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Edgecliff Station Upgrade

Traffic, Transport and Access Impact Assessment

Edgecliff Station Upgrade – Traffic, Transport and Access Impact Assessment

Technical Report

Client: Transport for New South Wales
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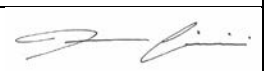
A	06-Oct-2017	Draft	Frank Ciancio	
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1 Introduction

1.1 Background

Transport for NSW (TfNSW) has proposed an upgrade of Edgecliff Station (the 'Proposal'). The Proposal forms part of the Transport Access Program, a NSW Government initiative to provide accessible, modern, secure and integrated transport infrastructure. The aim is to provide accessible interchange precincts for the mobility impaired, the elderly and parents/carers with prams and to meet the needs of a growing population. Interchange facilities must allow for seamless transfer between all modes, and for all customers, and safety must be given priority to all design options.

In 2015, AECOM (commissioned by TfNSW) produced accessibility upgrade concept plans and undertook options development and assessment for the Edgecliff Interchange Precinct. The report developed three concept plans to address interchange precinct deficiencies and a preferred concept was identified using a Multi-Criteria Assessment methodology.

The preferred concept has since been refined and is being progressed towards construction and implementation. As part of the Review of Environmental Factors (REF), AECOM has been commissioned by TfNSW to undertake a Traffic, Transport and Access Impact Assessment of the construction and operation of the Proposal.

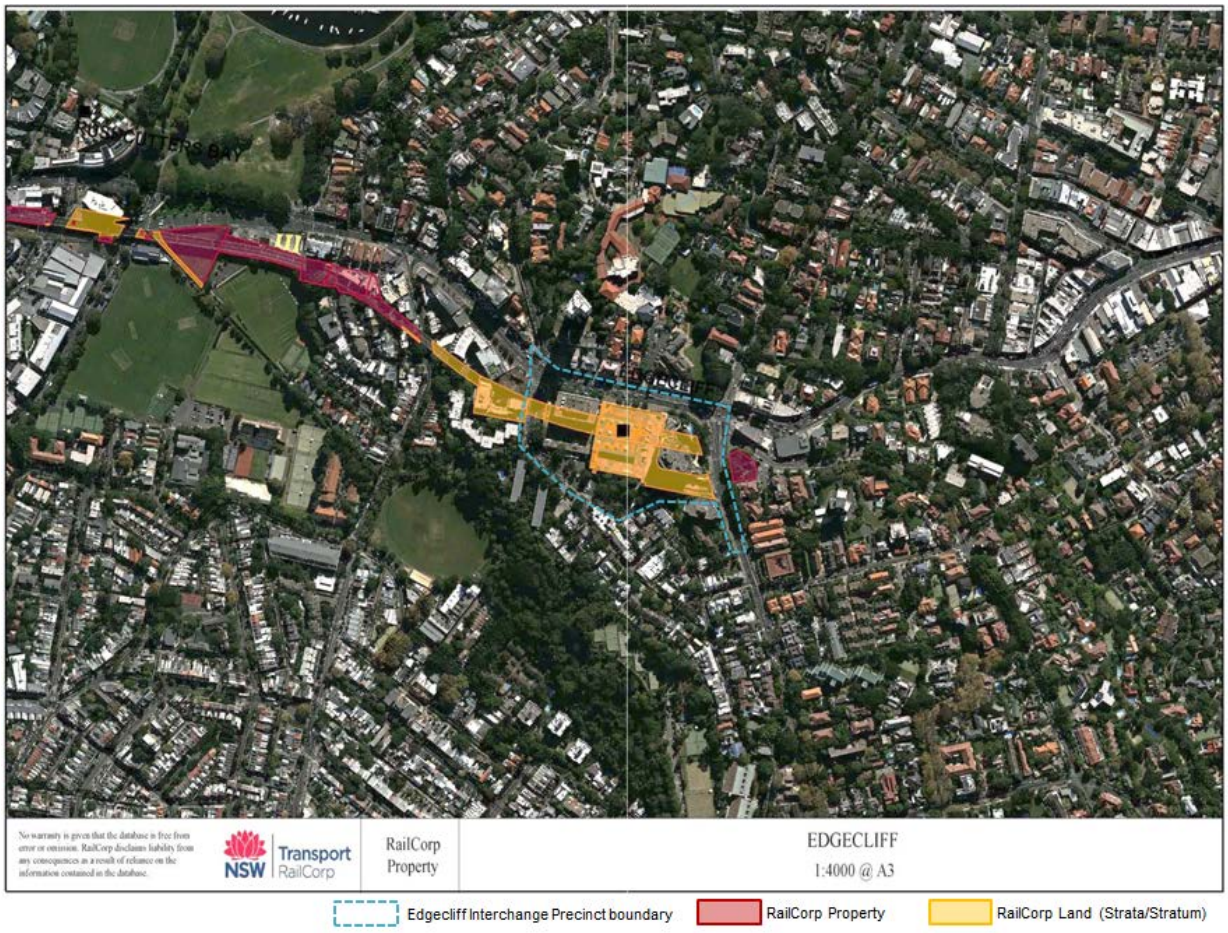
1.2 Project context

The objective of TfNSW's Transport Access Program is to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure. The program aims to provide station upgrades that will deliver components of this objective, as summarised below:

- stations that are accessible to people with a disability, limited mobility and parents / carers with prams
- modern buildings and facilities for all modes 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
- safety improvements including extra lighting, help points, fences and security measures for car parks and interchanges, including stations, bus stops and wharves
- signage improvements so customers can more easily use public transport and transfer between modes at interchanges
- other improvements and maintenance such as painting, new fencing and roof replacements.

1.3 Study area

The Edgecliff Interchange Precinct includes the rail station, associated interchange facilities and customer access between those facilities. It includes associated interchange structures and buildings, gates, pedestrian and cycle facilities, bus stops and shelters and taxi stands. The indicative boundary definition of Edgecliff Interchange Precinct is shown in Figure 1. This report also considered the broader Edgecliff area to assess interchange facilities and connections between the northern and southern sides of the station.



Source: RailCorp and TfNSW, 2014; modified by AECOM, 2015

Figure 1 Study area

1.4 Proposed works

The Proposal involves an upgrade of Edgecliff Station as part of the Transport Access Program to improve accessibility and amenities for customers. The key features of the proposal are summarised as follows:

- installation of a new lift (Lift 1) inside the paid station concourse area to provide access between the paid station concourse and the station platform
- installation of a new lift (Lift 2) outside the paid station concourse area to provide access between the station concourse, the gallery retail level and the bus interchange
- replacement of the existing four escalators that provide access between the paid station concourse and station platform with new escalators
- provision of new fire stairs to provide access between the paid station concourse and the station platform

- relocation of the existing ticket gate line and the addition of gates to increase circulation space in the paid station concourse
- partial demolition of the existing platform buildings to improve pedestrian movement
- installation of new pedestrian crossings and pram ramps at the bus interchange to provide an accessible path of travel from the new lift to the existing bus stands
- relocation of the existing bicycle c at the bus interchange
- provision of three new kiss and ride spaces on New McLean Street, sheltered seating and installation of a new bicycle racks
- extension of the existing pedestrian access ramp on New McLean Street to provide an accessible path of travel from the station concourse to the new interchange facilities
- ancillary works including adjustments to lighting, electrical upgrades, minor drainage works, new seating, improvement to station communications systems (including CCTV cameras) and wayfinding signage, and installation of Tactile Ground Surface Indicators.

1.5 Scope of the study

This Traffic, Transport and Access Impact Assessment provides an assessment of the potential impacts of the Proposal on transport, traffic, access and road safety. The purpose of this report is to:

- assess the existing traffic and transport conditions in and around Edgecliff Interchange Precinct
- evaluate the potential traffic generation caused by the Proposal and assess potential traffic impacts on the road network
- assess the impacts associated with construction and operation of the Proposal
- recommend mitigation measures to manage impacts, if required.

A site visit was undertaken on 19 July 2017 to observe the existing conditions at the site. In addition, a number of technical documents were reviewed to inform the assessment of Edgecliff Station, including:

- Edgecliff Station Precinct – Accessibility Upgrade – Concept Plan Project (AECOM, 2015)
- Edgecliff Station Precinct – Accessibility Upgrade – Concept Plan Project (AECOM, 2017)
- Edgecliff Station Precinct – Accessibility Upgrade – Appendix M – Traffic, Transport and Access Impact Assessment (AECOM, 2015).

1.6 Report structure

The report has been structured into the following sections:

- Section 2 provides a strategic review of existing traffic and transport conditions
- Section 3 documents the scope of works to be carried out as part of the Proposal and associated construction activities
- Section 4 details the construction impacts of the Proposal
- Section 5 provides details on the operational impacts of the Proposal
- Section 6 presents recommendations and measures to mitigate identified impacts.

2 Existing conditions

2.1 Edgecliff context

The suburb of Edgecliff is located within the Woollahra local government area (LGA), four kilometres from the Sydney central business district (CBD). Edgecliff is bounded by the suburbs of Woollahra to the south, Paddington to the southwest, Rushcutters Bay to the northwest, Double Bay to the east and Darling Point to the north. The suburb is served by the T4 Eastern Suburbs & Illawarra Line providing connections to the suburban Sydney Trains Network.

Land use surrounding Edgecliff Station comprises a mixture of medium to high density residential, commercial, recreational and residential zones. The station is positioned under Eastpoint Food Fair and Edgecliff Centre, providing retail, business and community services.

Figure 2 illustrates some of the key roads and land use features in Edgecliff, including the town centre, schools, parks and reserves.

Source: RailCorp and TfNSW, 2014, modified by AECOM, 2015

Figure 2 Edgecliff context

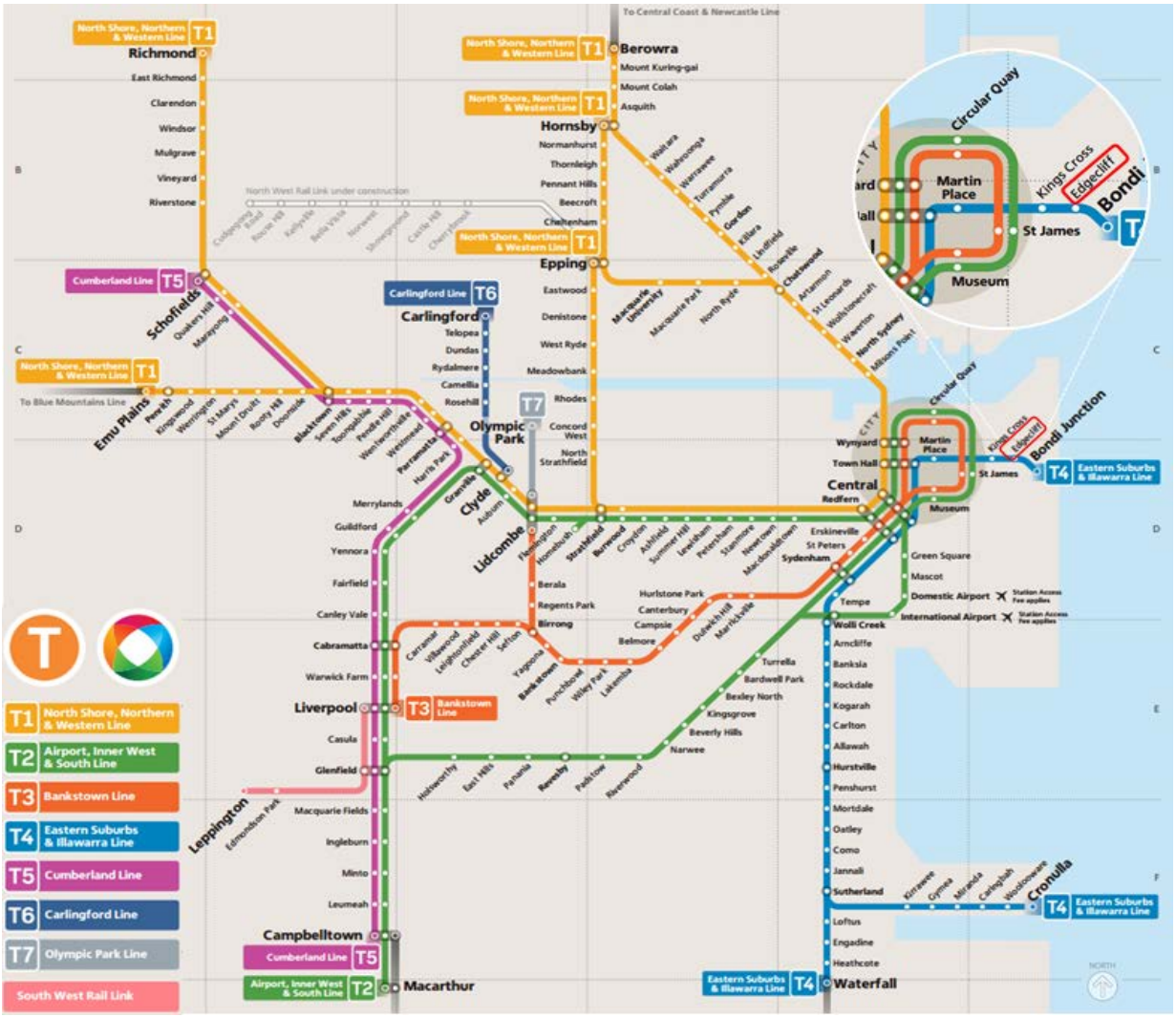
2.2 Edgecliff Interchange Precinct

The Edgecliff Interchange Precinct is a transport hub providing Edgecliff and surrounding suburbs key links and connections to Sydney's transport network. It is located within the Edgecliff Local Centre and is centred on Edgecliff Station with interchange facilities provided along New South Head Road and a bus interchange located above Eastpoint Food Fair.

The Edgecliff Interchange Precinct provides people the opportunity to access and transfer between transport modes including bike, train, bus and taxi.

2.3 Edgecliff Station

Edgecliff Station is serviced by the T4 Eastern Suburbs & Illawarra Line providing train services between Cronulla or Waterfall and Bondi Junction. Figure 3 shows Edgecliff Station on the Sydney Trains Network.



Source: Sydney Trains, 2015

Figure 3 Location of Edgecliff Station on the Sydney Trains Network

The station is located underground and runs parallel with New South Head Road. A paid concourse level with entrances from New South Head Road and New McLean Street provides access to two sets of escalators that provides a link to the platform level.

The station consists of a single island platform with two tracks. Platform 1 is the up direction Sydney CBD-bound platform providing services to Waterfall or Cronulla via City (T4). Platform 2 is the down direction platform providing services to Bondi Junction (T4).

The number of rail services stopping at Edgecliff during the AM and PM two-hour peak periods is shown in Table 1.

Table 1 Rail services at Edgecliff Station

Key destination	AM weekday peak (07:00 – 09:00)	PM weekday peak (16:00 – 18:00)
Waterfall or Cronulla to Bondi Junction	32	32
Bondi Junction to Waterfall or Cronulla	31	32

Source: Sydney Trains, 2017

2.3.1 Current train passenger travel demand

A breakdown of the 2017 station entries and exits are provided in Table 2.

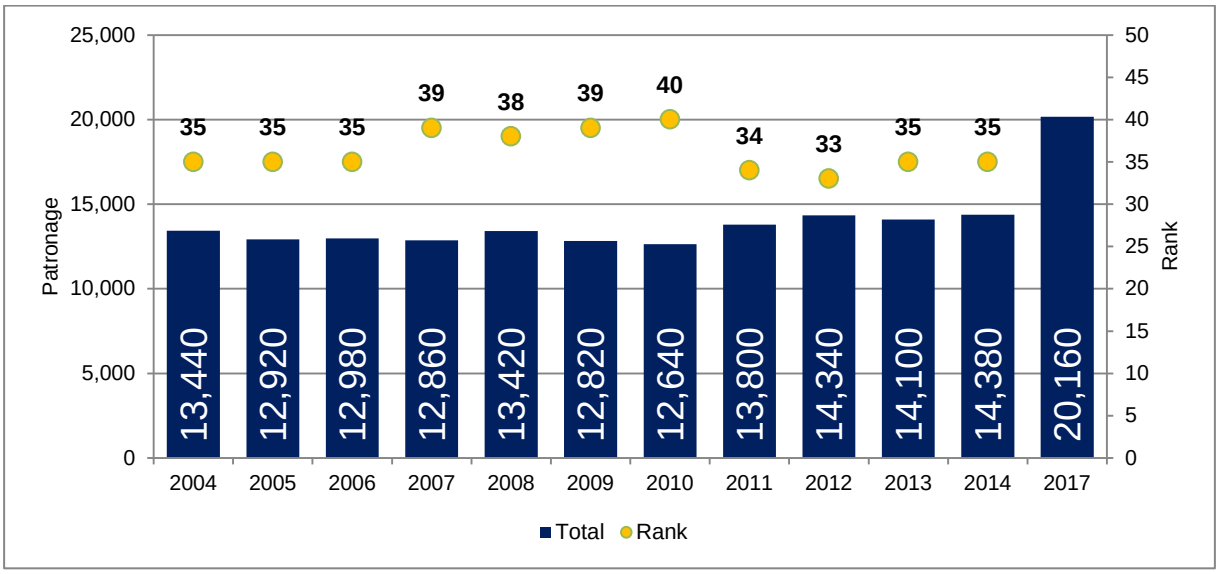
Table 2 Edgecliff Station 2017 opal data

Time period	In	Out
0200 – 0600	90	100
0600 – 0930	4,100	2,500
0930 – 1500	2,300	2,030
1500 – 1830	2,750	3,330
1830 – 0200	1,040	1,920
24 hours	10,280	9,880

Source: TfNSW, 2017

Historical station barrier counts obtained from the Bureau of Transport Statistics reveal Edgecliff Station is the 35th busiest station on the Sydney Trains network, with approximately 14,380 trips per average weekday recorded in 2014.

Historical patronage figures for Edgecliff Station are shown in Figure 4. The general trend in the data shows a significant increase in patronage at Edgecliff Station since 2014. Overall, the weekday patronage has increased by approximately 6,000 trips (40 per cent) over the past five years.



Source: Station Barrier Counts – 2004 to 2013, Bureau of Transport Statistics, 2014

Figure 4 Edgecliff Station historical patronage

2.3.2 Access mode split

Sydney Trains (formerly RailCorp) conducted interview surveys at Edgecliff Station to determine how passengers accessed the station in 1996 and 2004. The surveys were conducted during the AM peak period and showed that a majority of passengers accessed the station by walking, with this mode accounting for 61 per cent of passengers in 1996 and 71 per cent in 2004.

A pedestrian count was undertaken by Austraffic on 29 April 2015, which aimed to identify the modes of access during the AM peak period, between 6am and 9am. The surveys showed during the AM peak a majority (85 per cent) of passengers walked to the station and no users were recorded as having accessed the station by car during either peak periods.^

A summary of the results of the Sydney Trains survey and Austraffic pedestrian count is provided in Table 3.

Table 3 Edgecliff Station access mode share

Access mode	1996	2004	2015^
Time period	6:00am – 9:30am	6:00am – 9:30am	6:00am – 9:00am
Walk	61%	71%	85%
Bus	21%	10%	13%
Car park	13%	11%	<1%
Car lift	5%	8%	2%
Other	0%	0%	<1%

^It should be noted that there are limitations with the pedestrian count, since a questionnaire survey was not undertaken and the mode split is indicative of how commuters access Edgecliff Station.

Source: Station Barrier Counts – 2004 to 2013, Bureau of Transport Statistics and Austraffic – Pedestrian Survey 2015

2.4 Station accessibility

The station staff and ticket vending machines are located on the concourse level, with the island platform located at a lower level, accessed by escalators. Edgecliff Station currently does not provide lift or ramp access to the station platform or bus interchange. As a result, the station and bus interchange are not accessible for the elderly, people with a disability and customers travelling with children and/or luggage.

The station currently does not provide formal commuter car parking facilities. However, the station provides bus, bicycle, and taxi interchange facilities. Table 4 provides a summary of the facilities currently provided at Edgecliff Station.

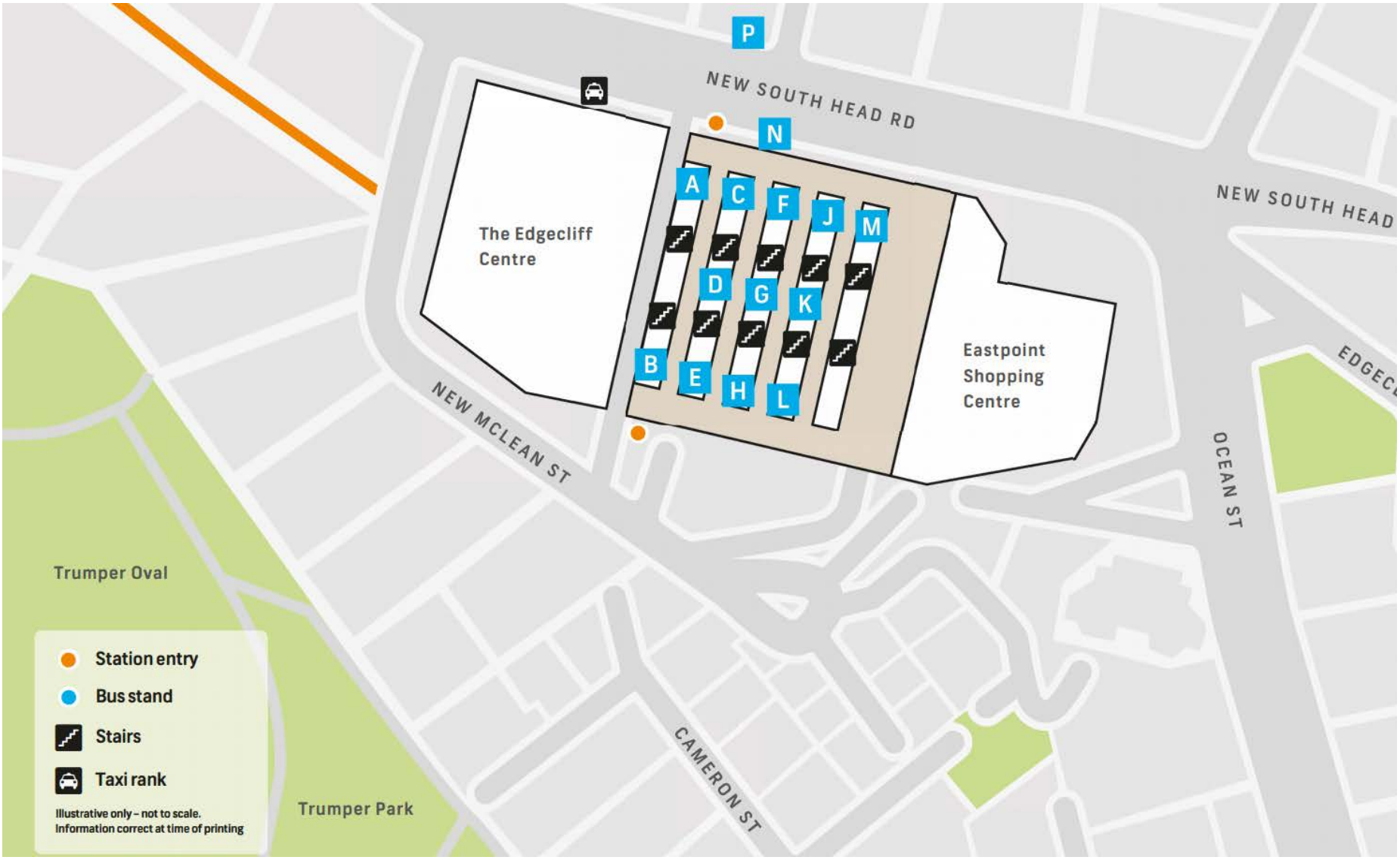
Table 4 Edgecliff Station facilities

Type	Facility
Accessibility	• Stairs • Escalator • Hearing loop • Portable boarding ramp • Wheelchair accessible toilet

Type	Facility
General	• Ticket vending machine • EFTPOS • Toilet • Payphone • Real-time information display screens • Help point
Transport interchange	• Bus stops • Taxi rank • Bicycle storage facilities

Source: Sydney Trains, 2017

A context map showing the location of Edgecliff Station and interchange facilities in relation to the surrounding area are shown in Figure 5.



Note: Bus services utilising the bus stands (A & B) on the eastern bus rank would have been relocated as a result of the delivery of the bicycle cage at the bus interchange level as part of TAP.

Source: Sydney Trains, 2017

Figure 5 Edgecliff Interchange Precinct context map

2.5 Pedestrian facilities

Pedestrian access to Edgecliff Station is provided through Eastpoint Food Fair. The station concourse can be accessed from the main entrance on New South Head Road and a secondary access in the form of a ramp on New McLean Street. On the concourse level, escalators (two in each direction) that are located in the paid area behind the ticket gates provide access to the platform level.

Escalators and stairs provide access from the concourse level to the gallery level above. From the gallery level, stairs provide a link to the bus interchange level. Each bus rank is provided with two sets of stairs from the gallery level.

Footpaths are present along both sides of New South Head Road, Ocean Street and New McLean Street as well as a majority of other roads surrounding the station. Signalised pedestrian crossing facilities are provided at the midblock of New South Head Road in front of the main entrance to Edgecliff Station/Eastpoint Food Fair and on all approaches of the New South Head Road/Ocean Street intersection. A zebra crossing is provided on New McLean Street to facilitate pedestrian access to the building. These facilities provide a safe crossing point to and from the station and interchange facilities.

Figure 6 provides an overview of pedestrian facilities at the Edgecliff Interchange Precinct.

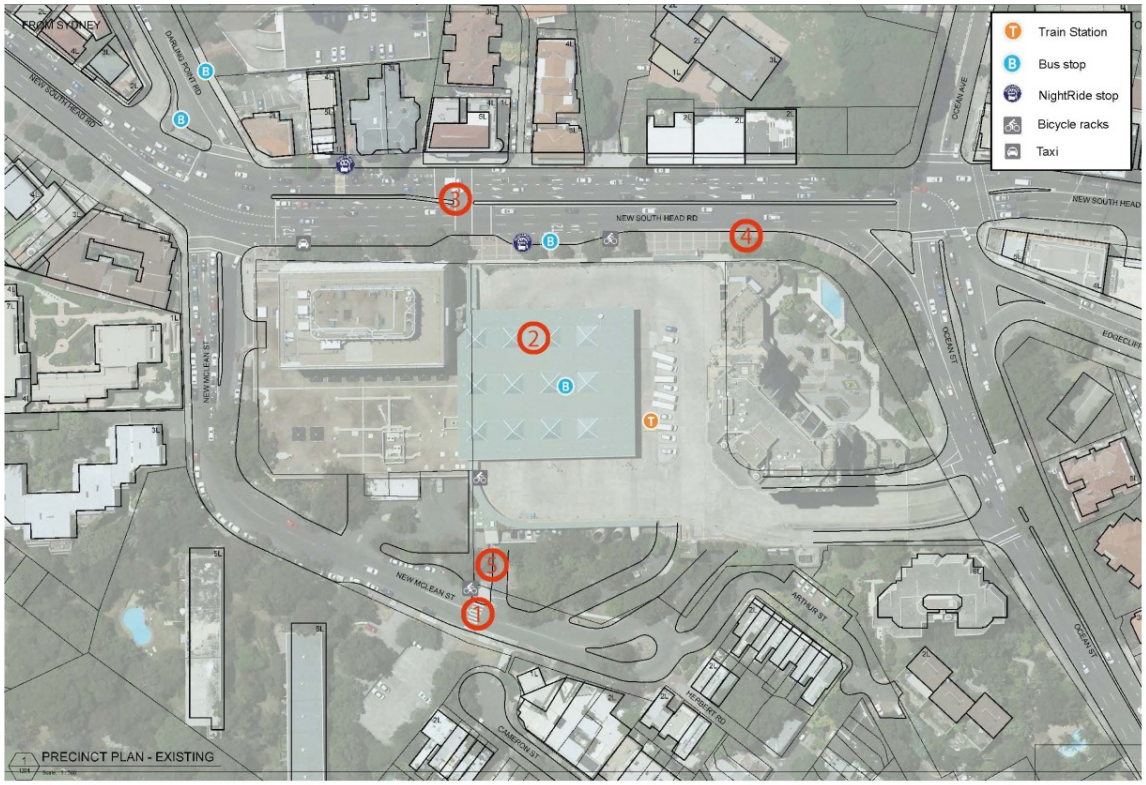
The pedestrian count undertaken by Austraffic on 29 April 2015 surveyed station platform movements during the AM and PM period. Results of the data indicated the AM peak hour pedestrian movement occurred between 7.45am and 8.45am and the PM peak hour occurred between 5.15pm and 6.15pm.

Analysis of the AM peak hour pedestrian movements at the station showed the following travel patterns:

- approximately 73 per cent of station entries originated from the New South Head Road entrance
- approximately 67 per cent of station entries opted to use the western escalator (closest escalator from ticket gate) to access the station platform
- the majority of station entries were destined for Platform 1 (train services to City)
- there was an even split of passengers using the western and eastern escalators when exiting the station platform.

Analysis of the PM peak hour pedestrian movements at the station showed the following travel patterns:

- the PM peak hour movements showed the western escalator was used more for both the entry and exit movements
- the majority of station exits were from passengers alighting from Platform 2 (train services from the City).



5. Ramp from New McLean Street to concourse

4. Footpath from New South Head Road (south)

1. Zebra crossing on New McLean Street

2. Eastern set of escalators within paid area

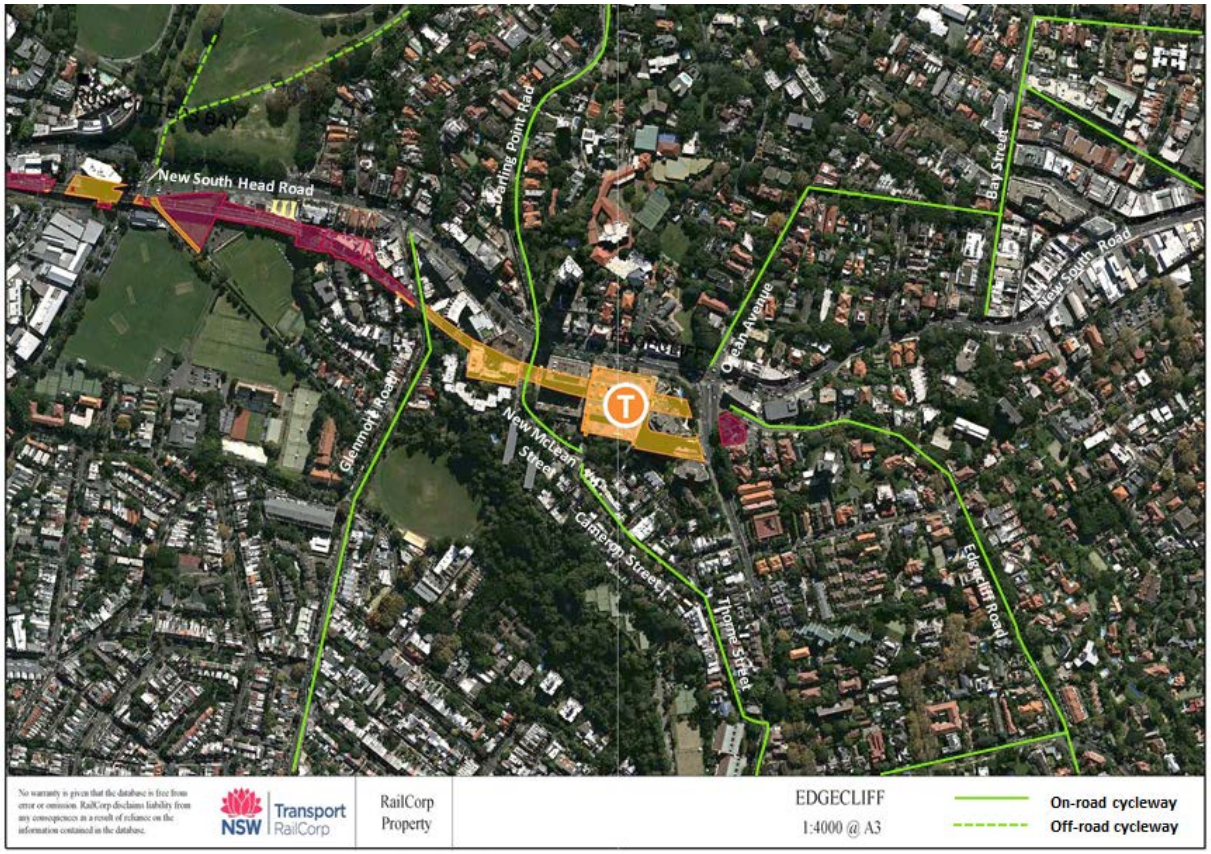
3. Signalised crossing on New South Head Road

Figure 6 Pedestrian facilities

2.6 Cycling facilities

The bicycle network within 800 metres of Edgecliff Interchange Precinct mainly comprises of on-road bicycle routes as shown in Figure 7. On-road cycle routes are currently on Edgecliff Road, Trelawney Street, Ocean Avenue, Bay Street, Darling Point Road, Glenmore Road Cooper Street, Cross Street and New McLean Street.

The on-road cycle routes on Darling Point Road, New McLean Street, Cameron Street and Thorne Street provide cyclists connections to the New McLean Street entrance of the interchange. However, there is currently limited bicycle storage facilities located near the entrance.



Source: RailCorp and TfNSW, 2014; modified by AECOM, 2015

Figure 7 Cycle routes surrounding Edgecliff Interchange Precinct

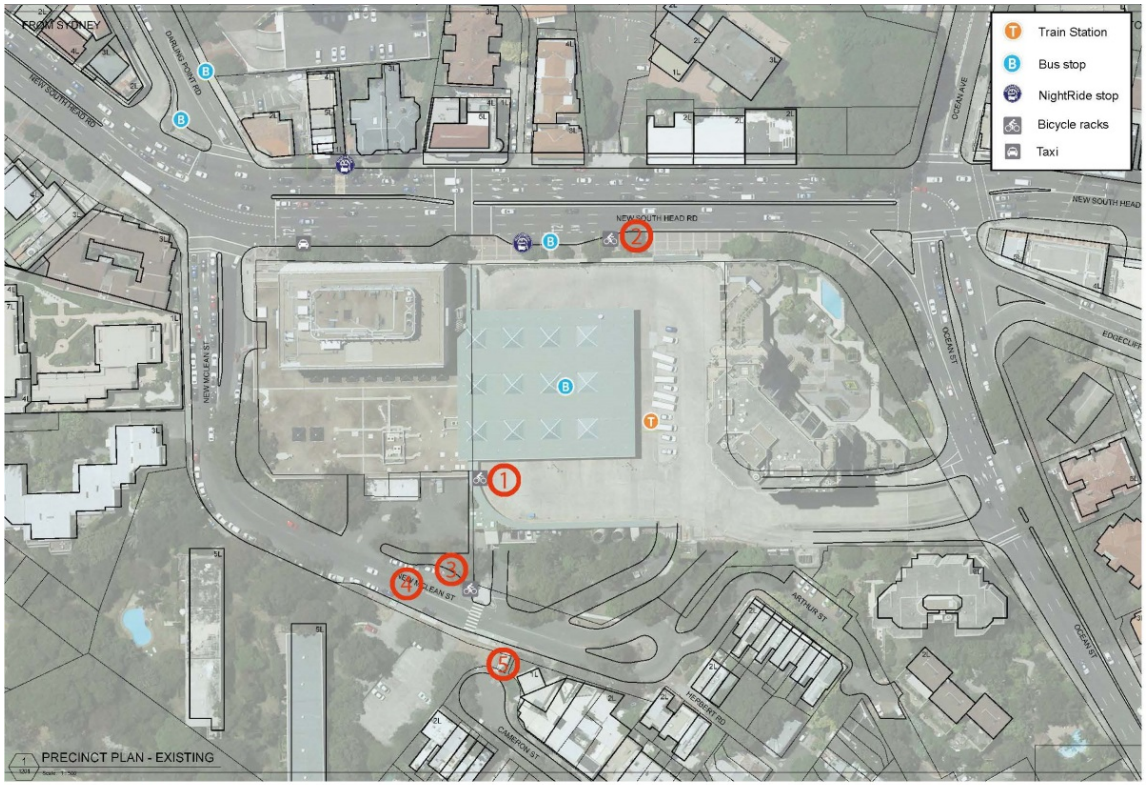
Edgecliff Interchange Precinct is classified as a Level A interchange, which requires a minimum of 50 bicycle cage spaces and 20 undercover bicycle rack spaces.

Six bicycle racks are currently present along New South Head Road and one bicycle rack located on New McLean Street which provides capacity for a total of 14 bicycles.

On the bus interchange level, a new bicycle cage has been recently installed and provides 48 bicycle spaces. As part of this project a formalised cycle path was also constructed. This path runs in a clockwise direction around the perimeter of the bus interchange, with shared vehicle/bicycle entrance/exit driveways and appropriate signage and line markings to ensure safety and guidance for cyclists accessing bike storage facilities.

An additional 12 bicycle racks are provided on the bus interchange level, which provides capacity for a total of 24 bicycles.

Figure 8 presents an overview of bicycle facilities that serve the Edgecliff Interchange Precinct.



5. Shared path between on-road cycle routes

4. On-road cycle route on New McLean Street

1. Bicycle shed within the bus interchange

2. Bicycle racks on New South Head Road (south)

3. Bicycle racks on New McLean Street (north)

Figure 8 Bicycle facilities

2.7 Bus services and facilities

Several bus routes currently stop at the Edgecliff Bus Interchange and at the bus stop located north of the main station entrance on New South Head Road. These bus routes connect residential areas to local transport interchanges, employment and retail areas. The bus routes servicing Edgecliff Interchange Precinct provide connections to Bondi Junction, Chatswood, Watsons Bay and the Sydney CBD.

Table 5 provides a summary of public bus services operating in peak periods in the bus interchange and on New South Head Road.

Table 5 Bus services frequency (mins) at Edgecliff Interchange Precinct

Route No.	Description	Frequency (mins)	
		AM peak (07:00 – 09:00)	PM peak (16:00 – 18:00)
200	Bondi Junction to Edgecliff/Chatswood†	20	20
	Chatswood/Edgecliff to Bondi Junction	20	20
323	Dover Heights to City†	30	-
	City to Dover Heights	-	30
324	Watsons Bay to City†	20	30
	City to Watsons Bay	10	20
325	Watsons Bay to City†	20	30
	City to Watsons Bay	30	30
326	Bondi Junction to City†	30	30
	City to Bondi Junction	30	30
327	Bondi Junction to City	20	30
	City to Bondi Junction	30	30
328	Darling Point to Bondi Junction	30	30
L24	Watsons Bay to City (limited stops)	20	-
N100^	Central to Bondi Junction	30	30
	Bondi Junction to Central	30	30

*Average frequency over the two hour peak, rounded to the nearest 5 minutes.

† Services stop at New South Head Road, not within the Edgecliff Bus Interchange

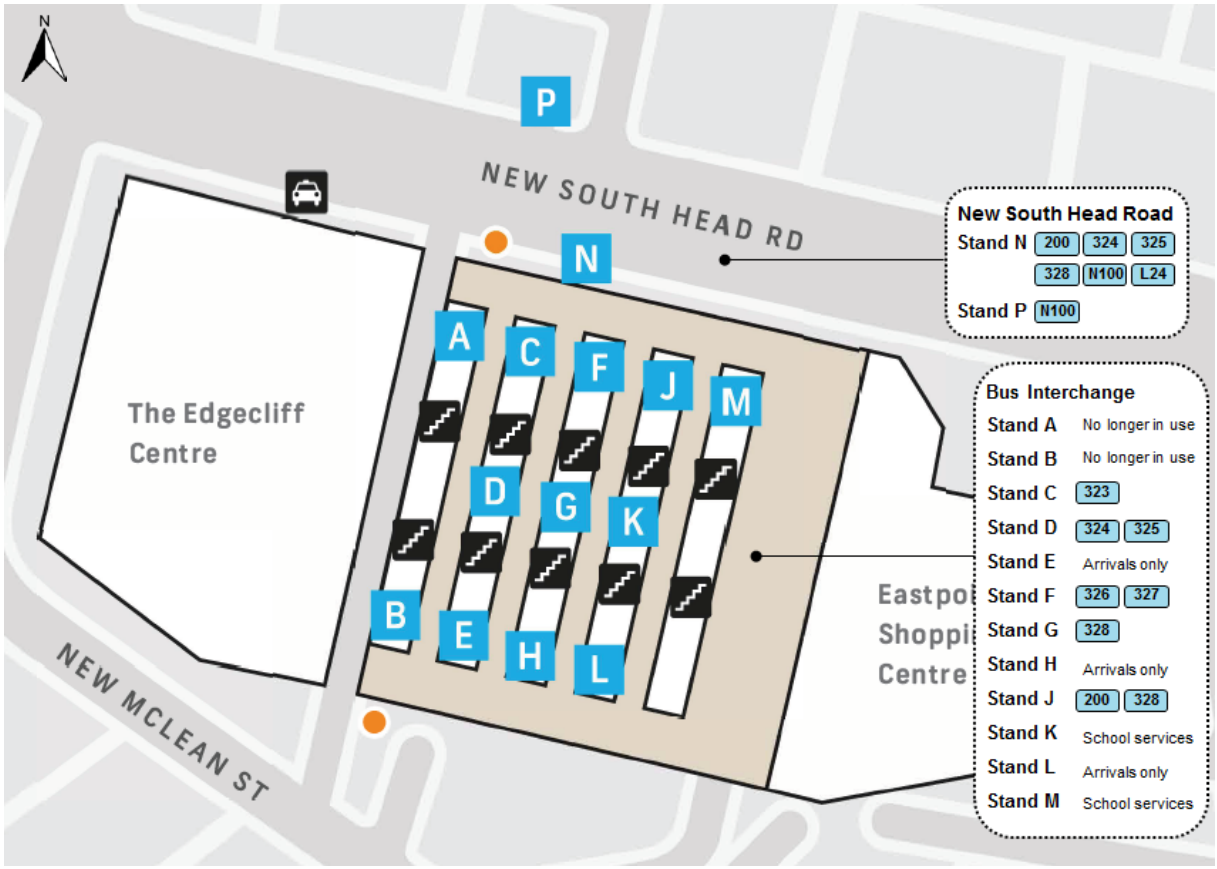
^ NightRide services, available Friday to Sunday from 12:30am to 5:30am

A number of school bus routes also operate to and from Edgecliff Bus Interchange, during the AM and PM Peak periods before and after school, including:

- 613e – to Sydney High Schools
- 673e – to Kincoppal Rose Bay
- 603e – to Rose Bay Secondary College
- 719e – to Sydney French School
- 721e – to Scots College
- 725e – to Sydney Grammar School.

In addition to the bus routes operating in the AM and PM peak periods, an off-peak NightRide route (N100) operates along New South Head Road near Edgecliff Station providing late night services between Bondi and the CBD.

The layout of the bus interchange currently provides four bus ranks, each with space for two stands and a set-down area. A summary of the bus facilities at Edgecliff is presented in Figure 9. The bus interchange also provides a parking area east of the bus ranks, which is used by local community transport groups, such as the Holdsworth Community Bus.



Note: Bus services utilising the bus stands (A & B) on the eastern bus rank would have been relocated as a result of the new bicycle path and cage which has been recently installed at the bus interchange.

Figure 9 Bus Interchange stands

2.8 Road network

The existing roads in the vicinity of the Edgecliff Interchange Precinct include New South Head Road, New McLean Street and Ocean Street, as shown in Figure 10. This section outlines the network with respect to the Edgecliff Station, providing a description of each key road.

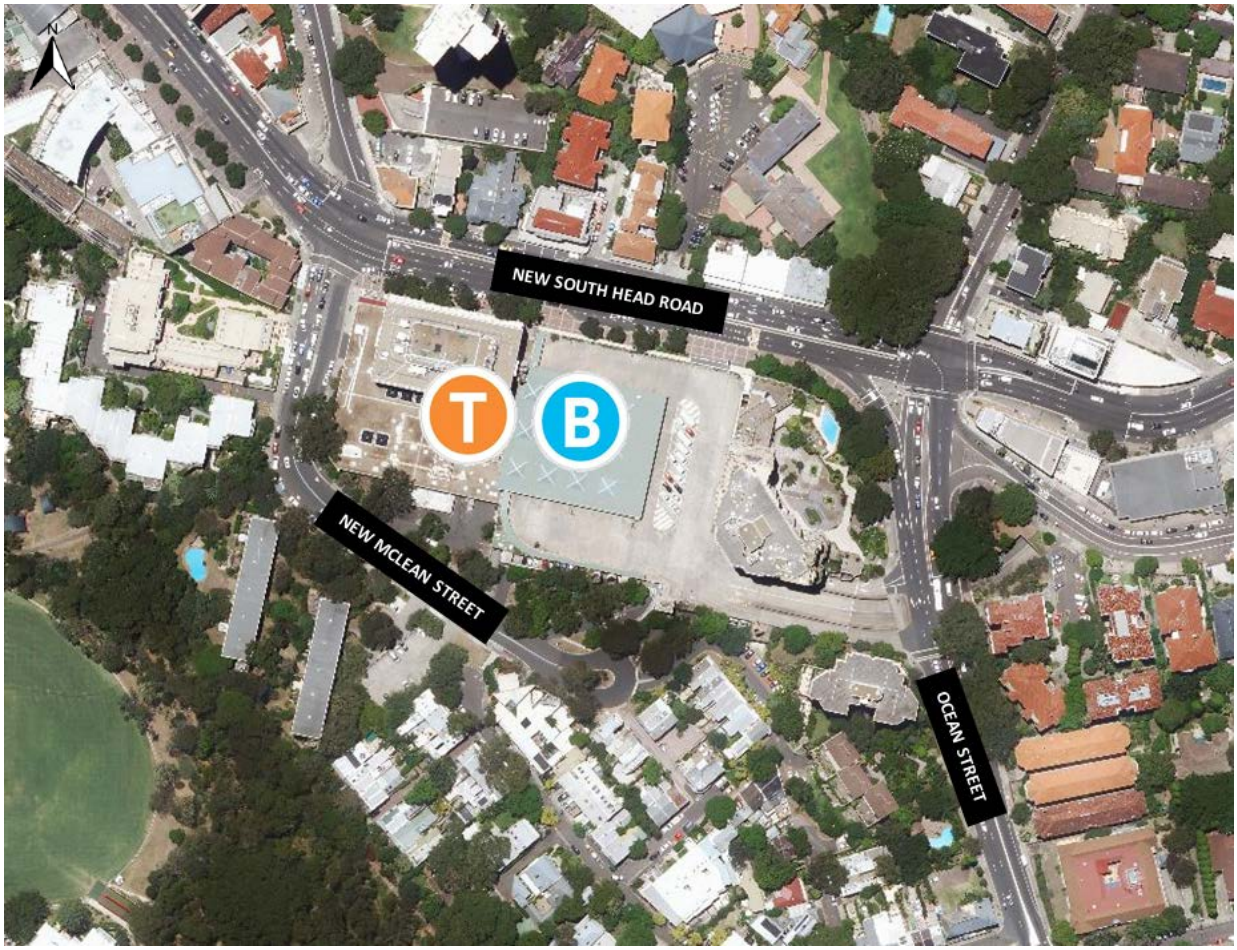


Figure 10 Road network surrounding Edgecliff Station

2.8.1 New South Head Road

New South Head Road is a classified state road aligned in an east-west direction generally with three traffic lanes in each direction for the majority of the corridor. During peak periods, clearway restrictions (T2 – transit lane) apply to the kerbside lane in the peak direction. The clearway restriction (T2 – transit lane) applies in the westbound direction during the morning peak period (6am to 10am) and eastbound direction during the afternoon peak period (3pm – 7pm).

A signalised pedestrian crossing is provided on New South Head Road at the main entrance to Edgecliff Station. An additional kerbside lane is provided in the westbound direction to cater for interchange facilities (bus zone and taxi zone) for the precinct and a 'No Stopping' zone which allows Australia Post vehicles to collect mail from the post boxes.

The posted speed limit is 60 kilometres per hour and short term kerbside parking is permitted intermittently outside of the AM and PM periods. New South Head Road is shown in Figure 11.

Figure 11 View of New South Head Road (looking westbound)

2.8.2 New McLean Street

New McLean Street is a local road running along the southern and western perimeter of Edgecliff Centre and Eastpoint Food Fair. The road provides one traffic lane and an intermittent short term kerbside parking lane in each direction. New McLean Street also provides footpaths on both sides, a zebra pedestrian crossing to access Eastpoint Food Fair, Edgecliff Centre and interchange facilities within the interchange precinct and a marked on-road cycleway. The posted speed limit is 50 kilometres per hour. New McLean Street is shown in Figure 12.

Figure 12 View of New McLean Street (looking westbound)

2.8.3 Ocean Street

Ocean Street, shown in Figure 13, is a regional road aligned in a north-south direction with one traffic lane and one parking lane in each direction for the majority of the corridor. The road widens to two traffic lanes in each direction between New South Head Road and Albert Street. Ocean Street serves as a major north-south corridor between Bondi, Edgecliff and Double Bay. The road has footpaths on either side of the road, with signalised pedestrian crossings at most signalised intersections in the corridor. The road provides buses and cyclists access to the bus interchange. The posted speed limit is 50 kilometres per hour.

Figure 13 View of Ocean Street (looking southbound)

2.9 Parking facilities

No commuter car park is provided for the interchange precinct. Parking restrictions on surrounding roads limit the opportunity for commuters to drive to the station. Paid off-street parking facilities are provided from New McLean Street for ALDI and Eastpoint Food Fair.

On-street restricted parking is provided on the surrounding local road network including New McLean Street. However, these spaces are located within the local centre and due to their time restrictions are not available exclusively to rail customers.

2.10 Kiss and ride facilities

Edgecliff Interchange Precinct currently does not provide formal signposted kiss and ride areas in the vicinity of the interchange precinct. However, kiss and ride movements are likely to occur at short-term (one hour) parking areas and have been observed to informally occur at the following locations:

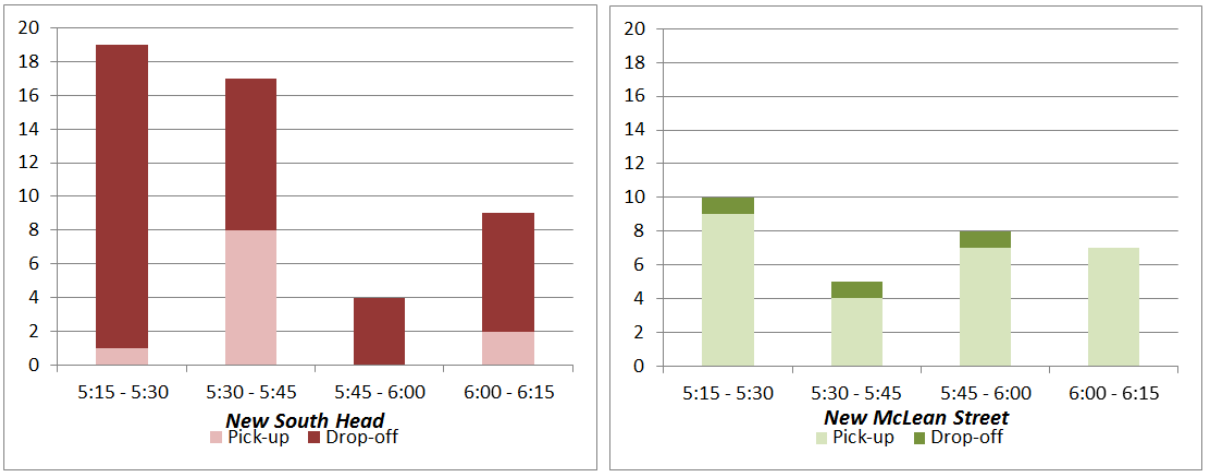
- the 'No Stopping' zones on New McLean Street and New South Head Road
- bus zones on New South Head Road
- when traffic lights are red at the signalised pedestrian crossing on New South Head Road.

Site observations were undertaken by AECOM on 19 July 2017 to gain a better understanding of kiss and ride movements surrounding the interchange precinct during the PM period. Observations took place at New South Head Road and New McLean Street between 5:15pm to 6:15pm, consistent with the PM peak hour identified for pedestrian movements at the station from Austraffic's pedestrian counts.

Figure 14 presents the kiss and ride movements (pick-up and drop-off) observed by AECOM. The following observations were made:

- **New South Head Road**
  - Mainly used to quickly drop off passengers within the bus zone. Vehicles would wait within the bus zone to also pick-up passengers, however if a bus was about to pull in, drivers would either wait at the No Stopping zone in front of the Australia Post boxes (if available) or continue driving.
  - A total of 38 drop-offs and 11 pick-ups were observed within the hour where a maximum of three vehicles dropping-off passengers were observed to occur at the same time.

- **New McLean Street:**
  - Mainly used to pick up passengers with vehicles waiting between three to 15 minutes either informally parked along No Parking and No Stopping zones or double parked at the 1P zone in front of the existing ramp at the New McLean Street entrance.
  - A total of three drop-offs and 27 pick-ups were observed within the hour where a maximum of four vehicles waiting to pick-up passengers were observed to occur at the same time.



Source: AECOM, 2017

Figure 14 Kiss and ride movements during the PM peak hour (5:15pm to 6:15pm)

2.11 Taxi facilities

A taxi zone is located along New South Head Road near the intersection with New McLean Street and provides four spaces for taxis.

Figure 15 Taxi zone on New South Head Road

2.12 Travel mode choice

Travel data obtained from the Australian Bureau of Statistics (ABS) provides an insight into the Journey to Work (JTW) characteristics of residents in Edgecliff. The Bureau of Transport Statistics derives the ABS data collected during the 2011 Census which includes method of travel to work at a travel zone level. Travel zones 537, 539 and 541 represent the immediate catchment area (within approximately 500 metres) of Edgecliff Station, with the data from these travel zones summarised in Table 6.

Table 6 Journey to work data

Access mode*	Edgecliff residents	Edgecliff residents	Greater Sydney
	Number	Percentage	Percentage
Train	700	40%	16%
Bus	65	3%	7%
Car – as driver	583	34%	61%
Car – as passenger	52	3%	5%
Walked only	236	14%	5%
Mode not stated	25	1%	2%
Other	73	4%	4%

**Excludes those who did not go to work or worked at home*

Source: JTW Explorer, Bureau of Transport Statistics, 2011

The 2011 JTW data shows that the majority of trips from Edgecliff are made by train, with approximately 40 per cent of trips attributable to this mode. Approximately 37 per cent of journey to work trips were made by car (including car drivers and passengers), which is significantly lower than the Greater Sydney average at 66 per cent. The main destinations of the JTW trips taken from Edgecliff are shown in Table 7.

Table 7 Destination of journey to work travel

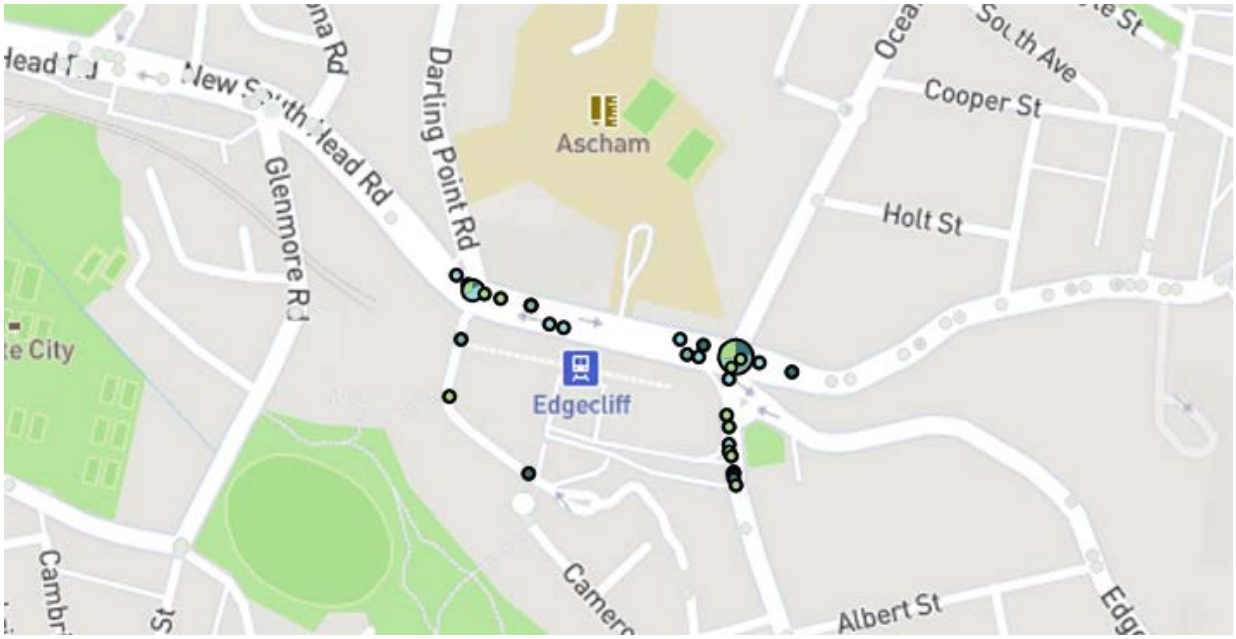
Destination of travel	Proportion
Sydney Inner City	50%
Eastern Suburbs – North	26%
North Sydney – Mosman	5%
Chatswood – Lane Cove	2%
Eastern Suburbs – South	2%

Source: Bureau of Transport Statistics, 2011

2.13 Road safety

Historical crash data was obtained from Roads and Maritime Services (Roads and Maritime) for roads in the vicinity of Edgecliff Interchange Precinct for a five year period between 2012 and 2016. The roads that were included in the analysis were: New South Head Road, Ocean Avenue, New Mclean Street and Ocean Street

A total of 58 crashes occurred on these roads over the five year period, with 37 injury crashes and zero fatal crashes. Locations of crashes on these roads have been shown in Figure 16.



Source: Roads and Maritime Services,2017

Figure 16 Crashes near Edgecliff Interchange Precinct

3 Construction activities

3.1 Overview

The construction of the Proposal would include the following activities:

- establishment of site compounds (erect fencing, site offices, amenities and plant/material storage areas)
- establishment of temporary facilities as required (e.g. temporary toilets)
- removal of vegetation
- relocation of existing ticket gate line and the addition of new ticket gates to improve pedestrian flow
- platform modifications including excavation for lift foundations and fire stair
- partial demolition of the existing platform buildings to provide two pedestrian passing bays
- construction of lift shafts including demolition of intermediate concrete slabs
- installation of lifts
- construction of fire stairs including demolition of intermediate concrete slabs
- replacement of existing escalators with new escalators
- construction of a compliant pedestrian access ramp at the New McLean Street station entrance
- construction of a kiss and ride zone on New McLean Street including shelter and seating
- construction of the new garbage store room
- provision of pedestrian crossings at the bus interchange and construction of wind breaks
- relocation of the existing bike cage at the bus interchange
- relocation and renewal of CCTV, relocation of Station Platform Indicators, installation of new fixtures, lighting, signage and hearing loops
- electrical and power supply upgrade works

3.2 Construction vehicles

In facilitating these construction activities, various plant and equipment are likely to be required. These would include a combination of:

- trucks
- bobcat
- jack hammer
- excavator
- chainsaws
- demolition saw
- cold cutting power saws
- concrete pump
- pilling rig
- concrete truck
- franna/mobile cranes
- lighting tower

- hi-rail plant (EWP / flatbed / hiab, etc)
- coring machine
- water cart
- generator
- suction trucks
- rail mounted trolly
- rail mounted elevated work platform
- vibrating roller / compaction plate
- road rail excavator
- elevated work platform
- hand tools
- concrete saws
- road forklifts
- skip trucks
- torque wrenches and impact wrenches
- hydraulic shears
- tile cutting saw
- mixer for screeding works
- forklift, pallet jacks and flatbed trucks
- concrete vibrator poker
- grinders and bar benders
- core drills
- hammer drills

Minor volumes of heavy vehicles are likely to be generated during the construction phase when transportation of concrete, equipment, preformed structures etc. is required. Construction vehicles movements are expected to include approximately one to 12 vehicles per day Monday to Saturday and between five to 20 vehicles per day during weekend possessions.

The size of vehicles used for haulage would be consistent with the access route constraints, safety and any worksite constraints. Some construction may require truck and trailer combinations or semi-trailers. Access arrangements for these vehicles would be defined in the Construction Traffic Management Plan (CTMP) prepared by the nominated Contractor during detailed design.

3.3 Working hours

Construction is expected to commence in 2018 and take around 18 months to complete. The construction staging would be further developed during the detailed design of the Proposal by the nominated Contractor in consultation with TfNSW.

Works would generally be undertaken during standard construction hours in accordance with the *Interim Construction Noise Guidelines* (Department of Environment, Climate Change and Water, 2009):

- Monday – Friday: 7am – 6pm
- Saturday: 8am – 1pm
- Sunday / Public holidays: No work.

However, it may be necessary to undertake certain works outside standard hours including night works and works during routine 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). Out of hours works would be required in some cases to minimise disruptions to customers, pedestrians, motorists, and freight movements; and to ensure the safety of railway workers and operational assets. For any out of hours works, prior approval would need to be obtained from TfNSW by the contractor and the community would need to be notified.

The construction methodology would be further developed during the detailed design of the Proposal by the nominated contractor in consultation with TfNSW.

3.4 Site hoarding

The design of hoardings for worksite compounds would be carefully considered and installed, given the high pedestrian activity levels during peak periods of the station operation. All construction hoardings would:

- comply with relevant codes and standards
- have smooth surfaces particularly for areas adjacent to footpaths to allow pedestrians to brush past without snagging
- be free of trip hazards at the base of the hoardings
- be clean and have a regular inspection of the surfaces
- have adequate lighting.

Worksite hoardings would discourage entry without approval and minimise vandalism. All access points to fenced compounds would have lockable gates and appropriate information signs would be provided at the worksites to identify the project, safety and communication protocols.

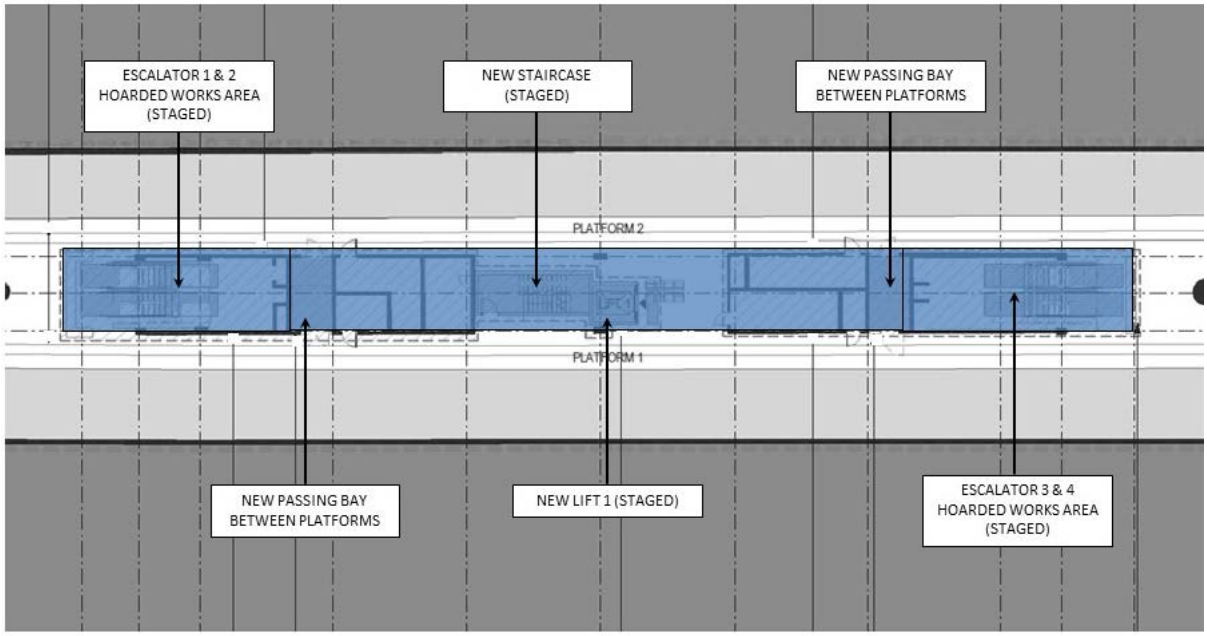
3.5 Ancillary facilities

Temporary construction compounds and worksite hoardings are required to accommodate a site office, amenities, laydown and storage area for materials. The following temporary construction compounds have been identified as storage/laydown areas:

- platform level – the area between eastern Escalators 1 & 2 and western Escalators 3 & 4, including the central Lift 1 and fire stair area
- retail car park level – the area south of enclosed motor room (subject to property agreement). The area around Lift 2 shaft will be hoarded to construct of the lift
- concourse level– the area between eastern Escalators 1 & 2 and western Escalators 3 & 4 including the central Lift 1 area. The area around Lift 2 will be hoarded to construct the lift
- gallery level – the area around Lift 2 will be hoarded to construct the lift
- bus interchange level – the area located south of the existing bicycle shed will be utilised as a construction compound and storage area. The area around Lift 2 will be hoarded to construct the lift, while the area around the relocated bicycle shed will be hoarded during its construction
- New McLean Street – the area south of the existing New McLean Street ramp will be utilised as a construction compound and storage area.

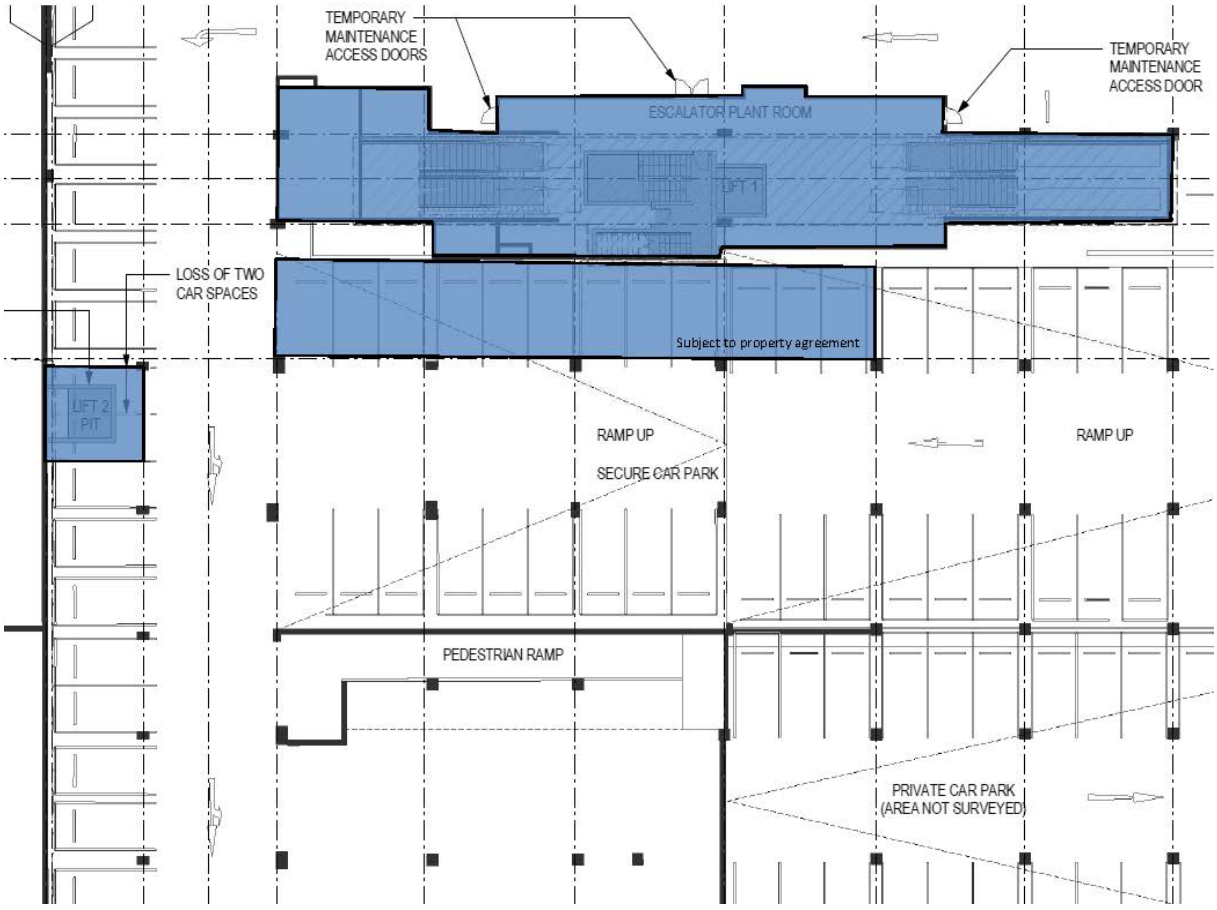
The final location of temporary construction compounds would be confirmed during detailed design when the construction methodology is further developed by the contractor in consultation with TfNSW and affected stakeholders.

Figure 17 to Figure 22 presents the areas nominated for construction compounds highlighted in blue.



Source: TfNSW, 2017

Figure 17 Platform level – site compound locations



Source: TfNSW, 2017

Figure 18 Retail car park level – site compound and construction hoarding locations

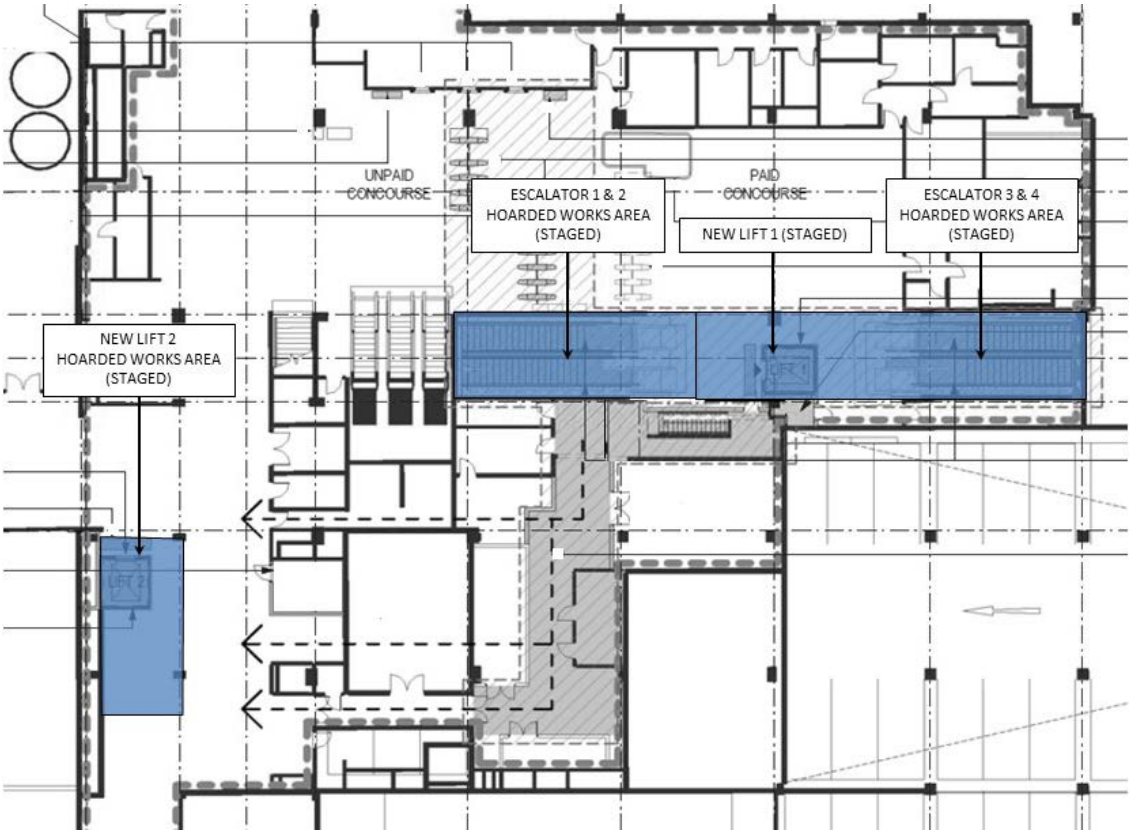
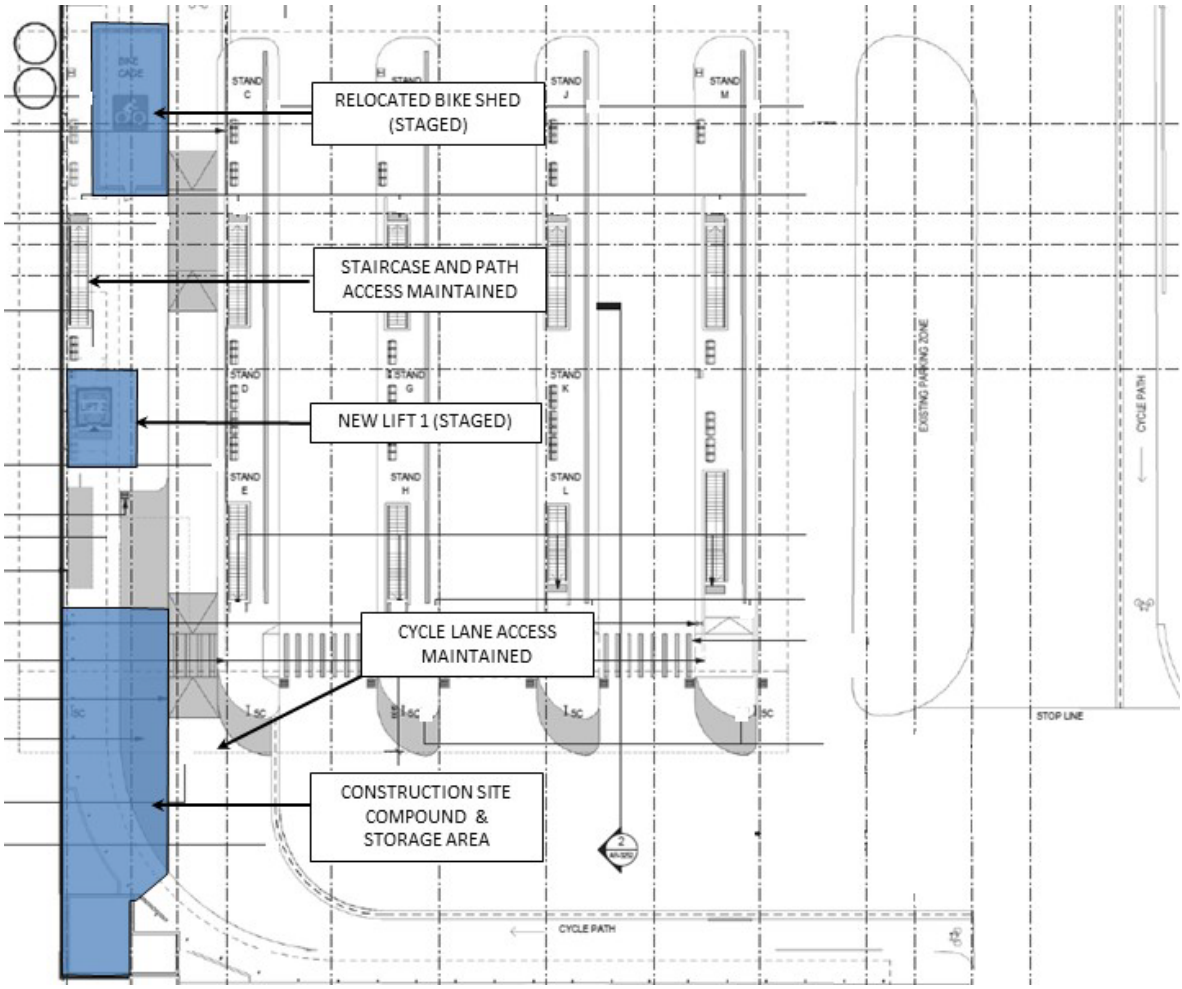


Figure 19 Concourse level – site compound and construction hoarding locations

Source: TfNSW, 2017

Figure 20 Gallery level – construction hoarding location



Source: TfNSW, 2017

Figure 21 Bus interchange level – site compound and construction hoarding locations

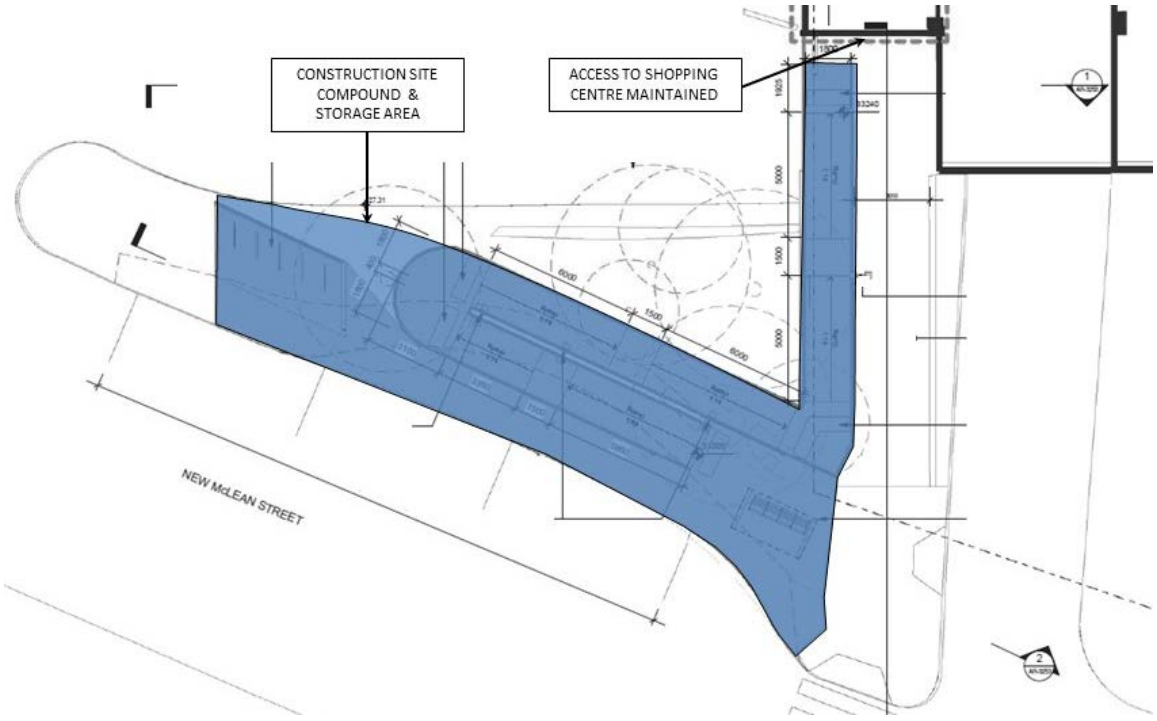


Figure 22 New McLean Street – site compound location

3.6 Construction vehicle routes

Figure 23 shows the potential access routes to the station, as well as Roads and Maritime approved B-double routes nearby. The routes provide a connection between the site and the Roads and Maritime approved routes, and have been identified as having appropriate widths to allow for temporary use as a haulage route. As shown in Figure 23, the nearest approved B-double routes accessible are Anzac Parade and Driver Avenue.

These approved B-double roads would have sufficient road widths to accommodate larger vehicles, making them ideal for the haulage routes, however they are subject to sign-posted restrictions.

Heavy vehicle movements close to the Edgecliff Local Centre and schools would be restricted during peak times and school zone hours.

Figure 23 Proposed haulage routes (indicative only, subject to detailed design)

Approved routes for 4.6 metre high vehicles are present south of the Cleveland Street intersection with Anzac Parade. As a result, it is anticipated that vehicles with heights of 4.6 metres or greater would travel via Driver Avenue to avoid potential issues with height restrictions.

3.7 Site security, site access and signage

Access to work areas would consider:

- public safety
- safety of construction workers and equipment
- impact on local communities in terms of safety, noise and road damage
- ease of access for emergency vehicles
- site security, particularly outside work hours.

3.8 Worker induction

All workers and sub-contractors engaged during the construction phase would be inducted prior to commencement of works. The induction would identify the construction haulage routes, local speed zones, worksite protocols, staff parking facilities, public transport availability, carpooling opportunities and emergency/incident management strategies. Workers would be encouraged to catch public transport to the site where possible or park away from the station during the works, particularly during normal access times (i.e. outside of rail possession / closures).

3.9 Temporary diversions

A section of New McLean Street (close to the existing ramp and pedestrian crossing) may be temporarily closed for access or operations and would be diverted from two lanes to one lane during construction activities. These works would likely be undertaken outside of peak periods or during rail shutdowns and would be managed with appropriate signage and traffic control to guide vehicles.

Temporary diversions would be confirmed during detailed design. The potential locations of temporary diversions would be identified in the CTMP and the appropriate Road Occupancy Licences would be sought as required.

4 Construction impacts

4.1 Public transport

At the bus interchange level, construction activities include the installation of Lift 2 and other pedestrian facilities. Bus services and customers using this bus interchange would be impacted during construction.

For the period of construction, a storage compound is required at the bus interchange level to facilitate construction of the proposed upgrades and unloading of construction material.

To avoid closing the bus interchange, temporary bus diversions are likely to occur during the staged construction of the pedestrian crossings. This would require one bus rank, lane and associated bus stands within the bus interchange to be closed to complete the associated construction works before moving onto the next bus rank.

During construction, key impacts on bus operations at the bus interchange level would include:

- potential congestion at the bus interchange due to the reduced operational and circulation areas for buses and passenger pick-up and set-down
- confusion among bus customers as a result of relocation of bus stands and access arrangements
- conflicts between buses and construction related vehicles accessing the compound site on the bus interchange level.

Any diversions or changes to bus services, or temporary relocation of bus stops, would be undertaken in consultation with bus service operators and would be adequately sign-posted with appropriate community notification of any changes, to ensure that bus passengers are fully informed of these changes. This would include advance notification via signage, web updates and other communication channels.

Train services are expected to operate during construction, continuing to provide services to rail customers. Should construction work require the interruption of train services outside of scheduled rail shutdown periods, the nominated Contractor would need to consult with TfNSW. Appropriate community notification of any changes would be required to ensure that rail passengers are fully informed of these changes.

4.2 Pedestrians and cyclists

Pedestrian and cyclist access through the precinct would be maintained throughout construction where possible. Where works are carried out that may potentially disrupt the existing pedestrian facilities, appropriate signs or traffic controllers would be positioned to notify pedestrians of the temporary arrangements.

Proposed works that may cause temporary disruptions to the existing pedestrian facilities surrounding the station have the potential for increased safety risks for pedestrians, due to potential interactions with construction vehicles. As a result, there may be minor diversions in these locations that would be appropriately signposted to notify pedestrians of the temporary arrangements. Any interaction between construction vehicles and pedestrians and cyclists would be managed and controlled by traffic controllers. Impacts to pedestrians during construction would be managed through the development of a CTMP.

Pedestrian movements along the station platform would be impacted during construction of Lift 1, the staged replacement of the escalators and the construction of the fire stairs at platform level due to the reduced amount of space on the platform and from construction ancillary facilities and hoardings. The reduced space on the platform may increase pedestrian congestion and reduce the amount of standing area for customers. The replacement of the escalators would temporarily increase the walking distances for rail customers along the

platform, requiring pedestrians to walk to the other set of escalators or the new lift which will be operational. Appropriate signage would be provided to mitigate any potential impacts to pedestrian movements on the platform.

The relocation of the existing ticket gate line would impact the pedestrian flow between the paid and unpaid concourse. Where possible, the new ticket gates would be constructed before the removal of existing ticket gates to maintain facilities for pedestrians with minimal interruption.

During construction works, the marked on-road bicycle lane close to the New McLean Street entrance may need to be closed temporarily to facilitate the installation of a compliant access ramp and other construction activities. Cyclists would still be able to use New McLean Street to link to other nearby cycle routes. No diversion is expected as New McLean Street would still continue to operate as an on-road cycle route.

During the construction of the lifts, a work zone would need to be established on each level the lifts pass through which would temporarily impact pedestrian movements within the vicinity of these areas. This would result in the pedestrian circulation space being reduced on the platform, concourse (paid and unpaid) and gallery level.

The proposed site compound on the bus interchange level would require the northern stairs to be closed off and would provide a single lane for cyclists to egress from the bicycle cage located at bus interchange level. The closure of the stairs would require pedestrians and cyclists to use other available stairs. The amount of pedestrians and cyclists likely to be impacted are expected to be minimal given the southern stairs are to be kept open during construction.

The bicycle cage is proposed to be relocated to the opposite side of the proposed new Lift 2 at the bus interchange level prior to the removal of the existing bicycle cage. As such it is not anticipated to impact the availability of bicycle storage facilities for the interchange precinct.

Mitigation measures would be subject to further consideration during detailed design and construction planning in consultation with the relevant authorities. The community would be appropriately notified about changes to pedestrian and cyclist access during construction of the Proposal. All construction sites would be made safe and secure.

4.3 Kiss and ride / taxi

There is currently no formal kiss and ride zones provided near the Edgecliff Interchange Precinct. However, it has been observed that informal kiss and ride activity occurs near the precinct entrances at New South Head Road and New McLean Street. The temporary diversion on New McLean Street entrance during construction may impact the informal kiss and ride activity at this location, which may relocate to New South Head Road. This would impact the operation of the kerbside lane of New South Head Road in proximity to the interchange precinct, in particularly in the westbound direction. This impact would be considered minor due to the temporary nature of the construction works and the informal nature of the existing kiss and ride activity.

There would be no impact to the taxis with the taxi zone remaining accessible during construction of the Proposal.

4.4 Traffic

A quantitative construction traffic impact assessment has not been undertaken as details would be confirmed during detailed design. It is recommended that a detailed construction impact assessment be undertaken when further construction details, including access locations and staging are known as part of the CTMP.

Construction of the Proposal would result in a minor temporary increase in traffic as a result of the following:

- delivery of construction materials
- delivery and removal of construction equipment and machinery
- movement of construction personnel.

Traffic generated by construction vehicles, including staff vehicles, is likely to be minimal given the nature of the works proposed and would fluctuate dependant on the construction stage. Construction workers would be encouraged to use public transport to travel to and from the site.

Minor volumes of heavy vehicles are likely to be generated during the construction phase when transportation of concrete, equipment, preformed structures etc. is required. Construction vehicles movements are expected to include approximately one to 12 vehicles per day Monday to Saturday and between five to 20 vehicles per day during weekend possessions. There may be localised impacts at construction access points including minor delays to local traffic on New McLean Street, New South Head Road and Ocean Street as construction vehicles enter and exit the site compounds.

Heavy vehicles would be restricted to non-peak periods and rail possessions where possible to minimise disruptions to traffic. It may also be necessary to undertake other construction activities, such as concrete pours and delivery of oversized materials, outside standard construction hours to minimise traffic disruption. It has also been identified that construction materials could be delivered by hi-rail vehicles (a vehicle that can operate both on rail tracks and a road), which would minimise the construction impact on traffic.

Construction activities would require temporary partial lane closures and/or traffic diversions at a section of New McLean Street, which would require a Road Occupancy Licence. This closure would result in impacts to vehicles accessing the retail and residential car parks located nearby. Temporary diversions would be determined during detailed design and would be managed with appropriate signage and traffic control, to direct vehicles along the diversion.

Overall, provided the proposed traffic management measures are implemented, the likely impact to traffic during construction is expected to be manageable and would have a minor temporary impact on the level of service of the surrounding road network.

4.5 Parking

The operation of a number of on-street and off-street parking facilities would be affected during the construction of the Proposal. Key parking areas likely to be impacted include:

- Up to two car parking spaces within the retail car park for the work zone proposed for Lift 2
- Up to five short term parking spaces (1P) on New Mc Lean Street for the purpose of a site compound as well as construction of the kiss and ride spaces and a compliant ramp.

The use of these spaces would result in a temporary loss of on-street and off-street parking during construction, which would have a minor increase in the demand for parking within the local network in the short term.

The impact on parking demand for retail would need to be discussed and Stakeholder consultation would be undertaken during detailed design with Eastpoint Food Fair to manage potential impacts on retail parking.

Parking provisions are not proposed for staff vehicles within or adjacent to the construction site, instead construction workers would be encouraged to car-pool or use adjacent public transport services. However, it is expected a portion of workers would travel via private vehicles, which may also marginally increase the demand for on-street parking within the surrounding local streets. The CTMP would be prepared to manage the impacts of construction traffic parking.

4.6 Property access

During construction, there is potential for temporary disruptions to access for residents and businesses along New McLean Street including Eastpoint Food Fair and Edgecliff Centre. However, property access would be maintained at all times, and any impacts would be short-term. Should the detailed design and construction staging of the Proposal identify impacts to residents and businesses, affected occupants would be consulted and notified in advance of the scheduled works. Access to all properties would be maintained during construction unless agreed with the property owner/s in advance.

4.7 Emergency vehicle access

Access for emergency vehicles would be maintained at the construction sites in accordance with emergency vehicle requirements. Emergency services would be advised of all planned changes to traffic arrangements prior to applying the changes. Advice would include information about upcoming traffic disruptions, anticipated delays to traffic, extended times of work and locations of any road possessions.

5 Operational impacts

The Bureau of Transport Statistics has provided patronage forecasts for Edgecliff Station based on its Strategic Travel Model. It is forecast that expected patronage will increase to about 17,190 trips daily by 2036. For design assessment purposes, an additional 15 per cent has been used to account for the trips expected to be generated due to improvements in facilities as part of the proposed upgrades. Patronage forecasts are provided in Table 8.

Table 8 Patronage forecasts

Year	AM peak hour entries[2]	AM peak hour exits[2]
2021	3,346	1,941
2036	3,557	2,196
2036 (+15%)[1]	4,091	2,525

Notes:

1 - an additional 15% has been added to the forecast years for design assessment purposes.

2 – peak hour - 6 am to 9:30am.

Source: Bureau of Transport Statistics and TfNSW, 2016

The Proposal has been designed to account for the predicted patronage forecasts. Detailed design would consider future patronage demands as part of the design considerations.

5.1 Public transport

The Proposal does not include changes to existing bus/rail services as part of the works and would not impact on the operation (service operation or timetabling) of public transport in the vicinity of Edgecliff Station.

The Proposal includes improved interchange facilities and pedestrian access to Edgecliff Station, which may increase rail patronage. It is anticipated that the additional rail patronage would mainly generate walking trips. However, with improved accessibility to Edgecliff Interchange Precinct, it is anticipated that the provision of formal kiss and ride facilities would be used by the community in and around the precinct.

The provision of pedestrian crossings between bus ranks at the bus interchange would result in some additional delays to buses as they give way to pedestrian movements between the bus ranks. It is anticipated the pedestrian crossing would have minimal impact to the operation of the bus interchange. However bus operators would need to be consulted as the pedestrian crossing impacts on the existing set-down area.

5.2 Pedestrians

The Proposal would improve facilities and offer significant benefits to pedestrians, including:

- installation of two new lifts to provide an accessible path of travel between the paid concourse level and station platform (Lift 1) and unpaid concourse level and bus interchange (Lift 2)
- installation of pedestrian crossings at the bus interchange
- upgrades to the New McLean Station entrance with the provision of a compliant pedestrian access ramp
- provision of Tactile Ground Surface Indicators throughout the concourse, platform and bus interchange

- improved wayfinding signage.

The Proposal includes upgrades that would improve pedestrian facilities and offer significant benefits to pedestrians. This would improve the user experience in the vicinity of the station and has the potential to encourage more customers to walk to the station.

5.3 Cyclists

Edgecliff Interchange Precinct is classified as a Level A interchange, which requires a minimum of 50 bicycle cage spaces and 20 undercover bicycle rack spaces (a total of 70 spaces)[1].

At present Edgecliff Interchange Precinct provides:

- six bicycle racks (12 bicycle spaces) on New South Head Road,
- a bicycle cage which provides 48 bicycle spaces at the bus interchange
- 12 bicycle racks (24 bicycle spaces) at the bus interchange
- one bicycle rack (2 bicycle spaces) on New McLean Street

The Proposal includes:

- replacement of the one bicycle rack (2 bicycle spaces) on New McLean Street with five bicycle racks (10 bicycle spaces)
- relocation of the bicycle cage (48 bicycle spaces) within the bus interchange to improve pedestrian movements between proposed Lift 2 and the bus ranks
- retention of the 24 bicycle spaces at the bus interchange
- retention of the 12 bicycle spaces on New South Head Road.

In total, there would be capacity for 94 bicycles, which meets the storage requirements of 70 bicycle spaces for the interchange precinct. This meets the objectives of the NSW Government's Bike and Ride initiative as identified in *Sydney's Cycling Future*, which encourages improved cycling facilities at transport interchanges and better integrating bicycle riding with other modes of transport.

The provision of a kiss and ride zone and compliant pedestrian access ramp at New McLean Street would result in the removal of the on-street cycle lane near the pedestrian crossing, however New McLean Street would still function as an on-street cycle route.

The introduction of additional bicycle storage facilities in the vicinity of the station is likely to encourage active transport as a mode of access to the station precinct.

5.4 Kiss and ride / taxi

The Proposal would address the lack of formal kiss and ride facilities within the interchange precinct through the provision of up to four kiss and ride spaces on New McLean Street within the existing short term parking zone near the station entrance. This requires realigning the indented kerb to accommodate the compliant ramp, which impacts on the marked on-road cycle lane.

The Proposal does not impact on the operation of the existing taxi rank on New South Head Road.

[1] Bicycle Demand at Interchange Locations 1.4, TfNSW, 2015

5.5 Parking

The Proposal would permanently remove two retail car parking spaces for the lift pit of Lift 2. The proposed kiss and ride zone on New McLean Street would result in the loss of approximately five short term (1P) on-street parking.

This loss would have a minor impact on the Edgecliff Local Centre. It is considered that the positive impacts arising from improved accessibility and upgraded facilities at Edgecliff Station would outweigh the potential negative impacts associated with the loss of short term timed parking spaces within the precinct.

5.6 Traffic

The Proposal would assist in making public transport infrastructure more accessible to public transport customers and in providing a seamless transition between transport modes, which would likely increase patronage. It is anticipated that the additional public transport patronage would mainly generate walking trips to the station (rather than additional traffic) and the improved kiss and ride facilities would provide formal areas for customer drop-off (reducing illegal drop-offs that currently impede road traffic movements).

No commuter parking is proposed as part of the Proposal, therefore the increase in future road traffic is expected to be minimal and it is considered that the Proposal would have a negligible impact on traffic in the local road network.

5.7 Property access

The Proposal would not result in changes to private property access.

6 Recommendations

Mitigation measures provided in this section would be implemented to minimise traffic, transport and access impacts during construction and operation of the Proposal.

6.1 Construction Traffic Management Plan

Prior to the commencement of construction, a Construction Traffic Management Plan (CTMP) would be prepared as part of the Construction Environmental Management Plan (CEMP) and would include at a minimum:

- identifying traffic management requirements during construction
- maximising safety and accessibility for pedestrians and cyclists
- maintaining public access to public transport services
- ensuring adequate sight lines to allow for safe entry and exit from the site
- ensuring that disruptions to traffic flows on public streets are minimised and, where unavoidable, managed in consultation with the relevant roads authority
- ensuring construction vehicle movements can be accommodated in and out of the construction sites with swept paths being conducted to ensure the largest required vehicle can access the construction 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
- managing impacts to other modes of public transport, including consultation with the State Transit Authority and private bus companies
- how staff travel to and from the site, including strategies to minimise impacts to traffic and parking locations for construction workers away from stations during normal access and busy residential areas during rail shutdowns 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
- assessing suitability of local roads providing access to the proposed compound sites
- 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 CTMP. This is 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
- where practicable, avoid delivery of construction material during peak commuter travel periods and school drop off/pick up times.

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.

6.2 Mitigation measures

The following additional mitigation measures are recommended to minimise traffic, transport and access impacts:

- works would be undertaken during scheduled rail shutdowns where feasible to minimise access, traffic and transport impacts
- undertake a construction traffic impact assessment as part of the CTMP
- ensure public safety by providing appropriate measures during construction, such as the use of traffic controllers, signposting and temporary fencing/hoarding
- communication would be provided to the community, businesses and local residents to inform them of changes to rail services, parking, pedestrian access and/or traffic conditions including vehicle movements and anticipated effects on the local road network relating to site works
- Road Occupancy Licences for temporary road closures would be obtained, where required
- station interchange facilities including bicycle racks and taxi ranks would be kept operational, or relocated during the construction works.

7 References

AECOM, 2015, *Edgecliff Station Precinct – Accessibility Upgrade – Concept Plan Project*

AECOM, 2017, *Edgecliff Station Precinct – Accessibility Upgrade – Concept Plan Project*

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