



195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Maroubra

ESD Report
State Significant Development
Application for Social and
Affordable Housing
SSD- 71454960

Prepared for: Homes NSW

Project No: SYD3066
Date: 14 October 2024
Revision: 01



Project: 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Maroubra
Location: 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade
 Maroubra NSW 2035
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00	08 Oct 2024	DA Draft Issue	Gaia Anjali RC	Khyati Saxena	Samuel Youssef
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Executive Summary

This ESD Opportunities Report has been prepared by ADP Consulting Pty Ltd on behalf of Homes NSW for a State Significant Development Application (SSD-71454960) for the redevelopment of existing social housing (the Project) at 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Maroubra (the Site). The Project involves the replacement of the 33 social housing units across eight 2 storey apartment buildings and a single storey dwelling with 144 units across four 3 storey buildings and two part 3/part 4 storey buildings.

The purpose of this ESD Opportunities Report is to provide a list of Environmentally Sustainable Design (ESD) initiatives and to address the Secretary’s Environmental Assessment Requirements (SEARs) for the project issued on 6 June 2024, Requirement 9 Ecologically Sustainable Development (ESD):

- > Identify how ESD principles (as defined in section 193 of the EP&A Regulation) are incorporated in the design and ongoing operation of the development. This will be addressed in Section 3.
- > Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards. This is addressed in Section 4.
- > Demonstrate how the development minimises greenhouse gas emissions (reflecting the Government’s goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and material

resources. This is demonstrated in Sections 4.1-4.2, 4.3, and 4.5 respectively.

SEARs Requirement 9: Ecologically Sustainable Development (ESD)	Section Addressing SEARs Requirement
<ul style="list-style-type: none"> • Identify how ESD principles (as defined in section 193 of the EP&A Regulation) are incorporated in the design and ongoing operation of the development. 	Section 3 - ESD Report
<ul style="list-style-type: none"> • Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards. 	Section 4 - ESD Report
<ul style="list-style-type: none"> • Demonstrate how the development minimises greenhouse gas emissions (reflecting the Government’s goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and material resources. 	Section 5 - ESD Report

Chapter 3 of Sustainable Buildings SEPP does not apply as the proposed development it is entirely residential and does not include any non-residential development. As such, these requirements are not applicable for this project:

- > NABERS embodied Emissions Materials Form
- > Net Zero Statement
- > NABERS Agreement(s) to Rate, or Commitment Agreement(s) to energy and water use

Following the desktop review of above, the sustainability initiatives summarised below are being incorporated during the design, construction, and operation of the proposed development:

- > National Construction Code (NCC) 2022 for residential communal areas, and BASIX compliance for residential spaces
- > Energy & Greenhouse Gas Emissions – building fabric design, efficient building services and metering, and onsite renewables.
- > Water Efficiency & Conservation – water efficient fixtures and appliances, rainwater capture and reuse, and Water Sensitive Urban Design strategies.
- > Materials – material selection informed by life cycle impacts, considerations for low carbon design, maintenance, durability, and cost.
- > Waste Management Practice – construction and operational waste reduction strategies.
- > Healthy Indoor Environment Quality – design principles that optimise indoor comfort for indoor air quality, light, sound, noise, and thermal comfort.

- > Recommended Social Initiatives – engagement with the Traditional Elders; responsible sourcing; universal design principles; provision of communal spaces for enjoyment
- > Biodiversity – strategies to minimise ecological impacts to nature reserves nearby
- > Sustainable Transport – considerations in infrastructure to support low carbon travel modes
- > Sustainable Management Practices – sound construction environmental practices, and CPTED principles for safety of the building occupants and visitors.

Additionally, preliminary discussions around climate change resilience and net zero operational carbon emissions are provided.

1. Introduction

1.1 Project Overview

This ESD Opportunities Report has been prepared by ADP Consulting Pty Ltd on behalf of Homes NSW for a State Significant Development Application (SSD-71454960) for the redevelopment of existing social housing (the Project) at 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Maroubra (the Site). The Project involves the replacement of the 33 social housing units across eight 2 storey apartment buildings and a single storey dwelling with 144 units across four 3 storey buildings and two part 3/part 4 storey buildings.

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- > Identify how ESD principles (as defined in section 193 of the EP&A Regulation) are incorporated in the design and ongoing operation of the development.
- > Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards.
- > Demonstrate how the development minimises greenhouse gas emissions (reflecting the Government's goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and material resources.

Chapter 3 of Sustainable Buildings SEPP does not apply as the proposed development it is entirely residential and does not include any non-residential development. As such, these requirements are not applicable for this project:

- > NABERS embodied Emissions Materials Form
- > Net Zero Statement
- > NABERS Agreement(s) to Rate, or Commitment Agreement(s) to energy and water use

Following a review of the project brief, existing site conditions and architectural drawings, the ESD categories below are explored in this report for the design, construction, and operation of the proposed development:

- > National Construction Code (NCC) 2022 for residential communal areas, and BASIX compliance for residential spaces
- > Energy & Greenhouse Gas Emissions
- > Water Efficiency & Conservation
- > Low Carbon Materials
- > Waste Management Practice
- > Healthy Indoor Environment Quality
- > Recommended Social Initiatives
- > Biodiversity
- > Sustainable Transport
- > Sustainable Management Practices

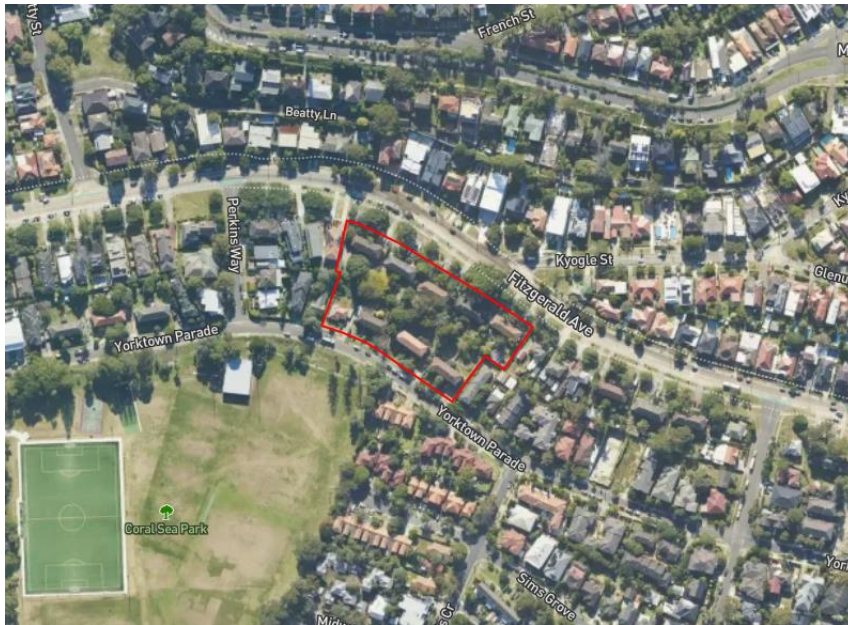
1.2 Project Background

1.2.1 The Project Site

The site is located within the Randwick City Council local government area (LGA) and is zoned R3 Medium Density Residential under the *Randwick Local Environmental Plan (LEP) 2012*.

The site has a total area of approximately 9,647 square metres (sqm) with frontages to Fitzgerald Avenue to the north and Yorktown Parade to the south. Refer to Figure 1.

Figure 1 Site location marked in red.



The existing buildings on the site are currently occupied. There are street trees located along the Fitzgerald Avenue frontage and a series of trees within the site between the buildings and along both street frontages.

The site is accessible by public transport with frequent bus services that run along Fitzgerald Avenue to Maroubra town centre and Bondi Junction, and connecting services to Sydney CBD. Options for transportation include:

- > Public transport: Bus stops are located along Fitzgerald Avenue (5-minute walk), Yorktown Parade (5-minute walk), and Minneapolis Crescent (4–6-minute walk). There are no ferries, trams, or trains in this local government area.
- > Bicycle: Fitzgerald Avenue has dedicated bicycle lanes for cyclists that connects to the bigger bicycle network of Sydney. Major roads have dedicated bicycle lanes or bicycle-friendly roads. Most cycling access is through streets without designated bicycle lanes.
- > Walking: Existing footpaths are pedestrian-friendly and connect to the pedestrian network throughout Maroubra. Maroubra Beach is a ten-minute walk away from the site.
- > Private vehicles: Existing roads provide excellent connection to the local and surrounding areas.

1.2.2 The Proposed Development

The proposed development comprises demolition of existing buildings and the construction of four 3 storey and two part 3/part 4 storey residential flat buildings to accommodate 144 social and affordable housing apartments, a communal room and a single level basement car park including bulk earthworks, tree removal and associated landscaping and public domain works.

The site is located within the Randwick City Council local government area (LGA) and is zoned R3 Medium Density Residential under the Randwick Local Environmental Plan (LEP) 2012. Further, the proposed development is to be classified as following:

- > NatHERS climate zone 56 for BASIX
- > Australian Building Codes Board (ABCB):
 - Climate Zone 5 (warm temperate)
 - NCC Classification Type 7a for the carpark area; Type 7b for the storage areas of the building e.g. waste room
 - NCC Classification Type 2 for all other areas

The site sits in the inner suburbs of Sydney; as such, the future residents have access to multiple community amenities to support their lifestyle. These include:

- > Multiple cafes and restaurants within 2 km radius
- > Public parks of various sizes. The closest park, Coral Sea Park is across the road from this proposed development.
- > Schools – there are 6 schools within 2 km. There are plenty of other public and private schools in the surrounding su
- > Sports facilities, physiotherapy, and remedial massage outlets within 2 km of the site
- > Places of worship – churches and a new age religion centre
- > Grocery stores – Coles and Aldi within 2 km to the project site. Two major shopping centres are located in the neighbouring suburbs.
- > Healthcare – private medical centres and a public clinic. Public hospitals are located in a neighbouring suburb

- > Attractions and places of interest – walking tracks, national parks, rockpools and beaches to the southeast of the project site

1.3 Relevant Policies and Guidelines

The following were used to guide the development of the ESD opportunities and recommendations for the project:

- > Section J provisions of the NCC 2022 Building (BCA) Code of Australia
- > State Environmental Planning Policy (Sustainable Buildings) 2022
- > Planning Secretary's Environmental Assessment Requirements (SEARS) for development within identified sites and precincts
- > NSW Land and Housing Corporation Design Requirements
- > NSW Government Round 1 HAFF Program: Homes HSW Mixed Tenure Development Brief June 2024 (Rev 01)
- > NSW Government Good Design for Social Housing (2020)
- > Randwick City Council Local Environmental Plan (LEP) 2012
- > Randwick Comprehensive Development Control Plan 2013 Part B3

1.4 Documentation

The following documentation has been used to inform this report:

- > Issue for Draft DA drawing package by SJB Architects (03rd October 2024)

2. Climate Change Resilience

The proposed development aims to create a resilient environment for the occupants. Climate change resilience is an important objective to address in the design development stage of the project. Present conditions of the project site are noted as the following:

Table 1. Climate risk assessment for the proposed development

Climate risk	Description
Flooding risk	<p>The project site is prone to flooding from overland flows during 1% AEP (1 in 100 year rainfall) events. This is primarily due to a local low point to the east of the site at the intersection of Fitzgerald Avenue and Kyogle Street.</p> <p>Source: Maroubra Bay Floodplain Risk Management Study and Plan (see link here); Maroubra flood affected map (see link here); 195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Maroubra Flood Impact and Risk Assessment (Mott MacDonald, October 2024)</p>
Decreased rainfall	<p>Change in annual rainfall is predicted to be -5% to 10% less in the near future (2020-2039) and far future (2070-2089) respectively. The decrease is anticipated to be the most drastic in winter months</p> <p>The project site will still have flooding risk during 1% AEP events.</p> <p>Source: AdaptNSW projections based on NARClim2.0 variables</p>

Climate risk	Description
Heat stress	<p>The project site is almost certain to experience increase in temperature by 0.5-1.0°C in the near future (2020-2039) and 1.5-3.0°C in the far future (2070-2089).</p> <p>Extreme heat days above 35°C are predicted to increase by 1-3 days.</p> <p>Source: AdaptNSW projections based on NARClim2.0 variables</p>

- > **Heat stress response:** Passive design to optimise the building form and material selection as well as efficient ventilation and cooling systems (Section 4.2), and landscaping to provide cover from direct heat (Section 4.8).

2.1 Design Recommendations

Given the significance of this project, the project team will consider the following measures:

- > **Flooding risk response:** The design responses have been addressed in the *195-213 Fitzgerald Avenue and 40-64 Yorktown Parade, Maroubra Flood Impact and Risk Assessment (October 2024)* issued by Mott MacDonald as part of this DA submission, including raising the buildings above the flood level. Please refer to the report for further details. The Randwick City Council has flood management strategies for the public realm to mitigate some of this risk.
- > **Decreased rainfall response:** The design has incorporated landscaping using plant species with low water requirements for both native and adaptive flora (see Section 4.8). The design will also incorporate low water use fixtures and fittings to reduce potable water consumption (Section 4.3).

3. Ecologically Sustainable Development (ESD) Principles

This ESD Opportunities Report addresses the Secretary's Environmental Assessment Requirements (SEARs) through the State Environmental Planning Policy (Sustainable Buildings) 2022 and Randwick Local Environmental Plan (LEP) 2012.

The SEARS requirement refers to section 193 of the EP&A Regulation (Environmental Planning and Assessment Regulation). Here it defines what the principles of a "ecologically sustainable development" are, as follows.

3.1 The precautionary principle

Namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:

- **(i)** careful evaluation to avoid, wherever practicable, serious, or irreversible damage to the environment, and
- **(ii)** an assessment of the risk-weighted consequences of various options

The project will ensure appropriate due diligence will continue to be conducted alongside the development process to ensure the above is satisfied. Consideration around the local environmental impact is outlined specifically with regard to water efficiency and conservation in Section 4.3, waste management in Section 4.6, local community impacts in Sections 4.5, 0 and 4.10. More general global impact and effects are outlined specifically with regard to climate change in Section 4.1, 4.2, and 0; and embodied carbon in Section 4.5.

3.2 Inter-generational equity

Namely, that the present generation should ensure that the health, diversity, and productivity of the environment are maintained or enhanced for the benefit of future generations.

The project will ensure a long-term design vision which considers long term impacts to the environment, with the goal to enhance the surroundings for the ongoing benefit of the community. Please refer to Sections 4.9-4.10.

3.3 Conservation of biological diversity and ecological integrity

Namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration.

The project will be designed to conserve and potentially enhance the local biological diversity and ecological integrity, design to maximise landscaping space, retain and preserve though the construction process, where possible, existing habitat. Further consideration on this item is outlined in Sections 4.8 and 4.10.

3.4 Improved valuation, pricing, and incentive mechanisms

Namely, that environmental factors should be included in the valuation of assets and services, such as:

- **(i)** *polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance, or abatement,*
- **(ii)** *the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,*
- **(iii)** *environmental goals, having been established, should be pursued in the most cost-effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.*

The project aims to reduce operation consumption as well as implement a waste management plan in line with sustainability goals, see Section 4.6, thereby abating pollution generation and/or waste generation from the development.








The project will consider Life cycle when making decisions around materials and the waste process, see Sections 4.2 and 4.5.






Environmental sustainability goals are be established based on industry recognised rating tools such as Green Star and NABERS, as outlined in Section 4. These tools are used only as industry best practice as the proposed development is not pursuing any formal certification. Additionally, these goals will also be adhering to the net zero ambitions of Homes NSW through low carbon material for upfront carbon (Section 4.5) and net zero building (Section 4.2).








3.5 Sustainability Targets & Objectives

The primary objective of the development is to create a positive impact on the surrounding environment and community through its design, in line with the sustainability ambitions of Randwick City Council and Homes NSW. The following key targets have been identified for the project as below:

Legend

						
Energy	Water	Ecology and Biodiversity	Community	Indoor Environment Quality	Waste	Transport

Development Policy/Guideline	Category	Requirements	Design Response
BASIX – Residential component (Class 2)		67% energy savings compared to standard benchmark. The project will adhere to the higher threshold requirements of NSW SEPP, thus exceeding the BASIX threshold. Construction material specification and volumes must be reported only – no targets need to be achieved.	Section 4.1, 4.2, and 4.5.
		40% water savings compared to standard benchmark	Section 4.3
		Thermal Comfort: Heating & cooling loads to not exceed thresholds stated for NatHERS Climate Zone 56. The average energy rating of all of the sole-occupancy units is not less than 7-Stars.	Section 4.1, 4.2, and 4.4.
NSW Land and Housing Corporation (LAHC) Design Requirements		Implement passive design principles Net zero: Optimise roof design for solar panels; aim for net zero homes; prioritise an all-electric building design. NatHERS and BASIX: An average 7-star rating or above across the whole building. Demonstrate compliance to BASIX for the built form.	Section 4.1 and 4.2
		Indoor environment quality: Prioritise products with low VOC and allergenic content, as well as high recycled content. Optimise natural ventilation. Apply ADG minimum solar access standards for all dwellings. Avoid any dwellings receiving less than 15 minutes of solar access to living areas and private open space.	Section 4.4

Development Policy/Guideline	Category	Requirements	Design Response
		Waste: Provide waste facilities in accordance with local council requirements. Allow for source separation of waste from recycling, including organic waste.	Section 4.6
		Landscaping: Preference to endemic native species, low maintenance and drought-tolerant plant species.	Section 4.8
		Universal design: Apply Liveable Housing Design Guidelines (Silver Level) to all new LAHC dwellings.	Section 4.9
Homes NSW Mixed Tenure Development Brief		Provision of solar panels to be maximised for common area power and hot water, individual apartment air conditioning units & power needs Buildings are to be all electric with common hot water.	Section 4.2
		CPTED Principles should be central to design. Universal Design: Meet Liveable Housing Design Guidelines to all new LAHC dwellings (Gold Level for all social dwellings and Silver Level for all affordable dwellings).	Section 4.9 and 4.10
		Provision for EV fast chargers	Section 4.7
		Indoor environment Quality: Social housing units must comply with the Apartment Design Guide (ADG) for solar access and natural cross ventilation.	Section 4.4

4. Environmentally Sustainable Design (ESD) Initiatives

This section outlines Environmentally Sustainable Design (ESD) design measures in line with BASIX, Randwick City Council DCP requirements, as well as Homes NSW sustainability aspirations for this project.

4.1 Energy Efficiency and Compliance

The proposed building will be designed complying to BASIX standards (which is aligned with and complement the NCC 2022), as follows:

- > All residential units to meet thermal performance as:
 - A minimum average of 7 Stars on NatHERS across the building.
 - Not exceed the maximum heating and cooling caps for individual apartments.

Further, the Heating, Ventilation, And Air-Conditioning (HVAC) systems are developed to minimize the operational energy consumption of the proposed development, whilst providing the building occupants with a thermally comfortable space.

4.2 Energy & Greenhouse Gas Emissions Reduction

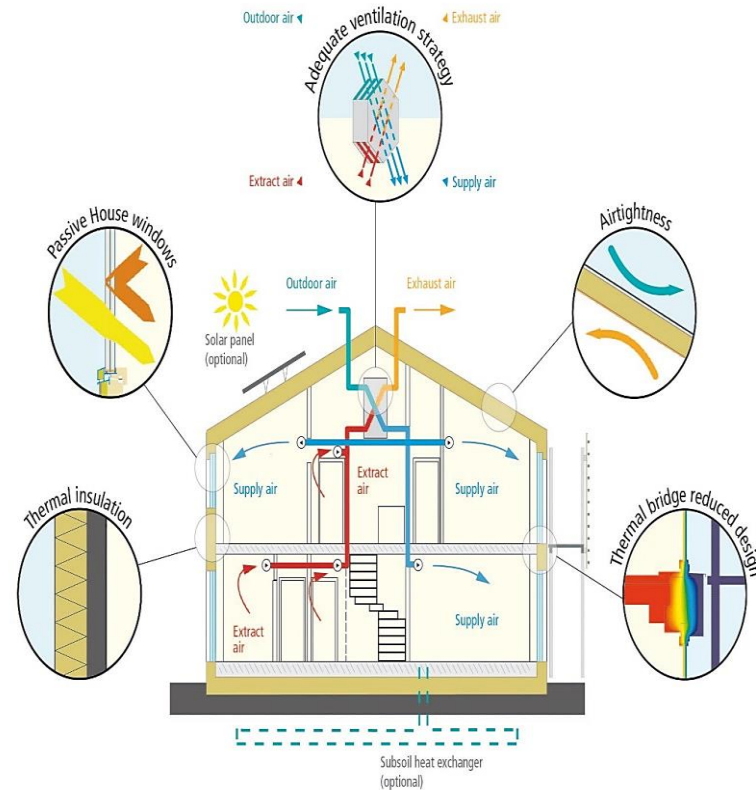
The project team are exploring opportunities to reduce the buildings greenhouse gas emissions impact, through the development of energy saving or energy generating design measures. The following section discusses design aspects of the building that are focused on energy efficiency in operation.

4.2.1 Building Fabric Design

Building fabric design impacts the ability of the building to maintain temperature, air quality and improve interior visibility. Ways the project will aim to do this are as follows:

- > Building orientation and form to be optimized for passive design
 - Passive cooling in the summer
 - Passive heating in the winter).
 - Optimisation of window to wall ratios to all facades of the residential areas.
- > Efficient glazing systems:
 - Provision of high-performing window systems to help reduce heat loss in winter and heat gain in summer.
 - The provision of glazing with a low solar heat gain coefficient to reduce unwanted heat gain from the morning (east) and evening (west) sun, optimising the thermal comfort levels and reducing the energy required to cool the space.
 - Glazing selections that allow for high levels of Visual Light Transmission (VLT) to allow for useful daylight levels of daylight throughout the day.
- > Provision of high levels of insulation to the external walls, roof, and exposed floors that form part of the building envelope.

Figure 2 Passive design strategies for dwellings



4.2.2 Heating, Ventilation, & Air Conditioning (HVAC) Design

The quality and level of HVAC design effects mainly the ongoing energy use and air quality of the building, the below items outline how the project is aiming to make the HVAC system more efficient:

- > Select high-efficiency HVAC systems for conditioned spaces and configure for optimum performance including the following features:
 - Space option for efficient wall mounted split system configured for optimum performance e.g. with an EER/COP of 3.4/3.7
 - Demand-controlled ventilation within apartments
- > Select HVAC equipment that is suitable for low-Global Warming Potential refrigerants to minimise the risk of emissions through refrigerant leakage.
- > Allow for operable windows for apartments and other spaces that are occupied by people to reduce the need for mechanical ventilation and air conditioning.
- > Install ceiling fans in residential apartments, helping to offset/supplement AC system usage and improve ventilation.

4.2.3 Lighting Design

Along with HVAC design, lighting design is one of the main ongoing energy users in a building. Ensuring the underlying design has considered efficiency is important for the ongoing operational costs of the project, the below are some ESD initiatives being incorporated in the design phase:

- > Building orientation and form to be optimized for passive design (cooling in the summer and passive heating in the winter) and natural lighting. Reduce the need for artificial lighting by introducing sunlight through sufficiently sized glazed windows and clerestory where applicable.
- > Select high-efficiency LED lights to provide adequate lighting levels and colour rendering with minimal energy expenditure.
- > Use of motion sensors and light sensors to ensure lighting is automatically dimmed or switched off when not required.
- > Consider impacts such as maintenance costs and access for easy maintenance in practice may also be considered.

4.2.4 Domestic Hot Water

Domestic Hot Water is an area which affects both energy usage as well as water usage, so the project have considered the below:

- > Opportunities to provide hot water via electric heat pump with high efficiency.
- > Insulate pipes to reduce heat loss from hot water distribution.

4.2.5 Facilities

The project has considered the strategies below for residential facilities, reducing both electricity consumption and associated greenhouse gas emissions from individual residences. The project will be designed to be all-electric through:

- > Implementation of clothes lines for each apartments, mitigating overuse/unnecessary use of clothes dryers
- > Induction cooktops and electric ovens
- > Central electric hot water system

4.2.6 Onsite Renewables

On-site solar photovoltaic (PV) generation is being incorporated as an effective method to assist with greater reductions in greenhouse gas emissions, helping to minimise the development's electricity consumption from the grid and offset any associated operational greenhouse emissions. The project is considering:

- > The size and capacity of photovoltaic (PV) system to be installed on the roof. The current provision allows for a 34kW peak array.
- > Combination of different options, layouts, and orientations to optimise performance whilst considering the constrained space, orientation, maintenance, and aesthetics of the project.

4.2.7 Metering & Monitoring

An important aspect for any new development is the metering and monitoring strategy, allowing building owners to measure, quantify, and obtain feedback for the sustainability initiatives implemented.

The project has considered:

- > Energy and water monitoring at the distribution level to identify main consumption factors and any building components that are associated with leakage/wastage.
- > The metering strategy will aim to monitor the following major systems:
 - Incoming electrical mains supply
 - Incoming water mains supply
 - Electrical supply to distinct areas and uses (e.g. common areas lighting and ventilation)
 - Metering for energy and water for individual dwelling units
 - Common area lighting systems

4.3 Water Efficiency & Conservation

Potable water is an increasingly important resource as a result of longer periods of draught and less rainfall. As a first measure, this project aims to reduce potable water consumption through water efficiencies. Alternative water sources (rainwater capture and reuse) will also be incorporated to reduce the demand on the municipal water system.

This project is considering the following measures to reduce potable water consumption:

- > A reduction in potable water use, through the installation of highly efficient fittings, fixtures, and appliances.

Table 2. Minimum WELS rating to reduce potable water consumption

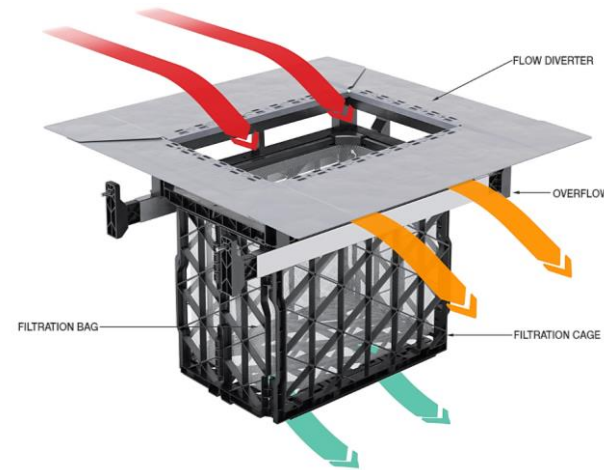
Water fixture/fitting/appliance	Minimum WELS rating
Kitchen taps	5 Star
Bathroom taps	4 Star
Showers	4 Star (>6.0 but ≤7.5 L/min)
Toilets	5 Star

- > Opportunities to provide fire protection systems that ensure test water is either collected, stored, and re-used or recirculated.
- > Flooding and stormwater impacts have been modelled and assessed in the context of the local environment. A Stormwater

Management Plan is being prepared incorporating these findings.

- > Water Sensitive Urban Design (WSUD) for stormwater management and to reduce the risk of flooding:
 - Prioritise reducing impermeable surfaces where possible to reduce overland water flow.
 - Implement rainwater capture and storage to be reused for landscape irrigation.
 - Implement stormwater filtration system to meet or exceed the water quality of the stormwater runoff.

Figure 3 Example of a stormwater filtration device for WSUD



Note that a holistic approach to the onsite water management and landscape design can contribute substantially to reducing the urban heat island effect of the development.

4.4 Healthy Indoor Environmental Quality

The project team has considered design initiatives that support the provision of a healthy, activated, and comfortable indoor environments that focus on improving the health and wellbeing of its occupants. The design is exploring:

- > Façade configurations and glazing selection that provide optimal levels of natural daylight to the residential spaces.
- > Glare mitigation measures through optimising the design for fixed or operable shading devices (including blinds) appropriate to the space.
- > Responsible material selections will be considered to minimise exposure to harmful indoor pollutants such as Volatile Organic Compounds (VOC's) and formaldehyde.

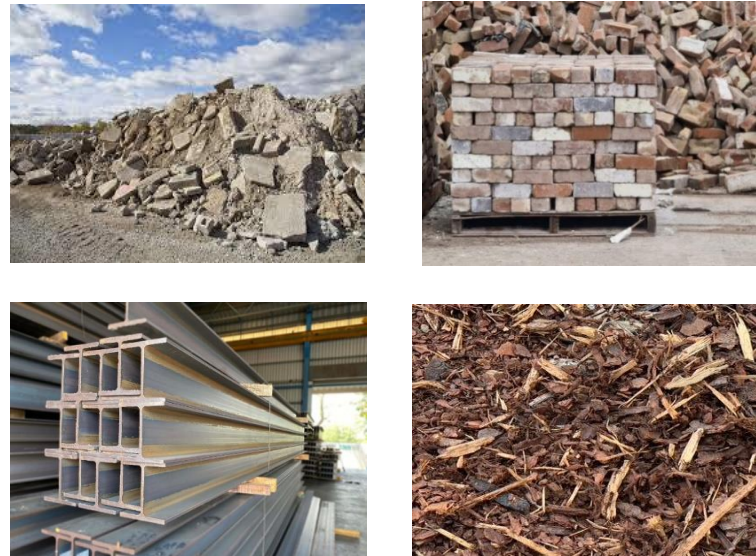
4.5 Sustainable Materials

The project has considered reducing its environmental impacts through responsible materials selection and initiatives with the following:

- > Optimise the building design to minimise material use and use life cycle assessment to guide the reduction of embodied carbon for the design.
- > Design the building and consider construction methodologies for optimum reuse and recyclability of building components.
- > Select materials for low-maintenance and long life to minimise compounding material impacts through repairs and refurbishments over the building's lifetime.

- > Ensure the buildings structure, envelope, systems, and finishes are comprised of responsibly selected products.
- > Potential for prefabricated building components for use in units, where repeating/standardised designs can benefit from prefabricated designs which may present some sustainability, quality, OH&S and cost benefits.
- > Select where feasible recycled and reuse materials, for example recycled bricks, reuse of onsite sandstone for landscaping, rammed earth, etc.
- > Design and construction strategies to prioritise performance and condensation management.

Figure 4 Sustainable material examples: Recycled concrete aggregate (top left); reclaimed brick (top right); recycled steel (bottom left); mulch from felled trees in the surrounding areas (bottom right)



4.6 Waste Management Practice

The project considers a site-specific waste management strategy designed to address both the construction and demolition waste generated from the base building design and operational waste generated from the ongoing retail operations. This waste management strategy will follow the waste hierarchy; i.e. emphasis on avoiding or reducing waste production, and providing options to divert waste from landfill.

Figure 5 Waste Hierarchy – prioritising strategies from the top of the pyramid.



Existing waste collection services from the Randwick City Council include:

- > General waste to landfill (kerbside collection)
- > Commingled recycling: glass, hard plastics, paper and cardboard, and metal (kerbside collection)
- > Food Organics & Garden Organics (FOGO kerbside collection)
- > Household clean-ups for bulky items (1 scheduled collection and 5 collections at request)

- > Special waste streams – e-waste, soft plastics, clothing, polystyrene, batteries, blister packs, x-ray films, whitegoods and metals, and chemical waste (drop off at resource recovery centre)

Leveraging off the council’s waste services, the design is exploring:

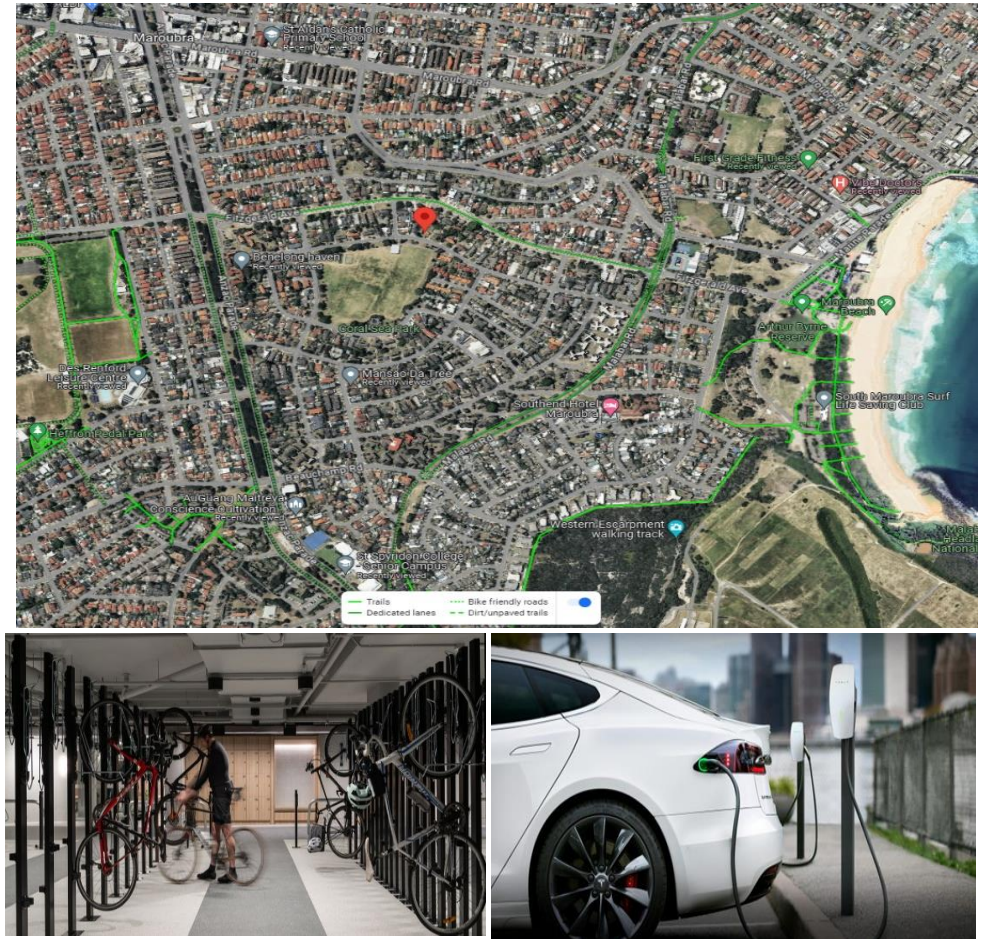
- > Development of a construction waste management plan in line with best practice guidelines. The project is implementing a Construction & Demolition Waste Management Plan that aims to reduce the total amount of waste being sent to landfill when compared against a typical building of its type.
- > Development of an operational waste management plan in line with best practice guidelines. The project is implementing an Operational Waste Management Plan that describes:
 - The identification of the waste streams relevant to the different operational components of the building (e.g. residential, common area use, landscaping and maintenance works), and the individual roles responsible for implementation.
 - Methods for encouraging the separation of waste streams, such as provision of bins, storage areas, or recycling facilities in public areas as required, and labelling of the bins for correct usage.
 - Requirement for the storage areas for all waste streams, and best practice safety and access requirements for their collection. This includes stating the safety methods for vehicle access and transfer of waste.

4.7 Sustainable Transport

The project has a current WalkScore of 72, stating a very walkable neighbourhood with many options for public transportation. Given the proximity of some community amenities, the site can be designed for low carbon transport, such as active transport and the uptake of electric vehicles (EVs). The design has considered:

- > Provision of electric vehicle charging infrastructure for residential carpark
- > Consideration of the capacity of the Sydney metropolitan Radwick City Council local roads, and public transport to safely accommodate the proposed development.
- > Provide secure bicycle storage/parking and maintenance facilities for the building occupants and visitors.
- > Leveraging local micromobility services e.g. Beam e-bicycles and e-scooters, Randwick-Sydney (public) bicycle sharing services, carsharing, etc.

Figure 6 Top: Bicycle routes surrounding the proposed development (red location icon) marked in green taken from Google Maps; bottom left: bicycle storage facilities; bottom right: EV charging infrastructure



4.8 Biodiversity

The existing, immediate site has many significant street trees that are being retained, and it can benefit from the surrounding green cover to reduce the impact of Urban Heat Island effect. It is also situated opposite a public park (Coral Sea Park). Biodiversity management efforts for this proposed development include:

- > Increase planting beyond replacement of the existing (tree) canopy that is being removed for the development.
- > Ecological value assessment has been conducted to maximise flora conservation and enhancement. Preference is being given to flora species that match or are aligned with the endemic species i.e., the Eastern Suburbs Banksia Scrub (ESBS) as discussed with Traditional Owners.
- > Robust construction environmental management plan to minimise impacts to the environment during the construction stage, such as:
 - Erosion and sedimentation control
 - Proper disposal of toxic wastes
 - Procedures for managing toxic spills e.g. from paints and solvents
- > Consideration for biodiversity to be aligned with Water Sensitive Urban Design strategies (for rain- and stormwater management) and Urban Heat Island mitigation (for reducing local heat stresses and shocks).

4.9 Recommended Social Initiatives

As part of an ongoing sustainability vision, it is important to also consider social sustainability initiatives for the wellbeing of the future tenants. Initiatives that are being incorporated for this project are:

- > Engagement with Traditional Elders and co-design this development.
- > Community facilities and programs. The community and outdoor spaces are designed flexibly to allow community events or programs to be held there. The following spaces are incorporated into the design:
 - Community gardens,
 - Children’s experiential play areas, and
 - Two common rooms for the tenants’ use.
- > Responsible and inclusive contractors, with ethical supply chains. The NSW Government Procurement Guide has strategies for responsible procurement and modern slavery requirements.
- > Implement universal design principles for a diverse range of users and abilities adhering to Livable Housing Design Guidelines to all new LAHC dwellings:
 - Gold Level for all social dwellings, and
 - Silver Level for all affordable dwellings

4.10 Sustainable Management Practices

The project team will consider opportunities to deliver best practice environmental management initiatives across the design and construction of the project. The design team will explore:

- > Development of a best practice Construction Environmental Management Plan (CEMP) and formalised management system for implementation during the demolition and construction phases of the project.
- > Design and implementation of Crime Prevention Through Environmental Design (CPTED) principles to increase the safety of the residents and visitors.

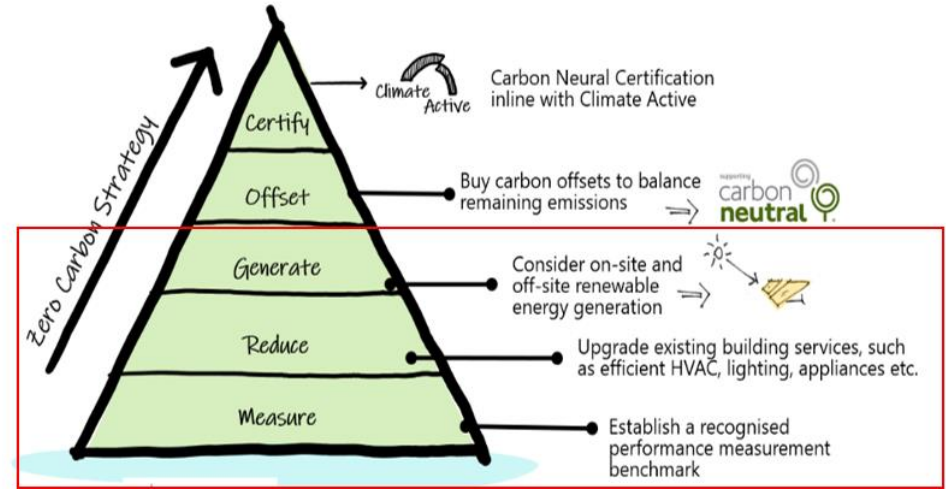
5. Net Zero Plan

5.1 Net Zero Operational Carbon Emissions

In line with the Home NSW’s aspirations for net zero emissions, the project has the opportunity to reduce its greenhouse gas emissions generated by its operational energy use. The following strategy has been proposed as a pathway for the development to aim for this:

- > **Measure:** At a minimum, annual review of the building monitoring system and services efficiencies.
- > **Reduce:** ESD initiatives explored in Section 4 – reduce operational energy and water consumption, encourage behaviour changes to reduce operational waste
- > **Generate:** Onsite PV explored in Section 4.
- > **Offset:** Future Consideration
- > **Certify:** Future Consideration

Figure 7 Net-zero Pathway



6. Conclusion

This ESD Report provides a list of the Environmentally Sustainable Design (ESD) initiatives and addresses the Secretary’s Environmental Assessment Requirements (SEARs) for the project], under Requirement 9 Ecologically Sustainable Development (ESD):

- > The ESD principles (as defined in section 193 of the EP&A Regulation) are described in Section 3. Common themes include passive design, energy and water efficiency, low carbon materials, social equity, and improved economic valuation.
- > The development is meeting the relevant industry recognised building sustainability and environmental performance standards. The sustainability initiatives outlined in Section 4 are based on industry best practice for each category.
- > The development minimises greenhouse gas emissions (reflecting the Government’s goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and material resources. This is addressed in Sections 4 and 5 respectively.

First and foremost, the proposed development will be compliant to NCC 2022 and BASIX requirements. Central to the theme of resource efficiency and minimising greenhouse gas emissions, the proposed development is incorporating the measures stated in Table 3. Improved economic valuation is being incorporated through the design stage by considering:

- > The impacts to the ease of construction, maintenance, durability, and to the environment.
- > Cost-benefit analysis for financial feasibility.

Table 3 Summary of the low carbon measures for energy, water, and materials

ESD theme	ESD measures
Energy efficiency	<ul style="list-style-type: none"> > Passive design for natural lighting, thermal comfort, and cross ventilation (Sections 4.1, 4.2.1-4.2.3, and 4.4) > Active design measures for building services (Sections 4.2.1-4.2.7) > Onsite renewables (Section 4.2.6)
Water efficiency	<ul style="list-style-type: none"> > Low water-use fixtures > Rainwater capture and reuse <p>Both items are discussed in Section 4.3</p>
Material resources	<ul style="list-style-type: none"> > Materials that minimise any adverse health impacts (Section 4.4) > Sustainable building products (Section 4.5) > Waste diversion from landfill (Section 4.6)

Additional ESD measures beyond Table 3 include:

- > Water Sensitive Urban Design (Section 4.3) for stormwater and rainwater management.
- > Healthy Indoor Environment Quality (Section 4.4) to optimise indoor air quality, light, sound, noise, and thermal comfort. This is in alignment with the passive design initiatives in Section 4.2.1
- > Social equity (Sections 4.7 and 4.9) – engagement with the Traditional Elders; responsible sourcing; universal design principles; provision of communal spaces for enjoyment; infrastructure for sustainable and low-carbon transport

- > Biodiversity strategies (Section 4.8) – landscaping considerations to local flora and fauna species, minimise impacts during construction
- > Sustainable Management Practices (Section 4.10) – sound construction environmental practices, and CPTED principles for safety of the building occupants and visitors.



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