CUNDALL

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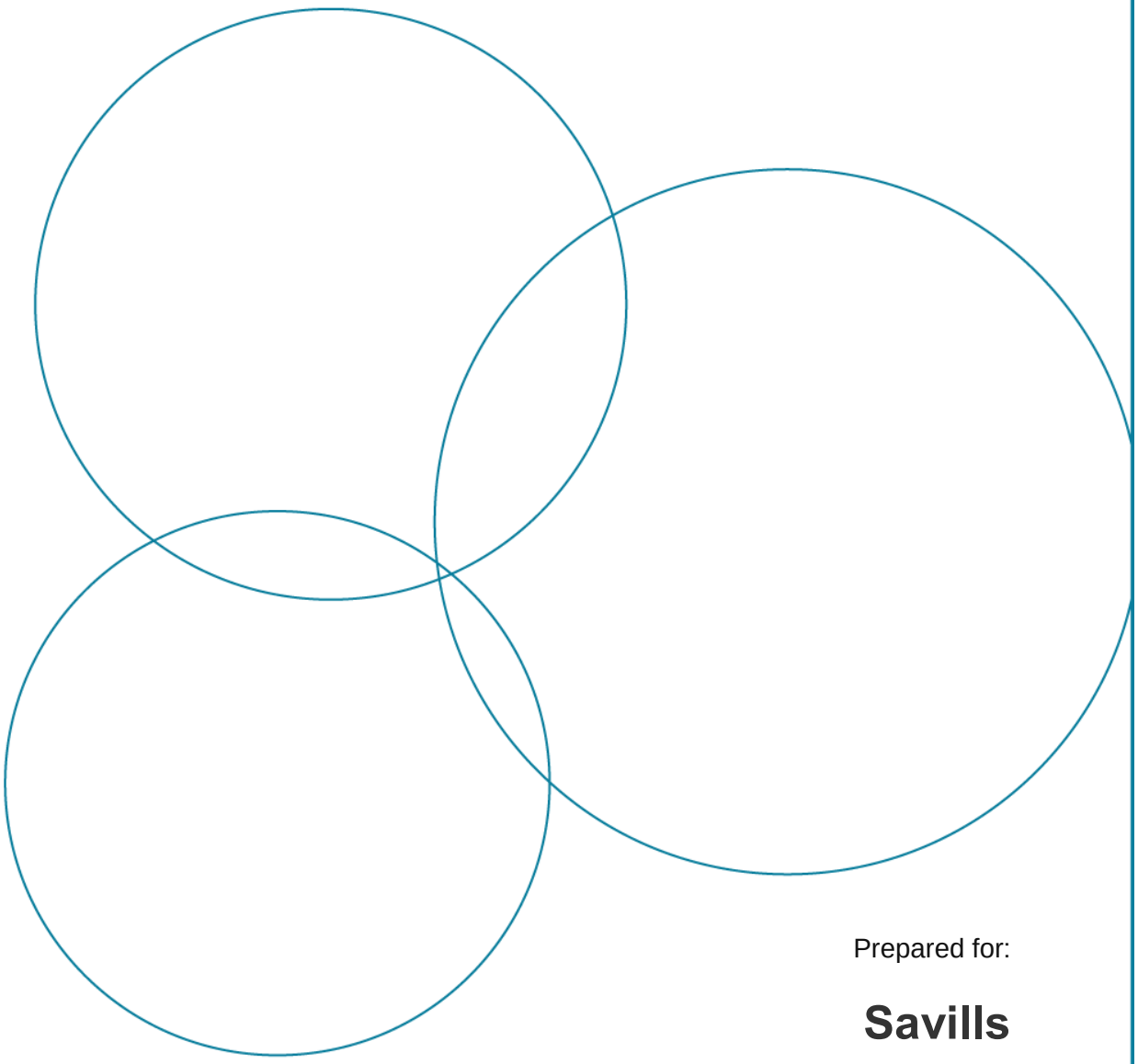
# 85 Harrington St, The Rocks

# ESD Report for DA



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The success and realisation of the proposed initiatives will be dependent upon the commitment of the design team, the development of the initiatives through the life of the design and also the implementation into the operation of the building. Without this undertaking the proposed targets may not be achieved.

# Contents

# Executive Summary

The following report provides an outline of the Ecologically Sustainable Design (ESD) initiatives that are being investigated to be incorporated within the proposed development located at 85 Harrington St, The Rocks, NSW. This project comprises 62 residential apartments in two apartment buildings, the redevelopment of Bakers terrace and retail and commercial space.

The following minimum regulatory requirements apply to the development:

- BCA Section J for Energy Efficiency
- Building and Sustainability Index (BASIX)

In addition to these minimum compliance requirements, the design team is committed to providing the residents and the local community with a sustainable and environmentally conscious development, in its design, construction and operation. The focus of the ESD initiatives relate to providing high levels of indoor and outdoor environmental quality and amenity, in addition to minimising on-going energy and water consumption.

The ESD measures outlined below are proposed and will be investigated in further detail and developed through the detailed design stages:

- Low emission materials – Limit the health risks associated with the selection of toxic constituents
- Passive design – Optimisation of daylight, natural ventilation and solar access to increase occupancy wellbeing and reduce energy consumption requirement

# 1 Introduction

This report outlines the key Ecologically Sustainable Design (ESD) initiatives for the 85 Harrington St, NSW, which is committed to exceeding standard environmental performance. The scope and systems described herewith cater for these performance requirements, and will be further developed through the design stages.

# 2 Minimum Requirements

Minimum regulatory ESD requirements applying to this site include the following:

- BCA Section J for Energy Efficiency;
- Building and Sustainability Index (BASIX);

## 2.1 BCA Section J for Energy Efficiency

The retail component of the development is required to comply with the BCA Section J for Energy Efficiency.

The Building Code Australia (BCA) Section J, sets minimum energy performance requirements for all new development, which cover air-conditioning, ventilation, lighting, power and hot water, in addition to building fabric considerations including thermal construction and insulation, building sealing, glazing and shading. The building has been designed in line with deemed-to-satisfy requirements for building fabric and services, as outlined in Section 4 of this report.

## 2.2 BASIX

New residential developments in NSW must reduce their energy and water use, according to BASIX requirements developed by the Department of Planning and Infrastructure. The objectives of the BASIX scheme are relative to an average development in NSW.

Targets for 85 Harrington St development can be seen below:

**Bakers terrace**

- 40% reduction in water consumption
- 20% reduction in greenhouse gas emissions
- Minimum thermal performance requirements for heating and cooling loads

**Apartment Buildings**

- 40% reduction in water consumption
- 20% reduction in greenhouse gas emissions
- Minimum thermal performance requirements for heating and cooling loads

A detailed BASIX assessment has been carried out and the related strategies are presented in Section 5 of this report.

# 3 Ecologically Sustainable Design (ESD) Approach

The following section identifies the ESD objectives and key principles that will apply to the proposed development through design, construction and operational phases.

## 3.1 ESD Principles in Design

The design team aims to provide residents and the local community with a sustainable and environmentally conscious development through a focus on providing high levels of indoor and outdoor environmental quality and amenity along with minimising energy and water loads.

### 3.1.1 Site wide

| Element | Passive Design Strategies |
|---|---|
| Management and Education | In recognition of effective handover being critical to the success of a building achieving its environmental aspirations, a simple and concise building users' guide will be developed to inform and educate building users, residents and tenants on how to capture and promote strong on-going environmental performance. |
| Materials | Forestry Stewardship Certified (FSC), Australian Forest Certified (AFS) or post-consumer recycled timber preferred.<br>Low emission paints, carpets, sealants, adhesives and composite wood products will be specified.<br>Materials will be selected to avoid toxic constituents such as cadmium, lead, mercury, phthalates, chlorofluorocarbons, polychlorinated biphenyls, chloroprene. |

### 3.1.2 Passive Design

Effective passive design can reduce the amount of air-conditioning required and improve internal comfort and amenity. A building's form, fabric and orientation will have the biggest influence on its thermal comfort and environmental performance.

| Element | Passive Design Strategies |
|---|---|
| Orientation | The residential spaces of the development have been designed where possible, to consider the impact of daylight and natural cross-flow ventilation on the health and wellbeing of the building occupants. Where possible, apartments have been oriented to take advantage of solar access throughout the day while balconies and operable shading devices provide adequate protection from the sun. Most residential living rooms are configured to take advantage of prevailing winds for cooling while providing protection from the wind during cold winter periods. |
| Glazing | The selection of appropriate performance glazing will decrease heat loss during the winter months and help to avoid heat gains in the summer. |

### 3.1.3 Occupant Amenity

Facilities that provide good occupant amenity will improve the lifestyle of residents and help to enhance the local community. Indoor Environmental Quality (IEQ) affects occupant health and wellbeing and comprises of thermal comfort, indoor air quality, views, daylight, and acoustic quality. These factors are outlined below with respect to the development application, and will be developed further during detailed design.

| Element | Occupant Amenity Strategies |
|---|---|
| Enhanced landscaping | Communal spaces are provided with access to the ground floor retail shops, whilst rooftop gardens enhance ecological value and occupant amenity for the development. |
| Transport | The site is well serviced by the nearby train line, ferry terminal and a number of bus stops with regular bus services. |
| Daylight, Glare and Views | The extent of glazing has been designed to optimise daylight, views, and winter sun. Operable shading devices and blackout blind systems will be provided for glare control. |
| Air quality | Contamination of indoor air will be minimised at source through careful consideration of finishes and materials to reduce air-borne pollutants, toxins and irritants. Examples include, selection of low VOC paints and carpets and low formaldehyde emitting wood products. |
| Private External Space | The majority of individual dwellings will be provided with private external space. |

### 3.1.4 Efficient Systems

Energy consumption can be reduced through the efficient design of lighting, air-conditioning and ventilation systems, in addition to water heating and other services. The following table outlines the initiatives that will reduce energy consumption relating to building services.

| System | GHG Emissions Reduction Strategies |
|---|---|
| Lighting | Efficient light fittings such as LED lamps are preferred throughout common areas and dwellings. Efficiency controls where possible will be provided including timers and motions sensors in car parks and common areas. |
| Heating, Cooling & Ventilation | Where AC is provided, energy-efficient systems will be specified.<br>Residential kitchens exhaust hoods for all dwellings will be fitted with individual fans and be ducted to the building façade or roof.<br>Car parks areas will be provided with mechanical ventilation for supply and exhaust and will incorporate CO monitoring and Variable Speed Drives (VSD). |

### 3.1.5 Water Efficiency

Where possible, mains/potable water consumption will be minimised on-site. Potable water consumption will reduced through a rainwater harvesting system and demand management.

| System | Water-saving Strategies |
|---|---|
| Fittings & Fixtures | All fittings will be WELS rated to minimise total water consumption (all residential areas and common areas). |
| Appliances & Equipment | Where installed, WELS rated water-efficient appliances will be selected and pipe work sized to maximise efficiency. |
| Landscape | The use of native, low-water planting species will be encouraged to reduce water consumption used in irrigation. |
| Alternative Sources | Landscape irrigation and car wash bays will utilise rainwater harvesting to limit potable water consumption |
| Flows to Sewer | Estimated wastewater discharge to sewer will be significantly reduced relative to a standard building through the implementation of water efficiency measures. |

# 4 BCA Section J for Energy Efficiency

The retail component of the development is required to comply with the BCA Section J for Energy Efficiency. It is intended that the retail component will meet the BCA Section J requirements with deemed to satisfy constructions and services.

# 5 BASIX

New residential developments in NSW must reduce their energy and water use, according to BASIX requirements developed by the Department of Planning and Infrastructure. The objectives of the BASIX scheme are relative to an average development in NSW and the targets for the Green Square Development are listed below;

**Apartment Buildings**

- 40% reduction in water consumption
- 20% reduction in greenhouse gas emissions
- Minimum thermal performance requirements for heating and cooling loads

**Bakers terrace**

- 40% reduction in water consumption
- 40% reduction in greenhouse gas emissions
- Minimum thermal performance requirements for heating and cooling loads

### 5.1.1 BASIX Water

**Unit Buildings 1 and 2**

Proposed strategies to achieve the BASIX water target of 40% reduction in potable water consumption are outlined in the table below:

| BASIX Base Case | Water Conservation Strategies |
|---|---|
| Individual Dwellings | Efficient fixtures including<br>• 3-star showerheads (>6 but ≤ 7.5L/min);<br>• 5-star kitchen<br>• 6-star bathroom wash hand basin; and<br>• 4-star dual-flush toilets |
| Appliances | For all individual dwellings<br>• 4 star clothes washer<br>• 4 star dishwasher |
| Common areas | Landscaping<br>• Garden area is planted with 50% native or low water-use species |
| Alternative water | • 100kL rainwater tank collecting off 915m$^2$ of roof area and serving 100m$^2$ common landscape, courtyard and car wash area |
| **BASIX Water Target** | **40%** |
| **Water Score** | **48%** |

**Bakers Terrace**

Proposed strategies to achieve the BASIX water target of 40% reduction in potable water consumption are outlined in the table below:

| BASIX Base Case | Water Conservation Strategies |
|---|---|
| Individual Dwellings | Efficient fixtures including<br>• 3-star showerheads (>6 but ≤ 7.5L/min);<br>• 5-star kitchen<br>• 6-star bathroom wash hand basin; and<br>• 4-star dual-flush toilets |
| Appliances | For all individual dwellings<br>• 4 star clothes washer<br>• 4 star dishwasher |
| Common areas | Landscaping<br>• N/A |
| **BASIX Water Target** | **40%** |
| **Water Score** | **44%** |

### 5.1.2 BASIX Energy

**Apartment Buildings**

Proposed strategies to achieve the BASIX energy target of 20% reduction in energy consumption are outlined in the following table:

| BASIX Base Case | Energy Conservation Strategies |
|---|---|
| HVAC | **Unit Building 1: Apartments 2, 3, 51 and 52** – Three phase VRF with electric driven compressor and COP3.5-4.0<br>**Unit Building 2: Apartments 7 and 8** – Three phase VRF with electric driven compressor and COP3.5-4.0<br>• **Remainder of Apartments** – Single phase Individual and zoned, air conditioning units with 3.0-3.5 EER cooling and heating for living rooms and bedrooms<br>• **Common Areas –** Mechanical ventilation<br>• **Corridors and Lobby –** Mechanical ventilation supply only<br>• **Bathroom and Laundry Exhaust** - Individual fans ducted to facade (manual on/off switch connected to the light).<br>• **Kitchen Exhaust –** Individual Fan ducted to facade (on/off switch)<br>• **Car Park** - Variable Speed Drive (VSD) ventilation with carbon monoxide sensors<br>• **Plant Space:**<br>○ Garbage – Exhaust ventilation<br>○ Plant rooms – No ventilation<br>○ Switch room – Air conditioned with thermostatic control |
| Lighting | • **Dwellings** - Dedicated LED or fluorescent lighting<br>• **Common Areas** - Fluorescent or LED lighting with daylight and motion sensor<br>• **Corridors** – Fluorescent or LED lighting with daylight and motion sensors<br>• **Car Park** - Fluorescent or LED lighting with time clocks and motion sensors<br>• **Lift Car** – Lighting connected to lift call button<br>• **Plant Space:**<br>○ Storage and garbage rooms – Motion sensors<br>○ Lighting in plant areas and switch rooms - Manual on/off switch |
| Appliances | • Gas cooktop and electric oven<br>• 4 star dishwashers<br>• 4 star clothes washer |
| Central Systems | • **Central hot water system** - Gas-fired boiler with R1.0 insulation external and R0.6 internal<br>• **Residential lifts** - Gearless traction with VVVF motor<br>• **Photovoltaic system** – 10kWe peak<br>• **Active Power Correction** |
| Other | • **Indoor clothes drying line**<br>• **Well ventilated fridge space** |
| **BASIX Target** | **20%** |
| **Energy Score** | **27%** |

**Bakers Terrace**

Proposed strategies to achieve the BASIX energy target of 40% reduction in energy consumption are outlined in the following table:

| BASIX Base Case | Energy Conservation Strategies |
|---|---|
| HVAC | Three phase VRF with electric driven compressor and COP3.5-4.0<br>• **Kitchen and Bathroom Exhaust** - Individual fans ducted to facade (manual on/off switch). |
| Lighting | • **Dwellings** - Dedicated LED or fluorescent lighting |
| Appliances | • Gas cooktop and electric oven |
| Central Systems | • **Central hot water system** - Gas-fired boiler with R1.0 insulation external and R0.6 internal |
| Other | • **Indoor clothes drying line**<br>• **Well ventilated fridge space** |
| **BASIX Target** | **40%** |
| **Energy Score** | **40%** |

## BASIX Thermal Comfort

The comfort levels of typical dwellings have been assessed using Accurate, second generation software approved by the National House Energy Rating Scheme (NatHERS), which predicts annual heating and cooling loads.

To satisfy BASIX, each dwelling must achieve the following objectives:

- Heating and cooling loads for individual dwellings must not exceed the limit specified in the BASIX scheme;
- The average of heating and cooling loads of all the proposed dwellings in a development must not exceed the specified average limit.

The development has been assessed using the following building envelope to achieve the BASIX thermal comfort targets:

| Building Element | Construction | Total R-Value |
|---|---|---|
| Construction & shading | • As indicated on the architectural drawings | - |
| External Wall | • 130mm concrete + Insulation and plasterboard. Total thickness of 250mm<br>• Sandstone Cladding + Insulation and plasterboard<br>• Terracotta Cladding + Insulation and plasterboard | R2.5 |
| Internal Walls | • Partitions: Plasterboard on studs | R0.4 |
| | • Party walls insulation + plasterboard | R1.0 |
| Roof | • 200mm concrete + R3.0 insulation and plasterboard to all exposed roof except above Building 1- 901 and 902 which require R4.0 Bulk Insulation | R3.2<br>R4.0 |
| Floor | • 200mm concrete slab + carpet/tile<br>• Bakers Terrace: Timber floor between floors<br>• Bakers Terrace above retail: Concrete floor | R2.0 where adjacent to car park<br>R1.0 where adjacent to outside air |
| Ceiling | • Suspended concrete slab between apartments | - |
| Glazing | Aluminium Framed Windows<br>First Rate 5 Reference ALM-002-01 for all windows<br>The following apartments have been model with a diff glazing performance for compliance.<br>– Building 1 - 306<br>– Building 2 – 401<br>– Building 1 - 402 | U Value 5.4<br>SHGC 0.58<br>U Value 4.8<br>SHGC 0.51 |

# Appendix A – BASIX Certificates

## A.1 85 Harrington Street

## A.2 Baker Terrace