

APPENDIX 8. SUSTAINABILITY STATEMENT



Project: M1 PBSA
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RE: M1 PBSA - Summary of Sustainability Initiatives

Summary

This sustainable design response for the proposed purpose built student accommodation site at 195 North Terrace in Adelaide outlines the project's commitment to embedding sustainability outcomes throughout the design and construction processes.

Project Context

Sustainability has been identified as a key component of the project's strategy based on the recognition of the large impacts that real estate contributes to environmental, economic and social outcomes. Globally, the built environment contributes almost 40% of annual carbon emissions (Figure 1).

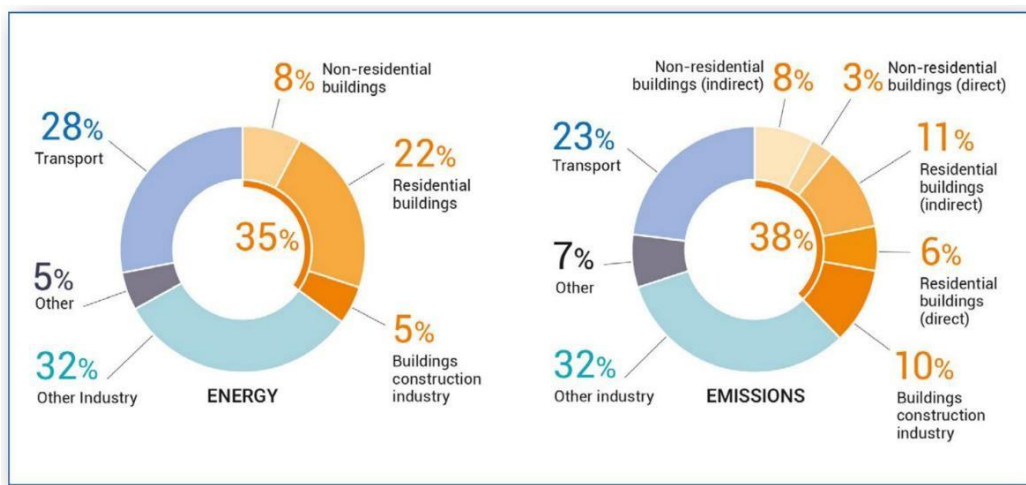


Figure 1 - Contribution of Built Environment to Global CO2 emissions

Source: <https://www.weforum.org/agenda/2022/01/decarbonizing-the-built-environment/>

Throughout the planning process, a series of workshops and meetings has allowed for a comprehensive sustainability strategy to be developed. Key outcomes will continue to be coordinated within the design team to ensure they remain embedded within the design process and are summarized in subsequent sections.



Sustainability Commitments

The Sustainability Commitments section outlines a set of commitments for the development to provide worthwhile and real-world impact including the following.

All Electric Development

The entire development will be all-electric, reducing operational emissions by utilising the rapidly decarbonising electricity grid (see below), which will be 100% net renewable in 2027 according to the latest state government announcement¹.

Beyond decarbonisation this has the following health and wellbeing benefits:

- Electric cooking reduces harmful pollutants to only the particulate matter produced from the food itself, compared to additional harmful pollutants produced from burning gas. One study² showed that gas cooking is equivalent to the impact of passive smoking in households and another³ showed children had a 42% higher rate of asthma, with gas burning and leakage in homes contributing to 12% of the national asthma burden in Australia⁴ Using electric heat pumps (minimum nominated efficiency of 350%) instead of gas fired boilers (typical efficiency 80%).

Variable Renewable Energy (VRE) in Annual Generation

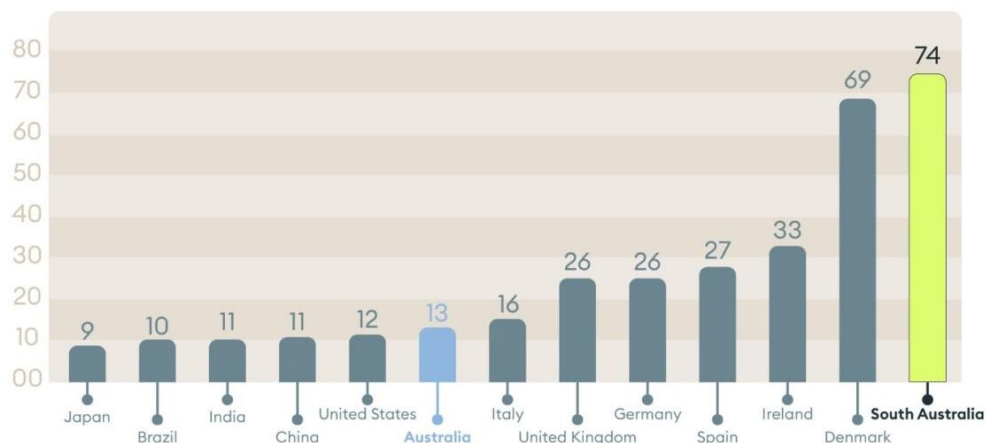


Figure 2 - Comparison of 2024 Renewable Electricity Supply Percentage for Global Grids

Source: <https://reneweconomy.com.au/our-largest-load-is-now-our-largest-generator-the-path-to-worlds-first-100-pct-variable-renewable-grid/>

¹ [https://www.energymining.sa.gov.au/consumers/energy-grid-and-supply/our-electricity-supply-and-market#:~:text=supply%20and%20demand-Where%20does%20South%20Australia's%20electricity%20come%20from?,National%20Electricity%20Market%20\(NEM\).](https://www.energymining.sa.gov.au/consumers/energy-grid-and-supply/our-electricity-supply-and-market#:~:text=supply%20and%20demand-Where%20does%20South%20Australia's%20electricity%20come%20from?,National%20Electricity%20Market%20(NEM).)

² <https://www.climatecouncil.org.au/resources/invisible-danger-gas-asthma-children/>

³ <https://academic.oup.com/ije/article/42/6/1724/737113?login=false>

⁴ <https://www.abc.net.au/news/2021-05-23/can-gas-stovetops-give-you-asthma/100157786>



Renewable Energy Supply

The development will ensure 100% of all electricity for at least the first 5 years is procured from renewable generation sources, regardless of the state's commitment to net-zero by 2027. This will ensure all carbon emissions associated with electricity consumption for at least the first 5 years of operation are regardless of the state's target being met or not, and ensures actual zero emissions operations regardless of carbon accounting methodology.

Building Resilience

All high or extreme risks related to impacts of forecast changes to extreme weather events as assessed in accordance with AS5334:2013 will be suitably ameliorated with residual risk no higher than medium. Impacts and risks associated with the following will be assessed, with the risk assessment led by a suitably qualified professional:

- Direct damage or failure of project components
- Accelerated deterioration of project components or reduced design life
- Reduced operating capacity
- Climate hazard impacts to surrounding areas (e.g., impacting access and egress)
- Impacts to the health and wellbeing of building occupants and other relevant stakeholders
- Indirect risks from impacts to other interdependent systems and services (e.g., transport networks, power, water, telecommunications)

Building Fabrics

- Double glazing to the facade with high performing, low-e coating to control solar gain. $U < 3.0$, $SHGC < 0.25$
- Naturally Ventilated dwellings: Optimisation of operable windows designed to maximize cross flow ventilation and reduce mechanical cooling. Achieve best practice natural ventilation criteria to AS1668.4 - 2012.
- Select a low solar absorptance roof (max SA = 0.32) to reduce both solar gain and urban heat island effect.
- Improved air tightness providing both improve energy efficiency and health benefits, with a target of $< 10 \text{ m}^3/\text{hr.m}^2$ for a minimum sample of 10 apartments.
- External shading to selected areas to reduce solar gains while maximising views and daylight.

Services

- Development to be at least 20% more energy efficient than a reference building compliant with NCC 2022.



- **HVAC:** High efficiency DX units throughout with low GWP R32 refrigerant, a reduction of approximately 70% global warming potential compared to industry typical R410a. All plant to have minimum AEER of 3.7.
- **DHW:** Centralised Heat Pump Hot Water system with COP > 3.5. All refrigerants with GWP of 10 or less (ie. R1234yf, R290 or CO2).
- **Lighting:** Install LED lighting throughout. At a minimum, install occupancy sensors in all intermittently occupied zones, ensure light switches are suitably frequent to allow for optimal control, achieve a 20% reduction in LPD and opaque diffusers to reduce lighting glare and colour rendition CRI>85. Limit external lighting to reduce light pollution and all fittings to have ULOR<5%
- **Vertical Transport:** Select lifts with standby power modes and regenerative drives.
- **Solar PV:** Consolidate roof plant to maximise common Solar PV system (*minimum 30kW on Apartment roof*) which will be distributed across all building users via the embedded network.
 - Expected to generate 46,000kWh annually, or the equivalent power consumption of approximately 11 homes in SA⁵
- **Appliances:** Where Appliances are installed, nominate energy efficiency options, including:
 - Dishwashers: 4 star
 - Washing Machines: 4.5 star
 - Dryers: 5.0 star
 - Fridge/Freezers: 4 star

Indoor Environment Quality & Amenity

- Specify glass with a minimum VLT of 45% for improved daylight.
- Provide block out blinds to control glare and reduce night-time light pollution to all dwellings
- Select and use low VOC products internally for adhesives, sealants, carpets, and paints
 - As per Appendix A
- Specify engineered timber products to meet formaldehyde limits.
 - As per Appendix A

Water & Landscaping

- Drought tolerant native species to min 50% of garden beds, with water efficient dripper irrigation installed throughout.
- Water efficient fixtures and fittings, with the following minimum WELS ratings:
 - 5 star Taps

⁵ <https://ahd.csiro.au/other-data/typical-house-energy-use/>



- 4 star Toilets
- 3 star Showers (Maximum flowrate of 7.5L/min)
- 4.5 star Washing Machine (where installed)
- 5 star Dishwasher (where installed)
- Reduce Urban Heat Island Effect through:
 - Low Solar Absorptance roof as per 'Buildings Fabrics' section.
 - Maximising Vegetated landscaping.

Waste

- Minimum 3 streams of waste collection for reduced landfill in operation
 - Organics
 - Commingled Recycle
 - General Waste
 - Include additional waste stream for one of the following: e-Waste, Bulky goods or Batteries.
- 90% diversion of Construction and Demolition Waste.

Materials

- Overall building to reduce upfront carbon by at least 10% compared to a reference building in accordance with the GBCA's Upfront Carbon Calculation methodology
- Impact of embodied carbon of the building will be reduced through:
 - Nominating concrete with a min. 40% reduction in Portland cement content for footings, slab, piles and other on- grade applications (typical concrete mixes and resultant improvement shown below⁶)
 - Design with Post tensioned slabs where possible to reduce volume of concrete and reinforcing steel.
 - All concrete to have a minimum 20% reduction in Portland cement reduction across the average of all mixes, or the equivalent embodied carbon saving thereof.

⁶ <https://msd.unimelb.edu.au/research/projects/current/environmental-performance-in-construction>

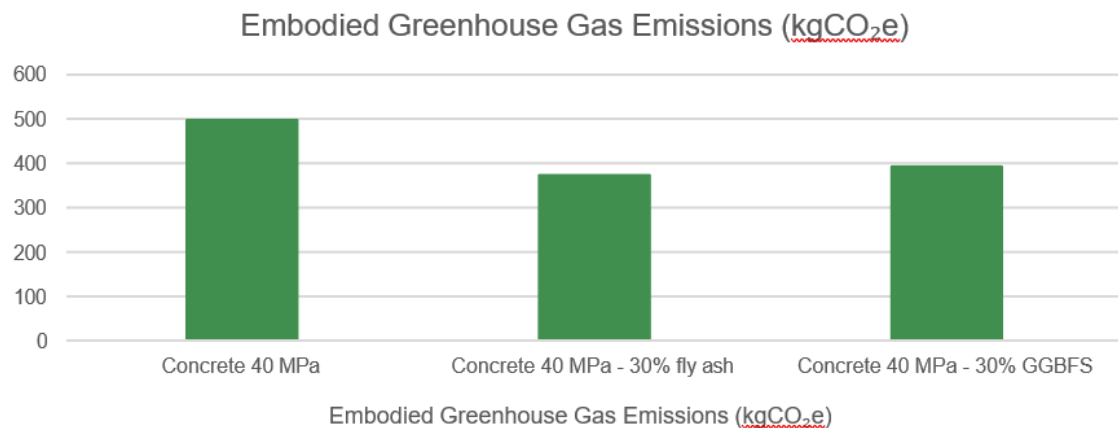


Figure 3 - Concrete Embodied Carbon Emissions

- A minimum of 75% of the site will be designed in accordance with the following outcomes to minimise urban heat island effect:
 - Vegetation
 - • Roofing materials, including shading structures, having the following:
 - For roof pitched $<15^\circ$ – a three-year SRI of minimum 64
 - For roof pitched $>15^\circ$ – a three-year SRI of minimum 34
 - Unshaded hard-scaping elements with a three-year SRI of minimum 34 or an initial SRI of minimum 39
 - Hardscaping elements shaded by overhanging vegetation
 - Naturally shaded by plant or permanent structure at 12:00 summer solstice

Sustainable Transport

- Site is in close proximity to public transport and bike paths, reducing carbon emissions associated with transport and promoting healthier lifestyles.
- Bike storage/hoops to be included for visitors and storage for occupants to be provided to maximise potential for active transport modes, including bike charging facilities.



Conclusion

The proposed development at 195 North Terrace, Adelaide has committed to a range of worthwhile sustainability initiatives that will have real-world impact in reducing its carbon footprint, improving energy efficiency, reducing water consumption and providing greater indoor environment quality through comprehensive set of design decisions.



Appendix A VOC & Formaldehyde criteria

Paints, Adhesives, Sealants and Carpets

The Contractor shall ensure that at least 95% of internally applied paints, adhesives, sealants (by volume) and carpets (by area) must meet stipulated 'Total Volatile Organic Compounds (TVOC) Limits'.

For paints, adhesives and sealants:

Product Category	Max. Total Volatile Organic Compounds (TVOC) in grams per litre (g/L) of ready to use product
General purpose adhesives and sealants	50
Interior wall and ceiling paint, all sheen levels	16
Trim, varnishes, and wood stains	75
Primers, sealers, and prep coats	65
One and two pack performance coatings for floors	140
Acoustic sealants, architectural sealant, waterproofing membranes and sealant, fire retardant sealants and adhesives	250
Structural glazing adhesive, wood flooring and laminate adhesives and sealants	100

For carpets:

Compliance option	Test protocol	Limit
ASTM D5116	ASTM D5116 - Total VOC limit *	0.5mg/m ² per hour
	ASTM D5116 - 4-PC (4-Phenylcyclohexene) *	0.05mg/m ² per hour
ISO 16000 / EN 13419	ISO 16000 / EN 13419 - TVOC at three days	0.5 mg/m ² per hour
ISO 10580 / ISO/TC 219 (Document N238)	ISO 10580 / ISO/TC 219 (Document N238) - TVOC at 24 hours	0.5mg/m ² per hour

* mg/m²hr may also be represented as mg/m²/hr



Engineered Wood Products

The Contractor must ensure at least 95% (by area) of all engineered wood products meet the following specified formaldehyde emission limits.

Test protocol	Emissions Limit / Unit of Measurement
AS/NZS 2269:2004, testing procedure AS/NZS 2098.11:2005 method 10 for Plywood	≤1mg/L
AS/NZS 1859.1:2004 - Particle Board, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1.5 mg/L
AS/NZS 1859.2:2004 - MDF, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1mg/L
AS/NZS 4357.4 - Laminated Veneer Lumber (LVL)	≤1mg/L
Japanese Agricultural Standard MAFF Notification No.701 Appendix Clause 3 (11) - LVL	≤1mg/L
JIS A 5908:2003- Particle Board and Plywood, with use of testing procedure JIS A 1460	≤1mg/L
JIS A 5905:2003 - MDF, with use of testing procedure JIS A 1460	≤1mg/L
JIS A1901 (not applicable to Plywood, applicable to high pressure laminates and compact laminates)	≤0.1 mg/m ² hr*
ASTM D5116 (applicable to high pressure laminates and compact laminates)	≤0.1 mg/m ² hr
ISO 16000 part 9, 10 and 11 (also known as EN 13419), applicable to high pressure laminates and compact laminates	≤0.1 mg/m ² hr (at 3 days)
ASTM D6007	≤0.12mg/m ³ **
ASTM E1333	≤0.12mg/m ³ ***
EN 717-1 (also known as DIN EN 717-1)	≤0.12mg/m
EN 717-2 (also known as DIN EN 717-2)	≤3.5mg/m ² hr

** The test report must confirm that the conditions of Table above comply for the particular wood product type, the final results must be presented in EN 717-1 equivalent (as presented in the table) using the correlation ratio of 0.98.

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SUMMATION