# CHAPTER 09

# Transport and traffic

**ALBURY TO ILLABO** ENVIRONMENTAL IMPACT STATEMENT

ARTC | INLAND RAIL
An Australian Government Initiative

# Contents



## Figures



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# 9. Transport and traffic

This chapter provides a summary of the potential impacts of the Albury to Illabo (A2I) section of the program (the proposal) on transport and traffic. A full copy of the assessment is provided in Technical Paper 1: Transport and traffic.

## 9.1 Summary

The existing rail corridor between Albury and Illabo is part of the Main South Line, which carries freight and passenger trains between Albury and Sydney. To avoid disruption to operation of the rail network, construction activities impacting the track or worker safety would occur during existing scheduled possession periods or track occupancy authorisations (for further discussion refer to Chapter 8: Construction of the proposal).

Construction vehicle movements on the road network would result in little to no change to road performance during construction, including during peak construction periods. The proposal has sought to minimise the use of and impacts to local roads, and to avoid the closure of key roads, such as the Olympic Highway, as far as practicable. To moderate any construction impacts and potential safety issues associated with either access, vehicle movements or diversions, road safety audits would be undertaken, and Construction Traffic Transport and Access Management Plans developed for each enhancement site prior to construction.

Temporary traffic diversions are required for road bridge works at Edmondson Street bridge, Wagga Wagga (about nine months); Kemp Street bridge, Junee (about eight months); and level-crossings at Henty and four locations along the Junee to Illabo clearances enhancement site (approximately three to five days at each level crossing).

The temporary diversions would increase travel times and the performance of certain roads and intersections along these routes would be impacted. The closure of the Edmondson Street bridge in Wagga Wagga in particular would result in significant delays during peak-hour periods (based on worst-case assumptions) due to increased road congestion at intersections that are already constrained. At Junee, a short-term division onto local roads would be required during intersection works at the Olympic Highway/Kemp Street intersection. This would require preventative road works to offset impacts from higher than typical traffic (including heavy vehicles). Regional traffic movements would also be encouraged to use Old Junee Road to limit impacts to local community, and opportunities to reduce the duration of level crossing closures at the Olympic Highway, Junee would be investigated during detailed design prior to the closure of Kemp Street bridge (refer to Chapter 13: Social).

Where detours require changes to the road network, further engagement would be undertaken with road authorities (local councils and Transport for NSW (TfNSW)) and public transport service providers, as well as with local communities.

Access for active transport across the rail corridor would be disrupted during construction at Albury, Wagga Wagga and Junee. In addition to closure of road bridges, diversions are required for Albury Station pedestrian bridge, Albury (about four months); Cassidy Parade pedestrian bridge, Wagga Wagga (about six months); and Wagga Wagga Station pedestrian bridge, Wagga Wagga (about six months). The required diversions would increase travel times for pedestrians and cyclists, with some resulting in detours of up to 2 km for longer-term bridge closures. In Wagga Wagga, three bridges would be impacted over the duration of construction. These bridge works have been staged to keep one bridge open at all times and to limit the duration and cumulative impact on the community in response to consultation with Wagga Wagga City Council, proximate residents, schools and the wider community. The duration of all bridge closures (pedestrian and road), the staging of these works and the required detours would be further refined during detailed design and consultation with TfNSW and other relevant stakeholders (such as local councils).

Operation of the proposal would involve larger and more frequent freight trains passing along the corridor, increasing the freight transportation capacity between Albury and Illabo. Additional level crossing closure would be caused by the more frequent passing of trains. The maximum duration for vehicles would stop at level crossings would be around two minutes; however, the number of vehicles stopping for level crossing closure in peak hour would be the same with and without the proposal.

Modifications would be undertaken at nine level crossings to accommodate the proposal, or to improve safety at these level crossings. This includes the conversion of two level crossings from passive to active vehicular controls, providing boom gates and flashing lights. While minor changes to the roads have been identified to allow for operation of the modified level crossings, no significant changes to operation of the road network are proposed.

The replacement pedestrian bridges at Albury and Wagga would improve accessibility at these locations and would be designed to be compliant with *Disability Discrimination Act 1992* (Cth) (DDA), a factor that was raised during engagement for the proposal as being important to councils, the Department of Education, community groups and general community members.

The two road bridges at Wagga Wagga (Edmondson Street) and Junee (Kemp Street) would be replaced to accommodate the operation of taller trains. The design of these bridges has incorporated shared paths on both sides of Edmondson Street bridge at Wagga Wagga and an extra-wide shared path on the northern side of the

Kemp Street bridge design in response to community and key stakeholder feedback. Further consultation with Wagga Wagga City Council and Junee Shire Council has confirmed the requirement for achieving DDA-compliant pedestrian access at the Edmondson Street bridge and Kemp Street bridge enhancement sites. ARTC is committed to revising the existing design to achieve DDA compliance. To achieve this, it is expected that a footbridge independent of the road bridge may be required as a substitute for the footpath on one side of the road bridge.

## 9.2 Approach

### 9.2.1 Secretary's Environmental Assessment Requirements

The Secretary's Environmental Assessment Requirements (SEARs) related to transport and traffic, and where in the environmental impact statement (EIS) these have been addressed, are detailed in Appendix A: Secretary's Environmental Assessment Requirements.

### 9.2.2 Relevant legislation, policies and guidelines

The assessment was undertaken in accordance with the SEARs and with reference to the requirements of relevant legislation, policies and/or assessment guidelines, including:

- The *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act), and *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act), and *Roads Act 1993* (NSW) (Roads Act)
- *Guide to Traffic Management—Part 3 Traffic Studies and Analysis* (Austroads, 2007)
- *Guide to Traffic Generating Developments Version 2.2* (Roads and Traffic Authority (RTA), 2002)
- *Level Crossing Closures Policy* (Transport for NSW (TfNSW), n.d.)
- *Australian Level Crossing Assessment Model (ALCAM): Level Crossing Assessment Handbook* (National ALCAM Committee, 2016)
- *Cycling Aspects of Austroads Guides* (Austroads, 2014)
- *NSW Bicycle Guidelines version 1.2* (RTA, 2005)
- *Planning Guidelines for Walking and Cycling* (Department of Infrastructure, Planning and Natural Resources (DIPNR), 2004)
- *Construction of New Level Crossing Policy* (TfNSW, 2017a)
- *Future Transport Strategy 2056* (TfNSW, 2018a)
- *NSW Freight and Ports Plan 2018-2023* (TfNSW, 2018b)
- *NSW Sustainable Design Guidelines Version 4.0* (TfNSW, 2017b)
- *Australian Level Crossing Assessment Model* (National ALCAM Committee, 2016)
- *Railway Crossing Safety Series 2011, Plan: Establishing a Railway Crossing Safety Management Plan* (RTA, 2011)
- *Guides to Road Design* (Austroads, 2021).

A detailed description of the legislative and policy context for the assessment is provided in Chapter 2 of Technical Paper 1: Transport and traffic.

### 9.2.3 Methodology

#### Study area

The study area for the assessment included transport networks and facilities that may be impacted by construction or operation of the proposal. The extent of the road network considered by the assessment included the route to the nearest arterial road. Beyond this point, the construction traffic would diminish as it is distributed across the broader network to multiple origins, which would have no measurable impact in the context of background traffic volumes (refer to Chapter 3 of Technical Paper 1: Transport and traffic for further discussion).

## Key tasks

The assessment involved:

- reviewing existing rail network and road features, including traffic patterns, transport services, pedestrian and cyclist facilities
- reviewing available traffic survey data available from TfNSW and local councils, and completing additional traffic surveys, where required, in June 2021
- estimating future baseline traffic volumes by applying annual growth rate to the received traffic count data for:
  - 2024, year of peak construction
  - 2025, year of commencement of operation of the proposal
  - 2040, operational design horizon (15 years) which considers a conservative forecast year for future operations (being the proposal and the broader Inland Rail program).
- modelling of link capacity and intersection performance for key roads using traffic modelling software (SIDRA) during peak periods
- considering the seasonality of traffic volumes, including movement of livestock, agricultural machinery, farm vehicles and other farm infrastructure
- assessing the potential impacts of construction and operation, including:
  - reviewing workforce and other construction vehicle types, quantities and distribution
  - assessing the impact of construction vehicles
  - assessing road closures and diversions, and associated travel time
  - assessing impacts to the rail network, including passenger and freight services
  - assessing impacts to other elements of the traffic and transport network, including pedestrians, cyclists, public transport, access, parking and emergency vehicle access
  - assessing impacts to heavy vehicle routes and travelling stock reserves (TSRs)
  - assessing construction site access and road safety, including completion of turn-warrant assessments (assessing the impact of construction vehicles entering and exit site access points).
- assessing impacts from permanent changes to the transport and traffic network during operation
- assessing safety for each level crossing be consistent with ALCAM and any interface agreements and safety management plans
- reviewing sight lines at all modified level crossings checked in accordance with the methodology documented in Appendix D of Australian Standard AS1742.7 – *Manual of uniform traffic control devices Railway crossings*
- assessing the potential travel-time impacts due to operation of level crossings based on the expected train lengths, travel speeds and closure times
- identifying mitigation measures to manage the potential impacts on transport and traffic.

Further detail on the assessment methodology is provided in Chapter 3 of the Technical Paper 1: Transport and traffic.

### Assumptions

The following assumptions were applied in the assessment:

- peak construction numbers were assessed based on construction during rail possession periods (worst case)
- the total number of construction vehicles estimated for an enhancement site (the worst case) were assessed for each intersection
- the assessment conservatively assumed no allowance for the transport of the construction workforce by bus; however, the assessment assumed 1.5 people per vehicle to allow for carpooling
- assessment of construction completed for 2024 (the peak year of construction).

### Definitions

#### Level of service for roads

Level of service (LoS) is a measure of the performance of the road based on its capacity and the volume of traffic utilising the road. It is defined as the operational performance of traffic on a roadway, traffic lane, approach, intersection, route or network, based on measures such as delay and degree of saturation during a given time period. It provides a means of classifying a performance measure or measures that represent quality of service, and

is measured on an A to F scale, with LoS A representing the best operation conditions from the traveller's perspective and LoS F the worst. During weekdays, on major and minor rural roads, LoS C is the performance standard (RTA, 2002). LoS D is noted as the performance standard for rural roads on weekends (RTA, 2002). No LoS has been specified as the performance standard for urban roads.

### 9.2.4 Key risks

The environmental risk assessment for the proposal (see Appendix E: Environmental risk assessment) included consideration of potential transport and traffic risks. Transport and traffic risks with an overall assessed risk rating of medium or above are:

- impact of construction work on existing rail freight operations
- potential temporary reduced safety and amenity for traffic, pedestrians and cyclists due to construction activities and due to potential conflicts with construction vehicles. This would be managed through implementation of measures such as manual supervision, physical barriers, etc.
- impacts to condition of roads due to construction traffic
- impacts on access to private properties during construction
- impacts to emergency services through delays in access due to construction works
- potential temporary deterioration of traffic performance on surrounding road network to an unacceptable level of service, due to construction vehicles and temporary road or lane closures
- reduced pedestrian and cyclist access due to diversion associated with road and pedestrian bridge replacements
- loss of parking due to temporary land requirements or adjustments to on-street parking by construction work
- increase in parking demand from construction workforce particularly during rail possessions
- impacts to bus routes and services as a result of increased road use and diversions due to road bridge replacement
- greater number of vehicles stopping at level crossings due to more frequent train movements.

The transport and traffic assessment considered the potential risks identified by the environmental risk assessment, in addition to potential risks and impacts identified by the scoping report, the SEARs and relevant guidelines and policies (as appropriate).

## 9.3 Existing environment

### 9.3.1 Regional road and rail network

The regional transport and traffic network relevant to road and rail infrastructure is discussed in the following sections. The regional transport and traffic network is shown in Figure 9-1.

#### Road

The key regional roads in the study area include:

- the Hume Highway, which provides access to enhancement sites in the Albury precinct. It is an arterial road and carries about 11,400 vehicles per day, on average, within the Albury precinct, and it connects Sydney and Melbourne
- the Olympic Highway, which provides access to enhancement sites north of Table Top Yard clearances. It is an arterial road that connects the Hume Highway to the Mid-Western Highway in Cowra. In 2011, the highway carried about 2,800 vehicles per day on average in the Greater Hume–Lockhart precinct.

These arterial roads predominantly facilitate movements of traffic in a north–south direction. Arterial roads intersecting the highways above include Riverina Highway (through the township of Albury), Sturt Highway (through the township of Wagga Wagga) and Goldfields Way (connecting to the Olympic Highway west of Junee).

**Seasonal traffic**

Increased traffic during certain periods of the year (seasonal traffic) can occur in certain areas. This may include movement of livestock or agricultural produce, agricultural machinery, farm vehicles and other farm infrastructure.

Analysis of average monthly traffic volumes for the Hume Highway identified low percentage of change in total or heavy vehicle monthly flows across the year, and no clear or significant change, which might be attributed to seasonal variation in traffic (refer to section 4.2 of Technical Paper 1: Transport and traffic). As such, it was concluded that seasonal variations are insignificant in the context of traffic volumes on arterial roads.

Seasonal variations in traffic volumes on local and regional roads may occur; however, the traffic generated on these roads would be much lower in comparison to traffic on a highway.

Land use surrounding the proposal includes a high proportion of agriculture, including grazing, and cropping land (refer to Chapter 12: Land use and property). Traffic generated by these land uses can be highly seasonal and timed around harvesting periods or transportation of livestock to market. Traffic generated during these periods can include heavy vehicles associated with transportation of agricultural product, machinery, farm vehicles, and other farm infrastructure as well as increased light vehicle movements from the seasonal workforce. Transportation of agricultural product also occurs within some enhancement sites, where vehicles transport grain and other produce to the rail line for transportation by train. Further discussion of agricultural infrastructure, grain silos or agricultural produce storage and transportation facilities relevant to each precinct is discussed in the following sections.

A number of events are known to occurred annually or intermittently in the regional area. Seasonal traffic associated with vehicles travelling to these events may result in temporary increases in traffic volumes; however, the direct assessment of these movements is not possible and would be managed through the mitigation and management measures outlined in section 9.6.

## Rail

The existing rail corridor between Albury and Illabo is part of the Main South Line, which runs from Albury, in a north–east direction, through Illabo to Cootamundra where it continues to Goulburn, Mittagong and Sydney. The line is a double non-electrified track along the Mittagong to Junee section, after which it becomes a single track to Albury. The Main South Line continues north-east from Illabo through the Bethungra Spiral to Cootamundra and continues to Sydney.

Two operating freight lines connect to the Albury to Illabo section of the rail line. The Junee to Griffith freight line connects to the Main South Line at Junee station, and The Rock to Boree Creek grain rail line connects to the Main South Line at The Rock station.

Intermodal terminals facilitate the transfer of freight between rail and road. Several intermodal terminals connect to this section of the rail corridor, including:

- Ettamogah Rail Hub, located 10 kilometres (km) north of Albury, has rail sidings with direct access to the Main South Line and the Hume Freeway
- Riverina Intermodal Freight and Logistics (RIFL) Hub in the Bomen Industrial Precinct northeast of Wagga Wagga is currently under construction and expected to be completed in mid-2022
- Harefield Intermodal Terminal is located in Harefield between Wagga Wagga and Junee
- privately owned grain terminals are located at several points along the rail corridor to facilitate loading of grain and agricultural products to freight trains.

### Freight services

The Main South Line is in operation 24 hours a day, 7 days a week. Grain/goods freight trains operate on an as-needs basis along the corridor. As of 2021, the average freight train movements (both directions) between Albury and Junee was eight trains per day with an increased average of 12 trains per day in the section of rail line between Junee and Illabo.

### Passenger services

There are six operating passenger stations located along this section of the Main South Line including:

- Albury precinct—Albury Station
- Greater Hume—Lockhart precinct, Culcairn, Henty and The Rock stations
- Wagga Wagga precinct—Wagga Wagga Station
- Junee precinct—Junee Station.

There are several stations along this section of corridor that have been closed (refer to Figure 3-1). This includes Yerong Creek, Uranquinty, Bomen and Illabo.

NSW TrainLink operates two passenger services a day in each direction, between Sydney and Melbourne, along the Main South Line. Six Victorian train services (V-Line) terminate or leave at Albury daily.

Further consideration of the rail network in each precinct, including relevant railway stations, is provided in the following sections.

## Other traffic and transport elements

### Heavy vehicle routes

Designated heavy vehicle routes relevant to the proposal are summarised in Table 9-1.

In addition, the Regional Freight Transport Plan (REROC, 2019) identifies Hume Highway (from Albury to Olympic Highway interchange) as a REROC Strategic Highway.

**TABLE 9-1 HEAVY VEHICLE ROUTES**

| Precinct | Heavy vehicle routes | |
|---|---|---|
| Albury | ▸ Hume Highway<br>▸ Borella Road<br>▸ Atkins Street<br>▸ MacLeay Street<br>▸ Panmure Street | ▸ East Street<br>▸ Young Street<br>▸ Wilson Street<br>▸ Railway Place<br>▸ Wagga Road |
| Greater Hume–Lockhart | ▸ Olympic Highway/Melville Street<br>▸ Balfour Street<br>▸ Railway Parade<br>▸ Sladen Street | ▸ Yankee Crossing Road<br>▸ Urana Street<br>▸ Mangoplah Road |
| Wagga Wagga | ▸ Olympic Highway<br>▸ Pearson Street<br>▸ Cheshire Street<br>▸ Fernleigh Road | ▸ Edward Street<br>▸ Fox Street<br>▸ Byrnes Road<br>▸ Merino Road |
| Junee | ▸ Byrnes Road<br>▸ Harefield Road<br>▸ Olympic Highway<br>▸ Seignior Street | ▸ Edgar Street<br>▸ Harold Street<br>▸ Brabins Road |

### Travelling stock reserves

TSRs are reserves of connected Crown land that are designated for the movement of stock between watering and grazing land, but are also used for emergency stock refuge and transport of stock to market, providing biodiversity corridors, and access and connection to Country for Aboriginal peoples, and cultural heritage protection. Often the TSR will be along roads and consequently interface with road vehicles. A TSR, when on public roads, is referred to as a livestock highway.

- Albury precinct—no TSRs relevant to the proposal
- Greater Hume—Lockhart precinct—livestock highways along the Olympic Highway from Henty through Yerong Creek and The Rock, and The Rock Road.
- Wagga Wagga precinct - livestock highways along the Olympic Highway through Uranquinty, along the Sturt Highway through Wagga Wagga and Bourke Street/Docker Street through central Wagga Wagga to the intersection of Sturt Highway/Docker Street
- Junee precinct—no TSRs relevant to the proposal.

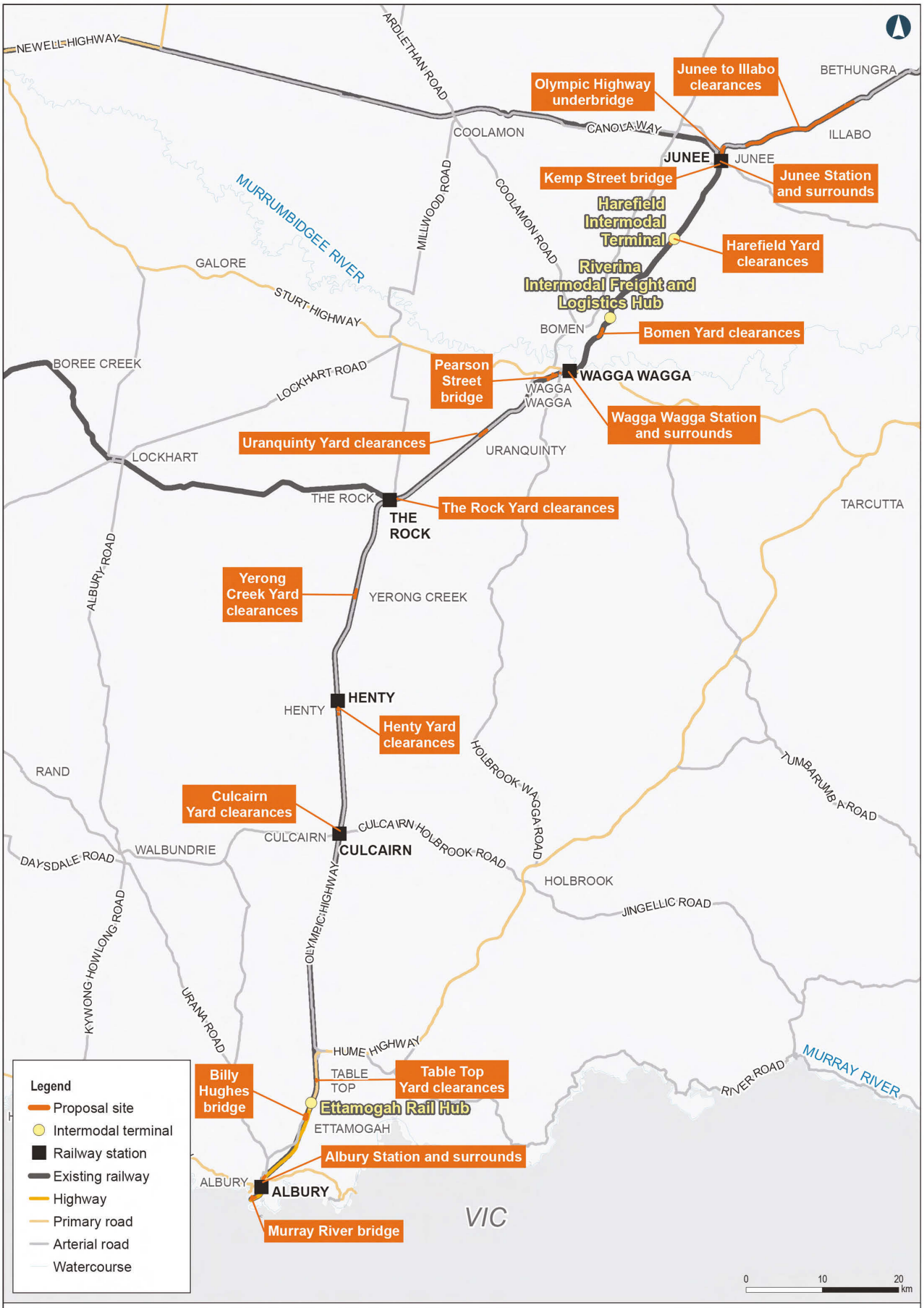


Figure 9-1 Regional traffic and transport network

Data Sources: ARTC, NSWSS

Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:650,000
Paper size: A4
Date: 10/12/2021

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### 9.3.2 Albury precinct

## Existing road and rail network

### Key roads and performance

An overview of the key roads, travel patterns and performance for enhancements sites within the Albury precinct is provided in Table 9-2, and shown in Figure 9-2.

All enhancement sites within Albury precinct are connected to the Hume Highway, which provides access between the sites and to the regional area. As discussed above, the Hume Highway is a major arterial road that carries a high volume of traffic and provides interstate travel between NSW and Victoria.

**TABLE 9-2 OVERVIEW OF KEY ROADS AND PERFORMANCE—ALBURY PRECINCT**

| Enhancement site | Key roads | Access | Maximum and minimum traffic volumes (daily two-way) | Performance of local roads |
|---|---|---|---|---|
| Murray River bridge | Atkins Street, East Street, Hume Highway, Macauley Street, Panmure Street, Abercorn Street, Kiewa Street, Townsend Street and Olive Street | Access from the Hume Highway is via Atkins Street, with local streets providing access to parts of Albury to the north, as well as Wodonga Place to the west. Access to the south is bounded by the Murray River. | Maximum—10,991, 5% heavy vehicles (East Street)<br>Minimum—330, 14% heavy vehicles (Macauley Street, Panmure Street, Abercorn Street, Townsend Street) | Roads perform at a LoS of C or better. |
| Albury Station and surrounds | Young Street, Borella Road, Smollet Street (Railway Place), Hume Highway northbound off ramps | Access from the Hume Highway is via ramps connecting to the Riverina Highway or Atkins Street. Cross-streets provide access to the rail corridor. | Maximum—13,894, 3% heavy vehicles (Borella Road)<br>Minimum—472, 3% heavy vehicles (Smollet Street, Railway Place) | Roads perform at a LoS of C or better. |
| Billy Hughes bridge | Wagga Road and Hume Highway | Access from the Hume Highway is via Wagga Road. | 5,392, proportion of heavy vehicles not available (Wagga Road) | Roads perform at a LoS of C or better. |
| Table Top Yard clearances | Perryman Lane, Tynan Road, and Hume Highway | Access from the Hume Highway is via Tynan Road and Perryman Lane. | Maximum—655, proportion of heavy vehicles not available (Tynan Road)<br>Minimum—576, 32% heavy vehicles (Perryman Lane) | Roads perform at a LoS of C or better. |

## Active transport network

### Land based

Footpaths are present on most roads within the urban area of the Albury precinct and pedestrian crossings are provided at most signalised intersections. Where enhancement sites contain active transport networks, these are summarised in Table 9-3.

Infrastructure located within, or intersecting, enhancement sites includes Albury Station pedestrian bridge and Amatex pedestrian bridge. No patronage data is available for active travel infrastructure and it is assumed that this infrastructure would service relatively high levels of patronage associated with access to Albury Station and the surrounding commercial areas.

**TABLE 9-3 ACTIVE TRANSPORT NETWORK (LAND BASED)—ALBURY PRECINCT**

| Enhancement site | Cycling infrastructure | Pedestrian infrastructure |
|---|---|---|
| Albury Station and surrounds (including Albury Station pedestrian bridge, Albury Station Yard clearances and Riverina Highway bridge) | ▸ Unmarked cycling routes on road shoulders.<br>▸ Shared paths including:<br>  ▸ East Street<br>  ▸ Albury Station pedestrian bridge<br>  ▸ Harold Mair<br>  ▸ Borella Road. | ▸ Footpaths are present on most roads within the urban area of the Albury precinct and pedestrian crossings are provided at most signalised intersections.<br>▸ Pedestrian bridges including:<br>  ▸ East Street<br>  ▸ Albury Station pedestrian bridge (ramps not provided)<br>  ▸ Amatex pedestrian bridge<br>  ▸ Harold Mair bridge. |

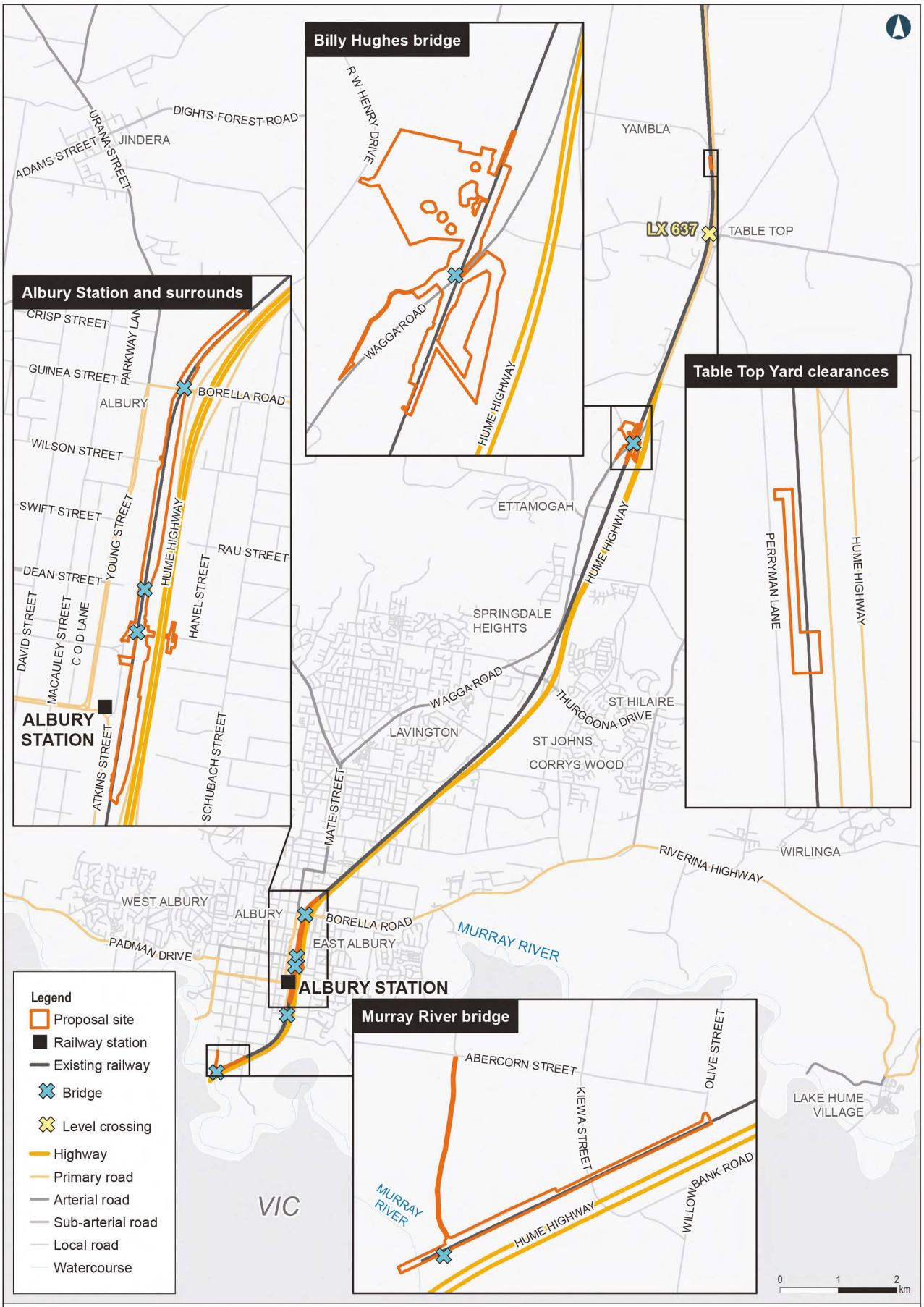


Figure 9-2 Existing road and rail network - Albury precinct

Data Sources: ARTC, NSWSS

Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:85,000
Paper size: A4
Date: 10/12/2021

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### Water based

No public or private water-based transport services operate on the Murray River within the study area; however, the Murray River is used for tourism and recreational purposes, with recreational users passing beneath the Murray River bridge. These potentially include:

- water ski school and users
- annual sporting events such as:
  - Murray River kayak race
  - Murray River long distance river swim
  - Frank Harrison Interstate Marathon Cup.
- commercial canoe kayak hire operators
- commercial river cruises
- private watercraft.

At the time of preparation of the assessment, river tour operators were closed due to COVID-19 restrictions and could not be contacted for comment on duration or location of activities on the Murray River.

The river features several public and private jetties that allow users to access the river, including at the new Albury riverside precinct that is due to be completed in December 2022 and Oddies Creek Park, both to the north of the Murray River bridge enhancement site. The river does not support public transport, trade, or shipping freight routes. In the vicinity of the study area the river is crossed by the Murray River bridge and the Hume Highway.

## Public transport services

Railway stations operating within the precinct include Albury Station, as shown in Figure 9-3, which services a passenger route between Sydney (Central Station) and Melbourne (Southern Cross Station) on the southern NSW line (route 621, 622, 623 and 624). Passenger rail services are discussed further in Section 9.3.1.

This route also passes through other enhancement sites in Albury; however, there are currently no train stations operating as stops for this service.

An overview of bus services operating within the Albury precinct is outlined in Table 9-4.

A bus interchange operates at Railway Place for Albury Station for bus routes and the NSW Trainlink service.

**TABLE 9-4 OVERVIEW OF BUS SERVICES—ALBURY PRECINCT**

| Enhancement site | Description | Service frequency |
|---|---|---|
| Murray River bridge, Albury Station and surrounds (including Albury Station pedestrian bridge, Albury Station Yard clearances and Riverina Highway bridge) | 10 bus routes | Between 3 and 24 services per day (Monday to Saturday) |
| | NSW Trainlink service | Four services per day (Monday to Saturday) |
| | Two school bus services | School times (twice daily, Monday to Fridays outside school holidays) |

## Parking

Parking within Albury precinct includes on-street parking on local roads. On-street parking is provided on local roads at all enhancement sites, including timed and untimed zones. Demand for on-street parking in the vicinity of enhancement sites was observed to be low as a proportion of the total parking available, with most residences utilising off-street parking in driveways and garages.

Designated off-street parking is summarised in Table 9-5. It is noted that, while data was not available, demand for parking within Albury Station is considered to be high based on general observations.

**TABLE 9-5 SUMMARY OF EXISTING PARKING—ALBURY PRECINCT**

| Enhancement site | Description | Type and quantity |
|---|---|---|
| Albury Station and surrounds (including Albury Station pedestrian bridge, Albury Station Yard clearances and Riverina Highway bridge) | Off-street parking within Albury Station (timed and untimed spaces). | Informal station parking to the north of the Albury Station pedestrian bridge—about 13 spaces<br>Short-term kerbside station parking—21 spaces<br>Short-term parking in front of station—24 spaces (including two disabled spaces)<br>Taxi parking in front of station—3 spaces<br>Albury Station Visitor Centre parking—28 spaces (including one disabled space) |

| Enhancement site | Description | Type and quantity |
|---|---|---|
| | | ▸ Designated parking to south of station building—61 spaces (including two disabled spaces)<br>▸ Caravan parking—about two spaces<br>▸ Long-distance coach parking—four bays<br>▸ Recreational vehicle servicing—five bays. |

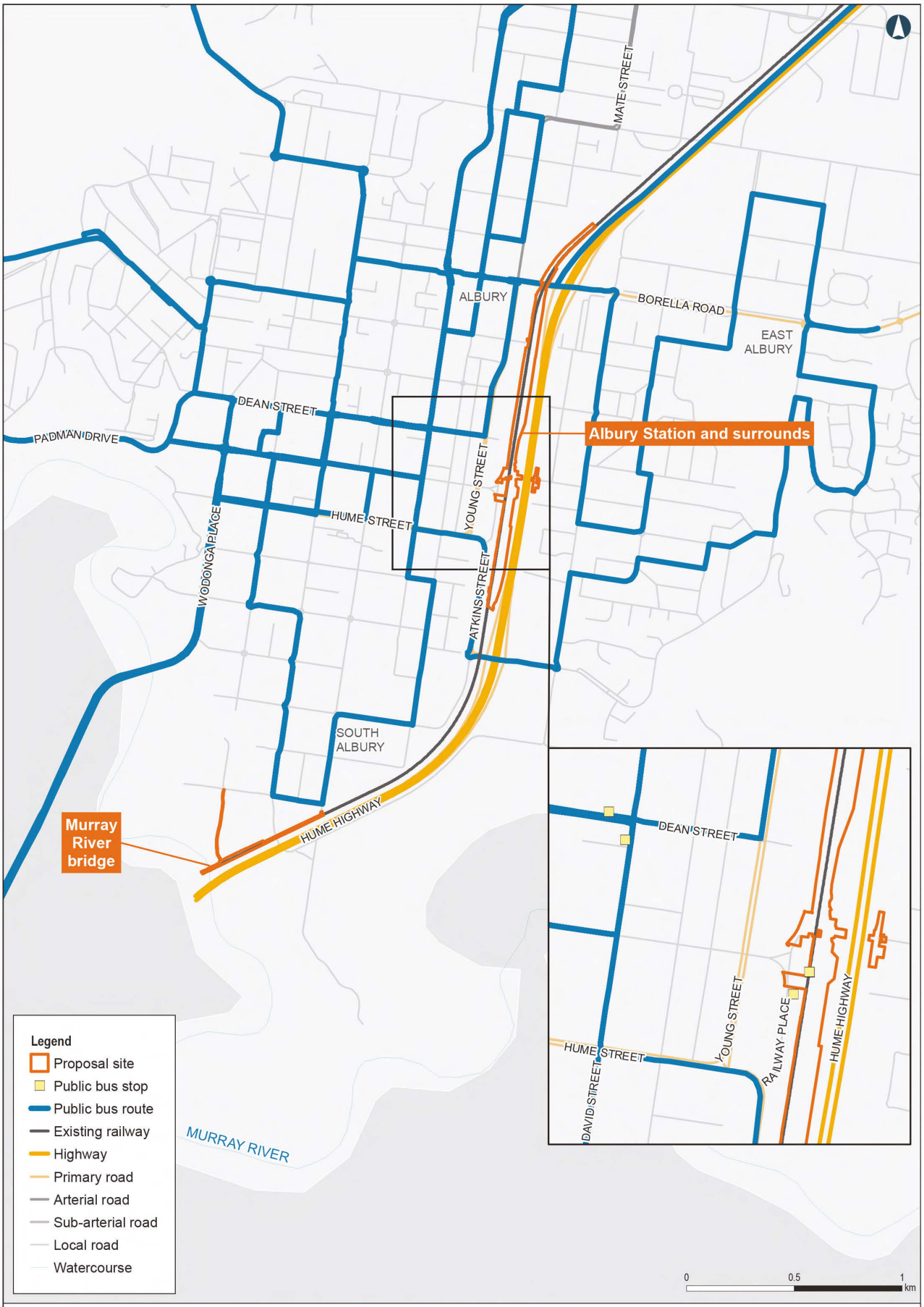


Figure 9-3 Public transport network - Albury precinct

Data Sources: ARTC, NSWSS

Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:23,000
Paper size: A4
Date: 10/12/2021

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### 9.3.3 Greater Hume–Lockhart precinct

## Existing road and rail network

### Key roads and performance

An overview of the key roads, travel patterns and performance for enhancements sites within the Greater Hume–Lockhart precinct is provided in Table 9-6, and shown in Figure 9-4.

Major arterial roads connecting the enhancement site (not discussed in the table below) include the Olympic Highway. As discussed above, the Olympic Highway is a major arterial road that carries a high volume of traffic in the region.

**TABLE 9-6 OVERVIEW OF KEY ROADS AND PERFORMANCE—GREATER HUME–LOCKHART PRECINCT**

| Enhancement site | Key roads | Overview of road network | Maximum and minimum traffic volumes for non-arterial roads (daily two-way) | Performance of local roads |
|---|---|---|---|---|
| Culcairn Yard clearances and Culcairn pedestrian bridge | Olympic Highway/Melville Street, Balfour Street, Railway Parade South, Railway Parade North | The enhancement site is parallel to the Olympic highway, which intersects with Walbundrie Road (from the west) and Balfour Street (from the east). Balfour street crosses the rail line via a level crossing. | Maximum—5,527, proportion of heavy vehicles not available (Balfour Street)<br>Minimum—906, proportion of heavy vehicles not available (Railway Parade North) | Roads perform at a LoS of A. |
| Henty Yard clearances | Olympic Highway/Railway Parade, Sladen Street, Rosler Parade/Yankee Crossing Road, Allan Street, and Ivor Street | The enhancement site is parallel to the Olympic highway. The rail lines crossed via a level crossing on Sladen Street and Rosler Parade. | Maximum—764, 12% heavy vehicles (Sladen Street)<br>Minimum—153, 12% heavy vehicles (Rosler Parade/Yankee Crossing Road) | Roads perform at a LoS of A. |
| Yerong Creek clearances | Olympic Highway/Cox Street, Plunkett Street, and Finlayson Lane | The enhancement site is parallel to the Olympic highway. The rail line is crossed via a level crossing on Cole Street. | Maximum—764, 12% heavy vehicles (Plunkett Street)<br>Minimum—191, 12% heavy vehicles (Finlayson Lane) | Roads perform at a LoS of A. |
| The Rock Yard clearances | Olympic Highway/Melville Street, Urana Street 2 | The enhancement site is parallel to the Olympic highway. The rail line is crossed via a level crossing on Urana Street and Yerong Street. | Minimum/maximum— 764, 12% heavy vehicles (Urana Street) | Roads perform at a LoS of A. |

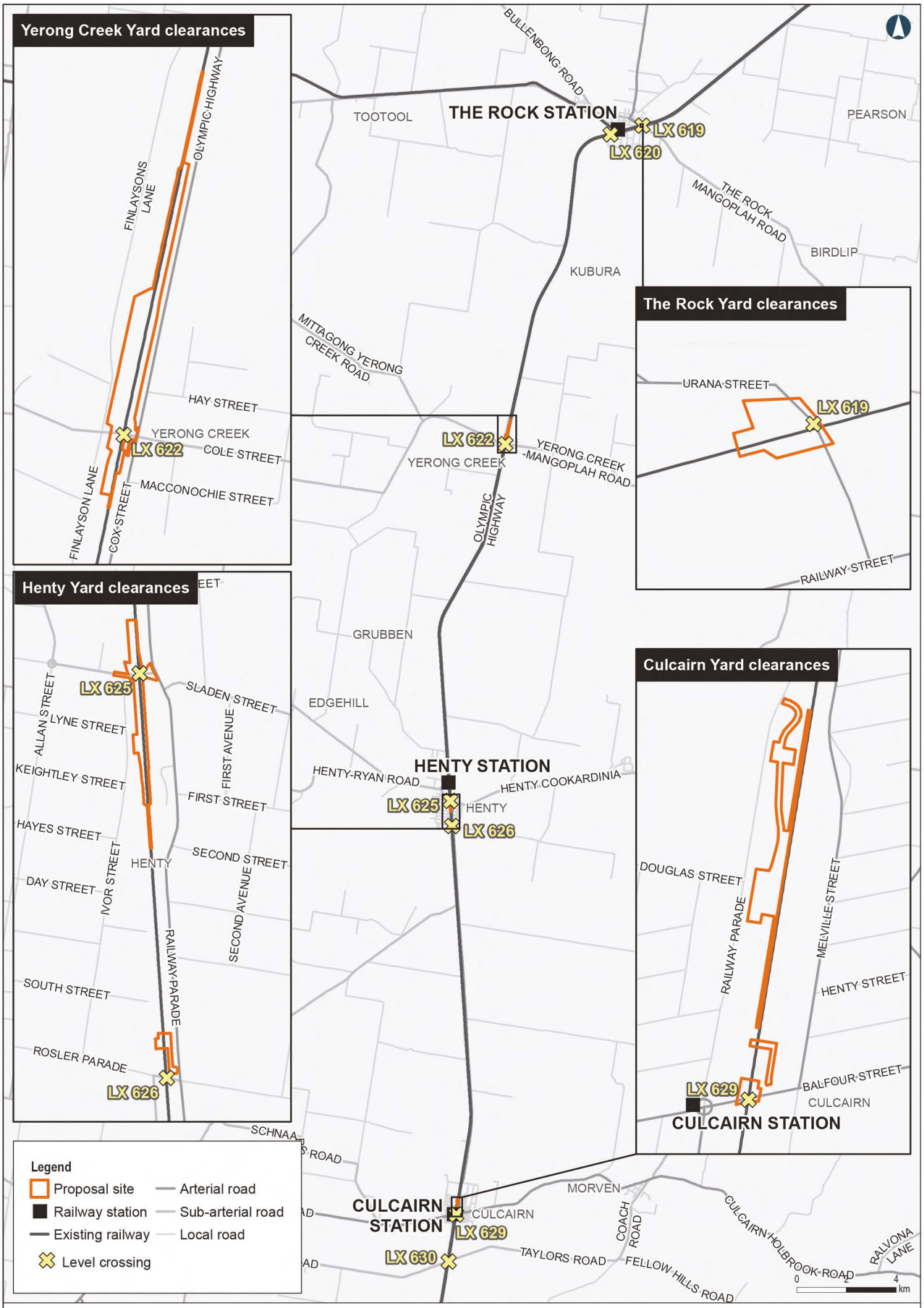


Figure 9-4 Existing road and rail network - Greater Hume-Lockhart precinct

Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:200,000
Paper size: A4
Date: 10/12/2021

Data Sources: ARTC, NSWSS

210_EAP_F0904_RoadRailNetwork_LGH_r1v4.mxd

### Active transport network

There is limited active transport infrastructure in Greater Hume–Lockhart precinct. Some cycle infrastructure is located in streets within Henty and Culcairn. Road lanes or shoulders may be used by cyclists in all areas. The Culcairn pedestrian bridge was closed in 2010, and pedestrians use the footpath on Balfour Street to cross the rail line via the level crossing.

Footpaths are provided on some residential streets within Henty, Culcairn and Yerong Creek. Dedicated pedestrian crossings are also provided for level crossings for these townships, with the exception of Rosler Parade in Henty.

### Public transport services

Passenger rail services are discussed further in Section 9.3.1.

Public bus services are provided by Regional Buses and are operated in collaboration with TfNSW under their rural and regional on-demand public transport pilot program.

An overview of bus services operating within the Greater Hume–Lockhart precinct is outlined in Table 9-7.

**TABLE 9-7 OVERVIEW OF BUS SERVICES—GREATER HUME–LOCKHART PRECINCT**

| Enhancement site | Description | Service frequency |
|---|---|---|
| Culcairn pedestrian bridge, Culcairn Yard clearances, Henty Yard clearances, Yerong Creek Yard clearances and The Rock Yard clearances | ▸ Four bus routes | ▸ On-demand services |
| | ▸ 17 school bus services | ▸ School times (twice daily, Monday to Fridays outside school holidays) |

### Parking

Parking within Greater Hume–Lockhart precinct includes on-street parking on local roads. On-street parking is provided on most local roads for all enhancement sites, with no time restrictions. No designated off-street parking spaces were identified within the study area. At the Culcairn Yard clearances and Culcairn pedestrian bridge enhancement sites, heavy vehicle parking restrictions apply on Railway Parade from 9pm–7am.

## 9.3.4 Wagga Wagga precinct

### Existing road and rail network

#### Key roads and performance

An overview of the key roads, travel patterns and performance for enhancements sites within the Wagga Wagga precinct is provided in provided in Table 9-8, and shown in Figure 9-5.

Major arterial roads connecting the enhancement site include the Sturt Highway and Olympic Highway. As discussed above, these roads are major arterial roads that carry a high volume of traffic in the region.

**TABLE 9-8 OVERVIEW OF KEY ROADS AND PERFORMANCE—WAGGA WAGGA PRECINCT**

| Enhancement site | Key roads | Overview of road network | Maximum and minimum traffic volumes for non-arterial roads (daily two-way) | Performance of local roads |
|---|---|---|---|---|
| Uranquinty Yard clearances | Olympic Highway, Yarragundry Street/ Uranquinty Cross Road, Hanging Rock Road | Access to the enhancement site is from the Olympic Highway via Yarragundry Street which crosses the rail crossing through a level crossing. | Maximum—507, 8% heavy vehicles (Yarragundry Street)<br>Minimum—50–100, proportion of heavy vehicles not available (Hanging Rock Road)[2] | Roads perform at a LoS of B or better. |
| Pearson Street bridge | Sturt Highway, Colin Knott Drive, Sturt Highway/ Edward Street, Pearson Street, Cheshire Street, Urana Street, Fernleigh Road, Alan Turner Depot Access Road | Access to the enhancement site is from the Sturt Highway/Edward Street via Pearson Street to the southern side of the rail line. Cross streets of Urana Street and Fernleigh Road intersect with Pearson Street. | Maximum—12,663, 5% heavy vehicles (Moorong Street)<br>Minimum—491 5% heavy vehicles (Cheshire Street)<br>It is noted that Pearson Street carries a relatively high volume of traffic at 9,814, 5% heavy vehicles. | Roads operate with a LoS of B or better, with the exception of Fernleigh Road, which performs at an LoS of D. |

| Enhancement site | Key roads | Overview of road network | Maximum and minimum traffic volumes for non-arterial roads (daily two-way) | Performance of local roads |
|---|---|---|---|---|
| Cassidy Parade pedestrian bridge, Edmondson Street bridge, Wagga Wagga Station pedestrian bridge, and Wagga Wagga Yard clearances | Edward Street/Hammond Avenue/Sturt Highway, Docker Street/Bourke Street, Brookong Avenue, Fox Street, Edmondson Street/Mitchelmore Street, Norman Street, Coleman Street, Cassidy Parade, Erin Street, Macleay Street, Railway Street, Station Place, Tarcutta Street/Lake Albert Road, Urana Street | Edmondson Street provides access across the existing rail line south to north. On the northern side of the rail line is Wagga Wagga central business district (CBD), as well as residential areas to the west, south of the rail line are residential areas. | Maximum—12,151, 8% heavy vehicles (Edward Street/ Hammond Avenue/Sturt Highway)<br>Minimum—332, 3% heavy vehicles (Norman Street, Fox Street)<br>It is noted that Edmondson Street carries a relatively high volume of traffic at 10,448, 2% heavy vehicles | The performance of local roads relevant to Wagga Wagga Station are discussed in the following section. |
| Bomen Yard clearances | Olympic Highway, Byrnes Road, Merino Street, East Bomen Road | Access to the enhancement site is from the Olympic Highway via Merino Street and Byrnes Road. Merino Street crosses the rail via an overbridge. | Maximum—2,503, 31% heavy vehicles (Byrnes Road)<br>Minimum—529, proportion of heavy vehicles not available (East Bomen Road) | Roads perform at a LoS of A or better. |

### Traffic volumes and performance surrounding Wagga Wagga Station

The road network surrounding Wagga Wagga Station (including Cassidy Parade pedestrian bridge, Edmondson Street bridge, Wagga Wagga Station pedestrian bridge, and Wagga Wagga Yard clearances enhancement sites) is bounded by the existing rail line, which intersects Wagga Wagga immediately south of the CBD. A large proportion of traffic movements in Wagga Wagga are associated with north–south movements across the rail corridor. To access the eastern parts of Wagga Wagga, including the CBD, these movements predominantly occur through one of three rail crossing locations:

- a level crossing at Docker Street/Bourke Street
- Edmondson Street bridge
- a rail bridge over Tarcutta Street/Lake Albert Road.

Link capacity for these, and interconnecting streets, indicates they currently perform well, with an LoS of B or better; with the exception of Coleman Street, which performs with an LoS of C.

Intersections for key roads relevant to Wagga Wagga Station perform well under existing traffic volumes with an LoS of B or better, with the exception of intersections with Edward Street and Docker Street, and Docker Street and Lake Albert Road. The performance of these intersections in 2024 was assessed as a LoS D, indicating some delay from congestion is experienced at these intersections during peak periods.

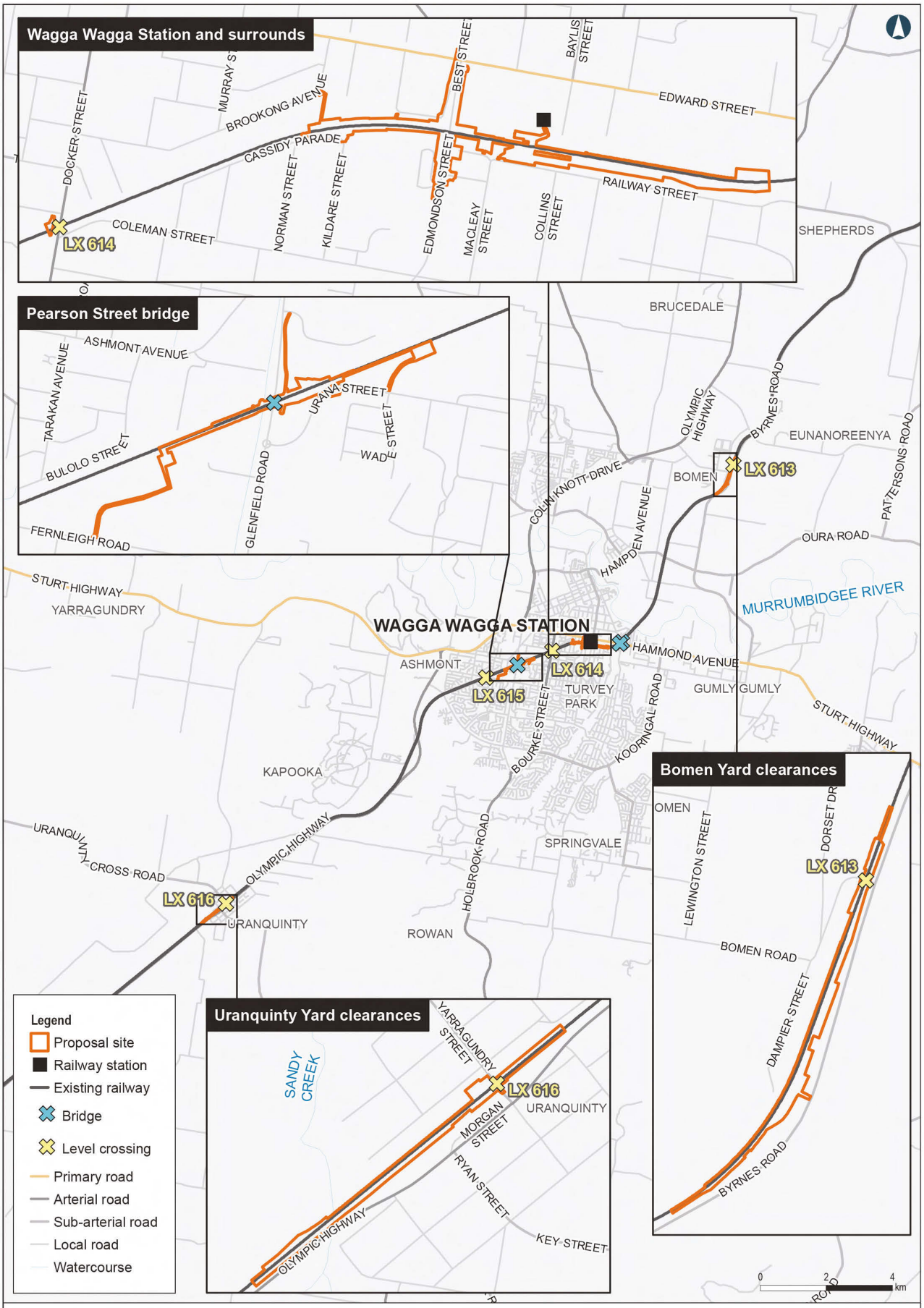


Figure 9-5 Existing road and rail network - Wagga Wagga precinct

Data Sources: ARTC, NSWSS

Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:150,000
Paper size: A4
Date: 10/12/2021

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## Active transport network

Footpaths are present on most roads within the urban area of Wagga Wagga, and pedestrian crossings are provided at most signalised intersections and level crossings. The level crossing at Bomen Yard clearances enhancement site does not facilitate pedestrian movements. Where enhancement sites contain active transport networks, these are summarised in Table 9-9.

Infrastructure located within or intersecting enhancement sites includes Cassidy Parade pedestrian bridge and Wagga Wagga Railway Station pedestrian bridge. While no patronage data is available for active travel infrastructure, its assumed that this infrastructure would service relatively high levels of patronage associated with access to Wagga Wagga Station and the surrounding commercial areas. Pedestrian infrastructure including Edmondson Street and adjacent pedestrian bridges also provides access to schools nearby including Kildare Catholic College and South Wagga Public School.

Wagga Wagga City Council are planning and constructing a 56 km network of shared and cycle paths across Wagga Wagga, referred to as the Wagga Wagga Active Travel Plan. One of the links in this plan crosses the rail corridor at the Cassidy Parade pedestrian bridge connecting to Brookong Avenue and Murray Street to the north, and Cassidy Parade and Norman Street to the south of the rail corridor (Wagga Wagga City Council, 2021).

**TABLE 9-9 ACTIVE TRANSPORT NETWORK—WAGGA WAGGA PRECINCT**

| Enhancement site | Cycling infrastructure | Pedestrian infrastructure |
|---|---|---|
| Cassidy Parade pedestrian bridge, Edmondson Street bridge, Wagga Wagga Station pedestrian bridge, and Wagga Wagga Yard clearances | No mapped unmarked or dedicated cycling infrastructure:<br>▸ unmarked cycling routes on road shoulders<br>▸ Cassidy Parade pedestrian bridge and Edmondson Street bridge. | ▸ Footpaths are present on most roads within the urban area of the Wagga Wagga precinct and pedestrian crossings are provided at most signalised intersections.<br>▸ Pedestrian bridges, including:<br>▸ Cassidy Parade<br>▸ Wagga Wagga Station. |

## Public transport services

Railway stations operating within the precinct include Wagga Wagga Station, as shown in Figure 9-6, which services a passenger route between Sydney (Central Station) and Melbourne (Southern Cross Station) on the southern NSW line (route 621, 622, 623 and 624). This route also passes through other enhancement sites in Wagga Wagga. Passenger rail services are discussed further in Section 9.3.1.

No bus routes operate for the Uranquinty Yard clearances or Bomen Yard clearances enhancement sites. An overview of bus services operating within the Wagga Wagga precinct is outlined in Table 9-10 and shown on Figure 9-6.

Key bus stops relevant to the proposal include:

- Kildare Catholic College
- Pearson Street before Edward Street (265078)
- Railway Street at Collins Street (2650305)
- Kildare Catholic College (2650107 and 265098)
- Docker Street opposite Meurant Ave (2650250)
- Henschke Primary School (2650100)
- South Wagga Public School (265052 and 26509).

**TABLE 9-10 OVERVIEW OF BUS SERVICES—WAGGA WAGGA PRECINCT**

| Enhancement site | Description | Service frequency |
|---|---|---|
| Pearson Street, Cassidy Parade pedestrian bridge, Edmondson Street bridge, Wagga Wagga Station pedestrian bridge, and Wagga Wagga Yard clearances | ▸ 15 bus routes | ▸ Between 1 and 17 services per day (Monday to Sunday |
| | ▸ NSW Trainlink services | ▸ Two services per day (Monday to Saturday) |
| | ▸ A high number of school bus services | ▸ School times (twice daily, Monday to Fridays outside school holidays) |

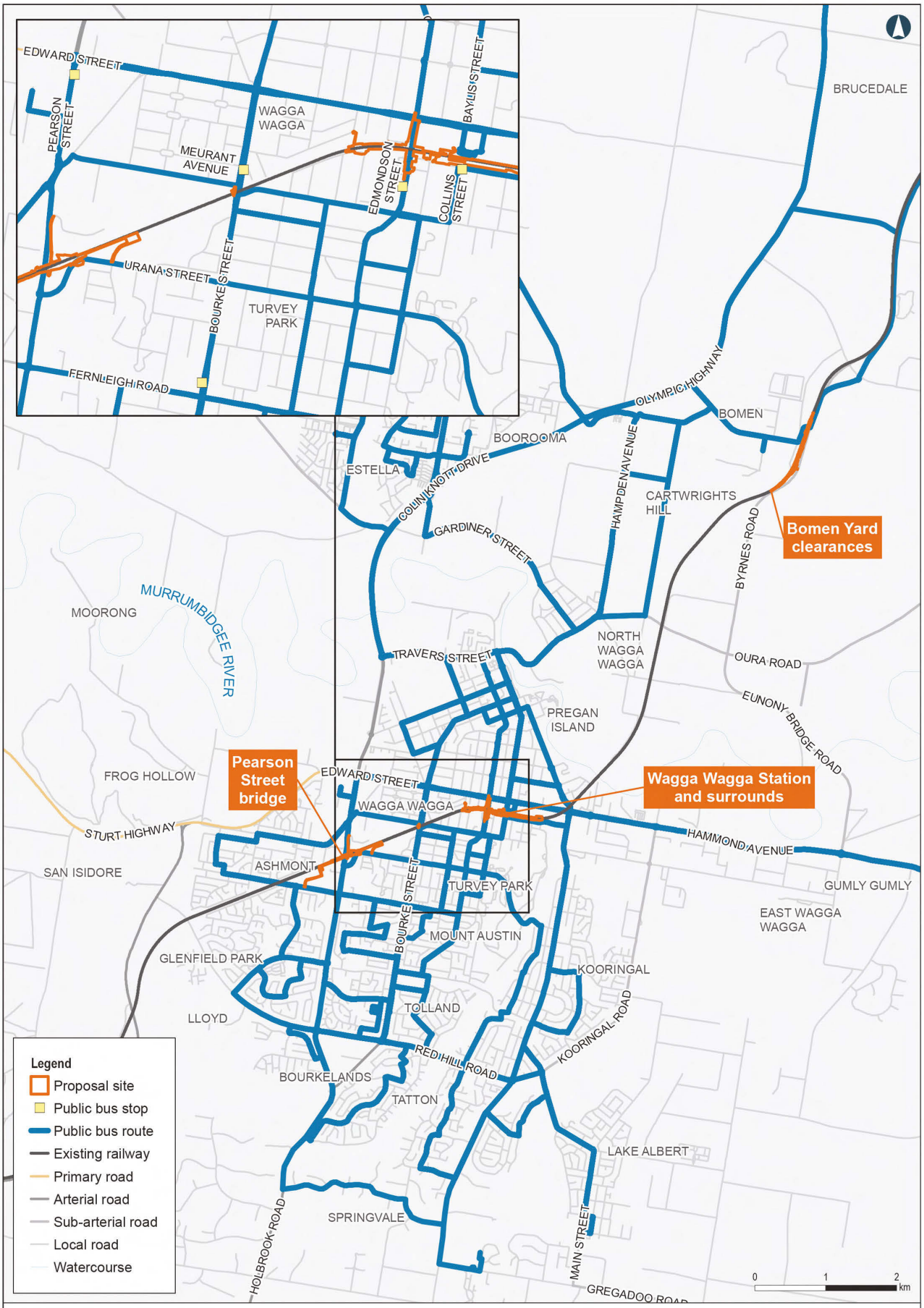



Figure 9-6 Public transport network - Wagga Wagga precinct

Data Sources: ARTC, NSWSS

Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:70,000
Paper size: A4
Date: 10/12/2021

210_EAP_F0906_PublicTransport_Wagga_r1v4.mxd

## Parking

Parking in the Wagga Wagga precinct includes on-street parking on local roads. On-street parking is provided on local roads at all enhancement sites, including timed and untimed zones. Demand for on-street parking in the vicinity of enhancement sites was observed to be low as a proportion of the total parking available, with most residences utilising off-street parking in driveways and garages.

Designated off-street parking is summarised in Table 9-11. It is noted that, while data was not available, demand for parking within Wagga Wagga Station is considered to be high based on general observations.

Off-street parking is present within commercial, industrial and retail uses in the surrounding area. Engagement with Wagga Wagga South Public School indicates that limited onsite parking and drop-off facilities combined with restricted adjacent roadside parking, results in Railway Street being an important location for the drop off of students who use the Wagga Wagga Station pedestrian bridge to access the school.

**TABLE 9-11 SUMMARY OF EXISTING PARKING—WAGGA WAGGA PRECINCT**

| Enhancement site | Description | Type and quantity |
|---|---|---|
| Cassidy Parade pedestrian bridge, Edmondson Street bridge, Wagga Wagga Station pedestrian bridge, and Wagga Wagga Yard clearances | ▸ Commuter parking in Wagga Wagga Station, off Railway Place | ▸ Short-term kerbside parking—10 spaces<br>▸ Public station off-street carpark—47 spaces (including two disabled spaces)<br>▸ Access to private off-street local business parking—quantity unknown<br>▸ Long-distance coach parking—three bays<br>▸ Taxi zone—one bay. |
| | ▸ Private parking in Mount Erin Heritage Centre, off Edmondson Street | ▸ No designated spaces. |

### 9.3.5 Junee precinct

## Existing road and rail network

### Key roads and performance

An overview of the key roads, travel patterns and performance for enhancements sites within the Junee precinct is provided in Table 9-12 and shown in Figure 9-7.

Major arterial roads connecting the enhancement site (not directly discussed in the table below) include the Olympic Highway. As discussed above, the Olympic Highway is a major arterial road that carries a high volume of traffic in the region.

**TABLE 9-12 OVERVIEW OF KEY ROADS AND PERFORMANCE—JUNEE PRECINCT**

| Enhancement site | Key roads | Overview of road network | Maximum and minimum traffic volumes for non-arterial roads (daily two-way) | Performance of local roads |
|---|---|---|---|---|
| Harefield Yard clearances | Harefield Road, Byrnes Road, Harefield Railway Access Road | The enhancement site is parallel to Byrnes Road, and includes a level crossing near the intersection of Byrnes Road and Harefield Road. Harefield Road connects to the Olympic Highway to the west. | Maximum—2,590, 33% heavy vehicles (Byrnes Road)<br>Minimum—17, 38% heavy vehicles (Harefield Road) | Roads operate with a LoS of B or better. |
| Junee Station and surrounds (including Kemp Street bridge, Junee Station pedestrian bridge, and Junee Yard clearances | Kemp Street/Olympic Highway, Seignior Street, Humphreys Street, Main Street/Olympic Highway, Lorne Street/Peel Street/Ducker Street, Hill Street, Harold Street, Thomas Street, Railway Lane, Railway Parade, William Street, Edgar Street/Byrnes Road, Joffre Street, Pretoria Avenue | Roads crossing the rail line include Kemp Street and Main Street/Olympic Highway. Surrounding roads are residential streets providing access to residential and commercial areas within Junee. | Maximum—2,90, 2% heavy vehicles (Kemp Street)<br>Minimum—341, 3% heavy vehicles (Railway Lane, Railway Parade) | Roads operate with a LoS of B or better. |
| Olympic Highway underbridge | Main Street/Olympic Highway, Illabo Road/ Olympic Highway | Access to the enhancement site is directly from Main Street/Olympic Highway. | Maximum/minimum – 592, 6% heavy vehicles (Illabo Road) | Roads operate with a LoS of A. |
| Junee to Illabo clearances | Olympic Highway, Brabins Road, Waterworks Road and Marinna Station Cross Road | The enhancement site is accessed from the Olympic Highway. | Maximum—241, proportion of heavy vehicles not available (Waterworks Road)<br>Minimum—44, proportion of heavy vehicles not available (Brabins Road, Marinna Station Cross Road) | Roads operate with a LoS of B or better. |

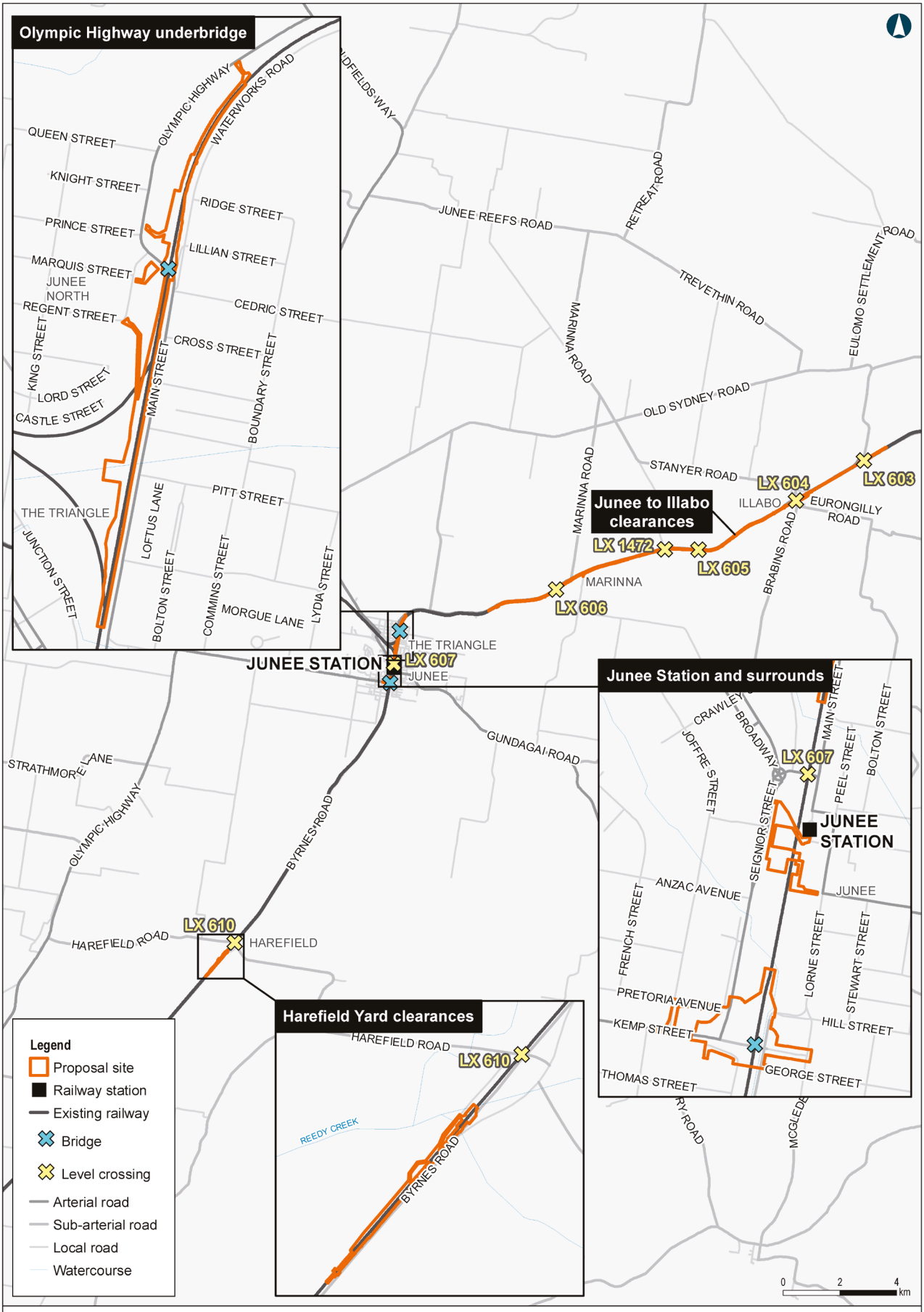



Figure 9-7 Existing road and rail network - Junee precinct

Data Sources: ARTC, NSWSS

Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:175,000
Paper size: A4
Date: 21/02/2022

210_EAP_F0907_RoadRailNetwork_Junee_r1v5.mxd

## Active transport network

Footpaths are present on most roads within the urban area of Junee and pedestrian crossings are provided at most signalised intersections and level crossings, excluding the Junee to Illabo clearances enhancement site. At the Harefield Yard and Junee to Illabo clearances enhancement sites, pedestrians and cyclists can cross the corridor at level crossings.

Where enhancement sites contain active transport networks, these are summarised in Table 9-13. The Junee Station pedestrian bridge is closed.

**TABLE 9-13 ACTIVE TRANSPORT NETWORK—JUNEE PRECINCT**

| Enhancement site | Cycling infrastructure | Pedestrian infrastructure |
|---|---|---|
| Junee Station (including Kemp Street bridge, Junee Station pedestrian bridge, and Junee Yard clearances | ▸ Shared path on Kemp Street, Seignior Street and Endeavour Park.<br>▸ Mapped cycling paths on road shoulder on some surrounding streets. | ▸ Footpaths are present on most roads and pedestrian crossings are provided at main signalised intersections. |
| Olympic Highway underbridge | ▸ Shared path on Olympic Highway.<br>▸ Mapped cycling paths on road shoulder on some surrounding streets. | ▸ Footpaths are present on most roads and pedestrian crossings are provided at main signalised intersections. |

## Public transport services

Railway stations operating within the precinct include Junee Station, which services a passenger route between Sydney (Central Station) and Melbourne (Southern Cross Station) on the southern NSW line (route 621, 622, 623 and 624). Passenger rail services are discussed further in section 9.3.1.

An overview of bus services operating within the Junee precinct is outlined in Table 9-14 and shown in Figure 9-8. No bus routes operate on roads relevant to the Junee to Illabo clearances enhancement site.

A bus interchange operates at Railway Square for Junee Station for bus routes and the Trainlink service.

**TABLE 9-14 OVERVIEW OF BUS SERVICES—JUNEE PRECINCT**

| Enhancement site | Description | Service frequency |
|---|---|---|
| Harefield Yard clearances | ▸ One bus route | ▸ Two services per day (Monday to Friday) |
| Junee Station (including Kemp Street bridge, Junee Station pedestrian bridge, and Junee Yard clearances) and Olympic Highway underbridge | ▸ Five bus routes | ▸ Between one and two services per day (Monday to Saturday) |
| | ▸ One Trainlink service | ▸ One service per day (Tuesday and Thursday only) |
| | ▸ Three school bus services | ▸ School times (twice daily, Monday to Fridays outside school holidays) |

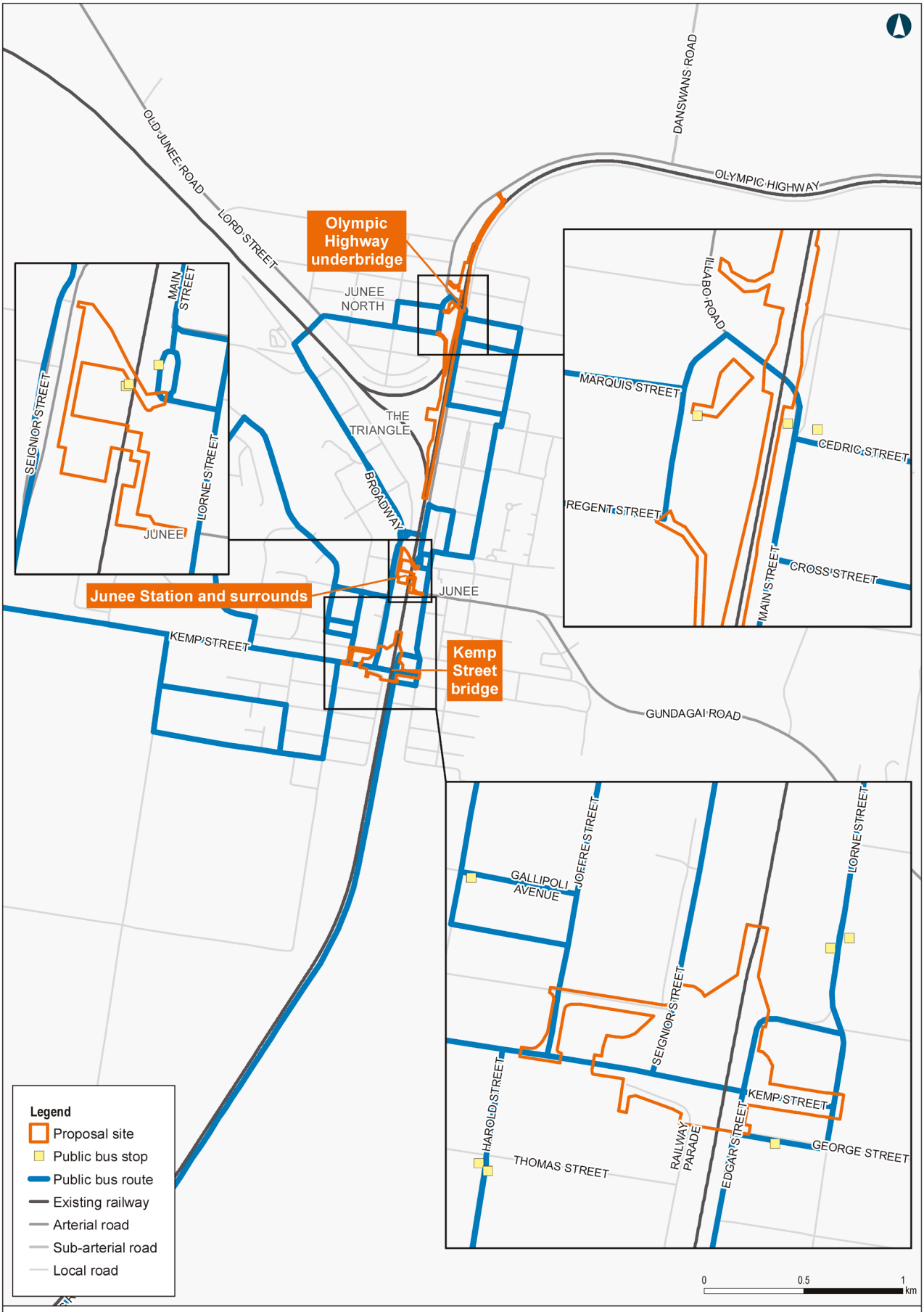
## Parking

Parking within Junee precinct includes on-street parking on local roads. On-street parking is provided on local roads at all enhancement sites, including timed and untimed zones. Demand for on-street parking in the vicinity of enhancement sites was observed to be a low proportion of the total parking available, with most residences using off-street parking in driveways and garages.

Designated off-street parking is summarised in Table 9-15.

**TABLE 9-15 SUMMARY OF EXISTING PARKING—JUNEE PRECINCT**

| Enhancement site | Description | Type and quantity |
|---|---|---|
| Junee Station (including Kemp Street bridge, Junee Station pedestrian bridge, and Junee Yard clearances | ▸ Junee Station (Railway Square) | ▸ 13 spaces |
| | ▸ Commuter parking is provided at Junee Station | ▸ Designated commercial parking behind train station: 60 car spaces (estimated) |




# Figure 9-8 Public transport network - Junee precinct

Data Sources: ARTC, NSWSS

Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:25,000
Paper size: A4
Date: 21/02/2022

210_EAP_F0908_PublicTransport_Junee_r1v4.mxd

## 9.4 Impact assessment—construction

### 9.4.1 Proposal-wide impacts

Discussion of impacts relevant to each precinct are discussed in sections 9.4.2 to 9.4.5. Consideration of impacts relevant to the proposal as a whole are discussed in the following sections.

#### Regional road network

While construction of the proposal would require use of the regional road network, these roads comprise arterial roads connecting areas of NSW and interstate. As discussed in section 9.3.1, the Hume Highway carries about 11,400 vehicles per day and the Olympic Highway carried about 2,800 vehicles per day on average (based on a traffic survey completed in 2011). Construction vehicle numbers are discussed in Section 9.4.2 to Section 9.4.5, which constitutes a minor percentage (less than one per cent) of total vehicles on the road.

Due to the high volume of traffic on arterial roads, the additional vehicles generated by construction of the proposal constitute a low proportion of the overall volumes.

Link assessment completed for arterial roads indicates they perform well (LoS of B or better) with construction vehicles for peak hours (refer to Technical Paper 1: Transport and traffic). Operation of these roads would improve further outside peak periods, as background traffic volumes are demonstrated to reduce.

Entry and exit ramps/acceleration and deceleration lanes from these roads allow for the operation of intersections without impact to the flow of traffic. Where regional roads are impacted by the proposal directly, including construction access, road closures or diversions, these are discussed in the sections assessing each relevant precinct below.

#### Rail network

Construction of the proposal requiring disruption to the operation of the rail network would occur during scheduled possession periods or track occupancy authorisations.

Work under rail possessions would be carried out during scheduled possession periods (that is, the times that the movement of trains along the rail corridor are stopped for maintenance). Rail possessions are typically for 60-hour periods, two times a year, in March and September.

Outside scheduled rail possessions, works would also occur within available 5- to 12-hour windows when train services are not scheduled and when authorised by ARTC (called a track occupancy authorisation). These periods are determined in consultation with operators of freight and passenger train services.

As such, no impacts to operation of the existing rail network are anticipated during construction.

#### Seasonal traffic

Temporary local events such as festivals, shows, and markets may result in minor localised traffic variations, particularly in townships of Albury, Wagga Wagga and Junee.

Enhancement sites outside these areas are surrounded by predominantly rural and agricultural land uses. Localised seasonal traffic variation would be experienced at enhancement sites that share land with agricultural infrastructure (grain silos, livestock loading facilities, etc.) as the infrastructure would generate additional heavy or farm vehicle movements during harvest seasons.

During construction of the proposal, coordination would be required to ensure impacts from seasonal traffic variation are managed; however, it is not predicted that any seasonal variation would significantly impact the outcomes of the traffic assessment, as background and construction vehicle traffic volumes are low and there would be sufficient capacity on the local roads to still account for change in seasonal traffic.

Agreement with operators of grain silos and other infrastructure within the proposal site would be required prior to construction, and access to these sites would be maintained.

#### Other transport and traffic impacts

**Public transport**

Where delays to the road network due to construction of the proposal occur, delays to public transport services travelling on these routes would also occur. Impacts to public transport within each precinct are discussed in section 9.4.2 to 9.4.5. It is noted that where public transport operates between different enhancement sites and precincts, delay to the service may occur as it passes through each relevant enhancement site. The potential for this to occur is dependent on a number of factors, including the construction schedule and likelihood of concurrent activities, the scheduling of the bus service, and traffic conditions at that time. As such, this impact has not been quantified through assessment. The mitigation measures outlined in section 9.6 include measures to manage impacts to public transport in consultation with operators and other stakeholders—this would include managing the impact to services operating on routes subject to impact from multiple enhancements sites.

### Active transport

Consideration of impacts to active transport within each precinct is provided in the sub-sections below; however, it is noted that where diversions are required for active travel routes, the selected diversion route has considered where pedestrian infrastructure is present. Where cyclists utilise diversion routes, and an existing cycle or shared path is not present, cyclists would be required to cycle on road. To facilitate construction access to the rail corridor and surrounds, including surrounding residences, diversion of pedestrians and cyclists within the proposal site would also be required. Detailed consideration of the management of pedestrian and cyclist safety within the proposal site would be completed prior to and during construction. Mitigation measures, including the requirements for a Traffic Management Plan (TMP), are provided in section 9.6.

### Heavy vehicle routes

Designated heavy vehicle routes are outlined in Table 9-16. Generally, the proposal would have no impact on heavy vehicle routes; however, where delays to the road network due to construction of the proposal occur, delays to heavy vehicles travelling on these routes would also occur. These are discussed below and include Edmondson Street bridge and Kemp Street bridge. It is noted that, where a heavy vehicle travels through both enhancement sites, collective delay would occur. This would depend on a number of factors, including the time and route of travel.

During the Edmondson Street bridge closure, additional diverted traffic is expected on Edward Street and Lake Albert Road. The additional traffic is expected to increase average delay by one minute during a peak period which is not considered a significant impact to the heavy vehicle route passing though these intersections.

The Kemp Street bridge enhancement site works would require diverting of part of the Olympic Highway in Junee, which is a designated heavy vehicle route. Heavy vehicle diversionary signage would be implemented to divert traffic outside of Junee on existing heavy vehicle routes via Goldfields Way and Old Junee Road, resulting in an additional travel distance of 4 km, to reduce impact associated with heavy vehicle movements on Pretoria Street during its use for two months.

**TABLE 9-16 HEAVY VEHICLE ROUTES RELEVANT TO THE PROPOSAL**

| Precinct | Heavy vehicle route | Precinct | Heavy vehicle route |
|---|---|---|---|
| Albury precinct | ▸ Hume Highway<br>▸ Borella Road/Riverina Highway<br>▸ Atkins Street<br>▸ MacLeay Street<br>▸ Panmure Street<br>▸ East Street<br>▸ Young Street<br>▸ Wilson Street<br>▸ Railway Place<br>▸ Wagga Road. | Wagga Wagga precinct | ▸ Olympic Highway<br>▸ Pearson Street<br>▸ Cheshire Street<br>▸ Fernleigh Road<br>▸ Edward Street<br>▸ Fox Street<br>▸ Byrnes Road<br>▸ Merino Road. |
| Greater Hume—Lockhart precinct | ▸ Olympic Highway/Melville Street<br>▸ Balfour Street<br>▸ Railway Parade<br>▸ Sladen Street<br>▸ Yankee Crossing Road<br>▸ Urana Street<br>▸ Mangoplah Road. | Junee precinct | ▸ Byrnes Road<br>▸ Harefield Road<br>▸ Olympic Highway<br>▸ Seignior Street<br>▸ Edgar Street<br>▸ Harold Street<br>▸ Brabins Road. |

### Travelling stock reserves

TSRs relevant to the proposal are summarised in Table 9-17—there are no TSRs relevant to Albury or Junee precincts; the mapped TSRs comprise livestock highways. Where delays to the road network due to construction of the proposal occur, disruption to potential stock movements on these routes would also occur; however, consideration of delay is not directly relevant to consideration of the movement of stock. No roads identified as TSR would be closed during construction of the proposal.

Moving of stock on public roads outside of TSRs is possible with the necessary permits and therefore stock may, at times, require limited use of rail crossings within the proposal.

The management and mitigation measures detailed in section 9.6 include measures to manage potential impacts to TSRs.

**TABLE 9-17 TRAVELLING STOCK RESERVES RELEVANT TO THE PROPOSAL**

| Precinct | Enhancement site | Roads mapped as TSR used for construction |
|---|---|---|
| Greater Hume – Lockhart | Henty Yard clearances | ▸ Olympic Highway |
| | Yerong Creek Yard clearances | ▸ Olympic Highway |
| | The Rock Yard clearances | ▸ Olympic Highway<br>▸ The Rock Road |
| Wagga Wagga | Uranquinty Yard clearances | ▸ Olympic Highway |
| | Pearson Street bridge | ▸ None |
| | Wagga Wagga Station and surrounds | ▸ Olympic Highway<br>▸ Bourke Street<br>▸ Edward Street<br>▸ Docker Street |
| | Bomen Yard clearances | ▸ None |

### Emergency vehicle access

Where access to enhancement sites is required for emergency services, including within the proposal site, this would be facilitated.

Construction of the proposal would result in temporary impacts to traffic and an increase in vehicle movements on the road network. Where impacts to road network performance occur (discussed in the following sections), some delay or disruption to emergency vehicles has the potential to occur; however, emergency vehicles do not operate as per other vehicles on the road network, therefore measures of delay are not directly applicable.

Where construction at enhancement sites is not predicted to cause delay in the surrounding road network, no significant impact to emergency vehicle access would occur as a result of the proposal, as roads would continue to operate at a similar level of performance to what currently occurs. Enhancement sites which include road diversions (Henty Yard clearances, Edmondson Street bridge, Kemp Street bridge and Junee to Illabo clearances) have the greatest potential for impact to emergency vehicle access.

Impacts to the road network operation, as well as delays from diversionary routes, has the potential to impact emergency vehicle response time. The likelihood of this impact is dependent on a number of factors, including origin and destination of the emergency vehicle, and time of day. These impacts can be mitigated through adequate planning to minimise the potential for significant disruption.

ARTC is continuing to consult with emergency services. Construction planning would include consultation with emergency services to ensure adequate protocols are implemented, including route planning and consideration of traffic diversions, to prevent potential impacts from the proposal. Where traffic management is in place for the proposal, emergency vehicle access would be prioritised. Refer to section 9.6 for further discussion of mitigation and management measures.

### 9.4.2 Albury precinct

## Construction profile

This section summarises the construction profile for the Albury precinct; the assessment of impacts associated with this profile is summarised in the following sections. Construction of the proposal includes the use of haulage routes for access to the enhancement sites, as well as road diversions where these are required. Construction routes were selected to minimise the use of local roads where possible; however, as detailed below, the number of heavy vehicles required for construction is generally low.

The construction profile for enhancement sites in the Albury precinct is summarised in Table 9-18. Access roads and key intersections for the Albury precinct are outlined in Figure 9-9.

**TABLE 9-18 CONSTRUCTION PROFILE—ALBURY PRECINCT**

| Enhancement site | Duration of construction (months) | Construction vehicles (maximum one-way movements per peak hour) | | Road closures/ traffic diversions required |
|---|---|---|---|---|
| | | Light vehicles | Heavy vehicles[1] | |
| Murray River bridge | 12 | 27 | 2 | No |
| Albury Station pedestrian bridge | 6 | 13 | 8 | No |
| Albury Yard clearances | 3 | 27 | 8 | No |
| Riverina Highway bridge | 16 | 40 | 10 | No |
| Billy Hughes bridge | 16 | 47 | 10 | No |
| Table Top Yard clearances | <1 | 7 | 2 | No |

1. Allowances for heavy vehicle movements include movements in and out of site (two-way) in the same hour

## Road network performance

Road network performance has been assessed through consideration of road performance (link capacity) and intersection performance—these are discussed in the following sections.

### Road performance

Assessment of LoS for link capacity of roads impacted by the proposal was completed for worst-case changes between existing performance and with construction of the proposal based on forecasted traffic volumes for 2024 (peak construction year). The assessment identified that all roads perform at an LoS of C or better, with and without the proposal—no changes in LoS were predicted for any road.

Impacts from construction vehicles are predicted to have negligible impacts on the performance of the existing road network.

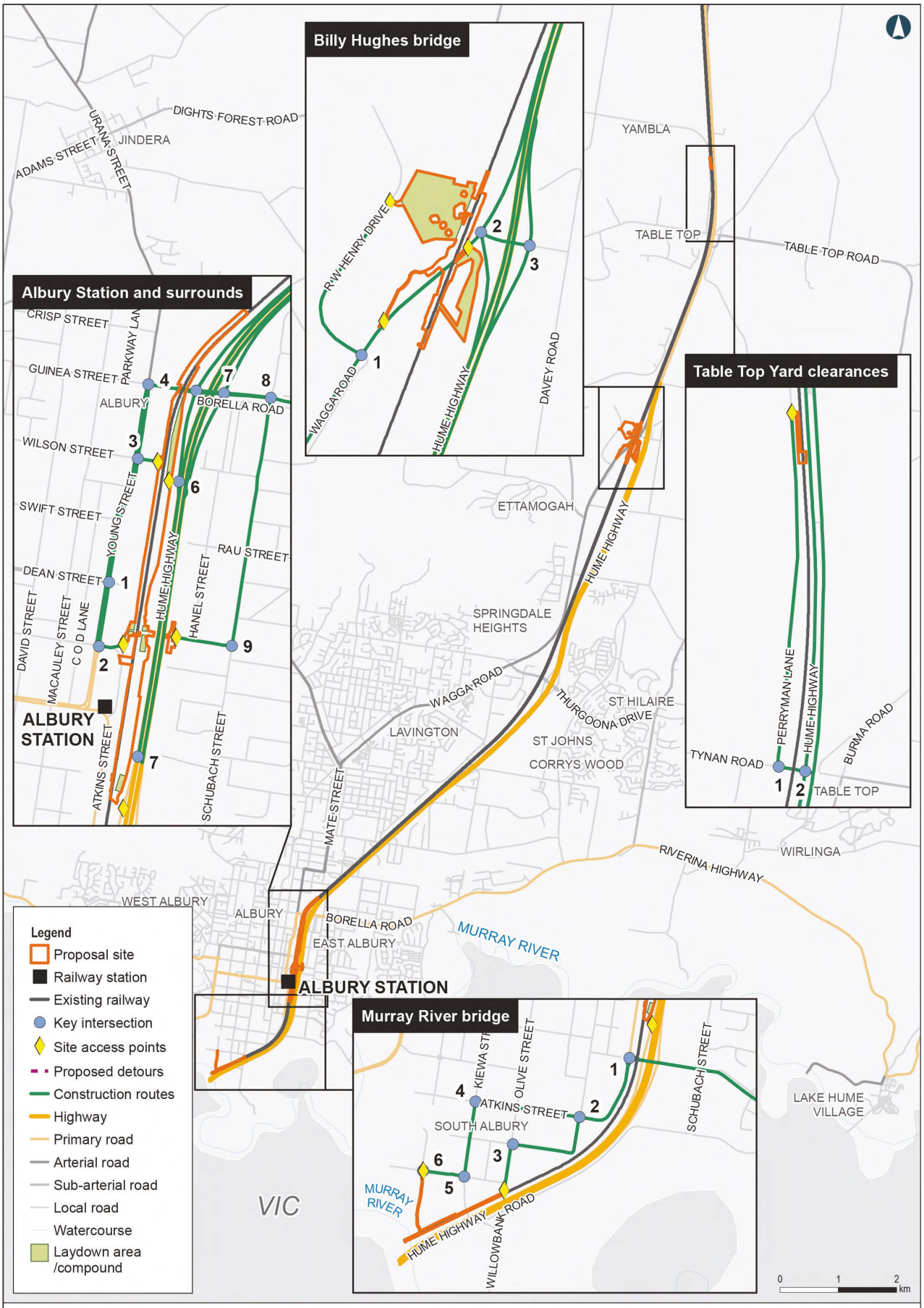



Figure 9-9 Construction access and intersections - Albury precinct

Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:85,000
Paper size: A4
Date: 10/12/2021

Data Sources: ARTC, NSWSS

210_EAP_F0909_ConstructionAccess_Albury_r1v4.mxd

#### Intersection performance

The predicted performance of the highest trafficked (on a per-lane basis) intersection on the construction route within the Albury precinct was assessed as a worst-case example, to determine the minimum performance level that would be achieved by all intersections. Within Albury precinct, this intersection was selected as the Guinea Street/Hume Highway (northbound) intersection.

The intersection assessment assessed peak-hour construction traffic in conjunction with peak-hour background traffic as a worst-case scenario for construction movements. As no road closures or diversions are proposed for enhancement sites in the Albury precinct, no changes in existing traffic volume predictions were applied. The assessment demonstrates that the intersection operates at an acceptable level (LoS C) both with and without construction of the proposal.

As no change in LoS as a result of the proposal was predicted, any change in intersection operation and performance would be minor and not sufficient to lower the category of performance below LoS C. Further, it was concluded that construction vehicles would not impact the performance of any other lesser trafficked construction route intersection within the precinct.

Based on this worst-case assessment, all intersections within the Albury precinct are predicted to operate at a LoS of C or better during construction, and no change in LoS as a result of the construction of the proposal is expected.

#### Delay from temporary road closures and diversions

No road closures or diversions are proposed for construction within the Albury precinct.

### Construction site access and road safety

Turn-warrant assessment of construction site access indicates turning treatments may be required for some site accesses in this precinct, subject to further consideration.

The proposed access points located on the Hume Highway entry ramp and Hume Highway exit ramps is from a one-way road (left in and left out only), therefore turning of vehicles is restricted to this movement, and further assessment is not required. These proposed enhancement site accesses would potentially have a greater impact on the performance and safe operation of the Hume Highway due to:

- proximity to high-speed traffic lanes (110 km/hr posted speed limit)
- high volumes of traffic
- limited shoulder width to provide space for turning construction vehicles to slow down without impacting other vehicles.

Changes to road conditions from increased traffic and new access points to the enhancement sites from the public road network can result in impacts to road safety. To manage any construction impacts to existing roads, or potential safety issues associated with either construction vehicle movements or the additional traffic on local roads from diversions, Road Safety Audits (RSAs), dilapidation reports and Construction Traffic Transport and Access Management Plans would be required to be undertaken prior to construction (refer to section 9.6).

### Parking

Parking for construction workers and laydown areas for unloading of heavy vehicles would be provided within the proposal site, and not impact existing parking facilities unless located within this area.

The proposal site does not include use of parking spaces within the Albury precinct, with the exception of Albury Station and surrounds (including the Albury Station pedestrian bridge, Albury Yard clearances and Riverina Highway bridge enhancement sites).

Public parking near Albury Station, on Smollett Street and Railway Place, would be impacted during construction at these enhancement sites, including a loss of 14 designated spaces and 13 informal spaces for a period of up to six months. A total of 114 designated parking spaces would remain available within the Albury Station carpark.

Review of surrounding streets, including Young Street, which contains parking about 200 m from Albury Station, indicates there is generally parking available to accommodate the loss of 27 spaces. As most local roads in the area permit kerbside parking, it is considered that there would be sufficient capacity to absorb the temporary loss of parking, with only minor delays for travel to Albury Station.

No accessible parking spaces would be impacted by the proposal.

### Public transport services

#### Road

No changes in the operation of bus services in the Albury precinct are required for construction of the proposal. There would be some minor disruption to travel times from additional construction vehicles on bus routes; however, as discussed above, the performance of the road network is anticipated to remain at the same LoS.

#### Rail

Construction of the proposal requiring disruption to the operation of the rail network would occur during scheduled possession periods, which occur as part of the existing operation of the rail network; as such, no impacts to passenger rail services are anticipated from the proposal. There would be some disruption to access in and around Albury station for train passengers entering and exiting the station (refer to active transport for further discussion).

### Active transport

Impacts to active transport for enhancement sites within Albury precinct are predominantly limited to Albury Station.

The Albury Station pedestrian bridge replacement would require closure of the bridge for about four months. During this time, pedestrians would be required to detour to nearby pedestrian bridges, including the Harold Mair bridge located 160 m north, and the Amatex pedestrian bridge located 460 m south, resulting in increased travel time.

Access would be maintained for pedestrians and cyclists entering Albury Station. Traffic management would be implemented, including pedestrian detours within the station where these are required.

While there would be general disruptions around construction sites, no significant impacts to active transport are anticipated at other enhancement sites in the Albury precinct.

#### Property access

Although there may be some minor, temporary disruptions due to the requirements for traffic management, property access would be maintained for the duration of the construction activities. Any changes to arrangements would need to be undertaken in consultation with the relevant stakeholders and in line with the Construction Traffic and Transport Management Plan.

### Water-based transport

Construction at the Murray River bridge enhancement site would require scaffolding beneath the bridge; minimum clearances may prevent access for recreational users of the Murray River for the duration of construction (12 months). This would partially restrict movements and cause delay or disruption to access for recreational or commercial users; however, the proposal would maintain the river as navigable by the provision of a channel under the bridge to maintain access for watercraft.

Work over river channel would be undertaken in consultation with TfNSW Maritime and the relevant stakeholder, including appropriate maritime permit requirements and safety notices (refer to section 9.6).

## 9.4.3 Greater Hume–Lockhart precinct

### Construction profile

This section summarises the construction profile for the Greater Hume–Lockhart precinct; the assessment of impacts associated with this profile is summarised in the following sections.

Construction of the proposal includes the use of haulage routes for access to the enhancement sites, as well as road diversions where these are required. Construction routes were selected to minimise the use of local roads where possible; however, as detailed below, the number of heavy vehicles required for construction is generally low. Where required, planning for diversion routes has selected roads of the same order as far as possible.

The construction profile for enhancement sites in the Greater Hume–Lockhart precinct is summarised in Table 9-19. Access roads and key intersections for the Greater Hume–Lockhart precinct are outlined in Figure 9-10.

**TABLE 9-19 CONSTRUCTION PROFILE—GREATER HUME–LOCKHART PRECINCT**

| Enhancement site | Duration of construction (months) | Construction vehicles (maximum one-way movements per peak hour) | | Road closures / traffic diversions required |
|---|---|---|---|---|
| | | Light vehicles | Heavy vehicles[1] | |
| Culcairn pedestrian bridge, Culcairn Yard clearances | 3 | 40 | 8 | No |
| Henty Yard clearances | 3 | 40 | 8 | Yes |
| Yerong Creek Yard clearances | 3 | 40 | 8 | No |
| The Rock Yard clearances | <1 | 7 | 1 | No |

### Road diversions

One road closure and diversion at Henty Yard clearances is required. Construction at the Sladen Street rail level crossing would require a road closure for a duration of five days. The closure would require vehicles to be diverted to the rail level crossing on Rosler Parade, located 500 m to the south, via the Olympic Highway on the eastern side of the rail line and via Allan Street on the western side of the rail line, as shown in Figure 9-11.

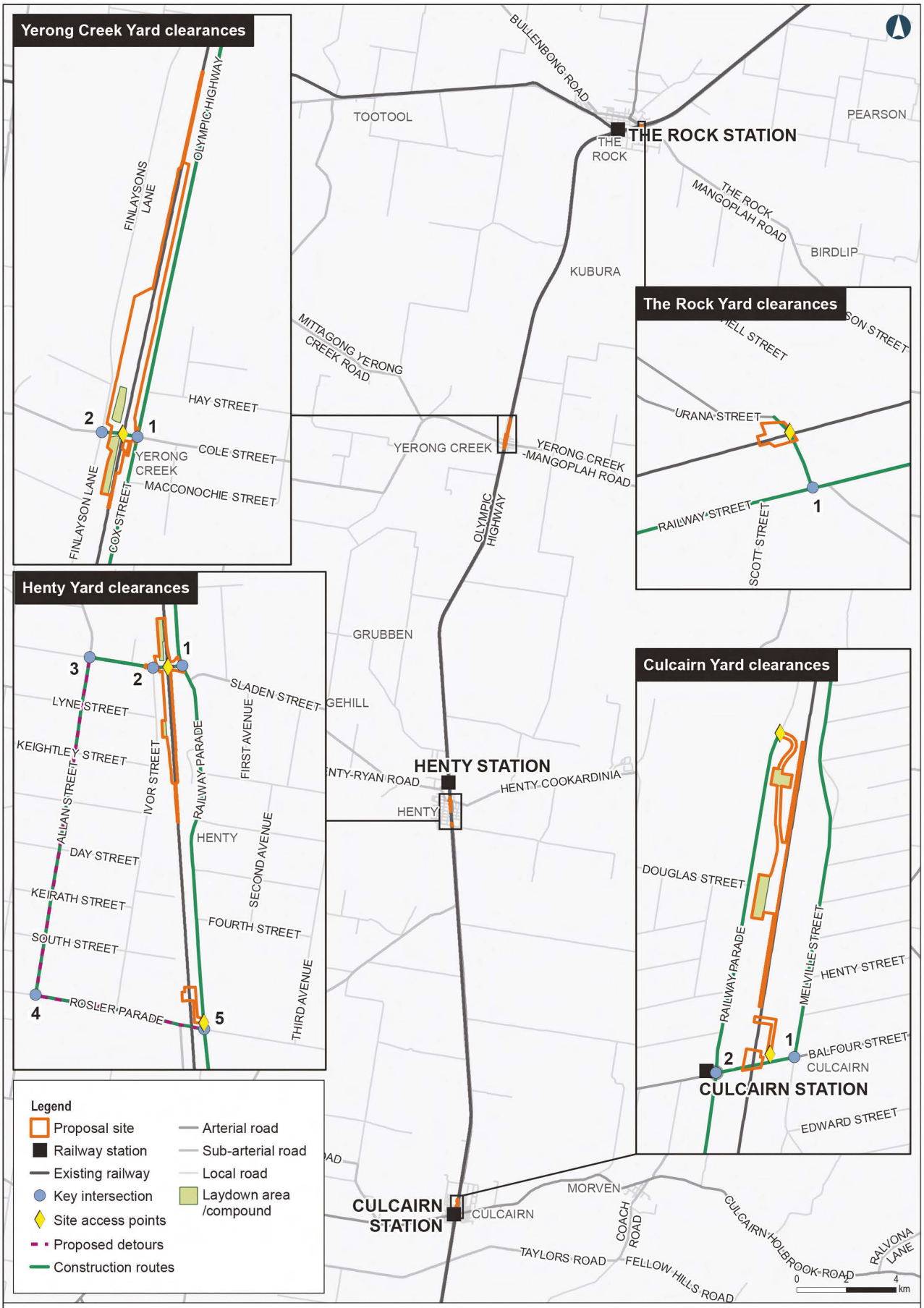



Figure 9-10 Construction access and intersections - Greater Hume-Lockhart precinct

Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:200,000
Paper size: A4
Date: 4/11/2021

Data Sources: ARTC, NSWSS

210_EAP_F0910_ConstructionAccess_LGH_r1v2.mxd

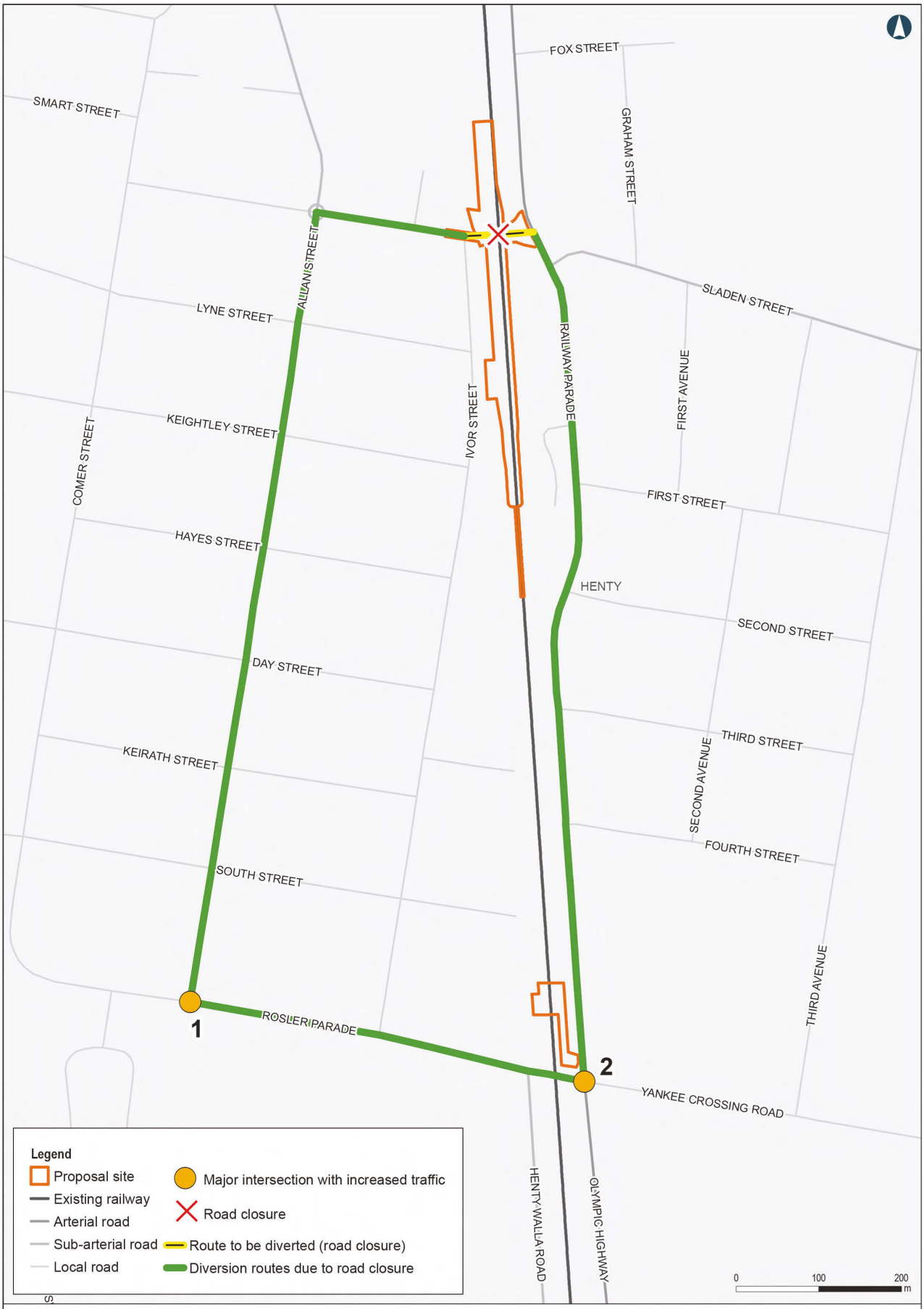



Figure 9-11 Road diversions due to closure of Sladen Street, Henty

Data Sources: ARTC, NSWSS

Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:6,000
Paper size: A4
Date: 18/09/2021

210_EAP_F0911_ClosuresDiversionRoutes_SladenSt_r1v1.mxd

## Road network performance

Road network performance has been assessed through consideration of road performance (link capacity) and intersection performance—these are discussed in the following sections.

### Roads not subject to impacts from road closures and diversions

#### Road performance

Assessment of LoS for link capacity of roads impacted by the proposal was completed for worst-case changes between existing performance, and with construction of the proposal, based on forecasted traffic volumes for 2024 (peak construction year). The assessment identified that all roads perform at an LoS of C or better with and without the proposal—no changes in LoS were predicted for any road.

Impacts from construction vehicles are anticipated to have negligible impacts on the performance of the existing road network.

#### Intersection performance

The predicted performance of the highest trafficked (on a per-lane basis) construction route intersection in the Greater Hume–Lockhart precinct was assessed as a worst-case example, to determine the minimum performance level that would be achieved by all intersections. Within the Greater Hume–Lockhart precinct, this intersection was selected as the Balfour Street/Railway Parade intersection at Culcairn (Culcairn Yard clearances and Culcairn pedestrian bridge).

As discussed above, road closures and diversions are required for the Henty Yard clearances enhancement site. Performance of the road network at this site during the closure is considered further in the following section.

The results show that the intersection operates at an acceptable level (LoS A) both with and without construction of the proposal. As no change in LoS as a result of the construction generated traffic and, subsequently, no significant impacts to intersection operation and performance are expected.

As no change in LoS as a result of the proposal was predicted, any change in intersection operation and performance would be minor and not sufficient to lower the category of performance below LoS A. Further, it was concluded that construction vehicles would not impact the performance of any other lesser trafficked construction route intersection within the precinct.

Based on this worst-case assessment, all intersections in the Greater Hume–Lockhart precinct (with the exception of Henty Yard clearances, which is discussed further below) are predicted to operate at an LoS of A during construction and no change in LoS as a result of the construction of the proposal is expected.

### Roads not subject to impacts from road closures and diversions

#### Road performance

Link capacity for roads subject to impacts from road closures and diversions associated with the Sladen Street road closure was assessed. No change in the link capacity LoS was identified and all roads continue to operate with an LoS of A.

#### Intersection performance

A ‘worst case’ assessment of construction route intersection performance was undertaken for the precinct in the section above. The analysis showed no impact to intersection performance as a result of the 39 construction vehicles, with the intersection performing at an LoS of A. As such, it is not considered that an additional 51 diverted vehicles per hour would impact the performance of other intersections with lower traffic volumes, which is seen at intersections impacted by road diversions as a result of the closure of Sladen Street. Further, this diversion would only be in place for a duration of five days; therefore, no additional intersection analysis has been undertaken to assess the impact of diverted vehicles to intersections during the Sladen Street closure.

### Delay from temporary road closures and diversions

Closure of Sladen Street and diversion of traffic would result in a maximum delay of about five minutes, due to the additional travel time.

## Construction site access and road safety

Turn-warrant assessment of construction site access indicates turning treatments may be required for some site accesses in this precinct, subject to further consideration.

Changes to road conditions from increased traffic, temporary diversions and new access points to the enhancement sites from the public road network has the potential to result in impacts to road safety. To moderate any construction impacts to existing or potential safety issues associated with either construction vehicle movements or the additional traffic on local roads from diversions, RSAs, road dilapidation report and Construction Traffic Transport and Access Management Plans would be required to be undertaken prior to construction.

## Parking

Parking for construction workers and laydown areas for unloading of heavy vehicles would be provided within the proposal site, and not impact existing parking facilities unless located within this area.

No impacts to designated parking areas are impacted by the proposal site within the Greater Hume–Lockhart precinct.

Any disruption to on-street parking due to traffic control or site accesses on the local road network would be managed in line with the Construction Traffic and Transport Management Plan.

## Public transport services

### Road

No changes in the operation of bus services within the Greater Hume–Lockhart precinct are required for construction of the proposal, with the exception of Henty Yard clearances. There would be some minor disruption travel times from additional construction vehicles on bus routes; however, as discussed above, the performance of the road network is anticipated to remain the same.

The level crossing works on Sladen Street would require the road to be closed, which would require existing traffic to be diverted to the southern level crossing on Rosler Parade via Allan Street. This diversion is expected to have a minimal impact on the operation of these bus services due to the on-demand nature of bus services through Henty with non-fixed routes and the limited time of the diversion (five days).

### Rail

Construction of the proposal requiring disruption to the operation of the rail network would occur during scheduled possession periods, which occur as part of the existing operation of the rail network; as such, no impacts to passenger rail services are anticipated from the proposal. There would be some disruption to access in and around operational railway stations at Culcairn, Henty and The Rock for train passengers entering and exiting the station (refer to the active transport section below for further discussion).

## Active transport

Provision of active transport infrastructure in the vicinity of the Greater Hume–Lockhart precinct enhancement sites is minimal and, given the surrounding land uses, the demand for cycling and pedestrian travel in the area is likely to be low. No significant delay from traffic volumes has been identified.

The level crossing works on Sladen Street in Henty would require the road to be closed temporarily (five days); however, pedestrian connectivity would be maintained through the closure's duration.

While access would be maintained for pedestrians and cyclists entering railway stations, traffic management would be implemented, including potential pedestrian detours within the station.

While there would be general disruptions around construction sites, no significant impacts to active transport are anticipated.

## Property access

Although there may be some minor, temporary disruptions due to the requirement for traffic management, property access would be maintained for the duration of the construction activities within Greater Hume–Lockhart precinct. Any changes to arrangements would need to be undertaken in consultation with the relevant stakeholders and in line with the Construction Traffic, Transport and Access Management Plan.

### 9.4.4 Wagga Wagga precinct

#### Construction profile

This section summarises the construction profile for the Wagga Wagga precinct, the assessment of impacts associated with this profile is summarised in the following sections.

Construction of the proposal includes the use of haulage routes for access to the enhancement sites, as well as road diversions where these are required. Construction routes were selected to minimise the use of local roads where possible; however, as detailed below, the number of heavy vehicles required for construction is generally low. Where required, planning for diversion routes has selected roads of the same order as far as possible.

The construction profile for enhancement sites within the Wagga Wagga precinct is summarised in Table 9-18. Access roads and key intersections for the Wagga Wagga precinct are outlined in Figure 9-12.

**TABLE 9-20 CONSTRUCTION PROFILE—WAGGA WAGGA PRECINCT**

| Enhancement site | Duration of construction (months) | Construction vehicles (maximum one-way movements per peak hour) | | Road closures / traffic diversions required |
|---|---|---|---|---|
| | | Light vehicles | Heavy vehicles[1] | |
| Uranquinty Yard clearances | 2 | 27 | 8 | No |
| Pearson Street bridge | 16 | 33 | 3 | No |
| Cassidy Parade pedestrian bridge | 6 | 13 | 3 | No |
| Edmondson Street bridge | 11 | 20 | 5 | Yes |
| Wagga Wagga Station pedestrian bridge | 6 | 13 | 3 | No |
| Wagga Wagga Yard clearances | 3 | 27 | 10 | No |
| Wagga Wagga Yard clearances (Docker Street gantry) | | 8 | 2 | No |
| Bomen Yard clearances | 2 | 27 | 8 | No |

**Road diversions**

The reconstruction of the Edmondson Street bridge would require a road closure on both Edmondson Street and Erin Street for a nine-month period. The assumed traffic diversion resulting from this closure includes (refer to Figure 9-13):

- Mitchelmore Street/Edmondson Street traffic:
  - traffic to/from the west and half the through movements on Edmondson Street rerouted to the west via Urana Street, Docker Street, Bourke Street and Edward Street
  - traffic to/from the east and half the through movements on Edmondson Street rerouted to the east via Urana Street, MacLeay Street, Railway Street and Lake Albert Road
- local traffic that currently uses Erin Street would be diverted via Coleman Street. Based on surrounding land uses and network connectivity, this traffic and associated impacts are expected to be minimal and has not been assessed.

For the purposes of this assessment, a worst-case scenario has been assessed where all traffic rerouted from Edmondson Street would use the specified diversion routes.

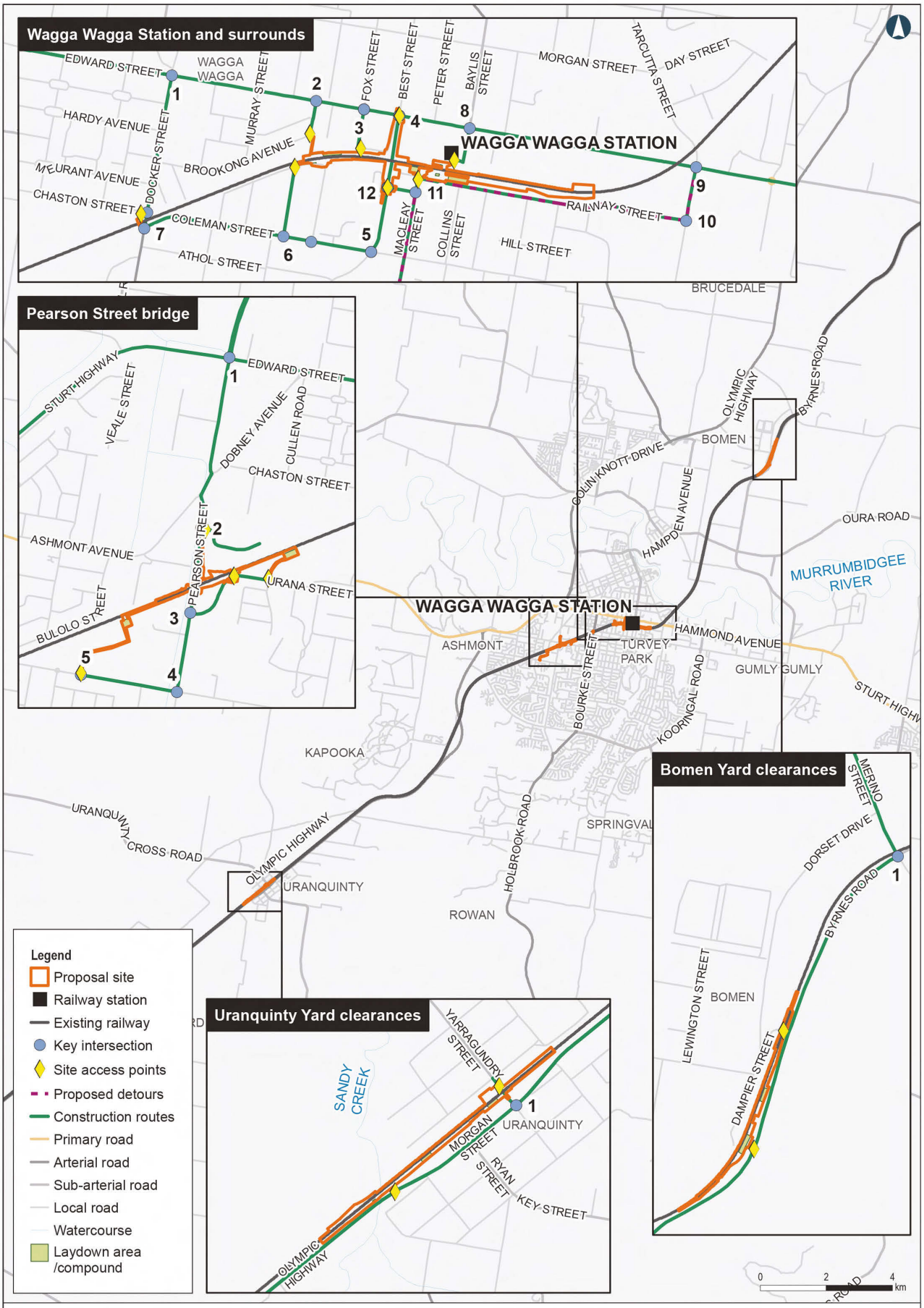



Figure 9-12 Construction access and intersections - Wagga Wagga precinct

Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:150,000
Paper size: A4
Date: 10/12/2021

Data Sources: ARTC, NSWSS

210_EAP_F0912_ConstructionAccess_Wagga_r1v4.mxd


Figure 9-13 Road diversions due to closure of Edmondson Street, Wagga Wagga

Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:15,000
Paper size: A4
Date: 4/11/2021

Data Sources: ARTC, NSWSS

210_EAP_F0913_ClosuresDiversionRoutes_EdmondsonSt_r1v2.mxd

## Road network performance

Road network performance has been assessed through consideration of road performance (link capacity) and intersection performance—these are discussed in the following sections.

### Roads not subject to impacts from road closures and diversions

#### Road performance

Assessment of LoS for link capacity of roads impacted by the proposal was completed for worst-case changes between existing performance, and with construction of the proposal, based on forecasted traffic volumes for 2024 (peak construction year). The assessment identified that all roads perform at an LoS of C or better with and without the proposal, with the exception of Fernleigh Road (Pearson Street bridge enhancement site), which operates with an LoS of D with or without the proposal. No changes in LoS were predicted for any road as a result of construction of the proposal.

Impacts from construction vehicles are anticipated to have negligible impacts on the performance of the existing road network.

#### Intersection performance

The predicted performance of the highest trafficked (on a per-lane basis) construction route intersection in the Wagga Wagga precinct was assessed as a worst case example, to determine the minimum performance level, which would be achieved by all intersections. Within Wagga Wagga precinct, this intersection was selected as the Edward Street and Pearson Street intersection (Pearson Street bridge enhancement site). Assessment of intersection performance for the Edmondson Street bridge enhancement site was completed separately, and included consideration of combined impacts from construction vehicles and road diversions. These are discussed in the section below.

As the proposal would not result in a change in LoS, any change in intersection operation and performance would be minor and not sufficient to lower the category of performance below LoS B. Further, it is concluded that construction vehicles would not impact the performance of any other lesser trafficked construction route intersection within the precinct.

Based on this worst-case assessment, all intersections within the Wagga Wagga precinct (excluding those relevant to Edmondson Street bridge) are predicted to operate at an LoS of B or better during construction. No change in LoS as a result of the construction of the proposal is expected.

### Roads subject to impacts from road closures and diversions—Edmondson Street bridge

The following sections assess the predicted impacts to the road network from the closure of Edmondson Street bridge, including road performance, intersection performance, delays, and consideration of impact outside peak periods. A summary section is included following these sections to describe the collective impact and approach to mitigation and management.

#### Road performance

Link capacity for roads subject to impacts from road closures and diversions associated with the Edmondson Street road closure are summarised in Table 9-21.

A change in link LoS is seen on all roads under assessment as a result of the diversions and construction traffic (where applicable) during the peak period:

- on the western diversion route, Urana Street is expected to operate at LoS E. All other road links on this diversion route operate at LoS C.
- on the eastern diversion route, MacLeay Street and Railway Street are expected to operate at LoS D. All other road links on this diversion route operate at LOS C or better.

**TABLE 9-21 OVERVIEW OF LINK CAPACITY OF ROADS IMPACTED BY ROAD CLOSURES AND DIVERSIONS—EDMONDSON STREET BRIDGE**

| Road | Link capacity LoS (without the proposal) | Link capacity LoS (with the proposal) |
|---|---|---|
| Edward Street/Sturt Highway | B | C |
| Docker Street/Bourke Street | A | C |
| Urana Street | C | E |
| MacLeay Street | A | D |
| Railway Street | A | D |
| Lake Albert Road | A | B |

### Intersection performance

As a result of the closure of Edmondson Street, the key intersections for movements associated with the diversion routes identified include:

- Sturt Highway/Best Street
- Sturt Highway/Docker Street
- Docker Street/Coleman Street/Bourke Street
- Bourke Street/Urana Street
- Urana Street/Mitchelmore Street
- Coleman Street/Edmondson Street/Mitchelmore Street
- Urana Street/MacLeay Street
- MacLeay Street/Coleman Street
- Lake Albert Road/Railway Street
- Sturt Highway/Lake Albert Road.

Based on consideration of opposing traffic flows at each intersection, the following intersections were identified as potentially impacted by the proposal and assessed further:

- Sturt Highway/Docker Street
- Bourke Street/Urana Street
- Urana Street/MacLeay Street
- Lake Albert Road/Railway Street
- Sturt Highway/Lake Albert Road.

A summary of the assessment of intersection performance with road diversions, including construction vehicles, is provided in Table 9-22.

The results indicate that performance of intersections would worsen during the nine months the road diversions are in place. Most significantly, the Sturt Highway/Docker Street would perform at a LOS of F, indicating significant congestion; however, this intersection is predicted to operate with a level of congestion without the proposal (LOS D). The Bourke Street/Urana Street and Lake Albert Road/Railway Street intersections deteriorate from LOS A and B, respectively, without the proposal, to LoS of D and E, respectively, with the proposal.

This assessment is considered to be a 'worst-case' scenario and it is expected that a proportion of diverted vehicles would seek alternative routes to avoid this congested intersection. This would likely distribute the impact of diversions more proportionally across the broader network. The assessment is also based on peak-hour performance and is not reflective of intersection performance across a day, which is likely to operate more optimally with lower vehicle volumes than during a peak hour (refer to the following section for discussion of impact outside peak hours).

**TABLE 9-22 OVERVIEW OF INTERSECTION PERFORMANCE OF ROADS IMPACTED BY ROAD CLOSURES AND DIVERSIONS—EDMONDSON STREET BRIDGE**

| Intersection | 2024 peak hour LoS (without construction) | 2024 peak hour LoS (with construction) Roads used for construction access |
|---|---|---|
| Sturt Highway/Docker Street | D | F |
| Bourke Street/Urana Street | A | D |
| Urana Street/MacLeay Street | A | A |
| Lake Albert Road/Railway Street | B | E |
| Sturt Highway/Lake Albert Road | D | D |

### Delay from temporary road closures and diversions

Table 9-23 summarises the predicted delay from road closures and diversions associated with construction at Edmondson Street bridge. With construction of the proposal, the additional journey time is predicted to be nine minutes via either diversion route. The delay from construction of the proposal for these routes would be up to three minutes.

Staging plans for traffic diversions are provided in Chapter 8: Construction of the proposal.

TABLE 9-23 OVERVIEW OF DELAYS DUE ROAD CLOSURES AND DIVERSIONS—EDMONDSON STREET BRIDGE

| Diversion route | Average journey time (without the proposal) | Average journey time (with construction of the proposal) |
|---|---|---|
| Urana Street, Docker Street, Bourke Street, and Edward Street | 6 minutes | 9 minutes |
| Urana Street, MacLeay Street, Railway Street and Lake Albert Road | 8 minutes | 9 minutes |

#### Road and intersection performance outside peak hours

Analysis of traffic volumes over an average day indicates that AM and PM peaks are about 60 per cent of the peak-hour volumes. Hourly volumes prior to the AM peak and post the PM peak rapidly diminish to relatively low volumes; therefore, it is not expected that the levels of link and intersection performance shown during the peak-hour (temporary) diversions would be experienced outside of the peak hours, and delays would decrease.

#### Summary of road and intersection performance during road closures and diversions—Edmondson Street bridge

The assessment of road network performance during road closures and diversions indicates that significant delays from road congestion would occur during peak-hour traffic conditions.

Assessment of the existing performance of these roads indicates they are constrained during these times, with the proposal worsening their operation. The worst performing intersections include the Sturt Highway/Docker Street and Sturt Highway/Lake Albert Road intersections, which perform at a LoS D. With the exception of Urana Street/MacLeay Street, the five assessed intersections on the diversion route are predicted to operate at a LoS D or below when the diversions are in place during the peak hour. Outside the peak, intersections are likely to operate more optimally given the lower volume of vehicles at these intersections.

The assessment is based on a number of worst-case assumptions on the traffic volumes and movements, and the movement of vehicles on the road is subject to a complex number of interrelated factors. It is expected that a proportion of diverted vehicles may seek alternative routes to the proposed diversions across the broader network or avoid peak-hour travel times where possible, which would mitigate these impacts.

Management of the impact of construction during closure of the Edmondson Street bridge requires coordination with road authorities, including TfNSW and Wagga Wagga City Council, as well as bus operators, emergency services and other stakeholders. Potential management measures to be considered would include temporary changes to signal phasing at intersections along the traffic diversion routes in Wagga Wagga during the Edmondson Street bridge closure (refer to section 9.6).

### Construction site access and road safety

Turn-warrant assessment of construction site access indicates turning treatments may be required for some site accesses in this precinct, subject to further consideration.

Changes to road conditions from increased traffic, temporary diversions and new access points to the enhancement sites from the public road network has the potential to result in impacts to road safety. To moderate any construction impacts to existing or potential safety issues associated with either construction vehicle movements or the additional traffic on local roads from diversions, RSAs, road dilapidation report and Construction Traffic Transport and Access Management Plans would be required to be undertaken prior to construction.

### Parking

No impacts to parking are anticipated for enhancement sites in the Wagga Wagga precinct, with the exception of Edmondson Street bridge.

During the nine-month closure of Edmondson Street, existing school drop-off areas on Edmondson Street adjacent to Kildare Catholic College would remain viable as parents would be able to drop off their children and undertake a U-turn on the eastern and western side of Edmondson Street, controlled by onsite traffic management. Access to the Mount Erin Heritage Centre car park would be maintained during construction.

Parking on Edmondson Street between Edward Street and Erin Street is largely restricted and, therefore, the Edmondson Street closure would have minimal impact in this area. The closure of Erin Street would remove two kerbside parking spaces on Erin Street for the duration of construction. Informal parking on the verge of the eastern side and kerbside parking on the western side of Little Best Street, within the enhancement site, would also be restricted during this period. In both locations the surrounding residential areas are predominantly low-density housing with off-street parking available. Review of aerial imagery of the area suggests that demand for on-street parking is relatively low in the surrounding streets as most residences have off-street parking in the area; therefore, there is low demand for parking and there is kerbside parking capacity to absorb the minor temporary parking losses.

Access to parking for the Multicultural Council of Wagga Wagga, located adjacent to the Wagga Wagga Station, would be impacted for approximately two days for lifting of construction materials during the replacement of the pedestrian bridge.

Off-street parking in Wagga Wagga Station would not be impacted; however, traffic management would be in place for road users entering and exiting the carpark.

## Public transport services

### Road

No changes in the operation of bus services within the Wagga Wagga precinct are required for construction of the proposal, with the exception of the Edmondson Street bridge closure during construction. There may be some minor disruption to travel times at sites other than Edmondson Street bridge from additional construction vehicles on bus routes; however, as discussed above, the performance (LoS) of the road network is anticipated to remain the same at these sites.

Bus services using Edmondson Street would require re-routing, resulting in delays to travel times. The following bus stops on Edmondson Street and Railway Street would also require closure/relocation:

- Kildare Catholic College (2650107 and 265098)
- Railway Street at Collins Street (2650305 and 265073).

Changes to bus routes and bus stops to mitigate these impacts, including establishing temporary stops, would need to be planned in consultation with the relevant stakeholders to minimise the impact on community, public transport users, and service providers.

### Rail

Construction of the proposal requiring disruption to the operation of the rail network would occur during scheduled possession periods, which occur as part of the existing operation of the rail network; as such, no impacts to passenger rail services are anticipated from the proposal.

Disruption to commuter access to Wagga Wagga Station would occur through delays due to:

- performance of the road network
- closure and diversion of active transport routes
- general construction activities and traffic management in Wagga Wagga Station.

These impacts are considered further in relevant sections.

## Active transport

There are no impacts to active transport in the vicinity of the Uranquinty Yard clearances and Bomen Yard clearances enhancement sites.

Footpaths are provided on key roads in the vicinity of the Pearson Street bridge enhancement site, with minimal provision of dedicated cycling infrastructure. No impacts to pedestrians are anticipated. There may be minor disruptions to cyclists using roads near these enhancement sites as a result of reduced speed limits and traffic control measures in place.

Edmondson Street bridge enhancement site would require the closure of Edmondson Street and Erin Street, impacting active transport movements. Some delays in cycling movements may occur as a result of traffic diversions.

The closures of the Wagga Wagga Station pedestrian bridge (Mothers bridge), Cassidy Parade pedestrian bridge, and Edmondson Street bridge would impact active transport connectivity and require alternative travel routes.

The additional distance and travel time to cross the rail line during construction of each of the bridges is shown below in Table 9-24. The distances reflect a trip to reach each side of a closed route via the nearest rail crossing and represents a worst-case scenario for active transport impact, as actual distance would vary by individual origin and destination.

The duration of impact would be for nine months during the closure of Edmondson Street bridge. Wagga Wagga Railway Station pedestrian bridge and Cassidy Parade pedestrian bridge closures would not occur simultaneously; therefore, delays to pedestrian and cyclists during this period would alternate between the 2 kms required to travel to the Cassidy Parade pedestrian bridge, and 850 m to travel to the Wagga Wagga Station pedestrian bridge. Following completion of construction of the Edmondson Street bridge, closure of the Wagga Station pedestrian bridge would require an additional travel distance of 850 m to the Edmondson Street bridge. The final staging of the bridge works in the Wagga Wagga precinct would be further refined during detailed design and in consultation with TfNSW and other relevant stakeholders.

Staging plans for active transport diversions are provided in Chapter 8: Construction of the proposal.

TABLE 9-24 ALTERNATIVE TRAVEL ROUTES DUE TO CLOSURE OF ACTIVE TRAVEL ROUTES—WAGGA WAGGA PRECINCT

| Active travel route | Proposed closure time | Alternative crossing location | Diversion distance | Travel time—walking | Travel time—cycling |
|---|---|---|---|---|---|
| Cassidy Parade pedestrian bridge | Six months | Wagga Wagga Station pedestrian bridge (Mothers bridge) | 2 km | 26 minutes | 8 minutes |
| | | Docker Street level crossing | 1.8 km | 22 minutes | 7 minutes |
| Edmondson Street bridge | Nine months | Cassidy Parade pedestrian bridge | 2 km | 20 minutes | 7 minutes |
| | | Wagga Wagga Station pedestrian bridge (Mothers bridge) | 850 m | 10 minutes | 3 minutes |
| Wagga Wagga Station pedestrian bridge | Six months | Edmondson Street bridge | 850 m | 10 minutes | 3 minutes |

### Property access

The proposal would utilise the Mount Erin Heritage Centre driveway off Edmondson Street for access to the Edmondson Street bridge enhancement site. Access to the Mount Erin Heritage Centre would be maintained through the duration of construction; however, some disruption may occur at times and traffic management would be in place.

The driveway of one residential property located on Erin Street and accessed via Railway Street would be impacted; however, it is expected that this would be intermittent in response to construction activities and alternative arrangements for access would be provided for the duration of construction.

The driveway from Station Place that gives access to the Multicultural Council of Wagga Wagga would be used for construction activities and would require temporary closure for up to two days as the new pedestrian bridge is lifted into place during a scheduled rail possession. Pedestrian access to the Multicultural Council of Wagga Wagga would be maintained under escort during this time. ARTC would consult with the operators of this facility to minimise the impacts of this closure, with works proposed to occur over a weekend and outside the standard operating hours of the facility.

Work on Edmondson Street bridge would be managed as to not disrupt access to properties on Little Best Street, which would remain open throughout construction.

Although there may be some minor, temporary disruptions, property access is expected to be maintained for the duration of the construction activities for other sites in the Wagga Wagga precinct. Any changes to arrangements would need to be undertaken in consultation with the relevant stakeholders and in line with the Construction Traffic and Transport Management Plan.

## 9.4.5 Junee precinct

### Construction profile

This section summarises the construction profile for the Junee precinct; the assessment of impacts associated with this profile is summarised in the following sections.

Construction of the proposal includes the use of haulage routes for access to the enhancement sites, as well as road diversions where these are required. Construction routes were selected to minimise the use of local roads where possible; however, as detailed below, the number of heavy vehicles required for construction is generally low. Where required, planning for diversion routes has selected roads of the same order as far as possible. In the instances where diversion routes have been required on roads of a lower order, the requirement for mitigation has been considered.

The construction profile for enhancement sites in the Junee precinct is summarised in Table 9-25. Access roads and key intersections for the Junee precinct are outlined in Figure 9-14 and Figure 9-15.

**TABLE 9-25 CONSTRUCTION PROFILE—JUNEE PRECINCT**

| Enhancement site | Duration of construction (months) | Construction vehicles (maximum one-way movements per peak hour) | | Road closures/ traffic diversions required |
|---|---|---|---|---|
| | | Light vehicles | Heavy vehicles[1] | |
| Harefield Yard clearances | 2 | 47 | 8 | No |
| Kemp Street bridge | 10 | 20 | 8 | Yes |
| Junee Station pedestrian bridge | 1 | 7 | 1 | No |
| Junee Yard clearances | 2 | 23 | 8 | No |
| Olympic Highway underbridge | 3 | 53 | 8 | No |
| Junee to Illabo clearances | 10 | 60 | 8 | Yes |

### Road diversions

As a result of construction in the Junee precinct, the following road diversions would be required:

- Kemp Street bridge (closure of Kemp Street) (see Figure 9-16):
  - Kemp Street bridge traffic diverted via Seignior Street, Lorne Street, Ducker Street, Hill Street, George Street and Edgar Street for eight months
  - traffic on Seignor Street would be diverted via Joffre Street and Pretoria Avenue for two months (discussed further below)
  - local access to Railway Lane and Railway Parade would be via Harold Street and Thomas Street for two months.
- Junee to Illabo clearances (level crossings):
  - alterations or upgrade of five level crossings in the Junee to Illabo clearances enhancement sites. At three locations (Waterworks Road, Brabins Road and one private property), these crossings would be closed for between three and five days and detours required. Elsewhere, access would be managed with traffic control and side tracking, with no road diversions are required.

As part of the construction of Kemp Street bridge, a temporary upgrade of Pretoria and Joffre Street would be completed to divert traffic from an existing section of Seignior Street (Olympic Highway) and cater for the additional volume of traffic. Upgrade of the road would include widening of the road (using part of Endeavour Park) and intersection arrangements to prioritise through movements to/from Kemp Street and Seignior Street.

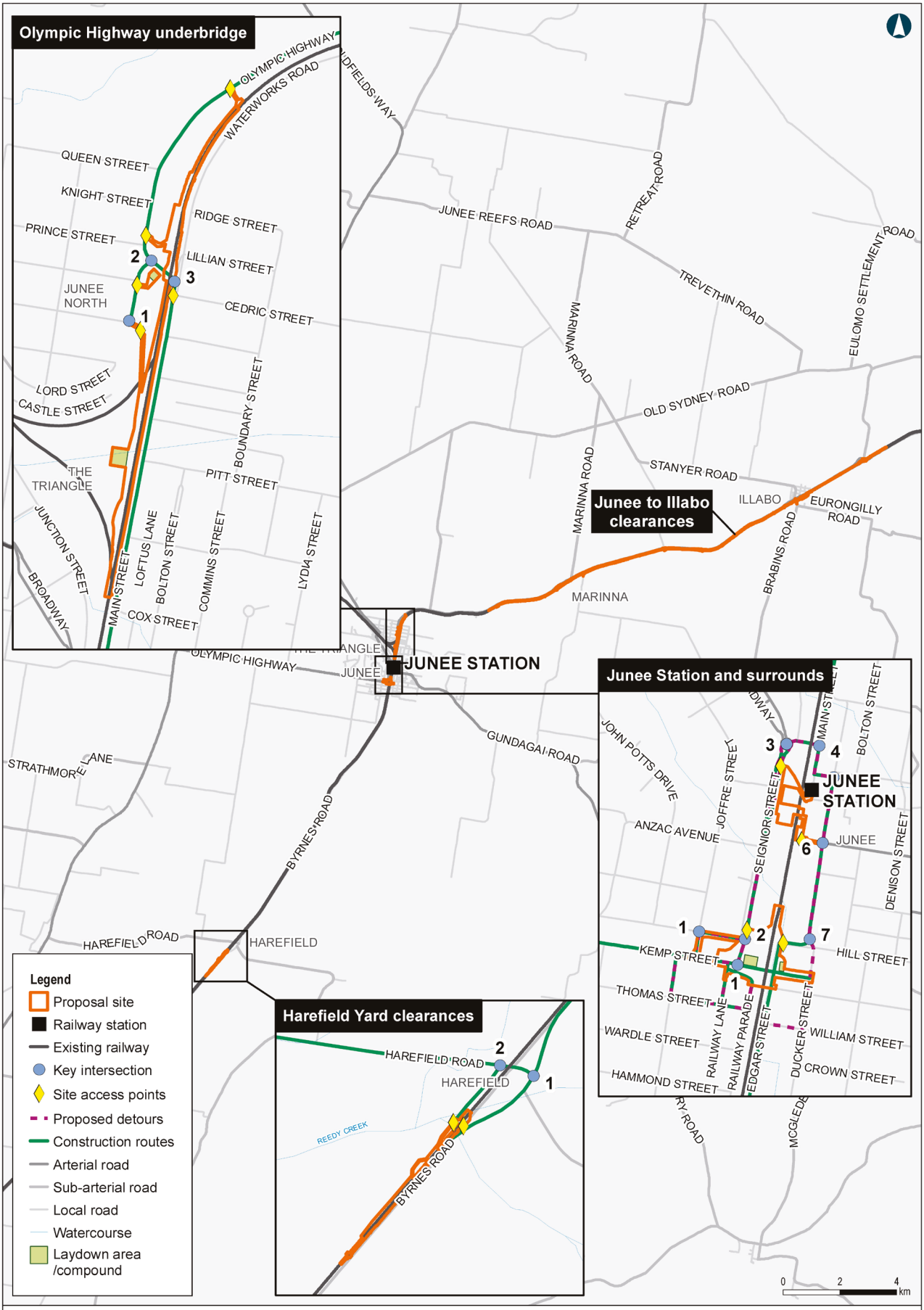



Figure 9-14 Construction access and intersections - Junee precinct

Data Sources: ARTC, NSWSS

Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:175,000
Paper size: A4
Date: 21/02/2022

210_EAP_F0914_ConstructionAccess_Junee_r1v5.mxd


Figure 9-15 Construction access and intersections for Junee to Illabo clearances

Data Sources: ARTC, NSWSS

Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:30,000
Paper size: A4
Date: 10/11/2021

210_EAP_F0915_ConstructionAccess_Junee_r1v3.mxd

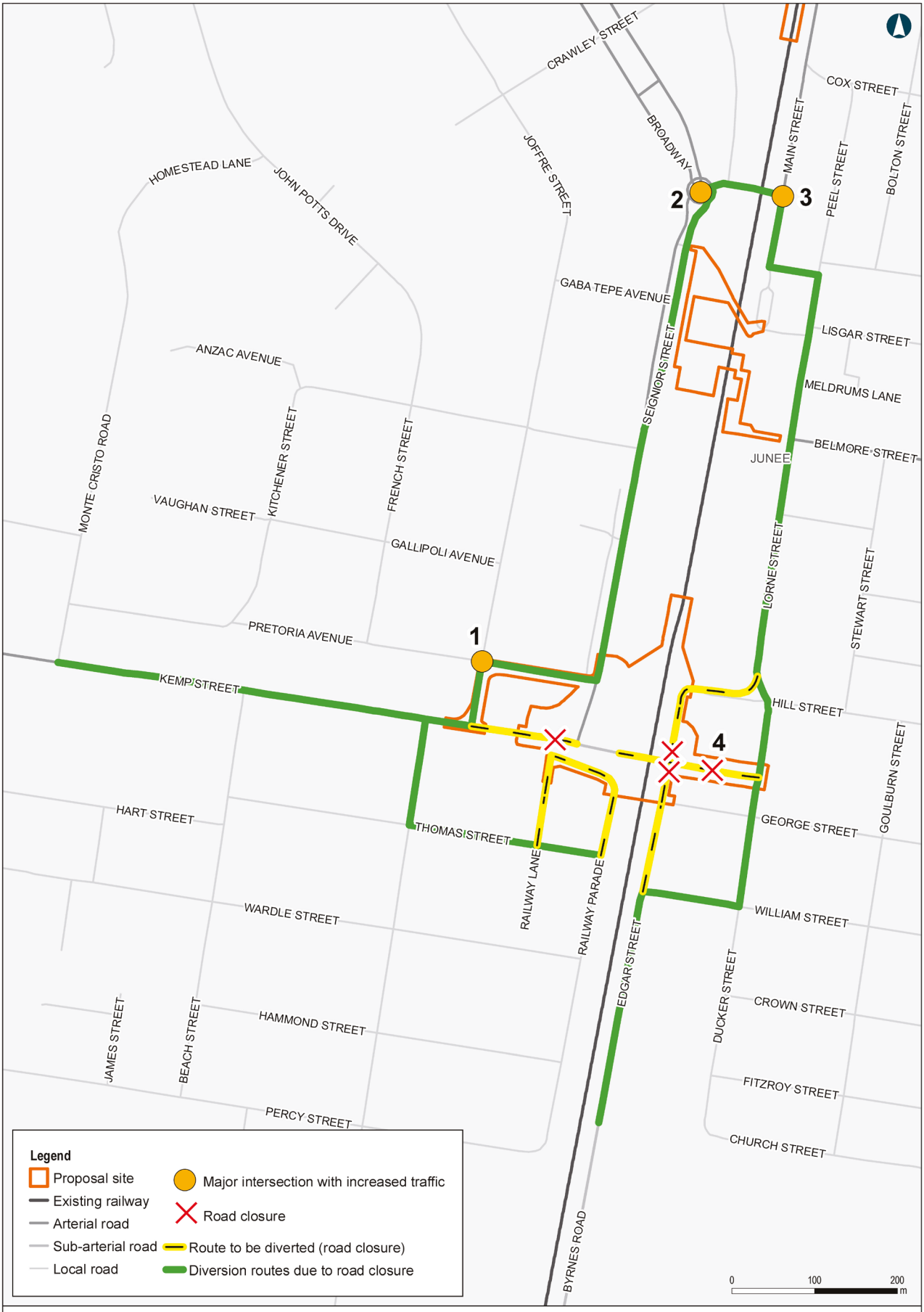



Figure 9-16 Road diversions due to closure of Kemp Street, Junee

Data Sources: ARTC, NSWSS

Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:6,000
Paper size: A4
Date: 21/02/2022

210_EAP_F0916_ClosuresDiversionRoutes_KempSt_r1v3.mxd

## Road network performance

### Roads not subject to impacts from road closures and diversions

#### Road performance

Assessment of LoS for link capacity of roads impacted by the proposal was completed for worst case changes between existing performance and with construction of the proposal based on forecasted traffic volumes for 2024 (peak construction year). The assessment identified that all roads perform at an LoS of B or better with and without the proposal—no changes in LoS were predicted for any road.

Impacts from construction vehicles are anticipated to have negligible impacts on the performance of the existing road network.

#### Intersection performance

An assessment of the performance of the expected highest trafficked (on a per-lane basis) construction route intersection in the Junee precinct was undertaken for the Junee Station and surrounds enhancement sites.

As vehicle diversions are proposed to occur over the majority of the construction period in this area, the impact of construction vehicles on intersection performance was not assessed in isolation. It is expected that during this limited period the impact to intersection performance would be minimal.

Assessment of intersection performance with construction vehicles road diversions is provided in the following section.

### Roads subject to impacts from road closures and diversions

#### Road performance

Link capacity for roads subject to impacts from road closures and diversions associated with the Kemp Street bridge road closure are summarised in Table 9-26.

A change in link LoS is seen on all roads under assessment, with the exception of Lorne Street. The worst change in LoS was for the Olympic Highway level crossing, which changed from a service level of A to C. All links maintain an LoS of C or better.

**TABLE 9-26 OVERVIEW OF LINK CAPACITY OF ROADS IMPACTED BY ROAD CLOSURES AND DIVERSIONS—KEMP STREET BRIDGE**

| Road | Link capacity LoS (without the proposal) | Link capacity LoS (with the proposal) |
|---|---|---|
| Seignior Street | B | C |
| Olympic Highway Level Crossing | A | C |
| Humphrys Street | A | B |
| Lorne Street | A | A |
| Joffre Street | A | B |
| Harold Street | A | A |

#### Intersection performance

As a result of closure of Kemp Street, the key intersections for movements associated with the diversion routes identified include:

- Olympic Highway/Joffre Street
- Joffre Street/Pretoria Avenue
- Seignior Street/Pretoria Avenue
- Seignior Street/Olympic Highway/Broadway
- Olympic Highway/Main Street
- Humphrys Street/Peel Street
- Edgar Street/Ducker Street
- Ducker Street/William Street
- William Street/Edgar Street
- Olympic Highway/Harold Street.

Based on consideration of opposing traffic flows at each intersection, the Seignior Street/Olympic Highway/Broadway intersection was identified as potentially impacted by the proposal and assessed further. The results indicate that performance of the intersection would maintain an LoS of A during the diversion.

As the Seignior Street/Olympic Highway/Broadway intersection is reflective of the worst case impact resulting from the diversion and construction route intersection in the Junee precinct, it is not considered that the performance of any other intersections forming part of the diversion routes or other intersections would be significantly impacted by the proposal.

**Delay from temporary road closures and diversions**

Table 9-27 summarises the predicted delay from road closures and diversions associated with construction at Kemp Street bridge. Delay due to diversion via Harold Street and Thomas Street would be minor (at four minutes).

Delays due to the closure of level crossings at Waterworks Road, Brabins Road and one private property for Junee to Illabo clearances would result in a worst-case delay of 10 minutes in travel time; however, most vehicles would experience a delay of up to six minutes depending on the direction of travel.

Staging plans for traffic diversions are provided in Chapter 8: Construction of the proposal.

**TABLE 9-27 OVERVIEW OF DELAYS DUE ROAD CLOSURES AND DIVERSIONS—KEMP STREET BRIDGE**

| Diversion route | Average journey time (without the proposal) | Average journey time (with construction of the proposal) |
|---|---|---|
| Joffre Street, Pretoria Avenue, Seignior Street, Lorne Street, Ducker Street, Hill Street, George Street, and Edgar Street | 3 minutes | 4 minutes |

## Construction site access and road safety

Turn-warrant assessment of construction site access indicates turning treatments may be required for some site accesses in this precinct, subject to further consideration.

Changes to road conditions from increased traffic, temporary diversions and new access points to the enhancement sites from the public road network has the potential to result in impacts to road safety. To moderate any construction impacts to existing or potential safety issues associated with either construction vehicle movements or the additional traffic on local roads from diversions, RSAs, road dilapidation report and Construction Traffic Transport and Access Management Plans would be required to be undertaken prior to construction.

## Parking

No impacts to parking are anticipated for enhancement sites in the Junee precinct, with the exception of Kemp Street bridge and Junee Station pedestrian bridge.

Multiple on-road parking spaces would be impacted during construction at Kemp Street bridge, including

- Kemp Street—19 on-road spaces
- Seignior Street—18 on-road spaces
- Railway Lane—13 on-road spaces
- Railway Parade - 3 on-road spaces
- William Street—16 on-road spaces
- Joffre Street—16 on-road spaces
- Pretoria Avenue—27 on-road spaces.

Review of aerial imagery of the area suggests that in all locations demand for on-street parking would be relatively low in the surrounding streets, as the areas are low-density residential areas and, generally, residences in the area have space for private off-street parking, for which access will be maintained. There is also kerbside parking capacity nearby to absorb the temporary parking losses.

Off-street parking associated with Junee station would be impacted during construction for less than two months at the Junee Station pedestrian bridge, including a loss of 27 designated spaces understood to be private parking. A total of 33 designated parking spaces would remain available in the carpark. One accessible parking space within Railway Square is likely to be temporarily impacted by works at Junee Station taking place on the overhead signal cables. These works are expected to last only for one to two days

As most local roads in the area permit kerbside parking, it is considered that there would be sufficient capacity to absorb the temporary loss of parking, with only minor delays for travel to Junee Station.

## Public transport services

### Road

No changes in the operation of bus services in the Junee precinct are required for construction of the proposal, with the exception of Kemp Street bridge. There may be some minor disruption to travel times at other enhancement sites from additional construction vehicles on bus routes also; however, as discussed above, the performance of the road network is anticipated to remain the same at these sites.

Bus services using Kemp Street would require re-routing, resulting in delay to travel times. The bus stop on Kemp Street after Joffre Street (2663127) would require temporary closure/relocation during construction. A bus stop is located near a site compound access point for the Olympic Highway underbridge on Illabo Road, Junee. Heavy vehicle access would need to be managed to avoid delays to buses using the stop.

### Rail

Construction of the proposal requiring disruption to the operation of the rail network would occur during scheduled possession periods, which occur as part of the existing operation of the rail network; as such, no impacts to passenger rail services are anticipated from the proposal.

Disruption to commuter access to Junee Station would occur through delays due to:

- performance of the road network
- closure and diversion of active transport routes
- loss of parking in Junee Station
- general construction activities, and traffic management in Wagga Wagga Station.

These impacts are considered further in relevant sections.

## Active transport

Provision for active transport in the vicinity of the Harefield, Junee Yard and Junee to Illabo clearances enhancement sites is minimal and, given the surrounding land uses, the demand for cycling and pedestrian travel in the area is likely to be low.

The closure of the Kemp Street bridge for approximately eight months would impact active transport (cyclists and pedestrians). During the closure period, cross-rail movements would be diverted to the Olympic Highway, located 700 metres north at the Olympic Highway underbridge. The worst-case additional travel distance from this diversion is about 1.4 kilometres, actual impacts would vary by individual origin and destinations. Footpaths are located for the diversion route between Kemp Street and Ducker Street, including Seignior Street and Lorne Street. Cyclists would be required to travel on-road via the diversion route. Pretoria Avenue and Joffre Street do not have formalised footpaths. The existing shared path located within the enhancement site through Endeavour Park would remain available until it is closed for construction. At this point, pedestrians would be detoured onto Pretoria Avenue and Joffre Street. Construction staging will be planned to account for continued active transport connectivity during construction.

The pedestrian footpath on the Olympic Highway at the Olympic Highway underbridge may require closure for periods during possession work, up to five days in duration. Works are planned during rail possession periods when the demand for pedestrian movement in this area is expected to be low. The nearest alternative crossing represents a detour of approximately 3.5 km and so it is expected that pedestrians would be managed by onsite traffic management during this period. Cyclists would be required to travel on-road via the diversion route.

While access would be maintained for pedestrians and cyclists entering Junee Station, traffic management would be implemented, including pedestrian detours within the station. The pedestrian bridge is currently closed.

While there would be general disruptions around all construction sites, no significant impacts to active transport are anticipated at other enhancement sites in the Junee precinct.

Access during closure of level crossings for Junee to Illabo clearances enhancement site would be managed with local traffic control and side-tracking, with minor diversions required.

Staging plans for active transport diversions are provided in Chapter 8: Construction of the proposal.

## Property access

Although there may be some minor, temporary disruptions, property access is expected to be maintained for the duration of the construction activities in the Junee precinct. Properties located adjacent to the Kemp Street bridge enhancement site on the Olympic Highway have laneway access from Harold Street, which would be maintained. Pedestrian access to these properties is expected to be provided during construction. One property on Railway Lane may be impacted by the closure of this street; however, alternative access arrangements are expected to be provided. Access to the rear of the Locomotive Hotel at Kemp Street would also be maintained throughout construction via Edgar Street.

Property access via LX605 during construction works at this level crossing would be coordinated with the impacted landowners (including Junee Shire Council).

Any changes to arrangements would need to be undertaken in consultation with the relevant stakeholders and in line with the Construction Traffic, Transport and Access Management Plan.

## 9.5 Impact assessment—operation

### 9.5.1 Proposal-wide impacts

#### Rail network

The proposal includes modification of the existing Main South Line to achieve the required clearances for double-stacked container trains.

As described in Chapter 2: Strategic context and need, the need for the proposal has been driven by continued growth in both road and rail freight volumes. The number of freight trains is expected to increase by up to 18 freight trains per day in 2025 to 20 freight trains per day in 2040. The frequency of trains in 2040 is predicted to be a maximum of two trains per hour. Existing trains are permitted up to a length of 1.8 kilometres in length, which would not change with the proposal. Existing rail speeds would be maintained for the proposal.

Passenger rail services would continue at the completion of the proposal, with no modifications to the existing passenger stop locations, service frequency or schedule required as part of the proposal's operation.

#### Road network performance

**Permanent changes to the road network**

The proposal includes modification of two roads, including Edmondson Street (Edmondson Street bridge enhancement site) and Kemp Street (Kemp Street bridge enhancement site). Road modifications would also result in minor changes at nearby intersections. While some modifications would occur, including road gradients and turning angles, the existing intersection arrangements on these roads would be maintained. Changes to gradients or turning angles comply with relevant road standards, and capacity would be maintained or improved.

The intersection of Railway Parade/Kemp Street/Olympic Highway in Junee would be reconfigured from close-set staggered T-intersections to a four-way priority intersection, maintaining all existing traffic movements. Due to the low volumes on Railway Parade, this permanent change to the road network is not expected to have any significant impacts to the intersection delay, capacity, or LoS to operation of the road network are anticipated.

**Traffic**

The proposal would not generate additional traffic during operation; as such, no impacts to the road network performance during operation of the proposal from vehicle movements would occur.

A key objective for Inland Rail is to increase movement of freight via rail. Operation of the Inland Rail program as a whole would have a positive impact on the wider road network by increasing freight movements via rail.

**Level crossings**

The proposal would result in an increase in the frequency of level crossing closures, due to additional trains passing through. The highest average daily increase in frequency is from one train every 1.5 hours in 2020, to a maximum of two trains in any hour in 2040. This change in frequency increases the likelihood that a train may be traversing the corridor in a peak hour.

Freight trains of 1,800 m in length currently operate on the rail network between Albury and Junee. An Inland Rail freight train that is 1,800 m long would generally travel through any given location at the same speed that a 1,800 m long freight train would under current operations. At level crossings, the total closure time for a freight train that is 1,800 m long would be the same with the operation of the proposal as it would under current operations (except where a level crossing is upgraded from passive to active control). As such, during operation, the likelihood of experiencing the maximum delay associated with a level crossing closure for a 1,800 m freight train would also increase.

##### Closure of level crossings

No level crossings closures are proposed; however, ARTC is consulting with relevant stakeholders in regard to the potential closure of LX 1472 (Wornes Gate Lane). Wornes Gate Lane is an unsealed road and expected to have minimal to no use by the public or for landowner access.

### Level crossing upgrades

As part of the proposal, two low-use level crossings would be upgraded from passive to active:

- Wornes Gate Lane (LX1472)
- Shire and Carter property level crossing (LX605).

This change has the potential to marginally increase delay due to the greater delay time between passive and active crossings. This is due to the duration of time that is programmed for the flashing lights and closing of the boom gates prior to the train pass-by, and for the flashing lights and opening of the boom gates when the train has passed, resulting in a 15-second longer closure time compared to a passive crossing, regardless of train speed. The upgrade of the passive crossing would, however, provide safety benefits to road and rail users by reducing the risk of collisions.

### Road network performance

Assessment of level crossing closures indicates that the maximum time for vehicles stopping at level crossings for any one closure event would be around two minutes. Vehicle queuing based on forecast peak-hour traffic volumes for the opening year (2025) and design horizon (2040) was assessed based on forecast traffic volumes. While minor queuing at the majority of level crossings was predicted (up to 10 vehicles), worst case queues of up to 57 vehicles in 2025 and 72 vehicles in 2040 were identified at the Bourke/Docker Street level crossing in Wagga Wagga.

The number of vehicles stopping for level crossing closure in peak hour would be the same with and without the proposal. While vehicle queuing at roads would occur, and may require consideration in the future, the operational impacts of the proposal would be associated with the additional frequency of closures. The number of impacted vehicles in a peak hour during a level crossing closure would be the same with and without the proposal.

The assessment of queuing is based on forecasted increases in traffic volumes resulting in additional cars being on the road in any given hour. Assessment of LoS considers the operation of the road network, including average queue lengths and average delay. Application of this assessment method to level crossings relevant to the proposal, indicates all crossings would operate with a LoS of A. This is due to sufficient recovery time between level crossings closures to clear queued vehicles.

### Impacts to adjacent intersections

Based on the average queue lengths calculated by SIDRA at public road level crossings, impacts to adjacent intersections during a level crossing closure are predicted to occur at the following level crossings.

- Greater Hume–Lockhart precinct:
  - Balfour Street
  - Urana Street
- Wagga Wagga precinct:
  - Fernleigh Road
  - Bourke/Docker Street
- Junee precinct
  - Olympic Highway (Junee).

The impacts to adjacent intersections would occur with or without the proposal; however, would occur more frequently with operation of the proposal.

### Level crossing safety

The presence of level crossings may present safety risks to motorists due to potential collisions with trains. In accordance with the safety measures outlined within the ALCAM assessment process, the proposed level crossings have been designed to ensure that all crossing points would have adequate safety measures to mitigate the likelihood of incidents between passing trains and passenger vehicles (refer to section 6.3.4 for further discussion). In accordance with the process outlined in the public level crossing treatment methodology (refer to Appendix A of Technical Paper 1: Transport and traffic), two level crossings would be upgraded from passive to active controls as part of the proposal (refer to section 7.3.1):

- Wornes Gate Lane (LX1472)
- Shire and Carter property private level crossing (LX605).

The pedestrian crossing at Sladen Street level crossing in Henty (LX625) would also be upgraded to an active crossing, with a pedestrian maze provided.

Sight lines were reviewed for all modified level crossings. Sight lines at the Brabins Road level crossing (LX 604) were identified to be insufficient. Vegetation clearing is proposed on the western side of the Brabins Road reserve to provide adequate sighting distance. This would provide a permanent solution that does not require substantial upgrade of the level crossing. Refer to Technical Paper 1: Traffic and transport (section 6.3.2) for more information.

The operation of public level crossings constructed as part of the proposal would be reviewed following the commencement of operation to confirm that the level of protection and the proposed infrastructure is appropriate for the traffic conditions. In addition, in accordance with National and State Rail Safety Law requirements, public level crossings would be subject to an interface agreement with the relevant road manager to ensure that safety risks are identified and minimised as far as reasonably practicable.

#### Short stacking

Short stacking is insufficient storage for a single vehicle to stand and give way to other traffic without stopping on or blocking the level crossing. Short stacking would occur at level crossings with or without the proposal. The proposal has been designed to address short stacking issues that were identified at the following level crossings:

- Waterworks Road (LX606)—Intersection priorities at Waterworks Road would be realigned as part of construction works to remove the short-stacking issue. ARTC is continuing to consult with Junee Shire Council in regard to mitigation at this level crossing.
- Private level crossing (LX605)—to resolve short stacking at this level crossing, a storage lane would be provided on the Olympic Highway with the capacity to store heavy vehicles clear of the rail without impacting on the Olympic Highway traffic movements, and a concrete island would be constructed to restrict movements to left in and left out.

At Sladen Street (LX625), there is an existing short-stacking deficiency for heavy vehicles at this level crossing. The proposed modifications at this level crossing to accommodate the realigned track do not introduce this deficiency. ARTC is continuing to consult with TfNSW to determine a suitable solution to the short-stacking issue, which will be confirmed during detailed design.

### Parking

Parking impacted during construction of the proposal would be re-established, with the exception of parking spaces at Albury Station pedestrian bridge and Wagga Wagga Station pedestrian bridge.

Two parking spaces at Albury Station pedestrian bridge would be permanently impacted due to clearances required for the *Disability Discrimination Act 1992* (Cth) (DDA) compliant ramp and associated adjustments to the existing pedestrian crossing. Engagement with TfNSW would be ongoing through subsequent design stages to investigate opportunities to ameliorate residual impacts to parking.

At the Wagga Wagga Station pedestrian bridge, three private parking spaces at the Multicultural Council of Wagga Wagga would be removed as the northern ramp would extend over these spaces. Opportunities to reinstate the parking spaces under the ramp would be investigated during detailed design.

As discussed above, the proposal would not generate additional traffic during operation; as such, no impacts to parking during operation of the proposal would occur.

### Public transport services

Bus services that cross the rail corridor via level crossings may experience an increase in frequency of stopping due to additional trains passing through level crossings at a rate of two per hour, as discussed above; however, the LoS would not be impacted.

Passenger rail services would continue at the completion of the proposal, with no modifications to the existing passenger stop locations, service frequency or schedule required as part of the proposal's operation.

Junee Station pedestrian bridge is currently closed and its removal would not change access within the station.

### Active transport routes

No impact to active travel times is anticipated during operation of the proposal, as current travel routes would be maintained.

The removal of the pedestrian bridge at Culcairn would not impact pedestrian connectivity as the overpass is already closed (since 2010) and the pedestrian crossing facility at the level crossing adjacent to the overpass would remain open. The Cassidy Parade pedestrian bridge is an existing link in the Wagga Wagga Active Travel Plan. The proposed bridge design includes a ramp on the southern side of the rail corridor. Discussions are ongoing with Wagga Wagga City Council to align plans and minimise any potential impacts on the final configuration of the future infrastructure.

The proposal includes pedestrian and cycling infrastructure, as discussed in Table 9-28. Enhancements of pedestrian crossings provide additional connectivity and DDA compliance for pedestrians and cyclists through the enhancement of active transport infrastructure at location.

Pedestrians and cyclists using level crossings may experience increased frequency of stopping at a level crossing associated with additional rail services (an increase to two closures per hour, each for a period of two minutes).

Provision of ramps on either end of the Albury Station pedestrian bridge would enhance connectivity for the community across the rail corridor and Hume Highway, as it would replace the current stair arrangements and has been designed to be DDA compliant.

ARTC would continue to work with Wagga Wagga City Council concerning the integration of the new Cassidy Parade pedestrian bridge with its Wagga Wagga Active Travel Plan.

**TABLE 9-28 ACTIVE TRANSPORT INFRASTRUCTURE**

| Location | Infrastructure |
|---|---|
| Albury Station pedestrian bridge | A pedestrian path providing access across the rail line |
| Cassidy Parade pedestrian bridge | A pedestrian path providing access across the rail line |
| Wagga Wagga Station pedestrian bridge | A pedestrian path providing access across the rail line |
| Edmondson Street bridge | Shared paths provided on both sides of the road.<br>Due to road gradient, the paths integrated on the bridge structure would not be DDA compliant. ARTC is committed to revising the existing design to achieve DDA compliance. To achieve this, it is expected that a footbridge independent of the road bridge may be required as a substitute for the footpath on one side of the road bridge. |
| Kemp Street bridge | A shared path would be provided on northern side of Kemp Street from Ducker Street to Olympic Highway. No path would be provided on the southern side of the bridge.<br>Due to road gradient, the path integrated on the bridge structure would not be DDA compliant. ARTC is committed to revising the existing design to achieve DDA compliance. To achieve this, it is expected that a footbridge independent of the road bridge may be required as a substitute for the footpath on one side of the road bridge. |

### Property access

No additional impacts to property access are forecast during operation of the proposal.

### Heavy vehicle routes and travelling stock reserves

Heavy vehicles would have a greater chance of being stopped at a level crossing, due to the increased frequency of level crossing closures as a result of the proposal.

No other impacts to heavy vehicle routes or TSRs would occur during operation of the proposal.

### Emergency vehicle access

No impacts are anticipated to emergency vehicle access during operation of the proposal. The proposal would result in the increased frequency of level crossing closures (two per hour) but the duration of closure would remain the same.

### Water-based transport

Clearance heights for the Murray River bridge would not be changed and no impacts to water-based transport are anticipated for operation of the proposal.

## 9.6 Mitigation and management

### 9.6.1 Approach to mitigation and management

Environmental management for the proposal would be carried out in accordance with the environmental management approach, as detailed in Chapter 27: Approach to mitigation and management and Appendix H: Construction Environmental Management Plan outline of the EIS.

This would include a traffic and transport management sub-plan (TTMP), prepared as part of the Construction Environmental Management Plan (CEMP). The sub-plan will include (but is not limited to) the following measures:

- Adequate road signage will be provided to inform drivers and pedestrians of the work, timing and alternative access arrangements.
- Heavy vehicle movements would be minimised during peak traffic times.
- Measures to manage traffic flows around the area affected by construction will be provided, including required regulatory and directional signposting, line marking, variable message signs, and all other necessary traffic control devices.

- Consultation with relevant road authorities regarding the potential for preventative road improvements to be undertaken prior to construction to minimise potential road damage
- Adequate signage for road and pedestrian diversions will be provided, clearly articulating alternative routes.
- Designated queuing and idling areas will be determined near work areas to minimise disruption to the local community.
- Appropriate controls will be established where vehicles are required to cross footpaths to access construction sites. This may include manual supervision, physical barriers or temporary traffic signals as required.
- Construction vehicles will park within the construction compound, where practicable.
- The timing of deliveries accessing the site will be programmed to ensure there is sufficient space within the proposal site to accommodate deliveries.

Construction Traffic, Transport and Access Management Plans (CTTAMP) would be developed for each enhancement site as part of the TMP to provide detailed consideration of traffic management, parking, pedestrian diversions and consultation requirements.

### 9.6.2 Mitigation measures

Measures that will be implemented to address potential impacts on transport and traffic are listed in Table 9-29.

**TABLE 9-29 TRANSPORT AND TRAFFIC MITIGATION MEASURES**

| Stage | Ref | Impact/issue | Mitigation measure |
|---|---|---|---|
| Detailed design/pre-construction | TT1 | Road operations | Early consultation will be undertaken with road authorities (local councils and Transport for NSW) and public transport service providers for aspects of the proposal that may require changes to the road network. This includes consideration of temporary changes to signal phasing at intersections along the traffic diversion routes in Wagga Wagga during the Edmondson Street bridge closure. |
| Detailed design/pre-construction | TT2 | Bus services | Changes to bus routes and bus stops to mitigate impacts to bus services, including establishing temporary stops, would need to be planned in consultation with TfNSW, bus operators and other key stakeholders, such as schools, to minimise the impact on community, public transport users, and service providers. |
| Detailed design/pre-construction | TT3 | Emergency Services | Consultation will be undertaken with emergency services to plan alternative routes that avoid the heaviest impacted areas of the road network during the Edmondson Street bridge and Kemp Street bridge closures and associated diversions to minimise travel time delay experienced by emergency service vehicles.<br>Consultation will also be undertaken with emergency services regarding the disruption to access on the Murray River. |
| Detailed design/pre-construction | TT4 | Stock movements | Prior to the commencement of works, Local Land Services (LLS) will be notified of increased vehicle movements along the TSRs and temporary closures of any level crossings during the construction phase so that stock handlers, including walking permit holders, can be notified of the impacts to stock movements. |
| Detailed design/ pre-construction | TT5 | Water based transport | Restrictions on navigation of the Murray River beneath and in the vicinity of the Murray River bridge site as result of the construction will be planned prior to commencing construction and handled in accordance with the *Marine Safety Act 1998* (NSW). TfNSW will be notified of the proposed works and will be consulted in regard to navigational marks, signage and marine notices. |
| Detailed design/pre-construction | TT6 | Impacts on existing roads | Consultation with Junee Shire Council will be undertaken regarding the potential for preventative road works, prior to road diversions in Junee on Joffre Street and Pretoria Avenue, to offset impacts from higher than typical traffic and heavy vehicle movements on some local roads due to diverted traffic. |

| Stage | Ref | Impact/issue | Mitigation measure |
|---|---|---|---|
| Detailed design/pre-construction | TT7 | Road safety | Development of RSAs and risk assessments, prior to commencement of construction, for each enhancement site where changes to the road network are required, or where increased traffic movements or diversions during the construction phase may present an increased crash risk. These will be undertaken by the contractor and developed in accordance with the Austroads guidelines to provide for safe movements of construction vehicles on public roads, and will consider the safety of all road users. A safe system approach will be adopted to minimise harm caused to all road users through the use of appropriate road design features and speeds. |
| Detailed design/pre-construction | TT8 | Active transport connectivity | Construction staging will be planned to account for continued active transport connectivity during construction. |
| Pre-construction/ construction | TT9 | Impacts on existing roads | Appropriate signage and warnings, including variable messaging signs, will be considered in the Construction Traffic, Transport and Access Management Plans. These will be deployed as considered appropriate in the vicinity of the enhancement sites to provide early warning for road users of disruptions due to construction activities and road closures. |
| Construction | TT10 | Road pavement | A Road Dilapidation Report will be prepared for all haul routes within each precinct. Should damage to the road occur as a result of construction, the damage will be rectified to restore the road to the pre-work condition as identified in the road dilapidation report or as otherwise agreed with the relevant road authority.<br>Joffre Street and Pretoria Avenue will be monitored for damage during construction and any necessary repairs attended to as soon as possible. |
| Construction | TT11 | Impacts on existing roads | Heavy vehicle diversionary signage will be implemented to encourage the diversion of heavy vehicle traffic outside of Junee on the existing heavy vehicle routes via Goldfields Way and Old Junee Road during the closure of the Kemp Street bridge. |
| Construction | TT12 | Access | Communication with relevant stakeholders will be undertaken regularly to minimise congestion and inconvenience to road users in areas affected by diversions, such as during the works for the replacement of the Edmondson Street bridge in Wagga Wagga and Kemp Street bridge in Junee, or level crossing closures (including full or partial closure). Stakeholders will include the relevant local council, bus operators, state government departments, emergency services and affected property owners/occupants.<br>The community will be notified in advance of pedestrian bridge closures and any proposed road or pedestrian network closures and diversions through signage, the local media and other appropriate forms of communication.<br>Appropriate wayfinding signage for road and pedestrian diversions will be provided, clearly articulating alternative routes. Consultation would also discuss opportunities for broader diversions away from congested roads. Additional measures identified as an outcome of consultation will be implemented during construction, where practicable. |
| Pre-construction/ construction | TT13 | Road operations | The construction access off Cheshire Street to the Pearson bridge enhancement site, and Chaston Street to Wagga Wagga Station and surrounds will be designated a left in, left out turning movement only to limit any performance or safety impacts to the surrounding road network. |
| Pre-construction/ construction | TT14 | Access | Where changes to access arrangements to businesses and residences are required as part of the proposal construction activities, ARTC will advise property owners/occupants and consult with them in advance regarding temporary disruption to existing accesses. Temporary changes to access arrangements during construction will include (but not limited to):<br>▸ Edmondson Street bridge<br>▸ Wagga Wagga station and surrounds<br>▸ Kemp Street bridge. |

| Stage | Ref | Impact/issue | Mitigation measure |
|---|---|---|---|
| Pre-construction/ construction | TT15 | Seasonal/ agricultural impacts | Special consideration would be given to enhancement sites that are located on land with agricultural storage or transportation infrastructure, such as grain silos, due to the high localised seasonal freight movements accessing them.<br>Detailed assessment of the site accesses will be undertaken as part of the RSAs and appropriate Construction Traffic, Transport and Access Management Plans will be developed by the contractor in consultation with the site operator prior to commencement of construction activities on site to moderate any potential safety issues. |
| Detailed design/pre-construction/construction | TT16 | Active transport integration | ARTC will continue to work with Wagga Wagga City Council on the integration of the new Cassidy Parade pedestrian bridge to align and minimise impacts to the Wagga Wagga Active Travel Plan. Further work with Wagga Wagga City Council and Junee Shire Council will pursue and adopt an alternative design that will provide DDA-compliant access for pedestrians at Edmondson Street bridge and Kemp Street bridge. |
| Operation | TT17 | Level crossing safety | In accordance with national and state rail safety law requirements, public road crossings would be subject to an Interface Agreement with the relevant road manager in order to identify and minimise safety risks as far as practicable during operations. |
| Operation | TT18 | Level crossing safety | Opportunities to consolidate low use level crossings will be progressed with key stakeholders as per the TfNSW Level crossing closure policy, where appropriate. Any closures will be progressed in accordance with the requirements of the *Transport Administration Act 1988* (NSW). |
| Operation | TT19 | Parking | All parking impacted by the construction phase will be re-instated and lines remarked to previous condition or better, where necessary, with the exception of Albury Station pedestrian bridge enhancement site and Wagga Wagga pedestrian bridge enhancement site.<br>At the Albury Station pedestrian bridge enhancement site, two parking spaces will not be re-instated after construction. These parking spaces will make way for a new DDA-compliant ramp. Engagement with TfNSW will be ongoing through subsequent design stages to investigate opportunities to ameliorate residual impacts to parking.<br>At the Wagga Wagga Station pedestrian bridge, three private parking spaces will not be re-instated after construction. Opportunities to reinstate the three parking spaces under the ramp would be investigated during detailed design. |

## Effectiveness of mitigation measures

The mitigation measures specified in Table 9-29 are anticipated to reduce the likelihood and/or consequence of the identified risks (refer to Table 9-30).

Transport elements with the potential for residual impact to transport users, local businesses and residents during construction are:

- Wagga Wagga urban road network during the diversion of traffic associated with the Edmondson Street bridge closure
- connectivity across the rail corridor for pedestrians and cyclists in Wagga Wagga and Junee during closures of bridges.

If any issues are unable to be mitigated through the design, construction or operational process, such as intersection performance during diversions or reduced pavement condition following the construction process (heavy vehicle activity), further works would be required to rectify these issues where possible. Due to the very low traffic volumes expected to be generated by the operation of the proposal, no residual impacts during operation of the proposal are expected.

### 9.6.3 Interactions between mitigation measures

Mitigation measures in other chapters that are relevant to the management of transport and traffic include:

- Chapter 12: Land use and property, specifically details measures that address access.

There are no mitigation measures identified in the assessment of other environmental aspects that are likely to affect the assessment of transport and traffic.

### 9.6.4 Residual risk

Residual impacts are impacts of the proposal that may remain after implementation of the mitigation measures detailed in Table 9-29. These are summarised in Table 9-30. The proposal would result in some unavoidable residual impacts, which would impact transport and traffic within the study area.

Further information on the approach to the environmental risk assessment, including descriptions of criteria and risk ratings, is provided in Appendix E: Environmental risk assessment.

**TABLE 9-30 RESIDUAL RISK MANAGEMENT—TRANSPORT AND TRAFFIC**

| Stage | Potential impact | Pre-mitigated Rating | Mitigation measures[1] | Residual risk rating | Residual risk management[1] |
|---|---|---|---|---|---|
| Construction | Impact of construction work on existing rail freight operations outside of scheduled possession windows | Medium | CEMP | Low | N/A |
| Construction | Potential temporary reduced safety and amenity for traffic, pedestrians and cyclists due to construction activities and due to potential conflicts with construction vehicles. | High | TT1, TT2, TT3, TT4, TT7, TT8, TT9, TT10, TT11, TT12, TT13, TT14. | Low | N/A |
| Construction | Impacts to condition of roads due to construction traffic | Medium | TT6, TT10, TT11 | Low | N/A |
| Construction | Impacts on access to private properties | Medium | TT12, TT14, TT15 | Medium | Potential impacts would be managed through appropriate measures identified in consultation with individual landholders. |
| Construction | Impacts to emergency services through delays in access due to construction works | High | TT3, TT12 | Medium | Potential impacts would be managed through appropriate measures identified in consultation with key stakeholders. |
| Construction | Potential temporary deterioration of traffic performance on surrounding road network to an unacceptable level of service, due to construction vehicles and temporary road or lane closures | High | TT1, TT2, TT3, TT6, TT9, TT10, TT11, TT12, TT13, TT14 | Medium | Potential impacts would be managed through appropriate measures identified in consultation with key stakeholders. |
| Construction | Reduced pedestrian and cyclist access due to diversions associated with road and pedestrian bridges replacements | High | CEMP | High | N/A |
| Construction | Increase in parking demand from construction workforce, particularly during rail possessions | Medium | CEMP | Low | N/A |

[1] As described in Table 9-29.

| Stage | Potential impact | Pre-mitigated Rating | Mitigation measures[1] | Residual risk rating | Residual risk management[1] |
|---|---|---|---|---|---|
| Construction | Loss of parking due to temporary land requirements or adjustments to on-street parking by construction work | Medium | TT12, TT19 | Low | N/A |
| Construction | Impacts to bus routes and services as a result of increased road use and diversions due to road bridge replacement | High | TT1, TT2, TT3, TT7, TT9, TT12 | Medium | Potential impacts would be managed through appropriate measures identified in consultation with Transport for NSW, bus operators and other relevant stakeholders |
| Construction | Increase to road use as a result of cumulative infrastructure projects in the vicinity of the proposal | Low | CEMP | Low | N/A |
| Operation | Greater number of stopped vehicles at level crossings due to more frequent train movements | Medium | ARTC operations | Low | N/A |

1. For residual impacts with a risk rating of medium or above