

AGNSW

**Art Gallery of NSW Expansion -
Sydney Modern**

Traffic Impact Assessment

Rev F | 1 November 2017

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 245767

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Executive Summary

This report has been prepared on behalf of the Art Gallery of NSW in response to Secretary Environmental Assessment Requirements (SEARs) issued for State Significant Development application (SSDA) No. 6471 of the Art Gallery of NSW Expansion – Sydney Modern.

This report addresses issues required for a SSD and specifically responds to the SEARs Issue number 1, part of Issue number 5 in relation to bicycle parking and Issue number 6.

(1) Statutory and Strategic Context

Address the relevant planning provisions, goals and strategic objectives in the following:

- *A Plan for Growing Sydney;*
- *NSW State Priorities;*
- *Planning Guidelines for Walking & Cycling;*
- *Sydney City Centre Access Strategy*
- *Sydney's Bus Future;*
- *Sydney's Ferry Future;*
- *Sydney's Walking Future; and*
- *Sydney's Cycling Future.*

(6) Traffic Impact Assessment

- *Details the existing daily and peak hour vehicle, public transport, pedestrian and bicycle movements and existing traffic and transport facilities provided on the surrounding road network;*
- *Evaluates daily and peak traffic movements likely to be generated by the development and the refurbishment works to the existing Art Gallery (construction and operation) including peak traffic movements during special events;*
- *Models and assesses the performance of key intersections providing access to the site, and any upgrades (road/intersections) required as a consequence of the development;*
- *Evaluates the cumulative impacts and potential conflict with traffic movements generated by existing uses, including the RBGD;*
- *Identifies pedestrian and cycle connections/circulation and required upgrades to meet the likely future demand within the precinct and connections to the external networks, particularly the cycle network identified in the Sydney City Centre Access Strategy;*

- *Outlines existing public transport services and opportunities for greater usage for workers and visitors;*
- *Details sustainable travel initiatives for workers and visitors, particularly for the provision of end-of-trip facilities;*
- *Details existing and proposed vehicular access and car parking arrangements for workers and visitors (cars, coaches/buses & taxi ranks), including compliance with parking codes and Australian Standards;*
- *Details access arrangements for emergency and service vehicles; and*
- *In relation to construction traffic:*
 - *assess the cumulative impacts associated with other construction activities including the Sydney Light Rail project;*
 - *assess and detail the impacts on the Cahill Expressway and Lincoln Crescent to ensure the development does not adversely impact on its safe and efficient movement;*
 - *assess and detail the impacts of the seawater heat exchange system on boat and ferry movements and pedestrian movement on the harbour front;*
 - *prepare a draft Construction Management Plan that will outline:*
 - *anticipated truck movements to and from the site;*
 - *car parking and work zones for construction traffic;*
 - *mitigation measures that will manage potential impacts on vehicle, pedestrian, cyclist, ferries or harbour vessel movements and public transport operations;*
 - *access arrangements for workers to/from the site, emergency vehicles and service vehicle movements; and*
 - *a construction and delivery program detailing and required road closures or restrictions on any public place, pathway or road.*

Relevant Policies and Guidelines

- *Guide to Traffic Generating Developments (RMS)*
- *EIS Guidelines – Road and Related Facilities (DoPI)*
- *NSW Planning Guidelines for Walking and Cycling*
- *Guide to Traffic Management – Part 12: Traffic Impacts of Developments (AUSTROADS)*

Conclusion

The Art Gallery of NSW proposes to undertake a major expansion of the existing art gallery adjacent to the Phillip Precinct of the Domain. The expansion, proposed as a separate, stand-alone building, is located north of the existing gallery, partly extending over the Eastern Distributor land bridge and includes a disused Navy fuel bunker located to the north east of this land bridge.

The new building comprises a new entry plaza, new exhibition spaces, shop, food and beverage facilities, visitor amenities, art research and education spaces, new roof terraces and landscaping and associated site works and infrastructure, including loading and service areas, services infrastructure and an ancillary seawater heat exchange system.

Currently the Gallery has an annual visitation of 1.1 million. The Sydney Modern Project will provide the capacity to increase visitation from the current level to over 2 million people a year. Based on the projected growth, a forecast of future visitor demand to the Gallery has been developed indicating that as many as an additional 1,100 people per hour may travel to the site on weekends and 800 people per hour on weekdays.

Private vehicle travel counts for only 24% of travel to the Gallery with the predominant travel modes being train and bus.

The gallery does not propose any on-site car parking for visitor activity, instead relying on the unused capacity of the Domain Car Park which provides approximately 1,100 spaces. The Gallery has a relationship with the Domain Car Park with a special discount available for Gallery patrons. There is available capacity both during the week and at weekends to meet the expected growth in car parking demand.

The entry to the existing Gallery will remain on Art Gallery Road with a new primary entry to the north adjacent to the new main entry plaza. It is proposed that Art Gallery Road is reconfigured with indented bays in sections along both sides of the road. A single traffic lane will be maintained in both directions. A flexible kerb side arrangement will enable the allocation of space to be allocated to each user type including taxis, private vehicle and coach drop-off/ pick-up. The regular bus stop has been allocated a zone at the southern end of the plaza in a similar location to existing.

A key aspect of the Sydney Modern Project is to improve the Gallery's loading and service access for art, and for general goods and waste. A new Loading Dock is proposed to be accessed from Lincoln Crescent. The Cowper Wharf Roadway / Lincoln Crescent intersection provides good access to the main road system. This will allow the existing dock accessed off Art Gallery Road to be less heavily used which will reduce truck and pedestrian conflict points.

The traffic impacts during construction and operation have been assessed and determined to be acceptable on the access road system. The Gallery enjoys good levels of public transport accessibility and it is anticipated that the current mode share across a wide range of access modes can be improved through improved legibility and promotion.

1 Introduction

1.1 Project Description

The Art Gallery of NSW proposes to undertake a major expansion of the existing art gallery adjacent to the Phillip Precinct of the Domain. The expansion, proposed as a separate, stand-alone building, is located north of the existing gallery, partly extending over the Eastern Distributor land bridge and includes a disused Navy fuel bunker located to the north east of this land bridge.

The new building comprises a new entry plaza, new exhibition spaces, shop, food and beverage facilities, visitor amenities, art research and education spaces, new roof terraces and landscaping and associated site works and infrastructure, including loading and service areas, services infrastructure and an ancillary seawater heat exchange system.

1.2 Site Location

The site is located to the north of the existing Art Gallery of NSW building as shown in Figure 1. There are also off-site works proposed for the sea water heat exchange system, and for partial road upgrades. The Domain Car Park is located to the south of the existing Gallery.



Figure 1: Site location

1.3 SEARs - Transport, Traffic, Car Parking and Access

This report has been prepared on behalf of the Art Gallery of NSW in response to Secretary Environmental Assessment Requirements (SEARs) issued for State Significant Development application (SSDA) No. 6471 of the Art Gallery of NSW Expansion – Sydney Modern (Second Modification 8 June 2016).

This report addresses issues required for a SSD and specifically responds to the SSD Issue number 1, part of Issue number 5 in relation to bicycle parking and Issue number 6.

SSD Issue	Report Section
1. Statutory and Strategic Context Development Standards: Address the relevant planning provisions, goals and strategic objectives in the following: • State Environmental Planning Policy (Infrastructure) 2007 • Sydney Local Environmental Plan 2012 • A Plan for Growing Sydney; • NSW State Priorities; • Planning Guidelines for Walking & Cycling; • Sydney City Centre Access Strategy • Sydney's Bus Future; • Sydney's Ferry Future; • Sydney's Walking Future; and • Sydney's Cycling Future.	2.0
6. Traffic Impact Assessment	
Details the existing daily and peak hour vehicle, public transport, pedestrian and bicycle movements and existing traffic and transport facilities provided on the surrounding road network;	3.0, 4.0 and 6.1
Evaluates daily and peak traffic movements likely to be generated by the development and the refurbishment works to the existing Art Gallery (construction and operation) including peak traffic movements during special events;	6.1 and 7.1
Models and assesses the performance of key intersections providing access to the site, and any upgrades (road/intersections) required as a consequence of the development;	8.2
Evaluates the cumulative impacts and potential conflict with traffic movements generated by existing uses, including the RBGD;	8.3
Identifies pedestrian and cycle connections/circulation and required upgrades to meet the likely future demand within the precinct and connections to the external networks, particularly the cycle network identified in the Sydney City Centre Access Strategy;	6.5
Outlines existing public transport services and opportunities for greater usage for workers and visitors;	3.5 and 6.3

SSD Issue	Report Section
Details sustainable travel initiatives for workers and visitors, particularly for the provision of end-of-trip facilities;	7.0
Details existing and proposed vehicular access and car parking arrangements for workers and visitors (cars, coaches/buses & taxi ranks), including compliance with parking codes and Australian Standards;	6.2
Details access arrangements for emergency and service vehicles; and	6.4.2 and 6.4.3
In relation to construction traffic: • assess the cumulative impacts associated with other construction activities including the Sydney Light Rail project; • assess and detail the impacts on the Cahill Expressway and Lincoln Crescent to ensure the development does not adversely impact on its safe and efficient movement; • assess and detail the impacts of the seawater heat exchange system on boat and ferry movements and pedestrian movement on the harbour front; • prepare a draft Construction Management Plan that will outline: - anticipated truck movements to and from the site; - car parking and work zones for construction traffic; - mitigation measures that will manage potential impacts on vehicle, pedestrian, cyclist, ferries or harbour vessel movements and public transport operations; - access arrangements for workers to/from the site, emergency vehicles and service vehicle movements; and - a construction and delivery program detailing and required road closures or restrictions on any public place, pathway or road.	9.0
Relevant Policies and Guidelines • Guide to Traffic Generating Developments (RMS) • EIS Guidelines – Road and Related Facilities (DoPI) • NSW Planning Guidelines for Walking and Cycling • Guide to Traffic Management – Part 12: Traffic Impacts of Developments (AUSTROADS)	2.0

1.4 Consultation

A briefing with authorities was held at the Art Gallery of NSW on 12 October 2017 with members from Transport for NSW, Roads and Maritime Services and Environmental Protection Agency. Arup and the Gallery presented the project and transport assessment to date.

Key comments raised during the briefing from the authorities have been considered in this report and included:

- No works (including night works) to be undertaken under land bridge in the Eastern Distributor.

- Management of pedestrians (including school children) during construction activities needs to be outlined
- Coach management – address why coach bay is on the northern side and what is the expected increase of demand.
- Show existing State Transit Authority (STA) bus stops on Art Gallery Road.
- Explain existing conditions on Art Gallery Road and why the new scheme is an improvement.
- The traffic assessment is to consider the site peak hours as well as the network peak hours and assess the worst case.
- Ensure that loading dock management is considered within the report.
- Note that the Woolloomooloo Ferry is not currently being pursued and ferries will only be provided for commuter peak demand.

A consultation session was also undertaken with neighbours of The Wharf Terraces on 18 October 2017. The following relevant traffic issues raised have been considered within this report:

- Concerns about increased vehicle traffic in Lincoln Crescent, particularly impinging on access into and out of the Lincoln Crescent private car park
- Concern about access into and out of Lincoln Crescent due to increased vehicle movements
- Control of timing of deliveries and hours of access to the loading dock
- Need for additional car parking in the new building
- Amount of public parking removed from Lincoln Crescent to accommodate loading dock
- Impacts of construction and demolition
- Use of the lift in Lincoln Crescent to provide accessible access from Woolloomooloo to the CBD
- Use of open public space for the new building

2 Planning Context

2.1 Sydney Local Environmental Plan 2012

The Sydney Local Environment Plan (LEP) 2012 applies to most of the City's local area and is made up of a written instrument and maps. It identifies the maximum number of on-site car parking spaces that can be provided for new developments based on their location and level of transport accessibility. The objective of the car parking rates is to minimise the amount of vehicular traffic generated because of the proposed development.

Clause 7.9(3) of Sydney LEP 2012 provides that the maximum number of car parking spaces for a building used for the purposes of information and education facilities which includes art galleries, is 1 space for every 200 square metres of the gross floor area of the building used for those purposes.

The Art Gallery of NSW provides no public car parking, instead relying on the adjacent Domain Car Park and on-street car parking in Mrs Macquaries Road. The Sydney LEP 2012 rate is a maximum rate, and it is appropriate that the SMP continues to utilise available nearby parking at the Domain Car Park which was specifically built for this purpose.

Notwithstanding the development is still providing car parking for staff. The relevant clauses (7.1, 7.2 and 7.9) do not appear to preclude staff parking. However, Clause 7.2(1)(d) precludes "a car parking space in a car park".

2.2 State Environmental Planning Policy (Infrastructure) 2007

The aim of this policy document is to facilitate the effective delivery of infrastructure across NSW. Clauses relevant to the SMP include:

Clause 103: Excavation in or immediately adjacent to corridors

This clause applies to development that involves the penetration of ground to a depth of at least 3m below ground level (existing) on land that is the road corridor, one of which includes the Eastern Distributor. Should the SMP require penetration of ground beyond this depth, the consent authority would give written notice of the application to the RMS within 7 days after the application is made.

Clause 104: Traffic-generating development

This clause applies to new or enlarged development sites including any alterations or additions of the size and capacity of the proposed SMP. The SMP proposes an expansion of the existing building to provide for greater visitor numbers throughout the year, and therefore is subject to this clause. The clause considers the threshold level of traffic generation for certain land uses, beyond which the development is to be referred to the RMS.

The SMP is classed as 'any other purposes' in the document and notes that should the development generate 200 or more vehicles the development would be

referred to the RMS. Given that the development will generate more than 200 vehicles, the DA will be referred to the RMS.

2.3 A Plan for Growing Sydney

A Plan for Growing Sydney (Department of Planning & Environment, 2014) presents a new framework for Sydney that will guide planning decisions over the next 20 years to accommodate growth. The planned growth will see an additional 700,000 jobs and 1.6 million residents added to Sydney by 2036.

The plan is driven by the vision of Sydney to be: ‘A strong global city, a great place to live’. To achieve this vision, the Government has set goals that Sydney will be:

- A competitive economy with world-class services and transport.
- A city of housing choice with homes that meet our needs and lifestyles.
- A great place to live with communities that are strong, healthy and well connected.
- A sustainable and resilient city that protects the natural environment and has a balanced approach to the use of land and resources.

The plan outlines a set of strategic directions to deliver the housing and workplaces required to meet growth whilst providing high levels of amenity and good accessibility to jobs and services, creating resilient communities and a highly liveable city.

The expansion of the Gallery aligns with the Plan’s vision of creating a strong global city and a great place to live. The growing population of Sydney will be provided with an enhanced cultural destination.

2.4 NSW State Priorities

The NSW Premier announced in September 2015 12 Premier’s priorities to support the growth of the economy while protecting the most vulnerable in our society.

The Premier’s priorities are supported by 30 State priorities or ‘reforms’ that aim to grow the economy, deliver infrastructure, deliver infrastructure, and improve health, education and other services across NSW.

Key policies and actions relevant to study area

- Accelerating major project assessment
- Building infrastructure
- Consistently meet public transport reliability targets.
- Improve the efficiency of the road network during peak times on Sydney’s road corridors

2.5 Sydney's Bus Future

Sydney's Bus Future (Transport for NSW, 2013) provides the framework for improving and delivering more frequent and reliable bus services throughout Sydney. The core aim of the strategy is to provide an integrated bus network with seamless connections to other transport services.

The strategy also aims to tailor bus services to customer needs. In this vein, bus services will be focused into three key types, with associated priority and infrastructure investment:

- Rapid routes, which will use priority infrastructure, connect regionally throughout the city and have stops every 800m-1km
- Suburban routes, which will have stops every 400m and have mix of frequent 'turn up and go' and timetabled services
- Local routes, which will complete the network using local streets.

Visitors and staff at the Gallery will take advantage of these improved connections.

2.6 Sydney's Ferry Future

Sydney's Ferry Future (Transport for NSW, 2013) identifies that Sydney's ferry services will play an expanded role in our integrated transport system, enhancing Sydney's attractiveness as a place to live and visit. New services will be introduced to meet customer needs and demand.

Key points to emerge from the strategy that are relevant to the Study Area include:

- The future is about re-designing ferry services to respond to customer demand and forecast growth.
- Woolloomooloo has been identified for a potential ferry wharf and further investigation within the strategy which could be introduced into the Double Bay route. It is understood that there is currently no commitment to this project.

2.7 Sydney's Walking Future

Sydney's Walking Future (Transport for NSW, 2013) sets out a strategy to encourage people in Sydney to walk more through actions that make it a more convenient, better connected and safer mode of transport.

Key points to emerge from the strategy that are relevant to the Study Area include:

- NSW Government commitment to invest in new walking links that connect people to public transport.
- Prioritisation of investment in walking infrastructure to be prioritised within 2km of centres and public transport interchanges.

- Commitment to invest in walking facilities as part of the Transport Access Program, including improved circulation spaces around station precincts and safer walking links.

2.8 Sydney's Cycling Future

Sydney's Cycling Future (Transport for NSW, 2013) provides a framework for the way cycling is planned and prioritised in Sydney. It aims to grow the number of people cycling for transport by investing in safe, connected networks, making better use of existing infrastructure and fostering the formation of partnerships to develop cycling infrastructure. Key points to emerge from the strategy that are relevant to the Study Area include:

- A safe and connected bicycle network benefits the wider transport network by improving access to towns and centres, reducing congestion and increasing capacity on the public transport system.
- The promotion of safe separation of cyclists from motor vehicles and pedestrians where possible.
- Investment in bicycle infrastructure should be prioritised within 5km of public transport interchanges to provide improved connections.
- Promoting 'bike-and-ride' at major public transport interchanges including secure parking facilities integrated with public transport access.

The Sydney CBD is moving towards a well connected cycle network to improve accessibility for workers and visitors to facilities such as the Gallery.

2.9 Relevant Policies and Guidelines

The following documents have been considered in the development of this transport strategy for the Sydney Modern project:

- **RMS Guide to Traffic Generating Developments**
Used to inform the traffic assessment undertaken for the project.
- **EIS Guidelines – Road and Related Facilities**
Used to inform the preparation of the transport strategy, in particular the assessment of transport impacts.
- **NSW Planning Guidelines for Walking and Cycling**
This document has been used to inform the development of the walking and cycling measures proposed in this strategy.
- **Guide to Traffic Management – Part 12: Traffic Impacts of Developments (AUSTROADS)**
This guide has been referenced for the appropriate methodology to be used for traffic impact assessment of the development.

3 Existing conditions assessment

3.1 Current travel patterns

3.1.1 Staff

Journey to Work census data has been used to estimate the current travel behaviour of staff. Census data for the travel zone immediately surrounding the Gallery indicates that 70% of staff travel to the site via non-car modes. Train is the predominant mode of travel, account for 40% of all journey to work trips. This reflects the good accessibility of the site in relation to nearby stations at Martin Place, St James and Circular Quay.

The current travel patterns of Gallery staff are illustrated in Figure 2

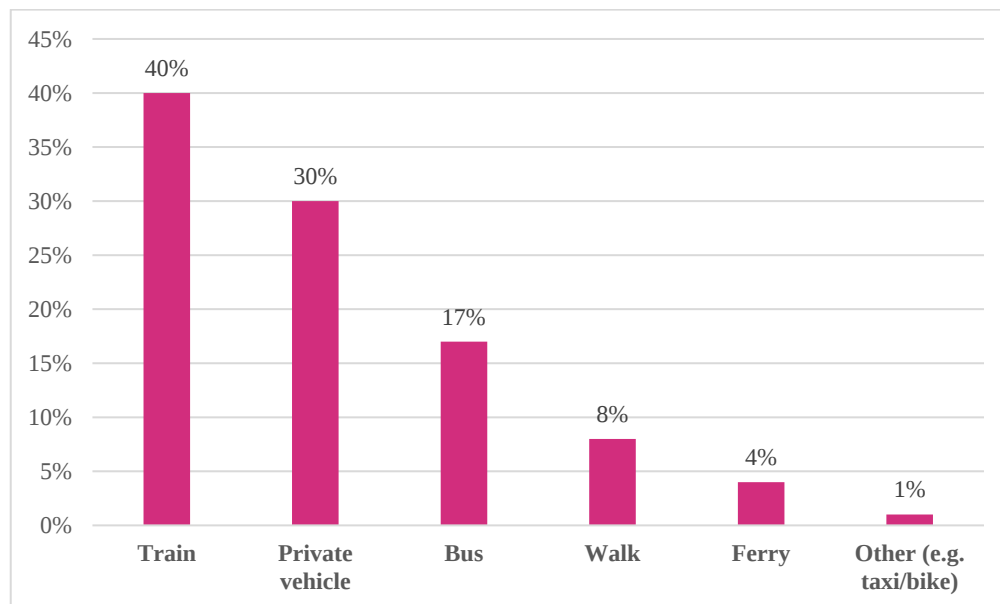


Figure 2: Current transport mode share of Gallery staff

3.1.2 Visitors

The Gallery conducted surveys of visitors in 2015 to understand how these people travel to and from the site. The survey results are presented in Figure 3 and indicates:

- Over half of all visitors to the site currently take public transport, with train being the primary mode of travel.
- 24% of visitors either drove or were dropped off to the Gallery, reflecting the good level of public transport accessibility and constrained parking environment around the site.

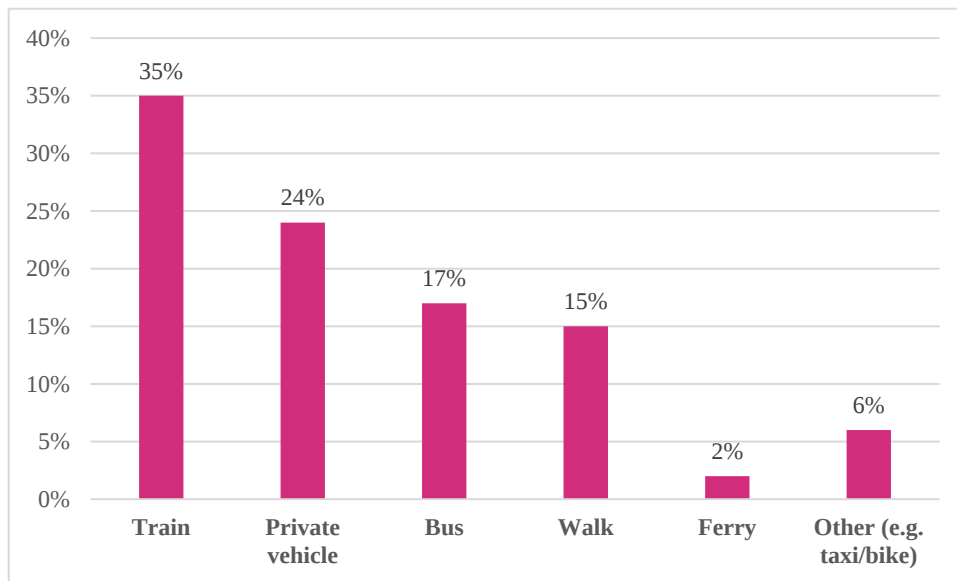


Figure 3: Current transport mode share of gallery visitors

(Note: the mode of transport is the primary mode if there were multiple modes taken)

3.2 Current staff levels

The Gallery has both full time staff and part time staff that fluctuate depending on the exhibitions that are running. There are approximately 196 staff employed across all categories including contractors and restaurant staff.

3.3 Current Visitation

3.3.1 Visitor Characteristics

Based on an Exit Survey in 2015, randomly sampled and weighted to actual visitation on the day, the following information relevant to visitation were revealed:

- 33% of visitors to the Gallery are visiting for the first time, mostly from overseas.
- 26% from overseas.
- 72% female
- The age profile is relatively evenly spread with peaks in the 25-34 and over 65 age brackets.
- Only 16% of visitors came alone

3.3.2 Weekly Attendance Profile

Total daily attendance at the Gallery over a typical week in February 2016 is shown in Figure 4. This indicates approximately 3,000 to 5,000 people attend the Gallery on a typical weekday. This increases to up to 8,000 visitors on a Sunday. It should be noted that the numbers presented in Figure 4 are based on visitation over a week where 'the Greats' art exhibition was held, with Sunday being closing day and therefore a good indication of a popular day. This can fluctuate but generally Saturday and Sunday are slightly busier than weekdays.

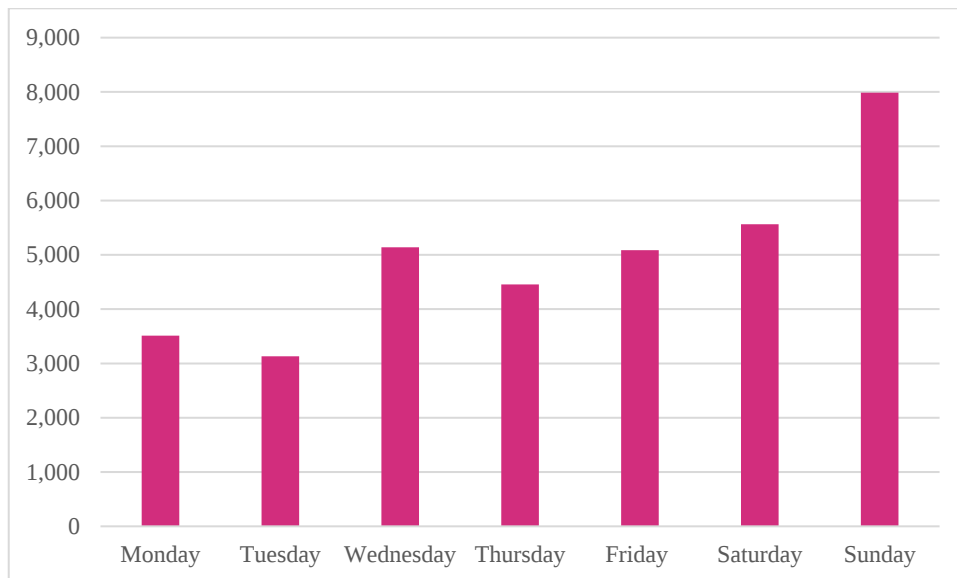


Figure 4: Weekly attendance numbers – typical week during February 2016

3.3.3 Daily Attendance Profile

The existing daily attendance profile (for Sunday 14 February 2016) is presented in Figure 5 below. This demonstrates that in the order of 1,400 people enter the Gallery per hour over the course of the day.

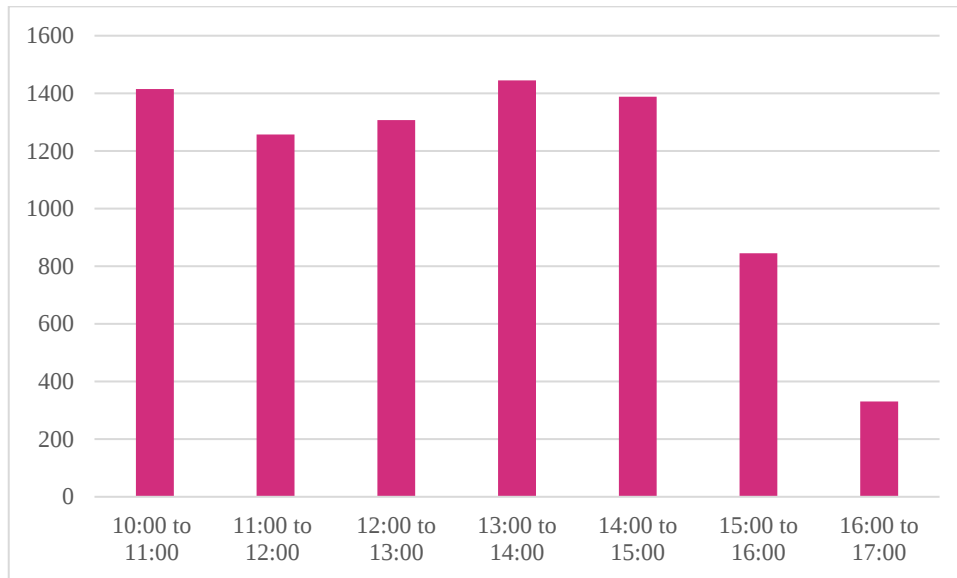


Figure 5: Daily attendance profile

3.3.4 Bus

The existing Gallery is within close walking distance of the Elizabeth Street bus stops near Martin Place Station. These bus stops serve bus routes from the Eastern Suburbs, Inner West (Parramatta Road) and Victoria Road. Bus 441 departs from the York Street side of Queen Victoria Building and drops off near the Gallery on Art Gallery Road (Figure 6). This bus route is still operating, despite recent changes to buses in the Sydney CBD.

On nights when the Gallery is open, a courtesy bus departs from the Gallery entrance every 15 minutes from 7pm until closing for the Domain Car Park, Martin Place, Wynyard and Town Hall.

This free service is provided Wednesdays throughout the year from 6 January 2016 for Art after Hours and Thursdays and Fridays, 7-29 January for Up late with The Greats.



Figure 6: Bus stop on Art Gallery Road

3.3.5 Yearly Attendance Profile

A summary of the yearly attendance at the Gallery (for the 2014-15 financial year) is summarised below. This indicates the Gallery currently generates in the order of 1.1 million visitors per year.

Table 1 Yearly attendance profile

Month	Total Attendance
July-14	91,764
Aug-14	114,502
Sept-14	104,932
Oct-14	61,801
Nov-14	93,260
Dec-14	84,525
Jan-15	110,727
Feb-15	110,635
Mar-15	88,515
Apr-15	77,128
May-15	71,832
Jun-15	66,574
Total	1,076,196

3.4 Connectivity to the Gallery

The key connections to the existing Gallery from the surrounding precinct and from public transport are shown in Figure 7. The Gallery has a number of key walking routes surrounding the site to external points described in the next section.



Figure 7: Connections to the Gallery

3.4.1 Pedestrian Access

The primary pedestrian access point to the existing Gallery is via Art Gallery Road (Figure 8). There are a number of pedestrian linkages from this entrance to the CBD via The Domain and Royal Botanic Gardens. A pedestrian bridge spans over Sir John Young Crescent and the Cahill Expressway to provide pedestrian access into Woolloomooloo.



Figure 8: Art Galley Road access point

There is another pedestrian entrance/exit at the rear of the building for deliveries and as an alternative access for visitors with disability. This is reached via the signed service road on the southern side of the building, leading to security gates where there is an intercom for access.

At times, visitors to Gallery staff will be directed to enter through the Yiribana Gallery at the rear of the building, following the path along the southern side of the Gallery. There is no vehicular access, except for previously authorised vehicles.

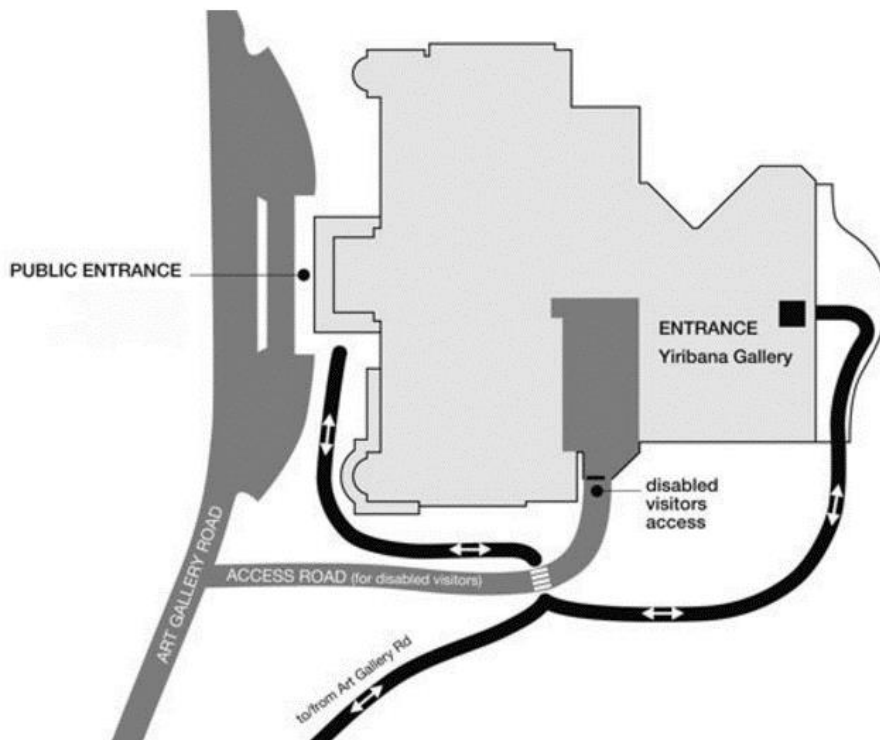


Figure 9: Pedestrian access points to the Gallery

3.5 Public Transport

3.5.1 Train

The closest railway stations to the Gallery are St James and Martin Place stations, which are both approximately 10 minutes walk.

3.5.2 Ferry

Circular Quay Ferry Wharf is located approximately 15 minute walk away from the Gallery and provides access for some patrons arriving from the Eastern Suburbs, Manly and Lower North Shore.

3.5.3 Taxi

There is a two car dedicated taxi rank at the Gallery in the drop-off / pick-up area at the main Gallery entrance. Taxis also generally circulate through the area picking up and setting down passengers.

3.6 Road Network

The primary roads which provide access to the Gallery come under the control of Sydney City Council and include:

- College Street to the south
- Macquarie Street to the north
- St Marys Road to the east

Vehicle access to the Gallery is provided via Art Gallery Road, which is managed by the Botanic Gardens Trust. Art Gallery Road has a dedicated drop off / pick up area located directly outside the main entrance (see Figure 10).



Figure 10: Existing vehicle drop off / pick up area

3.6.1 Management of the existing arrangement

The allocation of bays in front of the Gallery is shown in Figure 13. A number of users compete for the space, including taxis, coaches and the public. This can result in a number of reverse movements and general congestion.

Often, Art Gallery Road can become quite busy with a number of vehicles attempting to enter the drop-off loop for the Gallery. This is exacerbated by the pedestrian crossings, which can block traffic on Art Gallery Road and result in long vehicle queues.

The key safety issue is the congestion in front of the Gallery and the reverse movements within the drop-off loop amongst pedestrians, especially school and tour groups who wait to enter the Gallery and for their coach to return (see photographs below).



Figure 11: Photos of existing Art Gallery Road in front of Gallery



Figure 12: Photos of existing Art Gallery Road in front of Gallery

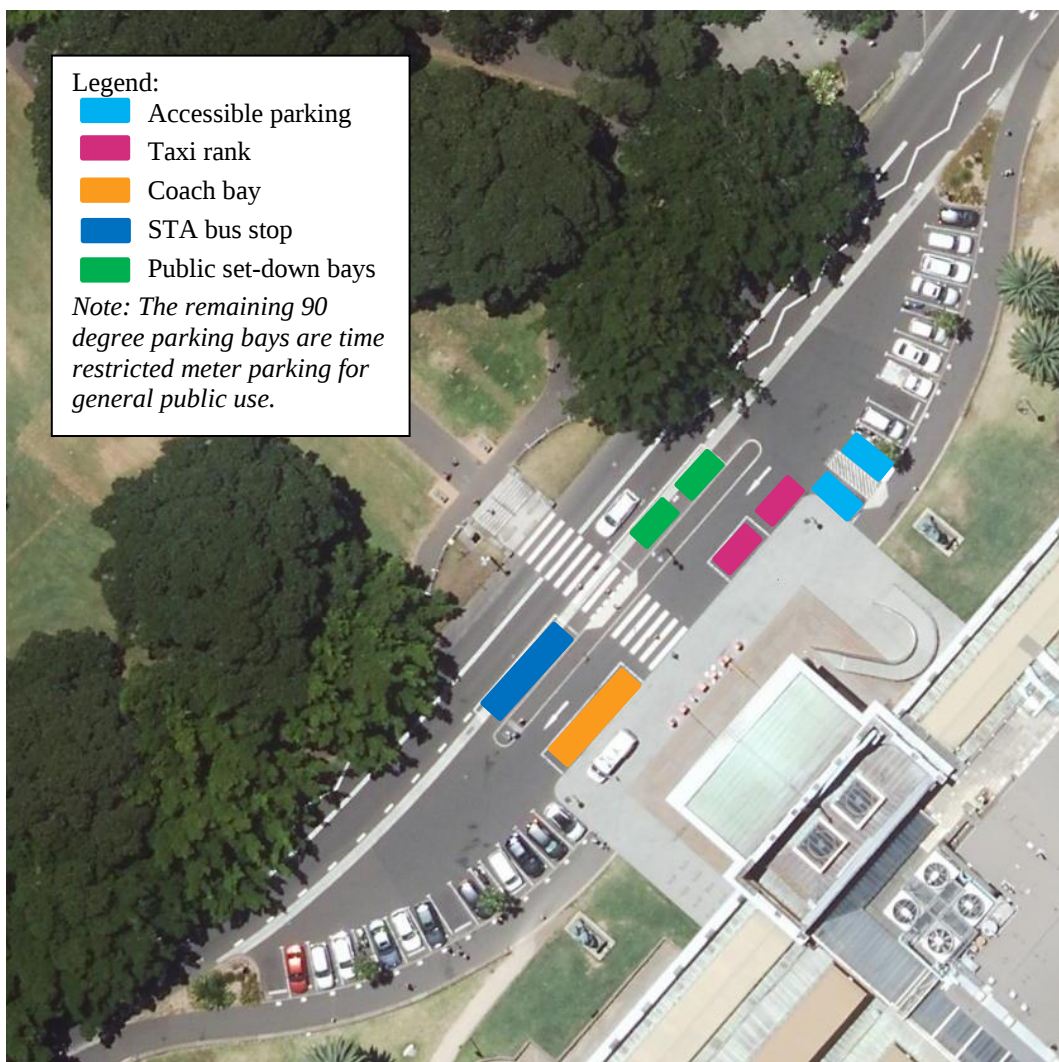


Figure 13: Existing set-down / pick-up area at the Gallery's main entrance

3.7 Parking

Parking is generally constrained in the area surrounding the Gallery. Limited on-street (meter) parking is available on Art Gallery Road, Mrs Macquaries Road and other streets around the Gallery available for 4-6 hours depending on time of day.

There are a number of parking stations near the Gallery, including the Domain Car Park which offers \$6 off casual parking after the first hour Monday to Friday if visitors parking ticket is stamped at the Gallery's information desk. There is a long-standing relationship between AGNSW & Domain Car park which is set to continue and enhanced through the construction of SMP.

The car park provides for 1,115 cars to park over the three levels. The Domain Car Park operates 7 days per week, closing at midnight every day.

A multi-million dollar upgrade of the car park has recently been completed with new lifts, wide car parking spaces and improved safety features. Lifts and stairs have been installed at the northern end of the car park to provide improved access to direct access to the Gallery.

There is also a public car park operated by Secure Parking available on Lincoln Crescent known as The Wharf, Woolloomooloo. This car park provides up to 89 public car parking spaces and was found to be one of the more popular car parking locations operated by Secure Parking. It is assumed that current patrons do not utilise this car park given its relative high cost (compared to the Domain Car Park) and lower parking capacity available.

3.8 Cycling

Bicycle parking in the form of racks for 16 bicycles are provided outside the main entrance to the Gallery on Art Gallery Road for use of staff and visitors as shown in Figure 14. While there is no dedicated cycling infrastructure (e.g. bicycle lanes) in the immediate vicinity of the site, a number of nearby streets including St Marys Road and Art Galley Road carry low volumes of traffic and are suitable for use of cyclists.



Figure 14: Bicycle parking rails at main entrance

4 Data Collection

Two sets of data were collected to inform the study. A full cordon count of pedestrians and cyclists was undertaken to assist with understanding the patterns of movement into and through the precinct. Key intersections were counted in peak periods and weekly traffic flow data was collected on key road links

4.1 Pedestrian and Cycle Surveys

A key aspect of the walking and cycling routes for access to the Gallery is that they are fully integrated with the City of Sydney's walking and cycling network.

Arup has undertaken pedestrian and cyclist surveys on the grounds surrounding the proposed site. Counts were undertaken on a weekday and a Saturday to assess the existing pedestrian situation around and into the site.

4.1.1 Pedestrian and bicycle survey location and peak hours

Pedestrian and cyclist counts were surveyed on a weekday (Tuesday 8 December 2015) and weekend (Saturday 5 December 2015) at 13 cordon locations around the site, and 1 intermediate site behind the Gallery as shown in Figure 15 to allow for a comprehensive count of pedestrians and cyclists entering and leaving the precinct. Locations are numbered 1-14 in an anti-clockwise direction around the site from the Woolloomooloo stairs on the corner of Cowper Wharf Roadway and Lincoln Crescent. Location 14 is the intermediate site behind the Art Gallery. Plots of the peak hour periods are contained in Appendix A.

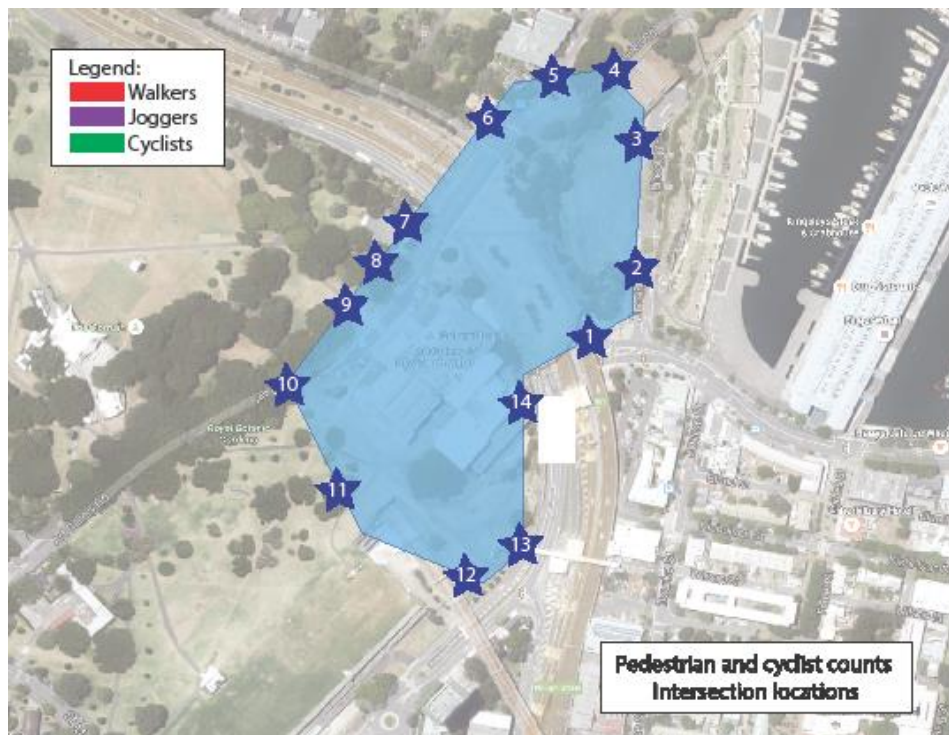


Figure 15: Pedestrian and cyclist count locations

The network peak hours were found to be:

- 7:45am-8:45am, 5:15pm-6:15pm, and 12:15pm-1:15pm for the weekday morning, evening and mid-day peaks respectively.
- 12:45pm-1:45pm for the weekend counts.

The following figures present the total volumes for each period surveyed.

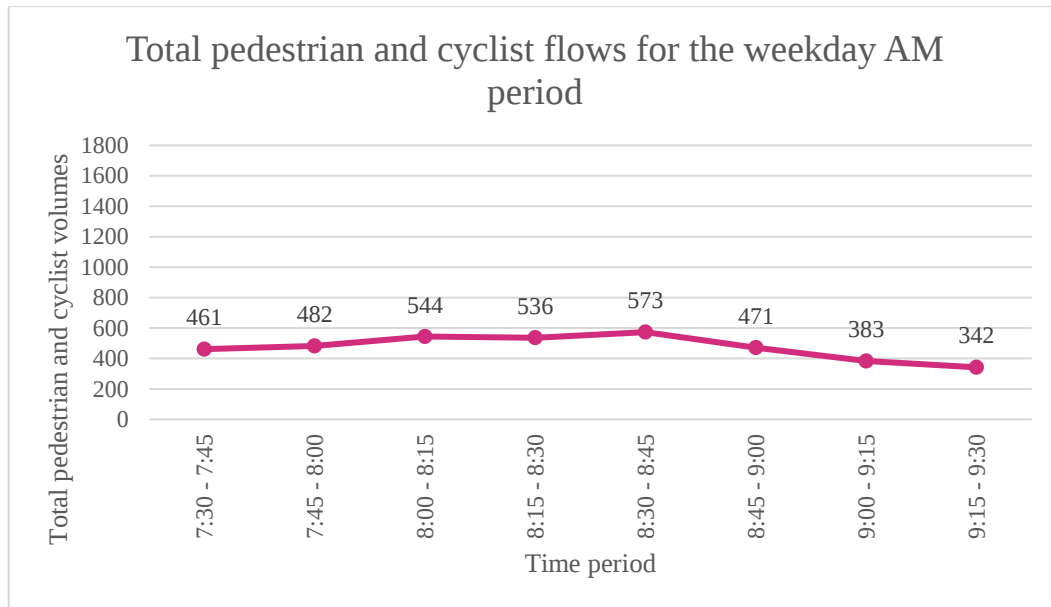


Figure 16: Total pedestrian and cyclist flows for the weekday AM period

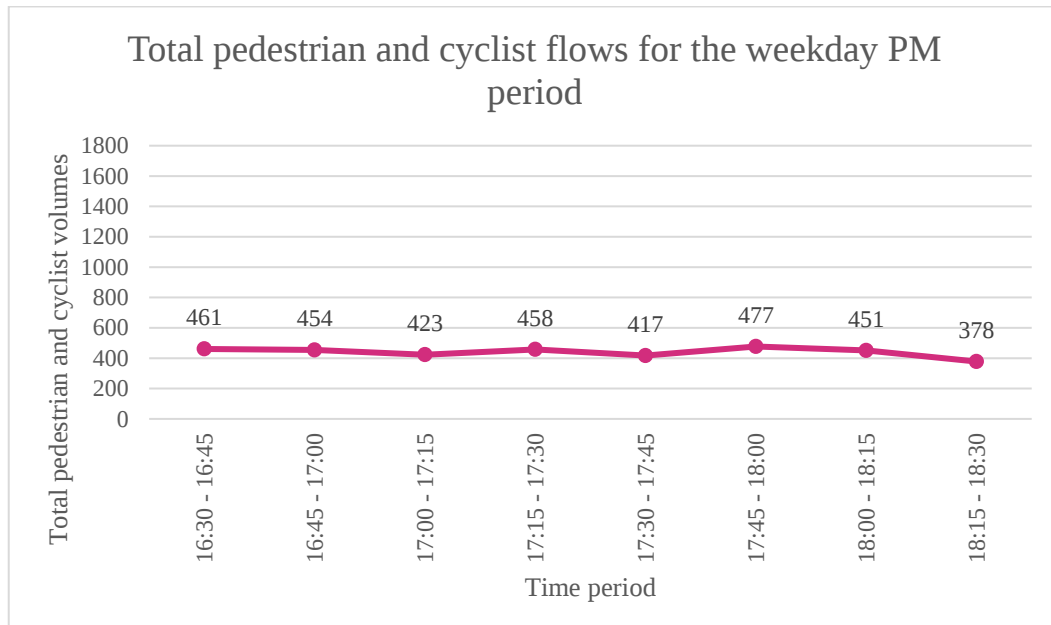


Figure 17: Total pedestrian and cyclist flows for the weekday PM period

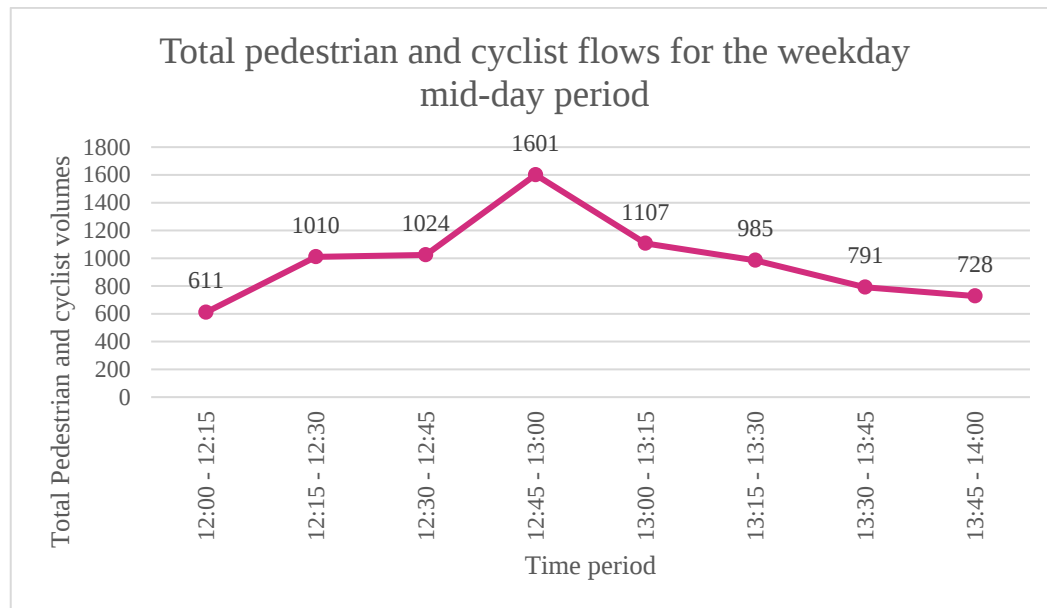


Figure 18: Total pedestrian and cyclist flows for the weekday mid-day period

A series of diagrams have also been prepared and attached, showing the directional flows at each location.

4.1.2 Peak period trends

The counts were undertaken differentiating walking, jogging and cycling traveller. The summarised data is shown in following Figure 19 and Figure 20. Key points to emerge from the trends were:

- A total of 1,929 and 1,522 walking pedestrians during the weekday AM and PM peak periods respectively, accounting for over 80 percent in both total counts.
- The most active peak period occurred on the weekday mid-day with a total of 4,742 travellers compared to the weekday average of 1,969. 37% of total travellers consisted of joggers, correlating to workers and nearby residents on a lunch break run.
- The weekend observed a total of 1,964 travellers compared to the weekday average of 650.
- The weekend peak period observed 97% as walkers, as expected to be as a result of the recreational use of the area.
- There were minimal cyclists (<2%) noted throughout the entire survey period.

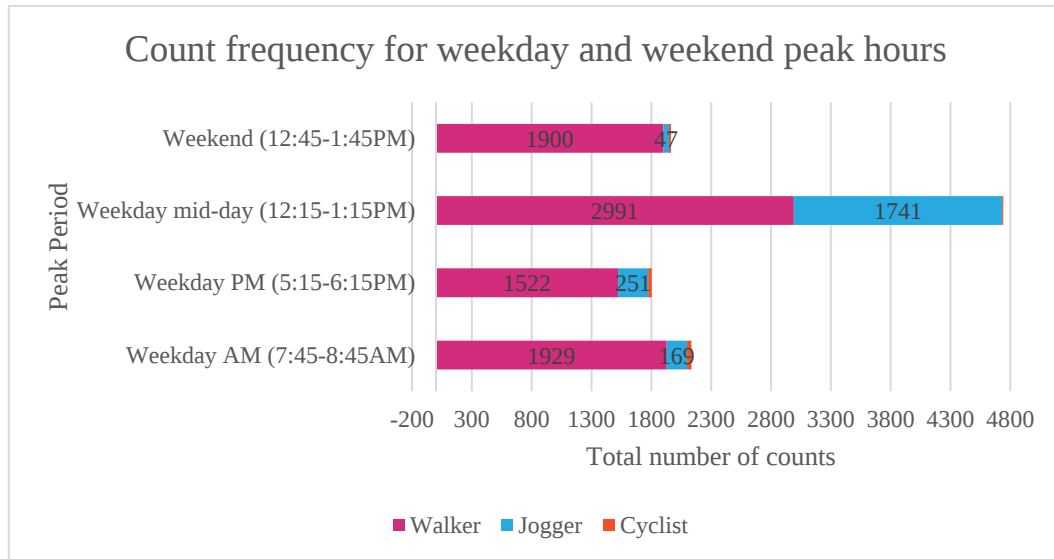


Figure 19: Frequency of travellers by peak period

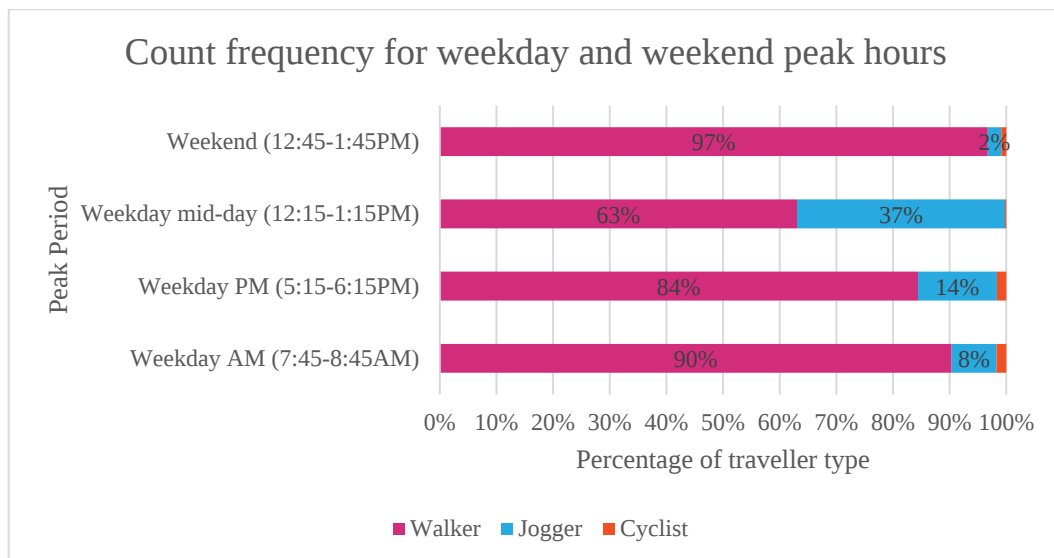


Figure 20: Percentages of travellers by peak period

4.1.3 Location trends

The number of pedestrians and cyclists were compared by location, summarised in Figure 21 and Figure 22. Findings found Art Gallery Road had the largest number of pedestrian and cyclist counts. The road appears to be frequented by pedestrians and cyclists for travellers travelling to the Gallery but also recreationally though the Royal Botanic Gardens. A similar trend was found for a larger number of cyclists to be travelling both northbound and southbound along Art Gallery Road and further north along Mrs Macquaries Road. The road is a scenic route for travellers between Mrs Macquaries Point and the Royal Botanic Gardens.

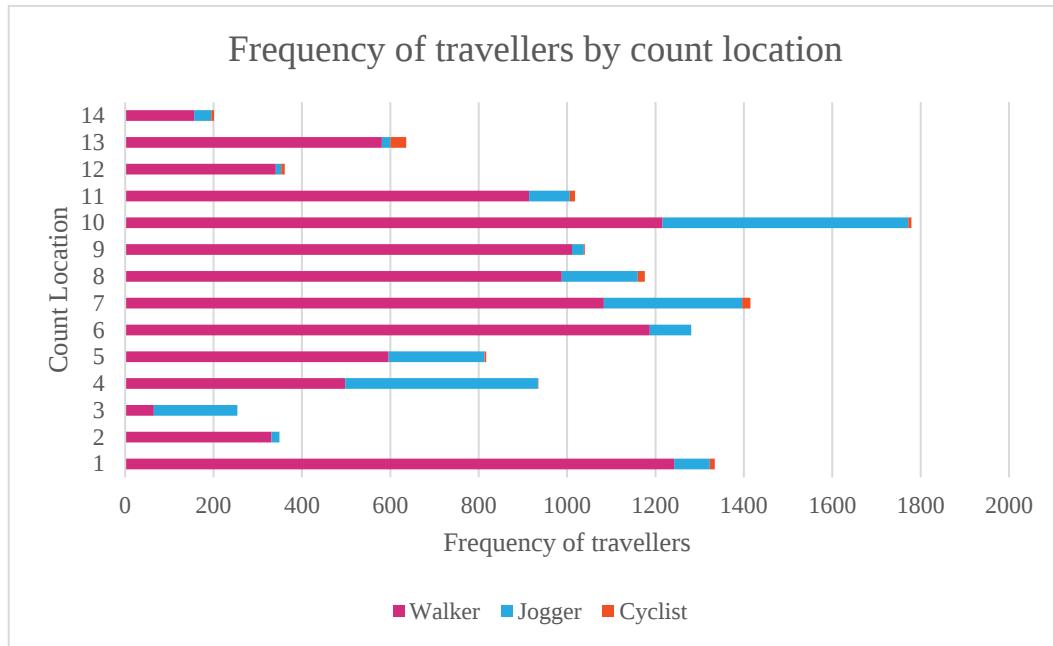


Figure 21: Frequency of travellers by count location

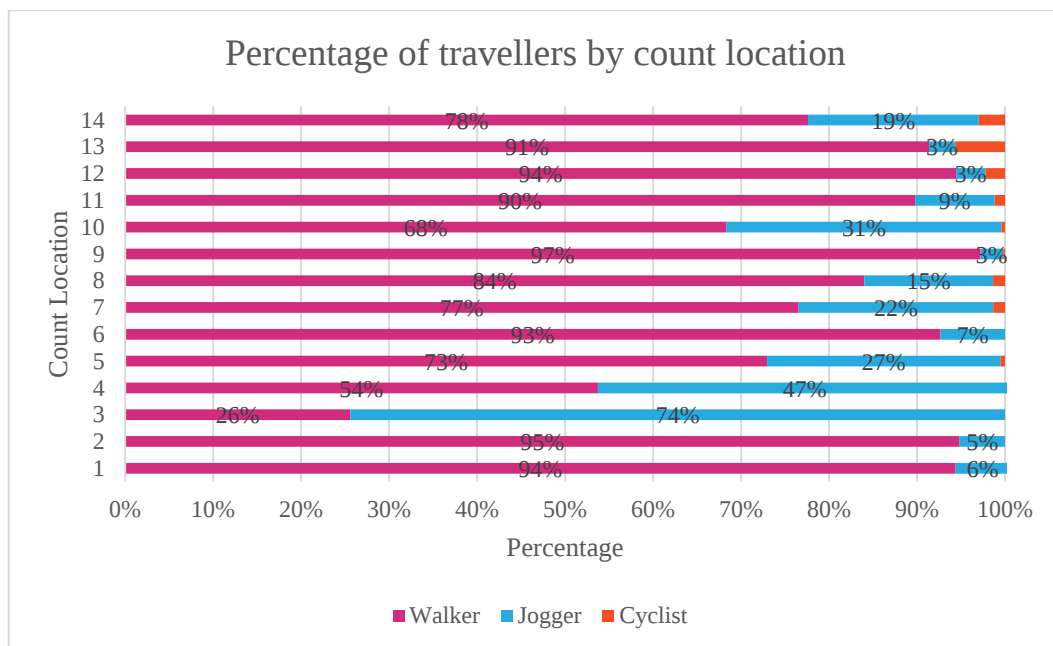


Figure 22: Percentage of travellers by count location

4.1.4 Site access

The potential number of visitors entering the site was determined by the variation in the hourly inbound and outbound movements of the site area as shown in Figure 15. The findings are presented in Table 2. During the weekend peak hour between 12:45pm and 1:45pm, a surplus of 108 total travellers were observed travelling into the site compared to those exiting. A proportion of these travellers may enter the site. 86 pedestrians were identified as entering the site during the weekday AM and 25 exiting on the weekday PM, accounting for workers and visitors to the site. The observed counts undertaken on the weekday mid-day peak

periods are minimal, inferring that pedestrians and cyclists are passing through the site area as opposed to a recreational visit.

Table 2: Inbound and outbound total movements

Peak period	Total outbound	Total inbound	Variation (direction)
Weekday AM (7:45am-8:45am)	1012	1098	86 (Inbound)
Weekday PM (5:15pm-6:15pm)	904	879	25 (Outbound)
Weekday Mid-day (12:15pm-1:15pm)	2301	2294	7 (Outbound)
Weekend (12:45pm-1:45pm)	923	1031	108 (Inbound)

4.1.5 Pedestrian count summary

Pedestrian and cyclist counts indicate the following:

- The SMP site is located in a high activity level area, surrounded by a number of recreational land uses within the vicinity.
- The area is most active during the mid-day weekday peak hour, with visitors utilising the recreational sites nearby.
- There were minimal cyclists noted throughout the survey periods.
- The weekday mid-day peak hour indicated that the majority of pedestrians and cyclists travel through the precinct around the site.
- The weekday AM and PM peak hours identify workers and visitors entering the precinct.
- There are a high proportion of joggers during the weekday mid-day peaks including both locals and workers within the vicinity.
- Art Gallery Road is associated with the highest pedestrian volumes, providing access to the Gallery from the east.

4.2 Traffic surveys

Traffic surveys were undertaken end of April / early May to assess the existing vehicle movements around and into the site. Traffic surveys included weekly tube counts and intersection turning counts as shown in Figure 23.

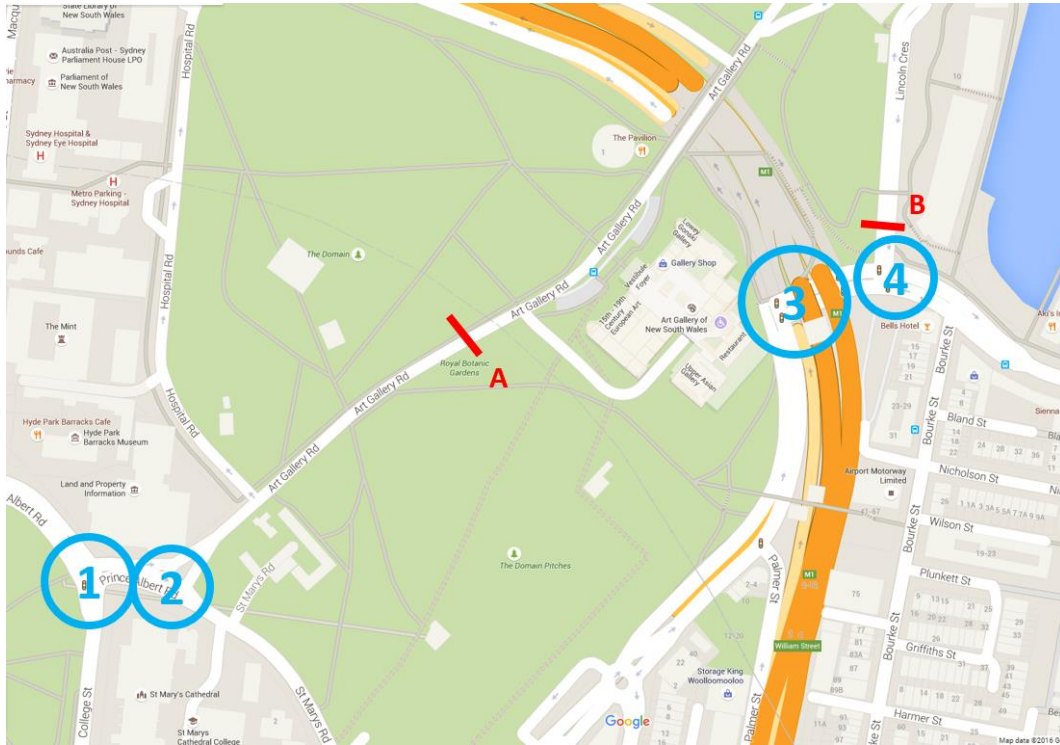


Figure 23: Traffic survey locations

4.2.1 Intersection counts

Intersection turning counts were surveyed on a weekday (Tuesday 30 April 2016) and weekend (Saturday 3 May 2016) at four intersections around the SMP site to allow for a comprehensive count of vehicles surrounding the precinct. Although the Gallery is slightly busier on a Sunday, counts on the road network were undertaken on Saturday as the busiest weekend day on the wider road network. The intersections included:

1. College Street / Prince Albert Road
2. Prince Albert Road / St Marys Road
3. Sir John Young Crescent / Cowper Wharf Roadway
4. Cowper Wharf Roadway / Lincoln Crescent

These volumes are shown in Appendix B.

4.2.2 Weekly and daily profiles

Weekly classified vehicle counts were undertaken on Art Gallery Road and Lincoln Crescent (at locations A and B respectively).

Surveys indicated that traffic volumes varied in the order of 500-1,100 vehicles during the week on Lincoln Crescent (see Figure 24). Saturday had the highest daily traffic volume and weekdays were relatively low compared the weekend volumes.

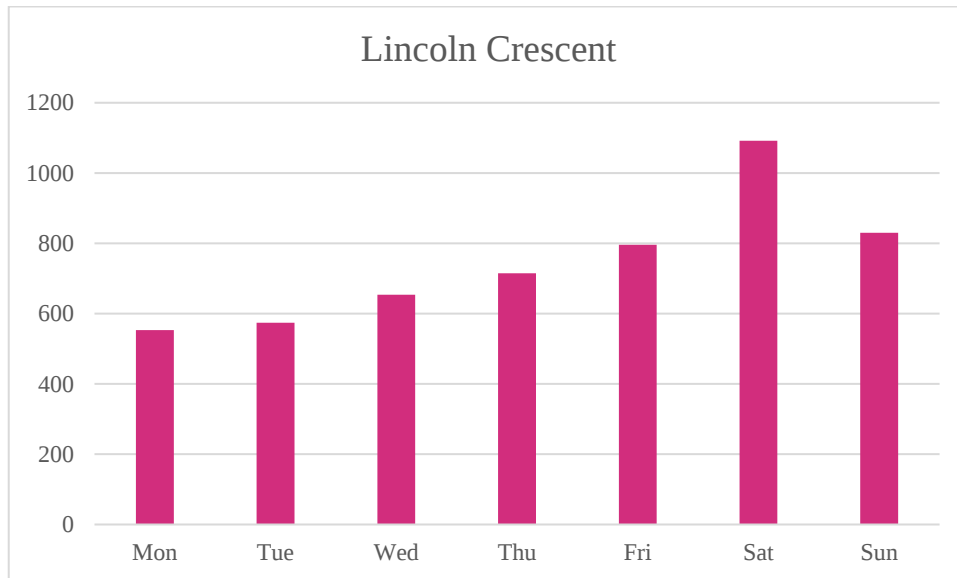


Figure 24: Weekly traffic profile on Lincoln Crescent

The heavy vehicle proportion varied between 1-4%, with an average of 2.7% during weekdays. The average daily profile for Lincoln Crescent is shown in Figure 25. The peak hour was found to be 10am to 11am, with a secondary peak at 6pm-7pm.

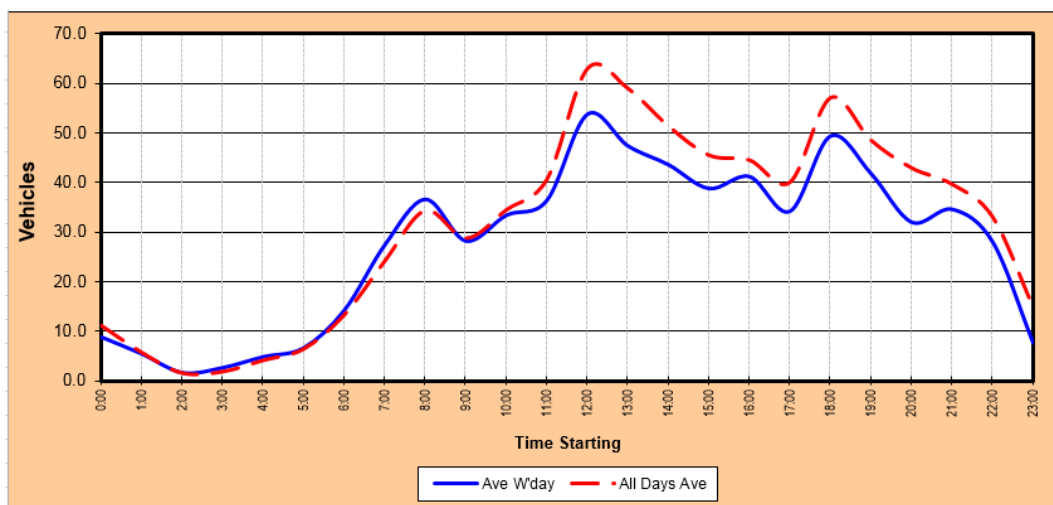


Figure 25: Daily traffic profile on Lincoln Crescent

Surveyed traffic volumes along Art Gallery Road indicate that traffic volumes varied between 2,300 to 4,000 daily vehicles (see Figure 26). Sunday was found to contain the lowest daily traffic volumes, with larger numbers of vehicles recorded during weekdays.

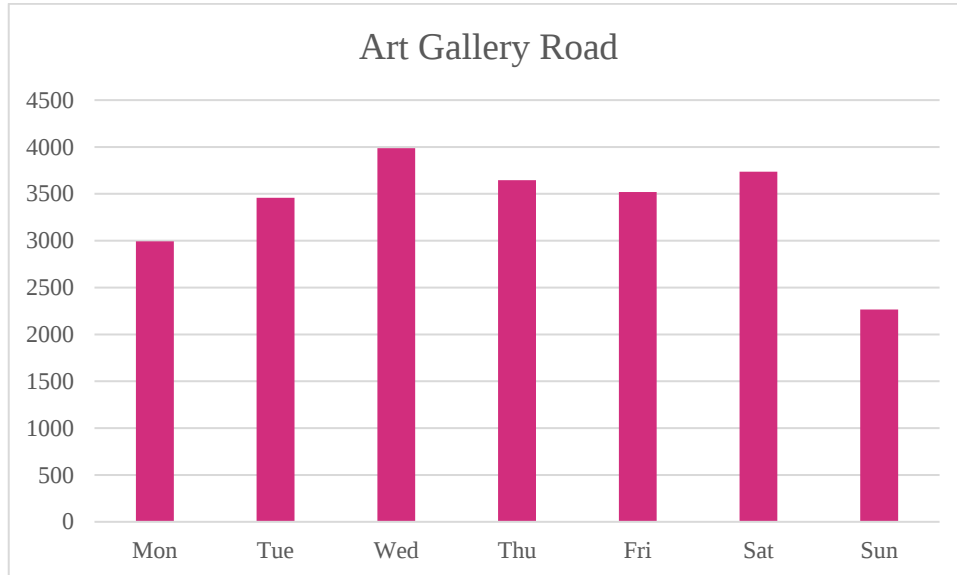


Figure 26: Weekly traffic profile on Art Gallery Road

The heavy vehicle proportion varied between 7-16%, with an average of 15% during weekdays, likely accounting the large number of coaches using the roadway. The average daily profile for Art Gallery Road is shown in Figure 27. The peak hour was also found to be 10am to 11am.

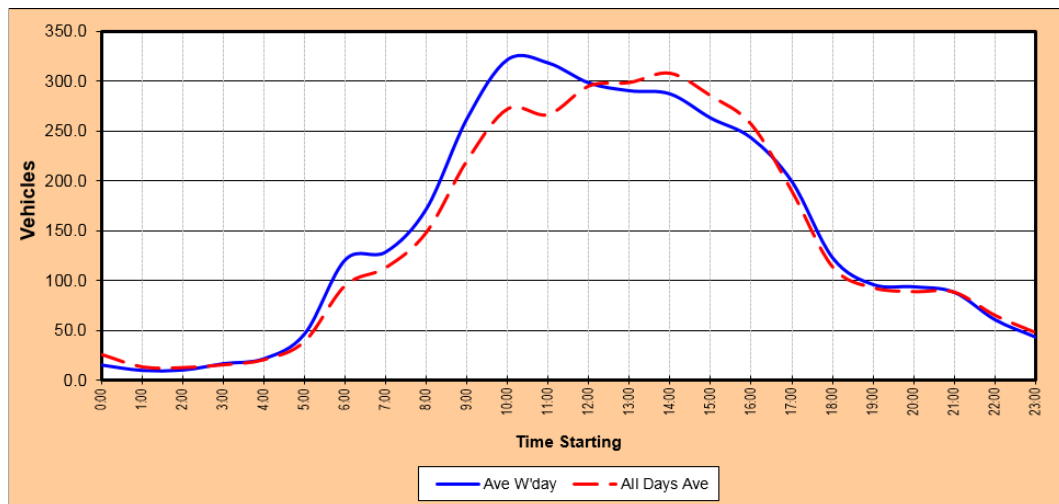


Figure 27: Daily traffic profile on Art Gallery Road

4.3 Loading dock activity

The Gallery monitors the activity in the existing loading dock. Table 3 provides the hourly accumulation on site for cars, delivery vans, delivery trucks, garbage, and art deliveries. Gallery vehicles can include cars, some of which are on site overnight.

Table 3: Typical weekday loading dock usage per hour

Time	Car	Delivery van	Delivery truck	Garbage	Contractor	Art	Total
00:00-1:00	4	0	0	0	0	0	4
1:00-2:00	4	0	0	0	0	0	4
2:00-3:00	4	0	0	0	0	0	4
3:00-4:00	3	0	0	0	0	0	3
4:00-5:00	2	0	0	0	0	0	2
5:00-6:00	1	1	1	0	2	0	5
6:00-7:00	0	2	2	0	2	0	6
7:00-8:00	0	2	1	0	4	0	7
8:00-9:00	3	1	1	0	2	0	7
9:00-10:00	5	1	0	0	3	0	9
10:00-11:00	4	2	1	0	3	0	10
11:00-12:00	5	4	0	0	3	0	12
12:00-13:00	3	2	0	0	4	0	9
13:00-14:00	7	2	0	0	4	0	13
14:00-15:00	9	3	0	0	3	0	15
15:00-16:00	7	2	0	0	2	0	11
16:00-17:00	6	1	0	0	2	0	9
17:00-18:00	5	1	0	0	2	0	8
18:00-19:00	8	1	0	0	1	0	10
19:00-20:00	8	1	0	0	1	0	10
20:00-21:00	7	1	0	0	0	0	8
21:00-22:00	7	0	0	0	0	0	7
22:00-23:00	7	0	0	0	0	0	7
23:00-24:00	6	0	0	0	0	0	6

On a typical day there are 94 vehicles that access the dock as shown in Table 4.

Table 4: Daily loading dock vehicle movements

	Car	Delivery van	Delivery truck	Garbage	Contractor	Art	Total
Vehicles per day	26	36	17	2	13	0	94

5 Proposed Development

5.1 Development Description

The Art Gallery of NSW proposes to undertake a major expansion of the existing art gallery adjacent to the Phillip Precinct of the Domain. The expansion, proposed as a separate, stand-alone building, is located north of the existing gallery, partly extending over the Eastern Distributor land bridge and includes a disused Navy fuel bunker located to the north east of this land bridge.

The new building comprises a new entry plaza, new exhibition spaces, shop, food and beverage facilities, visitor amenities, art research and education spaces, new roof terraces and landscaping and associated site works and infrastructure, including loading and service areas, services infrastructure and an ancillary seawater heat exchange system.

Development consent is sought for:

- Site preparation works, including:
 - Site clearing, including demolition of former substation, part of road surfaces, kerbs and traffic islands, pedestrian crossings, foot paths, retaining walls, stairs, and part of disused underground former Navy fuel bunkers;
 - Tree removal;
 - Excavation and site earthworks;
 - Remediation works;
- Construction of the new building comprising:
 - Covered public entry plaza;
 - Five building levels, including entry pavilion following the site topography down to Lincoln Crescent;
 - Retention of part of existing former underground Navy fuel bunker for use as gallery space and support spaces;
 - Art exhibition spaces;
 - Outdoor publicly accessible terraces;
 - Shop and cafe;
 - Multipurpose space;
 - Education spaces;
 - Ground level loading dock (accessed via Lincoln Crescent) with associated art handling facilities, workshops, service parking, plant, and storage areas.
- Landscaping and public domain improvements including:
 - Continuation of the east-west pedestrian link over the land bridge between the Domain and Woolloomooloo Bay, including dedicated lift structure for universal access;
 - Improved public access of the north south pedestrian link
 - Enhancement of the public open space on the land bridge to create a landscape and art connection between the two buildings
 - Hard and soft landscaping to roofs and terraces;

- Plantings and new pathways;
- Increased landscaped area to forecourt of existing Art Gallery building and removal of car parking
- Relocation of selected trees to the south-eastern corner of the site;
- Sound barrier to edge of land bridge;
- Upgrade works to part of Art Gallery Road, Cowper Wharf Road, Mrs Macquaries Road, and Lincoln Crescent, including new pedestrian crossings;
- Provision of vehicle drop off points including a taxi stand, private vehicle drop off and bus/coach drop off, at Art Gallery Road;
- Installation of an ancillary seawater heat exchange system to act as the new building's cooling system, adjacent to and within Woolloomooloo Bay;
- Diversion, extension and augmentation of physical infrastructure and utilities as required.

5.2 Audience Growth

Currently the Gallery has an annual visitation of 1.1 million. The Sydney Modern Project will revitalise the existing building and the new building will include new gallery spaces, providing the capacity to increase visitation from the current level to over 2 million people a year.

Based on the projected growth, a forecast of future visitor demand to the Gallery has been developed as shown in Figure 28 (for a weekday) and Figure 29 (for a Sunday). This provides an indication of the level of hourly demand over a busy weekday and Sunday, and indicates as many as an additional 1,100 people per hour may travel to the site.

Entry to the Gallery is free to all visitors. In addition visitors have the choice of attending up to 6 paid exhibitions each year – typically 3 major and 3 minor ones – which are located within various parts of the Gallery. This mix of free access and regular paid exhibitions is envisaged to continue once the Sydney Modern expansion project is complete, although on a larger scale. There is no direct correlation, however, between the daily visitation to the Gallery and the holding of a major paid exhibition as the Gallery is regularly changing exhibitions of its permanent collection and 'importing' other exhibitions which are not paid entry which still may attract large audiences. In the busiest weekend in July 2016, while 10,000 people came through the Gallery in total, only about 4,000 people purchased tickets to paid exhibitions.

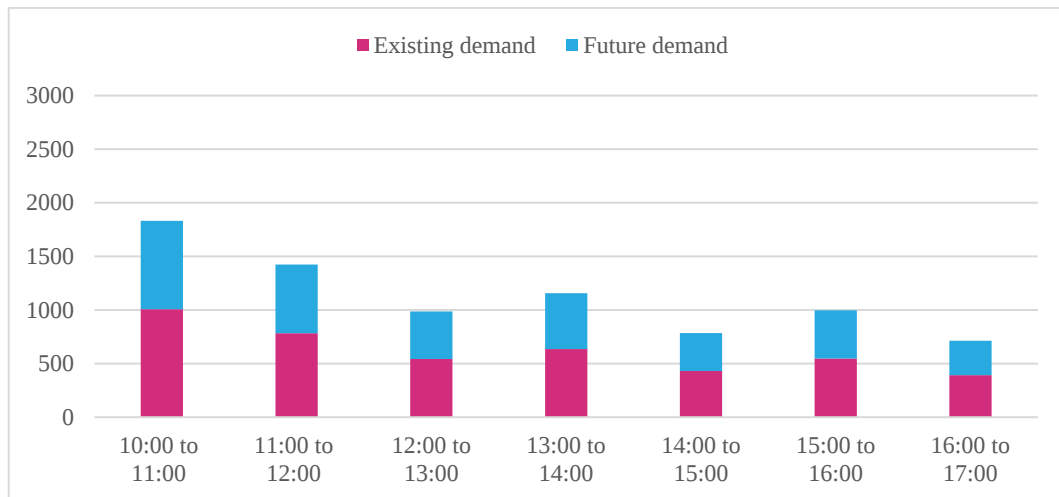


Figure 28: Forecast increase in visitor demand (Weekday)

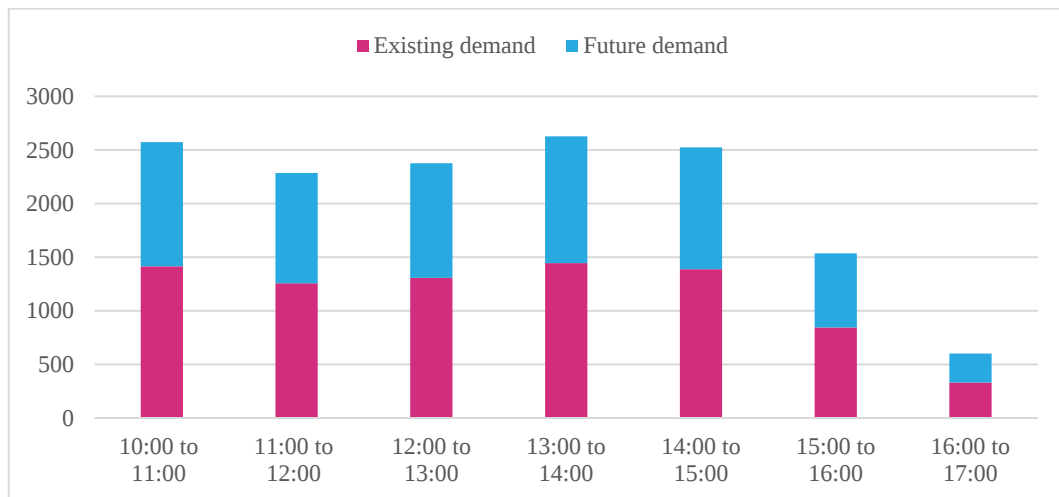


Figure 29: Forecast increase in visitor demand (Sunday)

5.3 Staff Growth

The Gallery has both full time staff and part time staff that fluctuate depending on the exhibitions that are running. A growth in staff from 196 to approximately 279 staff across all categories including contractors and restaurant staff is expected.

The vast majority of that increase in staff will be absorbed by the existing Gallery building.

6 Transport Strategy

6.1 Travel Demand

Based on the growth in visitation to the Gallery following the proposed development of the site, the future additional travel demand has been forecast. This considers the additional visitors generated over a peak hour on a busy day where a special exhibition is held. The mode of travel has been maintained at the current split as identified from the patron surveys as described in Section 3.1.2.

This future travel demand is summarised in Table 6 for the weekday and Table 6 for Sunday. The development may generate an additional 1,182 trips in the Sunday peak hour and 6,536 trips over the course of a busy Sunday (compared to current levels). On a weekday the increase is in the order of 3,500 daily trips to the site.

Table 5 Future travel demand (Weekday)

Mode of Transport	Mode Share	Additional peak hour trips	Additional daily trips
Train	35%	288	1,243
Private vehicle (driver / passenger)	24%	198	852
Bus	17%	140	604
Walk	16%	132	568
Ferry	2%	16	71
Other	6%	49	213
Total	100%	816	3,552

Table 6 Future travel demand (Sunday)

Mode of Transport	Mode Share	Additional peak hour trips	Additional daily trips
Train	35%	414	2,288
Private vehicle (driver / passenger)	24%	284	1,569
Bus	17%	201	1,111
Walk	16%	189	1,046
Ferry	2%	24	131
Other	6%	71	392
Total	100%	1,183	6,536

6.2 Parking Strategy

6.2.1 Car parking requirement

The art gallery is defined as an Information and Education Facility under Sydney LEP 2012. Clause 7.9(3) of the LEP provides a maximum parking rate of 1 space for every 200sqm of GFA of the building used for that purpose.

The overall building GFA of the Gallery is currently approximately 20,000m² increasing to approximately 32,000 m² following completion of the Sydney Modern expansion Project. Applying this rate indicates a future maximum parking supply of 160 spaces. Given that this rate is not site specific, we recommend applying the first principles assessment undertaken in Section 6.1.

6.2.2 Off-site car parking

The Gallery does not propose any on-site car parking for visitor activity, instead relying on the unused capacity of the Domain Car Park which provides approximately 1,100 spaces. The Domain Car Park also provides parking for motor cycles and bicycles which are available for visitor use.

As noted in Section 3.7, the Gallery has a relationship with the Domain Car Park with a special discount available for Gallery patrons. There is available capacity both during the week and at weekends.

A typical weekday profile is shown in Figure 30 which indicates approximately 200 available spaces. InterPark, the car park operators, have previously indicated that they would adjust their early bird rates to allow for any increase in casual parking. On a normal weekend, the car park operates at approximately 30% capacity leaving approximately 750 car spaces available. When there is an event on in the precinct, the car park fills to about 85% capacity, as indicated in Figure 31, leaving approximately 150 car spaces available.

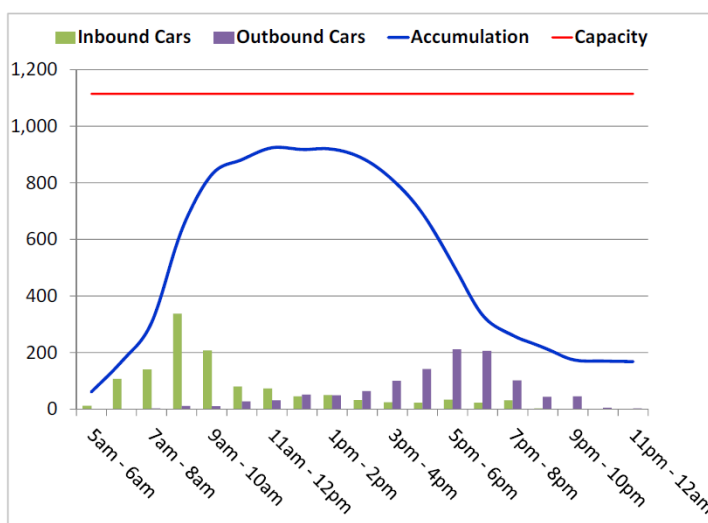


Figure 30: Typical Weekday - car park utilisation

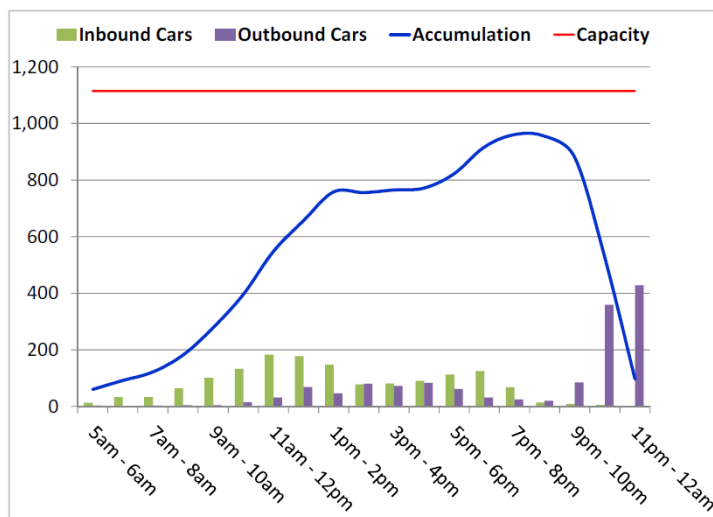


Figure 31: Typical event day on a weekend – car park utilisation

On a typical weekday it has been determined that an additional 198 visitors will arrive by private car in an hour. Assuming 2 hour stay and 2 people per vehicle results in a parking demand of 198 cars. This can easily be accommodated at the Domain Car Park and in other on-street and off-street parking locations. Similarly on the weekend some 284 visitors will arrive by private car in an hour. This results in a demand for 284 cars spaces which can be accommodated.

The Wharf Woolloomooloo Car Park operated by Secure Parking has relatively little spare capacity to cater for guests of the Gallery. Given the higher relative cost in comparison to the Domain Car Park, it is anticipated that this car park will be an unattractive option for visitors of the Gallery.

6.2.3 On-site car parking

The existing loading dock provides parking for a small number of operational and staff vehicles and 13 spaces are to be retained.

The car parking currently available on Art Gallery Road in the main entry area will be removed. There are 22 spaces that will be removed. The two accessible parking spaces will be replaced as indented parking in this location.

There are 5 vehicle spaces proposed in the new loading dock off Lincoln Crescent. These will be utilised predominantly for service vehicle parking.

6.2.4 Bicycle parking

The Sydney DCP 2012 provides rates for the provision of bicycle parking for art galleries as follows:

Employees 1 per 1,000m² GFA

Visitors 1 per 200m²

Although DCPs do not directly apply to State Significant Development, we have considered the requirement. For a total building GFA of approximately 32,000m², this requires 32 bicycle spaces for staff. The staff spaces will be provided in a

secure room. Currently, staff bicycle parking of 10 spaces is located within the existing loading dock. This will be expanded when further works are undertaken in the existing Gallery building.

For the public accessible space of approximately 20,000m² (after removal of back of house areas) some 100 bicycle spaces are indicated by the DCP for public use. The public spaces will be located on the western side of the existing land bridge in the form of U-rails. The existing bicycle parking rails are not currently heavily utilised. It is recommended therefore that initially some 32 U-rails be installed providing parking for 64 bicycles (50% of DCP rate) with room allocated for expansion should this be required.

6.3 Public transport

The current and future changes in public transport in the city are likely to enhance access to the gallery with the light rail construction, Sydney Metro (station at Martin Place) and improved bus services. The Sydney Metro line will deliver enhanced capacity and flexibility for access to the CBD by providing direct access from the north west sector, through Macquarie Park to the city and from the south on the Bankstown line and through Central Station allowing interchange with all other rail lines.

New wayfinding will enhance the clarity of access to the gallery from visitors arriving at the major surrounding rail stations e.g. St James. Circular Quay, Martin Place through wayfinding measures including signage.

By enhancing key pedestrian corridors to public transport nodes, this would improve pedestrian movement to public transport and may further increase usage. Physical measures can only achieve so much, and the travel demand strategy must include alternative strategies to encourage use of sustainable modes.

The number of additional trips by public transport modes was determined in Section 6.1 Travel Demand. Total people arriving by Train, Bus and Ferry is shown in Table 8, with 444 weekday peak hour people movements and 639 weekend peak hour people movements in each direction.

Table 7: Additional trips

Mode of Transport	Additional peak hour trips	
	Weekday	Weekend
Train	288	414
Bus	140	201
Ferry	16	24
Total	444	639

These trips can easily be accommodated on the modes of transport providing access to the city and the Domain precinct.

6.3.1 Potential ferry wharf in Woolloomooloo Bay

Transport for NSW are considering the potential for a future wharf and ferry route within Woolloomooloo Bay. No fixed location had been determined for the wharf which is subject to further investigations and assessments being completed.

The two possible areas under review are the south end of the bay (near the roadway, Cowper Wharf Road) and along the foreshore of the Botanic Gardens side (Mrs Macquaries Road) at the entry to the Bay.

With a new Woolloomooloo Bay ferry wharf, it could be expected that ferry patronage would increase to the site.

6.4 Access Strategy including Servicing

Vehicular movement in and around the precinct has been considered for a range of users including service vehicles, general access, mobility impaired access and parking, shuttle bus/coach and taxi access.

6.4.1 Drop-off/pick-up functions at the main entry

The main entry to the Gallery will remain on Art Gallery Road with the focus moving to the north adjacent to the main entry plaza. It is proposed that Art Gallery Road is reconfigured with indented bays in sections along both sides of the road. A single traffic lane will be maintained in both directions.

The proposed arrangement is shown in Figure 32 and Figure 33. A flexible kerb side arrangement will enable the allocation of space to be allocated to each user type including taxis, private vehicle and coach drop-off/ pick-up. The regular bus stop has been allocated a zone at the southern end of the plaza in a similar location to existing. Coach drop-off/ pick-up is allocated space on the western kerb line opposite the plaza. A pedestrian crossing is located at the back of the coach bays to provide access to the plaza.

Four accessible parking bays have been provided at the southern end of the plaza kerbside for general public use.

Removal of the large vehicle area in front of the Gallery removes the conflicts between vehicles and pedestrians. It also removes the ability for vehicles to turn around. Currently buses proceed north on Art Gallery Road to the first loop road at Mrs Macquaries Point to turn around to access the Gallery. This arrangement will continue. For cars and mini-buses, it is proposed to install a U-turn bay just to the north of the Gallery in the fork in the one-way road system. This arrangement is shown in Figure 32.

Another key issue involves the provision for bus and coach parking, given that a number of buses and coaches bring visitors to the Gallery (school groups, country visitors etc.). There are currently no arrangements for parking of coaches. Locations around the Gallery were explored for coach parking however due to the limited space, integration of the built form with the surrounding landscape of the Domain and the topography, no suitable location could be identified. The current arrangements will need to be maintained whereby coaches depart the site and park remotely before returning for pick-up at the northern side of Art Gallery Road.

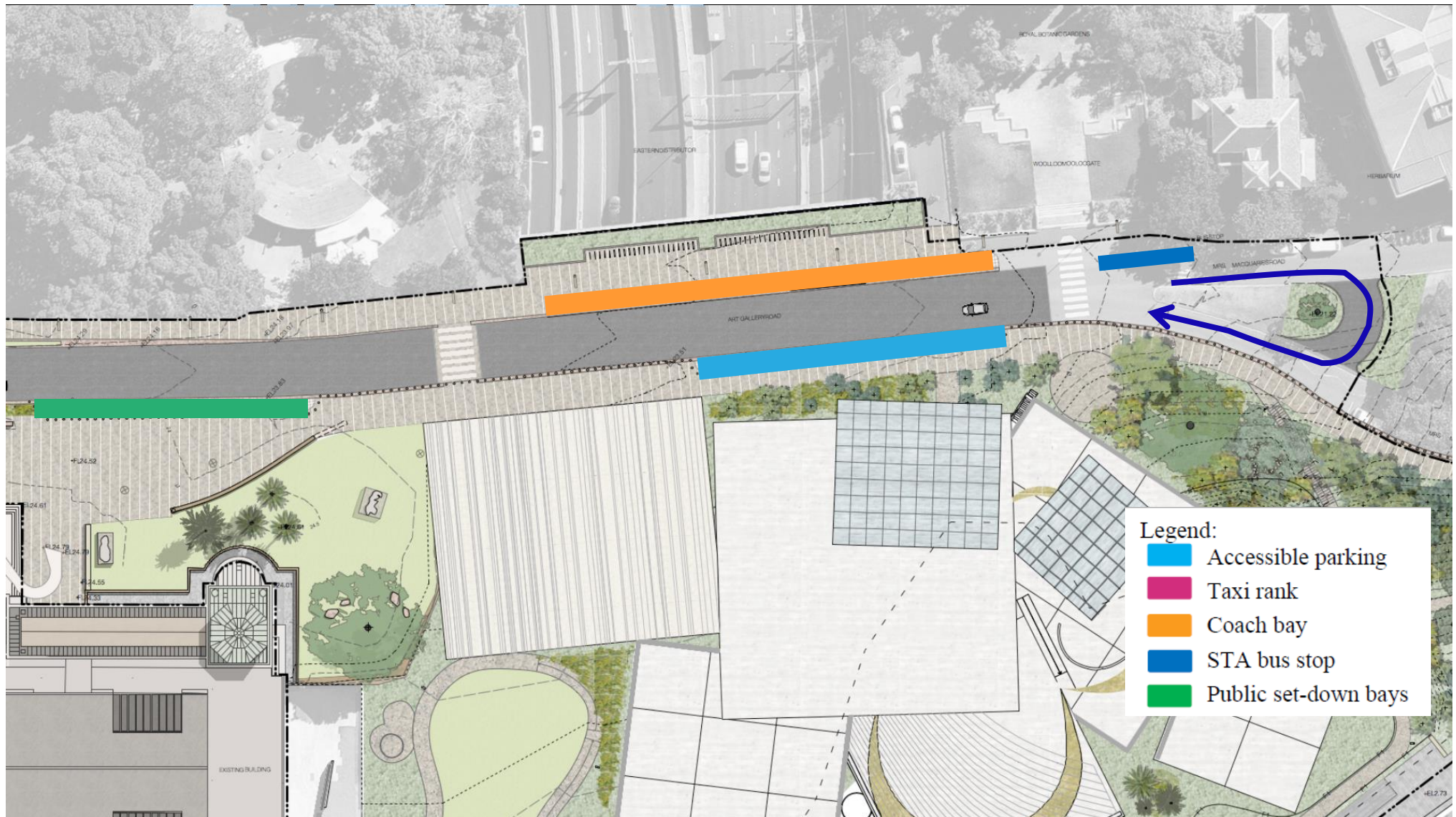


Figure 32: Art Gallery Road drop-off/pick-up – northern part

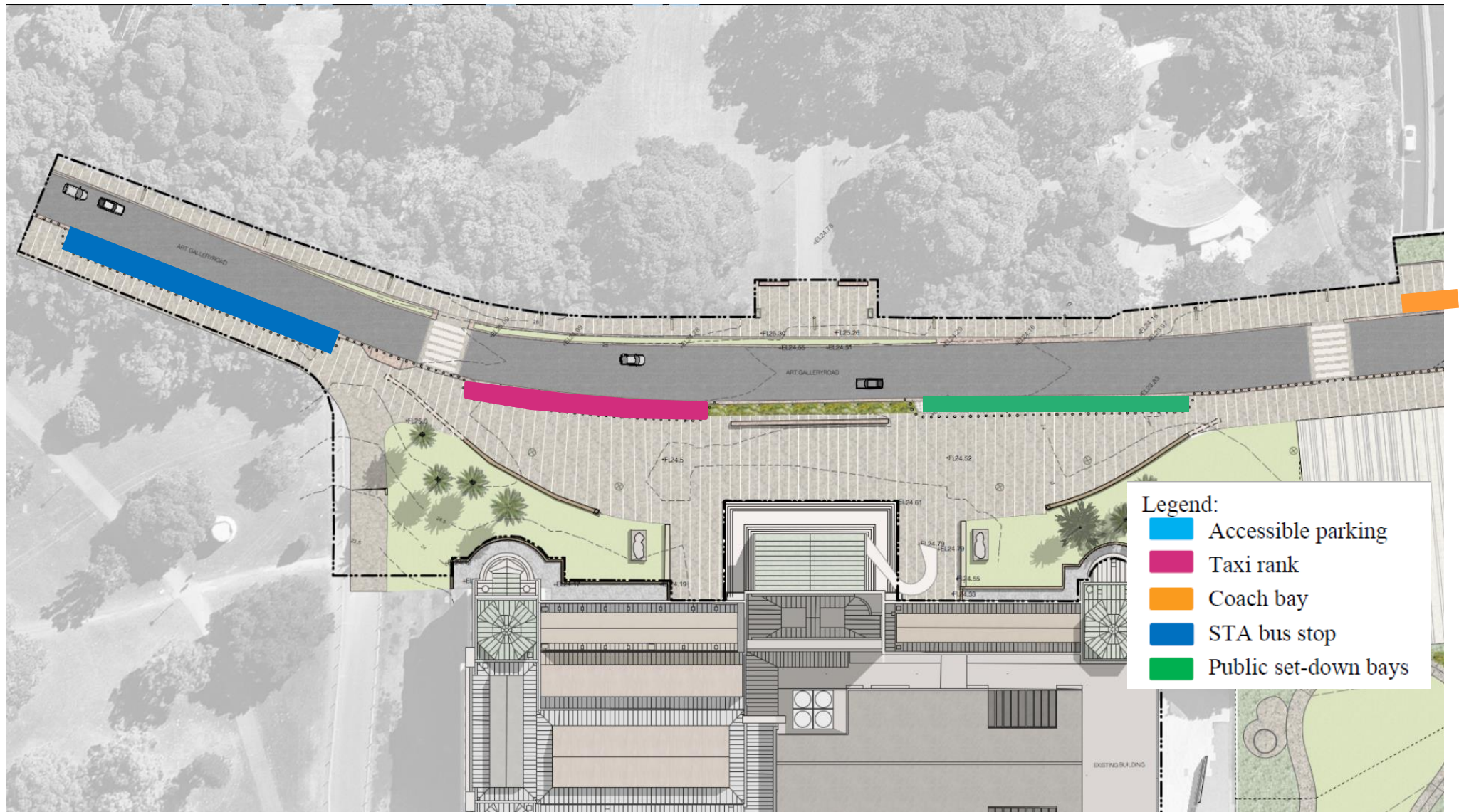


Figure 33: Art Gallery Road drop-off/pick-up – southern part

6.4.2 Loading and Servicing

A key aspect of the Sydney Modern Project is to improve the Gallery's loading and service access for art, and for general goods and waste. A new Loading Dock is proposed to be accessed from Lincoln Crescent. This will have a separate art loading dock to enable valuable art works to be delivered to, in particular a new 1,400 m² temporary exhibition space in accordance with best practice art-handling procedures. The Cowper Wharf Roadway / Lincoln Crescent intersection provides good access to the main road system.

Lincoln Crescent currently provides access to the Wharf Terraces car park for residents and the associated public car park as shown in Figure 34. There are approximately 43 on-street car parking spaces with 2hr restrictions 8am-6pm Mon-Fri and 4hr parking restrictions 6pm-10pm Mon-Fri and 8am-10pm Sat-Sun, along with the 89 off-street public parking bays.

A loading dock management plan will be prepared during later stages of the project.

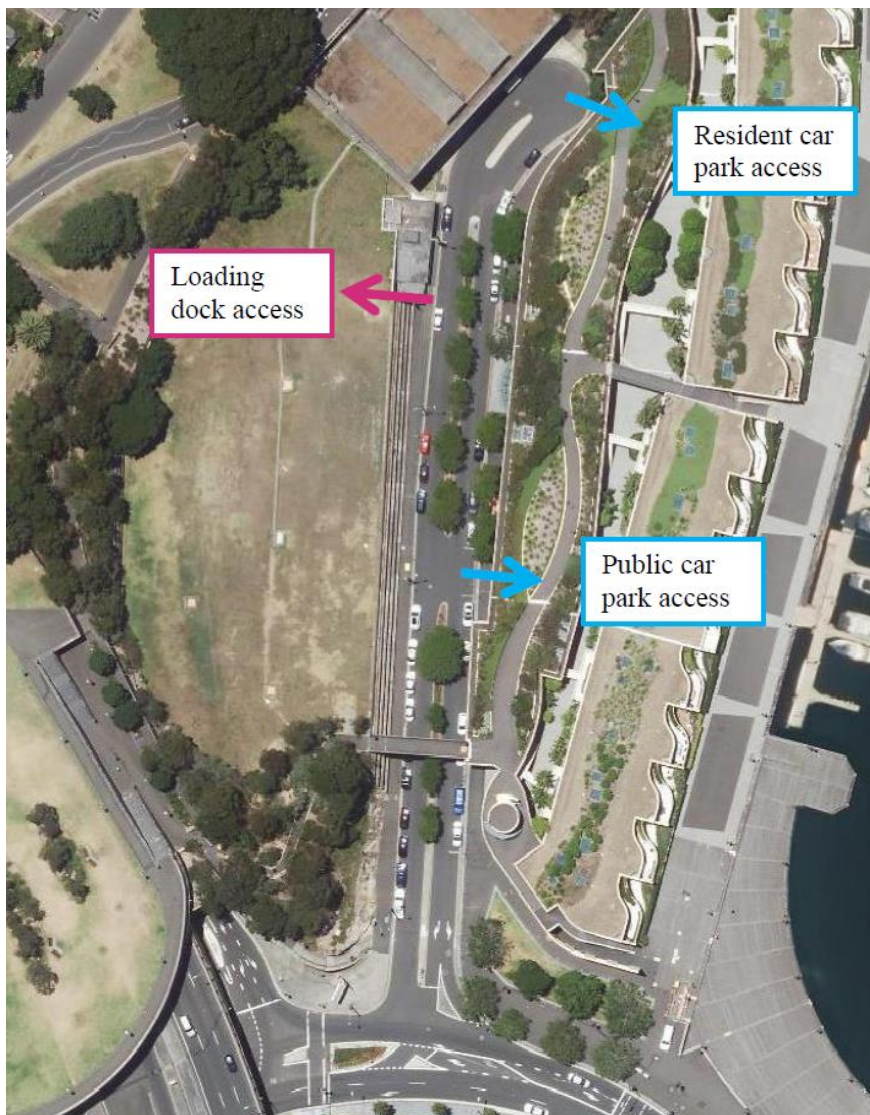


Figure 34: Lincoln Crescent access to loading dock

6.4.2.1 Existing Lincoln Crescent Traffic:

Lincoln Crescent carries approximately 550 daily vehicles (on Monday) to 1,100 daily vehicles (on Saturday with slightly less on Sunday) comprising resident vehicles accessing the Wharf Terraces, cars accessing the public car park and cars using the on-street car parking spaces.

6.4.2.2 Proposed Sydney Modern Traffic on Lincoln Crescent:

The proposed loading dock with access at the northern end of Lincoln Crescent will provide for the following vehicle types:

- Courier cars
- Delivery vans
- Delivery trucks ranging predominantly from small to medium sized trucks (MRV 8.8m long) with occasional large trucks (HRV 12.5m long)
- Garbage / Recycle trucks
- Contractor vehicles

The level of activity in the existing dock on a typical day was outlined in Section 4.3. With the expansion of the Gallery facilities it could be expected that a similar expansion of loading and servicing activity will occur. The existing dock is being maintained so it has been assumed that the same level of activity will occur at both the existing and the new dock. Daily vehicle movements of approximately 95 entries and 95 exits could be expected at each dock. The activity is spread over the day as shown in Figure 35.

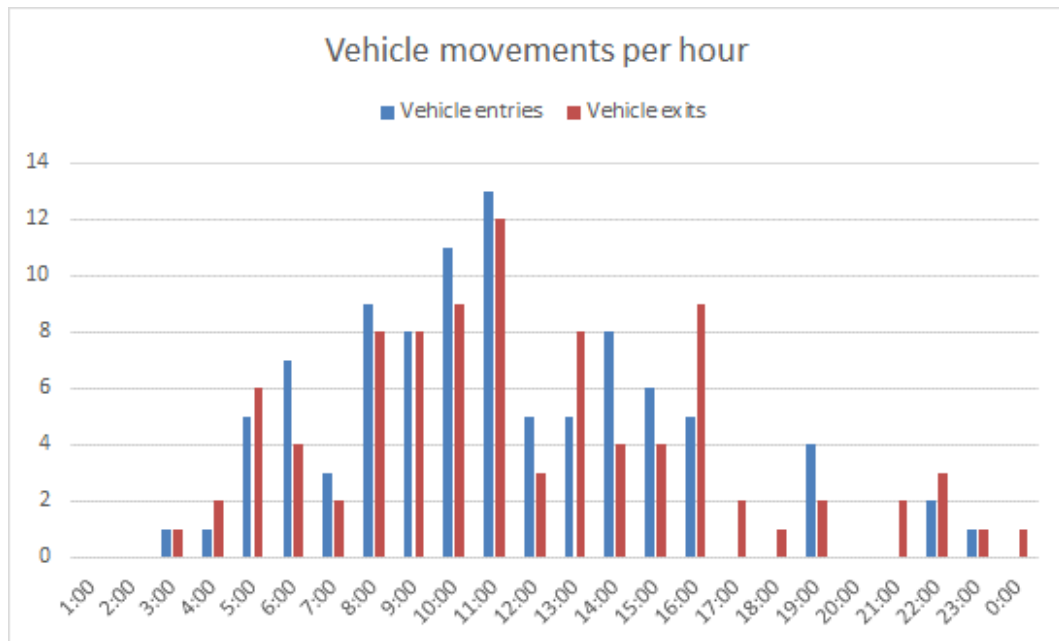


Figure 35: Loading and service vehicles to current Gallery dock

Consideration will be given to reduce operating times of loading dock to minimise disruptions on neighbouring developments.

6.4.2.3 Future Lincoln Crescent Traffic

The projected total daily traffic on Lincoln Crescent is estimated to be in the range of 740-1,280 daily vehicle movements two-way. This represents a 20-35% increase in activity. This level of traffic activity is well within the environmental capacity of a local street which is generally in the range of 2,000-3,000 vehicles per day (as per RTA Guide to Traffic Generating Developments v2 2002).

6.4.2.4 Art Loading Dock Activity

When exhibitions are changed at the Gallery, there are additional truck movements that would occur. These are often spread over a couple of days prior to and after each exhibition, which occur for varying periods of time during working hours. The number of trucks is variable but could be in the range of 2 to 10 trucks per exhibition.

6.4.2.5 Lincoln Crescent intersection

The intersection of Lincoln Crescent with Cowper Wharf Road has a Give Way priority control upon exit from Lincoln Crescent. There are two lanes at the exit providing for left and right turn exit movements. There are about four car lengths for queuing in each lane.

The increase in vehicle movements generated by the loading dock will be spread over the day as shown in Figure 36 with the busiest activity in the middle of the day when traffic conditions are good and less activity in the peak hours when some queuing occurs on Sir John Young Crescent. There is the potential to further reduce activity during the peak hours by managing the arrival of goods to the loading dock through timed delivery.

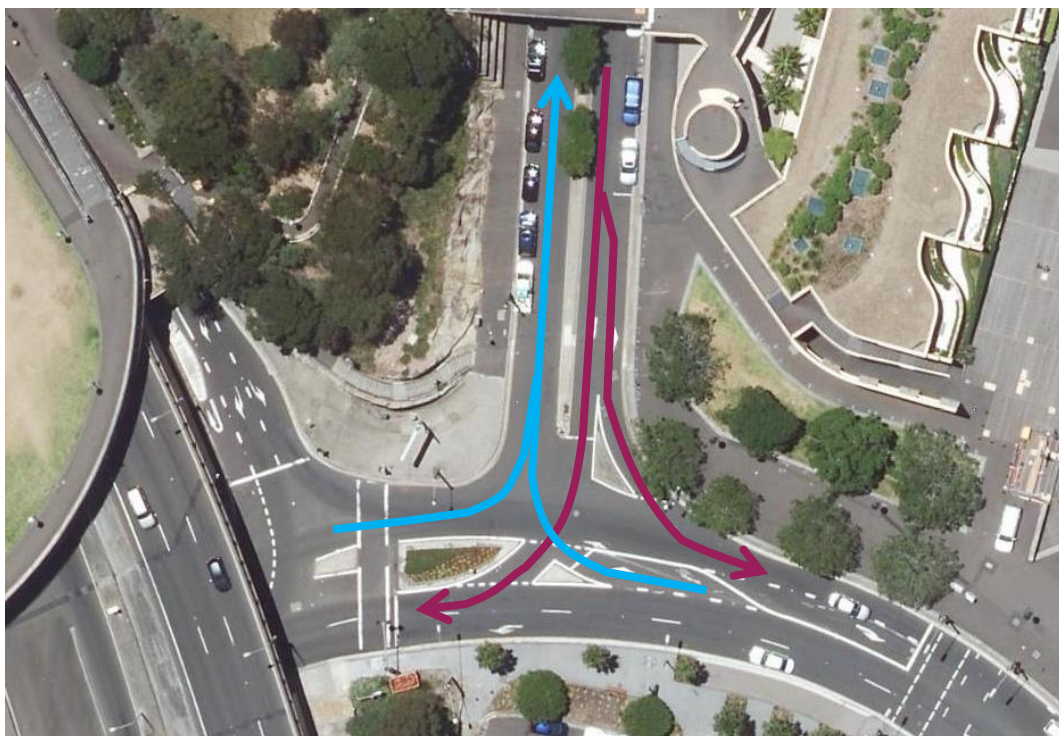


Figure 36: Intersection of Lincoln Crescent with Cowper Wharf Road

For servicing activities of the site, innovative methods of managing deliveries to minimise impacts will be considered. This will include pre-booked times for delivery access and coordinated strategies to reduce service vehicle numbers or change delivery timing to reduce impact.

6.4.2.6 Lincoln Crescent Loading and Art Dock

Two separate docks are proposed for loading and for art deliveries capable of accommodating a HRV 12.5m long truck as shown in Figure 37. The loading dock may be utilised by a MRV and an SRV at the same time. An efficient T-aisle arrangement has been used to allow the trucks to enter and leave independently and in a forward direction. There are also 4 service vehicle bays proposed for day to day use by couriers and service technicians. One accessible parking space has been nominated at this level.

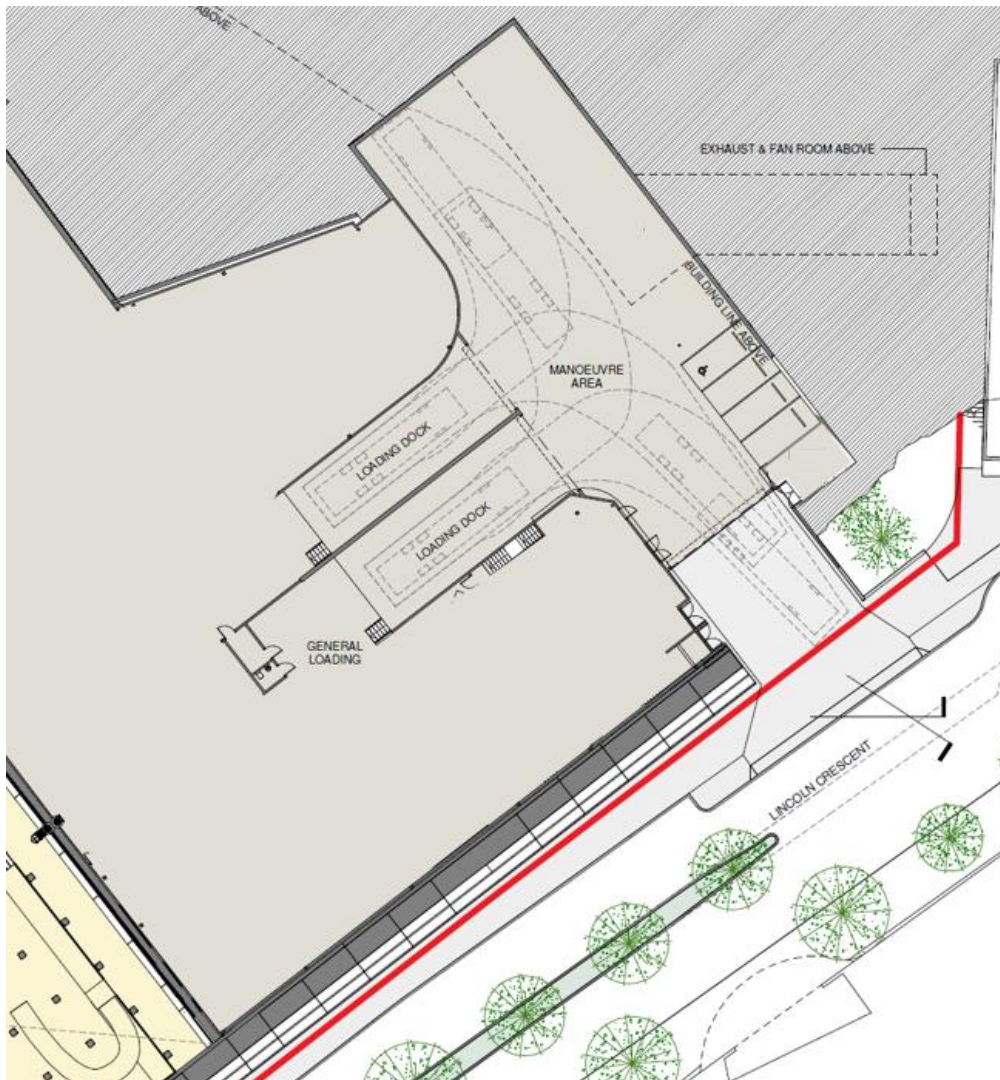


Figure 37: Lincoln Crescent Loading and Art Dock

6.4.2.7 Existing Gallery dock

The existing loading dock will be retained with access along the southern access roadway from Art Gallery Road. The general arrangement for the two bay loading dock and the HRV 12.5m long truck path are shown in Figure 38.

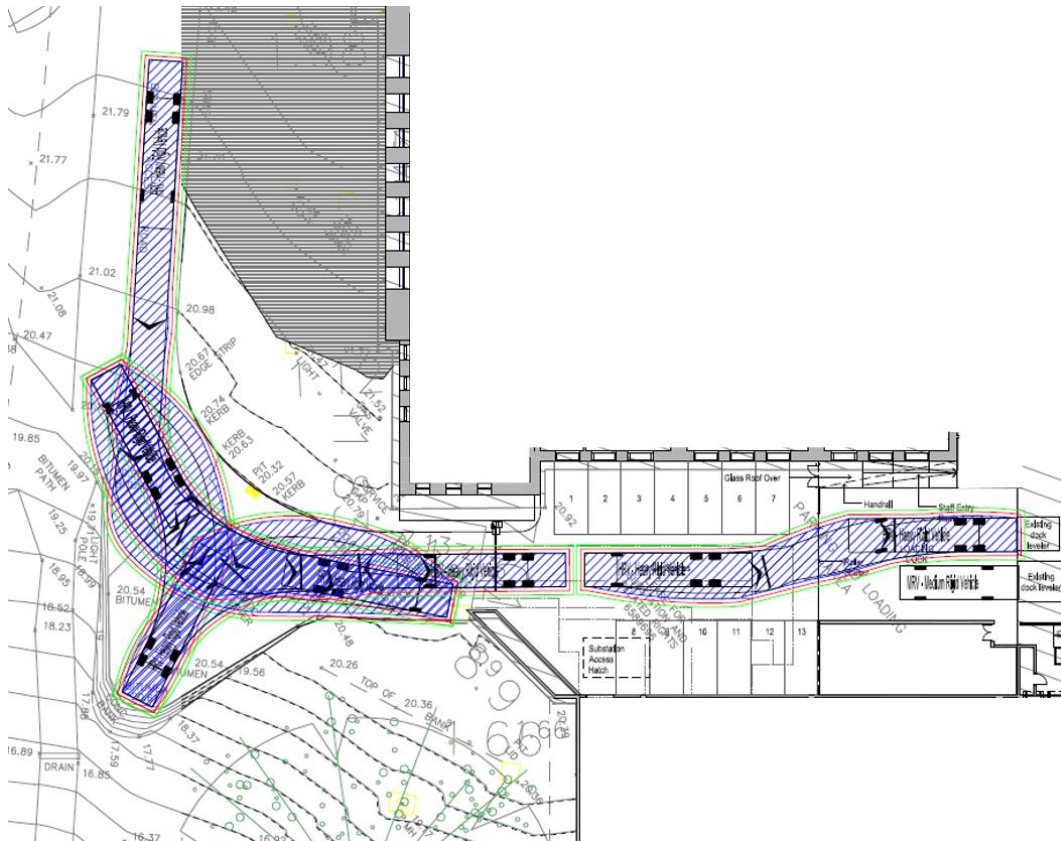


Figure 38: Existing loading dock upgrade

6.4.3 Emergency Vehicles

Emergency vehicles will approach the Gallery on Art Gallery Road unless otherwise directed.

6.4.4 Lincoln Crescent heavy vehicle access

Lincoln Crescent currently has on-street parking and a central median with street trees. This presents a relatively narrow roadway, which will be used for future loading activity.

Currently, vehicles up to 12.5m can service the roadway. There is an Ausgrid substation located at the northern end of Lincoln Crescent that requires 24 hours, 7 days a week of vehicle access. There are also garbage vehicles that travel the street frequently as shown in Figure 39 below.



Figure 39: Photos of garbage truck traversing Lincoln Crescent

6.4.5 Lincoln Crescent upgrades

To allow for the exit of trucks from the new loading dock, the central island needs to be reduced by about 10-12m at the northern portion of Lincoln Crescent adjacent to the proposed loading dock entry. Adjacent to the opening on the eastern kerb line, 2 car spaces will need to be converted to No Parking by extending the existing No Parking zone in front of the Wharf Terraces pedestrian entry. At the southern end, it is proposed to extend the pedestrian footpath by removing four car parking spaces along the western kerb and install a pedestrian crossing.

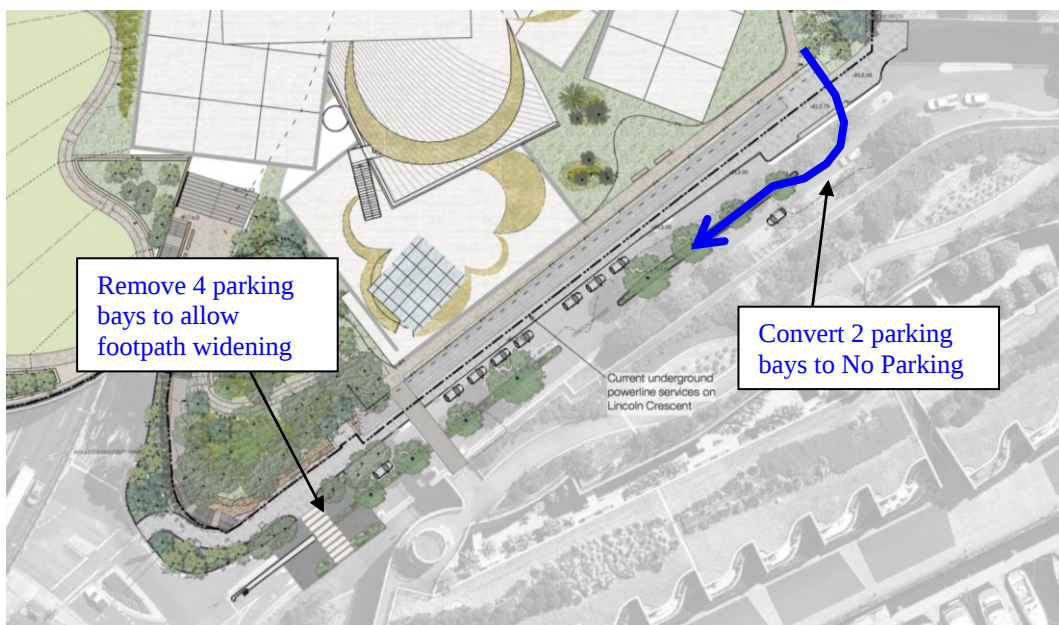
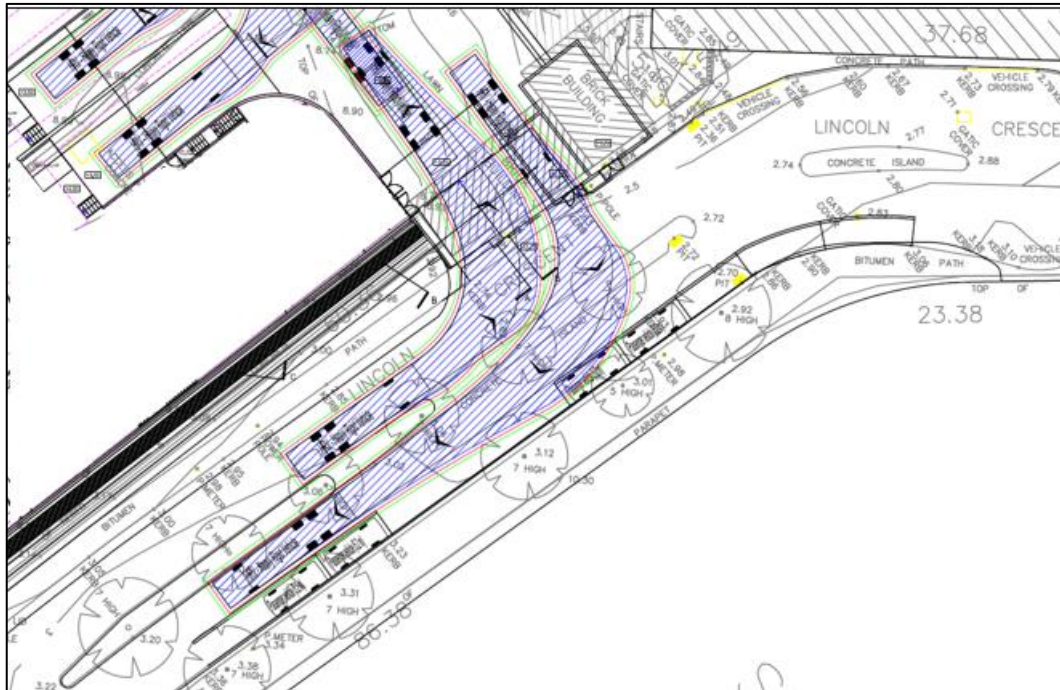


Figure 40: Lincoln Crescent Upgrades



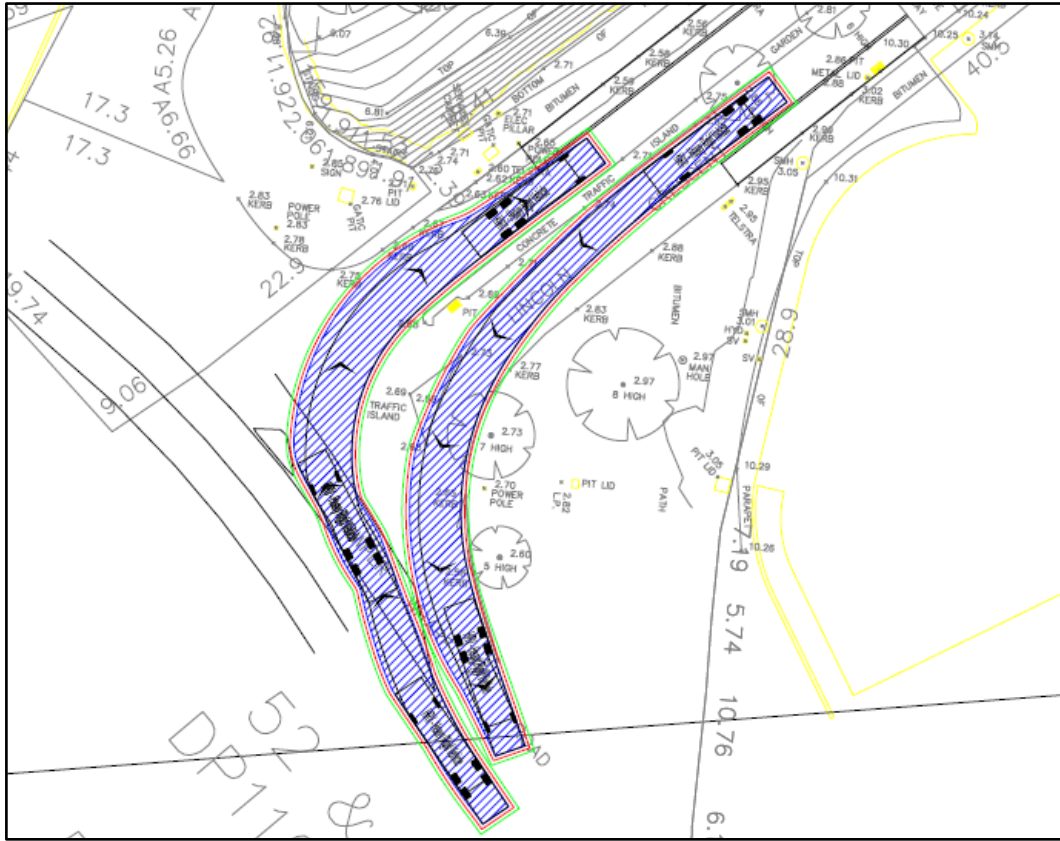


Figure 43: HRV Truck access to Lincoln Crescent to the east

6.5 Pedestrian and Cycle Strategy

6.5.1 Wider connections

The Gallery is well connected to the footpath network in the Domain and surrounding areas for pedestrian and bicycle use as shown in Figure 44.

For cyclists, these paths permit shared cycling with pedestrians and connect to the Bourke Street cycle way via the overbridge and to the city via St Marys Road. There are no formal bicycle paths in the vicinity of the Gallery.

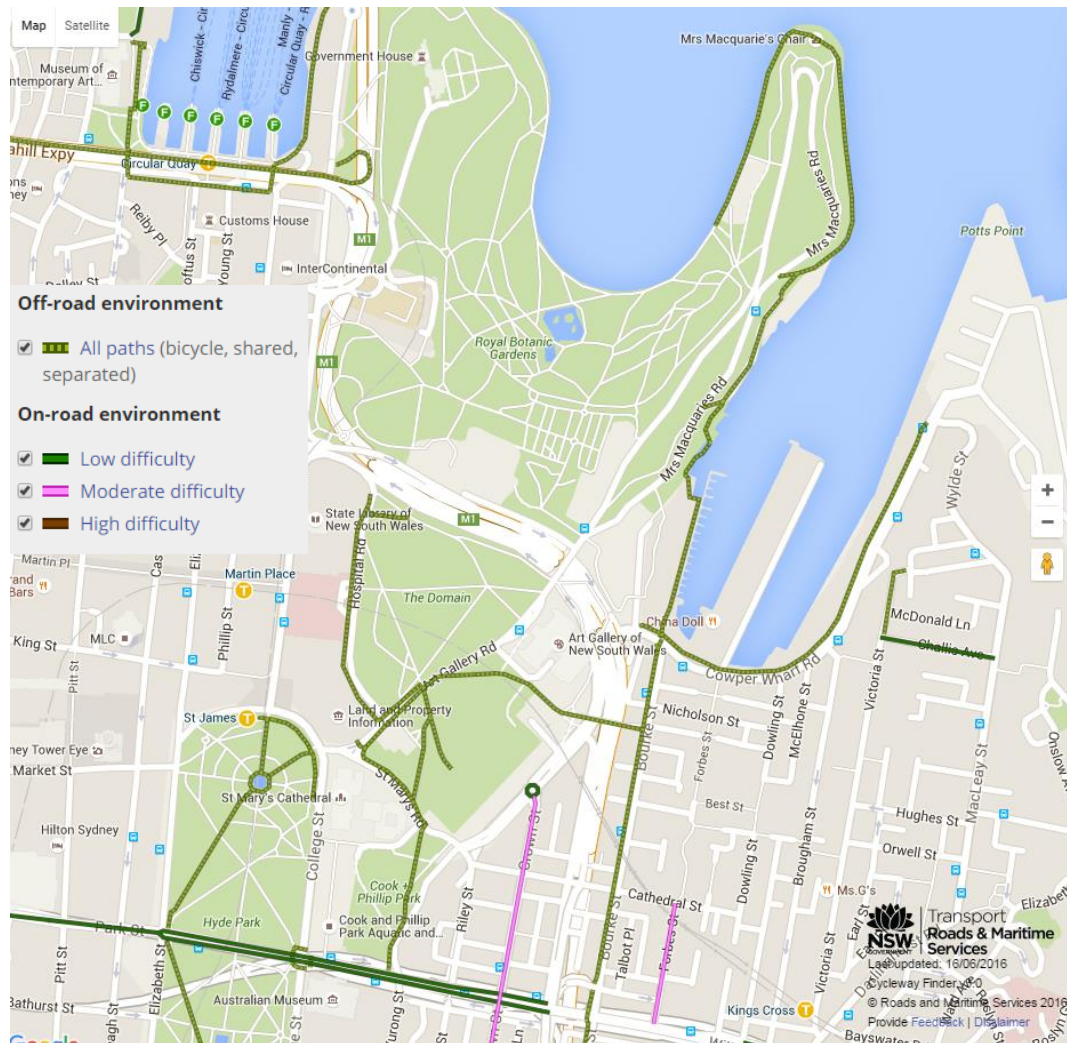


Figure 44: Sydney Cycleways network

Source: Roads and Maritime Services cycleway finder v3

Bicycle parking rails will be provided in the public domain area around the Gallery building for visitor use. Staff are able to park their bicycles in a dedicated back of house storage area which will be upgraded to meet growing staff demands. End of trip staff facilities are available.

6.5.2 Connections around the Gallery

New and enhanced pedestrian permeability will be created though and around the site as shown in Figure 45.

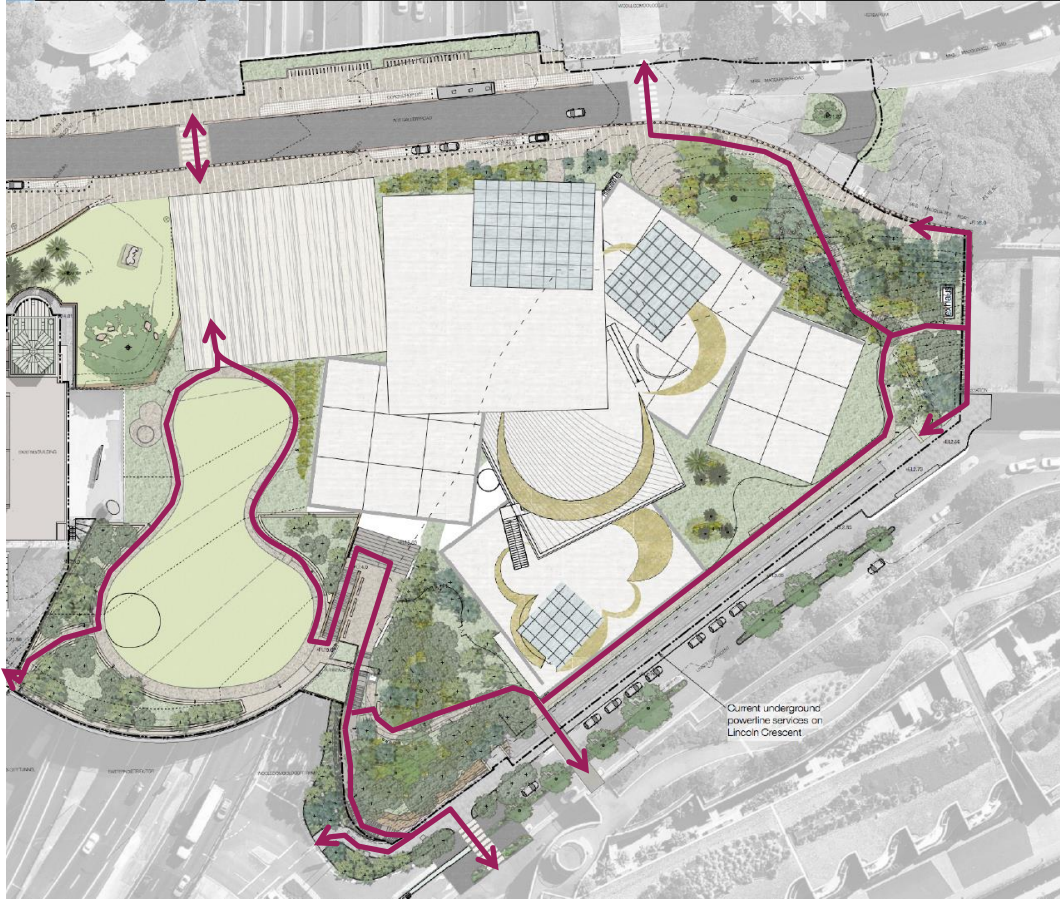


Figure 45: Pedestrian connectivity around the Gallery

7 Sustainable Travel Plan

7.1 Objectives

The main objectives of the sustainable travel plan are to reduce the need to travel and promotion of sustainable means of transport.

The more specific objectives include:

- High modal share for public transport, cycling and walking journeys
- To ensure adequate facilities are provided at the site to enable users to travel by sustainable transport modes
- To reduce the number of car journeys associated with business travel by staff and visitors
- To facilitate the sustainable and safe travel of employees and visitors
- To raise awareness of sustainable transport amongst users.

7.2 Infrastructure measures

- Bicycle parking for staff and visitors
- End of trip facilities for staff (showers, lockers, tool kits, etc)
- Shuttle bus for less mobile visitors for transfer to public transport node
- Work with the Royal Botanic Gardens and the City of Sydney to improve way-finding

7.3 Travel demand management measures

- Flexible working hours for staff
- Telecommuting and teleconferencing to reduce the need for staff to travel

7.4 Educational and promotional measures

- A travel pack of information supplied to all employees which includes information on the bicycle and walking routes, bus and rail timetables, information on car sharing, etc
- Advanced traveller information systems which use a range of telecommunications, wireless and visual technology to provide information to travellers in order to influence departure time or mode choice before the trip is undertaken
- Establish a 'cycle buddy' program where existing cyclists 'buddy up' with potential new cyclists as a mechanism for encouraging these users to ride to work.

8 Traffic Assessment

8.1 Traffic generation and distribution

The number of additional trips in a private vehicle was determined in Section 6.1 Travel Demand. Total people arriving as a driver or passenger in a car is shown in Table 8. Assuming a car mode share of 2 people on average results in 99 weekday peak hour vehicle movements and 142 weekend peak hour movements in each direction (which are assumed a worst case during events).

Table 8: Additional private vehicle trips

Mode of Transport	Weekday trips		Weekend trips	
	People	Vehicles	People	Vehicles
Private vehicle (driver / passenger)	198	99	284	142

Assuming that all vehicles park within the Domain Car Park and Art Gallery Road, a 50% split between these access points may be assumed. It is assumed that all vehicles arrive in the AM peak and leave in the PM peak conservatively (as the additional visitors would arrive and leave throughout the day), and an even split of in and out traffic is applied for the weekend trips.

It may be assumed that drivers are evenly split from each direction of the Sydney Metropolitan area (north, south, east and west). A simple distribution has been shown of the routes that vehicles would likely travel to the access points in Figure 46. Vehicles leaving the site would essentially follow the same routes entered, except vehicles from the west, which would travel along Druiett Street.

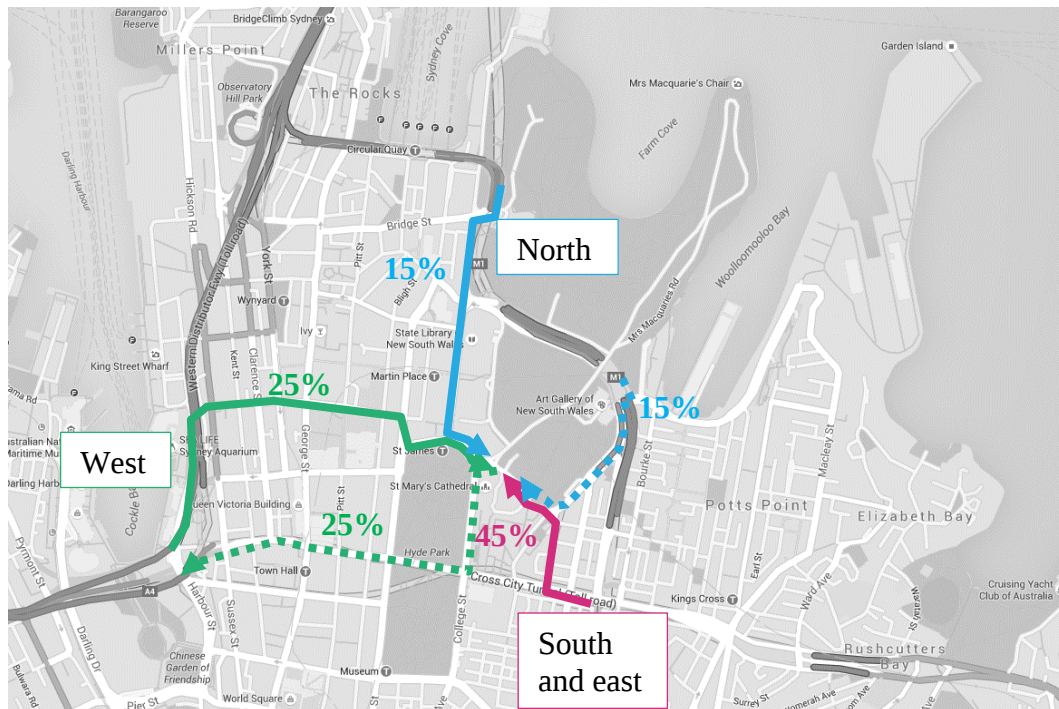


Figure 46: Traffic distribution

The resultant peak hour traffic flows by direction are shown in Table 9.

Table 9: Peak vehicle movements by direction

Direction	Two-way vehicles per hour		
	AM Peak	PM Peak	Weekend Peak
North	30	30	43
West	25	25	35
South and East	44	44	64
Total	99	99	142

8.2 Road and intersection capacity assessment

8.2.1 Lincoln Crescent

For the assessment of Lincoln Crescent, please see Section 6.4.2.

8.2.2 Sir John Young Crescent

Current traffic volumes at the Sir John Young Crescent intersection with Cowper Wharf Road indicate that there are in the order of 3,000 vehicles travelling on this section of road during peak hours. Therefore, the addition of 30 vehicles is considered minor (1%) in the context of existing traffic volumes. There is much more variation in day to day operation than the anticipated increase of traffic flows from the development.

8.2.3 Riley Street

The northern section of Riley Street carries some 500 vehicles during peak periods. The addition of 44 vehicles represents a 9% increase. This is still well within the environmental capacity of the street.

8.2.4 Prince Albert Road

The College Street and Prince Albert Road intersections have been assessed using RMS approved software SIDRA 7 software. The existing intersection performance is assessed in this report in terms of the following three factors for each intersection.

- Degree of Saturation
- Average Delay (Seconds per vehicle)
- Level of Service

In urban areas, the traffic capacity of the major road network is generally a function of the performance of key intersections. This performance is quantified in terms of Level of Service (LoS), is based on the average delay per vehicle. LoS ranges from A = very good to F = unsatisfactory (see Table 10).

Table 10: Level of service criteria for intersections

Level of Service	Average delay (seconds)	Description
A	Less than 14	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At Capacity. At signals, incidents will cause excessive delays. Roundabouts require other control mode
F	Greater than 71	Unsatisfactory with excessive queuing

Another common measure of intersection performance is the degree of saturation (DoS), which provides an overall measure of the capability of the intersection to accommodate additional traffic. A DoS of 1.0 indicates that an intersection is operating at capacity.

The results of the surrounding intersections are summarised in Table 11 for the following scenarios:

- Existing 2016 scenario to calibrate to existing traffic conditions,
- Existing 2016 with the proposed full development of the site

The models were calibrated to the existing conditions by observations of traffic flows and the observed cycle times.

Table 11: SIDRA modelling results

Intersection	Scenario		LoS	AVD	DoS
College Street / Prince Albert Road	AM Peak	Existing	C	30	0.84
		Existing + Development	C	30	0.84
	PM Peak	Existing	C	31	0.83
		Existing + Development	C	34	0.87
	WE Peak	Existing	C	30	0.79
		Existing + Development	C	32	0.83
Prince Albert Road / St Marys Road	AM Peak	Existing	B	23	0.37
		Existing + Development	B	27	0.41
	PM Peak	Existing	A	13	0.19
		Existing + Development	A	13	0.20
	WE Peak	Existing	B	17	0.28
		Existing + Development	B	20	0.36

The traffic modelling indicates all nearby intersections to the proposed development will continue to operate satisfactorily (level of service C or better) during the assessed peak hours. The road network impacts arising from the future development of the site, considering the cumulative impacts of adjacent development, is considered to be acceptable. Therefore, no upgrades are considered warranted for the surrounding intersections as a result of the development. Detailed traffic modelling results are provided in Appendix C.

8.3 Precinct special events

The peak period for special events in the domain and surrounding precinct is during the Sydney Festival in January each year and less intensively, in the couple of months before and after the festival. At that time of year, the Gallery typically holds a major paid exhibition or 'summer show' - and will continue to do so, once the Sydney Modern Project is completed. The Royal Botanic Gardens informs the Gallery what it is doing and usually puts in place lots of temporary fencing around the Domain to assist with pedestrian control.

Nearly all 'special events' in the Domain occur on weekends, either during the day, when the CBD vehicular traffic is relatively low or on Saturday night when the Gallery is closed. Additionally, the bus loads of students that are significant during the week do not exist on weekends so there is less impact on traffic generally.

When special events are held within the precinct such as the Domain or Mrs Macquaries Point, roads including Art Gallery Road are sometimes closed. Car parking remains available in the Domain Car Park and alternative CBD car parks. With the road closure, there are less cars in the precinct.

Road closures occur on weekends only and generally in the morning. They do not coincide with the peak weekend activity at the Gallery which occurs in the afternoon.

Special arrangements for drop-off are organised at this time and patrons are warned about the likely congestion in the precinct and impacts on access. All of the external special events are coordinated through the Roads and Maritime Services Transport Management Centre who consult with the organisations in the precinct to ensure appropriate planning is put in place.

9 Construction Traffic Management

This section details a preliminary Construction Pedestrian and Traffic Management Plan (CPTMP) for the construction of the Art Gallery of NSW, Sydney. The purpose of the CPTMP is to assess the proposed access and operation of construction traffic associated with the proposed development with respect to safety and capacity. The CPTMP is to be submitted in support of the development application in conjunction with the Construction Management Plan.

The Contractor (once appointed) will prepare a more detailed CPTMP with Traffic Control Plans prior to the commencement of works, detailing specific methods of safely managing construction vehicle traffic within the surrounding area and any required road closures for mobile crane days, if required.

The Contractor will monitor and coordinate all vehicles entering and exiting the Project. Truck shaker grids are intended for the entry and exit gates to remove tyre mud or grime prior to re-entering the public road.

It is understood that no works (including night works) will be undertaken under land bridge in the Eastern Distributor. Excavation planning will need to take account of this aspect, given the close proximity of the site to rock walls.

For further detail on construction methodology, please refer to the Construction Management Plan prepared by Time Planning.

9.1 Construction and delivery programme

As the project is in its preliminary stages, the following timeframes are approximate within an overall 30-month construction period and may vary once a contractor is appointed. Estimated duration of construction activities is currently unknown and note that a full construction program will be developed to calculate a more accurate Project duration.

9.2 Construction traffic

9.2.1 Construction routes

Construction activities at the site will generate vehicle trips primarily along Art Gallery Road, with other trips assigned to Lincoln Crescent where necessary. Lincoln Crescent will be the main access for demolition and earthworks at the initial stages of the construction works given the works being undertaken for the oil tanks.

The main construction access will be via the state road network including the Eastern Distributor and Western Distributor, and vehicles will likely originate from this network. The majority of trips will likely be generated from the west and will access the site via Eastern Distributor and the Harbour Tunnel. Trips from the east may access the site via William Street / College Street. These routes are shown in Figure 47.

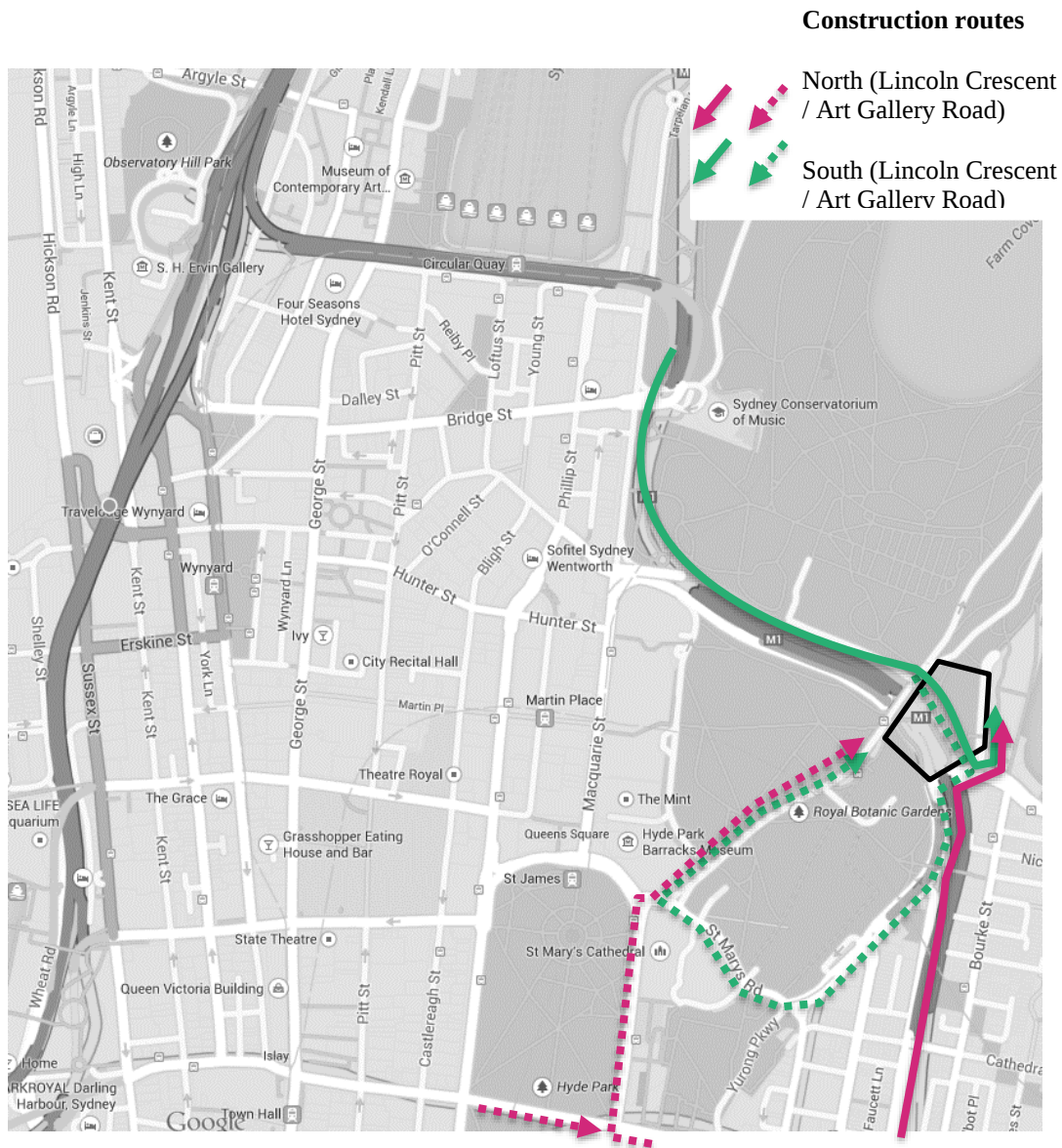


Figure 47: Construction vehicle routes to site

Vehicles that will access the site during construction will likely mainly comprise of heavy vehicles including Articulated Vehicles (AV) such as precast delivery trucks and Heavy Rigid (HR) such as concrete trucks are expected to access the site. These different types of vehicles may access the site at the same time.

Other heavy machinery plants such as cranes will have to be delivered to site in the preliminary stage. All heavy goods such as girders or machinery plants are likely to be delivered outside of peak traffic hours.

9.3 Construction traffic volumes

Workers will generate additional traffic to the site. Typically, main stage of the construction is likely to have a workforce of approximately 540 personnel. Given the public transport availability to the site, construction workers will be required to take public transport to work. Additionally, construction workers generally start earlier and finish earlier than the commuter peak periods, and would likely not coincide with the site's peak periods.

Access to the entrance of the existing Art Gallery is intended to remain the main access point for pedestrian traffic during construction. Similarly, the 22 car parking spaces adjacent to the main entrance will remain for the majority of the construction period.

There are five locations for vehicle access gates as indicated in the site management plan is shown in Figure 48. Gate 1 (Entry) and gate 2 (egress) are on Art Gallery Road. These gates 1 and 2 will also provide access for construction staff. Loading areas are available adjacent to the entry and exit path. A secondary access point (Gate 3) and adjacent loading area is available for smaller deliveries via the southern existing access road. Gate 4 is located adjacent to Lincoln Crescent Woolloomooloo. Gate 4 is intended to be used for demolition, excavation removal and site staff.

An average of 50 trucks per day are expected to use Lincoln Crescent for 4-5 months via Gate 4 during demolition and excavation is based on the volume of excavated material and quantity of demolition. On peak days, this number may increase to 70 trucks per day. There will however be more detail available once a contractor is appointed. Following the completion of demolition and excavation, during construction there will be on average some 10 truck movements per day. On concrete pour days, there will be peaks of up to 40 trucks per day.

ART GALLERY OF NEW SOUTH WALES - SITE MANAGEMENT PLAN

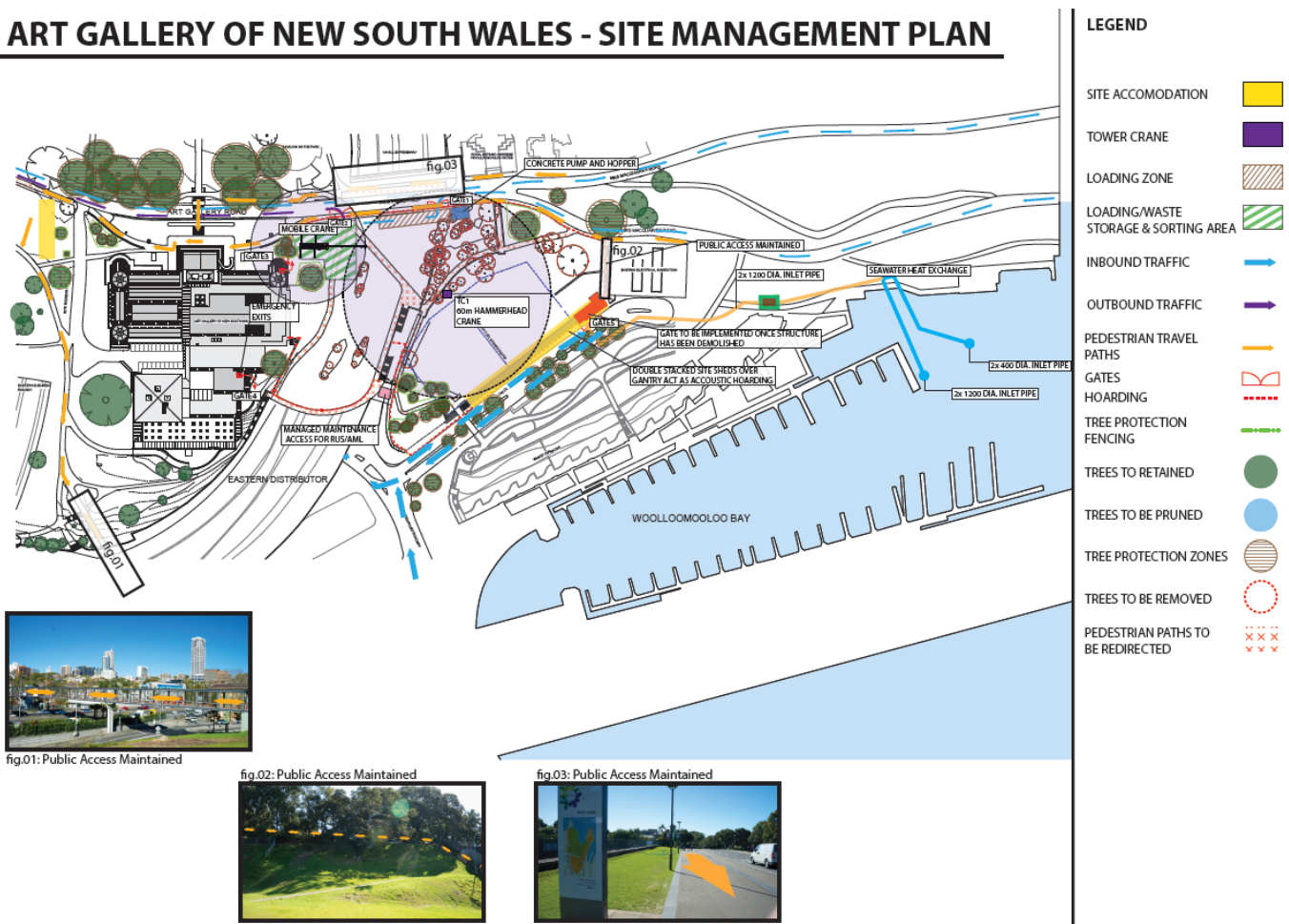


Figure 48: Construction site plan (source: timep)

9.4 Cumulative impact of existing site and construction traffic

9.4.1 Sydney Light Rail

The Sydney CBD and South East Light Rail (SLR) route is proposed to run from Circular Quay to Kingsford and Randwick, via George Street in the Sydney CBD. George Street will be pedestrianized between Hunter Street and Bathurst Street and general traffic will be limited for the remainder of the road.

As a result of the project, a number of construction activities will take place along the route during the proposed construction programme of the site. Construction began on 23 October 2015 and is due to finish by mid-2018, with 31 individual zones progressively scheduled to minimise construction impacts. All bus routes were completely removed from George Street on 4 October 2015.

Ongoing consultation will need to occur with TfNSW and construction contractor (ALTRAC) during the construction programme to ensure any cumulative impacts are managed. It is envisaged that there will be no impact to Sydney Light Rail construction access.

9.4.2 Road network impacts

The traffic generation of this magnitude is less than the amount of trips generated and assessed for the operational phase of the development and therefore the potential impacts are anticipated to be minimal.

The busiest truck period will be during demolition and excavation when up to 70 trucks per day will use Lincoln Crescent to access the site for a period of approximately 4 to 5 months. These truck movements will be spread over the day and managed at the site entry. Direct access to the main road system is available at Cowper Wharf Road.

9.4.3 Loading areas

It is anticipated that the primary loading bay is located adjacent to Art Gallery Road within the site and will likely be utilised as the main access point for site deliveries during construction. During demolition and excavation, there is also the potential for a loading bay to be located on Lincoln Crescent. A small number of on-street car parks may also be affected by the construction zone in attempting to maintain two-way access at all times. Ongoing management will be implemented to minimise the impact of traffic and on-street car parks. Ongoing liaison with the relevant authorities will occur throughout.

As detailed above and the site management plan in Appendix A, entry is intended via gate 1 and egress via gate 2. A secondary access point (Gate 3) is planned via the southern existing access road. Gate 4 is located adjacent to Lincoln Crescent Woolloomooloo.

The current southern pedestrian access to Woolloomooloo is planned to be maintained during construction. The access path that delivers pedestrians to the

area adjacent to gates 1 and 2 would be decommissioned during the construction period. This pedestrian traffic will be diverted to either the northern or southern pathway as indicated in site management plan in Appendix A.

Vehicles delivering concrete, concrete pumping, reinforcement, steel can occur in a contractor laydown area within the temporary established site boundaries.

The Project is adjacent to the central CBD location, a more detailed traffic management report will be prepared. As a mitigation, measures will be implemented to prevent the parking of waiting vehicles in the adjacent areas. Several access options for vehicle loads and marshalling areas are intended. Vehicle shaker grids and wash facilities will be used to wash egressing vehicle tyres.

9.4.4 Pedestrians

Pedestrians within the Domain may be impacted from walking past the site during construction. Traffic controllers with appropriate accreditation will hold construction vehicles and allow pedestrians to cross these work areas.

Temporary A-Class hoarding, site fencing and gates will be installed to the boundaries of the extent of the Project site area. Site accommodation will be established subject to the amount of personnel working on site. Temporary hoarding and signage will be adopted in all working areas at all times.

The following two site accommodation positions are nominated:

1. South of The Art Gallery loading and access road,
2. Multi-level stacked location over a gantry adjacent to Lincoln Crescent including acoustic hoarding. This acts as a barrier to minimise noise and dust reducing impact to the residents near Lincoln Crescent.

The locations for vehicle access gates will also provide access for construction staff. Gate 5 has been added to supplement emergency egress by providing access to a large public domain, to reduce paths of travel within the site and provide a dedicated location where construction staff and vehicle movements are separated.

Pedestrians entering the Gallery will be carefully managed so that waiting areas are clearly marked and clear from construction activities. Roads and Maritime Services accredited traffic controllers will be present during construction movements to safely manage vehicles and pedestrians.

9.4.5 Emergency vehicle management

Gates 1, 2, 3 and 4 can be used for service and emergency vehicles. In addition to the existing Gallery access points, Gate 5 is proposed predominantly for emergency vehicle and personnel access. Gate 5 has been added to supplement emergency egress by providing personnel access to a large public domain, to reduce paths of travel within the site and provide a dedicated location where construction staff and vehicle movements are separated.

9.5 Measures to ameliorate impacts

Mitigation measures would be adopted during the construction phase to ensure traffic movements have minimal impact on surrounding land uses and the community in general, and would include the following:

- Truck loads would be covered during transportation off-site for sensitive loads;
- Establishment and enforcement of appropriate on-site vehicle speed limits (20km/h), which would be reviewed depending on weather conditions or safety requirements;
- Neighbouring properties would be notified of construction works and timing;
- Materials would be delivered and spoil removed during standard construction hours;
- Avoid idling trucks alongside sensitive receivers; and
- Deliveries would be planned to ensure a consistent and minimal number of trucks arriving at site at any one time

9.6 Driver code of conduct

To manage driver conduct the following measures are to be implemented:

- All deliveries are to be pre booked;
- All deliveries are to check in at the site office;
- Drivers are to give way to pedestrians.

Traffic Controllers will be used to stop traffic on the public street(s) to allow trucks to enter or leave the site. Where possible, vehicles must enter and exit the site in a forward direction. They must wait until a suitable gap in traffic allows them to assist trucks to enter or exit the site. The Roads Act does not give any special treatment to trucks leaving a construction site - the vehicles already on the road have right-of-way. Vehicles entering, exiting and driving around the site will be required to give way to pedestrians.

9.7 Public transport services affected

It is not expected that public transport services would be affected by the works. The relatively close proximity of public transport servicing the site via rail (Sydney Trains) and the CBD bus network will enable construction personnel readily available public transport access to site and result in minimising road traffic impact around the site.

No bus services would be impacted by construction traffic as the work is confined to off street works.

9.8 Construction traffic provisions made for emergency vehicles, heavy vehicles, cyclists and pedestrians

Construction works and vehicle storage would be mainly confined to the site. As such, no additional specific provisions for emergency vehicles, heavy vehicles, cyclists or pedestrians have been identified on the surrounding road network.

9.9 OVA Sea Water Heat Exchange system

As shown in Figure 49, the sea water heat exchange outlets in Woolloomooloo Bay are not nearby to any current or proposed ferry wharf locations or ferry routes.

TfNSW has indicated that they expect to have minimal impact on a future wharf and ferry service, but the following conditions will apply:

- the 'depth' of the piping will be sufficient to be well clear of any ferry hull (i.e. draft),
- any structure installed associated with the piping did not restrict the location of a ferry wharf,
- any structure or operation of the system did not impact on the passage of ferries to or from the area.
- Any structure is adequate in its design to not be impacted or disrupted by the wash or ferry operations in using the wharf.

The draft structural details of the system will be issued to TfNSW for review and comment to ensure no conflicts arise during the design detailing.

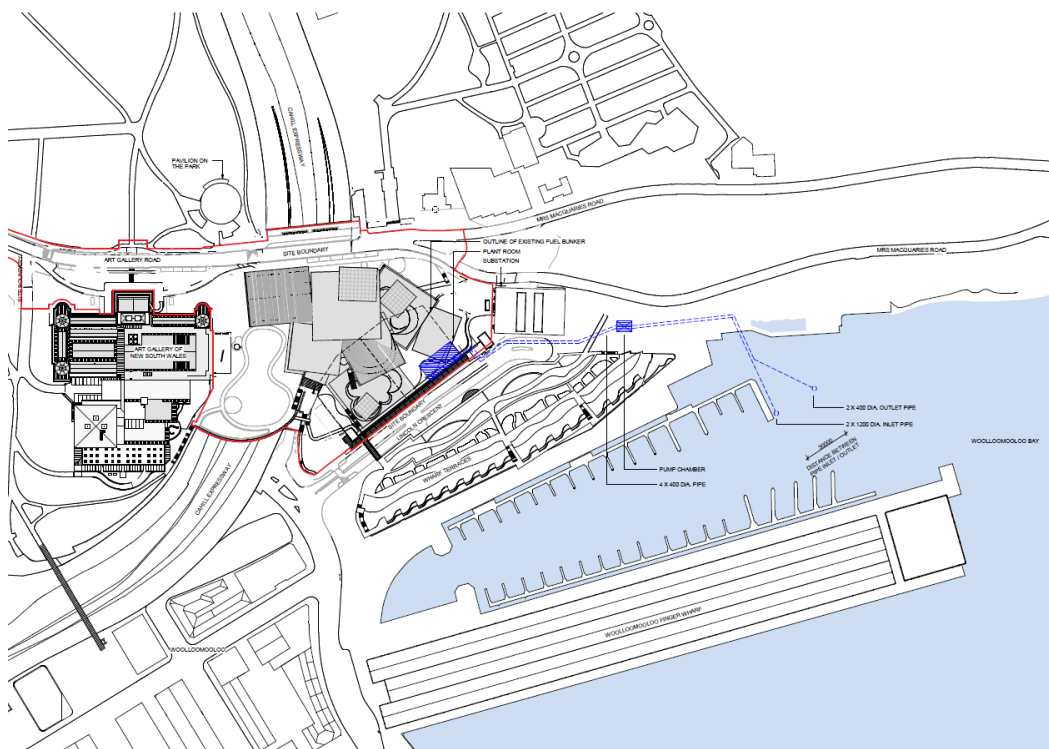


Figure 49: OVA Sea Water Heat Exchange system

10 Conclusions

The Art Gallery of NSW proposes to undertake a major expansion of the existing art gallery adjacent to the Phillip Precinct of the Domain. The expansion, proposed as a separate, stand-alone building, is located north of the existing gallery, partly extending over the Eastern Distributor land bridge and includes a disused Navy fuel bunker located to the north east of this land bridge.

The new building comprises a new entry plaza, new exhibition spaces, shop, food and beverage facilities, visitor amenities, art research and education spaces, new roof terraces and landscaping and associated site works and infrastructure, including loading and service areas, services infrastructure and an ancillary seawater heat exchange system.

Currently the Gallery has an annual visitation of 1.1 million. The Sydney Modern Project will provide the capacity to increase visitation from the current level to over 2 million people a year. Based on the projected growth, a forecast of future visitor demand to the Gallery has been developed indicating that as many as an additional 1,100 people per hour may travel to the site on weekends and 800 people per hour on weekdays.

Private vehicle travel counts for only 24% of travel to the Gallery with the predominant travel modes being train and bus.

The gallery does not propose any on-site car parking for visitor activity, instead relying on the unused capacity of the Domain Car Park which provides approximately 1,100 spaces. The Gallery has a relationship with the Domain Car Park with a special discount available for Gallery patrons. There is available capacity both during the week and at weekends to meet the expected growth in car parking demand.

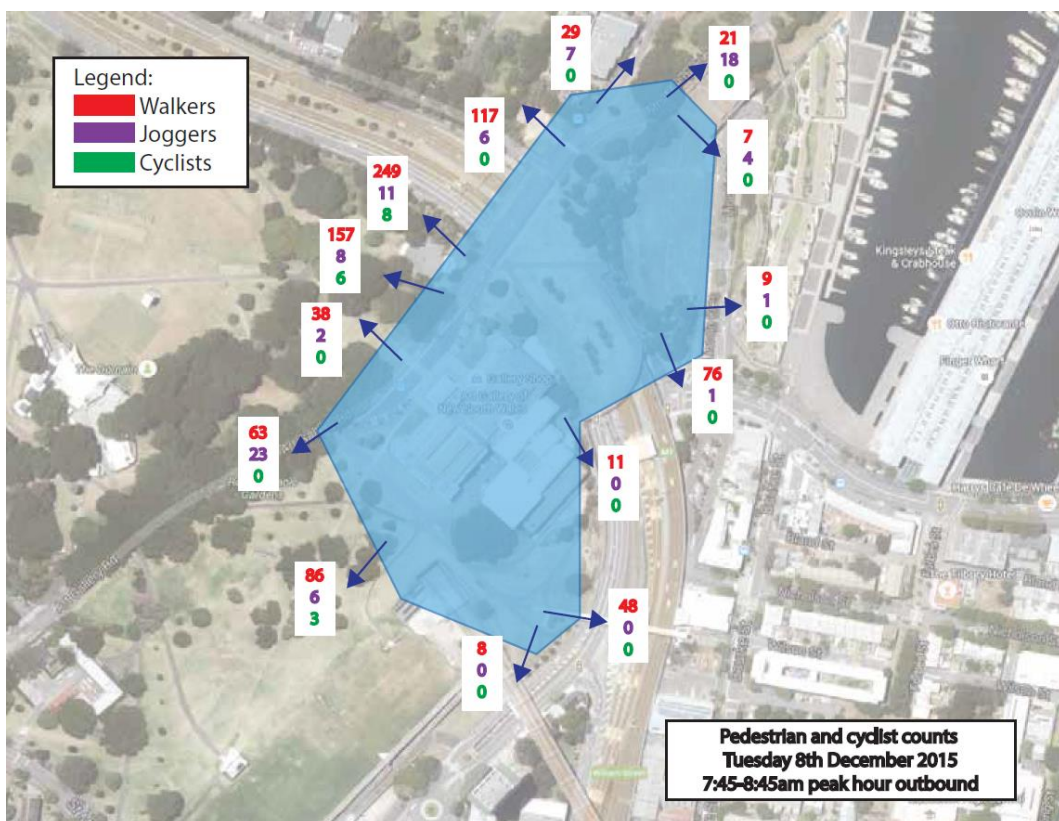
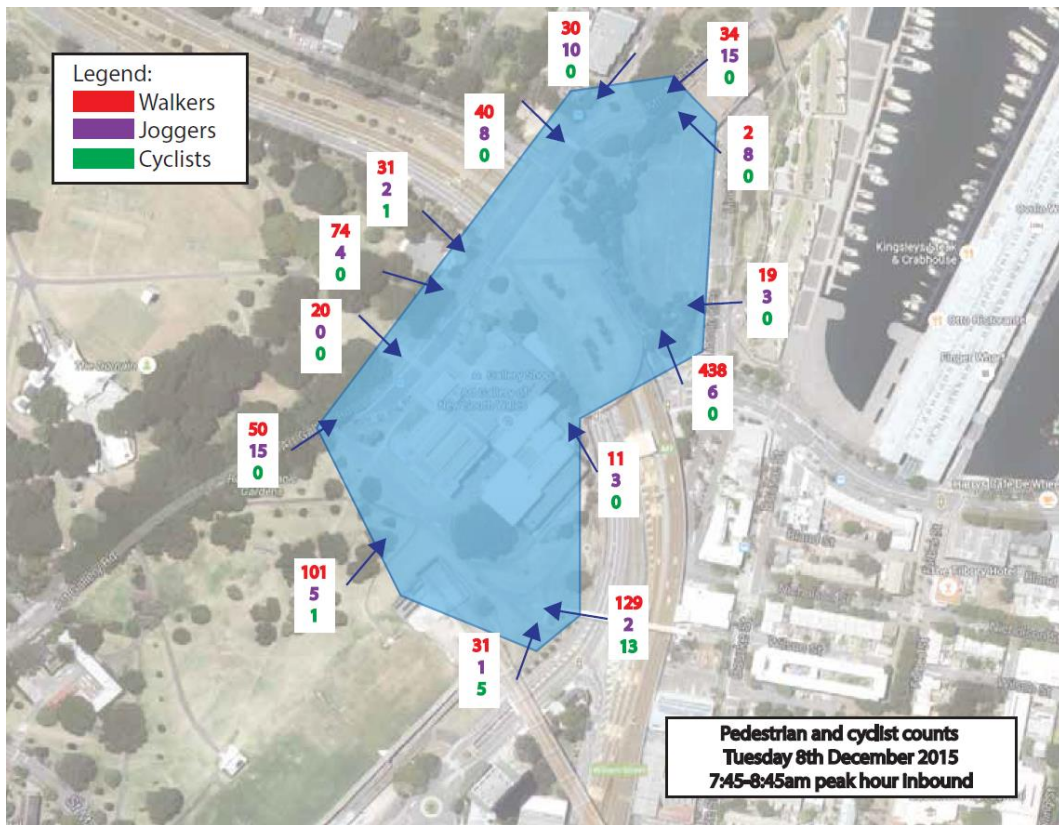
The entry to the existing Gallery will remain on Art Gallery Road with a new primary entry to the north adjacent to the new main entry plaza. It is proposed that Art Gallery Road is reconfigured with indented bays in sections along both sides of the road. A single traffic lane will be maintained in both directions. A flexible kerb side arrangement will enable the allocation of space to be allocated to each user type including taxis, private vehicle and coach drop-off/ pick-up. The regular bus stop has been allocated a zone at the southern end of the plaza in a similar location to existing.

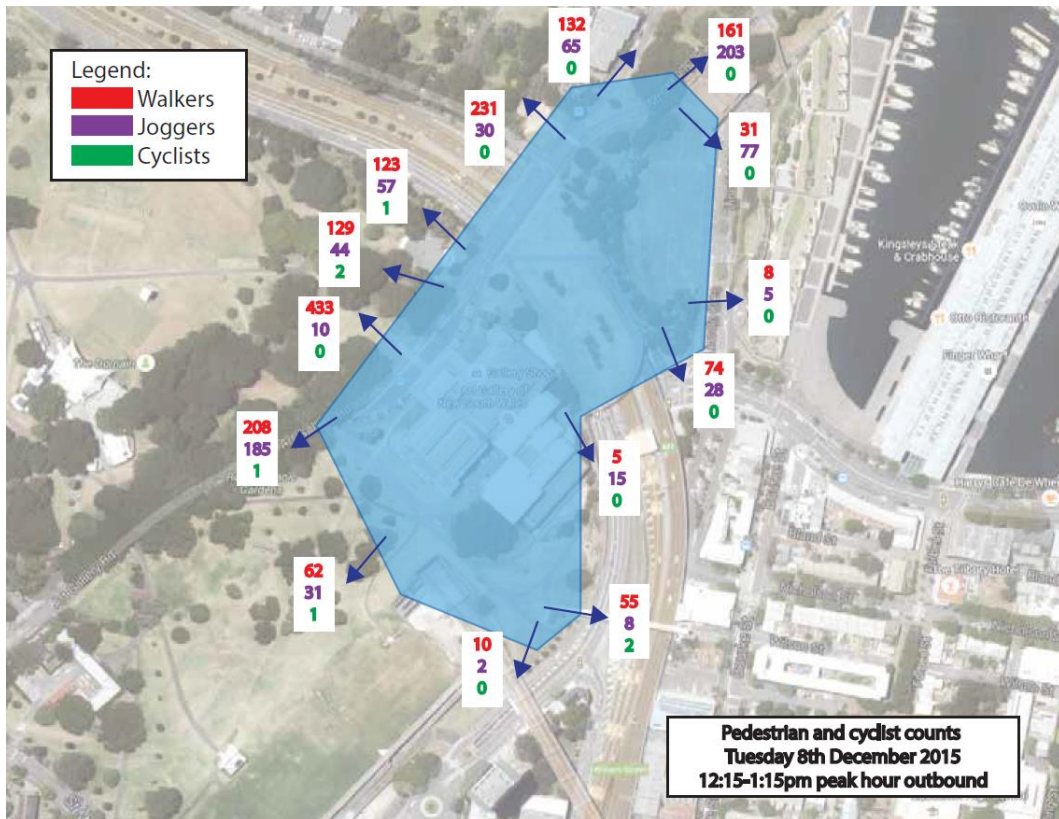
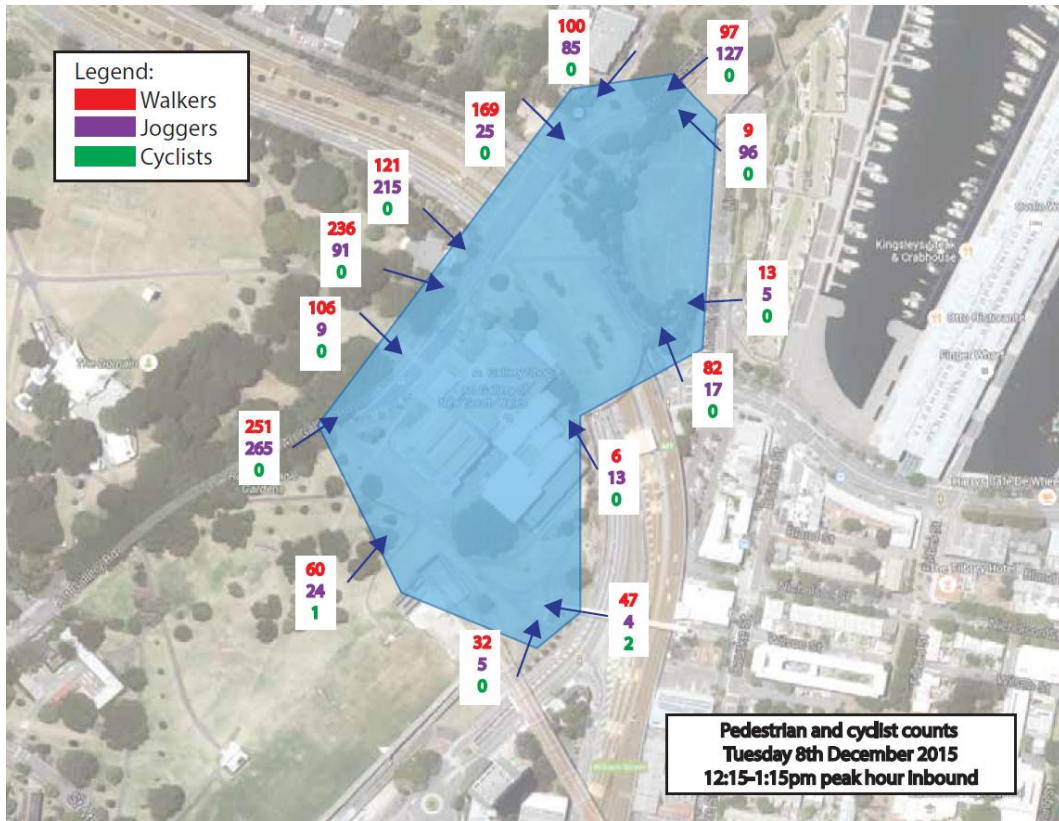
A key aspect of the Sydney Modern Project is to improve the Gallery's loading and service access for art, and for general goods and waste. A new Loading Dock is proposed to be accessed from Lincoln Crescent. The Cowper Wharf Roadway / Lincoln Crescent intersection provides good access to the main road system. This will allow the existing dock accessed off Art Gallery Road to be less heavily used which will reduce truck and pedestrian conflict points.

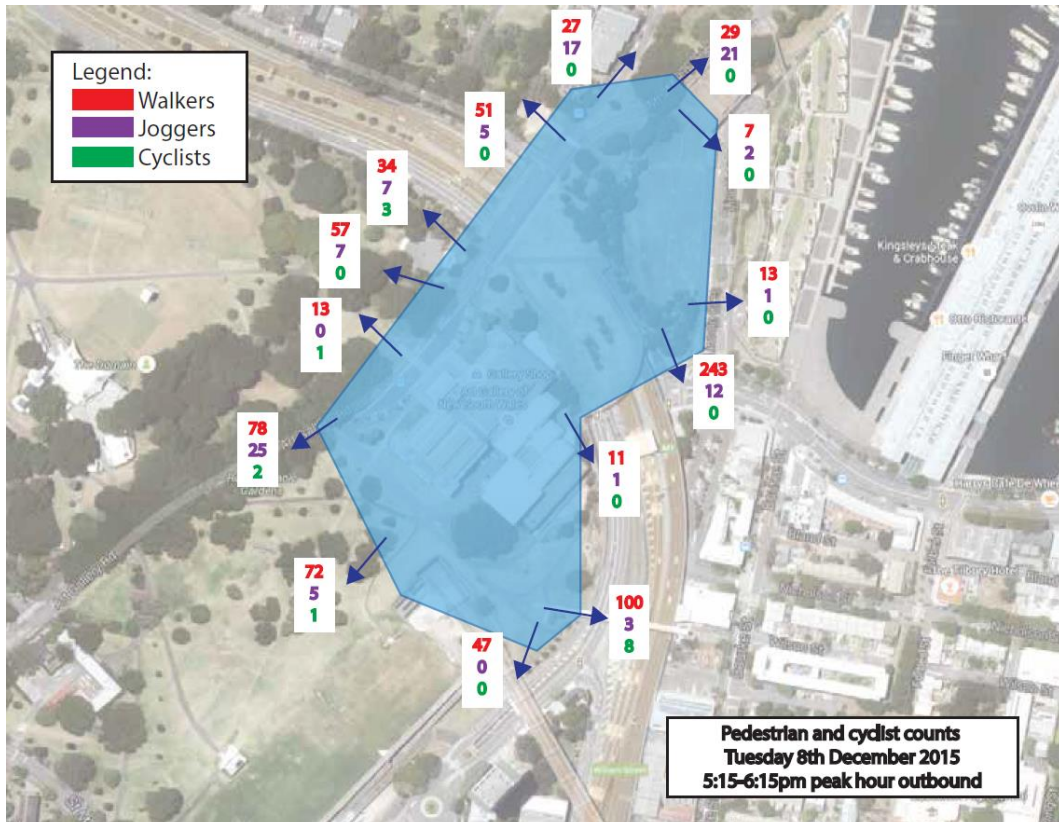
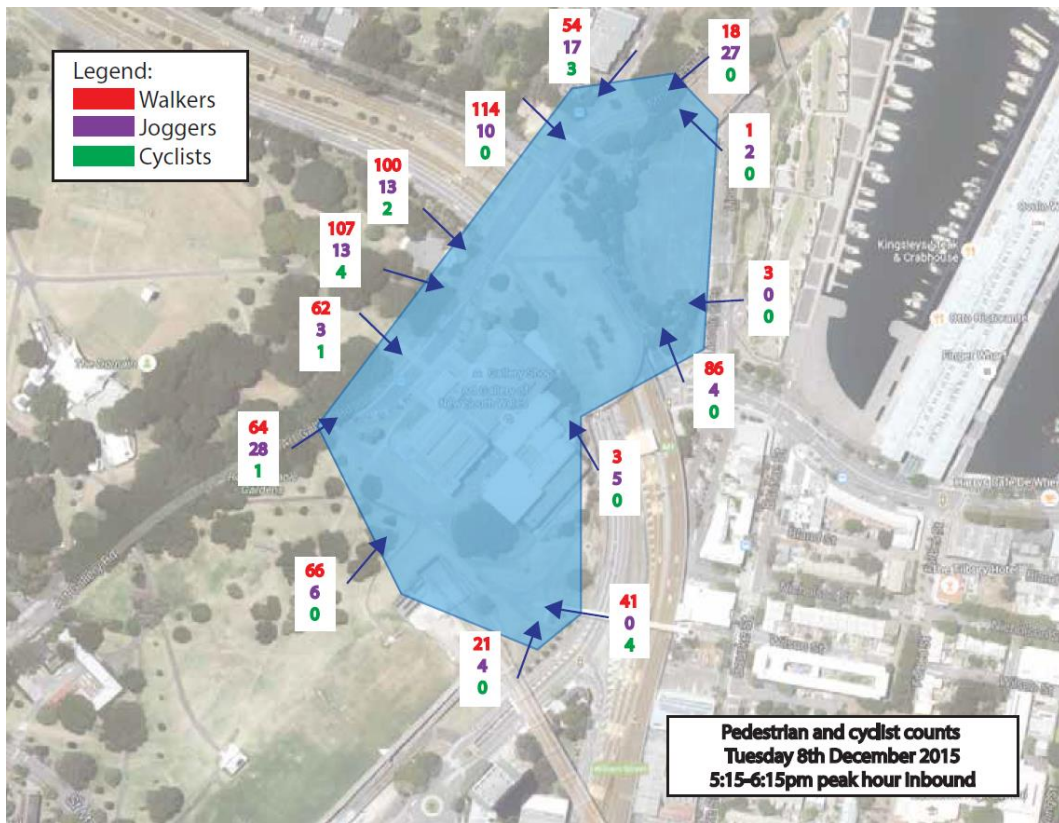
The traffic impacts during construction and operation have been assessed and determined to be acceptable on the access road system. The Gallery enjoys good levels of public transport accessibility and it is anticipated that the current mode share across a wide range of access modes can be improved through improved legibility and promotion.

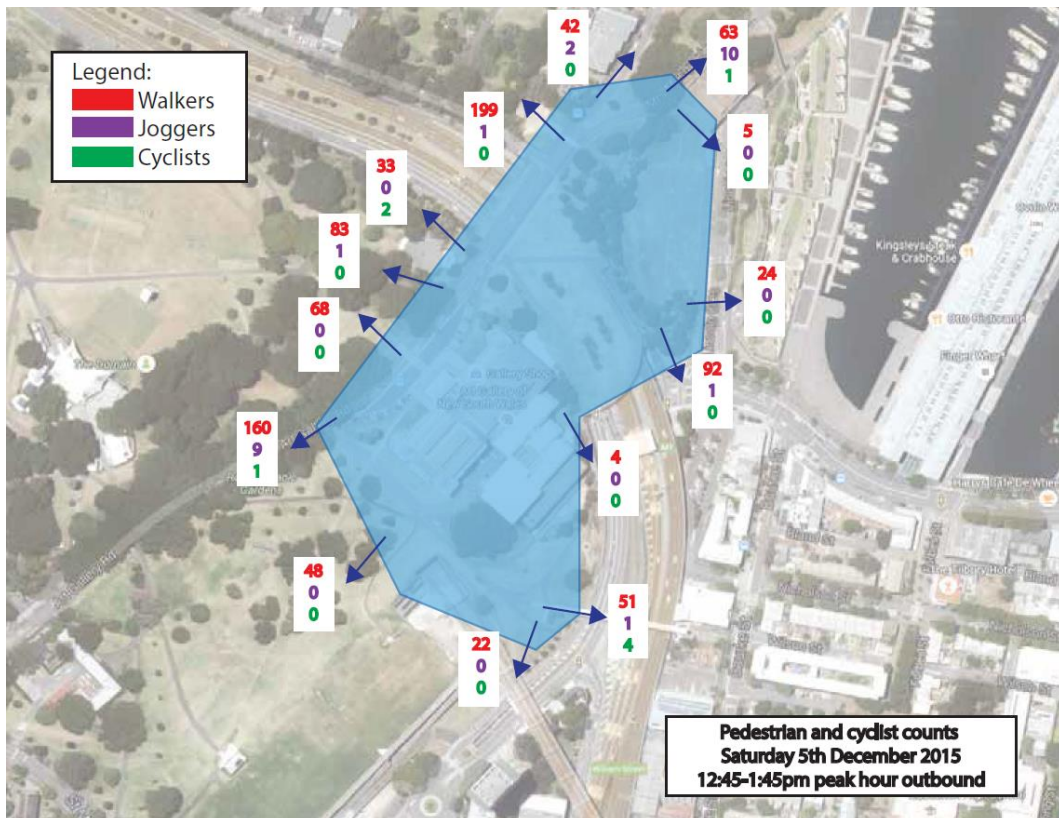
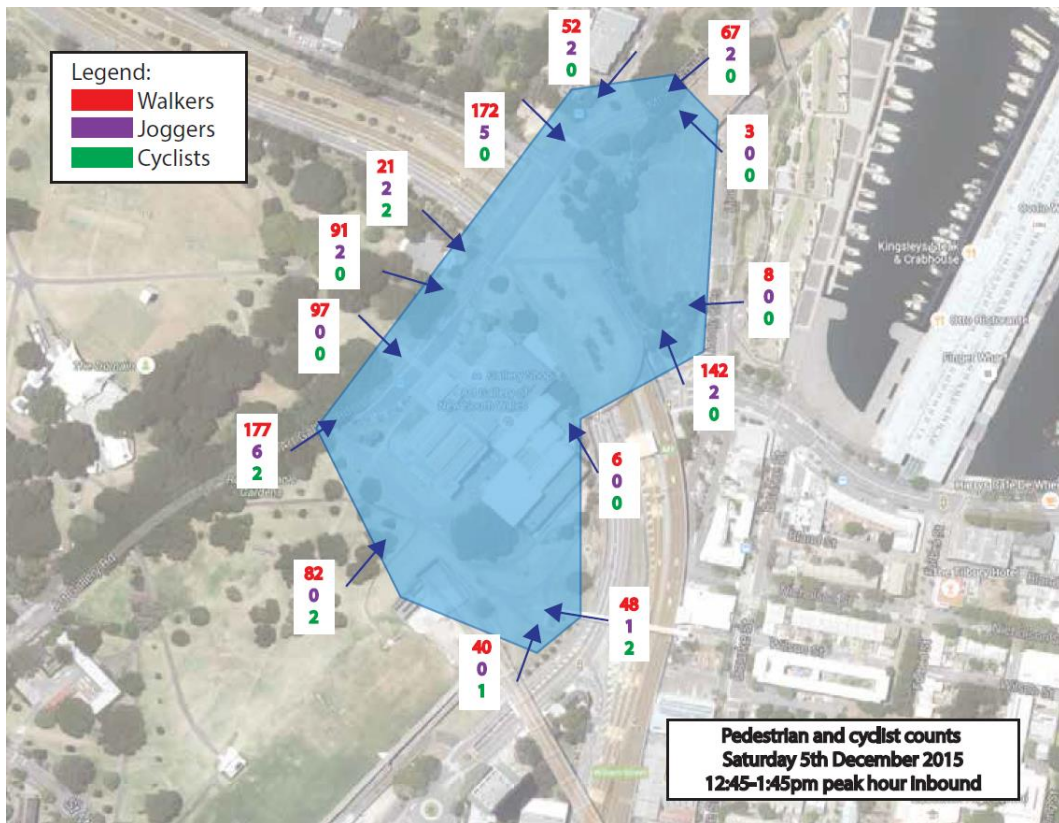
Appendix A

Pedestrian and Cyclists Peak Hour Flows





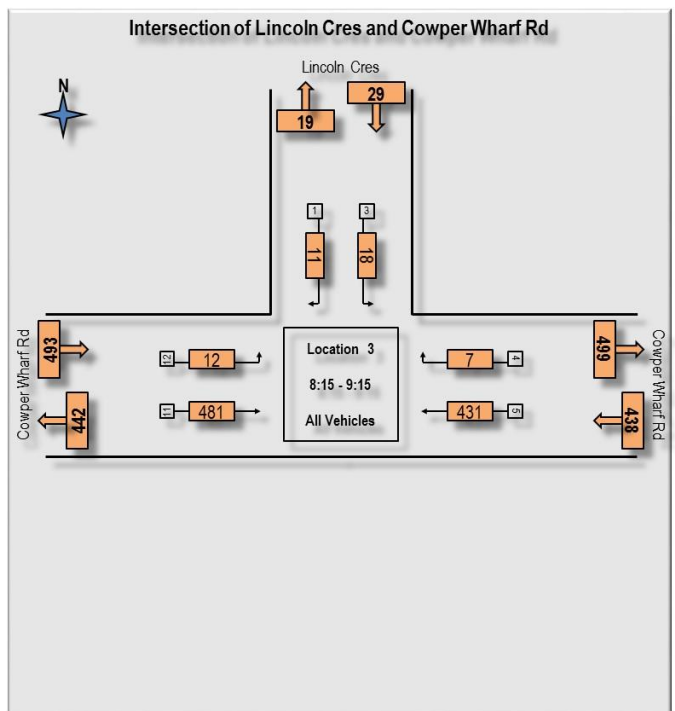
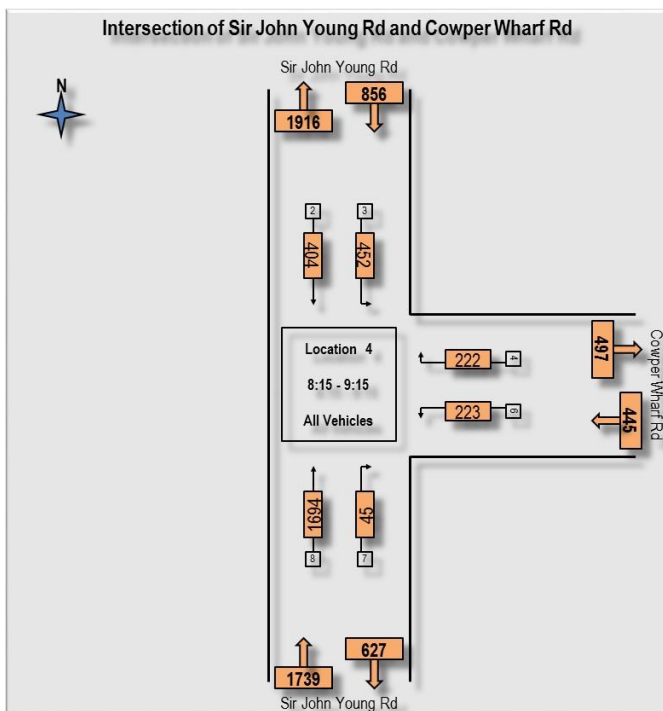
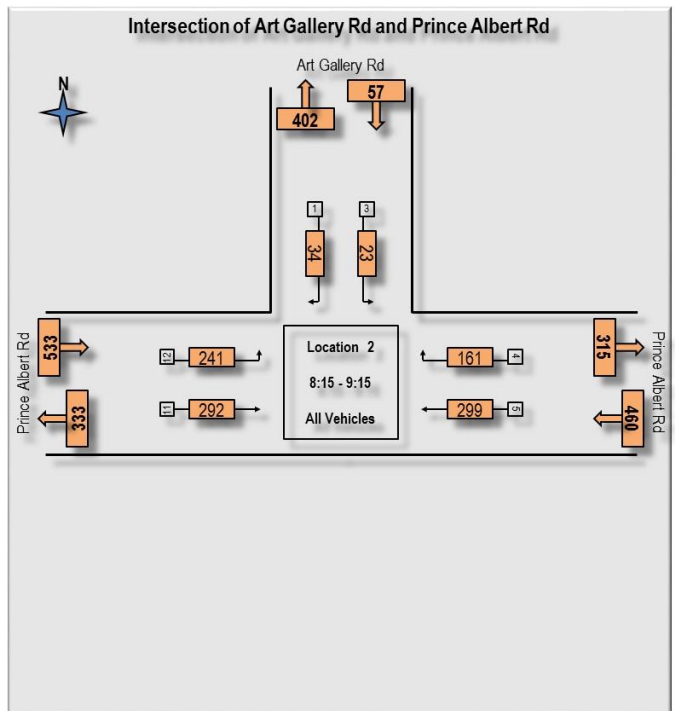
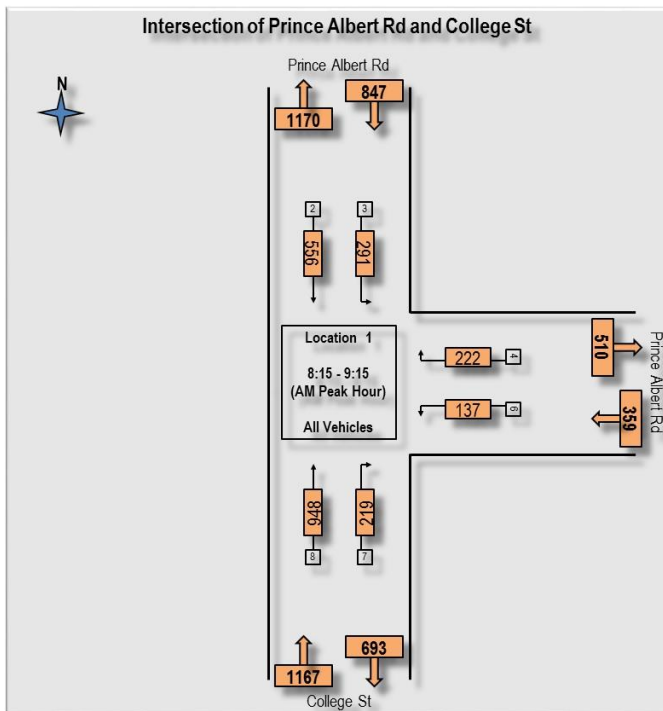




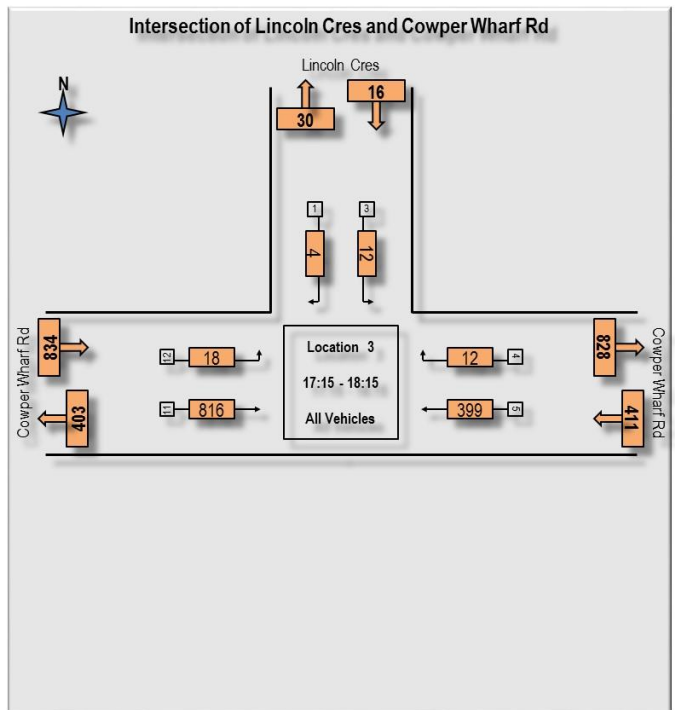
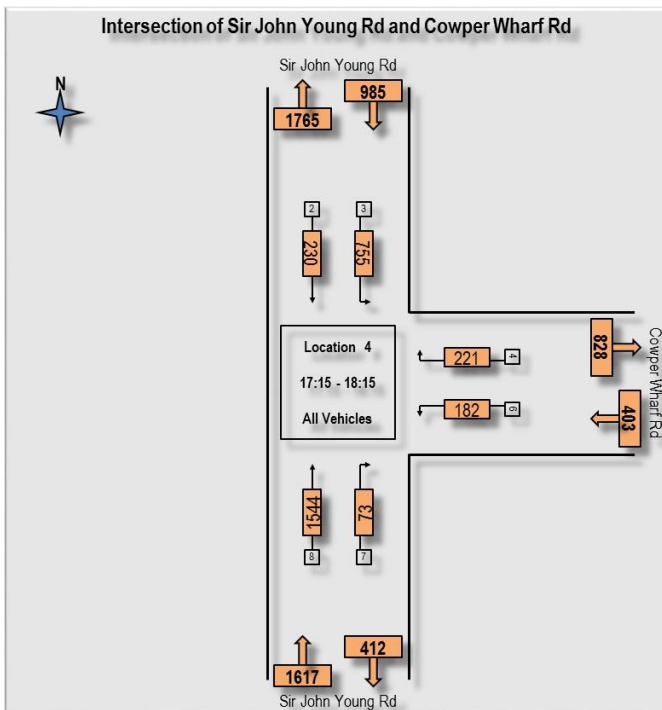
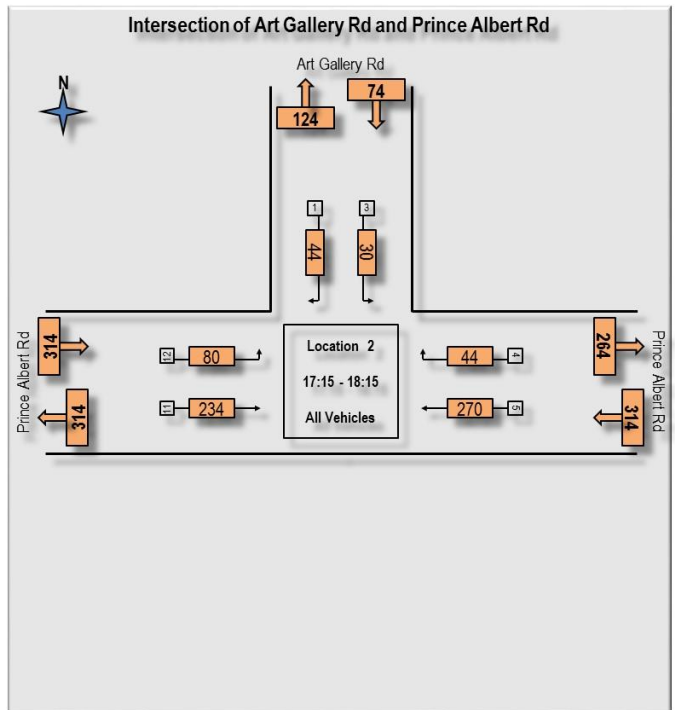
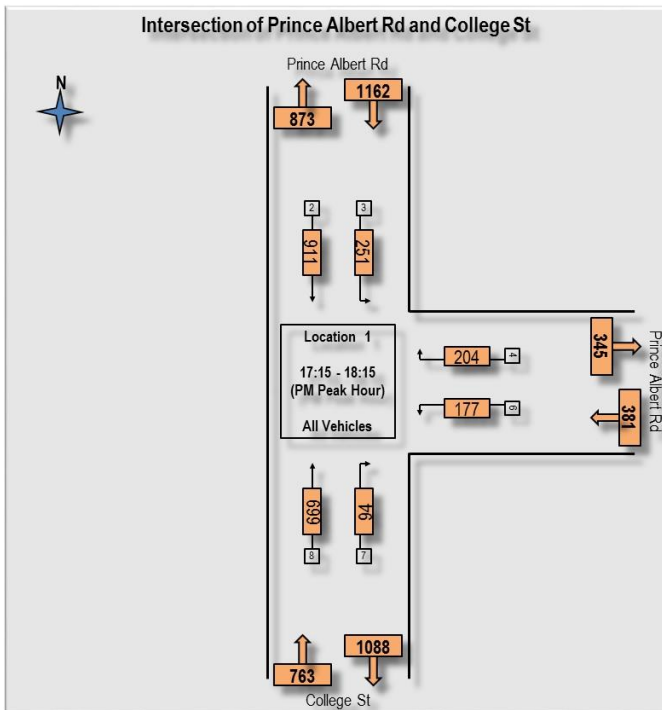
Appendix B

Traffic surveys

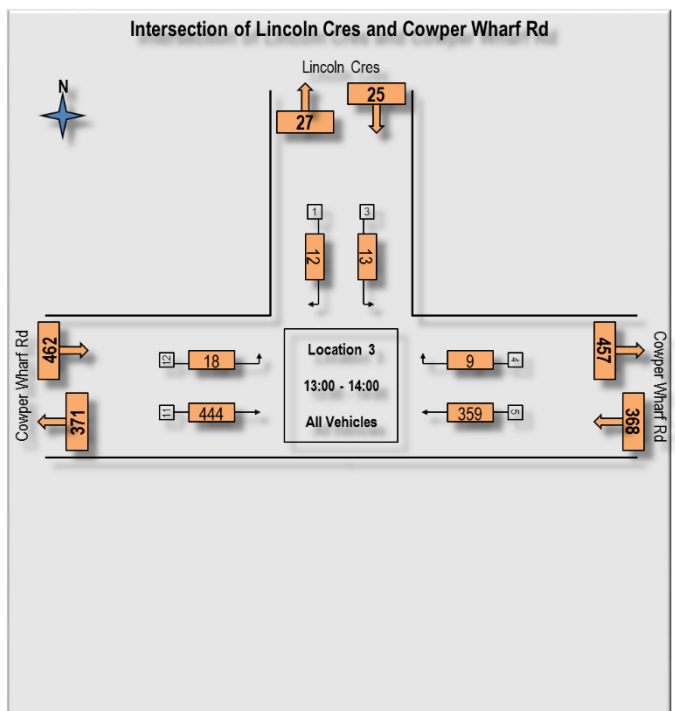
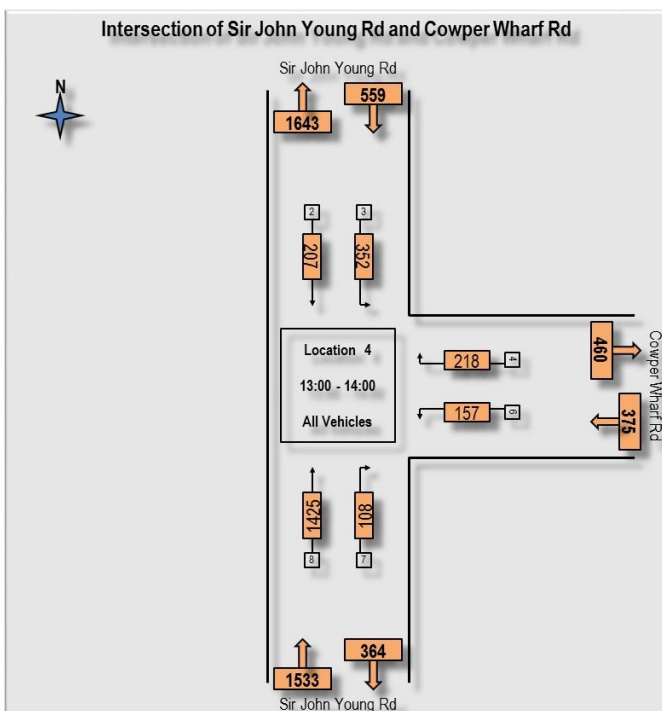
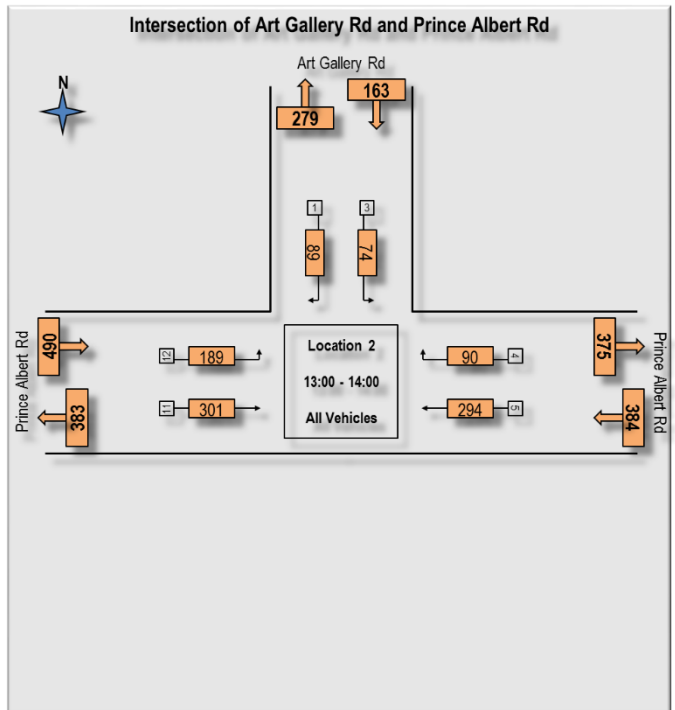
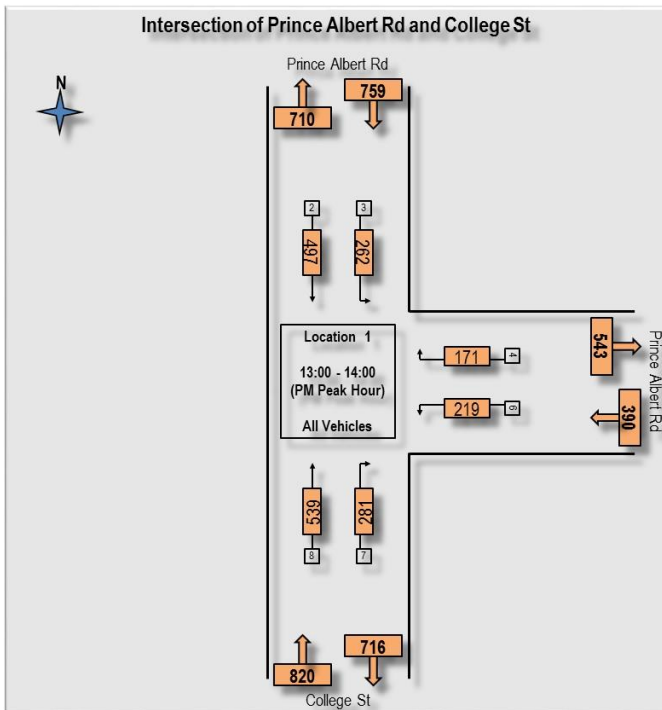
B1 Weekday AM peak hour summaries



B2 Weekday PM peak hour summaries



B3 Weekend peak hour summaries



Appendix C

Traffic Modelling Results

MOVEMENT SUMMARY

 **Site: 101 [AM (8.15-9.15)]**

Signals

Signals - Fixed Time Coordinated Cycle Time = 110 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: College St											
2	T1	998	3.2	0.409	16.8	LOS B	13.1	94.2	0.64	0.56	31.8
3	R2	231	2.7	0.521	38.7	LOS C	10.5	75.0	0.92	0.89	15.0
Approach		1228	3.1	0.521	20.9	LOS B	13.1	94.2	0.69	0.62	27.5
East: Prince Albert Rd											
4	L2	144	16.1	0.843	45.7	LOS D	9.0	70.0	1.00	0.97	13.0
6	R2	234	5.0	0.843	58.2	LOS E	9.8	71.4	1.00	0.95	8.6
Approach		378	9.2	0.843	53.4	LOS D	9.8	71.4	1.00	0.96	10.2
North: Prince Albert Rd											
7	L2	306	4.1	0.366	25.9	LOS B	10.5	76.3	0.69	0.77	15.8
8	T1	585	4.9	0.534	34.0	LOS C	12.5	90.8	0.80	0.69	21.5
Approach		892	4.6	0.534	31.2	LOS C	12.5	90.8	0.77	0.72	20.0
All Vehicles		2498	4.6	0.843	29.5	LOS C	13.1	94.2	0.76	0.70	21.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	121	48.5	LOS E	0.4	0.4	0.94	0.94	
P2	East Full Crossing	328	36.5	LOS D	0.8	0.8	0.82	0.82	
P3	North Full Crossing	294	49.8	LOS E	0.9	0.9	0.96	0.96	
All Pedestrians		743	43.7	LOS E			0.89	0.89	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: 101 [AM (8.15-9.15) - with Dev]**

Signals
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: College St											
2	T1	998	3.2	0.336	16.4	LOS B	10.3	73.8	0.62	0.54	32.2
3	R2	231	2.7	0.507	38.8	LOS C	10.4	74.4	0.91	0.89	15.0
Approach		1228	3.1	0.507	20.6	LOS B	10.4	74.4	0.68	0.61	27.7
East: Prince Albert Rd											
4	L2	144	16.1	0.843	45.2	LOS D	9.0	69.9	1.00	0.97	13.1
6	R2	234	5.0	0.843	58.0	LOS E	9.8	71.4	1.00	0.95	8.7
Approach		378	9.2	0.843	53.1	LOS D	9.8	71.4	1.00	0.96	10.2
North: Prince Albert Rd											
7	L2	348	4.1	0.519	27.2	LOS B	12.5	90.9	0.72	0.79	15.3
8	T1	585	4.9	0.584	35.2	LOS C	13.7	99.9	0.82	0.70	21.0
Approach		934	4.6	0.584	32.2	LOS C	13.7	99.9	0.79	0.73	19.3
All Vehicles		2540	4.5	0.843	29.7	LOS C	13.7	99.9	0.77	0.70	20.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	121	48.5	LOS E	0.4	0.4	0.94	0.94	
P2	East Full Crossing	328	37.3	LOS D	0.9	0.9	0.83	0.83	
P3	North Full Crossing	294	49.8	LOS E	0.9	0.9	0.96	0.96	
All Pedestrians		743	44.1	LOS E			0.90	0.90	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: 101 [PM (5.15-6.15)]**

Signals

Signals - Fixed Time Coordinated Cycle Time = 110 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: College St											
2	T1	704	3.6	0.238	15.4	LOS B	6.8	49.2	0.59	0.50	33.1
3	R2	99	3.2	0.320	43.8	LOS D	4.8	34.2	0.91	0.79	13.7
Approach		803	3.5	0.320	18.9	LOS B	6.8	49.2	0.63	0.53	29.3
East: Prince Albert Rd											
4	L2	186	13.6	0.832	41.4	LOS C	8.6	65.9	1.00	0.96	14.0
6	R2	215	2.9	0.832	57.7	LOS E	9.7	69.6	1.00	0.94	8.7
Approach		401	7.9	0.832	50.1	LOS D	9.7	69.6	1.00	0.95	11.0
North: Prince Albert Rd											
7	L2	264	1.6	0.283	22.0	LOS B	8.0	56.9	0.61	0.75	17.6
8	T1	959	3.0	0.819	35.9	LOS C	26.6	190.6	0.88	0.83	20.8
Approach		1223	2.7	0.819	32.9	LOS C	26.6	190.6	0.82	0.81	20.3
All Vehicles		2427	3.8	0.832	31.1	LOS C	26.6	190.6	0.79	0.74	20.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	143	48.5	LOS E	0.4	0.4	0.94	0.94	
P2	East Full Crossing	387	32.6	LOS D	0.9	0.9	0.78	0.78	
P3	North Full Crossing	352	49.9	LOS E	1.1	1.1	0.96	0.96	
All Pedestrians		882	42.1	LOS E			0.88	0.88	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 Site: 101 [PM (5.15-6.15) - with Dev]

Signals

Signals - Fixed Time Coordinated Cycle Time = 110 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: College St											
2	T1	704	3.6	0.242	16.0	LOS B	6.9	50.1	0.60	0.51	32.5
3	R2	99	3.2	0.314	45.7	LOS D	4.8	34.6	0.91	0.77	13.3
Approach		803	3.5	0.314	19.7	LOS B	6.9	50.1	0.64	0.54	28.7
East: Prince Albert Rd											
4	L2	213	13.6	0.842	40.7	LOS C	9.6	73.5	1.00	0.97	14.2
6	R2	231	2.9	0.842	57.8	LOS E	10.7	76.7	1.00	0.94	8.7
Approach		443	8.0	0.842	49.6	LOS D	10.7	76.7	1.00	0.95	11.1
North: Prince Albert Rd											
7	L2	264	1.6	0.288	22.6	LOS B	8.2	58.0	0.62	0.75	17.3
8	T1	959	3.0	0.869	42.4	LOS C	29.5	211.6	0.92	0.92	18.6
Approach		1223	2.7	0.869	38.1	LOS C	29.5	211.6	0.86	0.88	18.4
All Vehicles		2469	3.9	0.869	34.2	LOS C	29.5	211.6	0.81	0.78	19.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	143	48.5	LOS E	0.4	0.4	0.94	0.94	
P2	East Full Crossing	387	34.2	LOS D	1.0	1.0	0.79	0.79	
P3	North Full Crossing	352	49.9	LOS E	1.1	1.1	0.96	0.96	
All Pedestrians		882	42.8	LOS E			0.88	0.88	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: J:\245000\245767-00 Sydney Modern Traffic\Work\Internal\Analysis\SIDRA\Site 1_20160603.sip7

MOVEMENT SUMMARY

 Site: 101 [WE (13-14)]

Signals

Signals - Fixed Time Coordinated Cycle Time = 110 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: College St											
2	T1	567	1.5	0.186	14.4	LOS A	5.2	37.0	0.56	0.47	34.1
3	R2	296	1.8	0.599	38.2	LOS C	13.1	92.8	0.92	0.92	15.2
Approach		863	1.6	0.599	22.5	LOS B	13.1	92.8	0.68	0.62	25.5
East: Prince Albert Rd											
4	L2	231	6.4	0.786	30.3	LOS C	7.9	58.2	0.99	0.88	17.6
6	R2	180	1.8	0.786	54.9	LOS D	8.3	58.8	1.00	0.89	9.1
Approach		411	4.4	0.786	41.1	LOS C	8.3	58.8	1.00	0.89	13.1
North: Prince Albert Rd											
7	L2	276	2.7	0.340	26.8	LOS B	9.6	68.6	0.70	0.77	15.4
8	T1	523	3.4	0.471	34.4	LOS C	10.5	76.0	0.80	0.67	21.4
Approach		799	3.2	0.471	31.8	LOS C	10.5	76.0	0.76	0.71	19.7
All Vehicles		2073	2.7	0.786	29.8	LOS C	13.1	92.8	0.78	0.71	20.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	229	48.7	LOS E	0.7	0.7	0.95	0.95	
P2	East Full Crossing	223	37.2	LOS D	0.6	0.6	0.83	0.83	
P3	North Full Crossing	391	50.0	LOS E	1.2	1.2	0.96	0.96	
All Pedestrians		843	46.2	LOS E			0.92	0.92	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: 101 [WE (13-14) - with Dev]**

Signals

Signals - Fixed Time Coordinated Cycle Time = 110 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: College St											
2	T1	567	1.5	0.186	14.4	LOS A	5.2	37.0	0.56	0.47	34.1
3	R2	296	1.8	0.562	38.3	LOS C	12.7	90.4	0.90	0.93	15.1
Approach		863	1.6	0.562	22.6	LOS B	12.7	90.4	0.68	0.63	25.5
East: Prince Albert Rd											
4	L2	249	6.4	0.829	33.2	LOS C	9.7	71.2	1.00	0.91	16.6
6	R2	192	1.8	0.829	56.9	LOS E	9.7	71.2	1.00	0.92	8.8
Approach		441	4.4	0.829	43.5	LOS D	9.7	71.2	1.00	0.92	12.6
North: Prince Albert Rd											
7	L2	306	2.7	0.430	29.5	LOS C	11.4	81.8	0.75	0.79	14.4
8	T1	523	3.4	0.528	37.5	LOS C	11.4	82.3	0.84	0.71	20.2
Approach		829	3.1	0.528	34.5	LOS C	11.4	82.3	0.81	0.74	18.5
All Vehicles		2134	2.8	0.829	31.5	LOS C	12.7	90.4	0.79	0.73	19.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	229	48.7	LOS E	0.7	0.7	0.95	0.95	
P2	East Full Crossing	223	39.7	LOS D	0.6	0.6	0.85	0.85	
P3	North Full Crossing	391	50.0	LOS E	1.2	1.2	0.96	0.96	
All Pedestrians		843	46.9	LOS E			0.93	0.93	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

▽ Site: 102 [AM (8.15-9.15)]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: St Marys Rd											
5	T1	315	8.0	0.366	2.3	LOS A	2.4	17.8	0.46	0.28	52.5
6	R2	169	3.7	0.366	9.0	LOS A	2.4	17.8	0.46	0.28	53.9
Approach		484	6.5	0.366	4.6	NA	2.4	17.8	0.46	0.28	53.2
North: Prince Albert Rd											
7	L2	24	4.3	0.023	7.2	LOS A	0.1	0.6	0.44	0.62	52.1
9	R2	36	23.5	0.175	23.4	LOS B	0.6	4.9	0.84	0.93	33.9
Approach		60	15.8	0.175	16.9	LOS B	0.6	4.9	0.68	0.81	42.1
West: Prince Albert Rd											
10	L2	254	5.8	0.142	3.5	LOS A	0.0	0.0	0.00	0.50	53.9
11	T1	307	3.4	0.161	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		561	4.5	0.161	1.6	NA	0.0	0.0	0.00	0.23	57.0
All Vehicles		1105	6.0	0.366	3.7	NA	2.4	17.8	0.24	0.28	53.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 102 [PM (5.15-6.15)]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		veh	m		per veh	km/h
East: St Marys Rd											
5	T1	284	10.0	0.190	0.3	LOS A	0.4	3.0	0.14	0.09	57.4
6	R2	46	4.5	0.190	6.8	LOS A	0.4	3.0	0.14	0.09	56.6
Approach		331	9.2	0.190	1.2	NA	0.4	3.0	0.14	0.09	57.2
North: Prince Albert Rd											
7	L2	32	0.0	0.025	6.5	LOS A	0.1	0.7	0.35	0.58	52.5
9	R2	46	18.2	0.107	12.5	LOS A	0.4	3.1	0.63	0.84	41.7
Approach		78	10.8	0.107	10.1	LOS A	0.4	3.1	0.52	0.74	47.1
West: Prince Albert Rd											
10	L2	84	2.5	0.046	3.5	LOS A	0.0	0.0	0.00	0.51	54.1
11	T1	246	0.9	0.127	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		331	1.3	0.127	0.9	NA	0.0	0.0	0.00	0.13	58.3
All Vehicles		739	5.8	0.190	2.0	NA	0.4	3.1	0.12	0.17	56.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 102 [WE (13-14)]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: St Marys Rd											
5	T1	309	2.7	0.243	0.8	LOS A	0.9	6.6	0.29	0.16	55.6
6	R2	95	1.1	0.243	7.5	LOS A	0.9	6.6	0.29	0.16	55.7
Approach		404	2.3	0.243	2.4	NA	0.9	6.6	0.29	0.16	55.6
North: Prince Albert Rd											
7	L2	78	2.7	0.072	7.2	LOS A	0.3	2.0	0.44	0.65	52.1
9	R2	94	4.5	0.279	17.1	LOS B	1.1	8.0	0.78	0.94	38.0
Approach		172	3.7	0.279	12.6	LOS A	1.1	8.0	0.62	0.81	45.5
West: Prince Albert Rd											
10	L2	199	3.7	0.110	3.5	LOS A	0.0	0.0	0.00	0.50	54.1
11	T1	317	0.3	0.163	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		516	1.6	0.163	1.3	NA	0.0	0.0	0.00	0.19	57.5
All Vehicles		1092	2.2	0.279	3.5	NA	1.1	8.0	0.20	0.28	54.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 102 [AM (8.15-9.15) - with Dev]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: St Marys Rd											
5	T1	315	8.0	0.409	2.9	LOS A	3.1	22.7	0.51	0.34	51.3
6	R2	201	3.7	0.409	9.6	LOS A	3.1	22.7	0.51	0.34	53.2
Approach		516	6.4	0.409	5.5	NA	3.1	22.7	0.51	0.34	52.3
North: Prince Albert Rd											
7	L2	24	4.3	0.024	7.3	LOS A	0.1	0.6	0.45	0.63	52.0
9	R2	36	23.5	0.199	26.7	LOS B	0.7	5.6	0.86	0.95	32.1
Approach		60	15.8	0.199	18.9	LOS B	0.7	5.6	0.70	0.82	40.8
West: Prince Albert Rd											
10	L2	275	5.8	0.154	3.5	LOS A	0.0	0.0	0.00	0.50	53.9
11	T1	328	3.4	0.172	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		603	4.5	0.172	1.6	NA	0.0	0.0	0.00	0.23	57.0
All Vehicles		1179	5.9	0.409	4.2	NA	3.1	22.7	0.26	0.31	53.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 102 [PM (5.15-6.15) - with Dev]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: St Marys Rd											
5	T1	305	10.0	0.202	0.3	LOS A	0.4	3.1	0.13	0.08	57.6
6	R2	46	4.5	0.202	6.8	LOS A	0.4	3.1	0.13	0.08	56.6
Approach		352	9.3	0.202	1.1	NA	0.4	3.1	0.13	0.08	57.4
North: Prince Albert Rd											
7	L2	63	0.0	0.050	6.5	LOS A	0.2	1.4	0.35	0.59	52.5
9	R2	67	18.2	0.162	13.2	LOS A	0.6	4.8	0.66	0.86	41.2
Approach		131	9.4	0.162	9.9	LOS A	0.6	4.8	0.51	0.73	47.7
West: Prince Albert Rd											
10	L2	84	2.5	0.046	3.5	LOS A	0.0	0.0	0.00	0.51	54.1
11	T1	246	0.9	0.127	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		331	1.3	0.127	0.9	NA	0.0	0.0	0.00	0.13	58.3
All Vehicles		813	6.0	0.202	2.4	NA	0.6	4.8	0.14	0.20	55.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 102 [WE (13-14) - with Dev]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: St Marys Rd											
5	T1	325	2.7	0.273	1.0	LOS A	1.2	8.3	0.33	0.18	55.0
6	R2	118	1.1	0.273	7.7	LOS A	1.2	8.3	0.33	0.18	55.4
Approach		443	2.3	0.273	2.7	NA	1.2	8.3	0.33	0.18	55.1
North: Prince Albert Rd											
7	L2	101	2.7	0.095	7.3	LOS A	0.4	2.7	0.45	0.67	52.1
9	R2	109	4.5	0.364	20.0	LOS B	1.5	11.0	0.82	0.98	36.0
Approach		211	3.6	0.364	13.9	LOS A	1.5	11.0	0.64	0.83	44.7
West: Prince Albert Rd											
10	L2	215	3.7	0.119	3.5	LOS A	0.0	0.0	0.00	0.50	54.1
11	T1	333	0.3	0.171	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		547	1.7	0.171	1.4	NA	0.0	0.0	0.00	0.20	57.5
All Vehicles		1201	2.2	0.364	4.1	NA	1.5	11.0	0.24	0.30	53.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.