Environmental Assessment Report

Project Application

Commercial Building C3 (MP11_0044)

Barangaroo South

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

November 2011 ■ 10752

JBA Planning Pty Ltd ABN 84 060 735 104 ACN 060 735 104 w jbaplanning.com.au
Level 7, 77 Berry Street North Sydney NSW 2060 t + 61 2 9956 6962 ▪ 29 Beach Street Wollongong NSW 2500 t + 612 4225 7680

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 11/11/11

This report has been reviewed by: Lesley Bull

Signature  Date 11/11/11

Contents

Contents

Figures

Contents

Tables

Appendices

Contents

Contents

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 3 and Lot 5 in DP 876514
Proposed development	Construction of 49 storey (plus plant) commercial building 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	11 November 2011

Executive Summary

This Project Application (MP11_0044) 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Planning and Assessment Act 1979* (EP&A Act) that provides for the continued application of the provisions of the now repealed Part 3A of the EP&A Act.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 a 48-storey commercial building within the area of land known generally as Block 3 at Barangaroo South. The proposed commercial building is referred to herein as Commercial Building C3.

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(1)(b) of Schedule 6(A) 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 Commercial Building C3 is 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:

- piling and associated earthworks and remediation;
- construction and use of a new Commercial Building C3 with a maximum 115,291m^2 GFA accommodating:
  - 7,164m^2 retail floor space;
  - 105,573m^2 commercial floor space;
  - 995m^2 office lobby;
  - 1,559m^2 of community uses for the purposes of a child care centre;
- operation and use of the basement car park to accommodate 196 spaces allocated specifically to the proposed uses within Commercial Building C3;
- 448 bicycle spaces including:
  - 112 spaces to be temporarily located within the landscaped forecourt along the site's Hickson Road frontage; and
  - the use of 336 spaces within the basement car park the construction of which is the subject of the Bulk Excavation and Basement Car Park (Mod 1) Approval (Basement Car Park Approval);
- pedestrian and cycle access and circulation arrangements;
- signage zones on the building's facade that will accommodate building and business identification signage;
- temporary works and uses, including:
  - creation of a temporary forecourt and landscaping along Hickson Road frontage which is proposed to accommodate bicycle parking and planter boxes;
  - surfacing of surrounding streets and laneways including part of Globe Street and part of the future City Walk;
  - hoardings that are generally consistent with the City of Sydney's design requirements; and
- services and utilities provision required to service the building.

Bulk Excavation and Basement Car Parking Project Application

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 901 car parking spaces and associated services and infrastructure to support the initial phases of the future development of Barangaroo South, including Commercial Building C3.

Accordingly, this Project Application does not seek approval for the works contemplated by the Basement Car Park Approval.

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, having submitted the Bulk Excavation and Basement Car Park (Mod 3) Application (Basement Car Park Mod 3 Application) which seeks to reconfigure the access and internal structure of the approved basement and remove basement levels CP1-CP5. The implications of the Basement Car Park Mod 3 Application 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.

Under cl2(1)(b) of Schedule 6A, the provisions of Part 3A continue to apply to undetermined projects where the DGRs were issued before 1 October 2011 and a current major project declaration remains in force. As DGRs for MP11_0044 were issued on 9 September 2011 (and modified on 21 October 2011) and therefore prior to 1 October 2011, and a current major project declaration remains in force the C3 Commercial Building is a transitional Part 3A project.

Clause 3 of Schedule 6A to the Act also states 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, SEPP 55 - Remediation of Land, SEPP (Infrastructure) 2007, SREP (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.

Rogers Stirk Harbour + Partners have been commissioned to design Commercial Building C3. In accordance with the criteria set out in clause 19(2) of Part 12 of Schedule 3 of the Major Development SEPP, the building achieves 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 6 Star Green Star rating; and
- Lend Lease is committed to ensuring continuity in the design process and realisation of the submitted design in the completed building by retaining the same architectural team of Rogers Stirk Harbour + Partners and Tony Caro Architects and PTW through to completion.

Lend Lease is committed to delivering a high quality pedestrian and built environment at Barangaroo South, and recognises the importance to this outcome of successfully integrating the architecture of the Commercial Building C3 tower and podium elements as well as providing a strong built form expression through the ground plane. To ensure that the proposed design of Commercial Building C3 will deliver upon this important outcome, as part of the normal design development process for a project of this scale Lend Lease commits to undertake further design refinement (and consideration of further related statements of commitments) to the podium where as appropriate as part of the assessment process.

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 Commercial Building C3 because of the excellence of the proposed design of the building development (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 Commercial Building C3. It demonstrates that the proposed development is satisfactory with respect to:

- Built form;
- Visual impact;
- Public domain;
- 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 services;
- Building Code of Australia;
- Fire safety;
- Infrastructure and utilities;
- Accessibility;
- 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 Mod 3 Application 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;
- 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 has been informed by the detailed assessments included in the Basement Car Park Mod 3 Application EAR.

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 of a 49-storey (plus plant) commercial building (referred to herein as Commercial Building C3) within the area of land known generally as Block 3 at Barangaroo South as described in Section 4.0 of this EAR.

The EAR has been prepared by JBA Urban Planning Consultants Pty Ltd (JBA), for the proponent, Lend Lease (Millers Point) Pty Limited (Lend Lease), and is based on plans and drawings provided by Rogers Stirk Harbour + Partners (RSH+P) 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 9 September 2011 (and modified on 21 October 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 Basement Car Park Approval (MP10_0023) and Commercial Building C4 Project Approval (MP10_0025) by the Minister for Planning and Infrastructure on 3 March 2011. It is noted that Modification Applications for both Project Approvals were recently lodged with the Department of Planning and Infrastructure.

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 901 car parking spaces and associated services and infrastructure to support the initial phases of the future development of Barangaroo South, including the development of Commercial Building C3. Accordingly, it should be noted that this Project Application does not seek approval for the works already approved under the Basement Car Park Approval.

The Project Application works sit entirely within the lateral extent of the Basement Car Park Approval works and are fully integrated in terms of design with those works.

The EAR and PPR which accompanied the Basement Car Parking Mod 3 Application provide 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 the following:

- 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.

This Project Application is informed by the detailed assessments included in the Basement Car Park Mod 3 EAR.

This EAR should therefore be read in conjunction with the EAR prepared by JBA to accompany the Bulk Excavation and Basement Car Parking Project Application (dated June 2010), the Preferred Project Report (PPR) for that Application prepared by JBA (dated September 2010), the Section 75W Modification Application for Mod 1 prepared by JBA (dated November 2010) and the Basement Car Park Mod 3 Application also prepared by JBA and dated October 2011[1].

Where relevant, information submitted with the Basement Car Park Mod 3 Application has been re-submitted in this EAR to assist in the assessment and determination of this Project Application.

This EAR should also be read in conjunction with the Concept Plan (Mod 4) Approval and the original State Significant Site Study prepared by JBA (dated February 2007).

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 maximum gross floor area for Block 3 increased from 85,568m^2 to a combined total for Blocks 2, 3 and 4A, 4B and 4C of 428,932 m^2 (the previous combined total for Blocks 2, 3 and 4 was 418,475m^2).

The Concept Plan approval (Mod 4) provides for:

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

- 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 3 within which Commercial Building C3 is proposed:

- Maximum GFA of 142,669m^2; and
- Maximum building height of RL 209 / 207 metres above ground level.

Under Concept Plan (Mod 4) future project applications for buildings within Blocks 2, 3, 4A, 4B and 4C may accommodate a redistribution of GFA (but not in excess of the total GFA for those blocks) resulting from the Urban Design Controls identified in Condition B9 of the approval.

In addition to the terms of approval, the Statement of Commitments approved under the existing Concept Plan (Mod 4) require a series of Implementation Plans and Strategies to be prepared prior to the lodgement of relevant future project applications to address:

- Design Excellence;
- Public Domain;
- Transport Management and Access;
- Community and Social Impacts;
- Utility Services and Infrastructure;
- Housing;
- Marketing and Promotion;
- Retail Management; and
- Geotechnical and Environmental Site Remediation.

The Statement of Commitments require the establishment of Technical Working Groups to prepare each Implementation Plan and Strategy. The Technical

Working Groups have been convened and meet regularly to consider relevant documentation (refer to Section 3 for further details).

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 follows 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. It is also noted that the scheme was selected on the basis that the 3 proposed commercial buildings (known as C3, C4 and C5) work together as siblings, not as separate or disparate designs.

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 Project Application MP10_0023 for Bulk Excavation and Basement Car Parking was submitted to the Minister for Planning in June 2010 and publicly exhibited for a period of 30 days between 7 July 2010 and 5 August 2010. The Bulk Excavation and Basement Car Parking Project Application was approved by the Minister for Planning on 2 November 2010.

A Section 75W Modification Application to modify MP 10_0023 was submitted to the Minister for Planning in November 2010. The modification extended the excavation and bulk earthworks and basement construction to the south to provide additional basement area to support future development within Block 1 of Barangaroo South as well as expanding the plant provision that is required to support future development within Blocks 1, 2, 3(in part), 4A (in part) and X. The Modification (Mod 1), was approved by the Minister for Planning on 3 March 2011 (referred to in this EAR as the Basement Car Park Approval).

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 901 car parking spaces which equates to the car parking required to support GFA as envisaged by the approved Concept Plan for Blocks 2 and 3, and part of Block 4 (noting that it has been displaced by the enlarged Southern Cove) 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, including the extension of Lime Street;
- 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 basement car park has been designed to maintain maximum flexibility with respect to the potential options for the detailed design and distribution of above ground floor space (commercial, residential, community and retail floor space).

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.

The approved basement car park was designed such that it is capable of expansion / connection to additional basement areas at subsequent stages of the

development to accommodate additional parking as required to support the proposed gross floor area and land use mix as the overall Barangaroo South development proceeds.

A second Section 75W Modification Application (Mod 2) was submitted to the Minister for Planning in March 2011. The modification sought to amend Conditions A8 and A10 in order to clarify matters relating to the Remedial Action Plan and Human Health Ecological Risk Assessment and Interim Metro Corridor Agreement. However, due to the then imminent State election the assessment of Mod 2 was deferred. During this time the matters raised in Mod 2 were resolved and accordingly Mod 2 was withdrawn in October 2011.

Lend Lease is currently seeking the Minister's approval under section 75W of the EP&A Act for a further modification to the Basement Car Park Approval. The Basement Car Park Mod 3 Application seeks to reconfigure the access and internal structure of the approved basement and remove basement levels CP1-CP5.

The modified basement access proposed as part of the Basement Car Park (Mod 3) Application is located within the Project Application site. The Project Application has therefore been designed to be fully integrated with the Basement Car Park Mod 3 Application.

The Project Application proposes building works, including the core / foundations of the Commercial Building C3 and public domain above the basement level within Block 3, and the detailed layout and operation of the car parking and the number and allocation of car parking spaces within the proposed basement car park as relevant to the amount and land use mix of GFA proposed within the C3 development.

1.1.4 Commercial Building C4

Project Approval was granted for the first commercial building, known as Building C4 on 3 March 2011. The approved works the subject of that project approval are as follows:

- piling and associated earthworks and remediation;
- construction and use of a new commercial Building C4 with a maximum 98,514m^2 GFA accommodating:
  - 7,010m^2 retail floor space;
  - 88,582m^2 commercial floor space;
  - 916m^2 office lobby;
  - 2,006 m^2 of community uses for the purposes of a child care centre;
- operation and use of the basement car park to accommodate 168 spaces allocated specifically to the proposed uses within Building C4;
- 690 bicycle spaces including:
  - 127 spaces to be temporary located within the landscaped forecourt along the site's Hickson Road frontage; and
  - 563 spaces within the basement car park that is the subject of the Bulk Excavation and Basement Car Park Project Application;
- pedestrian and cycle access and circulation arrangements;
- construction of the surrounding public domain including:
  - a portion of Globe Street;
  - City Walk; and
  - the southern laneway;

- signage zones on the building's facade that will accommodate building and business identification signage;
- temporary works and uses, including:
  - creation of a temporary forecourt and landscaping along Hickson Road frontage which is proposed to accommodate bicycle parking and planter boxes;
  - surfacing of surrounding streets and laneways including part of Globe Street, the future City Walk, a portion of Shelley Lane and the southern laneway;
  - a turning circle at the northern junction of Globe Street;
  - hoardings that are generally consistent with the City of Sydney's design requirements; and
- services and utilities provision required to service the building.

Lend Lease is currently seeking the Minister's approval under section 75W of the EP&A Act for a modification to the approved Commercial Building C4 Project Application (Mod 1). The key modifications proposed to MP 10_0025 as a result of further design development are:

- reconfiguration of the approved tower floorplates with curved floorplates;
- changes to facade detailing;
- relocation of the internal core;
- introduction of balcony spaces on Levels 4 and 5;
- introduction of structural bracing elements and glazed facades on the plant levels;
- increasing the visual separation between the core and the office floor plate;
- redesign of the internal areas of the podium including new atrium space;
- expansion of the pop-up area of the podium;
- replacement of childcare centre and upper level retail with office space;
- additional podium signage zones;
- removal of roof bracing;
- extension of Globe Street; and
- revised gross floor area, uses and parking allocation.

1.1.5 Other Project Applications

Demolition Project Application

On 15 November 2007, the Minister for Planning granted project approval (MP 07_0077) for demolition and preliminary site establishment works to prepare the site for future development, in accordance with the Barangaroo Concept Plan (Demolition Project Application].

Prepared on behalf of the Sydney Harbour Foreshore Authority, the approved works included:

- demolition of structures including Transit sheds 3, 4, 5 and 6 and associated structures;
- demolition of transit shed 8, entry gatehouse, 13 light towers;
- demolition of the Sydney Ports Amenities building, Sydney Ports Office building, and Wharf 8 Passenger Terminal;

- removal of the vehicle wash down bay and diesel tanks and storage shed; and
- services decommissioning.

The first stage of works approved under MP 07_0077 was completed in June 2008. Completion of the remainder of works approved under MP 07_0077 commenced in July 2010 and is now complete.

Headland Park

A Project Application (MP10_0047), prepared by the Barangaroo Delivery Authority, for the Headland Park and Northern Cove - Early Works was approved by the Minister of Planning on 8 November 2010. Project Approval was granted for:

- demolition of above ground structures and establishment of a construction compound including sheds and site hoardings;
- bulk earthworks, including placement of fill as part of the formation of the final landform;
- extraction of rough sawn sandstone blocks for reuse within the Barangaroo site from beneath the existing concrete apron; and
- retention or relocation of the existing Sewage Pumping Station and Network.

A second Project Application (MP10_0048), prepared by the Barangaroo Delivery Authority, for the Headland Park Main Works & Northern Cove was approved by the Minister of Planning on 3 March 2011. Project Approval was granted for:

- land formation utilising fill from Stage 1, ranging from the 150,000m^2 identified in the Early Works application to approximately 230,000m^2 (additional 80,000m^2) along with excavated material from the Headland Park site itself (120,000m^2) to build the headland up to finished levels for a nominal one metre topsoil layer (total fill of 350,000m^2);
- construction of structural earth retaining walls utilising sandstone based materials;
- creation of a naturalistic shoreline and northern cove through excavation and formation of retaining walls using boulders;
- general landscaping and planting;
- construction and use of a network of pedestrian pathways connecting the foreshore walkway and surrounding areas;
- construction of a shoreline promenade with dual use pedestrian path and cycleway;
- jetty / viewing platform and public wharf extending into the Northern Cove from the southern shoreline;
- construction of a car park totalling up to 300 spaces within the headland with vehicular access;
- form Towns Place and pedestrian access from various locations within Headland Park;
- location and use of the former Sydney Water Sewage Pumping Station for the purposes of an amenities building;
- construction of a space for a future use (cultural facility) comprising initially 75,000m^2 and ultimately up to 100,000m^2;
- installation of relevant services and infrastructure;

- construction of the services and piping/pumping infrastructure associated with the air conditioning system (cooling water inlet/ outlet) for the future cultural facility and car park; and
- site remediation for limited contamination of fill material previously identified on the Headland Park site.

SICSO and SEPR Pilot Trials

A Project Application MP10_0087 for the pilot trialling of two in-situ remediation methods was approved by the Minister for Planning on 3 March 2011.

The Pilot Trials will enable the testing of two in-situ remediation technologies known as Surfactant-Enhanced In Situ Chemical Oxidation (S-ISCO) and Surfactant-Enhanced Product Recovery (SEPR) to remediate contaminants present in the soil and groundwater at Barangaroo Block 5 and a part of Hickson Road adjoining Barangaroo. The objective of the Pilot Trials is to assess the effectiveness of the two nominated in-situ technologies in remediating contaminated soils and groundwater on the site, and to refine the design of these technologies for potential full scale implementation.

The Pilot Trials are intended to demonstrate that where applied, remediation can be undertaken to address the NSW Office of Environment and Heritage (OEH) Remediation Site Declaration 21122 and the treated areas can be made suitable for the proposed future mixed use development of the site, through the full scale implementation of these in-situ technologies.

The Pilot Trials will be undertaken as part of the investigation works set out in Phase 1 Voluntary Management Proposal agreed by the Barangaroo Delivery Authority with the EPA. Any future full-scale implementation of SISCO and SEPR will be subject of a separate VMP (i.e.: Phase 2 VMP) between the OEH and the Barangaroo Delivery Authority.

The Pilot Trials are temporary and will only be in place for between approximately four and six months. No permanent structures will remain after the conclusion of the Pilot Trials.

The works approved as part of the Pilot Trials do not affect the Commercial Building C3 Project Application site.

1.1.6 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.

1.1.7 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_0044 were issued on 9 September 2011 (and modified on 21 October 2011) and therefore prior to 1 October 2011 and a current major project declaration remains in force, Commercial Building C3 is 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).

1.1.8 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 and Concept Plan (Mod 4), land use mix, scale and density, design excellence, transport, headland park, cruise terminal, contamination, public domain, and governance.

Snapshot Design Review

The Report noted that the approach to building design for Barangaroo South was carefully considered during the Barangaroo Stage 1 developer selection process throughout 2008/09. In particular it highlighted that the Lend Lease scheme was selected in accordance with 'generally accepted practice' and noted that there had been 'more emphasis on good design as a selection criteria than is usual in other jurisdictions'. It also highlighted that the Lend Lease proposal was supported as the best proposal by the overwhelming majority of the design experts involved.

The final two contenders in the developer selection process presented two different approaches for the buildings at Barangaroo South. The runner up (Brookfield Multiplex) proposed a scheme with a diverse arrangement of

buildings of different scale and design. The winning Lend Lease proposal, with Rogers Stirk Harbour + Partners, considered the site as an entity, with the principal tall buildings conceived as a cluster, working harmoniously together to give a sense of identity and place to the whole site - a sense of place which will be specific to Barangaroo. This approach has continued through the detailed design phases of the development to date.

Whilst noting that it is highly unusual that an international developer selection process, such as that undertaken for Barangaroo, would be the subject of subsequent independent design reviews, the Report recommended a one-off 'Snapshot Design Review' (Snapshot Design Review) to "assess and advise on the quality of forthcoming proposals and to reassure the community" in respect of the design process.

The terms of reference for the Snapshot Design Review were as follows:

The review will:

- *Be focused on the commercial towers C3 and C5 and their relationship to C4 at Barangaroo South, as proposed by the proponent;*
- *Include review of the podia and integration with the towers;*
- *Assess public domain impacts associated with the towers and podia such as bulk and microclimate, public/private domain, relationship to street pattern, relationship to public transport, etc;*
- *Be limited to consideration of the proponent's design propositions within the existing Concept Plan and Project Approvals;*
- *Identify areas (if any) where the Design Review Panel believes there is scope for improvement in the design;*
- *Report directly to the Premier as Minister for Barangaroo;*
- *Be completed over two consecutive days, with the report to the Premier to be finalised within a week of the meeting;*
- *Be informed by presentations and reports from the proponent, the Barangaroo Delivery Authority (BDA) and their designers, and may consider recent reports on relevant design matters that have been prepared by the DERP and by the BDA's Design Advisors.*

Consideration of the findings of the Snapshot Design Review consistent with the Government's response is included in Section 5.4.1.

Peer Review Into Barangaroo Remediation

In relation to the issue of remediation, the Report recommended that the Barangaroo Delivery Authority be required to fund a peer review of the site remediation plans by another independent accredited Contaminated Site Auditor selected by and reporting to a Panel made up of various nominated groups.

It is understood that the appointed peer reviewer has met with key stakeholders and is currently reviewing the relevant documentation. It is anticipated the preliminary findings will be presented towards the end of October 2011 with a final report due by the end of November 2011.

1.2 Summary of Approval Sought

The Project Application seeks approval for the construction of a 49-storey (plus plant) commercial building and associated services and infrastructure.

In summary, this Project Application seeks approval for:

- piling and associated earthworks and remediation;
- construction and use of a new Commercial Building C3 with a maximum 115,291m^2 GFA accommodating:
  - 7,164m^2 retail floor space;
  - 105,573m^2 commercial floor space;
  - 995m^2 office lobby;
  - 1,559m^2 of community uses for the purposes of a child care centre;
- operation and use of the basement car park to accommodate 196 spaces allocated specifically to the proposed uses within Commercial Building C3;
- 448 bicycle spaces including:
  - 112 spaces to be temporarily located within the landscaped forecourt along the site's Hickson Road frontage; and
  - 336 spaces within the basement car park that is the subject of the Bulk Excavation and Basement Car Park Project Application;
- pedestrian and cycle access and circulation arrangements;
- signage zones on the building's facade that will accommodate building and business identification signage;
- temporary works and uses, including:
  - creation of a temporary forecourt and landscaping along Hickson Road frontage which is proposed to accommodate bicycle parking and planter boxes;
  - surfacing of surrounding streets and laneways including part of Globe Street and part of the future City Walk;
  - hoardings that are generally consistent with the City of Sydney's design requirements; 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 Block 3;
- 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 within Block 3;
- on-site treatment and remediation of contaminated soils;
- 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 Urban Planning Consultants
Design	Rogers Stirk Harbour +Partners PTW Tony Caro Architects
Landscape	Aspect / Oculus
Traffic and Transport	ARUP
Contamination and Remediation	AECOM
Geotechnical	ARUP
Stormwater and Drainage	Cardno
Soil and Water	Cardno
Waste Management	ARUP
Air Quality & Odour	AECOM
Noise & Vibration	Wilkinson Murray
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	ARUP
Shadow impacts	Virtual Ideas
Wind	ARUP (CPP)
Reflectivity	ARUP
Building Services	ARUP
Structural Engineering	ARUP
Green Travel	ARUP
Access	Morris Goding Accessibility Consulting
BCA	McKenzie Group Consulting
Fire Engineering	ARUP
Site Auditor	Graeme Nyland (Environ)
Quantity Surveyor	RLB

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 1**.

Figure 1 – 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 3 (see the area coloured in red in **Figure 2**). In addition there will be works within the basement area including car parking spaces and provision of infrastructure and services.

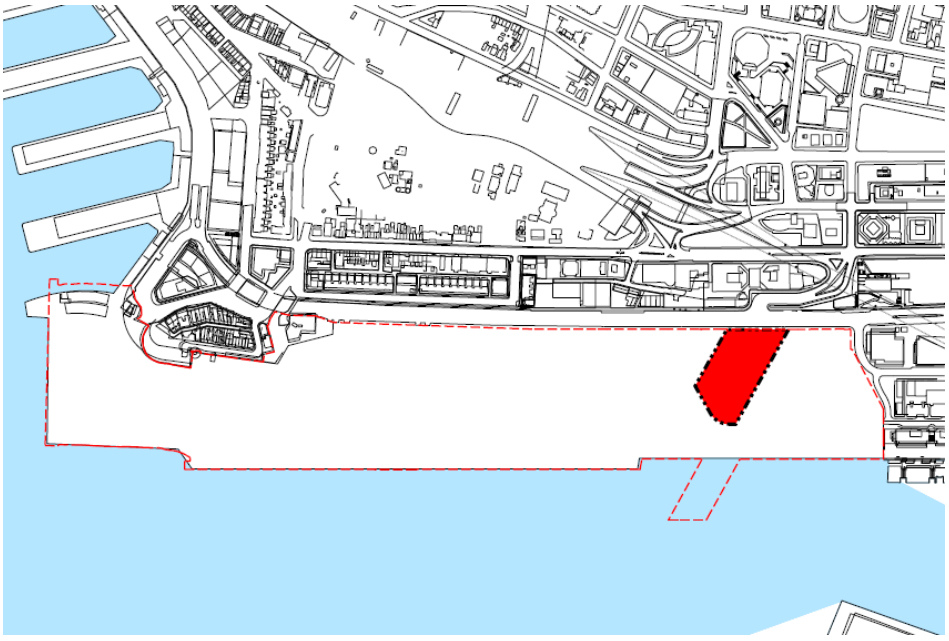

Figure 2 – Barangaroo site showing the Project Application site

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 of Lot 3 and 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 currently comprises an open concrete / bitumen apron which is largely reclaimed over water.

There are a number of existing structures on or immediately surrounding the Barangaroo site including:

- a temporary passenger terminal to the north of Block 5; and
- the existing caisson walls that form the edge of the existing wharf area.

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.

Accordingly, all existing structures within the Project Application site are proposed to be (or have already been) removed under separate project approvals.

2.4.2 Infrastructure and Services

Stormwater

The existing stormwater network within Barangaroo South is characterised by a series of transverse piped stormwater systems (typically between 450mm to 600mm in diameter) draining the Barangaroo South pavements, Hickson Road and other external catchments through the Barangaroo site directly to the Harbour. Existing pits and lines within Hickson Road generally feed into the Barangaroo stormwater network.

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 Commercial Building C3 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 network traversing the Project Application site which drains to an existing Sydney Water sewage pumping station SP1129 outside the site.

Electricity

There are a number of existing 5kV HV Energy Australia (EA) supplies to the Barangaroo site. There is an existing substation (DH No.7) currently within the Project Application site that serves the temporary Cruise Passenger Terminal and other existing buildings on site.

Telecommunications

A telephone exchange is located in Kent Street, and existing Telstra copper lines feed into the site at various locations along Hickson Road and Dalgety Road. There are mobile phone equipment shelters located near Hickson Road.

Natural Gas

There is an existing 110mm low pressure (7kPa) nylon gas main along Hickson Road and a high pressure gas main located at the corner of Sussex and Napoleon Streets. There is no existing high pressure main connection serving the Barangaroo site, however, there are small low pressure connections.

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.

Over 1,500 vehicles pass through the intersection of Hickson Road, Napoleon Street and Sussex Street in both the AM and PM peak periods (refer to ARUP TMAP (Supplementary) at **Appendix D**). Key local intersections surrounding the site have been modelled as a component of previous studies, and were found as having existing reasonable levels of operation.

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 Commercial Building C3 building will be the second building within the development at Barangaroo South. It will provide pedestrian friendly access with wide footpaths along Globe Street and City Walk.

It is estimated that out of the 91% of people accessing the Commercial Building C3 on foot, some 70% will be rail commuters and around 22% bus commuters. The majority of the bus and rail commuters are expected to utilise the Sussex Street and Margaret Street West intersection to access the site.

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 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. The Commercial Building C3 building will have bicycle access and onsite facilities for commuter cyclists. A baseline target of 5% of building occupants being provided with a bicycle space has been adopted which aligns with the mode share target of 4% of journey to work by bicycle.

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 which 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 2 and 3 (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 1.1.4, under the Basement Car Park Approval, approval was granted for bulk excavation works within the entirety of the Project Application site.

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 immediately north 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 3**). No part of the Commercial Building C3 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).

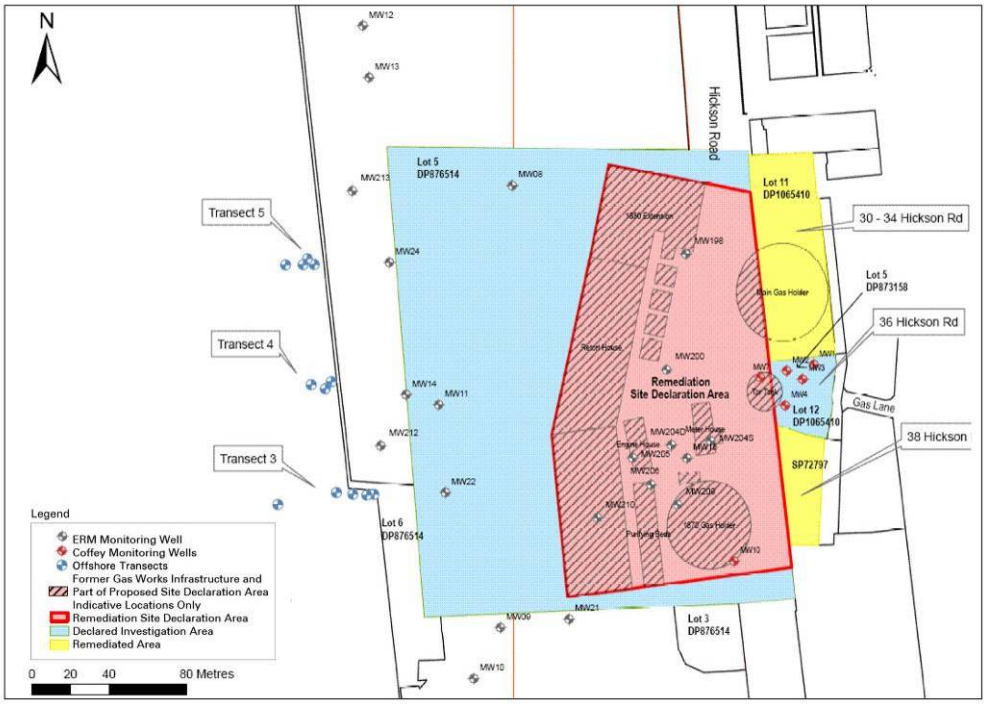

Figure 3 - DECCW Declared Area

ERM has prepared an Overarching Remedial Action Plan (RAP) for the Barangaroo site on behalf of the Barangaroo Delivery Authority (see **Appendix II**). 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 II**). 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 II**). The OWRS RAP includes the entire Project Application site. 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 (see **Appendix II**).

The extent of contamination within the Commercial Building C3 Project Application site can be summarised as:

- **Block 3**: potentially contaminated material is present in the north-eastern and north western portions of Block 3 and is attributed to the former gasworks and filling activities undertaken in the past. Remediation of Block 3 will be undertaken in conformance with the Overarching RAP and site specific RAP.

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 by 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 II**). 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 (see attached letters from OEH dated 11 July 2011 and 15 July 2011 at **Appendix II**).

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 (see **Appendix II**).

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.

The interface of the Project Application site with Hickson Road is characterised by mature Fig trees. Dominant species include *Melaleuca quinquenervia*, *Ficus micocarpa*, *Platanus x hybrida*, *Ficus benjamina*, and *Cupaniopsis anarcardioides*.

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 subsequent 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).

All existing structures on the site are proposed to be demolished under either the Demolition Project Approval, or the Basement Car Park Approval.

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 indicates that there is a moderate to high level of non-indigenous archaeological potential across most of the 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.

Approval was granted 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 Project Application site) to accommodate the basement car park, plant areas and ancillary areas under the Basement Car Park Approval. A total of approximately 410,000 m^3 of material will be excavated. Excavation of bedrock will be required.

Any indigenous or non-indigenous archaeological remains will be impacted by the bulk excavation approved under the Basement Car Park Approval. That project application was accompanied by a detailed assessment of potential impacts on archaeology, and Statements of Commitments to manage archaeological impacts.

A copy of the Non-Indigenous Archaeological Assessment is included at **Appendix F** of this EAR for reference purposes only.

A copy of the Aboriginal Archaeological and Cultural Heritage Assessment is included at **Appendix G** of this EAR for reference purposes only.

It is also noted that, as required by the Barangaroo Concept Plan Statement of Commitments, an Archaeological Management Plan and Research Design has been prepared by Comber and Stening, and was submitted to the Department of Planning and Infrastructure with the Basement Car Park Project Application. The Management Plan is intended to provide guidance and methodologies for undertaking the archaeological program within the approved development. A copy of the Management Plan is included at **Appendix H**.

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

Immediately to the north of the site is the remainder of Block 3. Further to the north of the Project Application site is the DECCW Declaration Area, which will be the subject of a future project application. Barangaroo Central and the site of the new Headland Park are further beyond to the north.

To the south of the Project Application site is the approved Commercial Building C4 within Block 2. Further to the south is Shelley Street and beyond Shelley Street lies the KPMG, Macquarie Bank and Amex buildings and the King Street Wharf precinct.

To the immediate east of the Project Application site is the remainder of Block 3, fronting Hickson Road. 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 Barangaroo site including the foreshore promenade/public recreation zone and beyond this, Sydney Harbour and the waters of Darling Harbour. Further west is Darling Island.

2.7.2 Future Proposed Development

The location of Block 3, in which Commercial Building C3 is proposed to be constructed, within the are the subject of approved Concept Plan (Mod 4) is illustrated at **Figure 4**.

Immediately to the north of the Project Application site will be will be Napoleon Street and the east / west pedestrian link. Also to the north will be the entrance to the loading dock and commercial car park which will be constructed as part of the Basement Car Park Approval. Further to the north will be other commercial and residential development, a plaza and the future Globe Harbour.

Immediately to the south of the Project Application site will be the new City Walk and the approved Commercial Building C4.

Future development to the west of the Project Application site will include residential and retail uses on the western side of Globe Street as well as the Foreshore Promenade. A foreshore link is proposed along 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 east of the Project Application site will be lower scale commercial buildings which address Hickson Road.

Figure 4 - Location of Building C3 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 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 Commercial Building C3. 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 1**.

Table 1 – 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 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

Implementation Plan/Strategy Required by Concept Plan	Technical Working Group Name	Membership
		▪ NSW Maritime ▪ 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.

In addition to participating in the Technical Working Group consultation meetings, the Barangaroo Delivery Authority has conducted six Planning Reference Group meetings since March 2010. These include representatives of the Department of Planning and Infrastructure, City of Sydney Council, Sydney Water, Road & Traffic Authority, Office of Environment and Heritage, Sydney Harbour Foreshore Authority, Barangaroo Delivery Authority, Department of Premier and Cabinet, Sydney Ports Corporation, Sydney Ferries, NSW Department of Transport, Housing NSW, NSW Maritime Authority and the NSW Department of Trade and Investment.

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:

- there has been more than 20 months of consultation on the evolution of the proposed design for Barangaroo South, as well as presentations regarding the Headland Park and consultation on the central precinct that were additional to any statutory planning requirements;
- more than 20,000 people have viewed the plans for Barangaroo in person, at public displays or online, or attended community consultation events and presentations (with many recording comments and providing feedback);
- the Authority has hosted eleven community presentations and workshops outlining the plans for Barangaroo and seeking feedback including:
  - a presentation for 1,200 stakeholders at the City Recital Hall in Angel Place on 23 February 2010, where both the plans were outlined and questions from the public were answered;

  - a series of four information sessions and community workshops held during May 2010 and attended by 400 people. The first was at the Lower Town Hall on 3 May, the second at Parramatta on May 17, the third at Caringbah on May 19 and the fourth at Customs House on 24 May;
  - Headland Park Design Open Day on 10 July 2010 attracted over 250 people. Follow up report published in August 2010;
  - Cultural forum held at the Sydney Opera House on 1 September 2010 attended by more than 200 people;
  - four community information sessions at the Authority's offices in November and December 2010 and two in June 2011 attracting several hundred attendees. These meetings covered a range of subjects including the overall plans for Barangaroo, construction information, SISCO remediation trials, Headland Park design and plans, Public Domain plans and the designs for the first commercial tower.
  - the Barangaroo Delivery Authority has held or attended more than 100 meetings, briefings and discussions with a broad cross section of the community representing groups as diverse as the arts, education, housing, tourism, business and sustainability interests;
- since March 2010, Lend Lease has undertaken more than 45 stakeholder and community information sessions, involving more than 1,500 members of the community;
- on 16 June 2010 Lend Lease launched the Barangaroo South website, which included online feedback pages, as well as a 1300 community information telephone line and a dedicated Barangaroo South email address. To date 16,890 people have visited the Barangaroo South website and more than 770 have contacted the project team directly via one of these three communication channels;
- Since August 2010, Lend Lease has distributed five editions of the Barangaroo South newsletter to over 3,000 residents and stakeholders;
- Since June 2010, 10 construction information update notifications, in the form of letters, have been distributed by Lend Lease to over 2,000 local residents and two monthly construction updates have been issued jointly with the Authority; and
- Since June 2010, the Lend Lease Community Relations Team has been involved in over 60 meetings and presentations to local authorities and neighbouring commercial buildings.

Ongoing Community Consultation and Notification

Following lodgement 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 2 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 2 - 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 Building C3 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 Building C3. ▪ 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 building C3. ▪ 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 Building C3. ▪ 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.

Barangaroo Review

As detailed in Section 1.8, in May 2011, the Hon Brad Hazzard, Minister for Planning and Infrastructure announced the General Review.

Consultation was a key part of the General Review methodology and a public submission process was announced and advertised by the Minister. The submission period ran from 31 May 2011 until 20 June 2011, although late submissions continued to be received and considered by the reviewers after this deadline. A total of 230 submissions were received. At the same time, the reviewers arranged meetings with organisations and individuals who were involved with Barangaroo, or who had made formal public statements about it. A total of 51 meetings were held with more than 100 individuals, including representatives from the NSW Department of Planning, the Barangaroo Delivery Authority, Lend Lease, the City of Sydney and Australians for Sustainable Development Inc.

The following actions have been undertaken by Lend Lease in response to the recommendations made by the General Review:

- Participation in the Barangaroo Independent Remediation Review Panel, which also includes a representative of the Barangaroo Delivery Authority, the City of Sydney and Australians for Sustainable Development and is chaired by the Office of Environment and Heritage. This involvement included an individual briefing with the Independent Peer Reviewer. In due course, the Remediation Panel will receive and consider the findings in the Independent Peer Reviewer's report and will make recommendations (if any) to the NSW Premier.
- Participated in a two day design review to an independent design panel consisting of Shelley Penn (chair), a Melbourne based architect and one of the co-authors of the Barangaroo Review; Peter Mould, the NSW Government Architect; and Ray Brown, an independent Sydney based architect. The panel's report was presented to the NSW Premier on 22 September 2011 and the NSW Government announced on 1 October that it would accept most of the report's recommendations relating to the need for better connections to the city and the podia design of the towers, but that construction of the towers within the current overall design (as proposed in this project application) must go ahead without delay.
- Issued a press release in response to the General Review. This was also posted on the Lend Lease and the Barangaroo South websites.
- Produced and distributed a new edition of the Barangaroo South News newsletter, which is distributed locally to approximately 3,000 residential and commercial neighbours. This newsletter edition included a specific article on the outcome of the General Review and its recommendations. This newsletter is also posted on the Barangaroo South website
- Participated in two community update briefings, arranged by the Barangaroo Delivery Authority. These meetings were attended by around 90 people and included an update on the General Review and the actions being undertaken in response to its recommendations

- Arranged and attended further stakeholder and community meetings with a number of groups including City of Sydney, NSW Transport, Millers Point Residents Action Group, neighbouring commercial tenants and landlords from the King Street Wharf precinct, Millers Point Public Housing tenants (hosted by Lord Mayor Clover Moore). Each of these meetings included discussion of the General Review and its recommendations.

Ongoing Agency Consultation

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 Commercial Building C3 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 (eg. Sydney Water) to consider issues and provide notification in a timely manner.

Ongoing Adjoining Landowners and General Public Consultation

As outlined previously in this report, Lend Lease has established a detailed Community and Stakeholder Engagement Strategy outlining the approach and commitment to consulting with the local community and stakeholders regarding the project.

In relation to the Commercial Building C3 specifically, following lodgement of this Project Application, Lend Lease will:

- issue a further Edition of the Barangaroo South Newsletter to over 3,000 local community members (both residential and business). This will include information on Commercial Building C3, details of the project application and the Department of Planning and Infrastructure's public exhibition process;
- notify over 100 private individuals, who are part of the Barangaroo South electronic mailing list, and approximately 50 individuals from government departments and surrounding commercial properties and businesses, advising that the Project Application has been submitted to the Department of Planning and Infrastructure and is available for viewing;
- undertake, jointly with the Authority or individually, an appropriate number of information sessions to provide local residents, community groups and stakeholders with a direct briefing on the Project Application, to answer questions and encourage feedback; and
- continue its regular programme of consultation with the building managers and tenant representatives of neighbouring commercial buildings to ensure they are kept up to date with all aspects of development , including the Project Application.

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:

- piling and associated earthworks and remediation;
- construction and use of a new Commercial Building C3 with a maximum 115,291m^2 GFA accommodating:
  - 7,164m^2 retail floor space;
  - 105,573m^2 commercial floor space;
  - 995m^2 office lobby;
  - 1,559m^2 of community uses for the purposes of a child care centre;
- operation and use of part of the basement car park to accommodate 196 car spaces allocated specifically to the proposed uses within Commercial Building C3;
- 326 bicycle spaces including:
  - 65 spaces to be temporary located within the landscaped forecourt along the site's Hickson Road frontage; and
  - the use of 261 spaces within the basement car park (the construction of which is the subject of the Basement Car Park Approval);
- pedestrian and cycle access and circulation arrangements;
- signage zones on the building's facade that will accommodate building and business identification signage;
- temporary works and uses, including:
  - creation of a temporary forecourt and landscaping along Hickson Road frontage which is proposed to accommodate bicycle parking and planter boxes;
  - surfacing of surrounding streets and laneways including part of Globe Street and part of the future City Walk;
  - hoardings that are generally consistent with the City of Sydney's design requirements; and
- services and utilities provision required to service the building.

An artist's impression of the proposed development is provided at **Figure 5** below with further photomontages located **Appendix GG**. The development proposal is illustrated in detail by Architectural Drawings prepared by RHS+P included at **Appendix A**. The following description is based on the Architectural Drawings and on information provided in the accompanying Architectural Design Statement at **Appendix I**.

Where required, future applications will be lodged for the fit out of the commercial office space, retail tenancies and the child care centre.

Figure 5 – Artists impression of Commercial Building C3

4.2 Design Objectives

The design objectives adopted for the proposed development are as follows:

- create a landmark commercial building which incorporates retail and community uses in the lower levels;
- deliver flexible floor plates of approximately 2,500m^2 each comprising communal break out spaces and "vertical villages" to encourage communication and social interaction and provide tenant amenity; inter-floor circulation and meeting spaces;
- maximise orientation to optimise views throughout the entire building;
- integrate materials from the surrounding neighbourhood into the new development;
- achieve a minimum six star Green Star v3 office building; and
- promote innovative and integrated sustainable design strategies such as high performance facades, good access to daylight, photovoltaic panels and solar tubes.

4.3 Numerical Overview

Table 3 outlines the key numeric information of the proposed development.

Table 3 – Key development information

Component	Proposal
Project site area	4,733m^2
GFA	115,291m^2
GFA by Use	▪ 105,573^2 – commercial ▪ 995m^2 – office lobby ▪ 7,164m^2 – retail ▪ 1,559m^2 – community uses (childcare centre)
Height ▪ RL ▪ metres ▪ storeys	 ▪ RL 209 ▪ 205.5 m ▪ 49 storeys (plus plant)
Total proposed car parking spaces	Maximum of 196, comprising: ▪ 178 commercial ▪ 18 retail / child care

4.4 Gross Floor Area and Use

The proposed development comprises a total GFA 115,291m^2. **Table 4** provides a detailed breakdown of the proposed gross floor area and use on a floor by floor basis. In summary, the key uses within Commercial Building C3 are:

- 7,164m^2 retail floor space;
- 105,573m^2 commercial floor space;
- 995m^2 office lobby; and
- 1,559m^2 of community uses for the purposes of a child care centre.

Table 4 – Land use and GFA by level

Level	Total GFA (m^2)	Dominant use
Ground	2,483	Retail and office lobby
Podium 1	2,394	Retail
Podium 2	2,287	Retail
3	1,559	Child care
4	1,909	Office
5	2,110	Office
6	2,372	Office
7	2,372	Office
8	2,372	Office
9	2,372	Office
10	2,372	Office
11	2,372	Office
12	2,372	Office
13	2,372	Office
14	2,372	Office
15	2,372	Office
16	2,372	Office
17	2,384	Office
18	0	Plant and Lift Interchange
19	2,478	Office
20	2,526	Office
21	2,474	Office
22	2,526	Office
23	2,474	Office
24	2,526	Office
25	2,474	Office
26	2,526	Office
27	2,474	Office
28	2,526	Office
29	2,474	Office
30	2,526	Office
31	2,474	Office
32	2,474	Office
33	2,538	Office
34	0	Plant & Lift Interchange
35	2,473	Office
36	2,580	Office
37	2,679	Office
38	2,576	Office
39	2,679	Office
40	2,576	Office

Level	Total GFA (m^2)	Dominant use
41	2,679	Office
42	2,576	Office
43	2,679	Office
44	2,576	Office
45	2,679	Office
46	2,576	Office
47	2,576	Office
48	2,679	Office
Plant	0	Plant
Roof	0	-
Total	**115,291m^2**	

When combined with the approved GFA on the site, Commercial Building C3 will result in a total GFA of 213,805m^2. It is also noted that if the Commercial Building C4 Modification Application is approved the total GFA will be 214,723m^2.

4.4.1 Commercial Uses

The primary use of the building is for commercial offices. The building has been designed so as to provide A-grade commercial floor plates which can be configured into a range of tenancy sizes. The fit out of these spaces will be the subject of future applications, where required.

4.4.2 Retail Uses

The ground and podium levels 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.

4.4.3 Childcare Centre

A childcare centre of 1,559m^2 is proposed on Podium Level 3. Under the approved Concept Plan (Mod 4), child care centres are categorised as community purposes.

A proportion of the 19 designated retail/child care parking spaces provided within the basement of the building will be available to the childcare centre.

The detailed design and fit out of the childcare centre, including landscape treatment of the outdoor play spaces on the podium roof will be the subject of a separate project application.

4.5 Building Height and Massing

Commercial Building C3's design is underpinned by an articulation of the main tower form into three vertical elements whilst also providing a strong design at the lower levels. The proposed building has been designed as one of a series of commercial towers that will form the commercial core of Barangaroo South.

The Commercial Building C3 form comprises an east-west oriented tower element, and aligns with the City Walk. An external service core is proposed to be positioned on the northern boundary. Articulated features include the lift cores, the podium, a structural bracing, recessed facade treatments and landscaping (refer to **Figures 6 – 10**). This approach offers the following benefits:

- the opportunity to anchor the tower form to the ground plane;
- location of the building lobby at the southern side of the building, thereby providing a street address to, and activating, the City Walk;
- linking the lobby to the tower above;
- it ensures the human scale and diversity of uses is located within the most publicly accessible levels of the buildings and draws the eye to the lower levels;
- it creates a variety of experiences, interest and activities at ground level;
- it ensures well defined streets and laneways are created; and
- it prioritises pedestrians rather than vehicles.

The proposed building has an overall maximum height of RL 209, or 49 storeys (plus plant). It has a flat roof form in accordance with the height controls and principles imposed by the approved Concept Plan (Mod 4).

Structural bracing masts which rise up to RL 220 will give presence to the building on the city skyline and create minimal overshadowing.

A three storey podium wraps around the building beyond the extent of the tower form. The podium reaches a height of RL 18, or approximately 14.5 metres above street level. The podium accommodates retail uses that will activate the building's street and land frontages and provide an appropriate human scale.

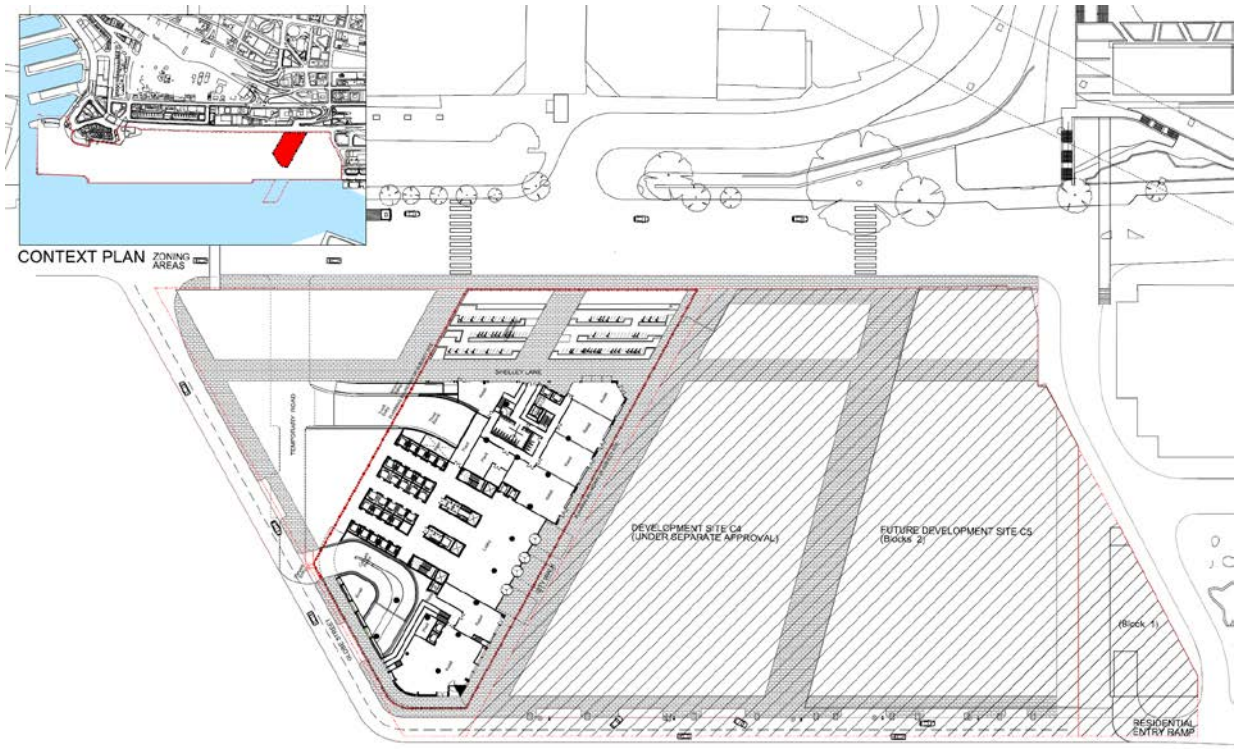

Figure 6 – Tower location (Context Plan)

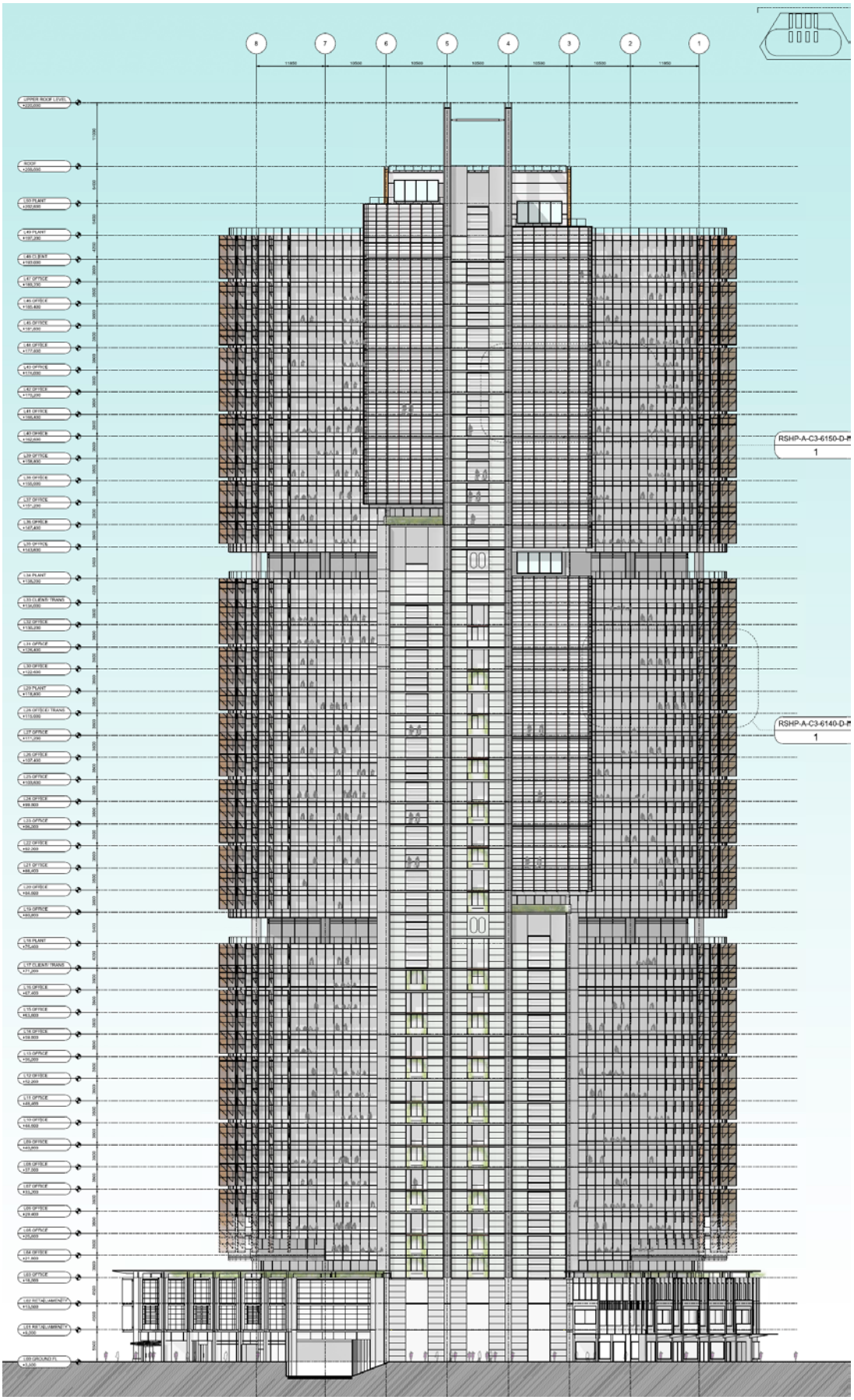

Figure 7 – Tower massing and articulation (northern elevation)

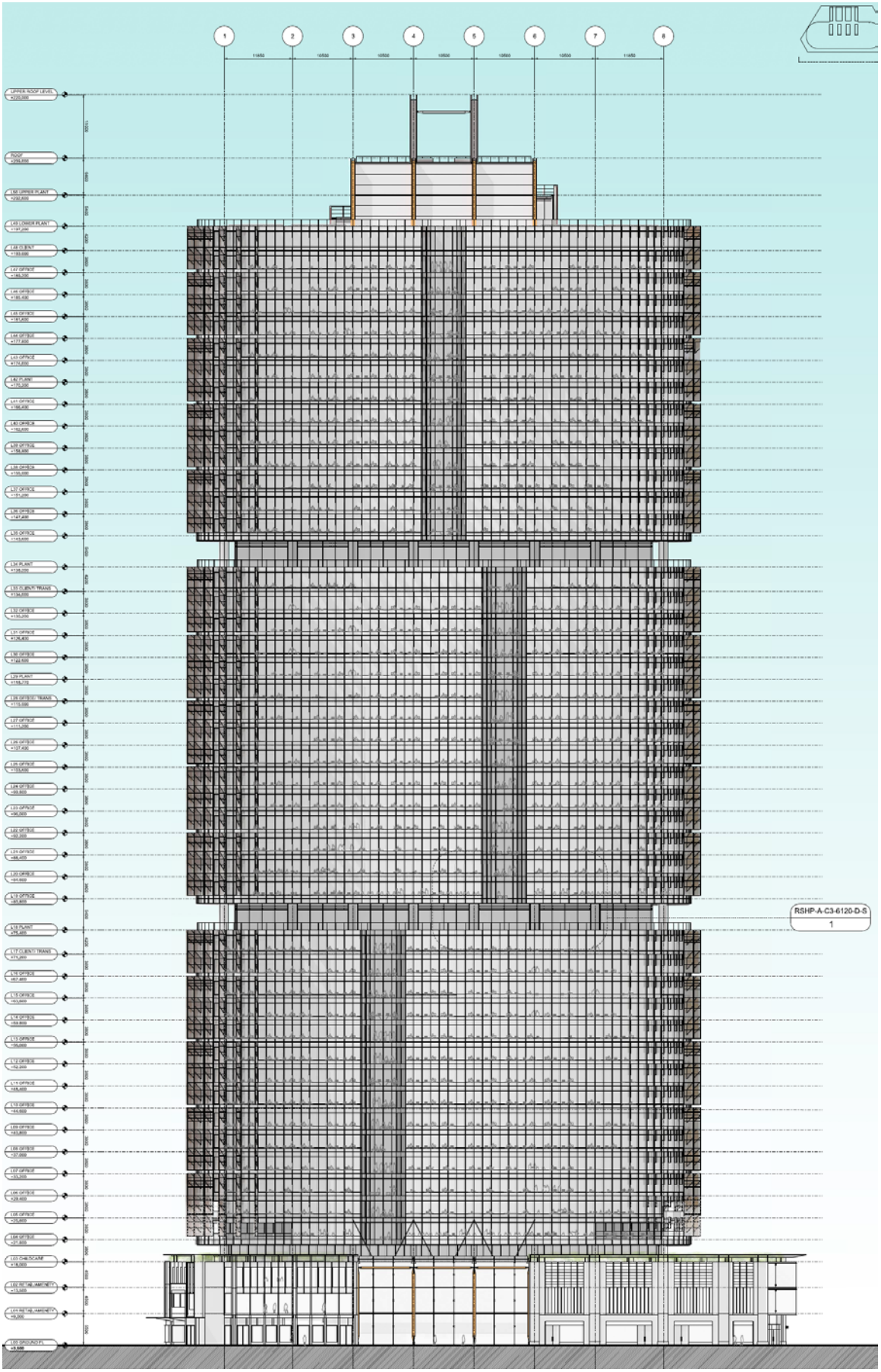

Figure 8 – Tower massing and articulation (southern elevation)

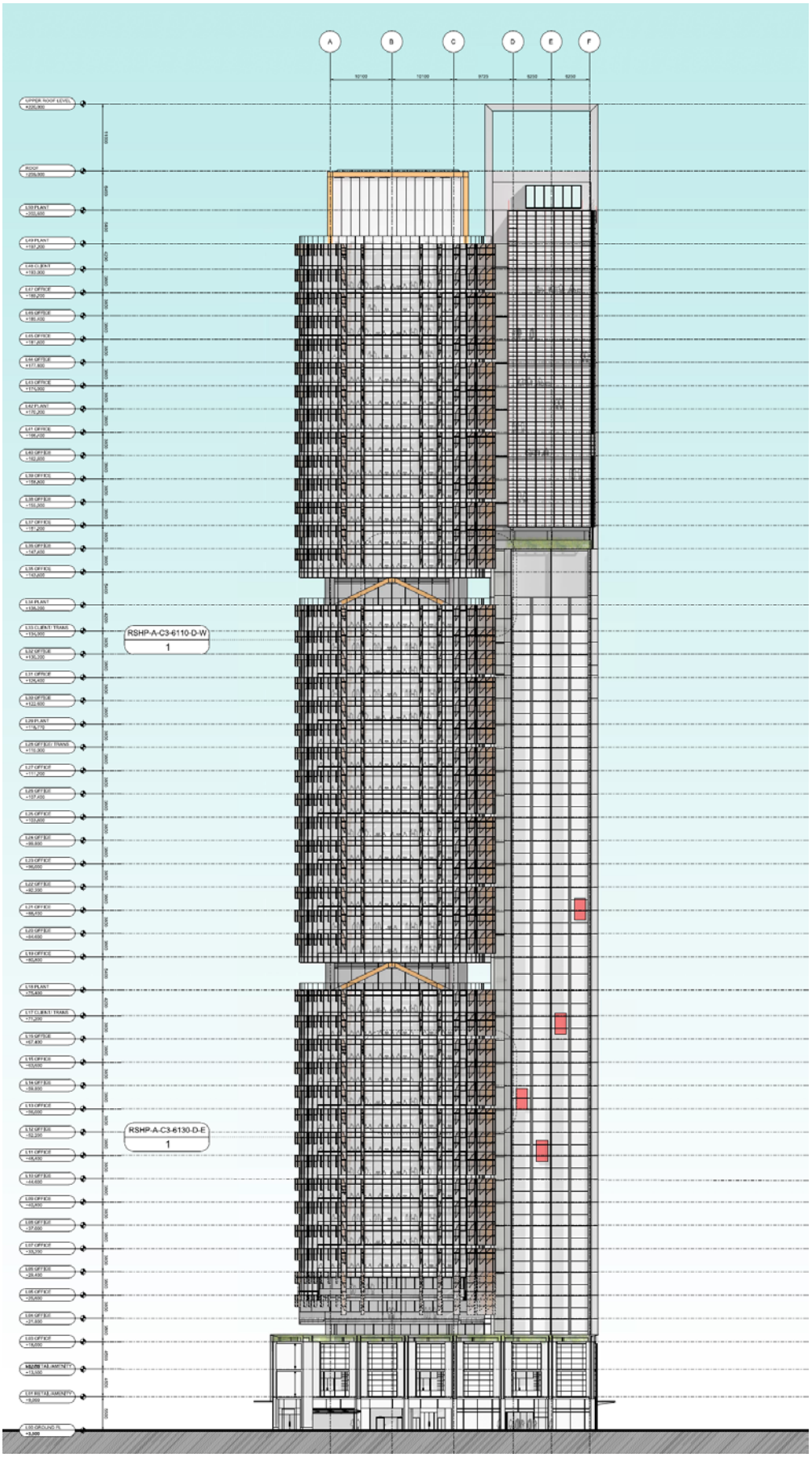

Figure 9 – Tower massing and articulation (eastern elevation)

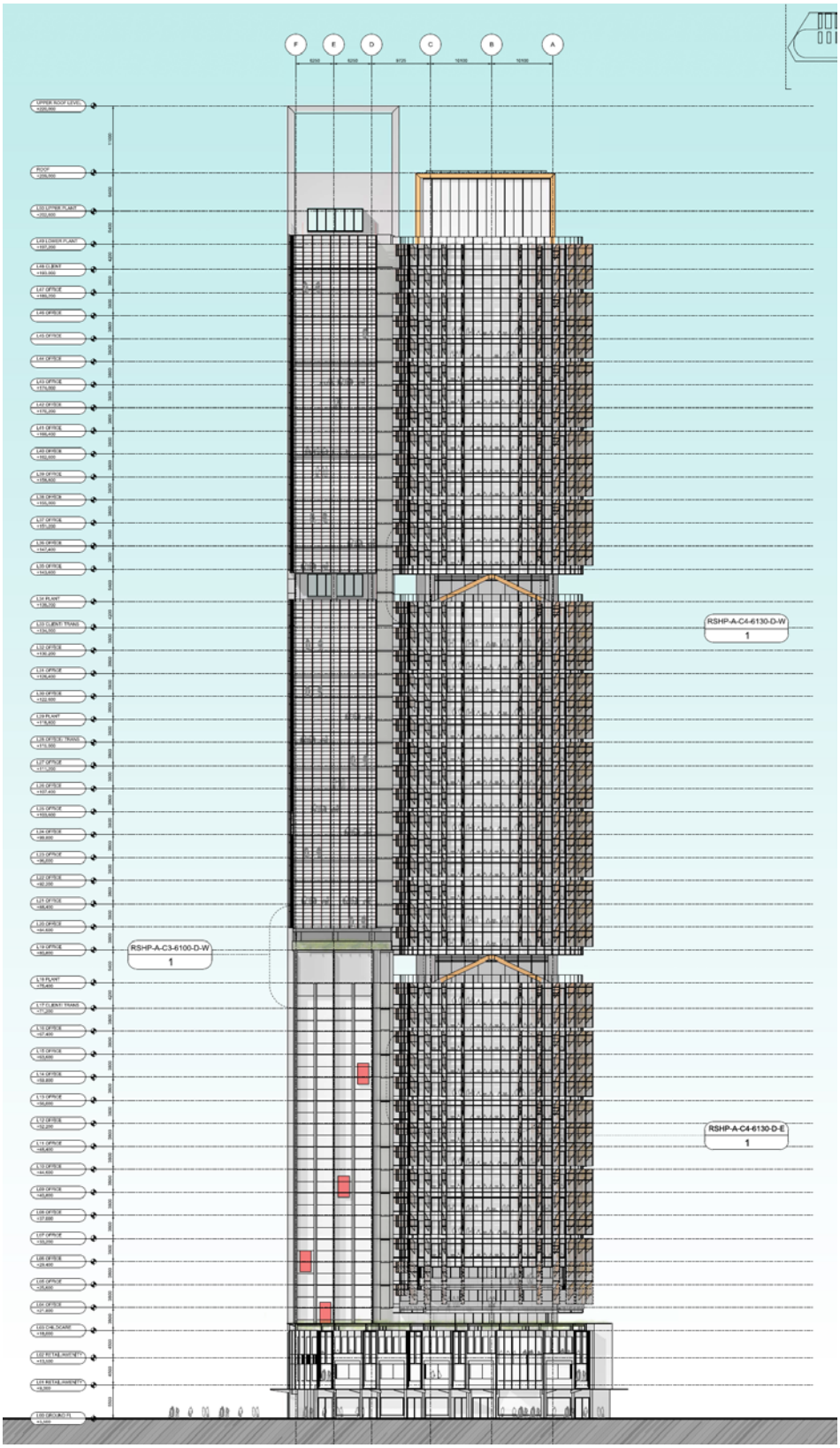

Figure 10 – Tower massing and articulation (western elevation)

4.6 Building Setbacks

The proposed setbacks of the Preferred Project are illustrated on the Architectural Drawings prepared by RSH +P included at **Appendix A**.

The tower above the podium is modulated with a series of setbacks which range in depth from the approved Block 3 boundaries on the Hickson Road and Globe Street frontages. A summary of the Commercial Building C3 setbacks are provided in **Table 5** and at **Figure 11**.

Table 5 - Building setbacks

Boundary	Podium Setback (m)	Tower Setback (m)
Northern Block 3 boundary	5	5
Southern Block 3 boundary	6	11
Western Block 3 boundary (Hickson Road)	26	5
Eastern Block 3 boundary	12	17

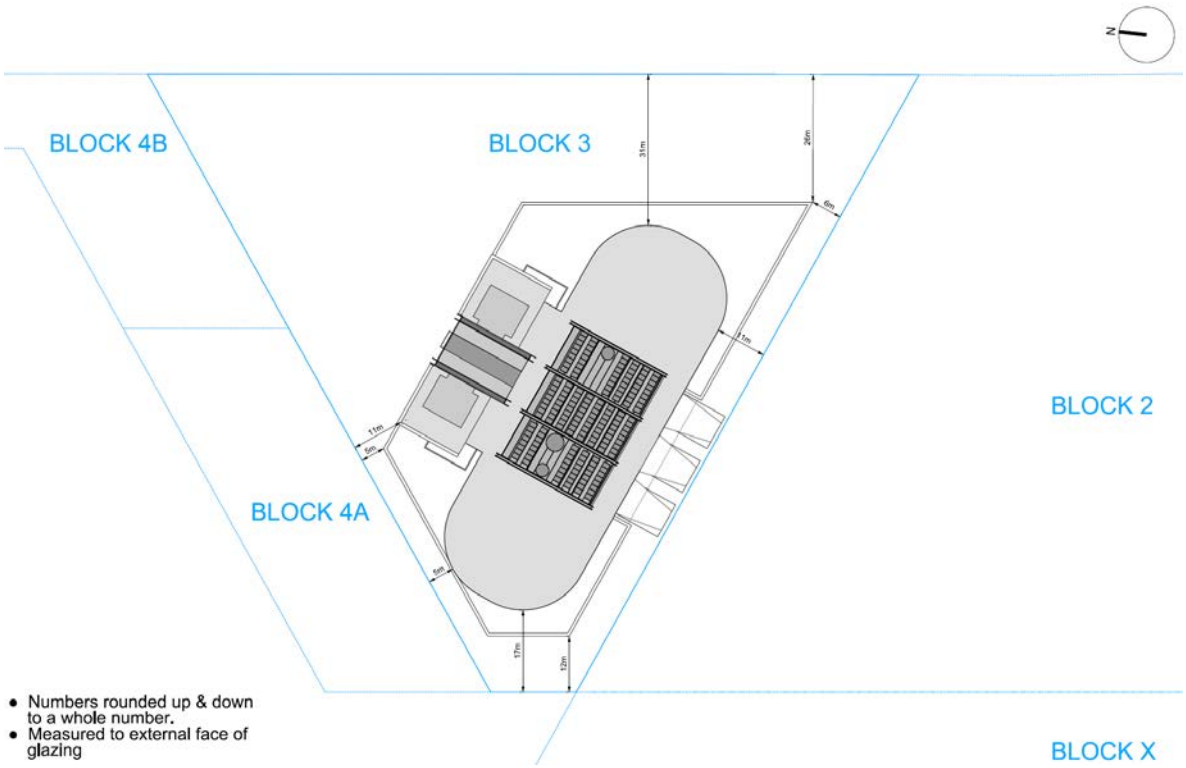

Figure 11 - Setbacks to the Block 3 boundaries

4.7 External Materials and Finishes

The tower will use a mixture of grey glass and metal finishes highlighted by brighter painted metal elements. The podium will use a combination of glazing and sandstone.

Key components of the external materials and finishes include:

- grey metal cladding on the concrete core and curtain wall mullions;
- red painted structural braces on the plant levels and entrance elements;
- orange painted metal elements on the core;

- a sandstone and glass podium;
- light grey glazed tower, lift cores and plant levels; and
- red metal external shadowing devices on the tower.

The façade of the building has been designed such that it is very transparent and allows deep daylight penetration into the office floors and retail spaces. The floor to ceiling height is 3.2m on the perimeter of the office floors, bringing more natural light to the floors and making the building appear less solid.

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

4.8 Public Domain, Landscaping and Public Art

Temporary Public Domain and Landscaping

As Commercial Building C3 is the second commercial building 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 tenants 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 K**.

Temporary pavements are proposed to all footpaths and pedestrian areas directly adjacent to Commercial Building C3. No road crossings are proposed as part of this Project Application.

The set out of the kerbs and gutters for Globe Street adjacent C3 Commercial Building will be provided as part of the C4 Project Approval. The footpaths adjacent to Commercial Building C3 are proposed as temporary pavements. 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.

Tree pits will be constructed on Globe Street with temporary planting to provide amenity for tenants and pedestrians. Temporary lighting and bench seating will be installed along Globe Street to provide public amenity, safety and comfort.

City Walk will also be treated with temporary paving as part of the works associated with the Commercial Building C4 Project Approval, which also includes temporary lighting and bench seating to provide public amenity, safety and comfort.

Landscaping

Aspect Oculus has prepared a Landscape and Temporary Public Domain Design Statement (**Appendix K**) which includes details of finishes and indicative planting of the landscaped areas.

The proposed ground plane public domain within the Project Application site has been designed to be generally consistent with the overall public domain vision established by the approved Concept Plan which envisages:

- an appropriately scaled, safer and more activated public domain;
- increased permeability;

- public domain which leads to an active waterfront destination; and
- improved relationship between the public realm and commercial buildings.

The key features of the Commercial Building C3 public domain and landscaping strategy are:

- highly activated retail frontages as well as streets and lanes which are conducive to high pedestrian traffic and connect to the building lobby;
- the use of a high quality material palette;
- part of the Level 3 podium roof top garden which provides a mix of hardscape areas surrounded by 'extensive' and 'intensive' planting areas;
- two terraces with raised planters and seating to provide communal break-out space for floor tenants; and
- external planting beds that support climbing plants on the building's northern facade to provide visual and architectural interest.

As detailed above, approval is sought for part of the Level 3 podium as a roof top garden. However, as the predominant use of that level will be a Child Care Centre, the remaining part of the podium roof top landscaping will be provided to meet that specified use as part of the future application for the fit out of the Child Care Centre.

Areas of landscaping within the building are shown on the Landscape Plans at **Appendix K**. The species chosen for the scheme are generally species which require low maintenance and have low water requirements. Plants will be grouped together according to the colour of their foliage and flowers. The planting layout has been arranged to ensure that colour is provided throughout the year.

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

Pedestrian access to, and within the site, is provided as shown in **Figure 12**. The principal street address to Commercial Building C3 is off Hickson Road, however the main pedestrian access is located off City Walk.

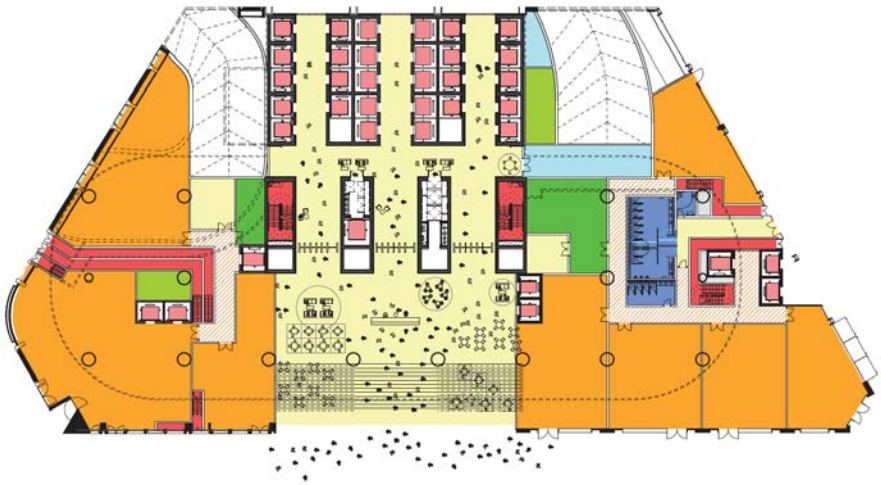

Figure 12 – Commercial Building C3 pedestrian circulation

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 Commercial Building C3 with a street address, and provide drop off and pick up areas for taxis and childcare users. It should be noted that Hickson Road also provides access to the building, and it is anticipated that taxis may use the Hickson Road frontage as an alternative drop off point.

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. Basement Car Park Mod 3 Application to amend the approved access to the basement car park is currently being assessed by the Department of Planning and Infrastructure. However, it should be noted that this Project Application does not rely on the proposed modifications under the Basement Car Park Mod 3 Application being approved in order to support the future use of Commercial Building C3.

Car Parking

The construction of the basement car park is the subject of the Basement Car Park Approval. The Basement Car Park Mod 3 Application, which seeks to amend the design of the basement car parking structure, is currently being assessed by the Department of Planning and Infrastructure. This Project Application seeks approval for the use and allocation of car parking within the revised basement car parking structure as relevant for Commercial Building C3.

It should be noted that the Project Application does not rely on the Basement Car Park Mod 3 Application being approved in order to support the future use of the development as the spaces could be accommodated within the basement car park of the approved Basement Car Park . The design of Commercial Building C3 would need to be modified if the Basement Car Park Mod 3 Application did not proceed.

The approved Concept Plan (Mod 4) promotes the use of public transport and non car borne travel (walk, cycle and ferry). Low car parking provision is considered important as it will also limit the potential traffic generation rates to and around the site.

A total of 196 tenant and visitor parking spaces will be provided within the basement, comprising:

- 178 commercial spaces; and
- 18 retail/child care spaces.

To facilitate pick up and drop off, the development will also utilise the 12 on-street parking spaces on Globe Street which will be provided as part of the Commercial Building C4 Project Approval.

The number of parking spaces has been determined having regard to the approved car parking rates, in particular:

- commercial car parking rate of 1/600m^2;
- retail car parking rate of as per the City of Sydney LEP 2005; and
- child care (community uses) rates as per the City of Sydney LEP 2005.

A range of shared loading facilities will be provided within the basement as set out in **Table 6** below.

Table 6 – 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 courier	2.5m	Office/Retail	5
Total			36

Public Car Parking

In the evenings and at weekends, it is proposed that the car park will operate as a public car park for a wider range of users visiting the retail, cultural centre, restaurants and bars. Public use of the car park will not coincide with peak commuter traffic and hence the surrounding road system will provide suitable capacity for this activity. Pricing strategies will be in place to provide suitable parking demand management at all times. The provision for differential parking charges for small, medium and large vehicle emission categories will also be explored.

Bicycle Parking

A total of 448 bicycle spaces are proposed to be provided as part of the Commercial Building C3 including:

- 112 spaces to be temporarily located within the landscaped temporary forecourt along the site's Hickson Road frontage; and
- 336 spaces within the basement car park that is the subject of the Basement Car Park Mod 3 Application;

Cyclist facilities (showers, lockers, toilets) will also be provided within the basement as shown on the plans at **Appendix A**. The temporary bicycle spaces

between Shelley Lane and Hickson Road will be relocated in accordance with the Barangaroo Public Domain Plan when future building works occur on that site.

4.11 Safety and Security

CCTV monitoring will be provided to foyers and entry lobbies, main public areas, retail common areas, car park and ground floor lift lobbies, goods lifts, loading docks, 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.

A central supervisory system, access control system, intruder alarms and intercommunication systems are also proposed.

In addition to the above, a concierge desk will be located in the ground level lobby of the building which will be manned by staff during business hours. Passive surveillance will also occur as a result of the operation of retail and child care uses.

4.12 Lighting

External and internal lighting will be provided around and throughout the building in accordance with AS 1680. Lighting is also proposed through-out the public domain for security and access requirements.

External luminaries will be installed to provide interest and highlight architectural features and will be selected to be in keeping with the general building design. Internal light fittings within the commercial and retail areas will be provided to comply with AS 1680 and Green Star targets. In addition, specialist lighting will be provided within the building's entrance lobby to enhance the visual environment at ground level. All lighting will be time clock and light level controlled.

4.13 Environmentally Sustainable Development

The design team has been set a brief of achieving a 6 star Green Star design and as built certification under version 3 of the Green Building Council's Office rating tools.

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

- Healthy Buildings:
  - World-leading 6-Star Green Star Office Design and Build 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
  - 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
  - Real-time commuter updates
  - 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 5.13.

4.14 Waste Management

A Waste Management Plan has been prepared by ARUP and is included at **Appendix L**. In summary, waste management will generally accord with the City of Sydney's Waste Storage Design requirements and will be managed in the following way:

- A dedicated central commercial garbage room will be located adjacent to the loading dock within the basement. The waste room will provide space for waste sorting and hold separate bins for glass, metal, plastic, electronic equipment and green waste. It will accommodate waste compactors for general waste and recyclable paper products to minimise the volume of waste.
- Intermediate collection points will be provided on the office and retail floors adjacent to the goods lift in these areas.
- Each commercial tenancy will be responsible for separating their waste and transferring the different types of waste and recycling to the central garbage rooms.
- Collection of waste will occur directly from the waste room, inside the basement. Service vehicles will park in the loading bay adjacent to the waste room.

- Separate waste storage areas will be provided for retail tenants. A separate room, adjacent to the main garbage room will be provided for refrigerated waste. Grease traps will be provided in retail areas linked to a grease arrestor storage tank in the basement level. The grease trap will be monitored by the building management.
- The building management will be responsible for the collection of waste from the public domain.

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

- commercial waste;
  - general waste – 2 x 3,000 litre bins;
  - recyclables – 9 x 660 litre bins;
  - approximately 30m^2 of floor area within the waste room;
- retail waste;
  - general waste – 2 x 3,000 litre bins;
  - recyclables – 9 x 660 litre bins; and
  - approximately 30m^2 of floor area within the waste room;
- childcare;
  - general waste – 1 x 240 litre bins;
  - recyclables – 2 x 240 litre bins; and
  - approximately 4m^2 of floor area within the waste room.

In addition, compactors will also be provided for general waste and cardboard/paper recycling within the basement.

4.15 Building Services

Building services are outlined in the Building Services Report prepared by ARUP and submitted at **Appendix M**.

Services in the proposed building have been designed consistent with Lend Lease's commitment to achieving a minimum 6 Star Green Star Office Design Rating under Version 3 of the Green Building Council of Australia's Office tools.

Mechanical Services

Mechanical services currently proposed by Lend Lease for the commercial and retail 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.

In order to reduce the load on the mechanical plant during non-peak periods, facilities will be provided to enable the economic running of central plant systems and associated air handling plant after hours.

Chilled water will be generated in the district cooling plant and reticulated to a central cooling room dedicated to Commercial Building C3 within the basement of the building. In addition, the individual retail uses will be serviced by metered cooling from the central basement cooling room. Heating will be provided via hot water units in dedicated plant allocated within the individual retail units.

Vertical Transportation (Elevators)

Commercial Building C3 is proposed to be provided with a high performance elevator system that will be designed and installed in accordance with AS 1735 and the relevant requirements of the BCA.

The lifts will be designed to minimise energy use where practicable. Lifts and escalators shall 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.

All elevators will incorporate facilities for persons with disabilities, fire brigade services and stretcher access requirements.

Electrical Services

Lend Lease proposes to extend the city grid into the site to service Commercial Building C3 via three onsite Energy Australia chamber substations, which are to be located within the basement and mid level plant rooms.

An onsite emergency standby generator is also proposed to be provided for back up electrical supply for emergency and safety services.

Power requirements for the individual retail units will be deferred to the individual tenants and subject to a separate consent for initial use and operation of the individual tenancies.

The main switchboards and tenant distribution boards will be provided with power recording meters to enable NABERS metering functionality, thus meeting the requirements of Green Star.

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 design criteria are summarised as:

- stormwater roof drainage shall be based on the 1:100 year rainfall intensity for 5 minute storm event durations;
- complete sanitary systems shall be provided to the commercial building areas, with future tenants of the individual retail units responsible for future fit out connections;
- water conservation measures will be installed to achieve the Green Star rating and 5 Star NABERS water rating;
- domestic hot and cold water systems will be provided to the commercial building areas only; and
- acoustic treatments will be undertaken to all pipe work services running within sound sensitive areas.

In addition, a central black water treatment plant will be provided in the common basement. This will treat waste water to Grade A standard where it will be distributed across the development including to Commercial Building C3. The plant will minimise potable water consumption and minimise sewer discharge.

Gas Services

A new metered natural gas service will be located within a gas meter room and will be installed to comply with AS 5601. The gas shall be supplied to serve the mechanical services heating plant requirements and the domestic water heating

requirements. Sufficient loads will be provided to also service the future retail outlets, including tenant kitchens.

Communications Services

The proposed building will include two dedicated distributor rooms for the accommodation of equipment from multiple telecommunications carriers.

Fire Services

Fire detection, emergency warning and fire protection systems are proposed to be installed to comply with BCA requirements and other relevant legislation, in accordance with the measures outlined in Section 6 of the Building Services Report (**Appendix M**) and the fire engineering solutions identified by ARUP as set out at **Appendix N** of the EAR.

Site Stormwater Infrastructure

Arup 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.

Rainwater harvesting within the development has been designed to maximise re-use opportunities in conjunction with the central blackwater treatment plant (the blackwater treatment will be subject to a separate application).

4.16 Hours of Operation

Construction Hours

In accordance with the Environmental, Construction and Site Management Plan prepared by 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.

Operational Hours

The tower building will be able to be accessed 24 hours a day/7 days a week, with services provision available on demand. Normal operating hours for the tower services will be 7am to 7pm.

Retail trading hours will generally be between 8.00am-7.00pm, subject to separate approval.

The Childcare Centre hours of operation will also be subject to separate approval.

4.17 Staging

Lend Lease proposes to undertake the construction of Barangaroo South in a staged manner, and Commercial Building C3 represents the third stage of that construction following on from the Basement and Bulk Excavation and Commercial Building C4.

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.

4.18 Signage Zones

Signage zones have been designated on the plans. Primary signage zones are located on the podium levels and on the upper level of the tower for building identification purposes.

The detailed design of the building identification signage and business identification signage will be submitted for the approval of the Director-General prior to the issue of the relevant Construction Certificate.

4.19 Construction Hoardings and Banners

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.

Approval is sought for banners to be located on the Commercial Building C3 tower during construction. The banners, which will partially screen the construction works, will be temporary and moved around the facades of the building as construction proceeds. The content of the banners is intended to predominantly display messages regarding sustainability initiatives being implemented in the building. There will be a maximum of 3 banners on any given facade at one time. The banners will be removed up to 3 months after practical completion. An indicative design of the banners is shown at **Appendix HH**.

4.20 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**. It is estimated that the quantity of excavated material from the core raft excavation and pile excavation will be approximately 2,200m^3 and 2,500m^3 respectively.

All of the necessary site preparation works required to be undertaken prior to the proposed Commercial Building C3 earthworks being undertaken will be carried out in accordance with the Basement Car Park Approval and do not form part of this Commercial Building C3 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 OWRS RAP.

5.0 Environmental Assessment

This section of the report assesses and responds to the environmental impacts of proposed Commercial Building C3. It addresses the matters for consideration set out in the Director-General's Environmental Assessment Requirements (DGRs).

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

As detailed at Section 1.0 of this EAR, the lodgement of the Commercial Building C3 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 901 car parking spaces and associated services and infrastructure to support the initial phases of the future development of Barangaroo South, including the development of Commercial Building C3.

The EAR and PPR accompanying the Basement Car Park Project Mod 3 Application provide detailed information and environmental assessment of a number of planning and environmental issues that are beyond the scope of works proposed in this Commercial Building C3 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.

Table 7 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.

Table 7 - Director-General's Environmental Assessment Requirements

Requirement	Location in Environmental Assessment	
Key Issues	**EA Report**	**Technical Study**
1. **Relevant EPI's, Policies and Guidelines**		
▪ Demonstrate that the project will comply with the requirements set out in the following provisions: - Clauses 8, 9, 17 and 18 of Part 12 (Barangaroo site) of Schedule 3 to State Environmental Planning Policy (Major Development) 2005.	Section 5.1	Not applicable
▪ Address the provisions of State environmental planning policies that would apply to the development on the Barangaroo site requiring development consent under Part 4 of the *Environmental Planning and Assessment Act 1979*, as if those provisions applied to the carrying out of the project, including the following: - State Environmental Planning Policy (Major Development) 2005; - State Environmental Planning Policy No 55 – Remediation of Land; - Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005; and	Section 5.1	Not Applicable
▪ Demonstrate that the project is consistent with the Metropolitan Plan for Sydney 2036 and the draft Sydney City Subregional Strategy.	Section 5.1	Not Applicable
2. **Concept Plan & Bulk Excavation and Basement Car Park Project Application**		
▪ The EA shall Demonstrate consistency with the terms of approval of Concept Plan MP06_0162 (as modified) and Bulk Excavation and Basement Car Park project approval MP10_0023 (as modified).	Section 5.2 Section 5.3	Not applicable
3. **Barangaroo Review**		
▪ As per the Barangaroo Review's recommendations, a 'Snapshot Design Review' of the proposed development must be undertaken and completed by a specially constituted Design Review Panel.	Section 5.4	Not applicable
▪ It is important that the results of the Review are considered during the preparation of the EA.	Section 1.1.8 Section 5.4	Not applicable
▪ In relation to the Barangaroo Review consider the following: - The findings of the Snapshot Design Review consistent with the	Section 5.4 Section 5.4.1	Not applicable

Requirement	Location in Environmental Assessment	
Government's response, Barangaroo Concept Plan (as modified), and relevant controls in State Environmental Planning Policy (Major Development) 2005. - The findings of the peer review into remediation of Barangaroo consistent with any Government response to the peer review if released prior to the lodgement of the EA.	Section 5.4.2	
4. Urban Design and Built Form		
Demonstrate how the proposed development will achieve design excellence including: ▪ The design process leading to the proposal;	Section 1.1 Section 5.5	Appendix I
▪ A high standard of architectural design, materials and detailing appropriate to each building and its location;	Section 4.2 & Section 4.7	Appendix A Appendix I Appendix J
▪ The form and external appearance of the proposed buildings and how it will improve the quality and amenity of the public domain;	Section 4.0 Section 5.6	Appendix A Appendix I Appendix J Appendix K
▪ The sustainable design principles incorporated into the development in terms of sunlight, natural ventilation, wind, reflectivity, visual and acoustic privacy, safety and security, resources, and water and energy efficiency;	Section 4.13 Section 5.13 Section 5.9 Section 5.10	Appendix I Appendix W
▪ Detailed plans, elevations and sections,	Section 4	Appendix A
▪ A view analysis is to be undertaken inclusive of photomontages and perspectives of key elements and views of the development from key locations (including, but not limited to, from Hickson Road, Kent Street, Shelley Street, Lime Street, Pyrmont and East Balmain, Darling Harbour, Blues Point and Millers Point);	Section 5.6.5	Appendix GG
▪ Impacts on key views from within the Barangaroo site;	Section 5.6.5	Appendix GG
▪ A materials/finishes sample board and detailed elevations confirming the application of materials and finishes for the development;	Section 4.7	Appendix J
▪ 3D modelling and a physical model of the proposed development in accordance with the City of Sydney requirements;	Under separate cover	
▪ Shadow Diagrams;	Section 5.8	Appendix Q

Requirement	Location in Environmental Assessment	
▪ Wind Effects report; and	Section 5.9	Appendix P
▪ Building signage details.	Section 4.18	Appendix A
5. Public Domain and Public Access		
▪ Design quality with specific consideration of the massing, waterfront interface, setbacks and visual impacts of any proposed structures, including views.	Section 4.1 Section 5.5 Section 5.6	Appendix A Appendix GG
▪ Provision of a Draft Public Domain Plan identifying all temporary and permanent works within the public domain.	Section 4.8	Appendix K
▪ Identify proposed open space, public domain and linkages with and between other public domain spaces, including the waterfront.	Section4.8 Section 5.6	Appendix K
▪ Details on the interface between the proposed uses, public domain, and the relationship to, and impact upon, the existing public domain, including demonstration of means of activating the public domain.	Section4.8 Section 5.6	Appendix K
▪ Address existing and future opportunities for public access to and along the foreshore.	Section 5.6.3	Not applicable
▪ Demonstrate how the entry and exit to basement car parking will not have a detrimental impact upon visual amenity and pedestrian safety.	Section 5.6.3	Not applicable
▪ Outline specific design features, including but not limited to: - Details of the road crossings on Hickson Road, Shelley Lane and Globe Street; - Footpaths and pavements, treatment to the right of carriageway (of applicable); - Materials and finishes; - Furniture and fixtures; - Street lighting, pedestrian lighting and feature lighting; - Edges, screens and fences; - Walls, embankments and mounds; - Steps, ramps, vehicle crossings, decks and pathways; - Services where affected, utility poles, and service pits; - Civil and stormwater infrastructure; - Tree planting; - Mass planting beds, planter boxes and individual plantings; and - Extent of temporary and permanent	Section 4.7 Section 4.8	Appendix K

Requirement	Location in Environmental Assessment	
features to be clearly shown, including bicycle parking, furnishing or footings, finished surfaces, service and planting.		
6. Land Use		
▪ Identify the proposed staging and timing for the delivery of the development and land uses and activities.	Section 4.17	N/A
▪ Provision of table listing different land uses, a floor by floor breakdown of GFA, total GFA, and site coverage as relevant to each stage and with reference to the overall Concept Plan.	Section 4.4	Appendix A
7. Transport and Accessibility Impacts		
▪ A Supplementary Transport Management and Accessibility Plan that updates the Barangaroo TMAP with particular regard to: - transport and traffic management within the overall Barangaroo precinct, including the demonstration of a minimalist approach to car parking provision; - pedestrian and cycle access/circulation to meet the likely future demand within the precinct and connections to the external networks; - measures to promote public transport usage and pedestrian and bicycle linkages; and - any changes to government commitments regarding public transport.	Section 5.11	Appendix D
▪ Justification of proposed quantum of on-site car parking for the proposal having regard to the Concept Plan approval (as amended), RTA guidelines and accessibility of the site to public transport, including the proposed light rail expansion.	Section 5.11	Appendix D
▪ Daily and peak traffic movements likely to be generated by the proposed development, including modelling and assessment of the performance of key intersections providing access to the site, and any upgrades (road/intersections) required as a consequence of the proposal. The modelling of peak traffic movements should be undertaken with the LINSIG modelling package in order to properly consider coordinated intersection operation.	Section 5.11 Section 5.20	Appendix D Appendix U

Requirement	Location in Environmental Assessment	
▪ Preparation of a Travel Demand Management Plan that provides an analysis of public transport provision, walking and cycling connections with the vicinity of the proposed site, and measures that will optimise the opportunity provided by the project site's proximity to public transport, including the preparation of a Work Place Travel Plan.	Section 5.11.2	Appendix U
▪ Preparation of a Construction Traffic Management Plan outlining: - Cumulative impacts associated with other construction activities on the Barangaroo site; - Details of anticipated truck movements to and from the site; - Details of access arrangements for workers to/from the site, emergency vehicles and service vehicle movements; - Impacts on the temporary cruise ship terminal; - Details of any proposed transportation of waste materials via the Harbour and proposed locations for handling materials; and - Mitigation measures to reduce impacts on accessibility and amenity.	Section 5.27	Appendix T
▪ Transport Management and Accessibility Plan with particular regard to: - Transport and traffic management within the overall Barangaroo precinct, including the demonstration of a minimalist approach to car parking provision; - Pedestrian and cycle access/circulation to meet the likely future demand within the precinct and connection to the external networks; and - Measures to promote public transport usage and pedestrian and bicycle linkages.	Section 4.10 Section 5.11	Appendix D
▪ Identification of Travel Demand management (TDM) measures that will optimise the opportunity provided by the project site's proximity to public transport, including the preparation of a Work Place travel Plan.	Section 5.11.2	Appendix U
▪ In relation to construction traffic: - Cumulative impacts associated with	Section 5.24 Section 5.27	Appendix T

Requirement	Location in Environmental Assessment	
other construction activities on the Barangaroo site: - Details of anticipated truck movements to and from the site; - Details of access arrangements for workers to/from the site, emergency vehicles and service vehicle movements; - Impacts on the temporary cruise ship terminal; and - Details of any proposed transportation of waste materials via the harbour and proposed locations for handling materials; and - Mitigation measures to reduce impacts on accessibility and amenity.		
8. Water, Drainage, stormwater and groundwater		
▪ Prepare a Stormwater and Drainage Assessment to assess the impacts of the proposal on surface and groundwater hydrology and quality.	Section 1.1.3 Section 5.24	Appendix O
▪ Water quality management focussing on potential impacts from the works on Sydney Harbour.	Section 1.1.3 Section 5.24	Appendix O Appendix CC
▪ Prepare a Water Management Plan. This should include stormwater and wastewater management, including any re-use and disposal requirements, demonstration of water sensitive urban design and any water conservation measures.	Section 5.13	Appendix O
▪ Prepare an Infrastructure Management Plan. The proponent shall provide information on the required water and wastewater services and any augmentation of Sydney Water infrastructure that may be required for the proposed development.	Section 5.19	Appendix DD
9. Air, Noise and Odour Quality		
▪ Address potential air quality, noise and odour impacts, in particular during the construction and operation of the development and appropriate mitigation measures. In particular the following must be addressed:	Section 5.24 Section 5.25 Section 5.26	Appendix EE Appendix FF
▪ The Environmental Assessment must include an Air Quality Impact Assessment that is prepared strictly in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales 2005*.	Section 5.26	Appendix FF
▪ The Air Quality Impact Assessment must also	Section 5.26	Appendix FF

Requirement	Location in Environmental Assessment	
make appropriate reference to the *Assessment and Management of Odour from Stationary Sources in NSW: Technical Framework 2006* and *Assessment and Management of Odour from Stationary Sources in NSW: Technical Notes 2006*.		
▪ The key air quality issues for the proposal will depend on the methods used to manage and remediate the contaminated material. Potential matters that must be covered in the Air Quality Impact Assessment include, where applicable: - the identification of the pollutants of concern, including individual toxic air pollutants, dust and odours; - the identification and assessment of all relevant fugitive and point source emissions; - appropriate coverage of all aspects of the remediation, including the excavation, storage, transport and treatment of contaminated material; and - proposed air quality management and monitoring procedures during remediation.	Section 5.26	Appendix FF
▪ The Air Quality Impact Assessment must consider the requirements of the Protection of the Environment Operations (Clean Air) Regulation 2010.	Section 5.26	Appendix FF
▪ The Environmental Assessment should include an assessment of noise and vibration impacts, including cumulative construction related noise impacts, prepared in consultation with Office of Environment and Heritage. All feasible and reasonable noise impact mitigation measures should be implemented. The assessment should be prepared in accordance with the NSW Government's *Interim Construction Noise Guideline, Industrial Noise Policy* and Application Notes, *Environmental Criteria for Road Traffic Noise and Assessing Vibration: A Technical Guide*, as appropriate and *Development Near Rail Corridors and Busy roads – Interim Guideline 2008*.	Section 5.25	Appendix EE
10. Climate Change and Sea Level Rise		
▪ An assessment of the risks associated with sea level rise on the proposal as set out in the *NSW Coastal Planning Guideline: Adapting to Sea Level Rise*.	Section 5.12	Appendix V
11. Heritage		

Requirement	Location in Environmental Assessment	
▪ An archaeological assessment of the likely impacts of the proposal on any Aboriginal cultural heritage, European cultural heritage and other archaeological items and outline proposed mitigation and conservation measures;	Section 2.6.7 Section 5.14	Appendix G
▪ An interpretation strategy that includes the provision for interpretation of any archaeological resources uncovered during the works.	Section 2.6.7 Section 5.14	Appendix H
12. Infrastructure Provision		
▪ Detail the existing infrastructure on site and identify possible impacts on any such infrastructure from the proposal, including the Railcorp 33Kv underground cable located in Hickson Road.	Section 2.4.2 Section 5. 19	Appendix DD
▪ Detail measures to mitigate the impacts of the proposal on any infrastructure items, including proposed relocation.	Section 5. 19	Appendix DD
13. Ecologically Sustainable Development		
▪ Identify how the development will incorporate ESD principles in the design, construction and ongoing operation phases of the development.	Section 4.13	Appendix W
▪ Address water quality management for the site including an "Integrated Water Management Plan" to include any proposed alternative water supply, proposed end uses of potable and non-potable water, demonstration of water sensitive urban design and any water conservation measures.	Section 5.13	Appendix O
▪ Operation waste management and reduction measures.	Section 5.23	Appendix L
14. **Remediation and Contamination**		
▪ The Environmental Assessment must include a Remedial Action Plan (RAP). The RAP must be prepared in accordance with the contaminated land planning guidelines under section 145C of the *Environmental Planning and Assessment Act 1979* and relevant guidelines produced or approved under section 105 of the *Contaminated Land Management Act 1997*.	Section 4.20 Section 5.7	Appendix II
15. **Waste**		
▪ Provide details of the quantity and type of liquid and non-liquid waste generated, handled, processed or disposed of on-site. Waste must be classified according to the Office of Environment and Heritage's *Waste Classification Guidelines 2008*.	Section 5.24 Section 5.28	Appendix L Appendix CC
▪ Provide details of the quantity, type and	Section 5.23	Appendix L

Requirement	Location in Environmental Assessment	
specifications for all output products proposed to be produced. The description should include the physical, chemical and biological characteristics (including contaminant concentrations) of those output products as well as relevant accredited standards against which the products would comply.	Section 5.28	
▪ Provide details of intended (or potential) end uses for output products and the relevant product standards used against which those products would be assessed.	Section 5.23 Section 5.28	Appendix L
▪ Provide details of the layout, the treatment process and the environmental controls of the proposal.	Section 5.13 Section 5.24	Appendix L
▪ Provide details of liquid waste and non-liquid waste management, including: - the transportation, assessment and handling of waste arriving at or generated at the site; - any stockpiling of wastes or recovered materials at the site; - any waste processing related to the proposal, including reuse, recycling, reprocessing or treatment both on- and off-site; - the method for disposing of all wastes or recovered materials; - the emissions arising from the handling, storage, processing and reprocessing of waste; and - the proposed controls for managing the environmental impacts of these activities.	Section 5.28	Appendix L
▪ Provide details of spoil disposal (if applicable) with particular attention to: - the quantity of spoil material likely to be generated; - proposed strategies for the handling, stockpiling, reuse/recycling and disposal of spoil; - the need to maximise reuse of spoil material in the construction industry; - identification of the history of spoil material and whether there is any likelihood of contaminated material, and if so, measures for the management of any contaminated material; and - designation of transportation routes for transport of spoil.	Section 5.24	Appendix L Appendix CC
▪ Provide details of procedures for the assessment, handling, storage, transport and disposal of all hazardous and	Section 5.24 Section 5.28	Appendix L Appendix CC

Requirement	Location in Environmental Assessment	
dangerous materials used, stored, processed or disposed of, in addition to the requirements for liquid and non-liquid wastes.		
▪ Provide details of the type and quantity of any chemical substances to be used or stored and describe arrangements for their safe use and storage.	Section 5.24	Appendix CC
▪ In documenting or describing the composition of output products and/or wastes generated, reference should be made to the Office of Environment and Heritage's *Waste Classification Guidelines 2008*.	Section 5.28	Appendix L
16. Planning Agreements / Developer Contributions		
▪ Scope and justification for any planning agreement/developer contributions proposed.	Not applicable	Not applicable
17. Environmental, Construction and Site Management Plan		
▪ The EA shall provide an Environmental and Construction Management Plan for the proposed works, and is to include: - 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.	Section 5.24 Section 5.25 Section 5.26 Section 5.27	Appendix CC Appendix T Appendix Y Appendix L
18. Staging		
▪ Details regarding the staging of the proposed development.	Section 4.17	Not applicable
19. Strata Subdivision		
▪ Details of strata subdivision and a subdivision plan of the proposed development (if applicable).	Not applicable	Not applicable
20. Consultation		
▪ Undertake an appropriate and justified level of consultation in accordance with the Department's Major project Community Consultation Guidelines October 2007.	Section 3.0	Not applicable
▪ Undertake an appropriate level of consultation with council and state	Section 3.0	Not applicable

Requirement	Location in Environmental Assessment	
government agencies regarding the recommendations of the Barangaroo Review.		

5.1 Consistency with Relevant EPIs, Policies and Strategies

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

- Metropolitan Plan for Sydney 2036;
- Draft Sydney City Subregional Strategy;
- State Environmental Planning Policy (Major Development) 2005;
- State Environmental Planning Policy No 55 - Remediation of Land;
- State Environmental Planning Policy (Infrastructure) 2007;
- 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 8**.

Table 8 – 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 Plan sets out 5 strategies which include goals such as 'Improving the performance of the NSW Economy', 'Increasing The Competitiveness of Doing Business in NSW' and 'Build Liveable Centres'. The Project Application is consistent with the Plan in that it will encourage job growth in centres, business investment in NSW, provide new office space in the CBD and will allow growth around existing transport hubs.
Sydney Metropolitan Plan for Sydney 2036	The Project Application is consistent with the Sydney Metropolitan Plan for Sydney as it will deliver the second building at Barangaroo South which is identified in the Metropolitan Plan as an opportunity to expand commercial, 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 second building 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.
State Planning Instruments and Controls	
Major Development SEPP	As detailed in Section 1.1.7, 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.

Instrument/Strategy	Comments	
	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	Commercial Building C3 is wholly 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	Commercial Building C3 is not located in the RE1 Public Recreation zone.
	Clause 17 - Height of buildings (Maximum RL 209)	Commercial Building C3 has a maximum RL of 209 and therefore complies with the maximum permitted height development standard (see Section 5.2).
	Clause 18 - Gross Floor Area Restrictions - Maximum 428,932m^2 (across Blocks 2, 3, 4A, 4B and 4C.)	When combined with the GFA approved to date across Blocks 2, 3, 4A, 4B and 4C, Commercial Building C3 complies with the maximum permitted gross floor area.
	Clause 19 - Design Excellence	Commercial Building C3 will achieve design excellence (see Section 5.5).
Infrastructure SEPP	The Infrastructure SEPP requires that applications for specific types of development are required to be referred to the RTA for its comment prior to determination. This Project Application is specified as traffic generating development and is required to be referred to the RTA.	
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 Commercial Building C3 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 5.7 and **Appendix II** 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.	
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. Commercial Building C3 is generally consistent with the	

Instrument/Strategy	Comments
	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 5.6.
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.

5.2 Consistency with the Concept Plan

This Project Application seeks approval for the construction of Commercial Building C3 as described in Section 4 of this report. Commercial Building C3 and the associated works proposed under this Project Application are located within Block 3 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, height and setback controls for each Development Block within Barangaroo South, including Block 3, within which the Commercial Building C3 is located. In addition, the Concept Plan requires project applications to address 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 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. The Urban Design Controls also encourage appropriate articulation of the facades to limit the appearance of larger floor plates, provide distinction between towers and podiums so that the built form of each block reads as separate buildings, and emphasise the activation of the public domain.

Numeric Concept Plan Controls

Table 9 provides a comparison of Commercial Building C3's consistency with the Concept Plan numerical controls.

Table 9 – Compliance with Concept Plan (Mod 4) Block 3 GFA and Height Controls

Block 3 Concept Plan (Mod 4) Control	Commercial Building C3 Project Application	Block 3 Cumulative Total	Compliance
Maximum GFA – 142, 669m^2	115,291m^2	115,514m^2	Compliant
Maximum height RL 209	RL 209	N/A	Compliant

As shown in **Table 9**, the proposed building complies with the maximum building height control of RL 209 under the Concept Plan (Mod 4). It is noted that the structural braces over the roof protrude above RL 209. However, the braces do not fall within the definition of 'Building Height' under the SEPP, which excludes "masts... and the like" from the calculation of the highest point of a building.

Notably, the proposed braces do not give rise to any adverse environmental impacts such as overshadowing in any event, and are an important component of the building's design, unifying the roof and connecting the tower to the core on the northern elevation. The braces express the central verticality of the building and when combined with the curved floor plate, create the appearance of a reduced tower form as the height of the building increases.

Built Form Principles

As demonstrated in the Architectural Design Statement at **Appendix I**, Commercial Building C3 complies with the Concept Plan (Mod 4) 's Built Form Principles, specifically it:

- will provide a slender tower form consistent with Built Form Principle 1 to create the City's New Western Facade.
- will define the public sense of space to the street by building the facades to the street alignment consistent with Built Form Principle 3;
- is located at the centre of Barangaroo South and as the tallest building will assist with achieving Built Form Principle 5, which is to achieve a tapering built form; and
- has been orientated to provide optimum orientation and transparency across the site and present the longest facade and tower form to the north in accordance with Built Form Principle 8.

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

Urban Design Controls

The Performance Based Urban Design Controls have been addressed in the Architectural Design Statement at **Appendix I.** Commercial Building C3 complies with the principles and controls by:

- adopting the fanning principle for the sitting of the building;
- providing a podium which creates a continuous street wall that defines Globe Street, City Walk and the east / west laneway;
- providing a highly articulated, legible and well proportioned building mass; and
- activating the ground floor through retail tenancies.

Table 10 demonstrates that Commercial Building C3 is compliant with the key Urban Design Controls of the Concept Plan (Mod 4).

Table 10 – Compliance with Concept Plan Urban Design Controls

Concept Plan (Mod 4) Block 3 Control	Commercial Building C3 Project Application	Comment
Control 1 Building Mass and Location		
Maximum horizontal floor plate - 85.5m	85.5	Compliant
Hickson Road minimum setback – 20m	26m	Compliant
Tower form floor plate depth – maximum 30 m	30m	Compliant
Podium height ▪ Minimum predominant height of 3 storeys ▪ Maximum – RL 27	 ▪ 3 storeys ▪ Maximum – RL 18	Compliant
Control 2 Street Wall Establishment		
The width and height of the colonnade along Hickson Road shall be appropriate to encourage its use, and be integrated into the proportions of the buildings of which it is part.	This Project Application does not propose to construct a building along Hickson Road.	N/A
Building form to create a street wall with a one storey minimum height for most of the public accessible ground floor facade.	The Project Application will create a street wall which is above the one storey minimum height control.	Compliant
Building mass to define a street wall on Globe Street, City Walk and Hickson Road.	This Project Application will provide a street wall on Globe Street and City Walk.	Compliant
Shelley Lane Minimum 6m wide	This Project Application does not propose to construct Shelley Lane, however >6m can be provided between Building C3 and Hickson Road to accommodate Shelley Lane.	N/A
Control 3 Building Articulation		
The building envelope and floor plates are to be articulated and modulated, using a range of architectural components such as prows, corner redents, vertical villages, expressed lift cores, bay windows and other structural expression.	The Commercial Building C3 building envelope and floor plates are articulated through measures such as the expression of the core, curved floorplates and vertical external shading.	Compliant
Tower Form to express sustainability features such as access to natural light.	As detailed in Section 4.13 the tower form will express sustainability features such as access to natural light.	Compliant
Control 4 Building Legibility		
The separate primary components of the building will be expressed.	The primary components of the building will be expressed.	Compliant
Visible parts of the towers' primary structure are to extend to the ground plane and be expressed as a separate element from the podium.	Visible parts of the towers' primary structure have been extended to the ground plane and expressed as a separate element of the podium.	Compliant
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.	Compliant
Provide two north to south and one east to west primary connections including the Hickson Road colonnade,	The primary connections through the block are being provided as part of other	N/A

and two east west connections through the block.	applications.	
Provide one east to west and one north to south secondary public access routes through the block.	Commercial Building C3 will not provide the secondary east to west or north to south pedestrian connections. A justification for the non-compliance is located below this table.	Non-Compliant
Shelley Lane must be not less than 50% open to the sky.	This Project Application does not propose to construct Shelley Lane. An awning will be located along the Shelley Lane frontage but will not prevent the achievement of this control.	N/A
For security purposes the secondary routes may be closed at certain times.	No secondary routes are proposed.	N/A
Control 6 Ensuring Quality of Rooftops		
Roof forms to incorporate architectural elements.	The roof form incorporates architectural elements.	Compliant
Lift shafts, overruns and control rooms are to be extruded above the roof line and used to provide architectural articulation to the roof.	The lift shafts, overruns and control rooms have been extruded above the roof line to provide articulation to the roof.	Compliant
Exposed mechanical equipment is to be avoided.	No exposed mechanical equipment is proposed.	Compliant
The architectural treatment of the roof and its form is to be designed, coordinated and remain sympathetic to adjacent context.	The roof form has been designed in response to its current and future adjacent context.	Compliant
Good quality materials (ie durable, hardwearing, sustainable) to be used.	Good quality materials will be used for the roof materials.	Compliant
Roof Design to integrate sustainable features.	The Roof Design integrates PV cells as a sustainable feature.	Compliant
Control 7 Facades		
Depth and layering of facades is to be achieved through relief and protrusions. Mirrored facades should be avoided.	As detailed in Section 4.7 Commercial Building C3 will integrate relief and protrusions to the facade thereby achieving depth and layering. No mirrored facades are proposed.	Compliant
The choice of appropriate materiality for longevity, durability and flexibility. Materials such as steel, glass, concrete, timber and aluminium.	The proposed materials, which include steel, glass, and concrete, have been chosen for their longevity, durability and flexibility.	Compliant
Environmentally sustainable design is to be incorporated on all facades.	As detailed in the Architectural Design Statement at **Appendix I**, ESD has been incorporated in to the design of the facades.	Compliant
Facade components such as external shading shall be used to provide light and shade to the building and to consider and reinforce Control 2 +3.	The design incorporates both vertical and horizontal external shading.	Compliant

Facades >60m should be modulated by distinctive architectural elements e.g. vertical villages	The north and south elevations which exceed 60m are modulated with distinctive architectural elements.	Compliant
There shall be no single plane in the facade having dimensions greater than 60m in length and 60m in height (or equivalent area) without articulation, and change in plane from adjoining building elements, unless otherwise determined by the "Barangaroo Design Excellence Review Panel", to the satisfaction of the Director-General in consultation with the Barangaroo Delivery Authority.	The building does not have any planes greater than 60m in length without articulation.	Compliant
Control 8 Active Street Fronts		
At least 60% of the Ground Level is to be active on the primary street wall facades	Over 60% of the ground level will be active on the primary street wall facades.	Compliant
Building entrances to internal areas such as office lobbies, exits and service areas or loading docks shall not count toward the 60% requirement.	Noted.	Noted
Building service areas, parking entrances and loading docks will be located on Napoleon Street.	The parking entrances, which form part of the Bulk Excavation and Basement Car Parking Project Application are located on Napoleon Street. Some building service areas will be located off Shelley Lane.	Compliant
The width of driveways should be minimised.	No driveways are proposed as part of the Project Application.	N/A
Control 9 Signage		
High level signage is to be limited to a maximum of 2 separate faces per buildings and is not to be greater than 1 building story high between floor slabs.	The plans nominate high level signage zones on each face of the tower, however, as reflected in the Statement of Commitments, only 2 of the 4 zones will be used for signage at any one time. The location and design of the signs will be finalised once the future tenants requirements are known.	Compliant
Signage is not to exceed 60m^2 per sign.	Signage zones have been identified on the plans. The detailed design of the signage will be submitted to the Director General for approval prior to the issue of the relevant Construction Certificate.	Noted
Identify signage only to be incorporated within the building facades/structure.		
Detailed of signage to be considered as part of the overall design of the building for the purposes of design excellence.		

The design of the ground floor does not provide the secondary east / west and north/south pedestrian routes through the building. Therefore the proposed development seeks a variation of Standard 3 of Control 5 of the Performance Based Urban Design Controls for Block 3, which requires that one east to west

and one north to south connection be provided for secondary public access through the block.

The variation to the performance based control is considered appropriate in this instance as Block 3 has two primary east / west routes and two primary north /south routes that will still be provided. As the connections are also located in very close proximity to each other, and the block is triangular in shape, the affected connections do not provide any substantial additional permeability. The removal of the secondary routes will also consolidate pedestrian movements along the primary routes, increasing safety and activation in the public domain.

The proposed variation to the pedestrian routes in the Concept Plan will still achieve the objectives of the performance based control in that:

- permeability and accessibility will be provided via the other links being provided as part of the future applications; and
- it will increase pedestrian activity along the primary pedestrian routes thereby increasing safety in the public realm.

In light of the above, the removal of the secondary pedestrian routes and variation to the performance based urban design controls are considered acceptable.

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;
- Supplementary TMAP (refer to **Appendix D**);
- Utility Services Infrastructure Plan (refer **Appendix DD**);
- Integrated Water Management Plan and Guidelines – covered by the Stormwater Plan and the ESD Report (**Appendix O** and **W**); 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 Commercial Building C3.

5.3 Consistency with the Basement Car Park Approval

The proposed development is consistent with the terms of the Basement Car Park Approval or Statement of Commitments.

As detailed in Section 1.1.3, 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. Instead, the basement car park was designed:

- to maintain maximum flexibility with respect to the potential options for the detailed design and distribution of above ground floor space (commercial, residential, community and retail floor space).

- 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.

Lend Lease is currently seeking the Minister's approval under section 75W of the EP&A Act for a further modification to the Basement Car Park Approval. Basement Car Park Mod 3 Application seeks to reconfigure the access and internal structure of the approved basement and remove basement levels CP1-CP5.

The modified basement access proposed as part of the Basement Car Park Mod 3 Application is located within the Commercial Building C3 Project Application site. The Project Application has therefore been designed to be fully integrated with the Basement Car Park Mod 3 Application , which reflects the likely future outcome for the design of the basement.

This Project Application proposes building works, including the core / foundations of the Commercial Building C3 and public domain above the basement level within Block 3, and the detailed layout and operation of the car parking and the number and allocation of car parking spaces within the proposed basement car park as relevant to the amount and land use mix of GFA proposed within the Commercial Building C3 development.

In the event that Basement Car Park Mod 3 Application is not approved, the proposed Commercial Building C3 can still proceed in accordance with the existing Basement Car Park Approval. It is noted that detailed location of uses within the basement would need to be updated.

Therefore Commercial Building C3 is consistent with the existing Basement Car Park Approval or the Basement Car Park Mod 3 Application.

5.4 Barangaroo Review

5.4.1 Snapshot Design Review

The General Barangaroo Review noted that the approach to building design for Barangaroo South was carefully considered during the Barangaroo Stage 1 developer selection process throughout 2008/09. In particular it highlighted that the Lend Lease scheme was selected in accordance with 'generally accepted practice' and noted that there had been 'more emphasis on good design as a selection criteria than is usual in other jurisdictions'. It also highlighted that the Lend Lease proposal was supported as the best proposal by the overwhelming majority of the design experts involved.

The final two contenders in the developer selection process presented two different approaches for the buildings at Barangaroo South. The runner up (Brookfield Multiplex) proposed a scheme with a diverse arrangement of buildings of different scale and design. The winning Lend Lease proposal, with Rogers Stirk Harbour + Partners, considered the site as an entity, with the principal tall buildings conceived as a cluster, working harmoniously together to give a sense of identity and place to the whole site - a place which will be specific to Barangaroo. This approach has continued through the detailed design phases of the development to date.

Whilst noting that it is highly unusual that an international developer selection process, such as that undertaken for Barangaroo, would be the subject of subsequent independent design reviews, the Report recommended a one-off 'Snapshot Design Review' (Snapshot Design Review) to "assess and advise on

the quality of forthcoming proposals and to reassure the community" in respect of the design process.

The Snapshot Design Review was undertaken by an independent Design Review Panel ('The Panel') who prepared a report referred to as the "DRP48 Review". The terms of reference for the Snapshot Design Review were as follows:

The review will:

- *Be focused on the commercial towers C3 and C5 and their relationship to C4 at Barangaroo South, as proposed by the proponent;*
- *Include review of the podia and integration with the towers;*
- *Assess public domain impacts associated with the towers and podia such as bulk and microclimate, public/private domain, relationship to street pattern, relationship to public transport, etc;*
- *Be limited to consideration of the proponent's design propositions within the existing Concept Plan and Project Approvals;*
- *Identify areas (if any) where the Design Review Panel believes there is scope for improvement in the design;*
- *Report directly to the Premier as Minister for Barangaroo;*
- *Be completed over two consecutive days, with the report to the Premier to be finalised within a week of the meeting;*
- *Be informed by presentations and reports from the proponent, the Barangaroo Delivery Authority (BDA) and their designers, and may consider recent reports on relevant design matters that have been prepared by the DERP and by the BDA's Design Advisors.*

The DGRs require this EAR to consider the findings of the Snapshot Design Review consistent with the Government's response[2], Barangaroo Concept Plan (Mod 4), and relevant controls in the Major Development SEPP. In light of the above, this Section provides consideration of the DRP 48 Review consistent with the Government Response and as relevant to the C3 Commercial Building.

Observations on Commercial Building C4

The DRP 48 Panel was generally very complimentary of the proposed design of Commercial Building C4. A number of positive comments were made about Commercial Building C4 which are equally true of Commercial Building C3:

- *The building form and façade is well articulated, with a strong connection to an expression of its interior function.*
- *The separation of the core offers the opportunity to break down the large form and to articulate the vertical dimensions, while the exaggerated horizontal bands also define the core's vertical transportation zones and modulate the form.*
- *The proposed reverse 'bay window' elements assist in modulating the façade, expressing function and introducing scale.*
- *The scheme offers high quality interior tenancy space and workplace experience.*
- *The proposed sustainability initiatives including a 6 star rating are highly commended, as important in themselves, but also as the scheme is a genuine response to, and is therefore expressive of, the commitment to sustainability.*

[2] http://www.nsw.gov.au/sites/default/files/DRP-48-Govt-report-final.pdf

- *The design of the sun-shading 'blade' elements has the potential to contribute to the delicacy of the façade, using a play of light and shade to modulate and animate the form.*
- *An appropriate relationship of the tower to its podium, and a high quality design for the podium buildings are crucial for the success of the design, in terms of the presence, expression and use of the tower and podium buildings and in terms of their ability to support the public domain at Barangaroo South as a successful experience within the city.*
- *It is fundamentally important that the tower comes to, and is expressed at the ground level entry point to ensure legibility and to reinforce the identity of the tower.*

Commercial Towers C3 and C5

Commercial Buildings C3, C4 and C5 have been consciously designed as a family of buildings.

Whilst the Panel considered Commercial Building C4 to be "an excellent proposal", it was also considered that, "its repetition in the design of towers at Commercial Buildings C3 and C5, is less successful".

Specifically, the Panel commented that:

In the context of their size, the combination of the three highly similar forms creates the effect of an homogenous mass and exacerbates the overall perception of significant visual bulk and a 'wall' of buildings. The subtle variations proposed for the three towers are considered to be inadequate to ameliorate the perceived mass and bulk of the towers as a group.

The Panel is of the view that expression of the three forms as separate towers, each conceived differently, would create diversity and diminish the perception of them as a uniform mass, significantly reducing the overall visual bulk.

The Panel is of the view that consideration should be given to development of more diversity through the designs for C3 and C5, ensuring each is an authentic, well-considered and high quality response (as is C4). This could be achieved by seeking a review of C3 and C5 by RSHP, or by engaging other architects, to consider towers of more diverse form, expression and visual identity.

The NSW Government provided a response to the Panel's comments relating to the repetition of the design for Commercial Buildings C3, C4 and C5, noting that it was the basis of the accepted design philosophy of the proponent's architect, Lord Richard Rogers of RSHP, which was integral to the successful Lend Lease bid of 2009.

That philosophy was to develop a family or set of closely related buildings designed by one architect and distinguished from each other through height, orientation, façade treatments, colour etc. The Government Response recognised that:

- Lend Lease has proceeded to develop the designs of the three towers with the continuing endorsement of the Design Excellence Review Panel (DERP) (constituted to ensure design excellence in accordance with the Concept Plan Approval and appointed by the then Minister for Planning) and the BDA Design Advisors since winning the bid.
- In June 2011, the DERP review of the proponent's Design Excellence Strategy, confirmed the three towers are to be an ensemble, Lord Rogers should be the architect for all three towers and that a design competition was not required to achieve excellence.

The Government Response concluded that in essence that, the 'sibling buildings' issue was:

> *A simple but fundamental difference of opinion between the DRP 48, Lend Lease, the Design Excellence Review Panel and the Barangaroo Development Authority's design advisors with regard to the overarching design philosophy of the towers and how to achieve diversity. Both opinions are valid and recognised as such by both Lend Lease and the DRP 48.*

The Government Response acknowledged that, if adopted, the Panel's recommendation would significantly impact the delivery program for the towers with consequential impacts on project financing arrangements and negotiations with future tenants. Consequently the Government Response encouraged Lend Lease to explore greater variation in the individual designs (both towers and podia) than is currently provided without impacting the fundamental design philosophy and brief and without impacting floor plates and heights which have planning approval, noting that the floor plates have been designed specifically to meet the current and future needs of the financial services industry.

Taking into account the DRP48 Review and the NSW Government Response, Lend Lease and RHSP believe the opportunity to provide a new precinct on a very significant site alongside Sydney Harbour deserves a very strong architectural gesture and that the three buildings under one architect, standing as siblings, is a powerful response to the opportunity presented.

On the issue of bulk, in every city block in Sydney a row of commercial tower buildings can, if viewed at an oblique angle, represent a wall of buildings. The visual bulk in those city blocks is not influenced materially by facade treatments, but by the height and width of each building making up the set.

Moreover, Lend Lease and RHSP firmly believe that the current sibling building facades add strength to the architecture and that their subtle diversity creates the perfect balance between the three buildings, and the dialogue they share with each other.

In light of the above:

- The three towers are to remain 'siblings' in style, under one architect, and together forming a powerful triplet architectural element to Sydney Harbour foreshore befitting the unique position and importance of the site.
- The following elements are to be used to continue to differentiate the towers, whilst at the same time never undermining the 'sibling' nature of the buildings:
  - Roof top treatment should vary across the three buildings with Commercial Building C3, the tallest building, having the most significant gesture of the three.
  - Commercial Building C5 should have a different southern facade to the other towers reflecting its southerly position and the significant exposure of its facade to Darling Harbour. The facade will be broken down into more elements than Commercial Buildings C3 and C4, with greater emphasis on activation at the lower levels.

Podia Design

The Panel acknowledged that at the time of the Review the podia were not yet designed, but felt that the current approach, whilst being well intentioned, was 'ultimately very limited in its ability to deliver a high quality outcome for the podia buildings', and would 'only result in carefully considered facades, not in three-dimensional volumetric built form'.

Lend Lease is committed to preventing 'facadism' and accordingly has designed Commercial Building C3 to have a volumetric built form that has a ground plane that faithfully acknowledges and respects the individual uses and diverse architectural styles of the precinct.

The Panel felt that the tower architect could design the relevant podium or should be engaged as master architect to advise on integration of design for the podium buildings within the respective 'block' (as bounded by four streets and lanes). Lend Lease considers that ultimately the panel's remit is to comment on design, not the number of architects which should be involved in the process.

The Panel observed that the podia at the base of the buildings are only three storeys high but are surrounded by tall towers and flanked to the east and west by 5 and 6 storey elements. The Panel therefore suggested that Lend Lease investigate the potential to vary the height of the podia in part (by one or two storeys) which - with proper consideration of street widths - may achieve better podium design. Importantly, podia height within Block 3, on which Commercial Building C3 is proposed, are controlled by the Urban Design Controls approved as part of the Concept Plan Mod 4 as follows: "Podium height shall be determined having regard to compatibility of streetscape form with the surrounding area, and appropriate engagement and framing of the public domain, together with environmental considerations on the public domain and surrounding buildings". The proposed podium heights are consistent with the urban design controls in Concept Plan (Mod 4) and are therefore considered to achieve an appropriate podium design.

Lend Lease is committed to delivering a high quality pedestrian and built environment at Barangaroo South, and recognises the importance to this outcome of successfully integrating the architecture of the Commercial Building C3 tower and podium elements as well as providing a strong built form expression through the ground plane. To ensure that the proposed design of Commercial Building C3 will deliver upon this important outcome, as part of the normal design development process for a project of this scale Lend Lease commits to undertake further design refinement (and consideration of further related statements of commitments) to the podium where as appropriate as part of the assessment process.

Permeability

The Panel commended the proposed through-block visual permeability and access to natural light from both north and south of the entry and foyer as indicated in the design of the commercial buildings. The Panel suggested that Lend Lease should also explore the potential to extend this permeability to allow through-block public pedestrian access.

As detailed in Section 5.2, the Concept Plan (Mod 4) Urban Design Controls envisaged public through-block access. However, following stakeholder feedback it has come to light that given the types of future tenants likely to lease space in Commercial Building C3 (which are likely to be banks and financial services firms) require strict foyer security. As a result, the north-south permeability of natural light and visual permeability have been retained, however security issues prevent the design from affording general public access north to south through the building. As detailed in Section 5.2, despite not providing the secondary access route through Block 3, Commercial Building C3 will still display a high level of permeability.

5.4.2 Peer Review into Barangaroo Remediation

The Review recommended that the Barangaroo Delivery Authority be required to fund a peer review of the site remediation plans by another independent

accredited Contaminated Site Auditor selected by and reporting to a Panel made up of various nominated groups.

It is our understanding that the appointed peer reviewer has met with the key stakeholders and is currently reviewing the relevant documentation. It is anticipated the preliminary findings will be presented to the specially constituted Contamination Panel towards the end of October with a final report due by mid-November.

As the peer review has not been released prior to the lodgement of the EA, the outcomes of the contamination review will be considered as part of the Preferred Project stage of this project as relevant.

5.5 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 Reduced Level (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.

The Design Team

Commercial Building C3 exhibits design excellence through the commissioning of world renowned Rogers Stirk Harbour + Partners in collaboration with PTW and Tony Caro Architects. 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.

Lend Lease's strategy is also generally consistent with the Major Development SEPP provisions and the requirements of the approved Concept Plan (Mod 4) through the commissioning of Aspect/Oculus and Lend Lease's in house design team.

Rogers Stirk Harbour + Partners is an international architectural practice based in London with offices in Sydney, Madrid and Tokyo. The practice is responsible for the design of several of the world's most recognised and frequently cited examples of superior urban form outcomes. These include:

- Lloyd's Register, London;
- Lloyd's of London;
- Millennium Experience, London;
- Greenwich Peninsula, London;
- Canary Wharf, London;
- Potsdamer Platz, Berlin;
- Pompidou Centre in Paris (with Renzo Piano);
- Headquarters for Channel 4 Television;
- European Court of Human Rights, Strasbourg;
- law courts in Bordeaux and Antwerp;
- the National Assembly for Wales, Cardiff; and
- Heathrow Terminal 5.

Over the past three decades, Rogers Stirk Harbour + Partners has attracted critical acclaim and won dozens of awards including the Stirling Prize 2009 for Maggie's London, the Stirling Prize 2006 for Terminal 4, Madrid Barajas Airport and the Manser Medal in 2008 for an energy-efficient housing scheme in Milton Keynes. Rogers Stirk Harbour + Partners' status as a world renowned architectural practice is therefore unrivalled.

Other members of the consultant team, including PTW, Tony Caro Architects and Aspect Oculus have also contributed greatly to the design, ensuring that Commercial Building C3 is a realistic, integrated and innovative design. Lend Lease's team of world class specialists in engineering, sustainability, office planning, 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.

Design Objectives

The design objectives that were adopted to guide the design for the Commercial Building C3 building are as follows:

- create a landmark commercial building which incorporates retail and office uses in the lower levels;
- deliver flexible floor plates of approximately 2,300m^2 each comprising communal break out spaces and "vertical villages" to encourage communication and social interaction and provide tenant amenity; inter-floor circulation and meeting spaces;
- maximise orientation to optimise views throughout the entire building and reinforce the key concept planning principles;
- facilitate pedestrian circulation through and around the site and provide a high degree of urban connectivity;
- adopt materials from the surrounding urban context into the new development;
- achieve a minimum six star Green Star V3 Office building; and
- promote innovative and integrated sustainable design strategies such as high performance facades, good access to daylight, photovoltaic panels.

Design Excellence Strategy

In accordance with the approved Design Excellence Strategy, Rogers Stirk Harbour + Partners continues its role as Master Architect for the Barangaroo South precinct, to ensure a coordinated approach across Barangaroo South. In association with the Australian architectural firms engaged in the project, including Tony Caro Architects and PTW, their role as Master Architect is to ensure that the interface between the buildings and the public domain and the integration of common facilities such as basement car parking and common infrastructure. In addition, Rogers Stirk Harbour + Partners will be responsible for the architecture for the three commercial towers, being C3, C4, and C5. This will ensure that the three principal commercial towers will continue to create a composition of towers that dialogue with each other to create a backdrop that clearly frames the place at macro and micro level.

Consistent with the approved Design Excellence Strategy, RSH+P has been responsible for the design for Commercial Building C3. The proposed building will function as a new model for offices of the future and has been designed to meet the needs of the world's most progressive businesses. The commercial design features include:

- large, clear and open floor plates that improve work place productivity and communication;
- healthier and more attractive environments that provide great places to be and to work;
- provision of flexible and efficient workspaces, in line with global trends, to meet the requirements of a range of tenants, particularly within the financial sector;

- connected and accessible spaces that offer immediate access to quality amenities;
- flexible workspace that is adapted to the latest working practices and business models; and
- advanced and progressive environmental and sustainability outcomes.

Computer analysis of the building's solar performance has helped the team to design and apply a bespoke facade shading system for each elevation of the tower that minimises internal heat gain and cooling requirements, whilst maximising user comfort and views from the offices. This approach utilises a primary vertical shading arrangement, which change in size and density depending on the facade's orientation. This ensures that the environmental performance of the Barangaroo office towers specifically responds to the building's location, orientation and the solar path. This approach demonstrates how the three office towers will set new environmental performance benchmarks in Australia.

The outcome is a proposed design for Commercial Building C3 that gives an appropriate building form that is more legible to represent the components of the building allowing a dynamic and exciting expression of the architecture. This includes the expression of the 'mechanics' of the building systems such as lift cars, plant and the key functions of the internal office function. The design typifies the signature style of Lord Richard Rogers work.

High Standard of Architectural Design

The proposed curved prows to the building and the expression of the north core create a highly legible composition of constituent elements. This approach creates a high degree of articulation, recesses, shadow and light, and texture of the architecture. The graduation of the size and position of the sunshades provide the visual understanding of the building orientation. The facades and sun shading fins provides a variable impression of the building depending on the different view of the building.

The vertical orientation of the sunshades emphasises the vertical massing of the floorplate component of the building. This is juxtaposed with the vertical massing of elements of the north core, demonstrating different strategies of the 'scaling' of the building.

Some of the key design features of Commercial Building C3 that demonstrate the high standard of architectural design include:

- Curved prows at the east and west elevations of the tower to create a floorplate that is shaped to suit its environmental orientation and allows for more egalitarian distribution of natural light and outlook.
- Structural design of the floorplate that has the flexibility to accommodate today's and future best workplace practices, including inter-floor connectivity and vertical villages.
- A highly visible shading system arranged as a family of elements that change in size and density depending on the orientation of the facades. This vertical blade solar shading system achieves new environmental benchmarks whilst providing maximum user amenity in terms of comfort and views.
- A recess on the southern elevation, opposite the lift arrival areas, tapered to provide easier circulation around the office perimeter. This creates relief in the facade and provides articulation with the play of light and shadow.
- Greater legibility and animation of the external core with the addition of external terraces above the lift shafts, the terraces further reinforce the design

approach by visually separating the lift core component to the vertical villages above.

- Maximising glazing to the vertical villages and providing a fine facade shading filigree to further reinforce the 'component' approach to the architecture.
- The composition of core elements break down the massing of the northern facade creating recess and relief of light and shadow.
- A roof top designed to be legible on the skyline, with the double height glazed plant rooms supporting photovoltaic panels on the roof.
- A clear relationship between the tower and the podium buildings, with a strong expression of the tower coming to ground and entrance lobbies that maximise natural light, transparency and visual permeability, including columns and core elements being expressing to ground level in order to improve the public domain.
- A structural approach that minimises columns to provide greater views from the offices and enabling further flexibility of the floorplate.
- The incorporation of the structural bracing on the intermediate plant room levels, to provide structural efficiency on the floor plates, reinforcing the recess articulation to the tower massing.
- The general quality of materials used as demonstrated on the physical materials and finishes board (submitted under a separate cover).
- The proposal has been designed with sustainable design principles in terms of sunlight, natural ventilation, wind, reflectivity, visual and acoustic privacy, safety and security and resource, energy and water efficiency.

Design Review Process

The design process leading to the proposal is detailed in the Architectural Design Statement included at **Appendix I**. The proposed design of the Commercial Building C3 has been through a rigorous process of design review, both internally and with the independent design experts. The proposed design was presented to the Design Excellence Review Panel on several occasions. Presentations have also been made to the Barangaroo Delivery Authority's independent design advisors. Comments from all of the design reviewers have been taken into account and have led to the refinement of the proposed modified design.

Lend Lease is committed to delivering a high quality pedestrian and built environment at Barangaroo South, and recognises the importance to this outcome of successfully integrating the architecture of the Commercial Building C3 tower and podium elements as well as providing a strong built form expression through the ground plane. To ensure that the proposed design of Commercial Building C3 will deliver upon this important outcome, as part of the normal design development process for a project of this scale Lend Lease commits to undertake further design refinement (and consideration of further related statements of commitments) to the podium where as appropriate as part of the assessment process.

As detailed in Section 1.3, a preliminary version of Commercial Building C3 was presented to the independent Design Review Panel who undertook the Snapshot Design Review (referred to as the "DRP48 Review"). A response to the matters raised in the DRP 48 Review is provided at Section 5.4.

Achieving Design Excellence

The proposed development will exhibit design excellence as:

- world renowned architectural practice Rogers Stirk Harbour + Partners has been retained as lead architects on the project along with other esteemed members of the consultant team, including Tony Caro Architects , PTW and 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 Commercial Building C3 design in the completed building by ensuring that RSH+P has direct involvement in the design documentation phase;
- it satisfies the principles and objectives identified in Section 2 of the Architectural Design Statement at **Appendix I**;
- it generally complies with the planning framework established for the site;
- it facilitates innovation through public art and installations;
- 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.

Furthermore, design excellence in Commercial Building C3's architecture and the public domain will be achieved by a combination of a design and integrated review panel, and design guidelines, which will be facilitated through the detailed design and construction phases.

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 design excellence strategy requirements established in the approved Concept Plan's (Mod 4) Statement of Commitments. In particular, the strategy has been prepared in consultation with the Technical Working Group (refer Section 3.1) to ensure that the approved Concept Plan (Mod 4) and its Statement of Commitments is satisfied. 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.

5.6 Urban Design and Built Form

5.6.1 Building Design

Commercial Building C3 is consistent within the approved Block 3 building envelope controls Concept Plan (Mod 4) and is therefore appropriate to the future character of the site in terms of building form, bulk, scale and height. The proposed building will provide the second of a series of distinctive and iconic elements to the western edge of the city. As demonstrated by the architectural plans and artist impressions, the facades of Commercial Building C3 are highly articulated and will make a positive contribution to the visual quality of the site and the city skyline.

The proposed building design is consistent with the objectives for street wall height, namely the provision of adequate daylight, protection from wind and pedestrian amenity. Having regard to the built form principles and urban design controls, the transparent and active nature of the podium will allow a high degree of visibility of the interiors when viewed from the public domain. The building core and vertical villages will provide a high degree of animation to the northern facade.

As detailed at Section 4.5, Commercial Building C3 sits within the approved development block envelope and complies with relevant urban design controls relating to that block. In this regard, the development will not give rise to any loss of views or vistas that have not already been considered in the approval of the existing Concept Plan.

5.6.2 Street Frontage Heights and Setbacks

The street frontage height control of predominantly 3 storeys and setbacks contained in the approved Concept Plan (Mod 4) controls aim to achieve a sense of enclosure to the future streets, whilst protecting the amenity of the street in terms of overshadowing, daylight access, wind, conditions for street trees and pedestrian comfort.

As demonstrated in Section 5.2, the Project Application complies with all the numeric standards for street frontage heights and setbacks set out in the Concept Plan (Mod 4).

In addition, the street frontages will retain an acceptable level of daylight access, particularly given the building's northern orientation. The proposed setbacks to Globe Street and Hickson Road offer the opportunity to provide active street frontages and temporary landscaping where these areas will be:

- accessible and usable by the public;
- have northern orientations and will enjoy a degree of solar access during the middle of the day;
- activated by the ground floor retail uses skirting the tower form. In addition to this, the transparent nature podium will provide an active retail area and views into the activity within the building;
- appropriately surfaced and landscaped to provide spaces that are inviting for public use and gathering; and
- the wind report prepared by CPP included as **Appendix P** notes that the public spaces will be protected from adverse wind conditions subject to the appropriate treatment detailed in the report.

5.6.3 Public Domain

A Public Domain Plan identifying all temporary and permanent works within the public domain is included at **Appendix K** and detailed in Section 4.8. Public access will be provided around all frontages of the building.

The waterfront interface of Commercial Building C3 and the interface of the building to the public domain are in accordance with the approved Concept Plan. Under the Concept Plan approval, there is a buffer distance established between the built form within Block 3 and the water by Globe Street and the adjoining recreational spaces, which also provide public access to and along the foreshore.

Active uses (cafés and retailing) are proposed to line almost 90% of the proposed street edges and importantly have been strategically located at the building's entrance. The proposed retail spaces will provide activation and vitality to both the building and the street and help to integrate the public and private domains.

The vehicular and loading dock entry and exits to the basement car park, which forms part of the Basement Car Park Mod 3 Application, have been integrated into the design of Commercial Building C3 and will not therefore have a detrimental impact upon visual amenity and pedestrian safety.

5.6.4 Privacy Impacts

Commercial Building C3 is not located in close proximity to any privacy sensitive receptors such as residential uses. The tower is setback a minimum of 30 metres on the eastern boundary from Hickson Road, thereby mitigating against adverse privacy impacts. The building is also sufficiently setback from Block 3's boundaries to provide scope for the future development in a manner that will allow privacy between properties and land uses.

5.6.5 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, including Commercial Building C3 will also result in the change of some views, in particular from buildings to the east of the site with views to the west and north. Key views

from within the Barangaroo site will be formed by future development when built in accordance with the approved Concept Plan.

Commercial Building C3 delivers 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. It is of an appropriate density to support the City's growth and to capitalise on the site's attributes.

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.

Commercial Building C3 sits within Block 3 with frontage to the new City Walk and new Globe Street. The development at Barangaroo South forms a western extension to the CBD and the Commercial Building C3 forms part of that extension. In visual terms the building will read as a new addition in the context of the existing CBD tower backdrop.

The height of Commercial Building C3 is within the terms of the approved Concept Plan (Mod 4) and the building will sit generally within the existing silhouette of the CBD when viewed from both the east and west. On this basis it is considered that no adverse impact to the city skyline or CBD views will result from the proposal. Commercial Building C3, as the second and tallest building at Barangaroo will make a positive contribution to and bold statement within the skyline along the western edge of the CBD.

The impacts on views associated with Commercial Building C3 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 Commercial Building C3 does not fill out the full envelope permitted under the Concept Plan (Mod 4), particularly when viewed from the east and west.

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 Commercial Building C3 is consistent with the approved Concept Plan.

In addition, with the establishment of new streets and laneways around Commercial Building C3 significant new views and vistas will be opened up from public spaces, particularly to the north, south and west.

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 GG.**

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

The impacts of the proposed Commercial Building C3 on key elements and views from key locations external to the site, and from within the site, is demonstrated at **Appendix GG** 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.

Commercial Building C3 will not affect views through the site from Hickson Road, which will be provided via City Walk, the east west pedestrian connection, and Napoleon Street. All views along Hickson Road through to the south CBD and the Darling Park development, 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 the view of Commercial Building C3 will be prominent, with views to the sky available around the building. This view impact is considered acceptable in this context as the development principles for the entire Barangaroo site envisage the highest and densest development at and in front of Napoleon Street (which commences under the viaduct). Further the existing views from this location are not considered significant. The framed sky views in the location are typical of the majority of views found in the CBD in a similar context.

Commercial Building C3 sits at the southern end of the Barangaroo site and will not impact on the westerly views to Balmain from the residential apartments on Kent Street. However, there will be a change to views to the south west over Darling Harbour for some residents. Commercial Building C3 sits within the block envelope, consistent with the approved Concept Plan (Mod 4), and as such this impact, which was previously considered to be acceptable, remains unchanged by the Commercial Building C3.

Shelley and Lime Streets

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.

The Shelley Street view corridor is framed and generally aligned to a direct view to the Sydney Ports Harbour Control tower. Commercial Building C3 will alter

this view, consistent with the approved Concept Plan. The existing views to the north along Lime Street will be largely maintained along its alignment through Barangaroo South. Views along Lime Street will be framed by Commercial Building C3 to the east.

Commercial Building C3 will have some impact on north 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 consistent with the approved Concept Plan (Mod 4) and is considered to be appropriate in the context of the urban design framework and the overall approach to views, vistas and view sharing which has been to preserve significant public and private view corridors to, from and within the site.

It should be noted that the approved Commercial Building C4 will largely block future views from Shelley and Lime Streets to Commercial Building C3.

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 Building C4). 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.

Commercial Building C3 will be prominent and contribute to the built form along the western edge of the city. The building will emphasise the site's role in providing a new activity hub at the western fringe of the CBD through a new and extended silhouette/skyline. It should be noted that the approved Commercial Building C4 will largely block future views from Pyrmont to Commercial Building C3.

Within the site at ground level there will be views from all directions, including the wide range of views available from Pyrmont back to and through to the rest of the CBD. Most importantly, Commercial Building C3 will not impact upon any significant heritage or cultural views over the waterways of Darling Harbour.

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 discernable. 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.

Commercial Building C3 whilst appearing taller than some existing CBD buildings from certain perspectives, will make a contribution to the new silhouette to the western edge of the CBD and relate to the approved Commercial Building C4 adjacent to the site. Commercial Building C3 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 Commercial Building C3 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 south, Commercial Building C3 will be largely obstructed by the approved Commercial Building C4. Should Commercial Building C4 not be constructed then Commercial Building C3 will be visually prominent from the subject location. 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.

The visual impact of Commercial Building C3 is minimal as it forms the western extent of the CBD. Commercial Building C3 will not impact negatively upon any views to Millers Point, Walsh Bay or Observatory Hill. At present these landmarks and locations are already nestled into the form and fabric of the existing CBD silhouette.

Commercial Building C3 will define the new western edge of the CBD which is currently defined by the row of towers along the northern end of Kent Street.

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.

Commercial Building C3 will largely sit behind the existing high rise residential towers on Kent Street when view from Observatory Hill Park and hence will not impact on significant water views or views south and west. The existing Kent Street towers act to provide a significant barrier to any existing and future views of the Barangaroo site.

Views Within the Site

Commercial Building C3 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, Commercial Building C3 will create a strong landmark against the western edge of the CBD.

At street level, the mixed use podium will create a human scaled environment that integrates the building with the existing city. The proposed podium will create a street wall on all frontages which, in conjunction with the adjacent buildings, will frame important view corridors through the site, such as the view down City Walk to the waterfront and back up to the CBD. Full height glazing on the northern and southern sides of the podium will provide views through the podium to other parts of the Barangaroo site.

5.6.6 Visual Analysis from Kent Street Residences

The View Analysis included at **Appendix GG** specifically assesses the cumulative impacts of Commercial Buildings C3, C4 and C5, on views from residential apartments on Kent Street.

The View Analysis has been prepared using orthogonal and oblique views, consistent with the methodology used for Concept Plan (Mod 4), from the four residential apartment buildings on Kent Street (Highgate, Stamford Marque, Georgia and Stamford on Kent). The views have been prepared for the low, mid and upper levels for each of the buildings.

The images demonstrate that the proposed development of Commercial Buildings C3, C4 and C5 will not result in any apartments losing their primary views to the west and north west over Sydney Harbour. In the case of each of the four residential buildings, no apartments have their primary orientation or outlook towards the south west. The development of the commercial buildings will affect oblique views back over towards Darling Harbour from some apartments. This view impact is consistent with the view impact considered as part of the Concept Plan (Mod 4) assessment. Further, it is noted that in the Central Sydney DCP 1996, Control 6.1.12 states that within Central Sydney 'There is no guarantee that views or outlooks from existing development will be maintained.'

The view impact on each of the apartment buildings is described in detail below.

Highgate

- Highgate (127 Kent Street) is located north of the alignment of Gas Lane, approximately 145m north of Commercial Building C3, the closest of the 3 commercial towers.
- The development will be visible from apartments on all levels of the building with a west facing elevation.
- The development of Commercial Building C3 will affect existing oblique views to the south west over Darling Harbour and Pyrmont. Due to the distance and oblique angle of the development from e Highgate, the impact of the development on these views is limited. This impact is consistent with the view impact considered as part of the Concept Plan (Mod 4) assessment.
- Existing views to the north, south, west and east will be unaffected by any of the three commercial buildings. Specifically the proposal will have no impact on the primary views available from Highgate to the west, north west and north over Sydney Harbour.

Georgia

- Georgia (155 Kent Street) is located north of the alignment of Gas Lane, approximately 125m north of Commercial Building C3, the closest of the 3 commercial towers.

- The development will be visible from apartments on all levels of the building with a west facing elevation. There are no apartments in the building with windows or balconies on the south facing elevation.
- The development of Commercial Building C3 will affect existing oblique views to the south west over Darling Harbour and Pyrmont. This impact is consistent with the view impact considered as part of the Concept Plan (Mod 4) assessment.
- Existing views to the north, south, west and east will be unaffected by any of the three commercial buildings. Specifically the proposals will have no impact on the primary views available from the Georgia to the west and north west over Sydney Harbour.

Stamford Marque

- Stamford Marque (161 Kent Street) is located north of the alignment of Gas Lane, approximately 110m north of Commercial Building C3, the closest of the 3 commercial towers.
- The development will be visible from apartments on all levels of the building with a west facing elevation.
- The development of Commercial Building C3 will affect existing oblique views to the south west over Darling Harbour and Pyrmont. This impact is consistent with the view impact considered as part of the Concept Plan (Mod 4) assessment.
- Existing views to the north, south, west and east will be unaffected by any of the three commercial buildings. Specifically the proposals will have no impact on the primary views available from Stamford Marque to the west and north west over Sydney Harbour.

Stamford on Kent

- Stamford on Kent (183 Kent Street) is located south of the alignment of Gas Lane, approximately 80m north of Commercial Building C3, the closest of the 3 commercial towers.
- As the closest of the four residential buildings, Stamford on Kent will be the most affected by the development of Commercial Buildings C3, C4 and C5. The development will be visible from apartments on all levels of the building with a west facing elevation. There are no apartments in the building with windows or balconies on the south facing elevation.
- The development of Commercial Building C3 will affect existing oblique views to the south west over Darling Harbour and Pyrmont. This impact is consistent with the view impact considered as part of the Concept Plan (Mod 4) assessment.
- Existing views to the north, south, west and east will be unaffected by any of the three commercial buildings. Specifically the proposals will have no impact on primary views available from Stamford on Kent to the west and north west over Sydney Harbour.

Other Kent Street Buildings

In addition to the above buildings, the view impacts on other non-residential buildings on Kent Street such as 187-219 Kent Street have also been considered and have been determined to be comparable to the impacts identified for the buildings listed above. This impact is consistent with the view impact assessed as part of the Concept Plan (Mod 4).

5.7 Remediation and Contamination

As identified at Sections 1.1.3 and 4.20 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 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 Commercial Building C3 Project Application include some excavation works for the piling and core of the proposed building that extend 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 II**). 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 II**). 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).

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 II**). 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 (see **Appendix II**).

Full details of the soil and groundwater contamination and exceedance levels within the Project Application site are documented in the ORWS RAP (see **Appendix II**).

Works pursuant to 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 the 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 (the subject of a separate Project Approval).

In accordance with Clause 7(1)(b) of SEPP 55, as the excavation and piling works included in the Commercial Building C3 Project Application that are additional to those already approved under the Basement Car Park Approval are to be carried out on contaminated land, the consent authority must be 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.

The proposed Commercial Building C3 Project Application works will be carried out in accordance with the ORWS RAP included at **Appendix II.**

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 II**). The Site Auditor's Report (**Appendix II**) advises that the Basement Car Park Approval site (which includes the whole of the land that forms the Commercial Building C3 Project Application 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 (see attached letters from OEH dated 11 July 2011 and 15 July 2011 in **Appendix II**).

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

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

The ORWS RAP, which is to be applied to the Commercial Building C3 Project Application works 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.

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 Building C3 is included at **Appendix II**.

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.

It is noted that the Basement Car Park (Mod 3) Application, which seeks to amend the design of the basement, will not affect the ability for Commercial Building C3 to satisfy the requirements of SEPP 55.

5.8 Overshadowing Impacts

Shadow diagrams for the proposed development have been prepared by Lend Lease and are included at **Appendix Q**. The shadowing analysis has been prepared for hourly intervals between 9am and 4pm at the winter solstice (June 21) and the equinoxes (March 21 and September 21) and summer solstice (December 21) and compares the existing CBD and proposed Commercial Building C3 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 3 from the maximum development block envelope.

Shadowing from existing CBD buildings is shown in grey. The Block 3 envelope is shown in red line and the Commercial Building C3 shadows are shown in fluorescent yellow.

It is noted that whilst the following assessment of overshadowing has been undertaken for Commercial Building C3 in isolation, the additional shadow cast

by the building in relation to the future shadows cast by the approved Commercial building C4 would result in a lesser shadow impact.

June 21

The shadow analysis indicates that some additional shadowing will occur on Sydney Wharf (between Barangaroo and Darling Island) between 8am and 10am. The Wharf currently accommodates the Australian Maritime Museum on its eastern side and some upper level residential uses. However, by 10am, the shadows have receded into Darling Harbour, and by 12pm Commercial Building C3 will not shadow buildings to the west, the Darling Harbour waterway or the future Waterfront Promenade. It is considered that this period of additional shadowing (to the west) is acceptable given that no further shadowing to western properties occurs after 10am in the midwinter period. In addition, the key lunch time period (12 midday to 2pm) associated with the peak demand for recreational boating activity, demonstrates that a significant portion of direct sunlight will be available to the waters of Darling Harbour.

By 1pm any additional shadowing is largely confined to predominantly commercial buildings to the south. To the east, the areas of 'potential' additional shadowing fall over the Western Distributor and commercial/hotel buildings.

Some shadowing of the Waterfront Promenade and adjoining public domain (particularly City Walk) occurs throughout the day.

Commercial Building C3 will not result in any additional shadowing impacts on June 21 beyond those envisaged by the approved Concept Plan (Mod 4).

March 21

The shadow analysis indicates that between 8am and 9am some additional shadowing will be experienced on Darling Island from Commercial Building C3.

As per the June 21 period, the extent of shadowing from the maximum development block envelopes on the waters of Darling Harbour reduces progressively between 10am and 12pm. By 12pm, being the commencement of the key lunch time period (12 midday to 2pm) shadows are almost confined entirely within the Barangaroo site. There will be a significant portion of direct sunlight available to the waters of Darling Harbour.

Shadowing over the CBD occurs in the afternoon period across the Western Distributor, and commercial buildings to the east.

Some shadowing of the Waterfront Promenade and adjoining public domain (particularly City Walk) occurs throughout the day.

Commercial Building C3 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 some additional shadowing of the waters of Darling Harbour at 8am. By 11am, the Darling Harbour waterway is also almost completely free of shadows. Again, the waterway is completely free of shadowing and will receive direct sunlight throughout the peak period (12pm to 2pm) for use by recreational boat users.

Shadowing over the CBD occurs in the afternoon period across the Western Distributor, and commercial buildings to the east.

Some shadowing of the Waterfront Promenade and adjoining public domain (particularly City Walk) occurs throughout the day.

Commercial Building C3 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 Commercial Building C3 are acceptable given that:

- the extent of shadowing to properties to the west falls mainly over commercial buildings, does not impact on parks to the west and is for a short period of time between 9am and 10am in mid winter; and
- 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 3 control envelopes included in the approved Concept Plan (red line) and demonstrated that Commercial Building C3 shadows are less than the shadowing approved for Block 3 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; and residential properties to the east and west are largely unaffected and do not experience any more shadowing than envisaged by the Concept Plan (Mod 4);
- 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; and
- the overshadowing impacts are less than with the approved Concept Plan (Mod 4).

5.9 Wind

A Wind Tunnel Study for proposed Commercial Building C3 has been prepared by Cermak Peterka Petersen (CPP) and is included at **Appendix P**.

The Wind Tunnel Study had modelled the proposed Commercial Building C3 to assess pedestrian wind comfort in isolation to other development within Barangaroo South.

A model of proposed Commercial Building C3 and surrounds to a radius of 570 metres was constructed at a scale of 1:400. The 570 metre radius represents an adequate portion of the adjoining environment to be included in a proximity model.

The testing was under taken for three different configurations:

- Configuration A: Commercial Building C3 with the existing environment;
- Configuration B: Commercial Building C3 with the existing environment and proposed Commercial Building C4 (Mod 1)(for which approval is currently being sought); and
- Configuration C: Commercial Building C3 with the existing environment and the remaining buildings in the Barangaroo Concept Plan.

The wind tunnel testing methodology is identified at Section 2 of the Wind Tunnel Study.

The adopted environmental wind criteria used in the wind study is that developed by Lawson (1990) as set out at **Table 11**. 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.

Table 11 - Summary of environmental wind criteria (Lawson, 1990)

Comfort (maximum of mean or gust equivalent mean wind speed exceeded 5% of the time	
<4 m/s	Pedestrian sitting (considered to be of long duration)
4 – 6 m/s	Pedestrian standing (or sitting for a short time or exposure)
6 – 8 m/s	Pedestrian walking
8 – 10 m/s	Business walking (objective walking from A to B or for cycling)
> 10 m/s	Uncomfortable
Distress (maximum of mean or gust equivalent mean wind speed exceeded 0.022% of the time)	
<15 m/s	Not to be exceeded more than 2 times per year (or one time per season) for general access area
<20 m/s	Not to be exceeded more than 2 times per year (or one time per season) where only able bodies people would be expected, frail or cyclists would not be expected

Velocity profile measurements were taken to verify that appropriate boundary layer flow approaching the site was established and to determine the likely pedestrian level wind climate around the test site. As part of the wind tunnel study, wind speed measurements were recorded at 19 locations to evaluate pedestrian comfort in and around the project site. The locations of pedestrian wind speed measurements are shown on Figures 4 and 5 in the Wind Tunnel Study.

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 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 locations tested around the development site are susceptible to winds from different directions, depending on the relative location of the point tested to the geometry of development.

The result of the wind tunnel testing under Configuration A illustrate that the wind environment for pedestrian comfort around the proposed development is quite variable.

The results under Configuration A show that wind conditions around the site are generally poorer than at the well known areas remote from the site and in some cases would be classified as uncomfortable and fail the distress criteria. This wind environment around Commercial Building C3 is primarily due to the isolated nature of the building. When wind hits a relatively large isolated building, the wind is accelerated down and around the windward corners in a mechanism called downwash. Due to the isolated nature of the building, winds from the north and south quadrants produces significant downwash from the exposed face of the building, resulting in strong mean wind conditions along the east and west faces.

Configuration B demonstrates that with the development of the approved Commercial Building C4 and the proposed C5, the buildings are expected to provide significant shielding to winds from the south, generally improving the wind condition around the site at most locations. The site will remain exposed from the north and west. Commercial Building C4 will also channel the flow of winds from the west quadrant causing windier conditions. However, these conditions will improve even further with the development of the other buildings envisaged at Barangaroo South under the Concept Plan (Mod 4).

Wind conditions along the east side of the building were considered to be suitable for pedestrian walking under all three configurations. The south eastern corner of the building was found to be uncomfortable and failed the distress criterion under Configuration A but improved significantly under the more developed Configurations B and C.

Wind conditions at the southern face of the building are considered to be suitable for pedestrian walking under Configuration A and B and improves to pedestrian sitting under Configuration C. It is noted that this area is located near the main entrance, and is therefore a suitable wind climate for this location.

Wind conditions on the west face were considered suitable for business walking under Configuration A, with one location failing the distress criterion. The introduction of Commercial Building C4 under Configurations B and C will alter the flow of air around the buildings and will result in improved wind conditions, with all locations being considered suitable for pedestrian standing and passing the distress criterion.

Wind conditions along the north face of the building under Configuration A were suited to pedestrian standing, and passed the general distress criterion. Under Configurations B and C one of the locations will not pass the general distress criterion as the massing of Commercial Building C4 encourages slightly more flow around the north of Commercial Building C3 during winds from the western quadrant. As a result the wind tunnel study recommends that a combination of vertical and horizontal screening be provided in the vicinity of these points.

The Wind Tunnel Study concludes that under Configuration A, without appropriate ameliorative measures wind conditions at certain locations around the building would not be acceptable for general pedestrian access. However, the wind conditions around the building will improve to a satisfactory level with the future construction of the other Barangaroo buildings; particularly Commercial Buildings C4 and C5 to the south of the site.

In the event that Commercial Building C3 is constructed prior to Commercial Building C4, temporary structures would be required to ameliorate the wind conditions.

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

5.10 Reflectivity

A Reflectivity Study for Commercial Building C3 has been prepared by ARUP and is included at **Appendix R**. 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 the proposed Commercial Building C3 performs well in terms of solar reflectivity, and glare affecting drivers on surrounding streets will not exceed the limits of acceptability.

Glare risks have been eliminated from those facade aspects that could potentially cause reflections affecting traffic, either because surrounding buildings and topology or other parts of the building itself will be blocking reflections that could cause potential glare on drivers.

The only exceptions occur on the south façade of the lower part of the tower, where glancing reflections of low angle sun may cause glare to drivers on Napoleon Street. There is also potential for reflections from the north-west façade of the podium, if this is a fully glazed façade, and assuming traffic is present on the proposed roadway on the Barangaroo North site. To mitigate any reflectivity impacts, the expressed mullions on the relevant part of the south facade have been kept to a minimum of 150mm protrusion from the face of the reflecting glazing. The design of the podium facades has also employed measures such as the provision of external vertical sunshades, the use of predominantly non-reflective materials and the outward sloping glazing.

The Reflectivity Study found that every facade aspect can have a maximum external 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 overshading effects from future proposed buildings on the wider Barangaroo South site and surrounding vegetation, or reduction of facade reflectivity through spandrel cladding, external shading devices and reduced external glass reflectivity.

From the perspective of pedestrians moving along roadways where any glare from reflections may occur, the observer is easily able to adjust their view and thus reduce the glare impacts of reflections. The Reflectivity Study concludes that pedestrians are easily able to adjust their view in any location where unwanted reflections may be received, reducing the impact of the reflections.

5.11 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 T**; and
- Travel Demand Management Plan at **Appendix U**.

The Construction Traffic Management Plan is addressed further at Section 5.27. The assessment and conclusions contained within the Supplementary TMAP, which addresses vehicle access arrangements to Commercial Building C3, pedestrian and bicycle links and public transport, and within the Travel Demand Management Plan, are summarised below.

5.11.1 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.

A Supplementary TMAP was prepared for both the Basement Car Park Project Application and the Commercial Building C4 Project Application that addressed

the changes to the September 2008 TMAP. The Supplementary TMAP for this Project Application takes the same approach.

Traffic Generation

Traffic generation rates for Commercial Building C3 have been assessed based on the following assumptions that were included in the September 2008 TMAP:

- commercial and retail trips split of 80% inbound and 20% outbound trips during the AM peak and 80% outbound and 20% inbound trips during the PM peak;
- traffic generation resulting from the 12 short term on-street car parking spaces to be provided on Globe Street has already been included in the Commercial Building C4 traffic generation forecasts;
- short term on street car parking is assumed to generate trips at twice the rate as commercial land uses;
- estimated service vehicle trips are based on comparable commercial buildings; and
- drop offs and taxis are estimated on a mode share target of 4% for journey to work trips by car.

The traffic generation of the site is constrained by the low parking provision rate for commercial and retail uses adopted under the approved Concept Plan (Mod 4).

Based on the proposed office, retail and childcare uses and GFA allocation, Commercial Building C3 is estimated to generate 149 two-way vehicle movements in the AM peak hour and 139 vehicle trips in the PM peak hour. When combined with the forecast traffic from Commercial Buildings C3 and C4, there is estimated to be 419 two-way vehicle movements in the AM peak hour and 389 vehicle trips in the PM peak hour.

As referenced in the September 2008 TMAP, a Paramics model of the Sydney CBD was utilised to test traffic options with different trip generations and traffic management measures for the completed Barangaroo development. For Commercial Building C3 ARUP has undertaken further specific traffic modelling using LINSIG of the nearest five and most relevant intersections being:

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

The existing peak hour traffic conditions and operations of these intersections were surveyed in April 2010 to determine their Level of Service (LOS) as well as degree of saturation and average delay per vehicle. ARUP has also modelled the forecast intersection performance as a result of the development of Commercial Buildings C3 and C4. The existing and forecast LOS of the five intersections is detailed in **Table 12** below. Full results of the modelling are contained in the Supplementary TMAP at (**Appendix D**).

Table 12 – Comparison of Intersection Level of Service

Peak	Intersection	Existing LOS*	Forecast LOS
AM	Sussex Street and Shelley Street	A	B
	Sussex Street and Erskine Street	B	B
	Erskine Street and Shelley Street	A	A
	Hickson Road and Napoleon Street	A	B
	Hickson Road and Globe Street	N/A	A
PM	Sussex Street and Shelley Street	A	A
	Sussex Street and Erskine Street	B	C
	Erskine Street and Shelley Street	A	A
	Hickson Road and Napoleon Street	A	B
	Hickson Road and Globe Street	N/A	B

* LOS A = describes free-flow operations.
LOS B = describes reasonable free-flow operations.
LOS C = describes at or near free-flow operations.

The modelling demonstrates that key intersections will perform similar to existing conditions and there will only be minor increases in the degree of saturation and average delay per vehicle times following the full occupation of Commercial Buildings C3, C4 and C5. 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.

Access and Circulation

Vehicular access to Commercial Building C3 at ground level will be via the newly constructed Globe Street, which will connect to Hickson Road and Lime Street (as proposed in the Basement Car Park Mod 3 Application and Commercial Building C4 (Mod 1) Application).

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 car parking will be provided via the Lime Street extension. Should the Basement Car Park Mod 3 Application be approved, vehicular access to the modified basement car parking will be provided via the Hickson Road entry to the north of the site. It is noted that adequate access to the basement car parking for Commercial Building C3 will be provided regardless of the outcome of the Basement Car Park (Mod 3) Application.

Commercial Building C3 and the surrounding public domain has been designed to integrate with the basement car park entry and exit arrangements in a manner that ensures pedestrian safety and visual amenity, as demonstrated by the plans included at **Appendix A** and **K**.

Car Parking

As outlined in Section 4.10, this Project Application seeks approval for 196 car parking spaces associated with Commercial Building C3.

The proposed number of car parking spaces complies with the relevant parking rates under the approved Concept Plan (Mod 4), based on the development comprising 106,568m^2 GFA for office (including lobby), 8,723m^2 GFA for retail and community uses.

It is noted that if approved the Basement Car Park Mod 3 Application will reduce the total number of car spaces provides within the basement. However, this reduction will not affect the basement's ability to accommodate the parking required to support the proposed development.

The proposed provision of commercial car parking in this Project Application (as required by the approved Concept Plan) represents a much stricter provision of commercial car parking than that permitted elsewhere in the Sydney CBD. By way of comparison, the City of Sydney commercial parking rate prescribed by the Central Sydney Local Environment Plan 2005 is 1 space per 340m^2 GFA. Lower car parking provision is considered important to achieving the sustainability goals set for Barangaroo South as well as limiting potential traffic generation by the site and thereby limiting potential impacts to the local road network.

Loading Docks

Shared loading dock arrangements form part of the Basement Car Park Approval which makes provision for garbage compactors, truck and van docks, and a range of courier spaces. Access to the loading dock bays is to be controlled by the loading dock manager. The proposed provision of loading dock spaces is set out at **Table 4** included at Section 4.10.

The provision is less than the requirements of the Central Sydney DCP, however it is considered that a more sustainable outcome for the provision of loading and refuse collection can be achieved by effective management of loading dock activities.

5.11.2 Travel Demand Management Plan

A Travel Demand Management Plan for Commercial Building C3 has been prepared by ARUP and is included at **Appendix U**.

The Travel Demand Management Plan is a package of measures designed to encourage sustainable travel whilst commuting to work and during the course of work, including business and delivery travel or other visitors to the site. It is a means for an organisation to demonstrate a commitment and take pro-active steps towards improving the environmental sustainability of its activities. It also includes key off-site initiatives that can be implemented through consultation and commitment from key stakeholders such as transport agencies and council.

A Work Place Travel Plan (which is sometimes referred to as a Green Travel Plan) is a key component of the Travel Demand Management Plan.

The Work Place Travel Plan for Commercial Building C3 addresses:

- the objectives for Commercial Building C3 in terms of travel;
- the physical and management measures that should be implemented; and
- the management, implementation and administration of the measures.

The key objectives of the Work Place Travel Plan are:

- high modal share for public transport, cycling and walking to work and residential journeys;
- to ensure adequate facilities are provided at the site to enable staff and visitors to commute by sustainable transport modes;
- to reduce the number of car journeys associated with business travel by staff and visitors;
- to facilitate the sustainable and safe travel of new employees;
- to reduce the need to travel for work related activities, particularly air travel; and
- to raise awareness of sustainable transport amongst staff.

The mode split target for Commercial Building C3 is consistent with the overall mode split for the Barangaroo South development.

Physical and management measures included in the Work Place Travel Plan include measures relating to:

- general marketing and promotion;
- reducing the need to travel;
- spreading travel demand;
- travel during the working day;
- cycling;
- public transport;
- walking;
- pool cars, taxi share and shuttle bus service;
- way finding and urban informatics;
- staff induction; and
- visitor travel / site access information.

A summary of measures that can be implemented is presented at Appendix A of the Travel Demand Management Plan.

An essential part of an effective Work Place Travel Plan is to nominate a Travel Plan coordinator for each business / tenant within Commercial Building C3. Each representative would form a Travel Plan Management team enabling a consistent and organised approach for the whole building, with one person selected to represent and lead the Work Place Travel Plan initiatives for the whole Commercial Building C3.

The success of a Work Place Travel Plan relies on the support of employees, overseen by a Work Place Travel Plan co-ordinator who will be responsible for all liaisons with outside bodies, including local transport operators, planning and highway authorities. Processes will be put in place to ensure that all employees will be made aware of the details of the Work Place Travel Plan, its objectives and the role of individuals in achieving its objectives.

The Work Place Travel Plan is a strategy that will evolve over time. Following the implementation of the Work Place Travel Plan, the Work Place Travel Plan management team should meet annually to undertake a review of the Travel Plan measures, to measure their success, and to identify the potential for refinements. The requirement for implementation of the Work Place Travel Plan, has been incorporated into the Statement of Commitments at Section 6.0.

5.12 Climate Change and Sea Level Rise

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

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 Sea Level Rise Policy Statement* and *NSW Draft 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 +3.50 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 Commercial Building C3 is 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 3.50m 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.

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

5.13 Ecologically Sustainable Development

ARUP has prepared an Ecologically Sustainable Development (ESD) report which is included at **Appendix W**.

The Stormwater Management Plan (**Appendix O**) and ESD Report (**Appendix W**) 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 Commercial Building C3, consistent with the sustainability requirement included in the Concept Plan Statement of Commitments.

Commercial Building C3 will be designed to achieve a 6 Star Green Star Office Design Rating under Version 3 of the Green Building Council of Australia's Office tools.

ARUP has assessed the requirements necessary to achieve a 6 Star Green Star Office Design. In order to achieve a 6 Star Green Star Office Design rating, an overall minimum weighted score of 75 point is required. Subject to detail design, ARUP has calculated that the proposed design is capable of achieving an overall weighted score of 78. Therefore a minimum 6 Star Green Star Office Design rating will be achieved.

In order to achieve a 6 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 including secure storage, change rooms showers and lockers;
- allocation of 25% of car parking spaces to be designed for small cars;
- 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 are set out in section 6(2) of the *Protection of the Environment Administration Act 1991* (NSW). The principles of ESD include intergenerational equity, the precautionary principle, conservation of biological diversity and ecological integrity and improved valuation, pricing and incentive mechanisms.. The principles of ESD have informed the design, construction and proposed operation of Commercial Building C3.

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, Commercial Building C3 is 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 Commercial Building C3. Consistent with the precautionary principle, the proposal for Commercial Building C3 has been formulated so as to mitigate against the risk of environmental degradation.

Construction of Commercial Building C3 will involve piling during the construction stage that may contain contaminated material which requires remediation. As detailed in Section 5.7, 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 II**) 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 (OWRS RAP) (see **Appendix II**). 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) (see **Appendix II**).

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 II**). The HHERA and the ORWS RAP were then subsequently approved by the Office of Environment and Heritage (OEH) **(see Appendix II**) and the Minister for Planning and Infrastructure (see **Appendix II**). A letter confirming that the Site Audit Report and Site Audit Statement for the ORWS RAP can be relied upon as being relevant to Commercial Building C3 is included at **Appendix II**.

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 Commercial Building C3.

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 Commercial Building C3 maintains or otherwise enhances the health, diversity and productivity of the environment for the benefit of future generations.

The proposed development of Commercial Building C3 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, 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 4.13, which include achieving a 6 Star Green Star Rating, demonstrate that significant investment and effort has and will be undertaken during the design, construction and operation of Commercial Building C3 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 5.7, 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. For example, it is noted that extensive solar modelling has resulted in the proposed shading elements for the Commercial Building C3 that will minimise internal heat gain and demands for cooling whilst maximising user comfort and views from the offices. Additionally, the building design acknowledges that workplaces of the future will evolve and needs will change and proposes flexible and adaptable floor plates to accommodate the changing needs of future generations (including full and part time workers, freelancers, mobile or virtual workers).

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 Commercial Building C3 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 5.7, demonstrates that no material risk will arise to the conservation of biological diversity or ecological integrity as a result of Commercial Building C3.

The proposed sustainability measures detailed in Section 4. 13, which include achieving a 6 Star Green Star Rating, demonstrates at that significant investment and effort has and will be undertaken during the design, construction and operation of Commercial Building C3 to ensure that ecological integrity is achieved.

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.

Improved Valuation, Pricing and Incentive Mechanisms

ESD involves the internalisation of environmental costs into decision making for projects likely to affect the environment. Commercial Building C3 responds 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 Commercial Building C3;
- 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. It is designed to deliver greater than 80% diversion of operational waste from landfill (refer to Section 5.23 Operational Waste Management);

- the proposed environmental measures and initiatives included within Commercial Building C3 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 Commercial Building C3);
- the proponent is funding all environmental measures and initiatives in connection with Commercial Building C3 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 Commercial Building C3, 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.

5.14 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 Commercial Building C3 Project Application site) to accommodate the basement car park, plant areas and ancillary areas. However, as detailed in Section 4.20 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 Commercial Building C3 (refer to **Appendix X**). The advice confirms that the excavation works associated with the construction of the basement car park will remove any archaeological resource from the Commercial Building C3 site area. Therefore there will be no impacts on the archaeological resource from works associated with the further excavation associated with the construction of Commercial Building C3.

A copy of the Non-Indigenous Archaeological Assessment is included at **Appendix F** of this EAR for reference purposes only. A copy of the Aboriginal Archaeological and Cultural Heritage Assessment is included at **Appendix G** of this EAR for reference purposes only. The archaeological and heritage assessments and strategies detailed in these reports form part of the Bulk Excavation and Basement Car Parking Project Approval and do not form part of this Project Application.

It is also noted that as required by the Concept Plan Statement of Commitments, an Archaeological Management Plan and Research Design strategy was prepared by Casey and Lowe and submitted to the Department of Planning and Infrastructure with the Bulk Excavation and Basement Car Parking Project Application. The management plan provides guidance and methodologies for undertaking the archaeological program within the approved development. A copy of the Management Plan is included at **Appendix H**.

5.15 Operational Noise and Vibration

5.15.1 Noise

An Operational Acoustic Study has been prepared by Wilkinson Murray and is located at **Appendix Y**. The assessment relates to the operational aspects of Commercial Building C3. A separate construction noise assessment has been undertaken and is detailed at Section 5.25.

Noise generating activities associated with the operation of Commercial Building C3 include services plant, retail tenancies and traffic entering and leaving the building. The Operational Noise Assessment includes a noise survey 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;
  - occupants of the child care centre and preschool on High Street;
  - commercial premises at Jones Bay Wharf; and
  - the Temporary Passenger 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;
  - The Sussex Hotel on Sussex Street; and
  - Former WMS stores on Jenkins Street.

Noise and Vibration Criteria and Guidelines

Wilkinson Murray has assessed the proposal against the following relevant criteria and guidelines:

- the NSW Industrial Noise Policy;
- the OEH Road Noise Policy; and
- Assessing Vibration: a Technical Guide.

The NSW Industrial Noise Policy provides guidelines for assessing noise impacts from development sites. The policy contains both amenity and intrusiveness criterion. The amenity criteria are designed to limit the absolute noise level from all industrial noise sources to a level that is consistent with the general environment. The intent of the intrusiveness criteria is to limit the audibility of noise emissions at residential receivers, requiring that noise emissions do not exceed background noise levels by more than 5dB(A).

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 13** below.

Table 13 – Site Specific Criteria for Commercial Building C3 Assessment

Site	Type of Receiver	LAeq,15min (dBA) Daytime (7-8pm)	Evening (6-10pm)	Night Time (10pm-7am)
38 Hickson Road, Millers Point	Residential	58	50	45
37 High Street, Millers Point	Residential	52	49	45
187 Kent Street, Millers Point	Residential	58	50	45
155-157 Kent Street, Millers Point	Residential	58	50	45
127-153 Kent Street, Millers Point	Residential	58	50	45
168-170 Kent Street, Millers Point	Residential	58	50	45
56 Merriman Street, Millers Point	Residential	51	49	45
21 Edward Street, Balmain East	Residential	54	45	40
Darling Island Apartments, Pyrmont	Residential	52	49	44
Sydney Wharf Apartments, Pyrmont	Residential	52	49	44
King Street Apartments, Sydney	Residential	57	50	45
The Sussex Hotel, 22-26 Sussex Street	Commercial	65	65	65
The Bond, 30 Hickson Road	Commercial	65	65	-
American Express, Shelley Street	Commercial	65	65	-
Temporary Cruise Passenger Terminal	Commercial	65	65	65

Land uses with the potential to create additional traffic on local roads should also comply with the requirements outlined in the Environmental Criteria for Road Traffic Noise (ECRTN) under the NSW Road Noise Policy. Based on the ECRTN criteria, noise level goals at residential receivers are:

- $L_{Aeq,15hr}$ day – 60dBA
- $L_{Aeq,9hr}$ day – 55dBA

Wilkinson Murray has also set out the internal noise criteria for spaces within Commercial Building C3. *Australian Standard 2107 Acoustics – Recommended Design Sound Level and Reverberation Times for Building Interiors*. The noise criteria for the relevant occupancy types are set out in **Table 14**.

Table 14 – Recommended Internal Noise Levels for Various Spaces

Type of Occupancy	Recommended Design Sound Level (dBA) Satisfactory	Maximum
Office Buildings		
Board and Conference Rooms	30	40
General office areas	40	45
Public spaces	40	50
Reception areas	40	45
Shop Buildings		
Small retail shops	45	50
Specialty shops	40	45

Noise Impact Assessment and Recommendations

The report concludes that the noise impacts to surrounding commercial and residential receivers from mechanical plant and traffic have been assessed on a 'whole of site' basis and found to meet the required OEH noise limits. Whilst detailed plant selections have not yet been made, indicative noise emissions have been determined. Based on indicative plant noise levels, the predicted noise levels at surrounding receivers are well below the site specific noise criteria. The final design will need to be assessed at detailed design stage to ensure that compliance with established noise criteria is achieved when specific plant selection and design is known.

Noise impacts from additional traffic due to Commercial Building C3 on surrounding roads are predicted to be well within relevant criteria, and this is also believed to be true for traffic generated by the entire site, although details of total traffic generation are not available at this stage.

Noise impacts within the building due to surrounding sources will be mitigated through careful design of the building facade and mechanical services systems to ensure that receivers are not impacted by noise produced by road, mechanical plant or public entertainment.

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

5.15.2 Vibration

Commercial Building C3 will be designed to meet the vibration levels specified in the OEH document *Assessing Vibration: A Technical Guideline*. The vibration limits in different occupancies for continuous vibration sources are show in **Table 15**.

Table 15 – Vibration limits for Varying Occupancies

Location	Maximum z-axis weighted rms acceleration (m/s^2)		Vibration Dose Value ($m/s^{1.75}$)
	Continuous	Impulsive	Intermittent
Residential areas (night)	0.007	0.10	0.13
Residential areas (day)	0.010	0.30	0.20
Office areas	0.020	0.64	0.40
Workshops (i.e. retail tenancies)	0.040	0.64	0.80

Wilkinson Murray has concluded that vibrations produced by operations within the development are unlikely to be detectable, and will be significantly below the limits outlined above.

It is considered highly unlikely that any commercial tenant would engage in vibration intensive operations. Further, appropriate measures can be implemented to mitigate any potential vibration associated with the car park and mechanical plant.

These recommendations have been incorporated into the Statement of Commitments at Section 6.0.

5.16 Building Services

A Building Services Report for Commercial Building C3 has been prepared by ARUP and is included at **Appendix M**. The Building Services Report provides details on the services infrastructure and design for Commercial Building C3 and addresses:

- mechanical services;
- electrical, communications, security and lighting services;
- fire and hydraulic services; and
- vertical transportation services.

The information presented in the Building Services Report identifies the sustainability targets adopted for proposed building services including the 6 star Green Star Office Design Rating Version 3. It also identifies relevant design criteria for adoption in the selected mechanical services including air conditioning, heating and ventilation. Refer also to Section 4.15.

As detailed in the Building Services Report:

- Mechanical services will meet design criteria that are standard for the Sydney CBD.
- Electrical services will be completed in accordance with the relevant standards and requirements including Ausgrid 33kV network standards. Site wide infrastructure for the distribution network supply is subject to a separate approvals process.
- Lighting will comply with relevant Australian Standards and the BCA. External building lighting (including within public domain areas) will be installed to provide interest, highlighting architectural features. No light beam will be directed beyond the site boundaries or upwards without falling directly on a surface to minimise light pollution. Lighting will be controlled by photoelectric cells or time switches.
- Lead-in communications cable routes will be provided for 3 service providers.
- A complete electronic security system will be provided for the base building including a central supervisory system, access control system, CCTV system, intruder alarm system and intercommunication system.
- Commercial Building C3 will be provided with a modern, high performance vertical lift and escalator system, designed and installed in accordance with the relevant requirements of the Lift Code AS 1735, the BCA and Workcover Authority requirements.
- Fire detection, emergency warning and fire protection systems for the building shall be designed and installed in accordance with the BCA and all relevant standards and coordinated with the fire engineering solution at Construction Certificate stage.
- A comprehensive set of fire safety management and evacuation plans will be developed consistent with all fire protection equipment to be installed and EPA regulations relating to fire safety.

The above recommendations have been incorporated into the Statements of Commitments at Section 6.0.

5.17 Building Code of Australia (BCA)

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 key findings and recommendations of the BCA Assessment in relation to fire safety are detailed at Section 5.18.

The key findings and recommendations of the BCA Assessment in relation to access for persons with a disability are detailed at Section 5.19.

Recommendations detailed in the BCA Assessment have been incorporated into the draft Statements of Commitments at Section 6.0.

5.18 Fire Safety

Fire Safety is addressed in the Building Services Report prepared by ARUP at **Appendix M**, the BCA Assessment prepared by McKenzie Group Consulting at **Appendix Z**, and in the Fire Engineering Statement prepared by ARUP at **Appendix N**.

As detailed in the BCA Assessment at **Appendix Z**, Commercial Building C3 will be constructed generally in accordance with Part C of the BCA. The building has been assessed on the basis of the following fire separation / compartmentation within the development:

- separation between the car park levels and the retail portions;
- separation between the retail levels and the commercial portions; and
- fire compartmentation of the building at each floor level as appropriate.

The BCA Assessment identifies that the egress provisions from the proposed building are provided in fire isolated stairways and external perimeter doorways. The locations of the proposed exits would appear to indicate that the travel distances, distances between alternative exits and egress widths will comply with the BCA.

Other issues that will need to be addressed at the detailed documentation phase include:

- door hardware;
- exit door operation;
- stair construction;
- handrail and balustrade construction;
- details of separation of rising and descending stairs;
- discharge from the fire isolated exits; and
- details of the egress provisions to the road.

The following fire services will need to be provided throughout the building:

- an automatic sprinkler system in accordance with the relevant provision of Part E of the BCA;
- fire hydrants in accordance with the BCA;
- fire hose reels in accordance with the BCA;
- portable Fire Extinguishers in accordance with BCA;
- sound System and Intercom System for Emergency Purposes in accordance with the BCA; and
- emergency lighting, exit signage and directional exit signage is required throughout the building in accordance with Part E of the BCA.

A fire control room will need to be provided to Building C3 in accordance with Part E of the BCA.

Smoke hazard management will be provided throughout the building by means of:

- an automatic air pressurisation system to the fire isolated exits;
- zone smoke control system; and
- an automatic smoke exhaust system to BCA Part E.

Throughout the development the provision of natural or mechanical ventilation is required to all habitable rooms in accordance with Part F of the BCA.

Other passive fire protection issues that will need to be addressed in detailed documentation phase include:

- lift motor rooms
- emergency power supply
- emergency generators
- electricity supply
- boilers or batteries
- hydrant pump rooms
- sprinkler pump rooms

The fire hazard properties of fixed surface linings and mechanical ductwork will also need to be addressed within the detailed documentation phase pursuant to specification C1.10 BCA.

The above recommendations have been incorporated into the Statements of Commitments at Section 6.0.

Where items for which an alternate solution is prepared relate to 'Category 2' items under the *Environmental Planning and Assessment Regulation 2000*, approval will be required by the NSW Fire Brigade as part of the Construction Certificate process.

As also detailed in the Building Services Report (**Appendix M**) and the Fire Engineering Statement (**Appendix N**), the fire safety strategy for Commercial Building C3 is to be developed to meet the performance requirements of the BCA via either the deemed to satisfy provisions, or, where the building falls outside of those provisions, through performance based fire engineering design.

The fire safety strategy will address:

- features that focus on providing complementary outcomes to the building services strategy to minimise the need for additional fire safety provisions;
- emergency egress for disabled or mobility impaired persons;
- connections to adjoining areas such as the basements; and
- fire brigade access and provisions.

A commitment to prepare a detailed Fire Safety Strategy as part of the Construction Certificate documentation is included in the Statements of Commitments at Section 6.

The draft Statement of Commitments has also committed Lend Lease to the preparation of the Fire Safety Strategy in consultation with the NSW Fire Brigade, building certifiers, building insurers and relevant stakeholders. The commitments obligate Lend Lease to undertake stakeholder consultation early in the design process to provide Lend Lease with the opportunity to appropriately resolve all fire safety engineering matters and proposed evacuation strategy(ies).

5.19 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 Commercial Building C3, 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.

Commercial Building C3 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.

A central black water treatment plant is proposed to be provided in the combined basement of the Barangaroo South development to treat waste water to Grade A standard for distribution across the development, including to Commercial Building C3. The central recycled water system will enable Commercial Building C3 to minimise potable water consumption and minimise discharge to sewer. This treatment plant will be the subject of a future application.

It is noted that as described at Section 1.1.3 existing site services with the Commercial Building C3 site area 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 Arup for Commercial Building C3 (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 (Commitment 23).

5.20 Access

An Access Report for Commercial Building C3 has been prepared by Morris-Goding Accessibility Consulting and is included at **Appendix AA**. The report provides an assessment of the proposal against the relevant Australian Standards, provisions from the Building Code of Australia (BCA) and standards contained within the *Commonwealth Disability Discrimination Act 1992* (Cth) (DDA) to ensure that the proposal can comply with relevant statutory guidelines. It contains a number of recommendations to be incorporated into the construction certificate design stage.

The Access Report has been prepared in accordance with the following requirements:

- AS 1428.1 - 2009 (General Requirements of Access);
- AS 1428.4.1 - 2009 (Tactile Ground Surface Indicators);
- AS 1735.12 - (Lifts, Escalators, & Moving Walks);
- AS 2890.6 - (Car Parking);
- BCA - Building Code of Australia; and
- Draft DDA Premises Standards.

The Access Report should be read in conjunction with the BCA Assessment prepared by McKenzie Group Consulting which also assesses compliance of the proposed development with the access for persons with a disability requirements of the BCA (refer to **Appendix Z**).

As detailed in the BCA Assessment and the Access Report, access for people with disabilities will be provided to and within the building in accordance with the requirements of Part D of AS1428.1-2009.

The main entrance will be accessible with a continuous accessible path of travel from surrounding areas in accordance with DDA Premises Standards. It is envisaged that the main entry will be situated where it can link to continuous accessible paths of travel to adjoining retail areas, public domain areas as well as transport linkages such as ferry wharves.

The path of travel from the ground floor lobby area will be made available via the use of passenger lifts to each commercial floor, compliant with BCA and the DDA Premises Standards.

The proposed building envelope demonstrates that sufficient floor area will exist for the circulation areas in front of all lifts on all floors to be able to achieve appropriate circulation spaces as to allow for appropriate manoeuvrability for wheelchair users. It is envisaged that a continuous accessible path of travel can be provided to all floors, including the basement car parking and associated accessible car bays.

Accessible toilets will be provided on all floors in accordance with DDA Premises Standards.

Accessible car parking will be provided in basement car parking levels. The accessible car bays will be located close to the passenger lifts that will provide access to all upper commercial floors.

Facilities, services and features of the building accessible to people with disabilities shall be identified by signage complying with the BCA.

Detailed recommendations are presented in the Access Report to be applied during the construction certificate design stage relating to the design of the:

- main entrance;
- retail entrances;
- emergency egress;
- paths of travel;
- lifts;
- toilets;

- accessible car parking;
- lighting; and
- signage.

Morris-Golding Accessibility Consulting has concluded that subject to demonstrated compliance with the recommendations set out at Sections 3 to 5 of the Access Review, the proposed Commercial Building C3 can achieve accessible paths of travel that are continuous throughout including all floors, basement car parking and associated accessible car spaces; and can comply with the relevant statutory requirements pertaining to ingress / egress, paths of travel, amenities and facilities, lighting and signage.

These recommendations have been incorporated into the Statement of Commitments at Section 6.0.

5.21 Structural Engineering

A Structural Engineering Report for Commercial Building C3 has been prepared by ARUP 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 Commercial Building C3 structure proposed under this Project Application and the basement car parking structure proposed under the Basement Car Park Mod 3Application.

Although the Sydney Metro project is currently on hold, the Structural Engineering Report also considers the proposed Commercial Building C3 with respect to its relationship to the Metro protection corridor.

Metro Protection Corridor

As detailed at **Appendix S**, the footprint of Commercial Building C3 sits outside the Metro protection corridor as defined by the first and second reserve documented in the Development Guidelines for the Sydney Metro Network Line 1 prepared by the Sydney Metro Authority. The proposed foundations of Commercial Building C3 are approximately 114 metres from the face of the Metro tunnel at the nearest point, with all load transferred to foundations below the top of sandstone bedrock on Class III or better quality rock. The top of sandstone bedrock is located at between RL-10m AHD to -24m AHD at the location of the proposed building. On this basis, ARUP has confirmed that the proposed Commercial Building C3 will not impede the Metro rail corridor or affect the future operations of the Metro project.

Building C3 Structural Design

The proposed Commercial Building C3 structure is a reinforced concrete frame stabilised by an arrangement of reinforced concrete shear walls, which may be supplemented by steel bracing elements. The typical floors are proposed to be of in-situ post-tensioned banded slab construction. Proposed foundations are bored piles founded within the Class II sandstone. The piles may be constructed top down from the existing ground level, or from the lowest basement level following excavation.

Alternatives to bored piles include barrettes and caissons, or over-excavation for construction of pad or strip footings founded on Class II/III sandstone. Pre-stressed ground anchors may be required to resist tension forces resulting from wind and seismic loading or construction staging. The foundation design will be developed following incorporation of the results of the additional site geotechnical investigations (refer to Section 5.22)

The vertical structure through the basement will consist primarily of reinforced concrete columns and shear walls utilising medium and high strength concrete. It is intended that all Commercial Building C3 tower columns and primary walls continue uninterrupted through the basement levels to avoid the inefficiency and cost of transfer structures.

The basement slab within the footprint of Commercial Building C3 may be integral to the pile cap and/or link slab between pile caps. The requirement for this slab to be watertight and designed for significant hydrostatic pressure will be dependent on final geotechnical designs and the structural design and detailing of the basement.

An intermediate reinforced concrete floor is intended to be constructed between the main basement level and the ground level across a portion of the Commercial Building C3 footprint, to provide support for ancillary plant rooms, storage areas, and retail back of house areas. This slab will be linked to the Commercial Building C3 tower structure for overall stability.

The design and documentation of the building and associated works shall comply with all relevant Australian Standards and the Building Code of Australia (BCA). This includes standards relating to dead loads, wind loads, seismic loading, earth pressure loading, water pressure loading etc.

5.22 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.

5.23 Operational Waste Management

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

The Waste Management Plan identifies waste sources during operation and proposes measures to manage waste in a way that satisfies all legislative requirements. The Waste Management Plan provides guidance for the project in waste minimisation, nominates effective waste separation, recycling and re-use measures, and includes management requirements for operation.

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.

Lend Lease has adopted an integrated waste strategy for Barangaroo South based on the principles of reduce, reuse, recycle and recover. It is designed to deliver greater than 80% diversion of operational waste to landfill. Achievement of this target will require partnerships and commitments with various third parties and authorities, and will need to be evaluated, measured and reviewed progressively throughout the project life.

The aim is to secure owner and occupant commitment to the following key strategies:

- Sustainable consumption and waste minimisation through education and awareness raising, information and monitoring systems, active intervention and assistance and a focus on product stewardship and extended producer responsibility.
- Source segregation, storage and collection – simple, easy to use systems will be applied across the precinct to maximise source segregation. Waste collection processes will be improved through precinct wide collection of separated waste streams.
- Resource recovery of recyclable waste through the engagement of an approved waste manager/ contractor with a Material Recycling Facility achieving 90-95% recovery of co-mingled recyclables.
- Resource recovery and green power generating using mixed solid waste through approved waste manager / operator's Mixed Waste Processing Facility. Biological treatment can produce inert organic material methane that is used to power an off-site co-generation plant.

Waste volumes for Commercial Building C3 have been estimated in order to determine the waste storage area and waste storage bins which will be required. These waste storage areas and bins have been approved as part of the design for the basement, which is the subject of the Basement Car Park Approval .

All waste estimates are based on the waste generation rates for commercial and retail development provided in the City of Sydney Waste Policy. The waste storage area required is also calculated based on the Plan Area Bin sizes provided in the City of Sydney Waste Policy. A number of different bin size options have been applied to the waste volumes estimated for the waste streams for Commercial Building C3.

As detailed at Section 5 of the Waste Management Plan, a total of 20,637L of general waste and 16,951L of recyclable waste is estimated to be produced by Commercial Building C3 each day. ARUP has estimated that the expected minimum space requirement for the Building C3 commercial areas is:

- General waste – 2 x 3000L bins
- Recyclables – 9 x 660L bins

And for the Commercial Building C3 retail areas is:

- General waste – 2 x 3000L bin
- Recyclables – 9 x 660L bins

And for the Commercial Building C3 childcare areas is:

- General waste – 1 x 240L bin
- Recyclables – 2 x 240L bins

ARUP has concluded that the waste storage areas and rooms proposed to be provided in the basement under the Basement Car Park Mod 3 Application are appropriate to accommodate the waste storage demand generated by Commercial Building C3.

It is likely that compactors will be provided in the basement for the general waste and cardboard/paper recycling for Commercial Building C3.

With respect to waste management responsibilities:

- the responsibility for cleaning the waste storage areas will be on the building manager;
- removal of waste to the waste storage rooms is the responsibility of building management;
- recyclables are to be moved to the waste storage areas via the goods lifts;
- labelling of the bins will be the responsibility of the building manager. This includes adequate signage identifying the waste and recycling area, and instructions outline how to use the waste management system and what materials are acceptable for recycling;
- transfer of bins from the storage area to the collection truck will be carried out by the waste collection contractors. After emptying the bins the contractors will return them immediately to the waste storage room within the premises;
- if truck access is limited, loading dock areas have provision for some bins to be moved here by building management (for a short period) prior to collection by waste contractors; and
- the final allocation of responsibilities will be subject to design development.

5.24 Environmental, Construction and Site Management

An Environmental Construction and Site Management Plan (ECSMP) has been prepared by Cardno and Lend Lease Project Management and Construction (**Appendix CC**) to address environmental issues associated with the construction of Commercial Building C3 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 Noise and Vibration Assessment prepared by Wilkinson Murray, which addresses the noise and vibration impacts on and off site (refer to **Appendix EE**);
- Construction Traffic Management Plan prepared by ARUP, which addresses construction traffic impacts (refer to **Appendix T**);
- Air Quality Impact Assessment prepared by AECOM, which addresses air quality and odour impacts (refer to **Appendix FF**); and
- Waste Management Plan which addresses waste sources and management measures during construction prepared by ARUP included at **Appendix L**.

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 A Class 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.
- Tower cranes will be erected on site at the building core. 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 "*Wilkinson Murray, Barangaroo South; Construction of Commercial Building C3, Construction Noise and Vibration Assessment – Project Application*". Refer to Section 5.25 below.
- Air Quality Management will be addressed in accordance with the recommendations of the *Barangaroo South – C3 Commercial Building – Air Quality Impact Assessment* (AQIA) *Project Application* prepared by AECOM. Refer to Section 5.26 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 Commercial Building C3 construction works. In addition, supplementary erosion and sediment control measures such as temporary sediment basins, will be implemented to treat surface run-off during Building C3 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 1.13 and Section 5.7.
- Management of construction generated solid and liquid waste will be addressed in accordance with the recommendations of the *Barangaroo South –C3 Commercial Building: Waste Management Plan – Project Application* (WMP) prepared by ARUP. Refer to Section 5.28 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.

5.25 Construction Noise and Vibration Impacts

Wilkinson Murray has undertaken a Construction Noise and Vibration Assessment for the proposed development (**Appendix EE**). 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 C4 and C5 and Basement Car Park works) and, if necessary, mitigation measures to manage adverse impacts.

The Construction Noise and Vibration Assessment forms part of and should be read in conjunction with the ECSMP (refer to Section 5.24 above).

A previous assessment of construction noise and vibration for the Basement Car Park Approval was prepared by Wilkinson Murray and submitted with that project application. The information and assessment presented in the Construction Noise and Vibration Assessment for the Commercial Building C3 works draws on the work contained in that previous report.

Potential noise and vibration sources

The main potential noise and vibration from the C3 Building works is typically construction plant and activities, relevantly including:

- piling rigs,
- bulldozers and bob cats;
- trucks,
- concrete pumps,
- forklifts,
- compressors,
- cranes,
- boom trucks and lifts, and
- a range of power tools.

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

- vibratory piling (limited periods);
- bored piling; and
- general earthmoving plant such as excavators, trucks etc (no rock breaker or rollers).

A detailed list of typical construction plant and relevant sound power levels is provided at Table 4-1 of the Construction Noise and Vibration Assessment.

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 preferred 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 Commercial Building C3 works are the same as those that have previously been identified as part of the Basement Car Park Project Application Excavation and Construction Noise and Vibration Assessment. The location of these sensitive receivers are shown on **Figure 13** below and summarised at **Table 16**.

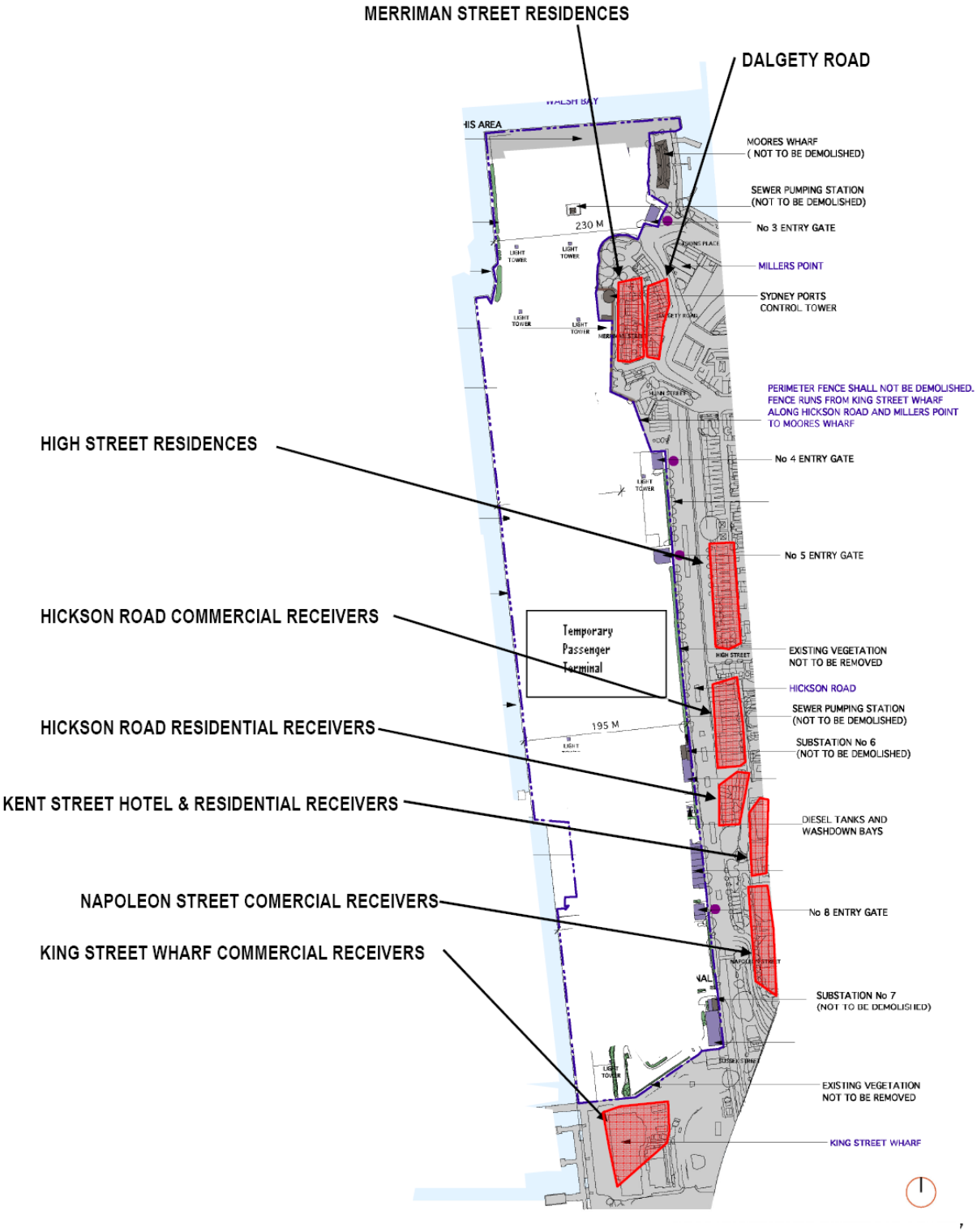

Figure 13 - Sensitive Noise Receivers around the Barangaroo site

Source: Acoustic Logic

Table 16 – Surrounding 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 Office Retail including indoor / outdoor cafes
37 High St, Millers Point	KU Lance Preschool and Children's Centre
Barangaroo Site	Temporary Cruise Passenger Terminal
Shelley St	Commercial on Cnr of Sussex and Shelley St
Residential Receivers	
38 Hickson Rd	Multi Storey Residential Building
High St, Millers Point	Terrace Residences
Kent St	Hotel and Residential
Merriman St, Dawes Point	Double Storey unit blocks and single storey houses
Dalgety Rd, Dawes Point	Double Storey Community housing
Edward St and Little Edward St, Balmain East	Waterfront properties along Balmain peninsula
Northern end of Darling Island Rd and Wharf Cr, Darling Island	Multi Storey High End Apartments
Northern end Sydney Wharf Pirrama Road Pyrmont	Multi Storey High End Apartments
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
2-4 Jenkins St	Former MWS stores

Source: Construction Noise & Vibration Assessment, Wilkinson Murray

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**.

Additional noise monitoring data has been utilised from noise logging conducted by ARUP as described in the Operational Acoustic Assessment Report prepared by ARUP submitted with the Basement Car Park Approval. The noise logging data prepared by ARUP has been reviewed by Wilkinson Murray and deemed suitable for use for assessment purposes in the Commercial Building C3 Construction Noise and Vibration Assessment.

The noise monitoring was conducted in accordance with the NSW OEH requirements.

Background noise levels at all locations were free of the influence of extraneous noise sources such as plant or construction activities and noise data measured during inclement weather was excluded in accordance with OEH procedures.

Figure 14 – Noise monitoring locations

Construction Noise and Vibration Criteria

The Construction Noise and Vibration Assessment 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.

Table 17 presents the adopted site specific construction noise management levels.

Table 17 – Site specific Construction Noise Management Levels

Location	Construction Noise Management Level, L_{Aeq} - dBA				Maximum Construction Noise Level, L_{Aeq} - dBA
	Day	Evening	Night	Saturday (extended)	
1 – Hickson Road Residences	63	58	54	55	**75**
5 – High Street Residences	57	49	46	50	**75**
6 – Dawes Point Residences	56	49	45	51	**75**
7 – Balmain East Residences	59	50	45	51	**75**
8 – Darling Island Residences	57	49	44	55	**75**
All Commercial Properties	70 (at all times)				
Schools / Preschools	55* (at all times)				
Parks / Outdoor Play Areas	65 (at all times)				

* The external noise goal of 55dBA is based on a 10dB reduction through an open window.

Source: Construction Noise & Vibration Assessment Wilkinson Murray

Human comfort and building damage construction vibration have been established for the Barangaroo South site.

Table 18 presents the adopted continued vibration criteria. Further criteria relating to acceptable levels of intermittent vibration is set out at Table 3-4 included in Section 3.2 of the Construction Noise and Vibration Assessment at **Appendix EE**.

In relation to potential building damage arising from vibration, the recommended limits (guide values) have been drawn from British Standard 7385 - Evaluation and measurement for vibration in buildings. The limits are for transient vibration to ensure minimal risk of cosmetic damage to residential and industrial buildings and are set out at Table 3-5 included at Section 3.2 of the Construction Noise and Vibration Assessment at **Appendix EE**.

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 3-6 included at Section 3.2 of the Construction Noise and Vibration Assessment.

Table 18 – Criteria for Exposure to Continuous Vibration

Place	Time	Peak Particle Velocity (mm/s)	
		Preferred	Maximum
Critical working areas (e.g. hospital operating theatres precision laboratories)	Day or night time	0.14	0.28
Residences	Daytime	0.28	0.56
	Night time	0.20	0.40
Offices	Day or night time	0.56	1.1
Workshops	Day or night time	1.1	2.2

Source: Construction Noise & Vibration Assessment, Wilkinson Murray

Construction Traffic Noise

The Construction Noise and Vibration Assessment adopts the traffic noise criteria set out in OEH's NSW Road Noise Policy (RNP). The RNP sets out the assessment criteria for residences to be applied to particular types of project, road category and land use. All residences potentially affected by traffic movements generated during the Commercial Building C3 works have been assessed against the RNP criteria.

The proposed haulage routes are located to the west of the site boundary, thereby avoiding the pass by haulage trucks of residences on Hickson Road. It has been determined that the residences subject to the highest levels of traffic noise associated with the site will be those on Hickson Road and Sussex Street. The main southern haulage truck route for would be along Sussex Street to the Western Distributor and/ or Cross City Tunnel/Eastern Distributor.

Some trucks may also travel north via Napoleon Street, Kent Street and onto the Harbour Bridge.

During the basement works a maximum of 230 movements are envisaged during the 'Piling and Anchors and Bulk Excavation' phase. Following a tapering down of basement truck movements the highest average truck flow will occur during Commercial Building C3, C4 and C5 construction when approximately 152 movements per day on average will occur.

A review of the predicted noise levels due to truck noise comply with the applicable noise criteria. Therefore the impact of construction traffic noise is considered acoustically acceptable.

Construction Noise Impact Assessment

Site-related noise emissions have been modelled with the "CadnaA" noise prediction program, using the ISO 9613 noise prediction algorithms. Factors that are addressed in the noise modelling are:

- equipment sound level emissions and location;
- screening effects from buildings;
- receiver locations;
- ground topography;
- noise attenuation due to geometric spreading;
- ground absorption; and

- atmospheric absorption.

The model includes the effect of the 2.4 metre noise barriers around the site as recommended in the noise impact assessment undertaken as part of the Basement Car Park Approval.

Modelling has been conducted for five potential construction scenarios as summarised in **Table 19**, with plant located across the construction site as follows:

- **Area Noise Sources** – General construction equipment that is distributed across the work site has been modelled as an area source based on proposed equipment numbers and total noise
- **Line Noise Source** – Truck routes are modelled as line noise sources with the number of trucks on the haulage route in a 15 minute period applied to these sources.
- **Point Noise Sources** – Fixed plant and equipment are modelled as point sources.

Table 19 – Construction Scenarios for Commercial Building C3

Scenario	Description	Works
A1	C3 Piling	4 piling rigs and 2 truck movements are assumed to operate in 15minutes.
A2	C3 Sheet Piling	In the event that vibratory impact sheet piling for C4 occurs in isolation. 1 piling rig operating for 4 weeks
B	C3 Building Construction	This scenario includes concreting and lifting. 2 concrete pumps, 2 forklifts, 4 compressors, 2 cranes, a boom truck and lift are assumed to operate in 15-minutes. Also concrete trucks and normal delivery trucks assumed to be 12 movements in 15-minutes.
C	C3 Facade	In the event that the construction of the façade occurs in isolation. Forklift and power tools assumed. 4 truck movements in 15-minutes assumed.
D	Scenarios B+C	Represents periods where both Scenarios B and C occur concurrently.

The modelling assumes a "typical worst case" scenario wherein all plant is running continuously. As such it represents likely noise levels that would occur during intensive periods of construction. Therefore the presented noise levels can be considered in the upper range of noise levels that can be expected at surrounding receivers when the various construction scenarios occur.

Resultant noise levels at identified surrounding receivers have been predicted and compared with the established sites specific noise criteria as identified above.

Predicted noise levels at surrounding residential, commercial and school / pre-school receivers for each of the modelled scenarios are set out at Section 5.1 of the Construction Noise and Vibration Assessment.

Daytime noise contour plots of the site and surrounds for the modelling scenarios have been prepared.

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

Residential receivers

Noise from the construction of Commercial Building C3 will be generally within the relevant noise criteria with the exception of an exceedance of 4dBA at the Hickson Road residences during normal construction hours and an exceedance of 12dBA during extended construction hours (Saturday 1.00pm-5.00pm).

The cumulative noise impacts of the construction of the basement and Commercial Buildings C3, C4 and C5 has also been assessed and detailed in Table 5.3 of the Construction Noise and Vibration Assessment.

During normal weekday operating hours, there are exceedances of up to 6 dBA at nearby residences on Hickson Road. During the extended construction hours (Saturday 1.00pm-5.00pm) it is predicted that exceedances of up to 19 dBA may occur at High Street residences due to combined noise from the basement works, Building C3, C4 and C5 works. Exceedances of 14dBA are also predicted at residences along Hickson Road.

The noise levels are consistent with the Basement Car Park Approval construction noise assessment, whereby noise from Commercial Building C3, C4, and C5 construction works were not considered significant contributors to predicted exceedances. It is noted that all construction noise levels will be well below the maximum construction noise level of 75 dBA.

Selection of noise control kits for some louder plant works would reduce these noise levels to some extent, and could potentially eliminate exceedances during normal working hours.

For Saturday operations where feasible, construction activities will be planned to ensure that the loudest activities occur during standard construction hours (Saturday morning). In addition, Wilkinson Murray recommend implementing respite periods during the use of equipment over defined periods which will be implemented through the Noise and Vibration Management Plan under the ECMP.

Commercial receivers

Compliance with the 70 dBA noise objective is indicated at all surrounding commercial premises.

These premises are generally of modern construction and do not have operable windows, such that a facade reduction of at least 20 dBA can be expected. As a result, maximum internal noise levels in the order of 40 dBA are predicted. This is consistent with the maximum noise levels recommended in Australian Standard 2107 for general office areas.

Commercial receivers which have operable windows would be subjected to construction noise levels at least 10 dBA higher if windows were open. Therefore, where internal noise levels exceed 45 dBA, windows may need to be closed during intensive periods of construction.

In the case of restaurants and cafes at the northern end of Lime Street and the Shelley Street precinct, maximum internal construction noise levels up to 58-60dBA are predicted. The provision of plywood hoardings has been previously recommended on the southern site boundary to improve the acoustic amenity of outdoor eating areas. These barriers have been included in the predictions.

Preschools

At preschools, external noise levels are predicted to comply with the external 65 dBA noise objective for active recreation areas. There are no exceedances of internal noise objectives for the Commercial Building C3 construction works, nor cumulative construction noise.

Temporary Cruise Ship Passenger Terminal
The temporary cruise ship passenger terminal has been approved by the Barangaroo Delivery Authority (under Part 5 of the EP&A Act) to operate adjacent to Gate 5 on the Barangaroo site until 2012. Based on information provided by Sydney Ports, there are approximately 130 ship days per year when a ship will be docked at Wharf 5.

Maximum noise levels of up to 52 dBA are predicted during construction of Commercial Building C3 and cumulative noise levels are predicted to be up 54dBA. These noise levels are not considered excessive.

Cumulative Noise Impacts with the Headland Park

Noise impacts from the Basement Car Park works and the Commercial Building C3 construction works when combined with Headland Park works, have been assessed. The predicted construction noise levels from the combined construction of the Basement Car Park and Commercial Buildings C3, C4 and C5 are well below the predicted construction noise from the Headland Park Construction Works at Balmain East and Dawes Point Residences (the two closest receivers to the Headland Park). As such the impact of Commercial Building C3 construction noise on these receivers is considered negligible.

Construction Vibration Impact Assessment

Construction, demolition and excavation activities have the potential to generate significant levels of vibration. However, the works associated with Commercial Building C3 will not involve plant that will generate significant vibration levels. The main plant that could generate vibration would be:

- vibratory piling (limited periods);
- bored piling; and
- general earthmoving plant such as excavators, truck etc (no rock breaker or rollers).

The distance from the works to the nearest receiver is approximately 50m and the vibratory level of all mentioned activities would be less than 0.1mm/s at 50m. Therefore no vibration impact is predicted.

Construction Traffic Noise

A review of the above predictions indicates that the existing noise levels at residences along Sussex Street already exceed the traffic objectives of the RNP. The additional traffic generated by Commercial Building C3 is not expected to increase traffic noise levels by more than 2 dBA and therefore complies with the RNP noise criteria. On this basis, the impact of construction traffic noise is considered acoustically acceptable.

Management and Mitigation Strategies

It has been determined that noise from construction activities during the day period will exceed established construction noise management goals for residential receivers, particularly during the proposed extended Saturday construction period.

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

The following measures were recommended.

- The noise barriers recommended in the Basement Car Park Approval should be maintained on site when Commercial Building C3 (and C4) construction works occur.
- Plant with noise control kits should be installed where practicable.
- An audit of plant should be conducted to select equipment that generates the lowest practical commercially available noise levels.
- Construction activities should be planned so that respite is provide to residences when noise activities occur. This is particular important during extended Saturday hours.
- An effective complaints and community consultation program should be implemented. This program should inform the project manager about appropriate mitigation measures to protect the acoustic amenity of surrounding residences.

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

Proposals with respect to noise and vibration monitoring are included in the Environmental, Construction and Site Management Plan prepared by Cardno and Lend Lease, included at **Appendix CC** (refer also to Section 5.24).

5.26 Construction Air Quality

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

The AQIA assesses impacts that are expected during the building phases of works associated with the construction of Commercial Building C3. The report assessed impacts on the air environment from the following activities and sources:

- the construction of the Commercial Building C3;
- the parallel construction of sections of Commercial Buildings C3 and C4; and
- Diesel emissions from vehicles, plant and equipment used in the above activities.

Specifically the AQIA includes:

- identification of the potential pollutant emissions and emissions sources associated with the Commercial Building C3 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.

As demonstrated in the following section, levels of background pollutants of potential concern are negligible. Only low potential emissions are anticipated likely to arise. Potential cumulative air quality impacts during any overlap between the Commercial Building C3 works and concurrent Basement Car Park Approval works is unlikely, but, if it did occur, would remain below relevant OEH assessment criteria.

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 oxides of nitrogen (NO_X) and particulate matter (PM_{10}). Other emissions, such as carbon monoxide, sulphur dioxide and volatile organic compounds, are also emitted from combustion engines, but are considered to be lower risk than particulate and NO_X emissions due to their generally higher trigger values.

Other equipment expected to be used during the construction works, such as the framework and man and material hoists, will be electronically powered and as such will not generate combustion products during their operation.

The proposed Commercial Building C3 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.

The primary source of potential emissions to air during the operation of the proposed development will depend on the nature of the future building tenants. For example:

- Restaurant and/or other food preparation facilities may emit odours.
- Businesses that require the installation and operation of generators, incinerators or other combustion plant may generate air pollutants such as particulates
  and NO_X.
- The Barangaroo South Basement Car Park may emit production of combustion.

As the project is still in the relatively early phases of planning, quantification of such emissions cannot be made at this time and as such operational emissions have not been addressed at this stage. Industry standard design and construction techniques is expected to be utilised to address and treat exhaust points such that emissions meet the requirements of relevant Australian Standards.

The primary pollutants/contaminants of potential concern that may be generated during the works / process are:

- Particulate matter (PM_{10}); and
- Oxides of nitrogen (as nitrogen dioxide (NO_2).

The potential effects of these pollutants are provided at Section 4 of the AQIA.

Modelling Methodology and Assumptions

Dispersion modelling has been undertaken to predict the potential effects of the proposed construction of Commercial Building C3. The CALPUFF air dispersion model has been used, in accordance with the OEH 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 and summarised in **Table 20** below.

Table 20 - Summary of AQIA dispersion modelling assumptions

Parameter	Assumptions/Methodology
Meteorology	OEH and Bureau of Meteorology (BOM) meteorological data CSIRO TAPM to define upper air meteorology CALMET meteorological model to generate three dimensional wind fields
Terrain	NASA Shuttle Radar Topographic Mission digital elevation data used along with the TAPM, OEH and BOM meteorological data
Modelling scenarios	Four modelling scenario assuming constant operation of all noise sources during construction hours, taken to be 7am – 5pm, 7 days per week.
Emissions inventory	Emissions factors for specific construction plant and equipment sources from a large scale construction project

Source: AECOM Air Quality Impact Assessment, September 2010

The following assumptions were made in the determination of potential emission sources:

- Paved roads were assumed to be maintained, swept and free of dust, with watering undertaken where required such that wheel-generated dust would be minimised.
- Concrete would be delivered in trucks to the top of the excavation area (i.e. no concrete batching plant would be required, and there would be no wheel-generated dust from concrete trucks travelling to the plant).
- Trucks delivering construction materials were assumed to drive on sealed hard stand areas or on watered roads.

Four scenarios have been modelled as follows:

- Scenario 1: Construction of Building C3 – ground level
- Scenario 2: Construction of Building C3 – 60 m elevation
- Scenario 3: Construction of Building C3 – 120 m elevation.
- Scenario 4: Parallel Construction of Building C3 ground level and Building C4 at 120m elevation.

Scenarios 1 to 3 reflect the increasing elevations at which the cranes and compressors are likely to be located. Scenario 4 assesses the impacts when the final stages of Commercial Building C4 construction and the beginning of Commercial Building C3 construction may occur in parallel.

Emissions sources included in each modelling scenario were:

- six cement trucks;
- three cranes;
- two forklifts; and
- two concrete pumps.

The OEH has specified ground level concentration criteria to minimise the adverse effects of airborne pollutants on sensitive receptors (DEC, 2005). The OEH ambient air quality criteria and emissions rates used in the dispersion modelling are summarised in **Table 21**.

Table 21 - Summary of adopted AQIA ambient air quality criteria and emissions rates

Pollutant of potential concern	Averaging period	Criteria (µg/m^3)
PM_{10}	24 hr maximum	50
	Annual	30
NO_2	1 hr maximum	246
Xylene	Annual	62

Source: AECOM Air Quality Impact Assessment, October 2010

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 site boundary.

The location of sensitive receptors incorporated into the dispersion modelling are provided in the AQIA (refer to Section 6.3, Table 9) and shown on **Figure 16** below.

Figure 15 – Sensitive receptor locations

Impact Assessment

Predicted pollutant concentrations resulting from the dispersion modelling demonstrate that all predicated concentrations are below the relevant assessment criteria.

The AQIA Report concludes that *"Provided the onsite activities are implemented in a manner consistent with the assumptions made by this modelling report (in accordance with proven and industry standard dust management techniques), it is unlikely adverse effects on local air quality would occur as a result of the proposed construction works."*

OEH (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. No other major construction activities in the immediate area were identified. As such, the cumulative impact assessments for PM_{10} and NO_2 were contemporaneous assessments made using hourly data for the modelling period.

It is noted that the construction schedule for Commercial Buildings C3, C4 and C5 is yet to be developed and that the construction may occur at differing stages simultaneously (scenarios that are beyond the scope of this initial assessment). Should this occur additional dispersion modelling will be undertaken as part of the construction management planning to define the mitigation measures needed to ensure compliance with the OEH impact assessment criteria.

Mitigation Measures and Monitoring

Potential emissions to air from construction activities consist of products of fuel combustion from vehicles and equipment and dust disturbed by in the construction and transportation activities.

AECOM has recommended that a Construction Environmental Management Plan (CEMP) be prepared prior to the commencement of the construction of the expansion infrastructure. The CEMP may include the following activities:

- Control of access via sealed roadways;
- Vehicle speed limits on site;
- Monitoring of wind speed and direction to manage dust-generating activities during undesirable conditions;
- Construction equipment idling time minimisation and appropriate engine tuning and servicing to minimise exhaust emissions;
- Procedures to address any complaints received; and
- Development of contingency measures for identified potential air quality impact.

Additional mitigation and work practices recommended to 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	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 ie defined road access to minimise dust

Trigger	Impact	Pollutants	Control Measure
	health		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

The proposed monitoring plan has also been 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 CC** and accordingly the above recommendations have been incorporated into the draft Statement of Commitments.

5.27 Construction Traffic Management

A Construction Traffic Management Plan has been prepared by ARUP and is included at **Appendix T**. 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. Traffic Control Drawings will be prepared for each project worksite and will provide full details of any necessary road alignment changes and / or new traffic control signage at the worksites.

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 (which will be operating from Darling Harbour Wharf 5 until 2012); 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 both the Basement Car Park Approval, the Headland Park Early Works Project Approval, the Commercial Building C4 Project Approval, Commercial Building C5 Project Application and the subject Commercial Building C3 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 294 vehicle movements per hour and will occur during June 2013. This is comprised of:

- AM Peak (8am - 9am): 172 cars in,50 cars out, 58 trucks in, 55 trucks out
- PM Peak (5pm - 6pm): 50 cars in,172 cars out, 55 trucks in, 58 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 traffic signal controlled intersections to the site construction stage access are as follows:

- Hickson Road/Napoleon Street;
- Sussex Street/Shelley Street;
- Sussex Street/Erskine Street; and
- Erskine Street/Shelley 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, Commercial Building C3 C4, and C3 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 (June 2013) LOS
AM	Sussex & Shelley Street	A	B
	Sussex &Erskine Streets	B	B
	Erskine & Shelley Streets	A	A
	Hickson Road & Napoleon Street	A	A
PM	Sussex & Shelley Street	A	A
	Sussex &Erskine Streets	B	B
	Erskine & Shelley Streets	A	A
	Hickson Road & Napoleon Street	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.

Whilst the existing peak hour traffic conditions at some Sussex Street intersections are currently heavily congested, the proposed construction traffic nevertheless has minimal impact at these intersections. To further minimise the impacts on existing evening traffic peaks along Sussex Street, it is intended

that large concrete pours will generally be commenced during morning periods wherever possible.

5.28 Construction Waste Management

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

The Waste Management Plan identifies waste sources during construction and proposes measures to manage waste in a way that satisfies all legislative requirements. It is noted that waste management during demolition and excavation works has previously been addressed in the Demolition Works Project Approval (MP07_0077) and in the Basement Car Park Project Approval. These two separate project approvals also cover the site preparation activities for the construction of Commercial Building C3.

The Waste Management Plan forms part of and should be read in conjunction with the ECSMP prepared by Cardno (refer to Section 5.24).

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 significant volume and 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 Building C3 Project Application is greater than 90% reduction of construction and demolition 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 Start.

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

- 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 Commercial Building C3 design in the completed building by ensuring that Rogers Stirk Harbour +Partners has 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 J** 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).
3. The public domain within the Commercial Building C3 site will be generally in accordance with the Landscape Design Statement prepared by Aspect Oculus included at **Appendix K** and the Public Domain Plan prepared by Aspect Oculus included at **Appendix K** of the Environmental Assessment Report prepared by JBA Planning dated November 2011 The final selection of plantings within the framework of the Public Domain Plan and Landscape Design Statement will take into consideration suitability having regard to the potential impacts resulting from the construction of nearby buildings. The Public Domain Plan will be fully integrated with the Barangaroo South Public Domain Guidelines, once finalised by the Technical Working Group.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
4. Temporary landscaping and lighting will be provided within the Commercial Building C3 site generally in accordance with the Temporary Public Realm plan prepared by Aspect Oculus included at **Appendix K** of the Environmental Assessment Report prepared by JBA Planning dated November 2011. The final selection of plantings within the framework of the Temporary Public Realm Plan will take into consideration suitability having regard to the potential impacts resulting from the construction of nearby buildings.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
1. The Architectural Drawings prepared by Rogers Stirk Harbour +Partners included at **Appendix A** of the Environmental Assessment Report prepared by JBA Planning dated November 2011 illustrate the maximum extent of signage zones for the tower facades. Within the maximum extent of signage zones: ▪ no more than two (2) building identification and/or business identification signs will be provided at high level on a maximum of two (2) facades of the building; and ▪ a maximum of two (2) building identification and/or business identification signs will be provided at podium level on a maximum of two facades of the building, ▪ a maximum of two (2) secondary building identification and/or business identification signs will be provided at podium level for	To be demonstrated by the proponent at the relevant construction certificate stage(s).

each facade of the building. The final form and content of any proposed building and business identification signage will be the subject of a separate future application (if required under relevant legislation).	
5. External and internal lighting will be provided around and throughout the building in accordance with AS 1680 and the BCA.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
6. Internal light fittings within the commercial and retail areas will comply with NABERS and Green Star targets.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
7. Specialist lighting will be provided within the building's entrance lobby to enhance the visual environment at ground level.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
8. 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).
9. Photovoltaic arrays will be provided at the roof level of the building	To be demonstrated by the proponent at the relevant construction certificate stage(s).
10. A complete electronic security system will be provided for the base building including a central supervisory system, access control system, CCTV system, intruder alarm system and intercommunication system.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
11. The detailed design of Commercial Building C3 will address the recommendations of the Wind Report prepared by CPP included at **Appendix P** 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).
12. The design of any temporary structures that may be required (depending on the construction staging of the adjoining future buildings within Block 2 of Barangaroo South) to mitigate wind impacts will be submitted prior to the issue of a Construction Certificate relating to works at the ground plane.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
Future separate applications	
13. Future planning approvals will be sought for the following where required: ▪ Fit out of the commercial office space; ▪ Fit out and operation of the retail units; ▪ Fit out and operation of the child care centre; and ▪ Installation of any site wide infrastructure.	Proponent, ongoing.

Public art	
14. Opportunities to implement art work within the Commercial Building C4 development will be further explored in accordance with the Public Art Strategy for Barangaroo South.	Proponent, ongoing.
Ecologically sustainable development	
15. Commercial Building C3 will be designed to achieve a 6 Star Green Star Office Design rating. In order to achieve a 6 Star Green Star Office Design rating, Lend Lease will target the initiatives set out in the ESD Report prepared by ARUP included at **Appendix W** 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).
16. Commercial Building C3 will achieve the ESD Performance Indicators for potable water consumption, reduction in flow to sewer, reductions in Greenhouse Gas emissions, use of renewable energy, micro climate, landscaping, transport, and waste as detailed in the approved Concept Plan (Mod 4) Statement of Commitments.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
Operational waste management	
17. Commercial Building C3 operational waste will be managed generally in accordance with the methodology outlined in the Waste Management Plan prepared by ARUP included at **Appendix L** of the Environmental Assessment Report prepared by JBA Planning dated November 2011.	Proponent, ongoing.
Building Services and Fire Safety	
18. Electrical services will be completed in accordance with the relevant standards and applicable statutory requirements.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
19. The detailed design of mechanical services will satisfy the relevant requirements of AS 1668.1-1998 and AS1688.2 – 1991 as applicable.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
20. Fire detection, emergency warning and fire protection systems will be installed to comply with BCA requirements and other relevant legislation, generally in accordance with the measures outlined in Section 6 of the Building Services Report included at **Appendix M** 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).
21. A detailed Fire Safety Strategy will be prepared and submitted as part of the relevant Construction Certificate documentation. The Fire Safety Strategy will be prepared in consultation with the NSW Fire Brigade, building certifiers, and relevant stakeholders.	To be prepared and submitted as part of the documentation for the relevant Construction Certificate (s).
Infrastructure and Services	
22. 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.
23. 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 Planning dated November 2011.	To be demonstrated by the proponent at the relevant construction certificate stage(s).

24. A suitably sized rainwater tank is to be provided for the collection and re-use of rainwater flows from the building's roof areas.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
Accessibility	
25. The detailed design of Commercial Building C3, including access, emergency egress, paths of travel, lifts, ramps, stairs, accessible toilets, accessible parking, lighting and signage, will generally comply with the recommendations set out in the Accessibility Report prepared by Morris-Goding Accessibility Consulting included at **Appendix AA** 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).
Building Code of Australia	
26. The detailed design of Commercial Building C3 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 Urban Planning Consultants dated November 2011.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
Operational Noise and Vibration	
27. Operational noise emissions from the site will comply with the noise limits and amenity and intrusiveness criteria detailed in Wilkinson Murray's Operational Accoustic 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).
28. Commercial Building C3 will be designed in accordance with Australian Standard 2107 Internal Design Sound Levels to ensure appropriate internal amenity is achieved.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
29. The detailed design of Commercial Building C3 will meet the vibration levels specified in the DECCW Assessing Vibration technical guideline.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
Travel Demand	
30. Lend Lease will prepare a Work Place Travel Plan for Commercial Building C3 to be completed prior to the first occupation certificate for the commercial tenant occupation.	To be prepared by the proponent prior to the first occupation certificate for the commercial tenant occupation.
Geotechnical and Structure	
31. 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 Commercial Building C3.	To be demonstrated by the proponent at the relevant construction certificate stage(s).
32. The structural design and documentation of Commercial Building C3 will comply with all relevant Australian Standards and the BCA	To be demonstrated by the proponent at

as outlined in the Structural Engineering Report prepared by ARUP included at **Appendix BB** of the Environmental Assessment Report prepared by JBA Planning dated November 2011.	the relevant construction certificate stage(s).
Environmental, Construction and Site Management	
33. Construction and site management relating to the construction of Commercial Building C3 will be in generally accordance with the Environmental, Construction and Site Management Plan prepared by Cardno & Lend Lease included at **Appendix CC** of the Environmental Assessment Report prepared by JBA Planning dated October 2011 including the following: ▪ Construction Noise and Vibration Assessment prepared by Wilkinson Murray, which addresses the noise and vibration impacts on and off site (refer to **Appendix EE** of the EAR); ▪ Construction Traffic Management Plan prepared by ARUP, which addresses construction traffic impacts (refer to **Appendix T** of the EAR); ▪ Air Quality Impact Assessment prepared by AECOM, which addresses air quality and odour impacts (refer to **Appendix FF** of the EAR); and ▪ Waste Management Plan prepared by ARUP which addresses construction waste management (refer to **Appendix L** of the EAR).	Proponent, ongoing
34. Lend Lease commits to providing high quality hoardings around the site, including along the foreshore walk. 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
Consultation	
35. Lend Lease will continue to undertake consultation in relation to the proposed Commercial Building C3 in accordance with the methodologies identified at Table 2 of the Environmental Assessment Report prepared by JBA Planning dated October 2011.	Proponent, ongoing
Piling and associated works	
36. The Commercial Building C3 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).
37. Lend Lease will obtain a Section A Site Audit Statement from the Site Auditor prior to the issue of an Occupation Certificate for Commercial Building C3.	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 a 48 storey commercial building within the area of land generally known as Block 3 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.

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.