

Appendix J – Transport Impact Assessment Report

prepared by ALUA

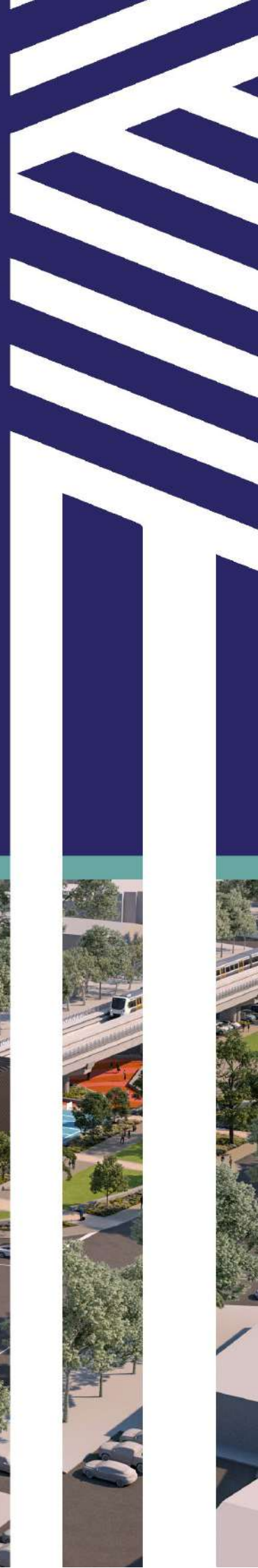
Canning Transport Impact Assessment

Victoria Park – Canning Level Crossing Removal Program

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ARMADALE LINE UPGRADE ALLIANCE



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1. Introduction

1.1 Purpose of this report

Armadale Line Upgrade Alliance (ALUA) has been commissioned by Office of Major Transport Infrastructure Delivery (OMTID) to prepare a detailed Transport Impact Assessment (TIA) for the proposed Victoria Park to Canning Level Crossing Removal (LXR) project within the City of Canning (the City). This assessment has been prepared in accordance with the Western Australian Planning Commission (WAPC) Transport Assessment Guidelines for Developments Volume 4 – Individual Developments. The key objectives of the TIA as per the WAPC guidelines are as follows:

- Assess the proposed access arrangements for all modes, that is, vehicle, public transport, pedestrian and cyclist;
- Assess the level of transport integration between the development and the surrounding land uses;
- Determine the impacts of the traffic generated by the development on the surrounding land uses; and
- Determine the impacts of the traffic generated by the development on the surrounding transport networks.

2. Proposed development

2.1 Project description

The Victoria Park to Canning Level Crossing Removal Project (VPCLXR) will involve all design and construction of the VPCLXR works including commissioning, interconnection with the existing passenger rail line network and Final Asset Acceptance of those works.

The VPCLXR project is Perth's first major elevated rail line that will improve public transport safety, reduce traffic congestion and create new publicly accessible spaces for ongoing use by the community within the existing rail corridor. The VPCLXR project includes the following key components:

- Three sections of new elevated rail line, or viaduct, comprising piers, pier headstock and 'U trough/s'
- The removal of six (6) existing level crossings at Mint Street, Oats Street, Welshpool Road, Hamilton Street, Wharf Street and William Street
- The development of five (5) new, modern elevated train stations at Carlisle, Oats Street, Queens Park, Cannington and Beckenham
- The removal of the existing Welshpool Train Station
- New station precincts at ground plane level around each of the new train stations including bus facilities at Oats Street and Cannington Stations, patron parking and landscaping
- New ground level public realm works between station precincts incorporating public spaces and facilities.

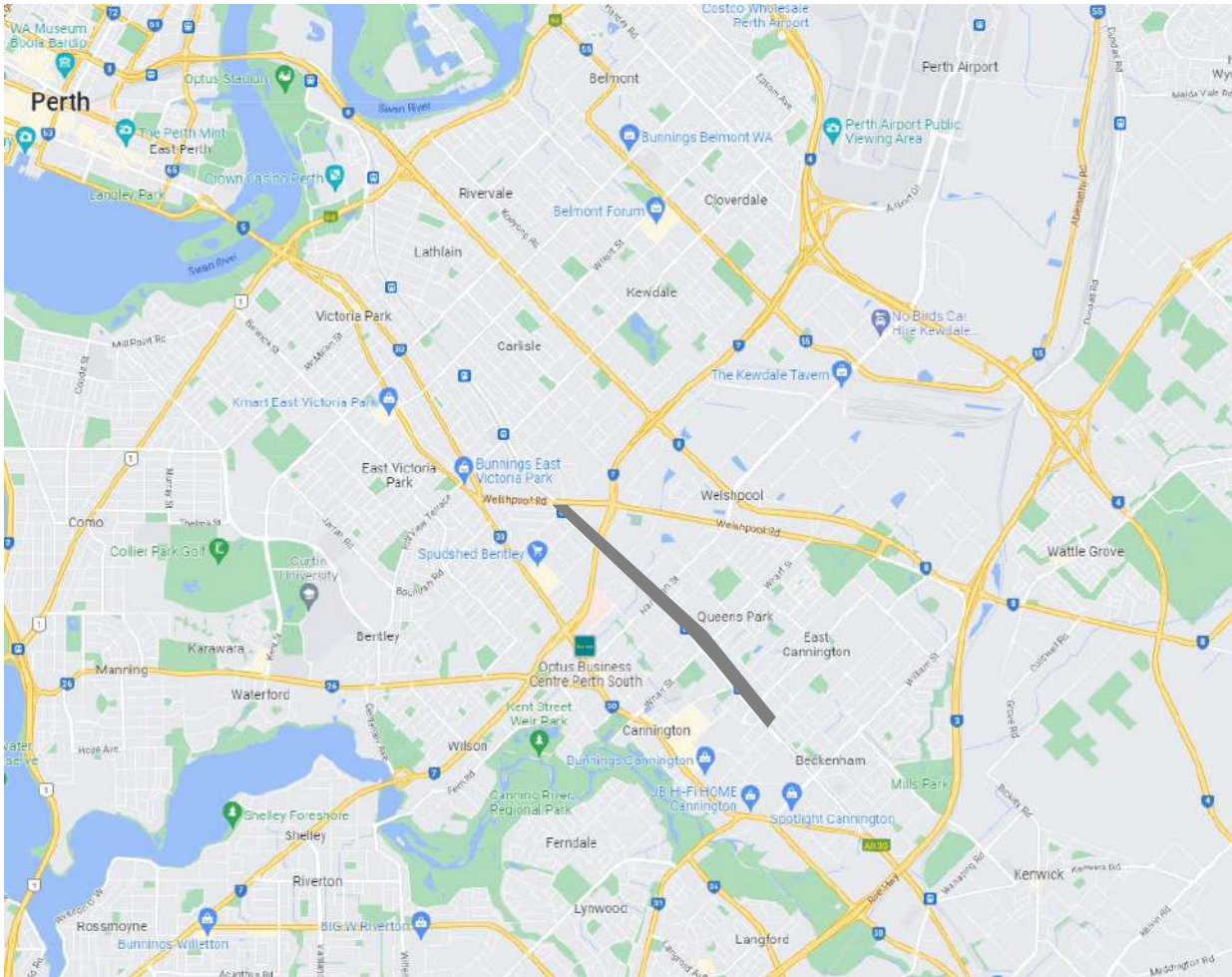
The scope of this Transport Impact Assessment is the extent of the development within the City of Canning. Within this scope, the project includes:

- Development of high-amenity public open space including an internal path network and community facilities
- Construction of a continuous Principal Shared Path connecting residents with the stations and with regional destinations, with improved road crossings for the Principal Shared Path.
- Removal of level crossings, with elevated rail over Welshpool Road, Hamilton Street, and Wharf Street
- Decommissioning of Welshpool Station due to low patronage
- Elevated station at Queens Park
- Elevated station at Cannington
- Upgrades to Cannington Station Bus Interchange
- Provision of increased secure bicycle parking at Queens Park and Cannington Stations
- Local road works and intersection modifications.

2.2 Regional context

The proposed development follows the existing Armadale Train Line. The extent of the project area within the City of Canning is shown in Figure 2.2.

FIGURE 2.1 REGIONAL CONTEXT OF SITE



Source: Google Maps (accessed January 2023)

FIGURE 2.2 LOCAL CONTEXT OF SITE

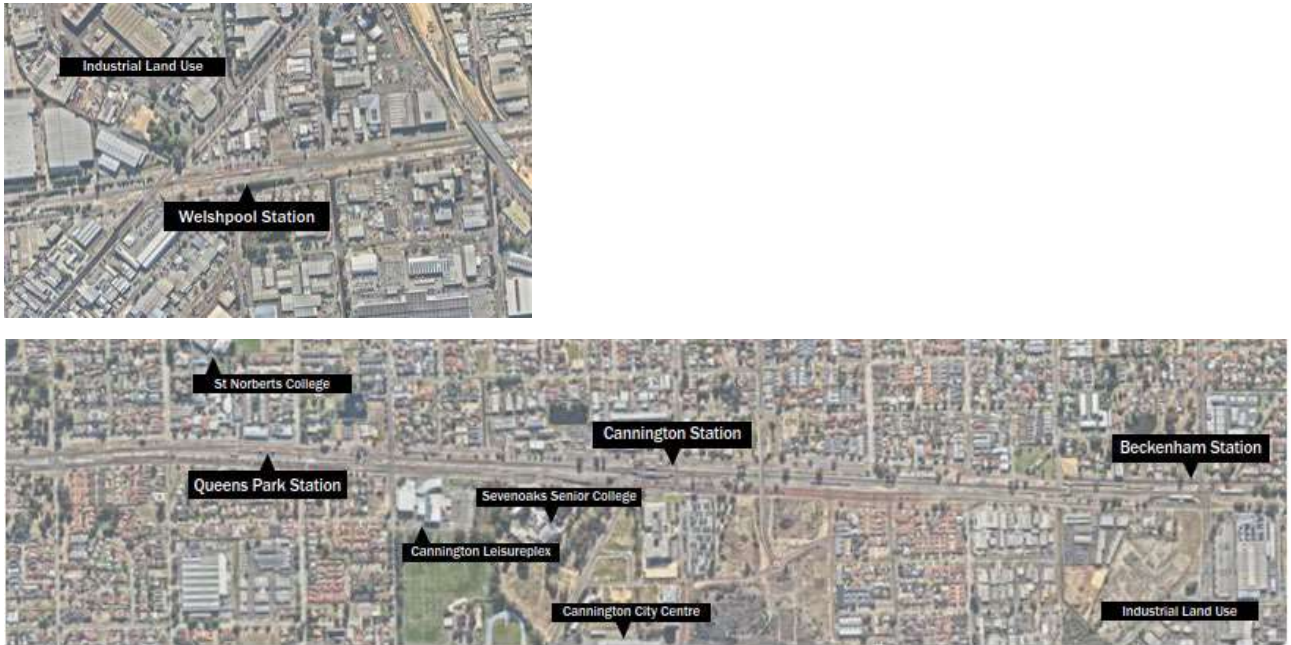


Source: Nearmap (accessed December 2022)

2.3 Major attractors/ generators

Key attractions surrounding the site are shown in Figure 2.3.

FIGURE 2.3 MAJOR ATTRACTORS/ GENERATORS



Source: Armadale Line Upgrade Alliance, Reference Design Stage – Project Definition Report, 2022

Welshpool Station is located within an industrial area with limited major attractors or trip generators surrounding.

Queens Park Station is a suburban station with limited major attractors or trip generators surrounding. Queens Park Station provides access to residents and to local shops on Railway Parade and Sevenoaks Street. St Norberts College (a secondary school catering for students years 6 to 12) is located within 800m (typically a 10-minute walking distance) of the Station.

Cannington Station is a bus/rail interchange station providing interchange opportunities as well as access to the Canning City Centre. The location is within 800m of Sevenoaks Senior College, the Cannington Leisureplex and Westfield Carousel Shopping Centre.

3. Existing situation

3.1 Existing site

The existing site is the Armadale Rail Line, which includes at-grade railway tracks, associated signalling infrastructure, train stations, car parking, shared paths, and general site improvements such as landscaping. There are existing level crossings at Welshpool Road, Hamilton Street and Wharf Street.

The existing station layouts for Welshpool, Queens Park and Cannington Stations are shown in Figure 3.1 to Figure 3.4. The existing station facilities are summarised in Table 3.1.

FIGURE 3.1 WELSHPOOL STATION EXISTING LAYOUT

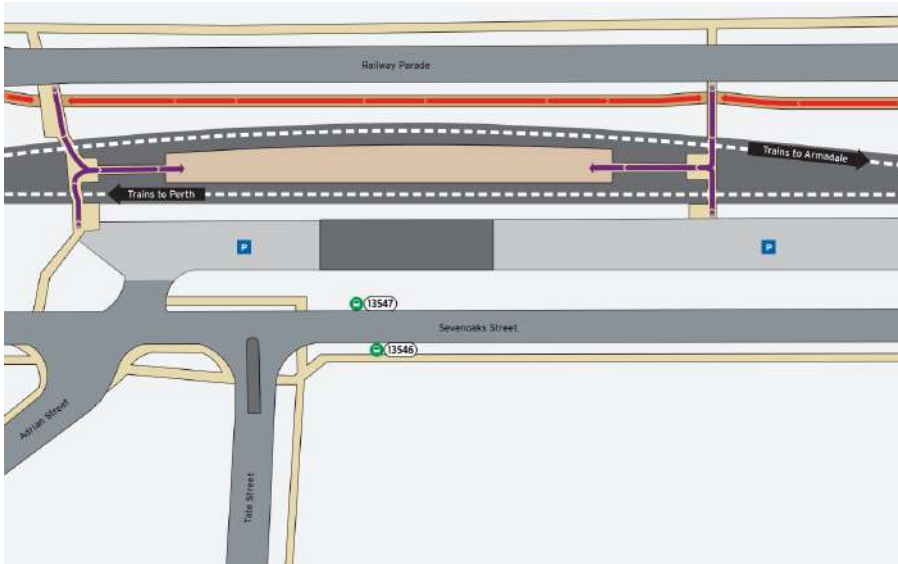


FIGURE 3.2 QUEENS PARK STATION EXISTING LAYOUT

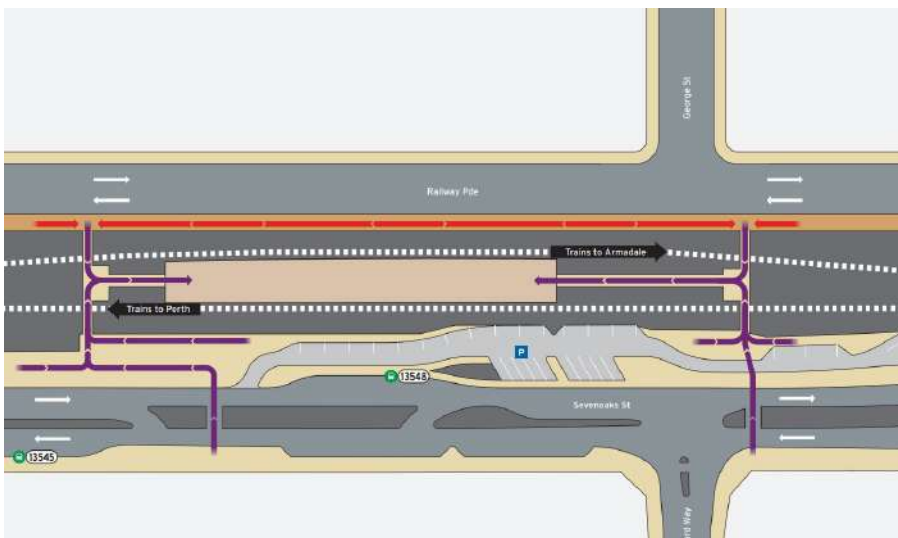


FIGURE 3.3 CANNINGTON STATION EXISTING LAYOUT

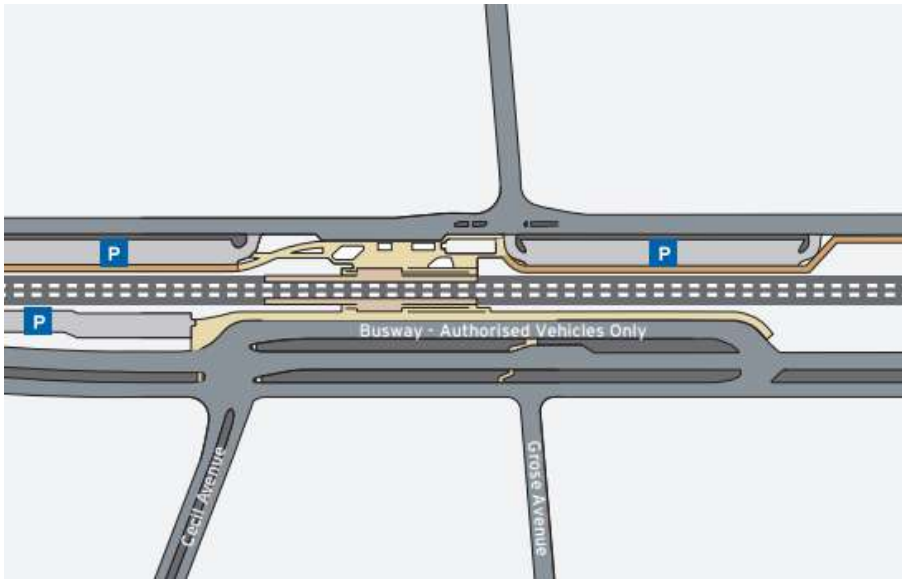


FIGURE 3.4 CANNINGTON BUS INTERCHANGE

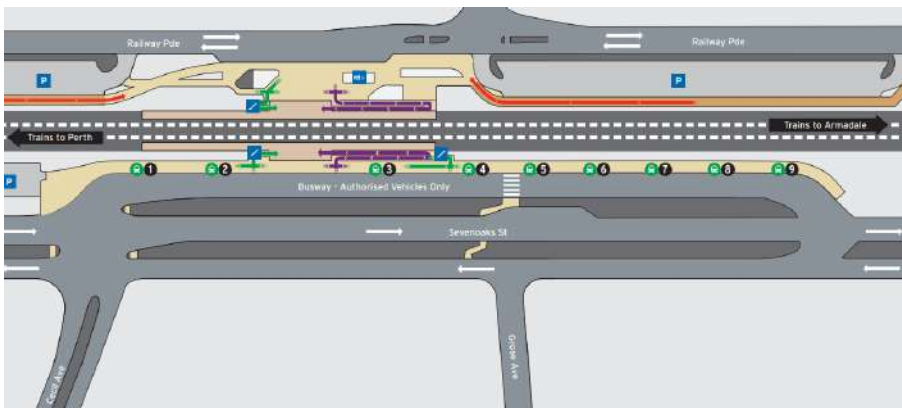


TABLE 3.1 EXISTING STATION FACILITIES

	WELSHPOOL STATION	QUEENS PARK STATION	CANNINGTON STATION
PLATFORM TYPE	Island platform	Island platform	Marginal platform
BUS INTERCHANGE	No bus interchange	No bus interchange	9 bus stands
CAR PARKING	67 car parking bays including ACROD bays	71 car parking bays including ACROD bays	303 car parking bays including ACROD bays
KISS 'N' RIDE	No formal kiss 'n' ride	2 kiss 'n' ride bays	Informal short term parking available on Railway Parade
BICYCLE PARKING	2 Bicycle lockers	24 bicycle spaces in shelter, 12 u-rails	48 bicycle spaces in shelter, 3 u-rails

Existing car parking demand at stations

Existing car parking facilities and access is discussed in Section 4.1, presented in a discussion of existing station facilities. Parking occupancy for each station is shown in the table below. While data was collected in different years, it is considered suitably similar for comparison purposes as it relates to average weekday usage over similar time periods in each year.

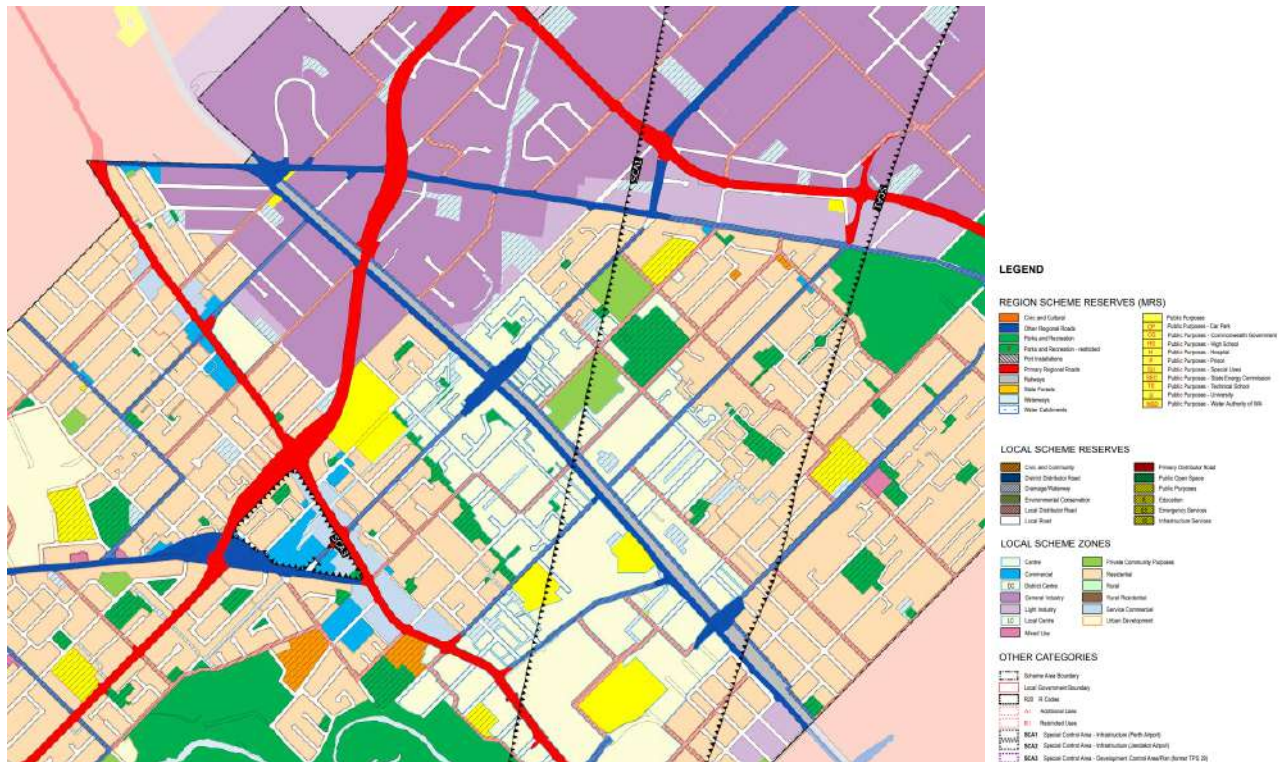
TABLE 3.2 CAR PARKING OCCUPANCY

STATION	OCCUPANCY	YEAR
Welshpool	52%	2017
Queens Park	33%	2019
Cannington	71%	2018

3.2 Existing land use

The City’s Local Planning Scheme No. 42 is shown in Figure 3.5. The site is shown as Railway under the Metropolitan Region Scheme (MRS) Reserves. The train line runs through general industry area, as well as the Canning Activity Centre.

FIGURE 3.5 CITY OF CANNING LOCAL PLANNING SCHEME NO. 42 ZONING MAP

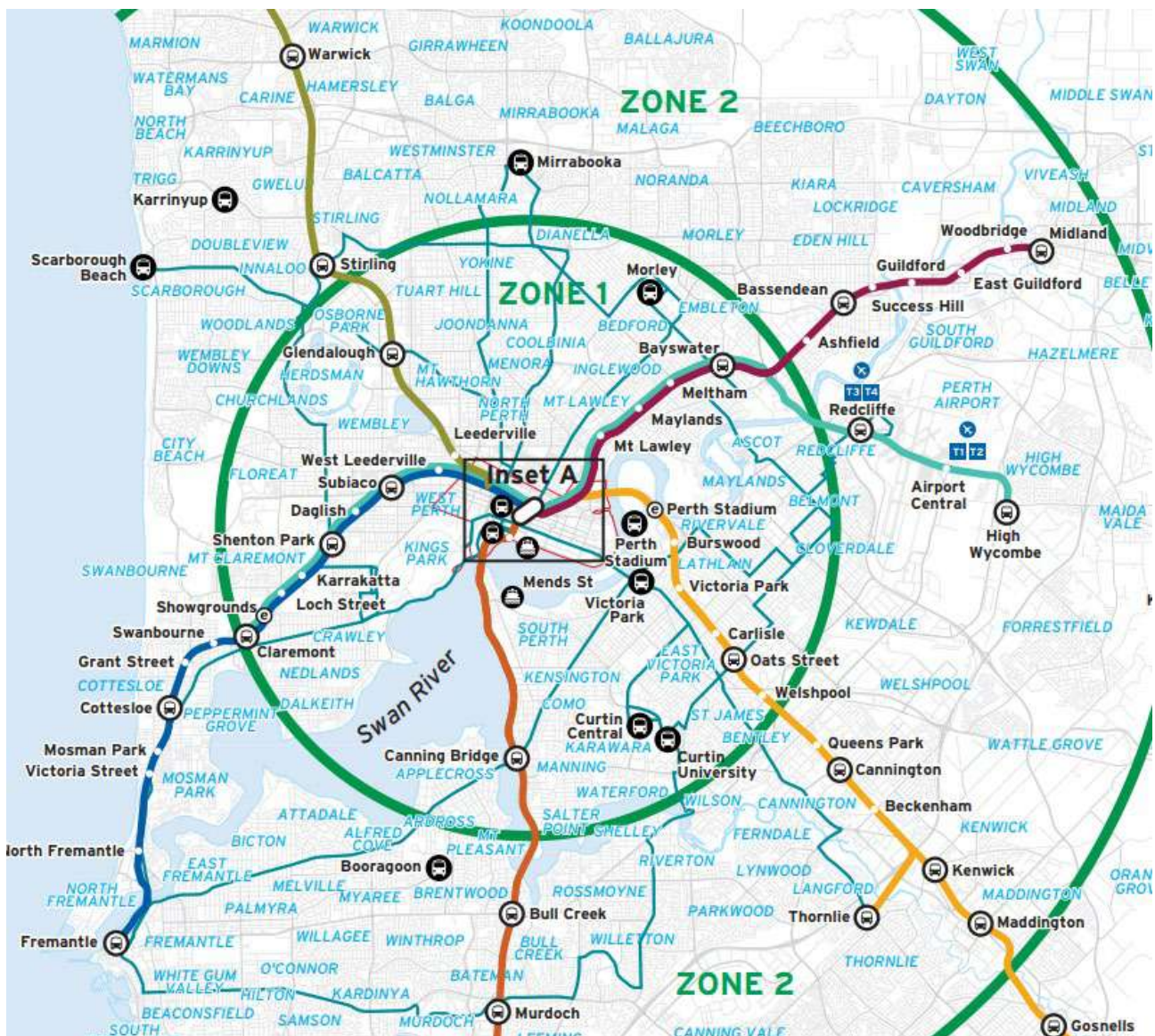


Source: City of Canning Intramaps (accessed December 2022)

3.3 Existing public transport

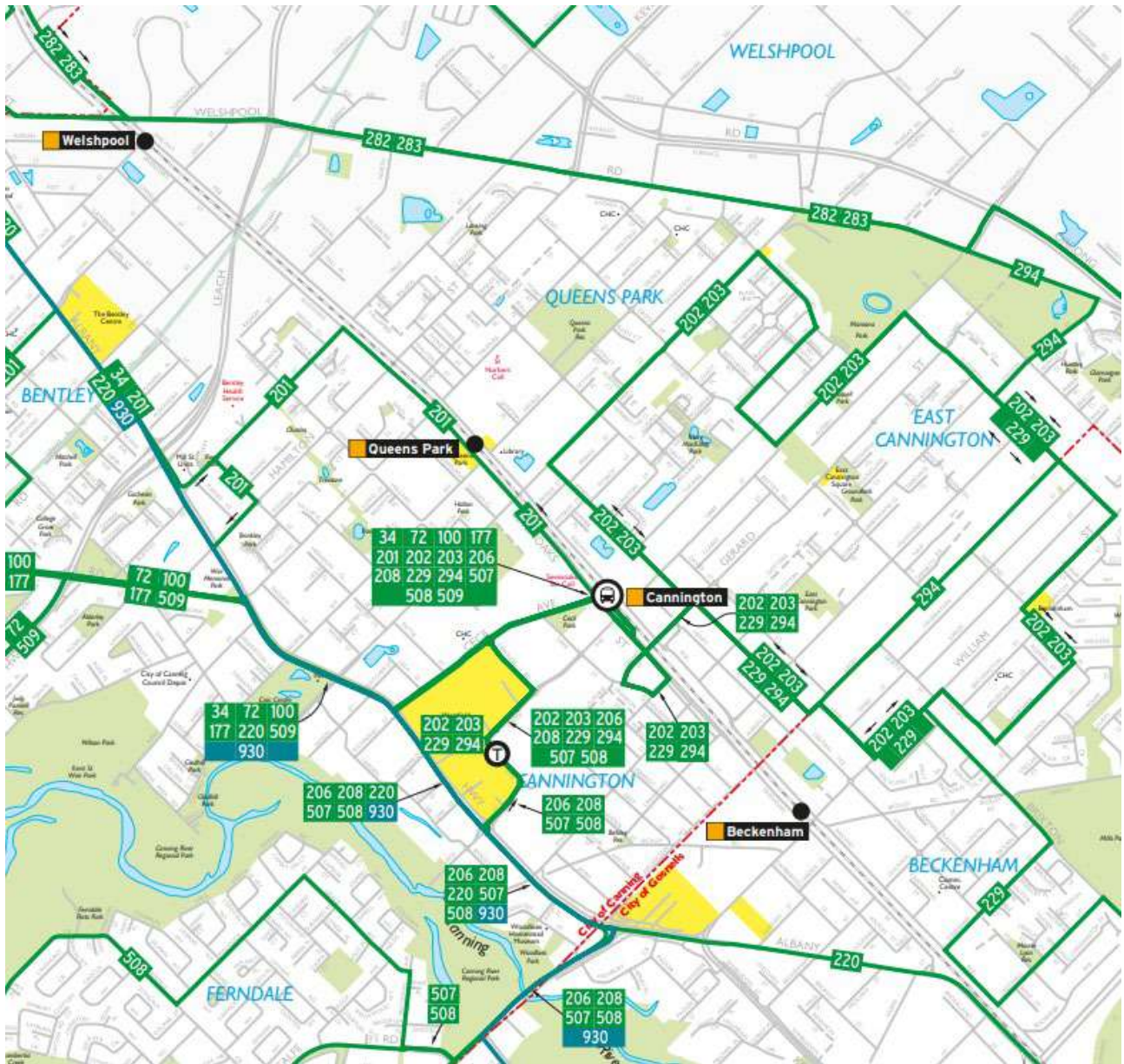
The existing public transport network within the plan area includes the Armadale Rail Line, Welshpool Station, Queens Park Station, Cannington Station and its bus interchange. As shown in Figure 3.6, Welshpool Station is located within Zone 1, and Queens Park and Cannington Stations are located within Zone 2. The bus routes for the development area and surrounds are shown in Figure 3.7. Note: bus route network maps are currently being updated by PTA, hence this figure may contain outdated information).

FIGURE 3.6 PERTH FARE ZONE MAP



Source: PTA, 2022 (accessed December 2022)

FIGURE 3.7 EXISTING SURROUNDING PUBLIC TRANSPORT ENVIRONMENT



Source: PTA Network Map 6 (accessed December 2022)

There is no direct access to Welshpool Station by bus. Bus stops on Welshpool Road can be used to access Welshpool Station. These stops are served by Routes 282 and 283, which connect Kalamunda Bus Station to Perth’s Elizabeth Quay Bus Station. Services run approximately every half hour. Transfer between Route 201 runs directly adjacent to Queens Park Station. However the bus route also services Cannington Station and there is no bus stop directly adjacent to Queens Park Station. For this reason, bus transfers at Queens Park Station are minimal. Cannington Station is serviced by a large number of buses as shown in Figure 3.7.

3.4 Existing walking and cycling network

City of Canning has an expansive path network to support walking and cycling, with annual funds allocated for the construction and maintenance of paths. The City’s cycle network, including shared paths and on road cycling routes, is shown in Figure 3.8. The City’s dense path network is shown in Figure 3.9.

FIGURE 3.8 CITY OF CANNING EXISTING CYCLING NETWORK (CITY OF CANNING CYCLING AND WALKING PLAN)



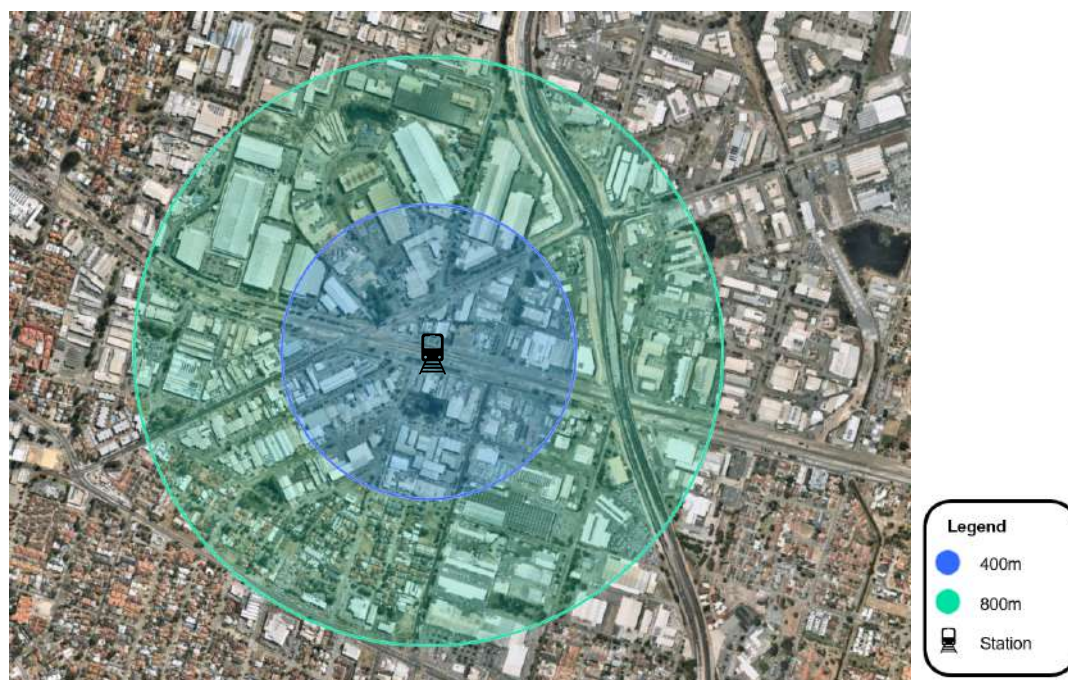
FIGURE 3.9 CITY OF CANNING EXISTING PATH NETWORK



The walking catchments for Welshpool Station, Queens Park Station and Cannington Station are shown in Figure 3.10 to Figure 3.12. The cycling catchments (2.5km or approximately 10-minutes riding time) for Welshpool Station, Queens Park Station and Cannington Station are shown in Figure 3.13 . Currently, people using the path network cross the rail line at-grade via mazes. Mazes require people on bikes to dismount.

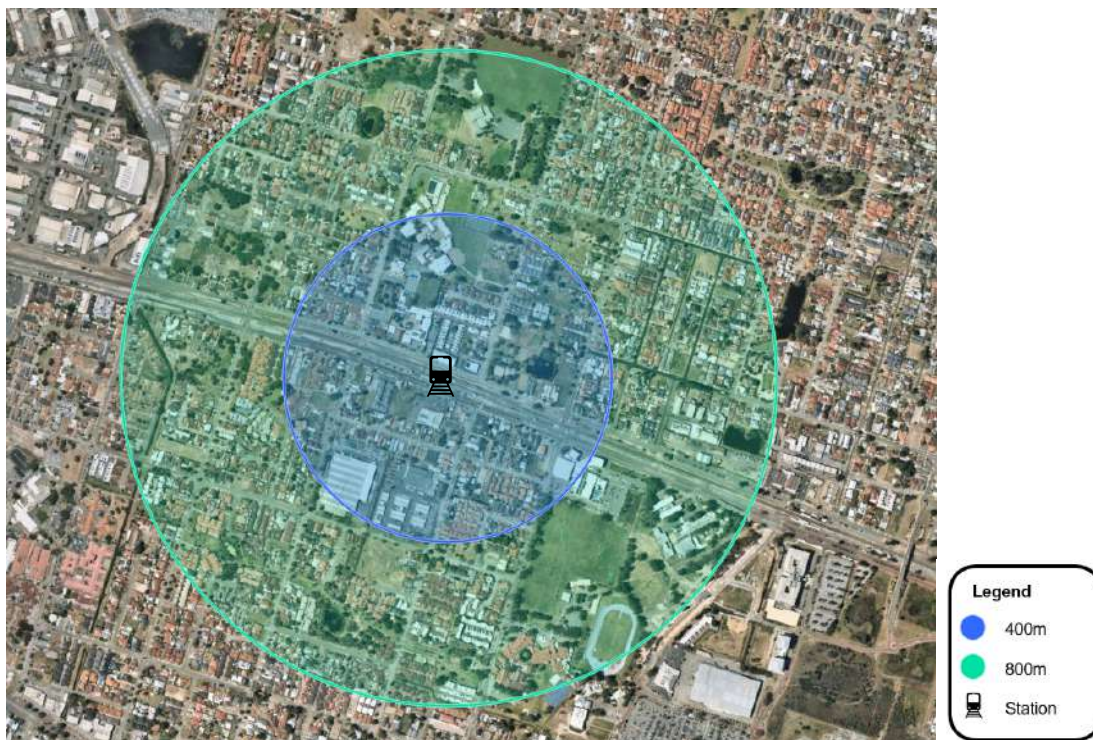
The station walking and riding catchments generally benefit from grid road network layouts, which support legible access to Stations and surrounding destinations. Queens Park Station in particular sees significant patronage accessing the station via walking. Smaller, local streets do not always have paths provided. Main connectors typically have paths on at least one side of the street. There is a Principal Shared Path running along the rail corridor.

FIGURE 3.10 WELSHPOOL STATION WALKING CATCHMENT



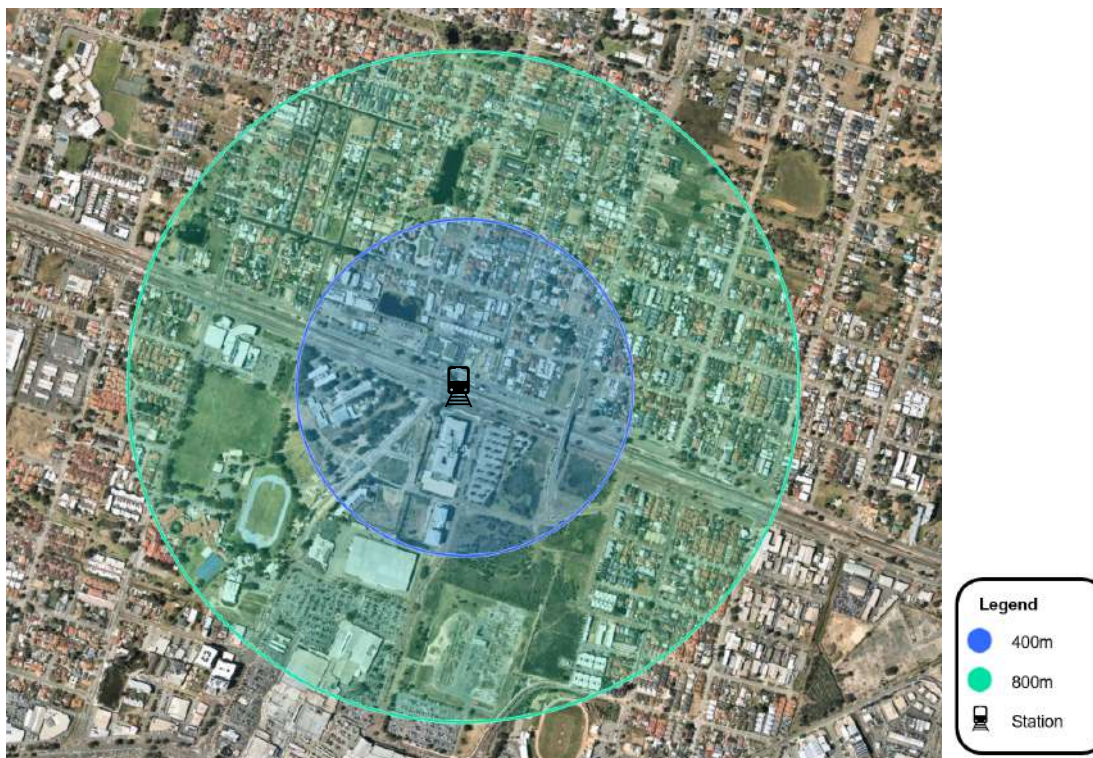
Source: Nearmap (accessed November 2022)

FIGURE 3.11 QUEENS PARK STATION WALKING CATCHMENT



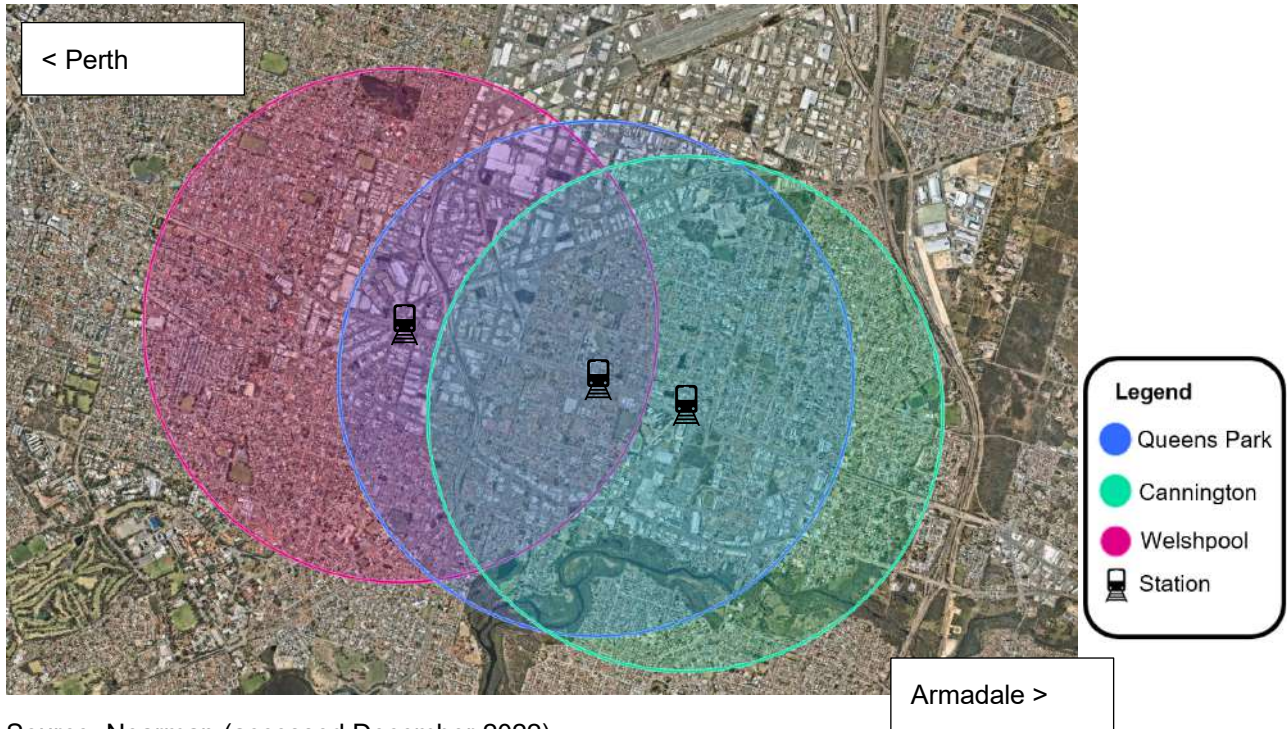
Source: Nearmap (accessed December 2022)

FIGURE 3.12 CANNINGTON STATION WALKING CATCHMENT



Source: Nearmap (accessed December 2022)

FIGURE 3.13 WELSHPOOL, QUEENS PARK AND CANNINGTON STATIONS CYCLING CATCHMENT

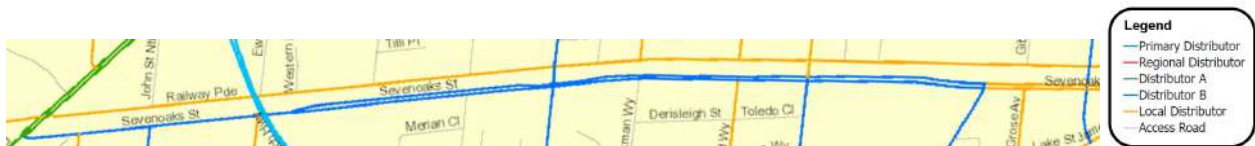


Source: Nearmap (accessed December 2022)

3.5 Existing road network

The existing road network hierarchy surrounding the site is shown in Figure 3.14. The road network surrounding the site is classified as Local Distributor (Railway Parade) and Distributor B (Sevenoaks Street). Level crossings will be removed at Welshpool Road (Distributor A), Hamilton Street (Distributor B) and Wharf Street (Distributor B/Local Distributor). The criteria and functions of these road types are summarised in Table 3.3 below.

FIGURE 3.14 EXISTING ROAD NETWORK HIERARCHY



Source: Main Roads WA, Road Information Mapping System (accessed December 2022)

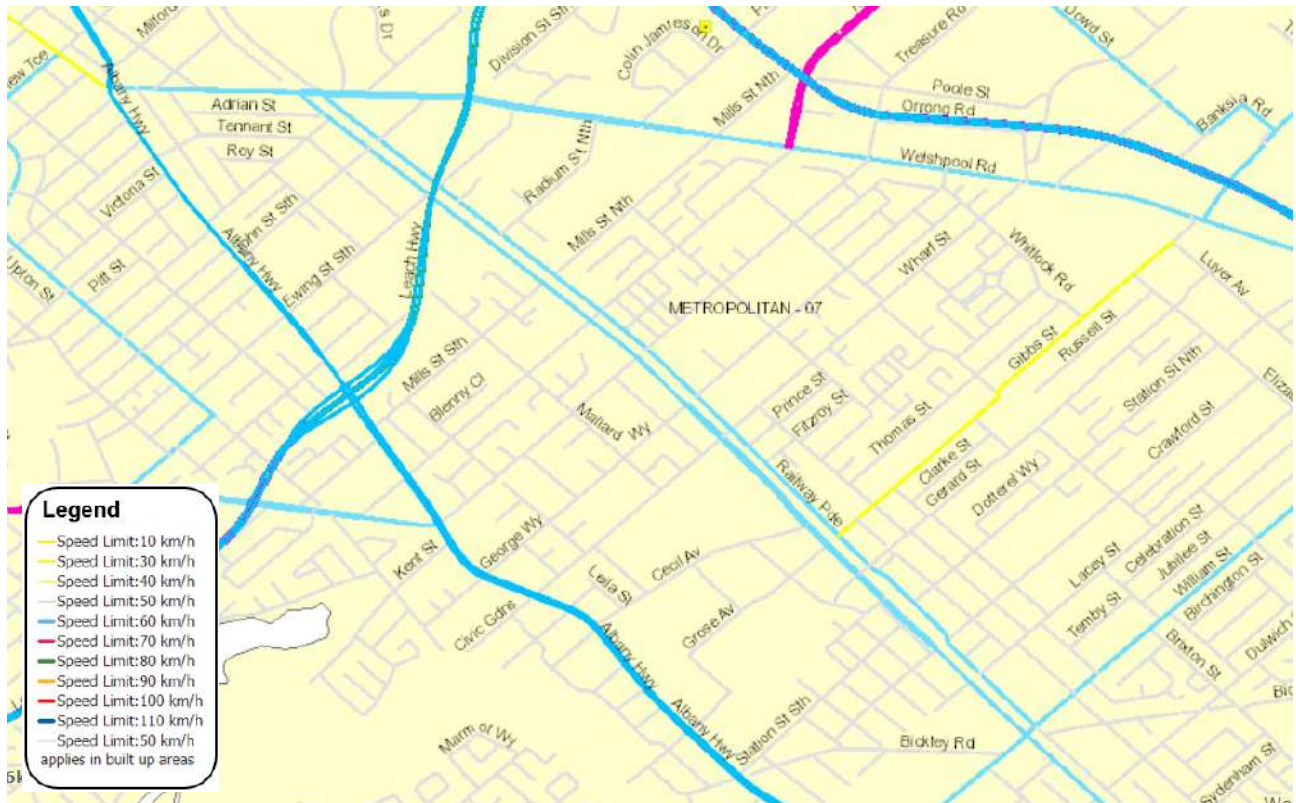
TABLE 3.3 ROAD HIERARCHY TYPES AND CRITERIA

CRITERIA	PRIMARY DISTRIBUTOR (PD) (see Note 2)	DISTRICT DISTRIBUTOR A (DA)	DISTRICT DISTRIBUTOR B (DB)	REGIONAL DISTRIBUTOR (RD)	LOCAL DISTRIBUTOR (LD)	ACCESS ROAD (A)
<i>Primary Criteria</i>						
1. Location (see Note 3)	All of WA incl. BUA	Only Built Up Area.	Only Built Up Area.	Only Non Built Up Area. (see Note 4)	All of WA incl. BUA	All of WA incl. BUA
2. Responsibility	Main Roads Western Australia.	Local Government.	Local Government.	Local Government.	Local Government.	Local Government.
3. Degree of Connectivity	High. Connects to other Primary and Distributor roads.	High. Connects to Primary and/or other Distributor roads.	High. Connects to Primary and/or other Distributor roads.	High. Connects to Primary and/or other Distributor roads.	Medium. Minor Network Role Connects to Distributors and Access Roads.	Low. Provides mainly for property access.
4. Predominant Purpose	Movement of Inter regional and/or cross town/city traffic, e.g. freeways, highways and main roads.	High capacity traffic movements between industrial, commercial and residential areas.	Reduced capacity but high traffic volumes travelling between industrial, commercial and residential areas.	Roads linking significant destinations and designed for efficient movement of people and goods between and within regions.	Movement of traffic within local areas and connect access roads to higher order Distributors.	Provision of vehicle access to abutting properties
<i>Secondary Criteria</i>						
5. Indicative Traffic Volume (AADT)	In accordance with Classification Assessment Guidelines.	Above 8 000 vpd	Above 6 000 vpd.	Greater than 100 vpd	Built Up Area - Maximum desirable volume 6 000 vpd. Non Built Up Area – up to 100 vpd.	Built Up Area - Maximum desirable volume 3 000 vpd. Non Built Up Area – up to 75 vpd.
6. Recommended Operating Speed	60 – 110 km/h (depending on design characteristics).	60 – 80 km/h.	60 – 70 km/h.	50 – 110 km/h (depending on design characteristics).	Built Up Area 50 – 60 km/h (desired speed) Non Built Up Area 60 – 110 km/h (depending on design characteristics).	Built Up Area 60 km/h (desired speed). Non Built Up Area 50 – 110 km/h (depending on design characteristics).
7. Heavy Vehicles permitted	Yes.	Yes.	Yes.	Yes.	Yes, but preferably only to service properties.	Only to service properties.
8. Intersection treatments	Controlled with appropriate measures e.g. high speed traffic management, signing, line marking, grade separation.	Controlled with appropriate measures e.g. traffic signals.	Controlled with appropriate Local Area Traffic Management	Controlled with measures such as signing and line marking of intersections.	Controlled with minor Local Area Traffic Management or measures such as signing.	Self controlling with minor measures.
9. Frontage Access	None on Controlled Access Roads. On other routes, preferably none, but limited access is acceptable to service individual properties.	Prefer not to have residential access. Limited commercial access, generally via service roads.	Residential and commercial access due to its historic status. Prefer to limit when and where possible.	Prefer not to have property access. Limited commercial access, generally via lesser roads.	Yes, for property and commercial access due to its historic status. Prefer to limit whenever possible. Side entry is preferred.	Yes.
10. Pedestrians	Preferably none. Crossing should be controlled where possible.	With positive measures for control and safety e.g. pedestrian signals.	With appropriate measures for control and safety e.g. median/islands refuges.	Measures for control and safety such as careful siting of school bus stops and rest areas.	Yes, with minor safety measures where necessary.	Yes
11. Buses	Yes.	Yes.	Yes.	Yes.	Yes.	If necessary (see Note 5)
12. On-Road Parking	No (emergency parking on shoulders only).	Generally no. Clearways where necessary.	Not preferred. Clearways where necessary.	No – emergency parking on shoulders – encourage parking in off road rest areas where possible.	Built Up Area – yes, where sufficient width and sight distance allow safe passing. Non Built Up Area – no. Emergency parking on shoulders.	Yes, where sufficient width and sight distance allow safe passing.
13. Signs & Linemarking	Centrelines, speed signs, guide and service signs to highway standard.	Centrelines, speed signs, guide and service signs.	Centrelines, speed signs, guide and service signs.	Centrelines, speed signs and guide signs.	Speed and guide signs.	Urban areas – generally not applicable. Rural areas - Guide signs.
14. Rest Areas/Parking Bays	In accordance with Main Roads' Roadside Stopping Places Policy	Not Applicable.	Not Applicable.	Parking Bays/Rest Areas. Desired at 60km spacing.	Not Applicable.	Not Applicable.

Source: Main Roads, WA, Road Hierarchy for Western Australia, Road Types and Criteria (accessed January 2023)

The existing speed zoning on the road network surrounding the site are shown in Figure 3.15. The streets running parallel to the railway line are 60km/hr. The site is surrounded by a network of local streets with a 50km/hr speed limit, including Hamilton Street and Wharf Street.

FIGURE 3.15 EXISTING SPEED ZONES



Source: Main Roads WA, Road Information Mapping System (accessed December 2022)

3.6 Existing traffic volumes

The existing traffic volumes for the site are detailed in Table 3.4 to Table 3.6.

TABLE 3.4 EXISTING TRAFFIC VOLUMES FOR WHARF STREET/ SEVENOAKS STREET

ROAD	DIRECTION	LOCATION	DAILY (VPD)	HV CONTENT	AM PEAK (VPH)	PM PEAK (VPH)
Wharf Street	Westbound	West of Sevenoaks St	5330	1.36%	330	287
Wharf Street	Eastbound	West of Sevenoaks St	2332	3.08%	199	195
Wharf Street	Westbound	East of Sevenoaks St	6070	1.51%	294	292
Wharf Street	Eastbound	East of Sevenoaks St	3423	3.47%	201	305

ROAD	DIRECTION	LOCATION	DAILY (VPD)	HV CONTENT	AM PEAK (VPH)	PM PEAK (VPH)
Sevenoaks Street	Northbound	North of Wharf St	7645	3.62%	622	655
Sevenoaks Street	Southbound	North of Wharf St	6582	2.96%	430	723
Sevenoaks Street	Northbound	South of Wharf St	7136	3.70%	599	672
Sevenoaks Street	Southbound	South of Wharf St	5722	3.04%	369	635

TABLE 3.5 EXISTING TRAFFIC VOLUMES FOR HAMILTON STREET/ SEVENOAKS STREET

ROAD	DIRECTION	LOCATION	DAILY (VPD)	HV CONTENT	AM PEAK (VPH)	PM PEAK (VPH)
Hamilton Street	Westbound	West of Sevenoaks St	2132	2.39%	208	204
Hamilton Street	Eastbound	West of Sevenoaks St	1968	3.00%	230	168
Hamilton Street	Westbound	East of Sevenoaks St	5058	2.98%	555	446
Hamilton Street	Eastbound	East of Sevenoaks St	5298	3.70%	458	444
Sevenoaks Street	Northbound	North of Hamilton St	6676	2.65%	694	517
Sevenoaks Street	Southbound	North of Hamilton St	6110	2.44%	342	655
Sevenoaks Street	Northbound	South of Hamilton St	6988	3.74%	587	545
Sevenoaks Street	Southbound	South of Hamilton St	6018	2.94%	354	649

TABLE 3.6 EXISTING TRAFFIC VOLUMES FOR WELSHPOOL ROAD/ SEVENOAKS STREET

ROAD	DIRECTION	LOCATION	DAILY (VPD)	HV CONTENT	AM PEAK (VPH)	PM PEAK (VPH)
Welshpool Road	Westbound	West of Sevenoaks St	7878	4.60%	628	663
Welshpool Road	Eastbound	West of Sevenoaks St	9768	4.53%	712	922
Welshpool Road	Westbound	East of Sevenoaks St	6732	8.67%	467	541
Welshpool Road	Eastbound	East of Sevenoaks St	8397	7.20%	590	737
Sevenoaks Street	Northbound	South of Welshpool Rd	5176	5.75%	399	435
Sevenoaks Street	Southbound	South of Welshpool Rd	5401	6.60%	360	498

Existing intersection performance

Extensive queuing is observed for current intersection performance. This typically results when boomgates are lowered for an extensive period. Boomgates have been observed to be commonly lowered in excess of 80 seconds, particularly during the AM peak. This has a significant negative impact on level of service.

3.7 Crash data

The crash data surrounding the site is shown in Figure 3.16. The crash data for Sevenoaks Street and Railway Parade including type of crash, crash severity and frequency between 2017-2021, including intersection and mid-block crashes is summarised in Table 3.7. No fatalities have been recorded.

FIGURE 3.16 CRASH DATA MAP



TABLE 3.7 SEVENOAKS STREET AND RAILWAY PARADE CRASH DATA 2017-2021

CRASH TYPE	CRASH SEVERITY				
	PROPERTY DAMAGE (MINOR)	PROPERTY DAMAGE (MAJOR)	MEDICAL ATTENTION	HOSPITAL	FATAL
HIT PEDESTRIAN	0	0	0	3	0
HIT OBJECT	1	7	0	2	0
REAR END	23	48	10	1	0
RIGHT ANGLE	21	60	11	5	0
RIGHT TURN THROUGH	7	33	3	4	0
SIDESWIPE (SAME DIRECTION)	6	10	4	0	0
OTHER	6	4	1	0	0
TOTAL	64	162	29	15	0

This LXR project is intended to improve safety for all by reducing the risk of conflicts between a variety of road users. It is unclear from the data available whether any of the crash instances involved collision between train and vehicle or pedestrian, however risk of such is avoided by LXR.

4. Proposed internal transport networks

This section focuses on direct access to the stations via walking and riding, public transport, and from park 'n' ride facilities. Each upgraded station will have a concourse level providing access to elevated platforms.

4.1 Public transport

Station facilities

The upgraded station facilities proposed by the development for Queens Park and Cannington stations are summarised in Table 4.1 and Table 4.2 below.

Welshpool Station is being removed due to low patronage, hence a summary of proposed station facilities is not provided.

TABLE 4.1 QUEENS PARK STATION PROPOSED FACILITIES

	QUEENS PARK STATION – EXISTING FACILITIES	QUEENS PARK STATION – PROPOSED FACILITIES
PLATFORM TYPE	Island platform with four access points	Marginal platform with six access points, three for each platform (stairs and 2 lifts)
BUS INTERCHANGE	Stop outside station serving bus route 201 (connecting Cannington Station and Curtin University)	Stop near station serving bus route 201
CAR PARKING AND KISS AND RIDE	Refer to parking section	Refer to parking section
BICYCLE PARKING	24 bicycle spaces (accommodated in one shelter), 12 u-rails	30 bicycle bays, 8 u-rails

TABLE 4.2 CANNINGTON STATION PROPOSED FACILITIES

	CANNINGTON STATION - EXISTING	CANNINGTON STATION - PROPOSED
PLATFORM TYPE	Marginal platform with two access points each via stairs and ramp plus underpass connecting north and south	Island platform with four access points to platform (2 stairs and 2 lifts). Inclusion of 2 future escalators is provided.
BUS INTERCHANGE	Nine bus stands	16 active bus stands (including 2 articulated bus bays), plus 8 layover bays (including 2 articulated bus bays)
CAR PARKING	297 car parking bays including: 6 ACROD bays 2 Staff bays	293 car parking bays including: 6 ACROD bays 4 Electric Vehicle charging bays 4 Staff bays 2 Emergency vehicle bays 2 Service Bays 1 Universal/taxi bay 1 Tenant parking bay 1 Loading bay 1 Accessible short term and Passenger set down bay Plus an additional: 3 Track Side Equipment Room (TSER) bays 6 Motorcycle bays
KISS 'N' RIDE	Short term parking available on the eastern side of the station (Railway Parade) integrated with taxi stand	3 Kiss 'n' Ride bays Note kiss and ride bays are included in total car parking figure
BICYCLE PARKING	Bike shelter and u-rail	50 bicycle bays

Bus interchange

The bus interchange at Cannington will provide for 16 active bus stands as well as 8 layover bays.

The key desire line between the bus interchange and the station is shown in Figure 4.1.

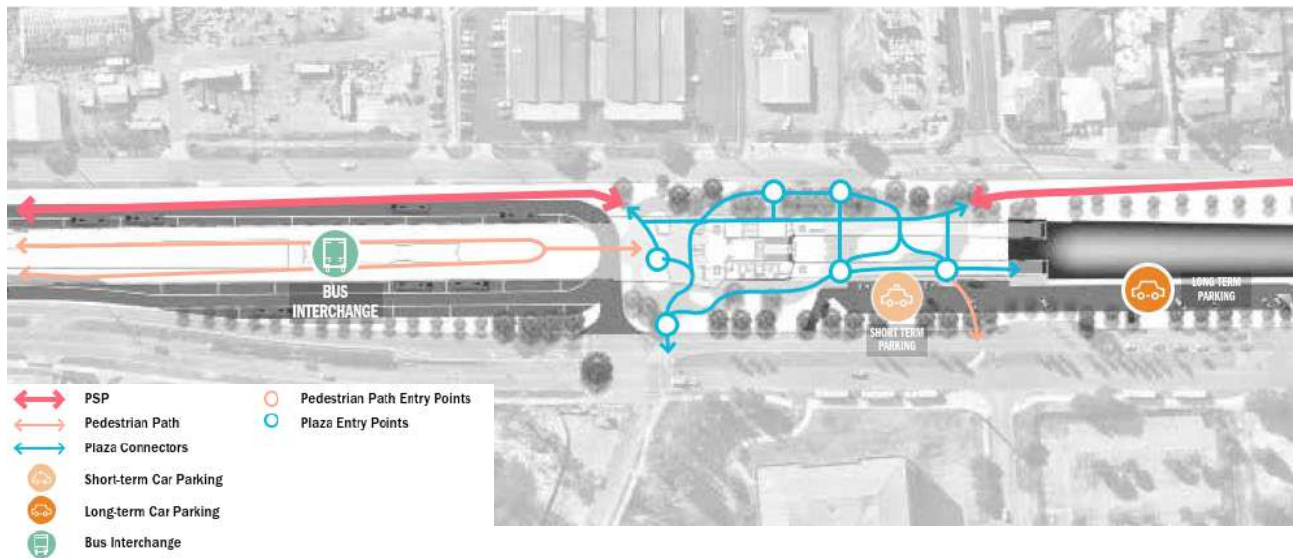
A dedicated pedestrian crossing (zebra crossing) is provided at the northern end of the interchange, and a signalised pedestrian crossing operating under full protection is provided at the southern end of the interchange.

This preferred option provides additional green time for pedestrians when compared to the other options assessed, including the option presented as part of the reference design. The pedestrian

crossing connects to the station entrance, providing direct and seamless connection for bus-to-train transfers.

Additionally, traffic modelling has been undertaken to determine that the interactions between the signalised pedestrian crossing, buses utilising the busway as well as Sevenoaks Street are acceptable for all modes interacting along the desire line shown across the bus interchange in Figure 4.1.

FIGURE 4.1 LOCAL ACCESS TO CANNINGTON BUS STATION



Source: Armadale Line Upgrade Alliance, Project Definition Report, 2022

The future bus routes their and frequencies using the bus interchange are summarised in Table 4.3. Note all frequencies are estimates.

TABLE 4.3 CANNINGTON BUS INTERCHANGE BUS ROUTE FUTURE FREQUENCIES

ROUTE	AM AND PM PEAK	AM AND PM CONTRAFLOW	OFF PEAK	NIGHT
34	5 min	10 min	15 min	15 to 30 min
36	10 to 20 min	10 to 20 min	30 min	30 min
51	7 to 8 min	15 min	15 min	30 min
72	10 min	15 min	15 min	30 min
177	15 min	15 min	30 min	60 min
200	15 min	15 min	30 min	60 min
201	20 min	20 min	60 min	30 min
202	15 min	-	30 min	60 min
203	15 min	-	30 min	60 min
205	10 min	10 min	15 min	30 min
206	10 min	10 min	15 min	30 min

ROUTE	AM AND PM PEAK	AM AND PM CONTRAFLOW	OFF PEAK	NIGHT
208	15 min	15 min	60 min	30 min
227	15 min	30 min	30 min	60 min
229	10 min	10 min	30 min	60 min
280	10 min	10 min	15 min	30 min
285	15 min	15 min	60 min	30 min
286	15 min	15 min	60 min	30 min
508	10 min	10 min	30 min	30 min
509	10 min	10 min	30 min	30 min
920	5 min	5 min	10 min	15 min
925	5 min	5 min	10 min	15 min

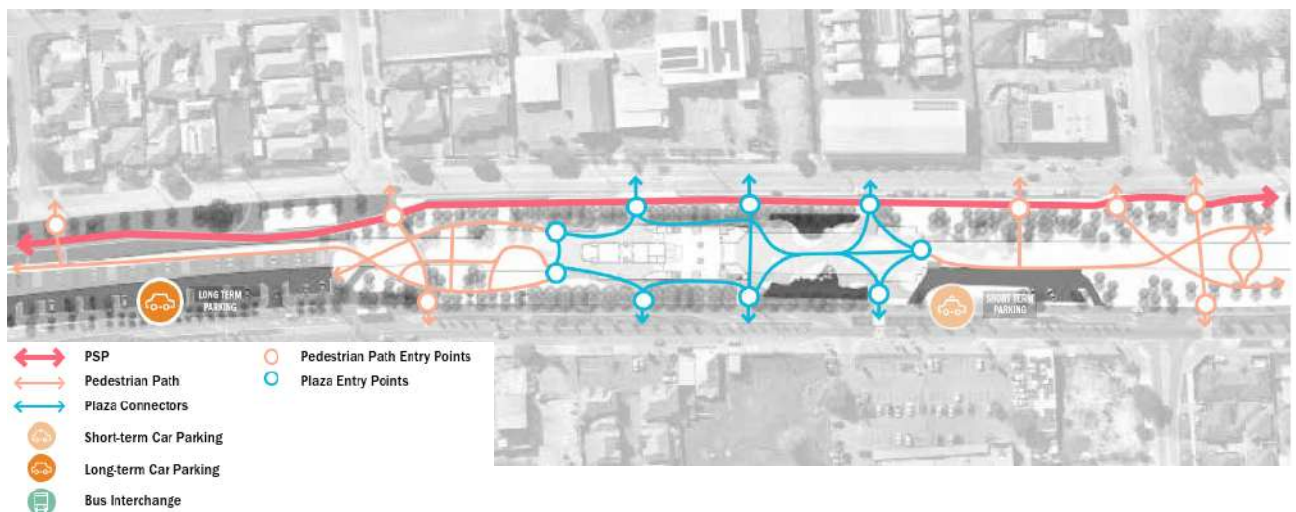
Source: Information provided by PTA, 2022

4.2 Walking and cycling

The development will improve walking and riding access at the concourse and to the Station platforms.

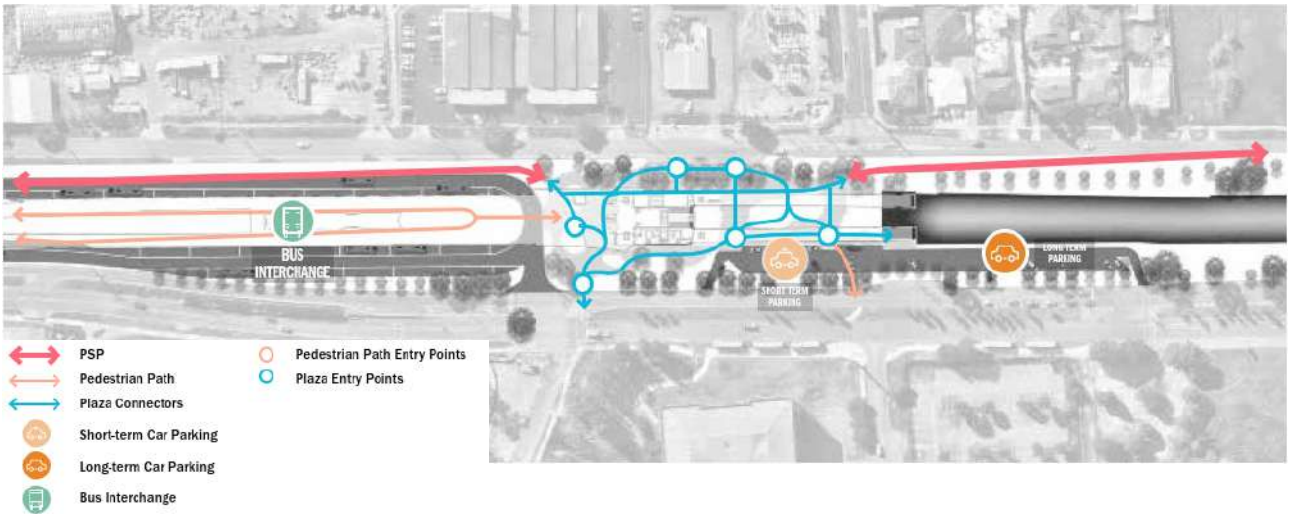
The key pedestrian desire lines and access points to Queens Park and Cannington Stations are shown in Figure 4.2 and Figure 4.3 below. These figures show connections to the local path network, which connects to nearby destinations.

FIGURE 4.2 QUEENS PARK STATION PEDESTRIAN DESIRE LINES



Source: Armadale Line Upgrade Alliance, Project Definition Report, 2022

FIGURE 4.3 CANNINGTON STATION PEDESTRIAN DESIRE LINES



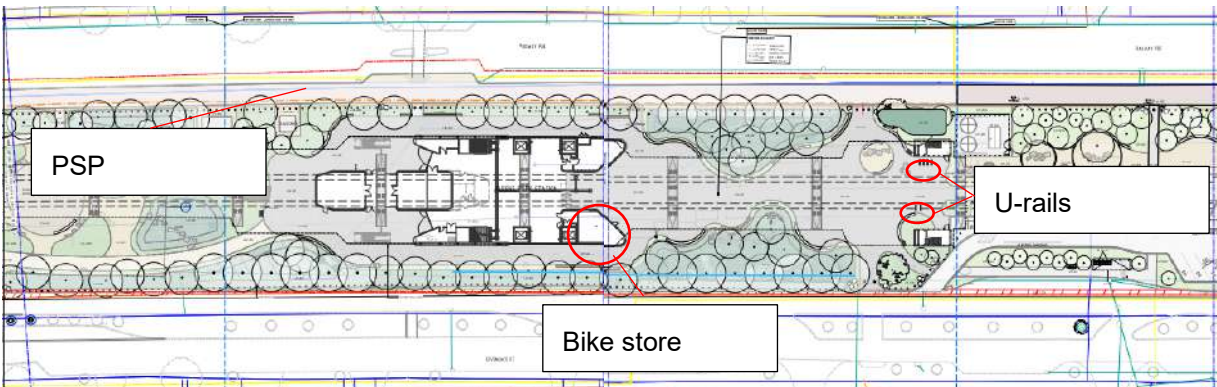
Source: Armadale Line Upgrade Alliance, Project Definition Report, 2022

At the western end of the bus interchange, access between Sevenoaks Senior College and the interchange is provided via traffic signals across Sevenoaks Street, and a zebra crossing across the bus way for access to bus services and the station entrance.

Bicycle parking

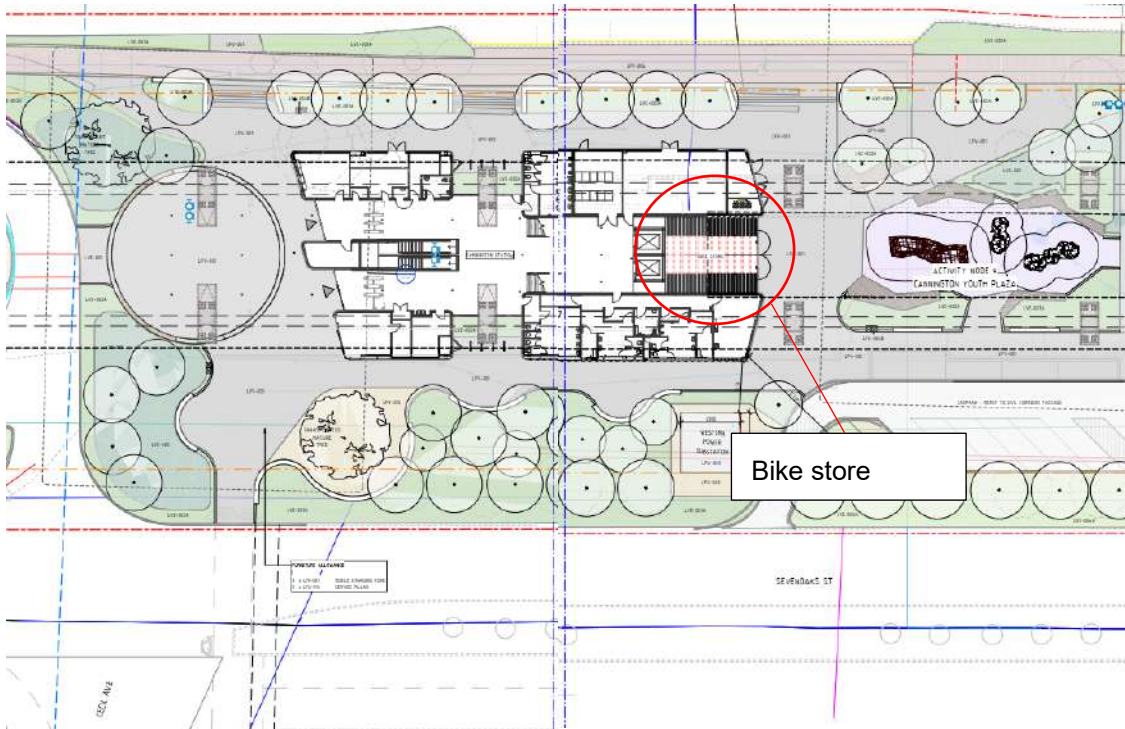
Bicycle parking is located close to the Principal Shared Path at each station. Locations for each station are shown in the figures below.

FIGURE 4.4 QUEENS PARK STATION BICYCLE PARKING



Source: Extracted from Armadale Line Upgrade Alliance, Urban Design and Landscape General Arrangement 2022

FIGURE 4.5 CANNINGTON STATION BICYCLE PARKING



Source: Extracted from Armadale Line Upgrade Alliance, Urban Design and Landscape General Arrangement 2022

4.3 Parking

The development will not significantly increase the quantity of parking supplied at either station. Existing and proposed parking information, including quantum, type and access for each station is summarised in Table 4.4 and Table 4.5. Car parks are designed to be compliant with requirements for the provision of ACROD parking spaces. Car parking is considered to be sufficient.

TABLE 4.4 QUEENS PARK EXISTING AND PROPOSED PARKING

	QUEENS PARK STATION – EXISTING PARKING	QUEENS PARK STATION – PROPOSED PARKING
PARK ‘N’ RIDE	71 car parking bays	91 car parking bays
ACROD	2 ACROD bays	2 ACROD bays (no change)
KISS ‘N’ RIDE	2 Kiss ‘n’ Ride bays	2 Kiss ‘n’ Ride bays (no change)
ACCESS	1 entry/exit point from Sevenoaks Street with bidirectional movement	1 joint entry point from Sevenoaks Street serving both long term and short-term parking lots. 1 exit point for each car park, both left out onto Sevenoaks Street. Unidirectional traffic movement within both carparks.

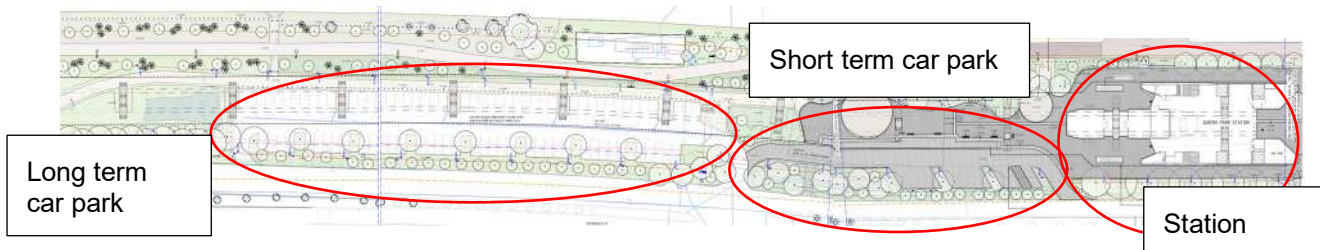
TABLE 4.5 CANNINGTON EXISTING AND PROPOSED PARKING

	CANNINGTON STATION - EXISTING PARKING	CANNINGTON STATION – PROPOSED PARKING
PARK ‘N’ RIDE	297 car parking bays	293 car parking bays
ACROD	6 ACROD bays	6 ACROD bays
KISS ‘N’ RIDE	6 Kiss ‘n’ Ride bays	3 Kiss ‘n’ Ride bays 1 Accessible Kiss ‘n’ Ride bay
ACCESS	<p>3 car parks.</p> <p>Railway Parade western car park has three entry points, all with bi-directional traffic and no restrictions on movement.</p> <p>Railway Parade eastern car park has two entry points, both with bi-directional traffic and no restrictions on movement.</p> <p>Sevenoaks Street car park has one entry/exit point with bi-directional traffic. Movements are restricted to Left-In-Left-Out by median traffic island on Sevenoaks Street.</p>	<p>4 car parks.</p> <p>Eastern Railway Parade car park will be retained with 109 bays. The eastern entry/exit will be closed. This car park will have bi-directional traffic and no restrictions on movement.</p> <p>Sevenoaks Street eastern car park will have two entry points, both with bi-directional traffic and no restrictions on movement. This will have 39 bays.</p> <p>Sevenoaks Street western carpark will have one entry/exit point with bi-directional traffic. Movements are restricted to Left-In-Left-Out by median traffic island on Sevenoaks Street. This will have 156 bays.</p>

Parking access

The below figures show car parking access and layout for Queens Park and Cannington Stations.

FIGURE 4.6 QUEENS PARK STATION PARK N RIDE CAR PARKING LOCATION



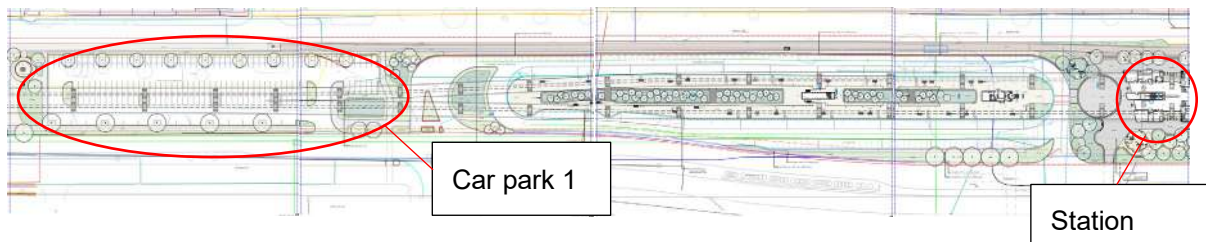
Source: Extracted from Armadale Line Upgrade Alliance, Urban Design and Landscape General Arrangement 2022

Provision of car park access off Sevenoaks Street has been driven by a strategy to separate PSP and car park access, to minimise conflicts between people walking, riding and driving.

Access into Queens Park Station from Sevenoaks Street is opposite Stockman Way, which maintains existing conditions, with no evidence of this configuration resulting in issues, however, monitoring should be undertaken post-station opening.

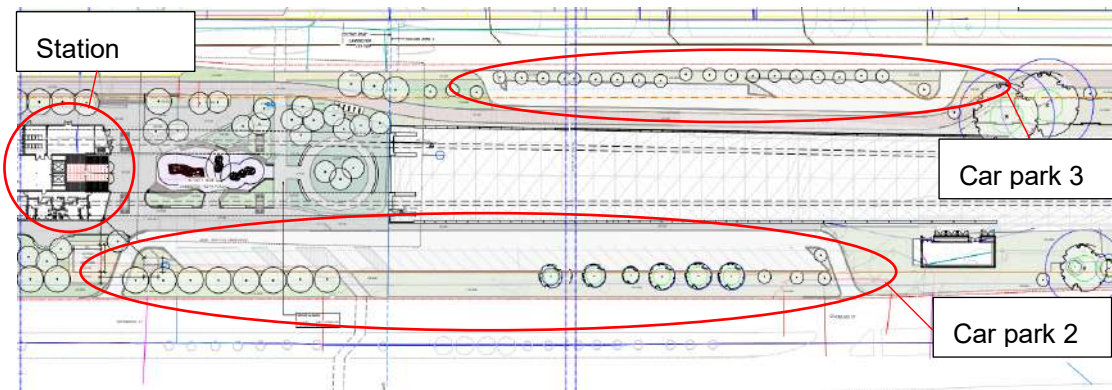
To mitigate concerns regarding access associated with exiting vehicles undertaking a U-turn manoeuvre, it is recommended that the City consider modifying and extending the median kerbing between the southbound lane and the right turn lane to restrict this movement. Noting this is an existing issue.

FIGURE 4.7 CANNINGTON STATION CAR PARKING LOCATION 1



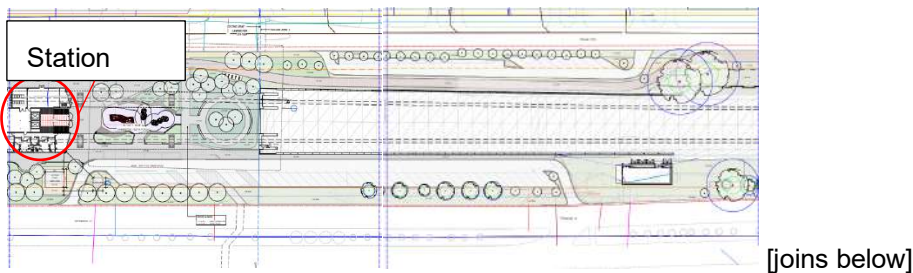
Source: Extracted from Armadale Line Upgrade Alliance, Urban Design and Landscape General Arrangement 2022

FIGURE 4.8 CANNINGTON STATION CAR PARKING LOCATIONS 2 AND 3



Source: Extracted from Armadale Line Upgrade Alliance, Urban Design and Landscape General Arrangement 2022

FIGURE 4.9 CANNINGTON STATION CAR PARKING LOCATION 4





Car park 1 and car park 2 propose left-in-left-out access onto Sevenoaks Street, which is reflective of the existing arrangement. Further, U-turns are not permitted at traffic signals unless signed otherwise.

Parking demand

Parking at stations is provided to support a limited degree of Park n Ride in line with the relevant Station Access Strategy. The Access Strategies determine that the number of bays will support car parking demand as shown in Table 4.6.

TABLE 4.6 2031 PARKING DEMAND AND PROPOSED SUPPLY

STATION	2031 DEMAND	PARKING PROVISION
Queens Park	77	91
Cannington	283	293

Travel demand management

Parking at both stations is provided as a fixed constraint, which will help to induce mode shift away from driving and parking. To support access by riding, walking and bus, a Movement Strategy has been developed for the project, as well as updated Station Access Strategies for each Station.

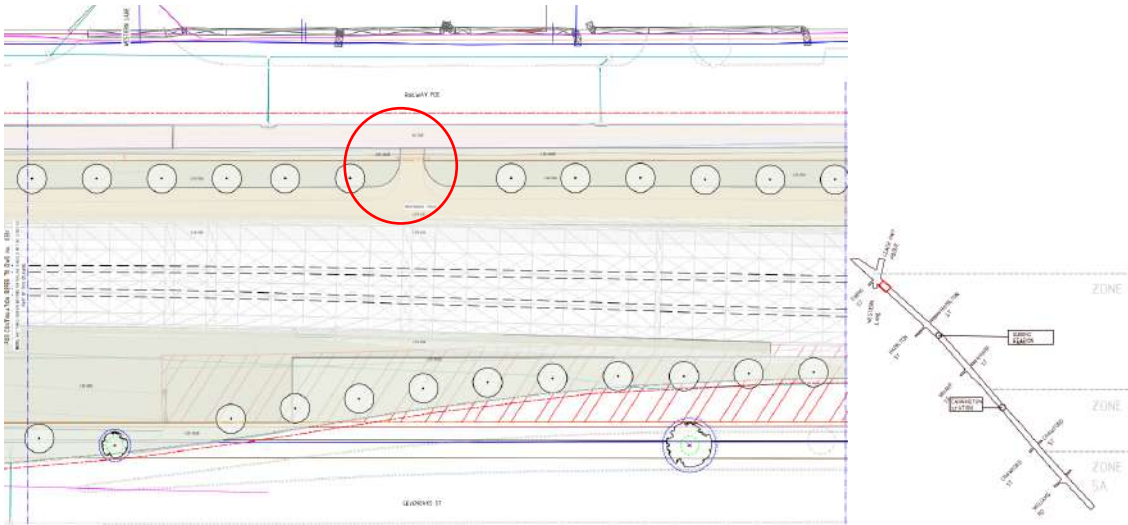
The Movement Strategy is provided in Appendix of this Development Application. The Movement Strategy deals with circulation and access around the site for active modes, including aligning the PSP on the eastern corridor and vehicle movements (car park entries and bus access) on the western side of the corridor, as well as the development of a recreational path network throughout the site. The PSP Crossing Strategy seeks to reduce pedestrian and cyclist conflicts by allowing faster cyclists a safe, direct path along the edge of the transport corridor and slower, recreational cyclists and pedestrians using the path network within the corridor centre.

PTA’s Station Access Strategies are developed for each station. These strategies consider how passengers currently travel to stations and suggest key improvements to station access infrastructure that can improve journeys by riding, walking and bus. In line with this project, updated Station Access Strategies are being produced.

4.4 Provision for services vehicles

Maintenance track access is provided over the Principal Shared Path

FIGURE 4.10 MAINTENANCE TRACK ACCESS



Service vehicle access is available to Station forecourts via concrete paths and hardstand areas with general access restricted via retractable bollards. It may also be appropriate for service vehicles to park in short stay parking/designated loading zones.

5. Changes to external transport network

This section focuses on changes affecting access to station concourses, as well as a brief overview of related projects in the external realm that are likely to affect the development area.

5.1 Public transport

A proposed (unfunded) bus route operating between Oats Street Station and Cannington Station (City of Canning) would serve the walkable catchment of Welshpool Station within the Welshpool Industrial Area. The route is proposed to operate on weekdays with a 15-minute peak frequency and 60-minute off-peak frequency.

Additionally, the Oats Street Station Access Strategy Update (PTA, 2021) outlines that there is potential for a range of different connections if there is capacity available for improved operations, including:

- Alterations to services that presently provide suburban connections through Belmont with the potential for connection to Redcliffe Station on the Forrestfield Airport Line.


This change is expected to have minimal overall impact on the public transport catchment to the plan area. Increased bus services will support the increase in rail patronage numbers.






Upgrades to Cannington Bus Interchange include alterations to the interchange layout. Under the new configuration a signalised four-way intersection enables bus entry and exit at the Cecil Avenue / Sevenoaks Street intersection (south) and at the Sevenoaks Street / bus station exit (north).




5.2 Walking and cycling network

Conditions for walking and cycling across the existing at-grade level crossings will be improved by the development. In addition to the elevated rail removing trains from the at-grade context, the relationship between vehicles and people walking and riding at key intersections will be improved. The existing situation at these intersections and proposed improvements are summarised in Table 5.1 below.

TABLE 5.1 INTERSECTION IMPROVEMENTS FOR WALKING AND CYCLING

INTERSECTION	EXISTING TREATMENT	PROPOSED TREATMENT
WELSHPOOL ROAD/ RUTLAND AVENUE/ SEVENOAKS STREET	<p>The existing PSP crossing of Welshpool Road at Rutland Avenue does not provide priority for people walking and riding. The alignment of the crossing is indirect (see red line on below image)</p>  <p>There are two existing signalised pedestrian crossings at Welshpool Road and</p>	<p>The PSP crossing of Welshpool Road will be grade separated from the road, elevated alongside the rail line allowing people using the path to cross Welshpool Road in a direct and uninterrupted fashion.</p> <p>The existing pedestrian crossing of Welshpool Road crossing Rutland Avenue will be closed, and the median will be reinstated.</p> <p>The existing signalised pedestrian crossings at the Welshpool Road and Sevenoaks Street intersection will be retained with improved pedestrian crossing facilities.</p>

	<p>Sevenoaks Street intersections (south and west sides)</p> <p>Southern pedestrian crossing of Welshpool Road/ Sevenoaks intersection:</p>  <p>Western pedestrian crossing of Welshpool Road/ Sevenoaks intersection:</p> 	
<p>HAMILTON STREET/ RAILWAY PARADE</p>	<p>Raised median island, with pedestrians and cyclists crossing in front of the island</p>  <p>Raised median island with cut through for Principal Shared Path to the north of rail line</p> 	<p>Raised median island with pedestrian cut through on Hamilton north of Railway Parade.</p> <p>Raised median island with cut through at signalised crossing for PSP over Hamilton Street, at Sevenoaks Street traffic signals.</p>
<p>HAMILTON STREET/ SEVENOAKS STREET</p>	<p>Traffic signals without pedestrian signals</p> <p>Pedestrian maze to cross rail line, requiring cyclists to dismount</p> 	<p>Signalised intersection with pedestrian crossings on western, southern and eastern sides accessing PSP and station plaza. All crossings via cut throughs in raised median islands.</p>
<p>WHARF STREET/ RAILWAY PARADE</p>	<p>Median island with pedestrian cut through north of Railway Parade as well as cut</p>	<p>Retain existing uncontrolled pedestrian crossings at western</p>

	<p>through for PSP</p> 	<p>and eastern sides of Railway Parade intersection.</p> <p>Retain median island and cut through over Wharf Street on northern side of intersection.</p>
<p>WHARF STREET/ SEVENOAKS STREET</p>	<p>Traffic signals with pedestrian lights on southern and eastern sides of intersection</p>  <p>Pedestrian maze to cross rail line on eastern side of intersection only, requiring cyclists to dismount</p> 	<p>Raised median island with cut through at signalised crossing for PSP over Wharf Street at the northern side of the intersection with Sevenoaks Street.</p> <p>Signalised intersection with pedestrian crossings on western, southern and eastern sides accessing PSP and station plaza. All crossings via cut throughs in raised median islands.</p>

Crossing treatments are shown in Figure 5.1 to Figure 5.4.

FIGURE 5.1 HAMILTON STREET PSP CROSSING

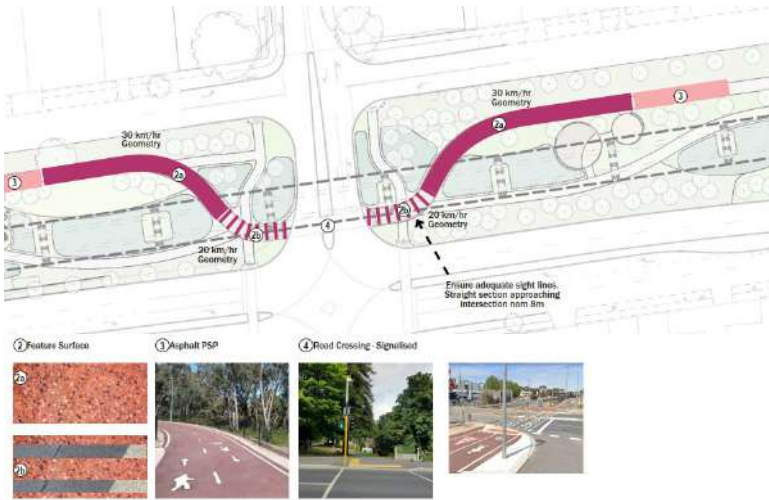


FIGURE 5.2 QUEENS PARK STATION

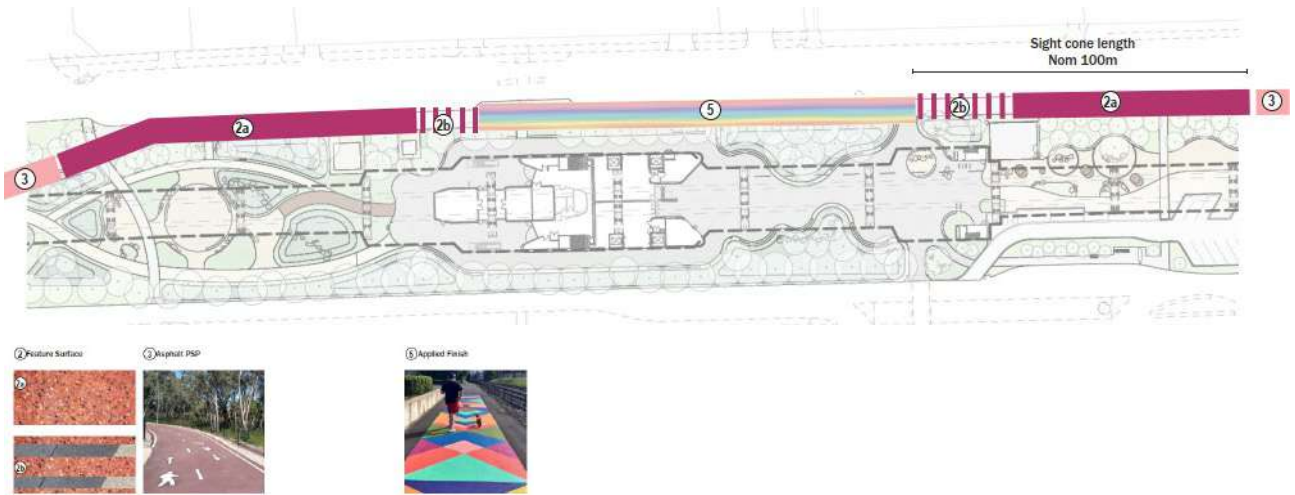


FIGURE 5.3 WHARF STREET CROSSING

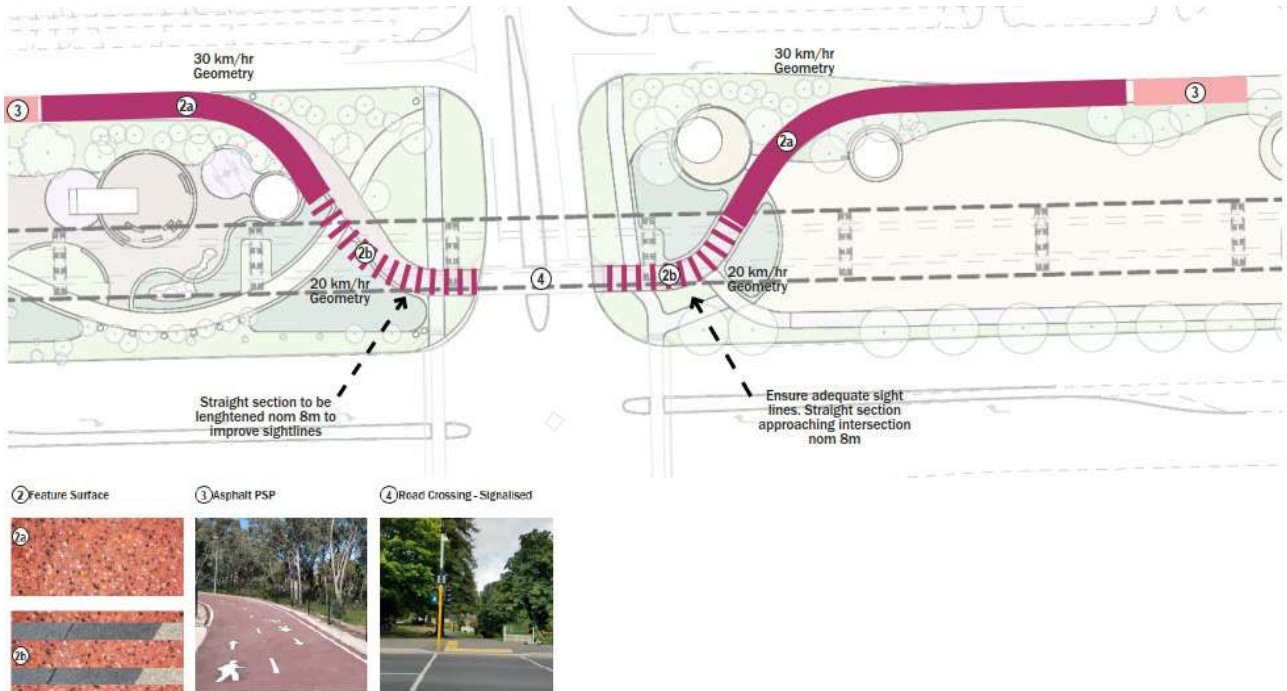
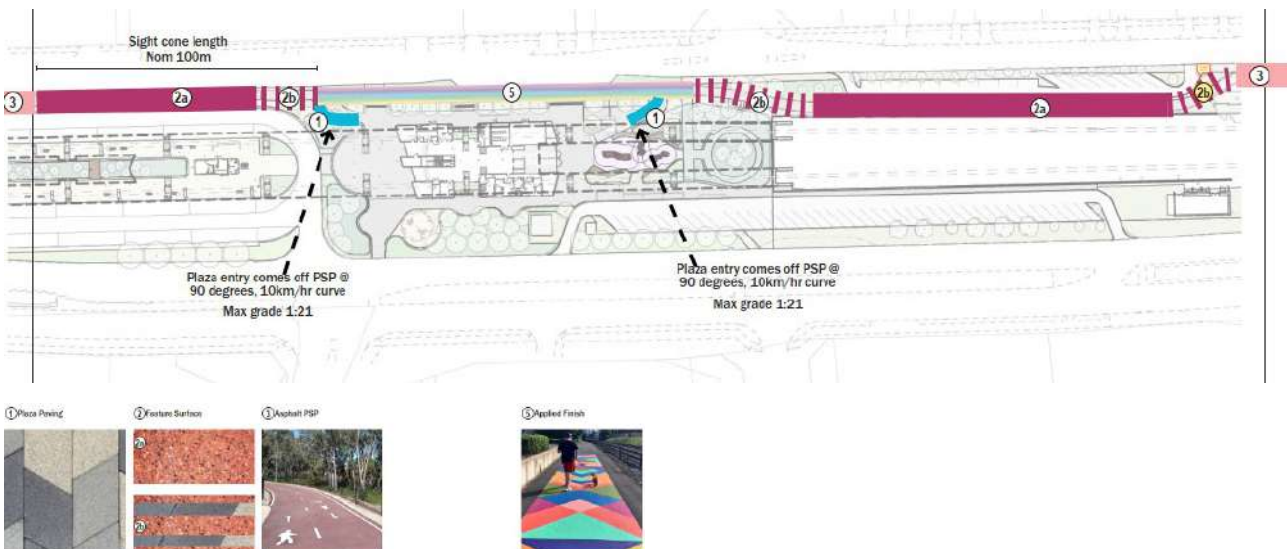


FIGURE 5.4 CANNINGTON STATION



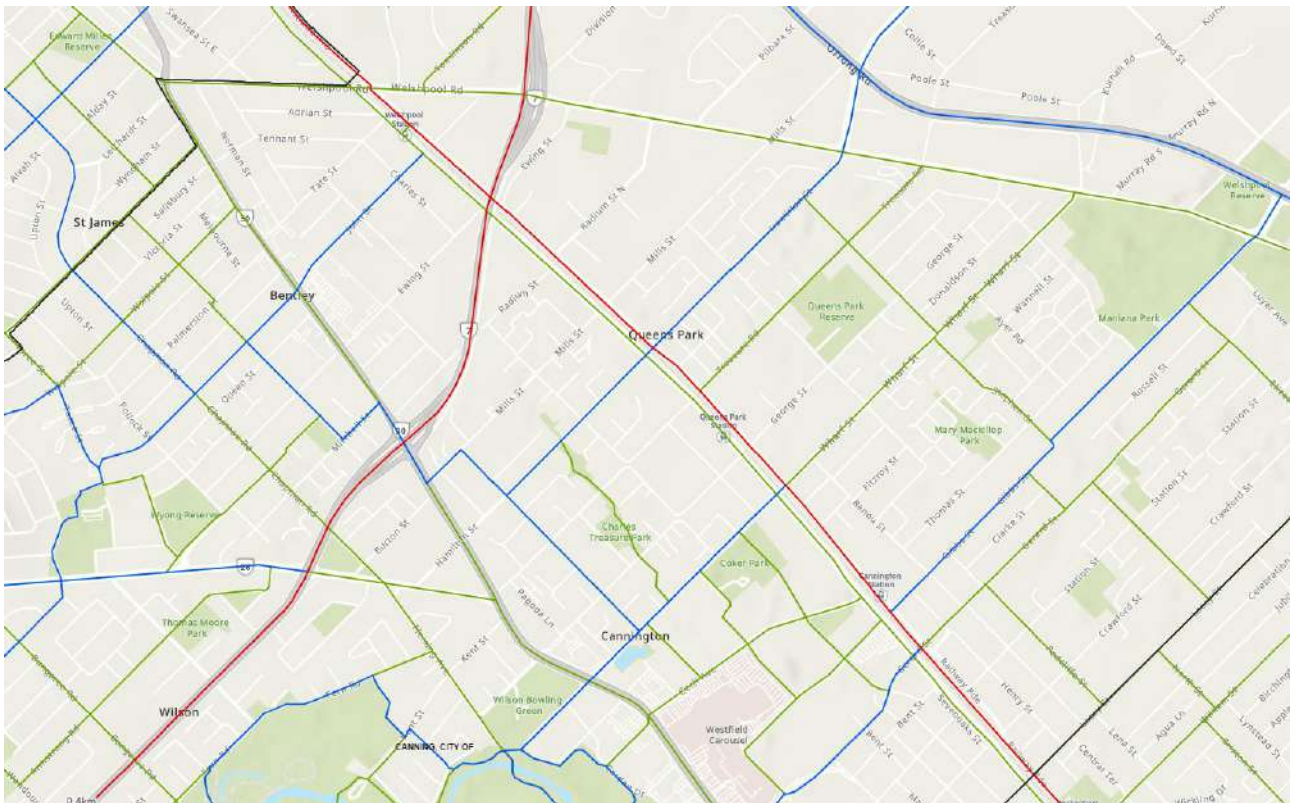
Department of Transport has partnered with 32 local governments in the Perth and Peel regions to establish the Long-Term Cycle Network (LTCN) for Perth and Peel. The LTCN classifies routes according to their function rather than their built form. The network surrounding the stations is shown in Figure 5.5 below. The completion of the LTCN (outside the scope of this level crossing removal project) will create a dense, permeable network to the stations and support local and regional connections to the stations and surrounding destinations. Local governments and DoT have committed to delivering this network in the long term.

As part of this project, removal of level crossings at Hamilton Street (Secondary Route) and Wharf Street (Local and Secondary Route) will support permeability across the rail line. The project will

also improve the Primary route along the rail (the Principal Shared Path) particularly at road crossings.

Additionally, ‘shared zone’ and ‘slow down’ line marking will be installed to alert people to the presence of potential conflict zones. This includes the section of embayed / on-street parking for Cannington Station on Railway Parade, where people exiting vehicles and people on bikes have clear view of each other.

FIGURE 5.5 LONG TERM CYCLE NETWORK FOR PERTH AND PEEL



Source: Department of Transport, Long-Term Cycle Network for Perth and Peel, 2022 (accessed December 2022)

5.3 Roads/ intersections

The proposed changes to roads and intersections are summarised in Table 5.2 below.

TABLE 5.2 SUMMARY OF CHANGES TO INTERSECTIONS

INTERSECTION	PROPOSED CHANGES
WELSHPOOL ROAD / RUTLAND AVENUE/ SEVENOAKS STREET	PSP elevated above road Existing pedestrian cut through within raised traffic median island crossing Welshpool Road on Rutland Avenue to be closed Retain existing signalised pedestrian crossings at Welshpool Road/ Sevenoaks Street
HAMILTON STREET / RAILWAY PARADE	Raised median island on Hamilton Street for Left In-Left Out movements: restricting vehicle movements

	<p>on Railway Parade to left turn only onto Hamilton Street</p> <p>Right turn from Hamilton Street to Railway Parade westbound restricted</p>
HAMILTON STREET / SEVENOAKS STREET	Signalised intersection including PSP crossing on northern side of intersection
WHARF STREET / RAILWAY PARADE	<p>Left In-Left Out movement retained. Left-only from Railway Parade onto Sevenoaks Street both directions.</p> <p>Shift median traffic island south towards Sevenoaks Street</p>
WHARF STREET / SEVENOAKS STREET	<p>Signalised four-way intersection. Raised median islands with pedestrian cut throughs on each side, including at the PSP crossing.</p> <p>Turning lanes on Sevenoaks Street to Wharf Street retained</p>
CECIL AVENUE / SEVENOAKS STREET	<p>Signalised four-way intersection.</p> <p>Existing pedestrian crossing on Sevenoaks Street (north) to be removed. Retain existing signalised pedestrian crossings within intersection across Cecil Avenue and Sevenoaks Street (south).</p> <p>Left turn banned from Sevenoaks Street (north) to Cannington Bus Station.</p> <p>Right turn pocket from Sevenoaks Street (north) to Cecil Avenue extended to 105m.</p>
SEVENOAKS STREET / BUS STATION EXIT	<p>Signalised four-way intersection.</p> <p>Right turn pocket from Sevenoaks Street (north) to Sevenoaks Senior College signalised.</p> <p>At the northern end of the bus interchange, access between Sevenoaks Senior College and the interchange is provided via traffic signals across Sevenoaks Street, and a zebra crossing across the bus way for access to bus services and the station entrance.</p> <p>Left and right turning lanes from Cannington Bus Station signalised.</p> <p>Pedestrian crossings across Sevenoaks Street (south) and Cannington Bus Station exit signalised.</p>

As noted in Section 3, the intersection performance of the intersections where level crossings are being removed currently suffer from issues associated with boom gates, particularly during peak times. The proposed changes will improve intersection performance from the existing state.

Road safety

A road safety audit has been completed and comments will be addressed as part of detailed design development.

None of the relevant intersections are identified as black spots, however level crossings have an implicit degree of safety risk due to interaction between the trains and people travelling in cars, by bike or walking. The project removes this interaction.

The project further supports safety for people riding and walking by reducing the interaction between active transport and vehicles. This is achieved through maintaining the key bicycle commuter route (Principal Shared Path) on the eastern edge of the corridor and locating vehicle access points to the site (entry to car parking and bus interchanges) on the western edge of the corridor.

6. Integration with surrounding area

6.1 Trip attractors/ generators

The existing station patronage for each station is shown in Table 6.1 below. These figures show average daily boardings. Based on the Strategic Transport Evaluation Model (STEM) modelling these figures are forecast to grow. With minimal changes to car parking, growth will be driven by walking, cycling and bus trips.

TABLE 6.1 EXISTING AND FORECAST PATRONAGE

STATION	EXISTING PATRONAGE	FORECAST PATRONAGE (2031)
QUEENS PARK STATION	866	1392
CANNINGTON STATION	2,910	4778

Source: Victoria Park-Canning Level Crossing Removal, Project Definition Plan, 2022

6.2 Connections to surrounding areas

The key network links between the stations and the external path network are shown in the desire line figures in section 4. These figures show the integration of the development with the surrounding walking and cycling network. As part of the project, Station Access Strategies for each station are being updated, with a program of works and behavioural interventions aimed at supporting access to stations and surrounding destinations.

The surrounding road network is not expected to have significant modifications other than the removal of the level crossings.

6.3 Committed developments

A search of current Development Assessment Panel (DAP) applications was undertaken. Within the City of Canning, no current DAP applications were located in proximity to the subject site.

6.4 Land use

The development does not actively involve changes to land uses in the surrounding areas.

METRONET's Station Precincts are the area within a one kilometre walk from the station (approximately a 10 to 15-minute walk from the station). These precincts are ideal locations for future developments of housing, jobs and community services as they make the best use of the State Government's investment in transport infrastructure. Full build-out of station precincts is expected to be achieved in the long term (30+ years). The development of station precincts is not within the scope of the level crossing removal project.

7. Analysis of external transport networks

7.1 LinSig Analysis

Analysis of the Welshpool Road/ Sevenoaks Street, Wharf Street/ Sevenoaks Street, Hamilton Street/ Sevenoaks Street and Cecil Avenue/ Sevenoaks Street was carried out using the computer software LinSig 3.2.44.1 under the 2026 Opening and 2031 opening + 5 scenario. The area is fully developed and the induced demand of removing the level crossing is covered by the 5 year scenario with minimal opportunity for further growth given the constrained road network surrounding the development.

LinSig is a commonly used intersection modelling tool for signalised intersections in the field of traffic engineering for obtaining TSAP. Outputs for four standard measures of operation performance can be obtained, being Degree of Saturation (DoS), Average Delay, Queue Length, and Level of Service (LoS).

- **Degree of Saturation (DoS)** Degree of saturation (DoS) is defined as the ratio of demand flow to the maximum flow which can be passed through the intersection from a particular lane. It is used as the primary performance indicator for determining the suitability of proposals for Main Roads projects.
- **Delay per pcu (s/pcu)** is the Average Delay for each PCU on the Lane averaged over the modelled time period.
- **End of red queue Length (pcu)** The extent of the Uniform Queue on a Lane at the time of the end of the Lane's controlling Phase's red period. Traffic may continue to add to the back of the queue whilst the queue is clearing leading to a Maximum Back of Uniform Queue greater than the queue at the end of red. The 'Back of Uniform Queue at the end of Red' allows only for the variation of the queue within a typical cycle and does not include Random and Oversaturation queues.
- **Mean Max queue length (pcu)** is the sum of the Maximum Back of Uniform Queue and the Random & Oversaturation Queue. It represents the maximum queue within a typical cycle averaged over all the cycles within the modelled time period. When a Lane is oversaturated the Maximum Queue within each cycle will grow progressively over the modelled time period. This means that the Mean Maximum Queue will be approximately half the final queue at the end of the modelled time period.

Assumptions

The following assumptions have been applied to the SIDRA modelling:

- LinSig uses a common unit to represent general traffic, known as the Passenger Car Unit (PCU). Common vehicle types are assigned a conversion factor so that an equivalent PCU value can be generated from classified vehicle data collected which has been adopted from *Main Roads WA Operational Modelling Guidelines*.
- This analysis assumes the existing peak hour will remain consistent in the future.
- Traffic growth is based on ROM data which have been further calibrated using existing traffic data with the Main Roads WA Urban Road Planning (URP) Method.

Welshpool Road / Sevenoaks Street

The intersection performance for the development access is outlined in Table 7.1 for the AM peak and in Table 7.2 for the PM peak.

TABLE 7.1 AM PEAK INTERSECTION PERFORMANCE FOR WELSHPOOL ROAD/ SEVENOAKS STREET

Year	2026 -Opening	2031 – 5 years after opening
Intersection LoS	C	D
Intersection DoS	63.3%	67.1%
Average delay (s/pcu)	52.3	52.3
End of red queue (pcu)	9.0	9.2
Mean max queue (pcu)	12.4	12.8

TABLE 7.2 PM PEAK INTERSECTION PERFORMANCE FOR WELSHPOOL ROAD/ SEVENOAKS STREET

Year	2026 -Opening	2031 – 5 years after opening
Intersection LoS	D	D
Intersection DoS	77.5%	87.1%
Average delay (s/pcu)	54.8	66.6
End of red queue (pcu)	10.1	10.3
Mean max queue (pcu)	14.8	17.0

Wharf Street / Sevenoaks Street

The intersection performance for the development access is outlined in Table 7.3 for the AM peak and in Table 7.4 for the PM peak.

TABLE 7.3 AM PEAK INTERSECTION PERFORMANCE FOR WHARF STREET/ SEVENOAKS STREET

Year	2026 -Opening	2031 – 5 years after opening
Intersection LoS	D	E
Intersection DoS	80.1%	84.0%
Average delay (s/pcu)	59.1	117.2
End of red queue (pcu)	7.3	11.7
Mean max queue (pcu)	10.9	18.8

TABLE 7.4 PM PEAK INTERSECTION PERFORMANCE FOR WHARF STREET/ SEVENOAKS STREET

Year	2026 -Opening	2031 – 5 years after opening
Intersection LoS	D	E
Intersection DoS	76.8%	84.4%
Average delay (s/pcu)	54.4	64.2
End of red queue (pcu)	8.4	10.8
Mean max queue (pcu)	12.4	17.2

Hamilton Street / Sevenoaks Street

The intersection performance for the development access is outlined in Table 7.5 for the AM peak and in Table 7.6 for the PM peak.

TABLE 7.5 AM PEAK INTERSECTION PERFORMANCE FOR HAMILTON STREET/ SEVENOAKS STREET

Year	2026 -Opening	2031 – 5 years after opening
Intersection LoS	D	D
Intersection DoS	79.0%	82.0%
Average delay (s/pcu)	53.1	62.1
End of red queue (pcu)	8.4	8.7
Mean max queue (pcu)	13.8	14.5

TABLE 7.6 PM PEAK INTERSECTION PERFORMANCE FOR HAMILTON STREET/ SEVENOAKS STREET

Year	2026 -Opening	2031 – 5 years after opening
Intersection LoS	C	D
Intersection DoS	73.6%	82.5%
Average delay (s/pcu)	45.1	62.0
End of red queue (pcu)	6.6	9.6
Mean max queue (pcu)	12.1	16.0

Sevenoaks Street / Bus Station exit

The intersection performance for the development access is outlined in Table 7.7 for the AM peak and in Table 7.8 for the PM peak.

TABLE 7.7 AM PEAK INTERSECTION PERFORMANCE FOR BUS STATION EXIT/ SEVENOAKS STREET

Year	2026 -Opening	2031 – 5 years after opening
Intersection LoS	B	B
Intersection DoS	51.2%	63.8%
Average delay (s/pcu)	43.6	45.1
End of red queue (pcu)	5.3	6.8
Mean max queue (pcu)	6.6	8.7

TABLE 7.8 PM PEAK INTERSECTION PERFORMANCE FOR BUS STATION EXIT/ SEVENOAKS STREET

Year	2026 -Opening	2031 – 5 years after opening
Intersection LoS	B	B
Intersection DoS	39.9%	48.5%
Average delay (s/pcu)	37.1	44.4
End of red queue (pcu)	4.6	5.8
Mean max queue (pcu)	6.9	9.7

Cecil Avenue / Sevenoaks Street

The intersection performance for the development access is outlined in Table 7.9 for the AM peak and in Table 7.10 for the PM peak.

TABLE 7.9 AM PEAK INTERSECTION PERFORMANCE FOR CECIL AVENUE/ SEVENOAKS STREET

Year	2026 -Opening	2031 – 5 years after opening
Intersection LoS	C	D
Intersection DoS	79.3%	89.8%
Average delay (s/pcu)	48.0	60.2
End of red queue (pcu)	9.2	12.0
Mean max queue (pcu)	15.4	23.4

TABLE 7.10 PM PEAK INTERSECTION PERFORMANCE FOR CECIL AVENUE/ SEVENOAKS STREET

Year	2026 -Opening	2031 – 5 years after opening
Intersection LoS	C	D
Intersection DoS	78.7%	89.9%
Average delay (s/pcu)	46.1	60.7
End of red queue (pcu)	7.4	10.2
Mean max queue (pcu)	11.9	16.4

8. Conclusions

A detailed Transport Impact Assessment of the proposed level crossing removal project concluded the following:

- The proposed development provides increased permeability for people accessing the station by walking, riding, bus or by vehicle
- The development will create a high-quality, direct, safe and high-amenity cycling route with limited interruptions by vehicles and buses. This is done by maintaining the PSP on the eastern side of the rail corridor and providing traffic access on the western side of the corridor
- The PSP will have priority at road crossings with the installation of pedestrian signals and WOMBAT crossings, supporting connected, continuous and comfortable access to stations as well as for regional cycling trips through the area
- The proposed development enhances the public realm for people walking and cycling to the stations as well as people riding and walking in their local neighbourhoods. The path network is based on connection to existing and proposed paths as well as connection to local destinations
- Removing the level crossing of rail at key intersections provides an opportunity to build a public realm supporting people walking and riding to have a more comfortable journey
- Elevating the PSP above Welshpool Road will create a direct and easy crossing, particularly for commuter cyclists
- Providing increased quantities of secure bicycle parking at each station will support additional trips to stations to be made by bicycle, which increases the catchment of each station
- The proposed development provides for universal access to each platform
- The proposed development supports bus movement as well as bus-train transfers with increased capacity provided at Cannington Station bus interchange, in addition to improved amenity at the bus interchange
- Intersections with existing level crossings (Hamilton Street and Wharf Street) provide a poor level of service to people travelling via these streets (all modes), which will be improved by the removal of the level crossings and elevation of the rail
- Cecil Avenue/ Sevenoaks Street intersection discussions are ongoing between City of Canning, MRWA, PTA and Transperth with respect to the operation of this intersection and pedestrian crossing within the bus interchange.
- Traffic modelling indicates that intersections will perform within capacity during both AM and PM peaks at opening and 5 years after opening. Given the current performance of intersections, this is considered to be appropriate.