SECTION J ENERGY EFFICIENCY REPORT NCC 2019

PROJECT NAME:	Commercial Space and Boarding House
ADDRESS:	1129-1131 Pittwater Road, Collaroy NSW
CLIENT:	Lotus Projects

DOCUMENT CONTROL

PREPARED BY:	Mohammmad Rayyan
CHECKED BY:	Can Chu
ISSUE:	FINAL
REVISION:	1
DATE:	27/03/20

DTS ENERGY EFFICIENCY DECLARATION

Pursuant to NCC A2.2 (vi) this report relies on supplied documentation for assessment with regards to adopting measures contributing to deemed-to-satisfy of designed and built deliverables. This report documents the energy efficiency assessment undertaken on the proposed building work described herein to confirm compliance with the Section J – Energy Efficiency Provisions of the National Construction Code Volume One – Class 2 to Class 9 Buildings. It is our opinion that this project can be constructed to satisfy the requirements of the National Construction Code.

certified energy

ABN: 95 164 564 210
Association of Building Sustainability Assessors (ABSA) No. 100765

Table of Contents

1 – Introduction

The term Proposed Development in this report refers to Proposed new development located at 1129-1131 Pittwater Road, Collaroy NSW 2097.

The purpose of this report is to provide an assessment of the design plans and documentation for the Proposed Development and to satisfy the requirements of Local Government Area of the development for issuance of Construction Certificate for construction operations in the development site.

The scope of this report is limited to the design documentation referenced in Section 2 of this report and only covers the Deemed-to-Satisfy (DTS) provisions of Section J - Energy Efficiency, of the Building Code of Australia (BCA) 2019.

2 – Referenced Documents

The following documents and design plans have been referenced in compilation of this report:

1. National Construction Code Series, Volume 1, Building Code of Australia 2019, Class 2 to Class 9 Buildings.

2. Architectural Plans listed below provided by "Lotus Projects" and received by Certified Energy at 17/03/2020.
    - A-00 Title Page - Dated 12/03/2020
    - A-01 Location Diagram - Dated 12/03/2020
    - A-02 Basement Floor plan - Dated 12/03/2020
    - A-03 Ground Floor plan- Dated 12/03/2020
    - A-04 First Floor plan - Dated 12/03/2020
    - A-05 Second Floor plan - Dated 12/03/2020
    - A-06 Third Floor plan - Dated 12/03/2020
    - A-07 Roof plan - Dated 12/03/2020
    - A-08 Elevations East and North - Dated 12/03/2020
    - A-09 Elevations South and West - Dated 12/03/2020
    - A-10 Sections - Dated 12/03/2020

3. Email correspondence and response to information request received from the client of the Proposed Development.

3 – Proposed Development

The Proposed Development in this report is a new development with Commercial and Boarding house located at 1129-1131 Pittwater Road, Collaroy NSW 2097.

The development is a class 6 & 3 building in BCA Climate Zone 5 according to BCA Climate Map for NSW.

The following construction elements are being proposed in the building design according to architectural plans and design documents referenced in this report:

Roof and Ceiling: Metal roof with colorbond steel.

External Walls: Cavity brick.

Internal Walls: Plasterboard on studs, Block walls with plasterboard lining.

Floors: Reinforced concrete slab on ground.

Windows: Standard Aluminium framed windows.

Skylights: No skylights.

Air Conditioning System: No design plans provided.

Lighting System: No design plans provided.

4 – Scope of Report (Building Envelope)

"**Envelope**", for the purposes of Section J, means the parts of the buildings fabric that separate a conditioned space or habitable room from-

(d) the exterior of the building; or

(e) a non-conditioned space including-

(i) the floor of a rooftop plant room, lift-machine room or the like; and

(ii) the floor above a carpark or warehouse; and

(iii) the common wall with a carpark, warehouse or the like.

Conditioned Space Note:

Legend: Building Envelope

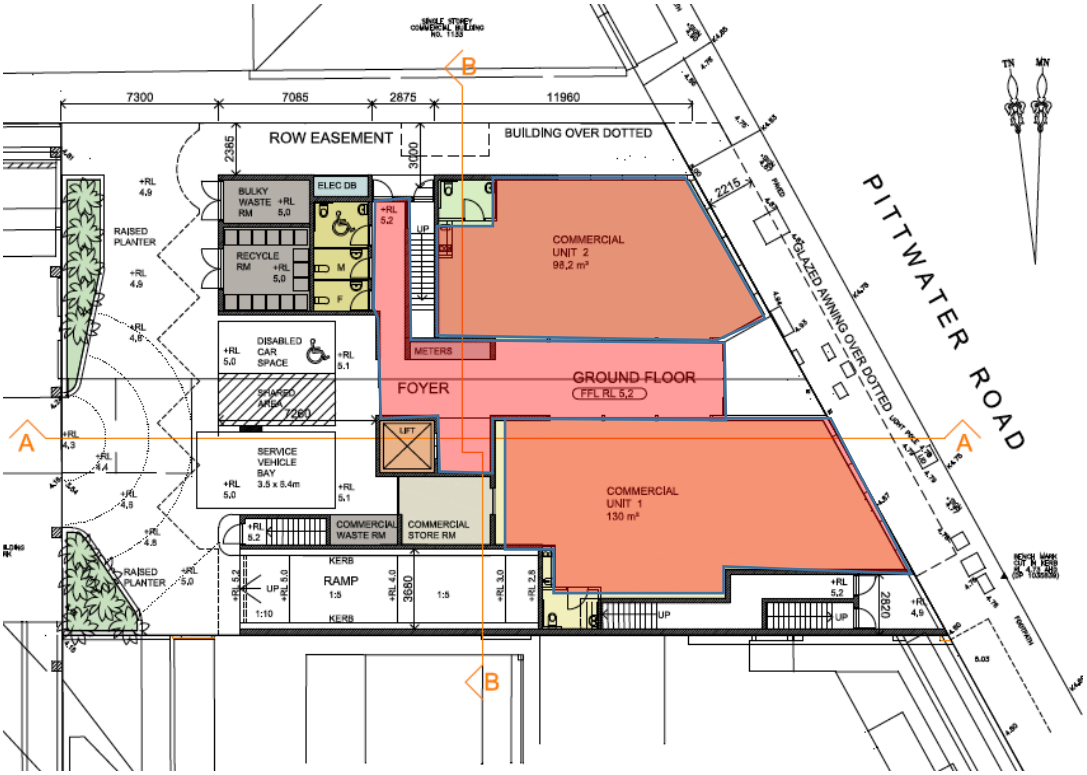


Figure 1 – Building Envelope – Ground Floor

Figure 2 – Building Envelope – First Floor

Figure 3 – Building Envelope – Second Floor

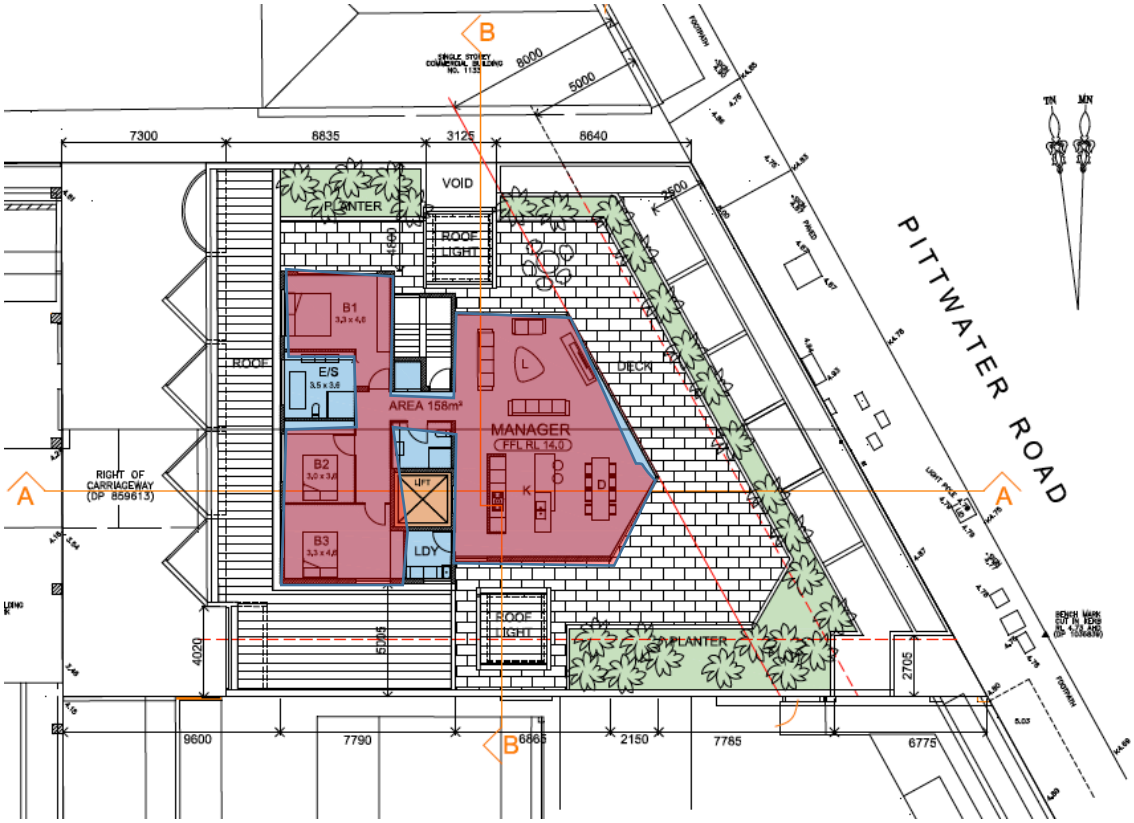
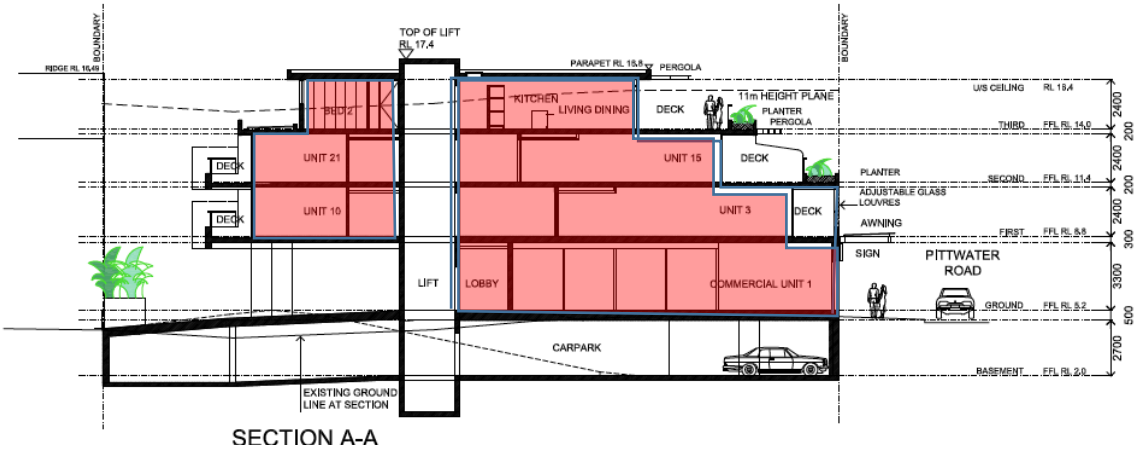


Figure 4 – Building Envelope – Third Floor

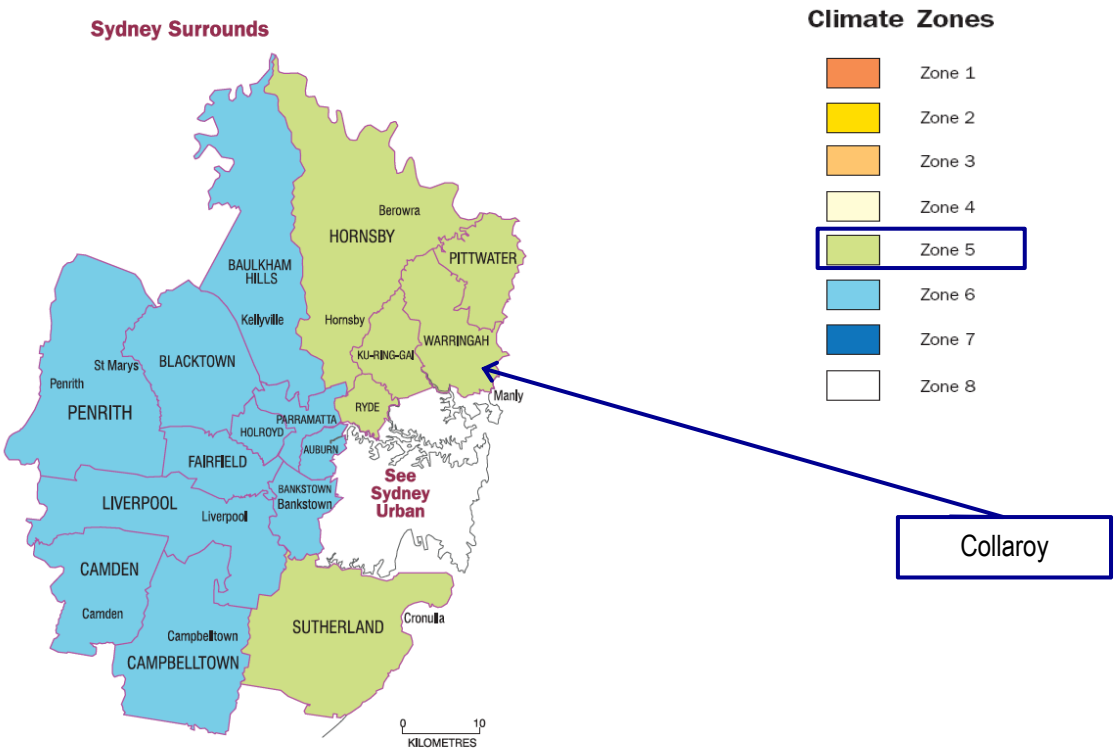


SECTION A-A

Figure 5 – Building Envelope – Section 1

5 – Project Classification and Climate Zone

BUILDING CLASS 3 & 6



CLIMATE	COLOUR	SUBURB
ZONE 5	**GREEN**	**COLLAROY**

Climate Characteristics of Zone 5

Warm Temperate

- Moderate diurnal (day-night) temperature range near coast to high diurnal range inland
- Four distinct seasons: summer and winter can exceed human comfort range, spring and autumn are ideal for human comfort
- Mild winters with low humidity
- Hot to very hot summers with low to moderate humidity
- Widely variable solar access and cooling breeze directions and patterns

Key Design Objectives

Minimising heating and cooling energy use should be a primary design objective

6 – BCA Section J Compliance Provisions

This section analyses the current elements of the building envelope of the Proposed Development against the provisions of Section J of the Building Code of Australia 2019, Energy Efficiency. In case of a non-complying element, advisory notes are provided to bring the building in compliance with Section J requirements.

A summary note of these provisions is provided in **Section 7-Conclusions** of this report that can be incorporated into specification blocks of architectural plans and, as a result, be deployed during construction. It is however the responsibility of the entity responsible for the submission of the design plans and documents to the council to ascertain each and every element of this report is clearly referenced and reflected on the submitted plans and documents.

6.1 – Part J1 Building Fabric

	Building Element	Energy Efficiency Provisions	Corresponding BCA Part
J1.3 Roof and ceiling construction			
1	Metal cladding roof with colorbond steel of the Proposed Development	Install minimum R3.18 m^2.K/W insulation OR Provide a roof and ceiling system with total performance of R3.7 m^2.K/W	Part J1.3(a) and Material Properties from Specification - J1.2
2	Metal cladding roof and plasterboard ceiling of the Proposed Development	All the upper surfaces of the roof should not exceed the solar absorptance of 0.45	Part J1.3(b)
J1.4 Roof Lights			
3	Roof lights of the Proposed Development	Total roof light area should not exceed the 5% of the floor area of the room or space served.	Part 1.4(a)
		Install roof lights with Total System U-value no more than 3.9 W/m^2.K and SHGC no more than 0.29	Part 1.4(b)
J1.5 Walls and Glazing			
4	External Cavity brick walls of the Proposed Development	Install minimum R2.50 m^2.K/W insulation OR Provide a wall system with total performance of R2.98 m^2.K/W	Part J1.5(a), (d), (e), Façade Calculator and Material Properties from Specification - J1.2
5	Internal plaster board on stud walls adjacent to unconditioned spaces	Install minimum R0.83 m^2.K/W insulation OR Provide a wall system with total performance of R1.4 m^2.K/W	Part 1.5(a), (d), (e), Façade Calculator and Material Properties from Specification - J1.2

6	Internal Block work with plaster board both sides adjacent to unconditioned spaces	Install minimum R0.86 m^2.K/W insulation OR Provide a wall system with total performance of R1.4 m^2.K/W	Part J1.5(a), (d), (e), Façade Calculator and Material Properties from Specification - J1.2
7	All new windows	Install windows with Total System U-value no more than 3.2 W/m^2.K and SHGC no more than 0.21	Part J1.5(a) and Façade Calculator
J1.6 Floors			
Suspended concrete slab of first floor conditioned areas on top of undercroft areas.		Install minimum R1.27 m^2.K/W insulation or provide a suspended slab system with total performance of R2.0 m^2.K/W.	Part J1.6(a)(i) and Table J1.6 considering the material properties from specification - J1.2 & J1.6 Figure 2(c)

6.1.1 – Building Fabric Breakdown

	Metal Roof	R value [m^2K/W]
1	Outdoor air film (7m/s)	0.03
2	Metal cladding	0.00
3	Roof airspace	0.28
4	Plasterboard gypsum (10mm, 880kg/m^3)	0.06
5	Indoor air film	0.15
	Default System R value	R0.52
	Total system R value required	R3.7
	Additional insulation required for compliance	**R3.18**

	External Cavity Brick Walls	R value [m^2K/W]
1	Outdoor air film (3-7m/s)	0.04
2	Brick Masonry walls	0.14
3	Airspace (20 to 40mm)	0.17
4	Brick Masonry walls	0.14
5	Plasterboard gypsum (10mm, 880kg/m^3)	0.06
6	Indoor air film	0.12
	Default System R value	R0.48
	Total system R value required	R2.98
	Additional insulation required for compliance	**R2.50**

	Internal Block Wall with plasterboard lining	R value [m^2K/W]
1	Indoor air film	0.12
2	Gyprock Plasterboard (12.5mm)	0.08
3	Solid reinforced concrete (200mm minimum)	0.14
4	Gyprock Plasterboard (12.5mm)	0.08
5	Indoor air film	0.12
	Default System R value	R0.54
	Total system R value to be achieved as per Façade Calculator	R1.4
	Additional insulation required for compliance	**R0.86**

	Internal Plasterboard Walls	R value [m^2K/W]
1	Indoor air film	0.12
2	Gyprock Plasterboard (12.5mm)	0.08
3	Airspace (20 to 40mm)	0.17
4	Gyprock Plasterboard (12.5mm)	0.08
5	Indoor air film	0.12
	Default System R value	R0.57
	Total system R value to be achieved as per Façade Calculator	R1.4
	Additional insulation required for compliance	**R0.83**

	Suspended Concrete Slab	R value [m^2K/W]
1	Indoor air film	0.11
2	Concrete floor slab (500mm)	0.33
3	Airspace under floor (100-300mm)	0.22
4	Fibre-cement (6mm)	0.03
5	Outdoor air film (3 m/s)	0.04
	Default System R value	R0.73
	Total system R value required	R2.0
	Additional insulation required for compliance	**R1.27**

6.3 – Part J3 Building Sealing

	Building Element	Energy Efficiency Provisions	Corresponding BCA Part
1	Openable windows and doors	Provide air seals on all edges or provide windows complying with AS2047 for the Proposed Development; except for fire doors, smoke doors, roller shutter doors roller shutter grille or other security door or device installed only for out-of-hours security	Part J3.4 (a),(b),(c)
2	Entry doors to the building which leads to conditioned spaces greater than 50m^2	Provide an air lock, self-closing mechanism, revolving door or similar system other than where a café, restaurant, open front shop or the like has a 3 m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and at all other entrances to the café, restaurant, open front shop or the like, self-closing doors	Part J3.4(d)
3	Exhaust fans	Must be equipped with a self-closing damper or similar	Part J3.5
4	Ceilings, walls, floors, windows frame, door frame and roof light frame	Must be enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; OR Be sealed by caulking, skirting, architraves, cornices or similar elements; Unless required for smoke hazard management.	Part J3.6

6.4 – Part J5 Air-Conditioning and Ventilation Systems

	Building Element	Energy Efficiency Provisions	Corresponding BCA Part
1	No design plans provided	N/A	N/A

6.5 – Part J6 Artificial Lighting and Power

	Building Element	Energy Efficiency Provisions	Corresponding BCA Part
1	Lighting electrical power of the Proposed Development	Maximum design lighting power allowed is 14,576 Watts for other than emergency lighting, signage, display lighting, and lighting for plant growth	Part J6.2 (b), (c) and Lighting Calculator

2	Artificial lighting control of Proposed Development	Artificial lighting of a room or space must be individually operated by a switch or other control device or a combination of both. Artificial lighting switch must be located in the space or 90% visible position to the space being switched.	Part J6.3 (a), (c)
3	Artificial lighting control for buildings or storey greater than 250m^2	95% of the light fittings must be controlled by a time switch or an occupant sensing device such as a security key card reader that registers a person entering and leaving the building or a motion detector.	Part J6.3(d)
4	Natural lighting control for buildings or storey greater than 250m^2	Artificial lights in a natural lighting zone adjacent to windows must be separately controlled, other than; ➢ The room area is less than 20m^2, or ➢ The room has less than 4 luminaires, or ➢ 70% luminaires in the natural lighting zone	Part J6.3(e)
5	Artificial lighting in fire-isolated areas	Artificial lighting in a fire-isolated stairway, fire-isolated passageway or fire-isolated ramp, must be controlled by a motion detector	Part J6.3(f)
6	Artificial lighting in foyer, corridor and other circulation spaces	If the allowed lighting power for the space is more than 250W (as per the lighting calculator), and located adjacent to windows; Artificial lighting must be controlled by a daylight sensor and dynamic lighting control device.	Part J6.3(g)
7	Interior decorative and display lighting, if installed	Must be separately controlled from other artificial lighting; and a separate manual switch for each area, other than the areas with similar operating times which can combined. And must be provided a time switch if the display lighting exceeds 1kW.	Part J6.4(a)
8	Windows display lighting, if installed	Must be controlled separately from other display lighting.	Part J6.4(b)
9	External lighting attached or directed to the Proposed Development	Must be controlled by either a daylight sensor or a time switch which is capable of being pre-programmed for different times of the day on variable days.	Part J6.5 (a)(i)
10	If the total perimeter lighting load of the Proposed Development exceeds 100 Watts	When not used for the emergency lighting and around detention centres; Use LED luminaires for 90% of the total lighting load; or be controlled by a motion detector; or have a separate time switch when used for decorative purposes.	Part J6.5 (a)(ii)

11	Façade lighting or signage lighting of the Proposed Development if installed	Must be provided with a separate time switch.	Part J6.5 (a)(iii)
12	Escalators and moving walkways, if installed	Must have the ability to slow to between 0.2m/s and 0.05m/s, when unused for more than 15 minutes.	Part J6.8
13	All the motion detectors, daylight sensors and time switches	Must be in accordance with Specification J6.	Part J6

6.6 – Part J7 Hot Water Supply and Swimming Pool and Spa Pool Plant

	Building Element	Energy Efficiency Provisions	Corresponding BCA Part
1	Heated water supply of the Proposed Development	Must be designed and installed in accordance with Part B2 of NCC Volume Three – Plumbing Code of Australia	Part J7.2

6.7 – Part J8 Access for Maintenance and Facilities for Monitoring

	Building Element	Energy Efficiency Provisions	Corresponding BCA Part
1	For the Proposed Development with a floor area of more than 500 m^2	Provide energy meter to record time-of-use consumption of gas and electricity	Part J8.3(a)

7 – Conclusions

Considering the design elements nominated on the Proposed Development provided by Lotus Projects the following can be concluded for the Proposed Development to meet the Deemed to Satisfy requirements of Section J of the Building Code of Australia 2016 – Amendment 1, Energy Efficiency;

Part J1 – Building Fabric:

Roof & Ceiling:

1. Install minimum R3.18 m^2.K/W insulation or provide a ceiling and roof system with total performance of R3.7 m^2.k/w for the roof of Proposed Development on top of conditioned areas.
2. All the upper surfaces of the roof should not exceed the solar absorptance of 0.45.

Walls:

3. Install minimum R2.50 m^2.K/W insulation OR Provide an external Brick masonry wall system with total performance of R2.98 m^2.K/W
4. Install minimum R0.83 m^2.K/W insulation OR Provide an internal plasterboard wall system with total performance of R1.4 m^2.K/W
5. Install minimum R0.86 m^2.K/W insulation OR Provide block wall with plasterboard lining on both sides with total performance of R1.4 m^2.K/W

Glazing:

6. Provide the following minimum performance requirements for doors & windows of conditioned areas, adjacent to unconditioned spaces.
    a) All windows; Install windows with Total System U-value no more than 3.2 W/m2.K and SHGC no more than 0.21

Flooring:

7. Install minimum R1.27 m2.K/W insulation OR provide a flooring system with total performance of R2.0 m2.K/W.

Insulations:

8. Installed insulation must comply with AS/NZS 4859.1 and be installed in such a way to meet the following requirements:
    a) The insulation must abut or overlap adjoining insulation other than at supporting members such as studs, noggins, joists, furring channels and the like where the insulation must be against the member.
    b) The installed insulation must form a continuous barrier with ceiling, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier while does not affect the safe and effective operation of a service or fitting.

c) The bulk insulation must maintain its position and thickness other than when it is compressed between cladding and supporting members, water pipes, electrical cabling or the like.

d) Reflective insulation must be installed with the necessary airspace to achieve the required R Value and be adequately supported by framing members. Each adjoining sheet of role membrane must be overlapped by not less than 50mm or tapped together. It must be closely fitted against any penetration, door or window opening.

Part J3 – Building Sealing:

9. Roof lights must be sealed or capable of being sealed, and must be constructed with either; an imperforate ceiling diffuser or the like installed at the ceiling or internal lining level, or a weatherproof seal, or a shutter system readily operated either manually, mechanically or electronically by the occupant.
10. Provide air seals on all edges or provide windows complying with AS 2047 for all external doors and openable windows of the Proposed Development servicing conditioned areas except fire doors, smoke doors, roller shutter doors roller shutter grille or other security door or device installed only for out-of-hours security.
11. Provide an air lock, self-closing mechanism, revolving door or similar system to the entry doors of the conditioned spaces greater than 50m^2 other than where a café, restaurant, open front shop or the like has a 3m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and at all other entrances to the café, restaurant, open front shop or the like, self-closing doors.
12. Exhaust fans of the Proposed Development serving conditioned areas must be equipped with a self-closing damper or similar.
13. Roofs, ceilings, walls, floors, windows frame, door frame and roof light frame of conditioned areas of the Proposed Development must be enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions OR be sealed by caulking, skirting, architraves, cornices or similar elements unless required for smoke hazard management.

Part J5 Air-Conditioning and Ventilation Systems

14. Has not asses the HVAC system of the proposed development.

Part J6 – Artificial Lighting & Power:

15. Maximum design lighting power allowed for the Proposed Development is 14,576 Watts, for other than; Emergency lighting, signage, display lighting, and lighting for plant growth.
16. Artificial lighting of a room or space must be individually operated by a switch or other control device or a combination of both; and, artificial lighting switch must be located in the space or 90% visible position to the space being switched.
17. Buildings or storey greater than 250m^2, 95% of the light fittings must be controlled by a time switch or an occupant sensing device such as a security key card reader that registers a person entering and leaving the

building or a motion detector; for the spaces other than, the sudden loss of artificial lighting would cause an unsafe situation. Such as a patient care area, a plant room, a lift motor room or workshops with power tools.

18. Buildings or storey greater than 250m^2, artificial lights in a natural lighting zone adjacent to windows must be separately controlled, other than; the room area is less than 20m2, or the room has less than 4 luminaires, or 70% luminaires in the natural lighting zone.
19. Artificial lighting in a fire-isolated stairway, fire-isolated passageway or fire-isolated ramp, must be controlled by a motion detector.
20. Artificial lighting in foyer, corridor and other circulation spaces; must be controlled by a daylight sensor and dynamic lighting control device, If the allowed lighting power for the space is more than 250W (as per the lighting calculator), and located adjacent to windows.
21. Interior decorative and display lighting, if installed; Must be separately controlled from other artificial lighting; and a separate manual switch for each area, other than the areas with similar operating times which can combined. And must be provided a time switch if the display lighting exceeds 1kW.
22. Windows display lighting, if installed; controlled separately from other display lighting.
23. External lighting attached or directed to the Proposed Development; must be controlled by either a daylight sensor or a time switch which is capable of being pre-programmed for different times of the day on variable days.
24. If the total perimeter lighting load of the Proposed Development exceeds 100 Watts, use LED luminaires for 90% of the total lighting load; or be controlled by a motion detector; or have a separate time switch when used for decorative purposes. Unless used for the emergency lighting and around detention centres.
25. Façade lighting or signage lighting of the Proposed Development if installed; must be provided with a separate time switch.
26. All lighting and power control devices of the Proposed Development including timers, time switches, motion detectors and daylight control devices must follow the guidelines and specifications outlined in Appendix D Artificial Lighting and Power Notes of this report.

Part J7 – Heater Water Supply & Swimming Pool & Spa Pool Plant:

27. Heated water supply of the Proposed Development must be designed and installed in accordance with Part B2 of NCC Volume Three – Plumbing Code of Australia.

Part J8 – Facilities for Energy Monitoring:

28. For the Proposed Development with floor area more than 500m^2; provide facilities to record gas and electricity consumption.

8 – Appendix

This section of the report demonstrates the results of employing BCA Calculators for Glazing, Lighting Power, and other referenced calculations and plans in this report.

8.1 – Appendix A – Façade Calculator

Façade

Report

Calculator

Project Summary

Date
9/3/20

Name
Boarding House

Company
0

Position
0

Building Name / Address
1119- 1131 Pittwater Road, Collaroy, 2097, NSW
0

Building State
NSW

Climate Zone
Climate Zone 5 - Warm temperate

Building Classification
Class 3 - other

Storeys Above Ground
4

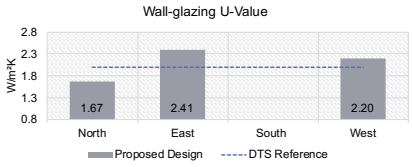
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

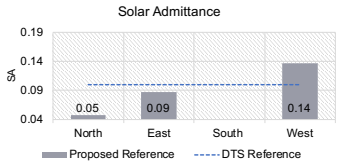
Compliant Solution =
Non-Compliant Solution =

Method 1

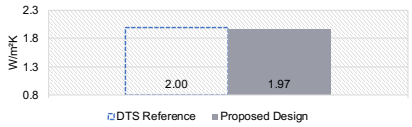
	North	East	South	West	Method 2 All
Wall-glazing U-Value (W/m².K)	1.67	2.41	0.49	2.20	1.97
Solar Admittance	0.05	0.09	0.01	0.14	
AC Energy Value					70

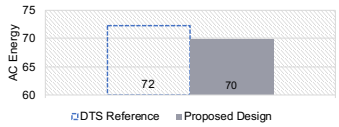
Method 1





Method 2





Project Details

	North	East	South	West
Glazing Area (m²)	37.204	154.086375	3.9944	109.9514
Glazing to Façade Ratio	46%	72%	5%	65%
Glazing References	External Window GF + Loure Window F1 + Lourve Window F2 + External Window F3 + External Window F3a +	External Window GF + External Door GF + External Door F1a + External Windowr F1 + Lourve Window F2 + External Door F2a	External Window F3 + External Window F3a +	External Door GF + External Door F1a + External Door F1b + External Door F2a + External Window F3 + External Window F3a +
Glazing System Types	Fixed +	Fixed +	Fixed +	Sliding Door + Fixed +
Glass Types	Double Glazed Unit - single low-E coating +	Double Glazed Unit - single low-E coating +	Double Glazed Unit - single low-E coating +	Double Glazed Unit - single low-E coating +
Frame Types	Aluminium +	Aluminium +	Aluminium +	Aluminium +
Methodology	WERS (Default module size)			
Average Glazing U-Value (W/m².K)	3.20	3.20	3.20	3.20
Average Glazing SHGC	0.21	0.21	0.21	0.21
Shading Systems	Horizontal	Horizontal	Horizontal	Horizontal
Wall Area (m²)	42.9332	58.799625	70.0896	58.7026
Wall Types	Wall +	Wall +	Wall +	Wall +
Methodology	0			
Wall Construction	Cavity Brick +	Cavity Brick +	Cavity Brick +	Cavity Brick +
Wall Thickness	250 +	250 +	250 +	250 +
Average Wall R-value (m²K/W)	2.98	2.98	2.98	2.98
Solar Absorptance	0.4	0.4	0.4	0.4

8.2 – Appendix B – Lighting Calculator

Non-residential Lighting (Beta)

Class 3 and 5-9 buildings

ABCB

National Construction Code

Main Menu | Help | Multiple Lighting Systems Calculator | Calculator

Building name/description	Classification
1119- 1131 Pittwater Road, Collaroy, 2097, NSW	Class 3

Number of rows preferred in table below: 74 *(as currently displayed)*

ID	Description	Floor area of the space	Perimeter of the space	Floor to ceiling height	Design Illumination Power Load	Space	Illuminance: Designed Lux Level	Illuminance: Recommended Lux Level	Adjustment Factor One: Adjustment Factor One	Adjustment Factor One: Dimming % Area	Adjustment Factor One: Illuminance Turndown	Adjustment Factor Two: Adjustment Factor Two	Adjustment Factor Two: Dimming % Area	Adjustment Factor Two: Illuminance Turndown	Light Colour Adjustment Factors: Light Colour Adjustment Factor One	Light Colour Adjustment Factors: Light Colour Adjustment Factor Two	SATISFIES PART J6.2: System Illumination Power Load Allowance	SATISFIES PART J6.2: Lighting System Share of % of Aggregate Allowance Used
							These columns do not represent a requirement of the NCC and are suggestions only		Adjustment Factors			Adjustment Factors						
1	B-PARKING	762.0 m²	116 m	2.7 m	1 W	Carpark - general											1524 W	1% of 1%
2	GF-COMMERCIAL UNIT 2	98.2 m²	37 m	3.3 m	1 W	Retail space including a museum and gallery whose purpose is the sale of objects											1786 W	1% of 1%
3	GF-COMMERCIAL UNIT 2	180.0 m²	51 m	3.3 m	1 W	Retail space including a museum and gallery whose purpose is the sale of objects											2930 W	1% of 1%
4	GF BULKY WASTE	7.8 m²	12 m	3.3 m	1 W	Service area, cleaner's room and the like											21 W	1% of 1%
5	GF RECYCLE RM	15.3 m²	16 m	3.3 m	1 W	Service area, cleaner's room and the like											38 W	1% of 1%
6	GF ELEC	2.2 m²	7 m	3.3 m	1 W	Control room, switch room, and the like - intermittent monitoring											13 W	1% of 1%
7	GF WC MALE FEMALE	13.1 m²	15 m	3.3 m	1 W	Toilet, locker room, staff room, rest room and the like											66 W	1% of 1%
8	GF WC COM UNIT 2	4.6 m²	9 m	3.3 m	1 W	Toilet, locker room, staff room, rest room and the like											25 W	1% of 1%
9	GF COMM STORE RM	13.5 m²	15 m	3.3 m	1 W	Storage											34 W	1% of 1%
10	GF RAMP	50.7 m²	34 m	3.3 m	1 W	Carpark - entry zone (first 15 m of travel) during the daytime											897 W	1% of 1%
11	GF WC COM UNIT	4.6 m²	9 m	3.3 m	1 W	Toilet, locker room, staff room, rest room and the like											25 W	1% of 1%
12	GF STAIRS	22.0 m²	28 m	3.3 m	1 W	Corridors											190 W	1% of 1%
13	GF ENTR AREA	7.5 m²	12 m	3.3 m	1 W	Corridors											67 W	1% of 1%
14	GF CORI	94.2 m²	66 m	3.3 m	1 W	Corridors											736 W	1% of 1%
15	F1 UNIT 1	25.6 m²	27 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											162 W	1% of 1%
16	F1 UNIT 2	27.0 m²	28 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											171 W	1% of 1%
17	F1 UNIT 3	28.0 m²	27 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											172 W	1% of 1%
18	F1 UNIT 4	28.0 m²	27 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											172 W	1% of 1%
19	F1 UNIT 5	28.0 m²	27 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											172 W	1% of 1%

ABCB

Non-residential Lighting (Beta)

Class 3 and 5-9 buildings

National Construction Code

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Building name/description	Classification
1119- 1131 Pittwater Road, Collaroy, 2097, NSW	Class 3

Number of rows preferred in table below: 74 *(as currently displayed)*

ID	Description	Floor area of the space	Perimeter of the space	Floor to ceiling height	Design Illumination Power Load	Space	Illuminance: Designed Lux Level	Illuminance: Recommended Lux Level	Adjustment Factor One: Adjustment Factor One	Adjustment Factor One: Dimming % Area	Adjustment Factor One: Illuminance Turndown	Adjustment Factor Two: Adjustment Factor Two	Adjustment Factor Two: Dimming % Area	Adjustment Factor Two: Illuminance Turndown	Light Colour Adjustment Factors: Light Colour Adjustment Factor One	Light Colour Adjustment Factors: Light Colour Adjustment Factor Two	SATISFIES PART J6.2: System Illumination Power Load Allowance	SATISFIES PART J6.2: Lighting System Share of % of Aggregate Allowance Used
							These columns do not represent a requirement of the NCC and are suggestions only		Adjustment Factors			Adjustment Factors						
20	F1 UNIT 6	25.8 m²	25 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											158 W	1% of 1%
21	F1 UNIT 7	24.8 m²	24 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											155 W	1% of 1%
22	F1 UNIT 8	23.0 m²	24 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											146 W	1% of 1%
23	F1 UNIT 9	25.0 m²	27 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											159 W	1% of 1%
24	F1 UNIT 10	25.0 m²	27 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											159 W	1% of 1%
25	F1 UNIT 11	25.0 m²	27 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											159 W	1% of 1%
26	COMMON RM 1	26.9 m²	22 m	2.4 m	1 W	Common rooms, spaces and corridors in a Class 2 building											181 W	1% of 1%
27	F1 UNIT 1 WC	4.9 m²	10 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											26 W	1% of 1%
28	F1 UNIT 2 WC	4.8 m²	9 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											25 W	1% of 1%
29	F1 UNIT 3 WC	4.6 m²	9 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											24 W	1% of 1%
30	F1 UNIT 4 WC	4.6 m²	9 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											24 W	1% of 1%
31	F1 UNIT 5 WC	4.6 m²	9 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											24 W	1% of 1%
32	F1 UNIT 6 WC	4.6 m²	9 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											24 W	1% of 1%
33	F1 UNIT 7 WC	6.0 m²	10 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											31 W	1% of 1%
34	F1 UNIT 8 WC	4.8 m²	9 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											25 W	1% of 1%
35	F1 UNIT 9 WC	4.8 m²	9 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											25 W	1% of 1%
36	F1 UNIT 10 WC	4.8 m²	9 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											25 W	1% of 1%
37	F1 UNIT 11 WC	4.8 m²	9 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											25 W	1% of 1%

Non-residential Lighting (Beta)

Class 3 and 5-9 buildings

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Building name/description	Classification
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Number of rows preferred in table below: 74 *(as currently displayed)*

ID	Description	Floor area of the space	Perimeter of the space	Floor to ceiling height	Design Illumination Power Load	Space	Illuminance: Designed Lux Level	Illuminance: Recommended Lux Level	Adjustment Factor One: Adjustment Factor One (Adjustment Factors)	Adjustment Factor One: Dimming % Area	Adjustment Factor One: Illuminance Turndown	Adjustment Factor Two: Adjustment Factor Two (Adjustment Factors)	Adjustment Factor Two: Dimming % Area	Adjustment Factor Two: Illuminance Turndown	Light Colour Adjustment Factors: Light Colour Adjustment Factor One	Light Colour Adjustment Factors: Light Colour Adjustment Factor Two	SATISFIES PART J6.2: System Illumination Power Load Allowance	SATISFIES PART J6.2: Lighting System Share of % of Aggregate Allowance Used
							These columns do not represent a requirement of the NCC and are suggestions only											
38	F1 UNIT 12 WC	4.8 m²	9 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											25 W	1% of 1%
39	F1 STAIRS	10.0 m²	13 m	2.4 m	1 W	Corridors											82 W	1% of 1%
40	F1 STORE	3.7 m²	8 m	2.4 m	1 W	Storage											11 W	1% of 1%
41	F1 COMMON AREA 2	97.0 m²	59 m	2.4 m	1 W	Common rooms, spaces and corridors in a Class 2 building											599 W	1% of 1%
42	F2 UNIT 13	25.0 m²	26 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											159 W	1% of 1%
43	F2 UNIT 14	20.0 m²	25 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											131 W	1% of 1%
44	F2 UNIT 15	22.0 m²	23 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											140 W	1% of 1%
45	F2 UNIT 16	22.0 m²	23 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											140 W	1% of 1%
46	F2 UNIT 17	22.0 m²	21 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											135 W	1% of 1%
47	F2 UNIT 18	26.0 m²	21 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											155 W	1% of 1%
48	F2 UNIT 19	24.1 m²	24 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											150 W	1% of 1%
49	F2 UNIT 20	24.8 m²	27 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											157 W	1% of 1%
50	F2 UNIT 21	24.8 m²	27 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											157 W	1% of 1%
51	F2 UNIT 22	24.8 m²	27 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											157 W	1% of 1%
52	F2 UNIT 23	23.7 m²	23 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											148 W	1% of 1%
53	F2 STAIRS	9.7 m²	13 m	2.4 m	1 W	Corridors											80 W	1% of 1%
54	F2 STORE	3.4 m²	8 m	2.4 m	1 W	Storage											9 W	1% of 1%

Non-residential Lighting (Beta)

Class 3 and 5-9 buildings

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Building name/description	Classification
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Number of rows preferred in table below: 74 *(as currently displayed)*

ID	Description	Floor area of the space	Perimeter of the space	Floor to ceiling height	Design Illumination Power Load	Space	Illuminance: Designed Lux Level	Illuminance: Recommended Lux Level	Adjustment Factor One: Adjustment Factor One	Adjustment Factor One: Dimming % Area	Adjustment Factor One: Illuminance Turndown	Adjustment Factor Two: Adjustment Factor Two	Adjustment Factor Two: Dimming % Area	Adjustment Factor Two: Illuminance Turndown	Light Colour Adjustment Factors: Light Colour Adjustment Factor One	Light Colour Adjustment Factors: Light Colour Adjustment Factor Two	SATISFIES PART J6.2: System Illumination Power Load Allowance	SATISFIES PART J6.2: Lighting System Share of % of Aggregate Allowance Used
							These columns do not represent a requirement of the NCC and are suggestions only		Adjustment Factors			Adjustment Factors						
55	F2 COMMON 2	54.0 m²	73 m	2.4 m	1 W	Common rooms, spaces and corridors in a Class 2 building											405 W	1% of 1%
56	F2 UNIT 13 WC	4.9 m²	9 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											26 W	1% of 1%
57	F2 UNIT 14 WC	3.8 m²	8 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											20 W	1% of 1%
58	F2 UNIT 15 WC	4.9 m²	9 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											26 W	1% of 1%
59	F2 UNIT 16 WC	4.9 m²	9 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											26 W	1% of 1%
60	F2 UNIT 17 WC	3.3 m²	7 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											18 W	1% of 1%
61	F2 UNIT 18 WC	6.0 m²	10 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											31 W	1% of 1%
62	F2 UNIT 19 WC	4.8 m²	9 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											25 W	1% of 1%
63	F2 UNIT 20 WC	4.8 m²	9 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											25 W	1% of 1%
64	F2 UNIT 21 WC	4.8 m²	9 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											25 W	1% of 1%
65	F2 UNIT 22 WC	4.8 m²	9 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											25 W	1% of 1%
66	F2 UNIT 23 WC	4.8 m²	9 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											25 W	1% of 1%
67	B3 MANAGER	77.0 m²	35 m	2.4 m	1 W	Office - artificially lit to an ambient level of 200 lx or more											428 W	1% of 1%
68	B3 LDY	4.2 m²	8 m	2.4 m	1 W	Service area, cleaner's room and the like											11 W	1% of 1%
69	B3 STAIRS	8.1 m²	13 m	2.4 m	1 W	Corridors											69 W	1% of 1%
70	B3 B1	18.1 m²	19 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											114 W	1% of 1%
71	B3 B2	11.0 m²	13 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											71 W	1% of 1%
72	B3 B3	16.0 m²	17 m	2.4 m	1 W	Dormitory of a Class 3 building used for sleeping and study											102 W	1% of 1%
73	B3 E/S	9.0 m²	12 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											45 W	1% of 1%

Non-residential Lighting (Beta)

Class 3 and 5-9 buildings

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							These columns do not represent a requirement of the NCC and are suggestions only											
74	B3 WC	5.2 m²	9 m	2.4 m	1 W	Toilet, locker room, staff room, rest room and the like											28 W	**1% of 1%**
				Total	74 W											***Total***	14576 W	

if inputs are valid ✓

8.3 – Appendix C – Insulation Mark-Up

LEGEND

- R2.98 EXTERNAL CAVITY BRICK WALLS
- R1.4 INTERNALL REINFORCED CONCRETE WALLS
- R1.4 INERNAL FC BOARD ON STUD
- R3.7 METAL CLADDING ROOF WITH COLORBONDSTEEL
- R2.0 SUSPENDED CONCRETE SALB

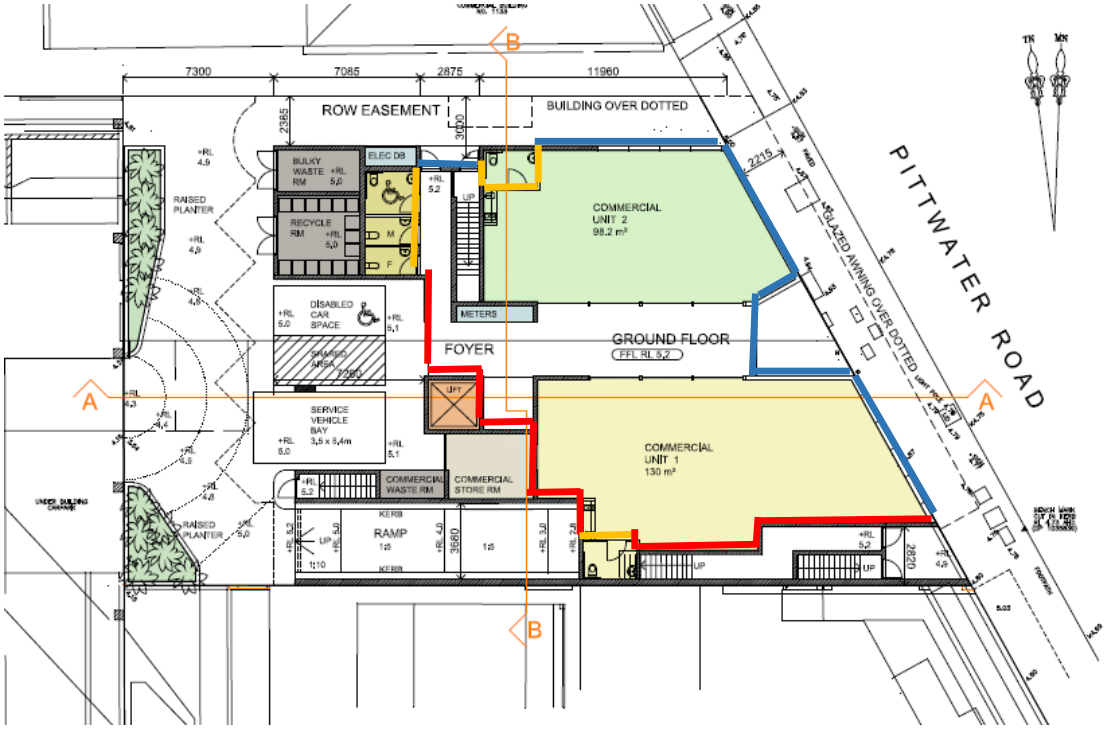

Figure 1 – Ground Floor

Figure 2 – First Floor

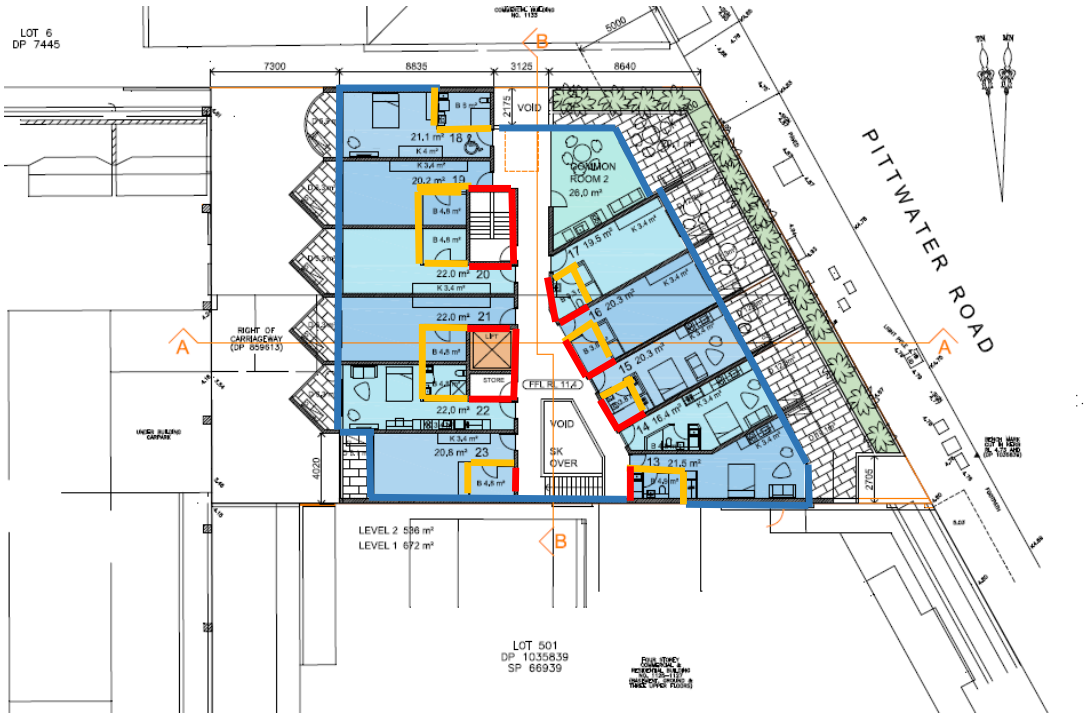

Figure 3 – Second Floor

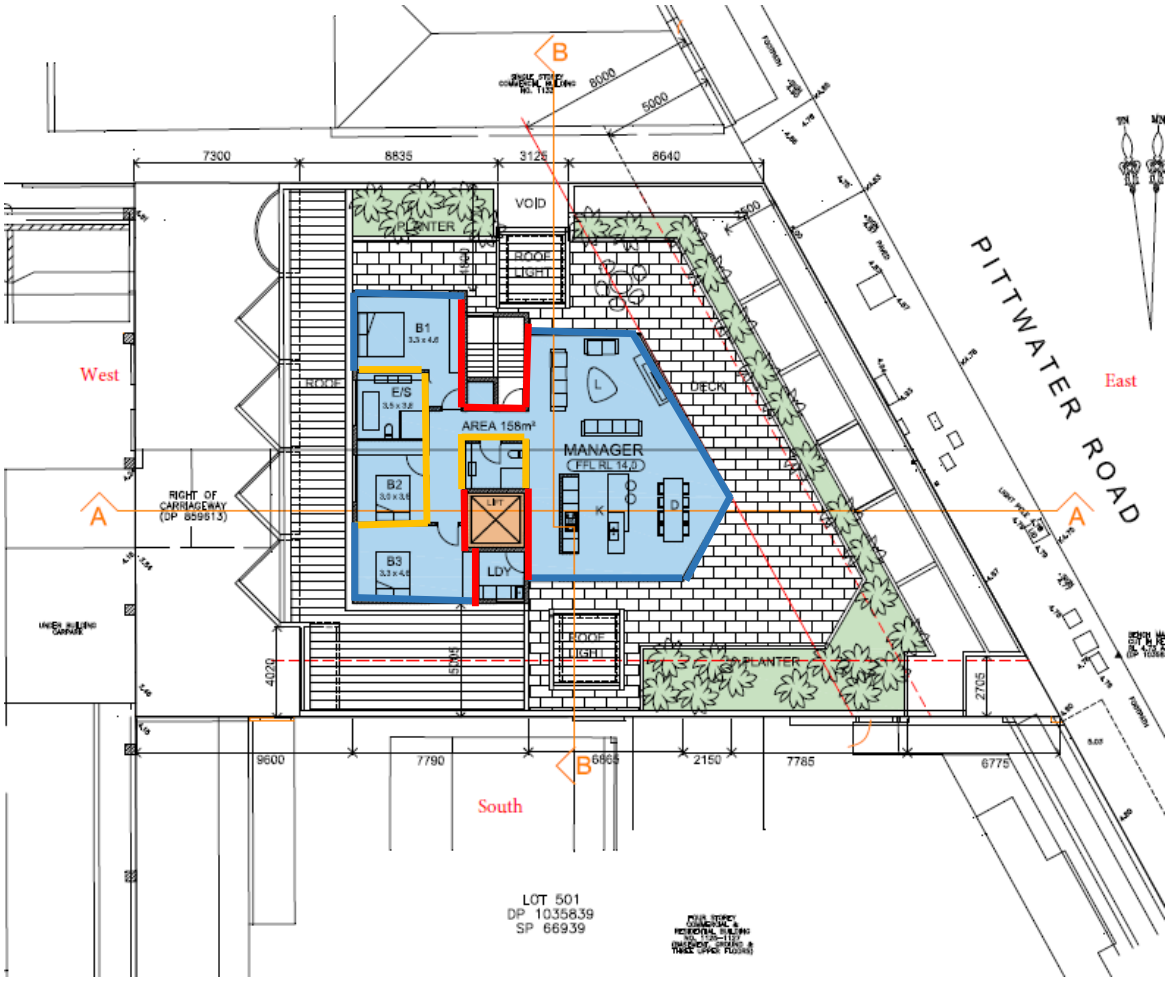

Figure 4 – Third Floor

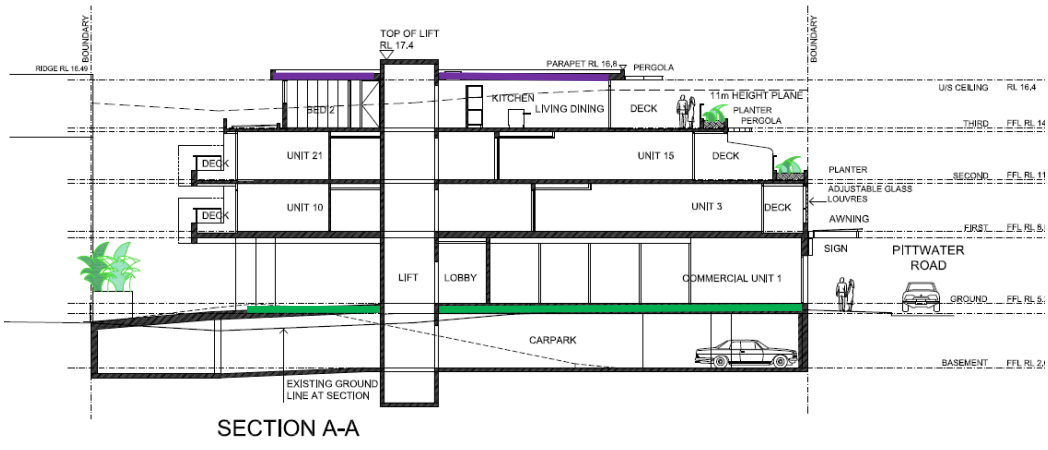

Figure 5 – Roof & Suspended Floor

8.4 – Appendix D – Artificial Lighting & Power Notes

1- A lighting timer must;

a. be located within 2 m of every entry door to the space; and
b. have an indicator light that is illuminated when the artificial lighting is off; and
c. not control more than
    i. an area of 100 m^2 with a single push button timer; and
    ii. 95% of the lights in spaces of area more than 25 m^2; and
d. be capable of maintaining the artificial lighting
    i. for not less than 5 minutes and not more than 15 minutes unless it is reset; and
    ii. without interruption if the timer is reset.

2- Time switch;

a. A time switch must be capable of switching on and off electric power at variable pre-programmed times and on variable pre-programmed days.
b. A time switch for internal lighting must be capable of being overridden by
    i. a means of turning the lights on, either by
        1. a manual switch or an occupant sensing device that on sensing a person's presence, overrides the time switch for a period of up to 2 hours, after which there is no further presence detected, the time switch must resume control; or
        2. an occupant sensing device that overrides the time switch upon a person's entry and returns control to the time switch upon the person's exiting, such as a security card reader; and
    ii. a manual "off" switch
c. A time switch for external lighting must be capable of
    i. limiting the period the system is switched on to between 30 minutes before sunset and 30 minutes after sunrise is determined or detected including any pre-programmed period between these times; and
    ii. being overridden by a manual switch or a security access system for a period of up to 30 minutes, after which the time switch must resume control.
d. A time switch for boiling water and chilled water storage units must be capable of being overridden by a manual switch or a security access system that senses a person's presence, overrides for a period of up to 2 hours, after which if there is no further presence detected, the time switch must resume control.

3- Motion detectors;

a. In a Class 2, 3 or 9c aged care building other than within a sole-occupancy unit, a motion detector must
    i. be capable of sensing movement such as by infra-red, ultrasonic or microwave detection or by a

combination of these means; and

ii. be capable of detecting a person before they are 1Â m into the space; and

iii. other than within a sole-occupancy unit of a Class 3 building, not control more than

1. an area of 100 m^2; and
2. 95% of the lights in spaces of area more than 25 m^2; and

iv. be capable of maintaining the artificial lighting when activated

1. for not less than 5 minutes and not more than 15 minutes unless it is reset; and
2. without interruption if the motion detector is reset by movement.

b. In a Class 5, 6, 7, 8, 9a or 9b building, a motion detector must

i. be capable of sensing movement such as by infra-red, ultrasonic or microwave detection or by a combination of these means; and

ii. be capable of detecting

1. a person before they have entered 1 m into the space; and
2. movement of 500 mm within the useable part of the space; and

ii. not control more than

1. in other than a carpark an area of 500 m^2 with a single sensor or group of parallel sensors; and
2. 75% of the lights in spaces using high intensity discharge; and

iii. be capable of maintaining the artificial lighting when activated

1. for a maximum of 30 minutes unless it is reset; and
2. without interruption if the motion detector is reset by movement; and

iv. not be overridden by a manual switch to permanently leave the lights on.

c. When outside a building, a motion detector must

i. be capable of sensing movement such as by infra-red, ultrasonic or microwave detection or by a combination of these means; and

ii. be capable of detecting a person within a distance from the light equal to

1. twice the mounting height; or
2. 80% of the ground area covered by the light's beam; and

ii. not control more than five lights; and

iii. be operated in series with a photoelectric cell or astronomical time switch so that the light will not operate in daylight hours; and

iv. be capable of maintaining the artificial lighting when the switch is on for a maximum of 10 minutes unless it is reset; and

v. have a manual override switch which is reset after a maximum period of 4 hours.

4- Daylight sensor and dynamic lighting control device;

a. A daylight sensor and dynamic control device for artificial lighting must

i. for switching on and off
    1. be capable of having the switching level set point adjusted between 50 and 1000 Lux; and
    2. have a delay of more than 2 minutes; and a differential of more than 100 Lux for a sensor controlling high pressure discharge lighting, and 50 Lux for a sensor controlling other than high pressure discharge lighting; and

i. for dimmed or stepped switching, be capable of reducing the power consumed by the controlled lighting in proportion to the incident daylight on the working plane either
    1. continuously down to a power consumption that is less than 50% of full power; or
    2. in no less than 4 steps down to a power consumption that is less than 50% of full power.

b. Where a daylight sensor and dynamic control device has a manual override switch, the manual override switch must not be able to switch the lights permanently on or bypass the lighting controls.

9 – Disclaimer

Recommendations:

Based on the information available on the supplied drawings and data, I am of the opinion that there is nothing that should prevent this project from compliance with the requirements of the Building Code of Australia. However, if the Construction Certificate is lodged/intend to be lodged after 30 April 2020, this project will need to be assessed under NCC 2019. Please contact Certified Energy if a reassessment under NCC 2019 is required.

This report is based on details available at the time of writing. Selected contractors and other parties contributing to the scope of the works should confirm that their supplied work will be in compliance with the BCA/NCC. It is advisable that this confirmation be requested prior to the commencement of construction. Final certification of BCA/NCC compliance at completion of works should be obtained to aid final certifier's approval.

Dimensions:

The dimensions used in this report are scaled from the supplied project documents. There may be some minor variation between the scaled dimensions, the dimensions on the window schedule and the actual dimensions on site.

Checked by:

Can Chu

B.EE(Renewable Energy), M.EME