



Transport for NSW

Yagoona Station Upgrade

Traffic and Transport Study

May 2021

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1. Introduction

1.1 Background

The NSW Government is planning to improve accessibility at Yagoona Station. This project is being delivered as part of the Transport Access Program (TAP), a NSW Government Initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure.

As part of this program, the Yagoona Station upgrade (the Proposal) would aim to provide a station precinct that is accessible to those with a disability, limited mobility, parents/carers with prams, and customers with luggage.

GHD has been commissioned by Transport for NSW to undertake a review of the traffic and transport facilities provided at Yagoona Station as part of the Review of Environmental Factors (REF) for the project.

1.2 Project objectives

The objectives of TAP are to provide:

- stations that are accessible to those with disabilities, the ageing and parents/carers with prams and customers with luggage
- modern buildings and facilities for all modes of transport that meet the needs of a growing population
- modern interchanges that support an integrated network and allow seamless transfers between all modes for all customers.

The specific objectives of the Proposal are to improve:

- customer experience (improved accessibility, weather protection, better interchange facilities and visual appearance)
- integration with the surrounding precinct and Yagoona town centre
- customer safety
- wayfinding in and around the station
- pedestrian connectivity between the car parks, the station and the Yagoona town centre along the Hume Highway.

1.3 The Proposal

The key features of the Proposal are summarised as follows:

- new station entry concourse from the Hume Highway including a new lift and stairs to provide access to the station platforms
- new station building on the platform for all station facilities, including a new family accessible toilet and new male and female ambulant toilets
- additional platform canopies to provide continuous cover from the new lift and stairs to the boarding assistance zones on both platforms
- two new accessible parking spaces in the Breasley Place commuter car park and upgrade of the two accessible parking spaces in the Ritchie Road commuter car park
- upgrade of footpaths from both commuter car parks to the station entrance

- new kiss and ride bay on the Hume Highway
- platform regrading and resurfacing
- relocating existing bike hoops
- ancillary work including service upgrades and/or relocation, minor drainage work, adjustments to fencing and lighting, relocation of station furniture, new Opal card readers, installation of new tactile ground surface indicators, improvements and modifications to station communications and security systems (including closed-circuit television (CCTV) cameras) and wayfinding signage.

Subject to planning approval, construction is expected to commence in mid-2021 and take up to 18 months to complete.

Key features of the Proposal are shown on Figure 1.1.

1.4 Purpose of study

The purpose of this assessment is to review the traffic and transport impacts of construction activity associated with the Proposal for inclusion on the REF.

1.5 The Proposal area

Yagoona Station is located approximately 20 kilometres to the south west of the Sydney CBD, within the Canterbury-Bankstown Local Government Area.

Yagoona Station consists of a station concourse and two platforms (one and two). The concourse provides direct access to Yagoona Station, off the Hume Highway. It houses a station convenience store, toilets, staff room and ticketing window.

Access from the concourse to the station platforms is via a single stairwell. Facilities include Opal card top up or single trip ticketing machine, emergency help-point and a payphone. Parking around the station is also provided at the car parks (east and west of the site), which provide accessible car spaces for people with impaired mobility.

The Proposal area is situated within the Yagoona town centre, a commercial business district in Yagoona that extends about 300 metres from west to east along the Hume Highway. The site includes Yagoona Station on the Hume Highway, the adjacent parking areas to the east and west of Yagoona Station, and Ron Whitehead Place park.

The immediate south includes the Hume Highway corridor, Yagoona Public School, and other infrastructure. The immediate north of the site includes recreational areas Ron Whitehead Place and Gazzard Park, Yagoona Community Centre and associated infrastructure.

Access to Yagoona Station is available through surrounding local roads, including Cooper Road, Ritchie Road, Church Road and Breasley Place, and access paths leading to the station entry.

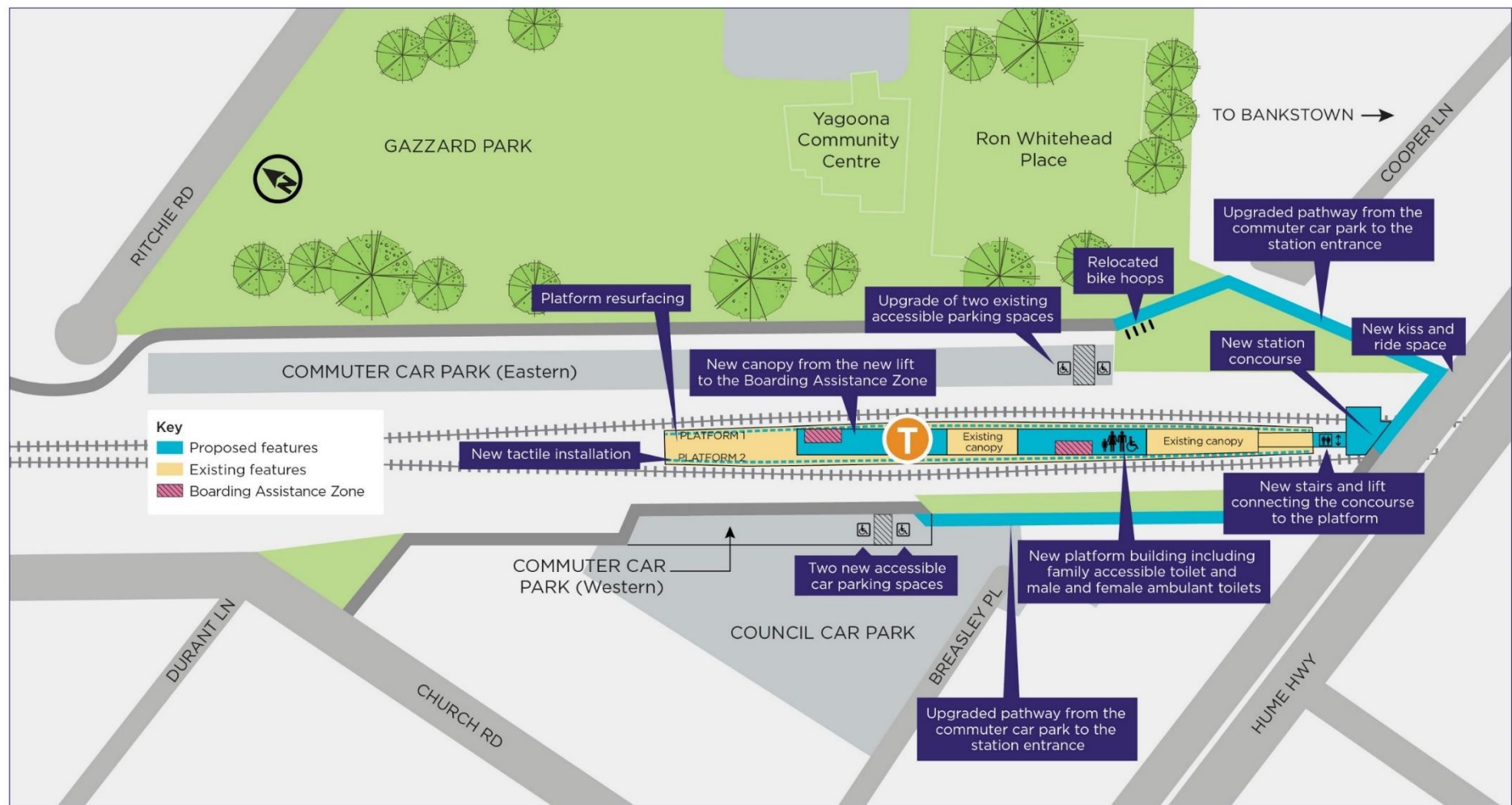


Figure 1.1 Key features of the Proposal

2. Existing conditions

2.1 Road network

The key roads in proximity to Yagoona Station are displayed in Figure 2.1.



Figure 2.1 Road network

The main access to Yagoona Station is provided on the Hume Highway. The Hume Highway is an arterial road that provides three travel lanes in either direction. In proximity to the station, time-restricted on-street parking is provided on both sides of the highway to support retail and commercial activity in the Yagoona town centre.



Figure 2.2 Hume Highway looking west from Yagoona Station

The (commuter) car park to the east of Yagoona Station is accessed from a cul-de-sac at the end of Richie Road via Cooper Road.

The (Council and commuter) car park to the west of Yagoona Station is accessed from Breasley Place via Church Street.

2.2 Station facilities

The facilities currently provided at Yagoona Station include:

- Opal card top-up machine
- payphone
- commuter parking
- unisex toilets
- an emergency help point
- bicycle parking.

Given the absence of a lift, Yagoona Station does not support access/egress by individuals with mobility impairments, senior citizens and parents/guardians with a pram.

2.3 Car parking

Car parks are provided on the east and west side of Yagoona Station.

The eastern car park (see Figure 2.6) provides approximately 80 parking bays, including two parking bays for the mobility impaired. These parking bays are allocated for all-day (commuter parking).

The western car park (see Figure 2.7) provides approximately 110 parking bays, including two parking bays for the mobility impaired. The car park provides a combination of three-hour time restricted parking available for the Yagoona town centre (75 spaces), available to support the Yagoona commercial and retail facilities and all-day commuter parking (35 spaces).



Figure 2.3 Eastern car park



Figure 2.4 Western car park

The eastern car park provides a turnaround bay at its northern end to enable vehicles to exit the car park if all the available parking bays are full.

Demand at these car parks is high, and they typically operate at or near capacity on weekdays.

In proximity to the station, time-restricted parking is provided on the Hume Highway (half an hour parking 10am and 6pm Monday to Friday and 8am to 12pm on Saturdays).

Parking on Cooper Street between the Hume Highway and Ritchie Road is time-restricted, a combination of one hour and two-hour parking (8:30am to 6:00pm Monday to Friday and 8:30am to 12:30pm on Saturdays). Parking along the Hume Highway, east of the station has a half hour restriction at all times. Two-hour parking restrictions are provided on Church Street in proximity to Yagoona Station.

The time-restricted parking areas support the operation of the Yagoona town centre and discourage commuters from parking on the road network in proximity to Yagoona Station.

2.4 Station access

The main station access is provided from the Hume Highway, as displayed in Figure 2.5.



Figure 2.5 Yagoona Station access on the Hume Highway

Footpaths are provided to the east (see Figure 2.6) and west (see Figure 2.7) of Yagoona Station linking the parking areas to the station entrance on the Hume Highway.

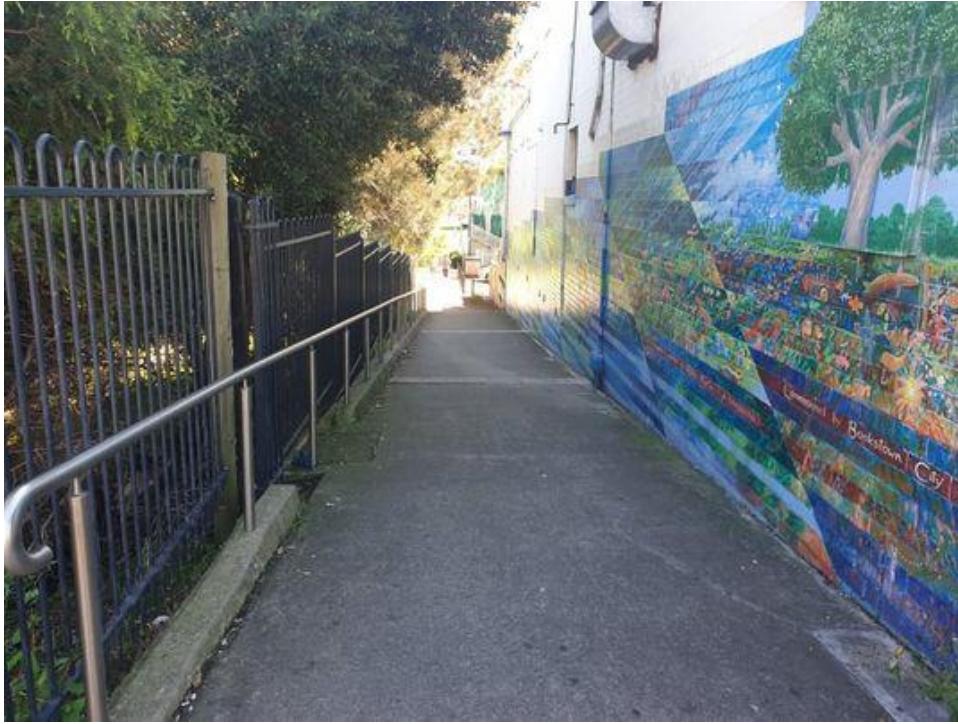


Figure 2.6 Eastern access pathway



Figure 2.7 Western access pathway

The current gradients of these pathways do not comply with Disability Standards for Accessible Public Transport (DSAPT) specifications to support access with individuals with mobility issues.

2.5 Active transport infrastructure

Signalised pedestrian crossing points are provided on the Hume Highway to the east of the station (at the intersection with Cooper Road) and the west of the station (at the intersection with Highlands Avenue).

A shared path is provided to the east of Yagoona Station (see Figure 2.8), adjacent to the east of the car park that connects to the pathway to the Hume Highway (see Figure 2.6).



Figure 2.8 Shared path to the east of Yagoona Station

Individuals parking in the western area can walk on a footway through the car park to access the pathway to the Hume Highway (see Figure 2.7).

There are wide pedestrian footpaths on both sides of the Hume Highway of approximately four metres. Concrete footpaths are provided on both sides of Cooper Road and Church Street.

A bicycle rack that provides parking for up to five bicycles is provided at the southern end of the eastern car park (refer to Figure 2.9).



Figure 2.9 Bicycle Parking at Yagoona

2.6 Public transport infrastructure

2.6.1 Rail services

Yagoona Station is located on the T3 Bankstown Line. The T3 Line operates between Liverpool and Sydney CBD via Lidcombe, Bankstown and Sydenham. Train services typically run with:

- 15 minute frequencies on weekdays between 4:00 am and 12:00 am
- 12 to 18 minute frequencies on weekends and public holidays.

The location of Yagoona Station within the wider Sydney Train Network is displayed in Figure 2.10.



Source: <https://transportnsw.info/sydney-trains-network-map>

Figure 2.10 Sydney Train Network

2.6.2 Bus services

As displayed in Figure 2.11, a bus stop is located on the northern side of the Hume Highway, adjacent to the station's entrance. Additionally, a bus stop is located on the southern side of the Hume Highway, approximately 100 metres to the west of the station entrance.

The signalised crossings at the intersection of the Hume Highway and Highlands Avenue supports the safe movement of pedestrians between bus stops.



Figure 2.11 Bus stop on Hume Highway

The bus services operating at these bus stops include:

- 907 Parramatta to Bankstown via Bass Hill, typically operates with 20-minute frequencies
- M91 Parramatta to Hurstville via Chester Hill and Padstow, typically operates with 10 to 15 minute frequencies.

Bus stops are also provided on both sides of Church Road at its intersection with the Hume Highway, approximately 150 metres to the west of Yagoona Station.

2.7 Kiss-and-ride and taxi facilities

Formal kiss and ride and taxi zones are not provided at Yagoona Station.

A No Parking zone (for one vehicle) is provided on the northern side of the Hume Highway, adjacent to the east of Yagoona Station. No Parking signage requires drivers to stop for a maximum of two minutes and stay within three metres of their vehicle. Accordingly, the zone operates as an informal kiss and ride/taxi facility for Yagoona Station.

2.8 Crash data

A summary of the crash data in proximity to Yagoona Station (between Church Street and Cooper Street) for the last five years of available data (2015 – 2019) is displayed in Figure 2.12.

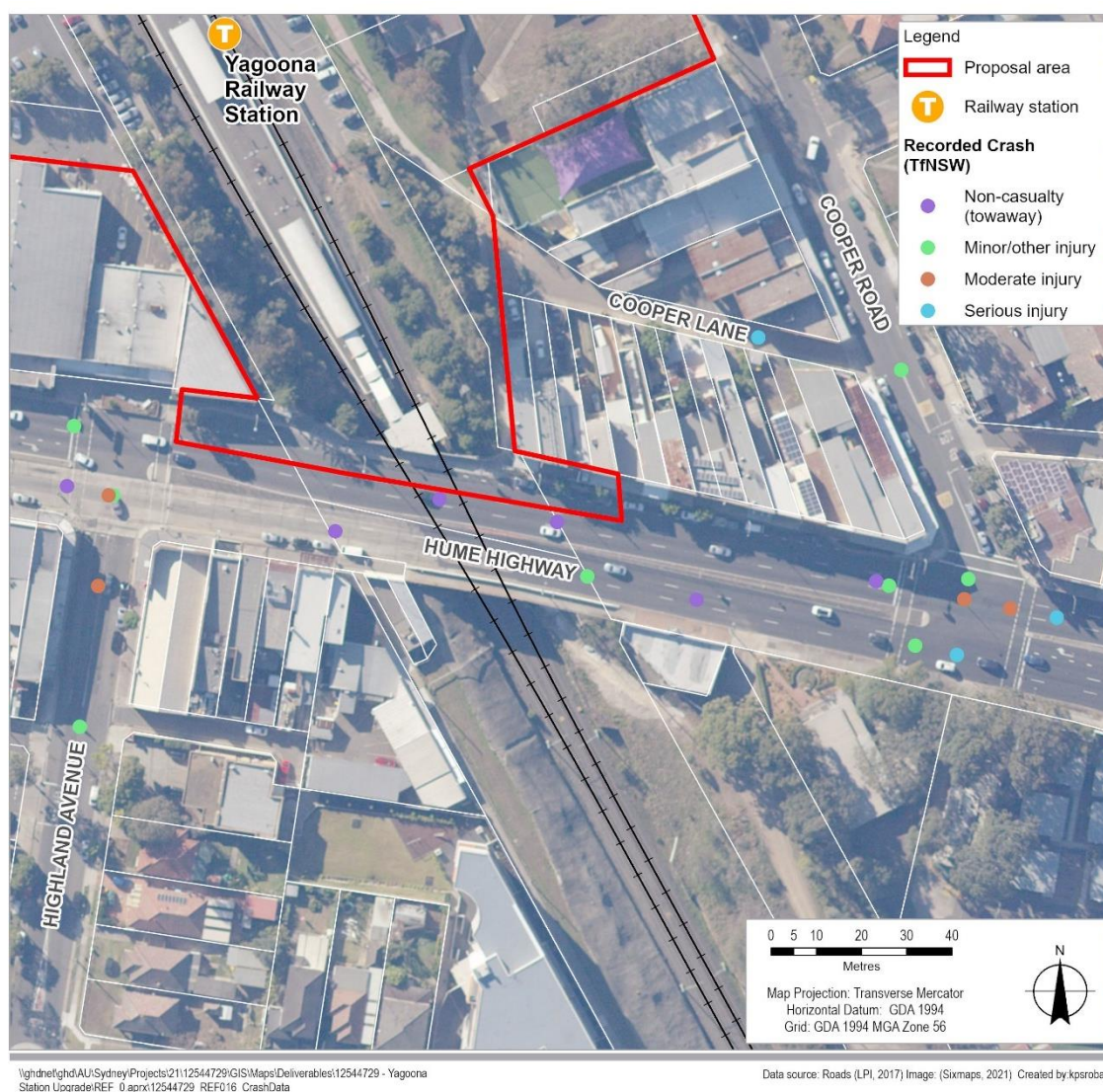


Figure 2.12 Crash data map

The data indicates that there have been no fatalities in proximity to Yagoona Station. However seven crashes resulted in serious injuries. Two crashes involved pedestrians, both of which resulted in serious injuries.

A summary of the crashes displayed in Figure 2.12 is detailed in Table 2.1.

Table 2.1 Crash History in proximity to Yagoona Station

Location	Year	Severity	RUM Code	Description
Highlands Ave/ Hume Hwy	2015	Serious	71	Left off road
	2016	Non-casualty	60	Crash with parked car
	2016	Serious	10	Crash from adjacent directions
	2018	Non-casualty	30	Rear-end
	2018	Minor	30	Rear-end
	2019	Non-casualty	33	Lane side-swipe
	2019	Minor	30	Rear-end
	2019	Serious	21	Crash from opposite directions
	2019	Minor	30	Rear-end
	2019	Moderate	21	Crash from opposite directions
Highlands Ave	2016	Moderate	30	Rear-end
	2017	Minor	39	Crash from same direction
	2017	Minor	30	Rear-end
Hume Hwy	2018	Non-casualty	30	Rear-end
	2018	Minor	30	Rear-end
	2018	Non-casualty	73	Right off road into object
	2018	Non-casualty	34	Lane side swipe
	2019	Non-casualty	42	Crash leaving parking space
	2019	Non-casualty	73	Right off road into object
Cooper Road/ Hume Hwy	2015	Moderate	71	Left off road
	2015	Serious	74	Lost control on carriageway
	2015	Minor	32	Rear-end
	2016	Minor	30	Rear-end
	2016	Minor	30	Rear-end
	2016	Non-casualty	30	Rear-end
	2016	Minor	31	Rear-end
	2016	Minor	21	Crash from opposite directions
	2017	Serious	0	Pedestrian crash
	2017	Serious	21	Crash from opposite directions
	2017	Minor	21	Crash from opposite directions
	2019	Moderate	30	Rear-end
	2019	Non-casualty	30	Rear-end
Cooper Road	2015	Minor	63	Collision with vehicle door
	2016	Serious	2	Pedestrian crash
	2019	Minor	11	Crash from adjacent directions

3. Proposal description

The Proposal includes the upgrade of Yagoona Station to improve accessibility, and amenity for customers. The upgrade works includes the construction of a new concourse, lift and stairs, platform work and upgrades to commuter car parks and pedestrian pathways.

3.1 Station entry upgrades

Details of the proposed work to take place at the station:

- construction of new station entry concourse from the Hume Highway to provide access to the platform
- construction of new stairs to connect the new concourse to the platforms below
- installation of a new 17 person lift to provide access between the new concourse and the platforms below
- removal of existing concourse, including concourse level station facilities and shop front
- removal of existing stairs to the platform.

Pedestrian access to the platforms will be maintained during the construction of the new concourse and station entry. The existing stairs and concourse would be removed during rail possessions with either temporary stairs, or the new stair access to the platforms installed in the same possession period. The design and staging of the new station entry and concourse would be determined during detailed design phase of the Proposal and staged to ensure customer access to the station is maintained.

3.2 Platform works

The Proposal includes the construction of a new station building on the platform to house the station facilities and will include:

- staff room with kitchenette
- staff toilet
- cleaner's storage room including a basin
- family accessible toilet
- male ambulant toilet
- female ambulant toilet
- main switchboard room
- station services equipment room
- fan room.

Other work along the platform includes:

- relocation of existing services and utilities from concourse to the new platform building
- upgrade of existing platform surfaces (re-grading and re-surfacing) across the platforms to provide compliant accessible paths
- provision of new hearing induction loops on the platforms

- relocate and suitably reinstate any existing infrastructure including seats, signage, guards indicators, Opal card readers, Opal top up machine, lighting, CCTV, fencing, vending machines and rubbish bins on the station
- provision of boarding assistance zones and markings on each platform
- new TGSIs, line marking and stencilling.

New canopies will also be installed between the existing canopies and the new station building to achieve continuous cover from the new lift and stairs to the boarding assistance zones on both platforms.

3.3 Car parks and pedestrian access to station

The following upgrade work would be undertaken to the existing commuter car parks to the east and west of the station:

- upgrade of the existing accessible parking spaces in the eastern car park including adjustments to the turning bay, relocation of bike hoops, line marking, signage, new kerb ramp and kerb adjustments
- provision of two new accessible spaces in the western car park, including line marking, signage, tree trimming, new kerb ramp and kerb adjustments.

The existing pedestrian paths connecting the car parks to the station entrance would be upgraded to provide compliant pathways. The works would include:

- realignment and re-grading of the pathway from the eastern commuter car park to the station entrance to provide a compliant accessible path
- realignment and re-grading of the pathway from the new accessible parking spaces in the western commuter car park to the station entrance on the Hume Highway
- provision of rest seating and landscaping works as required.

Provision of the new accessible path on the western side of the station may involve partial realignment through part of the rail corridor to achieve the required ramp grades. Some vegetation trimming and removal would be required to accommodate the new accessible path. The existing access to the station from the car parks will need to be disrupted during the works with temporary detours in place. The design and staging of the new accessible path would be determined during detailed design.

An image of the Proposal is displayed in Figure 3.1.

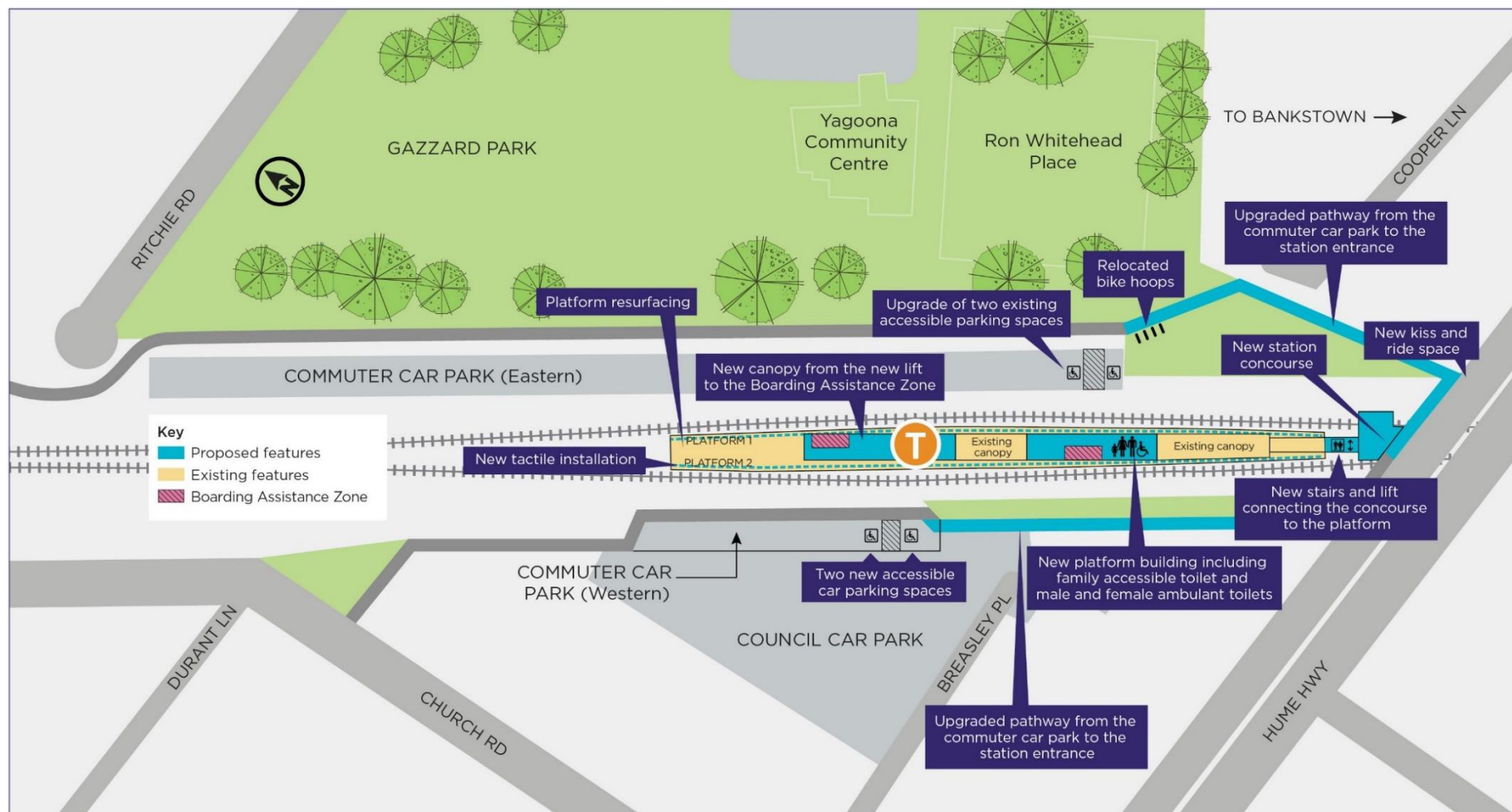


Figure 3.1 Key features of the Proposal

(Indicative only, subject to detailed design)

4. Construction impacts

4.1 Overview

Subject to approval, construction is expected to commence mid-2021 and take approximately 18 months to complete. The construction methodology would be further developed during the detailed design of the Proposal by the nominated Contractor in consultation with Transport for NSW.

The proposed construction activities for the Proposal are identified in Table 4.1. This staging is indicative and is based on the current concept design and may change once the detailed design methodology is finalised. The staging is also dependent on the Contractor's preferred methodology, program and sequencing of works.

Table 4.1 Yagoona Station Construction Information

Activity	Works Undertaken	Vehicle Types	Indicative Duration	Indicative Timing
Activity 1 Site establishment and enabling work	<ul style="list-style-type: none"> • site investigations and survey • establishment of site compounds (ie erect fencing, tree protection zones, site offices, amenities and plant/material storage areas) • establish temporary facilities as required (eg temporary access stairs, temporary toilets, temporary construction lights etc) • erect temporary site hoarding and fencing as required • relocation of services • installation of power where required • traffic control measures. 	Flatbed trucks Crane trucks	1-2 Months	Standard hours
Activity 2 Lift, stairs and concourse work	<ul style="list-style-type: none"> • excavate lift foundations • demolish existing concourse • construct new stairs • piling for footings and in situ concrete works • waterproofing (as required), install reinforcement, formwork and concrete to form the lift pit • erect precast concrete structures and steel canopies • demolish existing stairs • lift installation and commissioning • architectural fit-out around lift shaft including new awning and anti-throw screens. 	Concrete trucks 250 tonne crane	8 Months	Standard hours, night-works and 48-hour and 2-week rail shutdown during scheduled Sydney Trains track maintenance weekends
Activity 3 Platform building enabling Works	<ul style="list-style-type: none"> • excavation of footings and piling for building foundations • installation of in ground services route along platform • pour concrete foundations. 	Concrete trucks	2 Months	Standard hours

Activity	Works Undertaken	Vehicle Types	Indicative Duration	Indicative Timing
Activity 4 Platform building installation	<ul style="list-style-type: none"> installation of modular building sections 	Delivery trucks 250 tonne crane	2 Weekends	48-hour rail shutdown during scheduled Sydney Trains track maintenance weekends
Activity 5 Eastern ramp works	<ul style="list-style-type: none"> demolition of existing pathway concrete new footpaths including retaining walls and footings landscaping installation of handrails. 	Excavators Concrete trucks Bobcats	5 Months	Standard hours
Activity 6 Western ramp works	<ul style="list-style-type: none"> demolition of existing pathway concrete existing footpaths including retaining walls and footings tree removal and landscaping installation of handrails installation of new walkway. 	Excavators Concrete trucks Bobcats Crane trucks	5 Months	Standard hours
Activity 7 Station building works	<ul style="list-style-type: none"> fit out of all station building rooms including services, wall and floor finishes. 	Elevated work platform	2 Months	Standard hours
Activity 8 Platform modification work	<ul style="list-style-type: none"> re-grade platform surface relocate platform furniture including seating installation of TGSIs and new yellow line along platforms installation of new canopy. 	Excavators Delivery trucks Dump trucks	1 Month	Standard hours or 48-hour rail shutdown during scheduled Sydney Trains track maintenance weekends
Activity 9 Under Track services crossing	<ul style="list-style-type: none"> Excavate and install service routes under tracks and into platform, reinstate excavation and recertify track. 	Excavators Delivery trucks Dump trucks	Multiple Weekends	48-hour rail shutdown during scheduled Sydney Trains track maintenance weekends
Demobilisation	<ul style="list-style-type: none"> install other ancillary features and landscaping remove hoardings clear site remove environmental, safety and traffic controls. 	Excavators Bobcats Crane trucks	1 Month	Standard hours

4.2 Construction Hours

As detailed in Table 4.1, the majority of construction works would occur during “standard hours”.

The NSW Environmental Protection Authority (EPA), Draft Construction Noise Guidelines, details the recommended standard hours for construction works:

- Weekdays 7:00am – 6:00pm
- Saturdays 8:00am – 1:00pm
- Sundays and public holidays, no work.

During activities 2, 4, 8 and 9, some works would be scheduled to occur at night and on weekends during scheduled shutdowns for rail maintenance (referred to as rail possessions).

It is estimated that approximately eight rail possessions would be required to facilitate the following:

- demolition and removal of the existing canopy, excavation of stair and lift foundations and installation of hoarding
- installation of the concourse, lift and stairs
- trenching and services relocation to new platform building location
- installation of platform building
- platform re-grading and installation of canopy extensions.

Out of hours work may occasionally be required outside rail closure periods. As detailed in the EPA Guidelines, in these circumstances:

- the noisiest work should be timed to minimise potential sleep disturbances, ie prior to 10:00 pm.
- approval should be sought from Transport for NSW, and the nearby community should be informed of the proposed works.

4.3 Construction compounds

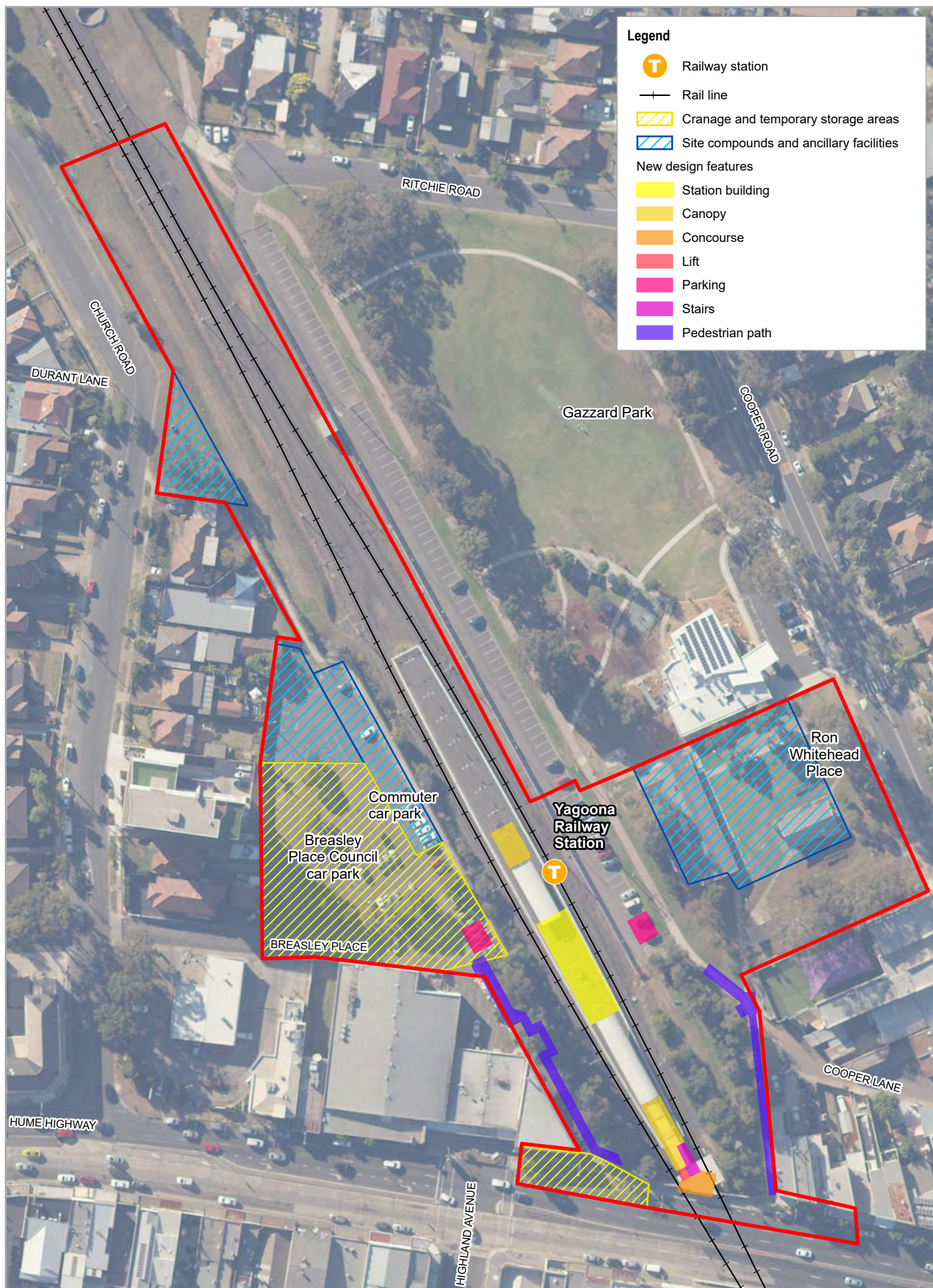
Two main potential sites for construction compounds have been identified for the Proposal:

- within the Breasley Place Council and commuter car parks (west of Yagoona Station)
- within Ron Whitehead Place (east of Yagoona Station).

A construction laydown area is also nominated within the rail corridor to the west of the station. The locations of the construction compounds and ancillary sites are displayed in Figure 4.1 (blue hatching).

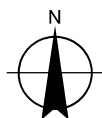
The use of Ron Whitehead Place as a temporary construction will require the temporary relocation of the pedestrian crossing to accommodate vehicle access.

The extent to which these sites would be utilised will be determined during detailed design and in consultation with City of Canterbury Bankstown Council.



Paper Size ISO A4
0 20 40
Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



Transport for NSW
Yagoona Station Upgrade
Review of Environmental Factors

**Site compounds
and ancillary facilities**

Project No. 1254729
Revision No. 0
Date 13/05/2021

FIGURE 4.1

A small area in the north of the western car park would be used as a construction compound, resulting in the temporary loss of approximately 20 to 25 parking spaces for the duration of construction. The southern portion of the Council and commuter car park would be used to establish a crane and temporary storage area. These activities would be scheduled to occur on weekends (during scheduled rail possession periods) to minimise adverse impacts to users of the western car park.

As shown in Figure 4.1, crane and temporary storage (yellow hatching) are proposed on:

- the southern section of the eastern car park
- a portion of the western car park
- the bus stop on the northern side of the Hume Highway at the frontage to Yagoona Station.

The duration of the requirement for these areas or which activities they will apply to (see Table 4.1) would be determined during the detailed design phase.

4.4 Haulage routes

Access to the site would require the use of the local road network. In determining appropriate access/egress routes for construction vehicles, an effort would be made to minimise impacts on local and collector roads. The Hume Highway would be the primary route to and from the construction compounds. Transport for NSW designates the Hume Highway as being able to accommodate 19 metre semi-trailers and 26 metre B-double routes.

For the proposed construction compound in the Breasley Place Council car park, vehicles would access/egress the site via Hume Highway, Church Road and Breasley Place. For the construction compound in Ron Whitehead Place, vehicles would access/egress the site via Hume Highway and Cooper Road.

The recommended haulage routes to the construction compounds are displayed in Figure 4.2.

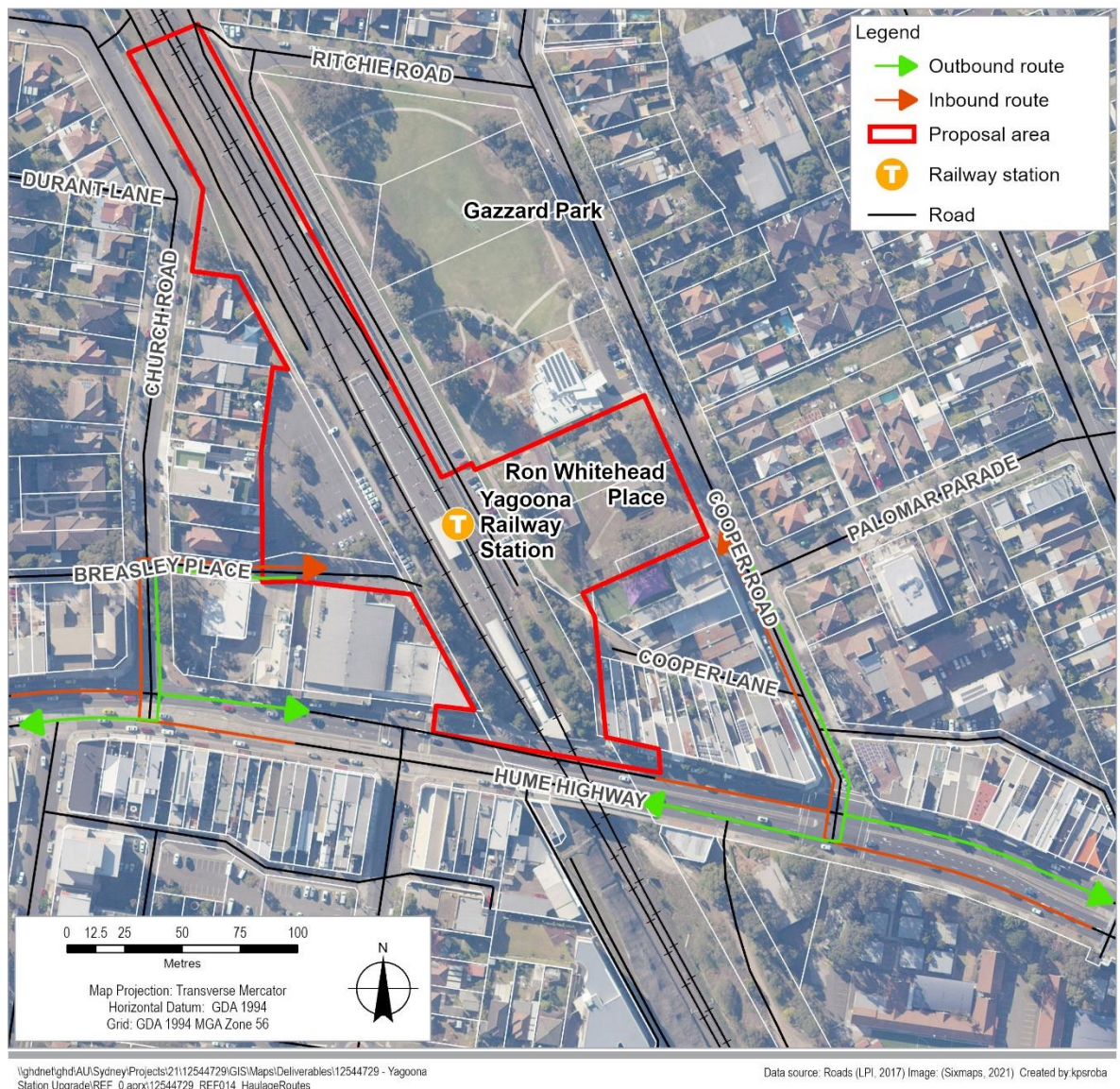


Figure 4.2 Recommended haulage routes

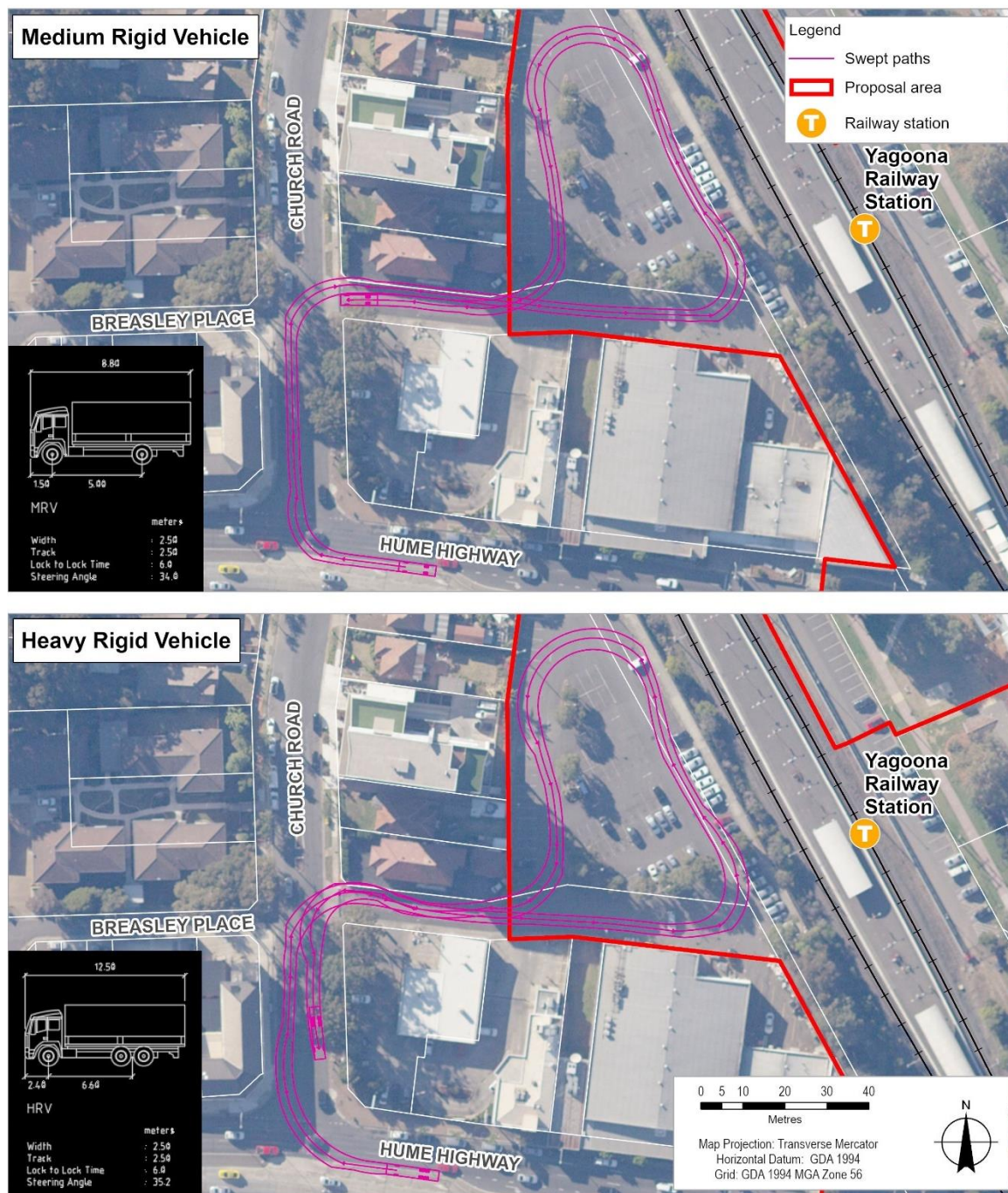
As part of the detailed Construction Traffic Management Plan (CTMP) works, truck drivers would be informed of the designated haulage routes to and from the Yagoona Station construction compounds.

The data in Table 4.1 indicates that articulated vehicles will not be used during construction.

Swept path analysis have been undertaken for:

- 8.8 metre medium rigid vehicle (MRV) and 12.5 metre heavy rigid vehicle (HRV) accessing and egressing both construction compounds
- 15.7 metre crane accessing and egressing the western compound.

The swept path analysis are presented in Figure 4.3 for the western compound and Figure 4.4 for Ron Whitehead Place.



\\ghdnet\ghd\AU\Sydney\Projects\21\12544729\GIS\Maps\Deliverables\12544729 - Yagoona Station Upgrade\REF_0.aprx\12544729_REF017_SweptPaths\WesternCompound

Data source: Imagery (SixMaps, 2021), Roads (LPI, 2017) Created by:kpsroba

Figure 4.3 Swept paths western compound

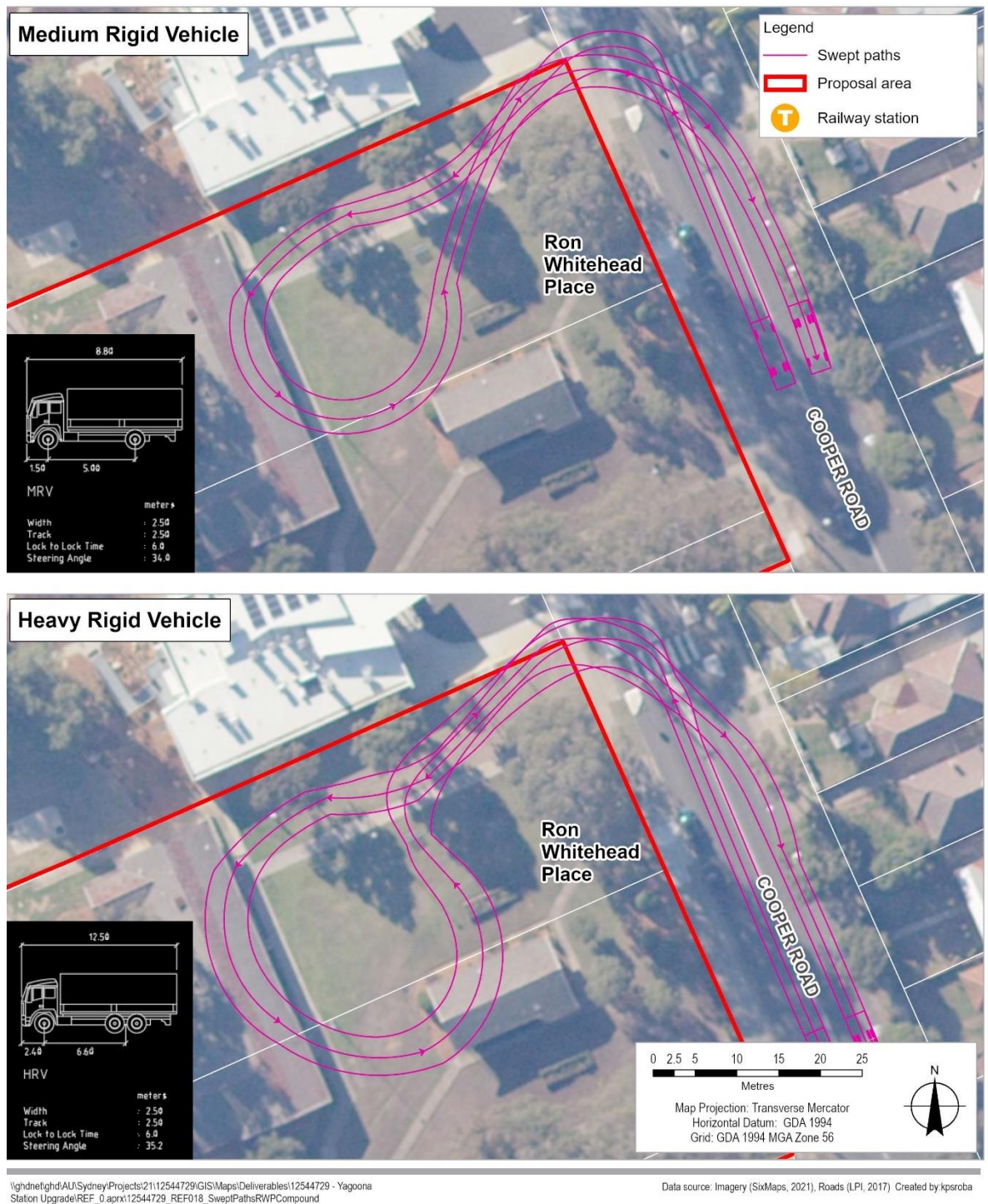


Figure 4.4 Swept path Ron Whitehead Place

Based on the analysis a MRV and HRV could access and egress the construction compounds. Though it is noted that the height clearance of the trees in the Ron Whitehead Place will need to be confirmed.

Additional swept path analysis of a 15.7 metre crane accessing and egressing the western compound is displayed in Figure 4.5.

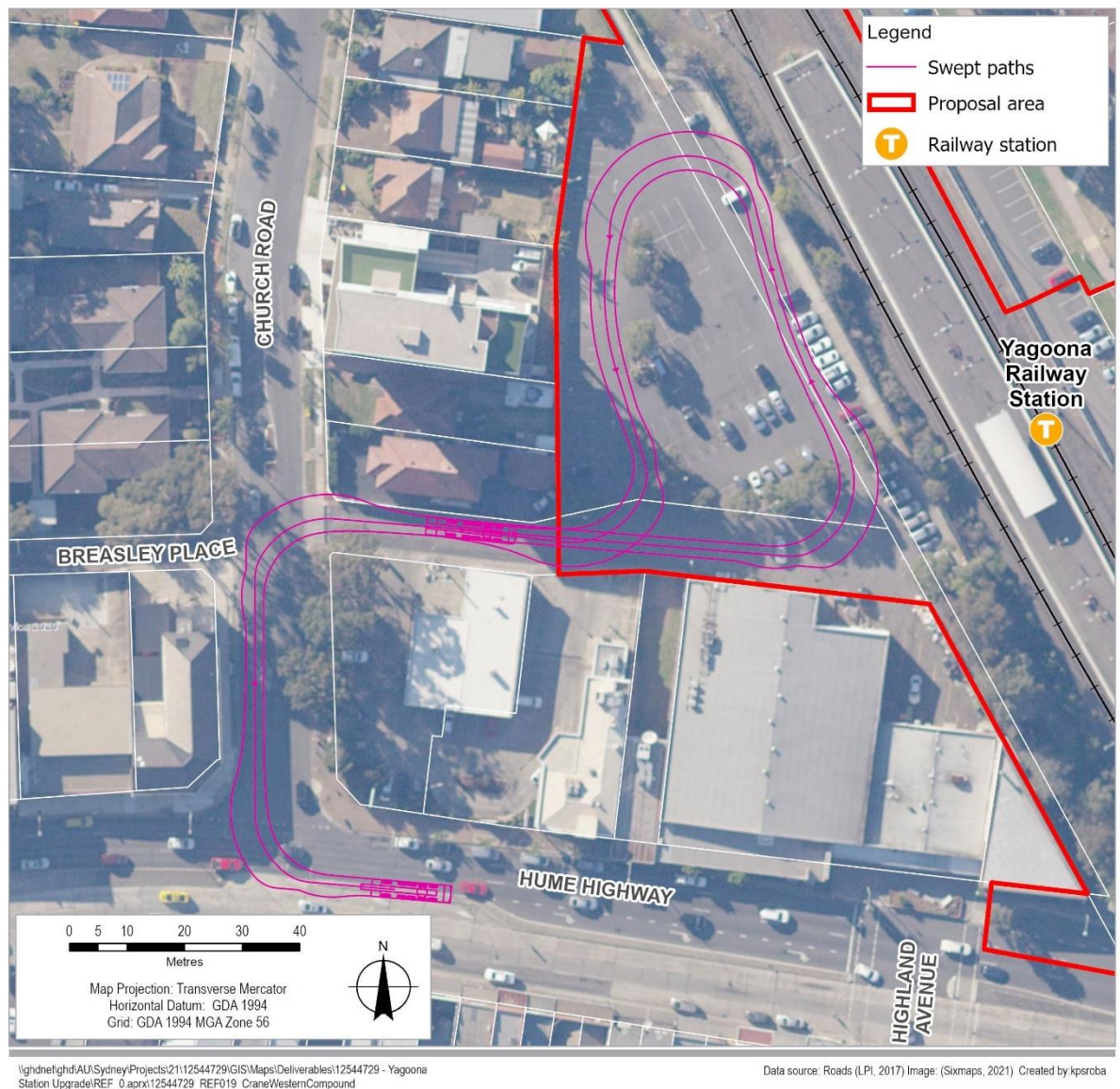


Figure 4.5 Swept path of a 15.7 metre crane

The figure above indicates that insufficient space is available on Breasley Place for a crane of 15.7 metre to access the compound.

Accordingly, the provision of a 250 tonne crane on the western compound will be difficult to achieve. Cranes of smaller dimensions may be required.

4.5 Traffic impacts

During weekend works (scheduled rail shutdowns), approximately six heavy vehicles are expected to access/egress the construction compounds over the course of each day. Outside of rail shutdowns, up to three heavy vehicles are expected to access/egress the construction compounds over the course of the day. During rail shutdowns, up to 20 workers are expected onsite, with up to 10 workers expected outside of these periods.

Construction vehicle movements are expected to fall within typical fluctuations of daily traffic movements and therefore not adversely alter the existing operation of the road network in proximity to Yagoona Station.

4.6 Impacts to parking

The compound to the west of the station would not require the use of the entire car. A small area at the northern end of the car park would be used. This would result in the temporary loss of approximately 20 to 25 timed and untimed parking spaces for the duration of construction. The crane and temporary storage area proposed in the eastern car park would result in the additional temporary loss of approximately 20 car parking spaces.

On weekends, during rail shutdowns, the entire western car park is expected to be used for construction activities (up to eight times during the construction period). However, these possessions have been timed to minimise the impacts on commuters using the car parks on weekdays.

Individuals using the commuter and council car parks on the western side of the station during rail shutdowns would need to find alternative parking areas. While time restricted parking (one hour and two hour) is provided on Cooper Road and Church Road, both car parks are heavily utilised by shoppers and the loss of parking spaces would result in inconveniences to these users.

Alternative parking measures and controls to mitigate the loss of parking during the construction of the Proposal would be considered in consultation with Council, prior to construction commencing.

4.7 Impacts to public transport

Some of the works associated with the Proposal would occur on weekends during scheduled rail shutdowns (scheduled closures that would occur regardless of the Proposal when part of the rail network is temporarily closed and trains are not operating). Buses would replace trains during rail shutdown periods.

Bus services may be subject to minor delays due to interactions with construction vehicles accessing/egressing the site compounds from the Hume Highway.

As displayed in Figure 4.1, crane and temporary storage areas are proposed along the bus stop on the Hume Highway. The duration of the requirement for this area, is currently unknown. However preliminary inputs suggest that the temporary bus stop closure would predominantly occur during possessions, with an additional two week shutdown in non-possession periods.

The bus stop on the Hume Highway would be temporarily closed for temporary crane operations and during works on the footpath. An alternative bus stop is located about 150 metres west of the existing bus stop (on Church Road).

Any construction activities occurring during rail shutdowns must consider additional buses and users. This should be addressed as part of a Construction Traffic Management Plan (CTMP) and Traffic Control Plan (TCP) which will be prepared prior to the commencement to construction.

There is currently ongoing discussion with Transport for NSW with respect to the appropriate locations for temporary/alternative bus stops, during the closure of the existing bus stop on the Hume Highway.

4.8 Road closures

Road closures are not proposed on the road network for the duration of works.

4.9 Impacts to active transport

Regrading and realignment of the footpaths on both sides of the station would require the temporary closures of the footpaths. These footpaths connect the car parks to the station entry and to the Hume Highway. The eastern footpath would be closed for approximately five months and sections of the western footpath closed for approximately three months.

The proposed new footpath would be parallel to the existing footpath within the rail corridor for much of its length. This would allow access to the businesses along the existing footpath to be maintained from Hume Highway during most construction activities. During these closures, commuters utilising the car parks, and members of the public accessing the Community Centre or Gazzard Park, would need to utilise alternative routes to access and egress Yagoona Station.

The recommended pedestrian routes to and from the car parks (see Figure 4.6) are as follows:

- eastern car park – Ron Whitehead Place, Cooper Road and Hume Highway
- western car park – Breasley Place, Church Road and Hume Highway.

The distance of both these potential pedestrian diversions is approximately 300 metres.

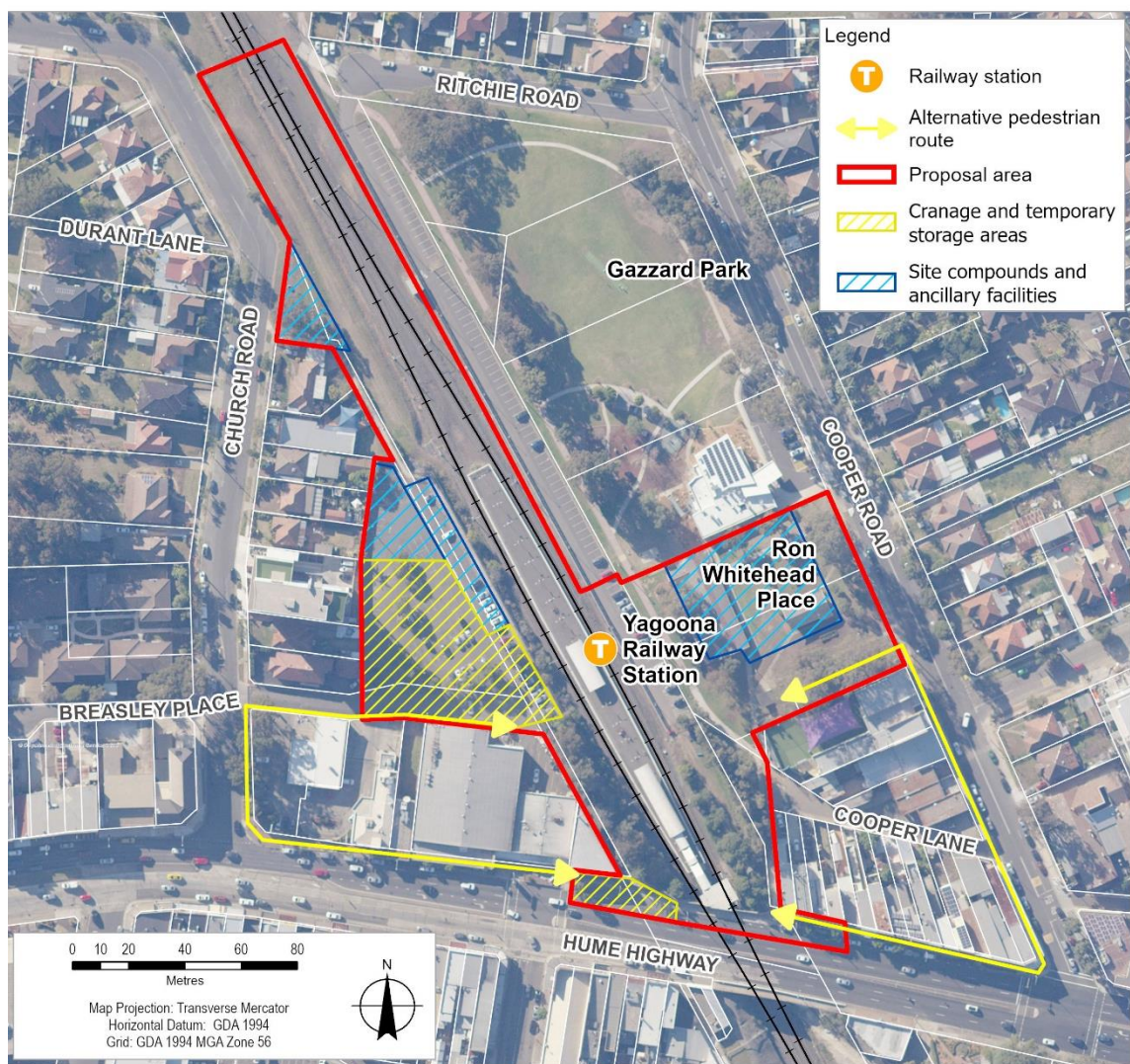


Figure 4.6 Recommended Alternative Pedestrian Routes

For the eastern car park, Cooper Lane is very narrow and with poor pedestrian facilities. Accordingly, for safety (potential conflicts with vehicles) and amenity (a very narrow footpath and people would be required to walk on the road) it is not considered suitable as a pedestrian path (see Figure 4.7). Accordingly, it is recommended that pedestrians are directed Ron Whitehead Place. If a construction compound is located in the park it would need to be fenced off, with a wide easement and supporting wayfinding signage provided for pedestrians.



Figure 4.7 Cooper Lane looking west from Cooper Road

For access to the Breasley Place Council and commuter car park, Breasley Place provides a narrow footpath. Accordingly, barricades or similar measures would be located on the southern side of Breasley Place to provide a designated footpath, separated from vehicle movements. The temporary pedestrian footpaths may result in temporary impacts on pedestrians due to the change in access arrangements and the additional distances required to access the station, particularly for individuals with reduced mobility.

These impacts are considered to be manageable with a CEMP (and CTMP) to be prepared by the Contractor outlining how pedestrian connectivity and safety would be maintained during the works. Wayfinding signage would be provided to indicate alternative routes to and from the station. The community would be notified of any footpath modifications during construction and diversions as part of the Community Liaison Management Plan.

Additionally, a traffic controller would be monitoring the site at all times during construction and ensuring that pedestrians in the vicinity of the site are protected from heavy vehicles entering and leaving the site.

The bicycle rack on the eastern side of the station would be temporarily unavailable during construction of the footpath and car park work. These would be reinstated following the completion of construction.

4.10 Impacts to kiss-and-ride

The Proposal includes the provision of an accessible kiss-and-ride zone on the northern side of the Hume Highway, adjacent to the east of Yagoona Station.

These works would include the relocation of planter boxes, payphone and public bench adjacent to the Hume Highway, as required to accommodate the new kiss-and-ride area. Thus, providing an improved environment for people being dropped off by car at Yagoona Station.

The introduction of this zone would result in the loss of two parking spaces on the Hume Highway.

4.11 Construction mitigation

4.11.1 Construction Traffic Management Plan

Prior to the commencement of construction, a CTMP would be prepared as part of the CEMP and would include at a minimum:

- ensuring adequate road signage at construction work sites to inform motorists and pedestrians of the work site ahead to ensure that the risk of road accidents and disruption to surrounding land uses is minimised
- maximising safety and accessibility for pedestrians and cyclists
- ensuring adequate sight lines to allow for safe entry and exit from the site
- ensuring access to railway stations, businesses, entertainment premises and residential properties (unless affected property owners have been consulted and appropriate alternative arrangements made)
- managing impacts and changes to on and off-street parking and requirements for any temporary replacement provision
- parking locations for construction workers away from stations and busy residential areas and details of how this will be monitored for compliance
- routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses
- details for relocating kiss and ride, taxi ranks and rail replacement bus stops if required, including appropriate signage to direct patrons, in consultation with the relevant bus/taxi operators. Particular provisions would also be considered for the accessibility impaired
- measures to manage traffic flows around the area affected by the Proposal, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the TMP.

Consultation with the relevant roads authorities would be undertaken during preparation of the CTMP. The performance of all project traffic arrangements must be monitored during construction.

Vehicles would be permitted to travel past the work compounds on Church Road and Cooper Road with appropriate traffic signage (which would be detailed in a TGS) to advise motorists of changes in road network conditions/operation or the expected vehicle movements to/from the site. TGSs are to be developed in accordance with Transport for NSW Traffic Control at Works Sites (TCAWS), v.06 2020 and AS1742.3 – Traffic Control for Works on Roads as part of a Construction Traffic Management Plan and be coordinated with the onsite staging requirements.

4.11.2 Monitoring of Traffic Guidances Schemes (TGSs)

During construction, the Contractor shall, each morning, prior to work commencing, ensure all signage is erected in accordance with the TGS and clearly visible. Not required after work hours, each evening, upon completion of work, the Contractor is to ensure signage is either covered or removed as required.

Any variation to the layout of the TGS on site is to be recorded and certified by authorised Transport for NSW accredited personnel. The associated TGS road signage will inform drivers of works activities in the area, including truck movements in operation.

A review of the proposed TGSs will be undertaken as required to determine any potential need for future amendments, according to procedures and process identified for the TMP, in Section 1.3 (also refer TCAWS Figure 8.1).

Any variation to the layout of the TGS on site is to be recorded and certified by accredited Roads and Maritime personnel.

4.11.3 Access to adjoining properties

Access to all adjoining properties will typically be maintained for the duration of works.

4.11.4 Method of communicating traffic changes

Prior to the commencement of works on site, the Contractor is to inform neighbouring properties of proposed works, impacts and site contact information as per the Community Liaison Plan (to be developed prior to construction). Notification can be provided by various mean including, but not limited to:

- letterbox distribution
- local newspaper
- council website.

TCPs developed in accordance with Australian Standards (AS 1742.3 – Traffic Control Devices for Works on Roads) and Transport for NSW Traffic Control at Worksites manual will identify appropriate signage (and location) to advise motorists of upcoming changes in the road network.

Prior to construction works progressing, the following is proposed:

- The Contractors and the Client are to have face-to-face introductions/meetings with landowners and tenants who will be directly affected, explaining construction processes and impacts to the surrounding area, answering questions they may have, and exchanging contact details so that neighbours can be made aware of upcoming site activities and establish a point of contact where they can direct concerns they have during the construction process.
- Further, it is suggested, following the approval of property owners and car park operator, car park users should be notified of proposed works, via signage to capture frequent users of the car park.

As stated previously, during some periods of construction, the capacity of the car parks will be significantly reduced during construction and the current pathways between the car parks and the Hume Highway will be closed.

Accordingly, it is recommended that notices be placed in the car parks prior to construction and Transport for NSW communicate this reduction to passengers, ie public notices at Yagoona Station, to inform passenger and help suppress parking demand during the construction period.

4.11.5 Environmental control

The following environmental requirements are to be adhered to:

- All vehicles transporting loose materials will have the entire load covered and/or secured to prevent any large items, excess dust or debris depositing onto the roadway during travel to and from the site, including but not limited to construction rumble strips/wheels wash at the site egress location.
- The lead Contractors will monitor the roads leading to and from the site and take all necessary steps to rectify any road deposits caused by site vehicles, to maintain the safety of all road users.
- Vehicles operating to, from and within the site shall do so in a manner, which does not create unreasonable or unnecessary noise or vibration.
- Public roads and access points will not be obstructed by any materials, vehicles, refuse skips or the like, under any circumstances.
- All subcontractors must be inducted by the lead Contractor to encourage that all the relevant procedures are met.

4.12 Staff induction

All staff and subcontractors engaged on site will be required to undergo a site induction. The induction will outline the requirements on the CTMP, including site access routes, environmental and occupational health and safety responsibilities, emergency procedures, potential carpooling opportunities and vehicle height restriction under the power lines.

Additionally, the Site Manager will discuss CTMP requirements regularly as a part of “toolbox talks”.

4.13 Occupational Health and Safety

Any workers required to undertake works or traffic control shall be suitably trained and hold the required accreditation to carry out works on site and will also be site inducted. All traffic control personnel will be required to hold Transport for NSW accreditation in accordance with the Transport for NSW Traffic Control at Worksites manual.

4.14 Contact of Emergency Services

In the event of an emergency related construction traffic incident on the public road network, it will be the responsibility of the Site Manager to ensure that emergency services are notified. The emergency services include but are not limited to:

- Fire
- Ambulance
- Police.

Phone “000” in cases of emergency.

Furthermore, it is the responsibility of the Site Manager to advise the emergency services of any restriction of vehicular access to the public and private areas (1) one week prior to its implementation.

4.15 Certificates and approvals

Approval is to be obtained from Council and other relevant authorities as required. Approvals that may need to be obtained for items such as but not limited to:

- roadwork Speed Zoneroadwork speed zone
- council Road opening permits
- road occupancy approvals
- hoarding/fencing approvals
- crane and barricades
- oversize and Articulated Vehicle use on local roads.

4.16 Obtaining Road Occupancy Approvals

The Construction Contractor will obtain the necessary approvals, as required by the Roads Act 1993 and NSW Traffic Acts and regulations, prior to conducting any works. The Construction Contractor is required to seek the concurrence of the relevant road authority prior to undertaking works. The Construction Contractor will ensure that all public roads to be used by construction traffic will be identified prior to construction and that management methods will be undertaken so that construction traffic uses the identified roads.

The three specific areas of approval will include:

- all construction works and/or any changes to existing infrastructure
- the installation and/or changes of any regulatory traffic control device
- occupation of the road network to conduct works, and the associated installation of temporary traffic control devices.

The road authorities responsible for roads affected by the project are listed below in Table 4.2.

Table 4.2 Road Classifications and Managing Authority

Classification	Authority
State	Transport for NSW
Regional	Transport for NSW or Canterbury-Bankstown Council
Local	Canterbury-Bankstown Council

4.17 Canterbury-Bankstown Council ROLs

The Construction Contractor will obtain the concurrence of Canterbury-Bankstown Council prior to the installation of temporary traffic controls/devices and/or occupying the local road network. The Construction Contractor's submission to Council will include:

- brief details of the works to be undertaken
- any relevant design drawings of the works
- program of the works
- copies of TCPs
- of applicable, details of speed zone authorisation (SZA)
- contact details of a construction site representative.

Special consultation will be undertaken with council and local residents regarding instances of special deliveries through local access roads.

4.18 Roadwork Speed Limits

Temporary roadwork speed limits are one of many traffic controls that can be implemented to manage the speed of traffic approaching and passing through a work site. However, they can, over long distances, have a significant impact on road user delay.

Roadwork speed zones must be logical and credible, as well as enforceable. When considering the use of a roadwork speed zones, they will:

- only be used where they are self-enforcing or will be enforced
- not be used alone but with other traffic control signs and devices
- not be used in place of more effective traffic controls
- only be used while road works are in progress or the lower speed road conditions exist.

4.18.1 Construction Speed Zone

Based on the vehicle composition and the existing levels of demand, it is proposed to reduce the posted speed limit to 40 kilometres per hour.

When night works are required, special consideration will be taken to determine changes in the speed limit depending on the location and type of works. As mentioned before, the Construction Contractor will aim to minimise impact to overnight freight vehicle.

If the case, as per Transport for NSW' Traffic Control at Work Sites Manual, when working adjacent to traffic in side streets the speed limit selection will be based on the following criteria:

- degree of vehicular and pedestrian conflicts
- type and extent of the work
- characteristics of the road and proximity of workers to passing traffic.

4.18.2 Speed Zone Authorisation (SZA)

An application to Council must be made for any proposed adjustment to speed limits whether they are temporary (tactical), such as those required for short-term road occupancies, longer term such as those for the duration of a construction stage, or permanent. A SZA application usually accompanies a ROL application where a change in speed limit is proposed as part of a road occupancy. The SZA application will be forwarded to Council's Interface Manager.

Councils generally require at least ten working days to process the application and will grant or reject the application within this period. All SZAs will comply with the over-arching road safety and traffic management principles, objectives and targets outlined in the CTMP.

5. Operational impacts

5.1 Public transport impacts

The Proposal is not expected to have an impact on the timetabling or operation of bus or train services at Yagoona Station.

5.2 Active transport impacts

The Proposal would enhance active transport connectivity to Yagoona Station by upgrading the pathways between the car parks and the station entry on the Hume Highway.

A new lift will support improved access/egress by individuals with a disability, limited mobility, parents/carers with prams, and customers with luggage.

Additionally, the bike racks will be relocated to be closer to the eastern pathway and further away from the station's waste storage area.

5.3 Kiss-and-ride

The Proposal includes the provision of an accessible kiss and ride zone on the Hume Highway, adjacent to Yagoona Station. The kiss and ride facility would provide an improved and safer environment for people being dropped off by car at Yagoona Station.

5.4 Parking

The accessible parking bays in the western commuter car park would be adjusted with new line marking, signage, tree trimming, new kerb ramp and kerb adjustments. The adjustment of the accessible parking bays would result in the loss of one parking bay.

The loss of one parking bay is expected to have a negligible impact on the operation of the western commuter car park.

The introduction of the proposed kiss and ride zone would result in the loss of two parking spaces on the Hume Highway. Alternative time-restricted parking is available along the Hume Highway and within the western car park. The loss of two parking spaces is expected to have a minor impact on parking availability in proximity to the station.

5.5 Traffic impacts

Given that the Proposal would provide a higher level of station accessibility and usability, the improved customer experience and upgraded facilities are likely to attract a higher patronage demand at the station. As a result, traffic activity is likely to marginally increase as a result of the Proposal. The potential traffic increase during operation is anticipated to have a negligible impact on the surrounding road network.

5.6 Safety

The Proposal is expected to improve pedestrian safety by upgrading the existing pathways and providing opportunities for patrons to access the platform via the lift instead of the stairs.

6. Summary

The following impacts are likely to be generated by the construction activities associated with the Proposal:

- A minor increase in traffic volumes associated with trucks and construction workers. These increases are expected to fall within typical fluctuations of daily traffic movements and therefore not adversely alter the existing operation of the road network in proximity to Yagoona Station.
- Some inconvenience for pedestrian access, due to the temporary closure of the pathways to the east and west of Yagoona Station. These closures are expected to last approximately five months.
- Temporary loss of up to 40 car parking spaces within the eastern and western car parks.
- The bus stop on the Hume Highway at the frontage to the station may need to be temporarily located to support craneage and temporary storage activities.
- Minor traffic delays associated with TGS implementation used to slow down and control vehicle movements during periods of construction.

It is expected that operational impacts of the Proposal will be positive, in accordance with the proposed improvements to the adjoining transport infrastructure and the provision of a lift to the platforms to assist individuals with disability, limited mobility, parents/carers with prams, and customers with luggage.

Additionally, a new accessible kiss and ride parking bay will be provided on the northern side of the Hume Highway, adjacent to Yagoona Station.

The following list summarises the measures that are recommended to be in place prior to the commencement of and during the execution of the construction period:

1. Key stakeholders, including operators of adjacent land uses, will be notified of any changed traffic management arrangements prior to the commencement of works.
2. Construction works will typically occur within the standard hours detailed by the NSW EPA.
3. Deliveries will be staged so as there are no delivery vehicles causing traffic disruption around the site.
4. Truck drivers will be directed to follow the predetermined haulage routes (via the Hume Highway).
5. Where works affect pedestrian access along Breasley Place, Church Road, Cooper Road and Ron Whitehead Place will be implemented.
6. The construction compounds will need to be fenced or separated from public.
7. A temporary bus stop location will need to be identified (if the bus stop on the Hume Highway is closed), with supporting wayfinding signage for passengers.
8. Car park users should be informed about the constructions works/closure to try and suppress parking demand during the phases of construction.
9. TGSs developed in accordance with Australian Standards (AS 1742.3 – Traffic Control Devices for Works on Roads) and Transport for NSW Traffic Control at Worksites (TCAWS), v.06 2020 manual will identify appropriate signage (and location) to advise motorists of upcoming changes in the road network.

10. Wayfinding signage should be implemented to direct passengers to Yagoona Station when the eastern and western pathways are closed.
11. During possession weekend, barricades or similar measures should be located on the southern side of Breasley Place to provide a designated pedestrian path, separated from vehicle movements.
12. Suitable staff induction methods and environmental controls will be implemented prior to the commencement of construction works.

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