Lend Lease (Millers Point) Pty Limited

Barangaroo South - C3 Commercial Building

ESD Report - Project Application

Rev B | 26 October 2011

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1 Introduction

This report supports a Project Application submitted to the Minister for Planning pursuant to Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act). The Application seeks approval for construction of a commercial building (known as Building C3) and associated works at Barangaroo South as described in the Project Summary Description section of this report.

1.1 Background

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 (herein after referred to as Barangaroo South).

Lend Lease was successfully appointed as the preferred proponent to develop Barangaroo Stage 1 (otherwise known as Barangaroo South) on 20 December 2009.

1.2 Planning History & Framework

On 9 February 2007 the Minister approved a Concept Plan for the site and on 12 October 2007 the land was rezoned to facilitate its redevelopment. The Approved Concept Plan allowed for a mixed use development involving a maximum of 388,300m^2 of gross floor area (GFA) contained within 8 blocks on a total site area of 22 hectares.

Modification No. 1 was approved in September 2007 which corrected a number of minor typographical errors.

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

On 11 November 2009 the Minister approved Modification No. 3 to the Concept Plan to allow for a modified design for the Headland Park and Northern Cove. The Approved Concept Plan as modified allows for a mixed use development involving a maximum of 489,500m^2 of gross floor area (GFA) across Barangaroo as a whole.

On 16 December 2010 the Minister approved Modification No. 4 to the Barangaroo Concept Plan. The Approved Concept Plan as modified allows for approximately 563,965m^2 Gross Floor Area of mixed use development across the entire Barangaroo site.

This Project Application forms one of a series of individual Applications that Lend Lease will be submitting to deliver Barangaroo South. This Project Application is consistent with the established planning framework for the site, including the approved Concept Plan (as modified).

A Project Application (MP10_0023) has been approved for the bulk excavation and construction of a basement car park to accommodate up to 880 car parking spaces and associated services and infrastructure to support the initial phases of

the future development of Barangaroo South. A Section 75W Modification Application was subsequently submitted seeking to modify MP10_0023 to extend the area of the approved basement to the south. This modification was approved by the Minister for Planning on 3 March 2011.

A further Section 75W application has been submitted to the Department of Planning and Infrastructure (the Department) and is currently being assessed, which seeks the Minister's approval to modify the depth of the excavation and change the reduced levels of the basement structure, using the same construction methodology as detailed and approved as part of the original project application. This includes:

- reduced excavation and bulk earthworks;
- reduced structural works – foundations, basement levels, perimeter retention system etc; and
- installation of associated services and infrastructure to support the initial phases of the future development of Barangaroo South.

A project application for the first commercial building, known as C4, was submitted to the Department of Planning on 29 October 2010. This application sought consent for construction and use of a new commercial Building C4 with a maximum 98,514m^2 GFA accommodating commercial and retail uses, a child care centre, bicycle parking and associated use and operation of car parking and loading facilities in the basement. Consent was issued by the Minister on 3 March 2011.

A Section 75W application has been submitted to the Department and is currently being assessed which seeks the Minister's approval to modify certain elements of the approved C4 building, including:

- mix of the uses within the building;
- total GFA;
- shape of floor plates of the podium and the tower elements of the building;
- facade details;
- roof treatment; and
- basement layout.

1.3 Site Location

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

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

The area of land within which development is proposed under this Project Application extends over land generally known and identified in the approved Concept Plan as Block 3 which comprises Lot 5 in DP 876514.

1.4 Project Summary Description

This Project Application seeks approval for the construction of a 49 storey building, comprising ground floor retail, a commercial lobby, childcare, podium and office tower, provision for associated cars and bicycle parking and the construction of the surrounding ancillary temporary public domain which includes access streets and landscaping.

1.5 Purpose of this Report

This report has been prepared to accompany the Project Application for the C3 Commercial Building and associated works at Barangaroo South. It addresses the relevant Director-General Requirements for the project. These Director-General Requirements are discussed in the Environmental Assessment Report (EAR) that has been prepared to support the application.

This report outlines the targets proposed for the development and in particular demonstrates the compliance of the works with the relevant requirements from the Statement of Commitments included in the approved Concept Plan.

The ESD initiatives for the development aim to be world class, and will provide support for and complement work by the Council of 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; and
- A broad based skill development program that will meet a wide range of learning and skilling needs – from blue and white collar to green.

2 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 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.

The proposed precinct wide targets are:

- Healthy Buildings:
  - World-leading 6-Star Green Star Office Design and As Built certification;
  - Tuned to Sydney's climate and connected to outdoors;
  - Passive design, low energy buildings; and
  - Use of some sustainable materials, including recycled content and low emissions.
- Energy and Carbon:
  - A carbon neutral outcome supported by the use of new offsite renewable energy generation;
  - Significant reduction in building energy consumption , reflected in a base building equivalent to a 5 Star NABERS Energy + 30% improvement, subject to tenancy behaviour;
  - 20% reduction in embodied carbon within the built form;
  - Efficient precinct infrastructure using central cooling plant and harbour heat rejection; and
  - Onsite photovoltaic generation sized for the public domain and blackwater treatment system.
- Water Positive:
  - A water positive outcome – where more water is exported than potable water is imported;
  - Treatment and reuse of a proportion of on-site stormwater catchment;
  - On-site waste water treatment and water recycling;
  - Capacity to export recycled water allowing neighbours to reduce their potable water demands; and
  - Sewer mining to reduce network demands.
- Zero Waste:
  - Greater than 90% diversion of construction waste from landfill.
- Sustainable Transport:
  - A new connection/entry point for the CBD (with provision for light rail, ferries, and the Barangaroo Pedestrian Link);

  - Car parking ratios resulting in less car parking spaces than normally provided for a CBD commercial building;
  - Infrastructure and support for cyclists and pedestrians;
  - Real-time commuter updates;
  - Green travel plan to promote vehicle sharing, small cars and electric cars; and
  - Safe, low-speed onsite environment.
- Landscape and Biodiversity:
  - Use of native flora and encourage habitats for fauna;
  - Inclusion of water-sensitive urban design;
  - Planning for climate change; and
  - Landscaped public spaces and selected green roof features.

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

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

3 C3 Building and its Sustainability Contribution

The C3 building Project Application complies with the sustainability requirements included in the Statement of Commitments of the approved Concept Plan and a detailed comparison of these requirements is provided below.

Table 1: Meeting the Approved Statement of Commitments

Clause	Approved Concept Plan	Barangaroo C3 Commercial Building Commitment
ESD		
64.	There is to be an environmental focus on strategies for Water, Energy, Micro-Climate, Environmental Quality / Amenity, Landscape, Transport, Waste and Materials for the development. Each building on site will achieve the primary benchmark of a "5 star" standard of : Green Star 5 star, and Residential: Green Star Residential score >60, and each development will be required to demonstrate how it satisfies each of the following Key Performance Indicators for each of the ESD focus areas referred to below.	The C3 building will be designed and constructed to achieve 5 Star + 30% NABERS Energy and 6 Star Green Star Office ratings.
Water		
65.	There is to be a 35% reduction in Potable Water Consumption compared to a standard practice development and a 40% reduction in flow to sewer compared to a standard practice development.	The C3 building will be designed to achieve a 5 Star NABERS Water rating. The basement provides the spatial allocation for a precinct blackwater treatment plant. This plant will be designed to a capacity that allows a Water Positive outcome (i.e. that produces more recycled water than potable water imported onto site). This plant will be utilised by the C3 building. A standard practice development is taken to be equivalent to a 2 Star NABERS Water benchmark.
Energy		
66.	There is to be a 35% reduction in Greenhouse Gas Emissions compared to a standard practice development. 20% of power is to be purchased from low impact, renewable sources or alternatively there should be a 20% reduction in GHG emissions through carbon offsets. The purchase of renewable energy should be at World Best Practice level.	The C3 building will be designed to achieve a 5 Star + 30% NABERS Energy rating. The basement provides a range of plant rooms for a centralised chilled water plant, harbour water cooling and various electrical infrastructure to support C3. These initiatives will support the project's ambition of a carbon neutral outcome. The rooftop of C3 is also planned to have an array of photovoltaic panels in order to meet onsite renewable energy requirements and reduce offsite renewable requirements. A standard practice development is taken to be equivalent to a 2 Star NABERS Energy benchmark.

Clause	Approved Concept Plan	Barangaroo C3 Commercial Building Commitment
Micro Climate		
67.	Key public open spaces (parks and squares) are to receive direct sunlight in mid-winter.	The C3 building will provide a micro-climate that harnesses winter sun where possible to key public open spaces on the ground plane.
Landscape		
68.	Primarily non-invasive plant species are to be used on the site.	This requirement will be met through the choice of appropriate plant species.
Transport		
69.	Ensure that there is sufficient public transport to achieve points under the public transport credit for Green Star Rating Tools for buildings and a future Green Star Tool for residential buildings.	Proximity to Wynyard station trains and buses will most likely achieve a high score in the Green Star public transport credit. Car park ratios and numbers are in accordance with the TMAP Supplementary Report for the project. This reduces the amount of cars associated with the development compared to a normal CBD commercial development. This application does not negatively impact on the Metro corridor and thereby does not limit consideration of this initiative in future. Road and car park access do not restrict the future incorporation of light rail, bus or taxi stop. The common loading dock and waste collection facilities in the basement remove truck parking from the streets at ground level, thereby improving amenity for pedestrians and public transport opportunities generally. (Ref: TMAP Supplementary Report)
Waste		
70.	Centralised recycling areas are to be provided in all buildings and 100% of waste bins for public use are to allow for waste separation.	Waste collection areas in the basement have been provided allowing for the streaming of waste and recyclables from C3 (Ref: Waste Management Plan).
Wind		
71.	Wind tunnel modelling and verification of proposed treatments will be carried out at the building design application stage due to the significant exposure of the site to the southerly and westerly winds. Any development proposal for the southern portion of the site should be subjected to a wind tunnel study, carried out in accordance with the procedures outlined in industry recognised guidelines such as the Australasian Wind Engineering Society Quality Assurance Manual.	Wind tunnel modelling for Building C3 has been conducted and details are contained in the Wind Impact Assessment Report.

4 Related Sustainability Aspects

The C3 Building design has been developed to ensure that sustainable best practice design links the concept plan to the buildings. The C3 building design is consistent with the overall project sustainability goals and will specifically demonstrate sustainability outcomes in the following key areas.

4.1 Landscape

C3 includes soft landscaped green spaces that contribute to public and private amenity and visibility, whilst linking the built form to landscaped spaces and parkland to the north.

4.2 Water

The C3 building is designed to capture and reuse rainwater from roof and podium areas, utilise precinct non potable recycled water where appropriate, and have its wastewater treated through the precinct blackwater treatment plant. The use of water will also be used to improve public amenity in selected areas.

4.3 Renewable Energy

The building optimises renewable energy generation on site through solar panel integrated within the building architecture and framework.

4.4 Climate

Building C3 responds to climate intrinsically within the building architecture, including solar control devices and thermally sound facades. This may be supplemented with natural ventilation subject to further design development.

4.5 Materials

The building aims to select and use sustainable materials that also produce a visibly identifiable environmental design and local character.

4.6 Stormwater

A comprehensive stormwater control and management approach is to be introduced as the precinct is built out for both the run-off that crosses the site from catchment areas beyond the eastern site boundary and the on-site catchment. This will involve the retention, treatment to defined standards and partial reuse of the stormwater (ref: Stormwater Management Plan)

Stormwater control and management is to be in place during the construction stage (ref: Environmental, Construction and Site Management Plan, Doc.10-0162).

4.7 Construction

Construction related sustainability initiatives are being considered such as the following:

- Use of treated groundwater in site related activities (e.g. dust suppression);
- Recycling and waste management initiatives (ref :Waste Management Plan);
- Construction worker inductions for safety and sustainability outcomes;
- Selected human health assessments applicable to workers involved in remediation; and
- Encouraging public transport to and from work for construction workers.

5 Green Star Rating

Lend Lease is committed to using and certifying against industry recognised rating tools as evidence of the project's commitment to sustainability. As the retail component is of a small size relative to the office component of C3, Lend Lease considers that the retail is therefore eligible and will be rated as part of the Green Star Office tool.

5.1 Commercial

The Green Star Office assessment presented for the C3 building below identifies the design target strategies that are currently being considered. Whilst the Statement of Commitments from the approved Concept Plan requires a 5 Star Green Star Office rating, Lend Lease is committed to achieve a 6 Star Green Star Office rating for C3, subject to further design development.

This section discusses the requirements associated with achieving a 6 Star Green Star Office Design version 3 rating and the implications on each of the disciplines forming part of the overall building design. The project is still to undergo detailed design and therefore various strategies within the overall 6 star objective may vary.

The following initiatives are being targeted as part of the rating:

5.1.1 Management

- Comprehensive commissioning and re-commissioning of the building's services;
- A high level of environmental management during the construction phase; and
- Exceeding the 80% Green Star requirement for the recycling of construction waste.

5.1.2 Indoor Environmental Quality

- An increase in fresh air for occupants;
- Designing lighting for visual comfort by keeping lighting levels no higher than 400 Lux for 95% of office areas;
- Promoting a low toxicity indoor environment through the use of low VOC paints, carpets and adhesives;
- Providing a high level of air quality through the monitoring of carbon dioxide in office areas;
- High levels of thermal comfort for occupants; and
- A well designed acoustic environment.

5.1.3 Energy

- Efficient facade to control thermal loads and optimise daylight;
- Efficient mechanical systems which deliver the same or higher levels of thermal comfort to occupants for less energy than a standard building uses;

- Use of the precinct's highly efficient central chilled water plant for all cooling requirements;
- Electrical sub metering to facilitate energy monitoring of building services, tenancies and floors; and
- Individually switched, zoned lighting in office areas to avoid turning on lights in areas which are not in use.

5.1.4 Transport

- Cyclist facilities, which include secure storage, change rooms, showers and lockers, to be provided for a minimum of 5% with a target of 10% of the building's occupants;
- Choice of site which is close to all modes of transport available in Sydney CBD. This includes, buses, trains and ferries;
- 10% of parking spaces will be designed for small cars and 5% for motorbikes reducing the number of larger vehicles with larger emission capacities; and
- Cyclist facilities and an array of public transport choices combined with the array of recreational facilities within and in close proximity of the precinct is an important and significant feature of the C3 building.

5.1.5 Water

- Use of water efficient fixtures and fittings;
- Use of treated non-potable water from the site black water treatment plant, where appropriate, to reduce the demand for potable water;
- Use of efficient irrigation systems for C3 site landscaping and green elements in the tower;
- Rainwater capture and reuse; and
- Recycling of fire sprinkler and hydrant test water which is normally lost.

5.1.6 Materials

- Minimisation of traditional PVC use, and/or use of PVC which meets the 'Best Practice Guidelines for PVC in the Built Environment' GBCA guidelines;
- Sustainable timber – investigate the use of all timber or composite timber products used in the building and construction works which shall be FSC or PEFC certified, or post consumer reused timber;
- Use of cement replacement and recycled aggregate for concrete; and
- Use of steel with recycled content.

5.1.7 Land Use and Ecology

- Building on a site previously built on.

5.1.8 Emissions

- Installation of a gross pollutant trap to prevent watercourse pollution;
- Recycling of black water through precinct infrastructure for non-potable uses such as toilet flushing; and
- Use of refrigerants with an ozone depleting potential of zero.

5.1.9 Preliminary Commercial Green Star Matrix

The following Green Star table represents the base and targeted points to achieve a 6 Star Green Star Office Design rating, and the additional potential credits targeted.

Table 2: Commercial Green Star Office Preliminary Matrix

Green Star Office Design v3.0

Green Star Office RoadMap ARUP

Type your 3 letter state code. This affects category weightings SFT

Summary Of Points

		Points Available	Points Targeted	Points Unconfirmed	Category Score	Weighted Category Score
Management		**12**	**12**	**0**	**100%**	**9**
Green Star Accredited Professional	Man-1	2	2	0		
Commissioning - Clauses	Man-2	2	2	0		
Commissioning - Building Tuning	Man-3	2	2	0		
Commissioning - Commissioning Agent	Man-4	1	1	0		
Building Users Guide	Man-5	1	1	0		
Environmental Management	Man-6	2	2	0		
Waste Management	Man-7	2	2	0		
Indoor Environment Quality		**26**	**18**	**2**	**69%**	**13.85**
Ventilation Rates	IEQ-1	3	1	1		
Air Change Effectivness	IEQ-2	2	2	0		
Carbon Dioxide and VOC Monitoring and Control	IEQ-3	1	1	0		
Daylighting	IEQ-4	3	1	0		
Daylight Glare Control	IEQ-5	1	1	0		
High Frequency Ballasts	IEQ-6	1	1	0		
Electric Lighting Levels	IEQ-7	1	1	0		
External views	IEQ-8	2	0	1		
Thermal Comfort	IEQ-9	2	2	0		
Individual Comfort Control	IEQ-10	2	0	0		
Hazardous Material	IEQ-11	0	na	0		
Internal Noise Levels	IEQ-12	2	2	0		
Volatile Organic Compounds	IEQ-13	3	3	0		
Formaldehyde Minimisation	IEQ-14	1	1	0		
Mould Prevention	IEQ-15	1	1	0		
Tenant Exhaust Riser	IEQ-16	1	1	0		

Energy		**29**	**17**	**4**	**59%**	**14.7**
Conditional Requirement	Ene	Req	Yes	0		
Greenhouse Gas Emmissions	Ene-1	20	10	2		
Energy Sub-metering	Ene-2	2	2	0		
Lighting Power density	Ene-3	3	3	0		
Lighting Zoning	Ene-4	2	2	0		
Peak Energy Demand Reduction	Ene-5	2	0	2		
Transport		**11**	**10**	**1**	**91%**	**7.27**
Provision of Carparking	Tra-1	2	2	0		
Fuel Efficient Transport	Tra-2	1	1	0		
Cyclist Facilities	Tra-3	3	2	1		
Commuting Mass Transport	Tra-4	5	5	0		
Water		**12**	**12**	**0**	**100%**	**12**
Occupant Amenity Water	Wat-1	5	5	0		
Water Meters	Wat-2	1	1	0		
Landscape Irrigation	Wat-3	1	1	0		
Heat Rejection Water	Wat-4	4	4	0		
Fire System Water Consumption	Wat-5	1	1	0		
Materials		**16**	**10**	**5**	**63%**	**8.75**
Recycling Waste Storage	Mat-1	2	2	0		
Building Reuse	Mat-2	0	na	0		
Reused Materials	Mat-3	1	0	1		
Shell and Core or Integrated Fitout	Mat-4	2	0	1		
Concrete	Mat-5	3	2	1		
Steel	Mat-6	2	2	0		
PVC Minimisation	Mat-7	2	2	0		
Sustainable Timber	Mat-8	2	2	0		
Design for Disassembly	Mat-9	1	0	1		
Dematerialisation	Mat-10	1	0	1		
Land Use & Ecology		**8**	**4**	**2**	**50%**	**3**
Conditional Requirement	Eco-	Req	Yes	0		
Top Soil	Eco-1	1	0	1		
Reuse of land	Eco-2	1	1	0		
Reclaimed Contaminated Land	Eco-3	2	2	0		
Change of Eccological Value	Eco-4	4	1	1		
Emissions		**16**	**12**	**2**	**75%**	**4.5**
Refrigerant ODP	Emi-1	1	1	0		
Refrigerant GWP	Emi-2	2	0	0		
Refrigerant Leaks	Emi-3	2	1	1		
Insulant ODP	Emi-4	1	1	0		
Water course Pollution	Emi-5	3	3	0		
Discharge to Sewer	Emi-6	5	4	1		
Light Pollution	Emi-7	1	1	0		
ALTERNATIVE Light Pollution	Emi-7a	0	0	0		
Legionella	Emi-8	1	1	0		
Innovation		**5**	**5**	**0**	**-**	**5**
Innovative Strategies and Technologies	Inn-1	2	2	0		
Exceeding Green Star Benchmarks	Inn-2	2	2	0		
Environmental Design Initiatives	Inn-3	1	1	0		
		135	100	16		78
			Weighted Category Score			

The table above shows a preliminary target of 78 points for the office component of Building C3 which does not include the potential additional points. A minimum overall weighted score of 75 points is necessary to achieve 6 stars.

Additional credits from the 'Points Unconfirmed' column are considered to provide an appropriate safety margin to achieve a 6 star rating at this stage in development.

Although some points may vary during the detailed design process, a minimum 6 Green Star Office rating will be achieved.

6 Conclusion

Arup has prepared this Ecologically Sustainable Development (ESD) assessment to inform and accompany the C3 Building Project Application.

The office component of the C3 Building will be designed to achieve a 5 Star + 30% NABERS Energy base building office rating.

The C3 Building will be designed to achieve a 6 Green Star Office Design rating.

Our conclusion is that the project presented in the proposed C3 Commercial Building Project Application can be designed and constructed utilising industry standard and proven design and construction techniques.