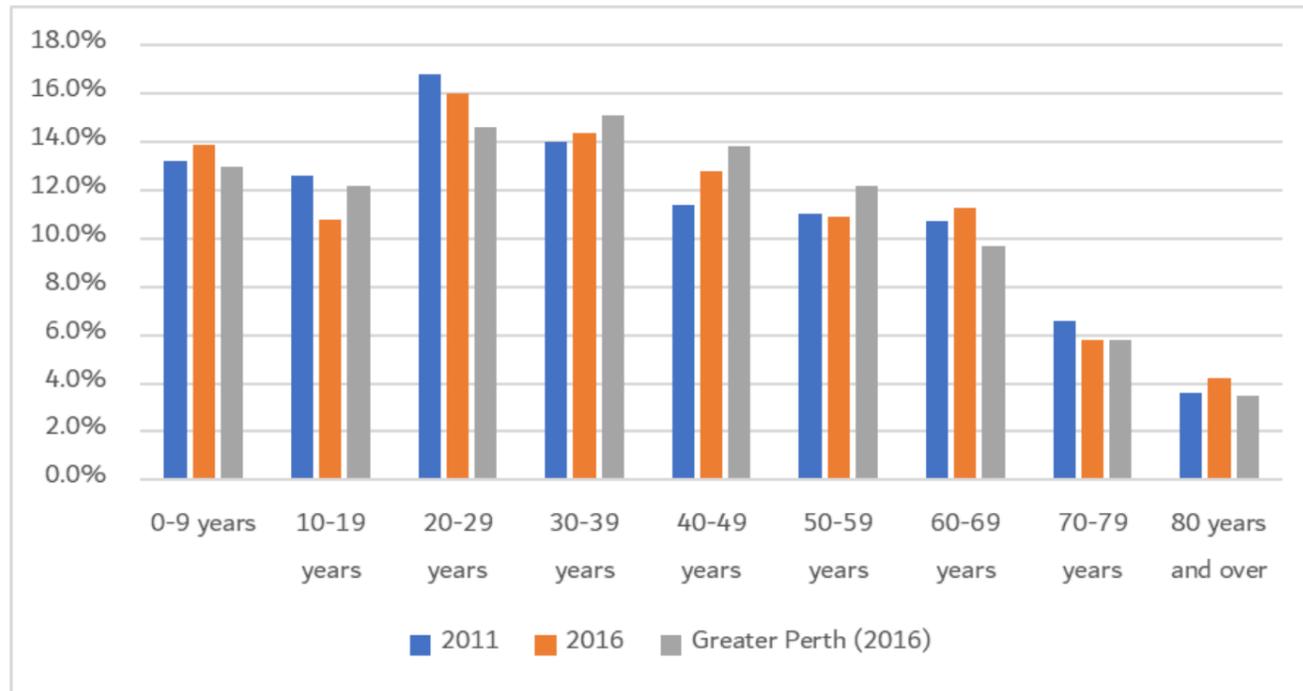


Figure 6 Demographic profile of Kelmscott (source: Australian Bureau of Statistics, 2016)

3.4 Existing Journey to Work

Journey to work data from the ABS 2016 census is shown for Kelmscott in Figure 7 to Figure 10. In each of the figures the Kelmscott ABS zone is highlighted and shows the location across central and southeastern Perth where residents from the Kelmscott ABS zone travel to work and locations from across Perth where people travel from to work in the Kelmscott ABS zone.

Figure 7 and Figure 8 show the locations where residents from the Kelmscott ABS zone travel to work (i.e. Kelmscott as the origin of their journey to work trip) – the first figure shows the number of people making the trip and the second figure shows the data as a percentage of total journey to work trips with an origin from the Kelmscott ABS zone.

Figure 9 and Figure 10 show the locations where people travel from to work in the Kelmscott ABS zone (i.e. Kelmscott as a destination for their journey to work trip) – the first figure shows the number of people making the trip and the second figure shows the data as a percentage of total journey to work trips with a destination in the Kelmscott ABS zone.

The ABS 2016 census journey to work data shows that 493 people live and work within the Kelmscott zone – this would include people who are registered as ‘working from home’.

The locations where the highest number of residents from the Kelmscott ABS zone travel to their place of work includes central Perth as well as the neighbouring centers of Armadale and Gosnells. The journey to work data suggests that there is a high level of combined working from home and local employment that underpins the travel behaviour of residents from the Kelmscott ABS zone.

Primary locations where Kelmscott residents travel to work:

- Kelmscott/working from home = 493 people
- Perth CBD/East Perth = 302 people
- Armadale = 244 people
- Gosnells = 183 people

The locations where the highest number of workers travel from to their place of work within the Kelmscott ABS zone includes the surrounding centres of population, such as Armadale, Bedforddale, Brookdale and Roleystone. Again, the journey to work data suggests that there is a high level of combined working from home and local employment that underpins the travel behaviour of workers into the Kelmscott ABS zone.

Primary locations where workers travel from to work in Kelmscott:

- Kelmscott/working from home = 493 people
- Armadale = 304 people
- Bedforddale = 217 people
- Brookdale = 210 people
- Roleystone = 160 people

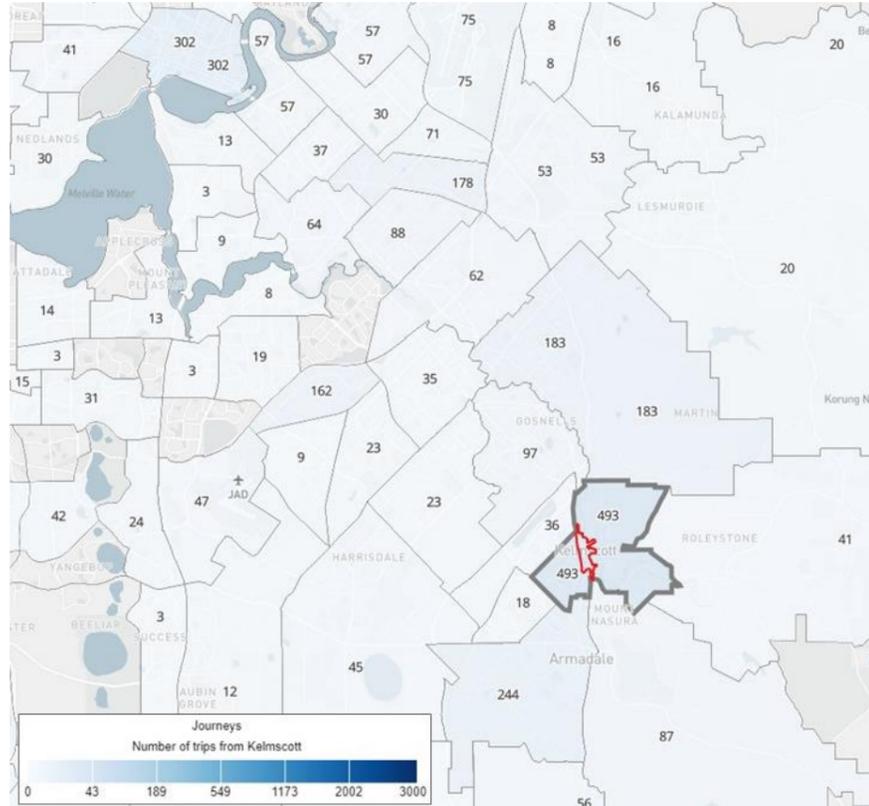


Figure 7 Journey to work data for Kelmscott (origin) – trips from Kelmscott (source: Australian Bureau of Statistics, 2016)

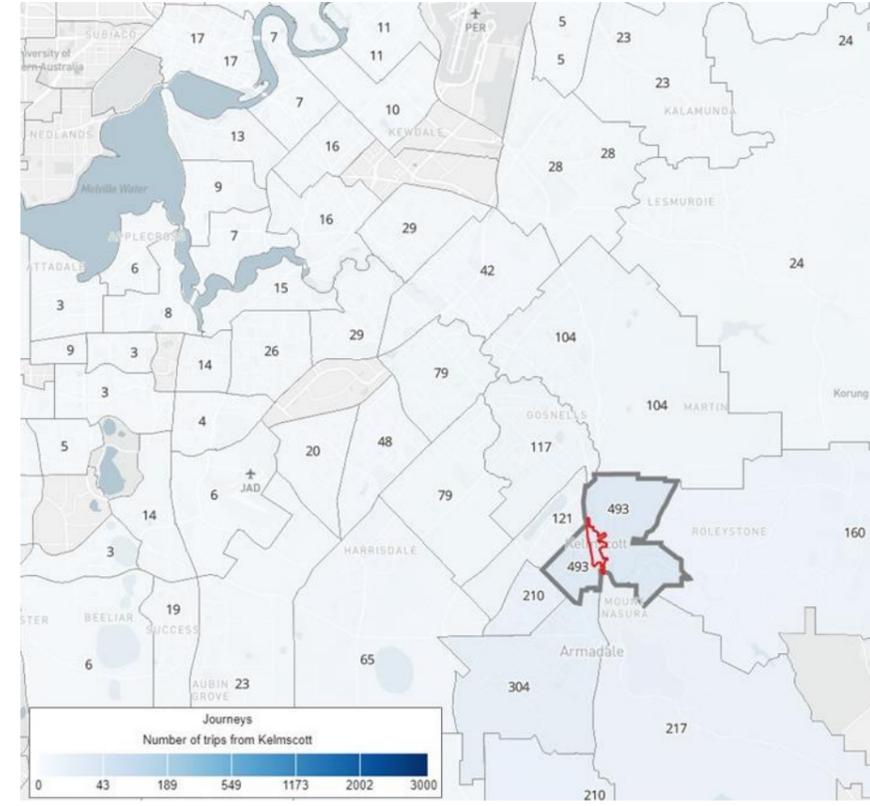


Figure 9 Journey to work data for Kelmscott (destination) – trips to Kelmscott (source: Australian Bureau of Statistics, 2016)

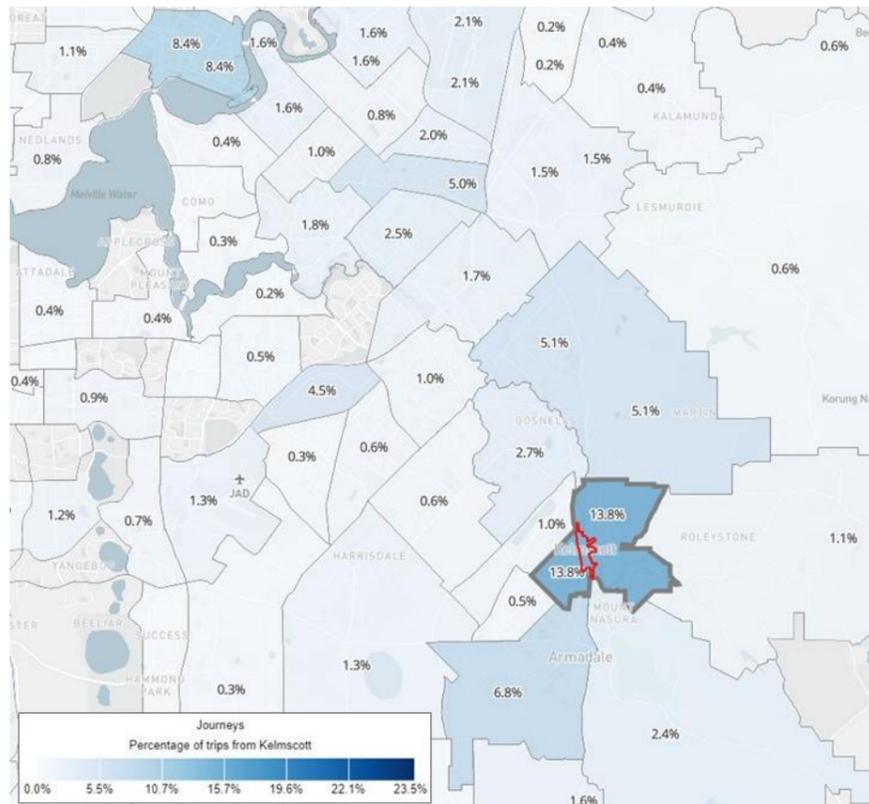


Figure 8 Journey to work data for Kelmscott (origin) – % trips from Kelmscott (source: Australian Bureau of Statistics, 2016)

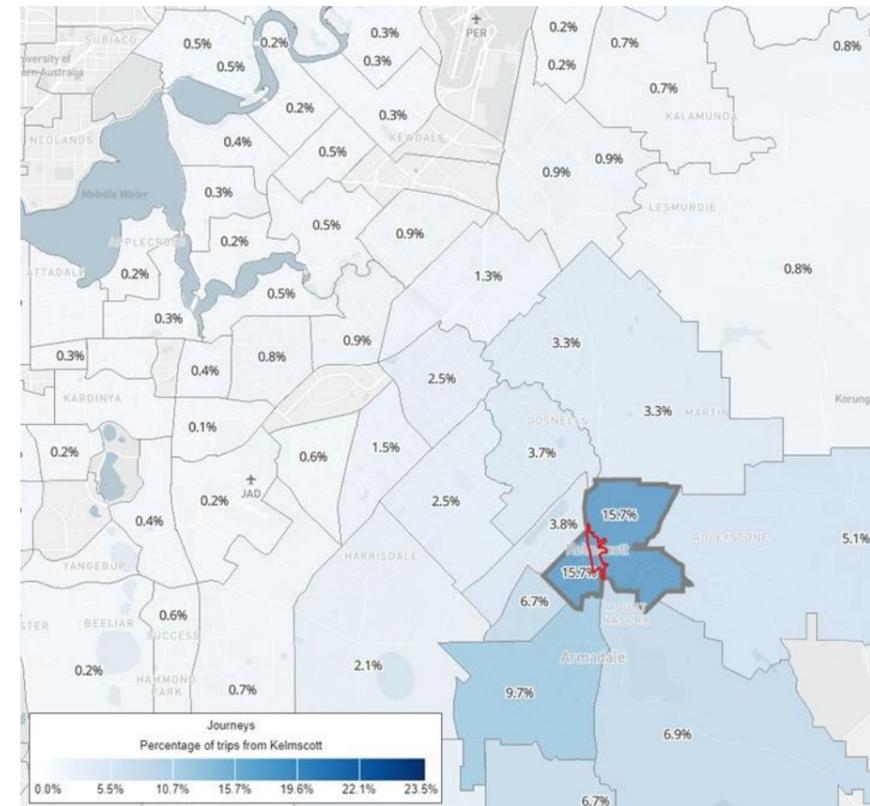


Figure 10 Journey to work data for Kelmscott (destination) – % trips to Kelmscott (source: Australian Bureau of Statistics, 2016)

3.5 Existing Passenger Mode Share to Access Kelmscott Station

The PTA recognise that access to station facilities forms an integral part of passengers’ overall public transport journeys – the PTA is developing a Station Access Strategy for each station on the existing passenger network considering how passengers currently travel to the station and any key improvements to station access infrastructure that can improve journeys and encourage greater use of rail infrastructure.

While it is recognised that each station is unique across the network, the strategies focus on prioritising active travel modes (walking and cycling) followed by bus and finally private vehicle travel (vehicle drop-off and parking) for travel to stations.

As part of the development of each strategy, extensive consultation is undertaken with the Department of Transport, the Department of Planning, Lands and Heritage, Main Roads WA, Local Government Authorities (LGA’s) and other stakeholders as appropriate. This ensures all views are represented within the strategy, and that the PTA’s vision for the station is consistent with other government planning and policies.

There are three key objectives of the Station Access Strategies:

- Improve the quality, amenity and safety of journeys to stations for existing public transport users.
- Encourage more users to public transport, by providing an easier first and last mile transfer between their home and the station.
- Provide sufficient capacity within station access facilities to meet ongoing growth in demand for the rail network, as identified by the Rail Growth Plan.

As part of the process to develop the Station Access Strategy for Kelmscott Station the PTA undertook a mode share survey of passengers boarding at Kelmscott Station between 5.30am and 4.30pm across two weekdays in October 2017.

Figure 11 shows the existing passenger mode share at Kelmscott Station based on the passenger mode share survey and the average weekday train boardings at Kelmscott Station in March 2017 of 1,574 passengers.

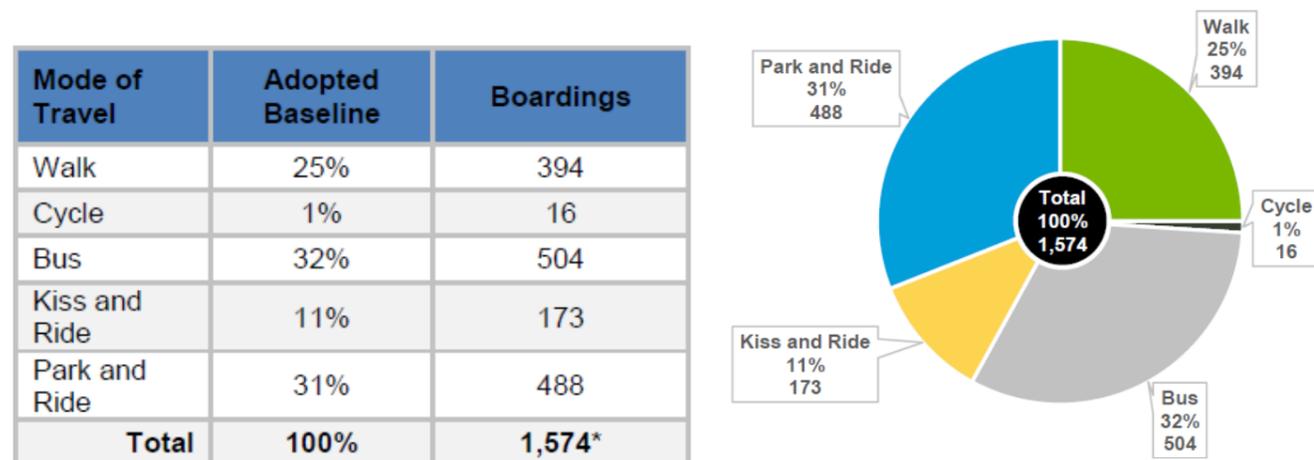


Figure 11 Kelmscott Station existing passenger mode share (source: Public Transport Authority, 2020)

The passenger mode share survey showed that currently 1/3 of all passengers boarding train services at Kelmscott Station arrive by bus (504 people / 32% of passengers) and 1/3 of all passengers arrive by private vehicle and Park and Ride at Kelmscott Station (488 people / 31% of passengers).

Of the remaining 1/3 of passengers boarding train services at Kelmscott Station, 394 people (25% of passengers) walk to the station, 173 people (11% of passengers) are dropped-off at the station and only 16 people (1% of passengers) cycle to the station.

An overview of the passenger mode share survey results is provided over the following sections.

3.5.1 Vehicle Access to Kelmscott Station

Figure 12 shows the origin location of Kiss and Ride as well as Park and Ride trips at Kelmscott Station. The majority of Park and Ride trips originate from locations to the east of Albany Highway, such as Roleystone and Kelmscott foothills.

Some of the Park and Ride trips appear to originate from within a walkable catchment of the station – and very few Kiss and Ride trips were recorded as part of the passenger mode share survey.

Figure 12 also shows the existing bus route corridors – with many of these bus routes serving Kelmscott Station. It is interesting to note that several Park and Ride trips appear to originate from within very close proximity to a bus route corridor that would provide access to Kelmscott Station.

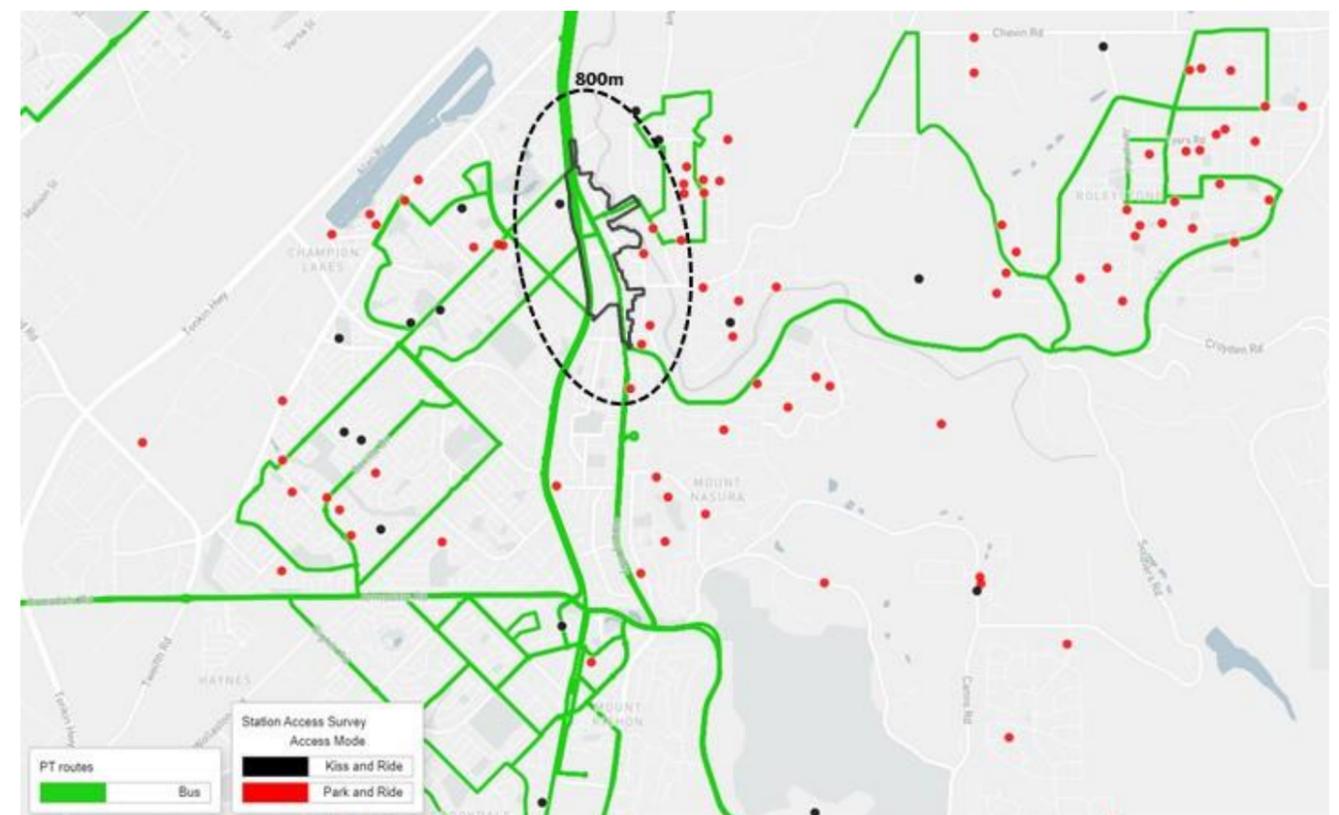


Figure 12 Kelmscott Station passenger mode share survey – vehicle access (source: Public Transport Authority, 2017)

3.5.2 Walking, Cycling and Public Transport Access to Kelmscott Station

Figure 13 shows the origin location of walking, cycling and public transport trips at Kelmscott Station.

Most walking trips originate from locations within an 800m radius from Kelmscott Station, with a few trips from slightly further away, from locations around Kuhl Park area.

There are very few cycling trips recorded to the station – of those recorded half originate from within 800m of the station and half originate from nearby locations approximately 1-2km from the station.

Bus trips to the station originate from alongside key bus route corridors to Kelmscott Station, such as along Westfield Road through Camillo and along bus route corridors through Roleystone.

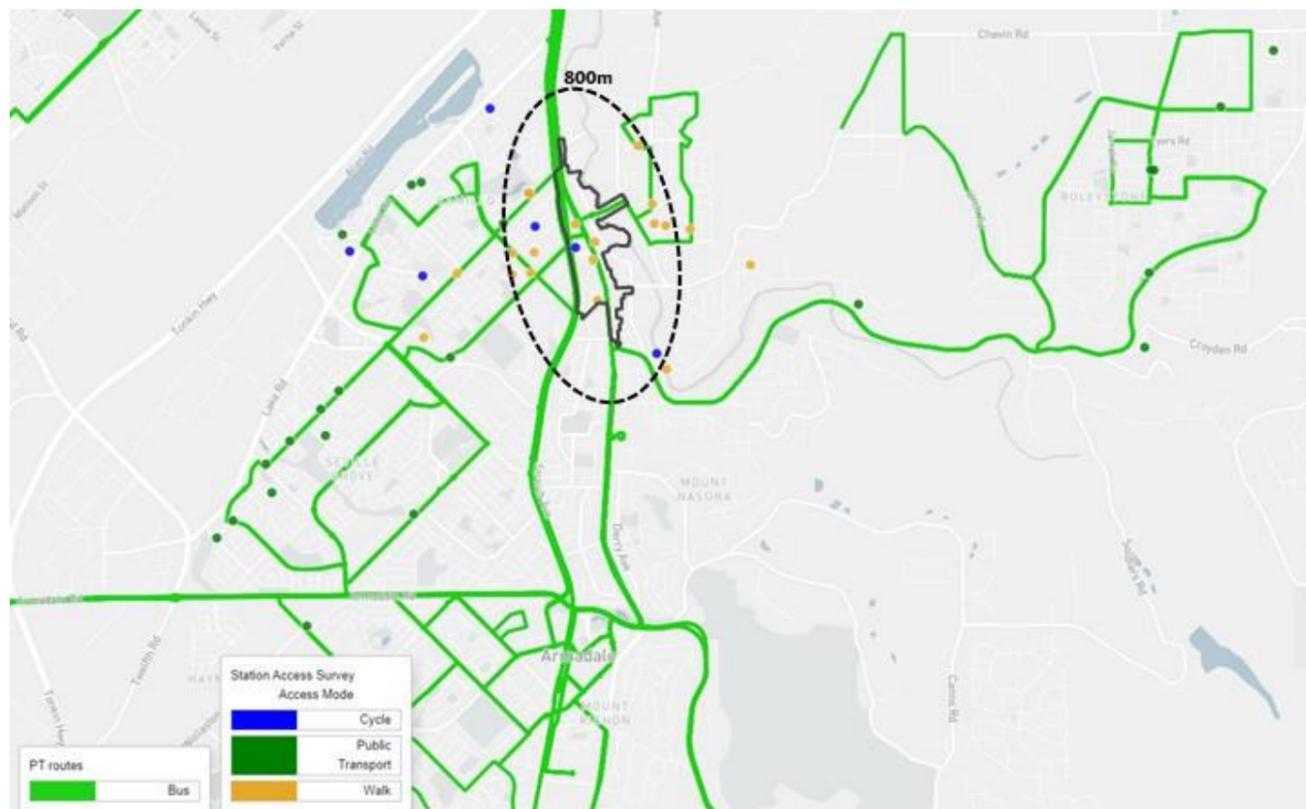


Figure 13 Kelmscott Station passenger mode share survey – walking, cycling and public transport access (source: Public Transport Authority, 2017)

Figure 14 shows the 5-minute and 10-minute walk catchments for the train stations along the Armadale Line. The figure is focused on the catchments providing access to Kelmscott Station – with the Challis Station catchment shown to the south.

The figure shows that the northern half of the Kelmscott Activity Centre Precinct Plan study area (areas from Davis Road northwards) are within a 10-minute walk or less of Kelmscott Station. Parts of the southern tip of the Kelmscott Activity Centre Precinct Plan study area are within a 10-minute walk of Challis Station to the south.

However, the figure shows that the majority of the southern half of the Precinct Plan study area (areas from Davis Road southwards) are outside of a 10-minute walk of either Kelmscott Station or Challis Station.

The existing central core of the Kelmscott Activity Centre Precinct, which includes Kelmscott Stargate Shopping Centre, Kelmscott Plaza Shopping Mall and the Spudshed site, are all located within a 5-minute walk of Kelmscott Station.

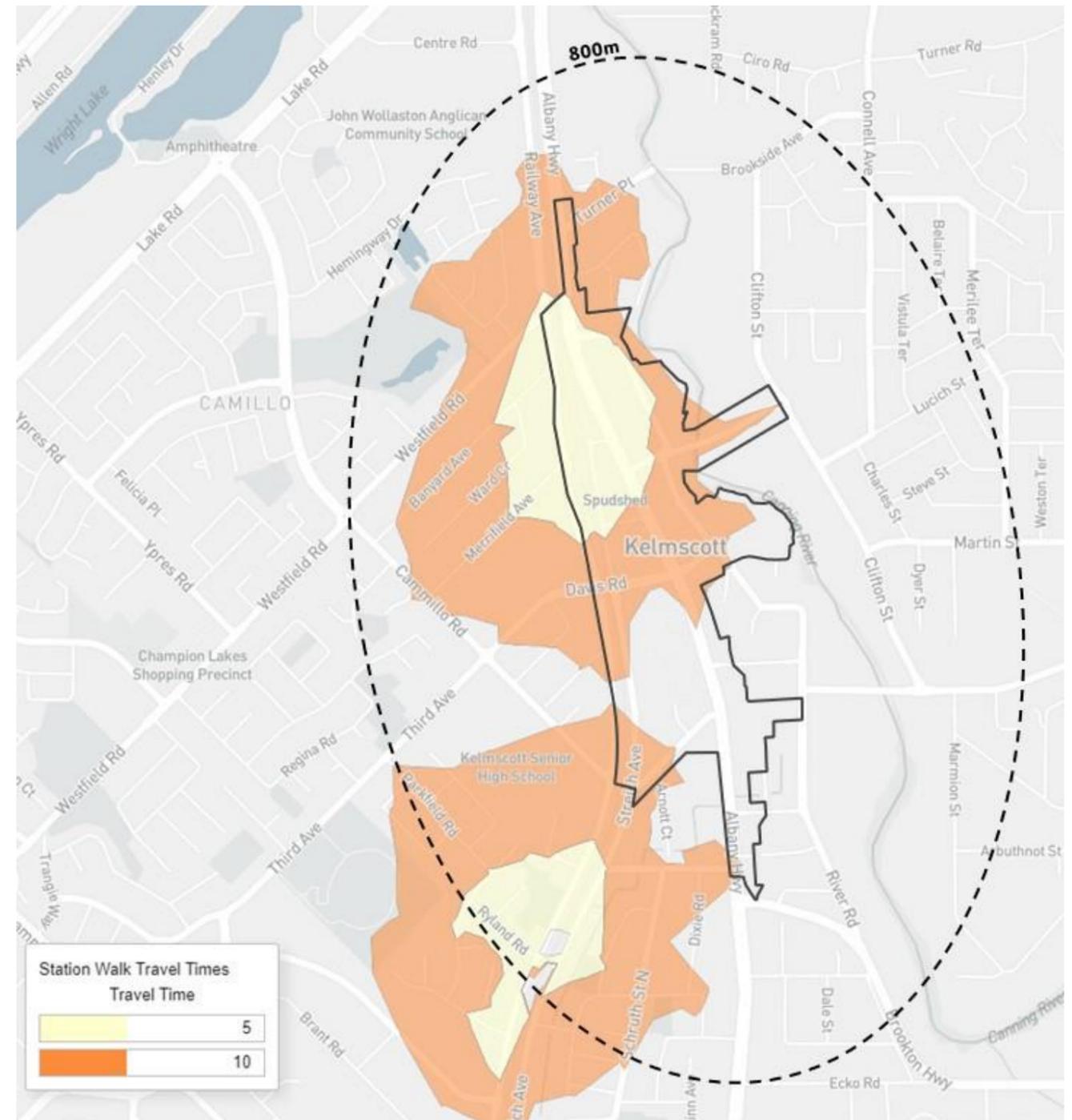


Figure 14 5-minute and 10-minute walk catchments from stations along the Armadale Line (source: Public Transport Authority, 2017)



4. Internal and External Transport Networks and Integration with Surrounding Area

4. INTERNAL AND EXTERNAL TRANSPORT NETWORKS AND INTEGRATION WITH SURROUNDING AREA

4.1 Vehicle Movement Network

4.1.1 Existing Situation

The road network within the Kelmscott Activity Centre Precinct has been subject to significant disruption over the past 12-18 months as a result of the METRONET works to deliver the Denny Avenue Level Crossing removal and replacement Davis Road underpass (see Section 4.5.1 for details) – as well as concurrent upgrades of utilities along the Albany Highway corridor.

From Tuesday 18 May 2021 to October 2021 the road network in the study area was subject to various road closures, detours, and one-way operation to facilitate constructions works. Figure 15 shows the operation of the road network through the study area in July 2021 – the road network operated with the traffic management as shown, between May and October 2021.

The disruption of the road network included the following key traffic management measures:

- Denny Avenue Level Crossing permanently closed from 1st April 2021.
- Davis Road underpass open with partial movements only to Streich Avenue north of Davis Road.
- Railway Parade one-way northbound between Cammillo Road and Merrifield Avenue.
- Third Avenue resident access only between Railway Parade and Cammillo Road.
- Streich Avenue resident access only between Davis Road and Ottaway Street.
- Albany Highway northbound carriageway (2 lanes) closed for construction area – southbound carriageway (2 lanes) operating as single northbound and southbound lanes.
- Streich Avenue closed between Albany Highway and Transperth car park access for construction area.
- Davis Road closed between Albany Highway and Streich Avenue for construction area.
- Fancote Street closed between Albany Highway and Page Road for construction area.

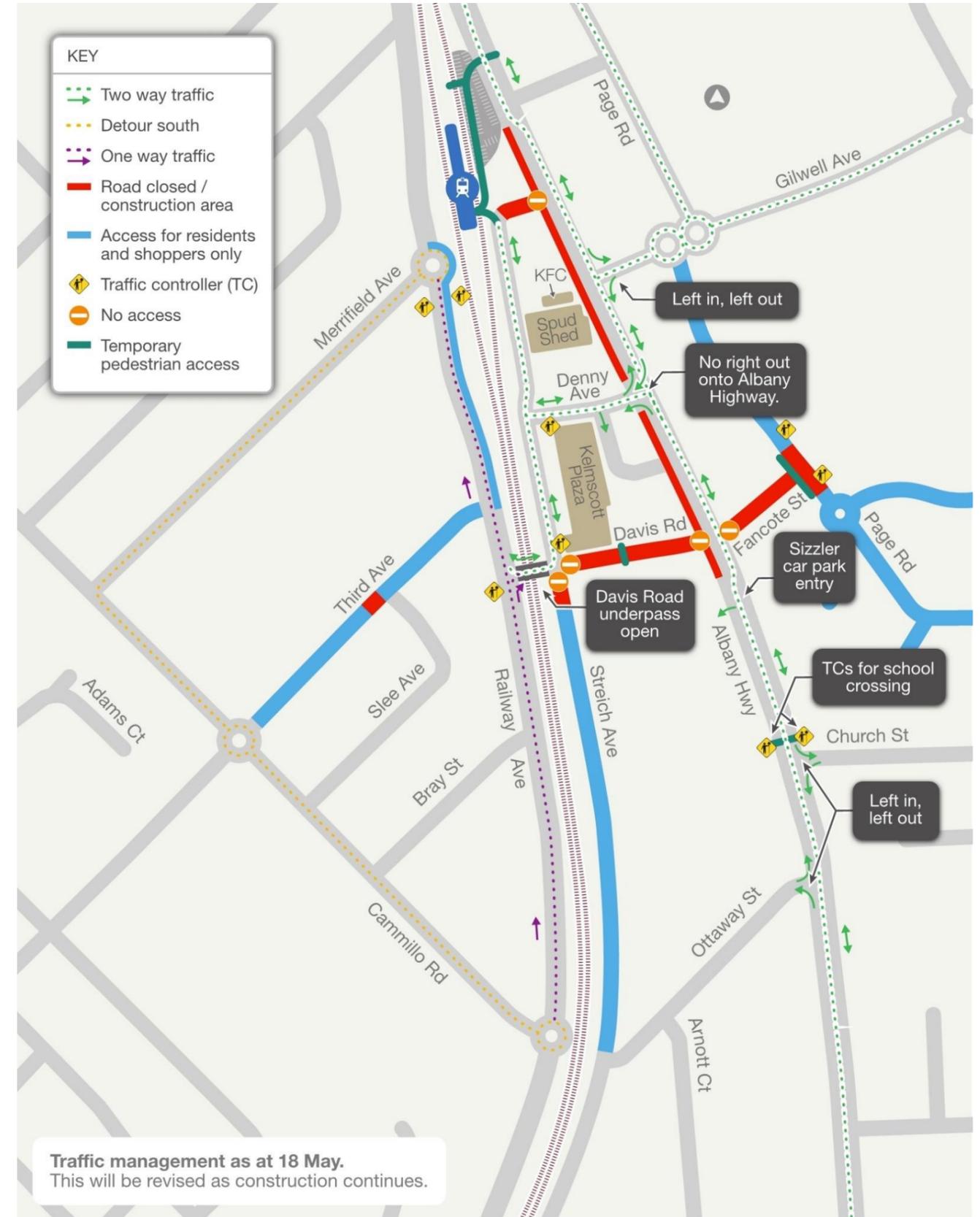


Figure 15 Denny Avenue Level Crossing removal project works – traffic management May to October 2021 (source: METRONET)

4.1.2 Road Network Hierarchy

The Kelmscott Activity Centre Precinct Plan study area is split in two by Albany Highway, which runs north-south through the study area. The parallel Railway Avenue and Armadale Line rail corridors run north-south along the western boundary of the study area.

The road network hierarchy through the study area is shown in Figure 16 and summarised below:

- **Primary Distributor Road** – under the control of Main Roads WA:
 - Albany Highway.
- **Distributor A Road** – under the control of the City of Armadale:
 - Railway Avenue.
 - Denny Avenue (expected to be reclassified following the closure of the Denny Avenue Level Crossing).
- **Distributor B Road** – under the control of the City of Armadale:
 - Gilwell Avenue.
 - Streich Avenue (south of Denny Avenue – may be reclassified to south of Davis Road).
 - Third Avenue (expected to be extended to include Davis Road through to Albany Highway).
 - Church Street.
- **Local Distributor Road** – under the control of the City of Armadale:
 - Page Road.
 - Fancote Street.
 - River Road.
- **Access Road** – under the control of the City of Armadale:
 - All other local streets.

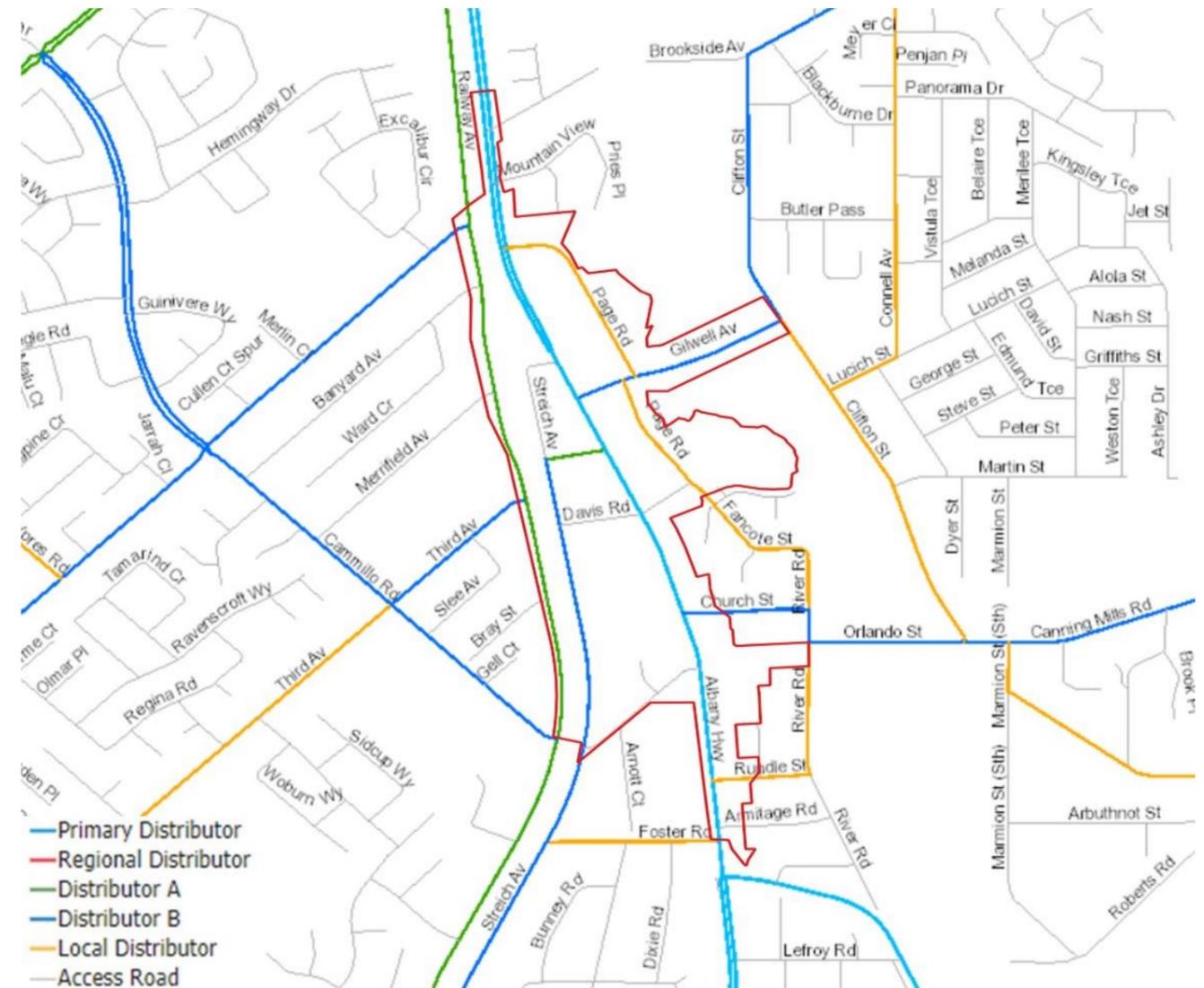


Figure 16 Road hierarchy in relation to the Kelmscott Activity Centre Precinct Plan study area (source: Main Roads WA)

4.1.3 Restricted Access Vehicle Network

Main Roads WA is responsible for determining and administering road access for Restricted Access Vehicles (RAV) in WA. Albany Highway is included in the RAV network and is permitted for use by RAV's up to 27.5m in length (part of the 27.5m Oversized B-Double Network).

The section of Albany Highway between Tonkin Highway access ramps and Armadale Road/South Western Highway (i.e. the section of Albany Highway through Kelmscott) is subject to the following RAV conditions:

'This section of road must not be used as a through route. This section of road may be used as access to pick-up goods, deliver goods, or garage vehicles to properties located on this section of road, or on roads only accessible via this section of road. Drivers must carry documentation as proof of local delivery, pickup or garaging address.'

(source: Main Roads WA)

Brookton Highway is also permitted for use by RAV's up to 27.5m in length (part of the 27.5m Oversized B-Double Network). With Brookton Highway RAV route only being accessible via Albany Highway, under the RAV conditions Brookton Highway bound RAV's are permitted to travel along the section of Albany Highway through Kelmscott.

The Brookton Highway RAV route is a strategically important route in the RAV network out to the central Wheatbelt Region and the section of Albany Highway through Kelmscott forms part of the Albany Highway-Brookton Highway connection for RAV's.

4.1.4 Service Vehicle Access

The Kelmscott Activity Centre currently includes two shopping centres, one with a Coles supermarket and one with a Woolworths supermarket, there is a standalone Spudshed and other standalone large format retail outlets such as Dan Murphy's and City Farmers.

These land uses are serviced from Albany Highway and the Precinct Plan ensures future servicing for commercial retail premises will continue to be serviced from the Albany Highway corridor.

4.1.5 Road Network Speed Limits

Albany Highway operates with a 70km/h posted speed limit to the north of the Kelmscott Activity Centre Precinct – with the 70km/h speed limit slightly extending into the northernmost section of Albany Highway within the study area (in proximity of Turner Place/Mountain View). Albany Highway to the south of Mountain View operates with a 60km/h posted speed limit through the study area.

It should be noted that the City of Armadale has advocated that the existing posted speed limit for Albany Highway through the Precinct Plan area, should be decreased to reflect the local town centre context/environment and movement activity of pedestrians, cyclists, and traffic along and across the Albany Highway corridor.

Railway Avenue also operates with a 70k/h posted speed limit to the north of the study area (north of the Railway Avenue and Westfield Road intersection) – with Railway Avenue operating with a 60km/h posted speed limit through the study area.

Streich Avenue to the south of Davis Road operates with a 60km/h posted speed limit – with the section of Streich Avenue between Davis Road and Kelmscott Station operating under a typical default 50km/h urban speed limit.

All other streets in the study area operate under a typical default 50km/h urban speed limit. Figure 17 shows the speed zoning in relation to the Kelmscott Activity Centre Precinct Plan study area. Figure 18 also shows the location of 40km/h School Speed Zones in relation to the study area.

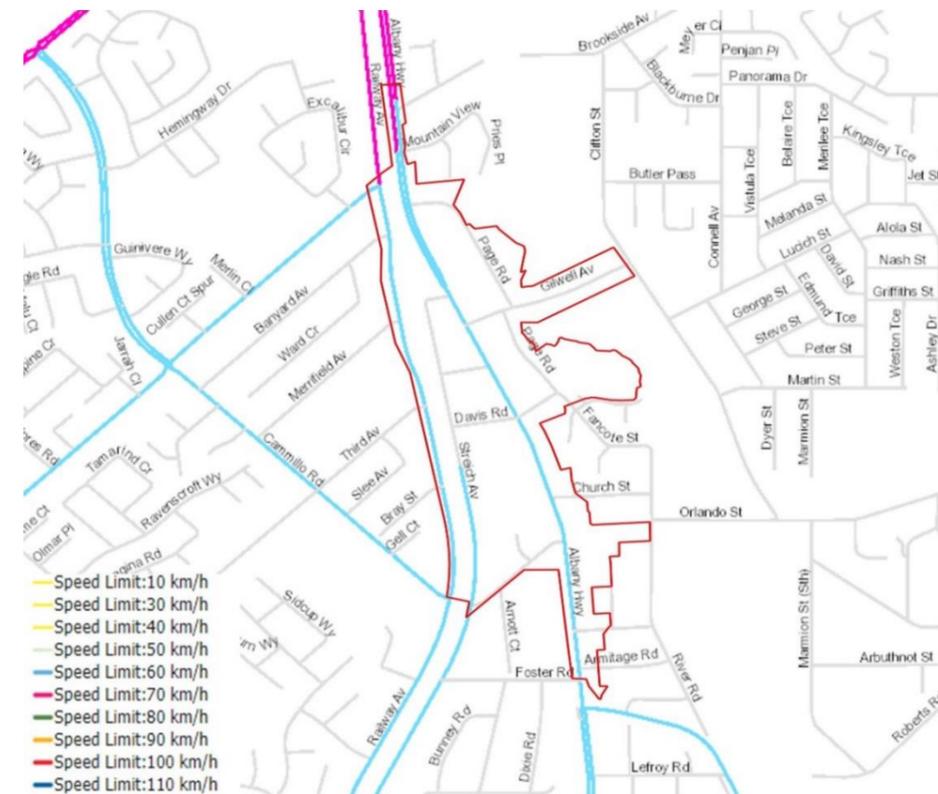


Figure 17 Speed zoning in relation to Kelmscott Activity Centre Precinct Plan study area (source: Main Roads WA)

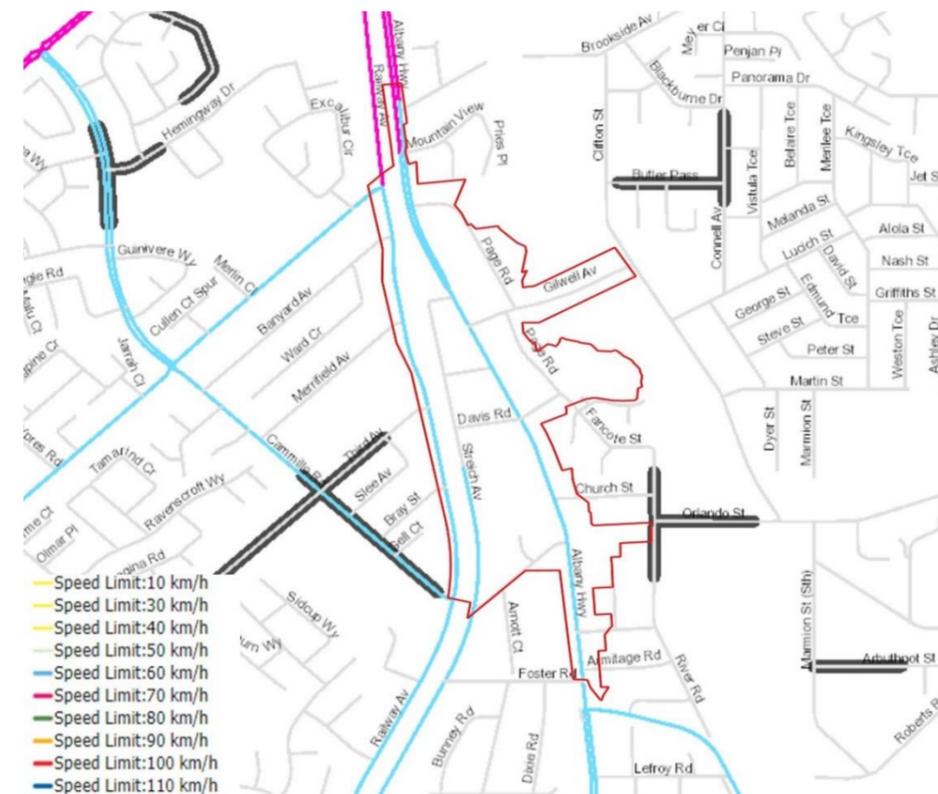


Figure 18 School speed zoning (40km/h) in relation to Kelmscott Activity Centre Precinct Plan study area (source: Main Roads WA)

4.1.6 Road Network Arrangement

The existing road network arrangements are (pre-Denny Avenue Level Crossing removal and utility upgrade works):

- Albany Highway - 2 lanes in each direction with primarily medians island treatments with some painted.
- Railway Avenue - 1 lane in each direction with a combination of median island and painted treatments.
- Denny Avenue - 2 lanes in each direction with median island treatments.
- Gilwell Avenue - 1 lane in each direction with a combination of painted median and painted centreline.
- Streich Avenue - 1 lane in each direction with primarily painted centreline.
- Third Avenue - 1 lane in each direction with painted median strip.
- Church Street - 1 lane in each direction with no centreline markings.
- Page Road - 1 lane in each direction with intermittent centreline markings.
- Fancote Street - 1 lane in each direction with intermittent centreline markings.
- River Road - 1 lane in each direction with combination of median island and painted treatments.

4.1.7 Traffic Volumes

Table 3 shows traffic count data for the road network within the Kelmscott Activity Centre Precinct from 2019 – pre COVID-19 pandemic impacts on travel behaviour and mode choice. Figure 19 shows the location of the traffic count data in relation to the study area.

The traffic data shows that typical weekday two-way traffic along the Albany Highway corridor was between 26,000-30,000 vehicles per day – with between 7.5%-8.5% of traffic being made up of larger heavy vehicles.

Railway Avenue had typical weekday two-way traffic of between 6,000-10,000 vehicles per day – with approximately 6.3% of traffic being made up of larger heavy vehicles.

Denny Avenue (with the level crossing still in place) had typical weekday two-way traffic of 8,000 vehicles per day – with approximately 6.2% of traffic being made up of larger heavy vehicles.

4.1.8 Vehicle Speeds

Figure 20 to Figure 25 show the 85th percentile vehicle speed for the six locations where traffic count data is presented in Table 3. The data shows that the 85th percentile vehicle speed along the Denny Avenue and Church Street is below the 50km/h posted speed limit for each of those corridors across the entire day.

The data shows that for the Railway Avenue corridor the 85th percentile vehicle speed is typically below the 60km/h posted speed limit for the corridor – other than prior to the AM peak period (approximately 4am-7am), when 85th percentile vehicle speed exceed the posted speed limit by approximately 5km/h.

The data shows that for the Albany Highway corridor the 85th percentile vehicle speed is over the posted speed limit (70km/h at location A and 60km/h at location B). With 85th percentile vehicle speeds typically being 5km/h above the posted speed limit – and up to 10km/h above the 60km/h posted speed limit at location B during the 3am-6am period.

The 85th percentile vehicle speed is best described as the speed at or below which 85 percent of all vehicles are observed to travel past a monitored point – this is considered to be the speed adopted by reasonable people, according to the road environment. As such, if the 85th percentile vehicle speed is above or below the roads posted speed limit, it suggests that for reasonable people that particular road environment does not fit with the posted speed limit.

In the future the City of Armadale should monitor the 85th percentile vehicle speeds on key corridors, such as Albany Highway through the Kelmscott Activity Centre Precinct, and identify when the 85th percentile vehicle speed consistently drops below the posted speed limit. This will provide additional rationale for any future City advocacy to reduce the posted speed limit to reflect the local town centre context/environment and movement activity of pedestrians, cyclists, and traffic along and across the Albany Highway corridor.

Table 3 – Traffic count data for 2019 (source: Main Roads WA)

Ref.	Traffic Count Data Location	Average Weekday Two-Way Traffic	Percentage of Light Vehicles	Percentage of Heavy Vehicles
A.	Albany Highway (north) – north of Turner Place	25,700	91.6%	8.4%
B.	Albany Highway (south) – north of Brookton Highway	30,100	92.5%	7.5%
C.	Denny Avenue – west of Albany Highway	7,900	93.8%	6.2%
D.	Railway Avenue (north) – south of Westfield Road	10,200	93.7%	6.3%
E.	Railway Avenue (south) – south of Denny Avenue	6,100	93.7%	6.3%
F.	Church Street – east of Albany Highway	2,300	92.1%	7.9%



Figure 19 Traffic count data locations (aerial source: Nearmap)

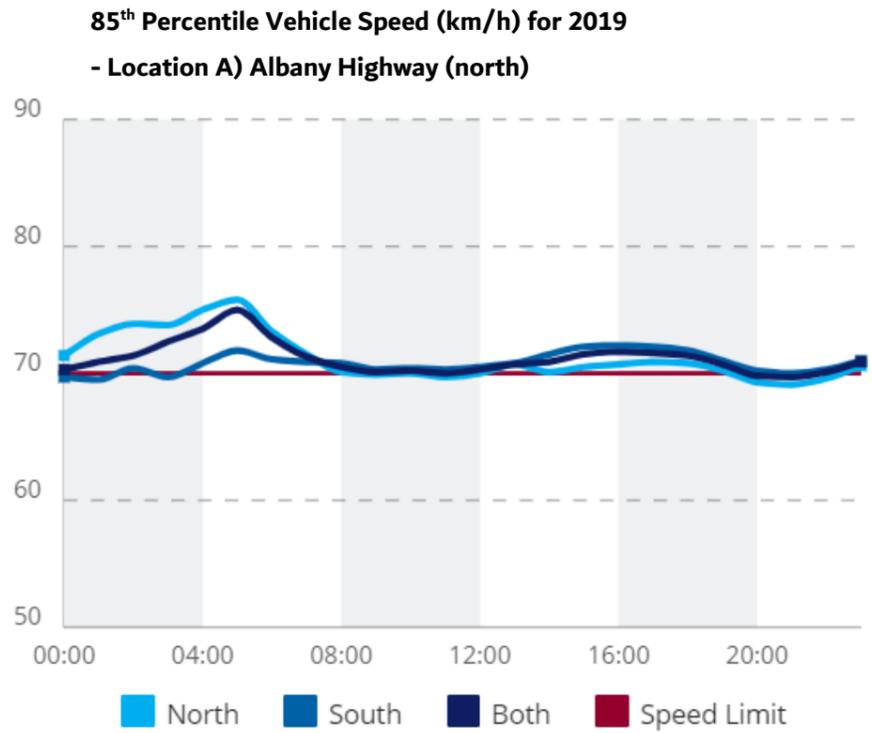


Figure 20 Albany Highway (north) – north of Turner Place
 (source: Main Roads WA)

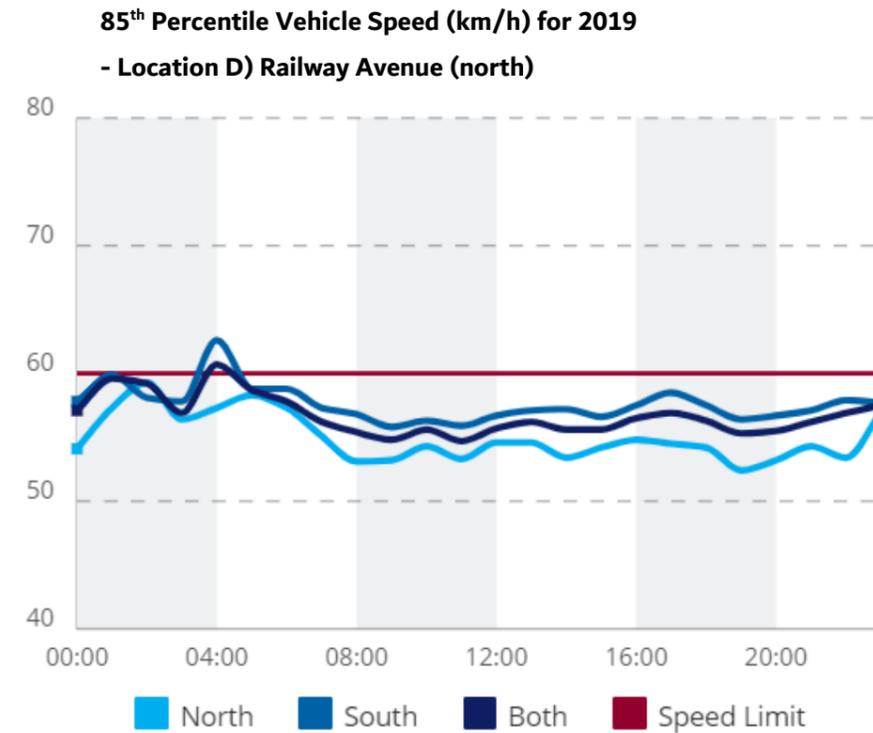


Figure 22 Railway Avenue (north) – south of Westfield Road
 (source: Main Roads WA)

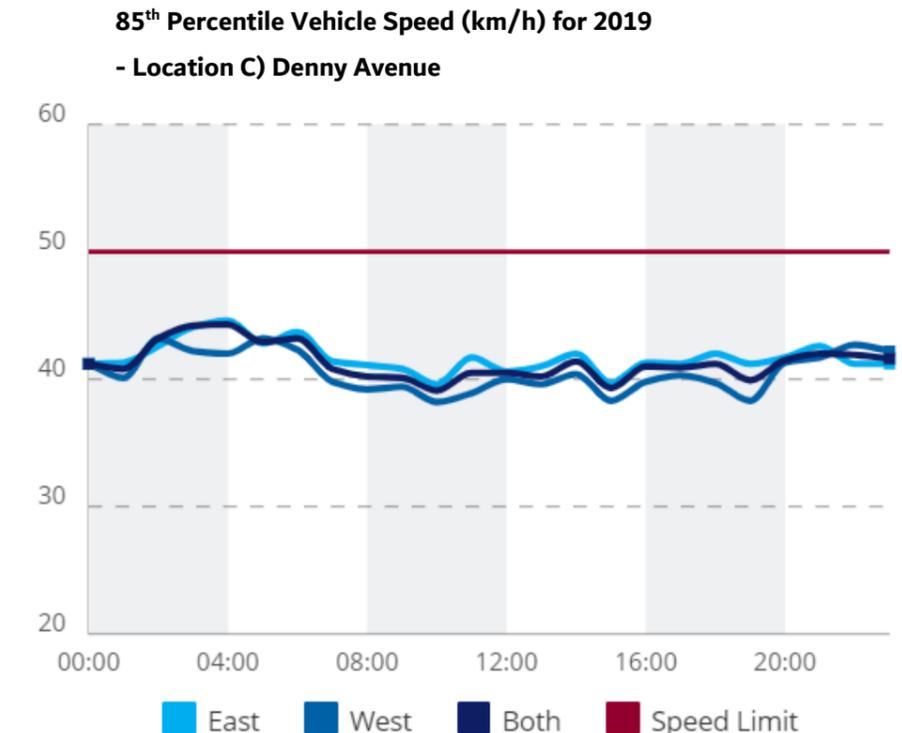


Figure 24 Denny Avenue – west of Albany Highway
 (source: Main Roads WA)

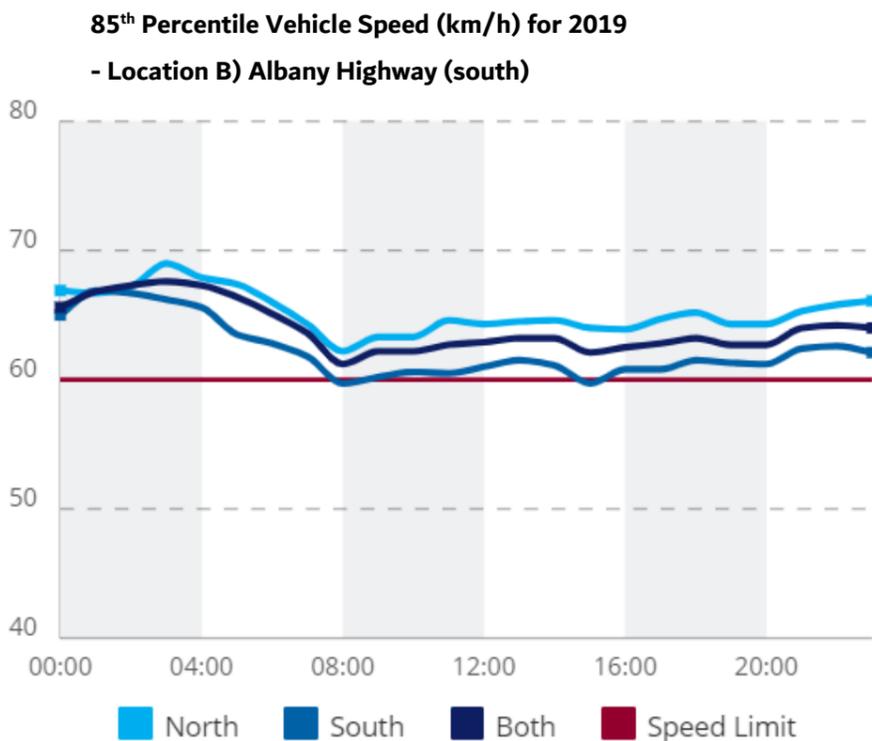


Figure 21 Albany Highway (south) – north of Brookton Highway
 (source: Main Roads WA)

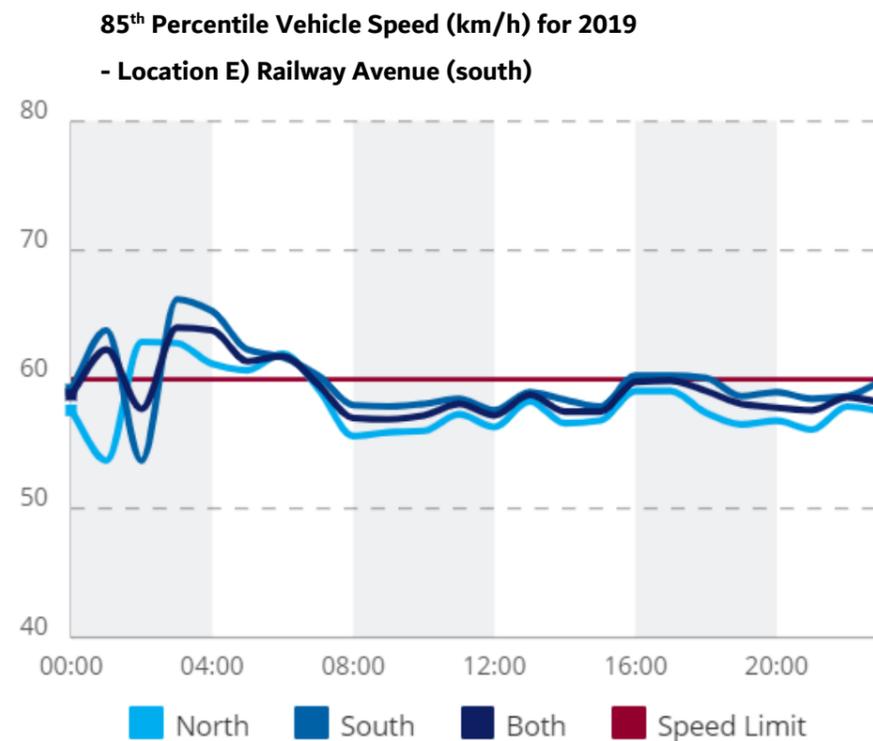


Figure 23 Railway Avenue (south) – south of Denny Avenue
 (source: Main Roads WA)

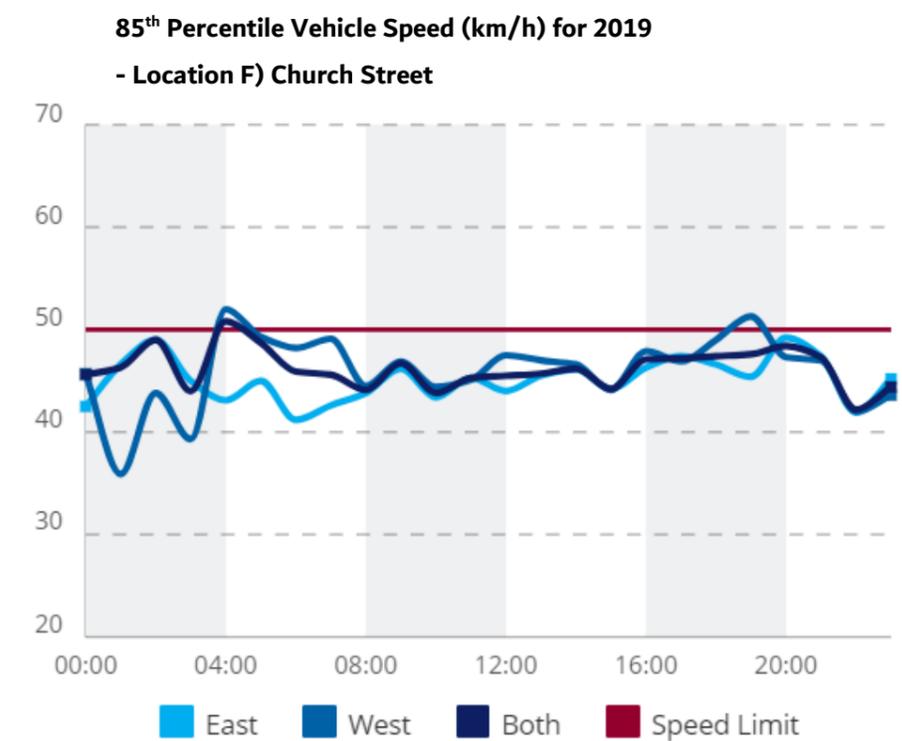


Figure 25 Church Street – east of Albany Highway
 (source: Main Roads WA)

4.1.9 Public Parking Utilisation

The City of Armadale confirmed for the purposes of the Kelmscott Activity Centre Precinct Plan project, that the only parking within the study area boundary considered to be ‘public parking’ were the following car parks:

- Kelmscott Station PTA car parks (paid parking - \$2 per weekday / free on weekends and public holidays):
 - PTA South West Car Park (52 bays) – accessed via Railway Avenue
 - PTA North West Car Park (86 bays and 2 ACROD bays) – accessed via Railway Avenue
 - PTA East Car Park (103 bays and 2 ACROD bays) – accessed via Albany Highway/Streich Avenue
- Fancote Park parking (free parking / no time restrictions):
 - Fancote Park car park (6 bays) – accessed via Page Road
 - Fancote Park informal verge parking (approximately 50 bays) – accessed along Page Road frontage to the park

The total public car parking within the study area is approximately 324 bays with an additional 4 ACROD bays. Of the total public car parking in the study area 268 bays (83%) are PTA car parking bays subject to a \$2 weekday parking fee, and 56 bays (17%) of the car parking bays are City of Armadale controlled bays with no fee or time restriction.

To provide a snapshot of the utilisation of the public car parking in the study area the City of Armadale conducted a weekday and a Saturday public car parking utilisation survey on the following dates:

- Tuesday 7 Sept 2021 – warm clear day with no rain / 9am 20 degrees, 3pm 27 degrees, high of 29 degrees
- Saturday 4 Sept 2021 – mild clear day with no rain / 9am 13 degrees, 3pm 19 degrees, high of 20 degrees

Car parking utilisation data was collected at each public car parking location within the study area – data was collected at 30-minute intervals between 7am-10am and 3pm-6pm. It should be noted that the PTA South West car park was closed on the data collections days – with the car parking being used for a site depot/lay down area for the METRONET Denny Avenue level crossing removal project.

Table 4 and Figure 26 show the public car parking utilisation data for Tuesday 7 September 2021. The data shows that during the morning period parking bays in the PTA car parks are 45% utilised by 7am, 90% utilised by 8am and 100% utilised by 8.30am. In the afternoon period parking bays in the PTA car parks are close to 90% utilised at 4pm, which as expected indicates that the majority of bays in the PTA car parks are used by commuters with bays being occupied all day. The data suggests that the PTA car parks begin to empty between 4.30pm (77% utilised) and 5.30pm (43% utilised) – by 6pm only 22% of bays in the PTA car parks are still utilised.

The public car parking at Fancote Park does not appear to be well utilised on weekdays – the data shows that during the survey period no cars were parked informally along the verge of Page Road adjacent to the park. The formal Fancote Park car park (6 parking bays) was used after 9am with 2-4 cars parked and between 3.30pm-5.30pm with 2-4 cars parked.

The data collection also covered the PTA bike shelter at Kelmscott Station (located in the PTA North West car park with 48 bays) and the u-rails on either side of the rail corridor. The data shows that during the survey period no bikes were parking in the u-rails, and the bike shelter had 5-7 bikes parked throughout the day (10%-15% utilised).

Table 4 – Kelmscott Activity Centre Precinct Plan – Public Car Parking Utilisation – Tuesday 7 Sept 2021 (source: City of Armadale)

Time	PTA North West		PTA East	Fancote Park
	Car Parking (86 Bays)	Bike Shelter (48 bays)	Car Parking (103 Bays)	Car Parking (6 Bays)
07:00	42 (49%)	3 (6%)	42 (41%)	0 (0%)
07:30	57 (66%)	4 (8%)	78 (76%)	1 (17%)
08:00	76 (88%)	5 (10%)	93 (90%)	0 (0%)
08:30	86 (100%)	5 (10%)	100 (97%)	0 (0%)
09:00	86 (100%)	5 (10%)	103 (100%)	4 (67%)
09:30	86 (100%)	5 (10%)	103 (100%)	2 (33%)
10:00	86 (100%)	5 (10%)	103 (100%)	3 (50%)
AVERAGE	74 (86%)	5 (10%)	89 (86%)	1 (24%)
15:00	79 (92%)	7 (15%)	100 (97%)	1 (17%)
15:30	77 (90%)	7 (15%)	100 (97%)	2 (33%)
16:00	72 (84%)	7 (15%)	98 (95%)	2 (33%)
16:30	53 (62%)	7 (15%)	92 (89%)	4 (67%)
17:00	48 (56%)	6 (13%)	70 (68%)	2 (33%)
17:30	37 (43%)	6 (13%)	44 (43%)	2 (33%)
18:00	19 (22%)	5 (10%)	22 (21%)	1 (17%)
AVERAGE	55 (64%)	6 (13%)	75 (73%)	2 (33%)

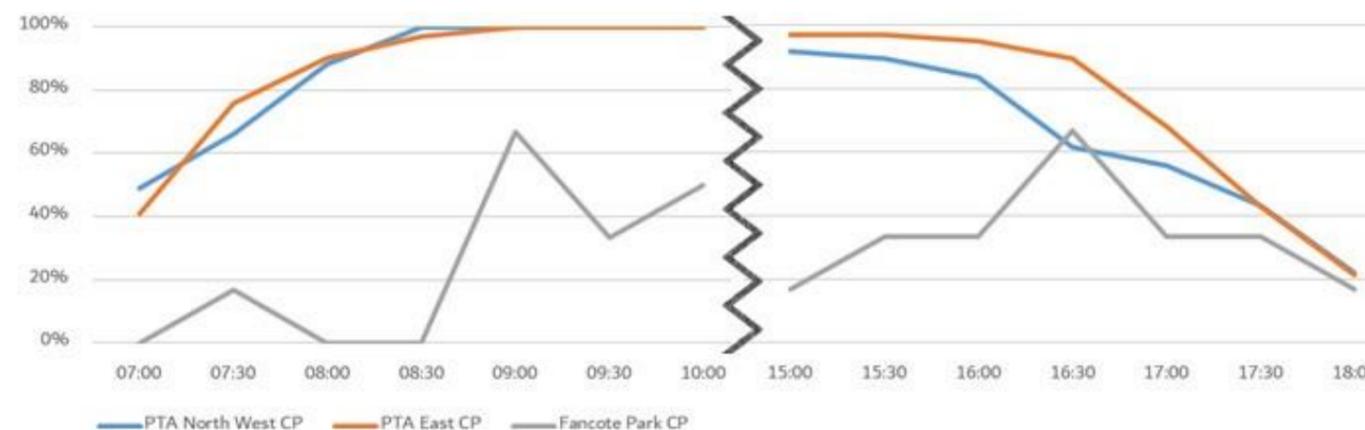


Figure 26 Kelmscott Activity Centre Precinct Plan – Public Car Parking Utilisation – Tuesday 7 Sept 2021 (source: City of Armadale)

Table 5 and Figure 27 show the public car parking utilisation data for Saturday 4 September 2021. The data shows that during the morning period parking bays in the PTA car parks are 2% utilised by 7am and only 7% utilised by 10am. In the afternoon period parking bays in the PTA car parks are 12% utilised at 4pm and only 6% utilised at 6pm – which suggests there is a very low level of use of PTA parking at weekends.

The public car parking at Fancote Park does appear to have slightly higher utilisation at weekends compared to weekdays – the data shows that during the survey period 1-2 cars were parked informally along the verge of Page Road adjacent to the park during the morning period and none during the afternoon period. The formal Fancote Park car park (6 parking bays) was used after 8am with 3-5 cars parked and between 8am-10am. During the survey no cars were parked in the Fancote Park car park on the Saturday after 3.30pm.

The data collection also covered the PTA bike shelter at Kelmscott Station (located in the PTA North West car park with 48 bays) and the u-rails on either side of the rail corridor. The data shows that during the survey period 1 bike was parked in the u-rails on the western side of the rail corridor between 3pm-4pm, and the bike shelter had 4 bikes parked throughout the day (8% utilised).

Table 5 – Kelmscott Activity Centre Precinct Plan – Public Car Parking Utilisation – Saturday 4 Sept 2021 (source: City of Armadale)

Time	PTA North West		PTA East	Fancote Park
	Car Parking (86 Bays)	Bike Shelter (48 bays)	Car Parking (103 Bays)	Car Parking (6 Bays)
07:00	2 (2%)	4 (8%)	4 (4%)	0 (0%)
07:30	3 (3%)	4 (8%)	4 (4%)	0 (0%)
08:00	5 (6%)	4 (8%)	2 (2%)	3 (50%)
08:30	6 (7%)	4 (8%)	3 (3%)	3 (50%)
09:00	6 (7%)	4 (8%)	3 (3%)	2 (33%)
09:30	9 (10%)	4 (8%)	3 (3%)	4 (67%)
10:00	9 (10%)	4 (8%)	5 (5%)	5 (83%)
AVERAGE	6 (7%)	4 (8%)	3 (3%)	2 (40%)
15:00	17 (20%)	4 (8%)	6 (6%)	2 (33%)
15:30	14 (16%)	4 (8%)	6 (6%)	0 (0%)
16:00	15 (17%)	4 (8%)	8 (8%)	0 (0%)
16:30	12 (14%)	4 (8%)	8 (8%)	0 (0%)
17:00	9 (10%)	4 (8%)	7 (7%)	0 (0%)
17:30	9 (10%)	4 (8%)	4 (4%)	1 (17%)
18:00	8 (9%)	4 (8%)	4 (4%)	0 (0%)
AVERAGE	12 (14%)	4 (8%)	6 (6%)	0 (7%)

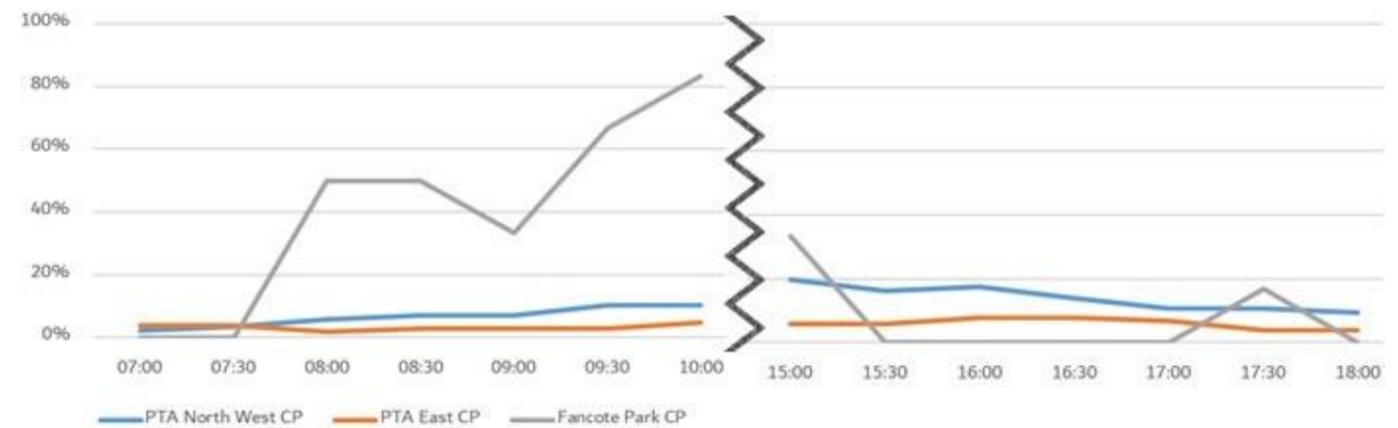


Figure 27 Kelmscott Activity Centre Precinct Plan – Public Car Parking Utilisation – Saturday 4 Sept 2021 (source: City of Armadale)

4.1.10 Private Parking Utilisation

To determine the total number of private car parking bays within the Kelmscott Activity Centre Precinct study area, high-resolution Nearmap aerial images were reviewed and private commercial car parking bays counted/estimated. Car parking associated with service stations (or known proposed future service station) were excluded from the count, as well as residential car parking and all car parking previously counted as ‘public parking’ outlined in Section 4.1.9.

The high-level estimate of private car parking suggests there is a total of approximately 2,177 car parking bays within the study area – these can broadly be grouped into one of four geographical precincts as shown in Figure 28 and outlined below:

- 597 car parking bays in the north precinct – Stargate Shopping Centre area bound by Page Road, Gilwell Avenue and Albany Highway.
- 702 car parking bays in the central-north precinct – Kelmscott Plaza Shopping Mall/Spudshed area bound by Streich Avenue, Albany Highway and Davis Road.
- 515 car parking bays in the central-south precinct – McDonald’s/Containers for Change/City Farmers/Good Shepherd Catholic Church area bound by Davis Road, Albany Highway, Ottaway Street and Streich Avenue.
- 363 car parking bays in the south precinct – Water Corporation Depot/Hogs Breath Café/Outdoors/Kelmscott Physiotherapy area bound by Church Street, River Road, Rundle Street, Albany Highway and Ottaway Street.

In order to gain a high-level understanding of the utilisation of the existing private car parking within the study area, high-resolution Nearmap aerial images of the Kelmscott Activity Centre Precinct were reviewed for the latest weekday, Saturday and Sunday in 2021, as well as a weekday, Saturday and Sunday 2018/19 pre-METRONET/Main Roads WA works within the study area – the reviewed images are shown in Figure 29 and Figure 30.

Whilst the aerial images of the north and central parts of the Kelmscott Activity Centre Precinct only provide a snapshot of parking utilisation on a particular date, collectively they show a pattern of car parking typically being less than 50% utilised at any given point in time. It should be noted that this may not be the case during peak periods of activity at the shopping centres – when parking utilisation may be considerably higher.

The aerial images indicate that the highest car parking utilisation is experienced at the Spudshed site car park and the car parking along the Albany Highway frontage of the Stargate Shopping Centre/Dan Murphy’s site. With lower levels of car parking utilisation in car parking areas to the rear of commercial properties – i.e. such as parking accessed off corridors like Page Road.

The car parking data collected for the Kelmscott Activity Centre Precinct study area suggest that there are approximately **2,500 car parking bays across the Precinct**, which can be described as either public car parking or private commercial car parking.

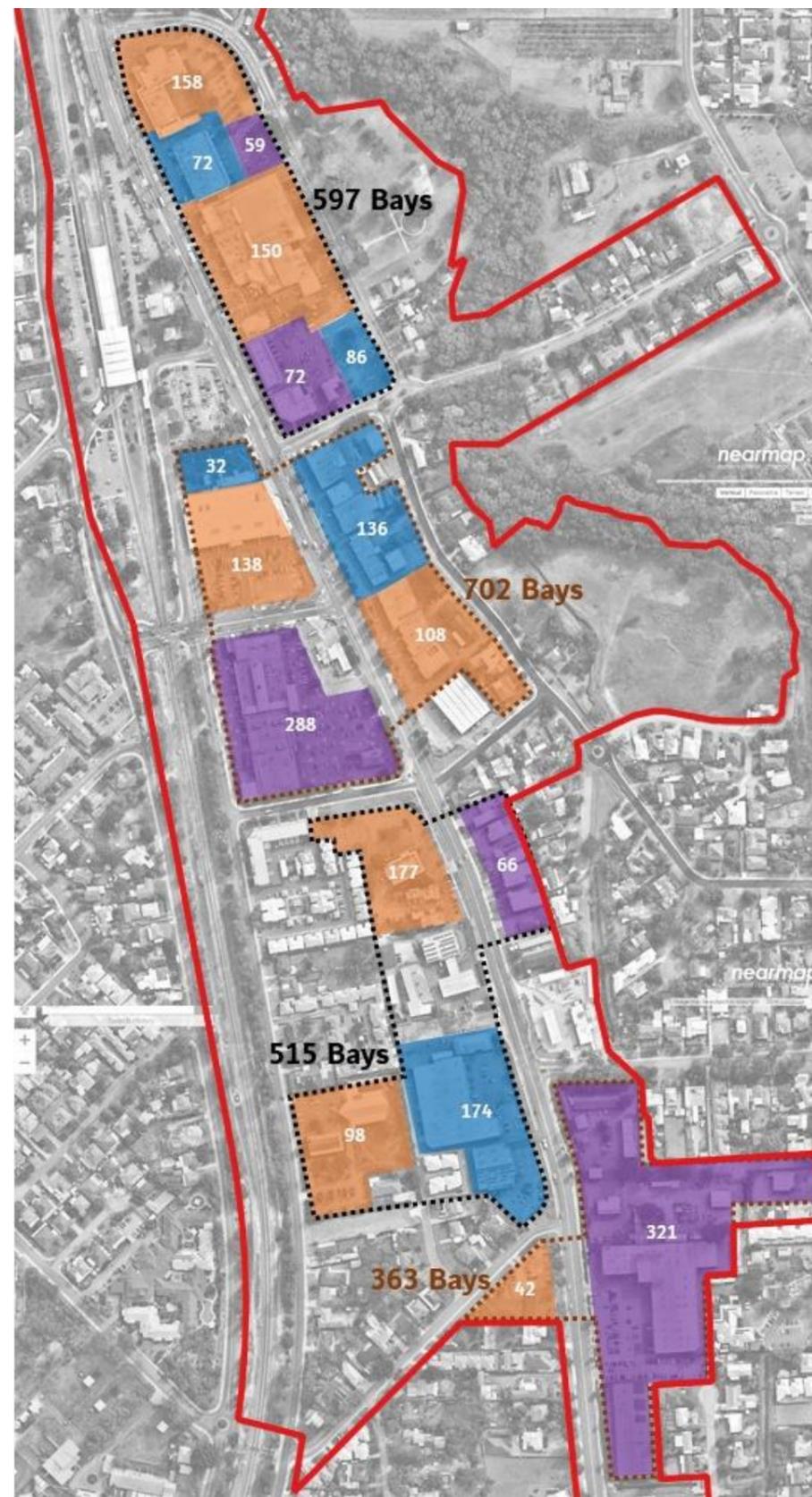
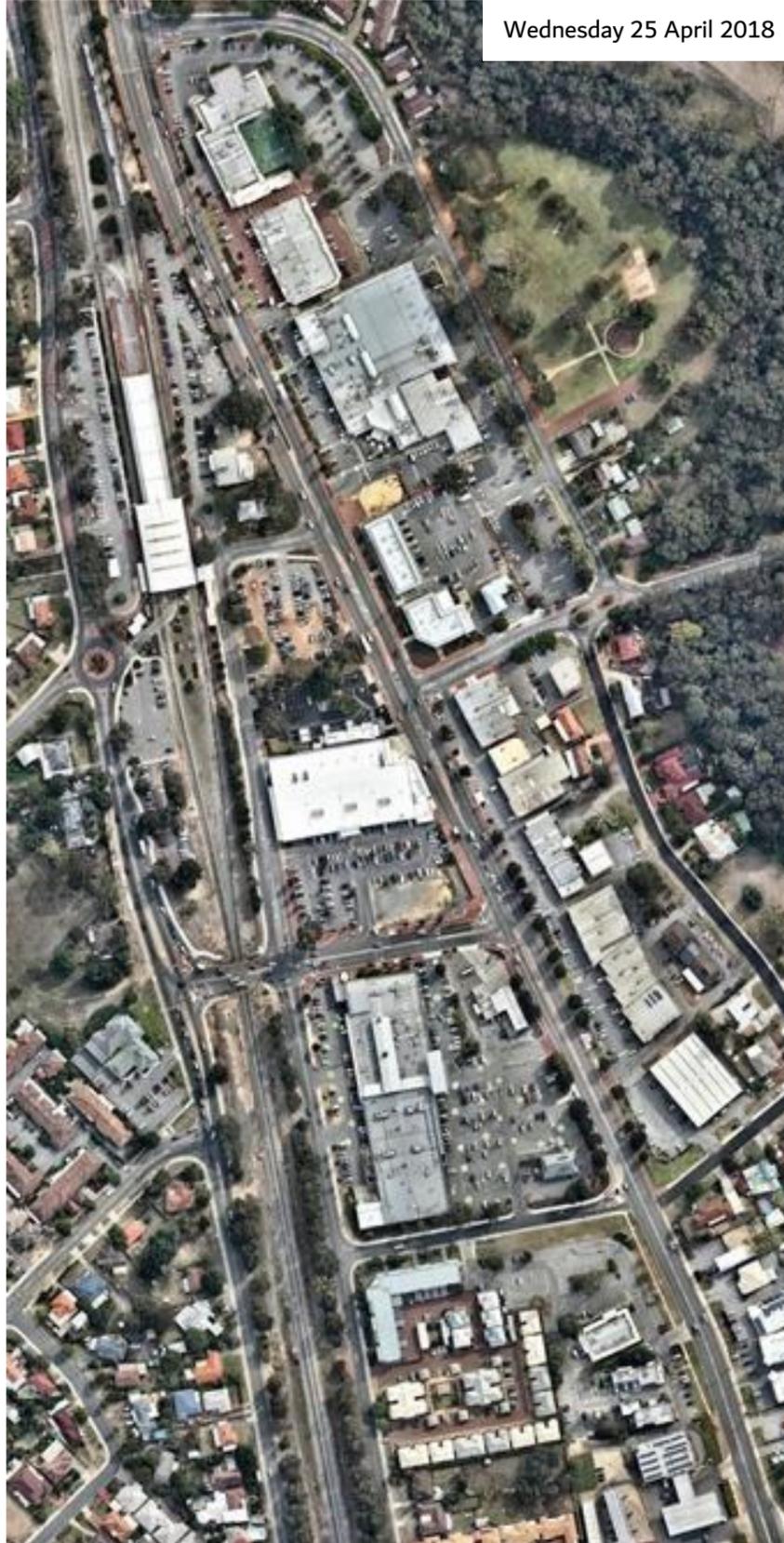


Figure 28 Location of private car parking across the Kelmscott Activity Centre Precinct (aerial source: Nearmap)

Wednesday 25 April 2018



Saturday 22 December 2018



Sunday 24 February 2019



Figure 29 Kelmscott Activity Centre Precinct – aerial images (aerial source: Nearmap)

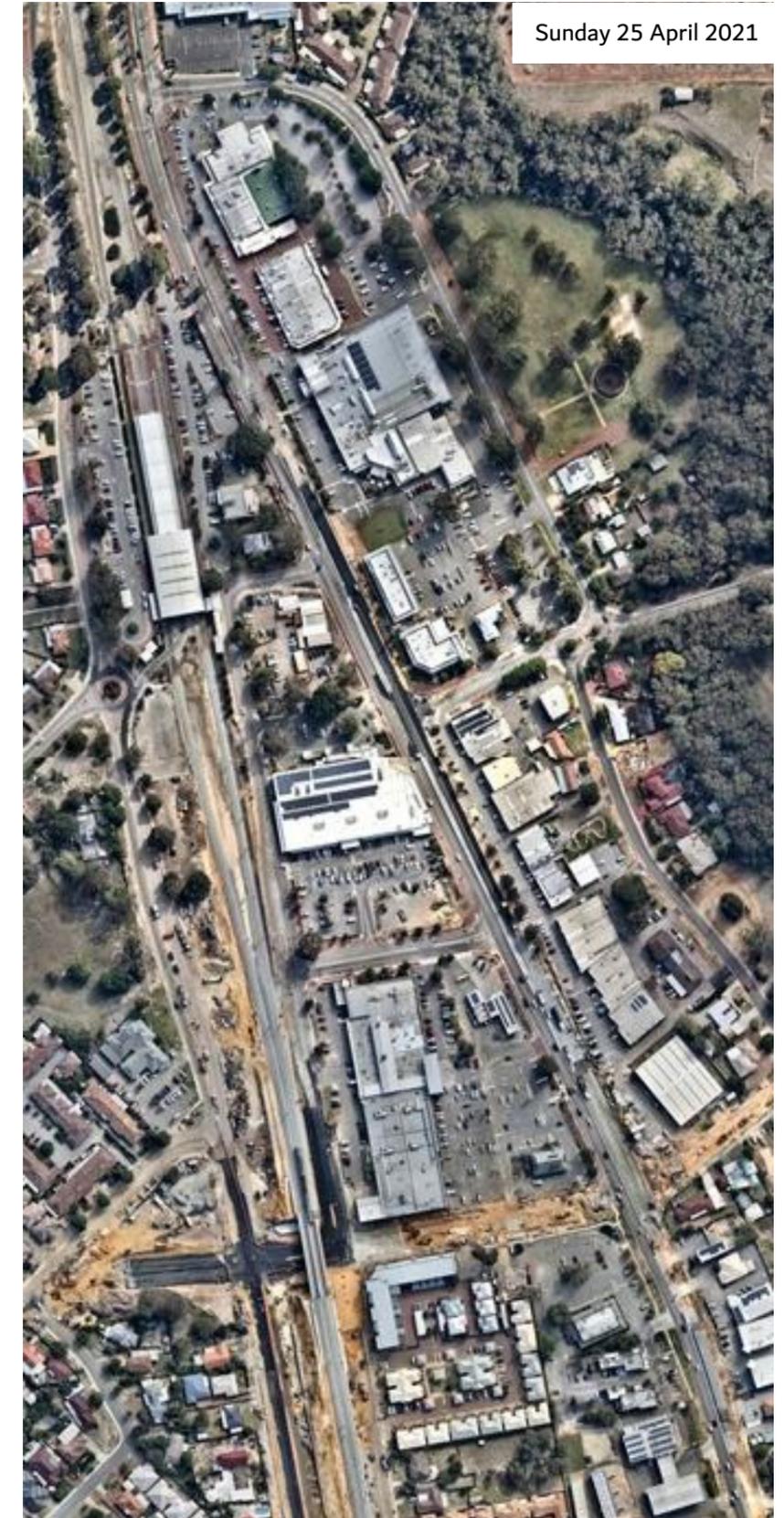


Figure 30 Kelmscott Activity Centre Precinct – aerial images (aerial source: Nearmap)

4.2 Public Transport Network

4.2.1 Existing Situation

The Kelmscott Activity Centre Precinct is served by Kelmscott Station, located between Albany Highway and Railway Avenue adjacent to Streich Avenue. The station provides access to train services north towards central Perth and south to Armadale. The station also features five active bus stands located in a central busway between the northbound and southbound rail tracks (the only such busway arrangement on the metropolitan rail network).

It should be noted that the Denny Avenue Level Crossing removal project works commenced in March 2021 and may have impacted public transport usage across the Precinct for the following 12 months. In Sections 4.2.2 and 4.2.3 March 2021 public transport ridership data is presented, which may have been impacted by the works commencing that month.

4.2.2 Bus Services

Figure 31 shows the bus routes serving the Precinct via Kelmscott Station – these include:

- **Route 240** - Kelmscott Station loop route serving Clifton Hills – 60 min frequency weekday service only.
- **Route 241** - Kelmscott Station loop route serving Roleystone – 30-60 min frequency weekday service.
- **Route 243** - Kelmscott Station to Armadale Station via Seville Drive – 40-60 min frequency weekday service.
- **Route 244** - Kelmscott Station to Armadale Station via Braemore Street– 30-60 min frequency weekday service.
- **Route 245** - Kelmscott Station to Armadale Station via Westfield Road – 15-20 min frequency weekday service.

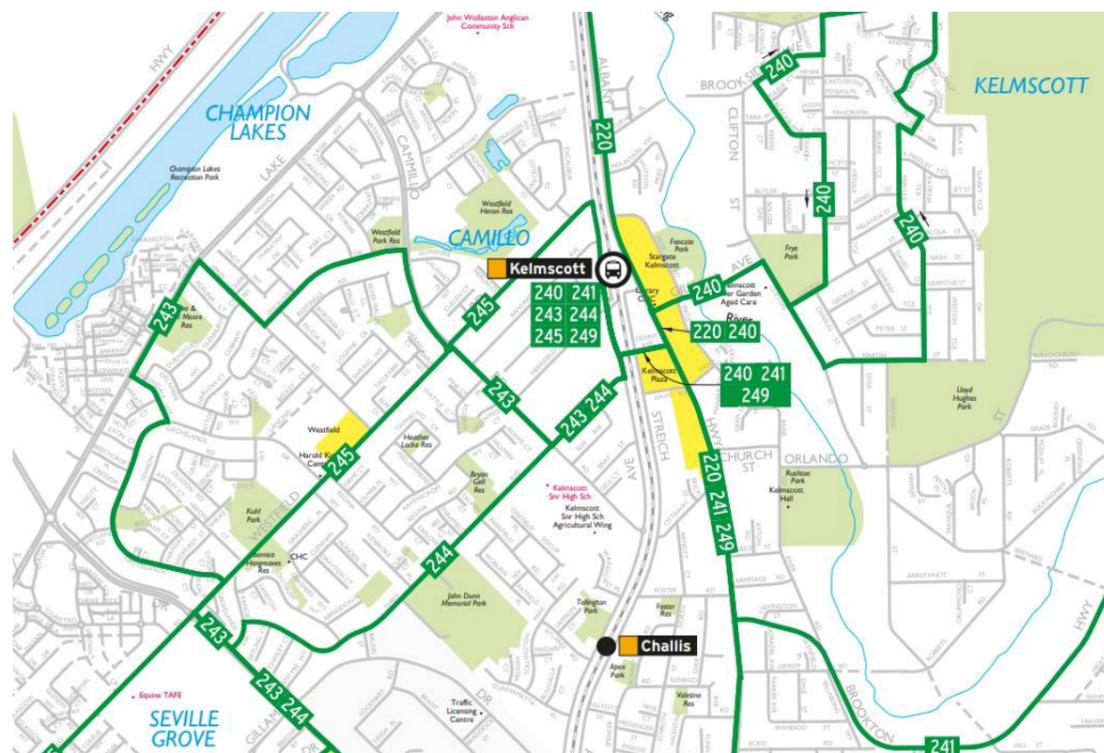


Figure 31 Public transport network providing access to/from the Kelmscott Activity Centre Precinct (source: Transperth)

Table 6 provides details of the existing bus stops located within the Kelmscott Activity Centre Precinct – Table 7 and Table 8 provide details of the combined patronage from bus stops across the Precinct and stands at Kelmscott Station.

Table 6 – Kelmscott Activity Centre Precinct bus stop and bus stand details

Kelmscott Activity Centre Precinct – Bus Stops (x12)		Kelmscott Station – Bus Stands (x5)	
Stop ID	Stop Details	Stop ID	Stop Details
10013	Albany Highway After Turner Place	22038	Kelmscott Station Stand 1
10197	Albany Highway After Turner Place	22037	Kelmscott Station Stand 2
10012	Albany Highway After Page Road	22036	Kelmscott Station Stand 3
10011	Albany Highway - Kelmscott Stargate Shopping Centre	22035	Kelmscott Station Stand 4
28249	Page Road Before Gilwell Avenue	25101	Kelmscott Station Stand 5
13382	Gilwell Avenue After Page Road		
13381	Gilwell Avenue After Clifton Street		
13394	Denny Avenue Before Streich Avenue <i>(Denny Avenue stop will be relocated to Davis Road)</i>		
10010	Albany Highway After Davis Road		
10009	Albany Highway Before Church Street		
10008	Albany Highway After Foster Road		
10201	Albany Highway After Rundle Street		

Table 7 – Kelmscott Activity Centre combined bus stops average March 2021 weekday bus service patronage (source: Transperth)

Time Period	Weekday Average			Saturday Average		
	Boardings	Alightings	Total	Boardings	Alightings	Total
12am to 3am	0	0	0	0	0	0
3am-6am	0	0	0	0	0	0
6am-9am	12	12	24	2	1	3
9am-12pm	6	7	13	3	4	7
12pm-3pm	6	7	13	3	3	6
3pm-6pm	6	14	20	3	3	6
6pm-9pm	1	1	2	0	0	0
9pm-12am	0	0	0	0	0	0
TOTAL	31	41	72	11	11	22

Table 8 – Kelmscott Station combined bus stands average March 2021 weekday bus service patronage (source: Transperth)

Time Period	Weekday Average			Saturday Average		
	Boardings	Alightings	Total	Boardings	Alightings	Total
12am to 3am	0	2	2	0	0	0
3am-6am	0	4	4	0	0	0
6am-9am	64	145	209	4	15	19
9am-12pm	22	60	82	18	45	63
12pm-3pm	49	30	79	18	28	46
3pm-6pm	156	92	248	38	13	51
6pm-9pm	36	10	46	15	7	22
9pm-12am	7	15	22	2	2	4
TOTAL	334	358	692	95	110	205

Figure 32 illustrates the data presented in Table 7 – it shows the combined bus stops daily boardings and alightings profile for average March 2021 weekday bus service patronage across all 12 bus stops in the Kelmscott Activity Centre Precinct.

The data shows that combined bus stop boardings and alightings for a typical March 2021 weekday are very low across the 12 bus stops – with a total of only 72 passengers either boarding or alighting bus services at one of the 12 bus stops in the Precinct.

The data shows that there are more alightings (41 passengers) than boardings (31 passengers) across the 12 bus stops – and that there is a near equal peak of alightings at bus stops in the Precinct both during the AM and PM peak periods – whilst boardings are highest during the AM peak period and remain consistent across the daytime 9am-6pm period.

Figure 33 illustrates the data presented in Table 8 – it shows the combined bus stands daily boardings and alightings profile for average March 2021 weekday bus service patronage across all 5 bus stands at Kelmscott Station. The data shows the following travel patterns through the station:

- **Overall** - the data shows that there are more alightings (358 passengers) than boardings (334 passengers) across the 5 bus stands – with the highest number of alighting passengers during the AM peak period – and the highest number of boarding passengers during the PM peak period.
- **AM Period 6am-9am** - during this 3-hour period the 209 bus passenger movements at the bus stands are dominated by alighting passengers – accounting for 70% of all bus passenger movements during this period. The high level of alighting bus passengers during the AM period will be either passengers completing a bus-train transfer through Kelmscott Station (mainly for commuting purposes) or bus passengers alighting at Kelmscott Station to walk to local schools.
- **Daytime Period 9am-3pm** - during this 6-hour period the 161 bus passenger movements are quite evenly split between boarding (45%) and alighting (55%) passengers.
- **PM Period 3pm-6pm** - during this 3-hour period the 248 bus passenger movements at the bus stands are dominated by boarding passengers – accounting for 63% of all bus passenger movements during this period. This reflects the reversal of the AM peak period travel patterns – with those who got a bus to Kelmscott Station to transfer to a train services or walk to local schools, now doing their journey in reverse to travel home.

Data for the level of bus to train transfer at Kelmscott Station suggests that of the 358 bus passengers alighting at the station – 286 passengers (80%) complete a bus to train transfer, with the remaining 72 passengers (20%) accessing local land uses.

While the bus patronage data shows that bus services provide a key bus to train transfer function at Kelmscott Station, the data also shows that bus services are less used by passengers to access the Kelmscott Town Centre. Overtime the diversification and increase in land uses across the town centre will result in an increase in activity across the town centre – and it will be key that local bus routes and the location of bus stops in the town centre are located to cater for the

efficient movement of residents, workers and visitors into the town centre. The future design of bus stop infrastructure delivered by Transperth should reflect the higher amenity outcome of a town centre.

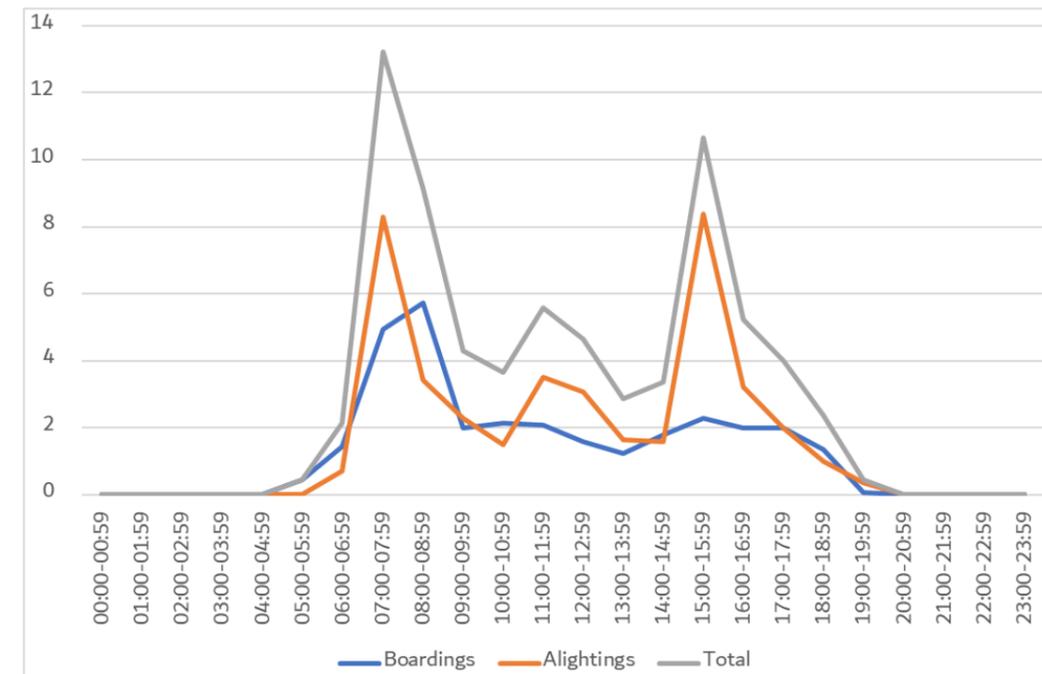


Figure 32 Kelmscott Activity Centre Precinct combined bus stops daily boardings and alightings profile for average March 2021 weekday bus service patronage (source: Transperth)

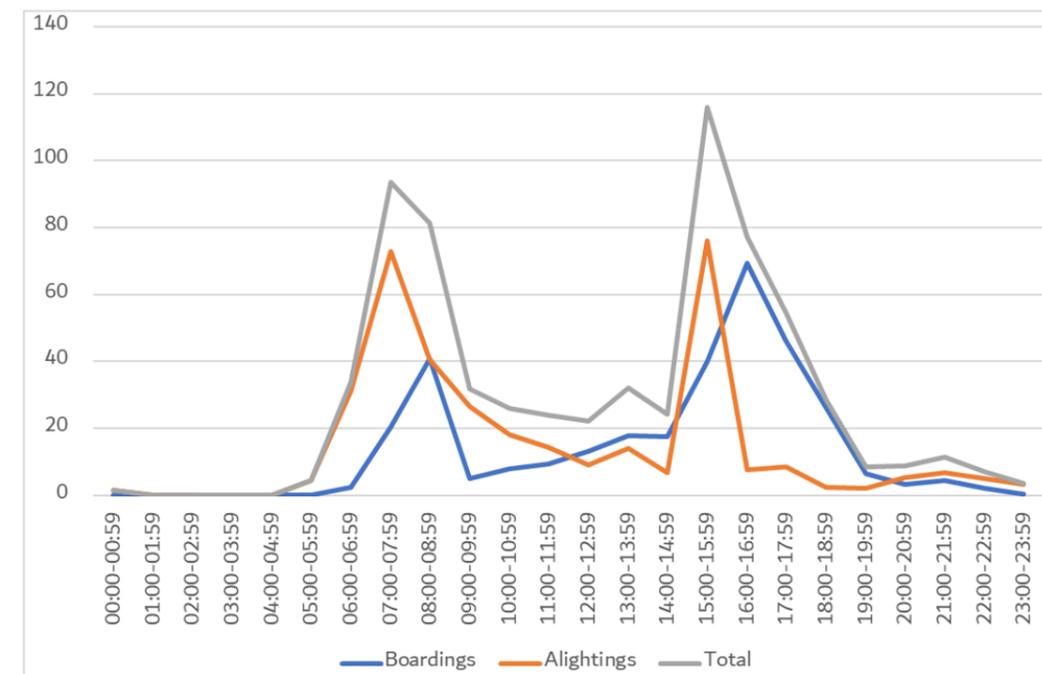


Figure 33 Kelmscott Station combined bus stands daily boardings and alightings profile for average March 2021 total weekday bus service patronage (source: Transperth)

4.2.3 Train Services

Kelmscott Station provides access to the following rail services:

- Kelmscott services operate towards Perth (28-minute journey time) and Armadale (7-minute journey time).
- Kelmscott Station services can be summarised as follows:
 - Weekday rail services - operate between 5.30am and 12 midnight – operating on a 10-minute frequency during the morning and afternoon peak periods and operating on a 15-minute frequency at other times (other than after 8pm where services operate on a 30-minute frequency).
 - Saturday rail services - operate between 5.30am and 12 midnight (there are two late night services on Friday and Saturday nights that run in the early hours of the morning) – operating on a 15-minute frequency (other than after 8pm where services operate on a 30-minute frequency).
 - Sunday rail services - operate between 7am and 12 midnight – operating on a 15-minute frequency (other than after 8pm where services operate on a 30-minute frequency).

Table 9 shows the average March weekday passenger boardings at Kelmscott Station for each year between 2010 and 2021.

The data shows the 2012 high of 1,979 average weekday boardings at the station and the 2021 low of 1,137 average weekday boardings at the station – with the 2021 data impacted by the COVID-19 pandemic impacts on travel behaviour and mode choice. The 10-year average March weekday boardings between 2010-2020 (not including the COVID-19 impacts) is 1,760 boardings.

To put into context the number of passengers boarding train services at Kelmscott Station in comparison to other stations on the Armadale-Thornlie Line – of the 17 stations on the rail line, Kelmscott Station consistently has the 4th highest average number of March weekday boardings. A comparison of the five busiest stations on the Armadale-Thornlie Line in terms of their 10-year average March weekday boardings between 2010-2020 (not including COVID-19 impacts) is shown below:

1. Cannington Station 3,065 boardings
2. Oats Street Station 2,451 boardings
3. Thornlie Station 2,067 boardings
- 4. Kelmscott Station 1,760 boardings**
5. Armadale Station 1,674 boardings

The passenger boardings data shows that Kelmscott Station is slightly busier on average than Armadale Station – with Armadale Station serving a Strategic Metropolitan Centre and Kelmscott Station serving a District Centre.

Overtime the diversification and increase in land uses across the town centre will result in an increase in activity across the town centre – and it will be important to leverage the high number of rail passengers boarding and alighting services at Kelmscott Station, with the stations location within Kelmscott Town Centre. Maintaining and improving pedestrian

and cycling connections between the station and key activity areas of the town centre will assist with leveraging commuter activity.

The City could also market Kelmscott Town Centre to passengers at Kelmscott Station to ensure passengers are aware of the opening of new or improved services/retail/food and beverage offerings across the town centre – and seek to leverage those passengers who have typically accessed Kelmscott Station via park and ride, to visit local town centre land uses before or after their train journey.

Table 9 – Kelmscott Station average March weekday train service boardings comparison 2010-2021 (source: Transperth)

Year	Kelmscott Station			Armadale Line Stations	Perth Rail Network
	Average March Weekday Boardings	Difference to 10-year Average	Percentage Difference to 10-year Average	Percentage Difference to 10-year Average	Percentage Difference to 10-year Average
2010	1,638	~	~	~	~
2011	1,799	39	102%	102%	98%
2012	1,979	219	112%	111%	105%
2013	1,922	162	109%	112%	107%
2014	1,881	121	107%	109%	106%
2015	1,875	115	107%	114%	107%
2016	1,671	-89	95%	96%	100%
2017	1,687	-73	96%	92%	99%
2018	1,648	-112	94%	90%	97%
2019	1,654	-106	94%	91%	98%
2020	1,610	-150	91%	89%	95%
2021	1,137	-623	65%	69%	73%
2010-2020 10yr Av.	1,760				

Figure 34 illustrates the data presented in Table 9 – it shows the comparison between the percentage difference between the annual average March weekday boardings and the 10-year average, for Kelmscott Station, all Armadale Line stations and all stations on the metropolitan rail network.

With 100% representing the 10-year average – those values above 100% represent annual boardings above the 10-year average and those values below 100% represent annual boardings below the 10-year average. The data shows that Kelmscott Station and all Armadale Line stations had annual boardings above the 10-year average between 2011-2015 and operated with boardings above the increases being seen across the rest of the metropolitan rail network.

However, with the significant drop in public transport patronage across the metropolitan bus and rail networks from 2016 – both Armadale Line stations, and in particular Kelmscott Station, has experienced more significant reductions in patronage compared to the 10-year average, than the rest of the metropolitan rail network.

Figure 35 shows the daily boardings and alighting profile at Kelmscott Station for an average March 2017 weekday. The data shows the following travel patterns through the station:

- **AM Period 5am-9am** - during this 4-hour period passenger movements at the station are dominated by boardings between 7am-8am – these would be both commuter and student trips. The low level of alightings at the station during this period indicate the lack of existing employment and land uses in the Kelmscott Station catchment that generate rail based trips, with many of the alightings being students accessing schools local to the station.
- **Daytime Period 9am-3pm** - during this 6-hour period there is a low level of boardings and alightings at the station – indicating that land uses within the Kelmscott Station catchment typically do not generate a significant number of rail based trips during the day. During this period there are slightly more boardings than alightings between 9am-12pm – with slightly more alightings than boardings between 12pm-3pm.
- **PM Period 3pm-7pm** - during this 4-hour period passenger movements are dominated by alightings across an extended period between 4pm-7pm – these would primarily be commuter trips. There is a spike in boardings at the station between 3pm-4pm – these would primarily be student trips from schools local to the station.

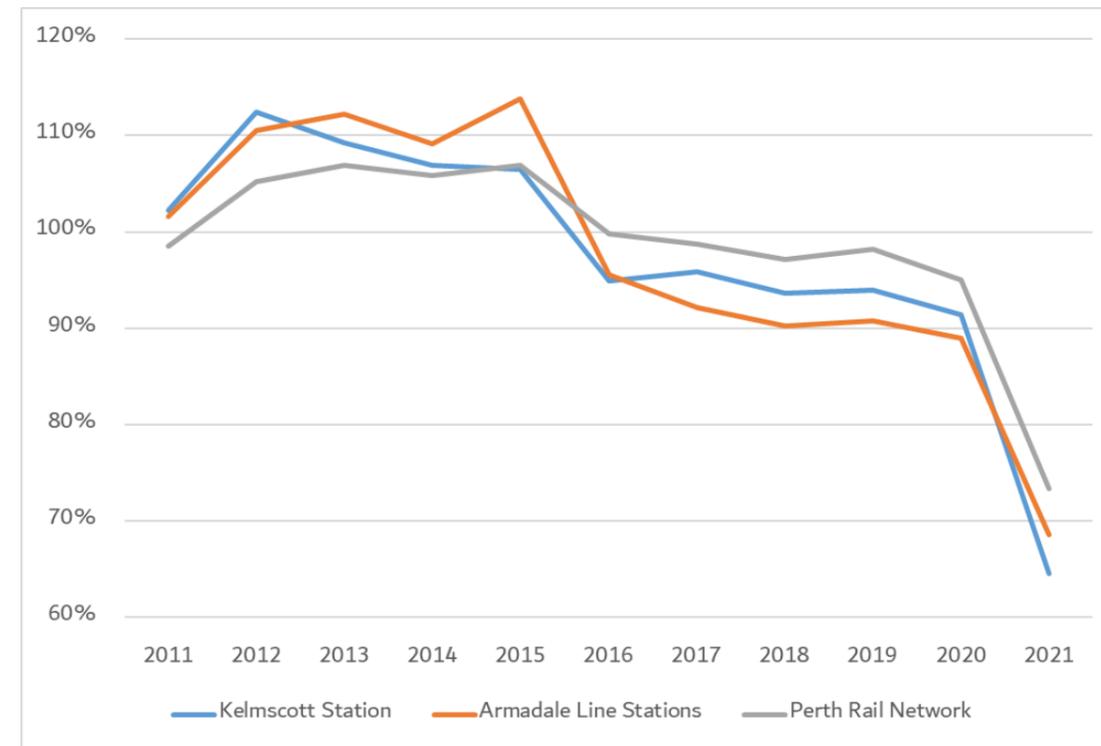


Figure 34 Kelmscott Station percentage difference to 10-year average for March weekday train service boardings 2011-2021 (source: Transperth)



Figure 35 Kelmscott Station daily boardings and alightings profile for an average March weekday in 2017 (source: Transperth)

4.3 Pedestrian Network

4.3.1 Existing Situation

The Kelmscott Activity Centre Precinct has an established pedestrian network with good levels of pedestrian connectivity (pre-Denny Avenue Level Crossing removal and utility upgrade works) –Figure 36 shows a 15 minute walk catchment from the centre of the study area and Figure 37 shows a 15 minute walk catchment from Kelmscott Station.

Figure 36 shows that the entire study area can be accessed from the centre of the Precinct within a 15-minute walk – Figure 37 shows that from Kelmscott Station only the southern portion of the study area is beyond a 15-minute walk.

The Walk Score walkability assessment tool measures the walkability of an address on a scale of 0-100 based on analysing walking routes to nearby amenities, including food convenience stores, schools, parks, restaurants and retail.

The Walk Score walkability assessment tool considers a central location within the Precinct (Denny Avenue) to be “Somewhat Walkable” where some errands can be accomplished on foot, with a walk score of 67 out of 100. The same Walk Score walkability assessment for Kelmscott Station also produces a result of “Somewhat Walkable” where some errands can be accomplished on foot, with a walk score of 63 out of 100.

The Walk Score assessment considers both locations to have good pedestrian access to groceries but only average access to retail shopping and culture/entertainment.

Whilst the Kelmscott Activity Centre Precinct has an established network of footpaths and shared paths, there are two significant barriers to east-west pedestrian movements across the Precinct – the Armadale Line rail corridor and the Albany Highway road corridor. As such, the following crossing locations/facilities are critical to the existing pedestrian network (pre-Denny Avenue Level Crossing removal and utility upgrade works).

- Armadale Line rail corridor (south to north):
 - Railway Avenue and Westfield Road at-grade universal access gate-controlled crossing.
 - Kelmscott Station at-grade universal access gate-controlled crossings of the rail corridor at the northern and southern ends of the station.
 - Denny Avenue at-grade universal access gate-controlled crossing of the rail corridor on the northern and southern sides of Denny Avenue at Railway Avenue and Streich Avenue.
 - Railway Avenue and Cammillo Road at-grade universal access gate-controlled crossing.
- Albany Highway road corridor (south to north):
 - Albany Highway between Mountain View and Page Road – mid-block uncontrolled pedestrian crossing.
 - Page Road and Albany Highway signalised intersection – pedestrian crossing on southern arm.
 - Albany Highway opposite Stargate Shopping Centre (x2) – mid-block uncontrolled pedestrian crossing.
 - Albany Highway either side of Streich Avenue – mid-block uncontrolled pedestrian crossing.
 - Albany Highway either side of Gilwell Avenue – mid-block uncontrolled pedestrian crossing.
 - Denny Avenue and Albany Highway signalised intersection – pedestrian crossing on southern arm.

- Albany Highway opposite Kelmscott Plaza Shopping Mall – mid-block uncontrolled pedestrian crossing.
- Albany Highway signal controlled pedestrian crossing north of Church Street.

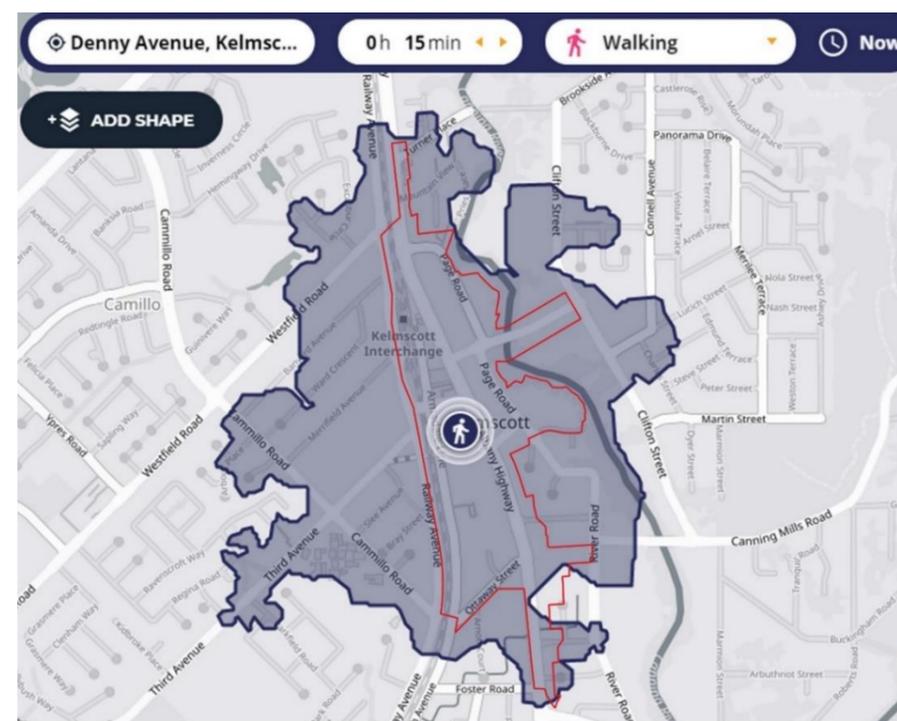


Figure 36 15-minute walking catchment from the centre of the Kelmscott Activity Centre Precinct (source: TravelTime)

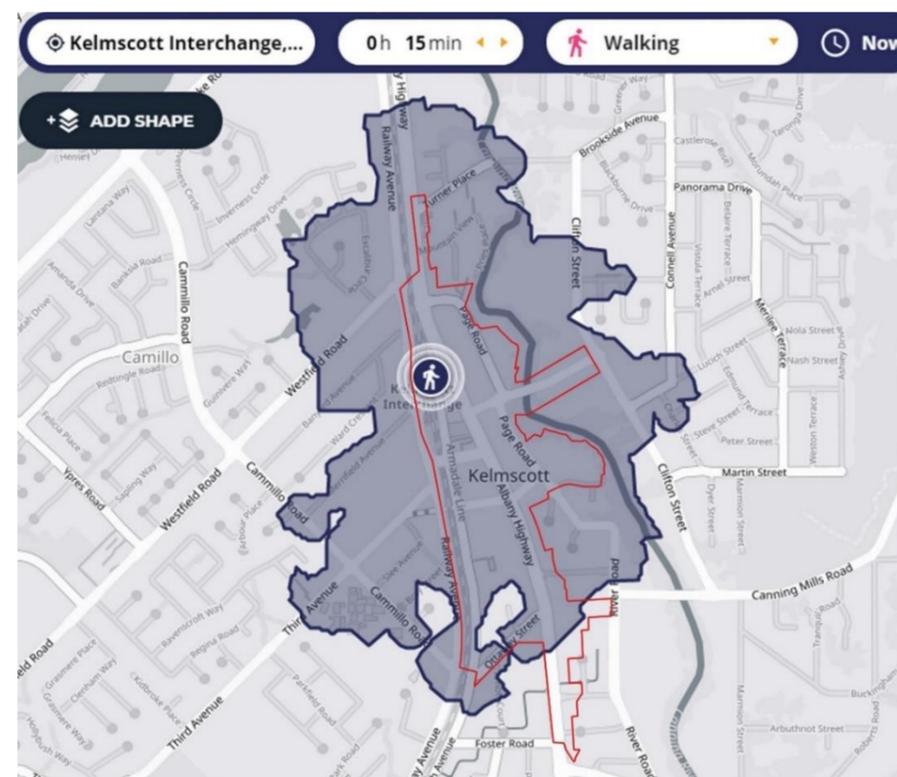


Figure 37 15-minute walking catchment from Kelmscott Station (source: TravelTime)

The Department of Planning, Lands and Heritage have released the Urban Tree Canopy Dashboard, which provides an interactive snapshot of the extent of tree canopy coverage across the Perth and Peel regions. The urban tree canopy is an essential part of creating healthy, liveable neighbourhoods, where more dense and mature tree canopies can support active travel along walking and bicycle riding paths.

In 2018 the street blocks in the City of Armadale had 17% canopy cover from trees over 3m tall, resulting in 83% of the street block area without any canopy cover (as shown in Figure 38). The Perth Metropolitan area has an average of 12% canopy cover from trees over 3m tall in street blocks.

The higher than average street block tree canopy within the City can help off-set the urban heat island effect and can help encourage people to walking in the local area. However, Figure 38 shows that most of the Kelmscott Town Centre has a low level of street tree canopy cover through the central areas of the Precinct – with only significant cover through Fancote Park and along the river.

Significant coverage is also shown along the eastern side of Railway Avenue between Denny Avenue and Cammillo Road – although Flyt understands from the City that many mature trees have been removed as part of delivering the METRONET Denny Avenue Level Crossing removal project – with the realignment of the rail tracks requiring mature trees to be removed to ensure the requisite off-set between trees and the electrified rail corridor.

The Precinct Plan includes landscaping requirements to improve shade and amenity on private lots, and the City's existing street tree planting programs can assist with the recovery of canopy loss (subject to achieving road, rail and utility service off-set standards set by other agencies/providers).

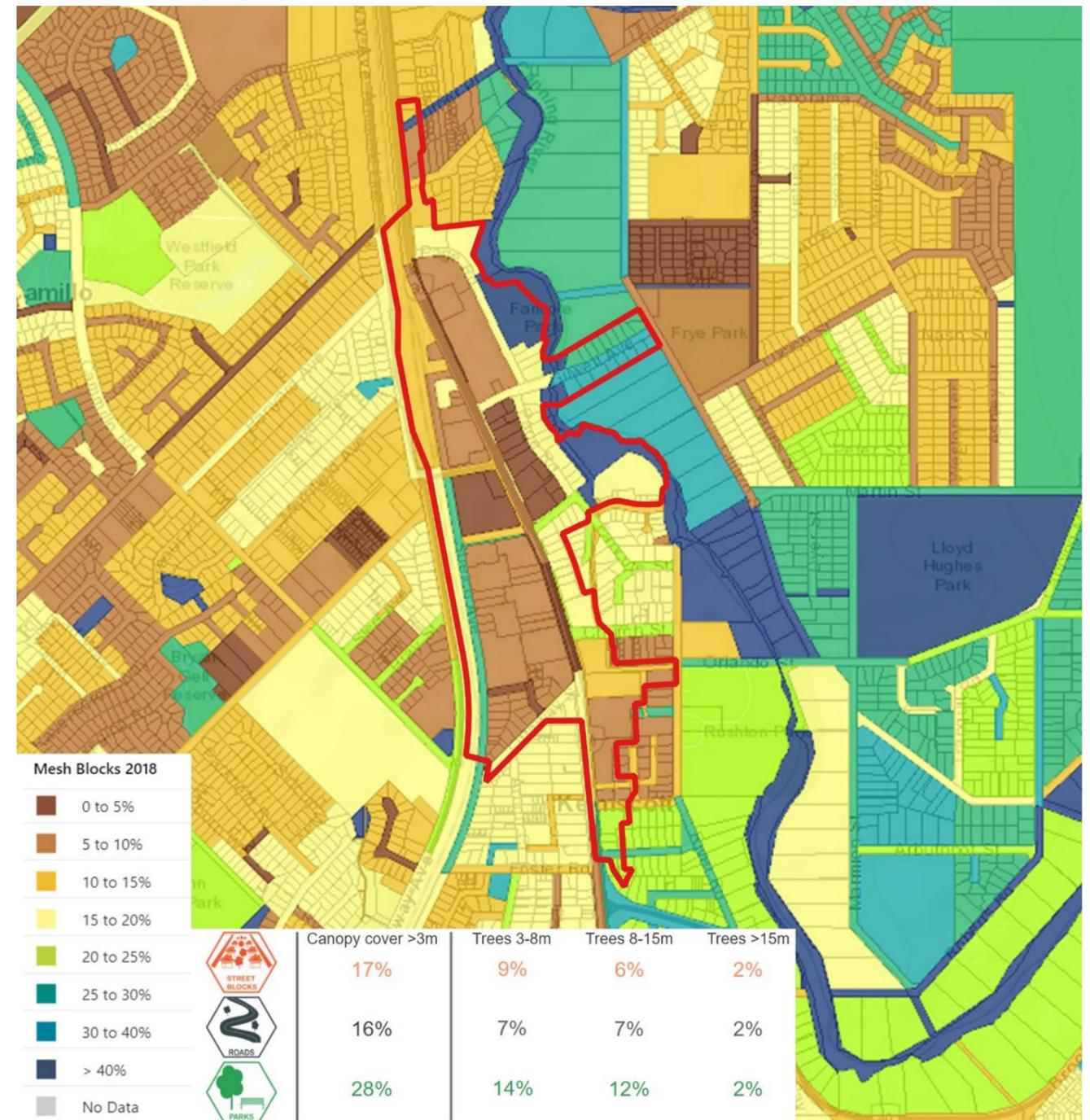


Figure 38 Kelmscott urban tree canopy coverage (source: Department of Planning, Lands and Heritage)

4.4 Bicycle Network

4.4.1 Existing Situation

The existing bicycle riding network is shown in Figure 39 (pre-Denny Avenue Level Crossing removal and utility upgrade works) – the Kelmscott Activity Centre Precinct has a good level of bicycle accessibility, particularly north-south with the high quality shared path along the Armadale Line.

Additional shared paths provide access from the rail corridor high quality shared path – to locations to the west of the study area along Westfield Road, Merrifield Avenue and Third Avenue (to access Kelmscott Senior High School). Limited formal bicycle routes are provided to the east of the rail corridor – with only on-street provision for bike riding.

Kelmscott Station features bicycle parking in the form of bike u-rails and bike lockers on both the eastern and western side of the rail line. In addition, the station features a bike shelter (secure bike parking only accessed with a registered SmartRider card) on the western side of the corridor – the bike shelter has a capacity for 48 bikes to be parked and the current usage is approximately 10 bikes parked in the bike shelter per weekday.

4.4.2 Future Bicycle Network Project – Armadale Line Shared Path Network

The Denny Avenue Level Crossing removal project includes a new shared path between Kelmscott Station and Bray Street – including grade separation over Davis Road.

The remaining shared path sections between Lake Road and Challis Station will be delivered by City of Armadale in separate stages. The Lake Road to Westfield Road section commenced construction in financial year 2020-21 and is complete. The route alignment for the Bray Street to Challis Station section is under consideration by the City of Armadale and State Government agencies.

Figure 40 provides an overview of the shared path project along the Armadale Line through the Kelmscott area.

4.4.3 Future Bicycle Network Project – Long Term Cycle Network

Between 2018-2020 the Department of Transport has worked with 33 local governments across Perth and Peel on the Long Term Cycle Network (LTCN) project. The LTCN project has been a collaboration between State and local governments to agree on an aspirational network of bicycle routes that link parks, schools, community facilities and transport services, to make cycling a convenient and viable option for more people and more journeys.

The aim of the project was to develop an aspirational blueprint to ensure State and local governments work together towards the delivery of one continuous cycling network providing additional transport options, recreational opportunities and support for tourism and commercial activity.

In May 2020 the City of Armadale Council endorsed their LTCN – from July 2020 the LTCN is eligible for the City to seek grant funding support from the Department of Transport to deliver bicycle infrastructure on the identified routes.

The LTCN routes in relation to the Kelmscott Activity Centre Precinct is shown in Figure 41– whilst Figure 42 includes the study area boundary to provide additional context.

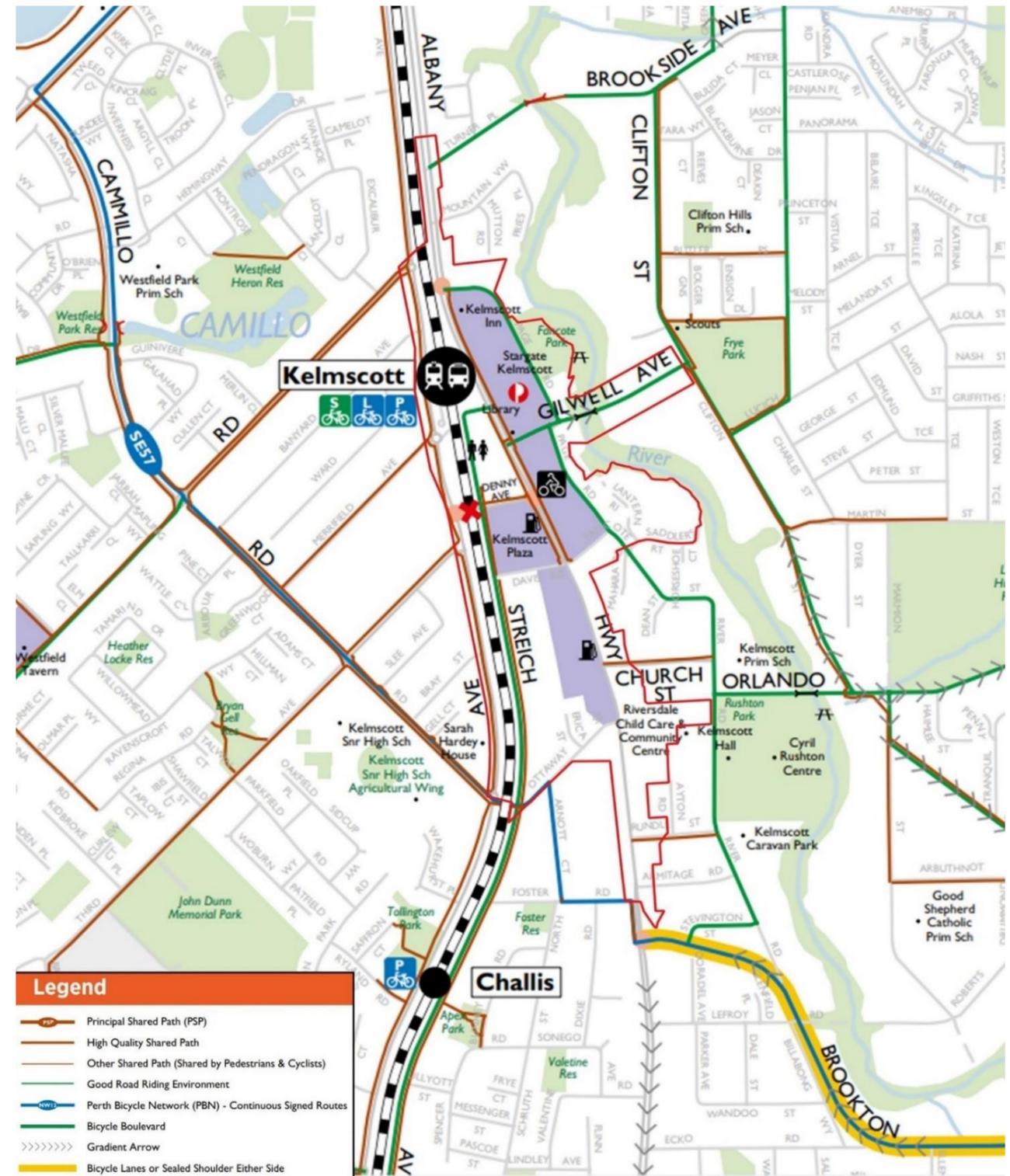


Figure 39 Existing bike network in relation to Kelmscott Activity Centre Precinct Plan study area (source: Department of Transport)

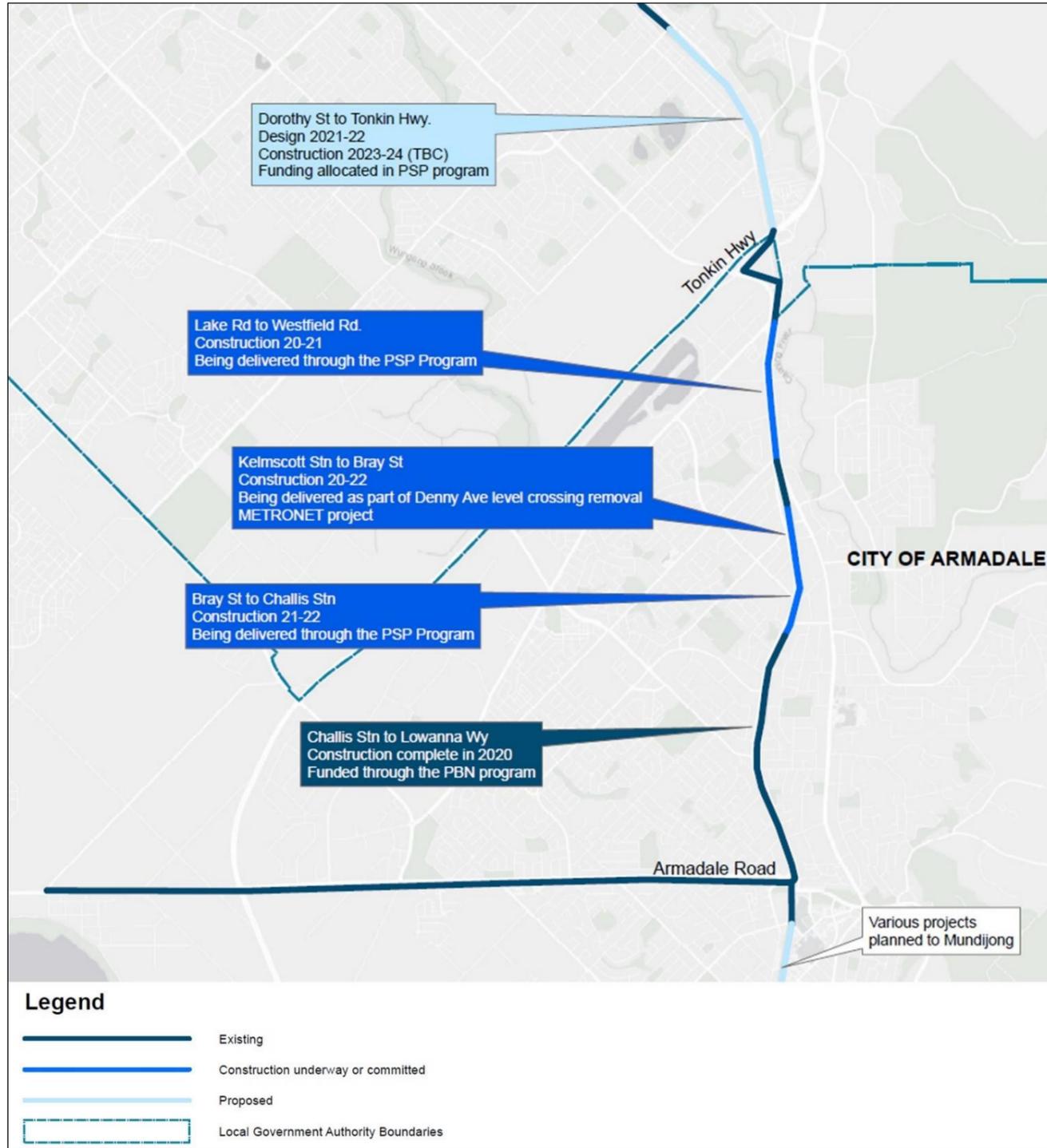


Figure 40 Armadale Rail Line shared path projects (source: Department of Transport)

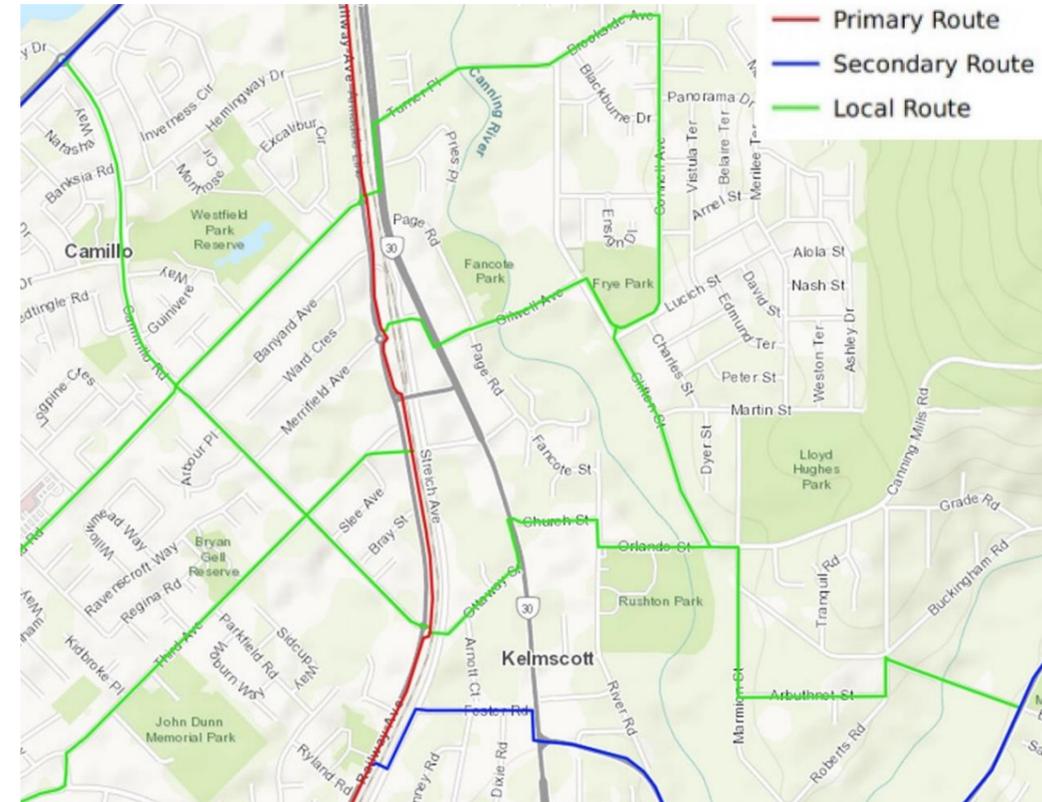


Figure 41 Council endorsed Long Term Cycle Network routes (source: Department of Transport)

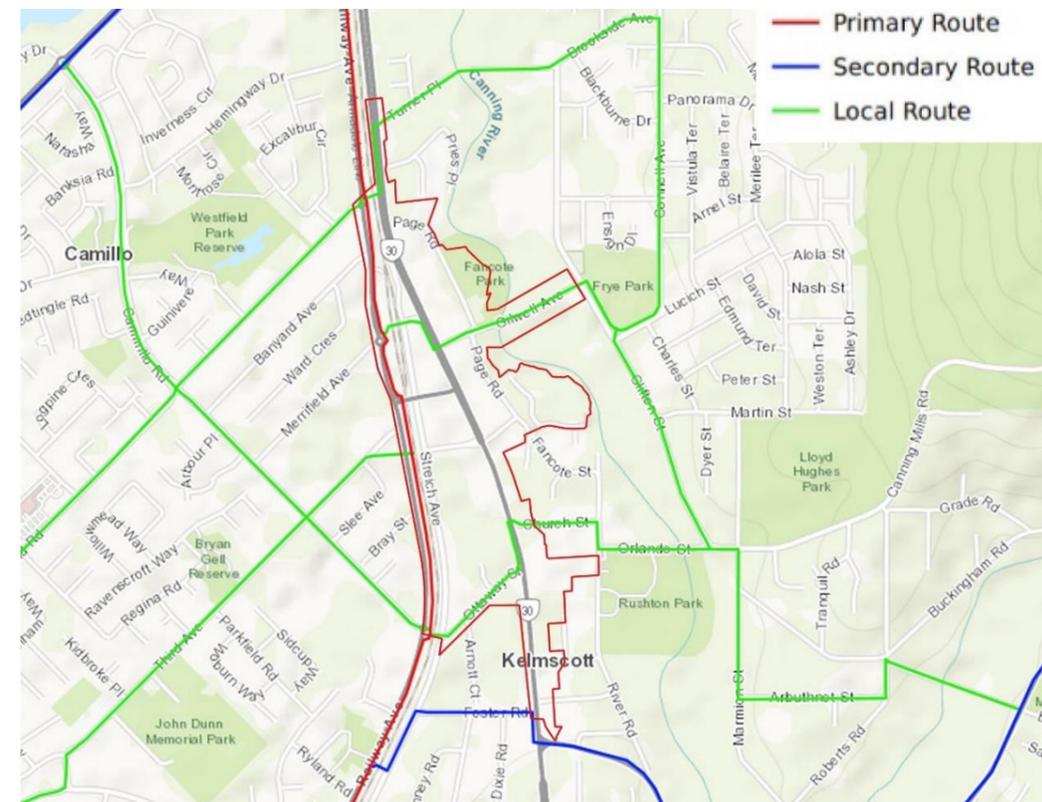


Figure 42 Council endorsed Long Term Cycle Network routes in relation to the study area (source: Department of Transport)

4.5 Committed Transport Projects and Precinct Considerations

4.5.1 Denny Avenue Level Crossing Removal Project

The Denny Avenue Level Crossing in Kelmscott is the first at-grade road crossing of the metropolitan rail network to be removed under the METRONET Level Crossing Removal Program. The crossing was permanently closed on 1st April 2021.

The level crossing boom gates were down for an average of 1 minute and 44 seconds (01:44) per closure and a total average closure of 3 hours and 7 minutes (03:07) per day. If the level crossing had remained open it was expected that the total average closure would have increased to 3 hours and 34 minutes (03:34) per day by 2031.

With the Denny Avenue Level Crossing now permanently closed, a new east-west connection of a rail-over-road underpass has been built at Davis Road, approximately 170m south of the previous Denny Avenue Level Crossing.

Figure 43 to Figure 48 show a series of still images taken from the METRONET fly-through video for the Denny Avenue Level Crossing removal project – the video shows a simulation of the transport networks that will be delivered as part of the project.

The main transport network upgrades to be delivered as part of the Denny Avenue Level Crossing removal project are:

- Removal of the Denny Avenue Level Crossing (Figure 43).
- Creation of an underpass (rail-over-road) at Davis Road (Figure 43 and Figure 44).
- Third Avenue realigned to connection into the new Davis Road underpass (Figure 46).
- Davis Road widened from 1 lane in each direction to 2 lanes in each direction (Figure 45).
- New signalised intersection between Davis Road/Third Avenue and Railway Avenue with pedestrian crossing facilities across northern and western arms of the intersection (Figure 46).
- New signalised intersection between Davis Road and Streich Avenue with pedestrian crossing facilities across northern and eastern arms of the intersection (Figure 44).
- New signalised intersection between Davis Road/Fancote Street and Albany Highway with pedestrian crossing facilities across all four arms of the intersection (Figure 44).
- New grade-separated shared path over the new Davis Road overpass (Figure 47).
- Public realm improvements around Kelmscott Station and Station Master House heritage building – including a Station Plaza (Figure 48).

A detailed general arrangement plan for the road network to be delivered as part of the Denny Avenue Level Crossing removal project is shown in Figure 49.



Figure 43 Denny Avenue Level Crossing closure and new Davis Road underpass

(source: METRONET YouTube Channel - <https://www.youtube.com/watch?v=dBTZAVGRKUs>)



Figure 44 New signalised intersections at Albany Highway and Davis Road and either side of the new Davis Road underpass

(source: METRONET YouTube Channel - <https://www.youtube.com/watch?v=dBTZAVGRKUs>)



Davis Road will increase from two to four lanes to keep traffic moving easily.

Figure 45 New Davis Road underpass (view from Albany Highway) with new signalised intersection with Streich Avenue (source: METRONET YouTube Channel - <https://www.youtube.com/watch?v=dBTZAVGRKUs>)



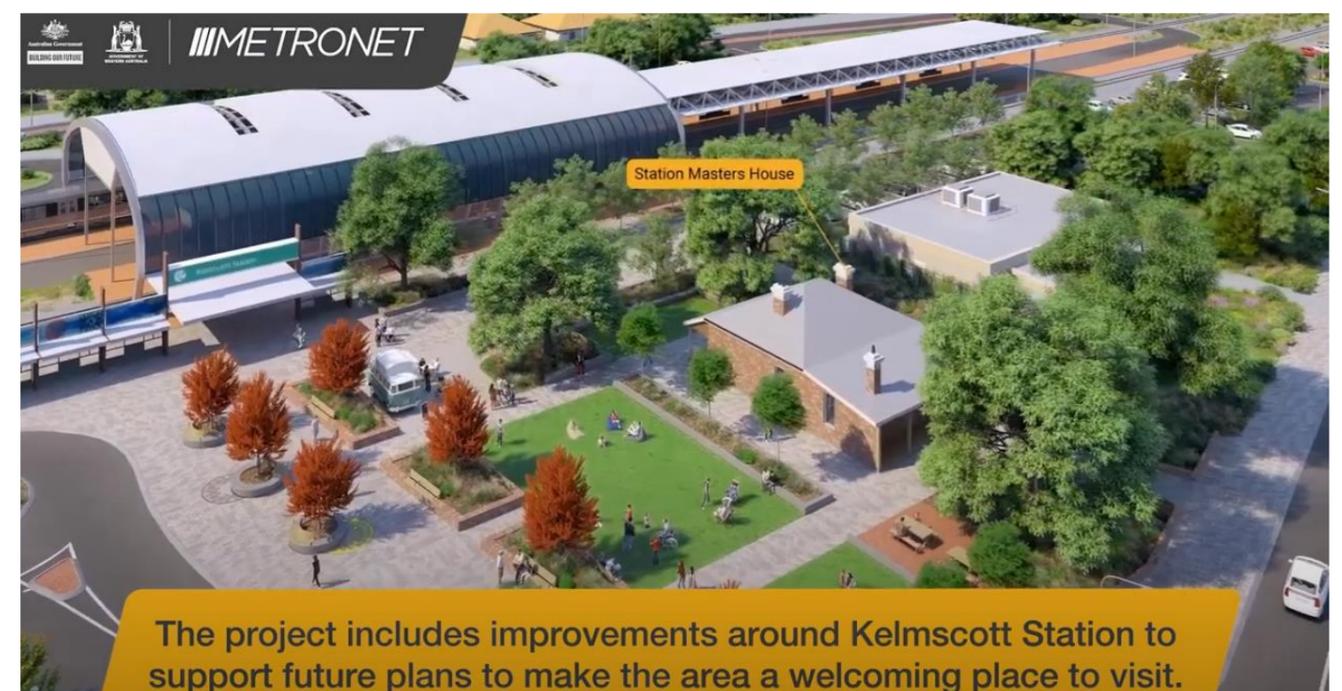
Cyclists can ride through the area on a separated Principal Shared Path over the new Davis Road underpass along Railway Avenue.

Figure 47 New grade-separated Principal Shared Path bicycle route connection over the new Davis Road underpass (source: METRONET YouTube Channel - <https://www.youtube.com/watch?v=dBTZAVGRKUs>)



The road will travel under the railway and connect to Third Avenue to maintain this important crossing in the area.

Figure 46 New Davis Avenue underpass (view from realigned Third Avenue) with new signalised intersection with Railway Parade (source: METRONET YouTube Channel - <https://www.youtube.com/watch?v=dBTZAVGRKUs>)



The project includes improvements around Kelmscott Station to support future plans to make the area a welcoming place to visit.

Figure 48 New Station Plaza and public realm improvements around the Station Masters House (source: METRONET YouTube Channel - <https://www.youtube.com/watch?v=dBTZAVGRKUs>)

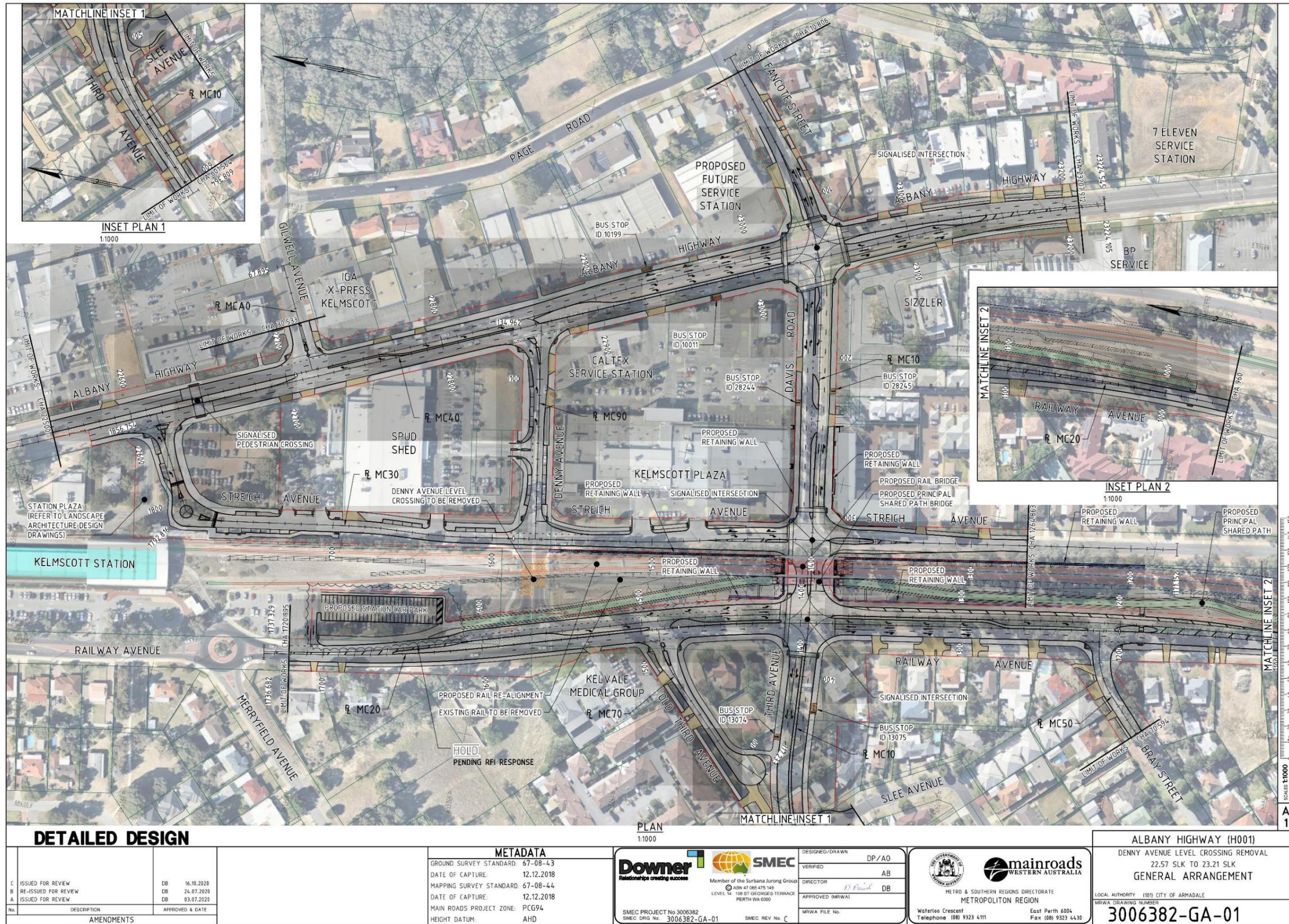


Figure 49 Denny Avenue Level Crossing Removal Project – General Arrangement Plan (source: METRONET / Main Roads WA)

4.5.2 METRONET Station Precinct Considerations

In October 2021 the METRONET (PTA) Team released the METRONET Station Precincts Gateway report (the METRONET report), which provides a high-level assessment of how planning and development around METRONET stations can contribute towards meeting the objectives of Perth and Peel @3.5 million and sub-regional growth strategies.

The METRONET report presents information for METRONET Stage One projects, which includes the Denny Avenue level crossing removal project and broader considerations for the Kelmscott Town Centre Station Precinct.

It is noted in the METRONET report that the information presented is intended to provide the basis for further consultation, planning and prioritisation of decisions – with the information in the report to be updated as more detailed plans are developed and approved. Review of the Station Precincts Gateway Report relating to Kelmscott has identified that underlying data sets are dated and that analysis has not been completed to the same level of detail as the Kelmscott Activity Centre Precinct Plan. For example, the Station Precincts Gateway Report does not recognise existing TPS No.4 clauses that allow the City to determine density codes in the District Centre zone, nor the existing split density codes in adjoining Residential zones that encourage higher dwelling density and diversity. Therefore the findings of the Kelmscott Activity Centre Precinct Plan are to be preferred.

Nevertheless, an overview of the movement network related considerations taken from the METRONET report in relation to the Kelmscott Town Centre Station Precinct, is outlined in the following sections.

About Kelmscott Town Centre Station Precinct

It is noted in the METRONET report that the Kelmscott Town Centre is located 23kms to the southeast of central Perth – with the Kelmscott Town Centre located along the Albany Highway corridor and serves established low density residential neighbourhoods – with the proximity to Canning River and the foothills of the Darling Escarpment contributing to Kelmscott’s character.

It is noted that the State Government is investing in the area through the Denny Avenue Level Crossing removal project – with the Denny Avenue level crossing now closed permanently and a new rail-over-road underpass built nearby at Davis Road. The project includes streetscape and public realm upgrades, including a new public plaza at the entry to Kelmscott Station.

It is outlined in the METRONET report that the Kelmscott Town Centre Station Precinct is designed as a Town Centre under the METRONET typology framework (as shown in Figure 50) – with the core of the station precinct designated a Redevelopment Area, which is in the process of being transferred back to the City of Armadale.

Precinct type	Description	Key characteristics
 Town Centre	Centres of increased density and diverse housing types, with a retail and service centre that supports its district catchment and local employment.	<ul style="list-style-type: none"> • Central amenity for adjacent suburbs. • Usually integrated station or active pavilion • Balanced access, limited parking.

Figure 50 METRONET station precincts typology framework– Town Centre character and function (source: METRONET)

Opportunities / Constraints for Kelmscott Town Centre Station Precinct

The METRONET report lists the following high-level opportunities and constraints for the Precinct.

Opportunities

- The removal of the level crossing at Denny Avenue will improve safety and connectivity across the rail corridor.
- Local amenity and sense of place is strengthened by the Canning River parklands and public realm upgrades.
- Precinct planning and the Kelmscott Redevelopment Area supports revitalisation and growth.
- Recent changes to the planning framework provides more opportunities for compact and diverse housing options.

Constraints

- Movement and access to destinations within the Precinct are predominantly car-based.
- Additional investment in public infrastructure and amenity will be required to stimulate higher intensity residential and commercial land uses.
- Despite established planning in place, there is limited market-readiness for urban intensification in Kelmscott in the short term.

Place Indicator Metrics for Kelmscott Town Centre Station Precinct

The METRONET (PTA) Team have undertaken a preliminary assessment of all station precincts across the metropolitan rail network to benchmark current conditions of each precinct. The METRONET report notes that the place indicators assessment allows METRONET and stakeholders to understand how precincts currently perform, and what should be priorities enhance livability. The place indicators considered are:

- Housing – livable places cater for a broad range of living and housing needs.
- Movement – livable places are well connected, have good access to public transport, and encourage a shift to more sustainable travel choices.
- Amenities – livable places are inclusive and provide a range of amenities to support the daily needs of their communities.
- Employment – livable places provide the opportunity for residents to live and work locally.
- Urban Ecology – livable places result from holistic balance between built and natural systems.

The METRONET report notes the following for the Kelmscott Town Centre Station Precinct and the movement indicator:

“Despite the positive walk score and walkable catchment indicators, there are currently low number of active movement journeys. A key challenge for movement is the at-grade railway line which will be improved by the new rail over road crossing at Davis Road. Precinct planning should consider design options that further encourage walking and cycling.”

Of the five place indicators, the METRONET report concludes that the Kelmscott Town Centre Station Precinct scores an above average rating for Urban Ecology, an average rating for Housing and Employment and a below average rating for Movement and Amenity (with the rating a comparison to other precincts with a Town Centre typology across metropolitan Perth).

In relation to the Movement place indicator, the Kelmscott Town Centre Station Precinct compares favorably to other precincts with a Town Centre typology in relation to percentage of the Precinct catchment within a 15-minute walk of the train station and the Precincts overall walk score ranking. However, the Kelmscott Town Centre Station Precinct contains fewer dwellings with access to high frequency public transport than a Town Centre typology average and has fewer active transport (walking and cycling) trips being made in the Precinct compared to a Town Centre typology average.

Figure 51 shows the overall movement rating for the Kelmscott Town Centre Station Precinct from the METRONET report.

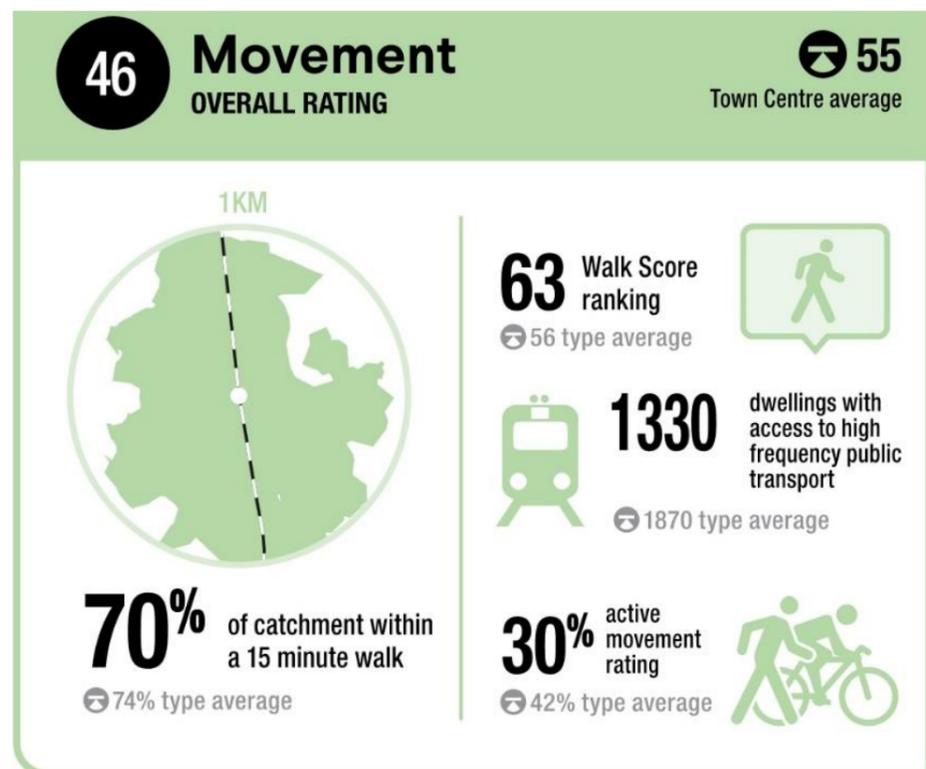


Figure 51 Kelmscott Town Centre Station Precinct – Movement place indicator rating (source: METRONET)

Development Potential for Kelmscott Town Centre Station Precinct

Complementing the place indicators, the METRONET report includes a multi-criteria evaluation of the opportunities for the development of more homes and employment areas close to public transport. The development potential assessment in the METRONET report considers measurable constraints and barriers to development and will be used as a reference for further consultation and planning.

The development potential assessment considers the following metrics:

- **Growth** – considers the forecast growth in population, housing and jobs to be accommodated within the station precinct and the project increase in public transport patronage.
- **Market** – assesses property market variables for each station precinct, informed by median house/apartment price, market activity, private sector market research and development feasibility.
- **Ownership** – assesses land fragmentation, average lot size and government owned land in proximity of the station precinct.
- **Land availability** – measures the capacity of the Precinct to accommodate population, housing and employment growth in the station precinct.
- **Readiness** – measures how ready the station precinct is for more intensive development, with a particular focus on planning and policy frameworks at both State and Local Government level.

In relation to the development potential metrics, the Kelmscott Town Centre Station Precinct compares favorably to other precincts with a Town Centre typology in relation to growth and ownership potential – both having typology average ratings. However, the Kelmscott Town Centre Station Precinct has a below average rating in relation to market score based on low values for housing diversity and price differential for houses and units. The Kelmscott Town Centre Station Precinct has an above average rating for land availability based on latent potential with lots currently not being developed to their enabled potential.

Precinct Scenario for Kelmscott Town Centre Station Precinct

METRONET has prepared a precinct scenario for each station precinct to envisage future growth, to estimate future housing, population and employment yields, and to indicate future needs for infrastructure, services and facilities.

The scenario maps developed by METRONET overlay station catchments with three categories of future urban form. These categories are sufficiently broad in definition so they can be applied consistently to diverse local conditions. The scenarios are intended to be propositional, to assist coordination of stakeholder agencies and to facilitate the next phases of local precinct planning – such as the Kelmscott Activity Centre Precinct Plan, which will be an outcome of this project. Capacity estimates for the Kelmscott Town Centre Station Precinct development scenario are outlined below.

CAPACITY ESTIMATE				
		CURRENT	MLUFS 2031	METRONET Growth Scenario
	Dwellings	1,900	2,290	2,980
	Population	4,560	5,750	6,710
	Employment	1,660	2,640	3,270

Figure 52 Kelmscott Town Centre Station Precinct – capacity estimate (source: METRONET)

The precinct scenario developed by METRONET for the Kelmscott Town Centre Station Precinct, is summarised as offering the potential to provide.

1. Opportunity to transition the shopping precinct into medium intensity mixed-use.
2. Medium intensity residential development surrounding station.
3. Medium intensity development along Clifton Street and Gilwell Avenue.
4. Low intensity infill to outer precinct that is sympathetic to existing neighbourhood character.
5. New rail-over-road underpass at Davis Road to facilitate closure of Denny Avenue level crossing.
6. Opportunity to provide station plaza integrated with historic Station Master’s house.

The numbered items above correspond to the numbers displayed on Figure 54. It should be noted that the boundary of the METRONET Kelmscott Town Center Station Precinct is a larger area than the City of Armadale study area boundary for the Kelmscott Activity Centre Precinct Plan project. Notably the METRONET station precinct extends to the west of the Armadale line rail corridor.

Figure 53 outlines the actions identified by METRONET to assist with delivering the Precinct development scenario – these include deliverables within the METRONET program, and other initiatives to be negotiated with stakeholders in future precinct planning.

REF	ACTION
KEL-1	Place Planning: Promote appropriate place outcomes in collaboration with stakeholders, including DevelopmentWA and City of Armadale.
KEL-2	Station Precincts Design Guide: Refer to guidance for Town Centre station types for an outline of expectations for the station precinct.
KEL-3	Public Art Strategy: Produce Public Art Plan for transport infrastructure and public realm within the Denny Avenue and Town Centre project area.
KEL-4	Sustainability Strategy: Produce Sustainability Management Plans for delivery of transport infrastructure. Identify opportunities and promote sustainability and resilience in broader precinct.
KEL-5	Transition planning for Redevelopment Area from DevelopmentWA to the City of Armadale.
KEL-6	Implement rail and road upgrades to deliver the Denny Avenue Level crossing removal project .
KEL-7	Implement the Kelmscott Town Centre Public Realm upgrades, including the delivery of station plaza and upgrades to Station Master's house.
KEL-8	Optimise benefits of undeveloped state-owned land to deliver higher density diverse housing product in close proximity to station.
KEL-9	Explore opportunities to deliver social housing, community housing and affordable housing to support people of all abilities with low and moderate incomes, including the METRONET Social and Affordable Housing and Jobs Package.

Figure 53 Kelmscott Town Centre Station Precinct – METRONET identified future actions (source: METRONET)

Key Considerations from METRONET Report for Future Precinct Planning

The following key considerations from the METRONET report will be considered during future precinct planning:

- Precinct planning will consider design options that further encourage walking and cycling – and seek to address east-west connectivity across the rail corridor and the Albany Highway corridor.
- Precinct planning will consider the scale of housing, population and jobs that can be accommodated within the Precinct and the impact these have on the movement networks.



FUTURE URBAN FORM	Storeys	Residential Focus	Employment Focus
High Intensity	5+	Mixed-use, Apartments ≥R100	Large Office, Retail
Medium Intensity	2-4	Apartments, Some mixed use R40-R80	Office, Retail, Showroom, Industrial
Low Intensity	1-2	Single, Grouped, Small Apartments ≤R35	Industrial, Office, Retail, Showroom
		Open space	Education, Health or Civic campuses
		Train Station	Bus Interchange

Figure 54 Kelmscott Town Centre Station Precinct – METRONET precinct development scenario (source: METRONET)

4.6 Mobility Design Considerations

4.6.1 Universal Access

Well designed and connected communities benefit everyone – an accessible environment is particularly relevant for people with a disability but also benefits a broader range of people. More people are being encouraged to use alternative modes of transport other than the car more often, resulting in a more sustainable, healthier, safer community with independent travel possible for groups such as the elderly, children, families, and people with disability.

It is noted by the Department of Transport in its ‘Universal Access’ resources, that currently one in five people in Australia have a disability – two out of three people over 75 years of age have a disability – and the prevalence of disability will increase further with the ageing of the Australian population. It is estimated that the total number of people who identify themselves as having a disability in Western Australia will increase to around 632,600 people by 2023.

An accessible environment, while particularly relevant for people with disabilities, has benefits for a broader range of people. For example, ramps assist parents pushing baby strollers as well as those with mobility issues where traditional kerbs become a trip hazard. Information in plain language helps those with less education or speakers of a second language. Announcements of each stop on public transport may aid travellers unfamiliar with the route as well as those with visual impairments. Importantly, the more people that understand the broader community benefits of accessible environments can help generate widespread support for making changes.

A desktop review of the detailed general arrangement plan for the road network to be delivered as part of the Denny Avenue Level Crossing removal project (shown in Figure 49), suggests that the project will deliver the following universal access infrastructure:

- Pram ramps with TGSIs at all typical pedestrian crossing locations – including locations where the path network crosses roads/streets, access roadways and crossovers into car parks.
- Signalised pedestrian crossing of Albany Highway to be provided to the south of the Streich Avenue and Albany Highway intersection – shown in Figure 55.
- The section of Streich Avenue adjacent to Kelmscott Station will be raised – to create a traffic calmed environment between the Station and Station Plaza interface with Streich Avenue and the key development Lot opposite Kelmscott Station (former unofficial car park site) – shown in Figure 55.
- New signalised intersection between Davis Road and Albany Highway with pedestrian crossing facilities across all four arms of the intersection.
- New signalised intersection between Davis Road and Streich Avenue with pedestrian crossing facilities across northern and eastern arms of the intersection.
- New signalised intersection between Davis Road/Third Avenue and Railway Avenue with pedestrian crossing facilities across northern and western arms of the intersection.

It should be noted that there are no pedestrian crossing facilities across the southern arms of the signalised intersections either side of the new Davis Road underpass (Davis Road/Streich Avenue intersection and Davis Road/Third Avenue/Railway Avenue intersection) – this will extend pedestrian wait time and walk distances between residential areas to the southwest of Railway Avenue/Third Avenue (including Kelmscott Senior High School) and Town Centre areas to the southeast of Streich Avenue/Davis Road – see Section 4.6.3 for details.

As shown in Figure 55 future opportunities exist to support universal access through the central part of the Town Centre – with opportunities to create a traffic calmed street environment along Denny Avenue with the street possibly raised and pedestrian movements facilitated across the street at regular intervals.

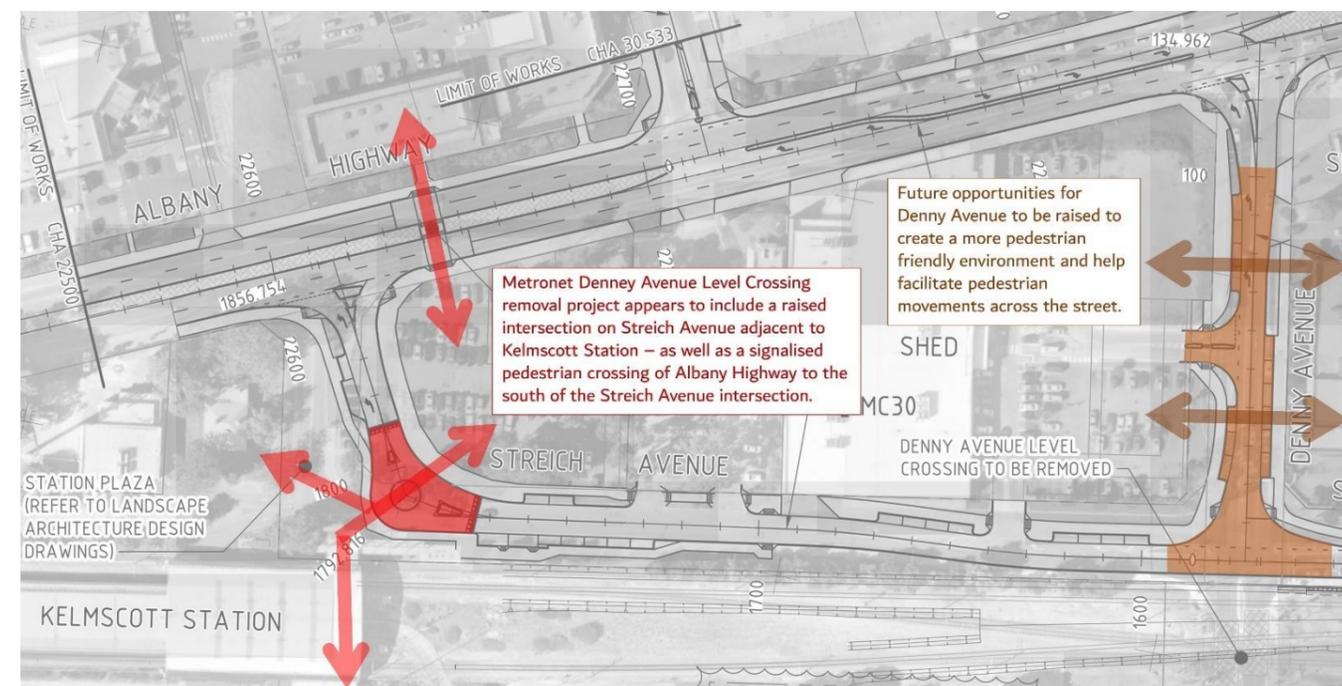


Figure 55 Key connections to be delivered as part of the Denny Avenue Level Crossing removal project and future opportunities (base plan source: METRONET / Main Roads WA)

As shown in Figure 56, Figure 57 and Figure 58 future opportunities also exist to support universal access with a more appropriate treatment of the interface between the rear of the Stargate Shopping Centre and Page Road and access across to Fancote Park and the Canning River.

At present only stepped access is provided from the shopping centre car park area to the footpath on Page Road to access Fancote Park – those requiring step-free access need to use one of the vehicle crossovers into the car parking area to access the Page Road footpath.

In the future a formal path network should be provided between Kelmscott Station-Albany Highway-Stargate Shopping Centre-Page Road-Fancote Park/Canning River, which may require access easements over private landholdings (subject to redevelopment). This path network should feature appropriate pram ramps with TGSIs and be legible to users and clearly signed.



Figure 56 Rear of Stargate Shopping Centre interface to Page Road and Fancote Park (source: Google Streetview)

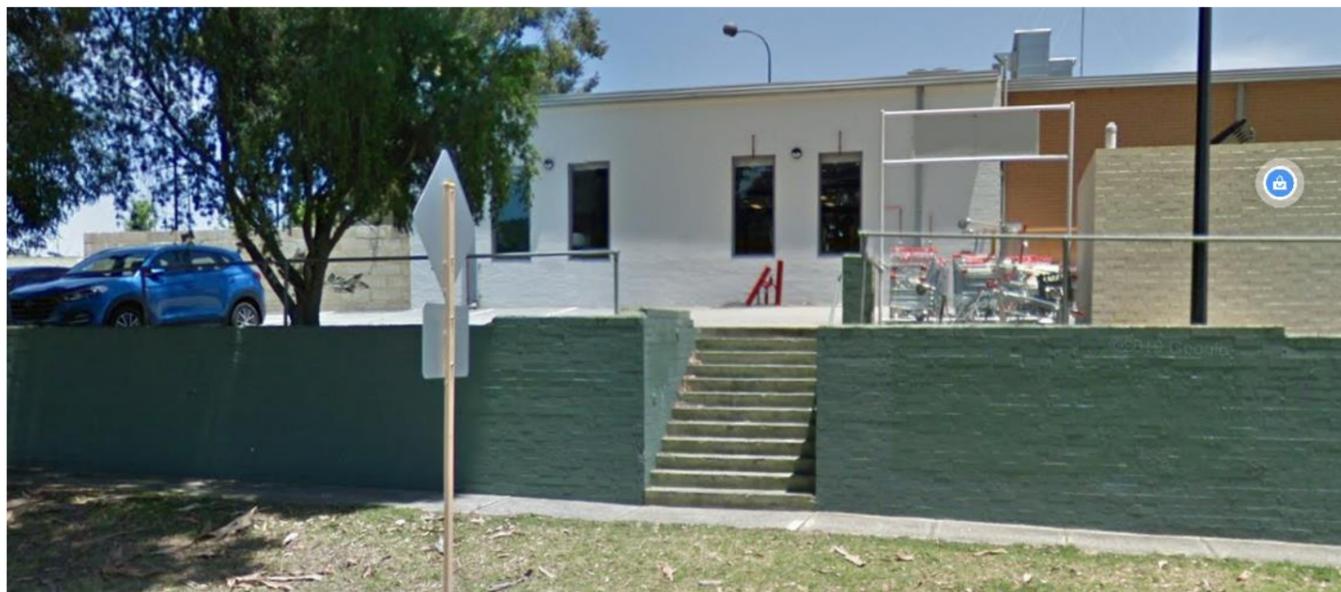


Figure 57 Rear of Stargate Shopping Centre interface to Page Road and Fancote Park (source: Google Streetview)



Figure 58 Rear of Stargate Shopping Centre interface to Page Road and Fancote Park (source: Google Streetview)

4.6.2 Streetscape and Movement Network Amenity and Safety

A desktop review of the detailed general arrangement plan for the road network to be delivered as part of the Denny Avenue Level Crossing removal project (shown in Figure 49), suggests that the following movement network amenity and safety matters should be considered in relation to the pedestrian and bicycle riding networks:

- Whilst the detailed general arrangement plan for the road network does not include details of the landscaping or street tree planting to occur as part of the project – Flyt understands from the City that many mature trees have been removed as part of delivering the METRONET Denny Avenue Level Crossing removal project – with the realignment of the rail tracks requiring mature trees to be removed to ensure the requisite off-set between trees and the electrified rail corridor.
- The re-planting of street trees along the Railway Avenue and Streich Avenue corridors should be priorities to re-establish the green corridors which previously lined the rail corridor – helping to create a visual buffer between the rail corridor and adjacent land uses and improving local amenity.
- Landscaping and vegetation can help shield development from busy traffic corridors – to date this has been used to a greater extent on the eastern side of the Albany Highway corridor – there are future opportunities to do similar on the western side of the corridor – to improve local amenity.
- With the reconfigured road network future opportunities exist to create a traffic calmed street environment along Denny Avenue with the street possibly raised and pedestrian movements facilitated across the street at regular intervals. As part of this design philosophy, Denny Avenue could be designed as a high-quality streetscape with supporting high-quality street furniture – which would help establish Denny Avenue as a focal point of the Town centre – and a location with high levels of amenity.
- With the reconfigured road network there are no pedestrian crossing facilities across the southern arm of the signalised intersections either side of the new Davis Road underpass – this will extend pedestrian wait times and walk distances between residential areas to the southwest of Railway Avenue/Third Avenue (including Kelmscott Senior High School) and Town Centre areas to the southeast of Streich Avenue/Davis Road. There are possible safety related concerns if pedestrians attempt to cross these intersections across the southern arms (with no formal pedestrian crossing facilities) – although it is not clear on the general arrangement plan, it would be expected that guardrails would be provided to prevent pedestrians crossing in these locations. It should be noted that the State are delivering the road network in vicinity of the new Davis Road underpass, and Road Safety Audits were completed and no safety concerns were raised relating to pedestrian movements at these locations.
- The City of Armadale’s Council endorsed Long Term Cycle Network (LTCN) shows a possible future Local Route along Third Avenue – planning will be required in the future to determine how this route would connect to the new shared path located between Railway Avenue and the Armadale Line rail corridor – with the shared path to be grade-separated over Davis Road.
- The grade separation and required retaining walls do make a future safe bicycle route connection between Third Avenue and the Armadale Line shared path more complex to deliver – the connecting route would either need to direct bicycle riders to the uncontrolled mid-block crossing of Railway Avenue to the south of Bray Street or to

the uncontrolled crossing of Railway Avenue at the southern arm of the Railway Avenue and Merryfield Avenue roundabout.

4.6.3 Cross Precinct East-West Mobility

The Kelmscott Activity Centre Precinct features two significant transport corridors – the Armadale Line rail corridor and the Albany Highway traffic corridor – both corridors run north-south through the Precinct and split the Precinct into three areas:

- East of Albany Highway – featuring the Stargate Shopping Centre and commercial development fronting the eastern side of Albany Highway and Fancote Park and the Canning River.
- Between the Armadale Line and Albany Highway – featuring Kelmscott Plaza Shopping Mall and commercial development between Kelmscott Station and Davis Road, with primarily residential development to the south of Davis Road.
- West of the Armadale Line – features primarily residential development to the west of Railway Avenue.

East-west mobility across the Precinct is significantly impacted by these two significant transport corridors – with the provision of safe pedestrian crossing facilities located further apart than you would typically expect within a town centre context.

Figure 59 shows the impacts on east-west mobility across the Precinct – these are summarised below:

- Armadale Line Rail Corridor
 - There is a 400m distance between the pedestrian crossings of the rail corridor at Kelmscott Station and the new Davis Road underpass. There is a 560m distance between the pedestrian crossing of the rail corridor at the Davis Road underpass and the pedestrian crossing at Cammillo Road/Ottaway Street.
 - With Denny Avenue Level Crossing closure – Kelmscott Station pedestrian crossing facilities across the rail corridor (at-grade at either end of the Station) take on increasing significance in the pedestrian network.
 - The pedestrian crossing between the new Station Plaza and Railway Avenue /Merrifield Avenue currently presents as a Station access rather than significant through route for pedestrians – this crossing will play a more significant role in the pedestrian network with the closure of the Denny Avenue Level Crossing.
 - There are no pedestrian crossing facilities across the southern arm of the signalised intersections either side of the new Davis Road underpass – this will extend pedestrian wait times and walk distances between residential areas to the southwest of Railway Avenue/Third Avenue (including Kelmscott Senior High School) and Town Centre areas to the southeast of Streich Avenue/Davis Road. It should be noted that the City of Armadale advocated for the inclusion of pedestrian crossing facilities across the southern arm of the signalised intersections either side of the new Davis Road underpass as part of the METRONET project.

- Albany Highway Traffic Corridor

- There is a 400m distance between the new pedestrian crossings of Albany Highway near Streich Avenue and the new Davis Road/Fancote Street signalised intersection. There is a 250m distance between the pedestrian crossing of Albany Highway at the new Davis Road underpass and the pedestrian crossing at Cammillo Road/Ottaway Street.
- Whilst a new signalised pedestrian crossing of Albany Highway will be provided to the south of the Streich Avenue intersection with Albany Highway – and it provides for good access between the new development Lot (former unofficial car park site) and Stargate Shopping Centre – it does not serve the direct desire line between Kelmscott Station/new Station Plaza and Stargate Shopping Centre.

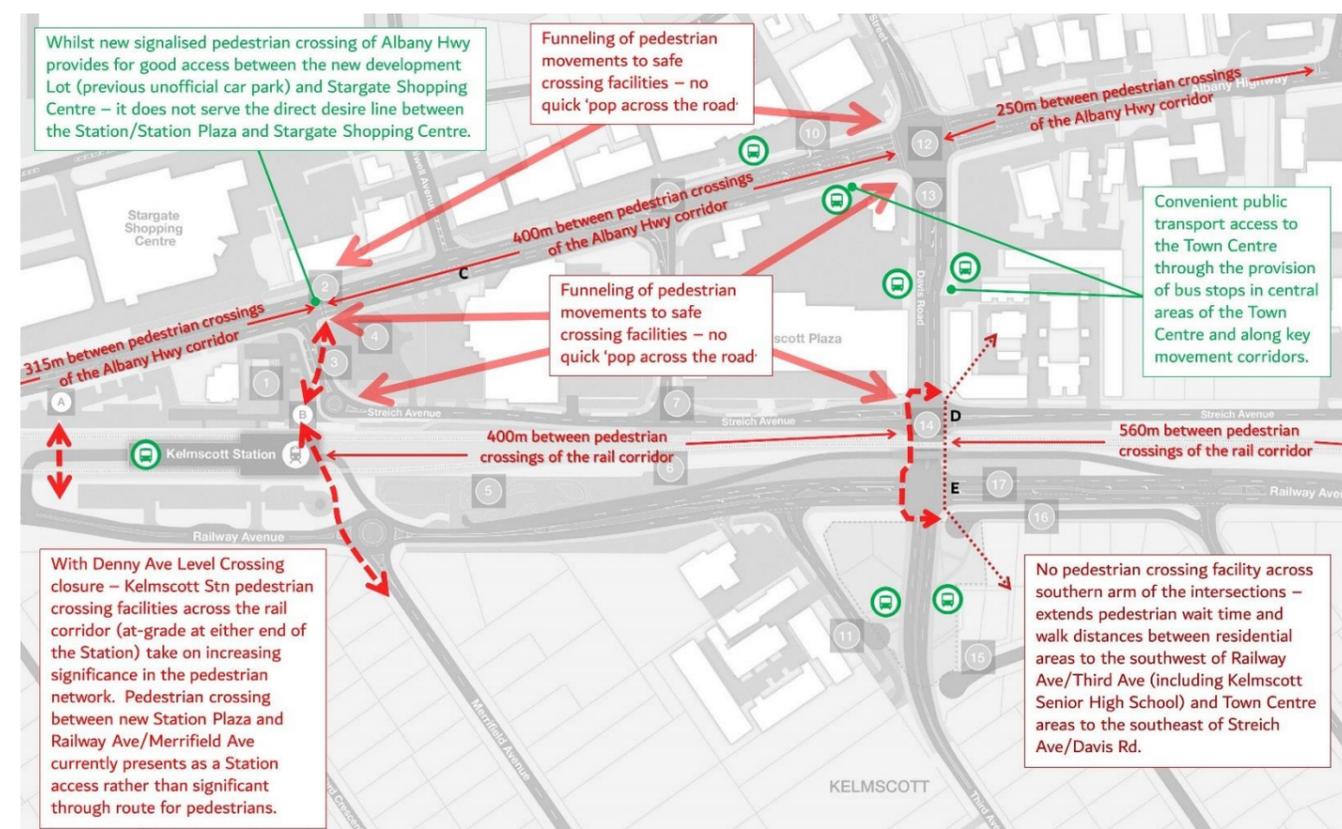


Figure 59 Kelmscott Activity Centre Precinct – east-west mobility (base plan source: METRONET)

Although it will never be possible to fully mitigate the impacts on mobility, amenity and severance caused by the Armadale Line rail corridor and Albany Highway corridor with 30,000+ vehicles per day passing through the Town Centre – there are opportunities to soften the impacts:

- Preserving as much as possible the existing rail line pedestrian crossings at Kelmscott Station (both north and south) and Albany Highway pedestrian crossing facilities. In the future as the Precinct develops and more walking and cycling trips are made, opportunities for additional pedestrian crossing facilities should be explored.
- Improving pedestrian functionality and connectivity through tree planting, footpath improvements and safe crossing points that provide shade and amenity and reduce the reliance upon, and dominance of, vehicles. Street setbacks for buildings along Albany Highway can be guided by opportunities to improve the appearance of car parking areas and enhance the pedestrian experience through the provision of street tree planting and landscaping within private land.
- The Canning River along the eastern side of the Precinct also presents a barrier to east-west pedestrian and bicycle movements – with very few existing path crossings of the river. The City of Armadale should investigate opportunities to provide additional river crossing path connections to improve east-west pedestrian and cyclist mobility between the Precinct and the Kelmscott foothills.

The area between the Armadale Line and Albany Highway may need to address the Denny Avenue corridor in future with the opportunities Denny Avenue presents for greater design outcomes and amenity.

4.6.4 Healthy Streets Assessments – Future Considerations

Overtime the diversification and increase in land uses across Kelmscott Town Centre will result in an increase in activity across the town centre, and local streets within the town centre may be redesigned to reflect the changing town centre context/environment. When streets are subject to redesign it is important that a broad set of key performance indicators are assessed to ensure the street is redesigned to balance the movement and place function of the corridor within the town centre. The Healthy Streets approach can be applied as a public realm assessment tool in the future to guide this redesign process.

Healthy Streets is a human-centred framework for embedding public health in transport, public realm and planning. The 10 Healthy Streets Indicators focus on the human experience needed on all streets.

The Healthy Streets Assessment Tool is used by designers and engineers to make an assessment of a street against the 10 Healthy Streets Indicators. The 10 indicators are measured by a scoring system of 19 metrics, which all contribute in some way to the 10 indicators. The metrics quantify the usability of the street for people who choose to walk and cycle and require the full range of human needs to be met; the metrics are not a tick-box exercise of infrastructure provision.

This approach does not create a specific plan, instead it measures the existing (and proposed) design focusing on the most important factors in providing a healthy and safe street environment. The assessment specifically measures the ‘weakest’ point along the street, knowing that a wide footpath is unusable for people in wheelchairs if it narrows to less 1.5m at any point and that a street is difficult to cross irrespective of pedestrian priority infrastructure further away.

The Assessment Tool recognises that each street has a different function, with varying degrees of movement and place, and for that reason the score itself will vary. The individual scores for the 10 indicators highlight what works well, and

areas which would benefit from improvements. The Healthy Street Assessment should be used as a work in progress to guide decisions on incremental improvements that directly benefit people who choose to walk, cycle and use public transport.

Higher scores for any metric relating to vehicles (such as lower vehicle speeds, lower volume of vehicles, lower proportion of heavy vehicles and reducing through traffic) has a bigger impact on the scoring than the other metrics. This highlights the incompatibility of higher vehicle volumes and speeds with a high amenity and safe pedestrian environment.

An overview of the Health Streets Assessment metrics and indicators is outlined in Figure 60.

Metric	Everyone feels welcome	Easy to cross	Shade and shelter	Places to stop and rest	Not too noisy	People choose to walk and cycle	People feel safe	Things to see and do	People feel relaxed	Clean air
1 Traffic speed	●	●			●	●	●		●	●
2 Volume of motorised traffic	●	●			●	●	●		●	●
3 Mix of vehicles	●	●			●	●	●		●	●
4 Conflict between cycles and turning vehicles	●					●	●		●	
5 Turning speeds at side-street intersections	●	●				●	●		●	
6 Ease of crossing mid block	●	●				●	●		●	
7 Priority of crossing at intersections	●	●				●	●		●	
8 Quality of the footpath	●					●			●	
9 Space for walking	●			●		●	●		●	
10 Appropriate separation of people walking from traffic	●				●	●	●		●	
11 Space for cycling	●			●		●	●		●	
12 Lighting	●					●	●		●	
13 Availability of drinking water	●			●		●	●	●	●	
14 Public seating	●			●		●		●	●	
15 Cycle parking	●			●		●			●	
16 Shade for walking	●		●			●		●	●	
17 Shade for cycling	●		●			●		●	●	
18 Reducing through traffic	●	●			●	●			●	
19 Bus stops	●		●	●		●			●	

Figure 60 Healthy Streets Assessment metrics and indicators (source: Health Streets)



5. Analysis of Transport Networks

5. ANALYSIS OF TRANSPORT NETWORKS

5.1 Modelling Introduction

Mesoscopic modelling has been undertaken to be able to understand the operation of the transport network in a forecast year, and that reflects the Kelmscott Activity Centre Precinct Plan land use proposals. An existing mesoscopic model previously constructed on behalf of METRONET and Main Roads WA has been provided for use in this work. The model was previously re-calibrated to reflect a 2019 base year model, prior to the closure of Denny Avenue and the replacement with the Davis Road underpass. This base year model was previously used to include the road network infrastructure proposals relating to the Davis Road underpass and was forecast to the year 2031.

The forecast year modelling has been updated to now reflect a 2041 forecast year and with details now available for the Kelmscott Activity Centre Precinct Plan land use proposals, the core area is able to be updated with specific trip generation details. The following subsections of this report summarise the following:

- Precinct plan land use proposals and traffic generation.
- 2041 modelled network.
- 2041 forecast growth calculation.
- 2041 activity centre trip generation.
- AM and PM peak hour summary model outputs.

5.2 Precinct Plan Land Use Proposals and Traffic Generation

The proposed future land use yields across the Kelmscott Activity Centre Precinct Plan area, were primarily developed by Taylor Burrell Barnett (residential development yields) and Pracsys (commercial development yields) with support from the wider consultant team.

Table 10 outlines the existing 2019 land uses across the Precinct Plan study area, as well as two future land use yield scenarios – the Potential Yield scenario and the Full Yield scenario. The Full Yield scenario represents the theoretical maximum build-out of residential and commercial development across the Precinct, based on detail Precinct assessment by the consultant team. The Potential Yield scenario represents the most likely maximum build-out of residential and commercial development across the Precinct by 2041, based on detailed Precinct and market assessment by the consultant team.

Based on consultant team analysis (including discussion with City of Armadale officers) the Potential Yield scenario has been adopted as being most representative of the anticipated long-term development across the Precinct.

Table 11 outlines the car based peak hour trip rates adopted for the assessment of the Potential Yield scenario. All vehicle trip rates adopted are standard trip rates from the WAPC Transport Impact Assessment Guidelines (2016), other than for the retail land uses – the retail vehicle trip rates in the WAPC guidelines are split into food and non-food rates.

The retail trip rates in the WAPC guidelines are quite different for food and non-food land uses – particularly in the PM peak. Pracsys were unable to provide a breakdown of food and non-food retail land uses under the Potential Yield scenario – as such for the purposes of this assessment it was assumed that the split would remain unchanged. In order to develop a suitable retail trip rate to cover food and non-food land uses, the retail floor area trip rates were adjusted to ensure that the 2019 existing situation trip generation was aligned to the previously re-calibrated 2019 base year model – as shown in the vehicle trip generation comparison across modelled scenarios in Table 12.

Table 10 - Existing and proposed land uses across the Kelmscott Activity Centre (source: TBB and Pracsys, 2021)

Land Use Category	Land Use Type	2019 Existing Situation	Future Potential Yield Scenario	Future Full Yield Scenario
Residential (Units)	Residential Dwellings	229	1,047	3,468*
Commercial (GFA m²)	Health / Welfare / Community Services	217	1,103	1,150
	Entertainment / Recreation / Cultural	4,263	7,028	7,951
	Office / Business	7,923	12,058	13,773
	Shop Retail	28,193	31,127	36,014
	Other Retail	4,710	5,322	6,342
	Manufacturing / Processing / Fabrication	665	665	665
	Storage / Distribution	993	993	993
	Utilities / Communications	460	460	460
	Vacant Floor Area	3,274	0	0
	Primary Rural	0	0	0
	Service Industry	3,510	3,966	4,726
TOTAL	Total Residential Dwellings	229	1,047	3,468
	Total Commercial (GFA m²)	54,208	62,722	72,074

* 3,292 multiple dwellings and 176 single dwellings

Table 11 - Car based peak hour trip rates

Peak Hour	Commercial / 100m ²	Retail* / 100m ²	Residential / dwelling	Industrial / 100m ²
AM inbound	1.60	1.50	0.20	0.80
AM outbound	0.40	0.90	0.60	0.20
AM TOTAL	2.00	2.40	0.80	1.00
PM inbound	0.40	1.50	0.50	0.20
PM outbound	1.60	1.25	0.30	0.80
PM TOTAL	2.00	2.75	0.80	1.00

* single retail trip rate adopted based on re-calibrated 2019 model

Table 12 – Kelmscott Activity Centre Precinct peak hour vehicle trip generation comparison

Peak Hour	2019 Model	2019 Existing Situation	Future Potential Yield Scenario	Difference between 2019 Existing and Future Potential Yield Scenario
AM inbound	784	803	1,153	+350 / 1.44
AM outbound	516	522	1,090	+568 / 2.09
AM TOTAL	1,300	1,325	2,243	+918 / 1.69
PM inbound	706	722	1,250	+528 / 1.73
PM outbound	739	733	1,145	+412 / 1.56
PM TOTAL	1,445	1,455	2,395	+940 / 1.64

5.3 2041 Modelled Network

The network extents that have been utilised for this assessment is shown below in Figure 61. The area to the north, including Tonkin Highway and its interchanges with Albany Highway and Railway Avenue, as well as the southern extents to Armadale Road have been included to help tie in with the forecast year trip generation that makes use of a ROM24 sub-area network covering a similar area.

Importantly, this network has been updated to include the following infrastructure changes that were previously identified through the Denny Avenue removal program and are illustrated in Figure 49.

- Denny Avenue level crossing removal, and associated intersection adjustments for Denny Avenue and Streich Road.
- Denny Avenue and Albany Highway intersection right turn out (to Albany Highway SB) banned.
- Streich avenue and Albany Highway left in / left out only.
- Davis Road underpass installed including new signalised intersections with Streich Avenue and Railway Avenue.
- Davis Road, Albany Highway and Fancote Street intersection signalised.
- Albany Highway signalised pedestrian crossing between Gilwell Avenue and Streich Avenue.

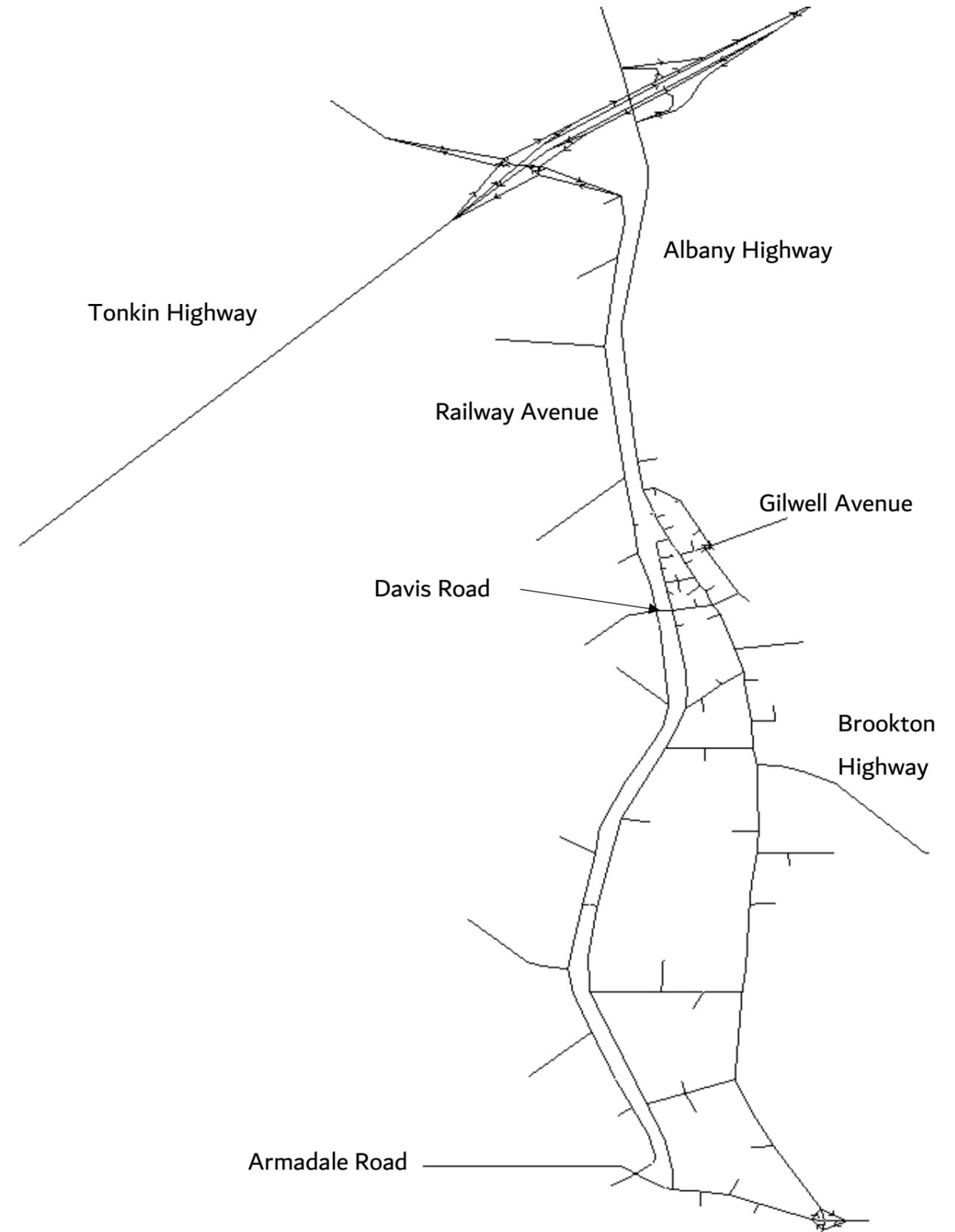


Figure 61 Mesoscopic Model Extents

5.4 2041 Forecast Growth Calculation – Stage 1

The forecasting process has made use of ROM24 outputs provided by Main Roads Western Australia. The outputs provided are based on a sub-area network that has been cordoned or extracted from the main model. This sub-area is shown in Figure 62 and covers a very similar extents when compared against the mesoscopic modelled network.

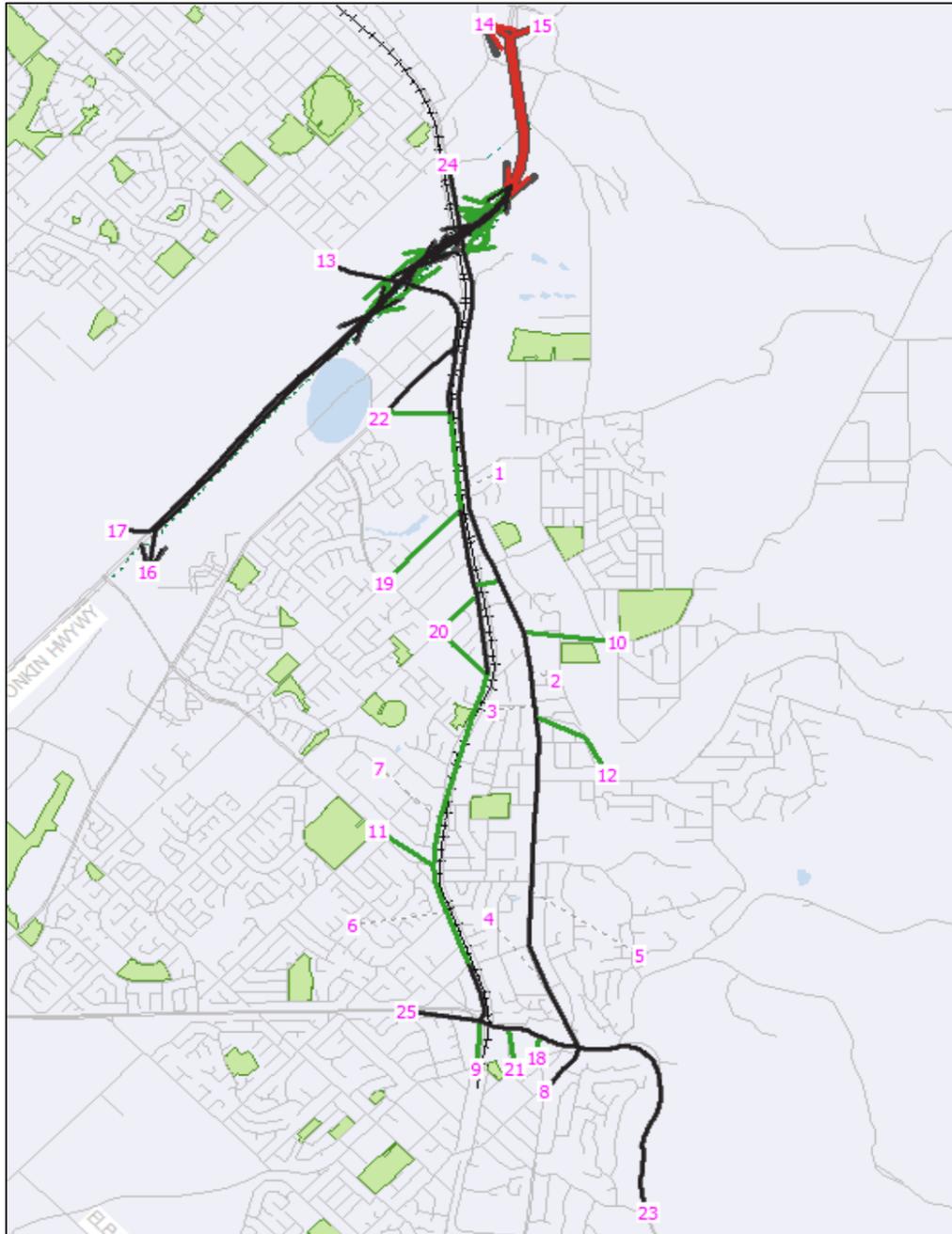


Figure 62 ROM24 Sub-area network extents

For this project the intent is to gain an understanding of the Kelmscott Activity Centre Precinct Plan proposals and their potential impact or integration with the transport network in the forecast year 2041. Although the modelled network

extents is similar between ROM24 and the mesoscopic models, there is naturally a more detailed representation of the road network within the mesoscopic model and this also relates to the modelled zones.

For example, within ROM24, the Kelmscott area is covered by three large zones, circled in Figure 63 below, and these benefit from disaggregation through the translation to the mesoscopic model.

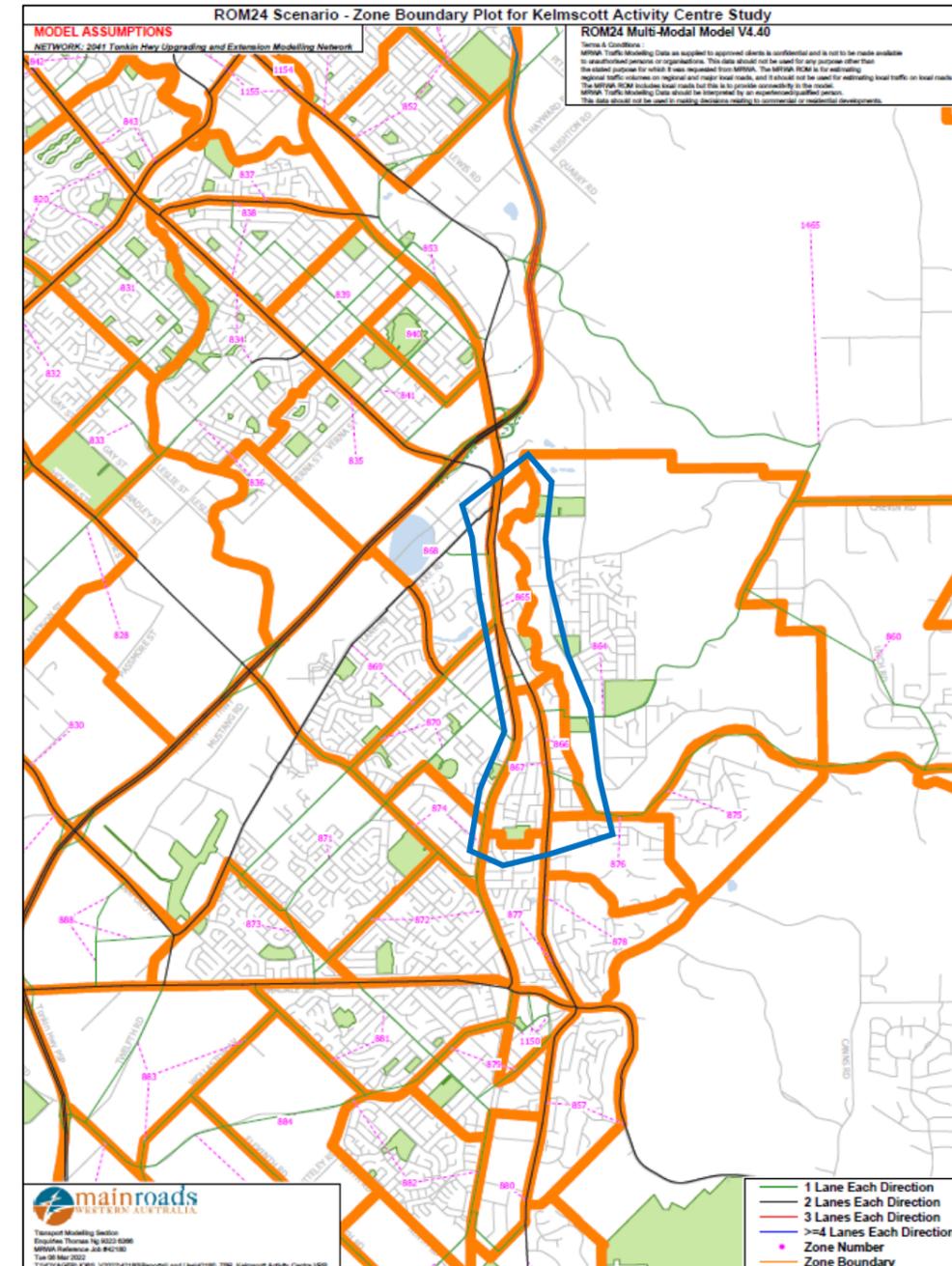


Figure 63 ROM24 Zone boundaries

A benefit of utilising forecast year demand volume change from a strategic model like ROM24 is that it is able to account for and capture the impact or effect of infrastructure and land use proposals that are included in areas away from the

study area. For this reason, the use of ROM24 in the Kelmscott Activity Centre study is to account for the change in forecast year trips that are considered between external zones across the sub-area network. Initially, the whole of the sub-area model is used to account for changes in forecast year demands, although in subsequent stages of the process, the trips that specifically relate to the Kelmscott Activity Centre Precinct study area are addressed separately. A summary of the overall forecasting process is set out below:

- Translate ROM24 sub-area matrices into a common format (2036 and 2041 zones differ from 2016 and 2021).
- Check and analysis of individual Origin-Destination cell demands to understand changes to the forecast year distribution.
- Establish change in demands between successive ROM24 forecast year outputs (on an “all-day” basis).
- Convert change in demand matrices to peak hour AM and PM matrices.
- Calculate change matrix to apply to 2019 base year demands to forecast to 2041.
- Translate change matrices into mesoscopic model format.
- Stage 1 - Apply change in demands to 2019 mesoscopic base year AM and PM peak demands.
- Calculate Kelmscott Activity Centre trip generation, by individual land use zones.
- Retain base model Kelmscott Activity Centre trip distribution.
- Stage 2 – Adjust stage 1 matrices to reflect Kelmscott Activity Centre trip end values.

A summary of the ROM24 sub-area matrix demands and the percentage increase in demands between subsequent years is set out in Table 13. The annual percentage change (assuming a linear growth between years) from 2016 to 2021 and from 2036 to 2041 is consistent at 2.5% and generally inline with expected annual increases. A larger change in annual demands (4.1%), despite being over a longer period of time, is shown from 2021 to 2036. Analysis of the ROM24 sub-area matrices suggests that these increases are predominantly related to the movement in both directions along Tonkin Highway and could be attributed to the Tonkin Highway grade-separation proposals.

Table 13 - ROM24 Sub-area demand summary

Year	Sub-Area matrix total (trips)	Percentage Increase	Annual Percental Increase
2016	127,870	~	~
2021	143,851	12.5%	2.5%
2036	231,708	61.1%	4.1%
2041	260,660	12.5%	2.5%

Additionally, the three ROM24 zones that represent the Kelmscott Activity Centre Precinct study area and their change in demand over the forecast years are summarised in Table 14. These are presented separately by Origin (outbound) and Destination (inbound). These show a similar change in annual percentage increase when compared against the overall matrix change, also outputting the larger jump in demand between 2021 and 2036.

Table 14 - ROM24 Kelmscott zone demand summary

Year	Origin (outbound) Trips			Destination (inbound) Trips		
	Sub-Area matrix total	Percentage Increase	Annual Percental Increase	Sub-Area matrix total	Percentage Increase	Annual Percental Increase
2016	7,230	~	~	7,147	~	~
2021	8,312	15.0%	3.0%	8,239	15.3%	3.1%
2036	15,410	85.4%	5.7%	15,387	86.8%	5.8%
2041	16,636	8.0%	1.6%	16,719	8.7%	1.7%

Following the calculation of forecast year growth, the ROM24 zoning has been converted into a format that matches the base year 2019 mesoscopic model. This has required the disaggregation of several zones, predominantly within the Kelmscott area. As set out, the ROM24 model makes use of three individual zones that cover the Kelmscott area, and these are considered too coarse for detailed model assignment to the transport network. This requires the three zones to be split into approximately 20 mesoscopic zones.

The output from Stage 1 of the forecasting is a mesoscopic AM and PM peak hour set of 2041 forecast year demand matrices that have utilised the outputs from the ROM24 strategic model.

5.5 2041 Kelmscott Activity Centre Trip Generation – Stage 2

Following the Stage 1 forecasting, which calculates the growth across the entire modelled area using various years’ ROM24 outputs and translates the ROM24 sub-area zoning system into the mesoscopic model, the specific Kelmscott Activity Centre Precinct study area can be addressed.

Section 5.2 has covered the proposed land uses for the Kelmscott Activity Centre Precinct Plan zones. The land use zones are very finely defined and on occasion can be aggregated together for input to a single mesoscopic model zone. Figure 64 shows the proposed land use zones alongside the mesoscopic modelled network overlaid with the land use zones. Model zone 27 is shown to cover the area bounded by Albany Highway, Gilwell Avenue, Fancote Street and Page Road and would be comprised of land use zones 10, 11, 12, 13, 14, 15, 16 and 17.

The trip generation has been calculated for each individual land use zone and their respective land use proposals (see Section 5.2 for details). The trip rates are provided in Table 15 and

Table 16 includes the total trip generation for the Kelmscott Activity Centre Precinct in the forecast year 2041.

Table 15 - Car based peak hour trip rates

Peak Hour	Commercial / 100m ²	Retail / 100m ²	Residential / dwelling	Industrial / 100m ²
AM inbound	1.60	1.50	0.20	0.80
AM outbound	0.40	0.90	0.60	0.20
PM inbound	0.40	1.50	0.50	0.20
PM outbound	1.60	1.25	0.30	0.80

Table 16 - Kelmscott Activity Centre Precinct peak hour vehicle trip generation – future Potential Yield scenario (notionally 2041)

Peak Hour	Commercial	Retail	Residential	Industrial	TOTAL
AM inbound	273	653	212	15	1,153
AM outbound	68	390	629	3	1,090
PM inbound	68	653	526	3	1,250
PM outbound	273	543	314	15	1,145



Figure 64 Land use and mesoscopic model zones

The Stage 1 2041 AM and PM peak hour demand matrices have been adjusted to reflect the proposed trip generation that has been calculated for each individual land use zone. The previous distribution analysis from the ROM24 sub-area outputs showed little change between the forecast years, and where the land use nature is not set to change dramatically, the mesoscopic model distribution from the 2019 base year has been retained. The Stage 2 forecasting process has therefore looked to adjust the trip end values (Origins and Destinations) for the Kelmscott Activity Centre Precinct zones while retaining the external zones trip end values that were calculated using ROM24 outputs.

This process is therefore able to more accurately reflect the individual trip generation that can then be attributed to the smaller more detailed zoning and their use of the available transport network. The trip generation totals that have been calculated for individual land use and zones above have been attributed to the model zones as set out in Figure 65 and Table 17.

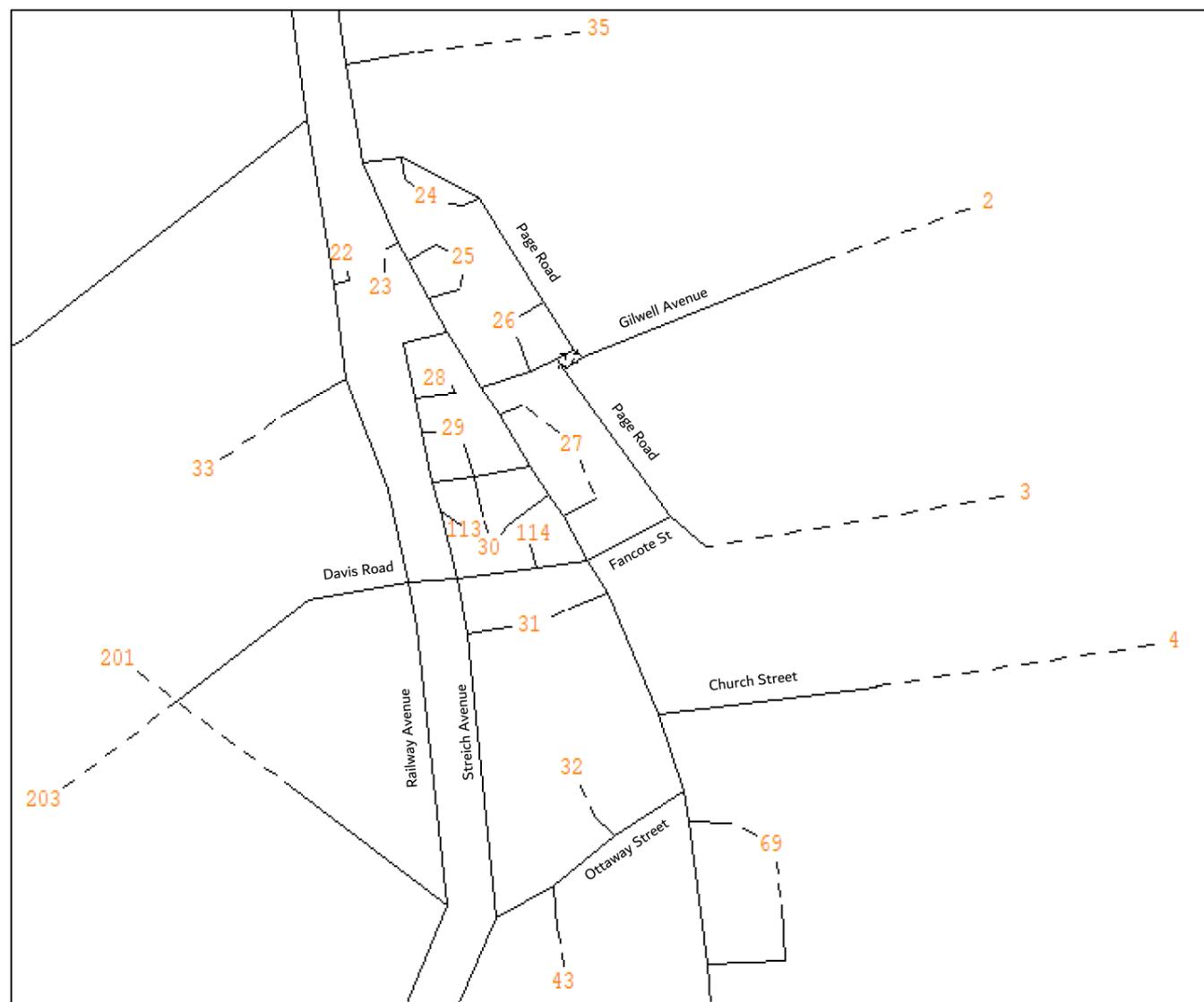


Figure 65 Kelmscott Activity Centre Precinct model zones

It should be noted that while the majority of the Kelmscott Activity Centre Precinct zones that are internal (rather than zones that represent roads entering the network) entirely replace the Stage 1 trip end values while the external zones (e.g. Zone 2 representing Gilwell Avenue) are additional trips to the Stage 1 trip end values.

Table 17 - Model zone trip generation – future Potential Yield scenario (notionally 2041)

Model zone	AM peak hour inbound	AM peak hour outbound	PM peak hour inbound	PM peak hour outbound
2	7	20	16	9
3	8	22	18	11
4	77	22	25	76
23	5	13	11	6
24	74	77	90	72
25	129	112	142	122
27	163	147	174	160
28	11	27	24	14
29	71	74	91	68
30	4	9	7	5
31	106	127	130	114
32	99	119	129	103
35	40	46	42	46
43	4	11	10	6
69	243	143	199	223
114	112	121	142	110
TOTAL	1,153	1,090	1,250	1,145

5.6 2041 Mesoscopic Model Assignment

The 2041 modelled network that reflects the infrastructure proposals detailed in Section 5.2 has been used to assign the 2041 calculated forecast year demands to. The models have been assigned and convergence statistics monitored for consistency. The initial model outputs have also been checked for distribution and delays to understand whether they are logical or not. Importantly, the physical nature of the modelled network has not been adjusted further through the inclusion of additional lanes, adjustment of intersection control type (e.g. from priority controlled to signals or roundabout) or the banning of turning movements. This modelling assessment is relatively high-level and the intent is to understand the possible impact of the proposed forecast year land use on the transport network.

The following sections summarise the AM and PM peak hour model outputs with a focus on links that are shown to have a higher volume to capacity ratio (VC%) and intersections that show higher delays or queuing potential.

5.7 AM Peak Hour Summary Outputs

The following model plots demonstrate the AM peak hour demand volumes as a set of select link analyses (SLA). The SLA show the volume of vehicles for a specific link (highlighted red) and their origin and destination. Figure 66 shows AM peak hour SLA along Albany Highway, either side of the Kelmscott Activity Centre Precinct, with approximately 1,800 vehicles northbound and 1,500 vehicles southbound. The plots show that the majority of the demand travels continuously along Albany Highway with only a small proportion accessing the Kelmscott Activity Centre Precinct zones.

Figure 67 shows the SLA in both directions through the Davis Road underpass during the AM peak hour. The distribution of trips here is consistent with the 2019 base year and previous forecast year analysis. Vehicles making use of the underpass are more localised in nature (school and work trips and access to the activity centre) although there is also some use by trips originating at Corfield Street and travelling south along Albany Highway.



AM Peak northbound SLA Albany Highway

AM Peak southbound SLA Albany Highway

Figure 66 AM peak hour Albany Highway SLA



AM Peak eastbound SLA Albany Highway

AM Peak westbound SLA Albany Highway

Figure 67 AM peak hour Davis Road SLA

Figure 68 shows link volume/capacity ratio outputs and ranges of average intersection delays across the network. The volume/capacity (VC%) is filtered to only show those links that experience an average of greater than 85%. This value is used to generally suggest that there may be operational issues for a link or road where the demand (volume) is becoming close to or over its actual capacity. The roads shown with emerging capacity issues are the northbound approach to the signalised intersection of Albany Highway with Davis Road, Gilwell Avenue approach to Albany Highway, the northbound approach to the new pedestrian crossing along Albany Highway and the link that represents Turner Place. The roads with the higher VC% also have some of the greater intersection delays. The largest average intersection delay shown across the Kelmscott Activity Centre Precinct study area is the new signalised intersection of Albany Highway and Davis Road (approximately 30 seconds average delay). The other larger delays are all shown at signalised intersections along Albany highway and the new Davis Road underpass intersections.



Figure 68 AM peak hour link VC% and intersection average delays

5.8 PM Peak Hour Summary Outputs

Figure 69 shows the PM peak hour SLAs for the northbound and southbound movements along Albany Highway. The northbound hourly demand is approximately 1,600 vehicles, and the dominant afternoon peak movement southbound at approximately 2,100 vehicles. Similarly, to the AM peak hour, the majority of Albany Highway demand is travelling northbound and southbound past the Kelmscott Activity Centre Precinct itself.

Figure 70 shows the SLA in both directions through the Davis Road underpass during the PM peak hour. The distribution of trips here is similar to the morning peak, although the more dominant use of the Page Road, Fancote Street to Davis Road distribution is noted compared to the morning peak that splits the distribution and some vehicles travel via Gilwell Avenue, Albany Highway to Davis Road. During the PM peak, the delays for the Gilwell Avenue left turn onto Albany Highway are larger and vehicles choose to route via Fancote Street instead.



PM Peak northbound SLA Albany Highway

PM Peak southbound SLA Albany Highway

Figure 69 PM peak hour Albany Highway SLA



PM Peak eastbound SLA Albany Highway

PM Peak westbound SLA Albany Highway

Figure 70 PM peak hour Davis Road SLA

Figure 71 shows link volume/capacity ratio outputs that relate to a few of the minor roads that join Albany Highway. These are usually the product of a single lane approach attempting to load a reasonably large demand onto a main carriageway. The largest average intersection delay shown across the Kelmscott Activity Centre Precinct study area during the PM peak is also the new signalised intersection of Albany Highway and Davis Road (approximately 30 seconds average delay). The other larger delays are all shown at signalised intersections along Albany highway and the new Davis Road underpass intersections.



Figure 71 PM peak hour link VC% and intersection average delays

5.9 2041 Commentary

Commentary around the 2041 modelling should be cognisant of the fact that the operation reflects a long-range forecast year and that there have been no further infrastructure proposals to mitigate the inclusion of the Kelmscott Activity Centre Precinct Plan land use proposals.

As such, it should be noted that the road network infrastructure recently delivered by State Government as part of the Denny Avenue Level Crossing Removal project (most notably the permanent closure of the Denny Avenue Level Crossing and the creation of an underpass (rail-over-road) at Davis Road, and Albany Highway carriageway modifications) has delivered major road infrastructure expected to address access and movement requirements through Kelmscott Town Centre in the long term – and this sets the road network arrangements across the Precinct Plan area for the long term.

It should also be noted that the mesoscopic nature of the model should be to provide a slightly higher level of analysis where trip distribution can be checked and analysed. Although the distribution of these trips will depend on delays at intersections – while waiting at traffic signals, or waiting at a priority intersection, the results are based on an average hour’s operation and will therefore “smooth” any short-term queueing or delays that could occur within a condensed timeframe. Individual intersection results and operation could therefore differ from intersection analysis software (LinSig or Sidra).

Although there are some roads that are modelled with higher VC% and delays based on the larger forecast year 2041 demand volumes, the transport network is shown to operate reasonably over the average hour periods. It is also noted that a larger proportion of the demands travelling along Albany Highway are longer distance strategic trips rather than those associated with the Kelmscott Activity Centre Precinct Plan proposals.

Davis Road and its connection between Albany Highway and Railway Avenue continue to provide an important link between residential and school areas, a local connection for users of the Kelmscott Activity Centre Precinct and also as part of longer distance trips that need to cross the railway line between Tonkin Highway and Armadale Road. It is possible that if congestion becomes more significant along Albany Highway or Railway Avenue, that drivers may reassign between either of these routes to avoid perceived delays.

It should also be noted that overtime Perth’s urban transport networks will develop to provide a wider range of opportunities for people to travel by non-car modes, whether that be by active transport (walking and cycling) or through improved public transport options. This change will likely occur in the inner metropolitan areas of Perth first and then middle/outer town centre locations, such as the Kelmscott Town Centre. The Kelmscott Activity Centre Precinct Plan supports active transport opportunities by increasing the liveability and attractiveness of the Town Centre urban corridor by (for example) improving landscaping requirements on private lots adjoining the urban corridor and by encouraging a mix of land uses.



6. Parking Strategy

6. PARKING STRATEGY

6.1 Parking Context

The position of the Kelmscott Activity Centre Precinct located along the strategic road corridor of Albany Highway and adjacent to the Armadale Line rail corridor and the Precinct Plan's projected growth in residential dwellings and development as a growing commercial and retail precinct – is anticipated to place parking pressure on the Precinct over the coming years.

The management of both the supply and demand of parking will be necessary to ensure the right level of parking is available to meet local demand without negatively impacting on the function or design of the urban area. It will also be required from the point that significant redevelopment occurs across the Kelmscott Activity Centre Precinct – in particular to manage potential issues with on-street informal Park and Ride that is seen at other locations around the Perth Metropolitan Region.

6.2 Parking Management Principles

The following principles will guide parking management within the Kelmscott Activity Centre Precinct:

- Encourage the efficient use of available parking resources and minimise land and capital investments in parking.
- Prioritise on-street parking for short-term use by visitors to residential and mixed-use areas.
- Maximise the efficient use of public car parking by ensuring a high level of turnover and availability.
- Ensure car park design does not hinder safe and secure pedestrian, cyclist and public transport access (including access on foot from public transport).
- Support shared use arrangements between landowners to maximise the efficient use of on-site car parking.
- Provide longer term parking for Kelmscott Station (provided by PTA adjacent to the station) and businesses in dedicated locations on-site rather than within the public realm.
- Ensure the parking demand created by development is predominantly provided on-site rather than reliant on public parking.

6.3 Parking Demand Management

The Kelmscott Activity Centre Precinct will redevelop over time and is progressively designed to maximise the efficiency of walking, cycling and public transport through the investment in public infrastructure and coordinated design of this infrastructure.

It is anticipated that over time a redevelopment program with a design focus on prioritising the efficiency of walking, cycling and public transport, would reduce demand for private vehicle usage for local and longer distance trips, and in turn greatly reduce the reliance on private and public vehicle parking.

In order to encourage residents and visitors to reduce their demand for parking the City of Armadale should undertake an ongoing education campaign about the opportunities and benefits associated with walking, cycling and using public transport within the Precinct.

6.4 Public Parking Supply Management

Public parking within the Kelmscott Activity Centre Precinct is relatively limited, with informal on-street parking available on local streets and dedicated public parking in Kelmscott Station PTA car parks and Fancote Park parking areas. Of the total public car parking within the Precinct there are approximately 324 bays with an additional 4 ACROD bays.

Of the total public car parking in the study area 268 bays (83%) are PTA car parking bays subject to a \$2 weekday parking fee, and 56 bays (17%) of the car parking bays are City of Armadale controlled bays with no fee or time restriction.

In implementing the Kelmscott Activity Centre Precinct Plan it is anticipated that limited additional public parking will be provided – therefore the management of public parking will be critical to ensure that increased activity and demand is met without detriment to the function of the area. In particular, management of public parking could be required in the following locations:

- Kelmscott Station PTA car parks: these car parking areas will remain under the control of PTA and be subject to PTA management regimes – which currently includes a weekday fee for parking at PTA station car parks.
- Fancote Park parking areas: the small car park and informal verge parking alongside the park are currently free with no time restrictions. It is possible that any future development of recreational facilities in the park and alongside any future park-based café/food and beverage outlet – would place pressure on the limited local public parking and require management by the City, possibly with time restrictions imposed.
- Local on-street parking: as the Precinct redevelops over time and additional residential, commercial and retail land uses are developed, pressure will be placed on the availability of on-street parking across the local street network. In addition, available on-street parking within a short walk of Kelmscott Station could be used increasingly by commuters if official PTA car parks reach capacity and/or parking fees increase at the stations making free on-street parking more appealing. It is possible that as the Precinct develops the City's management of free unrestricted on-street parking will need to be progressively managed to ensure equitable use of parking. It is anticipated this would begin with time restrictions imposed across on-street parking within the Precinct or within core areas of activity within the Precinct – and management regimes increased if required.

6.5 Off-Street Parking Requirements

The City of Armadale’s Local Planning Scheme No. 4 provides a ratio for the minimum on-site car parking requirements for each of the listed uses within the Scheme. In an Activity Centre Precinct it is considered appropriate to reduce the supply of private parking to maximise the availability of land for development purposes and encourage residents and visitors to utilise more sustainable transport options of walking, cycling and using public transportation.

In aligning with this principle, it is proposed that on-site parking will be required to comply with a minimum and maximum ratio dependent on the proposed land use(s). The adoption of the State Planning Policy 7.3 Residential Design Codes Volume 2 – Apartments provides a basis from which the future provision of parking within residential development must be applied in this location. Within the guidelines, there are performance-based outcomes that supplement the acceptable outcomes that the City can use in judging the level of parking per site.

For the Kelmscott Activity Centre Precinct, the provisions within Element 3.9 of the State Planning Policy 7.3 Residential Design Codes Volume 2 – Apartments have been adopted as set out in Table 18.

Simplification of minimum and maximum ratios for other land uses has been simplified. No provision beyond the maximum number of bays within Table 18 would be permissible.

Table 18 – Minimum and maximum parking and minimum bicycle parking requirements for land use

Land Use Category	Minimum Car Parking Bays	Maximum Car Parking Bays	Minimum Bicycle Parking Bays
Residential Uses	Studio and 1 bed - 0.75 bay per dwelling / unit	Studio and 1 bed – 1.5 bay per dwelling / unit	
	2 bed and above – 1 bay per dwelling	2 bed and above – 2 bays per dwelling subject to design outcomes	1 bicycle parking space per dwelling/ unit
	Visitors - 1 bay per four dwellings up to 12 dwellings, 1 bay per eight dwellings for the 13th dwelling and above	Visitors - 1 bay per four dwellings up to 12 dwellings, 1 bay per eight dwellings for the 13th dwelling and above	0.25 visitor bicycle parking space per dwelling/unit
Commercial and Retail Uses	3.5 bays per 100m ² of gross floor area	4.5 bays per 100m ² of gross floor area	1 bay per 200m ² of gross floor area
Civic, Community or other uses	To be determined by the local government based on site specific parking management plan.		

For any proposed reduction in minimum parking associated with residential developments in the Kelmscott Activity Centre Precinct, the application must be submitted with an assessment of the Design Guidance DG 3.9.1 to 3.9.13 within the State Planning Policy 7.3 Residential Design Codes Volume 2 – Apartments.

In addition to the requirement for on-site car parking, applicants will also be required to provide a minimum number of bicycle parking bays dependent on the proposed land use. No maximum number of bicycle parking bays is applicable, and the design of bicycle parking facilities will be required to be in accordance with best practice, City of Armadale requirements and/or any Precinct Design Guidelines developed in the future for the Kelmscott Activity Centre Precinct.



7. Summary

7. SUMMARY

7.1 Introduction

In March 2021 the City of Armadale resolved to prepare a Precinct Plan for the Kelmscott Activity Centre (the Precinct).

The Precinct is located along two sides of a 1.5km length of Albany Highway and contains a diverse range of uses including residential, retail, office, commercial, restaurants, cafes, medical and community type uses in a core area and fringing highway development.

As dwellings and population numbers grow within the Precincts catchment area, the number and extent of business within the Precinct is expected to grow and undergo renewal.

Planning for the Precinct is required to accommodate not only future growth of the Activity Centre, but also a changing appreciation for the urban form of the Precinct, with a greater emphasis on inner city and higher density living near to public transport, commercial precincts, and Town Centre locations.

The Movement, Transport and Parking Strategy report has been completed to inform the development of a Precinct Plan for the Kelmscott Activity Centre. This report addresses the requirements of the following two State guidelines:

- Western Australia Planning Commission (WAPC) *Transport Impact Assessment Guidelines – Volume 2 Planning Schemes, Structure Plan and Activity Centre Plans* (2016).
- State Planning Policy 7.2 (SPP 7.2) *Precinct Design Guidelines* (2020).

7.2 Overview of Kelmscott Activity Centre Precinct Plan

The Kelmscott Activity Centre Precinct Plan has been prepared by Taylor Burrell Barnett with support from the wider consultant team- and is shown in Figure 2. The distribution of land uses across the Precinct Plan is summarised below.

- Core area of Precinct activity:
 - Primarily mixed-use residential development along the Albany Highway corridor between Streich Avenue (to the west), Page Road (to the east) and Davis Road/Fancote Street (to the south).
 - Mixed-use residential development to a 6-storey maximum across the majority of the core area of Precinct activity.
 - Mixed-use residential development to a 9-storey maximum across the area between Streich Avenue (to the north and west), Albany Highway (to the east) and Davis Road (to the south) – the areas covered by the former unofficial car park site, KFC Kelmscott site, Spudshed site and Kelmscott Plaza Shopping Mall site.
- Residential fringe to core area of Precinct activity:
 - Pocket of mixed-use residential development to a 3-storey maximum between Mountain View and Page Road – to the east of Albany Highway.

- Pocket of mixed-use residential development to a 3-storey maximum between Albany Highway to River Road – to the south of Fancote Street.
- Large area of mixed-use residential development to a 3-storey maximum between Davis Road to the Good Shepherd Catholic Church – to the east of Streich Avenue.
- Pockets of mixed-use residential development to a 3-storey maximum at the intersection of Albany Highway and Ottaway Street – and along the Albany Highway corridor (to the east of Albany Highway) between Rundle Street and Brookton Highway.
- Centres of commercial activity:
 - Pocket of commercial activity fronting the Albany Highway corridor at the north of the Kelmscott Activity Centre – between Turner Place and Mountain View.
 - Large area of commercial activity fronting the Albany Highway corridor between Davis Road/Fancote Street and Rundle Street.

The Kelmscott Activity Centre Precinct Plan includes the following key movement design responses and connections:

- Retains the road network arrangements as delivered by Main Roads WA and the METRONET teams as part of the Denny Avenue Level Crossing removal project.
- Seeks to create a strong east-west pedestrian connection between Kelmscott Station and Fancote Park.
- Seeks to create a shared space street along Denny Avenue to connect the adjacent sites of future activity.
- Seeks to create sufficient space alongside major roads and local streets for additional tree planting and shade.

7.3 Pedestrian and Bicycle Networks in Context to the Precinct Plan

Existing Pedestrian Network

The Walk Score walkability assessment tool considers a central location within the Kelmscott Activity Centre Precinct (Denny Avenue) to be “Somewhat Walkable” where some errands can be accomplished on foot, with a walk score of 67 out of 100. The same Walk Score walkability assessment for Kelmscott Station also produces a result of “Somewhat Walkable” where some errands can be accomplished on foot, with a walk score of 63 out of 100.

The Walk Score assessment considers both locations to have good pedestrian access to groceries but only average access to retail shopping and culture/entertainment.

Existing Bicycle Network

The Kelmscott Activity Centre Precinct has a good level of bicycle accessibility, particularly north-south with the high quality shared path along the Armadale Line. Additional shared paths provide access from the rail corridor high quality shared path – to locations to the west of the study area along Westfield Road, Merrifield Avenue and Third Avenue (to access Kelmscott Senior High School). Limited formal bicycle routes are provided to the east of the rail corridor – with only on-street provision for bike riding.

Future Cross Precinct Mobility

Although it will never be possible to fully mitigate the impacts on mobility, amenity and severance caused by the Armadale Line rail corridor and Albany Highway corridor with 30,000+ vehicles per day passing through the Town Centre – there are opportunities to soften the impacts:

- Preserving as much as possible the existing rail line pedestrian crossings at Kelmscott Station (both north and south) and Albany Highway pedestrian crossing facilities. In the future as the Precinct develops and more walking and cycling trips are made, opportunities for additional pedestrian crossing facilities should be explored.
- Improving pedestrian functionality and connectivity through tree planting, footpath improvements and safe crossing points that provide shade and amenity and reduce the reliance upon, and dominance of, vehicles. Street setbacks for buildings along Albany Highway can be guided by opportunities to improve the appearance of car parking areas and enhance the pedestrian experience through the provision of street tree planting and landscaping within private land.
- The Canning River along the eastern side of the Precinct also presents a barrier to east-west pedestrian and bicycle movements – with very few existing path crossings of the river. The City of Armadale should investigate opportunities to provide additional river crossing path connections to improve east-west pedestrian and cyclist mobility between the Precinct and the Kelmscott foothills.

7.4 Public Transport in Context to the Precinct Plan

Future Bus Service/Passenger Opportunities

While the bus patronage data shows that bus services provide a key bus to train transfer function at Kelmscott Station, the data also shows that bus services are less used by passengers to access the Kelmscott Town Centre. Overtime the diversification and increase in land uses across the town centre will result in an increase in activity across the town centre – and it will be key that local bus routes and the location of bus stops in the town centre are located to cater for the efficient movement of residents, workers and visitors into the town centre.

The future design of bus stop infrastructure delivered by Transperth should reflect the higher amenity outcome of a town centre.

Future Train Service/Passenger Opportunities

Overtime the diversification and increase in land uses across the town centre will result in an increase in activity across the town centre – and it will be important to leverage the high number of rail passengers boarding and alighting services at Kelmscott Station, with the stations location within Kelmscott Town Centre.

Maintaining and improving pedestrian and cycling connections between the station and key activity areas of the town centre will assist with leveraging commuter activity.

The City could also market Kelmscott Town Centre to passengers at Kelmscott Station to ensure passengers are aware of the opening of new or improved services/retail/food and beverage offerings across the town centre – and seek to leverage those passengers who have typically accessed Kelmscott Station via park and ride, to visit local town centre land uses before or after their train journey.

7.5 Traffic Impacts of Traffic Generated by the Activity Centre Precinct

Mesoscopic modelling has been undertaken to be able to understand the operation of the transport network in a forecast year, and that reflects the Kelmscott Activity Centre Precinct Plan land use proposals. An existing mesoscopic model previously constructed on behalf of METRONET and Main Roads WA has been provided for use in this work. The model was previously re-calibrated to reflect a 2019 base year model, prior to the closure of Denny Avenue and the replacement with the Davis Road underpass. This base year model was previously used to include the road network infrastructure proposals relating to the Davis Road underpass and was forecast to the year 2031.

The forecast year modelling has been updated to now reflect a 2041 forecast year and with details now available for the Kelmscott Activity Centre Precinct Plan land use proposals, the core area is able to be updated with specific trip generation details.

Based on consultant team analysis (including discussion with City of Armadale officers) the Potential Yield scenario has been adopted as being most representative of the anticipated long-term development across the Precinct.

Table 19 shows a comparison of the peak hour vehicle trip generation based on the re-calibrated 2019 base year model, the 2019 existing situation and future Potential Yield scenario (notionally 2041).

Table 19 – Kelmscott Activity Centre Precinct peak hour vehicle trip generation comparison

Peak Hour	2019 Model	2019 Existing Situation	Future Potential Yield Scenario	Difference between 2019 Existing and Future Potential Yield Scenario
AM inbound	784	803	1,153	+350 / 1.44
AM outbound	516	522	1,090	+568 / 2.09
AM TOTAL	1,300	1,325	2,243	+918 / 1.69
PM inbound	706	722	1,250	+528 / 1.73
PM outbound	739	733	1,145	+412 / 1.56
PM TOTAL	1,445	1,455	2,395	+940 / 1.64

7.5.1 AM Peak Hour Summary

The select link analysis (SLA) for the AM peak hour along Albany Highway, either side of the Kelmscott Activity Centre Precinct, shows approximately 1,800 vehicles northbound and 1,500 vehicles southbound – with the majority of the demand traveling continuously along Albany Highway with only a small proportion accessing the Kelmscott Activity Centre Precinct zones.

The SLA in both directions through the Davis Road underpass during the AM peak hour show a distribution of trips consistent with the 2019 base year and previous forecast year analysis. Vehicles making use of the underpass are more localised in nature (school and work trips and access to the activity centre) although there is also some use by trips originating at Corfield Street and travelling south along Albany Highway.

The roads shown with emerging capacity issues are the northbound approach to the signalised intersection of Albany Highway with Davis Road, Gilwell Avenue approach to Albany Highway, the northbound approach to the new pedestrian crossing along Albany Highway and the link that represents Turner Place. The roads with the higher volume/capacity (VC%) also have some of the greater intersection delays. The largest average intersection delay shown across the Kelmescott Activity Centre Precinct study area is the new signalised intersection of Albany Highway and Davis Road (approximately 30 seconds average delay). The other larger delays are all shown at signalised intersections along Albany highway and the new Davis Road underpass intersections.

7.5.2 PM Peak Hour Summary

SLAs for the PM peak hour along Albany Highway show approximately 1,600 vehicles northbound and the dominant afternoon peak movement southbound at approximately 2,100 vehicles. Similarly, to the AM peak hour, the majority of Albany Highway demand is travelling northbound and southbound past the Kelmescott Activity Centre Precinct itself.

SLAs in both directions through the Davis Road underpass show a similar distribution of trips to the morning peak, although the more dominant use of the Page Road, Fancote Street to Davis Road distribution is noted compared to the morning peak that splits the distribution and some vehicles travel via Gilwell Avenue, Albany Highway to Davis Road. During the PM peak, the delays for the Gilwell Avenue left turn onto Albany Highway are larger and vehicles choose to route via Fancote Street instead.

The roads shown with emerging capacity issues relate to a few of the minor roads that join Albany Highway. These are usually the product of a single lane approach attempting to load a reasonably large demand onto a main carriageway. The largest average intersection delay shown across the Kelmescott Activity Centre Precinct study area during the PM peak is also the new signalised intersection of Albany Highway and Davis Road (approximately 30 seconds average delay). The other larger delays are all shown at signalised intersections along Albany highway and the new Davis Road underpass intersections.

7.5.3 2041 Summary

Commentary around the 2041 modelling should be cognisant of the fact that the operation reflects a long-range forecast year and that there have been no further infrastructure proposals to mitigate the inclusion of the Kelmescott Activity Centre Precinct Plan land use proposals. It should also be noted that the mesoscopic nature of the model should be to provide a slightly higher level of analysis where trip distribution can be checked and analysed. Although the distribution of these trips will depend on delays at intersections – while waiting at traffic signals, or waiting at a priority intersection, the results are based on an average hour's operation and will therefore “smooth” any short-term queueing or delays that

could occur within a condensed timeframe. Individual intersection results and operation could therefore differ from intersection analysis software (LinSig or Sidra).

Although there are some roads that are modelled with higher VC% and delays based on the larger forecast year 2041 demand volumes, the transport network is shown to operate reasonably over the average hour periods. It is also noted that a larger proportion of the demands travelling along Albany Highway are longer distance strategic trips rather than those associated with the Kelmescott Activity Centre Precinct Plan proposals.

Davis Road and its connection between Albany Highway and Railway Avenue continue to provide an important link between residential and school areas, a local connection for users of the Kelmescott Activity Centre Precinct and also as part of longer distance trips that need to cross the railway line between Tonkin Highway and Armadale Road. It is possible that if congestion becomes more significant along Albany Highway or Railway Avenue, that drivers may reassign between either of these routes to avoid perceived delays.

It should also be noted that overtime Perth's urban transport networks will develop to provide a wider range of opportunities for people to travel by non-car modes, whether that be by active transport (walking and cycling) or through improved public transport options. This change will likely occur in the inner metropolitan areas of Perth first and then middle/outer town centre locations, such as the Kelmescott Town Centre. The Kelmescott Activity Centre Precinct Plan supports active transport opportunities by increasing the liveability and attractiveness of the Town Centre urban corridor by (for example) improving landscaping requirements on private lots adjoining the urban corridor and by encouraging a mix of land uses.

