Environmental Assessment Report

Project Application

Residential Buildings R8 & R9 (MP 11_0002)

Barangaroo South

Submitted to Department of Planning and Infrastructure
On Behalf of Lend Lease (Millers Point) Pty Ltd

November 2012 ■ 10751

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JBA Urban Planning Consultants Pty Ltd operates under a Quality Management System. This report has been prepared and reviewed in accordance with that system. If the report is not signed below, it is a preliminary draft.

This report has been prepared by: Michael Rowe

Signature  Date 20/11/12

This report has been reviewed by: Lesley Bull

Signature  Date 20/11/12

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Z Building Code of Australia Report
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Defire

BB Structural Engineering Report
Brown Consulting

CC Environmental, Construction and Site Management Plan
Lend Lease / Cardno

DD Air Quality Impact Assessment
AECOM

EE Construction Traffic Management Plan
ARUP

Statement of Validity

Prepared under Part 3A of the Environmental Planning and Assessment Act, 1979 (as amended)

Environmental Assessment prepared by	
Name	Lesley Bull
Qualifications	BTP (Hons), MEL
Address	Level 7, 77 Berry Street, North Sydney
In respect of	a Project Application
Project Application	
Applicant name	Lend Lease (Millers Point) Pty Limited
Applicant address	Level 4, 30 The Bond, Hickson Road, Millers Point NSW
Land to be developed	Lot 5 in DP 876514
Proposed development	Construction and use of two residential buildings as described in Section 4.0 of this Environment Assessment
Environmental Assessment	An Environmental Assessment (EA) is attached.
Certificate	I certify that I have prepared the content of this Environmental Assessment and to the best of my knowledge: ▪ It is in accordance with the Environmental Planning and Assessment Act and Regulation. ▪ It is true in all material particulars and does not, by its presentation or omission of information, materially mislead.
Signature	
Name	Lesley Bull
Date	20 November 2012

Executive Summary

This Project Application (MP11_0002) and Environmental Assessment Report (EAR) is submitted to the Minister for Planning pursuant to clause 3(1) of Schedule 6A to the *Environmental Planning and Assessment Act 1979* (EP&A Act) that provides for the continued application of the provisions of the now repealed Part 3A of the EP&A Act.

This Project Application is seeking approval for the construction and use of two residential flat buildings within the area of land known generally as Block X at Barangaroo South. The proposed residential buildings are referred to herein as Residential Buildings R8 & R9.

The applicant for the project is Lend Lease (Millers Point) Pty Ltd (Lend Lease). The Barangaroo Delivery Authority is the landowner of the site the subject of the Project Application (Project Application site).

The Barangaroo site is listed as a State Significant Site under Part 12 of Schedule 3 of the State Environmental Planning Policy (Major Development) 2005 (Major Development SEPP). Part 3A of the EP&A Act continues to apply to the project as it falls within the definition of a "transitional Part 3A project" under clause 2 of Schedule 6A to the EP&A Act.

Background

The 22 hectare Barangaroo site has been divided into three distinct redevelopment areas (from north to south) – the Headland Park, Barangaroo Stage 2 (referred to herein as Barangaroo Central) and Barangaroo Stage 1 (herein referred to as Barangaroo South).

Lend Lease was successfully appointed as the preferred proponent to develop Barangaroo South on 20 December 2009.

Lend Lease's appointment followed approximately 18 months of open and subsequently selective tendering by multiple consortia. At each stage of the process, the consortia were required to develop and submit increasingly detailed designs for Barangaroo South, which were evaluated by the Barangaroo Delivery Authority and its evaluation panel.

The scheme submitted by Lend Lease and selected by the State Government was chosen as the winning bid on the basis that it exhibits the urban structure, place making, sustainability, and financial drivers required to ensure the viability of Barangaroo's Southern Precinct.

This Project Application forms one of a series of individual Project Applications that Lend Lease will be submitting to deliver Barangaroo South.

Barangaroo Concept Plan (Mod 4)

The Barangaroo Concept Plan as modified, known as MP06_0162 Modification 4 (Concept Plan (Mod 4)) establishes a planning framework for development at Barangaroo South within which the proposed Residential Buildings R8 & R9 are to be considered. The Concept Plan (Mod 4) provides for:

- a 563,965m^2 mixed use development across the entire Barangaroo site, comprising:
  - a maximum of 514,465m^2 mixed uses GFA, including residential, commercial and retail uses which includes:
    - a maximum of 128,763m^2 of residential uses (a minimum of 99,763m^2 of which will be in Barangaroo South);

  - a maximum of 50,000m^2 of tourist uses GFA;
  - a maximum of 39,000m^2 of retail uses;
- a maximum of 4,500m^2 of active uses GFA (3,000m^2 of which will be in Barangaroo South); and
- a maximum of 12,000m^2 of community uses GFA (10,000m^2 of which will be in Barangaroo South);

- approximately 11 hectares of new public open space/public domain, with a range of formal and informal open spaces serving separate recreational functions and including a 2.2km public foreshore promenade;
- built form principles, maximum building heights and GFA for each development block within the mixed use zone;
- a public domain landscape concept, including parks, streets and pedestrian connections; and
- alteration of the existing seawalls and creation of a portion of new shoreline to the Harbour.

This Project Application complies with the terms of the Concept Plan (Mod 4) and all relevant environmental planning instruments.

Proposed Development

This Project Application seeks approval for:

- demolition of any existing hardstand areas, footings or piles in the area to the west of the approved basement car park;
- piling and associated earthworks and remediation;
- construction and use of an 9-11 storey building (RL 41.5) known as Residential Building R8, comprising:
  - 860m^2 retail floor space;
  - 8,920m^2 residential floor space;
  - 82 apartments;
- construction and use of a 7-9 storey building (RL 36) known as Residential Building R9, comprising:
  - 907m^2 retail floor space;
  - 7,539m^2 residential floor space;
  - 77 apartments;
- operation and use of the basement car park to accommodate 172 car spaces allocated specifically to the proposed uses within Residential Buildings R8 & R9;
- temporary works and uses, including:
  - surfacing of surrounding public domain including part of Globe Street and part of the Foreshore Promenade;
  - hoardings; and
- services and utilities provision required to service the building.

It is noted that the project is targeting a 5-Star Green Star rating under Green Star Multi-Unit Residential v1 which is considered to be Australian excellence.

As identified above, the Project Application does not seek approval for development that was approved under MP10_0023 (herein referred to as the Basement Car Park Approval), which encompasses:

- demolition of any existing structures and footings, hardstand areas, piles and vegetation within the basement area;
- site establishment, including the provision of concrete crushing infrastructure, environmental protection structures, de-watering infrastructure, and groundwater treatment;
- bulk earthworks for the purposes of excavating the basement;
- on-site treatment and remediation of contaminated soils within the basement;
- transportation or stockpiling of excavated material;
- structural works associated with the basement levels; and
- associated utilities and infrastructure works associated with that Project Application including decommissioning and / or relocation of services.

Basement Car Park Approval

The Basement Car Park Approval relates to Blocks 1, 2, 3 (in part), 4A (in part) and X of Barangaroo South. It approves demolition works, tree removal, site establishment, bulk earthworks, on-site treatment and remediation of contaminated soils and construction of a basement car park to accommodate up to 779 car parking spaces and associated services and infrastructure to support the initial phases of the future development of Barangaroo South, including Residential Buildings R8 & R9. Accordingly, this Project Application does not seek approval for the works contemplated by the Basement Car Park Approval. It does, however, seek approval for the operation and use of part of the basement car park.

Lend Lease is currently seeking the Minister's approval under section 75W of the EP&A Act to amend the approved Basement Car Park Approval. There are two current modifications:

- Basement Car Park (Mod 4) Application: which seeks to include concrete batching as part of the construction methodology (currently under assessment); and
- Basement Car Park (Mod 5) Application: which seeks to reconfigure the commercial vehicular access ramps to the basement and provide the detailed design for the Harbour Heat Rejection plant (about to be lodged for Test of Adequacy).

The implications of the Basement Car Park Mod 4 and Mod 5 Applications on the Project Application are considered in the relevant sections of this EAR.

Strategic and Statutory Planning Considerations

On 1 October 2011 Part 3A of the EP&A Act was repealed. Despite this, Part 3A continues to apply to certain projects subject to the transitional provisions identified in Schedule 6A to the Act.

Pursuant to clause 3(1) of Schedule 6A, the provisions of Part 3A continue to apply to and in respect of "transitional Part 3A projects". This project application falls within the definition of a "transitional Part 3A project" as set out in clause 2 of Schedule 6A because environmental assessment requirements (DGRs) were last notified within 2 years before the Part 3A repeal date (being 1 October 2011). As DGRs for MP11_0002 were issued on 21 January 2011 and therefore prior to 1 October 2011, and a current major project declaration remains in force, Residential Buildings R8 & R9 is a transitional Part 3A project.

Clause 3 of Schedule 6A to the Act provides that any State environmental planning policy or other instrument made under or for the purposes of Part 3A as

in force on the repeal of that Part and as amended after that repeal, such as the Major Development SEPP, continues to apply to and in respect of a transitional Part 3A project.

The Project Application is consistent with, or is justified in terms of relevant legislation, strategies and planning instruments including the Major Development SEPP, State Environmental Planning Policy (State and Regional Development) 2011 (State And Regional Development SEPP), State Environmental Planning Policy 55 - Remediation of Land (SEPP 55), State Environmental Planning Policy 65 - Residential Flat Buildings (SEPP 65), State Environmental Planning Policy (BASIX) 2005 (BASIX SEPP), State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP), State Regional Environmental Plan (Sydney Harbour Catchment) 2005, Sydney Harbour Foreshores and Waterways Area Development Control Plan, the NSW State Plan, Sydney Metropolitan Plan and the Draft Sydney City Subregional Strategy.

In accordance with relevant provisions of the Major Development SEPP, in determining an application for a new building at Barangaroo, the consent authority must consider whether the proposed development exhibits design excellence.

FJMT and PTW, two architects known for their outstanding reputation in architecture, selected from the Panel of Nominated Architects, set out in the Design Excellence Strategy prepared for Concept Plan (Mod 4), have been commissioned to design Residential Buildings R8 & R9 respectively. In accordance with the criteria set out in clause 19(2) of Part 12 of Schedule 3 of the Major Development SEPP, the buildings achieve design excellence through:

- a high standard of architectural design, materials and detailing, appropriate to the building type and location;
- the building form, external appearance and the ground floor plane providing high amenity and quality of public domain;
- reflecting sustainable design principles including achieving a 5 Star Green Star rating; and
- Lend Lease's commitment to ensuring continuity in the design process and realisation of the submitted design in the completed building by retaining the same architectural team through to completion.

It is formally requested as part of this Project Application that the Director-General certifies in writing that a design competition is not required in relation to Residential Buildings R8 & R9 because of the excellence of the proposed design of the buildings (having regard to cl19(4) of Part 12 of Schedule 3 to the Major Development SEPP).

Environmental Impact

This Environmental Assessment and the technical supporting investigations provide a detailed assessment of the environmental impact of the proposed Residential Buildings R8 & R9. It demonstrates that the proposed development is satisfactory with respect to:

- Urban design and built form;
- Visual impact;
- Public domain;
- Residential amenity;
- Remediation;
- Overshadowing;

- Wind impacts;
- Reflectivity;
- Transport and accessibility;
- Climate change and sea level rise;
- Ecologically sustainable development;
- Archaeology and European heritage;
- Operational noise and vibration;
- Building Code of Australia and Accessibility;
- Fire safety;
- Infrastructure and utilities;
- Structural engineering;
- Geotechnical constraints;
- Operational waste management;
- Environmental, construction and site management, including construction noise and vibration impacts, construction air quality, construction traffic management and construction waste management.

All measures that have been recommended as part of the detailed technical investigations and studies to mitigate potential environmental impacts have been incorporated into the Project Application, or are included in the Statement of Commitments.

The technical documentation accompanying the Basement Car Park Approval provides detailed information and environmental assessment of a number of planning and environmental issues that are beyond the scope of works proposed in this Project Application, including:

- demolition and tree removal;
- transportation, re-use and disposal of excavated material;
- non indigenous archaeology;
- indigenous archaeology;
- geotechnical impacts;
- acid sulphate soils;
- de-watering, groundwater treatment and water quality; and
- environmental protection structures.

1.0 Introduction

This Project Application and Environmental Assessment Report (EAR) is submitted to the Minister for Planning and Infrastructure pursuant to clause 3(1) of Schedule 6A to the *Environmental Planning and Assessment Act 1979* (EP&A Act) that provides for the continued application of the provisions of the now repealed Part 3A of the EP&A Act. The Project Application seeks approval for construction and use of two residential buildings (referred to herein as Residential Buildings R8 & R9) within the area of land known generally as Block X at Barangaroo South as described in Section 4.0 of this EAR.

The EAR has been prepared by JBA, for the proponent, Lend Lease (Millers Point) Pty Limited (Lend Lease), and is based on plans and drawings provided by FJMT, PTW, and Lend Lease Design (LLD) (**Appendix A**) and other supporting technical documents provided by the proponent's expert consultant team (see Table of Contents).

The EAR describes the Project Application site, its environs and the proposed development, and includes an assessment of the proposal in accordance with the Director-General's Environmental Assessment Requirements (DGRs) issued on 21 January 2011 pursuant to Part 3A of the EP&A Act (**Appendix B**). It should be read in conjunction with the studies and other information appended to this report. The studies provide a technical assessment of the environmental impacts of the proposed development, and recommend proposed mitigation measures to manage potential environmental impacts associated with the proposal.

The lodgement of the Project Application by Lend Lease follows the Bulk Excavation and Basement Car Park Project Approval (Basement Car Park Approval) (MP10_0023) and Commercial Buildings C3, C4 and C5 Approvals (MP10_0025, MP10_0004, MP10_0026).

The Basement Car Park Approval relates to Blocks 1, 2, 3 (in part), 4A (in part) and X of Barangaroo South. Approval was granted for demolition works, tree removal, site establishment, bulk earthworks, on-site treatment and remediation of contaminated soils and construction of a basement car park to accommodate up to 779 car parking spaces and associated services and infrastructure to support the initial phases of the future development of Barangaroo South, including the development of Residential Buildings R8 & R9. Accordingly, this Project Application does not seek approval for the works already approved under the Basement Car Park Approval.

This EAR should be read in conjunction with the EAR prepared by JBA to accompany the Basement Car Parking Project Application (dated June 2010), the Preferred Project Report (PPR) for that Application prepared by JBA (dated September 2010), and the Section 75W Modification Applications for Mod 1-5[1] prepared by JBA.

[1] Note: Mod 2 was withdrawn in October 2011

1.1 Background

1.1.1 Approved Concept Plan

An international design competition for Barangaroo was held in 2005, attracting 139 entries from around the world. The winning design by Hill Thalis Architecture + Urban Projects, Paul Berkemeier Architects and Jane Irwin Landscape Architecture was announced in March 2006 together with a naming competition for the new headland precinct. The jury recommended key changes to the winning proposal which were required to be incorporated into the Barangaroo Concept Plan development.

The Concept Plan was approved in February 2007. The Concept Plan covers urban design and policy initiatives and is the statutory planning approval to guide the urban renewal of Barangaroo.

The approved Concept Plan has been modified four times since originally being approved and the Statement of Commitments has been revised accordingly. The most recent modification, Concept Plan (Mod 4) was approved on 16 December 2010.

To accommodate the Concept Plan (Mod 4), Schedule 3 Part 12 of the Major Development SEPP was amended. The amendment rezoned parts of the Barangaroo site and adjoining areas of land from RE1 Public Recreation, W1 Maritime Waters and Transport to B4 Mixed Use and RE1 Public Recreation. The Amendment also modified the distribution of gross floor area and building heights within the Barangaroo site.

The Concept Plan approval (Mod 4) provides for:

- a 563,965m^2 mixed use development across the entire Barangaroo site, comprising:
  - a maximum of 514,465m^2 mixed uses GFA, including residential, commercial and retail uses which includes;
    - a maximum of 128,763m^2 of residential uses (a minimum of 99,763m^2 of which will be in Barangaroo South);
    - a maximum of 50,000m^2 of tourist uses GFA;
    - a maximum of 39,000m^2 of retail uses;
  - a maximum of 4,500m^2 of active uses GFA (3,000m^2 of which will be in Barangaroo South); and
  - a maximum of 12,000m^2 of community uses GFA (10,000m^2 of which will be in Barangaroo South);
- approximately 11 hectares of new public open space/public domain, with a range of formal and informal open spaces serving separate recreational function and including a 2.2km public foreshore promenade;
- built form principles, maximum building heights and GFA for each development block within the mixed use zone;
- public domain landscape concept, including parks, streets and pedestrian connections; and
- alteration of the existing seawalls and creation of a portion of the new shoreline to the Harbour.

Under the Concept Plan (Mod 4) the following key provisions apply to Block X within which Residential Buildings R8 & R9 are proposed:

- a maximum GFA of 18,908m^2;
- a maximum residential GFA of 16,463m^2; and
- a maximum building height of RL 41.5.

1.1.2 Stage 1 Tender and Bid Process

The 22 hectare Barangaroo site has been divided into three distinct redevelopment areas (from north to south) – the Headland Park, Barangaroo Stage 2 (referred to herein as Barangaroo Central) and Barangaroo Stage 1 (herein referred to as Barangaroo South).

Lend Lease was successfully appointed as the preferred proponent to develop Barangaroo South on 20 December 2009. Lend Lease's appointment followed approximately 18 months of open and subsequently selective tendering by multiple consortia. At each stage of the process, the consortia were required to develop and submit increasingly detailed designs for Barangaroo South, which were evaluated by the Barangaroo Delivery Authority and its evaluation panel.

The Stage 1 bid chronology can be broadly summarised as follows:

- April 2008 – Stage 1 Expression of Interest released;
- June 2008 – Stage 1 Expression of Interest closes;
- September 2008 – Shortlist of 3 proponents (including Lend Lease) announced and invited to participate in the Stage 1 Request for Detailed Proposals (RFDP);
- August 2009 – Lend Lease and Brookfield Multiplex chosen as final 2 proponents to participate in the Final Phase RFDP process;
- November 2009 – Final Phase bids close; and
- December 2009 – Lend Lease announced as winning preferred proponent.

The scheme submitted by Lend Lease and selected by the State Government was chosen as the winning bid on the basis that it exhibits the urban structure, place making, sustainability, and financial drivers required to ensure the viability of Barangaroo's Southern Precinct.

A modification to the Concept Plan was required to facilitate development of certain elements of Lend Lease's winning scheme, particularly the redistribution of built form and GFA.

This Project Application forms one of a series of individual project applications that Lend Lease will be submitting to deliver Barangaroo South.

1.1.3 Bulk Excavation and Basement Car Park

An EAR for the Basement Car Park was approved by the Minister for Planning on 2 November 2010. Following that approval a further two Section 75W Modification Application to modify the Basement Car Park have been approved.

The development approved as part of the Basement Car Park Approval includes:

- demolition of existing structures and footings, part of an underground caisson wall, hardstand areas, removal of piles, and removal of existing vegetation within Blocks 1, 2, 3(in part), 4A (in part) and X and within the adjacent public domain area, which have not been previously approved to be demolished or removed under MP 07_0077 Demolition Works;

- site establishment, including provision of concrete crushing infrastructure, environmental protection structures, de-watering infrastructure, and groundwater treatment;
- bulk earthworks for the purposes of excavating for the basement within Blocks 1, 2, 3(in part), 4A (in part) and X and the adjacent public domain area;
- on-site treatment and remediation of contaminated soils;
- temporary stockpiling of excavated material across the Barangaroo site as required;
- transportation and disposal of material off site, where required;
- structural works, comprising the construction of:
  - foundations (piling, caps and footings);
  - basement levels;
  - perimeter retention system to basement walls; and
  - all associated elements and structures;
- up to 779 car parking spaces which equates to the car parking required to support GFA as envisaged by the approved Concept Plan (Mod 4) for Blocks 1, 2, 3(in part), 4A (in part) and X in accordance with the car parking rates approved under the Concept Plan;
- indicative parking layout, loading, plant location, bicycle parking and associated amenities;
- road works;
- construction of temporary vehicular access from Hickson Road and permanent vehicular access from Lime Street;
- associated utilities and infrastructure works including decommissioning and/or relocation of services; and
- temporary use of the basement for construction related storage and activity.

Approval was not sought under the Basement Car Park Approval for the detailed final internal layout, allocation of parking spaces to future land uses/specific buildings, or for operation of the basement car park.

The Project Application proposes building works, including the core / foundations of the Residential Buildings R8 & R9 and temporary public domain above the basement level within part of Block X. It also proposes the detailed layout and operation of the car parking and the appropriate number and allocation of car parking spaces within the car park for use associated with the Residential R8 & R9 development.

The basement car park has been designed such that the building core locations, final car parking provision and layout, and pedestrian and vehicular access arrangements (including lifts and fire stairs) can continue to be resolved whilst having regard to the future built form above the basement car park, which is to be the subject of separate detailed project application(s) in the future.

Lend Lease is currently seeking the Minister's approval under section 75W of the EP&A Act to amend the approved Basement Car Park Approval. There are two current modifications:

- Basement Car Park (Mod 4) Application: which seeks to include concrete batching as part of the construction methodology; and

- Basement Car Park (Mod 5) Application: which seeks to reconfigure the commercial vehicular access ramps to the basement and provide the detailed design for the Harbour Heat Rejection plant.

The modified basement access proposed as part of the Basement Car Park (Mod 5) Application does not affect the access to or structure of the basement related to the subject Project Application. However, the Project Application has been designed to reflect the latest basement designs in the Basement Car Park Mod 5 Application and therefore must be read in conjunction with that proposed modification.

1.1.4 Commercial Buildings C3, C4 and C5

Project Approval has been granted for three commercial buildings, known as Commercial Building C3, C4 and C5. **Table 1** below provides a summary of the key development information for each of the buildings. A photomontage of the three buildings is shown at **Figure 1**.

Table 1 – Summary of Commercial Buildings C3, C4 and C5

	Commercial Building C3	Commercial Building C4	Commercial Building C5
Height			
– storeys	49	42	39
– Max RL	209	182	168
GFA	115,448m^2	99,656m^2	90,539m^2
– Commercial	106,633m^2	96,965m^2	85,130m^2
– Retail	7,021m^2	2,691m^2	5,315m^2
Parking Spaces	196	166	153
Bicycle Spaces	448	720	326

Figure 1 – Commercial Buildings C3, C4, and C5

1.1.5 Barangaroo Delivery Authority

The Barangaroo Delivery Authority was established on 30 March 2009 under the *Barangaroo Delivery Authority Act 2009* (NSW) to manage the redevelopment of Barangaroo and to deliver world class benchmarks in urban design, public domain and sustainability.

The creation of the Barangaroo Delivery Authority reinforces the NSW Government's commitment to the delivery of Barangaroo in a coordinated and financially responsible manner.

The Barangaroo Delivery Authority is subject to the control and direction of the NSW Premier.

The objects of the *Barangaroo Delivery Authority Act* are:

- to encourage the development of Barangaroo as an active, vibrant and sustainable community and as a location for national and global business;
- to create a high quality commercial and mixed use precinct connected to and supporting the economic development of Sydney;
- to facilitate the establishment of Barangaroo Headland Park and public domain land;
- to promote the orderly and sustainable development of Barangaroo balancing social, economic and environmental outcomes; and
- to create in Barangaroo an opportunity for design excellence outcomes in architecture and public domain design.

The Barangaroo Delivery Authority is the registered landowner of most of the Barangaroo site.

1.1.6 Part 3A Repeal

On 1 October 2011 Part 3A of the EP&A Act was repealed. Despite this, Part 3A continues to apply to certain projects subject to the transitional provisions identified in Schedule 6A of the Act.

Clause 3 of Schedule 6A of the EP&A Act provides that Part 3A continues to apply to "transitional Part 3A projects", relevantly including undetermined projects in respect of which the DGRs were issued before 1 October 2011 and a current major project declaration remains in force. As the DGRs for MP11_00002 were issued on 21 January 2011 and therefore prior to 1 October 2011 and a current major project declaration remains in force, Residential Buildings R8 & R9 are a transitional Part 3A project.

Clause 3 of Schedule 6A to the EP&A Act also provides that any State environmental planning policy or other instrument made under or for the purposes of Part 3A, as in force on the repeal of that Part and as amended after that repeal, continues to apply, to and in respect of, a transitional Part 3A project (as defined).

1.1.7 Barangaroo Review

In May 2011 the Minister for Planning announced a 'Short Sharp Review' (General Review) of the Barangaroo development generally. The General Review looked at the reasonableness of the process that led to the current planning for Barangaroo in order that parties, including the Government and Lend Lease, could make an assessment about the reasonableness of the outcome proposed at Barangaroo.

The report outlining the outcomes of the General Review was released on 1 August 2011 (Report). The Report made a number of observations and

recommendations including in relation to the early planning, appointment of Lend Lease, Concept Plan (Mod 4), land use mix, scale and density, design excellence, transport, headland park, cruise terminal, contamination, public domain, and governance.

Relevantly to this project application, the Report stated "The level of residential development proposed appears appropriate subject to design". The design of the proposed residential development is assessed in Sections 5.3 and 5.4 and **Appendix A**.

1.2 Summary of Approval Sought

The Project Application seeks approval for the construction and use of two residential buildings with ground floor retail and associated services and infrastructure.

In summary, this Project Application seeks approval for:

- demolition of any existing hardstand areas, footings or piles in the area to the west of the approved basement car park;
- piling and associated earthworks and remediation;
- construction and use of an 9-11 storey building (RL 41.5) known as Residential Building R8, comprising:
  - 860m^2 retail floor space;
  - 8,920m^2 residential floor space;
  - 82 apartments;
- construction and use of a 7-9 storey building (RL 36) known as Residential Building R9, comprising:
  - 907m^2 retail floor space;
  - 7,539m^2 residential floor space;
  - 77 apartments;
- operation and use of the basement car park to accommodate 172 car spaces allocated specifically to the proposed uses within Residential Buildings R8 & R9;
- temporary works and uses, including:
  - surfacing of surrounding public domain including part of Globe Street and part of the Foreshore Promenade;
  - hoardings; and
- services and utilities provision required to service the building.

As identified above, the Project Application does not seek approval for development that was approved under the Basement Car Park Approval, which encompasses:

- demolition of any existing structures and footings, hardstand areas, piles and vegetation within the basement area;
- site establishment, including the provision of concrete crushing infrastructure, environmental protection structures, de-watering infrastructure, and groundwater treatment;
- bulk earthworks for the purposes of excavating the basement;
- on-site treatment and remediation of contaminated soils within the basement;
- transportation or stockpiling of excavated material;

- structural works associated with the basement levels; and
- associated utilities and infrastructure works associated with that Project Application including decommissioning and / or relocation of services.

1.3 Project Team

An expert project team has been formed to deliver the project and includes:

Proponent	Lend Lease (Millers Point) Pty Limited
Urban Planning	JBA
Design	FJMT PTW Lend Lease Design
Landscape	Aspect / Oculus
Traffic and Transport	ARUP
Contamination and Remediation	AECOM
Geotechnical	ARUP
Stormwater and Drainage	Cardno
Soil and Water	Lend Lease
Waste Management	ARUP
Air Quality & Odour	AECOM
Noise & Vibration	Renzo Tonin
Climate Change and Sea Level Rise	ARUP
Heritage	
▪ **Non Indigenous Archaeology**	Casey and Lowe
▪ **Indigenous Heritage and Archaeology**	Comber and Stening
Environmental, Construction & Site Management	Cardno and Lend Lease Project Management and Construction
Infrastructure & Services Provision	ARUP and Lend Lease
Ecologically Sustainable Development	Lend Lease Design
Shadow impacts	Lend Lease
Wind	CPP
Reflectivity	ARUP
Building Services	AECOM and SPP
Structural Engineering	Brown Consulting
Access	McKenzie Group Consulting
BCA	McKenzie Group Consulting
Fire Engineering	Defire
Site Auditor	Graeme Nyland (Environ)

2.0 Site Analysis

2.1 Site Location and Context

Barangaroo is located on the north western edge of the Sydney Central Business District, bounded by Sydney Harbour to the west and north, the historic precinct of Millers Point (for the northern half), The Rocks and the Sydney Harbour Bridge approach to the east and a range of new development dominated by large CBD commercial tenants to the south.

The 22 ha Barangaroo site is generally rectangular in shape and has a 1.4 kilometre harbour foreshore frontage, with an eastern street frontage to Hickson Road. The locational context of the site is shown in **Figure 2**.

Figure 2 – Locality Plan

2.2 Project Application Site Description

The Barangaroo site has been divided into three distinct redevelopment areas (from north to south) – the Headland Park, Barangaroo Central and Barangaroo South, and has been subject to multiple investigations that detail the physical and natural characteristics of the site.

The area of land within which development is proposed under this Project Application (the Project Application site), comprises land generally known and identified in the approved Concept Plan (Mod 4) as Block X (see the area coloured in red in **Figure 3**). In addition there will be works within the public domain to the west of Block X and the basement including car parking spaces and provision of infrastructure and services.

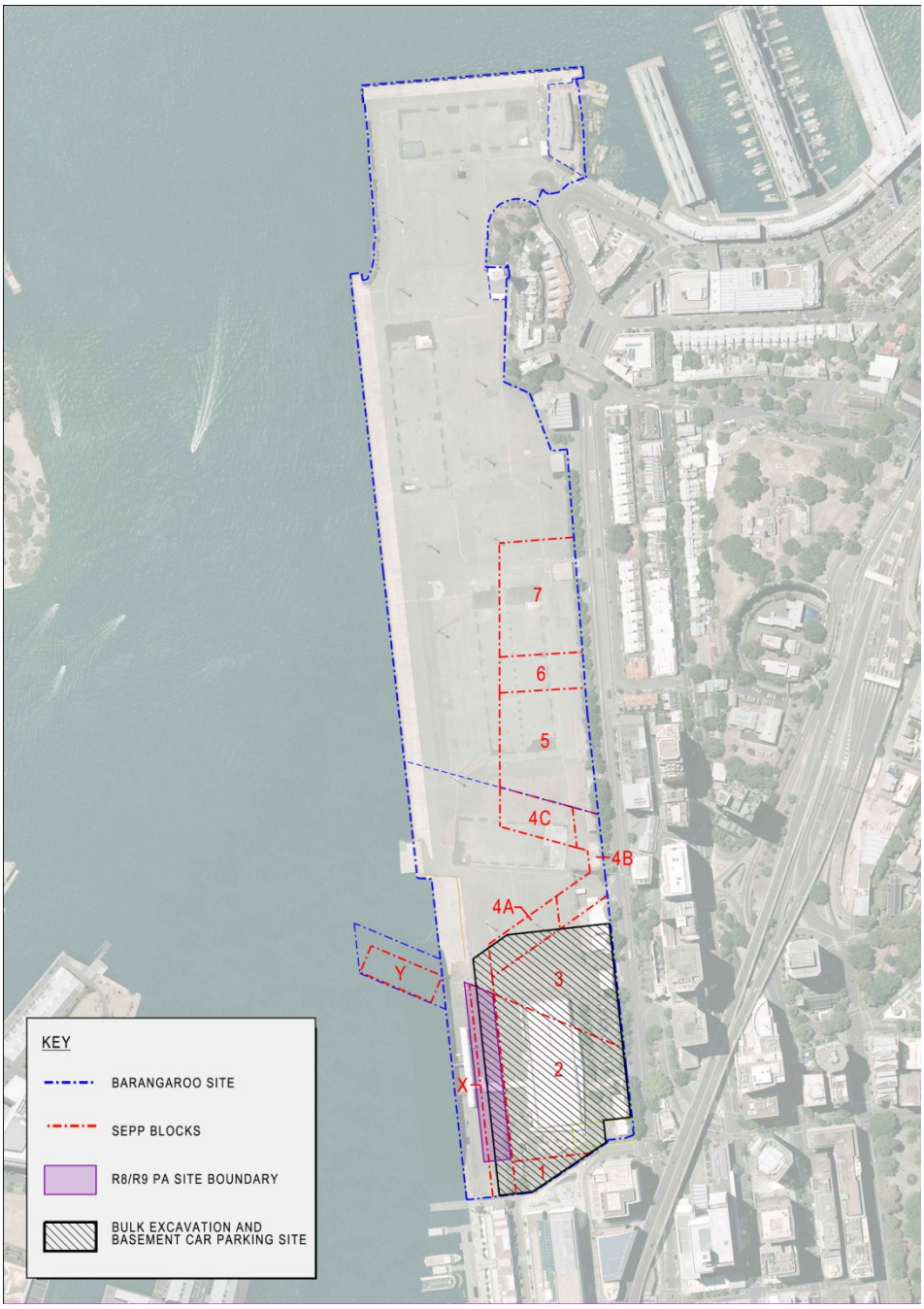


Figure 3 – Barangaroo site showing the Project Application site

2.3 Land Ownership and Description

A site survey plan is included at **Appendix C**.

Under the *Barangaroo Delivery Authority Act 2009* (NSW), Barangaroo is defined as the land identified as the "Barangaroo Delivery Authority operational area on the Barangaroo Delivery Authority Operational Area Map". The operational area comprises Lots 1-6 in DP 876514, Lot 7 in DP 43776, Lot 100 in DP 83823 and Lots 6 and 7 in DP 869022.

The Barangaroo Delivery Authority owns the majority of Barangaroo, however small areas are owned by other Government agencies including the Marine Ministerial Holding Corporation, the Roads and Maritime Services and the Crown.

The Project Application site comprises part Lot 5 in DP 876514. The Barangaroo Delivery Authority is the owner of the Project Application site. The Barangaroo Delivery Authority has issued landowner's consent to the making of this Project Application, as evidenced by the completed Application Form submitted under separate cover.

2.4 Existing Development and Structures

2.4.1 Built Form

The Barangaroo site comprises an open concrete / bitumen apron which is largely reclaimed over water.

As identified at Section 1.1.3, under the Basement Car Park Approval, approval was granted for the demolition of any existing structures and footings, part of an underground cassion wall, hardstand areas, removal of piles, and removal of existing vegetation within Blocks1, 2, 3 (in part), 4A (in part) and X of Barangaroo, and with the adjacent public domain area, which had not previously been approved to be demolished or removed under the approval issued in respect of MP 07_0077 Demolition Works. Construction under the Basement Car Park Approval has commenced and the Project Application site is located within the zone of those construction works.

It is noted that this application seeks approval for demolition of any hardstand areas, footings or piles in the area west of the approved car park.

2.4.2 Infrastructure and Services

Stormwater

The external catchment draining to the existing stormwater drainage system is approximately 14 Ha. The existing Stormwater Drainage system consists of large diameter pipes along Hickson Road that turn across the site and discharge untreated water into the harbour. Overland flows in excess of the piped flows are directed to the existing low point in Hickson Road and ponded water traverses the Barangaroo South site and ultimately discharges to the harbour.

Changes to the existing stormwater network are approved under the Basement Car Park Approval.

There are no existing stormwater pipes located within the Project Application site. The proposed Residential Buildings R8 & R9 will utilise the stormwater services provided under the Basement Car Park Approval.

Water

The existing water supplies to the Barangaroo site are supplied from a 300mm diameter Sydney Water main in Hickson Road.

There are no Sydney Water potable water mains located within the Project Application site.

Sewer

There is an existing sewer trunk main in Hickson Road near the western kerb line draining which drains to an existing Sydney Water sewage pumping station SP1129 outside the site.

Electricity

The Barangaroo South site was served by 5 KV high voltage feeders entering the site at the southern end of Hickson Road and terminating in an AusGrid (formerly Energy Australia) HV switch room. The HV supply and private HV reticulation were decommissioned and the private substations demolished as part of demolition works in 2010/2011.

Telecommunications

The majority of the existing network infrastructure is limited to basic copper services in the vicinity of the Barangaroo South site. The current pathways in the area are servicing a temporary Shipping Terminal and surrounding developments.

All major telecommunications services are located to the east on Kent Street, and new and augmented pathways have been recently installed to the south of the Precinct to service new developments in Kent Street, Shelly Street and the 'King Street Wharf' precinct.

Natural Gas

There is an existing gas supply at the intersection of Napoleon Street and Hickson Road and also at the end of Lime Street near the south-west corner of the site.

2.5 Traffic and Transport

2.5.1 Vehicular and Pedestrian Access

Hickson Road connects into Sussex Street south of Napoleon Street and is the predominant north-south access road for Barangaroo South and consequently the Project Application site.

Local road access to the Barangaroo site area is provided as follows:

- from the CBD via Napoleon Street;
- from Millers Point via Dalgety Road;
- via George Street from the north east;
- via Sussex Street/Kent Street/Napoleon Street from the southern CBD;
- via Harbour Street, Wheat Road (through King Street Wharf) to Shelley Street from the south; and
- via the east-west alignment of Napoleon Street and Margaret Street.

2.5.2 Public Transport

The Barangaroo site is served by the following public transport modes:

- **Rail:** Wynyard, Martin Place, Town Hall and Circular Quay railway stations are within viable walking distance of the Barangaroo site and provide frequent services throughout the day.
- **Bus:** There is a major bus interchange located at Wynyard Station for buses servicing the Hills District, Northern Beaches and the North Shore areas. These services all utilise the bus lane on the Harbour Bridge to access Wynyard.

  A number of bus routes also terminate in the vicinity of the Barangaroo site, King Street Wharf and Circular Quay.
- **Ferry:** Commuter ferry services arrive and depart from both King Street Wharf and Circular Quay.

Refer to Transport Management and Access Plan (Supplementary) prepared by ARUP at **Appendix D**.

2.5.3 Pedestrians and Cyclists

Pedestrian Access

The NSW Government's 2011-12 Budget includes $51 million to start building the Wynyard Walk (previously Barangaroo Pedestrian Link), a direct pedestrian link between the new Barangaroo development and Wynyard Station and transport interchange.

The NSW Government has commenced construction on Wynyard Walk (previously Barangaroo Pedestrian Link), a direct pedestrian link between the new Barangaroo development and Wynyard Station and transport interchange. The Wynyard Walk, expected to be complete by mid 2015, will provide a high level of access to public transport for the growing western corridor of the CBD, including Barangaroo and the King Street Wharf. This will assist in accommodating the additional commuters who are expected to use this route to access the Barangaroo site.

Pedestrian access to Barangaroo is available along local roads, all of which are footpath lined. Pedestrian access is also available across the Barangaroo site and along the waterfront via fenced routes. Notwithstanding the high degree of pedestrian footpaths and thoroughfares, there are generally low levels of pedestrian activity adjacent to the site.

Bicycles

A bicycle lane exists along Hickson Road between Circular Quay and Napoleon Street which is utilised by both commuter and recreational cyclists. Cycling connections to the site have been improved through the construction of separated cycleways along King Street and Kent Street by Council. Internally, the site is relatively flat which will encourage pedestrian and cycle movement.

2.6 Physical Characteristics

2.6.1 Topography

The ground surface of the entire Project Application site is at an elevation of approximately 2m (AHD).

The surrounding landform (outside the bounds of the site) rises rapidly to the east. A 10m high sandstone cliff is situated east of Hickson Road and Sussex Street and is likely to continue beneath the fill and alluvial materials present on the site (see Section 2.6.2 below).

2.6.2 Geology and Geomorphology

Investigation reports prepared previously by AECOM and others provide a detailed analysis of the geological and geomorphological characteristics of the Project Application site and the Barangaroo site generally.

The Geotechnical Report prepared by ARUP at **Appendix E** provides a detailed analysis of the geological and geomorphological characteristics of the Project Application site.

The Sydney Geological Map Scale 1:100,000 and the Sydney Geological Map Scale 1:250,000 indicate the Barangaroo site is underlain by Hawkesbury Sandstone. Quaternary sediments and man-made fill overlay the Hawkesbury Sandstone.

The Geotechnical Report indicates that the site is underlain by manmade fill, which is in turn underlain by marine sediment and Hawkesbury Sandstone. The fill material is up to 21m deep and comprises a mix of silt clay, course gravel and fragments of concrete, brick, steel, glass and ash.

Structural lineaments and dykes of note include:

- The Luna Park Fault Zone located near the northern extent of the Barangaroo South area and which is associated with significant reductions in rock strength; and
- The Pittman LIV Dyke is inferred to traverse the northern extent of the Barangaroo South area, approximately 300m north of the existing Passenger Terminal.

2.6.3 Groundwater and Hydrogeology

The groundwater profile beneath the Project Application site is likely to be influenced by the groundwater flow from the east beneath the CBD and tidal fluctuations associated with Sydney Harbour.

Data collected in July 2006 indicates that the depth of groundwater ranged between 1.7m and 2.5m below ground level. Short term variations in groundwater levels were reported particularly close to the sea wall.

A detailed chemical composition of the groundwater was prepared and is addressed in ERM's Remedial Action Plan prepared to accompany the Basement Car Park Approval.

In summary, groundwater analysis indicates varying concentrations of contaminates. Detectable concentrations of TPH, PAHs and BTEX are limited to the north eastern area of Barangaroo South associated with the former gasworks. Heavy metal concentrations likely to be related to fill materials are present in groundwater across the site.

As identified at Section 1.1.3, under the Basement Car Park Approval, approval was granted for site establishment works within Blocks X (which includes the Project Application site), including de-watering infrastructure and groundwater treatment, and the on-site treatment and remediation of contaminated soils.

This Project Application is informed by the detailed assessments in relation to groundwater and hydrogeology undertaken as part of the Basement Car Park Approval.

2.6.4 Soil Landscapes

The 1:100,000 Sydney Soil Landscape Map indicate the Project Application site is underlain by disturbed soils.

An Acid Sulfate Soils Management Plan prepared by AECOM in relation to the Basement Car Park Approval has identified Potential Acid Sulfate Soils (PASS) to be potentially present at depths ranging from -10.58 to15.36m AHD across the Project Application site (refer to Acid Sulfate Soils Report prepared by AECOM at Appendix I of the EAR prepared by JBA Planning dated June 2010 in support of the Bulk Excavation and Basement Car Parking Project Application).

This plan provided strategies for dealing with those PASS (refer to Appendix I of that EAR).

As identified at Section 1.1.3, under the Basement Car Park Approval, approval was granted for bulk excavation works.

This Project Application is informed by the detailed soils assessments undertaken as part of the Basement Car Park Approval.

2.6.5 Site Contamination

A number of site history studies and environmental site investigations have been undertaken to assess the extent and nature of contaminants within the Barangaroo site as a whole, as well as within the Barangaroo South area and the Project Application site specifically.

Investigations have revealed that both the soil and groundwater is contaminated, and that the extent of the contaminated materials varies across the Barangaroo site.

Concentrations of lead, total petroleum hydrocarbons (TPHs), benzene, xylenes and polycyclic aromatic hydrocarbons (PAHs) in the soil variably exceed prescribed criteria levels. The contamination is largely associated with the operation of a former gasworks (which were located to the north east of the Project Application site), and from the importation of materials historically used to fill the site.

In May 2009, the Department of Environment, Climate Change and Water (DECCW) (now the Office of Environment and Heritage) declared part of the Barangaroo site (part of Blocks 3, 4A, 4B, 4C and 5) and immediately adjacent land within the Hickson Road reservation to be a "remediation site" under the Contaminated Land Management Act, 1997 (Declaration No. 21122) (known as the 'DECCW Declaration Area') (see **Figure 4**). No part of the Residential Buildings R8 & R9 Project Application is located within the DECCW Declaration Area.

Remediation of that part of the Barangaroo site comprising the relevant part of Blocks 3, and Blocks 4A, 4B, 4C and 5, together with the Southern Cove and the adjacent area of Hickson Road, will be the subject of a future project application(s).

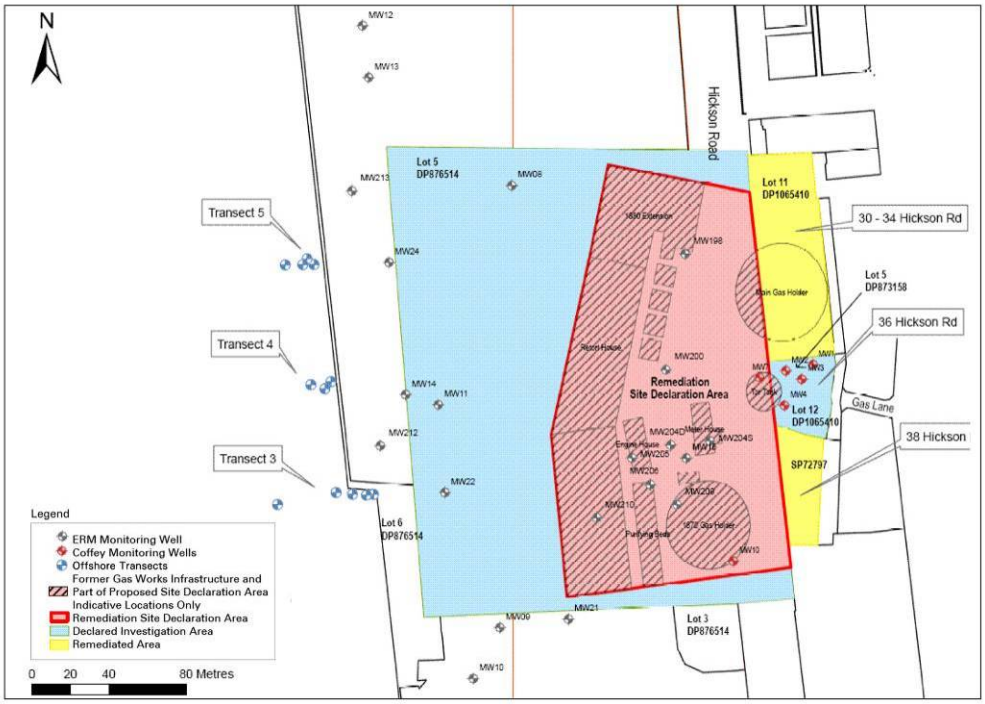


Figure 4 - DECCW Declared Area

ERM has prepared an Overarching Remedial Action Plan (RAP) for the Barangaroo site on behalf of the Barangaroo Delivery Authority (see **Appendix G**). The Overarching RAP presents a summary of the contamination issues identified on the Barangaroo site and outlines an approach to the remediation of the site as a whole. A Site Auditor's Statement has been prepared by Graeme Nyland in relation to the Overarching RAP (see **Appendix G**). The Overarching RAP requires that site specific RAPs be developed for the DECCW Declaration Area and for the other development sites. Site specific Remedial Works Plans are also required under the Overarching RAP, which are to detail remedial measures.

The Overarching RAP envisages that excavated material will be remediated (where required) and re-used within the Barangaroo site, including re-use for the construction of the approved northern Headland Park (subject to a separate project approval).

With respect to the Project Application site, the Overarching RAP considers on-site treatment of contaminated material to be the most practical methodology. The Overarching RAP notes that on-site treatment of groundwater from dewatering excavations will also be required, however ongoing treatment of groundwater is not likely to be required following removal of contaminated material.

In accordance with the requirements of the Overarching RAP, a Site Specific Remedial Action Plan known as the "Amended Remedial Action Plan - Barangaroo - Other Remediation Works (South) Area" has been prepared by AECOM Australia Pty Ltd, dated 7 July 2011 (ORWS RAP) (see **Appendix G**). The OWRS RAP includes the entire Project Application site. The preparation of the OWRS RAP was informed by the Human Health Environmental Risk Assessment, prepared by AECOM, dated 4 July 2011 (HHERA), including the Site Specific Target Criteria (SSTC) that are contained in the HHERA.

Full details of the soil and groundwater contamination and exceedance levels within the Project Application site are documented in the AECOM Remedial Action Plan submitted with Bulk Excavation and Basement Car Parking Project Application.

Works approved in the Basement Car Park Approval include the establishment of a remediation enclosure (exclusion zone) for management of contaminated material, construction of an ex-situ treatment facility within the exclusion zone, and set up of decontamination stations and wheel wash zones at the entrance and exit points of the remediation enclosure. Suitably treated and excavated material will be re-used across the broader Barangaroo site to minimise the need to import fill for public domain works, and the creation of the Headland Park.

Accredited Site Auditor, Graeme Nyland, completed a Site Audit Report and Site Audit Statement that approved the ORWS RAP, dated 14 July 2011(see **Appendix G**). The HHERA and the ORWS RAP were approved by the Office of Environment and Heritage (OEH) in satisfaction of a condition A8 of the Basement Car Park Approval.

After giving consideration to the approvals given by OEH and the site auditor, and after reviewing the RAP, the Minister for Planning and Infrastructure approved the RAP on 17 August 2011 in relation to the Basement Car Park Approval.

A Site Auditor's Statement will be obtained upon completion of the remediation works certifying the site is suitable for the proposed uses.

2.6.6 Vegetation

The Project Application site is devoid of existing vegetation.

2.6.7 Heritage and Archaeology

Heritage

Neither the Project Application site nor any building, structure or element within it, is listed as a local or State heritage item.

The approved Concept Plan (Mod 4) and Demolition Project Application comprehensively addressed the heritage significance of the Barangaroo site. The Heritage Impact Statement prepared for the site by City Plan Heritage in 2007 (refer to Demolition Project Application) also confirms the Project Application site is not of heritage significance and does not exhibit heritage values (including existing buildings and structures).

The Statement of Commitments for Concept Plan (Mod 4) required an Interpretation Strategy to be prepared prior to any works commencing that involve surface disturbance. Accordingly, an Outline Interpretation Plan was prepared by Tanner Architects and was submitted to the Department of Planning and Infrastructure as part of the EAR for the Basement Car Park Project Application (refer to Appendix FF of that EAR). The Outline Interpretation Plan relates to the whole of the Barangaroo South area, including the Project Application site.

Indigenous and Non-Indigenous Archaeology

A Non-Indigenous Archaeological Assessment undertaken by Casey and Lowe for the Barangaroo South area and for land within the vicinity of the broader Barangaroo site was submitted with the Basement Car Parking Project Application. That Assessment indicated that there was a moderate to high level of non-indigenous archaeological potential across most of the Barangaroo site. The site contains a mixture of archaeological remains associated with maritime infrastructure, shipbuilding and industrial land uses.

A search of the OEH's Aboriginal Heritage Information Management System (AHIMS) indicates that no known Aboriginal sites have been previously recorded within or in the vicinity of the Project Application site or the broader Barangaroo site.

An Aboriginal Archaeological and Cultural Heritage Assessment prepared by Comber Consultants was submitted with the Basement Car Park Project Application. That Assessment suggests that, notwithstanding the above, subsurface archaeological deposits containing artefact scatters and/or middens may be located within the eastern portion of the Barangaroo South area, including land particularly near the original shoreline.

During 2011 and 2012 Casey & Lowe and Comber Consultants undertook a 10 month archaeological program of excavation and recording. Following completion of the program there are no surviving significant archaeological remains within Blocks 2 and 3. No archaeological issues were identified in the area to the west of the eastern 40m of Barangaroo South. Therefore the Project Application site is considered to have no archaeological potential or significance.

2.7 Surrounding Development

A description of the existing development and future proposed development envisaged under the approved Concept Plan (Mod 4) is outlined below.

2.7.1 Existing Development

The area immediately to the north and south of the site forms part of the construction site for the Basement Car Park. Further to the north is the DECCW Declaration Area, Barangaroo Central and the new Headland Park. Further to the south is the Macquarie Bank and the King Street Wharf buildings.

To the east of the Project Application site is the Basement Car Park and Commercial Buildings C3-C5 construction sites. On the eastern side of Hickson Road is the Sussex Hotel and Western Distributor.

To the west of the Project Application site is the remainder of the foreshore promenade/public recreation zone. Further to the west is the waters of Darling Harbour.

2.7.2 Future Proposed Development

The location of Block X, in which Residential Buildings R8 & R9 are proposed to be constructed, is illustrated at **Figure 5**.

Immediately to the north of the site will be a plaza and the future Globe Harbour.

To the south of the Project Application site will be Margaret Street and Residential Building R1.

To the west of the site will be the future Foreshore Promenade. The Foreshore Promenade will link the western edge of the Barangaroo site, connecting the King Street Wharf Precinct in the south to the Headland Park in the north. A new pier and proposed hotel will form part of the new Foreshore Promenade to the north west.

To the east of the Project Application site is the approved Commercial Buildings C3, C4 and C5. Further to the east will be lower scale commercial buildings which address Hickson Road.

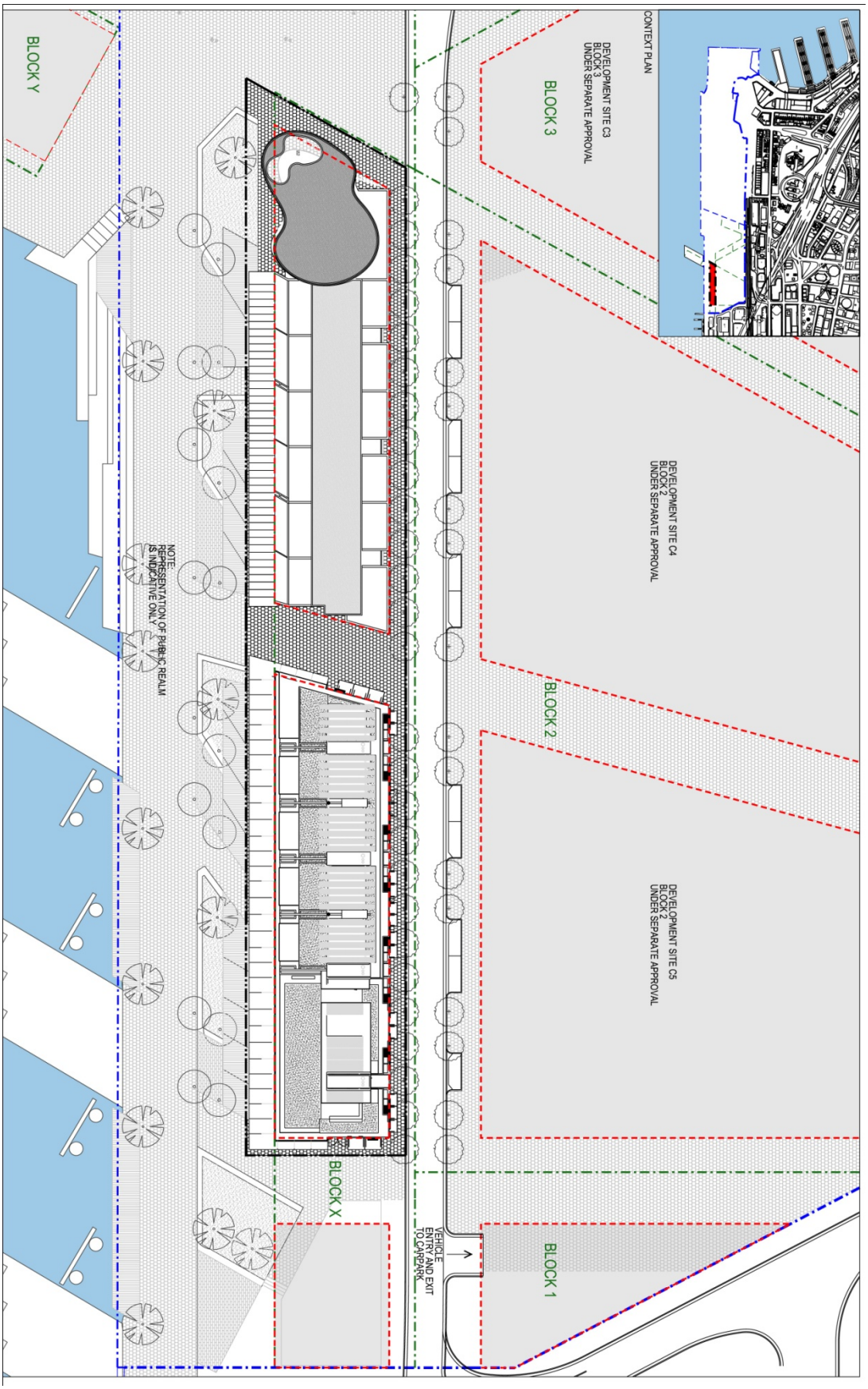


Figure 5 - Location of Buildings R8 & R9 within the Concept Plan site

3.0 Stakeholder Engagement Strategy

In accordance with the DGRs for this Project (refer **Appendix B**), consultation must be undertaken with relevant public authorities, community groups and affected landowners. This section details the consultation undertaken as part of the preparation of this Project Application and proposed ongoing stakeholder engagement. Accordingly, consultation has been undertaken as required by the DGRs that is in conformance with the Department of Planning and Infrastructure's Major Project Community Consultation Guidelines 2007.

A strong commitment to an inclusive and pro-active community and stakeholder engagement process underpins this strategy. Lend Lease's key objective to the ongoing consultation is:

> *To set the path for carrying out effective and meaningful consultation through an 'early and often' approach which incorporates stakeholder feedback into every stage of the project.*

It is noted that both Lend Lease (as the Proponent) and the Barangaroo Delivery Authority continue to work collaboratively in undertaking stakeholder engagement for the wider development at Barangaroo as well as the proposed Residential Buildings R8 & R9. Both organisations are committed to ensuring the approach is inclusive, transparent and provides a forum for community feedback.

3.1 Technical Working Groups

The approved Concept Plan (Mod 4) Statement of Commitments requires the establishment of Technical Working Groups to prepare a series of Implementation Plans and Strategies for Barangaroo.

Nine Technical Working Groups have been established for consultation in the preparation of the various Implementation Plans and Strategies. The membership of all Technical Working Groups are summarised in **Table 2**.

Table 2 – Technical Working Group Memberships for Implementation Plans/Strategies

Implementation Plan/Strategy Required by Concept Plan	Technical Working Group Name	Membership
Geotechnical and Environmental Site Remediation and Remedial Action Plan	Remediation	▪ Barangaroo Delivery Authority ▪ Lend Lease ▪ OEH
Transport Management and Access Plan	Transport and Access	▪ Barangaroo Delivery Authority ▪ Lend Lease ▪ Transport for NSW ▪ City of Sydney Council
Utility Services Infrastructure Plan	Physical Infrastructure	▪ Barangaroo Delivery Authority ▪ Lend Lease ▪ Sydney Water ▪ City of Sydney Council ▪ OEH
Design Excellence Strategy	Built Form	▪ Barangaroo Delivery Authority ▪ Lend Lease ▪ City of Sydney Council
Public Domain Plan	Public Domain	▪ Barangaroo Delivery Authority ▪ Lend Lease Sydney Harbour Foreshore Authority ▪ Roads and Maritime Services

Implementation Plan/Strategy Required by Concept Plan	Technical Working Group Name	Membership
		▪ City of Sydney Council
Community and Social Plan	Community Development	▪ Barangaroo Delivery Authority ▪ Lend Lease ▪ Department of Housing ▪ City of Sydney
Marketing and Promotion Strategy	Investment	▪ Barangaroo Delivery Authority ▪ Lend Lease ▪ Department of Industry and Investment
Retail Management Plan	Investment	▪ Barangaroo Delivery Authority ▪ Lend Lease ▪ Department of Industry and Investment
Housing Strategy	Community Development	▪ Barangaroo Delivery Authority ▪ Lend Lease ▪ Department of Housing ▪ City of Sydney

Further to this consultation, several of the specialists responsible for the preparation of the technical reports that comprise the appendices to this EAR have engaged in various consultations with relevant stakeholders, including the relevant utility providers.

3.2 Stakeholder Consultation

The Barangaroo Delivery Authority and Lend Lease are consulting with local residents and other relevant stakeholders as part of its ongoing community engagement program related to Barangaroo. The opportunity to participate has been provided through a number of direct and indirect mediums including community consultation events, presentations and workshops, the Barangaroo South website and Barangaroo South newsletter.

Following lodgement of the Project Application, Lend Lease will undertake further detailed consultation and notification to the local community and relevant stakeholders, prior to the commencement of works.

A wide range of communication channels will be used to consult with and notify the community and stakeholders about the proposal. This will ensure that all parties are truly consulted with and informed about the proposal in a timely manner.

Table 3 summarises the communication methods proposed for consulting with, involving and informing stakeholders, community and the public. A systematic approach will be developed to communicating with stakeholders and the community to ensure the right information is readily available, at the right time and in the right place.

Table 3 - Proposed consultation methods

Method of Consultation	Purpose
Community Information Sessions	▪ To discuss with members of the community who are located in direct proximity to the work what Residential Buildings R8 & R9 involves and the measures that are being taken to reduce the potential impact on the community. ▪ To enable an opportunity for the community to raise any questions or concerns they may have about Residential Buildings R8 & R9. ▪ These community information sessions will be attended by key people from the Lend Lease Barangaroo Team and Barangaroo Delivery Authority who have an in depth understanding of the proposed development to present to the group about the development and answer any questions. ▪ In addition to this, feedback forms will be provided to further understand the needs and current opinion of the community.
Stakeholder one-on- one briefings	▪ To ensure that commercial stakeholders in close proximity to the work are consulted with and informed about the development both prior and during the activities. ▪ The Community Relations team will personally meet with these commercial properties to address any concerns they may have about the work and understand requirements of these groups during the development.
1300 Community Enquiry Line	▪ A key channel for the community to raise issues, ask questions and speak directly to a member of the Community Relations team. An afterhours service will also be provided to ensure any issues occurring outside of business hours are addressed in a timely manner.
Barangaroo South Blog	▪ An opportunity for open communication between the community, stakeholders and general public about the project, including the design of Residential Buildings R8 & R9. ▪ This will be moderated by the Lend Lease team to ensure no explicit language is posted.
Barangaroo South Website	▪ The central portal to all information about the project, including information specific to Residential Buildings R8 & R9. ▪ The website will also contain electronic copies of all newsletters, notifications, press releases and links to the Department of Planning and Infrastructure website and submissions. ▪ The website will also contain the contacts details of the Lend Lease Barangaroo South Community Relations team should they have any comments or require further information about the proposed development.
Community Newsletter	▪ A hard copy format to provide key information about the development and wider project to those community members and stakeholders in reasonable proximity to the work or who have expressed interest in being updated about Barangaroo South. ▪ The community newsletter will also encourage the community to contact the Lend Lease Barangaroo South Community Relations team should they require any further information or would like to provide feedback about the work.
Community Notifications	▪ To ensure all community members and stakeholders in close proximity to the work are informed about the development prior to the work commencing and provided updates when appropriate about the work. ▪ Issued to the neighbouring community and stakeholders to provide formal notification about the commencement of the development. This notification will include details about the nature and location of works, the hours of work and the contact details of the Community Relations team should they require any further information about the work.
Commercial Property Notice Boards	▪ When appropriate, general information about the development and overall project will be included on the notice boards in neighbouring commercial properties. ▪ This will also contain the contacts details of the Lend Lease Barangaroo South Community Relations team should they require any further information about the work.

3.3 Council and Agency Consultation

Lend Lease recognises the importance of positive relationships with Council and agencies and seeks to proactively engage with them over the duration of the project. Lend Lease proposes to undertake stakeholder engagement to ensure all individuals and/or groups that have an interest in, or are affected by, the Project Application are consulted with.

As part of the preparation of the Project Application, Lend Lease met with the City of Sydney on two occasions and presented earlier iterations of Residential Buildings R8 & R9. During the presentation the City of Sydney provided feedback on the proposed schemes which has been incorporated into the Project Application submission where appropriate. Specific changes to the design as a result of the City of Sydney's feedback included reconfiguration of the apartment layouts along the southern facade of Residential Building R8 in order to maximise the view corridor between Residential Buildings R8 and R9 towards the Harbour.

Following lodgement of this Project Application. Lend Lease will undertake further detailed consultation with the relevant agencies during the public exhibition and assessment process, prior to commencement and during, the Residential Buildings R8 & R9 works.

- **City of Sydney Council**
  Consultation and notification will be undertaken with the City of Sydney Council prior to commencement and during the development.
- **Office of the Environment and Heritage (OEH)**
  Ongoing consultation will be undertaken with OEH prior to and during the development.
- **Other Agency bodies**
  Consultation will be undertaken with other agencies as required (e.g. Sydney Water) to consider issues and provide notification in a timely manner.

4.0 Description of Development Proposal

4.1 Overview of Proposal

Pursuant to Section 75J(3) of the EP&A Act, approval is sought for:

- demolition of any existing hardstand areas, footings or piles in the area to the west of the approved basement car park;
- piling and associated earthworks and remediation;
- construction and use of an 9-11 storey building (RL 41.5) known as Residential Building R8, comprising:
  - 860m^2 retail floor space;
  - 8,920m^2 residential floor space;
  - 82 apartments;
- construction and use of a 7-9 storey building (RL 36) known as Residential Building R9, comprising:
  - 907m^2 retail floor space;
  - 7,539m^2 residential floor space;
  - 77 apartments;
- operation and use of the basement car park to accommodate 172 car spaces allocated specifically to the proposed uses within Residential Buildings R8 & R9;
- temporary works and uses, including:
  - surfacing of surrounding public domain including part of Globe Street and part of the Foreshore Promenade;
  - hoardings; and
- services and utilities provision required to service the building.

As identified above, the Project Application does not seek approval for development that was approved under the Basement Car Park Approval, which encompasses:

- demolition of any existing structures and footings, hardstand areas, piles and vegetation within the basement area;
- site establishment, including the provision of concrete crushing infrastructure, environmental protection structures, de-watering infrastructure, and groundwater treatment;
- bulk earthworks for the purposes of excavating the basement;
- on-site treatment and remediation of contaminated soils within the basement;
- transportation or stockpiling of excavated material;
- structural works associated with the basement levels; and
- associated utilities and infrastructure works associated with that Project Application including decommissioning and / or relocation of services.

An artist's impression of the proposed development is provided at **Figure 6** below with further photomontages located **Appendix I**. The development proposal is illustrated in detail by Architectural Drawings prepared by FJMT and PTW included at **Appendix A**. The following description is based on the Architectural Drawings

and on information provided in the accompanying Architectural Design Statements at **Appendix A**.

Figure 6 – Photomontages of Residential Buildings R8 & R9

4.2 Design Objectives

The design objectives adopted for the proposed development are to:

- create variety, interest and a 'destination' at the waterfront edge of Barangaroo;
- mitigate the scale change from adjacent commercial and residential developments;
- provide apartments with a high level of residential amenity;
- provide a continuous and active edge to the public domain, in particular the Foreshore Promenade;
- maximise connectivity to the harbour and waterfront edge;
- create a continuous street wall along the foreshore promenade;
- achieve best practice sustainability outcomes; and
- manage the western sun whilst maximising views to the Harbour.

4.3 Numerical Overview

4.3.1 Numerical Summary

Table 4 outlines the key numeric information of the proposed development.

Table 4 – Key development information

Component	Proposal
Project site area	4836.85m^2
GFA	18,225m^2 ▪ 16,459m^2 – residential ▪ 1,767m^2 – retail
Apartments	159
Maximum Height	▪ RL 41.5 ▪ 38.1m ▪ 11 storeys
Total proposed car parking spaces	Maximum of 172, comprising: ▪ 168 residential ▪ 4 retail

4.3.2 Gross Floor Area and Use

The proposed development comprises a total GFA of 18,225m^2. **Table 5** provides a detailed breakdown of the proposed gross floor area and use on a floor by floor basis. In summary, the key uses within Residential Building R8 & R9 are:

- 1,767m^2 retail floor space; and
- 16,459m^2 residential floor space.

Table 5 – Land use and GFA by level

Level	R8 (m^2)	R9 (m^2)	Dominant use
Ground	1,043	1,071	Retail and residential lobbies
1	1134	1116	Residential
2	1134	1116	Residential
3	1136	1116	Residential
4	1137	1116	Residential
5	1136	1116	Residential
6	1135	1116	Residential
7	1131	644	Residential
8	510	35	Residential
9	167	-	Residential
10	119	-	Residential
Roof	-	-	-
Sub-Total	**9,780**	**8,431**	**-**
Total	**18,225**		**-**

When combined with the approved GFA on the site (305,643m^2), Residential Buildings R8 & R9 will result in a total GFA of 323,800m^2. The proposed GFAs comply with the maximums set out in Concept Plan (Mod 4).

The ground will accommodate a mix of active retail uses which are likely to be occupied by café / restaurant and a range of specialised retail uses. The fit-out of these spaces will be the subject of future applications, where required.

4.3.3 Apartments and Dwelling Mix

Table 6 provides a detailed breakdown of the proposed number of apartments and dwelling mix in Residential Buildings R8 & R9.

Table 6 – Apartments and dwelling mix by building

	1 Bedroom	2 Bedroom	3 Bedroom	Total
Residential Building R8	23	47	12	82
Residential Building R9	24	53	-	77
Total	47 (30%)	100 (62%)	12 (8%)	159

4.4 Demolition

The Project Application seeks approval for the demolition of any existing hardstand areas, footings or piles in the area to the west of works already approved as part of the Basement Car Park Approval and Demolition Approval.

4.5 Piling and Remediation

The Project Application seeks approval for piling and associated earthworks work to accommodate piling and core that extends beyond the extent of works already approved as part of the Basement Car Park Approval. The location of the proposed excavation is shown on the Architectural Drawings at **Appendix A**.

All of the necessary site preparation works required to be undertaken prior to the proposed Residential Buildings R8 & R9 earthworks being undertaken will be

carried out in accordance with the Basement Car Park Approval and do not form part of this Residential Buildings R8 & R9 Project Application.

The piling and associated works will be carried out in accordance with the Environmental Construction and Site Management Plan. During piling and excavation works, there is potential that contaminated material may be encountered. This Project Application therefore seeks approval for the remediation of the material in accordance with the ORWS RAP.

4.6 Residential Building R8

The following description is based on the Architectural Drawings (see **Appendix A**) and on information provided in the accompanying Architectural Design Statement prepared by FJMT at **Appendix A**. A photomontage of Residential Building R8 is shown at **Figure 7**.

Figure 7 – Photomontage of Residential Building R8

4.6.1 Height and Massing

Residential Building R8 is broken into two modules, a northern module which has a maximum height of RL 41.5 (11 storeys) and a southern module of RL 36 (9 storeys). The southern module is a carefully scaled rectilinear form that defines and characterises the waterfront edge and Globe Street. This form is represented as three sections, that relate to Globe Street to the east, the public domain to the west and a higher central spine where lifts and services are primarily located. The northern module is a higher more organic singular form that turns to the north to address the main public open space.

Consistent with the Concept Plan (Mod 4) the Residential Building R8 maintains a continuous street wall along both Globe Street and the foreshore promenade, and has a flat roof form.

The building will have a maximum GFA of 9,780m^2, comprising 8,920m^2 of residential uses and 860m^2 of retail uses. The proposed building height and massing complies with the maximums set out in Concept Plan (Mod 4).

4.6.2 Facades

The facade systems for Residential Building R8 are highly specific and have been chosen to suit the functional, environmental and aesthetic requirements of each facade.

The west facade is divided into three separate equal modules giving identity to each block of apartments and reducing the buildings overall scale along the water's edge. Within these modules the building's form is further articulated by angled separating walls that gently 'turn' the building to the north. The solid areas of the facade are comprised of natural coloured cladding from level 1 and above.

External adjustable bi-fold screens are provided on Levels 1 - 6. On Level 7 there are no screens and the facade is expressed as a double height framed volume which reflects the two story height of the loft apartments. The custom external adjustable bi-fold screens are made up of horizontal natural coloured battens in a metal angle frame. The screens allow personalised control and also create a lively pattern of use, layering and light and shade across the facade. The natural colour and intentional tonal variation of the battens varies across the west facade to provide additional layering and depth to the facade.

The eastern facade includes setbacks and recessed oblique windows to improve privacy and enable views along the length of Globe Street instead of directly across the road to the commercial development opposite. Solid areas of the facade are clad in precast concrete panels with windows expressed as recessed openings within them. The windows on this elevation also have additional measures to increase privacy in the form of fixed natural coloured batten screens that provide further layering and visual interest. On this facade the colour, tone and material application of the batten screens and precast cladding panels varies, becoming lighter in tone towards the northern end of the facade. Set within this facade are the fire stairs which are expressed as strong vertical elements and are enclosed with adjustable glass louvres.

At the northern end of Residential Building R8 the building takes on a more organic and expressive form with subtle double curves. The curved forms are created through facetted cladding panels and bi-fold balcony screens. These screens echo the screens on the west facade but are formed from light-coloured perforated metal sheet laser-cut in a custom pattern.

On the south facade external fixed louvres are proposed. These are orientated to provide privacy from the Residential Building R9 whilst maintaining the views from Residential Building R8 to the harbour.

A materials board has been prepared and is submitted under separate cover. A materials schedule is also provided at **Appendix A**.

4.6.3 Setbacks

The proposed setbacks are illustrated on the Architectural Drawings prepared by FJMT included at **Appendix A**. Residential Building R8 is modulated with a series of setbacks which range in depth from the approved Block X boundaries on the foreshore promenade and Globe Street frontages. A summary of the relevant Residential Building R8 setbacks are provided in **Table 7**.

Table 7 - Relevant building setbacks

Boundary	Minimum Building Setback (m) (excluding balconies)
Northern Block X boundary	5
Western Block X boundary	2.3
Eastern Block X boundary	5

4.6.4 Landscaping

The proposed landscaping in Residential Building R8 is shown on the Landscape Plans prepared by Aspect Oculus at **Appendix J**.

Balconies on the upper floors (Level 7 and 8) have been designed to incorporate a series of raised planters located across the facade that articulate and breakdown the building frontage.

The planters will provide soil depth for a variety of planting, consisting of native grasses, succulents and groundcovers that in time will cascade over the edges of these planters. Taller screening species will be used where screening and privacy is required, particularly on the eastern facade facing the Commercial Building C4.

The species chosen for the scheme are generally species which require low maintenance and have low water requirements. A colour palette of blue / grey and yellow / green planting with contrasting architectural strappy foliage and softer, fine shrub foliage will be used to create visual interest within each planter.

Maintenance of the landscaping will be the responsibility of the Body Corporate. It is noted that a sub irrigation chamber at the base of each planter will provide year round irrigation and fertilisation to the plants without the requirement for hand watering.

4.7 Residential Building R9

The following description is based on the Architectural Drawings (see **Appendix A**) and on information provided in the accompanying Architectural Design Statement prepared by PTW at **Appendix A**. A photomontage of Residential Building R8 is shown at **Figure 8**.

Figure 8 – Photomontage of Residential Building R9

4.7.1 Height and Massing

Residential Building R9 has a maximum height of RL 36 (9 storeys). The massing is broken up into three layers, the ground plane, six bands of typical apartments, and a double storey layer of apartments that extend over 60% of the length of the building. The transition from 9 to 7 storeys towards the south brings the scale of the building down to the scale of the buildings along Kings Street Wharf and Lime Street. Towards the north the 9 storey height ties in with Residential Building R8 to create continuity along the public promenade and unite the two buildings as the western facade to the Barangaroo development.

Consistent with Concept Plan (Mod 4) Residential Building R9 maintains a continuous street wall along both Globe Street and the foreshore promenade, and has a flat roof form.

The building will have a maximum GFA of 8,445m^2, comprising 7,539m^2 of residential uses and 907m^2 of retail uses. The proposed building height and massing complies with the maximums set out in Concept Plan (Mod 4).

4.7.2 Facades

The facade systems for Residential Building R9 are highly specific and have been chosen to suit the functional, environmental and aesthetic requirements of each facade.

Residential Building R9 has a palette of natural façade materials, comprising precast concrete, profiled zinc (or similar) and reconstituted timber, which emphasize the different planes of the facade and create harmony through colour and texture.

Profiled perforated zinc (or similar) screens are provided on the east and west facades to create a pattern that enriches the façade, and will create further depth,

articulation and layering. The inner layer and the outer layer of the facades are contrasted through the use of reconstituted timber and precast concrete panels.

On the western facade the screens are designed to bi-fold to the side of the balcony to allow for residents to enjoy uninterrupted views of the Harbour. When in the open position, the exposed edges display the strong primary yellow and orange colours which relate to the primary colours used throughout Commercial Buildings C3-5. Three storey stacks of green planters run up the façade to further articulate the west façade.

The eastern façade is strongly modulated through the expressed egress staircases that mark the four modules of the building. On the eastern facades zinc (or similar) sliding screens are provided to improve privacy from the office buildings whilst acting to further articulate and layer the facades.

On the northern and southern facades the screens are used as fixed screens which create a sense of privacy to the corner apartments and direct the view towards the view of the Sydney Harbour.

When viewed from within the apartments, the screens will have a sense of transparency whilst still providing privacy, shade and protection from wind, ensuring a good microclimate for each apartment.

A materials board has been prepared and is submitted under separate cover. A materials schedule is also provided at **Appendix A**.

4.7.3 Setbacks

The proposed setbacks are illustrated on the Architectural Drawings prepared by FJMT included at **Appendix A**. Residential Building R9 is modulated with a series of setbacks which range in depth from the approved Block X boundaries on the foreshore promenade and Globe Street frontages. A summary of the relevant Residential Building R9 setbacks are provided in **Table 8.**

Table 8 - Relevant building setbacks

Boundary	Minimum Building Setback (m) (excluding balconies)
Western Block X boundary	2.7
Eastern Block X boundary	5

4.7.4 Landscaping

The proposed landscaping in Residential Building R9 is shown on the Landscape Plans prepared by Aspect Oculus at **Appendix J**.

Wall Planters

A series of raised planters are located at various intervals across the facade that articulate and breakdown the building frontage. The custom designed planters (see **Figure 9**) will be wrapped within a steel mesh climbing frame and provide soil depth for a variety of predominantly low water use plants, consisting of native grasses, succulents and groundcovers. The wall planters will be common property and maintained by the body corporate.

The frames will also extend from Level 7 up to the Level 8 private roof terraces, enabling the climbers to cover the frames in foliage and flowers, creating a living focal point towards the top of the building.

Planters are also included on the east elevation (Globe Street) on both the Ground Floor and Level 1. Again the climbers and cascading plants will help soften the building facade along this streetscape.

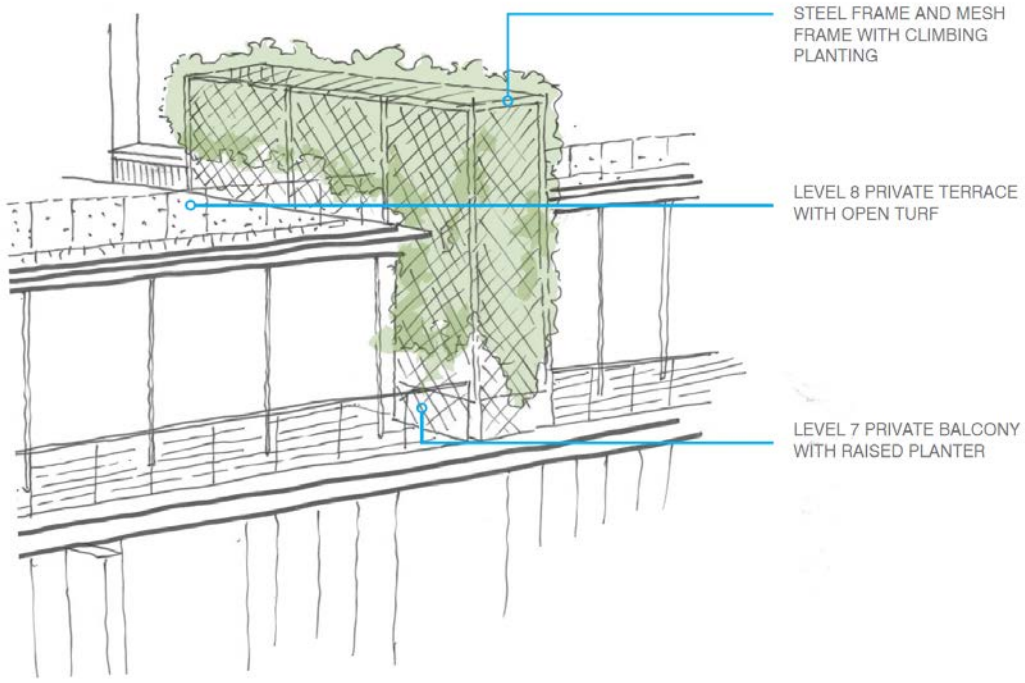
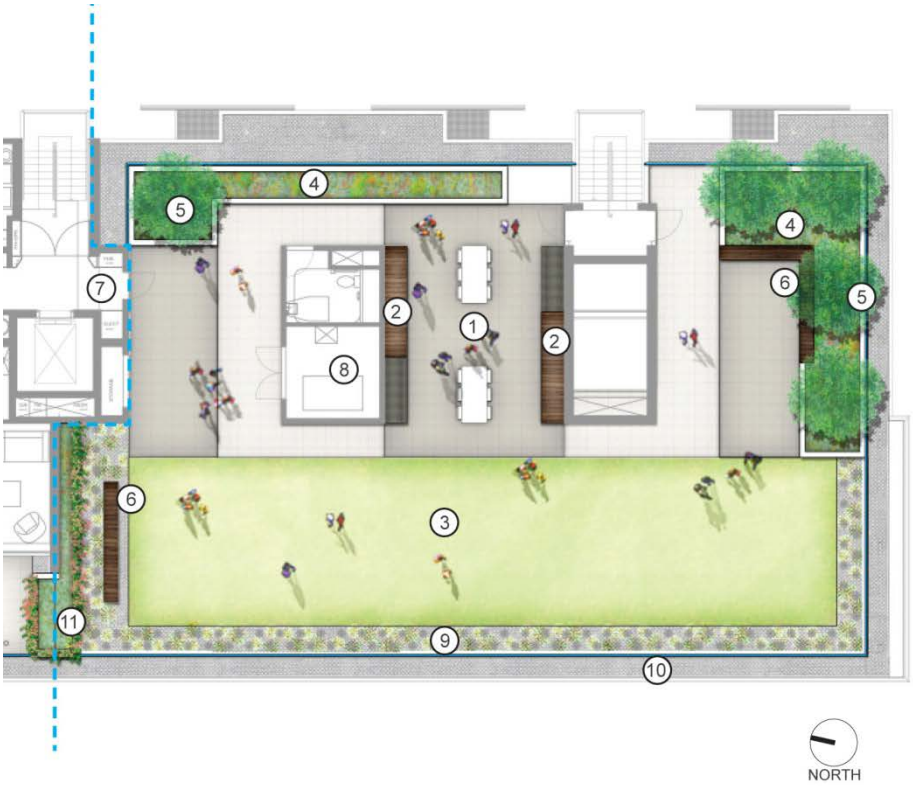


Figure 9 – Sketch of the Level 7 and 8 Custom Planter

Communal Roof Terrace

A private communal rooftop terrace is provide at the southern end of the building (see **Figure 10**). The terrace provides building residents with a private break out space with amenities such as barbecues, outdoor dining tables and chairs, and bench seating. The rooftop will provide a variety of spaces including areas open to the western views, as well a enclosed and sheltered spaces surrounded by raised planters.

Further planting is provided along the eastern boundary of the terrace offering green screening of the Commercial Buildings C3, C4 and C5 beyond. Feature trees including Olea Europa and Plumeria acutifolia provide additional canopy and screening to the sides of the terrace. A canopy structure consisting of photovoltaic panels extends across the paved dining space towards the centre of the terrace, producing energy and providing shade for terrace users below. Succulent planting within a gravel bed provides the a decorative edge to the terrace, with low colourful species used for added visual interest.



DETAIL PLAN - R9 LEVEL 7 PRIVATE COMMUNAL ROOF TERRACE

1. Paved outdoor dinning area
2. BBQ with preparation bench
3. Turf
4. Raised planters with hardy low water use planting
5. Feature trees including *Olea europaea* and *Plumeria acutifolia*
6. Timber bench
7. Entry from internal lift core
8. Internal store room and bathroom
9. Gravel bed with low succulent planting
10. Gravel maintenance path to periphery of terrace
11. Custom planter with steel frame and mesh supporting climbing plants

Figure 10 – Detail plan of the Residential Building R9 Communal Roof Terrace

Private Roof Terraces

Five private roof terraces are located on Level 8 for the exclusive use of residents of the penthouse apartments. Each terrace is accessed via an internal staircase from the apartment below and has been designed as an outdoor extension of the residents living space.

A small raised lawn is provided within each terrace, extending from the paved dining area to the glass balustrade on the western edge. These lawns take in

prominent western views to Pyrmont and Balmain and offer informal sitting and lounging opportunities.

4.8 Public Domain

Temporary Public Domain and Landscaping

As Residential Building R8 & R9 are the forth and fifth buildings proposed on the Barangaroo South site, the surrounding curtilage of the building will need to strike a balance between providing good amenity and access for residents and allowing for the construction program to proceed whilst successive stages are constructed. To that end, a "temporary" public domain solution is proposed for areas external to the building. A full description and illustrations of the proposed temporary public domain works is set out in the Landscape and Temporary Public Domain Design Statement at **Appendix J**.

Temporary pavements are proposed to all footpaths and pedestrian areas directly adjacent to Residential Building R8 & R9 see **Figure 11**. No road crossings are proposed as part of this Project Application.

Tree pits will be constructed along the western side on Globe Street in front of the site with temporary planting to provide amenity for tenants and pedestrians. The set out of the kerbs and gutters for Globe Street adjacent Residential Building R8 & R9 will be provided as part of the Commercial Building C4 Project Approval. The surface of the footpaths will be converted to the final finish following the construction of successive stages and in line with the Barangaroo Public Domain Plan, once approved.

The Foreshore Promenade will also be treated with temporary paving, which also includes temporary lighting to provide public amenity, safety and comfort.

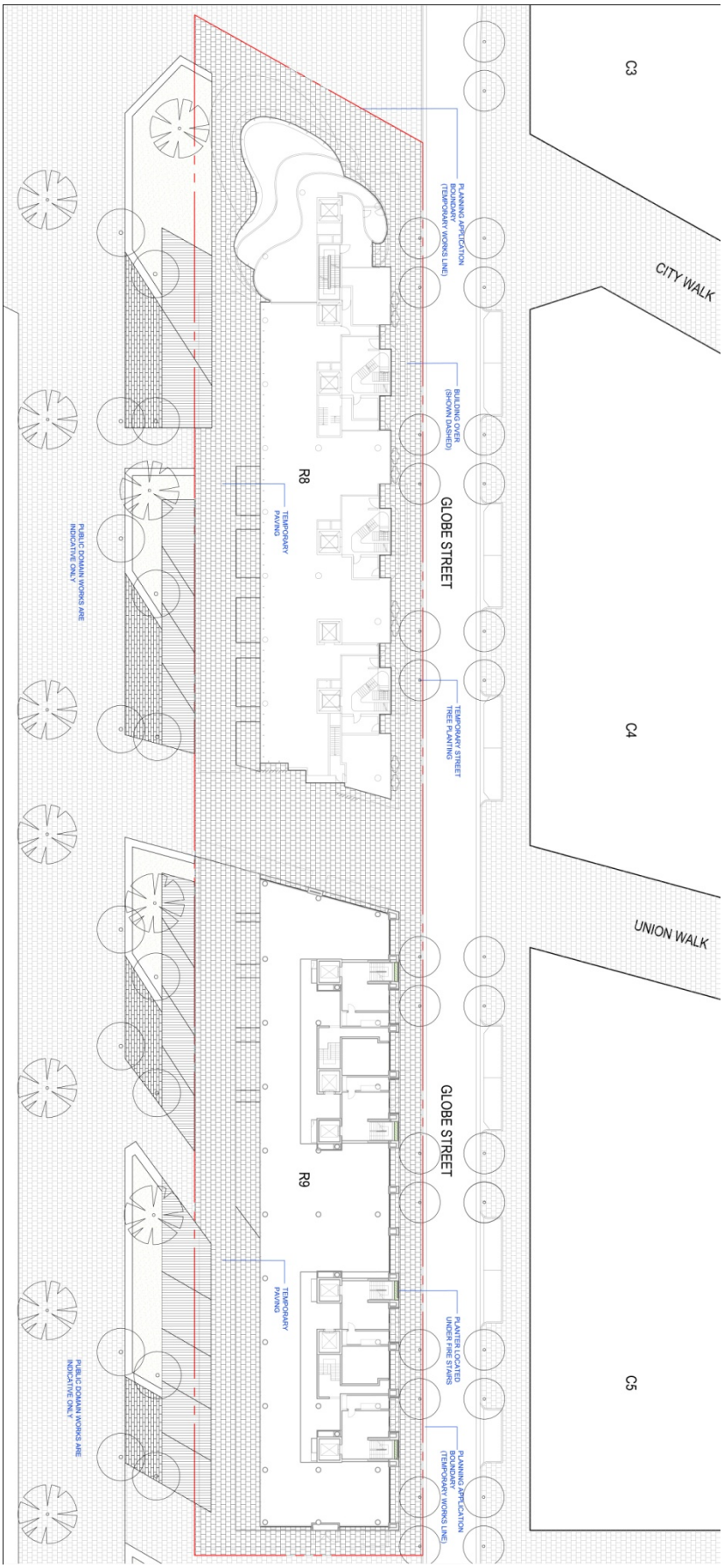


Figure 11 – Temporary Public Domain

Public Art Strategy

The Barangaroo Delivery Authority (in conjunction with Lend Lease) has prepared a public art strategy for Barangaroo South and consequently this Project Application.

For this Project Application, potential opportunities to implement artwork include the building fabric and facades; the public domain and landscape; heritage interpretation strategies, stand-alone artworks; and temporary works. The nature and location of public art works will be subject to future approvals.

4.9 Pedestrian Circulation

The principal street address and pedestrian access to the residential apartments are located off Globe Street. Each building has four separate residential lobbies. The residential lobbies will also be directly accessible via the lifts within the basement. The pedestrian access to the retail areas will be located from their respective frontages, which are primarily off the Foreshore Promenade.

4.10 Vehicular Access and Parking

Vehicular Access

Globe Street will be constructed as part of the Commercial Building C4 Project Approval. The construction of Globe Street will provide Residential Building R8 & R9 with a street address, and provide drop off and pick up areas for taxis and visitors. Vehicular entrances to the basement car park will be provided as part of the Basement Car Park Approval and accordingly do not form part of this application.

Car Parking

The construction of the basement car park is the subject of the Basement Car Park Approval. The number of parking spaces within the basement to be allocated to Residential Buildings R8 & R9 has been determined having regard to the approved car parking rates in Concept Plan (Mod 4). A total of 172 parking spaces will be provided within the basement, comprising:

- 168 residential spaces; and
- 4 retail spaces.

To facilitate pick up and drop off, the development will also utilise the on-street short stay parking spaces on Globe Street which are to be provided as part of the Commercial Building C4 Project Approval.

A range of shared loading facilities will be provided within the basement as set out in **Table 9** below.

Table 9 – Proposed Loading Dock spaces

Vehicle Size	Vehicle Length	Use	Number of spaces
Articulated Truck	19m	Retail	1
Heavy rigid truck	12.5m	Office/Retail	2
Medium rigid truck	8.8m	Office/Retail	4
Small rigid truck	6.4m	Office/Retail	4
Van/car	5m	Office/Retail	20
Motor cycle/bicycle	2.5m	Office/Retail	5

Vehicle Size	Vehicle Length	Use	Number of spaces
courier			
Total			36

Bicycle Parking

Bicycle parking for residents will be provided as part of their storage cages, which will be located within the basement. There will also be public bicycle parking provided in close proximity to the entry lobbies for short term visitor use.

4.11 Safety and Security

CCTV monitoring will be provided to the entry lobbies, retail common areas, car park, building entry and exit points and car park entry and exit points. The CCTV coverage will be viewed and controlled by 24 hour security staff from a centralised security room.

Passive surveillance will also occur as a result of the operation of retail and residential uses.

4.12 Environmentally Sustainable Development

The project is targeting a 5-Star Green Star rating under Green Star Multi-Unit Residential v1 which is considered to be Australian excellence.

Future detailed design will resolve the final sustainable development initiatives to be provided in both buildings. However, the proposed buildings are being designed with the following energy and water saving features:

- Healthy Buildings:
  - 5-Star Green Star Multi-Unit Residential Design certification
  - Tuned to Sydney's climate and connected to outdoors
  - Passive design, low energy buildings
  - Use of some sustainable materials, including recycled content and low emissions
- Energy and Carbon:
  - A carbon neutral outcome supported by the use of new offsite renewable energy generation
  - Significant reduction in building energy consumption reflected in a base building equivalent to a 5 Star NABERS Energy + 30% improvement, subject to tenancy behaviour
  - 20% reduction in embodied carbon within the built form
  - Efficient precinct infrastructure using central cooling plant and harbour heat rejection
  - Onsite photovoltaic generation sized for the public domain and black water treatment system
- Water Positive
  - a water positive outcome – where more water is exported than potable water is imported
  - treatment and reuse of a proportion of on-site stormwater catchment
  - on-site waste water treatment and water recycling
  - capacity to export recycled water allowing neighbours to reduce their potable water demands

  - sewer mining to reduce network demands
- Zero Waste:
  - Greater than 90% diversion of construction waste from landfill
- Sustainable Transport:
  - A new connection/entry point for the CBD (light rail, ferries, with provision for Barangaroo Pedestrian Link)
  - Reduced car parking ratios
  - Infrastructure and support for cyclists and pedestrians
  - Green travel plan to promote vehicle sharing, small cars and electric cars
  - Safe, low-speed onsite environment
- Landscape and Biodiversity:
  - Use of native flora and encourage habitats for fauna
  - Inclusion of water-sensitive urban design
  - Planning for climate change
  - Landscaped public spaces and selected green roof features

An assessment against the principles of Ecologically Sustainable Development is located at Section 5.12.

4.13 Waste Management

A Waste Management Plan has been prepared by ARUP and is included at **Appendix P**. The waste storage areas will be located at the base of each residential waste chute (4 in each building) in the basement. The retail areas have access to 2 goods lifts within each building for the transfer of waste to the basement.

ARUP has undertaken an estimate of the amount of waste that will be generated by the proposed development (see **Appendix P**) and as such the following waste storage is provided for within the basement.

For the residential dwellings, the WMP recommends 1 x 660L bin for general waste and 1 x 660L bin for recyclables will be located in each waste room. For the retail waste, the waste will be transported via the goods lifts, therefore the WMP recommends 240L bins be used. The expected bin requirement for each retail waste room is 3 x 240L bins for general waste and 2 x 240L bins for recyclables.

Waste management will generally accord with the City of Sydney's Waste Storage Design requirements and will be managed in the following way:

- Occupants from each unit will place their general and recyclable waste down a waste chute which will automatically segregate the general waste from recyclable waste based on a selection made by the resident at the chute entry point. The waste will be collected in waste storage rooms within the basement.
- Waste will be segregated into 240L bins within the retail store and then taken via the goods lift to a dedicated waste storage area.
- Waste and recyclables collection will be undertaken by the City of Sydney or an approved waste manager/operator (operating under a precinct waste management agreement) occurring daily as part of the same collection for the large commercial buildings.

4.14 Building Services

The following section provides a summary of the proposed building services as are outlined in the following reports:

- Mechanical, Electrical, Security, Communications, and Lift Services Report prepared by AECOM (**Appendix L**);
- Hydraulic Services prepared by SPP Group (**Appendix N**); and
- Fire Services Report prepared by WSP (**Appendix M**).

Mechanical Services

Mechanical services currently proposed by Lend Lease for the retail and residential uses include chilled beam air conditioning, heating plant and free cooling. All plant and air handling systems will be designed and installed to meet the applicable Australian Standards.

Chilled water will be generated at the district cooling plant and reticulated to a distribution room in the basement under Residential Buildings R8 and R9 for distribution via chilled water pipe risers. Heating hot water will be generated in the hot water generator plant room on the roof of each building and reticulated via hot water pipe risers adjacent to the chilled water pipe risers. In addition, retail uses will be serviced by a dedicated metered chilled and heating water system.

All lift lobbies will be naturally ventilated with the exception of the northern most lift lobby of Residential Building R8, which will be serviced by mechanical ventilation.

Residential apartments will be provided with a decentralised exhaust system, servicing toilets, laundries and range hoods. Retail tenancies in both buildings will be provided with a commercial kitchen exhaust system, as well as a decentralised toilet exhaust system for ground floor amenities.

Lifts

Residential Buildings R8 and R9 are proposed to be provided with a lift system designed to achieve a level of service commensurate with similar luxury developments. The system will also be in accordance with AS1735, AS3000 and all the relevant requirements of the BCA.

The lifts will be designed to minimise energy use where practicable. Lifts and escalators will include Variable Voltage Variable Frequency (VVVF) motor drives which allow the lift to generate power when the out of balance load is assisting the direction of travel. Lifts will utilise efficient gearless motors, LED lighting, and automatic shutoff of lighting and ventilation when lifts are not in use.

All lifts will incorporate facilities for persons with disabilities, fire services and stretcher access. In addition, all lifts will be integrated with the building security system and will include swipe card readers, intercoms and provision for CCTV.

Electrical Services

Residential Buildings R8 and R9 will be provided with incoming power from the Barangaroo Precinct substation infrastructure via switch rooms and consumer's mains located within the basement.

Residential apartment lighting will be energy efficient and locally controlled to suit BASIX requirements, while some apartments will have lighting design suited to adaptable housing requirements. Retail lighting will be the responsibility of the individual tenant.

A photovoltaic array is proposed to be installed on the building roof to provide renewable energy, and will be connected to the to the Barangaroo Precinct grid.

All electrical services will be installed in accordance with the relevant Australian Standards and the BCA.

Hydraulic Services

Appropriately sized new sewer and water connections will be made to the building in accordance with the relevant requirements and authority specifications. The building's hydraulics services include:

- A sanitary drainage system that conveys residential waste water to the Barangaroo South black water treatment plant with an overflow discharge via gravity to the local sewer main in Hickson Road.
- A trade waste drainage system that treats waste from retail food tenancy on ground level. The trade waste drainage system shall be located at high level under the ground floor slab and shall discharge to grease arrestors located on basement level 1.
- Potable hot and cold water systems will be provided to the retail and residential areas of the building. Each core in each building shall be served by a central gas fired hot water plant located in the plant rooms at roof level.

Gas Services

The future natural gas main to be located in Globe Street will be connected to the main meter/regulator assembly located in the gas meter rooms of the basement.

The gas supply will then extend up through the buildings in hydraulic services risers attached to the main core. Each apartment shall be provided with a 20mm isolation valve and meter assembly within the designated services cabinet located in the corridor servicing the apartments. The retail tenancies will also be provided with a gas supply. All meters shall be wired back to a central data logger in the gas meter room for billing purposes. A branch line shall extend to the central hot water plants located at roof level and mechanical equipment as required.

Communications Services

Incoming communications for Residential Buildings R8 and R9 will come from the Barangaroo Precinct Infrastructure. Each proposed building will have its own room for electronic/active equipment and the provision of cabling and distribution of communications services to tenants and common areas.

Each tenant will be provided with a dedicated incoming communication service cable. MATV, suitable for television and Pay TV connections, will be provided by an antenna above one of the rooftop plant rooms. All communications services installation will be in accordance with the relevant standards and the BCA.

Security Services

The proposed buildings will be provided with standalone access control, intruder detection and CCTV, all of which will interface with a precinct security room. Standalone security will be housed in the services room within each building, although some systems such as CCTV, some access control and intruder detection will be IP-based.

Access control will control access to lifts, car parks and main entries, with an option for installation of access control on fire stairs in the future. CCTV will cover the building perimeter, all entries and exits, the main lobby and mail rooms, the car park and loading docks, and possibly the lift cars. Intruder detection will monitor

all perimeter doors, fire stair doors, plant room doors and access controlled doors. An intercom system will link building entry points, apartments and lifts.

Fire Services

In accordance with the measures outlined in the Fire Services Report (**Appendix M**), fire detection, emergency warning and fire protection systems are proposed to be installed to comply with BCA requirements and other relevant legislation.

Site Stormwater Infrastructure

Lend Lease has prepared a Stormwater Management Plan for the site **Appendix O**. The site stormwater system has been designed to accept the 1 in 100 year storm event and will be discharged to Sydney Water's stormwater mains.

The stormwater drainage system will collect runoff from the building areas including landscaped areas and balconies for discharge to the civil stormwater drainage system. All site stormwater will be pre treated and discharge through a gross pollutant trap prior to connection to the civil stormwater system.

4.15 Construction Hours

In accordance with the Environmental, Construction and Site Management Plan prepared by Lend Lease / Cardno at **Appendix CC**, construction works are proposed to be undertaken between the hours of 7.00am and 7.00pm Monday-Friday and between 7.00am and 5.00pm on Saturdays. No work will be undertaken on Sundays or public holidays.

4.16 Construction Staging

Lend Lease proposes to undertake the construction of Barangaroo South in a staged manner, and Residential Buildings R8 & R9 represents the fifth stage of that construction, following on from the Basement Car Park and Commercial Buildings C3, C4, and C5. Noting that the construction of the five projects will occur overlap during certain stages.

It is therefore requested that the Minister for Planning and Infrastructure structure the Instrument of Approval and consent conditions to facilitate a staged construction, so that all the works do not have to be undertaken upfront before issuing of staged Construction Certificates and subsequent Occupation Certificates.

4.17 Construction Hoardings

The construction site will be secured by Class A hoardings. The conceptual treatment of the hoardings will be designed to improve the appearance of the site in the streetscape throughout the construction phase and provide a transparent and open view of the site to the community. It will include information about Barangaroo South and its aspirations, such as sustainability, community engagement, heritage and the overall ambitions of the development, all of which may be updated from time to time. It may incorporate elements of public art as part of the graphic installation but will not include any third party advertising material.

A maintenance regime will be implemented to ensure the appearance and integrity of the hoarding is maintained. The final graphic treatment for the hoardings and any future changes will be submitted to the Director-General of the Department of Planning and Infrastructure for approval prior to its implementation on site.

5.0 Environmental Assessment

This section of the report assesses and responds to the environmental impacts of proposed Residential Buildings R8 & R9. It addresses the matters for consideration set out in the Director-General's Environmental Assessment Requirements (DGRs).

Appendix Q provides a detailed summary of the individual matters listed in the DGRs and identifies where each of these requirements has been addressed in this report and the accompanying technical studies.

The draft Statement of Commitments at Section 6.0 complements the findings of this section.

As detailed at Section 1.1.3 of this EAR, the lodgement of the Residential Buildings R8 & R9 Project Application follows the Basement Car Park Approval relating to Blocks 1, 2, 3 (in part), 4A (in part) and X of Barangaroo South.

The Basement Car Park Approval allows for demolition works, tree removal, site establishment, bulk earthworks, onsite treatment and remediation of contaminated soils and construction of a basement car park to accommodate up to 779 car parking spaces and associated services and infrastructure to support the initial phases of the future development of Barangaroo South, including the development of Residential Buildings R8 & R9.

The EAR and PPR accompanying the Basement Car Park Project Approval provide detailed information and environmental assessment of a number of planning and environmental issues that are beyond the scope of works proposed in this Residential Buildings R8 & R9 Project Application, including, relevantly the following:

- demolition and tree removal;
- remediation of contaminated material;
- transportation, re-use and disposal of excavated material;
- non indigenous archaeology;
- indigenous archaeology;
- geotechnical impacts;
- acid sulphate soils;
- de-watering, groundwater treatment and water quality; and
- environmental protection structures.

This Project Application is informed by the detailed assessments included in the Basement Car Park Project Application EAR. Some information submitted with the Basement Car Park Project Application has been re-submitted in this EAR for information and ease of reference only.

5.1 Consistency with Relevant EPIs, Policies and Strategies

The DGRs require the following legislation, strategies and planning instruments to be addressed:

- NSW 2021;
- Metropolitan Plan for Sydney 2036;
- Draft Sydney City Subregional Strategy;
- Sustainable Sydney 2030;
- State Environmental Planning Policy (Major Development) 2005;
- State Environmental Planning Policy No 55 - Remediation of Land;
- State Environmental Planning Policy No 65 - Design Quality of Residential Flat Development;
- State Environmental Planning Policy (Infrastructure) 2007;
- State Environmental Planning Policy (BASIX) 2005;
- Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005; and
- Sydney Harbour Foreshores and Waterways Area Development Control Plan 2005.

The Project Application's consistency with the relevant strategic and statutory plans and policies is provided in **Table 10**.

Table 10 – Summary of consistency with key strategic and statutory plans and policies

Instrument/Strategy	Comments
Strategic Plans	
NSW 2021	NSW 2021 is a 10 year plan to rebuild the economy, provide quality services, renovate infrastructure, restore government accountability, and strengthen our local environment and communities. The Project Application is consistent with the Plan in that it will provide new housing near employment and transport.
Sydney Metropolitan Plan for Sydney 2036	The Project Application is consistent with the Sydney Metropolitan Plan for Sydney as it will deliver the first two residential buildings with ground floor retail uses at Barangaroo South which is identified in the Metropolitan Plan as an opportunity to expand tourism and residential uses with improved harbourside access integrated with the CBD.
Draft Sydney City Subregional Strategy	The Project Application is consistent with the Draft Sydney City Subregional Strategy as it will deliver the first residential buildings at Barangaroo South which is identified in the Draft Strategy as a major development opportunity to conduct a focused and considered renewal process aimed at generating a new urban precinct in Australia's premier city.
Sustainable Sydney 2030	The Sustainable Sydney 2030 plan (Sydney 2030) was released by the City of Sydney in March 2008. It represents the beginning of an ongoing commitment by the City of Sydney to achieve the vision and targets set for a green, global and connected city. The Project Application reinforces the 10 strategic directions set out in the plan. In particular it will contribute to achieving: – A Leading Environmental Performer; – A Lively, Engaging City Centre – Housing for a Diverse Population; and – A City for Walking and Cycling.

Instrument/Strategy	Comments	
State Planning Instruments and Controls		
Major Development SEPP	As detailed in Section 1.1.6, Clause 3 of Schedule 6A to the EP&A Act states that any State Environmental Planning Policy made under or for the purposes of Part 3A as in force on the repeal of that Part and as amended after that repeal, such as the Major Development SEPP, continues to apply to and in respect of a transitional Part 3A project. The Barangaroo site is listed as a State Significant Site under Part 12 of Schedule 3 of the Major Development SEPP.	
	Clause 8 - Zone B4 Mixed Use	Residential Buildings R8 and R9 are predominantly located within the B4 Mixed Use zone. The proposed development is permissible and consistent with the objectives of the zone.
	Clause 9 - Zone RE1 Public Recreation	Public domain works are proposed within the RE1 Public Recreation zone. The proposed works are permissible and consistent with the objectives of the zone. In response to feedback from the BDA, a small number of Residential Building R8's balconies are located within the RE1 Public Recreation zone. See further discussion below the table.
	Clause 17 - Height of buildings (Maximum RL 41.5)	Residential Buildings R8 and R9 have a maximum RL of 41.5 and 36 respectively, and therefore comply with the maximum permitted height development standard (see Section 5.2).
	Clause 18 - Gross Floor Area Restrictions - Maximum 18,908m^2 (across Block X)	Residential Buildings R8 and R9 comply with the maximum permitted gross floor area in Block X.
	Clause 19 - Design Excellence	Residential Buildings R8 and R9 will achieve design excellence (see Section 5.5).
	Clause 23 - Development near zone boundaries	As noted above, a small number of Residential Building R8's balconies are located within the RE1 Public Recreation zone. Residential uses are not permissible with development consent in RE1 zone. Accordingly, approval is sought for the proposed balconies within the RE1 zone under clause 23. See further discussion below the table.
Infrastructure SEPP	The proposed development involves excavation more than 2m below ground level within 'Zone B' on the interim rail corridor map. An assessment of the proposed development on the Metro Corridor is included at Appendix W.	
SEPP 55	As identified at Section 1.1.3 of this EAR, the Basement Car Park Approval granted approval for remediation of contaminated material within the Residential Buildings R8 & R9 Project Application site with the exception of excavation works for the piling of the core of the proposed building that extends beyond the extent of excavation that is already approved as part of the Basement Car Park Approval. Section 5.6 and Appendix G demonstrate that the provisions of SEPP 55 and the contaminated land planning guidelines have been appropriately satisfied as is relevant to the purpose for which the works are intended to be carried out for this Project Application.	
SEPP 65	The Design Verification Statements prepared by PTW and FJMT (see Appendix A) address the principles of SEPP 65. An assessment of the proposal against the relevant rules of thumb in the Residential Flat Design Code is located at Section	

Instrument/Strategy	Comments
	5.5 and within the Design Reports (see Appendix A).
SEPP BASIX	A BASIX Certificate demonstrating the achievement of the thermal comfort, energy and water targets is included at Appendix K.
Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005	Barangaroo is located within the boundaries of the Sydney Harbour Catchment and as such is subject to the provisions of Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 (Sydney Harbour REP). The Sydney Harbour REP aims to provide a clear and consistent planning framework to protect and enhance the unique attributes of the Harbour. Within the Sydney Harbour REP, Barangaroo is identified as being within the Foreshores & Waterways Area Boundary. Part 3, Division 2 of the Sydney Harbour REP refers to matters which are to be taken into consideration by consent authorities before granting consent for development. Residential Buildings R8 and R9 are generally consistent with the relevant provisions and matters for consideration set out in Clauses 20 to 27 of the Sydney Harbour REP. Building design and views issues are discussed at Section 5.4.
Sydney Harbour Foreshore and Waterways Area Development Control Plan	The Sydney Harbour Foreshore and Waterways Area Development Control Plan (the DCP) complements Sydney Harbour REP and provides more detailed design parameters for development within the foreshore area of Sydney Harbour. The proposal is generally consistent with the DCP.

It is noted that whilst the Sydney LEP 2005 applies to the land, the Major Development SEPP is the relevant environmental planning instrument to be taken into account in the assessment and determination of this Project Application.

Major Development Clause 23 Development near zone boundaries

As noted in **Table 10** above, the balconies at the north west corner of the R8 Residential Building protrude into the RE1 Public Recreation zone above ground level. Residential uses are not permissible with development consent in RE1 zone, therefore the development seeks approval for the proposed balconies within the RE1 zone under clause 23 of the Major Development SEPP.

Clause 23 provides that a use allowed on the one side of a zone boundary, may be carried out in the adjoining zone if the development is consistent with both zones, and if it is compatible with the land uses for the adjoining land. The development near zone boundaries clause only applies to land within 25m of the zone boundary.

The northern end of Residential Building R8 has been carefully and specifically designed in response to its more prominent interface with the public domain and Globe Harbour. The northern end of the building is deliberately taller and distinctly expressed to provide a high quality facade design. During the design development of the building the Barangaroo Delivery Authority provided design feedback that the northern module of the building required greater design expression and that the curved nature of the then proposed facade should be further emphasised. This has resulted in the curved facade and apartment balconies projecting over the Block X boundary above ground level.

As illustrated in **Figure 12**, only a minor portion of the balconies extend over the block boundary to the west. No part of the northern building elevation extends outside the Block X boundary and no apartment living room extend over the Block X boundary. The area of overhang varies on each level of the building above the ground floor and ranges from approximately $5m^2$ to $15m^2$. **Figure 12**, illustrates the area of the Level 4 balcony (the largest overhang) that extends beyond the Block X boundary. The variation in the extent of balcony overhang across each level is shown on the individual floor plans included at **Appendix A**.

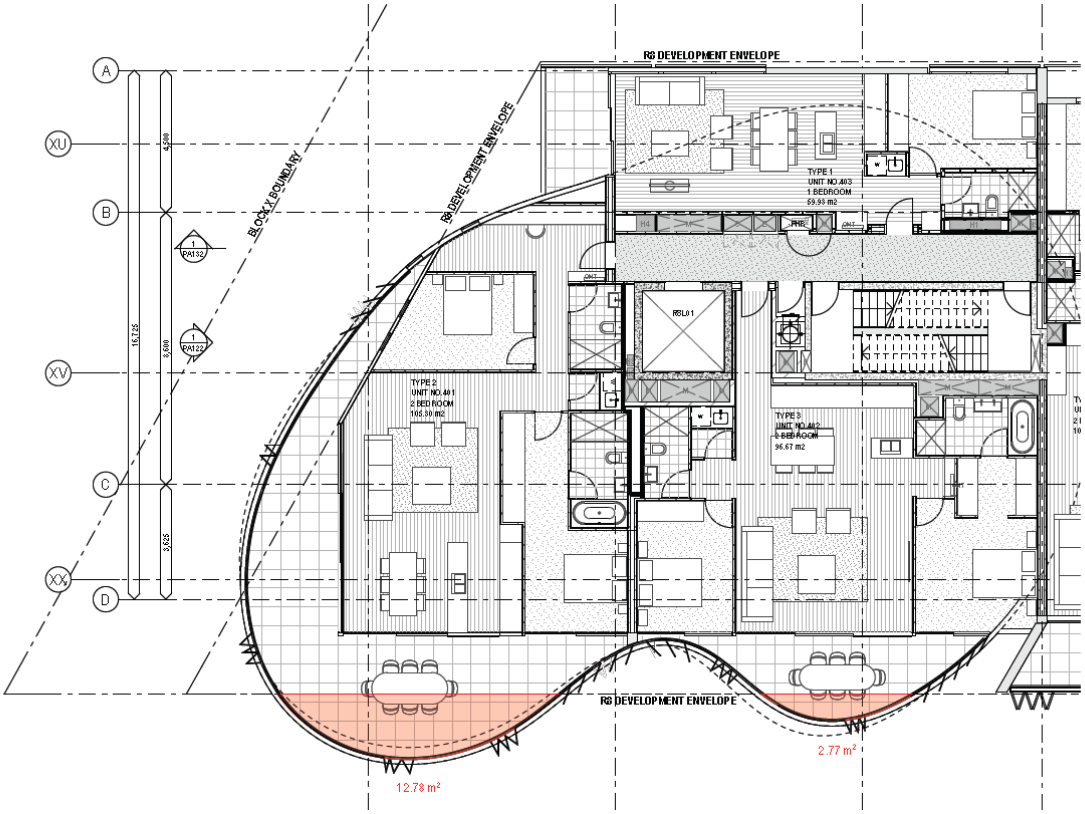


Figure 12 – Extent of Balcony Overhang on Level 4 (Worst Case)

The design of the northern end of the western facade has an expressive form with subtle double curves. The curved forms are created through facetted cladding panels and bi-fold balcony screens. The facade has been designed to provide character and amenity to the adjoining open space and Globe Street. The building has been designed to provide a distinctive curved form whist aiming to maintain the layout and design of the residential apartments and minimising any overhang into the adjoining RE1 zone.

The residential and retail uses within Building R8 are permissible with consent within the B4 Mixed Use zone. The proposed development is also consistent with the relevant objectives of the zone in that a mix of compatible land uses is proposed, the building is of a contemporary design and sustainability measures have been incorporated into the building.

The balcony overhang into the RE1 Public Recreation zone will not impact on the development of the waterfront promenade as a public recreation space. The development will be compatible with the proposed public recreation use of the land and is not inconsistent with the zone objectives for RE1 in that:

- that RE1 zoned land can still be used for public open space or recreational purposes;
- the balcony overhangs do not impact on the range of recreational settings and activities that can be provided;
- the vitality of the public domain will be maintained and passive surveillance can be undertaken;
- that natural environment will not be impacted upon; and
- the proposed balcony overhangs will not dominate or impact on the use of the land for public open space or recreational purposes.

The overhang of the balconies in the RE1 Public Recreation zone only occurs above ground level and is compatible with the future recreation and public open space uses on the waterfront promenade. It is also noted that the overhang of the balconies does not exceed the depth of the awnings at ground level. Residential Building R8 provides a strong urban edge development to the waterfront promenade. The Barangaroo Concept Plan (Mod 4) provides for a minimum 27m wide promenade with tree plantings, outdoor seating areas associated with ground floor restaurants and a ten metre wide unobstructed pedestrian zone along the water's edge. These key concepts of the waterfront promenade will not be impacted on by the proposed balcony overhang.

The building design provides a built form that is consistent with the objective of the flexible zone boundary clause which allows for logical and appropriate development that is compatible with the planning objectives and land uses of the adjoining zone.

5.2 Consistency with the Concept Plan

This Project Application seeks approval for the construction of Residential Buildings R8 & R9 as described in Section 4 of this report. Residential Buildings R8 & R9 and the associated works proposed under this Project Application are generally located within Block X of Barangaroo as identified under the approved Concept Plan (Mod 4) and have been designed in accordance with the approved Concept Plan, as detailed below.

The Barangaroo Concept Plan identifies maximum GFA and height controls for each Development Block within Barangaroo South, including Block X, within which Residential Buildings R8 & R9 are located. In addition, the Concept Plan requires project applications to demonstrate consistency with the Built Form Principles and Urban Design Controls within the Supplementary Urban Design Statement by RSH +P (12 November 2010), with required modifications as outlined in Condition B9.

Compliance with the conditions and consideration of the Built Form Principles was imposed by the Minister for Planning and Infrastructure to ensure that the bulk and scale of future buildings on the Development Blocks is acceptable with respect to the relationship between the street wall/podium level and surrounding land uses, and the bulk and scale of buildings.

Numeric Concept Plan Controls

Table 11 provides a comparison of Residential Buildings R8 & R9's consistency with the Concept Plan numerical controls.

Table 11 – Compliance with Concept Plan (Mod 4) Block X GFA and Height Controls

Block X Concept Plan (Mod 4) Control	Residential Buildings R8 & R9 Project Application	Block X Cumulative Total	Compliance
Maximum GFA – 18,908m^2	18,225m^2	18,225m^2	Compliant
Maximum Residential GFA - 16,463	16,459m^2	16,459m^2	Compliant
Maximum height RL 41.5	RL 41.5	N/A	Compliant

It is noted that the subject Project Application uses a large portion of the GFA allocated to Block X. The proposed distribution of GFA is consistent with the intent of the Concept Plan which provides a maximum GFA for the Block on the basis that it can be allocated within the future buildings as required. As a result, Residential Building R1 which is also located in Block X will remain a low scale, predominantly retail, building directly related to the foreshore and proposed ferry terminals.

Built Form Principles

As demonstrated in the Architectural Design Statement at **Appendix A**, Residential Buildings R8 & R9 comply with the Concept Plan (Mod 4) 's Built Form Principles, specifically they:

- provide a ribbon of residential units facing the water front to mediate the scale between the tower forms and the public promenade on the waterfront consistent with Built Form Principle 1;
- define the public sense of space to the street by building the facades to the street alignment consistent with Built Form Principle 3;
- provide pedestrian permeability through the block consistent with Built Form Principles 4 and 6; and
- are orientated to the west to define the linear nature of the promenade consistent with Built Form Principle 8.

It is noted that the development is not inconsistent with the other Built Form Principles.

Urban Design Controls

In the introduction to the Urban Design Controls, the document states that the Controls are intended to *"guide the built form and allow flexibility for the design of individual buildings and spaces, within the certainty of a structured framework."* It is not intended that these Standards or Objectives are implemented as a prescriptive set of design requirements. Conversely such controls have been avoided in order to allow for innovation, creativity and alternative design solutions to be achieved on each of the development blocks.

The Performance Based Urban Design Controls have been addressed in the Architectural Design Statements at **Appendix A.** Residential Buildings R8 & R9 comply with the principles and controls by providing:

- a building mass that is appropriate within the envelope;
- a street wall that defines the promenade;
- an articulated, well proportioned and legible building mass;
- permeability and accessibility through the site;
- articulated and legible rooftops;
- high architectural quality facades that contribute to the buildings articulation and mass; and
- activation of the promenade through providing approximately 95% of the ground floor frontages to the promenade as retail or entertainments uses.

Table 12 demonstrates that Residential Buildings R8 & R9 is generally consistent with the key Urban Design Controls of the Concept Plan (Mod 4).

Table 12 – Compliance with Concept Plan Urban Design Controls

Concept Plan (Mod 4) Block X Control	Residential Buildings R8 & R9 Project Application	Comment
Control 1 Building Mass and Location		
Above Ground floor level the westerly oriented facades to have a minimum 3m setback. Open and enclosed balconies are allowed to protrude into the setback zones.	Above ground level, Residential Building R8 is setback 2 - 2.3m to the west and Residential Building R9 is generally setback 2.7 - 3m. See further discussion below.	See further discussion below
The building mass height will be between maximum and minimum heights of RL41.5 and RL25 respectively.	The proposed building heights sit between RL41.5 and RL35.4 and therefore complies.	Consistent
On the easterly oriented facades a minimum of 1m setback is required.	A 5.4m setback has been provided to Block X on the eastern elevation.	Consistent
Control 2 Street Wall Establishment		
The building mass at the podium is to form a continuous Street Wall around the site for a minimum of 85% of the site perimeter.	The proposed building mass forms a continuous street wall around the site.	Consistent
Control 3 Building Articulation		
To reduce the impact of the buildings mass, the envelope and floor plates are to be horizontally and/or vertically articulated, in particular at upper levels.	The proposed building envelopes and floor plates have been horizontally and vertically articulated, in particular at the upper levels of both buildings.	Consistent
Building Form is to express sustainability features such as for example access to natural light, ventilation and solar shading.	The proposed building forms express the sustainability features of the buildings by integrating shading devices into the facades.	Consistent
Control 4 Building Legibility		
The separate primary components of the building will be expressed and include additional elements such as the open and enclosed balconies.	The components of the building have been expressed to enhance the legibility and modulation of the building form.	Consistent
Building form is to be reinforced using modulation of open and enclosed balconies, building elements, etc. to avoid monotony.	The proposed development features operable shutters on the balconies to allow them to be open and closed and provide modulation to the building form.	Consistent
Control 5 Ground Floor Permeability and Accessibility of Public Realm		
Public access around the Block is to be maintained on all edges.	Public access around the Block edges has been maintained.	Consistent
To provide one north to south and four east to west primary connections.	The proposed buildings are located in accordance with the indicative building envelopes in the Concept Plan and will provide (in part) the north to south and 3 of the east west connections. It is noted that the forth connection is not located within the Project Application site.	Consistent
Control 6 Ensuring Quality of Rooftops		
Roof forms to incorporate architectural elements.	The roof form incorporates architectural elements.	Consistent
Architectural treatment of exposed elements such as lift shafts, overruns control rooms and any sustainability features.	Lift shafts, overruns and plant rooms have been integrated into the overall design and architectural treatment of the building.	Consistent
Exposed mechanical equipment is to be avoided.	No exposed mechanical equipment is proposed.	Consistent
Good quality materials (i.e. durable, hardwearing, sustainable) to be used.	Good quality materials will be used for the roof materials.	Consistent
Roof to incorporate no more than 60% accessible terraces.	Residential Building R9 will have accessible terraces that exceed 60% of the roof area. See further discussion below.	Consistent

Control 7 Facades		
The choice of appropriate materiality for longevity, durability and flexibility. Materials such as steel, glass, concrete, timber and aluminium shall be considered.	The proposed materials (see Sections 4.6.2 and 4.7.2) have been chosen for their longevity, durability and flexibility.	Consistent
Environmentally sustainable design is to be incorporated on all facades.	The facades have been designed to respond to their orientation in order to maximise the sustainability of the building. The features include louvres, batons, and landscaping.	Consistent
Depth and layering of facades is to be achieved through relief and protrusions. Mirrored facades should be avoided.	As detailed in Sections 4.6.2 and 4.7.2 Residential Buildings R8 & R9 will integrate relief and protrusions to the facade thereby achieving depth and layering. No mirrored facades are proposed.	Consistent
Facade components such as external shading shall be used to provide light and shade to the building.	The facades have been designed to respond to their orientation, using external shading and balconies to control the light and shade to the apartments.	Consistent
Control 8 Active Street Fronts		
At least 85% of the Ground Level is to be active on the primary Street Wall facades (North & West)	Approximately 98% of the ground level will be active on the primary street wall facades.	Consistent
Building entrances to internal areas such as residential lobbies, exit ways and service areas or loading docks shall be considered as part of the 85% active requirement.	Noted.	Noted
Building service areas, parking entrances and loading docks will not be located on the promenade with the majority of servicing occurring from the basement.	No service areas are located on the promenade with the majority of services, parking and loading dock occurring from within the basement.	Consistent
The width of driveways shall be minimised.	No driveways are proposed.	N/A

Control 1, Standard 1 identifies a setback of 3m above ground level on the western facade. Noting that open and enclosed balconies are allowed to protrude into the setback zone.

As discussed in Section 5.5, the western orientation of Block X makes achieving 2 hours of solar access to the living rooms of apartments on the 21 June very difficult. Following detailed solar access studies, it was demonstrated that marginally reducing the setback to the west greatly increased the opportunity for solar penetration into the living areas of the apartments, which is otherwise blocked by the balconies. As a result, Residential Building R8 proposes to vary this control by approximately 0.7m across the length of the building, and Residential Building R9 proposes to vary the control by approximately 0.3m intermittently along the frontage.

The objective of the control is to ensure the building mass is appropriate within the envelope. The proposed variations of up to 0.7m within the 3m setback zone, which is occupied with balconies, will not have a significant impact on the perception of the building mass from the public domain. Furthermore, the proposed buildings comply with the other relevant Major Development SEPP, Concept Plan Approval, and Urban Design controls that work in conjunction to establish an appropriate built form on the site. In light of the above the variation is considered to achieve the objective of the control as it will achieve a building mass appropriate within envelope.

Given the significant benefit achieved in terms of improved solar access from the reduced setback, the proposed variation is considered to deliver a better planning outcome.

Statement of Commitments

The Statement of Commitments requires the following Plans and Strategies to be submitted to the Planning Reference Group prior to lodgement of any relevant Project Application (other than for demolition or early /site preparation work).

- Design Excellence Strategy;
- Public Art Strategy;
- Housing Strategy;
- Supplementary TMAP (refer to **Appendix D**);
- Utility Services Infrastructure Plan (refer **Appendix V**);
- Integrated Water Management Plan and Guidelines – covered by the Stormwater Management Plan and the ESD Report (**Appendix O** and **K**); and
- Marketing and Promotion Strategy and Retail Management Plan.

In conformance with the Statement of Commitments the above plans and strategies were submitted to the Planning Reference Group prior to the submission of the Commercial Building C4 Project Application and where appropriate have been updated for Residential Buildings R8 & R9.

The Concept Plan Statement of Commitments also includes commitments relating to residential amenity. **Table 13** below assesses the proposed development's consistency with the Residential Amenity Commitments:

Table 13 – Assessment against the Residential Amenity Statement of Commitments

Commitment	Proposal
90. Building Types: In terms of the classifications under the Residential Flat Design Code (RFDC), generally the residential buildings on the EDH site are to consist of Row Apartment, Courtyard Apartment, Slab (Block), Tower and Hybrid building types.	Noted. Row apartments are proposed.
91. Building Heights, Floor Space Ratios and Setbacks: All building heights and setbacks are to comply with the development block envelope controls contained within the Concept Plan.	The proposed building heights comply with the Concept Plan block envelope controls. In some cases the proposed setbacks have been varied in response to the design review process with the Barangaroo Delivery Authority and their advisors, as well as reviews with the City of Sydney. See further discussion at Section 5.4.1.
92. Building Depth: The maximum building depth, as measured from glass to glass excluding balconies, limited to 18 metres. In Row Apartment, Courtyard Apartment, Slab (Block) types, 15 metres glass to glass is preferred.	The proposed building depths measured from glass to glass excluding balconies, is less than 18 metres.
93. Building Separation: Building separations should have regard to separation distances set out in the RFDC. Where smaller separation distances are provided consistent with the Concept Plan urban design envelopes, the amenity, privacy and solar access to existing and proposed dwellings and the public domain need to be adequately considered.	The proposed building separation between R8 and R9 (12m) is consistent with the Concept Plan indicative building envelopes, but smaller than the separation distances in the RFDC. However, as detailed in Section 5.4.4 and 5.5, the proposed apartments have been specifically designed to ensure the affected apartments achieve a high level of amenity and privacy. solar access and the impact on the public domain]
94. Landscape Design: generally, landscape spaces for future residents of the EDH will be in the form of roof terraces and balconies. All private landscape design should be consistent with the design principles set out on pp46-47 of the RFDC. Due to the frontage to the extensive new harbour-side park, the proposed street tree planting and the	Landscape spaces in the form of terraces and balconies have been provided within Residential Buildings R8 & R9 consistent with the design principles set out on pages 46-47 of the RFDC.

adjacency to the city centre, there is no requirement for deep soil planting within blocks.	
95. Apartment Mix: Housing across the EDH site should provide a variety of types, sizes and configurations. Flexible live / work housing types are highly appropriate for the city centre fringe location.	A variety of apartment types, sizes and configurations are proposed within Residential Buildings R8 & R9. A total of 12 x 3 bedroom apartments, 100 x 2 bedroom apartments and 47 x 1 bedroom apartments are proposed
96. Solar Access: Living rooms and private open spaces for at least 70 % of apartments in a development should receive a minimum of 3 hours direct sunlight between 9a.m. and 3p.m. in mid-winter. For up to 30% of dwellings, 2 hours is required (excluding south-facing units).	Consistent with the approved Concept Plan, Residential Buildings R8 & R9 have been orientated to the west in order to maximise their uninterrupted outlook over the harbour. However, as detailed in Section 5.5, despite achieving a high level of residential amenity, due to the orientation of Residential Buildings R8 & R9 the buildings will not achieve 3 hours of solar access to living rooms between 9am and 3pm in mid-winter for 70% of the apartments. Whilst referring to 'a development', this commitment was made as part of the Concept Plan and achieving it should be considered on a Concept Plan basis, not individual buildings that despite being consistent with Concept Plan orientation and built form controls, could never achieve the 70% target. It is noted that the vast bulk of residential dwellings on the site will be located in small footprint towers consisting of north facing apartments, therefore achieving the precinct wide commitment is highly achievable.
97. Single Orientation Apartments: Apartment buildings should aim to maximise cross ventilation. The number of single aspect apartments with a southerly aspect (SW-SE) should be limited to a maximum of 10% total of the total units proposed. Developments which seek to vary from the minimum standards must demonstrate how site constraints and orientation prohibit the achievement of these standards and how energy efficiency is addressed.	The orientation of the building has been determined by the Concept Plan, with the proposed apartments generally facing due west. The number of single aspect apartments facing south is limited to 6, which equates to 3%. The development will achieve a high level of cross ventilation, exceeding the RFDC rule of thumb.

Barangaroo Housing Strategy

Consistent with the Barangaroo Housing Strategy prepared for Barangaroo South, the proposed residential buildings will contribute to Barangaroo becoming a sustainable, vibrant and diverse community that will provide housing that will support a wide range of people.

The proposed housing mix provides the flexibility to be capable of being adapted in the future, and will respond to the changing dynamics of the market and preferences of apartment owners and occupiers. Residential Buildings R8 & R9 include a mix of one, two and three bedroom apartments for investors, city professionals and owner occupiers, as well as a small amount of premium residences. In particular, Residential Buildings R8 & R9 are generally consistent with the proposed mixes, internal areas and price points established in the Barangaroo Housing Strategy, and will adopt parking rates consistent with the City of Sydney DCP.

It is noted that the Barangaroo Housing Strategy commits to providing 2.3% of residential GFA (approximately 36 apartments) as Key Worker Housing (KWH) when not less than 75% of the total residential developable GFA is complete (approximately 99,000m^2). It is also envisaged that the KWH will be located within the residential buildings closer to Hickson Road. Accordingly, the 2.3% KWH

target will be met as part of future buildings within Barangaroo South and no KWH is proposed in Residential Buildings R8 & R9.

5.3 Design Excellence

Pursuant to Clause 19, Part 12 of Schedule 3 of the Major Development SEPP and DGR 4 - Urban Design and Built Form, in determining an application for a new building at Barangaroo, the consent authority must consider whether the proposed development exhibits design excellence.

In considering whether the proposed building exhibits design excellence, the consent authority must have regard to the following matters:

a) *whether a high standard of architectural design, materials and detailing appropriate to the building type and location will be achieved;*

b) *whether the form and external appearance of the building will improve the quality and amenity of the public domain;*

c) *whether the building will meet sustainable design principles in terms of sunlight, natural ventilation, wind, reflectivity, visual and acoustic privacy, safety and security and resource, energy and water efficiency; and*

d) *if a design competition is required to be held in relation to the building, as referred to in subclause (3), the results of the competition.*

Clause 19(3) requires a design competition to be held for development that will be greater than RL 57, or where the erection of a new building is proposed on a site of greater than 1,500 square metres. A design competition is not required to be held if the Director-General certifies in writing that the development exhibits design excellence and is satisfied that the architect responsible for the proposed design has an outstanding reputation in architecture, and necessary arrangements have been made to ensure that the proposed design is carried through to the completion of the development concerned (as per cl19(4)).

In addition, Condition C2 – Design Excellence of the approved Concept Plan (Mod 4) requires a design excellence competition to be held by the Director-General and convention of a design review panel for development that exceeds 55 metres in height, or is on land exceeding 1,500m^2 in area. Under Condition C2, the key matters for consideration are:

- whether a high standard of architectural design, materials and detailing appropriate to the building type and location will be achieved;
- whether the form and external appearance of the building will improve the quality and amenity of the public domain;
- whether the building meets sustainable design principles in terms of sunlight, natural ventilation, wind, reflectivity, visual and acoustic privacy, safety and security and resource, energy and water efficiency;
- a comparison of the proposed development against the indicative building controls identified in Section 13.0 – Built Form of the approved Concept Plan EAR; and
- whether the new development detrimentally impacts on view corridors, particularly from public spaces and streets.

In order to ensure design excellence was achieved across the Barangaroo South site Lend Lease prepared a Design Excellence Strategy (DES). The DES was approved by the Barangaroo Reference Group. The DES set out a range of initiatives and elements to ensure a high quality design outcome is achieved for all

individual buildings. Specifically Lend Lease selected several local and international architectural firms for inclusion on a 'Panel of Nominated Architects' that would be responsible for the design of C6, C2, C8, R2, R3, R4, R5, R6, R8, R9, and the Cultural Building.

In accordance with the Approved Design Excellence Strategy, Lend Lease has selected two architects from the panel, being FJMT and PTW .

The Design Team

Residential Buildings R8 & R9 exhibit design excellence through the commissioning of renowned Australian Architects FJMT and PTW. This partnership satisfies the criteria identified in clause 19(4)(b)(i) of Part 12, Schedule 3 of the Major Development SEPP, namely that the architects responsible for the proposed design have an outstanding reputation in architecture.

FJMT has won over 100 awards for excellence and innovation in architecture. These awards include international awards for architecture and sustainable design and Australia's highest awards for architecture, most notably:

- The AIA's Sir Zelman Cowen Award for Public Architecture and Lloyd Rees Award for Excellence in Civic Design for Scientia at the University of New South Wales
- The Sir John Sulman Award for Architectural Excellence and the Francis Greenway Award for Conservation for the Mint - Office for the Historic Houses Trust

FJMT's experience in residential design is demonstrated by past and current residential projects such as Sugar Dock Apartments at Jacksons Landing, Alaris and Manta Apartments at Little Bay and Capella Apartments in Kensington, which have been awarded a range of UDIA, Local Government and AIA awards and commendations.

Since its inception in Sydney in 1889, PTW Architects has been recognised for its consistent delivery of architectural innovation and high standards of design. Their architectural achievement has been recognized repeatedly throughout its history. In 1930, the firm won the inaugural Sulman Award (the highest honour awarded by the Royal Australian Institute of Architects) for Science House - Sydney. It won the Sulman award again in 1952 for the Royal Swedish Legation, Canberra. More recently PTW's awards include the 2012 AIA Public Architecture Award for the Sydney Grammar School Assembly Hall and the 2012 AIA John Verge Interior Architecture Award for the John Kaldor Family Gallery at the Art Gallery of New South Wales.

PTW been involved in designing some of Sydney's most important and acclaimed foreshore residential developments, including the Walsh Bay, Darling Island Apartments at Pyrmont, and the Quay Grand and Bennelong Centre at East Circular Quay.

Further information regarding both architects' outstanding reputation is included within their respective Design Reports at **Appendix A**.

The design of Residential Buildings R8 & R9 was informed by the 'Master Architects' of the Barangaroo South, Rogers Stirk Harbour + Partners. Other members of the consultant team, including Aspect Oculus have also contributed greatly to the design, ensuring that Residential Buildings R8 & R9 are a realistic, integrated and innovative design. Lend Lease's team of world class specialists in engineering, sustainability, urban planning and landscape design have all helped to shape the scheme from its inception.

In addition, Jan Gehl, Danish architect and urban designer has helped to design the massing, streets and public spaces of Barangaroo South generally to ensure an appropriate human, people-centred environment is created. This Project Application adopts the principles established by Jan Gehl, further demonstrating that design excellence is to be achieved throughout all facets of the development.

The project team has always been mindful of emerging trends throughout the world and has benchmarked the scheme against other projects in Australia and internationally.

High Standard of Architectural Design

Some of the key design features of Residential Building R8 that demonstrate the high standard of architectural design include:

- splitting the long linear building into two primary forms; a carefully scaled rectilinear form that defines and characterises the waterfront; and a higher more organic form that turns to the north and addresses the main public open space;
- dividing the western facade into three separate equal modules giving identity to each separate apartment building and reducing the overall scale of the west facade of the building along the water's edge;
- gently angling the separating walls to the north in order to prioritise the northern orientation and reduce the impact of low western sun in summer;
- using adjustable external bi-fold natural coloured batten screens on the western facade that allow personalised environmental and privacy control and create a lively pattern across the facade;
- implementing a variety of environmentally suitability measures to achieve a 5-star Green Star rating under Green Star Multi-Unit Residential v1; and
- providing setbacks and recessed oblique windows to improve privacy and enable views along the length of Globe Street instead of directly across the road.

Some of the key design features of Residential Building R9 that demonstrate the high standard of architectural design include:

- providing a tri-partite horizontal composition that mediates between the traditional scale of the waterfront and the high-rise commercial towers to the east;
- layering the façade to create solid and voids that give depth to the building and break up its scale;
- using a palette of natural façade materials; precast concrete, zinc (or similar) and reconstituted timber emphasize the different planes of the façade and create harmony through colour and texture;
- modulating the facades through using bi-folding perforated zinc (or similar) screens for sun shading and privacy;
- implementing a variety of environmentally suitability measures to achieve a 5-star Green Star rating under Green Star Multi-Unit Residential v1; and
- using landscaping to form a counterpoint in the facade design that generates an urban scale that contrasts with the human scale of the bi-folding screens.

Design Review Process

The design process leading to the proposal is detailed in the Architectural Design Statements included at **Appendix A**. The proposed designs for Residential Buildings R8 & R9 have been through a rigorous process of design review, both

internally and with the independent design experts. The proposed design was presented to the Barangaroo Delivery Authority's Design Director and design advisors and to the City of Sydney Council. Comments from all of the design reviewers have been taken into account and have led to the refinement of the proposed modified design.

Achieving Design Excellence

The proposed development will exhibit design excellence as:

- renowned architectural practice FJMT and PTW have been engaged as architects on the project along with other esteemed members of the consultant team, including Aspect Oculus;
- a high standard of architectural design, materials and detailing is achieved, appropriate to the building type and location;
- the building form, external appearance and the ground floor plane provides for high amenity and quality of public domain;
- Lend Lease commits to ensuring continuity in the design process and realisation of the submitted Residential Buildings R8 & R9 design in the completed building by ensuring that FJMT and PTW have direct involvement in the design documentation phase;
- it generally complies with the planning framework established for the site;
- the new development will have no adverse impacts on view corridors, particularly from public spaces and streets.
- it utilises Lend Lease's skills and proven track record to deliver an exemplary commercial building; and
- it explores and implements innovative technical and sustainable solutions, contributing to cutting edge design excellence.

The Project Application exhibits design excellence and therefore clearly meets with the requirements at Clause 19 of the Major Development SEPP and Condition C2 of the approved Concept Plan (Mod 4). The strategy is also consistent with and addresses the requirements of the DES requirements established in the approved Concept Plan's (Mod 4) Statement of Commitments. It is therefore formally requested as part of this Project Application that the Director-General certifies in writing that the development exhibits design excellence and that accordingly a design competition is not required in relation to the development.

5.4 Urban Design and Built Form

5.4.1 Building Design

As detailed at Section 5.2, Residential Buildings R8 & R9 generally comply with the Block X built form principles under Concept Plan (Mod 4) and the relevant urban design controls relating to that block, and is therefore appropriate to the future character of the site in terms of building form, bulk, scale and height. In this regard, the development will not give rise to any additional adverse built form impacts beyond those considered in the Concept Plan (Mod 4).

Both Residential Buildings R8 & R9 have a predominant 9 storey height to create continuity along the public promenade and unite the two buildings as the western façade to the Barangaroo development.

Residential Building R9's transition from 9 to 7 storeys towards the south brings the scale of the building down to the scale of the buildings along Kings Street Wharf and Lime Street.

At the northern end of Residential Building R8, where it faces onto the future public square, the building takes on a more organic and expressive form with subtle double curves and an increased overall height, emphasising the importance of the public space and enhancing the building's character and identity.

Whilst Residential Building R8, and to a lesser extent R9, propose minor variations to the Block X Urban Design Control relating to the setback to the western elevation, as demonstrated in Section 5.2, this proposed variation will improve solar access to the living rooms of the apartments and still result in an appropriate building mass.

As demonstrated by the architectural plans and artist impressions, the facades of the two buildings are highly articulated and will make a positive contribution to the visual quality of the site and the waterfront interface.

5.4.2 Public Domain

Public access will be provided around all frontages of the building. The waterfront interface of Residential Buildings R8 & R9 and the interface of the building to the public domain are in accordance with the approved Concept Plan and will improve the amenity and quality of the public domain. Active uses (cafés and retailing) are proposed to line approximately 98% of the key public domain frontages to the north and west identified in the Concept Plan. Retail and residential lobbies also line approximately 90% of Globe Street. The proposed retail spaces will provide activation and vitality to both the building and the foreshore promenade and help to integrate the public and private domains. Active uses in the form of residential lobbies have been provided along Globe Street to create an address for the building and activate the street.

The vehicular and loading dock entry and exits to the basement car park form part of the Basement Car Park Approval and are located elsewhere on the site and will not therefore have a detrimental impact upon visual amenity and pedestrian safety.

The proposed development ingrates with the approved and future development under the Concept Plan (Mod 4). Specifically the development facilitates the provision of the key pedestrian connections identified in the Concept Plan Built Form Principles and Urban Design Controls as illustrated in **Figure 13** below.

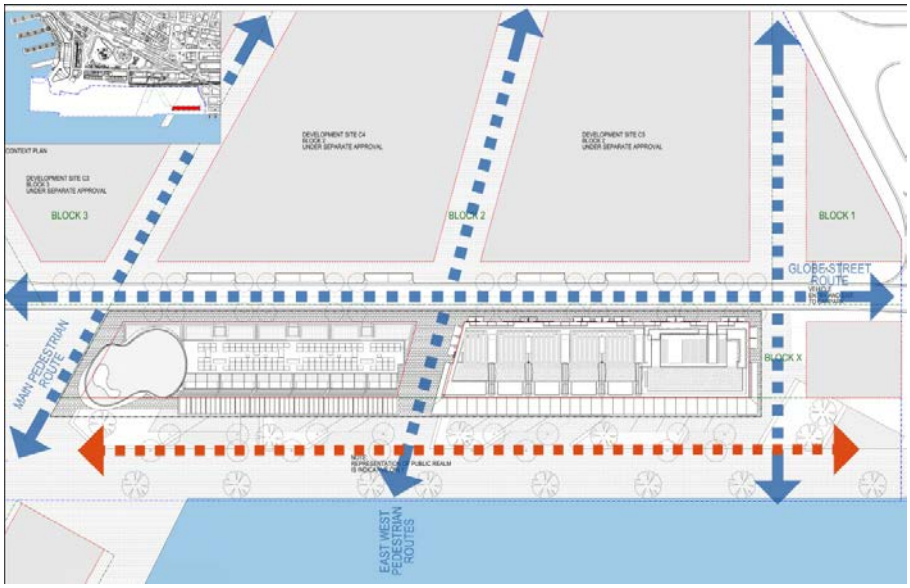


Figure 13 – Pedestrian Network Integration

5.4.3 Visual Analysis from the Public Domain

Barangaroo is a significant urban renewal project for Sydney. It is the Government's intention that the renewal will leverage and strengthen the Sydney CBD, and hence the State's economy, well into the 21st Century. The urban form principles established for the site to date under the approved Concept Plan (Mod 4) are based on examination of multiple urban form options and urban design / architectural ideas and solutions to help underpin the Government's vision for the renewal of the site

There are a number of fundamental principles embodied within the approved Concept Plan (Mod 4) which direct the location, height, scale, bulk, massing and general configuration of the future floor space to be predominantly within Barangaroo South, as follows:

- the urban design structure, which creates major new parklands on the harbour edge, and defines an eastern foreshore link that is highly activated by the adjoining mixed use or urban development precinct. The public domain is the clear unifying structure that acts as the framework for the development form and integrates the site into the fabric of the surrounding city;
- higher density development is to be focussed towards the southern end of the site, linking into existing higher density development at King Street Wharf and the western edge of the CBD. To continue a built form dialogue with the adjoining city, building heights across the site generally taper towards the north, with the highest forms concentrated in the block in front of Napoleon Street;
- the street layout is integral to the physical ordering principles of the site as a whole, integrating with existing streets within Walsh Bay, Millers Point, King Street Wharf and the western grid of the city. It provides a framework for the built form, and determines the configuration and massing of the future development; and
- to promote equitable access to views towards the harbour, built forms have been arranged to define the street corridors, and to allow view corridors from the existing private buildings to the east.

The redevelopment of Barangaroo South in accordance with the above principles and in the manner proposed by the approved Concept Plan (Mod 4) will significantly alter existing views that are available to the west, north-west and south west from surrounding development.

The redevelopment of the Barangaroo site will result in the creation of new public views and vistas into and out of the site. The new buildings will result in a minor change of some views, in particular from buildings to the west of the site.

Residential Buildings R8 & R9 deliver a built form that is appropriate to the site's context and to the desired urban form and scale for the western part of the Sydney CBD at the interface with Darling Harbour.

The built form reinforces the landmark significance of the site, maintains significant view corridors within the site and from the public domain surrounding the site towards Sydney Harbour, and has regard to view sharing principles with respect to existing surrounding development.

Residential Buildings R8 & R9 generally sit within Block X and have a key frontage to the Foreshore Promenade. The development at Barangaroo South forms a western extension to the CBD and the Residential Buildings R8 & R9 forms part of that extension. In visual terms the building will read as a new addition in the context of the existing CBD backdrop.

The impacts on views associated with Residential Buildings R8 & R9 are consistent with those assessed under the approved Concept Plan (Mod 4) and will not have any adverse view impacts beyond those already considered under the approved Concept Plan (Mod 4). Furthermore, it should be noted that the view impacts assessed as part of the Concept Plan (Mod 4) were based on the maximum extent of the permissible block envelopes within Barangaroo South. The proposed Residential Buildings R8 & R9 do not fill out the full envelope permitted under the Concept Plan (Mod 4).

Key views, view corridors, and vistas internal to the site as established by the approved Concept Plan (Mod 4), will not be impacted upon, as the location of Residential Buildings R8 & R9 is consistent with the approved Concept Plan.

In addition, with the establishment of the promenade to the west of Residential Buildings R8 & R9, significant new views and vistas will be opened up from public spaces.

Artist impressions and perspectives of views from the following locations have been prepared for the following locations:

- Hickson Road;
- Kent Street;
- Shelley Street;
- Lime Street;
- Pyrmont;
- East Balmain;
- Darling Harbour;
- Blues Point; and
- Millers Point.

A copy of Artist impressions is included at **Appendix I.**

The methodology for preparation of the visual impact images, including the rationale for lens selection is documented in the material included at **Appendix I**.

The impacts of the proposed Residential Buildings R8 & R9 on key elements and views from key locations external to the site, and from within the site, is demonstrated at **Appendix I** and summarised below.

Hickson Road

Views along Hickson Road are presently framed only to the east by the sandstone cutting at and along the High Street alignment and a generally continuous wall or urban form along Kent Street or lower-rise developments along the eastern edge of Hickson Road. The western edge is an open view only in part obstructed by various permanent and temporary structures and plantings.

Residential Buildings R8 & R9 will not affect views through the site from Hickson Road, which will be provided via Union Walk, an east west pedestrian connection. All views along Hickson Road through to the south CBD, which terminates this view, will be retained.

Kent Street

There are currently only limited views to or over the Barangaroo site from Kent Street given the existing form of development along its western edge and the limited openings created by streets intersecting it at a perpendicular angle. The

most significant views to or through Barangaroo South occur at Margaret Street and at Gas Lane.

The existing view westwards at the intersection of Kent Street and Margaret Street is one dominated by the Western Distributor viaduct which sits high within the view corridor. The experience of a sky view is cluttered and partially framed only by development both beneath and surrounding the viaduct. There are no major existing views of any significance to water or nearby foreshores from this location. There are some wider views to the ridgelines of Pyrmont and Balmain.

At the Kent Street – Margaret Street intersection only a small part of the top corners of Residential Buildings R8 & R9 will be visible, with both buildings being largely obstructed by the existing Sussex Hotel and future Commercial Buildings C4 and C5.

Shelley Street, Lime Street and King Street Wharf

Shelley and Lime Streets are both located within the King Street Wharf precinct and principally run parallel in a north-south direction. At present these streets both allow for framed or open views to the north.

Residential Buildings R8 & R9 will not be visible from Shelley Street.

Residential Buildings R8 & R9 will have some minor impact on north and north west facing views from existing buildings within the King Street Wharf precinct. Views to the east, west and south from King Street Wharf will be unaffected. Whilst the impact on existing views from King Street Wharf is acknowledged, this impact is minor and consistent with the approved Concept Plan (Mod 4).

The proposed buildings will be visible from some locations along King Street Wharf. The development will allow for uninterrupted views directly north up the foreshore promenade reinforcing the perception of public access to the foreshore.

Pyrmont

Views from Pyrmont to the Barangaroo site vary dependent upon the viewer's location. Generally, the existing views to the CBD from Pyrmont are typified by the layers of development filling the CBD's silhouette, newer development at King Street Wharf and the western CBD expansion, Millers Point, and a significant void at Barangaroo (noting that approval has been granted for Commercial Buildings C3, C4 and C5). Views towards Millers Point, High Street's sandstone cutting, Observatory Hill, and North Sydney beyond vary depending on which part of Pyrmont the viewer is located. Further, the ability to discern detail and the cultural heritage attributes of the Millers Point and Observatory Hill precinct are greatly reduced as the viewer moves south through Pyrmont and the view becomes dominated by the urban form of the CBD proper.

Residential Buildings R8 & R9 will be visible from Pyrmont and contribute to the built form along the western edge of the foreshore. The buildings will assist in creating a continuous street wall along the foreshore consistent with the Built Form Principles in Concept Plan (Mod 4).

East Balmain

Views from East Balmain are more distant views across the waters of Darling Harbour. The site presently sits as an undeveloped expanse at the edge of the CBD, with the more recent development of King Street Wharf at the southern edge of Barangaroo South. The Kent Street commercial and residential towers act as a significant wall to the north western edge of the CBD with few gaps discernible. The key view from East Balmain is to Observatory Hill and Millers Point. The trees in Observatory Hill Park and the High Street terraces and sandstone cutting are all especially visible.

Residential Buildings R8 & R9 will make a positive contribution to the development along the western foreshore, continuing with the scale of the Macquarie Bank building and King Street Wharf developments. Residential Buildings R8 & R9 will not affect key views to Observatory Hill or Millers Point.

Darling Harbour

Views from Darling Harbour, like from Pyrmont, can vary greatly depending on the viewer's location. As an example, northerly and north-eastern views from Pyrmont Bridge are presently framed and dominated by developments in the CBD and cultural buildings at Pyrmont's foreshore. The CBD generally steps to the foreshore with its topography when viewed from certain locations. In part the view highlights a wall-like form to the existing CBD. Views may in part also be enjoyed through to the northern shore of Sydney Harbour and its silhouette and markers, such as North Sydney and Royal North Shore Hospital.

Views to Residential Buildings R8 & R9 will vary considerably depending on the viewer location, which could include Pyrmont Bridge, Cockle Bay, Harbourside precinct or National Maritime Museum. When viewed from the Pyrmont Bridge, Residential Buildings R8 & R9 will be visible and contribute to the built form along the western edge of the foreshore. The buildings will assist in creating a continuous street wall along the foreshore consistent with the Build Form Principles in Concept Plan (Mod 4). Distant views towards North Sydney and the North Shore will remain, as will a high degree of sky views through and beyond the site.

Blues Point

As with views from East Balmain, views from Blues Point to Barangaroo South are distant views across Sydney Harbour. Significant views of Walsh Bay and Observatory Hill are available in the foreground. The existing Sydney Harbour control tower is a prominent feature of the view due to its visual separation from the CBD buildings.

Residential Buildings R8 & R9 will not be visible from Blues Point as it will be obstructed by the existing development on Millers Point.

Millers Point (and Observatory Hill)

At present, the best views and vistas enjoyed at Millers Point are those from Observatory Hill Park. The park's size and height allows for panoramic views to the south-west from Pyrmont and White Bay around to East Balmain, Goat Island, and to the northern shores of Sydney Harbour. Much of this view includes water views, particularly from White Bay and to the north. There are only minor glimpses to water in the vicinity of Pyrmont, where these views are dominated by that peninsula's new built form.

Residential Building R9 will not be visible from Observatory Hill Park. Residential Building R8 will largely sit behind the existing buildings on Kent Street when view from Observatory Hill Park and hence will not impact on significant water views or views south and west.

Views Within the Site

Residential Buildings R8 & R9 will preserve the important public domain views that are to be established within the Barangaroo site.

When viewed from Barangaroo Central, the Headland Park and the waterfront promenade within Barangaroo South, Residential Buildings R8 & R9 will create a strong street wall that frames the Foreshore Promenade.

At street level, the proposed buildings will create a human scaled environment that integrates the building with the existing city. The proposed buildings create a street wall on all frontages which, and in conjunction with the adjacent buildings, will frame important view corridors through the site, such as the view down Union Walk to the waterfront and back up to the CBD.

The northern elevation of Residential Building R8 will be particularly prominent from the public domain around the Southern Cove. In order to respond to its context the northern module of Residential Building R8 has been made higher with a unique organic singular form.

Residential Building R9 continues the street wall alignment of the Commercial Building C5 podium along Margaret Street West. The building will frame views down Margaret Street West to the Foreshore Promenade and Harbour beyond.

5.4.4 Visual Analysis from Kent Street Residences

Residential Buildings R8 & R9 will not be visible from the residential apartments on Kent Street as they will be obstructed by the approved Commercial Buildings C3, C4 and C5.

5.5 Residential Amenity

The following assessment uses the 'Rules of Thumb' in the RFDC, which are a means for measuring the amenity of an apartment. **Table 14** lists the relevant 'Rules of Thumb' and assesses projects consistency with those standards.

The assessment demonstrates that the proposed development complies with the majority of the 'Rules of Thumb' and that all apartments within the proposed development will achieve a very high standard of internal amenity. Where variations are proposed to the Rules of Thumb they are discussed in further detail below the table.

Table 14 – Assessment against the relevant 'Rules of Thumb' in the RFDC

Rule of Thumb	Residential Building R8	Residential Building R9
Building Depth		
In general, an apartment building depth of 10 to 18 metres is appropriate. Freestanding buildings may have a depth greater than 18 metres only if they achieve satisfactory daylight and natural ventilation.	✓	✓
Visual Privacy		
Nine storeys and above/ over 25 metres: – 24 metres between habitable rooms/balconies – 18 metres between habitable rooms/balconies and non-habitable rooms – 12 metres between non-habitable rooms	×	×
Pedestrian Access		
Identify the access requirements from the street or car parking area to the apartment entrance.	✓	✓
Follow the accessibility standard set out in Australian Standard (AS 1418 (Parts 1 & 2) as a minimum.	✓	✓
Provide barrier free access to at least 20% of dwellings in the development.	✓	✓
Apartment Layout		
Single-aspect apartments should be limited in depth to 8 metres from a window.	✓	✓
The back of a kitchen should be no more than 8 metres from a window.	×	×
The width of cross-over or cross-through apartments over 15 metres deep should be 4 metres or greater to avoid deep narrow apartment layouts.	✓	✓

If Council chooses to standardise apartment sizes, a range of sizes that do not exclude affordable housing should be used. As a guide, the Affordable Housing Service suggest the following minimum apartment sizes which can contribute to housing affordability: (apartment assize is only one factor influencing affordability) – 1 Bedroom apartment 50m² – 2 Bedroom apartment 70m² – 3 Bedroom apartment 95m²	✓	✓
Balconies		
Minimum depth of private balconies 2 metres	✓	✓
Ceiling Heights		
Minimum 2.7m for all habitable rooms.	✓	✓
In Mixed Use buildings: 3.3m minimum for ground floor retail or commercial and for first floor retail, residential or commercial.	✓	✓
Internal Circulation		
In general where units are arranged off a double-loaded corridor, the number of units accessible from a single core corridor should be limited to eight.	✓	✓
Storage		
In addition to kitchen cupboards and bedroom wardrobes, provide associated storage facilities at the following rates: – Studio apartments 6m³ – One bedroom apartments 6m³ – Two bedroom apartments 8m³ – Three plus bedroom apartments 10m³	✓	✓
Daylight Access		
Living rooms and private open spaces for at least 70 percent of apartments in a development should receive a minimum of three hours direct sunlight between 9 am and 3 pm in mid-winter. In dense urban areas a minimum of two hours may be acceptable.	Partial Living Area 37% Private Open Space 92%	Partial Living Area 14.2% Private Open Space 100%
Limit the number of single-aspect apartments with a southerly aspect (SW-SE) to a maximum of 10 percent of the total units proposed. Developments which seek to vary from the minimum standards must demonstrate how site constraints and orientation prohibit the achievement of these standards and how energy efficiency is addressed (see Orientation and Energy Efficiency).	✓	✓
Natural Ventilation		
Sixty percent (60%) of residential units should be naturally cross-ventilated.	✓ (82%)	✓ (69%)
Twenty five percent (25%) of kitchens within a development should have access to natural ventilation. Developments which seek to vary from the minimum standards must demonstrate how natural ventilation can be satisfactorily achieved, particularly in relation to habitable rooms.	✓ (100%)	✓ (100%)

Visual Privacy

The RFDC recommends a buliding separation of 24m between habitable rooms and balconies of buildings over 25m in height.

The proposed separation between Residential Buildings R8 & R9 is 12 metres and the proposed separation between the Residential Buildings R8 & R9 and the podium of Commercial Buildings C4 and C5 to the East is 16 metres. The variation to the suggested building seperation distances in the RFDC are justified as:

- the proposed building seperation is consistent with the Concept Plan Indicative Building Envelopes, which take into consideration the context of the site and the achievement of broader urban design objectives such as creating a street wall along the foreshore promenade;

- both buildings' primary aspect is across Darling Harbour which cannot be developed; and
- the apartment layouts have been designed to minimise overlooking and where appopriate will have lourvers or other forms of screening to alleviate privacy issues.

Apartment Layout

The RFDC recommends the rear wall of a kitchen to be no more than 8m from a window. The majority of kitchens in Residential Buildings R8 & R9 are consistent with the Rule of Thumb. However, 30 apartments (36%) in R8 and 42 apartments (54%) in R9 propose a minor variation to the 'rule of thumb' as these rear wall kitchens are approximately 9m from a window. The RFDC states that buildings not meeting the minimum standard must demonstrate how satisfactory daylight and natural ventilation can be achieved. The proposed variation to this 'rule of thumb' is considered acceptable given that:

- the majority of the kitchen area is within 8m of the window;
- all the non-compliant apartments achieve cross ventilation;
- the windows are full height windows which will allow large amounts of light to reach the back of the kitchen; and
- there are no walls or obstructions between the windows and the kitchen area.

Daylight Access

The RFDC recommeds that for dense urban areas at least 70% of apartments in a development should receive a minimum of two hours direct sunlight to living rooms and private open space between 9am to 3pm in mid winter (21 June).

The amount of solar access achieved for each individual apartment is provided within the respective Architectural Design Statements at **Appendix A**. **Table 15** below provides a summary of the daylight access achieved by the proposed development.

Table 15 – Daylight Access in Residential Buildings R8 & R9 on 21 June

	Residential Building R8		Residential Building R9		Total	
	%	No. of Apartments	%	No. of Apartments	%	No. of Apartments
Between 9am - 3pm						
Living Areas	36.5	30	14.2	11	25.7	41
Private Open Space	92.6	76	100	77	96.2	153
Between 9am - 5pm						
Living Areas	84.1	69	100	77	91.8	146
Private Open Space	92.6	76	100	77	96.2	153

Table 15 demonstrates that the proposed development will exceed the 70% target of 2 hours of solar access for the private open space between 9am and 3pm with 91.8%, however it will not achieve it for the the living areas, achieving 25.7%.

Despite technically not achieving 70% because of their western aspect, as demonstrated in **Table 15**, the apartments achieve solar access to the living rooms long after 3pm, and if considered as part of the calculation of the 2 hours of solar access to the living rooms, would achieve 96.2%, exceeding the 'Rule of Thumb'.

The percentage of solar access provided to the living rooms is a result of the buildings' orientation, which is predetermined by the Concept Plan (Mod 4). Accepting that Residential Buildings R8 & R9 are required to be generally in accordance with the Concept Plan (Mod 4), the proposed buildings' could not be

designed differently, and achieve significantly improved solar access. It is noted that solar access to living rooms could be improved if there were no balconies proposed on the western facade, however, considering the site's context this would be considered a lesser outcome in terms of the amenity of the apartments and the design of the building.

In response to the solar access constraints of the site, each building has adopted specific design measures that boost the solar access to the living areas and private open space of each apartment, with both building reducing the depth of the balconies in part, and Residential Building R8 featuring splayed balcony blade walls and Residential Building R9 adopting a stagerred facade.

It should be noted that the internal amenity of apartments should be considered holistically, and not on their strict compliance with the numeric solar access 'Rules of Thumb'. In the case of Residential Buildings R8 & R9, the apartments will experience a very high level of residential amenity as a result of having:

- uninterrupted and iconic views of Darling Harbour;
- generous apartment sizes and efficient layouts;
- large private open space areas, and in the case of Residential Building R9 communal roof top open space, that have good solar access; and
- being located at Barangaroo.

5.6 Remediation and Contamination

As identified at Sections 1.1.3 and 4.5 of this EAR, the Basement Car Park Approval provides for the remediation of all contaminated material within the Project Application site with the exception of any contaminated material found as a result of the excavation works for the piling of the core of the proposed building that are either outside or extend beyond the extent of excavation that is already approved as part of the Basement Car Park Approval.

Clause 7(1) of SEPP 55 provides that a consent authority must not consent to the carrying out of any development on land unless:

(a) it has considered whether the land is contaminated, and

(b) if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and

(c) if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.

Clause 7(2) of SEPP 55 also requires a consent authority, when considering an application for consent to carry out development that would involve a change of use on land, to consider a report specifying the findings of a preliminary investigation of the land concerned carried out in accordance with the contaminated land planning guidelines.

Clause 17(1) of SEPP 55 further requires all remediation work to be carried out in accordance with:

(a) The contaminated land planning guidelines; and

(b) The guidelines in force (if any) under the Contaminated Land Management Act 1997; and

(c) In the case of category 1 remediation work – a plan of remediation, as approved by the consent authority, prepared in accordance with the contaminated land planning guidelines.

Managing Land Contamination – Planning Guidelines SEPP 55 – Remediation of Land 1998 is the current contaminated land planning guidelines referred to at (c) above (Guideline).

Clause 4.6 of the Guideline identifies that in carrying out functions under the EP&A Act in relation to land that is or potentially is contaminated, planning authorities should take into account the following principles:

- No planning decision should be made unless sufficient information is available to make the decision.
- Development applications should include sufficient information on past uses of the subject land to allow the suitability of the land for the proposed use to be assessed.
- Changes of use on contaminated land may proceed provided:
  - the land is suitable for the intended use, or
  - provisions are included in the planning instrument to require appropriate investigation or restrictions on any subsequent development applications, or
  - conditions are attached to the development consent to ensure that the subject land can and will be remediated to a level appropriate to its intended use prior to, or during, the development stage.

In accordance with Clause 7(1)(a) of SEPP 55, this EAR has considered and identified that the land that is subject to the Project Application is contaminated. The works proposed as part of the Residential Buildings R8 & R9 Project Application include some excavation works for the piling and core of the proposed building that extend outside of or beyond the extent of excavation that is already approved as part of the Basement Car Park Approval. The Project Application therefore seeks approval for the remediation of that excavated material.

ERM has prepared an Overarching Remedial Action Plan (Overarching RAP) for the Barangaroo site for the Barangaroo Delivery Authority (see **Appendix G**). The Overarching RAP presents a summary of the contamination issues identified on the Barangaroo site and outlines an approach to the remediation of the site as a whole. A Site Auditor's Statement has been received in relation to the Overarching RAP (see **Appendix G**). The Overarching RAP requires that site specific RAPs be developed for the DECCW Declaration Area and for the other development sites. Site specific Remedial Action Plans are also required, which are to detail remedial measures.

The Overarching RAP envisages that excavated material will be remediated (where required) and re-used within the Barangaroo site, including re-use for the construction of the approved northern Headland Park (subject to a separate approval).

In accordance with the requirements of the Overarching RAP, a Site Specific Remedial Action Plan known as the "Amended Remedial Action Plan - Barangaroo - Other Remediation Works (South) Area" has been prepared by AECOM Australia Pty Ltd, dated 7 July 2011 (ORWS RAP) (see **Appendix G**). The preparation of the ORWS RAP was informed by the Human Health Environmental Risk Assessment, prepared by AECOM, dated 4 July 2011 (HHERA), including the Site Specific Target Criteria (SSTC) that are contained in the HHERA.

Accredited Site Auditor, Graeme Nyland, completed a Site Audit Report and Site Audit Statement that approved the ORWS RAP, dated 14 July 2011(see **Appendix G**). The Site Auditor's Report (**Appendix G**) advises that the ORWS site is capable of being made suitable for its intended uses. The HHERA and the ORWS RAP

were approved by the Office of Environment and Heritage (OEH) in satisfaction of a condition A8 of the Basement Car Park Approval.

After giving consideration to the approvals given by OEH and the site auditor, and after reviewing the ORWS RAP, the Minister for Planning and Infrastructure approved the ORWS RAP on 17 August 2011 (see **Appendix G**).

Residential Buildings R8 & R9 are located to the west of the ORWS in a position that straddles the basement perimeter retaining wall. This positioning is not consistent with the assumptions made in the ORWS RAP and associated HHERA therefore, Graeme Nyland, the NSW-EPA accredited Contaminated Sites Auditor who prepared the Site Audit Report and accompanying Site Audit Statement regarding the ORWS RAP has reviewed the Project Application. A letter confirming that the Site Audit Report and Site Audit Statement for the ORWS RAP can be relied upon as being relevant to Residential Buildings R8 & R9 is included at **Appendix H**.

The RAP defined four areas within ORWS based on land uses and material types. Area A was defined in the RAP as "material to remain in situ within the Public Domain (South), outside the retention wall system and potentially in hydraulic connection with Darling Harbour, where limited or no excavation will be required".

The retention wall system was considered to mark the boundary between the Public Domain (South) and the Development Area (South), located to the east. However, the boundary of the Public Domain (South) is located 27m from the Darling Harbour shore line, some distance outside (to the west) of the retention wall system. The Development Area (South) therefore extends beyond the retention wall system, to the west.

Whilst the proposed development does not exactly match the assumptions made under the ORWS RAP, the scenarios considered in deriving remediation criteria for Area A are adequately protective for the proposed use of Residential Buildings R8 & R9. That is, overall the modelled scenarios are more conservative than the proposed scenario of high density residential development above ground level commercial uses with no basement (slab on ground) and the remediation criteria adopted is adequately protective of the proposed development.

The Site Auditor therefore concludes that the remediation criteria developed and control measures specified in the ORWS RAP are considered appropriate for the proposed development and therefore the Site Audit Report and Site Audit Statement dated 14 July 2011 can be relied upon as being relevant to Residential Buildings R8 & R9.

The ORWS RAP, which is to be applied to the Residential Buildings R8 & R9 Project Application works therefore satisfies the requirement for a 'plan of remediation' under clause 17(1)(c) of SEPP 55 and has been prepared in accordance with the contaminated land planning guidelines.

Accordingly, the ORWS RAP (including the HHERA and SSTC) together with copies of all documents referred to in this section are formally submitted to the Minister, as the relevant consent authority, for approval in connection with this Project Application for the purposes of SEPP 55.

5.7 Overshadowing Impacts

Shadow diagrams for the proposed development have been prepared by Lend Lease and are included at **Appendix R**. The shadowing analysis has been prepared for 9am, 12pm and 3pm on the winter solstice (June 21), the equinoxes (March 21 and September 21) and summer solstice (December 21) and compares the existing CBD, the approved Commercial Buildings C3, C4, and C5 and

proposed Residential Buildings R8 & R9 shadows. To provide a more realistic indication of the potential shadowing impacts, the shadowing analysis identifies the maximum area within which shadows may potentially be cast by buildings within Block X from the maximum development block envelope.

Shadowing from existing CBD buildings is shown in grey. The future shadows cast by the approved Commercial Building C3, C4 and C5 are shown in blue line. The Block X envelope is shown in red line and the Residential Buildings R8 & R9 shadows are shown in fluorescent yellow.

June 21

The shadow analysis indicates that at 9 am on the 21 June the buildings will cast a shadow over a small part of Darling Harbour immediately in front of the site. However, this shadow is almost entirely contained within the shadow of the approved Commercial Buildings and therefore will not result in any significant additional shadows.

By 12pm the shadow falls entirely within the Block X boundary before moving across to shadow Globe Street and parts of the podium of Commercial Buildings C4 and C5 in the afternoon.

Residential Buildings R8 & R9 will not result in any additional shadowing impacts on June 21 beyond those envisaged by the approved Concept Plan (Mod 4).

March 21

Consistent with June 21, the shadow analysis indicates that at 9am a small area of additional shadowing will be experienced on Darling Harbour. However, this shadow is almost entirely contained within the shadow of the approved Commercial Buildings and therefore will not result in any significant additional shadows.

By 12pm shadows are confined entirely within the Barangaroo site and again will sit largely within the area that will be over shadowed by Commercial Buildings C3 and C4. A small area of additional shadow falls on part of the Foreshore Promenade, noting that the majority of the promenade still receives full sun.

Shadowing in the afternoon period occurs over Globe Street and Commercial Buildings C4 and C5 to the east.

Residential Buildings R8 & R9 will not result in any additional shadowing impacts on March 21 beyond those envisaged by the approved Concept Plan (Mod 4).

September 21

The September shadow diagrams demonstrate that only a very minor amount of additional shadowing of the waters of Darling Harbour occurs and the shadow will sit entirely within the area that will be overshadowed by the approved Commercial Buildings. By 12pm, the shadow falls entirely within Block X and the Darling Harbour waterway and Foreshore Promenade are completely free of shadows.

Shadowing in the afternoon period occurs over Globe Street and Commercial Buildings C4 and C5 to the east.

Residential Buildings R8 & R9 will not result in any additional shadowing impacts on September 21 beyond those envisaged by the approved Concept Plan (Mod 4).

Summary and Conclusion

Overall, it is considered that the shadowing impacts of Residential Buildings R8 & R9 are acceptable given that:

- the extent of additional shadowing over CBD buildings has been modelled against the maximum area within which shadows may potentially be cast by buildings within the Block X control envelopes included in the approved Concept Plan (red line) and demonstrated that the Residential Buildings R8 & R9 shadows are less than the shadowing approved for Block X under the approved Concept Plan (Mod 4);
- the waters of Darling Harbour maintain significant direct daylight hours during the key recreational middle of the day boating period;
- there is not additional overshadowing of any residential properties or public open space outside of the site; and
- the future Waterfront Promenade and other public domain areas will enjoy an acceptable level of direct sunlight during the course of the day and in the case of the Waterfront Promenade during the peak lunchtime period.

5.8 Wind

A Wind Impact Assessment (WIA) for proposed Residential Buildings R8 & R9 has been prepared by Cermak Peterka Petersen (CPP) and is included at **Appendix S**.

Wind tunnel testing has been carried out around the buildings as part of the previous Concept Plan and Commercial Buildings C3 and C5 Environmental Assessments. The WIA notes that whilst the detailed geometry of the site has changed, the massing and orientation of the buildings has remained similar and the results are expected to be representative of the proposed wind environment around Residential Buildings R8 & R9.

The adopted environmental wind criteria used in the wind study is that developed by Lawson (1990). Lawson's criteria have categories for discomfort, based on wind speeds being exceeded five percent of the time, allowing planners to judge the usability of locations for various intended purposes ranging from 'business walking' to 'pedestrian sitting'. The criteria also includes a distress rating, for safety assessment, which is based on occasional (once or twice per year) wind speeds. Assessment using the Lawson criteria provides a similar classification as using once per annum gust criteria, which is the basis of the City of Sydney (2004) DCP, however it provides significantly more information regarding the serviceability wind climate.

To enable a quantitative assessment of the wind environment, the wind tunnel data were combined with wind frequency and direction information measured by Bureau of Meteorology. Testing was performed without planned trees or other plantings and structures to provide a worst case scenario assessment, as heavy streetscape planting typically reduces the wind speeds by less than 10%.

The wind tunnel testing identifies that the most frequent strong winds are from the south, and to a lesser extent, the west and north east. The WIA notes that the massing of Commercial Buildings C3, C4, and C5 and the future Hotel (as approved under Concept Plan (Mod 4) will significantly influence the wind climate to the north of Residential Building R8. Being in such close proximity to these significantly larger buildings, Residential Buildings R8 & R9 will only influence the wind environment in the immediate vicinity.

The results of the wind tunnel study (see **Figure 14**) illustrate that the wind climate around the site is acceptable for use as a main public accessway and meets the distress criterion at all close locations except for location 34 to the south-east of Residential Building R9, which is dictated by the massing of Commercial Building C5 during winds from the south quadrant. Importantly, the wind environment to the west of the site will be suitable for use for pedestrian

sitting and is similar to the wind environment in the King Street Wharf precinct to the south.

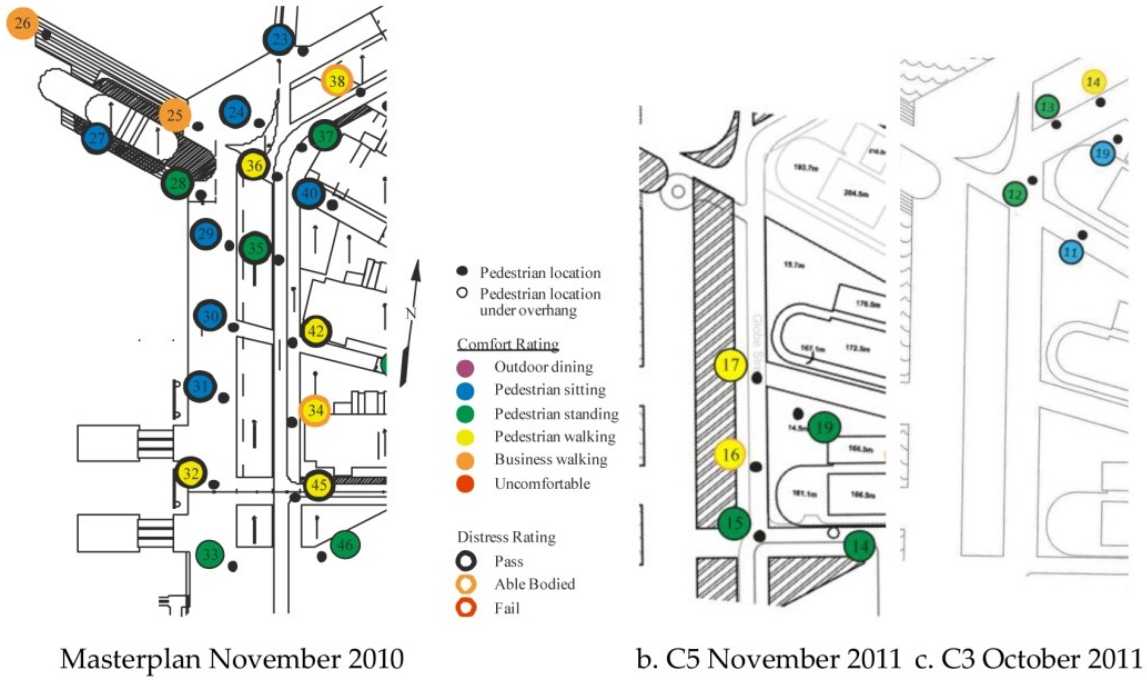


Figure 14 – Pedestrian wind speed measurement locations with comfort/distress ratings

Winds from the south are currently channelled along Kent, Shelley and Lime Streets by the taller CBD buildings to the south. Commercial Building C5 will generate a significant amount of downwash, and is the primary reason for the windy conditions measured along Globe Street. The WIA concludes that Residential Buildings R8 & R9 will protect the foreshore from the downwash winds, improving pedestrian amenity in these locations. The WIA notes that the provision of awnings and landscaping along the Globe Street frontage of Residential Buildings R8 & R9 will assist in providing a wind environment suitable for pedestrian walking activities.

Winds from the west are currently channelled and accelerated up the rises of Margaret and Erskine Streets. The inclusion and orientation of Residential Building R8 and R9 will offer protection to the outdoor seating areas to the west of the buildings as the flow will slow on approach to the buildings, and channel some flow between the buildings. During winds from the west, wind conditions around the site are expected to be suitable for pedestrian standing activities.

The rooftop terraces are exposed to accelerated flow from most wind directions. The WIA considers that specific locations on the rooftop terrace would be suitable for pedestrian sitting activities for about 60% of time. Noting that for specific wind directions, the articulation and accessibility of the space means that small calmer areas would be generated regardless of wind direction without additional amelioration measures. The WIA also notes that terrace users would soon understand the local wind environmental conditions and use the space accordingly. The WIA concludes that the provision of canopies on the roof terraces will offer some protection to users, but recommends that the inclusion of additional vertical or horizontal screening elements be investigated during the detailed design phase to improve the conditions on the terraces.

5.9 Reflectivity

A Reflectivity Study for Residential Building R8 & R9 has been prepared by ARUP and is included at **Appendix T**. The assessment methodology followed in the Study is that of David N H Hassall of the University of New South Wales.

The Reflectivity Study assesses the impact of solar reflections off the proposed development on traffic in the surrounding area of the Barangaroo site and adjacent area of Millers Point and the Sydney CBD, in terms of reduced visibility of visual tasks.

The Reflectivity Study concludes that proposed Residential Buildings R8 and R9 perform well in terms of solar reflectivity, and glare affecting motorists on surroundings streets is not expected exceed the limits of acceptability according to the Hassall methodology.

Glare risks have been discounted for the different façade aspects, either because it could be shown that these do not reflect the sun towards traffic, or the intensity of reflections will be below the limit of acceptability as set out by Hassall, or because reflections do not appear unless the sun is directly visible and are thus considered not to be an additional cause of glare to drivers.

The Reflectivity Study has found that each façade aspect can have a maximum external specular reflectance of 20% without causing unacceptable glare. This result was obtained making worst case assumptions about the reflectivity of the facade, not taking into account any overshadowing effects from future proposed buildings on the Barangaroo South site and surrounding vegetation, or reduction of facade reflectivity through non-reflective cladding elements, and reduced external glass reflectivity.

The above recommendation has been incorporated into the Statements of Commitments.

5.10 Transport and Accessibility

Traffic, access and parking impacts are addressed in the following reports prepared by ARUP:

- Supplementary Transport Management and Accessibility Plan (TMAP) at **Appendix D**;
- Construction Traffic Management Plan at **Appendix EE**; and
- Travel Demand Management Plan at **Appendix U**.

The Construction Traffic Management Plan is addressed further at Section 5.24. The assessment and conclusions contained within the Supplementary TMAP, which addresses vehicle access arrangements to Residential Building R8 & R9, pedestrian and bicycle links and public transport, and within the Travel Demand Management Plan, are summarised below.

5.10.1 Transport Management and Accessibility Plan

Under the approved Concept Plan (Mod 4), a TMAP was required to be prepared prior to submission of the first project application to give effect to the concept plan, which was to address public transport, traffic and pedestrian access and car parking provision. Accordingly, a TMAP was prepared in September 2008 by the NSW Government.

Supplementary TMAPs that address the changes to the September 2008 TMAP have been prepared for the subsequent Project Applications submitted for Barangaroo South. The Supplementary TMAP for this Project Application takes the same approach.

Traffic Generation

Based on the proposed residential and retail uses, Residential Buildings R8 & R9 are estimated to generate 22 two-way vehicle movements in the AM peak hour and 22 vehicle trips in the PM peak hour. When combined with the forecast traffic from Commercial Buildings C3, C4 and C5, there is estimated to be 441 two-way vehicle movements in the AM peak hour and 411 vehicle trips in the PM peak hour.

The traffic modelling for the TMAP references the intersection traffic counts undertaken by AECOM in November 2011. For Residential Buildings R8 & R9 ARUP has undertaken specific traffic modelling using LinSig of the nearest five and most relevant intersections being:

- Hickson Road/Globe Street;
- Hickson Road/Napoleon Street;
- Sussex Street/Shelly Street;
- Sussex Street/Erskine Street; and
- Erskine Street/Shelley Street.

The existing and forecast LOS of the five intersections is detailed in **Table 16** below. Full results of the modelling are contained in the Supplementary TMAP at (**Appendix D**).

Table 16 – Comparison of Intersection Level of Service

Peak	Intersection	Approved C3/C4/C5 LOS*	Forecast C3/C4/C5 & R8/R9 LOS
AM	Hickson Road and Globe Street	C	C
	Hickson Road and Napoleon Street	B	B
	Sussex Street and Shelley Street	A	A
	Sussex Street and Erskine Street	C	C
	Erskine Street and Shelley Street	B	B
PM	Hickson Road and Globe Street	D	D
	Hickson Road and Napoleon Street	B	B
	Sussex Street and Shelley Street	A	A
	Sussex Street and Erskine Street	F	F
	Erskine Street and Shelley Street	A	A

The modelling demonstrates that key intersections will perform the same or similar to existing conditions and there will only be minor increases in the degree of saturation and average delay per vehicle times. As a result of the modelling, it can be concluded that the local road network will continue to operate at a satisfactory level post development of Commercial Buildings C3, C4 and C5 and Residential Buildings R8 & R9.

Access and Circulation

Vehicular access to Residential Buildings R8 & R9 at ground level will be via the newly constructed Globe Street, which will connect to Hickson Road and Lime Street.

All of the basement car parking and basement areas are contained beneath the building block to provide public streets with a high quality landscaped public domain. The basement car park, including the entry and exit arrangements to the basement car park form part of the Basement Car Park Approval. Under the

Basement Car Park Approval, access to the basement residential car parking will be provided via the Lime Street extension. No change to the basement car parking for Residential Buildings R8 & R9 is proposed as part of the Basement Car Park (Mod 5) Application.

Car Parking

As outlined in Section 4.10, this Project Application seeks approval for 168 resident and 4 retail tenant car parking spaces associated with Residential Buildings R8 & R9.

The proposed number of car parking spaces complies with the relevant parking rates under the approved Concept Plan (Mod 4), being:

- 1 bedroom unit – 1 space / 2 units
- 2 bedroom unit – 1.2 spaces / unit
- 3 bedroom unit – 2 spaces / unit

Loading Dock

Shared loading dock arrangements form part of the Basement Car Park Approval. Access to the loading dock bays is to be controlled by the loading dock manager.

5.10.2 Travel Demand Management Plan

A Travel Demand Management Plan for Residential Buildings R8 & R9 has been prepared by ARUP and is included at **Appendix U**.

The Travel Demand Management Plan provides a framework to develop a Green Travel Plan to address travel demand and sustainable travel initiatives for future residents. A Green Travel Plan is a package of measures to encourage sustainable transport. The main objective of the Green Travel Plan is to reduce the need to travel and promote sustainable transport. It is part of the Travel Demand Management for Barangaroo South.

The key objectives of the Green Travel Plan are:

- To reduce the level of single occupancy car trips associated with commuting.
- To facilitate the sustainable and safe travel of visitors to the site.
- To reduce site traffic and congestion and associated pollution.
- To work in partnership with neighbouring organisations, groups and companies to achieve the maximum mode shift away from public transport.
- To facilitate resident access to key facilities such as retail, leisure, health and education.

The mode split target for Residential Buildings R8 & R9 is consistent with the overall mode split for the Barangaroo South development. Barangaroo South will be well serviced by pedestrian linkages and accessible to a range of public transport services.

Physical and management measures included in the Green Travel Plan include:

- distributing resident travel packs with information about the Green Travel Plan and available transport services;
- general marketing and promotion of sustainable travel alternatives;
- car sharing to reduce the number of car journeys;
- information to promote walking, cycling and public transport journeys during the day;

- providing bicycle parking spaces and promoting cycling;
- promote the use of public transport;
- encourage more walking trips;
- encourage working from home;
- provide way finding and urban informatics; and
- establishing of a Travel Plan Group.

Monitoring travel behaviour is a critical element of the Green Travel Plan. Monitoring will be undertaken by a Travel Plan Co-ordinator and residents travel plan group. The primary method of monitoring travel behaviour will be through completion of questionnaires.

A summary of suggested initiatives and measures are detailed in Section 5 of the Travel Demand Management Plan. These measures will be refined closer to the initial occupancy of the buildings. The requirement for implementation of a Green Travel Plan, has been incorporated into the Statement of Commitments at Section 6.0.

5.11 Climate Change and Sea Level Rise

A Climate Change and Sea Level Rise Report has been prepared by ARUP and is included at **Appendix X**.

The Climate Change and Sea Level Rise Report provides an assessment of the risks of climate change in increasing sea levels in Sydney Harbour and potential inundation impact on Barangaroo South. The Assessment has been prepared in accordance with the *NSW Coastal Planning Guideline: Adapting to Sea Level Rise*. The NSW Government has adopted a planning benchmark of 0.9m mean sea level rise by 2100.

The Report determines that there is a risk that a 0.9m sea level rise could result in inundation of parts of the Barangaroo South site by either direct coastal inundation or by a failure of the stormwater system where the discharge point to the Harbour would become submerged.

Notwithstanding this, the risk of coastal inundation of the Project Application site has been largely mitigated by adopting a ground plane height of +3.40 AHD for the building. Levels adopted for the surrounding areas within the Project Application site will be above the minimum height where possible, and will be as high as reasonably practical with consideration for the greater public domain.

The Report concludes that Residential Buildings R8 & R9 are inherently protected against the anticipated sea level rise, and the height of the existing sea wall does not need to be increased as part of this Project Application. The adopted height of 3.40m AHD is considered appropriate as it is:

- greater than the current 1 in 100 year event (1.435m AHD) for Sydney Harbour plus an additional 0.9m to accommodate mean sea level rise (2.335m AHD); and
- greater than the current Sydney Harbour Foreshores DCP (1.675 m AHD) plus an additional 0.9m (2.575 m AHD); and
- able to be incrementally increased in the future by extending the sea wall vertically, to respond to actual demonstrated sea level changes.

Whilst the residual risk of coastal inundation on the development as a result of climate change induced sea level rise is considered very low, a greater risk remains

due to the potential failure of the stormwater infrastructure if the discharge point is submerged. The following measures are proposed as part of the broader redevelopment of the Barangaroo site to mitigate against these risks:

- selecting materials to prevent accelerated degradation of infrastructure and buildings;
- locating key infrastructure at elevated locations closer to Hickson Road (such as substations);
- providing for safe exit routes above storm flood height level; and
- adoption of principles of adaptive management such that the seawall's height may be incrementally increased.

5.12 Ecologically Sustainable Development

Lend Lease has prepared an Ecologically Sustainable Development (ESD) report which is included at **Appendix K**.

The Stormwater Management Plan (**Appendix O**) and ESD Report (**Appendix K**) incorporate the information that would otherwise be covered in an Integrated Water Management Plan. The two reports address proposed alternative water supply, proposed end uses of potable and non-potable water and demonstration of relevant water sensitive urban design and water conservation measures.

The ESD Report outlines the targets proposed for Residential Buildings R8 & R9, consistent with the sustainability requirement included in the Concept Plan Statement of Commitments.

Residential Buildings R8 & R9 will be targeting a 5 Star Green Star Multi-Unit Residential Design using the Green Building Council of Australia's Version 1 tools.

Lend Lease has assessed the requirements necessary to achieve a 5 Star Green Star Multi-Unit Residential Design. In order to achieve a 5 Star Green Star Multi-Unit Design rating, an overall minimum weighted score of 60 points is required. Subject to detail design, Lend Lease has calculated that the proposed design is capable of achieving an overall weighted score of 68. Therefore a minimum 5 Star Green Star Office Design rating should be achieved.

In order to achieve a 5-Star Green Star rating, the following initiatives will be targeted:

- a high level of environmental management during construction phase;
- exceeding the 80% requirement for recycling of construction waste;
- measures to achieve a high level of indoor environmental quality;
- energy efficient facade, mechanical systems and building services;
- cycling facilities;
- water efficient fixtures and fittings and rainwater capture and re-use;
- use of sustainable and recycled materials and minimising use of PVC; and
- emissions and pollution control measures.

The above targets and associated initiatives have been incorporated into the Statement of Commitments at Section 6.0.

Ecologically Sustainable Development

The principles of ecologically sustainable development (ESD) have informed the design, construction and proposed operation of Residential Buildings R8 & R9.

It is appropriate for decisions made under the EP&A Act to have regard to the objects of the Act, as set out in Section 5 of the Act, including ESD.

The EP&A Act adopts the definition of ESD found in the *Protection of the Environment Administration Act 1991*. Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental considerations in decision-making processes and that ESD can be achieved through the implementation of:

(a) the precautionary principle - namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:
  (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
  (ii) an assessment of the risk-weighted consequences of various options,
(b) inter-generational equity—namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,
(c) conservation of biological diversity and ecological integrity—namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,
(d) improved valuation, pricing and incentive mechanisms—namely, that environmental factors should be included in the valuation of assets and services, such as:
  (i) polluter pays—that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,
  (ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,
  (iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

Importantly, Residential Buildings R8 & R9 are consistent with the principles of ESD as it meets the needs of the present without compromising the ability of future generations to meet their own needs. Each principle of ESD as relevant to the Project Application is addressed below.

Precautionary Principle

The precautionary principle indicates that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

It is considered that there is no actual or threat of serious or irreversible environmental damage arising from the design, construction or operation phases of Residential Buildings R8 & R9. Consistent with the precautionary principle, the proposal for Residential Buildings R8 & R9 has been formulated so as to mitigate against the risk of environmental degradation.

Construction of Residential Buildings R8 & R9 will involve piling during the construction stage that may contain contaminated material which requires remediation. As detailed in Section 5.6, the remediation will be undertaken in

accordance with the broader remediation strategy for Barangaroo South and in a manner that mitigates against the risk of environmental degradation.

The proposed remediation strategy is based on a broad range of professional expertise and includes an Overarching Remedial Action Plan, dated June 2010 (see **Appendix G**) and a Site Specific Remedial Action Plan known as the "Amended Remedial Action Plan - Barangaroo - Other Remediation Works (South) Area" prepared by AECOM Australia Pty Ltd, dated 7 July 2011 (ORWS RAP) (see **Appendix G**). Consistent with the precautionary principle, the ORWS RAP was informed by a Human Health Environmental Risk Assessment (HHERA), prepared by AECOM, dated 4 July 2011, which included Site Specific Target Criteria (SSTC).

A Site Audit Report and Site Audit Statement for the ORWS RAP was then prepared by Accredited Site Auditor, Graeme Nyland, dated 14 July 2011(see **Appendix G**). The HHERA and the ORWS RAP were then subsequently approved by the Office of Environment and Heritage (OEH) and the Minister for Planning and Infrastructure. A letter confirming that the Site Audit Report and Site Audit Statement for the ORWS RAP can be relied upon as being relevant to Residential Buildings R8 & R9 is included at **Appendix H**.

Importantly, the remediation of the site will mitigate against possible environmental harm to Sydney Harbour through the migration of contaminants in groundwater beneath the site. The precautionary principle forms the basis of the remediation works being undertaken and also informs the manner in which this remediation is to be carried out.

Having regard to the information presented by a broad range of professional experts in the Project Application, the issues, risks and consequences associated with the carrying out of the proposed development have been explored to the fullest extent possible applying the precautionary principle and appropriate environmental protection measures have been adopted for Residential Buildings R8 & R9.

Inter-Generational Equity

The principle of intergenerational equity identifies that actions undertaken now should maintain or enhance the environment in the future. The Proponent seeks to ensure that Residential Buildings R8 & R9 maintains or otherwise enhances the health, diversity and productivity of the environment for the benefit of future generations.

The proposed development of Residential Buildings R8 & R9 is part of the redevelopment of Barangaroo. The vision for Barangaroo is to become "a place to inspire innovation for generations to come" (mindful that the site has historically been, and is at present, with the exception of the foreshore, inaccessible to the public). As a result, the design, construction and operational phases of the development are directly intended to facilitate the improvement of the existing environment for future generations (by improving the quality of the public domain and access to the Sydney Harbour foreshore). It is also noted that the overall development of the Barangaroo site is intended to facilitate the improvement of the existing environment for future generations by creating an iconic new locale in the Sydney CBD with a highly activated public domain and a mix of uses which will rejuvenate and revitalise the Harbour foreshore.

The proposed sustainability measures detailed in Section 4.12, which include achieving BASIX and 5-Star Green Star, demonstrate that significant investment and effort has and will be undertaken during the design, construction and operation of Residential Buildings R8 & R9 to ensure the ecological footprint of the building is minimised to achieve both inter and intra generational equity.

The remediation strategy for the site, outlined under the discussion of the Precautionary Principle above and detailed in Section 5.6, demonstrates that appropriate procedures are in place to ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations. Furthermore the broader remediation works being undertaken on the Barangaroo site will result in long lasting environmental benefits for future generations.

Lend Lease's commitment to achieve a high level of quality during the design, construction and operation phases will result in lasting social and economic inter and intra generational equity.

The information and analysis presented in the Project Application demonstrates that the proposed design, construction and operation is consistent with the principle of inter-generational equity, and will not give rise to any material risk to the environment, nor will the proposed works give rise to any unacceptable cumulative impacts.

Conservation of Biological Diversity and Ecological Integrity

The proponent accepts that the conservation of biological diversity and ecological integrity is a fundamental consideration. Importantly, it is considered that there is no material risk that the design, construction or operational phases of Residential Buildings R8 & R9 will adversely impact on the conservation of biological diversity and ecological integrity.

The information and analysis contained in the Project Application, specifically in regard to the remediation of contaminated material, outlined under the discussion of the Precautionary Principle above and as detailed in Section 5.6, demonstrates that no material risk will arise to the conservation of biological diversity or ecological integrity as a result of Residential Buildings R8 & R9.

Furthermore, the broader remediation works being undertaken on the Barangaroo site will improve the biological diversity and ecological integrity of the Barangaroo site and adjacent Sydney Harbour.

The proposed sustainability measures detailed in Section 4.13, which include achieving a 5 Star Green Star Rating, demonstrates that significant investment and effort has and will be undertaken during the design, construction and operation of Residential Buildings R8 & R9 to ensure that ecological integrity is achieved.

Improved Valuation, Pricing and Incentive Mechanisms

ESD involves the internalisation of environmental costs into decision making for projects likely to affect the environment. Residential Buildings R8&R9 respond to this principle in the following ways:

- the environmental goals are being pursued in the most effective way (including by having regard to the objective of environmental and cost effectiveness) at the design, construction and operational phases of Residential Building R8 & R9;
- the proponent adopts the polluter pays (or user pays) principle through the adoption of an integrated waste strategy based on the principles of reduce, reuse, recycle and recover;
- the proposed environmental measures and initiatives included within Residential Building R8 & R9 have been taken into account and the development has been priced to reflect both the short-term and long-term external environmental costs (based on the full life cycle of the goods and services required in connection with Residential Building R8 & R9);

- the proponent is funding all environmental measures and initiatives in connection with Residential Building R8 & R9 and will seek to ensure that environmental factors are appropriately included in the valuation of assets and services; and
- the costs of ongoing environmental compliance and sustainability, together with initial environmental works associated with Residential Building R8 & R9, such as remediation, have been factored into design, construction and operational aspects of the development and will be internalised by direct stakeholders and users of Barangaroo, rather than being borne by the community as a whole.

5.13 Archaeology

As identified at Section 1.1.3, the Basement Car Park Approval grants approval for the bulk earthworks required to excavate the area of Blocks 1, 2, 3(in part), 4A (in part) and X (including the entirety of the Residential Buildings R8 and R9 Project Application site) to accommodate the basement car park, plant areas and ancillary areas. However, as detailed in Section 4.5 some of the Project Application seeks approval for piling and associated earthworks to accommodate piling and core that extends beyond the extent of works already approved as part of the Bulk Excavation and Basement Car Parking Project Application.

Casey & Lowe and Comber Consultants has prepared additional advice specifically in relation to the proposed Residential Buildings R8 and R9 (refer to **Appendix F**). The advice confirms that the excavation works associated with the construction of the basement car park will remove any archaeological resource from the Residential Buildings R8 & R9 site area. Therefore there will be no impacts on the archaeological resource from works associated with the further excavation associated with the construction of Residential Buildings R8 & R9.

The letter notes that no archaeology was identified in the area to the west of the eastern 40m of Barangaroo South, meaning Residential Buildings R8 & R9 are to be built in areas considered as having no archaeological potential or significance. Therefore there are no archaeological issues in relation to these proposed new buildings.

5.14 Operational Noise and Vibration

An Operational Noise Report has been prepared by Renzo Tonin and is located at **Appendix Y**. The assessment relates to the operational aspects of Residential Buildings R8 & R9. A separate construction noise assessment has been undertaken and is detailed at Section 5.22.

Noise generating activities associated with the operation of Residential Buildings R8 & R9 include services plant, retail tenancies and associated traffic entering and leaving the basement car park. The operational noise assessment uses a noise survey undertaken to establish the current ambient noise levels around the site and identifies noise sensitive receivers in the vicinity.

The closest noise sensitive receivers to the site have been identified as:

- Occupants of commercial buildings including:
  - The Bond commercial offices and child care centre;
  - commercial premises along Shelley Street;
  - commercial premises on Napoleon Street;
  - commercial and retail premises at King Street Wharf; and
  - the Temporary Cruise Terminal.

- Occupants of residential buildings including:
  - apartments on Hickson Road, east of the site;
  - terrace houses on High Street, Millers Point;
  - hotel and residential uses on Kent Street;
  - dwellings at Dawes Point;
  - apartments at Darling Island, west of the site;
  - apartments at Pyrmont Bay Wharf, west of the site; and
  - residents at Balmain East, north west of the site.
- Heritage receivers including:
  - former Grafton Bond Store building on Hickson Road; and
  - The Sussex Hotel on Sussex Street.

Renzo Tonin has assessed the proposal against the following relevant criteria and guidelines:

- NSW Industrial Noise Policy;
- NSW Interim Construction Noise Guideline (INCG, DECC 2009);
- the OEH Environmental Criteria for Road Traffic Noise;
- British Standard 7385: Part 2 "Evaluation and measurement of vibration in buildings";
- German Standard DIN 4150 – Part 3 – "Structural vibration on buildings – Effects on Structures";
- Assessing Vibration: a Technical Guide.

The results of the noise monitoring have been used to develop amenity and intrusiveness criteria for properties surrounding the site. These have been used as the basis to develop site specific noise criteria, as outlined in **Table 17** below.

Table 17 –Site Specific Noise Criteria for nearby residential buildings

Site	Type of Receiver	LAeq,15min (dBA)		
		Daytime (7.00am-6.00pm)	Evening (6.00pm - 10.00pm)	Night Time (10.00pm - 7.00am)
High Street, Millers Point	Residential	52	49	46
Hickson Road, Millers Point	Residential	58	58	54
Sydney Wharf Apartments, Pyrmont	Residential	52	49	44
Darling Island Apartments, Pyrmont	Residential	52	49	44
Edward Street, Balmain East	Residential	54	50	45
Dawes Point	Residential	51	49	45

For nearby commercial buildings an amenity criterion of 65 dB has been set.

The noise impact upon Residential buildings R8 and R9 has also been assessed have regard the relevant BCA standards and the City of Sydney Development Control Plan, which provides objectives and criteria for internal noise levels within residential occupancies. Future ambient noise levels at Barangaroo will differ once the site has been developed and depend upon the siting and design of other noise generating activities within the site. Noise levels will also vary at the different facades of Residential Buildings R8 and R9. However, Wilkinson Murray have previously assessed the estimated future ambient noise levels for Barangaroo based on measurements undertaken at East Circular Quay, Darling Quarter (former known as Darling Walk) and Harbourside, as detailed in **Table 18**.

Table 18 – Site Specific Noise Criteria for nearby residential buildings

Site	L_{Aeq}, period (dBA)			L_{A1},15min (dBA)		
	Day	Evening	Night	Day	Evening	Night
High Street, Millers Point	62	60	56	70	65	60

Development within the Barangaroo site will want to achieve a high level of amenity and acoustically the amenity of future residents in R8 and R9 and other residential developments within Barangaroo South will be the most sensitive receptors to operational noise from Residential Buildings R8 and R9. By satisfying the noise criteria at the site, compliance with the noise criteria for other nearby residential receivers will be satisfied.

Based on the estimated noise levels, the internal noise goals for the residential apartments can be achieved by selecting the appropriate glazing for windows and doors. For these building this is likely to be single laminated glazing. It is noted however that a higher specification glazing is likely to be required to address thermal performance requirements, which will also provide greater acoustic performance than that required to meet internal noise levels.

Whilst detailed plant selections have not yet been made, mechanical plant will be treated acoustically and the following noise management measures will be undertaken:

- Acoustic assessment of the mechanical services equipment will be undertaken during the detailed design and equipment selection phase of the development to ensure that the equipment, singularly or in total, does not emit noise levels which exceed noise limits.
- An acoustic consultant will be consulted during the detailed mechanical services system design.
- Locating mechanical plant to maximise the distance between the plant and sensitive receivers.
- Acoustic silencers, attenuators, enclosures and screens will be used where possible to reduce noise emissions.
- Mechanical plant will have noise specifications and proposed locations checked prior to installation on site.

The above measures have been incorporated into the Statement of Commitments at Section 6.0

5.15 Fire Safety

The proposed fire services are described in Section 4.14 and in the Fire Services Report prepared by Warren Smith & Partners at **Appendix M**.

A Fire Safety Engineering Review has been prepared by Defire and is included at **Appendix AA**. The Fire Safety Engineering Review indentifies a number or areas in Residential Buildings R8 & R9 that will incorporate alternative solutions complying with the performance requirements of the National Construction Code 2012 Volume One – BCA. The issues to which alternative solutions are required are as follows:

- Residential Buildings R8 & R9 will be treated as separate buildings to the basement below;
- reduction of fire rating in ground floor, which includes fire separation between retail and residential portions on the ground floor and between the retail ground floor and the residential storeys above;

- no fire rating to the walls of the fire isolated stairs projecting past the external wall of the sole occupancy units and are exposed to sole occupancy units, as well as providing unprotected glazing;
- some parts of the residential buildings have access to only one exit;
- the fire isolated stairs discharge into lobbies instead of road or open space;
- the hydrant booster assembly is not within side of the main building entrance;
- the fire rated protection around the booster assembly does not extend in accordance with standards;
- no sprinklers are proposed on the residential balconies;
- zone smoke control is not provided within ground floor retail areas;
- some portions of the residential buildings may not be provided with an emergency lift; and
- emergency sound and intercom systems are not proposed.

Details of the proposed alternative solutions are dependent on the fire engineering brief and analysis, which will be carried out in accordance with International Fire Engineering Guidelines. The alternative solutions will be developed as part of ongoing design and development.

The Fire Safety Engineering Review concludes that it is possible to develop alternative solutions to the issues identified to comply with the BCA, without major design changes.

5.16 Infrastructure and Utilities

Infrastructure Impact Assessment

Lend Lease are committed to working closely with the relevant stakeholders to ensure that the proposed development will have no adverse impacts on existing infrastructure and utilities. Lend Lease have contacted Sydney Water and AusGrid to discuss the services supply strategies for Barangaroo South and proposed routes for new services.

As part of the detailed design of the infrastructure and utilities Lend Lease carried out a subsurface scan of underground services to determine accurate location and depths of existing in-ground service using Ground Penetrating Radar along Hickson Road and Shelley Street. In preparation of the plans and cross sections of the existing services, Lend Lease also used available information from the utilities authorities, Dial-Before-You-Dig and City of Sydney Council.

The proposed concept designs for the temporary and proposed permanent services were then overlaid with the existing services in 3D (with a specific focus on stormwater and the 33kV infrastructure). The mapping did not identify any clashes between the existing and proposed services.

It is also noted that as design develops for the permanent services a 'clash detection exercise' (similar to the process detailed above) will be carried out to determine and requirements for relocation, deviation of change in depth of the existing services.

Infrastructure Provision

The Barangaroo South development, including proposed Residential Buildings R8 & R9, requires the upgrading and extension of existing site infrastructure services to ensure that there is sufficient capacity and redundancy for the development as a

whole. The final upgrading requirements are to be developed in conjunction with local authorities and are subject to a separate approval process.

Residential Buildings R8 & R9 will connect into the new infrastructure network as follows:

- Electricity – connection from city grid extension;
- Gas – connection from new gas infrastructure extended to the Barangaroo site;
- Water – connection from extended Sydney water mains; and
- Communications – connection to the new site wide communication infrastructure.

It is noted that as described at Section 1.1.3 existing site services with the Residential Buildings R8 & R9 site area have or will be decommissioned as part of the Basement Car Park Approval which approved the construction of in-ground stormwater infrastructure and the temporary diversion of the existing stormwater infrastructure.

A Stormwater Management Plan has been prepared by Cardno for Residential Buildings R8 & R9 (included at **Appendix O**) which proposed to collect all rainwater runoff from roof areas and awnings and reticulate captured water to a rainwater harvesting system for reuse or discharge within the development for non-potable uses.

Water Sensitive Urban Design (WSUD) measures will be used to treat stormwater that is to be discharged into Sydney Harbour. The WSUD elements will be designed with regard to:

- selection of appropriate vegetation for swales and bio-retention areas where appropriate;
- selection of appropriate filter media for bio-retention systems;
- incorporating multiple drainage entry points to bio-retention systems to avoid concentration of flow where appropriate;
- incorporating energy dissipaters at drainage outfalls where necessary;
- selection and sizing of appropriate GPT's;
- regular maintenance by authorities of all water quality measures to remove built-up sediment;
- separation of construction drainage and operational drainage during phase delivery if appropriate; and
- adopting landscaped batter slopes appropriate to the soil type used.

The above measures have been incorporated into the Statement of Commitments.

5.17 Building Code of Australia (BCA) and Access

A Building Code of Australia (BCA) Assessment has been prepared by McKenzie Group Consulting and is included at **Appendix Z**. The assessment identifies the areas of the proposal including fire resistance, egress, fire services and equipment, ventilation and smoke hazard management, lift services, sanitary facilities, access and energy efficiency that either comply with the BCA requirements or are to be the subject of a performance based alternative.

It is anticipated that due to the size and nature of the building, there will be alternative solutions that address non-compliances with the deemed to satisfy

provisions of the BCA. The alternate solutions will be assessed against the relevant Performance Requirements of the BCA by suitably qualified persons.

The proposed buildings have been assessed against the provisions for Access for People with Disabilities in Part D3 of the BCA. Compliance with these provisions is proposed to be achieved subject to further review of detailed design. Details of compliance with Part D3 of the BCA will be resolved as part of the Construction Certificate process.

5.18 Structural Engineering

A Structural Engineering Report for Residential Buildings R8 & R9 has been prepared by Brown Consulting and is included at **Appendix BB**. The Structural Engineering Report provides information with respect to the overall design criteria for the proposed structure and the structural methodology considered most appropriate to satisfy these criteria as determined at this stage in the design process, with specific consideration given to the relationship between the Residential Buildings R8 & R9 structure proposed under this Project Application and the basement car parking structure under the Basement Car Park Approval.

Although the Sydney Metro project is currently on hold, a separate Metro Corridor Impact Report has also been prepared to assess the proposed Residential Buildings R8 & R9 with respect to their relationship to the Metro protection corridor.

Buildings R8 & R9 Structural Design

The structure of the proposed Residential Buildings R8 & R9 consists of reinforced and post-tensioned concrete frames supported by lift and stair cores. It is proposed that the vertical structure will typically consist of reinforced concrete columns and shear walls utilising medium and high strength concrete, with a Level 1 transfer structure transferring vertical loads to the retail and basement structural columns. Floors will be of flat post-tensioned concrete slab construction.

Bored piles founded within sandstone are proposed for the basement and foundations and will be capable of supporting both the basement and building superstructure of Residential Buildings R8 & R9. Design of basement columns and walls will be coordinated with the reactions from the superstructures of both buildings to ensure BCA compliance.

Robustness, wind and seismic loading will be applied in accordance with the relevant sections of AS/NZ1170, with additional data based on the results of wind tunnel testing. Structural stability will be provided by an arrangement of reinforced concrete shear walls, and may be supplemented by outriggers, belt trusses or steel bracing at plant or other selected locations.

Metro Protection Corridor

The footprint of Residential Building R9 partially overlies the Metro protection corridor, with a number of superstructure columns and walls lying directly over the proposed corridor. A report has been prepared by Mott MacDonald (refer **Appendix W**) that details proposed measures that will allow for the construction of the Sydney Metro without any significant impacts from Residential Building R9.

The proposed key elements of the structural design and construct methodology that will protect the Sydney Metro corridor are as follows:

- The establishment and adoption of an integrated survey grid between the proposed development and the CBD Metro including the subsequent verification of Works as Executed drawings.
- The establishment of a 1 metre minimum clearance between the CBD Metro tunnels and walls, columns or foundation elements associated with the bulk

excavation and basement car parking works and the Residential Building R9 works (this clearance is in addition to appropriate construction tolerances).

- Where required, the founding of all vertical structures associated with Residential Building R9will be at a level below the zone of influence of the CBD Metro tunnels (or as agreed).
- Upon the completion of the development, all the ground above the crown of the future metro tunnels under the slab spanning between the piles supporting Residential Building R9 is retained. The minimum clearance from the underside of the slab to the crown of the future Sydney Metro tunnels will be 2m.
- The NSW Department of Transport should ensure that when the tunnel is excavated under the building an additional level of tunnel construction surveillance is applied to that used outside the building footprint.

5.19 Geotechnical

A Geotechnical Report has been prepared by ARUP and is included at **Appendix E**. The information contained within the report has been prepared on the basis of existing information that is available for the site, information obtained in relation to adjoining sites and other geological / geotechnical information available.

The report provides advice subject to the completion of detailed ground investigations. The preliminary assessment indicates that the geotechnical conditions on the site are suitable for the proposed development and that the building can be designed and constructed utilising industry standard and proven design and construction techniques.

The report also provides advice on the foundation construction methods which could be implemented when developing the detailed construction drawings for the proposed works.

The report also recommends that further detailed site testing be undertaken in accordance with the requirements of Australian Standard 2159 Piling – Design and Installation and Australian Standard 3600 – Concrete Structures, to determine the exposure classification and durability design requirements.

The above recommendations have been reflected in the draft Statement of Commitments at Section 6.0.

5.20 Operational Waste Management

A Waste Management Plan has been prepared by ARUP and is included at **Appendix P**. The Waste Management Plan identifies waste sources during operation and proposes measures to manage waste in a way that satisfies all legislative requirements.

Waste generation estimates have been made using industry estimates and are devised from the waste estimation tables contained within City of Sydney's Policy for Waste Minimisation in New Developments 2005. All waste facilities and equipment will be design and constructed in accordance with City of Sydney requirements as outlined in its Waste Policy where appropriate, the BCA, and Australian Standards.

Waste volumes for Residential Buildings R8 & R9 have been estimated in order to determine the waste storage area and waste storage bins which will be required (see Section 4.13). ARUP has concluded that the waste storage areas and rooms proposed to be provided in the basement are appropriate to accommodate the waste storage demand generated by Residential Buildings R8 & R9.

5.21 Environmental, Construction and Site Management

An Environmental Construction and Site Management Plan (ECSMP) has been prepared by Lend Lease (**Appendix CC**) to address environmental issues associated with the construction of Residential Buildings R8 & R9 including the following as required by the DGRs:

- Community consultation, notification and complaints handling;
- Impacts of construction on adjoining development and proposed measures to mitigate construction impacts;
- Noise and vibration impacts on and off site;
- Air quality impacts on the neighbourhood;
- Odour impacts;
- Water quality management for the site; and
- Waste and chemical management.

Included in the ECSMP are:

- Plans and drawings identifying erosion and sediment control measures, staging and works areas, vehicular and pedestrian access, water quality monitoring locations, delivery and store areas, haulage zones and materials storage zones and site amenities (refer to Appendix A of the ECSMP); and
- Stakeholder Engagement Strategy (refer to Appendix B of the ECSMP).

The ECSMP should be read in conjunction with the:

- Construction and Operation Noise and Vibration Report prepared by Renzo Tonin, which addresses the noise and vibration impacts on and off site (refer to **Appendix Y**);
- Construction Traffic Management Plan prepared by ARUP, which addresses construction traffic impacts (refer to **Appendix D**);
- Air Quality Impact Assessment prepared by AECOM, which addresses air quality and odour impacts (refer to **Appendix DD**); and
- Waste Management Plan which addresses waste sources and management measures during construction prepared by ARUP included at **Appendix P**.

Key elements of the ECSMP can be summarised as follows:

- Works are proposed to be undertaken between the hours of 7.00am and 7.00pm Monday-Friday and between 7.00am and 5.00pm on Saturdays. No work will be undertaken on Sundays or public holidays.
- The site will be enclosed by hoardings along all frontages.
- Site vehicular access will be off Hickson Road.
- Lunch, change and ablution facilities will be provided for the use of all site personnel as identified at Appendix A of the ECSMP.
- All site personnel, including subcontractors and visitors, will be inducted under Lend Lease's Environment, Health and Safety Management System (EH&S). Records of all induction, ongoing training and reporting will be maintained.
- Cranes will be erected along the western elevation. A materials handling team member will ensure the efficient management of deliveries and removals and hence minimise disruption to traffic around the site.

- Site specific Environmental Management protocols will be established to ensure the company's environmental responsibilities are implemented and documented.
- Primary contact(s) to deal with environmental emergencies will be nominated and their 24 hour/day 7 days/week contact details will be prominently displayed on site.
- Management and monitoring of the noise and vibration generated from construction activity will be addressed according to the recommendations of the "*Renzo Tonin, Barangaroo South; R8/R9 Residential Buildings: Construction and Operation Noise and Vibration Report*".
- Air Quality Management will be addressed in accordance with the recommendations of the *Barangaroo South – R8/R9 Residential Building – Air Quality Impact Assessment* (AQIA) *Project Application* prepared by AECOM. Refer to Section 5.23 below.
- Dust suppression, as well as erosion and sediment control measures, will be installed prior to detailed excavation works and service installations commencing as part of the works approved under the Bulk Excavation and Basement Car Parking Project Application (MP10_0023), and these shall be maintained for the duration of construction.
- Surface and ground water hydrology and quality, including Harbour water quality, will be assessed and monitored with monitoring in place as part of the works and processes approved under the Basement Car Park Approval. The monitoring will be continued during Residential Buildings R8 & R9 construction works. In addition, supplementary erosion and sediment control measures such as temporary sediment basins, will be implemented to treat surface run-off during Residential Buildings R8 & R9 construction works.
- ORWS RAP prepared by AECOM will be implemented for remediation of contaminated soil and water as part of the works and processes approved under the Basement Car Park Approval. Refer to Sections 1.1.3 and Section 5.6.
- Management of construction generated solid and liquid waste will be addressed in accordance with the recommendations of the *Barangaroo South –R8/R9 Residential Buildings: Construction and Operation: Waste Management Plan – Project Application* (WMP) prepared by ARUP. Refer to Section 5.25 below.
- Appropriate control measures will be implemented, documented and monitored to control the potential for leakage of hazardous substances and dangerous goods during storage and handling.
- Vehicular and pedestrian traffic management and controls will be implemented and monitored to minimise disruptions to site activities, the surrounding road network, as well as the ongoing operation of the passenger terminal. The site haulage route and foreshore Promenade will continue to be managed in accordance with the works and processes set out in the Basement Car Park Approval.
- The majority of utility services within the site will be made redundant and removed as part of the demolition works approved under the Bulk Excavation and Basement Car Park Approval. Associated drainage, sewer and communication services will be diverted from the construction area with temporary connections made. Those services within and surrounding the site to remain will be located and protected as necessary during construction.
- A Stakeholder Engagement Strategy will be implemented to maintain a good neighbour policy with surrounding businesses, residents and special interest groups during construction as outlined at Appendix B of the ECSMP.

The project will be undertaken in accordance with **Appendix CC** and accordingly the above recommendations are reflected in the draft Statement of Commitments.

5.22 Construction Noise and Vibration Impacts

Renzo Tonin has undertaken a Construction Noise and Vibration Assessment for the proposed development (**Appendix Y**). The Construction Noise and Vibration Assessment:

- establishes site specific construction noise management levels and vibration criteria in accordance with the OEH Interim Construction Noise Guidelines (ICNG) and Assessing Vibration: A Technical Guideline;
- identifies noise sensitive commercial and residential receivers likely to be affected by noise and vibration from the proposed works;
- calculates noise levels likely to be associated with the proposed works; and
- considers the impacts that may result from the proposed works, including the cumulative impacts of other construction activities that may occur concurrently (including Headland Park works, Commercial Buildings C3, C4 and C5, Barangaroo Central Waterfront Promenade, Wynyard Walk and Basement Car Park works) and, if necessary, mitigation measures to manage adverse impacts.

The Construction Noise and Vibration Assessment should be read in conjunction with the ECSMP (refer to Section 5.21 above).

Potential Noise and Vibration Sources

The main potential noise from the Residential R8 and R9 building works is typically construction plant and activities, relevantly including:

- bored piling rigs,
- cherry picker;
- trucks,
- concrete pumps,
- forklifts,
- compressors,
- cranes,
- light commercial vehicles, and
- a range of power tools.

The main plant that can be expected to generate vibration is:

- excavators and bulldozers;
- compactors;
- vibratory rollers; and
- truck traffic.

A detailed list of typical construction plant and relevant sound power levels is provided at Table 13 and 14 of the Operational and Construction Noise and Vibration Report at **Appendix Y**.

The proposed construction hours are between 7.00am and 7.00pm Monday – Friday and between 7.00am and 5.00pm on Saturdays. No work will be undertaken on Sundays or Public Holidays.

It is noted that the proposed hours for Saturdays are outside DECCW's standard hours of construction being 8.00am and 1.00pm. However, this extended period of construction hours will enable the major noise and vibration generating activities to be carried out in a more efficient manner, thereby shortening the period over which sensitive receptors will be exposed.

These works will be undertaken during hours that are consistent with the City of Sydney Council's hours for construction. These hours include Saturday afternoon up to 5pm, which recognises the urban nature of the city environment. This differs from the DECCW guideline which covers the entire range of environments in NSW.

Sensitive Receivers

The residential and commercial receivers that may be affected by construction noise and vibration associated with the Residential Building R8 and R9 works are the same as those that have previously been identified as part of the Basement Car Park Project Applications and Commercial Buildings C3, C4 and C5 Project Applications. The location of these sensitive receivers are shown on **Figure 15** below and summarised at **Table 19**.

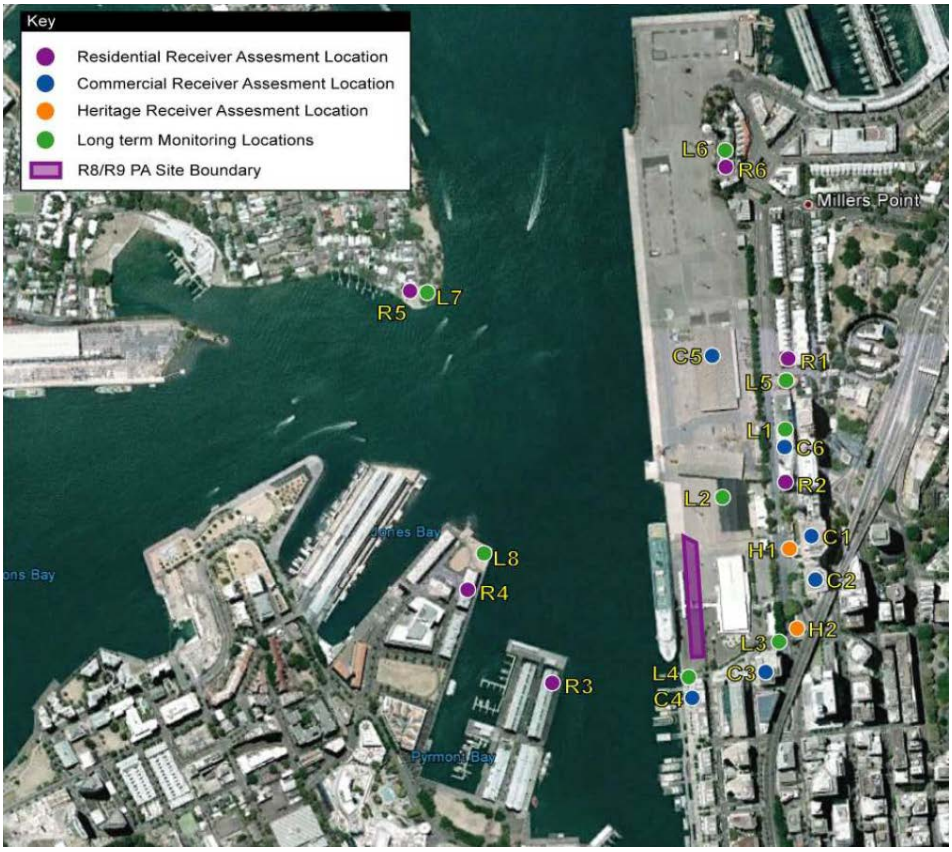


Figure 15 – Sensitive Noise Receivers around the Barangaroo site

Source: Renzo Tonin

Table 19 – Nearby Sensitive Receivers

Receiver Address	Comments
Commercial Receivers	
Napoleon St	Aon Australia Building Symantec Building
30 Hickson Rd	Billabond Child Care Centre, Top Floor Café, Lend Lease offices,
Lime St, (King Street Wharf)	Commercial Offices Retail including indoor / outdoor cafes
Barangaroo Site	Temporary Cruise Passenger Terminal
Shelley St	Commercial offices (KPMG, American Express)on Cnr of Sussex and Shelley St
Residential Receivers	
38 Hickson Rd	Multi Storey Residential Building
High St, Millers Point	Terrace Residences
Pirrama Road, Pyrmont	Sydney Wharf Apartments
Northern end of Darling Island Rd and Wharf Cr, Darling Island	Multi Storey High End Apartments
Dalgety Rd, Dawes Point	Double Storey Community housing
Merriman St, Dawes Point	Double Storey unit blocks and single storey houses
Edward St and Little Edward St, Balmain East	Waterfront properties along Balmain peninsula
Heritage Receivers	
Former Grafton Bond Store, Hickson Rd, Millers Point	Former Grafton Bond Store Building
20-26 Sussex St, Sydney	The Sussex Hotel - Former Moreton's Hotel

Source: Operational and Construction Noise & Vibration Report, Renzo Tonin.

Ambient noise measurements

In order to quantify the existing noise environment, long term ambient noise levels were monitored at 8 locations surrounding the site, selected to cover the range of environments in the potentially affected areas. The noise monitoring locations are shown in **Figure 14** above. The noise monitoring was conducted in accordance with the NSW OEH requirements.

Construction Noise and Vibration Criteria

The Construction Noise and Vibration Report has determined applicable site specific construction noise and vibration criteria based on the OEH guidelines, namely the Interim Construction Noise Guideline and Assessing Vibration: A Technical Guideline.

The Assessment also identifies appropriate construction traffic noise criteria in accordance with OEH's requirements. The measured background noise level, the Rating Background Level (RBL) is used to determine the noise management level. The noise affected level is the RBL plus 10dbA and applies during standard construction hours. **Table 20** presents the adopted site specific construction noise management levels.

Table 20 – Site specific Construction Noise Management Levels

Location	Construction Noise Management Level dB(A)		
	Day RBL	Noise Affected	Highly Noise Affected
R1 High St, Millers Point	47	57	75
R2 38 Hickson Rd	53	63	75
R3 Sydney Wharf Apartments, Pirrama Rd, Pyrmont	47	57	75
R4 Darling Island Residences	47	57	75
R5 Edward Street, Balmain East	49	59	75
R6 Dawes Point	46	56	75
C1 AON Australia, Napoleon St	60	70	75
C2 Symantec, Napoleon St	60	70	75
C3 KMPG/American Express, Sussex St and Shelley St	60	70	75
C4 Lime St (King St Wharf)	52	70	75
C5 Temporary Cruise Terminal	52	70	75
C6 30 Hickson Road, Millers Point	53	70	75
H1 Former Grafton Bond Store, Hickson Rd, Millers Point	60	70	75
H2 The Sussex Hotel 20-26 Sussex St, Sydney	60	70	75

Source: Operational and Construction Noise and Vibration Report Renzo Tonin

For disturbance to building occupants, the recommended limits for continuous and impulsive vibration have been drawn from DECC's 'Assessing Vibration: a technical guideline'. This guideline is based on criteria drawn from British Standard 7385 - Evaluation and measurement for vibration in buildings. **Table 21** presents the adopted vibration criteria. Further criteria relating to acceptable levels of intermittent vibration is set out in Section 6.5 of the Operational and Construction Noise and Vibration Report at **Appendix Y**.

Table 21 – Criteria for Exposure to Intermittent Vibration

Place	Daytime		Night time	
	Preferred Value	Maximum Value	Preferred Value	Maximum Value
Critical working areas (e.g. hospital operating theatres precision laboratories)	0.10	0.20	0.10	0.2
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.8
Workshops	0.80	1.6	0.80	1.60

Source: Operational and Construction Noise and Vibration Report Renzo Tonin

The German Standard DIN 4150 – 3 "Structural Vibration Part 3 – Effects of Vibration on Structures" has also been used to derive specific separate guidance for potential structural damage to nearby heritage buildings. This criterion is set out at Table 12 included at Section 6.5 of the Operational and Construction Noise and Vibration Report at **Appendix Y**.

Construction Noise Impact Assessment

Construction noise levels at any given receiver vary dependent upon the location of the receiver with respect to:

- equipment sound level emissions and location;
- screening effects from buildings;
- shielding from topography;
- type and duration of construction activity;
- ground absorption; and
- atmospheric absorption.

Noise predictions for construction activity have estimated for the construction of Residential Buildings R8 and R9. In addition the cumulative noise impacts of the construction of Residential Buildings R8 and R9, the basement, and commercial towers C3, C4 and C5 has also been undertaken. The predicted noise levels are set out in Table 15 in Section 6.7 of the Operational and Construction Noise and Vibration Report at **Appendix Y**.

In summary, the results of the assessment are as follows:

- Noise from R8 and R9 construction activities alone are predicted to comply with the 'noise affected' targets at all residential, commercial and heritage listed receivers.
- The cumulative impacts from all Barangaroo South construction activities are predicted to exceed the noise affected targets at the following locations:
  - R1 – High St, Millers Point
  - R2 – 38 Hickson Rd, Millers Point
  - R3 – Sydney Wharf Apartments, Pirrama Road, Pyrmont
  - R4 – Darling Island Apartments, Darling Island
  - C3 – KPMG/American Express, Cnr of Sussex and Shelley Sts
  - C4 – Lime St (King St Wharf)

During normal weekday operating hours, there are exceedances of up to 4 dBA, at these locations, however all of the above locations are predicted to comply with the highly affected targets. The predictions do not consider any acoustic shielding that may be provided by either R8 or R9 buildings or the commercial towers. Therefore it is expected there will be reduced noise levels for receivers particularly to the east and west of the site.

Construction Vibration Impact Assessment

Construction activities have the potential to generate levels of vibration. However, the works associated with the construction of Residential Buildings R8 and R9 are not expected to generate significant vibration levels. The main plant that could generate vibration would be:

- compactors;
- vibratory rollers; and
- general truck traffic.

Based on the likely sources of vibration and the distance to the vibration sensitive receptors, vibration generated from the construction of the residential towers is not expected to cause damage or adverse human response.

Management and Mitigation Strategies

It has been determined that noise from cumulative construction activities during the day period will exceed established construction noise management goals for some residential and commercial receivers.

Therefore, the planning and management of construction activities must take into account the sensitivities of surrounding residents and workers so as to minimise the impact of construction activities at these receivers.

The following measures were recommended.

- Scheduling noisy work during less sensitive time periods.
- Select low-noise plant and equipment.
- Restrict noise emissions for specified plant and equipment.
- Restrict vehicle movements outside construction hours including unloading and loading operations.
- Only have necessary equipment on-site and only use equipment with the necessary size and power.
- Minimise use of reversing alarms.
- Undertake an audit of plant to select equipment that generates the lowest practical commercially available noise levels.
- Locate noisy plant and equipment as far as possible from noise sensitive areas. Equipment should also be located to take advantage of noise barriers provided by site features and structures.
- Implement a noise and vibration monitoring compliance program to ensure equipment remains within specified limits.
- An effective complaints and community consultation program should be implemented.

The proposed works will be carried out in accordance with the Operational and Construction Noise and Vibration Report and its recommended mitigation measures have been incorporated into the draft Statement of Commitments.

5.23 Construction Air Quality

An Air Quality Impact Assessment (AQIA) has been prepared by AECOM and is included at **Appendix DD**.

The AQIA assesses impacts that are expected during the building phases of works associated with the construction of Residential Buildings R8 & R9. The report assessed impacts on the air environment from the following activities and sources:

- the construction of the Residential Buildings R8 & R9;
- the parallel construction of sections of Residential Buildings R8 & R9 and Commercial Buildings C3, C4 and C5; and
- operation of an on-site concrete batching plant.

Specifically the AQIA includes:

- identification of the potential pollutant emissions and emissions sources associated with the Residential Buildings R8 & R9 construction works;
- an assessment of the predicated pollutant concentrations against OEH's impact assessment criteria ; and

- air quality management and monitoring procedures for the project.

The AQIA has been prepared in accordance and/or in consideration of the *Approved Methods for Modelling and Assessment of Air Pollutants in New South Wales* (DEC, 2005) and the requirements of the Protection of the Environment Operations (Clean Air) Regulation 2002.

Potential Impacts

The AQIA identifies that from an air quality perspective, emissions are expected to be limited to diesel powered plant and equipment used during construction works which may generate a range of pollutant emissions, primarily nitrogen dioxide (NO_2) and particulate matter (PM_{10}). The potential effects of these pollutants are provided at Section 4 of the AQIA.

The proposed Residential Buildings R8 & R9 construction works are not expected to generate odours other than those associated with the operation of diesel-power equipment and plant. As such, odour during construction is not identified as an issue of concern for this scope of works.

Modelling Methodology and Assumptions

Dispersion modelling has been undertaken to predict the potential effects of the proposed construction of Residential Buildings R8 & R9. The CALPUFF air dispersion model has been used, in accordance with the EPA Approved Methods (DEC, 2005). The inputs (specifically meteorology, terrain, building parameters, modelling scenarios, source characteristics and emissions inventory), sensitive receptor locations, and methodology as to how pollutant concentrations have been estimated are detailed at Section 6.0 of the AQIA.

EPA (DEC 2005) specifies that AQIAs are to assess the cumulative impact of a proposal against their impact assessment criteria. This involves adding existing background pollutant levels and expected pollutant levels from other concurrent developments to maximum pollutant concentrations predicted by dispersion modelling. The cumulative impact assessments for PM_{10} and NO_2 were contemporaneous assessments made using hourly data for the modelling period.

As construction works for Commercial Buildings C3, C4 and C5 will be underway at the time the proposed R8 and R9 construction works will commence, emission sources associated with those buildings were incorporated into the assessment. Additionally, adopting a conservative approach, the operation of a concrete batching plant (subject to Basement Car Park (Mod 4)) was also included in the assessment.

Sensitive Receptors

Sensitive receptors are identified by the OEH as anywhere someone works or resides or may work or reside, including residential areas, hospitals, hotels, shopping centres, play grounds, recreational centres and the like.

The closest receptors to the site are the residences located along Hickson Road, which are located approximately 20 metres from the Barangaroo site boundary.

The location of sensitive receptors incorporated into the dispersion modelling are provided in the AQIA and shown on **Figure 165** below.

Figure 16 – Sensitive receptor locations

Impact Assessment

The dispersion modelling demonstrates:

- Exceedences of the 1 hour NO_2 criterion were predicted to occur at 17 of the 36 receptors assessed, and the annual NO_2 criterion was predicted to be slightly exceeded at one receptor (Receptor 19).
- Exceedences of the 24 hour PM10 criterion were predicted to occur at 21 of the 36 receptors assessed. The maximum number of additional exceedences predicted was 35 at Receptor 1. No exceedences of the annual PM10 criterion were predicted. No exceedences of the annual TSP criterion were predicted, with maximum predicted concentrations reaching approximately half the criterion level.

Based on the modelling results, adverse effects on air quality may result from the proposed construction activities. However, these exceedences are largely the result of materials handling associated with the proposed concrete batching plant

(subject of Basement Car Park (Mod 4) and not the construction activities associated with Residential Building R8 & R9.

The AQIA notes that Lend Lease has implemented an extensive monitoring and management system to mitigate adverse impacts associated with the current works on site and to date, no exceedences of air quality criteria have been detected at the site.

Therefore, in order to ensure that the predicted adverse effects do not occur as a result of the proposed works considered in this assessment, the AQIA recommends that the existing monitoring and management procedures must be extended to cover the proposed works.

Mitigation Measures and Monitoring

AECOM has recommended that the following mitigation and work practices be implemented at the site are described in **Table 22**.

Table 22 – Additional recommended mitigation and work practices

Trigger	Impact	Pollutants	Control Measure
Fuel combustion emissions from vehicles and equipment	Increased risk to human health	NO_x PM_{10}	Turn engines off whilst parked on site
			Vehicular access confined to designated access roads
			Equipment, plant and machinery regularly tuned, modified or maintained to minimise visible smoke and emissions
			Site speed limits implemented
			Minimising haul road lengths
Fugitive dust from exposed surfaces and vehicles	Nuisance (dust) Discoloration of buildings or structures Increased risk to human health	PM_{10}	Covering exposed surfaces at the end of each shift and during dry / windy conditions
			Erection of wind break barriers on the site boundary
			Control roadway use i.e. defined road access to minimise dust
			Regular clean up of spills
			Implement a complaints management system
			Adjust work practices (as required) based on wind observations
			Adjust work practices (as required) based on real time dust monitoring results
			Instantaneous dust monitoring at the boundary

In addition the AQIA recommends that the Air Quality Monitoring Program currently underway and Air Quality Management Plan be incorporated into the ECSMP prepared for the site (see **Appendix CC**). Refer also to Section 5.24.

The project will be undertaken in conformance with **Appendix DD** and accordingly the above recommendations have been incorporated into the draft Statement of Commitments.

5.24 Construction Traffic Management

A Construction Traffic Management Plan has been prepared by ARUP and is included at **Appendix EE**. The report assesses the likely construction traffic generated during the initial stages of the development of the site and its likely impact on the road network, pedestrian safety and amenity issues during the construction of the proposed development.

The construction traffic impact assessment in the Construction Traffic Management Plan reflects the staged nature of the development of the site. The Construction Traffic Management Plan addresses the following in relation to construction traffic management:

- construction related truck and car traffic generation and its anticipated route to and from the site;
- impacts of construction traffic on the existing road network including cumulative impacts of known construction activity in the precinct;
- pedestrian safety along the site boundary and at the work site entry and exit points;
- potential traffic conflicts with car, bus and other vehicles and pedestrian access for the temporary Cruise Passenger Terminal; and
- Hickson Road and Shelley Street pedestrian provisions during construction.

There are no other major construction projects within the vicinity of Barangaroo that are known at this point in time and as a consequence the cumulative construction traffic impacts are confined to developments associated with the Barangaroo development works. Future project applications will consider the likely cumulative traffic impacts into their assessments at the time of submission.

An assessment has been made of the cumulative impacts of the Basement Car Park Approval, the Headland Park and Northern Cove Project Approval, the Commercial Buildings C3, C4 and C5 Project Approvals, Wynyard Walk, and the subject Residential Buildings R8 & R9 Project Application. The estimated truck volumes for each of the aforementioned projects is detailed Section 3 of the Construction Traffic Management Plan.

The highest combined level of total morning peak hour car/ute and truck traffic movements generated by all the worksites will be a total of 351 vehicle movements per hour and will occur during August 2013. This is comprised of:

- AM Peak (8am - 9am): 175 cars in, 55 cars out, 62 trucks in, 59 trucks out
- PM Peak (5pm - 6pm): 55 cars in, 175 cars out, 59 trucks in, 62 trucks out

Full details of the resulting monthly variations in the total generated peak hour car/ute and truck traffic volumes from the combined worksites is included at Appendix B of the Construction Traffic Management Plan.

Intersection Analysis

The four nearest and most relevant intersections to the site construction stage access are as follows:

- Hickson Road/Napoleon Street;

- Sussex Street/Shelley Street;
- Sussex Street/Erskine Street;
- Erskine Street/Shelley Street; and
- Shelley Street/Lime Street.

A complete LINSIG intersection capacity analysis of existing key intersections is included at Appendix A of the Construction Traffic Management Plan.

The effect of the estimated additional peak hour traffic at each phase of construction (for the Headland Park, Basement Car Park, Wynyard Walk, Commercial Building C3 C4, and C5, and Residential Buildings R8 & R9 construction) has been estimated at each intersection for the typical morning and afternoon peak hour periods.

The results for the combined traffic movements are summarised in **Table 23** and show predicted future changes to the intersection operations, as calculated by means of the LinSig intersection analysis program.

Table 23 – Intersection Analysis

Peak	Intersection	Existing LOS	Forecast Peak (Aug 2013) LOS
AM	Hickson Road & Napoleon Street	A	A
	Sussex & Shelley Streets	B	C
	Sussex & Erskine Streets	C	E
	Erskine & Shelley Streets	B	B
	Shelley & Lime Streets	A	A
PM	Hickson Road & Napoleon Street	A	A
	Sussex & Shelley Streets	B	B
	Sussex & Erskine Streets	F	F
	Erskine & Shelley Streets	B	B
	Shelley & Lime Streets	A	A

The results of the intersection analysis forecasts minimal changes in the operation of the key intersections surrounding the site as a result of the cumulative Barangaroo construction traffic.

The additional construction vehicles associated with the Residential Buildings R8 & R9 works has only a minor impact on forecast road network performance compared to that previously forecast in the Commercial Building C3, C4 and C5 Approvals.

The greatest impact in terms of road network performance is forecast occur at the Sussex Street / Erskine Street intersection in the PM peak hour. It is recognised that significant vehicle queuing currently occurs in the southbound direction on Sussex Street during this time as a result of more congested traffic operating conditions in the vicinity of the cross traffic movements at the King Street and Market Street intersections. These intersections effectively act as the 'masters' along Sussex Street and impact on vehicle queues and delays of intersections to the north, particularly Sussex / Erskine Street. This intersection is forecast to operate at capacity in the PM peak hour, both with and without the additional construction traffic generated by Barangaroo South and surrounding developments.

It is noted that a Modification to the Basement Car Park Approval (Mod 4) for the provision of a temporary on-site concrete batch plant, is currently being assessed by the Department of Planning and Infrastructure. Presently the concrete required to service the basement construction site would need to be sourced externally off-site and transported to the basement construction site via the local and regional road network. The provision of an on-site concrete batch plant will

significantly reduce the number of truck movements associated with concrete pours (a 30% reduction in overall site truck movements).

As the modification is currently being assessed, the reduction in truck movements has not been included in the LinSig intersection analysis. However, should the Modification be approved, the performance of key intersections will significantly improve relative to those presented above.

5.25 Construction Waste Management

A Waste Management Plan has been prepared by ARUP and is included at **Appendix P**.

The Waste Management Plan identifies waste sources during construction and proposes measures to manage waste in a way that satisfies all legislative requirements.

The Waste Management Plan is provided in a format which can assist with the completion of a Construction Waste Management Plan which will be required by the contractor prior to the construction of the development.

During construction it is anticipated that a variety of waste will be generated. The quantity of waste is not currently known at this point in time, the actual strategies and management measures will be refined as the construction program and phasing is defined. If material is required to be disposed of off-site it will be classified for offsite disposal, and disposed of in accordance with OEH's Waste Classification Guidelines 2008.

Lend Lease is committed to minimising waste to landfill and greenhouse gas emissions associated with waste generation and the movement of waste from the site. The adopted target for construction waste in the Residential Buildings R8 & R9 Project Application is greater than 90% reduction of construction waste to landfill.

The Construction Waste Management Plan directly influences the Man-7 Green Star indicator. Within the Management category of Green Star, Waste Management (Man-7) addresses construction waste management and is worth a possible 2 points. The maximum of 2 points is awarded for achieving 80% reuse or recycling of construction materials by weight, with 1 point awarded for achieving 60%. The implementation of the Construction Waste Management Plan and adopted percentage of waste re-used or recycled is proposed in order to qualify for a Man-7 credit under Green Star.

The waste management measures that are proposed to be implemented during construction can be summarised into the following categories:

- Waste management hierarchy;
- Waste avoidance and reduction;
- Resource recovery;
- Waste education / training;
- Waste utilisation on alternate sites;
- Good housekeeping;
- Monitoring and reporting;
- Materials and procurement; and
- Transportation of waste.

Further details on the relevant initiatives in each of these categories are provided at Section 4 of the Waste Management Plan. Detailed strategies and management measures will be refined as the construction program and phasing is defined, and will be documented in the Construction Waste Management Plan for the project.

6.0 Draft Statement of Commitments

In accordance with Part 3A of the *Environmental Planning and Assessment Act 1979*, the following are the commitments made by Lend Lease to manage and minimise potential impacts arising from the proposal.

Commitments and Requirement	Responsibility / Timing
Design	
1. Lend Lease commits to ensuring continuity in the design process and realisation of the submitted Residential Buildings R8 & R9 design in the completed building by ensuring that FJMT and PTW have direct involvement in the design documentation phase.	Proponent, ongoing.
2. External building materials and finishes will be generally in accordance with the materials schedule included at **Appendix A** of the Environmental Assessment Report prepared by JBA dated October 2012.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
3. External building lighting will be installed to provide interest, highlighting architectural features. No light beam will be directed beyond the site's boundaries or upwards without falling directly on a surface to minimise light pollution. Lighting will be controlled by photoelectric cells or time switches.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
4. The glazing selected for external facades will have a maximum external specular reflectance of 20%.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
Public art	
5. Opportunities to implement art work within the Residential Buildings R8 & R9 development will be further explored in accordance with the Public Art Strategy for Barangaroo South.	Proponent, ongoing.
Ecologically sustainable development	
6. Lend Lease will target the initiatives set out in the ESD Report included at **Appendix K** of the Environmental Assessment Report prepared by JBA dated October 2012.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
Operational waste management	
7. Residential Buildings R8 & R9 operational waste will be managed generally in accordance with the methodology outlined in the Waste Management Plan prepared by ARUP included at **Appendix P** of the Environmental Assessment Report prepared by JBA dated October 2012.	Proponent, ongoing.
Infrastructure and Services	
8. Appropriately sized new sewer and water connections will be provided to the building in consultation and agreement with Sydney Water.	To be demonstrated by the proponent prior to release of any occupation certificate.

9. Stormwater discharge will be generally in accordance with the Stormwater Management Plan prepared by ARUP included at **Appendix O** of the Environmental Assessment Report prepared by JBA dated October 2012.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
Building Code of Australia	
10. The detailed design of Residential Buildings R8 & R9 will comply with all relevant BCA requirements and Australia Standards generally in accordance with the recommendations of the BCA Assessment prepared by McKenzie Group Consulting included at **Appendix Z** of the Environmental Assessment Report prepared by JBA dated October 2012.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
Operational Noise and Vibration	
11. Operational noise emissions from the site will comply with the noise limits and amenity and intrusiveness criteria detailed in Wilkinson Murray's Operational Acoustic Study included at **Appendix Y** of the Environmental Assessment Report prepared by JBA Planning dated November 2011.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
Geotechnical and Structure	
12. Further detailed geotechnical site testing will be undertaken in accordance with the requirements of Australian Standard 2159 Piling – Design and Installation and Australian Standard 3600 – Concrete Structures, to determine the exposure classification and durability design requirements. The further detailed geotechnical testing will be used to inform the detailed structural design and documentation of Residential Buildings R8 & R9.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
Environmental, Construction and Site Management	
13. Construction and site management relating to the construction of Residential Buildings R8 & R9 will be in generally accordance with the Environmental, Construction and Site Management Plan prepared by Lend Lease included at **Appendix CC** of the Environmental Assessment Report prepared by JBA dated October 2012 including the following: ▪ Construction Noise and Vibration Assessment prepared by Renzo Tonin, which addresses the noise and vibration impacts on and off site (refer to **Appendix Y** of the EAR); ▪ Construction Traffic Management Plan prepared by ARUP, which addresses construction traffic impacts (refer to **Appendix EE** of the EAR); ▪ Air Quality Impact Assessment prepared by AECOM, which addresses air quality and odour impacts (refer to **Appendix DD** of the EAR); and ▪ Waste Management Plan prepared by ARUP which addresses construction waste management (refer to **Appendix P** of the EAR).	Proponent, ongoing
14. Lend Lease commits to providing high quality hoardings around the site, including along the foreshore promenade. Hoardings will be treated with graphics and other designs consistent with an overall coordinated high quality Barangaroo communications strategy to be endorsed by the Barangaroo Delivery Authority and submitted to the Director-General.	Proponent, ongoing

Piling and associated works	
15. The Residential Buildings R8 & R9 Project Application works will be carried out in accordance with the Remedial Action Plan – Other Remediation Works (South) Area prepared by AECOM (including any RAP addendums that are proposed to be prepared and remedial work plan(s) as proposed to be prepared in conformance with these RAPs).	To be demonstrated by the proponent at the relevant construction certificate stage(s).
16. Lend Lease will obtain a Section A Site Audit Statement from the Site Auditor prior to the issue of an Occupation Certificate for Residential Buildings R8 & R9.	To be demonstrated by the proponent at the relevant construction certificate stage(s).

7.0 Conclusion

This Project Application seeks approval for the construction and use of two residential flat buildings, known as Residential Buildings R8 & R9, within the area of land generally known as Block X at Barangaroo South.

The proposal is consistent with the approved Concept Plan (Mod 4) and the Concept Plan Statement of Commitments. The assessment of the Project Application has demonstrated that the proposed development will have minimal adverse environmental effects and where impacts do occur appropriate measures can be adopted to mitigate the impacts.

It is formally requested as part of this Project Application that the Director-General certifies in writing that a design competition is not required in relation to Residential Buildings R8 & R9 because of the excellence of the proposed design of the buildings (having regard to cl19(4) of Part 12 of Schedule 3 to the Major Development SEPP).

Given the environmental planning merits described above, and the significant public benefits proposed, it is requested that the Minister approve the Project Application under Section 75J of the EP&A Act.