6-8 Woodburn Street, Redfern

Sustainability Report / prepared for Mark Shapiro Architects

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Document Status

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Author(s) Bob Wilson and Li Chen Approved by Brian Mason		

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1 Introduction

1.1 Purpose

Waterman has been engaged to prepare a Sustainability Report for the purpose of addressing the relevant Secretary's Environmental Assessment Requirements (SEARs) listed in the 9. Ecologically Sustainable Development (ESD) section for the proposed residential development.

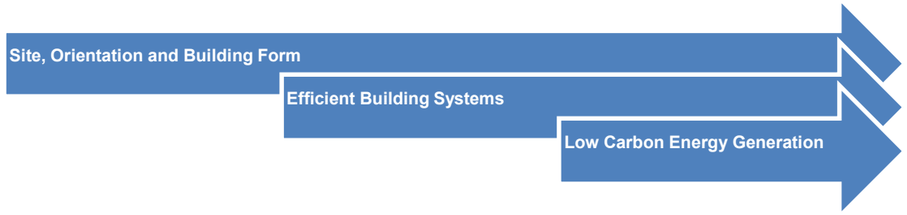
This Sustainability Report lists the Environmentally Sustainable Design (ESD) initiatives and attributes currently considered for the design of this project. The project team will endeavour to ensure that all aspects of the design listed within this report are fully implemented into the design documents and the constructed building.

1.2 Design Philosophy

The proposed development is a Class 3 residential development located at 6-8 Woodburn Street, Redfern. The development includes 216 co-living accommodation beds, with associated common areas.

Sustainability has been integrated into the heart of this development with careful consideration given to sustainable outcomes from the initial siting, massing and orientation of the building.

In addition to these core features, this project has included wide ranging initiatives to ensure the building is a healthy, energy and water efficient building with a minimal ecological footprint.



1.3 Sources of Information and Limitations

This report has been based on the following architectural information:

> Mark Shapiro Architects. Architectural Package For SDD - Issue P06 For Council Consultation. Date: 21/7/22.

This Sustainability Report is based on our interpretation of the architectural documentation and project briefing requirements issued to us to date. It is also based on our understanding of the key design considerations that we believe are beneficial to a development of this type and size in order to reduce the development's impact on the environment.

This report has been specifically prepared for the organisation noted on the cover of the report.

No responsibility or liability to any third party is accepted for any loss or damage arising from the use of this report by any third party. Any third party wishing to act upon any material contained in this report should confer with Waterman for detailed advice to take into account that party's particular requirements.

This report is not to be used for any other project.

2 Summary and Conclusions

This report outlines a number of sustainable design initiatives which are to be integrated into the design and specification of the proposed development in order to reduce the development's environmental impact.

The performance outcomes presented in this report demonstrate that the proposed development meets the SEARs requirements for sustainable development.

2.1 BASIX Results

The project meets the minimum requirements for thermal comfort and energy, and achieves a best practice outcome for water.

Section	Minimum Requirement	Score
Water	40	40
Thermal Comfort	Pass	Concession Target Pass
Energy	25	34

Refer to Appendix A for the BASIX Report prepared by Sustainable Thermal Solutions.

2.2 Design Response to SEARs Requirements

SEARs Section 9 ESD Requirements	Design Response
• Identify how ESD principles (as defined in clause 7(4) of Schedule 2 of EP&A Regulation) are incorporated in design and ongoing operation of the development.	The principles of ESD defined in clause 7(4) of Schedule 2 of EP&A Regulation are as follows, • precautionary principle, • inter-generation equity, • conservation biological diversity and ecological integrity • improved valuation, pricing and incentive mechanisms The proposed development aims to meet the ESD requirements via an equivalent outcome to a Green Star 5-star rating for a level Australian Excellence for its design and construction. The ESD principles implemented into the proposed design include • avoiding serious or irreversible damage to the environment via compiling various Green Star design category requirements. • maintaining health, diversity and productivity of the environment for future generations via minimising consumption of energy, water resource and materials resources under Green Star compliance requirements. • minimising ecological impact from the proposed development via approximately F34.1% of the site provided with Open Landscape Area with native vegetation as priority and preferred • ensuring the operation performance of the proposed development is generally equivalent to a Green Star 5-star rating standard.
• Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards.	**Green Star Benchmarking** • Targeting up to 67 points which would provide equivalent environmental outcomes to a 5 Star rated development. This is a level of Australian Excellence.
• Demonstrate how the development minimises greenhouse gas emissions (reflecting the Government's goal of net zero by 2050) and consumption of energy, water (including water sensitive urban design) and materials resources.	The proposed strategy towards net carbon emissions for the development is based on the following framework: **High performance Building Envelope** • Target 25% improvement to building fabric insulation performance over current NCC Section J requirements • High performance window systems – thermally improved **Energy Efficient appliances and services systems** • Specification of high star rating built in appliances • Specification of high efficiency invertor drive air conditioning systems. • Specification of high efficiency LED light fittings throughout • Specification of flexible lighting controls including motion sensors to common areas. **On-site solar generation** • Provide PV system to all suitably orientated roof areas to allow onsite power generation to be maximized. • The PV system will be carefully integrated into the developments roof design which includes expansive landscaped areas for resident amenity and wellbeing. **Remove reliance on Fossil Fuel usage** • No gas fired appliances (domestic hot water, cooktops etc) be specified. • Building to be fully electric to maximise usage of on-site generation and provide the

SEARs Section 9 ESD Requirements	Design Response
	mechanism to offset emissions via the purchase of Green Power. **Future commitment of renewable energy purchasing of Green Power.** • Once a 'real life' energy consumption profile is established with the building in operation a staged procurement plan can be established for the progressive purchase of Green Power. • Green Power purchasing is proposed to be established in a staged manner with levels of Green Power purchased increasing over time and the development moves towards Net Zero Emissions.
	Water Resources • High Star Rated fittings and fixtures
	Materials • Reused and Recycled content • Sustainably Certified Products and Materials • Preference to locally sources materials • Material selections to target longevity, adaptation, disassembly, re-use and recycling where possible. •

2.3 Green Star Benchmarking

The project has chosen to benchmark its performance against the Green Star rating tool (Green Star – Design and As-Built v1.3).

While the project is not committing to achieving a formal rating or meeting a minimum performance requirement, we are using the tool to benchmark the project's performance. The impacts of formal certification on the project are being explored.

Currently the project is targeting up to 67 points, which would equate to 5 Stars under the scheme if certified.

3 Urban Ecology

Urban ecology has been a significant focus of the design, with the aim to improve the biodiversity of plantings onsite from the existing conditions.

The site contains around 688.3m² of landscape areas (approximately 34.1% of the site area), with most landscaped areas being usable by occupants, providing additional amenity to this co-living building.

Landscaped areas include:

- The courtyard in the central atrium, which is expected to be well-daylit and with vegetation.
- The wetlands and bridges in the courtyard of the building.
- Planter boxes on the edge of the site on ground floor.
- Planter boxes creating a vertical garden along most accessways and breakout areas throughout each level in well daylit areas.
- Planter boxes along the Level 5 communal areas.
- Extensive planting throughout the rooftop terrace communal areas, including lawns and gardens.

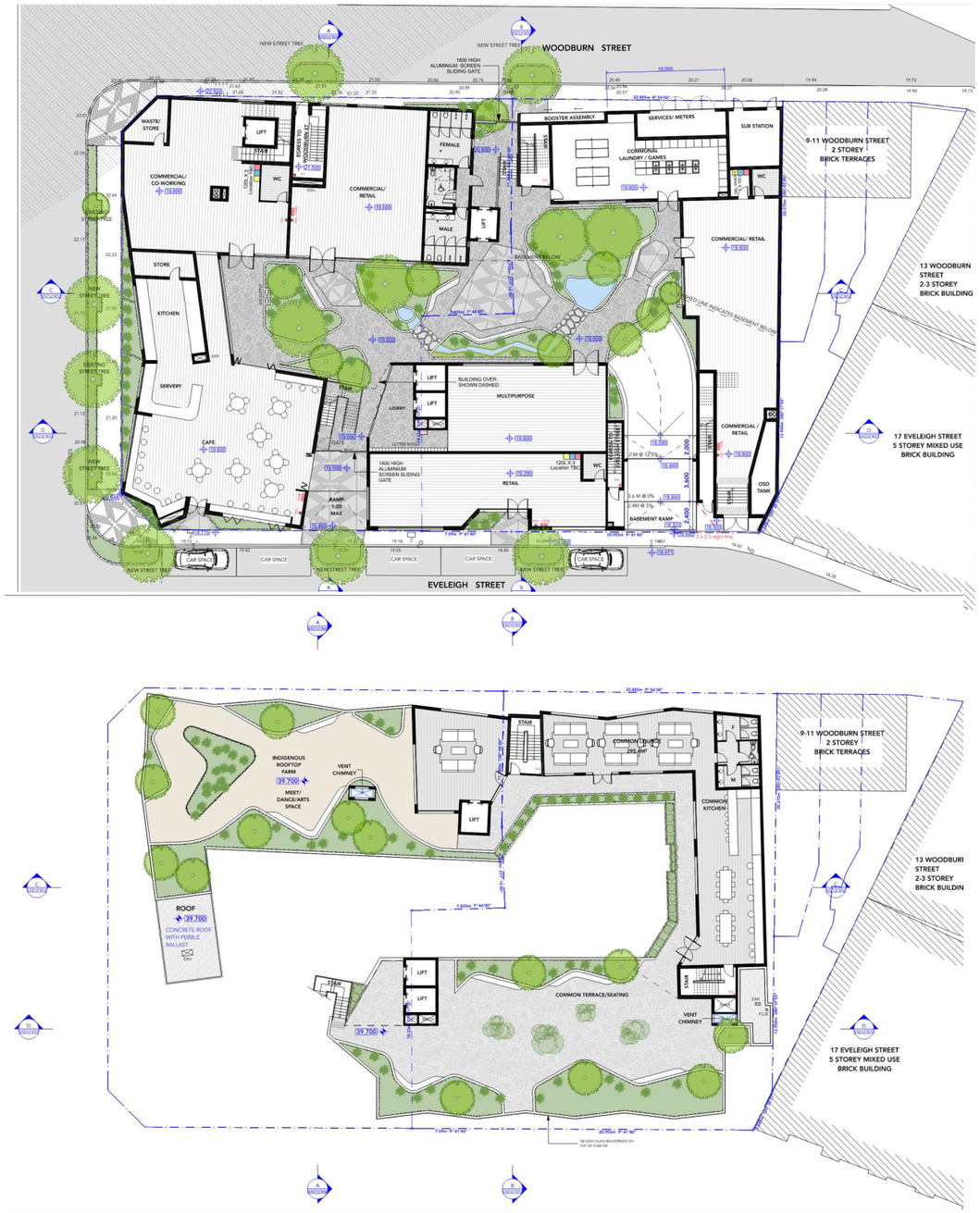


Figure 1: Plans showing the extent of vegetation and wetlands on ground floor and the rooftop terrace.

4 Natural Ventilation

Designing spaces that are well ventilated is critical to providing a healthy building that promotes wellness. Internal spaces typically generate pollutants such as carbon dioxide from occupants, volatile compounds emitted from furniture, finishes, paints, sealants and adhesives, and formaldehyde from particleboard and other wood products. Regular air changes through ventilation are required to ensure that these pollutants do not build up to harmful concentrations.

A typical building designed to the minimum standards can have a concentration of CO_2 of well over 1000ppm while fully occupied, compared to the outside air concentration of 400ppm. This, in combination with high levels of volatile organic compounds, formaldehyde, dust and microbial organisms, contributes to a variety of health effects known as ‘Sick Building Syndrome’.

A building with high quality ventilation can limit the build-up of pollutants in internal spaces and create a healthy, positive environment for occupants.

Wherever possible, natural ventilation has been included as part of the ventilation strategy for the building.

The natural ventilation strategy for this project consists of providing rooms with a consideration of single sided and cross-flow ventilation to allow residents to adjust the amount of ventilation to suite various conditions and personal preference.

Figure 2: Ventilation modes available to occupants in cross-ventilated apartments at Level 2.

5 Water Resources

5.1 Water Balance

A carefully designed, holistic water strategy can reduce the reliance of a building on potable water supply and local water catchment areas, while improving the local biodiversity. A typical water strategy will include the following objectives.

- Reduce water demand through efficient fittings and fixtures
- Treat outflows from the site to minimise pollutants in the local stormwater systems

5.2 Water Efficiency

This project will incorporate efficient fittings and fixtures designed to minimise water use within the building.

Showers	*4 Star WELS (≤7.5 L/min)*
Bathroom Taps	*6 Star WELS (≤6.0 L/min)*
Kitchen Taps	*6 Star WELS (≤6.0 L/min)*
WC's	*4 Star WELS (≤4.5 L/flush and ≤3.0 L/half flush)*
Urinals	*5 Star WELS (≤0.8 L/flush)*

7 Renewable Energy

A solar availability assessment has been undertaken which shows around 300m² of roof area which may be suitable for a solar PV installation.

As such at this stage we are targeting up to 20kWe of rooftop solar of plant equipment on the roof level.

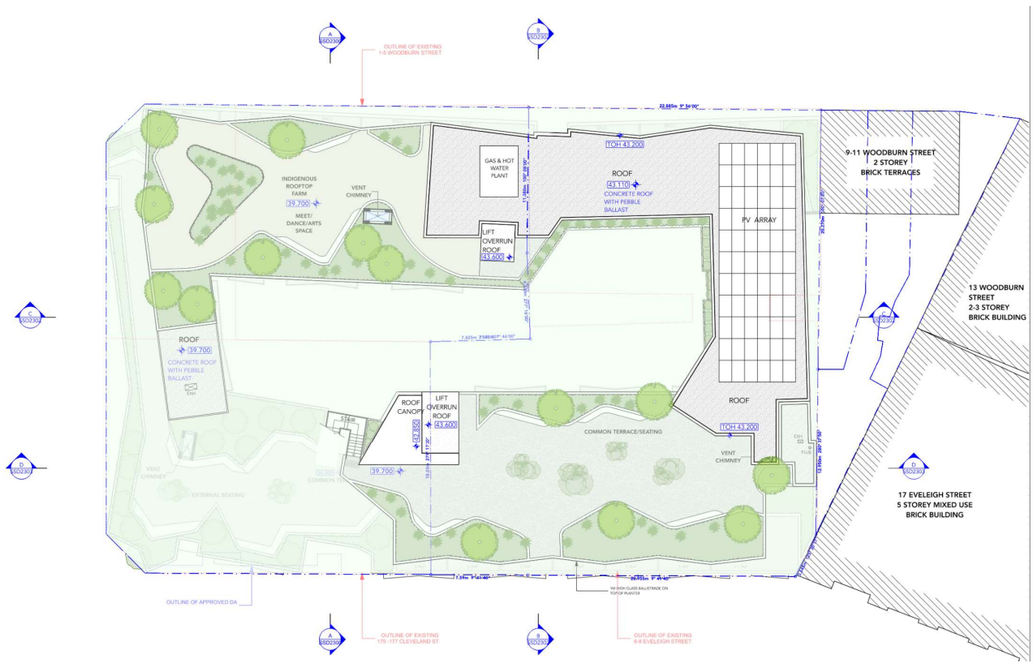


Figure 3: Solar PV Array an the Roof level

8 Materials

8.1 Material Preference

The following opportunities will be considered to limit the environmental impact of the building and furnishing materials:

- Reused products or products with recycled content.
- Reduced impact concrete:
  - Cement reduction
  - Aggregate reduction
  - Potable water reduction
- Certified timber (FSC or PEFC)
- Low impact PVC (best practice certified)
- Selection of third party certified products (i.e. GECA, Greengage etc.)
  - Flooring
  - Joinery
  - Furniture
  - Ceilings
  - Plasterboard
  - Insulation
  - Blinds

The external cladding will be designed with durability and low maintenance requirements in mind.

8.2 Toxic Emissions

All paints, adhesives, sealants and carpets will be selected to be low VOC and comply with the Green Star VOC requirements.

All joinery will have low formaldehyde emissions where possible.

8.3 Locally Sourced Supply Chain

Products which must be sourced from overseas will be avoided unless there are no local alternatives.

8.4 Timber

All timber used onsite will be reused, recycled or from a sustainably managed forestry operation (i.e. FSC or PEFC certified timber).

8.5 Durability and Flexibility

Building components, such as structural framing, roofing and cladding will be designed for longevity, adaptation, disassembly, re-use and recycling where possible.

8.6 Dematerialisation

The following dematerialisation strategies will be explored as the design progresses:

- Minimising the use of external cladding (over and above that required for weatherproofing etc.)
- Including spaces with exposed services, no ceilings, minimal and durable internal finishes.
- Supplying prefabricated rooms, such as bathrooms, as an integrated pod to reduce waste.

APPENDIX A
BASIX Report

BASIX® Certificate

Building Sustainability Index www.basix.nsw.gov.au

Multi Dwelling

Certificate number: 1326239M

This certificate confirms that the proposed development will meet the NSW government's requirements for sustainability, if it is built in accordance with the commitments set out below. Terms used in this certificate, or in the commitments, have the meaning given by the document entitled "BASIX Definitions" dated 10/09/2020 published by the Department. This document is available at www.basix.nsw.gov.au

Secretary
Date of issue: Saturday, 24 September 2022
To be valid, this certificate must be lodged within 3 months of the date of issue.

NSW GOVERNMENT | Planning, Industry & Environment

Project summary	
Project name	Cleveland St & Woodburn St Redfern (job 1380)
Street address	175-177/6-8 Cleveland and Woodburn Street Redfern 2016
Local Government Area	Sydney City Council
Plan type and plan number	deposited 780307+
Lot no.	1-5,10
Section no.	-
No. of residential flat buildings	1
No. of units in residential flat buildings	216
No. of multi-dwelling houses	0
No. of single dwelling houses	0

Project score		
Water	✔ 40	Target 40
Thermal Comfort	✔ concession	Target Pass
Energy	✔ 34	Target 25

Certificate Prepared by
Name / Company Name: Sustainable Thermal Solutions
ABN (if applicable): 55146061059

Description of project

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Section no.	-
Project type	
No. of residential flat buildings	1
No. of units in residential flat buildings	216
No. of multi-dwelling houses	0
No. of single dwelling houses	0
Site details	
Site area (m²)	2016.9
Roof area (m²)	437
Non-residential floor area (m²)	948.9
Residential car spaces	19
Non-residential car spaces	0

Common area landscape	
Common area lawn (m²)	0.0
Common area garden (m²)	660.0
Area of indigenous or low water use species (m²)	330.0
Assessor details	
Assessor number	N/A
Certificate number	N/A
Climate zone	N/A
Ceiling fan in at least one bedroom	N/A
Ceiling fan in at least one living room or other conditioned area	N/A
Project score	
Water	✔ 40 Target 40
Thermal Comfort	✔ concession Target Pass
Energy	✔ 34 Target 25

Description of project

The tables below describe the dwellings and common areas within the project

Residential flat buildings - Building1, 216 dwellings, 6 storeys above ground

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
101	1	17.2	0.0	0.0	0.0
106	1	17.68	0.0	0.0	0.0
111	1	20.51	0.0	0.0	0.0
116	1	18.03	0.0	0.0	0.0
121	1	20.51	0.0	0.0	0.0
126	1	21.22	0.0	0.0	0.0
131	1	21.22	0.0	0.0	0.0
136	1	20.51	0.0	0.0	0.0
201	1	17.2	0.0	0.0	0.0
206	1	17.68	0.0	0.0	0.0
211	1	20.51	0.0	0.0	0.0
216	1	18.03	0.0	0.0	0.0
221	1	20.51	0.0	0.0	0.0
226	1	21.22	0.0	0.0	0.0
231	1	21.22	0.0	0.0	0.0
236	1	20.51	0.0	0.0	0.0
241	1	17.68	0.0	0.0	0.0
246	1	17.68	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
102	1	17.2	0.0	0.0	0.0
107	1	17.68	0.0	0.0	0.0
112	1	20.51	0.0	0.0	0.0
117	1	18.03	0.0	0.0	0.0
122	1	20.51	0.0	0.0	0.0
127	1	21.22	0.0	0.0	0.0
132	1	21.22	0.0	0.0	0.0
137	1	20.51	0.0	0.0	0.0
202	1	17.2	0.0	0.0	0.0
207	1	17.68	0.0	0.0	0.0
212	1	20.51	0.0	0.0	0.0
217	1	18.03	0.0	0.0	0.0
222	1	20.51	0.0	0.0	0.0
227	1	21.22	0.0	0.0	0.0
232	1	21.22	0.0	0.0	0.0
237	1	20.51	0.0	0.0	0.0
242	1	17.68	0.0	0.0	0.0
247	1	17.68	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
103	1	17.2	0.0	0.0	0.0
108	1	20.51	0.0	0.0	0.0
113	1	20.06	0.0	0.0	0.0
118	1	18.03	0.0	0.0	0.0
123	1	20.51	0.0	0.0	0.0
128	1	21.22	0.0	0.0	0.0
133	1	21.22	0.0	0.0	0.0
138	1	20.86	0.0	0.0	0.0
203	1	17.2	0.0	0.0	0.0
208	1	20.51	0.0	0.0	0.0
213	1	20.06	0.0	0.0	0.0
218	1	18.03	0.0	0.0	0.0
223	1	20.51	0.0	0.0	0.0
228	1	21.22	0.0	0.0	0.0
233	1	21.22	0.0	0.0	0.0
238	1	20.86	0.0	0.0	0.0
243	1	17.68	0.0	0.0	0.0
248	1	17.2	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
104	1	17.68	0.0	0.0	0.0
109	1	20.51	0.0	0.0	0.0
114	1	20.06	0.0	0.0	0.0
119	1	20.51	0.0	0.0	0.0
124	1	20.51	0.0	0.0	0.0
129	1	21.22	0.0	0.0	0.0
134	1	20.51	0.0	0.0	0.0
139	1	20.06	0.0	0.0	0.0
204	1	17.68	0.0	0.0	0.0
209	1	20.51	0.0	0.0	0.0
214	1	20.06	0.0	0.0	0.0
219	1	20.51	0.0	0.0	0.0
224	1	20.51	0.0	0.0	0.0
229	1	21.22	0.0	0.0	0.0
234	1	20.51	0.0	0.0	0.0
239	1	20.06	0.0	0.0	0.0
244	1	17.68	0.0	0.0	0.0
301	1	17.2	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
105	1	17.68	0.0	0.0	0.0
110	1	20.51	0.0	0.0	0.0
115	1	20.51	0.0	0.0	0.0
120	1	25.51	0.0	0.0	0.0
125	1	30.86	0.0	0.0	0.0
130	1	21.22	0.0	0.0	0.0
135	1	20.51	0.0	0.0	0.0
140	1	20.06	0.0	0.0	0.0
205	1	17.68	0.0	0.0	0.0
210	1	20.51	0.0	0.0	0.0
215	1	20.51	0.0	0.0	0.0
220	1	25.51	0.0	0.0	0.0
225	1	30.86	0.0	0.0	0.0
230	1	21.22	0.0	0.0	0.0
235	1	20.51	0.0	0.0	0.0
240	1	20.86	0.0	0.0	0.0
245	1	20.66	0.0	0.0	0.0
302	1	17.2	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
303	1	17.2	0.0	0.0	0.0
308	1	20.51	0.0	0.0	0.0
313	1	20.06	0.0	0.0	0.0
318	1	18.03	0.0	0.0	0.0
323	1	20.51	0.0	0.0	0.0
328	1	21.22	0.0	0.0	0.0
333	1	21.22	0.0	0.0	0.0
338	1	20.86	0.0	0.0	0.0
343	1	17.68	0.0	0.0	0.0
348	1	17.2	0.0	0.0	0.0
405	1	17.68	0.0	0.0	0.0
410	1	20.51	0.0	0.0	0.0
415	1	20.51	0.0	0.0	0.0
420	1	25.51	0.0	0.0	0.0
425	1	30.86	0.0	0.0	0.0
430	1	21.22	0.0	0.0	0.0
435	1	20.51	0.0	0.0	0.0
440	1	20.06	0.0	0.0	0.0
445	1	20.66	0.0	0.0	0.0
502	1	21.62	0.0	0.0	0.0
507	1	22.76	0.0	0.0	0.0
512	1	20.51	0.0	0.0	0.0
517	1	20.51	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
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309	1	20.51	0.0	0.0	0.0
314	1	20.06	0.0	0.0	0.0
319	1	20.51	0.0	0.0	0.0
324	1	20.51	0.0	0.0	0.0
329	1	21.22	0.0	0.0	0.0
334	1	20.51	0.0	0.0	0.0
339	1	20.06	0.0	0.0	0.0
344	1	17.68	0.0	0.0	0.0
401	1	17.2	0.0	0.0	0.0
406	1	17.68	0.0	0.0	0.0
411	1	20.51	0.0	0.0	0.0
416	1	18.03	0.0	0.0	0.0
421	1	20.51	0.0	0.0	0.0
426	1	21.22	0.0	0.0	0.0
431	1	21.22	0.0	0.0	0.0
436	1	20.51	0.0	0.0	0.0
441	1	17.68	0.0	0.0	0.0
446	1	17.68	0.0	0.0	0.0
503	1	21.62	0.0	0.0	0.0
508	1	22.76	0.0	0.0	0.0
513	1	25.51	0.0	0.0	0.0
518	1	20.51	0.0	11.0	0.0

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320	1	25.51	0.0	0.0	0.0
325	1	30.86	0.0	0.0	0.0
330	1	21.22	0.0	0.0	0.0
335	1	20.51	0.0	0.0	0.0
340	1	20.06	0.0	0.0	0.0
345	1	20.66	0.0	0.0	0.0
402	1	17.2	0.0	0.0	0.0
407	1	17.68	0.0	0.0	0.0
412	1	20.51	0.0	0.0	0.0
417	1	18.03	0.0	0.0	0.0
422	1	20.51	0.0	0.0	0.0
427	1	21.22	0.0	0.0	0.0
432	1	21.22	0.0	0.0	0.0
437	1	20.51	0.0	0.0	0.0
442	1	17.68	0.0	0.0	0.0
447	1	17.68	0.0	0.0	0.0
504	1	22.76	0.0	0.0	0.0
509	1	18.03	0.0	0.0	0.0
514	1	20.51	0.0	0.0	0.0
519	1	20.51	0.0	0.0	0.0

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321	1	20.51	0.0	0.0	0.0
326	1	21.22	0.0	0.0	0.0
331	1	21.22	0.0	0.0	0.0
336	1	20.51	0.0	0.0	0.0
341	1	17.68	0.0	0.0	0.0
346	1	17.68	0.0	0.0	0.0
403	1	17.2	0.0	0.0	0.0
408	1	20.51	0.0	0.0	0.0
413	1	20.06	0.0	0.0	0.0
418	1	18.03	0.0	0.0	0.0
423	1	20.51	0.0	0.0	0.0
428	1	21.22	0.0	0.0	0.0
433	1	21.22	0.0	0.0	0.0
438	1	20.86	0.0	0.0	0.0
443	1	17.68	0.0	0.0	0.0
448	1	17.2	0.0	0.0	0.0
505	1	31.62	0.0	0.0	0.0
510	1	18.03	0.0	0.0	0.0
515	1	20.51	0.0	0.0	0.0
520	1	20.51	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
307	1	17.68	0.0	0.0	0.0
312	1	20.51	0.0	0.0	0.0
317	1	18.03	0.0	0.0	0.0
322	1	20.51	0.0	0.0	0.0
327	1	21.22	0.0	0.0	0.0
332	1	21.22	0.0	0.0	0.0
337	1	20.51	0.0	0.0	0.0
342	1	17.68	0.0	0.0	0.0
347	1	17.68	0.0	0.0	0.0
404	1	17.68	0.0	0.0	0.0
409	1	20.51	0.0	0.0	0.0
414	1	20.06	0.0	0.0	0.0
419	1	20.51	0.0	0.0	0.0
424	1	20.51	0.0	0.0	0.0
429	1	21.22	0.0	0.0	0.0
434	1	20.51	0.0	0.0	0.0
439	1	20.06	0.0	0.0	0.0
444	1	17.68	0.0	0.0	0.0
501	1	22.76	0.0	0.0	0.0
506	1	22.76	0.0	0.0	0.0
511	1	18.03	0.0	0.0	0.0
516	1	20.51	0.0	0.0	0.0
521	1	20.51	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
522	1	20.51	0.0	0.0	0.0
527	1	23.27	0.0	0.0	0.0
532	1	20.51	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
523	1	20.51	0.0	0.0	0.0
528	1	20.51	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
524	1	20.51	0.0	0.0	0.0
529	1	20.51	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
525	1	21.92	0.0	0.0	0.0
530	1	20.06	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
526	1	22.76	0.0	0.0	0.0
531	1	20.6	0.0	0.0	0.0

Description of project

The tables below describe the dwellings and common areas within the project

Common areas of unit building - Building1

Common area	Floor area (m²)
Car park area (No. 1)	1122.6
Lift car (No.3)	-
Garbage room (No. 2)	52.4
Plant or service room (Basement)	40.0
Female WC (Ground)	20.2
Multi-Purpose (Ground)	96.6
Hallway/lobby type (No. 1)	1258.0

Common area	Floor area (m²)
Lift car (No.1)	-
NBN & MSB (Basement)	15.7
Communal/Laundry	83.2
Sub-Station (Ground)	19.7
Male WC (Ground)	24.5
Common Kitchen & Lounges (L6)	271.0

Common area	Floor area (m²)
Lift car (No.2)	-
Garbage room (No. 1)	91.6
WCs (L6)	9.3
Services/Meters (Ground)	14.8
Accessible WC (Ground)	7.2
Ground floor lobby type (No. 1)	26.1

Schedule of BASIX commitments

1. Commitments for Residential flat buildings - Building1
    (a) Dwellings
        (i) Water
        (ii) Energy
        (iii) Thermal Comfort
    (b) Common areas and central systems/facilities
        (i) Water
        (ii) Energy

2. Commitments for multi-dwelling houses

3. Commitments for single dwelling houses

4. Commitments for common areas and central systems/facilities for the development (non-building specific)
        (i) Water
        (ii) Energy

Schedule of BASIX commitments

The commitments set out below regulate how the proposed development is to be carried out. It is a condition of any development consent granted, or complying development certificate issued, for the proposed development, that BASIX commitments be complied with.

1. Commitments for Residential flat buildings - Building1

(a) Dwellings

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must plant indigenous or low water use species of vegetation throughout the area of land specified for the dwelling in the "Indigenous species" column of the table below, as private landscaping for that dwelling. (This area of indigenous vegetation is to be contained within the "Area of garden and lawn" for the dwelling specified in the "Description of Project" table).	✔	✔	
(c) If a rating is specified in the table below for a fixture or appliance to be installed in the dwelling, the applicant must ensure that each such fixture and appliance meets the rating specified for it.		✔	✔
(d) The applicant must install an on demand hot water recirculation system which regulates all hot water use throughout the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below.		✔	✔
(e) The applicant must install: (aa) a hot water diversion system to all showers, kitchen sinks and all basins in the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below; and (bb) a separate diversion tank (or tanks) connected to the hot water diversion systems of at least 100 litres. The applicant must connect the hot water diversion tank to all toilets in the dwelling.		✔ ✔	✔ ✔
(e) The applicant must not install a private swimming pool or spa for the dwelling, with a volume exceeding that specified for it in the table below.	✔	✔	
(f) If specified in the table, that pool or spa (or both) must have a pool cover or shading (or both).		✔	
(g) The pool or spa must be located as specified in the table.	✔	✔	
(h) The applicant must install, for the dwelling, each alternative water supply system, with the specified size, listed for that dwelling in the table below. Each system must be configured to collect run-off from the areas specified (excluding any area which supplies any other alternative water supply system), and to divert overflow as specified. Each system must be connected as specified.	✔	✔	✔

	Fixtures					Appliances		Individual pool				Individual spa		
Dwelling no.	All shower-heads	All toilet flushing systems	All kitchen taps	All bathroom taps	HW recirculation or diversion	All clothes washers	All dish-washers	Volume (max volume)	Pool cover	Pool location	Pool shaded	Volume (max volume)	Spa cover	Spa shaded
All dwellings	4 star (> 4.5 but <= 6 L/min)	3 star	4 star	4 star	no	-	-	-	-	-	-	-	-	-

	Alternative water source							
Dwelling no.	Alternative water supply systems	Size	Configuration	Landscape connection	Toilet connection (s)	Laundry connection	Pool top-up	Spa top-up
None	-	-	-	-	-	-	-	-

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must install each hot water system specified for the dwelling in the table below, so that the dwelling's hot water is supplied by that system. If the table specifies a central hot water system for the dwelling, then the applicant must connect that central system to the dwelling, so that the dwelling's hot water is supplied by that central system.	✔	✔	✔
(c) The applicant must install, in each bathroom, kitchen and laundry of the dwelling, the ventilation system specified for that room in the table below. Each such ventilation system must have the operation control specified for it in the table.		✔	✔
(d) The applicant must install the cooling and heating system/s specified for the dwelling under the "Living areas" and "Bedroom areas" headings of the "Cooling" and "Heating" columns in the table below, in/for at least 1 living/bedroom area of the dwelling. If no cooling or heating system is specified in the table for "Living areas" or "Bedroom areas", then no systems may be installed in any such areas. If the term "zoned" is specified beside an air conditioning system, then the system must provide for day/night zoning between living areas and bedrooms.		✔	✔
(e) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Artificial lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that the "primary type of artificial lighting" for each such room in the dwelling is fluorescent lighting or light emitting diode (LED) lighting. If the term "dedicated" is specified for a particular room or area, then the light fittings in that room or area must only be capable of being used for fluorescent lighting or light emitting diode (LED) lighting.		✔	✔

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(f) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Natural lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that each such room or area is fitted with a window and/or skylight.	✔	✔	✔
(g) This commitment applies if the applicant installs a water heating system for the dwelling's pool or spa. The applicant must:			
(aa) install the system specified for the pool in the "Individual Pool" column of the table below (or alternatively must not install any system for the pool). If specified, the applicant must install a timer, to control the pool's pump; and		✔	
(bb) install the system specified for the spa in the "Individual Spa" column of the table below (or alternatively must not install any system for the spa). If specified, the applicant must install a timer to control the spa's pump.		✔	
(h) The applicant must install in the dwelling:			
(aa) the kitchen cook-top and oven specified for that dwelling in the "Appliances & other efficiency measures" column of the table below;		✔	
(bb) each appliance for which a rating is specified for that dwelling in the "Appliances & other efficiency measures" column of the table, and ensure that the appliance has that minimum rating; and		✔	✔
(cc) any clothes drying line specified for the dwelling in the "Appliances & other efficiency measures" column of the table.		✔	
(i) If specified in the table, the applicant must carry out the development so that each refrigerator space in the dwelling is "well ventilated".		✔	

	Hot water	Bathroom ventilation system		Kitchen ventilation system		Laundry ventilation system	
Dwelling no.	Hot water system	Each bathroom	Operation control	Each kitchen	Operation control	Each laundry	Operation control
All dwellings	central hot water system 1	individual fan, ducted to façade or roof	manual switch on/off	individual fan, ducted to façade or roof	manual switch on/off	natural ventilation only, or no laundry	-

	Cooling		Heating		Artificial lighting						Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/ toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
125, 126, 127, 128, 129, 130, 131, 132, 133, 225, 226, 227, 228, 229, 230, 231, 233, 325, 326, 327, 328, 329, 330, 331, 332, 333, 425, 426, 427, 428, 429, 430, 431, 432, 433, 501, 502, 503, 504,	ceiling fans + 3-phase airconditioning EER < 2.5	3-phase airconditioning EER < 2.5	3-phase airconditioning EER < 2.5	3-phase airconditioning EER < 2.5	1 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	no

	Cooling		Heating		Artificial lighting						Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/ toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
505, 506, 507, 508												
All other dwellings	ceiling fans + 3-phase airconditioning EER < 2.5	3-phase airconditioning EER < 2.5	3-phase airconditioning EER < 2.5	3-phase airconditioning EER < 2.5	1 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	yes

	Individual pool		Individual spa		Appliances & other efficiency measures							
Dwelling no.	Pool heating system	Timer	Spa heating system	Timer	Kitchen cooktop/oven	Refrigerator	Well ventilated fridge space	Dishwasher	Clothes washer	Clothes dryer	Indoor or sheltered clothes drying line	Private outdoor or unsheltered clothes drying line
All dwellings	-	-	-	-	electric cooktop & electric oven	2 star	yes	-	-	-	yes	no

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The development will be a Class 3 building. The applicant must include in the documentation accompanying the application for a construction certificate (or complying development certificate, if applicable), a report demonstrating that the development will meet Section J of the National Construction Code - Volume 1.	✔	✔	✔

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✔	✔
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✔	✔	✔
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✔	✔	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✔	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✔	✔
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✔	✔

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	4 star (> 6 but <= 7.5 L/min)	4 star	4 star	3 star

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✔	✔
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✔	✔
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✔	✔	✔

	Common area ventilation system		Common area lighting		
Common area	**Ventilation system type**	**Ventilation efficiency measure**	**Primary type of artificial lighting**	**Lighting efficiency measure**	**Lighting control system/BMS**
Car park area (No. 1)	ventilation exhaust only	carbon monoxide monitor + VSD fan	light-emitting diode	time clock and motion sensors	No
Lift car (No.1)	-	-	light-emitting diode	connected to lift call button	No
Lift car (No.2)	-	-	light-emitting diode	connected to lift call button	No
Lift car (No.3)	-	-	light-emitting diode	connected to lift call button	No
NBN & MSB (Basement)	no mechanical ventilation	-	light-emitting diode	manual on / manual off	No
Garbage room (No. 1)	ventilation exhaust only	-	light-emitting diode	motion sensors	No
Garbage room (No. 2)	ventilation exhaust only	-	light-emitting diode	motion sensors	No
Communal/Laundry	ventilation exhaust only	none ie. continuous	light-emitting diode	time clock and motion sensors	No
WCs (L6)	ventilation exhaust only	none ie. continuous	light-emitting diode	time clock and motion sensors	No
Plant or service room (Basement)	ventilation exhaust only	thermostatically controlled	light-emitting diode	manual on / manual off	No
Sub-Station (Ground)	ventilation exhaust only	none ie. continuous	light-emitting diode	manual on / manual off	No
Services/Meters (Ground)	no mechanical ventilation	-	light-emitting diode	manual on / manual off	No
Female WC (Ground)	ventilation exhaust only	none ie. continuous	light-emitting diode	time clock and motion sensors	No
Male WC (Ground)	ventilation exhaust only	none ie. continuous	light-emitting diode	time clock and motion sensors	No
Accessible WC (Ground)	ventilation exhaust only	none ie. continuous	light-emitting diode	time clock and motion sensors	No
Multi-Purpose (Ground)	ventilation (supply + exhaust)	none ie. continuous	light-emitting diode	time clock and motion sensors	No
Common Kitchen & Lounges (L6)	ventilation exhaust only	none ie. continuous	light-emitting diode	time clock and motion sensors	No
Ground floor lobby type (No. 1)	no mechanical ventilation	-	light-emitting diode	time clock and motion sensors	No
Hallway/lobby type (No. 1)	no mechanical ventilation	-	light-emitting diode	time clock and motion sensors	No

Central energy systems	Type	Specification
Central hot water system (No. 1)	gas-fired boiler	Piping insulation (ringmain & supply risers): (a) Piping external to building: R0.3 (~13 mm); (b) Piping internal to building: R0.3 (~13 mm)
Lift (No. 1)	geared traction with V V A C motor	Number of levels (including basement): 8
Lift (No. 2)	geared traction with V V A C motor	Number of levels (including basement): 8
Lift (No. 3)	geared traction with V V A C motor	Number of levels (including basement): 7

4. Commitments for common areas and central systems/facilities for the development (non-building specific)

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✔	✔
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✔	✔	✔
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✔	✔	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✔	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✔	✔
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✔	✔

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	4 star (> 6 but <= 7.5 L/min)	4 star	4 star	3 star

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✔	✔
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✔	✔
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✔	✔	✔

Notes

1. In these commitments, "applicant" means the person carrying out the development.
2. The applicant must identify each dwelling, building and common area listed in this certificate, on the plans accompanying any development application, and on the plans and specifications accompanying the application for a construction certificate / complying development certificate, for the proposed development, using the same identifying letter or reference as is given to that dwelling, building or common area in this certificate.
3. This note applies if the proposed development involves the erection of a building for both residential and non-residential purposes (or the change of use of a building for both residential and non-residential purposes). Commitments in this certificate which are specified to apply to a "common area" of a building or the development, apply only to that part of the building or development to be used for residential purposes.
4. If this certificate lists a central system as a commitment for a dwelling or building, and that system will also service any other dwelling or building within the development, then that system need only be installed once (even if it is separately listed as a commitment for that other dwelling or building).
5. If a star or other rating is specified in a commitment, this is a minimum rating.
6. All alternative water systems to be installed under these commitments (if any), must be installed in accordance with the requirements of all applicable regulatory authorities. NOTE: NSW Health does not recommend that stormwater, recycled water or private dam water be used to irrigate edible plants which are consumed raw, or that rainwater be used for human consumption in areas with potable water supply.

Legend

1. Commitments identified with a "✔" in the "Show on DA plans" column must be shown on the plans accompanying the development application for the proposed development (if a development application is to be lodged for the proposed development).
2. Commitments identified with a "✔" in the "Show on CC/CDC plans and specs" column must be shown in the plans and specifications accompanying the application for a construction certificate / complying development certificate for the proposed development.
3. Commitments identified with a "✔" in the "Certifier check" column must be certified by a certifying authority as having been fulfilled. (Note: a certifying authority must not issue an occupation certificate (either interim or final) for a building listed in this certificate, or for any part of such a building, unless it is satisfied that each of the commitments whose fulfilment it is required to monitor in relation to the building or part, has been fulfilled).

APPENDIX B
Section J Report

Sustainable Thermal Solutions
STS

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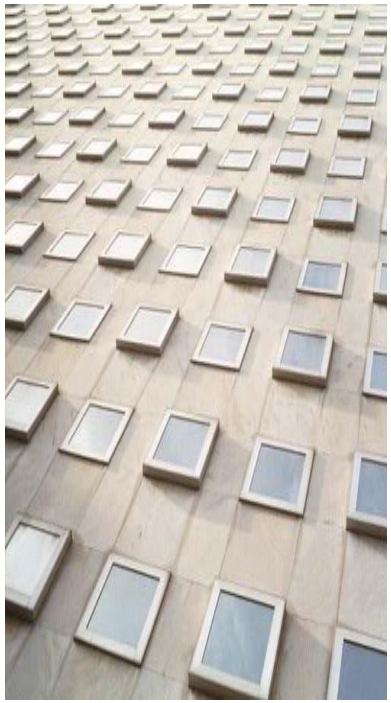
M: 0420 312 721
E: enquiries@sustainablethermalsolutions.com.au
W: www.sustainablethermalsolutions.com.au



NCC SECTION J

Energy Efficiency Report

Version: 1 (Final)
Date: 23 Sep 2022
Prepared: Bruce Carr
Approved:

Bruce Carr

(Signature required)

Project: Mixed use co-living development + Commercial Space
175-177 Cleveland St & 6-8 Woodburn St
REDFERN NSW 2016

Job No. 1380

CONTENTS

Report Revision History:

Date	Issue	Status	Prepared By
15 August 2022	Draft 1 Version 1	Issued to client	Bruce Carr
23 August 2022	Draft 2 Version 1	Issued to client	Bruce Carr
23 September 2022	Version 1 (FINAL)	Issued to client	Bruce Carr

1 INTRODUCTION

This report assesses the proposed development for its compliance with Section J energy efficiency provisions of the National Construction Code (NCC) 2019 Volume 1 (Amendment 1). These provisions will apply or all new (and altered) construction work.

This report will detail the measures required to achieve compliance and will be required as part of the submission to the council or the consent authority for a SSD (State Significant Development).

2 APPLICATION

Section J Deemed-to-Satisfy (DTS) provisions of the NCC 2019 (Volume One – Amndt 1) have been applied for the assessment of this project and this report will outline what measures are required for this building to comply.

The DTS provisions consist of 5 Parts.

This report is concerned with the following parts:

- Part J1: Building Fabric
- Part J3: Building Sealing
- Part J6: Artificial Lighting and Power
- Part J7: Heated Water Supply and Swimming Pool and Spa Pool Plant
- Part J8: Facilities for Energy Monitoring

The following section will not form part of this report, as they will require the expertise of specialist service consultants:

- Part J5: Air-conditioning and Ventilations Systems

Note:

Part J4 has been removed from the NCC since 2010

Part J2 has been removed from the NCC since 2019 which existed in the NCC 2016. Glazing provisions are now included in Part J1.

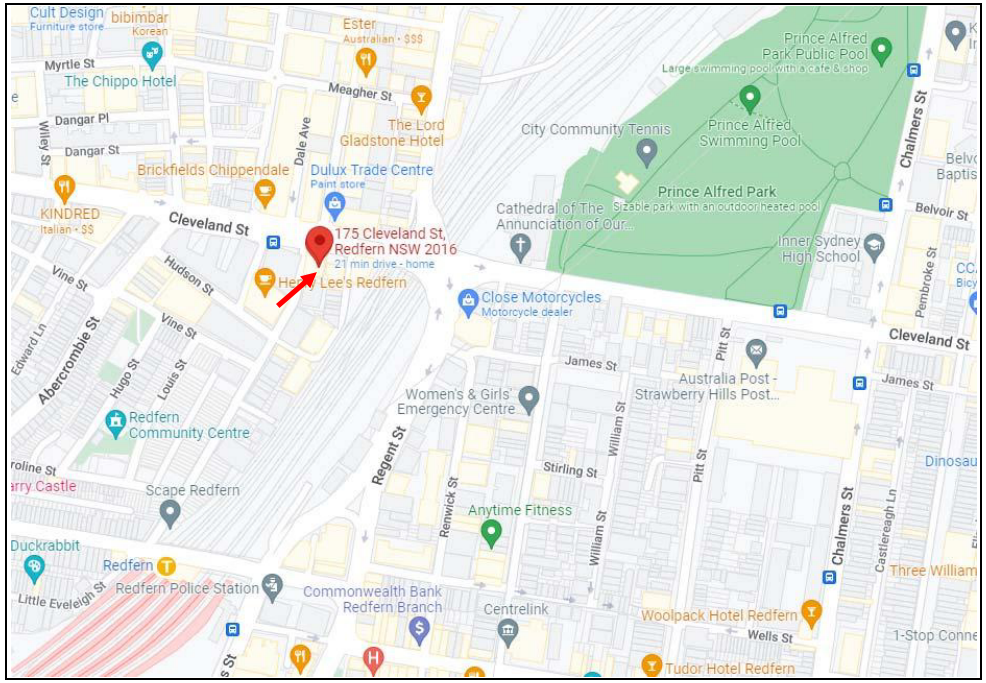
3 BUILDING DETAILS

The title, address and location details for the project are as follows:

Project: Mixed use co-living development + Commercial Space

Address: 175-177 Cleveland St & 6-8 Woodburn St REDFERN NSW 2016

Authority: Council of the City of Sydney



Climate zone: **5** (*Warm Temperate*)

- This climate zone is characterised by low diurnal temperatures near the coast to high diurnal ranges inland.
- Four distinct seasons: Summer and winter can exceed human comfort range, spring and autumn are ideal for human comfort
- Mild winters with low humidity, hot to very hot summers with moderate humidity

Description:

A new 7 storey mixed-use development is planned. This will consist of:

- 216 Sole occupancy units (SOUs) (Class 3) - levels 1 to 5
- 2 x Class 6 retail units on the ground floor
- 4 x Class 5 units (ground floor)
- 'Multi-purpose' common room (Class 3)
- 1 x Class 5 unit (level 1)
- Single level basement car park (Class 7a)
- Common garden, laundry and communal area at the ground level
- Common lounge and kitchen on level 6

All SOUs and commercial units will be conditioned. There will be glazing on all facades.

The following construction materials are being proposed in the building design in accordance to the plans and design documentation referenced below:

- External Walls: Cavity brick lined internally with plasterboard
- Roof and Ceiling: Concrete lined internally with plasterboard
- Internal Walls: Plasterboard on studs
- Floors: Suspended concrete
- Windows: Single glazed
- Skylights: N/A
- Lighting: LED or compact fluorescent

Building classes:

Class 3: "*a residential building, other than a building of Class 1 or 2, which is a common place of long term or transient living for a number of unrelated persons including a boarding house, guest house…"*

Class 5: "*an office building used for professional or commercial purposes, excluding buildings of a Class 6, 7, 8 or 9"*

Class 6: *"A shop or other building for the sale of goods by retail or the supply of services direct to the public eg. Café, restaurant, kiosk, hairdressers, showroom or service station".*

Class 7a: *"A building which is a carpark".*

References:

a) Plans:

Mark Shapiro Architects. Received by STS on 9th Sep 2022
Project Number: 21022 (Revision P11)
Date: 8/09/2022
Drawing Numbers: SSD0001, SSD1000-1001, SSD1200, SSD2000–2009, SSD2011-2016, SSD2300, SSD2302–2304, SSD2400–2405, SSD9000, SSD9001

b) National Construction Code 2019 Vol. 1 (Amendment 1)

4 SUMMARY AND CERTIFIER CHECK:

Below is a summary of the energy efficiency actions required to meet the requirements of the NCC. Details are available in each relevant section.

Element	Insulation Requirements	Action	Certifier Check
Ceiling/Roof	Insulation is required in the concrete ceiling/roof of the following rooms: • Level 5: All rooms • Level 4: Rooms 4.45-4.48, 4.01-4.10, 4.34-4.44 4.25-4.33	Add minimum insulation of **R3.05** (or **3.27** if the insulation fills the airspace)	
External Walls	Insulation is required in the external cavity brick walls: Commercial & Retail: Sole Occupancy Rooms:	Add min. insulation of **R1.5** Add min. insulation of **R1.0**	
Walls other than External: (dividing conditioned & non-conditioned space)	Insulation is required in the cavity brick party walls between the conditioned rooms and the fire stairs and lifts.	Add minimum insulation of **R1.0**	
Floor	Insulation is required in the following concrete floors: i) Ground floor commercial & retail units. These are above the basement carpark (which is unenclosed and mechanically ventilated by more than 1.5 air changes per hour) ii) Level 1 Sole Occupancy Rooms. The following rooms contain a suspended concrete slab above 'open air': 1.05, 1.20, 1.21, 1.26, 1.27, 1.28 iii) Commercial/Retail floor slab on ground. This is located on the southern side and a portion of the floor is slab on ground	Add minimum insulation of **R1.66** Add minimum insulation of **R1.66** Add minimum insulation of **R0.54**	
External Glazing	**Class 3 Sole Occupancy Units + Multi-Purpose Rm:** Single glazed clear: U-Value=5.8/SHGC=0.70 **Class 5 & 6 Commercial Units:** Single glazed low-e: U-Value=4.7/SHGC=0.43	Ensure that a certificate of compliance is supplied with the windows.	

J3: Building Sealing

Sealing of new doors and windows is required. Refer to the relevant sections below for details.

J5: Air Conditioning and Ventilation Systems:

Refer to the design and installation requirements of the Mechanical Engineer or trade contractor's specifications.

J6: Artificial Lighting and Power:

See Section 10 further requirements on interior lighting and control.

J7: Heated Water Supply & Swimming Pool & Spa Pool Plant:

Hot water system to be installed in accordance with Part B2 of NCC Volume 3 – Plumbing Code of Australia.

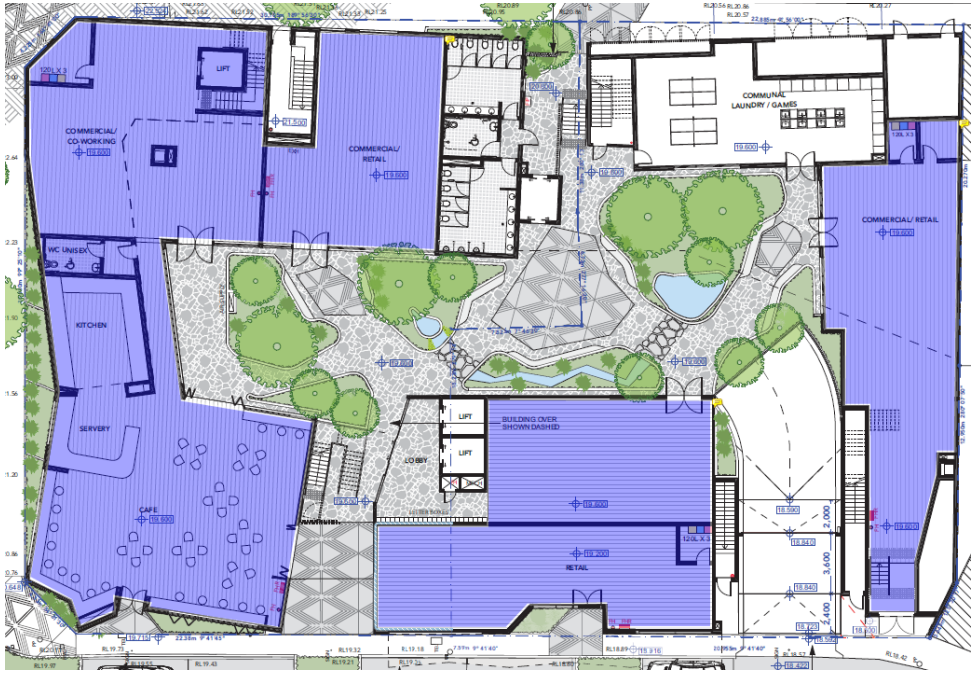
J8: Facilities for Energy monitoring:

A building or sole occupancy unit with a floor area of more than 500 m^2 must have an energy metre configured to record the time-of-use consumption of gas and electricity. A building with a floor area of more than 2,500 m2 must have energy meters configured to enable individual time-of-use energy consumption data recording.

Figure 5.1 (Floor Plans):

Site Plan:

True North



Ground:

Level 1:

Level 2:

Level 3:

Level 4:

Level 5:

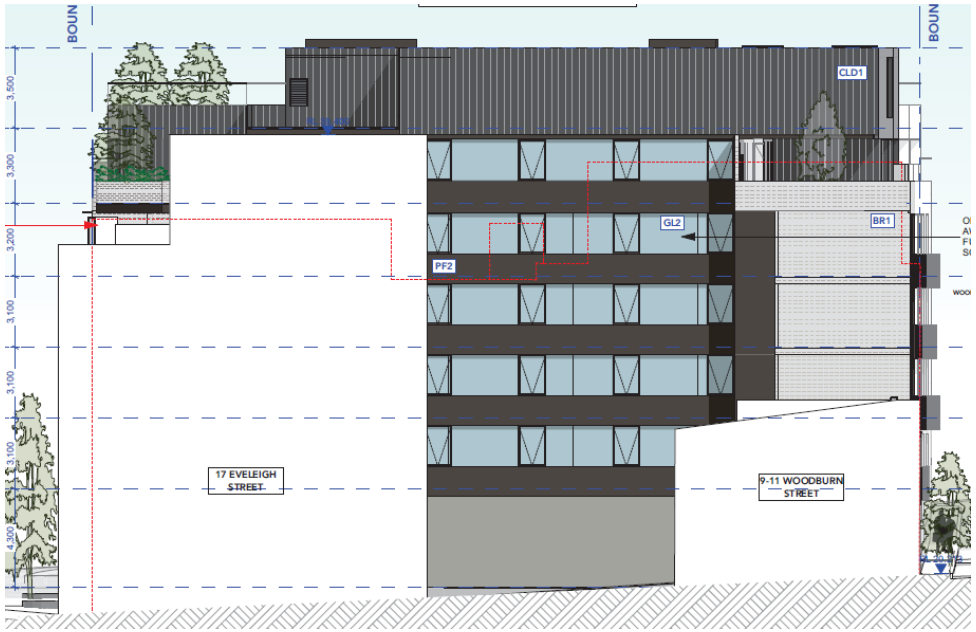
Legend: Conditioned Areas

Figure 5.2 (Elevations):

North:

West:

South:



East:

Following is the detail of each part of Section J of the NCC:

Part J1 is applicable only to NEW or ALTERED building works forming part of the external envelope around conditioned areas and the envelope separating the conditioned space from non-conditioned space.

5 PART J1: BUILDING FABRIC

The NCC Part J1 is concerned with the following 4 provisions:

- J1.3 – Roof and ceiling construction
- J1.4 – Roof lights
- J1.5 – Walls
- J1.6 – Floors

The provisions in Part J1 apply to the conditioned spaces in the proposed development. The NCC uses the term 'envelope' to demarcate the conditioned space from non-conditioned space and the exterior of the building. A space is deemed to be conditioned if the air contained will be actively heated or cooled by an air-conditioning service (see definitions at the end of this report).

The diagram above shows the building envelope (Figure 5.1). This is the boundary between the conditioned and non-conditioned zones (or outdoor space).

5.1 J1.2: THERMAL CONSTRUCTION GENERAL

All insulation that is part of the 'envelope' will be installed in accordance with Clause J1.2, the manufacturer's Specifications and AS/NZS 4859.1

5.2 J1.3: ROOF AND CEILING CONSTRUCTION

5.2.1 Roof and ceiling insulation requirement

As per Part J1.3(a), a building's roof & ceiling in climate zone 5 that is part of the 'envelope' is required to achieve a total R-Value of **R3.7** in a downwards direction.

In climate zone 5, the solar absorptance of the upper surface of a roof must not be more than **0.45**.

The sole occupancy units contain a concrete ceiling/roof to 5 degrees with a suspended plasterboard ceiling under. Those SOUs with a ceiling below a concrete walking surface above are required to be insulated. The following SOUs contain all or a portion of a ceiling below a concrete walking surface:

- Level 5: All rooms
- Level 4: Rooms:
    - 4.45-4.48
    - 4.01-4.10
    - 4.34-4.44
    - 4.25-4.33

This ceiling and roof achieve the following R-Values:

	Roof Type: Solid concrete roof to 5°, suspended plaster ceiling	***R-Value*** ***(heat flow direction: downwards)***
1	Outdoor air film (7m/s)	0.04
2	Waterproof membrane, rubber synthetic (4mm, 961 kg/m^3)	0.03
3	*Solid Concrete (200mm, 2400 kg/m^3)	0.14
4	Ceiling Air Space (100mm to 300mm, non-reflective)	0.22
5	Plasterboard (10mm)	0.06
6	Indoor air film (still air)	0.16
	Total *R-Value*	**0.65#**

NB:

*This is calculated from table J1.5(d) NCC 2016 where 100mm of solid concrete provides an R-Value of 0.07. For 200mm solid concrete, this equates to an R-Value of 0.14.

#This R-Value calculation has assumed there will be no thermal bridging between the concrete and plasterboard ceiling as there will be no studs.

Table 5.2a:

R-Value for Roof & Ceiling Construction	**Insulation R-Value Requirements**	**Action to Achieve Compliance**
0.65	**3.7** required: Additional insulation needed is: 3.7 – 0.65 = **3.05**	Add minimum insulation of **R3.05** to the ceiling below the concrete tiled walking surface above
Assuming the insulation fills the air space between the concrete and plasterboard (air space = 0.22). 0.65 - 0.22 = 0.43	**3.7** Required. Additional R-Value is 3.7 - 0.43 = **3.27**	Addition minimum insulation of **R3.27** to the ceiling below the concrete tiled walking surface above

5.3 J1.4: ROOF LIGHTS

5.1.1 Roof light performance requirement

Not applicable

5.4 J1.5: WALLS AND GLAZING

5.4.1 Requirement

An external wall that is part of the envelope must achieve the minimum total R-Value or, satisfy one of the options as specified in Table J1.5a.

The total system U-Value of wall-glazing construction must not be greater than:

- 2.0 for a Class 5 (commercial) building in climate zone 5
- 2.0 for a Class 6 (retail) building in climate zone 5
- 2.0 for a Class 3 (room) building in climate zone 5

The walls surrounding this 'conditioned' space along with the walls separating conditioned and non-conditioned space (lifts, fire stairs, common ground floor WCs and laundry) are the building 'envelope'. These walls therefore need to comply with the NCC.

The following option in table 5.4a below will achieve compliance:

Table 5.4a:

External Wall Insulation:

The following option in table 5.4a below will achieve compliance:

Description	Required Total Wall Construction R-Value	Typical Construction Specifications	Required Added Insulation
Class 5 Offices	North, East & West: R1.0 South: R1.4	*Cavity Brick, plasterboard lined internally	Add minimum insulation of **R1.5**
Class 6 Retail	North, East & West: R1.0 South: R1.4	*Cavity Brick, plasterboard lined internally	Add minimum insulation of **R1.5**
Class 3 Sole Occupancy Rooms	All orientations: R1.0	*Cavity Brick, plasterboard lined internally	Add minimum insulation of **R1.0**

NB: * This R-Value calculation has assumed there will be no thermal bridging due to absence of frames.

Table 5.4b: Glazing Requirements:

		*Minimum Requirements (incl. frame)		Additional Shading Devices Required	
Level/Description	**Orientation**	**U-Value (≤)**	**SHGC (±10%)**		**#Typical Glazing**
Class 3 SOUs	All	5.8	0.70	None	Single glazed clear
Class 5 Office Space	All	4.7	0.43	None	Single glazed low-e
Class 6 Retail & Cafe	All	4.7	0.43	None	Single glazed low-e

See **Appendix 1** at the end of this report for a façade report summary generated by the ABCB Façade Calculator for confirmation of compliance of the U-Value and solar admittance for each façade. Compliance was met as follows:

- Class 3: Method 2
- Class 5: Method 2
- Class 6: Method 2

The performance figures & specifications are indicative only and may vary depending on the chosen manufacturer & supplier.

***The glazing manufacturer must provide performance data to show that the selected glazing complies with the values in the table through the WERS certification.**

NB: The following links to the WERS website provides information on the window manufacturers which are certified under WERS and the energy rating of each of their glazing products: http://www.wers.net/

5.5 J1.6: FLOORS

5.5.1 Floor insulation requirement

A floor that is part of the 'envelope' must achieve the minimum Total R-Value in a downwards and upwards direction or satisfy one of the options as specified in Table J1.6.

The following floors are required to comply:

iv) Ground floor commercial units. These are above the basement carpark (which is unenclosed and mechanically ventilated by more than 1.5 air changes per hour) &

v) Level 1 Sole Occupancy Rooms & Multi-Purpose Room. The following rooms contain a suspended concrete slab above 'open air': 1.05, 1.20, 1.21, 1.26, 1.27, 1.28

vi) 'Commercial/Retail' unit on the ground floor. This is located on the southern and contains a concrete slab on ground

As per table J1.6, a floor must achieve a minimum R-Value of R2.0 in the downwards direction in climate zone 5.

i) & ii) Suspended concrete slab for ground floor commercial units & level 1 SOUs:

	Floor type: Concrete suspended floor	***R-Value***
1	Indoor air film	0.16
2	Concrete Floor (200mm)	0.14
3	Outdoor Air	0.04
	Total *R-Value*	**0.34**

The following options in table 5.3a below will achieve compliance:

Table 5.5a:

Insulation Provided by Construction	**Required R-Value**	**Required Action to Achieve Compliance**
0.34	**R2.0** Required. Additional R-Value is 2.0 - 0.34 = **1.66**	Addition minimum insulation of **R1.66**.

iii) Slab on ground for Retail unit:

	Floor type: Concrete slab on ground	***R-Value***
1	Indoor air film	0.16
2	Concrete Floor (200mm)	0.14
3	R-Value of soil	1.16*
	Total *R-Value*	**1.46**

NB: * Calculated from table 2a in Specification J1.6 based on the ratio of the floor area to floor perimeter.

The following options in table 5.3a below will achieve compliance:

Table 5.5a:

Insulation Provided by Construction	**Required R-Value**	**Required Action to Achieve Compliance**
1.46	**R2.0** Required. Additional R-Value is 2.0 – 1.46 = **0.54**	Addition minimum insulation of **R0.54**.

6 PART J2: GLAZING

This part is blank as it was removed by the NCC in the 2019 version and integrated into Part J1 (Building Fabric).

7 PART J3: BUILDING SEALING

7.1 J3.2: CHIMNEYS AND FLUES

Not applicable

7.2 J3.3: ROOF LIGHTS

A roof light must be sealed, or capable of being sealed, when serving a conditioned space or a habitable room in climate zones 4, 5, 6, 7 or 8. The seal must be constructed with:

- An imperforate ceiling diffuser or the like installed at the ceiling or internal lining level, or
- A weatherproof seal, or
- A shutter system readily operated either manually, mechanically or electronically by the occupant

7.3 J3.4: WINDOWS AND DOORS

A seal to restrict air infiltration must be fitted to each edge of a new door, openable window or the like forming part of the envelope of a conditioned space in climate zones 4, 5, 6, 7 or 8.

Above requirements do not apply to:

a) Windows complying with AS2047 (Windows in Buildings – Selection and Installation) or
b) A fire door or smoke door or
c) A roller shutter door, roller shutter grill or other security or device installed only for out-of-hours security

The seal on the bottom of an external swing door must be a draft protection device and for the other edges of an external door or edges of an openable window or other such opening, may be foam or rubber compression strip, fibrous seal or the like.

As per Clause J3.4d, an entrance to a building, if leading to a conditioned space must have an air lock, self-closing door, rapid roller door, revolving door or the like, other than:

i) where the conditioned space has a floor area of not more than 50m2; or
ii) where a front shop or the like has-
    a. a 3m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and
    b. At all other entrances to the café, restaurant, open front shop or the like, self-closing doors.
iii) A loading dock entrance, if leading to a conditioned space, must be fitted with a rapid roller door or the like

7.4 J3.5: EXHAUST FANS

An exhaust fan must be fitted with a sealing device such as a self-closing damper or the like when serving a conditioned space or a habitable room in climate zones 4, 5, 6, 7 or 8.

7.5 J3.6: CONSTRUCTION OF ROOFS, WALLS AND FLOORS

Ceilings, walls, floors and any opening such as a window frame, door frame, roof light frame or the like must be constructed to minimise air leakage when forming part of the envelope or in climate zones 4, 5, 6, 7 or 8. This must be constructed by:

- enclosing by internal lining systems that are close fitting at ceiling, wall and floor junctions or,
- sealed by caulking, skirting, architraves, cornices, expanding foam, rubber strips or the like.

The above requirements do not apply to openings, grilles or the like required for smoke hazard management.

7.6 J3.7: EVAPORATING COOLERS

Not applicable.

8 PART J4

This part is blank as it was removed by the NCC in a previous version.

9 PART J5: AIR CONDITIONING AND VENTILATION SYSTEMS

Refer to the Mechanical Engineer's documentation for compliance requirements for air-conditioning.

10 PART J6: ARTIFICIAL LIGHTING AND POWER

10.1 J6.2 ARTIFICIAL LIGHTING

For artificial lighting, the aggregate design illumination power load must not exceed the sum of the allowances obtained by multiplying the 'area' of each space by the adjusted 'illumination power density' (IPD) – see last column below for the total maximum Watts allowable for each room. This excludes any emergency lighting, signage or display cabinet lighting or a heater where the heater also emits light.

The aggregate design illumination power load is the sum of the design illumination power loads in each of the spaces served. In determining this design illumination power load, where there are multiple lighting systems serving the same space;

i) The total illumination power load of all systems must be used; or

ii) For a control system that permits only one system to operate at a time, the design illumination power load is:

a. Based on the highest illumination power load; or

b. Determined by the formula:

(H x T/2 + P x (100 – T/2))/100

Where:

H=the highest illumination power load; and

T=the time for which the maximum illumination power load will occur, expressed as a percentage; and

P=the predominant illumination power load.

Table A:

Description	Levels	Unadjusted IPD	Area	Adjusted IPD	*Control Factor	#Max Power (W) Per Space
Car Park	Basement	2	1122.60	2.0	0.7	**3207**
NBN & MSB	Basement	3	15.70	5.1	1.0	**80**
Res Garbage Room (No. 1)	Basement	1.5	91.60	1.9	1.0	**174**
Res Garbage Room (No. 2)	Basement	1.5	52.40	2.0	1.0	**106**
Comm Garbage Room	Basement	1.5	31.30	2.3	1.0	**73**
Pump Room	Basement	1.5	40.00	2.1	1.0	**84**
Communal Laundry/games	Ground	4.5	83.20	5.8	1.0	**483**
Sub-station	Ground	1.5	19.70	2.3	1.0	**45**
Services/Metres	Ground	3	14.80	4.9	1.0	**73**
Female WC	Ground	3	15.80	4.7	1.0	**75**
Male WC	Ground	3	14.60	4.8	1.0	**70**
Accessible WC	Ground	3	7.20	5.1	1.0	**37**
Multi-Purpose Room	Ground	2.5	96.60	3.6	1.0	**348**
Commercial/Co-Working	Ground	2.5	170.00	3.2	1.0	**544**
Café	Ground	14	253.00	17.9	1.0	**4524**
Retail	Ground	14	114.20	21.2	1.0	**2422**
Commercial/Retail	Ground	2.5	154.00	3.6	1.0	**558**
Commercial	L1	2.5	151.40	3.7	1.0	**558**

Description	Levels	Unadjusted IPD	Area	Adjusted IPD	*Control Factor	#Max Power (W) Per Space
101-104	L1	5	17.20	8.1	1.0	**139**
105-107	L1	5	17.68	8.0	1.0	**142**
108-112, 115	L1	5	20.51	7.9	1.0	**162**
113, 114	L1	5	20.06	7.9	1.0	**159**
116-118	L1	5	18.03	8.0	1.0	**145**
119	L1	5	20.51	7.9	1.0	**162**
120	L1	5	25.51	7.9	1.0	**201**
121-124	L1	5	20.51	7.9	1.0	**162**
125	L1	5	30.86	7.5	1.0	**232**
126-133	L1	5	21.22	7.9	1.0	**168**
134-137	L1	5	20.51	7.9	1.0	**162**
138	L1	5	20.86	8.0	1.0	**167**
139-140	L1	5	20.06	7.9	1.0	**159**
01-03	L2, L3, L4	5	17.20	8.1	1.0	**139**
04-07	L2, L3, L4	5	17.68	8.0	1.0	**142**
08-12	L2, L3, L4	5	20.51	7.9	1.0	**162**
13-14	L2, L3, L4	5	20.06	7.9	1.0	**159**
15	L2, L3, L4	5	20.51	7.9	1.0	**162**
16-18	L2, L3, L4	5	18.03	8.0	1.0	**145**
19	L2, L3, L4	5	20.51	7.9	1.0	**162**
20	L2, L3, L4	5	25.51	7.9	1.0	**201**
21-24	L2, L3, L4	5	20.51	7.9	1.0	**162**
25	L2, L3, L4	5	30.86	7.5	1.0	**232**
26-33	L2, L3, L4	5	21.22	7.9	1.0	**168**
34-37	L2, L3, L4	5	20.51	7.9	1.0	**162**
38	L2, L3, L4	5	20.86	8.0	1.0	**167**
39-40	L2, L3, L4	5	20.06	7.9	1.0	**159**
41-44	L2, L3, L4	5	17.68	8.0	1.0	**142**
45	L2, L3, L4	5	20.66	8.0	1.0	**165**
46-47	L2, L3, L4	5	17.68	8.0	1.0	**142**
48	L2, L3, L4	5	17.20	8.1	1.0	**139**
501	L5	5	22.76	7.8	1.0	**178**
502	L5	5	21.62	7.9	1.0	**171**
503	L5	5	21.62	7.9	1.0	**171**
504	L5	5	22.76	7.8	1.0	**178**
505	L5	5	31.62	7.6	1.0	**242**
506-508	L5	5	22.76	7.8	1.0	**178**
509-511	L5	5	18.03	8.0	1.0	**145**
512	L5	5	20.51	7.9	1.0	**162**
513	L5	5	25.51	7.9	1.0	**201**
514-524	L5	5	20.51	7.9	1.0	**162**
525	L5	5	21.92	7.8	1.0	**172**
526	L5	5	22.76	7.8	1.0	**178**
527	L5	5	23.27	7.8	1.0	**181**
528	L5	5	20.51	7.9	1.0	**162**
529	L5	5	20.51	7.9	1.0	**162**
530	L5	5	20.06	7.9	1.0	**159**
531	L5	5	20.06	7.9	1.0	**159**
532	L5	5	20.51	7.9	1.0	**162**

Description	Levels	Unadjusted IPD	Area	Adjusted IPD	*Control Factor	#Max Power (W) Per Space
Common Kitchen/Lounge	L6	4.5	206.50	5.9	1.0	**1211**
Common Meeting Room	L6	4.5	56.00	6.5	1.0	**364**
WCs	L6	3	20.00	4.6	1.0	**93**
Lobby	Ground	9	26.10	15.4	0.6	**671**
Corridor	L1	5	259.00	5	0.6	**2158**
Corridor	L2	5	259.00	5	0.6	**2158**
Corridor	L3	5	259.00	5	0.6	**2158**
Corridor	L4	5	259.00	5	0.6	**2158**
Corridor	L5	5	222.40	5	0.6	**1853**

NB: *Any control devices such as lighting timers, motion detectors, daylight sensors or dynamic lighting control devices used for any zones listed in the table above must comply with Specification J6 of the NCC Volume 1 2019.

10.2 J 6.3 INTERIOR ARTIFICIAL LIGHTING AND CONTROL

Artificial lighting of a room or space must be individually operated by a switch or other control device or a combination of both. An artificial lighting switch must be located in a visible and easily accessible position in the room or space being switched or in an adjacent room or space from where 90% of the lighting being switched is visible.

An artificial lighting switch or other control device must, for other than a single functional space such as an auditorium, theatre, swimming pool, sporting stadium or warehouse:

- Not operate lighting for an area of more than 250 m^2 if in a Class 5 or 8 building, or
- Not operate lighting for an area of more than 250 m^2 for a space of not more than 2000 m^2

95% of the light fittings in a building or storey of a building, other than a Class 2 or 3 of more than 250 m^2 must be controlled by a time switch in accordance with Specification J6 or, an occupant sensing device such:

- as a security key card reader that registers a person entering and leaving a building; or
- a motion detector in accordance with Specification J6.

Artificial lighting in a fire-isolated stairway, fire-isolated passageway or fire-isolated ramp, must be controlled by a motion detector in accordance with Specification J6.

In a Class 5, 6 or 8 building of more than 250m^2, artificial lighting in a natural lighting zone adjacent to windows must be separately controlled from artificial lighting not in a natural lighting zone in the same storey except where:

- the room containing the natural lighting zone is less than 20m^2, or
- the room's natural lighting zone contains less than 4 luminaires, or
- 70% or more of the luminaires in the room are in the natural lighting zone

Artificial lighting in a foyer, corridor and other circulation spaces of more than 250 W within a single zone and adjacent to windows must be controlled by a daylight sensor and dynamic control device in accordance with Specification J6.

An occupant activated device such as a room security device, a motion detector in accordance with Specification J6, or the like, must be provided in sole occupancy units of Class 3, other than where the accommodation is for people with a disability or the aged, in order to cut power of the artificial lighting, air conditioning, local exhaust fans and bathroom heaters when the sole occupancy unit is unoccupied.

10.3 J 6.4 INTERIOR DECORATIVE AND DISPLAY LIGHTING

Interior decorative and display lighting, such as for a foyer mural or art display, must be controlled-

a) Separately from other artificial lighting; and

b) By a manual switch for each area other than when the operating times of the displays are the same in an area, in which case they may be combined.

c) By a time switch in accordance with Specification J6 where the display exceeds 1Kw.

Window display lighting must be controlled separately from other display lighting.

10.4 J6.5 ARTIFICIAL LIGHTING AROUND THE PERIMETER OF A BUILDING

Exterior artificial lighting attached to or directed at the façade of a building must:

i) be controlled by:

a) a daylight sensor or

b) a time switch that is capable of switching on and off electric power to the system at variable pre-programmed times and on variable pre-programmed days; and

ii) when the total perimeter lighting loads exceeds 100W:

a) use LED luminaires for 90% of the total lighting load, or

b) be controlled by a motion detector in accordance with Specification J6, or

c) when used for decorative purposes, such as façade lighting or signage lighting, have a separate time switch in accordance with Specification with J6.

The requirements in ii) above do not apply to emergency lighting in accordance with Part E4.

10.5 J6.6 BOILING WATER AND CHILLED WATER STORAGE UNITS

Power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with Specification J6.

10.6 J6.7 LIFTS

Lifts must:

(a) be configured to ensure artificial lighting and ventilation in the car are turned off when it is unused for 15 minutes; and
(b) achieve the idle and standby energy performance level in Table 6.7a; and
(c) achieve:
(i) the energy efficiency class in Table 6.7b; or
(ii) if a dedicated goods lift, energy efficiency class D in accordance with ISO 25745-2.

Table 6.7a Lift idle and standby energy performance level

Rated load	Idle and standby energy performance level in accordance with ISO 25745-2
Less than or equal to 800 kg	2
801 kg to less than or equal to 2000 kg	3
2001 kg to less than or equal to 4000 kg	4
Greater than 4000 kg	5

Table 6.7b Lift energy efficiency class

Usage Category in accordance with ISO 25745-2	Energy efficiency class in accordance with ISO 25745-2
1 - 4	C
> 5	D

10.7 J6.8 ESCALATORS AND MOVING WALKWAYS

Not applicable

11 PART J7: HEATED WATER SUPPLY AND SWIMMING POOL AND SPA POOL PLANT

11.1 J7.2: HEATED WATER SUPPLY

A heated water supply system for food preparation and sanitary purposes must be designed and installed in accordance with Part B2 of NCC Volume three – Plumbing Code of Australia.

11.2 J7.3: SWIMMING POOL HEATING AND PUMPING

Not applicable

11.3 J7.4: SPA POOL HEATING AND PUMPING

Not applicable

12 PART J8: FACILITIES FOR ENERGY MONITORING

12.1 J8.3: FACILITIES FOR ENERGY MONITORING

a) A building or sole occupancy unit with a floor area of more than 500 m^2 must have the facility to record the consumption of gas and electricity.

b) A building with a floor area of more than 2,500 m2 must have energy meters configured to enable individual time-of-use energy consumption data recording, in accordance with (c), of the energy consumption of—
- (i) air-conditioning plant including, where appropriate, heating plant, cooling plant and air handling fans; and
- (ii) artificial lighting; and
- (iii) appliance power; and
- (iv) central hot water supply; and
- (iv) internal transport devices including lifts, escalators and moving walkways where there is more than one serving the building; and
- (v) other ancillary plant.

c) Energy meters required by (b) must be interlinked by a communication system that collates the time-of-use energy consumption data to a single interface monitoring system where it can be stored, analysed and reviewed.

13 DEFINITIONS

The following definitions from the 2019 NCC (Volume 1) are relevant to this Section J Report:

Envelope

Parts of a building's fabric that separate a conditioned space or habitable room from -
- (a) the exterior of the building; or
- (b) a non-conditioned space including -
  - (i) the floor of a rooftop plant room, lift-machine room or the like; and
  - (ii) the floor above a carpark or warehouse; and
  - (iii) the common wall with a carpark, warehouse or the like.

Habitable room

Means a room used for normal domestic activities, and:

(a) includes a bedroom, living room, lounge room, music room, television room, kitchen, dining room, sewing room, study, playroom, family room, home theatre and sunroom; but

(b) excludes a bathroom, laundry, water closet, pantry, walk-in wardrobe, corridor, hallway, lobby, photographic darkroom, clothes-drying room, and other spaces of a specialised nature occupied neither frequently nor for extended periods.

Conditioned space

Means a space within a building, including a ceiling or under-floor supply air plenum or return air plenum, where the environment is likely, by the intended use of the space, to have its temperature controlled by air-conditioning, but does not include:

Air-conditioning

A service that actively cools or heats the air within a space, but does not include a service that directly cools or heats cold or hot rooms or; maintains specialised conditions for equipment or processes, where this is the main purpose of the service.

Bulk Insulation

Has a high resistance to the flow of heat by conduction. It includes Fibreglass, Rockwool, Glass Wool, Polyester, expanded or extruded polystyrene or other similar materials.

R-Value (m^2. K/W)

Means the thermal resistance of a component calculated by dividing its thickness by its thermal conductivity.

U-Value (m^2. K/W)

Means the thermal transmittance of the composite elements allowing for the effect of any airspaces, thermal bridging and associated surface resistances.

End of report

APPENDIX 1

Façade
Report

Calculator

Project Summary

Date
23/08/2022

Name
Bruce Carr

Company
Sustainable Thermal Solutions

Position
Owner Operator

Building Name / Address
Boarding House: 175-177 Cleveland St & 6-8 Woodburn St Redfern NSW 2016
0

Building State
NSW

Climate Zone
Climate Zone 5 - Warm temperate

Building Classification
Class 3 - other

Storeys Above Ground
6

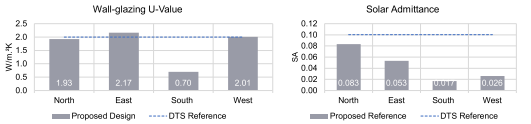
Tool Version
1.1 (April 2020)

The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

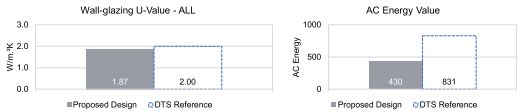
Compliant Solution =
Non-Compliant Solution =

Method 1

	North	East	South	West	Method 2 All
Wall-glazing U-Value (W/m².K)	1.93	2.17	0.70	2.01	1.87
Solar Admittance	0.08	0.05	0.02	0.03	
AC Energy Value					430



Method 2



Project Details

	North	East	South	West
Glazing Area (m²)	312.48	623.7	20	541.01
Glazing to Façade Ratio	26%	30%	2%	27%
Glazing References	W1 W2 W3 W4 W5	W2 W5 W6 W7	W5	W2 W3 W5
Glazing System Types	Sliding Door	Sliding Door	Sliding Door	Sliding Door
Glass Types	Single glazing	Single glazing	Single glazing	Single glazing
Frame Types	Aluminium	Aluminium	Aluminium	Aluminium
Average Glazing U-Value (W/m².K)	5.80	5.80	5.80	5.80
Average Glazing SHGC	0.37	0.18	0.70	0.10
Shading Systems	Horizontal	Horizontal	Horizontal	Horizontal
Wall Area (m²)	897.1	1426.7	814.1	1431
Wall Types	Wall	Wall	Wall	Wall
Methodology	Wall			
Wall Construction	Cavity Brick (R1.0) Cavity Brick (Internal)	Cavity Brick (R1.0)	Cavity Brick (R1.0)	Cavity Brick (R1.0)
Wall Thickness	270	270	270	270
Average Wall R-value (m².K/W)	1.73	1.73	1.73	1.73
Solar Absorptance	0.7	0.7	0.7	0.7

Façade

Report

Calculator

Project Summary

Date
26/09/2022

Name
Bruce Carr

Company
Sustainable Thermal Solutions

Position
Owner Operator

Building Name / Address
Offices: 175-177 Cleveland St & 6-8 Woodburn St Redfern NSW 2016
0

Building State
NSW

Climate Zone
Climate Zone 5 - Warm temperate

Building Classification
Class 5 - office building

Storeys Above Ground
2

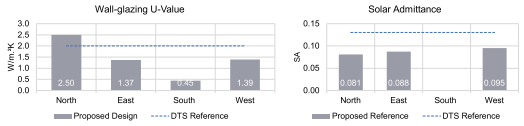
Tool Version
1.1 (April 2020)

The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

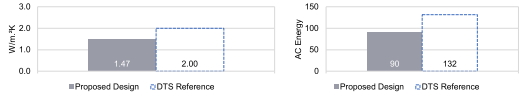
Compliant Solution =
Non-Compliant Solution =

	Method 1 North	Method 1 East	Method 1 South	Method 1 West	Method 2 All
Wall-glazing U-Value (W/m².K)	2.50	1.37	0.45	1.39	1.47
Solar Admittance	0.08	0.09		0.10	
AC Energy Value					90

Method 1



Method 2



Project Details

	North	East	South	West
Glazing Area (m²)	71.11	29.28	0	56.4
Glazing to Façade Ratio	48%	22%	0%	22%
Glazing References	W7 W1 W2 W3	W4 W7 W6		W7
Glazing System Types	Fixed	Fixed		Fixed
Glass Types	Single Glazing - low-E coating	Single Glazing - low-E coating		Single Glazing - low-E coating
Frame Types	Aluminium	Aluminium		
Average Glazing U-Value (W/m².K)	4.70	4.70		4.70
Average Glazing SHGC	0.17	0.43	0.00	0.43
Shading Systems	Horizontal	Horizontal	Horizontal	Horizontal
Wall Area (m²)	76.1	105.8	114.92	198.5
Wall Types	Wall	Wall	Wall	Wall
Methodology	Wall			
Wall Construction	Cavity Brick (R1.5)	Cavity Brick (R1.5)	Cavity Brick (R1.5)	Cavity Brick (R1.5)
Wall Thickness	270	270	270	270
Average Wall R-value (m².K/W)	2.23	2.23	2.23	2.23
Solar Absorptance	0.7	0.7	0.7	0.7

Façade

Report

Calculator

Project Summary

Date
26/09/2022

Name
Bruce Carr

Company
Sustainable Thermal Solutions

Position
Owner Operator

Building Name / Address
Retail: 175-177 Cleveland St & 6-8 Woodburn St Redfern NSW 2016
0

Building State
NSW

Climate Zone
Climate Zone 5 - Warm temperate

Building Classification
Class 6 - restaurants, cafes, bars

Storeys Above Ground
1

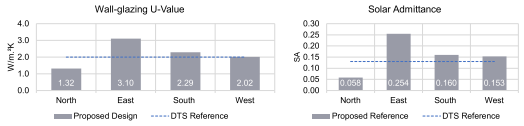
Tool Version
1.1 (April 2020)

The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

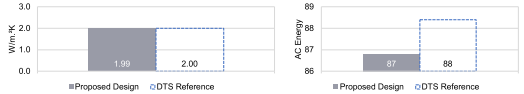
Compliant Solution =
Non-Compliant Solution =

	Method 1 North	Method 1 East	Method 1 South	Method 1 West	Method 2 All
Wall-glazing U-Value (W/m².K)	1.32	3.10	2.29	2.02	1.99
Solar Admittance	0.06	0.25	0.16	0.15	
AC Energy Value					87

Method 1



Method 2



Project Details

	North	East	South	West
Glazing Area (m²)	24.026123	26.95	37.057	53.2142
Glazing to Façade Ratio	20%	62%	43%	37%
Glazing References	W1 W2 W9	W3 W9	W4 W5	W6 W7 W8 W9
Glazing System Types	Fixed	Fixed	Fixed Casement	Fixed
Glass Types	Single Glazing - low-E coating	Single Glazing - low-E coating	Single Glazing - low-E coating	Single Glazing - low-E coating
Frame Types	Aluminium	Aluminium	Aluminium	Aluminium
Average Glazing U-Value (W/m².K)	4.70	4.70	4.70	4.70
Average Glazing SHGC	0.34	0.43	0.43	0.43
Shading Systems	Horizontal	Horizontal	Horizontal	Horizontal
Wall Area (m²)	93.6	16.2	48.5	90.8
Wall Types	Wall	Wall	Wall	Wall
Methodology	Wall			
Wall Construction	Cavity Brick (R1.5)	Cavity Brick (R1.5) Cavity Brick (Int)	Cavity Brick (R1.5)	Cavity Brick (R1.5)
Wall Thickness	270	270	270	270
Average Wall R-value (m².K/W)	2.23	2.23	2.23	2.23
Solar Absorptance	0.7	0.7	0.7	0.7

APPENDIX C
Green Star Pathway

Total Score Targeted	67.3

CATEGORY / CREDIT	CODE	CREDIT CRITERIA	POINTS AVAILABLE	TARGETED POINTS	COMMENTS
Management			14		
Green Star Accredited Professional	1.0	Accredited Professional	1	1	Project has appointed an ESD Consultant
Commissioning and Tuning	2.0	Environmental Performance Targets	-	Complies	An Owners Project Requirements (design intent report) will be produced (based on the services SD / DD report), including: - basic functions, operations and maintenance requirements - energy, water targets for the building and various building systems - a metering and monitoring description / diagram
	2.1	Services and Maintainability Review	1	1	A specific review of the services will be undertaken prior to construction led by the owners representative, addressing the following: - commission ability - controllability - maintainability - operability, including fitness for purpose - safety
	2.2	Building Commissioning	1	1	Airtightness testing will be carried out at PC to meet Green Star benchmarks
	2.3	Building Systems Tuning	1	1	Building tuning will be carried out for 12 months post completion. This includes quarterly reviews and adjustments.
	2.4	Independent Commissioning Agent	1	1	Requires an independent commissioning agent to be engaged
Adaptation and Resilience	3.1	Implementation of a Climate Adaptation Plan	2	2	Requires a Climate Adaptation Risk Management workshop and report with adaptation measures to be implemented in the design.
Building Information	4.1	Building Information	1	1	An operations and maintenance manual will be developed and provided to the facilities management team. A building users' guide will be developed, aimed at the tenants' representatives and occupants with basic descriptions of how to use the building.
Commitment to Performance	5.1	Environmental Building Performance	1	1	"Green lease" reporting clauses will be included in the lease, showing that both the landlord and tenant have committed to set, measure and report on at least two of the following metrics. - greenhouse gases or energy - water - waste - IEQ
	5.2	End of Life Waste Performance	1	1	"Green lease" reporting clauses will be included in the lease, showing that both the landlord and tenant have a mutually agreed methodology to follow at the end-of-life for a fitout, including performance measurement procedures for waste from fitout end-of-life and make good works.
	6.0	Metering	-	Complies	Electrical meters will be provided separately for the major energy uses Gas meters will be provided for any food retail tenants, and the main building. Water meters will be provided for major water uses.

CATEGORY / CREDIT	CODE	CREDIT CRITERIA	POINTS AVAILABLE	TARGETED POINTS	COMMENTS
Metering and Monitoring	6.1	Monitoring Systems	1	1	All meters will be connected to a BMS or other monitoring system which: - has the capacity to produce alerts if any inaccuracies in the meter network are found (in excess of meter tolerances). - has the capacity to collect data from all meters. - alert the facilities management to missing data. - records energy use and water use for at least 18 months at 15 min intervals. - raises an alarm when consumption increases beyond certain parameters and issues an instant alert. - provides a breakdown of information by building system or by space. - can report load vs time and power factor. - can produce quarterly reports. - is commissioned in accordance with the requirements listed in Validating Non-Utility Meters for NABERS Ratings protocol, issued by NSW Office of Environment and Heritage.
Responsible Building Practices	7.0	Environmental Management Plan	-	Complies	The builder will be required to implement a site specific Environmental Management Plan (EMP) for the project. The EMP will be required to include measures to limit stormwater impacts during construction, including but not limited to those listed in the WSUD Response section of the SMP.
	7.1	Formalised Environmental Management System	1	1	Preference will be given to builders with a formally certified ISO14001 compliant Environmental Management System.
	7.2	High Quality Staff Support	1	1	Deliver sub-contractor training in sustainability as part of an induction process.
Operational Waste	8A	Performance Pathway - Specialist Plan	1	1	Operational waste management plan in place (council requirement)
	8B	Prescriptive Pathway - Facilities	-		
Total			14	14	
Indoor Environment Quality			17		
Indoor Air Quality	9.1	Ventilation System Attributes	1	1	Outside air intakes will be located away from pollutant sources (based on ASHRAE 62.1:2013). Access for cleaning will be provided to both sides of moisture and debris catching equipment (eg. Coils, filters etc.). Construction management processes will be implemented to ensure that ducts remain free of dust throughout the construction process, in accordance with SMACNA or other standard.
	9.2	Provision of Outdoor Air	2	2	75% of the building complies with the criteria for natural ventilation. Review increasing outside air rates for the remainder of the building.
	9.3	Exhaust or Elimination of Pollutants	1	1	Carbon Monoxide monitors are nominated to the basement carpark exhaust fan control. Individual exhaust fans are nominated to each bathroom and each kitchen and ducted to external façade or roof.
Acoustic Comfort	10.1	Internal Noise Levels	1	1	Acoustic Engineer to be engaged. Internal noise levels are to be no higher than 5dB(A) above the lower figure in AS2107:2016 for each space.
	10.2	Reverberation	1	1	Reverberation levels are to be no higher than the maximum stated in AS2107:2016 for each space.
	10.3	Acoustic Separation	1	1	All enclosed spaces (meeting rooms, private offices etc.) are to have a bounding construction achieving one of the following: - The partition between the spaces shall be constructed to achieve a Rw value of 45 (35 where the partition contains a door), or - The sound insulation must comply with Dw +LAeqT > 75
	11.0	Minimum Lighting Comfort	-	Complies	All lighting in occupied areas to be LED, have electronic drivers with a 12-bit or greater resolution, and have a Colour Rendering Index (CRI) of greater than 80.

CATEGORY / CREDIT	CODE	CREDIT CRITERIA	POINTS AVAILABLE	TARGETED POINTS	COMMENTS
Lighting Comfort	11.1	General Illuminance and Glare Reduction	1	1	All lighting in occupied areas to achieve the following: - at minimum 95% of area to meet AS1680:2006 recommended lighting levels - lux plots to be provided to demonstrate compliance - luminaire selection to incorporate translucent diffusers to eliminate direct light, or comply with AS1680.1:2006 Section 8.3.4
	11.2	Surface Illuminance	1		
	11.3	Localised Lighting Control	1	1	Each individual occupant is required to be able to control lighting in their immediate environment.
Visual Comfort	12.0	Glare Reduction	-	Complies	Blinds to be installed as a base building provision to all occupied spaces. Blinds are to have a VLT <10%.
	12.1	Daylight	2	1	This depends on the façade treatment, but the proposed design may be able to achieve points. To validate compliance daylight modelling is required.
	12.2	Views	1	1	Based on 60% of occupied space having access to an external view.
Indoor Pollutants	13.1	Paints, Adhesives, Sealants and Carpets	1	1	All paints, adhesives, sealants and carpets installed in interior applications are to meet the specified VOC emissions limits.
	13.2	Engineered Wood Products	1	1	All engineered wood products (particleboard, plywood, MDF, LVL, HPL, compact laminate, and decorative overlaid wood panels) are to meet the specified formaldehyde emissions limits.
Thermal Comfort	14.1	Thermal Comfort	1	1	Requires 80% of the occupants to be satisfied, based on predictive modelling. Generally can be achieved by maintaining air conditioning setpoints.
	14.2	Advanced Thermal Comfort	1		Requires 90% of the occupants to be satisfied, based on predictive modelling. Generally requires external shading to prevent direct solar ingress.
Total			**17**	**14**	
Energy			**22**		
	15E.1	Comparison to a Reference Building Pathway	20	5	Energy modelling TBC
	16B	Performance Pathway - Reference Building	2		Refer to energy modelling report
Total			**22**	**5**	
Transport			**10**		
	17B.1	Access by Public Transport	3	2	Based on location of site. TBC as requires GBCA registration
	17B.2	Reduced Car Parking Provision	1	1	Based on car spaces provided
	17B.3	Low Emission Vehicle Infrastructure	1	1	Will require at least 1 electric vehicle charge point. Potentially 3 depending on GBCA clarifications
	17B.4	Active Transport Facilities	1	1	Based on regular occupancy of 700 people (including residents and admin / retail staff), 1 point requires 53 bicycle spaces for regular occupants, plus visitor spaces for 5% of peak visitors (peak occupancy minus regular occupancy). End of trip facilities (staff only) are required.
	17B.5	Walkable Neighbourhoods	1	1	1 point achievable based on 8 amenities within 400m of centre of site
Total			**10**	**6**	
Water			**12**		
Potable Water	18A.1	Potable Water - Performance Pathway	12	5.3	The following fixtures and fitting benchmarks are to be met: - Showers: 3 Star WELS (<7.5 L/min). - Kitchen Taps: 5 Star WELS (6.0 L/min). - Bathroom Taps: 5 Star WELS (6.0 L/min). - WC's: 4 Star WELS (3.5 L/min). - Dishwashers: Fisher Paykel DD60SDFX9 or equivalent. - Washing Machine: Dexter T-300 or equivalent. This project excludes rainwater collection and reuse.
Total			**12**	**5.3**	

CATEGORY / CREDIT	CODE	CREDIT CRITERIA	POINTS AVAILABLE	TARGETED POINTS	COMMENTS
Materials			**14**		
Life Cycle Impacts	19A.1	Comparative Life Cycle Assessment	5	5	Life Cycle Practitioner will be engaged to review the design's lifecycle environmental impacts. Preliminary advice indicates that 5 points will be achieved.
	19A.2	Additional Life Cycle Impact Reporting	4		
Responsible Building Materials	20.1	Structural and Reinforcing Steel	1	1	Requires certified supplier and steel maker for structural steel, reinforcing steel is required to be made with Polymer Injection Technology (PIT) processes or equivalent. Essentially this is met by using a major supplier of Australian steel.
	20.2	Timber Products	1	1	Requires all timber to be certified, reused or recycled.
	20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	1	1	Requires certified PVC products or non-PVC replacements throughout.
Sustainable Products	21.1	Product Transparency and Sustainability	3	1	A proportion of all materials used in the project is required meet the requirements as below, A. Reused Products, B. Recycled Content Products, C. Environmental Product Declarations, D. Third-Party Certificates, or E. Stewardship Programs.
Construction and Demolition Waste	22A	Fixed Benchmark	0		
	22B	Percentage Benchmark	1	1	Requires 90% of construction and demolition waste to be diverted from landfill.
Total			**14**	**10**	
Land Use & Ecology			**6**		
Ecological Value	23.0	Endangered, Threatened or Vulnerable Species	-	Complies	Site is unlikely to contain habitat for endangered species.
	23.1	Ecological Value	3	2	1 point for 5% of site being native vegetation, 2 and 3 points for 25% and 50% native vegetation coverage respectively.
Sustainable Sites	24.0	Conditional Requirement	-	Complies	Development does not impact on wetlands, prime agricultural land, old growth forest.
	24.1	Reuse of Land	1	1	Point awarded based on site being already developed.
	24.2	Contamination and Hazardous Materials	1	1	Hazardous materials survey to be undertaken on existing buildings.
Heat Island Effect	25.0	Heat Island Effect Reduction	1	1	Roofing material to have a Solar Reflectance Index > 82 (eg. Colorbond Coolmax or equivalent).
Total			**6**	**5**	
Emissions			**5**		
Stormwater	26.1	Stormwater Peak Discharge	1	1	Stormwater detention to be implemented so that there is no increase in 5-year ARI peak discharge from predevelopment levels.
	26.2	Stormwater Pollution Targets	1	1	Requires treatment of stormwater from site (civil to advise)
Light Pollution	27.0	Light Pollution to Neighbouring Bodies	-	Complies	External lighting is to fully comply with the requirements of AS4282.1:1997, including pre and post curfew requirements for boundary illumination etc.
	27.1	Light Pollution to Night Sky	1	1	All external lighting is to have a maximum Upward Light Output Ratio of 5%.
Microbial Control	28.0	Legionella Impacts from Cooling Systems	1	1	Air conditioning to be air cooled
Refrigerant Impacts	29.0	Refrigerants Impacts	1	0	
Total			**5**	**4**	
Innovation			**10**		
Innovative Technology or Process	30A	Innovative Technology or Process	10		
Market Transformation	30B	Market Transformation			
Improving on Green Star Benchmarks	30C	Improving on Green Star Benchmarks		2	Stormwater design meets 'Class C' treatment requirements.
				1	Ultra low VOC paints to be nominated

CATEGORY / CREDIT	CODE	CREDIT CRITERIA	POINTS AVAILABLE	TARGETED POINTS	COMMENTS
Innovation Challenge	30D	Innovation Challenge			
Global Sustainability	30E	Global Sustainability		1	The design meets the criteria for the Quality of Amenities innovation credit.
Total			**10**	**4**	

TOTALS	AVAILABLE	TARGETED
CORE POINTS	100	63.3
CATEGORY PERCENTAGE SCORE		63.3
INNOVATION POINTS	10	4.0
TOTAL SCORE TARGETED		67.3