Yifang Pty Ltd

2-16 Young Road Carlingford

BASIX Assessment Report

ESD Synergy Pty Ltd
Contact No: +61 497 979 868
+61 413 591 688
Email: info@esdsynergy.com
Web: www.esdsynergy.com

Attention	Ken Yang
Client	Yifang Pty Ltd C/- Aleksandar Design Group
Author	Henky Mantophani
Reviewer	Adriana Segovia
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Subject	2-16 Young Road Carlingford – BASIX Assessment Report

1. SITE APPRECIATION

The proposed development is located at 2-16 Young Road Carlingford and consists of:

- Basement car parking
- 118 apartments over 3 buildings

2. BASIX WATER SECTION

The proposed development will meet the mandatory BASIX water target of 40% as long as the water commitments detailed in Table 1 are installed. For details of the requirements necessary to achieve this target, please refer to the BASIX Certificate No. 866988M_02.

Table 1: BASIX Water Commitments

Common Areas and Central Systems	
Area of Indigenous or low water species	• 1748.8 m2 of the landscaping areas must be of indigenous or low water use species • See Appendix B for more details
Rainwater collection	• Total of 20,000L rainwater tank • Total Roof collection area – 538 m^2 • Rainwater collected to be used for all common landscape irrigation and 2 carwash bay
Fire Sprinkler Test Water	• Test water must be diverted to a closed system
Private Dwellings	
Fixtures for apartments	• 3-star (Water Rating) showerheads with a flow rate > 6.0L/min & ≤ 7.5L/min • 4-star (Water Rating) toilets • 5-star (Water Rating) kitchen taps • 5-star (Water Rating) bathroom taps • 5-star (Water Rating) dishwashers

3. BASIX THERMAL COMFORT SECTION

The thermal performance of the development has been evaluated using BERS Pro 2nd Generation software. The BERS Pro computer simulation of residential developments forms part of the Nationwide House Energy Rating Scheme, and is used to assess the potential of a residential development to have low heating and cooling energy requirements once operational.

3.1 MODELLING ASSUMPTIONS

The "base-case" building fabric and glazing and associated thermal performance specifications are described in Table 2 below: Note these assumptions are based on the nominated preferred construction materials indicated by the architect.

Note: Table 2 must be read in conjunction with Table 3. Table 3 outlines additional thermal enhancements / treatments to meet the mandatory thermal load targets to achieve compliance.

Table 2: Base Case Assumptions on Construction and Fabric

Element	*Material*	*Detail*
External walls	Cavity Brick	**Insulation: See Table 3**
		Medium colour: 0.7<absorptance< 0.475
Internal walls	Plasterboard	
Party walls	Concrete, lined	Common corridors, neighbour, fire stairs & lifts
Windows	6mm Single glazed, clear with Aluminium frame **for sliding doors, sliding & fixed windows**	Total Window System Properties **U-value 6.7 & SHGC 0.70**
	6mm Single glazed, clear with Aluminium frame **for awning windows**	Total Window System Properties **U-value 6.7 & SHGC 0.57**
	Window Operability	Balcony windows: **30%, 45% & 60% (i.e. sliding)** Bedroom windows: **10%** (BCA D2.24) All other non-balcony windows: **0% (i.e. fixed)**
Roof	Metal Deck	**Insulation: See Table 3**
		Dark colour: absorptance > 0.7
Ceilings	Plasterboard	**Insulation: See Table 3**
Floors	Concrete	Tiles: Living, Dining, Kitchen, Wet areas
		Tiles: Bedrooms
Common corridors naturally ventilated		No
Recessed downlights assessed		No

3.2 BERS PRO RESULTS (THERMAL COMFORT)

The simulated heating and cooling loads per dwelling are summarized in Table 3 below. Where the dwellings have failed to meet the thermal load targets additional thermal enhancements / treatments are provided. This is typically in the form of bulk insulation.

These additional thermal treatments are required to pass the BASIX Thermal performance requirements.

Table 3: BERS Pro Thermal Loads

Unit No.	*Additional Treatments Required*	*Heating Load ($MJ/m^2.yr$)*	*Cooling Load ($MJ/m^2.yr$)*	*Stars*	*Pass/Fail*
A001	R1.0 Bulk Floor Insulation adjacent to carpark only, R1.5 Bulk External Wall Insulation, Double glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows	44.4	18.1	5.3	Pass
A002	R1.0 Bulk Floor Insulation adjacent to carpark only, R1.5 Bulk External Wall Insulation, Double glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows	39.9	23.3	5.2	Pass
B001	R1.0 Bulk Floor Insulation adjacent to carpark only, R1.5 Bulk External Wall Insulation including walls adjacent to bin room, Double glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows	42.6	15.4	5.4	Pass
B002	R1.0 Bulk Floor Insulation adjacent to carpark only, R1.5 Bulk External Wall Insulation, Single glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 5.4 & SHGC 0.58 to all windows	38.7	22.3	5.4	Pass
C001	R1.0 Bulk Floor Insulation adjacent to carpark only, R1.5 Bulk External Wall Insulation, Double glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows	40.3	22.6	5.2	Pass
C002	R1.0 Bulk Floor Insulation adjacent to carpark only, R1.5 Bulk External Wall Insulation including walls adjacent to carpark, Double glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows	39.8	18.6	5.4	Pass
A101	R1.5 Bulk Floor Insulation adjacent to carpark only, R1.5 Bulk External Wall Insulation, Double glazed Low Solar Gain Low-E glass with aluminium frame of total window system properties U-value 4.9 & SHGC 0.33 to all window	43.9	27.2	4.8	Pass
A102	R1.0 Bulk Floor Insulation adjacent to carpark only, R1.5 Bulk External Wall Insulation	22.7	26.5	6.2	Pass
A103	R1.0 Bulk Floor Insulation adjacent to carpark only, R1.5 Bulk External Wall Insulation	33.0	17.8	6.0	Pass
A104	R1.5 Bulk Floor Insulation adjacent to carpark only, R1.5 Bulk External Wall Insulation, Double glazed High Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows	41.9	9.8	5.9	Pass
A105	R1.0 Bulk Floor Insulation adjacent to carpark only, R1.5 Bulk External Wall Insulation, Double glazed High Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows	42.7	12.1	5.8	Pass

Unit No.	Additional Treatments Required	Heating Load ($MJ/m^2.yr$)	Cooling Load ($MJ/m^2.yr$)	Stars	Pass/Fail
A106	R1.0 Bulk Floor Insulation adjacent to carpark only, R1.5 Bulk External Wall Insulation, Double glazed High Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows	43.4	11.5	5.8	Pass
A107	R1.5 Bulk External Wall Insulation, Single glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 5.4 & SHGC 0.58 to all windows	38.5	22.4	5.4	Pass
A108	R1.5 Bulk External Wall Insulation, Double glazed High Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows	22.6	27.7	6.1	Pass
B101	R1.5 Bulk External Wall Insulation, Double glazed High Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows, at least 60% ventilation opening to North Living room window	12.9	23.9	7.2	Pass
B102	R1.5 Bulk Floor Insulation adjacent to elevated areas only, R1.5 Bulk External Wall Insulation, Double glazed clear glass with aluminium frame of total window system properties U-value 4.8 & SHGC 0.59 to all windows	39.4	16.8	5.2	Pass
B105	R1.0 Bulk Floor Insulation adjacent to carpark only, R1.5 Bulk External Wall Insulation, Double glazed High Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows	40.7	17.0	5.5	Pass
B106	R1.0 Bulk Floor Insulation adjacent to carpark only, R1.5 Bulk External Wall Insulation, Double glazed clear glass with aluminium frame of total window system properties U-value 4.8 & SHGC 0.59 to all windows	41.3	17.6	5.4	Pass
B107	R1.0 Bulk Floor Insulation adjacent to carpark & elevated areas only, R1.5 Bulk External Wall Insulation, Double glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows	39.7	21.6	5.3	Pass
B108	R1.5 Bulk External Wall Insulation, Double glazed Low Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.9 & SHGC 0.33 to all windows, at least 60% ventilation opening to South Living room window	22.4	25.0	6.3	Pass
C101	R1.5 Bulk External Wall Insulation, Double glazed Low Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.9 & SHGC 0.33 to all windows, at least 60% ventilation opening to North Living room window	13.0	24.4	7.2	Pass
C102	R1.0 Bulk Floor Insulation adjacent to carpark & elevated areas only, R1.5 Bulk External Wall Insulation, Double glazed clear glass with aluminium frame of total window system properties U-value 4.8 & SHGC 0.59 to all windows	37.7	20.0	5.5	Pass
C103	R1.0 Bulk Floor Insulation adjacent to carpark only, R1.5 Bulk External Wall Insulation, Single glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 5.4 & SHGC 0.58	38.7	17.5	5.7	Pass

Unit No.	Additional Treatments Required	Heating Load ($MJ/m^2.yr$)	Cooling Load ($MJ/m^2.yr$)	Stars	Pass/Fail
	to all windows				
C104	R1.0 Bulk Floor Insulation adjacent to carpark only, R1.5 Bulk External Wall Insulation	36.2	22.2	5.4	Pass
C105	R1.0 Bulk Floor Insulation adjacent to carpark & elevated only, R1.5 Bulk External Wall Insulation, Double glazed clear glass with aluminium frame of total window system properties U-value 4.8 & SHGC 0.59 to all windows	43.9	15.0	5.4	Pass
C106	R1.5 Bulk External Wall Insulation, Double glazed Low Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.9 & SHGC 0.33 to all windows, at least 60% ventilation opening to South Living room window	22.7	25.1	6.3	Pass
C107	R1.0 Bulk Floor Insulation adjacent to carpark, R1.5 Bulk External Wall Insulation, Double glazed clear glass with aluminium frame of total window system properties U-value 4.8 & SHGC 0.59 to all windows	41.2	21.3	5.3	Pass
C108	R1.5 Bulk Floor Insulation adjacent to carpark, R1.5 Bulk External Wall Insulation, Double glazed Low Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.9 & SHGC 0.33 to all windows	42.1	24.0	4.9	Pass
A201	R1.5 Bulk External Wall Insulation, Double glazed Low Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.9 & SHGC 0.33 to all windows, at least 60% ventilation opening to North Living room window, North Living window to be reduced to have a maximum glazed area of 10.8 sq.m, West Living window to be reduced to have a maximum glazed area of 8.4 sq.m, vertical louvres of 60% opacity to all of the West facade, West overhang to increase to a maximum width of 0.4 metres	29.4	29.3	5.4	Pass
A202	R1.5 Bulk External Wall Insulation	18.2	27.0	6.4	Pass
A203	R1.5 Bulk External Wall Insulation	24.8	18.9	6.6	Pass
A204	R1.5 Bulk External Wall Insulation	34.6	18.5	5.9	Pass
A205	R1.5 Bulk External Wall Insulation	27.3	15.4	6.7	Pass
A206	R1.5 Bulk External Wall Insulation	38.9	13.7	5.9	Pass
A207	R1.5 Bulk External Wall Insulation, Single glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 5.4 & SHGC 0.58 to all windows, vertical louvres of 60% opacity to all of the West facade, West overhang to increase to a maximum width of 0.4 metres	34.9	22.4	5.6	Pass
A208	R1.5 Bulk External Wall Insulation, Double glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows, vertical louvres of 60% opacity to all of the West facade, West overhang to increase to a maximum width of 0.4 metres	19.0	26.3	6.4	Pass
B201	R1.5 Bulk External Wall Insulation, Single glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 5.4 & SHGC 0.58 to all windows, at least 60% ventilation opening to North Living room window, vertical louvres of 60%	22.4	27.3	6.2	Pass

Unit No.	Additional Treatments Required	Heating Load ($MJ/m^2.yr$)	Cooling Load ($MJ/m^2.yr$)	Stars	Pass/Fail
	opacity to all of the West facade				
B202	R1.5 Bulk External Wall Insulation	35.5	23.9	5.4	Pass
B203	R1.0 Bulk Floor Insulation adjacent to carpark entry only, R1.5 Bulk External Wall Insulation	44.1	19.2	5.2	Pass
B204	R1.0 Bulk Floor Insulation adjacent to carpark entry only, R1.5 Bulk External Wall Insulation	40.1	20.6	5.4	Pass
B205	R1.5 Bulk External Wall Insulation	20.1	19.6	6.9	Pass
B206	R1.5 Bulk External Wall Insulation	42.7	22.4	5.1	Pass
B207	R1.5 Bulk External Wall Insulation, Single glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 5.4 & SHGC 0.58 to all windows	41.3	25.4	4.9	Pass
B208	R1.5 Bulk External Wall Insulation, Double glazed Low Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.9 & SHGC 0.33 to all windows, at least 60% ventilation opening to South Living room window, vertical louvres of 60% opacity to all of the West facade	19.1	21.9	6.9	Pass
C201	R1.5 Bulk External Wall Insulation, Single glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 5.4 & SHGC 0.58 to all windows, at least 60% ventilation opening to North Living room window, vertical louvres of 60% opacity to all of the West facade	22.9	27.4	6.1	Pass
C202	R1.5 Bulk External Wall Insulation	41.1	23.4	5.1	Pass
C203	R1.5 Bulk External Wall Insulation	35.8	20.6	5.7	Pass
C204	R1.5 Bulk External Wall Insulation	21.6	24.1	6.4	Pass
C205	R1.5 Bulk External Wall Insulation	18.9	19.1	7.1	Pass
C206	R1.5 Bulk External Wall Insulation, Single glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 5.4 & SHGC 0.58 to all windows	28.3	22.0	6.1	Pass
C207	R1.0 Bulk Floor Insulation adjacent to carpark & elevated areas only, R1.5 Bulk External Wall Insulation, Single glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 5.4 & SHGC 0.58 to all windows	40.0	26.6	4.9	Pass
C208	R1.5 Bulk External Wall Insulation, Double glazed Low Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.9 & SHGC 0.33 to all windows, at least 60% ventilation opening to South Living room window, vertical louvres of 60% opacity to all of the West facade	19.1	21.9	6.9	Pass
A301	R1.5 Bulk External Wall Insulation, Double glazed Low Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.9 & SHGC 0.33 to all windows, at least 60% ventilation opening to North Living room window, North Living window to be reduced to have a maximum glazed area of 10.8 sq.m, West Living window to be reduced to have a maximum glazed area of 8.4 sq.m, vertical louvres of 60% opacity to all of the West facade, West overhang to increase to a maximum width of 0.4 metres	30.5	28.5	5.4	Pass
A302	R1.5 Bulk External Wall Insulation	19.1	24.9	6.6	Pass

Unit No.	Additional Treatments Required	Heating Load ($MJ/m^2.yr$)	Cooling Load ($MJ/m^2.yr$)	Stars	Pass/Fail
A303	R1.5 Bulk External Wall Insulation	25.8	18.6	6.6	Pass
A304	R1.5 Bulk External Wall Insulation	26.1	19.0	6.4	Pass
A305	R1.5 Bulk External Wall Insulation	19.8	15.8	7.3	Pass
A306	R1.5 Bulk External Wall Insulation	39.8	13.4	5.9	Pass
A307	R1.5 Bulk External Wall Insulation, Single glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 5.4 & SHGC 0.58 to all windows, vertical louvres of 60% opacity to all of the West facade, West overhang to increase to a maximum width of 0.4 metres	36.1	21.6	5.5	Pass
A308	R1.5 Bulk External Wall Insulation, Double glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows, vertical louvres of 60% opacity to all of the West facade, West overhang to increase to a maximum width of 0.4 metres	19.9	25.5	6.4	Pass
B301	R1.5 Bulk External Wall Insulation, Single glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 5.4 & SHGC 0.58 to all windows, at least 60% ventilation opening to North Living room window, vertical louvres of 60% opacity to all of the West facade	23.5	24.6	6.3	Pass
B302	R1.5 Bulk External Wall Insulation	41.3	19.7	5.4	Pass
B303	R1.5 Bulk External Wall Insulation	33.8	20.4	5.8	Pass
B304	R1.5 Bulk External Wall Insulation	22.9	23.4	6.4	Pass
B305	R1.5 Bulk External Wall Insulation	14.7	19.4	7.4	Pass
B306	R1.5 Bulk External Wall Insulation	43.9	21.5	5.1	Pass
B307	R1.5 Bulk External Wall Insulation, Double glazed glass with aluminium frame of total window system properties U-value 4.8 & SHGC 0.59 to all windows	38.3	20.0	5.4	Pass
B308	R1.5 Bulk External Wall Insulation, Double glazed Low Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.9 & SHGC 0.33 to all windows, at least 60% ventilation opening to South Living room window, vertical louvres of 60% opacity to all of the West facade	24.4	15.0	6.9	Pass
C301	R1.5 Bulk External Wall Insulation, Single glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 5.4 & SHGC 0.58 to all windows, at least 60% ventilation opening to North Living room window, vertical louvres of 60% opacity to all of the West facade	27.9	18.7	6.4	Pass
C302	R1.5 Bulk External Wall Insulation, Single glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 5.4 & SHGC 0.58 to all windows	36.4	17.3	5.9	Pass
C303	R1.5 Bulk External Wall Insulation	36.9	20.2	5.6	Pass
C304	R1.5 Bulk External Wall Insulation	22.4	23.8	6.4	Pass
C305	R1.5 Bulk External Wall Insulation	15.5	19.5	7.3	Pass
C306	R1.5 Bulk External Wall Insulation	40.3	23.1	5.2	Pass
C307	R1.5 Bulk External Wall Insulation	41.7	21.1	5.3	Pass
C308	R1.5 Bulk External Wall Insulation, Double glazed Low Solar Gain Low-E clear glass with aluminium	24.4	15.0	6.9	Pass

Unit No.	Additional Treatments Required	Heating Load ($MJ/m^2.yr$)	Cooling Load ($MJ/m^2.yr$)	Stars	Pass/Fail
	frame of total window system properties U-value 4.9 & SHGC 0.33 to all windows, at least 60% ventilation opening to South Living room window, vertical louvres of 60% opacity to all of the West facade				
A401	R1.5 Bulk External Wall Insulation, Double glazed Low Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.9 & SHGC 0.33 to all windows, at least 60% ventilation opening to North Living room window, North Living window to be reduced to have a maximum glazed area of 10.8 sq.m, West Living window to be reduced to have a maximum glazed area of 8.4 sq.m, vertical louvres of 60% opacity to all of the West facade, West overhang to increase to a maximum width of 0.4 metres, R2.5 Bulk Ceiling Insulation to exposed areas only	37.7	29.4	4.9	Pass
A402	R1.5 Bulk External Wall Insulation, R2.0 Bulk Ceiling Insulation to exposed areas only	26.2	22.1	6.3	Pass
A403	R1.5 Bulk External Wall Insulation, R2.0 Bulk Ceiling Insulation to exposed areas only	29.5	22.2	5.9	Pass
A404	R1.5 Bulk External Wall Insulation, R2.0 Bulk Ceiling Insulation to exposed areas only	30.8	23.8	5.8	Pass
A405	R1.5 Bulk External Wall Insulation, R2.0 Bulk Ceiling Insulation to exposed areas only	24.7	20.5	6.4	Pass
A406	R1.5 Bulk External Wall Insulation, R2.0 Bulk Ceiling Insulation to exposed areas only	44.0	14.9	5.4	Pass
A407	R1.5 Bulk External Wall Insulation, Single glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 5.4 & SHGC 0.58 to all windows, vertical louvres of 60% opacity to all of the West facade, West overhang to increase to a maximum width of 0.4 metres, R2.5 Bulk Ceiling Insulation to exposed areas only	43.7	17.7	5.3	Pass
A408	R1.5 Bulk External Wall Insulation, Double glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows, vertical louvres of 60% opacity to all of the West facade, West overhang to increase to a maximum width of 0.4 metres, R2.5 Bulk Ceiling Insulation to exposed areas only	29.6	21.8	5.9	Pass
B401	R1.5 Bulk External Wall Insulation, Single glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 5.4 & SHGC 0.58 to all windows, at least 60% ventilation opening to North Living room window, vertical louvres of 60% opacity to all of the West facade, R2.5 Bulk Ceiling Insulation to exposed areas only	30.3	19.5	6.1	Pass
B402	R1.5 Bulk External Wall Insulation	42.2	19.4	5.3	Pass
B403	R1.5 Bulk External Wall Insulation, R2.0 Bulk Ceiling Insulation to exposed areas only	37.2	24.0	5.4	Pass
B404	R1.5 Bulk External Wall Insulation, R2.0 Bulk Ceiling Insulation to exposed areas only	27.7	29.2	5.6	Pass
B405	R1.5 Bulk External Wall Insulation, R2.0 Bulk Ceiling Insulation to exposed areas only	19.1	24.2	6.7	Pass
B406	R1.5 Bulk External Wall Insulation, R2.5 Bulk Ceiling Insulation to exposed areas only, Single glazed High	35.9	23.1	5.4	Pass

Unit No.	Additional Treatments Required	Heating Load ($MJ/m^2.yr$)	Cooling Load ($MJ/m^2.yr$)	Stars	Pass/Fail
	Solar Gain Low-E glass with aluminium frame of total window system properties U-value 5.4 & SHGC 0.58 to all windows				
B407	R1.5 Bulk External Wall Insulation, Double glazed glass with aluminium frame of total window system properties U-value 4.8 & SHGC 0.59 to all windows, R2.5 Bulk Ceiling Insulation to exposed areas only	38.9	19.5	5.4	Pass
B408	R1.5 Bulk External Wall Insulation, Double glazed Low Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.9 & SHGC 0.33 to all windows, at least 60% ventilation opening to South Living room window, vertical louvres of 60% opacity to all of the West facade, R2.5 Bulk Ceiling Insulation to exposed areas only	29.6	16.7	6.4	Pass
C401	R1.5 Bulk External Wall Insulation, Single glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 5.4 & SHGC 0.58 to all windows, at least 60% ventilation opening to North Living room window, vertical louvres of 60% opacity to all of the West facade, R2.5 Bulk Ceiling Insulation to exposed areas only	31.2	20.0	5.9	Pass
C402	R1.5 Bulk External Wall Insulation, R2.5 Bulk Ceiling Insulation to exposed areas only, Single glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 5.4 & SHGC 0.58 to all windows	37.1	17.1	5.8	Pass
C403	R1.5 Bulk External Wall Insulation, R2.0 Bulk Ceiling Insulation to exposed areas only	39.3	24.8	5.2	Pass
C404	R1.5 Bulk External Wall Insulation, R2.0 Bulk Ceiling Insulation to exposed areas only	26.9	29.4	5.7	Pass
C405	R1.5 Bulk External Wall Insulation, R2.0 Bulk Ceiling Insulation to exposed areas only	19.8	24.4	6.6	Pass
C406	R1.5 Bulk External Wall Insulation, R2.0 Bulk Ceiling Insulation to exposed areas only	43.6	26.1	4.8	Pass
C407	R1.5 Bulk External Wall Insulation	42.5	20.7	5.2	Pass
C408	R1.5 Bulk External Wall Insulation, Double glazed Low Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.9 & SHGC 0.33 to all windows, at least 60% ventilation opening to South Living room window, vertical louvres of 60% opacity to all of the West facade, R2.5 Bulk Ceiling Insulation to exposed areas only	29.6	16.7	6.4	Pass
A501	R1.5 Bulk External Wall Insulation, R2.5 Bulk Ceiling Insulation to exposed areas only, Double glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows	31.7	20.1	5.9	Pass
A502	R1.5 Bulk External Wall Insulation, R2.5 Bulk Ceiling Insulation to exposed areas only, Single glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 5.4 & SHGC 0.58 to all windows	35.7	17.8	5.9	Pass
A503	R0.5 Bulk Floor Insulation to elevated areas only, R1.5 Bulk External Wall Insulation, Double glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 4.3 & SHGC	38.9	22.5	5.3	Pass

Unit No.	Additional Treatments Required	Heating Load ($MJ/m^2.yr$)	Cooling Load ($MJ/m^2.yr$)	Stars	Pass/Fail
	0.53 to all windows, R2.5 Bulk Ceiling Insulation to exposed areas only, R1.3 Bulk+Foil (Reflective both sides) to metal roof only				
A504	R1.5 Bulk External Wall Insulation, Double glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows, R2.5 Bulk Ceiling Insulation to exposed areas only, R1.3 Bulk+Foil (Reflective both sides) to metal roof only	45.4	26.9	4.7	Pass
A505	R1.5 Bulk External Wall Insulation, Double glazed glass with aluminium frame of total window system properties U-value 4.8 & SHGC 0.59 to all windows	38.6	14.0	5.9	Pass
A506	R1.5 Bulk External Wall Insulation, Double glazed Low Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.9 & SHGC 0.33 to all windows, at least 60% ventilation opening to North & West Living room window, R2.5 Bulk Ceiling Insulation to exposed areas only, West facade to have 1 metre overhang	30.5	28.1	5.4	Pass
B501	R1.5 Bulk External Wall Insulation, R2.5 Bulk Ceiling Insulation to exposed areas only, Double glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows	25.3	28.7	5.8	Pass
B502	R1.5 Bulk External Wall Insulation, R2.5 Bulk Ceiling Insulation to exposed areas only, Single glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 5.4 & SHGC 0.58 to all windows	43.5	18.0	5.3	Pass
B503	R0.5 Bulk Floor Insulation to elevated areas only, R1.5 Bulk External Wall Insulation, Double glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows, R2.5 Bulk Ceiling Insulation to exposed areas only, R1.3 Bulk+Foil (Reflective both sides) to metal roof only, East Living window to be reduced to a maximum glazed area of 12.15 sq.m, North Living window to be reduced to a maximum glazed area of 10.8 sq.m	45.2	26.4	4.7	Pass
B504	R2.5 Bulk External Wall Insulation, Double glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows, R3.0 Bulk Ceiling Insulation to exposed areas only, R1.3 Bulk+Foil (Reflective both sides) to metal roof only, South Bed 1 & Bed 2 window to be deleted, East Living window to be reduced to a maximum glazed area of 9.45 sq.m	45.0	19.4	5.1	Pass
B505	R1.5 Bulk External Wall Insulation, Double glazed glass with aluminium frame of total window system properties U-value 4.8 & SHGC 0.59 to all windows	36.5	16.0	5.9	Pass
B506	R1.5 Bulk External Wall Insulation, Double glazed Low Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.9 & SHGC 0.33 to all windows, at least 60% ventilation opening to West Living room window, R2.5 Bulk Ceiling Insulation to exposed areas only, West Living window to be reduced to a maximum glazed area of	37.3	26.8	5.2	Pass

Unit No.	*Additional Treatments Required*	*Heating Load (MJ/m^2.yr)*	*Cooling Load (MJ/m^2.yr)*	*Stars*	*Pass/Fail*
	10.8 sq.m, West Bedroom 2 glazing to be removed, West facade to have 0.4 metre overhang				
C501	R1.5 Bulk External Wall Insulation, Double glazed Low Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.9 & SHGC 0.33 to all windows, at least 60% ventilation opening to West Living room window, R2.5 Bulk Ceiling Insulation to exposed areas only	41.9	27.3	4.9	Pass
C502	R1.5 Bulk External Wall Insulation, Double glazed glass with aluminium frame of total window system properties U-value 4.8 & SHGC 0.59 to all windows	37.8	14.9	5.9	Pass
C503	R1.5 Bulk External Wall Insulation, Double glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows, R3.0 Bulk Ceiling Insulation to exposed areas only, R1.3 Bulk+Foil (Reflective both sides) to metal roof only, East & West Living window to be reduced to a maximum glazed area of 8.1 sq.m, East Upper Stairs window to be reduced to a maximum glazed area of 4.86 sq.m	45.3	19.8	5.1	Pass
C504	R1.5 Bulk External Wall Insulation, Double glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 4.3 & SHGC 0.53 to all windows, R2.5 Bulk Ceiling Insulation to exposed areas only, R1.3 Bulk+Foil (Reflective both sides) to metal roof only	39.6	26.5	4.9	Pass
C505	R1.5 Bulk External Wall Insulation, Single glazed High Solar Gain Low-E glass with aluminium frame of total window system properties U-value 5.4 & SHGC 0.58 to all windows, R2.5 Bulk Ceiling Insulation to exposed areas only	42.9	19.0	5.3	Pass
C506	R1.5 Bulk External Wall Insulation, Double glazed Low Solar Gain Low-E clear glass with aluminium frame of total window system properties U-value 4.9 & SHGC 0.33 to all windows, at least 60% ventilation opening to West Living room window, R2.5 Bulk Ceiling Insulation to exposed areas only, West Living window to be reduced to a maximum glazed area of 13.5 sq.m, at least 1 metre overhang to North & West Living/Kitchen facade	40.9	28.8	4.8	Pass

4. BASIX ENERGY SECTION

The proposed development will meet the mandatory BASIX Energy target as long as the energy commitments detailed in Table 4 are installed.

Table 4: BASIX Energy Commitments

Component		*Commitment*
Common Areas and Central Systems	Lifts	• All lifts to use Gearless traction with VVVF motor servicing all levels
	Ventilation	• Car park: Ventilation (supply only) with a CO monoxide monitor & VSD fan • Garbage Rooms: Ventilation (exhaust only), continuous • Switch Room & Plant/Service Rooms: Ventilation (exhaust only), continuous • Hallways & lobbies: Ventilation (supply Only), time clock/BMS controlled
	Lighting	• Car park: Fluorescent lighting with time clocks and motion sensors • Lift Cars: LED lighting, connected to lift call button • Garbage Rooms: Fluorescent lighting with motion sensors • Switch Room & Plant/Service Rooms: Fluorescent lighting with manual on/off switch • Hallways & lobbies: LED lighting with motion sensors + time clock
Private Dwellings	Hot Water System	• Individual Gas Instantaneous HWS with 6 Stars Rating
	Ventilation	• Kitchen, Bathroom & Laundry Exhaust: Individual fan, ducted to roof or façade, with manual on/off switch
	Heating & Cooling	• Heating: Living & Beds to have individual 2-star 1-phase air-conditioning • Cooling: Living & Beds to have individual 2-star 1 phase air-conditioning
	Lighting	• No commitments
	Other	• Gas cook top and electric oven • Install a minimum 4-star (energy rating) dishwashers • Install a minimum 2-star (energy rating) dryers

5. CONCLUSION

The proposed development has been assessed to optimise its thermal performance (passive and fabric design) using the Nationwide House Energy Rating scheme (NatHERS) and also been assessed in terms of its ability to conserve water and minimise energy consumption through BASIX Tool.

With the commitment recommendations contained within this report the proposed development is able to meet BASIX requirements and is BASIX compliant.

For further details, please refer to the BASIX Certificate No. 866988M_02 provided.

APPENDIX A - ARCHITECTURAL DRAWINGS

The building sustainability performance assessment carried out in this report was based on the following architectural drawings supplied by Aleksandar Design Group received on 24 Aug 18.

DA 00	COVER PAGE + CALCULATIONS
DA 01	SITE ANALYSIS + DEMOLITION PLAN
DA 02	SITE & ROOF PLAN
DA 03	BASEMENT 2 PLAN
DA 04	BASEMENT 1 PLAN
DA 05	GROUND FLOOR PLAN
DA 06	LEVEL 1 PLAN
DA 07	LEVEL 2 PLAN
DA 08	LEVEL 3 PLAN
DA 09	LEVEL 4 PLAN
DA 10	LEVEL 5 PLAN
DA 11	LEVEL 6 PLAN
DA 12	DEEP SOIL + GFA CALCULATIONS
DA 13	SITE COVERAGE + COMMUNAL OPEN SPACE
DA 14	SHADOW DIAGRAMS - WINTER
DA 15	SHADOW DIAGRAMS - SUMMER
DA 16	SECTIONS AA, BB, CC
DA 17	SECTION DD
DA 18	ELEVATIONS 1-4
DA 19	ELEVATIONS 5-8
DA 20	ELEVATIONS 9-12

APPENDIX B – Landscaping Areas

Private gardens - area total - 782 sq m

area lawn - 352 sq m

area planted - 332 sq m

Common area area total - 2 832 sq m

area lawn - 294 sq m

area planted - 1775 sq m

Planting percentages

44% locally indigenous

39% native

17% exotic