

# Ecologically Sustainable Development (ESD) Report

1 Barrack Lane and 81-83 George Street,  
Parramatta

State Significant Development Application

Project No.	P01866
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**E-LAB Consulting**  
Where Engineering and Science Inspire Design.



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04				

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### Authorised by:

Engineering Lab NSW Pty Ltd



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We recognise the Traditional Custodians of the land on which the proposed development will be constructed. We respect their enduring cultural and spiritual connections to the land and waters, and celebrate their knowledge, kinship, and values. We acknowledge that these connections to the land and waters have existed for millennia and will continue into the future. We respect the Elders who have gone before, together with those of today for their guidance on our shared journey. We recognise that we are, and always will be, on Aboriginal land.

# EXECUTIVE SUMMARY

This Ecologically Sustainable Development (ESD) Report has been prepared by E-LAB Consulting to accompany the State Significant Development Application (SSDA) for the 1 Barrack Lane and 81-83 George Street, Parramatta development. The proposed development seeks approval for the demolition of existing site structures and the construction of a 40 storey mixed use development including build to rent (BTR) housing.

The development's governing ESD principles and performance requirements are in alignment with the following planning frameworks, legislative policy, guidelines and the like:

- State Environmental Planning Policy Sustainable Buildings 2022 (Sustainable Buildings SEPP 2022).
- NSW Environmental Planning and Assessment (EPA) Regulation 2021.
- City of Parramatta Development Control Plan (DCP) 2023.
- City of Parramatta Local Environmental Plan (LEP) 2023.
- NCC 2022 Section J Energy Efficiency Part J4 Building Fabric.

In response to the above, the ESD initiatives and commitments which have been implemented for the development include the following:

- Exceeding the BASIX requirements of the Sustainable Buildings SEPP 2022, as well as achieving the increased BASIX targets of the High Performing Building Design provisions under Part 7 Division 5 Section 7.25(3) of the Parramatta LEP 2023:
  - **BASIX Energy 78%.**
  - **BASIX Water 55%.**
- Delivering a high level of thermal performance, demonstrated through a **7 star average and 6 Star minimum NatHERS rating** across the development.
- Implementing **Volumetric Modular Construction (VMC)**, lowering embodied energy, improving resource efficiency, enhancing building performance, and reducing the environmental impact throughout the lifecycle of the development.
- **WELL for Residential Program commitment** as an innovative initiative for improving health and wellbeing.
- **Green Star Buildings Principles** adopted, achieving performance outcomes consistent with **Australian Excellence** benchmarks.
- Incorporating a wholistic range of sustainability initiatives across the site spanning **energy efficiency, water efficiency, indoor environment quality, waste management and comfort.**

# 1 INTRODUCTION

E-LAB Consulting has prepared this Ecologically Sustainable Development (ESD) Report to accompany the State Significant Development Application (SSDA) for the 1 Barrack Lane and 81-83 George Street, Parramatta development. The proposed development seeks approval for the demolition of existing site structures and the construction of a 40 storey mixed use development including build to rent (BTR) housing.

The content of this report is based on the Revision A SSDA Submission architectural documentation issued by FK Architecture dated the 7<sup>th</sup> of October 2025.

## 1.1 PROJECT OVERVIEW

The SSDA seeks development consent for the demolition of existing structures and the construction of a 40 storey mixed use development with ground floor retail and a build-to-rent (**BTR**) tower. Specifically, the proposal comprises the following:

- The demolition of existing site structures and the removal of two trees.
- The construction of a forty storey mixed-use development comprising:
  - Site preparation works including preparatory earthworks.
  - A three storey podium including:
    - Ground floor: a flexible retail area and a retail tenancy, a build-to-rent lobby and management area, services and waste rooms, separate vehicle entries for residential use and service use, 4 parking spaces for service vehicles, bike repair facilities and 40 bicycle parking spaces.
    - First level: 32 car parking spaces, inclusive of 2 accessible spaces, 214 bicycle parking spaces, 7 motorcycle parking space, a residential storage area and services.
    - Second level: 39 car parking spaces, inclusive of 2 accessible spaces, 170 bicycle parking spaces, 7 motorcycle parking spaces, a residential storage area and services.
    - Upper podium level providing communal open space and amenities.
  - A thirty-seven (**37**) storey residential tower incorporating 383 BTR units.
- Installation of a new substation and infrastructure connections as required.
- Associated landscaping and public domain works.
- Extended hours of construction.

## 1.2 SITE DESCRIPTION

The Site is located at 1 Barrack Lane and 81-83 George Street within the City of Parramatta Local Government Area (LGA), in close proximity to the Parramatta Train Station, Westmead & Carlingford Light Rail Line, Parramatta Ferry Wharf, and the future Parramatta Metro Station.



Figure 1 Site Aerial (Source: SixMaps)

## 2 GOVERNING ESD FRAMEWORKS & POLICIES

The development's guiding principles and overall performance has been designed in alignment with the following planning frameworks, legislative policy, guidelines and the like:

- State Environmental Planning Policy (Sustainable Buildings) 2022 (Sustainable Buildings SEPP 2022) – Section 2.1.
- NSW Environmental Planning and Assessment (EPA) Regulation 2021 – Section 2.2.
- City of Parramatta Development Control Plan (DCP) 2023 – Section 2.3.
- City of Parramatta Local Environmental Plan (LEP) 2023 – Section 2.4.
- NCC 2022 Section J Part J4 compliance – Section 2.5 & Section 7.
- WELL for Residential Certification – Section 2.6 & Section 5.
- Green Star Buildings v1 Certification Section 4.

## 2.1 STATE ENVIRONMENTAL PLANNING POLICY (SEPP) SUSTAINABLE BUILDINGS 2022

The Sustainable Buildings SEPP 2022 was introduced by the NSW Department of Planning, Housing and Infrastructure to consolidate the approach to sustainable building design and to move closer to a net zero emission future and sets requirements for both residential and non-residential developments.

### 2.1.1 Residential Development

The Sustainable Buildings SEPP 2022 sets Building Sustainability Index (BASIX) targets that the residential portions of the development must meet. BASIX is a legislative requirement for all residential dwelling types within NSW to assess the potential performance of certain residential buildings against a range of sustainability indices including energy and water reduction targets relative to the NSW average benchmark as well as thermal comfort and embodied emission performance targets.

The residential spaces in the development must meet the following BASIX targets according to SEPP 2022. The project has also committed to meeting the High Performing Building Design requirements under Part 7 Division 5 Section 7.25(3) of the Parramatta LEP 2023 (see Section 2.4).

- BASIX Energy: **78%** (SEPP minimum 63% + LEP High Performing Building Design 15%).
- BASIX Water: **55%** (SEPP minimum 40% + LEP High Performing Building Design 15%).
- Meet Thermal Comfort requirements.
- Material reporting through the BASIX Materials Index.

Refer to Section 6 and the BASIX Report that accompanies this submission for details on how the targets are met.

### 2.1.2 Non-Residential Development

All **Non-Residential Development** components of the project must:

*Table 1 Sustainable Buildings SEPP Non-Residential Response*

Part	Requirement	Response
1(a)	Minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials,	Refer Section 3.5 highlighting a 90% diversion rate of construction and demolition waste from landfill.
1(b)	Reduction in peak demand for electricity, including through the use of energy efficient technology,	Refer Section 3.3 which discusses reduction in electricity and energy through efficient systems and monitoring.
1(c)	Reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design,	Refer Section 3.3 for energy efficiency initiatives.
1(d)	Generation and storage of renewable energy,	Solar PV generation potential to be investigated and incorporated into the design.
1(e)	Metering and monitoring of energy consumption,	Refer Section 3.3 discussing energy metering and monitoring requirements for the development.
1(f)	Minimisation of the consumption of potable water.	Refer Section 3.4 discussing the efficient systems in place to minimise water use and the strategies in place to recycle water throughout the development.
2	Quantification of the embodied emissions attributable to the development using the NABERS tool disclosed at development application and construction certificate stages.	The development will declare materials for embodied emissions reporting through the NABERS Embodied Emissions Reporting form.

## 2.2 EPA PRINCIPLES

The 1 Barrack Lane and 81-83 George Street, Parramatta development will embed ecologically sustainable design principles throughout the design, construction, and operation of the development. The principles of Ecologically Sustainable Development to which the development should generally adhere to are defined within Part 8, Division 5, clause 193 of the NSW EPA Regulation 2021 as.

*(2) **The Precautionary Principle** is 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.*

*(3) In applying the **Precautionary Principle**, public and private decisions should be guided by—*

*(a) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and*

*(b) an assessment of the risk-weighted consequences of various options.*

**Development Response:** The project will employ proactive environmental protection measures and undertake risk assessments to ensure no irreversible environmental harm is acted as a result of the construction or operation of the development.

During construction, it is intended the main contractor will implement an independently certified Environmental Management System (EMS) to a recognised standard such as AS/NZS ISO 14001, that will demonstrate a formalised systematic and methodical approach to planning, implementing and auditing for environmental management. During operation, adherence to procedures that account for environmental risk and mitigation measures will be met.

*(4) **Inter-generational Equity** is that the present generation should ensure the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.*

**Development Response:** The project will ensure no irreversible environmental harm is acted as a result of the construction or operation of the development. The design team will address key elements such as energy, potable water and resource/material consumption to do all which is within the project's control to ensure future generations have equal opportunity and access to the environment.

*(5) **Conservation of Biological Diversity and Ecological Integrity** is that the conservation of biological diversity and ecological integrity should be a fundamental consideration.*

**Development Response:** The pre-developed site can be considered to have low-ecological value and biodiversity significance. The project is committed to planting native vegetation and using integrated landscaping to enhance the overall ecological and biodiversity of the site. Rainwater and stormwater will be carefully managed and controlled to minimise impacts on surroundings.

*(6) **Improved Valuation, Pricing and Incentive Mechanisms** is that environmental factors should be included in the valuation of assets and services, such as—*

*(a) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,*

*(b) 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,*

*(c) established environmental goals 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.*

**Development Response:** The project is committed to maximising construction and demolition waste diversion from landfill through the implementation of a project specific demolition and construction waste management strategy. The development shall ensure that the full life cycle impacts of goods and services employed throughout the construction and operation of the project have been considered. Further, it will be designed to minimise operational energy and water consumption, which provides benefit for users through lower utility bills.

## 2.3 CITY OF PARRAMATTA DEVELOPMENT CONTROL PLAN (DCP) 2023

Part 5.4 *Environmental Performance* of the Parramatta DCP provides controls to ensure ecologically sustainable design principles are considered and integrated within a development. The sections relevant to this ESD Report are highlighted and addressed in the following table:

*Table 2 Parramatta DCP Response*

Section	Response
5.4.1 Energy Efficiency	BASIX Energy target of 78% Energy efficiency initiatives outlined in Section 3.3.
5.4.2 Water Efficiency	BASIX Water target of 55% Water efficiency initiatives outlined in Section 3.4.
5.4.3 Urban Cooling	Urban heat island effect and mitigation strategies addressed in Section 3.6.
5.4.4 Solar Light Reflectivity (Glare)	Architectural design to ensure façade materiality meets the reflectivity requirements. If requested, a Reflectivity Report will be produced at a later date
5.4.5 Natural Refrigerants in Air Conditioning	Mechanical design to ensure natural refrigerants with GWP of less than 10 are used, subject to feasibility

## 2.4 CITY OF PARRAMATTA LOCAL ENVIRONMENTAL PLAN (LEP) 2023

The 1 Barrack Lane and 81-83 George Street development has been designed to achieve the High Performing Building Design bonus under Part 7 Division 5 Section 7.25(3) of the City of Parramatta LEP. The bonus allows certain developments to exceed the maximum permissible Floor Space Ratio (FSR) by up to 5% if the consent authority is satisfied of the following:

- The additional GFA will be used for residential accommodation,
- The development will not adversely impact neighbouring land in terms of visual bulk or overshadowing,
- The part of the building that is a dwelling is capable of exceeding –
  - the applicable BASIX target for water by at least **15 points** or equivalent, and
  - the applicable BASIX target for energy by at **15 points** (for a building with 31+ storeys).

To meet the requirements of the LEP 2023 Section 7.25(3) High Performing Building Design bonus, the project is committed to achieving the following:

- BASIX Energy: **78%** (SEPP minimum 63% + LEP bonus 15%).
- BASIX Water: **55%** (SEPP minimum 40% + LEP bonus 15%).

Clause 7.25(4) is not applicable as the development does not fall under the classification of subclause (2)(a)-(d) or (f).

Please refer to Section 6 and the BASIX Report that accompanies this submission for further details on how the development has met the requirements.

## 2.5 NATIONAL CONSTRUCTION CODE (NCC) 2022, VOLUME ONE, SECTION J (ENERGY EFFICIENCY)

The development will ensure the energy use of proposed building adheres to the relevant minimum performance requirements as set out within Section J of the NCC, 2022. The development will manage energy use whilst maintaining a high degree of human comfort through the use of high-performance thermal fabric elements and efficient building service equipment.

Refer to Section 7 and the NCC Section J Part J4 DtS Assessment Report that accompanies this submission for further details.

## 2.6 WELL FOR RESIDENTIAL

The development also aims to meet and exceed industry best practice health and well-being standards within its design, construction, and ongoing operation. As part of its commitment to delivering healthier living environments, the development is recommended to target certification under the WELL for Residential framework.

The WELL for Residential certification is the first and only holistic, third-party verified certification program to exclusively address health, well-being and amenity in all residence types, regardless of operational model (i.e. build-to-sell, build-to-rent, purpose-built student accommodation, independent living units, etc).

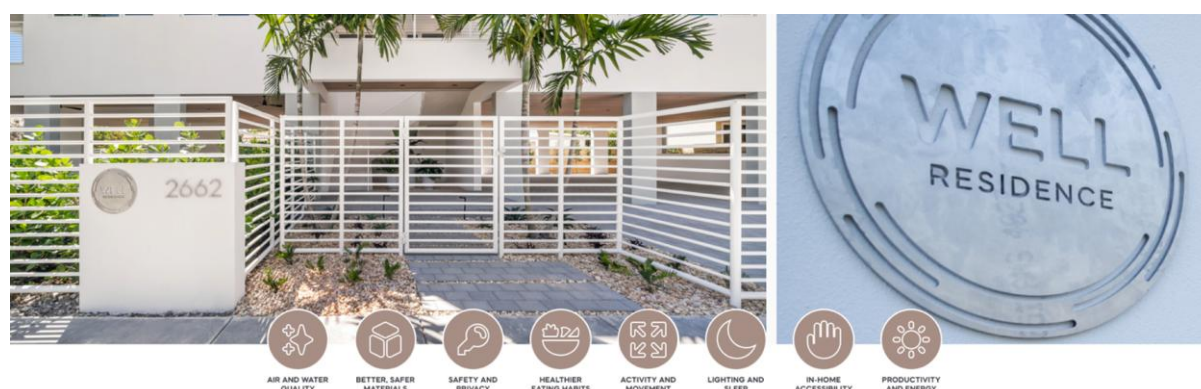
This approach has been taken by the project as an innovative approach by the development to provide additional amenity benefits to residents through design, policy and operational measures and verified through third party, independent review and on-site testing (where applicable).

The standard comprises of over 100+ strategies which are evidence-based and undergo a rigorous governance selection process prior to inclusion into the program.

Every strategy implements results in points earned, and once a minimum number of points are earned following a rigorous 3<sup>rd</sup> party certification process, residential units earn the designation of a WELL Residence.

The WELL for Residential program is a voluntary certification program. Incorporating the requirements within the WELL for Residential certification will provide a significant amount of enhanced amenity provisions in addition to those outlined in the statutory requirements provisioned for as part of SSDA requirements and Apartment Design Guidelines (ADG).

This will be achieved by addressing the ten core concepts of the WELL Standard—Air, Water, Nourishment, Light, Movement, Thermal Comfort, Sound, Materials, Mind, and Community—ensuring the integration of design strategies and performance outcomes that support resident health, comfort, and quality of life. The initiatives and approaches incorporated into this development are extrapolated in Section 5.



### A new standard of living

Informed by the WELL Standard, the certification program includes 100+ strategies for improving resident well-being and fostering a healthier home environment.

Figure 2 Infographic on the WELL for Residential Standard

## 3 SUSTAINABLE DESIGN RESPONSE

### 3.1 OVERVIEW

The only path to a low carbon economy and achieving a “2°C world” where the average global temperature is kept to less than 2°C above pre-industrial levels is through comprehensive and complete consideration of how the development consumes resources. The proposed strategy focuses on energy, water, and materiality to ensure resource use is appropriate and to address the requirements identified by the governing ESD frameworks and policies outlined in Section 2.

### 3.2 VOLUMETRIC MODULAR CONSTRUCTION

The 1 Barrack Lane and 81-83 George Street, Parramatta development is one of the first large-scale residential projects in New South Wales to incorporate the use of Volumetric Modular Construction (VMC) as one of the core principles of design. VMC offers significant ecological and sustainability benefits when applied to residential developments through the following:

- **Reduced Embodied Carbon and Material Waste:** Factory production enables more precise material cutting, fewer off-cuts, and better reuse or recycling of waste materials. Tighter quality control in factories can also reduce the likelihood of construction defects or rework which can cause waste.
- **Energy Efficiency and Thermal Performance:** The controlled manufacturing environment allows for consistent integration of high-performance insulation, airtightness, and renewable energy systems, improving long-term operational efficiency which is harder to achieve reliably on traditional sites. Reduced thermal bridging, more uniform finishes, and better assembly mean that operational energy consumption (e.g. heating, cooling) is lower over the life of the building.
- **Lower Environmental Impact of Construction:** Shorter on-site construction periods reduce disturbances to neighbouring sites and the community, such as less noise, dust, and traffic. Minimal site disruption can also help protect existing trees, soil, ecosystems, and heritage items.
- **Logistical and Transport Efficiency:** Modular components can be delivered just-in-time, reducing storage on site and limiting the number of trips, helping to reduce emissions. Factory consolidation of manufacturing processes also tends to allow for batch production efficiencies, which generally consume less energy per unit than on-site assembly of each piece.
- **Potential for Reuse, Disassembly, Circularity:** Modules may be designed for disassembly or modular replacement rather than demolition. Subsequently, materials can be planned with end-of-life in mind, using more recyclable materials or those with lower environmental impact.

Overall, VMC aligns strongly with ecologically sustainable design principles by lowering embodied energy, improving resource efficiency, enhancing building performance, and reducing the environmental impact throughout the lifecycle of the residential development.

### 3.3 ENERGY & GREENHOUSE GAS EMISSIONS

The energy efficiency strategy generally follows the energy efficiency hierarchy in Figure 3 below. The development will prioritise in the first instance to reduce the demand for energy consumption through the optimisation and sizing of active systems in tandem with implementing passive design principles. The use of energy can then be made more efficient through integrating efficiencies into high demand systems such as heating, cooling, hot water, ventilation, lighting and other appropriate building services.

Once the development has reduced the demand of energy-consuming elements as much as feasible and introduced efficiency measures, renewable energy sources (both on and off site) shall be considered to supply the development with the required remaining energy. Only after all the above major steps have been completed should offsets be investigated to close the gap to achieve operational carbon neutrality.

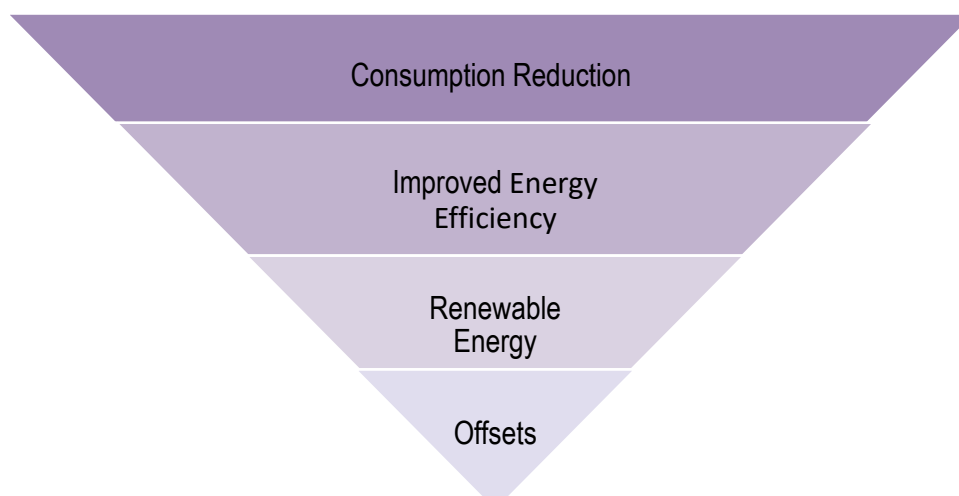


Figure 3: Energy Hierarchy

To achieve the above, the following initiatives are being sought to be implemented:



**Renewable Energy** – Exposed roof area across site and vertical facade provides an opportunity for the installation of solar photovoltaic panels and building integrated photovoltaics (BIPV). An appropriately sized system will allow the development to generate renewable electricity to offset demand and minimise stress on the grid. PV will be installed at a rate that maximises the coverage of the non-trafficable roof area and facades. This system size will be confirmed during subsequent stages of development and coordinated with the services strategy.



**Fully Electrified** – The building has been designed to be fully electrified, to enable operational net zero through the procurement of renewable electricity.



**Efficient Lighting Systems** – High efficiency LED lighting throughout, including common areas with efficiency controls. Controls will include motion and daylight sensors, timers and zoned switching which will help reduce the unnecessary consumption of energy.



**Energy Metering and Monitoring** – Energy meters and monitoring systems will be provided to assist in reducing unnecessary energy consumption and allow energy demands to be better managed across the development.



**Passive Design** – The balance between daylight access and thermal exchange is a priority of the design team to ensure occupant comfort and energy performance is maximised. Building massing, form, orientation, shading analysis and high-performance building fabric elements have been considered to achieve the required energy performance targets. Proper sealing of the envelope through construction practices and verification will also be considered to ensure undesirable energy flows are minimised.



**Hot Water** – Domestic hot water is a major source of energy demand, especially in residential context and therefore the efficiency of these systems will be prioritised. These systems are highly efficient which will allow occupants to utilise systems often with reduced energy consumption. Showers and taps with a high WELS rating will be used to reduce water demand from hot water fixtures across the development.



**Appliances & Equipment** – Appliances and centralised equipment will be selected with a high energy efficiency/performance to ensure reduced energy consumption.



**Low Emission Transportation** – To encourage low-emission transport alternatives bicycle parking will be provided. Pedestrian access will be maximised to nearby public transport networks such as the Parramatta Train Station, Westmead & Carlingford Light Rail Line, Parramatta Ferry Wharf, and the future Parramatta Metro Station.



**Electric Vehicles** – EV charging provisions will be provided as per the Parramatta DCP requirements for resident car parking spaces.

### 3.4 WATER

To achieve responsible water consumption and water sensitive urban design, best practice water-saving initiatives will need to be implemented across the project. The following initiatives will be explored to achieve the potable water targets:

**Sanitary Fixtures** – By implementing low-flow water fixtures, the consumption will be significantly reduced. All sanitary fixtures are to be provided with the minimum Water Efficiency Labelling Scheme (WELS) star rating identified below.

- Toilets: 4 Star.
- Kitchen Taps: 6 Star.
- Bathroom Taps: 6 Star.
- Showers: 4 Star (> 4.5 but <= 6 L/min).
- Dishwashers: 5.5 Star.
- Washing Machines: 5 Star.



**Landscape Irrigation** – Efficient irrigation systems will be implemented, including sub-surface drip systems, moisture sensors, and the prioritisation of native plants. Native plants have evolved to thrive in the Australian environment and are typically more resilient than their exotic counterparts, they typically require less water and are more likely to survive the predicted increase in extreme drought conditions due to climate change.



**Rainwater** – The development will provide a rainwater storage tank with reuse supplied to landscape irrigation, reducing reliance on mains supply water. Final sizing of the tank and detail regarding collection considering the catchment area, expected demand and pumping infrastructure is to be refined during detailed design stages.



### 3.5 MATERIALS

In line with the principles of sustainability outlined in the EPA and the Parramatta DCP 2023, the project will have a significant focus on the life cycle impacts of material use and responsible procurement. The implementation of VMC also presents a unique opportunity for the 1 Barrack Lane and 81-83 George Street development to optimise material use through precision manufacturing and standardisation of building components. By fabricating modules in a controlled factory environment, materials can be cut, assembled, and recycled with minimal waste, ensuring efficient use of resources and reducing the project's overall embodied carbon footprint.

At a high level and subject to further design stages, the use of materials for the development will consider:

**Waste Management** – 90% of construction and demolition waste is to be diverted from landfill, diverting and ensuring reuse or recycling of a high portion of site waste.

Alignment with the site specific Operational Waste Management Plan to ensure waste can be appropriately sorted, separated, and recycled will also be prioritised assisting the ongoing diversion from landfill for the development. Provision is made for sufficient bins and appropriate separation systems to ensure waste is minimised and effective recycling is enabled.



**Low VOC and Low Formaldehyde Materials** – paints, adhesives, sealants, floor coverings, carpets and engineered wood will be selected appropriately to provide a healthier and low-impact environment. Such efforts provide a cleaner and better environment for all.



**Sustainable Certifications & Credentials** – Products and materials selected for the project should hold third-party verified environmental declarations (or equivalent certification) to allow for life cycle reporting and quantification of embodied impacts. Products with high recycled content, opportunities for re-use and low embodied emissions will support the sustainable delivery of the development.

Materials such as steel and concrete which inherently have higher embodied carbon, and environmental impact should be the main priority for the development to considerably reduce total impact. Substitutions such as fly-ash and blast-furnace slag should be considered to reduce the embodied carbon of concrete. High quality steel will be procured for use in the manufacturing of VMC units, with the added benefit of reduced material wastage.



**FSC/PEFC Timber** – Where possible timber, including virgin and engineered timber used during construction (i.e. formwork) and as part of finished elements shall be sourced from certified sustainable forestry or reused. This ensures the timber provided to site is of the highest standard and sourced from renewable suppliers.



### 3.6 URBAN HEAT ISLAND

The urban heat island effect must also be addressed to reduce the excessive retention of solar heat within the built form. Currently, the site is identified as experiencing a high level of urban heat island impact compared to its surroundings. The figure below shows that the site experiences temperatures in excess of **6.99°C** above the local baseline surface air temperatures due to the urban heat island effect. To ensure that the project is effective in reducing impact on the urban heat island effect, compliance with the following mitigation strategies will be investigated and implemented:

- Site greening through on-grade canopy cover and terrace landscaping.
- High solar reflectance (SRI) finishes.
- Passive shading.
- Roof top PV arrays.

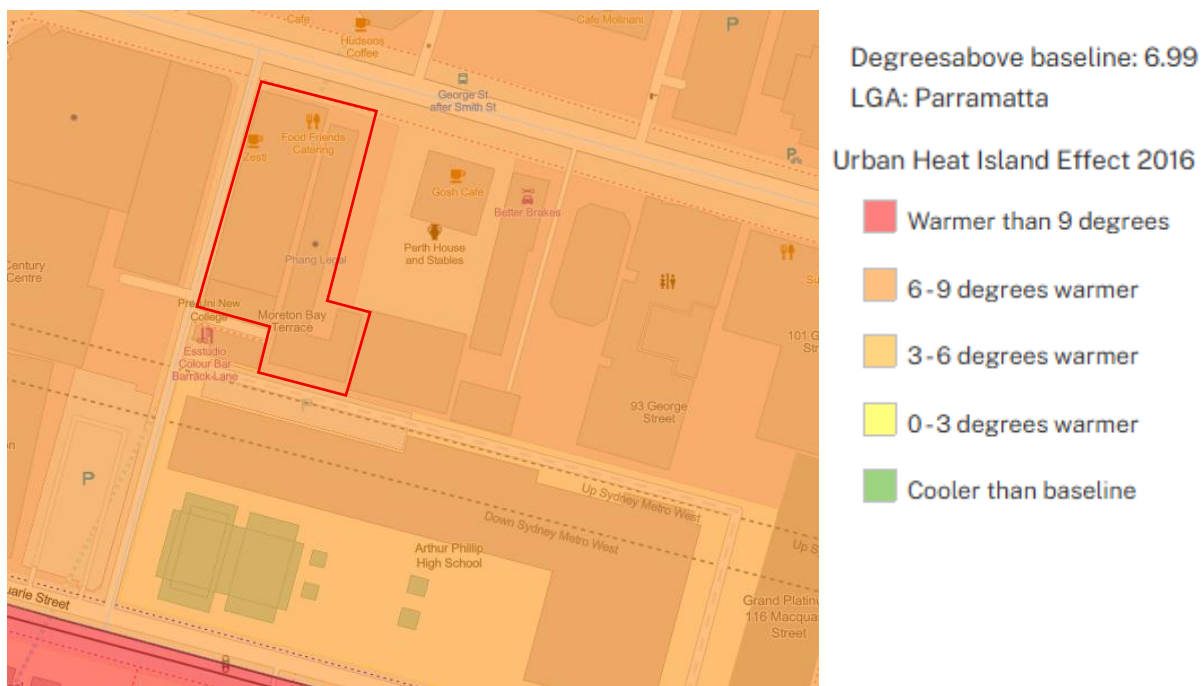


Figure 4 Urban Heat Island Effect (Source: SEED Database)

### 3.7 COMFORT & QUALITY

To ensure the best quality for residents and visitors inside the space, the following key initiatives will be committed to:

- **Visual Comfort** – Maximising high-quality light into the living spaces, with views to the sky and movement where possible.
- **Acoustic Excellence** – Designing the layouts of the apartments to be protected from noise from external sources. The use of VMC allows for consistent material selection and manufacturing, enhancing acoustic performance and ensuring privacy between dwellings.
- **Thermal Comfort** – Appropriate mix of vernacular design, overhangs, high-performance windows, and mechanical systems to deliver the users optimised thermal comfort. Implementing the VMC methodology enables a consistently high construction quality and tighter building envelope. Factory controlled fabrication ensures precise insulation installation, minimised air leakage, and reduced thermal bridging, resulting in more stable indoor temperatures and improved energy efficiency for residents throughout the year.
- **Lighting Comfort** – Use of LED lighting throughout the entire development. Low-glare lighting with baffles or louvres to limit glare.
- **Generous natural planting** – Greenery through natural planting throughout the development assists in a connection to nature for users and passersby. It also has a cooling effect, reducing the urban heat island burden on the project.

# 4 GREEN STAR BUILDINGS

## 4.1 OVERVIEW

Green Star Buildings is a holistic credit based sustainability rating tool administered by the Green Building Council of Australia (GBCA) for new buildings and major refurbishments. The tool provides a framework for designing and constructing buildings that are low-carbon, resource-efficient, and future-ready. Projects are assessed across a range of environmental, social, and governance criteria, with certification involving registration, evidence-based submission, independent assessment, and final approval by GBCA. Achieving a Green Star Buildings rating demonstrates a project’s commitment to sustainability, occupant wellbeing, and long-term environmental performance, while reducing regulatory and market risk as Australia transitions to a low carbon built environment.

A project that achieves a Green Star Buildings certification may achieve the following ratings:

- **4 Star** Best Practice. (All Minimum Expectations + 15 points).
- **5 Star** Australian Excellence. (All Minimum Expectations + 35 points).
- **6 Star** World Leadership. (All Minimum Expectations + 70 points).

E-LAB, in consultation with Freecity and the wider design team, have developed a project specific Green Star Buildings pathway, incorporating all Minimum Expectations and the required points to achieve a 5 Star rated building, demonstrating Australian Excellence in environmentally sustainable design. The credits selected are conducive to the development type, location, environmental and social context, as well as the co-existing sustainability initiatives and targets within the development, ensuring a developed response to the Green Star Buildings categories listed in Figure 5 below.



Figure 5 Green Star Buildings Categories

## 4.2 MINIMUM EXPECTATIONS

There is a set of Minimum Expectations that must be targeted by all projects looking to achieve a Green Star rating. Minimum Expectations are not awarded points, therefore, to achieve a rating the project must accumulate points in addition to the Minimum Expectations.

The Minimum Expectations aim to ensure all Green Star rated buildings meet a basic definition of a green building (energy efficient, water efficient, good healthy spaces, built responsibly, and on sites that are not highly sensitive areas).

### 4.3 CLIMATE POSITIVE PATHWAY

Central to the certification is the Climate Positive Pathway, which sets out evolving minimum expectations to guide projects toward eliminating fossil fuels, improving energy efficiency, and sourcing renewable energy. Pursuing the Climate Positive Pathway is mandatory for the following projects:

- Projects registered from 2023 onwards that wish to achieve a 5 Star or higher rating.
- Any projects registered from 2026 onwards.

The Climate Positive Pathway consists of 14 points plus an additional 1 Leadership point for achieving the pathway and requires the following elements:

1. **Upfront Carbon Emissions:** Building upfront carbon emissions are at least 20% less than those of a reference building and all demolition works are offset. A reference building is defined as an NCC 2022 minimum performance building. This will be assessed during Design Development. As the existing building was completed in 1990 and will mostly be demolished, 80% of the embodied carbon associated with the existing structure must be offset, adding cost to the project.
2. **Energy Use:** The building's energy use is at least 20% less than a reference building.
3. **Energy Source:** 100% of the building's energy comes from renewables (i.e. through onsite renewable energy and a renewable energy contract).
4. **Other Carbon Emissions:** Emissions from refrigerants are eliminated or offset.



Figure 6 Climate Positive

## 5 WELL FOR RESIDENTIAL

This section elaborates further the health & wellbeing initiatives pursued under the WELL for Residential certification program. The intent is that the list of interventions and the benefits presented are not definitive but give a broad representation of the health & wellbeing benefits outcomes to the residents and wider stakeholder base.



Figure 7 Some benefits of a certified WELL Residence

The interventions are grouped into four broad impact categories as follows:

1. **Apartment Design and Layouts.**
2. **Wider Building Amenity Provisions.**
3. **Neighbourhood Attributes.**
4. **Policy, Operational and Wider Social Value.**

For each specific intervention highlighted, a narrative is also provided to link the intervention with the evidence-base (including references) on how it improves health, wellbeing and broader social value outcomes. These research publications also provide the objective metrics used to carry out the WELL for Residential certification assessments. Each intervention falls within the 10-Concept Framework of WELL to achieve holistic impact, with the relevant concepts tagged. The 10-Concepts of WELL are shown below.

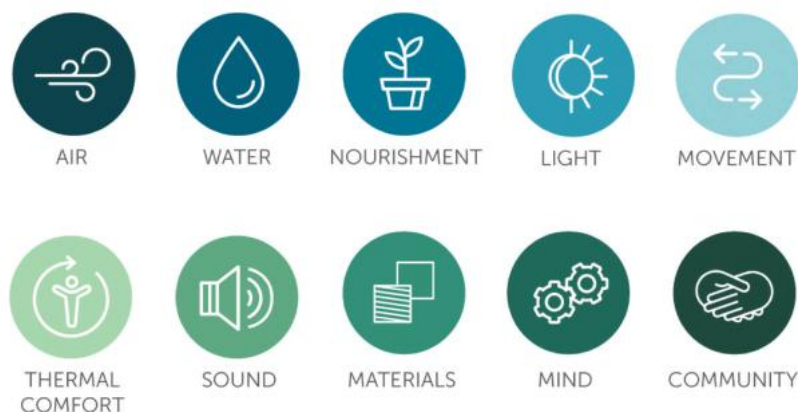


Figure 8 - The 10 Concept Categories addressed within the WELL for Residential certification

## 5.1 APARTMENT DESIGN AND LAYOUT

This section relates to interventions that apply directly to the design and layout of the individual apartment units. These provide typically the highest level of impact, as it is commensurate with the proportion of time spent in apartment units. The average person spends 90% of their time indoors, with most of that time typically spent in their homes.

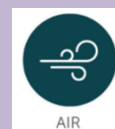
### 5.1.1 Ventilation Design and Hydraulics Design Supportive of Health

The residential development features mechanical systems i.e. exhaust systems to kitchens, bathrooms which are externally vented as per minimum prescribed rates. They are resident-controlled and externally vented to expel moisture.

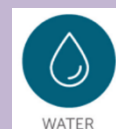
Hydraulic systems are designed to prevent backflow and sized in accordance with appropriate water demand calculated for potable water. All systems used to circulate potable water are approved and safe for drinking water to prevent leaching of contaminants.

#### **EVIDENCE-BASE FOR HEALTH**

- Effective exhaust and ventilation strategies, including cooktop exhausts reduce indoor air pollution, overall air quality and may lead to improved residents' overall health, especially with reduced exposure to pollutants such as oxidised fat-based metabolites and particulate matter.<sup>1</sup>
- Designing water delivery systems adequately and preventing water stagnation (including backflow prevention) prevents contamination of potable water networks and preserves water quality for residents.<sup>2</sup>



AIR



WATER

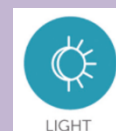
### 5.1.2 Daylight and Shading provisions

Daylight provision to the apartment units complies with a minimum Tier 2 level under WELL For Residential with total glazing area analysed to be a minimum of 10% of regularly occupied areas of dwelling units, with regularly occupied rooms containing at least one window.

Blackout shading provision (max. 1% visible light transmittance) is also provisioned for the development to provide residents with the ability to control the amount of daylight within spaces.

#### **EVIDENCE-BASE FOR HEALTH**

- Appropriate window sizing helps to increase access to light, improve circadian rhythm regulation and leads to positive health effects. There is scientific evidence also of decreased falling incidents, infectious diseases and depression.<sup>3,4</sup>



LIGHT

<sup>1</sup> National Center for Healthy Housing. Studying the optimal ventilation for environmental indoor air quality. Columbia, MD; 2022. [https://nchh.org/resource-library/report\\_studying-the-optimal-ventilation-for-environmental-indoor-air-quality.pdf](https://nchh.org/resource-library/report_studying-the-optimal-ventilation-for-environmental-indoor-air-quality.pdf)

<sup>2</sup> U.S. Centers for Disease Control and Prevention, U.S. Department of Housing and Urban Development. Healthy housing reference manual. Atlanta, GA: U.S. Department of Health and Human Services; 2006. [https://www.cdc.gov/nceh/publications/books/housing/housing\\_ref\\_manual\\_2012.pdf](https://www.cdc.gov/nceh/publications/books/housing/housing_ref_manual_2012.pdf)

<sup>3</sup> Osibona O, Solomon BD, Fecht D. Lighting in the home and health: A systematic review. Int J Environ Res Public Health. 2021;18(2):609. doi:10.3390/ijerph18020609

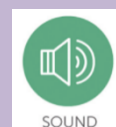
<sup>4</sup> Campano MA, Aguilar T, Fernández-Agüera, J, Domínguez S. Optimization of the window design in offices for a proper circadian stimulus: Case study in Madrid. Int J Eng Technol. 2019;11(2):127-131. doi:10.7763/IJET.2019.V11.1134

### 5.1.3 Sound and Acoustic Comfort

Sound transmission design for both walls and floor-ceiling assemblies are completed to meet minimum Weighted Sound Reduction ( $R_w$ ) values. Acoustic specifications which cover elements including wall construction, door specifications, floor construction, insulation are provided to reduce the cross-transfer of noise within apartments and between apartment units.

#### **EVIDENCE-BASE FOR HEALTH**

- Noise issues frequently top the list of residential complaints and neighbour problems. Appropriate specifications can help to reduce noise transfer between rooms and providing additional acoustical comfort to residents overall.<sup>5,6</sup>
- Noise disturbances are linked to negative health effects such as tiredness, difficulty concentrating, anxiety and depression.<sup>7</sup>



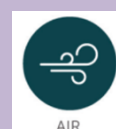
### 5.1.4 Air Quality Monitoring and Verification

The development is actively considering the installation of indoor air quality monitors as well as completing indoor air quality tests to achieve both live and post-completion verification of indoor air quality. The metrics to be measured would include indicators such as PM 2.5, PM 10, TVOC and CO. Each of these constituents have demonstrable impacts on human health and wellbeing when exceeding baseline thresholds and can have impacts to the following population groups such as those suffering from allergies, immune-compromised, elderly or those with respiratory conditions like asthma.

Indoor air quality monitors may not necessarily need to be installed in each bedroom, but with sufficient visibility to provide residents with sufficient awareness and confidence in the overall building performance.

#### **EVIDENCE-BASE FOR HEALTH**

- Research shows that occupants actively use air quality data to modify behaviour and reduce exposure. With the presence of digital displays linked to air quality sensors, awareness of the “invisible” factor of air quality is deemed significant enough to activate behaviour change which results in improved experienced air quality.<sup>8</sup>



<sup>5</sup> Lee PJ, Jeong JH. Attitudes towards outdoor and neighbour noise during the COVID-19 lockdown: A case study in London. *Sustain Cities Soc.* 2021;67:102768. doi:10.1016/j.scs.2021.102768

<sup>6</sup> New York City Administrative Code. Article 9: Noise control in multiple dwellings. § 27-768 Requirements. <https://codelibrary.amlegal.com/codes/newyorkcity/latest/NYCAadmin/0-0-0-51913>. Accessed April 12, 2023.

<sup>7</sup> Wang J, Norbäck D. Home environment and noise disturbance in a national sample of multi-family buildings in Sweden-associations with medical symptoms. *BMC Public Health.* 2021;21(1):1989. doi:10.1186/s12889-021-12069-w

<sup>8</sup> Who Responds to Air Quality Alerts? ResearchGate accessed August 28, 2025 ([https://www.researchgate.net/publication/276126841\\_Who\\_Responds\\_to\\_Air\\_Quality\\_Alerts](https://www.researchgate.net/publication/276126841_Who_Responds_to_Air_Quality_Alerts))

## 5.2 WIDER BUILDING AMENITY PROVISIONS

This section addresses the broader design provision across the development, which includes the landscaping, common areas within the building and broader amenity provisions. The wider building context has a meaningful impact on the overall user experience of residents, with some design features providing “signature experiences” which can sometimes have a higher weighting of impact to the overall wellbeing than apartment specific features.

### 5.2.1 Provision of Indoor Activity Space (including accessibility provisions)

As part of the development, there is also an indoor activity space, which will facilitate not only standard machine-based gym provisions but sufficient space to conduct group-based workouts. Consideration is also made to ensure that the gym equipment is also potentially assessed for accessibility provisions to provide benefit to residents who may have physical challenges.

#### **EVIDENCE-BASE FOR HEALTH**

- Places for physical activity, such as those located near residents and those that have robust amenities and programming, are effective at increasing physical activity and exercise. These have been shown to support resident overall health and well-being.<sup>9,10</sup>



### 5.2.2 Designing Layouts for Reassurance

The orientation of the apartments is positioned so that main dwelling unit entrances are in a direct line of sight to another main dwelling unit entrance or a hallway which connects other dwelling units. Furthermore, vehicular access into the project boundary will be designated slow zones with the appropriate signage included.

#### **EVIDENCE-BASE FOR HEALTH**

- Building orientation that supports social interconnectedness and mutual trust can increase informal surveillance and act as a crime deterrent.<sup>11</sup>



<sup>9</sup> Roubal AM, Jovaag A, Hyojun P, Gennuso KP. Development of a nationally representative built environment measure of access to exercise opportunities. *Prev Chronic Dis*. 2015;12:140378. doi:10.5888/pcd12.140378

<sup>10</sup> Sharon-David H, Siekanska M, Tenenbaum G. Are gyms fit for all? A scoping review of the barriers and facilitators to gym-based exercise participation experienced by people with physical disabilities. *Perform Enhanc Health*. 2021;9(1):100170. doi:10.1016/j.peh.2020.100170

<sup>11</sup> Kamalipour H, Faizi M, Memarian G. Safe place by design: Urban crime in relation to spatiality and sociality. *Curr Urban Stud*. 2014;2:152-162. doi:10.4236/cus.2014.22015

### 5.2.3 Active Transport Provisions (in-building)

The building end-of-trip provisions support and promote active cycling use by provided sufficient short-term and long-term bike parking

#### **EVIDENCE-BASE FOR HEALTH**

- Cycling, whether for leisure or commuting, is associated with increased physical activity levels and lower mortality rates.<sup>12,13</sup>



## 5.3 POLICY, OPERATIONAL, AND WIDER SOCIAL VALUE

An often neglected and missed aspect of providing health & wellbeing benefits are the policies and operational procedures in-place. These are analogous to the “software” that complement the “hardware” (building fabric and design) of a building. These are often “invisible” but are as important in ensuring that health and wellbeing benefits are sustained for residents and wider stakeholders.

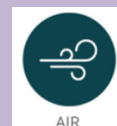
### 5.3.1 Construction Pollution and Well-being Policies

The developer will seek to implement a construction pollution management plan that ensures internal building systems like ducts, registers, grills and diffusers are protected and sealed during construction. Moisture and dust management procedures are also being considered during construction such as storage of absorptive/porous material are protected from moisture damage during construction. Dust guards and walk-off mats at entryways during construction will also be employed.

Furthermore, health and well-being construction policies on the worksite including thermal comfort control, paid break, drinking water, sunscreen and appropriate education are provided.

#### **EVIDENCE-BASE FOR HEALTH**

- Construction sites can generate air pollutants that have been linked to negative health effects. Effective construction management techniques reduce exposure to harmful particles.<sup>14,15</sup>
- Preventative design practices can eliminate work-related injuries, hazards, illnesses and deaths – providing social value to key stakeholders in a development which are the on-site workers.<sup>16</sup>



<sup>12</sup> Reynolds R, McKenzie S, Allender S, Brown K, Foulkes C. Systematic review of incidental physical activity community interventions. *Prev Med.* 2014;67:46-64. doi:10.1016/j.ypmed.2014.06.023

<sup>13</sup> Handy S, van Wee B, Kroesen M. Promoting cycling for transport: Research needs and challenges. *Transp Rev.* 2014;34(1):4-24. doi:10.1080/01441647.2013.860204

<sup>14</sup> Singh R, Ahmad K, Jakhwal DC, Kumar MS. Impact of air quality on human health in the vicinity of construction sites in Delhi-NCR. *Int J Eng Res Appl.* 2014;4(8v4):18-26. doi:ISSN 22489622

<sup>15</sup> Kim S-S, Kang D-H, Choi D-H, Yeo, M-Y, Kim K-W. Comparison of strategies to improve indoor air quality at the pre-occupancy stage in new apartment buildings. *Build Environ.* 2008;43(3):320-328. doi:10.1016/j.buildenv.2006.03.026

<sup>16</sup> National Institute for Occupational Safety and Health. Prevention through Design: Designing out hazards and risk in the workplace. [https://www.cdc.gov/niosh/newsroom/feature/ptd\\_designing.html](https://www.cdc.gov/niosh/newsroom/feature/ptd_designing.html). Reviewed February 8, 2022. Accessed April 10, 2023

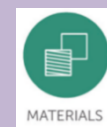
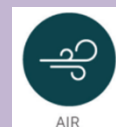
### 5.3.2 Low-Toxic Cleaning Operations

Building cleaning procedures and policies for common areas that ensure thorough cleaning and selection of low-toxicity cleaning materials are implemented. These include protocols such as:

- List of cleaning supplies used.
- Extent and frequency of cleaning.
- Protocol for storage and coding of cleaning products.
- Training provisions, including PPE and safety guidelines during cleaning.

#### **EVIDENCE-BASE FOR HEALTH**

- Cleaning products that are made without certain chemical can decrease an individual's risk of exposure to toxic substances. These are shown to reduce negative impacts to individuals' skin and toxic substances.<sup>17</sup>



## 5.4 NEIGHBOURHOOD ATTRIBUTES

Neighbourhood Attributes relate to benefits to residents derived from the local neighbourhood context. Site selection of this location has taken into consideration some of these evidence-based wider benefits. A key part of the health & wellbeing strategy of this development is to provide education and awareness of these features to supplement the provisions made available within the building.

### 5.4.1 Support Fresh Food Access

The building has been analysed to be within the 800m walking distance of a supermarket or grocery store with a fruit and vegetable section. This maximum separation distance has been shown to significantly improve the access to fresh fruit and vegetables.

#### **EVIDENCE-BASE FOR HEALTH**

- Proximity to supermarkets, grocery stores and farmers markets can help individuals improve their dietary and lifestyle behaviours by supporting better food choices. Residents who have better access tend to have healthier diets and are less likely to be overweight or obese.<sup>18,19</sup>



### 5.4.2 Walkable Neighbourhoods

The primary building entrance connects onto footpaths with local connectivity to other streets within a 540 m walking distance. The walking footpath connects residents to three unique use types within an 800 m radius such as grocery stores, retail, services such as a bank, laundry, restaurant and other civic and community facilities.

<sup>17</sup> Calderon L, Maddalena R, Russell M, et al. Air concentrations of volatile organic compounds associated with conventional and "green" cleaning products in real-world and laboratory settings. *Indoor Air*. 2022 32(11):e13162. doi:10.1111/ina.13162

<sup>18</sup> Larson NI, Story MT, Nelson MC. Neighborhood environments: Disparities in access to healthy foods in the U.S.. *Am J Prev Med*. 2009;36(1):74-81.e10. doi:10.1016/j.amepre.2008.09.025

<sup>19</sup> Saelens BE, Sallis JF, Frank LD, et al. Obesogenic neighborhood environments, child and parent obesity. *Am J Prev Med*. 2012;42(5):e57-e64. doi:10.1016/j.amepre.2012.02.008

#### **EVIDENCE-BASE FOR HEALTH**

- Communities that focus on pedestrian-friendly design, including proximity, connectivity, density and aesthetics, are associated with increased walking for people of all ages and genders. Regular activity contributes to numerous health benefits such as lowering the risk of high blood pressure, heart disease, depression, some cancers, diabetes and obesity.<sup>20,21</sup>



### **5.4.3 Availability of Public Transport and Active Transport Paths**

The building entrance is within a 400m walking distance of a bus service which has at least 72 weekday trips and 30 weekend trips to provide local accessibility to nearby amenities.

#### **EVIDENCE-BASE FOR HEALTH**

- Reliable public transportation systems not only help improve physical and mental health but also support health equity through improved access to healthy food options and economic opportunities.<sup>22</sup>
- Individuals are more likely to cycle when streets have dedicated cycling infrastructure, such as bike lanes, and when destinations have secure bike parking.<sup>23</sup>



### **5.4.4 Public Outdoor Activity Space Accessibility**

The building is within 800 m of Paramatta Park and Paperbark playground which collectively meets the minimum size requirements (1 acre) and has provisions such as a walking path, outdoor exercise equipment and recreational courts.

#### **EVIDENCE-BASE FOR HEALTH**

- Park use and physical activity increase when parks offer a variety of amenities and are near homes. Parks close to residential communities can contribute to numerous benefits beyond physical activity, including improved mental health, air quality and noise mitigation.<sup>24,25</sup>



<sup>20</sup> World Health Organization. Global Status Report of Physical Activity. Geneva, Switzerland; 2022. doi:ISBN 978 92 4 005916 0

<sup>21</sup> Cerin E, Sallis JF, Salvo D, et al. Determining thresholds for spatial urban design and transport features that support walking to create healthy and sustainable cities: Findings from the IPEN Adult study. *Lancet Glob Health*. 2022;10(6):e895-e906. doi:10.1016/S2214-109X(22)00068-7

<sup>22</sup> Heaps W, Abramsohn E, Skillen E. Public transportation in the US: A driver of health and equity. *Health Affairs Health Policy Brief*. 2021. doi:10.1377/hpb20210630.810356

<sup>23</sup> Handy S, van Wee B, Kroesen M. Promoting cycling for transport: Research needs and challenges. *Transp Rev*. 2014;34(1):4-24. doi:10.1080/01441647.2013.860204

<sup>24</sup> Pontin FL, Jennesson VL, Morris MA, Clarke GP, Lomax NM. Objectively measuring the association between the built environment and physical activity: a systematic review and reporting framework. *Int J Behav Nutr Phys Act*. 2022;19(119). doi:10.1186/s12966-022-01352-7

<sup>25</sup> Sallis JF, Spoon C, Cavill N, et al. Co-benefits of designing communities for active living: An exploration of literature. *Int J Behav Nutr Phys Act*. 2015;12(30): doi:10.1186/s12966-015-0188-2342

## 6 BASIX COMMITMENTS (RESIDENTIAL)

The Building Sustainability Index (BASIX) is a legislative requirement for all residential dwelling types within NSW to assess the potential performance of certain residential buildings against a range of sustainability indices including thermal comfort, water, embodied emission and energy.

BASIX sets water and greenhouse gas reduction targets relative to the NSW average benchmark for per person potable water consumption & greenhouse gas emissions within the residential sector. It also sets the minimum performance levels for thermal comfort of the dwelling and embodied emission of materials.

The new targets were set into place from October 2023 that increased the standards according to the Sustainable Buildings SEPP 2022.

The project is committed to exceed the requirements of the Sustainable Buildings SEPP 2022 at the time of delivery, as well as achieving the increased targets of the High Performing Building Design provisions under Part 7 Division 5 Section 7.25(3) of the Parramatta LEP 2023 (refer to Section 2.4). The targets are:

- **Energy Standards:** Required to achieve a reduction of **78%** (SEPP minimum **63%** + LEP High Performing Building Design **15%**) in energy consumption through energy efficient design.
- **Thermal Performance Standards:** Required to achieve minimum 7 Star NatHERS average rating for the whole development and minimum 6 Star NatHERS rating for individual apartments.
- **Water Standards:** Required to achieve a reduction of **55%** (SEPP minimum **40%** + LEP High Performing Building Design **15%**) in water consumption of whole development through water efficient design.
- **Materials Index:** Required to estimate the volume of different materials used in the construction and applying the emissions factors for the materials.

Please refer to the BASIX Report that accompanies this submission for further details.

## 7 NCC 2022 SECTION J PART J4 – BUILDING FABRIC (NON-RESIDENTIAL)

Retail space and residential common areas of the development are subject to compliance with NCC 2022 Volume 1 Amendment 2 Section Part J4 Building Fabric. This section of the code places strict environmental performance requirements on the building envelope.

E-LAB have undertaken a preliminary assessment of the development against the Deemed-to-Satisfy (DtS) performance requirements of Section J Part J4 for the glazed and opaque elements of the building envelope. The table below outlines the minimum thermal performance targets to comply with using the DtS provisions of NCC 2022 Volume 1 Amendment 2 Section J for Part J4 Building Fabric.

Refer to the NCC Section J Part J4 DtS Assessment Report that accompanies this submission for further details.

Table 3 Building Fabric Thermal Performance Targets

Building Fabric Element	Thermal Performance Targets*
Exposed Roofs/Ceiling Construction (Exposed to Outside Air or Unconditioned Spaces - Heat Flow Downward)	R3.7 m <sup>2</sup> .K/W
External Wall Construction (Separating Internal Conditioned Spaces from the Outside Air)	R1.0 m <sup>2</sup> .K/W
Internal Wall Construction (Separating Internal Conditioned Spaces from the Internal Unconditioned Spaces)	R1.4 m <sup>2</sup> .K/W
Concrete Slab on Ground** (With No In-slab Heating or Cooling System - Heat Flow Downward)	R2.0 m <sup>2</sup> .K/W (Assumed un-insulated slab on ground)
Suspended Slab Construction	R2.0 m <sup>2</sup> .K/W suspended slab insulation

\*R-Value represents whole system, including thermal breaks, air gaps, bulk insulation and metal-on-metal contact.

\*\*No additional thermal insulation is required to floor slab on ground

Table 4 Glazing Specification Performance Targets

Glazing Specification	Thermal Performance Targets***
All Glazed Windows/Doors	Total System U-Value: 3.18 W/m <sup>2</sup> .K Total System SHGC: 0.365

\*\*\* The Values above represent total system values and require the contractor to provide thermal performance calculations to demonstrate the SHGC

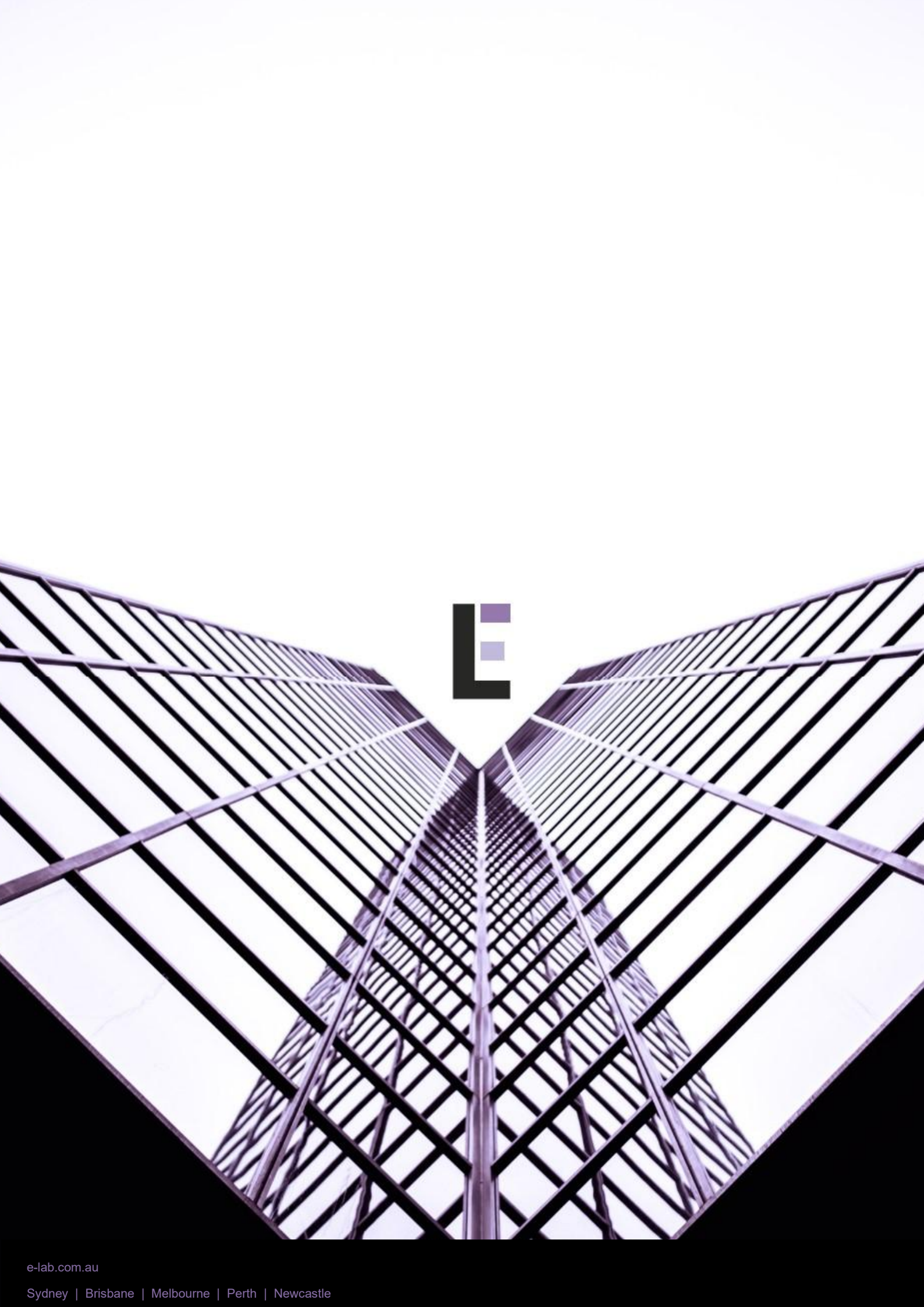
## 8 CONCLUSION

This report provides an outline of the 1 Barrack Lane and 81-83 George Street, Parramatta development's ESD initiatives which aim to reduce the project's overall environmental footprint, demonstrate industry leadership and comply with statutory requirements.

In pursuit of environmental design excellence, the ESD strategies proposed will assist the development to achieve high levels of sustainability and environmental performance. These include:

- Exceeding the BASIX requirements of the Sustainable Buildings SEPP 2022, as well as achieving the increased BASIX targets of the High Performing Building Design provisions under Part 7 Division 5 Section 7.25(3) of the Parramatta LEP 2023:
  - **BASIX Energy 78%.**
  - **BASIX Water 55%.**
- Delivering a high level of thermal performance, demonstrated through a **7 star average and 6 Star minimum NatHERS rating** across the development.
- Implementing **Volumetric Modular Construction (VMC)**, lowering embodied energy, improving resource efficiency, enhancing building performance, and reducing the environmental impact throughout the lifecycle of the development.
- **WELL for Residential Program commitment** as an innovative initiative for improving health and wellbeing.
- **Green Star Buildings Principles** adopted, achieving performance outcomes consistent with **Australian Excellence** benchmarks.
- Incorporating a holistic range of sustainability initiatives across the site spanning **energy efficiency, water efficiency, indoor environment quality, waste management and comfort.**

This report and the accompanying BASIX report confirm that the development can utilise the High Performing Building Design incentive clause under the Parramatta LEP 2023.



E