

**Architectural Design Statement
for Planning Application
MP11_0044 Commercial Building C3
RSHP Australia Pty Limited
21st October 2011**

Preface



Barangaroo is currently a concrete wasteland. Its redevelopment provides an opportunity to create a lively, well-designed, sustainable and successful mixed-use district that is both local in character, global in importance and an extension of the existing CBD area in scale and form. It is also an opportunity to add to – and celebrate – the uniquely beautiful Sydney skyline and the magnificence of Darling Harbour, bringing the CBD to the water's edge and transforming the area into an attractive environment where Sydneysiders can live, work and play.

The current flat, derelict, concrete site was originally developed for the unloading and processing of shipping containers. In the proposed masterplan, it has been dramatically remodelled, with over 50 per cent of the whole Barangaroo area being given over to public activities including a major park on the headland, a waterfront promenade and a network of public squares and footpaths. The aim is to encourage walking and cycling rather than the use of cars.

Most buildings will be in the southern part of the site, Barangaroo South. As well as being sustainable and integrating with the existing fabric of the city, each building will be functional in response to commercial demands and flexible to meet future requirements, with the aim of attracting some of the world's most prestigious tenants. This application is for building C3 (C3), located to the north of C4 and is the northern most commercial tower in the suite of three. C3 - a commercial tower of RL209 – is detailed in this document. C3 is considered as a part of an ensemble of three sibling buildings. These buildings dialogue with each other whilst having their own individual identity at the scale of other CBD buildings. This dialogue is achieved through the directional plan form from the east and west and the slender nature of all three towers equally focuses on the spaces between the buildings as well as the buildings themselves. Building C3 has undergone significant design analysis and review by the Barangaroo Delivery Authority and their Design Advisors as well as the Design Excellence Review Panel.

All architecture has a responsibility to contribute to the public realm beyond its immediate boundaries and envelope. As C3 and the neighbouring commercial towers sit above three-storey base buildings, the lobbies are at ground floor level alongside other street activities such as retail, encouraging vitality as well as a high degree of safety and generally enhancing the public realm. The entrance lobby in C3 is arranged north - south and provides visual cross connection through the lobby. In addition, to minimise the number of service vehicles entering the

development, all of the commercial buildings will share a common basement accessed from a entry along side the northern core, leaving the surrounding streets fully pedestrianised or pedestrian prioritised.

To give rhythm, scale and beauty to C3, the design organises the various parts so the building can be read like a book; each element is a fundamental part of this narrative, creating a legible and strong manifestation of the building at ground level and encouraging interest from users, visitors and passers-by.

Environmental issues have been a major driver of the design. The east-west orientation minimises environmental impact by optimising shading. Energy consumption is reduced by arranging the more environmentally tolerant lift cores and interstitial spaces on the northern elevation to provide shading for the rest of the building. High performance façades and building services create a comfortable and sustainable environment. The podium roofs are to be planted, adding biodiversity to this urban site.

Once complete, C3 – together with the other proposed commercial towers – will make a significant contribution to the redevelopment of this part of Sydney, helping to create a vibrant public domain, adding to the overall urban form of the city and meshing with both existing and proposed developments.

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Illustration of proposed scheme for building C3

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INTRODUCTION



Photomontage of the C3 site in its context

1.1 Introduction

The 22 hectare Barangaroo site has been divided into three distinct redevelopment areas (from north to south) - The Headland Park, Barangaroo Stage 2 and Barangaroo Stage 1.

Following a detailed tender and design process, Lend Lease (Millers Point) Pty Ltd ("Lend Lease") has been appointed as the developer for Stage 1 of the Barangaroo redevelopment: Barangaroo South. C3 is the second commercial tower in Barangaroo South for which a Planning Application is being submitted.

Rogers Stirk Harbour + Partners has been engaged by Lend Lease to prepare the architectural design for C3.

The Approved Concept Plan establishes the urban design principles and planning framework for the redevelopment of the 22 hectare Barangaroo site. It articulates the desired outcomes for the precinct and sets the broad parameters for sustainable redevelopment through a series of concept strategies.

Building C3 is located in Block 3 of the Approved Concept Plan. It is a 49 storey + plant, RL209 tall building of approximately 108,000sqm GFA. The Ground, First and Second Floors are primarily retail and office lobby uses. Office accommodation is located on the upper levels, along with three plant floors. Basement levels house plant, parking and associated loading facilities.

The Architectural Design Statement's key aims are to:

- Describe the design process and the evolution of the design to ensure design excellence and creativity are achieved in C3;
- Respond to the Director General's Environmental Assessment Requirements issued by the Department of Planning;
- Formulate design principles informed by an analysis of the site and its context, and which are underpinned by the site's specific opportunities and constraints;
- Describe a design that follows the design principles, urban design controls and built form principles of the Approved Concept Plan;
- Respond to the design refinements made relating to the suite of buildings, as a result of the design reviews associated with the Barangaroo Delivery Authority Design Advisors and the Design Excellence Review Panel.

The Architectural Design Statement also describes how building C3 will help make Barangaroo South a vibrant mixed-use precinct that offers a variety of experiences, and contributes to the liveliness of the existing Sydney CBD. C3 will be a world-class building.

Building C3 will be a legible, sustainable, people oriented building that provides a dynamic workplace for the future and creates a dramatic addition to the urban fabric of Sydney.



Illustration of proposed scheme for building C3

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DESIGN EXCELLENCE, THE PROCESS

Director General's Requirements Matrix

DGR Reference [MP11_0044] - Issued 09.09.2011

Modified 21.10.2011

	Architectural Design Statement References	Architectural Drawing or other References
2. Concept Plan & Bulk Excavation and Basement Car Park Project Application		
<ul style="list-style-type: none"> Demonstrate consistency with the terms of approval of Concept Plan MP06_0162 (as modified) and Bulk Excavation and Basement Car Park project approval MP10_0023 (as modified). 	Section 6	
3. Barangaroo Review, Snapshot Design Review and Peer review into Barangaroo remediation		
Barangaroo Review		
<ul style="list-style-type: none"> In relation to the Barangaroo Review consider the following: 		
Snapshot Design Review		
<ul style="list-style-type: none"> The findings of the Snapshot Design Review consistent with the Government's response, Barangaroo Concept Plan (as modified), and relevant controls in State Environmental Planning Policy (Major Development) 2005. 	Section 2, Section 4, Section 5	
4. Urban Design & Built Form		
Demonstrate how the proposed development will achieve design excellence including:		
<ul style="list-style-type: none"> The design process leading to the proposal; 	Section 2	
<ul style="list-style-type: none"> A high standard of architectural design, materials and detailing appropriate to the building and its location; 	Section 2, Section 5	Appendix F
<ul style="list-style-type: none"> The form and external appearance of the proposed building and how it will improve the quality and amenity of the public domain; 	Section 4, Section 5	
<ul style="list-style-type: none"> The sustainable design principles incorporated into the development in terms of sunlight, natural ventilation, wind, reflectivity, visual and acoustic privacy, safety and security, resources, and water and energy efficiency; 	Section 5	
<ul style="list-style-type: none"> Detailed plans, elevations and sections; 	Throughout Statement.	Appendix A
<ul style="list-style-type: none"> A view analysis is to be undertaken inclusive of photomontages and perspectives of key elements and views of the development from key locations (including, but not limited to, from Hickson Road, Kent Street, Shelley Street, Lime Street, Pyrmont and East Balmain, Darling Harbour, Blues Point and Millers Point); 	Section 4, Section 5	Appendix E
<ul style="list-style-type: none"> Impacts on key views from within the Barangaroo site; 	Section 4, Section 5	
<ul style="list-style-type: none"> A materials/finishes sample board and detailed elevations confirming the application of materials and finishes for the development; 		Appendix F
<ul style="list-style-type: none"> 3D modelling and a physical model of the proposed development in accordance with the City of Sydney requirements; 		Refer Planning Application Submission
<ul style="list-style-type: none"> Shadow diagrams; 		Appendix D
<ul style="list-style-type: none"> Wind Effects report; and 		Refer Planning Application Submission
<ul style="list-style-type: none"> Building signage details 	Section 6	

DGR Reference [MP11_0044]

Architectural Design Statement References

Architectural Drawing or other References

DGR Reference [MP11_0044]	Architectural Design Statement References	Architectural Drawing or other References
<p>5. Public Domain and Public Access</p>		
<p>Design quality with specific consideration of the massing, waterfront interface, setbacks and visual impacts of any proposed structures, including views.</p>	<p>Section 4, Section 5</p>	<p>Refer Documents prepared by Aspect Oculus</p>
<p>Provision of a Public Domain Plan identifying all temporary and permanent works within the public domain.</p>		<p>Refer Planning Application Submission</p>
<p>Identify proposed open space, public domain and linkages with and between other public domain spaces, including the waterfront.</p>	<p>Section 3, Section 4</p>	<p>Refer Documents prepared by Aspect Oculus</p>
<p>Details on the interface between the proposed uses, public domain, and the relationship to, and impact upon, the existing public domain, including demonstration of means of activating the public domain.</p>	<p>Section 4, Section 5</p>	<p>Refer Documents prepared by Aspect Oculus</p>
<p>Address existing and future opportunities for public access to and along the foreshore.</p>	<p>Section 4</p>	<p>Refer Documents prepared by Aspect Oculus</p>
<p>Demonstrate how the entry and exit to basement car parking will not have a detrimental impact upon visual amenity and pedestrian safety.</p>	<p>Section 4, Section 5</p>	<p>Refer Lend Lease Basement Plans</p> <p>Refer RSHP Ground Floor Plan</p> <p>Refer Documents prepared by Aspect Oculus</p>

Director General's Requirements

Director General's Requirements

Section 75F of the Environmental Planning and Assessment Act 1979

Application number	MP11_0044
Project	Commercial Building C3
Location	Block 3, Barangaroo South, Sydney
Proponent	Lend Lease (Millers Point) Pty Ltd
Date issued Date modified	Issued on 9 September 2011 Modified on 21 October 2011
Key issues	<p>The Environmental Assessment (EA) must:</p> <ol style="list-style-type: none"> Relevant EPI's, Policies and Guidelines <ul style="list-style-type: none"> Demonstrate that the project will comply with the requirements set out in the following provisions: <ul style="list-style-type: none"> Clauses 8, 9, 17 and 18 of Part 12 (Barangaroo site) of Schedule 3 to State Environmental Planning Policy (Major Development) 2005. Address the provisions of State environmental planning policies that would apply to the development on the Barangaroo site requiring development consent under Part 4 of the Environmental Planning and Assessment Act 1979, as if those provisions applied to the carrying out of the project, including the following: <ul style="list-style-type: none"> State Environmental Planning Policy (Major Development) 2005 State Environmental Planning Policy No 55 – Remediation of Land Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005. Demonstrate that the project is consistent with the Metropolitan Plan for Sydney 2036 and the draft Sydney City Subregional Strategy. Concept Plan & Bulk Excavation and Basement Car Park Project Application <ul style="list-style-type: none"> Demonstrate consistency with the terms of approval of Concept Plan MP06_0162 (as modified) and Bulk Excavation and Basement Car Park project approval MP10_0023 (as modified). Barangaroo Review, Snapshot Design Review and Peer review into Barangaroo remediation <p><u>Barangaroo Review</u></p> <ul style="list-style-type: none"> In relation to the Barangaroo Review consider the following: <p><u>Snapshot Design Review</u></p> <ul style="list-style-type: none"> The findings of the Snapshot Design Review consistent with the Government's response, Barangaroo Concept Plan (as modified), and relevant controls in State Environmental Planning Policy (Major Development) 2005. <p><u>Peer review into Barangaroo remediation</u></p> <ul style="list-style-type: none"> The findings of the peer review into remediation of Barangaroo consistent with any Government response to the peer review if released prior to the lodgement of the EA. Urban Design and Built Form <ul style="list-style-type: none"> Demonstrate how the proposed development will achieve design excellence including: <ul style="list-style-type: none"> The design process leading to the proposal; A high standard of architectural design, materials and detailing appropriate to the building and its location; The form and external appearance of the proposed building and how it will improve the quality and amenity of the public domain;

	<ul style="list-style-type: none"> The sustainable design principles incorporated into the development in terms of sunlight, natural ventilation, wind, reflectivity, visual and acoustic privacy, safety and security, resources, and water and energy efficiency; Detailed plans, elevations and sections; A view analysis is to be undertaken inclusive of photomontages and perspectives of key elements and views of the development from key locations (including, but not limited to, from Hickson Road, Kent Street, Shelley Street, Lime Street, Pyrmont and East Balmain, Darling Harbour, Blues Point and Millers Point); Impacts on key views from within the Barangaroo site; A materials/finishes sample board and detailed elevations confirming the application of materials and finishes for the development; 3D modelling and a physical model of the proposed development in accordance with the City of Sydney requirements; Shadow diagrams; Wind Effects report; and Building signage details. <ol style="list-style-type: none"> Public Domain and Public Access <ul style="list-style-type: none"> Design quality with specific consideration of the massing, waterfront interface, setbacks and visual impacts of any proposed structures, including views. Provision of a Public Domain Plan identifying all temporary and permanent works within the public domain. Identify proposed open space, public domain and linkages with and between other public domain spaces, including the waterfront. Details on the interface between the proposed uses, public domain, and the relationship to, and impact upon, the existing public domain, including demonstration of means of activating the public domain. Address existing and future opportunities for public access to and along the foreshore. Demonstrate how the entry and exit to basement car parking will not have a detrimental impact upon visual amenity and pedestrian safety. Outline specific design features, including but not limited to: <ul style="list-style-type: none"> Details of the road crossings on Hickson Road, Shelley Lane and Globe Street; Footpaths and pavements, treatment to the right of carriageway (of applicable); Materials and finishes; Furniture and fixtures; Street lighting, pedestrian lighting and feature lighting; Edges, screens and fences; Walls, embankments and mounds; Steps, ramps, vehicle crossings, decks and pathways; Services where affected, utility poles, and service pits; Civil and stormwater infrastructure; Tree planting; Mass planting beds, planter boxes and individual plantings; and Extent of temporary and permanent features to be clearly shown, including bicycle parking, furnishing or footings, finished surfaces, service and planting. Land Use <ul style="list-style-type: none"> Identify the proposed staging and timing for the delivery of the development and land uses and activities. Provision of table listing different land uses, a floor by floor breakdown of GFA, total GFA, and site coverage as relevant to each stage and with reference to the overall concept plan. Transport and Accessibility Impacts <ul style="list-style-type: none"> A Supplementary Transport Management and Accessibility Plan that updates the Barangaroo TMAP
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	<p>with particular regard to:</p> <ul style="list-style-type: none"> o transport and traffic management within the overall Barangaroo precinct, including the demonstration of a minimalist approach to car parking provision; o pedestrian and cycle access/circulation to meet the likely future demand within the precinct and connections to the external networks; o measures to promote public transport usage and pedestrian and bicycle linkages; and o any changes to government commitments regarding public transport and findings of the Auditor-General's Performance Audit report titled <i>Government expenditure and transport planning in relation to implementing Barangaroo</i>. <ul style="list-style-type: none"> • Justification of proposed quantum of on-site car parking for the proposal having regard to the Concept Plan approval (as amended), RTA guidelines and accessibility of the site to public transport, including the proposed light rail expansion. • Daily and peak traffic movements likely to be generated by the proposed development, including modelling and assessment of the performance of key intersections providing access to the site, and any upgrades (road/intersections) required as a consequence of the proposal. The modelling of peak traffic movements should be undertaken with the LINSIG modelling package in order to properly consider coordinated intersection operation. • Preparation of a Travel Demand Management Plan that provides an analysis of public transport provision, walking and cycling connections with the vicinity of the proposed site, and measures that will optimise the opportunity provided by the project site's proximity to public transport, including the preparation of a Work Place Travel Plan. • Preparation of a Construction Traffic Management Plan outlining: <ul style="list-style-type: none"> o Cumulative impacts associated with other construction activities on the Barangaroo site; o Details of anticipated truck movements to and from the site; o Details of access arrangements for workers to/from the site, emergency vehicles and service vehicle movements; o Impacts on the temporary cruise ship terminal; o Details of any proposed transportation of waste materials via the Harbour and proposed locations for handling materials; and o Mitigation measures to reduce impacts on accessibility and amenity. <p>8. Water, Drainage, Stormwater and Groundwater</p> <ul style="list-style-type: none"> • Prepare a Stormwater and Drainage Assessment to assess the impacts of the proposal on surface and groundwater hydrology and quality. • Water quality management focussing on potential impacts from the works on Sydney Harbour. • Prepare a Water Management Plan. This should include stormwater and wastewater management, including any re-use and disposal requirements, demonstration of water sensitive urban design and any water conservation measures. • Prepare an Infrastructure Management Plan. The proponent shall provide information on the required water and wastewater services and any augmentation of Sydney Water infrastructure that may be required for the proposed development. <p>9. Air, Noise and Odour Quality</p> <ul style="list-style-type: none"> • Address potential air quality, noise and odour impacts, in particular during the construction and operation of the development and appropriate mitigation measures. In particular the following must be addressed: <p><u>Air and Odour</u></p> <p>The Environmental Assessment must include an Air Quality Impact Assessment that is prepared strictly in accordance with the <i>Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales 2005</i>, available at: http://www.environment.nsw.gov.au/resources/air/ammodelling05361.pdf.</p>
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	<p>The Air Quality Impact Assessment must also make appropriate reference to the Assessment and Management of Odour from Stationary Sources in NSW: Technical Framework 2006 and Assessment and Management of Odour from Stationary Sources in NSW: Technical Notes 2006, available at: http://www.environment.nsw.gov.au/air/odour.htm.</p> <p>The key air quality issues for the proposal will depend on the methods used to manage and remediate the contaminated material. Potential matters that must be covered in the Air Quality Impact Assessment include, where applicable:</p> <ul style="list-style-type: none"> • the identification of the pollutants of concern, including individual toxic air pollutants, dust and odours; • the identification and assessment of all relevant fugitive and point source emissions; • appropriate coverage of all aspects of the remediation, including the excavation, storage, transport and treatment of contaminated material; and • proposed air quality management and monitoring procedures during remediation. <p>The Air Quality Impact Assessment must consider the requirements of the Protection of the Environment Operations (Clean Air) Regulation 2010.</p> <p><u>Noise</u></p> <p>The Environmental Assessment should include an assessment of noise and vibration impacts, including cumulative construction related noise impacts, prepared in consultation with Office of Environment and Heritage. All feasible and reasonable noise impact mitigation measures should be implemented. The assessment should be prepared in accordance with the NSW Government's Interim Construction Noise Guideline, Industrial Noise Policy and Application Notes, Environmental Criteria for Road Traffic Noise and Assessing Vibration: A Technical Guide, as appropriate, available at http://www.environment.nsw.gov.au/noise/ and Development Near Rail Corridors and Busy roads – Interim Guideline 2008.</p> <p>10. Climate Change and Sea Level Rise</p> <ul style="list-style-type: none"> • An assessment of the risks associated with sea level rise on the proposal as set out in the NSW Coastal Planning Guideline: Adapting to Sea Level Rise. <p>11. Heritage</p> <ul style="list-style-type: none"> • An archaeological assessment of the likely impacts of the proposal on any Aboriginal cultural heritage, European cultural heritage and other archaeological items and outline proposed mitigation and conservation measures; • An interpretation strategy that includes the provision for interpretation of any archaeological resources uncovered during the works. <p>12. Infrastructure Provision</p> <ul style="list-style-type: none"> • Detail the existing infrastructure on site and identify possible impacts on any such infrastructure from the proposal, including the Railcorp 33Kv underground cable located in Hickson Road. • Detail measures to mitigate the impacts of the proposal on any infrastructure items, including proposed relocation. <p>13. Ecologically Sustainable Development (ESD)</p> <ul style="list-style-type: none"> • Identify how the development will incorporate ESD principles in the design, construction and ongoing operation phases of the development. • Address water quality management for the site including an "Integrated Water Management Plan" to include any proposed alternative water supply, proposed end uses of potable and non-potable water, demonstration of water sensitive urban design and any water conservation measures. • Operational waste management and reduction measures. <p>14. Remediation and Contamination</p> <p>The Environmental Assessment must include a Remedial Action Plan (RAP). The RAP must be prepared</p>
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	<p>in accordance with the contaminated land planning guidelines under section 145C of the <i>Environmental Planning and Assessment Act 1979</i> and relevant guidelines produced or approved under section 105 of the <i>Contaminated Land Management Act 1997</i>.</p> <p>Note: The current guidelines under section 145C of the <i>Environmental Planning and Assessment Act 1979</i> are the guidelines <i>"Managing Land Contamination, Planning Guidelines, SEPP 55 – Remediation of Land" 1998</i></p> <p>15. Waste</p> <ul style="list-style-type: none"> • Provide details of the quantity and type of liquid and non-liquid waste generated, handled, processed or disposed of on-site. Waste must be classified according to the Office of Environment and Heritage's <i>Waste Classification Guidelines 2008</i>. • Provide details of the quantity, type and specifications for all output products proposed to be produced. The description should include the physical, chemical and biological characteristics (including contaminant concentrations) of those output products as well as relevant accredited standards against which the products would comply. • Provide details of intended (or potential) end uses for output products and the relevant product standards used against which those products would be assessed. • Provide details of the layout, the treatment process and the environmental controls of the proposal. • Provide details of liquid waste and non-liquid waste management, including: <ul style="list-style-type: none"> ○ the transportation, assessment and handling of waste arriving at or generated at the site; ○ any stockpiling of wastes or recovered materials at the site; ○ any waste processing related to the proposal, including reuse, recycling, reprocessing or treatment both on- and off-site; ○ the method for disposing of all wastes or recovered materials; ○ the emissions arising from the handling, storage, processing and reprocessing of waste; and ○ the proposed controls for managing the environmental impacts of these activities. • Provide details of spoil disposal (if applicable) with particular attention to: <ul style="list-style-type: none"> ○ the quantity of spoil material likely to be generated; ○ proposed strategies for the handling, stockpiling, reuse/recycling and disposal of spoil; ○ the need to maximise reuse of spoil material in the construction industry; ○ identification of the history of spoil material and whether there is any likelihood of contaminated material, and if so, measures for the management of any contaminated material; and ○ designation of transportation routes for transport of spoil. • Provide details of procedures for the assessment, handling, storage, transport and disposal of all hazardous and dangerous materials used, stored, processed or disposed of, in addition to the requirements for liquid and non-liquid wastes. • Provide details of the type and quantity of any chemical substances to be used or stored and describe arrangements for their safe use and storage. • In documenting or describing the composition of output products and/or wastes generated, reference should be made to the Office of Environment and Heritage's <i>Waste Classification Guidelines 2008</i>. <p>16. Planning Agreements / Developer Contributions</p> <ul style="list-style-type: none"> • Scope and justification for any planning agreement / developer contributions proposed. <p>17. Environmental, Construction and Site Management Plan</p> <p>The EA shall provide an Environmental and Construction Management Plan for the proposed works, and is to include:</p> <ul style="list-style-type: none"> • Community consultation, notification and complaints handling; • Impacts of construction on adjoining development and proposed measures to mitigate construction impacts; • Noise and vibration impacts on and off site;
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	<ul style="list-style-type: none"> • Air quality impacts on the neighbourhood; • Odour impacts; • Water quality management for the site; and • Waste and chemical management. <p>18. Staging</p> <ul style="list-style-type: none"> • Details regarding the staging of the proposed development. <p>19. Strata Subdivision</p> <ul style="list-style-type: none"> • Details of strata subdivision and a subdivision plan of the proposed development (if applicable). <p>20. Consultation</p> <ul style="list-style-type: none"> • Undertake an appropriate and justified level of consultation in accordance with the Department's Major Project Community Consultation Guidelines October 2007. • Undertake an appropriate level of consultation with council and state government agencies regarding the recommendations of the Barangaroo Review.
Deemed refusal period	60 days

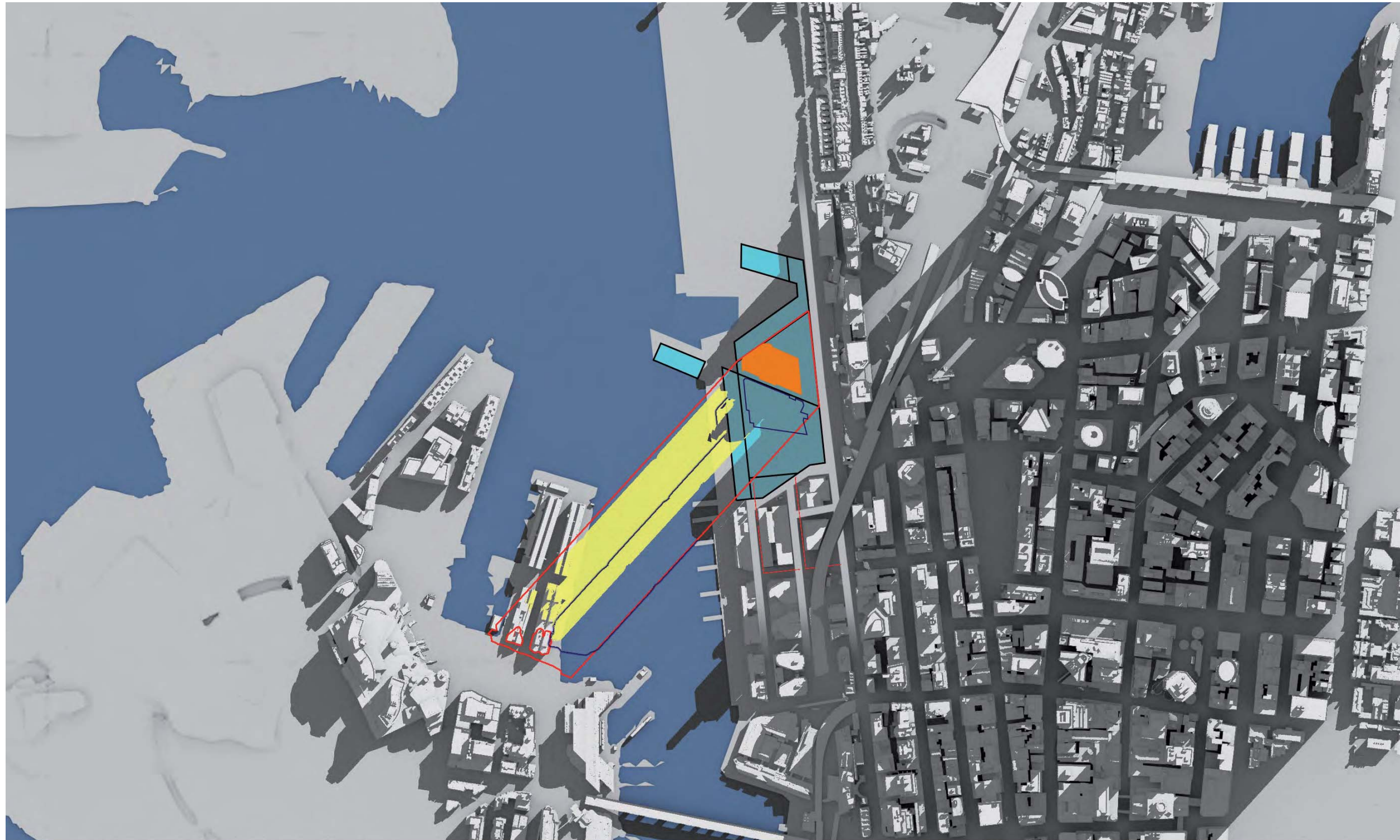
Plans and Documents to accompany the Application

<p>General</p>	<p>The Environmental Assessment (EA) must include:</p> <ol style="list-style-type: none"> 1. An executive summary; 2. A thorough site analysis including site plans, aerial photographs and a description of the existing and surrounding environment; 3. A thorough description of the proposed development; 4. An assessment of the key issues specified above and a table outlining how these key issues have been addressed; 5. An assessment of the potential impacts of the project and a draft Statement of Commitments, outlining environmental management, mitigation and monitoring measures to be implemented to minimise any potential impacts of the project; 6. The plans and documents outlined below; 7. A signed statement from the author of the Environmental Assessment certifying that the information contained in the report is neither false nor misleading; 8. A Quantity Surveyor's Certificate of Cost to verify the capital investment value of the project (in accordance with the definition contained in the Major Projects SEPP; and 9. A conclusion justifying the project, taking into consideration the environmental impacts of the proposal, the suitability of the site, and whether or not the project is in the public interest.
<p>Plans and Documents</p>	<p>The following plans, architectural drawings, diagrams and relevant documentation shall be submitted (where relevant);</p> <ol style="list-style-type: none"> 1. An existing site survey plan drawn at an appropriate scale illustrating: <ul style="list-style-type: none"> • the location of the land, boundary measurements, area (sq.m) and north point; • the existing levels of the land in relation to buildings and roads; • location and height of existing structures on the site; and • location and height of adjacent buildings and private open space. • all levels to be to Australian Height Datum. 2. A Site Analysis Plan must be provided which identifies existing natural elements of the site (including all hazards and constraints), existing vegetation, footpath crossing levels and alignments, existing pedestrian and vehicular access points and other facilities, slope and topography, utility services, boundaries, orientation, view corridors and all structures on neighbouring properties where relevant to the application (including windows, driveways, private open space etc). 3. A locality/context plan drawn at an appropriate scale should be submitted indicating: <ul style="list-style-type: none"> • significant local features such as parks, community facilities and open space and heritage items; • the location and uses of existing buildings, shopping and employment areas; • traffic and road patterns, pedestrian routes and public transport nodes. 4. Architectural drawings at an appropriate scale illustrating: <ul style="list-style-type: none"> • the location of any existing building envelopes or structures on the land in relation to the boundaries of the land and any development on adjoining land; • detailed floor plans, sections and elevations of the proposed buildings; • elevation plans providing details of external building materials and colours proposed; • fenestrations, balconies and other features; • accessibility requirements of the Building Code of Australia and the Disability Discrimination Act; • the height (AHD) of the proposed development in relation to the land;

	<ul style="list-style-type: none"> • the level of the lowest floor, the level of any unbuilt area and the level of the ground; • any changes that will be made to the level of the land by excavation, filling or otherwise. <p>5. Other plans (where relevant):</p> <ul style="list-style-type: none"> • Erosion and Sediment Control Plan – plan or drawing that shows the nature and location of all erosion and sedimentation control measures to be utilised on the site; • Geotechnical Report – prepared by a recognised professional which assesses the risk of Geotechnical failure on the site and identifies design solutions and works to be carried out to ensure the stability of the land and structures and safety of persons; • Landscape Plan - illustrating treatment of open space areas on the site, screen planting along common boundaries and tree protection measures both on and off the site. • Shadow Diagrams showing solar access to the site and adjacent properties at summer solstice (Dec 21), winter solstice (June 21) and the equinox (March 21 and September 21) at 9.00 am, 12.00 midday and 3.00 pm.
<p>Documents to be submitted</p>	<ul style="list-style-type: none"> • 1 copy of the EA, plans and documentation for the Test of Adequacy; • 12 hard copies of the EA (once the EA has been determined adequate); • 12 sets of architectural and landscape plans to scale, including one (1) set at A3 size (to scale); and • 1 copy of the Environmental Assessment and plans on CD-ROM (PDF format), not exceeding 5Mb in size.







APPENDIX D

SHADOW DIAGRAMS



Barangaroo - C3 - Shadow Study
 In the Context of Approved Concept Plan Amendment (Mod 4 MP06_0162)







21st June, 9am

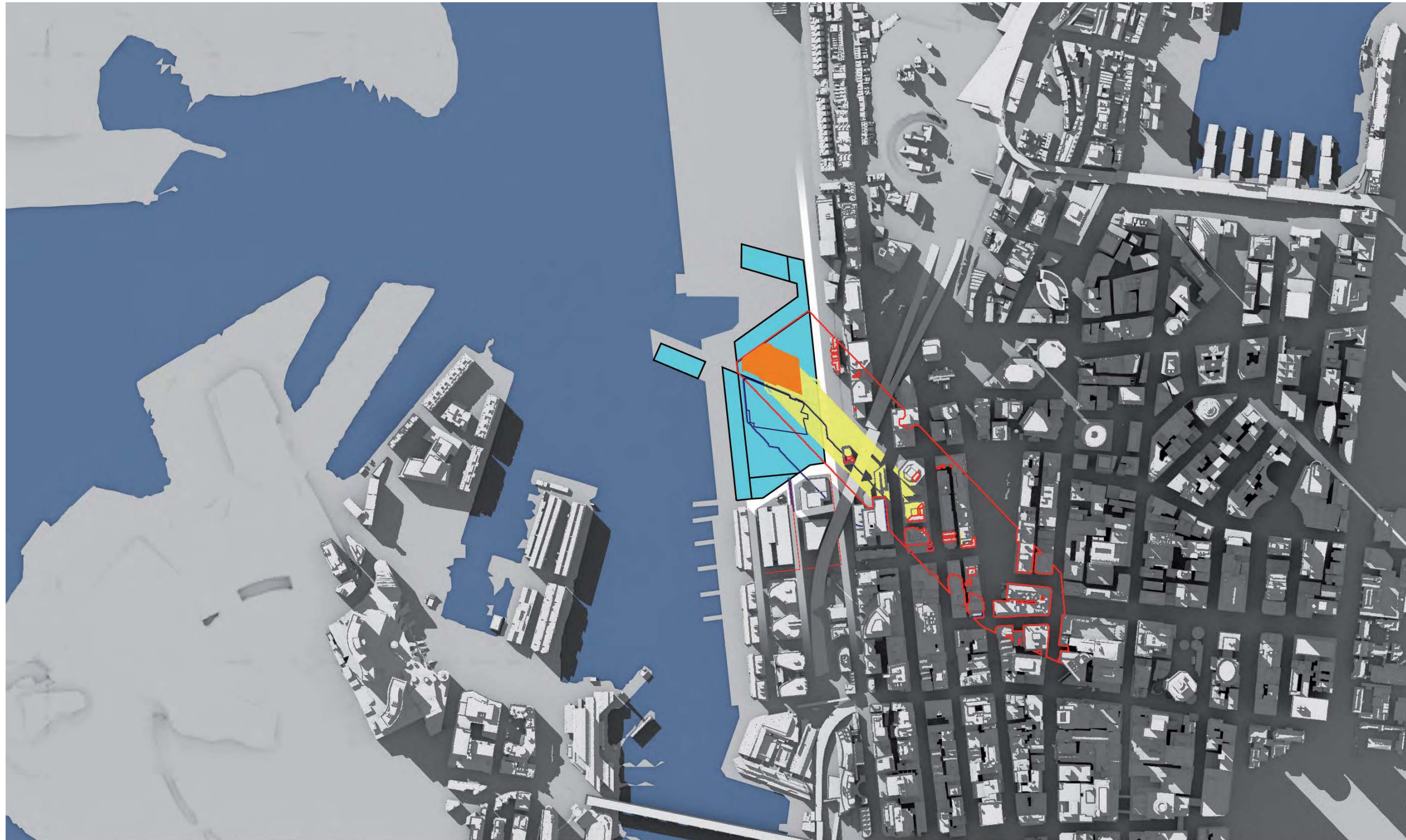
 Block 3 Envelope Shadow	 C4 S75W Scheme Footprint and Shadow	 C3 Shadow	 C3 Footprint	 Shadows cast by Existing City Buildings	 SEPP Block Plan (Mod 4)
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Barangaroo - C3 - Shadow Study
 In the Context of Approved Concept Plan Amendment (Mod 4 MP06_0162)







21st June, 12pm

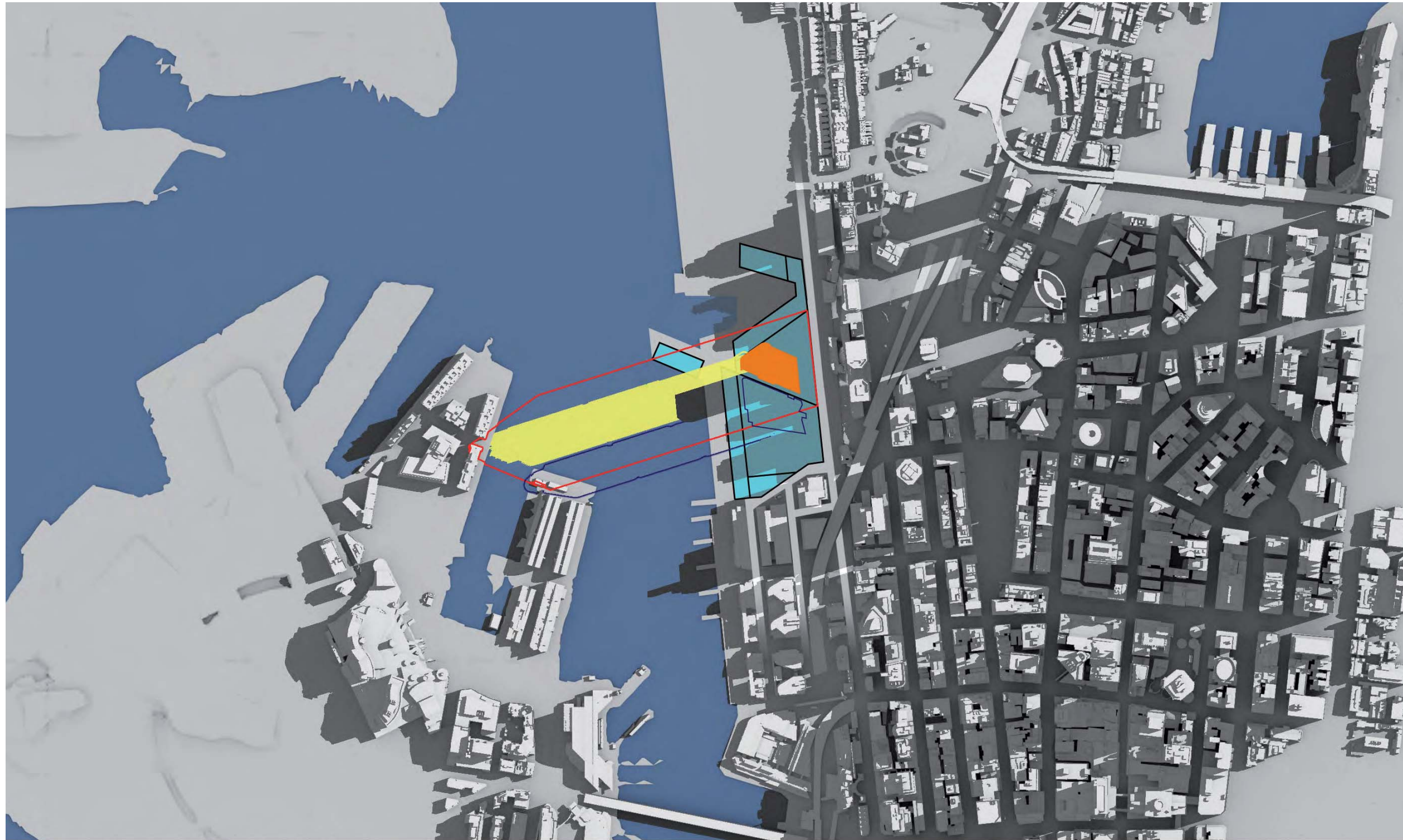
 Block 3 Envelope Shadow	 C4 S75W Scheme Footprint and Shadow	 C3 Shadow	 C3 Footprint	 Shadows cast by Existing City Buildings	 SEPP Block Plan (Mod 4)
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Barangaroo - C3 - Shadow Study
 In the Context of Approved Concept Plan Amendment (Mod 4 MP06_0162)







21st June, 3pm

 Block 3 Envelope Shadow	 C4 S75W Scheme Footprint and Shadow	 C3 Shadow	 C3 Footprint	 Shadows cast by Existing City Buildings	 SEPP Block Plan (Mod 4)
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Barangaroo - C3 - Shadow Study
 In the Context of Approved Concept Plan Amendment (Mod 4 MP06_0162)







21st March, 9am

 Block 3 Envelope Shadow	 C4 S75W Scheme Footprint and Shadow	 C3 Shadow	 C3 Footprint	 Shadows cast by Existing City Buildings	 SEPP Block Plan (Mod 4)
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Barangaroo - C3 - Shadow Study
 In the Context of Approved Concept Plan Amendment (Mod 4 MP06_0162)







21st March, 12pm

 Block 3 Envelope Shadow	 C4 S75W Scheme Footprint and Shadow	 C3 Shadow	 C3 Footprint	 Shadows cast by Existing City Buildings	 SEPP Block Plan (Mod 4)
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Barangaroo - C3 - Shadow Study
 In the Context of Approved Concept Plan Amendment (Mod 4 MP06_0162)







21st March, 3pm

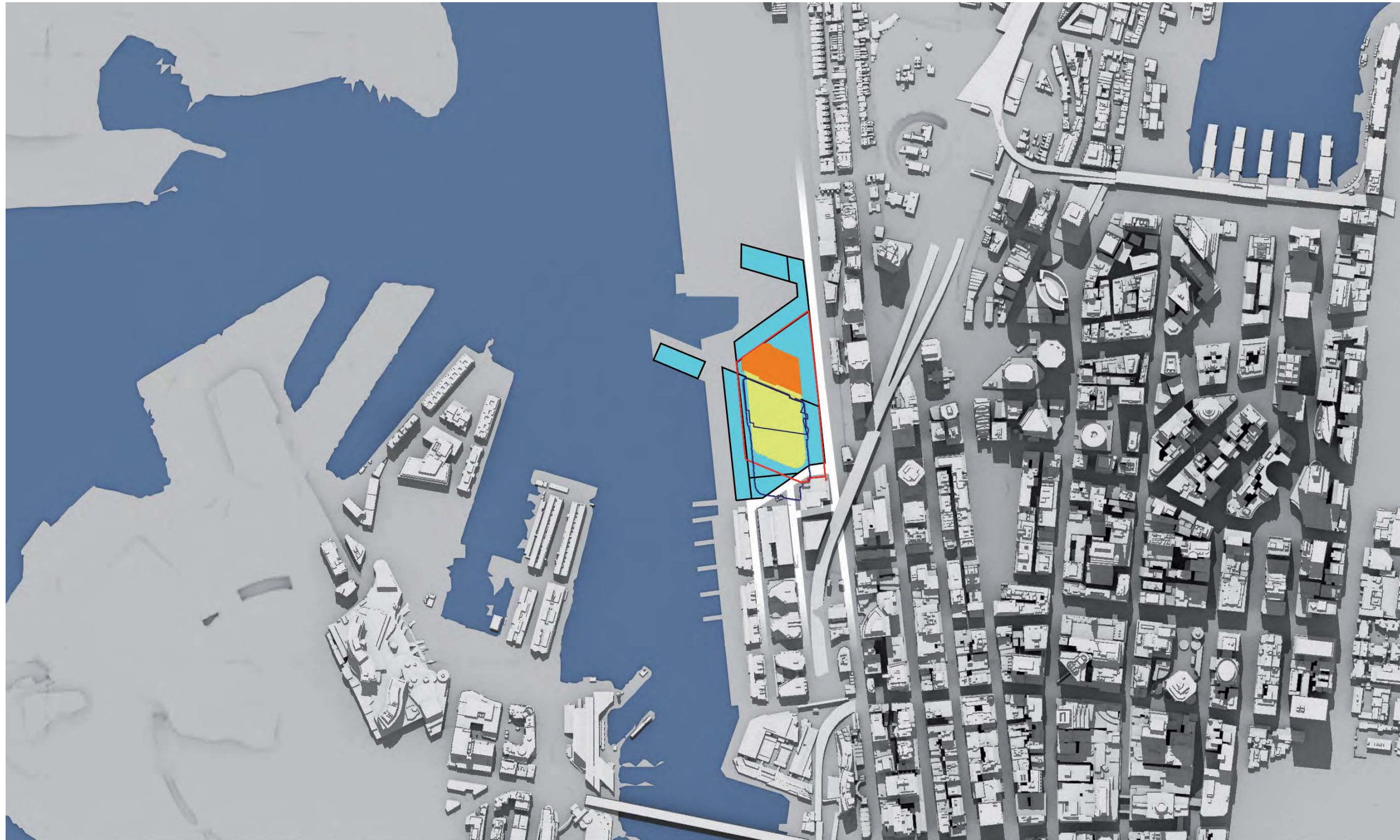
 Block 3 Envelope Shadow	 C4 S75W Scheme Footprint and Shadow	 C3 Shadow	 C3 Footprint	 Shadows cast by Existing City Buildings	 SEPP Block Plan (Mod 4)
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Barangaroo - C3 - Shadow Study
 In the Context of Approved Concept Plan Amendment (Mod 4 MP06_0162)







21st September, 9am

 Block 3 Envelope Shadow	 C4 S75W Scheme Footprint and Shadow	 C3 Shadow	 C3 Footprint	 Shadows cast by Existing City Buildings	 SEPP Block Plan (Mod 4)
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Barangaroo - C3 - Shadow Study
 In the Context of Approved Concept Plan Amendment (Mod 4 MP06_0162)







21st September, 12pm

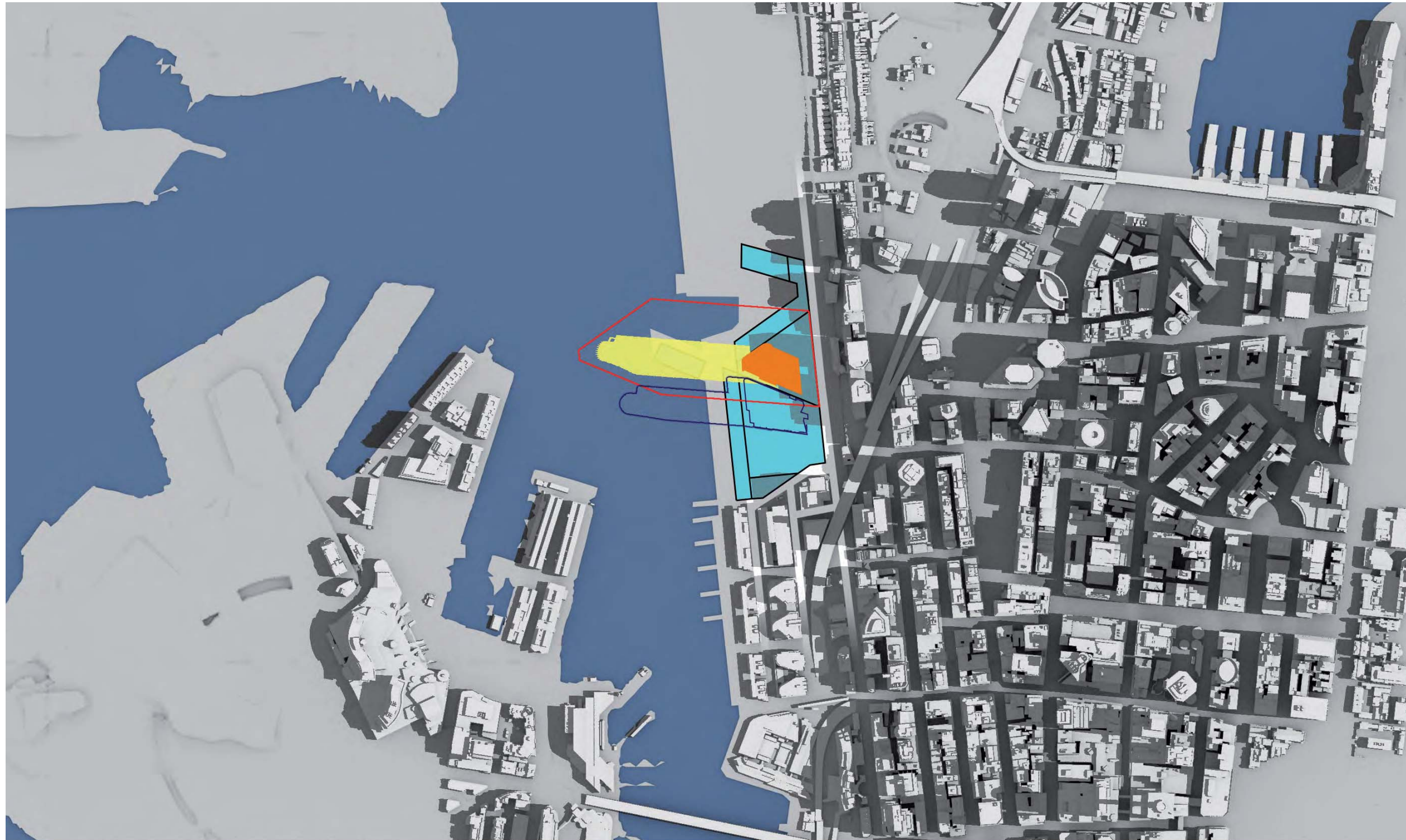
 Block 3 Envelope Shadow	 C4 S75W Scheme Footprint and Shadow	 C3 Shadow	 C3 Footprint	 Shadows cast by Existing City Buildings	 SEPP Block Plan (Mod 4)
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Barangaroo - C3 - Shadow Study
 In the Context of Approved Concept Plan Amendment (Mod 4 MP06_0162)







21st September, 3pm

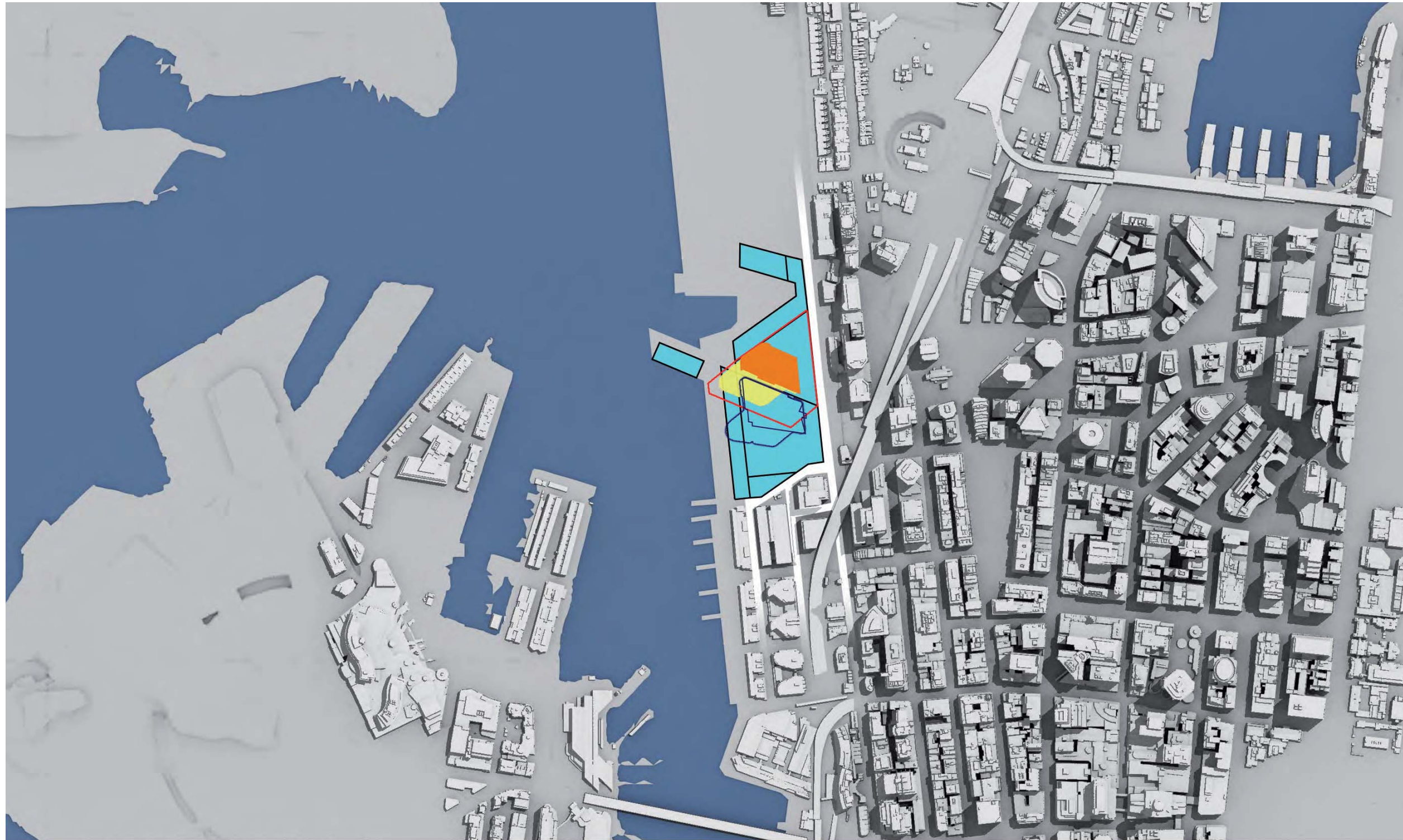
 Block 3 Envelope Shadow	 C4 S75W Scheme Footprint and Shadow	 C3 Shadow	 C3 Footprint	 Shadows cast by Existing City Buildings	 SEPP Block Plan (Mod 4)
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Barangaroo - C3 - Shadow Study
 In the Context of Approved Concept Plan Amendment (Mod 4 MP06_0162)







21st December, 9am

 Block 3 Envelope Shadow	 C4 S75W Scheme Footprint and Shadow	 C3 Shadow	 C3 Footprint	 Shadows cast by Existing City Buildings	 SEPP Block Plan (Mod 4)
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Barangaroo - C3 - Shadow Study
 In the Context of Approved Concept Plan Amendment (Mod 4 MP06_0162)







21st December, 12pm

 Block 3 Envelope Shadow	 C4 S75W Scheme Footprint and Shadow	 C3 Shadow	 C3 Footprint	 Shadows cast by Existing City Buildings	 SEPP Block Plan (Mod 4)
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Barangaroo - C3 - Shadow Study
 In the Context of Approved Concept Plan Amendment (Mod 4 MP06_0162)

21st December, 3pm

 Block 3 Envelope Shadow	 C4 S75W Scheme Footprint and Shadow	 C3 Shadow	 C3 Footprint	 Shadows cast by Existing City Buildings	 SEPP Block Plan (Mod 4)
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APPENDIX E

VIEW ANALYSIS

Visual Impact Photomontage Methodology for Barangaroo Commercial Building C3 Planning Application

BACKGROUND

This document was prepared by Virtual Ideas to describe the processes used to create the visual impact photomontages and illustrate the accuracy of the results, and show media to allow assesment of visual impact..

Virtual Ideas is a highly experienced 3D visualisation company which commonly prepares material for both application and court use, and is familiar with requirements to provide 3D visualisation media that will communicate the visual impact of proposed developments. Our methodologies and results have been inspected by various court appointed experts in a variety of cases and have always been found to be accurate and acceptable.

OVERVIEW

The process of creating accurate photomontage renderings begins with the creation of an accurate, real world scale digital 3D model. We then take site photographs from known locations and place cameras in the digital 3D model that match the real world position of the site photography.

By matching the lens properties of the cameras in the digital 3D software, to that of the real world photography, and rotating the cameras in the software so that surveyed points in 3D space align with the corresponding points on the photograph, we can create a rendering that is correct in terms of position, scale, rotation, and perspective. Time and data information is also recorded during the site photography so that accurate lighting conditions can be reproduced in the 3D rendering.

A digital image is then rendered from the camera in the 3D software application that is then superimposed into the real world photo to generate an image that represents accurate form and visual impact.

DESCRIPTION OF COLLECTED DATA

To create the 3D model and establish accurate reference points for alignment to the photography, a variety of information was collected. This includes the following:

- 1) 3D model of the Approved Concept plan (Mod 4)
 - Supplied by: RSHP Architects
 - Format: DWG
 - Content: 3D model of the Approved Concept plan
- 2) Ortho-corrected aerial photography of the city of Sydney and surrounds
 - Created by: Department of Lands
 - Supplied by: Department of Lands
 - Format: ecw
 - Content: Ortho-corrected aerial photography
- 3) Digital terrain model of the city of Sydney and surrounding suburbs
 - Created by: Department of Lands
 - Supplied by: Department of Lands
 - Format: DWG
 - Content: 3D contours of the ground plane only (no buildings)
- 4) Surveyed 3D model of the city of Sydney buildings and ground plane
 - Created by: AAM Hatch
 - Supplied by: Lend Lease
 - Format: DWG
 - Content: 3D model of the city of Sydney buildings and ground plane
- 5) 3D model of the Barangaroo Commercial Building C4
 - Created by: RSHP Architects
 - Supplied by: Lend Lease
 - Format: DWG
 - Content: 3D model of the Barangaroo buildings
- 6) Site photography
 - Created by: Luke Kolln of Virtual Ideas (VI Photos)
 - Format: JPEG file
 - Content: High resolution photo

CREATION OF THE DIGITAL 3D MODEL

Creating the surrounding terrain model

Using our software application (3D Studio Max) we imported the Lands 3D topographical CAD data and created a three dimensional terrain model at real world scale. This model was referenced back to MGA co-ordinates using a common reference point that all project drawings are being referenced to. The ortho-corrected aerial photography was then mapped to this model giving us a relatively accurate source for referencing camera positions in both position and height.

Creating the Sydney city buildings 3D model

To have sufficient survey data that would allow us to accurately align the 3D model to the photography, a surveyed 3D model was purchased from AAM hatch and positioned into the 3D scene using the common MGA reference point as the origin. In addition a surveyed ground plane from AAM Hatch was also purchased and positioned under the buildings.

The building survey was created by AAM Hatch using photogrammetric mapping equipment and techniques.

Creating the Barangaroo Commercial Buildings C3 3D model

The Barangaroo C3 building model was supplied by RHSP and Lend Lease. The building was supplied in its correct MGA referenced position and was correct in height and scale.

SITE PHOTOGRAPHY

Site photography was taken from the positions agreed with Lend Lease. The positions were selected to fulfil the Director General Requirements provided by the department of planning. The DGR requirements did not specify a lens size for the photographs.

Additional locations for photomontages were requested by the city of Sydney, and subsequently photographed.

The lens selection for each shot was based on the following criteria:

- The on-site location for the photograph should be as close as possible to the instructed location.
- The entirety of the proposed buildings, including the approved concept plan envelope should be in view in each photo where possible.
- Surrounding existing buildings should also be visible in each photomontage to allow for fair and accurate comparison to existing built form.

The lens size selected for each shot ranges from 17-40mm. For further explanation of digital photography and the human eye refer to Appendix A.

In most cases we consider that a 17-24mm lens is a fair representation of the focal length of the human eye. It is difficult to define the exact focal length of the eye as we have to consider the distance to the subject and peripheral vision. There are many studies to support that 17mm is acceptable. Also many scientists consider 20-24mm acceptable when looking at a specific item in the distance. - Please see appendix A.

CREATION OF PHOTOMONTAGES

The positions of the real world photography were located in the 3D scene using the lands and AAM Hatch 3D models, and the orthorectified photography.

Cameras were then created in the 3D scene to match the locations and height of where the photographs were taken from and the lens data stored in the metadata of the photograph. The cameras were then aligned in rotation so that the points of the 3D model aligned with their corresponding objects that are visible in the photograph.

A realistic sun & skylight light system was then created in the 3D scene and matched to the precise time and date of when each photograph was taken.

3D renderings of the new built form were then created from the selected cameras, at the exact pixel dimensions and aspect ratio of the original digital photograph. (4368 x 2912 pixels)

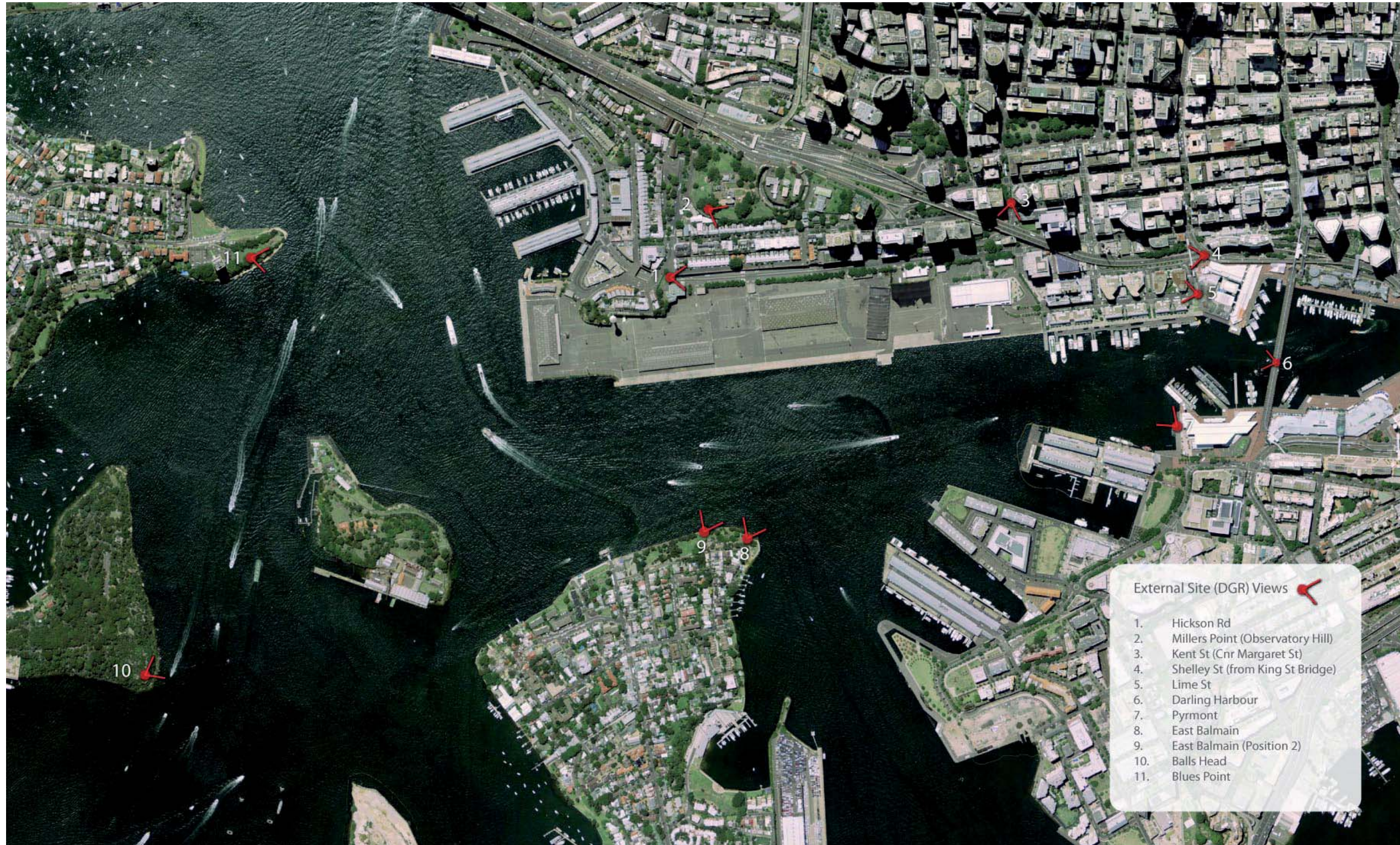
The 3D renderings were then placed into the digital photography, and masked out where existing form appeared in front of the buildings.

In conclusion, it is my opinion as an experienced 3D architectural visualisation professional that the images provided accurately portray the level of visibility and impact of the built form with respect to the surrounds.

Yours sincerely

Grant Kolln,
Director Virtual Ideas

A handwritten signature in black ink, appearing to read 'GK', is positioned below the typed name and title.



- External Site (DGR) Views
1. Hickson Rd
 2. Millers Point (Observatory Hill)
 3. Kent St (Cnr Margaret St)
 4. Shelley St (from King St Bridge)
 5. Lime St
 6. Darling Harbour
 7. Pyrmont
 8. East Balmain
 9. East Balmain (Position 2)
 10. Balls Head
 11. Blues Point



Image showing block 3 from the approved concept plan (Mod 4)



Image showing proposed building montaged into existing photograph & crop marks for longer lenses sizes.

Photographic data

Location: HICKSON ROAD
 Camera R.L. 17.5m
 MGA coords: X: 333734.347, Y: 6252097.407
 Lens: 24mm
 Dimensions: 4368 x 2912
 Date: 18/06/2010 12:30 PM
 Camera: Canon EOS 5D

Rationale for lens selection

The rationale for using a 24mm lens was to capture the heights of several existing city buildings to the left of the image, and also show the building immediately to the right of the viewer. Including the handrail in this image also visually describes that the viewer is standing on the bridge.

Overlays showing longer lenses have been included to illustrate the effect of a longer lens. Note that using a longer lens from the same location will have the same effect as cropping the wider image.



Image showing proposed C3 building montaged into existing photograph.



Image showing block 3 from the approved concept plan (Mod 4)



Image showing proposed building montaged into existing photograph & crop marks for longer lenses sizes.

Photographic data

Location: MILLERS POINT (OBSERVATORY HILL)
 Camera R.L. 43.2m
 MGA coords: X: 333894.874, Y: 6252001.792
 Lens: 40mm
 Dimensions: 4368 x 2912
 Date: 2/06/2010 2:57 PM
 Camera: Canon EOS 5D

Rationale for lens selection

The rationale for using a 40mm lens was that from this specific location the wider lens only captured more of the underside of the canopy and did not see any additional built form. Therefore we selected a 40mm lens as this balanced the amount of built form vs the surrounding nature in the image.

Overlays showing longer lenses have been included to illustrate the effect of a longer lens. Note that using a longer lens from the same location will have the same effect as cropping the wider image.



Image showing proposed C3 building montaged into existing photograph.



Image showing block 3 from the approved concept plan (Mod 4)



Image showing proposed building montaged into existing photograph & crop marks for longer lenses sizes.

Photographic data

Location: KENT ST (CNR MARGARET ST)
 Camera R.L. 17.9m
 MGA coords: X: 333899.463, Y: 6251329.789
 Lens: 20mm
 Dimensions: 4368 x 2912
 Date: 2/06/2010 2:19 PM
 Camera: Canon EOS 5D

Rationale for lens selection

The rationale for using a 20mm lens was to capture the heights of the Westpac building, while also providing enough room to see the extent of the future Barangaroo buildings and the approved concept plan.

Overlays showing longer lenses have been included to illustrate the effect of a longer lens. Note that using a longer lens from the same location will have the same effect as cropping the wider image.



Image showing proposed C3 building montaged into existing photograph (for context, C4 S75W shown as transparent).

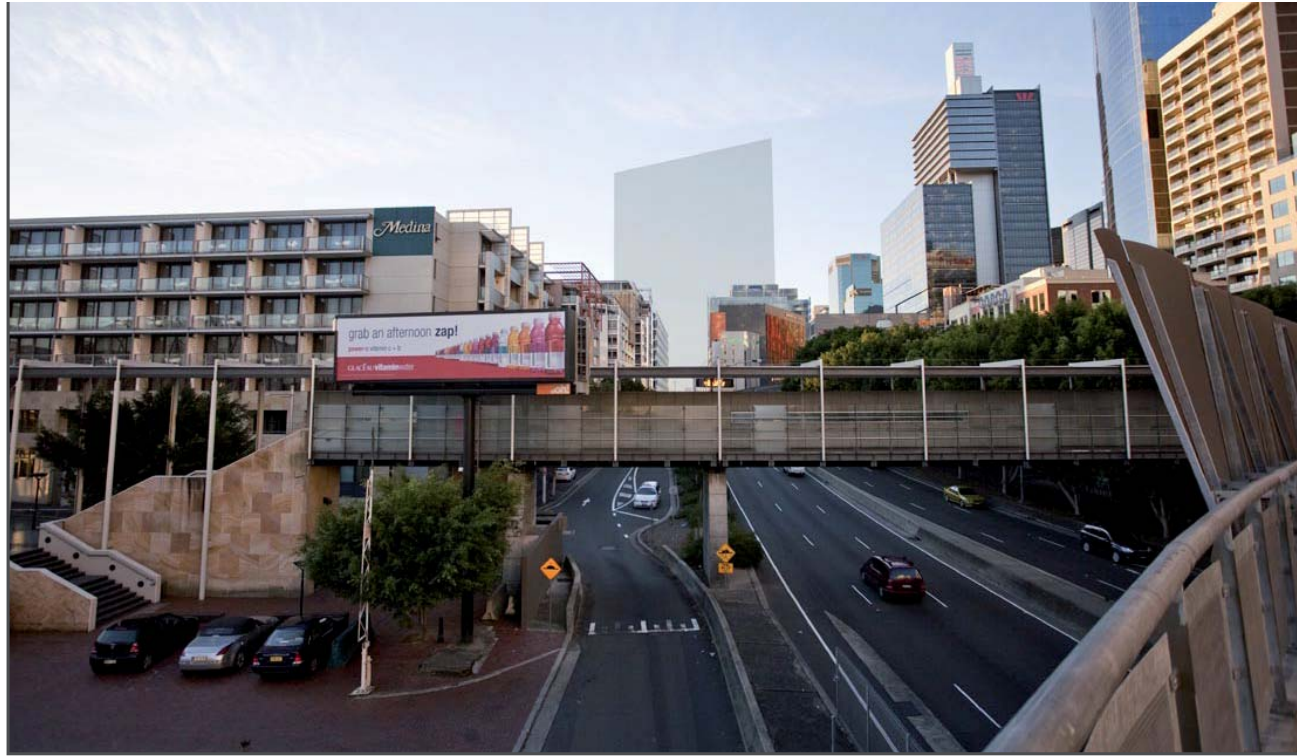


Image showing block 3 from the approved concept plan (Mod 4)

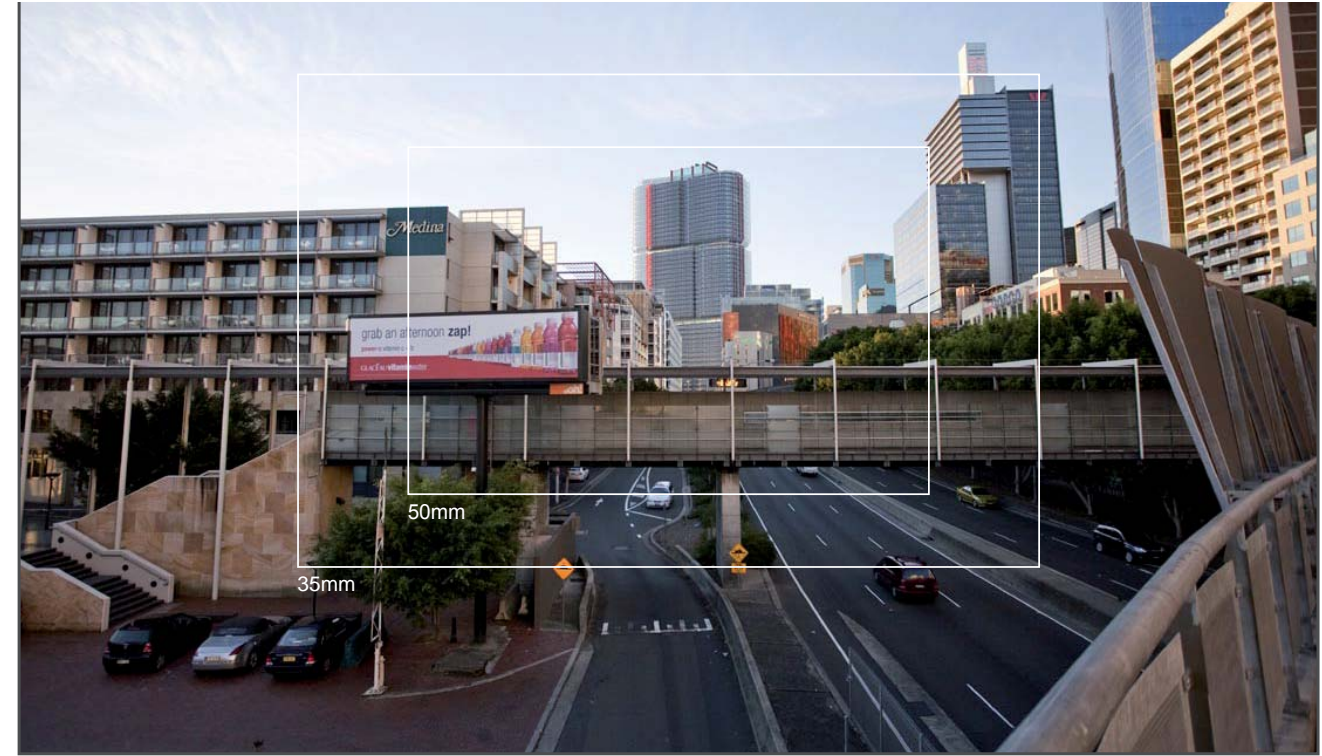


Image showing proposed building montaged into existing photograph & crop marks for longer lenses sizes.

Photographic data

Location: SHELLEY ST FROM KING ST BRIDGE
 Camera R.L. 11.8m
 MGA coords: X: 333775.939, Y: 6250899.372
 Lens: 20mm
 Dimensions: 4368 x 2912
 Date: 8/06/2010 5:41 PM
 Camera: Canon EOS 5D

Rationale for lens selection

The rationale for using a 20mm lens was to capture the heights of several existing city buildings to the right of the image, and also show some of the built form to the left of the viewer. Including the handrail in this image also visually describes that the viewer is standing on the bridge.

Overlays showing longer lenses have been included to illustrate the effect of a longer lens. Note that using a longer lens from the same location will have the same effect as cropping the wider image.



Image showing proposed C3 building montaged into existing photograph (for context, C4 S75W shown as transparent).



Image showing block 3 from the approved concept plan (Mod 4)



Image showing proposed building montaged into existing photograph & crop marks for longer lenses sizes.

Photographic data

Location: LIME STREET
 Camera R.L. 6.7m
 MGA coords: X: 333693.502, Y: 6250920.272
 Lens: 22mm
 Dimensions: 4368 x 2912
 Date: 8/06/2010 5:47 PM
 Camera: Canon EOS 5D

Rationale for lens selection

The rationale for using a 22mm lens was that to show the width of the street in front of the viewer, as well as to capture the height of the lime st buildings.

Overlays showing longer lenses have been included to illustrate the effect of a longer lens. Note that using a longer lens from the same location will have the same effect as cropping the wider image.



Artists Impression

Image showing proposed C3 building montaged into existing photograph (for context, C4 S75W shown as transparent).



Image showing block 3 from the approved concept plan (Mod 4)

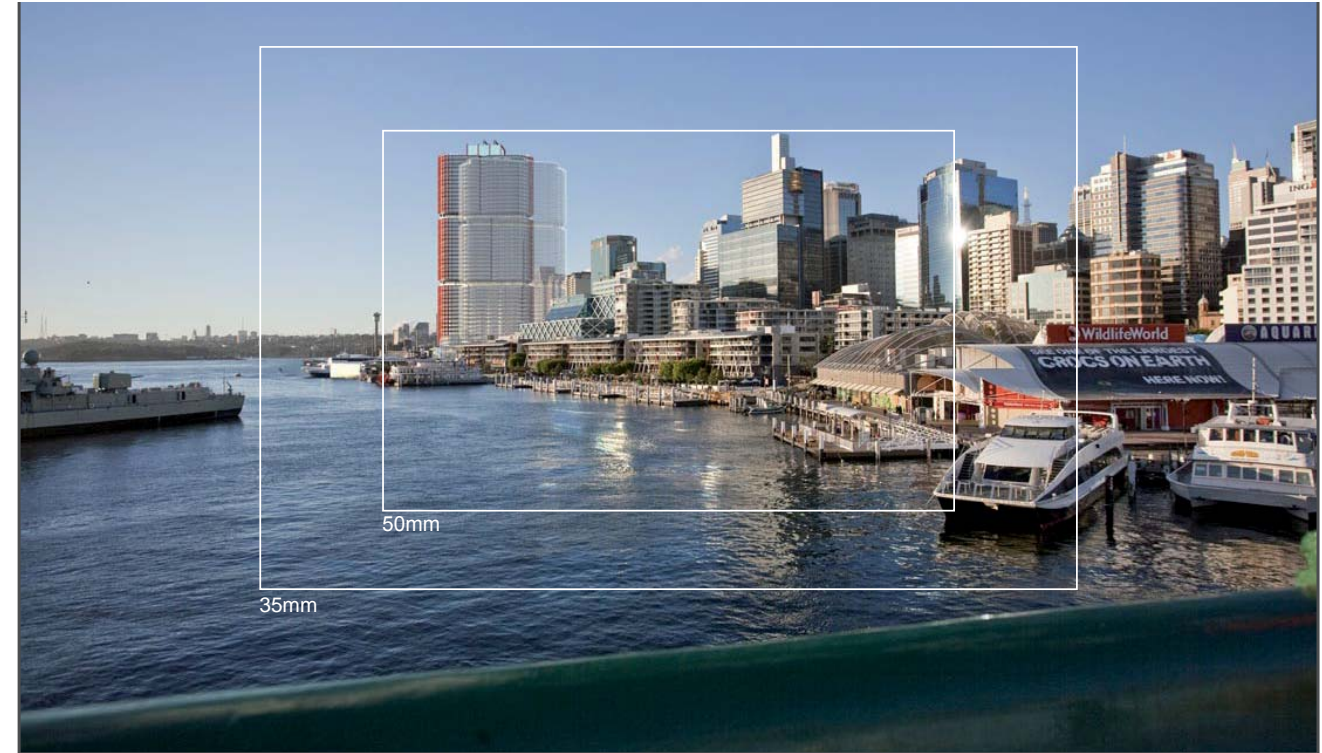


Image showing proposed building montaged into existing photograph & crop marks for longer lenses sizes.

Photographic data

Location: DARLING HARBOUR
 Camera R.L. 13.6m
 MGA coords: X: 333547.744, Y: 6250747.816
 Lens: 22mm
 Dimensions: 4368 x 2912
 Date: 8/06/2010 5:15 PM
 Camera: Canon EOS 5D

Rationale for lens selection

The rationale for using a 22mm lens was to capture the surrounding city buildings, while capturing some of the foreground elements so that the viewer could feel like they were standing on the bridge.

Overlays showing longer lenses have been included to illustrate the effect of a longer lens. Note that using a longer lens from the same location will have the same effect as cropping the wider image. (See appendix B)



Image showing proposed C3 building montaged into existing photograph (for context, C4 S75W shown as transparent).



Image showing block 3 from the approved concept plan (Mod 4)

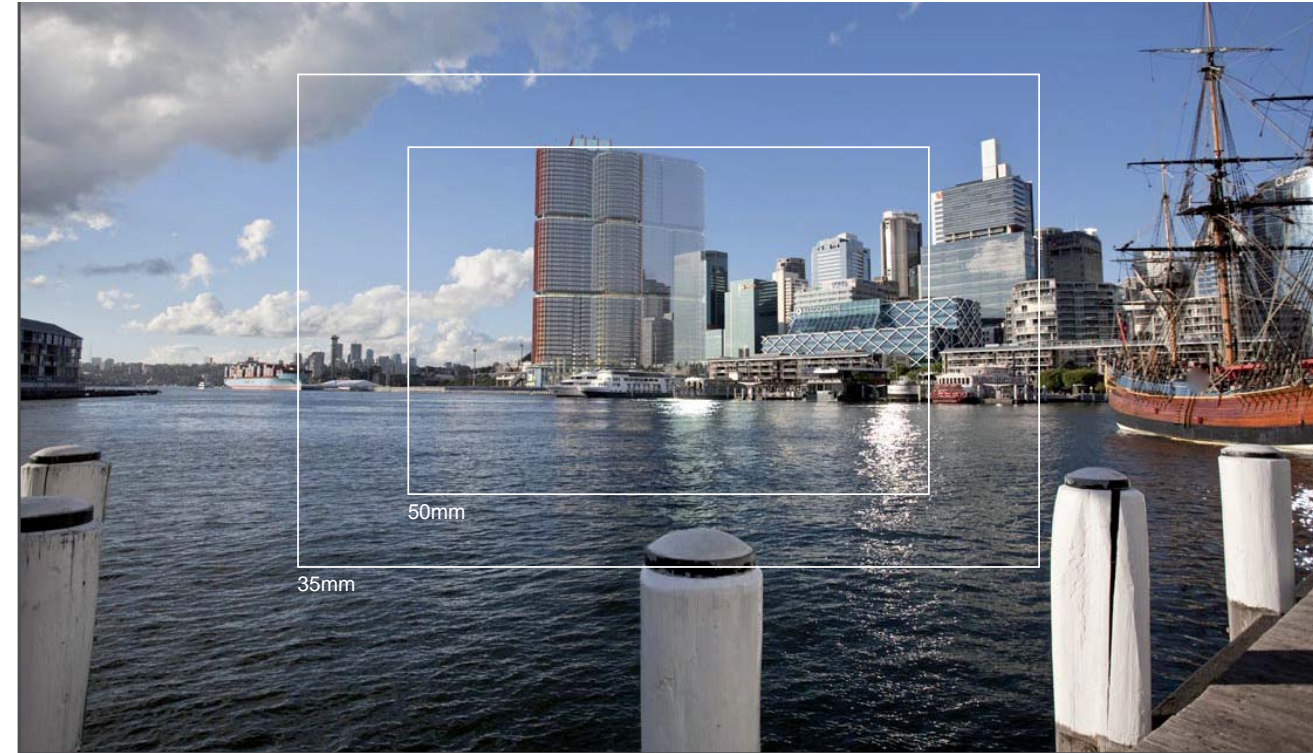


Image showing proposed building montaged into existing photograph & crop marks for longer lenses sizes.

Photographic data

Location: PYRMONT
 Camera R.L. 4.9m
 MGA coords: X: 333401.942, Y: 6250969.394
 Lens: 20mm
 Dimensions: 4368 x 2912
 Date: 8/06/2010 4:43 PM
 Camera: Canon EOS 5D

Rationale for lens selection

The rationale for using a 20mm lens was to capture the surrounding city buildings, while capturing some of the foreground elements so that the viewer could feel like they were standing at the waters edge. We also wanted to ensure that the edge of Sydney wharf was included in the photo so that the distance between the Barangaroo site and Sydney wharf was clearly visible.

Overlays showing longer lenses have been included to illustrate the effect of a longer lens. Note that using a longer lens from the same location will have the same effect as cropping the wider image.



Image showing proposed C3 building montaged into existing photograph (for context, C4 S75W shown as transparent).

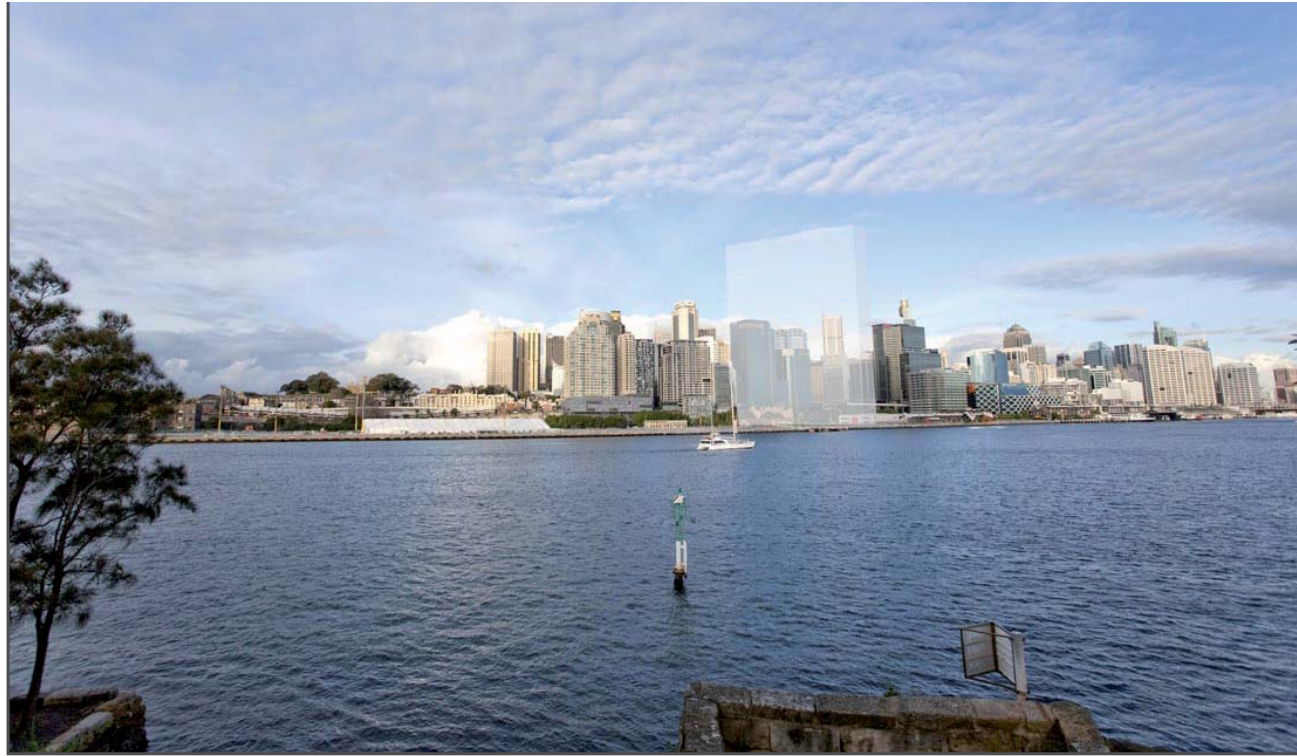


Image showing block 3 from the approved concept plan (Mod 4)

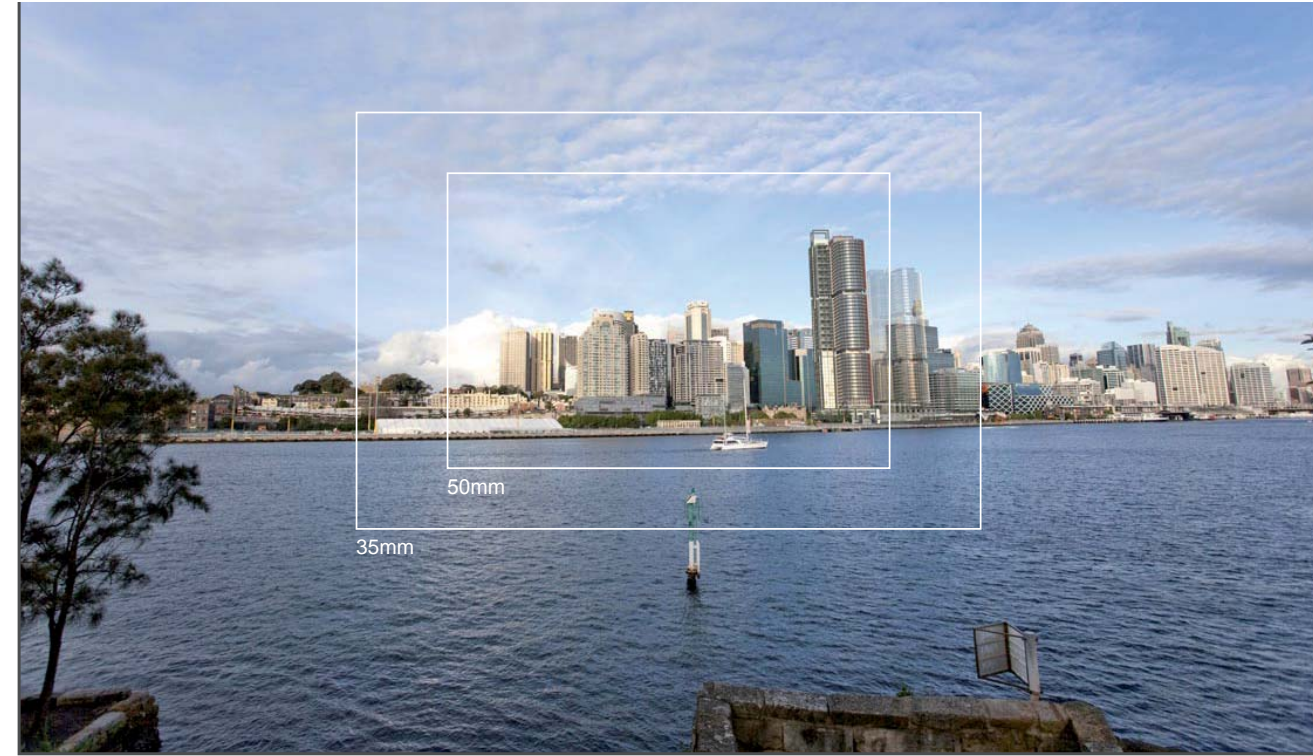


Image showing proposed building montaged into existing photograph & crop marks for longer lenses sizes.

Photographic data

Location: BALMAIN EAST
 Camera R.L. 11.6m
 MGA coords: X: 333142.111, Y: 6251923.256
 Lens: 17mm
 Dimensions: 4368 x 2912
 Date: 2/06/2010 4:55 PM
 Camera: Canon EOS 5D

Rationale for lens selection

The rationale for using a 17mm lens was to capture as much of the city buildings as possible from the selected position. We also wanted to show some of the foreground element so the viewer knows where they are standing.

Overlays showing longer lenses have been included to illustrate the effect of a longer lens. Note that using a longer lens from the same location will have the same effect as cropping the wider image.



Image showing proposed C3 building montaged into existing photograph (for context, C4 S75W shown as transparent).



Image showing block 3 from the approved concept plan (Mod 4)



Image showing proposed building montaged into existing photograph & crop marks for longer lenses sizes.

Photographic data

Location: EAST BALMAIN (POSITION 2)
 Camera R.L. 6.5m
 MGA coords: X: 333168.223, Y: 6251983.911
 Lens: 21mm
 Dimensions: 4368 x 2912
 Date: 2/06/2010 5:05 PM
 Camera: Canon EOS 5D

Rationale for lens selection

The rationale for using a 21mm lens was to capture the extent of the city skyline and also provide some foreground information so that the viewer knows that they are at the waters edge.

Overlays showing longer lenses have been included to illustrate the effect of a longer lens. Note that using a longer lens from the same location will have the same effect as cropping the wider image.



Image showing proposed C3 building montaged into existing photograph (for context, C4 S75W shown as transparent).



Image showing block 3 from the approved concept plan (Mod 4)



Image showing proposed building montaged into existing photograph & crop marks for longer lenses sizes.

Photographic data

Location: BALLS HEAD
 Camera R.L. 32m
 MGA coords: X: 332869.201, Y: 6253291.613
 Lens: 40mm
 Dimensions: 4368 x 2912
 Date: 2/06/2010 4:17 PM
 Camera: Canon EOS 5D

Rationale for lens selection

The rationale for using a 40mm lens was that the location was quite far away and zooming to this extent captured the city and the Barangaroo site as a whole. We also included some of the foreground foliage for reference.

Overlays showing longer lenses have been included to illustrate the effect of a longer lens. Note that using a longer lens from the same location will have the same effect as cropping the wider image.



Image showing proposed C3 building montaged into existing photograph (for context, C4 S75W shown as transparent).



Image showing block 3 from the approved concept plan (Mod 4)



Image showing proposed building montaged into existing photograph & crop marks for longer lenses sizes.

Photographic data

Location: BLUES POINT
 Camera R.L. 14.6m
 MGA coords: X: 333783.957, Y: 6253021.351
 Lens: 21mm
 Dimensions: 4368 x 2912
 Date: 2/06/2010 3:58 PM
 Camera: Canon EOS 5D

Rationale for lens selection

The rationale for using a 21mm lens was to capture as much of the city buildings as possible from the selected position. We also wanted to show some of the foreground elements so the viewer knows where they are standing.

Overlays showing longer lenses have been included to illustrate the effect of a longer lens. Note that using a longer lens from the same location will have the same effect as cropping the wider image.



Image showing proposed C3 building montaged into existing photograph (for context, C4 S75W shown as transparent).

APPENDIX A - DIGITAL CAMERA LENSES FOR PHOTOMONTAGES AND VISUAL IMPACT ASSESSMENTS

The intention of a photomontage rendering is to visually communicate how proposed built form sits in respect to its surroundings. To achieve this, a digitally rendered image from a digital 3D model is accurately superimposed into a digital photograph to provide an accurate representation in terms of light, material, scale, and form.

Camera lens selection also plays an important part in creating a photomontage that communicates visual impact. There are several things to consider with respect to lens selection.

Field of View of the Human Eye

This is a topic that varies depending on the source of information. In many cases the field of view of the eye is stated to be 17mm. Other sources of information on the web say that it is more like 22-24mm. Whichever the case it is clear that the human eye has quite a wide field of view and when we stand close to a subject (say a building) we have quite a lot of vision towards the top, sides and bottom. In addition to this the human eye can change focus and target direction extremely quickly allowing us to view a large structure in a very short period of time, effectively making our perceived field of view even larger.

The Perspective of the human eye

It is difficult to accurately reproduce what the human eye sees by the means of a printed image. As the back of the human eye is curved and the sensors on cameras are flat the perspective of a photograph can look quite different to how we see things in the real world, especially with a larger field of view, or wider lens.

In digital photography circles it is commonly stated that using a longer lens (approx 50mm) reduces the amount of perspective in an image and therefore looks more like the human eye would see reality, but this is talking about perspective only, and does not consider the field of view of the eye. If you take a photo using a 50mm lens, print the photo, and hold the print out against the actual view in the same location the photo was taken from, it becomes very clear that the human eye can see much more of the surrounding information than what is shown on the print out.

Changing the FOV on a digital camera

The main difference in using a longer lens vs. a wider lens is the amount of information that is displayed at the edges of the subject. Changing the lens to a smaller FOV produces the same result as cropping in on the wide angle image, providing that the position and the angle of the camera remains constant while taking the photographs. In short, a lens with a wider FOV does not create an image that has incorrect perspective it simply means that the perspective is extended at the edges of the image showing more of the surrounds in the images.

What all of this means for visual assessment is that there is no one fits all solution for lens selection. If we follow the opinion that a longer lens produces images that are closer to the perspective of the human eye, we will inevitably be in the situation where we cannot show the entirety of our subject and enough of the surrounds that it resides in. Also if we strictly stick to a 17mm lens we will have situations where the subject is far away and looks very small in the image, again making it difficult to assess visual impact. For these reasons we have taken the view that we can never totally represent what the human eye will see on a piece of paper, and for visual impact photomontages we should select lenses that strike a balance between the two and can accurately display the built form in its surroundings.

The most effective way to accurately gauge visual impact and get a real world feeling for scale would be to take prints of the photomontages to the exact site photography locations and compare the prints with the scale of the existing built form.

Extract from the web site - The Physics Factbook - Concerning the Focal Length of a Human Eye

<http://hypertextbook.com/facts/2002/JuliaKhutoretskaya.shtml>

The human eye is the organ which gives us the sense of sight, allowing us to learn more about the surrounding world than we do with any of the other four senses. We use our eyes in almost every activity we perform, whether reading, working, watching television, and driving a car, among countless other ways.

And how exactly does the eye work? The eyeball is a spherical structure approximately 2.5 cm (about 1 in) in diameter with a pronounced bulge on its forward surface, the cornea. Just behind the cornea is the iris, a coloured area with a hole in the centre called the pupil. Circular muscle tissue in the iris allows it to open and close the pupil to regulate the amount of light that gets inside the eyeball. Just behind the iris and pupil is the lens. The cornea and the lens work together to focus images on the retina, which is the light-sensitive layer that lines the inside of the eyeball.

Light moves in straight lines. Whenever a light ray encounters a surface of a different transparent medium, however, it refracts. The amount of refraction depends on the refractive index of the substance, the angle at which the light hits it, and the colour of the light. On a curved surface such as a lens, parallel rays of light will hit the surface at different angles and will be refracted in different directions.

The eye focuses on an object by bending all of the light rays from a single point on the observed object toward a single point on the retina. In the eyeball, light rays passing through the cornea are bent by its curvature toward the pupil. The lens flexes to change its curvature and finish the focusing process. When an object is located at infinity, the focal length, or the distance from the cornea to the retina, of a normal relaxed eye is about 1.7 cm (17 mm).

Bibliographic Entry	Result (w/surrounding text)	Standardized Result
Serway, Raymond & Beichner, Robert. <i>Physics for Scientists and Engineers with Modern Physics, Fifth Edition</i>. Saunders College Publishing. 2000.	"For an object distance of infinity, the focal length of the eye is equal to the fixed distance between the lens and the retina, about 1.7 cm"	17 mm
Cameron, John R.; James G. Skofronick & Roderick M. Grant. <i>Physics of the Body. Second Edition</i>. Madison, WI: Medical Physics Publishing, 1999.	"The diameter of the central bright spot at the retina is the product of the effective aperture to retina distance (17 mm) ..."	17 mm
Alexander, David. <i>Light and Color (PHYS 1230) Lecture 21</i>. University of Colorado. 1997.	"The normal relaxed eye focuses rays from infinity onto the retina, with a focal length of about 1.7 cm or power of about +60 diopters."	17 mm
The Eye: The Wonder of Accommodation. The Physics Classroom and Mathsoft Education and Engineering, Inc. 2002.	"The distance from the cornea (where the light undergoes most of its refraction) to the central portion of the fovea on the retina is approximately 1.7 cm."	17 mm

APPENDIX F

MATERIALS BOARD

This report has been produced for Lend Lease for the purpose of supporting Lend Lease's Planning Application submission for MP11_0044 Commercial Building C3 and, in accordance with RSHP's normal practice, RSHP does not accept any responsibility or liability for the contents of this report towards any person other than Lend Lease or for the consequences of this report being used for a purpose other than the purpose for which it was commissioned.

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2.1 Design Excellence

The design for the C3 Building demonstrates a commitment to create a high quality and world-leading sustainable office and retail environment for Sydney.

The expression begins by creating a central framework or chassis for the building. By articulating the plant levels and formulating a tripartite reading, a primary scale is created making the tower legible from a distance. This is further defined by expressing the distinction between key 'served' and 'servant' elements of the building such as the interstitial, community spaces which are positioned above the vertical transportation as they drop off. The environmental strategy is made clearly visible by way of the facade's solar protection, along with energy generation, which are all expressed at a more human scale, legible from both inside and out.

Design Process

Design Excellence has been the overriding goal of the design team. Formal processes and reviews specific to Building C3 have been established to achieve this, along with ongoing collaborative design amongst the entire project team of designers, and consultants.

A critical part of the design process has included reviews both specific to C3 and also the design reviews by the Barangaroo Delivery Authority Design Advisors and the Design Excellence Review Panel for the 3-tower composition. The outcomes of these reviews have been critical in refining Barangaroo South, the relationship of sibling buildings and have guided the refinement of C3.

The Planning Application drawings and illustrations in this report define Design Excellence and provide more background material than would usually be contained in an Architectural Design Statement, and are included to demonstrate the degree of analysis and thought that has gone into the design. Building C3 is not just an image but an outcome, it is more legible, elegant and expressive of the architectural concept as a result of this rigorous design process.

Design Team

Within Rogers Stirk Harbour + Partners, the design team has been led by partner Ivan Harbour and supported by Richard Rogers.

Weekly reviews with all the directors of the practice, plus the project team, have taken place in the 'Monday Design Forum', an office institution that ensures that the breadth and depth of the practice's expertise and experience is brought to the design.

Rogers Stirk Harbour + Partners is an international architectural practice based in London with offices in Sydney, Madrid and Shanghai and is employing around 180 people, including 10 Directors and 57 Associates. The practice has designed a wide range of buildings, notably the Pompidou Centre in Paris (with Renzo Piano); Lloyd's of London, the European Court of Human Rights, Strasbourg; law courts in Bordeaux and Antwerp; the National Assembly for Wales; Madrid Airport; Heathrow Terminal 5; Ching Fu Group Headquarters, Kaohsiung, Taiwan; Parc 1, Yeouido, Seoul, South Korea. RSHP is currently working on a range of high profile projects including; an extension to the British Museum in London; Tower 3 on the World Trade Center site in New York; a major mixed-use development in Scandicci, Italy; and a wide range of major masterplans in cities across three continents. The practice is currently participating in the Greater Paris project, which looks at the future of the city as a more integrated metropolitan region as it faces the social and environmental challenges of the 21st century.

Over three decades, RSHP has attracted critical acclaim and won dozens of awards including the Stirling Prize 2009 for Maggie's London, the Stirling Prize 2006 for Terminal 4, Madrid Barajas Airport and the Manser Medal in 2008 for an energy-efficient housing scheme in Milton Keynes. Richard Rogers is the 2007 Laureate of the Pritzker Architecture Prize and recipient of the 2006 Golden Lion for Lifetime Achievement. He was Chief Advisor on Architecture and Urbanism to the former Mayor of London, Ken Livingstone and has played an advisory role on design to the current Mayor of London, Boris Johnson. He

has acted as Chairman of the British Government's Urban Task Force and was a member of the Mayor of Barcelona's Urban Strategies Advisory Council.

Ivan Harbour joined RSHP in 1985. He has wide-ranging experience of directing complex projects all over the world, from Terminal 4 Madrid Barajas Airport and the National Assembly for Wales in Cardiff to the 300 New Jersey Avenue office development in Washington DC, the Ching-Fu HQ building in Kaohsiung, Taiwan and a major mixed-use development in Seoul, currently under construction. As well as office, residential, infrastructure and educational buildings, Ivan's design experience includes law courts, parliaments, schools, hotels and research facilities. In addition to the Barangaroo Masterplan project, Ivan has headed up several other design proposals in Australia including the competition for the Sydney Metro. He teaches and lectures in the UK and overseas and has served as a jury member for a number of major awards including the Stirling Prize for Architecture, the UK's highest award for a completed building.

Other members of the consultant team have contributed greatly to the design. World class specialists in engineering, sustainability, office planning, urban planning and landscape design have all helped to shape the scheme from its inception, ensuring it is a viable, integrated and innovatively designed building.

Jan Gehl, Danish architect and urban designer who has been a consultant to the City Authorities of Sydney, London and New York, has helped to design the massing, streets and public spaces of Barangaroo South to make a human, people-centred and vibrant urban quarter for Sydney. He has taken part in regular design reviews and workshops with the project team.

The world-leading environmental engineer Guy Battle has worked with the project team to incorporate achievable environmental and sustainability strategies into the core design to ensure C3 and the scheme can achieve its ambitious sustainability targets. Guy has also taken part in a series of workshops that moved the design forward.

Frank Duffy, an international authority on the design of office environments, has contributed to making C3 an exemplar of office design. Through a series of workshops, Frank helped to establish the optimum size and configuration of the office floors.

The project team also benchmarks the scheme against other projects in Australia and internationally. Some of the benchmarking is technical – such as size of floorplates, and others are more subjective, relating to the quality of the environments created and sustainability outcomes.



RSHP design forum



Port Authority Bus Terminal, New York



World Trade Center, Tower 3, New York



Lloyd's of London, London



88 Wood Street, London



Broadwick House, London

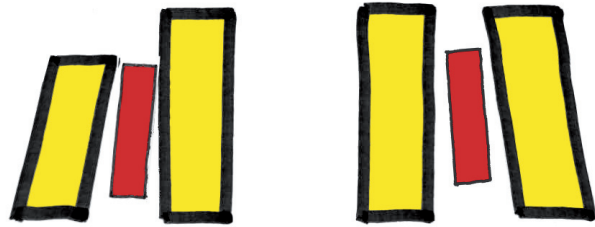


Lloyds Register of Shipping, London

2.2 Design Evolution

2.2.1 Tower Arrangement

March 2009



Our initial proposal was predicated on two pairs of towers sharing facilities and creating a civic plaza between them. The geometry responded to the opening up of the water inlet.

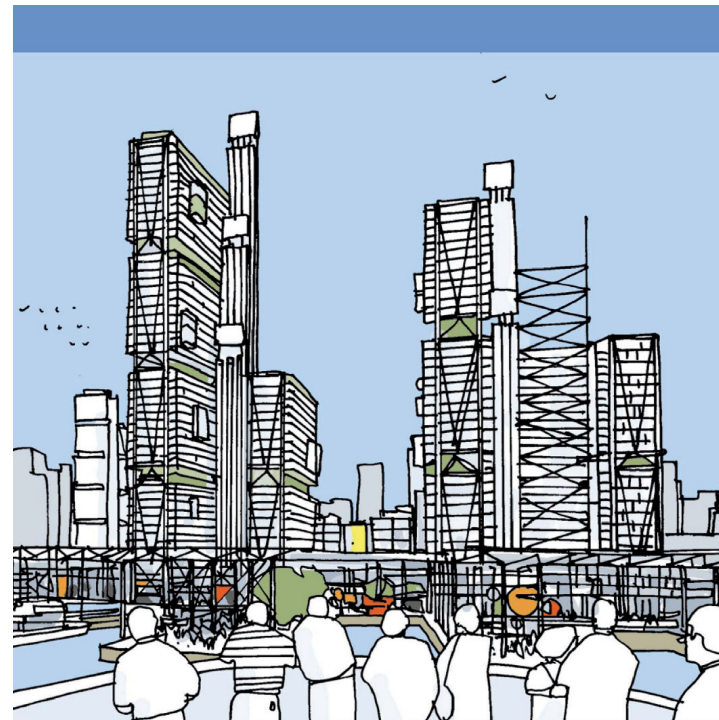
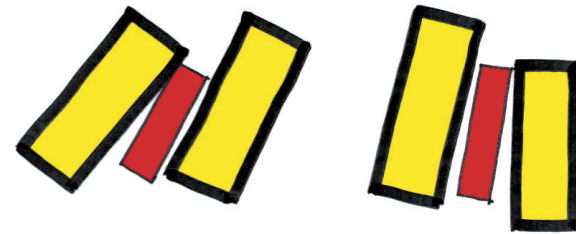


Illustration of March 2009 proposed scheme

November 2009

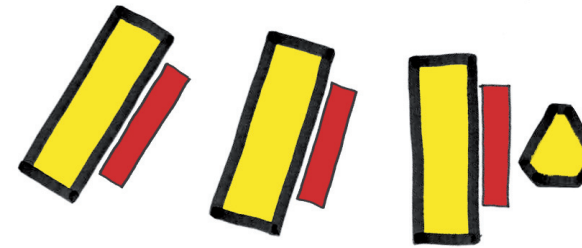


This arrangement maintained two pairs of towers and reorientated them into an arrangement with smaller streets at the ground level.



Illustration of November 2009 proposed scheme

April 2010



This arrangement proposed three towers instead of two pairs to open up the Margaret Street corridor and to reduce the bulk of the towers. The reduction in commercial area was off set by the introduction of waterfront low level buildings. It also moved the principal plaza to the waterfront.

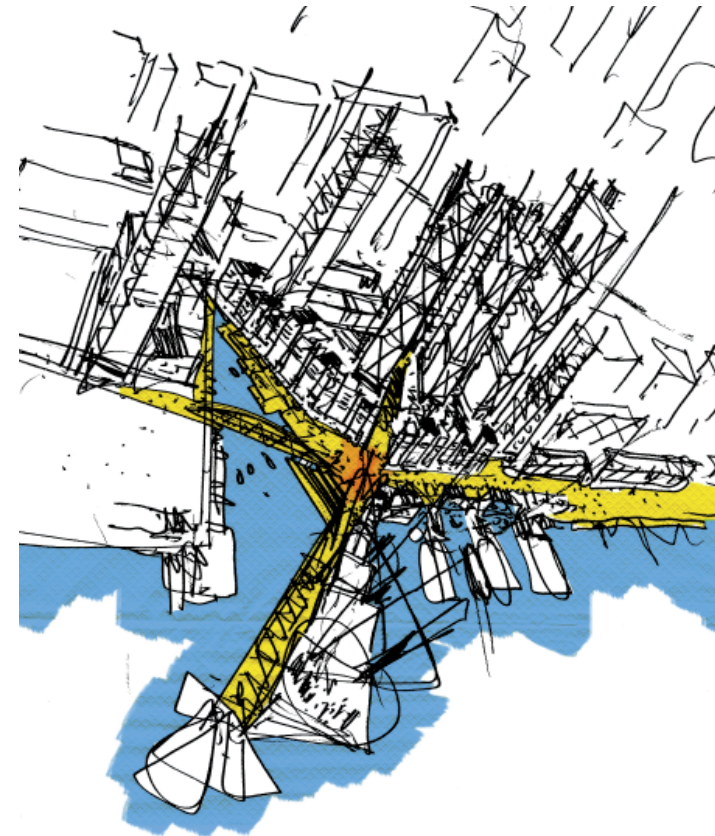
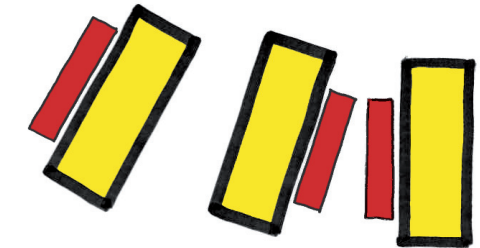


Illustration of April 2010 proposed scheme

June 2010



This arrangement proposed creating combined lobby/laneways in the secondary East/West streets.

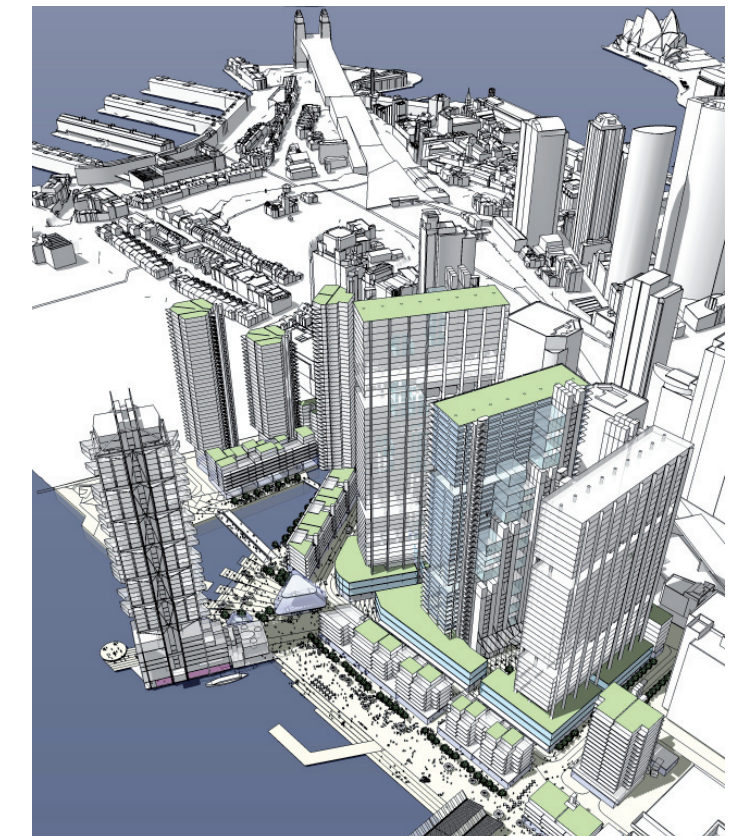
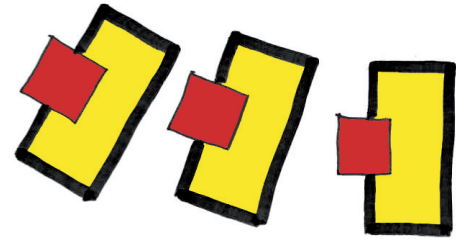


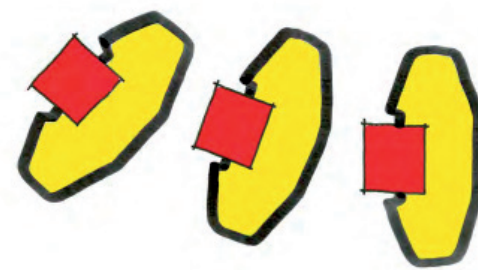
Illustration of June 2010 proposed scheme

September 2010



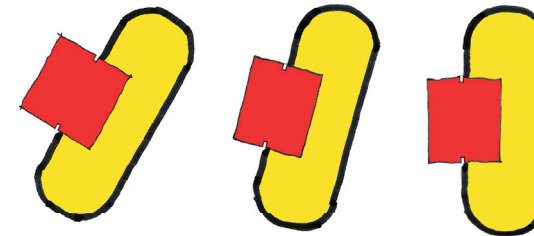
This arrangement refines the two southern building's lobbies to create a clear street network between each tower which are orientated in the best way environmentally.

February 2011



This arrangement retains the overall orientation but tapers the plan form providing greater space between the towers. The tower entrances are placed on the east west civic streets providing a greater mix strengthening these routes.

August 2011



This arrangement retains the overall orientation but the towers plan is modified to curve, reducing the perceived building bulk and improving the towers solar performance. The tower entrances are unchanged, placed on the east west civic streets providing a greater mix strengthening these routes.

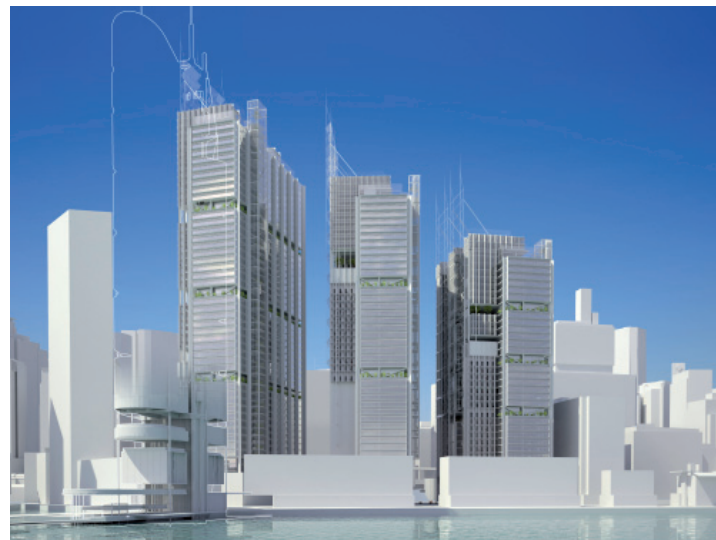


Illustration of September 2010 proposed scheme



Illustration of February 2011 proposed scheme



Illustration of August 2011 proposed scheme

2.2.2 Floor Plate and Core Arrangement



Active lift



Inactive lift



Escape stair



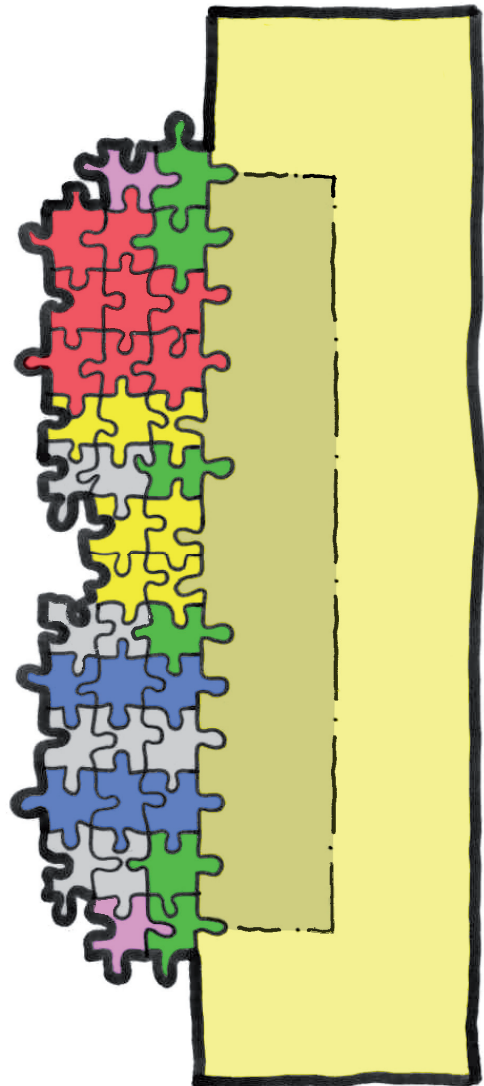
Toilet



Service riser

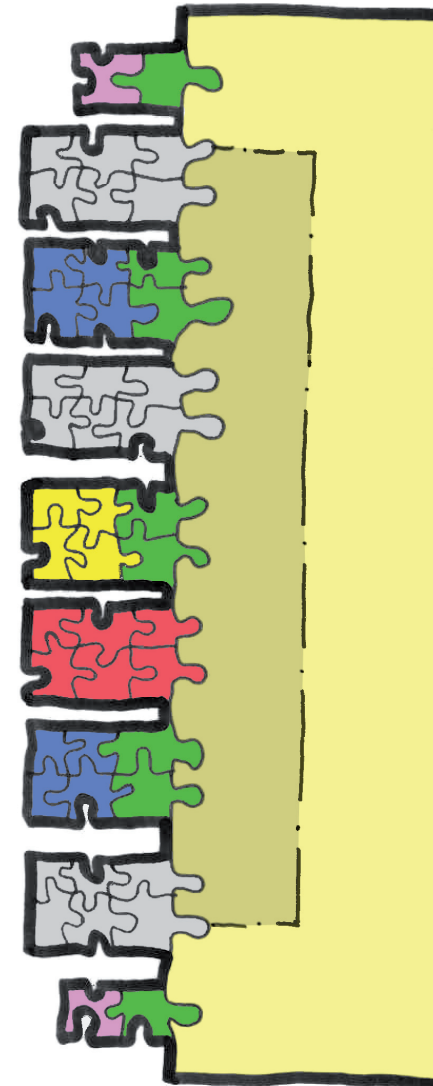
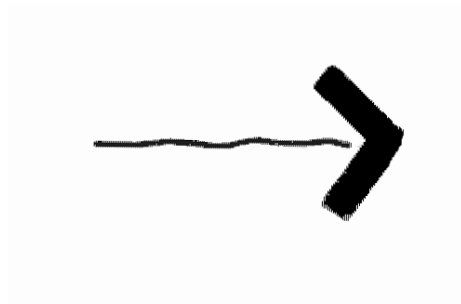


Break-out space

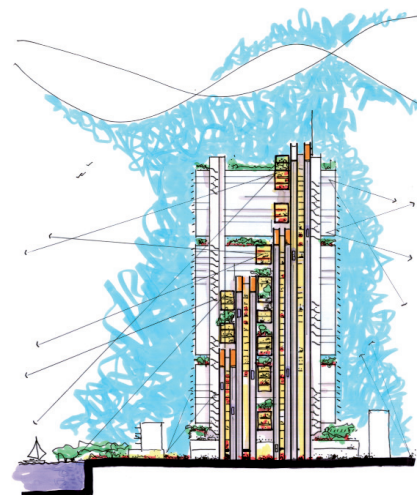
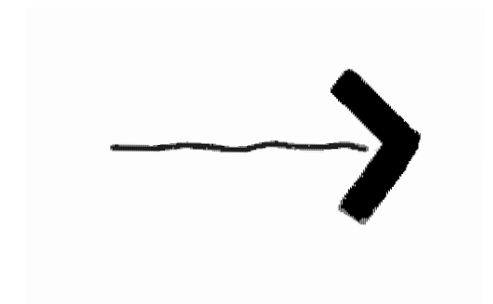


The starting point for the development of the commercial floor was an open floor plate of a size and flexibility of space to suit the market demands.

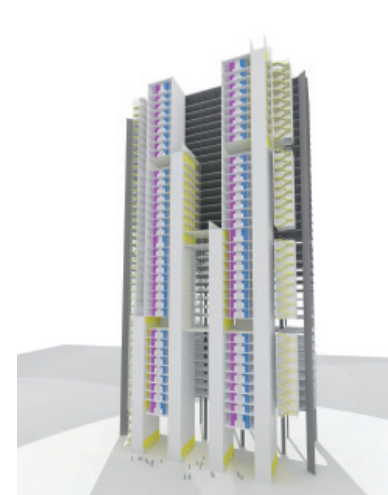
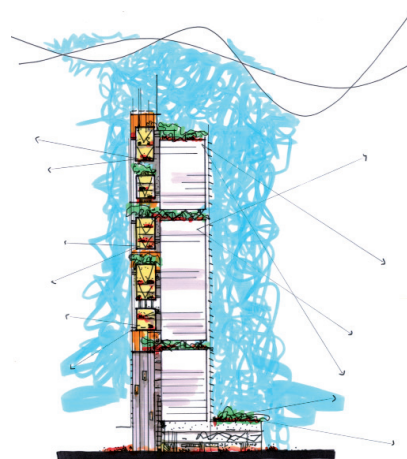
The complexity of a tower building over a simple low rise results in a highly bespoke and complex core that causes a proportion of the floorplate to diminish in quality.



The second iteration organises the various fixed and flexible core components in a way that creates a basic chassis. The spaces between these rational cores improve the daylight aspect but do not sufficiently solve the qualitative issues.

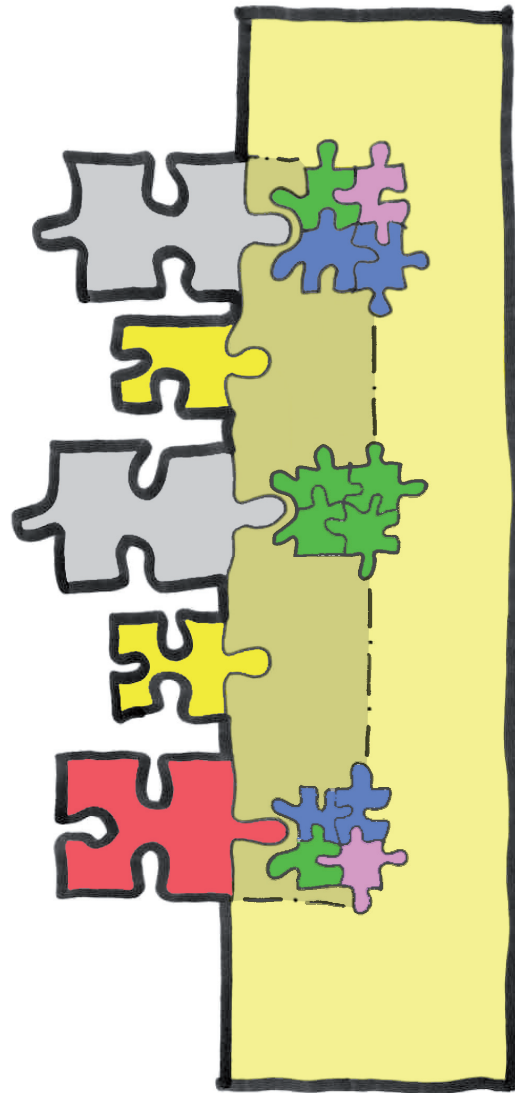


Early sketch elevations

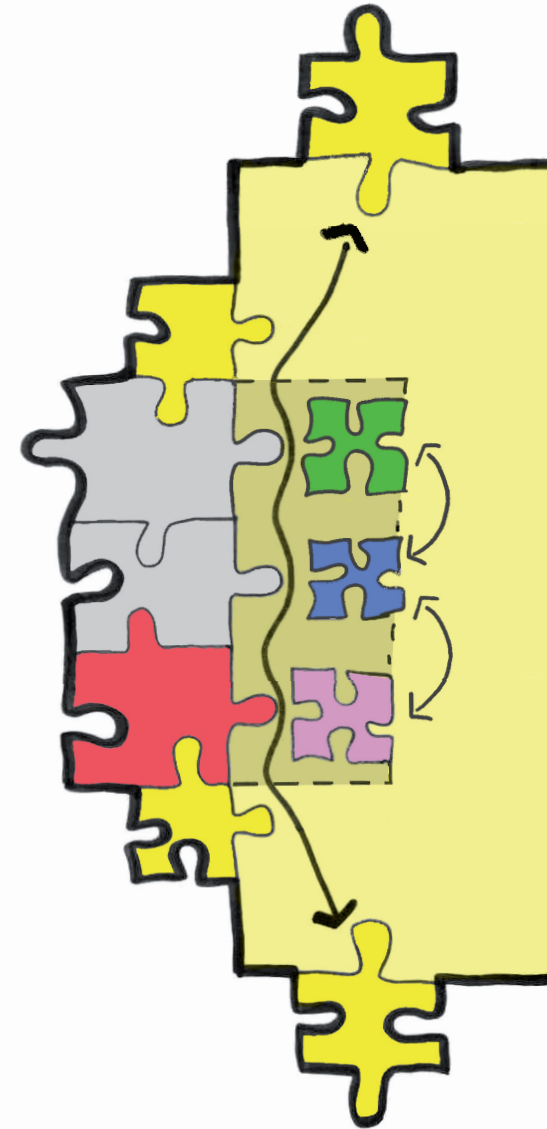
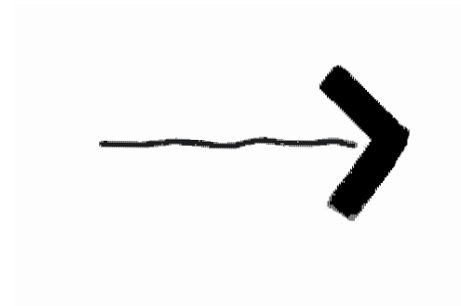


Early modelling of concept design

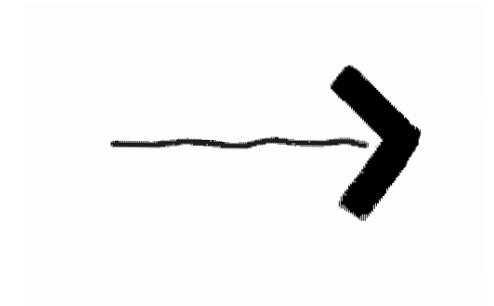




The third iteration sacrificed the clear rectangular floor by placing the more flexible core elements within the shadow of the fixed elements. The lift banks are reduced from four to three and the area lost on the floorplate was reclaimed in special spaces above the lift banks, increasing the visible mass. Market testing also proved that the smaller floor arm was less attractive to tenants.



The fourth iteration rebalanced the uninterrupted floorplates with the more specialised spaces and created a relationship between them. The stepped form of the lift cores was re-introduced by widening the building slightly to maintain floorplate area. The prows at either end of the building were articulated to reduce apparent mass and to give scale.



Early modelling of concept design



Early modelling of concept design

2.2.2 Floor Plate and Core Arrangement



Active lift



Inactive lift



Escape stair



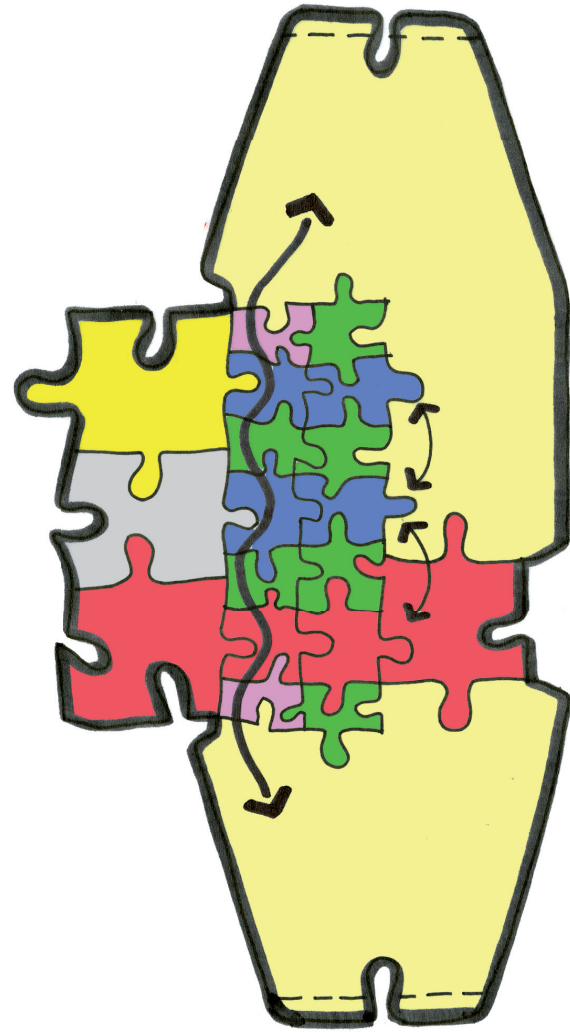
Toilet



Service riser

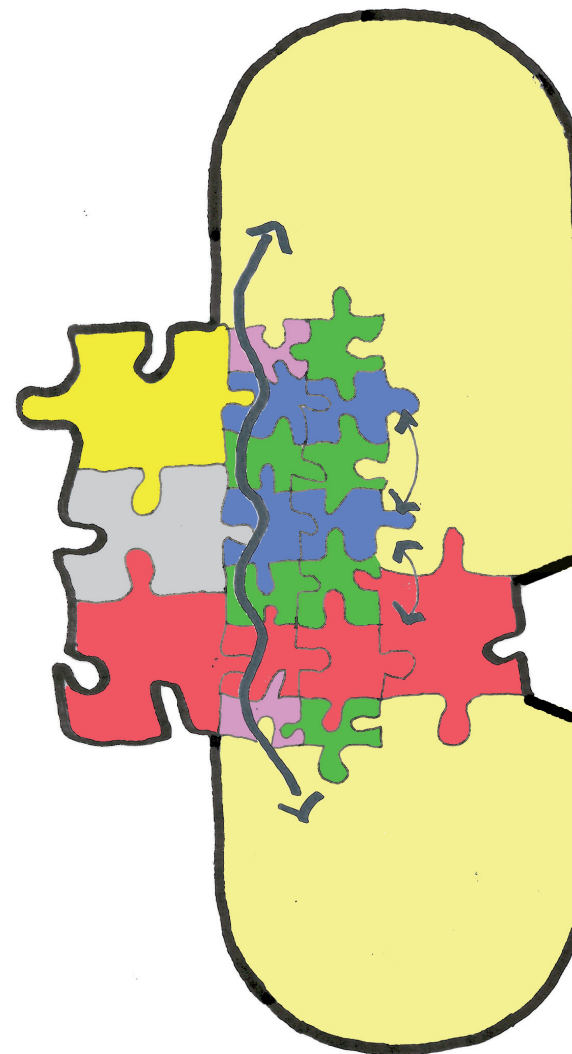
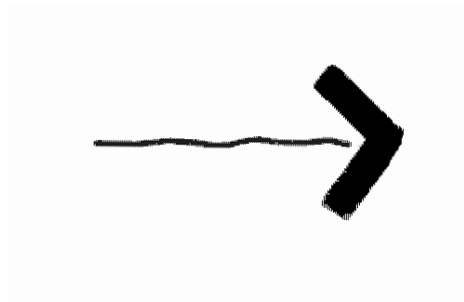


Break-out space



The fifth iteration creates a stronger reading of both the plan arrangement and the tripartite tower composition by contrasting the promontories and the centre of the building through expression of the structure through the central section.

The bay windows have been absorbed into the main body of the building to form a smooth single entity. The width of buildings ends have been maintained but a curved corner profile reduced the perceived width and length of the building.

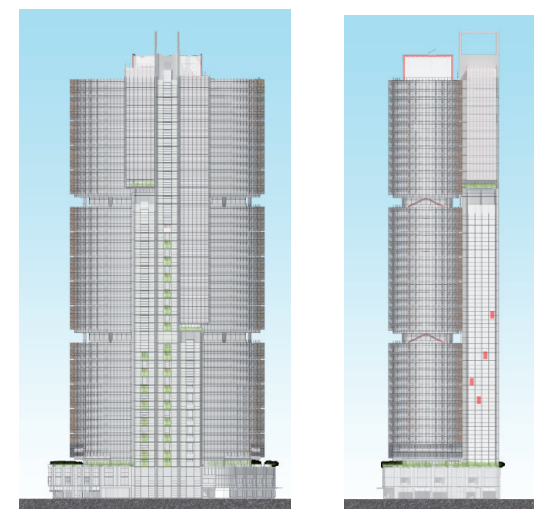


The design for C3 maintains a strong reading of both the plan arrangement and the tripartite tower composition through expression of the core and the recession of building facade.

The corners of the tower are softened to create curved ends. These curved ends further reduce the perceived width and length of the building. The design reduces perceived bulk and is further supported by the use of external vertical facade elements.



Illustration of concept design



Elevations of proposed scheme

3

SITE ANALYSIS

3.1 Site Analysis

3.1.1 Local Environment

Barangaroo faces directly onto the harbour, looking west towards Pyrmont and Balmain, north west to Goat Island, with Lavender Bay to the north. Behind it to the east rises the Kent Street apartments and the large-scale cityscape of Sydney's CBD. There are small-scale pockets of residential, community and leisure to the east and south of the site.

The site itself reflects the scale of the heavy industry once based here. It is broadly rectangular, with a straight dock edge and a fenced perimeter facing the city. Its key characteristic is the unrelenting flatness of the hard man-made apron. Not unlike a 'concrete backyard', it is singular and monotonous and lacking an internal network of streets or urban grid.

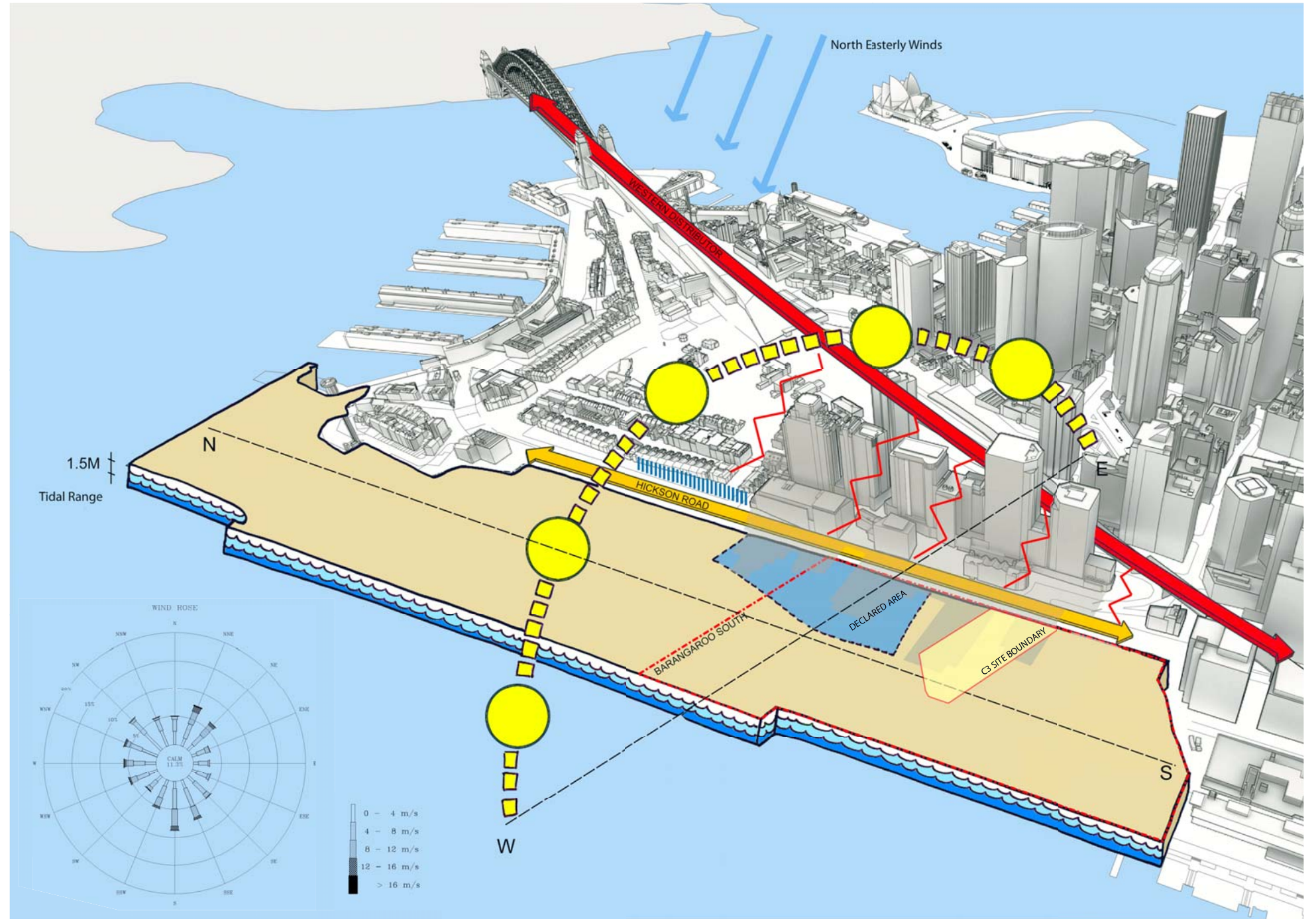
The site as it currently stands provides no shelter from the sun or wind and its composition of landfill and concrete makes it an inhospitable environment for any natural habitats.

Key Characteristics:

- 1.5m tidal range
- Noise from the Western Distributor
- Breezes off the harbour and prevailing north easterlies
- Sun path and effects of shadowing
- A flat, man-made surface
- Department of Environment, Climate Change and Water (DECCW) Declaration Area
- Hickson Road is nearest existing street
- Low-scale residential and commercial in the immediate locale
- Sandstone cutting nearby

Challenges:

- Creating a sustainable environment
- Protecting from the harsh, south westerly winter winds
- Creating connections to the foreshore
- Capturing sunlight whilst providing shelter
- Creating variety, interest and a 'destination' at the waterfront
- Integration with the CBD



Site analysis diagram

3.1.2 Physical Constraints

With the natural shoreline effectively following the western edge of Hickson Road, Barangaroo is a man-made platform that has been used for commercial shipping since the 19th century. It is fundamentally an artificial, reclaimed part of the harbour, similar to the rest of Darling Harbour. The site occupied by Barangaroo South has been constantly changing and evolving over the last two centuries to adapt and meet the changing requirements of shipping and commerce. Today the site comprises a single rectangular hardstand apron that is the legacy of the advent of container shipping in the 1960s.

This apron hides and disguises the historical evolution of the site, and buries both its natural past and its archaeology. The existing ground conditions vary from areas of well compacted fill to those that are poorly compacted. To the south of the site is the future C4 separated by City Walk. C3 has been designed to work in conjunction with C4 to assist in the activation of City Walk, establishing and defining a strong viewing corridor from Hickson Rd down to the harbour.

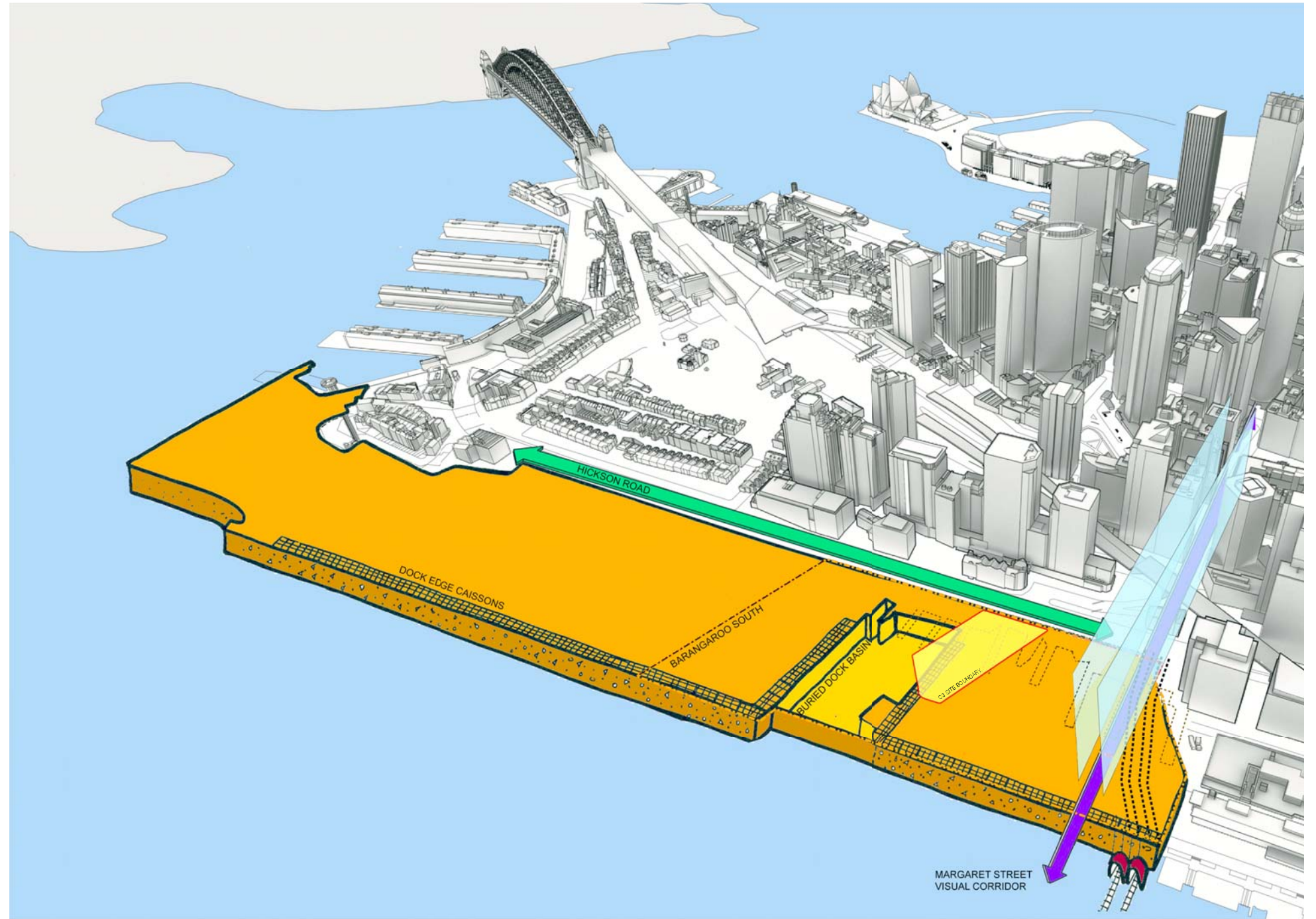
The topography that occurs at the eastern side of Hickson Road, which rises up to the city, currently presents a barrier in achieving a physical connection to the city.

Key Constraints:

- Reclaimed harbour primarily constructed from fill
- Existing buried dock basin
- Existing dock edge caissons
- Topography east of Hickson Road
- Sydney's frame for high buildings
- Consideration of the approved C4 building.

Challenges:

- Varying ground conditions with associated engineering challenges
- Remediation of contaminated land
- Maintaining view corridors
- Connecting to the city
- Protection of the harbour



Physical constraints diagram

3.1.3 Site Opportunities

The greatest opportunity is to reconnect the site and the water's edge back into the city of Sydney. Full access to the public along the entire waterfront can be achieved via a number of cross routes which can be activated by bringing the density of the CBD across Hickson Road to create a new vibrant community at the harbour's edge.

The topography of the eastern side of Hickson Road currently presents the first barrier in achieving this connectivity. Formulating the west side of Hickson Road unifies this road and enables it to be developed to carry all forms of traffic and future light rail. Its edge should be broken to allow for the retention of views from Hickson Road through the development to the water.

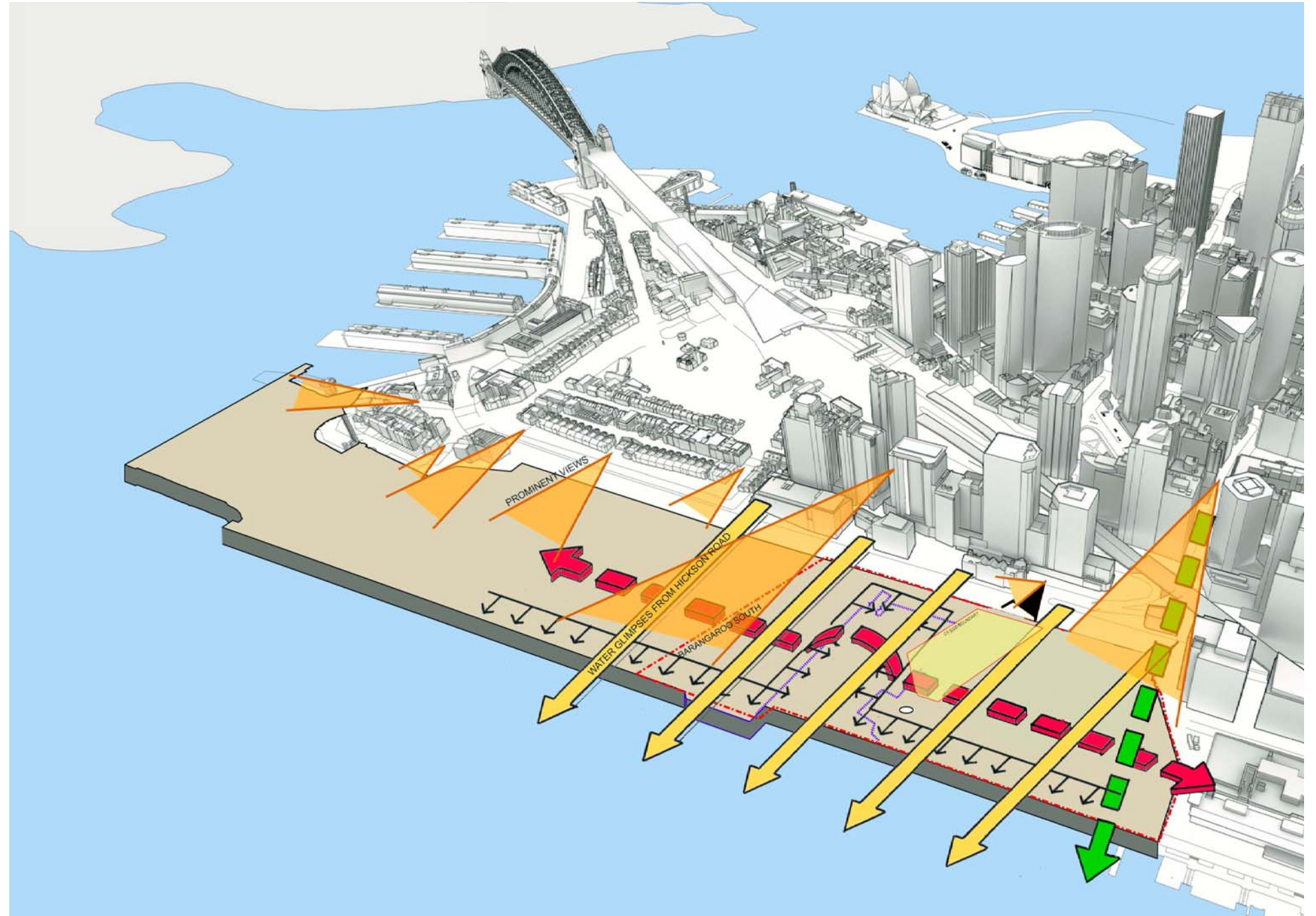
With these two defined edges, there is an opportunity to bring the CBD further west with greater permeability from high and low level connectors across Hickson Road. There is also an opportunity to connect across the bay through ferry terminals and possible future metro so the city can reinforce its connection with the inner-west.

Key Goals & Opportunities in the vicinity of C3:

- Repair and extend east-west and north-south connections
- Complete the harbour foreshore public walking trail
- Remake and reinterpret the southern cove
- Maintain important existing harbour views
- Activate waterfront edges through variety
- Capture views towards Darling Harbour and Balmain from the western sides of the building
- Availability of views towards the Harbour Bridge and Sydney Opera House at high levels of the building

Challenges:

- Creating a vibrant extension to the CBD
- Preserving existing views and creating new views across the site
- Permeability and accessibility
- Connecting to existing and proposed transport hubs
- Water views from Hickson Road
- Contain the site on its west and easterly edges with human scale built form



Site opportunities diagram

3.2 C3 Site within the Approved Concept Plan



Block boundaries diagram

4

URBAN DESIGN

4.1 Urban Design Vision for C3

C3 is the northern building of the three sibling commercial tower buildings of Barangaroo South forming part of the new urban quarter for Sydney. As part of a coherent masterplan, C3 plays an important role in the extension of the CBD.

C3's length is oriented on a north west - south east axis and arranged within the fan of three commercial towers of the Approved Concept Plan. This fan form creates a strong relationship between these buildings whilst allowing water views. It also provides view corridors for neighbouring buildings along Kent Street and for pedestrians within the new precinct. Additionally, the fan arrangement establishes a welcoming, open relationship for the CBD with the west.

Building C3 continues the strong city framework of tall buildings on the Sydney skyline. It forms part of a stepped composition that rises up from Building C5 (C5) to the south of the development.

At street level, mixed use podium buildings vary from two to four floors to create a human scaled environment that integrate Barangaroo South with the existing city.

The floorplate design of C3 accommodates for highly flexible offices of approximately 2,300m² NLA per floor. This arrangement has been developed in conjunction with potential tenants and space planning specialists. The arrangement allows for a visual continuity across the floorspace that responds to the demands of contemporary workplace planning.

A series of interstitial communal break-out spaces known as Vertical Villages encourage communication and social exchange between users and visitors. It is envisaged that these spaces will offer opportunities for a dynamic, flexible space tailored to user's needs.



Illustration of building C3 as part of an ensemble of three towers

4.2 Site Context



Illustration of the Approved Concept Plan

4.2.1 Approved Concept Plan MP06_0162 Modification No.4

The Approved Concept Plan establishes the urban design principles and planning framework for the redevelopment of the 22-hectare Barangaroo site. It articulates the desired outcomes for the precinct and sets the broad parameters for sustainable redevelopment through a series of concept strategies. Building C3 conforms to the requirements of the Approved Concept Plan. This is described in detail in Section 6.

4.2.2 Synopsis of Approved Concept Plan MP06_0162 Modification No.4

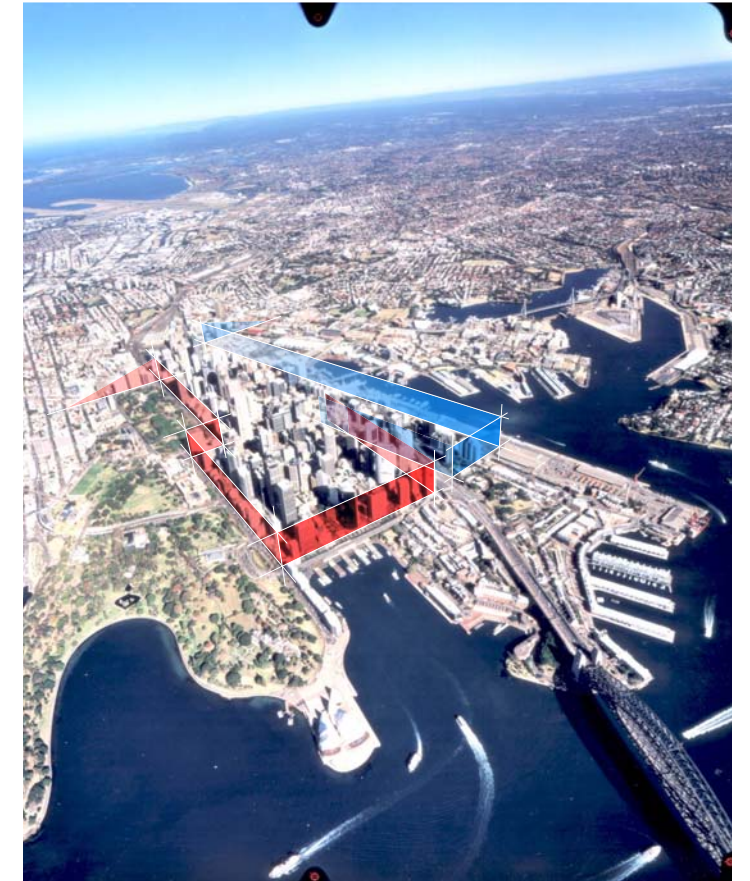
Framing Sydney

- A sense of place
- A sense of community
- Connected to the water
- Sustainable
- Taking the CBD to the western waterfront

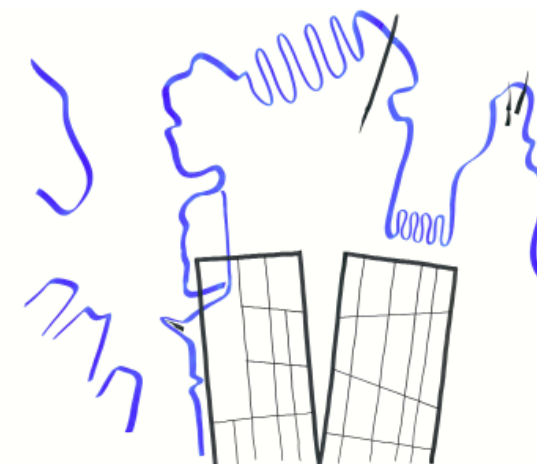
Sydney's elevated centre of tall buildings (indicated in red) against the lower level foreshore along the harbour forms the city's frame.

Sydney's frame is key to the Approved Concept Plan for Barangaroo. The Approved Concept Plan for Barangaroo South underpins the new north west edge to the city (indicated in blue) and reinforces the existing distinction in built development and parkland. The Approved Concept Plan will build on this frame by developing a harbour edge that will be home to commercial, residential, retail and entertainment spaces.

The development of the last large brownfield site in Sydney's CBD is book-ended by the western foreshore on one side and Hickson Road on the other. The redevelopment will be sympathetic to its neighbours and complementary to its city environment.



The framing of Sydney's CBD



Framing Sydney

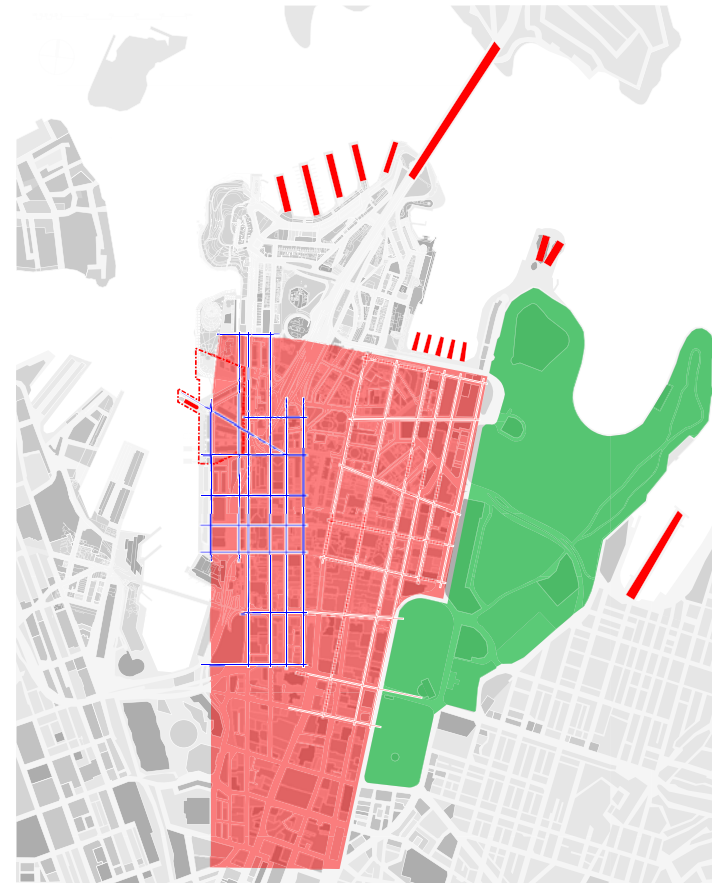
Restoring the Grid

- Connecting into the existing CBD
- Respond to the sun path and site boundaries
- Create an elegant skyline facing the water
- An environmentally-driven fanned grid

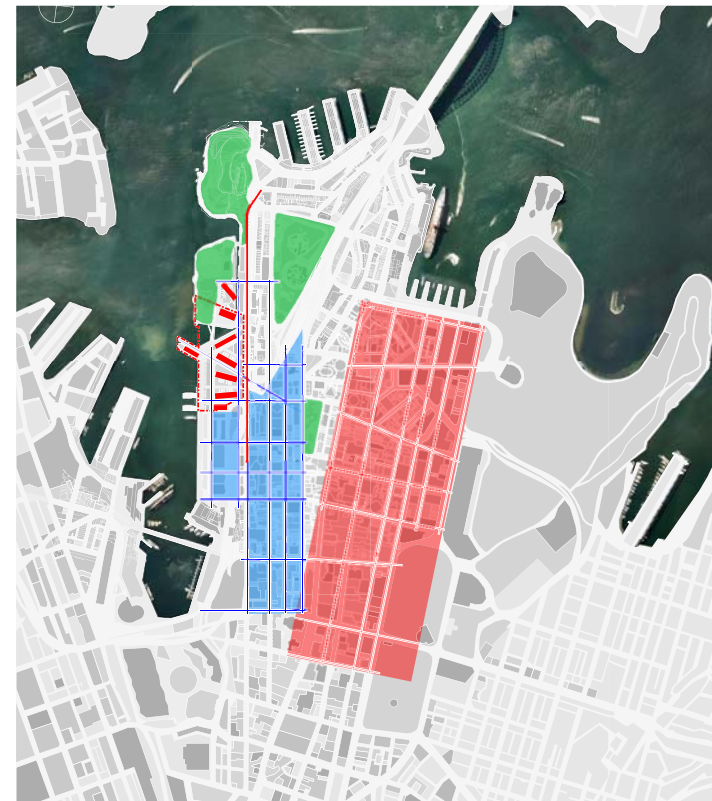
The existing city grid is abruptly terminated at Hickson Road through the cutting of the sandstone cliffs at the boundary of the old container port.

Barangaroo South locks into the city grid at the Hickson Road perimeter of the site. It then follows a radial arrangement that responds to the sun path and site boundaries: the grid fans out. This maximises sustainable outcomes and responds to the changing nature of the site and its context with the city.

Hickson Road will be one of the key transport arteries, allowing people to move easily across the city from north to south. It becomes the sight-line that sets out the planning of the new city district of Barangaroo South.



Connecting to the existing CBD



The radial geometry connecting into existing grid

The Fan

- Solar penetration
- Elegant and slender buildings to complement the city skyline
- Dynamic
- Opening towards the water

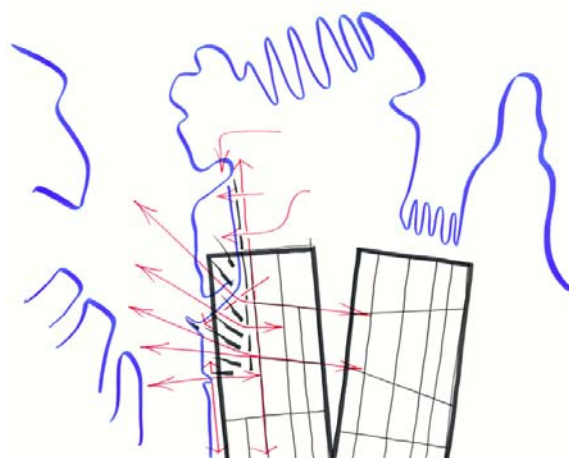
A radial, fanned arrangement is introduced to respond to the changing nature of the site and its context with the city. This change in geometry is deliberate, providing for deeper solar penetration into the spaces between buildings. This move changes the character of the buildings' silhouette on the skyline and helps temper the density of the development that is established by the grid as it nears the waterfront.

In contrast to a rectilinear grid, the fan establishes a more democratic arrangement eliminating distinction between absolute waterfront and second tier sites.

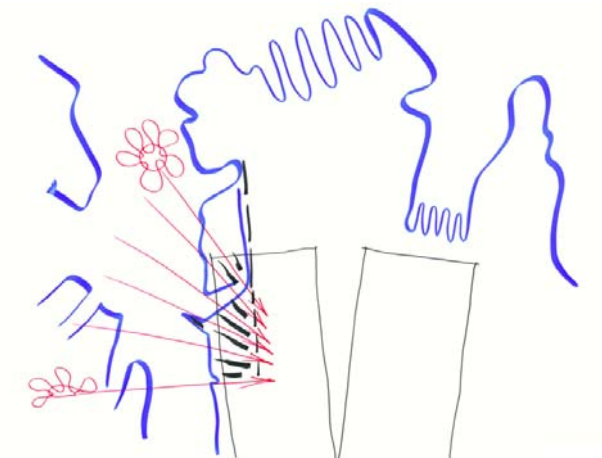
This solution provides daylight and sunlight to ground level and to the public areas.



Fan opens up views and solar aspect



Restoring the grid



The Fan

A Place for the Future

- Carbon neutral and water positive
- Low energy buildings
- Climate responsive design
- Future-proofed infrastructure
- Sustainable transport strategy

At the very heart of the design philosophy is a complete and total commitment to creating the world's leading sustainable community. Our project's aspirations are to reach for new standards in sustainable design, with Barangaroo South becoming the world's first carbon-neutral, zero waste, water positive development.

Barangaroo South will not only showcase commercial buildings of 6-star environmental standards, but it will help make sustainable living a natural and easy way of life for its community.

The development will be climate positive as well as socially and economically diverse and sustainable; the buildings will be healthy and smart, tuned to their environment.



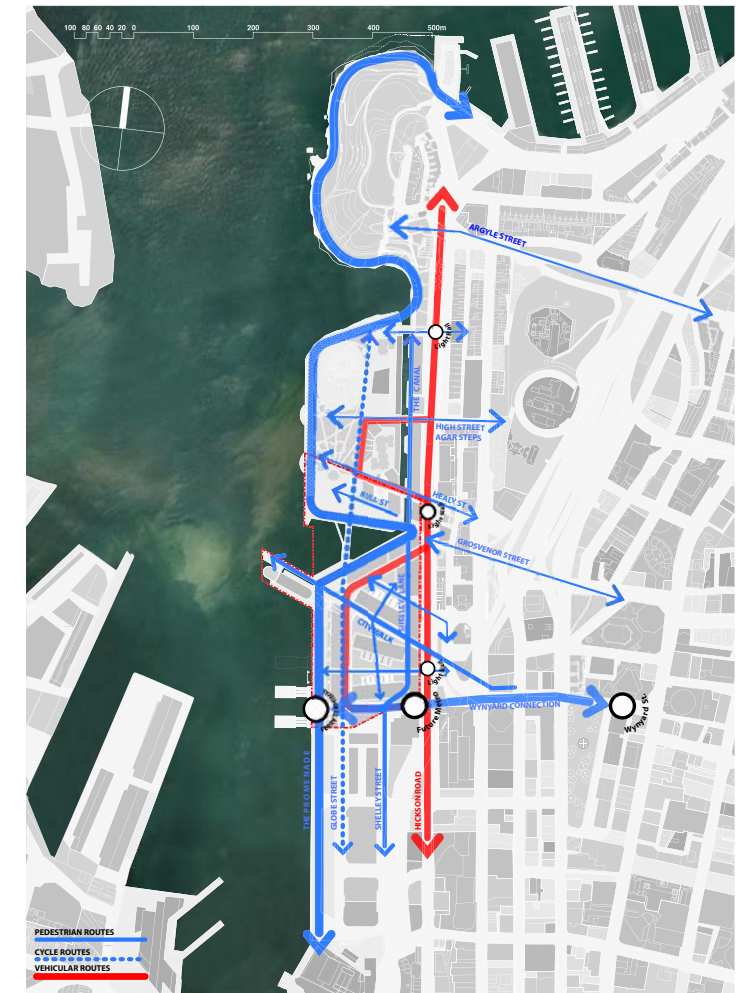
Barangaroo site-wide sustainability

Connections

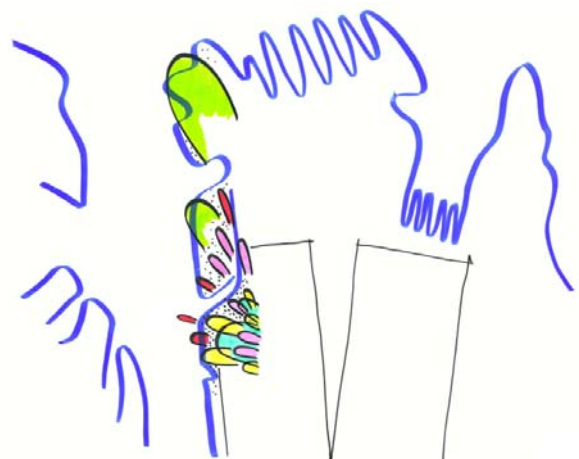
- Integration with the Sydney CBD
- An expansion of the city
- Repair and extend east-west connections
- Create new north-south connections
- A public waterfront accessible for all
- A catalyst for developing Sydney's infrastructure

Barangaroo South will establish connectivity across the city core from east to west, and will promote a better quality public realm within the existing city core. It will inspire and link together existing and new forms of public transport, providing the gateway to and from the west.

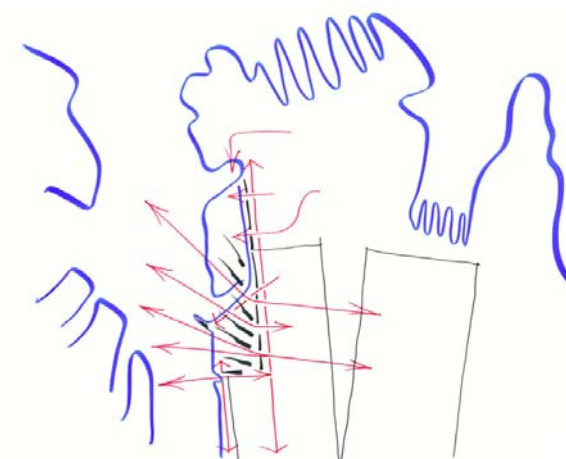
The introduction of ferries, the proposed new light rail and Wynyard Station links will make Barangaroo South one of the most connected places in the city. This in turn will generate greater future activity to the south and east, re-balancing the city and encouraging vibrant high density interaction at the harbour's edge.



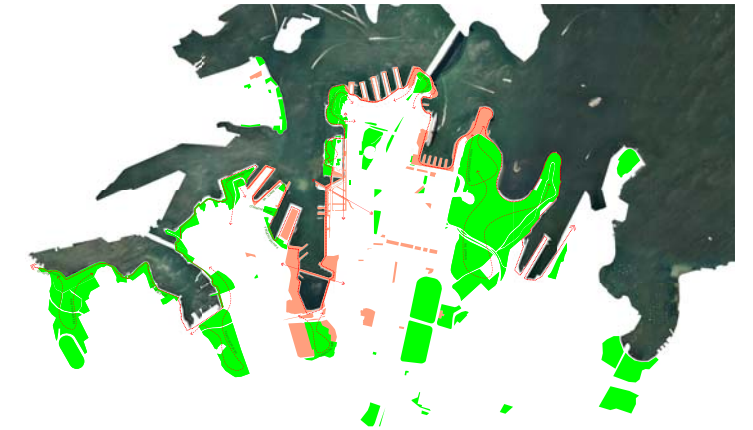
Pedestrian and vehicular connections



A place for the future, spaces, a mixed use community



Connections



Accessible public waterfront

Gateways and Markers

- A marker along the foreshore
- The focal point for Barangaroo South
- A new Sydney landmark and attraction for visitors frames the new public space
- A cultural focus
- Communal and accessible to all

Memorable cities in history are marked by the clear reading of contrasts between the major monuments and the built form of the rest of the city. The contrasts between the spires and domes of historic European cities with their general urban fabric give these places their memorable image.

In Sydney, its colonial-era monuments (such as Town Hall and St Mary's Cathedral) have been eclipsed by the high-rise development of the last 40 years. However, the freestanding nature and the memorable form of the Sydney Harbour Bridge and Sydney Opera House and their connection with the harbour have given them a key role in the image of the city.

The Barangaroo South Approved Concept Plan continues this theme, developing buildings of distinct character alongside the water's edge without crowding the water or limiting its access by the public.

The scheme for Barangaroo South has three generic categories of buildings: "landmark" or foreground buildings, core buildings and space-defining edge buildings.

The landmark buildings are the Hotel and Cultural Centre. These are both structures with a memorable sculptural form and are accessible by the public. They define the Southern Cove water body and create a unique sense of place.

The core buildings are the three principal office towers, sitting on podiums that define a network of pedestrian spaces and laneways and the high rise apartment towers. Richly articulated with radial geometry and variable heights, they provide the bulk of the space within the development.



The 'Cultural Ribbon'

The edge buildings are the residential ribbon and Hickson Road frontage colonnaded buildings. These mediate between the established scale of the Darling Harbour foreshore development to the south and the historic context of Millers Point to the east and north. These buildings are of human scale and contrasting character. They respond to the specific requirements of the public spaces and waterfront and achieve the same urban design objectives proposed by the podium elements in the Approved Concept Plan, including the creation of human scale buildings around the main public spaces to improve climate outcomes.

Barangaroo will provide a missing link in the series of facilities and attractions that represent the current cultural ribbon around the Sydney city foreshore. This ribbon supports the city's identity and enhances Sydney's reputation as an internationally-recognised and unique cultural experience.

Land Spaces

- 24hr public access to the waterfront
- Overlapping activities for dynamic and active spaces
- Priority given to people, not cars
- Redesigning Sydney's vernacular
- Creating variety and interest at street level

The ambition for Barangaroo South is to establish a sequence of desirable public spaces that will become icons for greater Sydney. Barangaroo South will constitute a critical mass of overlapping activities and building uses that promote live-work-leisure-learn in one dynamic vibrant quarter that is in itself a natural extension and development of the surrounding city.

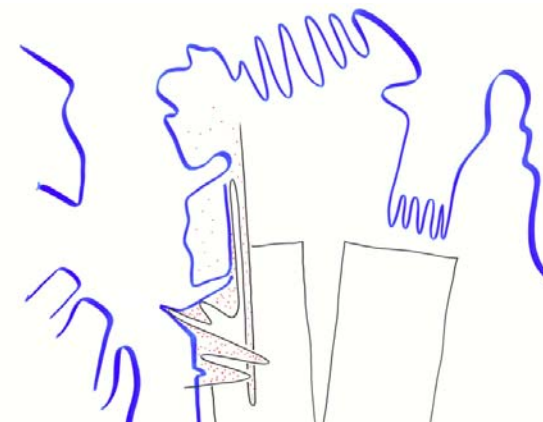
It will prioritise the public realm and everyday experience for workers, residents and visitors. The selection of materials will also be prioritised in pedestrian trafficked areas.

It will be of its place, a present day vernacular that promotes sustainability and celebrates Sydney's diversity, climate and lifestyle.

It will provide full public access along the entire waterfront and to all major public spaces.



Activities, spaces and streets



Gateways and markers

Waterfront Spaces

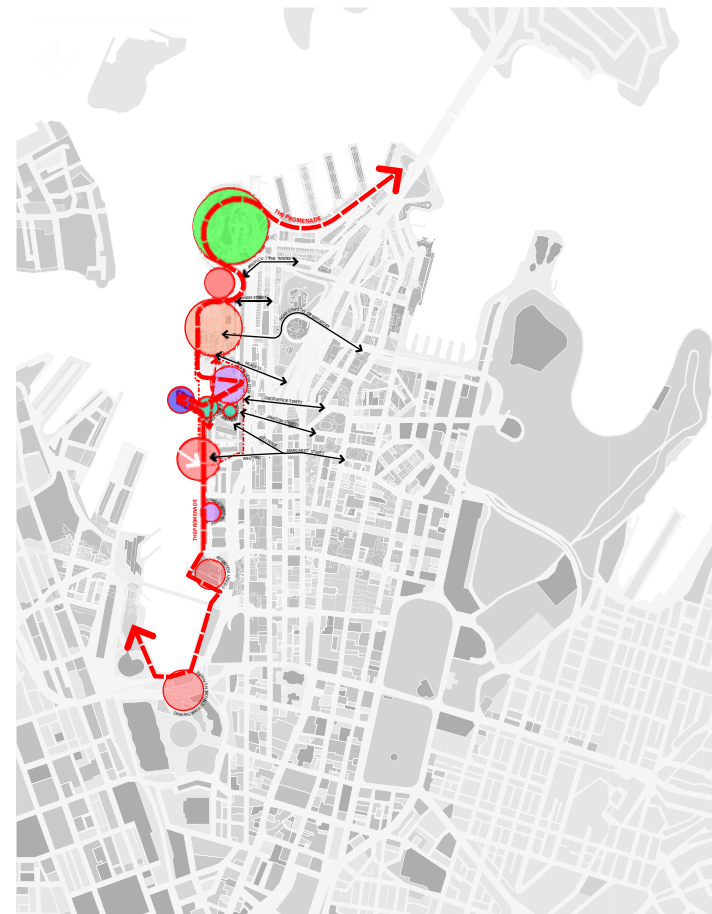
- 100% Public Access
- Varied waterfront spaces, extended water edge experiences.
- One of the world's great waterfront promenades
- Bringing water back into Barangaroo

Barangaroo returns 2.2 kilometres of prime waterfront to the people of Sydney and will complete an uninterrupted 14 kilometre walk stretching from Woolloomooloo all the way to the ANZAC Bridge - one of the world's great waterfront walks.

Within Barangaroo South, the promenade is framed by low rise residential buildings to the city side, activated by retail and leisure activities at ground level.

The enlarged Southern Cove is at the location of the last piece of water in-filled in the 1960s to create the container port. It is emphasised and framed by creating an inflection in the foreshore walk and water's edge, with the introduction of a new pier and hotel. The pier frames the enlarged southern cove and provides new vistas of Darling Harbour and the Inner West Suburbs and provides a public space in and around the Hotel. It takes the form of a protective arm, sheltering the new cove and new waterfront square.

The waterfront square extends the breadth of waterside activity by bringing people to the water level to get their feet wet. It is also a place for enjoying the Sydney sun. This space nestles at the heart of the site, is intimate in scale when compared to the harbour edge but large enough to provide a major focus of water activity.



Augmenting the 'Cultural Ribbon'

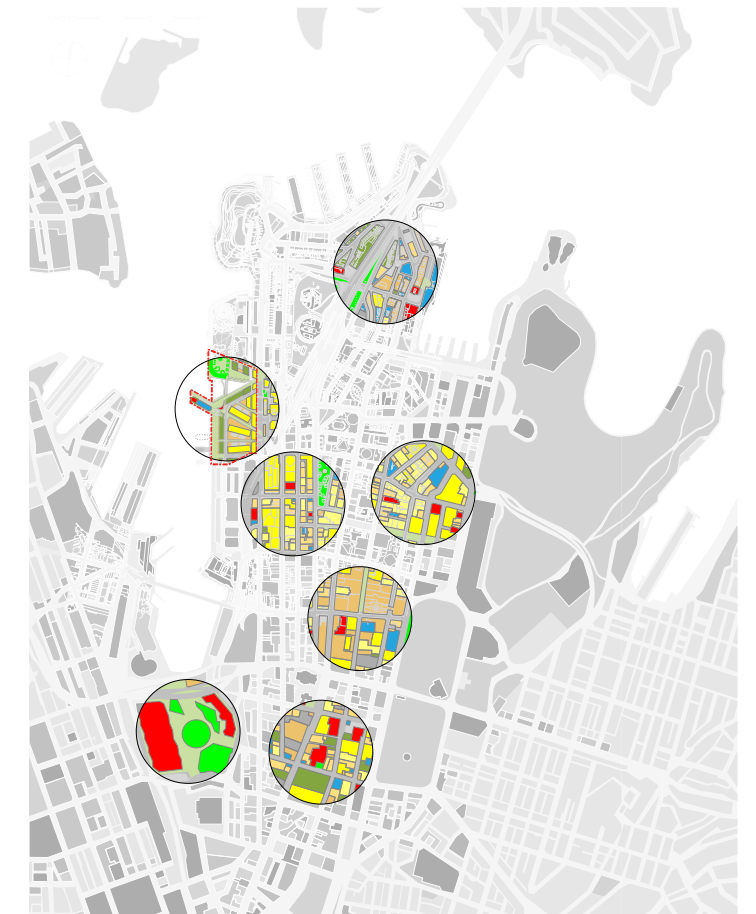
A Mixed Use Precinct

- Urban heart of the Barangaroo area
- An appropriately activated community
- A destination along the Cultural Ribbon
- Appropriate amount of residential space.
- Diversity in building types and uses

Barangaroo South will form the urban heart of the greater Barangaroo redevelopment. It is an opportunity to extend the CBD west, bridging Hickson Road and completing the city grid. To be an effective extension to the west of the existing CBD, it will need to provide a diversity of uses and functions to guarantee it becomes an active and vibrant part of the city.

Within the Approved Concept Plan there is a clear definition of building uses and typologies, which are all held together to create a unified precinct. The Approved Concept Plan proposes residential towers to the north and south forming bookends to the development; a low-rise ribbon of predominantly residential buildings facing the harbour; and commercial buildings facing Hickson Road. Framed between these are the three commercial towers with retail and office entrances activating the base and podiums ensuring a human scale at street level.

A variety of building forms will reflect the mix of uses and allow the precinct to meet the changes of the future. By ensuring that Barangaroo South is not dominated by a "single building" typology, the precinct will be more adaptable to the changing needs of commerce and the increasing shift in live-work arrangements. This mix of uses is also positive for the Environmental Sustainability Platform through having a variety of energy demands at different times of the day and night.



Diversity of uses around central Sydney

Completing this community of buildings in the heart of the site are the Hotel and Cultural Centre. These will offer a variety of functions and programs that appropriately activate the precinct 7 days a week with a high through put of different uses throughout the day. Linked in with the wider cultural ribbon of the city, Barangaroo South will become a destination in its own right.

A variety of retail and lifestyle offerings will support the needs of the new precinct and its neighbours, ranging from childcare, well-being, supermarkets, boutiques, major chain stores and an array of cafe's and restaurants.

4.3 Building C3 as part of the Approved Concept Plan

4.3.1 Sibling Buildings

The Approved Concept Plan for Barangaroo South is a direct development of the Lend Lease proposal of December 2009, with Rogers Stirk Harbour + Partners. A main tenet of that proposal was that the site be considered as an entity and the principal tall buildings conceived as a cluster, working harmoniously together to give a sense of identity and place to the whole site - a place which will be specific to Barangaroo.

The scale and nature of the Barangaroo South site is unique. It presents an opportunity to work holistically - to compose a group of buildings that define the place at both city and street scale level and create an authentic and genuine new precinct for the city, rather than simply three new unconnected buildings that compete with each other visually and at the ground plane.

Our approach to this opportunity is to create a composition of towers that dialogue with each other that clearly frames the place at macro and micro

levels. This composition carefully exploits the privileged position Barangaroo enjoys by the water, recognising a key objective of the scheme; place-making on the waterfront. C3 is the largest of the three towers and has the most prominent position with respect to the north facing skyline of the CBD. It has a role within the composition to mark the peak of the ascending forms.

In plan, the scheme's key strengths come from a fan-like arrangement of principal streets and tall buildings, focusing both on the primary connection with the existing CBD and Barangaroo South's role in opening the city outwards towards the west. This is a contemporary arrangement of built form that is informed by environmental and social concerns. The three principal buildings are carefully composed for neighbourliness, view sharing, solar access and protection, democracy of space and connectivity to the CBD.

The dialogue between the towers develops a balance of commonality and sense of place, with the buildings' orientation, height and architectural expression creating clear points of difference. We refer to a 'sibling' relationship between the buildings, where there is a clear DNA but where each expresses its own individual identity and responds to their relative location, to the environment (the single most important driving principle today) and to reflect tenant demands.

C3 is the bookend building of 'the fan' and is orientated so that its slender dimension faces the City and the water, allowing for clear views of the City when viewed from the harbour and vice versa. The skyline is highlighted at the rooftop levels with photovoltaics, sun-shading and articulated setbacks.

The tower is mediated at ground-level by an appropriate sized podium to activate the pedestrian realm. It also flanks the northern face of City Walk which connects the CBD to Globe Harbour, Barangaroo South's main space.

The three commercial towers and the spaces between them will create a strong landmark against the open space of the harbour. RSHP believes that place-making is about the spaces between buildings and not just about the buildings themselves. The plan form frames streetscapes and places which are surrounded by human scale low-rise buildings, arranged for optimum daylight and designed to provide variety so that people will be unaware of the tower's height above. All together the built form, with its spaces in between, will bring the CBD down to the waterfront and create a western gateway to the city - a unique identity for Barangaroo.

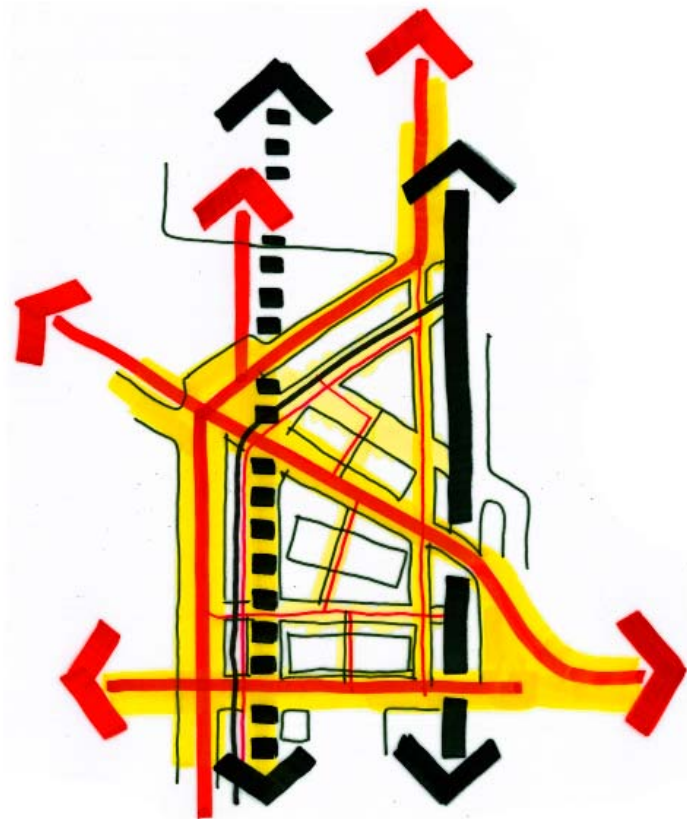


Illustrative early concept model of the three office towers

4.3.2 Ground Plane and Land Uses

One of the key design proposals of the Approved Concept Plan is to create a generous and permeable public realm at the lower levels of the buildings. Each tower's address, with clear and legible access, is off a civic street where the main flow of pedestrian traffic will arrive.

Material choices will be critical in the consideration of the ground plane of C3 and especially with respect to their use and context within the City of Sydney.

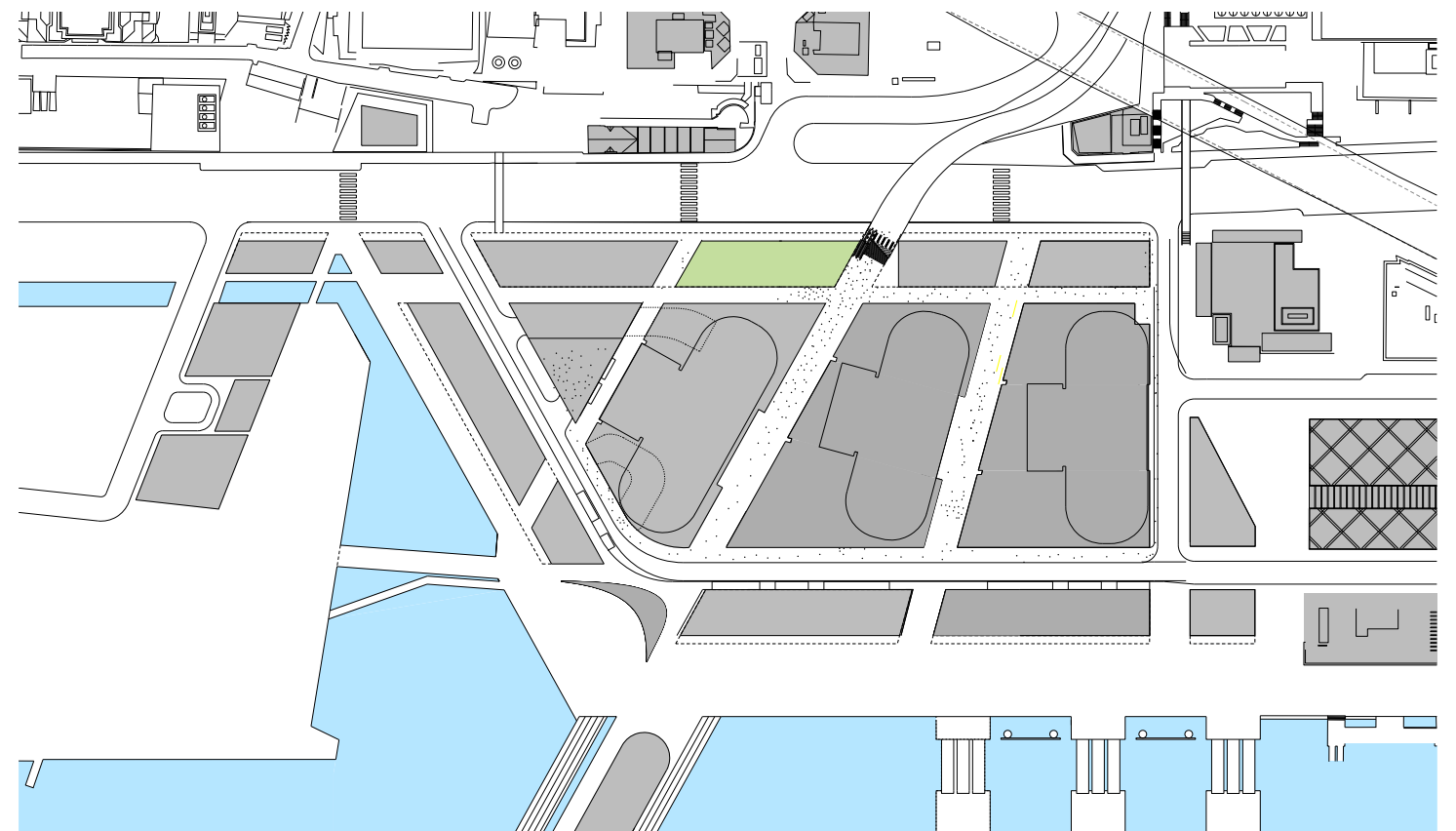


Connections

4.3.3 Pedestrian Access

Barangaroo South forms part of the city with permanent 24 hour public pedestrian access to the streets, lanes and the waterfront. The primary pedestrian access through the site is City Walk, a civic street and a major axis, linking the existing CBD to the proposed hotel and waterfront.

The transparency of the lobby provides visual connection, increases the permeability of the site and helps with pedestrian orientation and wayfinding. The mixed-uses at the street levels will attract a diverse range of people to the principal streets and lanes. Awnings and entrance canopies will protect the visitors and create a lively streetscape with a kaleidoscope of activities.



Temporary landscaped space

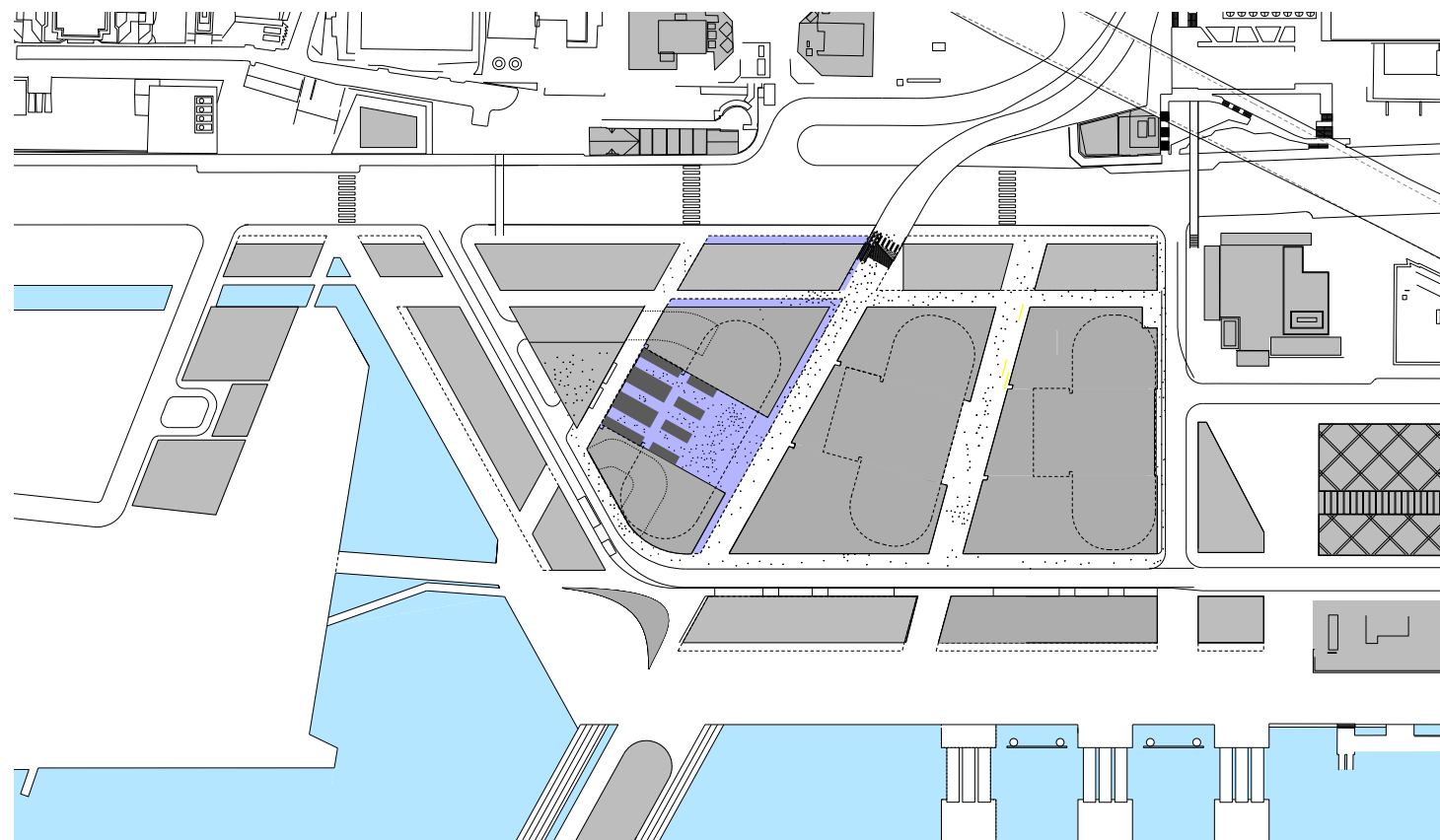
4.3.3 Pedestrian Access



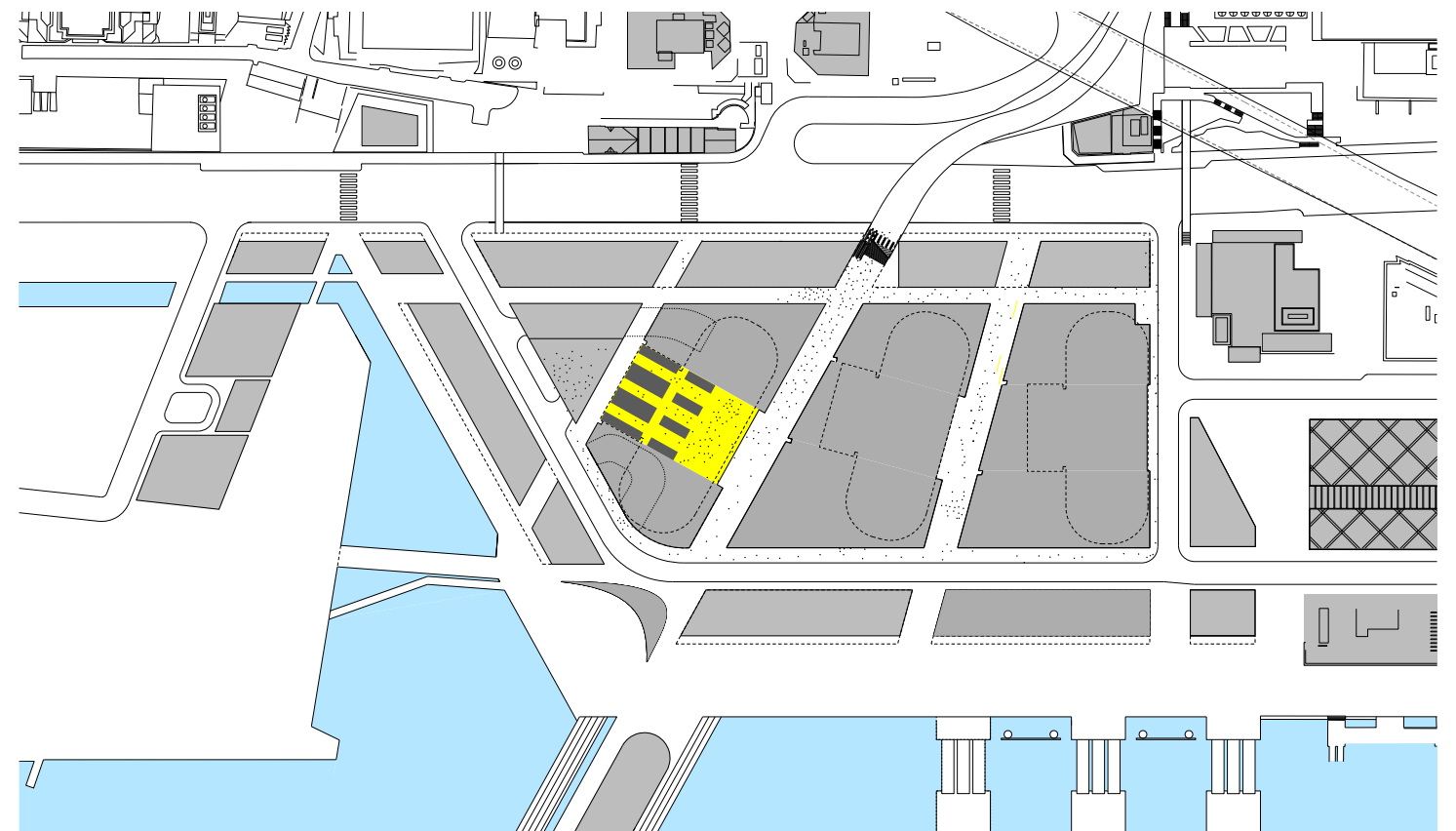
Streetscape activated with cafes on either side



Active civic street



Covered open space, awnings, canopies, colonnade, entrance halls, wind screens



Lobby Space

4.4 Massing Visualisations

View from North



Illustration of building C3

Artist Impression

4.4 Massing Visualisations

View from West



Illustration of building C3

Artist Impression

4.4 Massing Visualisations

View from Pyrmont Bridge

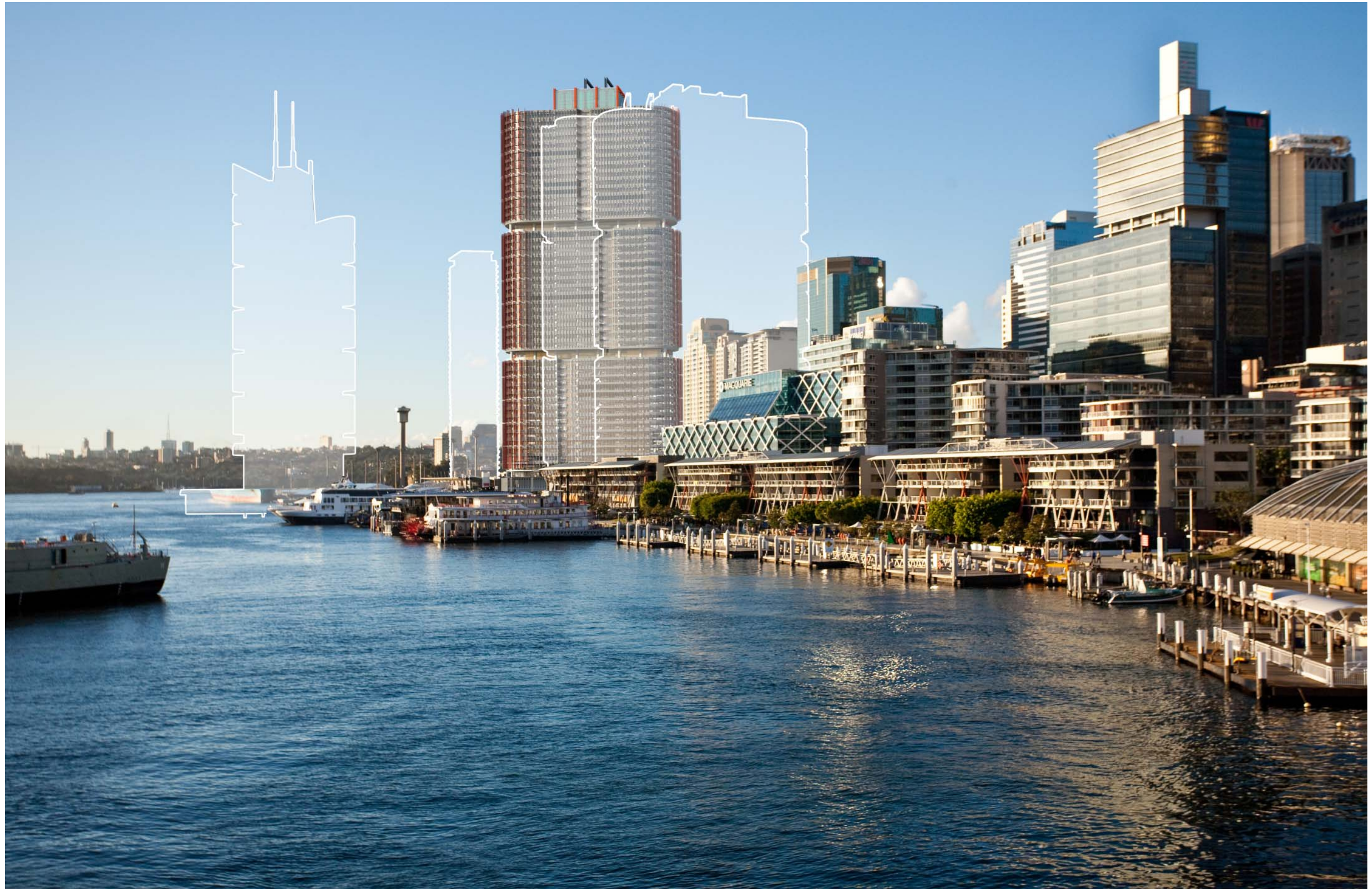


Illustration of building C3

Artist Impression

4.4 Massing Visualisations

View from Goat Island



Illustration of building C3

Artist Impression

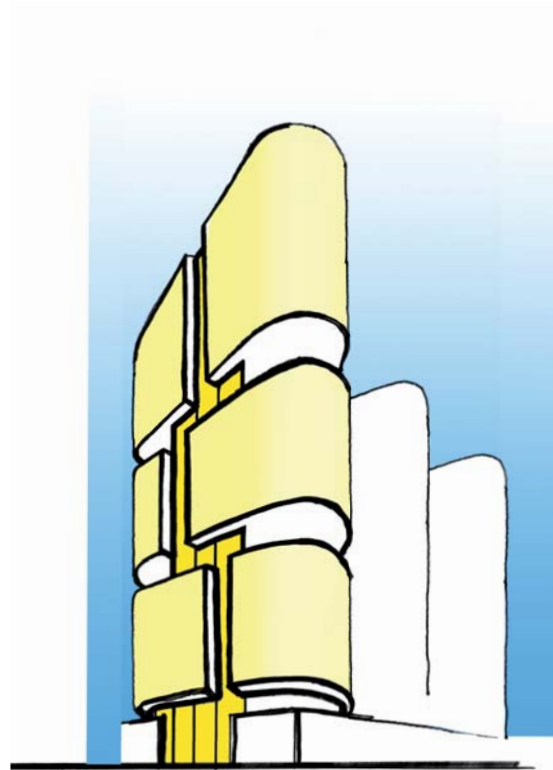
5

BUILT FORM

5.1 Design Principles

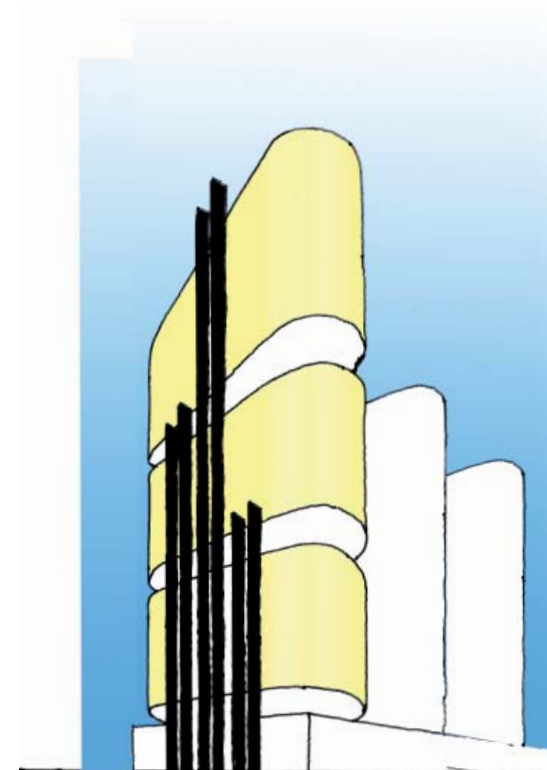
Among the key design principles for C3:

- World class sustainable design targets
- Simple flexible office floorplates of approximately 2,300m² NLA
- Communal break-out spaces known as Vertical Villages that encourage communication and social exchange
- Good access to daylight – generally no work station should be located further than 12-15 metres from the external wall to meet current day expectations
- High performance façades and building services that offer a comfortable and sustainable environment
- Maximisation of openness and views out from the building throughout its height
- Human scale at ground level
- Legibility of lift elements of the tower and a clear definition between served and servant elements of the building
- A structural solution which communicates the way the building is designed and built
- A variety of working environments by the provision of large office floorplates in combination with smaller, more task-focused and specially designed village areas
- Maintain views to and from the CBD to the water



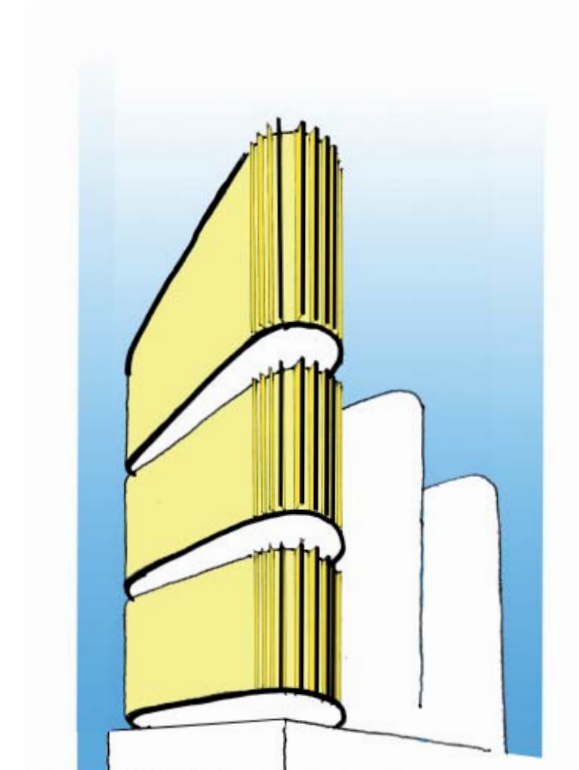
Visible connection to ground plane

Key structural elements of the tower visibly connect with the ground plane to provide legibility to the built form. This includes bringing the main service core and structural columns through the entrance lobbies. Large volume lobby spaces combined with highly glazed facades maximise the northern daylight and increase the visibility of this connection. This is further developed by exposing the columns at the plant floors and using the southern recess to signify the active lift lobby on the southern facade.



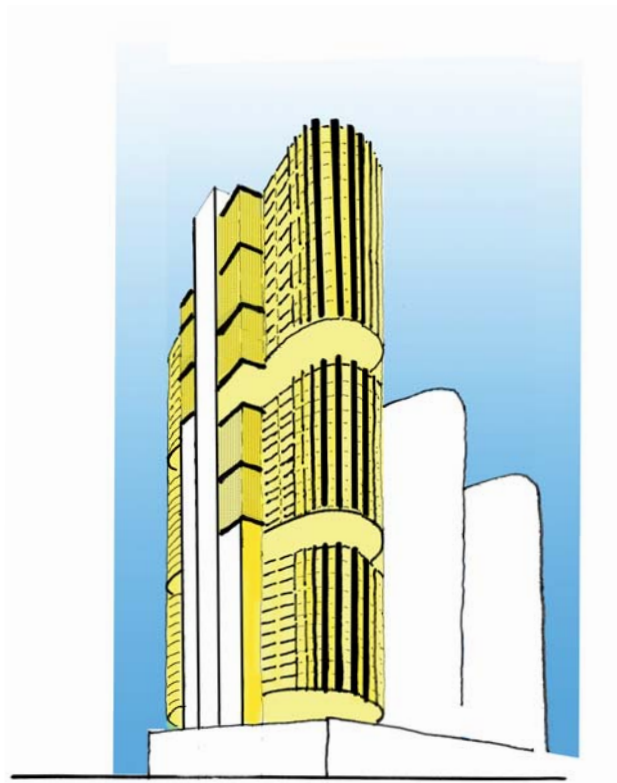
Legible distinction between key 'Served and Servant' elements of the building

Expressed vertical transportation cores and lift lobbies to be in contrast to the rest of the building. Separating the external core from the office floorplate provides a greater distinction between the 'Served and Servant'. Glazing to the vertical transportation further develops the distinction.



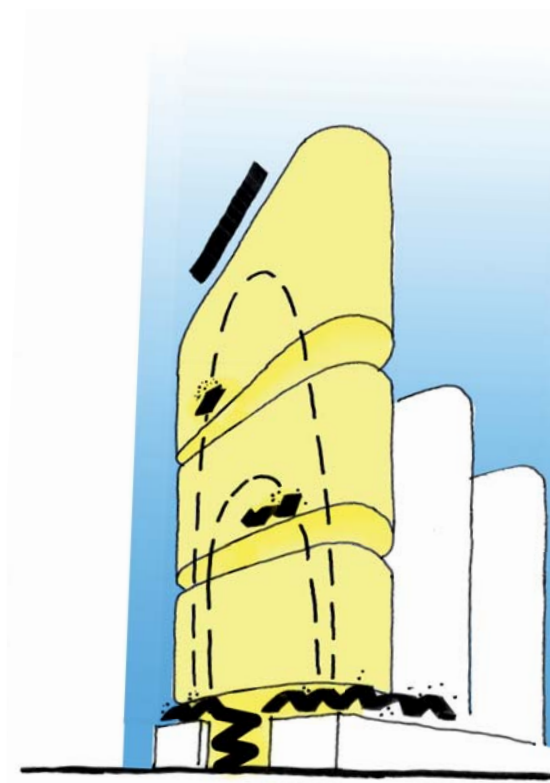
Building prows

The proposed scheme uses the vertical and horizontal elements of the solar shading to achieve scale and grain to the prow of the tower. It reinforces the vertical expression of the tower when viewed from both the city and the water. The rounded ends of the building open up views from the floorplate, responding equitably to the solar load and mitigate the wind



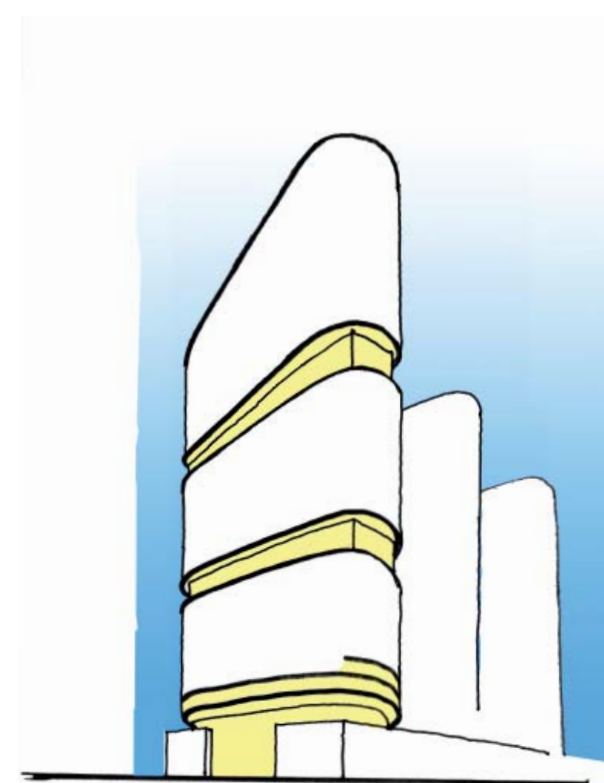
Layering and visual depth

Elements of the façade construction are arranged in layers to achieve visual depth and an appropriate level of detail. In the proposed scheme the shading devices on the facades are clearly arranged as a family of horizontal and vertical elements, which varies in depth and intensity according to the building's orientation and solar demand. The shading to the external core has a finer horizontal veil which creates a contrast to the rest of the floorplate.



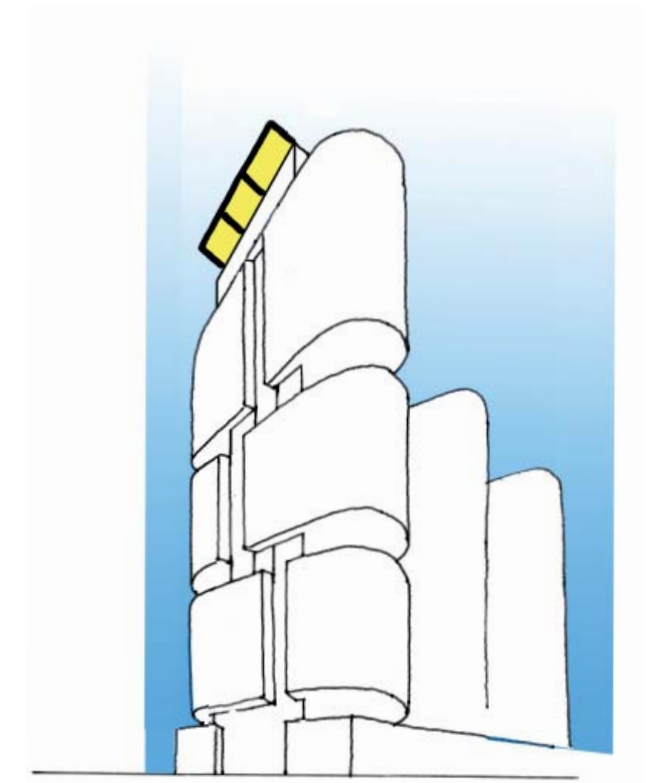
Visible environmental strategies

Ensure that green planting, solar shading, photovoltaic panels and other sustainable strategies are clearly articulated in the building's appearance. The proposed scheme uses an overt shading system with different combinations of horizontal and vertical shading components and are a direct response to the building's orientation and solar exposure. It also adds an additional level of scale and grain to the building. The shading, coupled with the glazed plant floors illustrate the environmental strategies of the building.



Horizontal articulation / breakdown of scale

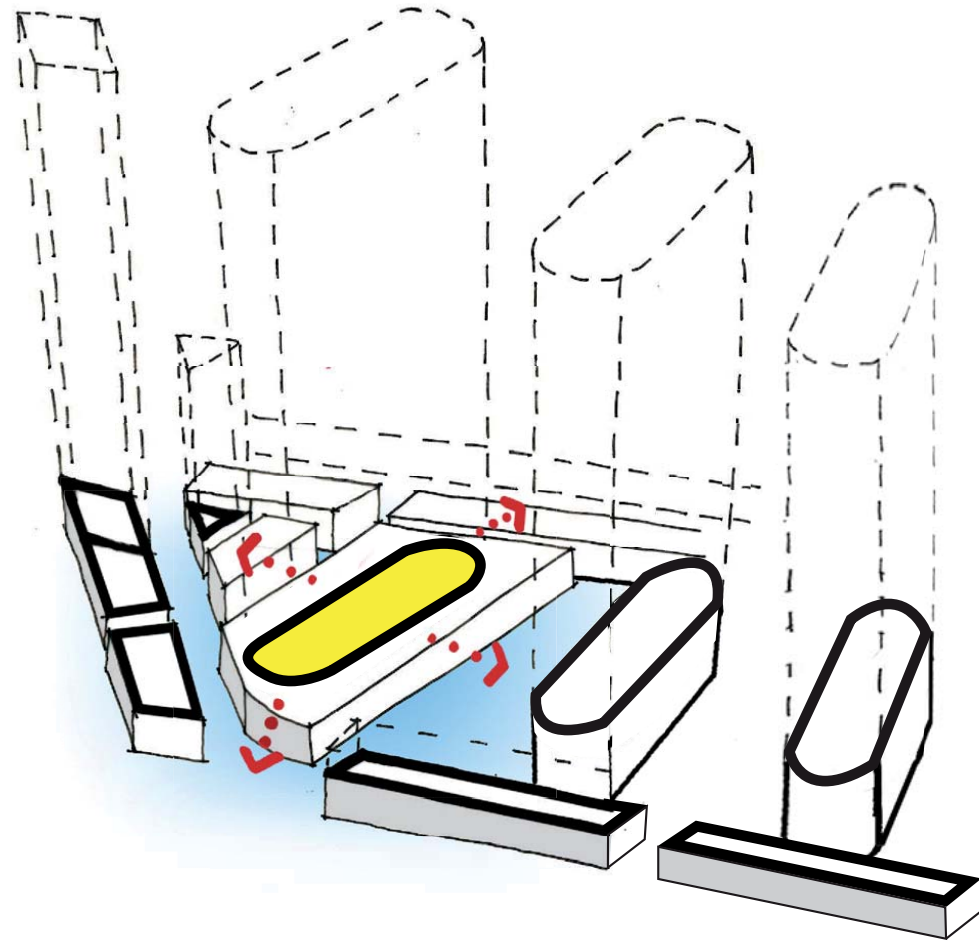
Façades to be broken down horizontally to achieve an appropriate scale and skyline resolution. Deep recesses are created at the plant levels along with balconies at the lower levels providing a more human scale at the interface with the podium.



Expression of the tower top

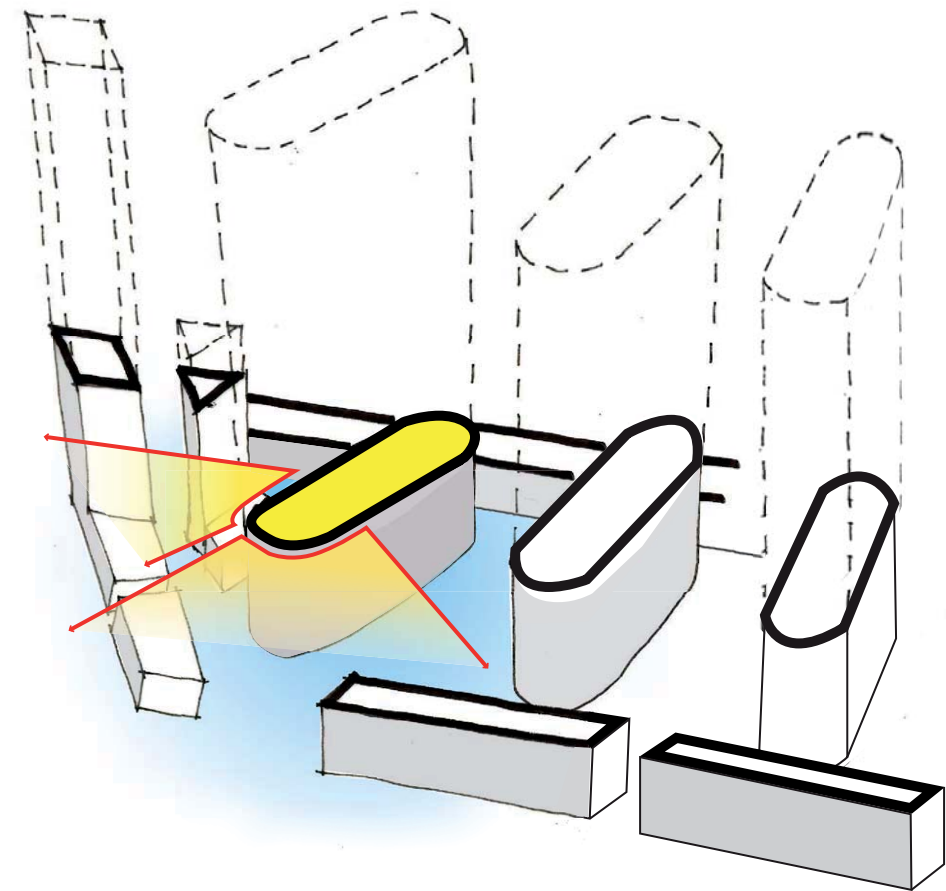
The articulation at the top of the tower provides definition against the skyline. Extending the glazed plant floor and the southern cuts enhances its relationship to the ground.

5.2 View Analysis



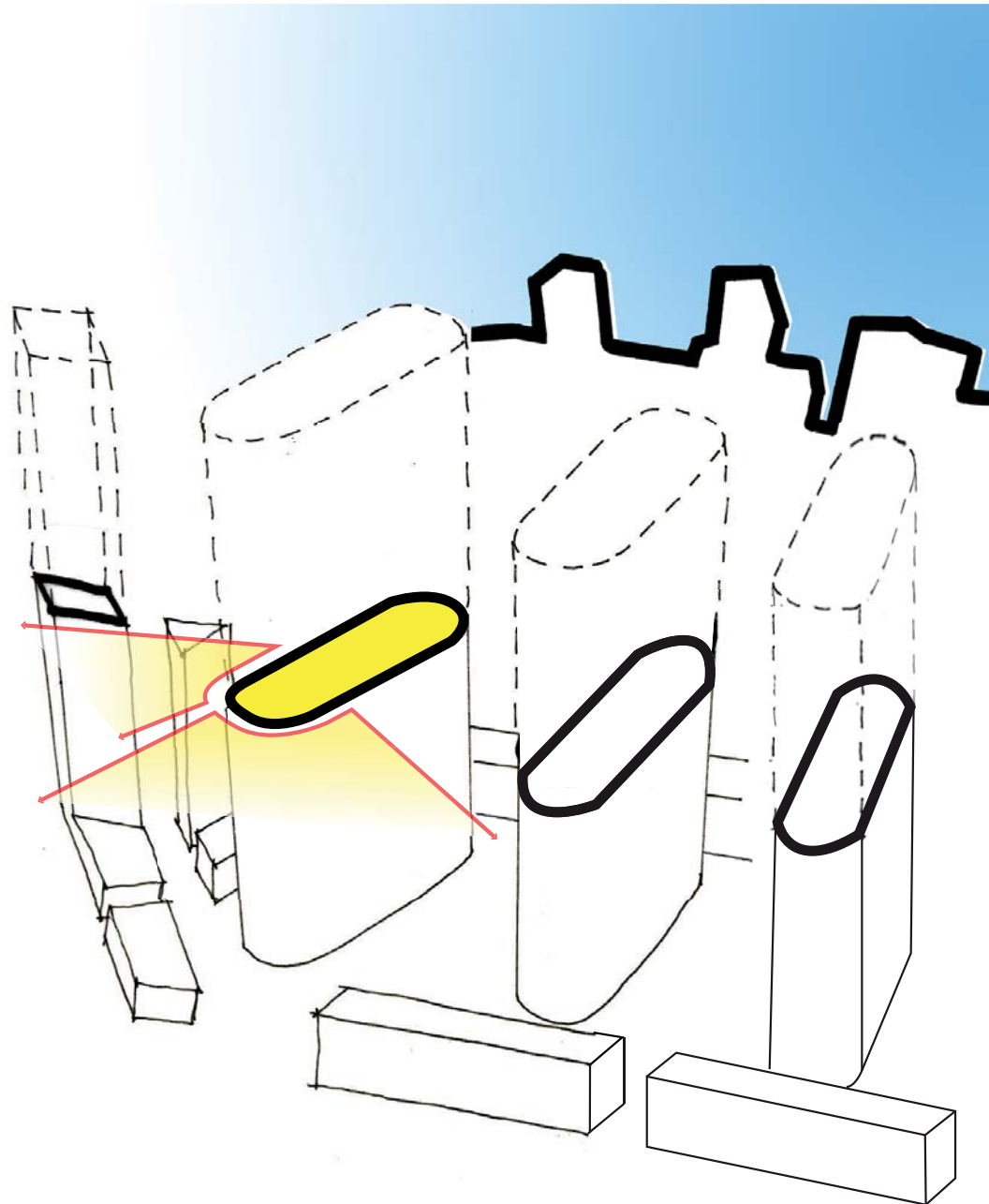
Podium Levels

Views from podium levels and immediately above are largely short-distance towards the future surrounding buildings and across the civic street of City Walk to C4. Additionally there are westerly views towards the proposed hotel and water-body.



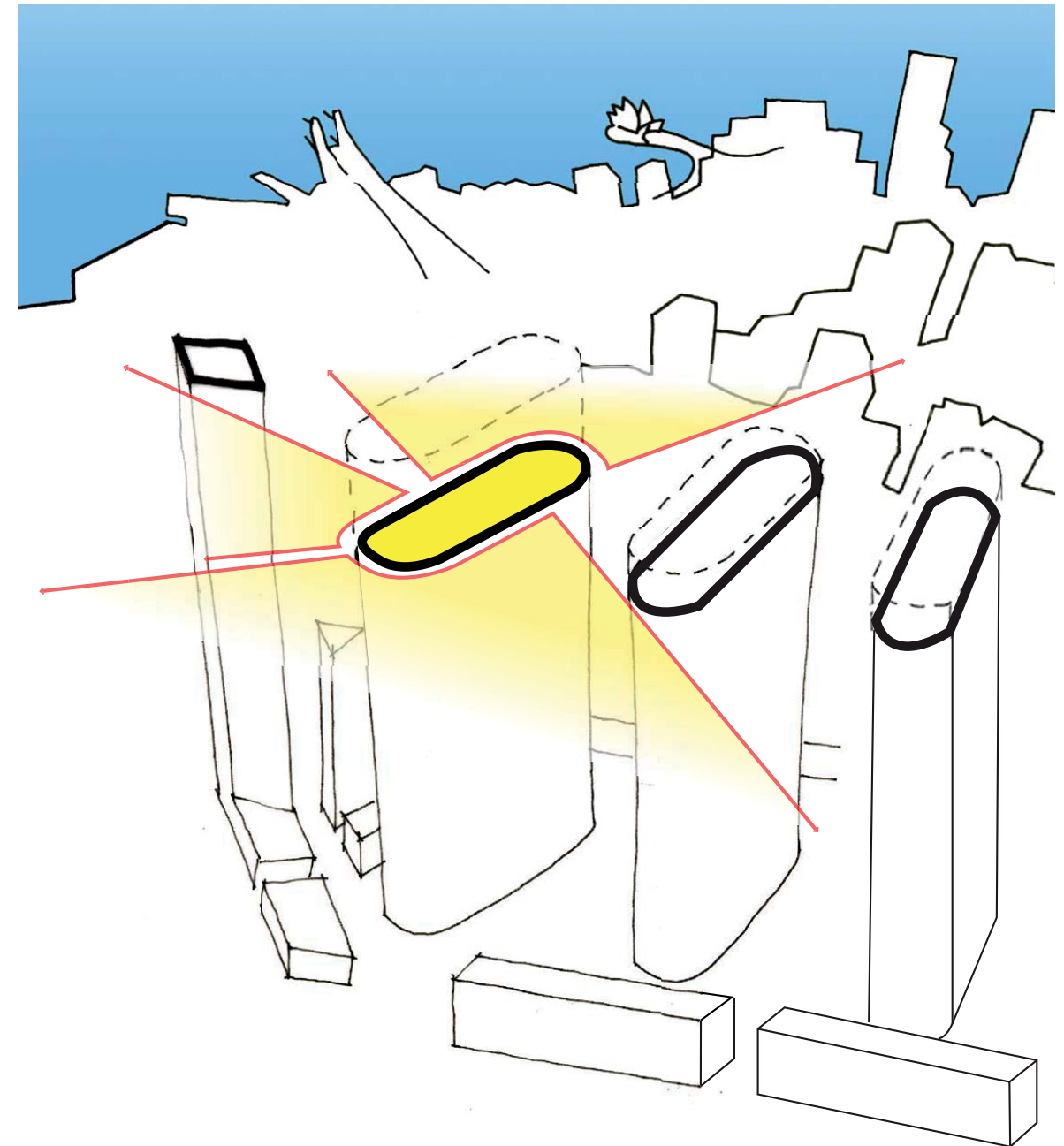
Low-rise Levels

Views from low-rise office floors are towards the west and the north-west.



Mid-rise Levels

Views from mid-rise office floors give an uninterrupted aspect onto the western side of the harbour and nearby shorelines



High-rise Levels

Views from the top portion of the building are in all directions. They capture the harbour, CBD and in certain locations the Harbour Bridge and the Opera House

5.3 Building Scale



City Scale



Building Scale



Human Scale

The design of C3 has evolved to create a building that is expressive and articulate at the scale of the city, the scale of the building, and the scale of a person.

At city scale, the massing of C3 has been considered in relation to its function, its CBD location and its position on the city skyline.

At building scale, the main design elements of C3 are more clearly articulated to make the operational and sustainable aspect of the building legible.

At human scale, the elements that people see and touch are textural and legible, create a comfortable working environment and easier for users to engage with the building.

At all scales the response to sustainability and environmental issues has been a major driver of the design, as has the desire to make Barangaroo a lively vibrant area that connects the western harbour with the rest of Sydney.

5.4 Scheme Concept and Tower Components

In plan, C3 is split into two components, the main floorplate and the external circulation core, known as the 'Served and Servant' which provides a primary vertical reading of the building. This is augmented by a tripartite reading created by the glazed recessed plant floors. This formulates the basic chassis and structure of the building to which additional elements are added.

The curved building ends allow panoramic views, and assist in reducing the perceived width and length of the building.

The proposed scheme utilises vertical louvres on the east and west elevations to provide scale and grain and to reinforce the vertical expression of the tower when viewed from both the city and the water. Elements of the façade construction are arranged in layers to achieve visual depth and an appropriate level of detail. The shading devices on the facades are clearly arranged as a family of elements, which depending on their relationship to the solar path vary in density, size and orientation.

The contrasting expressions of the northern core and the primary floorplate further reflect the tower's 'Served and Servant' principle and exposes the vertical transportation systems

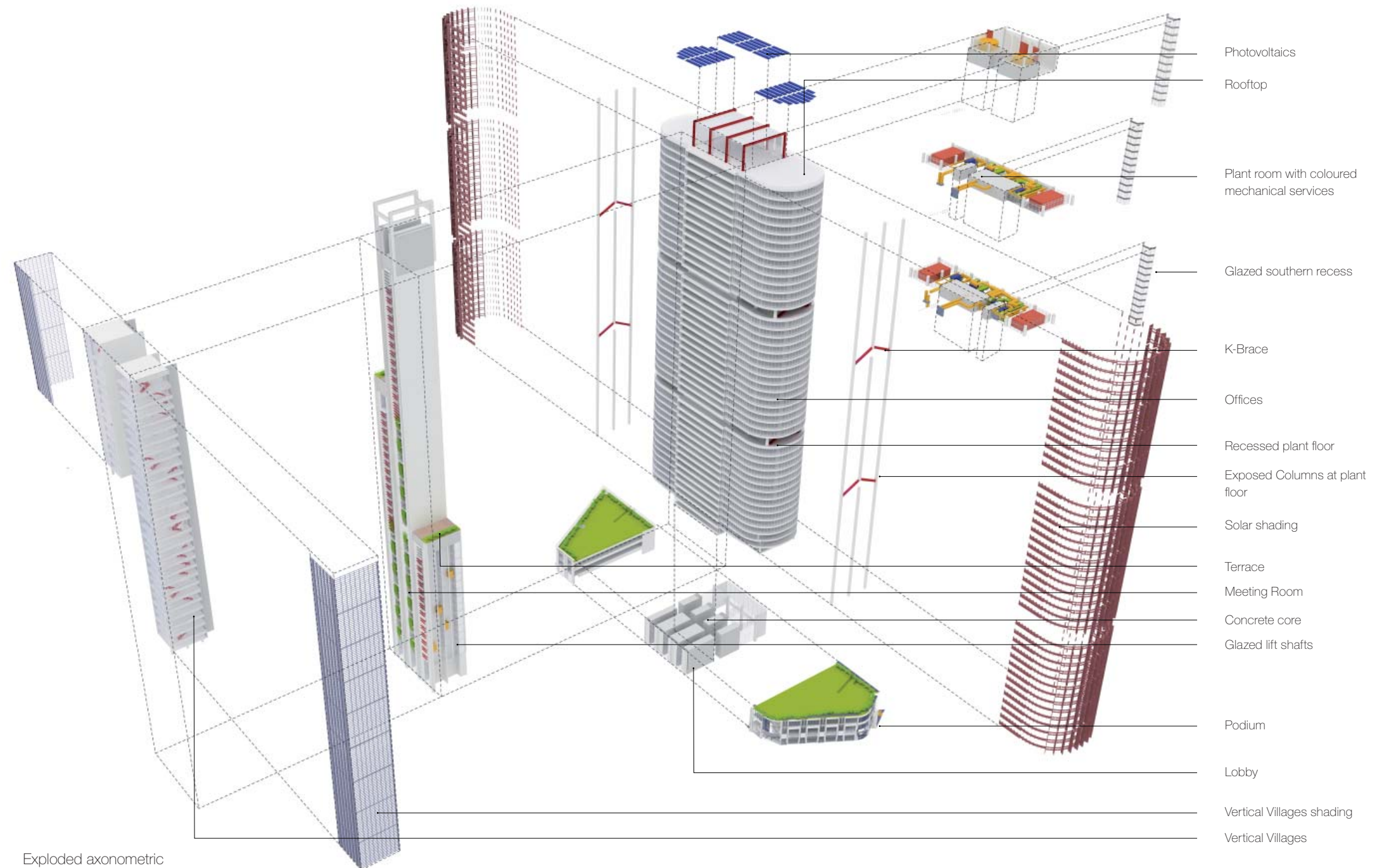
On the southern elevation vertical articulation is achieved by a southern recess, breaking up the width of the building elevation and accentuating verticality. The southern recess shifts in reference to the active lift lobby of the northern cores, and as an inverted bay window forming a focal point of arrival on the main floorplate.

A rational services strategy with clear riser areas and locations, distributes primary mechanical plant across three levels, allowing deep horizontal recesses and enabling a strong modulation of the facades whilst exposing the buildings primary structure.

The main floorplate comprises of a concrete services core which contains the internal technical areas, whilst the lifts and Vertical Villages provide vertical articulation and animation to the northern elevation.

The Vertical Villages will utilise passive and active shading devices to protect the interior spaces whilst giving detail and texture to the facade.

As C3 is the tallest of the three office towers, emphasis has been placed on composing the lift shafts, Vertical Villages, plantroom and photovoltaic panels to enhance the building's profile and contribute to it's environmental strategy. This composition is achieved by reducing the bulk and mass of these elements, giving a distinctive addition the city's skyline.



Exploded axonometric

5.5 Solar - Response

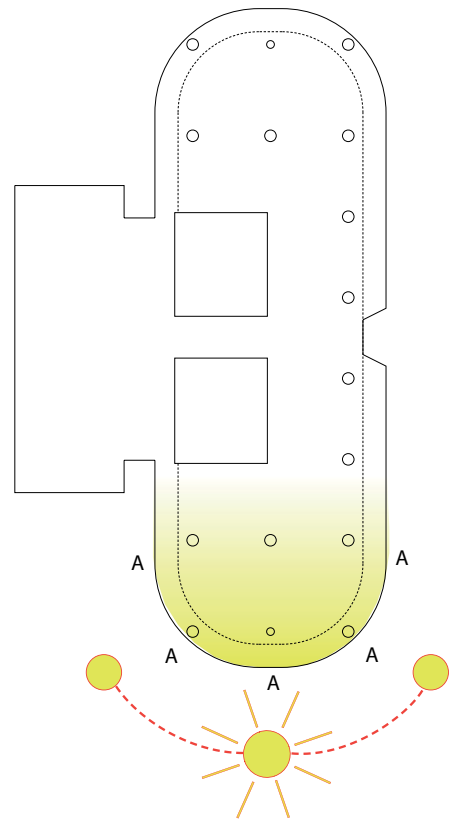
Barangaroo South utilises a fan arrangement to set out the commercial towers and civic streets in order to maximise the solar penetration between the buildings. As a result, the length of C3 is orientated on a north-west and south-east axis.

The C3 building prow is a singular curve form which enables an even distribution of solar load, avoiding 'hot spotting' and provides a consistent thermal heat load across the facade.

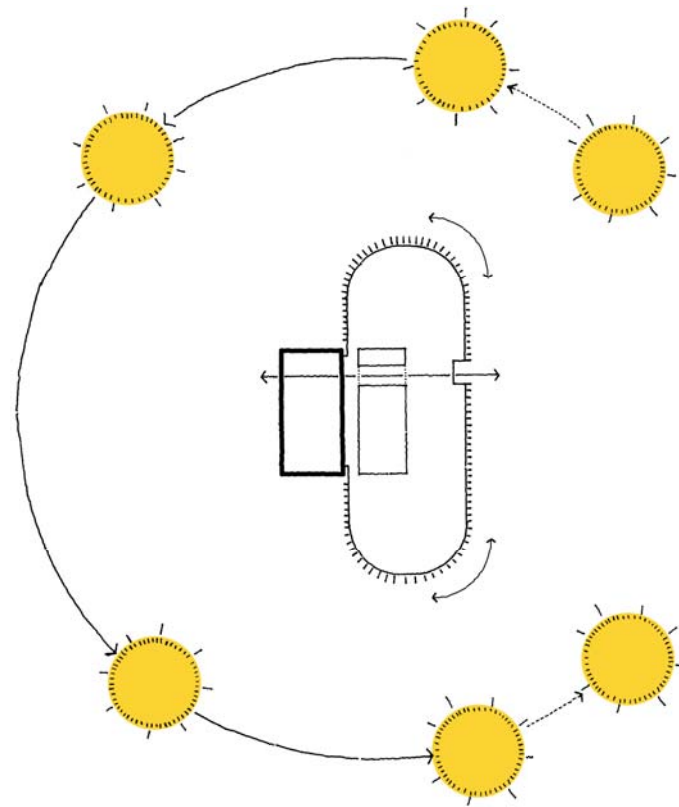
The facade's shading devices are arranged as a family of elements which vary in their size, frequency and orientation which responds to the solar path.

Building C3, along with C4 and C5, requires an individual response to its' unique geographic and environmental condition. This response has informed

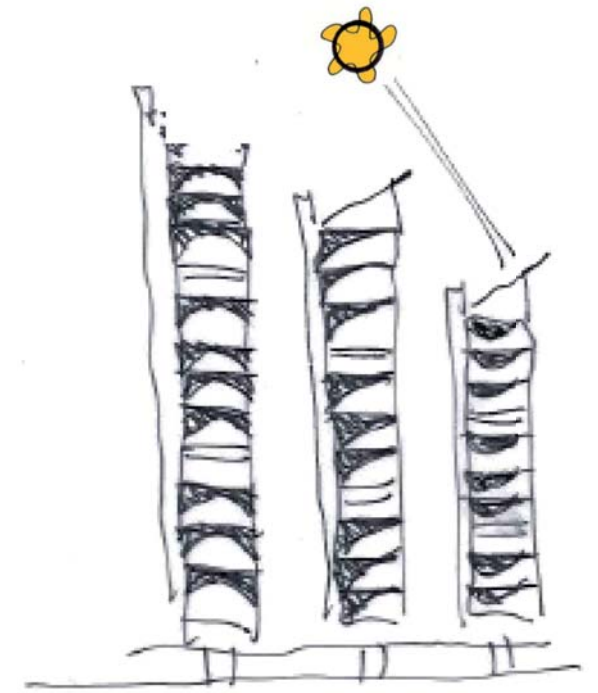
the design development of the floorplate and facades, bringing diversity and individuality to the design of the building.



Solar Diagram: Singular curved prows respond to the differing solar and environmental conditions of each office tower.



Solar Diagram: Proposed scheme provides a facade response dependent on its changing solar load throughout the day



Diagrammatic Elevation: Orientation will bring diversity to the ensemble through different shading responses

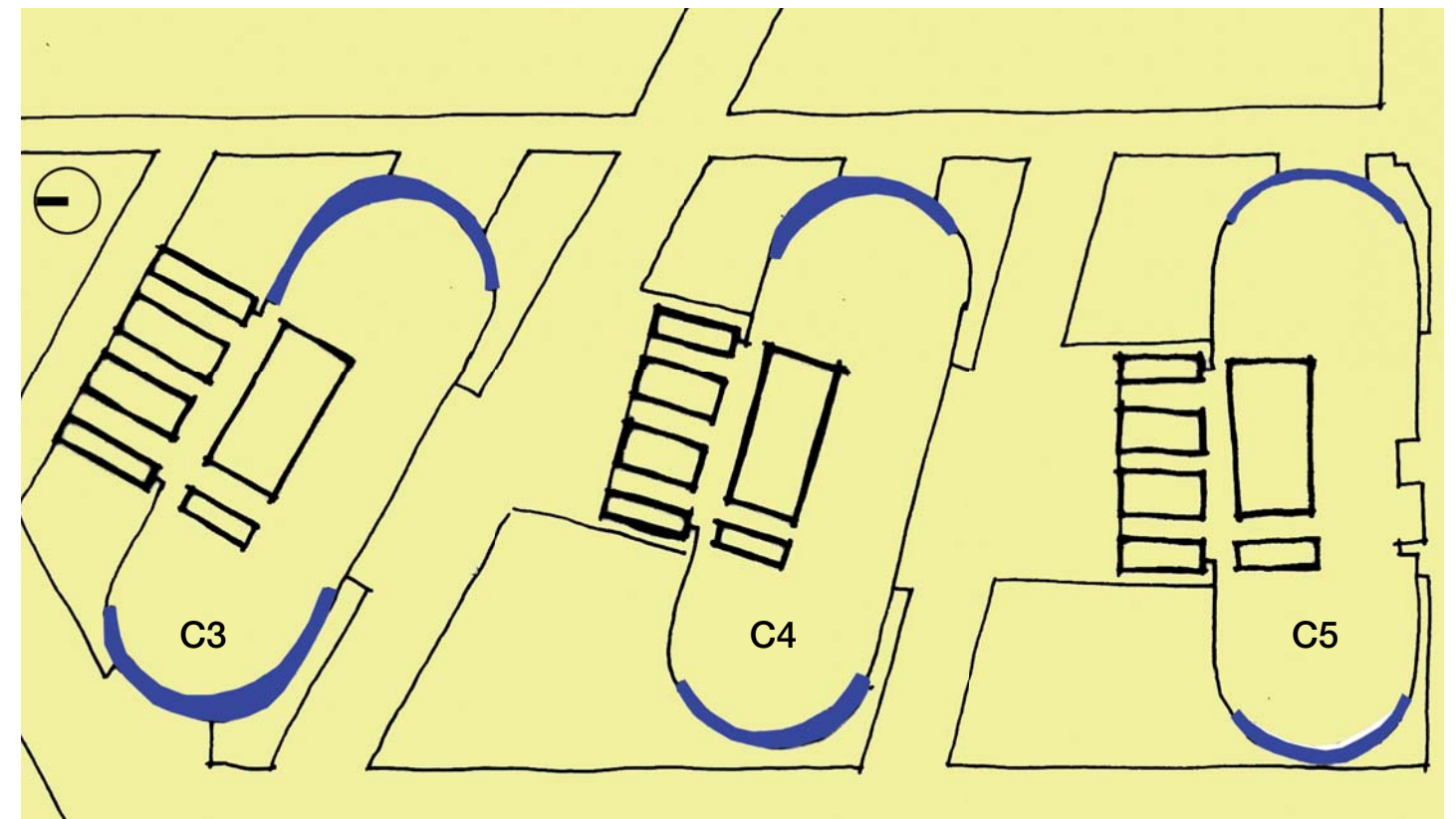
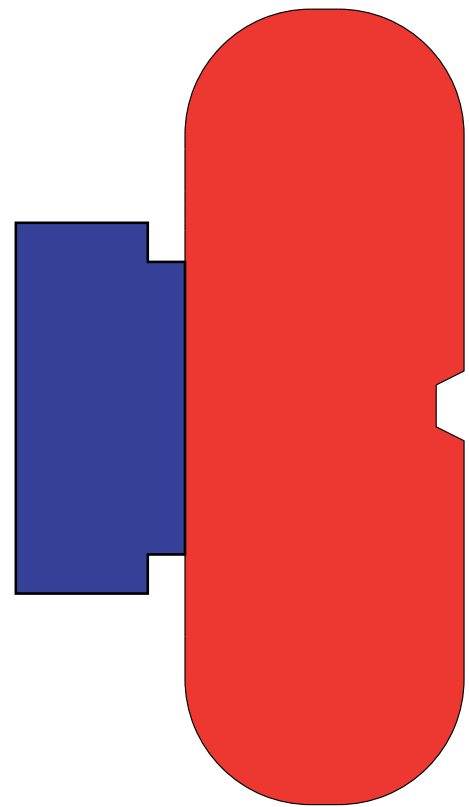


Diagram of the three office towers' floorplate: Sibling buildings each responding to its individual geographic and environmental conditions

5.6 Served and Servant

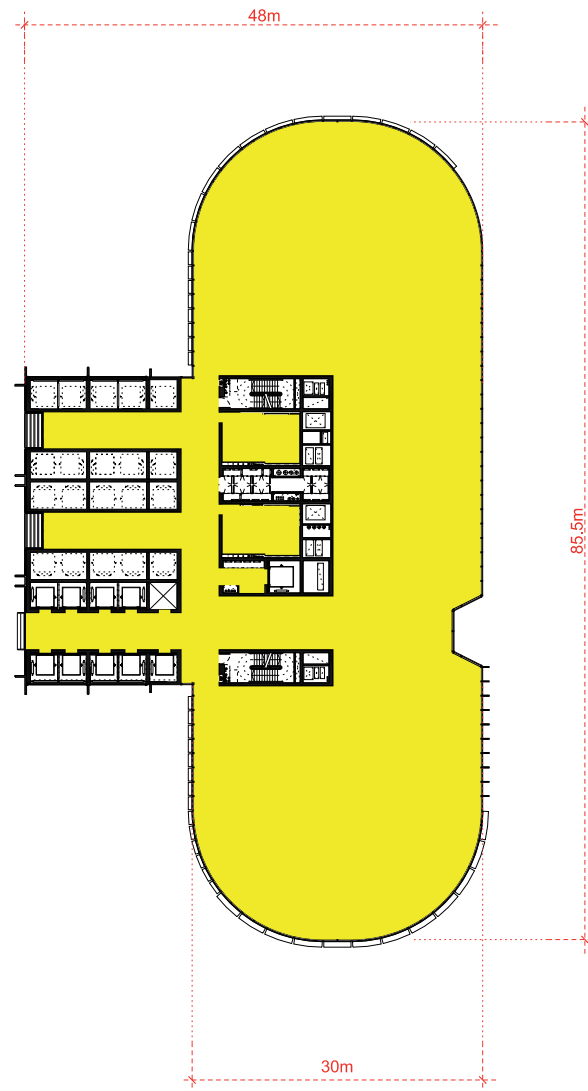
The expression of the building's constituent parts is read as 'Served and Servant'. This is emphasised by detaching the office floorplate from the external core thus creating vertical articulation.

'Served and Servant' is further strengthened by contrasting the different facade treatments of the Vertical Villages and the office floorplate facade systems.

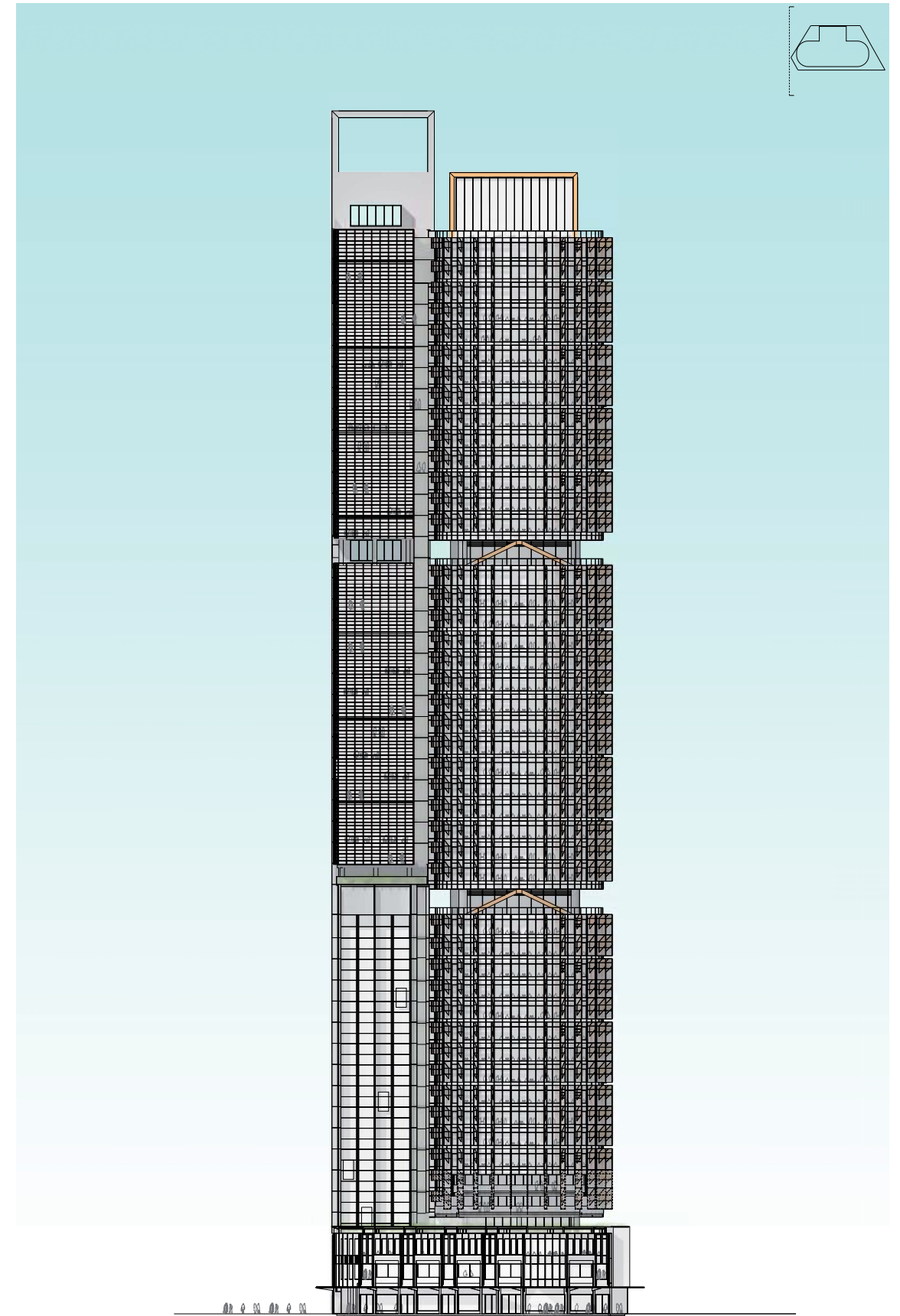


- Served - Office Floorplate
- Servant - Circulation and Services

Proposed Scheme
'Served and Servant'



Proposed Scheme
Plan

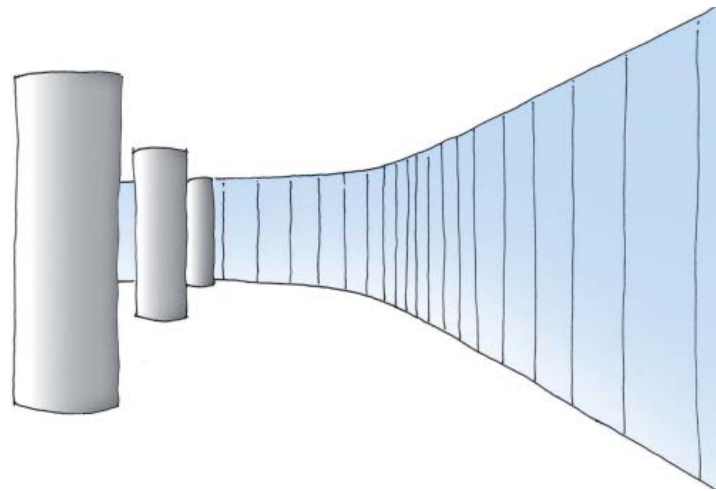


Proposed Scheme
West Elevation

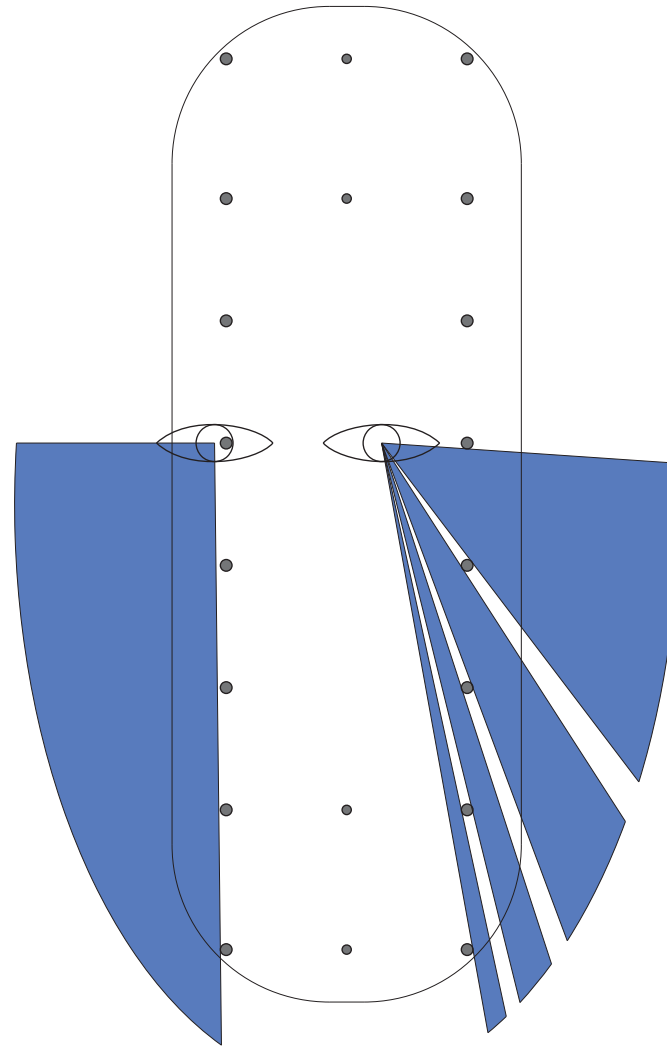
5.7 Floorplate Design

The curved building prow makes for an egalitarian office arrangement, improving the building's solar efficiency and views across the floorplate. To help maximise these views a 'K-Brace' structure is introduced to reduce the loads of the central columns to the prows of the floorplate.

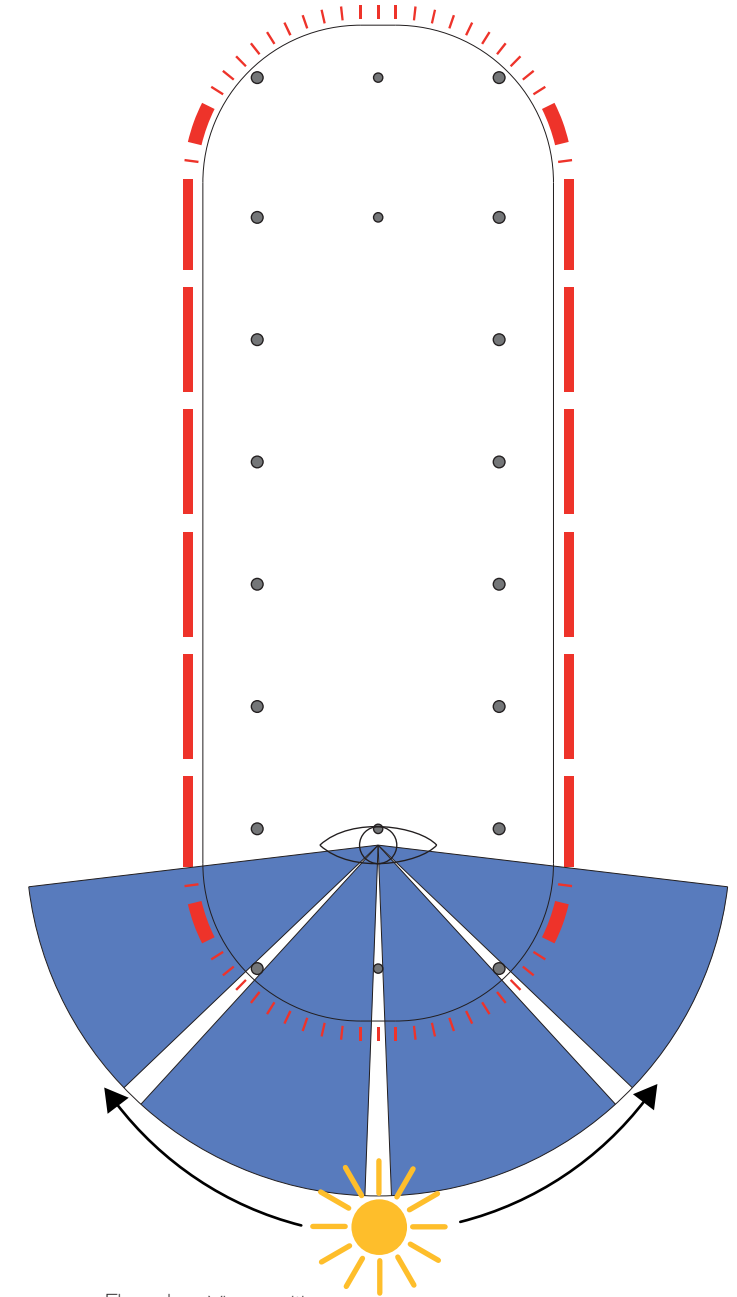
The rectilinear and ordered structural column grid gives the opportunity for a variety of office layouts that are more efficient and better suited to current workplace practices. The north-south orientation of the floor beams enable tenants to create inter-floor connections in multiple locations allowing for increased office planning flexibility. The arrival sequence will bring people through the lift lobby, past reception and through the office floor to arrive at the southern recess. Vertical Villages to the north offer the tenants flexible spaces to be used for a range of activities.



Sketch of internal view

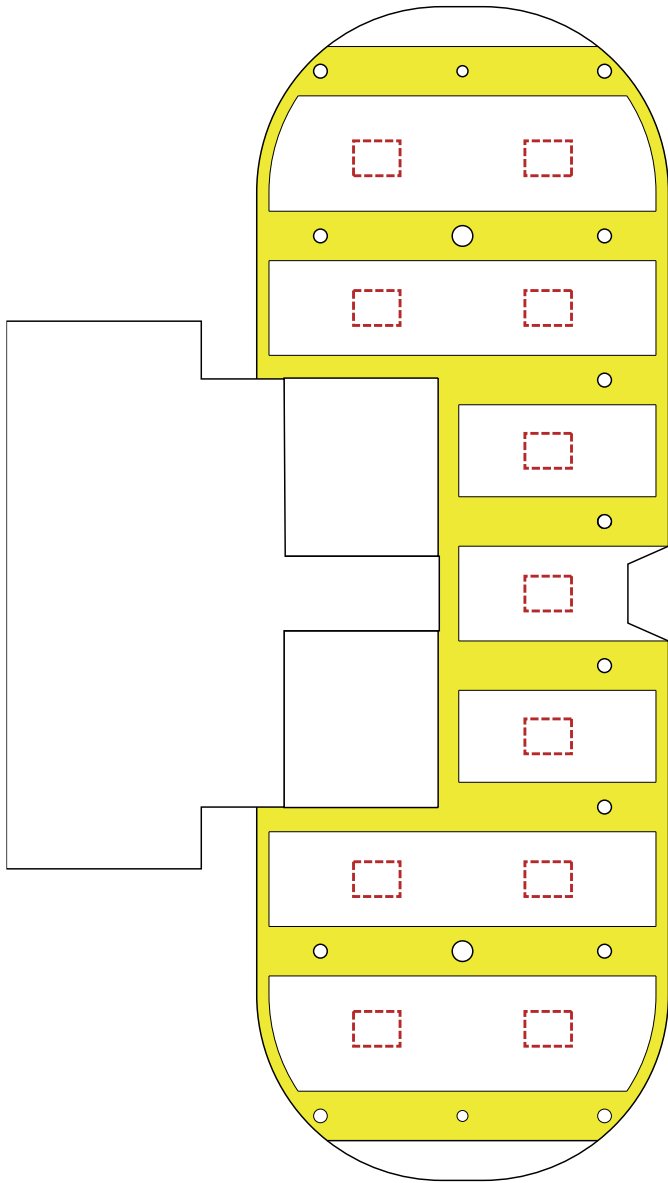


Floorplan: Views with recessed column line

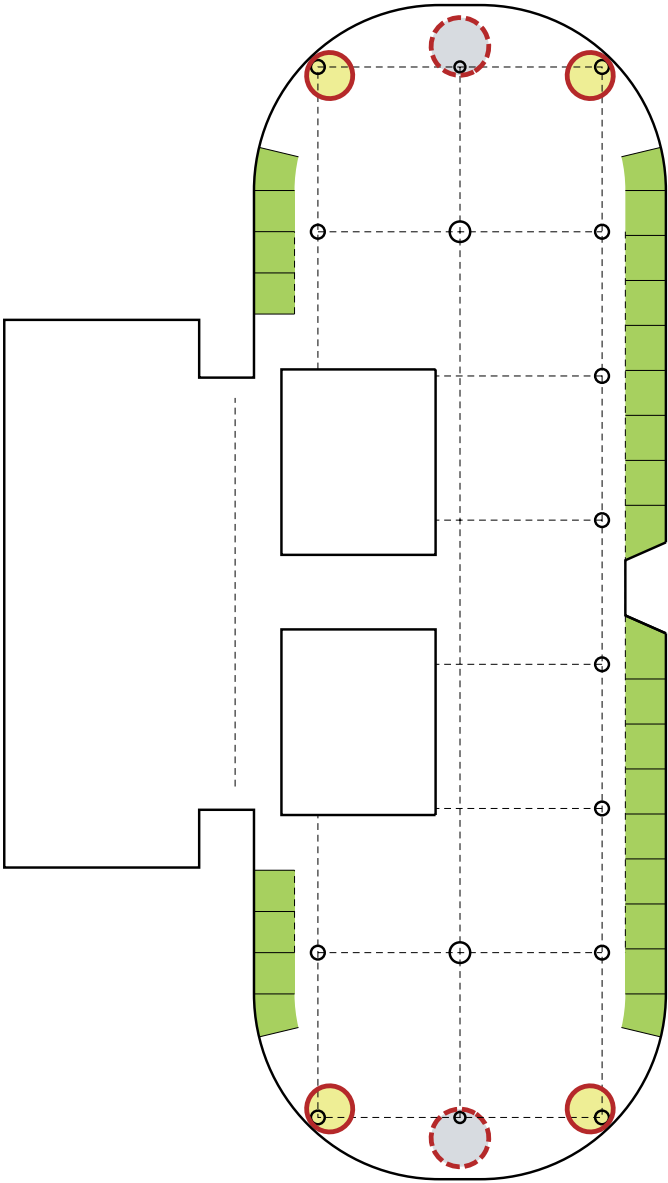


Floorplan: Views with shading system

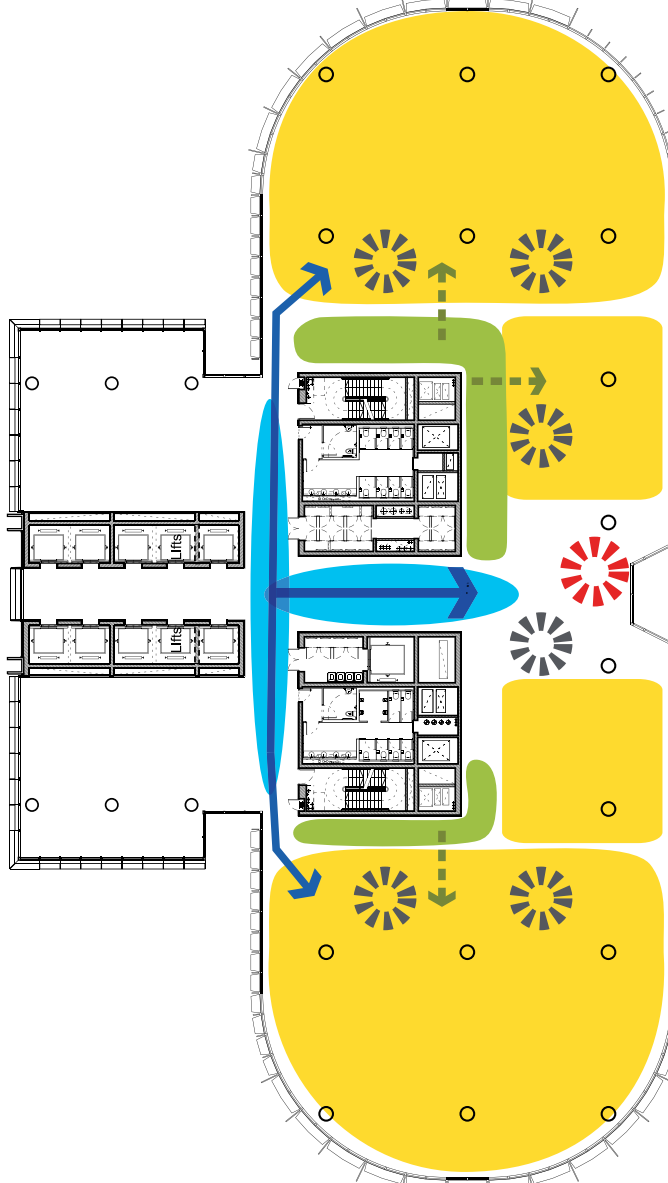
5.7 Floorplate Design



Floorplan: Structural floor beams orientated north-south allowing for inter-floor connections

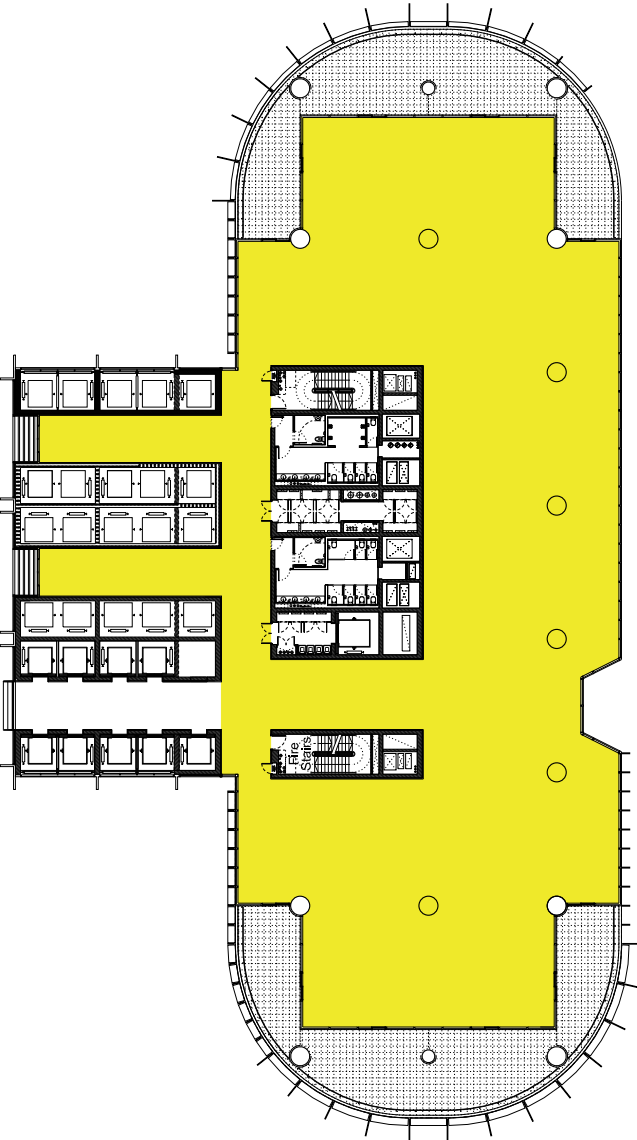


Floorplan: Office cell layout and special places

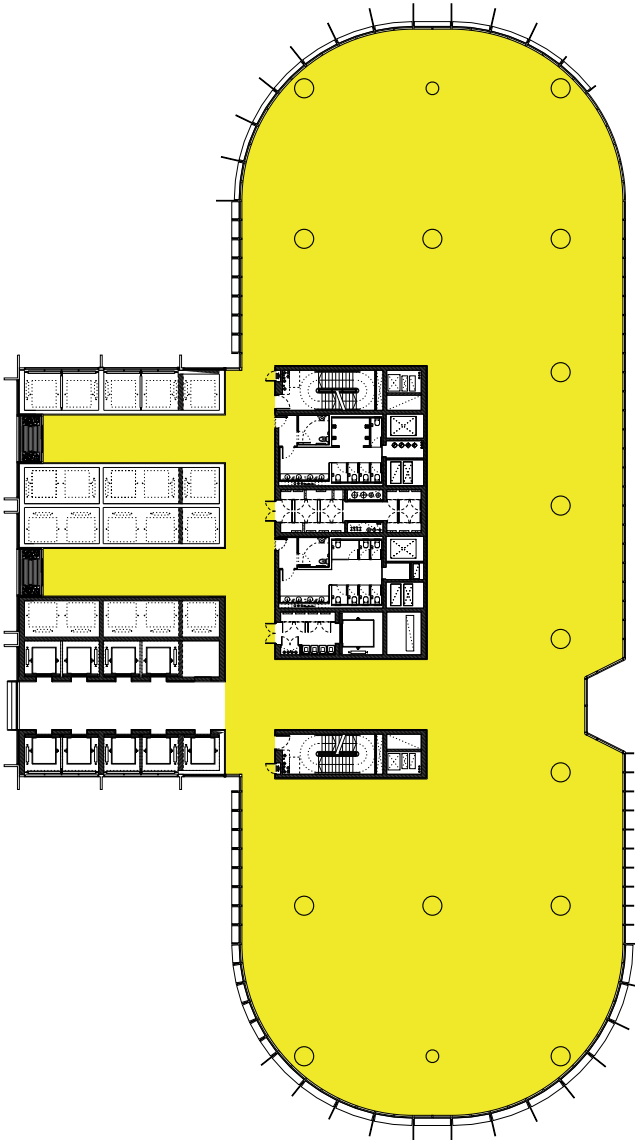


Floorplan: Floorplate principles and the arrival sequence with the point of arrival identified on the southern facade. Opportunities for cellular offices around the core

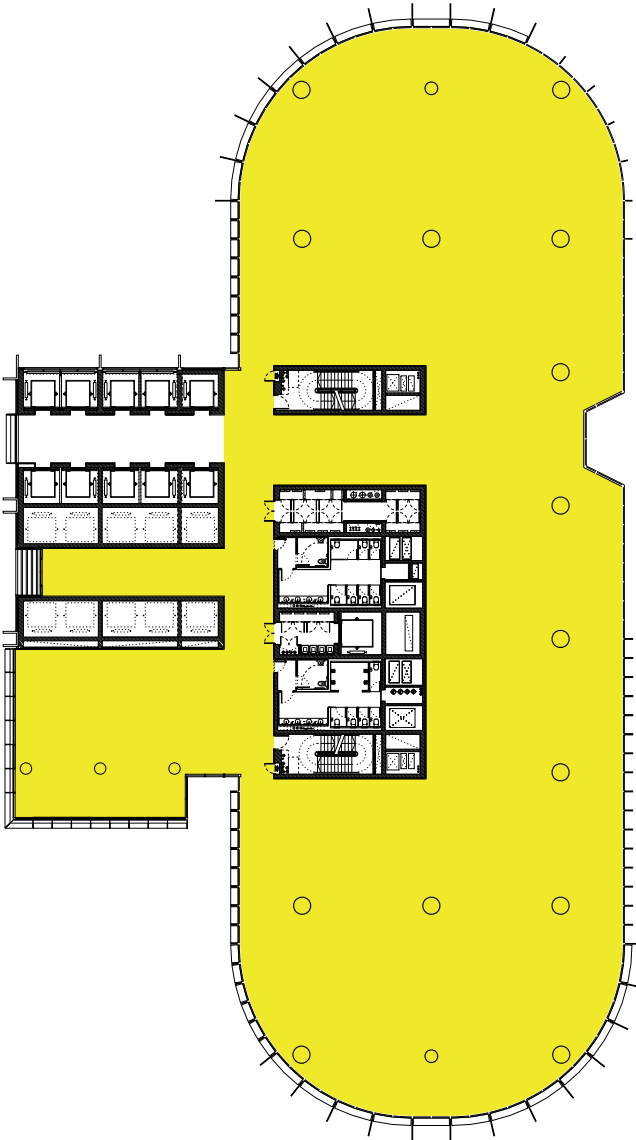
5.7 Floorplate Design



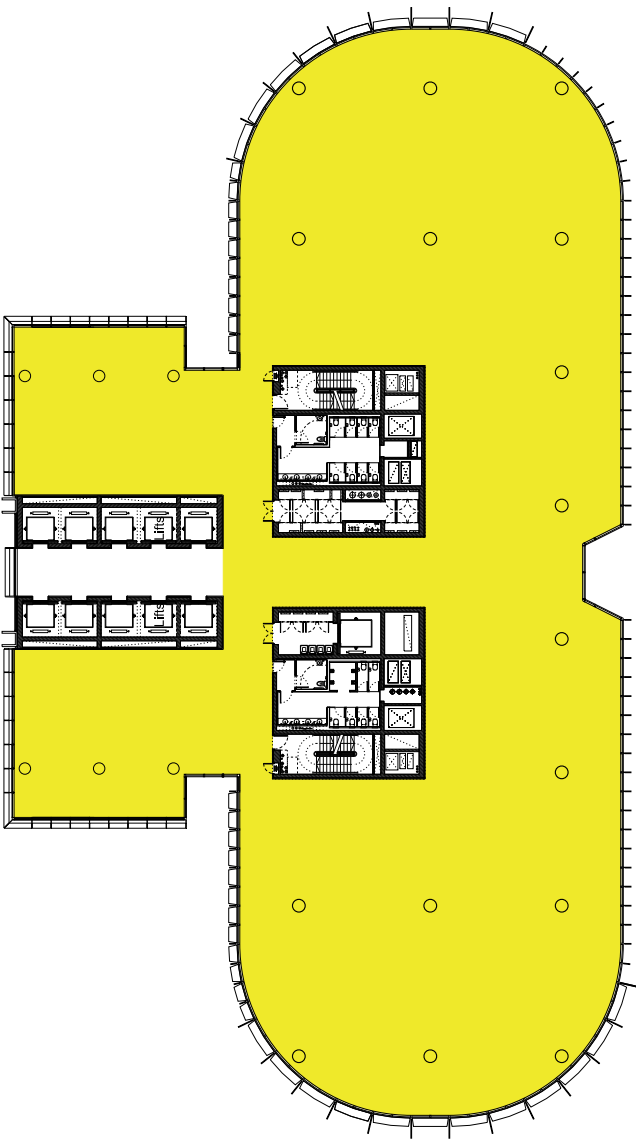
Floor Plan: Level 4



Floorplan: Typical Low Rise



Floorplan: Typical Mid Rise



Floorplan: Typical High Rise

5.8 Office Floors and Cores

Office

Work places of the future will evolve and needs will change. Flexibility and generosity of space are key to attract a growing workforce of freelancers, part-timers, mobile and virtual workers. With that in mind, workplace flexibility is integral to the design philosophy for C3.

There is a lack of large premium-grade office space within the Sydney CBD and such space is in high demand by global financial and professional services organisations. C3 has floorplates of approximately 2,100m² NLA which provides an opportunity to meet this demand.

The floorplate dimensions have been established

through discussions with prospective users and Frank Duffy who is a world renowned office planner. The dimensions allow for flexible office layouts with views and natural light to the majority of spaces.

The office layout can be manipulated to form a variety of office arrangements including open-plan seating, cellular offices and breakout spaces. In addition the office floorplate structure also enables inter-floor connections to be made between levels as required by tenants.

External Cores

The external circulation cores located on the north facade assist in providing solar shading to the occupied areas of the floorplate and protect the occupants from

the areas of greatest solar intensity. Furthermore it allows for a fully glazed southern elevation to the offices to remain uninterrupted and thereby maximising the views to the city and water.

The external core consists of the passenger circulation concrete lift shafts arranged in three groups; low, mid and high. The glazed east and west aspects of the lift shafts reveal the movement of the passenger lifts. At the end of the lift lobbies, full height glazing provides views and natural light while non-active lift lobbies are used as meeting rooms.

The low and mid rise lift motor room roofs are used as accessible terraces for the offices. Above the terraces, the space is utilised by the introduction of breakout areas known as Vertical Villages. It is proposed

that these spaces could be used by the tenant to accommodate a variety of uses to support the main office floorplates. Proposals include training rooms, cafeterias, small meeting rooms, boardrooms, gyms, small auditoriums, multi-leveled spaces, interconnecting circulation and landscaped gardens.

Internal Cores

Internal cores house the goods lift, escape stairs and service risers, along with toilet accommodation that is located according to the on-floor arrival sequence.

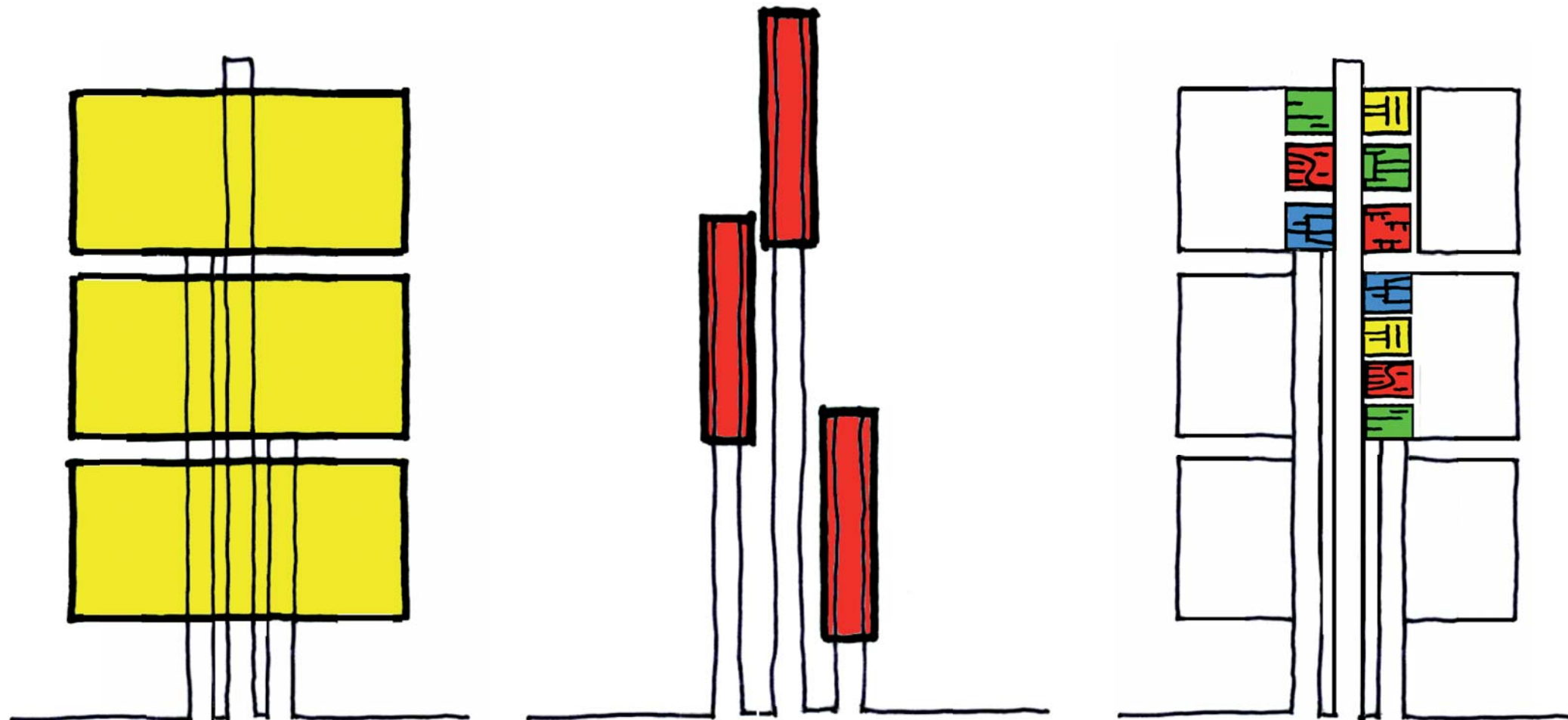


Diagram: The intermediate scale and building mass provides the framework for tenant identity, legibility of structural, architectural and environmental threads - a framework into which the human scale can be composed

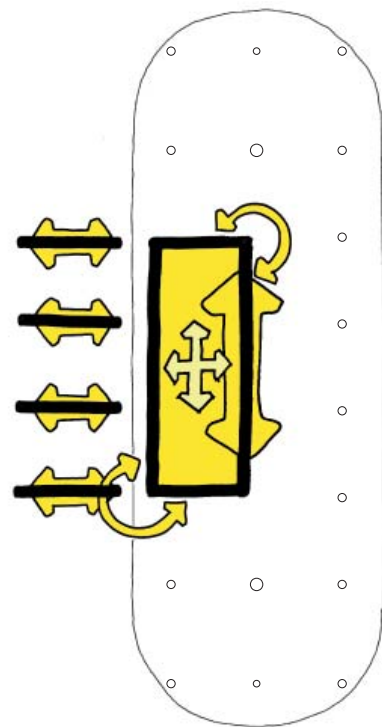
5.9 Structure

5.9.1 Structural Strategy

To the north, the lift shafts of the external core consists of shear walls running north-south to aid in the stability in this axis. The internal core will provide further lateral and torsional stability.

The floorplate consists of an in-situ reinforced concrete floor slab with reinforced concrete columns. Floor beams run from north to south at column locations, allowing for inter-floor penetrations. At plant floor levels, the columns are exposed thereby expressing the cantilevered structural system.

On the external core, the columns to the Vertical Villages are located directly above the concrete lift shaft shear walls to provide structural continuity and to maximise views. At the roof terrace locations above the lift motor rooms, the columns are expressed to identify a change in the core's use. Exposing the structural elements provide legibility and communicates the way the building is designed a built.



Floorplan Diagram: Structural load accommodated in the external and internal concrete service cores and internal columns

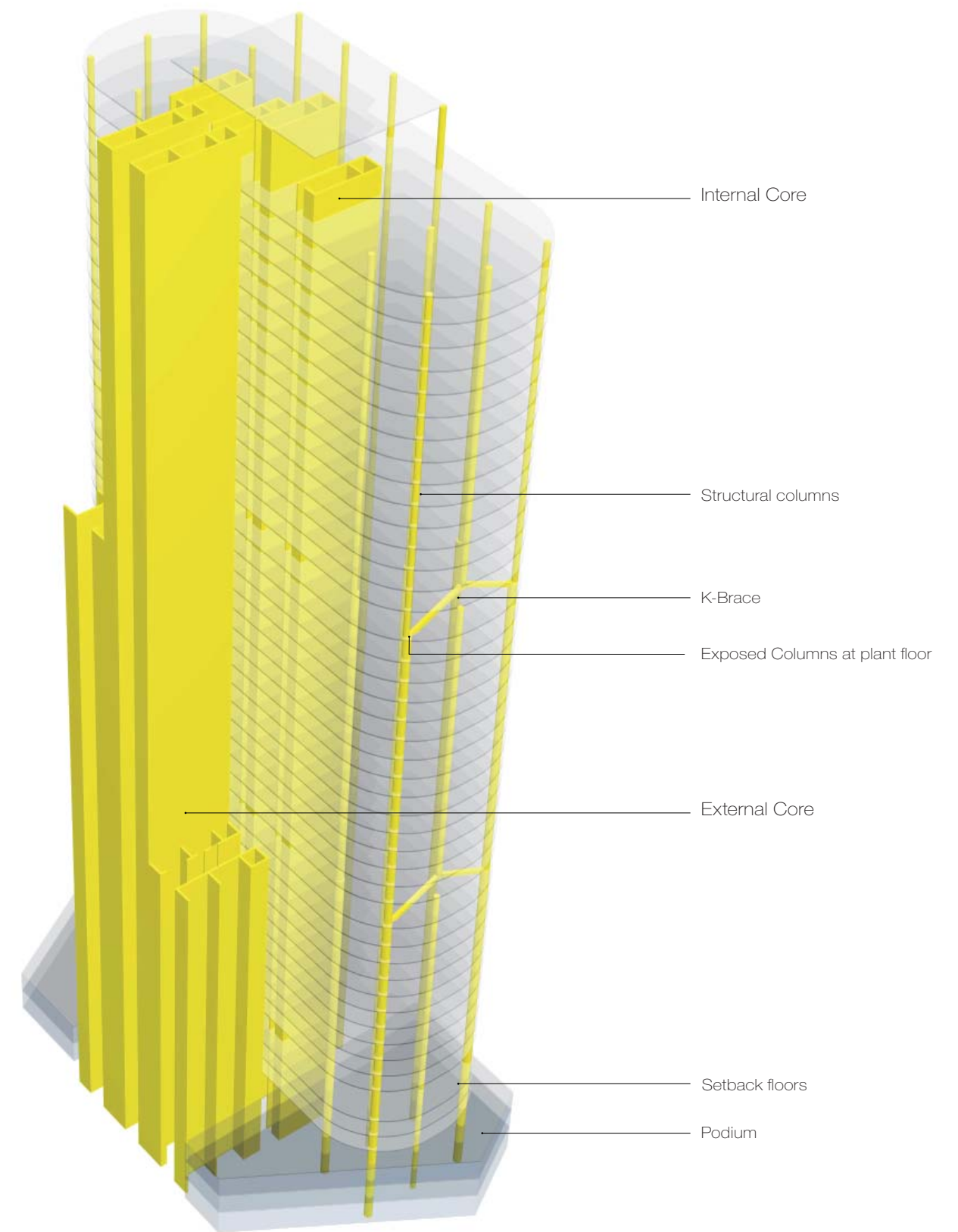
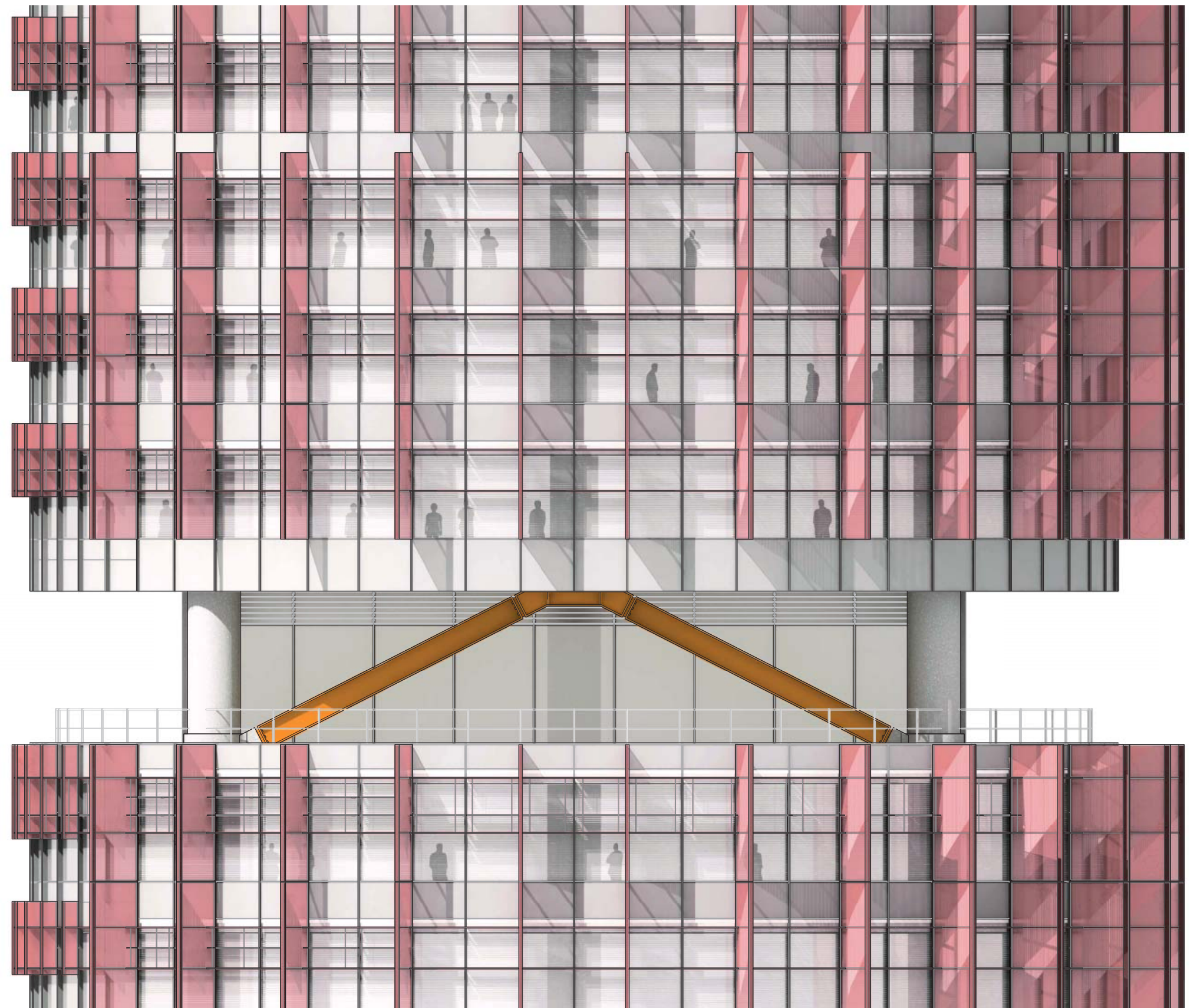


Illustration of building C3

5.9 Structure

5.9.2 K-Brace

By utilising a 'K Brace' at the recessed plant levels, the column located at the prows of the floorplate can be reduced in size to maximise views from the office and aid in office layout arrangements. The exposure of the "K-Brace" provides an additional level of scale and grain to the office towers.



Elevation: Building C3 with K-Brace at recessed glazed plantroom floor

5.10 Facades

5.10.1 Office Tower

A key aspiration of the Barangaroo South office towers is to set new environmental benchmarks in Australia. This will be achieved through the combination of solar shading, glass technology and thermal performance directly responding to its context, orientation and solar path.

Detailed computer analysis into solar performance will allow us to apply the facade shading specifically to suit each elevation of the building. The shading elements will consist of areas of opacity, translucency and transparency to suit its individual location. The analysis will enable the shading to be optimised for its function thereby reducing material use. Environmentally, this will minimise internal heat gain and demands for cooling whilst maximising user comfort and views from the offices.



Illustration of building C3 facade system

5.10 Facades

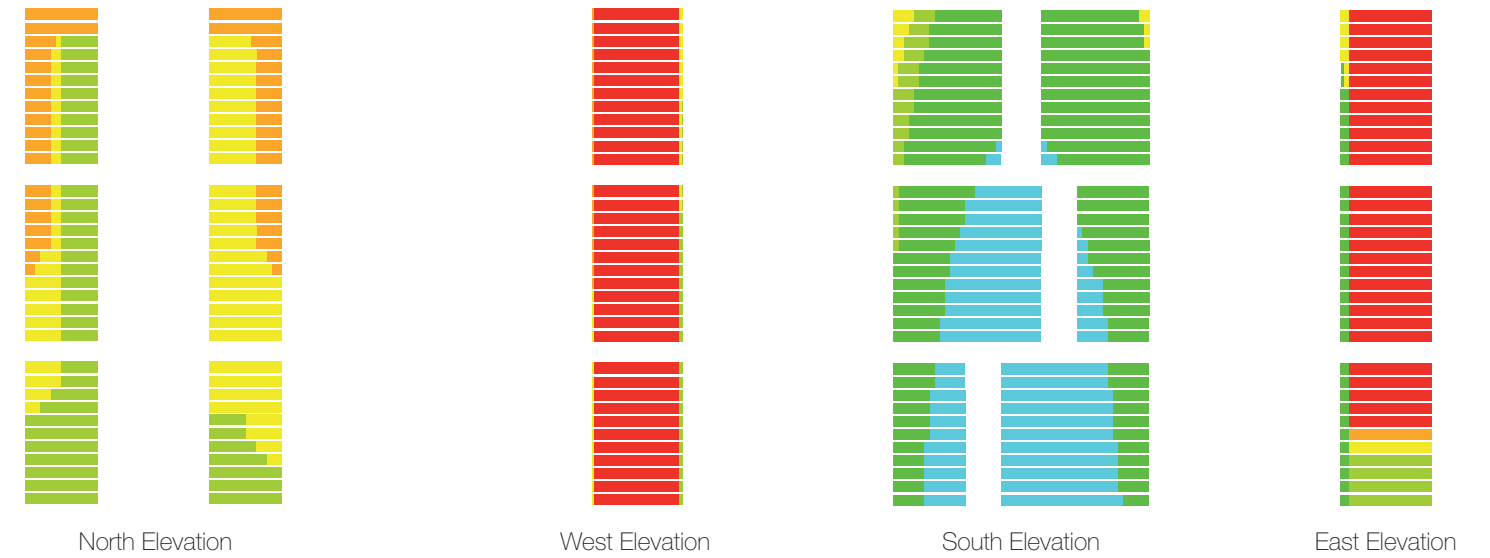
5.10.1 Office Tower

The solar shading of the office tower is an overt modular system to protect the glass from excessive heat gain while retaining transparency for views and daylight amenity.

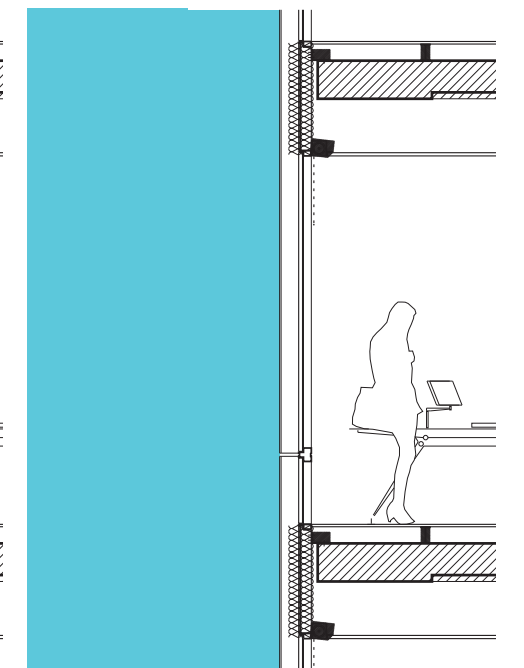
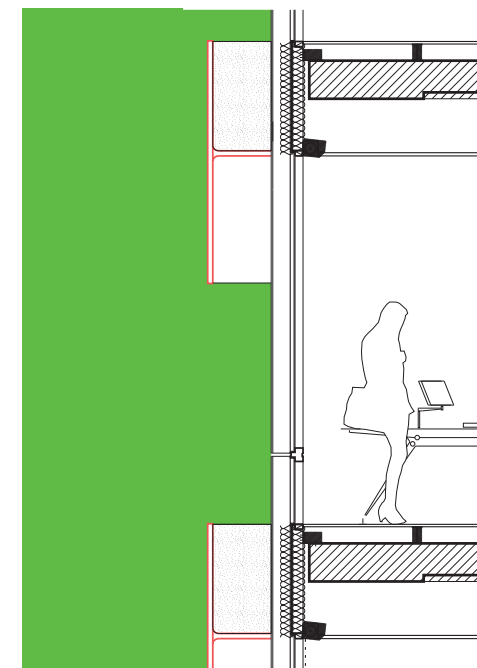
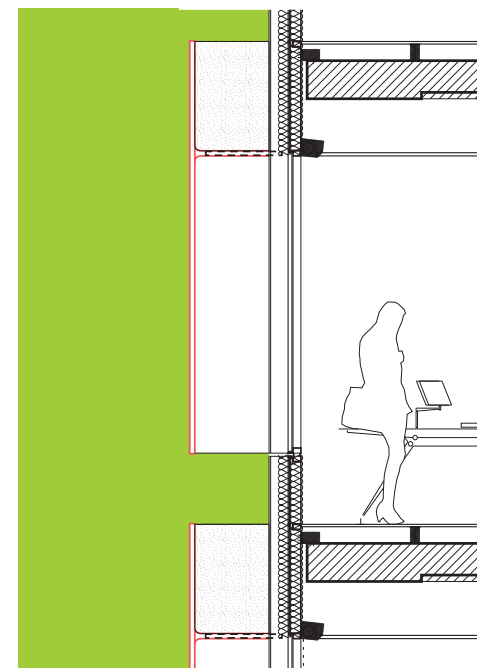
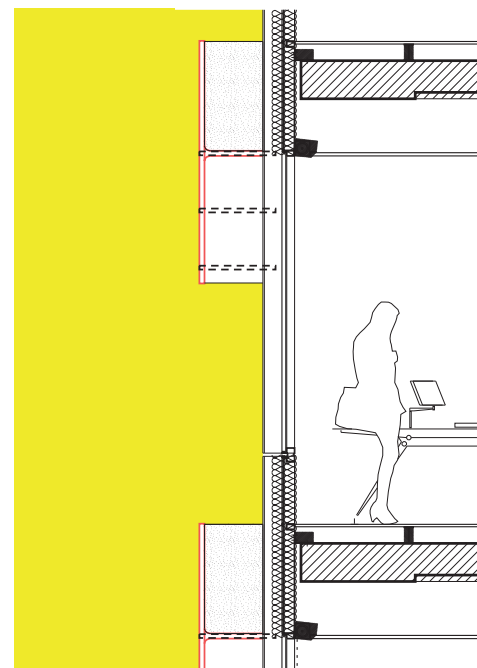
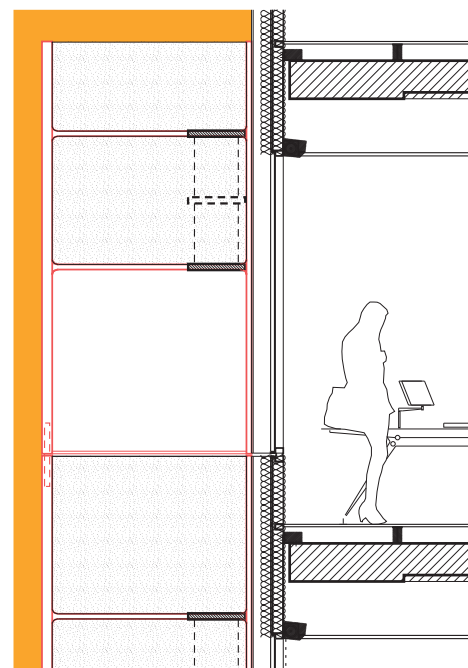
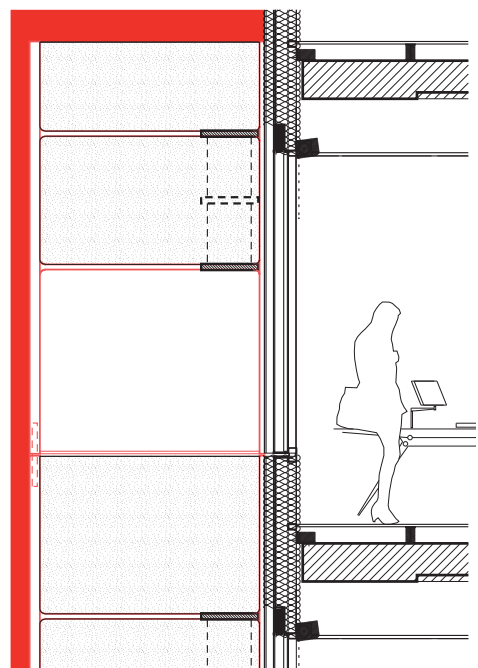
Through detailed solar analysis, categories of thermal load are established. Each category comprises of vertical and horizontal elements that address the solar loads on the glazed panels. This results in a gradual change in the size and combination of the shading elements.

The shading provides a layer of scale and grain to the building's architectural expression from the street. The application of the shading system coupled with different materiality will provide a unique identity to each tower.

Facade Analysis: Solar Intensity



Minimal Shading:
Very low levels of solar intensity

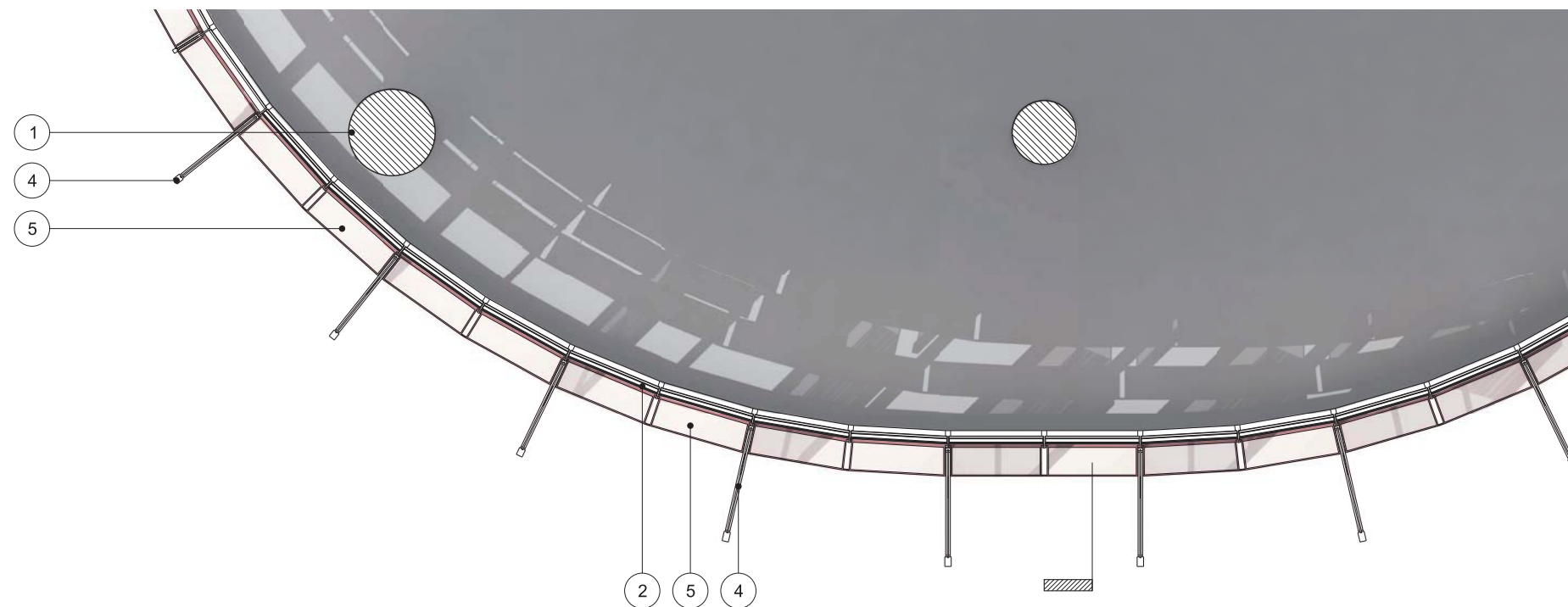
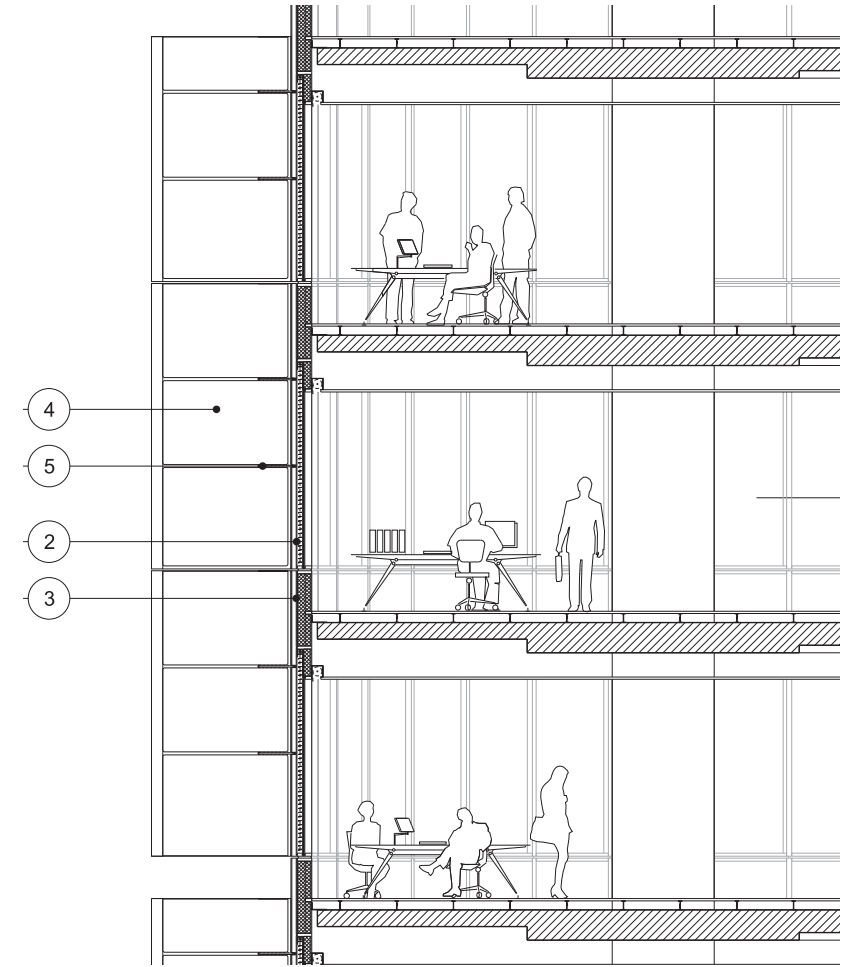
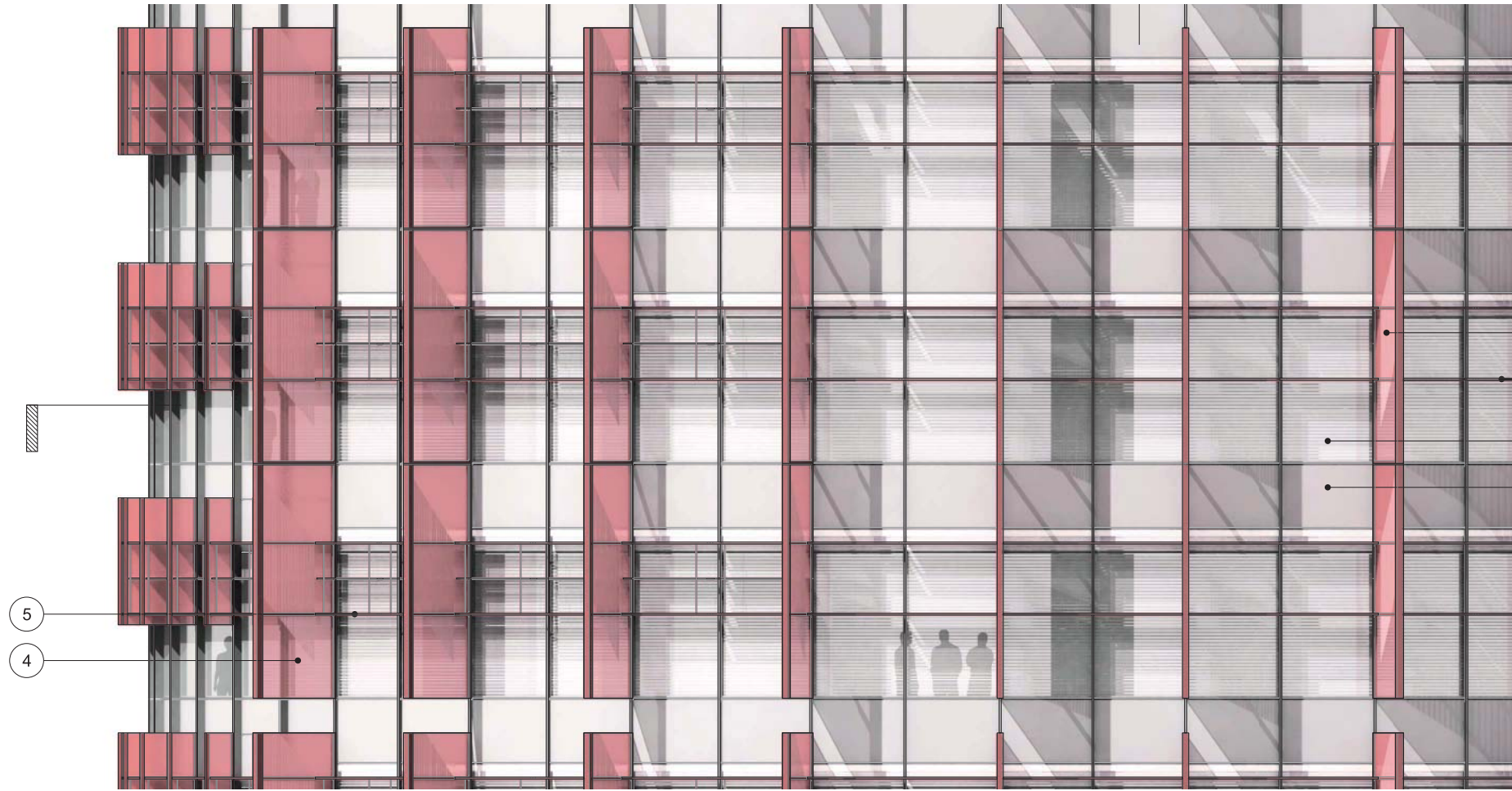


Maximum Shading:
Highest levels of solar intensity

Sections: Possible categories of shading responding to its solar load

5.10 Facades

5.10.1 Office Tower - Typical Building Prow West

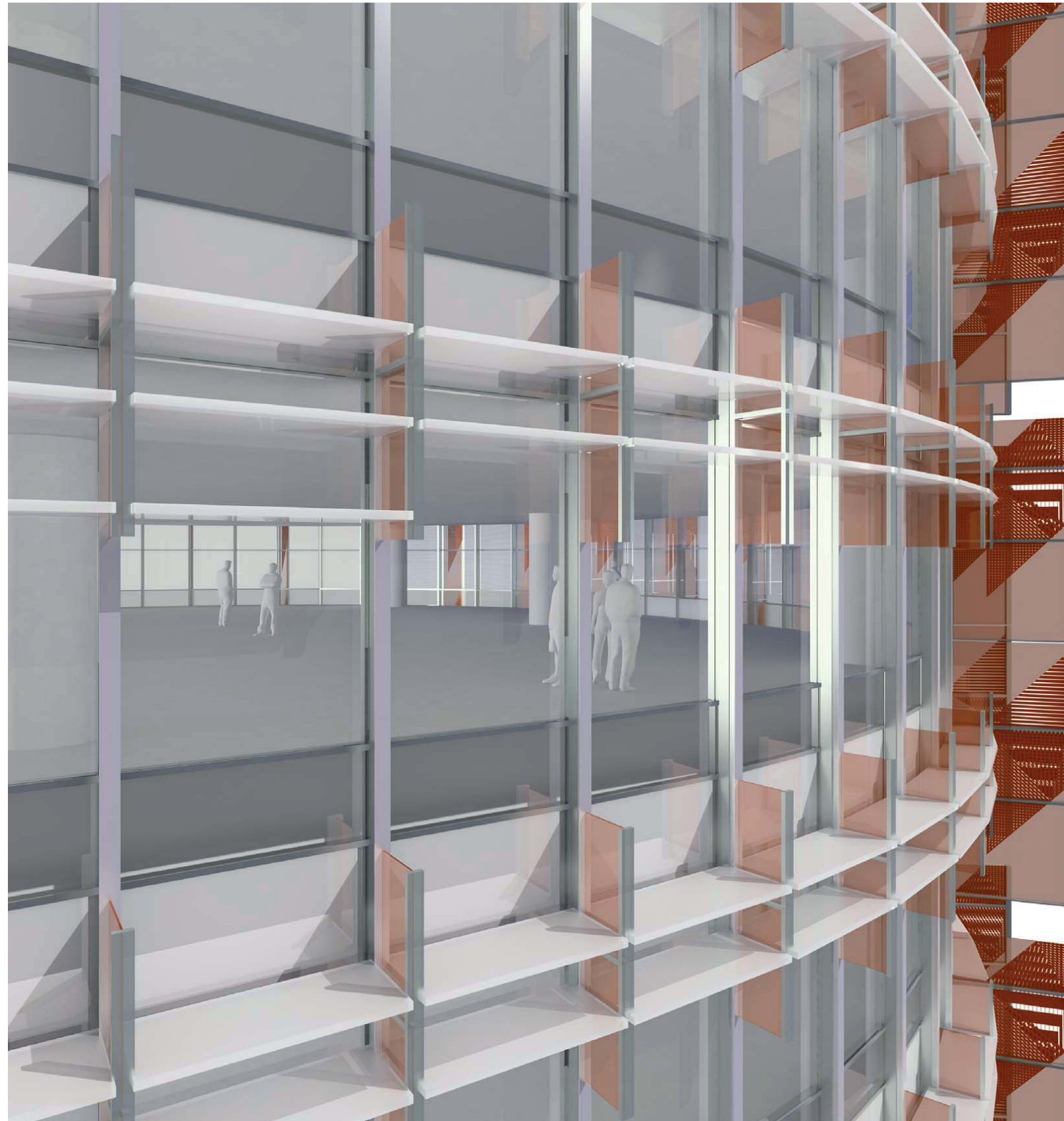


MATERIAL DESCRIPTION

- | | |
|--|--|
| <p>1 - STRUCTURE
Primary structural concrete frame</p> <p>2 - EXTERNAL ENVELOPE
Double glazed unit within aluminium curtainwall system with blind</p> <p>3 - EXTERNAL ENVELOPE
Back-painted glass spandrel and upstand panels within aluminium curtainwall system</p> | <p>4 - SOLAR SHADING
Glazed vertical shading fin within sub-frame supported from curtainwall mullion with translucent and fritted sections to high level and spandrel zones</p> <p>5 - SOLAR SHADING
Fixed horizontal louvre supported from curtainwall mullion and vertical fin sub-frame</p> |
|--|--|

5.10 Facades

5.10.1 Office Tower



Concept illustration of vertical and horizontal solar protection

A range of light conditions are achieved by varying the opacity and reflectivity of the shading material. Fritted glass is used for shading whilst transparent glass is used to enhance views and daylight amenity. The design aims to be composed of environmentally sustainable materials.

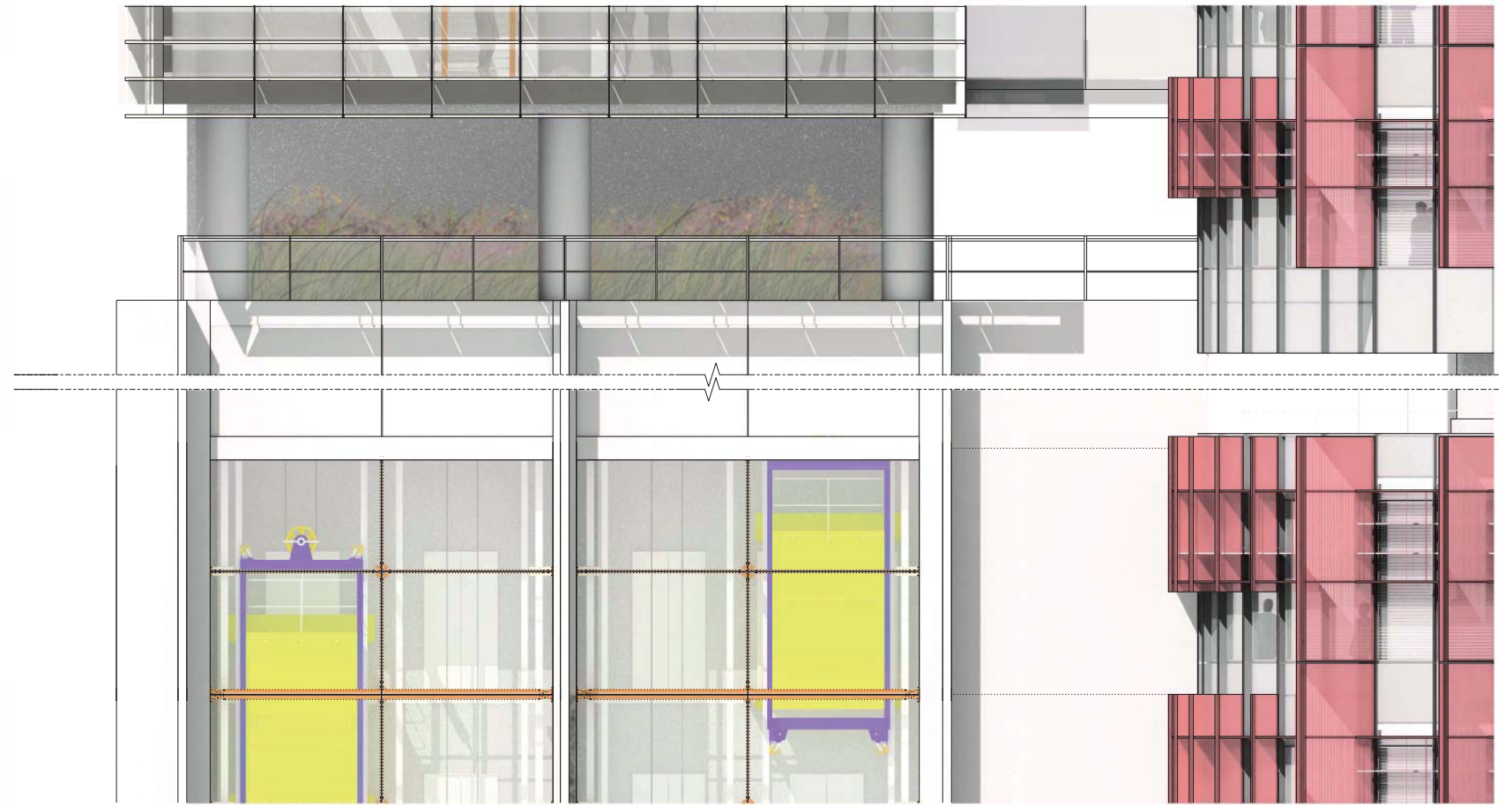
The shading system will reduce reliance on blinds for minimal interruption of views. When combined with high performance glass, it heightens transparency and daylight by minimising glare and improving the on-floor experience.

5.10 Facades

5.10.2 External Core

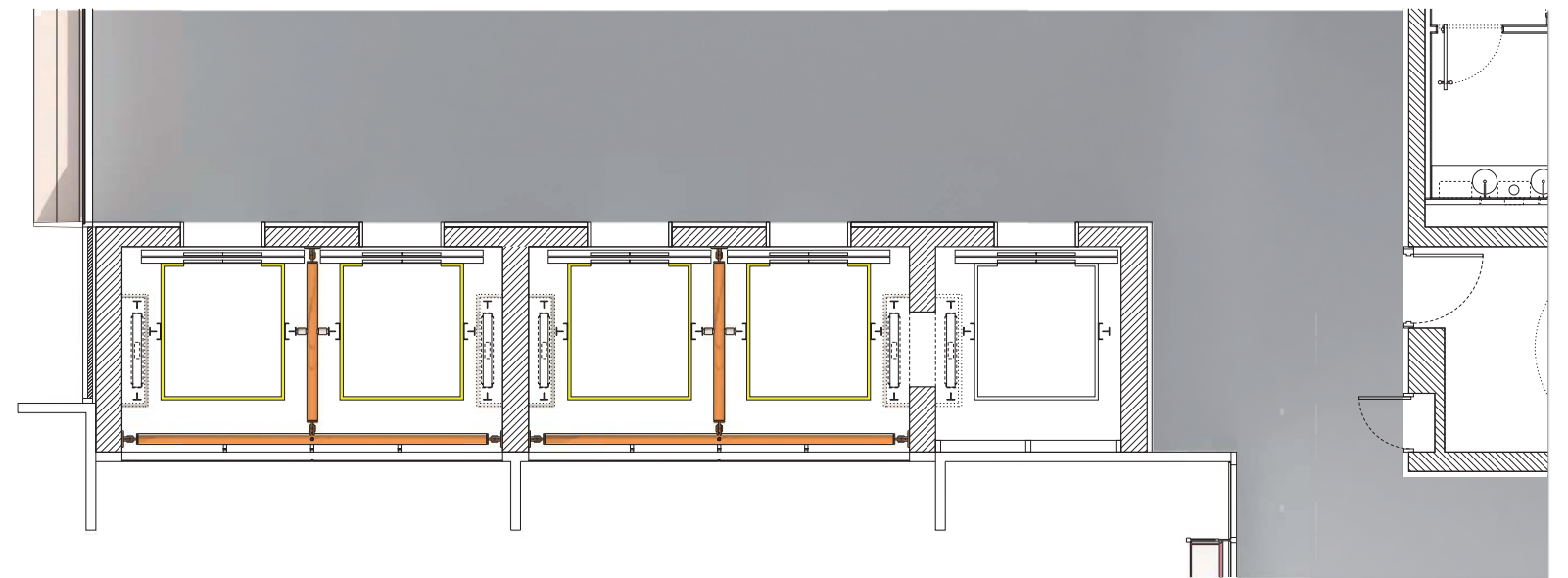
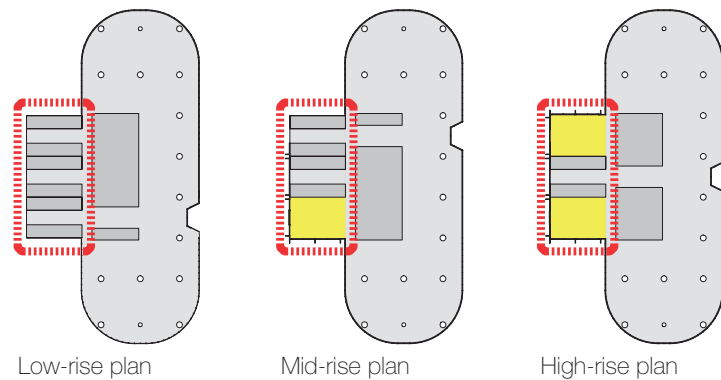
Composed primarily of lift shafts with Vertical Villages above, legibility of the external core is achieved by contrasting the facade treatments. The separation of these two elements is further defined by a rooftop terrace above the lift shafts.

The east and west aspects of these spaces are opened up with glazing which is shaded by a continuous external micro-louvre. This, together with the glazed lift shafts and external terraces work together in bringing animation to the external core.



Elevation: West view of external core with glazed lift shafts

Keyplan | External core and Vertical Villages location



Floorplan: External core

5.10 Facades

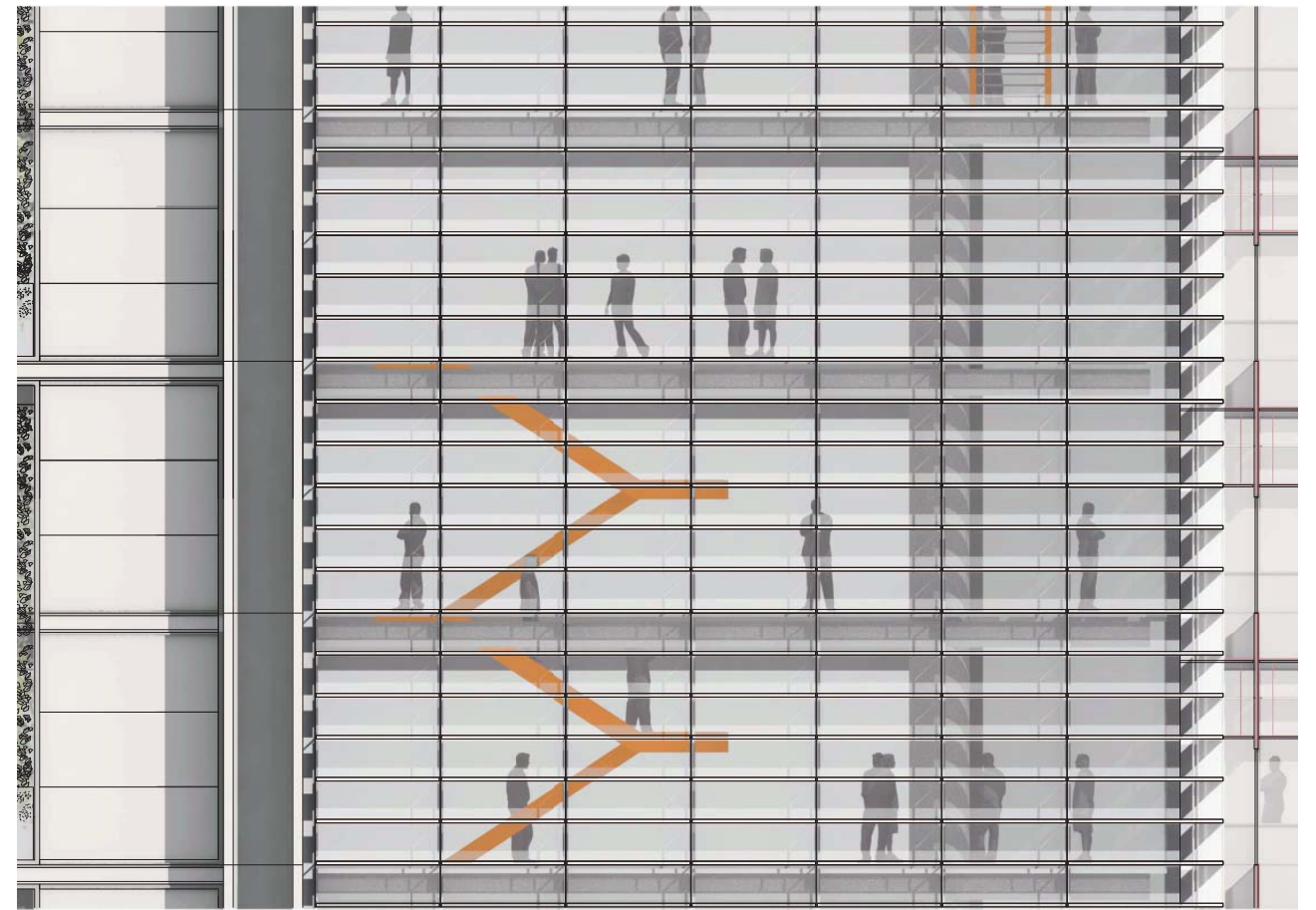
5.10.3 Vertical Villages

Vertical Villages are interstitial communal break-out spaces that encourage communication and social exchange between people.

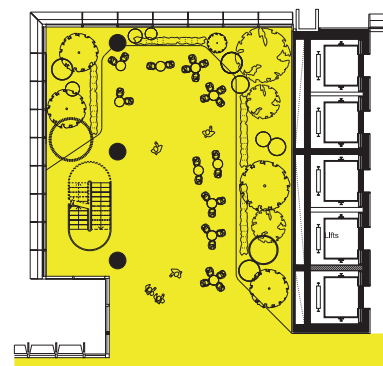
They allow for special tenant amenity, community spaces, interfloor circulation, unique meeting rooms or offices, naturally ventilated mini-atriums, kitchenettes, canteens or other special provisions required by the tenants. They could be the social space or hub of the office.

On the north facade, the cladding to the Vertical Villages on top of the lift cores act as a contrast to the filigree of the primary floor plate with a veil of horizontal louvre shading creating a visual counterpoint. This is subdivided into a four storey reading to give building scale.

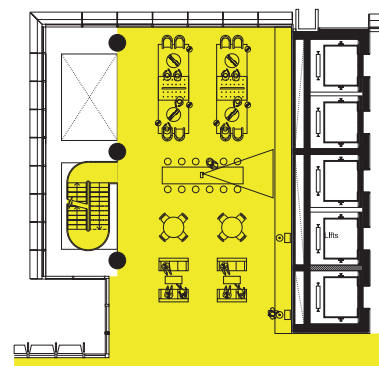
Views into the Vertical Villages reveal movement and activity on partial floorplates within double and triple height spaces. The Villages are supported above the lift cores following the profile of the three cores. This creates a logical structure, gives a functional and expressive link between the cores and the Villages.



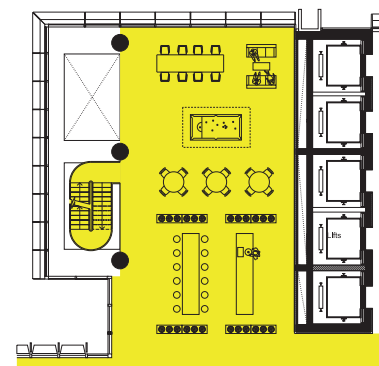
Elevation: Vertical Villages



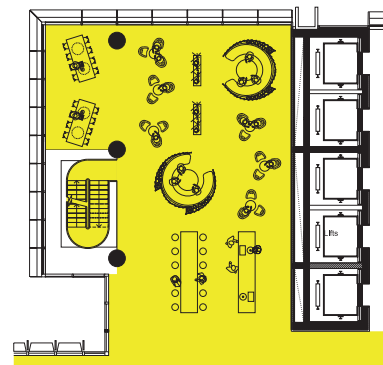
Garden / Cafe



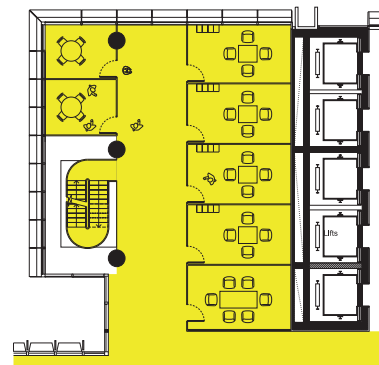
Break Out Space 01



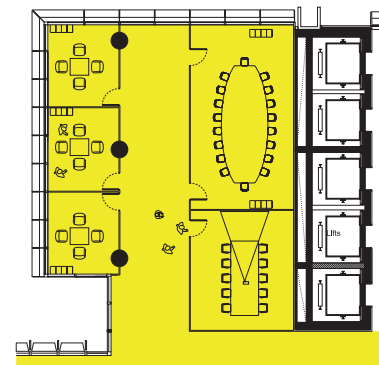
Break Out Space 02



Break Out Space 03

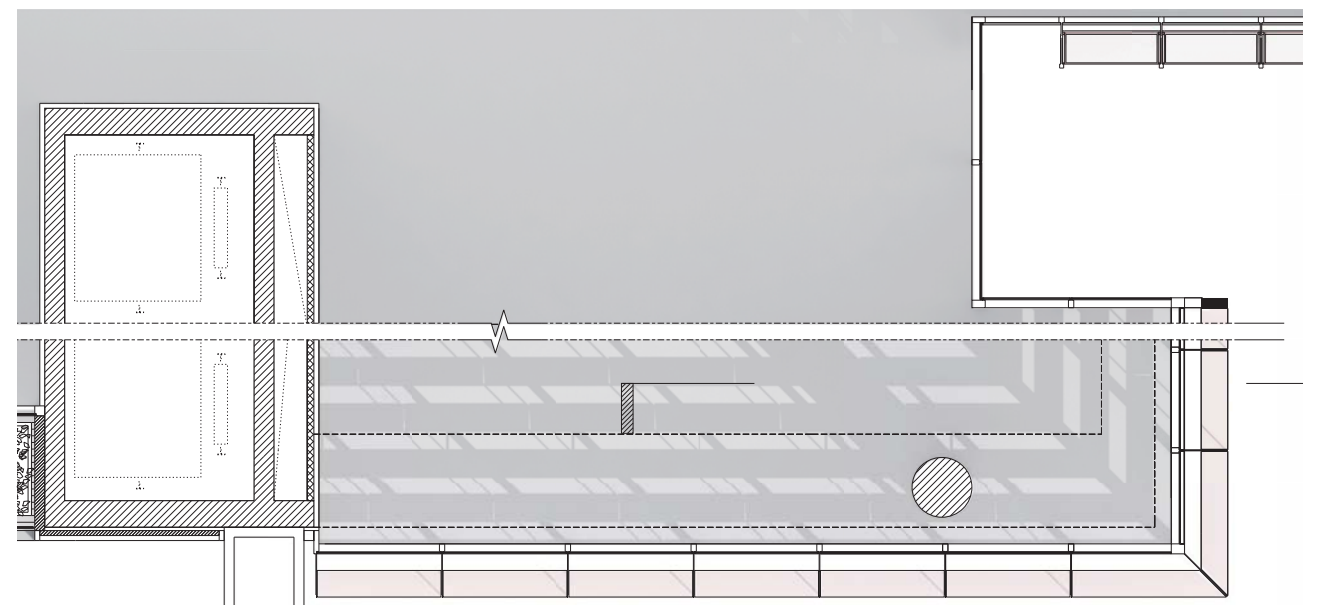


Meeting Room 01



Meeting Room 02

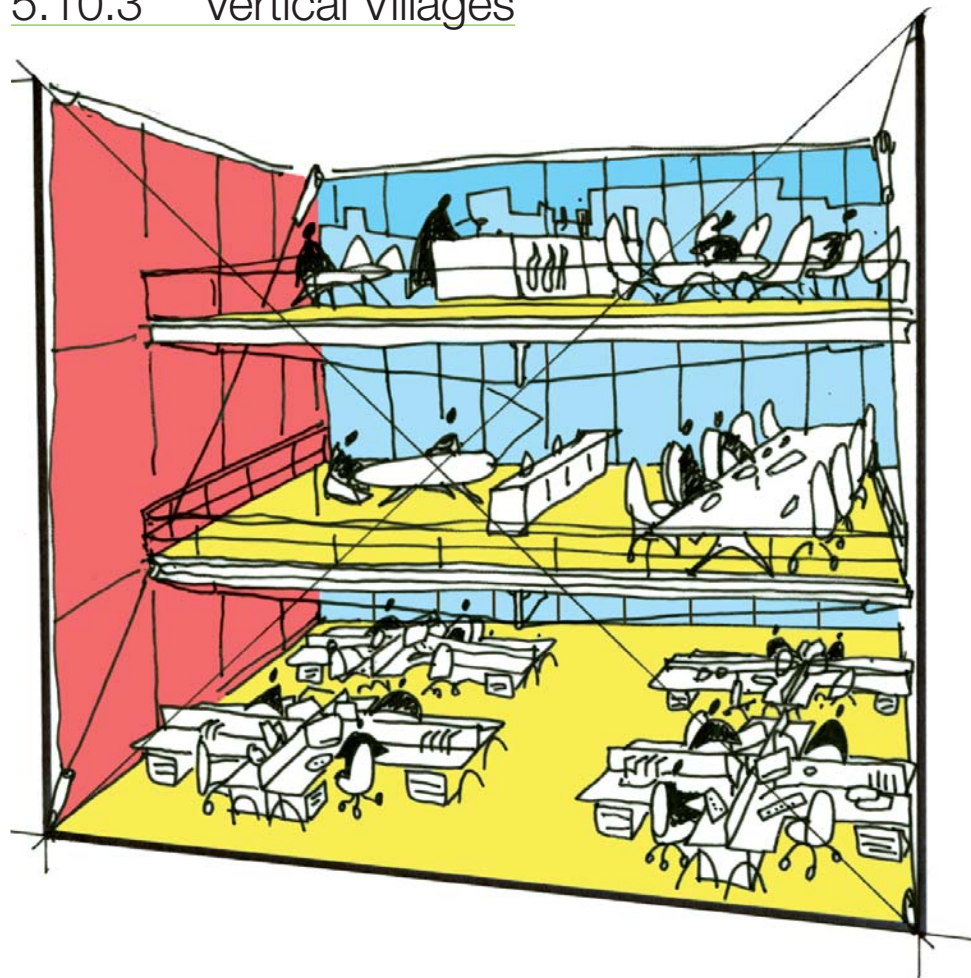
Concept plans of Vertical Village (Layouts are indicative only)



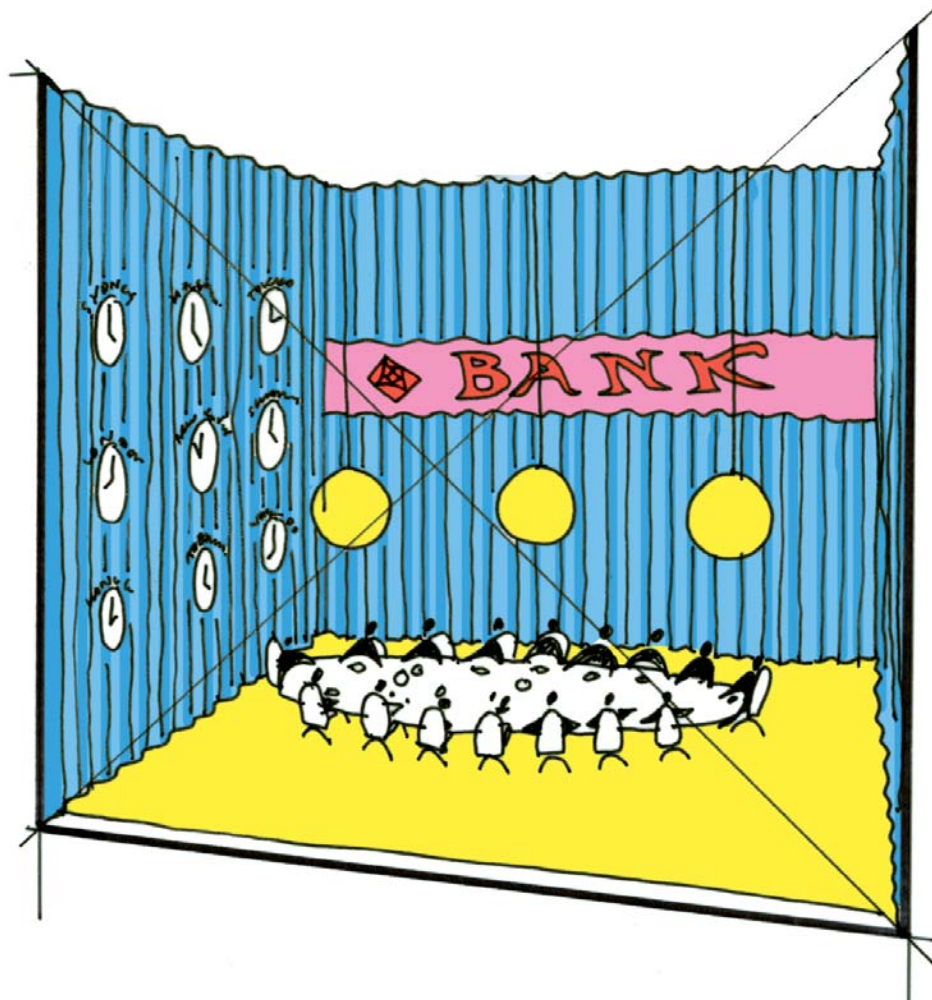
Floorplan: Vertical Village

5.10 Facades

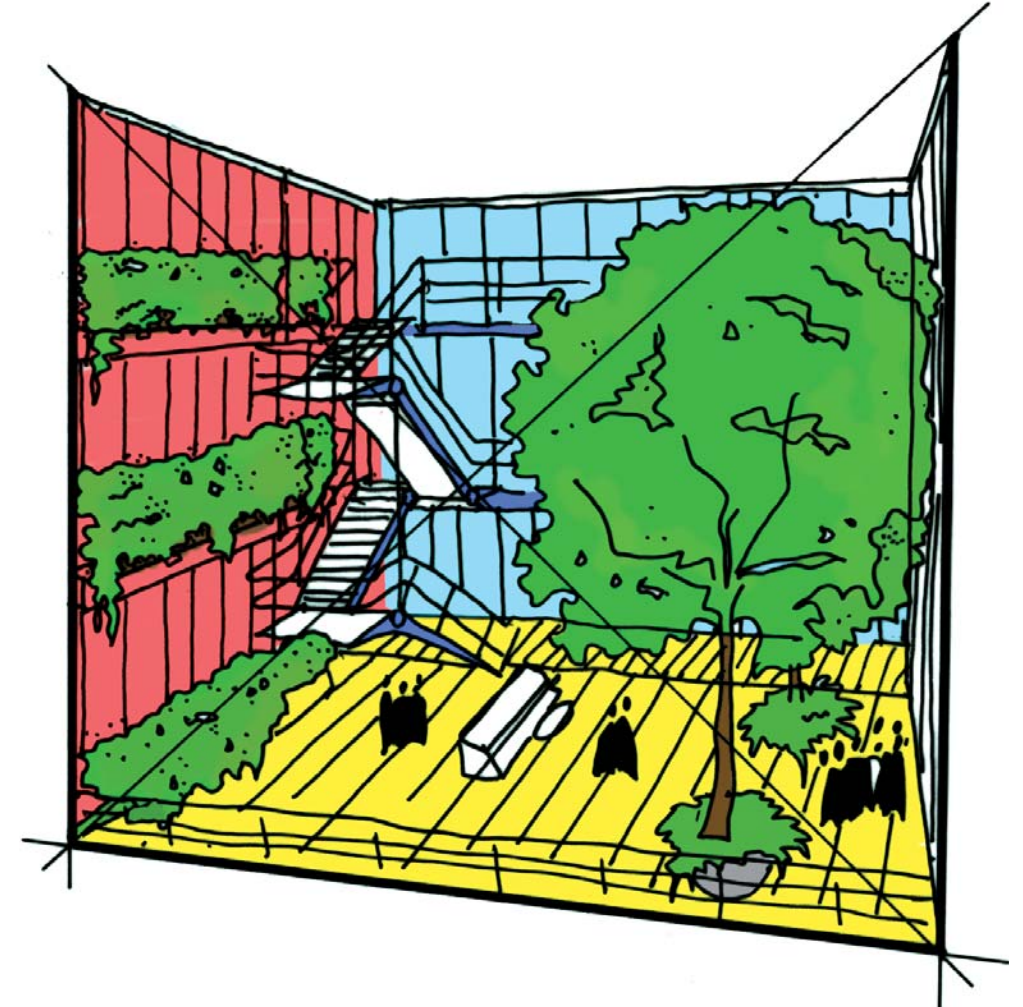
5.10.3 Vertical Villages



Work stations/meeting rooms



Formal meeting/board rooms



Winter gardens/social spaces



Examples of internal spaces



5.10 Facades

5.10.3 Vertical Villages

The Vertical Villages have dual aspect on the east and west facades. On a city scale these read as highly transparent elements with a potential to display a variety of activities on the facades according to tenant requirements.

Glazing the two sides of the Vertical Villages provides the opportunity for panoramic views towards the Harbour Bridge and to Pyrmont.



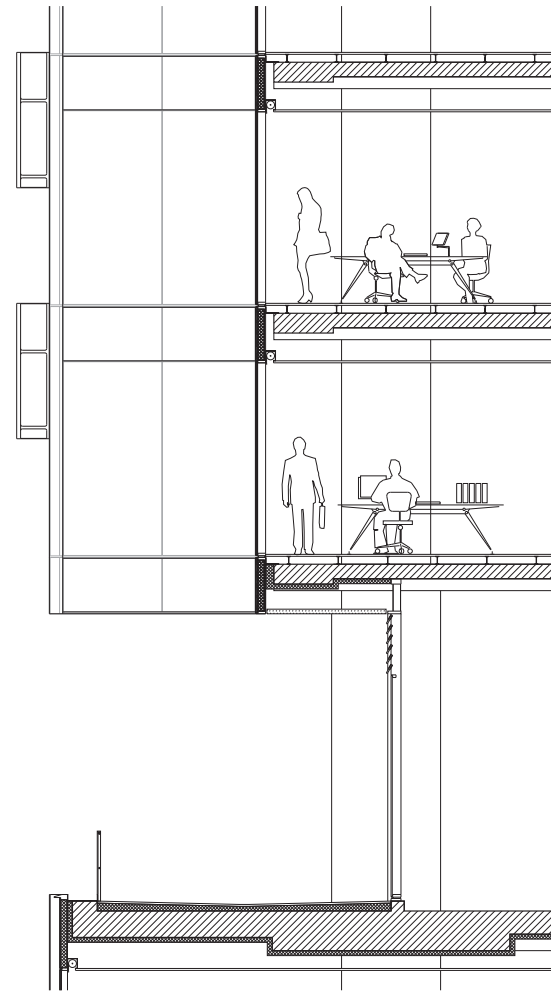
Illustration of the external core and Vertical Villages

5.10 Facades

5.10.4 Office Tower - Southern Recess

The southern recess reduces the bulk and mass of C3 through vertical articulation which varies in location between low, mid and high. It provides a visual continuity from the top of the tower, through the recessed plantrooms and brings it to the ground.

On elevation, the southern recess helps orientate the user by marking the location of the serving lift lobby on the external core through to the end of the on-floor arrival sequence. This conclusion provides panoramic views through floor to ceiling glazing to this unique and special location. It's tapered form allows for oblique long distance views to the city and water as well as localised views to people and the streets below.

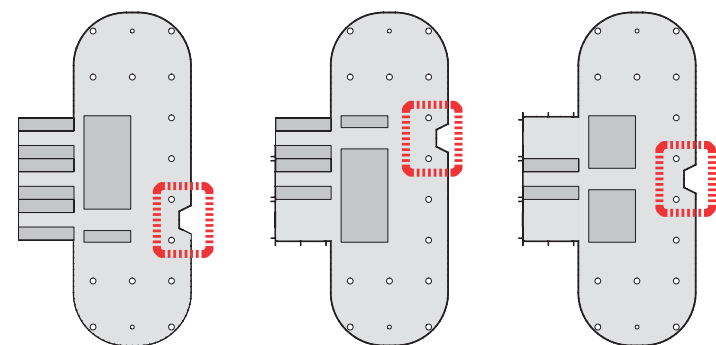


Section: Southern recess

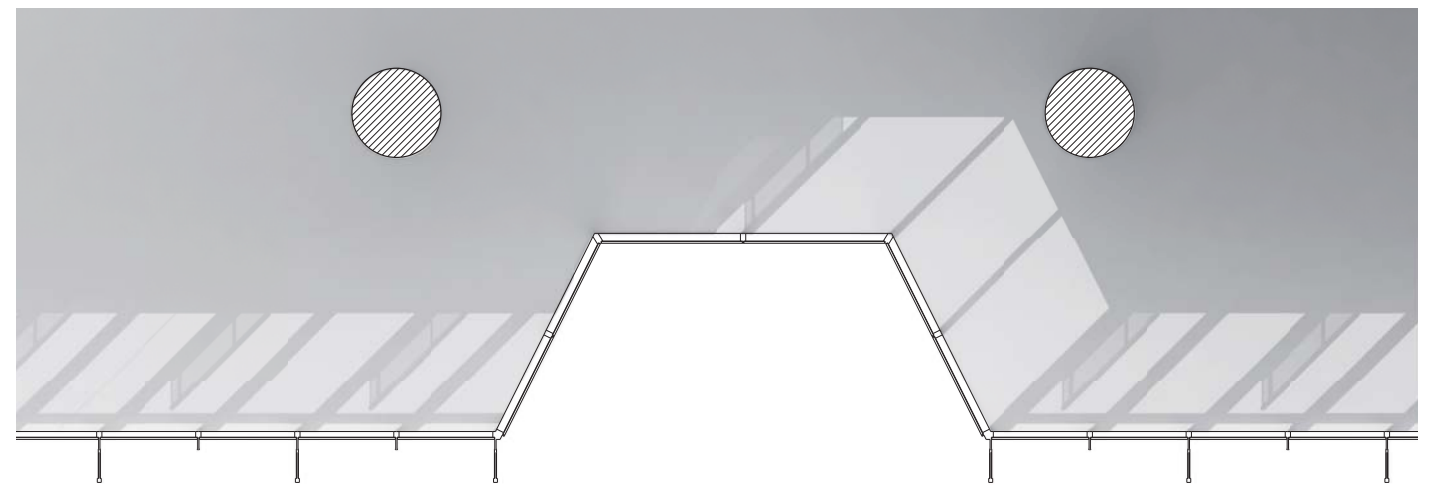


Elevation: Southern recess and recessed plantroom floor

Keyplan | Southern recess locations



Low-rise plan Mid-rise plan High-rise plan



Floorplan: Tapered southern recess

5.11 Podium and Tower Connection

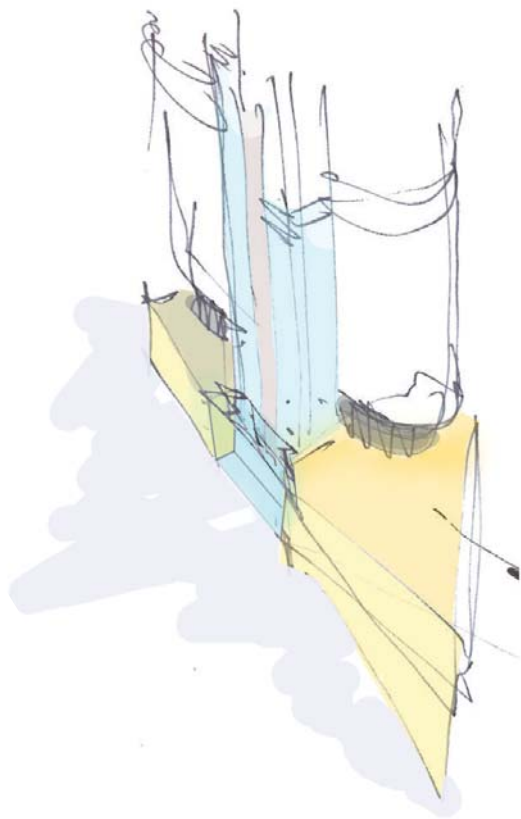
5.11.1 Podium and Lobby Facades

The transition between podium and tower is marked with a series of balconies at the base of the tower to provide activation and variety while humanising the tower's base.

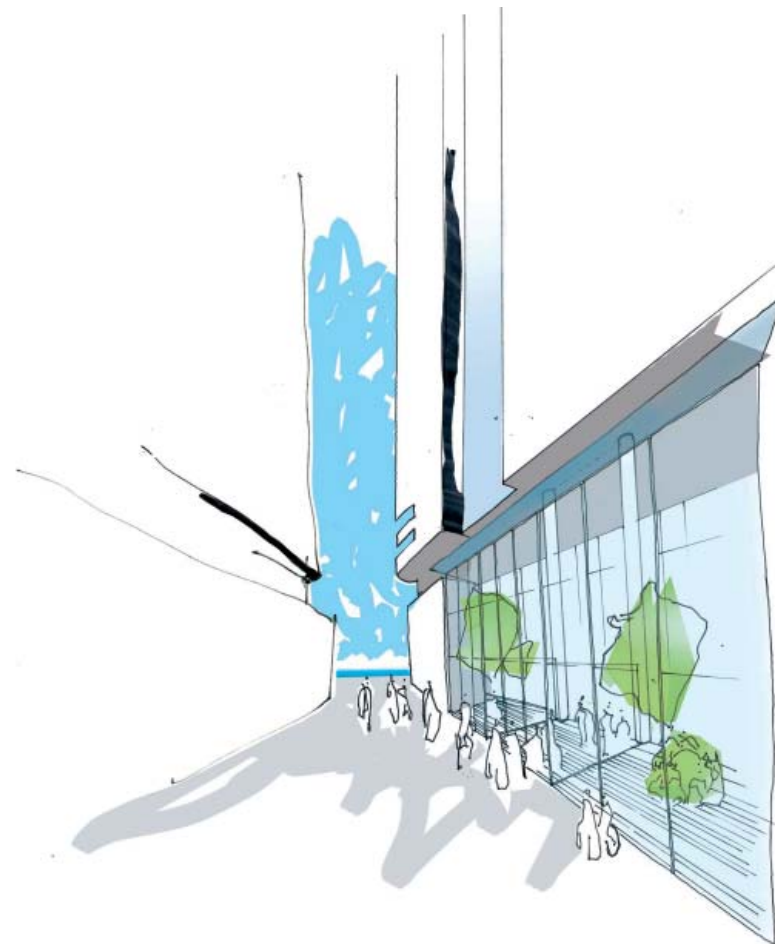
The building's entrance lobby addresses the cross streets and is accessed from the southern side. The glazed facade reveals the tower's primary structure coming to ground, making legible the way the building above is supported.

This transparency provides openness and visual permeability drawing people into the lobby. Daylight floods through the glazed northern facade and cores to give a dramatic sense of arrival in a triple height space.

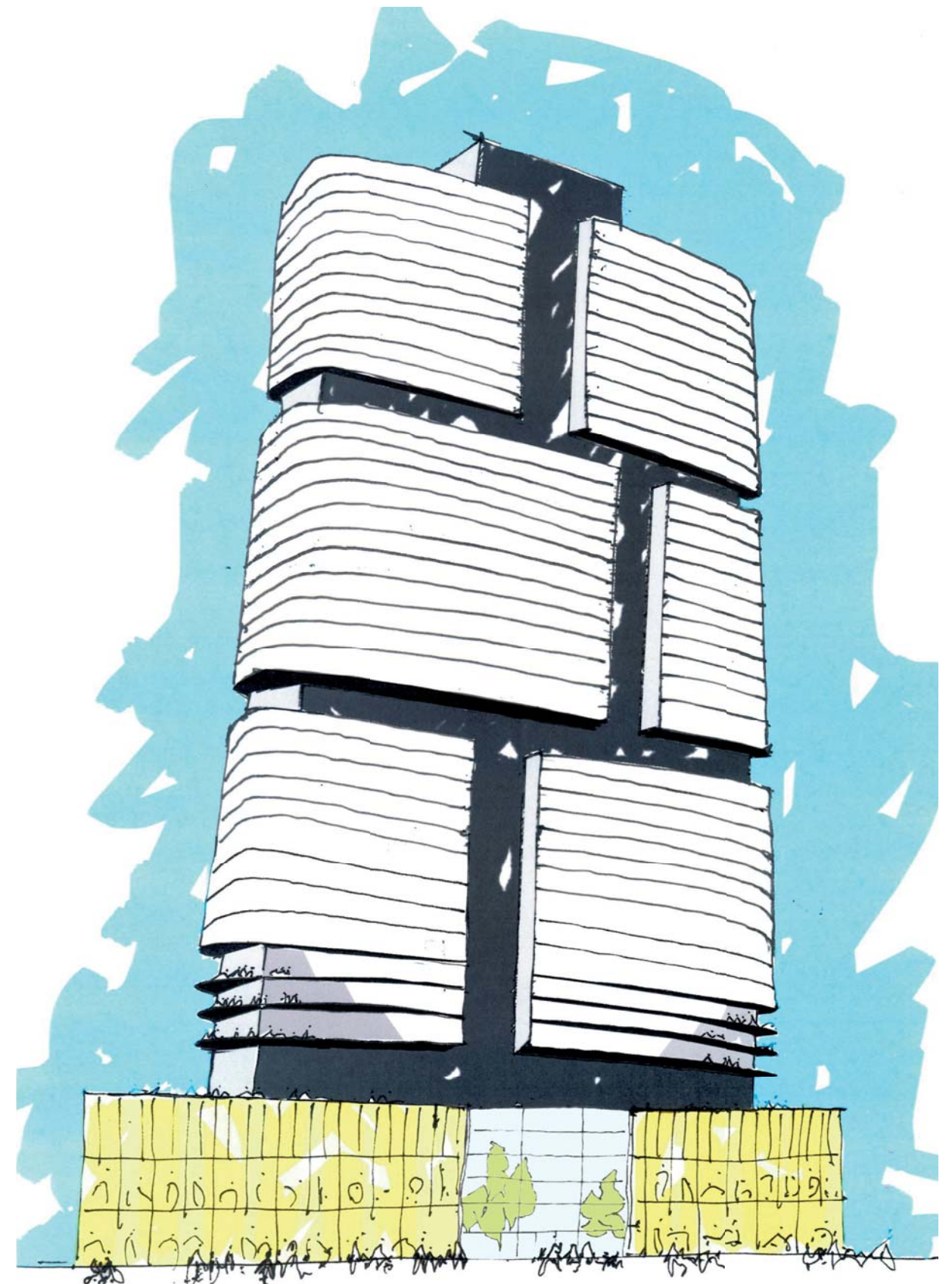
The lobby facade continues the street wall of the podium buildings along the east-west pedestrian walk. The transparent lobby facade provides a striking contrast to the solidity of the masonry podium buildings.



Sketch of the north-west view with the triple height glazed lobby



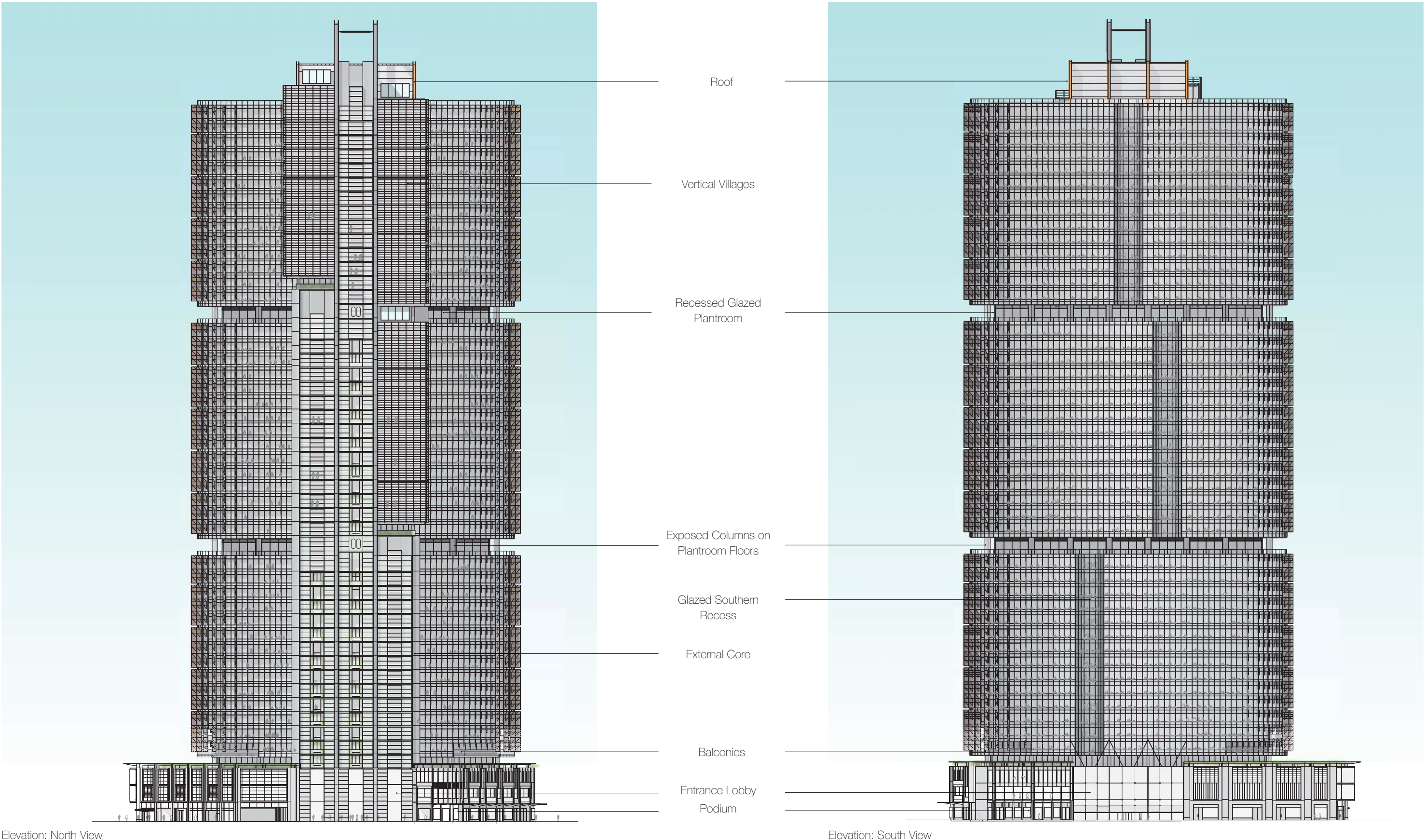
Sketch of the south elevation with the triple height glazed lobby



Sketch of the south elevation showing the visual continuity through the southern recess, plant rooms and onto the ground with the triple height glazed lobby

5.11 Podium and Tower Connection

5.11.1 Podium Facades



Elevation: North View

Elevation: South View

5.11 Podium and Tower Connection

5.11.2 Entrance Lobby - South Facade

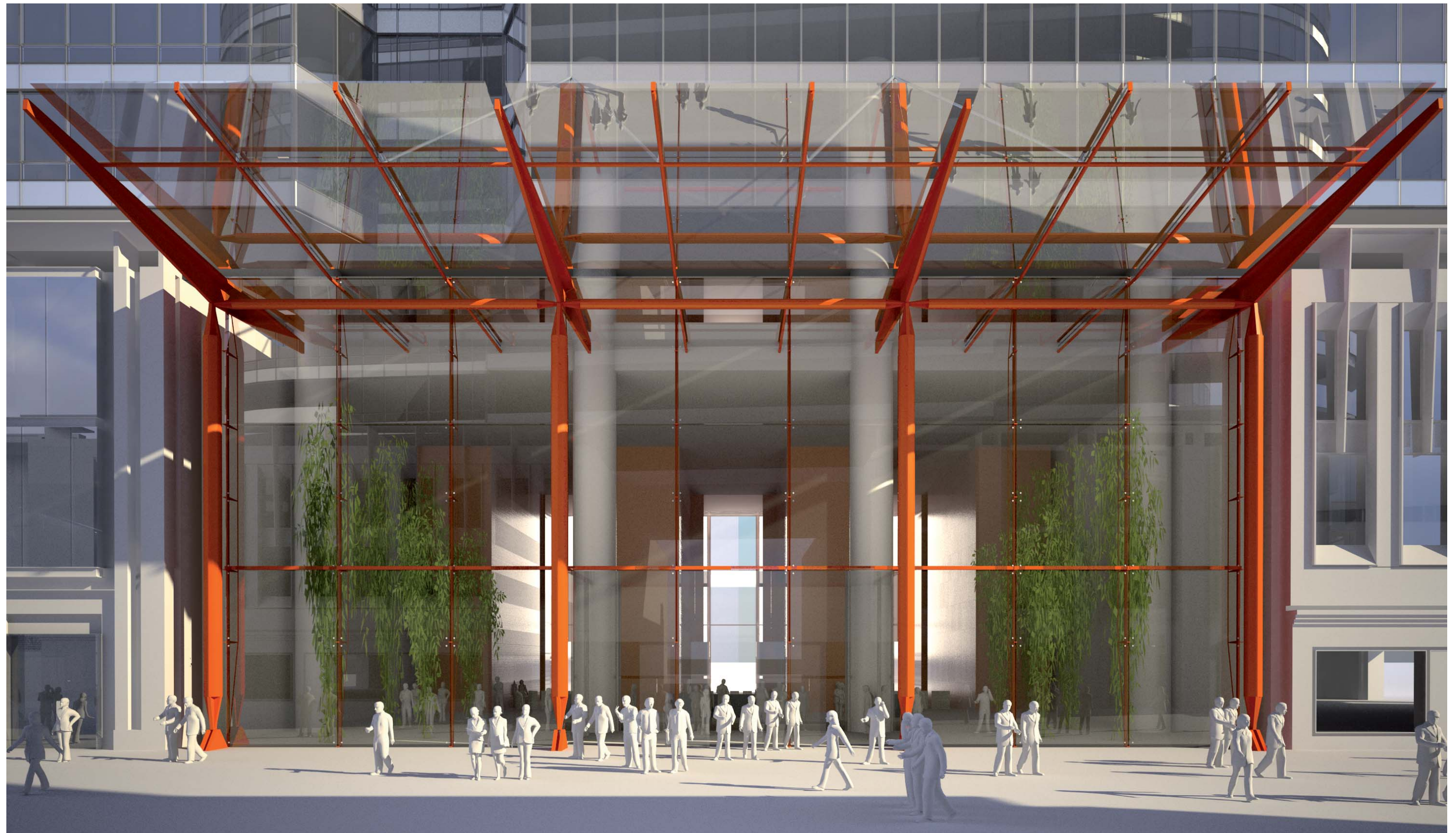


Illustration of south lobby in the proposed scheme

5.12 Podium

5.12.1 Design Concept

Section By Tony Caro Architecture and PTW

The urban design strategy adopted for Barangaroo South proposes two interrelated built form elements: City scaled towers and street scaled podium base buildings.

The podium elements generally comprise three generously proportioned levels to the perimeter of the street blocks resulting in a consistent street wall height of around 16 metres.

Design Concept - Podium East PTW

C3 podium east addresses City Walk to the south, Shelley Lane to the east and the entrance to the basement levels off Napoleon Street to the north. These facades have been modeled to provide a lively articulated street wall activated with shop windows, cafés and other services and to address the distinct character of each of these streets and lanes. The rhythm of each bay has been carefully managed to provide a well-proportioned and human-scaled environment at street level, activated by lively shop fronts, cafés and other services. The interplay between entrances and windows, solid and void will add a further layer of complexity to these street frontages. In addition the facades are created with a strong regular vertical element that has been reinforced at the upper levels with the expression of glazing mullions and vertical blades, forming a strong intermediary with the commercial towers above. This delineation is reinforced by the use of a strong cornice-like element at the top of the podium façade, further mediating between the street scale and the city scale of the tower above.

City Walk is one of the key streets and view corridors proposed at Barangaroo. As such it has been envisaged as a promenade without awnings. The proposed façade provides a vibrant and articulated retail shop front at ground level and a two storey expression above articulated by vertical metal blades.

Shelley Lane is a narrower livelier street filled with the activity of cafés and restaurants throughout the day and evening. The facades open up at ground level, allowing the street to visually occupy the retail space and giving a greater impression of space at this level. The upper levels consist of large bay windows that have been organized proportionally into two storey vertical elements where the lower bay may be opened up into a balcony giving further depth and modeling to this façade. This approach is continued across the short return on the northern side where the vehicle entrance to the ground floor forms a portal at the ground level.



Illustration of C3 podium - north east corner



Illustration of C3 podium - south east corner

5.12 Podium

5.12.1 Design Concept

Section By Tony Caro Architecture and PTW

Podium West

Tony Caro Architecture

The western podia building is situated at the key intersection of Globe Street and City Walk where the alignment of north-south alignment of Globe Street curves to connect to Napoleon Street which connects to Hickson Road. The curvature is expressed by a distinct change in the façade rhythm through its curved section, which is replicated at the north-eastern end where the façade returns to the northern side of the C3 office core.

A vertical incision into the façade for the height of the building at the City Walk corner provides a dramatic corner expression and potential for a grand entry to a major retail or commercial space.

The dramatic corner expression also serves as a device to divide the facades of the building into separate but related characters.

The short and long bay rhythms of the Globe Street façade offset to the ground floor portals to create a sense of liveliness.

The stately “palazzo-like” street façade of City Walk is further complimented at ground floor where it draws on the intended precedent of the static rhythm and character found in Martin Place. The vertical fenestration provides a good balance between sun protection and outlook whilst creating a dense vertical pattern when viewed from within the street corridor.

On the upper floors of both facades the expression is more consistent in detail and fenestration order to

create a strong sense of unity when the whole building is viewed “in the round”

The vertical fenestration in various rhythmic patternations of the facades is consistent with a demur human-scaled traditional street architecture.

The facades express the structural bays that set up the various rhythms of articulation. In this way the construction tectonics reinforce the robust masonry character, expressive of the site topography/geomorphology and materially distinct from the lighter glassier forms of the commercial towers above.

The Globe Street/Street Level consists of stone-faced portal elements which define entry locations to tenancies, large glazed window display bay elements with dark metallic frames cantilevered over a recessed plinths and solid cantilevered awnings with dark metal panelized soffit.

The City Walk/Street Level consists of stone-faced vertical elements with double width at structural grids and single width at intermediate locations. The window display bays are smaller in width compared to Globe Street, to create a stronger sense of the intended masonry static rhythm and character. Dark bronze coloured metallic perforated metal screens above display cases provide visual richness, texture and a sense of lux to this façade.



Illustration of C3 podium - north west corner



Illustration of C3 podium - south west corner

5.12 Podium

5.12.2 Materials and Finishes

Section By Tony Caro Architecture and PTW

Podium East

The material character of C3 Podium East responds to the street environments that it fronts onto. As a key pedestrian promenade, City Walk presents a moderately civic face with deep masonry column and wall elements framing simply articulated retail shop fronts. Where the street width is narrower at Shelley Lane, the shop fronts are defined by operable elements, stacking, bi-folding and renlita style doors. These are framed by thinner metal blade elements which also support the cornice above and maximize the transparency at this lower level. There is opportunity on Shelley Street for projecting fabric shop awnings to provide limited protection from wind and rain.

The upper levels are characterized by recessed textured masonry panels and projecting bay windows and balconies on the Shelley Street leaving and projecting vertical metal blades over recessed glazing on City Walk underpinning the masonry character of these streets.

Mediating between each of these street facades is a strong steel framed, glazed corner element.

Podium West

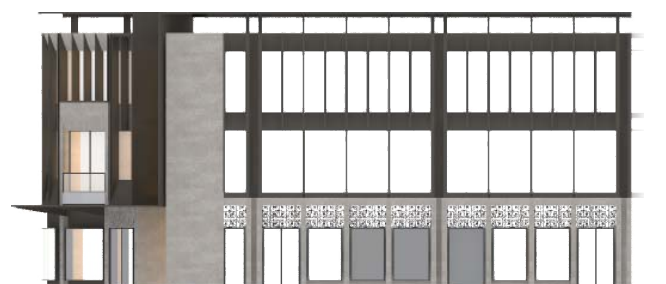
The ground floors below awnings focus on adding detail and high quality materials including dark bronze coloured metallic perforated screens, rusticated stone portals and cantilevered display cases which provide visual richness, texture and a sense of lux to the facades.

The robust masonry character of the upper floors is punctuated with dark bronze anodized vertical ribs to articulate and provide a balance between sun protection and outlook.

The cornice element is integrated into the façade by extension of upper vertical metal ribs to provide support and accentuate verticality.



Elevation: C3 Podium West
Images by Tony Caro Architecture



Elevation: C3 Podium West
Images by Tony Caro Architecture

5.12.3 Function & Use

Section By Tony Caro Architecture and PTW

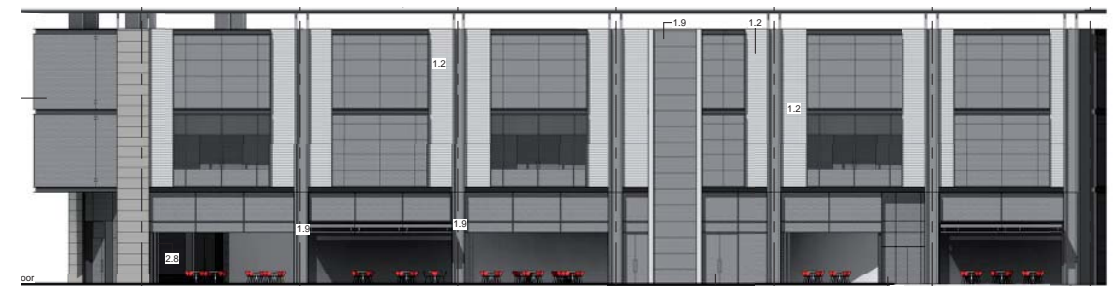
Retail Elements

The provision of continuous active retail frontages to the street network is critical to the vitality and success of the project. This will be served through a variety of conditions for the retail tenancies as well as a concentration of certain retail types in specific locations to support the various street characters.

Within the streets a variety of retail conditions are proposed. These range from single level street based modules with articulated frontages, to multiple level corner tenancies with predominate glazed frontages articulated by internal and external screens at upper levels.

A greater richness will be achieved within the podium elements through the interior design of the various individual retail uses which will be guided and controlled through strict tenancy guidelines and a rigorous design review process to ensure design excellence is achieved.

On the ground level there is a rich variety of cafes, restaurants and services, while the first and second floors hold a larger informal restaurant setting. The childcare centre at the third floor is accessed from the ground level via two passenger lifts.



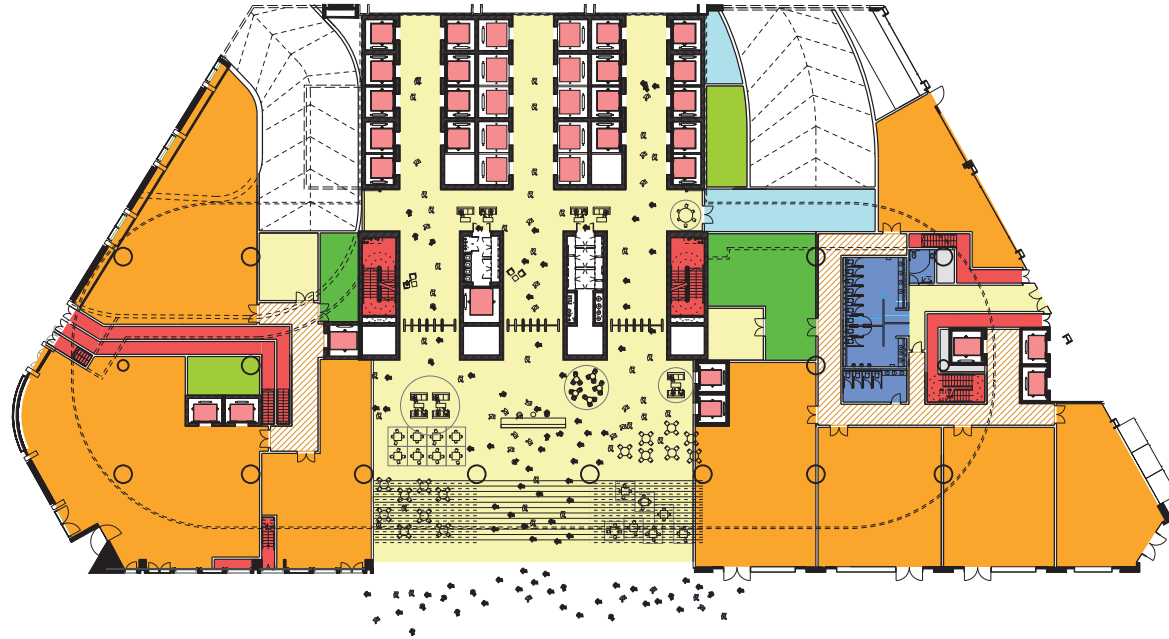
Elevation: C3 Podium East
Images by PTW



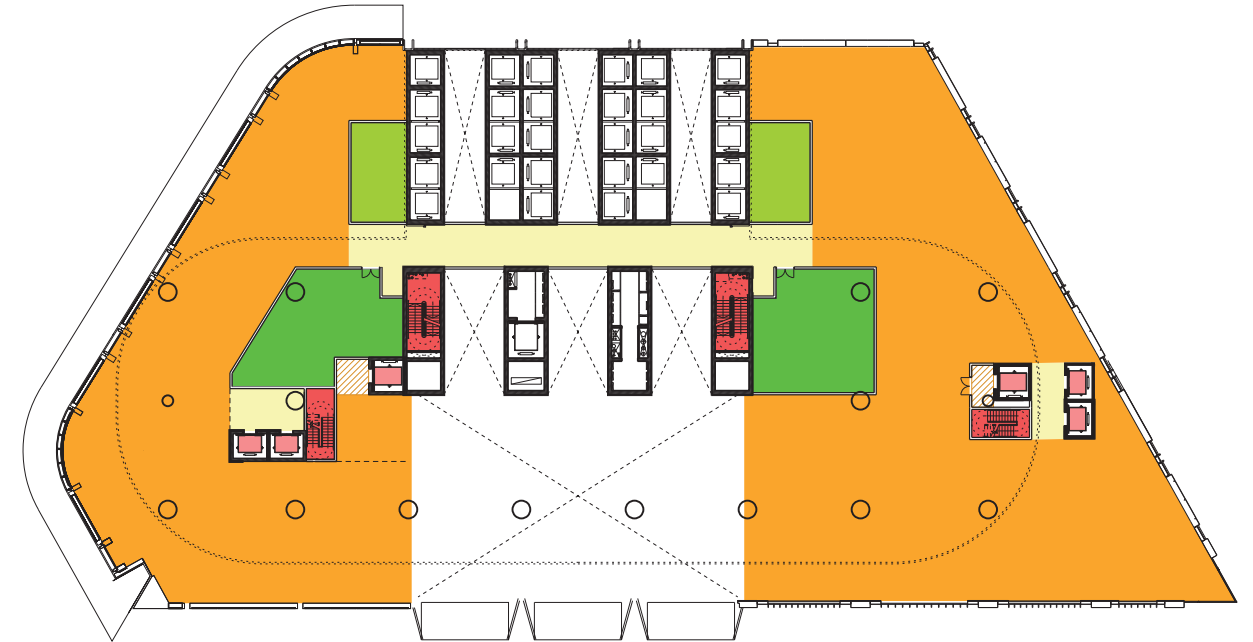
Elevation: C3 Podium East
Images by PTW

5.12 Podium

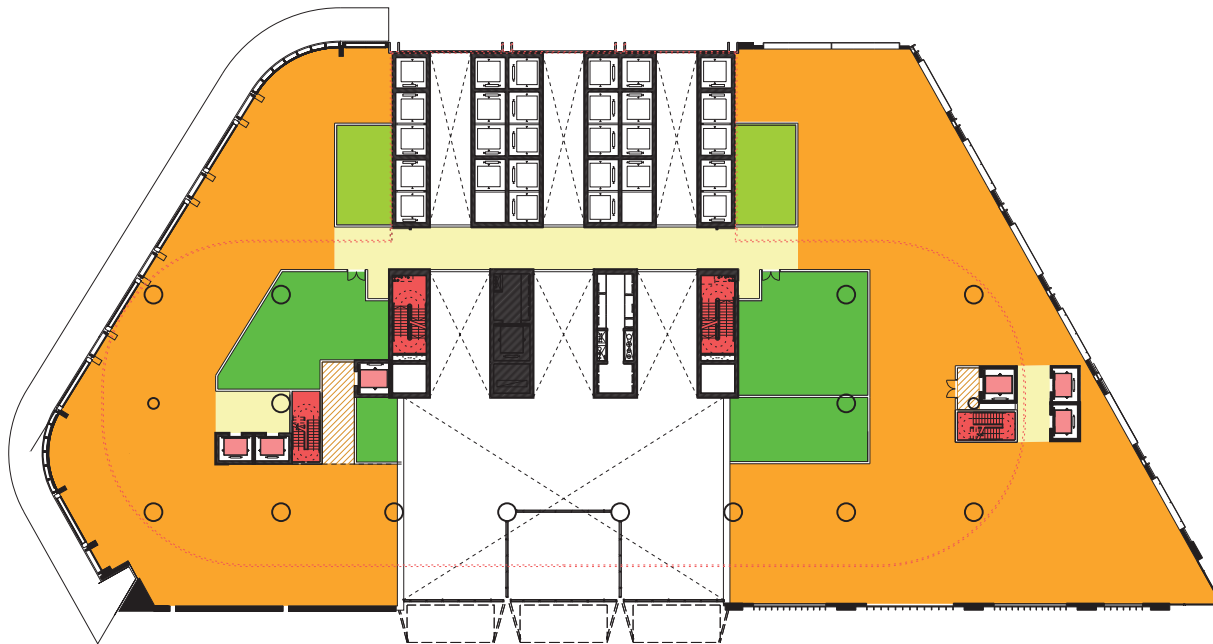
5.12.3 Function & Use



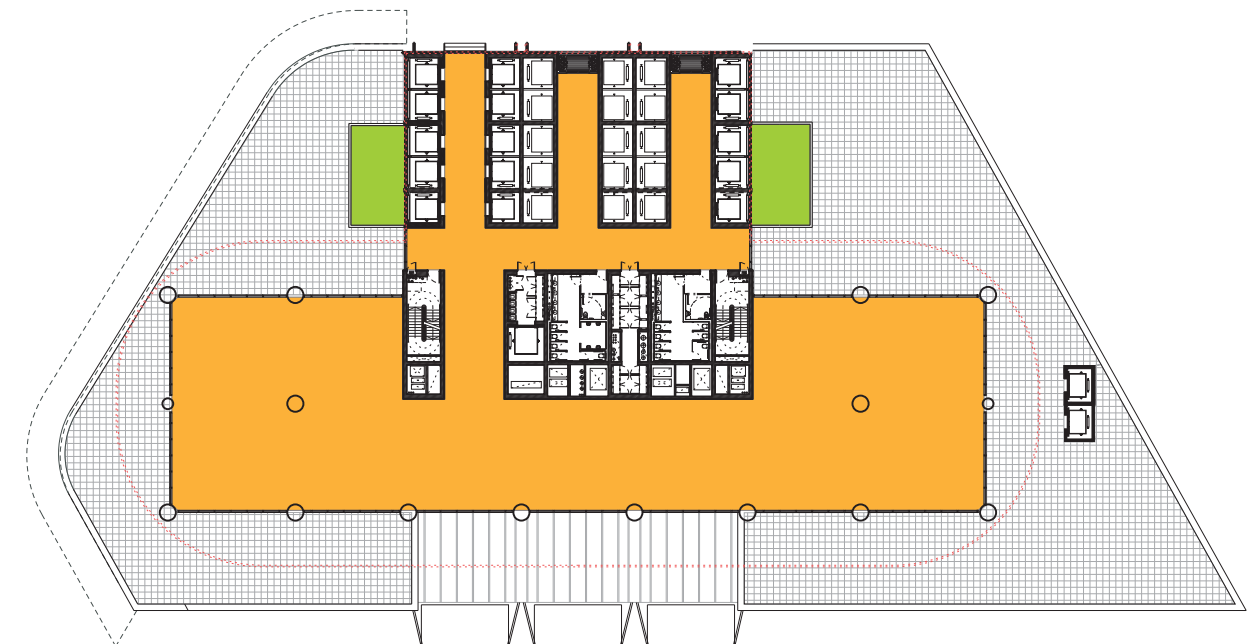
Ground floor plan



First floor plan



Second floor plan



Third floor podium roof plan

- | | | | | |
|--|--|---|---|---|
| ■ Lobby BOH | ■ Plant | ■ Office | ■ Egress | ■ Circulation |
| ■ WCs | ■ Basement Risers | ■ Retail (Childcare on Third Floor) | ■ Lifts | |

5.13 Rooftop

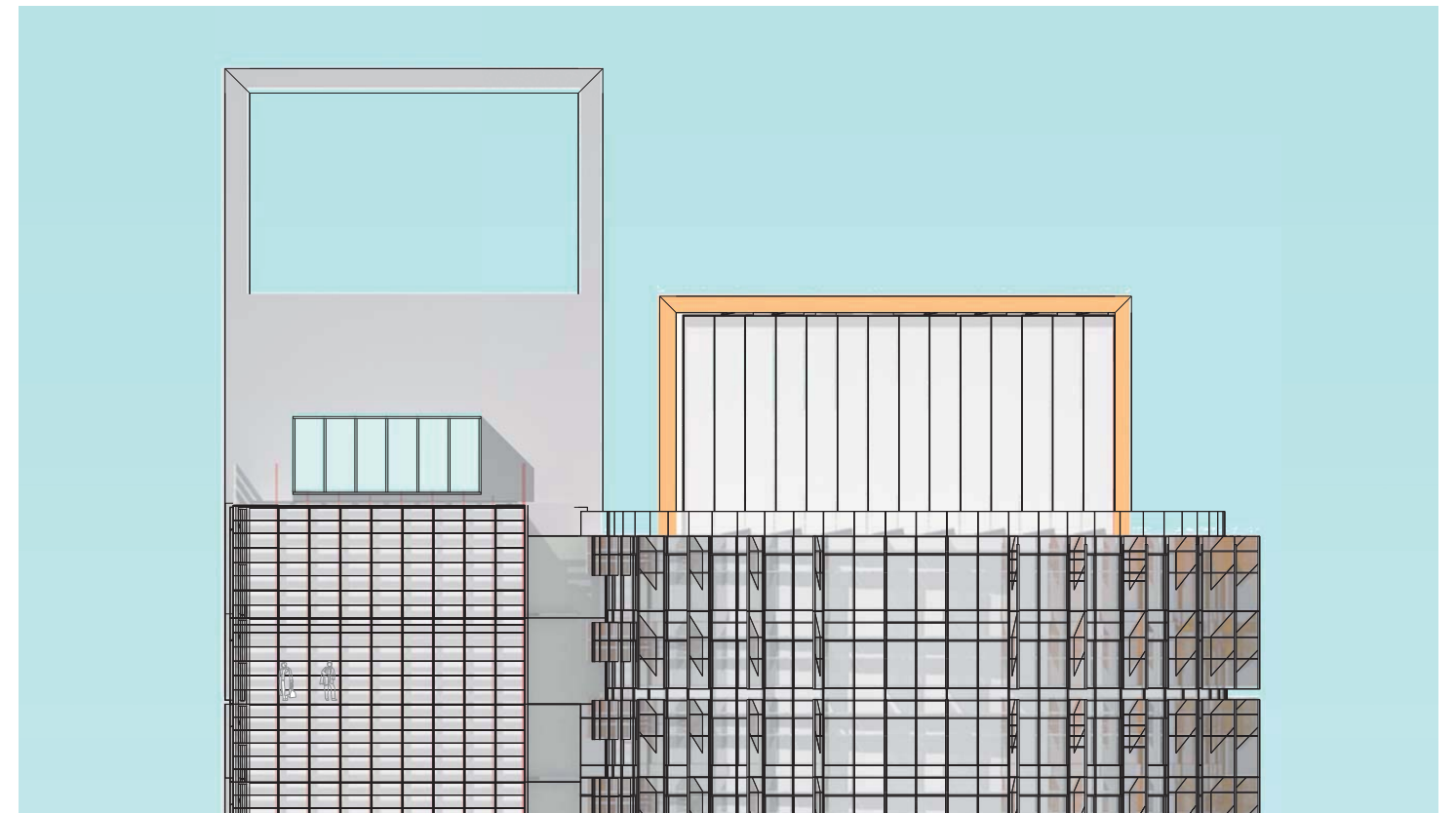
The roof top is designed to be legible on the skyline, with the double height glazed plantrooms supporting photovoltaic panels on the roof.

The roof level will house the lift motor rooms, flues, extract vents and equipment for façade cleaning and maintenance.

Cores project beyond the roofline to creating a silhouette on the skyline. The Vertical Villages are stepped as they extend to the roof level with the highrise lifts crowning the northern facade, dematerialising as they reach upwards.



Illustration of building C3's rooftop



Elevation: C3's rooftop

5.14 Services

5.14.1 Plant Room

The setback plant room floors that serve the office floorplates provide a level of scale and grain to the building's form as well as emphasise the legibility of the 'Served and Servant' concept. The setback facades reveal the structural columns to these levels.

The plant rooms are enclosed with floor to ceiling glazing to exhibit the inner workings of the building's mechanical services. Each of the components within the plant room is colour coded to reflect their functionality. During the night the plant rooms will be illuminated to maintain the scale and grain of the building.

In the following diagram the constituent components have been coloured to identify:

- Air handling units
- Substation, generators and electrical
- Electrical trunking distribution
- Supply air ductwork
- Extract air ductwork

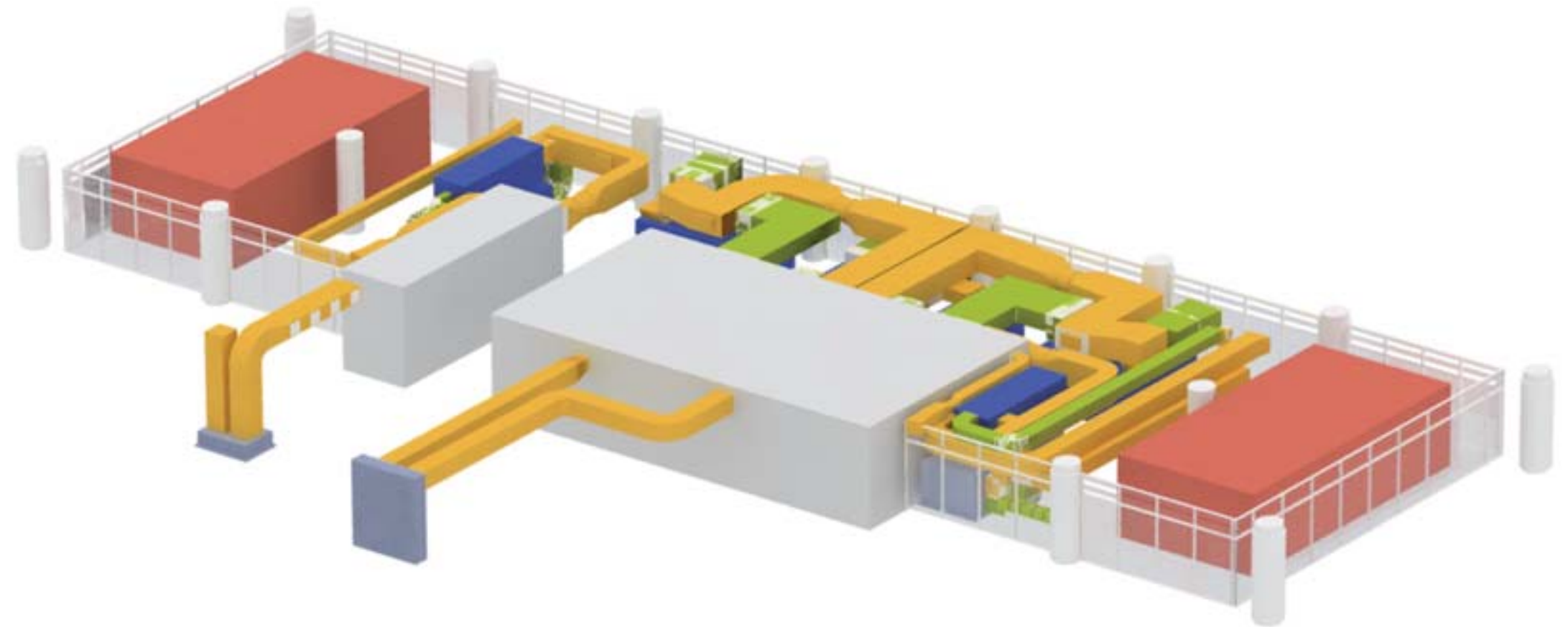


Diagram of plant room with colour coded mechanical services

5.14 Services

5.14.2 System Strategy

The Building Services systems for C3 will provide a high quality service commensurate with a modern A-Grade office building. The services principles are consistent with the sustainability objectives and the Green Star targets for the proposed building design.

The aim has been to organise the building services to maximise the efficiency of the floorplates and to provide a logical and efficient arrangement of services. As such, the tower is served by three plant rooms located at Levels 18 and 34 and rooftop. This positioning allows for an even distribution of service risers vertically through the office tower. Primary services to the tower including air, gas, water and power are distributed vertically through the core risers to the office floors.

The podium and retail levels are served by local plant rooms within the podium. The detailed design of the local plant rooms will be developed to respond to the specific requirements of the retail, food and beverage, and other uses.

Mechanical Services

The conditioning to the floor plates within the tower consists of a water based system of active and passive chilled beams. The passive chilled beams serve the perimeter zones and the active beams serve the internal zones. Further design will be informed by energy and indoor environment quality modelling in line with the building's world-leading ESD credentials.

Chilled water will be distributed from the basement cooling plant into the retail and commercial office spaces via vertical risers. Heat rejection for the tower and podium mechanical systems will be achieved via the District Harbour Heat Rejection Plant located in the basement.

Smoke exhaust and return air systems will discharge at the podium and tower roof levels in accordance with Australian Standards.

Vertical risers are also located within the podium levels for car park supply and exhaust ventilation which terminates at podium roof level.

Electrical Services

The in-coming electrical infrastructure and the associated service rooms are located in the basement level B01. Electrical service rooms associated with incoming services are located within the basement to meet authority and accessibility requirements.

The substations and HV switch rooms required to service C3 are located within each of the office tower plant rooms. Access to the substations for the installation and removal/replacement of equipment is to be provided via doors through the façade of each of these plant levels.

Electrical services from the tower substations are distributed to the office floor plates via vertical risers which also house distribution boards.

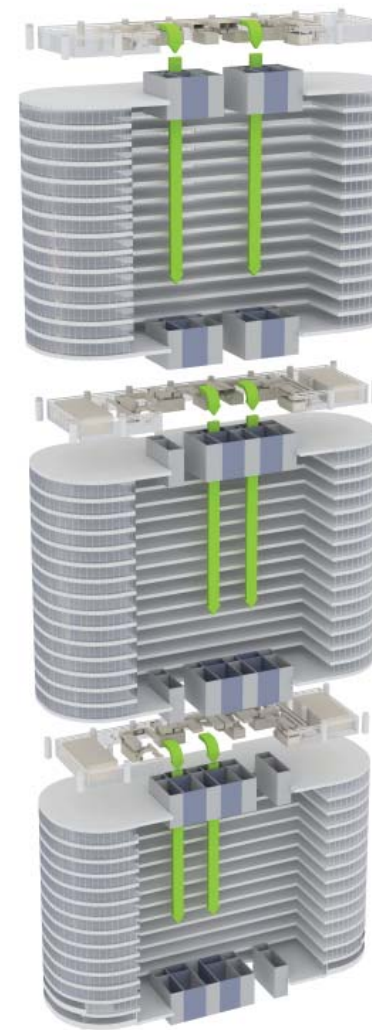
Vertical Transportation

The passenger lifts for the tower are arranged in banks, 9 lifts to service the low rise (Levels 3-17), 10 lifts to the mid rise, (Levels 19-33) and 10 lifts to the high rise (Levels 35-48). The transfer floors between rises are located at levels 17 and 33.

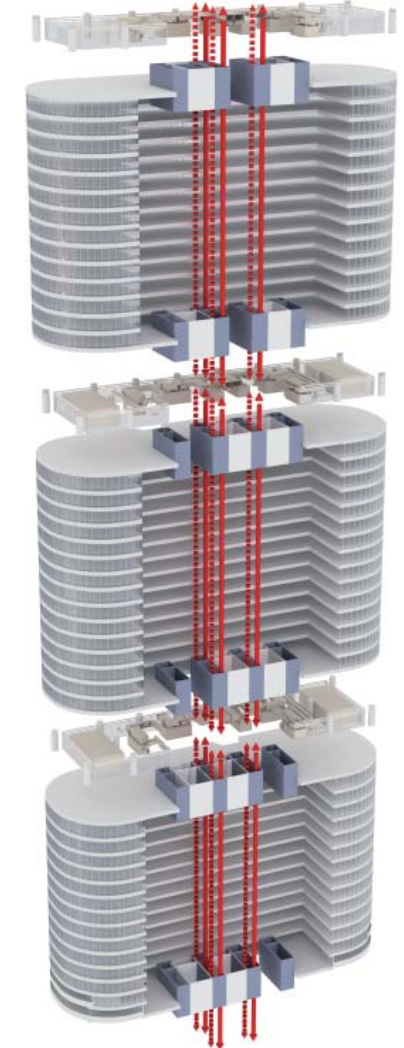
Two shuttle lifts connect the car park levels to the office foyer at ground level.

The multi-level retail tenancies are serviced by passenger lifts to comply with accessibility requirements. A separate goods lift for all office levels is provided at the loading dock area within the basement.

Two goods lifts service the retail tenancies in the podium and provide direct access to the loading dock level.



Mechanical services diagram



Communications / electrical services diagram

5.14 Services

5.14.2 System Strategy

Hydraulics

The hydraulics services strategy is consistent with the sustainability objectives and Green Star targets for the project. Water will be collected, treated and reused within the building.

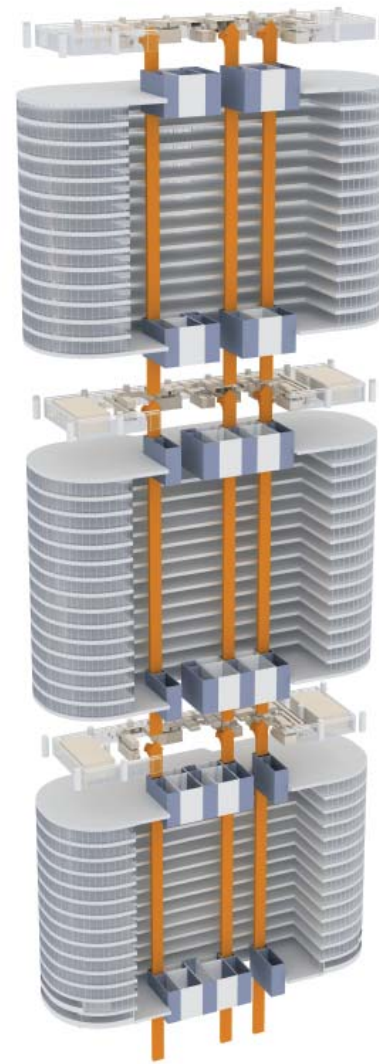
Rainwater will be collected from roofs and awnings with black and grey water to be collected and treated within the blackwater treatment facility, located within the basement. The treated water will be reused for flushing water in toilets and irrigating landscaped areas.

All potable water including showers and basins will have a separate reticulation system connected to an external mains supply.

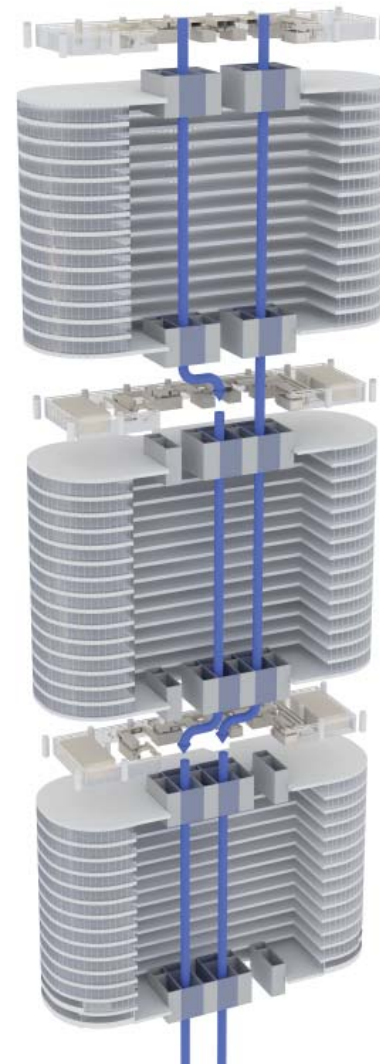
Fixtures and fittings including toilets, taps and showers will be selected to achieve the water conservation objectives and Green Star targets for the project.

Fire Protection

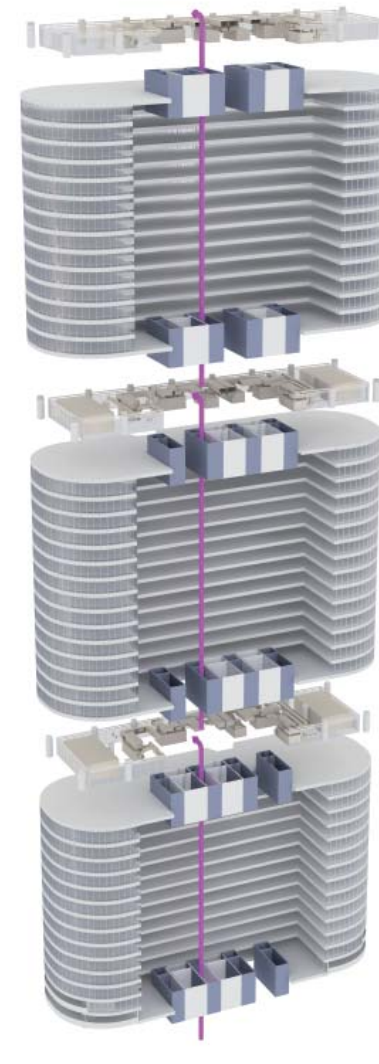
The fire protection system, including fire sprinklers, Emergency Warning and Intercommunications System (EWIS), fire hydrants and hose reels will be in accordance with Australian statutory codes and standards. Fire control rooms will be located at ground level with direct access from the street and fire protection plant including pump rooms and storage tanks will be located in the basement level.



Return air services diagram



Gas Service Diagram



Hydraulics services diagram

5.15 Wind

5.15.1 Wind Mitigation

The podium will disperse downdrafts from the tower at a height well above street level to prevent uncomfortable conditions. Canopies over the lobby entrance will also disperse downdrafts.

The buildings to the south will provide additional amelioration of wind conditions surrounding C3. Additional canopies and wind mitigation devices will be introduced across the site to ensure it provides the optimal climate for pedestrians.

5.16 Basement

Barangaroo South will operate a precinct-wide approach to basement services, including shared water treatment, waste and cooling systems. In addition, the delivery and servicing of the commercial and retail tenancies will take place below ground, minimising the volume of commercial traffic at ground level. Consent for the excavation and construction of the basement has been granted under MP10_0023.

The basement levels consist of one service and loading level (B01), and two car parking levels (B01-B02).

Loading and Service Levels

The loading and service level accommodates all service and loading vehicles required for the servicing of the retail tenancies, commercial office building and district plant installations. B01 allows for standard, mid to large sized loading and service vehicles with appropriate space provided for manoeuvring all such vehicles within the site. The height clearance within B01 is 4.5 metres to allow for all types of service vehicles and garbage trucks. It is proposed that garbage compactors will be located within the loading dock area. The loading dock clearance height also accommodates vehicles with a 'roll-on-roll-off' facility for garbage removal.

Access to the loading dock for C3 will be via a vehicle ramp located on the north side of Barangaroo South. This is designed as a two-way ramp and all vehicles will enter and exit the loading dock in a forward direction. The loading dock will be provided with a dedicated Loading Dock Supervisor's booth for management of all deliveries and loading vehicle movements within the basement space.

Motorcycle and bicycle parking for couriers is also located within a dedicated area of the loading dock. Access to these spaces will be via the loading dock entry ramp from street level.

The loading dock is served by a dedicated goods lift for the office tower. One passenger lift in each rise (Low rise, Mid rise and High rise) of the tower will access the loading dock to provide additional flexibility and capacity for goods movements within the tower.

Suitably located and sized dedicated retail goods lifts are provided to service the retail areas in the podium levels and connect the loading dock area to each of the podium floors including ground. All goods movement and servicing for the retail is therefore contained within the development and away from the ground level streets.

Car park Levels

It is proposed that the tenant car park spaces for C3 are distributed across car park levels B01 and B02.

Access to the car park will be via a dedicated carpark entry ramp at the north of Barangaroo South.

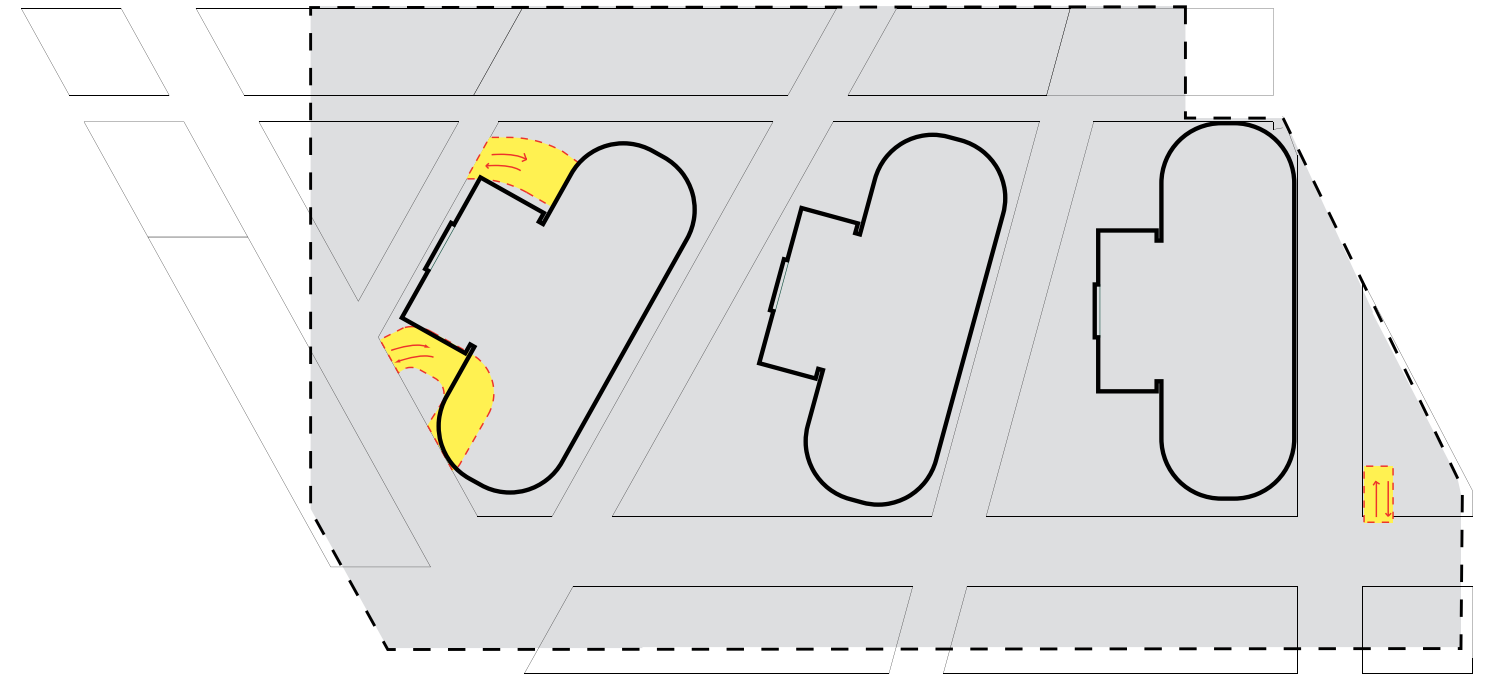
Person with Disability (PWD) vehicle spaces for tenants and public use are located at car park level B01 and are in close proximity to the car park lifts.

Commercial tenant motorcycle parking will be located within the tenant car park levels.

Small vehicle spaces and car share allocations within the car park levels will be consistent with the Green Star targets for the building.

Tenant Facilities

Tenant bicycle parking with shower and change facilities are located within the basement and mezzanine space adjacent to the C3 loading dock. Access for cyclists will be via a dedicated bicycle lane on the entry ramp. The quantity of bicycle parking and associated amenity facilities provided will be consistent with the Green Star targets for the C3 Building.



Basement shown grey below towers. Entries in yellow.

5.17 Environment and Sustainability

The ESD initiatives for the C3 development aim to be world class, and will provide support for and complement work by the City of Sydney on its 'Sustainable Sydney 2030' plans.

The overall Barangaroo South development aims to provide:

- Inspiring architecture with healthy, light-filled homes and workplaces
- Low energy buildings that respond to the environment and the people within
- Transport links and options that make it easy to leave the car at home
- A mixed-use precinct with outdoor spaces that everyone can share and enjoy
- Centralised precinct services that support a carbon neutral, water positive and zero waste outcome
- A long-term governance structure that also delivers carbon reduction and community benefits
- A focused approach on delivering social initiatives that will assist in establishing a healthy and happy community integrated into the Sydney CBD
- A broad-based skill development programme that will meet a wide range of learning and skilling needs – from blue and white collar to green

Precinct Initiatives:

- The Barangaroo South precinct has established a range of significant sustainability targets that will be delivered progressively throughout the development phase. This short overview provides the context for considering the commercial building C3 application against the aspirations of the broader project.
- The descriptions in the section below are provided for information only and will be subject to more detailed reports and approvals as part

of the subsequent building works applications as they are developed.

The proposed precinct-wide targets are:

Healthy Buildings:

- World-leading 6-Star Green Star Office Design and Build certification
- Tuned to Sydney's climate and connected to outdoors
- Passive design, low energy buildings
- Use of sustainable materials, as appropriate, including recycled content and low emissions

Energy and Carbon:

- Significant reduction in building energy consumption
- Efficient precinct infrastructure using central cooling plant and harbour heat rejection
- Photovoltaic generation located on the roof level contributes to the power needs of the public domain and blackwater treatment system
- A carbon neutral outcome achieved by the above initiative and supported by the use of new off-site renewable energy generation
- Reduction in embodied carbon within the built form

Water Positive:

- Treatment and reuse of a proportion of on-site stormwater catchment
- On-site waste water treatment and water recycling
- Capacity to export recycled water to neighbours further reducing their potable water demands
- Sewer mining to reduce network demands



Visible Environmental Strategies

5.17 Environment and Sustainability

- A water positive precinct – where more water is exported than the potable water that is required to be imported

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
- The potential to extend this service to adjoining properties

Sustainable Transport:

- A new connection/entry point for the CBD (light rail, ferries, with provision for Barangaroo pedestrian link)
- Reduced car parking ratios
- Infrastructure and support for cyclists and pedestrians
- Real-time commuter updates
- Green travel plan to promote vehicle sharing, small electric cars
- Safe, low-speed onsite environment

Landscape and Biodiversity:

- Use of native flora and encourage habitats for fauna
- Inclusion of water-sensitive urban design
- Planning for climate change
- Landscaped public spaces and selected green roof features

Many of these targets involve various third parties, and will need partnerships and commitments to be achieved.

These world leading ambitions will be measured, evaluated and reviewed progressively throughout the project’s life.

Building Development C3 Environmental Design

Specific Environmental Targets

C3 will achieve Green Star- 6 Green Star target

Environmental Attributes

Each building within Barangaroo South plays an essential part in delivering a successful outcome for the whole project. Each of these ‘parts’ are different with varying environmental solutions dependent on their position within the development. Within this context, building C3 has been designed with the following environmental attributes:

1. Bioclimatic Responsive Design

The building shape and form has been designed to respond to climate and site to maximise climatic benefits and minimise adverse environmental impacts:

- Plan and orientation of the building is designed to optimise daylight and views
- Roof designed to harvest solar energy
- Façades designed to be responsive to orientation, use and reduce energy consumption.

2. Integrated Landscape, Ecology and Water Strategy

The building has been designed within the context of the overall Landscape, water and Ecological strategy for the whole of Barangaroo South:

- Rainwater collection, storage and recycling from roof tops
- Vertical landscape integrated through the building on key transfer floors and within North façades
- Ecological roof tops (green/brown roofs) on podium level – optimised for ecology and habitat

3. Healthy Building and High Environmental Quality Workspace

The building is designed to provide high environmental quality workspace that increases productivity and ensures well being of occupants:

- Good views and daylight are maximised to all perimeter zones
- Provision of ‘ Vertical Villages’ and breakout zones with integrated landscape on some of the floors, providing a visual link to outside
- Building services systems designed to ensure comfort and good environmental control

4. Efficient System Design

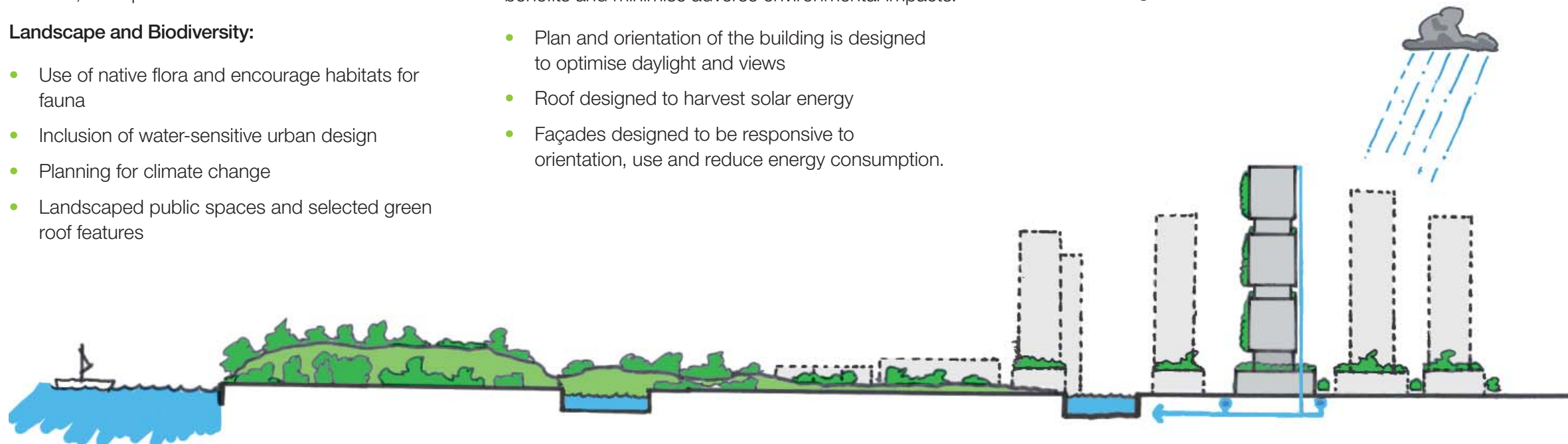
The building systems have been designed to be low energy and minimise resource use:

- Reduction in energy consumption
- External shading and solar control
- Daylight maximised and working in conjunction with electric lighting systems to ensure limited energy consumption
- Efficient cooling and heating systems
- Mechanical air plant provides enhanced fresh air supply to each office space whilst optimising opportunities for energy recovery all year round

5. Centralised Plant and Water Treatment

The site as a whole has been designed to be serviced from a central plant that maximises opportunities for efficiencies. The C3 building will be connected to these systems which include the following initiatives:

- Centralised cooling using harbour water
- Centralised blackwater treatment – this includes sewer mining
- Centralised waste management



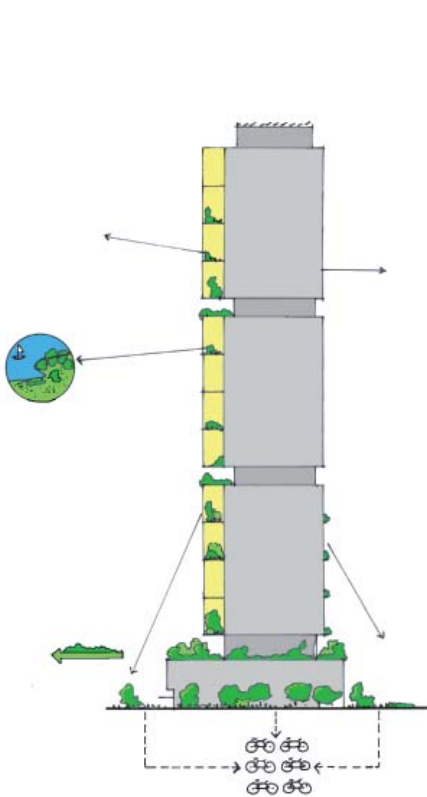
Site Wide Strategy

- Integrated landscape, ecology and water focus, with shared central plant services strategy
- Vertical landscape for people and links to green public realm within streetscape
- Rainwater collection and recycling
- Horizontal ecological zone linked to headland park

5.17 Environment and Sustainability

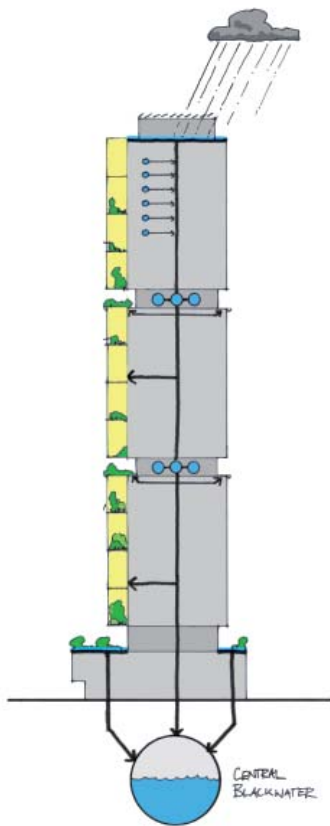
Landscape & Green Public Realm

- Green landscaped spaces for tenant amenity
- Vertical landscapes for people to meet and interact
- Views to distant green spaces
- Links to green public realm within streetscape
- Shared facilities to discourage excess vehicle use
- Horizontal ecological zone linked to Headland Park



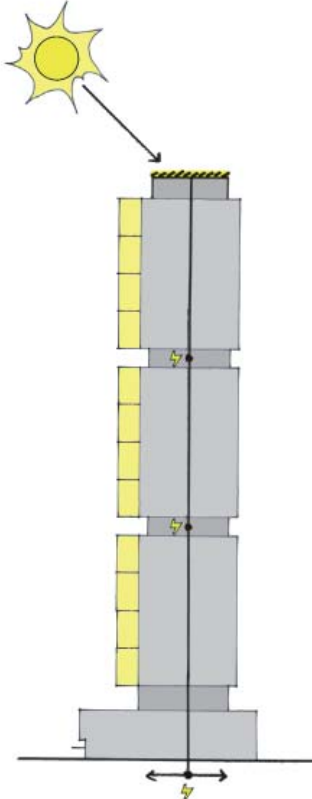
Water

- Central blackwater plant for collecting and treating & blackwater
- Treated blackwater to be used in building for landscape irrigation and toilet flushing



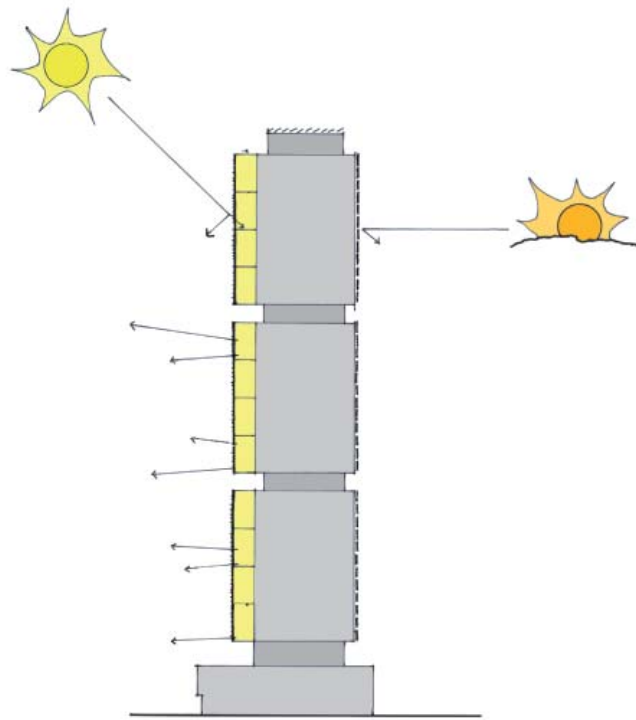
PVs

- Photovoltaic System for offset in public domain and onsite elements



Vertical Villages

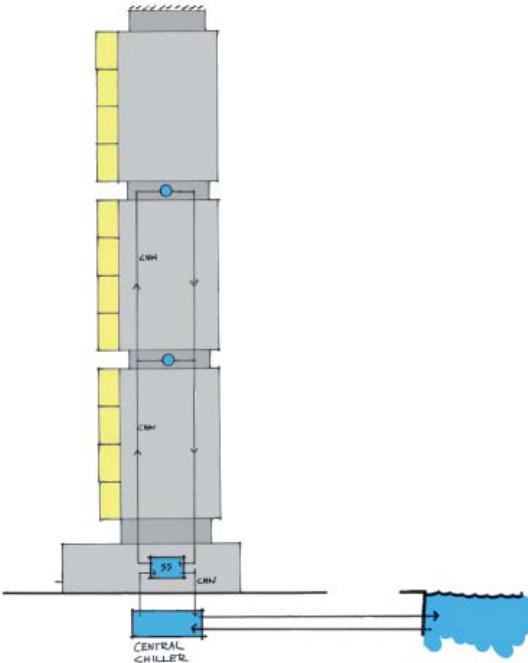
- Optimised façade, balanced for:
- Views & Vision
 - Solar control
 - Insulation
 - Thermal comfort
 - Possibility for mixed-mode village environment



5.17 Environment and Sustainability

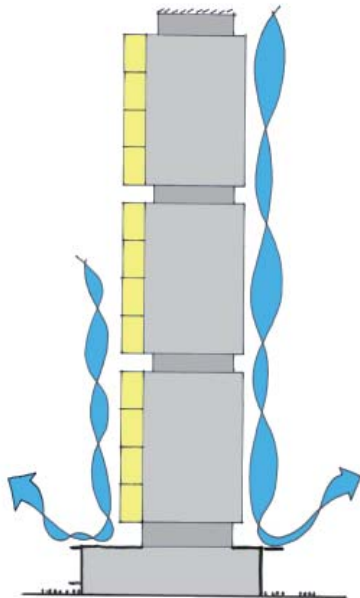
Water & Cooling

- Chiller heat rejection via harbour water to eliminate fan energy along with water evaporation



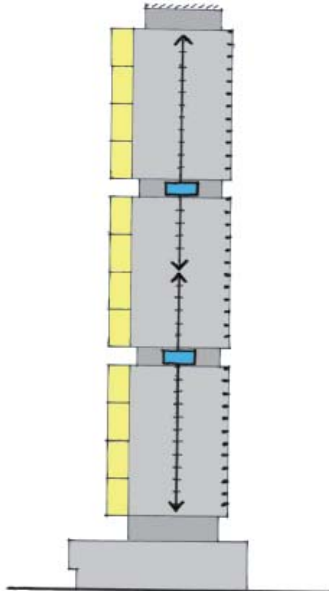
Wind

- Podium design and placement, along with strategic awnings, assist in mitigating cross wind and down draft conditions



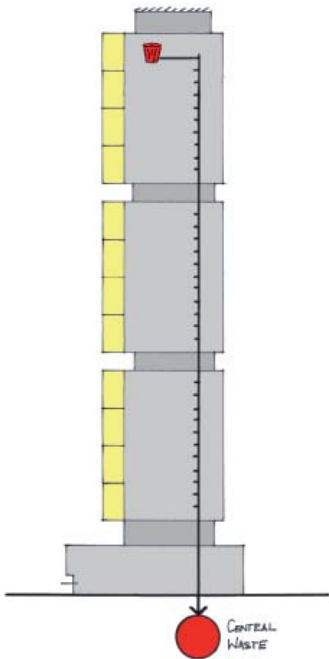
Air & Cooling

- Chilled beams with outside air for optimum air circulation whilst also catering for additional perimeter solar load



Central Waste Collection

- All waste is collected from the basement



5.18 Visualisation - View from North



Illustration of building C3

6

COMPLIANCE WITH APPROVED CONCEPT
PLAN MP06_0162 MODIFICATION NO.4

Compliance with Approved Concept Plan MP06_0162 Modification No.4

Please Note : All illustrations in this section are indicative only

6.1 Building Mass and Location

Objectives:

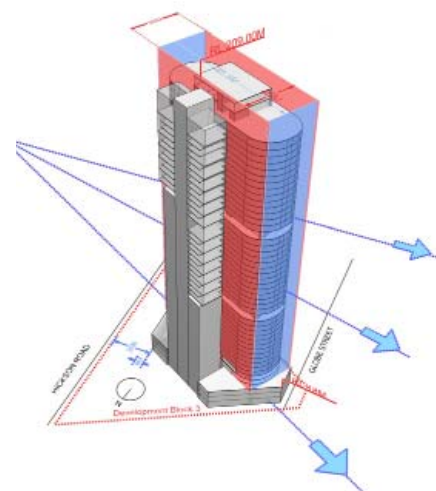
- Adoption of “fanning principle” for siting of buildings.
- To ensure building mass is appropriate within the envelope.
- The northern half of the block (Building C7) shall contain comparatively lower buildings (when compared to the tower forms) as generally indicated in the indicative design.
- The proposed podium is predominantly three-storeys with a roof height of 18m nominally. The north-west corner is less than 27m
- The depth of the horizontal floorplate of the east+west elevation of the tower form is 30m
- Horizontal articulation is achieved with deeper recesses at the plant floor to all elevations

Standard:

- The length of the horizontal floor plate of the North and South elevation of the tower form is to be no more than 85.5m.
- The bulk of building mass is to be set back from the Hickson Road alignment by a minimum of 20m.
- The primary floor plate depth, excluding structure and shading devices of each tower form sits between vertical planes (red), which establishes a 30m zone. Expressed structure and secondary floor plate is allowable outside this dimension.
- Podium to be a minimum predominant height of 3 storeys and a maximum of RL27

Methods of achieving the Objectives:

- The tower is set out utilising the “fanning principle”.
- The length of the horizontal floor plate of the North and South elevation of the tower form is 85.5m with environmental controls outside this zone
- The mass of the tower form is articulated to break down its scale. A tripartite composition has been created horizontally (using the recesses at the plant floors) and a modulated façade vertically is achieved through a offset vertical cut (south cut recesses related to active lift lobby floors of the northern cores).



6.2 Street Wall Establishment

Objectives:

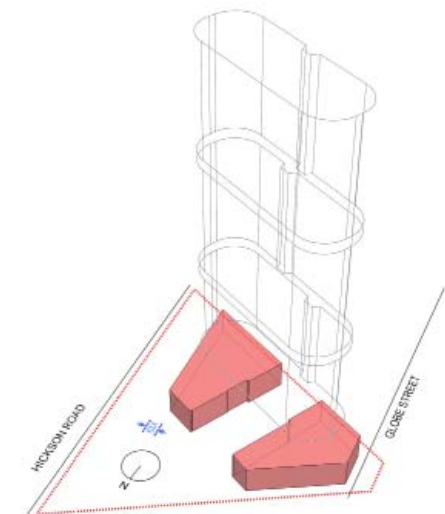
- To establish spaces to articulate and define facades.
- Building mass at podium to form a continuous Street Wall with a 1 storey minimum height.
- Street Wall to define Globe Street and East-West laneways.
- Podium height shall be determined having regard to compatibility of streetscape form with the surrounding area, and appropriate engagement and framing of the public domain, together with environmental considerations on the public domain and surrounding buildings.

Standard:

- To establish a colonnade along Hickson Road. The width and height of the colonnade along Hickson Road shall be appropriate to encourage its use, and be integrated into the proportions of the buildings of which it is a part.
- Building form to create a Street Wall with a one storey minimum height for most of the public accessible ground floor facade.
- Building mass to define a Street Wall on Globe Street, City Walk and Hickson Road.
- Shelley Lane to be a minimum of 6m in width with a defined eastern edge parallel to Hickson Road at ground level.

Methods of achieving the Objectives:

- Three storey high streetwall is created around the perimeter of the podium.
- Future location of Shelley Lane is to the east of the podium wall and is envisaged to be 6m wide.



6.3 Building Articulation

Objectives:

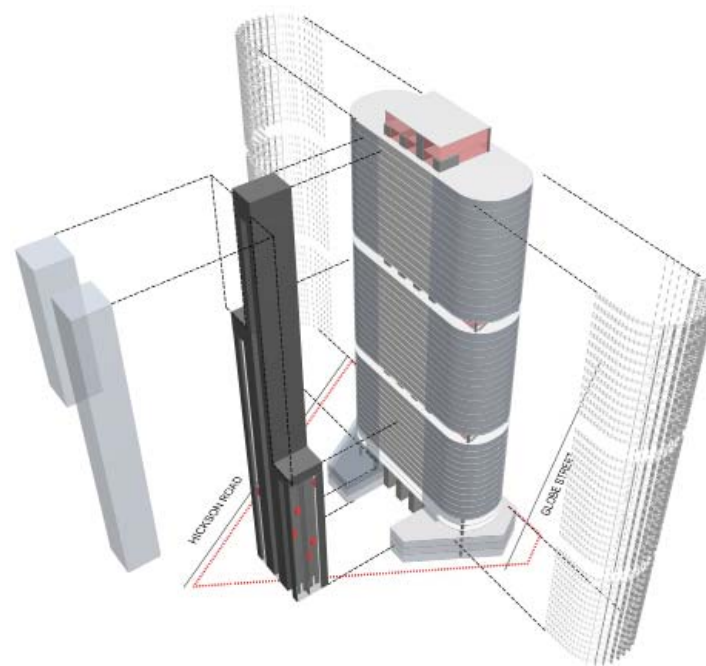
- To establish an articulated, well proportioned building mass.
- To reduce the impact of the building mass,

Standard:

- The building envelope and floor plates are to be articulated and modulated, using a range of architectural components such as prows, corner redents, Vertical Villages, expressed lift cores, bay windows and other structural expression.
- Tower Form to express sustainability features such as access to natural light.

Methods of achieving the Objectives:

- Building façades consist of a family of elements and are highly articulated to express volumetric configuration and environmental orientation of the building. Please refer to 5000 series drawings (Elevations) and 6000 series drawings (Façades).
- Redents stagger vertically up the southern elevation of the tower to providing articulation to the facade and correspond with the active lift lobbies to the north. The plant rooms are recessed which provides horizontal facade articulation.
- A slender recess is expressed between the north core and the main floorplate. This reinforces the vertical expression of the tower when viewed from both the city and the water and articulates the building's primary reading, 'served and servant'.
- Shading to the facades is arranged as one family of elements that increase or decrease in size



6.4 Building Legibility

Objectives:

- Constituent elements of the building need to be articulated.
- The elements and structure should be legible at the base of the building.

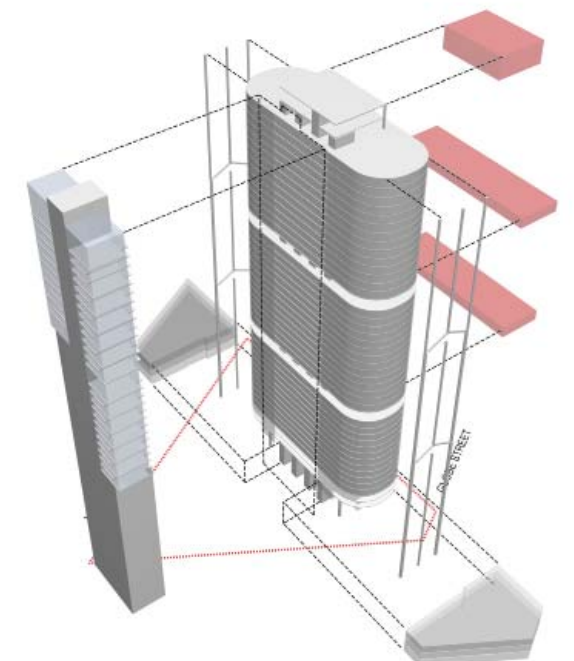
Standard:

- The separate primary components of the building will be expressed.
- Visible parts of the towers primary structure are to extend to the ground plane and be expressed as a separate element from the podium.

Methods of achieving the Objectives:

- Structure, cladding, vertical transportation cores, external shading and special floor areas are expressed as separate legible elements.
- The base of the building is composed as three components - the lobby entrance and two separate adjoining podium buildings. The lobby is a 3 storey glazed volume, to increase natural light and visual permeability
- Key structural elements of the tower visibly connect with the ground plane to provide drama and legibility of the built form - the expressed vertical transportation cores and lift lobbies are contrasted to the rest of the building on the northern side.
- The integration of the lift cores and the Vertical Villages makes a clear contrast between the verticality of the core and horizontally of the primary office floor plates.
- Façades are broken down horizontally to achieve an appropriate scale and skyline resolution with deeper recesses at plant levels.
- Glazed lift shafts express the vertical transportation systems.

- The 'K brace' at plant levels express the method of reducing the internal central column and enabling it to be sized for only one rise.



6.5 Ground Floor Permeability and Accessibility of Public Realm

Objectives:

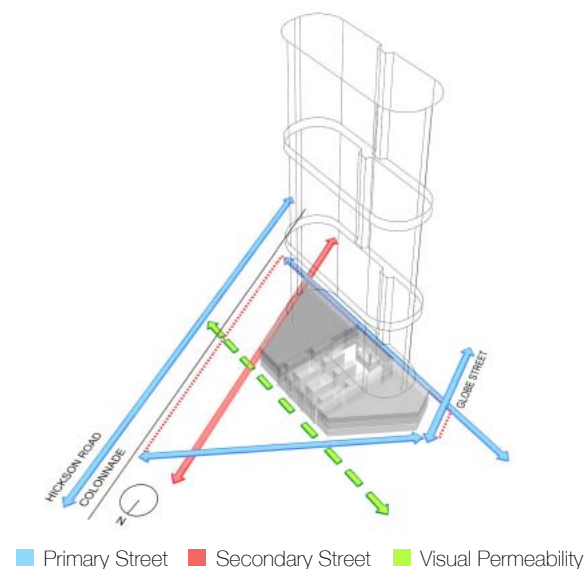
- To provide permeability and accessibility through Barangaroo South.
- To maximise safety in the public realm.

Standard:

- Public access around the Block is to be maintained on all edges.
- Provide two north to south primary connections, including the Hickson Road colonnade, and two east to west connections through the block.
- Provide one east to west and one north to south secondary public access routes through the block.
- Shelley Lane must be not less than 50% open to the sky.
- For security purposes the secondary routes may be closed at certain times.

Methods of achieving the Objectives:

- The proposal meets the objectives of the Concept Plan Mod.4, while reducing permeability, enhancing activation of the principle routes and overall street surveillance.
- The proposal allows for two north-south primary routes including the Hickson Road colonnade, and a secondary north south connection via Shelly Lane
- The proposal allows for two east-west primary routes namely City Walk and Napoleon St.
- The permeability that is offered east west is by way of generous pedestrian connections.
- The block maintains sightlines and a sense of open space.



6.6 Ensuring Quality of Rooftops

Objectives:

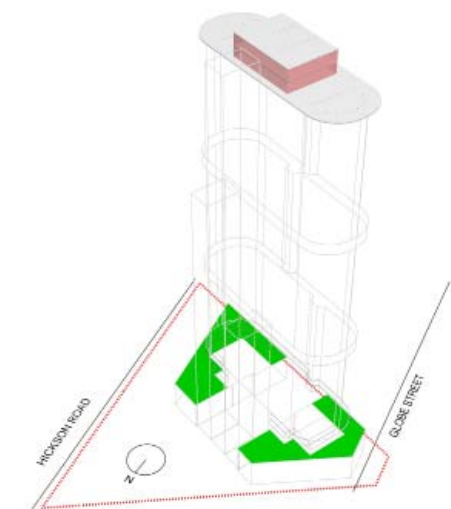
- The mass at the rooftop shall be articulated and legible.

Standard:

- Roof forms to incorporate architectural elements.
- Lift shafts, overruns and control rooms are to be extruded above the roof line and used to provide architectural articulation to the roof.
- Exposed mechanical equipment is to be avoided.
- The architectural treatment of the roof and its form is to be designed, coordinated and remain sympathetic to adjacent context.
- Good quality materials (ie durable, hardwearing, sustainable) to be used.
- Roof Design to integrate sustainable features.

Methods of achieving the Objectives:

- Podium roofs are designed to be green and accessible. The C3 tower roof is articulated by protruding lift motor rooms and overruns; and terrace areas with access to daylight and views. Photovoltaic panels are on top of the plantroom roof structure. Please refer to 4000 series drawings (Sections) and 5000 series drawings (Elevations).
- The top of the tower has been emphasised to break up the building silhouette with double height plantrooms and the highrise lifts dematerialising up to the sky.



6.7 Façades

Objectives:

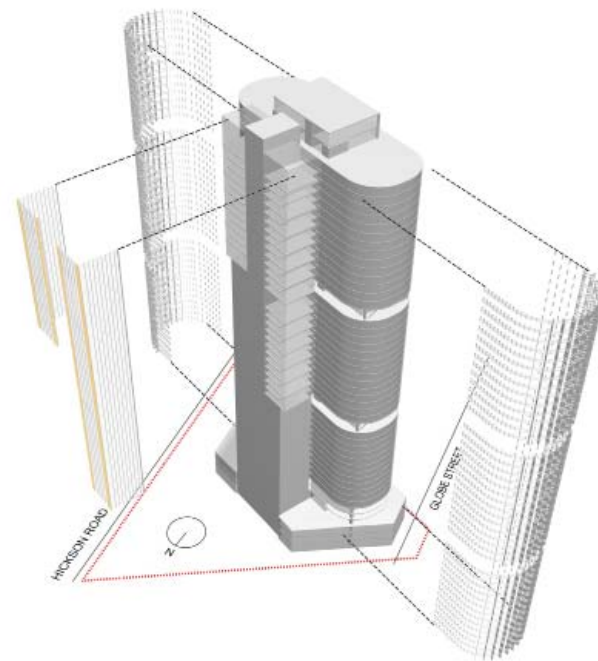
- To ensure the architectural quality of the facades.
- To articulate the building's functions and massing with appropriate facade design and detailing.
- To ensure the facades contribute to the building's articulation and mass.
- To contribute to the "carbon neutral" aims for Barangaroo South.

Standard:

- Depth and layering of facades is to be achieved through relief and protrusions. Mirrored facades should be avoided.
- The choice of appropriate materiality for longevity, durability and flexibility. Materials such as steel, glass, concrete, timber and aluminium.
- Environmentally sustainable design is to be incorporated on all facades.
- Facade components such as external shading shall be used to provide light and shade to the building and reinforce Controls 2+3.
- Facades longer than 60m are to be modulated above podium level by distinctive and significant architectural elements eg as Vertical Villages, cores or external staircases, in the vertical plane.
- There shall be no single plane in the facade having dimensions greater than 60m in length and 60m in height (or equivalent area) without articulation, and change in plane from adjoining building elements, unless otherwise determined by the "Barangaroo Design Excellence Review Panel", to the satisfaction of the Director-General in consultation with the Barangaroo Delivery Authority.

Methods of achieving the Objectives:

- Façades are highly articulated to express the building's functions. Please refer to 5000 series drawings (Elevations) and 6000 series drawings (Façades).
- Elements of the façade construction are arranged in layers to achieve visual depth and an appropriate level of detail.
- Shading to the facades is highly visible and arranged as one family of elements that increase or decrease in density depending upon the orientation of the facade.
- Maximum length of an unmodulated façade (south and north face) is approximately 50m long.



6.8 Active Streetfronts

Objectives:

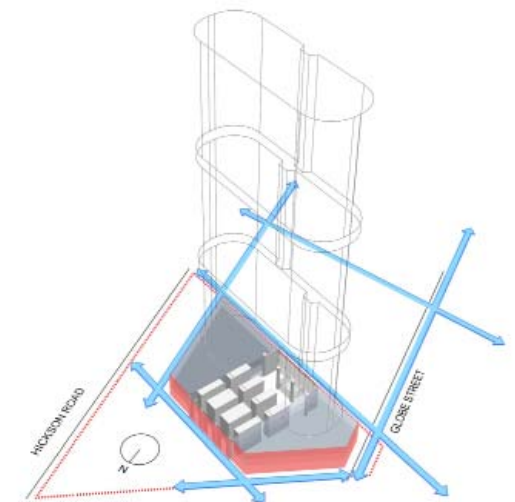
- To ensure a vibrant public domain will be created at street level.

Standard:

- At least 60% of the Ground Level is to be active on the primary Street Wall facades
- Building entrances to internal areas such as office lobbies, exit ways and service areas or loading docks shall not count toward to 60% requirement.
- Building service areas, parking entrances & loading docks will be located on Napoleon Street.
- The width of driveways shall be minimised.

Methods of achieving the Objective:

- Building C3 forms a portion of Block 3 of which at least 60% of the Ground Level will be active on the primary Street Wall facades.
- A vibrant public domain is created at street level.



6.9 Signage

Objectives:

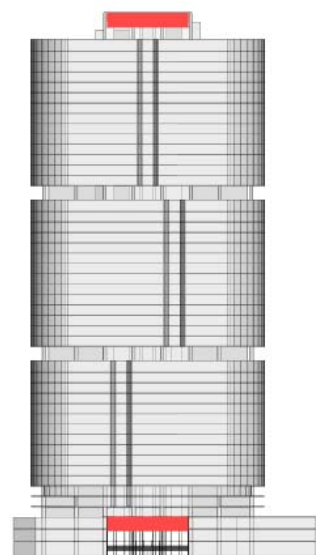
- To ensure that the location, size, appearance and the quality of the signage on the building is appropriate.

Standard:

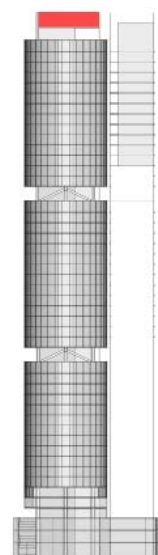
- High level signage is limited to a maximum of 2 separate faces per building.
- Signage is not to exceed 60sqm per sign.
- Identity signage only to be incorporated within the building facades/structure.
- Details of signage to be considered as part of the overall design of the building for the purposes of Design Excellence.
- Signage shall not be greater than 1 building storey high between floor slabs).

Methods of achieving the Objective:

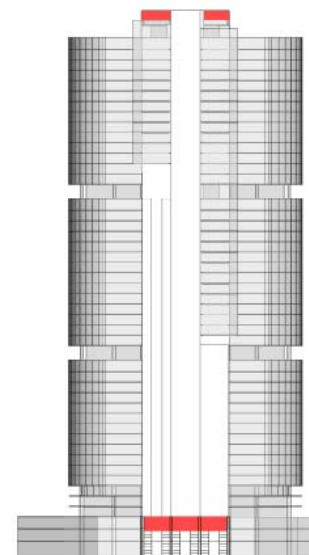
- The principle location options for signage are at roof level plant, above the entrance lobby and where the core comes to ground. (Refer to 5000 series drawings (Elevations). The signage will be appropriately designed for the proposed building and will be compliant with the above.



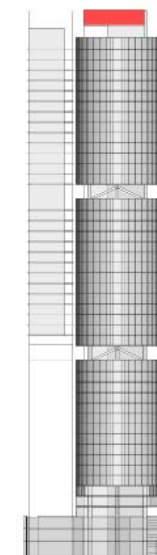
South elevation



East elevation



North elevation



West elevation

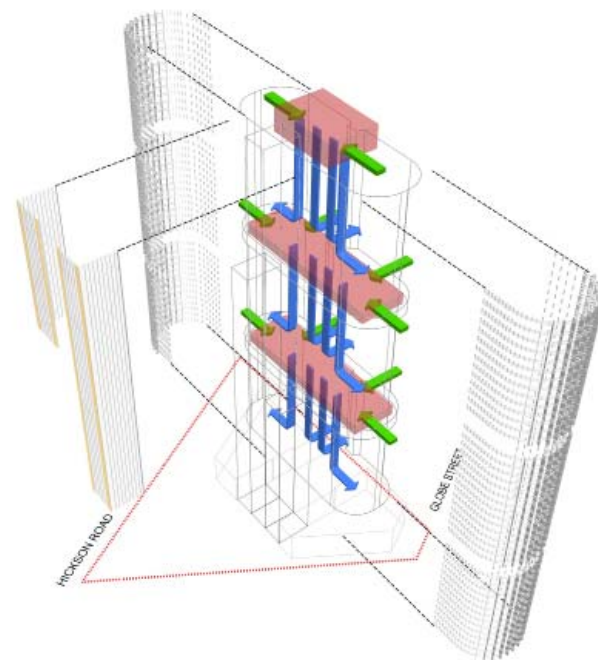
6.10 Sustainable Building Design

Objectives:

- The design of the buildings and the public domain shall incorporate, utilise and integrate leading sustainability practices in design, massing, materials and detailing. Buildings should be a model for sustainable building design and construction, and where accepted sustainability measures exist for the type of building being proposed, an industry-leading rating should be achieved. Sustainability measures should preferably be legible and discernible in the building design.

Methods of achieving the Objective:

- Green planting, solar shading, photovoltaic panels and other sustainable strategies are clearly articulated in the building's appearance.
- The building will achieve a 6 star green star design rating.
- Solar shading is a highly visible and legible part of the building design. Photovoltaic panels on the roof, and green planting in areas of the building facade along with glazed plant floors illustrate the environmental strategies of the building.
- Green planting, solar shading, photovoltaic panels and other sustainable strategies are clearly articulated in the building's appearance.



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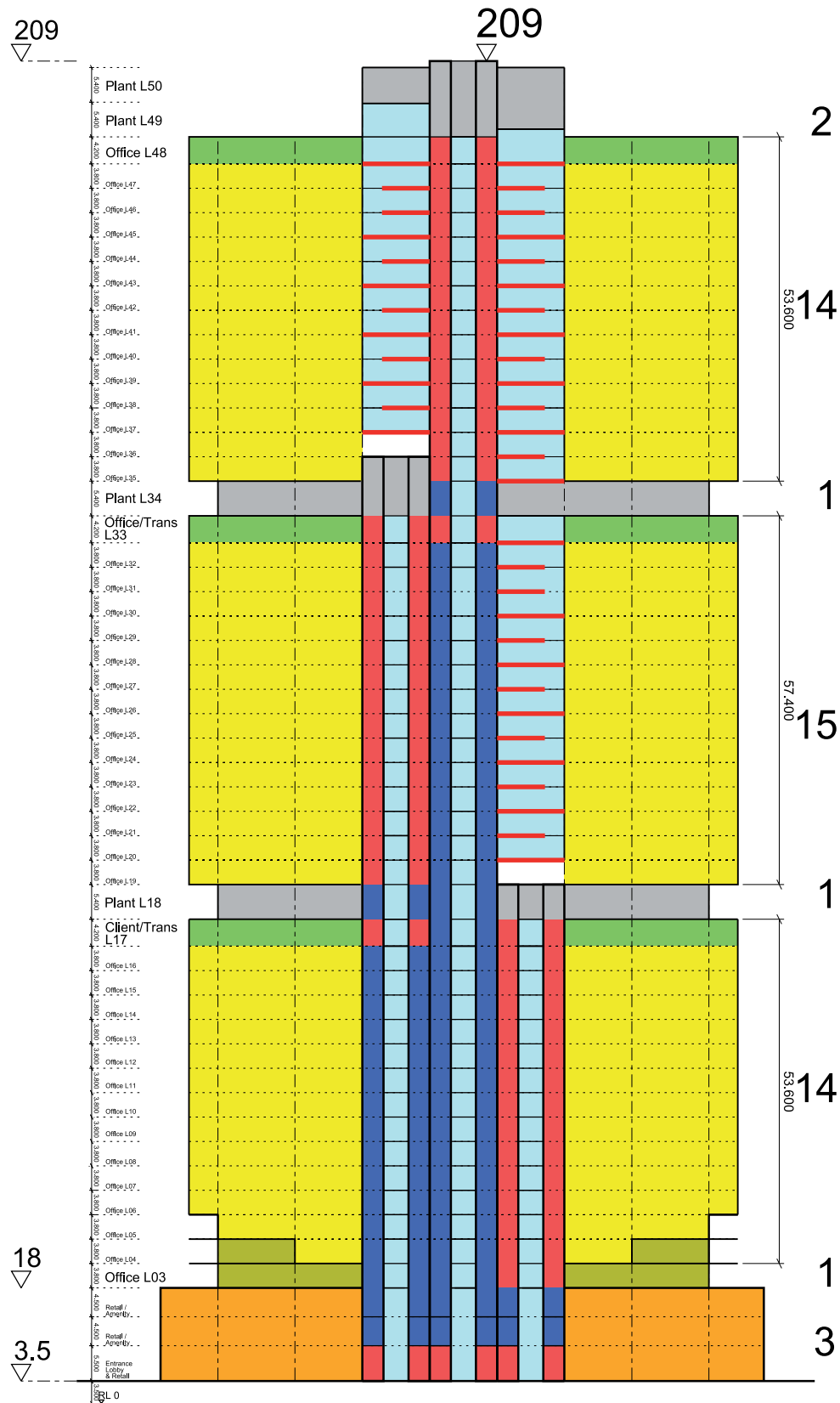
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APPENDIX A

LIST OF DRAWINGS AND DRAWINGS @ A3

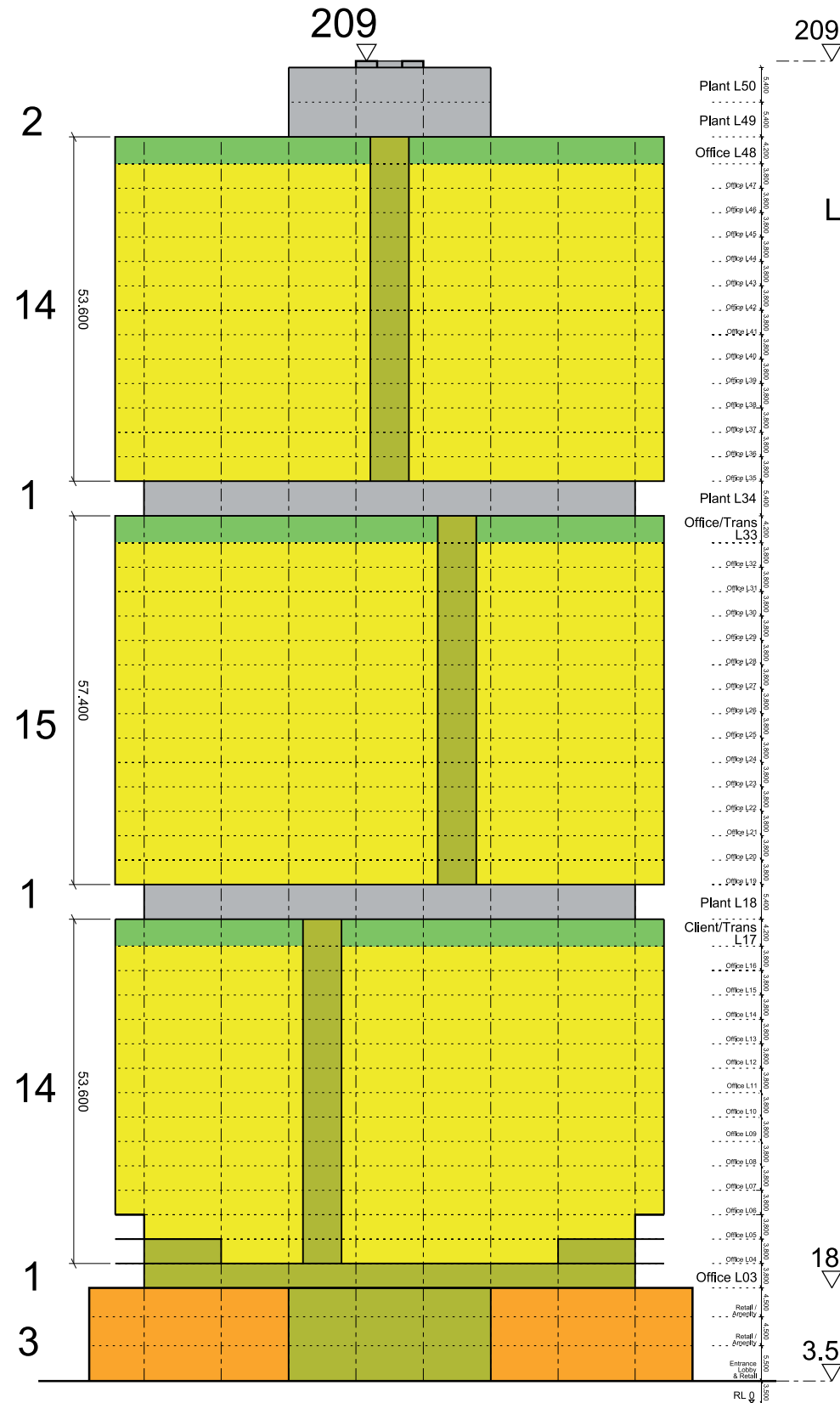
APPENDIX B

AREA SCHEDULE



C3 - North

Stacking Diagram for building C3



C3 - South

- Office 3800 F/F ■
- Office / Transfer / Client 4200 F/F ■
- Plant 5400 F/F ■
- Lift Lobby / Vertical Village / Meeting ■
- Active Lift Stop ■
- Express Lift Shaft ■
- Podium 5500-4500-4500 F/F ■
- Cut Back Floors and Slots ■
- Full Vertical Village Floor ■
- Intermediate Vertical Village Floor ■
- Full slab Meeting Rooms ■

C3-PA

C3 Commercial Building Office Gross Floor Area (GFA) Schedule

RSHP - 20th October 2011

Floor Level	Relative Level (m)	Prevailing Function	Floor to Floor	GFA per floor
Top of Lifts				
Plant Roof	208			0
50	202.6	Plant	5.4	0
49	197.2	Plant	5.4	0
48	193	Client	4.2	2,679
47	189.2	Office	3.8	2,576
46	185.4	Office	3.8	2,576
45	181.6	Office	3.8	2,679
44	177.8	Office	3.8	2,576
43	174	Office	3.8	2,679
42	170.2	Office	3.8	2,576
41	166.4	Office	3.8	2,679
40	162.6	Office	3.8	2,576
39	158.8	Office	3.8	2,679
38	155	Office	3.8	2,576
37	151.2	Office	3.8	2,679
36	147.4	Office	3.8	2,580
35	143.6	Office	3.8	2,473
34	138.2	Plant	5.4	0
33	134	Client & Transfer	4.2	2,538
32	130.2	Office	3.8	2,474
31	126.4	Office	3.8	2,474
30	122.6	Office	3.8	2,526
29	118.8	Office	3.8	2,474
28	115	Office	3.8	2,526
27	111.2	Office	3.8	2,474
26	107.4	Office	3.8	2,526
25	103.6	Office	3.8	2,474
24	99.8	Office	3.8	2,526
23	96	Office	3.8	2,474
22	92.2	Office	3.8	2,526
21	88.4	Office	3.8	2,474
20	84.6	Office	3.8	2,526
19	80.8	Office	3.8	2,478
18	77	Plant	5.4	0
17	73.2	Client & Transfer	4.2	2,384
16	67.8	Office	3.8	2,372
15	63.6	Office	3.8	2,372
14	59.8	Office	3.8	2,372
13	56	Office	3.8	2,372
12	52.2	Office	3.8	2,372
11	48.4	Office	3.8	2,372
10	44.6	Office	3.8	2,372
9	40.8	Office	3.8	2,372
8	37	Office	3.8	2,372
7	33.2	Office	3.8	2,372
6	29.4	Office	3.8	2,372
5	25.6	Office	3.8	2,110
4	21.8	Office	3.8	1,909
Tower 3	18	Office	3.8	1,559
Podium 3	18		3.8	0
Podium 2	13.5	Retail	4.5	2,283
Podium 1	9	Retail	4.5	2,381
Ground	3.5	Retail	5.5	2,521

Area spreadsheet

Tower Total GFA: 108,127

Total Podium GFA 7,185

Total GFA 115,312

AREA CALCULATIONS

These areas have been measured from plans produced at Schematic stage of the design and are approximate and illustrative only. Further development of the design, measurement and construction tolerances and/or further client/tenant requests will inevitably result in changes to these areas [which could involve significant reductions] and RSHP accepts no legal responsibility for any decision, commercial or otherwise, made on the basis of these areas.

APPENDIX C

DG REQUIREMENTS