SYDNEY INTERNATIONAL CONVENTION, EXHIBITION AND ENTERTAINMENT PRECINCT
DARLING HARBOUR LIVE – DARLING SQUARE - WESTERN PLOT - BUILDING W1

TRANSPORT & TRAFFIC IMPACT ASSESSMENT

FOR SSDA12

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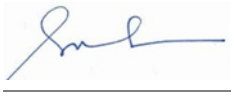
DARLING HARBOUR LIVE

SICEEP – DARLING SQUARE -WESTERN PLOT - BUILDING W1

Transport and Traffic Impact Assessment for Stage 2 State Significant Development Application (SSDA 12)

Author	Sally Manahan	
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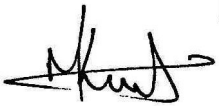
Approver	Michael Kurtz	
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REVISIONS

Revision	Date	Description	Prepared By	Approved By
01	14/08/2015	Draft for co-ordination and review	CM	-
02	19/09/2015	Review and Update	SM	-
03	01/09/2015	Final report	SM	MBK
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05	07/09/2015	Final report	MAK	MBK
06	11/09/2015	Final Report	CM	MBK
07	14/09/2015	Final Report	CM	MBK

CONTENTS

APPENDICES

1 INTRODUCTION

This report supports a State Significant Development (SSD) Development Application (DA) submitted to the Minister for Planning pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The Application (referred to as SSDA 12) follows the approval of a staged SSD DA (SSDA 2) in December 2013. SSDA 2 sets out a Concept Proposal for a new mixed use residential neighbourhood at Haymarket referred to as "Darling Square", previously known as "The Haymarket". Darling Square forms part of the Sydney International Convention, Exhibition and Entertainment precinct (SICEEP) Project, which will deliver Australia's global city with new world class convention, exhibition and entertainment facilities and support the NSW Government's goal to "make NSW number one again".

More specifically this subsequent DA seeks approval for a residential building (student accommodation) within the Western development plot (Darling Drive) of Darling Square and associated public domain works. The DA has been prepared and structured to be consistent with the Concept Proposal DA.

2 OVERVIEW OF PROPOSED DEVELOPMENT

The proposal relates to a detailed ('Stage 2') DA for a residential building (student accommodation) in the Darling Drive Plot of Darling Square together with associated public domain works. The Darling Square Site is to be developed for a mix of residential and non-residential uses, including but not limited to residential buildings, commercial, retail, community and open space. The Darling Drive Plot is one of six development plots identified within the approved Concept Proposal.

More specifically, this SSD DA seeks approval for the following components of the development:

- Demolition of existing site improvements;
- Associated tree removal and planting;
- Construction and use of one residential building within the Darling Drive Plot, to be used for student accommodation purposes;
- Public domain improvements, including provision of a new urban courtyard space between student accommodation buildings W1 and W2; and
- Extension and augmentation of physical infrastructure / utilities as required.

3 BACKGROUND

The NSW Government considers that a precinct-wide renewal and expansion of the existing convention, exhibition and entertainment centre facilities at Darling Harbour is required, and is committed to Sydney reclaiming its position on centre stage for hosting world-class events with the creation of SICEEP.

Following an extensive and rigorous Expressions of Interest and Request for Proposals process, a consortium comprising AEG Ogden, Lend Lease, Capella Capital and Spotless was announced by the NSW Government in December 2012 as the preferred proponent to transform Darling Harbour and create SICEEP.

Key features of the Preferred Master Plan include:

- Delivering world-class convention, exhibition and entertainment facilities, including:
  - Up to 40,000m^2 exhibition space;
  - Over 8,000m^2 of meeting rooms space, across 40 rooms;
  - Overall convention space capacity for more than 12,000 people;
  - A ballroom capable of accommodating 2,000 people; and
  - A premium, red-carpet entertainment facility with a capacity of 8,000 persons.
- Providing a hotel complex at the northern end of the precinct.
- A vibrant and authentic new neighbourhood at the southern end of the precinct, now called 'Darling Square', including apartments, student accommodation, shops, cafes and restaurants.
- Renewed and upgraded public domain that has been increased by a hectare, including an outdoor event space for up to 27,000 people at an expanded Tumbalong Park; and
- Improved pedestrian connections linking to the proposed Ultimo Pedestrian Network drawing people between Central, Chinatown and Cockle Bay Wharf as well as east-west between Ultimo/Pyrmont and the City.

On 21 March 2013 a critical step in realising the NSW Government's vision for the SICEEP Project was made, with the lodgement of the first two SSD DAs with the (now) Department of Planning and Environment. The key components of these proposals are outlined below.

Public Private Partnership SSD DA (SSD 12_5752)

The Public-Private Partnership (PPP) SSD DA (SSDA 1) includes the core facilities of the SICEEP Project, comprising the new, integrated and world-class convention, exhibition and entertainment facilities along with ancillary commercial premises and public domain upgrades. SSDA1 was approved on 22 August 2013.

The Darling Square Concept Proposal (SSD 13_5878)

The Concept Proposal SSD DA (SSDA 2) establishes the vision and planning and development framework which will be the basis for the consent authority to assess detailed development proposals within the Darling Square Site. SSDA2 was approved on 5 December 2013. The Stage 1 Concept Proposal approved the following key components and development parameters:

- Indicative staging of demolition and development of future development plots;
- Land uses across the site including residential and non-residential uses;
- Street and laneway layouts and pedestrian routes;

- Open spaces and through-site links;
- Six separate development plots, development plot sizes and separation, building envelopes, building separation, building depths, building alignments, and benchmarks for natural ventilation and solar access provisions;
- A maximum total gross floor area (non-residential and residential GFA);
- Above ground car parking including public car parking;
- Residential car parking rates;
- Design Guidelines to guide future development and the public domain; and
- A remediation strategy.

In addition to the approval of SSDA2, the following approvals have been granted for various stages of the Darling Square site:

- Darling Drive (part) development plot (SSDA3) for the construction and use of a residential building/W2 (student accommodation) and the provision of associated public domain works approved on 7 May 2014;
- North-West development plot (SSDA4) for the construction and use of a mixed use commercial development and public car park building and associated public domain works approved on 7 May 2014; and
- South-West development plot (SSDA5) – construction and use of a mixed use residential development and associated public domain works approved on 21 May 2014.
- North-East development plot (SSDA7) – construction and use of a mixed use residential development and associated public domain works approved on 16 April 2014.

Approval was also granted on 15 June 2014 for SSDA6 which includes the construction and use of the International Convention Centre (ICC) Hotel and provision of public domain works.

This report has been prepared to support a detailed Stage 2 SSD DA for a residential building/W1 (student accommodation) and associated public domain works within Darling Square (SSDA 12), consistent with the Concept Proposal (SSDA 2).

4 SITE DESCRIPTION

The SICEEP Site is located within Darling Harbour. Darling Harbour is a 60 hectare waterfront precinct on the south-western edge of the Sydney Central Business District that provides a mix of functions including recreational, tourist, entertainment and business.

With an area of approximately 20 hectares, the SICEEP Site is generally bound by the Light Rail Line to the west, Harbourside shopping centre and Cockle Bay to the north, Darling Quarter, the Chinese Garden and Harbour Street to the east, and Hay Street to the south (refer to Figure 1).

The Darling Square Site is:

- Located in the south of the SICEEP Site, within the northern portion of the suburb of Haymarket;
- Bounded by the Powerhouse Museum to the west, the Pier Street overpass and Little Pier Street to the north, Harbour Street to the east, and Hay Street to the south; and
- Irregular in shape and occupies an area of approximately 43,807m^2.

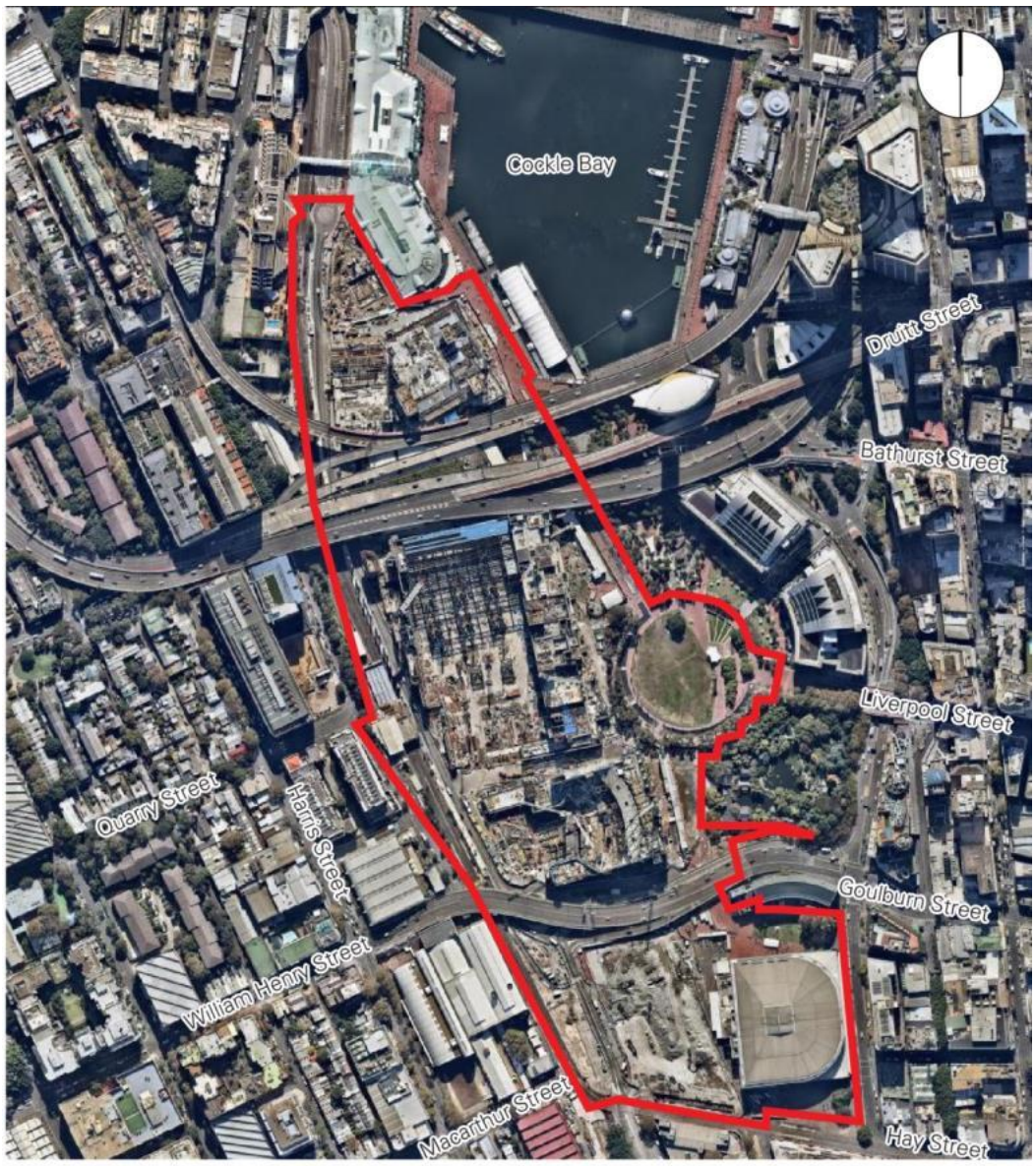


Figure 1: Aerial photograph of the SICEEP Site

The Concept Proposal DA provides for six (6) separate development plots across the Darling Square Site (refer to Figure 2):

1. North Plot;
2. North East Plot;
3. South East Plot;
4. South West Plot;
5. North West Plot; and
6. Western Plot (Darling Drive).

The Application Site area relates to the northern portion of the Western Plot and surrounds as detailed within the architectural and landscape plans submitted in support of the DA.

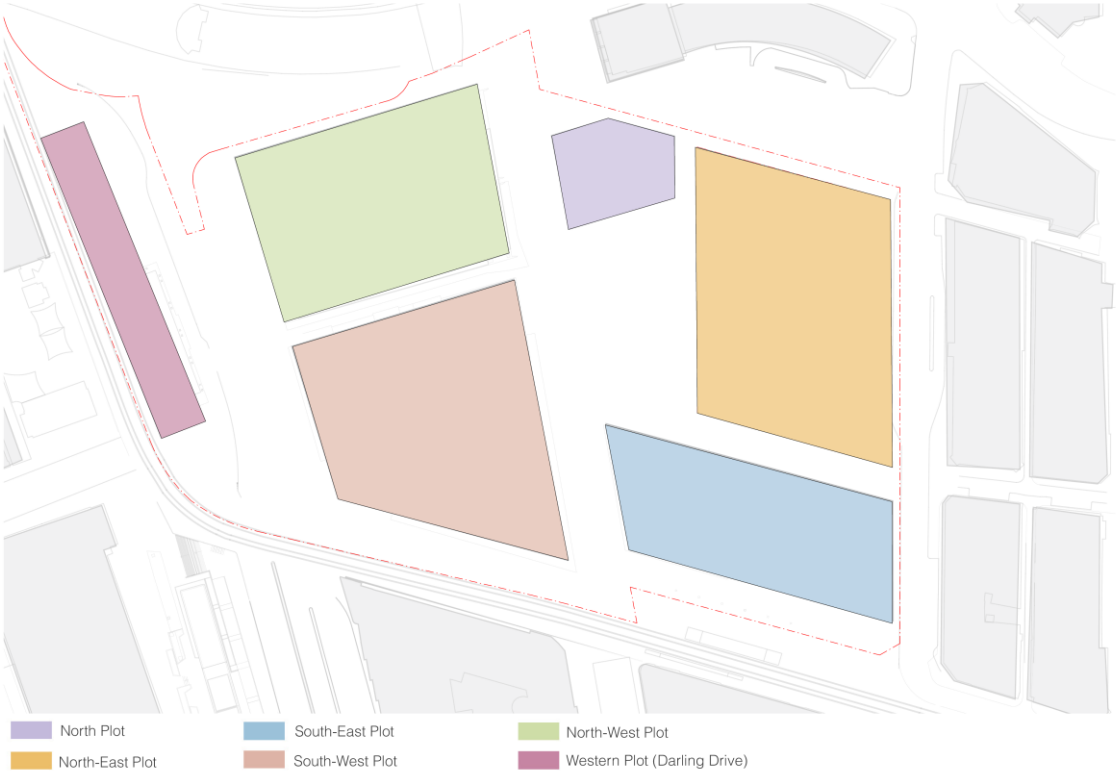


Figure 2 – Concept Proposal Development Plots

The Site area for this Stage 2 DA relates to the Western Plot and surrounds as detailed within the architectural and landscape plans submitted in support of the DA (refer to Figure 3).

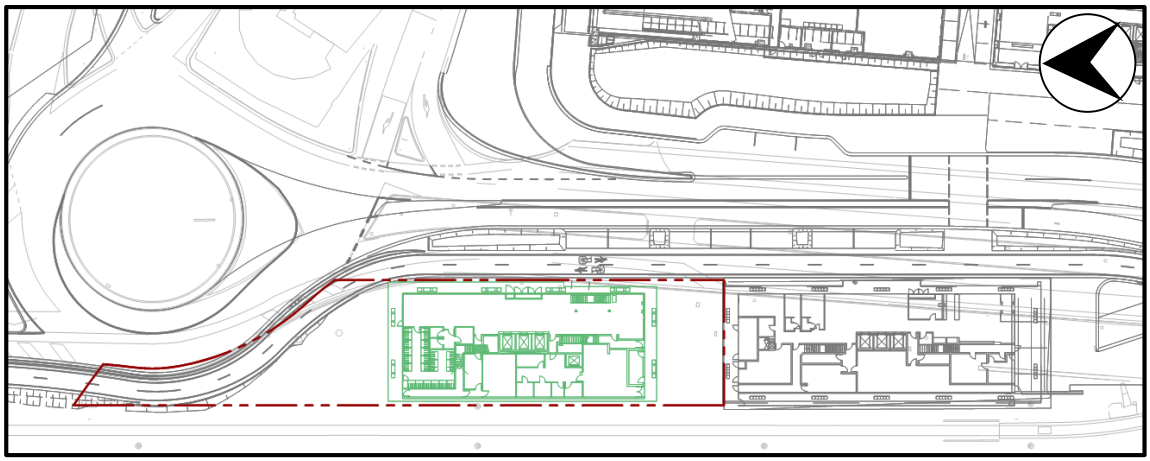


Figure 3: - Works boundary for subject DA

5 PURPOSE OF THIS REPORT

This report is being submitted to support the development application of the Student Accommodation within the Western Plot of Darling Square comprising of a residential building, and associated public domain works. This report should be read in conjunction with the Transport and Traffic Impact Assessment report submitted with SSDA2 which is included as Appendix A.

The Environmental Assessment Requirements issued by the Director General for development approval for the Preferred Master Plan and Specific Requirements for the individual SSDAs for the SICEEP (SSD 5752-2012) were issued on 21 January 2013. The main report addresses the general requirements for the overall project relating to Transport and Accessibility, as outlined in Section 8 of the DGRs.

Section 8 of the DGR's requires the following:

Table 1 Director General Requirements

Issue Description	Relevant Section in the Main Report	Relevant Section in this Report	Comments
Address the impact of traffic and pedestrian volumes on surrounding road network including intersections using appropriate traffic modeling analysis based on the worst cumulative traffic impacts including a sensitivity analysis	Section 6, Section 7, Section 8, Section 9	Section 8.2	Traffic generation associated with the Western plot relates mainly to pedestrian movements and occasional vehicle movements to and from the Student Accommodation There are two key intersections within the Western plot.
Provide details of any upgrading or road improvement works required to accommodate the proposed development	Section 6.2.1	Section 7.1 and Section 7.3	The realignment and reconfiguration of Darling Drive is proposed to create the Western plot in order to facilitate the Student Accommodation building. A new signalised pedestrian crossing is proposed to be installed across Darling Drive to link the new student accommodation building to the rest of the Darling Square precinct.

Issue Description	Relevant Section in the Main Report	Relevant Section in this Report	Comments
Address any impacts on the Light Rail corridor and Western Distributor viaducts	Section 6.3	N/A	There is a direct interface of vehicles with the light rail operations at the Darling Drive/Hay St intersection. This has been assessed as part of the intersection analysis. A separate report has been prepared to address the impact of the proposed Student Accommodation building on the existing light rail corridor.
Justify the level of car parking provided on the site	Section 5.4	Section 7.2	No car parking provisions are proposed for the Student Accommodation. Bicycle storage will be provided for the residents.
Provide details of measures to encourage sustainable transport measures, including end of trip cyclist facilities, pedestrian and cycle connections and travel plans	Section 10	Section 7.3 and 7.4	Cycle and pedestrian connections will be enhanced through the provision of new linkages. End of trip facilities are incorporated in the design of the student accommodation building.
Address the impacts from construction traffic to the surrounding area and include the cumulative impact of construction activities from other sites in the locality	Section 9	Section 9.7	Construction Traffic Management Plans have been prepared for the PPP, SSDA3, SSDA4, SSDA5 (including all new building works and the Darling Drive realignment). These plans outline how potential impacts may be mitigated and will be regularly updated to address any new outcomes as the works progress.
Provide details of the parking provision and arrangements during the demolition/construction period	Section 9	Section 9.4	A preliminary Construction Management Plan has been prepared. On-site parking will not be allowed during the construction. Measures will be implemented to promote public transport use.

Issue Description	Relevant Section in the Main Report	Relevant Section in this Report	Comments
Provide details of the pedestrian and cyclist connections to the surrounding area including west to Ultimo and east to the Central Business District	Section 5.7, 5.8, 3.3	Section 7 and Section 7.3 / 7.4	Cycle and pedestrian connectivity will be enhanced in the east west direction via new pedestrian crossing and in the north-south direction via the cycle/pedestrian shared path on the west side of Darling Drive which connects into existing and proposed networks.
Address road safety at key intersections and locations subject to heavy vehicle movements and high pedestrian activity	Section 8	Section 8.3 and Section 9.5	Road safety measures have been integrated in the proposed design of those intersections subject to heavy vehicle movements and high pedestrian activity. The road layout supports the modelled heavy vehicle movements and pedestrian activity is supported through new and upgraded signalised pedestrian crossing facilities and generous verges. The construction management plan will address pedestrian and heavy vehicle movements during construction whilst post construction heavy vehicle movements (generally associated with the operations of the core facilities) have been facilitated in the proposed design and will be further addressed through the road safety audit process.

In addition to the General Requirements, a list of Specific Requirements for each of the individual SSDAs was provided. Issues to be considered for SSDA 2 – Darling Square precinct (Concept) and SSDA 3 – Student Accommodation in Darling Square precinct listed the following issue under Transport and Accessibility:

Issue Description	Relevant Section in this Report	Comments
Address the seasonal logistical requirements of students moving in and out of buildings and the impact on the broader road/transport network	Section 8.2	A drop-off zone is provided to address seasonal logistical requirements. However, it should be noted that the student accommodation is a fully furnished facility and will not require the new residents to provide any furnishings.

This report details the outcomes of the traffic impact assessment of the development components associated with the Student Accommodation and addresses the relevant requirements of the DGRs for the project.

The Secretary's Environmental Assessment Requirements (SEARs) issued by the Secretary for development approval for the SICEEP Building W1 Western Plot Student Accommodation (SSD 7133) were issued on 20 July 2015.

This report also addresses the following Secretary's environmental assessment requirements (SEARs).

Issue Description	Relevant Section in this Report	Comments
Estimate the total daily and peak hour trips likely to be generated by the proposed development, including vehicle, public transport, pedestrian and cycle trips	Section 8.1	Traffic generation associated with the Western plot relates mainly to pedestrian movements and occasional vehicle movements to and from the Student Accommodation.
Demonstrate the measures to be implemented to encourage users of the development to make sustainable travel choices, including walking, cycling, public transport and car sharing	Section 7.2, 7.3 and 7.4	No car parking provisions are proposed for the Student Accommodation. Bicycle storage will be provided for the residents. Cycle and pedestrian connections will be enhanced through the provision of new linkages. End of trip facilities are incorporated in the design of the student accommodation building.
Demonstrate appropriate provision, design and location of on-site bicycle parking, and how cycle provision will be integrated with the existing cycle network	Section 7.2.2 and 7.4	Bicycle storage will be provided for the residents. Cycle and pedestrian connectivity will be enhanced in the east west direction via new pedestrian crossing and in the north-south direction via the cycle/pedestrian shared path on the west side of Darling Drive which connects into existing and proposed networks.
Provide details of service vehicle movements and site access arrangements	Section 7.1	A drop-off zone is provided to address service vehicle movements and vehicle access arrangements.

6 EXISTING TRANSPORT CONDITIONS

The existing transport conditions for Darling Square are assessed as part of the Transport and Traffic Impact Assessment report submitted with SSDA2 as attached as Appendix A.

7 DEVELOPMENT COMPONENTS

7.1 DROP OFF ZONE

A drop-off zone is to be provided on the western kerbside of Darling Drive for taxis, deliveries, seasonal movements of residents and waste collection. The drop off zone will be adjacent to the shared pedestrian/cycle path and will be able to accommodate 7 vehicles at any one time. Parking control will be managed through signage and timed parking restrictions.

7.2 PARKING PROVISION

7.2.1 CAR PARKING

No car parking is proposed to support the student accommodation building on the premise that the development site has the locational advantage of being in close proximity to existing public transport and active transport services and facilities. This is consistent with other student accommodation developments located within Sydney City and Building W2, also located within the Western Plot of Darling Square.

The student accommodation site is well serviced by public transport. The student accommodation building is in very close proximity to the light rail stop at The Exhibition Centre. Furthermore, improved pedestrian linkages towards George Street via The Goods Line and the Chinatown Public Domain Plan provide improved accessibility to bus services.

The student accommodation site is approximately 500m to 800m to UTS and Ultimo Tafe.

7.2.2 BICYCLE PARKING

To determine bike parking requirements, reference is made to the Planning Guidelines for Walking and Cycling which suggests that bicycle parking for a category named as 'boarding houses' be provided at the following rates:

- 5-10% of the number of rooms for resident/staff

The development proposal provides secure storage for 90 bicycles for residents within the building plus proposed bike racks in the public domain. In total, the proposed bike parking provision exceeds guidelines noted above. This provision is also informed by existing bike parking requirements from comparable operating student accommodation facilities.

7.3 PEDESTRIAN NETWORK

The Traffic Transport and Access Plan for the whole precinct (refer SSDA1 & SSDA2) illustrates the proposed pedestrian connections and linkages.

The design of the pedestrian network for this plot is generally consistent with SSDA2.

A new signalised pedestrian crossing facility (subject to approval by others) will be installed on Darling Drive linking the student accommodation building with the rest of the Darling square development and city beyond (to the east) and across the light rail corridor linking with The Goods Line (to the south). The proposed location aligns with Dickson Lane at Darling Square and is approximately 49 metres north of the intersection of Darling Drive with Hay Street. This would

create the east west pedestrian linkage across the Darling Square Precinct and would provide a safe pedestrian crossing to what is a strong desire line.

In order to facilitate pedestrian movements to / from the proposed pedestrian crossing facility as well as to provide pedestrian access to the light rail station to the north of Pier Street, a shared path (in accordance with Austroads Part 6A: Pedestrian and Cyclist Paths) along the western edge of Darling Drive between Hay Street and the light rail station has been approved under SSDA 3 for the W2 Building.

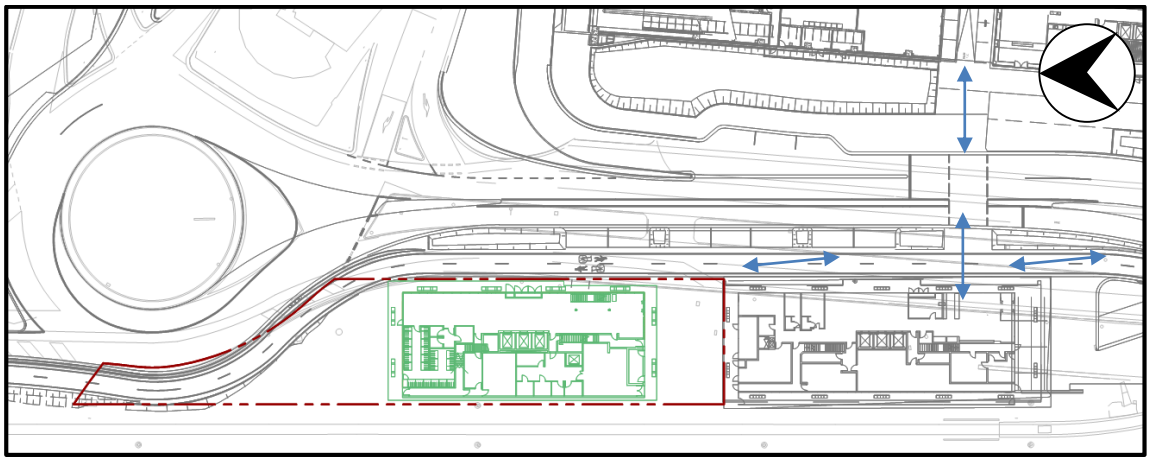


Figure 4 Proposed Signalised Pedestrian Crossing

7.4 CYCLE NETWORK

A detailed Cycle Network assessment was undertaken as part of SSDA1 & SSDA2 and new linkages were identified to accompany the development works of SSDA1 and Darling Square. Cycle connections will be provided along Darling Drive as part of the realignment and reconfiguration of Darling Drive and these proposals form part of the overall improvement to the cycle network serving the West plot and precinct as a whole.

As part of the realignment and reconfiguration of Darling Drive, cycle connections are proposed to be enhanced via the 2.5m wide shared path on the west side of Darling Drive. Further connections to the existing routes will be provided through new linkages on the existing road network.

The proposed shared space zone will tie into a dual lane cycleway, in the northern sector, north of the Darling Drive / Pier Street roundabout. South of the light rail intersection and outside the DA boundary, the proposed cycleway will connect into the existing single lane, one-way cycle paths linking into the cycle network on both sides of Darling Drive including the future Goods Line connection to UTS and Central Station.

The new and improved linkages will improve connectivity in the Precinct and improve access to public transport.

8 TRAFFIC IMPACT ASSESSMENT

8.1 TRAFFIC GENERATION AND TRIP DISTRIBUTION

There are no guidelines for trip generation rates for student accommodation in the RMS Guide to Traffic Generating Developments, Version 2.2, October 2002. Similar to other student accommodations in Sydney City, it is anticipated that a significant majority of the trips for the student accommodation will comprise of walking trips, cycling trips and public transport trips during the peak hour. Destinations like UTS and other educational institutions or facilities and major transport hubs (i.e. Central Station and Town Hall) are within walking distance.

No car parking is being proposed for the student accommodation building. Hence, vehicle trips for this land use are expected to be minimal and are anticipated to mostly occur outside the normal commuter peak. No parking will be provided for this land use but loading zone on Darling Drive will be incorporated in the design layout to allow for students moving in and moving out noting that the accommodation is provided fully furnished. The loading facilities will also be utilised for servicing and collection. In the absence of any guidelines, it is assumed that vehicle trip generation for student accommodation is not likely to exceed the vehicle trip generation for high density residential (0.19 vehicle trips per unit or 0.09 vehicle trips per bedroom in the AM peak and 0.15 vehicle trips per unit of 0.07 vehicle trips per bedroom in the PM peak) and a high estimate could potentially be in the order of 0.10 vehicle trips per unit. Hence, for a total of 668 beds, vehicle trip generation could be in the order of 67 vehicle trips. There will also be seasonal logistical requirements of students moving in and out of the buildings and these trips are anticipated to occur outside the peak hour and dispersed throughout the day.

For the purpose of this assessment, trip distribution for traffic associated with the student accommodation is assumed to be similar to the local traffic distribution observed within the adjacent road network.

8.2 NETWORK CAPACITY AND LEVEL OF SERVICE (LOS)

A micro-simulation model was developed for the core study area bounded by Darling Drive to the west, Harbour Street to the east, Hay Street to the south and Pyrmont Bridge to the north. The traffic modelling encompasses the Whole of Precinct (WOP) and investigates cumulative impacts from the development of the PPP, Darling Square and the ICC Hotel. The future modelling scenario represents 'worst case scenario' analysis and accounts for design proposals developed at this stage. Details of the modelling are reported in the Darling Square Report (see Appendix A). The network modelling was then supplemented by more detailed assessments of selected key intersections using the SIDRA intersection modelling software to test intersection performance at the isolated level during the selected peak hours and to identify potential measures to achieve improved outcomes.

8.2.1 EXISTING INTERSECTION OPERATION

It should be noted that the modelling undertaken for the assessment takes into account the cumulative traffic for the development of the SICEEP Precinct as a whole. The results of the analysis incorporate impacts from the various components of the development.

The criteria for evaluating the operational performance of intersections are provided by the RMS Guide to Traffic Generating Developments, Version 2.2, October 2002. The criterion is based on a qualitative measure (i.e. Level of Service), which is applied to each average delay band.

The 'Level of Service' is the standard used to measure the performance of the intersection operation. This is defined as the qualitative assessment of the quantitative effect of factors such as speed, traffic volume, geometric features, delays and freedom of movement.

The intersections were assessed for existing operational performance using SIDRA Intersection Analysis. SIDRA Intersection calculates the amount of delay experienced by vehicles using an intersection, and gives a Level of Service rating. The 'Level of Service' (LOS) indicates the relative performance of that intersection with regard to the average delay (in seconds per vehicle) experienced by vehicles at the intersection.

At a signalised intersection, the Level of Service (LoS) criteria are related to average intersection delay measured in seconds per vehicle. The RMS Guide has recommended that with roundabout, "Stop" and "Give Way" sign control intersections, the LoS value is determined by the critical movement with the highest average delay. Table 3 summarises intersection LoS criteria used to assess the intersection performance.

Table 2 LOS Criteria

Level of Service	Average Delay per Vehicle (sec/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	<14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required

Level of Service	Average Delay per Vehicle (sec/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode
F	>70	Unsatisfactory with excessive queuing	Unsatisfactory with excessive queuing

In general, SIDRA predicts intersection performance for the following key parameters:

- Degree of saturation (DoS);
- Average delays to intersection;
- Level of service (LoS) determined from LoS criteria; and
- Queue length.

Intersection analysis of the key intersections adjacent to the Student Accommodation site was undertaken. The results of the modelling for existing traffic are shown in Table 4 and 5. The results of the modelling reveal that on the overall the key intersections perform at an acceptable LoS on a typical Friday or Saturday PM peak.

Table 3 Intersection Performance of Existing Friday PM Peak Condition (2012)

Intersection	Intersection Control	Approach	Average Delay Approach (sec/veh)	Approach LoS	Overall Average Delay (sec/veh)	Overall LoS
Darling Dr / Pier Street	Roundabout	Darling Dr North	3.6	A	10.2	A
		Pier St (off-ramp) East	8.9	A		
		Existing SEC Car Park Exit	5.8	A		
		Darling Drive South	7.9	A		
Darling Dr / Car Park Access (Hay Street)	Signalised	Darling Dr North	19.4	B	23.0	B
		Existing SW Entertainment Centre Car Park Access	46.5	D		
		Darling Dr South	16.4	B		
Darling Dr / Ultimo Road	Signalised	Ultimo Road West	13.8	A	17.7	B
		Darling Drive North	24.5	B		
		Ultimo Road East	13.5	A		

Table 4 Intersection Performance of Existing Saturday Peak (2012)

Intersection	Intersection Control	Approach	Average Delay Approach (sec/veh)	Approach LoS	Overall Average Delay (sec/veh)	Overall LoS
Darling Dr / Pier street	Roundabout	Darling Dr North	3.6	A	10.4	A
		Pier St (off-ramp) East	9	A		
		Existing SEC Car Park Exit	6.1	A		
		Darling Drive South	9.6	A		
Darling Dr / SW Car Park Access (Hay Street)	Signalised	Darling Dr North	19.4	B	23.0	B
		Existing SEC Car Park Access	46.5	D		
		Darling Dr South	16.5	B		

8.2.2 FUTURE OPERATIONAL PERFORMANCE

The results of the modelling for the future network with the proposed development are presented Table 5 and 6 below.

Table 5 Future Intersection Performance (Friday Event)

Intersection	Intersection Control	Approach	Average Delay Approach (sec/veh)	Approach LoS	Overall Average Delay (sec/veh)	Overall LoS
Darling Dr / Pier Street	Roundabout	Darling Dr North	4.1	A	9.4	A
		Pier St (off-ramp) East	9.4	A		
		Darling Drive South	8.9	A		
Darling Dr / Car Park Access (Hay Street)	Signalised	Darling Dr North	8.7	A	10.9	A
		Future approach from SW Car Park Access[1]	71.7	F		
		Darling Dr South	8.3	A		
Darling Dr / Ultimo Road	Signalised	Ultimo Road West	18.8	B	21.6	B
		Darling Drive North	18.9	B		
		Ultimo Road East	24.8	B		

[1]Exiting vehicles from the carpark will experience relative delays due to green time priority given to through traffic on Darling Drive. The volume of vehicles exiting the carpark is expected to be minimal compared to volume of vehicles on Darling Drive.

Table 6 Future Intersection Performance (Saturday Event)

Intersection	Intersection Control	Approach	Average Delay Approach (sec/veh)	Approach LoS	Overall Average Delay (sec/veh)	Overall LoS
Darling Dr / Pier Street	Roundabout	Darling Dr North	4.3	A	9.8	A
		Pier St (off-ramp) East	9.7	A		
		Darling Drive South	20.5	B		
Darling Dr / SW Car Park Access (Hay Street)	Signalised	Darling Dr North	9.4	A	10.4	A
		Future approach from SW Car Park Access[1]	62.6	E		
		Darling Dr South	6.9	A		

[1]Exiting vehicles from the carpark will experience relative delays due to green time priority given to through traffic on Darling Drive. The volume of vehicles exiting the carpark is expected to be minimal compared to volume of vehicles on Darling Drive.

The results indicate that with development traffic, the key intersections will perform at an acceptable overall LoS on a typical Friday or Saturday peak. Vehicles exiting the SW carpark will experience delays as Darling Drive will have more green time priority over the SW car park exit. It should also be noted that the approved changes to the Exhibition Place as part of the PPP works diverts exit traffic from the Theatre parking and the NW parking away from the roundabout. Hence, resulting in an improved LoS for the Pier Street/Darling Drive roundabout despite the additional traffic attributed to the development of The Darling Square Precinct.

8.3 PEDESTRIAN SAFETY ON DARLING DRIVE

Crash data was supplied by the RMS for a five-year period from July 2007 to June 2012 inclusive. The crash statistics revealed five (5) crashes involving pedestrians occurred over a span of five years and were observed to occur at the intersections, notably Darling Drive/Murray Street/Pyrmont Bridge Road and at Darling Drive/Pier Street roundabout.

The approved reconfiguration of Darling Drive removes the existing mini bus parking on the east side and hence, eliminates reversing manoeuvres along Darling Drive and minimises potential conflicts with pedestrian and cyclist.

A new signalised pedestrian crossing facility will be installed on Darling Drive linking the Student Accommodation with The Darling Square development. The proposed location directs pedestrians to and from the east west pedestrian network within The Darling Square Precinct and provides access to the north west pedestrian linkage via the Boulevard. This proposed additional crossing will provide a safer opportunity to cross Darling Drive.

Pedestrian safety measures will be incorporated in the construction management plans for the student housing building and will be reviewed and updated as required.

9 CONSTRUCTION TRAFFIC IMPACT AND MANAGEMENT

9.1 BACKGROUND

Preliminary Construction Management Plans have been prepared for the Darling Drive realignment works and construction of the student housing building. These documents outline the indicative management plans relating to the works associated with SSDA12. This section presents excerpts from the above document relevant to Traffic and Pedestrian Management during construction of The Darling Square Precinct, including description and layouts of the planned mitigation arrangements demonstrating how, during the development, the pedestrian and vehicular movements will be addressed to minimise impact.

The figure below depicts the indicative hoarding locations proposed during the construction of the SSDA12 works and identifies areas indicatively accessible to the general public and areas cordoned off for the construction works. Construction of the Western Plot, including hoarding will not affect the light rail operations.

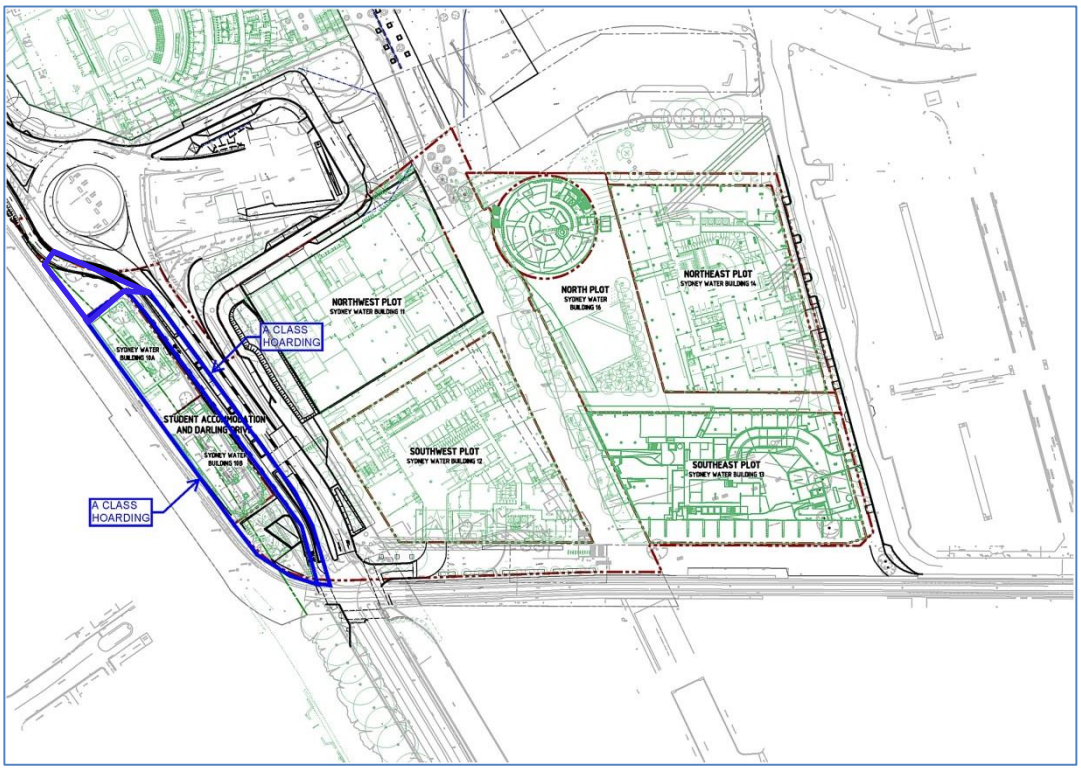


Figure 5 Construction Site Boundary (Student Accommodation Building)

9.2 CONSTRUCTION STAGING

Construction of the realignment of Darling Drive to the east and the relocation of existing services from the building footprint is underway. Once completed, construction of the student accommodation can commence.

The approved drop-off zone on the western side of Darling Drive will be utilised for construction loading minimising disruptions to northbound traffic.

The construction methodology is summarised in Buildcorp's Construction Management Plan that shall accompany the submission.

9.3 CONSTRUCTION VEHICLE ACCESS

The primary construction heavy vehicle access and egress will be via the Darling Drive network. Then onsite traffic flow will generally follow a south to north direction This will involve vehicles accessing Darling Drive from the North using Pyrmont Bridge Road, Pyrmont and vehicles accessing Darling Drive from the South using Ultimo Road and Harris Street, Ultimo.

Traffic movements and vehicles will conform to current Roads and Maritime Services (RMS) requirements. To coordinate with the onsite construction activities, some truck movements may need to be 'drive in- drive out' from either the northern or southern gates

All vehicles accessing the site will conform to the "Traffic controls at work sites" manual, and Australian Standard 1742 – Traffic control, and only certified traffic controllers shall be used to direct vehicles outside of the construction boundaries.

On site construction access routes will be established within the construction boundaries with hoists transporting personnel and materials within each building.

The truck movements anticipated will be spread evenly throughout the construction programme. Usually the bulk truck movements would be during the excavation phase, however, the adopted design involves minimal bulk excavation thereby reducing this heavy vehicle activity.

During the course of the development it is anticipated that vehicle movements for such trades as Civil, Piling, Detail Excavation, Structure, Façade, Internal Finishes and Public Domain works shall occur.

Based on the programme and volume of materials required, it is estimated that approximately 3-4 trucks per hour will access the site for the duration of the development. In such instances such as concrete pours, this volume will increase, but shall be controlled (as the preferred supply plant is within 1km of the development) to alleviate any congestion to the surrounding traffic network.

9.4 SITE SCREENING

The proximity of the site to the light rail corridor has been considered and measures have been incorporated to ensure construction works are completed outside the rail corridor. A safety screen will be installed to maintain physical separation between the light rail corridor and the construction site by the use of boundary fencing and by erecting safety screens along the western boundary of the site for the full length of the building in the northern and southern direction. It is noted that the construction methodology is based on no access being required at any time from the rail corridor.

9.5 PARKING

Onsite parking will not be allowed during construction. Measures will be implemented to encourage the use of good public transport systems already in place for construction staff and workers. This will be conveyed through all subcontract documentation and site inductions. Timetables shall be provided for all bus routes and the three closest railway stations serviced by bus routes.

9.6 PEDESTRIAN ACCESS

Pedestrian access during construction will generally be adopting the following principles:

- Hoardings will be erected to prevent public entry into constructions areas;
- Public access along existing desire lines around construction areas will be maintained where possible;
- The southern portion of the Boulevard (part of SSDA5) is scheduled to be completed by December 2016 to connect with the Northern and Central Sector portion of the Boulevard; and
- Pedestrian access along Darling Drive will be controlled and may need to be limited periodically during demolition and services relocation works to ensure public safety.

9.7 TRAFFIC MANAGEMENT MEASURES

Appropriate directional signage and traffic control will be provided to ensure vehicles enter and leave the site with minimal disturbance to other road users and so they are advised of any changes in road conditions.

Temporary road closures, single lane access and relocations during the construction period will be subject to coordination with the appropriate authorities. All traffic related issues and changes shall also be presented to Stakeholders as part of the consultation process. These will, wherever and whenever possible, be carried out in non-peak periods.

The traffic and pedestrian management plan outlined in the Construction Management Plan is generally aimed at mitigating any potential impacts that may be attributed to the construction works. Risks to the public and the construction crew would be minimised through the implementation of the construction management plans specifically prepared for the SICEEP construction works of the PPP and Darling Square. The Plan will be regularly updated to address any new outcomes identified through constant monitoring as the works progress.

9.8 CUMULATIVE TRAFFIC IMPACTS

The construction of the PPP and the western portion of the Darling Square Precinct will be expected to be nearing completion by the time of commencement of construction of the Western plot. In close proximity to the West plot will be the construction sites of the NW plot, SW plot, NE and the SE plot. Each of the four sites will be accessed at different locations as follows:

- The NW plot will be accessed from the north along the new Theatre Lane via the Darling Drive roundabout beneath Pier Street;
- The SW plot will be accessed by vehicles travelling north and south along Darling Drive turning into a loading area within the Hay Street corridor;
- The NE plot will be accessed from the east on Harbour Street; and
- The SE plot will be accessed via the Darling Drive network. This will involve vehicles accessing Darling Drive from the North using Pyrmont Bridge Road, Pyrmont and vehicles accessing Darling Drive from the South using Ultimo Road and Harris Street, Ultimo. .

In addition, construction traffic for the PPP and other construction activities associated with other nearby developments has also been considered. Construction vehicles associated with the works for the PPP will access from the north along Darling Drive while construction vehicles

for construction works of other development projects are not anticipated to coincide with construction vehicle routes in the associated area.

Construction works for other planned developments in the vicinity of the SICEEP site that are likely to coincide with the development have been considered Table 7 provides a list of known projects within and around the SICEEP site.

Table 7 Construction Projects in the vicinity of the SICEEP Site

Project Work	Start	Finish
SICEEP PPP	February 2014	August 2016
SICEEP - Darling Square	February 2014	August 2016
SICEEP - ICC Hotel	July 2014	August 2016
Wynyard Walk	December 2013	October 2015
Barangaroo	September 2010	Circa 2020-2025

A review of active construction projects near to the SICEEP development indicates that construction traffic associated with the ongoing construction projects is not likely to coincide with the proposed construction period for the West plot and that the peak traffic loads associated with these developments occur well before the West plot construction activities begin to ramp up.

It is anticipated that access routes to construction works of other developments are likely to differ from that of West plot. However, where the routes coincide the increase in heavy vehicles will be temporary only for the duration of the construction and will be managed through the preparation of a Construction Traffic Management and Access Plan. A preliminary plan has been prepared for the Darling Square Precinct. This plan will be constantly updated prior to commencement of construction works and in consultation with the relevant stakeholders and affected parties.

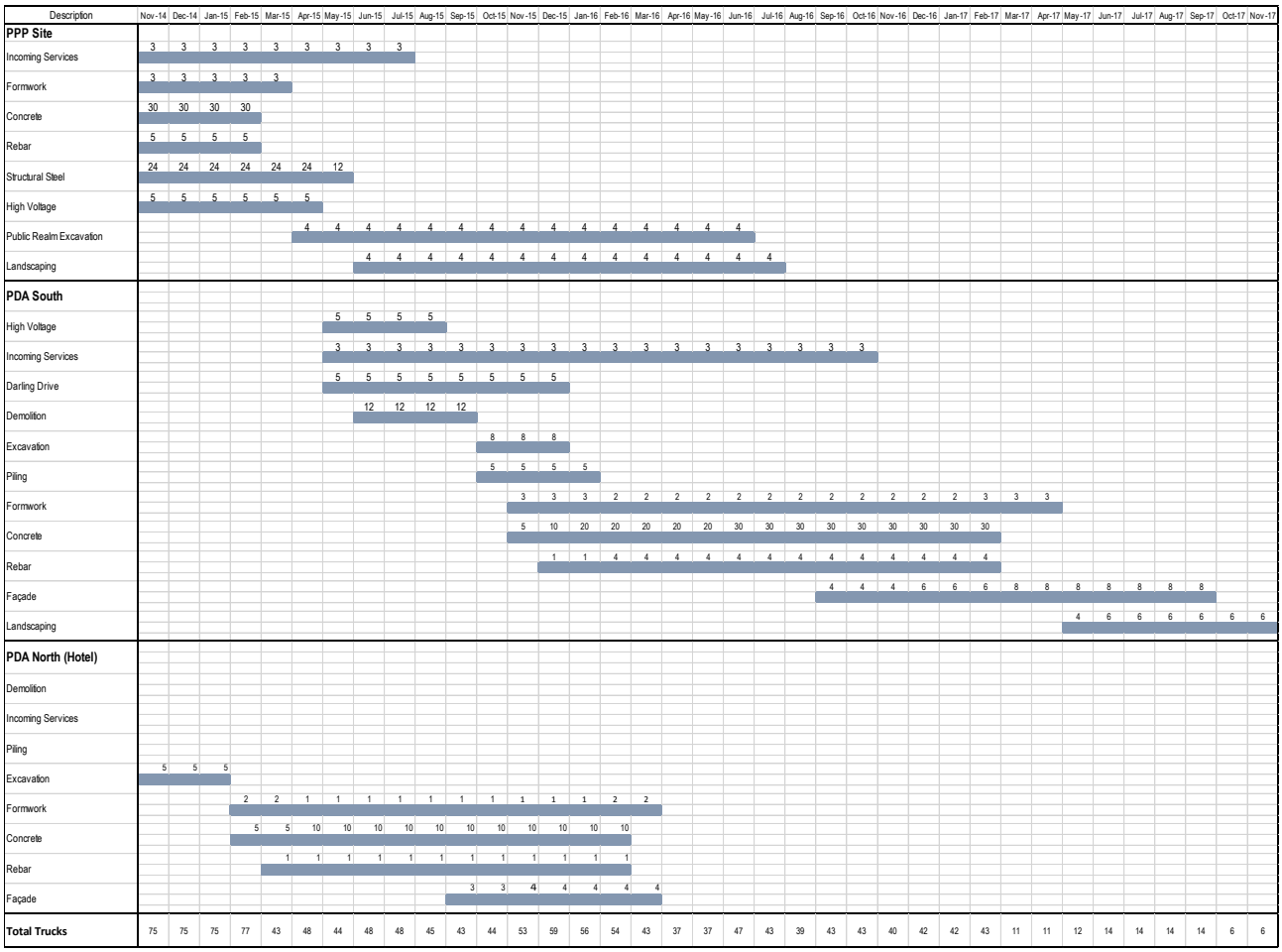
This diversity of construction access points will largely mitigate any significant construction traffic impacts on Darling Drive, Pier Street and Harbour Street.

Analysis of the frequency and type of expected construction vehicles suggests:

- The distribution will alleviate potential for congestion at any single access point;
- Potential conflict points can be monitored and managed through the preparation of detailed construction traffic management plans;
- The specific plans will be regularly updated in accordance with any changes required to proposed route and movements as identified through constant monitoring as the works progress, and,
- Any possible impact would be marginal and temporary.

Table 8 provides an indicative estimate of truck movements through each component of the PPP, PDA South, and PDA North projects through their early works and structure phases where it is expected that peak traffic loads shall occur. Based on the construction programme of the PPP, PDA North and PDA South, the estimated peak construction traffic for was expected between the months of July 2014 (97 truck movements per day) to February 2015 (107 truck movements per day). From then on, the construction traffic has drop off significantly following this period.

Table 8 Indicative Construction Duration and Associated Truck Movements by Construction Component



10 SUMMARY

10.1 CONCLUSIONS

The transport assessment of Student Accommodation in the Western plot was undertaken as a component of The Darling Square Precinct. The assessment focusses on access and the connectivity of the precinct with the external network for all modes of transport and cites the key features of the whole precinct that will contribute to this.

Key features include:

Public Transport

- The location of the Student Accommodation in the Western plot site is accessible by public transport via the pedestrian linkages between the public transport nodes and the development.
- The design provides enhanced access to the public transport services through the creation of more direct travel paths through pedestrian boulevards and walkways.

Parking Provision

- No car parking is proposed to support the student accommodation building on the premise. The development site has the locational advantage of being in close proximity to existing public transport and active transport services and facilities.
- The public carpark located in the North West plot (refer SSDA4) is expected to service the developments within the SICEEP precinct, including visitors to the Western plot.

Road Network/Intersection Operational Performance

- The overall operational performances of the key intersections have been demonstrated to be satisfactory.
- The results of the intersection modelling indicate that the one way road system proposed for the Theatre carpark and NW Darling Square development lot carpark egress (which sits within the adjacent PPP scope of works) would significantly improve operational performance of the adjacent intersection of Darling Drive/Pier Street.
- The results of modelling indicate that the impact of the Student Accommodation in the Western plot as part of Darling Square development does not impose conditions on the intersections worse than what would have otherwise occurred through existing traffic.
- The reconfiguration and realignment of Darling Drive will still have the capacity to accommodate existing traffic plus additional traffic to be generated by the developments, including the PPP and Darling Square. Traffic modelling suggests the realignment will not result in detrimental impacts to the overall road network.

Pedestrian

- The development will provide improved pedestrian linkages notably the main boulevard within the Public Realm linking The Goods Line to the south and Harbourside to the north. The main boulevard will be up to 20m wide and will have sufficient capacity to cater to peak pedestrian demand anticipated during events at the PPP. It also provides the main linkage between Darling Square, Darling Central and Bayside.
- The provision of pedestrian linkages via the pedestrian/cycle shared zone on the western side of Darling Drive and the new signalised pedestrian crossing on Darling Drive in

addition to the crossings at the intersections will cater to the pedestrian desire lines from the Student Accommodation site.

Cycleway

- Cycle connections are enhanced via the shared cycleway on the west side of Darling Drive south of the roundabout, the segregated dual cycle lane north of the roundabout, new east-west linkages and completion of the new boulevard running north-south through the precinct.

DGR's

- The requirements of the DGR's have been adequately assessed in the overall Transport and Traffic Impact Assessments (including TMAP and road safety assessment) for the SICEEP development submitted with SSDA1, SSDA2 (See Appendix A) & SSDA3.

SEARs

- The requirements of the SEARs have been addressed in this submission for the SSDA12.

10.2 RECOMMENDATIONS

Public Transport

- The access improvements being proposed as part of the development design will likely result in an improvement in public transport patronage. It is recommended that appropriate wayfinding and signage be installed along key access corridors to facilitate access.

Pedestrian

- Interfacing with the improved external pedestrian network will enhance accessibility of Darling Square precinct and further strengthen linkages with public transport.

Construction Traffic

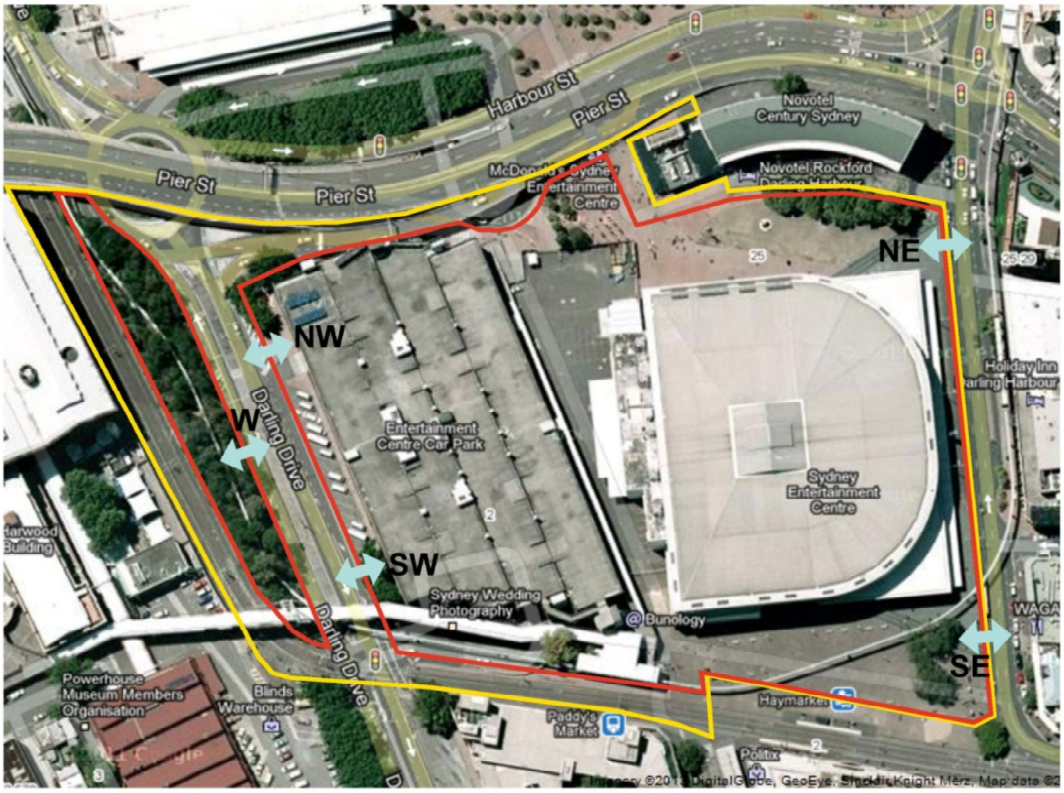
- Appropriate directional signage and traffic control to ensure vehicles enter and leave the SSDA12 Site with minimal disturbance;
- Temporary road closures, single lane access and relocations during the construction period will be subject to coordination with the appropriate authorities;
- Carry out the above in non-peak periods where appropriate; and
- All traffic related issues and changes should be presented to stakeholders as part of the consultation process.

APPENDIX A

SSDA2 TRANSPORT AND TRAFFIC IMPACT ASSESSMENT REPORT

SYDNEY INTERNATIONAL CONVENTION, EXHIBITION AND ENTERTAINMENT PRECINCT (SICEEP) – THE HAYMARKET PRECINCT

TRANSPORT AND TRAFFIC IMPACT ASSESSMENT (INCLUDING TMAP AND ROAD SAFETY ASSESSMENT)



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DARLING HARBOUR LIVE

Sydney International Convention, Exhibition and Entertainment Precinct (SICEEP)

Transport and Traffic Impact Assessment (including TMAP and Road Safety Assessment) - The Haymarket

Author	Sally Manahan	
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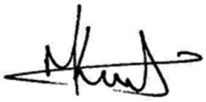
Approver	Michael Kurtz	

Report No

Date

This report has been prepared for Lend Lease Pty Ltd in accordance with the terms and conditions of appointment for Darling Harbour Live dated March 2013. Hyder Consulting Pty Ltd (ABN 76 104 485 289) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

CONTENTS

1 INTRODUCTION

This report supports a State Significant Development Application (SSD 5752-2012) submitted to the Minister for Planning and Infrastructure pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The Application seeks approval for the establishment of building envelopes and design parameters for a new neighbourhood and a community hub (referred to as The Haymarket) as part of the Sydney International Convention, Exhibition and Entertainment Precinct SICEEP Project at Darling Harbour.

The project will develop The Haymarket into one of Sydney's most innovative residential and working districts. Through the delivery of the overall Project, Darling Harbour will also become home to Australia's largest convention and exhibition facilities, Sydney's largest red carpet entertainment venue, and a hotel complex of up to 900 rooms.

The SICEEP Project importantly forms a critical element of the NSW Government's aspiration to "make NSW number one again".

2 OVERVIEW OF PROPOSED DEVELOPMENT

The proposal relates to a staged development application and seeks to establish concept plan details for The Haymarket, located within the southern part of the SICEEP Site.

The Haymarket will include student housing, public car parking, a commercial office building, and four mixed use development blocks (retail/commercial/residential podium with residential towers above) centred around a new public square to be named Haymarket Square.

More specifically concept approval is sought for the following:

- Demolition of existing site improvements, including the existing Sydney entertainment Centre (SEC), Entertainment car park, and part of the pedestrian footbridge connected to the Entertainment car park and associated tree removal;
- North-west block – construction of a part public car park and part commercial/office building;
- North-east block – construction of a mixed use podium (comprising retail, commercial, above ground parking, and residential);
- South-east block - construction of a mixed use podium (comprising retail, commercial, above ground parking, and residential);
- South-west block - construction of a mixed use podium (comprising retail, commercial, above ground parking, and residential);
- North block – construction of a low rise mixed use building comprising retail, commercial and residential;
- Student housing – construction of two buildings providing for student accommodation;
- Public domain improvements including a new square, water features, new pedestrian streets and laneways, streetscape embellishments, and associated landscaping. (It is intended that a Stage 2 DA seeking approval for parts of the part of the public domain (The Boulevard and Haymarket Square) will be lodged with the first residential stage);
- Darling Drive realignment
- Remediation strategy; and

- Car parking rates.

2.1 BACKGROUND

The existing convention, exhibition and entertainment centre facilities at Darling Harbour were constructed in the 1980s and have provided an excellent service for Sydney and NSW.

The facilities however have limitations in their ability to service the contemporary exhibition and convention industry which has led to a loss in events being held in Sydney.

The NSW Government considers that a precinct-wide renewal and expansion is necessary and is accordingly committed to Sydney reclaiming its position on centre stage for hosting world-class events with the creation of the Sydney International Convention, Exhibition and Entertainment precinct.

Following an extensive and rigorous Expressions of Interest and Request for Proposals process, Darling Harbour Live (formerly known as 'Destination Sydney'- a consortium comprising AEG Ogden, Lend Lease, Capella Capital and Spotless) was announced by the NSW Government in December 2012 as the preferred proponent to transform Darling Harbour and create the new Sydney international convention, exhibition and entertainment precinct.

Key features of the Darling Harbour Live Preferred Master Plan include:

- Delivering world-class convention, exhibition and entertainment facilities, including:
  - Up to 40,000m^2 exhibition space;
  - Over 8,000m^2 of meeting rooms space, across 40 rooms;
  - Overall convention space capacity for more than 12,000 people;
  - A ballroom capable of accommodating 2,000 people; and
  - A premium, red-carpet entertainment facility with a capacity of 8,000 persons.
- Providing up to 900 hotel rooms in a hotel complex at the northern end of the precinct.
- A vibrant and authentic new neighbourhood at the southern end of the precinct, called 'The Haymarket', home to an IQ Hub focused on the creative industries and high-tech businesses, apartments, student accommodation, shops, cafes and restaurants.
- Renewed and upgraded public domain, including an outdoor event space for up to 25,000 people at an expanded Tumbalong Park.
- Improved pedestrian connections linking to the proposed Ultimo Pedestrian Network drawing people between Central, Chinatown and Cockle Bay Wharf as well as east-west between Ultimo/Pyrmont and the City.

2.2 SITE DESCRIPTION

The SICEEP Site is located within Darling Harbour. Darling Harbour is a 60 hectare waterfront precinct on the south-western edge of the Sydney Central Business District that provides a mix of functions including recreational, tourist, entertainment and business.

With an area of approximately 20 hectares, the SICEEP Site is generally bound by the Light Rail Line to the west, Harbourside shopping centre and Cockle Bay to the north, Darling Quarter, the Chinese Garden and Harbour Street to the east, and Hay Street to the south.

The SICEEP Site has been divided into three distinct redevelopment areas (from north to south) – Bayside, Darling Central and The Haymarket. The Application Site area relates to The Haymarket as shown in Figure 1.

Figure 1 SICEEP Site

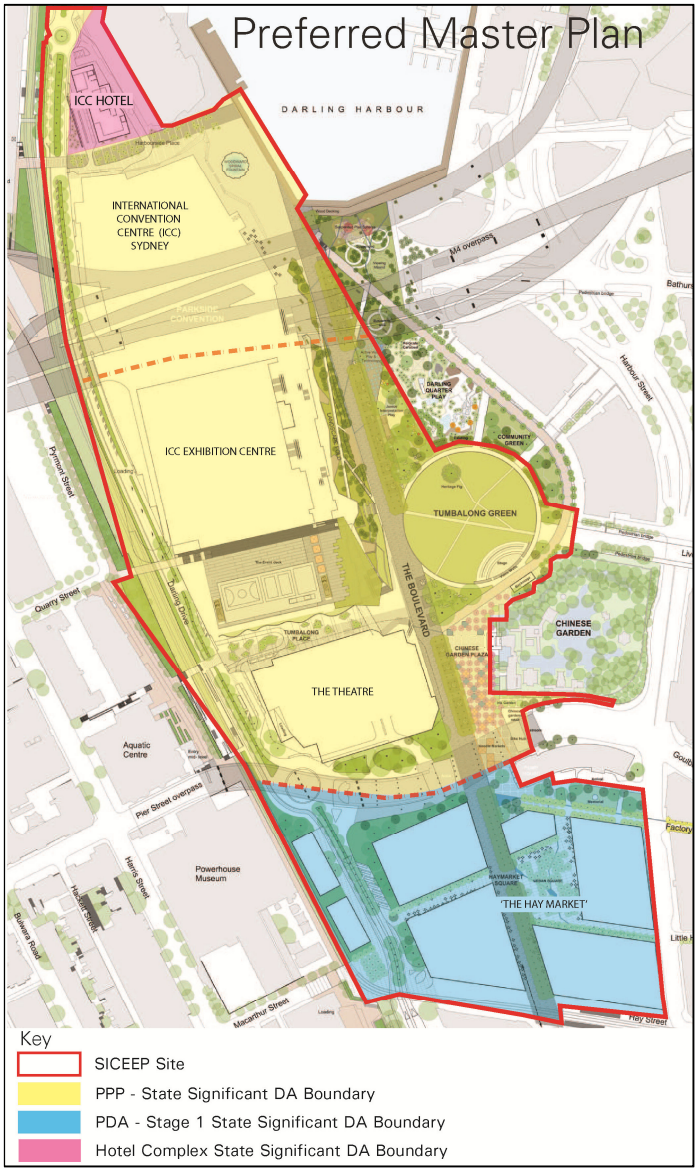
2.3 PLANNING APPROVALS STRATEGY

In response to separate contractual agreements with the NSW Government and staging requirements Lend Lease (Haymarket) Pty Ltd is proposing to submit a number of separate development applications for key elements of the overall Project.

This staged development application involves the establishment of building envelopes and design parameters for a new neighbourhood and a community hub (The Haymarket) within the southern part of the SICEEP Site. Detailed development applications will accordingly follow seeking approval for specific aspects of The Haymarket in accordance with the approved staged development application.

Separate development applications will be lodged for the PPP component of the SICEEP Project (comprising the convention centre, exhibition centre, entertainment facility and associated public domain upgrades) and Hotel complex.

Figure 2 Preferred Master Plan



2.4 SCOPE OF STUDY

An overall Transport and Traffic Impact Assessment (including TMAP and Road Safety Assessment) Study was undertaken for the Preferred Master Plan in order to assess the cumulative impacts of the proposal as a whole. A Transport and Traffic Assessment Report (Main Report) was prepared to support the development approval of the project and is attached as Appendix A. This report is being submitted to support the development approval of The Haymarket and has been prepared in conjunction with the Main Report.

This report is a compilation of the key sections from the Main Report that are relevant to The Haymarket. The Environmental Assessment Requirements issued by the Director General for development approval for the Preferred Master Plan and Specific Requirements for the individual SSDAs for the SICEEP (SSD 5752-2012) were issued on 21 January 2013. The main report addresses the general requirements for the overall project relating to Transport and Accessibility, as outlined in Section 8 of the DGRs.

Section 8 and 16.2 of the DGRs require the following:

- Address the impact of traffic and pedestrian volumes on surrounding road network including intersections using appropriate traffic modelling analysis based on the worst cumulative traffic impacts including a sensitivity analysis;
- Provide details of any upgrading or road improvement works required to accommodate the proposed development;
- Address any impacts on the Light Rail corridor and Western Distributor viaducts;
- Justify the level of car parking provided on the site;
- Provide details of measures to encourage sustainable transport measures, including end of trip cyclist facilities, pedestrian and cycle connections and travel plans;
- Address the impacts from construction traffic to the surrounding area and include the cumulative impact of construction activities from other sites in the locality;
- Provide details of the parking provision and arrangements during the demolition/construction period;
- Provide details of the pedestrian and cyclist connections to the surrounding area including west to Ultimo and east to the Central Business District;
- Address road safety at key intersections and locations subject to heavy vehicle movements and high pedestrian activity; and,
- Address traffic management during construction including cumulative impact from surrounding development sites and details of vehicle routes, numbers of trucks, hours of operation, access arrangements, traffic control measures, crane locations and swing path of cranes.

In addition to the General Requirements, a list of Specific Requirements for each of the individual SSDAs were provided. Issues to be considered for SSDA 2 – The Haymarket precinct (Concept) did not identify any issue under Transport and Accessibility.

2.5 STUDY OBJECTIVES

This study has been prepared in accordance with NSW Department of Transport's *Draft Interim Guidelines on TMAPs* and the RMS *Guide to Traffic Generating Developments*. The objectives of this study are to:

- Meet the DGRs
- Manage the transport impacts of the SICEEP development (The Haymarket)
- Help reduce reliance on private car use
- Promote and maximise the use of sustainable modes of transport, i.e. public transport, walking and cycling.

2.6 PREVIOUS STUDIES

This assessment was undertaken on the basis of data and information collected at the time of preparation of the report and supplemented by traffic data and information contained in the following reports:

- Traffic and Transport Conditions Report, Darling Harbour South Master Plan, Sydney Harbour Foreshore Authority, (Halcrow), November 2010.
- Urban Design Report – Darling Harbour South Master Plan, Johnson Pilton Walker, Sydney Harbour Foreshore Authority, December 2010.
- Ultimo Pedestrian Network (UPN) Stage 2 Central Station to Darling Harbour Pedestrian Link, SHFA (Aspects Studios with Choi Ropiha Fighera).

In addition, INSW provided two reports that covered the preliminary traffic analysis of baseline conditions of the SICEEP including the baseline traffic model developed in AIMSUN:

- Existing Traffic and Transport Conditions Report, Sydney International Convention, Exhibition and Entertainment Precinct, Infrastructure New South Wales (Mott MacDonald), May 2012.
- Traffic Management and Accessibility Plan, Sydney International Convention, Exhibition and Entertainment Precinct, Infrastructure New South Wales (Mott Macdonald), August 2012

The above reports formed the basis for the network model and is attached in Appendix A

2.7 REPORT STRUCTURE

This report is structured to provide a full assessment of the transport accessibility issues relating to the Preferred Master Plan. This report is laid out in the following order:

- Section 1 provides an introduction to the study;
- Section 2 provides an overview of the project, background information and the study objectives;
- Section 3 details the strategic context within which the assessment has taken place. This section provides a summary of strategies and priorities noted from relevant state, regional, local and other documents;
- Section 4 establishes the existing transport context in the surrounding area. The chapter also provides an overview of public transport, walk and cycle provisions;
- Section 5 presents the modelling approach and methodology to assess the road network impacts of the proposed development;
- Section 6 provides a more detailed overview of the Haymarket concept plan in terms of the development component, access arrangement etc.;
- Section 7 documents the impact assessment;

- Section 8 provides a summary of crash statistics collected by the RMS and discusses road safety issues associated with Darling Drive and Harbour Street corridors;
- Section 9 outlines the construction impacts and the draft construction traffic management plan; and,
- Section 10 provides the conclusions and recommendations of this study.

3 STRATEGIC CONTEXT

3.1 INTRODUCTION

NSW Government strategies and policies have been continuously articulated in policy documents. Key themes in these policies have been the need to reduce car dependency, increase the attractiveness and usage of sustainable transport modes, reduce the growth in vehicle kilometres travelled and provide an urban form which supports public transport provision.

The documents reviewed contain the strategic context relevant to the local planning and development of the SICEEP site. Details of each document have been provided in the Main Report and are noted below in the context of development directions relevant to the Southern Haymarket Precinct.

3.2 STATE AND REGIONAL STRATEGIC POLICIES

The following documents were reviewed:

- NSW 2021
- Metropolitan Plan for Sydney 2036
- NSW Long Term Master Plan
- The Sydney City Draft Sub-Regional Strategy
- Planning Guidelines for Walking and Cycling
- NSW Bike Plan 2010
- Integrating Land use and transport Policy Package

The strategic policies embodied in these documents provide the framework for the overall development objectives for the SICEEP noting key priorities in land use and transport to support economic growth and guide strategic directions of planning outcomes necessary to ensure sustainable environments.

3.3 LOCAL PLANNING CONTEXT

- Sustainable Sydney 2030
- Cycle Strategy and Action Plan
- Infrastructure NSW SICEEP Urban Design and Public Realm Guidelines
- City of Sydney Chinatown Public Domain Plan
- Ultimo Pedestrian Network

The local planning documents outline the planning principles to guide the development of the City of Sydney. The documents define specific goals and objectives that should be met while planning of infrastructure for transport and accessibility.

4 EXISTING TRANSPORT CONDITIONS

4.1 ROAD NETWORK PERFORMANCE

An assessment of existing network capacity has been undertaken to identify key issues with regard to network deficiencies at key roads and intersections.

4.1.1 TRAFFIC SURVEY DATA

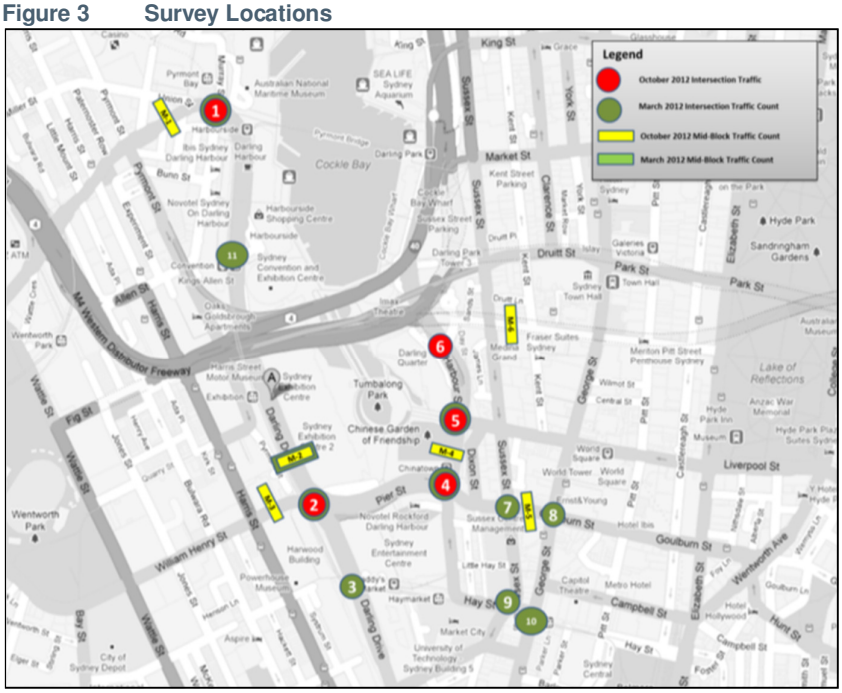
INSW provided intersection turning movement counts for eight intersections and midblock automatic tube counts for 7 locations within the study area. The intersection classified turning movement counts were undertaken for three hours in the AM peak (7-10am) and three hours in the PM peak (4-7pm) on a Thursday (25 October 2012) and on a Saturday (27 October 2012). The midblock automatic tube counts were collected for three days from Thursday to Saturday (25-27 October 2012).

Traffic surveys were also undertaken as part of the Transport Study commissioned by INSW to Mott MacDonald. The traffic survey data was also provided to Hyder for reference in this study. The surveys covered turning movement counts at 14 intersections and were undertaken for two hours (4:30-6:30 p.m.) on a Friday (23 March 2012). The midblock automatic tube counts were collected at two locations for a period of seven (7) days (16-23 March 2012).

Combining both data sets, a total of nineteen (19) intersections had survey data, eight (8) of which had both weekday and weekend data while eleven (11) sites had only weekday data. Both data sets were utilised to inform the analysis for model development, calibration and validation.

Figure 3 shows locations of the selected surveyed intersections and midblock locations included in the modelling.

Figure 3 Survey Locations



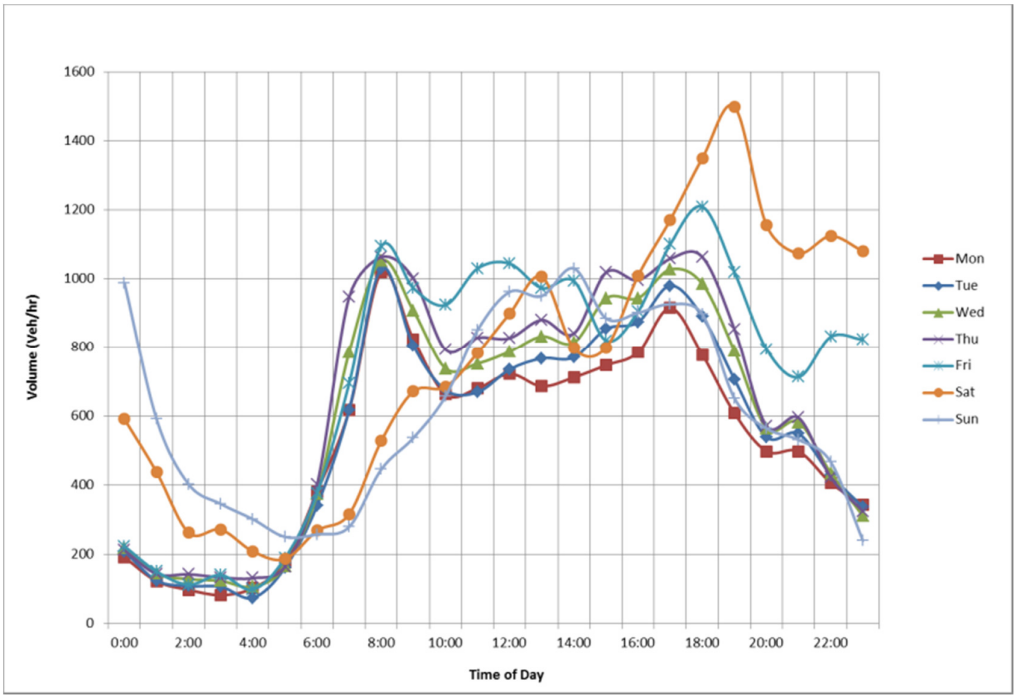
4.1.2 TRAFFIC VOLUME TRENDS

In the study document prepared by Mott MacDonald for INSW it was reported that Friday evening (5.30pm to 6.30pm) manifests the highest peak for traffic volume at the study area compared to other weekday traffic volume (based on midblock 24hours data collection). The profile shown in Figure 4 below represents traffic volume trends observed on Darling Drive.

Insights from the data include:

- Monday to Thursday follow similar trends and volume profiles throughout the day;
- Morning peak hour is generally between 8am to 9am and evening peak hour is generally between 5pm to 6pm on a weekday;
- Friday shows a different trend with the traffic increasing till 9am and remaining relatively constant until 6pm after then traffic volume decreases but then starts again to increase at 9 pm and reaches a daily high at midnight; and
- Saturday evening peak is 38% higher than the average weekly peak. Different traffic pattern indicates the use of the network by regular commuter traffic for most of the week and the shift to “entertainment-related” traffic for both Friday and Saturday evenings.

Figure 4 Seven days Traffic Volume Counts (March 2012), Darling Drive



Mid-block counts conducted in November 2012 showed similar trends on Pyrmont Road and Darling Drive with Saturday count manifesting the highest PM peak period. Traffic volumes observed on Pier Street, Harbour Street, Goulburn Street and Bathurst Street showed weekday (Thursday and Friday) traffic to be generally higher than weekend (Saturday) traffic.

4.1.3 OBSERVED PEAK PERIODS AT INTERSECTIONS

Table 4-1 summarises the highest peak hour observed at key intersections in the vicinity of The Haymarket Precinct. The hour between 17:00 PM and 18:00 PM shows predominant weekday peak. The weekend PM peak spreads between 18:00 PM and 19:00 PM.

Table 4-1 Observed AM and PM Peak Periods at selected key Intersections

Intersection	Control Type	Weekday PM Peak	Weekend PM Peak
Darling Drive/Pier Street	Roundabout	17:30-18:30	17:45-18:45
Darling Drive/Hay Street	Signal	17:00-18:00	
Harbour Street/Liverpool	Signal	17:00-18:00	18:00-19:00
Harbour Street/Goulburn	Signal	17:30-18:30	18:00-19:00

4.2 PUBLIC TRANSPORT SERVICES

The site is accessible via public transport services generally located on the eastern side of the Darling Harbour precinct and consisting of buses, light rail, ferry services and heavy rail.