NSW GOVERNMENT

Redfern Station Upgrade – New Southern Concourse

Technical report 3 - Traffic, transport and access

Artist's impression of the proposed Redfern Station Upgrade - New Southern Concourse. Indicative only, subject to detailed design.

Transport for NSW | May 2020

Redfern Station Upgrade - New Southern Concourse

Technical report - Traffic, transport and access

Client: Transport for NSW

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Terms and abbreviations

Term	Meaning
AADT	Average Annual Daily Traffic
AS	Australian Standards
CBD	Central Business District
CCTV	Closed-circuit television
CEMF	Construction Environmental Management Framework
CTMP	Construction Traffic Management Plan
DDA	*Disability Discrimination Act 1992*
DPIE	NSW Department of Planning, Industry and Environment
DSAPT	*Disability Standards for Accessible Public Transport (2002)*
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
Kiss and ride	A facility designed to allow commuters either to be dropped off by car and complete their journey by public transport or to be picked up by car after alighting at a public transport facility.
km	Kilometres
km/h	Kilometres per hour
LGA	Local Government Area
m	Metres
NSW	New South Wales
OEMP	Operational Environmental Management Plan
Opal card	The integrated ticketing smartcard introduced by Transport for New South Wales.
Rail possession	Possession is the term used by railway building/maintenance contractors to indicate that they have taken possession of the track (usually one section of track) for a specified period, so that no trains operate for a specified time. This is necessary to ensure the safety of workers and rail users.
ROL	Road Occupancy Licence
SEARs	Secretary's Environmental Assessment Requirements
TAP	Transport Access Program – an initiative of Transport for NSW to provide a better experience for transport customers by delivering accessible, modern, secure and integrated transport infrastructure.
TfNSW	Transport for NSW
TGSI	Tactile ground surface indicators

Executive Summary

Transport for NSW (TfNSW), the lead agency for the integrated delivery of public transport services across all modes of transport in NSW, and is seeking approval to construct and operate an upgrade of Redfern Station (Redfern Station Upgrade – New Southern Concourse) ('the Project'), as a component of the Transport Access Program (TAP). TAP is a NSW Government initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure across NSW.

The Project involves the construction of a new pedestrian concourse to the south of the existing Lawson Street concourse providing both lift and stair access to the existing surface platforms (Platforms 1 to 10). The new pedestrian concourse would provide a new connection across the railway corridor, extending between Little Eveleigh Street and Marian Street in the suburbs of Redfern and Eveleigh and include associated public transport customer upgrades such as new station entrances at Marian Street and at Little Eveleigh Street.

To ensure that the station continues to function in an integrated and holistic manner, the Project also includes upgrades to integrated transport interchange facilities surrounding Redfern Station. These include:

- formalisation of a shared zone on Little Eveleigh Street, including safety improvements to vehicle, cyclist and pedestrian interactions, relocation of on-street parking spaces to a new off-street carpark at the end of Little Eveleigh Street
- upgrade of Marian Street/Cornwallis Street/Rosehill Street area, including an extension to the existing shared zone to include part of Rosehill Street and safety improvements to vehicle, cyclist and pedestrian interactions including footpath widening
- relocation of the existing shuttle bus zone from Little Eveleigh Street to Lawson Street
- kiss and ride on Lawson Street and associated footpath upgrade
- kiss and ride on Gibbons Street, and associated footpath upgrade
- footpath widening on Ivy Street.

The Project would provide safe and equitable access to the platforms and the surrounding pedestrian network along with generally improving customer facilities, amenity and safety. The improvements would in turn assist in supporting the growth in public transport use and would provide an improved customer experience for existing and future users of Redfern Station.

This technical report (Traffic, transport and access), is one of a number of technical documents that form part of the Redfern Station Upgrade Environmental Impact Statement (EIS). This assessment addresses the relevant Secretary's Environmental Assessment Requirements (SEARs), aiming to identify potential impacts of the Project and to outline performance outcomes and mitigation measures relating to traffic, transport and access during detailed design, construction and operation of the Project.

Existing traffic and transport environment

Redfern Station is located in the suburb of Redfern, approximately three kilometres south of the Sydney central business district (CBD), within the City of Sydney Local Government Area (LGA). It is well served by the Sydney Trains network with a number of suburban and intercity services stopping at Redfern Station. The land use surrounding Redfern Station consists of residential areas (low to high density) and mixed-use centres.

The road network immediately surrounding Redfern Station includes Gibbons Street, Lawson Street, Little Eveleigh Street, Ivy Street, Ivy Lane, the Marian Street/Cornwallis Street/Rosehill Street loop and Wilson Street. These are local roads except for Gibbons Street which is a State road.

More than 300 train services stop at Redfern Station during the 2-hour morning and afternoon peak periods. Over an entire day, the station services more than 62,000 train customers.

The two main station entrances are located at the northern end of the station, at Lawson Street and the corner of Gibbons Street and Lawson Street. Both station entrances are linked by a concourse

which provides access to the station platforms. Redfern Station has 12 platforms with Platforms 1 to 10 located above ground and Platforms 11 and12 located underground. Redfern Station does not currently meet key requirements of the *Disability Standards for Accessible Public Transport (2002)* (DSAPT).

Impacts during construction

It is anticipated that the Project would be constructed over an approximate period of 18 months commencing late 2020/early 2021, once necessary approvals are obtained. Individual construction stages may occur concurrently as construction progresses. Construction would be generally undertaken within standard working hours, however work outside of these hours would be required (up to 24 hours a day in some cases).

Impacts during the Project's construction are likely to occur for pedestrians/cyclists along the Marian Street/Cornwallis Street/Rosehill Street loop and Little Eveleigh Street during the construction of the shared zones on these streets, with alternative access arrangements and diversions required. There are likely to be further impacts to pedestrians during footpath works along Ivy Street, Lawson Street and Gibbons Street, which may require footpath diversions.

The construction of the Project would require temporary periodic closure of the railway. However minor impacts are expected as the works over the railway would be undertaken largely during scheduled rail possessions and during the daily station shutdown periods (i.e. between the last and first train service of the day). The customer experience on the platforms may be temporarily impacted due to the reduced amount of space resulting from construction work, particularly to allow for the construction of lift areas and stairway landings and the construction of the concourse columns.

The Project would result in the relocation of the shuttle bus zone on Little Eveleigh Street to Lawson Street. This relocation would not significantly increase the distance pedestrians would need to travel to the station, given its proximity to the existing bus stop. The relocated bus zone would provide a more direct route for buses and would not entail the turnaround time currently required when buses pull into Little Eveleigh Street.

Taxi facilities would not be impacted during construction. New formal kiss and ride facilities would be provided as part of the Project. There would be a loss of on-street parking on Marian Street, Rosehill Street, Little Eveleigh Street, Ivy Street, Gibbons Street and Lawson Street due to construction works, however there is alternative existing on-street parking provision within 400-metres of the streets where the parking would be lost.

A new 20-space car park at the western end of Little Eveleigh Street would be constructed prior to the construction of the shared zone on Little Eveleigh Street. This would replace 18 residential on-street parking spaces, one disabled parking space and one car-share space that would be removed for the new shared zone along Little Eveleigh Street.

The expected peak volume of construction vehicles of 20 heavy vehicles and 40 light vehicles per day would create negligible traffic impacts on the key regional access routes, given that this traffic from the Project would result in a small percentage increase in traffic volumes for the key routes. There are likely to be partial road closures at Little Eveleigh Street and Marian Street to construct the shared zones, however as these roads provide mainly local access (which would be maintained throughout the construction phase), it is not likely that there would be significant impacts on network performance as a result of these closures.

Impacts during operation

Redfern Station has been designed to integrate with other transport modes. The upgrade of the station entrances at Little Eveleigh Street and Marian Street and the establishment of new shared zones at these locations would enhance the customer experience, specifically pedestrians and cyclists and encourage walking and cycling as an alternative mode of transport. The formalisation and provision of new kiss and ride facilities at Lawson Street and Gibbons Street and the relocation of the shuttle bus zone optimises the station operation through integrating multiple modes of transport, with footpath and pavement upgrades proposed linking these modes to the station.

Environmental management

Potential transport impacts from construction and operational activities would be mitigated through the a range of management and mitigation measures. These measures, alongside a suite of performance outcomes, would be met through the development of a Construction Traffic Management Plan, which would form part of an overarching Construction Environmental Management Plan for the Project.

1. Introduction

1.1 Project overview

Transport for NSW (TfNSW) is the lead agency for the integrated delivery of public transport services across all modes of transport in NSW, and is responsible for the delivery of projects within the Transport Access Program (TAP). TAP is a NSW Government initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure across NSW.

TfNSW is seeking approval to construct and operate an upgrade of Redfern Station (Redfern Station Upgrade – New Southern Concourse) ('the Project') as a component of the TAP. The Project involves the construction of a new pedestrian concourse to the south of the existing Lawson Street concourse providing both lift and stair access to Platforms 1 to 10. The new pedestrian concourse would provide a new connection across the railway corridor, extending between Little Eveleigh Street and Marian Street in the suburbs of Redfern and Eveleigh and include associated interchange upgrades.

The key features of the Project include:

- a six metre wide concourse between Little Eveleigh Street and Marian Street
- new stair and lift access from the new concourse to Platforms 1 to 10
- an upgraded station entrance at Marian Street including station services and customer amenities
- a new station entrance at Little Eveleigh Street including station services and customer amenities
- formalisation of a shared zone on Little Eveleigh Street, including:
  - safety improvements to vehicle, cyclist and pedestrian interactions
  - improvements to streetscape such as landscaping, lighting, drainage and pavements
  - relocation of approximately 20 parking spaces (including 18 resident/ restricted parking spaces, one accessible parking space and one car share scheme parking space)
  - utility adjustments
- upgrade of Marian Street/Cornwallis Street/Rosehill Street area, including:
  - extension of existing shared zone including part of Rosehill Street
  - safety improvements to vehicle, cyclist and pedestrian interactions including footpath widening
  - improvements to streetscape such as lighting, drainage, landscaping and pavements as well as utility adjustments
  - changes to street parking arrangements including removal of approximately 16 parking spaces (including relocation of one car share scheme parking space)
- operation of the Project.

Other components of the Project include:

- relocation of the shuttle bus zone from Little Eveleigh Street to Lawson Street
- kiss and ride on Lawson Street, and associated footpath upgrade
- kiss and ride on Gibbons Street, and associated footpath upgrade
- footpath widening on Ivy Street
- relocation of a building on Platform 1 to accommodate the concourse
- repurposing, relocations and alterations to platform building features and other platform features, including privacy walls, doors, screens and roofing, platform seats and electrical equipment
- addition of platform canopies

- platform resurfacing on all platforms and associated drainage alterations
- installation of station operational components and infrastructure including:
  - wayfinding and signage
  - tactile ground surface indicators (TGSI)
  - rubbish bins
  - CCTV
  - passenger information system (e.g. passenger information display, public address and hearing loops)
  - emergency equipment (e.g. for fire and life safety)
- service relocations and upgrades including:
  - relocation of overhead wiring structures
  - installation of a new rail signal between Platforms 1 and 2.

The Project's context and location is provided in Figure 1, and the Project area and an overview of the key features is shown in Figure 2.

Subject to planning approval, construction is anticipated to commence following Project approval in late 2020/early 2021 and would take approximately 18 months to complete.

A more detailed description of the Project is provided in **Chapter 5** of this EIS.

The Project is subject to assessment and approval by the Minister for Planning under Division 5.2 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). This technical report provides an assessment of the Project on potential traffic, transport and access impacts and addresses the requirements of the Secretary of the Department of Planning, Industry and Environment (DPIE) (the 'Secretary's environmental assessment requirements' or SEARs, dated 20 December 2019) (refer Section 1.3).

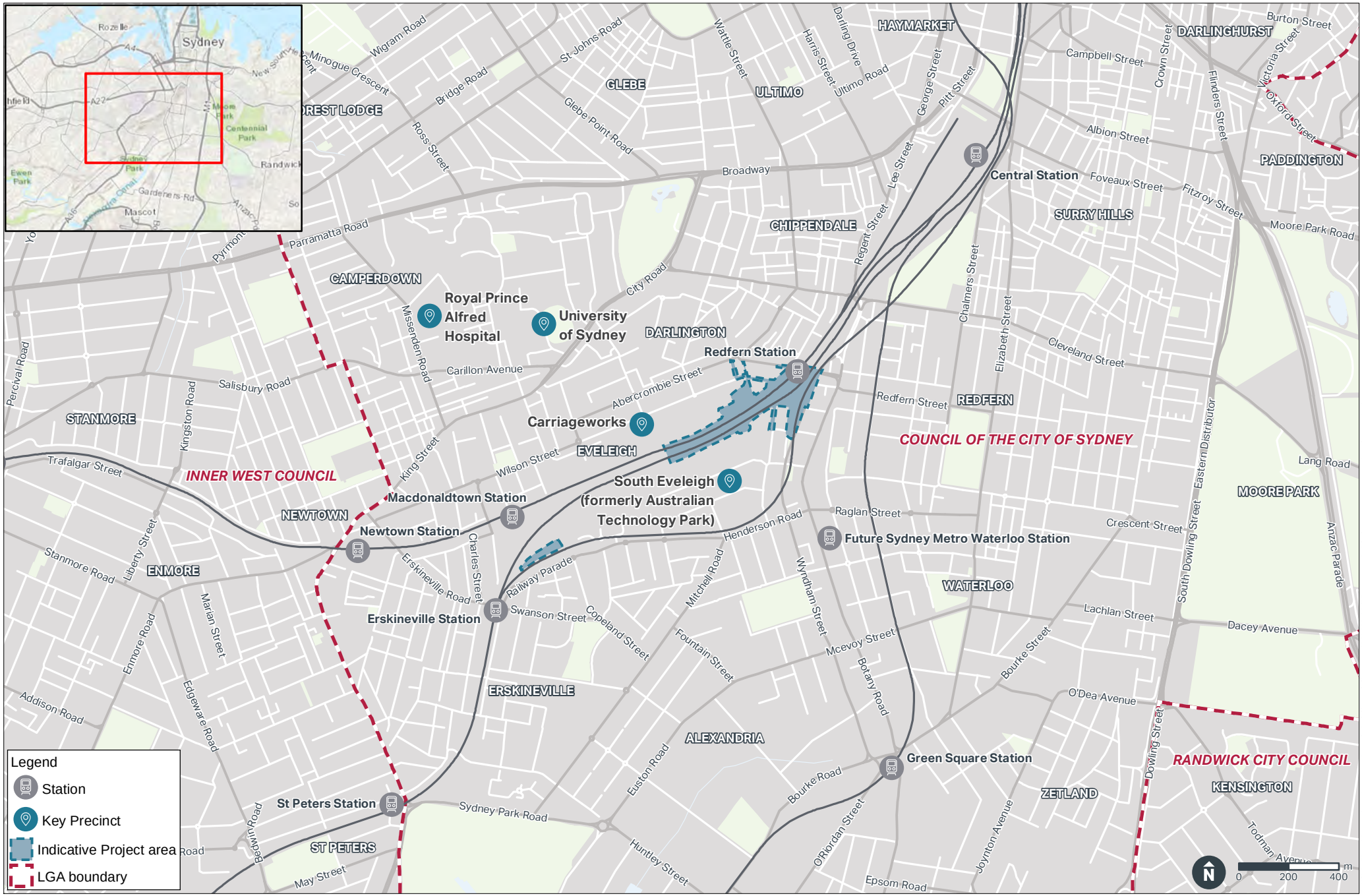


FIGURE 1: PROJECT OVERVIEW AND LOCATION

FIGURE 2: PROJECT AREA AND OVERVIEW OF KEY FEATURES

Source: Imagery © Nearmap, 2019.

Indicative and subject to detailed design.

1.2 Purpose and scope of this technical report

This technical report (Traffic, transport and access), is one of a number of technical documents that form part of the EIS. The purpose of this technical report is to identify potential impacts of the Project and to outline mitigation measures relating to traffic, transport and access during detailed design, construction and operation of the Project.

This traffic, transport and access assessment addresses the relevant SEARs as described in Section 1.3.

1.3 Secretary's environmental assessment requirements

The SEARs relating to transport and traffic, and where these requirements are addressed in this technical report, are outlined in Table 1.

Table 1 Secretary's environmental assessment requirements

Secretary's environmental assessment requirements		Where addressed
Transport and Traffic		
1.	Construction transport and traffic (vehicle, pedestrian and cyclists) impacts, including, but not necessarily limited to:	
a.	a considered approach to access route identification and scheduling of construction vehicle movements, including deliveries	Section 4.2.7
b.	indicative daily number, frequency and size of construction related vehicles (passenger, commercial and heavy vehicles, including spoil management movements)	Section 4.2.7
c.	construction worker parking	Section 4.2.6
d.	the nature of existing traffic (types and number of movements) on construction access routes	Section 3 and Section 3.3.8.
e.	access constraints and impacts on pedestrians and cyclists	Section 4.2 and Section 4.2.2
f.	the need to close, divert or otherwise reconfigure elements of the road, pedestrian and cycle network during construction and the duration of these changes	Section 4.2
g.	temporary and permanent impacts to street parking, including to residents and businesses.	Section 4.2.6
2.	Operational transport impacts (and model where appropriate), including:	
a.	property and business access and on-street parking	Section 4.3.10 and Section 4.3.8
b.	impacts on cyclists, pedestrian access and safety.	Section 4.3.3 and Section 4.3.4

2. Assessment methodology

2.1 Overview

This section outlines the methodology to complete the traffic, transport and access impact assessment for the Project.

A detailed description of the Project and its associated works are provided in **Chapter 5** of the EIS.

2.2 Assessment methodology

A qualitative assessment was undertaken to identify potential impacts on road, public transport and active transport networks during the construction and operation phases of the Project. The methodology for the assessment included:

- Providing an overview of the existing environment around Redfern Station, including train passenger travel behaviours, public transport interchange facilities, access facilities to the station, active transport links, parking and taxi facilities and the surrounding road network. Site observations were undertaken during the AM, lunch time and PM weekday peak periods to assist with the existing conditions overview. Existing traffic volumes collated from SCATS data and traffic surveys undertaken to inform the design of the Project were also reviewed and summarised.
- Reviewing the Project and providing a high-level description of the design parameters.
- Preparing an assessment of the likely impacts on all road users including drivers, cyclists, public transport, parking, pick up/drop off facilities, property access, emergency services, delivery vehicles and garbage trucks within the Project area during construction and operation. Consideration has further been given to pedestrians, customers with access requirements for disability (including wheelchair users and people with a visual impairment), carers with prams or people with luggage.
- Providing trip generation forecasts for construction vehicles, and a qualitative assessment of the likely impacts. During the operation of the Project, it is anticipated that the station upgrades associated with the new accessibility provisions and the formal kiss and ride areas would generate additional vehicle trips. However, these additional trips would generally not result in significant impacts on the operation of the surrounding road network (as discussed in Section 3.3). Traffic modelling software is generally not sensitive enough to traffic volume changes of this magnitude, and therefore traffic surveys and traffic modelling activities have not been undertaken.
- Providing recommendations for mitigation measures that may alleviate the identified transport, traffic and access impacts associated with the construction and operation of the Project.

2.3 Study area

Redfern Station is bounded by Lawson Street, Gibbons Street and Little Eveleigh Street within the suburb of Redfern, New South Wales. The immediate precinct surrounding the station includes a connected network of local, regional and arterial roads, associated interchange structures and buildings, ticket gates, pedestrian and cycle access paths, pedestrian access, pedestrian linkages to the adjacent streets and bus stops, taxi and bicycle facilities.

The indicative study area for this technical report (for assessing both construction and operational impacts) is shown in Figure 3. It covers Redfern Station, Little Eveleigh Street, Ivy Street, the Marian Street/Cornwallis Street/Rosehill Street loop and associated transport interchange facilities on Lawson Street and on Gibbons Street.

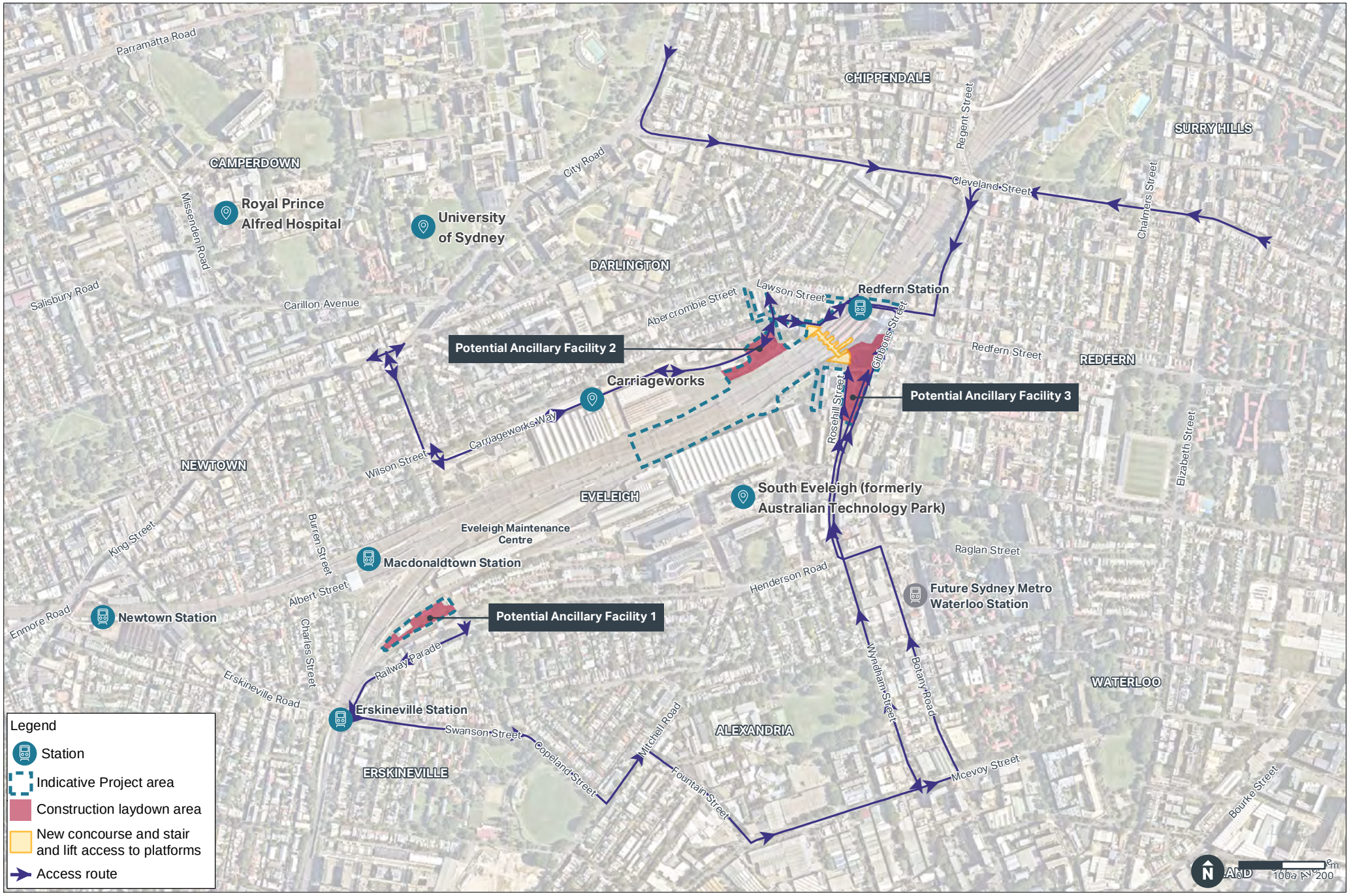


FIGURE 3: STUDY AREA

2.4 Legislation and policy

Section 138 of the *Roads Act 1993* (NSW) requires approval from the relevant roads authority to impact, or carry out work on or over, a public road. Clause 5(1) of Schedule 2 to the *Roads Act 1993* exempts public authorities from this requirement, except in relation to works on or over Crown roads. The Project would impact primarily local roads, however as TfNSW is a public authority, approval from the relevant roads authority (City of Sydney Council) for carrying out such work is not required. Relevant Road Occupancy Licences (ROLs) or local Council equivalent would however be obtained for any road closures required. Traffic Control Plans (TCPs) required for the submission of ROLs would be prepared and submitted for approval by the relevant transport authority (City of Sydney or Transport for New South Wales.

2.5 References

The following technical documents were reviewed to inform this assessment, including:

- Survey Report 09 September 2016–08 October 2019, Redfern Station Upgrade – New Southern Concourse Online Survey, Engagement HQ-Bang the Table, October 2019
- TfNSW Open Data Portal: *Open Data Portal, Train Station Entries and Exits 2016-2018*, (TfNSW, 2018)
- *Train Statistics 2014* (TfNSW, 2014)
- *Australian/New Zealand Standard AS 2890.1:2004 – Parking facilities, Part 1: Off-street car parking.*

3. Existing environment

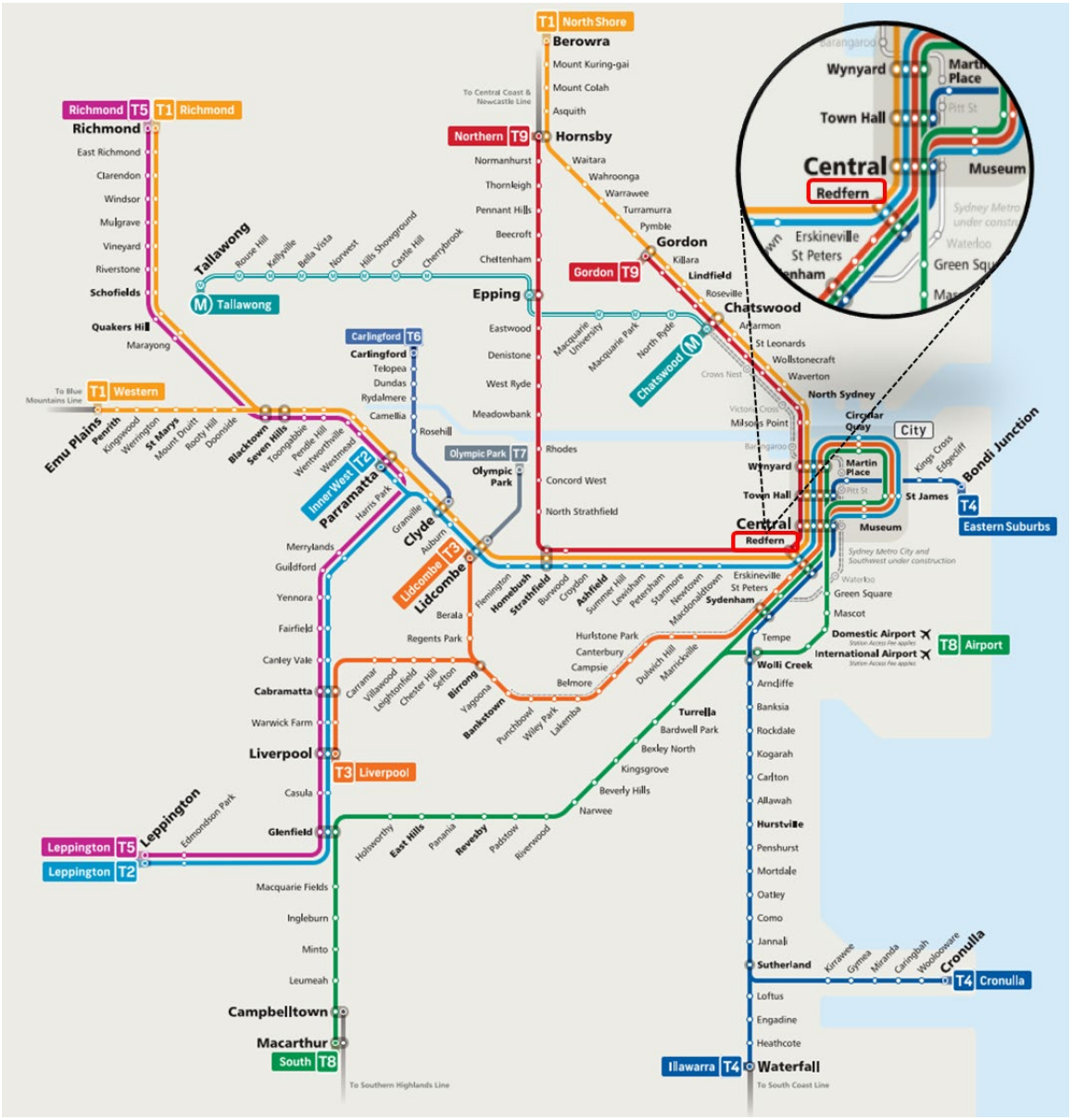
3.1 Redfern context

The suburb of Redfern is located approximately three kilometres south of the Sydney central business district (CBD), within the City of Sydney Local Government Area (LGA). It is well served by the Sydney Trains network with a number of suburban and intercity services stopping at Redfern Station.

The land use surrounding Redfern Station consists of residential areas (low to high density) and mixed-use centres. Figure 3 illustrates some of the key roads and land use features in Redfern, including educational facilities, parks and community facilities.

3.2 Redfern Station

Redfern Station is a major transport hub providing Redfern and surrounding employment and educational precincts key links and connections to Sydney's public transport network. Figure 4 shows Redfern Station on the Sydney Trains suburban network.



Source: Sydney Trains, 2019 (modified by AECOM 2020)

Figure 4 Location of Redfern Station on the Sydney Trains network

The following railway lines provide rail services to Redfern Station:

- T1 North Shore & Western Line
- T2 Inner West & Leppington Line
- T3 Bankstown Line
- T4 Eastern Suburbs & Illawarra Line
- T8 Airport & South Line
- T9 Northern Line
- Blue Mountains Line (BMT)
- Central Coast & Newcastle Line (CCN)
- South Coast Line (SCO).

The two main station entrances are located at the northern end of the station, at Lawson Street and the corner of Gibbons Street and Lawson Street. Both station entrances are linked by a concourse which provides access to the station platforms. An additional entrance is provided to the south at Marian Street which is accessed from the main concourse to the north via Platform 10. A fourth entry/exit gate was recently opened and is located to the north west of the station at the corner of Lawson Street and Little Eveleigh Street.

Redfern Station has 12 platforms with Platforms 1 to 10 located above ground and Platforms 11 and12 located underground. Redfern Station does not currently meet key requirements of the DSAPT (refer Section 3.2.3).

The Project would provide safe and equitable access to the above ground platforms and the surrounding pedestrian network along with generally improving customer facilities, amenity and safety. The improvements would in turn assist in supporting the growth in public transport use and would provide an improved customer experience for existing and future users of Redfern station.

The number of services at Redfern Station during the AM and PM four-hour peak periods are shown in Table 2.

Table 2 Rail services at Redfern Station

Line	Key destination	AM weekday peak 6 10am	PM weekday peak 3 7pm
T1	Emu Plains or Richmond to City	64	58
	City to Emu Plains or Richmond	54	67
	Berowra to City via Gordon	58	64
	City to Berowra via Gordon	61	58
T2	Parramatta or Leppington to City	57	42
	City to Parramatta or Leppington	50	52
T3	Liverpool or Lidcombe to City via Bankstown	35	26
	City to Liverpool or Lidcombe via Bankstown	31	36
T4	Waterfall or Cronulla to Bondi Junction	59	60
	Bondi Junction to Waterfall or Cronulla	56	58
T8	Macarthur to City via Airport or Sydenham	6	0
	City to Macarthur via Airport or Sydenham	0	8
T9	Hornsby to North Shore via City	19	16
	North Shore to Hornsby via City	18	19
BMT	Bathurst and Lithgow to Central	2	0
	Central to Lithgow and Bathurst	0	3
CCN	Newcastle Interchange to Central via Strathfield or Gordon	3	0
	Central to Newcastle Interchange via Strathfield or Gordon	0	3

Line	Key destination	AM weekday peak 6 10am	PM weekday peak 3 7pm
SCO	Bomaderry or Port Kembla to Central and Bondi Junction	12	6
	Bondi Junction and Central to Bomaderry or Port Kembla	5	11

Source: Sydney Trains, 2019

3.2.1 Train passenger travel demand

Rail station entries and exits counts published by TfNSW in its Open Data portal reveal Redfern Station was the sixth busiest station on the Sydney Trains network in 2018, when there were approximately 62,300 entries and exits per average weekday. A breakdown of the 2018 station entries and exits counts by time period is provided in Table 3.

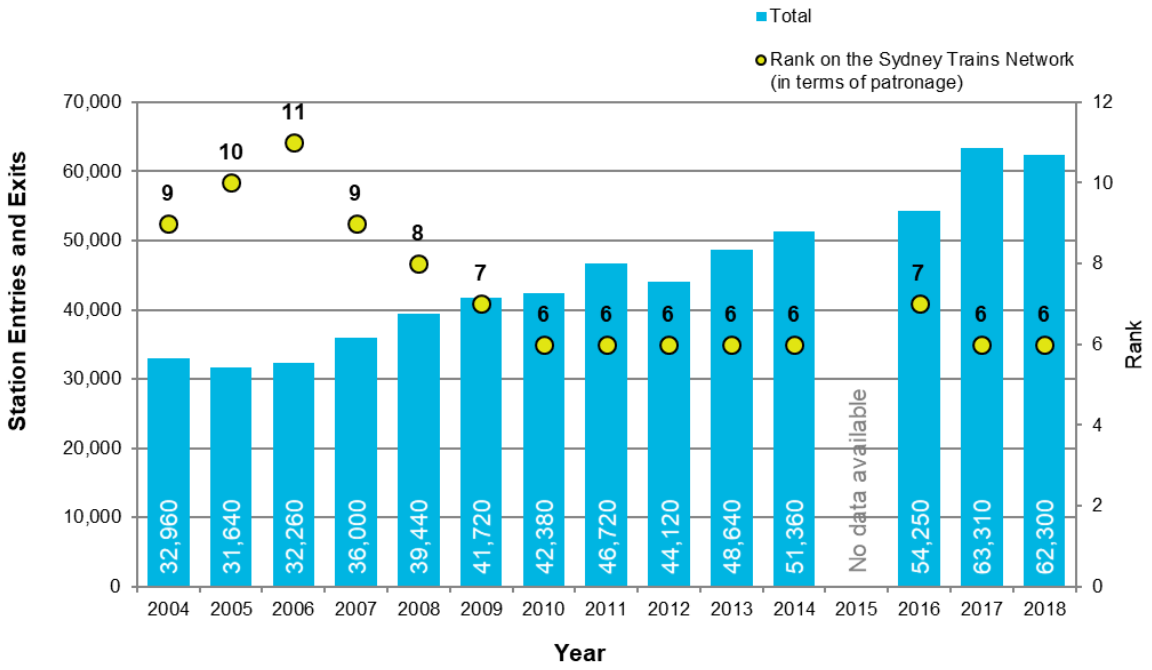
Table 3 Redfern Station 2018 barrier counts for an average weekday

Time period	Entries	Exits	Total
6–10am	5,380	14,520	19,900
10am–3pm	5,610	7,980	13,590
3–7pm	14,230	6,690	20,920
7pm–6am	4,890	3,000	7,890
Total (24 hours)	30,110	32,190	62,300

Source: https://opendata.transport.nsw.gov.au/dataset/train-station-entries-and-exits-data/resource/491763fc-82ed-4e44-9fca-8f3285db526e, accessed on 14 October 2019.

Historical patronage figures for Redfern Station between 2004 and 2018[1] are provided in Figure 5. The general trend in the data shows trips have notably increased in 2017 and 2018. These totals only account for customers entering and exiting Redfern Station, and exclude any train-to-train interchange at Redfern.

[1] No data was available for 2015.



Source: Station Barrier Counts – 2004 to 2014, Bureau of Transport Statistics, 2016, https://opendata.transport.nsw.gov.au/dataset/train-station-entries-and-exits-data/resource/491763fc-82ed-4e44-9fca-8f3285db526e

Figure 5 Historical patronage data at Redfern Station

The high frequency of passenger rail services at Redfern Station is seen as both a factor contributing to its high ranking in terms of patronage in the Sydney Trains network, as well as a response to meet the level of demand.

3.2.2 Railway station access modes

An online survey was undertaken by TfNSW between September 2019 and October 2019 to seek information about customer travel patterns at Redfern Station. One of the questions in the survey asked respondents to select access modes used to get to/from Redfern Station, with multiple responses allowed. Table 4 provides a breakdown of the access modes used by 119 customers responding to the question "*How to you get to and from Redfern Station?*"

Table 4 Redfern Station access modes (2016–2019)

Access mode	Number	Percentage
Walk	100	84%
Bicycle	17	14%
Motorbike	2	2%
Ride share or carpool	1	1%
Bus	1	1%
Taxi	13	11%
Other	2	2%

Source: Survey Report 09 September 2016 – 08 October 2019, Redfern Station Upgrade – New Southern Concourse Online Survey (Engagement HQ-Bang the Table, October 2019)

These mode shares compare with interview surveys undertaken at Redfern Station by Sydney Trains in 2008 to determine how rail customers accessed the station. The results are presented in Table 5, which show the primary mode of access then was by walking, accounting for 88 per cent of trips during the AM peak. This result is in line with the 84 per cent walking mode share in the 2019 online

community survey undertaken for the Project. During the off-peak period, there was an increase in the proportion of rail customers accessing the station via kiss and ride (ride share or car pool).

Table 5 Redfern Station access modes (2008)

Access mode	AM peak (6 9:30am)	Off peak (after 9am)
Walk	88%	81%
Bus	0%	0%
Car-park (park and ride)	5%	0%
Car-lift (kiss and ride)	7%	19%
Other	0%	0%

Source: Sydney Trains, 2008

3.2.3 Station accessibility and facilities

The majority of the station facilities are located on the concourse level (to the north), with the island platforms located below, accessed by stairs, escalators or a lift in the case of Platforms 6 and 7. Equitable access at Redfern Station is limited. The majority of platforms are accessed by a single stairway at the northern end of the platforms, with the exception of Platforms 6 and 7 (which are serviced by an existing lift), Platforms 11 and12 (which are serviced by an escalator) and Platform 10 (which has a second set of stairs to the south linking with Marian Street). The stairs do not provide an accessible path of travel for several groups of people including those with a disability, limited mobility and parents/carers with prams. Table 6 provides a summary of the facilities currently provided at Redfern Station.

Table 6 Redfern Station facilities

Accessibility	General facilities	Transport interchange
• stairs • escalators (Platforms 11 and 12) • lift (Platforms 6 and 7) • public address system • tactile surfaces	• Opal ticketing machines • toilets • payphone • emergency help point • wheelchair accessible payphone • refreshments kiosks • vending machines	• kiss and ride stopping area (informal) • taxi rank • bicycle locker and hoops

Source: Sydney Trains, 2020

A map showing the location of Redfern Station and associated facilities is provided in Figure 6.

Source: TfNSW, 2020, modified by AECOM

Figure 6 Current Redfern Station facilities

3.2.4 Pedestrian facilities

Pedestrian access to Redfern Station is provided from the following four station entry locations:

- Lawson Street: access requires a step from footpath to station entrance/concourse level/paid area
- corner of Gibbons Street and Lawson Street: level access from footpath to station entrance/concourse level/paid area
- Marian Street: access requires the use of two sets of stairs to access the station concourse/paid area
- corner of Little Eveleigh Street and Lawson Street: access requires three steps between concourse level and the Lawson Street footpath.

From the concourse level, stairs provide access to the platforms, with escalators also providing access to underground Platforms 11 and 12, and a lift providing access to Platforms 6 and 7.

Footpaths along streets surrounding the station link to the station entrances. Pedestrian crossing facilities on the surrounding road network providing direct links to the station entrances are summarised in Table 7. These facilities provide a safe crossing point to and from the station.

Table 7 Pedestrian crossing facilities surrounding Redfern Station

Station entrance	Pedestrian crossing facility
Lawson Street	• refuge island along Lawson Street
Corner of Gibbons Street and Lawson Street	• marked foot crossing on all approaches at the signalised intersection of Gibbons Street and Lawson Street • marked foot crossing at the mid-block signalised intersection along Gibbons Street (about 30 metres south of the Gibbons Street/Lawson Street intersection)
Marian Street	• shared zone along Marian Street where vehicles are required to give way to pedestrians
Corner of Little Eveleigh Street and Lawson Street	• pavement treatment across Little Eveleigh Street • no formal crossing facility across Lawson Street

It is noted that both sides of Lawson Street along the frontage of Redfern Station have pedestrian barriers, with the only mid-block crossing opportunity limited to the refuge island opposite the station entrance.

Figure 7 to Figure 12 provide an overview of pedestrian circulation areas within Redfern Station, while Figure 13 to Figure 18 highlight some of the key pedestrian access facilities in the Project area.

Source: AECOM, 2019

Figure 7 Platform 2/3 stairs to main concourse (looking north)

Source: AECOM, 2019

Figure 8 View of main concourse towards north (looking west)

Source: AECOM, 2019

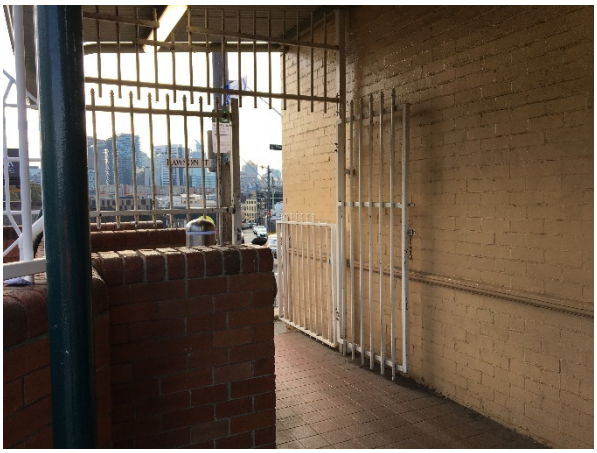
Figure 9 Access off corner of Lawson Street and Gibbons Street (looking south)

Source: AECOM, 2019

Figure 10 View of platforms from main concourse (looking south)

Source: AECOM, 2019

Figure 11 View of Marian Street access from Platform 10 (looking south)



Source: AECOM, 2019

Figure 12 Access off corner of Lawson Street and Little Eveleigh Street (looking north)

Source: AECOM, 2019

Figure 13 Lawson Street pedestrian refuge (looking west)

Source: AECOM, 2019

Figure 14 Corner of Gibbons Street and Lawson Street (looking south)

Source: AECOM, 2019

Figure 15 Mid-block foot crossing on Gibbons Street (looking south)

Source: AECOM, 2019

Figure 16 Corner of Lawson Street and Little Eveleigh Street (looking west)

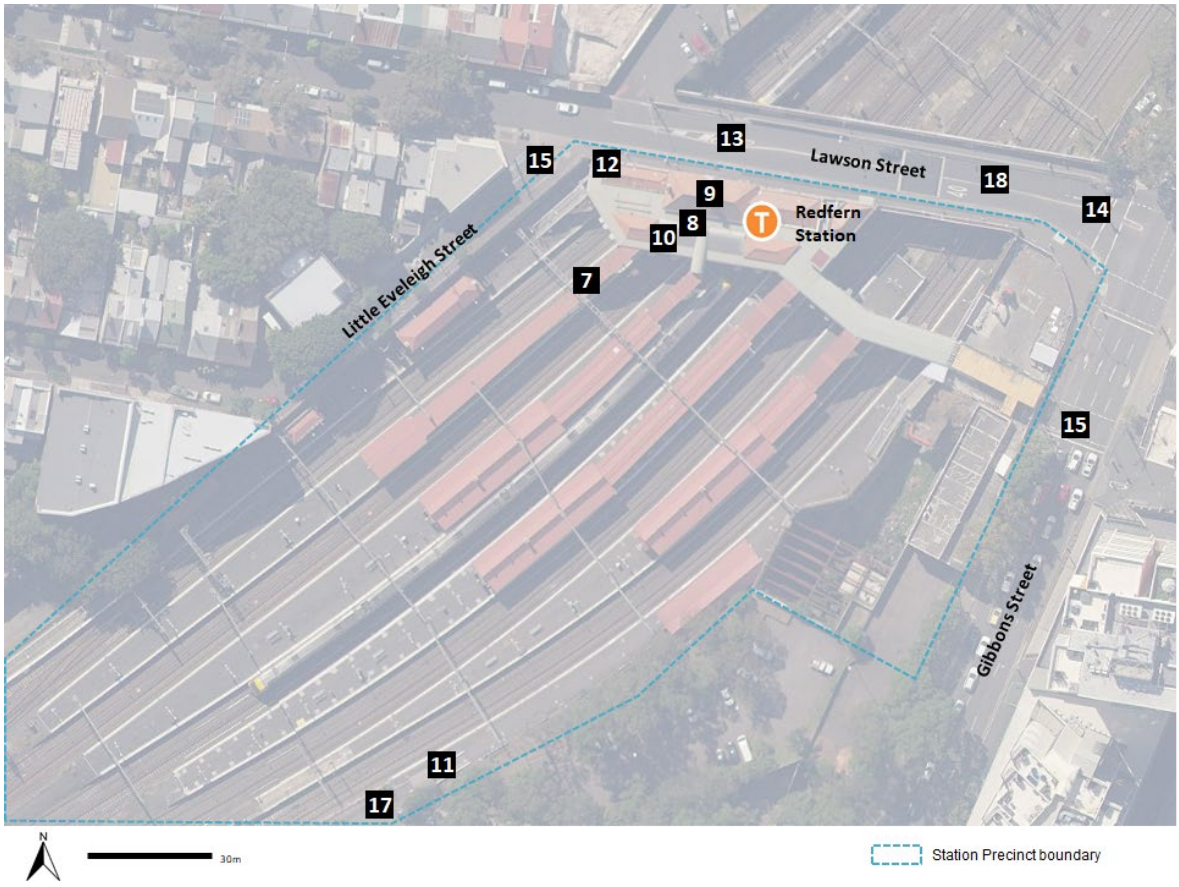
Source: AECOM, 2019

Figure 17 Access from Marian Street (looking north)

Source: AECOM, 2019

Figure 18 High pedestrian activity area on Lawson Street, with pedestrian barriers on both sides (looking west)

Figure 19 highlights the key pedestrian circulation areas and the access facilities in the vicinity of Redfern Station shown in Figure 7 to Figure 18.



Source: AECOM, 2019

Figure 19 Key pedestrian facilities in the vicinity of Redfern Station shown in Figure 7 to Figure 18

3.2.5 Cycling facilities

The cycle network within 800 metres of the study area comprises of a mix of on-street and off-street cycle routes as shown in Figure 20. The study area is well connected to the Sydney Bike Network with a regional cycle route passing along Lawson Street.

An off-road shared path is provided along Gibbons Street to Marian Street, and links with shared paths in Eveleigh.

On Little Eveleigh Street, a shared traffic lane is provided in the westbound direction, and a cycle path is provided in the eastbound direction. This route links with Newtown and Ashfield and is provided with wayfinding signage.

Source: City of Sydney, 2020 (https://www.cityofsydney.nsw.gov.au/__data/assets/pdf_file/0003/314643/Sydney-Cycling-Map-Jun-2019-v1.3-WEB.pdf)

Figure 20 Cycle routes in the study area

Bicycle storage facilities are provided within the study area allowing cyclists to transfer to rail as shown in Figure 21 to Figure 26. A bicycle locker with 32 horizontal rack spaces is provided near the station entrance at the corner of Gibbons Street and Lawson Street. A total of 17 bicycle hoops are also provided on Little Eveleigh Street (providing 34 bicycle parking spaces). In addition, three bicycle hoops are provided on Cornwallis Street (providing six bicycle parking spaces).

Informal bicycle parking is observed on the shared path on Gibbons Street as well as on Marian Street, although no formal bicycle parking racks are provided.

Eleven racks are provided on the eastern side of Gibbons Street opposite the station (associated with Club Redfern), which could also be used by station customers.

Source: AECOM, 2019

Figure 21 Bicycle storage facility at the corner of Lawson Street and Gibbons Street (looking west)

Source: AECOM, 2019

Figure 22 Access from Marian Street (looking north) Bicycle parking on Little Eveleigh Street

Source: AECOM, 2019

Figure 23 Shared path on the western side of Gibbons Street (looking north) between Marian Street and Lawson Street

Source: AECOM, 2019

Figure 24 Shared bicycle lane and bicycle path on Little Eveleigh Street (looking west)

Source: AECOM, 2019

Figure 25 Bicycle parking on the eastern side of Gibbons Street (looking south)

Source: AECOM, 2019

Figure 26 Informal bicycle parking on the western side of Gibbons Street (looking north)

3.2.6 Bus services and facilities

Figure 27 to Figure 30 illustrates the bus stop and bus services that serve the study area. There are two bus stops located along Gibbons Street within walking distance to the station. Eight bus routes serve the bus stops which are primarily operated by the State Transit Authority. These routes include:

- Route 301 – Eastgardens to Redfern via Mascot
- Route 302 – Eastgardens to Redfern via Kingsford
- Route 303 – Sans Souci to Redfern via Mascot
- Route 308 – Marrickville Metro to Central Eddy Ave via Redfern (Loop Service)
- Route 309 – Banksmeadow to Central Railway Square
- Route 309X – Port Botany to Central Railway Square (Express Service)
- Route N11 – Cronulla to City Town Hall
- Route N20 – Riverwood to City Town Hall via Airport

These bus routes connect residential areas to local transport interchanges, as well as employment and retail areas.

Only Stand A on Gibbons Street (Stop ID 201631) provides seating and shelter. Stand B (Stop ID 201646) provides a bench and is used by Routes 308 and 309, and also caters for temporary bus services (Routes 52T2 and 55T2) as well as some charter services.

The signed bus zone north of Stand B on Gibbons Street is also used by buses laying over between runs.

On Little Eveleigh Street, a designated No Parking zone with buses excepted for a 15-minute limit, is used by shuttle buses operated by nearby organisations, including the University of Sydney, Royal Prince Alfred Hospital and Tribal Warrior.

Source: AECOM, 2019

Figure 27 Stand A on Gibbons Street (looking south)

Source: AECOM, 2019

Figure 28 Stand B on Gibbons Street (looking north)

Source: AECOM, 2019

Figure 29 Shuttle bus waiting on Little Eveleigh Street (looking south)

Source: AECOM, 2019

Figure 30 Bus zone on Gibbons Street used for layover (looking north)

3.2.7 Parking facilities

There are currently no commuter parking facilities available in the study area. There is time restricted / residents on-street parking is provided in surrounding streets, including Gibbons Street, Cornwallis Street, Marian Street and Rosehill Street to the south and east, and on Little Eveleigh Street to the west. These on-street parking spaces are primarily used by residential, retail and commercial establishments as well as other local attractors in the Eveleigh area, except for on-street parking along Little Eveleigh Street which is primarily used by residents.

Car share spaces are provided in the vicinity of Redfern Station. A car share parking space and an accessible parking space are provided on Little Eveleigh Street. Car share parking spaces are also provided on the north side of Lawson Street, west of Little Eveleigh Street and on the north side of Marian Street, near the Marian Street entrance.

3.2.8 Kiss and ride facilities

There is currently no formal kiss and ride zone in the study area. Short-term parking and No Parking/No Stopping zones on Gibbons Street, Little Eveleigh Street and Marian Street are at times used as informal kiss and ride areas. The stretch of Lawson Street between Gibbons Street and Eveleigh Street/Little Eveleigh Street has kerbside pedestrian barriers preventing pedestrian interface between the street and the footpath, except at the pedestrian refuge outside the station entrance. This indicates that this section of Lawson Street is not used as an informal kiss and ride area.

3.2.9 Taxi facilities

A taxi rank with approximately three spaces is provided along Gibbons Street. However the useable space within the taxi rank is for two taxis only, because the northern portion of the taxi rank is inaccessible due to a marked difference in elevation between the kerb and the footpath.

3.3 Road network

This section outlines the key roads in the study area and provides a description of each road. The key roads in the study area include Gibbons Street, Lawson Street, Little Eveleigh Street, the Marian Street/Cornwallis Street/Rosehill Street loop, Ivy Street, Ivy Lane and Wilson Street, as shown in Figure 3.

3.3.1 Gibbons Street

Gibbons Street is a state road with a north-south alignment. It is a one-way road in the northbound direction with four traffic lanes, as shown in Figure 31. The kerbside lanes are generally used for parking (south of Marian Street) and also cater for interchange facilities (bus zones and taxi zone). During peak periods, clearway restrictions apply for the eastern kerbside lane. The sign-posted speed limit is 60 kilometres per hour.

SCATS traffic survey data provided by TfNSW for the week commencing 6th March 2019 indicates that average weekday traffic volumes are in the region of 26,000 vehicles per day at its intersection with Wyndham Street and Boundary Street, with a peak hour flow of between 1,700 – 1,800 vehicles in the AM and PM peak hour.

Source: AECOM, 2019

Figure 31 View of Gibbons Street (northbound)

3.3.2 Lawson Street

Lawson Street is a local road aligned in an east-west direction to the north of Redfern Station. The road generally provides one traffic lane and kerbside parking in each direction, with kerbside parking prohibited on the overpass bridge immediately north of Redfern Station.

Near the station entrances the road is sign-posted as a high pedestrian activity area with a speed limit of 40 kilometres per hour, as shown in Figure 32. A speed cushion is also provided along the road close to the station entrance / exit.

Traffic surveys undertaken by Austraffic on 10 March 2020 indicate that average weekday traffic volumes are in the region of 7,700 vehicles per day, with a peak hour flow of 665 in the PM peak hour at its intersection with Little Eveleigh Street.

Source: AECOM, 2019

Figure 32 View of Lawson Street (northbound)

3.3.3 Little Eveleigh Street

Little Eveleigh Street is a local road running to the north and west of the railway corridor. It has one-way traffic flow from Lawson Street through to Ivy Lane. It provides local access to driveways, properties, the Sydney Trains staff carpark and the on-street parking, and generally would not carry any through traffic. Traffic surveys undertaken by Austraffic on 10 March 2020 indicate that average weekday traffic volumes are in the region of 681 vehicles per day.

The configuration of Little Eveleigh Street in the travel direction is comprised of kerbside parking spaces to the left, a shared cycle and traffic lane, as well as a contraflow bicycle path heading back to Lawson Street.

On-street parking duration is generally limited to one hour, with permit holders excepted.

There is a 50km/h speed zone in place, however based on site observation, the traffic speeds are considerably lower due to the road geometry and parked cars.

Figure 33 to Figure 36 provides a view of the configuration of Little Eveleigh Street.

Source: AECOM, 2019

Figure 33 View of Little Eveleigh Street (southbound into westbound)

Source: AECOM, 2019

Figure 34 View of Little Eveleigh Street (westbound), near Ivy Lane

Source: AECOM, 2019

Figure 35 View of Little Eveleigh Street (eastbound), opposite 125-127 Little Eveleigh St

Source: AECOM, 2019

Figure 36 View of Little Eveleigh Street (northbound)

3.3.4 Marian Street/Cornwallis Street/Rosehill Street

The Marian Street/Cornwallis Street/Rosehill Street forms a one-way loop road located to the south and east of the study area. This loop is accessed from Gibbons Street near its intersection with Boundary Street, and links to the station entrance at the southern end of Platform 10 at Marian Street. The road then continues back southward via Cornwallis Street towards Boundary Street. Figure 37 to Figure 40 provides views of the Marian Street/Cornwallis Street/Rosehill Street loop.

The Rosehill Street section of the loop road generally has a parking lane on each side of the one-way road, plus a travel lane in the centre.

Cornwallis Street is generally configured with a kerbside parking lane on the west and a travel lane on the east heading in the direction of travel. Although footpaths are provided on both sides of Cornwallis Street, the eastern footpath is very narrow, with its use generally limited to immediate local access to properties. The western footpath is about 2.5 metres wide and is used by a high number of pedestrians to access the Australian Technology Park and surrounding areas from the Marian Street entrance of Redfern Station.

Marian Street forms the north leg of the loop. It has driveways accessing the Sydney Trains staff car park north of the Gibbons Street Reserve, as well as the basement off-street parking area of 1 Marian Street (The Watertower Building). A short section (about 25 metres) of Marian Street fronting the station entrance is designated as a shared zone, with a speed limit of 10 km/h and provided with distinct paving.

The on-street parking spaces along the Marian Street/Cornwallis Street/Rosehill Street one-way loop road are used by the commercial establishments and residential buildings in this area. The loop road is also used to access off-street parking areas associated with these buildings.

Traffic surveys undertaken by Austraffic on 10 March 2020 indicate that average weekday traffic volumes are in the region of 486 vehicles, with a peak hour flow of 64 in the AM peak hour.

On-street parking along the loop (where allowed) is generally limited to two hours with exceptions given to permit holders.

3.3.5 Ivy Lane

Ivy Lane is a local road located to the west of the Redfern Station. It is aligned in a north-south direction and connects to Little Eveleigh Street to the south and Lawson Street to the north. The road has one-way northbound traffic flow from Little Eveleigh Street through to Lawson Street. It provides local access to driveways and properties and generally would carry local traffic accessing Little Eveleigh Street.

Traffic surveys undertaken by Austraffic on 10 March 2020 indicate that average weekday traffic volumes are in the region of 600 vehicles, with a peak hour flow of 59 in the PM peak hour.

3.3.6 Ivy Street

Ivy Street is a local road running to the west of the Redfern Station. It is located west of Ivy Lane and has one-way southbound traffic flow south of Abercrombie Street, from Lawson Street through to Wilson Street. North of Abercrombie Street, it is one-way northbound and turns into two-way north of Lander Street. South of Abercrombie Street, Ivy Street provides local access to driveways, properties and the on-street parking, linking to Wilson Street in the south.

Traffic surveys undertaken by Austraffic on 10 March 2020 indicate that average weekday traffic volumes are in the region of 10 vehicles per day.

3.3.7 Wilson Street

Wilson Street is local collector aligned in an east-west direction, to the west of Redfern Station. It is a two-way road between Ivy Street and Burren Street/ Brocks Lane and is one way eastbound, west of Burren Street/ Brocks Lane. The road generally provides one traffic lane and kerbside parking in each direction. Near the station, the road is sign-posted with a speed limit of 50 km/h, and caters for on-road cycling.

Traffic survey data for Wilson Street is not available, however from undertaking site observations, it was observed that traffic volumes along Wilson Street are relatively low due to it being a local, residential street.

3.3.8 Road network performance

Little Eveleigh Street and the Marian Street/Cornwallis Street/Rosehill Street loop are local roads providing local access to driveways, properties and car parking. From undertaking site observations during the AM, lunch time and PM weekday peak periods, traffic volumes are observed to be low and network performance along these streets is good with minimal delays and queuing. The traffic composition is generally light vehicles, with occasional heavy vehicles observed to make deliveries and waste collection. Significant pedestrian volumes can also be observed along these roads, with pedestrians often observed walking along the carriageway and crossing the road outside designated pedestrian crossings, replicating a shared zone environment.

Gibbons Street and Lawson Street are regional roads and carry a large number of vehicles during the network peak hours. During the weekday AM and PM peak periods, site observations indicated delays and queueing present along Gibbons Street and Lawson Street, however network performance did not appear to be at capacity or at unacceptable levels. The traffic composition is a mix of light and heavy vehicles including buses. Gibbons Street is an approved B-Double route so vehicles up to 26 m in length are also expected to use the route.

It should be noted that due to the minimal number of trips likely to be generated by the Project during construction and operation (refer Section 5.3 for vehicle numbers), it is considered that the Project would result in a marginal increase in traffic on the existing road network during construction. As a

result, a quantitative assessment of the performance of the existing road network (and specifically construction access routes) has not been undertaken. The potential impacts of the Project on the local road network are discussed in detail in Section 4.2.7 for construction related traffic, and in Section 4.3.9 for operational traffic.

Source: AECOM, 2019

Figure 37 View of Rosehill Street looking south

Source: AECOM, 2019

Figure 38 View of Marian Street looking north toward existing Redfern Station entrance

Source: AECOM, 2019

Figure 39 View of Cornwallis Street looking south

Source: AECOM, 2019

Figure 40 View of Marian Street looking south

4. Impact assessment

This section discusses the impacts on traffic, transport and access in relation to construction and operation of the Project.

4.1 Construction overview

4.1.1 Staging

The key stages in constructing the Project are:

- site establishment and enabling works
- building modification works
- overhead wiring relocations/adjustments
- main construction works, including platform preparation works, installation of the concourse and station entrances
- road works on Little Eveleigh Street Marian Street, Cornwallis Street, Rosehill Street, Lawson Street and Gibbons Street.

It is anticipated that the Project would be constructed over an approximate period of 18 months commencing late 2020/early 2021, once all necessary approvals are obtained. Individual construction stages may occur concurrently as construction progresses.

4.1.2 Construction hours

Construction would generally be undertaken within standard working hours as defined in the *Interim Construction Noise Guideline* (Department of Environment and Climate Change NSW, 2009) and the *TfNSW Construction Noise and Vibration Strategy 2019*:

- Monday to Friday 7am–6pm
- Saturday 8am–1pm
- no work on Sundays or public holidays.

Work outside of the above hours may be required in some cases for the safety of workers and to minimise disruptions to customers, pedestrians and motorists. Some of the works would also need to be undertaken during standard rail possession periods (when trains are not running) to minimise disruption to rail operations and risk to rail worker safety. Examples of works that would be required in possessions include overhead wiring works, concourse and lift installation and some work on platforms. Some of these works may also be required to be undertaken outside standard construction hours.

It is anticipated that the works would be undertaken over approximately 20 scheduled weekend rail possession periods with continual work from Friday to Sunday nights. Approximately two additional (non-scheduled) rail possession periods are proposed including a possession across the 2020 Christmas period. During these possessions, standard mitigation and management measures would be implemented to minimise impacts to the community, including providing alternative transport arrangements and notifications. There is also the potential for mid-week night work to be required throughout various stages of the Project depending on the activity required.

4.1.3 Ancillary facilities

Three construction ancillary facilities are proposed for the construction of the Project, located at the Eveleigh Maintenance Centre, the Sydney Trains land located behind the Sydney Trains Chief Mechanical Engineers Building, and part of Gibbons Street Reserve. These ancillary facilities would provide construction assembly, laydown and storage areas, and site office compound areas. Figure 3 shows the location of each ancillary facility and the construction access routes.

A more detailed description of the construction activities associated with the Project, including an indicative program of works, is provided in Section 5.2 of **Chapter 5** of the EIS.

4.1.4 Car parking

Construction workers would be encouraged to travel to the site utilising public transport. If this is not possible, workers would be encouraged to carpool. Under the Sustainability Management Plan, a 'Green Travel' initiative would be implemented to formalise less carbon impacting forms of transport. A workers reward scheme would be implemented for those who adhere to the initiative.

4.2 Construction impacts

4.2.1 Pedestrians

4.2.1.1 Surrounding Redfern Station

The Project is expected to cause temporary disruptions to the existing pedestrian facilities surrounding the station, particularly for pedestrian access to the station when construction works for the station entrances and surrounding footpaths are being undertaken. This has the potential for increased safety risks for pedestrians, especially those with disabilities, visual impairment and customers requiring wheelchair access due to potential interactions with construction plant and vehicles. Works would be undertaken in a manner to ensure that public access routes within the Project area and to and from Redfern Station are maintained, and pedestrian diversions are minimised.

The conversion of Little Eveleigh Street to a shared zone would impact on pedestrians using this route to access Redfern Station and the surrounding areas. It is likely that the construction method required would require a partial road closure, which would limit space available for pedestrians to pass through. It is anticipated however that pedestrian access would be maintained throughout construction, however some diversions may be required for safety purposes. Pedestrian access for Little Eveleigh Street residents would be maintained at all times.

The proposed upgrade of the eastern footpath on Ivy Street would require temporary closure of this pedestrian facility. Pedestrian movements along Ivy Street would need to be diverted around these works, potentially to the western footpath during the period of the works.

A footpath upgrade is also proposed on the southern side of Lawson Street which is associated with the proposed kiss and ride at this location. This would require the temporary closure of the footpath. Pedestrians would be diverted to the northern side of the road during these works and would utilise other existing pedestrian facilities such as the existing pedestrian refuge on Lawson Street.

Similarly, along Gibbons Street, a footpath upgrade would be required which is associated with the new kiss and ride facility at this location. Appropriate diversion routes would be identified and put into place to mitigate impacts on pedestrians.

The station entrance works on Marian Street would impact pedestrians accessing or egressing from Platform 10. The existing shared zone on Marian Street would be extended to include part of Rosehill Street, with footpath widening works expected to be undertaken along this area. Where required, customers may need to be diverted to use Gibbons Street to travel between Redfern Station and the signposted Eveleigh precinct, requiring a longer travel distance.

There are likely to be impacts to pedestrians in the vicinity of the ancillary facilities, for example at the entry/exit gates to the ancillary facilities where the driveway is located across a footpath. There would be an increase in the number of light and heavy vehicles at these locations, which may also increase the risk of pedestrian and vehicle collisions at these driveways. In addition to this, there are currently footpaths provided through Gibbons Reserve providing access from Gibbons Street to Rosehill Street and Marian Street. If the ancillary facility requires the occupation of these footpaths, pedestrians may experience increased travel times between Gibbons Street and Rosehill Street/Marian Street as a result of required diversions.

4.2.2 Cyclists

Little Eveleigh Street is a key bicycle route linking the Redfern Station precinct with Newtown, Ashfield, Darlington and other areas. Construction activities associated with converting Little Eveleigh Street into a shared zone would require the removal of the cycle route running along the street, potentially requiring diversion between Wilson Street and Lawson Street via Ivy Street during construction only. Ancillary facility 2 (refer to Figure 3) would require vehicular access via Little

Eveleigh Street. With the increase in light and heavy vehicle movements, there are potential impacts to amenity and safety for cyclists using Little Eveleigh Street in a westbound direction. Bicycle parking spaces on Little Eveleigh Street would be replaced during construction and additional spaces would be installed, providing a total of 60 bicycle parking spaces near the station entrance. Bicycle parking spaces may not be available during these works.

In addition, Marian Street is a key east-west bicycle route, linking Eveleigh to Redfern. The existing shared zone on Marian Street would be extended to include part of Rosehill Street, with footpath widening and pavements works proposed at this location also. These construction works would potentially require diversion between Cornwallis Street and Rosehill Street via Boundary Street or Henderson Road in the south. Ancillary Facility 3, located within Gibbons Reserve, may also require the removal of the east-west cycle way currently in use at this location. Cycle way diversions would be required for cyclists to travel between Rosehill Street and Gibbons Street.

4.2.3 Public transport

4.2.3.1 Train services

The construction of the Project would require temporary periodic closure of the railway corridor. As noted in Section 4.1, it is anticipated that approximately 20 scheduled weekend rail shutdowns would be utilised to undertake a number of construction activities, with two additional (non-scheduled) rail possession periods proposed (including a possession across the 2020 Christmas period). During these possessions, standard mitigation measures would be implemented to minimise impacts to the community, including providing alternative transport arrangements and notifications (refer to Section 5).

While this would be mitigated via the accepted practice of providing replacement bus services to transport train customers, there would be impacts to these train customers in terms of longer travel times associated with replacement bus services. Dependent on the affected customers' trip origins and destinations, additional travel times of 30 minutes up to approximately an hour could be required. This is in line with typical travel time adjustments that are required during train possessions undertaken on a regular basis in the Sydney Trains network.

4.2.3.2 Train customers within Redfern Station

During times when train services would continue to run at Redfern Station, train customer movement on the station platform would be temporarily impacted due to the reduced amount of space resulting from construction work, particularly to allow for the construction of lift areas and stairway landings. The reduced space on the platform may increase customer congestion and reduce the amount of standing/waiting and passageway areas. The risk also applies to disembarking customers at Redfern Station, where the reduced platform spaces may increase passenger congestion upon egress, particularly during morning peak periods.

Platform 1 is also used by Sydney Trains staff to access train operations and maintenance sites to the south west. Staff access to these areas would be impacted by the Project's construction, in particular works on Platform 1, however access to these areas would be maintained through the changing of access routes to these sites.

4.2.3.3 Bus services

The existing bus zone on Little Eveleigh Street would be relocated to a new bus zone at the eastern end of Lawson Street, near Little Eveleigh Street. This would allow for the formalisation of the shared zone at Little Eveleigh Street. It is anticipated that relocation works would be completed prior to removal of the existing bus zone to ensure disruption to bus services is minimised. Customers requiring access to the relocated bus zone would be required to travel approximately the same distance as to the existing bus stop, with a requirement to cross Little Eveleigh Street, which has low traffic volumes. As such, the impacts to customers utilising this bus zone are expected to be minor.

Other bus services in the vicinity of Redfern Station would be unlikely to be affected during construction. Bus services along Gibbons Street would continue to operate during construction activities, however they may experience minor impacts, such as minor delays due to temporary traffic diversions, construction vehicle movement towards the Rosehill Street area and other temporary

relocations such as those relating to construction activities associated with the proposed kiss and ride facility adjacent to the existing bus zone.

4.2.4 Kiss and ride

Informal pick-up and drop-off activity was observed at the shared zone on Marian Street, on Little Eveleigh Street and on Lawson Street. On Marian Street, the construction of the Project would impact the informal pick-up and drop-off activity observed in this area with construction vehicles moving around the area, and intermittent road closure to allow for deliveries and movement of equipment.

On Little Eveleigh Street, the construction activities relating to its conversion into a shared zone would require a partial closure of the road for a period of up to nine months. This would also preclude any informal pick-up/drop-off activity undertaken on Little Eveleigh Street.

A new kiss and ride would be provided on both Lawson Street and Gibbons Street, each requiring the removal of approximately three restricted car parking spaces (refer also to Section 4.2.6). These construction works would occur concurrently with the footpath upgrade works at these locations. Partial lane closures would be required along Lawson Street or Gibbons Street to allow for construction of the kiss and ride facilities. Temporary pedestrian and cyclist diversions would also be required as part of these construction works.

4.2.5 Taxi

The operation of the taxi rank on Gibbons Street would not be impacted during the construction of the Project.

4.2.6 Parking

Construction of the Project would impact on parking arrangements in the Project area as discussed below.

Marian Street/Cornwallis Street/Rosehill Street loop

The Marian Street/Cornwallis Street/Rosehill Street one-way loop road is used for on-street parking by the commercial establishments and residential buildings in this area. The loop road is also used to access off-street parking areas associated with these buildings.

During construction, some street parking would be intermittently unavailable, before the permanent removal of approximately 16 parking spaces, including five unrestricted parking spaces, eleven restricted parking spaces (signed two-hour restricted/permit holders unrestricted). A car share scheme parking space would also be relocated to a new location further south along Rosehill Street.

Ancillary facility 3 (Figure 3) would generate additional vehicular traffic using the Marian Street/Cornwallis Street/Rosehill Street loop, however these vehicles would be required to park within the ancillary facility areas or in other areas further away from the station. The less than 40 light vehicle movements per day (total for the Project) would give rise to minimal impacts to on-street parking. Construction vehicles (likely to be either small, medium or heavy rigid vehicles between 6.4 m and 12.5 m in length) would need to access the Ancillary facility 3 using Rosehill Street, and then Marian Street and Cornwallis Street on egress. The required traffic control to allow this may include restricting additional on-street parking on at least one side of Rosehill Street for intermittent periods.

There is existing on-street parking available within 400 m of these lost parking spaces, primarily along Rosehill Street, Cornwallis Street, Gibbons Street, Regent Street, Garden Street and Boundary Street.

Little Eveleigh Street

The railway-owned land at the western end of Little Eveleigh Street is proposed to be used as an ancillary facility (Ancillary facility 2) and would be accessed from either Carriageworks (subject to approval with the operator of Carriageworks) or Little Eveleigh Street. The ancillary facility would provide construction parking facilities, rail corridor access and laydown area, and would likely be where some components of the new concourse could be assembled prior to installation within the railway corridor.

Parking along Little Eveleigh Street would become unavailable when works for establishment of the shared zone commences; this would involve the permanent relocation of 20 existing on-street parking spaces (including 18 resident/restricted parking spaces, one accessible parking space and one car

share scheme parking space from Little Eveleigh Street). These spaces would be relocated to the proposed new car park within railway corridor land at the western end of Little Eveleigh Street (refer to Figure 2). This replacement carpark would be operational prior to the commencement of works on the shared zone.

Temporary relocation to an alternate off-street site would increase travel distances for residents and the community to access their vehicles.

Ivy Street

The works proposed in Ivy Street (i.e. footpath widening) may require temporary relocation of on-street parking activity on Ivy Street to accommodate construction activities. The existing on-street spaces would be temporarily unavailable, and users would need to use alternate parking spaces in other surrounding streets, which would potentially result in longer walking/travel distances to and from cars. There is existing on-street parking available within 400 m of these lost parking spaces including on the section of Ivy outside of the Project area, Wilson Street, Lawson Street, Abercrombie Street and Lander Street.

Gibbons Street

Gibbons Street south of Marian Street provides on-street car parking along both sides of the road. On-street parking is generally time-restricted, with a two-hour limit.

A new kiss and ride facility is proposed along Gibbons Street. These construction works would require the removal of approximately three restricted car parking spaces. In the context of the existing street parking available along Gibbons Street and other roads in the vicinity, this impact is minor.

The proposal to upgrade the existing footpath along Gibbons Street may also restrict access to a number of on-street car parking spaces due to footpath diversion requirements as well as construction activities.

There is existing on-street parking available within 400 m of these lost parking spaces, primarily along Rosehill Street, Cornwallis Street, Regent Street, Garden Street and Boundary Street.

Lawson Street

Up to four time-restricted (two-hour limit) street parking spaces on Lawson Street would be unavailable as a result of the proposed works along Lawson Street near Little Eveleigh Street, before the permanent removal of approximately three parking spaces to accommodate the proposed kiss and ride facility at this location. These parking spaces are typically used by staff and visitors to nearby commercial establishments, as well as residents. They would need to have to park further away which would impact on the walking distance typically associated with using the impacted car parking spaces.

There is existing on-street parking available within 400 m of these lost parking spaces including on the section of Ivy outside of the Project area, Louis Street, Caroline Street, Abercrombie Street and Hugo Street.

Sydney Trains staff carpark

The existing Sydney Trains carpark on Marian Street would form part of ancillary facility 3 for the Project (including a site office compound and an administration centre), which would include the erection of several site sheds and car parking facilities for construction staff. This site may also be used for storage of construction equipment and materials. Construction staff would be encouraged not to park on local streets, and to use public/active transport or car pool wherever possible.

This activity would require relocation of the carpark on Marian Street, currently utilised by Sydney Trains staff. Alternative parking arrangements would be required for these vehicles, and Sydney Trains vehicles would be required to park at the staff car park off the western end of Little Eveleigh Street.

4.2.7 Traffic

Additional traffic generated by the Project would constitute up to 20 heavy vehicle movements and up to 40 light vehicle movements per day during peak construction periods. Heavy vehicles would likely be either Small, Medium or Heavy Rigid Vehicles between 6.4 m and 12.5 m in length. The frequency of these vehicle movements would be as required and would depend on the construction stage and

activity being undertaken, with most of these movements anticipated during the concourse construction, the modification of 125-127 Little Eveleigh Street, during roadworks on Little Eveleigh Street and Marian Street, and also for spoil movement.

Heavy vehicles would generally follow established heavy vehicle routes (approved by TfNSW (former RMS)) to access the ancillary facilities, and only use local roads where required to complete the trip. Key regional access routes to the construction areas include Cleveland Street, Regent Street, Wyndham Street/Gibbons Street and Lawson Street. Locally, Little Eveleigh Street, and the Marian Street/Cornwallis Street/Rosehill Street loop would be used to access ancillary facilities 2 and 3. The access route for ancillary facility 1 would include Wyndhan Street, Botany Road, McEvoy Street, Fountain Street, Mitchell Road, Copeland Street/Swanson Street and Railway Parade (refer to Figure 3).

Traffic modelling has not been undertaken to assess the impact to intersection or network performance as a result of the expected peak volume of construction vehicles (20 heavy vehicles and 40 light vehicles per day). Traffic volume increases of this nature would create negligible traffic impacts on the key local and regional access routes, given that this traffic from the Project would result in a small percentage increase in traffic volumes for these key routes.

The arterial road network generally has higher operating capacity and is more resilient than local roads. Where possible, the vehicle movements would follow the arterial road network, which generally has a higher operating capacity than local roads. Further, construction traffic would largely be generated outside of the network peak periods and distributed throughout the working day.

However, the local roads that would be used to access the construction sites and construction ancillary facilities would generally have lower operating capacity, but also lower background traffic volumes. Potential traffic impacts could include higher safety risks associated with pedestrian, cyclist or vehicle interaction with construction traffic rather than impacts to network performance. Local access for residences would be maintained at all times. In particular, along Little Eveleigh Street and the Marian Street/Cornwallis Street/Rosehill Street loop, partial road closures and diversions for through traffic would be required during specific phases of construction to complete the works. In this instance, access for through traffic would be prohibited for the duration of the closure, and drivers attempting to use Little Eveleigh Street would be diverted along Lawson Street. Drivers accessing the Marian Street/Cornwallis Street/Rosehill Street loop would be for local access as there is no through route so diversions would not apply here. The impacts to travel time of these drivers are not expected to be significant as these roads generally provide local access rather than a key through route for general traffic, and there is a convenient diversion route along Lawson Street for through traffic. Furthermore, network performance as a result of any diversions and road closures is not expected to deteriorate due to the low number of construction vehicle volumes expected, and also as road closures and construction vehicle movements in general would be planned to occur outside of peak hours where possible.

A construction traffic management plan would be prepared during detailed design in coordination with the construction contractor. All vehicle movements associated with the Project would be scheduled to arrive and depart to a fixed operating schedule to avoid impacts to the road network. This may include queueing/possible reverse manoeuvres at the ancillary areas and work sites and the stacking of heavy vehicles awaiting delivery slots etc. As a worst case assessment, if all 60 vehicle trips were generated in a single hour, it would result in an additional vehicle trip every minute. These additional trips would also likely be distributed across the network at the various work sites and ancillary facilities, further reducing the density of the additional traffic volumes.

4.2.8 Property access

4.2.8.1 Marian Street/Cornwallis Street/Rosehill Street

During construction along Marian Street/Cornwallis Street/Rosehill Street it is anticipated that access would be maintained for local vehicles, pedestrians and cyclists, however some diversions may be required and space may be constrained. Some delays may also be experienced due to the presence of construction vehicles and machinery. These impacts would be experienced by pedestrians and vehicles accessing properties along these streets, particularly 1 Marian Street (The Watertower Building). These could also extend to vehicular access to other properties serviced by Marian Street/Cornwallis Street/Rosehill Street, particularly those on the northern side of Margaret Street.

4.2.8.2 Little Eveleigh Street

During construction of the proposed shared zone along Little Eveleigh Street it is anticipated that access would be maintained for local vehicles, pedestrians and cyclists. However, in some instances access to individual properties may be temporarily impacted. These impacts would be discussed and coordinated with individual residents to minimise the impacts as far as possible. Furthermore, some diversions for through vehicles and space restrictions may be required, and some delays may be experienced due to the presence of construction vehicles and machinery. This would include impacts to pedestrians accessing the residences and commercial establishments, as well as to vehicles accessing existing off-street parking areas. These impacts would be experienced across the majority of the construction period, however closures and diversions would be limited to shorter time periods as required.

There are an estimated eight driveways with 12 car parking spaces impacted on the north side of Little Eveleigh Street and two driveways with two parking spaces on the south side. This excludes 125-127 Little Eveleigh Street, existing uses of which would be changed as part of the Project. Access to driveways would be maintained at all times throughout the Project.

4.2.8.3 Ivy Street

The Project also involves footpath widening works on Ivy Street. During these works it is expected that property access would be maintained, however temporarily impacts may be experienced during times where diversions are required. Potential impacts associated with longer walking distances as a result of parking diversions would be experienced by residents during times in which typical parking spaces are occupied by construction works, vehicles or machinery.

4.2.8.4 Gibbons Street

The existing footpath along the western side of Gibbons Street would be upgraded to connect to the existing footpath which provides access to the station entrance. These works may temporarily impact pedestrian access to/from Gibbons Street Reserve through the requirement to put diversions in place. The portion of the reserve that would be used as an ancillary facility would be unavailable to the public also.

4.2.8.5 Lawson Street

Construction works associated with the new kiss and ride and new bus zone along Lawson Street would require a footpath upgrade. The proposed works would impact pedestrian access to the residences and commercial developments along the section of Lawson Street (near Little Eveleigh Street) due to footpath diversions and reduced widths, as well as vehicular access to existing off-street parking areas, which would also be temporarily disrupted. Three restricted car parking spaces would be removed as part of these works. Pedestrian access would be maintained by ensuring that adequate and safe pedestrian paths are maintained along Lawson Street between Redfern Station and Abercrombie Street. Where required, construction hoarding would be erected to ensure pedestrian safety.

4.2.9 Access for emergency services, delivery vehicles and waste collection vehicles.

Access to Little Eveleigh Street and the Marian Street/Cornwallis/Rosehill Street areas would be maintained for emergency, delivery and waste collection vehicles during the Project's construction period. Waste bins may need to be relocated to areas accessible for collection by the waste collection service and in an area that does not disrupt access to the work site. This may result in minor impacts to the efficiency of the waste collection in terms of longer turnaround times.

4.3 Operational impacts

4.3.1 Operational overview

Following construction of the Project, Redfern Station would continue to operate as a major transportation hub with trains arriving and departing throughout the day and night. It is estimated that approximately 100,000 pedestrians would use the new concourse each day by 2036, including exit/entry, transfers and cross corridor usage. Key operational components of the Project directly related to customer experience are outlined in Section 1.1.

During operation, ongoing maintenance would be required for key operational components. This would be undertaken by Sydney Trains in line with standard maintenance policies. These standard policies would also include incident and emergency management procedures.

4.3.2 Future demand

Table 8 presents the potential forecast station patronage for 2024, based on investigations undertaken to inform the design of the Project.

Table 8 Redfern Station patronage forecasts for 2024

Period	Entries[1]	Transfers[1]	Exits[1]	Total
AM peak hour	2,570	4,630	10,160	17,360
PM peak hour	8,000	3,360	2,760	14,120

Notes:

1 – Transport for NSW and extrapolated data

It is estimated that around 19% of total commuters would use the Little Eveleigh Street entrance and 39% would use the Marian Street entrance.

The Project has been designed to account for the predicted patronage forecasts. Detailed design would continue to consider future patronage demands.

4.3.3 Pedestrians

The Project would improve the customer experience overall within the Redfern Station precinct, primarily by improving accessibility of the station and surrounds. The Project would introduce the following benefits:

- installation of six new lifts to provide an accessible path of travel to the station platforms and across the railway line
- improvements to the accessibility of the station for persons with a disability, including wheelchair users and people with a visual impairment
- additional stair access to the south of the platforms, potentially reducing walk distance for a number of customers, crowding at stairs and platform clearance times
- upgraded platform levels and surfaces
- improvements to the new station entries at Marian Street and provision for a new station entry at Little Eveleigh Street
- upgraded footpaths and pavement resurfacing
- upgraded wayfinding signage.

The Project also offers the opportunity to expand the walking catchment of Redfern Station and the local community. By upgrading the existing station entrance at Marian Street and providing a new entrance location at Little Eveleigh Street, walking distances to Redfern Station would mostly decrease, and improve accessibility for active transport modes.

The proposed shared zone on Little Eveleigh Street would also contribute to better experience for customers accessing the station, as it would include an improved access footpath, reduced traffic speeds, improved pedestrian safety and enhanced walkability.

Similarly, the proposed extension of the Marian Street shared zone would also enhance the customer experience and walkability along the south-east access to the Station.

In addition, the footpath widening works within Ivy Street would improve pedestrian safety and connectivity with Abercrombie Street and surrounding areas. The kiss and ride and footpath upgrades proposed on Gibbons Street and Lawson Street would improve safety for passengers alighting vehicles to access the station, however may slightly increase walking distances to the train station.

Access to the platforms would be limited to paying customers, and platforms would be closed after hours. Concourse and station entrances are proposed to remain open, where possible. Consultation

with key stakeholders is ongoing to confirm out-of-hours access arrangements. This would provide positive benefits for the community. The concourse would be fitted with security features such as lighting, CCTV cameras and emergency equipment.

During operation of the Project approximately 3,300 and 6,770 pedestrians are anticipated to utilise Little Eveleigh Street and Marian Street respectively during a typical AM peak hour. The shared zones would be designed to provide adequate capacity for these volumes.

4.3.4 Cyclists

Cyclists and cycle routes around Redfern Station would be impacted in the following ways during the operation of the Project:

- the existing Gibbons Street/Marian Street cycle path would not be adversely affected; however this cycle path would be enhanced by the expanded share zone along Marian Street.
- There would be potentially higher cyclist/pedestrian interactions on Marian Street due to the higher pedestrian volumes associated with the new station entrance.
- approximately 20 additional bicycle hoops would be provided at the new Marian Street station entrance, creating a positive impact for cyclists.
- higher risk between cyclist and pedestrian interaction along Little Eveleigh Street, due to the increased pedestrian volumes associated with the new station entrance and shared zone. It is noted that cyclists would not have a marked cycle lane within the shared zone and pedestrians would gain priority within this area. However the shared zone is designed to be a safe zone for all modes of transport, with a speed limit of 10km/h.
- additional bicycle hoops would be installed on Little Eveleigh Street, providing a total of 60 bicycle parking spaces at this location, creating a positive impact for cyclists.

4.3.5 Public transport

Once operational, Redfern Station would provide equitable access. Although not easily quantifiable, a number of train customers with special access requirements currently travel longer distances and transfer at Central Station instead of Redfern Station due to the current accessibility issues (e.g. absence of lifts). As a result of the Project these customers would be able to access all above ground platforms at Redfern Station. Which is a significant accessibility benefit.

The Project enables more evenly distributed spread of waiting passengers on the platforms, reducing congestion on the northern stairs. Investigations undertaken to inform the concept design of the Project indicate that the Project would potentially divert approximately 50 per cent of the current customer load on the Lawson Street entrances to the new entrance on Little Eveleigh Street, and the upgraded entrance on Marian Street.

The existing shuttle bus zone along Little Eveleigh Street would be relocated to Lawson Street as part of the Project. This relocation would not significantly increase the distance pedestrians would need to travel to the station given its close proximity to the existing bus zone. However, the relocated bus zone would provide a more direct route for buses and would not entail the longer turnaround time currently required when buses pull into Little Eveleigh Street.

Access to bus services on Gibbons Street would also be enhanced by the Project, with shorter walking distances between the platforms and the bus stops, via the new entrance at Marian Street.

Overall, the negative operational impacts of the Project on public transport operations are limited, with mostly significant positive impacts, generally associated with customer amenity, convenience and safety, offering a better customer experience.

4.3.6 Kiss and ride

The introduction of formalised kiss and ride facilities on Lawson Street and Gibbons Street presents a positive impact on the overall operation of the Station as it allows the opportunity for additional modal access to Redfern Station. Footpath upgrades are also proposed as part of the kiss and ride facilities, to ensure equitable accessibility from the kiss and ride locations to the station.

4.3.7 Taxi

The operation of the Project would have no direct impact on taxi operations, including on the existing taxi rank on Gibbons Street. Taxi customers interchanging to/from train services would gain benefits from the introduction of a kiss and ride facility (which taxis can access) and improved pedestrian facilities along the western side of Gibbons Street. The construction of the new entrance at Marian Street also provides an additional pedestrian access route with shorter distances between the platforms and the Gibbons Street taxi rank. Similarly, the introduction of the kiss and ride facility along Lawson Street also provides an additional taxi pick up/drop off area.

4.3.8 Parking

The key impacts the Project's operation on parking are as follows:

- Formalisation of the shared zone on Little Eveleigh Street would require the relocation of approximately 20 parking spaces to a new car park at the western end of Little Eveleigh Street (including 18 resident/restricted parking, an accessible space and a car share scheme parking space). The parking spaces would be replaced like for like. The relocation of existing on-street parking spaces along Little Eveleigh Street would require the users of these on-street spaces to walk longer distances to the new car park in some cases, however as the replacement parking is like for like, the impact is expected to be minor. It is further noted that no formal loading zones would be provided within the new shared zone areas.
- The upgrade of Marian Street/Cornwallis Street/Rosehill Street would require the permanent removal of approximately 16 car parking spaces, including five unrestricted parking spaces and 11 time-restricted spaces. The existing car share scheme parking space would be relocated to a new location further south along Rosehill Street. The final location of the relocated space would be determined in consultation with City of Sydney Council as part of the detailed design process. The loss of unrestricted parking would not likely have an impact on parking amenity as these are likely to be occupied by commuter or all-day parking given their proximity to the station. However, the loss of time-restricted (two-hour limit) and resident parking spaces would put additional pressure on the surrounding car parking supply, and inconvenience local residents who may need to park further away from their residence. In addition, formal loading arrangements would not be provided within the new formalised shared zone areas.
- The new kiss and ride and bus zone provided on Lawson Street, near the intersection of Little Eveleigh Street, would require three existing parking spaces to be removed (signed two hour restricted/permit holder unrestricted). The permanent removal of these parking spaces may put additional pressure on the surrounding car parking supply.
- The new kiss and ride provided on Gibbons Street would also require the removal of approximately three restricted car parking spaces. This may put additional pressure on the surrounding car parking supply.

As described in Section 4.2.6, there is existing on-street parking available within 400 m of these lost parking spaces.

4.3.9 Traffic

During operations the Project is not anticipated to significantly generate any additional vehicular traffic, and therefore negligible impacts to traffic flows around Redfern Station are expected.

The only notable change the Project would bring is the reduction in the speed limit to 10 kilometres per hour within the new shared zone areas (along Little Eveleigh Street and Marian Street/Cornwallis Street/Rosehill Street). Given the current traffic flow characteristics with slow operating speeds of vehicles along these roads, this is considered a negligible impact.

4.3.10 Property access

The operation of the Project would result in permanent impacts to property access along Little Eveleigh Street. The provision for a new station entry at Little Eveleigh Street would require relocation of the tenant of 125-127 Little Eveleigh Street by mid to late 2020.

The Little Eveleigh Street and the Marian Street/Cornwallis Street/Rosehill Street shared zone components of the Project would maintain all existing property access arrangements, including access to off-street vehicle parking (relocated) and space for waste collection and deliveries.

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5. Mitigation and management measures

5.1 Overview

This chapter describes the environmental management approach for traffic, transport and access during the construction and operation of the Project. Further details on the environmental management approach for the Project are provided in **Chapter 24** of the EIS (Environmental management approach and framework).

A Construction Environmental Management Framework (CEMF) (Appendix D of the EIS) describes the approach to environmental management, monitoring and reporting during construction. Specifically, it lists the requirements to be addressed by the construction contractor in developing the CEMP, sub-plans, and other supporting documentation for each specific environmental aspect.

A Traffic Management Plan would be developed for the Project as identified by Section 6.1 of the CEMF. The chapter includes a compilation of the performance outcomes as well as mitigation measures, including those that would be included in these plans.

5.2 Performance outcomes

The following performance outcomes have been established for this Project:

- safe and efficient access routes are provided for pedestrians, cyclists and road users, including buses
- maintain access for all customers to Redfern Station, while the station is operational
- access to residences and commercial properties is maintained
- access for emergency vehicles, waste management services and deliveries is maintained
- the local community, relevant authorities and other proponents undertaking concurrent work close to the Project are consulted to minimise disruptions to road, active transport and public transport users
- the local community and relevant authorities are consulted regarding upcoming Project construction activities to minimise disruptions to road, active transport and public transport users the Project provides convenient, safe and direct access for customers to the station during operation.

5.3 Mitigation measures

Table 9 outlines the mitigation measures that would be implemented to minimise transport and access impacts during construction and operation of the Project.

Table 9 Mitigation measures

ID	Mitigation measure	Applicable location(s)
Construction		
T1	Relocation of bus stops would be carried out by TfNSW in consultation with the City of Sydney, University of Sydney, Royal Prince Alfred Hospital, bus operators and other relevant authorities. Wayfinding and customer information would be provided to notify customers of relocated bus stops.	Little Eveleigh Street and Lawson Street
T2	The new offset parking facilities on Little Eveleigh Street would be constructed prior to the removal of parking, to accommodate parking spaces displaced to facilitate construction activities.	Little Eveleigh Street

ID	Mitigation measure	Applicable location(s)
T3	Road Safety Audits would be carried out to address vehicular access and egress, and pedestrian, cyclist and public transport safety. Road Occupancy Licences (or equivalent) for temporary road/lane closures would be obtained where required.	The Project area
T4	Appropriate signage and line marking would be provided to guide pedestrians and cyclists past construction sites and on the surrounding network to allow access to be maintained. Appropriate access measures would further be developed to guide customers with access requirements for disability, including wheelchair users and people with a visual impairment.	The Project area
T5	Community consultation would be carried out and notifications would be issued in advance for any proposed road and pedestrian network changes through appropriate channels and forms of communication.	The Project area
T6	Access to existing properties and buildings would be maintained, where possible, in consultation with property and business owners.	The Project area
T7	Construction sites would be managed to minimise construction worker parking on surrounding streets. Workers would be encouraged to use public or active transport and ride share with the implementation of a Green Travel Plan initiative. A workers reward scheme would be implemented for those who adhere to the initiative.	The Project area
T8	Construction site traffic would be managed to minimise traffic impacts during the peak periods through scheduling construction vehicle movements outside the peak hours. Where possible, group deliveries would be restricted.	The Project area
T9	Enhancement of pedestrian and cycle infrastructure at the station would be further investigated in consultation with relevant authorities, including TfNSW and the City of Sydney.	All
T10	Carry out pre-parking surveys and post-parking surveys and provide the data to City of Sydney. The surveys are to demonstrate that pressures on parking within the Project area and surrounds are managed in accordance with predicted future supply and demand.	All

6. Conclusion

This Traffic and Transport Assessment presents a qualitative assessment to identify potential impacts on road, public transport and active transport networks during the construction and operation of the Project.

6.1 Construction impacts

The Project is expected to cause temporary disruptions to the existing pedestrian, cycle, public transport and road networks during construction.

Pedestrian and cycle access to Redfern Station is likely to be restricted from Little Eveleigh Street and Marian Street during the construction of the new shared path facilities, however access would continue to be provided to the station via the station entrances from Gibbons Street ad Lawson Street. The proposed footpath upgrades along Ivy Street, Lawson Street and Gibbons Street would likely require temporary footpath closures, with diversions required onto adjacent footpaths or alternative routes. Additionally, the proposed ancillary facility located within Gibbons Reserve would likely require the occupation of the footpath, again requiring diversions for pedestrians and cyclists for the duration of the Project lifecycle. These impacts would be managed through the preparation of a Construction Traffic Management Plan, which would ensure that safe passage for pedestrians to pass these work sites is provided, and diversion routes where required.

The construction of the Project would require temporary periodic closure of the railway. It is anticipated that approximately 20 scheduled weekend rail shutdowns would be utilised to undertake a number of construction activities, with two additional (non-scheduled) rail possession periods proposed (including a possession across the 2020 Christmas period, between 1am on Saturday 26 December and 2am on Thursday 31 December). Furthermore, during times when train services would continue to run at Redfern Station, train customer movement on the station platform would be temporarily impacted due to the reduced amount of space resulting from construction work, particularly to allow for the construction of lift areas and stairway landings. In addition to the impacts to the railway, the existing bus zone on Little Eveleigh Street would be relocated onto Lawson Street to allow for the construction of the Little Eveleigh Street shared zone. Customers requiring access to the relocated bus zone would be required to travel approximately similar distances, and as such the impacts to customers utilising this bus zone are expected to be negligible.

Informal pick-up and drop-off activity was observed at the shared zone on Marian Street, on Little Eveleigh Street and on Lawson Street. The works proposed on Marian Street and Little Eveleigh Street would preclude pick-up and drop-off from occurring, and therefore temporary kiss and ride facilities would be provided on Lawson Street and Gibbons Street to mitigate this impact. The taxi rank on Gibbons Street, the only facility serving the station would remain unchanged during construction.

A number of parking spaces would be displaced due to the construction activities along Marian Street, Little Eveleigh Street, Ivy Street, Gibbons Street and Lawson Street. Alternative on-street parking is available within a 400-metre walk of these streets which would likely cater for these displaced parking spaces. In addition to this, a new off-street parking facility would be provided to replace the on-street parking that would be lost on Little Eveleigh Street upon completion of the Project. This facility would be provided prior to the construction of the shared zone of Little Eveleigh Street to mitigate this impact.

Traffic generated by the Project would constitute up to 20 heavy vehicle movements and up to 40 light vehicle movements per day during peak construction periods. The expected peak volume of construction vehicles (20 heavy vehicles and 40 light vehicles per day) would create negligible traffic impacts on the key regional access routes, given that this traffic from the Project would result in a small percentage increase in traffic volumes for these key routes. Furthermore, these movements would be scheduled outside of the AM and PM weekday peak periods to further mitigate the impacts.

The proposed works along Little Eveleigh Street and the Marian Street/Cornwallis Street/Rosehill Street loop would likely require partial road closures and diversions during specific phases of construction to complete the works. Drivers accessing these streets are likely to be doing so for local property access, which would be maintained through the construction of the Project. Network performance as a result of any diversions and road closures is not expected to deteriorate significantly due to the low number of construction vehicle volumes expected.

It is concluded that although there are likely to be negative impacts during the construction of the Project, the impacts are not expected to be significant due to the proposed mitigation measures that would be put in place to reduce these impacts.

6.2 Operation impacts

The Project would improve the customer experience overall within the Redfern Station precinct, primarily by improving accessibility of the station and surrounds. It also offers the opportunity of expanding the walking catchment of Redfern Station and the local community. By opening the new entrance gates, walking distances to Redfern Station for some customers would decrease, and improve accessibility for active transport modes.

Improved cycle facilities are proposed as part of the Project, with additional bicycle parking spaces provided along Little Eveleigh Street and Marian Street. The bicycle network would remain largely unchanged, however the introduction of the shared zone along Little Eveleigh Street may have the potential to increase the risk of pedestrian / cycle collisions but would likely reduce the speed of general traffic which would help reduce the severity of any vehicle / cycle collisions at this location.

Once operational, Redfern Station would provide equitable access. Although not easily quantifiable, a number of train customers with special access requirements currently travel longer distances and transfer at Central Station instead of Redfern Station due to the current accessibility issues (e.g. absence of lifts). As a result of the Project these customers would be able to access all above ground platforms at Redfern Station, which is a significant accessibility benefit. The Project enables more evenly distributed spread of waiting passengers on the platforms, reducing congestion on the northern stairs and assist in managing safety risks associated with crowding. Furthermore, the bus infrastructure surrounding the station would provide more direct access to / from the station with redesigned facilities along Lawson Street and Gibbons Street.

One of the residual impacts of the Project during its operation is the loss of parking spaces along Marian Street, Rosehill Street, Gibbons Street and Lawson Street. A total of 22 parking spaces would be lost, made up of five unrestricted parking spaces and 17 time limited / resident parking spaces. There is alternative on-street parking available within a 400-metre walk of these streets which would likely cater for these displaced parking spaces.

During operations the Project is not anticipated to significantly generate any additional vehicular traffic, and therefore negligible impacts to traffic flows around Redfern Station are expected.

The only notable change the Project would bring to the road network is the reduction in the speed limit to 10 kilometres per hour within the new shared zone areas (along Little Eveleigh Street and Marian Street/Cornwallis Street/Rosehill Street). Given the current traffic flow characteristics with slow operating speeds of vehicles along these roads, this is considered a negligible impact.

There would also be no impact to property or business access during operation of the Project.

It is concluded that there are positive impacts on the public and active transport networks, and negligible impacts to the road network upon completion of the Project. The Project would result in the removal or relocation of car parking spaces. However, alternative parking arrangements would be provided and additional parking pressures resulting from the Project would be managed in consultation with City of Sydney.

7. References

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