Andrea and Colin Henry

342-348 High St, Penrith

BASIX Assessment Report

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Subject	342-348 High St, Penrith – BASIX Assessment Report

1. SITE APPRECIATION

The proposed development is located at 342-348 High St, Penrith and consists of:

- Retail & Commercial tenancies over 5 levels in Building A
- 29 new residential units between 2 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. 1206256M.

To meet a GreenStar rating of 5-stars:

- **1 technical point** can be achieved under **Section 18B.1 Sanitary Fixture Efficiency** where all fixtures are within one star of the WELS rating stated below.
- **1 technical point** can be achieved under **Section 18B.2 Rainwater use** where a rainwater is installed.

Table 1: BASIX Water Commitments

Common Areas and Central Systems	
Area of Indigenous or low water species	• Please refer to Appendix B
Rainwater collection	• 100,000L rainwater tank [1] • Roof collection area – A minimum area of 300m^2 • Rainwater to be used for Common areas and private landscape irrigation
Fire Sprinkler	• Test water must be diverted to a closed system
Private Dwellings	
Fixtures for apartments	• 4-star (Water Rating) showerheads with a flow rate > 4.5L/min & ≤ 6.0L/min • 5-star (Water Rating) toilets • 6-star (Water Rating) kitchen taps

[1] One GreenStar point awarded for a GFA 10,953.04 m^2

	• 6-star (Water Rating) bathroom taps • 5-star (Water Rating) clothes washer • 6-star (Water Rating) dishwashers
Outdoor spa – Unit 604	• 8.5 kL • Spa will have a cover

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.

To meet a GreenStar rating of 5-stars, **1 technical point** can be achieved under **Section 14.1 Thermal Comfort** where residential spaces achieve an average NatHERS rating of **7-stars**.

3.1 MODELLING ASSUMPTIONS

The "base-case" building fabric and glazing and associated thermal performance specifications are described in Table 2 below as 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	Brick Veneer	**Insulation: See Table 3**
		Medium colour: 0.475<absorptance< 0.70
Internal walls	Plasterboard	
Party walls	Concrete, fixed plasterboard	**Insulation: None**
		Common corridors
	Concrete, fixed plasterboard	**Insulation: None**
		Neighbour
	Concrete	**Insulation: None**
		Fire stairs & lifts
Windows	**Type 1 (Typical Single glazed clear glass with aluminium frame)**	Total Window System Properties **U-value 4.3 & SHGC 0.53 for sliding doors, sliding & fixed windows** **And** Total Window System Properties **U-value 4.3 & SHGC 0.47 for bifold doors, awning & casement**

Element	*Material*	*Detail*
		windows
	Window Operability	Balcony windows: **30%, 45% (i.e. sliding)** Bedroom windows: **10%** (BCA D2.24) All other non-balcony windows: **0% (i.e. fixed)**
	Shading device	Balcony windows: **60% opacity** Non-balcony windows: **60% opacity**
Skylight	N/A	
Roof	Concrete	**Insulation: None**
		Dark colour: Absorptance> 0.70
Ceilings	Plasterboard	**Insulation: See Table 3**
Floors	Concrete	**Insulation: See Table 3**
		Tiles: Wet areas only
		Carpet: Bedrooms only
		Timber: Elsewhere
Common corridors naturally ventilated		No
Recessed downlights assessed		No
Exhaust fans (kitchens, bathrooms, laundry)		**All assumed to be sealed**
Note: Only a ±5% SHGC tolerance to the value stated above & U-value can be greater than or equal to the value stated above		

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. Please refer to BASIX Certificate No. 1206256M & NatHERS Universal Certificate No. 0006659290 for details.

The development achieves an average NatHERS star rating of **7.4 stars.**

Table 3: BERS Pro Thermal Loads – Stage A

Unit No.	*Additional Treatments Required*	*Heating Load (MJ/m².yr)*	*Cooling Load (MJ/m².yr)*	*Stars*	*Pass/Fail*
505	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows, R1.0 Bulk Ceiling Insulation to exposed areas only (total ceiling/roof system R-value Rt1.16), South Bedroom 2 window to have at least 10% ventilation opening, South Bedroom 3 window to have at least 10% ventilation opening	16.5	60.0	6.5	Pass
506	R1.0 Bulk Floor Insulation to exposed floors only (total floor system R-value of R1.2), R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows, R1.0 Bulk Ceiling Insulation to exposed areas only (total ceiling/roof system R-value Rt1.16)	51.0	31.0	6.3	Pass
604	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows,	23.7	54.6	6.4	Pass

Unit No.	Additional Treatments Required	Heating Load ($MJ/m^2.yr$)	Cooling Load ($MJ/m^2.yr$)	Stars	Pass/Fail
	R2.5 Bulk Ceiling Insulation to exposed areas only (total ceiling/roof system R-value Rt2.66), East Study window to have at least 20% ventilation opening, South Bedroom 3 window to have at least 10% ventilation opening, East Bedroom 4 window to have at least 10% ventilation opening,				

Table 4: BERS Pro Thermal Loads – Stage B

Unit No.	Additional Treatments Required	Heating Load ($MJ/m^2.yr$)	Cooling Load ($MJ/m^2.yr$)	Stars	Pass/Fail
101	R1.5 Bulk Floor Insulation to carpark & exposed areas only (total floor system R-value of Rt1.88), R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows	31.8	18.4	7.7	Pass
102	R1.5 Bulk Floor Insulation to carpark (total floor system R-value of Rt1.88), R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows, North Bedroom 1 window to have at least 10% ventilation opening	4.3	19.8	8.9	Pass
103	R1.5 Bulk Floor Insulation to carpark (total floor system R-value of Rt1.88), R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows	57.0	30.8	5.9	Pass
104	R1.5 Bulk Floor Insulation to carpark (total floor system R-value of Rt1.88), R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows	42.6	26.2	6.9	Pass
105	R1.5 Bulk Floor Insulation to carpark (total floor system R-value of Rt1.88), R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows	50.6	23.9	6.6	Pass
201	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows	15.7	21.1	8.4	Pass
202	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows, North Bedroom 1 window to have at least 10% ventilation opening	0.8	22.0	9.0	Pass
203	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows	41.0	33.6	6.6	Pass
204	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows	21.9	31.2	7.6	Pass
205	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows	26.6	26.5	7.6	Pass
301	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows	17.0	19.5	8.4	Pass
302	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows, North Bedroom 1 window to have at least 10% ventilation opening	1.1	21.0	9.1	Pass
303	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows, R1.0 Bulk Ceiling Insulation to exposed areas only (total ceiling/roof system R-value Rt1.16)	46.4	31.4	6.4	Pass
304	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows, R1.0 Bulk Ceiling Insulation to exposed areas only (total	30.1	28.6	7.3	Pass

Unit No.	Additional Treatments Required	Heating Load (MJ/m².yr)	Cooling Load (MJ/m².yr)	Stars	Pass/Fail
	ceiling/roof system R-value Rt1.16)				
305	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows, R1.0 Bulk Ceiling Insulation to exposed areas only (total ceiling/roof system R-value Rt1.16)	39.7	27.4	6.9	Pass
401	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows	16.3	17.8	8.4	Pass
402	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows, North Bedroom 1 window to have at least 10% ventilation opening	1.3	18.8	9.2	Pass
403	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows, South Bedroom 1, 2 & 3 windows to have at least 10% ventilation opening	26.1	30.4	7.4	Pass
404	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows, South Bedroom 1, 2 windows to have at least 10% ventilation opening	29.0	22.5	7.7	Pass
501	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows, R1.0 Bulk Ceiling Insulation to exposed areas only (total ceiling/roof system R-value Rt1.16)	21.6	19.3	8.2	Pass
502	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows, R1.0 Bulk Ceiling Insulation to exposed areas only (total ceiling/roof system R-value Rt1.16)	5.4	20.1	8.9	Pass
503	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows, R1.0 Bulk Ceiling Insulation to exposed areas only (total ceiling/roof system R-value Rt1.16)	31.2	32.6	7.1	Pass
504	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows, R1.0 Bulk Ceiling Insulation to exposed areas only (total ceiling/roof system R-value Rt1.16)	41.9	25.0	6.9	Pass
601	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows, R2.5 Bulk Ceiling Insulation to exposed areas only (total ceiling/roof system R-value Rt2.66)	48.5	30.8	6.4	Pass
602	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows, R2.0 Bulk Ceiling Insulation to exposed areas only (total ceiling/roof system R-value Rt2.16)	16.4	40.1	7.4	Pass
603	R2.0 Bulk External Wall Insulation with vapour barrier (total wall system R-value of Rt2.52), Type 1 windows, R2.0 Bulk Ceiling Insulation to exposed areas only (total ceiling/roof system R-value Rt2.16)	39.7	44.3	6.1	Pass

4. BASIX ENERGY SECTION

The proposed development will meet the mandatory BASIX Energy target of 25% as long as the energy commitments detailed in Table 5 are installed.

To meet a GreenStar rating of 5-stars, **3 technical points** can be achieved under **Section 15C BASIX Pathway** where the greenhouse gas emissions reduction meets **20%** (i.e. 30% BASIX Energy).

Table 5: BASIX Energy Commitments

Component		*Commitment*
Common Areas and Central Systems	Hot Water System	• Centralised Gas-fired boiler with internal piping insulation of R1.0 (~38mm)
	Lifts	• All lifts to use Gearless traction with VVVF motor and regenerative drive servicing all levels
	Alternative Energy Supply	• Photovoltaic system of rated electrical output 8kW peak
	Ventilation	• Car park: Ventilation (supply & exhaust) with a CO monoxide monitor & VSD fan • Switch Room: Ventilation (supply only), thermostatically controlled • Garbage Rooms: Ventilation (exhaust only), continuous • Plant/Service Rooms: Ventilation (supply only), thermostatically controlled • Hallways & lobbies: Ventilation (supply only) connected to time clock or BMS controlled
	Lighting	• Car park: LED lighting with time clocks and motion sensors • Lift Cars: LED lighting connected to lift call button • Switch Room: LED lighting with manual on/off switch • Garbage Rooms: LED lighting with motion sensors • Plant/Service Room: LED lighting with manual on/off switch • Hallways & lobbies: LED lighting with motion sensors + time clock
Private Dwellings	Hot Water System	• See Central systems
	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 3-star (average zone) 1-phase air-conditioning • Cooling: Living & Beds to have individual 3-star (average zone) 1-phase air-conditioning • **Air conditioning to be day-night zoned between bedrooms and living areas**
	Lighting	• At least 80% of light fittings (including the main light fitting) in all hallways, laundries, bathrooms, kitchens, bedrooms and living areas to use Fluorescent or LED lights with dedicated fittings[2]
	Outdoor spa	• Heating system: Gas • Pump will be controlled by a timer

[2] Definition of dedicated fittings is a light fitting that is only capable of accepting fluorescent or LED (Light Emitting Diode) lamps. It will not accept incandescent, halogen or any other non-fluorescent or non-LED lamps.

Component		Commitment
	Other	• Gas cook top and electric oven • Well-ventilated fridge space. • Install a 3.5-star (energy rating) dishwashers • Install a 3-star (energy rating) clothes washer • Install a 2-star (energy rating) dryers • Install an indoor clothes drying line (e.g. line over bath or a screened line on balconies)

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. 1206256M provided.

APPENDIX A - ARCHITECTURAL DRAWINGS

The building sustainability performance assessment carried out in this report was based on the following architectural drawings supplied by Integrated Design Group received on 8th October 2021.

DA DRAWING SET		
NUMBER	NAME	REVISION
0001	COVER PAGE	B
0002	GENERAL NOTES	B
0003	BASIX COMMITMENTS	A
0100	SITE PLAN	J
0200	DEMOLITION PLAN	B
0300	NCC COMPLIANCE PLANS	B
0400	AREA CALCULATIONS	B
0500	SEPP 65 ANALYSIS	B
0600	WASTE MANAGEMENT DETAILS	B
1000	BASEMENT 01 PLAN	S
1001	BASEMENT 02 PLAN	S
1100	GROUND LEVEL PLAN	S
1101	LEVEL 1 PLAN	Q
1102	LEVEL 2 PLAN	S
1103	LEVEL 3 PLAN	S
1104	LEVEL 4 PLAN	S
1105	LEVEL 5 PLAN	Q
1106	LEVEL 6 PLAN	T
1107	ROOF PLAN	Q
2000	ELEVATIONS BUILDING A	J
2001	ELEVATIONS BUILDING B	J
3000	SECTIONS 1	H
3001	SECTIONS 2	H
3002	SECTIONS 3	H
3003	DRIVEWAY SECTIONS 1	C
8000	FACADE AND SIGNAGE DETAIL 1	C
8001	FACADE AND SIGNAGE DETAIL 2	C
9100	SHADOW DIAGRAMS	B
9300	ADAPTABLE UNIT PLANS	B
9600	EXTERNAL FINISHES SCHEDULE	B

APPENDIX B – Landscaping Areas

COS:
Lawn= 0 sq.m
Garden beds: GF external: 179 sq.m (could make about 90 sq.m Indigenous/ LWU if required
GF Internal planters: 22.7 sq.m
Stage A atrium planters: 17.4 sq.m (3 x 5.8 sq.m)
Stage B Level 6 (south side planter): 24.8 sq.m

POS:
STAGE A Level 3 Commercial: Garden beds= 190 sq.m
Lawn= 17 sq.m
STAGE A Level 6 Private: Garden bed= 64.6 sq.m
Lawn= 0 sq.m

STAGE B Private (Garden beds only, no lawn):
1.03= 1.6 sq.m
2.03= 1.6 sq.m
3.03= 1.6 sq.m
4.01= 5.4 sq.m
4.02= 3.3 sq.m
4.03= 11.2 sq.m
4.04= 4 sq.m
5.01= 5.4 sq.m
5.02= 3.3 sq.m
5.03= 11.2 sq.m
5.04= 4 sq.m
6.01= 9.6 sq.m
6.02= 7.14 sq.m
6.03= 20.3 sq.m