

# Panania Station Upgrade

Traffic, Transport and Access Impact Assessment



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Client: Transport for New South Wales

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31-May-2016

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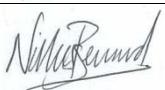
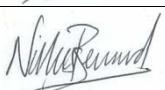
Ref 60488497

Date 31-May-2016

Prepared by Marcel Cruz

Reviewed by Nick Bernard

### Revision History

Revision	Revision Date	Details	Authorised Name/Position	Signature
A	20-Apr-2016	Draft	Nick Bernard Senior Transport Planner	
B	26-May-2016	Revision to incorporate TfNSW comments	Nick Bernard Senior Transport Planner	
C	31-May-2016	Final	Nick Bernard Senior Transport Planner	

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## 1.0 Introduction

### 1.1 Background

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

In 2015, Jacobs (commissioned by TfNSW) produced accessibility upgrades concept plans and undertook options development and assessment for the Panania Station Precinct. The report developed alternative concept plans to address station precinct deficiencies and a preferred concept was identified using a Multi-Criteria Assessment methodology.

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

### 1.2 Proposal context

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

- stations that are accessible to those with disabilities, the ageing, parents/carers with prams and customers with luggage
- modern buildings and facilities for all modes that meet the needs of a growing population
- modern interchanges that support an integrated network and allow seamless transfers between all modes for all customers
- safety improvements including extra lighting, lift alarm, fences and security measures for car parks and interchanges, including stations, bus stops and wharves
- signage improvements so customers can more easily use public transport and transfer between modes at interchanges
- other improvements and maintenance such as painting, new fencing and roof replacements.

### 1.3 Study area

Panania Station is located between Marco Avenue and Weston Street within the suburb of Panania. The Panania Station Precinct includes the station, associated interchange structures and buildings, gates, pedestrian and cycle access paths, pedestrian access, pedestrian linkages to the adjacent streets and commuter car parking, bus stops, kiss and ride locations and bicycle facilities. The indicative boundary definition of Panania Station Precinct (i.e. study area) is shown in Figure 1. The broader Panania area was also considered in terms of the road network and potential traffic impacts on the northern and southern side of the station.

For the purposes of this assessment Anderson Avenue to the north of Panania Station has been referred to as Anderson Avenue (north) and Anderson Avenue to the south of Panania Station has been referred to as Anderson Avenue (south) as shown on Figure 1.

**Figure 1 Location map**

Source: AECOM, 2016

## 1.4 Proposed works

The Proposal involves an upgrade of Panania Station as part of the Transport Access Program which would improve accessibility and amenities for customers. The Proposal would provide a number of improved features to provide an accessible station and improved interchange facilities, including:

- installation of three new lifts and stairs to provide access to the island platform
- replacement of the existing footbridge with a new pedestrian bridge
- installation of new canopies at both station entrances and along the new pedestrian bridge, stairs, lift landings and sections of the platform
- refurbishment of the Platform Building with a new family accessible toilet, an accessible Customer Information Window and staff facilities to replace existing facilities
- new undercover bicycle rack on the southern side of the station and an upgrade to the existing bicycle rack on the northern side of the station
- provision of two new accessible parking spaces on both sides of the station
- upgrades to the existing kiss and ride and taxi rank facilities on Anderson Avenue (south) and installation of two additional kiss and ride spaces on Weston Street
- installation of a new raised pedestrian crossing on Weston Street, a new pedestrian refuge on Anderson Avenue (north) and new line marking on Braesmere Road
- new kerb ramps to provide an accessible path of travel to new and existing interchange facilities
- relocation of High Voltage electrical cables below ground at the station and surrounds

- ancillary works including platform regrading (as necessary), services diversion and/or relocation, station power supply upgrade, minor drainage works, adjustments to lighting, upgrades to fencing and landscaping, new ticketing facilities including additional Opal card readers, improvement to station communication systems (including CCTV cameras) and wayfinding signage.

A detailed description of the Proposal and its associated works are provided in Section 3 of the Panania Station Upgrade Review of Environmental Factors (AECOM, June 2016).

Construction is anticipated to commence in 2016 and would take approximately 18 months to complete. It is likely that around seven weekend rail possessions would be required.

An alternative construction option is being considered which may use an extended (six week) temporary station closure to allow for an accelerated construction completion which would reduce the overall program by up to six months.

If the temporary station closure option is adopted, replacement shuttle buses would be provided between Panania and its adjacent stations (East Hills and Revesby) at suitable intervals for the duration of the shutdown. The benefits of this alternative construction option include:

- reduced construction period (by up to six months) which would allow the upgraded station to be opened to the community sooner
- reduced temporary visual and amenity impacts due to a reduced construction period
- reduce the safety risk to the customers from the construction/pedestrian interface
- improve construction staging efficiency with potential cost benefits.

The construction methodology would be further developed during the detailed design of the Proposal by the nominated contractor in consultation with TfNSW. Both construction options have been assessed in this report.

## 1.5 Scope of the study

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

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

A site visit was undertaken on Tuesday 5 April 2016 to observe the existing conditions at the site. In addition, a number of technical documents were reviewed to inform the assessment of Panania Station, including:

- Concept Plan Final Report (Jacobs, 2015a)
- Traffic, Transport and Access Impact Assessment (Jacobs, 2015b)
- Panania Pedestrian Modelling Technical Note (Jacobs, 2015c).

## 2.0 Existing conditions

### 2.1 Panania context

The suburb of Panania is located approximately 22 kilometres south-west of Sydney central business district, within the Canterbury-Bankstown Local Government Area (LGA).

Panania is bordered by the suburbs of East Hills to the west, Revesby to the east, Sandy Point to the south and Milperra to the north. The suburb is served by the T2 Airport, Inner West and South Line providing connections to the suburban Sydney Trains network. The adjacent stations to Panania are East Hills (west) and Revesby (east).

The land use surrounding Panania Station comprises primarily low density residential areas and mixed use local centres. Figure 2 illustrates some of the key roads and land use features in Panania including community facilities, schools, parks and reserves.

**Figure 2 Panania context**

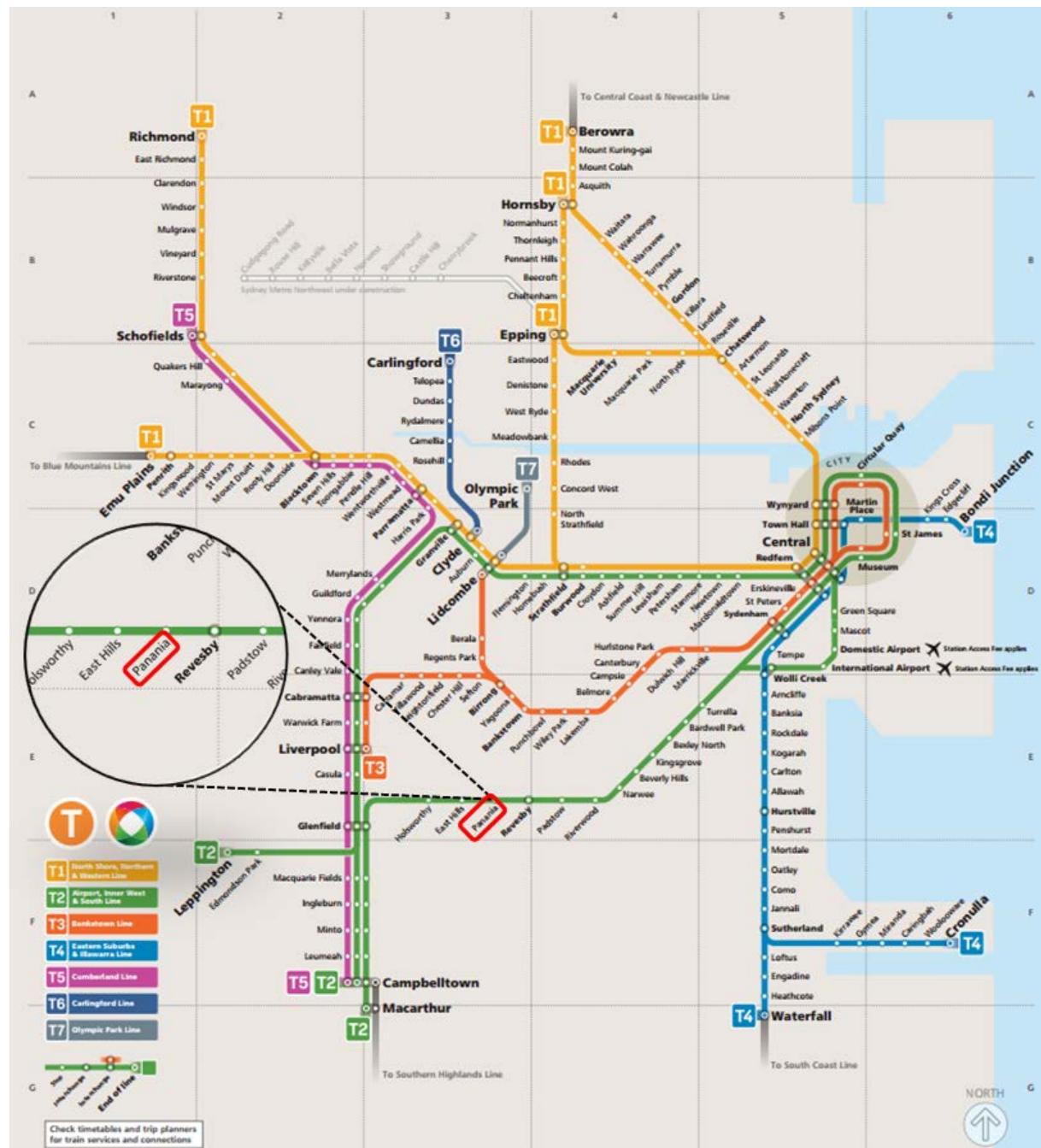


Source: AECOM, 2016

## 2.2 Panania Station

Panania Station is served by the T2 Airport, Inner West and South Line providing train services between Macarthur and the City via the Airport. Figure 3 shows Panania Station on the Sydney Trains network.

**Figure 3 Location of Panania Station on the Sydney Trains network**



Source: Sydney Trains, 2016 (modified by AECOM 2016)

The main station entrances are from Anderson Avenue (north) to the north and Weston Street/Anderson Avenue (south) to the south. The station is currently accessible by a *Disability Discrimination Act 1992* (DDA) non-compliant ramp on either side of a footbridge which crosses the railway. Stairs provide the only means of access from the footbridge to the island platform. The footbridge and ramps also provide an access point for pedestrian and cyclists to cross the railway. There are also no canopies for weather protection above the footbridge, ramps and stairs.

The station consists of an island platform with Platform 1 located on the northern side of the station and provides services in the up direction to the City via Airport. Platform 2 is located on the southern side of that station and provides services in the down direction to Campbelltown and Macarthur.

The number of services at Panania Station during the AM and PM two hour peak periods are shown in Table 1.

**Table 1 Rail services at Panania Station (part of the T2 Airport, Inner West and South Line)**

Key Destination	AM Weekday Peak (07:00-09:00)	PM Weekday Peak(16:00-18:00)
Macarthur to City via Airport	10 services	8 services
City to Macarthur via Airport	10 services	8 services

Source: Sydney Trains, 2016

## 2.2.1 Current train passenger travel demand

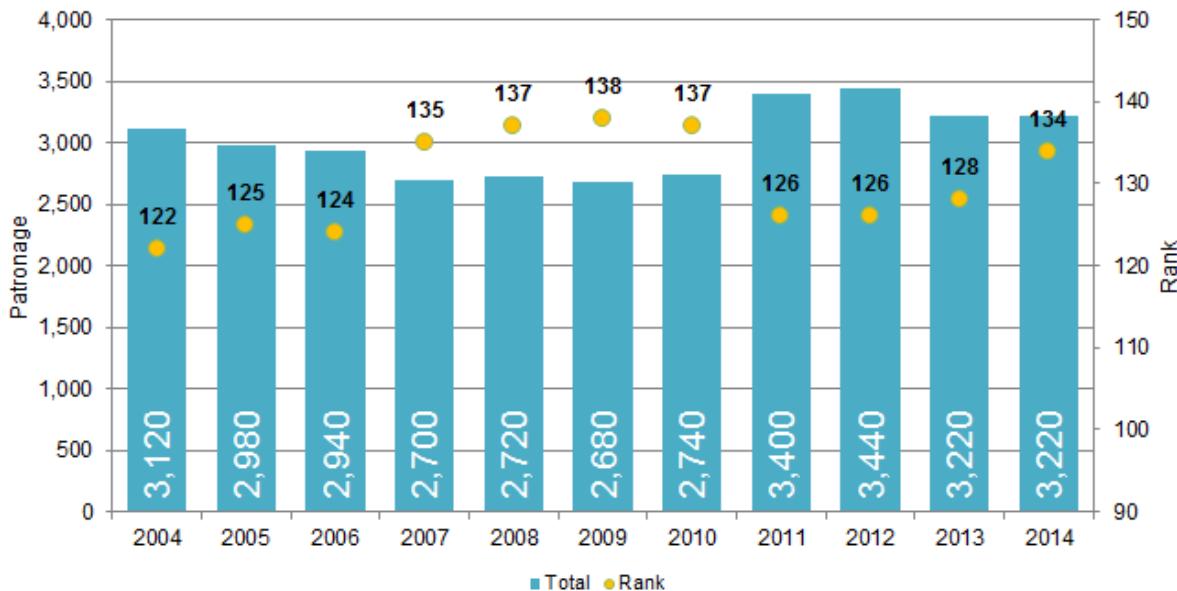
Station barrier counts obtained from the Bureau of Transport Statistics reveal Panania Station is the 134<sup>th</sup> busiest station on the Sydney Trains network with approximately 3,230 trips per average weekday recorded in 2014. A breakdown of the 2014 station entries and exits are provided in Table 2.

**Table 2 Panania Station 2014 barrier counts**

Time period	In (number of customers)	Out (number of customers)
0200 – 0600	30	10
0600 – 0930	800	510
0930 – 1500	270	180
1500 – 1830	480	660
1830 – 0200	30	260
<b>Total (24 hours)</b>	<b>1,610</b>	<b>1,620</b>

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

Historical patronage figures for Panania Station are provided in Figure 4. The general trend in the data suggests that patronage has remained relatively steady over the past decade at about 3,000 trips per day. A fall in patronage was recorded between 2004 and 2007, with patronage remaining steady between 2007 and 2010 before increasing again to 3,400 trips per day in 2011.

**Figure 4** Historical patronage data at Panania Station

Source: Station Barrier Counts – 2004 to 2014, Bureau of Transport Statistics, 2016

## 2.2.2 Access mode split

A mode of access count was undertaken by Jacobs as part of the development of the concept design options on Wednesday 12 November 2014, which identified the modes of access during the AM peak period. Results of the counts indicate that 48 per cent of station entries arrived by walking and 47 per cent accessed the station by car (either as a driver or passenger). Table 3 presents the mode of access survey results.

**Table 3** Access mode to Panania Station in the AM Peak Period

Mode	Percentage
Walk	48%
Bicycle	<1%
Bus	5%
Car lift (passenger / kiss and ride)	21%
Car park (park and ride)	26%

Source: Jacobs, 2015

## 2.2.3 Station accessibility

The station is located between Anderson Avenue (north) and Weston Street, with an existing footbridge joining the two access points above the railway. Panania Station is currently not accessible with stairs the only form of access provided to the station platform, located at the centre of the footbridge. In addition, the existing ramp grades from both station entrances do not comply with DDA requirements.

The majority of the station facilities are located on the platform level and there are currently a number of interchange facilities provided at Panania Station, as shown in Table 4

**Table 4** Panania Station facilities

Accessibility	General facilities	Transport interchange
- Stairs - Ramps (1:8 gradient) - Hearing loop - Portable boarding ramp	- Ticket vending machine - Toilets - Payphone - Real-time information display screens - Help point	- Bus stops - Taxi ranks - Bicycle racks - Kiss and ride - Car parks

Source: Sydney Trains, 2016

## 2.2.4 Pedestrian facilities

Pedestrian access to Panania Station is provided from Anderson Avenue (north) and Weston Street, via ramps and a footbridge over the railway. Footpaths are present along both sides of Anderson Avenue (north) and on the southern side of Weston Street. There is also a pedestrian path on the north side of Braesmere Road and through Edwards Reserve. The existing footbridge and ramps are unpaid and provide an access point for pedestrians to cross the railway to/from Anderson Avenue (north) to Anderson Avenue (south) and are likely to be used by parents/carers with prams and customers with luggage and/or bicycles. The pedestrian facilities at the Panania Station Precinct are presented in Figure 5.

**Figure 5 Overview of pedestrian facilities and access routes**



Source: Panania Station Precinct Accessibility Upgrade Concept Plan, Jacobs, 2015

Figure 6 and Figure 7 highlight some of the key pedestrian facilities near Panania Station. Pedestrian refuge islands are provided on Marco Avenue, Anderson Avenue (north) and Braesmere Road on the northern side of the station. Two raised pedestrian crossings are provided on Anderson Avenue (south), between Sherlock Avenue and Tower Street on the southern side of the station. A pedestrian crossing is also provided on Sherlock Avenue providing direct access to the southern entrance on the western side of Anderson Avenue (south). These facilities provide pedestrians a safe crossing point to and from the station. These crossings have tactile ground surface indicators (TGSIs) installed to assist with providing an accessible path of access.

There is no formal crossing of Weston Street to the east of the southern entrance adjacent to the commercial premises. There is a traffic management speed hump and kerb ramps which provide a natural location for pedestrians to cross Weston Street as shown in Figure 8 though there are no safety control measures currently installed.

**Figure 6 Pedestrian refuge island on Braesmere Road**



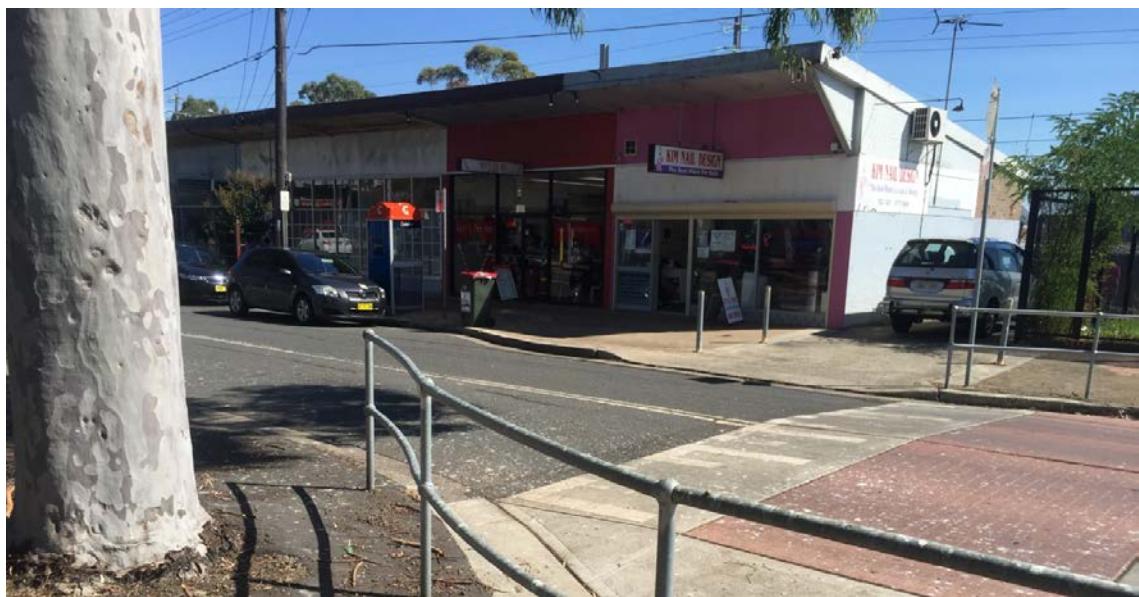
Source: AECOM, 2016

**Figure 7 Pedestrian crossing on Sherlock Avenue and Anderson Avenue (south)**



Source: AECOM, 2016

**Figure 8 Traffic management speed hump and kerb ramps at Weston Street**



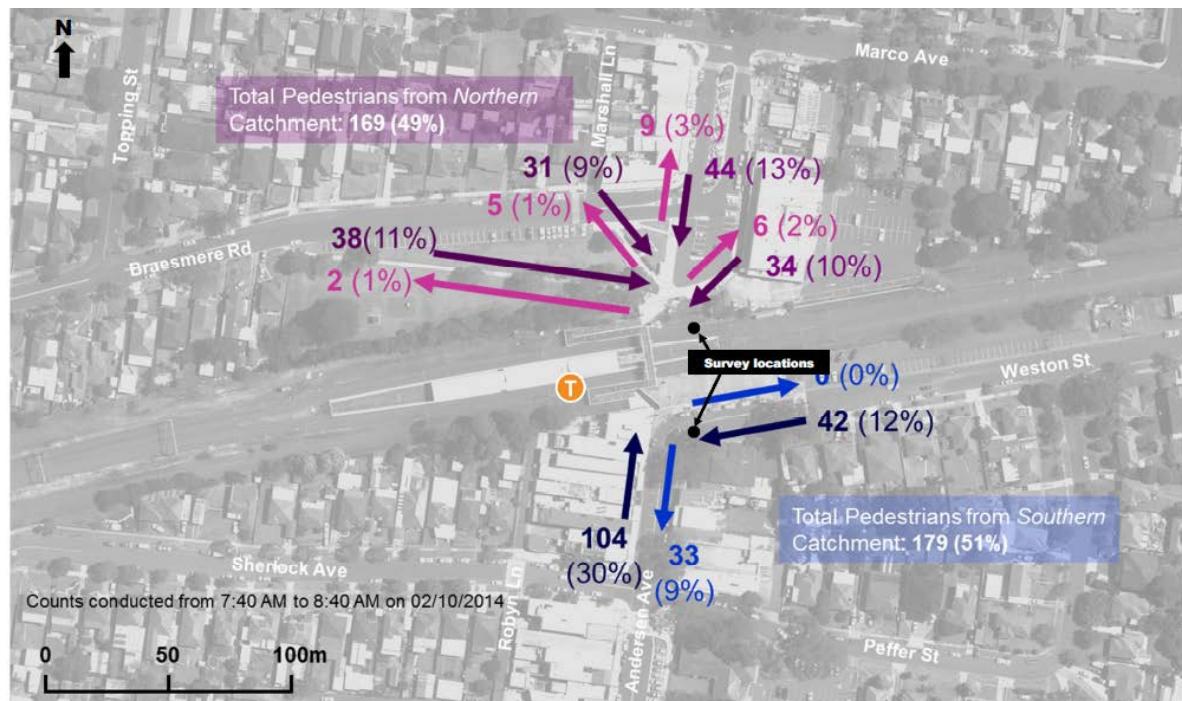
Source: AECOM, 2016

A pedestrian count was undertaken by Jacobs as part of the development of concept design options to survey station platform pedestrian movements during the AM peak period on 2 October 2014. Analysis of the AM peak hour pedestrian movements at the station showed the following travel patterns:

- approximately 49 per cent of the station access / egress movements originated from the northern side (Anderson Avenue)
- approximately 51 per cent of the station access / egress movements originated from the southern side (Weston Street).

Figure 9 presents the results of the pedestrian analysis, indicating the directional splits for pedestrians accessing and egressing the station.

**Figure 9 Pedestrian access analysis – AM peak hour**

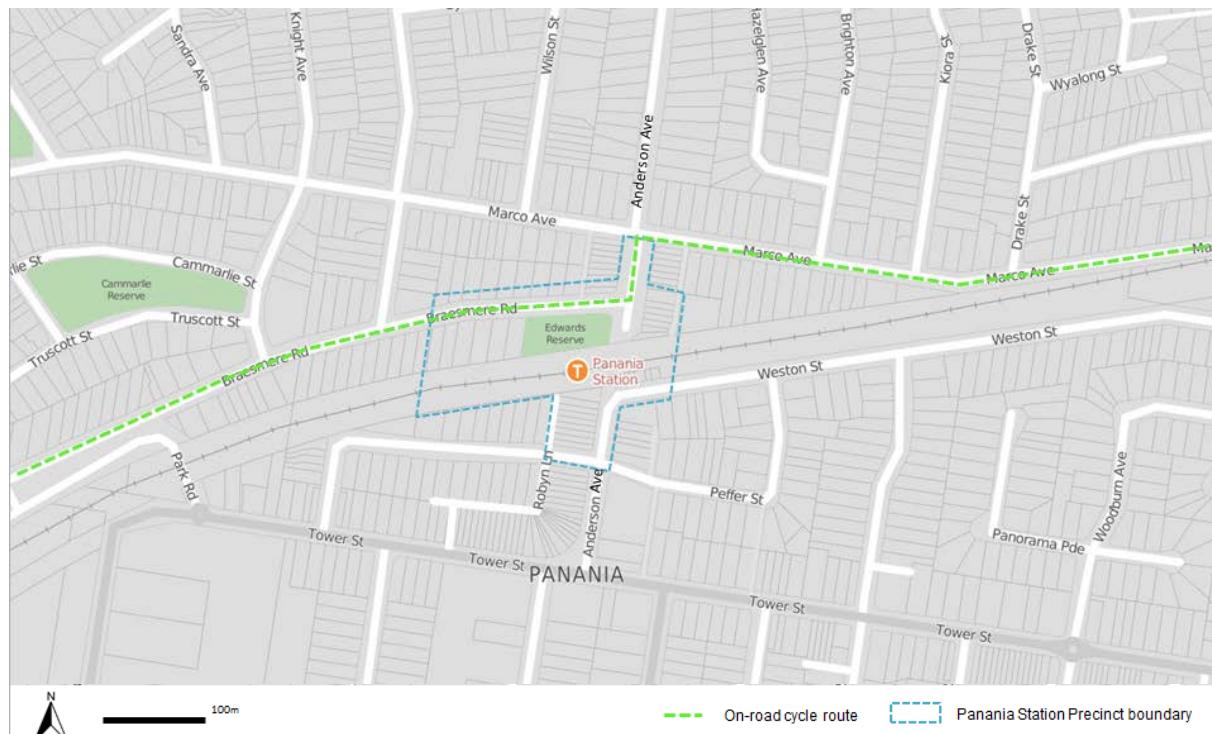


Source: Panania Station Precinct Accessibility Upgrade Concept Plan, Jacobs, 2015

## 2.2.5 Cycling facilities

Existing cycle routes in the vicinity of the Panania Station Precinct are shown in Figure 10, and there is currently an on-road cycle route along Braesmere Road, Anderson Avenue (north) and Marco Avenue, approximately 45 metres to the north of the station entrance. There are currently no formal cycle routes to the southern (Weston Street) station entrance.

**Figure 10 Cycle routes around Panania Station**



Source: Sydney Cycleways, 2016

There is an existing sheltered bicycle rack with the capacity for six bicycles on the northern side of the station close to the station entrance, as shown in Figure 11. There are no formal bicycle racks provided on the southern side of the station. It was noted during AECOM's field inspection that the existing bicycle rack on the northern side of the station was being used within the spaces available, however additional bicycles were locked to other street furniture (e.g. sign posts) near the southern station entrance.

**Figure 11 Bicycle racks near the northern entrance**



Source: AECOM, 2016

## 2.2.6 Bus services and facilities

Figure 12 presents the bus routes that currently stop within walking distance of Panania Station. These bus routes connect residential areas to local transport interchanges, as well as employment and retail areas. The bus stops shown on Weston Street, Braesmere Road and Anderson Avenue (south) are the main bus stops for interchange between rail and bus at Panania Station.

**Figure 12 Bus routes servicing Panania Station**



Source: Panania Station Precinct Accessibility Upgrade Final Report, Jacobs, 2015

The following bus routes service Panania Station operated by Transdev Bus Company and Sydney Buses:

- Route 923 operates from Panania to Bankstown via Revesby; it also provides limited services to Picnic Point and Revesby Heights
- Route 924 operates from East Hills to Bankstown via Panania and Revesby
- Route 925 operates from East Hills to Bankstown via Panania, Revesby, and Condell Park
- Route S5 operates from Milperra to Padstow via Panania and Revesby.

Bus services are provided around every 30 minutes for routes 923, 924 and 925 during peak periods on Monday to Friday (AM peak: 07:00 to 09:00, PM peak 16:00 to 18:00). Five services are provided for the S5 bus route per day (Monday to Friday) in each direction.

In addition, Route N40 operates from East Hills to City, providing NightRide services (late night bus departures) providing ten night bus services from 12:00 to 05:00.

The existing bus stops on Weston Street and the south of Braesmere Road are sheltered with accessible wheelchair spaces and have Tactile Ground Surface Indicators (TGSIs) to indicate boarding point. These facilities are not provided at the Anderson Avenue (south) nor the northern Braesmere Road bus stop.

## 2.2.7 Parking facilities

There are a number of car parking facilities available around Panania Station, however there are currently no accessible parking facilities. There is a commuter car park located along Braesmere Road on the northern side of the station, providing 44 untimed car parking spaces as shown in Figure 13. There is also a commuter car park located along Weston Street on the southern side of the station providing 77 untimed on-street parking spaces as shown in Figure 14.

There are currently no accessible parking spaces provided at either commuter car park locations. A limited number of short term (1P) on-street parking spaces are also provided to the south of the station, along Weston Street adjacent to the commercial properties. However, these spaces are located within the local centre and are not available exclusively to commuters.

During AECOM's field inspection it was observed that both commuter car parks were fully occupied. However, a number of unrestricted on-street parking spaces were available on surrounding streets.

**Figure 13 Northern commuter car park on Braesmere Road**



Source: AECOM, 2016

**Figure 14 Southern commuter car park on Weston Street**



Source: AECOM, 2016

## 2.2.8 Kiss and ride facilities

Panania Station currently provides a formal signposted kiss and ride zones on both sides of the station adjacent to the blue signs as shown in Figure 15 and Figure 16.

North of the station, the kiss and ride zone is provided on Anderson Avenue (north), to the east of Edwards Reserve. South of the station the kiss and ride zone is provided where Anderson Avenue (south) meets Weston Street, in front of the station entrance. Sheltered seating is provided at the northern kiss and ride zone only as shown in Figure 15.

During the AM peak it was observed that short term parking near the southern entrance on Weston Street was also frequently used for informal kiss and ride.

There is currently no accessible path of travel from these facilities to the island platform.

**Figure 15 Kiss and ride zone on the northern side of Panania Station**



Source: AECOM, 2016

**Figure 16 Kiss and ride zone on the southern side of Panania Station**



Source: AECOM, 2016

## 2.2.9 Taxi facilities

Two taxi zones are provided near Panania Station, both with one space each. To the north, a taxi zone is located along Anderson Avenue (north), approximately 30 metres from the northern station entrance. The southern taxi rank is located along Sherlock Avenue, approximately 80 metres from the southern station entrance. Both two taxi zones are unsheltered and have no seating. The Sherlock Avenue taxi rank is shown in Figure 17.

**Figure 17 Taxi zone on the southern side of Panania Station (on Sherlock Avenue)**



Source: AECOM, 2016

## 2.3 Road network

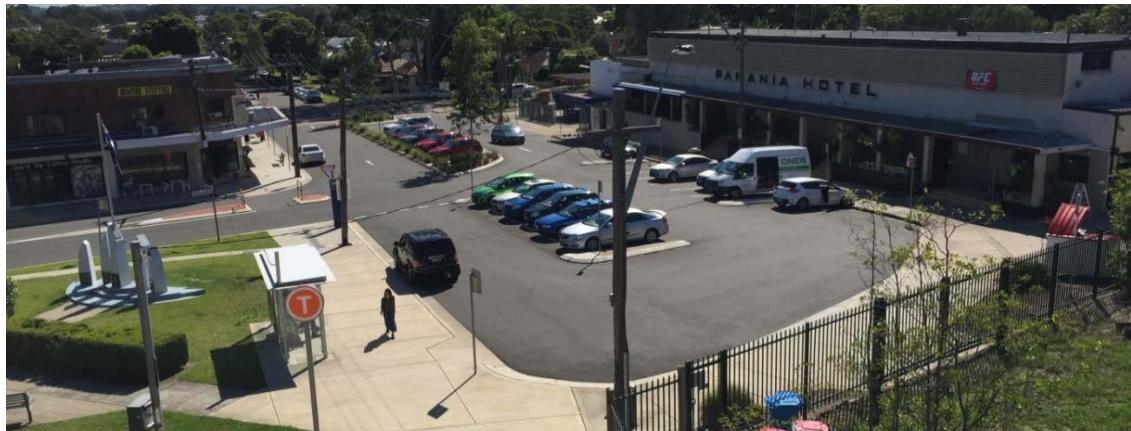
The key existing roads in the vicinity of the study area include Braesmere Road, Anderson Avenue (north), Anderson Avenue (south), and Weston Street as shown in Figure 1. This section outlines the road network with respect to the Panania Station Precinct, providing a description of each key road.

Henry Lawson Drive is the nearest arterial road and is located approximately one kilometre south-west of the station which connects to the M5 Motorway to the north.

### 2.3.1 Anderson Avenue (north and south)

Anderson Avenue is a local road which provides one traffic lane and one on-street parking lane in each direction, with a north-south alignment. The road is divided by the station connected by the existing footbridge (i.e. pedestrian access only). Anderson Avenue provides direct pedestrian access to Panania Station from both the north and south of the station via Anderson Avenue (north) and Anderson Avenue (south). The sign-posted speed limit for both Anderson Avenue (north) and Anderson Avenue (south) is 50 km/h. Anderson Avenue (north) provides interchange facilities for the station precinct and on-street parking for the Panania local centre as shown in Figure 18. Anderson Avenue (south) merges to form Weston Street at the southern station entrance.

**Figure 18 View of Anderson Avenue (north) looking north towards Marco Avenue**



Source: AECOM, 2016

### 2.3.2 Weston Street

Weston Street is a local collector road with one traffic lane and one on-street parking lane in each direction with an east-west alignment. The road continues as Anderson Avenue (south) to the west and Uranus Road to the east. The sign-posted speed limit is 50 km/h. Weston Street provides access to the southern commuter car park. The remainder of the road provides a lane for kerbside parking in each direction and is shown in Figure 19.

**Figure 19 View of Weston Street looking east towards the southern commuter car park**



Source: AECOM, 2016

### 2.3.3 Braesmere Road

Braesmere Road is a local road that provides one traffic lane and one parking lane in each direction, aligned parallel to the north of the rail corridor, and provides an east-west connection between Childs Street and Anderson Avenue (north). The sign-posted speed limit is 50 km/h. Braesmere Road provides access to the northern commuter car park and is shown in Figure 20.

**Figure 20 View of Braesmere Road looking west towards the northern commuter car park**



Source: AECOM, 2016

## 2.4 Travel mode choice

Travel data obtained from the Bureau of Transport Statistics provides an insight into the Journey to Work characteristics of residents in Panania. The Bureau of Transport Statistics uses the Australian Bureau of Statistics (ABS) data collected during the 2011 Census which includes method of travel to work at a travel zone level. Travel zone 2370, 2371, 2372, and 2374 represents the immediate catchment area (within about 800 metres of Panania Station), with the data from these travel zones summarised in Table 5.

**Table 5 Journey to work data**

Mode of travel	Panania <sup>1</sup> (Number)	Panania <sup>1</sup> (%)	Greater Sydney (%)
Train	695	21%	16%
Bus	27	1%	7%
Car – as driver	2,289	68%	61%
Car – as passenger	166	5%	5%
Walked only	58	2%	5%
Mode not stated	71	2%	2%
Other	35	0%	4%

Note 1: Excludes those who did not go to work

Source: Bureau of Transport Statistics, 2011

The 2011 Journey to Work data shows that the majority of trips from Panania are made by car, with approximately 73 per cent of trips attributable to this mode (including car drivers and passengers). Approximately 21 per cent of journey to work trips were made by train, which is higher than the Greater Sydney average at 16 per cent.

The main destinations of the Journey to Work trips taken from Panania are shown in Table 6. The majority of trips from Panania are to Bankstown (30 per cent). Other common destinations include Sydney Inner City, Hurstville, Botany and Canterbury.

**Table 6 Destination of journey to work travel**

Destination of travel	Percentage
Bankstown	30%
Sydney Inner City	17%
Hurstville	4%
Botany	4%
Canterbury	4%

Source: Bureau of Transport Statistics, 2013

## 3.0 Operational impacts

### 3.1 Future demand

The Bureau of Transport Statistics has provided patronage forecasts for Panania Station based on its Strategic Travel Model where it is expected patronage will increase to approximately 4,400 by 2036. For design assessment purposes, an additional 15 per cent has been used to account for the trips expected to be generated by the Panania Station due to improvements in facilities as part of the proposed upgrades. The patronage forecasts are provided in Table 7.

**Table 7 Patronage forecasts**

Year	AM peak hour entries <sup>2</sup>	AM peak hour exits <sup>2</sup>	24 hour (entries and exits)
2014	564	81	3,220
2036	767	110	4,383
2036 (+15%) <sup>1</sup>	882	126	5,040

Notes:

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

2 - peak 1 hour conversion factors were applied to hourly volumes based on 2014 station barrier counts for the 3.5 hour AM peak period.

Source: Jacobs and TfNSW, 2015

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

### 3.2 Public transport

The Proposal does not include changes to bus/rail services as part of the works and would not impact on the operation (service operation or timetabling) of public transport in the vicinity of Panania Station. The Proposal includes improved interchange facilities and improved pedestrian and cyclist access to Panania Station which may increase rail patronage.

It is anticipated that the additional rail patronage would mainly generate walking trips. However, with improved accessibility to Panania Station and interchange facilities (on Weston Street and Anderson Avenue), it is anticipated that the kiss and ride, taxi and commuter car transport facilities would be more utilised by the community in and around the precinct.

The existing bus stops on Anderson Avenue (south) and the northern Braesmere Road bus stops do not have accessible spaces, are not sheltered (though at both locations the shop canopies appear to provide weather protection) and are not fitted with Tactile Ground Surface Indicators (TGSIs) to indicate boarding point. These facilities are not currently provided as part of the Proposal, it is recommended that this be investigated as a potential additional improvement during detailed design.

### 3.3 Pedestrians

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

- installation of three new lifts and stairs to provide an accessible path of travel to the island platform
- the alignment of the new pedestrian bridge further west would better accommodate a key pedestrian desire line across the railway and would result in a shorter walking distance to connect to adjacent footpaths and roads
- new kerb ramps to provide an accessible path of travel to new and existing interchange facilities with associated Tactile Ground Surface Indicators (TGSIs)
- installation of new canopies at both station entrances and along the new pedestrian bridge, stairs, lift landings and sections of the platform would provide weather protection and help to improve customer safety
- installation of a new raised pedestrian crossing on Weston Street and a new pedestrian refuge on Anderson Avenue (north), with installation of Tactile Ground Surface Indicators, to improve safety

- improved wayfinding signage and additional CCTV coverage at ramps and new pedestrian facilities.

The Proposal would improve the user experience in the vicinity of the station and has the potential to encourage more customers to walk to the station. The pedestrian modelling undertaken by Jacobs indicates that the new pedestrian bridge and stairs would achieve a level of service 'C' for the 2036 + 15 per cent patronage forecast which is considered acceptable under the National Construction Code as determined by the Building Code of Australia.

### 3.4 Cyclists

The Proposal includes the provision of 15 bicycle racks which would provide 30 undercover spaces, (i.e. eight undercover bicycle racks with a capacity for 16 bicycles near the northern entrance (to replace the existing bicycle rack) and seven bicycle racks with a capacity for 14 bicycles near the southern entrance).

This provision would meet the bicycle storage requirements for the station, and is consistent with the objectives of the NSW Government's Centre for Road Safety Campaigns *Go Together*, which encourages improved cycling facilities and transport interchanges. In addition, the increase in capacity is likely to minimise the likelihood of informal bicycle parking along fences and railings.

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

### 3.5 Kiss and ride / taxi

The Proposal includes the provision of a total of six kiss and ride spaces (including existing, upgraded and new facilities) with kerb ramps installed to provide an accessible path of travel (where required).

Four kiss and ride spaces are proposed on Weston Street, south of the station. The existing two kiss and ride spaces on the northern side of the Weston Street are to be relocated around 15 metres to the east. In addition, two new kiss and ride spaces are proposed on the southern side of Weston Street adjacent to the proposed raised pedestrian crossing to accommodate traffic from the other direction. The existing two kiss and ride spaces at Anderson Avenue (north) would be maintained.

In summary, the Proposal would address the informal kiss and ride activity, currently observed on roads near Panania Station and would improve accessibility to these facilities (e.g. new kerb ramps).

The existing single space taxi zone at Anderson Avenue (north) would be maintained. A new single space taxi zone is proposed on Weston Street adjacent to the two new kiss and ride spaces (to replace the existing taxi rank on Sherlock Avenue which would be converted to timed parking). This would reduce the walking distance to the station from around 80 metres to around 15 metres given the taxi zone would be relocated closer to the station. The proposed changes to the kiss and ride areas and taxi rank would impact parking availability, see Section 3.6 for details.

### 3.6 Parking

The Proposal addresses the current lack of accessible parking by proposing four new accessible parking spaces within the Panania Station Precinct. Two accessible parking spaces are proposed near to the northern station entrance on Anderson Avenue (north) resulting in the loss of three short term (2P) on-street parking spaces. Two accessible parking spaces are proposed near the southern station entrance on Weston Street resulting in the loss of three short term (1P) on-street parking spaces.

The new kiss and ride area on the southern side of Weston Street would result in the loss of two timed parking spaces, while the relocation of the kiss and ride area on the northern side of Weston Street would result in no net loss of parking as the existing facilities are converted back to timed parking.

The relocation of the taxi rank from Sherlock Avenue to Weston Street would also result in no net loss of parking as the existing taxi rank space on Sherlock Avenue would be converted to timed parking.

The provision of four accessible parking spaces along with the proposed changes in the kiss and ride areas and taxi rank facilities results in the net loss of eight short term on-street parking spaces. The loss of the short term on-street parking spaces would have a minor impact on the Panania Local Centre as there is a number of short term on-street and off-street parking available in the area. The priority principles of interchange facilities outlined in the *Customer Focused Transport Interchange Design Handbook* (TfNSW, 2012) also ranks parking as a last

priority. While a net loss of parking is not ideal, the loss in parking would facilitate other transport interchange facilities.

### **3.7 Traffic**

The Proposal would assist in making public transport infrastructure more accessible to rail customers and in providing a seamless transition between transport modes, which would likely increase patronage. It is anticipated however that the additional rail patronage would mainly generate walking trips to the station (rather than additional traffic) and the improved kiss and ride facilities would provide formal areas for customer drop-off (reducing potential illegal drop-offs which may impede road traffic movements). The increase in future road traffic is therefore expected to be minimal and it is considered that the Proposal would have a negligible impact on traffic in the local road network.

### **3.8 Property access**

No changes to private property access would be required as part of the operation of the Proposal.

## **4.0 Construction activities**

### **4.1 Overview**

The construction of the Proposal would include the following activities:

- establishment of site compound (erect fencing, tree protection zones, site offices, amenities and plant/material storage areas)
- establishment of temporary facilities as required (e.g. temporary access stairs to station, temporary toilets)
- demolition and removal of existing structures (e.g. existing footbridge) to allow for new lifts and stairs
- relocation of High Voltage electrical cables, services and signals, including overhead wiring stanchion
- platform modifications including piling and foundations for lift shafts
- construction of lift shafts, stairs, fencing, new canopies and new overhead wiring structures and re-profiling overhead wiring
- installation of lifts and associated fixtures, lighting, signage and CCTV cameras
- platform regrading
- reconfiguration of heritage Platform Building to allow for communications room, staff facilities and toilets
- refurbish heritage Platform Building including painting works
- upgrade of existing pedestrian crossing at Weston Street, kerbs and gutters, resurfacing, painting and lighting
- provision of accessible parking spaces, kiss and ride, taxi ranks and sheltered bicycle racks
- installation of wayfinding signage
- electrical and power supply upgrade works
- landscaping, fencing adjustments and bollards
- activities to test and commission power supply, lifts, lighting, new/modifications to station services, ticketing systems, communication and security systems.

### **4.2 Construction vehicles**

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

- excavators

- bobcats
- delivery trucks
- compaction equipment
- piling rig
- generator
- scissor lift
- cranes
- lighting tower
- concrete mixer and pump trucks
- smaller specialised machineries.

Minor volumes of heavy vehicles are likely to be generated during the construction phase when transportation of concrete, equipment, preformed structures etc. is required. It is expected one to five heavy vehicles would be generated per day from Monday to Friday, and up to 16 heavy vehicles during weekend possessions. The size of vehicles used for haulage would be consistent with the access route constraints, safety and any worksite constraints. It is assumed the standard vehicle would be either a tip truck or truck and dog, with a capacity of up to 25 tonnes.

Some construction activities (such as the delivery of precast sections) may require truck and trailer combinations or semi-trailers. Access arrangements for these vehicles would be defined in the Construction Traffic Management Plan (CTMP) prepared by the contractor during detailed design.

### 4.3 Working hours

Construction is expected to commence in 2016 and take around 18 months to complete. The majority of construction work at Panania Station would be limited to the standard construction hours as recommended by the Environmental Protection Authority (EPA):

- Monday – Friday: 7:00 am – 6:00 pm
- Saturday: 8:00 am – 1:00 pm
- Sunday / Public holidays: No work without prior approval from TfNSW

However, it may be necessary to undertake certain construction activities, such as overnight concrete pours and delivery of oversized materials, outside of the standard construction hours so as to facilitate structural design requirements and minimise traffic disruption. For any out of hours works, prior approval would need to be obtained from TfNSW by the contractor.

It is likely that up to seven weekend rail possessions would be necessary to undertake a number of construction activities, which would require prior approval from TfNSW as well as community notification.

An alternative construction option is being considered which may use an extended (six week) temporary station closure to allow for an accelerated construction completion which would reduce the overall program by up to six months. If the temporary station shutdown option is adopted, replacement shuttle buses would be provided between Panania and its adjacent stations (East Hills and Revesby) at suitable intervals for the duration of the shutdown. The benefits of this alternative construction option include:

- reduced construction period (by up to six months) which would allow the upgraded station to be opened to the community sooner
- reduced temporary visual and amenity impacts due to a reduced construction period
- reduce the safety risk to the customers from the construction/pedestrian interface
- improve construction staging efficiency with potential cost benefits.

The construction methodology would be further developed during the detailed design of the Proposal by the nominated contractor in consultation with TfNSW. Both construction options have been assessed in this report.

#### **4.4 Site hoarding**

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

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

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

#### **4.5 Ancillary facilities**

Temporary construction compounds are required to accommodate a site office, amenities, laydown and storage area for materials. The following locations are being considered for use as construction compounds:

- an area to the west of the existing northern ramp within rail property, adjacent to Edwards Reserve
- an area to the west of the southern station entrance within rail property.

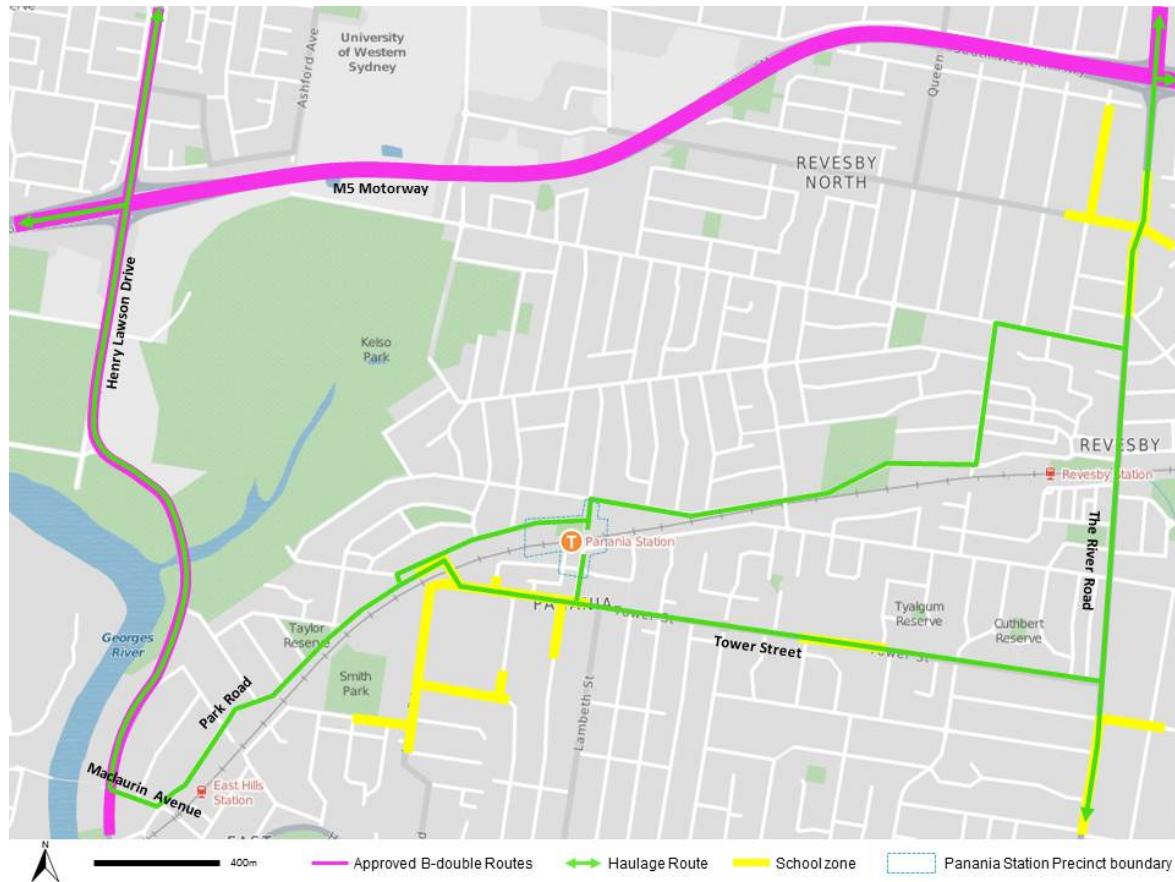
Temporary storage/laydown areas may also be required on the station platform. The areas nominated for the compounds are on land owned by RailCorp (managed by Sydney Trains).

#### **4.6 Construction vehicle routes**

Figure 21 shows the potential access routes to each side of the station entrance, as well as Roads and Maritime Services approved B-double routes adjacent to the sites. The construction site is near the M5 Motorway (east-west) and Henry Lawson Drive (north-south), which are B-double routes. These routes provide high clearances and sufficient road widths to accommodate larger vehicles, making them ideal for the haulage routes.

River Road, Tower Street, Park Road and Maclaurin Avenue are regional roads which would be suitable for occasional heavy vehicle movements. It is anticipated that the M5 would serve vehicles from the east and west, Henry Lawson serving vehicles from the north and The River Road serving vehicles from the north and south. Heavy vehicle movements in proximity to the Panania Local Centre and schools would be restricted during peak times and school zone hours.

**Figure 21 Proposed haulage routes (indicative only, subject to detailed design)**



## 4.7 Site security, site access and signage

Access to work areas would consider:

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

## 4.8 Worker induction

All workers and sub-contractors engaged during the construction phase would be inducted prior to any commencement of works. The induction would identify the construction haulage routes, local speed zones, worksite protocols, staff parking facilities / public transport availability / carpooling opportunities and emergency / incident management strategies. Workers would be encouraged to park away from the station during the works.

## 4.9 Temporary diversions

A section of Anderson Avenue (south) and Weston Street may be temporarily closed for access during the use of a crane required for construction activities (e.g. installation of lifts and new pedestrian bridge). These works would likely to be undertaken outside of peak periods, during a weekend rail possession. Temporary traffic diversions would be implemented with appropriate signage to guide vehicles. Access to properties within the locations of road closures would be maintained where possible. Figure 22 shows the potential location of temporary diversions which would be confirmed during detailed design and identified in the CTMP. Road Occupancy Licenses would be sought as required.

**Figure 22 Proposed temporary diversions (indicative only, subject to detailed design)**



Source: AECOM, 2016

## 5.0 Construction impacts

### 5.1 Public transport

Bus services in the vicinity of the Proposal would not be majorly affected during construction. Minor impacts may occur during off peak times due to road works and temporary road closures (e.g. use of a crane). This would result in reduced speeds and potential diversions, however it is anticipated that buses would continue to service the bus stops on Anderson Avenue (north and south), Weston Street and Braesmere Road for the majority of the time. Any diversions or changes to bus services would be adequately sign-posted with appropriate community notification of any changes.

If the temporary station shutdown construction option is adopted, replacement shuttle buses would be provided between Panania and its adjacent stations (East Hills and Revesby) at suitable intervals for the duration of the shutdown. Appropriate signage to notify customers of the alternate transport arrangements would be provided should changes be required.

### 5.2 Pedestrians

During construction, pedestrian movement on the platform would be temporarily impacted due to the reduced amount of space from construction ancillary facilities. The reduced space on the platform may increase pedestrian congestion and reduce the amount of standing area for customers. Appropriate signage would be provided to mitigate any potential impacts to pedestrian movement on the platform.

The existing station ramps would be closed off during construction (to allow the installation of the new pedestrian bridge), with access to the existing footbridge maintained through temporary access stairs at the northern and southern station entrances. This may temporarily increase pedestrian walking distances for some of the community (e.g. parents/carers with prams, cyclists) if the existing ramps were typically used to cross the railway.

and would then require the use of alternative routes (such as the bridges on Park Road, around 530 metres west, or Carson Street, around 670 metres east) to cross the railway. There is limited space available at the existing station entrances and so alternative temporary access ramps are not possible. Alternative railway line crossings are shown in Figure 23.

If the alternative construction option is used which would utilise an extended (six week) temporary station closure, access to the station would not be provided during this time, and shuttle bus replacements would be used as an alternative.

The proposed works may potentially cause temporary disruptions to the existing pedestrian facilities in the local roads surrounding the station (including Anderson Avenue (north and south), Weston Street and Braesmere Road), particularly during the installation of the new and upgraded interchange facilities. This has the potential for increased safety risks for pedestrians due to potential interactions with construction plant and vehicles. Appropriate signs or traffic controllers would be positioned to notify pedestrians of the temporary arrangements. Any interaction between construction vehicles and pedestrians would be managed and controlled by traffic controllers. Impacts to pedestrians during construction would be managed through the development of a CTMP.

Mitigation measures would be subject to further consideration during detailed design and construction planning in consultation with the relevant authorities. Notification would be provided to the community on alternative transport arrangements (including details of rail replacement buses, nearby stations and changes to pedestrian access).

**Figure 23 Alternative railway line crossings for pedestrians**



Source: AECOM, 2016

### 5.3 Cyclists

The cycle route along Braesmere Road, Anderson Avenue (north) and Marco Avenue is around 45 metres north of the station, and therefore would not be impacted during construction of the Proposal. The Proposal supports the NSW Government's Bike and Ride Initiative that better integrates bicycle riding with other modes of transport, making it convenient to ride to transport hubs, park bicycles securely and transfer to public transport as part of longer transport journeys.

There would be minor impacts to bicycle facilities provided at Panania Station with the existing sheltered bicycle rack near the northern entrance temporarily unavailable while the new sheltered racks are installed. The proposed works would be scheduled to minimise the temporary loss of these facilities (where possible).

### 5.4 Kiss and ride / taxi

Minimal impacts are anticipated for kiss and ride and taxi spaces currently provided at Panania Station, and may be temporarily unavailable while being relocated. The relocation works would be scheduled to minimise any temporary loss of these interchange facilities.

### 5.5 Parking impacts

A section of Anderson Avenue (south) and Weston Street may be temporarily closed for access during the use of a crane required for construction activities (e.g. installation of lifts and new pedestrian bridge) which would result in the temporary loss of parking along Weston Street in the vicinity of the works. These works would likely to be undertaken outside of peak periods, during a weekend rail possession to reduce the impacts to the community.

There may also be temporary loss of parking during the proposed upgrades to the interchange facilities as work zones are set up around these areas. This would increase the demand for on-street parking within the local network in the short term. Impacts associated with the permanent loss of parking have been assessed in Section 3.6, but would also come into effect during construction.

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

Overall, with the current availability of on-street parking surrounding Panania Station, the impact of increased on-street parking in the short term would be minor. The use of a six week temporary station closure would reduce the overall construction period which would reduce the temporary demands on parking from construction traffic.

### 5.6 Traffic

Traffic generated by construction vehicles, including staff vehicles, is likely to be minimal given the nature of the works proposed and would fluctuate dependant on the construction stage. Approximately one to five heavy vehicles would be generated per day from Monday to Friday, and up to 16 heavy vehicles during weekend possessions. It is expected there would be a minimal impact on existing traffic conditions.

Work zones to construct the proposed interchange facilities along Anderson Avenue (south), Anderson Avenue (north), Weston Street and Brasemere Road which may require temporary or partial lane closures and/or traffic diversions. Road Occupancy License would be sought as required. Road works would be undertaken progressively and in the minimum area and timeframe required to undertake the particular phase of work. Signage would be displayed around work areas to inform the public.

A section of Anderson Avenue (south) and Weston Street may be temporarily closed for access during the use of a crane required for construction activities (e.g. installation of lifts and new pedestrian bridge) which would result in the temporary loss of access along Weston Street in the vicinity of the works. Temporary diversions (e.g. along Peffer Street) would be implemented with appropriate signage to direct vehicles along the diversions. The potential location of any temporary diversions which would be confirmed during detailed design and identified in the CTMP. These works would also likely to be undertaken outside of peak periods, during a weekend rail possession to reduce the impacts to the community. A Road Occupancy License would be sought as required.

## 5.7 Property access

During construction, there is potential for temporary disruptions to private property access for residents and businesses along Anderson Avenue (south) and Weston Street. Property access would be maintained, where possible, to minimise the impact to local residents and businesses. However, during activities such as use of a crane and/or unloading of oversized materials, short term impacts to property access may be necessary. In such incidences, affected occupants would be notified in advance of the scheduled works.

Given the proximity of nearby properties to the Proposal area, it is also possible that cranes would need to operate in the airspace above. The Contactor would adhere to all relevant requirements to ensure the safe operation of the crane.

## 5.8 Emergency vehicle access

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

## 6.0 Recommendations

Mitigation measure would be implemented to minimise traffic, transport and access impacts during construction and operation of the Proposal.

### 6.1 Construction Traffic Management Plan

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

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

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

### 6.2 Mitigation measures

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

- an investigation into potential improvements to bus stops on Anderson Avenue (south) and the northern side of Braesmere Road should be undertaken during detailed design. This would include, as a minimum the potential installation of Tactile Ground Surface Indicators (TGSIs) to indicate boarding point and the provision of wheelchair spaces
- communication would be provided to the community and local residents to inform them of changes to parking, pedestrian access and/or traffic conditions including vehicle movements and anticipated effects on the local road network relating to site works.
- Road Occupancy Licences for temporary road closures would be obtained, where required
- construction works would be scheduled to minimise temporary loss of interchange facilities and available parking, including during works on the northern bicycle rack, kiss and ride areas and parking upgrades.

## References

- AECOM, 2016, *Review of Environmental Factors - Panania Station Upgrade*, Sydney
- Jacobs, 2015a, *Concept Plan Final Report - Panania Station Precinct Accessibility Upgrade*, Sydney
- Jacobs, 2015b, *Traffic, Transport and Access Impact Assessment - Panania Station Precinct Accessibility Upgrade*, Sydney
- Jacobs, 2015c, *TN1 Panania Pedestrian Modelling: Technical Note – Tranche 1 Station Precinct Accessibility Upgrades*, Sydney