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28 Shepherd Street, Liverpool

## Preliminary BASIX Report Revision 2

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Date:

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# Revision

REVISION	DATE	COMMENT	APPROVED BY
3	25/11/2015	Stage 2 DA Issue	NCJ
2	09/10/2015	Revised DA Issue	NCJ
1	17/06/2015	DA Issue	NCJ
0	24/04/2015	Preliminary for Client Review	NCJ

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# 28 Shepherd St Liverpool

## Summary of Assessment

Wood & Grieve Engineers have completed a revised BASIX Assessment for the proposed multi-unit residential development at 28 Shepherd St, Liverpool. The assessment has been based upon the updated Architectural Drawings (18/11/2016) prepared by Woods Bagot Architects.

In summary, we can confirm the following outcome of the BASIX analysis:-

- It has been determined that the proposed building shall achieve a BASIX Certification with the following scores:
  - Water: 40% (Required target: 40%)
  - Thermal Comfort: pass (Required target: pass)
  - Energy: 20% (Required target: 20%)
- Our assessment work has reviewed all apartments (included amended designs) based on the architectural drawing issue 18 November 2016, as prepared by Woods Bagot.
- Detail regarding building services has been prepared via consultation with the relevant project consulting engineers, architect and client.
- Further information regarding the thermal comfort and building fabric specification has been outlined within Section 3.0 of this report.
- Note – BASIX Certificate is attached within Appendix A of this report.

# 28 Shepherd St Liverpool

## 1. Introduction

Wood and Grieve Engineers have completed a revised Building Sustainability Index (BASIX) assessment for the proposed multi-unit residential development at 28 Shepherd St, Liverpool, NSW. Based on information provided to date and the nominated architectural drawings (issued 30/09/2015) the following outcome has been achieved.

### 1.1 Design Target

Based on the relevant Local Environmental Plan, Development Control Plan (DCP) – Liverpool Council and the residential Apartment Design Guide (formerly residential flat code / SEPP 65), we understand that the project is required to demonstrate BASIX compliance in support of the application development approval.

### 1.2 Building Sustainability Index (BASIX)

BASIX is implemented under the Environmental Planning and Assessment Act and applies to all residential dwelling types within NSW. BASIX forms both part of the development application and building certification process within the state of NSW.

BASIX sets water and greenhouse gas reduction targets relative to the NSW average benchmark for per person potable water consumption & greenhouse gas emissions within the residential sector. BASIX also sets the minimum performance levels for thermal comfort of the dwelling and replaces the NCC Energy Efficiency benchmarks within the state of NSW. Thermal comfort levels are assessed via a simulation method in accordance with the NatHERS House Energy Rating protocol.

### 1.3 (NatHERS) Thermal Performance Software

Wood & Grieve Engineers have completed preliminary thermal comfort analysis utilising the NCC endorsed FirstRate5 software. The FirstRate5 assessment tool conducts predictive analysis of the thermal performance of a Class 1 or Class 2 facility. FirstRate5 assess proposed buildings fabric on energy loads for heating and cooling. The information required for the FirstRate5 assessment includes:-

- Floor Area
- Wall Layouts and Wall Types (including insulation ratings)
- Roof Layouts and Roof Types (including insulation ratings)
- Glazing Layouts and construction types
- Shading details
- Extent of building sealing devices (i.e. door seals, window seals etc.)

FirstRate5 does not include an assessment of building services plant efficiency, the embodied energy of materials or any renewable energy considerations.

# 28 Shepherd St Liverpool

## 1.4 Design Documentation

The following assessment is based on all architectural drawings received 18 November 2016 and specifications as noted above and received to date, including:

- A0000 – Cover Sheet
- A0001 – Existing Survey
- A0002 – Location Plan
- A2189 – Basement 03
- A2190 – Basement 02
- A2191 – Basement 01
- A2200 – Ground Floor
- A2201 – Level 01
- A2202 – Level 02-03
- A2203 – Level 04-05
- A2206 – Level 06
- A2207 – Level 07
- A2209 – Level
- A3000 – Building C1 Elevations (East & West)
- A3001 – Building C1 & C2 Elevations (North & South)
- A3002 – Building C2 Elevations (East & West)
- A3101 – Building C1 & C2 Section AA
- A3102 – Building C1 Section BB & CC

***Note: Changes to the design drawings and specifications will affect the outcome of this assessment and potentially the certification of the proposed building works.***

# 28 Shepherd St Liverpool

## 2. Thermal Comfort Design Assessment

### 2.1 Thermal Comfort Design Assessment

The thermal comfort aspect of this assessment was conducted using the FirstRate5 Thermal Performance Assessment Software, which assesses the thermal performance of a Class 1 or Class 2 dwelling in accordance with the requirements as stated in the BASIX Thermal Comfort Protocol.

Compliance requires that the average area adjusted heating and cooling loads be below the average area adjusted heating and cooling loads calculated by BASIX.

Compliance also requires that the individual dwelling area adjusted heating and cooling loads be below the individual area adjusted heating and cooling loads calculated by BASIX.

Based on the information received from Woods Bagot Pty Ltd (architectural drawings – 18/11/2016) the development average area adjusted heating and cooling loads were found to be as noted in the table below.

28 Shepherd St	AREA ADJUSTED HEATING LOAD (MJ/m <sup>2</sup> )	AREA ADJUSTED COOLING LOAD (MJ/m <sup>2</sup> )
BASIX Target	<74.0	< 70.0
Average All Dwellings	52.6	48.5

*\*Note: A full summary of energy modelling has been provided within Appendix – 1.*

### 2.2 Energy Modelling Limitations

*The energy modelling results obtained from the FirstRate5 software provides an estimate of the base building energy performance only. This estimate is based upon a simplified and idealised version of the building that does not fully comply with the intricacies of a building and its operation. As a result the energy model represents an interpretation of the potential building performance only. Several dependent factors will affect the actual operational performance of the building, including local climate variation, building occupant behaviour, construction technique and building services commissioning. No guarantee or warrantee of building performance in practice can be based on energy modelling results alone.*

# 28 Shepherd St Liverpool

## 3. Design Specification – Building Fabric/Services

<b><u>Design Specification:</u></b>
<b><u>External Walls:</u></b> A minimum of R2.5 insulation added to concrete external walls to give a total R-Value of R2.8.
<b><u>Walls to internal Corridor:</u></b> A minimum of R1.5 insulation to partition walls between apartments and corridors or non-conditioned internal zones.
<b><u>Internal Walls to Adjoining Apartment:</u></b> As the adjoining apartment is considered a conditioned space there is no thermal insulation requirement for this wall. Therefore the insulation to this wall shall be as per acoustic requirements.
<b><u>Ceilings:</u></b> We have assumed ceiling heights as indicated on the architectural drawings received (2700mm).
<b><u>Roof Type:</u></b> A minimum of R3.0 insulation to be added to all apartments below concrete roof or where there is an exposed concrete terrace/balcony area above (total R-value R3.2).
<b><u>Suspended Floor Slabs:</u></b> Add R1.0 insulation to underside of the suspended slab i.e. floor between conditioned spaces and non-conditioned (i.e. balcony zones or carpark) below.
<b><u>Windows</u></b> The following apartments require clear double glazed windows with a thermal performance of <b>U-Value of 3.67 W/m<sup>2</sup>.K and an SHGC of 0.67 (Clear)</b> : <ul style="list-style-type: none"><li>• RG.09</li><li>• R2.07</li><li>• R2.08</li><li>• R3.07</li><li>• R3.08</li><li>• R5.09</li></ul> <p>The remaining fixed glazing and operable windows have been assumed to be equivalent to a single glazed unit with standard aluminium frames with a thermal performance of <b>U-Value of 6.45 W/m<sup>2</sup>.K and an SHGC of 0.76 (Clear)</b>.</p> <p>All windows above have been specified with weather-strips to prevent air infiltration when closed. This is standard compliance with AS2047.</p> <p><b>Note:</b> <i>The thermal performance values for all windows detailed above are for glass and framing system combined.</i></p>
<b><u>Floor Coverings</u></b> The following floor finishes have been specified. Carpet to all bedrooms Timber floor boards to the living/kitchen spaces; and



## 28 Shepherd St Liverpool

<b><u>Design Specification:</u></b>
Ceramic tiles to the bathrooms/wet areas.
<b><u>Air Leakage</u></b> Kitchen Exhaust will be via a ducted range-hood to the external façade or roof. All bathrooms and ensuites exhaust to be via a ducted exhaust fan to external façade or roof. Back-draft dampers must be installed to prevent air infiltration.
<b><u>Alternative Water Supply</u></b> <b>Rainwater tanks:</b> A rainwater tank has not been included within the BASIX due to insufficient areas for run-off capture. For additional stormwater or OSD requirements, please refer Civil engineer detail.
<b><u>Hot Water System</u></b> A centralised gas hot water service has been specified within the BASIX Certificate. Domestic Hot Water pipework is required to have R1.0 insulation.
<b><u>Fire Sprinkler System</u></b> A condition on the BASIX certificate is for the proposed <i>car park</i> and <i>Buildings C-1 and C2</i> fire sprinkler systems to be closed-loop. This means potable water is retained on-site for future use following routine system testing.
<b><u>Mechanical Ventilation Systems:</u></b> <b>Common Areas:</b> Car park – Mechanical Supply & Exhaust with carbon monoxide monitor + VSD fan Garbage Rooms – Ventilation Exhaust Only Plant/Switch Rooms – Ventilation Exhaust Only Corridors/Lobby/ Stair – No Mechanical Ventilation
<b><u>Dwelling Air-Conditioning Systems:</u></b> Reverse cycle air-conditioning (Single Phase) for all living zone and main bedroom of 3 bedroom apartments. Minimum EER ratings – Cooling 3.0-3.5, Heating 3.0-3.5
<b><u>Lighting:</u></b> <b>Common Areas:</b> Corridor/Carpark/ Stairs/Garbage: Compact Fluorescent or LED lighting with motion sensor or time-clock control. Switch/Services/Stores: Compact Fluorescent or LED lighting with motion sensor or time-clock control. <b>Dwellings</b> Dedicated Fluorescent or LED Lamps.
<b><u>Appliance Specifications:</u></b> The following minimum energy performance specifications have been included within the BASIX assessment:

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### **Design Specification:**

#### **Energy Star Ratings:**

Gas cooktop and electric ovens to all dwellings.

Dishwasher – Min. 3 Star Energy Rating

Clothes Dryer – Not Specified

Clothes Washer – Not Specified

#### **Water WELS ratings:**

Dishwasher – Min. 2 Star WELS Rating

### **Fixtures & Fittings:**

We note that fixtures with the following WELS ratings have been included in the BASIX Assessment:

#### **Common Areas (as applicable) & all dwellings:**

3 Star WELS rated Showerheads ( $>6.0$  but  $\leq 7.5$  l/min),

4 Star WELS Toilets

6 Star WELS Kitchen taps

6 Star WELS Bathroom taps

We note a reduction in the quality of these appliances will affect the water aspect of the BASIX rating.

# 28 Shepherd St Liverpool

## 3.1 BASIX Certification Detail

Project Summary	
Project Name	28 Shepherd St
Street Address	28 Shepherd St, Liverpool
Local Government Area	Liverpool City Council
Plan Type / Number	DP 859055
Lot No#	22
Section No#	-
No. of Residential Buildings	2
No. of units in Residential Flat Buildings	140
No. of multi-dwelling houses	-
No. of single dwelling houses	-
BASIX Certificate No#	64427M_04
Project Score	
Water	40%
Thermal Comfort	Pass
Energy	20%

## Appendix 1 – NatHERS Thermal Performance Summary

**28 Shepherd St - Building C1**  
First Rate Energy Rating Assessment

JOB NO. 27826-SYD-G  
Rev 0

CLIMATE ZONE	AVERAGE ENERGY INTENSITY ( MJ/m <sup>2</sup> )	AVERAGE STAR RATING	Total Number of Apartments
28	98.0	5.6	75

Level	Apt No.	Apt Type	Bedrooms	A/C Area (m <sup>2</sup> )	Non A/C Area (m <sup>2</sup> )	Heating - MJ/m <sup>2</sup>	Cooling - MJ/m <sup>2</sup>	Energy Rating - MJ/m <sup>2</sup>	Total Energy - MJ
Ground Floor	RG.04	17	3	116.5	0.0	58.10	27.10	85.2	9925.80
	RG.05	16	1	63.9	0.0	55.60	25.50	81.1	5182.29
	RG.06	15	3	127.5	0.0	64.80	40.00	104.8	13362.00
	RG.07	14	1	70.2	0.0	63.30	22.80	86.1	6044.22
	RG.08	RG.08	2	74.3	0.0	82.80	55.90	138.7	10305.41
	RG.09	RG.09	2	87.2	4.1	84.80	87.70	172.5	15042.00
	RG.03	10	3	90.6	0.0	37.60	30.20	67.8	6142.68
	RG.02	9	1	51.4	0.0	45.70	43.50	89.2	4584.88
Level 01	RG.01	1B6_G	1	49.8	0.0	72.20	53.20	125.4	6244.92
	RG.12	8	1	57.3	0.0	44.60	35.70	80.3	4601.19
	R1.04	16	1	63.9	0.0	55.60	25.50	81.1	5182.29
	R1.03	10	3	90.6	0.0	37.60	30.20	67.8	6142.68
	R1.02	9	1	51.4	0.0	45.70	43.50	89.2	4584.88
	R1.01	21	2	113.6	0.0	52.90	60.70	113.6	12904.96
	R1.07	2B17	2	76.2	0.0	53.80	45.40	99.2	7559.04
	R1.06	2B16a	2	79.0	0.0	43.90	54.40	98.3	7765.70
Level 2	R1.05	22	2	100.0	0.0	73.90	59.70	133.6	13360.00
	R2.04	19_M	2	72.9	0.0	36.20	42.90	79.1	5766.39
	R2.05	1B20	1	55.2	0.0	51.90	50.30	102.2	5641.44
	R2.06	20	2	75.6	0.0	48.40	33.30	81.7	6176.52
	R2.07	R2.07	1	57.6	0.0	44.00	86.80	130.8	7534.08
	R2.08	R2.08	2	65.5	0.0	59.20	87.60	146.8	9615.40
	R2.03	19	2	72.9	0.0	36.20	43.80	80.0	5832.00
	R2.02	9	1	51.4	0.0	45.70	43.50	89.2	4584.88
Level 3	R2.01	21	2	113.6	0.0	52.90	60.70	113.6	12904.96
	R2.12	2B17a	2	76.2	0.0	49.90	45.90	95.8	7299.96
	R2.11	1B24_v	1	53.3	0.0	52.50	59.40	111.9	5964.27
	R2.10	2B27	2	77.5	0.0	54.90	45.40	100.3	7773.25
	R3.04	19_M	2	72.9	0.0	36.20	42.90	79.1	5766.39
	R3.05	1B20	1	55.2	0.0	51.90	50.30	102.2	5641.44
	R3.06	20	2	75.6	0.0	48.40	33.30	81.7	6176.52
	R3.07	R3.07	1	57.6	0.0	60.80	46.40	107.2	6174.72
Level 4	R3.08	R3.08	2	65.5	0.0	77.90	44.50	122.4	8017.20
	R3.03	19	2	72.9	0.0	36.20	43.80	80.0	5832.00
	R3.02	9	1	51.4	0.0	45.70	43.50	89.2	4584.88
	R3.01	21	2	113.6	0.0	52.90	60.70	113.6	12904.96
	R3.12	2B17a	2	76.2	0.0	49.90	45.90	95.8	7299.96
	R3.11	1B24_v	1	53.3	0.0	52.50	59.40	111.9	5964.27
	R3.10	2B27	2	77.5	0.0	54.90	45.40	100.3	7773.25
	R4.04	19_M	2	72.9	0.0	36.20	42.90	79.1	5766.39
Level 5	R4.05	1B20	1	55.2	0.0	51.90	50.30	102.2	5641.44
	R4.06	20	2	75.6	0.0	48.40	33.30	81.7	6176.52
	R4.07	20_M	2	75.6	0.0	44.50	37.60	82.1	6206.76
	R4.08	R4.08	1	42.0	0.0	65.50	32.70	98.2	4124.40
	R4.09	R4.09	1	53.0	0.0	82.40	36.70	119.1	6312.30
	R4.03	19	2	72.9	0.0	36.20	43.80	80.0	5832.00
	R4.02	9	1	51.4	0.0	45.70	43.50	89.2	4584.88
	R4.01	21	2	113.6	0.0	52.90	60.70	113.6	12904.96
Level 6	R4.12	2B17a	2	76.2	0.0	49.90	45.90	95.8	7299.96
	R4.11	1B24_v	1	53.3	0.0	52.50	59.40	111.9	5964.27
	R4.10	2B27	2	77.5	0.0	54.90	45.40	100.3	7773.25
	R5.04	19_M	2	72.9	0.0	36.20	42.90	79.1	5766.39
	R5.05	1B20	1	55.2	0.0	51.90	50.30	102.2	5641.44
	R5.06	20	2	75.6	0.0	48.40	33.30	81.7	6176.52
	R5.07	20_M	2	75.6	0.0	44.50	37.60	82.1	6206.76
	R5.08	R5.08	1	42.0	0.0	62.60	30.90	93.5	3927.00
Level 6	R5.09	R5.09	1	53.0	0.0	55.30	21.70	77.0	4081.00
	R5.03	19	2	72.9	0.0	36.20	43.80	80.0	5832.00
	R5.02	9	1	51.4	0.0	45.70	43.50	89.2	4584.88
	R5.01	21	2	113.6	0.0	52.90	60.70	113.6	12904.96
	R5.12	2B17a	2	76.2	0.0	49.90	45.90	95.8	7299.96
	R5.11	1B24_v	1	53.3	0.0	52.50	59.40	111.9	5964.27
	R5.10	2B27	2	77.5	0.0	54.90	45.40	100.3	7773.25
	R6.04	19_M	2	72.9	0.0	36.20	42.90	79.1	5766.39
Level 6	R6.05	1B20	1	55.2	0.0	51.90	50.30	102.2	5641.44
	R6.06	20	2	75.6	0.0	48.40	33.30	81.7	6176.52
	R6.07	20_M	2	75.6	0.0	44.50	37.60	82.1	6206.76
	R6.08	1B20a	1	54.7	0.0	55.60	55.80	111.4	6093.58
	R6.09	19_M	2	72.9	0.0	36.20	42.90	79.1	5766.39
	R6.03	19	2	72.9	0.0	36.20	43.80	80.0	5832.00
	R6.02	9	1	51.4	0.0	45.70	43.50	89.2	4584.88
	R6.01	21	2	113.6	0.0	52.90	60.70	113.6	12904.96
Level 6	R6.12	2B17a	2	76.2	0.0	49.90	45.90	95.8	7299.96
	R6.11	1B24_v	1	53.3	0.0	52.50	59.40	111.9	5964.27
Level 6	R6.10	2B27	2	77.5	0.0	54.90	45.40	100.3	7773.25

**28 Shepherd St - Building C2**  
First Rate Energy Rating Assessment

JOB NO. 27826-SYD-G  
Rev 0

CLIMATE ZONE	AVERAGE ENERGY INTENSITY ( MJ/m <sup>2</sup> )	AVERAGE STAR RATING	Total Number of Apartments
28	104.4	5.3	65

Level	Apt No.	Apt Type	Bedrooms	A/C Area (m <sup>2</sup> )	Non A/C Area (m <sup>2</sup> )	Heating - MJ/m <sup>2</sup>	Cooling - MJ/m <sup>2</sup>	Energy Rating - MJ/m <sup>2</sup>	Total Energy - MJ
Ground	SG.05	2B8_G	2	77.4	0.0	59.70	55.60	115.3	8924.22
	SG.06	2B8a_G	2	77.4	0.0	61.60	57.40	119.0	9210.60
	SG.07	7	1	58.0	0.0	62.80	34.50	97.3	5643.40
	SG.08	2B8_G	2	77.4	0.0	59.70	55.60	115.3	8924.22
	SG.04	6	2	91.5	0.0	50.70	43.10	93.8	8582.70
	SG.03	5	2	80.6	0.0	57.50	47.60	105.1	8471.06
	SG.02	4	2	92.7	0.0	44.40	37.90	82.3	7629.21
	SG.01	3	2	90.8	0.0	53.90	52.30	106.2	9642.96
	SG.11	3B14a_G	3	113.3	0.0	35.60	56.60	92.2	10446.26
Level 1	SG.10	2	3	104.9	0.0	50.70	39.10	89.8	9420.02
	SG.09	1	3	100.1	0.0	63.10	40.40	103.5	10360.35
	S1.01	2B8	2	77.4	0.0	45.60	55.40	101.0	7817.40
	S1.02	2B8a	2	77.4	0.0	49.20	48.80	98.0	7585.20
	S1.03	1B9	1	45.9	0.0	58.70	68.00	126.7	5815.53
	S1.04	1B9a	1	51.9	0.0	42.20	60.40	102.6	5324.94
Level 2	S1.05	1B9b	1	51.9	0.0	48.20	59.80	108.0	5605.20
	S1.06	2B8_v	2	77.4	0.0	48.60	55.00	103.6	8018.64
	S2.04	18_M	2	72.6	0.0	69.50	38.80	108.3	7862.58
	S2.05	1B9c	1	51.5	0.0	42.20	58.50	100.7	5186.05
	S2.06	2B8a_M	2	100.5	0.0	47.60	52.90	100.5	10100.25
	S2.07	2B8a_M	2	100.5	0.0	47.60	52.90	100.5	10100.25
	S2.08	1B9c	1	51.5	0.0	42.20	58.50	100.7	5186.05
	S2.09	2B8b_v	2	77.4	0.0	49.40	48.30	97.7	7561.98
	S2.03	18	2	72.6	0.0	43.20	42.00	85.2	6185.52
	S2.02	1B26_h_v	1	53.2	0.0	57.80	55.70	113.5	6038.20
	S2.01	1B9d	1	50.0	0.0	63.60	49.90	113.5	5675.00
	S2.12	2B8a_M	2	100.5	0.0	47.60	52.90	100.5	10100.25
	S2.11	1B26_h	1	53.2	0.0	67.30	53.00	120.3	6399.96
	S2.10	22_m_v	2	100.0	0.0	77.00	49.20	126.2	12620.00
Level 3	S3.04	18_M	2	72.6	0.0	69.50	38.80	108.3	7862.58
	S3.05	1B9c	1	51.5	0.0	42.20	58.50	100.7	5186.05
	S3.06	2B8a_M	2	100.5	0.0	47.60	52.90	100.5	10100.25
	S3.07	2B8a_M	2	100.5	0.0	47.60	52.90	100.5	10100.25
	S3.08	1B9c	1	51.5	0.0	42.20	58.50	100.7	5186.05
	S3.09	2B8b_v	2	77.4	0.0	49.40	48.30	97.7	7561.98
	S3.03	18	2	72.6	0.0	43.20	42.00	85.2	6185.52
	S3.02	1B26_h_v	1	53.2	0.0	57.80	55.70	113.5	6038.20
	S3.01	1B9d	1	50.0	0.0	63.60	49.90	113.5	5675.00
	S3.12	2B8a_M	2	100.5	0.0	47.60	52.90	100.5	10100.25
	S3.11	1B26_h	1	53.2	0.0	67.30	53.00	120.3	6399.96
	S3.10	22_m_v	2	100.0	0.0	77.00	49.20	126.2	12620.00
	S4.04	18_M	2	72.6	0.0	69.50	38.80	108.3	7862.58
Level 4	S4.05	1B9c	1	51.5	0.0	42.20	58.50	100.7	5186.05
	S4.06	2B8a_M	2	100.5	0.0	47.60	52.90	100.5	10100.25
	S4.07	2B8a_M	2	100.5	0.0	47.60	52.90	100.5	10100.25
	S4.08	1B9c	1	51.5	0.0	42.20	58.50	100.7	5186.05
	S4.09	2B8b_v	2	77.4	0.0	49.40	48.30	97.7	7561.98
	S4.03	18	2	72.6	0.0	43.20	42.00	85.2	6185.52
	S4.02	1B26_h_v	1	53.2	0.0	57.80	55.70	113.5	6038.20
	S4.01	1B9d	1	50.0	0.0	63.60	49.90	113.5	5675.00
	S4.12	2B8a_M	2	100.5	0.0	47.60	52.90	100.5	10100.25
	S4.11	1B26_h	1	53.2	0.0	67.30	53.00	120.3	6399.96
	S4.10	22_m_v	2	100.0	0.0	77.00	49.20	126.2	12620.00
	S5.04	18_M	2	72.6	0.0	69.50	38.80	108.3	7862.58
Level 5	S5.05	1B9c	1	51.5	0.0	42.20	58.50	100.7	5186.05
	S5.06	2B8a_M	2	100.5	0.0	47.60	52.90	100.5	10100.25
	S5.07	2B8a_M	2	100.5	0.0	47.60	52.90	100.5	10100.25
	S5.08	1B9c	1	51.5	0.0	42.20	58.50	100.7	5186.05
	S5.09	2B8b_v	2	77.4	0.0	49.40	48.30	97.7	7561.98
	S5.03	18	2	72.6	0.0	43.20	42.00	85.2	6185.52
	S5.02	1B26_h_v	1	53.2	0.0	57.80	55.70	113.5	6038.20
	S5.01	1B9d	1	50.0	0.0	63.60	49.90	113.5	5675.00
	S5.12	2B8a_M	2	100.5	0.0	47.60	52.90	100.5	10100.25
	S5.11	1B26_h	1	53.2	0.0	67.30	53.00	120.3	6399.96
	S5.10	22_m_v	2	100.0	0.0	77.00	49.20	126.2	12620.00

## Appendix 2 – BASIX Certificate

*Note: Refer BASIX Certificate 64427M\_04 attached.*

# BASIX<sup>®</sup>Certificate

Building Sustainability Index [www.basix.nsw.gov.au](http://www.basix.nsw.gov.au)

## Multi Dwelling

Certificate number: 624427M\_04




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 18/09/2014 published by the Department. This document is available at [www.basix.nsw.gov.au](http://www.basix.nsw.gov.au)

Secretary

Date of issue: Friday, 25 November 2016

To be valid, this certificate must be lodged within 3 months of the date of issue.



Project summary		
Project name	28 shepherd st_04	
Street address	28 Shepherd Street Liverpool 2170	
Local Government Area	Liverpool City Council	
Plan type and plan number	deposited 859055	
Lot no.	22	
Section no.	-	
No. of residential flat buildings	2	
No. of units in residential flat buildings	140	
No. of multi-dwelling houses	0	
No. of single dwelling houses	0	
Project score		
Water	 40	Target 40
Thermal Comfort	 Pass	Target Pass
Energy	 20	Target 20

### Certificate Prepared by

Name / Company Name: Wood & Grieve Engineers

ABN (if applicable): 97137999609



# Description of project

## Project address

Project name	28 shepherd st_04
Street address	28 Shepherd Street Liverpool 2170
Local Government Area	Liverpool City Council
Plan type and plan number	deposited 859055
Lot no.	22
Section no.	-

## Project type

No. of residential flat buildings	2
No. of units in residential flat buildings	140
No. of multi-dwelling houses	0
No. of single dwelling houses	0

## Site details

Site area (m²)	5887
Roof area (m²)	2676.8
Non-residential floor area (m²)	-
Residential car spaces	162
Non-residential car spaces	-

## Common area landscape

Common area lawn (m²)	910.0
Common area garden (m²)	2181.6
Area of indigenous or low water use species (m²)	2181.6

## Assessor details

Assessor number	VIC/13/1513
Certificate number	15130027
Climate zone	28

## Project score

Water	✓ 40	Target 40
Thermal Comfort	✓ Pass	Target Pass
Energy	✓ 20	Target 20

## Description of project

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

### Residential flat buildings - Building - C1, 75 dwellings, 7 storeys above ground

Dwelling no.	No. of bedrooms	Conditioned floor area (m <sup>2</sup> )	Unconditioned floor area (m <sup>2</sup> )	Area of garden & lawn (m <sup>2</sup> )	Indigenous species (min area m <sup>2</sup> )
R1.01	2	113.6	0.0	0.0	0.0
R1.05	2	100.0	0.0	0.0	0.0
R2.02	1	51.4	0.0	0.0	0.0
R2.06	2	75.6	0.0	0.0	0.0
R2.11	1	53.3	0.0	0.0	0.0
R3.03	2	72.9	0.0	0.0	0.0
R3.07	1	57.6	0.0	0.0	0.0
R3.12	2	76.2	0.0	0.0	0.0
R4.04	2	72.9	0.0	0.0	0.0
R4.08	1	42.0	0.0	0.0	0.0
R4.12	2	76.2	0.0	0.0	0.0
R5.04	2	72.9	0.0	0.0	0.0
R5.08	1	42.0	0.0	0.0	0.0
R5.12	2	76.2	0.0	0.0	0.0
R6.04	2	72.9	0.0	0.0	0.0
R6.08	1	54.7	0.0	0.0	0.0
R6.12	2	76.2	0.0	0.0	0.0
RG.04	3	116.5	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m <sup>2</sup> )	Unconditioned floor area (m <sup>2</sup> )	Area of garden & lawn (m <sup>2</sup> )	Indigenous species (min area m <sup>2</sup> )
R1.02	1	51.4	0.0	0.0	0.0
R1.06	2	79.0	0.0	0.0	0.0
R2.03	2	72.9	0.0	0.0	0.0
R2.07	1	57.6	0.0	0.0	0.0
R2.12	2	76.2	0.0	0.0	0.0
R3.04	2	72.9	0.0	0.0	0.0
R3.08	2	65.5	0.0	0.0	0.0
R4.01	2	113.6	0.0	0.0	0.0
R4.05	1	55.2	0.0	0.0	0.0
R4.09	1	53.0	0.0	0.0	0.0
R5.01	2	113.6	0.0	0.0	0.0
R5.05	1	55.2	0.0	0.0	0.0
R5.09	1	53.0	0.0	0.0	0.0
R6.01	2	113.6	0.0	0.0	0.0
R6.05	1	55.2	0.0	0.0	0.0
R6.09	2	72.9	0.0	0.0	0.0
RG.01	1	49.8	0.0	0.0	0.0
RG.05	1	63.9	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m <sup>2</sup> )	Unconditioned floor area (m <sup>2</sup> )	Area of garden & lawn (m <sup>2</sup> )	Indigenous species (min area m <sup>2</sup> )
R1.03	3	90.6	0.0	0.0	0.0
R1.07	2	76.2	0.0	0.0	0.0
R2.04	2	72.9	0.0	0.0	0.0
R2.08	2	65.5	0.0	0.0	0.0
R3.01	2	113.6	0.0	0.0	0.0
R3.05	1	55.2	0.0	0.0	0.0
R3.10	2	77.5	0.0	0.0	0.0
R4.02	1	51.4	0.0	0.0	0.0
R4.06	2	75.6	0.0	0.0	0.0
R4.10	2	77.5	0.0	0.0	0.0
R5.02	1	51.4	0.0	0.0	0.0
R5.06	2	75.6	0.0	0.0	0.0
R5.10	2	77.5	0.0	0.0	0.0
R6.02	1	51.4	0.0	0.0	0.0
R6.06	2	75.6	0.0	0.0	0.0
R6.10	2	77.5	0.0	0.0	0.0
RG.02	1	51.4	0.0	0.0	0.0
RG.06	3	127.5	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m <sup>2</sup> )	Unconditioned floor area (m <sup>2</sup> )	Area of garden & lawn (m <sup>2</sup> )	Indigenous species (min area m <sup>2</sup> )
R1.04	1	63.9	0.0	0.0	0.0
R2.01	2	113.6	0.0	0.0	0.0
R2.05	1	55.2	0.0	0.0	0.0
R2.10	2	77.5	0.0	0.0	0.0
R3.02	1	51.4	0.0	0.0	0.0
R3.06	2	75.6	0.0	0.0	0.0
R3.11	1	53.3	0.0	0.0	0.0
R4.03	2	72.9	0.0	0.0	0.0
R4.07	2	75.6	0.0	0.0	0.0
R4.11	1	53.3	0.0	0.0	0.0
R5.03	2	72.9	0.0	0.0	0.0
R5.07	2	75.6	0.0	0.0	0.0
R5.11	1	53.3	0.0	0.0	0.0
R6.03	2	72.9	0.0	0.0	0.0
R6.07	2	75.6	0.0	0.0	0.0
R6.11	1	53.3	0.0	0.0	0.0
RG.03	3	90.6	0.0	0.0	0.0
RG.07	1	70.2	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m <sup>2</sup> )	Unconditioned floor area (m <sup>2</sup> )	Area of garden & lawn (m <sup>2</sup> )	Indigenous species (min area m <sup>2</sup> )
RG.08	2	74.3	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m <sup>2</sup> )	Unconditioned floor area (m <sup>2</sup> )	Area of garden & lawn (m <sup>2</sup> )	Indigenous species (min area m <sup>2</sup> )
RG.09	2	87.2	4.1	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m <sup>2</sup> )	Unconditioned floor area (m <sup>2</sup> )	Area of garden & lawn (m <sup>2</sup> )	Indigenous species (min area m <sup>2</sup> )
RG.12	1	57.3	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m <sup>2</sup> )	Unconditioned floor area (m <sup>2</sup> )	Area of garden & lawn (m <sup>2</sup> )	Indigenous species (min area m <sup>2</sup> )
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### Residential flat buildings - Building - C2, 65 dwellings, 6 storeys above ground

Dwelling no.	No. of bedrooms	Conditioned floor area (m <sup>2</sup> )	Unconditioned floor area (m <sup>2</sup> )	Area of garden & lawn (m <sup>2</sup> )	Indigenous species (min area m <sup>2</sup> )
S1.01	2	77.4	0.0	0.0	0.0
S1.05	1	51.9	0.0	0.0	0.0
S2.03	2	72.6	0.0	0.0	0.0
S2.07	2	100.5	0.0	0.0	0.0
S2.11	1	53.2	0.0	0.0	0.0
S3.03	2	72.6	0.0	0.0	0.0
S3.07	2	100.5	0.0	0.0	0.0
S3.11	1	53.2	0.0	0.0	0.0
S4.03	2	72.6	0.0	0.0	0.0
S4.07	2	100.5	0.0	0.0	0.0
S4.11	1	53.2	0.0	0.0	0.0
S5.03	2	72.6	0.0	0.0	0.0
S5.07	2	100.5	0.0	0.0	0.0
S5.11	1	53.2	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m <sup>2</sup> )	Unconditioned floor area (m <sup>2</sup> )	Area of garden & lawn (m <sup>2</sup> )	Indigenous species (min area m <sup>2</sup> )
S1.02	2	77.4	0.0	0.0	0.0
S1.06	2	77.4	0.0	0.0	0.0
S2.04	2	72.6	0.0	0.0	0.0
S2.08	1	51.5	0.0	0.0	0.0
S2.12	2	100.5	0.0	0.0	0.0
S3.04	2	72.6	0.0	0.0	0.0
S3.08	1	51.5	0.0	0.0	0.0
S3.12	2	100.5	0.0	0.0	0.0
S4.04	2	72.6	0.0	0.0	0.0
S4.08	1	51.5	0.0	0.0	0.0
S4.12	2	100.5	0.0	0.0	0.0
S5.04	2	72.6	0.0	0.0	0.0
S5.08	1	51.5	0.0	0.0	0.0
S5.12	2	100.5	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m <sup>2</sup> )	Unconditioned floor area (m <sup>2</sup> )	Area of garden & lawn (m <sup>2</sup> )	Indigenous species (min area m <sup>2</sup> )
S1.03	1	45.9	0.0	0.0	0.0
S2.01	1	50.0	0.0	0.0	0.0
S2.05	1	51.5	0.0	0.0	0.0
S2.09	2	77.4	0.0	0.0	0.0
S3.01	1	50.0	0.0	0.0	0.0
S3.05	1	51.5	0.0	0.0	0.0
S3.09	2	77.4	0.0	0.0	0.0
S4.01	1	50.0	0.0	0.0	0.0
S4.05	1	51.5	0.0	0.0	0.0
S4.09	2	77.4	0.0	0.0	0.0
S5.01	1	50.0	0.0	0.0	0.0
S5.05	1	51.5	0.0	0.0	0.0
S5.09	2	77.4	0.0	0.0	0.0
SG.01	2	90.8	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m <sup>2</sup> )	Unconditioned floor area (m <sup>2</sup> )	Area of garden & lawn (m <sup>2</sup> )	Indigenous species (min area m <sup>2</sup> )
S1.04	1	51.9	0.0	0.0	0.0
S2.02	1	53.2	0.0	0.0	0.0
S2.06	2	100.5	0.0	0.0	0.0
S2.10	2	100.0	0.0	0.0	0.0
S3.02	1	53.2	0.0	0.0	0.0
S3.06	2	100.5	0.0	0.0	0.0
S3.10	2	100.0	0.0	0.0	0.0
S4.02	1	53.2	0.0	0.0	0.0
S4.06	2	100.5	0.0	0.0	0.0
S4.10	2	100.0	0.0	0.0	0.0
S5.02	1	53.2	0.0	0.0	0.0
S5.06	2	100.5	0.0	0.0	0.0
S5.10	2	100.0	0.0	0.0	0.0
SG.02	2	92.7	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m <sup>2</sup> )	Unconditioned floor area (m <sup>2</sup> )	Area of garden & lawn (m <sup>2</sup> )	Indigenous species (min area m <sup>2</sup> )
SG.03	2	80.6	0.0	0.0	0.0
SG.07	1	58.0	0.0	0.0	0.0
SG.11	3	113.3	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m <sup>2</sup> )	Unconditioned floor area (m <sup>2</sup> )	Area of garden & lawn (m <sup>2</sup> )	Indigenous species (min area m <sup>2</sup> )
SG.04	2	91.5	0.0	0.0	0.0
SG.08	2	77.4	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m <sup>2</sup> )	Unconditioned floor area (m <sup>2</sup> )	Area of garden & lawn (m <sup>2</sup> )	Indigenous species (min area m <sup>2</sup> )
SG.05	2	77.4	0.0	0.0	0.0
SG.09	3	100.1	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m <sup>2</sup> )	Unconditioned floor area (m <sup>2</sup> )	Area of garden & lawn (m <sup>2</sup> )	Indigenous species (min area m <sup>2</sup> )
SG.06	2	77.4	0.0	0.0	0.0
SG.10	3	104.9	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 - Building - C1

Common area	Floor area (m²)
Lift car (No. 1)	-
Lift car (No. 4)	-

Common area	Floor area (m²)
Lift car (No. 2)	-

Common area	Floor area (m²)
Lift car (No. 3)	-

### Common areas of unit building - Building - C2

Common area	Floor area (m²)
Lift car (No. 5)	-

Common area	Floor area (m²)
Lift car (No. 6)	-

### Common areas of the development (non-building specific)

Common area	Floor area (m²)
Car park area (Basement 1,2,3)	6958.0
Plant or service room (Combined)	1531.06
Hallway/lobby type (Combined)	1423.0

Common area	Floor area (m²)
Switch room (Combined)	54.6
Stair area (Combined)	632.2

Common area	Floor area (m²)
Garbage (Combined)	259.44
Storage (Combined)	2044.39

# Schedule of BASIX commitments

## 1. Commitments for Residential flat buildings - Building - C1

### (a) Dwellings

- (i) Water
- (ii) Energy
- (iii) Thermal Comfort

### (b) Common areas and central systems/facilities

- (i) Water
- (ii) Energy

## 2. Commitments for Residential flat buildings - Building - C2

### (a) Dwellings

- (i) Water
- (ii) Energy
- (iii) Thermal Comfort

### (b) Common areas and central systems/facilities

- (i) Water
- (ii) Energy

## 3. Commitments for multi-dwelling houses

## 4. Commitments for single dwelling houses

## 5. 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 - Building - C1

#### (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	3 star (> 6 but <= 7.5 L/min)	4 star	6 star	6 star	no	-	2 star	-	-	-	-	-	-	-

	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	individual fan, ducted to façade or roof	manual switch on/off

Dwelling no.	Cooling		Heating		Artificial lighting						Natural lighting	
	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
R1.03, RG.03, RG.04, RG.06	1-phase airconditioning EER 3.0 - 3.5 (zoned)	1-phase airconditioning EER 3.0 - 3.5 (zoned)	1-phase airconditioning EER 3.0 - 3.5 (zoned)	1-phase airconditioning EER 3.0 - 3.5 (zoned)	3 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	no
R1.02, R1.04, R2.02, R2.05, R2.07, R2.11, R3.02, R3.05, R3.07, R3.11, R4.02, R4.05, R4.08, R4.09, R4.11, R5.02, R5.05, R5.08, R5.09, R5.11, R6.02, R6.05, R6.08, R6.11, RG.01, RG.02, RG.05, RG.07, RG.12	1-phase airconditioning EER 3.0 - 3.5 (zoned)	airconditioning ducting only (zoned)	1-phase airconditioning EER 3.0 - 3.5 (zoned)	airconditioning ducting only (zoned)	1 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	no

Dwelling no.	Cooling		Heating		Artificial lighting						Natural lighting	
	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
R1.01, R1.05, R1.06, R1.07, R2.01, R2.03, R2.04, R2.06, R2.08, R2.10, R2.12, R3.01, R3.03, R3.04, R3.06, R3.08, R3.10, R3.12, R4.01, R4.03, R4.04, R4.06, R4.07, R4.10, R4.12, R5.01, R5.03, R5.04, R5.06, R5.07, R5.10, R5.12, R6.01, R6.03, R6.04, R6.06, R6.07, R6.09, R6.10,	1-phase airconditioning EER 3.0 - 3.5 (zoned)	airconditioning ducting only (zoned)	1-phase airconditioning EER 3.0 - 3.5 (zoned)	airconditioning ducting only (zoned)	2 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	no

Dwelling no.	Cooling		Heating		Artificial lighting						Natural lighting	
	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
R6.12, RG.08, RG.09												

Dwelling no.	Individual pool		Individual spa		Appliances & other efficiency measures							
	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	-	-	-	-	gas cooktop & electric oven	-	yes	3 star	-	-	no	no

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must attach the certificate referred to under "Assessor details" on the front page of this BASIX certificate (the "Assessor Certificate") to the development application and construction certificate application for the proposed development (or, if the applicant is applying for a complying development certificate for the proposed development, to that application). The applicant must also attach the Assessor Certificate to the application for a final occupation certificate for the proposed development.			
(b) The Assessor Certificate must have been issued by an Accredited Assessor in accordance with the Thermal Comfort Protocol.			
(c) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the "Thermal Loads" table below.			
(d) The applicant must show on the plans accompanying the development application for the proposed development, all matters which the Thermal Comfort Protocol requires to be shown on those plans. Those plans must bear a stamp of endorsement from the Accredited Assessor, to certify that this is the case.			
(e) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all thermal performance specifications set out in the Assessor Certificate, and all aspects of the proposed development which were used to calculate those specifications.			

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(f) The applicant must construct the development in accordance with all thermal performance specifications set out in the Assessor Certificate, and in accordance with those aspects of the development application or application for a complying development certificate which were used to calculate those specifications.		✓	✓
(g) Where there is an in-slab heating or cooling system, the applicant must:  (aa) Install insulation with an R-value of not less than 1.0 around the vertical edges of the perimeter of the slab; or (bb) On a suspended floor, install insulation with an R-value of not less than 1.0 underneath the slab and around the vertical edges of the perimeter of the slab.	✓	✓	✓
(h) The applicant must construct the floors and walls of the development in accordance with the specifications listed in the table below.	✓	✓	✓

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m <sup>2</sup> /yr)	Area adjusted cooling load (in mJ/m <sup>2</sup> /yr)
R1.05	73.9	59.7
R1.06	43.9	54.4
R1.07	53.8	45.4
R2.07	44.0	86.8
R2.08	59.2	87.6
R3.07	60.8	46.4
R3.08	77.9	44.5
R4.08	65.5	32.7
R4.09	82.4	36.7
R5.08	62.6	30.9
R5.09	55.3	21.7
R6.08	55.6	55.8
RG.01	72.2	53.2
RG.04	58.1	27.1
RG.06	64.8	40.0

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m <sup>2</sup> /yr)	Area adjusted cooling load (in mJ/m <sup>2</sup> /yr)
RG.07	63.3	22.8
RG.08	82.8	55.9
RG.09	84.8	87.7
RG.12	44.6	35.7
R1.03, RG.03	37.6	30.2
R1.04, RG.05	55.6	25.5
R4.07, R5.07, R6.07	44.5	37.6
R2.03, R3.03, R4.03, R5.03, R6.03	36.2	43.8
R2.05, R3.05, R4.05, R5.05, R6.05	51.9	50.3
R2.06, R3.06, R4.06, R5.06, R6.06	48.4	33.3
R2.10, R3.10, R4.10, R5.10, R6.10	54.9	45.4
R2.11, R3.11, R4.11, R5.11, R6.11	52.5	59.4
R2.12, R3.12, R4.12, R5.12, R6.12	49.9	45.9
R1.01, R2.01, R3.01, R4.01, R5.01, R6.01	52.9	60.7
R2.04, R3.04, R4.04, R5.04, R6.04, R6.09	36.2	42.9
All other dwellings	45.7	43.5

**(b) Common areas and central systems/facilities**

<b>(i) Water</b>	<b>Show on DA plans</b>	<b>Show on CC/CDC plans &amp; specs</b>	<b>Certifier check</b>
(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.		✓	✓

<b>Common area</b>	<b>Showerheads rating</b>	<b>Toilets rating</b>	<b>Taps rating</b>	<b>Clothes washers rating</b>
All common areas	3 star (> 4.5 but ≤ 6 L/min)	4 star	6 star	no common laundry facility

<b>(ii) Energy</b>	<b>Show on DA plans</b>	<b>Show on CC/CDC plans &amp; specs</b>	<b>Certifier check</b>
(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
Lift car (No. 1)	-	-	compact fluorescent	connected to lift call button	Yes
Lift car (No. 2)	-	-	compact fluorescent	connected to lift call button	Yes
Lift car (No. 3)	-	-	compact fluorescent	connected to lift call button	Yes
Lift car (No. 4)	-	-	compact fluorescent	connected to lift call button	Yes

Central energy systems	Type	Specification
Lift (No. 1)	gearless traction with V V V F motor	Number of levels (including basement): 10
Lift (No. 2)	gearless traction with V V V F motor	Number of levels (including basement): 10
Lift (No. 3)	gearless traction with V V V F motor	Number of levels (including basement): 11
Lift (No. 4)	gearless traction with V V V F motor	Number of levels (including basement): 11



## 2. Commitments for Residential flat buildings - Building - C2

### (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	3 star (> 6 but <= 7.5 L/min)	4 star	6 star	6 star	no	-	2 star	-	-	-	-	-	-	-

	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	individual fan, ducted to façade or roof	manual switch on/off

Dwelling no.	Cooling		Heating		Artificial lighting						Natural lighting	
	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
SG.09, SG.10, SG.11	1-phase airconditioning EER 3.0 - 3.5 (zoned)	1-phase airconditioning EER 3.0 - 3.5 (zoned)	1-phase airconditioning EER 3.0 - 3.5 (zoned)	1-phase airconditioning EER 3.0 - 3.5 (zoned)	3 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	no
SG.01, SG.02, SG.03, SG.04	1-phase airconditioning EER 3.0 - 3.5 (zoned)	1-phase airconditioning EER 3.0 - 3.5 (zoned)	1-phase airconditioning EER 3.0 - 3.5 (zoned)	1-phase airconditioning EER 3.0 - 3.5 (zoned)	2 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	no
S1.03, S1.04, S1.05, S2.01, S2.02, S2.05, S2.08, S2.11, S3.01, S3.02, S3.05, S3.08, S3.11, S4.01, S4.02, S4.05, S4.08, S4.11, S5.01, S5.02, S5.05, S5.08, S5.11, SG.07	1-phase airconditioning EER 3.0 - 3.5 (zoned)	airconditioning ducting only (zoned)	1-phase airconditioning EER 3.0 - 3.5 (zoned)	airconditioning ducting only (zoned)	1 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	no

Dwelling no.	Cooling		Heating		Artificial lighting						Natural lighting	
	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
S1.01, S1.02, S1.06, S2.03, S2.04, S2.06, S2.07, S2.09, S2.10, S2.12, S3.03, S3.04, S3.06, S3.07, S3.09, S3.10, S3.12, S4.03, S4.04, S4.06, S4.07, S4.09, S4.10, S4.12, S5.03, S5.04, S5.06, S5.07, S5.09, S5.10, S5.12, SG.05, SG.06, SG.08	1-phase airconditioning EER 3.0 - 3.5 (zoned)	airconditioning ducting only (zoned)	1-phase airconditioning EER 3.0 - 3.5 (zoned)	airconditioning ducting only (zoned)	2 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	no

	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	-	-	-	-	gas cooktop & electric oven	-	yes	3 star	-	-	no	no

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must attach the certificate referred to under "Assessor details" on the front page of this BASIX certificate (the "Assessor Certificate") to the development application and construction certificate application for the proposed development (or, if the applicant is applying for a complying development certificate for the proposed development, to that application). The applicant must also attach the Assessor Certificate to the application for a final occupation certificate for the proposed development.			
(b) The Assessor Certificate must have been issued by an Accredited Assessor in accordance with the Thermal Comfort Protocol.			
(c) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the "Thermal Loads" table below.			
(d) The applicant must show on the plans accompanying the development application for the proposed development, all matters which the Thermal Comfort Protocol requires to be shown on those plans. Those plans must bear a stamp of endorsement from the Accredited Assessor, to certify that this is the case.			
(e) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all thermal performance specifications set out in the Assessor Certificate, and all aspects of the proposed development which were used to calculate those specifications.			
(f) The applicant must construct the development in accordance with all thermal performance specifications set out in the Assessor Certificate, and in accordance with those aspects of the development application or application for a complying development certificate which were used to calculate those specifications.		✓	✓
(g) Where there is an in-slab heating or cooling system, the applicant must:  (aa) Install insulation with an R-value of not less than 1.0 around the vertical edges of the perimeter of the slab; or (bb) On a suspended floor, install insulation with an R-value of not less than 1.0 underneath the slab and around the vertical edges of the perimeter of the slab.	✓	✓	✓
(h) The applicant must construct the floors and walls of the development in accordance with the specifications listed in the table below.	✓	✓	✓

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m <sup>2</sup> /yr)	Area adjusted cooling load (in mJ/m <sup>2</sup> /yr)
S1.01	45.6	55.4
S1.02	49.2	48.8
S1.03	58.7	68.0
S1.04	42.2	60.4
S1.05	48.2	59.8
S1.06	48.6	55.0
SG.01	53.9	52.3
SG.02	44.4	37.9
SG.03	57.5	47.6
SG.04	50.7	43.1
SG.06	61.6	57.4
SG.07	62.8	34.5
SG.09	63.1	40.4
SG.10	50.7	39.1
SG.11	35.6	56.6
SG.05, SG.08	59.7	55.6
S2.01, S3.01, S4.01, S5.01	63.6	49.9
S2.02, S3.02, S4.02, S5.02	57.8	55.7
S2.03, S3.03, S4.03, S5.03	43.2	42.0
S2.04, S3.04, S4.04, S5.04	69.5	38.8
S2.09, S3.09, S4.09, S5.09	49.4	48.3
S2.10, S3.10, S4.10, S5.10	77.0	49.2
S2.11, S3.11, S4.11, S5.11	67.3	53.0
S2.05, S2.08, S3.05, S3.08, S4.05, S4.08, S5.05, S5.08	42.2	58.5
All other dwellings	47.6	52.9

**(b) Common areas and central systems/facilities**

<b>(i) Water</b>	<b>Show on DA plans</b>	<b>Show on CC/CDC plans &amp; specs</b>	<b>Certifier check</b>
(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.		✓	✓

<b>Common area</b>	<b>Showerheads rating</b>	<b>Toilets rating</b>	<b>Taps rating</b>	<b>Clothes washers rating</b>
All common areas	3 star (> 4.5 but ≤ 6 L/min)	4 star	6 star	no common laundry facility

<b>(ii) Energy</b>	<b>Show on DA plans</b>	<b>Show on CC/CDC plans &amp; specs</b>	<b>Certifier check</b>
(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
Lift car (No. 5)	-	-	compact fluorescent	connected to lift call button	Yes
Lift car (No. 6)	-	-	compact fluorescent	connected to lift call button	Yes

Central energy systems	Type	Specification
Lift (No. 5)	gearless traction with V V V F motor	Number of levels (including basement): 9
Lift (No. 6)	gearless traction with V V V F motor	Number of levels (including basement): 9

## 5. 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	3 star (> 4.5 but ≤ 6 L/min)	4 star	6 star	no common laundry facility

Central systems	Size	Configuration	Connection (to allow for...)
Fire sprinkler system (No. 1)	-	So that fire sprinkler test water is contained within the fire sprinkler system for re-use, rather than disposed.	-
Fire sprinkler system (No. 2)	-	So that fire sprinkler test water is contained within the fire sprinkler system for re-use, rather than disposed.	-

(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	Common area ventilation system		Common area lighting		
	Ventilation system type	Ventilation efficiency measure	Primary type of artificial lighting	Lighting efficiency measure	Lighting control system/BMS
Car park area (Basement 1,2,3)	ventilation (supply + exhaust)	carbon monoxide monitor + VSD fan	compact fluorescent	motion sensors	Yes
Switch room (Combined)	no mechanical ventilation	-	compact fluorescent	manual on / manual off	No
Garbage (Combined)	ventilation exhaust only	-	compact fluorescent	motion sensors	Yes
Plant or service room (Combined)	ventilation exhaust only	interlocked to light	compact fluorescent	manual on / manual off	No
Stair area (Combined)	no mechanical ventilation	-	compact fluorescent	motion sensors	Yes
Storage (Combined)	no mechanical ventilation	-	compact fluorescent	manual on / manual off	No
Hallway/lobby type (Combined)	no mechanical ventilation	-	compact fluorescent	motion sensors	Yes

Central energy systems	Type	Specification
Central hot water system (No. 1)	gas-fired boiler	Piping insulation (ringmain & supply risers): (a) Piping external to building: R1.0 (~38 mm); (b) Piping internal to building: R1.0 (~38 mm)

## 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).