

ONE SYDNEY HARBOUR

**BARANGAROO SOUTH
STAGE 1B BASEMENT**

**ESD REPORT – DEVELOPMENT APPLICATION
09 NOVEMBER 2015**

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STAGE 1B BASEMENT ESD REPORT



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EXECUTIVE SUMMARY

This ESD summary report has been produced by Lend Lease Design to describe the initiatives that are to be included within the Stage 1B Basement as part of the Barangaroo South precinct, which contribute to the achievement of the broader sustainability commitments for the Barangaroo Site under the Concept Plan.

The project aims to deliver a sustainable precinct, with low operational energy consumption, reduced potable water use, minimisation of waste to landfill and appropriate materials selection while at the same time maintaining a high level of indoor environmental quality through appropriate mechanical design, façade configuration and materials selection.

The Barangaroo South precinct sustainability targets include:

- Minimal operational energy consumption off-set by offsite renewable energy to ensure a carbon neutral precinct.
- The capability to export more recycled water than potable water is imported to ensure a positive water impact.
- An 80% operational waste diverted from landfill, targeting zero net waste to landfill by 2020.
- 20% reduction in embodied carbon (cradle to gate) not including tenant fit outs.
- On site renewables of an amount to offset public realm and recycled water treatment plant energy use.
- Green Star Multi Unit Residential Design and As-Built ratings for all eligible buildings within the precinct.

The precinct has many sustainability initiatives such as the district cooling plant, on-site renewables strategy and precinct recycled water plant to ensure it achieves the above sustainability targets. The Stage 1B Basement supports these initiatives to enable the precinct sustainability targets to be achieved, as described in the following report.

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1.0 Introduction

This report supports a State Significant Development Application (SSD6960) submitted to the Minister for Planning pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EPA Act). The Development Application (DA) seeks approval for construction of the Stage 1B Basement and associated works at Barangaroo South as described in the Overview of Proposed Development section of this report.

1.1 Overview of Proposed Development

The Stage 1B Basement DA seeks approval for the construction of a four level basement to accommodate parking for the Stage 1B Residential Buildings (subject to separate SSD applications). The works include the excavation, construction of basement structure, provision of common plant and services, loading docks, waste rooms and storage areas, as well as structural cores to the new ground floor level and associated building services for the Stage 1B Residential Buildings. The proposed development also includes above ground elements required to commission the Basement, including temporary roads, car park and loading dock ramps, lifts and stairs, and basement service risers, temporary public domain and temporary landscaping works.

1.2 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 a range of new development dominated by large CBD commercial tenants to the south.

The Barangaroo site has been divided into three distinct redevelopment areas (from north to south) – Barangaroo Reserve, Barangaroo Central and Barangaroo South.

The Stage 1B Basement DA Site area is the northern part of the Barangaroo South precinct. The Development Application Site is located within Stage 1B, on land generally known and identified in the proposed Concept Plan MP06_0162 (Mod 8) as Development Blocks 4A, 4B and 5, and the adjacent area designated for public domain.

1.3 Purpose of This Report

This report has been prepared to accompany the Project Application for the Stage 1B Basement works at Barangaroo South. It outlines the targets proposed for the Barangaroo South precinct, which contribute to the achievement of the broader sustainability commitments for the Barangaroo Site under the Concept Plan. It also addresses the relevant Secretary's Environmental Assessment Requirements for the project, in particular demonstrating consistency of the proposed development with the relevant Statement of Commitments of the Concept Plan. It should be noted that Concept Plan (Mod 8) which is currently under assessment, does not seek to modify the approved commitments for Barangaroo relating to ESD.

The ESD initiatives for the Barangaroo South 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 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;

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- 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.

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2.0 Referenced Documentation

2.1 Architectural

Analysis to date and information provided within this report is consistent with the following drawings.

Drawing No.	Revision	Drawing Title
BB2_PA2_A000	Rev A	Title Sheet
BB2_PA2_A001	Rev A	Aerial Location Plan
BB2_PA2_A002	Rev A	Survey Plan
BB2_PA2_A003	Rev A	Demolition, Excavation & Services Work Plan
BB2_PA2_A105	Rev A	BASEMENT PLAN LEVEL B5
BB2_PA2_A100	Rev A	BASEMENT PLAN LEVEL B0
BB2_PA2_A101	Rev A	BASEMENT PLAN LEVEL B1
BB2_PA2_A102	Rev A	BASEMENT PLAN LEVEL B2
BB2_PA2_A103	Rev A	BASEMENT PLAN LEVEL B3
BB2_PA2_A104	Rev A	BASEMENT PLAN LEVEL B4
BB2_PA2_A501	Rev A	BUILDING ELEMENTS - ELEVATIONS
BB2_PA2_A402	Rev A	BUILDING ELEMENTS - PODIUM 2
BB2_PA2_A401	Rev A	BUILDING ELEMENTS - PODIUM 1
BB2_PA2_A400	Rev A	BUILDING ELEMENTS - GROUND FLOOR
BB2_PA2_A303	Rev A	SECTION 04
BB2_PA2_A302	Rev A	SECTION 03
BB2_PA2_A301	Rev A	SECTION 02
BB2_PA2_A300	Rev A	SECTION 01

2.2 Building Services

Information generally provided verbally, through available design information and the 'Stage 1B Basement and Infrastructure Services DA Submission' report.

2.3 Limitations

This report is based on the above-referenced documentation supplied to Lend Lease Design at the date of writing. This documentation is subject to change as the design progresses and specific outcomes may be substituted or omitted whilst still targeting the sustainability aspirations for the Barangaroo precinct.

3.0 Precinct Initiatives

The Barangaroo South precinct has established a range of significant sustainability targets that will be delivered progressively throughout the development phase to contribute to the broader Barangaroo Concept Plan Commitments. This short overview provides the context for considering the Stage 1B Basement 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:

- 6 Star Green Star Office v3 Design and As-Built ratings;
- 5-Star Green Star Multi Unit Residential v1 Design and As-Built ratings;
- Attuned to Sydney's climate and connected to outdoors;
- Passive design, ultra-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 offsite new renewable energy generation;
- Significant reduction in building energy consumption. The residential buildings throughout the precinct are targeting a 55% carbon reduction from business as usual performance;
- 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;
- 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; and
- Greater than 80% diversion of operational 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;
- Landscaping to suit future climate change; and
- Landscaped public spaces and selected green roof features.

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Many of these targets involve various third parties and authorities, and will need partnerships and commitments to achieve these targets. These world leading initiatives will be evaluated, measured and reviewed progressively throughout the project life.

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4.0 Sustainability Contribution

The proposed basement will appropriately contribute towards the achievement of the sustainability commitments included in the Statement of Commitments of the approved Concept Plan. The table below summarises these commitments and confirms how the project will address each statement of commitment.

Category	Clause	Approved Concept Plan	Stage 1B Basement Commitment
General ESD	78	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.	<p>The basement will support the residential buildings in the attainment of 5 Star Green Star Multi -Unit v1 Design and As-Built ratings. Spatial requirements, plant and physical connections to Stage 1A services, including chilled water and recycled water distribution, and on-site generation are provided to enable ESD targets to be achieved. Refer to the Services Report for the development for further details.</p> <p>The basement will also incorporate materials initiatives, including those associated with concrete and steel, to enable precinct wide commitments, inclusive of Green Star ratings, to be achieved,.</p>
Water	79	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.	A recycled water supply will be extended from the Stage 1A recycled water supply connection point in the Stage 1A Level B1 Basement. A 150mm service will extend through the basement to metering points for the Stage 1B Basement and the individual buildings where the water will be used for toilet flushing, laundries and wash-down purposes.
Energy	80	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.	<p>The basement will support buildings within Stage 1B with regards to these targets.</p> <p>The proposed basement will include services that will enable reticulation of recycled water and chilled water from the district chilled water plant provided in Stage 1A to the buildings located within Stage 1B. The district cooling plant utilises harbour heat rejection eliminating water consumption for heat rejection.</p> <p>The design of the basement will ensure energy efficiency strategies are implemented to enable buildings within Stage 1B to achieve emissions targets.</p> <p>Energy efficiency strategies proposed for the basement include LED lighting with appropriate zoning and controls, demand controlled ventilation and sufficient metering to enable performance to be</p>

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			<p>measured and monitored against proposed targets.</p> <p>In addition space has been provided within the Barangaroo South Stage 1B Basement to accommodate a method of carbon abatement in the future. There are several possible methods being considered including:</p> <ul style="list-style-type: none"> ▪ Natural gas fired reciprocating engine generator with heat recovery ▪ Natural gas fired gas turbine generator(s) with heat recovery ▪ Natural gas fuel cell generator with heat recovery. <p>The residential buildings are being designed with the ability to accept electricity and waste heat from any future cogeneration system.</p>
Micro-Climate	81	Key public open spaces (parks and squares) are to receive direct sunlight in mid-winter.	This requirement is not applicable to this Application.
Landscape	82	Primarily non-invasive plant species are to be used on the site.	Primarily non-invasive plant species will be used for the interim public domain if it is implemented.
Transport	83	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.	This requirement is not applicable to this Application.
Waste	84	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 future Stage 1B buildings.
Wind	85	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.	This requirement is not applicable to this Application.

5.0 Conclusion

The proposed Stage 1B Basement will support the sustainability aspirations set for the Barangaroo South precinct and the broader Barangaroo site, as expressed by the Concept Plan Statement of Commitments. The Barangaroo South project aims to deliver sustainable buildings, with low operational energy consumption, reduced potable water use, minimisation of waste to landfill and appropriate materials selection while at the same time maintaining a high level of indoor environmental quality through appropriate mechanical design, façade configuration and materials selection.

Barangaroo South sustainability initiatives such as the district cooling plant, on-site renewables strategy and precinct recycled water plant will be supported by the proposed basement. These initiatives are essential to ensure the precinct achieves the many sustainability objectives.