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Energy Efficiency Assessment Report

Proposal to construct a mixed use building

Prepared for Urban Partners

21 Whistler Street

MANLY NSW

Report 2018/09097

Dated 20 September 2018

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1 Introduction

This report has been prepared on behalf of Urban Partners, seeking to construct a mixed use building with attached basement carpark on land known as 21 Whistler Street, Manly.

1.1 Summary

The proposed building is to be located at 21 Whistler Street, Manly. This is situated within climate zone 5 and less than 300 metres AHD.

The proposed building comprises the following parts:

- | | |
|---------|--|
| Class 2 | a building containing two or more sole-occupancy units each being a separate dwelling. |
| Class 6 | <p>a shop or other building for the sale of goods by retail or the supply of services direct to the public, including—</p> <ul style="list-style-type: none">(a) An eating room, café, restaurant, milk or soft-drink bar, or(b) A dining room, bar, shop or kiosk part of a hotel or motel;
or(c) A hairdresser's or barber's shop, public laundry, or undertaker's establishment; or(d) Market or sale room, showroom, or service station |
| Class 7 | <p>a building which is--</p> <ul style="list-style-type: none">(e) Class 7a - A carpark; or(f) Class 7b – for storage, or display of goods or produce for sale by wholesale. |

The building is considered able to comply with the Deemed to Satisfy provisions of the Building Code of Australia and as such achieve compliance with Performance Requirement JP1.

As there is a Class 2 portion of the development, this will be addressed in the BASIX certificate which forms part of the Development Application.

2 Basis for Assessment

2.1 Building Description

The proposed building is comprised of a retail tenancy, basement carpark and residential units. The subject building is to be located at 21 Whistler Street, Manly, situated within climate zone 5 and comprising the following parts:

- Class 2 a building containing 2 or more sole occupancy units each being a separate dwelling;
- Class 6 A shop or other building for the sale of goods by retail or the supply of services direct to the public, including an eating room, café, restaurant, milk or soft-drink bar;
- Class 7 a building which is--

Class 7a - A carpark; or

Class 7b – for storage, or display of goods or produce for sale by wholesale.

The proposed development will incorporate a residential unit building, with basement carparking over one level and a ground floor retail tenancy. Due to the similar building materials they will be assessed together wherever possible.

The residential buildings will be assessed using the NatHERS protocol for residential dwellings and this report only refers to the Commercial section of the proposed development.

2.2 Construction Materials

The materials listed below were used as the basis for this assessment. These materials were determined from the architectural drawings and information provided by the proponent.

Should these materials be altered, it may require a re-assessment of the proposed structure against the deemed to satisfy provisions of the BCA.

2.2.1 Flooring and Required Insulation

Construction System	Concrete		
Coverings	Ceramic Tiles	None	Carpet
Sub-Floor	Above garage		
Insulation	Nil		

2.2.2 External Wall and Required Insulation

Construction System	As indicated
Cladding types	As indicated
Colour	Medium – SA 0.475-0.7 Light – SA 0.1-0.475
Insulation	As indicated

2.2.3 Roof, Ceiling and Required Insulation

Roofing Material	Concrete
Colour	Medium – SA 0.475-0.7
Roof Insulation	R3.0 (Only in areas as indicated)
Ventilation	Not required
Ceiling Material	Plasterboard
Ceiling Insulation	Nil

2.2.4 Window Glazing

Manufacturer	Generic
Glazing Type	As per requirements
Window Frame	Aluminium

2.2.5 Air Conditioning System

Small package air-conditioner units are proposed for the retail tenancy. Energy requirements and outputs are to be consistent with the provisions of the BCA.

2.2.6 Artificial Lighting

Generic individual lighting is identified later in the report. Figures are established from industry standard average Watts.

2.2.7 Hot Water Supply

As per Australian Standard 3500.4

3 Assessment under Deemed to Satisfy Provisions

3.1 Building Fabric

Where required, insulation must comply with AS/NZS 4859.1 and be installed so that it:

- (i) abuts or overlaps adjoining insulation other than at supporting members such as studs, noggings, joists, furring channels and the like where the insulation must butt against the member; and
- (ii) forms a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier; and
- (iii) does not affect the safe or effective operation of a service or fitting.

Where required, reflective insulation must be installed with:

- (i) the necessary airspace to achieve the required R-Value between a reflective side of the reflective insulation and a building lining or cladding; and
- (ii) the reflective insulation closely fitted against any penetration, door or window opening; and
- (iii) the reflective insulation adequately supported by framing members; and
- (iv) each adjoining sheet of roll membrane being:
 - (A) overlapped not less than 50 mm; or
 - (B) taped together.

Where required, bulk insulation must be installed so that:

- (i) it maintains its position and thickness, other than where it compresses between cladding and supporting members, water pipes, electrical cabling or the like; and
- (ii) in a ceiling, where there is no bulk insulation or reflective insulation in the wall beneath, it overlaps the wall by not less than 50 mm.

A roof that:

- (i) is required to achieve a minimum Total R-Value; and
- (ii) has metal sheet roofing fixed to metal purlins, metal rafters or metal battens; and
- (iii) does not have a ceiling lining or has a ceiling lining fixed directly to those metal purlins, metal rafters or metal battens

must have a thermal break, consisting of a material with an R-value of not less than R0.2, installed between the metal sheet roofing and its supporting metal purlins, metal rafters or metal battens.

Roof, ceiling, wall and floor materials, and associated surfaces are deemed to have the thermal properties listed in Specification J1.2 of the BCA unless otherwise stated by manufacturer.

3.1.1 Roof and Ceiling Construction

External Concrete Roofing

Description	R Value	Required R-Value
Outdoor Airfilm (7 m/s)	0.04	
Waterproof membrane, rubber synthetic (4mm, 961 kg/m ³)	0.03	
Solid Concrete (150mm, 2400 kg/m ³)	0.10	
Ceiling airspace (100mm to 300mm, non reflective)	0.22	
Bulk Insulation	3.50	
Plasterboard, gypsum (10mm, 880kg/m ³)	0.06	
Indoor air film (Still air)	0.16	
Total	4.11	3.95

The above Ceiling/Roof insulation requirements are only for the areas of the roof/ceiling which are not adjacent to the residential units above.

The required R value has been increased by 0.75 as identified in Section 3.14 of this report.

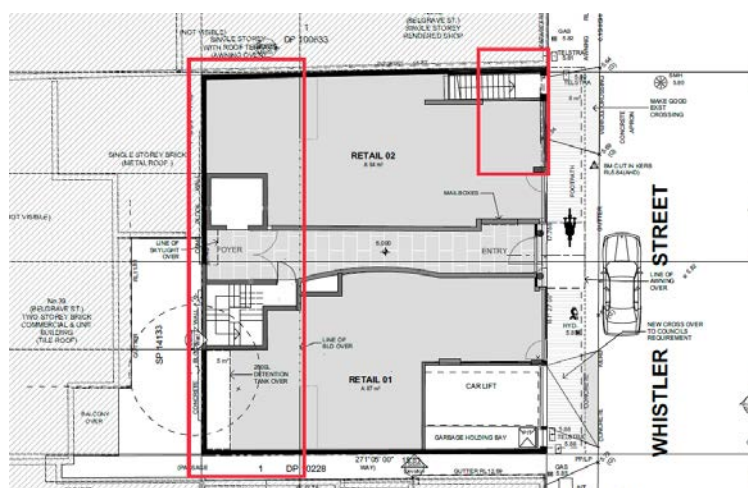


Figure 1 - Identified areas with no adjacent residential units

The ceiling/roof between the commercial space and the Class 2 building above does not require insulation as per the provisions of the NCC.

3.1.2 Roof Lights

No skylights are proposed as part of the building.

3.1.3 Wall Construction

Brick Veneer

Description	R Value	Maximum Required R-Value
Outdoor Airfilm (7m/s)	0.04	
150mm Minimum solid reinforced concrete	0.10	
Permiwall or similar	1.49	
Plasterboard, gypsum (10mm, 880kg/m ³)	0.06	
Indoor Air Film (still air)	0.12	
Total	1.81	1.40

Wall Orientation	R-Value Required
N	R1.4
E	R1.4
S	R1.4
W	R1.4

Internal walls between conditioned space and unconditioned space is to have a minimum total construction R-Value of R1.0.

3.1.4 Floors

Concrete Flooring

Description	R Value	Required R-Value
Indoor air film (still air)	0.16	
Flooring Tiles	0.01	
Waterproof membrane, rubber synthetic (4mm, 961 kg/m ³)	0.03	
Solid Concrete (250mm, 2400 kg/m ³)	0.18	
Indoor air film (still air)	0.16	
Total	0.54	0.50

The level of floor insulation has been reduced by 0.5, with 0.75 added to the required R value of the external ceiling as per the provisions of Part J1.6.(b).

3.2 External Glazing

The proposed glazing is based upon the requirements of the Building Code of Australia. The U-Value and solar heat gain co-efficient (SHGC) are identified in the glazing calculator forming Appendix A.

The proposed external glazing is considered to be consistent with the deemed to satisfy provisions for Part J2. A Glazing calculator demonstrating this is attached as Appendix A.

3.3 Building Sealing

3.3.1 Chimneys and Flues

None proposed as part of the development.

3.3.2 Roof Lights

No roof lights are proposed as part of the development.

3.3.3 Windows and Doors

A seal to restrict air infiltration must be fitted to each edge of any door, openable window or the like, forming part of the envelope of a conditioned space, except where:

- (i) any window complying with AS 2047; or
- (ii) a fire door or smoke door; or
- (iii) a roller shutter door, roller shutter grille or other security door or device installed only for out-of-hours security.

Any required seal for the bottom edge of an external swing door, must be a draft protection device; and for the other edges of an external door or the edges of an openable window or other such opening, may be a foam or rubber compressible strip, fibrous seal or the like.

3.3.4 Exhaust Fans

Any exhaust fan, such as a bathroom or domestic kitchen exhaust fan, must be fitted with a sealing device such as a self-closing damper or the like when serving a conditioned space

3.3.5 Construction of Roofs, Walls and Floors

Roofs, ceilings, walls, floors and any opening such as a window frame, door frame or the like must be constructed to minimise air leakage by being:

- (i) enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or
- (ii) sealed by caulking, skirting, architraves, cornices or the like.

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

3.3.6 Evaporative Coolers

No evaporative coolers are proposed.

3.4 Air Conditioning and Ventilation Systems

3.4.1 Air Conditioning Systems

Air conditioning unit or systems must –

- (i) be capable of being deactivated when the sole-occupancy unit, building or part of the building served is not occupied; and
- (ii) Where the air-conditioning unit or system has motorised outside air and return dampers, close the dampers when the air-conditioning unit or system is deactivated; and
- (iii) Have any supply and return ductwork sealed and insulated in accordance with Specification J5.2 of the BCA; and
- (iv) Other than where a packaged air-conditioning unit is used, have a variable speed fan when its supply air quantity is varied; and
- (v) Be designed so that the total fan motor power of the air-conditioning supply air and return air fans in the building, divided by the floor area served by those fans is, in accordance with the following table

Air-conditioning sensible heat load (W/m ² of the floor area of the conditioned space)	Maximum fan motor power (W/m ² of the floor area of the conditioned space)	
	For an air-conditioning system serving not more than 500 m ²	For an air-conditioning system serving more than 500 m ²
Up to 100	5.3	8.3
101 – 150	9.5	13.5
151 – 200	13.7	18.3
201 – 300	22.2	28.0
301 - 400	30.7	37.0

It is considered that the air-conditioning units proposed are able to achieve the deemed-to-satisfy provisions of the BCA 2016

3.4.2 Mechanical Ventilation System

No mechanical ventilation system proposed.

3.4.3 Exhaust Systems

Any miscellaneous exhaust system with an air flow rate of more than 1000 L/s, that is associated with equipment having a variable demand such as a stove must be designed to minimise the exhausting of conditioned air and have the means for the operator to:

- a. reduce the energy used, such as by a variable speed fan, and
- b. stop the motor when the system is not needed.

The restrictions above do not apply where the air flow must be maintained for safe operation.

3.5 Artificial Lighting and Power

As per the proposed summary table (full calculation details are provided as Appendix B), the total allowable Illumination Power Load for the building is 5,556 Watts. The proposed aggregate Design Illumination Power Load is 5,400 Watts.

As per the provisions of Part J6.2 these are an allowable Design illumination Power Load.

3.6 Hot Water Supply

Any hot water system, other than a solar hot water system, will be designed and installed in accordance with Section 8 of AS 3500.4.

3.7 Access for Maintenance

Services to be mounted in an accessible area to allow access in accordance with Part I2 of the BCA

4 Conclusion

The above report shows that the proposed development demonstrably complies with the Deemed to Satisfy Provisions of Section J of the Building Code of Australia.

This report demonstrates that the proposal is consistent with the DTS provisions of the BCA in regard to energy efficiency and is anticipated to satisfy the objective of Section J, to reduce greenhouse gas emissions by efficiently using energy.



Appendix A

ABCB Glazing Calculator

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

Building name/description
21 Whistler Street MANLY

Application
shop display

Climate zone
5

Storey
1

Facade areas

N	NE	E	SE	S	SW	W	NW	internal
		56.1m²						n/a

Option A
Option B

Glazing area (B) 27.3m²

Number of rows preferred in table below **3** (as currently displayed)

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS									SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S _H)	Cooling (S _C)	Area used (m²)	Element share of % of allowance used
1	Retail 01		E	3.10	3.70		6.7	0.70	1.800	3.100	0.58	0.00	0.65	0.60	11.47	42% of 99%
2	Retail 02 W01		E	3.10	3.00		6.7	0.70	1.800	3.100	0.58	0.00	0.65	0.60	9.30	34% of 99%
3	Retail 02 D01		E	3.10	2.10		6.7	0.70	1.800	3.100	0.58	0.00	0.65	0.60	6.51	24% of 99%

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR
The Glazing Calculator has been developed by the ABCB to assist in developing a better understanding of glazing energy efficiency parameters. While the ABCB believes that the Glazing Calculator, if used correctly, will produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all. Your use of the Glazing Calculator is entirely at your own risk and the ABCB accepts no liability of any kind.

if inputs are valid



Appendix B

ABCB Electrical Lighting Calculator

[Main Menu](#)**LIGHTING CALCULATOR FOR USE WITH J6.2(b) VOLUME ONE (First issued with NCC 2014)**[Multiple Lighting
Systems Calculator](#)[Help screen](#)

Building name/description

21 Whistler Street, Manly

Classification

Class 6

Number of rows preferred in table below **2** (as currently displayed)

ID	Description	Floor area of the space	Perimeter of the space	Floor to ceiling height	Design Illumination Power Load	Space	Adjustment Factor One			Adjustment Factor Two			OVERALL DESIGN PASSES			
							Adjustment Factor One	Dimming Percentages		Design Lumen Depreciation Factor	Adjustment Factor Two	Dimming Percentages		Design Lumen Depreciation Factor	System Illumination Power Load Allowance	Lighting System Share of % of Aggregate Allowance Used
							Adjustment Factors	% Area	% of full power		Adjustment Factors	% Area	% of full power			
1	Retail 01	87.0 m²	47 m	3.0 m	2600 W	Retail space including a museum and gallery whose purpose is the sale of objects							2696 W	48% of 97%		
2	Retail 02	91.0 m²	52 m	3.0 m	2800 W	Retail space including a museum and gallery whose purpose is the sale of objects							2860 W	52% of 97%		

Total 5400 W

Total 5556 W

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The Lighting Calculator has been developed by the ABCB to assist in developing a better understanding of lighting energy efficiency parameters. While the ABCB believes that the Lighting Calculator, if used correctly, will produce accurate results, the calculator is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all. Your use of the Lighting Calculator is entirely at your own risk and the ABCB accepts no liability of any kind.

if inputs are
valid