



SYDNEY INTERNATIONAL CONVENTION, EXHIBITION AND ENTERTAINMENT PRECINCT
DARLING SQUARE PRECINCT – PDA WORKS

SERVICES INFRASTRUCTURE REPORT

FOR SSDA2 (5878-13) SECTION 96 APPLICATION (MOD 2)



DARLING HARBOUR LIVE

SICEEP – DARLING SQUARE

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Sewer, Water, Gas, Telecommunications, Electrical & Stormwater

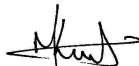
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Report No DN00339/S96 MOD 2

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1 EXECUTIVE SUMMARY

Hyder Consulting has been engaged by Lend Lease to provide civil infrastructure advice to support a Modification Application to the SSDA2 for an increase in Gross Floor Area (GFA) and number of apartments within the precinct. The proposed modification also seeks to adjust the North Plot parameter plan

This report has been prepared to address the Director-General Requirements (DGR's) that have been issued for this project and details the investigation of existing utilities in the vicinity of the development in the context of the proposed development scheme, the likely points of future connection to the utilities and the associated potential upgrades or augmentation works that may be required. This report also has regard to the approved SSDA's on the South West (SW), North West (NW), North East (NE), W2 and W1 plots.

This report focuses on the increase in GFA. The proposed modifications to the GFA are considered to have minimal impact on the existing and proposed service networks within and around the precinct.

2 INTRODUCTION

This report supports an application made under section 96 of the Environmental Planning and Assessment Act 1979 (EP&A Act) to modify Development Consent, SSD 13-5878 relating to the concept proposal for Darling Square (formerly known as The Haymarket), the new urban neighbourhood at the southern end of the Sydney International Convention, Exhibition and Entertainment Precinct (SICEEP).

Development Consent SSD 13-5878 was granted on 5 December 2013 and 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.

This section 96 application (the Modification Application) constitutes the first modification to the consent. This Modification Application follows the approval and current assessment of a number of SSDAs and s96s within the SICEEP site, including:

- SSDA1 which secured approval for the core convention, exhibition and entertainment facilities of the SICEEP Project;
- SSDA2, a staged application that established a Concept Proposal for a new mixed use neighbourhood at Darling Harbour known as Darling Square;
- SSDA3, SSDA4, and SSDA5 which related to three detailed proposals for use of the development plots within Darling Square;
- SSDA 6 which secured approval for the construction of the ICC Sydney Hotel;
- SSDA7 which secured approval for the construction and use of a mixed use development on the North-East Plot of Darling Square;
- SSDA8 which secured approval for the ICC Hotel fitout, external lighting and subdivision;
- SSDA9 which seeks approval for the construction and use of a mixed use development on the South-East Plot of Darling Square;
- SSDA10 which seeks approval for the construction and use of a mixed use development on the North Plot and public domain works to the new Square within Darling Square;
- SDA11 which seeks approval for an interactive display system; and
- SSDA12 which secured approval for the construction and use of a residential building (student accommodation) within the Western Plot (Darling Drive) of Darling Square.

3 OVERVIEW OF PROPOSED MODIFICATIONS

This Modification Application seeks approval for the following amendments:

- increase in the total maximum non-residential and residential Gross Floor Area;
- adjustments and increase to the maximum height of the north plot parameter plan/building envelope;
- minor administrative correction to the alignment of Little Hay Street; and
- consequential amendments to the Design Guidelines.

These modifications are driven principally by responding to the realities of moving from concept to the design and delivery of individual stages (which is a fluid process that involves a number of facets and considerations).

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 (refer to Figure 1 and Figure 2) the subject of this modification application 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 37,770m².

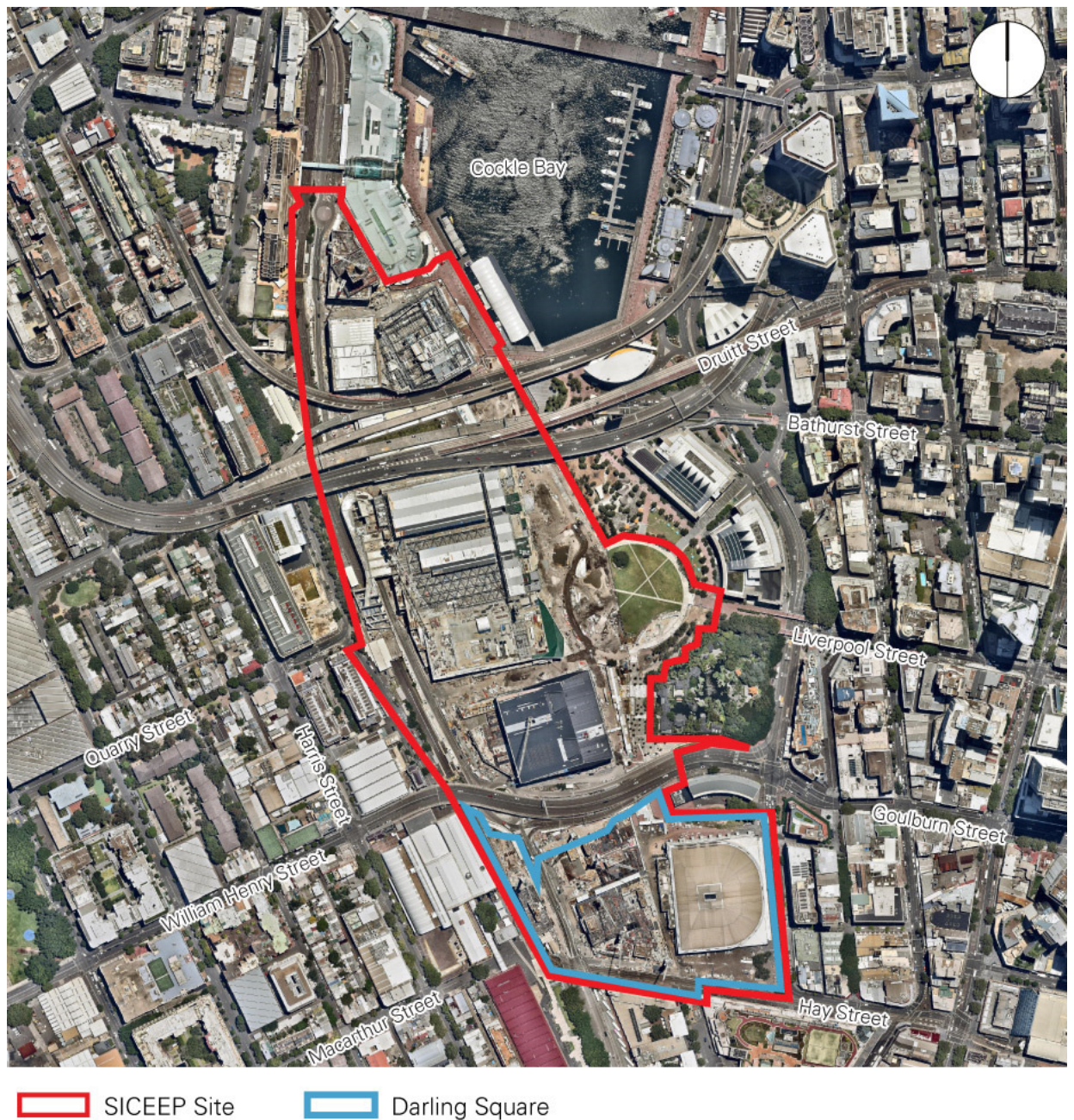


Figure 1: Aerial Photograph of the SICEEP Site

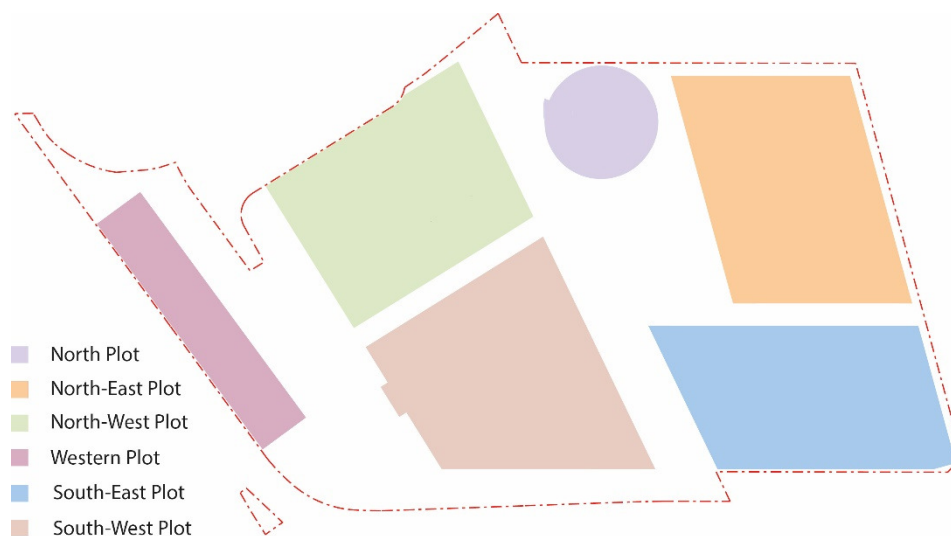


Figure 2 – Concept Proposal Development Plots

5 PURPOSE OF THIS REPORT

This report has been prepared to accompany the section 96 application for the Darling Square component of the SICEEP project. It addresses the relevant requirements of the DGR's for the project, issued on the 21st of January 2013. Requirement 11: Utilities states:

- *“In consultation with relevant agencies, the existing capacity and any augmentation requirements of the development for the provision of utilities including staging of infrastructure shall be addressed; and*
- *Details of how infrastructure assets of various utility stakeholders will be protected during the demolition and construction phase of the project.”*

This report details the likely impact of the proposed modifications to the Concept Proposal will have on the existing and proposed utility services in the vicinity of the development.

The basis for the investigation of the existing utilities in the vicinity of the site was a 'Dial Before You Dig' enquiry that was undertaken on 5th July 2011. Figure 2 depicts the area subject to the DBYD enquiry. This report does not consider any utility infrastructure outside the enquiry boundary and its' potential relationship to, or impact on the supply of utility services to the site.

For greater clarity, this report relates only to the portion of the site south of Pier Street where Darling Square development is located (refer Figure 3). Separate reports cover the PPP and The ICC Hotel complex components of the SICEEP development.

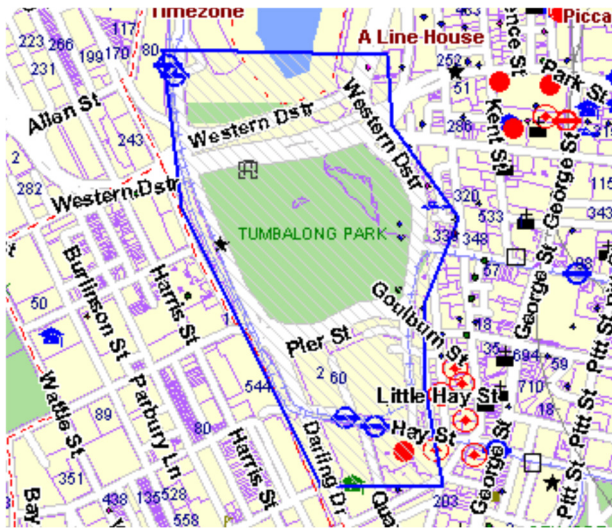


Figure 3: DBYD Enquiry Area (DBYD, 2011)

The following entities were identified as having an interest in the DBYD enquiry area:

- Roads and Maritime Services (RMS), (formerly RTA)
- Verizon Business
- RailCorp
- Visionstream
- AAPT / PowerTel
- PIPE Networks
- NBNCo
- Ausgrid
- Telstra
- Optus and/or Uecomm
- Jemena
- Sydney Water
- AARNet Pty Ltd
- Primus Telecom

This report only details the investigations undertaken in relation to the services infrastructure belonging to Ausgrid, Telstra, NBNCo/Telstra, Jemena, Sydney Water and RailCorp as required to supply Darling Square. Other private utility providers (such as private telecommunications) will be addressed at the Stage 2 DA phase for each building.

5.1 DETAILS OF MODIFICATION PROPOSAL

This Modification Application seeks approval for the following amendments:

- increase in the total maximum non-residential and residential Gross Floor Area;
- adjustments and increase to the maximum height of the north plot parameter plan/building envelope;
- minor administrative correction to the alignment of Little Hay Street; and
- consequential amendments to the Design Guidelines.

The specific changes are detailed in the table below:

Building	Previous GFA/No of Apartments	Proposed GFA/No of Apartments
Student Accommodation building W1	Approximately 265 apartments (using the same bed to apartment ratio as W2) - 431 beds ¹	668 beds
Student Accommodation building W2	252 Apartments - 635 beds ²	635 beds
North West Plot Commercial Building	Commercial 28,055 m ² GFA and Retail 1,705 m ² GFA ³	Commercial 28,055 m ² GFA and Retail 1,705 m ² GFA
South West Mixed Use Residential Building	539 Apartments and Retail 2003 m ² GFA ⁴	539 Apartments and retail 2,308 m ²
South East Plot Residential buildings (under assessment)	391 Apartments and Retail 1900 m ² GLFA	391 Apartments and Retail 1,510 m ² GFA
North East Plot Residential buildings	581 Apartments and Retail 2,050 m ² GFA ⁵	581 Apartments and Retail 2,050 m ² GFA
North Plot (under assessment)	44 Apartments (and Community use)	6,685 m ² GFA Community/Retail use

Notes:

¹ - SSDA12 - Approved

² - SSDA 3 – Approved

³ – SSDA 4 - Approved

⁴ – SSDA 5 – Approved

⁵ – SSDA 7 – Approved

6 UTILITIES INFRASTRUCTURE

6.1 SEWER

6.1.1 SEWER SERVICE TO THE PRECINCT

The site is located in the Sydney Water Corporation (SWC) service area, and is located within the existing urban sewer collection network. Preliminary discussions with SWC indicate the mains in the location have adequate capacity to service the SICEEP precinct.

Sections of existing infrastructure will require demolition, and new reticulation pipework shall be installed to suit the new planning. The collection pipework shall be designed in accordance with WSA Sewerage Code of Australia Sydney Water Edition 1- Version 3.

The new sewer collection system and diversions shall be designed and constructed in accordance with SWC requirements which when completed will become SWC assets.

6.1.2 MODIFICATION ASSESSMENT

BUILDING	SEWER DISCHARGE						
	Programmed building delivery date	Annualised Daily Average	Peak Day excl. Cooling Plant Intake	Cooling Plant Intake	Total Peak Day	8:15-9:15am Peak 1	1:00-2:00pm Peak 2
		kL/day	kL/day	kL/day	kL/day	kL/hr	kL/hr
Haymarket		652	782	57	791	78	37
Total Student Accommodation	End '16	150	180	0	180	18	8
Total North West Plot	Aug '16	45	54	9.5	63	6	3
Total South West Plot	May '17	160	192	0	192	19	9
Total South East Plot	2020 +	116	139	0	139	14	6
Total North East Plot	Oct '19	172	206	0	206	20	10
Total North Building	Oct '19	10	12	0	12	1	1
PPP	Jan '15	240.7	551.6	62	613.5	29.4	45.9
Hotel	May '16	92.2	116.4	8.3	124.6	10.6	8.8
TOTAL PEAK HOURS						118	92

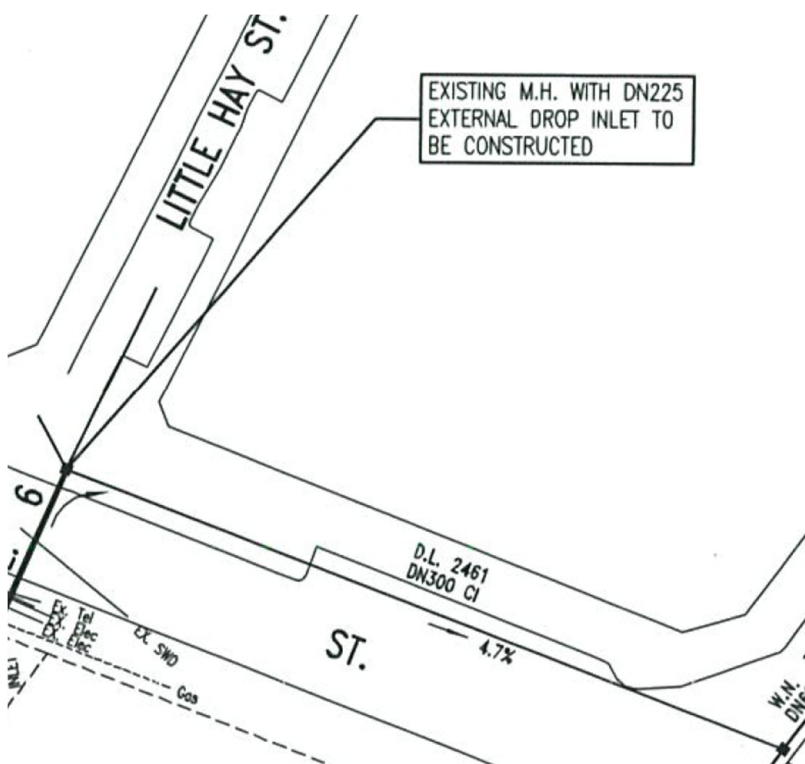
The following assessment of the capacity of the currently proposed sewer network has been undertaken to determine whether the proposed changes to the overall loading can be accommodated.

The results of this assessment can be summarised as follows:

- A) South East Plot Building - Current sizing is OK and can accommodate the proposed 391 Apartments

The South East Building development maintains the same number of apartments to that previously anticipated. The makeup of 391 apartments is:

- S – 4
- 1B – 186
- 2B – 188
- 3B/3B+ - 13



The current sewer loading for the South East area is 391 Apartments.

Total proposed sewer loading is 978 EP (@ 2.5 EP per apartment).

Sewer Line 6 is DN225 can take up 1600 EP, so there is still spare capacity within this sewer.

Since sewer Line 6 is downstream i.e. closer to the DN750 sewer carrier on Hay Street, it is unlikely it will cause problems to catchment area upstream of Line 6.

- B) North Plot Building– Current sizing is OK and can accommodate the increase of 4,088m² Retail/Community Area (Total GFA 6,635m²)

Please note, this assessment above is of Hyder sewer design only. We will need to notify Sydney Water in regard to change in sewer catchment so that Sydney Water can assess whether the downstream sewer and pumping station can take the additional flow.

6.1.3 CONSULTATION

Consultation with SWC was previously undertaken as part of the SSDA2 and further development of the concept planning and detailed planning for the individual plot development applications (SSDA3, SSDA4, SSDA5, SSDA7 and SSDA12).

Further consultation with SWC regarding the proposed modifications to the Concept Proposal will be required prior to commencement of detailed design. As has been demonstrated above, the current proposed sewer design for the precinct has capacity to accommodate the additional flows generated by the changes in the total gross floor areas.

6.2 WATER

6.2.1 WATER SERVICE TO THE PRECINCT

Darling Square is located in the SWC service area, and is located within the existing urban supply network. Preliminary discussions with SWC indicate the mains in the location have adequate capacity to service the SICEEP precinct.

Sections of existing infrastructure will require demolition/capping off, and new reticulation pipework shall be installed to suit the new development scheme planning. The reticulation pipework shall be designed in accordance with Water Supply Code of Australia (WSA)– Sydney Water edition 2012, suitable for the water loading and fire requirements for the development.

On completion, this new water service reticulation will become a SWC asset.

6.2.2 MODIFICATION ASSESSMENT

BUILDING	Programmed building delivery date	WATER CONSUMPTION					
		Annualised Daily Average	Peak Day excl. Cooling Plant Intake	Cooling Plant Intake	Total Peak Day	Peak 1 8:15-9:15am kL/hr	Peak 2 1:00-2:00pm kL/hr
		kL/day	kL/day	kL/day	kL/day	kL/hr	kL/hr
Haymarket		714	857	57	914	90	43
Total Student Accommodation	End '16	165	199	0	199	19	9
Total North West Plot	Aug '16	57	68	57	125	12	6
Total South West Plot	May '17	171	206	0	206	20	10
Total South East Plot	2020 +	124	149	0	149	15	7
Total North East Plot	Oct '19	184	221	0	221	22	10
Total North Building	Oct '19	13	15	0	15	1	1
PPP	Jan '15	267.4	612.9	413	1025.9	53	83
Hotel	May '16	102.4	129.3	55	184.3	15	13
TOTAL PEAK HOURS						158	139

Water demand calculations for the precinct have been revised based on the new proposed gross floor areas and total number of apartments. It is noted that while in some plots the total number of apartments has increased, the number of 1 bedroom apartments has also been increased. The overall water demand in the precinct has therefore been reduced slightly from

the previously calculated demand. It is anticipated that, as the total demand has been reduced, the current proposed water servicing arrangements are likely to be confirmed to be suitable for the new proposed gross floor areas and demand.

6.2.3 CONSULTATION

Consultation with SWC was previously undertaken as part of the SSDA and further development of the concept planning and detailed planning for the individual plot development applications (SSDA3, SSDA4, SSDA5, SSDA7 and SSDA12).

Further consultation with SWC regarding the proposed modifications to the Concept Proposal will be required prior to commencement of detailed design to ensure that the additional demand resulting from the increases in gross floor area and total apartments. It is anticipated that the current proposed water supply design for the precinct has capacity to accommodate the additional demand generated by the changes in the total gross floor areas.

6.3 GAS

Gas infrastructure in the vicinity of the site is owned and operated by Jemena. A 100mm/250mm secondary main (1,050kPa) skirts the northern and eastern border of the site. A branch off this line currently supplies the Entertainment Centre. It is proposed that a high pressure gas regulator will be introduced on this branch and further extended into the site and reticulated to feed the Darling Square precinct.

Jemena had previously indicated during the SSDA2 assessment that whilst the infrastructure in the immediate vicinity of the site has the capacity to service the needs of the different developments across all three precincts, the gas supply to the City of Sydney in general was close to reaching the available capacity of the trunk mains that feed it and that the SICEEP development will be required to contribute towards these costs.

Hyder Consulting will undertake further consultation with Jemena including provision of a revised Concept Proposal plan of the SICEEP development, along with predicted future gas demands for the development, once these demands have been determined.

Subject to commercial negotiations regarding developer contributions towards increasing Jemena's capacity to supply gas to the City of Sydney, it is expected that Jemena will be able to supply the site based on the current development concepts.

6.4 TELECOMMUNICATIONS

6.4.1 TELECOMMUNICATIONS (FIXED)

Utility Responsible

NBN Co

Current in-principle approval as per NBN Co's Early Certificate for the Redevelopment.

Utility Consultation and Agreements

Further consultation with NBN Co will be required, and will be undertaken as part of the detailed design for supply of services to the precinct and each plot.

It is anticipated that the proposed additional gross floor areas will be adequately serviced via the currently proposed conduits feeding each building. Designs previously undertaken for telecommunications provision will be revised to confirm this.

6.4.2 TELECOMMUNICATIONS (WIRELESS)

Utility Responsible (Darling Square and The Bayside (ICC Hotel))

- Telstra;
- Optus;
- Crown Castle (Vodafone Hutchinson site manager);
- Darling Harbour Convention and Exhibition Pty Ltd (DHCE); and
- Sydney Harbour Foreshore Authority (SHFA).

Utility Consultation

Further consultation will be undertaken with each of the service providers identified above, however it is not anticipated that the proposed modifications to the gross floor area will have any further impact on the provision of wireless telecommunications service to the precinct or surrounding areas.

6.5 ELECTRICAL

6.5.1 ELECTRICAL SERVICE TO THE PRECINCT

The site is located in the Ausgrid service area with the Darling Square site being located on the boundary between the CBD Triplex HV Network (to the East) and the Urban Network to the West. Previous discussions with Ausgrid have resulted in Ausgrid preparing an indicative Feasibility Report outlining possible means to service the site including considerations associated with the SICEEP PPP project loads and the Bayside (ICC Hotel). Ausgrid have subsequently confirmed that the PDA and PPP project loads will be serviced by two 11kV Ausgrid feeders originating from the Camperdown Zone Substation located on Purkis Street. Ausgrid have made available the capacity to service the SICEEP precinct as outlined in their Feasibility Study document.

Sections of existing infrastructure will require demolition, either due to planning and/or due to abandonment, and some diversions (where existing infrastructure clashes with the planned development) will be required. All new reticulation shall be installed to suit the new development scheme. The design and installation of the electrical infrastructure (new and/or augmented) will be undertaken by Level 3 and Level 1 and/or 2 Accredited Service Providers to the requirements of Ausgrid. On completion of the staged HV utility works by Lend Lease, the HV electrical infrastructure will become assets of Ausgrid, in stages, commensurate with the development staging.

6.5.2 CONSULTATION

Further consultation with Ausgrid has been undertaken as part of the detailed design for the precinct and plot development applications. The currently proposed servicing provisions include extension of conduits for connection to each of the buildings and establishment of chamber substations within each development lot. It is anticipated that the proposed additional floor space can be serviced via the currently proposed chamber substations.

6.5.3 EXISTING ELECTRICAL INFRASTRUCTURE

Existing Ausgrid HV infrastructure is located in Harbour Street to the east of the Darling Square site and forms part of the CBD Triplex Network. This infrastructure currently supplies the existing Sydney Entertainment Centre complex. To the west of the Darling Square site, the existing infrastructure forms part of the Urban HV Network. This infrastructure is not currently supplying services to the Darling Square site and some of this is routed directly adjacent the proposed development site for the Student Accommodation. Ausgrid's 132kV Cable Tunnel and a separate pit and conduit system (on Darling Drive) lie beneath the planned site for the proposed Student Accommodation. The existing 132kV ductline that runs through the Student Accommodation site is being modified to provide a suitable future ductline route along Darling Drive. The existing 11kV ductlines are being retained and extend to service the HV cabling extensions into each of the new chamber substations.

6.5.4 AUSGRID APPLICATION & CERTIFICATION

Revised maximum forecast demand calculations have been prepared for the SICEEP developments and submitted as part of the 'Application for Connection' process to Ausgrid.

The Design Information Packs from Ausgrid, have been provided for each of the Ausgrid works elements including the new chamber substations, temporary supply kiosk substations, existing 11kV diversions and new Darling Drive streetlighting. Level 3 ASP(s) has been engaged by Lend Lease and design certification has been granted by Ausgrid to permit the construction of the Ausgrid network augmentation projects.

6.6 RAIL CORRIDOR UTILITIES

The proposed modifications to the gross floor area will not have any additional impact on any services located within land currently under the tenure of TransportNSW commensurate with the existing light rail corridor west of Darling Drive.

Further consultation with TransportNSW is not deemed necessary as the current proposal will not impact further upon the light rail network and its environs.

6.7 STORMWATER DRAINAGE

6.7.1 EXISTING STORMWATER DRAINAGE UTILITIES

The existing stormwater drainage infrastructure network within the site falls under the tenure of 3 different authorities being City of Sydney (CoS), the Sydney Harbour Foreshore Authority (SHFA) and Sydney Water Corporation (SWC).

Stormwater drainage within the precinct includes a combination of below ground local network and trunk drainage and above ground overland flow paths. Surface inlet pits within road ways, pedestrian thoroughfares and landscaped areas capture local surface flows and drain them into minor pipe networks that drain to major trunk stormwater culverts within the precinct. These culverts then discharge into Cockle Bay towards the northern end of the SICEEP development precinct. Overland flows that bypass the inlet structures to the underground drainage network flow overland through and around the site to discharge into Cockle Bay at approximately the same location at the trunk stormwater culverts.

The proposed modifications to the gross floor area will have no impact on the currently proposed stormwater network as there is inconsequential change in roof or hard surface areas within the precinct.

All plots within the precinct will be drained via the currently proposed stormwater network.

6.7.2 SWC CONSULTATION

Further consultation with SWC, City of Sydney and the Sydney Harbour Foreshore Authority is not deemed necessary due to the inconsequential change in roof or hard surface areas within the precinct.

6.7.3 WATER SENSITIVE URBAN DESIGN

At present there is minimal infrastructure in place within the precinct that is intended to manage the quality of stormwater runoff from the precinct. The majority of existing runoff within the precinct discharges directly into Cockle Bay in conjunction with untreated flows from upstream external catchments.

Where practicable, the SICEEP development proposes to implement principles of Water Sensitive Urban Design (WSUD) to treat stormwater runoff from the precinct through a combination of measures that include rain water tanks, grass bio-swales, stormwater inlet-pit filters/inserts, gross pollutants traps and the like. The intention of these water sensitive urban design measures will be to reduce the suspended solids and nutrient loads that currently discharge into Cockle Bay via untreated stormwater runoff. The extent of WSUD initiatives will be subject to further consultation with relevant authorities.

7

CONCLUSION

Lend Lease (including Hyder Consulting) has consulted where possible with relevant authorities and utility providers regarding the proposed Darling Square development in the context of:

- Existing utilities and arrangements
- Forecast demand for utilities required by the proposed Darling Square development; and
- New infrastructure, augmentation and diversion works required to facilitate the proposed the Darling Square development.

Previous consultation has confirmed that the Darling Square can be adequately serviced by utility providers, subject to further detailed investigation, scheme development and design development in consultation with the providers. Hyder are currently contacting utility providers to advise of modifications to the Darling Square plots to confirm the precinct can be adequately serviced.

However, as set out in the report the proposed modifications to the GFA are considered to have minimal impact on the existing and proposed service networks within and around the Precinct.