



# 35 Waterloo Rd BTR, Macquarie Park

Environmentally Sustainable Design (ESD) Opportunities Report

Prepared for: Goodman Group

**Project No:** SYD2433  
**Date:** 6 September 2023  
**Revision:** 3



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**Project:** 35 Waterloo Rd BTR, Macquarie Park  
**Location:** 35 Waterloo Rd  
Macquarie Park, NSW 2113  
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### Project Team

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**Client / Principal** Goodman  
**Architect** DKO Architecture

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# 1. Introduction

## 1.1 Project Overview

This ESD Opportunity Report is submitted to the Department of Planning and Environment (DPE) in support of a State Significant Development Application (SSDA) (SSD-52947710) for a new build-to-rent housing (BTR) development at 35 Waterloo Road, Macquarie Park (the site).

The proposed development will specifically comprise the following:

- > Site preparation and excavation.
- > Construction of a new build-to-rent development comprising five new buildings ranging between 7 to 20 storeys. Specifically, the following is proposed:
  - > 4361 m<sup>2</sup> of non-residential floor area at ground level, including commercial and retail uses,
  - > 39216 m<sup>2</sup> of build-to-rent housing,
  - > 513 no. dwellings/apartments,
  - > 2,447 m<sup>2</sup> of communal residential amenity facilities located throughout the building.
  - > 417 no. car parking spaces,
  - > 60 no. bicycle spaces,
  - > 0 no. motorcycle spaces (not required under DCP)
- > Provision of a new road along the north-eastern boundary connecting Lane Cove Road and Dirrabari Road.
- > Provision of a new public park and through site link facilitating activation and pedestrian movement throughout the site.
- > Shared basement carparking, comprising a total of 527 car parking spaces, bicycle spaces, and motorcycle spaces.
- > Vehicular access is provided via Waterloo Road and the new road along the north-eastern boundary.
- > Associated landscaping and public domain works; and
- > Augmentation of, and connection to, existing utilities as required.

This report provides a list of Environmentally Sustainable Design (ESD) initiatives & recommendations to be considered for the proposed development.

Following a review of the project brief, site location and architectural drawings, we propose the following areas of sustainability to be explored during the design, construction, and operation of the proposed development:

- > National Construction Code (NCC) 2022
- > Energy & Greenhouse Gas Emissions
- > Water Efficiency and Conservation
- > Healthy Indoor Environmental Quality (IEQ)
- > Sustainable Transport Options
- > Best Practice Waste Management
- > Green Building Certification
- > Net-zero carbon (carbon neutral through procurement of GreenPower and carbon offsets)

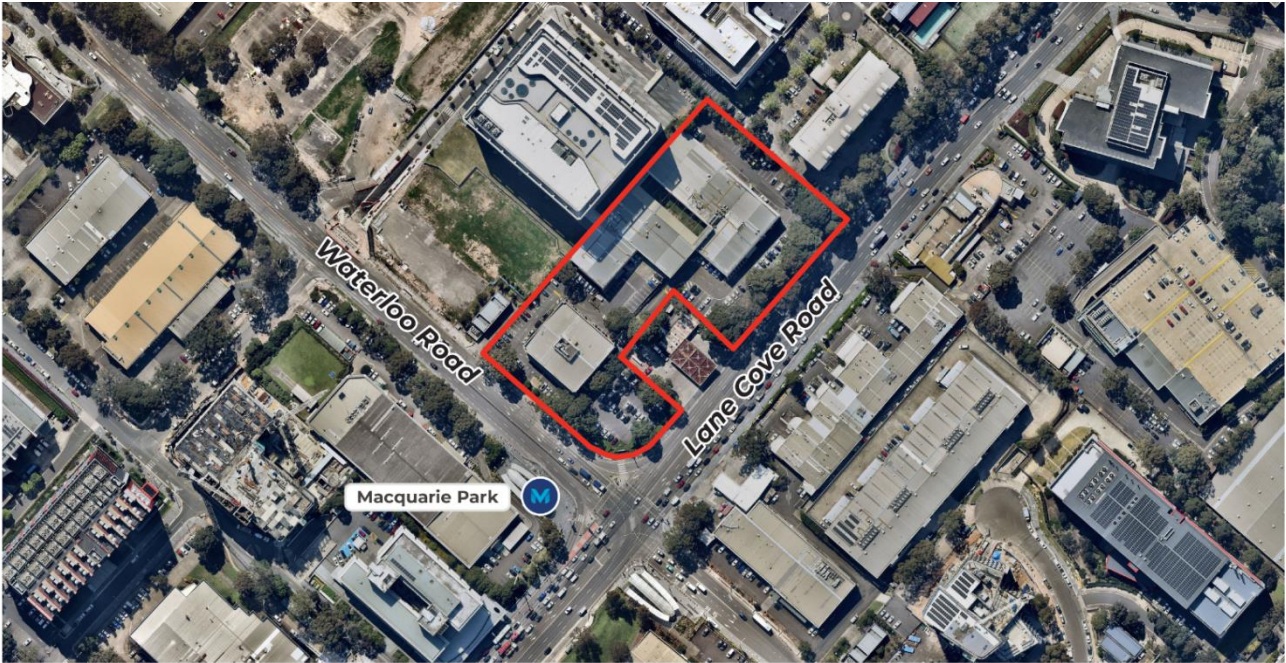
## 1.2 Project Background

The site is located at 35 Waterloo Road, Macquarie Park and is within the City of Ryde Local Government Area. The site is legally described as Lot 5 in DP 1249920 and has a total area of approximately 15,915sqm. It is owned by Goodman and currently comprises the Waterloo Business Park.

The site is situated within the Macquarie Living Station Precinct under the Macquarie Park Place Precinct Strategy. It is located immediately north-west of the Macquarie Park Metro Station and approximately 1km south-east of the Macquarie University Metro Station. A summary of the surrounding development is provided below:

- **North-east:** Immediately to the north-east is the Marriott Hotel. Further north-east is access to the M2 on-ramp and the Lane Cove National Park.
- **South-east:** The site is bounded by Lane Cove Road to the south-east. Beyond that is a range of commercial and light industrial uses for a range of tenants.
- **North-west:** The new Macquarie Square precinct by John Holland Development is located directly to the north-west of the site, which once complete, will comprise 5 commercial buildings, retail and restaurant spaces, and public open space. Further north-west, is the Macquarie Centre, Macquarie University Campus and Metro Station.
- **South-west:** The site is bounded by Waterloo Road to the south-west. Directly adjacent to the road and opposite the site is the Macquarie Park Metro Station.

The site is identified in **Figure 1** below. We note that there is a parcel of land located at the centre of the site, which currently comprises a service station. This parcel of land does not form part of the proposed development. However, the development has been designed accordingly to ensure appropriate integration and interface with the service station and to ensure it is not isolated.



 Site Boundaries



Figure 1: Proposed Development Sites: 35 Waterloo Rd, Macquarie Park, NSW, 2113

The proposed development is to be located within climate Zone 5 (Warm temperate), as identified by the Australian Building Codes Board (ABCB) and consists of the following NCC Classification Types:

Table 1 NCC Classifications for 35 Waterloo Rd, Macquarie Park, NSW, 2113

Level	Usage	NCC Class
Basement Level 2	Carpark	7a
Basement Level 1	Carpark, Resident Amenity	7a, 2/9b
Lower Ground Level	Carpark, Resident Amenity, Retail	7a, 2/9b, 6
Ground Level	Resident Amenity, Retail, Residential	2/9b, 6, 2
Level 1	Residential, Library/Coworking, Gym	2, 9b, 9b
Level 2-3	Residential, Resident Amenity	2, 2
Level 4-19	Residential	2

### 1.3 Relevant Policies and Guidelines

- > City or Ryde Council – Development Control Plan (DCP) 2014
- > Ryde Local Environmental Plan (LEP) 2014
- > Planning Secretary’s Environmental Assessment Requirements (SEARs)
- > Section J provisions of the NCC 2022 Building (BCA) Code of Australia

## 1.4 Documentation

The following documentation has been used to inform this report:

- > 35 Waterloo Rd Architectural Drawings by DKO Architecture dated 16 August 2023
- > BTR industry SEARs Request dated 14 December 2022

## 1.5 Sustainability Targets & Objectives

The primary objectives of the development is to be assets to the local environment and create a positive impact on the surrounding environment and community through its design, in line with the sustainability ambitions of City of Ryde council and the Goodman Group.

The following key targets have been identified for the projects:

### 1.5.1 Minimum Compliance:

#### > **BASIX**

Residential component (Class 2):

- > Energy: 25% energy savings compared to standard benchmark
- > Water: 40% water savings compared to standard benchmark
- > Thermal Comfort: Minimum 7 Star average NatHERS Rating

#### > **NCC Section J**

Commercial and retail component (Class 6 and 9):

#### > **SEARs Requirements**

This ESD Opportunity Report addresses the following relevant Secretary’s Environmental Assessment Requirements (SEARs) set out in the **Table 2** below.

Table 2 Secretary’s Environmental Assessment Requirements relevant to this Report

SEARS	Location in Report
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 2
Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards.	Section 3 and 4.3
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.	Sections 4, 3.3, 3.4 and 3.9

#### > **NSW SEPP**

Minimises the use of on-site fossil fuels, as part of the goal of achieving net zero emissions in New South Wales by 2050.

## 1.5.2 Sustainability Excellence

### Recommended Ratings

- **5 Star** Green Star Buildings rating.

Please see section 3.3 for more detail on Greenstar.

### Optional Ratings

- NABERS for Apartment Buildings
- Greenstar Performance
- WELL Building Standards
- WELL Performance Rating

Please see Section 3.2 for more detail on the above post occupancy rating tools

## 1.5.3 Sustainability at Goodman

Goodman's 2030 Sustainability Strategy is based on three pillars: **Sustainable properties, People and culture** and **Corporate performance**.

From financial year 2022 Goodman's performance review process has also incorporated and tracked progress on the below targets.

- > 400MW of solar PV capacity in operation by 2025
- > 100% renewable energy use within their operations by 2025
- > Carbon neutral operations by 2025

In addition, one of Goodman's 2030 emissions reduction commitments is to reduce their absolute Scope 1 (Natural Gas, Fuels and Refrigerants) and Scope 2 (Electricity) GHG emissions by 42% in total (compared to a 2021 baseline). This is in conjunction and in line with Goodman's Climate Active Carbon Neutral Certification.

There will be many key design decisions which will directly influence progress on these targets and the goal throughout this project will be to ensure these developments actively help Goodman in reaching these targets.

Acknowledging these goals will assist in aligning the projects with Goodmans sustainability vision as well as their tracking, measuring, and reporting requirements.

Further opportunities to maximise the sustainable outcomes of the current design as well as align the project with council, government and Goodman's sustainability goals are highlighted in this report.

## 2. Ecologically Sustainable Development

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

### 2.1 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 and conservation in section 3.4, waste management in section 3.7, local community impacts in section 3.6, 3.8 and 3.10. More general global impact and effects are outlined specifically with regard to; climate change in section 5, Embodied carbon in section 3.9 and ongoing CO<sub>2</sub> emissions in section 3.3 and 4.

### 2.2 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. Section within this report which are particularly pertinent to this point are sections 3.4, 3.5, 3.7 and 5.

### 2.3 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 plant space, retain and preserve though the construction process, where possible, existing habitat. Further consideration on this item is outlined in section 3.4 and 3.5.

### 2.4 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 3.3, 3.4 and 3.7 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 3.7 and 3.9.

Environmental sustainability goals will be established based on industry recognised rating tools such as Green Star and NABERS which are designed to deliver beneficial environmental and social outcomes during construction and operation (*see section 4*).

# 3. Environmentally Sustainable Design (ESD) Opportunities

## 3.1 General

This section outlines Environmentally Sustainable Design (ESD) design measures, in line with the City of Ryde Council DCP requirements as well as Goodman's sustainability pillars, including additional opportunities that are to be considered during the detailed design stage of the project to support these ambitions and targets.

## 3.2 Section J Compliance: Energy Efficiency

The proposed building will be designed in line with the NCC 2022 Section J Energy Efficiency provisions and will consider energy efficient building services and optimised façade performance.

In addition to this, the heating, ventilation, and air-conditioning systems will be developed with a view to minimise the operational energy consumption of the proposed development, whilst providing the building occupants with a thermally comfortable space.

Compliance will be achieved in line with the minimum Deemed-to-Satisfy (DTS) provisions as follows:

- > All window and insulation selections will meet DTS compliance with Parts J1 to J3, establishing the minimum performance requirements for the building fabric.
- > All building services will meet DTS compliance Parts J5 to J8 and establish the minimum performance for mechanical and electrical systems (including fan and pump efficiency), lighting and ancillaries.

## 3.3 Energy & Greenhouse Gas Emissions Reduction

The project team will explore 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.

### 3.3.1 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:

- > Provision of high-performing double-glazed 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 appropriately placed external shading devices to all façades providing protection from solar irradiance experienced from the high-angle summer sun.
- > Provision of high levels of insulation to the external walls, roof, and exposed floorings that form part of the building envelope.

- > Optimisation of window to wall ratios to all facades of the lower-level non-residential areas.

### 3.3.2 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 can aim to make the HVAC system more efficient.

- > Allow for operable windows for apartments and other spaces that are occupied by people to reduce the need for mechanical ventilation and air conditioning.
- > Select high-efficiency HVAC systems for conditioned spaces and configure for optimum performance including the following features:
  - Space option for Highly efficient water-cooled chillers with cooling towers and heat pumps configured for optimum performance.
  - Base option of cooling towers coupled with water cooled VRV
  - Demand-controlled ventilation, utilising temperature, and CO2 sensors.
  - Heat Recovery Ventilation
  - Economy Mode Ventilation
- > Select HVAC equipment that is suitable for low-Global Warming Potential refrigerants (GWP < 10) to minimise the risk of emissions through refrigerant leakage.
- > Provision of outside air to all occupied spaces, exploring opportunities to provide increased fresh air provisions to occupants, optimising their indoor health and wellbeing. Outside air flow rates can be monitored by the building control system and opportunities for CO2 sensors will be considered
- > Heat-recovery ventilation to pre-heat cold air in winter and potentially offset additional heating loads.
- > Explore the use of ceiling fans in residential apartments, helping to offset/supplement AC system usage and improve ventilation.
- > Explore the feasibility of ground source heat pumps noting Refrigerant Heat pumps typically have greater GWPs as they are a blend of HFO and R410a.

### 3.3.3 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 considerations in the design phase.

- > Reduce the need for artificial lighting by introducing sunlight through sufficiently size glazed windows.
- > Select high-efficiency LED lights to provide adequate lighting levels and colour rendering with minimal energy expenditure.
- > Consider careful design of daylighting controls to adjust electric lighting in response to daylight levels without causing undesirable noticeable switching effects or interactions.
- > Use of motion sensors and light sensors to ensure lighting is automatically dimmed or switched off when not required.
- > Consider Whole-of-Life impacts such as maintenance costs and access for easy maintenance in practice may also be considered.

### 3.3.4 On Site and Off-site Renewables

On-site solar photovoltaic (PV) generation and GreenPower purchasing will be explored as an effective method to assist with greater reductions in greenhouse gas emissions, helping to minimise the developments electricity consumption from the grid and offset any associated operational greenhouse emissions.

The project will consider:

- > Provision of most appropriate Photovoltaic (PV) cells and system to be located on the building envelope of the development. We will explore the systems size and capacities that can be generated from specific orientations to the north, west and east to avoid overshadowing. We will consider a combination of different options, layouts, and orientations to optimise performance whilst considering the constrained space, orientation and aesthetics of the project.
- > Greenpower purchasing to assist with further offsetting the development's greenhouse gas emissions. The project has the opportunity to purchase eligible offset units to support certified carbon offset projects (such as the Yarra Yarra Biodiversity Corridor) to compensate for emissions that cannot be completely reduced through energy efficient design or the generation of on-site renewable energy.



Figure 2: Solar installation example

### 3.3.5 Metering & Monitoring

An important aspect for any new development, allowing building owners to measure and quantify sustainability metrics, inform rating tools, give the ability to back charge/invoice retail or commercial tenants and be used as a feedback mechanism on sustainability initiatives.

- > The project will consider energy monitoring at the distribution level to identify main energy consumption factors and any building components that are associated with energy leakage/wastage.
- > The project will consider a site-specific metering strategy to monitor and provide feedback on distinct energy use and water consumption within the building.
- > The metering strategy will aim to monitor the following major systems:
  - Incoming electrical mains supply
  - Incoming water mains supply
  - Electrical supply and thermal meters to distinct areas and uses (i.e., sub metres for retail spaces)

- Lighting systems
  - Air conditioning systems
  - Large individual equipment loads that exceed 5% of the total energy use (or over 100kVA)
  - Large water use that consumes more than 10% of the total water uses
- > Smart Metering: Opportunities to incorporate smart meters within the building design. This will allow for assessment and evaluation of the building energy and water consumption at hourly intervals. This will provide ongoing feedback in real time to the facilities management (daily) for monitoring and tenant billing purposes.
- > Smart home integration: Opportunities to incorporate smart home integration within the residential unit design. The potential implementation of and use of dashboard style apps by occupants. This will allow individual occupants to assess and keep track of the operation of their unit's energy and/or water usage as well as potential operation of basic home automations.

### 3.3.6 Domestic Hot Water

An area which affects both energy (Gas or Electricity) usage as well as water usage, the project will consider the below:

- > Consider opportunities to provide hot water via electric heat pump with high efficiency.
- > Pipes to be insulated to reduce heat loss as the hot water is distributed which means less energy is consumed as the water temperature can be lowered.

### 3.3.7 Facilities

The project will consider the below facilities/amenities which will assist in the reducing electricity consumption from individual residences.

- > Implementation of clothes lines within apartments (line in bathroom, laundry room or on balcony), mitigating overuse/unnecessary use of clothes driers.
- > Explore potential implementation of communal laundry facilities.

### 3.4 Water Efficiency & Conservation

On a large development such as this there are many different water using components, the below points highlight how these can be reduced, how the necessary water using components can be more efficient and how alternate water sources can be promoted.

- > A reduction in potable water use, through the installation of highly efficient fittings and fixtures. To prevent water waste, potable water flows will be reduced in line with the WELS certified taps, showers, and toilets.
- > A selection of highly efficient whitegoods (such as dishwashers in break out points) will be considered in line with a water efficient WELS Star rating.
- > Opportunities to provide fire protection systems that ensure test water is either collected, stored, and re-used or recirculated.

The site and proposed development cover a substantial area, will consist of many hard surfaces and have a landscaped portion of the outdoor areas. It has therefore been important to consider rainwater collection, stormwater management and landscape design that considers these two aspects. The below points outline sustainability initiatives that these aspects of the design will consider:

- > Ongoing rainwater capture and storage will be explored. The project team will undertake a rainwater capture assessment during the detailed design to confirm feasibility of roof run off areas.
- > Where feasible rainwater re-use will be considered for landscape irrigation to all green areas and landscaping surrounding the development and within the site boundary.
- > Where feasible rainwater re-use will be considered for toilet flushing and clothes washing.
- > The provision of low water or drought resistant and native planting for all green spaces.
- > Consider integration of the centralised water feature into the sites overall storm water management plan, opportunity to have storm water feed/supply the water feature/bioretention basins.
- > Consider an integrated approach regarding landscaping irrigation and the centralised water supply, opportunity for excess irrigation to feed the water feature and/or for the water feature to seep water (Sub-irrigate) for irrigation to surrounding gardens.

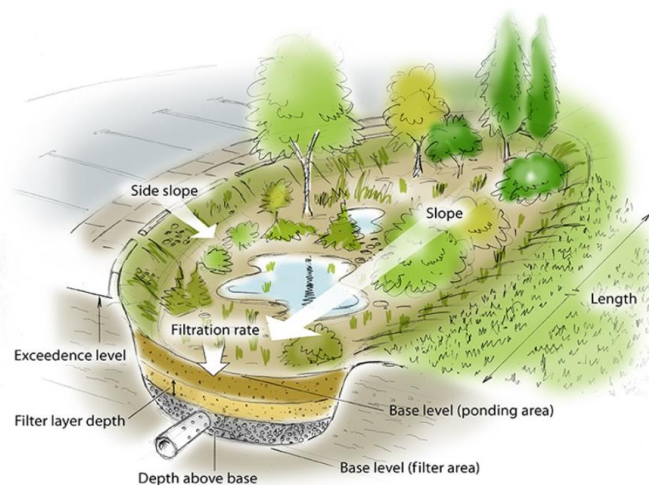


Figure 3: Bioretention system examples

- > Water Sensitive Urban Design (WSUD) Techniques and principles will be explored to help manage stormwater run-off and pollution.
- > Provision of dual piping to all suitable end-uses and connection to rainwater harvesting
- > Flooding and stormwater impacts will be modelled and assessed in the context of the local environment and a Stormwater Management Plan will be prepared.
- > Shading devices and or canopy cover provided by plants will reduce evaporation from the water feature.

Noting 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. See section 5 for more detail on why reducing head island effect is important.

Through retaining water for longer on site through bio retention systems, water features, strategic storm water runoff channels as well as increase ground cover via shading and planting.

### 3.5 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:

- > Opportunities to set environmental targets, including a commitment to monitor and measure the buildings environmental performance, such as energy, water, waste, or indoor environmental quality.
- > Independent commissioning activities including the provision of a 12-month building tuning service for the projects nominated systems (following practical completion)
- > Development of an owner's Building Users Guide, ensuring access to select building user information for all tenants and building occupants.
- > 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.

### 3.6 Healthy Indoor Environmental Quality

The project team will consider 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 many of these are related to consideration around HVAC and building fabric design. The design will explore:

- > Façade configurations that provide optimal levels of natural daylight to the residential spaces
- > Glazing selections that allow for high levels of Visual Light Transmission (VLT), flooding the space with useful daylight levels throughout the day
- > Glare mitigation measures through optimising the design for fixed or operable shading devices (including blinds) appropriate to the space.
- > The ventilation system will be designed to mitigate the entry of outdoor pollutants and will provide access points for ease of maintenance and cleaning. The project will ensure that all relevant ductwork will be cleaned prior to occupation and use.
- > Strategies will be investigated to remove pollutants from the conditioned space directly to the outdoors. Examples of this may include separate kitchen and toilet exhausts and where applicable pollutants from photo copiers and multi-functional devices (MFD). Additional Filtration options (above the minimum requirements) will also be considered as part of the design.
- > HVAC operational strategies will be investigated to provide Improved levels of thermal comfort across the residential and retail spaces. Where possible the project team will seek to meet the Predicted Mean Vote (PMV) thermal comfort values for occupant satisfaction
- > Responsible material selections will be considered to minimise exposure to harmful indoor pollutants such as Volatile Organic Compounds (VOC's), formaldehyde from engineered wood and PVC.
- > Potential to design portions of carpark basements with exposure to ground plane for increased ventilation.
- > Given the site's proximity to a service station, an Air Quality Assessment will be undertaken to evaluate and outline measures to minimise and mitigate the impact on air quality for future residents, particularly from the adjacent service station and potential emissions.

### 3.7 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. The design will explore:

- > Development of a construction waste management plan in line with best practice guidelines. The project will look 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 that will include initiatives that:
  - Identify the waste streams relevant to the different operational components of the building (i.e., retail spaces), and the individual roles responsible for implementation.
  - Set diversion from landfill targets and/or targets for reducing total materials generation (general waste materials and recyclable/reusable materials), as well as monitoring and measurement procedures for waste and recycling streams by weight.
  - Outline methods for encouraging the separation of waste streams, such as bins, storage areas, or recycling facilities in public areas as required.
  - Identify storage areas for all waste streams and outline best practice safety and access requirements for their collection.
  - Identify safe methods for vehicle access and transfer of waste.
  - Incorporate a review process to assess the success of the Operational Waste Management plan and make improvements, based on operational experience.
  - Where feasible implementation of biodigester and/or composting programs, for use on organic waste products.



Figure 5: Waste Hierarchy



Figure 6: Waste Stream examples

### 3.8 Sustainable Transport

The project is located at the heart of Macquarie Park and is surrounded by good levels of public transport access and connection (such as Macquarie Park and Macquarie University metro Stations). To complement this, the project team will consider opportunities to reduce the use of personal car use and promote active transport alternatives. The design will explore:

- > Provision of electric vehicle charging infrastructure for residential and commercial carpark
- > Consideration of the capacity of the regional and local roads, and public transport to safely accommodate the new development will be considered. (Transport Management and Access Plan, Traffic Impact Assessment and Green Travel Plan)
- > Provide secure bicycle storage/parking and maintenance facilities for the building occupants and visitors.
- > Mapping out of current and proposed cycling routes may support usage within Macquarie Park and surround suburbs.
- > Provide active transport facilities, including end of trip showers and lockers to promote healthy commuting for commercial and retail workers.
- > Provision for car spaces dedicated to/for car share services.
- > Potential for communal/share bike or scooter services integration with any bike storage and workshop spaces.

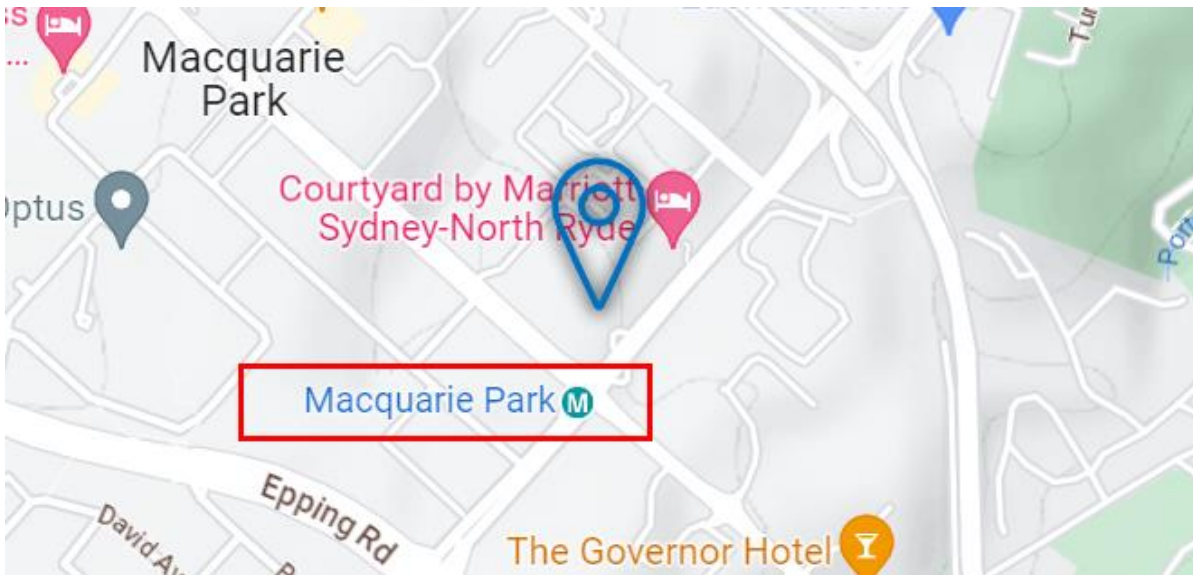


Figure 7: Site location with reference to local transportation options

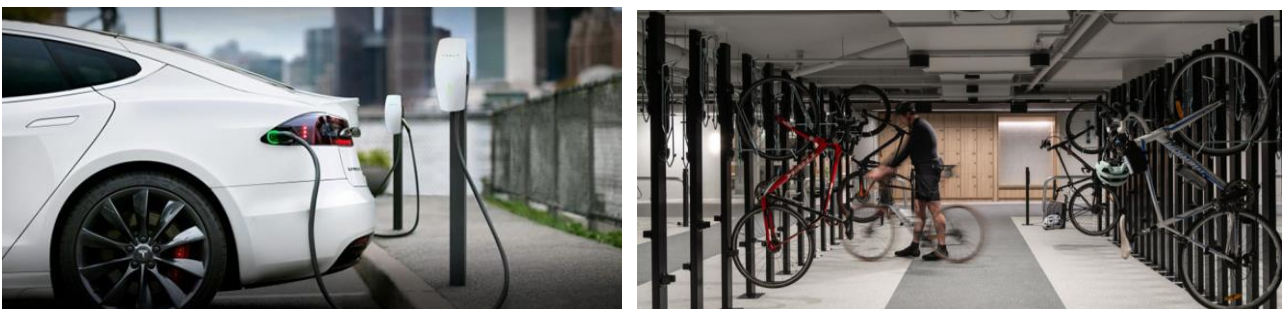


Figure 8: Sustainable transport alternatives (Electric vehicles and cycling)

### 3.9 Materials

The project has the opportunity to consider reducing its environmental impacts through responsible materials selection and initiatives, The design aim to:

- > Optimise the building design to minimise material use.
- > 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.
- > Select low-embodied or carbon-neutral materials for example green concrete, terracotta/ceramic cladding, CLT for smaller buildings.
- > Explore high performance and/or passive performance materials.

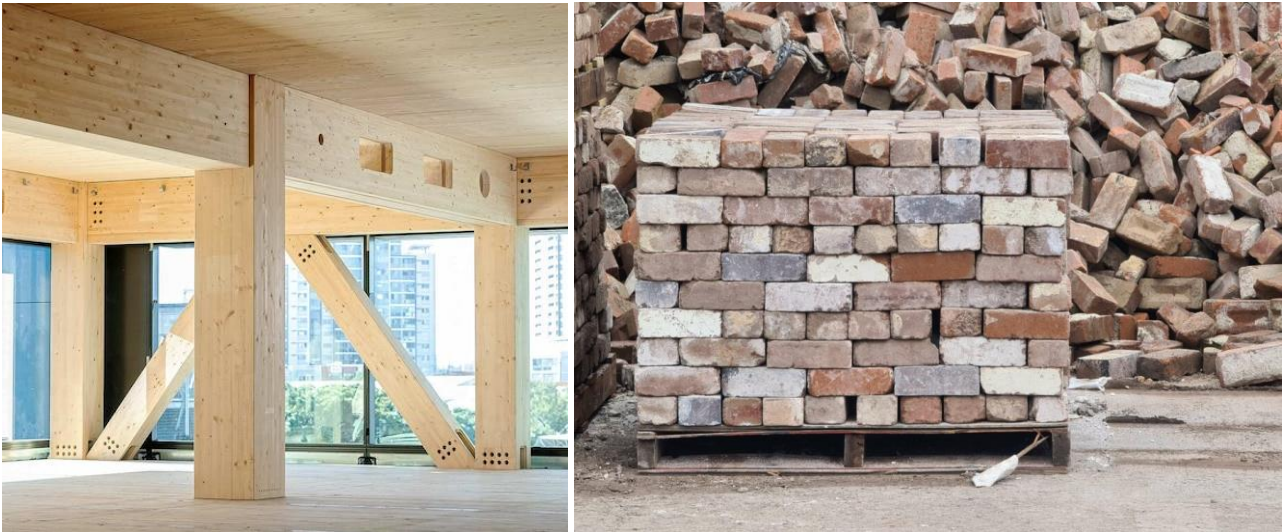


Figure 9: Sustainable material examples: Cross laminated timber and Reclaimed Brick

### 3.10 Recommended Social Initiatives

As part of an ongoing sustainability vision, it is important to also consider social sustainability initiatives, which may or may not fall under ADP scope. Initiatives that we see relevant to the site are:

- > Engagement with Traditional Elders and subsequent design incorporation.
- > Community facilities and programs. Some spaces might be designed flexibly to allow community events or programs to be held there.
  - Examples include; Community gardens, composting areas on the roof areas, Games area.
- > Responsible and inclusive contractors, with understood and ethical supply chains. Procurement and contractor questionnaires to establish their “green” credentials. Green Star also provides a framework to judge contractors for their procurement strategies – e.g., responsible procurement and modern slavery requirements.
- > Inclusive and wheel-chair accessible design and encouraging stair use for able bodied patrons.
- > Engagement with City of Ryde Council. Potential for council led groups to engage via events and workshops, in the site’s community garden spaces.



Figure 10: Implementation of indigenous design at Ngarara Place at RMIT Melbourne

# 4. Net Zero Plan

## 4.1 Net Zero Operational Carbon Emissions

In line with the NSW's commitments to achieve net zero emissions by 2050 as well as the preservation of Goodman's Carbon Active Carbon Neutral Certification, the project has the opportunity to reduce and offset its greenhouse gas emissions generated by its operational energy use. The following strategy has been proposed as a pathway for the development to achieve net zero certification:

- > **Measure:** Recommended post occupancy rating tool (NABERS Apartment, Greenstar Performance etc.)  
See section 1.5.2
- > **Reduce:** ESD initiatives and Greenstar Buildings
- > **Generate:** Onsite PV
- > **Offset:** Future Consideration
- > **Certify:** Future Consideration

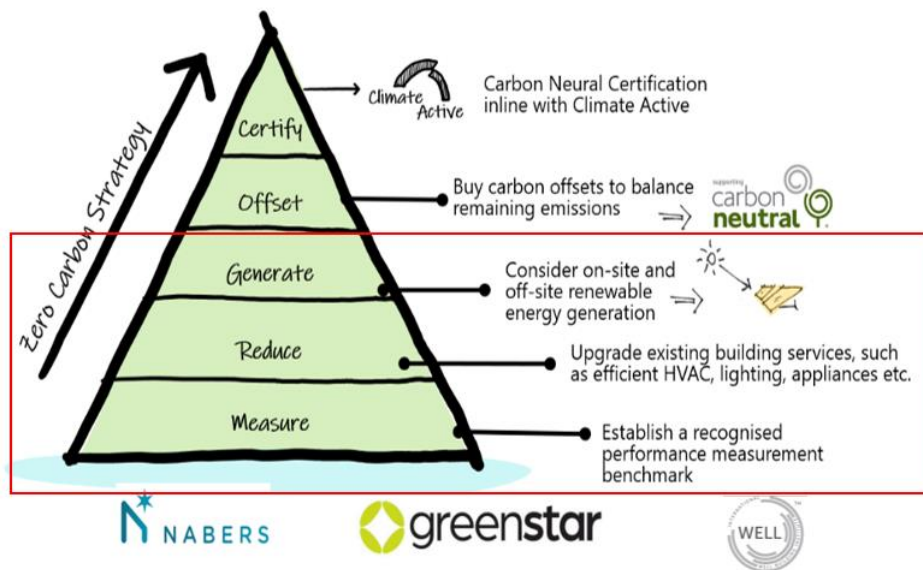


Figure 11: Net-zero Pathway

## 4.2 Ongoing rating tool

As outlined in section 1.5.2, ongoing certification will assist in monitoring performance measures overtime, giving the ability for building operators to course correct and improve overtime.

Ongoing rating tools which may be appropriate for this development include:

- > **NABERS for Apartment Buildings**

NABERS ratings for apartment buildings quantify your building's energy and water performance. Rating from one to six stars, based on the energy and/or water use of shared services such as car parks, lobbies and gyms.

> **Greenstar Performance**

Greenstar Performance provides a framework for projects to track and progressively improve their operational performance. Initial certification acts as a benchmarking exercise and subsequent certifications facilitate the creation of clear goals and a process to improve over time.

> **WELL Performance Rating**

Informed by the WELL Building Standard, the WELL Performance Rating focuses on measurable building performance strategies that are verified through onsite testing and sensor technology. Performance measurements cover air, light and water quality as well as thermal and acoustic comfort.

Items which will contribute positively to the ongoing building performance and any ongoing rating that are considered as part of the design process include:

- > High-performance building façade
- > Energy efficient HVAC selections and system
- > Energy efficient lighting designs
- > Improved operations and control of the nominated building systems
- > On-site renewable system – Photovoltaic cells

### 4.3 Green Star Buildings

The project team will consider the target of a 5 Star Green Star Buildings Certification in line with the proposed ESD strategies outlined in the previous subsections of this report.

Based on a future review of the projects concept design documentation, an initial Green Star Assessment using the Green Star Buildings tool can be undertaken. Outlining potential credits and preliminary scores that can be identified.

Table 3 Green Star Strategy categories & available Points

GS Category	Available Points
Responsible	17
Healthy	14
Resilient	8
Positive	30
Places	8
People	9
Nature	14
Leadership	-
<b>Total</b>	<b>100</b>

#### **4.3.1 Energy use**

The project should aim to achieving Credit Achievement in the Energy use credit for the whole building design to demonstrate sustainability above minimum requirements for Green Star. This can be achieved in in line with the ESD strategies provided in the report.

#### **4.3.2 Water use**

The project team should consider an opportunity to target Credit Achievement in Water use credit for whole building, in line with the proposed ESD strategies outlined in the previous subsections of this report.

#### **4.3.3 Upfront Carbon emissions and other carbon Emissions**

The project team should target 10% reduction in upfront carbon emissions when compared to a reference building. Also, the project team should consider an opportunity to offset 100% of carbon emissions from refrigerants and target Credit Achievement for other carbon emissions credit.

## 5. Climate Change Resilience

The Waterloo Rd, Macquarie Park BTR's aims to create a resilient environment for the occupants and its local surroundings. Climate change resilience is an important objective to address in the design development stage of the project. The following climate change projections have been identified from the NARClIM projected data for the site:

### 5.1 Climate Projection: Near and Far Future

#### 5.1.1 Increased Temperatures:

Climate projects show an annual mean temperature increase of 0.7°C in the near future 2030 and 2.1°C by 2030 it is projected to experience an average of 4 more days above 35°C per year and continue to rise to 11 days per year by 2070. By 2030 it is projected to experience an average of 5 fewer nights below 2°C per year and continue to decrease by 12 nights per year by 2070.

#### 5.1.2 Increased Rainfall

Although the annual rainfall is projected to have little change (+4%) by 2020, it is expected to increase by +6.5% by 2070 and be more erratic throughout the year. More summer and autumn rains would become the norm.

### 5.2 Design Recommendations

Macquarie Park region can expect higher temperatures and more hot days over the coming years. More wet summer and autumn days will mean higher humidity to deal with. The following risk items will be analysed in the design development of the project:

- > Undertake a comprehensive review of the acute shocks and chronic stresses likely to influence future building operations and address them in design and future operational plans.
- > Design to maintain the building's a level of survivability and design purpose in a blackout.
- > Future climate files to be used for mechanical sizing to account for higher temperatures, higher humidity, and frequent hot days.
- > Maximise passive heating and cooling in the building to reduce energy usage when weather conditions are not extreme.
- > Utilise water sensitive design strategies to address increased rainfall like increased ground permeability, hardy native planting, swales, responsible stormwater, and rainwater discharge.
- > At least 75% of the whole site area comprises of one or a combination of strategies that reduce the heat island effect to improve local environment and outdoor thermal comfort in the surroundings such as:
  - Increased green cover.
  - Light colour roof and shading material or finishes with low SRI.
  - Shading pavement areas
  - Include water features.
- > Create grid resilience by designing infrastructure to deliver an appropriate demand response strategy or utilising active generation and storage systems on site if found suitable for the project.



# 6. Consultants Declaration

## Consultant Declaration Form

PROJECT DETAILS	
PROJECT NAME	
Application number	SSD-52947710
Address of subject land	35 Waterloo Road, Macquarie Park
Lot / DP	Lot 5 in DP 1249920
APPLICANT DETAILS	
Applicant name	Goodman
Applicant address	1-11 Hayes Road, Rosebery NSW 2018
REPORT DETAILS	
Name of report this declaration relates	35 Environmentally Sustainable Design Opportunities Report
Report reference no.	N/A
Report date	06/09/2023
Company name (inc. ABN / ACN)	ADP Consulting (81139719529)
Author name	Jacob Delailoa
Author qualifications	ESD Consultant
Author address	L6/33 Erskine St, Sydney
DECLARATION BY CONSULTANT	
Name	Stephen Drane
Registration no.	2906543

PROJECT DETAILS

Organisation registered with Engineers Australia

Declaration

The undersigned declares that this infrastructure report:

- has been prepared in accordance with the following legislative requirements:
  - Australian Standards
  - Secretary's Environmental Assessment Requirements (SEARs)
  - National Construction Code 2022
- contains all available information relevant to the environmental assessment of the development, activity or infrastructure to which the EIS relates;
- does not contain information that is false or misleading;
- addresses the Planning Secretary's Environmental Assessment Requirements (SEARs) for the project;
- identifies and addresses the relevant statutory requirements for the project, including any relevant matters for consideration in environmental planning instruments;
- has been prepared having regard to the Department's State Significant Development Guidelines;
- contains a simple and easy to understand summary of the report, including:
  - the condition of the existing environment;
  - the ability to avoid, mitigate and/or offset the impacts of the project having regards to:
    - > mitigation measures incorporated into the detailed design of the project (e.g. changes to the project area, project layout and design, key uses and activities carried out on site, timing)
    - > other mitigation measures that will be implemented
    - > any negotiated agreements or offsets proposed to address any residual impacts of the project following mitigation
- the scale and nature of the predicted impacts, including any cumulative impacts, and whether these impacts will comply with the relevant statutory requirements, standards or performance measures;
- key uncertainties associated with the assessment (e.g. lack of baseline data, doubts about the effectiveness of the proposed mitigation measures, limitations of the methodology used to predict impacts, lack of agreed criteria for evaluating impacts);
- the proposed measures to deal with these uncertainties (e.g. monitoring, review, further technical investigation, staging, adaptive management).

Signature



Date

06/09/2023

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