



Ecologically Sustainable Development (ESD) Report

SSD - 88953706 : Edmondson Park Mixed Use Development

To be built at Lots 4 - 5, 6 - 7 and 8 in DP 1275478 Liverpool City

Prepared for: UPG Edmondson Parkland Pty Ltd

Attention: Anthony Simac

Issue	File Ref.	Description	Author	Reviewer	Issue Date
A	2602330	ESD Report for SSDA February 2026	AA	RB	19/03/2026

Limitations of this report: The report is prepared using design and systems assumptions at a development application level of resolution (before tender and detailed construction level of design and specification). It should be recognized that final detailed design (for construction certificate) will be refined and adjusted after procurement of the building contractor and after final specification and construction details are resolved. Analysis at this stage relies on comparisons of proposed activities against averages (often at different rated performance levels) as complete bottom up data is not yet available.

Report author: Alison Adendorff is a GBCA Green Star Accredited Professional (in the Green Star Buildings rating scheme); has over 14 years experience in buildings projects with strong sustainability goals; holds a Master of Architecture and a BSc (Architecture).



Sustainable Building Consultants

Lots 4-5, 6-7 and 8 Buchan Avenue, Edmondson Park Ecologically Sustainable Development Report

CONTENTS	Page
1. Executive Summary	2
2. Project response to SEARs	4
3. Proposal and Project Information	6
4. Policy and Planning Framework	10
5. Mitigation Measures	11
5. Energy and carbon efficiency	14
6. Water efficient design	21
7. Responsible materials and waste management	22
8. Urban heat management	23
9. Human wellbeing and indoor environmental quality	24
Key Abbreviations/Glossary	25
Appendix A—NABERS Embodied Emissions Form	26





Introduction

This Ecologically Sustainable Development (ESD) Report is submitted to the Department of Planning, Housing and Infrastructure (DPHI) on behalf UPG Edmondson Parkland Pty Ltd (UPG) (the Applicant), to support a State Significant Development Application (SSDA) and Concurrent Rezoning Report for the construction of a new multi stage residential project at Lots 4-5, 6-7, and 8 Buchan Avenue, Edmondson Park (known as Sites 3, 4 and 5) (the site). The proposed development comprising a mix of shop-top housing, residential flat buildings (RFB), co-living housing, and affordable housing, together with public domain improvements including a new publicly accessible plaza, a public library and through-site pedestrian links.

The project has been identified by the NSW Housing Delivery Authority (HDA) as a key development to accelerate the delivery of well-located, diverse and affordable housing across Greater Sydney, with the HDA playing a coordinating role across government agencies to unlock complex sites through strategic planning, infrastructure coordination and streamlined assessment pathways. On 19 February 2025, the HDA recommended that the proposed development on Sites 4 and 5 (6-7 and 8 Buchan Avenue, Edmondson Park), as outlined in EOI application 232588 dated 17 January 2025, be declared State Significant Development (SSD) under section 4.36(3) of the Environmental Planning and Assessment Act 1979, followed by a similar recommendation on 2 June 2025 for Site 3 (4-5 Buchan Avenue, Edmondson Park) as described in EOI application 246574 dated 14 March 2025. These recommendations were formalised through the Minister's issuance of State Significant Development Declaration Order (No. 9) 2025 on 12 June 2025, with the proposals to be facilitated by a concurrent amendment to the State Environmental Planning Policy (Precincts – Western Parkland City) 2021.

Approximately 94% of the development is residential, making residential sustainability outcomes central to the project's ESD strategy.

The report outlines how the proposal responds to the Secretary's

Environmental Assessment Requirements (SEARs), the Sustainable Buildings SEPP, and broader State and local planning objectives. The project demonstrates a strong commitment to integrating sustainable design principles across building performance, environmental protection, resilience, and long-term operational efficiency.

Energy and Carbon Efficiency

The development adopts a high-performance, low-carbon design approach, with all residential apartments delivered as fully electric and no gas connection provided to dwellings. Apartments achieve NatHERS thermal performance ratings of 8.2–8.6 stars, supported by optimised glazing ratios, strong solar access, and effective cross-ventilation that meets or exceeds ADG requirements. All non-residential and common areas comply with NCC 2022 Section J.

Operational energy demand is minimised through the use of energy-efficient systems, including LED lighting and high-efficiency HVAC throughout residential areas. A minimum 20kW rooftop solar PV system will be installed at completion, with additional roof space reserved to enable future PV expansion and potential battery storage, if feasible.

Retail tenancies may be provided with a gas connection to accommodate specialist restaurant cooking requirements; however, the base building and all residential infrastructure are designed to support long-term electrification. Electrical capacity, distribution, and services have been sized to enable future removal of gas from retail areas as commercial electric cooking technologies mature and the electricity grid continues to decarbonise. The development also plans for widespread adoption of electric mobility. All residential parking spaces will have provision for EV chargers, supported by dedicated distribution boards, active load management, and provision for e-bike and e-scooter charging.

1. Executive Summary



Site 4—Buchan Avenue (Image Credit: Plus Studio)



Site 5—Riparian Interface (Image Credit: Plus Studio)



Water Efficiency

The project achieves 50% BASIX potable water savings through a recycled water connection connected to toilets and irrigation, high-efficiency WELS-rated fixtures, and water-wise landscape design. Landscaped areas prioritise native and drought-tolerant species, while drip irrigation and moisture sensors reduce irrigation demand and contribute to improved stormwater quality and reduced runoff.

Responsible Materials and Waste Management

To minimise environmental impact during construction and operation, the proposal targets 90% diversion of construction and demolition waste from landfill, with requirements for contractors to operate under an ISO 14001-certified Environmental Management System. The tender process will seek environmentally preferable materials, including options for low-embodied-carbon concrete and steel, supported by Environmental Product Declarations (EPDs). A NABERS Embodied Emissions Materials Form has been completed in accordance with SEPP requirements.

Urban Heat Mitigation

More than 75% of horizontal surfaces across the site incorporate strategies to reduce urban heat, including extensive landscaping, increased tree canopy, shaded open spaces, and high-reflectance roof and hardscape materials. Landscaping improves biodiversity, reduces heat loads, and supports more comfortable outdoor spaces for residents and visitors.

Indoor Environmental Quality and Wellbeing

The project delivers high standards of occupant wellbeing through improved air quality, acoustic comfort, and daylighting. Natural cross-ventilation is achieved in over 60% of apartments, and glazing design maximises daylight and reduces reliance on artificial lighting. Internal materials will be selected for low toxicity

(low-VOC and low-formaldehyde). The development provides inclusive and community-focused amenity, including 15% Affordable Housing and generous adaptable apartment provision, as well as extensive communal open spaces.

Conclusion

Overall, the ESD strategy for Edmondson Park delivers a high-performance, resilient mixed-use precinct that aligns strongly with State and local policy requirements, contemporary sustainability benchmarks, and SEARs expectations. The proposal integrates passive design excellence, renewable energy, future-proofed electrical infrastructure, efficient water use, responsible material selection, and wellbeing-oriented design to support long-term environmental, social, and economic sustainability.

1. Executive Summary



Site 3—Jericho Road West (Image credit: Plus Studio)



Site 3—Laneway Link (Image credit: Plus Studio)

2. Project Responses to SEARs

Declaration		
Qualified Professional Name	Alison Adendorff	
Qualified Professional Qualifications	Bachelor of Science (Architecture), Masters of Architecture, Green Star Accredited Professional	
This ESD Report addresses the following relevant Secretary’s Environmental Assessment (SEARs) set out in the table below.		
SEARs item no.	SEARs ISSUE and ASSESSMENT REQUIREMENTS	Relevant Section of this report that addresses SEARs Requirement
1.	Statutory Context - Address all relevant legislation, environmental planning instruments (EPIs) (including drafts), plans, policies, guidelines and planning circulars. - Identify compliance with applicable development standards and provide a detailed justification for any non-compliances.	Section 4. Policy and Planning Framework NatHERS and BASIX Report
15.	Ecologically Sustainable Development (ESD) - Identify how ESD principles (as defined in section 193 of the EP&A Regulation) are be incorporated in the design and ongoing operation of the development - The precautionary principle - Inter-generational equity - Conservation of biological diversity and ecological integrity - Improved valuation, pricing and incentive mechanisms	Section 5. Mitigation Measures



2. Project Responses to SEARs

SEARs item no.	SEARs ISSUE and ASSESSMENT REQUIREMENTS	Relevant Section of this report that addresses SEARs Requirement
15.	Ecologically Sustainable Development (ESD) - Where relevant, provide an assessment of the development against the standards for non-residential development set out in Chapter 3 of <i>State Environmental Planning Policy (sustainable Buildings) 2022</i>. Chapter 3 of the Sustainable Building SEPP: Development consent for non-residential development 1. In deciding whether to grant development consent to non-residential development, the consent authority must consider whether the development is designed to enable the following- α) The minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials, β) A reduction in peak demand for electricity, including through the use of energy efficient technology, χ) A reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design, δ) The generation and storage of renewable energy, ε) The metering and monitoring of energy consumption, φ) The minimisation of the consumption of potable water 2. Development consent must not be granted to non-residential development unless the consent authority is satisfied the embodied emissions attributable to the development have been quantified.	Section 5. Mitigation Measures Section 6. Energy Efficiency and Low Carbon Emissions Section 7. Water Efficiency Section 8. Responsible Materials, Construction and Waste NABERS Embodied Emissions Materials Form
Signed		
Dated	27 February 2026	

3. Proposal and Project Information



3. Proposal and Project Information

Rezoning Proposal

To facilitate the proposed development described in the following section a Rezoning Proposal is sought to seek the following amendments to the *State Environmental Planning Policy (Precincts – Western Parkland City) 2021* (Precincts SEPP):

- Amend the Height of Buildings Map to apply a suite of maximum building heights across the site, ranging from 52m – 135m;
- Amend the Floor Space Ratio Map to apply maximum FSRs of 3.7:1 - 5.4:1 across the site;
- Remove the requirement for a Development Control Plan for the site;
- Permit development for the purposes of 'commercial premises' on Site 5.

State Significant Development Application

The proposed amendments to the Precincts SEPP, as outlined above, will facilitate the following development, sought via a concurrent SSDA. Specifically, the proposed works sought under the SSDA include:

- Construction of fourteen residential towers (ranging in height between 6 to 40 storeys) over five podiums (ranging in height between 2-5 storeys), comprising:
 - Mixed use podiums in Site 5.
 - Public library in Site 3.
 - A total of 1,805 residential apartments located above in a combination of build-to-sell, affordable, and co-living formats.
- Basement car parking.
- Associated landscaping and public domain improvements, including a new publicly accessible plaza, public library and through-site links.

It is noted that the project will commit to providing 15% of the GFA as affordable housing for a minimum of 15 years, to be managed by a registered Community Housing Provider (CHP).

For a detailed description of the proposed development, refer to the Environmental Impact Statement (EIS) prepared by Beam

Planning, and the Architectural Drawings prepared by Plus Architecture.

The Site

The combined site is located at 4-5, 6-7, and 8 Buchan Avenue, Edmondson Park, and is legally described as Lots 4, 5, 6, 7 and 8 in DP1275478. The site has a total area of approximately 3.1 hectares, with a primary street frontage of approximately 298m to Buchan Avenue, and a secondary street frontage of approximately 186m to Horrie Road. The combined site is owned by UPG Edmondson Parkland Pty Ltd.

The site is located approximately 330m from the Edmondson Park Train Station and directly adjacent to a future high school (currently under construction). The site is also approximately 400m northwest of Frasers Ed Square Town Centre, placing it in a highly accessible and active urban precinct. The site and its surroundings are currently undeveloped presenting a significant opportunity for coordinated and well-integrated urban development.

It is noted that earthworks, subdivision, and the construction of the major and minor roads surrounding the site has been undertaken under previous development consents.



Aerial View of the Site

3. Proposal and Project Information

Structure of this report

The report has been structured into key ESD categories as indicated in the SEARs CI 15 and as required in the general sustainability categories as set out in the Sustainable Buildings SEPP. Each category details the ESD measures included in the proposal and an assessment of the performance of this measure against regulatory requirements and industry benchmarks where applicable. The categories include:

- Energy and carbon efficiency
- Water efficient design
- Responsible materials and waste management
- Reducing urban heating
- Human wellbeing and indoor environmental quality

Section 1 of the report provides a summary of responses to relevant Ecologically Sustainable Development (ESD) SEARs. This includes:

- SEAR 1 considering relevant ESD related regulations and controls predominantly in relation to the Sustainable Buildings SEPP.
- SEAR 15 that requires a response to key ESD factors including a response to EP&A Regulation ESD principles; minimising green house gas emissions, energy, water and material resources.

Additional reports/documents required under the Sustainable Buildings SEPP are also submitted with the proposal including:

- A NABERS embodied emissions materials form required for non-residential development under the SEPP.

Methodology to identify ESD measures and outcomes

Efficient Living uses a combination of industry benchmarks, reference projects and comparative project data, together with industry recognised modelling tools, to assess the strength of ESD measures proposed.

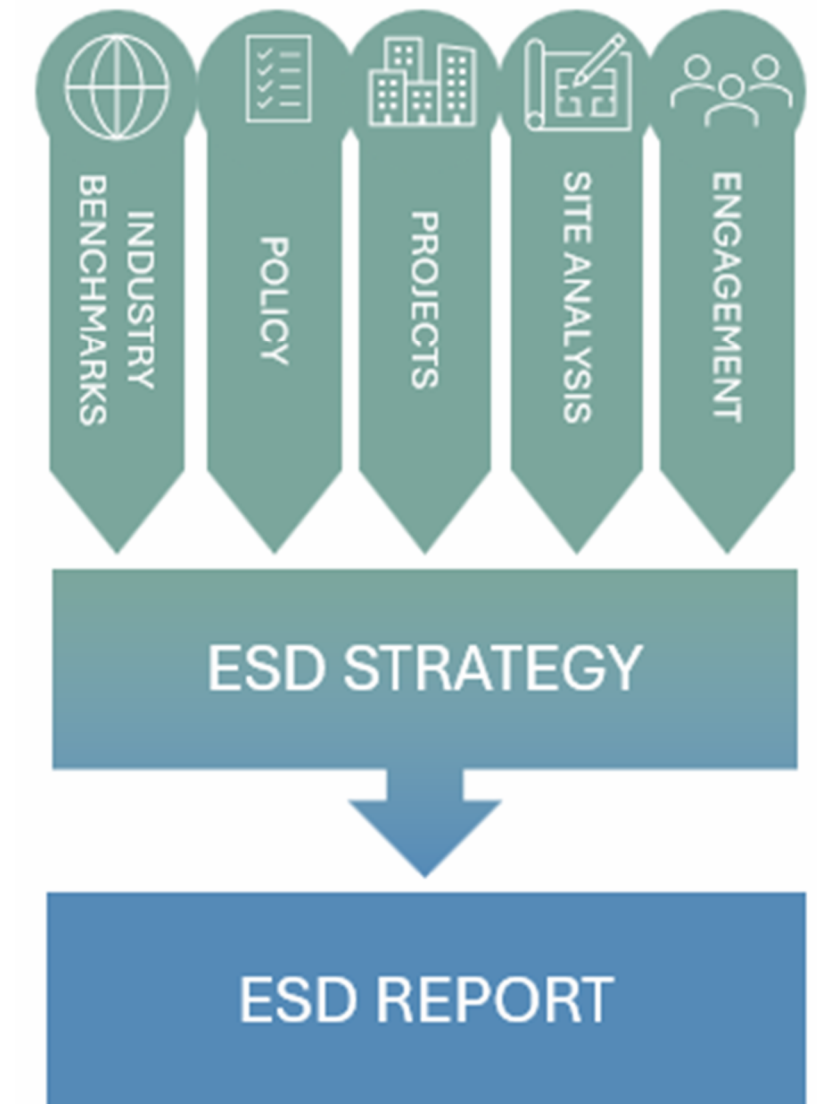
It should be noted that a wide cross section of ESD factors are considered with both qualitative and quantitative measures.

Ultimately the proposed ESD measure is assessed against the performance and detail required under key planning policy requirements at a State level, and as relevant Local level.

Where relevant, comment and reference to published Australian standards and sustainability rating schemes (such as GBCA Green Star) is made. Efficient Living also relies on its experience across multiple NSW proposals to provide opinion on whether the proposed ESD measure meets 'industry benchmarks' which can be subjective.

The ESD report also recommends further detail and specification outcomes as the project moves into detailed design and tender processes that accompany construction phases. ESD outcomes can not be finally determined until the detailed level of design and final construction package of works is agreed.

We note that the proposal is weighted approximately 94% to residential floorspace and 6% to commercial floorspace making residential ESD outcomes the central focus of the report.



ESD Vision and Summary of Initiatives

Climate Positive

Solar/PV arrays for onsite renewable energy generation (BASIX)

Future options available to provide 100% renewable energy to base building

Infrastructure provisions made to transition from gas to electric services in the future supporting NSW Government Net Zero policy

Provision for future uptake of 100% EV's (residential spaces) and battery services (NCC 2022)



Water Efficient

Potable water savings achieved through efficient water fixtures and appliances

Low water use and indigenous landscaping

Recycled water connection for irrigation and toilet flushing



Sites 3, 4 and 5 Edmondson Park

The proposal will support the supply of cost efficient and environmentally efficient housing for the Liverpool City.

Thermally efficient apartments, net zero emission in operation, and with measures to reduce urban heating.

Materials

Seeking options for high levels of construction waste recycling and additional waste streams in operations

Environmental management plan to be established for construction and seeking key materials options with certified Environmental Product Declarations



Health and Wellbeing

Strong passive design elements leading to >7-star NatHERS average rating for apartments

Healthy indoor environments with low VOC finishes, daylight availability and cross ventilation



Urban Heat Mitigation

A combination of measures to reduce urban heating included across the project



4. State and Local Strategies and Policies

Key State ESD related strategies and policies

There are a number of national and local authorities that require compliance for planning approval. Some of these are compulsory, some are preferential, and some are design guidelines to facilitate approval.

The main material documents which refer to sustainability performance standards include:

- BCA 2022 National Construction Code (NCC) Section J
- Environmental Planning and Assessment (EP&A) Regulation Section 193
- SEARs (SSD-88953706)
- Sustainable Buildings SEPP
- Liverpool Local Environmental Plan 2008
- Landcom Sustainability Mandatory Requirements

Sustainable Buildings SEPP

For residential development the proposal meets the requirements of the BASIX conditions for thermal performance, energy/carbon reductions and potable water reductions.

For the non-residential development, such as retail floor space, the proposal includes measures considering the general sustainability requirements including waste management, energy efficiency and management, improved passive design, generation and storage of renewable energy and reduced potable water consumption.

A NABERS Embodied Emissions Material Form will also be provided with the proposal.

Housing SEPP—NSW Apartment Design Guide (ADG)

The objectives, design criteria and design guidance are considered especially in relation to design criteria including:

- Sunlight to habitable rooms (68% of apartments to receive 2 hours, <15% receive no sunlight)

- Natural cross ventilation to at least 60% of apartments
- Apartment and room sizes, window requirements, room depths for habitable rooms, balcony provision and size

Greater Sydney Region Plan

Various objectives of this plan require targeted ESD outcomes including Objective 27 Biodiversity is protected, urban bushland and remnant vegetation is enhanced; 30 Increased tree canopy; 33 Low carbon city; 34 Energy and water flows are captured, used and reused; 35 More waste is recycled; 36 People and places adapt to climate change; 37 Exposure to natural and urban hazards is reduced; 38 Heatwaves are managed.

Western City District Plan

Consistent with the Greater Sydney Region Plan targeted ESD outcomes are required for W15 increasing urban canopy tree cover, W18 high quality open space, W19 reduced carbon emissions and efficient use of energy, water and waste, W20 adaptation and resilience to climate change.

NSW Government Net Zero Plan

The NSW Government targets (NSW Climate Change Policy Framework—Net Zero Plan) for 70% reduced emissions by 2035 and net zero by 2050 also shape the ESD initiatives for the proposal.

Liverpool Local Environmental Plan 2008

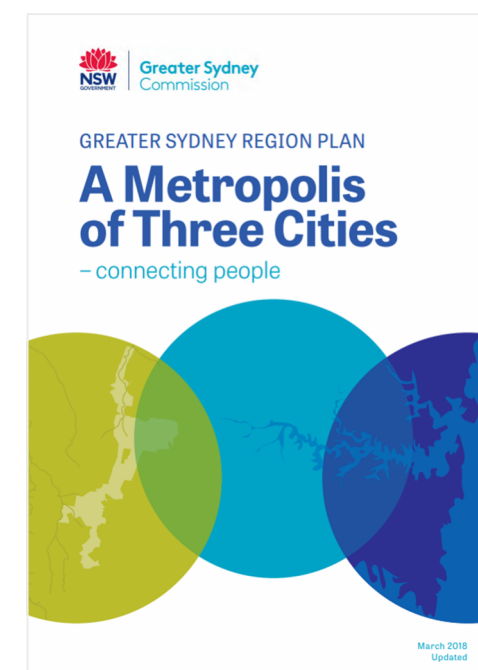
The plan aims to ensure that large developments incorporate high-quality urban design and best-practice environmentally sensitive principles. Projects must demonstrate clear consideration of water and energy efficiency, improved indoor environmental quality, sustainable and low-impact material use, reduced emissions, sustainable transport options that minimise car dependence, and responsible land use that protects ecology and supports land remediation.

National Construction Code (NCC) Section J Energy Efficiency

Section-J of the National Construction Code 2022 focuses on “energy efficiency of buildings”. Section J is a minimum performance target for standard buildings and specifies minimum performance targets known as deemed-to-satisfy (DTS) requirements, for building fabric and services.

The report considers Section J measures that will be required for compliance with the detailed design and construction certificate for the proposal.

Provision for infrastructure that can support EV charging equipment, battery provision if feasible, and minimum areas for PV array provision are included in these requirements.



5. Mitigation Measures

SEARs ESD Principles

The Section 193 of the EP&A Regulation requires the development to address the following principles of ecologically sustainable development.

Principles	Requirements	Project Stage	Mitigation Measures	Refer to Relevant Section
Precautionary Principle	- 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. - Careful valuation to avoid irreversible damage to the environment. - An assessment of risk-weighted consequences.	Construction	Contractor will follow best practice and develop a site-specific construction environmental management plan.	- Construction Management Plan - Construction Waste Management Plan - Section 8.. Responsible Materials, Construction and Waste
		Operation	Operational Waste Management Plan will be developed by the operator to avoid irreversible damage to the environment.	- Operational Waste Management Plan - Section 8.. Responsible Materials,
Inter-generational Equity	The present generation should ensure the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.	- Design - Operation	Mix of housing outcomes provided, through apartment sizes, and market price points, and Affordable Housing provision	Development Schedule
		- Design - Operation	Targeted rooftop PV arrays will be utilized to power basic systems during utility disruptions	BASIX Certificate
Conservation of biological diversity and ecological integrity	The conservation of biological diversity and ecological integrity should be a fundamental consideration.	- Design - Operation	The existing site has limited biological diversity. Therefore, proposed landscaping has minimum impact on local species or ecological integrity. The proposed landscaping schemes will improve biological diversity and provide better environments for local ecosystems. The post development outcome has no greater diversity or ecological impact than the current state of the site.	- Biodiversity Development Assessment - Landscape Plans
		- Design - Construction	Major materials and products will be responsibly sourced for low environmental impact with third-party accreditation.	Refer to Section 8 Responsible Materials, Construction and Waste
		- Design - Operation	Chiller plant and all refrigeration systems will be selected on the basis of minimising environmental impacts through the selection of low ozone depletion potential (low ODP) and low global warming potential (low GWP) refrigerants and through	Refer to Section 8 Responsible Materials, Construction and Waste

5. Mitigation Measures

Principles	Requirements	Project Stage	Mitigation Measures	Refer to Relevant Section
Conservation of biological diversity and ecological integrity	The conservation of biological diversity and ecological integrity should be a fundamental consideration.	Design	Landscaping around the buildings promote green corridors, promote biodiversity and reduce urban heat island effects	Landscape Plans
Improved valuation, pricing and incentive mechanisms	Environmental factors should be included in the valuation of assets and services such as: the polluter pays, users of goods and services should pay prices based on life cycles, established ESD goals should be pursued in the most cost-effective ways.	Operation	During building operation, minimise waste-to-landfill through the provision of recyclable waste, organics, e-waste and non-recyclable waste storage at each level of the building as appropriate	Refer to Operational Waste Management Plan
		- Design - Operation	Eliminate combustion and air pollution emission sources from regularly used building systems, including heating, cooling, and hot water generation.	Section 6. Energy Efficiency and Low Carbon Emissions
		- Design - Operation	The buildings will have provision to transition to all electric and run on 100% renewable power (except for emergency generators).	Section 6. Energy Efficiency and Low Carbon Emissions

5. Mitigation Measures

Sustainable Buildings SEPP

This policy sets statewide standards for sustainable building practices, focusing on reducing greenhouse gas emissions, minimising water consumption, and monitoring embodied carbon in construction materials. The policy ensures alignment with New South Wales' climate goals and mandates consistent environmental assessments across all developments

State Environmental Planning Policy (Sustainable Buildings) 2022		Design Response (Mitigation Measures)
Chapter 3 Standards for Non-Residential Development		
Development consent for non-residential development.		
1.	In deciding whether to grant development consent to non-residential development, the consent authority must consider whether the development is designed to enable the following—	
	α) The minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials, β) A reduction in peak demand for electricity, including through the use of energy efficient technology, γ) A reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design, δ) The generation and storage of renewable energy, ε) The metering and monitoring of energy consumption, φ) The minimisation of the consumption of potable water.	• The project is targeting 95% diversion of construction and demolition waste from landfill. • Energy efficient lighting and mechanical plant will be designed to reduce the peak demand for electricity. • • At least 20kW of PV will be installed on the roof, helping to reduce peak electricity demand. See BASIX Certificate • Lighting will be controlled by movement and daylight sensors where suitable. • • Facades have been designed to reduce reliance on mechanical heating and cooling systems through rationalised window to wall ratios, high performance glazing and rationalised shading to facades. • • Accessible energy and water metering will be provided for all common uses, major uses and major sources. The meters will be connected to an automatic monitoring system that will provide continual information. • • Efficient fittings will meet WELS rating and will be specified and installed to reduce water demand.
2.	Development consent must not be granted to nonresidential development unless the consent authority is satisfied the embodied emissions attributable to the development have been	• A NABERS Embodied Emissions Material Form has been completed.

6. Energy Efficiency and Low Carbon Emissions

Passive design Initiatives to reduce energy use

With thoughtful planning, a well-designed building can be passively heated, cooled, and ventilated for most of the year in temperate NSW climates. This approach minimizes reliance on mechanical heating, ventilation, and air-conditioning (HVAC) systems, which are only needed when outside temperatures are too extreme to be controlled passively.

Proposed outcomes meeting regulatory requirements and industry standards

- NatHERS average ratings of 8.1-8.6 stars for apartment buildings (minimum 6 stars per apartment) exceeding upgraded BASIX thermal performance requirements that commenced in 2023.
- Cross ventilation and solar access for apartments at a minimum meet ADG requirements.
- Building shell outcomes for commercial floor space to meet Section J DTS or future JV3 performance provisions

Strong NatHERS ratings for apartments

The buildings achieve strong NatHERS thermal performance ratings generally from 7.0-7.5 (please refer to final NatHERS certificate provided). This outcome exceeds the upgraded requirements of the Sustainable Buildings SEPP 2022. (commenced in 2023).

This performance is driven by strong building design elements including:

- Optimised glazing ratios in the façade
- Use of balconies and shading elements to create positive shading outcomes to glazing
- Attention to protecting key living areas from orientations that reduce thermal performance

Compliance with NCC 2022

The project will comply with the latest NCC 2022 Section J inclusions

for building fabric and energy requirements. This will include the commercial/retail spaces and any common residential spaces that may be conditioned.

Cross Ventilation

The building floor plates have been designed to maximise the number of dwellings achieving natural cross ventilation.

Please refer to the cross ventilation diagrams for each site for detail.

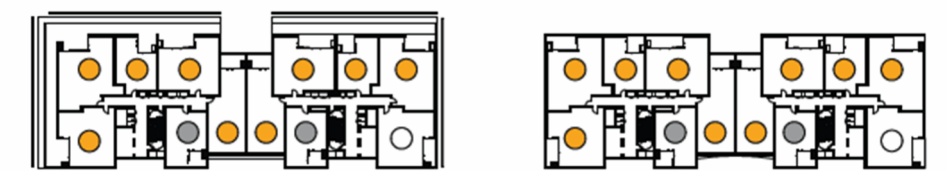
Opportunities to naturally ventilate the commercial/retail areas will be investigated as the design progresses. As the commercial/retail premises are at ground level, acoustics will need to be considered for any naturally ventilated strategy of these floors.

Solar Access

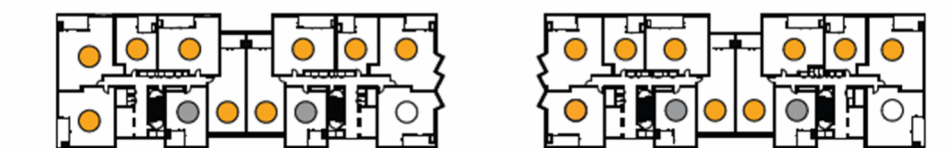
The floor plate of the buildings have been designed to maximise solar access. Solar access provides daylight which means electric lights can be left off during the day but also provide passive heating during the winter months, meaning that the heating system has less work to do, and less energy is consumed heating the spaces.

Please refer to the solar access diagrams for each site for detail.

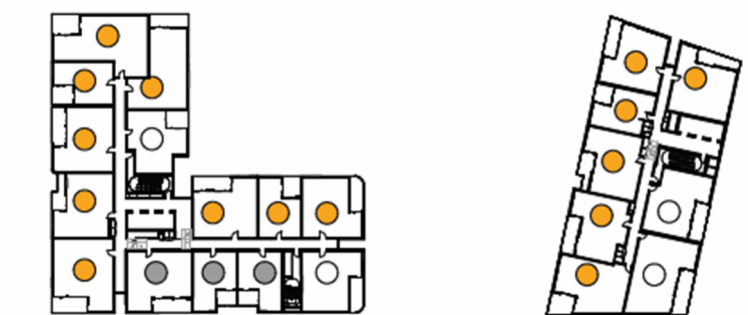
Strong daylight outcomes are expected for the commercial/retail tenancies given the large floor to ceiling windows proposed. These details will be resolved as detailed design of this floor space is resolved before a construction certificate is issued.



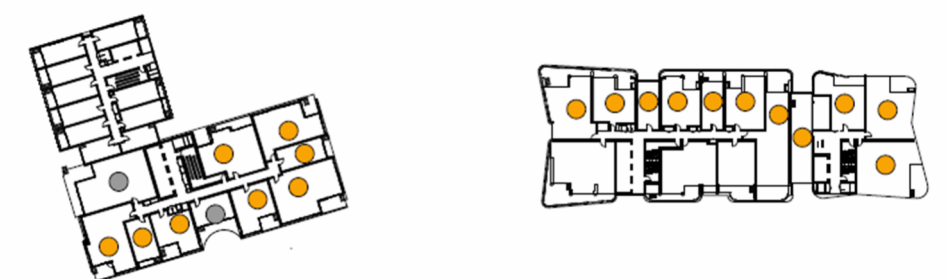
Site 3—Level 4



Site 4—Level 9—13



Site 5—Level 3



Typical Levels—strong solar access outcomes at least meeting 73% ADG compliance of 2 hours per day

(Source : Plus Studio)

6. Energy Efficiency and Low Carbon Emissions

Service and appliance initiatives to reduce energy use and carbon emissions

Proposed outcomes meeting regulatory requirements and industry standards

- BASIX Energy outcome of 63% meeting increased Sustainable Building SEPP/BASIX Energy standards introduced in 2023
- A/C efficiency target of > 3.5 ACOP
- NCC provision for battery charging and provision for future EV charging to 100% of residential car spots, and E bike charging, if feasible
- Commercial floor space to meet NCC 2022 Section J energy efficiency requirements

Mix of electric and gas services—future transition to all electric provisioned in infrastructure planning

The buildings will be serviced for gas provision for retail (food and beverage tenancies) cooktops and with electricity for all other services, including energy efficient heat pumps for residential hot water, and electric or induction residential cooktops.

Transition to all electric services, anticipated at the end of the useful life of the gas services (or as required), will be made possible by:

- Provision of a hard wired circuit to each cooktop able to connect an electric induction cooktop in the future (that can be used in the interim for the gas cooktop)
- Provision for additional substation capacity that will support all electric services in the future without the need for an upgrade

Consideration has also been given to the total electrical demand requirement, including for future high uptake of EVs, and how this will be managed with active load management systems and catered for through substation sizing.

Hot Water Systems

Hot water systems can be responsible for 10-15% of total apartment building CO2 emissions.

Initially, centralised electric heat pump systems are planned for the buildings with high level of insulation for the hot water ring mains. Hot water services to the commercial office floor space areas will be provided by localised electric boilers.

The community pool heating will be serviced with a hybrid electric/solar pool heater.

Air conditioning services

With strong passive design, reflected in the strong project NatHERS ratings, space conditioning is only responsible for about 5-8% of total apartment building CO2 emissions.

Air conditioners will be single phase with ACOPs targeted at 3.0-3.5 for cooling and 3.5-4.0 for heating (BASIX requirements).

Opportunities to improve further on these efficiency levels will be considered in the procurement process.

Final HVAC services to commercial and retail floor space will be determined in detailed design noting that commercial and retail floor space makes up under 6% of total proposed floorspace.

Appliances

Appliances and related other electrical demand average approximately 35% of total CO2 emissions in a modern apartment building.

The following star ratings are recommended for key domestic appliances subject to final clarification of BASIX requirements.

- Dishwashers - minimum 4 star (BASIX requirement)
- Clothes Dryers - minimum 8 star (BASIX requirement)

Lighting

Lighting can use up to 10% of an apartment of a building's electricity consumption, therefore efficient luminaires and lighting control systems are critical in order to optimise the building's energy efficiency. The following measures will be implemented:

- LED lighting to be specified throughout with opportunities to reduce typical NCC minimum compliance energy use to be targeted in detailed lighting design (normally achieved through ongoing improvement in LED technologies)
- Common area lighting to have motion and daylight sensors with further zoned lighting controls for car park areas.

Commercial floor space will also utilise efficient lighting outcomes in line with NCC 2022 Section J. At detailed design, a lighting design specification for commercial floorspace will be incorporated seeking to provide LUX outcomes for activities consistent with AS1680 rather than targeting exceedance of these standards (through application of additional efficiency mechanisms).

Lifts

Lift use can be responsible for over 10% of total apartment building CO2 emissions.

The lifts will incorporate VVVF motor and regenerative drive technology and will target a Class A energy efficiency rating under ISO 25745.

Car park ventilation

Common area ventilation can be responsible for over 10% of apartment building CO2 emissions.

By using CO sensors to modulate fan operation and variable speed drives to adjust airflow as needed, carpark ventilation systems run only as hard as conditions require. This demand-based control significantly cuts unnecessary fan energy consumption while maintaining safe air quality.

Other ventilation, such as to switch rooms, plant rooms and communal bathrooms, will be either interlocked to light switching or controlled through a building management system.

6. Energy Efficiency and Low Carbon Emissions

Electric transport services to reduce carbon emissions

Electric transport

Electric vehicles are anticipated to experience high adoption over the coming decades with NSW Government Strategy to increase EV sales to over 50% by 2030-31¹. When serviced with renewable electricity this mode of transport provides an effective net zero in operation outcome for travel.

Provision for electric cars is the major item to consider followed by power access and storage for the fast growing use of e-bikes and e-scooters.

Electric car provisions

Final detailed electrical system design will cater for a high uptake of electric cars and bikes.

Consistent with NCC 2022, dedicated distribution boards to support EV charging on each parking level will be provisioned together with an active load management system that allows future connection of all parking spots within an achievable total electrical demand level for the project.

Consideration of a charger provision and tariff system/model so that individual apartments are provided with an accurate electricity bill for their usage is also recommended. This service is most often provided by specialist EV charging entities.

- Residential parking bays will require that 100% of spots are provisioned for future charging capacity to allow 12kWh to be provided from 11pm—7am daily
- Commercial parking bays will require future charging capacity to allow 12 kWh from 9am-5pm daily
- Distribution boards must sized and equipped to allow future installation of a 7kW (32A) type 2 EV charger for 100% of residential spaces and 10-20% of commercial spaces

Any shared car service parking spots and service provider procurement should also plan for shared EVs to further provide zero net carbon outcomes for car based transport.

E-bike and e-scooter provisions

Provision of standard GPOs with access from bike storage racks and other storage areas (potentially for e-scooters) will be provided to facilitate charging of these mobility devices.

The future of Electric Vehicle batteries integrated with building electricity demand

Batteries in EVs theoretically store enough energy to run a moderate home for 4-5 days or apartment for 5-7 days. Technology is under development to allow the energy in EV batteries to be accessed by homes, and potentially apartment buildings, to help reduce peak demand and otherwise supplement demand throughout the day as required.

When fully developed this energy management system may be able to greatly reduce the buildings peak demand and therefore help reduce the required substation size requirements for 'all electric' buildings.

In the future this could well mean that EVs support transition of buildings, with fossil fuel inputs such as this proposal, to become all electric buildings with inherent capability to reduce peak usage.

By providing the core network of electrical circuits with higher capacity, and switchboard spaces for EVs and batteries, in line with NCC 2022 Section J9, future implementation will be simplified.



Example of EV charging provision image from <https://evse.com.au/blog/apartmentevcharger/>



Modern buildings are providing charging options for e-bikes and e-scooters

¹ NSW Electric Vehicle Strategy 2023 (revision)

6. Energy Efficiency and Low Carbon Emissions

Renewable energy sources and energy management

Proposed outcomes meeting regulatory requirements and industry standards

- Solar/PV arrays will be provided aligned to the final BASIX requirement— anticipated to total 20kWp capacity
- Roof space has been identified to allow potential future expansion of this system if the body corporate, or any commissioned embedded energy network operator, wishes to pursue this option
- Provision for future battery system integration, if feasible in line with NCC2022 Section J

Incorporation of solar/PV arrays

Total PV arrays of 20kW will be provided compliant with BASIX requirements. Please refer to the BASIX certificate and report provided with the proposal.

The diagrams on the following page indicate the additional potential roof space on all buildings that can be utilised in the future if a larger system is desired by the buildings body corporate, which may also include commissioning of an embedded network operator. These spaces have been identified after removing the required areas for:

- On roof systems including provision for electric heat pump hot water storage and systems
- Roof top communal areas
- Sensible set backs from the roof edge

The total space identified, and left clear for future potential PV arrays, will exceed the 20% of roof area required under NCC 2022 Section J9.

Building energy management

Building systems will be set up with sufficient sub meters to allow detailed monitoring of consumption patterns and equipment performance.

For commercial spaces this is a requirement of NCC 2022 Section J.

With the required break down of sub meters and logged hourly consumption patterns this will allow active building energy management.

Investigation of a centralised battery system

In future detailed design, an area will be identified in close proximity to the main switchboard to allow future potential installation of batteries as required in NCC 2022 Section J., if feasible.

The building body corporate/potential embedded network operator will ultimately determine if a shared community battery is worthwhile given the specific demand profile, and PV production profile,

Ultimately the potential to utilise 'two way' EV batteries linked to the building system (discussed on the preceding page) will determine if a stationary battery system is also warranted.

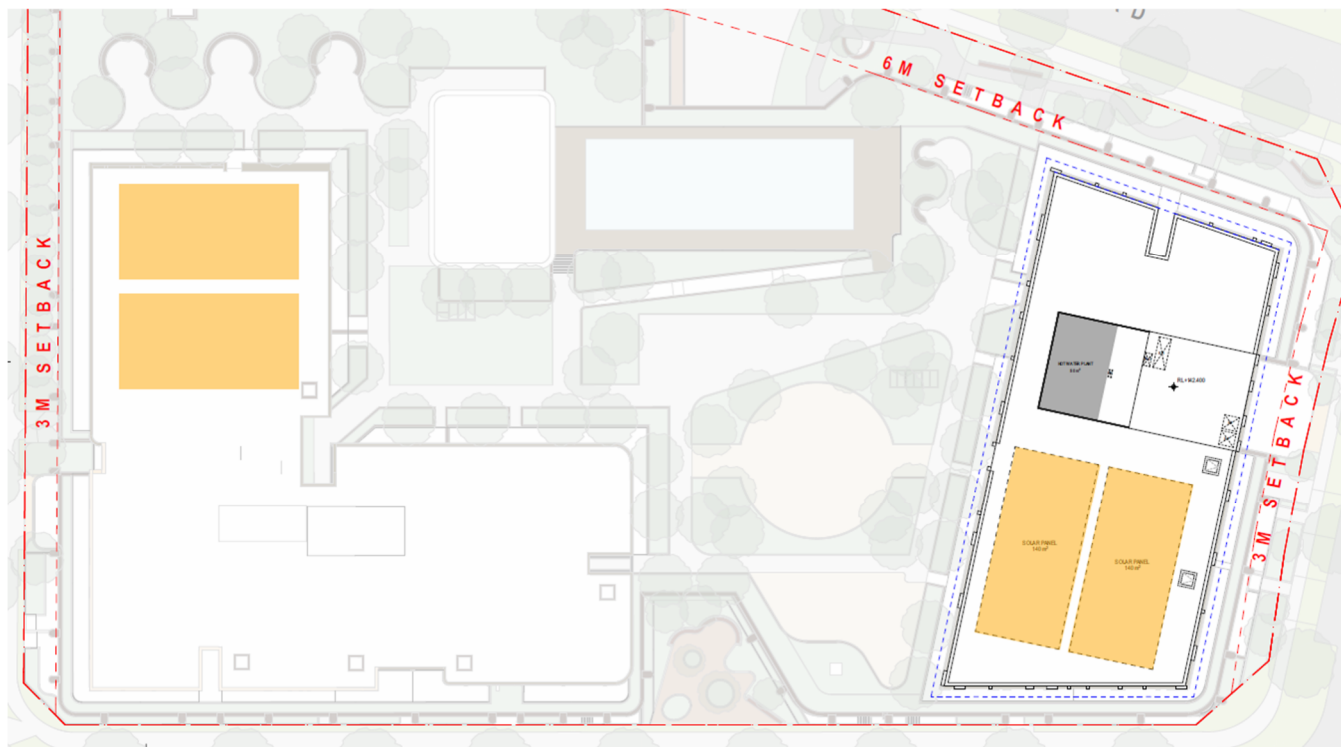
RENEWABLE ENERGY SOURCES AND ENERGY MANAGEMENT



INCORPORATION OF
SOLAR/PV ARRAYS

PROVISION FOR FUTURE
BATTERY SYSTEM INTEGRATION

6. Energy Efficiency and Low Carbon Emissions



Approximately 562sqm space for PV panels on site 3.

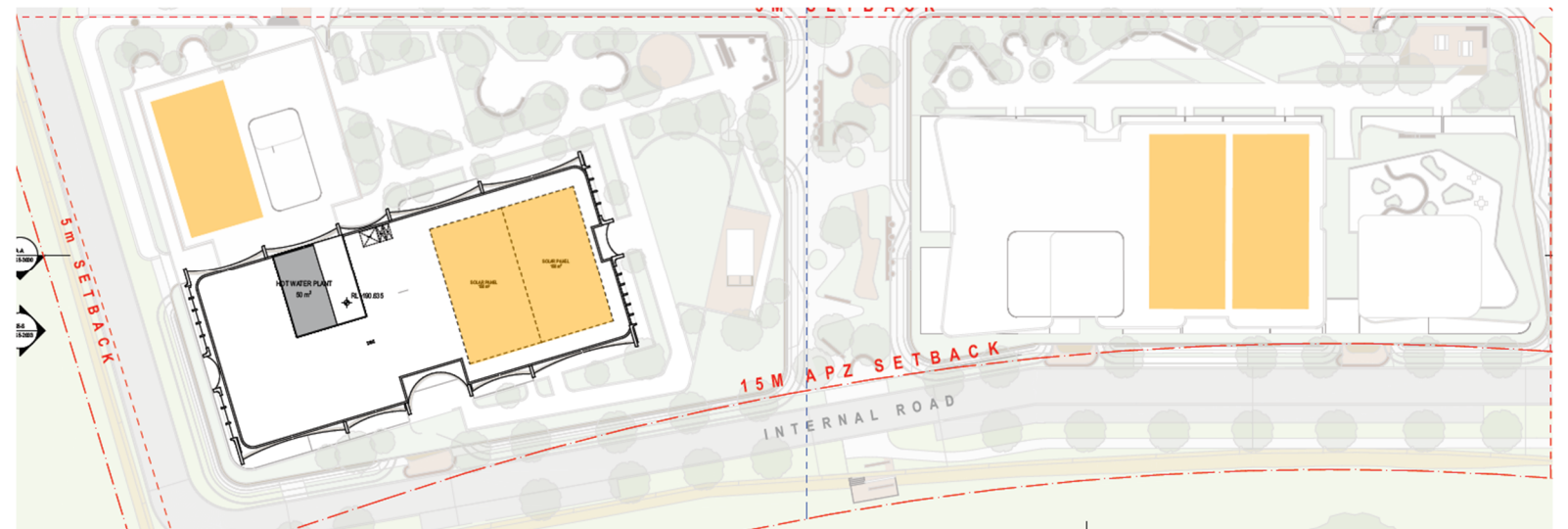
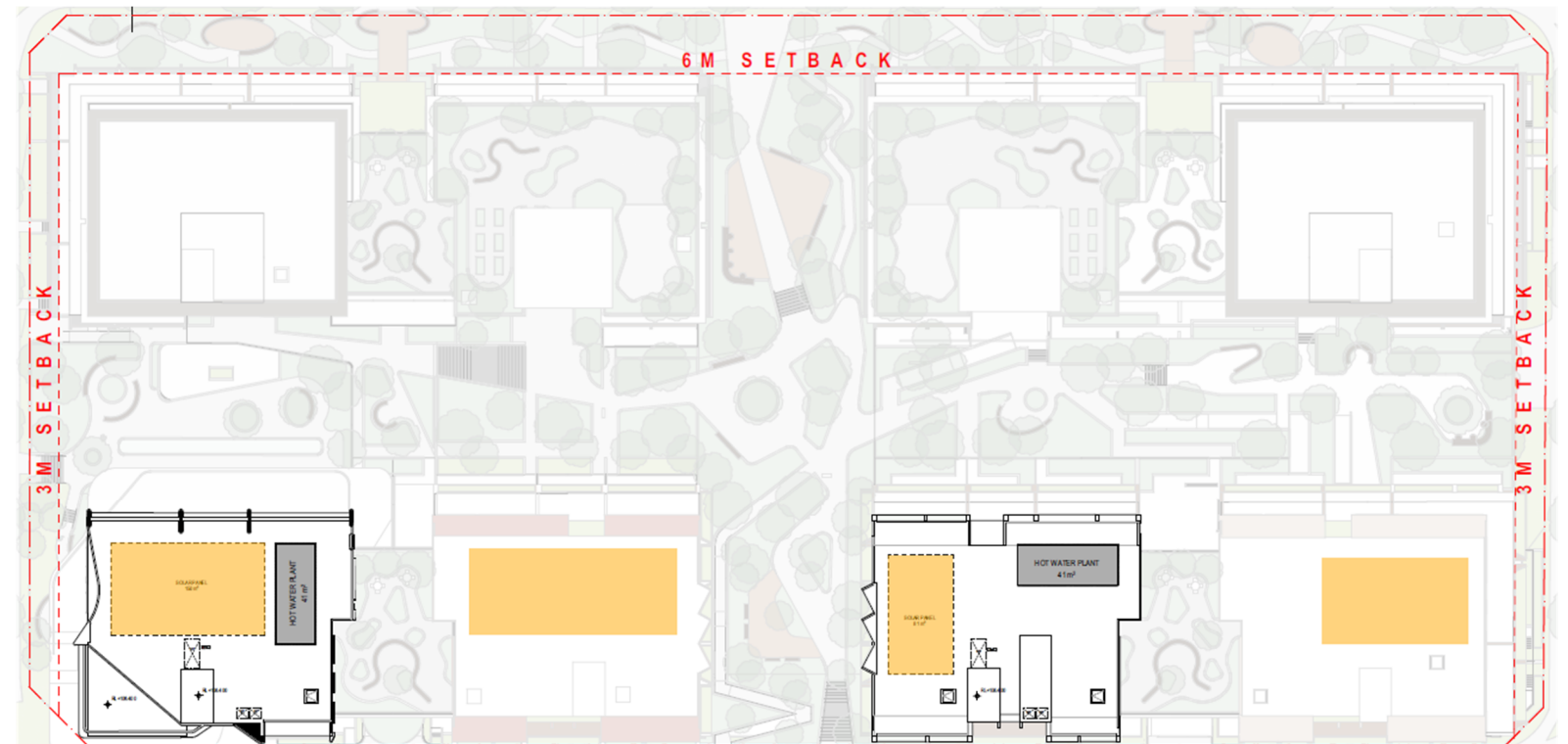
Approximately 580sqm space for PV panels on site 4.

Approximately 822sqm space for PV panels on site 5.

Highlighted areas on the roof plans above identify available roof area for PV panels on available roof space for each site.

The total space available is in the order of 1,964sqm with detailed design of roof equipment and PV panel rows required to confirm a final outcome.

This space can be utilised for initial 20kW PV arrays compliant with BASIX requirements, and in the future by the respective body corporate, potentially in partnership with an embedded network operator for the buildings.



6. Energy Efficiency and Low Carbon Emissions

Summary of carbon emission reduction measures

Boundary and Scope of carbon emissions considered

- The most relevant boundary for considering CO₂ reduction measures are the activities carried out in building operations—predominantly residential activities (c. 96% of floorspace) with a small amount of commercial activities (c. 4% of floorspace).
- Scope 1 CO₂ emissions for the project are produced from gas consumption in centralised gas hot water units and gas cooktops, refrigerant leakage from heat pump systems is also a source of emissions but is considered minor in the context of this project.
- Scope 2 CO₂ emissions, the major source of emissions, come from electricity sourced to power building systems and appliances.
- Significant Scope 3 CO₂ emissions, embodied carbon in key buildings materials and carbon emissions related to cars stored in the building for transport are also considered.

Operational carbon emissions—reduce energy use

Passive design reducing mechanical energy requirement

- NatHERS average rating of 8.2—8.6 stars exceeding the new upgraded BASIX 2022 benchmark
- Commercial floor space to comply at a minimum with NCC 2022 Section J building fabric provisions

Energy efficient systems and appliances

- Air conditioning with heating ACOP > 3.5
- 8 star clothes dryers to apartments
- Energy efficient light, lift and ventilation systems to common areas
- Retail floor space serviced with all electric systems.

Operational carbon emissions—future ability to replace fossil fuels with renewables

Transition from Scope 1 fossil fuels

- Gas cooktops (retail premises) can be transitioned to electricity at the end of the equipment's useful life due to space and infrastructure provisions
- Substation capacity is available to switch gas HW and cooktops to electric induction when required
- Additional space for electric heat pump hot water storage reserved on roof tops
- Suitable amp capacity circuits for future electric cooktops installed
- Retail premises to have no Scope 1 carbon emissions (noting commercial retail premises may have gas services primarily for cooking)

On-site renewable electricity

- A total PV array system has been committed at 20kW capacity in line with BASIX requirements
- Roof space identified to expand the PV array systems if required by the future body corporate

Offsite renewable electricity

- The future body corporate(s) will be able to specify renewable electricity contracts for base building services, including through third party embedded network operators as relevant

Operational carbon emissions—energy management

- Energy metering in place to allow monitoring and optimisation of core systems
- Provision for future battery storage, if feasible, to manage peak loads and also consideration of how future EV battery integration may occur

Reduced upfront embodied carbon emissions

Work by the GBCA (GBCA Think Step ANZ Embodied Carbon and Embodied Energy in Australia's Buildings 2021) can be used to identify the key building materials responsible, on average, for embodied carbon emissions:

- Steel 46%
- Concrete 44%

Concrete embodied emissions could be further reduced by targeting certified low carbon concrete mixes (for example the Boral Envisia range of concrete). A combination of recycled materials, reduced concrete and other additives allow concrete, across strength grades, with reduced carbon emissions of 30-60%.

It is proposed that the tender phase for building contractors include a requirement for tender submissions to provide material options that would achieve reduced embodied carbon emissions, and clarify differences in relation to increased cost, structural integrity and delivery risks (if any). Based on this analysis the project proponent will be able to make an informed decision on the feasibility to implement a reduced embodied emission strategy.

Provide for EVs to replace fossil fuel vehicles

As a minimum the developer will meet NCC 2022 requirements to include future provision for 100% of residential car spots to be EV charger capable in the future (Type 2 charger @ min 7kW).

Annual CO₂ emissions amount to on average 2.22 tCO₂pa per car (for a car driven 15,000 Km/pa) so the potential for saved emissions by providing for low or no emission EVs is substantial.

6. Energy Efficiency and Low Carbon Emissions

Summary of carbon emission reduction outcomes

Target savings in operational carbon emissions

Residential component - operation (est. BASIX outputs)	Proposal case (TnCO ₂ pa) - Scope 1 & 2	Base case (TnCO ₂ pa) - Scope 1 & 2
Common area services	927	
Heating and cooling (& ventilation)	472	
Hot water	506	
Cooking	421	
Lights	132	
Appliances and other	1329	
Residential total	3788	10005
Renewable electricity onsite (20kW) BASIX compliance	-18	
Residential CO ₂ pa reduction	62%	
Non residential component - operation		
Office/retail/restaurant - assumed NCC 2022 compliant	750	750
Buildings total	4520	10755
Buildings total CO ₂ pa reduction	-58%	

Potential Scope 3 CO ₂ emission savings	
Potential concrete with 50% reduced embodied CO ₂ emissions (upfront saving) if commercially feasible in procurement	3363
Potential CO ₂ savings p.a. with future 100% EV uptake	1974

Notes:

- Residential assumptions utilize working BASIX engine results for the project at the time of the report (proposed case and base/reference case) —final outcomes will vary according to final 'as built' building specifications and final BASIX certificate requirements
- Commercial emissions use average sqm electricity usage from 2022 Commercial Building Baseline Study,
- Carbon intensity from grid assumed at 0.67kgCO₂/kWh, in line with BASIX, to reflect the increasing amount of renewable energy on the grid.
- Potential carbon emission savings in lower embodied carbon concrete utilize 'GBCA Think Step ANZ Embodied Carbon and Embodied Energy in Australia's Buildings' to estimate a per apartment materials average and carbon intensity—note that undercroft car parking will reduce concrete intensity in the project compared to an average basement car parking solution. This outcome is subject to acceptable commercial feasibility to procure the low embodied emission concrete product.
- Potential carbon emission savings for EV uptake assume avoided CO₂ emissions from typical ICE vehicle (2.2 tonnes CO₂ pa—NTC 2022, CO₂ Emissions Intensity for New Australian Vehicles 2021)
- Final CO₂ emissions outcomes will vary from averages depending on final design, systems and materials selections for the buildings

Integrated water management plan

Water resources will be managed to deliver three clear objectives for the redeveloped site as an integrated water management plan.

- Reduce the demand for potable water through water efficient fixtures and an alternative water supply—in particular recognising the green landscaped areas proposed
- Reduce negative stormwater volume impacts within and leaving the site (please refer to the project Stormwater Management Plan (SMP)).
- Reduce negative stormwater quality impacts within and adjacent to the site (please refer to the SMP).

Proposed outcomes meeting regulatory requirements and industry standards

- BASIX Water outcome of 50% across buildings exceeding compliance and average industry standards (as observed by Efficient Living in contemporary apartment projects) and meeting the Landcom requirement
- Best practice WELS water efficiency levels for taps, toilets and shower roses
- Landscape strategy utilising mainly low water demand and indigenous plant species to reduce irrigation demand

Recycled Water Utilisation

The development will utilise an existing recycled water connection to further reduce reliance on potable water supplies. Recycled water will be reticulated to all residential and non-residential toilets for flushing, as well as to irrigation systems serving landscaped areas. This alternative water supply significantly offsets potable water demand, particularly for non-drinking uses with consistent and predictable water requirements. The integration of recycled water for toilet flushing and irrigation supports the project's BASIX water efficiency outcomes and aligns with best-practice integrated water management principles.

Water sensitive urban design

The project incorporates water sensitive urban design principles to minimise stormwater impacts and reduce potable water demand. Landscape design prioritises native and low water demand plant species, with over 80% indigenous or native planting, reducing irrigation requirements. Where irrigation is required, high-efficiency sub-surface drip systems and soil moisture sensors will be used to minimise water use and avoid unnecessary irrigation.

Water efficient fixtures and fittings

Water efficiency in the project will be underpinned by efficient fixtures and fittings. Timed tap flow mechanisms will also be incorporated in communal and commercial areas. The following WELS water ratings will be achieved in the top quartile of efficiency for apartment, common and commercial areas:

- Shower roses—flow rates of 6-7.5L/min 4 star
- Toilets 4 star
- Taps 5 star
- Dishwashers minimum 5 star

The recycled water connection to toilet flushing and irrigation, as well as high efficiency water fixtures and low water demand green landscape strategy meet a BASIX 50% potable water saving.

7. Water Efficient Design



WELS shower label certifying 6.5 L flow rate—consistent with this proposal

8. Responsible Materials, Construction and Waste

Lower impact materials and 'circular' waste management

Options will be sought in tender phases to identify and supply materials with certified environmental performance. In addition options will be sought from the building contractor to maximise waste recycling outcomes.

Proposed outcomes meeting regulatory requirements and industry standards

- Options sought to maximise construction waste recycled
- Environmental Product Disclosures (EPDs) options sought for key materials
- EMS and EMP required for head building contractor (ISO 14001)

Supporting responsible materials in the building structure and envelope

The detailed design and tender phases for the project will require options for products that follow good practice in respect to measuring environmental impacts and reducing these impacts. Products with a certified EPD will be sought where available.

The GBCA defined Good Practice products with a Responsible Product Value >10, as detailed at <https://new.gbca.org.au/green-star/rating-system/responsible-products-framework/#responsible-structure>, is a valuable resource to consider in this process.

Building contractor tender responses will be required to provide options for building materials alignment or otherwise with recognised responsible materials ratings schemes as set out by the GBCA.

Key building processes to be considered in detailed design would include:

- Design allowing sub structure and super structure to utilise environmentally certified concrete, steel and other major components
- Façade design also considered to support use of responsible glazing, panel and shade structures etc

Responsible construction

The tender requirements for building contractors will require that the head contractor has an environmental management system under AS/NZS ISO 14001 and will develop and Environmental Management Plan for the project advised to all sub contractors.

Construction waste recycling

Options will be sought for construction and demolition waste management maximising recycling outcomes.

Designing in Waste Sorting and Storage Facilities

The project will provide adequately sized waste storage areas in the basement with separation of major waste streams according to Liverpool City Council services.

A separate waste streaming area for e-waste should also be considered for occasional removal as required.

A garden organics composting/recycling area onsite should also be considered in the final landscape plan.

A Waste Management Plan will be developed for the project guiding the final sizing and location of facilities and providing a guide to future building operators.



Future proofing

Proposed outcomes meeting regulatory requirements and industry standards

- Over 75% of horizontal surfaces to minimise urban heating effects
- Heat reflection from building to street level mitigated through high proportion of ground level green landscape

Urban heating resilience and mitigation

Over 75% of total site horizontal surfaces (excluding the area of proposed PV arrays) have been targeted for reduced urban heating outcomes including:

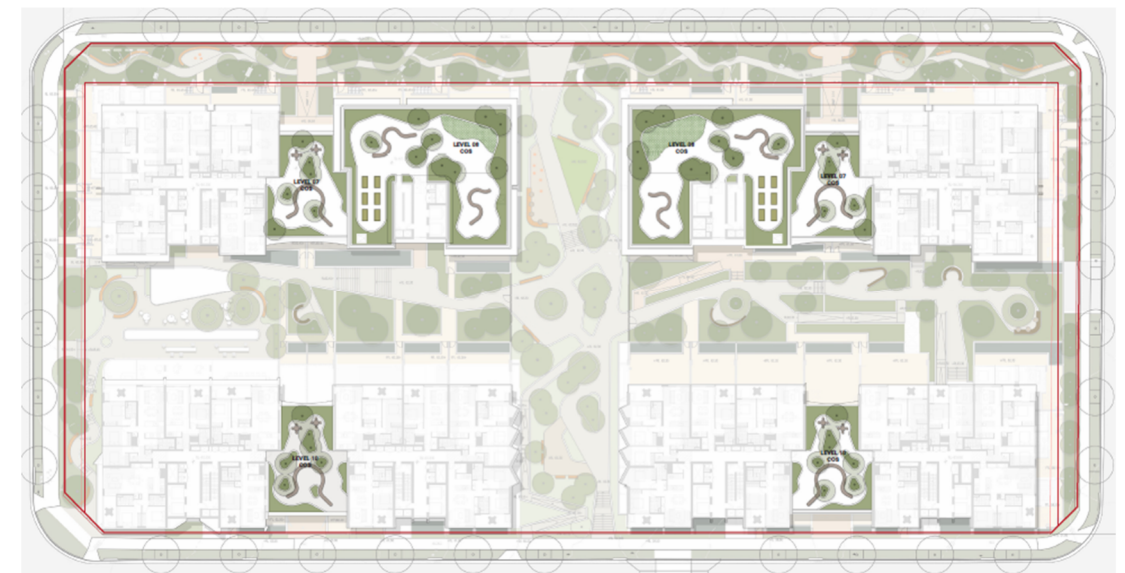
- High green landscape site coverage at ground level and podium levels
- Increased tree canopy, providing shade to hard surfaces and natural cooling
- Final colours for the roof, podium hard surfaces and ground level hardscape surfaces will be specified to achieve low solar absorptance/high solar reflectivity.
 - Roof initial SRI of target minimum 82
 - Hardscapes initial SRI of target minimum 35

Highly reflective glazed facades (and other façade materials such as glass faced spandrels and some metal finishes) can have a large influence on the ground level microclimate by pushing/reflecting solar radiation down to this level.

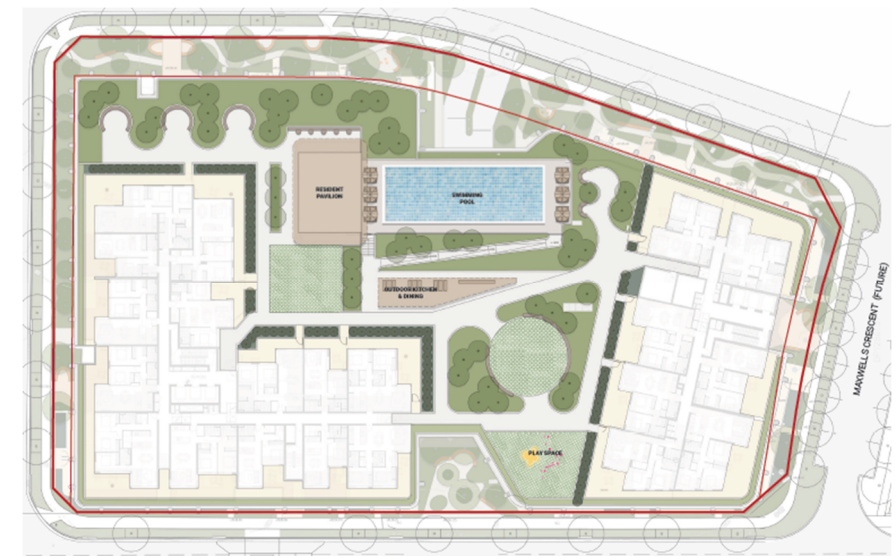
The sum of soft landscaped areas, shaded hardscapes, and light coloured roofs and non-road hardscapes make up more than 75% of the site area for the proposal helping to mitigate heat retention

9. Urban Heat Management

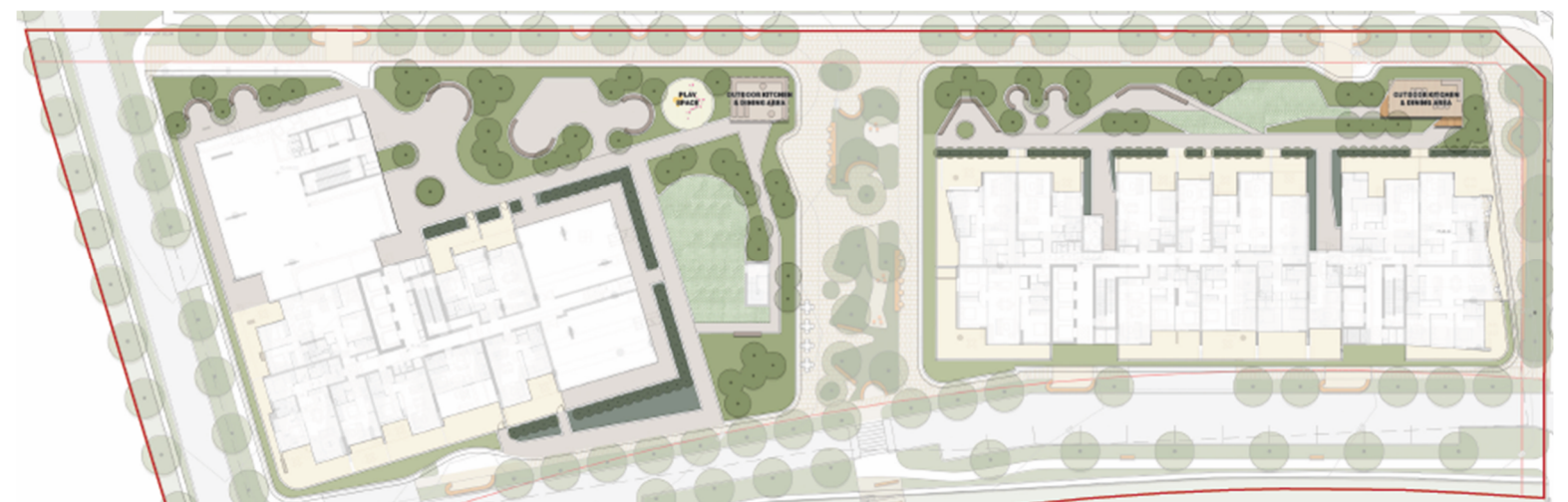
Site 3—landscape areas



Site 4—landscape areas



Site 5—landscape areas



10. Wellbeing and Indoor Environmental Quality

Human wellbeing initiatives

Proposed outcomes meeting regulatory requirements and industry standards

- All NCC and Australian Standards for air quality, light and acoustic comfort will be met
- Cross ventilation outcomes for minimum 60% of apartments meeting the ADG guidelines
- Internal materials and fixings will be selected based on certification of low toxicity as measured by VOC off gassing and formaldehyde content
- Delivery of 15% of the total floor space as Affordable Housing.

Air quality

For commercial and retail premises outdoor air flow will at least meet the AS 1668.2:2012 requirement with opportunities to exceed this performance standard recommended.

Natural cross ventilation outcomes, as measured by the ADGs, are achieved by at least 60% of apartments.

Acoustic Comfort

An acoustic study has been carried out by Pulse White Noise and should be referred to, establishing requirements for satisfactory acoustic outcomes for building occupants according to the activity they are undertaking.

For residential apartments the strategy and design and inclusions will ensure that:

- Maximum acceptable internal noise levels are achieved in bedroom and living room areas considering local rail and road noise
- Acoustic separation insulation levels between apartments will be targeted to meet NCC minimum requirements.

Lighting Comfort

To further enhance the health and wellbeing of residents the project has considered daylighting outcomes through design and will target lighting fixture selection that enhances human comfort.

- Daylighting outcomes are enhanced by the ADG guidelines for window sizing and room depths.
- LED globe modulation, or flicker, should be reduced and target compliance with the international recommendation IEEE 1789-2015.
- LED lighting colour outputs should be accurate, and reflect natural colour outcomes, as measured by a CRI greater than 85 (luminaires should quantify the CRI level)
- LED temperature should target lower levels (2700k-3000k) in bedrooms with brighter (4500K-6500K) in living and kitchen areas with dimming function

Inclusive homes and spaces

15% of total project GFA will be dedicated as Affordable Housing to be managed through a Community Housing Provider.

Communal Facilities and Spaces

The proposal provides a range of communal outdoor spaces designed to be inclusive, safe, flexible and enjoyable for residents.

The proposal aims to deliver a series of fine-grain open spaces that support everyday community interaction and direct engagement with nature. These spaces will accommodate informal conversation, alfresco dining, incidental play and social gathering.



Quality communal spaces create strong community connection—proposed on the extensive podium areas in the proposal



Key abbreviations/glossary

ESD: Ecologically Sustainable Development or often Environmentally Sustainable Development

COP: 'Co-efficient of performance' used to measure conversion of electrical energy into heating or cooling energy

GFA: Gross floor area

ACOP: 'Annualized co-efficient of performance' also used to measure conversion of electrical energy into heating or cooling energy but typically adjusted for local climate conditions

NatHERS: National Home Energy Rating Scheme—note only refers to thermal performance of the home

BASIX: Building Sustainability Index measuring thermal, total energy and water efficiency in the home—part of the Sustainable Buildings SEPP 2022

EV: Electric vehicle

PV/solar array: Solar panels using photo voltaic technology to convert solar radiation into electricity

IEQ: Indoor environmental quality usually referring to air, noise and light quality in the building

DA/SSDA: Development Application/ State Significant Development Application'

SEPP: State Environmental Planning Policy

LEP: Local Environmental Planning Policy

DCP: Development Control Plan

CC: Construction certificate

SEAR: Secretary's Environmental Assessment Requirement issued to support a SSDA

ADG: NSW Apartment Design Guide setting apartment design standards in the NSW Housing SEPP

VOC: 'Volatile organic compound' that is a chemical gas release from typically internal building surfaces and materials

HVAC: Heating, ventilation and air conditioning—also includes cooling processes

Section J: The energy efficiency section requirements of the National Construction Code

GBCA: Green Building Council of Australia—the owner of Green Star ratings for buildings and communities

NABERS: National Australian Built Environment Rating Scheme—providing ratings from actual water and energy consumption in buildings

WELS: Water efficiency labelling and standards scheme

GEMS: Greenhouse and Energy Minium Standards

MEPS: Minimum Energy Performance Standards (under GEMS)

EPD: Environmental Product Disclosure providing transparent information on environmental impacts

Emission scopes – A mechanism for classifying different sources of carbon/GHG emissions used in carbon accounting. There are three 'scopes'

Scope 1 covers direct emissions from on-site fuel combustion (e.g. diesel, natural gas and LPG).

Scope 2 covers indirect emissions from the consumption of purchased electricity, steam, heating and cooling.

Scope 3 covers indirect emissions from activities not owned or controlled by the reporting organization, including production of fuels, electricity transmission losses, embodied carbon in construction and maintenance (including materials and products) tenant energy consumption, waste treatment, water treatment and travel to/from the building.

(adopted from Net Zero Technical Note—DPE 2023)



Appendix A

NABERS Embodied Emissions Materials Form

Step 1: About the building (For Non Residential portion Only)

Fill out blue cells

Building location and site data	Value	Unit	Note	Comment
Building address	Site 3-5, Buchan Avenue, Edmondson Park NSW 2174			
Postcode	2174		Required	Postcode of building
Town/city	Edmondson Park		Town/city/suburb/region automated from postcode (may not give exact town name)	Town/city/suburb/region of the building site.
Distance to nearest major city/town		km	Enter for rural/regional locations only	Declare the shortest route by road to your site from the centre of your nearest major city (>100,000 people). The route must be traversable by a semitrailer truck.
Project stage	Development		Required	Stage of development
New build or major renovation?	New build		Required	
Brownfield or greenfield site?	Brownfield		Required	

Floor area by NCC building classification	Gross (GFA)	Net (NLA/NSA/UFA)	Unit	Note	
Please enter all floor areas relevant to your building. Leave areas blank if not applicable. Please enter Gross Floor Area (GFA) for all building classifications. Please also enter the corresponding net area (Net Lettable Area, Net Sellable Area or Usable Floor Area) where it is commonly used for that building classification.					
Class 1a: Detached residential buildings			m²	Required for Class 1a: Detached residential houses, townhouses	Gross Floor Area (GFA), as defined by the AIA
Class 1b: Boarding houses and hostels			m²	Required for Class 1b: Boarding house, guest house, hostel	Net area (Net Lettable Area, Net Sellable Area)
Class 2: Multi-unit residential buildings			m²	Required for Class 2: Multi-unit residential, including apartment buildings	
Class 3: Other residential buildings			m²	Required for Class 3: Other residential buildings	
Class 4: Residential inside non-residential			m²	Required for Class 4: Residential building inside a non-residential building, e.g., caretaker residence	
Class 5: Office buildings			m²	Required for Class 5: Office building	
Class 6: Retail buildings			3139 m²	Required for Class 6: Retail building, e.g., shop, restaurant, café	
Class 7a: Carparks			8847 m²	Required for Class 7a: Carparks	
Class 7b: Warehouse-type buildings			m²	Required for Class 7b: Warehouses, wholesalers and storage facilities	
Class 8: Industrial buildings			m²	Required for Class 8: Industrial buildings, e.g., factories and workshops	
Class 9a: Healthcare buildings			m²	Required for Class 9a: Healthcare, e.g., hospitals, clinics, day surgeries	
Class 9b: Civic buildings			1538 m²	Required for Class 9b: Civic buildings, e.g., theatres, civic centres, train stations	
Class 9c: Aged care and personal care buildings			m²	Required for Class 9c: Aged care and personal care	
Class 10a: Non-habitable buildings			m²	Required for Class 10a: Non-habitable buildings including sheds, carports and private garages	
Class 10b: Miscellaneous structures			m²	Required for Class 10b: Miscellaneous structures, including fences, masts, antennas, retaining walls and swimming pools	
Class 10c: Bushfire shelters			m²	Required for Class 10c: Bushfire shelters not attached to a Class 1a building	
Total (For Non Residential portion Only)	-		13524 m²	Required: Sum of m² inputs must be more than 0.	

Project information (For Non Residential portion Only)	Value	Unit	Note	
Total cost of project	10,741,100	AUD excl. GST	Required	Include labour, materials, transport, plant, equipment
Building design life	50	years	Required	If uncertain, enter 50 years
Estimated envelope life		years	Optional	
Estimated replacement cycle for mechanical services		years	Optional	
Estimated replacement cycle for vertical transportation		years	Optional	

Dimensions of the building and the site (For Non Residential portion Only)	Value	Unit	Note	
Site area	3.10	Hectares	Required	Total area of site to external boundary.
Shared services or infrastructure	Yes		Required	Indicate if there are shared services that the building uses
Building footprint area	6380	m²	Required	Total floor area of the ground floor measured to the external boundary
Typical floor area (if different to building footprint area)		m²	Only needed if different to row above	
Typical floor perimeter		m	Required	
Area of external carpark (not included in GFA)		m²	Required. Enter 0 if not applicable.	
Area of external hardstand (not included in GFA)		m²	Required. Enter 0 if not applicable.	
Area of other hard landscaping (not included in GFA)	3472	m²	Required. Enter 0 if not applicable.	Include all other impervious areas. For example, paved areas, paths, etc.
Number of floors/storeys above ground, including ground floor	2	no.	Required	
Number of floors/storeys below ground	1	no.	Required. Enter 0 if not applicable.	
Number of floors/storeys of car parking	1	no.	Required. Enter 0 if not applicable.	
Total height above ground	11	m	Required	Measured from the average finished grade to the highest point of the building

Structural material choices	Value	Unit	Note	
Foundation type	Piles		Required	
Frame type (dominant)	Reinforced concrete		Required	
Suspended floor type (typical)	Reinforced concrete		Only needed for multi-storey buildings	
Describe low carbon materials specified in your building (e.g. green concrete, low carbon bricks)	The project has not nominated low carbon construction materials at this point. Detailed material selection will be confirmed during the detailed design phase.		Required	
Describe recycled content specified in your building (e.g. recycled steel)	The project has not nominated recycled construction materials at this point. Detailed material selection will be confirmed during the detailed design phase.		Required	

Step 2: Quantity of materials (For Non Residential portion Only)Complete all blue cells that are applicable to the building. Leave items that aren't applicable blank.

Fill out blue cells

Material category	Site 3-5, Buchan Avenue, Edmon	Sub-category 2	Sub-category 3	Value	Unit of measure	Comment	AIQS ACM	ICMS3 (Le
Structure (For Non Residential portion Only)								
This includes fill below the substructure, foundations, basement levels, suspended floors, wall structure, roof structure, stairs, lift shafts and balconies.								
Coverage of structural material spend	-	-	-	95	%	Required. Coverage of spend for structural elements entered below. Minimum requirement = 80%. Exclude head contractor preliminaries and margins.		
Concrete in-situ	≤10 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	01_SB	0 02 or 03
Concrete in-situ	>10 MPa to ≤20 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	01_SB	0 02 or 03
Concrete in-situ	>20 MPa to ≤32 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	01_SB	0 02 or 03
Concrete in-situ	>32 MPa to ≤40 MPa	-	-	2,067.76	m³	Please enter reinforcing steel as part of "Reinforcing steel" below	01_SB	0 02 or 03
Concrete in-situ	>40 MPa to ≤50 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	01_SB	0 02 or 03
Concrete in-situ	>50 MPa to ≤60 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	01_SB	0 02 or 03
Concrete in-situ	>60 MPa to ≤80 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	01_SB	0 02 or 03
Concrete in-situ	>80 MPa to ≤100 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	01_SB	0 02 or 03
Concrete in-situ	>100 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	01_SB	0 02 or 03
Concrete pre-cast panel	-	-	-		m³	Please enter reinforcing steel in relevant line items below. If not known at DA stage, please make your best estimate. If not known at CC stage, please ask your supplier. Enter as <u>cubic metres</u> , calculated as (area in m²) * (thickness in mm / 1000). Please include all block fill concrete and all reinforcing steel in relevant line items above/below.	01_SB	0 02 or 03
Concrete block	Hollow core	-	-	1892.2152	m³	Enter as <u>cubic metres</u> , calculated as (area in m²) * (thickness in mm / 1000)	01_SB	02 or 03
Concrete block/brick	Solid	-	-		m³	Solid Aerated Autoclaved Concrete (AAC) block.	01_SB	02 or 03
Concrete block/brick	Solid AAC	-	-		m³	Enter as <u>cubic metres</u> , calculated as (area in m²) * (thickness in mm / 1000).	01_SB	02 or 03
Mortar	-	-	-		kg		01_SB	02 or 03
Reinforcing steel	Bar & mesh	-	-	325,512.16	kg	Include all reinforcing steel bar/mesh in the building's structure in this row. Usually this is calculated as kg/m³ per concrete element and then summed. Example: 10 m³ of 40 MPa concrete @ 100 kg/m³ + 5 m³ of 50 MPa concrete @ 150 kg/m³ = 1,750 kg reinforcing steel.	01_SB	0 02 or 03
Reinforcing steel	Fibre & strand	-	-		kg	Include all steel fibre reinforcing and steel strand in the building's structure in this row.	01_SB	0 02 or 03
Structural steel	Hot rolled structural	-	-		t	Examples include universal beams, universal columns and welded beams	01_SB	02 or 03
Structural steel	Cold formed structural	-	-		t	Examples include C purlins, Z purlins and all light gauge steel framing	01_SB	02 or 03
Structural steel	Other welded structural	-	-		t		01_SB	02 or 03
Structural steel	Plate	-	-		t	Include any allowance for connections here	01_SB	02 or 03
Structural steel	Sheet	-	-		t		01_SB	02 or 03
Stainless steel	-	-	-		t	Primarily for engineered timber structure connections	02_11	02 or 03
Reinforced concrete piles	Concrete	-	-		m³	Please enter reinforcing steel in the line below. If not known at DA stage, please make your best estimate. If not known at CC stage, please ask your supplier.	01_SB	02 or 03
Reinforced concrete piles	Steel reinforcing	-	-		kg	If not known at DA stage, please make your best estimate. If not known at CC stage, please ask your supplier.	01_SB	02 or 03
Steel piles	-	-	-		t	Where concrete and reinforcing steel are also used, enter these in the rows above.	01_SB	02 or 03
Timber poles/piles	-	-	-		m³	Where concrete and reinforcing steel are also used, enter these in the rows above.	01_SB	02 or 03
Timber (solid)	Sawn softwood	-	-		m³		02_11	02 or 03
Timber (solid)	Sawn hardwood	-	-	228.12	m³		02_11	02 or 03
Timber (engineered)	CLT	-	-		m³		02_11	02 or 03
Timber (engineered)	Glulam	-	-		m³		02_11	02 or 03
Timber (engineered)	LVL	-	-		m³		02_11	02 or 03
Timber (engineered)	OSB	-	-		m³	Enter as <u>cubic metres</u> , calculated as (area of wall in m²) * (thickness in mm / 1000)	02_11	02 or 03
Brick	Heat cured	-	-		m³	Enter as <u>cubic metres</u> , calculated as (area of wall in m²) * (thickness in mm / 1000)	02_11	02 or 03
Structural Insulated Panel (SIP)	Steel outer	-	-		m²		01_SB	02 or 03
Structural Insulated Panel (SIP)	Aluminium outer	-	-		m²		01_SB	02 or 03
Structural Insulated Panel (SIP)	Engineered timber outer	-	-		m²		01_SB	02 or 03
Fill	-	-	-		t	Include purchased material only. Exclude site-won material.	01_SB	1
Sand & gravel	-	-	-		t	Include purchased material only. Exclude site-won material and sand/gravel in concrete.	01_SB	1
Waterproofing membrane	Bituminous	-	-		m²		01_SB	01 or 02 or
Waterproofing membrane	Polyethylene	-	-	1307.13	m²		01_SB	01 or 02 or
Other structural (Describe and add unit >>)		-	-			Please enter a description for any structural material that does not fit a predefined classification		
Other structural (Describe and add unit >>)		-	-			Please enter a description for any structural material that does not fit a predefined classification		

Other structural (Describe and add unit >>)		-			Please enter a description for any structural material that does not fit a predefined classification
---	--	---	--	--	--

Envelope (For Non Residential portion Only)

This includes the roof cladding, wall cladding, windows, doors and internal/external shading. It also includes insulation and the internal wall lining of envelope walls.

Coverage of envelope material spend	-	-	-	90	%	Required. Coverage of spend for the envelope items you have entered below. Minimum requirement = 80%. Exclude head contractor preliminaries and margins.		
Roof cladding	Profiled steel	-	-		m²	Enter as m² of roof area. Exclude allowances for overlap in the roofing sheets. This row includes all metal-coated and pre-painted steel sheets where steel is the base metal. Examples include: galvanised steel, zinc-aluminium (zincalume) coated steel and zinc-aluminium-magnesium (ZAM) coated steel, whether painted or unpainted.	05_RF	03 or 04
Roof cladding	Profiled aluminium	-	-		m²	Enter as m² of roof area. Exclude allowances for overlap in the roofing sheets. This row also includes pre-painted aluminium sheets.	05_RF	03 or 04
Roof cladding	Profiled zinc	-	-		m²	Enter as m² of roof area. Exclude allowances for overlap in the roofing sheets. This row also includes pre-painted zinc sheets.	05_RF	03 or 04
Roof cladding	Membrane	-	-		m²	Enter as m² of roof area. Exclude allowances for overlap in the membrane sheets.	05_RF	03 or 04
Roof cladding	Tiles (traditional clay)	-	-		m²	Enter as m² of roof area. Exclude allowances for overlap between the tiles.	05_RF	03 or 04
Roof cladding	Tiles (concrete)	-	-		m²	Enter as m² of roof area. Exclude allowances for overlap between the tiles.	05_RF	03 or 04
Roof cladding	Other (Please describe >>)		-		m²	Please enter a description for any roofing that does not fit a predefined classification	05_RF	03 or 04
Wall cladding	Bricks (heat cured)	-	-		m²	Enter as m² of wall area. Heat-cured bricks use a kiln or furnace to raise the brick temperature above ambient temperature during curing process.	06_EW	03 or 04
Wall cladding	Bricks (air dried)	-	-		m²	Enter as m² of wall area. Air-dried bricks are cured using ambient temperature.	06_EW	03 or 04
Wall cladding	Bricks (under fired)	-	-		m²	Enter as m² of wall area.	06_EW	03 or 04
Wall cladding	Bricks (concrete)	-	-		m²	Enter as m² of wall area	06_EW	03 or 04
Wall cladding	Mortar and render	-	-	500,680	kg		06_EW	03 or 04
Wall cladding	Profiled steel	-	-		m²	Enter as m² of wall area. Exclude allowances for overlap in the cladding sheets, offcuts, etc. This row includes all metal-coated and pre-painted steel sheets where steel is the base metal. Examples include: galvanised steel, zinc-aluminium (zincalume) coated steel and zinc-aluminium-magnesium (ZAM) coated steel, whether painted or unpainted.	06_EW	03 or 04
Wall cladding	Profiled aluminium	-	-	1,862.68	m²	Enter as m² of wall area. Exclude allowances for overlap in the cladding sheets, offcuts, etc. This row also includes pre-painted aluminium sheets.	06_EW	03 or 04
Wall cladding	Profiled zinc	-	-		m²	Enter as m² of wall area. Exclude allowances for overlap in the cladding sheets, offcuts, etc. This row also includes pre-painted zinc sheets.	06_EW	03 or 04
Wall cladding	GRC cladding	-	-		m²	Enter as m² of wall area. GRC = Glass Reinforced Concrete.	06_EW	03 or 04
Wall cladding	Timber weatherboards	-	-		m²	Enter as m² of wall area. Exclude allowances for overlap between weatherboards, offcuts, etc.	06_EW	03 or 04
Wall cladding	Fibre cement board	-	-		m²	Enter as m² of wall area. Exclude allowances for offcuts, etc.	06_EW	03 or 04
Wall cladding	Terracotta	-	-		m²	Enter as m² of wall area. Exclude allowances for offcuts, etc.	06_EW	03 or 04
Wall cladding	Brick tiles / veneers	-	-		m²	Enter as m² of wall area. Exclude allowances for offcuts, etc.	06_EW	03 or 04
Wall cladding	Plasterboard	-	-		m²	Enter as m² of wall area. Exclude allowances for offcuts, etc. Include both external wall linings and internal wall linings for envelope walls.	12_WF or (	03 or 04
Wall cladding	Plywood	-	-		m²	Enter as m² of wall area. Exclude allowances for offcuts, etc. Include both external wall linings and internal wall linings for envelope walls.	12_WF or (	03 or 04
Wall cladding	Other (Please describe >>)		-		m²	Please enter a description for any wall cladding that does not fit a predefined classification	06_EW or (	03 or 04
Windows & doors	Aluminium frame	Single glazed	-	1862.68	m²	Include all single glazing, including standard, toughened, laminated and low-E	07_WW or 03 or 04	
Windows & doors	Aluminium frame	Double glazed	-		m²	Include all double glazing, including standard, toughened, laminated and low-E	07_WW or 03 or 04	
Windows & doors	Aluminium frame	Triple glazed	-		m²	Include all triple glazing, including standard, toughened, laminated and low-E	07_WW or 03 or 04	
Windows & doors	Timber frame	Single glazed	-		m²	Include all single glazing, including standard, toughened, laminated and low-E	07_WW or 03 or 04	
Windows & doors	Timber frame	Double glazed	-		m²	Include all double glazing, including standard, toughened, laminated and low-E	07_WW or 03 or 04	
Windows & doors	Timber frame	Triple glazed	-		m²	Include all triple glazing, including standard, toughened, laminated and low-E	07_WW or 03 or 04	
Windows & doors	uPVC frame	Single glazed	-		m²	Include all single glazing, including standard, toughened, laminated and low-E	07_WW or 03 or 04	
Windows & doors	uPVC frame	Double glazed	-		m²	Include all double glazing, including standard, toughened, laminated and low-E	07_WW or 03 or 04	
Windows & doors	uPVC frame	Triple glazed	-		m²	Include all triple glazing, including standard, toughened, laminated and low-E	07_WW or 03 or 04	
Windows & doors	Frameless	Single glazed	-		m²	Include all single glazing, including standard, toughened, laminated and low-E	07_WW or 03 or 04	
Windows & doors	Frameless	Double glazed	-		m²	Include all double glazing, including standard, toughened, laminated and low-E	07_WW or 03 or 04	
Windows & doors	Frameless	Triple glazed	-		m²	Include all triple glazing, including standard, toughened, laminated and low-E	07_WW or 03 or 04	
Windows & doors	Other (Please describe >>)		-		m²	Please enter a description for any windows or doors that do not fit a predefined classification	07_WW or 03 or 04	
Curtain wall	Single skin façade	Glazed panel	Single glazed		m²	Please declare all single-skin façade area in this section. All double-skin façade area should be entered in the next section. Include all single glazing, including standard, toughened, laminated and low-E	06_EW	03 or 04
Curtain wall	Single skin façade	Glazed panel	Double glazed		m²	Include all double glazing, including standard, toughened, laminated and low-E	06_EW	03 or 04
Curtain wall	Single skin façade	Glazed panel	Triple glazed		m²	Include all triple glazing, including standard, toughened, laminated and low-E	06_EW	03 or 04

Curtain wall	Single skin façade	Opaque panel	Aluminium cladding		m²		06_EW	03 or 04
Curtain wall	Single skin façade	Opaque panel	GRC cladding		m²	GRC = Glass-fibre Reinforced Concrete	06_EW	03 or 04
Curtain wall	Single skin façade	Opaque panel	Insulated shadow box		m²		06_EW	03 or 04
Curtain wall	Single skin façade	Opaque panel	Brick cladding		m²		06_EW	03 or 04
Curtain wall	Single skin façade	Opaque panel	Stone cladding		m²		06_EW	03 or 04
						Please declare all double-skin façade area in this section. Please declare as the area of the curtain wall and do not enter the inner and outer skins twice.		
Curtain wall	Double skin façade	Glazed panel	Single glazed		m²	Include all single glazing, including standard, toughened, laminated and low-E.	06_EW	03 or 04
Curtain wall	Double skin façade	Glazed panel	Double glazed		m²	The type of glazing refers to the building's envelope wall, not including the outer skin	06_EW	03 or 04
Curtain wall	Double skin façade	Glazed panel	Triple glazed		m²	The type of glazing refers to the building's envelope wall, not including the outer skin	06_EW	03 or 04
Curtain wall	Double skin façade	Opaque panel	Aluminium cladding		m²		06_EW	03 or 04
Curtain wall	Double skin façade	Opaque panel	GRC cladding		m²	GRC = Glass-fibre Reinforced Concrete	06_EW	03 or 04
Curtain wall	Double skin façade	Opaque panel	Insulated shadow box		m²		06_EW	03 or 04
Curtain wall	Double skin façade	Opaque panel	Brick cladding		m²		06_EW	03 or 04
Curtain wall	Double skin façade	Opaque panel	Stone cladding		m²		06_EW	03 or 04
Curtain wall	Other (Please describe >>)		-		m²	Please enter a description for any curtain wall that does not fit a predefined classification	06_EW	03 or 04
Stick-framed wall system	Aluminium frame	Glazed section	Single glazed		m²	Include all single glazing, including standard, toughened, laminated and low-E	06_EW	03 or 04
Stick-framed wall system	Aluminium frame	Glazed section	Double glazed		m²	Include all double glazing, including standard, toughened, laminated and low-E	06_EW	03 or 04
Stick-framed wall system	Aluminium frame	Glazed section	Triple glazed		m²	Include all triple glazing, including standard, toughened, laminated and low-E	06_EW	03 or 04
Stick-framed wall system	Aluminium frame	Opaque section	Aluminium cladding		m²		06_EW	03 or 04
Stick-framed wall system	Aluminium frame	Opaque section	GRC cladding		m²	GRC = Glass-fibre Reinforced Concrete	06_EW	03 or 04
Stick-framed wall system	Aluminium frame	Opaque section	Insulated shadow box		m²		06_EW	03 or 04
Stick-framed wall system	Aluminium frame	Opaque section	Brick cladding		m²		06_EW	03 or 04
Stick-framed wall system	Aluminium frame	Opaque section	Stone cladding		m²		06_EW	03 or 04
Stick-framed wall system	Steel frame	Glazed section	Single glazed		m²	Include all single glazing, including standard, toughened, laminated and low-E	06_EW	03 or 04
Stick-framed wall system	Steel frame	Glazed section	Double glazed		m²	Include all double glazing, including standard, toughened, laminated and low-E	06_EW	03 or 04
Stick-framed wall system	Steel frame	Glazed section	Triple glazed		m²	Include all triple glazing, including standard, toughened, laminated and low-E	06_EW	03 or 04
Stick-framed wall system	Steel frame	Opaque section	Aluminium cladding		m²		06_EW	03 or 04
Stick-framed wall system	Steel frame	Opaque section	GRC cladding		m²	GRC = Glass-fibre Reinforced Concrete	06_EW	03 or 04
Stick-framed wall system	Steel frame	Opaque section	Insulated shadow box		m²		06_EW	03 or 04
Stick-framed wall system	Steel frame	Opaque section	Brick cladding		m²		06_EW	03 or 04
Stick-framed wall system	Steel frame	Opaque section	Stone cladding		m²		06_EW	03 or 04
Stick-framed wall system	Other (Please describe >>)		-		m²	Please enter a description for any wall system that does not fit a predefined classification	06_EW	03 or 04
Wall louvre system	Aluminium	-	-	186	m²		06_EW	03 or 04
External shading system	Aluminium frame	Aluminium cladding	-	0	m²	Please enter as m² of shaded area = linear metres * (width in mm / 1000)	06_EW	03 or 04
External shading system	Aluminium frame	GRC cladding	-		m²	Please enter as m² of shaded area = linear metres * (width in mm / 1000).	06_EW	03 or 04
External shading system	Aluminium frame	Terracotta cladding	-		m²	GRC = Glass-fibre Reinforced Concrete.	06_EW	03 or 04
External shading system	Aluminium frame	Stone cladding	-		m²	Please enter as m² of shaded area = linear metres * (width in mm / 1000)	06_EW	03 or 04
External shading system	Aluminium frame	Pre-cast concrete	-		m²	Please enter as m² of shaded area = linear metres * (width in mm / 1000)	06_EW	03 or 04
External shading system	Aluminium frame	Timber	-		m²	Please enter as m² of shaded area = linear metres * (width in mm / 1000)	06_EW	03 or 04
External shading system	Aluminium frame	Glass (opaque)	-		m²	Please enter as m² of shaded area = linear metres * (width in mm / 1000)	06_EW	03 or 04
External shading system	Aluminium frame	Steel	-		m²	Please enter as m² of shaded area = linear metres * (width in mm / 1000)	06_EW	03 or 04
External shading system	Other (Please describe >>)		-		m²	Please enter as m² of shaded area = linear metres * (width in mm / 1000)	06_EW	03 or 04
Roller doors	Steel profile	-	-	54.00	m²	Please note unit is <u>square metres</u> , not quantity	08_ED	03 or 04
Roller doors	Hardwood over steel	-	-		m²	Please note unit is <u>square metres</u> , not quantity	08_ED	03 or 04
Roller doors	Softwood over steel	-	-		m²	Please note unit is <u>square metres</u> , not quantity	08_ED	03 or 04
Revolving doors	Glass/aluminium/steel	-	-		no.		08_ED	03 or 04
Fire-rated doors	Engineered timber	-	-	18	no.	Please enter as single-leaf equivalent. For double-leaf doors, multiply the quantity by 2.	08_ED	03 or 04
Fire-rated doors	Steel	-	-	2	no.	Please enter as single-leaf equivalent. For double-leaf doors, multiply the quantity by 2.	08_ED	03 or 04
Fire-rated doors	Aluminium/glass	-	-	33	no.	Please enter as single-leaf equivalent. For double-leaf doors, multiply the quantity by 2.	08_ED	03 or 04
Insulation	Glass wool / fibreglass	-	-	-	m²	Please include both wall and ceiling insulation	05_RF	03 or 04
Insulation	Stone wool	-	-		m²	Please include both wall and ceiling insulation	05_RF	03 or 04
Insulation	Polyester	-	-		m²	Please include both wall and ceiling insulation	05_RF	03 or 04
Insulation	Expanded polystyrene	-	-		m²	Please include both wall and ceiling insulation	05_RF	03 or 04
Insulation	Other (Please describe >>)		-		m²	Please include both wall and ceiling insulation	05_RF	03 or 04
Other (Please describe and add unit >>)		-	-			Please enter a description for any envelope material that does not fit a predefined classification		

Other (Please describe and add unit >>)		-	-			Please enter a description for any envelope material that does not fit a predefined classification
Other (Please describe and add unit >>)		-	-			Please enter a description for any envelope material that does not fit a predefined classification

Permanent internal walls and doors (For Non Residential portion Only)

Walls and doors within the building that are either structural or designed to be permanent.

Coverage of material spend on permanent internal walls and doors				95	%	Enter the % coverage of spend for the items you have entered below. There is no minimum requirement: enter what you know. This should include all structural walls. Exclude head contractor preliminaries and margins.		
Interior wall (permanent)	Steel (light framing)	-	-		t		09_NW	03 or 04
Interior wall (permanent)	Timber framing	-	-		m³		09_NW	03 or 04
Interior wall (permanent)	AAC panel (reinforced)	-	-		m²	Panels of autoclaved aerated concrete (AAC) with reinforcing steel. E.g., Hebel.	09_NW	03 or 04
Interior wall (permanent)	Concrete-filled steel panel	-	-		m²	Panels made from a steel sheet outer with an aerated concrete core. E.g., Speedpanel.	09_NW	03 or 04
Interior wall (permanent)	Plasterboard	-	-	264.00	m²	Enter as single-layer equivalent. If using 2 layers, multiply the area by 2.	09_NW	03 or 04
Interior wall (permanent)	Plywood	-	-		m²	Enter as single-layer equivalent. If using 2 layers, multiply the area by 2.	09_NW	03 or 04
Interior wall (permanent)	Fibre cement sheet	-	-		m²	Enter as single-layer equivalent. If using 2 layers, multiply the area by 2.	09_NW	03 or 04
Interior wall (permanent)	Insulation	-	-		m²		09_NW	03 or 04
Interior wall (permanent)	Glass	-	-		m²		09_NW	03 or 04
Interior wall (permanent)	Other (Please describe >>)		-		m²	Please enter a description for any internal wall that does not fit a predefined classification	09_NW	03 or 04
Internal door (permanent)	Aluminium/glass	-	-		no.	Please enter as single-leaf equivalent. For double-leaf doors, multiply the quantity by 2.	11_ND	03 or 04
Internal door (permanent)	Timber/glass	-	-		no.	Please enter as single-leaf equivalent. For double-leaf doors, multiply the quantity by 2.	11_ND	03 or 04
Internal door (permanent)	Timber solid lightweight	-	-		no.	Please enter as single-leaf equivalent. For double-leaf doors, multiply the quantity by 2.	11_ND	03 or 04
Internal door (permanent)	Fire resistant	-	-	86	no.	Please enter as single-leaf equivalent. For double-leaf doors, multiply the quantity by 2.	11_ND	03 or 04
Internal door (permanent)	Steel	-	-		no.	Please enter as single-leaf equivalent. For double-leaf doors, multiply the quantity by 2.	11_ND	03 or 04
Internal door (permanent)	Other (Please describe >>)		-		no.	Please enter a description for any internal door that does not fit a predefined classification	11_ND	03 or 04
Other (Please describe and add unit >>)		-	-			Please enter a description for any material that does not fit a predefined classification		
Other (Please describe and add unit >>)		-	-			Please enter a description for any material that does not fit a predefined classification		
Other (Please describe and add unit >>)		-	-			Please enter a description for any material that does not fit a predefined classification		

Services (For Non Residential portion Only)

building only, then only enter these items. If you cannot split services by type, please enter them all in the "Other services" category at the bottom. Enter all values as material costs in

					Unit of measure			
Mechanical services	-	-	-	371,012.40	AUD excl. GST	Where possible, enter material costs excluding labour, plant, equipment, margins and taxes	28_SS	5
Vertical transportation	-	-	-	117,691.51	AUD excl. GST	Where possible, enter material costs excluding labour, plant, equipment, margins and taxes	28_SS	5
Electrical services	-	-	-	665,011.18	AUD excl. GST	Electrical services including the main power supply, backup generators, security and communications. Excluding solar installations.	26_LP	5
Solar photovoltaic installations	-	-	-		incl. AUD excl. GST	Where possible, enter material costs excluding labour, plant, equipment, margins and taxes	26_LP_LPt	5
Plumbing/hydraulic services	-	-	-	713,994.84	AUD excl. GST	Where possible, enter material costs excluding labour, plant, equipment, margins and taxes	18_PD and 05 or 06	
Fire services				433,775.95	AUD excl. GST	Where possible, enter material costs excluding labour, plant, equipment, margins and taxes	25_FPSS0	5
Other services (Please describe)		-	-		AUD excl. GST	Please group all other services here, meaning that coverage will always be 100% for services. Enter only the material costs (excluding labour, plant, equipment, margins and taxes).	29_SS or multiple	

External works (For Non Residential portion Only)

This includes hardstands, carpark, driveways, covered walkways, decks, patios, awnings, fences, gates, etc. Soft landscaping should be excluded.

Coverage of spend on external works	-	-	-	85	%	Required. Coverage of spend for external works (excluding soft landscaping) entered below. Minimum requirement = 80%. Exclude head contractor preliminaries and margins.		
Asphalt	-	-	-		t		33_XR	7
Concrete in-situ	≤10 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	33_XR or 3	7
Concrete in-situ	>10 MPa to ≤20 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	33_XR or 3	7

Concrete in-situ	>20 MPa to ≤32 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	33_XR or 3	7
Concrete in-situ	>32 MPa to ≤40 MPa	-	-	694.4	m³	Please enter reinforcing steel as part of "Reinforcing steel" below	33_XR or 3	7
Concrete in-situ	>40 MPa to ≤50 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	33_XR or 3	7
Concrete in-situ	>50 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	33_XR or 3	7
Pavers, bricks and blocks	Concrete	-	-		m²		33_XR	7
Pavers, bricks and blocks	Clay	-	-		m²		33_XR	7
Reinforcing steel	Bar & mesh	-	-	55552	kg	Include all reinforcing steel bar/mesh in the external works in this row. Usually this is calculated as kg/m² per concrete element and then summed. Example: 10 m² of 40 MPa concrete @ 100 kg/m² + 5 m² of 50 MPa concrete @ 150 kg/m² = 1,750 kg reinforcing steel.	33_XR or 3	7
Reinforcing steel	Fibre & strand	-	-		kg	Include all steel fibre reinforcing and steel strand in the external works in this row.	33_XR or 3	7
Structural steel	-	-	-		t		02_11	7
Structural aluminium	-	-	-		t	Includes structures, louvre systems, etc.	35_XB	7
External roof/wall cladding	Polycarbonate	-	-		m²	Enter as profiled polycarbonate sheet that would ordered, including allowance for overlap	35_XB	7
External roof/wall cladding	PVC	-	-		m²	Enter as profiled PVC sheet that would ordered, including allowance for overlap	35_XB	7
External roof/wall cladding	Bitumen sheet	-	-		m²	Enter as bituminous sheet that would ordered, including allowance for overlap	35_XB	7
External roof/wall cladding	Steel profile	-	-		m²	Enter as profiled steel sheet that would ordered, including allowance for overlap	35_XB	7
Fill	-	-	-		t	Include purchased material only. Exclude site-won material.	33_XR or 3	7
Sand & gravel	-	-	-		t	Include purchased material only. Exclude site-won material and sand/gravel in concrete.	33_XR or 3	7
Timber (solid)	Sawn softwood	-	-		m³		33_XR or 3	7
Timber (solid)	Sawn hardwood	-	-		m³		33_XR or 3	7
Timber (engineered)	CLT	-	-		m³		33_XR or 3	7
Timber (engineered)	Glulam	-	-		m³		33_XR or 3	7
Timber (engineered)	LVL	-	-		m³		33_XR or 3	7
Timber (engineered)	OSB	-	-		m³		33_XR or 3	7
Fabric (awning/sunshade)					m²		35_XB or 3	7
Other (Please describe and add unit >>)		-	-			Please enter a description for any external works that does not fit a predefined classification		
Other (Please describe and add unit >>)		-	-			Please enter a description for any external works that does not fit a predefined classification		
Other (Please describe and add unit >>)		-	-			Please enter a description for any external works that does not fit a predefined classification		

Step 3: Certifier details

Fill out blue cells

bill of quantities) and certified by a quantity surveyor, designer, engineer or NABERS Assessor.

Site 3-5, Buchan Avenue, Edmondson Park

Person that completed this form	Value	Note
Name	Michael M. Dakhoul	Required
Company	Construction Consultants (QS)	Required
ABN	81 613 437 488	
Profession	Certified Quantity Surveyor AIQS	Required
Qualification or registration	FAIQS CQS MAIB MCIOB ICECA FAIQS Reg. No. 3618	Required

Person that certified the details in this form	Value	Note
Name	Michael M. Dakhoul	Required
Company	Construction Consultants (QS)	Required
ABN	81 613 437 488	
Profession	Certified Quantity Surveyor AIQS	Required
Qualification or registration	FAIQS CQS MAIB MCIOB ICECA FAIQS Reg. No. 3618	Required

Confirmation of certification	Value	Note
Are 80% of material costs captured for the building's structure, envelope and external works?	Yes	Required
If no - why not?		

Additional comments from data provider

Additional comments of certifier

Attach this Excel spreadsheet to your development application or construction certificate application.



efficient
LIVING

-  Shop 6/1-5 Collaroy Street, Collaroy NSW (Sydney)
-  02 9970 6181
-  admin@efficientliving.com.au
-  efficientliving.com.au

