

Environmental Assessment Report Concept Plan and State Significant Site Listing

Barangaroo South

Concept Plan Modification and Major Development SEPP Amendment

Submitted to
Department of Planning
On Behalf of Lend Lease (Millers Point) Pty Limited

August 2010 ■ 10051

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This report has been prepared by: Stephanie Ballango

Signature



Date 06/08/10

This report has been reviewed by:

Lesley Bull

Signature



Date 06/08/10

Statement of Validity

This Environmental Assessment has been prepared and submitted under Part 3A of the *Environmental Planning and Assessment Act 1979* (as amended) by:

Environmental Assessment

Name	Stephanie Ballango
Qualifications	BSc (Applied Geog) Hons, MPIA
Company	JBA Urban Planning Consultants Pty Ltd
Address	Level 7, 77 Berry Street North Sydney NSW 2060
In respect of	Study and Concept Plan Application

Project Application

Applicant	Lend Lease (Millers Point) Pty Ltd
Address	The Bond, 30 Hickson Road, Millers Point
Land to be developed	Barangaroo South – refer to Section 2.2
Proposed development	Mixed Uses

Environmental Assessment	An Environmental Assessment (EA) is attached
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Certificate	I certify that I have prepared the content of this Environmental Assessment and to the best of my knowledge:
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- 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	
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Name	Stephanie Ballango
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Date	6 August 2010
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Executive Summary

Background

Concept Plan approval (MP06_162) for the redevelopment of the East Darling Harbour (now known as Barangaroo) was granted in February 2007.

Lend Lease was successfully appointed as the preferred proponent to develop Barangaroo South on 20 December 2009. Lend Lease has embarked on a thorough review of the approved Concept Plan with a particular focus on how the development could be improved. As part of the review process, Lend Lease in conjunction with the Barangaroo Delivery Authority also undertook several consultation sessions with the local community, government agencies and other major stakeholders to ascertain their thoughts and suggestions on the redevelopment of the site.

The Proposed Modification

The Concept Plan Modification proposes for Barangaroo South:

- an increase in the total quantum of GFA within Barangaroo South Mixed Use Precinct from 430,275m² to 490,240m² related to an increase of 45,188m² in residential floor space and an increase of 14,777m² in commercial floor space;
- reallocation of the 8,500m² of passenger terminal GFA approved under the Concept Plan for community uses GFA, and an increase in total community uses GFA by 1,500m² such that there is a total of 10,000m²;
- an increase in total active uses GFA by 1500m² such that there is a total of 3000m²;
- a redesign and reconfiguration of the public waterfront promenade (RE1 Public Recreation Zone) including a reduction in the width of the public promenade from a minimum of 60m to a minimum of 27m;
- the reconfiguration of Blocks 1 to 4;
- the establishment of two new Development Blocks within Barangaroo South, being:
 - Block X – a new predominantly residential development block located west of Globe Street with a maximum GFA of 18,908m² and a maximum building height of RL 41.5, and
 - Block Y – the establishment of a new pier and landmark building extending into the Harbour with a maximum GFA 33,000m² and a maximum building height of RL 170;
- an increase in the maximum building height within the previously described Development Blocks 1, 3 and 4 as follows:
 - Block 1 from RL 62 to RL 80 (an increase of 18m);
 - Block 3 from RL 112 to RL 209 (an increase of 97m); and
 - Block 4 from RL 100 to a maximum of RL 175 in Block 4B (an increase of 75m), noting the approved Block 4 has been split into 3 separate Blocks;
- revisions to the approved Built Form Principles and Urban Design Controls; and
- a redistribution of the approved land use mix within Barangaroo South.

For the entire Barangaroo site, the Concept Plan Modification will result in:

- a 563,965m² mixed use development across the entire Barangaroo site, comprising:
 - a maximum of 514,465m² mixed uses GFA, including residential, commercial and retail uses which includes:
 - a maximum of 128,763m² of residential uses (a minimum of 99,763m² of which will be in Barangaroo South);
 - a maximum of 50,000m² of tourist uses GFA;
 - a maximum of 39,000m² of retail uses;
 - a maximum of 4,500m² of active uses GFA (3,000m² of which will be in Barangaroo South); and
 - a maximum of 12,000m² of community uses GFA (10,000m² 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.

The Concept Plan Modification does not propose any amendments to Barangaroo Central or the Headland Park.

The approved Concept Plan (as modified) is subject to conditions, or terms of approval, which require design amendments to the approved scheme. These include the modification to the Southern Cove required by Concept Plan Condition B3, and the consequential redistribution of GFA within Development Blocks 2, 3, 4 and 5 that is displaced as a result of the Southern Cove, as permitted by Condition C1 of the approved Concept Plan.

Existing Concept Plan Conditions of Approval

This Environmental Assessment also presents the way in which the Lend Lease proposal has incorporated an enlarged Southern Cove in response to Condition B3, and the manner in which GFA within Development Blocks 2, 3 and 4 is proposed to be distributed as a direct consequence of the proposal in respect of the Southern Cove, in accordance with Condition C1.

A modification to the Approved Concept Plan is not required to allow for the changes to the urban structure and built form outcomes for Barangaroo South that arise as a consequence of the enlargement of the Southern Cove and resultant re-distribution of GFA.

This Environmental Assessment nonetheless describes and provides justification for the manner in which Conditions B3 and C1 of the Approved Concept Plan are proposed to be met by the Lend Lease Scheme. Specifically, the Environmental Assessment provides information and analysis with respect to:

- the revised urban structure, including street and pedestrian connections and the resultant Development Block pattern;
- the design intent of the enlarged of Southern Cove; and
- the proposed increase in the public domain space in Barangaroo South.

New Planning Controls – Amendment to Major Projects SEPP

The proposed modifications to the Concept Plan depart from the existing development controls for the site, established under State Environmental Planning Policy (Major Development) 2005 (Major Development SEPP). These components of Lend Lease's scheme consequently require a SEPP Amendment to reconcile the Major Development SEPP planning provisions with the Concept Plan Modification and more specifically to:

- create new development blocks, redefine the existing development blocks, and reconfigure land uses in accordance with previous Concept Plan modifications and Lend Lease's proposed Concept Plan Modification;
- redefine the delineation between urban development and public recreation;
- amend the site boundary to include the proposed public pier and parts of Hickson Road;
- increase the maximum permissible GFA within the Barangaroo South development blocks to reflect previous Concept Plan modifications and Lend Lease's proposed Concept Plan Modification;
- increase the maximum permissible height controls within the Barangaroo South blocks to reflect the changes in configuration of land uses and GFA across the site, whilst allowing flexibility for the design of individual buildings within the certainty of a structured framework; and
- undertake general tidy up and housekeeping amendments to the existing SEPP provisions to reflect current legislative requirements.

The proposed modifications to the Concept Plan approval seek to improve on the approved Concept Plan by way of redistribution of the built form across the site and the resultant creation of larger public domain areas.

Environmental Assessment

Lend Lease has complied with the approved Concept Plan conditions which require an enlarged Southern Cove and subsequently facilitates a redistribution of GFA across the site.

The Concept Plan Modification seeks to improve on the approved Concept Plan by revising the urban structure and varying the mix of uses across the site. A greater proportion of residential uses, a small increase in commercial use and a public pier and landmark building are now proposed to activate the precinct during all times of the day, improve the public domain, continue Sydney's "Cultural Ribbon", and provide viable commercial and tourist floor plates to cater for market demand.

The approved Concept Plan (as modified) demonstrates through a series of strategies how the sustainable renewal of the overall Barangaroo site can be achieved.

The proposed amendments, consistent with the approved concept plan, continue to embody the principles of Crime Prevention Through Environmental Design (CPTED). The amended proposal retains a legible and connected public domain and avoids confined or hidden areas.

Views

The Concept Plan Modification has been developed with a number of view principles in mind:

- views to Sydney Harbour and parks are to be maintained from as many points as possible at street level;
- new significant views should be opened-up where possible including those that terminate at Sydney Harbour, parklands, low level sky, or a publicly significant object;
- vistas along streets that are terminated by buildings, can be enhanced with sensitive design of the visually prominent buildings that terminate them; and
- the siting and design of new buildings should maintain existing vistas along streets to places of architectural, landscape, or cultural significance.

The View Impact Analysis demonstrates the proposed built form within the maximum GFA and height controls will reinforce the landmark significance of the site, maintain 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. The proposal is able to achieve all relevant and appropriate view, vista, outlook and visual impact objectives.

Solar Access

The shadow analysis indicates the waters of Darling Harbour will maintain significant direct daylight hours during the middle of the day when recreational boating is likely to peak. Residential properties to the east and west are largely unaffected with the extent of additional shadowing falling mainly over commercial buildings.

Wind Impacts

In assessing the existing wind environment of the site and its surrounds, Arup notes that the existing southerly wind conditions at various locations already exceed the accepted walking comfort criterion.

The Concept Plan Modification will result in increased wind velocities around the site on an intermittent basis. Wind break treatments have been recommended and will be refined during the detailed design phase using environmental wind tunnel tests. Such wind break treatments and landscaping will significantly improve the wind environments in and around the site.

Parking and Access

The Concept Plan Modification proposes an amalgamated basement which will provide a more efficient layout. Parking rates will comply with the requirements of the approved Concept Plan which includes a reduced rate for commercial uses and will result in approximately 2,600 parking spaces.

Using the same trip generation rates used to assess the approved Concept Plan, but reflecting the proposed land use mix Arup traffic consultants estimate the amendments to the Concept Plan will generate slightly lower traffic volumes to that previously anticipated. Hence, the traffic outcome for the Transport Management and Access Plan (Supplementary) (TMAP) report is unchanged when compared to the TMAP prepared in 2008.

The amendments also seek to improve pedestrian permeability and safety at ground level by directing cars quickly underground and by converting some of the previously envisaged roads at surface level to pedestrian only zones. These changes also result in cycle links being given greater priority across the site.

Navigation

The proposed landmark building and the Public Pier do not give rise to adverse cumulative impacts on boating activities, including ferries, (both existing and proposed future services), within the locality of Darling Harbour.

Water-based construction activities necessary for the construction of the public pier and landmark building and the adjacent simultaneous construction of the proposed Southern Cove and ferry wharves is not expected to give rise to adverse cumulative impacts on boating activities, including ferries, within the locality of Darling Harbour.

Consultation with NSW Maritime and the Harbour Master of the Port of Sydney, during design and construction of the relevant applications has been recommended to ensure sailing speeds and appropriate lighting and navigational markers are implemented.

Noise Impacts

The Concept Plan Modification does not alter the findings of the approved Concept Plan for noise impacts. Noise management measures have been identified in the Noise and Vibration Management Plan prepared by Acoustic Logic to manage construction noise impacts.

Further, an Acoustic Assessment has been prepared for the operational phase of the redevelopment by Arup which concludes:

- acoustic treatments will be required where the ECRTN criteria cannot be met for future residential and commercial uses;
- specific protection against air craft noise is not required; and
- the site is not affected by rail vibration.

Future project applications will address issues such as mechanical noise emission criteria, use of improved glazing and mechanical ventilation where required to meet ECRTN criteria and compliance with BCA / City of Sydney sound insulation requirements.

Conclusion

The Concept Plan Modification is the result of a commitment by Lend Lease to deliver a high quality development at Barangaroo South. The Modification is generally consistent with the approved Concept Plan but will ensure that a superior and more sustainable outcome will be achieved. In particular the proposal will deliver:

- a critical mass of overlapping activities and building uses that promote a live-work-leisure-learn and socially and economically diverse community, in one dynamic quarter, and offer a much needed addition to Sydney's urban make up;
- a landmark building on a new public pier that is a focal point for the western edge of the city, defines the cultural and public space at the heart of the Barangaroo South, celebrates the Harbour, attracts visitors and makes a statement about Sydney's role as a major South East Asian financial centre and a 21st Century world city;
- additional housing, new jobs and infrastructure consistent with the aims of the Sydney Metropolitan Strategy;
- a greater quantum of commercial floor space, reinforcing Sydney's role as a global city in the Asia Pacific region;
- an enhanced public domain area for the new and existing communities;
- a better transition between Barangaroo South and the existing CBD;
- greater sustainability outcomes; and
- safer pedestrian links and cycle routes.

1.0 Introduction

This Environmental Assessment Report (EAR) and State Significant Site study has been prepared to modify the approved Concept Plan and existing State Environmental Planning Policy (Major Development) 2005 (Major Development SEPP) controls for the Barangaroo site. This report is submitted to the Minister for Planning pursuant to Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act), on behalf of Lend Lease (Millers Point) Pty Limited (Lend Lease) to fulfil the Environmental Assessment Requirements for a modification to the approved Concept Plan (ref: MP06_0162) relating to the Barangaroo site under Section 75W of the EP&A Act.

This application seeks to modify the existing Concept Plan approval as it currently applies to Barangaroo South. It also seeks to amend the planning controls that apply to Barangaroo South by amending the relevant provisions in Schedule 3 Part 12 of the Major Development SEPP.

The EAR has been prepared by JBA Urban Planning Consultants Pty Ltd, for Lend Lease, and is based on plans and drawings provided by Rogers Stirk Harbour + Partners (**Appendix A**) and the supporting technical documents provided by the expert consultant team (see Table of Contents).

The EAR describes the site, its environs and the proposed Concept Plan modification. It includes an assessment of the proposal in accordance with the Director General's Environmental Assessment Requirements (DGRs) under Part 3A of EP&A Act (**Appendix C**). The EAR should be read in conjunction with the studies and other information appended to this report which address the DGRs for the environmental assessment. The studies provide a technical assessment of the environmental impact of the proposed modified development, and recommend mitigation measures to manage potential environmental impacts associated with the proposal.

It should also be read in conjunction with the Concept Plan Instrument of Approval (06_0162) (as modified) and the original State Significant Site Study prepared by JBA Urban Planning Consultants (dated February 2007).

To assist understanding of places and addresses at Barangaroo South, indicative names have been given to the new streets, roads, lanes, and public spaces which are throughout this document. Actual names will be selected in the future in conjunction with the Barangaroo Delivery Authority and the community.

1.1 Background

1.1.1 Approved Concept Plan

An international urban design competition for the East Darling Harbour site (now known as Barangaroo) was held in 2005, attracting 139 entries from around the world. The winning design by Hill Thalys Architecture + Urban Projects, Paul Berkemeier Architects and Jane Irwin Landscape Architecture was announced in March 2006.

The Barangaroo Concept Plan (based on the winning Hill Thalys scheme) was prepared by the Sydney Harbour Foreshore Authority and approved by the Minister for Planning on 9 February 2007. On 12 October 2007, the land was rezoned to facilitate its redevelopment.

The Concept Plan, as originally approved on 9 February 2007, was subject to conditions and allowed for:

- a mixed use development involving a maximum of 388,300m² gross floor area (GFA), contained within 8 blocks on a total site area of 22 hectares, comprising of:
 - a maximum of 97,075 m² and a minimum of 58,245 m² residential GFA;
 - a maximum of 50,000 m² GFA for tourist uses;
 - a maximum of 39,000 m² GFA for retail uses; and
 - a minimum of 2,000 m² GFA for community uses;
- a maximum of 8,500 m² GFA for a passenger terminal and a maximum of 3,000 m² GFA for active uses that support the public domain within the public recreation zone;
- 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 1.4km public foreshore promenade;
- maximum building heights and maximum GFA for each development block within the mixed use zone; and
- public domain landscape concept, including parks, streets and pedestrian connections.

A condition of approval of the original Concept Plan approval also required two enlarged water intrusions into the Barangaroo site, one at the northern end and one at the southern end and the creation of a natural northern headland. In addition to the terms of approval, the Statements of Commitment approved under the original Concept Plan required a series of Implementation Plans and Strategies to be prepared prior to the lodgement of 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 Statements of Commitment required the establishment of Technical Working Groups to prepare each Implementation Plan and Strategy.

Following approval of the original Concept Plan, a Consolidated Concept Plan was issued which consolidated into one document:

- the East Darling Harbour State Significant Site Proposal Concept Plan and Environmental Assessment (Volume 1) and Appendices (Volume 2) prepared by JBA Urban Planning Consultants and dated October 2006;
- the Revised Statement of Commitments for the Barangaroo Concept Plan dated January 2007; and
- other relevant aspects of the information required by the Department of Planning following public exhibition of the Concept Plan.

The Consolidated Concept Plan, supported by the original technical studies prepared for the project, which provided:

- background information regarding the evolution of the Barangaroo project;
- an analysis of the existing site and its context;
- an analysis of national and international economic and other trends;
- details of consultation;
- renewal objectives and concept strategies for the project;
- key built form and open space elements for the long term development and management of the site;
- an environmental assessment of the project in accordance with the DGRs;
- the Statement of Commitments for the Concept Plan.

Since then, the originally approved Concept Plan has been modified three times and the Statements of Commitments have been revised accordingly. Modification No. 1 was approved in September 2007 which corrected a number of minor typographical errors.

On 25 February 2009, the Minister for Planning approved Modification No. 2 to the Concept Plan. The approved Concept Plan (as modified) allowed for a mixed use development involving a maximum of 508,300m² of gross floor area (GFA) contained within 8 blocks on a total site area of 22 hectares.

On 11 November 2009, the Minister for Planning approved Modification No. 3 to the Concept Plan to allow for a modified design for the Headland Park and Northern Cove. The approved Concept Plan (as modified) allowed for a mixed use development involving a maximum of 489,500m² of gross floor area (GFA) contained within 7 blocks on a total site area of 22 hectares.

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 Central (ie: Blocks 5,6 and 7) and Barangaroo Stage 1 (also known 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 proposals and designs for Barangaroo South, which were evaluated by the Barangaroo Delivery Authority and its evaluation panel.

The Barangaroo South bid chronology can be broadly summarised as follows:

- April 2008 – Stage 1 Expression of Interest released;
- June 2008 – Stage 1 Expression of Interest closed;
- 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 closed; and
- December 2009 – Lend Lease announced as the 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 exhibited the urban structure, place making, sustainability, and financial drivers required to ensure the viability of Barangaroo's Southern Precinct.

Lend Lease's winning scheme maintains the principles of the approved Concept Plan including:

- an enlarged Southern Cove;
- connection of the western edge of the City with the waterfront;
- creation of a variety of experiences along the foreshore that contribute to the liveliness of the area, create landmarks and differ from the more naturalistic parklands experiences to the north;
- provision of unobstructed public access around the entire perimeter of enlarged water intrusion and along the foreshore;
- retention of significant views across the site to the waterfront and across the Harbour from Millers Point and Observatory Hill;
- retention of existing view corridors from the elevated portions of the existing Napoleon Street and Margaret Street;
- preservation of the pedestrian linkages along the foreshore by way of a bridge, thereby retaining the site's envisaged western spine; and
- provision of high quality architectural and urban design underpinned by the engagement of world-renowned architects.

Notwithstanding the above, a modification is required to facilitate development of Lend Lease's scheme, and particularly the redistribution of built form and Gross Floor Area (GFA), which differs from the Concept Plan and Major Development SEPP.

In addition to this Concept Plan modification Lend Lease will be submitting a series of Project Applications to deliver the Barangaroo South development. A number of Project Applications are consistent with the approved Concept Plan and can therefore be lodged under the approved Concept Plan. Lend Lease has prepared the first of these Project Applications, which is for bulk excavation and construction of basement car parking, which has been lodged with the Department of Planning and is on public exhibition between 7th July and 5th August 2010. A summary of this application is provided at Section 5.3 below.

1.1.3 Barangaroo Delivery Authority

The Barangaroo Delivery Authority was established under the Barangaroo Delivery Authority Act 2009 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 the landowner of most of the site. Ownership details are further discussed in Section 2.2.

1.2 Summary of Approval Sought

The Concept Plan Modification proposes for Barangaroo South:

- an increase in the total quantum of GFA within Barangaroo South Mixed Use Precinct from 430,275m² to 490,240m² related to an increase of 45,188m² in residential floor space and an increase of 14,777m² in commercial floor space;
- reallocation of the 8,500m² of passenger terminal GFA approved under the Concept Plan for community uses GFA, and an increase in total community uses GFA by 1,500m² such that there is a total of 10,000m²;
- an increase in total active uses GFA by 1500m² such that there is a total of 3000m²;
- a redesign and reconfiguration of the public waterfront promenade (RE1 Public Recreation Zone) including a reduction in the width of the public promenade from a minimum of 60m to a minimum of 27m;
- the reconfiguration of Blocks 1 to 4;
- the establishment of two new Development Blocks within Barangaroo South, being:
 - Block X – a new predominantly residential development block located west of Globe Street with a maximum GFA of 18,908m² and a maximum building height of RL 41.5, and
 - Block Y – the establishment of a new pier and landmark building extending into the Harbour with a maximum GFA 33,000m² and a maximum building height of RL 170;
- an increase in the maximum building height within the previously described Development Blocks 1, 3 and 4 as follows:
 - Block 1 from RL 62 to RL 80 (an increase of 18m);
 - Block 3 from RL 112 to RL 209 (an increase of 97m); and
 - Block 4 from RL 100 to a maximum of RL 175 in Block 4B (an increase of 75m), noting the approved Block 4 has been split into 3 separate Blocks;
- revisions to the approved Built Form Principles and Urban Design Controls; and
- a redistribution of the approved land use mix within Barangaroo South.

For the entire Barangaroo site, the Concept Plan Modification will result in:

- a 563,965m² mixed use development across the entire Barangaroo site, comprising:
 - a maximum of 514,465m² mixed uses GFA, including residential, commercial and retail uses which includes:
 - a maximum of 128,763m² of residential uses (a minimum of 99,763m² of which will be in Barangaroo South);
 - a maximum of 50,000m² of tourist uses GFA;
 - a maximum of 39,000m² of retail uses;
 - a maximum of 4,500m² of active uses GFA (3,000m² of which will be in Barangaroo South); and
 - a maximum of 12,000m² of community uses GFA (10,000m² 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.

The Concept Plan Modification does not propose any amendments to Barangaroo Central or the Headland Park.

The approved Concept Plan (as modified) is subject to conditions, or terms of approval, which require design amendments to the approved scheme. These include the modification to the Southern Cove required by Concept Plan Condition B3, and the consequential redistribution of GFA within Development Blocks 2, 3, 4 and 5 that is displaced as a result of the Southern Cove, as permitted by Condition C1 of the approved Concept Plan.

This Environmental Assessment also presents the way in which the Lend Lease proposal has incorporated an enlarged Southern Cove in response to Condition B3, and the manner in which GFA within Development Blocks 2, 3 and 4 is proposed to be distributed as a direct consequence of the proposal in respect of the Southern Cove, in accordance with Condition C1.

A modification to the Approved Concept Plan is not required to allow for the changes to the urban structure and built form outcomes for Barangaroo South that arise as a consequence of the enlargement of the Southern Cove and resultant re-distribution of GFA.

This Environmental Assessment nonetheless describes and provides justification for the manner in which Conditions B3 and C1 of the Approved Concept Plan are proposed to be met by the Lend Lease scheme. Specifically, the Environmental Assessment provides information and analysis with respect to:

- the revised urban structure, including street and pedestrian connections and the resultant Development Block pattern;
- the design intent of the enlarged of Southern Cove; and
- the proposed increase in the public domain space in Barangaroo South.

The proposed modifications to the Concept Plan depart from the existing development controls for the site, established under the Major Development SEPP. These components of Lend Lease's scheme consequently require a SEPP Amendment to reconcile the Major Development SEPP planning provisions with the Concept Plan Modification and more specifically to:

- create new development blocks, redefine the existing development blocks, and reconfigure land uses in accordance with previous Concept Plan modifications and Lend Lease's proposed Concept Plan Modification;
- redefine the delineation between urban development and public recreation;
- amend the site boundary to include the proposed public pier and parts of Hickson Road;
- increase the maximum permissible GFA within the Barangaroo South development blocks to reflect previous Concept Plan modifications and Lend Lease's proposed Concept Plan Modification;
- increase the maximum permissible height controls within the Barangaroo South blocks to reflect the changes in configuration of land uses and GFA across the site, whilst allowing flexibility for the design of individual buildings within the certainty of a structured framework; and
- undertake general tidy up and housekeeping amendments to the existing SEPP provisions to reflect current legislative requirements.

1.3 Team

An expert project team has been formed to support the Concept Plan Modification comprising:

Proponent	Lend Lease (Millers Point) Pty Limited
Urban Planning	JBA
Master Designer	Rogers Stirk Harbour + Partners
Collaborative Designers	PTW, FJMT, LAVA and Lend Lease Design
Landscape	Aspect / Oculus
View Analysis	Virtual Ideas/JBA
Traffic and Transport	ARUP
Contamination and Remediation	AECOM
Geotechnical	ARUP
Soil and Water	
■ Water Quality and Navigation	Worley Parsons
■ Stormwater Management & Drainage	ARUP
Waste Management	ARUP
Air Quality & Odour	AECOM
Noise & Vibration	Acoustic Logic Consultancy
Operational Noise	ARUP
Climate Change and Sea Level Rise	ARUP
Heritage	
■ Interpretation Strategy	Tanners Architects
■ Non Indigenous Archaeology	Casey and Lowe
■ Indigenous Heritage and Archaeology	Comber and Stening
Infrastructure & Services Provision	ARUP
Ecologically Sustainable Development	ARUP

2.0 The Site

Barangaroo is located on the north western edge of the Sydney Central Business District (CBD), 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 bounded to the south by a range of new development dominated by large CBD commercial tenants, and the King Street Wharf/Cockle Bay precinct.

The 22ha 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 site location of Barangaroo is shown at Figure 1.

The 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 following section summarises the key features of the Barangaroo South site.



The Site

Figure 1 – Site Location

2.1 Concept Plan Modification Area

Barangaroo South predominantly comprises an open apron which is largely reclaimed over water and identified in the existing approved Concept Plan as Blocks 1 – 4, and the immediately adjacent public recreation area. It is proposed that Barangaroo South also extends beyond the western edge of the existing apron and includes a north-west oriented structure into the existing waters of Darling Harbour to enable the proposed public pier and landmark building.



Figure 2 – Barangaroo South

2.2 Land Ownership and Legal Description

A site survey plan and land ownership is shown in Figure 3.

The site is legally described as Lots 1-6 DP 876514, Lot 7 DP 43776, Lot 100 DP 83823, Lots 6 and 7 DP 869022 and Lot 110 DP 1061311. The Barangaroo Delivery Authority owns the majority of Barangaroo South, however small areas are owned by other Government agencies including the Marine Ministerial Holding Corporation, the Maritime Services Board of NSW (NSW Maritime) and the Crown.

The Barangaroo Delivery Authority has issued landowner's consent, as evidenced by the completed Application Form submitted under separate cover. Landowner's consent will be obtained from Marine Ministerial Holding Corporation, the Maritime Services Board of NSW (NSW Maritime) and the Crown prior to determination of the Concept Plan Modification in accordance with the Environmental Planning and Assessment Regulation, 2000.

2.3 Existing Development and Structures

2.3.1 Built Form

Barangaroo South is predominantly covered by hardstand areas including concrete and bitumen. There are a number of structures that currently occupy the site, including:

- the Wharf 8 Passenger Terminal, car parking and landscaped areas;
- a disused brick office building, security gate house and electrical substation located in the southeast;
- Sydney Ports Authority workshop building in the northeast; and
- a number of light poles spaced across the entire area.

The unoccupied Cruise Passenger Terminal consists of a main building in the central portion of the site (containing a warehouse, offices and main passenger terminal area) and a cruise ship loading dock on Darling Harbour. Structures on Barangaroo South are proposed to be demolished in August 2010 (under approved MP 07_0077 – refer to Section 4.4). A temporary cruise passenger terminal has already been erected to the north of Block 5 and is operational.

Surrounding built form is shown in **Figure 4**.

2.3.2 Existing Sea Wall

The existing sea wall at Barangaroo South varies from 2.1m to 2.2m Australian Height Datum (AHD). The site rises from 2.06m to 3.5m AHD at Hickson Road, approximately 200m landwards of the sea wall.

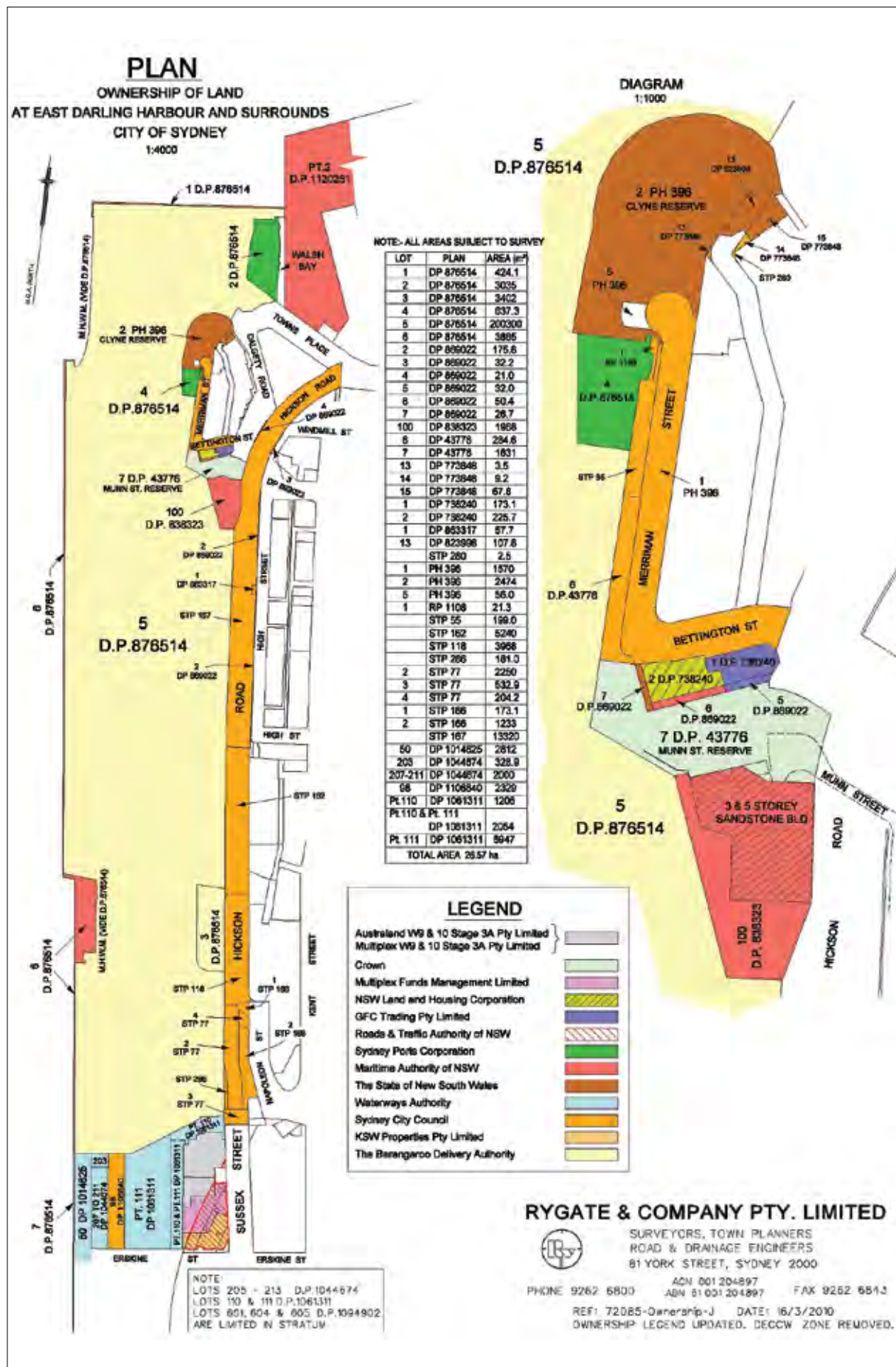


Figure 3 – Cadastral layout and ownership plan

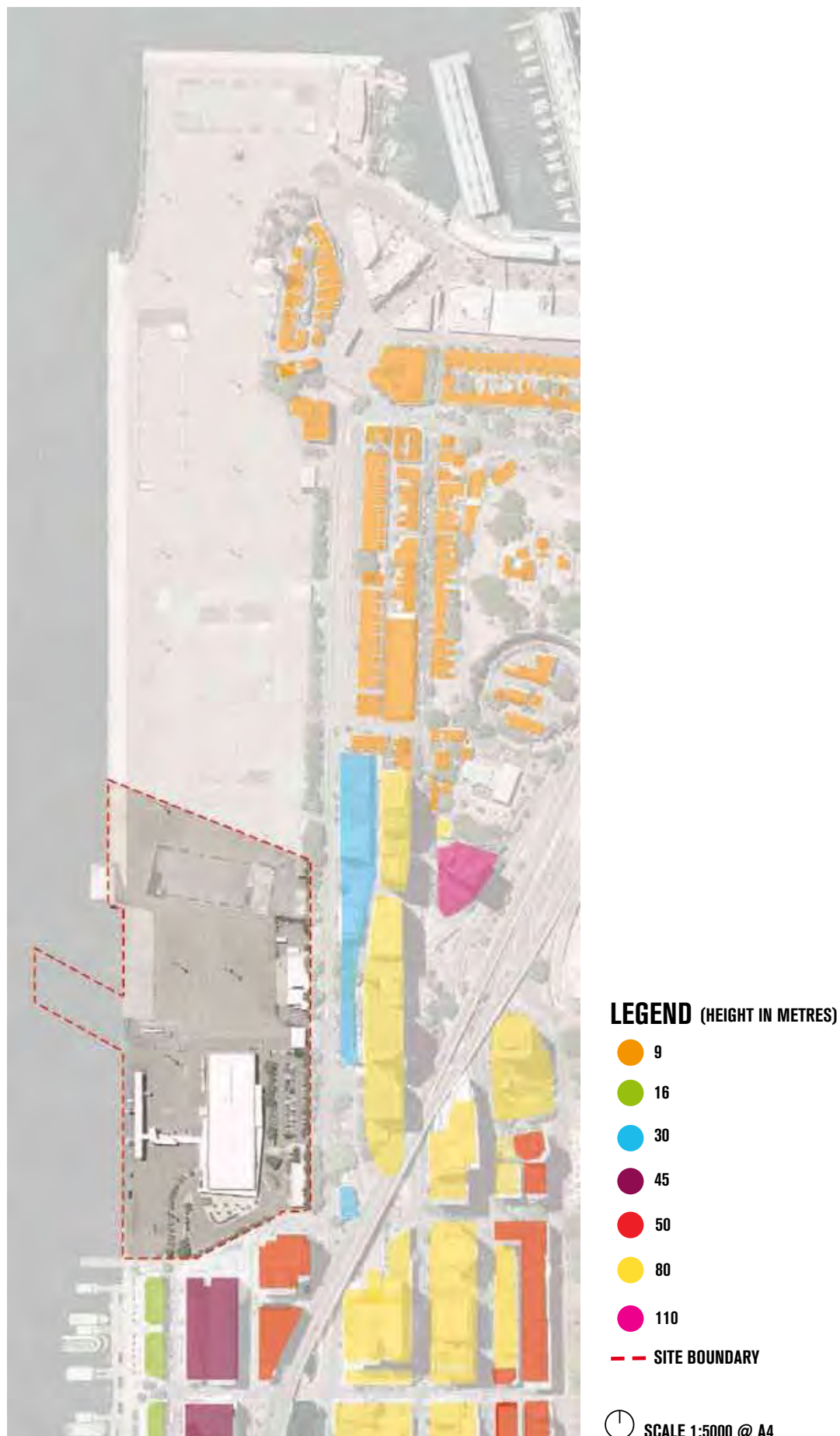


Figure 4 – Existing surrounding built form

2.3.3 Infrastructure and Services

Stormwater

The existing stormwater network serving the site is characterised by a series of transverse piped stormwater systems (typically between 450mm to 600mm in diameter) draining Hickson Road and other external catchments through the Barangaroo site directly to the Harbour.

Water

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

Sewer

There is an existing sewer network traversing the site which drains to an existing Sydney Water sewage pumping station SP 1129 and SP 14, located outside Barangaroo South.

Pumping station SP 1129 and SP 14 services both the current requirements of the Barangaroo site and the local residential and commercial catchments external to 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) that serves the 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.

2.4 Traffic and Transport

2.4.1 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 (**Figure 5**). Local road access to Barangaroo South is provided as follows:

- from the CBD via Napoleon Street and Margaret Street;
- via Sussex Street and Hickson Road from the southern CBD; and
- via Harbour Street and Lime Street (through King Street Wharf) to Shelley Street from the south.

Over 1,500 vehicles pass through the intersection of Hickson Road, Napoleon Street and Sussex Street (refer to the Transport Management and Access Plan (Supplementary) prepared by Arup at **Appendix H**). 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.



LEGEND

-  PEDESTRIAN CONNECTIONS FROM KENT ST
-  PRIMARY VEHICULAR STREET
-  SECONDARY VEHICULAR STREET
-  EXISTING BUS ROUTE
-  EXISTING CYCLEWAY
-  BUS TERMINAL
-  SITE BOUNDARY

 SCALE 1:5000 @ A4

Figure 5 – Existing street network

2.4.2 Public Transport

Barangaroo South is served by the following public transport modes:

- **Rail:** Wynyard, Martin Place, Town Hall and Circular Quay railway stations are within walking distance of the Barangaroo site and provide frequent services throughout the day. It is closer to walk from Wynyard to Barangaroo South than it is to walk from Wynyard to the middle of Martin Place.
- **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 H**.

2.4.3 Pedestrians and Cyclists

Pedestrian Access

Pedestrian access is currently available along all local roads, which are footpath lined. Pedestrian access is also available 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.

On days when the Temporary Passenger Terminal is operational, passengers arriving and departing the site use the Sussex Street / Shelley Street intersection to access Wynyard Station. This intersection is controlled by traffic signals and has pedestrian crossing facilities on all three approaches.

Pedestrian traffic movements to and from the Temporary Passenger Terminal are in the order of 1,700 pedestrian movements in total for each cruise ship visit, with the majority typically occurring between the hours of 10am and 2pm.

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 are being improved through the construction of separated cycleways along King Street (completed May 2009) and Kent Street (scheduled for completion early 2011).

Internally, the site is relatively flat which will encourage pedestrian and cycle movement. The site is constrained however in that there is a considerable grade differential to the east of the site to other parts of the CBD and to Wynyard Station.

2.5 Physical Characteristics

Site opportunities and constraints are illustrated in **Figures 6** and **7**.

2.5.1 Topography

The ground surface of Barangaroo South is at an elevation of approximately 2m AHD and rises by approximately 1.5m towards Hickson Road to approximately 3.5m 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 (see Section 2.6.2).

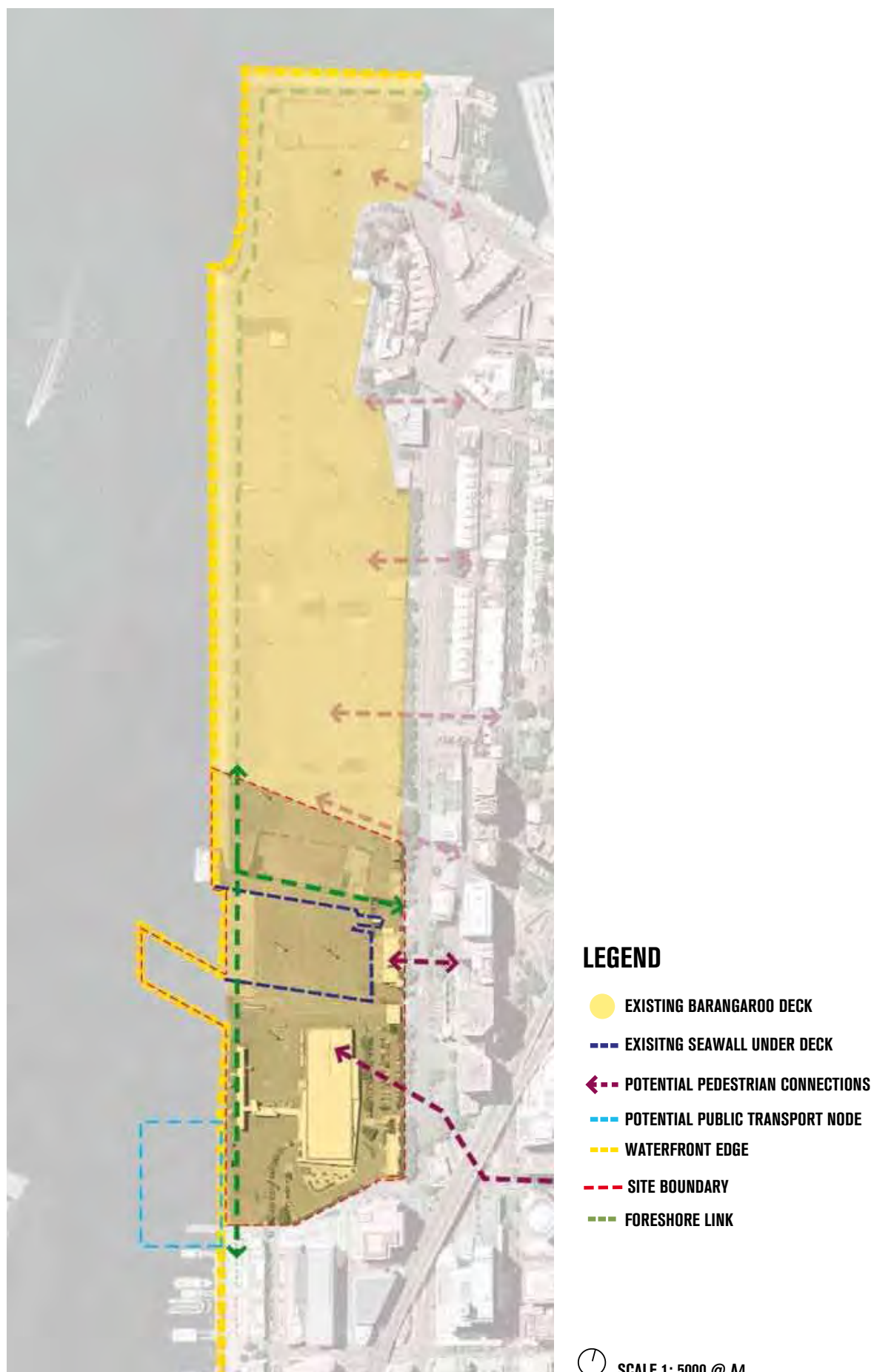


Figure 6 – Site opportunities

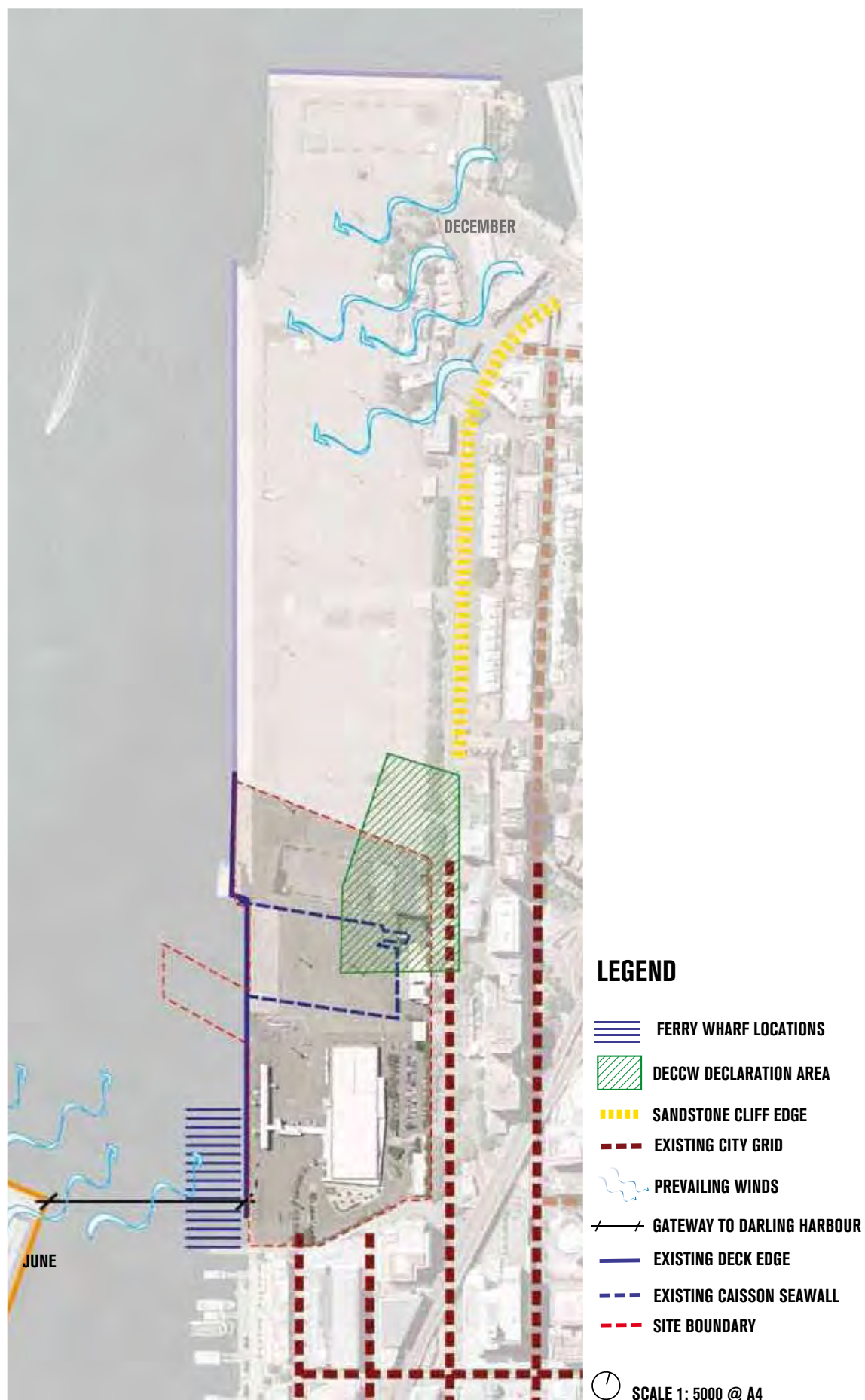


Figure 7 – Site constraints

2.5.2 Geology and Geomorphology

Previous drilling investigations undertaken have shown a variable thickness of layer of pavement and fill over the alluvial and marine deposits. The man-made fill below the bitumen and concrete paving is at variable depths. The 1:100,000 Sydney Soil Landscape Map indicate Barangaroo South is underlain by disturbed soils.

A high probability of acid sulphate soil is associated with the estuarine sediments in Sydney Harbour. Accordingly, acid sulphate soil is likely to underlie the man-made fill materials that occupy Barangaroo South. The Sydney Geological Map Scale 1:100,000 and the Sydney Geological Map Scale 1:250,000 indicate the man-made fill is underlain by Hawkesbury Sandstone.

Structural lineaments and dykes include:

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

2.5.3 Groundwater and Hydrogeology

The groundwater profile beneath Barangaroo South 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.

Previous environmental site investigations undertaken for the site have analysed groundwater quality and this analysis indicates varying concentrations of a range of contaminants. Detectable concentrations of total petroleum hydrocarbons (TPHs), benzene, xylenes and polycyclic aromatic hydrocarbons (PAHs) and benzene, toluene, ethylbenzene, and xylenes (BTEX) have been recorded and are associated with the former gasworks operations on and in the immediate vicinity of the site. Heavy metal concentrations likely to be related to fill materials are present in groundwater across the site.

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

Concentrations of lead, total petroleum hydrocarbons (TPHs), benzene, xylenes and polycyclic aromatic hydrocarbons (PAHs) in the soil variably exceed accepted Department of Environment, Climate Change and Water (DECCW) criteria levels. The contamination is largely associated with the operation of the former gasworks and from the importation of materials historically used to fill the site.

In May 2009, DECCW declared part of the Barangaroo site (Blocks 4 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). The DECCW Declaration Area is illustrated in **Figure 8**.

Remediation of that part of Barangaroo South is within an area comprising Blocks 4 and 5 and the Southern Cove, and the adjacent area of Hickson Road and is being guided by the Overarching Remedial Action Plan prepared by ERM (refer to Excavation and Basement Project Application), and will be the subject of a separate future Remedial Action Plan and Project Application(s). In addition, a specific Remedial Action Plan has been prepared in support of the Excavation and Basement Car Parking Project Application which has been lodged. It deals with the remediation strategy for land south of the DECCW Declaration Area.

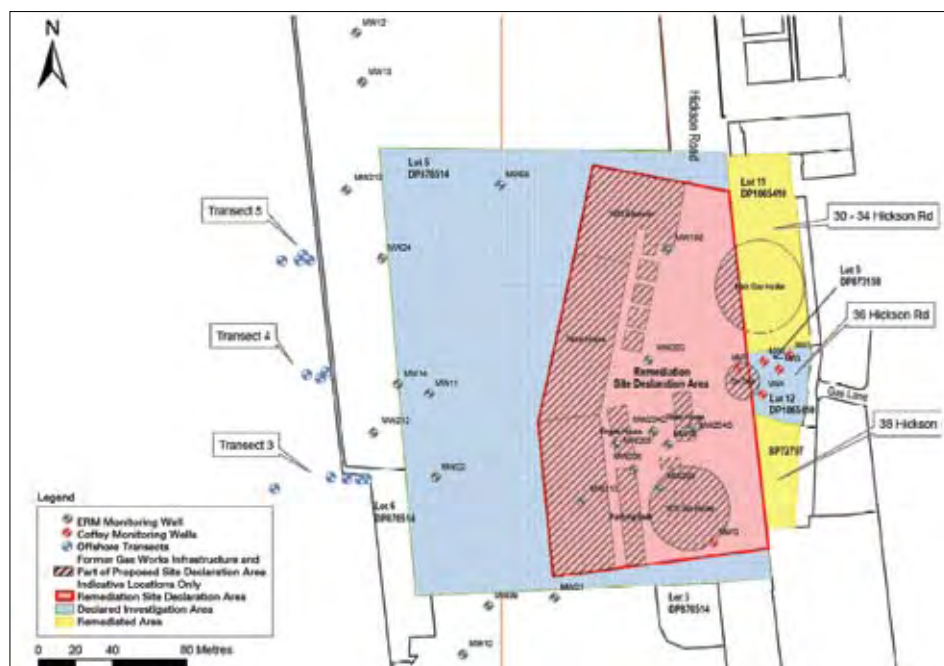


Figure 8 – DECCW Declared Remediation Area

2.5.5 Environmental Conditions

The site is generally orientated north-south and receives high levels of sunlight, particularly from the north and west, due to the site's topography, waterfront location and absence of built structures.

The current prevailing winds are from the north-east and south between the months of September to April and from the west between April and September.

2.5.6 Heritage

There are no listed heritage items within the Barangaroo South site. Surrounding heritage items are shown in **Figure 9**.

A Non-Indigenous Archaeological Assessment undertaken by Casey and Lowe indicates there is a moderate to high level of archaeological potential across most of the site (**Appendix I**). The site contains a mixture of archaeological remains associated with maritime infrastructure, shipbuilding and industrial land uses, in particular:

- early maritime infrastructure (1810s-1830s) with associated stores and reclamation processes, notably Portion 20 associated with Prosper de Mestre and Francois Girard;
- Henry Bass' early shipyard;
- the AGL gasworks (1839-1921) which is an area that is highly contaminated;
- mid 19th-century wharfage which was augmented, demolished and upgraded through time until it became the Grafton wharf which was associated with the nearby bond stores; and
- new wharfage in the 1880s involved the raising of street levels (0.60m) to accommodate larger ships.

An Aboriginal Archaeological and Cultural Heritage Assessment prepared by Comber Consultants confirms that there are no recorded Aboriginal sites within Barangaroo South (**Appendix Y**).



LEGEND

- PARKS, LANEWAYS, SPACES, STAIRS, BRIDGES, CLIFF FACES, WALLS, AND FENCES
- TREES, FOUNTAINS, DRINKING FOUNTAINS, STRUCTURES
- BUILDINGS AND SITES
- SITE BOUNDARY

 SCALE 1:5000 @ A4

Figure 9 – Surrounding heritage items

3.0 Consultation

In accordance with the Environmental Assessment Requirements issued by the Director-General (refer **Appendix C**), 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.

3.1 Council and Agency Consultation

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

Nine (9) 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 is summarised in **Table 1**.

Since their establishment, the Technical Working Groups have met on numerous occasions and the relevant Implementation Plans/Strategies have been prepared in consultation with these Technical Working Groups.

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.

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	<ul style="list-style-type: none"> - Barangaroo Delivery Authority (Chair) - Lend Lease - DECCW
Transport Management and Access Plan	Transport and Access	<ul style="list-style-type: none"> - Barangaroo Delivery Authority (Chair) - Lend Lease - NSW Transport and Infrastructure - City of Sydney Council
Utility Services Infrastructure Plan	Physical Infrastructure	<ul style="list-style-type: none"> - Barangaroo Delivery Authority (Chair) - Lend Lease - Sydney Water - City of Sydney Council - DECCW
Design Excellence Strategy	Built Form	<ul style="list-style-type: none"> - Barangaroo Delivery Authority (Chair) - Lend Lease - City of Sydney Council
Public Domain Plan	Public Domain	<ul style="list-style-type: none"> - Barangaroo Delivery Authority (Chair) - Lend Lease - Sydney Harbour Foreshore Authority - NSW Maritime - City of Sydney Council
Community and Social Plan	Community Development	<ul style="list-style-type: none"> - Barangaroo Delivery Authority (Chair) - Lend Lease - Department of Housing - City of Sydney

Implementation Plan / Strategy Required by Concept Plan	Technical Working Group Name	Membership
Marketing and Promotion Strategy	Investment	<ul style="list-style-type: none"> - Barangaroo Delivery Authority (Chair) - Lend Lease - Department of Industry and Investment
Retail Management Plan	Investment	<ul style="list-style-type: none"> - Barangaroo Delivery Authority (Chair) - Lend Lease - Department of Industry and Investment
Housing Strategy	Community Development	<ul style="list-style-type: none"> - Barangaroo Delivery Authority (Chair) - Lend Lease - Department of Housing - City of Sydney

3.2 Community Consultation

More than 15,000 people have viewed the plans for Barangaroo and Barangaroo South either online or in person. The opportunity to participate has been provided through a number of direct and indirect ways as follows:

- the Barangaroo Display at Hickson Road, which attracted 3,000 visitors and 250 written comments;
- the Barangaroo Online Forum, which has attracted 1,400 unique visitors;
- some 6,500 people have visited the Online Information Display;
- 400 people have attended a series of four community forum events in Sydney's CBD, Parramatta and Caringbah;
- 5000 people have visited the dedicated Barangaroo South Website since its launch on 16 June 2010 (barangaroosouth.com.au);
- over 50 people have contacted Lend Lease's dedicated Barangaroo South 1300 telephone number since it was launched on 16th June, with over 130 people providing follow-up written comments; and
- Barangaroo South information events and attendance at community meetings have engaged with over 300 community members to date.

This extensive program of community engagement has been aimed at providing direct public feedback into the ongoing design process for Barangaroo South and enabling the community to develop a sense of ownership over the project. The objective of the forums has been to encourage people both locally and from all over Sydney to provide feedback into the design and contribute ideas to 'weave' Barangaroo into the existing fabric of Sydney.

The Barangaroo Delivery Authority conducted a series of community events across Sydney, including the CBD, Parramatta and Caringbah. Lend Lease presented the Barangaroo South scheme and representatives of the Authority's Public Domain Design Team (Peter Walker and Partners and Johnson Pilton Walker) presented the Headland Park scheme at these events. Lend Lease representatives also participated in workshops presented as part of these events. Additional large format forums will continue to be run together with a display of the Barangaroo South Concept Plan modification at Customs House.

As a result, hundreds of ideas, suggestions and comments have been fed directly into the design process for the site and have influenced the overall design rationale for Barangaroo South.

3.3 Ongoing Consultation

Lend Lease recognises the importance of positive relationships with all stakeholders and seeks to proactively engage with them over the duration of the project. A Stakeholder Consultation Strategy has been prepared (**Appendix G**) which details Lend Lease's approach to stakeholder engagement and will ensure relevant individuals and/or groups that have an interest in, or are affected by, Barangaroo South, are appropriately consulted with in the future.

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.

Lend Lease's communications strategy has been devised with the following principles in mind:

- **an inclusive approach** – to implement inclusive community engagement processes, stakeholders must be provided with information that enables them to make informed decisions and to contribute in a meaningful (and informed) way. This includes providing the right amount of information in a timely way that is in plain English and consistent;
- **transparent processes** – engagement processes should be transparent in order to develop trust and build strong relationships with the community. This means that information should be shared openly between stakeholders, where possible; and
- **community feedback** – engagement activities should be responsive as well as pro-active. This means that feedback should be an integral part of the process. Stakeholders should have the opportunity to provide feedback as part of the consultation process. This will assist in developing trust, ensuring communication flows in and out of the project team and that the community is kept informed of Barangaroo South's progress.

Lend Lease's Stakeholder Consultation Strategy has been prepared to provide Lend Lease with the opportunity to:

- be proactive in order to understand the needs of stakeholders and be in a position to respond to these needs and meet them wherever possible;
- provide accurate, up to date and accessible information to stakeholders as early as possible and at regular intervals throughout the project;
- be open, honest, fair and realistic in all dealings with stakeholders;
- treat the communities in which Lend Lease works with respect;
- recognise diversity and seek to inform all stakeholders of any decisions affecting them;
- ensure that all stakeholders and affected community members are well informed about the Barangaroo development and can provide input into the project;
- communicate Lend Lease's intentions transparently in relation to Barangaroo;
- minimise impacts to affected residents and stakeholders;
- reiterate Lend Lease's commitment to local employment and job creation, revitalised infrastructure and improved quality of life for Sydney residents and visitors to Sydney;
- create a forum for exchange and information flow; and
- evaluate and review the Stakeholder Engagement Strategy at appropriate times.

4.0 Strategic and Statutory Context

In order to understand the nature and extent of Lend Lease's Concept Plan Modification, and the potential departures from the established planning framework for Barangaroo South, it is important to understand the planning regime that currently applies to the site.

The existing planning framework is established by a range of strategic planning policies and statutory controls, including:

- Planning provisions at Schedule 3 Part 12 of the Major Development SEPP;
- Barangaroo Concept Plan, as approved on 9 February 2007 and modified on 25 September 2007, 16 February 2009 and 11 November 2009; and
- Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 for the water based areas proposed to be included within the Barangaroo South site.

4.1 Strategic Framework

4.1.1 State Plan

The New South Wales State Plan (2006) sets the strategic direction and goals for the NSW Government across a broad range of services and infrastructure. The Plan nominates one of the key challenges for the state as being the planning challenges that arise from a continuing population growth. In addition to this, the Plan nominates environmental challenges from climate change and drought.

The redevelopment of Barangaroo South will provide a substantial amount of new commercial floor space and housing in an area which is highly accessible to public transport infrastructure and social services. It will also demonstrate a high level of sustainability with the implementation of the proposed infrastructure (Sections 5.5 and 5.6) and specific ecologically sustainable initiatives (Section 5.7).

4.1.2 Sydney Metropolitan Strategy

The Sydney Metropolitan Strategy outlines seven key strategies for the development of Sydney over the next 25 years. Barangaroo is located within the Sydney City subregion. The Sydney sub-region is nominated as a 'Global Centre' which is the:

"main focus for national and international business, professional services, specialised health and education precincts, specialised shops and tourism, it is also a recreational and tourist destination for the Sydney region and has national and international significance".

The Strategy sets specific targets for increasing housing and jobs in the major centres of Sydney. The specific targets set for the Sydney region are approximately 48,400 new jobs and 31,793 new dwellings. Barangaroo South will make a significant contribution towards achieving these targets as it is expected to provide approximately 21,123 new jobs and 775 – 800 new dwellings.

Barangaroo South will also help achieve a number of other strategies through the sustainability commitments that have been made and the delivery of a significant amount of new public open space.

4.2 Statutory Planning Controls

The following State Environmental Planning Policies are relevant to the proposal and are discussed further below:

- State Environmental Planning Policy (Major Development) 2005;
- Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005;
- State Environmental Planning Policy (Infrastructure) 2007;
- State Environmental Planning Policy No. 32 – Urban Consolidation;
- State Environmental Planning Policy No. 55 – Remediation of Land;
- State Environmental Planning Policy No. 64 – Advertising and Signage;
- State Environmental Planning Policy No. 65 – Design Quality of Residential Flat Development;
- State Environmental Planning Policy Building Sustainability Index 2004; and
- Sydney City Local Environmental Plan 2005.

4.2.1 State Environmental Planning Policy (Major Development) Schedule 3 Part 12

The planning controls for the Barangaroo site are contained in Schedule 3 Part 12 of the Major Development SEPP. The planning controls establish the category of development that is subject to assessment under Part 3A of the EP&A Act and the provisions applying to development within the Barangaroo site.

The planning provisions applying to development within the site include:

- Land use zones, objectives and permitted uses;
- Exempt and complying development;
- Consent requirements for subdivision of land;
- Building height controls;
- Gross Floor Area (GFA) restrictions;
- Design excellence requirements;
- Heritage conservation controls; and
- Exceptions to development standards.

Zoning & Development Standards

Part 12 Schedule 3 of State Environmental Planning Policy (Major Development) 2005 – “Barangaroo site” zones the land part B4 Mixed Use and part RE1 Public Recreation.

Maximum building heights and gross floor area (GFA) restrictions are established for nominated development blocks within the B4 Mixed Use zone. There are no maximum building height or GFA restrictions imposed by the SEPP on land within the RE1 Public Recreation Zone (**Figure 10**).

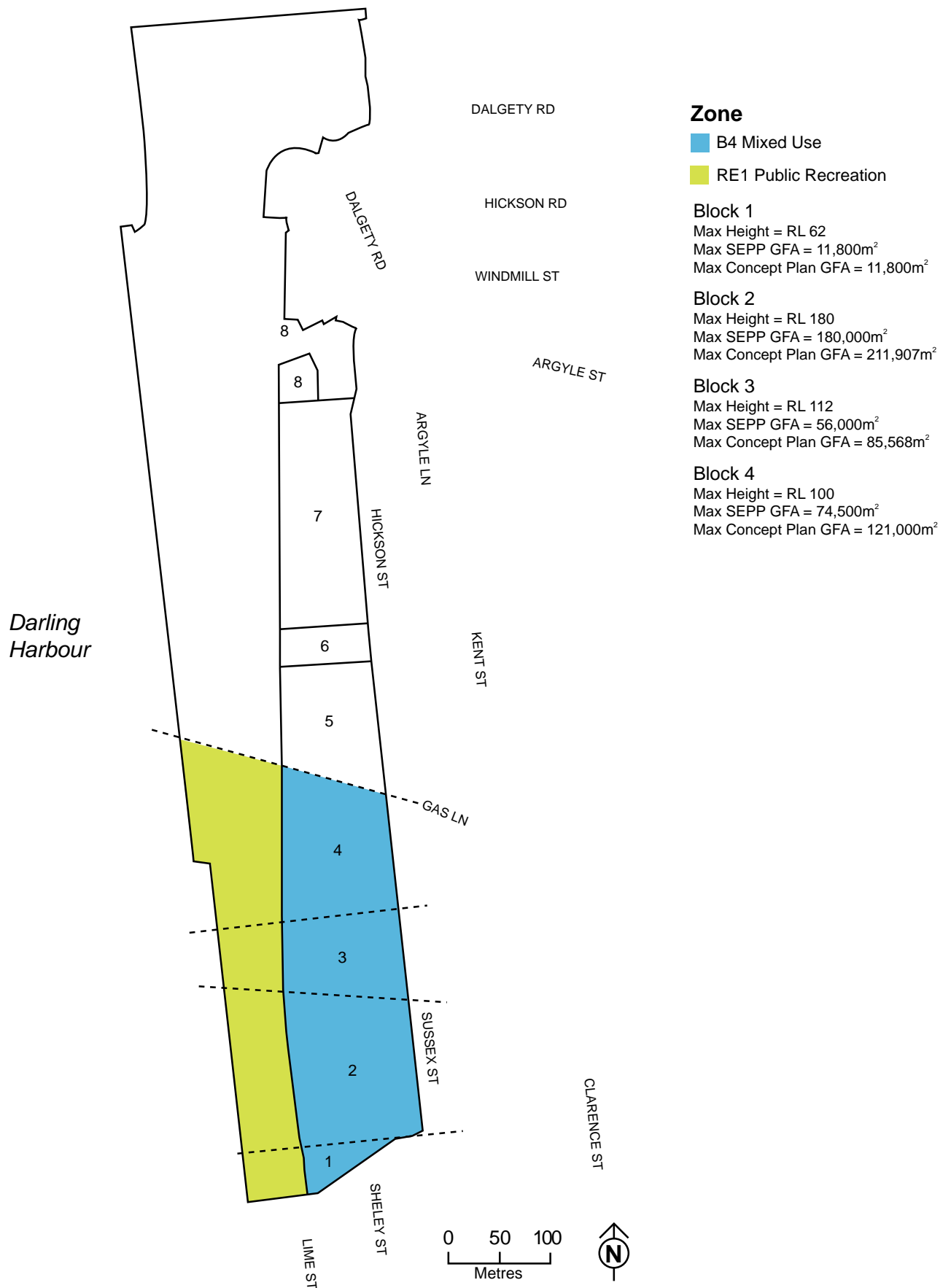


Figure 10 – Summary of zoning and development standards for Blocks 1 – 4

Design Excellence

Clause 19 of the Major Development SEPP (Part 12, Schedule 3) sets the parameters for design excellence on the site. Consideration must be given to:

- Architectural design and materials;
- Form and external appearance of future buildings; and
- Whether buildings will meet sustainable design principles.

In addition, a design competition is required to be held for development greater than RL 57 or for any building greater than 1,500m² unless the Director General waives that requirement.

4.2.2 Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005

The Sydney Harbour Regional Environmental Plan (REP) applies to the hydrological catchment of the Harbour (including the waterways and tributaries) and establishes planning principles and specific provisions for the Foreshores and Waterways Area (generally one street back from foreshore), strategic foreshore sites, heritage items and wetland protection areas. In line with the recent planning reforms, the REP is now a deemed SEPP.

The Darling Harbour waterway (west of the Barangaroo RE1 zoning boundary) falls within the Foreshores and Waterways Area. Land located west of the Barangaroo RE1 zoning boundary is zoned W1 Maritime Waters under the Sydney Harbour REP.

4.2.3 SEPP (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 aims to facilitate the effective delivery of infrastructure across the state and identifies matters to be considered in the assessment of development adjacent to particular types of infrastructure development. Future development envisaged by the Concept Plan Modification is classified as a traffic generating development and accordingly the Concept Plan Modification will be required to be referred to the Roads and Traffic Authority (RTA) for comment.

4.2.4 SEPP 32 – Urban Consolidation

SEPP 32 promotes the orderly and economic use and development of land by enabling urban land which is no longer required for the purpose for which it is currently zoned or used to be redeveloped for multi-unit housing and related development. In determining a proposal for urban consolidation:

Each council must consider and the Minister must consider whether urban land is no longer needed or used for the purposes for which it is currently zoned or used, whether it is suitable for redevelopment for multi-unit housing and related development in accordance with the aims and objectives of this Policy and whether action should be taken to make the land available for such redevelopment.

In the assessment and approval of the approved Concept Plan (MP06_162) the Minister for Planning has already determined that Barangaroo is suitable for redevelopment.

4.2.5 SEPP 55 – Remediation of Land

SEPP 55 provides that a consent authority must not consent to the carrying out of development on land unless it has considered whether the land is contaminated, and if the land is contaminated, it is satisfied that the land is suitable for the purpose for which the development is proposed to be carried out.

Further, it requires that where remediation is required to make the land suitable for a proposed use, the consent authority must be satisfied that the land will be remediated before the land is used for that purpose.

The Overarching Remedial Action Plan (prepared by ERM – refer to Excavation and Basement Project Application) and the Remedial Action Plan, Barangaroo – Other Remediation Works (South) Area (prepared by ERM – refer to Excavation and Basement Project Application) have been prepared in accordance with SEPP 55 and set out the detailed methodology for remediating Barangaroo South to make it suitable for the proposed uses.

4.2.6 SEPP 64 – Advertising and Signage

State Environmental Planning Policy 64 – Advertising and Signage applies to all signage that can be displayed with or without development consent and is visible from any public place or public reserve. Schedule 1 of SEPP 64 identifies assessment criteria which must be complied with. The Urban Design Statement contains proposed signage controls compliant with SEPP 64. Future Project Applications will also need to address the requirements of SEPP 64.

4.2.7 SEPP 65 – Design Quality of Residential Flat Development

SEPP 65 aims to improve the design quality of residential flat development in New South Wales.

The Concept Plan Modification proposes an increase in residential floor space (refer to Section 5.2). The revised floor space figures and resultant density on the site have been analysed and it has been demonstrated that sufficient onsite facilities can be provided for the densities proposed. It is also noted that the site is suitable for higher densities given its close proximity to the CBD and major public transport nodes.

The Statements of Commitment require future Project Applications to generally comply with the requirements of SEPP 65.

4.2.8 SEPP Building Sustainability Index 2004

BASIX, the Building Sustainability Index, was introduced by the NSW Government, to ensure homes and units are designed to use less potable water and emit fewer greenhouse gas emissions. BASIX sets minimum energy and water reduction targets for houses and units to achieve this goal.

A commitment has been made by Lend Lease to achieve and exceed the minimum targets set by BASIX at Barangaroo South. In particular Lend Lease has set a target of achieving a 5 star or higher Green Star rating under the Green Building Council's residential tool and achieving 6 stars for commercial development.

The Statements of Commitments have been updated to reflect Lend Lease's sustainability targets (refer Section 8.0).

4.2.9 Sydney LEP 2005

The Hickson Road reservation is zoned Maritime and Transport under the Sydney Local Environmental Plan 2005 as identified in **Figure 11** below. The Concept Plan Modification envisages future pedestrian bridges (Section 5.3), which are prohibited development in this zone.

Lend Lease proposes to amend the Major Development SEPP provisions to apply to Hickson Road to permit pedestrian bridges (Section 6.0). No other development is proposed within the Hickson Road reserve.



Figure 11 – Zoning Map

4.3 Approved Barangaroo Concept Plan

The approved Concept Plan defines the principles of the Barangaroo redevelopment project and establishes a planning framework for the assessment of future detailed Project Applications. It articulates the desired outcomes for the project, and sets the broad parameters for sustainable redevelopment of the site through a series of concept strategies. A consolidated version of the approved Concept Plan Instrument of Approval (as modified) is attached at **Appendix D**.

Conditions A1 and B4 of the Concept Plan approval (and subsequent modifications) provide for the:

- Urban structure, including the public domain, street pattern and the development block pattern within the mixed use zone;
- A mixed use development involving a maximum of 489,500m² gross floor area (GFA) within the mixed use zone comprised of:
 - a maximum of 97,075 m² and a minimum of 58,245 m² residential GFA;
 - a maximum of 50,000 m² GFA for tourist uses;
 - a maximum of 39,000 m² GFA for retail uses; and
 - a minimum of 2,000 m² GFA for community uses;
- 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 1.4 km public foreshore promenade;
- A maximum of 8,500m² GFA for a passenger terminal and a maximum of 3,000m² GFA for active uses that support the public domain within the public recreation zone;
- Built form design 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 sea walls and creation of a portion of the new shoreline to the harbour.

4.3.1 Previous Concept Plan Amendments

The approved Concept Plan has been modified three times under Section 75W of the Environmental Planning and Assessment Act, 1979 since originally being approved. MP 06-0162 MOD 3 was most recently approved in November 2009.

The modifications are summarised in **Table 2** below.

Table 2 – Summary of Concept Plan Modifications

Modification	Approval Date	Scope
Modification No. 1	25/09/2007	Correction of minor typographical errors in the concept plan Instrument of Approval and modification to design excellence requirements
Modification No. 2	16/02/2009	Modification to seek an additional 120,000m ² of commercial floor space on the site distributed across Blocks 2, 3, 4 and 5
Modification No. 3	11/11/2009	Amended design for the Headland Park and Northern Cove, removal of Block 8 and part Block 7, reduction of floor space by 18,800m ² and removal of the Sydney Ports Harbour Control tower

The Statements of Commitment have been progressively modified with each Concept Plan modification.

In December 2008, the NSW Government announced that it would permanently relocate the Darling Harbour No. 8 Cruise Passenger Terminal to White Bay to facilitate and enhance the Barangaroo redevelopment project. To date, the approved Concept Plan (as modified) has not been updated to reflect this Government policy. However, the Government has ceased operation of the Darling Harbour No. 8 Cruise passenger Terminal and a temporary Cruise Passenger Terminal has been erected to the north of Block 5 and is operational.

4.3.2 Approved Concept Plan Terms of Approval

The approved Concept Plan (as modified) is subject to conditions, or terms of approval, which require design amendments to the approved scheme. These include the modification to the Southern Cove required as a condition of Concept Plan MOD 1 and 2, and the consequential reconfiguration of the development blocks and redistribution of GFA within the site. The modifications are required to be undertaken to comply with the approved Concept Plan (as modified).

Southern Cove Enlargement

The International Design Competition facilitated for the Barangaroo site in 2005/2006 resulted in a Design Jury report. The Jury's report provided:

In developing the scheme beyond its current concept the Jury recommends that the following elements be integrated in the next phase of the project:

- *A natural headland which touches the water at the northern end of the site;*
- *A large northern cove located directly behind the headland to further define the headland; and*
- *A larger intervention of the Southern Cove located north of Napoleon Street.*

In direct response to the Jury's recommendations, the Minister for Planning imposed conditions on the original Concept Plan requiring further detailed designs to be prepared for the proposed new Southern Cove (Director General's Assessment Report, February 2007, pg 17). Condition B3 of the approved Concept Plan accordingly requires future detailed designs to address the following requirements and objectives:

- an enlarged water intrusion including a component east of the proposed "Globe Street";
- active edges around the enlarged water body, including appropriate ground floor uses in buildings to activate the foreshore area;
- achieving appropriate pedestrian linkages along the foreshore and connections to Hickson Road; and
- a theme which celebrates the water as an important part of the landscape element.

Figure 12 illustrates the way in which Lend Lease has incorporated an enlarged Southern Cove in response to Condition B3 of the approved Concept Plan to create the Southern Cove. The design also provides a north-south canal which is intended to link to the future Northern Cove. The design satisfies the requirements and objectives of Condition B3 by:

- significantly increasing the size of the Southern Cove to a total of approximately 8,140m²;
- providing additional waterfront linkages around the perimeter of the Southern Cove;
- reconnecting the western edge of the City with the waterfront, bringing the water's edge closer to Hickson Road in line with the original foreshore;
- providing informal open and civic places around the perimeter of the Southern Cove as envisaged by the approved Concept Plan;

- preserving the pedestrian desire line between the southern and northern shores of the Southern Cove by way of a pedestrian bridge, thereby reinforcing the Foreshore Promenade as the site's western spine;
- providing unobstructed public access around the entire perimeter of the Southern Cove;
- activating the foreshore by allowing for the establishment of ground floor retail /restaurant uses with water frontages;
- creating a variety of experiences along the foreshore including the bridge, boardwalks and ground floor uses (including bars and restaurants) that contribute to the liveliness of the area and differ from the more naturalistic parklands that will be experienced to the north; and
- celebrating the water by bringing water elements that are complementary to the Cove further into the site, including the proposed new canal that runs parallel to Hickson Road.

Condition C1 of the approved Concept Plan allows for the redistribution of GFA within Development Blocks 2, 3, 4 and 5 that is displaced as a result of the enlargement of the Southern Cove required by Condition B3.



Figure 12 – Proposed Southern Cove enlargement (Modification B3)

Urban Structure and Redistribution of GFA

In regard to Barangaroo South and the enlarged Southern Cove specifically, Condition C1 of the approved Concept Plan (as modified) permits the reconfiguration and redistribution of GFA across Development Blocks 2 – 4. This is reinforced in the Department of Planning's assessment report for the original Concept Plan, which acknowledged future applications should address detailed design and that maximum flexibility should be afforded to future proponents (Director General's Assessment Report, February 2007, pg 18).

Block 1 as approved in the current Concept Plan is proposed to remain as is. The revisions to the Development Block structure for Blocks 2 – 4 in direct response to the requirements of Condition C1 is illustrated in **Figure 13** and is summarised as follows:

- **Block 2** – is bordered by Hickson Road to the east, Globe Street to the west, a pedestrian access way known as City Walk to the north and Margaret Street West to the south. The northern boundary of Block 2 has been reoriented to a 23° angle;
- **Block 3** – is bordered by Hickson Road to the east, Globe Street to the west a new Napoleon Street to the north and City Walk to the south. Block 3 has been redesigned to take on a triangular form in response to the realignment of the enlarged Southern Cove, termination of the vehicular Globe Street and the creation of City Walk;
- The dividing of Block 4 into three new Blocks as follows:
 - **Block 4A** – is a rectangular Development Block bordered by Block 4B to the east, Napoleon Street to the south, public recreation to the west and the Southern Cove to the north. Block 4A is a direct response to the enlarged Southern Cove which has replaced Block 4 as envisaged in the approved Concept Plan;
 - **Block 4B** – is an irregularly-shaped Development Block bordered by Hickson Road to the east, Block 3 to the south, Blocks 4A and 4C and the enlarged Southern Cove to the west and Healy Street to the north; and
 - **Block 4C** – is a rectangular Development Block bordered by Block 4B to the east, the Southern Cove and waterfront to the south, public recreation area to the west and Healy Street to the north.

4.3.3 Approved Statement of Commitments

The Statement of Commitments approved under the existing Concept Plan (as modified) require a series of Implementation Plans and Strategies to be prepared prior to the lodgement of 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 requires the establishment of Technical Working Groups to prepare each Implementation Plan and Strategy. The Technical Working Groups have been convened and meet regularly (refer to Section 3 for further details). The specialist studies prepared in support of this Concept Plan Modification are consistent with the approved Statements of Commitment.

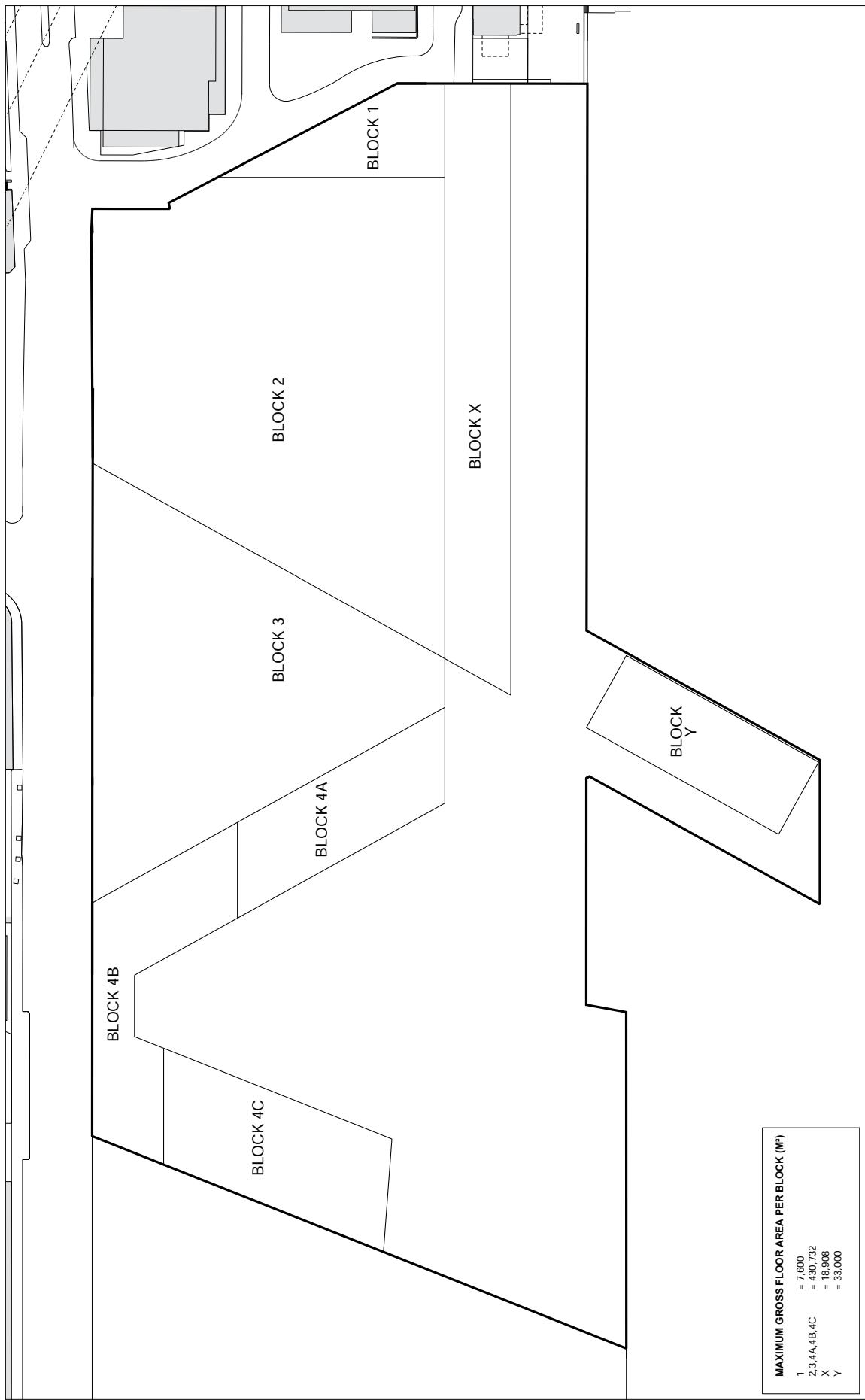


Figure 13 – Barangaroo South Redistributed Blocks 1 – 4 (Modification C1)

4.4 Project Applications

To date, Barangaroo has been subject to the following three Project Applications, one of which was specifically on Barangaroo South.

4.4.1 Demolition Project Application

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

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, and 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 were completed in June 2008. Completion of the remaining works on Barangaroo South approved under MP 07_0077 is scheduled to commence in August 2010.

4.4.2 Bulk Excavation and Basement Car Parking

On 18 June 2010, Lend Lease submitted a Project Application for bulk excavation of part of Barangaroo South and the construction of a basement car park and associated services and infrastructure to support the initial phases of the future development of Barangaroo South. The Project Application is on public exhibition from 7 July 2010 to 6 August 2010.

Specifically, the Project Application seeks approval for:

- demolition of any existing structures and footings, part of an underground cassion wall, hardstand areas, removal of piles, and removal of existing vegetation within Blocks 1, 2 and 3 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 the basement within Blocks 1,2 and 3 and the adjacent public domain area;
- on-site treatment and remediation of contaminated soils;
- transportation of excavated material to temporary locations to the site of the Headland Park for future placement and land forming by the Barangaroo Delivery Authority under its Headland Park Early Works Project Application;
- 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 880 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 Margaret Street (known as Margaret Street West in the approved Concept Plan) and Lime Street;
- construction of temporary vehicular access from Hickson Road and permanent vehicular access from Margaret Street West;
- associated utilities and infrastructure works including decommissioning and/or relocation of services as outlined in the Infrastructure Concept Plan at **Appendix K**; and
- temporary use of the basement for construction related storage and activity.

4.4.3 Headland Park

An early works Project Application has been submitted by the Barangaroo Delivery Authority to prepare the northern extremities of the Barangaroo site for the construction of the Headland Park. The Project Application is on public exhibition until 12 August 2010 and seeks approval for:

- Demolition of above ground structures and establishment of a construction compound including sheds and site hoardings;
- Bulk earthworks, including placement of fill from Barangaroo South 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 (yet to be determined) of the existing Sewage Pumping Station and Network.

5.0 Barangaroo South Concept Plan Modification

The enlargement of the Southern Cove water intrusion in conjunction with the planning and design requirements imposed by Conditions B3 and C1 have provided the opportunity to further reconsider the overall urban structure for the site, including the configuration of the internal street and public domain networks, arrangement of land uses across the site, and the distribution of the approved GFA and heights across the Barangaroo South site (**Figure 2**).

Lend Lease is seeking the Minister's approval under Section 75W of Part 3A of the EP&A Act to amend the approved Concept Plan as it applies to Barangaroo South. The scope of Modification is addressed in the following sections, and includes:

The Concept Plan Modification proposes for Barangaroo South:

- an increase in the total quantum of GFA within Barangaroo South Mixed Use Precinct from 430,275m² to 490,240m² related to an increase of 45,188m² in residential floor space and an increase of 14,777m² in commercial floor space;
- reallocation of the 8,500m² of passenger terminal GFA approved under the Concept Plan for community uses GFA, and an increase in total community uses GFA by 1,500m² such that there is a total of 10,000m²;
- an increase in total active uses GFA by 1500m² such that there is a total of 3000m²;
- a redesign and reconfiguration of the public waterfront promenade (RE1 Public Recreation Zone) including a reduction in the width of the public promenade from a minimum of 60m to a minimum of 27m;
- the reconfiguration of Blocks 1 to 4;
- the establishment of two new Development Blocks within Barangaroo South, being:
 - Block X – a new predominantly residential development block located west of Globe Street with a maximum GFA of 18,908m² and a maximum building height of RL 41.5, and
 - Block Y – the establishment of a new pier and landmark building extending into the Harbour with a maximum GFA 33,000m² and a maximum building height of RL 170;
- an increase in the maximum building height within the previously described Development Blocks 1, 3 and 4 as follows:
 - Block 1 from RL 62 to RL 80 (an increase of 18m);
 - Block 3 from RL 112 to RL 209 (an increase of 97m); and
 - Block 4 from RL 100 to a maximum of RL 175 in Block 4B (an increase of 75m), noting the approved Block 4 has been split into 3 separate Blocks;
- revisions to the approved Built Form Principles and Urban Design Controls; and
- a redistribution of the approved land use mix within Barangaroo South.

For the entire Barangaroo site, the Concept Plan Modification will result in:

- a 563,965m² mixed use development across the entire Barangaroo site, comprising:
 - a maximum of 514,465m² mixed uses GFA, including residential, commercial and retail uses which includes;
 - a maximum of 128,763m² of residential uses (a minimum of 99,763m² of which will be in Barangaroo South);
 - a maximum of 50,000m² of tourist uses GFA;
 - a maximum of 39,000m² of retail uses;
 - a maximum of 4,500m² of active uses GFA (3,000m² of which will be in Barangaroo South); and
 - a maximum of 12,000m² of community uses GFA (10,000m² 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.

The Concept Plan Modification does not propose any amendments to Barangaroo Central or the Headland Park.

The approved Concept Plan (as modified) is subject to conditions, or terms of approval, which require design amendments to the approved scheme. These include the modification to the Southern Cove required by Concept Plan Condition B3, and the consequential redistribution of GFA within Development Blocks 2, 3, 4 and 5 that is displaced as a result of the Southern Cove, as permitted by Condition C1 of the approved Concept Plan.

This Environmental Assessment also presents the way in which the Lend Lease proposal has incorporated an enlarged Southern Cove in response to Condition B3, and the manner in which GFA within Development Blocks 2, 3 and 4 is proposed to be distributed as a direct consequence of the proposal in respect of the Southern Cove, in accordance with Condition C1.

A modification to the Approved Concept Plan is not required to allow for the changes to the urban structure and built form outcomes for Barangaroo South that arise as a consequence of the enlargement of the Southern Cove and resultant re-distribution of GFA.

This Environmental Assessment nonetheless describes and provides justification for the manner in which Conditions B3 and C1 of the Approved Concept Plan are proposed to be met by the Lend Lease Scheme. Specifically, the Environmental Assessment provides information and analysis with respect to:

- the revised urban structure, including street and pedestrian connections and the resultant Development Block pattern;
- the design intent of the enlarged of Southern Cove; and
- the proposed increase in the public domain space in Barangaroo South.

5.1 Concept Strategies

The approved Concept Plan (as modified) demonstrates through a series of strategies how the sustainable renewal of the overall Barangaroo site can be achieved. Those strategies, as they apply to Barangaroo Central and the Headland Park, are proposed to be retained and remain unchanged.

The Concept Plan Modification does however provide an opportunity to enhance and augment the approved Concept Plan strategies as they relate to the proposed new economy, new community and new environment at Barangaroo South.

Economic

The Concept Plan Modification will reinforce Barangaroo's envisaged role as a new gateway for commerce in the 21st century. The renewal of Barangaroo South will attract international investment due to its scale and significance, and consequently provide significant economic impetus to Sydney as a trading city.

The Concept Plan Modification provides the opportunity to realise the following economic positioning strategies:

- provision of large A-grade floor plate commercial buildings that are in high demand and difficult to achieve within the existing city footprint;
- prospect of attracting regional and global headquarters which can be converted into net investment and employment growth with significant long term benefits to NSW and its economy;
- emergence of a new high value economic cluster that builds upon the local economy's strengths;
- creation of a commercial precinct that is a natural extension of the existing CBD, and one which offers a distinctly contemporary expression of urbanity, sustainability and walk-ability; and
- incorporation of sufficient housing and community related infrastructure (social and recreational) to reinforce the integration of Barangaroo South into the existing CBD.

Urban Design Structure and Built Form

The urban design structure is the vehicle through which the economic strategies can be realised. The urban design structure is the relationship of the proposed buildings with the new open spaces, streets, parks and foreshore, as well as the relationships with adjoining buildings and streets. The built form, height and shape of buildings must respond to the needs of the end users in order to be attractive to investors.

The Concept Plan Modification includes the following built form strategies:

- connection of built form back to the existing CBD to assist network and business co-location opportunities;
- provision of new commercial floor space that can contribute to the City's space growth needs;
- provision of commercial buildings with views of the Harbour to create a distinct character;
- retention of the established design excellence strategy to ensure the superior design quality of both the built form and public domain and support for the economic agenda; and
- promotion of high quality interfaces between buildings and the public domain at ground level.

Retail

Consistent with the approved Concept Plan principles, a range of retail experiences will primarily be located on the ground floor of the commercial core, ensuring appropriate activation throughout the day.

The following retail strategies are envisaged by the Concept Plan Modification:

- creation of a critical mass of up to a maximum of 33,777m² retail GFA uses;
- attraction of a range of retail tenants to deliver a range of retail innovation, design leadership, originality and differentiation of category or range; and
- facilitation of spontaneous retailing including events, markets and festivals that complement and enhance the form and function of the urban structure and public domain elements.

Tourist

The inclusion of tourist facilities within the landmark building (refer to Section 5.4) will fulfil a number of important functions over and above the provision of additional hotel rooms for the city:

- hotel facilities will add vibrancy to the area, extend operating hours, enhance the viability of co-located community uses and provide passive security;
- the hotel public areas will add to the range, diversity and availability of communal spaces for people to meet, interact and collaborate as an extension to the workplace;
- conference facilities will enhance the services and facilities available to corporate organisations located at Barangaroo South;
- creation of a focal point for the western edge of the city, which defines cultural and public spaces, celebrates the Harbour, attracts visitors, and makes a statement about Sydney's role as a major South East Asian financial centre; and
- the hotel will be of a quality and size to attract an international hotel operator and of sufficient scale needed to stand out against the commercial buildings of the CBD behind it.

Marketing

Lend Lease has embarked on a marketing strategy aimed at global businesses which could be attracted to locate at Barangaroo South.

Consistent with the international approach to the design for the project, Lend Lease's Concept Plan Modification presents the opportunity to:

- kick start a multi-billion economic stimulus;
- attract investments and visitors; and
- create a new international destination.

Access and Mobility

The Barangaroo South Concept Plan Modification builds upon the principles established in the approved Concept Plan. New methods of access and connection within the site, and between the site and the rest of the city and the Harbour are proposed and promoted.

The Concept Plan Modification includes the following access provisions above and beyond those included in the approved Concept Plan:

- some 40% of the site is to be publicly accessible open space, generally comprising the enlarged Southern Cove, the waterfront promenade and the Cultural Centre forecourt (Globe Square). This is in addition to the streets and public spaces in the mixed use development zone;
- realisation of the Cultural Ribbon initiative as envisaged by the City of Sydney's Sustainable Sydney – 2030 Vision which will support the City's cultural walking trail;
- creation of a variety of edge conditions along the foreshore providing the opportunity to touch the water, celebrate water themes and bring the water closer to the CBD, consistent with the approved Concept Plan conditions;
- creation of strong pedestrian linkages into the site from the existing CBD, through the provision of City Walk and overhead pedestrian bridges over Hickson Road;
- separation of Globe Street from the public waterfront promenade to assist in foreshore amenity for pedestrians; and
- creation of Hickson Road as a Barangaroo South's main address, whilst also becoming a vital public transport artery.

Cultural

The cultural facilities are a key improvement of the Concept Plan Modification. An energetic cultural environment is proposed with an emphasis on the Harbour's edge, significant public art, well-designed spaces for cultural events, people gathering, and informal interaction.

The Concept Plan Modification includes the following cultural provisions:

- 10,000m² of community uses GFA within Barangaroo South which includes:
 - provision of the Cultural Centre that forms the core cultural infrastructure and will feature public entertainment and leisure spaces facing the water;
 - a potential gallery or similar facility within the base of the landmark building;
 - flexible outdoor venues for city-scale events and activities such as outdoor performance, cultural events, outdoor exhibitions, fresh food markets, sport telecasts and events; and
 - public art will be a defining part of the environment giving the area a distinctive cultural identity and establishing Barangaroo South as an iconic and highly enjoyable city destination.

Social

Social infrastructure at Barangaroo South will be achieved through a flexible mix of services, spaces and facilities to accommodate changing social needs, and may include:

- multipurpose community hub and entertainment facilities, including uses such as a medical centres, child care facilities, early learning centres, a wellness centre and the like;
- provision of linkages between adjacent communities to enable easy access to programs and services; and
- opening this foreshore area up to the larger community, and providing a great social gathering place for the city.

Recreation

The Barangaroo South Concept Plan Modification retains the proposed recreational vision for the site, namely:

- extension of the public recreation uses along the entire length of the foreshore;
- use of the Harbour's edge and open space systems to provide exceptional recreational experiences;
- a harbour foreshore walk and cycle path linking King Street Wharf with Millers Point and on to Walsh Bay and Circular Quay;
- provision of the Southern Cove that will form a water link between the commercial core and the future Headland Park to the north; and
- a mix of open space, cultural spaces and community facilities which will allow individual cultural based recreational activities to become part of the way the area is experienced.

Housing

The Concept Plan Modification includes the following residential provisions:

- contribution to the residential housing targets established by the subregional strategy through the provision of up to 99,763m² of residential floor space, and potentially accommodating up to 2,475 new residents in 775 to 800 dwellings within Barangaroo South.

Environment and Sustainability

The Concept Plan Modification includes the following environmental and sustainability concepts:

- introduction of aspirational performance targets and rating tools to reduce water consumption, energy usage and ensure a carbon neutral development that seek to exceed the goals established in the approved Concept Plan (as modified).

5.2 Mixed Use Precinct

5.2.1 Urban Structure

In addition to the revised Development Block structure illustrated in **Figure 13** as outlined in Section 4.3.2, Lend Lease proposes two new Development Blocks, being:

- **Block X** – a new Block X has been established west of Globe Street; and
- **Block Y** – is centrally situated within the new pier that extends west from the current foreshore into the Harbour on a 23° alignment.

The revised urban structure, comprising Lend Lease's redistribution of approved Development Blocks 1 – 4(A-C) and new Development Blocks X and Y is illustrated in **Figures 14, Figures 15 and 16** demonstrate the site's urban structure in relation to surrounding foreshore connections and the existing street network.

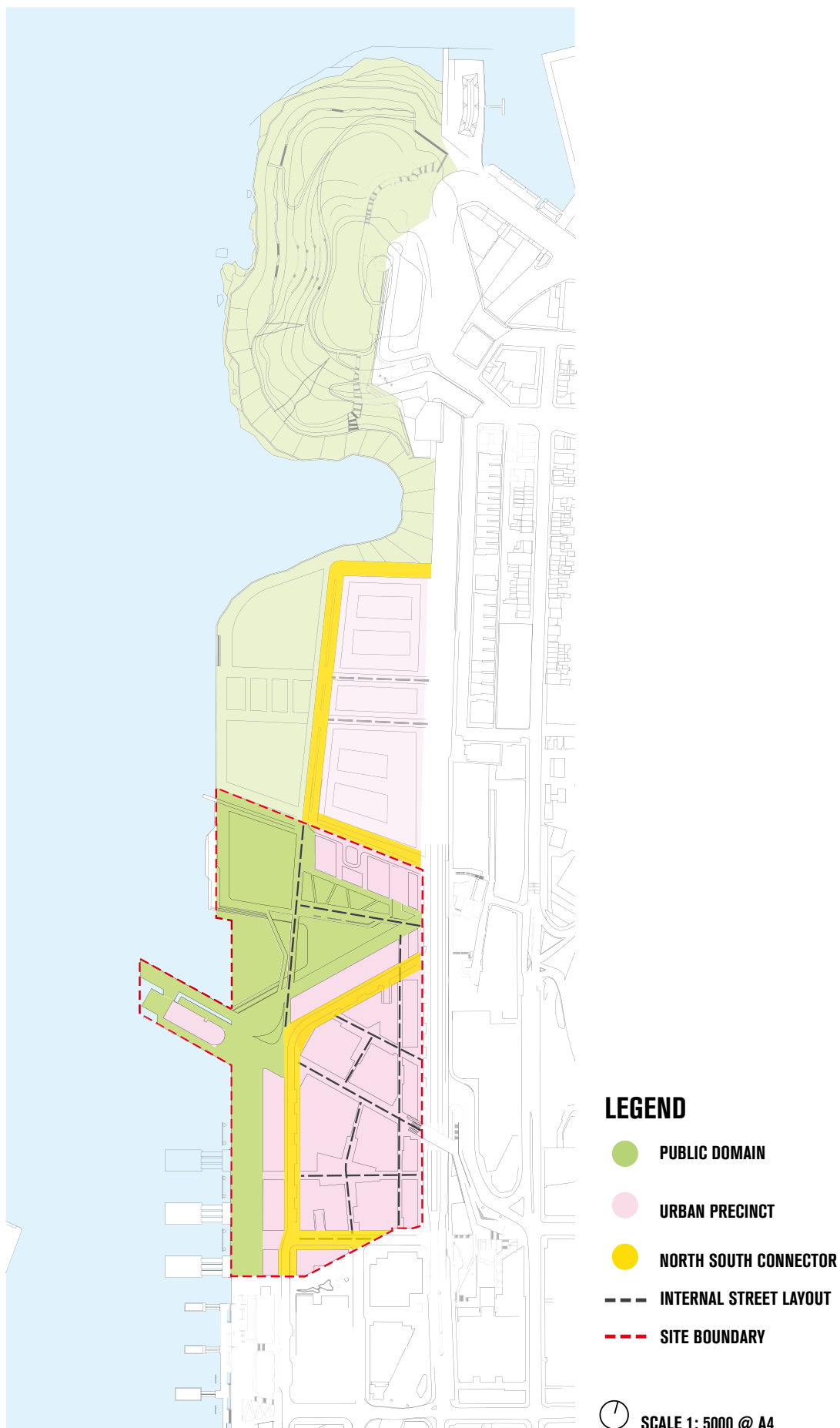


Figure 14 – Barangaroo South Proposed Development Blocks

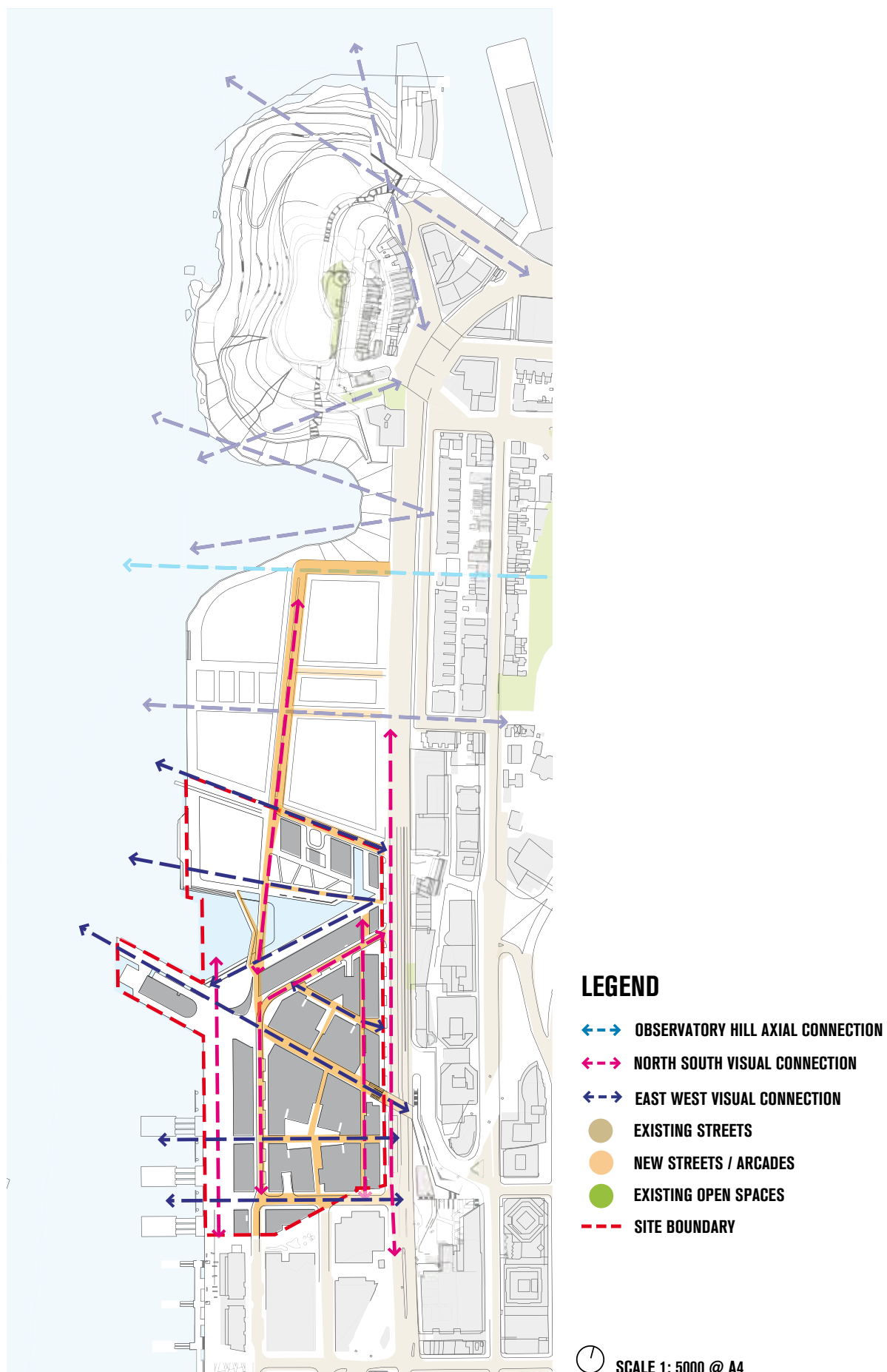


Figure 15 – Connectivity

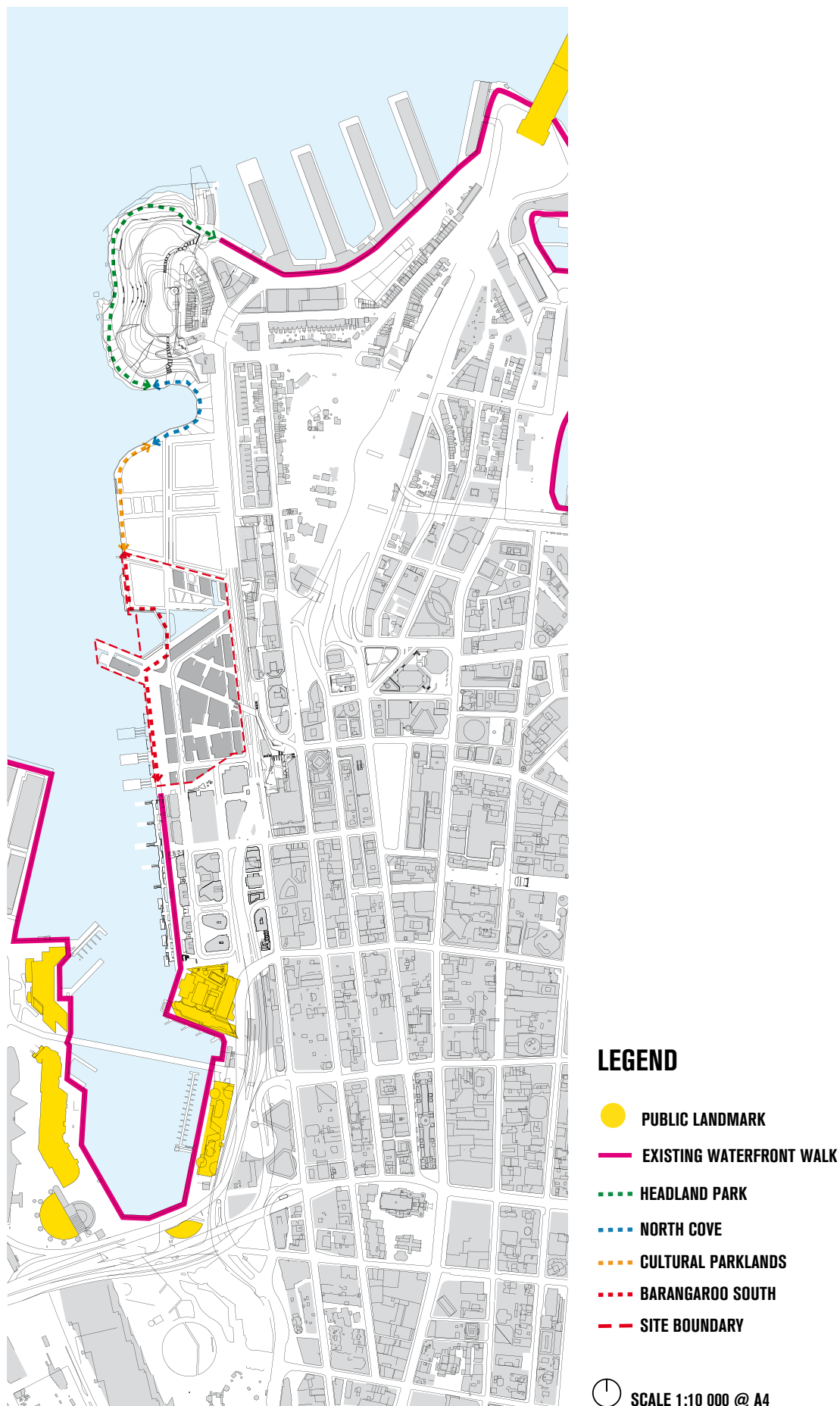


Figure 16 – Foreshore connections

5.2.2 Indicative Layout & Land Use Distribution

The Barangaroo South Concept Plan Modification retains the approved vision for the site as a mixed use precinct. Blocks 1 – 4(A-C), X and Y propose a range of uses dispersed over the site to create an integrated development comprising residential, office, retail and tourist uses.

Lend Lease has prepared an indicative design to demonstrate how the site may be developed under the proposed Concept Plan Modification (**Figure 17**). The following sections identify the key land uses within the proposed urban structure and provide a brief explanation of their desired future character as envisaged by Lend Lease's indicative design.

The indicative design does not form part of the Concept Plan Modification for which approval is being sought under Section 75W of the EP & A Act. Rather it merely illustrates how future development may be pursued within the Development Blocks and in accordance with the proposed development controls. Future Project Applications will determine the final form and design of buildings and public spaces.



Figure 17 – Lend Lease's Indicative Design (at the ground level)

5.2.3 Blocks 1 – 4(A-C), X and Y

The reconfiguration of the Development Blocks in response to Condition B1 of the approved Concept Plan (as modified) as well as the indicative future intent is set out below:

- **Block 1** – Block 1 accommodates a single residential building (R7) and ground floor retail uses.
- **Block 2** – Block 2 (together with Block 3) forms the commercial core of Barangaroo South. Block 2 contains two commercial towers (C4 and C5) and two lower scale commercial buildings fronting Hickson Road (C2 and C6). The two tower buildings will front a plaza, with east/west connections to Globe Street. Retail uses will also be provided on the ground floor.
- **Block 3** – Block 3 contains one commercial tower (C3) and three lower scale commercial buildings (C1, C7 and C8), two of which will front Hickson Road and one which is proposed to address Napoleon Street. Block 3 will also contain a plaza. Retail uses will also be provided on the ground floor.
- **Block 4A** – Block 4A will accommodate one residential buildings – R2 – with ground floor retail uses.
- **Block 4B** – Block 4B will include residential buildings – R3, R10, R11 with ground floor retail uses.
- **Block 4C** – Block 4C will include residential buildings, R5, R4 and R6 and will be complemented by a nominal amount of ground floor retail space.
- **Block X** – Block X is envisaged to accommodate low rise residential buildings with retail uses proposed on the ground floor to activate Globe Street and the foreshore promenade.
- **Block Y** – A landmark building providing publicly accessible uses generally at ground level and new hotel and serviced apartments at the upper levels is proposed within Block Y. Ground floor active uses are also proposed.

5.2.4 Public Pier and Landmark Building

The public pier extends west of the site's seawall and will be 85m long and 50m wide, providing a total area of 3,947m² (refer to **Figure 18**).

The landmark building is proposed to accommodate approximately 200 hotel rooms and 45 serviced apartments and is also proposed to accommodate community uses. It is intended that the landmark building will include a rooftop bar and public observation deck, offering Sydneysiders and visitors the opportunity to enjoy new views of the city and Harbour from this unique vantage point. At ground level it will offer leisure and cultural space, including a new public gallery area, a lobby bar and all-day dining restaurants to address and activate the pier. Approximately 51% of publicly available recreation and activating uses will skirt the entire perimeter of the landmark building.

The landmark building will be serviced predominantly by vehicle access through the basement, where all truck movement related to deliveries, garbage collection, laundry collection, etc will occur. A loading dock and basement access corridor will facilitate the servicing below ground level. There is also potential to include a guest-only basement connecting lift to help provide guests with direct access from the car park to the lobby.

At ground level, the landmark building arrival will be limited as a vehicular drop off and pick up point with a port cochere extending in part from the landmark building. Specifically, the entry area will not allow for taxi layover. A taxi waiting zone will be provided in adjacent Globe Street and taxis will be called on an as required basis. Coach and bus drop off will occur in adjacent Globe Street or alternatively in the basement landmark building entry point. The public pier face on the southern side of the landmark building is also proposed to be used for the berthing of superyachts which might visit Sydney Harbour.



Figure 18 – Public pier and landmark building

In order to assist in creating a safe, pedestrian friendly zone immediately in front of the hotel, it is proposed to establish the driveway area as a shared way and limit the permitted speed of vehicles to an appropriate “walking” speed (approx 5 km/ hr). The paving materials on the waterfront will be continuous across the entire width and length of the waterfront in front of Block X to reinforce the pedestrian priority. The shared zone will be demarcated with paving inserts and appropriate signage and markers. The defined car access route will be designed to ensure pedestrians have clear sight lines to see cars driving onto the waterfront.

Emergency vehicles may need selected access to the landmark building lobby at ground level on occasion. Further discussions will be required with the various authorities to determine the most appropriate method for accessing the hotel for the variety of emergency scenarios (eg fire, ambulance etc).

The function and form of these facilities has not been finalised however their relationship to the waterfront promenade and in particular the north-south pedestrian desire lines will require careful consideration. Accordingly, the design objectives for the porte cochere and drop off facilities are:

- create facilities that are suited to the needs of the tourist uses and landmark building but are also non-intrusive in design and respond to the waterfront promenade;
- integrate with the waterfront promenade;
- provide priority access to pedestrians and create a high quality pedestrian environment; and
- consider and address grades and flush paving; high quality paving materials; appropriate planting and landscaping to ensure the porte cochere and drop off facilities are appropriately integrated into the surrounding environment.

An artist’s impression, based on Lend Lease’s indicative scheme is provided at **Figure 19**. The illustrated design does not form part of the Concept Plan Modification for which approval is being sought under Section 75W of the EP & A Act, and is merely intended to illustrate the possible scope of public access and activity available on the public pier and landmark building.



Figure 19 – Artists impression of the landmark building

5.2.5 Cultural Centre

The Cultural Centre, located at the junction the City Walk and the waterfront promenade, forms the principal cultural infrastructure for Barangaroo South. The Centre will potentially feature public entertainment and leisure spaces, including exhibition and gallery spaces, educational facilities, performance spaces, conference, breakout spaces and a restaurant.

The Centre is proposed to be a transparent built structure. The footprint of the building is designed to allow free flowing and transparent pedestrian access to ensure people are not constrained by the built form, particularly at the ground plane.

Lend Lease's vision for the Cultural Centre is illustrated in **Figure 20** and further detailed in the Urban Design Statement at **Appendix A**. The illustrated design does not form part of the Concept Plan Modification for which approval is being sought under Section 75W of the EP & A Act, and is merely intended to illustrate the possible vision for the Cultural Centre.

5.2.6 Gross Floor Area

The Concept Plan Modification reinforces the mixed use development vision for the site. The objectives for the distribution of GFA and land use mix are:

- To establish a critical mass of overlapping activities and building uses that promote a live-work-leisure-learn and socially/economically diverse community;
- To evenly distribute and balance residential uses across the site, thereby improving the vibrancy and mix of uses within Barangaroo South;
- To create a better balance of activities by facilitating low rise design which overlooks public spaces and creates a more welcoming and secure precinct

The maximum GFA for each Development Block within Barangaroo South is shown in **Table 3**. **Table 3** also identifies the approved GFA for Development Blocks 5, 6 and 7 for reference purposes only (shaded pale light grey)– no modifications are proposed to Development Blocks 5-7.



Figure 20 – Artists impression of the Cultural Centre

Table 3 – Proposed Gross Floor Area and Land Use by Block

Proposed Land Use (m²)							
Area	Commercial	Tourist	Active	Community	Residential	Retail	Total
Block 1	0	0			9,000	400	9,400
Block 2	191,595	0			0	17,885	209,213
Block 3	132,105	0			0	10,297	142,669
Block 4A	0	0			6,900	1,250	8,150
Block 4B	0	0			28,900	1,000	29,900
Block 4C	0	0			38,500	500	39,000
Block X	0	0			16,463	2,445	18,908
Block Y	0	33,000			0	0	33,000
Barangaroo South Subtotal	323,700	33,000	0	0	99,763	33,777	490,240
Block 5							41,225
Block 6							3,000
Block 7							15,000
Barangaroo Subtotal	323,700	33,000				33,777	549,465
Barangaroo South active and Community Uses			3,000	10,000			13,000
Barangaroo Central and Headland Active and Community Uses			1,500	2,000			3,500
BARANGAROO TOTAL	323,700	33,000	4,500	12,000*	99,763	33,777	563,965**

*2,000m² of this GFA is already accounted for on the GFA for Blocks 6 or 7 as a result of conditions of approval imposed under Modification No. 2.

**the total GFA has been adjusted to avoid double counting the 2,000m² of approved community GFA.

Lend Lease proposes to adopt the Concept Plan approved definition of gross floor area, which is defined by the Major Development SEPP. For clarity, gross floor area means:

“the sum of the floor area of each storey of a building measured from the internal face of external walls, or from the internal face of walls separating the building from any other building, measured at a height of 1.4 metres above the floor, and includes:

- (a) the area of a mezzanine within the storey, and*
- (b) habitable rooms in a basement, and*
- (c) any shop, auditorium, cinema, and the like, in a basement or attic,*

but excludes:

- (d) any area for common vertical circulations, such as lifts and stairs, and*
- (e) any basement:*
- (f) storage, and*
- (g) vehicular access, loading areas, garbage and services, and*
- (h) plant rooms, lift towers and other areas used exclusively for mechanical services or ducting, and*
- (i) car parking to meet any requirements of the consent authority (including access to that car parking), and*
- (j) any space used for the loading or unloading of goods (including access to it), and*
- (k) terraces and balconies with outer walls less than 1.4 metres high, and*
- (l) voids above a floor at the level of a storey or storey above.”*

In terms of the proposed land uses:

- **Commercial uses** include business premises, office premises, and the like as defined in the Major Development SEPP and the Department of Planning’s Standard Local Environmental Plan Template;
- **Residential uses** include residential accommodation, multi unit housing, residential flat buildings, seniors housing, shop top housing and boarding houses, as defined in the Major Development SEPP and the Department of Planning’s Standard Local Environmental Plan Template;
- **Tourist uses** include backpacker’s accommodation, bed and breakfast accommodation and, hotel accommodation and serviced apartments, as defined in the Major Development SEPP and the Department of Planning’s Standard Local Environmental Plan Template. Serviced apartments are only permitted to be included in the ‘tourist uses’ GFA if they are in single ownership and are not strata titled (refer to Condition B6(1) of the Barangaroo Concept Plan Determination);
- **Retail uses** include food and drink premises, retail premises, markets and pubs, as defined in Major Development SEPP and the Department of Planning’s Standard LEP Template;
- **Community uses** include child care centres, community facilities, educational establishments, entertainment facilities (other than cinemas and amusement centres), information and education facilities, landside ferry facilities, places of public worship, public administration buildings, public halls, recreation areas, recreation facilities (major, outdoor and indoor) as defined in Major Development SEPP and the Department of Planning’s Standard LEP Template; and
- **Active uses** include cafe kiosks, retail kiosks, pavilions, ferry ticket office, public convenience (toilet facilities) and small equipment storage spaces and the like.

5.2.7 Height

The Concept Plan Modification reinforces the development vision for the site. The objectives for the increase in height include:

- tall buildings to be designed to maximise solar penetration;
- buildings should be no taller than the existing CBD skyline;
- a mix of low rise buildings and podia should be used to moderate the scale of the taller buildings; and
- the scale should be comparable to other world class cities.

For the purposes of the Concept Plan Modification, Lend Lease proposes to adopt the Major Development SEPP's definition of building height, being:

the vertical distance between ground level (existing) at any point to the highest point of the building, including plant and lift overruns, but excluding communication devices, antennae, satellite dishes, masts, flagpoles, chimneys, flues and the like.

The proposed maximum building height for each of the Development Blocks is shown in **Figures 21 – 23** and summarised in **Table 4**. Depiction of built forms in the following Figures are for illustrative purposes only and do not form part of the Concept Plan Modification.

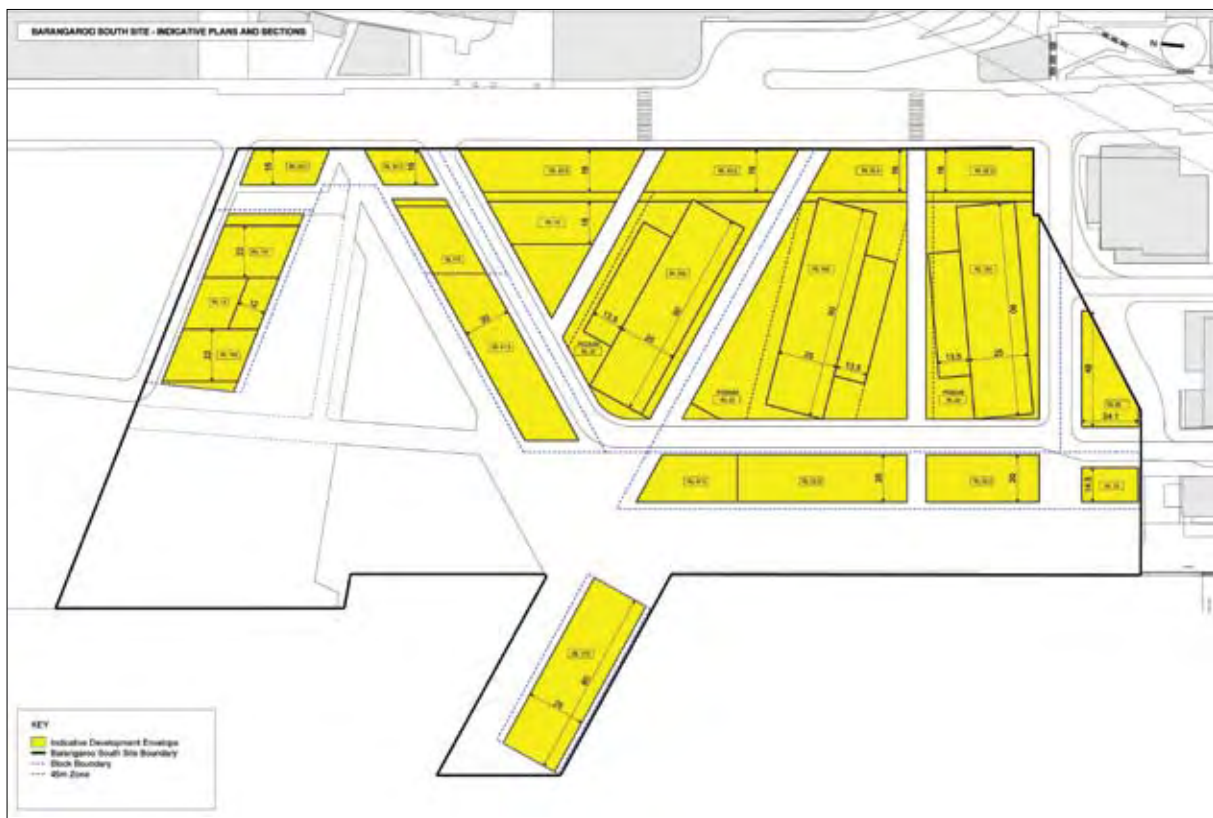


Figure 21 – Proposed building heights

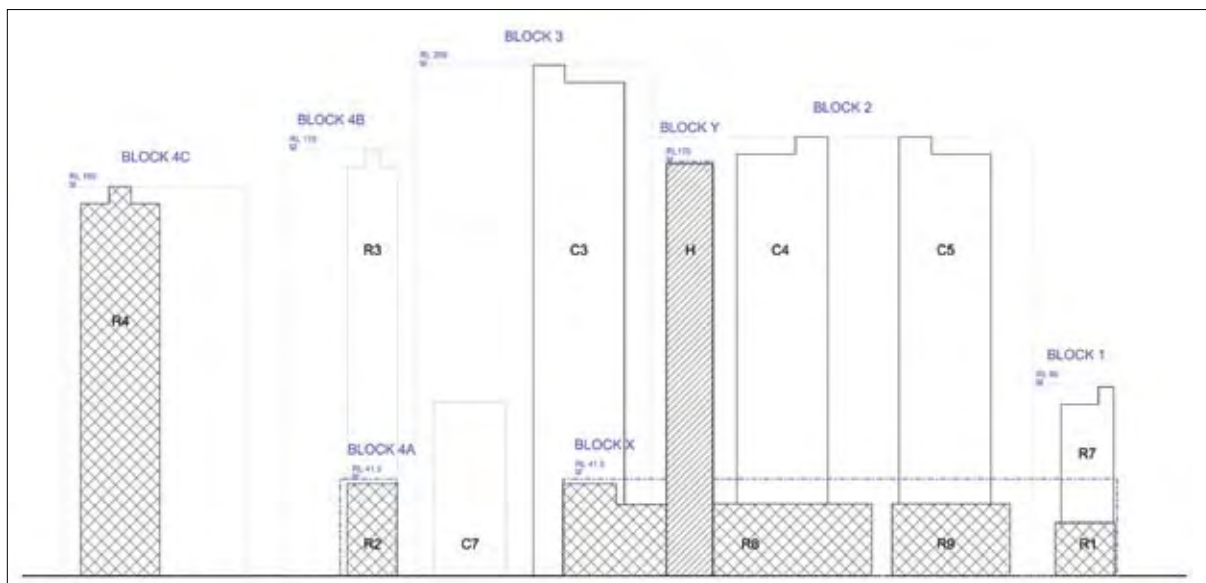


Figure 22 – Proposed building heights – Section 1

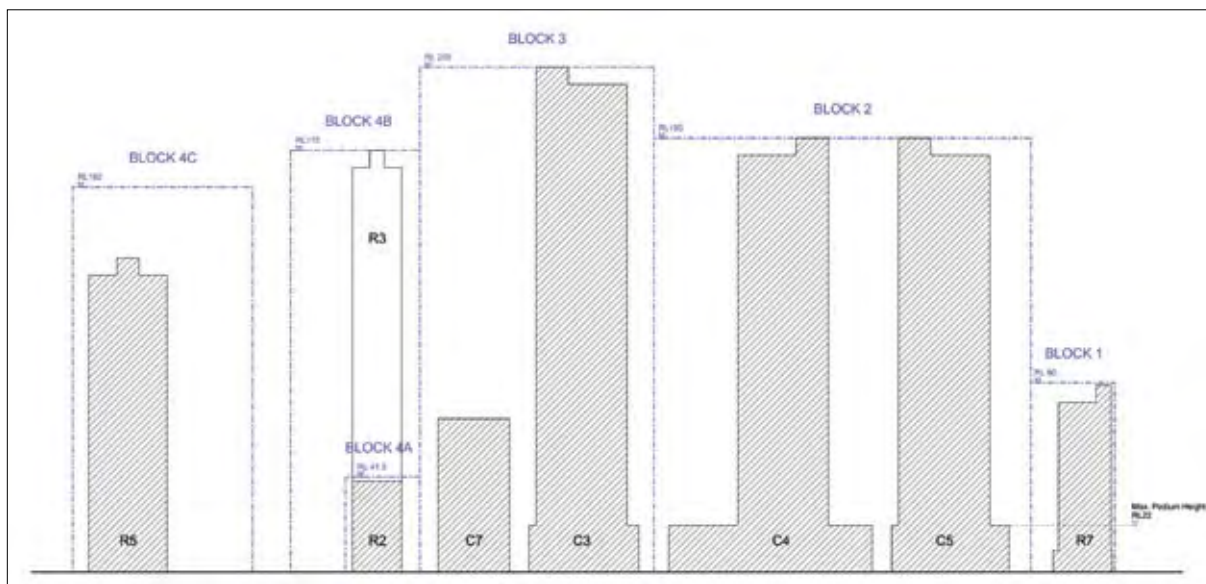


Figure 23 – Proposed building heights – Section 2

Table 4 – Proposed Building Heights by Block

Area	RL
Block 1	80
Block 2	180
Block 3	209
Block 4A	41.5
Block 4B	175
Block 4C	160
Block X	41.5
Block Y	170
Block 5	34
Block 6	29
Block 7	35
Public Recreation	n/a

5.2.8 Condition B9 – Built Form

Condition B9 of the approved Concept Plan establishes a series of performance based controls to:

- ensure that the design of the built form is acceptable with respect to the relationship between the street wall/podium level and surrounding land uses;
- ensure that the design of the built form is acceptable with respect to the bulk and scale of buildings;
- regulate the size and location of the podiums and towers by introducing maximum heights (for the podiums), maximum widths and depths for the tower elements, minimum building separations, and minimum street setbacks;
- ensure a diversity of occupancies, and combined with required building separations, better view corridors, good internal amenity, and access to natural light and ventilation;
- ensure a more appropriate building scale for pedestrians with any final building design.

The Concept Plan Modification retains the intent of the Condition B9, however Lend Lease has refined the controls in response to the revised urban structure, and other proposed modifications to the scheme.

The Urban Design Controls identified in Section 5 of Rogers Stirk Harbour + Partners Urban Design Statement at **Appendix A** will supersede and replace the approved Condition B9 Built Form controls for Blocks 2, 3 and 4, however they will be retained for Block 5 within Barangaroo Central. Future Project Applications will need to be benchmarked against the Controls.

5.2.9 Built Form Principles and Urban Design Controls

The approved Concept Plan requires future development proposals to address the Built Form Principles at Section 7.3.3 of the Barangaroo Part 3A Modification No.2 Report and the Performance Based Urban Design Controls. Consideration of the 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.

The Built Form Principles and Urban Design Controls identified in Section 5 of Rogers Stirk Harbour + Partners Urban Design Statement at **Appendix A** will supersede and replace the approved Built Form Principles and Urban Design Controls. Future Project Applications will need to be benchmarked against the new Principles and Controls.

Built Form Principles

The key differences between the approved and proposed Built Form Principles are summarised as follows:

- the built form model within Barangaroo South has been replaced. The model for Blocks 5, 6 and 7 remains as per the approved Concept Plan;
- Built Form Principle 2 (Hickson Road as a Boulevard) – removal of requirement for a consistent street wall along Globe Street, in response to the revised form and function of Globe Street;

- Built Form Principle 4 (North South Pedestrian Connection) – introduction of a new control for Blocks 2, 3 and 4 that requires a continuous mid block pedestrian connection at ground floor level. The connection must be a minimum of 4m wide and open to the sky for at least half of its length; and
- Built Form Principle 5 (Tapering Built Form) – refinement of the approved control to ensure the tallest buildings are located within the centre of Barangaroo South and not adjacent to Napoleon Street (as required under the approved Concept Plan (as modified)).

The remaining Built Form Principles are proposed to be retained generally as currently approved.

Urban Design Controls

The key differences between the approved and proposed Urban Design Controls are summarised as follows:

- the Urban Design Controls within Barangaroo South have been replaced. The Urban Design Controls for Blocks 5, 6 and 7 remain as per the approved Concept Plan;
- creation of new controls for Block 1 which require:
 - a stronger emphasis on simplifying building mass by requiring a minimum 3m setback from Lime Street;
 - a maximum podium height of 8m;
 - the activation of the Margaret Street West extension by requiring the northern facade to be the primary street wall;
 - strong building legibility through architectural design and the introduction of balconies and other elements;
 - architectural treatment of the roof form;
 - articulation of facades through appropriate material selection and feature elements such as external shading (louvres);
 - a requirement for a minimum 60% of the ground plane to be activated on the primary street wall; and
 - creation of new controls to guide the location, size, appearance and quality of signage;
- amendment to the approved Block 2 Controls, including:
 - creation of a new minimum (14m) and maximum (29m) setbacks to Hickson Road;
 - introduction of a new maximum horizontal tower dimension of 90m, where previously there was no control;
 - replacement of the approved maximum 25m horizontal dimension with the introduction of new vertical planes through Block 2;
 - introduction of a new minimum 1 storey podium height;
 - stronger controls relating to street wall establishment, building articulation, facade treatment, building legibility and ground floor permeability;
 - a requirement for a minimum 60% of the ground plane to be activated on the primary street wall; and
 - creation of new controls to guide the location, size, appearance and quality of signage;

- amendment to the approved Block 3 Controls, including:
 - creation of a new minimum (14m) and maximum (29m) setbacks to Hickson Road;
 - increase to the approved horizontal dimension of tower form to a maximum of 90m (an increase of 30m);
 - replacement of the approved maximum 25m horizontal dimension with the introduction of new vertical planes through Block 3;
 - introduction of a new minimum 1 storey podium height;
 - stronger controls relating to street wall establishment, building articulation, facade treatment, building legibility and ground floor permeability;
 - a requirement for a minimum 60% of the ground plane to be activated on the primary street wall; and
 - creation of new controls to guide the location, size, appearance and quality of signage;
- amendment to the approved Block 4 Controls, including:
 - specific controls for the newly created Blocks 4A, 4B and 4C;
 - creation of a new minimum (2m) setback to Hickson Road;
 - introduction of new maximum height controls to Globe Street, Napoleon Street, Bull Street and Healy Street, with strong ground level activation required;
 - stronger controls relating to street wall establishment, building articulation, facade treatment, building legibility and ground floor permeability, in exchange for the removal of the existing 5m minimum setback to Globe Street;
 - a requirement for a minimum 60% of the ground plane to be activated on the primary street wall; and
 - creation of new controls to guide the location, size, appearance and quality of signage;
- new controls for Block X, which:
 - introduce a maximum height control of RL 41.5;
 - require a minimum 3m setback from the waterfront promenade;
 - promote a continuous street wall for at least 85% of Block X's length;
 - introduce strong controls relating to building articulation, facade treatment, building legibility and ground floor permeability; and
 - require a minimum 85% of the ground plane to be activated along the waterfront promenade;
- new controls for Block Y, which:
 - introduce maximum elevation widths of 80m (north and south) and 30m (east and west);
 - limit the landmark buildings footprint to a maximum 2,400m²;
 - ensure that the location of guest rooms is above RL20;
 - introduce strong controls relating to building articulation, facade treatment, building legibility and ground floor permeability; and
 - require strong activation of, and uninhibited public access to, the ground plane and the public pier; and
 - requires that servicing and car parking be located beneath ground level.

5.3 Public Domain

The public domain strategy for Barangaroo South will guide the future public domain framework (**Appendix J**). The framework is premised on the following objectives:

- a more interesting waterfront and promenade;
- a new north facing public square;
- amore appropriately scaled, safer and more activated waterfront;
- increased permeability;
- an active waterfront destination; and
- improved relationship between the public realm and commercial buildings.

5.3.1 Waterfront Promenade

The waterfront promenade, connecting King Street Wharf and Darling Harbour from the south to the Central Parkland and Headland Park to the north, is Barangaroo South's primary waterfront pedestrian connection (**Figure 24**).

The waterfront promenade extends along the entire western site boundary, tracing the seawall and new foreshore edge and is a minimum of 27m wide. Along the water's edge, a ten metre wide unobstructed pedestrian zone, has been allocated to allow people to access the waterfront and ferries and take in views.

Tree planting, outdoor seating areas associated with the ground floor restaurants, the landmark building's forecourt, programmed events, public art and street theatre will be located and performed along the Promenade.

The Promenade is connected to the new Southern Cove, and on to the streets that connect the site into the surrounding city. It also completes the continuous foreshore walk from the ANZAC Bridge to Woolloomooloo, passing through Darling Harbour, King Street Wharf, Walsh Bay, Circular Quay and past the Opera House.

Lend Lease's vision for the waterfront promenade is illustrated in **Figure 25** and further detailed in the Urban Design Statement at **Appendix A** and the Streetscape and Public Domain Report at **Appendix J**. The illustrated design does not form part of the Concept Plan Modification for which approval is being sought under Section 75W of the EP & A Act, and is merely intended to illustrate the possible vision for the Promenade.

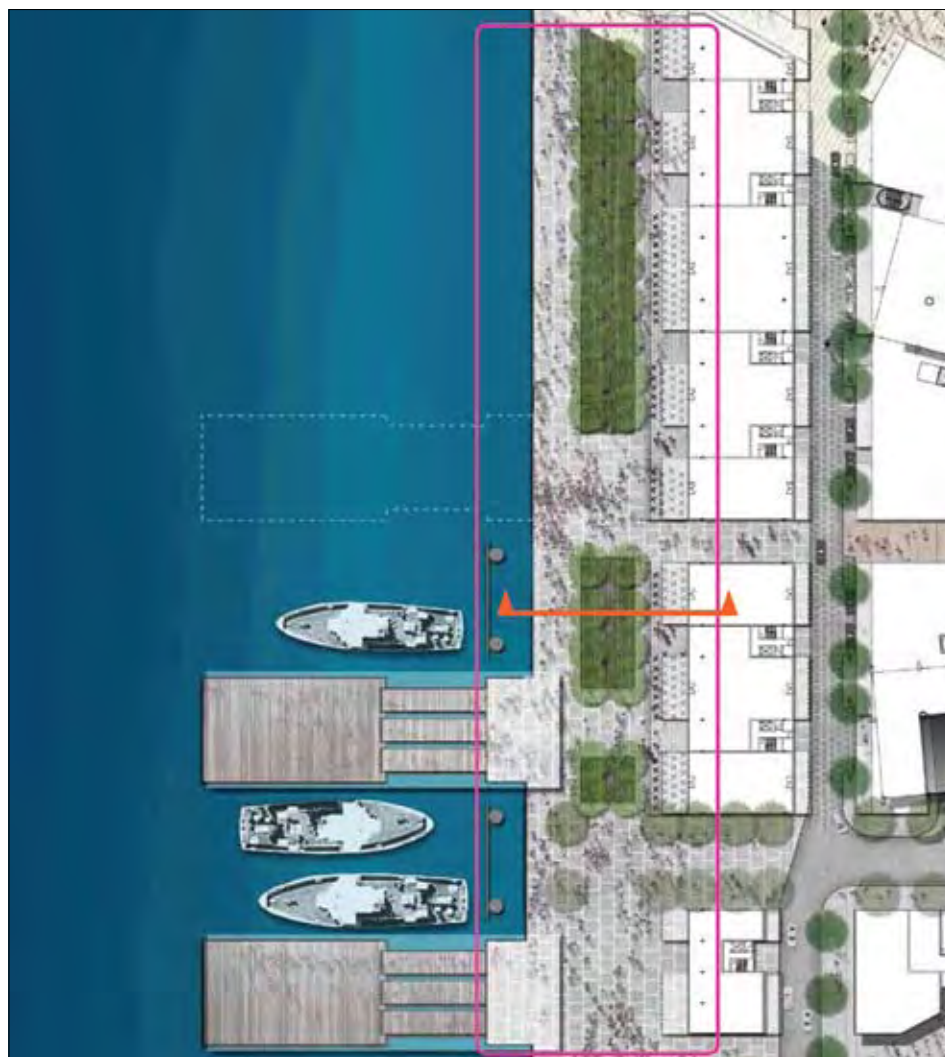


Figure 24 – Foreshore Promenade



Figure 25 – Waterfront Promenade Artists Impression

5.3.2 Southern Cove

Section 4.3.2 identifies the way in which the Concept Plan Modification incorporates an enlarged Southern Cove in response to Modification B3 of the approved Concept Plan. As also outlined in that Section, the design provides the potential of a north-south canal.

The Southern Cove will form a new southern water body that is overlooked by commercial, residential and public buildings as well as the landmark building. The Southern Cove may contain a weir to set water levels on its eastern side to eliminate tidal variation and facilitate greater water access and integration from the Promenade. The western side of Southern Cove will remain tidal.

A pedestrian bridge will connect the waterfront promenade with the central parkland along the waterfront and onto the Headland Park.

Figure 26 provides details of the Southern Cove. **Figure 27** also provide an illustration of the possible vision for the Southern Cove. **Figure 27** does not form part of the Concept Plan Modification for which approval is being sought under Section 75W of the EP & A Act.

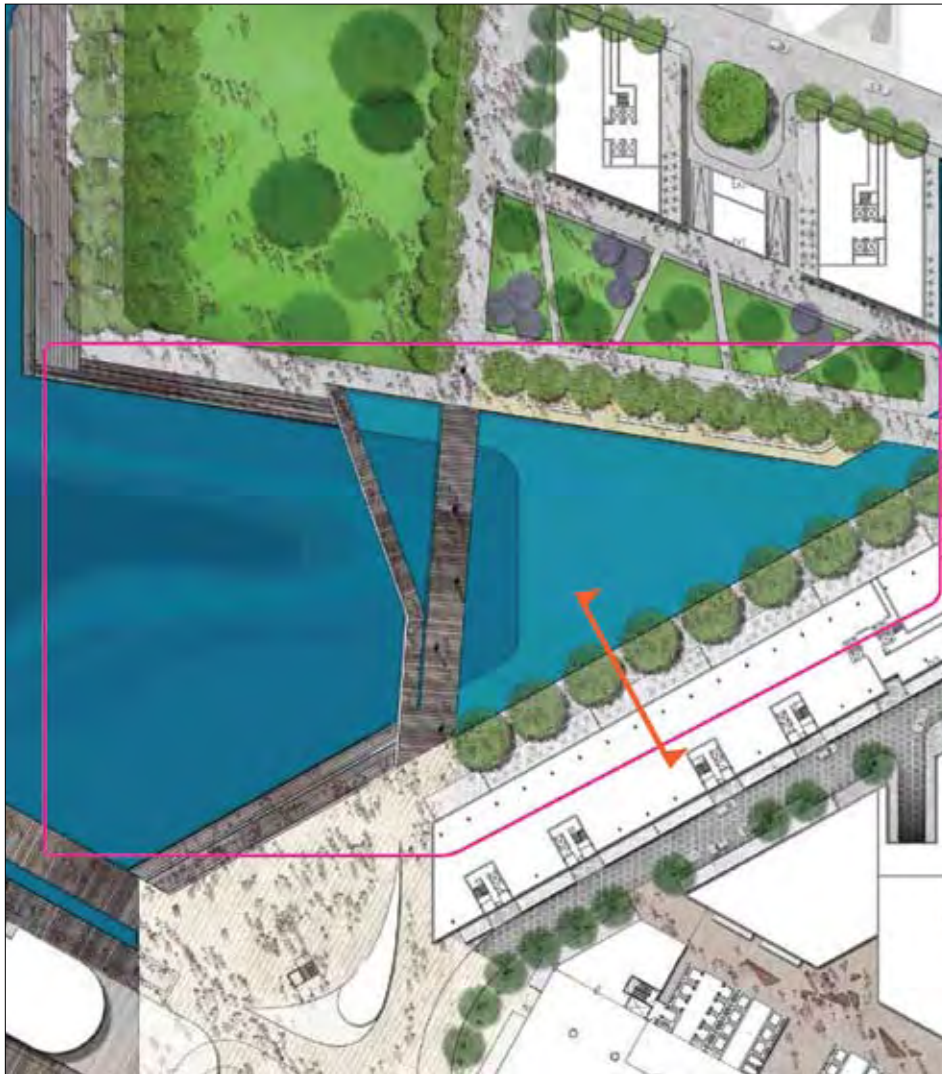


Figure 26 – Southern Cove



Figure 27 – Artists impression of the Southern Cove

5.3.3 Squares and Civic Places

Figure 28 illustrates the squares, gallerias and civic places within Barangaroo South. The Concept Plan Modification retains the notion of squares and civic places for concentrated activity, events and community gathering. They will be of various sizes and will be located along the waterfront, and amongst buildings and streets.

Of the proposed squares and civic places, Globe Square located on the southern foreshore of the Southern Cove and with the capacity to accommodate up to 3,000 people, will be the most prominent. Globe Square has been designed to be used as an outdoor amphitheatre. It provides for a new harbour connection to the site that enjoys a northwest aspect capturing the sun throughout the day.

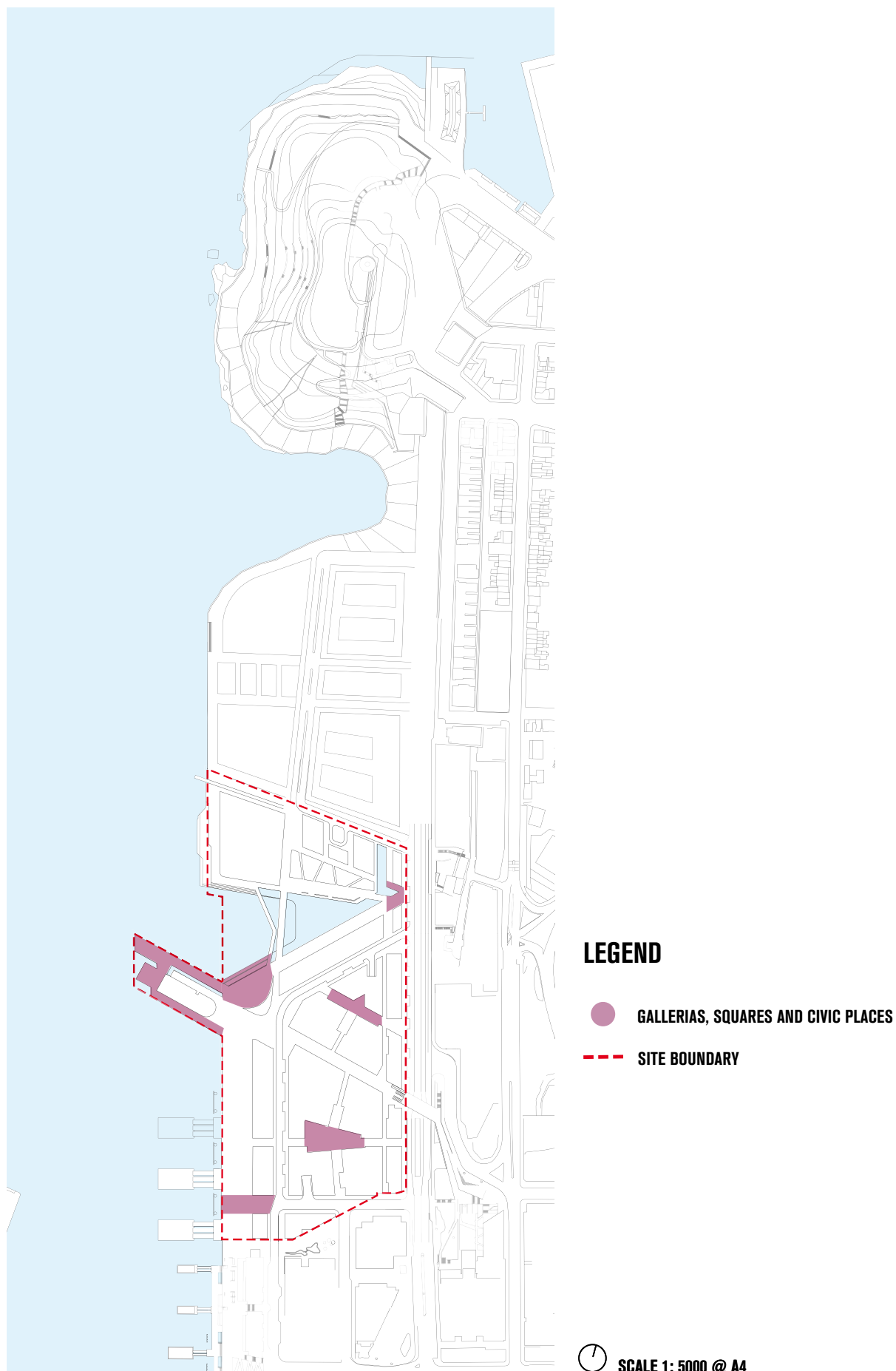


Figure 28 – Squares and Civic Places

5.3.4 Pedestrian Connections

There will be a number of east-west pedestrianised streets that connect between the waterfront and Hickson Road, and which are aligned to reflect and connect into the surrounding city street pattern (Figures 29 and 30).



Figure 29 – Proposed pedestrian connections

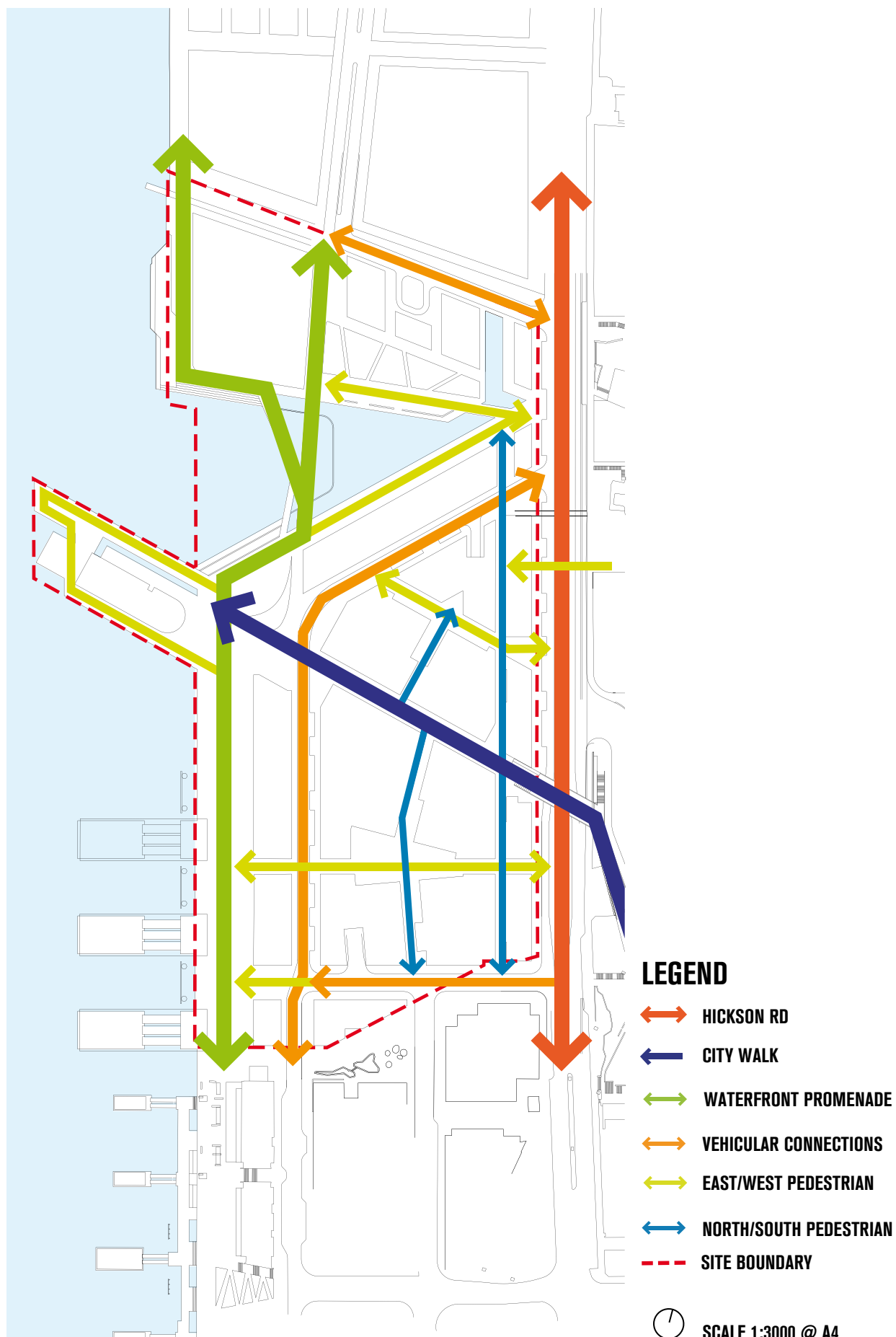


Figure 30 – Future connections at Barangaroo South

All streets link Barangaroo South to the city, connect places within the site, bring activity to the public domain, provide an address for new buildings and civic places, and facilitate public transport and commerce. Pedestrian connections are also aligned to frame vistas to the Harbour. The street network within the site provides pedestrian access (refer to Section 5.7), however a key component of the Modification is the strong focus on pedestrian only access and connections.

Of these, City Walk, is the primary pedestrian connection to Barangaroo South and will bring people from the city and Wynyard transport nodes over Hickson Road via a future pedestrian bridge and down to the ground level. A second overhead pedestrian bridge is envisaged to provide pedestrian access to the northern half of Barangaroo South. The bridge is expected to launch from 189 Kent Street, and relies on a redevelopment of that site to proceed.

Current conditions on the approved Concept Plan restricting overhead pedestrian bridges are proposed to be lifted to facilitate City Walk and the future 189 Kent Street bridges.

At grade pedestrian access to and through Barangaroo South will be available via the following public streets Hickson Road; Globe Street; Shelley Lane; Margaret Street West; Napoleon Street; Bull Street; and Healy Street as described in Section 5.7. In addition to these, a series of secondary and tertiary laneways, gallerias, courtyards and arcades are proposed within the mixed uses precinct enabling extensive pedestrian access both north-south and east-west across Barangaroo South. This will allow Barangaroo South to provide the dynamic retail, leisure and commercial addresses alongside the more public thoroughfares. The two key pedestrian connections that will perform this function are:

- **Shelley Lane (Figure 31):** which provides a public north-south pedestrian connector between Margaret Street West and the Southern Cove. Shelley Lane also provides access to the tower lobbies;
- **Arcades and gallerias (Figure 31):** which will be covered spaces that provide pedestrian access to the various commercial buildings and connect Hickson Road to the waterfront promenade. These spaces will vary in width and will be publicly accessible. They will be closed at night for security purposes.

The Public Domain Plan prepared by Aspect/Oculus at **Appendix J** further outlines the future desired character of individual pedestrian connections. **Figure 32** also illustrates the separation of public and private areas.



Figure 31 – Shelley Lane (left) and laneways and gallerias (right)

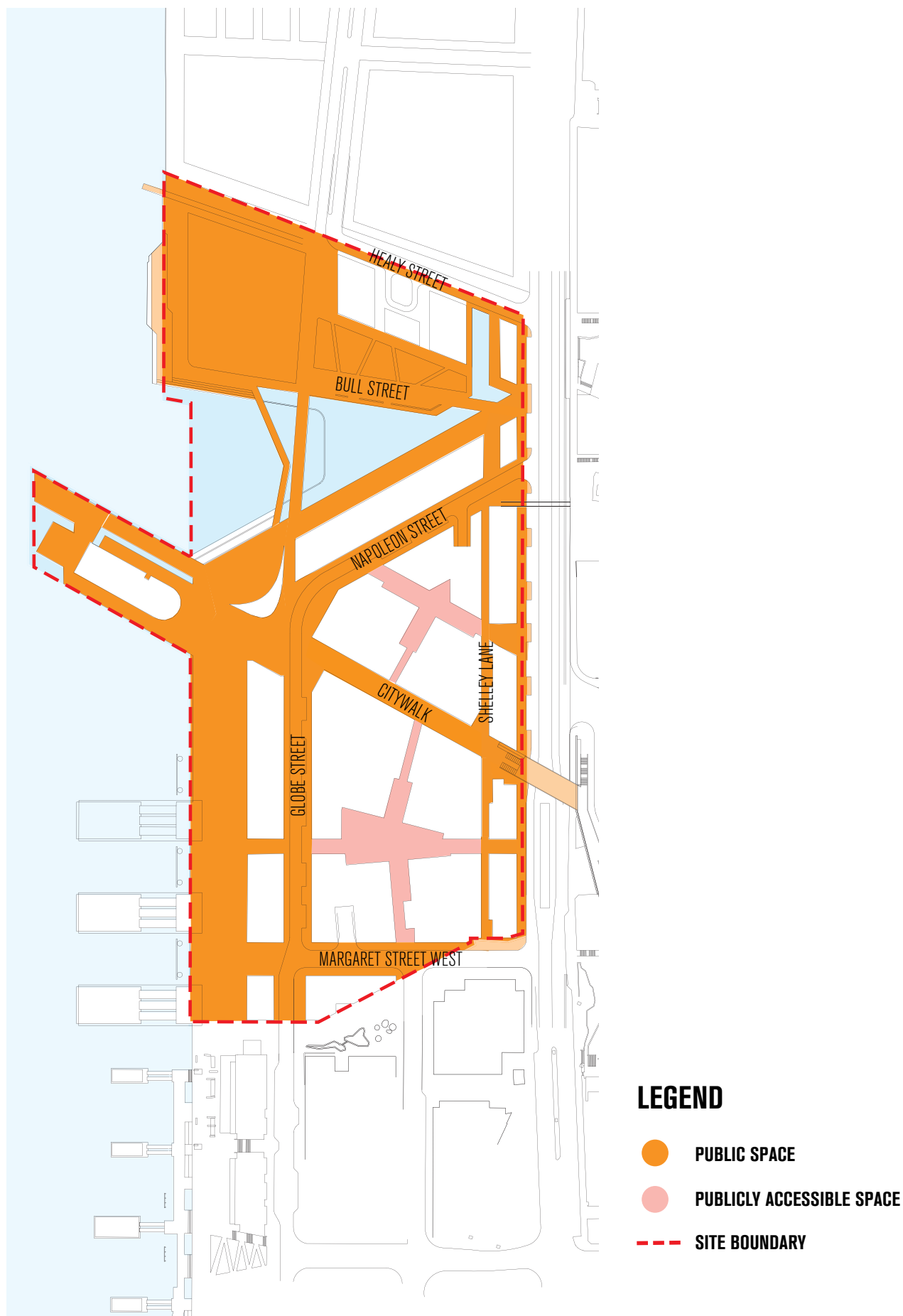


Figure 32 – Public / private realm

5.3.5 External Public Domain

A series of external improvements are envisaged to improve connections between Barangaroo South and the city. As the improvements are outside the Concept Plan area, they can only be delivered with the approval of the City of Sydney Council, NSW Maritime, and other relevant stakeholders. In some cases, the infrastructure will also be delivered by parties, other than Lend Lease.

Potential future external public domain elements may include:

- resolution of the interface between the site and King Street Wharf;
- upgrade of the public domain of the Margaret Street pedestrian connection to Wynyard rail station;
- public domain upgrade and kerb re-alignment to Hickson Road including the construction of several pedestrian bridges at the upper level; and
- new public piers and wharf projections over the Harbour for the future ferry terminal.

5.4 Access and Transport

5.4.1 Public Streets

The Concept Plan Modification retains a hierarchy of east-west and north-south public streets that provide access and permeability into and within the site (**Figure 29**). The street layout and connections assist orientation, improve legibility, protect view corridors, and ease of access. Vehicular access will be provided via Hickson Road, Margaret Street West and Globe Street/Napoleon Street. The principal street addresses and function can be summarised as follows:

- **Hickson Road:** the primary street address and equivalent to a collector road. Hickson Road will be transformed into a boulevard and provide car, bus, light rail, cycle and pedestrian access. It will be architecturally defined by low rise buildings and a colonnade. As Hickson Road is outside the Concept Plan, the proposed works will be subject to approval by the City of Sydney. Refer **Figure 33**.
- **Margaret Street West:** is the southernmost vehicular access into Barangaroo South, and will provide important connecting functions to the King Street Wharf precinct. Margaret Street West also provides vehicular access into the site-wide basement (car parking and loading docks). Refer **Figure 34**.
- **Globe Street/Napoleon Street:** is Barangaroo South's primary north-south connector and will link the waterfront promenade to Hickson Road. Globe Street and Napoleon Street are secondary vehicular accessways, and will provide street addresses for the low rise residential buildings in Block X and to the proposed land uses in Blocks X and Y. Napoleon Street, like Margaret Street West, provides vehicular access into the site-wide basement. Refer **Figure 35**. **Figure 36** also provide an illustration of the possible vision for the Globe Street. **Figure 36** does not form part of the Concept Plan Modification for which approval is being sought under Section 75W of the EP & A Act.
- **Bull Street:** framing the Southern Cove's northern foreshore, Bull Street has been pedestrianised however it will be accessible to cyclists. Bull Street forms a protective edge to the adjacent foreshore and public spaces.
- **Healy Street:** defining Barangaroo South's northern edge, Healy Street provides vehicular access and a street address to future residential buildings within Block 4C.

Each street provides pedestrian and cycle access. In addition to these, a series of north-south and east-west connections provides a strong pedestrian priority network as set out in Section 5.5.4.

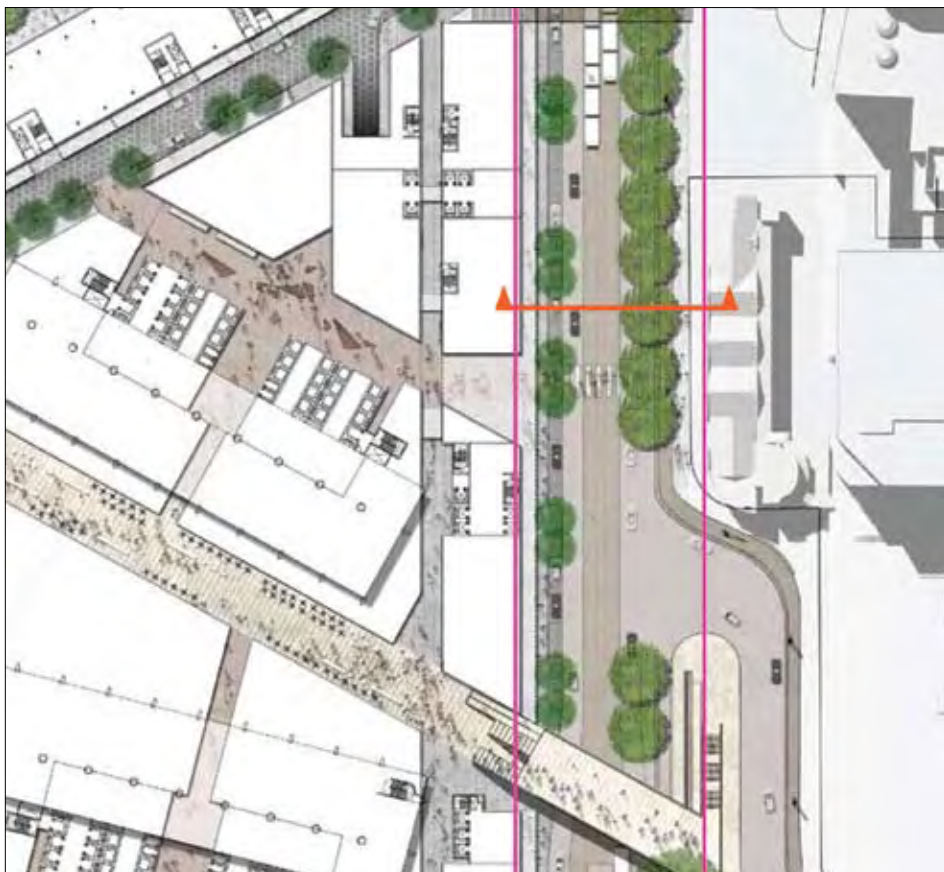


Figure 33 – Hickson Road



Figure 34 – Margaret Street West



Figure 35 – Globe Street



Figure 36 – Artists impression of Globe Street

Tourist visitation demand will be generated by the landmark building. To cater for this demand and avoid uncontrolled parking, and vehicular drop off, a porte cochere and vehicular drop off/turning circle is proposed east of the public pier. A taxi waiting zone will also be provided in Globe Street and Hickson Road.

5.4.2 Car Parking

A key aspect of the transport strategy for Barangaroo South is to promote public over private transport and thereby cap commercial parking spaces to minimise traffic impacts on existing CBD streets and intersections. This is an appropriate strategy given the closeness of Wynyard Rail Station and proposed new bus services.

The recently submitted and exhibited Excavation and Basement Car Parking EAR seeks approval for the construction of one 880 space (approximate) underground basement car park to service the mixed uses precinct. This car parking will be augmented by additional basement car parking provision to reflect the new mix of uses and to service the landmark building and Block X (subject to separate future Project Applications).

The following car parking rates adopted by the approved Concept Plan (as modified) are proposed to be retained and applied to Barangaroo South:

- Commercial – 1 space per 600m² GFA;
- Residential
 - 1 bedroom/bedsitter – 0.5 spaces
 - 2 bedroom – 1.2 spaces
 - 3 bedroom – 2 spaces
 - 3+ bedroom – 2 spaces
- Retail – as per City of Sydney LEP 2005 rates; and
- Tourist – as per City of Sydney LEP 2005 rates.

In total, up to 2,690 spaces are proposed to be provided.

5.4.3 Public Transport

The Concept Plan Modification retains the proposed bus routes and extensions to existing bus routes, envisaged by the approved Concept Plan (as modified).

There have been a number of concepts for extension of the light rail system through the CBD. The Barangaroo Concept Plan Modification strengthens the potential demand for tourist/commuter trips along a western corridor. The proposed road layouts and pedestrian facilities are planned to allow for any future construction of a light rail system along Hickson Road.

5.4.4 Pedestrian and Bicycle Facilities

As Barangaroo South is to form an extension to the city CBD it will be readily accessible by rail and bus. The Concept Plan Modification offers the opportunity to optimise these locational advantages via pedestrian bridge connections and street footpaths.

The pedestrian connections within the proposed street network are outlined in Sections 5.5.4 and 5.7.1. In particular, overhead pedestrian bridges will connect to Margaret Street and Wynyard Station. Accordingly, Condition B10 which provides that pedestrian bridges were not approved under the approved Concept Plan (as modified) is proposed to be removed to facilitate this outcome.

The Concept Plan Modification facilitates the approved bicycle strategy for Barangaroo South, namely connection to the City of Sydney “Cycle Plan”. The principal route into Barangaroo South from the city to the south is from Kent Street, turning into Napoleon Street onto Hickson Road. Hickson Road is currently a City of Sydney bicycle route with a dedicated, marked bicycle lane.

The Foreshore Promenade will be designed wide enough to accommodate both pedestrians and bicyclists. The Foreshore Promenade will connect into the route leading through King Street Wharf to the pedestrian Pyrmont Bridge at Darling Harbour.

The public domain will contain bicycle racks at strategic locations, and developments at Barangaroo South will be required to provide facilities such as secure bicycle storage and showers that encourage commuter cyclists.

5.5 Water Cycle Management

The Concept Plan Modification aspires to exceed the benchmarks established by the approved Concept Plan to showcase best practice in ecologically sustainable design (ESD).

An Integrated Water Strategy has been prepared for Barangaroo South by Arup (**Appendices J and K**). The Strategy addresses opportunities for:

- stormwater collection, re-use and discharge;
- stormwater quality management; and
- site overland flow paths.

Key aspirations have been identified below, and are illustrated in **Figures 35-39**, and are further considered in Section 7.

5.5.1 Stormwater Services

- All existing stormwater pipes on-site and within the Barangaroo South footprint are proposed to be removed and realigned.
- Extension of the existing stormwater network to allow stormwater to flow to and be stored in the Cultural Parkland for irrigation purposes (subject to a future Project Application(s) with Barangaroo Central).
- The realigned pipe network is proposed to be intercepted and Gross Pollutant Traps installed to reduce the discharge of suspended solids and refuse into the Harbour.
- Stormwater falling on the Barangaroo South footprint is proposed to be either reused via building based rainwater tanks or alternatively treated via water sensitive urban design principles to required standards and discharged into the Harbour.

5.5.2 Potable Water Supply

- All existing site water infrastructure within Barangaroo South is proposed to be capped off at the site boundary and removed.
- Water main to be extended from the existing 300mm Sydney Water supply in Hickson Road throughout Barangaroo South.
- Water supply to typically be located beneath roadways, with easements created where necessary.
- Buildings would be provided with individual metered connections.
- Water supply infrastructure is proposed to be dedicated and subsequently owned by Sydney Water.
- Final routing and locations are to be agreed with Sydney Water during detailed design and once modelling of the existing network is complete (ie: during subsequent Project Applications).

5.5.3 Non Potable Water Supply

- A separate non-potable water service is proposed to be provided from a black water treatment plant to each building to minimise potable water consumption.
- The black water treatment plant will be privately owned.

5.5.4 Sewer Service Upgrades

- All existing sewer infrastructure within Barangaroo South site will be truncated and removed.
- A proposed black water treatment plant is to be located along the eastern side of the Barangaroo South site and generally south of the existing sewage pumping station, SP1129.
- Sewage generated by Barangaroo South is generally proposed to be treated to required standards before being re-used on or off site. Buffer tank storage may be provided as part of the water plant design.
- Discussions are in progress with Sydney Water to confirm the capacity of the existing pumping station and the feasibility for the sewer main/pumping station to be sewer mined to provide additional capacity that can be treated and reused by the proposed water plant and subsequently exported.

5.5.5 Chilled Water

- A centralised chiller plant and Harbour heat rejection plant from which chilled water shall be reticulated to individual buildings is proposed to be located within Barangaroo South (**Appendix K**).
- It is proposed that this chilled water plant and reticulation network is privately owned and operated.

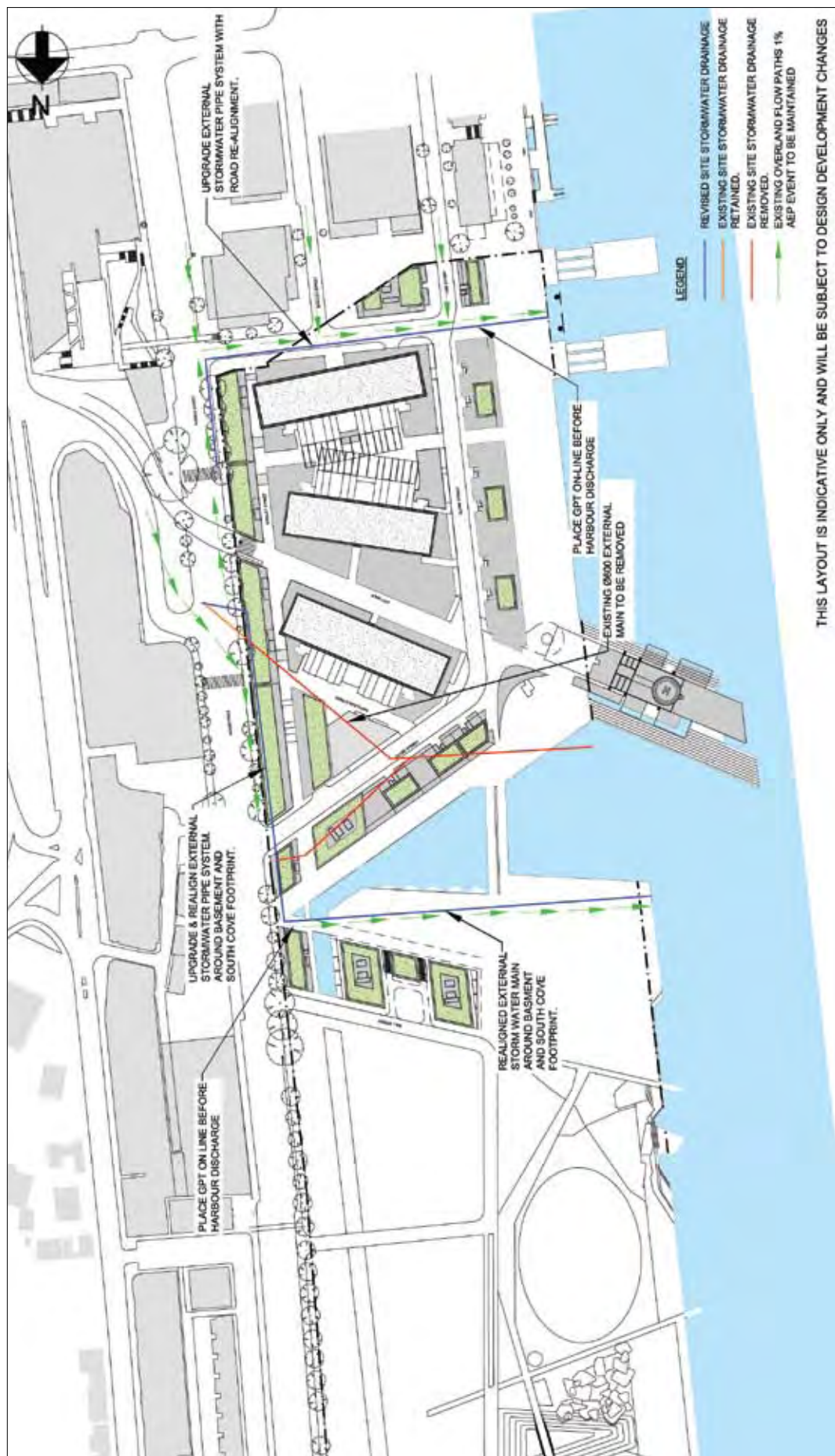


Figure 37 – Indicative Stormwater Infrastructure Plan

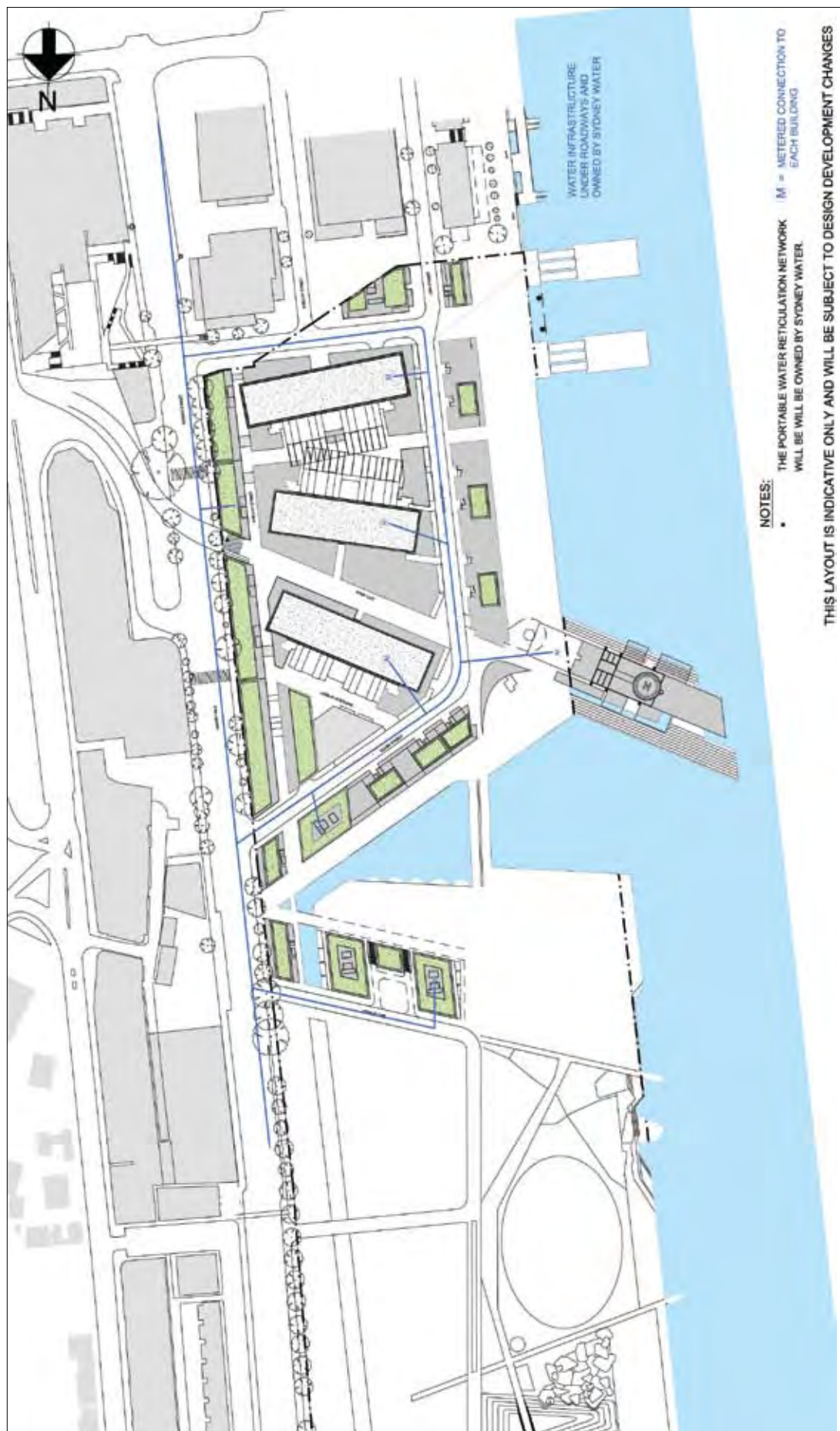


Figure 38 – Indicative Potable Water Supply Infrastructure Plan

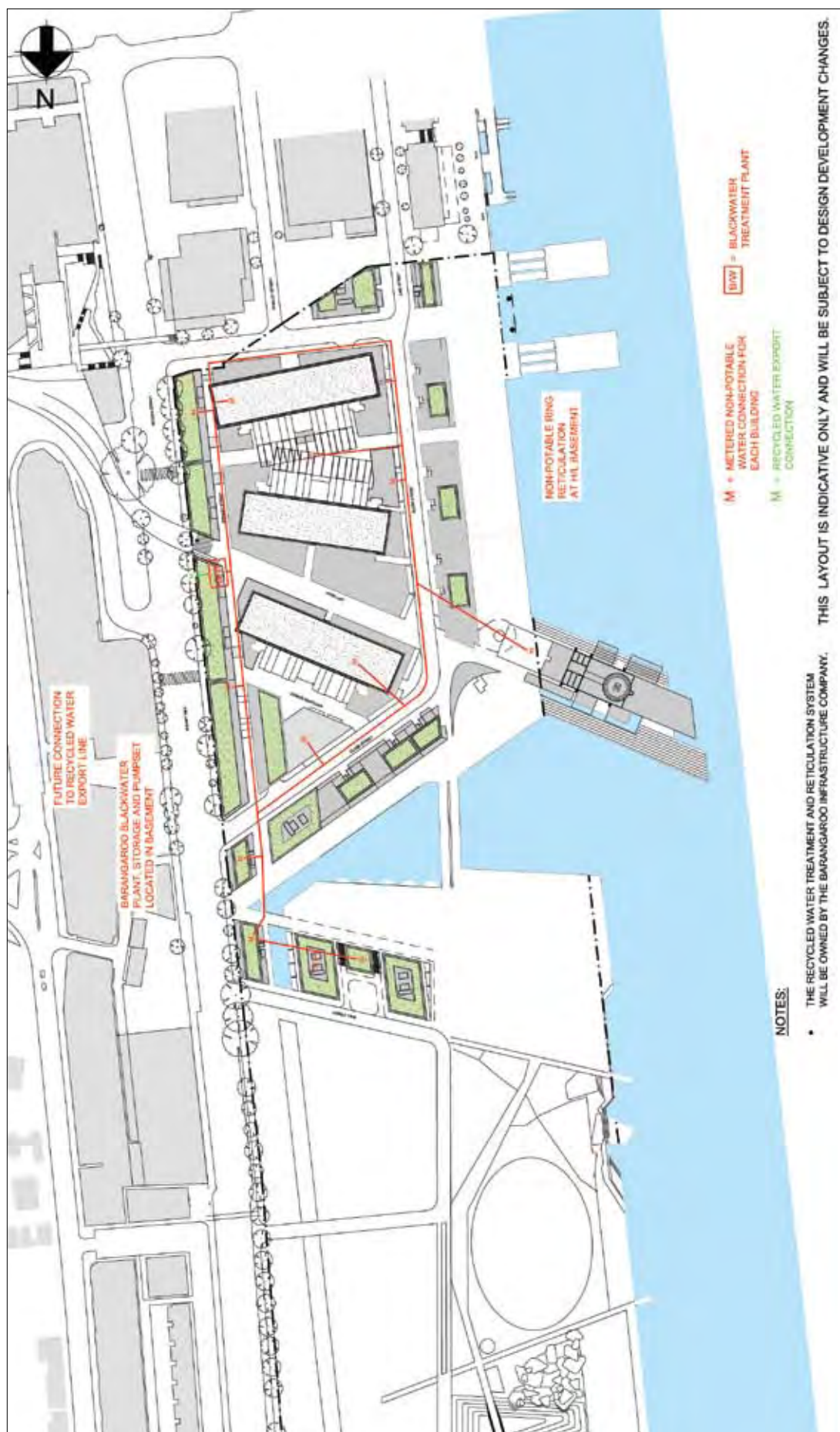


Figure 39 – Indicative Non Potable Water Supply Infrastructure Plan

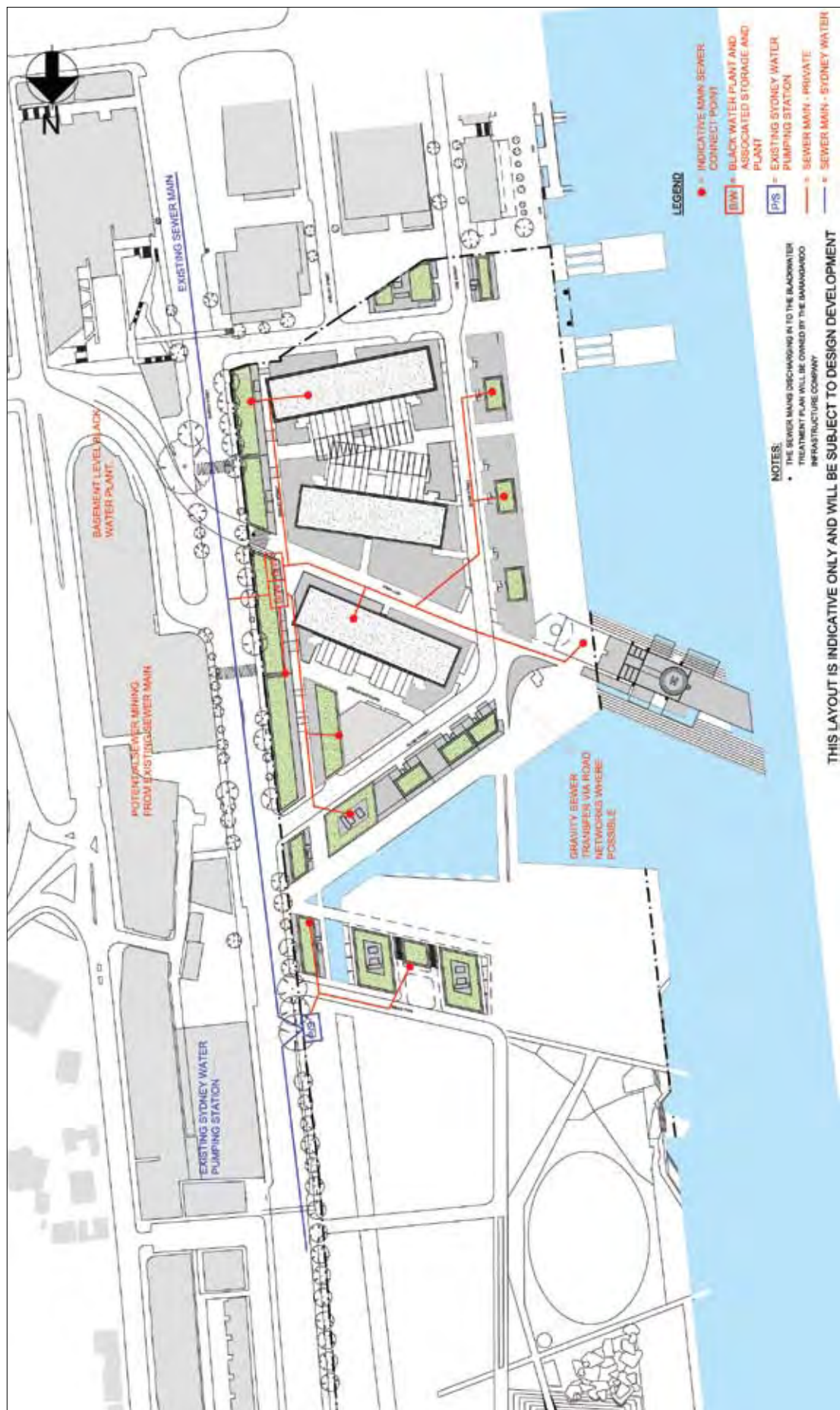


Figure 40 – Indicative Sewer Services Infrastructure Plan

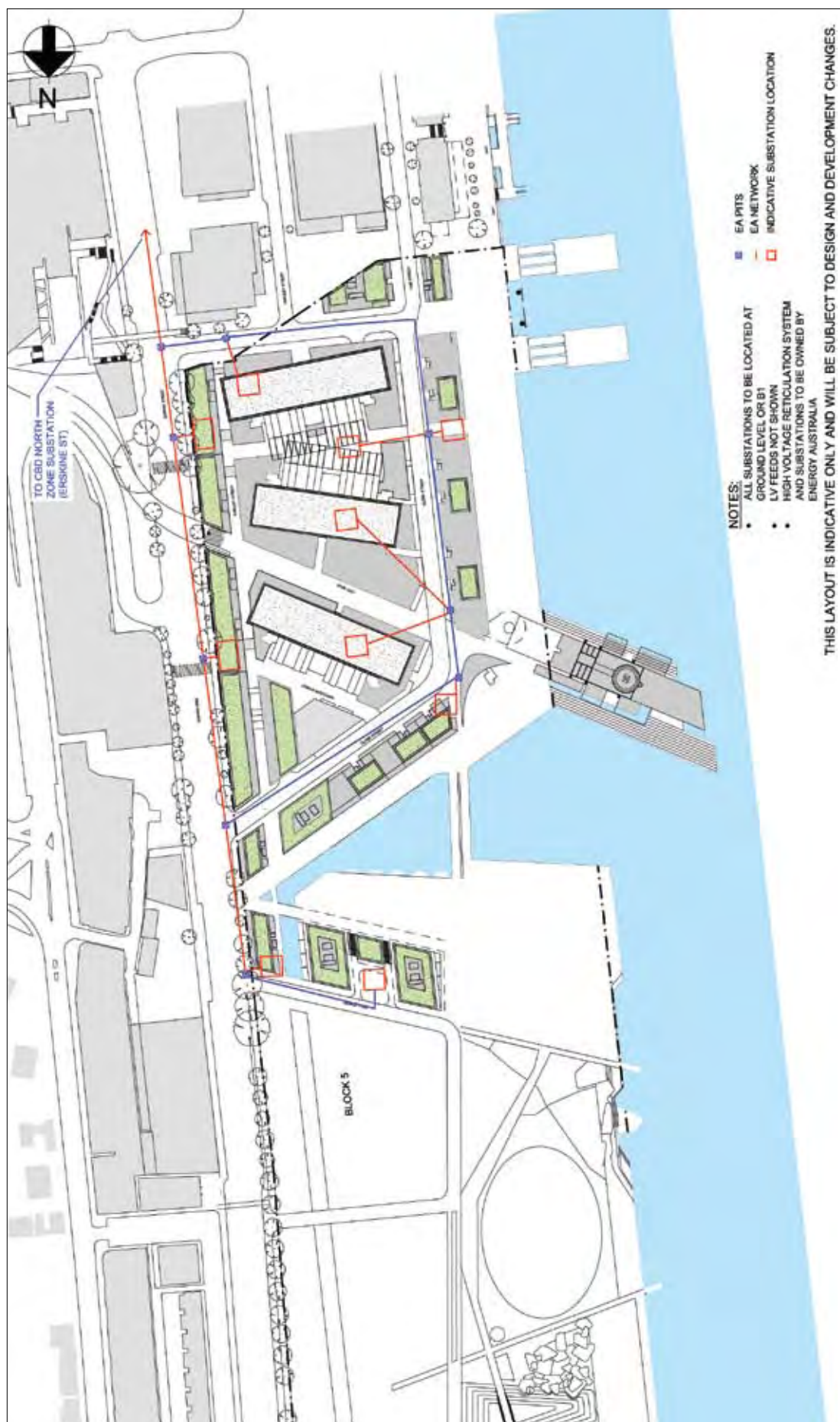


Figure 41 – Indicative Chilled Water Infrastructure Plan

5.6 Infrastructure

The scale and location of Barangaroo South provides an opportunity to coordinate the provision of site-wide infrastructure.

An Infrastructure Concept Plan has been prepared to identify the upgrades and new works required to service Barangaroo South (**Appendix K**). Individual Indicative Infrastructure Plans have also been prepared for stormwater, potable water supply, sewer, electrical, telecommunications, and natural gas services. A centralised water treatment plant, centralised chillers and Harbour heat rejection plant are also proposed.

Further detailed work is required in the lead up to, and during future Project Applications to determine the achievable infrastructure requirements. However the following sections and **Figures 40 – 42** illustrate the Indicative Infrastructure Plans for each service and outline their respective underlying principles.

5.6.1 Electrical Services

- Energy Australia has confirmed that supply will be from the City North Zone Substation located on the corner of Erskine Street and Sussex Street.
- Barangaroo South will be connected to the City North Zone substation via a 33kV feeder with similar redundancy provision to the 11kV Triplex network.
- Feeders to Barangaroo South will likely be reticulated along Sussex Street and Hickson Road in underground ducts from the City North Zone Substation.
- Substations will be established within buildings and basements at Barangaroo South and supplied from the underground Energy Australia feeders.

5.6.2 Telecommunications

- Extensive upgrading of the surrounding telecommunications systems will be required.
- Lend Lease will work with telecommunications providers to develop strategies to supply Barangaroo with the appropriate concepts/technologies (phone, internet broadband, etc) to meet the expected demands of the development.

5.6.3 Natural Gas

- Strategies to develop gas supply shall be developed with the relevant gas supplier.
- The existing high pressure main may require extending to provide sufficient gas.
- Any new gas mains shall be owned and maintained by the utility supplier and shall be reticulated under the roadways around Barangaroo South. Easements will be created where necessary.
- Metered connections shall be made to each building to serve mechanical boiler plant and other gas uses.

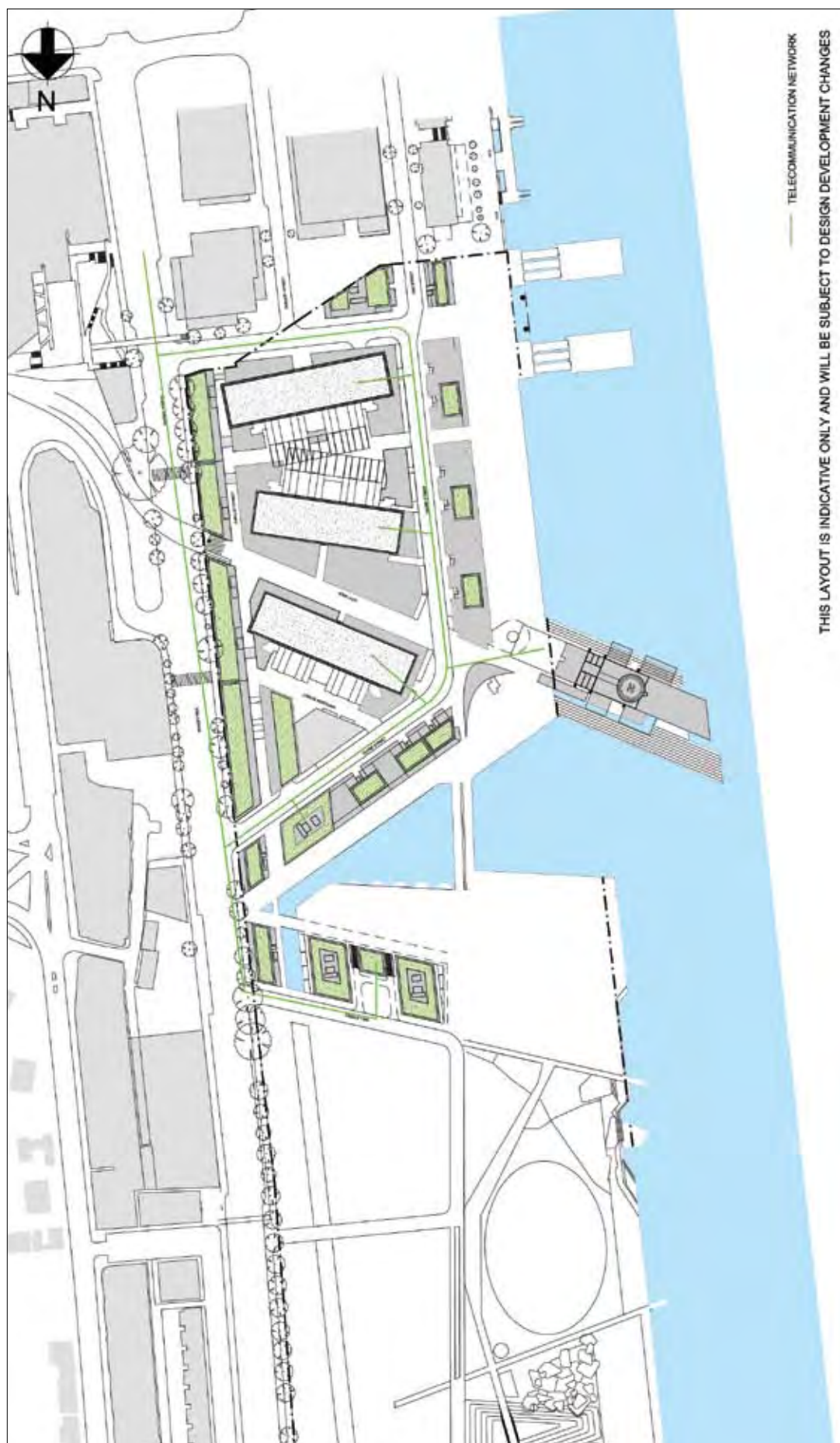


Figure 42 – Indicative Electrical Services Infrastructure Plan

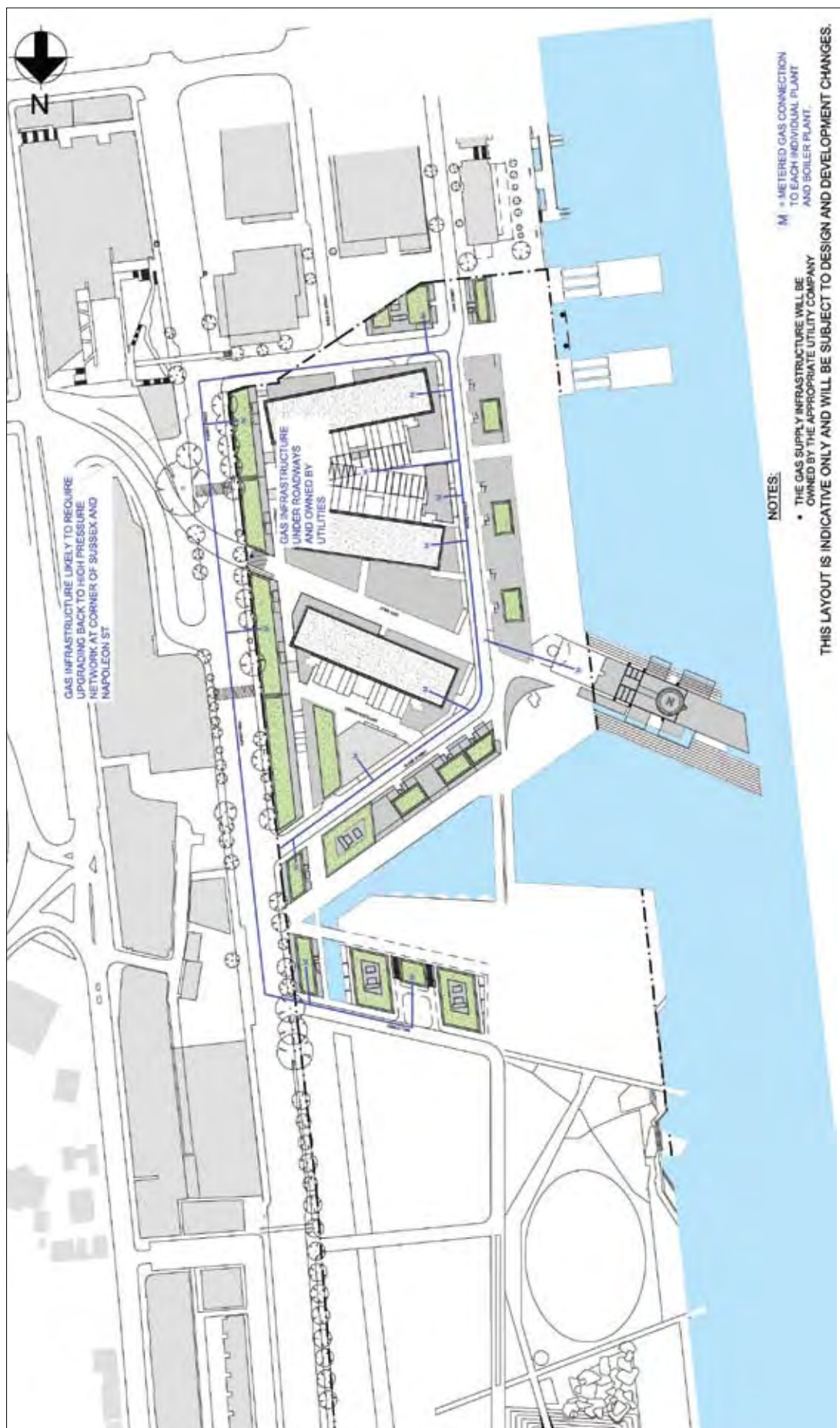


Figure 43 – Indicative Telecommunications Infrastructure Plan

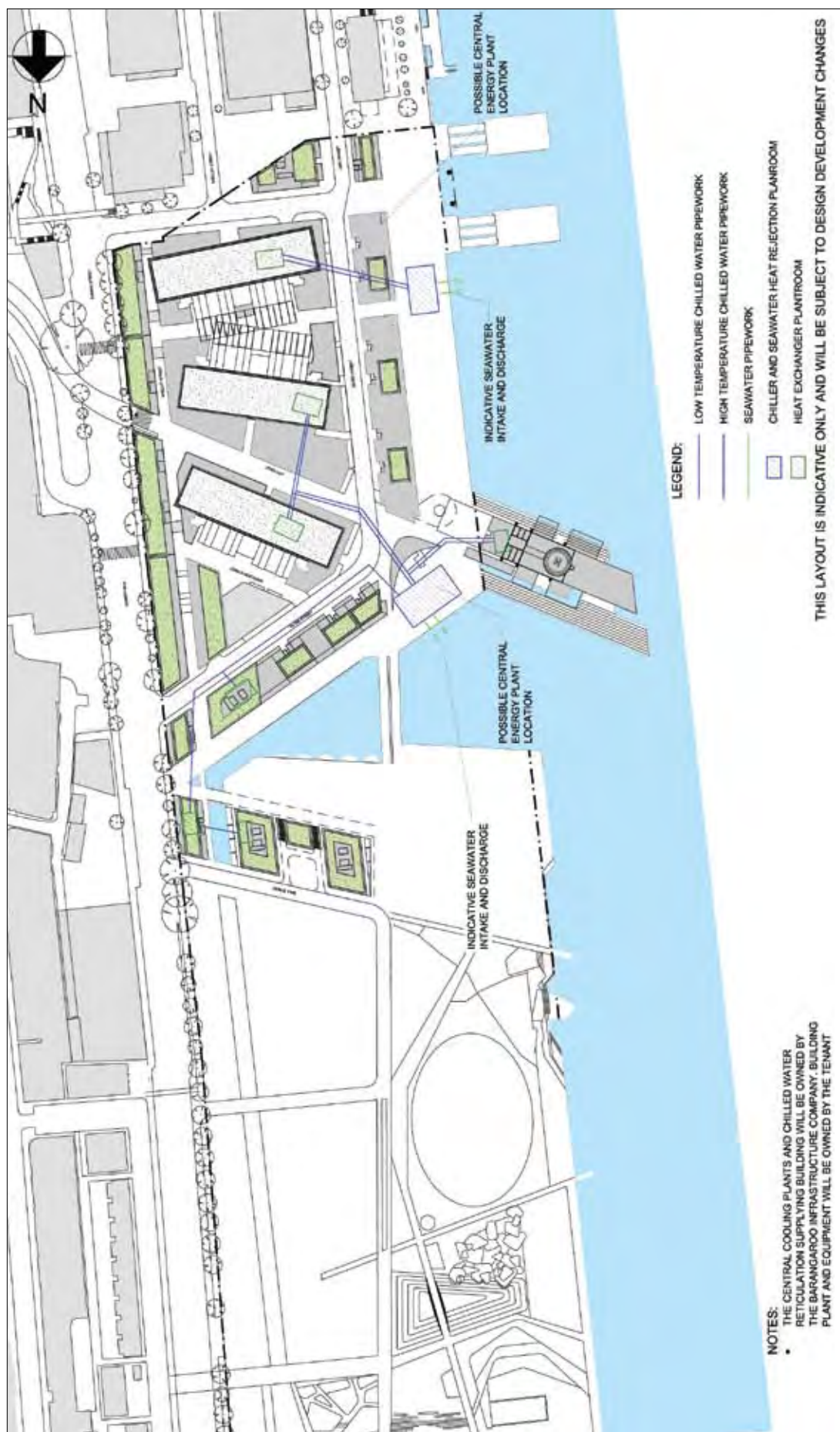


Figure 44 – Indicative Gas Infrastructure Plan

5.7 Ecologically Sustainable Development

The following range of significant sustainability targets have been established for Barangaroo South:

Healthy Buildings

- World-leading 6-Star Green Star Commercial Office Design and Build certification with abundant daylight and fresh air;
- 5 Star Green Star Residential;
- Tuned to Sydney's climate and connected to outdoors;
- Passive design, ultra low energy buildings; and
- Use of some sustainable materials – 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 due to building materials;
- Efficient precinct infrastructure using central cooling plant and harbour heat rejection; and
- 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 reticulated throughout the precinct;
- Capacity to export recycled water, allowing neighbours to reduce their potable water demands; and
- Sewer mining to reduce network demands.

Zero Waste:

- Greater than 90% diversion of construction waste from landfill;
- Greater than 80% diversion of operational waste from landfill;
- 'Closed loop' return of usable soil and energy from waste processing; and
- The potential to extend this service to adjoining properties.

Sustainable Transport

- A new connection/entry point for the CBD (with provision for light rail, ferries, Barangaroo Pedestrian Link);
- Reduced car parking ratios for Commercial uses. City of Sydney DCP rates for Retail and Tourism. (Ref. TMAP Supplementary Report);
- Temporary shared Retail and Commercial and Tourism use car parking;
- Infrastructure and support for cyclists and pedestrians (Ref. TMAP Supplementary Report);
- Real-time commuter updates;
- Green travel plan to promote vehicle sharing, small cars and electric cars; and
- 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; and
- Landscaped public spaces and selected green roof features.

Many of these targets involve various third parties and authorities, and will need partnerships and commitments to work with, and towards, these targets.

5.8 Indicative Project Staging

Lend Lease is proposing to lodge a series of initial individual project applications for site works, remediation, basement car parking, public domain and individual buildings in quick succession to commence works on site, including:

- demolition and site establishment works;
- bulk excavation and basement car parking;
- Block C1 commercial building;
- Block C4 commercial building; and
- DECCW declared remediation and land forming works.

Initial investigation work has already commenced at Barangaroo South and is expected to be completed by late 2010. Pending approval of the Excavation and Basement Project Application, retention, dewatering and construction work will commence in late 2010, with the first building targeted for completion by 2014.

The Lend Lease plan is flexible and allows work to start early, in accordance with the existing planning framework.

The development programme will be driven by market demand, and the rate of residential take up. It is anticipated that the indicative project staging for buildings and associated basements will be as follows:

- between 40,000m² – 90,000m² by 2014;
- between 50,000m² – 100,000m² by 2016;
- between 50,000m² – 100,000m² by 2018;
- between 50,000m² – 100,000m² by 2021; and
- between 50,000m² – 120,000m² by 2024.

Pending approval of this Concept Plan Modification, Lend Lease will revisit the current Excavation and Basement Car Park Project Application to confirm the size of any required enlargements to the currently proposed basement car parking structure. Works are also being coordinated with the proposed Headland Park works, ensuring a holistic construction approach.

5.9 Proposed Modifications to Instrument of Approval

The proposed Concept Plan Modifications detailed above require amendments to the Terms of Approval in Schedule 2 of the Instrument of Approval.

Appendix E includes a marked up version of the Instrument of Approval with words proposed to be deleted shown in ~~**bold-strike**~~ through and words to be inserted are shown in ***bold italics***.

5.10 Revised Statements of Commitment

In recognition of the additional design and investigations undertaken by Lend Lease and its consultant team, the Statements of Commitment are proposed to be amended as part of this Concept Plan Modification to inform future subsequent Project Applications.

Minor housekeeping amendments have also been made to replace previous references to the “Barangaroo Taskforce” with references to the “Barangaroo Planning reference Group” in recognition of the relevant authority that has been tasked with facilitating the preparation of future Plans and Strategies.

6.0 State Significant Site Amendment

The Barangaroo site is already listed as a State Significant Site in Part 12 of Schedule 3 of the Major Development SEPP. The Major Development SEPP zones the land part B4 Mixed Use and part RE1 Public Recreation.

Maximum building heights and GFA restrictions are established for nominated development blocks within the B4 Mixed Use zone. There are no maximum building heights or GFA restrictions imposed by the SEPP on land within the RE1 Public Recreation Zone.

As outlined above, Lend Lease's redistribution of GFA across the site to respond to the enlarged southern cove has resulted in the block specific GFA and height controls being exceeded. A series of design refinements also depart from the existing SEPP controls. These components of Lend Lease's scheme consequently require a SEPP Amendment to reconcile the Major Development SEPP planning provisions with the Concept Plan Modification and more specifically to:

- create new development blocks, redefine the existing development blocks, and reconfigure land uses in accordance with previous Concept Plan modifications and Lend Lease's proposed Concept Plan Modification;
- redefine the delineation between urban development and public recreation;
- amend the site boundary to include the proposed public pier and parts of Hickson Road;
- increase the maximum permissible GFA within the Barangaroo South development blocks to reflect previous Concept Plan modifications and Lend Lease's proposed Concept Plan Modification;
- increase the maximum permissible height controls within the Barangaroo South blocks to reflect the changes in configuration of land uses and GFA across the site, whilst allowing flexibility for the design of individual buildings within the certainty of a structured framework; and
- undertake general tidy up and housekeeping amendments to the existing SEPP provisions to reflect current legislative requirements.

To reflect the above amendments, a proposed SEPP Amendment and Explanatory Note have been prepared and are attached at **Appendix F**. In summary, the SEPP Amendment proposes:

- amendments to the main body of the existing Schedule 3 Part 12 State Significant Site provisions within the Major Development SEPP for Barangaroo; and
- amendments to the gazetted Major Development SEPP maps including the Land Application Map, Land Zoning Map, Gross Floor Area Map, Height of Buildings Map and Heritage Map.

The SEPP Amendment can be supported on the basis that the redevelopment of Barangaroo South will enhance the growth and positioning of Sydney as the premier cultural and living centre of the Asia-Pacific region. The site is of regional and State importance due to its strategic location, its ability to deliver significant public outcomes in the form of public open space, infrastructure and public domain improvements, its contribution to the economic growth of Sydney and its importance in achieving State Government objectives with respect to commerce, employment and housing.

With a limited number of sites remaining in the core of the CBD capable of delivering large scale commercial and residential floor space, together with opportunities for large-scale recreation and significant infrastructure improvements, it is appropriate for the development potential of Barangaroo South to be optimised.

Consistent with the Department of Planning's criteria of the Draft Guideline State Significant Sites, the proposed SEPP Amendment as it applies to Barangaroo South is important in terms of achieving government policy objectives, as it:

- is part of the "Global Sydney" Strategic centre in the City's Metropolitan Strategy City of Cities, A Plan for Sydney's Future, 2005;
- is a "Strategic Foreshore site" under Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 (Harbour REP, a deemed SEPP), being a site considered to be "strategically significant in terms of its prominent location, size and / or potential for redevelopment";
- is a Major Project subject to Part 3A of the EP&A Act under Schedule 2 of SEPP (Major Projects) 2005;
- consistent with State Plan objectives which collectively seek to:
 - build harmonious communities;
 - increase business investment;
 - maintain and invest in infrastructure;
 - provide jobs closer to home;
 - provide housing affordability; and
 - encourage more use of parks and recreational facilities and participation in the arts and cultural activities;
- exhibits an important Metropolitan strategic context and role in the implementation of the Metropolitan Strategy, namely:
 - a strategic economic context, including its premium location for the attraction of new investment in Sydney, and potential to strengthen the global competitiveness of Sydney's existing business community;
 - an ability to contribute to employment targets and economic growth for the region and NSW as envisaged in the Metropolitan Strategy by increasing the long term supply of commercial floor space in the CBD; and
 - an ability to contribute to the housing supply for the City and assist in meeting the demand for housing by increasing the long term supply of residential floor space within strategic centres;
- provides new and enhanced opportunities for access to public open space in a strategic location that can provide both passive and active recreation and assist State Government in achieving the right balance between working and living in centres;
- is consistent with providing enhanced opportunities to link the City's waterfront walkway;
- ensures the sustainability of the tourist market by providing a viable building envelope for future tourist uses; and
- enhances one of Australia's most important historic precincts Millers Point, by providing living and working opportunities.

7.0 Environmental Assessment

This section of the report assesses and responds to the environmental impacts of the Concept Plan Modification proposal. It addresses the matters for consideration set out in the Director-General's Environmental Assessment Requirements (DGRs), and compliance with the approved Concept Plan (as modified) including relevant Statements of Commitment.

A draft revised Statement of Commitments complements the findings of this section.

7.1 Director General's Environmental Assessment Requirements

Table 5 provides a detailed summary of the individual matters listed in the Director General's Environmental Assessment Requirements (DGRs) and / or identifies where each of these requirements has been addressed in this report and the accompanying technical studies.

Table 5 – Director General's Environmental Assessment Requirements

Director General's requirements	Location in Report
Relevant EPI's, policies and guidelines	
Planning provisions applying to the site, including permissibility and the provisions of all plans and policies including: <ul style="list-style-type: none"> - Major Development SEPP 2005; - State Environmental Planning Policy 55 – Remediation of Land; - State Environmental Planning Policy (Infrastructure) 2007; - Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005; - Sydney Harbour Foreshores and Waterways Area Development Control Plan 2005; - NSW State Plan, Sydney Metropolitan Strategy and the draft Sydney City Subregional Strategy. An outline of the nature and extent of any non-compliance with relevant environmental planning instruments, plans and guidelines and justification for any non-compliance.	<ul style="list-style-type: none"> - Section 4.0 - Section 6.0 - Appendix F
Urban design, development controls and land uses	
The methodology and justification for the non-compliance with the existing Concept Plan approval's (as amended) built form controls, including, but not limited to, GFA, building heights, zoning and site area.	<ul style="list-style-type: none"> - Section 4.0 - Section 7.2
Analysis of proposed bulk and scale of the modifications, including but not limited to, the proposed landmark building and additional heights across Blocks 1-4 against the existing bulk and scale of surrounding development.	<ul style="list-style-type: none"> - Section 7.4 - Section 7.5 - Appendix A
Consideration of issues relating to and proposed development controls for wind impacts, density, heights, topography, streetscape, shadowing, view corridors, connectivity, street address, open space, vegetation, traffic management and road hierarchy.	<ul style="list-style-type: none"> - Appendix B - Appendix F - Appendix J
Demonstrate how the proposed scheme relates to and safeguards the (approved) metro rail infrastructure.	<ul style="list-style-type: none"> - Appendix N - Appendix O
Consideration of potential land use conflicts, with particular regard to the proposed location of residential development above retail and bar uses adjacent to the public waterfront area (between Globe Street and the Harbour).	<ul style="list-style-type: none"> - Appendix P - Appendix Q - Appendix S

Director General's requirements	Location in Report
View Impacts	
Assess the visual impacts of landmark building, office towers and any other proposed building height and/or density increases in Sydney Harbour and surrounding areas.	- Section 7.2 - Section 7.4
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, Hickson Road, Kent Street, Shelley Street, Lime Street, Gas Lane, Jenkins Street, Pyrmont, East Balmain, Darling Harbour, Blues Point and Millers Point); and Impacts on key views from within the Barangaroo site, including the north-south view along the foreshore walk.	- Appendix A - Appendix N
Transport Management and Accessibility Impacts	
Analysis of existing and future transport networks, traffic generation and circulation, service vehicle arrangements and car parking as a consequence of the modification.	- Section 5.4 - Section 7.7
Analysis of car parking provisions and any resultant changes proposed as part of the modification.	- Section 7.9 - Appendix H
Outline the amendments to, and provision of, public transport, including bus, ferry and light rail and pedestrian and cycle access.	- Appendix J - Appendix S
Demonstrate integration with the City of Sydney Cycle network, including connections to the south into the King Street Wharf precinct.	- Appendix U
Potential to accommodate vehicular movements in the surrounding road network.	
Outline the potential to accommodate charter vessels, water taxis and private boats for short or long stays in the proposed Southern Cove. Consider the potential for the landmark building pier to be made available for the mooring of larger visiting vessels such as tall ships and large private craft.	
Preparation of a comprehensive Transport Management and Accessibility Plan for the Barangaroo site to properly ascertain the cumulative regional traffic impacts associated with the modification, including, but not limited to regional and local intersection and road improvements, vehicular access options for adjoining sites, public transport needs, the timing cost of infrastructure works (if required) and the identification of funding.	
Streetscape and Public Domain	
Explore the relationship of urban spaces and their adjoining built form, and how the proposed modifications change this relationship.	- Section 5.2 - Section 5.3
Details on the proposed location, design, function and visual analysis of the proposed overhead pedestrian bridges.	- Section 5.4 - Section 6.0
Consider the relationship between the public domain and ground floor uses of all buildings (including the landmark building).	- Section 7.4
Outline the changes to public spaces, in particular the encroachment of the building envelope into the RE1 Recreation zone and how this will not impede the ability to provide sufficient space for a pedestrian promenade and sufficient carriageway width for "Globe Street".	- Appendix A - Appendix F - Appendix J
Outline the changes to public street and public pedestrian connections, in particular the east-west connections between Hickson Road and the foreshore walk and how adequate permeability will be achieved through large street blocks.	- Appendix N
Demonstrate the new access hierarchy, including the relationship between streets, footpaths and buildings (including the landmark building).	
Clearly identify and distinguish between public spaces and streets, and private spaces/commercial spaces.	
Detail the amendments to the foreshore promenade, its interaction with the landmark building and its relationship with Sydney Harbour.	

Director General's requirements	Location in Report
Landmark Building	
Justify the proposed introduction of a built form element into Sydney Harbour and its integration with the surrounding environment, including the suitability of the site for a landmark building, and infrastructure e.g. piling, required to accommodate the proposal in this location.	<ul style="list-style-type: none"> - Section 5.1 - Section 5.2 - Section 5.3
Assess the geotechnical and contamination issues associated with the construction of the landmark building and associated pier/promenade.	<ul style="list-style-type: none"> - Section 7.2 - Section 7.4
Address the cumulative impact on boating activities, including ferries, in the locality and the proposed landmark building's impact on navigation and the movement of vessels in consultation with the Harbour Master of the Port of Sydney and NSW Maritime.	<ul style="list-style-type: none"> - Section 7.6 - Section 7.9 - Appendix A - Appendix B - Appendix F - Appendix J - Appendix N - Appendix U
Soil and Water	
Address the potential impacts due to construction and operations on water quality	<ul style="list-style-type: none"> - Section 5.5 - Section 5.6
Consider the drainage and stormwater management issues	<ul style="list-style-type: none"> - Section 7.8
Address potential impacts on aquatic habitats from changes to the quantity	<ul style="list-style-type: none"> - Appendix K - Appendix L - Appendix R
Housing	
Outline any proposed arrangements for housing diversity to be addressed in the Housing Strategy.	<ul style="list-style-type: none"> - Section 7.6
Utilities	
Consider how the modifications can be satisfactorily serviced for utilities and green infrastructure services such as the supply of potable and non potable water, sewerage, stormwater, gas and electricity.	<ul style="list-style-type: none"> - Section 5.5 - Section 5.6 - Section 7.8 - Appendix K - Appendix L
Staging	
Detail the staging of the Stage 1 (Blocks 1-4) proposal, and its interrelationship with the staging of the overall Barangaroo development.	<ul style="list-style-type: none"> - Section 5.8
Air, Noise and Odour Quality	
Identify potential air quality, noise and odour impacts, in particular during the construction and operation of the development and appropriate mitigation measures.	<ul style="list-style-type: none"> - Section 7.10 - Appendix P - Appendix V - Appendix W
Heritage	
An assessment of the likely impacts of the proposal on heritage and archaeological items and proposed conservation and mitigation measures.	<ul style="list-style-type: none"> - Section 2.5 - Section 7.12 - Appendix I - Appendix Y

Director General's requirements	Location in Report
Climate Change and Sea Level Rise	
An assessment of the risks associated with sea level rise on the modifications as set out in the draft <i>NSW Coastal Planning Guideline: Adapting to Sea Level Rise</i> .	- Section 7.13 - Appendix Z
Ecologically Sustainable Development (ESD)	
Identify how the development will incorporate ESD principles in the design, construction and ongoing operation phases of the development.	- Section 5.7 - Section 7.14
Address water quality management for the site including an " <i>Integrated Water Management Plan</i> " 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.	- Appendix M
Planning Agreements / Developer Contributions	
Scope and justification for any planning agreement/developer contributions proposed.	- Section 7.15
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 - Appendix G

7.2 Urban Design, Land Uses and Development Controls

7.2.1 Built Form

As discussed in Section 4, Modification B3 of the Concept Plan approval requires the new Southern Cove to be enlarged to create:

- an enlarged water intrusion including a component east of the proposed "Globe Street";
- active edges around the enlarged waterbody, including appropriate ground floor uses in buildings to activate the foreshore area;
- achieving appropriate pedestrian linkages along the foreshore and connections to Hickson Road; and
- a theme which celebrates the water as an important part of the landscape element.

The enlargement of the Southern Cove in conjunction with the planning and design requirements imposed by Modification B3, have consequently generated a series of urban design opportunities related to the distribution and mix of uses at Barangaroo South, including the reconfiguration of the internal street and public domain networks, arrangement of land uses across the site, and the distribution of the approved GFA and heights across the entire site. Lend Lease's Concept Plan Modification has been driven by the following design principles.

The Fan and Grid Pattern

Figures 45 and **46** illustrates the Concept Plan Modification's intention to extend the City's natural north-west oriented grid into the site. Within the site a radial grid arrangement has been introduced to respond to the changing nature of the site at its periphery and to soften the land/water interface. The fan-like grid pattern provides daylight penetration into the spaces between buildings, and helps temper the density of development closer to the foreshore. The fanned grid arrangement also benefits Barangaroo South over a more conventional grid pattern as it provides indirect water frontage to all sites, rather than distinguishing between absolute waterfront and second tier sites.



Figure 45 – Sydney's North Western Grid



Figure 46 – The Fan

The reconfigured street grid layout has the following benefits:

- extension of the City's established street network west into Barangaroo South;
- retention of the existing physical and visual links with the CBD and residential buildings along Kent Street, thereby reinforcing already established east-west linkages;
- creation of expanded public and private viewing corridors which draw out towards the water as streets fan out towards the water's edge;
- emphasis on the design of buildings to reinforce and enhance the City's north western corner and to ensure they are oriented for maximum solar and light access, long view corridors, water edge permeability and wind mitigation;
- an appropriate response to the re-alignment of Margaret Street West abutting Block 1 which was constructed as part of the Macquarie Bank development;
- creation of strong pedestrian linkages into the site from Margaret Street/ Wynyard through overhead pedestrian bridges from Kent Street over Hickson Road and multiple at grade connections;
- pedestrianisation of Bull Street on the northern edge of Globe Harbour to provide an entirely car-free public foreshore.

In addition to the above, the Concept Plan Modification:

- creates Hickson Road, Globe Street and Napoleon Street as the primary street addresses for commercial towers C3, C4 and C5 and provides the Southern Cove with a waterfront street address, further enhancing the important function of the Barangaroo street hierarchy;
- retains the previously proposed "loop road" system reinforcing Hickson Road as the site's eastern street address, retaining permeable east-west connections through the site and providing convenient access to building lobbies, ferry wharves, below ground car parking and service areas; and
- prioritises pedestrian access and reduces the reliance on vehicular access throughout the site.

Completing the City Frame

An analysis of the City's existing built form has concluded that the CBD is characterised by a concentration of tower forms setting up a frame, whilst low rise and iconic buildings skirt the perimeter and form markers along the City's edges. The "City Frame" – a clear distinction between the built and natural environments – can be identified along the CBD's eastern, northern and to a lesser extent western edges (**Figure 45**).

The Concept Plan Modification extends and completes the City Frame into Barangaroo South by bookending the City's western edge with the new tower elements. Less dominant built form and passive uses such as the low rise residential buildings in Development Block X, the promenade, and Southern Cove waterfront offset the City Frame and ensure an appropriate scale is presented to public recreation areas and adjacent to the waterways. The landmark building is the only exception to this approach and has been designed to be a key marker as outlined below.



Figure 47 – City Frame Line

Creating Gateways, Markers and Place Making

One of the key features of the Concept Plan Modification is to continue the City's theme of establishing landmark buildings and spaces at strategic locations throughout the CBD and along its edges. The landmark building, Cultural Centre, Southern Cove and its waterfront are key buildings and places that have been designed and located to emphasise Barangaroo South's natural and built attributes and function as anchors along the foreshore. The indicative layout demonstrates that whilst the Concept Plan Modification is coherent and flexible, the distribution of Development Blocks and land use mix will emphasise landmark buildings and spaces and reinforce Barangaroo's intended iconic status.

The Southern Cove and the waterfront promenade form junctures along Barangaroo South's western edge and create recreational and performance event opportunities. The Concept Plan Modification promotes a range of experiences and encourages these spaces to differ in form and function, creating an exciting and vibrant waterfront. The creation of the publicly accessible Southern Cove foreshore in particular, at approximately 4,000m² in area (main dimensions), complements the enlarged Southern Cove, and creates a sense of arrival when approaching from Hickson Road, Napoleon Street and the overhead pedestrian bridge City Walk (refer **Figure 48**).

Similarly, the Cultural Centre, public pier and landmark building are prominently located adjacent to and near the Southern Cove and will attract and draw employees, residents and visitors to Barangaroo South. Each of these markers create new opportunities to provide significant pedestrianised civic and gathering spaces to function as Barangaroo South's cultural and recreational anchors. The creation of the public pier and landmark building is consistent with established Sydney based precedents including Walsh Bay, Woolloomooloo and the Rocks (Park Hyatt).

The Concept Plan Modification and particularly the introduction of the landmark building, Cultural Centre, Southern Cove and waterfront promenade, therefore satisfy specific objectives of the Concept Plan as currently approved which aim to:

- provide a diverse range of passive and active urban waterfront experiences and connections that also respond to key view lines for the site's residents, visitors, and workforce;
- create various civic spaces that allow for kiosks, events, markets, festivals and community activities that service both the local residential community, visitors and workers.
- create large open spaces suited to major public gatherings, events and festivals;
- provide the first stage of a continuous foreshore promenade that connects King Street Wharf to Walsh Bay;
- integrate public domain, squares and spaces throughout the site and connect into the new street network;
- create new interfaces and relationships between land and water, particularly around the perimeters of Globe Street and through the creation of the Southern Cove foreshore, Globe Square and the waterfront promenade;
- develop buildings of distinct character along the water's edge without crowding the water and whilst protecting views;
- define the Southern Cove and create a unique sense of place;
- reinforce and implement the Cultural Ribbon which will activate the foreshore with leisure, recreation and cultural facilities; and
- generate activities to create a lively precinct throughout the day and on weekends with a range of services and facilities.



Figure 48 – Landmarks plan

Circulation and Permeability

Barangaroo South's proposed street and circulation network, as envisaged by the Concept Plan Modification, reinforces the connections between the CBD, Barangaroo South and landmark public buildings and markers along the foreshore established in the approved Concept Plan (as modified) (**Figure 49**).

The specific urban design principles that the Concept Plan Modification has adopted and which are reinforced from the approved Concept Plan are summarised as follows:

- In relation to Globe Street/Napoleon Street: their creation as a new public primary street address and connective promenade to enhance pedestrian access, activate the waterfront promenade and provide active retail, leisure and recreational frontages for local workers, residents and visitors (as illustrated at Figure 11.16 of the approved Concept Plan);
- In relation to Shelley Lane: the new north-south pedestrian only public street running parallel to Hickson Road will introduce a finer grain into the site and provide enhanced pedestrian connectivity between Margaret Street West, the Southern Cove and (eventually) the Headland Park to the north of Barangaroo South. It correlates to key pedestrian desire lines identified in the approved Concept Plan and accordingly maximises legibility, street address and urban identity;
- In relation to City Walk and the 189 Kent Street bridge: the new overhead public pedestrian linkages draw people from the CBD and complement the publicly accessible east-west streets (a range of promenades, streets, and lanes of varying widths) and Hickson Road and accordingly connect the CBD to the water's edge;
- Street views are maintained to open space and the water (as illustrated at Figures 11.17 and 11.18 of the approved Concept Plan), visitors and workers are drawn into Barangaroo South via City Walk, and a strong sense of permeability is provided through Margaret Street West, Bull Street, Healy Street and the suite of laneways, arcades and galleries;
- The street layout provides pedestrian and vehicle circulation routes within the urban precinct and encourages future connections into existing streets within Walsh Bay, Millers Point, King Street Wharf, and the western grid of the city in a clear and logical way (as identified at the approved Concept Plan Sections 8.2.1 & 8.3.2); and
- The street footpaths and adjacent land uses foster street activity and provide efficient pedestrian movement within the urban precinct. The new street alignments have been positioned in response to the re-oriented commercial towers and the introduction of the low rise residential uses in Development Block X, however they also provide water vistas, and bring the surrounding network of city streets and the Harbour together (refer to approved Concept Plan Section 8.2.1 & 8.3.2).

In summary, whilst detailed building footprints are not determined in the Concept Plan, the indicative layout prepared by Lend Lease demonstrates the urban structure of the site, including the street layout and urban form, have been designed to reflect the surrounding street pattern and 'urban grain'. The indicative layout also recognises existing view corridors to the water from Towns Place, Munn Street, High Street, Gas Lane, and Napoleon Street (as established under the approved Concept Plan).

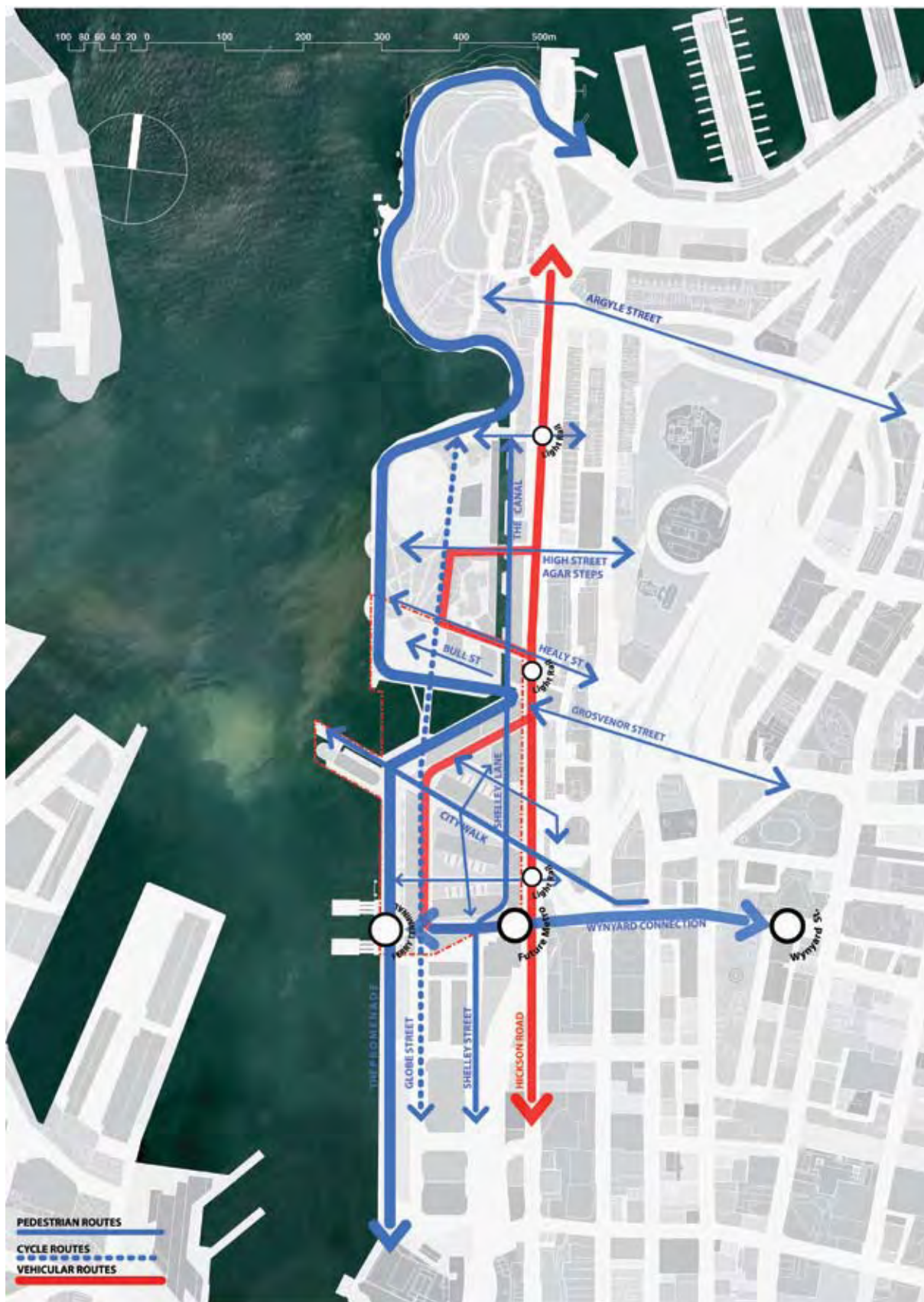


Figure 49 – Circulation and permeability

The Concept Plan Modification satisfies the approved Concept Plan's built form objectives as it continues to ensure that future built form will:

- result in 3.1ha of Barangaroo South being set aside for open space and public recreation uses, including the waterfront promenade and Southern Cove foreshore, public recreation areas and the public pier, and will thereby provide a significant contribution to the overall objective to set aside 50% of the overall Barangaroo site for open space and public recreation uses;
- be appropriate to the site's context and to the desired urban form and scale for the western part of the Sydney CBD;
- be of an appropriate density to capitalise on the site's attributes;
- concentrate taller buildings towards the centre of Barangaroo South (and consequently the southern part of the overall Barangaroo South site), where they are compatible with the higher density city scale development to the south and west;
- reinforce the landmark significance of the site;
- maintain significant view corridors within the site and from the public domain surrounding the site towards Sydney Harbour;
- achieve view sharing principles from existing surrounding development;
- ensure permeability throughout the site, with pedestrian through-site-links; and
- allow creativity in built form, whilst providing certainty over the bulk and scale of development.

7.2.2 Gross Floor Area

Table 6 compares the approved and proposed distribution of GFA across Barangaroo South.

Condition C1 of the approved Concept Plan (as modified) permits the redistribution of any GFA between Blocks 2, 3, 4 and 5, that is displaced by the encroachment of the enlarged Southern Cove, as long as the total GFA permitted on those Blocks is not exceeded. In addition to redistributing GFA between Blocks 2, 3 and 4(A–C), Lend Lease proposes Development Blocks 1 and Block X provide additional residential and retail GFA and Block Y to accommodate the landmark building (tourist uses). Additional GFA for active and community uses is also proposed across the entire extent of Barangaroo South.

The redistribution of GFA arising as a direct consequence of the satisfaction of Condition C1 of the approved Concept Plan (as modified) does not in itself require a modification to the Concept Plan. The redistribution of GFA resulting from the satisfaction of Modification C1, combined with the otherwise proposed increase in GFA across Barangaroo South has resulted in the following GFA departures from the approved planning framework:

- an overall increase in GFA of 59,965m², with 45,188m² being for residential uses and the remaining 14,777m² being for commercial uses. This represents an 82.7% uplift of residential floor space and a 4.8% commercial uplift within Barangaroo South;
- a 8,057m² (or 2%) increase in total GFA across the area of land defined as Blocks 1–4 in the approved Concept Plan (as modified) and now proposed to be amended to include Blocks 1 – 4(A–C);
- a 26,280m² (or 48%) increase in residential GFA across Blocks 1–4(A–C);
- provision of tourist, retail and residential uses (51,908m²) west of Globe Street, which are currently prohibited in the underlying RE1 Public Recreation and W1 Maritime Waterways zone under the Major Development SEPP and Harbour REP;

- a reallocation of passenger terminal uses (8,500m²) to community uses. The addition of 1,500m² taking the total up to 12,000m² with 10,000m² being allocated for community use across Barangaroo South;
- a 1,500m² increase in active uses GFA. This will result in an overall total of 4,500m² of active uses GFA at Barangaroo, of which 3,000m² will be within Barangaroo South.

Consistent with the approved Concept Plan, the Concept Plan Modification proposes a mix of uses dispersed over Barangaroo South to create an integrated development combining residential, office, tourist and retail accommodation. Up to 46,777m² of retail, community and active uses are proposed to activate ground floor and public spaces across Barangaroo South. The proposed range of uses across Blocks 1-4(A-C), and X is permissible within each of the Development Blocks and is consistent with the intended development outcomes under both the SEPP Amendment and approved Concept Plan (as modified). The tourist and other activating uses proposed on the public pier and Block Y will be permissible pending the Major Development SEPP, however they are consistent with the aims and objectives of the approved Concept Plan and have planning merit (refer to Section 6 and **Appendix F**).

The proposed increase in GFA in Blocks 1-4(A-C) and creation of the new Blocks X and Y is considered acceptable on both planning and urban design grounds. The current mix of residential and commercial land uses in the approved Concept Plan (as modified) can be better distributed and more evenly balanced. The distinctive commercial and residential precincts could potentially result in sterile and non-activated spaces under the established planning framework. The Concept Plan Modification seeks to improve the land use mix and future activity at Barangaroo South by both increasing and redistributing residential GFA more evenly across the Barangaroo South site. The increase in residential GFA represents an 82.7% uplift on the approved quantum of proposed residential uses, which will significantly increase the vibrancy of Barangaroo South through the larger residential population. The additional residential GFA and commensurate increase in residents will also benefit the proposed retail, community and active uses, and support public transport, by reinforcing demand and critical mass.

The placement of new residential GFA west of Globe Street can be supported on the basis that the Concept Plan Modification maintains an appropriate setback from the foreshore (minimum of 27m). The proposed waterfront promenade width is considered a better planning and land use outcome than the previously proposed 60m wide connection as it is an appropriate scale for projected recreational activities at ground level and is a continuation of the scale of the waterfront spaces in front of King Street Wharf albeit slightly wider by some 6 metres. It will encourage the incorporation of small scale public art and active elements into the public domain. The reduced promenade will respond more appropriately to the human scale, be better defined, and low scale buildings will become more dominant at eye level, introducing visual interest. The reduced promenade will also benefit from the passive surveillance and security that the low rise residential and ground floor retail uses will offer.

Furthermore, the Southern Cove provides a significant area of additional publicly accessible foreshore appropriate to the intended form and function of Globe Harbour and people activity not envisaged under the approved Concept Plan and accordingly offsets the reduction in the width of the waterfront promenade dimensions.

In addition, the Concept Plan Modification continues to:

- use the harbour edge and open space network to provide exceptional recreational experiences;
- increase the 2.2 kilometre harbour foreshore walk and cycle path linking King Street Wharf with Millers Point and on to Walsh Bay and Circular Quay; and
- Create the waterfront promenade along the site's western boundary which through the creation of Block X establishes and reinforces the boundaries between the urban precinct and recreational areas.

The Concept Plan Modification accommodates a total 99,763m² of residential GFA in Blocks 4(A-C) and X to activate the foreshore, whilst 9,000m² of residential GFA is proposed at Block 1 to ensure the entire precinct is activated and there is appropriate integration of commercial and residential uses across Barangaroo South.

The GFA increase also accommodates a total 4.8% increase in commercial uses above that permitted in the approved Concept Plan (as modified). Increased commercial GFA will support Sydney's continued growth. Independent research data from BIS Shrapnel forecasts demand for an additional 720,000m² of commercial floor space over the next 10 years. The proposed 323,700m² of commercial GFA represents 45% of BIS Shrapnel's forecasted demands respectively.

Table 6 – Distribution of approved and proposed GFA

Block	Overall Block GFA (m ²)		Maximum Residential GFA (m ²)	
	Approved	Proposed	Approved	Proposed
Barangaroo South Mixed Uses Precinct				
1	11,800	9,400	0	9,000
2	211,907	209,213	20,000	0
3	85,568	142,669	9,575	0
4A		8,150	–	6,900
4B	121,000	29,900	25,000	28,900
4C		39,000	–	38,500
X	–	18,908	–	16,463
Y	–	33,000	–	0
Subtotal (A)	430,275	490,240	54,575	99,763
Barangaroo Central (Mixed Uses Precinct)				
5	41,225	41,225	15,000	15,000
6	3,000	3,000	0	0
7	15,000	15,000	14,000	14,000
Subtotal (B)	59,225	59,225	29,000	29,000
Barangaroo Additional Uses (Mixed Uses and Public Recreation)				
Active Uses**	3,000	4,500	–	–
Community Uses**	2,000*	12,000**	–	–
Passenger Terminal	8,500	–	–	–
Subtotal (C)	13,500*	16,500	54,575	99,763
Overall Total (A+B+C)	501,000*	563,965***	83,575	128,763

*The 501,000m² of GFA approved under Modification No.2 envisages 2,000m² of community uses GFA within Blocks 6 and/or 7.

** Community and Active Uses GFA is as per Section 5.2.6. The proposed 12,000m² includes the 2,000m² of approved community uses GFA.

***The 2,000m² community use is required to be provided within Blocks 6 or 7 and is not double counted in the total Block GFA.

Barangaroo South maximises the opportunities to contribute to the future commercial GFA requirements and optimise sustainability efficiencies associated with providing GFA near existing transport and infrastructure, whilst also potentially alleviating the need to increase building densities elsewhere within the CBD or across greater Sydney.

It should be noted that the cumulative subtotal of the maximum permissible residential GFA for all Development Blocks is 13,500m² less than the overall total maximum residential GFA permitted on the Barangaroo site under Modifications A1(1)(a) and B4(1)(a) of the approved Concept Plan (as modified).

The increase in commercial GFA is also directly a response to Sydney's existing shortfall in A-grade office space, which is in high demand by global, financial and other professional services. Barangaroo South provides an opportunity to meet this demand, and consequently reinforce Sydney's position as a major financial centre within South East Asia. The proposed built form principles and indicative layout accordingly facilitate the provision of 2,000+m² floor plates which are preferred by multi-national organisations. The built form and GFA response has direct economic, sustainability and social benefits through the creation of more jobs (construction and operation), adaptable and flexible floor plates, economic stimulus and international investment.

As the State Government has indicated it proposes to relocate the passenger terminal to White Bay, and the 8,500m² of passenger terminal uses are no longer required on the site, it is proposed to reallocate the approved floor space towards community uses. This means that there is a 3,000m² net increase in active and community uses sought. The nominal increase in active and community uses GFA reinforces the activation, vibrancy and destination aspirations of Barangaroo South. The provision of an additional 1,500m² of active uses and 10,000m² of community uses will support and facilitate the civic focus of the key landmark buildings and places, such as the landmark building, Cultural Centre and landside ferry facilities. Further, the additional community uses GFA will encourage the location of uses that are not necessarily restricted to conventional business hours. This will ensure visitors, residents and employees are drawn to, and remain at, Barangaroo South for longer periods of time (ie: later in the evening).

In summary, the Concept Plan Modification responds to the key planning and urban design issues identified during the preparation of the original Concept Plan and SEPP Amendment. The Concept Plan Modification also satisfies the underlying planning objectives and controls established by the State Government for Barangaroo South.

The quantum of additional GFA is considered appropriate as the following urban design and public benefit outcomes will be achieved and/or protected:

- the GFA contributes to Metropolitan Strategy residential and employment targets and also delivers a significant portion of commercial and tourist floor space that will be required over the next 20 years;
- the distribution of GFA facilitates the creation of a much larger Southern Cove to a higher standard;
- significant benefits arise from the increased activity and vibrancy created from a permanent residential community of an appropriate critical mass;
- flexible floor plates will accommodate a range of tenant needs, gain efficiencies of space and arrangement, provide naturally light, free and open floor plates which are inherently flexible, and create optimal solar and light access and opportunities for dramatic open views of Darling Harbour;
- the proposed increases in GFA reinforce the City's north-western corner, enhance public domain objectives, and will improve the form and function of key landmark spaces and buildings;
- the established north-south and east-west streets and laneways, including Shelley Street, Napoleon Street and the City Walk are retained and enhanced through additional GFA which provides an interesting and vibrant finer grain to activate the ground plane; and
- existing view corridors and new major view corridors to the water between the commercial towers and over the Southern Cove will be protected and facilitated, allowing visual permeability of the site to and from the water.

The introduction of new Blocks to accommodate additional residential GFA and the landmark building, whilst currently non-compliant with the underlying zone provisions, are proposed to be reconciled through the proposed SEPP Amendment. Under earlier modifications to the approved Concept Plan, the Department of Planning's Director General's report to the Minister for Planning acknowledges that an amendment to SEPP Major Development would be required to modify the maximum permitted GFA for each Development Block. A SEPP Amendment is also required to reconcile the recent modifications to the Headland Park layout with the underlying SEPP controls. Notwithstanding this, the Concept Plan Modification will generally comply with the provisions of the SEPP once amended.

7.2.3 Building Height

The maximum building heights for Blocks 1 – 4 established under the approved Concept Plan (as modified) were derived on the basis of the building massing generated by the east-west street layout nominated in the Concept Plan, and the then resulting distribution of the maximum GFA at the time.

Under the Concept Plan Modification, the proposed building form located on Blocks 1–4(A – C) has been massed to respond positively to the key urban design principles underpinning the approved Concept Plan, whilst delivering commercially viable and flexible floor plates. The reconfiguration of the development blocks which has allowed GFA to be transferred across Development Blocks 1 – 4(A – C), has also resulted in increased heights on Development Blocks 1, 3 and 4 and the need for new building heights for Blocks X and Y. Block X and Block Y are non-compliant with the current planning controls and necessitate the SEPP Amendment.

Table 7 summarises the proposed extent of building height departures from the approved Concept Plan (as modified). As shown in Table 7, the greatest extent of non-compliances from the approved parameters is in Blocks 3 and 4(B and C). This is a direct response to the proposed residential GFA increases. Blocks X and Y respectively propose maximum heights of RL 41.5 and RL 170 which have previously not been envisaged in the approved Concept Plan. Block 4A proposes less height than is permitted under the current planning controls.

The increase in height is predominantly the result of an increase in GFA. The design Built Form Principles and Urban Design Controls established within the Urban Design Statement (**Appendix A**) encourage fewer but taller buildings, which has clear benefits for the public domain framework, optimises solar access, and retains view corridors. The proposed heights will be mediated at ground level through the Built Form Principles and Urban Design Controls established within **Appendix A**. Of these, the most significant is the design response to the first 25m of the proposed tower forms. Careful consideration is required to create human-scaled environments at the base of taller buildings and will be addressed through the provision of a diverse mix of uses (eg: cafes, restaurants, retail, child care, super markets), awning and sheltering treatments, use of podia, stepping profiles and potentially the construction of double height retail spaces.

Table 7 – Comparison of approved and proposed building heights

Block	Approved Height (RL)	Proposed Height (RL)	Difference (m)
1	62	80	+18
2	180	180	0
3	112	209	+97
4A	100	41.5	-58.5
4B	100	175	+75
4C	100	160	+60
X	–	41.5	–
Y	–	170	–

The upper floors of tall buildings will generally be most visible when viewed from a distance, and in the context of the City skyline. The potential view impacts are discussed in detail in Section 7.4, however greater visual interest can be achieved through architectural modelling, and specific design responses, including upper level setbacks, articulation, and roof-top features. These principles have been incorporated into the Built Form Principles and Urban Design Controls at **Appendix A**. Notably a comparison of Barangaroo South building heights to existing Sydney, Australian and international building heights demonstrates the proposed heights are generally less than existing precedents (**Figure 48**).

The landmark building forms a gateway to Darling Harbour in the same way that the Sydney Opera House marks Circular Quay and Sydney Harbour Bridge marks the Harbour to the west. By its very nature as an intended iconic building and key landmark, it is required to be tall. The landmark building's proposed height defines the Southern Cove, and will help draw visitors through Blocks 1 – 4(A – C) towards the foreshore. A roof top bar and observation deck will create new tourist attractions and provide the opportunity to view the City and Harbour from a new vantage point, thereby further reinforcing the activation and vibrancy of the public pier and Barangaroo South.

Further to this, Lend Lease's proposed Built Form Principles and Urban Design Controls promote building modulation and articulation, ground floor activity, high quality roof tops, and appropriate building massing. Significant views identified in the Concept Plan View Analysis (**Appendix N**) will not be compromised and shadow diagrams demonstrate that no additional significant shading or of the foreshore and Darling Harbour, or existing commercial and residential properties is expected during the winter months.

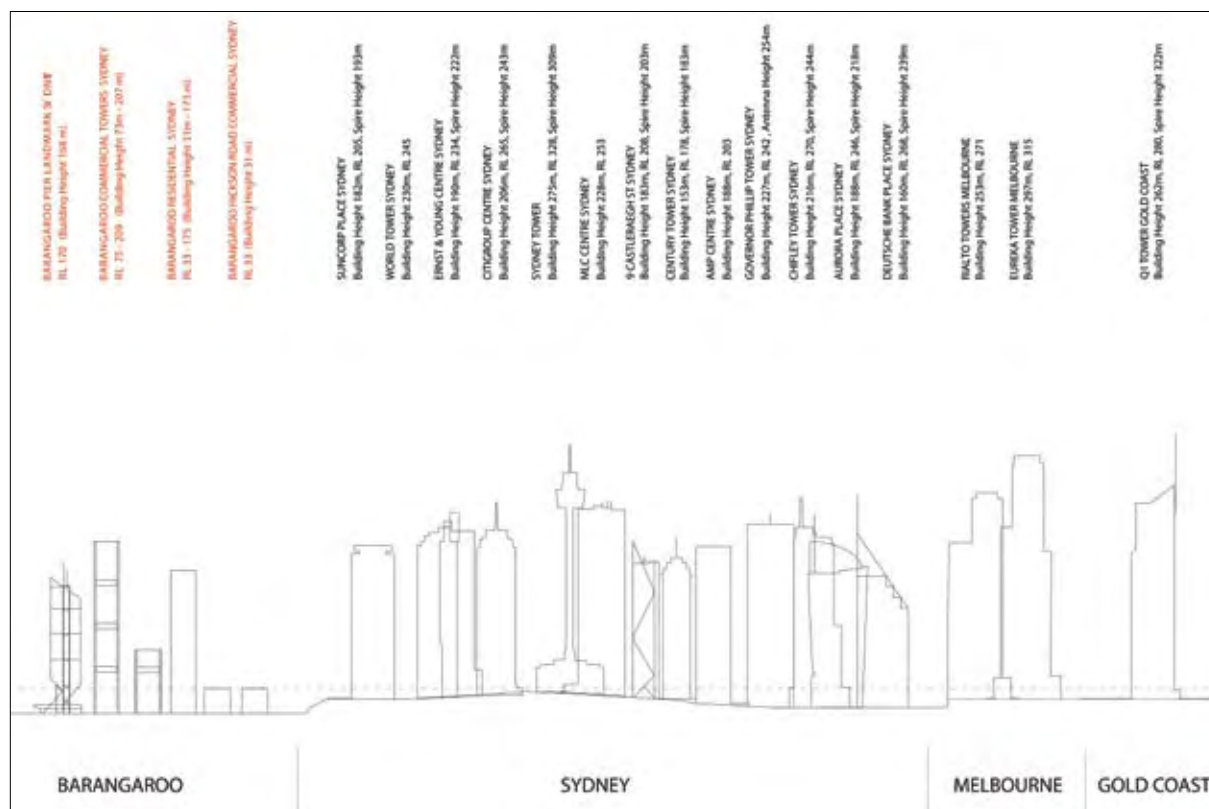


Figure 50 – Comparison of building heights in Sydney, Australia and globally

7.2.4 Bulk and Scale

Condition B9 of the approved Concept Plan was imposed by the Minister for Planning to ensure that the design, bulk and scale of the future built form that is ultimately designed within the maximum height and GFA established by the approved Concept Plan (as modified), is acceptable. Accordingly, the controls at Condition B9 seek to regulate the size and location of the podiums and towers by introducing maximum heights (for the podiums), maximum widths and depths for the tower elements, minimum building separations and minimum street setbacks. The restrictions on built form width and depth are also intended to ensure a diversity of occupancies, and combined with required building separations, better view corridors, good internal amenity, access to natural light and ventilation and a more appropriate building scale for pedestrians with any final building design.

Lend Lease has reconciled and improved the approved Built Form Principles and Urban Design Controls in response to the proposed Concept Plan Modification. The proposed Controls and Principles are considered appropriate as they collectively continue to satisfy the original objective of the approved built form principles and controls by:

- enabling visual connectivity to the east or west;
- promoting the use of different architectural treatments, detailing of facades and strategic selection of materials to create visual interest and break up expanses of building walls with modulation of form and create a balance between public and private spaces;
- ensuring the built form and the tower elements in particular continue to read as individual towers and maintain an appropriate relationship within the Development Blocks themselves and to the human scale;
- improving the pedestrian streetscape through consistent architectural design, street frontage bulk, massing and modulation of buildings;
- promoting the use of column lines and structures to provide additional rhythm and articulation to buildings;
- placing highly visible base activities (shops, restaurants, studios, bars, etc) at street level to respond directly to human scale and senses rather than drawing the eye to the building facade; and
- requiring a generally consistent building height and form along Hickson Road and the waterfront promenade.

7.3 Design Excellence

Design excellence in building architecture and the public domain will be achieved by a combination of a design and integrated review panel, detailed design guidelines, and design competitions.

Lend Lease's strategy is generally consistent with the Major Development SEPP provisions and the requirements of the approved Concept Plan (as modified). Lend Lease has commissioned world-renowned Rogers Stirk Harbour + Partners as master plan architects for the site with PTW, FJMT, LAVA, Aspect/Oculus and Lend Lease's in house design team as collaborating architects. Lend Lease intends to utilise a combination of design competitions and alternative design excellence strategies for delivery of the project.

Design excellence will therefore be achieved through:

- general compliance with the planning framework established for the site;
- design competitions for a range of buildings, public art and other elements;
- retaining an internationally and Australian renowned design team which is recognised for design innovation and excellence;

- creating and delivering the recommended enhancements arising out of the International Design Competition winning scheme and the Barangaroo Stage 1 bid process;
- integrating informal design review processes in the ongoing design and refinement of future Project Applications for which planning approval will be sought;
- fostering a collaborative relationship with any future Design Review Panel that is required to be established under the Concept Plan Statement of Commitments;
- facilitating innovation through public art and installations;
- utilising the Lend Lease's skills and proven track record to deliver an exemplary commercial, residential, entertainment, educational, public domain and recreational precinct; and
- exploring and implementing innovative technical and sustainable solutions, contributing to cutting edge design excellence.

The proposed strategy meets the requirements at Clause 19 of the Major Development SEPP and Condition C2 of the approved Concept Plan (as modified).

7.4 View Impacts

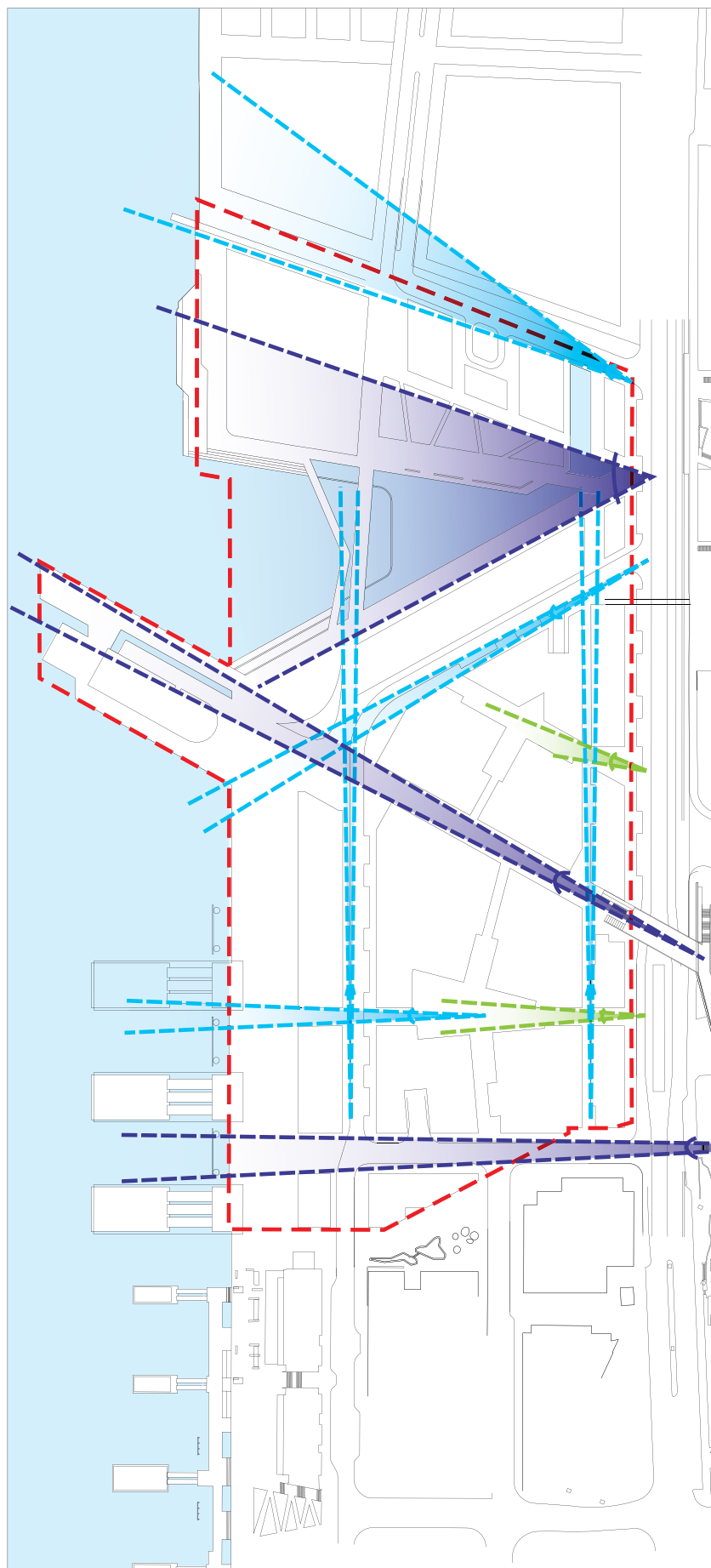
The View Impact Analysis prepared by JBA Urban Planning Consultants is attached at **Appendix N**. The Concept Plan Modification has been developed with a number of principles in mind. Densities have been determined in accordance with development factors whilst maintaining the principle of lowering heights towards the north, providing interpretation of the landform features; the protection of key views and vistas from the surrounding historic precincts; and maintenance of key vantage points across the Harbour.

Figure 49 illustrates the key views across the site. Whilst some views will be impacted, the View Impact Analysis concludes that these impacts will be on the basis that:

- Public access will be available to Barangaroo South on a major section of city harbour foreshore, which will create many new views from the site thereby providing a new appreciation of the harbour and Millers Point;
- Retention of views across the site from the Harbour to Millers Point or Observatory Hill Park, or from Observatory Hill Park and Millers Point to the opposite harbour foreshores; and
- Creation of a new road and pedestrian path network, which connects into the existing street pattern extending and interpreting the planned and lost street alignments. Views and vistas will be retained and established throughout this public domain network.

The Concept Plan Modification will deliver a built form that is appropriate to the site's context and to the desired urban form and scale for the western part of the Sydney CBD and is of an appropriate density to support the support the City's growth and to capitalise on the site's attributes. The development provides a transition in building height across the site, limiting the height of buildings on the northern portion of the site and ensuring that taller buildings are directed towards the southern part of the site, where they are compatible with the higher density city scale development to the south and east.

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. The urban structure of the site, including the Southern Cove location, street layout and urban form, has been designed to reflect the surrounding street pattern and 'urban grain', and to preserve existing view corridors to the water from Gas Lane, and Napoleon Street.



LEGEND

PRIMARY STREET ADDRESS

SECONDARY STREET ADDRESS

PRECINCT ADDRESS

--- SITE BOUNDARY



SCALE 1:3000 @ A4

Figure 51 – Proposed views

7.5 Amenity and Design

7.5.1 Solar Access & Shadowing

A shadowing analysis for the proposed Concept Plan Modification is included at **Appendix B**. The shadowing analysis has been prepared for hourly intervals between 9am and 3pm at the solstice (June 21) and the equinoxes (March 21 and September 21) and compares the existing CBD, approved Concept Plan and Concept Plan Modification shadows.

Shadowing from existing CBD buildings is shown in grey.

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 the Development Block from the maximum development block envelopes. This area is shown as yellow on the analysis drawings, whilst the maximum area for which shadows could be cast by the approved Concept Plan building envelopes is shown in red. It should be noted however, the maximum potential extent of shadowing can never be realised, as the maximum GFA for each Development Block contained within the Concept Plan does not allow for an end building design to fill the maximum permitted envelopes.

The shadowing analysis also shows the shadows expected to be cast by Lend Lease's indicative layout. The maximum extent of shadows cast by these buildings is indicated by the solid blue line within the maximum potential shadow area.

June 21

The shadow analysis indicates that some additional shadowing will occur on Sydney Wharf (between Barangaroo and Darling Island) between 9am and 10am. The Wharf currently accommodates the Australian Maritime Museum on its eastern side and some upper level residential uses. During this same time, a small portion of additional shadowing also occurs over the Wharf 7 Plaza area and the historic ship associated with the Natural Maritime assuming the maximum Development Block Controls are realised (ie: the yellow shaded areas). However, Lend Lease's indicative layout (as a potential development scenario which is well within the maximum Development Block controls) does not shadow these elements. It is considered that this period of additional shadowing is acceptable given that no further shadowing to western properties occurs after 10am in the midwinter period.

As the day progresses during mid winter, the extent of shadowing from the maximum development block envelopes on the waters of Darling Harbour dissipates or reduce progressively between 10am and 2pm. 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 12pm any additional shadowing from the maximum development block envelopes is largely confined to waters directly adjoining Barangaroo South and to predominantly commercial buildings to the south. The additional 'potential' shadowing to the south is over commercial buildings within the King Street Wharf precinct, with some apparent additional shadowing of the Portside Residential Towers. To the east, the areas of 'potential' additional shadowing fall over the Western Distributor and commercial/hotel buildings. Notably, the shadowing resulting from the indicative layout generally falls within the approved Concept Plan shadows for this afternoon period (blue line).

March 21

The shadow analysis indicates that between 9am and 10am some additional shadowing will be experienced by commercial buildings on Darling Island from the maximum development block envelopes. The sunlight to Ballarat Park is maintained and the effect of shadowing has moved off the Island after 10am. Some minor additional shadowing from the maximum development block envelopes also occurs on the Sydney Wharf (between Barangaroo and Darling Island) between 9am and 10am, but again is dissipated within an hour.

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 2pm. 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 12pm any additional shadowing from the maximum development block envelopes is largely confined to waters directly adjoining Barangaroo South and some minor additional shadowing to commercial buildings to the south.

Some areas of additional shadowing over the CBD occur in the afternoon period based on a review of the 'maximum envelopes' (yellow). The 'potential' additional shadowing to the south is over commercial buildings within the King Street Wharf precinct, whilst to the east the areas of additional shadowing fall over Hickson Road, the Western Distributor, Kent Street and some commercial buildings. Again, Lend Lease's indicative layout suggests no additional shadowing impacts beyond those envisaged by the approved Concept Plan (as modified).

September 21 and December 21

The September shadow diagrams demonstrate some additional shadowing of the waters of Darling Harbour from the maximum development block envelopes, however, again a significant portion of the waters also receive direct sunlight throughout the day for use by recreational boat users.

Some areas of additional shadowing over the CBD occur in the afternoon period based on a review of the 'maximum envelopes' (yellow). 'Potential' afternoon shadowing over CBD buildings is generally confined to roads, commercial buildings and hotel/serviced apartment uses. Based on the maximum envelopes, some additional shadowing to the western facade of the Kent Street residential buildings occurs between 2pm and 3pm in September and at 3pm in December, though it is noted that the indicative layout generally falls within the approved Concept Plan shadows for this afternoon period.

Summary and conclusion

Overall, it is considered that the shadowing impacts of the Concept Plan Modification are acceptable given that:

- the water of Darling Harbour maintains significant direct daylight hours during the key recreational middle of the day boating period;
- residential properties to the east and west are largely unaffected and are not expected to experience any more shadowing than envisaged by the approved Concept Plan (as modified) – this includes the landmark building;
- the extent of additional 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 on March 21; and
- the extent of additional shadowing over CBD buildings from the envelopes has been modelled against the maximum area within which shadows may potentially be cast by buildings within the block control envelopes included in the modified Concept Plan (yellow), which in practice will never be realised. A review of Lend Lease's indicative design shadowing (blue line) reveals that in most instances the real effect of shadowing is generally within the approved shadowing of the existing Concept Plan.

7.5.2 Wind Impacts

Arup and Cermak Peterka Petersen Pty Ltd's Wind Impact Assessment (**Appendix O**) identifies that Barangaroo South experiences prevailing winds from the north-east (summer), south (frontal systems) and west (late winter/spring). Winds from the south are currently channelled along south-north oriented streets including Sussex Street, Shelley Street and Lime Street. Average wind speeds reach 4 metres per second at the measured reference height of 10 metres. At typical pedestrian heights, this is translated into wind speeds of approximately 6 metres per second.

Table 8 identifies the pedestrian wind assessment criteria adopted by Arup and Cermak Peterka Petersen Pty Ltd's Wind Impact Assessment in its assessment of Barangaroo South.

Table 8 – Pedestrian wind comfort criteria for various activities

Wind Speed	Activity
Comfort (maximum wind speed exceeded 5% of the time)	
< 2 m/s	Outdoor fine dining
2 – 4 m/s	Pedestrian sitting (considered to be of long duration)
4 – 6 m/s	Pedestrian standing (or sitting for short term exposure)
6 – 8 m/s	Pedestrian walking
8 – 10 m/s	Business walking (objective to walk from A to B or for cycling)
>10 m/s	Uncomfortable
Distress (maximum wind speed exceeded 0.022% of the time, twice per annum)	
<15 m/s	General access area
15 – 20 m/s	Acceptable only where able bodied people would be expected; no frail people or bicyclists
>20 m/s	Unacceptable
Wind speed is either the mean wind speed or gust equivalent mean (GEM) wind speed. The GEM wind speed is equal to the 3 second gust wind speed divided by 1.85.	

In addition to the above criteria, wind flow visualisation has been used to model wind flow and movement against building faces and between buildings.

The Wind Impact Assessment results indicate:

- Barangaroo South will improve wind conditions along Hickson Road and the pedestrian environment to Kent Street (ie: Margaret Street, Napoleon Street and Gas Lane);
- southerly winds reaching Buildings C3, C4 and C5 will create a downwash of wind, causing windy conditions;
- the staggered building heights and fanned orientation of Buildings C3, C4 and C5 will generally reduce adverse wind impacts, however the built form to the east may accelerate higher wind flow;
- the south-east corner of Building C5 is expected to be the worst affected;
- in the event that suitable wind protection structures are not placed on Building C5, wind conditions will propagate through to Buildings C4 and C3;
- the landmark building is also expected to experience down washing, particularly at the south east and south west corners of the pier;

- in terms of the proposed residential buildings:
 - Buildings R8 and R9 are expected to induce the circulation of westerly winds from Globe Street;
 - Windy conditions may be experienced around the western corners of Buildings R4 and R5, during windy conditions and consequential downwash from Building R4;
 - local windy conditions may be experienced between Buildings R10 and R11 due to the acceleration of winds through R3 and R5;
- the Cultural Centre may be prone to windy conditions during most of the year; and
- further wind tunnel testing will need to be undertaken to investigate the likely pedestrian level conditions and to determine any required mitigation measures.

The recommendations made by Wind Impact Assessment to mitigate wind impacts include:

- further wind tunnel modelling to better understand wind conditions and how they may be ameliorated and reduced; and
- adoption of the following design features during the detailed design of individual buildings:
 - Awning structures;
 - public domain planting;
 - Installation of localised screens and/or revolving doors;
 - Ground plane wind breaks; and
 - Creation of podia, particularly under Buildings C3, C4 and C5.

These recommendations have been incorporated into the Draft Statements of Commitment.

7.5.3 Internal Residential Amenity

Residential development at Barangaroo South is orientated to the north and west to take advantage of the high level of internal amenity derived from the Harbour outlook. This will also ensure excellent light and solar access to the residential floor space.

State Environmental Planning Policy (SEPP) 65 – Design Quality of Residential Flat Development, which aims to improve the design quality of all residential flat buildings in NSW applies to Blocks 4(A – C) and X.

To create high quality residential buildings all new residential buildings will be designed to generally comply with or exceed the design standards set out in SEPP 65 and the accompanying Residential Flat Design Code (RFDC). Lend Lease's design team has confirmed that at this stage, the Built Form Principles and Urban Design Controls contained at **Appendix A** allow for compliance with the requirements of SEPP 65.

The amenity related recommendations endorsed under the approved Concept Plan (as modified) remain valid and have been reinforced in the revised Statements of Commitment.

7.5.4 Noise Criteria and Guidelines

Design sound levels for various types of buildings have been identified by Arup generally in accordance with the applicable Australian Standards (**Appendix P**). Future Project Applications and detailed design will be bench marked against the predicted noise levels to ensure an acceptable level of amenity is achieved.

7.6 Social and Economic Issues

7.6.1 Economy and Employment

The proposed redevelopment of Barangaroo South will have a positive economic impact on Sydney and New South Wales. The development will generate significant economic and employment opportunities during and post construction, and will provide significant new commercial, residential, tourist, and retail floor space in the western part of the CBD. The economic and employment impacts of the proposed redevelopment and its contribution to the implementation of the Metropolitan Strategy for Sydney are considered in this report. Based on the GFA, it is estimated that a population of up to 21,123 workers and 2,475 residents will be located at Barangaroo South.

In response to the landmark building specifically, the tourism industry is the twelfth largest industry in NSW, contributing \$27 billion annually to the NSW economy and generating approximately 267,000 direct and indirect jobs. Sydney is the most popular destination for overseas visitors, attracting 53% of international visitors to Australia. In 2008-2009, NSW received almost 22.6 million domestic overnight visitors and over 2.7 million international overnight visitors. Of these visitors, 25% of domestic visitors and 10% of international visitors stayed in hotels, resort and motels (NSW Department of Planning).

However, there are a number of recognised issues facing the tourism industry and the ongoing supply of hotel rooms in Sydney, including:

- competition for land within the Sydney CBD;
- loss of, and conversion, of existing hotel stock; and
- broader macro economics issues such as a reduction in business travel arising from the global financial crisis.

There is a finite amount of hotel operators and developers for any market. Given the high start up costs and the long period over which a hotel is required to operate before it makes a financial return. Further, hotel development is ultimately driven by the marketplace. Hotel developers or operators face a more difficult task in determining developer risk, in that the success of hotel uses cannot be properly realised until completion and operation (assuming that a predetermined sale on completion has not been agreed). This in turn impacts upon a developer's ability to raise capital and finance to fund a hotel development.

The Concept Plan Modification's proposed 33,000m² of tourist uses directly responds to these issues which in turn supports the NSW and Sydney tourism and convention industries. Further, the landmark buildings proposed GFA reflects Lend Lease's recent discussions with international hotel operators. The Economic Impact Assessment at **Appendix AA** provides further detail of the expected economic impacts.

7.6.2 Housing Supply and Choice

Barangaroo South will include a mix of housing types and tenures. The benefits of the inclusion of socially sustainable non-market housing include:

- Social equity and inclusion;
- Social mix and diversity;
- Housing the global city workforce; and
- International best practice in medium and high density housing design.

Lend Lease will deliver intermediate housing for essential and key workers employed within the Barangaroo South precinct and the wider Sydney CBD area via the Australian Affordable Housing Partnership (AAHP), which is a collaborative partnership between Lend Lease and the public, private and community sectors. The AAHP delivers affordable housing across the inner and middle rings of Australia's major cities. As a founding partner, Lend Lease delivers origination, development, sales and marketing expertise across all AAHP projects.

The intermediate housing offer Lend Lease proposes will deliver:

- social equity and inclusion by providing a mix of housing tenures for essential and key workers in the Barangaroo precinct and wider Sydney CBD area;
- social mix and diversity by targeting a range of households including singles, families and retirees; and
- international best practise by working with Community Housing Providers (CHPs) to deliver asset and tenancy management of affordable rental accommodation.

Lend Lease's intermediate housing component will offer a range of tenures including rentals and sales to households with incomes \pm 50% of median income via the AAHP. Lend Lease proposes to provide 2.3% of the total proposed residential GFA as intermediate housing. Land will be retained on a 99-year lease basis and will be allocated within the AAHP to CHP's to hold as long-term rental stock. All rentals will be owned and managed by CHPs.

Future dwelling typologies will cater for a broad cross section of the community including singles, couples and small families, and will be targeted at households with incomes \pm 50% of median income (\$30k-\$90k). This level of household income falls within the income bracket of essential and key worker households within Barangaroo and the wider Sydney CBD. Product offerings may include 1-bedroom and 2-bedroom apartments with shared community access to the precinct and building facilities.

7.6.3 Community Services & Facilities

Barangaroo will provide a quality living and working environment accommodating a range of facilities benefiting the social, health, cultural and recreational needs of the existing and future communities. It will achieve:

- A high quality living and working environment in which the health and well being of the working, residential and visiting populations are met;
- New benchmarks as an urban area that supports good health outcomes through the provision of opportunities for active recreation, availability of healthy food and access to health and lifestyle services;
- The locality will provide a high level of cultural amenity for visitors, workers and residents; and
- A recreational environment of regional significance attracting visitors while meeting the needs of workers and residents.

The Community Plan jointly prepared by the Barangaroo Delivery Authority and Lend Lease at **Appendix Q** in consultation with the relevant Technical Working Group further details the benefits of the Concept Plan Modification.

7.7 Transport Management and Accessibility

Under the approved Concept Plan (as modified), a TMAP was required to be prepared prior to submission of the first Project Application, and was required to address public transport, traffic and pedestrian access and car parking provision. A TMAP was prepared in September 2008 by the NSW Government, which has subsequently been amended with recent Project Applications and subsequent to Concept Plan Modification No. 2.

For the purposes of modelling a transport scenario under the Concept Plan Modification, Arup assumed 563,965m² of commercial and mixed use spaces (**Appendix H**). Accepted assumptions adopted in earlier versions of the TMAP and the indicative layout have also been relied upon to provide an indication of likely traffic generation associated with the proposed scope of the Concept Plan Modification. These uses (when fully developed) are likely to result in up to 21,123 workers and an average estimate of 2,475 residents.

7.7.1 Assessment Methodology

As noted in the TMAP (Supplementary), the traffic impact of Barangaroo South will occur when the combination of traffic from the proposed development and traffic already in existence on the road network are at their greatest. To determine the traffic effects of the Concept Plan Modification an estimate of the number of vehicles trips associated with the particular land uses within the site was forecast (based on previously adopted traffic generation rates).

7.7.2 Traffic Generation

To minimise site traffic generation in peak periods the Concept Plan Modification retains the restrictive parking supply policy for the commercial components of the development established in the approved Concept Plan (as modified). It is proposed that commercial development on site parking supply be limited to 1 space per 600m² GFA. For residential/other land use it is proposed to generally adopt Sydney City Council's existing parking rates under Sydney LEP 2005 (also established under the approved Concept Plan).

It is also proposed that existing on-street all day parking on Hickson Road be made short-term only. One underground public car park of 1,974 spaces is proposed to service Barangaroo South, equating to 244 additional spaces beyond earlier versions of the TMAP. In line with the City of Sydney's public transport initiative all intermediate apartments delivered under the AAHP will not include car parking space however residents will have access to a car pool facility.

Having regard to the restrictive parking policy, the total traffic generation of the full development is estimated to be some 548 to 670 vehicles/hour (in and out) in peak periods. Traffic generation results indicate the proposed GFA and trip rates is comparable to previously modelled impacts. In fact, Barangaroo South as proposed under the Concept Plan Modification generates slightly lower traffic volumes than the approved Concept Plan (as modified). This is due to the Concept Plan Modification's proposed land use mix.

There is also an objective to introduce Travel Plans to reduce the need to travel and promotion of sustainable means of transport. Green Travel Plans for employees and residents for both intra and inter-site travel will be developed.

The more specific objectives for Barangaroo workers, residents and visitors include:

- 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, residents 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 and residents;
- to reduce the need to travel for work-related activities, particularly air travel;
- to raise awareness of sustainable transport amongst staff and residents;
- to liaise with organisations, City of Sydney Council, Bicycle NSW and other relevant bodies where reasonable and appropriate; and
- to monitor and review the progress of the Travel Plan strategy.

In terms of the landmark building specifically, traffic movements will peak in the mornings to coincide with check in/out times, when guests will be arriving on early morning flights from overseas destinations, or checking out mid morning.

7.7.3 Local Intersection Operation

Local traffic modelling indicates that there is no significant change expected to the surrounding street network. Given the lower traffic generation rates, traffic at localised intersections as a result of the development of Barangaroo South will not have a detrimental impact.

7.7.4 Public Transport Services

The Concept Plan Modification will facilitate new direct and higher quality pedestrian connections to rail and bus services at Wynyard, including City Walk.

The public transport strategy incorporated within the approved Concept Plan canvassed a wide range of potential changes/extensions to existing bus services which could provide a direct service to Barangaroo. Key changes included the extension of eastern/southern services from the Queen Victoria Building to Barangaroo, plus extension of northern bus services from Wynyard to Barangaroo.

The TMAP (Supplementary) indicates that the Concept Plan Modification is unlikely to impact on existing or future bus services. Rather, the Metropolitan Transport Plan discusses the introduction of 1,000 additional buses to service strategic bus corridors. The proposed public transport mode share reduces bus use and therefore bus demand.

The TMAP (Supplementary) observations regarding rail, North West Metro and light rail is summarised as follows:

- approximately 7,471 additional commuters are expected to arrive at Barangaroo South by rail (Wynyard). This necessitates an increase in four additional trains during peak hour;
- the cancellation of the North West Metro does not warrant further transport analysis; and
- proposed light rail extensions are currently being independently assessed, however Hickson Road has been identified as a potential corridor. The Concept Plan Modification does not compromise the ability for light rail to be provided.

The main existing ferry access is seen as the King Street Wharf Number 3. The Concept Plan facilitates pedestrian access to this wharf. A new ferry wharf is proposed at Barangaroo South. Possible adjustments to ferry services and the role of the Barangaroo Wharf will be the subject of further study in consultation with the Ministry of Transport and Sydney Ferries. The illustrated design at **Figure 52**, whilst not forming part of the Concept Plan Modification for which approval is being sought under Section 75W of the EP & A Act, illustrates the possible vision for Barangaroo Wharf.

7.7.5 Pedestrian Linkages

The Barangaroo South development provides for a number of new pedestrian connections to the surrounding local area, particularly to create safe and convenient connections to Wynyard Station. Internally the development provides for a generous foreshore walkway as well as a network of north-south and east-west road and footpath connections.

7.7.6 Cycle Facilities

It is proposed to complement the Sydney City Bike Plan by the creation of a bicycle route along Napoleon Street, Globe Street, the Headland Park and Hickson Road, as well as shared bike/pedestrian route along the waterfront promenade. Individual buildings will be required to provide bicycle parking and shower facilities, and bike parking would be extensively provided within the public domain.



Figure 52 – Artists impression of Barangaroo Wharf

7.7.7 Recommendations

The TMAP (Supplementary) identifies extensive transport commitments including:

Road network

- The mode share targets including the low share for car travel must be implemented;
- Supporting policies including stringent parking requirements must be provided;
- The proposed road transport infrastructure must be based on the road network modelling;
- The proposed network must provide cohesive connections from Barangaroo to CBD streets and regional roads with minimal alterations to the existing network;
- Timely delivery and funding of the required road and intersection upgrades is essential; and
- All proposed road network changes and improvements are subject to approval by the RTA.

Car parking

- Limitations on parking supply are crucial to achieving the mode share targets;
- The parking provision rates adopted in this TMAP based on an assumed land use mix are to be applied; and
- On-street parking supply must be short stay only and limited in number.

Pedestrian connections

- Pedestrian links must be upgraded for transport mode share targets to be achieved;
- The main route to Wynyard requires a major upgrade with new infrastructure;
- Design and delivery of the pedestrian tunnel to Wynyard is to be undertaken by the NSW Government;
- A possible extension of the tunnel to Australia Square and connection with the new Metro station will be considered in planning; and
- Upper level grade separated connection(s) between existing streets and Barangaroo should be considered.

Rail services

- An integrated transport hub comprising the rail systems, bus services and the Wynyard - Barangaroo pedestrian link will need to be created.

Bus services

- Barangaroo will receive substantially upgraded bus service levels including direct services to enable the mode share targets to be achieved;
- Implementation of changes to bus routes, including traffic management and bus infrastructure needs; and
- Detailed design of development must accommodate bus routes, stops, driver facility and a layover.

Active waterfront

- The waterfront at Barangaroo will be activated by facilities for maritime vessels and the interrelationship between land and water based activities.

Cycling

- Measures to be taken to increase the use of cycling to ensure mode share targets are met;
- Proposals must include connections to local cycle networks, and CBD and regional connections; and
- Proposals must also include facilities for cyclists within development in Barangaroo.

Light rail

- Light rail will share the mode split target with buses (2% light rail and 18% buses). With the future extension this could increase mode share to 5% for light rail.

Ferry

- Ferry mode split target of 1% is very low. With the provision of additional ferry services to the Barangaroo Wharf this could increase mode share to 5%.

Coaches, taxis and service vehicles

- Include appropriate provision of facilities for taxis, coaches and service vehicles.

The recommendations contained within the Transport Report have been incorporated into the Statement of Commitments.

7.8 Soil and Water

7.8.1 Remediation of Contaminated Land

The Concept Plan Modification does not propose a change to the overall remediation strategy for the site as contemplated by the approved Concept Plan (as approved). The Overarching Remedial Action Plan for Barangaroo prepared by ERM and the Remedial Action Plan Other Remediation Works (South) Area prepared by AECOM (refer to Bulk Excavation and Basement Car Parking Project Application) establish the first phase of the endorsed remediation activities for Barangaroo, including Barangaroo South.

The proposed remediation works for this Project Application will be undertaken in conformance with these two RAPs. Future detailed RAPs will also be prepared for remaining areas of Barangaroo South, including Block 5 and the DECCW Declaration Area.

The preferred remediation strategy for Barangaroo South is to remediate contaminated soil which is either a source of groundwater contamination and/or a risk to human health. It is noted that remediation may also be undertaken to address those portions of the DECCW Declaration Area outside Barangaroo South, on behalf of the Barangaroo Delivery Authority (**Figure 8**).

The remedial process is focused on soil remediation to ensure the site is suitable for future use and to address the source of groundwater contamination. Extensive groundwater remediation is not proposed, as groundwater contamination is to be addressed by remediating the contamination source (soil). Notwithstanding this, treatment of contaminated groundwater will be undertaken as part of excavation dewatering and also where any in-situ remediation is undertaken.

The treatment of contaminated material is proposed to be ex-situ stabilisation of materials, or chemical oxidation (in-situ or ex-situ). For stabilisation, chemical additives will be blended into the contaminated soil to limit solubility and mobility, and allow potential re-use of some material and limited off-site disposal to landfill.

This is a proven method of treating a broad range of contaminants including petroleum hydrocarbons, PAHs and metals. Chemical oxidation (in-situ or ex-situ) is another treatment option which may be undertaken to treat contaminated soils, to allow retention in-situ, or reuse following excavation.

The re-use of treated materials (where suitable) within the broader Barangaroo site will be cost effective and deliver significant environmental benefits including:

- minimising waste disposal to landfill;
- minimising CO₂ emissions through reduced transport requirements;
- reducing the amount of imported fill; and
- helping minimise the carbon footprint of the overall Barangaroo re-development.

As outlined in the Bulk Excavation and Basement Car Parking Project Application, temporary stockpiling may be required across the Barangaroo site to store excavated (and where relevant suitably treated) material. The exact location of temporary stockpiles will be confirmed pending Project Application approval and prior to excavation works commencing on the site. Unsuitable treated material will be disposed off site to a licensed landfill operator.

The two RAPs which have been prepared to date have been reviewed by accredited Site Auditors, who have advised:

- the assessment of remedial options in the RAPs was adequate;
- the preferred remediation options and rationale are appropriate;
- the validation sampling approach is reasonable, however the frequency of sampling required will depend upon the results obtained and their consistency;
- a groundwater monitoring plan should be prepared; and
- the site management plan and contingency plan measures are considered appropriate.

The Site Auditor has concluded that the remediation and validation approach is generally appropriate and that the level of detail in the RAP is appropriate for the current stage of the remediation planning process. In reviewing the RAP associated with the Bulk Excavation and Basement Car Parking Project Application, the Site Auditor has also considered that the RAP strategies contained within that RAP are generally consistent with the Overarching RAP. The draft Statement of Commitments commits Lend Lease to implementation of the RAPs and their respective findings and reinforces the need for subsequent RAPs to be prepared for future relevant Project Applications (ie: namely the future Project Application that will be prepared specifically for the DECCW Declaration Area).

7.8.2 Soils and Geotechnical Stability

Arup's Geotechnical Report (**Appendix R**) provides the following preliminary advice with respect to the Concept Plan Modification. Detailed investigations will need to be validated and refined during detailed design and the preparation of subsequent Project Applications.

Landform and Geotechnical Capability

Appendix R indicates that the geotechnical conditions at Barangaroo South are suitable for the proposed development. Rock excavation is likely to be required in the east and north of the site; however rock defects that could present difficult excavation conditions are not anticipated. Ongoing inspections during the course of excavations will be required to ensure support structures can adequately bear rock masses, and to also minimise the risk of disruption from local failures/rock defects.

In terms of the pier and landmark building specifically, the geotechnical challenges of constructing in the Harbour can be addressed through the adoption of standard and accepted engineering design and construction techniques, including the use of bored piled foundations to rock through driven liners or from within a cofferdam.

Having regard to the future Metro, Section 6.10 of **Appendix R** identifies a series of design considerations which will ensure that development as envisaged by the Barangaroo South Concept Plan Modification does not impede the Metro Rail Corridor or affect the future operations of the Metro project.

Seismicity

Each individual building will need to be assessed individually to determine whether any design considerations need to be incorporated into the buildings to accommodate earthquake risks. Building specific assessments will be required due to the varying soil profile underlying the site. Arup has recommended Lend Lease adopt the Earthquake Design Category for each of the buildings in accordance with AS/NZS 1170.0–2002 and 1170.4–2007.

Liquefaction

Based on the limited in situ testing completed to date and material observations there are zones within the fill and marine / estuarine deposits that are described as granular, loose and saturated. It is considered that liquefaction, a process by which saturated, unconsolidated sediments are transformed into a substance that acts like a liquid, is a potential risk in these zones during a seismic event.

The density and classification of these materials will require further assessment and verification as the drilling methods utilised during the existing investigations may have loosened the material leading to inaccurate assessments. The impact of potential liquefaction on temporary and permanent structures will also require detailed assessment following completion of the detailed ground investigation.

Foundations

Foundation conditions will vary considerably across the site depending on building location, presence of a basement and proposed basement depth. Various foundation options have been outlined based on potential foundations depth (refer to Section 6.4 of **Appendix R**).

Soil Salinity

Soil aggressivity assessments for concrete and steel piles were generally carried out in accordance with AS3600-2001 'Concrete Structure' and AS2159-2009 'Piling Design and Installation'. Both standards require evaluation against soil pH, sulphate and chloride content in addition to location relative to sea water. Previous investigations have determined there are no traces of sulphate present at Barangaroo South, with the exception of a single isolated very high concentration of 31,500mg/kg. No reference to testing for Chloride or pH of the soil or soil/water extract has however been identified.

Based on the variable nature of the soils beneath the site and the known presence of contaminants it is anticipated that aggressive conditions are likely to occur. In addition, given the proximity to the Sydney Harbour and the known high hydraulic conductivity of the granular fill materials, it is anticipated that exposure categories of Moderate to Severe in accordance with AS 2159 are appropriate and B2 and C in accordance AS 3600 are appropriate.

Acid Sulphate Soils

A high potential of acid sulphate soil is associated with the estuarine sediments in Sydney Harbour and it is anticipated that the estuarine sediments underlying the site could have acid sulphate soil potential. Actual acid sulphate conditions only occur when the materials are exposed and allowed to oxidise. Where these sediments are to be exposed in excavations, aggressive conditions are likely to result. Durability design will need to assess this issue carefully.

A total of five samples have been analysed to evaluate the potential for potential or actual acid sulphate soils to be present. The results indicate that actual Acid Sulphate Soils were not present in the samples analysed, however there is potential for acid sulfate soils to be present at depths within the marine / estuarine deposits.

The sulphur and acid trails observed within the samples exceed DECCW's accepted criteria and accordingly trigger the preparation of an Acid Sulphate Soils Management Plan. To that end, an Acid Sulphate Soils Management Plan has been prepared by AECOM and has been submitted with the excavation and Basement EAR. The Management Plan outlines the strategies for dealing with the actual and potential acid sulphate soils. In general, material will be placed into an appropriately bunded treatment area (pads) and treated with a neutralising agent (e.g. lime, or taken off site for disposal at an approved landfill site). The treatment pad design details are presented in the Management Plan.

The Concept Plan Modification does not raise any new or additional impacts beyond those approved by the established planning framework for Barangaroo South. The following design considerations, engineering methods and investigations are identified in Section 6 of **Appendix R** to input into the preparation of subsequent Project Applications and detailed design:

- engagement of a geotechnical engineer during construction to assess and verify rock materials;
- installation of rock anchors where required to provide temporary lateral restraint to retaining walls;
- adoption of the specific geotechnical recommendations as they apply to the pier and landmark building;
- adoption of the strategy outlined in Section 6.10 to protect the Metro Rail Corridor and future operations of metro project;
- the preliminary design of piled foundations should be undertaken generally in accordance with the recommendations identified in Section 6.4 of **Appendix R** and with reference to AS 2159;
- each proposed structure is to be evaluated in accordance with AS/NZS 1170.0–2002 and 1170.4–2007 once its form and position is finalised to determine the potential Earthquake Design Category;
- further detailed assessment to determine the impact of potential liquefaction on temporary and permanent structures and any consequential mitigation measures;
- further testing will need to assess the density and classification of fill and marine / estuarine deposits to determine the risk of liquefaction;
- further detailed testing in accordance with the requirements of AS2159 and AS3600 to confirm the exposure classification and durability design requirements; and
- future Project Applications will adopt the prepared Acid Sulfate Soils Management Plan, where appropriate.

These recommendations have been incorporated into the Draft Statements of Commitment.

7.8.3 Water and Hydrogeology

Hydrogeology

Existing fill material at Barangaroo South is considered to have a variable permeability, however due to the granular nature of fill, permeability is expected to be high. Further in-situ and laboratory testing is required to verify the site's permeability characteristics, and consequently inform design decisions relating to seepage paths and cut off requirements for the basement construction and the use of drained verses tanked basement structures.

Notwithstanding this, the overall long term impact on the hydrogeological regime is expected to be minimal. It is likely that the basement will be formed using either a groundwater control wall to manage flow from the Harbour or using tanked (watertight) basement walls. Either option will result in limited flow of water into the basement from the fill and soil layers.

In areas of deep basement, excavation in the rock is likely to be undrained below the base of any retention structure resulting in minor ongoing seepage into the basement accompanied by possible treatment and disposal. Given the general low mass permeability of the Hawkesbury Sandstone the inflow volumes can be expected to be small and to have only a minor impact on the wider groundwater regime.

Groundwater

Sulphate concentrations of between 26mg/L to 3240mg/L, and pH ranging from 6.2 to 9.9 were recorded in previous groundwater investigations. When compared against the assessment criteria in AS3600-2001, the surface and exposure environment of B2 and C is appropriate depending on proximity to the harbour edge.

When compared and assessed in accordance with AS2159-2009, considering the highly permeable soil condition and proximity to the Harbour an exposure classification of moderate to severe is appropriate. Classification against pH suggests a mild exposure classification in accordance with AS2159-2009 in this environment. It is anticipated that groundwater flow within the sandstone would occur along bedding planes and larger continuous defects within the rock mass.

Water Quality

Construction works which have the potential to impact on water quality in Darling Harbour include:

- piling associated with construction of the landmark building and ferry terminals which have the capacity to generate short term localised increases in turbidity through resuspension of sediments;
- minor localised and short term resuspension of bottom sediments which may cause the remobilisation of any associated heavy metals and other contaminants into the water column; and
- excavation of the Southern Cove has the potential to release contaminated land-based sediments and groundwater into the marine environment, impacting on water quality and aquatic ecology, if not appropriately controlled.

To minimise water quality impacts, Worley Parsons in its Marine Ecology, Water Quality and Sediment Assessment Impact Report (Appendix T) has recommended:

- all excavation and construction activities associated with the Southern Cove should be carried out in a manner which reduces the potential for materials to enter the Harbour;
- any construction activities associated with the basement perimeter retention systems, seawalls, caissons, and existing embankment should limit the creation of turbid plumes into the marine environment by utilising appropriately designed and positioned silt curtains, installed prior to the commencement of operations;
- construction Management Plans should be prepared and implemented to address erosion and sediment management;
- water quality monitoring should be undertaken to ensure that water quality conditions are maintained beyond the silt curtains and in the broader area;
- site spillage equipment should be retained and utilised to avoid any spills entering the water;
- materials such as sand may be used to limit the potential resuspension of silts from within the Southern Cove following inundation;
- following construction of the Southern Cove, during inundation with seawater, the silt curtain should remain in place until the turbidity within the Cove returns to background conditions reflective of levels outside of the silt curtain and at the nominated reference locations; and
- should barging of spoil / excavated material from the site be proposed, consultation with the Harbour Master will be required including an assessment of potential impacts and proposed mitigation measures.

These recommendations comply with the approved Concept Plan and Statements of Commitment (as modified) and are in response to the Concept Plan Modification's known scope of water related impacts and accordingly have been incorporated into the Draft Statement of Commitments.

Stormwater Management

The Stormwater Concept Plan prepared by Arup for Barangaroo South has been designed to provide:

- Positive drainage for the 1 in 20 year storm event flows; and
- Safe overland flow paths to convey 1 in 100 year storm event flows.

Rainwater will be collected through either a central rainwater tank or individual rainwater tanks within buildings and will be harvested for reuse, thereby reducing the runoff entering the stormwater system.

A typical minor-major drainage strategy will be adopted for stormwater drainage and incorporated into a piped network generally designed to meet City of Sydney Council's drainage standards conveying minor storm event flows (1 in 20 year) to the Harbour, and overland flow paths conveying major (1 in 100 year) storm flows.

Future building/basement entries will be designed to provide adequate freeboard above the predicted 1 in 100 year overland flow levels. City of Sydney Council has confirmed that due to the proximity of the site to the Harbour, on-site detention of stormwater will not be required.

Future Project Applications will be undertaken in conformance with **Appendix T** and as such the above initiatives are reflected in the draft Statement of Commitments. These recommendations comply with the approved Concept Plan and Statements of Commitment (as modified) and are in response to the Concept Plan Modification's known scope of water related impacts and accordingly have been incorporated into the Draft Statements of Commitment.

Marine Vegetation and Aquatic Ecology

Due to the lack of aquatic vegetation in the vicinity of Barangaroo South, impacts are not expected on:

- **Benthic habitat** – as the seabed comprises clayey, silty, sandy sediments and exhibits considerable bio turbation and accordingly does not have habitat value;
- **Seagrass / Mangroves / Saltmarsh** – as no seagrass was observed during spot dives, or on the video transects undertaken for the site;
- **Wetland Areas** – as a result of the sandstone seawall which extends for several hundred metres along the foreshore; and
- **Introduced Marine Flora** – which were not observed during spot dives or on video transects undertaken for the site.

Any potential increase in run-off from the site is therefore not expected to have an impact on the limited marine vegetation or aquatic ecology that may be present in the vicinity of Barangaroo South.

7.9 Navigation Impacts

Worley Parsons has undertaken a Navigation Study to determine the potential impacts of the Concept Plan Modification on navigation within Darling Harbour (Appendix U). Figure 52 shows the proposed Barangaroo South Concept Plan amendment overlaid on the existing navigation layouts for Darling Harbour.



Figure 53 – Existing navigation layouts

Public Pier and Landmark Building

The existing width of Darling Harbour between the King Street Wharf and Pyrmont Wharf is approximately 130m and widens to approximately 220m wide in front of the proposed public pier location. Between King Street Wharf and Pyrmont Wharf, nominal 15m buffer zone on each side leaves approximately 100m for active vessel navigation or approximately 50m in each direction. By comparison, at Barangaroo South a nominal 15m buffer zone on each side leaves approximately 190m for active vessel navigation or approximately 95m in each direction.

Therefore, the introduction of the 85m long Public Pier does not represent a net reduction in the already generous width of the navigation channel, when compared to the existing channel width at the existing King Street Wharf. Further, Matilda charter vessels and Sydney Ferries departing from the Aquarium currently have to change course to navigate around the Australian National Maritime Museum pontoons and change course again to avoid King Street Wharf. Therefore vessels operating in Darling Harbour that would have to navigate past the proposed public pier would already be used to altering course to avoid existing navigation hazards.

The length of the public pier from the existing foreshore would be approximately 17m further into the Harbour than the length of the existing berth boxes for the adjacent King Street Wharves (68m long). The public pier may therefore present some restriction to sight lines between vessels travelling up and down Darling Harbour and vessels exiting the existing King Street Wharf or the proposed future Barangaroo Ferry Wharves. The introduction of a 4 knot speed limit and provision of port hand lateral markers that will be lit at night at the western most end of the public pier would mitigate potential navigational impacts arising from the public pier and aide sight lines.

The public pier and landmark building is proposed to be sited at the location of the current Sydney Ports Corporation cruise ship terminal. This is comprised of a 40m berth box plus a 30m water-side restricted zone when a liner is berthed. This area of water is currently regularly not used for navigation or the movement of vessels (other than the current cruise liners). Accordingly, there would be no cumulative adverse impact on navigation at the site.

Cruise liners at the southern limit of the temporary cruise liner terminal berth box would still be approximately 90m north of the northern end of the mouth of the Southern Cove and would have approximately 60m of open water to manoeuvre. Any tug servicing the cruise ships in this location would also still retain adequate clearance from the Southern Cove.

Superyachts, or other similar vessels, berthing alongside the southern side of the landmark building are not anticipated to pose any threats to navigation in the area. Vessels intending to berth at this point would approach from the western side of the channel which would allow for an unobstructed view of all vessel movement in and out of Darling Harbour. Vessels leaving the berth would typically sound their horns three times when moving astern, consistent with boating regulations, and have an unobstructed view of vessels leaving Darling Harbour along the eastern channel. Similarly, vessels leaving Darling Harbour along this channel would have an unimpeded view of vessels arriving or departing from the landmark building once past King Street Wharf.

Southern Cove

The public pier and landmark building will not impact on the Southern Cove and the operation of the future ferry wharves as:

- vessels are not proposed to navigate the Southern Cove;
- any vessels inadvertently navigating the Southern Cove could head north without being impacted by the public pier;
- any vessels inadvertently navigating the Southern Cove could head south by moving slowly into the nominal 15m buffer zone of water beyond the west end of the public pier. From the buffer zone, these vessels would have clear lines of sight north and south and would be clearly visible to other vessels heading north from Darling Harbour; and
- the Barangaroo Ferry Wharves would operate as an extension of the King Street Wharf facility and would depart the ferry wharves and easily navigate past the proposed public pier.

The construction phase of the landmark building, public pier and submerged basement is likely to give rise to “one off” and short term navigational challenges. Prior to the undertaking of any works, Lend Lease will develop a detailed work method plan for all water based construction related activities in consultation with Sydney Ports, NSW Maritime and other appropriate authorities. On the basis that the work zones and construction techniques identified in **Appendix U** complied with, the creation of the proposed Southern Cove would not impact adversely on navigation in Darling Harbour.

Future Ferry Wharves

Construction of the future ferry wharves, is proposed to be undertaken by others and does not form part of the Concept Plan Modification, however the cumulative impact on boating activities and navigation impacts have been considered.

Vessels travelling north from Darling Harbour would be 80 – 100m west of the face of the existing Darling Harbour wharf face. Accordingly, there is sufficient clearance to ensure that navigation in Darling Harbour would not be adversely affected.

7.10 Air, Noise and Odour Quality

7.10.1 Air Quality and Odour Impacts

An Air Quality Impact Assessment (AQIA) has been prepared by AECOM (**Appendix V**) to determine the potential air quality and odour impacts arising from future development as envisaged by the Concept Plan Modification.

Primary sensitive receptor locations within 20m of Barangaroo South are identified in **Figure 51**. Receptors are predominantly residential properties in Towns Place Hickson Road, and High Street and commercial properties such as the KPMG building, Macquarie Bank Centre, Maritime Trade Towers, Lend Lease and the northern end of King Street Wharf. Public receptors that have been identified include Clyne Reserve, Jones Bay Wharf, Goat Island, Sydney Wharf, Blues Point Reserve and nearby site walkways amongst others.

The proposed scope of the Concept Plan Modification does not result in any additional or more intense construction activity beyond that envisaged by the approved Concept Plan. The construction of the landmark building and pier will rely on submerged and/or in situ construction methods (ie: within the Harbour and below water level) that will not give rise to air quality and/or odour impacts. The construction of the Southern Cove, partially within the DECCW Declared Area may raise specific odour issues, however the Statements of Commitment require any future application to specifically address air quality and odour impacts.

The construction impacts are limited to short-term exceedences of PM_{10} and NO_2 levels as a result of the basement retention system excavations and the bulk excavation emplacement works. The annual TSP criteria are also predicted to potentially exceed assessment criteria at Clyne Reserve. Odour and volatile organic compound impacts are similarly expected to be triggered by excavation operations.

The exceedences are primarily predicted to occur at receptors located closest to the site (i.e. those located across Hickson Road and adjacent to the emplacement activities proposed at Headland Park). The exceedences will primarily affect commercial properties, which are likely to be serviced by air conditioning. As such, actual effects on people within those buildings would be determined by the locations of the air conditioning intakes. It is noted that the Headland Park activities will be assessed by the Barangaroo Delivery Authority as part of its Headland Park Early Works Project Application proposed to be submitted in June 2010.

The AQIA recommends that a review should be undertaken of potentially affected buildings to determine whether intake valves are located on the sides of buildings closest to the Barangaroo site. If the valves are not located on the western side of the buildings then the emissions from the site are not likely to significantly affect air quality within the buildings.

In the event that the intake valves are located on the sides of buildings closest to the Barangaroo site, the AQIA recommends a monitoring program for future Project Applications to minimise and mitigate any impacts of construction works on sensitive receptors (see below). Provided the future construction activities are implemented consistent with the findings and recommendations of the AQIA, adverse impacts are not expected to occur at sensitive receptors around Barangaroo South.

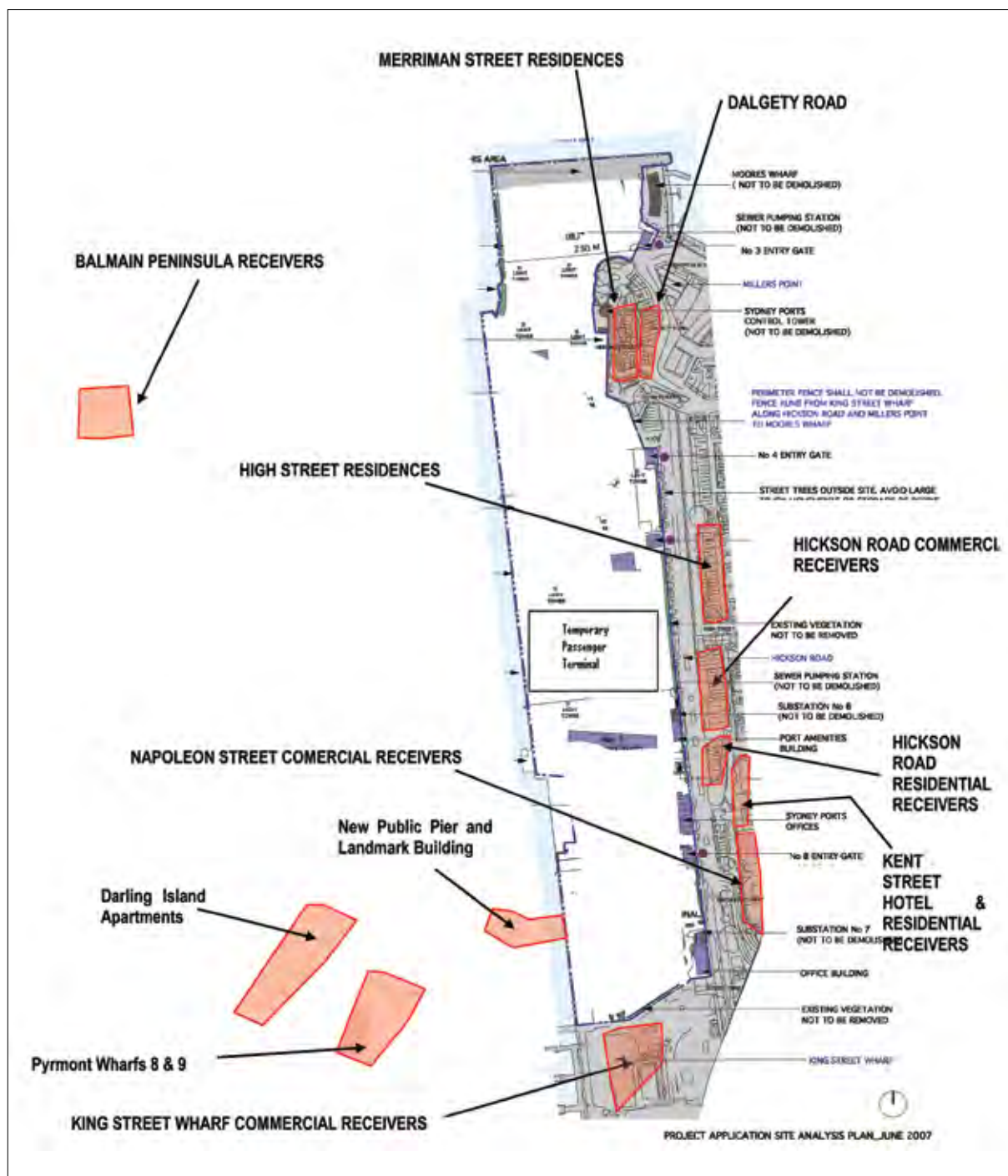


Figure 54 – Sensitive receptors

A Construction Environmental Management Plan (CEMP) will be prepared for individual construction activities prior to commencement of works to address air quality monitoring and odour impacts and management measures. The CEMP should address the matters listed below.

- appropriate dust management practices including (but not limited to):
 - containment of excavation within an excavation enclosure where practicable;
 - minimisation of exposed/excavated areas where practicable;
 - covering of surfaces;
 - management of the rate of in-ground dewatering to ensure that excavated material is moist at the time of exposure;
 - installation of hoardings to a minimum 2.4m height to the site perimeter adjacent to key receptors;
 - minimisation of dust generating activities during times of high wind speeds; and
 - dust suppression through water sprays, hand spraying, chemical wetting agents and/or hydro mulch.
- the further investigations that should be conducted to determine the source of emissions and the appropriate measures to be implemented in the event that unacceptable levels of volatile gases are detected during construction works;
- the general operating measures to be implemented to work practices to mitigate air quality and odour impacts, including (but not limited to):

To reduce fuel combustion emissions from vehicles and equipment

- engines should be turned off when not in use;
- vehicular access should be confined to designated access roads;
- equipment, plant and machinery should be regularly tuned, modified or maintained;
- site speed limits should be implemented; and
- haul road lengths should be minimised, where practicable.

To manage fugitive dust and odour from exposed surfaces and vehicles

- exposed surfaces should be covered at the completion of each day's work and during windy conditions where practicable;
- loads should be covered during transportation;
- surfaces and roads should be regularly watered;
- a complaint management system should be implemented; and
- works practices should be adjusted as required to respond to real time dust events

To manage hazardous and other air pollutants

- loads should be covered during transportation;
- surfaces and roads should be regularly watered;
- surfaces should be stabilised to minimise wind blown dust; and
- wind break barriers should be erected at the site boundaries where practicable.

- air quality monitoring of pollutant concentrations at selected receptors during construction works to assess the potential impacts of construction activities and allow reactive dust mitigation measures to be implemented. The receptors are identified in Section 9 of **Appendix V** and should be identified in the future CEMP(S);
- the need for air quality monitoring to be undertaken in accordance with:
 - DECCW's approved methods for sampling and analysis of air pollutants;
 - AS/NZS 3580.9.3:2003 Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – Total suspended particulate matter;
 - AS/NZS 3580.9.8:2008 Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM10 continuous direct mass method using a tapered element oscillating microbalance analyser;
 - AS/NZS 3580.9.8:2008 Methods for sampling and analysis of ambient air – Guide to siting air monitoring equipment; and
 - AS 2923-1987 Ambient air – Guide for measurement of horizontal wind for air quality applications.

These recommendations comply with the approved Concept Plan and Statements of Commitment (as modified) and are in response to the Concept Plan Modification's known scope of air quality and odour impacts and accordingly have been incorporated into the Draft Statement of Commitments.

7.10.2 Noise and Vibration Impacts

Appendix W also considers the potential vibration impacts related to the proposed scope of construction activity.

The Noise and Vibration Assessment divides potential noise and vibration impacts into 2 categories:

- Noise emissions on existing activities that may be changed by the proposal; and
- Noise emissions from existing activities and the community on new buildings/ activities within Barangaroo South;

Noise Impacts from Existing Land Uses on Barangaroo South

The Noise and Vibration Assessment identifies the following potential external noise sources on development within Barangaroo South:

- mechanical services plant;
- traffic;
- ferries and other harbour traffic;
- light rail;
- entertainment; and
- air traffic.

The assessment concludes that noise impacts from existing activities are not expected to cause significant noise impacts on the proposed range of commercial, residential and retail developments. Noise sources to the south of Barangaroo South pose the greatest risk of adverse noise impacts, particularly to the residential buildings proposed within Block 1. The landmark building will be most susceptible to noise from passing water traffic.

The Assessment concludes that noise from the above sources can be mitigated by adhering to specific design standards, through management techniques and through the imposition of appropriate conditions of approval. Notwithstanding this, an Acoustic Benchmarking Study is proposed to be undertaken during the design development phase to establish definitive project specific environmental noise criteria.

Noise Impacts From Within Barangaroo South on Existing Land Uses

Noise sources associated with Barangaroo South that could potentially impact the surrounding community include:

- mechanical services plant;
- retail units and future retail outlets;
- car parking and loading docks;
- road traffic;
- ferries and other harbour traffic;
- entertainment; and
- construction noise.

The closest noise sensitive receivers are expected to be the residential areas on and adjacent to the site and the existing child care facility on Hickson Road. Construction noise will be the greatest source of noise, however a Noise and Vibration Management Plan has been prepared by Acoustic Logic which proposes the following mitigation measures to minimise construction noise impacts to the community, where practicable:

- selection of alternate appliances or processes;
- acoustic barriers and buffer zones;
- silencing devices;
- treatment of specific equipment;
- material handling methods;
- the establishment of appropriate site practices;
- strategic positioning of processes on site;
- establishment of direct communication with affected parties;
- management training;
- complaints handling; and
- monitoring.

A detailed assessment of operational noise sources will be undertaken during the design phase when more detailed information is available and the Acoustic Benchmarking Study has been completed.

Management Strategies and Recommendations

The Noise and Vibration Assessments conclude:

- existing noise levels are not representative of either the future or most recent noise environment on and around the Barangaroo South site because currently, the site is largely vacant and un-used with the exception of the temporary cruise passenger terminal;
- noise sources from the surrounding community affecting the Barangaroo South developments and from Barangaroo South developments affecting the community have been identified. Practical mitigation measures will and can be taken to meet all relevant noise and vibration criteria;
- an Acoustic Benchmarking Study should be undertaken during the design development phase to establish definitive project specific environmental noise criteria; and
- the Barangaroo South Concept Plan Modification will not result in any significant additional impacts beyond those reasonably understood and expected to have been contemplated in the Approved Concept Plan (as modified), provided appropriate planning conditions and controls are imposed on the construction and operation of new development.

These recommendations have been incorporated into the Draft Statements of Commitment.

7.11 Waste

Consistent with Lend Lease's commitment to minimise waste to landfill and greenhouse gas emissions, Arup has prepared a Waste Management Plan for the Concept Plan Modification which considers potential construction and operation waste generation (**Appendix X**).

Construction waste targets set for Barangaroo South are:

- >90% reduction of construction and demolition waste to landfill; and
- >60% reduction in greenhouse gas emissions compared to business as usual waste disposal.

To achieve these targets, detailed waste management plans will be prepared which will address:

- waste avoidance and reduction;
- resource recovery;
- training;
- waste utilisation on other sites;
- good housekeeping;
- monitoring and reporting;
- materials and procurement; and
- transportation of waste.

Similarly operational waste targets have been set including a greater than 80% diversion of operational waste to landfill, and the creation of a closed loop return of useable soil and energy from waste processing. The achievement of these targets relies upon:

- sustainable consumption and waste minimisation;
- source segregation, storage and collection;
- resource recovery of recyclable waste; and
- resource recovery and green power generation.

Arup has concluded that subject to the adoption of the recommendations within the Waste Management Plan, the Concept Plan Modification will not result in any significant additional impacts beyond those expected under the approved Concept Plan (as modified).

7.12 Heritage

7.12.1 Non-Indigenous Archaeology

The Non-Indigenous Archaeological Assessment undertaken by Casey and Lowe concludes there is limited opportunity to retain archaeology in situ within Barangaroo South without it being impacted by the works proposed by the Excavation and Basement Project Application (**Appendix Y**).

The Assessment therefore recommends:

- a program of archaeological investigation should be undertaken and an excavation director appointed to manage the program;
- a Research Design and Management Strategy report needs to be written to guide this investigation, which is prepared in accordance with applicable Heritage Council guidelines;
- testing of areas of impact within the study area should be carried out to determine the nature and depth of archaeological remains and to assist the development of an archaeological management strategy;
- based on the archaeological integrity of the remains, a program of archaeological salvage and recording should be undertaken. Salvage is to include sampling sections of the site, such as:
 - Recording a number of sections of the later 19th century wharfage, notably the Grafton wharf;
 - The maritime infrastructure, stores and reclamation in Portion 20, Block 2;
 - If possible the remains of Henry Bass' early shipyard and associated reclamation and expansion of the site, but dependent on contamination issues;
 - The nature of the area's reclamation fills should be investigated – these will be present throughout the study area; and
 - Evidence for the early topography and natural landform and how this was modified through time;
- develop a strategy for recording as much of the gasworks as possible within the risks and constraints imposed by the contamination to human health and safety;
- the archaeological sampling and recording need to be undertaken according to adoption and implementation of Heritage Branch guidelines and best practice archaeological methodologies. This will then feed into the future interpretation and produce a detailed record of the site; and
- a repository for the artefacts recovered from the site will need to be provided.

Accordingly, and as required by the Barangaroo Concept Plan Statement of Commitments, an Archaeological Research Design and Management Strategy has been prepared by Casey and Lowe (refer to Excavation and Basement Project Application). The Strategy provides guidance and methodologies for undertaking the archaeological program within Barangaroo South and is consistent with the heritage related objectives of the approved Concept Plan (as modified).

7.12.2 Indigenous Archaeology

The Aboriginal Cultural Heritage Assessment prepared by Comber Consultants concludes that sub-surface Aboriginal archaeological deposits may remain within the site in the form of stone tools or remnant midden material (**Appendix Y**).

The Assessment recommends a program of subsurface testing within the extent of the original shoreline prior to construction. Testing within the DECCW declared area is not required. A subsequent Aboriginal Archaeological Management Plan and Research Design report has been prepared by Comber Consultants (refer to Excavation and Basement Project Application) which provides strategies for managing Aboriginal archaeological heritage within Barangaroo South and sets out strategies and research design to enable the testing to be undertaken.

The combined Assessments recommend the following strategies which have been incorporated into the draft Statement of Commitments:

- a program of Aboriginal archaeological sub-surface testing should be undertaken prior to the redevelopment of Barangaroo South. Prior to commencement of the testing, a research design and archaeological management plan should be prepared which clearly sets out the methodology to be followed. This document should also consider issues of contaminated soils, the impact of remediation on the archaeological resource and mitigation measures;
- such a program of sub-surface testing should be undertaken in partnership with the Metropolitan Local Aboriginal Land Council;
- if any Aboriginal “objects” (as defined under the National Parks and Wildlife Act 1974) are located during the course of the testing program, the Metropolitan Local Aboriginal Land Council should apply for a Care Agreement with DECCW to enable retention of any discovered relics;
- the program of sub-surface testing should be coordinated with Casey & Lowe, the archaeologists undertaking testing in respect of the historical archaeology;
- if, during the course of the redevelopment, any previously undetected Aboriginal “objects”, artefacts or sites are uncovered, work must cease in the vicinity of that object, artefact or site and further advice sought from the archaeologist who undertook the program of sub-surface testing; and
- interpretation of the Aboriginal history of the site should be included in the redevelopment proposals.

7.12.3 Interpretation Strategy

The approved Concept Plan's Statements of Commitment require an Interpretation Strategy to be prepared prior to any works commencing that involve surface disturbance.

The Outline Interpretation Plan prepared by Tanner Architects (attached to the Basement and Excavation Project Application):

- identifies the themes and messages considered significant to Barangaroo South;
- develops a conceptual approach to interpretation of Barangaroo South, using a variety of means;
- proposes locations for specific interpretation to enhance the understanding of the heritage significance of Barangaroo South; and
- recommends methods and media appropriate to the interpretation of the Stage 1 area.

7.13 Climate Change and Sea Level Rise

Arup has considered the risks of climate change and in particular sea level rise in Sydney Harbour to determine the potential impact of inundation on Barangaroo South in response to the DGRs issued for the Concept Plan Modification (**Appendix Z**). **Table 9** summarises the accepted climate change and sea level rise projections.

Having regard to the accepted projections, the resulting impact on current sea levels has been identified and is summarised in **Table 10**.

Table 9 – Guidelines and Standards for Sea Level Rise

Guideline	Standard	Comment
NSW Sea Level Rise Policy Statement	<ul style="list-style-type: none"> - 0.4m sea level rise by 2050 - 0.9m sea level rise by 2100 	
NSW Draft Coastal Planning Guideline: Adapting to Sea Level Rise	No standards	Establishes matters for consideration during development assessment
Sydney Harbour Foreshores and Waterways Area DCP	Requires a sea wall height of 1.675m AHD	DCP not updated to reflect NSW Sea Level Rise Planning Benchmarks
AS 4997-2005 Guidelines for the Design of Maritime Structures	Includes provision for sea level rise based on medium range estimates for 25, 50 and 100 years: <ul style="list-style-type: none"> - 25 years – 0.1m - 50 years – 0.2m - 100 years – 0.4m 	These predictions are now considered outdated given more recent predictions, however AS 4997-2005 does provide guidance regarding impact of storm surges.
IPCC Global Projections (Fourth Assessment)	<ul style="list-style-type: none"> - 0.28m by 2050 - 0.82m by 2100 	
Upper limit of sea level rise projected by statistical methods	- 1.4m by 2100	
Suggested upper limit of global mean sea level rise if all variables accelerated to extremely high limits	- 2m by 2100	

Table 10 – Projections of Mean Sea Level Rise to 2100

Extreme Water Level	m(AHD)			
	Current Level (no SLR)	+0.9m SLR	+1.4m SLR	+2m SLR
Highest Astronomical Tide	1.075	1.975	2.475	3.075
Highest Astronomical Tide +0.3m surge	1.375	2.275	2.775	3.375
Highest Astronomical Tide + 0.6m surge	1.675	2.575	3.075	3.675
1 in 100year extreme sea level event	1.435	2.335	2.835	3.435
Sydney Harbour Foreshores and Waterways DCP	1.675	2.575	3.075	3.675

In conjunction with the predicted sea level rise, the potential impacts of inundation as a result of extreme events and long term events have been identified in **Appendix Z** and assigned a qualitative risk value. In summary, the likelihood of extreme and long term impacts occurring are considered to be “Unlikely – Very Unlikely” (refer Table 10 of **Appendix Z**). The worst case scenario, albeit unlikely, is the inundation of basements and building ground levels during storm surge events. Arup has categorised such an event as having a moderate risk rating that may require a design change or increased level of asset maintenance (refer Table 10 of **Appendix Z**).

Inundation resulting from storm surge can be mitigated through the establishment of a sea wall that is:

- greater than the current 1 in 100 year event for Sydney Harbour and accommodates an additional 0.99m to accommodate mean sea level rise;
- equal to the current Sydney Harbour Foreshores and Waterways DCP and accommodates an additional 0.99m to accommodate mean sea level rise; and
- able to be incrementally increased in the future to respond to quantified sea level rises.

Notwithstanding the above, inundation impacts could still be experienced at Barangaroo South in the event that mean sea level rise is greater than the predicted 0.9m or an extreme storm surge event occurs which is greater than the current 1 in 100 year event.

To mitigate against the anticipated risks of inundation arising from climate change and sea level rise, Arup has recommended the following measures be considered by future Project Applications:

- appropriate selection of materials to prevent accelerated degradation of infrastructure and buildings;
- location of key infrastructure, such as substations, at elevated levels closer to Hickson Road;
- provision of safe exit routes above storm flood height levels;
- adoption of principles of adaptive management to ensure the sea wall or alternative landscaping elements are designed to enable incremental increases in height should future research, Government policy or actual events suggest that current sea level rise projections are exceeded.

The above recommendations have been incorporated into the draft Statement of Commitments.

7.14 Ecologically Sustainable Development

Arup has prepared an Ecologically Sustainable Development assessment which outlines the targets proposed for the development as envisaged by the Concept Plan Modification (**Appendix M**). The assessment also demonstrates the Concept Plan Modification as proposed complies with the Statement of Commitments and original ESD initiatives established under the approved planning framework.

The Concept Plan Modification continues to satisfy the approved Concept Plan's ESD vision for the site as follows:

- Lend Lease is committed to constructing residential and commercial buildings that achieve minimum 5 star Green Star building ratings;
- Lend Lease is proposing to exceed the minimum 35% potable water reduction and 40% sewer outfall reductions nominated in the approved Statements of Commitment through the provision of demand reduction measures and the blackwater treatment plant;
- the proposal's greenhouse gas reduction targets are consistent with or seek to improve upon those established in the approved Statements of Commitment, namely:
 - 35% reduction in operational energy related to carbon emissions;
 - minimum 20% of power is proposed to be purchased from low impact renewable sources; or
 - alternatively 20% reduction in greenhouse gas emissions through carbon offsets, if appropriate and feasible
- key open space areas will have direct sunlight in mid winter;
- the Landscape Framework for the site promotes the use of non-invasive plant species;
- car parking rates and the overall quantum of proposed car parking consistent with the approved TMAP approved for the site, which adopts lesser rates of provision than standard practice, thereby promoting public transport and reducing the reliance of private vehicular use;
- the Concept Plan Modification recognises the Metro may proceed and does not impede any future Metro Corridor and associated operations;
- roads and car parking areas have been designed to accommodate and complement light rail, buses and taxi stops, offering alternatives to private vehicles; and
- centralised waste collection and recycling areas promote the streaming of recyclables from the ongoing operation of buildings and public spaces.

In addition, Lend Lease aspires to exceed the above targets through:

- creation of a radial grid arrangement to facilitate building design that is oriented for optimum solar, light access and wind mitigation;
- creation of a "water positive" site by developing infrastructure with the capacity to recycle and export more water than the amount of potable water imported;
- creation of a zero waste community which reduces, recycles and treats waste off site to minimise waste going to landfill and convert waste to energy;
- creation of a carbon neutral environment that is effectively powered through an offsite renewable energy source;
- achievement of minimum 6 Star Green Star commercial buildings and use of green infrastructure to extend sustainability outcomes across the whole of Barangaroo South rather than individual buildings; and

- provision of large and high grade commercial floor plates comprising flexible floor plates that can be fitted out in a range of ways, ensuring long term building viability.

Future Project Applications will be undertaken in conformance with **Appendix M** and as such the above initiatives are reflected in the draft Statement of Commitments.

Lend Lease's suite of sustainability targets involves various third parties and authorities, and will need partnerships and commitments to work with, and towards, these targets. Lend Lease's commitment to continuing working relationships with relevant authorities and organisations is also reflected in the Statements of Commitment.

7.15 Developer Contributions

Lend Lease is required through contractual arrangements and the Barangaroo Delivery Authority Act, 2009 provisions to pay developer contributions as follows:

- a development levy which is 1% of the amount of the development cost of the development works, which is paid as the development progresses; and
- a public art levy which is 1% of the amount of the development cost of the development works, which is part payment and part public art works-in-kind and is paid/delivered as the development progresses.

In addition:

- Lend Lease will make fixed payments to the State which allows the Government to deliver Headland Park, ferry terminal, and connections to Wynyard and the City;
- Lend Lease will provide 2.3% of residential GFA as key worker housing; and
- the Barangaroo Delivery Authority has the potential to share in the project's financial success.

The Statement of Commitments has been revised to reflect these requirements.

8.0 Revised Statement of Commitments

The Statement of Commitments approved under the current Concept Plan (as modified) have been refined and amended based on the environmental assessment undertaken in the preparation of this Environmental Assessment Report. They provide a commitment by Lend Lease indicating the responsibilities and timing to implement measures to prevent potential environmental impacts that have been identified and to ensure that the project is environmentally, socially and economically sustainable. The revised Statement of Commitment also outlines a program of works to take forward the staged development of the Barangaroo South under future project applications.

Due to their large format, the revised Statement of Commitments is provided at the end of this Report following the Conclusion.

9.0 Conclusion

Barangaroo South, by virtue of its size and access to infrastructure, presents a rare and a significant opportunity to create a new mixed use precinct in the Sydney CBD.

The Concept Plan Modification is the result of a commitment by Lend Lease to deliver a high quality development. The proposed Modification is generally consistent with the approved Concept Plan as it:

- provides an enlarged Southern Cove;
- reconnects the western edge of the City with the waterfront;
- creates a variety of experiences along the foreshore that contribute to the liveliness of the area, create landmarks and differ from the more naturalistic parklands experiences to the north;
- provides unobstructed public access around the entire perimeter of the enlarged Southern Cove and along the foreshore including Globe Street;
- retains significant views across the site to the waterfront and across the Harbour from Millers Point and Observatory Hill;
- retains existing view corridors from the elevated portions of the existing Napoleon Street;
- preserves the pedestrian desire lines along the foreshore by way of a bridge, thereby retaining Globe Street as the site's western spine; and
- provides a high quality architectural and urban design underpinned by the engagement of world-renowned architects.

To demonstrate the strong design commitment to deliver the development, several internationally and locally renowned and respected architects have been commissioned to design the urban structure, public domain and individual buildings on the site. The ideas and thoughts of those architects, the local community and relevant stakeholders have been considered during the review of the approved Concept Plan and many suggestions have been incorporated into the amendments that are now proposed.

The Concept Plan Modification and supporting Major Development SEPP amendment will:

- provide more useable and viable floor plates which will help encourage commercial and tourist development and create economic stimulus;
- increase the activation of the public domain;
- ensure the provision of high quality and appropriately scaled public places, particularly with respect to the width of the waterfront promenade and the configuration of spaces between buildings;
- improve the mix of uses by increasing the amount of residential and community/public uses integrated into the core commercial precinct thereby encouraging greater activation for longer periods of the day and on weekends;
- improve public amenity and views to and from within the development, maximise solar penetration to public places, minimise wind impacts and maximise views to and from the CBD and the water along the Margaret Street alignment;
- separate vehicles and pedestrians along the waterfront promenade to ensure that a high quality experience, is achieved;
- provide a public waterfront space that is appropriately scaled to ensure activation and enjoyment of the space; and
- provide appropriately scaled retail space at the ground plane to ensure

activation, with residential above to provide visual security.

The Concept Plan Modification and Major Development SEPP enable Barangaroo South to be showcased as an example of sustainable development on a precinct scale. The sustainability strategy to be implemented under the Concept Plan Modification specifically, includes the initiatives of the use of water treatment infrastructure and the commitment of Lend Lease to achieve a carbon neutral, water positive and zero waste precinct. A minimum 5 star Green Star rating for all residential buildings is proposed with a target to attain 6 star ratings for new commercial buildings is also proposed.

The proposal will deliver an enhanced public domain due to greater activity and the variety of spaces proposed. The reduction of on-site vehicle movements will also see improved pedestrian safety and cycle priority as well as improve the amenity of the public domain areas.

This Environmental Assessment Report has demonstrated that despite the proposed amendments, the Concept Plan will remain consistent with the relevant provisions of the State Plan, the Sydney Metropolitan Strategy and the State Environmental Planning Policies applying to the site.

In light of these planning merits, it is recommended that the project be approved in accordance with the submitted plans and revised Statement of Commitments.