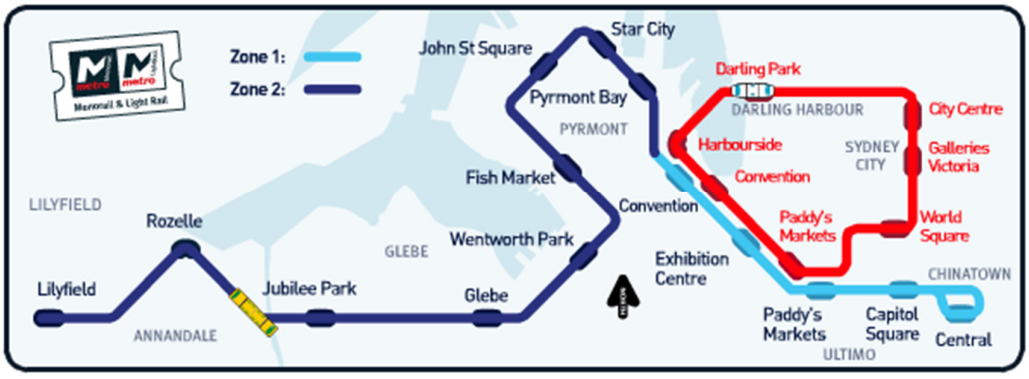
4.2.1 CITYRAIL SUBURBAN RAIL SERVICES

The Haymarket Precinct site is accessible via the suburban rail stations in the CBD with walking distances from approximately 700-800 metres from the train station at Town Hall and Central Station, respectively. Town Hall Station is approximately 10-12 minutes walking distance to The Haymarket Precinct. via Bathurst Street and Harbour Street. Central Station is a also 10-12 minutes' walk via Ultimo Road/George Street. Both rail stations provide connections to the suburban rail network with Central Station also servicing interurban and inter regional rail services and coaches. Most train services do not operate between midnight and 4 AM but an alternative NightRide bus service is available between these hours on most Sydney suburban lines.

4.2.2 LIGHT RAIL

The Metro Light Rail provides a direct connection from Central Station/CBD on the eastern side with the inner West suburbs through Darling Harbour South. The Metro Light Rail transport system traverses east west from Central Station along Hay Street via Capitol Square, Paddy's Market, then travels north parallel to Darling Drive with stops at ICC Exhibition Centre, Convention Centre, up to Pyrmont Bay, then Star Casino then onwards to Lilyfield. The light rail operates from 6am to 11pm daily between Central Station and Lilyfield with a service frequency of 10-15 minutes and 24 hours daily between Central Station and Star Casino with night service at 30 minute intervals. Extended hours are also observed on the Central Station to Lilyfield route during Fridays and Saturdays.

Figure 5 Sydney Light Rail Service Coverage



Source: www.metrotransport.com.au

4.2.3 EXISTING BUS SERVICES

Bus services in the Sydney CBD are provided by Sydney Buses. There are no bus routes or bus stops in the immediate vicinity adjoining the ICC Exhibition Centre or along Darling Drive. The closest bus stop is located at the Maritime Museum some 5 minutes walking distance from the Site and is being serviced by bus route 443 and bus route 448.

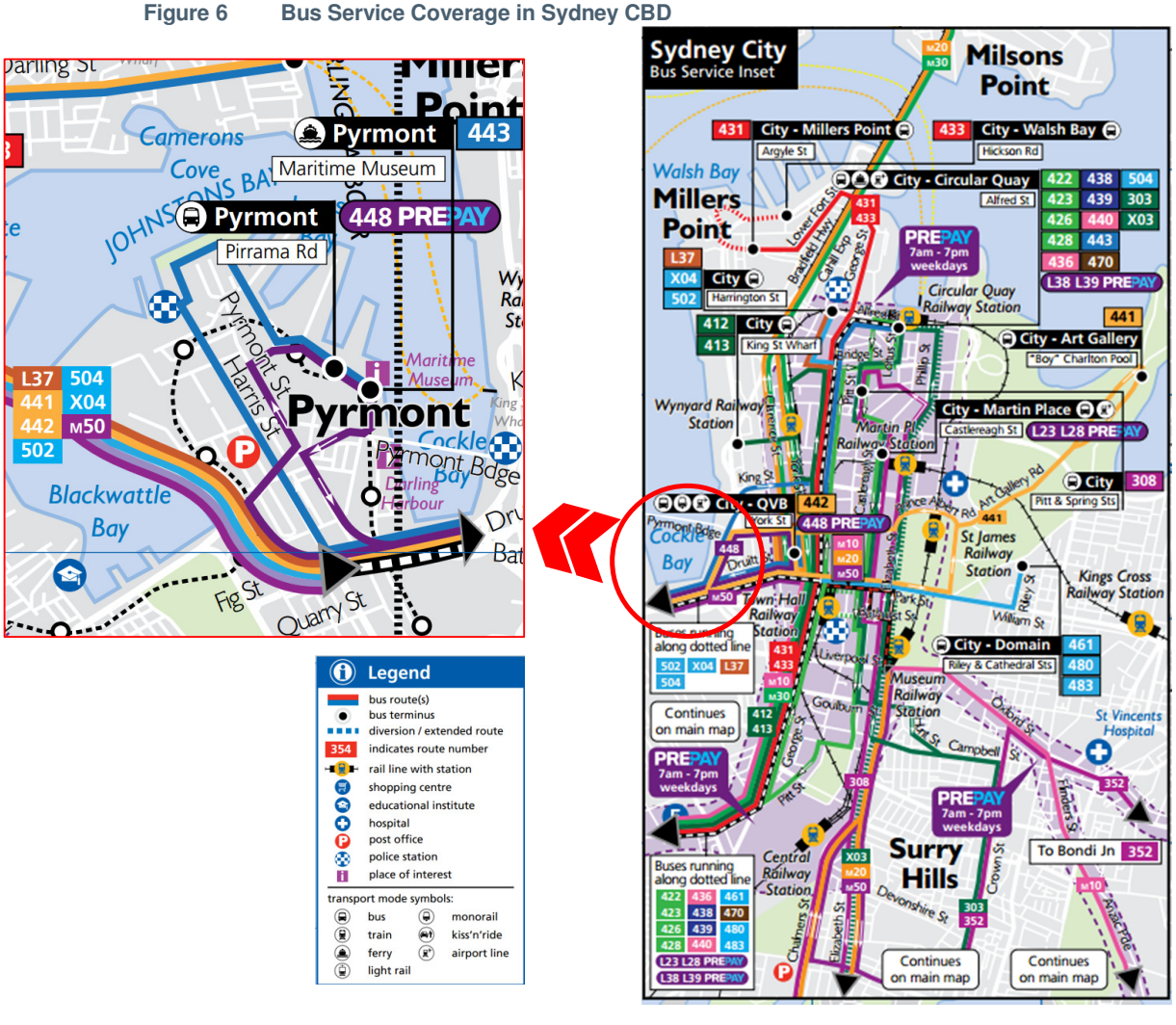
In proximity to the site, a large number of routes operating in the CBD have stops along George Street, with the majority stopping at Town Hall/QVB approximately some 10 minutes walking distance from the SICEEP.

A total of eight (8) bus routes travelling along George Street can service the transport demand for the SICEEP. These routes including bus routes 443 and 448 will be assessed in terms of its level of service based on its current operating characteristics.

The routes consist of daily full time service, Monday to Friday peak hour service, pre-pay service only and a combination of pre-pay and pay-on-board service.

The routes are shown in Figure 6. In addition to the above routes, Sydney Buses operates Route 555 which is a free shuttle bus service in the CBD. The Sydney CBD shuttle bus runs every 10 minutes in both directions on a loop from Central Station to Circular Quay via Elizabeth and George Streets. On weekdays, the shuttle bus operates from 9:30am to 3:30pm with a late finish of 9pm on Thursday evenings and on weekends from 9:30am to 6:00pm. Commuters can board these high frequency buses from any bus stop marked with the green shuttle logo. Each bus is an accessible bus that can be used by people in wheelchairs or with other accessibility requirements, and parents or carers with prams.

Figure 6 Bus Service Coverage in Sydney CBD



Source: www.151300.com.au

4.2.4 FERRY SERVICES

Sydney Ferries operates ferry services between Circular Quay and Darling Harbour via Milson Point, McMahons Point, Balmain East and stops at Sydney Aquarium and Pyrmont Bay. Both stops are some 5-10 minutes walking distance to the Convention Centre.

In addition, water taxis operate in Sydney Harbour and provides pickup or drop off at any accessible wharf or waterfront location.

4.3 PEDESTRIAN AND CYCLE FACILITIES

4.3.1 PEDESTRIAN NETWORK

Pedestrian access to and from the SICEEP and adjacent areas of the CBD is provided by a network of footpaths alongside major roads. Pedestrian connectivity across Darling Harbour and adjacent areas in the CBD consists of multiple road crossings or overhead walkways including steps, ramps or lifts.

Current initiatives being implemented by the Sydney Harbour Foreshore Authority and the City of Sydney are aimed at improving pedestrian and cyclist access from the CBD into Darling Harbour. Works are underway to improve the overall landscape, amenity and character of the adjoining area to complement the development of the SICEEP.

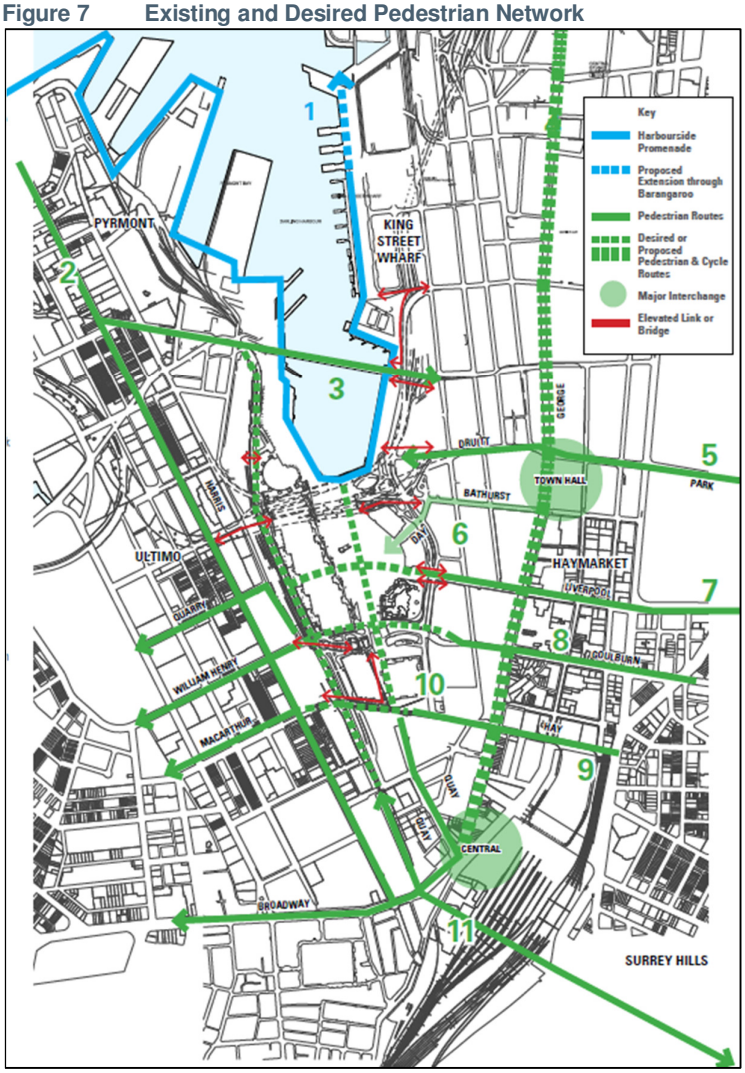
The major pedestrian links to the Precinct include connection to Town Hall and Central Station. The principal routes to and from Town Hall are Druitt Street and Bathurst Street. From Central Station, a direct route exists along Quay Street but is under-utilised as linkages close to Central Station are poor. At the intersection of Quay Street and Hay Street, the route is further obstructed by the loading area between the Sydney Entertainment Centre and the Entertainment Carpark.

In the Urban Design Report prepared for the Darling Harbour South Master Plan, a detailed Precinct survey was undertaken to assess pedestrian connectivity across Darling Harbour South and adjacent areas in the CBD.

The Urban Design Report has listed proposals to improve pedestrian routes to enhance pedestrian connectivity (as shown in Figure 7).

- New pedestrian link between Liverpool Street to Quarry Street (east-west connection);
- Improve link along Goulburn Street to William Henry Street;
- Improve link along Hay Street to MacArthur Street currently provided by stairs at the Entertainment Carpark rising to an elevated footbridge; and
- Improve link on Quay Street to Central Station.

Figure 7 Existing and Desired Pedestrian Network



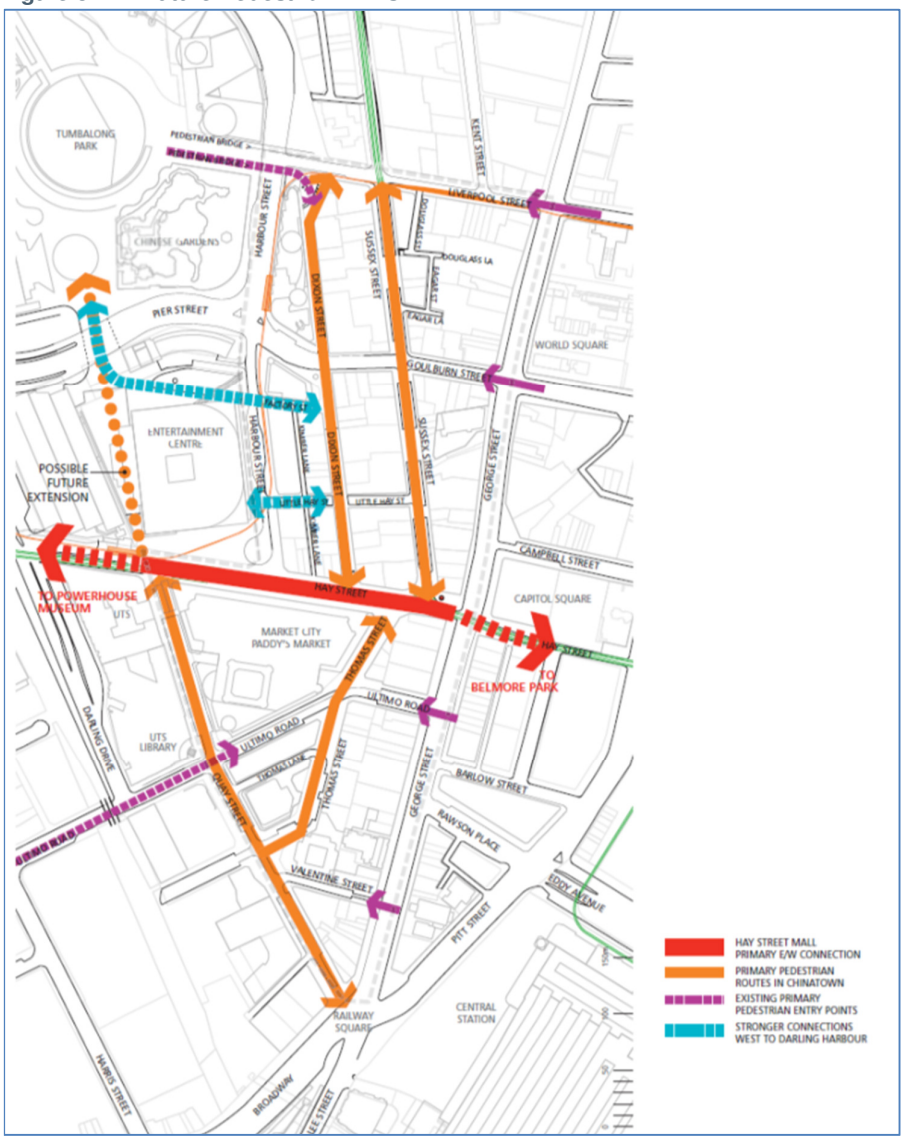
Source: Urban Design Report – Darling Harbour South Master Plan, JPW , Dec 2010

Current proposals under the Ultimo Pedestrian Network (UPN) and Chinatown Public Domain Plan are anticipated to improve access to Darling Harbour from along Goulburn Street side and along Hay Street.

Moreover, the Chinatown Public Domain Plan includes a network of future pedestrian links shown in that will likewise improve pedestrian connectivity to Darling Harbour as the UPN project.

Figure 8 shows the nominated future pedestrian links under the Chinatown Public Domain Plan.

Figure 8 Future Pedestrian Links



Source: Chinatown Public Domain Plan, CoS

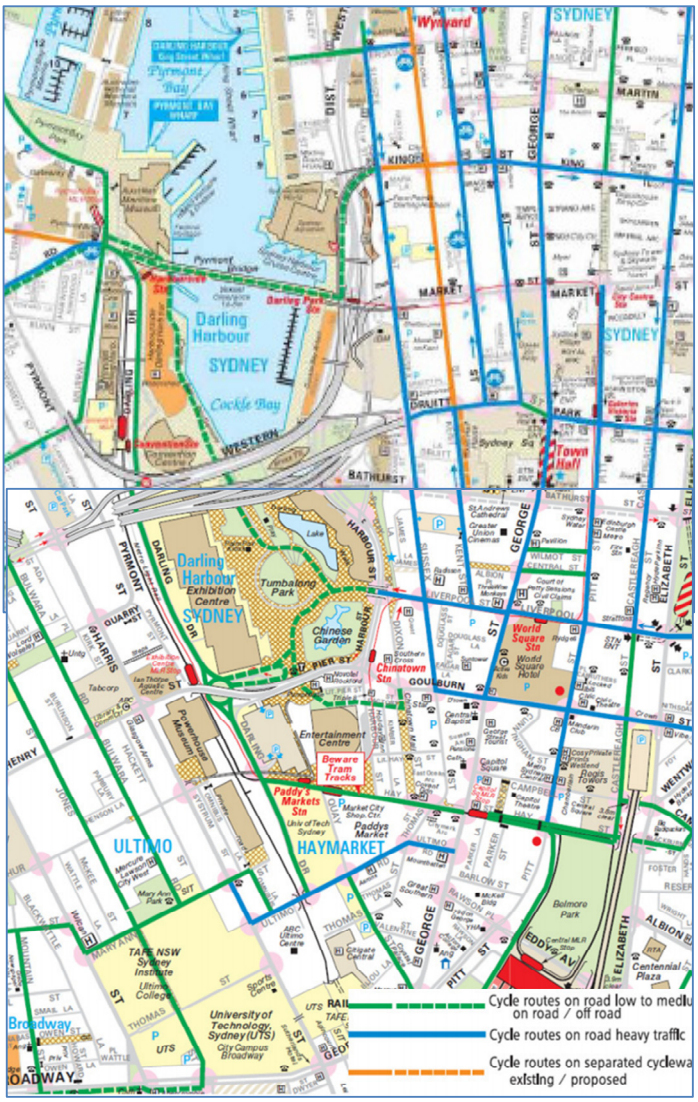
4.3.2 CYCLE FACILITIES

The current Sydney CBD bicycle network is deemed by many to be limited in terms of connectivity and available infrastructure. Majority of the routes are shared routes on roads containing medium to high levels of vehicle traffic.

The Sydney CBD Cycleway network consists of on-street marked cycle lanes, and separated at-grade cycleways. SICEEP is currently connected to the CBD network via the on-street marked cycle lanes along Darling Drive and the off-road cycle path within Darling Harbour.

Figure 9 shows the Cycle Network in the vicinity of SICEEP. Opportunities for east-west linkages are limited. It is suggested that improvements along the east west direction be included as part of the development package.

Figure 9 Existing Cycle Network



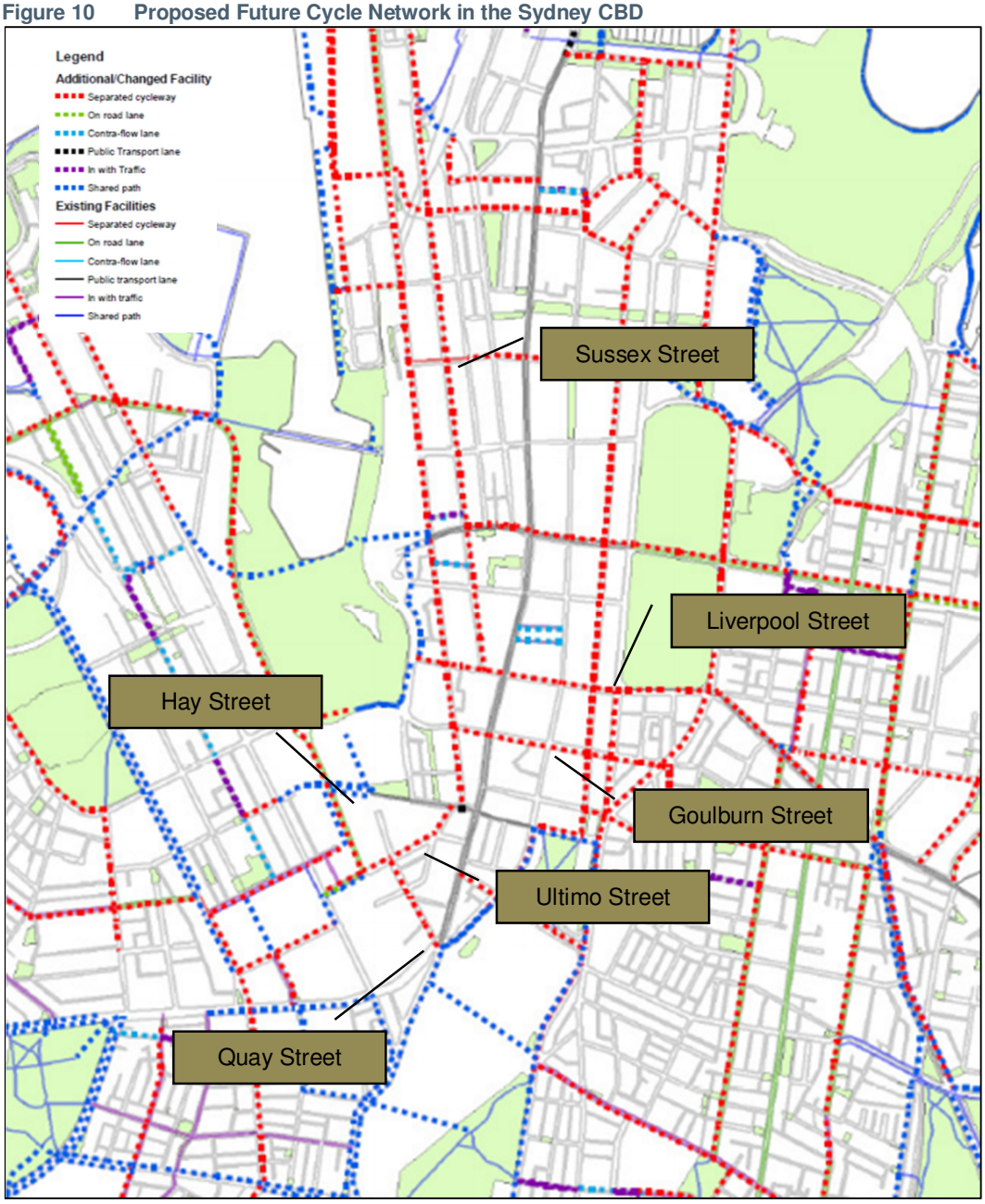
Source: www.cityofsydney.gov.au

As part of the City of Sydney's Cycle Strategy and Action Plan 2007-2017, dedicated bicycle paths will be constructed at key thoroughfares within the CBD over the next 2-3 years.

Figure 10 shows the proposed future cycle network in the Sydney CBD. The key cycle facilities proposed within the vicinity of SICEEP include:

- A separated cycle path along Ultimo Road linking Harris Street to Hay Street;
- A separated cycle path along Hay Street;
- Separated cycle paths along Sussex Street, Goulburn Street and Liverpool Street

Figure 10 Proposed Future Cycle Network in the Sydney CBD



Source: www.cityofsydney.gov.au

4.4 PARKING

4.4.1 EXISTING PARKING SUPPLY

There are a number of public carparks located adjacent to and within walking distance to the SICEEP that can accommodate a total of approximately 10,000 bays. A selected number of the carparks are in close proximity to The Haymarket Precinct.

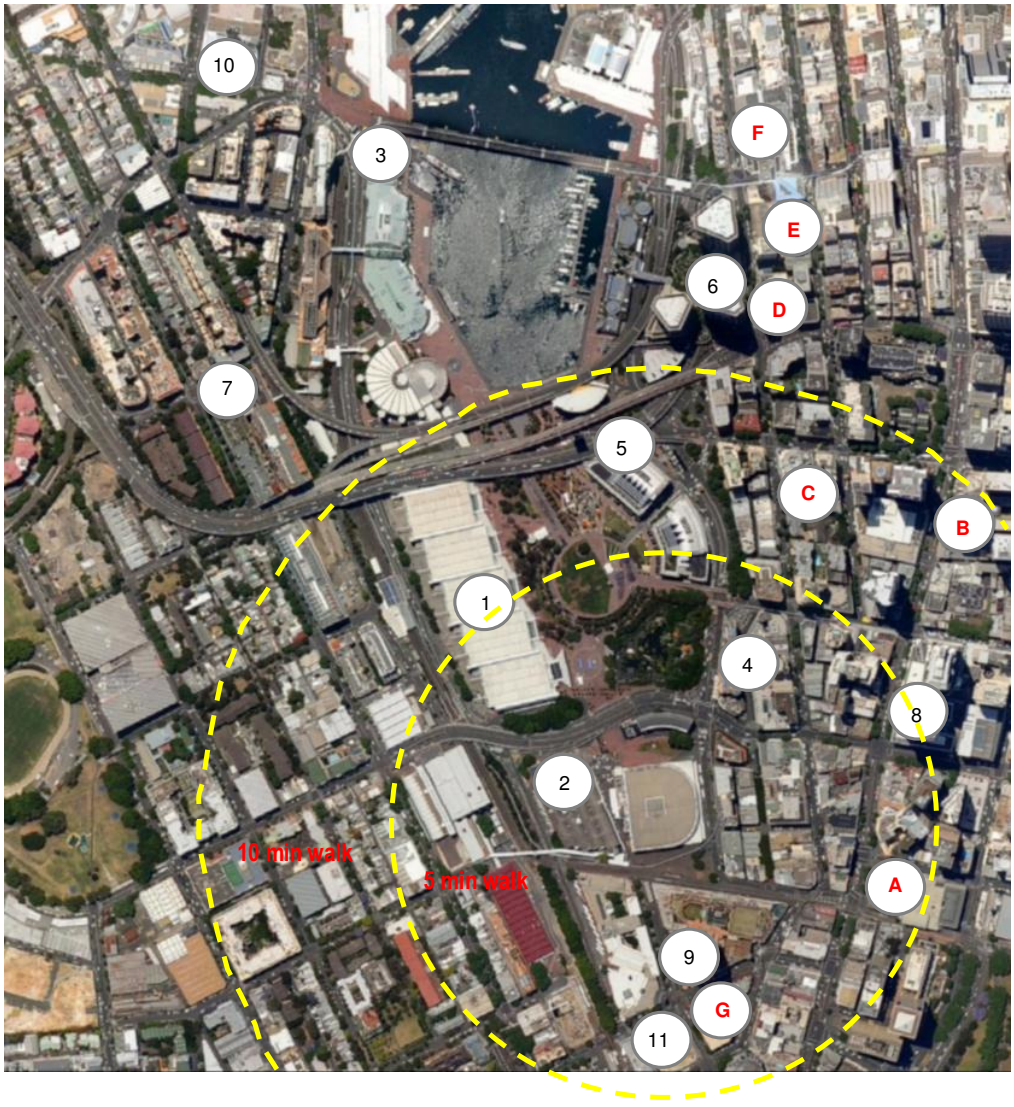
Figure 11 presents the locations of car parks with Table 4-2 indicating their respective capacities.

Table 4-2 Car Parking Capacity

Map ID	Car Park[1]	Bays	Availability[1]	
			Day	Evening
1	Exhibition Centre	900	800	600
2	Sydney Entertainment Centre	1900	926	1423
4	1 Dixon Street	100	14	53
5	Darling Quarter	600	66	246
8	Market City	614	68	250
9	World Square	557	62	227
11	Citigate Central (Thomas St)	600	67	245

[1] Selected carparks in close proximity to The Haymarket Precinct only. No available information on carpark capacity for carparks A, B, C and G.

Figure 11 Locations of Car Parking near The Haymarket Precinct



5 TRAFFIC MODELLING APPROACH

5.1 OVERVIEW OF THE TRAFFIC MODELLING APPROACH

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. AIMSUN (Advanced Interactive Microscopic Simulator for Urban and Non-Urban Networks) is a dynamic transport modeling software tool that has the ability to model the movements of individual vehicles and their interactions with other traffic and network constraints. This level of modeling is well suited for modeling traffic circulation in urban centres, and developments such as the SICEEP development. 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.

The traffic modelling encompasses the Whole of Precinct (WOP) and investigates cumulative impacts from the development of the PPP, The Haymarket and the ICC Hotel. The future modelling scenario represents 'worst case scenario' analysis and accounts for design proposals developed at this stage.

5.2 AIMSUN MODELLING

The base AIMSUN model was initially developed by Mott MacDonald[1] for INSW. The base model represented existing conditions on a Friday PM Peak (5:30 pm to 6:30 pm) with a network coverage consisting of 14 intersections. The Mott MacDonald base model employed the traffic state demand method and did not include pedestrian movements at the intersection. As agreed with INSW in a meeting held 16 January 2013, the base model developed by Mott MacDonald for INSW will be adopted by Hyder but further developed to incorporate key amendments to reflect existing network and proposed changes in the future road network. In the meeting, Hyder had expressed the limitations of the base model prepared by Mott MacDonald for INSW and the absence of a calibration/validation report. Hyder stated that the base model will need to be updated and model calibration / validation will be undertaken to confirm the base model is robust and can be used for modelling the future traffic in the SICEEP.

The key amendments include the following:

- Reconfiguration and realignment of Darling Drive;
- Road Changes to Exhibition Place
- Additional zones to represent car park access (ingress and egress); and
- Incorporate pedestrian movements at relevant intersections assessed.

Furthermore,

- A Saturday PM peak model was also developed; and
- Calibration and validation checks were undertaken where required.

[1] SICEEP - Traffic and Transport Conditions – Mott MacDonald, May 2012

The future AIMSUN (Non-event and Event) models were developed to facilitate a more in-depth analysis of the operational impacts of key intersections within the SICEEP study area. The AIMSUN models were calibrated and validated in accordance with industry standards with reference to the RMS Paramics Modelling Guidelines to ensure that the models adequately represent existing condition. The models represented weekday and weekend afternoon (PM) peak periods, i.e.:

- Weekday (Friday) PM peak period between 5:30 pm and 6:30 pm, and
- Weekend (Saturday) PM peak period between 6:00 pm and 7:00 pm.

Figure 12 shows the representation of the amended network for future base network that includes the access nodes to the car parks within the SICEEP

Figure 12 Amended Base Network

The criteria for the calibration of a model include the GEH assessment criteria based on the UK Design Manual for Roads and Bridges requirements. This assessment criteria requires not less than 85% of the total modelled flows to be greater than a GEH value of 5. In addition, all GEH values are required to be less than 10. The AIMSUN models for both the Friday and Saturday PM Peaks were calibrated and validated. .

5.3 SIDRA MODELLING

Detailed SIDRA modelling is employed to further confirm the outcomes of the micro-simulation modelling and to determine future intersection performance at key locations. The assumptions used for the modelling include:

- For the future scenario, all signalised intersections are modelled with optimum signal settings. In lieu of the current settings (from the RMS SCATS data) for signal phasing time allocation, SIDRA optimises the signal phasing time allocation based on the forecast future approach demand to achieve optimum results in terms of LoS
- Future demand volumes tested at the intersections were based on the assumed traffic distribution parameters detailed in the report in Section 7.1. The distribution parameters were applied to calculate forecast demand volumes at the intersections; and
- Short lane effects were modelled for signalised intersections to account for adjacent lane spillover.

The above assumptions reflect anticipated future operations at the intersections.

6 DEVELOPMENT COMPONENTS

6.1 OVERVIEW

SICEEP includes the development of a combination of new multi-functional facilities and flexible spaces to enhance the existing convention, exhibition and entertainment facilities. SICEEP forms part of the vision embodied in the Darling Harbour South Master Plan. The SICEEP development works consists of the demolition of the existing Entertainment Centre and Entertainment Centre car park (Haymarket) to give way to redevelopment into mixed-use precinct with residential/retail precinct; an increase in capacity of the exhibition and convention space - ICC, ICC Exhibition Centre, as well as the development of the new Multi-Functional Entertainment Centre (MFEC) – The Theatre.

6.2 ROAD CHANGES TO EXHIBITION PLACE

The proposed road network has introduced proposals for road changes to the access lane from the roundabout to be undertaken as part of the PPP. A one-way system is being proposed where vehicles accessing The Theatre carpark and NW public carpark at The Haymarket will enter from the roundabout but will exit via a proposed new one way road running parallel to northern boundary of the northwest block of The Haymarket in the east-west direction then turning southbound parallel to Darling Drive merging into the outer lane on the proposed amended Darling Drive. The egress and exit point of the NW block will also be at northern side facing Pier Street and can be accessed via the loop road from the roundabout and exit via the one way road.

This is shown in Figure 13. This new configuration will force vehicles exiting the carparks to travel southbound towards Ultimo Road.

Figure 13 Proposed Road Changes to Exhibition Place

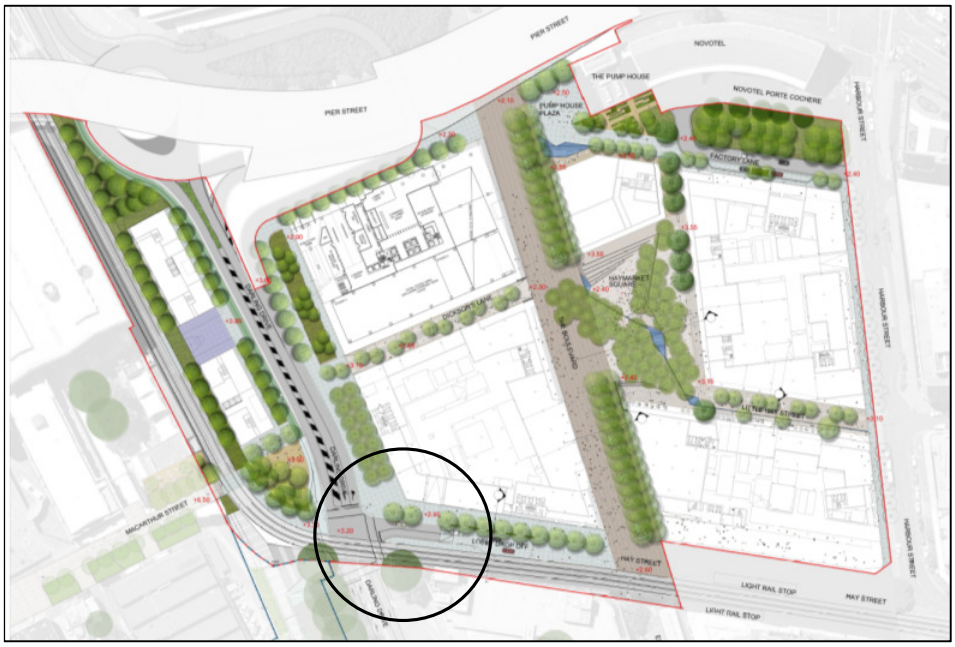
The above road changes will impact on the existing bus operators and coach routing system when accessing the bus stop under the Pier Street viaduct. The one-way system will only allow buses and coaches to travel southbound after drop-off or pick –up. However, two new bus drop-off locations will be provided within the PPP to service the precinct.

The impact of this proposed road change has been modelled and the results are presented in Section 7.2 of this report.

6.3 NEW LANEWAY AT HAY STREET

A new laneway at Hay Street is being proposed to service the podium of the Southwest building as well as service the private carparking provisions at the Southwest sector of The Haymarket Precinct. The egress and exit point of the SW block will be maintained on the southwest corner off the intersection of Darling Drive/Hay Street. The new laneway will be adjacent to the access driveway to the SW carpark and entry and exit will be controlled in the same manner as the carpark access via amendment to the existing signal system at the intersection with Darling Drive.

Figure 14 New Laneway at Hay Street



6.4 RECONFIGURATION AND REALIGNMENT OF DARLING DRIVE

It is proposed that Darling Drive be reconfigured and realigned to accommodate the student accommodation proposed for The Haymarket Precinct. It is noted that the existing configuration of Darling Drive provides two lanes per direction with a two directional cycle lane on east side between the southbound lane and the SEC carpark access lane.

The proposed design reduces Darling Drive to one lane per direction with an additional southbound lane from the loop road for the Theatre carpark and NW public carpark .

The assessment of mid-block lane capacity of Darling Drive is essential to provide an indication of the ability of Darling Drive to carry existing and future traffic.

The AUSTROADS *Guide to Traffic Engineering Practice - Part 2: Roadway Capacity* states that the typical one-way mid-block lane capacities on urban roads under interrupted flow conditions are 900-1000 vehicles/hr/lane. Table 6-3 provides the traffic flow limits for different levels of service, in terms of peak hour flows for one and two lanes of unidirectional travel. Level of Service is used as a performance standard to assess effect of a development proposal on the traffic efficiency of the road network.

Table 6-3 LOS Criteria – Urban Road Peak Hour Flows

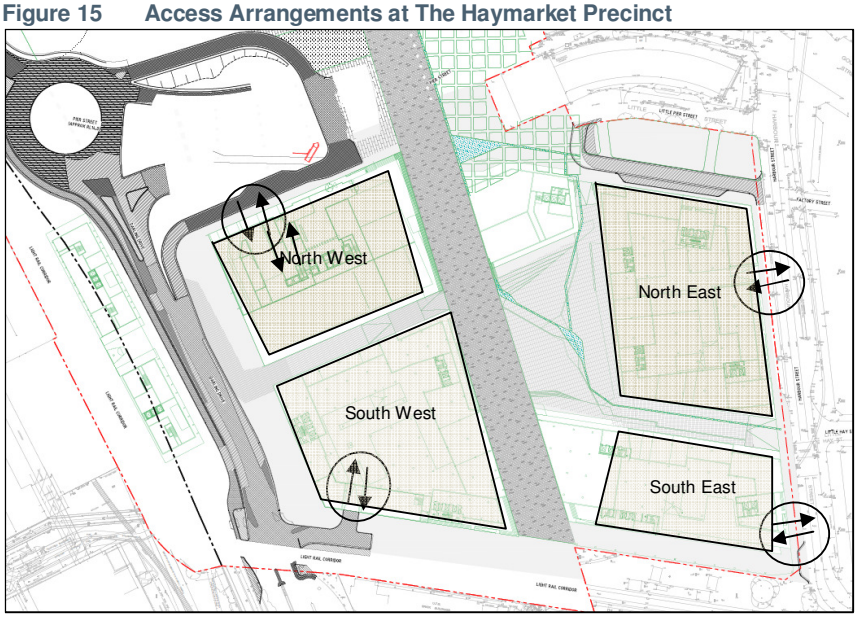
Level of Service	One Lane (veh per hr)	Two Lanes (veh per hr)
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

It is estimated that the PM peak hour volume on Darling Drive is approximately in the order of 900 vehicles per hour in the southbound direction and 400 vehicle per hour in the northbound per direction. From Table 6-3, it can be stated that Darling Drive will still have the capacity to accommodate existing traffic plus additional traffic to be generated by the north and south car parks. Hence, the proposed reconfiguration of Darling Drive is anticipated to be able to accommodate the forecast peak hour volume. .

6.5 NEW VEHICULAR ACCESS POINTS TO HARBOUR STREET

The proposed layout of The Haymarket introduces new vehicular access points to Harbour Street. The residential apartments on the western side of Harbour Street will be facilitated with two separate driveways which provide access to two separated (un-connected) car parking facilities. (See Figure 15)

Figure 15 Access Arrangements at The Haymarket Precinct



These driveways will be located on the western kerb line of Harbour Street approximately 15m and 140m north of Hay Street respectively. A high level assessment was carried out of the potential traffic implications of providing driveways at these locations. There are several key assumptions that were made in this assessment, as follows:

(1) Harbour Street is a one-way northbound road with three traffic lanes and one parking lane. At present, lane 1 (the western-most lane) is a designated bus drop off/ pick up area. However, as the demand for bus services is heavily governed by the existing entertainment centre, which will cease to exist post-development, it has been assumed that the bus zone will be removed and this traffic lane will henceforth operate as a full-time travel lane with no kerb side parking permitted.

(2) The Goulburn Street/ Pier Street/Harbour Street signalised intersection is assumed to have an average cycle time between 60-75 seconds. Furthermore, it has been conservatively assumed that the average green time provided for traffic in the southern (Harbour Street) approach is 20 seconds per cycle, followed by 40-55 seconds of “red”.

(3) The average vehicle footprint is 7m allowing for the vehicle length and the spatial buffer in front of and behind the vehicle.

(4) The capacity of the northern car park is 350 cars with an estimated 20% outbound volume in the PM peak period. This equates to up to 70 outbound vehicles in the PM peak hour.

(5) The capacity of the southern car park is 285 cars with an estimated 20% outbound volume in the PM peak period. This equates to up to 57 outbound vehicles in the PM peak hour.

(6) The left-turn egressing movements from the driveways would require gaps of 5 seconds in the receiving traffic flows. Sight lines would be sufficient for following vehicles to achieve a follow-up time of 3 seconds.

Queuing implications in the southern approach to the Goulburn Street/ Pier Street/ Harbour Street intersection

The potential queue spillback from the Goulburn Street/ Pier Street/ Harbour Street intersection was assessed to determine whether these queues would block the egress path for outbound vehicles from the driveways.

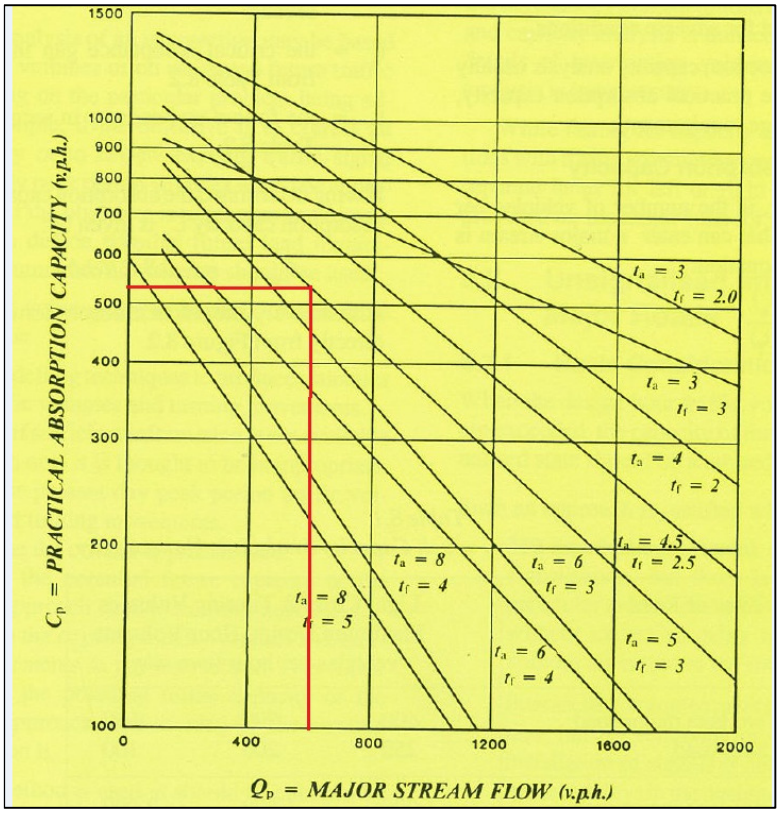
A PM peak traffic volume of 600 vehicles/hour has been adopted for Harbour Street NB. The approximate 300m lane distance from the upstream intersection of Hay Street/ Sussex Street/ Thomas Street signalised intersection would allow for some degree of platoon dispersion. However, as an inner city road, it is still likely that the arrival rate in this southern approach to the Goulburn Street/ Pier Street/ Harbour Street intersection would be platooned. As such, a more intensified arrival rate equivalent to 900 vehicles/hour has been adopted for conservatism.

An intensified arrival rate of 900 vehicle/hour for Harbour Street equates to 300 vehicles/hour/lane based on an assumption that all traffic is evenly split across the three northbound travel lanes. This equates to an arrival rate of 0.083 vehicles/ second/ lane. Therefore, a red period of 55 seconds would generate queues in the order of 35m in each lane in the southern approach to the Goulburn Street/ Pier Street/ Harbour Street intersection. As the northern driveway is more than 50m south of the intersection, it is unlikely that the queues from this intersection would block the egress path from the driveway. Furthermore, the estimated 70 outbound vehicles in the PM peak period (ie. 1 outbound vehicle every 50 seconds) is unlikely to experience difficulty egressing and the queuing potential within this driveway would also be limited.

Absorption capacity of Harbour Street

The absorption capacity of Harbour Street refers to the maximum volume of additional traffic that Harbour Street can absorb before it reaches saturation conditions. The Austroads Guide to Traffic Engineering Practice Part 2 – Roadway Capacity (1988) provides a method for determining the absorption capacity of receiving traffic streams based on gap acceptance and follow up headway requirements of the entering traffic. The figure below, Figure 16, shows the practical absorption capacities based on these requirements.

Figure 16 Practical Absorption Capacity



As seen, a road with an traffic volume of 600 vehicles/hour (for a single lane) would have an absorption capacity in excess of 500 vehicles/hour. That is, an additional 500 vehicles per hour could enter that road before the road reaches saturation levels. Based on this, the forecasted 127 vehicles per hour from the two driveways would be easily absorbed into the Harbour Street traffic stream. Furthermore, this analysis is conservative as it has assumed that all 600 vehicles on Harbour Street would be in lane 1, whereas in reality a more even distribution across the three travel lanes would be expected.

Potential road safety implications

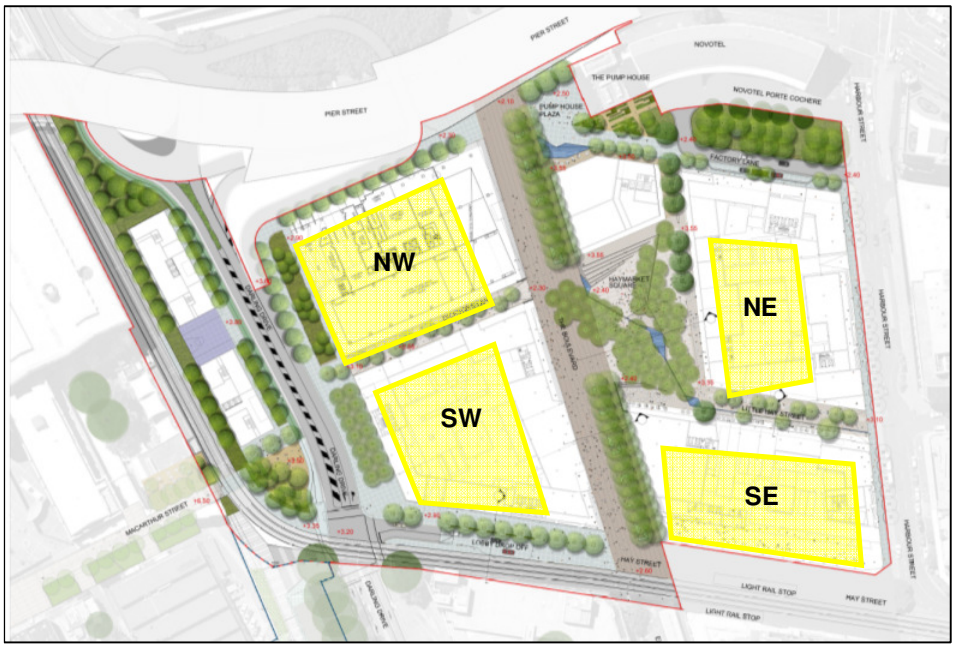
The one-way travel restriction on Harbour Street is advantageous in significantly reducing the crash conflicts at the two driveways. This will make the two driveways function as left-in-left-out intersections which are one of the safest forms of unsignalised T intersection configuration and traffic control. That is, a traditional 'T' intersection with all travel movements permitted have nine possible vehicle-to-vehicle crash conflicts. By contrast, a left-in-left-out intersection has two possible vehicle-to-vehicle conflicts.

Further work will be conducted at the detailed design stage to ensure that minimum gap acceptance sight lines are provided and maintained for outbound traffic from the car parks, as well as safe intersection sight distances for northbound traffic on Harbour Street to the driveways.

6.6 PARKING PROVISION

Parking provision for The Haymarket will consist of four blocks (NW, SW, NE and SE) with a total provision of approximately 1,040 car park spaces. In addition, a public carpark with 400 spaces will also be provided in the northwest block and will be available for visitors to the SICEEP Precinct.

Figure 17 Parking Locations for The Haymarket Precinct



A breakdown of the car park spaces is shown in Table 6-4.

Table 6-4 Proposed Parking Provision

Parking Location	Proposed Car Parking Bays	
Residential / retail / student accommodation / commercial car park (The Haymarket Precinct) [1]		
North West Office/Commercial	50	
North East residential	350	
North residential	30	
South East residential	285	
South West residential	325	
Total provision within The Haymarket Precinct		1040
North West Public Carpark	400[2]	

[1] Current indicative design for the The Haymarket Precinct

[2]This public carpark will consist of 400 car park spaces to be delivered under the Haymarket Precinct and will be available for visitors for the SICEEP precinct.

On-site car parking provision for The Haymarket Precinct is assessed against guidelines listed in the RMS *Guide to Traffic Generating Development (Section 5 – Parking Requirements for Specific Land Uses)* and parking rates approved for similar developments within the City of Sydney LGA (CoS).

Parking rates generally vary by type of land use development and location of development. Factors to be considered include the availability of public transport, mode split, car occupancy, availability of on-street parking, and others.

RMS Guidelines

The RMS Guidelines stipulates parking rates based on surveyed developments and researched conducted by the RMS. For the RMS, the main criterion in the assessment of parking provided for developments is the adequacy of off-street parking to meet the peak parking accumulations observed and thereby discouraging on-street parking thus maintaining the existing levels of service and safety of the road network. Hence, the RMS guidelines stipulate the required minimum parking provision for a specific development. The Guide also notes that potential variations between local government areas must also be considered. Thus, these parking provision rates will be validated against the City of Sydney Council's rates.

Table 6-5 RMS Parking Rates and Proposed provisions

Land Use Type	Units / Rooms / GLA[3]	RMS Suggested Parking Rates	RMS Guidelines for Parking Requirements	Proposed Parking Provision
Residential			735 spaces	990 spaces
Studio[1]	122	(0.4 spaces/1 bedroom) [1]		
One bedroom	653	0.4 spaces/1 bedroom		
Two Bedroom	558	0.7 spaces/2 bedroom		
Three Bedroom	27	1.2 spaces/3 bedroom		
Visitor parking:		Plus 1 space/7 units	194 spaces	0[2]
Office/ Commercial	25,000 sqm GFA	Unrestrained – 1 per 40sqm Restrained - 1 per 125sqm GFA (assuming Category E, CoS DCP2012) [3]	200 spaces (25,000 sqm GFA)	50 spaces
Retail	7,689 sqm GFA	1/50 sqm GFA	154 spaces	0
TOTAL			1089 spaces	1,040 spaces

[1] No rates stipulated for Studio type, assumes same rate as one-bedroom.

[2] Visitor parking will be at the public carpark.

[3] Indicative only. The site does not fall within an assigned category and the adjacent areas are Category D and F.

Based on the above parking rates of the RMS, the estimated minimum car parking requirements for The Haymarket Precinct is 1089 spaces. A total of 1040 spaces will be provided in the

precinct plus the 400 space public carpark to be located in the northwest sector. Hence, The Haymarket Precinct development complies with the minimum provision as required from the RMS guidelines.

City of Sydney Council Parking Rates

On the other hand, the City of Sydney Council's Development Control Plan (DCP) states that car parking spaces must be provided to meet the car parking needs of the development having regard to the accessibility of the development and Council's policy of reduced car dependency. Council has clarified that the DCP is written to indicate the maximum number of car parking spaces allowable and not to impose an absolute minimum of car parking spaces required. Various DCPs have been developed by Council to apply to specific areas of the City.

Sydney DCP 2012 is the most recent DCP that covers the Pyrmont and Darling Harbour and it supports the Sydney Local Environmental Plan (LEP) 2012 with more detailed planning and design guidelines for developments within the CoS. However, the SICEEP development site is excluded from the area covered under the Sydney LEP 2012 and hence, the parking rates contained in the LEP do not apply to the development proposed. Instead, the development seeks approval for parking rates per Table 6.4 above that are considered appropriate for the development on the basis of comparisons with rates applied to the immediate surrounding areas and known CoS approved rates of comparable land use developments.

Residential

The proposal seeks development approval for a total of 1,360 residential units totalling 124,393 sqm GFA. The parking rates being proposed are:

- Studio apartments – 0 space`
- One bedroom – maximum 0.5 space
- Two bedroom – maximum 1 space plus 1 space per 5 units (includes 1 bedroom plus study)
- Three bedroom and more – maximum 2 spaces

The proposed rates being sought for The Haymarket Precinct residential component are consistent with those approved for comparable developments within the City of Sydney. Comparable developments in the area that have been approved with the above parking rates include:

- Carlton and United Brewery (CUB) site in Chippendale 1400 dwellings with 132,950 sqm GFA. Based on the mix of units, a total of 1,072 parking spaces for residential use
- The Quay site in Haymarket – 271 residential apartments and 270 parking spaces.
- Harold Park – 1,250 dwellings with 120,361 sqm GFA. The parking rates applied to Harold Park differ slightly from the above since the maximum car parking spaces is set out in a site specific LEP.

With the future mix of land uses between The Haymarket Precinct and the PPP, demand for parking will balance across different peak periods and consequently, reduce potential impacts associated with parking provision.

Office / Commercial

It is proposed to incorporate a maximum of 25,000sqm GFA allocated for office/commercial development and proposes to provide a total of 50 spaces to support the office/commercial space. This equates to approximately 1 space per 300 sqm commercial GFA.

The above rate is comparable to Darling Walk which has a GFA of 64,000 sqm and basement parking with 200 spaces.

Retail + Student Accommodation

No car parking is proposed to support the retail and the student accommodation land uses on the basic premise that the development site has the locational advantage of being in close proximity to existing public transport and active transport modes and it is anticipated to also mainly service the local areas surrounding the site whereby patrons will likely access the site via walking trips. It should be noted that significant enhancements for the active transport network for the immediate area is being proposed as part of the development proposal.

Table 6-6 summarises the parking rates for The Haymarket Precinct.

Table 6-6 Summary of Proposed Parking Provision for The Haymarket Precinct

Land Use Type	Proposed Parking Rates	Proposed Parking Provision
Residential		990 spaces[1]
Studio	0 space	
One bedroom	0.5 spaces/1 bedroom	
Two Bedroom	1.2 spaces/2 bedroom	
Three Bedroom	2 spaces/3 bedroom	
Office/ Commercial	1 space /300 sqm GFA	50 spaces
Retail	No provision	-
Student accommodation	No provision	-

[1] This is based on an indicative design. Final parking provision based on these rates will be finalized with each Stage 2 DA.

6.7 PEDESTRIAN NETWORK

The proposed pedestrian network builds on the initiatives introduced with the Ultimo Pedestrian Network and the Chinatown Public Domain Plan and provides interfacing with the improved pedestrian network around South Darling Harbour. Aside from maintaining existing routes, the design will extend the UPN to Darling Drive to improve access and strengthen linkages between Central Station, the education precinct (UPS/TAFE), Haymarket, Chinatown from the south towards the Powerhouse Museum and Darling Harbour to the north. The reconfiguration of Darling Drive and the new pedestrian connections will enhance accessibility to Quarry Street to the west and create new east-west connections through Tumbalong Place.

The design proposes to enhance at-grade pathways through the PDA towards Tumbalong Park creating a direct north-south promenade extending from Quay Street to the Harbourside and linking major public gathering spaces (Haymarket Square, Tumbalong Park and Harbouside) within the Precinct.

The Traffic Transport and Access Plan for the whole precinct illustrates the proposed pedestrian connections and linkages.

6.8 CYCLE NETWORK

Darling Harbour Live proposes to build upon the initiatives of City of Sydney to improve connectivity in the Precinct with the cycle network and new public transport linkages. The proposal will create new cycling routes through the Public Domain by:

- Extending the cycling route in the east west direction and providing a new shared pedestrian and cycle pathway linking the Precinct to the west along the Pier Street corridor link and;
- Enhancing the north-south connections at Quay Street to Harbourside via a through route between the ICC Exhibition Centre and Tumbalong Park.

As part of the realignment and reconfiguration of Darling Drive, cycle connections are proposed to be enhanced via the dual lane two-way segregated cycle 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 cycle way could be segregated to improve the safety of cyclists along Darling Drive and will run along the western side of Darling Drive.

The proposed dual lane cycle way can tie into a shared space zone, in the southern sector, south of the Darling Drive / Pier Street roundabout. Within this shared space zone, the dual cycle way cansplit and link into the existing single lane, one-way cycle way network, on either side of Darling Drive.

North of the Darling Drive / Pier Street roundabout the dual lane two-way segregated cycle-way will be provided along the western side of Darling Drive, until it meets the proposed scramble crossing in the northern sector by the ICC and ICC Hotel. At this junction the proposed cycle-way will utilise the proposed scramble crossing to allow a safe connection to the existing single lane, one-way cycle way network, on the eastern side of Darling Drive. Consequently, the proposed cycle way will revert back to a single lane, one-way cycle way, and link into the existing cycle network on both sides of Darling Drive.

6.9 TAXIS, COACHES AND BUSES

The provision for taxis, coaches and buses are generally located in the PPP areas and are accessible to The Haymarket.

7 TRAFFIC IMPACT ASSESSMENT

7.1 TRAFFIC GENERATION AND TRIP DISTRIBUTION

7.1.1 THE HAYMARKET PRECINCT

An indication of the peak hour traffic generation potential of the future development within The Haymarket Precinct has been based on the Roads and Traffic Authority *Guide to Traffic Generating Developments" (2002)*. The RTA's Guide provides a series of traffic generation rates for a variety of land uses based on generic surveys undertaken by the RTA. These rates are generally applied to the Gross Floor Area (GFA) or Gross Leasable Floor Area (GLFA).

The typical peak hour traffic generation rates applicable for the proposed land uses of The Haymarket Precinct are as follows:

- Residential evening peak vehicle trips: 0.24 vehicle trips per hour for each unit
- Retail evening peak hour vehicle trips: 0.56 vehicle trips per hour per 100sqm GLFA
- Commercial evening peak vehicle trips 2 vehicle trips per hour per 100sqm GFA

Application of the above traffic generation rates to the proposed development yields a weekday peak period total traffic generation potential of 372 vehicle trips per hour comprising 270 In / 102 Out during evening peak periods. These traffic generation projections have been based on an arrival/departure split of 80/20 for residential, 50/50 for retail and 20/80 for commercial during the evening peak period. The estimated peak hour traffic generation for the proposed future developments is shown in Table 7-7.

Table 7-7 Traffic Generation for the PDA

PDA Divisions	IN (vtph)	OUT (vtph)	TOTAL (vtph)
North East and North	100	25	125
South East	75	19	94
South West	86	21	107
North West	9	37	46
Total	270	102	372

The above table assumes the following:

- Retail trips will mainly consist of non-car trips; and
- Office/Commercial trips would be capped with the available parking space allocation.

For the purpose of this assessment, the following traffic distribution is assumed:

- 30% trips anticipated to arrive from western suburbs via M4 Western Distributor;
- 10% trips anticipated to arrive from western suburbs via Great Western Highway;
- 30% trips anticipated to arrive from northern suburbs via M4 Western Distributor and then through Darling Drive and Ultimo Road;
- 20% trips anticipated to arrive from southern suburbs by using Eastern Distributor and then through north Darling Drive and Ultimo Road; and,
- 10% trips anticipated to arrive from southern suburbs by using Great Western Highway and then through Harris Street and Ultimo Road.

7.1.2 STUDENT ACCOMMODATION

There are also no guidelines for trip generation rates for student accommodation in the RMS Guide. However, it is anticipated that majority of the trips for the student accommodation will comprise of walking trips and public transport trips during the peak hour. 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 facilities will be incorporated in the design layout to allow for students moving in and moving out. 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 (0.24 vehicle trips

per unit) and a high estimate could potentially be in the order of 0.12 vehicle trips per unit. Hence, for a total of 422 units, vehicle trip generation could be in the order of 50 vehicle trips.

7.2 INTERSECTION OPERATION

7.2.1 NETWORK CAPACITY AND LEVEL OF SERVICE (LOS)

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 7-8 summarises intersection LoS criteria used to assess the intersection performance.

Table 7-8 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
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.

It should be noted that inappropriate interpretation of these parameters can create misleading conclusions, particularly for sign controlled intersections. For example, for a sign controlled intersection LoS is determined by the highest delay for minor traffic movements and there are instances where the LoS could be lower such as LoS "F" but associated only to a small volume of traffic being delayed. In this situation, the intersection should actually not have a significant capacity issue except for that one minor movement.

7.2.2 EXISTING INTERSECTION PERFORMANCE

SIDRA modelling was undertaken to assess existing operational performance of key intersections. The model runs were based on:

- Traffic survey data from the peak hour intersection turning movement counts;
- SCATS (Sydney Coordinated Adaptive Traffic System) data on phasing plan and cycle time; and,
- Existing intersection configurations.

Table 7-9 and Table 7-10 below present the summary of existing level of service (LoS) for the key intersections of the precinct.

Table 7-9 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
(I-1) Darling Dr / Murray St / Pyrmont Bridge Rd	Signalised	Murray St North	49.7	D	44.9	D
		Darling Dr East	33.4	C		
		Murray St South	58.7	E		
		Pyrmont Bridge Rd West	49.9	D		
(I-2) 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		
(I-3) Darling Dr / Car Park Access	Signalised	Darling Dr North	19.4	B	23.0	B
		Future PDA Car Park Access	46.5	D		
		Darling Dr South	16.4	B		
(I-4) Pier St / Harbour St / Goulburn St	Signalised	Harbour St North	61.4	E	44.2	D
		Goulburn St East	28.6	C		
		Harbour St South	51.3	D		

Intersection	Intersection Control	Approach	Average Delay Approach (sec/veh)	Approach LoS	Overall Average Delay (sec/veh)	Overall LoS
		Pier St West	34.2	C		
(I-5) Harbour St / Liverpool St	Signalised	Harbour St North	24.3	B	34.0	C
		Liverpool St East	42.3	C		
		Harbour St South	31.8	C		
		Car Park Exit (West)	65.8	E		

** it is assumed that 90 vehicles are coming out and 15 vehicles are going into the SEC car park exit / entry leg at Darling Drive and Pier Street roundabout. (for both Friday and Saturday)*

***model short lane as full lane to examine the actual capacity of the adjacent lane*

Table 7-10 Intersection Performance of Existing Saturday PM Peak (2012)

Intersection	Intersection Control	Approach	Average Delay Approach (sec/veh)	Approach LoS	Overall Average Delay (sec/veh)	Overall LoS
(I-1) Darling Dr / Murray St / Pyrmont Bridge Rd	Signalised	Murray St North	57.6	E	47.3	D
		Darling Dr East	30.5	C		
		Murray St South	64.2	E		
		Pyrmont Bridge Rd West	52.9	D		
(I-2) 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		
(I-3) Darling Dr / Car Park Access	Signalised	Darling Dr North	19.4	B	23.0	B
		Future PDA Car Park Access	46.5	D		
		Darling Dr South	16.5	B		
(I-4) Pier St / Harbour St / Goulburn St	Signalised	Harbour St North	53.9	D	42.4	C
		Goulburn St East	31.3	C		
		Harbour St South	51.6	D		
		Pier St West	31.2	C		
(I-5) Harbour St / Liverpool St	Signalised	Harbour St North	19.1	B	27.5	B
		Liverpool St East	44.8	D		
		Harbour St South	20.5	B		
		Car Park Exit (West)	58.2	E		

** it is assumed that 90 vehicles are coming out and 15 vehicles are going into the SEC car park exit / entry leg at Darling Drive and Pier Street roundabout. (for both Friday and Saturday)*

***model short lane as full lane to examine the actual capacity of the adjacent lane*

The results of the modelling reveal the following key findings:

- The modelling investigation has found that on the overall the five key intersections perform at an acceptable LoS on a typical Friday or Saturday PM peak.
- Some turning movements have longer delays and have capacity issues with the available phase time splitting information;
- At intersection I-1, left and right turning from Pyrmont Bridge Road west are the critical movements in terms of average delay. Queue length will occasionally exceed right turning bay (40m) and overflow to the adjacent lane;
- Similar results for right turning from Darling Drive east which showed queue lengths exceeding lane storage length (50m) and blocking the through traffic movement; and,
- Right turning from Goulburn Street East in the intersection I-4 shows a potential capacity issue and the queue extends back of the short turning bay and blocks the through movement. At present there is provision for two short lanes – 30m and 28m for right turning vehicles.

7.2.3 FUTURE OPERATIONAL PERFORMANCE

The results of the modelling for the future network with the proposed development are presented in the following section.

Table 7-11 Future Intersection Performance (Friday Event)

Intersection	Intersection Control	Approach	Average Delay Approach (sec/veh)	Approach LoS	Overall Average Delay (sec/veh)	Overall LoS
(I-1) Darling Dr / Murray St / Pyrmont Bridge Rd	Signalised	Murray St North	44.7	D	40.9	C
		Darling Dr East	38.1	C		
		Murray St South	50.0	D		
		Pyrmont Bridge Rd West	40.3	C		
(I-2) Darling Dr / Pier street	Roundabout	Darling Dr North	4.0	A	9.4	A
		Pier St (off-ramp) East	9.4	A		
		Darling Drive South	8.9	A		
(I-3) Darling Dr / Car Park Access	Signalised	Darling Dr North	8.7	A	10.7	A
		Future PDA Car Park Access	71.7	F		
		Darling Dr South	7.9	A		
(I-4) Pier St / Harbour St / Goulburn St	Signalised	Harbour St North	40.7	C	33.8	C
		Goulburn St East	35.1	C		
		Harbour St South	38.7	C		
		Pier St West	23.0	B		
(I-5) Harbour St / Liverpool St	Signalised	Harbour St North	23.8	B	35.5	C
		Liverpool St East	45.0	D		
		Harbour St South	33.9	C		
		Car Park Exit (West)	70.8	F		

Table 7-12 Future Intersection Performance (Saturday Event)

Intersection	Intersection Control	Approach	Average Delay Approach (sec/veh)	Approach LoS	Overall Average Delay (sec/veh)	Overall LoS
(I-1) Darling Dr / Murray St / Pyrmont Bridge Rd	Signalised	Murray St North	54.4	D	61.2	E
		Darling Dr East	32.0	C		
		Murray St South	59.8	E		
		Pyrmont Bridge Rd West	85.9	F		
(I-2) 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		
(I-3) Darling Dr / Car Park Access	Signalised	Darling Dr North	9.4	A	10.4	A
		Future PDA Car Park Access	62.6	E		
		Darling Dr South	6.9	A		
(I-4) Pier St / Harbour St / Goulburn St	Signalised	Harbour St North	49.6	D	38.4	C
		Goulburn St East	33.0	C		
		Harbour St South	44.7	D		
		Pier St West	24.1	B		
(I-5) Harbour St / Liverpool St	Signalised	Harbour St North	15.1	B	20.4	B
		Liverpool St East	29.9	C		
		Harbour St South	17.9	B		
		Car Park Exit (West)	33.5	C		

8 ROAD SAFETY ISSUES

8.1 CRASH STATISTICS

This assessment is based on the crash data supplied by the RMS for the five-year period from July 2007 to June 2012 inclusive. The data covers crashes reported to the Police, and includes fatal, injury or vehicle damage only accidents for:

- Harbour St from Hay Street to Bathurst Street including 10m at intersections; and
- Darling Drive from Ultimo Road to Murray Road, including 10m at intersections.

A total of 58 crashes were recorded for Harbour Street and a total of 78 crashes were recorded for Darling Drive in the five year period. Figure 18 and Table 8-13 shows crash statistics for the five year period between 2006 and 2010.

Figure 18 Five Year Crash History

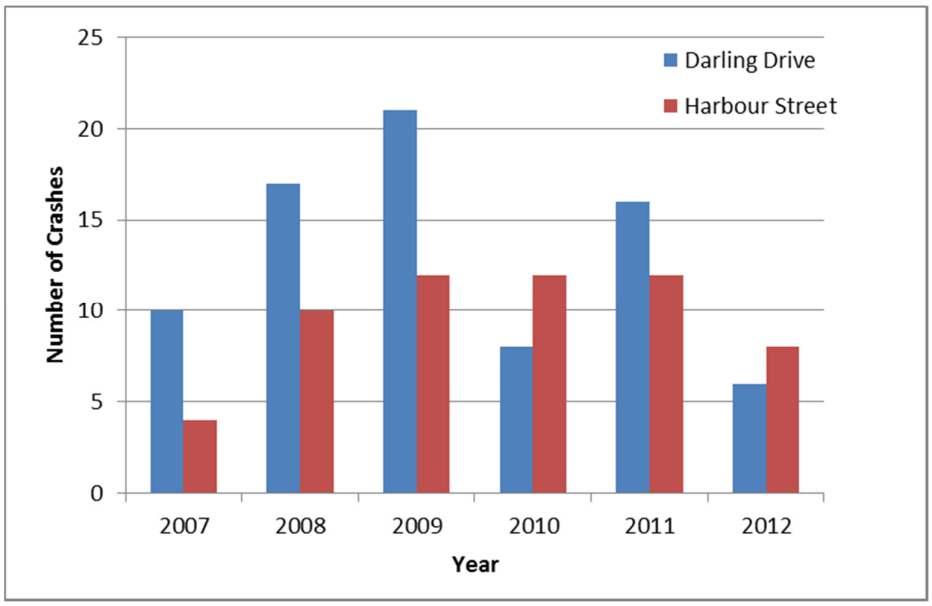


Table 8-13 Highlights of Crash Statistics for Five Years (July 2007- June 2012)

Type of Crash	Harbour Street		Darling Drive	
	Number of Crashes	Percentage	Number of Crashes	Percentage
Total No. of Crashes	58	100%	78	100%
Casualties	34	58.8%	46	59.0%
Non-casualty	24	41.4%	32	41.0%
Intersection, adjacent approaches	10	17.2%	32	41.0%
Rear end	11	19.0%	2	15.4%
Hit pedestrian	11	19.0%	5	6.4%
Opposing vehicle, turning	3	5.2%	11	14.1%
Fatal	0	0	0	0
Wet Surface	17	29.3%	14	17.9%

Source: RMS' crash data

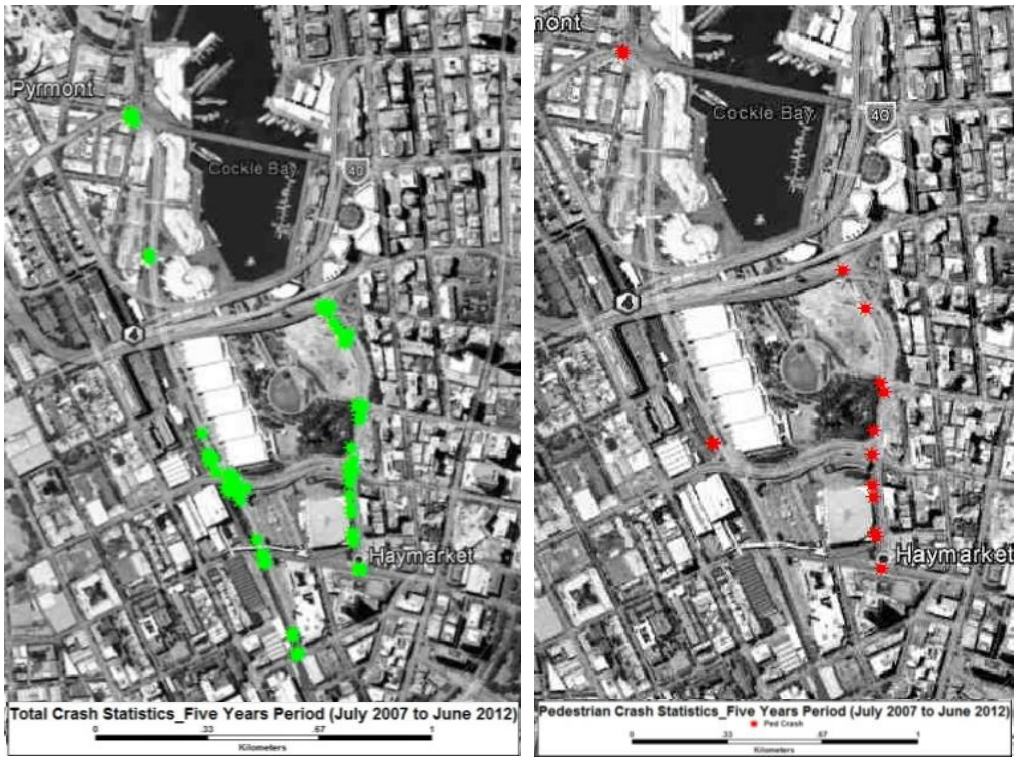
Figure 18 shows that there is a marked reduction in the number of crashes on both Darling Drive and Harbour Street.

The crash data was plotted on a map to identify potential 'black spots'. Figure 19 shows the locations of the crashes recorded by the RMS over a five year period (July 2007 to June 2012). It can be observed that majority of the pedestrian crashes occurred along Harbour Street and the majority occur at the intersections:

- Darling Drive/Pier Street;

- Darling Drive/Hay Street;
- Pier Street/harbour Street/Goulburn Street;
- Harbour Street/Liverpool Street; and
- Harbour Street/Day Street.

Figure 19 RMS Crash Data for a Five year period (July 2007 – June 2012)



8.2 PEDESTRIAN SAFETY ON DARLING DRIVE

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.

At the intersection of Darling Drive and Murray Street, pedestrian crossings are integrated with the intersection and have an assigned pedestrian crossing phase in the cycle time while at the Darling Drive / Pier Street roundabout, the pedestrian crossing across is located north of the roundabout and is provided to also cater to the passengers going to and coming from the light rail stop.

The reconfiguration of Darling Drive and the confinement of the loading activities away from Darling Drive are achieved by the transfer of truck parking, loading and queuing within the loading dock facilities as part of the PPP. The management of loading activities within the loading docks potentially minimises the risks to other road users on Darling Drive and promotes safety for pedestrians and cyclists. Two new pedestrian crossing facilities will be installed on Darling Drive linking the light rail with the core facilities via enhanced pedestrian links. These crossings are located at a reasonable distance from the loading dock entrance and exits to

ensure the proper sight distances are maintained for both the pedestrian crossing and the truck driver.

Pedestrian safety measures are incorporated in the overall management plans for both construction and operation but may need to be constantly reviewed to assess any deficiencies brought about by unforeseen operational changes within the facilities. A more detailed road safety audit could be undertaken to determine future measures to reinforce the safety and ensure minimal risks to road users.

8.3 PEDESTRIAN SAFETY ON HARBOUR STREET

The crash statistics revealed 19% of the crashes on Harbour Street involved a pedestrian of which 5 of the 11 records occurred in the section between Hay Street and Goulburn Street. This section has one way vehicle directional flow and no pedestrian crossing except at the intersection of Pier St/Harbour St/Goulburn. Records from previous studies reported medium to heavy pedestrian activity in the block east of the SEC precinct due to the proximity of Chinatown.

Future proposals by others associated with the Chinatown Public Domain Plan include provision for a pedestrian crossing facility across Harbour Street south of Goulburn Street. The type of treatment is yet to be finalised but current initiatives are in place to address this issue.

Other pedestrian crashes on Harbour Street were observed to occur at the intersections with Goulburn Street, Liverpool Street, Day Street and Bathurst. These intersections have pedestrian crossing facilities integrated with the signal phasing.

A more detailed road safety audit could be undertaken to assess any gaps and deficiencies at the intersections in order to determine a more appropriate treatment.

9 CONSTRUCTION TRAFFIC IMPACT AND MANAGEMENT

9.1 BACKGROUND

A Preliminary Construction Management Plan has been prepared by Lend Lease Project Management and Construction (LLPM&C) for the PPP development application. The document outlines the indicative management plans relating to the construction works in the PPP and The Haymarket Precinct. With each Stage 2 DA, a Construction Management Plan will be prepared.

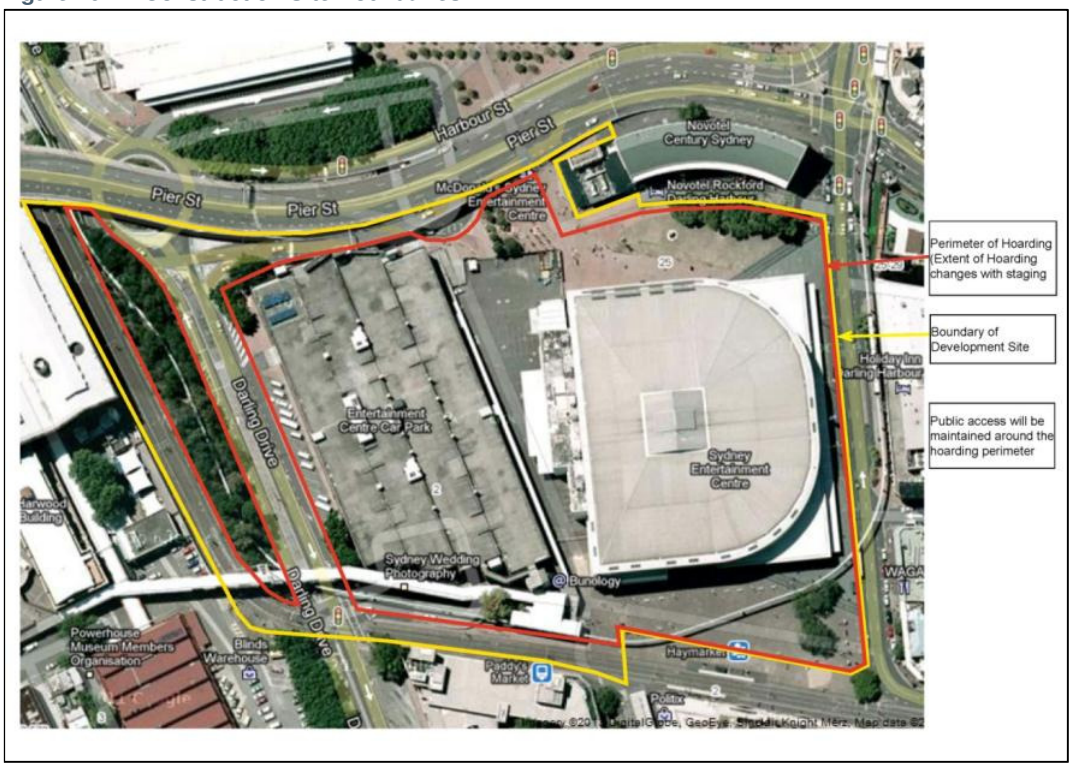
This section presents excerpts from the above document relevant to Traffic and Pedestrian Management during construction of The Haymarket Precinct, including description and layouts of the planned mitigation arrangements demonstrating how, during the development, the pedestrian and vehicular movements will be addressed to minimise impact.

9.2 SITE BOUNDARY

Figure 20 below depicts the indicative hoarding locations proposed within the Southern Sector and identifies areas indicatively accessible to the general public and areas cordoned off for the

construction works. The construction of the Southern Sector buildings is proposed to proceed in stages with further detail provided with stage 2 DA submissions

Figure 20 Construction Site Boundaries



9.3 CONSTRUCTION VEHICLE ACCESS

The primary construction heavy vehicle egress will be via the established Darling Drive network to the West of the development. 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 the later phases of development of the precinct, construction access will be via Harbour Street to the east of the southern sector.

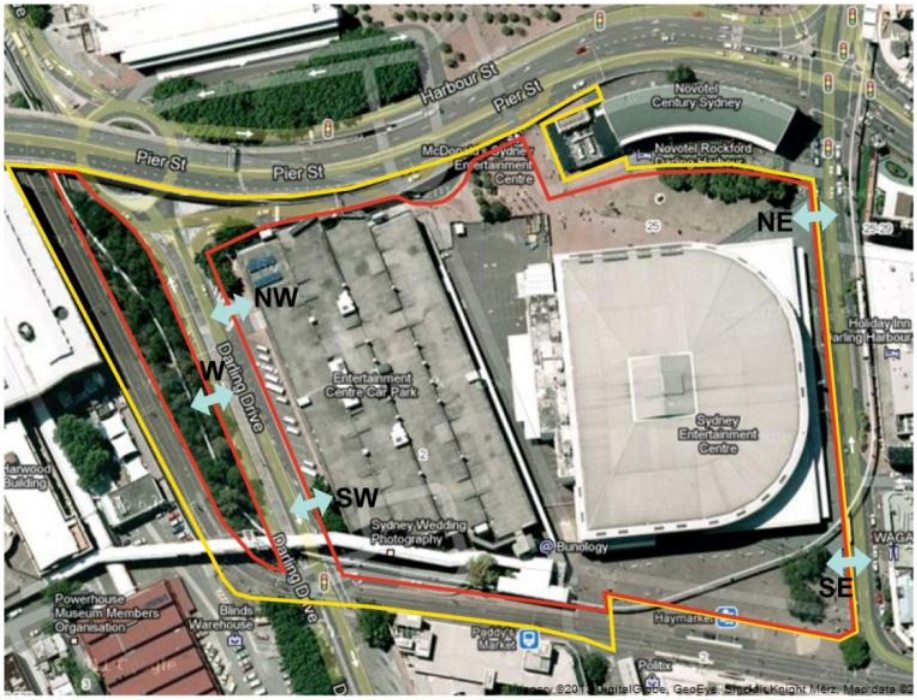
Traffic movements and vehicles will conform to current Roads and Maritime Services (RMS) requirements.

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. Traffic movements and vehicles to the site shall maintain the existing entry and egress points currently used by the existing Precinct, especially to Darling Drive.

The main and entry for construction materials and vehicles servicing the west, north west and south west development lots shall be from the west, off Darling Drive. The south east, north east and north development lots will be access from Harbour Street.

All vehicles will use the entry and exit gates located generally as shown on Figure 21.

Figure 21 Access to Site (indicative) – The Haymarket Precinct



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, our adopted design means there is no big bulk excavation activity thereby reducing the heavy vehicle activity upfront.

During the course of the development it is anticipated that vehicle movements for such trades as Demolition, 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 s within 1km of the development) to alleviate any congestion to the surrounding traffic network.

9.4 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.

9.5 PEDESTRIAN ACCESS

Development of the Southern Sector will be undertaken in stages with pedestrian access adjusted progressively to respond to those stages. Future Stage 2 DAs will provide further detail regarding pedestrian access during construction generally 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 generally be maintained unless noted otherwise below;
- The existing elevated pedestrian walkway from Harris Street will be terminated at the western side of the light rail corridor with a new lift and stairway provided to connect with Hay Street;
- The elevated walkway between the SEC Carpark and the SEC will be closed from commencement of demolition of the SEC Carpark;
- The southern portion of the Boulevard will be completed by December 2016 to connect with the Northern and Central Sector portion of the Boulevard;
- Pedestrian access along Darling Drive will be controlled during realignment works to facilitate the staged construction of the road works and to ensure public safety.

The pedestrian diversion from Exhibition light rail station will be coordinated with the construction works of the Southern Sector.

9.6 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, are carried out in non-peak periods.

9.7 STAGED DEMOLITION OF SYDNEY ENTERTAINMENT CENTRE AND SYDNEY ENTERTAINMENT CENTRE CARPARK

While the demolition of the SEC car park is proposed to facilitate the initial development stages of the Haymarket on the western side of the site, the Sydney Entertainment Centre will remain in operation until December 2015. Prior to December 2015, the car parking needs of the SEC will be serviced by the public carparking facilities beneath Darling Walk and other adjacent public car parking stations.

9.8 SUMMARY

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 The Haymarket. The Plan will be regularly updated to address any new outcomes identified through constant monitoring as the works progress.

10 SUMMARY

10.1 CONCLUSIONS

The overall assessment of the SICEEP (detailed in the Main Report)was undertaken to assess existing and future transport conditions surrounding the precinct (site wide with consideration of the SICEEP Whole of Precinct development that will be delivered in stages. The outcomes of the assessment highlight key features of the SICEEP development that would support the overall efficiency of the transport network servicing the whole site.

The transport assessment of The Haymarket Precinct (this Report) 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, including design elements of the proposal:

Generally:

- Hyder has used the base model prepared by Mott MacDonald and have updated the base model to reflect network changes for the existing and future conditions. Hyder undertook calibration and validation and results indicated that the base model complies with the criteria for calibration and validation of a model (i.e. the GEH assessment criteria) based on the UK Design Manual for Roads and Bridges requirements. Hyder concluded the base model was 'fit for purpose'.

The Haymarket Public Transport

- The Haymarket site is well served by public transport.
- The Haymarket development design generally provides enhanced access to the public transport services through the creation of more direct travel paths through pedestrian boulevards and walkways.

The Haymarket Parking

- Parking provision within The Haymarket precinct complies with the minimum requirements set by the RMS Guidelines for specific land use development.
- Parking rates being sought for the residential component are justified on the basis of comparable developments in the immediate vicinity of the development.

The Haymarket Road Network/Intersection Operational Performance

- The modelling undertaken by Hyder indicate that optimised signal cycle settings at all intersections analysed in this study will improve intersection performance and maintain level of service at acceptable levels. Signalised intersections which are directly adjacent to The Haymarket development include Darling Drive / Hay Street intersection which will require minor adjustment to the signal layout and operation and the Harbour Street / Pier

Street / Goulburn Street intersection which will require signal coordination with adjacent signals.

- The overall operational performances of the intersections have been demonstrated as maintained in 'status quo' for Friday event traffic.
- The results of the intersection modelling indicate that the one way road system proposed for the Theatre carpark and NW Haymarket development lot carpark egress (which sits within the adjacent PPP scope of works) would significantly improve operational performance of adjacent intersections such as Darling Drive/Pier St intersection and Pier Street/Goulburn St/Harbour Street intersection.
- With the exception of Pyrmont Bridge Road/Murray Street/Darling Drive intersection, the operational performances of the key Haymarket intersections (Darling Drive/Hay Street and Darling Drive/Pier Street) are considered satisfactory for Saturday event traffic. Pyrmont Bridge Road/Murray Street/Darling Drive is a key access intersection that links the SICEEP study area to the external network to the north and west. This intersection provides access for vehicles entering and leaving the SICEEP study area, including the Haymarket Precinct. It is estimated that around 3-4 % of the east-west peak hour through traffic at this intersection is associated with the PDA. This volume is expected to have only a marginal impact on the overall performance of the intersection in the context of the greater PPP works.
- The results of modelling indicate that the impact of The Haymarket 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 The Haymarket.
- The new development lot vehicular accesses to Harbour Street (2 of), Darling Drive (1 of) and loop toad (1 of) are appropriate and will not result in detrimental impacts to road network.

***The Haymarket** Pedestrian*

- The development will provide improved pedestrian linkages notably the main boulevard within the Public Realm linking the Ultimo Pedestrian Network 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 The Haymarket, Darling Central and Bayside.

***The Haymarket** Cycleway*

- Cycle connections can be enhanced via a dual lane two-way segregated cycle path on the west side of Darling Drive north of the Pier Street roundabout. South of the roundabout, the cycle way will split and link into the existing single lane, one-way cycle way network on either side of Darling Drive.

DGR's

- The requirements of the DGR's have been adequately assessed in this Transport and Traffic impact Assessment (including TMAP and road safety assessment).

10.2 RECOMMENDATIONS

Public Transport

- Pedestrian access to public transport has been improved through the creation of pedestrian boulevards and more direct routes to public transport hubs, stops and stations (including Central Railway station). There are no recommendations arising from this Haymarket study which affect the public transport infrastructure itself however the improved pedestrian access will likely result in an improvement in public transport patronage.

Parking

- It is recommended that the parking rates be adopted in accordance with this report

Road Network/Intersection Operational Performance

- Cycle time optimisation to existing signals to remain at the Harbour Street / Pier Street / Goulburn Street intersection to improve coordination with existing adjacent signalised intersections. This will require liaison and consultation with the RMS Traffic Management Centre.
- The signals at the Darling Drive / Hay Street intersection will require minor layout adjustment to coordinate with site access.
- Coordination is required with the proposed PPP laneway from the Theatre and how it interfaces with the PDA NW building access and the tie in to Darling Drive. This will be addressed in the Design Development stage of the PPP.
- The realignment of Darling Drive would accommodate future traffic volumes and will not result in detrimental impacts to the overall road network.
- The new development lot vehicular accesses to harbour street (2 of), Darling Drive (1 of) and loop toad (1 of) are appropriate and will not result in detrimental impacts to road network.

Pedestrian

- It is recommended that the proposed pedestrian routes provided throughout the PDA be enhanced through interactive wayfinding and signage to facilitate connectivity in all directions.
- Ongoing initiatives of the Ultimo Pedestrian Network Plan and the Chinatown Public Domain Plan (both by others) also address external pedestrian connectivity to major transport nodes adjacent to The Haymarket Precinct. Interfacing with the improved external pedestrian network will enhance accessibility of The Haymarket Precinct and further strengthen linkages with public transport.

Cycleway

- As with the improved pedestrian amenity, the proposed augmentation of the city wide cycleway proposed along Darling Drive should be supported.
- Furthermore, the installation of support facilities (such as secure cycle parking) within the precinct is recommended to encourage the use of cycle and increasing the mode share according to the current targets for sustainable transport