National Construction Code (Australia) 2019

Deemed-To-Satisfy Compliance

Section J Report

Proposed Multi use Development

Class 6 Retail and Class 7a Carpark

231 Whale Beach Road

Whale Beach NSW 2536

Prepared for Richard Cole Architects

August 2021

PREPARED BY CRAIG CROWTHER BDAV Accredited Thermal Assessor

Chartered Architect ARB NSW 7059 QLD 3598

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Appendix A (refer attached development application drawings)

Appendix B (refer Façade Calculator NCC 2019)

Figure B1 – Class 6 and 7a glazing and wall assessment from Facade Calculator for use with Clause J1.5, NCC Volume One 2019

Appendix C (refer lighting calculator document NCC 2019)

Figure C1 – Class 6 and 7a lighting assessment from Lighting Calculator for use with Clause J6.2(b), NCC Volume One 2019

1 Executive Summary

A preliminary assessment of the proposed multi use development at 231 Whale Beach Road, Whale Beach, NSW for compliance with NCC Section J Energy Efficiency has been completed for the Class 6 and Class 7a components.

The Class 6 and Class 7a areas were assessed for compliance with parts J1, J2 and J3 via the deemed to satisfy provisions within the NCC 2019.

The Class 6 and Class 7a areas were assessed for compliance with J1 using the façade calculator.

Table 1.1 below provides a short summary of Section J assessment of the proposed development.

Component	Requirement for Compliance
Thermal Construction general	The proposal achieves compliance All insulation to comply with BCA and AS/NZS 4859.1 Tested Fabrics
Roof and Ceiling Construction	The proposal achieves compliance
Light and Ceiling Penetration	The proposal achieves compliance
Walls / Glazing Construction	The proposed Wall / Glazing combinations achieve the compliance
Floors	The proposed floor achieves the compliance.
Roof Lights	Roof lights (skylights) achieves the compliance.
Building Sealing	To achieve compliance the following must be addressed: Weather-strip all external doors and windows. Seal all exhaust fans (including installation of non-return dampers for bathroom/toilet and laundry exhaust fans). The main entrance must incorporate automatic or self-closing doors.

Table 1.1 – Section J, Part J1, J2

The Deemed-to-Satisfy Provisions of Part J1 apply to building elements that form part of the envelope, where the envelope separates a conditioned space or habitable room from the exterior of the building or a non-conditioned space. This includes roofs, walls, glazing and floors as per the definition of “fabric”.

Some Class 6, 7, 8 and 9b buildings that are not a conditioned space by definition may be excluded from controls for building fabric. Class 6 and 9b buildings cover a wide range of uses and some could reasonably be expected to be airconditioned at some time in the future while others may not. For example, it may be unlikely that a school gymnasium will be air-conditioned while classrooms may well be when funds are available. Some States are already retrofitting air-conditioning to schools. Note that the phrase “likely by the intended use of the space to be air-conditioned” is in the definition of a conditioned space.

The external elements of an atrium or solarium that is not a conditioned space may also be excluded. The atrium maybe attached to a Class 5 building and would otherwise attract some of the requirements appropriate for a Class 5 building. Again, either there is no energy saving to be made by thermally treating the elements, or the saving is below the minimum threshold and so not cost-effective.

The Deemed-to-Satisfy Provisions of Part J1 do not apply to Class 8 electricity network substations as these buildings are not required to be air-conditioned for the purposes of Section J. See the definition for air-conditioning. The air-conditioning systems of these buildings are instead designed to maintain the efficient operation of sensitive electrical equipment.

2 Assessment Overview

2.1 NCC Energy Efficiency Overview

Energy efficiency regulations (Part J) in the National Construction Code (NCC) were introduced by the Australian Building Codes Board ABCB in 2006. These regulations impact most building classes and apply to new buildings and those being refurbished, altered and / or extended.

Compliance can be achieved by adopting 'deemed to satisfy' provisions or via performance based verification methods (energy modelling). The deemed to satisfy provisions limit areas of external glazing depending on orientation, glazing performance (U-value and solar heat gain coefficient) and external shading. Minimum total R-values are specified for roofs, walls and floors. There are also minimum efficiency requirements for HVAC and lighting systems.

To simplify achieving external glazing wall facade compliance, the Australian Building Codes Board (ABCB) has developed a glazing and wall facade calculator that provides compliance for glazing and wall values combined.

2.1.1 Assessment Scope

The scope of this report is to provide the following preliminary NCC 2019 Section J compliance for the proposed multi use development at 231 Whale Beach Road, Whale Beach, NSW including:

- 'Deemed to satisfy' assessment for the proposed development, for compliance with J1 – Building Fabric, J3 - Building Sealing, J5 – Air-conditioning and Ventilation systems, J6 – Artificial Lighting and Power, J7 – Heated Water Supply and Swimming Pool and Spa plant and J8 – Access for Maintenance and Facilities for Monitoring of the NCC 2019.

This project is located within climate Zone 5 as indicated in Figure A1.1 of the NCC 2019, and the assessment has been carried out on this basis.

2.1.2 Sources of information

The following sources of information have been used to complete this preliminary assessment:

- Insight Architecture – Construction Certificate Application Drawings as follows:

Drawing Number	Drawing	Issue
Project No 1609 DA00 to DA64	Development Application	U 09/8/21

- Email correspondence
- NCC 2019
- NCC 2019 Glazing and Facade Calculator
- NCC 2019 Lighting Calculator

2.1.3 Limitations

This preliminary assessment has been based on and limited to the sources and information detailed above. This assessment has only addressed minimum compliance with the regulations specified and does not provide any advice on achieving environmental best practice or optimising the design for energy efficiency or cost

2.1.4 Building Orientation

Accurate orientation information was determined from the Development Application drawings.

Figure 1 – Layout of Project Site

3 Compliance Overview

3.1 Deemed-to-Satisfy Regulatory Requirements

Below is an overview of the compliance requirements and the deemed to satisfy provisions of a **Class 6 and Class 7a** to Part J1 and Part J3 in climate zone **5**, as applicable to this building. Please note that this is a generic section which provides a general overview of the regulations to this building class and climate zone. Some sections may not be applicable to the building being assessed.

3.1.1 Part J1: Building Fabric

3.1.1.1 Thermal Construction - General

(a) 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 be 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.

(b) 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
(iv) the *reflective insulation* adequately supported by framing members; and
(v) each adjoining sheet of roll membrane being—

(A) overlapped not less than 50 mm; or

(B) taped together.

(c) Where *required*, bulk insulation must be installed so that—

(i) it maintains its position and thickness, other than where it is compressed 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.

(d) Roof, ceiling, wall and floor materials, and associated surfaces are deemed to have the thermal properties listed in Specification J1.2.

(e) The *required Total R-Value* and *Total System U-Value*, including allowance for thermal bridging, must be (i)calculated in accordance with AS/NZS 4859.2 for a roof or floor; or

(iii) determined in accordance with Specification J1.5a for *wall-glazing construction*; or
(iii) determined in accordance with Specification J1.6 or Section 3.5 of CIBSE Guide A for soil or sub-floor spaces.

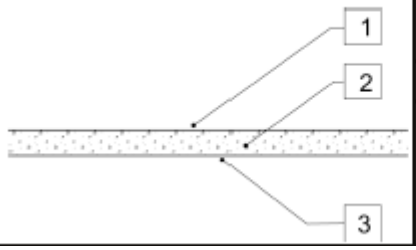
3.1.1.2 Roof and Ceiling Construction

For compliance, roofs and ceilings must satisfy the following options:

(a) A roof or ceiling must achieve a *Total R-Value* greater than or equal to—

(i) in *climate zones* 1, 2, 3, 4 and 5, R3.7 for a downward direction of heat flow; and
(ii) in *climate zone* 6, R3.2 for a downward direction of heat flow; and
(iv) in *climate zone* 7, R3.7 for an upward direction of heat flow; and
(v) in *climate zone* 8, R4.8 for an upward direction of heat flow.

(b) In *climate zones* 1, 2, 3, 4, 5, 6 and 7, the solar absorptance of the upper surface of a roof must be not more than 0.45.
SA J1.3(c)

(c) Solid concrete suspended slab 	1.	Indoor air film (still air)	0.11	0.16
	2.	Solid concrete (150 mm, 2400 kg/m^3)	0.10	0.10
	3.	Outdoor air film (7 m/s)	0.04	0.04
		Total R-Value	0.25	0.30

3.1.1.3 Roof Lights

Roof lights must have—
(a) a total area of not more than 5% of the *floor area* of the room or space served; and

(b) transparent and translucent elements, including any imperforate ceiling diffuser, with a combined performance of—

(i) for *Total system SHGC*, in accordance with Table J1.4; and
(ii) for *Total system U-Value*, not more than U3.9.

Table J1.4 Roof lights - Total system SHGC

Roof light shaft index [Note 1]	Total area of *roof lights* up to 3.5% of the *floor area* of the room or space	Total area of *roof lights* more than 3.5% and up to 5% of the *floor area* of the room or space
< 1.0	≤ 0.45	≤ 0.29
≥ 1.0 to < 2.5	≤ 0.51	≤ 0.33
≥ 2.5	≤ 0.76	≤ 0.49

Notes to Table J1.4:

1. The *roof light* shaft index is determined by measuring the distance from the centre of the shaft at the roof to the centre of the shaft at the ceiling level and dividing it by the average internal dimension of the shaft opening at the ceiling level (or the diameter for a circular shaft) in the same units of measurement.

2. The area of a *roof light* is the area of the roof opening that allows light to enter the building. The total area of *roof lights* is the combined area for all *roof lights* serving the room or space.

3.1.1.4 Walls and Glazing

(a) The *Total System U-Value* of *wall-glazing construction* must not be greater than—

(i) for a Class 2 common area, a Class 5, 6, 7, 8 or 9b building or a Class 9a building other than a *ward area*, U2.0; and
(ii) for a Class 3 or 9c building or a Class 9a *ward area*—

(A) in *climate zones* 1, 3, 4, 6 or 7, U1.1; or

(B) in *climate zones* 2 or 5, U2.0; or

(C) in *climate zone* 8, U0.9.

(b) The *Total System U-Value* of *display glazing* must not be greater than U5.8.

(c) The *Total System U-Value* of *wall-glazing construction* must be calculated in accordance with Specification J1.5a.

(d) Wall components of a *wall-glazing construction* must achieve a minimum *Total R-Value* of—

(i) where the wall is less than 80% of the area of the *wall-glazing construction*, R1.0; or
(ii) where the wall is 80% or more of the area of the *wall-glazing construction*, the value specified in Table J1.5a.

Table J1.5a Minimum wall Total R-Value - Wall area 80% or more of wall-glazing construction area

Climate zone	Class 2 common area, Class 5, 6, 7, 8 or 9b building or a Class 9a building other than a *ward area*	Class 3 or 9c building or Class 9a *ward area*
1	2.4	3.3
2	1.4	1.4
3	1.4	3.3
4	1.4	2.8
5	1.4	1.4
6	1.4	2.8
7	1.4	2.8
8	1.4	3.8

e) The *solar admittance* of externally facing *wall-glazing construction* must not be greater than—

(i) for a Class 2 common area, a Class 5, 6, 7, 8 or 9b building or a Class 9a building other than a *ward area*, the values specified in Table J1.5b; and
(ii) for a Class 3 or 9c building or a Class 9a *ward area*, the values specified in Table J1.5c.

(f) The *solar admittance* of a *wall-glazing construction* must be calculated in accordance with Specification J1.5a.

(g) The *Total system SHGC* of *display glazing* must not be greater than 0.81 divided by the applicable shading factor specified in Clause 7 of Specification J1.5a.

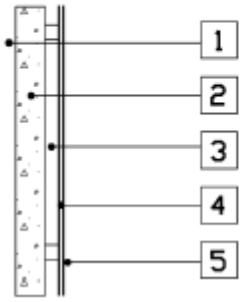
Table J1.5b Maximum wall-glazing construction solar admittance - Class 2 common area, Class 5, 6, 7, 8 or 9b building or Class 9a building other than a ward area

Climate zone	Eastern aspect *solar admittance*	Northern aspect *solar admittance*	Southern aspect *solar admittance*	Western aspect *solar admittance*
1	0.12	0.12	0.12	0.12
2	0.13	0.13	0.13	0.13
3	0.16	0.16	0.16	0.16
4	0.13	0.13	0.13	0.13
5	0.13	0.13	0.13	0.13
6	0.13	0.13	0.13	0.13
7	0.13	0.13	0.13	0.13
8	0.2	0.2	0.42	0.36

Table J1.5c Maximum wall-glazing construction solar admittance - Class 3 or 9b building or Class 9a ward area

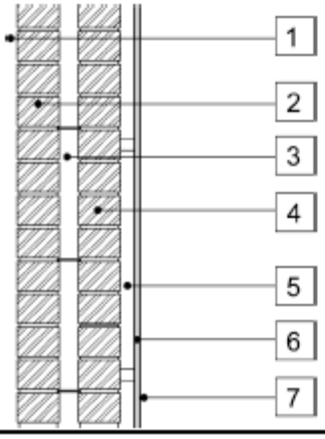
Climate zone	Eastern aspect *solar admittance*	Northern aspect *solar admittance*	Southern aspect *solar admittance*	Western aspect *solar admittance*
1	0.07	0.07	0.10	0.07
2	0.10	0.10	0.10	0.10
3	0.07	0.07	0.07	0.07
4	0.07	0.07	0.07	0.07
5	0.10	0.10	0.10	0.10
6	0.07	0.07	0.07	0.07
7	0.07	0.07	0.08	0.07
8	0.08	0.08	0.08	0.08

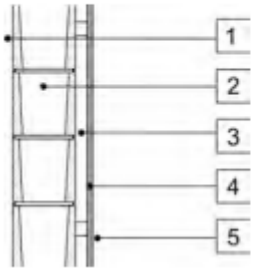
(d) 125 mm solid reinforced concrete (dense weight) – 10 mm internal plaster on battens or furring channels



1.	Outdoor air film (7 m/s)	0.04
2.	125 mm minimum solid reinforced concrete (See Note 3)	0.09
3.	Airspace (20 mm to 40 mm non-reflective and unventilated)	0.17
4.	Plasterboard, gypsum (10 mm, 880 kg/m^3)	0.06
5.	Indoor air film (still air)	0.12
	Total R-Value	0.48

Typical R values for Concrete Walls

(b) Cavity masonry – 20 mm to 50 mm cavity, 10 mm internal plaster on battens or furring channels 	1.	Outdoor air film (7 m/s)	0.04
	2.	Masonry (See Notes 3 and 4)	0.09
	3.	Masonry cavity (20 mm to 50 mm, non-reflective and unventilated)	0.17
	4.	Masonry (See Note 4)	0.09
	5.	Airspace (20 mm to 35 mm, non-reflective and unventilated)	0.17
	6.	Plasterboard, gypsum (10 mm, 880 kg/m^3)	0.06
	7.	Indoor air film (still air)	0.12
		Total R-Value	0.74

External wall construction description	Item	Item description	*R-Value*
(c) Dense weight hollow concrete block with internal plaster on battens or furring channels 	1.	Outdoor air film (7 m/s)	0.04
	2.	Dense weight hollow concrete block (See Notes 3 and 4)	0.15
	3.	Airspace (20 mm to 40 mm non-reflective and unventilated)	0.17
	4.	Plasterboard, gypsum (10 mm, 880 kg/m^3)	0.06
	5.	Indoor air film (still air)	0.12
		Total R-Value	0.54

Typical R values for Masonry Walls

3.1.1.5 Floors

(a) A floor must achieve the *Total R-Value* specified in Table J1.6.

(b) A floor must be insulated around the vertical edge of its perimeter with insulation having an *R-Value* greater than or equal to 1.0 when the floor—

(i) is a concrete slab-on-ground in *climate zone* 8; or
(ii) has an in-slab or in-screed heating or cooling system, except where used solely in a bathroom, amenity area or the like.

(c) Insulation *required* by
(b) or a concrete slab-on-ground must—

(i) be water resistant; and
(ii) be continuous from the adjacent finished ground level—

(A) to a depth not less than 300 mm; or
(B) for the full depth of the vertical edge of the concrete slab-on-ground.

Table J1.6 Floors - Minimum Total R-Value

Location	*Climate zone* 1 — upwards heat flow	*Climate zones* 2 and 3 — upwards and downwards heat flow	*Climate zones* 4, 5, 6 and 7 — downwards heat flow	*Climate zone* 8 — downwards heat flow
A floor without an in-slab heating or cooling system	2.0	2.0	2.0	3.5
A floor with an in-slab heating or cooling system	3.25	3.25	3.25	4.75

Note to Table J1.6: For the purpose of calculating the *Total R-Value* of a floor, the sub-floor and soil *R-Value* must be calculated in accordance with Specification J1.6 or Section 3.5 of CIBSE Guide A.

3.1.2 Part J3: Building Sealing

The building sealing provisions require that:

The *Deemed-to-Satisfy Provisions* of this Part apply to elements forming the *envelope* of a Class 2 to 9 building, other than—

(a) a building in *climate zones* 1, 2, 3 and 5 where the only means of *air-conditioning* is by using an evaporative cooler; or

(b) a permanent building opening, in a space where a gas appliance is located, that is necessary for the safe operation of a gas appliance; or

(c) a building or space where the mechanical ventilation *required* by Part F4 provides sufficient pressurisation to prevent infiltration.

3.1.2.1 Chimneys and flues

The chimney or flue of an open solid-fuel burning appliance must be provided with a damper or flap that can be closed to seal the chimney or flue.

3.1.2.2 Roof lights

(a) A *roof light* must be sealed, or capable of being sealed, when serving—

(i) a *conditioned space*; or
(ii) a *habitable room* in *climate zones* 4, 5, 6, 7 or 8.

(b) A *roof light required* by (a) to be sealed, or capable of being sealed, must be constructed with—

(c)

(i) an imperforate ceiling diffuser or the like installed at the ceiling or internal lining level; or
(ii) a weatherproof seal; or
(iii) a shutter system readily operated either manually, mechanically or electronically by the occupant.

3.1.2.3 Windows and doors

(a) A door, openable *window* or the like must be sealed—

(i) when forming part of the *envelope*; or
(ii) in *climate zones* 4, 5, 6, 7 or 8.

(b) The requirements of (a) do not apply to—
(i) a *window* complying with AS 2047; or
(ii) a fire door or smoke door; or
(iv) a roller shutter door, roller shutter grille or other security door or device installed only for out-of-hours security.

(c) A seal to restrict air infiltration—
(i) for the bottom edge of a door, must be a draft protection device; and
(ii) for the other edges of a door or the edges of an openable *window* or other such opening, may be a foam or rubber compression strip, fibrous seal or the like.

(d) An entrance to a building, if leading to a *conditioned space* must have an airlock, *self-closing* door, *rapid roller door*, revolving door or the like, other than—
(i)where the *conditioned space* has a *floor area* of not more than 50 m2; or
(ii)where a café, restaurant, open front shop or the like has—

(A) a 3 m deep un-conditioned zone between the main entrance, including an open front, and the *conditioned space*; and
(B) at all other entrances to the café, restaurant, open front shop or the like, *self-closing* doors.

(e) A loading dock entrance, if leading to a *conditioned space*, must be fitted with a *rapid roller door* or the like.

3.1.2.4 Exhaust Fans

(a) An exhaust fan must be fitted with a sealing device such as a self-closing damper or the like when serving—
(i) a *conditioned space*; or
(ii) a *habitable room* in *climate zones* 4, 5, 6, 7 or 8.

3.1.2.5 Construction of Ceilings, Walls and Floors

(a) Ceilings, walls, floors and any opening such as a *window* frame, door frame, *roof light* frame or the like must be constructed to minimise air leakage in accordance with (b) when forming part of—

(i) the *envelope*; or
(ii) in *climate zones* 4, 5, 6, 7 or 8.

(b) Construction *required* by (a) must be—

(i) enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or
(ii) sealed at junctions and penetrations with—

(A) close fitting architrave, skirting or cornice; or
(B) expanding foam, rubber compressible strip, caulking or the like.

(c) The requirements of (a) do not apply to openings, grilles or the like *required* for smoke hazard management.

3.1.2.6 Evaporative Coolers

An evaporative cooler must be fitted with a self-closing damper or the like—

(a) when serving a heated space; or
(b) in *climate zones* 4, 5, 6, 7 or 8

4 Preliminary Compliance Assessment

Class 6 Retail and Class 7a Carpark

4.1 NCC Deemed to Satisfy Compliance Assessment and Recommendations
Detailed below is the assessment of the project for compliance with NCC 2019 Part J1, and Part J3 and recommendations where compliance is not achieved.

4.1.1 Part J1: Building Fabric

4.1.1.1 Thermal Construction General

Thermal insulation must be installed to create a thermal envelope surrounding the conditioned spaces to separate them from adjacent external or unconditioned areas. Insulation and its location for walls and ceilings are marked on the plans in Appendix A.

Deemed-to-Satisfy Provisions

(a) 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 be 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.

(b) 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.

(c) Where *required*, bulk insulation must be installed so that—

(i) it maintains its position and thickness, other than where it is compressed 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.

(d) Roof, ceiling, wall and floor materials, and associated surfaces are deemed to have the thermal properties listed in Specification J1.2.

(e) The *required Total R-Value* and *Total System U-Value*, including allowance for thermal bridging, must be—

(i) calculated in accordance with AS/NZS 4859.2 for a roof or floor; or

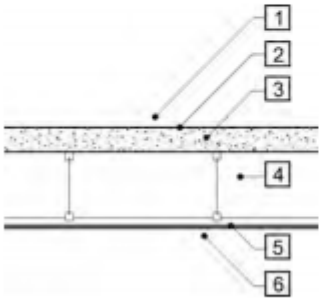
(ii) determined in accordance with Specification J1.5a for *wall-glazing construction*; or

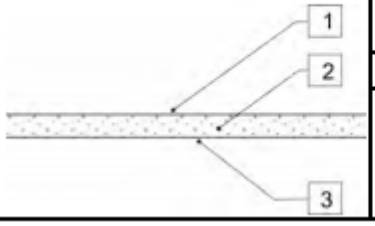
(iii) determined in accordance with Specification J1.6 or Section 3.5 of CIBSE Guide A for soil or sub-floor spaces.

4.1.1.2 Roof and Ceiling Construction

Insulation must be incorporated into all ceiling and roof areas above:

Class 6 and Class 7a circulation / spaces to achieve a minimum total R-value of **R3.7** downward direction of heat flow.

Roof construction description	Item	Item description	*R-Value* Unventilated	
			Up	Down
(g) 100 mm solid concrete roof to 5° – 10 mm plaster, suspended ceiling – Applied external waterproof membrane 	**1.**	Outdoor air film (7 m/s)	0.04	0.04
	2.	Waterproof membrane, rubber synthetic (4 mm, 961 kg/m^3)	0.03	0.03
	3.	Solid concrete, (100 mm, 2400 kg/m^3)	0.07	0.07
	4.	Ceiling airspace (100 mm to 300 mm, non-reflective)	0.15	0.22
	5.	Plasterboard, gypsum (10 mm, 880 kg/m^3)	0.06	0.06
	6.	Indoor air film (still air)	0.11	0.16
		Total R-Value	0.46	0.58

(c) Solid concrete suspended slab 	1.	Indoor air film (still air)	0.11	0.16
	2.	Solid concrete (150 mm, 2400 kg/m^3)	0.10	0.10
	3.	Outdoor air film (7 m/s)	0.04	0.04
		Total R-Value	0.25	0.30

This development of the Multi Unit development Class 6 Retail and Class 7a Carpark has a Concrete roof design of up to 5 deg pitch.

The proposed roof composition is outlined in table 4.2.1.1 below indicating R-value of each individual component.

Roof Type (external)	Roof Elements	Material R-value (Specification J1.3)	Proposed Insulation Solution	Compliance Achieved	Location
Concrete Roof	Outdoor Air Film (7m/s)	0.04	**R3. Bulk Insulation to ceiling**		Locations of proposed ceiling insulations are shown in Appendix A – Figure A1
	Waterproof membrane	0.03			
	Solid concrete min 100mm	0.07			
	Ceiling airspace	0.15			
	Plasterboard 10mm	0.06			
	Indoor Air Film	0.11			
Total		**.46**	**R3.5**		
Required R value to comply =R3.7		**.46**	**R3.5**	**Yes R3.96**	

Table 4.2.1.1 - roof insulation

If Roof sheeting is used to the Class 6 or Class 7a spaces, it must comply with a solar absorptance of .45 or less, the following Colorbond roof colors comply with that requirement.

4.1.1.3 Roof Lights (Skylights)

Table J1.4 ROOF LIGHTS - THERMAL PERFORMANCE OF TRANSPARENT AND TRANSLUCENT ELEMENTS

Roof light shaft index (see Note 1)	Constant	Total area of *roof lights* serving the room or space as a percentage of the *floor area* of the room or space			
		Up to 2%	More than 2% to and up to 3%	More than 3% and up to 4%	More than 4% and up to 5%
Less than 0.5	*Total System SHGC*	Not more than 0.83	Not more than 0.57	Not more than 0.43	Not more than 0.34
	Total System U-Value	Not more than 8.5	Not more than 5.7	Not more than 4.3	Not more than 3.4
0.5 to less than 1.0	*Total System SHGC*	Not more than 0.83	Not more than 0.72	Not more than 0.54	Not more than 0.43
	Total System U-Value	Not more than 8.5	Not more than 5.7	Not more than 4.3	Not more than 3.4
1.0 to less than 2.5	*Total System SHGC*	Not more than 0.83	Not more than 0.83	Not more than 0.69	Not more than 0.55
	Total System U-Value	Not more than 8.5	Not more than 5.7	Not more than 4.3	Not more than 3.4
2.5 and more	*Total System SHGC*	Not more than 0.83	Not more than 0.83	Not more than 0.83	Not more than 0.83
	Total System U-Value	Not more than 8.5	Not more than 5.7	Not more than 4.3	Not more than 3.4

Notes:

1. The *roof light* shaft index is determined by measuring the distance from the centre of the shaft at the roof to the centre of the shaft at the ceiling level and dividing it by the average internal dimension of the shaft opening at the ceiling level (or the diameter for a circular shaft) in the same units of measurement.
2. The total area of *roof lights* is the combined area for all *roof lights* serving the room or space.
3. The area of a *roof light* is the area of the roof opening that allows light to enter the building.
4. The thermal performance of an imperforate ceiling diffuser may be included in the *Total System U-Value* and *Total System SHGC* of the *roof light*.
5. The total area of *roof lights* serving the room or space as a percentage of the *floor area* of the room or space must not exceed 5% unless allowed by J1.4(b).

Roof Lights have not been proposed to any of the Class 6 or Class 7a spaces

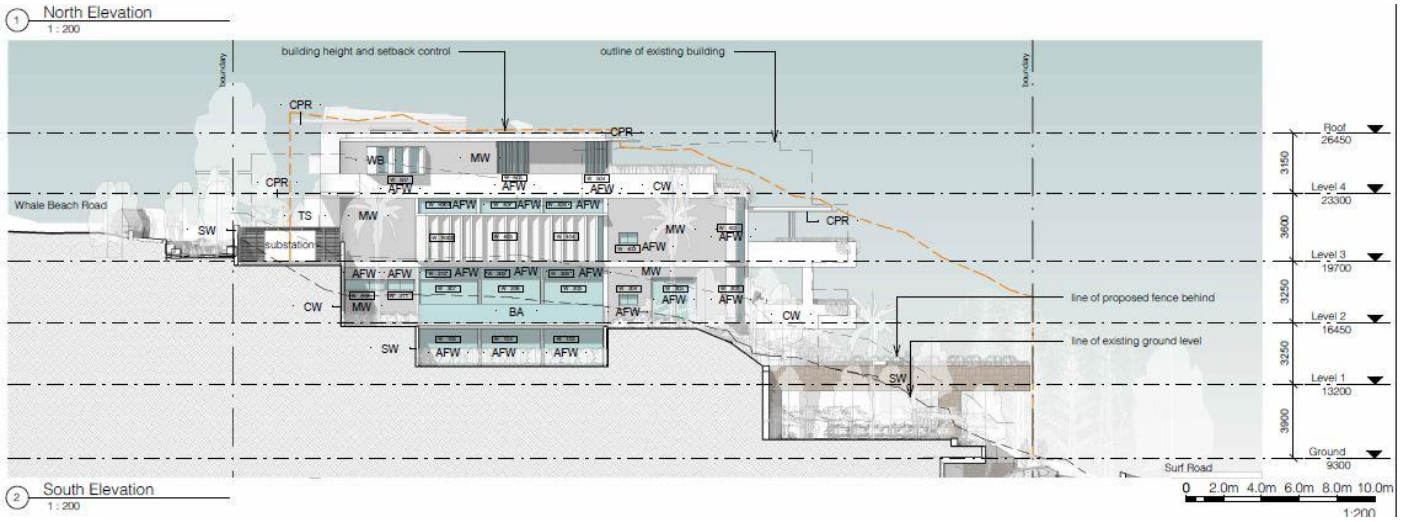
4.1.1.4 Walls and Glazing

In **climate zone 5**, The total system U Value of wall glazing construction must not be greater than specification in J1.5a Calculation of U-Value and Solar Admittance

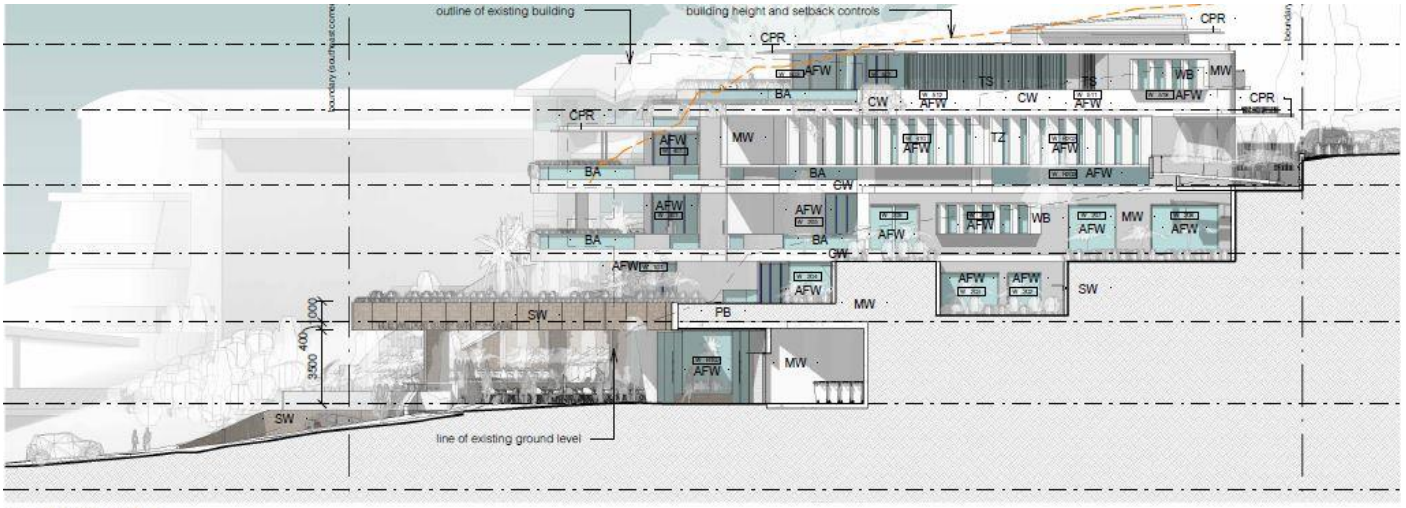
It should also be noted that there is an energy offset provision being proposed in a Photovoltaic roof system.

This project has complied with that requirement as demonstrated in the attached façade calculator detailing wall, glazing and solar admittance values for all new building envelope walls.

East Elevation

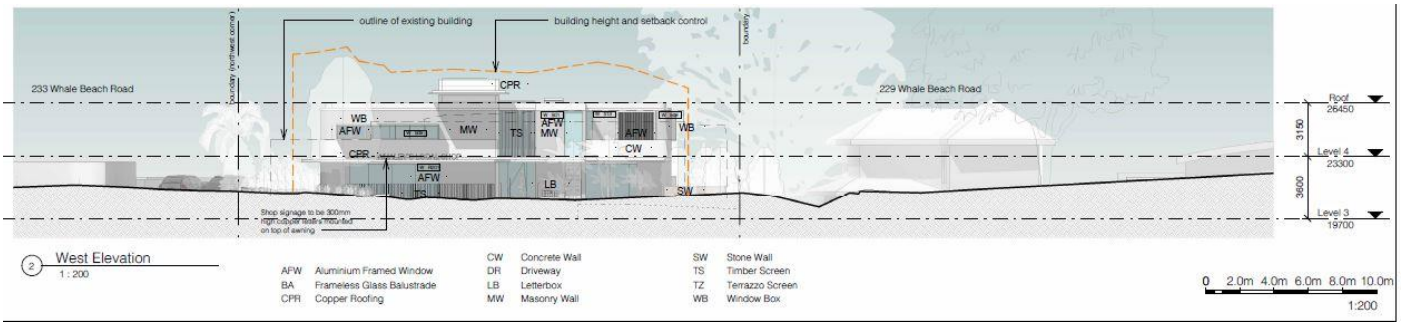


South Elevation



1 North Elevation
1 : 200

North Elevation

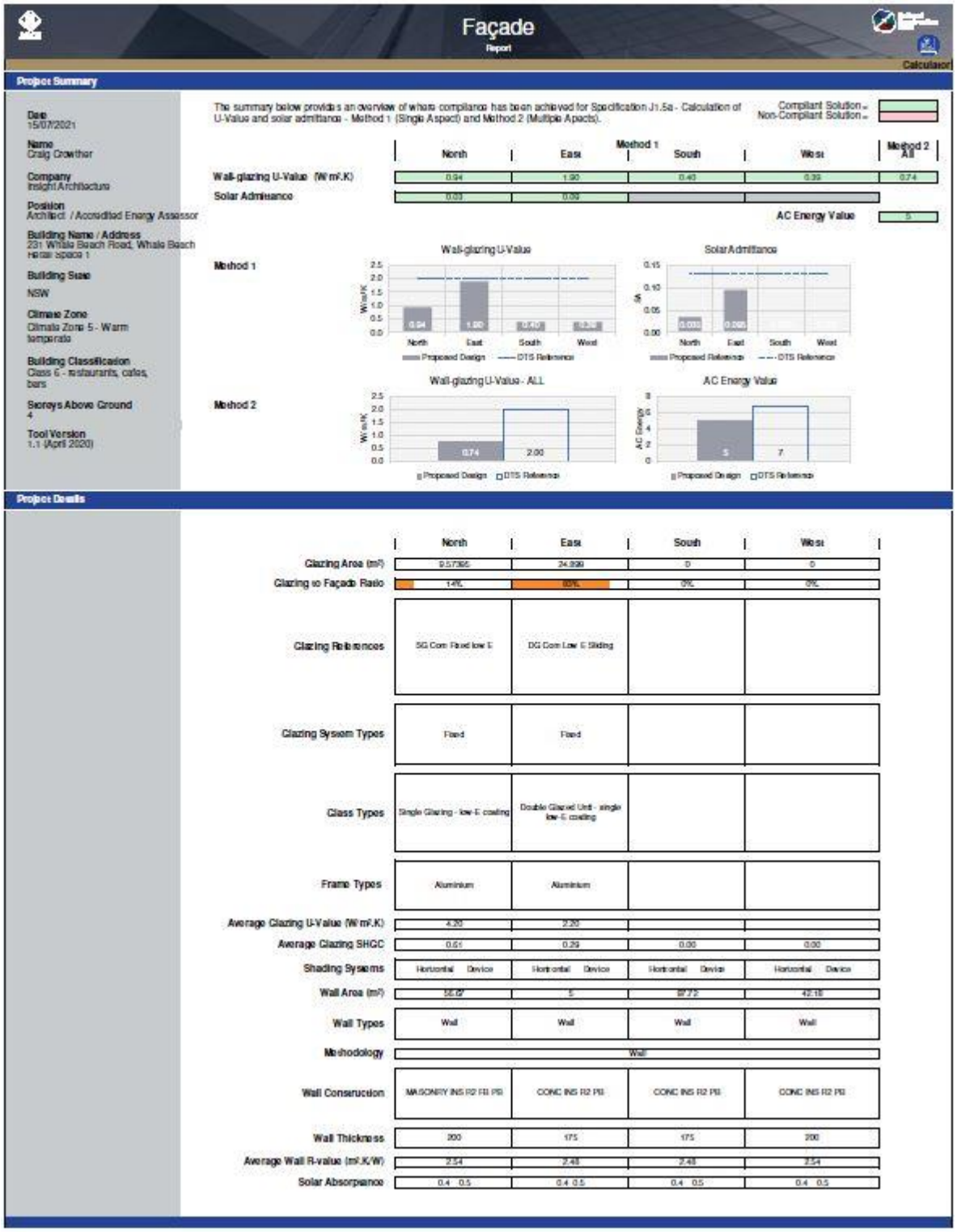


2 West Elevation
1 : 200

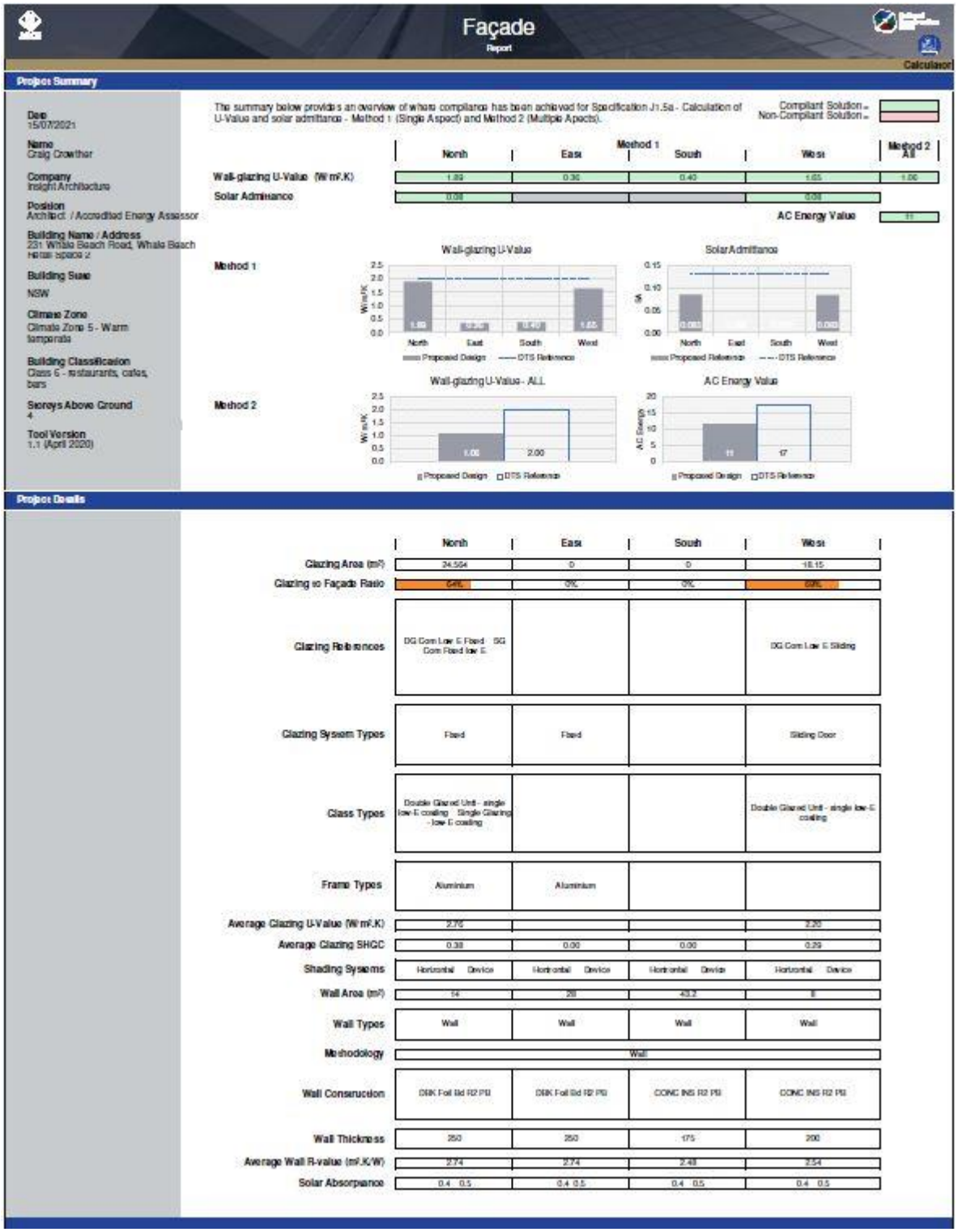
AFW	Aluminium Framed Window	CW	Concrete Wall	SW	Stone Wall
BA	Frameless Glass Balustrade	DR	Driveway	TS	Timber Screen
CPR	Copper Roofing	LB	Letterbox	TZ	Terrazzo Screen
		MW	Masonry Wall	WB	Window Box

West Elevation

Façade Calculator Retail 1



Façade Calculator Retail 2



Façade Calculator Retail 3

Wall components of a wall – glazing construction must achieve a minimum Total R value of

(a) Where the wall is less than 80% of the area of the glazing construction, R1.0 or

(b) Where the wall is 80% or more of the wall glazing construction, the specified the value specified in Table J1.5a will apply

That value for a Class 7a building in climate zone 5 is **R Value 1.4**
That value for a Class 6 building in climate zone 5 is **R Value 1.4**

Proposed new wall is less than 80% of the area of the glazing wall construction.
(Class 6 and 7a Climate zone 5)

Wall Type	**Wall Build Up**	**Material R-value** (Specification J1.5)	**Proposed Insulation Solution**	**Compliance Achieved**	**Location**
Cavity Masonry 20 to 50mm cavity, 10mm internal plasterboard on battens	Outdoor Air Film	0.04	R1.4 Green Foilboard 10mm		Locations of external wall insulation are shown in Appendix A – Figure A2 and A3
	Masonry	0.09			
	Masonry cavity (20m to 50mm, non reflective and unventilated)	0.17			
	Masonry	0.09			
	Airspace20mm to 40 mm non reflective and unventilated	0.17			
	Plasterboard Gypsum 10mm	.06			
	Indoor Air Film	.12			
Total		**.74**	**R1.4**		
Required R value to comply = R1.0		**.74**	**R1.4**	**R2.14**	

Wall Type	**Wall Build Up**	**Material R-value** (Specification J1.5)	**Proposed Insulation Solution**	**Compliance Achieved**	**Location**
Solid Concrete 150mm, airspace 20 to 50mm,10mm internal plasterboard on battens	Outdoor Air Film	0.04	R1.4 Foilboard 10mm		Locations of external wall insulation are shown in Appendix A – Figure A2 and A3
	Concrete	0.09			
	Airspace20mm to 50 mm non reflective and unventilated	0.17			
	Plasterboard Gypsum 10mm	.06			
	Indoor Air Film	.12			
Total		**.48**	**R1.4**		
Required R value to comply = R1.0		**.48**	**R1.4**	**R1.88**	

Proposed new wall is more than 80% of the area of the glazing wall construction.
(Class 6 and 7a)

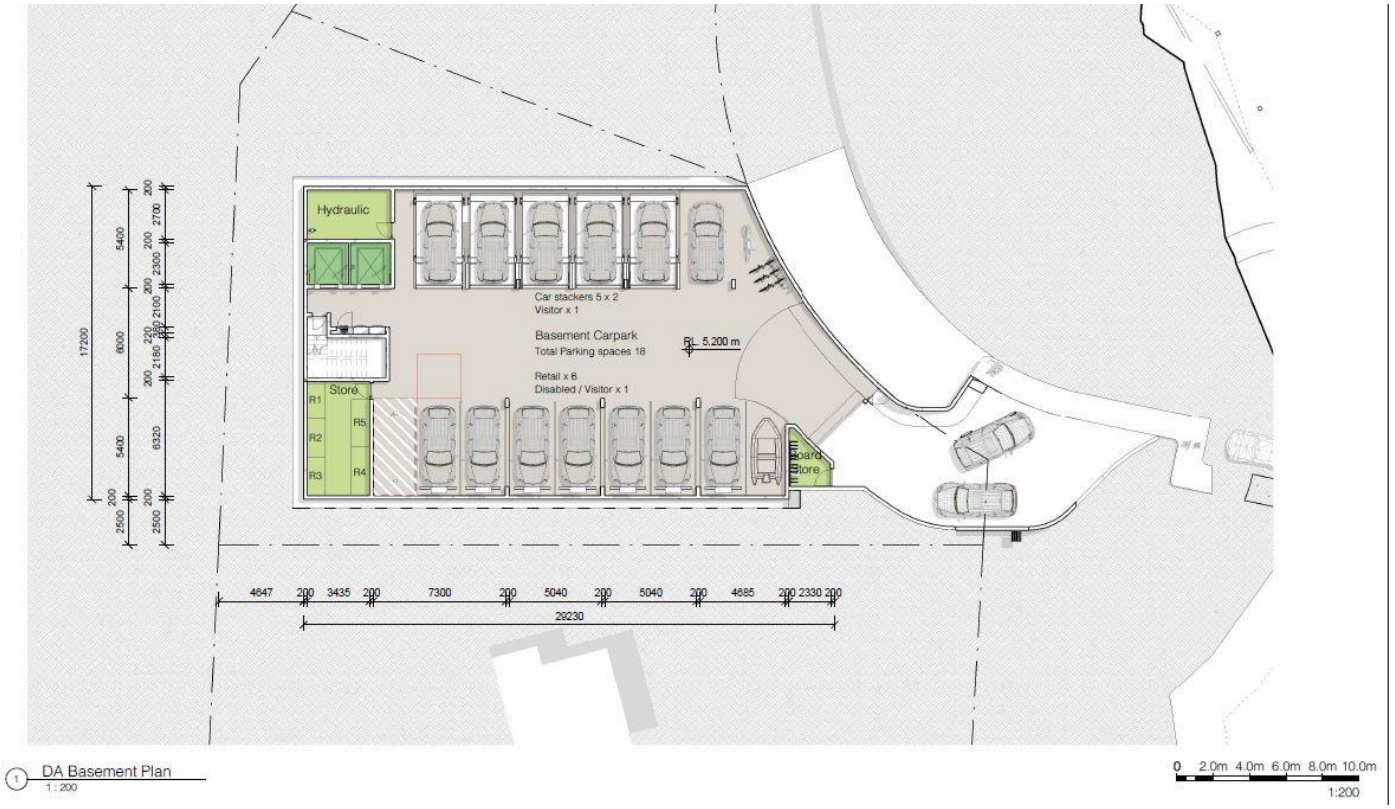
Wall Type	**Wall Build Up**	**Material R-value** (Specification J1.5)	**Proposed Insulation Solution**	**Compliance Achieved**	**Location**
Cavity Masonry 20 to 50mm cavity, 10mm internal plasterboard on battens	Outdoor Air Film	0.04	R1.4 Green Foilboard 10mm		Locations of external wall insulation are shown in Appendix A – Figure A2 and A3
	Masonry	0.09			
	Masonry cavity (20m to 50mm, non reflective and unventilated)	0.17			
	Masonry	0.09			
	Airspace20mm to 40 mm non reflective and unventilated	0.17			
	Plasterboard Gypsum 10mm	.06			
	Indoor Air Film	.12			
Total		**.74**	**R1.4**		
Required R value to comply = R1.4		**.74**	**R1.4**	**R2.14**	

Wall Type	**Wall Build Up**	**Material R-value** (Specification J1.5)	**Proposed Insulation Solution**	**Compliance Achieved**	**Location**
Solid Concrete 150mm, airspace 20 to 50mm,10mm internal plasterboard on battens	Outdoor Air Film	0.04	R1.4 Foilboard 10mm		Locations of external wall insulation are shown in Appendix A – Figure A2 and A3
	Concrete	0.09			
	Airspace20mm to 50 mm non reflective and unventilated	0.17			
	Plasterboard Gypsum 10mm	.06			
	Indoor Air Film	.12			
Total		**.48**	**R1.4**		
Required R value to comply = R1.4		**.48**	**R1.4**	**R1.88**	

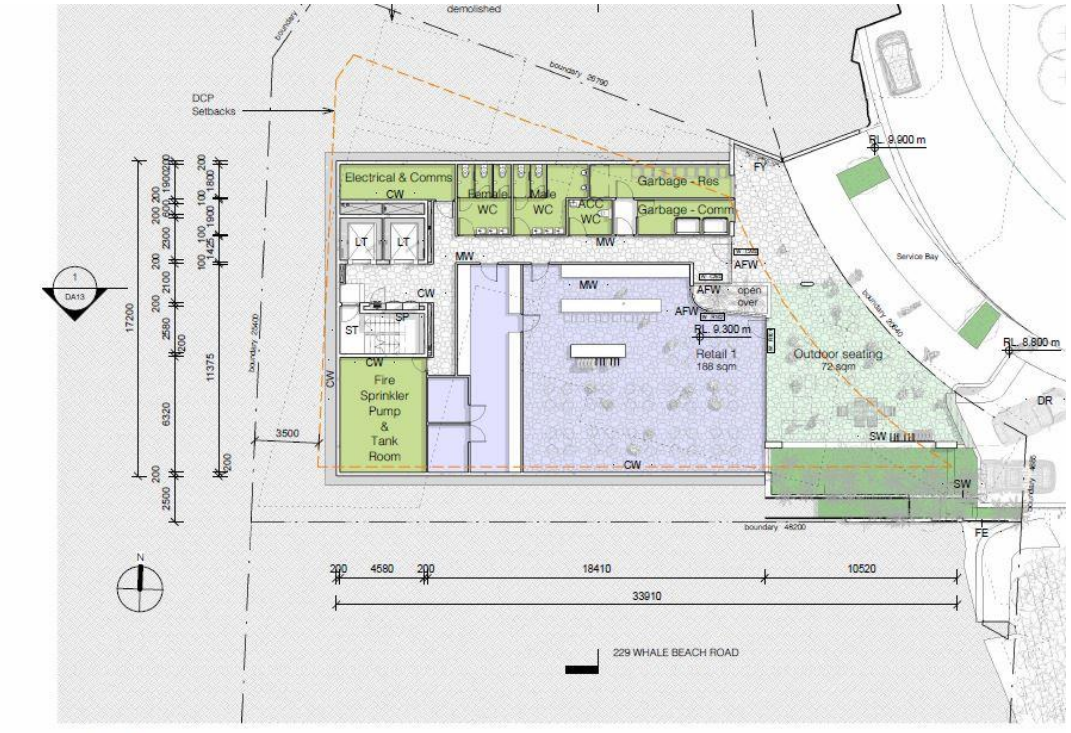
4.1.1.5 Floors

The proposed Class 6 Retail Spaces proposes a suspended concrete slab (without floor heating), there is a requirement to provide an insulation of **R value 2.0 in Climate Zone 5**

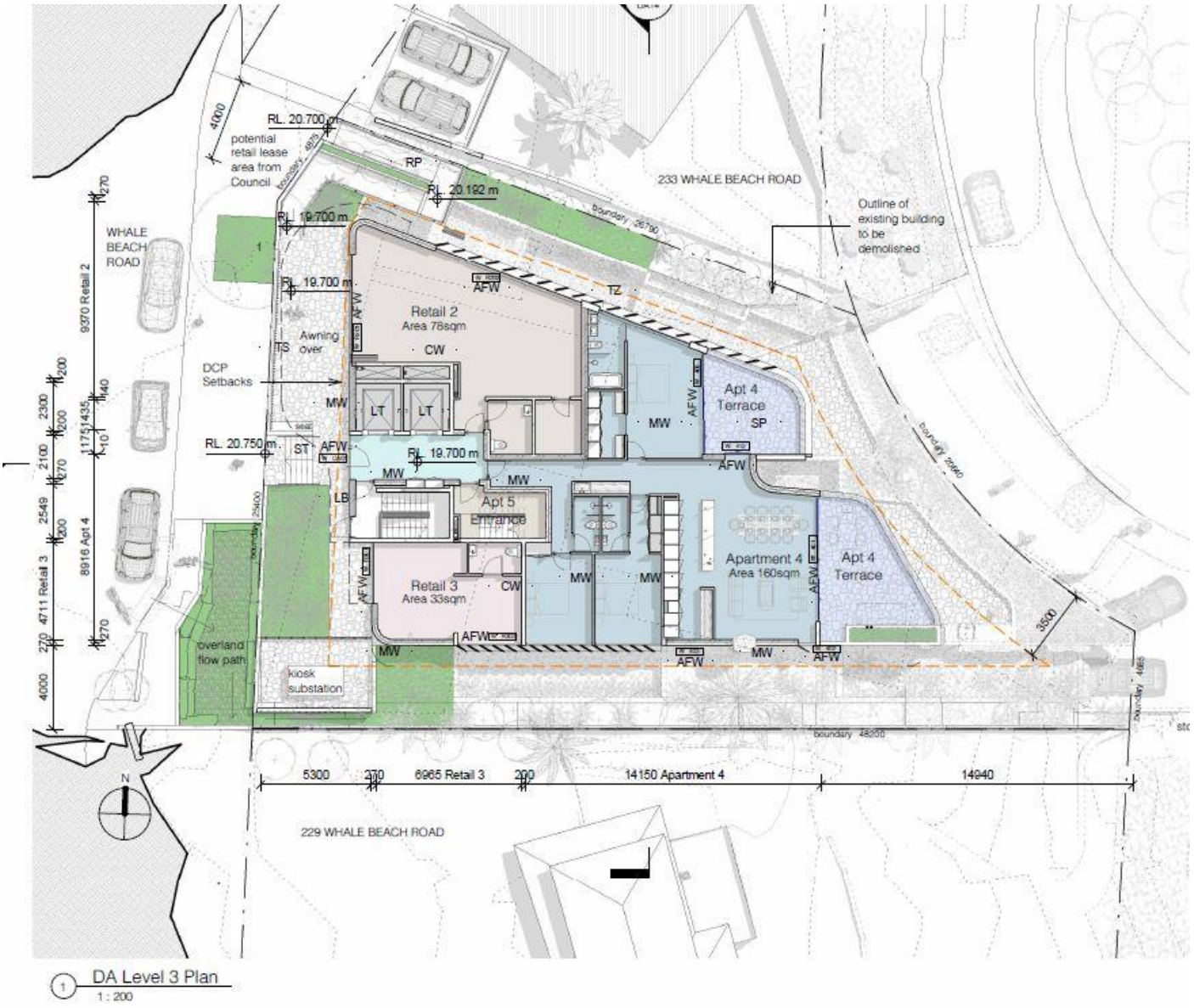
The proposed Class 7a Carpark incorporates a concrete slab on ground floor (without floor heating), there is a requirement to provide an insulation of **R value 2.0 in Climate Zone 5**



Basement Floor Plan



Retail 1 Floor Plan



Retail 2 and 3 Floor Plan

4.1.2 Part J2 : Intentionally left blank

4.1.3 Part J3 : Building Sealing

The Class 6 retail has conditioned spaces with elements forming part of the building envelope therefore is required to comply with the following building sealing provisions:

4.1.3.1 Chimneys and Flues

The chimney or flue of an open solid fuel burning appliance must be provided with a damper or flap that can be closed to seal the chimney or flue

4.1.3.2 Roof Lights

(a) a roof light must be sealed, or capable of being sealed, when serving-
  (i) a conditioned space
  (ii) habitable rooms in Climate zone 4,5,6,7 or 8

(b) A roof light required by (a) to be sealed, or capable of being sealed, must be constructed with –
  (i) An imperforate ceiling diffuser or the like installed at the ceiling or internal lining level; or
  (ii) A weatherproof seal; or
  (iii) A shutter system readily operated either manually, mechanically or electronically by the occupant

4.1.3.3 Windows and Doors

(a) A door, openable window or the like must be sealed –
  (i) When forming part of the envelope; or
  (ii) In climate zones 4,5,6,7 or 8

All doors and windows forming part of the proposed building envelope are to be sealed, this can be achieved by;

A. Installing draft devices on the bottom edge of doors; and
B. For the other edges of a door or the edges of an openable window or such opening, may be a foam or rubber compression strip, fibrous seal or the like.

(b) The requirements of (a) do not apply to-
  (i) A window complying with AS 2047; or
  (ii) A fire door or smoke door; or
  (iii) A roller shutter door, roller grill or other security door or device installed only for out of hours security

(c) An entrance to a building, if leading to a conditioned space must have an airlock, self-closing door, rapid roller door, revolving door or the like, other than-
  (i) where the conditioned space has a floor area of not more than 50m2; or
  (ii) where a café, restaurant, open front shop or the like has-
    (a) a 3m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and
    (b) at all other entrances to a café, restaurant open shop front or the like, self closing doors
    (c) A loading dock entrance, if leading to a conditioned space, must be fitted with a rapid roller door or the like

4.1.3.4 Exhaust Fans

An exhaust fan must be fitted with a sealing device such as self closing damper or the like in a conditioned space or a habitable room in climate zones 4,5,6,7 or 8. As this development is in Climate zone 6 all exhaust fans are to have a sealing device as mentioned above, in conditioned spaces and habitable rooms.

4.1.3.5 Construction of ceilings, walls and floors

(a) Ceilings, walls, floors and any opening such as a *window* frame, door frame, *roof light* frame or the like must be constructed to minimise air leakage in accordance with (b) when forming part of—
  (i) the *envelope*; or
  (ii) in *climate zones* 4, 5, 6, 7 or 8.

(b) Construction *required* by (a) must be—
  (i) enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or
  (ii) sealed at junctions and penetrations with—
    (A) close fitting architrave, skirting or cornice; or
    (B) expanding foam, rubber compressible strip, caulking or the like.

(c) The requirements of (a) do not apply to openings, grilles or the like *required* for smoke hazard management.

All of the above sealing provisions must be noted on final documentation to achieve compliance.

4.1.2.6 Evaporative coolers

An evaporative cooler must be fitted with a self-closing damper or the like—

(a) when serving a heated space; or
(b) in *climate zones* 4, 5, 6, 7 or 8.

This proposal has no evaporative coolers therefore not applicable

4.1.4 Part J4: Air Movement

This Part has deliberately been left blank within the NCC

4.1.5 Part J5: Air Conditioning and Ventilation System Part

The Class 3 areas are conditioned spaces and therefore are required to comply with the following provisions J5.1 to J5.12:

4.1.5.2 Air conditioning system control

(a) An *air-conditioning* system—
  (i) must be capable of being deactivated when the building or part of a building served by that system is not occupied; and
  (ii) when serving more than one *air-conditioning* zone or area with different heating or cooling needs, must—
    (A) thermostatically control the temperature of each zone or area; and
    (B) not control the temperature by mixing actively heated air and actively cooled air; and
    (C) limit reheating to not more than—
      (aa) for a fixed supply air rate, a 7.5 K rise in temperature; and
      (bb) for a variable supply air rate, a 7.5 K rise in temperature at the nominal supply air rate but increased or decreased at the same rate that the supply air rate is respectively decreased or increased; and

(iii) which provides the *required* mechanical ventilation, other than in *climate zone* 1 or where dehumidification control is needed, must have an *outdoor air economy cycle* if the total air flow rate of any airside component of an *air-conditioning* system is greater than or equal to the figures in Table J5.2; and

(iv) which contains more than one water heater, chiller or coil, must be capable of stopping the flow of water to those not operating; and

(iv) with an airflow of more than 1000 L/s, must have a variable speed fan when its supply air quantity is capable of being varied; and

(v) when serving a *sole-occupancy unit* in a Class 3 building, must not operate when any external door of the *sole-occupancy unit* that opens to a balcony or the like, is open for more than one minute; and

(vi) must have the ability to use direct signals from the control components responsible for the delivery of comfort conditions in the building to regulate the operation of central plant; and

(vii) must have a control dead band of not less than 2°C, except where a smaller range is *required* for specialised applications; and

(ix) must be provided with balancing dampers and balancing valves that ensure the maximum design air or fluid flow is achieved but not exceeded by more than 15% above design at each—

(A) component; or

(B) group of components operating under a common control in a system containing multiple components,

as *required* to meet the needs of the system at its maximum operating condition; and

(x) must ensure that each independently operating space of more than 1 000 m2 and every separate floor of the building has provision to terminate airflow independently of the remainder of the system sufficient to allow for different operating times; and

(xi) must have automatic variable temperature operation of heated water and chilled water circuits; and

(xii) when deactivated, must close any motorised outdoor air or return air damper that is not otherwise being actively controlled.

Table J5.2 Requirement for an outdoor air economy cycle

Table J5.2 Requirement for an outdoor air economy cycle

Climate zone	Total air flow rate *requiring* an economy cycle (L/s)
2	9000
3	7500
4	3500
5	3000
6	2000
7	2500
8	4000

(b) When two or more *air-conditioning* systems serve the same space they must use control sequences that prevent the systems from operating in opposing heating and cooling modes.

(c) **Time switches—**

(i) A time switch must be provided to control—

(A) an *air-conditioning* system of more than 2 kWr; and

(B) a heater of more than 1 kWheating used for *air-conditioning*.

(ii) The time switch must be capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days.

(iii) The requirements of (i) and (ii) do not apply to—

(A) an *air-conditioning* system that serves—

(aa) only one *sole-occupancy unit* in a Class 2, 3 or 9c building; or

(bb) a Class 4 part of a building; or

(B) a *conditioned space* where *air-conditioning* is needed for 24 hour continuous use.

4.1.5.3 Mechanical ventilation system control

(a) **General —** A mechanical ventilation system, including one that is part of an *air-conditioning* system, except where the mechanical system serves only one *sole-occupancy unit* in a Class 2 building or serves only a Class 4 part of a building, must—

(i) be capable of being deactivated when the building or part of the building served by that system is not occupied; and

(ii) when serving a *conditioned space*, except in periods when evaporative cooling is being used—

(A) where specified in Table J5.3, have—

(aa) an energy reclaiming system that preconditions outdoor air at a minimum sensible heat transfer effectiveness of 60%; or

(bb) demand control ventilation in accordance with AS 1668.2 if appropriate to the application; and

(B) not exceed the minimum outdoor air quantity *required* by Part F4 by more than 20%, except where—

(aa) additional unconditioned outdoor air is supplied for free cooling; or

(bb) additional mechanical ventilation is needed to balance the *required* exhaust or process exhaust; or

(cc) an energy reclaiming system preconditions all the outdoor air; and

(iv) for an airflow of more than 1000 L/s, have a variable speed fan unless the downstream airflow is *required* by Part F4 to be constant.

Table J5.3 Required outdoor air treatment

Climate zone	Outdoor air flow (L/s)	*Required* measure
1	>500	Modulating control
2	-	No *required* measure
3	>1000	Modulating control
4 and 6	>500	Modulating control or energy reclaiming system
5	>1000	Modulating control or energy reclaiming system
7 and 8	>250	Modulating control or energy reclaiming system

(b) **Exhaust systems —** An exhaust system with an air flow rate of more than 1000 L/s must be capable of stopping the motor when the system is not needed, except for an exhaust system in a *sole-occupancy unit* in a Class 2, 3 or 9c building.

(c) ***Carpark* exhaust systems —** *Carpark* exhaust systems must have a control system in accordance with—

(i) 4.11.2 of AS 1668.2; or

(ii) 4.11.3 of AS 1668.2.

(d) **Time switches—**

(i) A time switch must be provided to a mechanical ventilation system with an air flow rate of more than 1000 L/s.

(ii) The time switch must be capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days.

(iii) The requirements of (i) and (ii) do not apply to—

(A) a mechanical ventilation system that serves—

(aa) only one *sole-occupancy unit* in a Class 2, 3 or 9c building; or

(bb) a Class 4 part of a building; or

(B) a building where mechanical ventilation is needed for 24 hour occupancy.

4.1.5.4 Fan Systems

(a) Fans, ductwork and duct components that form part of an *air-conditioning* system or mechanical ventilation system must—

(i) separately comply with (b), (c), (d) and (e); or

(ii) achieve a fan motor input power per unit of flowrate lower than the fan motor input power per unit of flowrate achieved when applying (b), (c), (d) and (e) together.

(b) **Fans—**

(i) Fans in systems that have a static pressure of not more than 200 Pa must have an efficiency at the full load operating point not less than the efficiency calculated with the following formula:

$\eta min = 13 \times \ln(p) - 30$

where—

ηmin = the minimum *required* system static efficiency for installation type A or C or the minimum *required* system total efficiency for installation type B or D; and

p = the static pressure of the system (Pa).

(ii) Fans in systems that have a static pressure above 200 Pa must have an efficiency at the full load operating point not less than the efficiency calculated with the following formula:

$\eta min = 0.85 \times (a \times \ln(P) - b + N) / 100$

where—

ηmin = the minimum *required* system static efficiency for installation type A or C or the minimum *required* system total efficiency for installation type B or D; and

P = the motor input power of the fan (kW); and

N = the minimum performance grade obtained from Table J5.4a; and

a = regression coefficient a, obtained from Table J5.4b; and

b = regression coefficient b, obtained from Table J5.4c; and

ln = natural logarithm.

(iii) The requirements of (i) and (ii) do not apply to fans that need to be explosion proof.

Table J5.4a Minimum fan performance grade

Fan type	Installation type A or C	Installation type B or D
Axial — as a component of an air handling unit or fan coil unit	46.0	51.5
Axial — other	42.0	61.0
Mixed flow — as a component of an air handling unit or fan coil unit	46.0	51.5
Mixed flow – other	52.5	65.0
Centrifugal forward-curved	46.0	51.5
Centrifugal radial bladed	46.0	51.5
Centrifugal backward-curved	64.0	64.0

Notes to Table J5.4a:

1. **Installation type A** means an arrangement where the fan is installed with free inlet and outlet conditions.
2. **Installation type B** means an arrangement where the fan is installed with a free inlet and a duct at its outlet.
3. **Installation type C** means an arrangement where the fan is installed with a duct fitted to its inlet and with free outlet conditions.
4. **Installation type D** means an arrangement where the fan is installed with a duct fitted to its inlet and outlet.

Table J5.4b Fan regression coefficient a

Fan type	Fan motor input power < 10 kW	Fan motor input power ≥ 10 kW
Axial	2.74	0.78
Mixed flow	4.56	1.1
Centrifugal forward-curved	2.74	0.78
Centrifugal radial bladed	2.74	0.78
Centrifugal backward-curved	4.56	1.1

Table J5.4c Fan regression coefficient b

Fan type	Fan motor input power < 10 kW	Fan motor input power ≥ 10 kW
Axial	6.33	1.88
Mixed flow	10.5	2.6
Centrifugal forward-curved	6.33	1.88
Centrifugal radial bladed	6.33	1.88
Centrifugal backward-curved	10.5	2.6

(c) **Ductwork—**

(i) The pressure drop in the index run across all straight sections of rigid ductwork and all sections of flexible ductwork must not exceed 1 Pa/m when averaged over the entire length of straight rigid duct and flexible duct. The pressure drop of flexible ductwork sections may be calculated as if the flexible ductwork is laid straight.

(ii) Flexible ductwork must not account for more than 6 m in length in any duct run.

(iii) The upstream connection to ductwork bends, elbows and tees in the index run must have an equivalent diameter to the connected duct.

(iv) Turning vanes must be included in all rigid ductwork elbows of 90° or more acute than 90° in the index run except where—

(A) the inclusion of turning vanes presents a fouling risk; or

(B) a long radius bend in accordance with AS 4254.2 is used.

(d) **Ductwork components in the index run—**

(i) The pressure drop across a coil must not exceed the value specified in Table J5.4d.

Table J5.4d Maximum coil pressure drop

Number of rows	Maximum pressure drop (Pa)
1	30
2	50
4	90
6	130
8	175
10	220

(ii) A high efficiency particulate arrestance (HEPA) air filter must not exceed the higher of—
  (A) a pressure drop of 200 Pa when clean; or
  (B) the filter design pressure drop when clean at an air velocity of 1.5 m/s.

(iii) Any other air filter must not exceed—
  (A) the pressure drop specified in Table J5.4e when clean; or
  (B) the filter design pressure drop when clean at an air velocity of 2.5 m/s.

Table J5.4e Maximum clean filter pressure drop

Filter minimum efficiency reporting value	Maximum pressure drop (Pa)
9	55
11	65
13	95
14	110

(iv) The pressure drop across intake louvres must not exceed the higher of—
  (A) for single stage louvres, 30 Pa; and
  (B) for two stage louvres, 60 Pa; and
  (C) for acoustic louvres, 50 Pa; and
  (D) for other non-weatherproof louvres, 30 Pa.

(v) The pressure drop across a variable air volume box, with the damper in the fully open position, must not exceed—
  (A) for units with electric reheat, 100 Pa; and
  (B) for other units, 25 Pa not including coil pressure losses.

(vi) Rooftop cowls must not exceed a pressure drop of 30 Pa.

(viii) Attenuators must not exceed a pressure drop of 40 Pa.

(ix) Fire dampers must not exceed a pressure drop of 15 Pa when open.

(ix) Balancing and control dampers in the index run must not exceed a pressure drop of 25 Pa when in the fully open position.

(x) Supply air diffusers and grilles must not exceed a pressure drop of 40 Pa.

(xi) Exhaust grilles must not exceed a pressure drop of 30 Pa.

(xii) Transfer ducts must not exceed a pressure drop of 12 Pa.

(xiii) Door grilles must not exceed a pressure drop of 12 Pa.

(xiv) Active chilled beams must not exceed a pressure drop of 150 Pa.

(e) The requirements of (a), (b), (c) and (d) do not apply to—
  (i) fans in unducted *air-conditioning* systems with a supply air capacity of less than 1000 L/s; and
  (ii) smoke spill fans, except where also used for *air-conditioning* or ventilation; and
  (iii) the power for process-related components; and
  (iv) kitchen exhaust systems.

4.1.5.5 Ductwork Installation

(a) Ductwork and fittings in an *air-conditioning* system must be provided with insulation—
  (i) complying with AS/NZS 4859.1; and

(ii) having an insulation *R-Value* greater than or equal to—
(A) for flexible ductwork, 1.0; or
(B) for cushion boxes, that of the connecting ductwork; or
(C) that specified in Table J5.5.

(b) Insulation must—
(i) be protected against the effects of weather and sunlight; and
(ii) be installed so that it—
(A) abuts adjoining insulation to form a continuous barrier; and
(B) maintains its position and thickness, other than at flanges and supports; and
(iii) when conveying cooled air—
(A) be protected by a vapour barrier on the outside of the insulation; and
(B) where the vapour barrier is a membrane, be installed so that adjoining sheets of the membrane—
(aa) overlap by at least 50 mm; and
(bb) are bonded or taped together.

(c) The requirements of (a) do not apply to—
(i) ductwork and fittings located within the only or last room served by the system; or
(ii) fittings that form part of the interface with the *conditioned space*; or
(iii) return air ductwork in, or passing through, a *conditioned space*; or
(iv) ductwork for *outdoor air* and exhaust air associated with an *air-conditioning* system; or
(v) the floor of an in-situ air-handling unit; or
(vi) packaged air conditioners, split systems, and variable refrigerant flow *air-conditioning* equipment complying with *MEPS*; or
(vii) flexible fan connections.

(d) For the purposes of (a), (b) and (c), fittings—
(i) include non-active components of a ductwork system such as cushion boxes; and
(ii) exclude active components such as air-handling unit components.

Table J5.5 Ductwork and fittings - Minimum insulation R-Value

Location of ductwork and fittings	*Climate zone* 1, 2, 3, 4, 5, 6 or 7	*Climate zone* 8
Within a conditioned space	1.2	2.0
Where exposed to direct sunlight	3.0	3.0
All other locations	2.0	3.0

4.1.5.6 Ductwork Sealing

Ductwork in an *air-conditioning* system with a capacity of 3000 L/s or greater, not located within the only or last room served by the system, must be sealed against air loss in accordance with the duct sealing requirements of AS 4254.1 and AS 4254.2 for the static pressure in the system.

4.1.5.7 Pump systems

(a) **General —** Pumps and pipework that form part of an *air-conditioning* system must either—
(i) separately comply with (b), (c) and (d); or
(ii) achieve a pump motor power per unit of flowrate lower than the pump motor power per unit of flowrate achieved when applying (b), (c) and (d) together.

(b) **Circulator pumps —** A glandless impeller pump, with a rated hydraulic power output of less than 2.5 kW and that is used in closed loop systems must have an energy efficiency index (EEI) not more than 0.27 calculated in accordance with European Union Commission Regulation No. 622/2012.

(c) **Other pumps —** Pumps that are in accordance with Articles 1 and 2 of European Union Commission Regulation No. 547/2012 must have a minimum efficiency index (MEI) of 0.4 or more when calculated in accordance with European Union Commission Regulation No. 547/2012.

(d) **Pipework —** Straight segments of pipework along the index run, forming part of an *air-conditioning* system—

(i) in pipework systems that do not have branches and have the same flow rate throughout the entire pipe network, must achieve an average pressure drop of not more than—

(A) for constant speed systems, the values nominated in Table J5.7a; or

(B) for variable speed systems, the values nominated in Table J5.7b; or

(ii) in any other pipework system, must achieve an average pressure drop of not more than—

(A) for constant speed systems, the values nominated in Table J5.7c; or

(B) for variable speed systems, the values nominated in Table J5.7d.

(e) the requirements of (d) do not apply—

(i) to valves and fittings; or

(ii) where the smallest pipe size compliant with (d) results in a velocity of 0.7 m/s or less at design flow.

Table J5.7a Maximum pipework pressure drop - Non-distributive constant speed systems

Nominal pipe diameter (mm)	Maximum pressure drop in systems operating 5000 hours/annum or less (Pa/m)	Maximum pressure drop in systems operating more than 5000 hours/annum (Pa/m)
Not more than 20	400	400
25	400	400
32	400	400
40	400	400
50	400	350
65	400	350
80	400	350
100	400	200
125	400	200
150 or more	400	200

Table J5.7b Maximum pipework pressure drop - Non-distributive variable speed systems

Nominal pipe diameter (mm)	Maximum pressure drop in systems operating 5000 hours/annum or less (Pa/m)	Maximum pressure drop in systems operating more than 5000 hours/annum (Pa/m)
25	400	400
32	400	400
40	400	400
50	400	400
65	400	400
80	400	400
100	400	300
125	400	300
150 or more	400	300

Table J5.7c Maximum pipework pressure drop - Distributive constant speed systems

Nominal pipe diameter (mm)	Maximum pressure drop in systems operating 2000 hours/annum or less (Pa/m)	Maximum pressure drop in systems operating between 2000 hours/annum and 5000 hours/annum (Pa/m)	Maximum pressure drop in systems operating more than 5000 hours/annum (Pa/m)
Not more than 20	400	300	150
25	400	220	100
32	400	220	100
40	400	220	100
50	400	220	100
65	400	400	170
80	400	400	170
100	400	400	170
125	400	400	170
150 or more	400	400	170

Table J5.7d Maximum pipework pressure drop - Distributive variable speed systems

Nominal pipe diameter (mm)	Maximum pressure drop in systems operating 5000 hours/annum or less (Pa/m)	Maximum pressure drop in systems operating more than 5000 hours/annum (Pa/m)
Not more than 20	400	250
25	400	180
32	400	180
40	400	180
50	400	180
65	400	300
80	400	300
100	400	300
125	400	300
150 or more	400	300

4.1.5.8 Pipework Insulation

(a) *Piping*, vessels, heat exchangers and tanks containing heating or cooling fluid, where the fluid is held at a heated or cooled temperature, that are part of an *air-conditioning* system, other than in appliances covered by *MEPS*, must be provided with insulation—

(i) complying with AS/NZS 4859.1; and

(ii) for *piping* of heating and cooling fluids, having an insulation *R-Value* in accordance with Table J5.8a; and

(iii) for vessels, heat exchangers or tanks, having an insulation *R-Value* in accordance with Table J5.8b; and

(iv) for refill or pressure relief *piping*, having an insulation *R-Value* equal to the *required* insulation *R-Value* of the connected pipe, vessel or tank within 500 mm of the connection.

(b) Insulation must—

(i) be protected against the effects of weather and sunlight; and

(ii) be able to withstand the temperatures within the *piping*, vessel, heat exchanger or tank.

(c) Insulation provided to *piping*, vessels, heat exchangers or tanks containing cooling fluid must be protected by a vapour barrier on the outside of the insulation.

(d) The requirements of (a) and (b) do not apply to *piping*, vessels or heat exchangers—

(i) located within the only or last room served by the system and downstream of the control device for the regulation of heating or cooling service to that room; or

(ii) encased within a concrete slab or panel which is part of a heating or cooling system; or

(iii) supplied as an integral part of a chiller, boiler or unitary air-conditioner complying with the requirements of J5.9, J5.10 and J5.11; or

(iv) inside an air-handling unit, fan-coil unit, or the like.

(e) For the purposes of (a), (b), (c) and (d)—

(i) heating fluids include refrigerant, heated water, steam and condensate; and

(ii) cooling fluids include refrigerant, chilled water, brines and glycol mixtures, but do not include condenser cooling water.

Table J5.8a Piping — Minimum insulation R-Value

Fluid temperature range	Minimum insulation *R-Value* — nominal pipe diameter ≤ 40 mm	Minimum insulation *R-Value* — nominal pipe diameter > 40 mm and ≤ 80 mm	Minimum insulation *R-Value* — nominal pipe diameter between > 80 mm and ≤ 150 mm	Minimum insulation *R-Value* — nominal pipe diameter > 150 mm
Low temperature chilled — ≤ 2°C	1.3	1.7	2.0	2.7
Chilled — > 2°C but ≤ 20°C	1.0	1.5	2.0	2.0
Heated — > 30°C but ≤ 85°C	1.7	1.7	1.7	1.7
High Temperature heated — > 85°C	2.7	2.7	2.7	2.7

Note to Table J5.8a: The minimum *required R-Value* may be halved for *piping* penetrating a structural member.

Table J5.8b Vessels, heat exchangers and tanks — Minimum insulation R-Value

Fluid temperature range	Minimum insulation *R-Value*
Low temperature chilled — ≤ 2°C	2.7
Chilled — > 2°C but ≤ 20°C	1.8
Heated — > 30°C but ≤ 85°C	3.0
High temperature heated — > 85°C	3.0

4.1.5.9 Space Heating

(a) A heater used for *air-conditioning* or as part of an *air-conditioning* system must be—

(i) a solar heater; or

(ii) a gas heater; or

(iii) a heat pump heater; or

(iv) a heater using reclaimed heat from another process such as reject heat from a refrigeration plant; or

(v) an electric heater if—

(A) the heating capacity is not more than—

(aa) 10 W/m2 of the *floor area* of the *conditioned space* in *climate zone* 1; or

(bb) 40 W/m2 of the *floor area* of the *conditioned space* in *climate zone* 2; or

(cc) the value specified in Table J5.9 where reticulated gas is not available at the allotment boundary; or

(B) the annual energy consumption for heating is not more than 15 kWh/m2 of the *floor area* of the *conditioned space* in *climate zones* 1, 2, 3, 4 and 5; or

(C) the in-duct heater complies with J5.2(a)(ii)(C); or

(vi) any combination of (i) to (v).

(b) An electric heater may be used for heating a bathroom in a Class 2, 3, 9a or 9c building if the heating capacity is not more than 1.2 kW and the heater has a timer.

(c) A fixed heating or cooling appliance that moderates the temperature of an outdoor space must be configured to automatically shut down when—
  (i) there are no occupants in the space served; or
  (ii) a period of one hour has elapsed since the last activation of the heater; or
  (iii) the space served has reached the design temperature.

(d) A gas water heater, that is used as part of an *air-conditioning* system, must—
  (i) if rated to consume 500 MJ/hour of gas or less, achieve a minimum gross thermal efficiency of 86%; or
  (ii) if rated to consume more than 500 MJ/hour of gas, achieve a minimum gross thermal efficiency of 90%.

Table J5.9 Maximum electric heating capacity

Floor area of the *conditioned space*	W/m² of *floor area* in *climate zone* 3	W/m² of *floor area* in *climate zone* 4	W/m² of *floor area* in *climate zone* 5	W/m² of *floor area* in *climate zone* 6	W/m² of *floor area* in *climate zone* 7
≤ 500 m²	50	60	55	65	70
> 500 m²	40	50	45	55	60

4.1.5.10 Refrigerant Chillers

An *air-conditioning* system refrigerant chiller must comply with *MEPS* and the full load operation energy efficiency ratio and integrated part load energy efficiency ratio in Table J5.10a or Table J5.10b when determined in accordance with AHRI 551/591.

Table J5.10a Minimum energy efficiency ratio for refrigerant chillers — Option 1

Chiller type	Full load operation (W_r / $W_{input\ power}$)	Integrated part load (W_r / $W_{input\ power}$)
Air-cooled chiller with a capacity ≤ 528 kWr	2.985	4.048
Air-cooled chiller with a capacity > 528 kWr	2.985	4.137
Water-cooled positive displacement chiller with a capacity ≤ 264 kWr	4.694	5.867
Water-cooled positive displacement chiller with a capacity > 264 kWr but ≤ 528 kWr	4.889	6.286
Water-cooled positive displacement chiller with a capacity > 528 kWr but ≤ 1055 kWr	5.334	6.519
Water-cooled positive displacement chiller with a capacity > 1055 kWr but ≤ 2110 kWr	5.800	6.770
Water-cooled positive displacement chiller with a capacity > 2110 kWr	6.286	7.041
Water-cooled centrifugal chiller with a capacity ≤ 528 kWr	5.771	6.401
Water-cooled centrifugal chiller with a capacity > 528 kWr but ≤ 1055 kWr	5.771	6.519
Water-cooled centrifugal chiller with a capacity > 1055 kWr but ≤ 1407 kWr	6.286	6.770
Water-cooled centrifugal chiller with a capacity > 1407 kWr	6.286	7.041

Table J5.10b Minimum energy efficiency ratio for refrigerant chillers — Option 2

Chiller type	Full load operation (W_r / $W_{input\ power}$)	Integrated part load (W_r / $W_{input\ power}$)
Air-cooled chiller with a capacity ≤ 528 kWr	2.866	4.669
Air-cooled chiller with a capacity > 528 kWr	2.866	4.758
Water-cooled positive displacement chiller with a capacity ≤ 264 kWr	4.513	7.041
Water-cooled positive displacement chiller with a capacity > 264 kWr but ≤ 528 kWr	4.694	7.184
Water-cooled positive displacement chiller with a capacity > 528 kWr but ≤ 1055 kWr	5.177	8.001
Water-cooled positive displacement chiller with a capacity > 1055 kWr but ≤ 2110 kWr	5.633	8.586
Water-cooled positive displacement chiller with a capacity > 2110 kWr	6.018	9.264
Water-cooled centrifugal chiller with a capacity ≤ 528 kWr	5.065	8.001
Water-cooled centrifugal chiller with a capacity > 528 kWr but ≤ 1055 kWr	5.544	8.001
Water-cooled centrifugal chiller with a capacity > 1055 kWr but ≤ 1407 kWr	5.917	9.027
Water-cooled centrifugal chiller with a capacity > 1407 kWr	6.018	9.264

4.1.5.11 Unitary air-conditioning equipment

Unitary *air-conditioning* equipment including packaged air-conditioners, split systems, and variable refrigerant flow systems must comply with *MEPS* and for a capacity greater than or equal to 65 kWr—

(a) where water cooled, have a minimum energy efficiency ratio of 4.0 Wr / Winput power for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1, where input power includes both compressor and fan input power; or

(b) where air cooled, have a minimum energy efficiency ratio of 2.9 Wr / Winput power for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1, where input power includes both compressor and fan input power.

4.1.5.12 Heat rejection equipment

(a) The motor rated power of a fan in a cooling tower, closed circuit cooler or evaporative condenser must not exceed the allowances in Table J5.12.

(b) The fan in an air-cooled condenser must have a motor rated power of not more than 42 W for each kW of heat rejected from the refrigerant, when determined in accordance with AHRI 460 except for—

  (i) a refrigerant chiller in an *air-conditioning* system that complies with the energy efficiency ratios in J5.10; or

  (ii) packaged air-conditioners, split systems, and variable refrigerant flow *air-conditioning* equipment that complies with the energy efficiency ratios in J5.11.

Table J5.12 Maximum fan motor power — Cooling towers, closed circuit coolers and evaporative condensers

Type	Cooling tower maximum fan motor input power (W/kW_{rej})	Closed circuit cooler maximum fan motor input power (W/kW_{rej})	Evaporative condenser maximum fan motor input power (W/kW_{rej})
Induced draft	10.4	16.9	11.0
Forced draft	19.5	Note	11.0

Note to Table J5.12: A closed circuit, forced draft cooling tower must not be used.

4.1.5 Part J6: Artificial lighting and power

4.1.6.2 Artificial lighting

(a) In a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building—

(i) the *lamp power density* or *illumination power density* of artificial lighting must not exceed the allowance of—

(A) 5 W/m2 within a *sole-occupancy unit*; and

(B) 4 W/m2 on a verandah, balcony or the like attached to a *sole-occupancy unit*; and

(ii) the *illumination power density* allowance in (i) may be increased by dividing it by the *illumination power density* adjustment factor for a control device in Table J6.2b as applicable; and

(iii) when designing the *lamp power density* or *illumination power density*, the power of the proposed installation must be used rather than nominal allowances for exposed batten holders or luminaires; and

(iv) halogen lamps must be separately switched from fluorescent lamps.

(b) In a building other than a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building—

(i) for artificial lighting, the aggregate design illumination power load must not exceed the sum of the allowances obtained by multiplying the area of each space by the maximum *illumination power density* in Table J6.2a; and

(ii) the aggregate design illumination power load in (i) is the sum of the design illumination power loads in each of the spaces served; and

(iii) where there are multiple lighting systems serving the same space, the design illumination power load for (ii) is—

(A) the total illumination power load of all systems; or

(B) where a control system permits only one system to operate at a time—

(aa) based on the highest illumination power load; or

(bb) determined by the formula—

$$[H \times T/2 + P \times (100 - T/2)] / 100$$

where—

H = the highest illumination power load; and

T = the time for which the maximum illumination power load will occur, expressed as a percentage; and

P = the predominant illumination power load.

(c) The requirements of (a) and (b) do not apply to the following:

(i) Emergency lighting provided in accordance with Part E4.

(ii) Signage, display lighting within cabinets and display cases that are fixed in place.

(iii) Lighting for accommodation within the residential part of a *detention centre*.
(iv) A heater where the heater also emits light, such as in bathrooms.
(v) Lighting of a specialist process nature such as in a surgical operating theatre, fume cupboard or clean workstation.
(vi) Lighting of performances such as theatrical or sporting.
(vii) Lighting for the permanent display and preservation of works of art or objects in a museum or gallery other than for retail sale, purchase or auction.
(viii) Lighting installed solely to provide photosynthetically active radiation for indoor plant growth on green walls and the like.

(d) For the purposes of Table J6.2b, the following control devices must comply with Specification J6:
(i) Lighting timers.
(ii) Motion detectors.
(iii) Daylight sensors and dynamic lighting control devices.

Table J6.2a Maximum illumination power density

Space	Maximum *illumination power density* (W/m^2)
Auditorium, church and public hall	8
Board room and conference room	5
Carpark - general	2
Carpark - entry zone (first 15 m of travel) during the daytime	11.5
Carpark - entry zone (next 4 m of travel) during the day	2.5
Carpark - entry zone (first 20 m of travel) during nighttime	2.5
Common rooms, spaces and corridors in a Class 2 building	4.5
Control room, switch room and the like - intermittent monitoring	3
Control room, switch room and the like - constant monitoring	4.5
Corridors	5
Courtroom	4.5
Dormitory of a Class 3 building used for sleeping only	3
Dormitory of a Class 3 building used for sleeping and study	4
Entry lobby from outside the building	9
Health-care - infants' and children's wards and emergency department	4
Health-care - examination room	4.5
Health-care - examination room in intensive care and high dependency ward	6
Health-care - all other *patient care areas* including wards and corridors	2.5
Kitchen and food preparation area	4
Laboratory - artificially lit to an ambient level of 400 lx or more	6
Library - stack and shelving area	2.5
Library - reading room and general areas	4.5
Lounge area for communal use in a Class 3 or 9c building	4.5
Museum and gallery - circulation, cleaning and service lighting	2.5
Office - artificially lit to an ambient level of 200 lx or more	4.5
Plant room where an average of 160 lx vertical illuminance is required on a vertical panel such as in switch rooms	4
Plant rooms with a horizontal illuminance target of 80 lx	2
Restaurant, café, bar, hotel lounge and a space for the serving and consumption of food or drinks	14
Retail space including a museum and gallery whose purpose is the sale of objects	14
School - general purpose learning areas and tutorial rooms	4.5
Sole-occupancy unit of a Class 3 or 9c building	5
Storage	1.5
Service area, cleaner's room and the like	1.5
Toilet, locker room, staff room, rest room and the like	3
Wholesale storage area with a vertical illuminance target of 160 lx	4
Stairways, including *fire-isolated stairways*	2
Lift cars	3

Notes to Table J6.2a:

1. In areas not listed above, the maximum *illumination power density* is—
   a. for an illuminance not more than 80 lx, 2 W/m2; and
   b. for an illuminance more than 80 lx and not more than 160 lx, 2.5 W/m2; and
   c. for an illuminance more than 160 lx and not more than 240 lx, 3 W/m2; and
   d. for an illuminance more than 240 lx and not more than 320 lx, 4.5 W/m2; and
   e. for an illuminance more than 320 lx and not more than 400 lx, 6 W/m2; and
   f. for an illuminance more than 400 lx and not more than 600 lx, 10 W/m2; and
   g. for an illuminance more than 600 lx and not more than 800 lx, 11.5 W/m2.

2. For enclosed spaces with a Room Aspect Ratio of less than 1.5, the maximum *illumination power density* may be increased by dividing it by an adjustment factor for room aspect which is—
   0.5 + (Room Aspect Ratio/3)
   The Room Aspect Ratio of the enclosed space is determined by the formula—
   A/(H x C),
   where—

   a. A is the area of the enclosed space; and
   b. H is the height of the space measured from the floor to the highest part of the ceiling; and
   c. C is the perimeter of the enclosed space at floor level.

3. In addition to 2, the maximum *illumination power density* may be increased by dividing it by the *illumination power density* adjustment factor in Table J6.2b and Table J6.2c and where the control device is not installed to comply with J6.3.

4. Circulation spaces are included in the allowances listed in the Table.

Table J6.2b Illumination power density adjustment factor for a control device

Item Note 1	Description	*Illumination power density* adjustment factor
Motion detector	In a toilet or change room, other than a public toilet, in a Class 6 building	0.4
Motion detector	Where a group of light fittings serving less than 100 m^2 is controlled by one or more detectors	0.6
Motion detector	Where a group of light fittings serving 100 m^2 or more is controlled by one or more detectors	0.7
Programmable dimming system Note 2	Where not less than 75% of the area of a space is controlled by programmable dimmers	0.85
Fixed dimming Notes 2 and 3	All fittings with fixed dimming	Whichever is greater of (a) 0.5; or (b) 0.2+0.8L where L = the illuminance turndown for the fixed dimming.
Lumen depreciation dimming Note 2	All fittings with lumen depreciation dimming	0.85
Two stage sensor - equipped lights with minimum power of 30 % of peak power or less	Fire stairs and other spaces not used for regular transit	0.4
Two stage sensor - equipped lights with minimum power of 30% of peak power or less	Transitory spaces in regular use or in a *carpark*	0.7
Daylight sensor and dynamic lighting control device - dimmed or stepped switching of lights adjacent *windows* Notes 2 and 4	In a Class 5, 6, 7, 8 or 9b building or a Class 9a building, other than a *ward area*, where the lights are adjacent *windows*, other than *roof lights*, for a distance from the *window* equal to the depth of the floor to *window* head height	0.5 Note 2
Daylight sensor and dynamic lighting control device - dimmed or stepped switching of lights adjacent *windows* Notes 2 and 4	Serving a Class 3 or 9c building, or a Class 9a *ward area*, where the lights are adjacent *windows*, other than *roof lights*, for a distance from the *window* equal to the depth of the floor to *window* head height	0.75 Note 2
Daylight sensor and dynamic lighting control device - dimmed or stepped switching of lights adjacent *windows* Notes 2 and 4	In a Class 5, 6, 7, 8 or 9b building or a Class 9a building, other than a *ward area*, where the lights are adjacent *roof lights*.	0.6 Note 2
Daylight sensor and dynamic lighting control device - dimmed or stepped switching of lights adjacent *windows* Note 2 and 4	In a Class 3 or 9c building, or a Class 9a *ward area*, where the lights are adjacent *roof lights*	0.8 Note 2

Notes to Table J6.2b:

1. A maximum of two *illumination power density* adjustment factors for a control device can be applied to an area. Where more than one *illumination power density* adjustment factor (other than for room aspect) apply to an area, they are to be combined using the following formula: A x (B + [(1 - B) / 2]),
   where—

a. A is the lowest applicable *illumination power density* adjustment factor; and
b. B is the second lowest applicable *illumination power density* adjustment factor.

2. The adjustment factor does not apply to tungsten, halogen or other incandescent sources.
3. Includes luminaires with a pre-programmed function which provides dimming from ON to OFF (one-stage dimming).
4. The *illumination power density* adjustment factor is only applied to lights controlled by daylight sensors between 8:00am and 7:00pm.

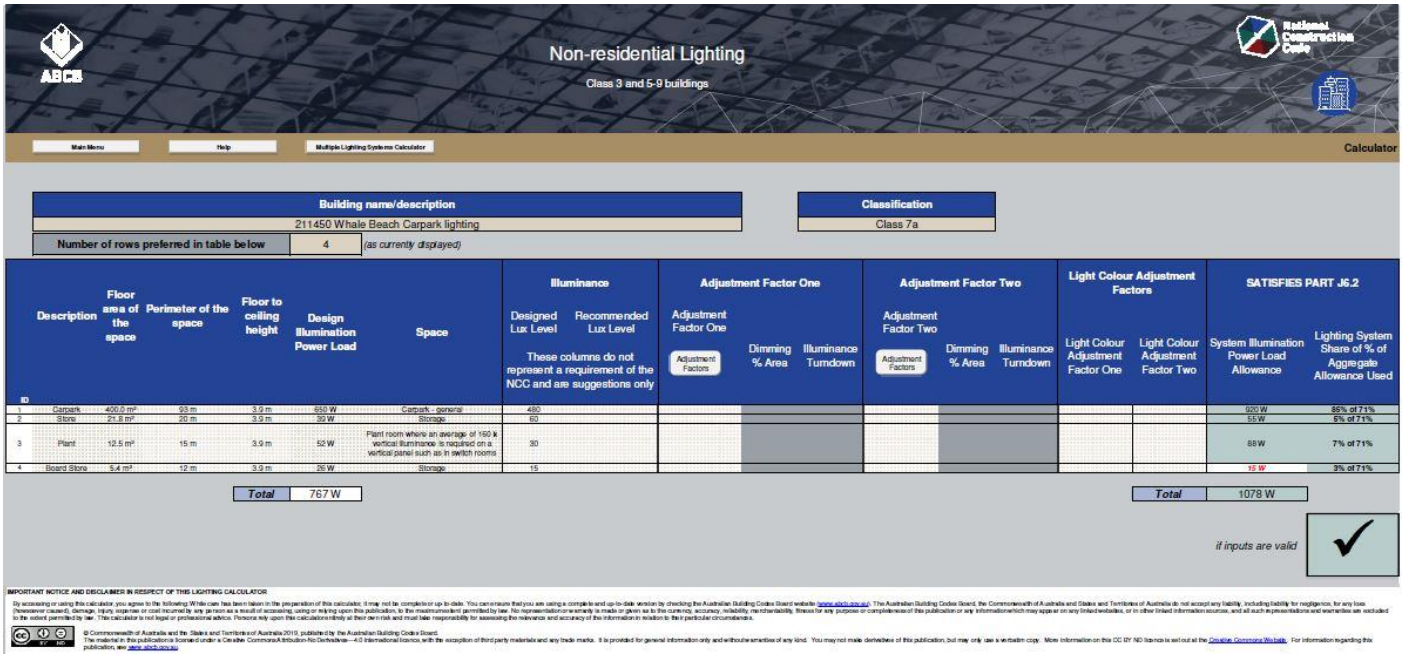
Table J6.2c Illumination power density adjustment factor for light colour

Light source	Description	*Illumination power density* adjustment factor
CRI ≥ 90	Where lighting with good colour rendering is used	0.9
CCT ≤ 3500 K Note	Where lighting with a warm appearance is used	0.8
CCT ≥ 4500 K	Where lighting with a cool appearance is used	1.1

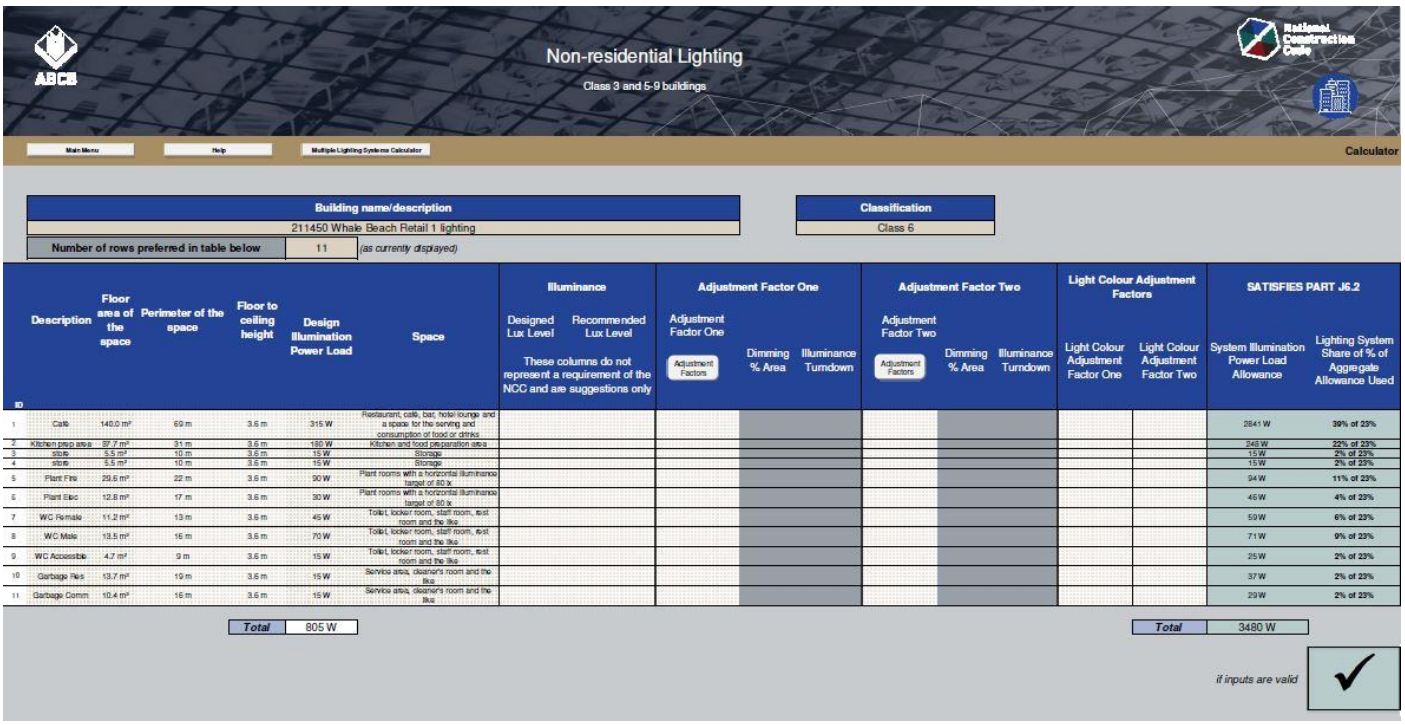
Note to Table J6.2c: Includes luminaires that can adjust their CCT to 3500 K or below.

Roof Plan Motel Units, shaded areas new, existing roof to have Roof Lights added as shown on roof plan

As part of this assessment lighting calculations are to be provided, compliance has been achieved with this proposal, attached is the lighting calculator NCC 2019



Basement Carpark Lighting



Non-residential Lighting

Class 3 and 5-9 buildings

Main Menu | Help | Multiple Lighting Systems Calculator | Calculator

Building name/description	Classification
211450 Whale Beach Retail 1 lighting	Class 6

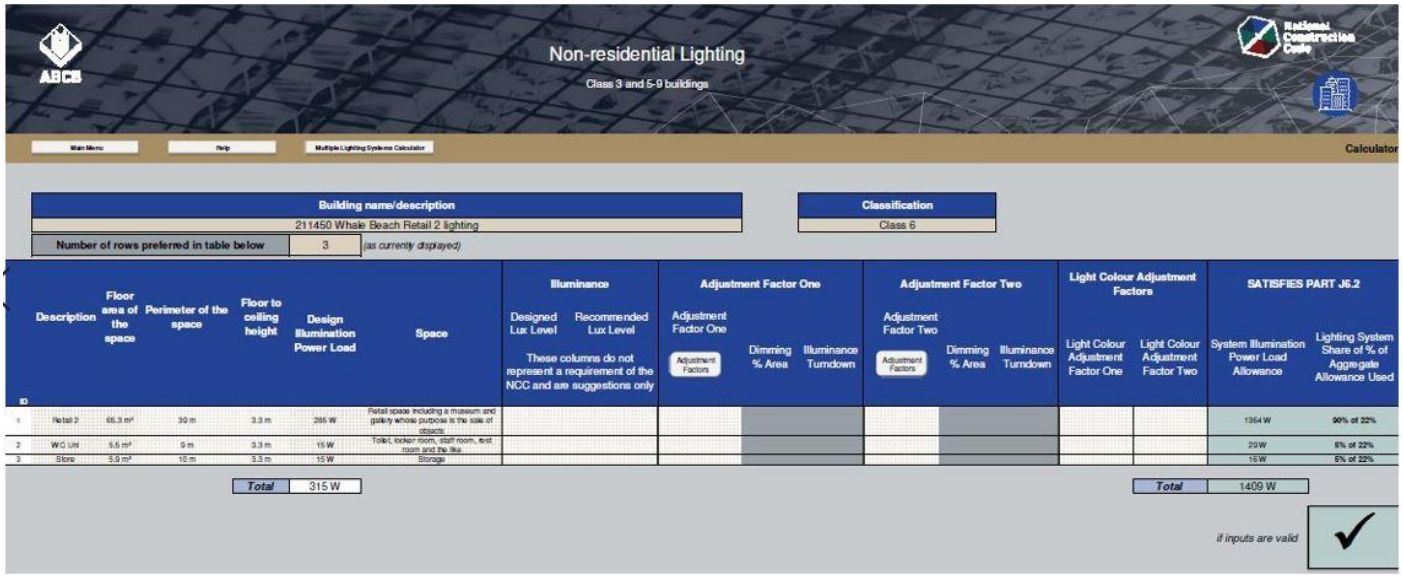
Number of rows preferred in table below: 11 *(as currently displayed)*

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: Dimming % Area	Adjustment Factor One: Illuminance Turndown	Adjustment Factor Two	Adjustment Factor Two: Dimming % Area	Adjustment Factor Two: Illuminance Turndown	Light Colour Adjustment Factor One	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
1	Café	140.0 m²	69 m	3.6 m	315 W	Restaurant, café, bar, hotel lounge and a space for the serving and consumption of food or drinks											2841 W	39% of 23%
2	Kitchen prep area	37.7 m²	31 m	3.6 m	180 W	Kitchen and food preparation area											249 W	22% of 23%
3	store	5.5 m²	10 m	3.6 m	15 W	Storage											15 W	2% of 23%
4	store	5.5 m²	10 m	3.6 m	15 W	Storage											15 W	2% of 23%
5	Plant Fire	29.6 m²	22 m	3.6 m	90 W	Plant rooms with a horizontal illuminance target of 80 lx											94 W	11% of 23%
6	Plant Elec	12.8 m²	17 m	3.6 m	30 W	Plant rooms with a horizontal illuminance target of 80 lx											45 W	4% of 23%
7	WC Female	11.2 m²	13 m	3.6 m	45 W	Toilet, locker room, staff room, rest room and the like											59 W	6% of 23%
8	WC Male	13.5 m²	16 m	3.6 m	70 W	Toilet, locker room, staff room, rest room and the like											71 W	9% of 23%
9	WC Accessible	4.7 m²	9 m	3.6 m	15 W	Toilet, locker room, staff room, rest room and the like											25 W	2% of 23%
10	Garbage Res	13.7 m²	19 m	3.6 m	15 W	Service area, cleaner's room and the like											37 W	2% of 23%
11	Garbage Comm	10.4 m²	16 m	3.6 m	15 W	Service area, cleaner's room and the like											29 W	2% of 23%

Total: 805 W — Total: 3480 W

if inputs are valid ✓

Retail 1 Lighting



Non-residential Lighting

Class 3 and 5-9 buildings

Main Menu | Help | Multiple Lighting Systems Calculator | Calculator

Building name/description	Classification
211450 Whale Beach Retail 2 lighting	Class 6

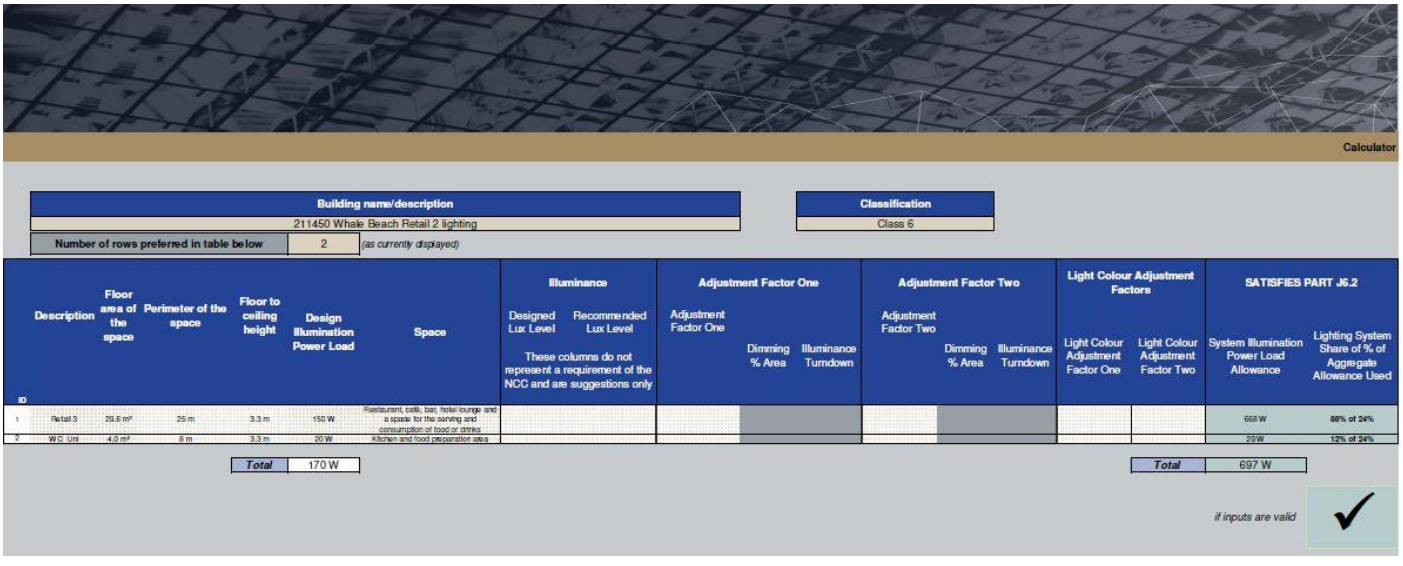
Number of rows preferred in table below: 3 *(as currently displayed)*

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: Dimming % Area	Adjustment Factor One: Illuminance Turndown	Adjustment Factor Two	Adjustment Factor Two: Dimming % Area	Adjustment Factor Two: Illuminance Turndown	Light Colour Adjustment Factor One	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
1	Retail 2	65.3 m²	39 m	3.3 m	285 W	Retail space including a museum and gallery whose purpose is the sale of objects											1364 W	90% of 22%
2	WC Uni	5.5 m²	9 m	3.3 m	15 W	Toilet, locker room, staff room, rest room and the like											29 W	6% of 22%
3	Store	5.9 m²	10 m	3.3 m	15 W	Storage											16 W	6% of 22%

Total: 315 W — Total: 1409 W

if inputs are valid ✓

Retail 2 Lighting



Calculator

Building name/description	Classification
211450 Whale Beach Retail 2 lighting	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	Illuminance: Designed Lux Level	Illuminance: Recommended Lux Level	Adjustment Factor One	Adjustment Factor One: Dimming % Area	Adjustment Factor One: Illuminance Turndown	Adjustment Factor Two	Adjustment Factor Two: Dimming % Area	Adjustment Factor Two: Illuminance Turndown	Light Colour Adjustment Factor One	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
1	Retail 3	29.6 m²	25 m	3.3 m	150 W	Restaurant, café, bar, hotel lounge and a space for the serving and consumption of food or drinks											668 W	88% of 24%
2	WC Uni	4.0 m²	8 m	3.3 m	20 W	Kitchen and food preparation area											29 W	12% of 24%

Total: 170 W — Total: 697 W

if inputs are valid ✓

Retail 3 Lighting

4.1.6.3 Interior artificial lighting

(a) All artificial lighting of a room or space must be individually operated by–
  (i) a switch; or
  (ii) other control device; or
  (iii) a combination of (i) and (ii).

(b) An occupant activated device, such as a room security device, a motion detector in accordance with Specification J6, or the like, must be provided in the *sole-occupancy unit* of a Class 3 building, other than where providing accommodation for people with a disability or the aged, to cut power to the artificial lighting, air-conditioner, local exhaust fans and bathroom heater when the *sole-occupancy unit* is unoccupied.

(c) An artificial lighting switch or other control device in (a) must—
  (i) if an artificial lighting switch, be located in a visible and easily accessed position—
    (A) in the room or space being switched; or
    (B) in an adjacent room or space from where 90% of the lighting being switched is visible; and
  (ii) for other than a single functional space such as an auditorium, theatre, *swimming pool*, sporting stadium or warehouse—
    (A) not operate lighting for an area of more than 250 m2 if in a Class 5 building or a Class 8 laboratory; or
    (B) not operate lighting for an area of more than—
      (aa) 250 m2 for a space of not more than 2000 m2; or
      (bb) 1000 m2 for a space of more than 2000 m2,
      if in a Class 3, 6, 7, 8 (other than a laboratory) or 9 building.

(d) 95% of the light fittings in a building or *storey* of a building, other than a Class 2 or 3 building or a Class 4 part of a building, of more than 250 m2 must be controlled by—
  (i) a time switch in accordance with Specification J6; or
  (ii) an occupant sensing device such as—
    (A) a security key card reader that registers a person entering and leaving the building; or
    (B) a motion detector in accordance with Specification J6.

(e) In a Class 5, 6 or 8 building of more than 250 m2, artificial lighting in a natural lighting zone adjacent to *windows* must be separately controlled from artificial lighting not in a natural lighting zone in the same *storey* except where—
  (i) the room containing the natural lighting zone is less than 20 m2; or
  (ii) the room's natural lighting zone contains less than 4 luminaires; or
  (iii) 70% or more of the luminaires in the room are in the natural lighting zone.

(f) Artificial lighting in a *fire-isolated stairway*, *fire-isolated passageway* or *fire-isolated ramp*, must be controlled by a motion detector in accordance with Specification J6.

(g) Artificial lighting in a foyer, corridor and other circulation spaces—
  (i) of more than 250 W within a single zone; and
  (ii) adjacent to *windows*,
  must be controlled by a daylight sensor and dynamic lighting control device in accordance with Specification J6.

(h) Artificial lighting for daytime travel in the first 19 m of travel in a *carpark* entry zone must be controlled by a daylight sensor in accordance with Specification J6.

(i) The requirements of (a), (b), (c), (d), (e), (f), (g) and (h) do not apply to the following:
  (i) Emergency lighting in accordance with Part E4.

(ii) Where artificial lighting is needed for 24 hour occupancy such as for a manufacturing process, parts of a hospital, an airport control tower or within a *detention centre*.

(j) The requirements of (d) do not apply to the following:
- (i) Artificial lighting in a space where the sudden loss of artificial lighting would cause an unsafe situation such as—
  - (A) in a *patient care area* in a Class 9a building or in a Class 9c building; or
  - (B) a plant room or lift motor room; or
  - (C) a workshop where power tools are used.
- (ii) A heater where the heater also emits light, such as in bathrooms.

4.1.6.4 Interior decorative and display lighting

(a) Interior decorative and display lighting, such as for a foyer mural or art display, must be controlled—
- (i) separately from other artificial lighting; and
- (ii) by a manual switch for each area other than when the operating times of the displays are the same in a number of areas such as in a museum, art gallery or the like, in which case they may be combined; and
- (iii) by a time switch in accordance with Specification J6 where the display lighting exceeds 1 kW.

(b) Window display lighting must be controlled separately from other display lighting.

4.1.6.5 Exterior artificial lighting

(a) Exterior artificial lighting attached to or directed at the facade of a building, must—
- (i) be controlled by—
  - (A) a daylight sensor; or
  - (B) a time switch that is capable of switching on and off electric power to the system at variable pre-programmed times and on variable pre-programmed days; and
- (ii) when the total lighting load exceeds 100 W—
  - (A) use LED luminaires for 90% of the total lighting load; or
  - (B) be controlled by a motion detector in accordance with Specification J6; or
  - (C) when used for decorative purposes, such as façade lighting or signage lighting, have a separate time switch in accordance with Specification J6.

(b) The requirements of (a)(ii) do not apply to the following:
- (i) Emergency lighting in accordance with Part E4.
- (ii) Lighting around a *detention centre*.

4.1.6.6 Boiling water and chilled water storage units

Power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with Specification J6.

4.1.6.7 Lifts

Lifts must—

(a) be configured to ensure artificial lighting and ventilation in the car are turned off when it is unused for 15 minutes; and

(b) achieve the idle and standby energy performance level in Table 6.7a; and

(c) achieve—
- (i) the energy efficiency class in Table 6.7b; or
- (ii) if a dedicated goods lift, energy efficiency class D in accordance with ISO 25745-2.

Table 6.7a Lift idle and standby energy performance level

Rated load	Idle and standby [Note] energy performance level in accordance with ISO 25745-2
Less than or equal to 800 kg	2
801 kg to less than or equal to 2000 kg	3
2001 kg to less than or equal to 4000 kg	4
Greater than 4000 kg	5

Note to Table 6.7a**:** Applies to the standby power used after 30 minutes.

Table 6.7b Lift energy efficiency class

Usage category in accordance with ISO 25745-2	Energy efficiency class in accordance with ISO 25745-2
1 - 4	C
> 5	D

4.1.6.8 Escalators and moving walkways

Escalators and moving walkways must have the ability to slow to between 0.2 m/s and 0.05 m/s when unused for more than 15 minutes.

4.1.7 Part J7: Heated water supply & swimming pool & spa plant

4.1.7.2 Heated water supply

A heated water supply system for food preparation and sanitary purposes must be designed and installed in accordance with Part B2 of NCC Volume Three — Plumbing Code of Australia.

4.1.7.3 Swimming pool heating and pumping

(a) Heating for a *swimming pool* must be by—
- (i) a solar heater; or
- (ii) a heater using reclaimed heat from another process such as reject heat from a refrigeration plant; or
- (iii) a geothermal heater; or
- (iv) a gas heater that—
  - (A) if rated to consume 500 MJ/hour or less, achieves a minimum gross thermal efficiency of 86%; or
  - (B) if rated to consume more than 500 MJ/hour, achieves a minimum gross thermal efficiency of 90%; or
- (v) a heat pump; or
- (vi) a combination of (i) to (v).

(b) Where some or all of the heating *required* by (a) is by a gas heater or a heat pump, the *swimming pool* must have—
- (i) a cover with a minimum *R-Value* of 0.05; and
- (ii) a time switch to control the operation of the heater.

(c) A time switch must be provided to control the operation of a circulation pump for a *swimming pool*.

(d) Where *required*, a time switch must be capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days.

(e) Pipework carrying heated or chilled water for a *swimming pool* must comply with the insulation requirements of J5.8.

(f) For the purpose of J7.3, a *swimming pool* does not include a spa pool.

4.1.7.4 Spa pool heating and pumping

(a) Heating for a spa pool that shares a water recirculation system with a *swimming pool* must be by—
  (i) a solar heater; or
  (ii) a heater using reclaimed heat from another process such as reject heat from a refrigeration plant; or
  (iii) a geothermal heater; or
  (iv) a gas heater that—
    (A) if rated to consume 500 MJ/hour or less, achieves a minimum gross thermal efficiency of 86%; or
    (B) if rated to consume more than 500 MJ/hour, achieves a minimum gross thermal efficiency of 90%; or
  (v) a heat pump; or
  (vi) a combination of (i) to (v).

(b) Where some or all of the heating *required* by (a) is by a gas heater or a heat pump, the spa pool must have—
  (i) a cover with a minimum *R-Value* of 0.05; and
  (ii) a push button and a time switch to control the operation of the heater.

(c) A time switch must be provided to control the operation of a circulation pump for a spa pool having a capacity of 680 L or more.

(d) Where *required*, a time switch must be capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days.

(e) Pipework carrying heated or chilled water for a spa pool must comply with the insulation requirements of J5.8.

4.1.8 Part J8: Facilities for energy monitoring

4.1.8.2 Application of Part

The *Deemed-to-Satisfy Provisions* of this Part do not apply—
(a) within a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building; or
(b) to a Class 8 *electricity network substation*.

4.1.8.3 Facilities for energy monitoring

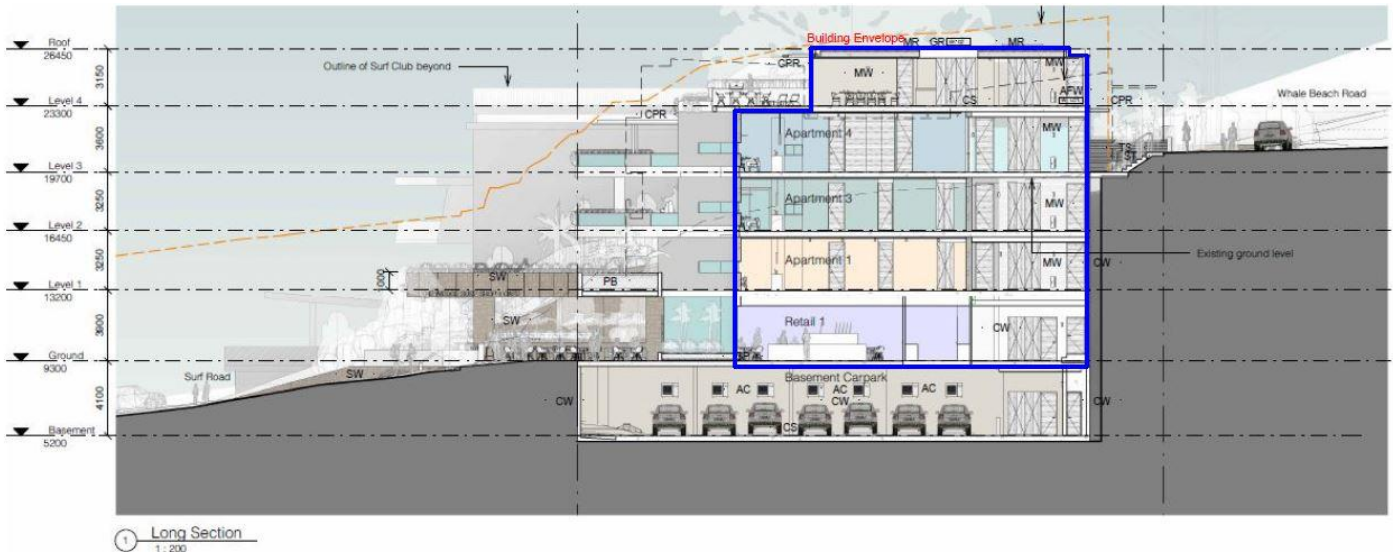
(a) A building or *sole-occupancy unit* with a *floor area* of more than 500 m2 must have an energy meter configured to record the time-of-use consumption of gas and electricity.

(b) A building with a *floor area* of more than 2 500 m2 must have energy meters configured to enable individual time-of-use energy consumption data recording, in accordance with (c), of the energy consumption of—
  (i) *air-conditioning* plant including, where appropriate, heating plant, cooling plant and air handling fans; and
  (ii) artificial lighting; and
  (iii) appliance power; and
  (iv) central hot water supply; and
  (v) internal transport devices including lifts, escalators and moving walkways where there is more than one serving the building; and
  (vi) other ancillary plant.

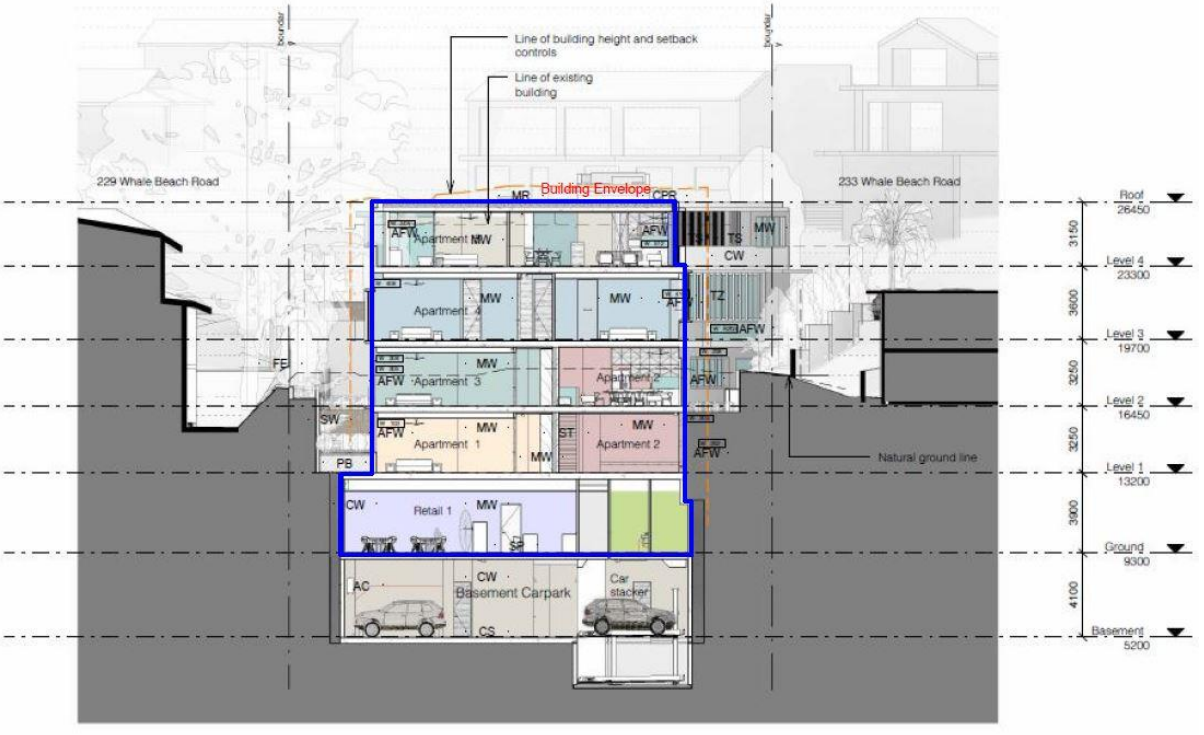
(c) Energy meters *required* by (b) must be interlinked by a communication system that collates the time-of-use energy consumption data to a single interface monitoring system where it can be stored, analysed and reviewed.

(d) The provisions of (b) do not apply to a Class 2 building with a *floor area* of more than 2 500 m2 where the total area of the common areas is less than 500 m2.

Building Envelope Sections



AC	AC Condenser
AFW	Aluminium Framed Window
CPR	Copper Roofing
CS	Concrete Slab
CW	Concrete Wall
FE	Paling Fence
MR	Membrane Roof
MW	Masonry Wall
PB	Planter Bed
SP	Stone Paving
ST	Stair
SW	Stone Wall
TS	Timber Screen
TZ	Terrazzo Screen



Sheet Number	Issue	Sheet Name
DA01	U	Site Plan
DA02	U	Locality Plan
DA03	U	Basement Plan
DA04	U	Ground Floor Plan
DA05	U	Level 1 Plan
DA06	U	Level 2 Plan
DA07	U	Level 3 Plan
DA08	U	Level 4 Plan
DA09	U	Roof Plan
DA10	U	Elevations
DA11	U	Elevations
DA12	U	Boundary Elevations
DA13	U	Section
DA14	U	Section
DA15	U	Shadow Diagram - 900am June 21
DA16	U	Shadow Diagram - 1200noon June 21
DA17	U	Shadow Diagram - 300pm June 21
DA18	U	Neighbouring Shadow Studies
DA19	U	Solar Access Study
DA20	U	Driveway Profile
DA21	U	Photomontage - Whale Beach Road
DA22	U	Photomontage - Surf Road
DA23	U	Site Analysis - Existing
DA24	U	Site Analysis - Proposed
DA30	U	Sectional Perspective (Site)
DA31	U	Compliance Check
DA32	U	Gross Floor Area Calculations
DA33	U	Area Calculations
DA34	U	Landscaped Areas
DA35	U	Finishes Board - Surf Road
DA36	U	Finishes Board - Whale Beach Road
DA37	U	Building Height Plane
DA39	U	BASIX Requirements
DA40	U	Retail 1 Plan
DA41	U	Apartment 1 Plan
DA42	U	Apartment 2 Plan (lower)
DA43	U	Apartment 2 Plan (upper)
DA44	U	Apartment 3 Plan
DA45	U	Retail 2 & 3 Plan
DA46	U	Apartment 4 Plan
DA47	U	Apartment 5 Plan
DA50	U	196 WBR View Impact Study
DA51	U	196 WBR View Impact Study
DA52	U	194 WBR View Impact Study
DA53	U	194 WBR View Impact Study
DA54	U	198 WBR View Impact Study
DA55	U	200 WBR View Impact Study
DA56	U	229 WBR View Impact Study
DA57	U	229 WBR View Impact Study
DA58	U	229 WBR View Impact Study
DA59	U	229 WBR View Impact Study
DA60	U	229 WBR View Impact Study
DA61	U	233 WBR View Impact Study
DA62	U	233 WBR View Impact Study
DA63	U	No.229 View Study - Plan
DA64	U	No 202 View Impact Study

Keynote Legend

AC	AC Condenser
AFW	Aluminium Framed Window
BA	Frameless Glass Balustrade
CL	Clothesline
CPR	Copper Roofing
CS	Concrete Slab
CW	Concrete Wall
DR	Driveway
FE	Paling Fence
FT	Footpath
FY	Fire Hydrant
GA	Garbage Storage Area
GR	Glazed Roofing
LB	Letterbox
LT	Lift
MR	Membrane Roof
MW	Masonry Wall
PB	Planter Bed
PV	Photovoltaic Panels
RP	Ramp
SP	Stone Paving
SPA	Spa
ST	Stair
SW	Stone Wall
TS	Timber Screen
TZ	Terrazzo Screen
WB	Window Box

WHALE BEACH NEIGHBOURHOOD CENTRE

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

acn:093 598 415 abn:58 093 598 415
nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach

for
Leslie Cassar

AUGUST 2021

1 DA Site Plan
1 : 500

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

acn:093 598 415 abn:58 093 598 415
nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

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O	Preliminary Revised DA	06/10/2020
P	Revised Development Application	09/10/2020
Q	Revised Development Application	22/04/2021
R	Revised Development Application	27/05/2021
S	Revised Development Application for Review	7/06/20201
T	Revised DA for Review	27/07/2021
U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE

DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Site Plan

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 500
Drawn by	KW		DA01

N

1 DA Locality Plan
1 : 5000

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

acn:093 598 415 abn:58 093 598 415
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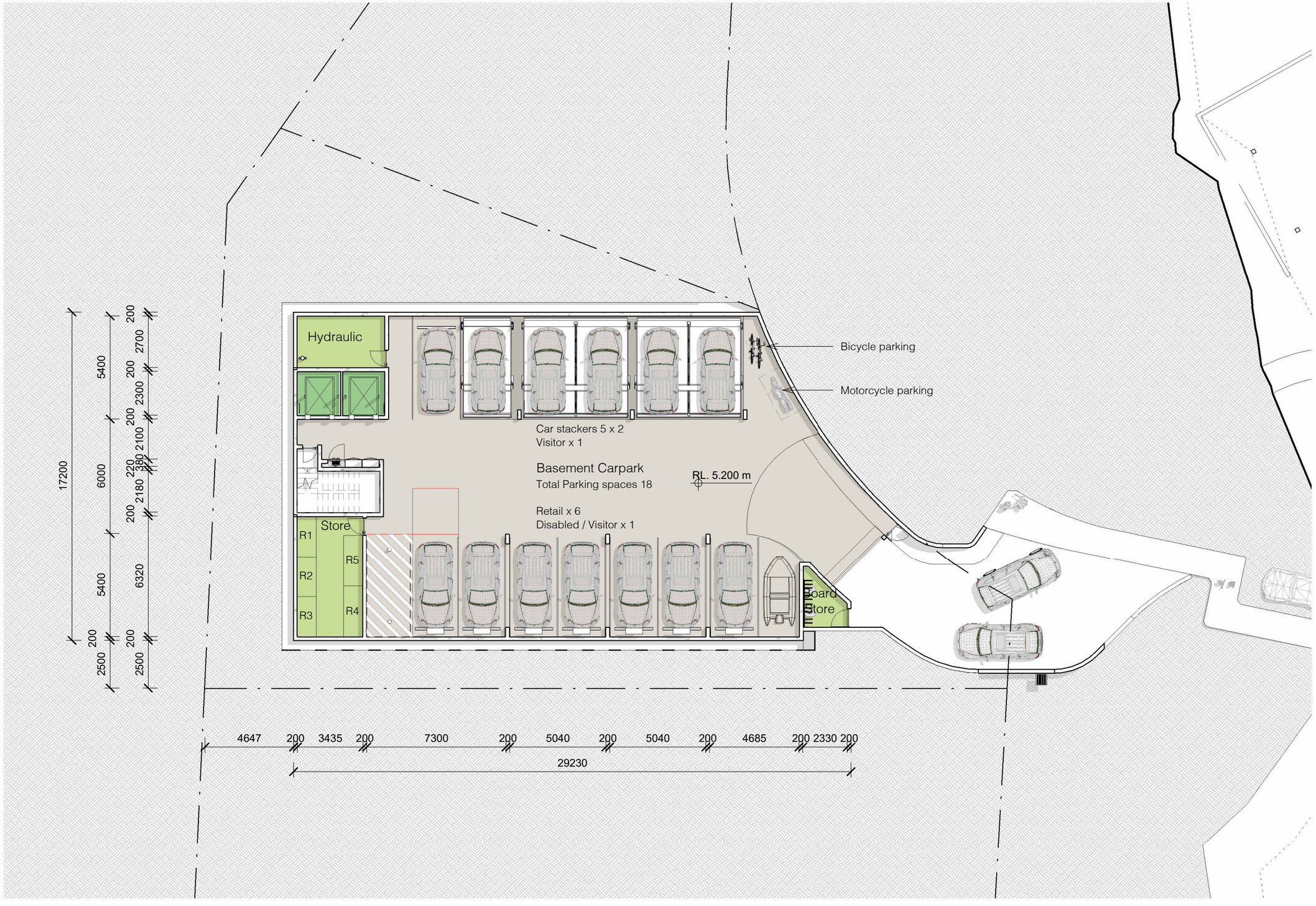
U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Locality Plan

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 5000
Drawn by	RC		DA02



1 DA Basement Plan
1 : 200

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

acn:093 598 415 abn:58 093 598 415
nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

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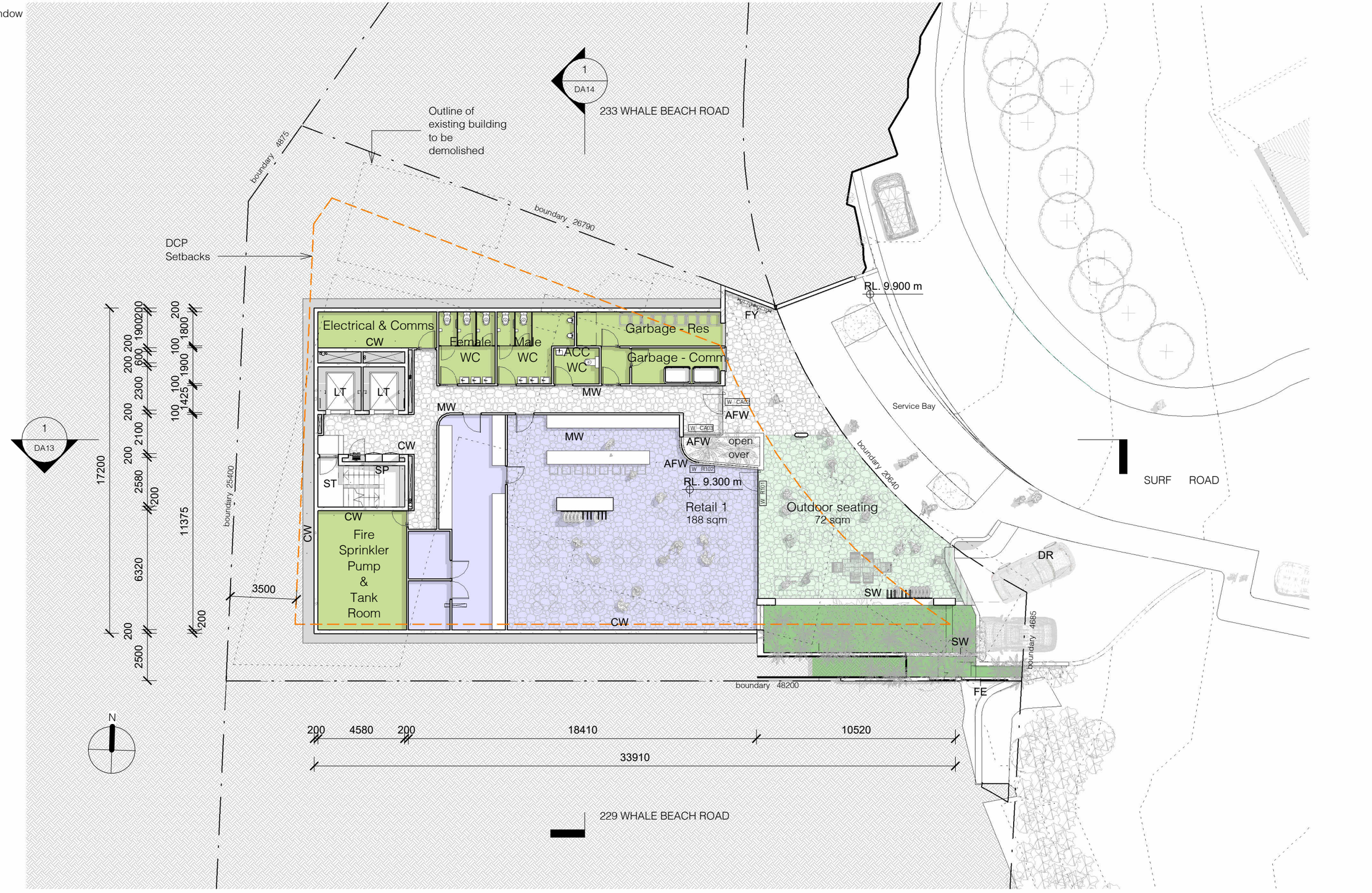
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Basement Plan

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 200
Drawn by	KW		DA03

AFW	Aluminium Framed Window
CW	Concrete Wall
DR	Driveway
FE	Paling Fence
FY	Fire Hydrant
LT	Lift
MW	Masonry Wall
SP	Stone Paving
ST	Stair
SW	Stone Wall



1 DA Ground Floor Plan
1 : 200

0 2.0m 4.0m 6.0m 8.0m 10.0m
1:200

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

acn :093 598 415 abn :58 093 598 415
nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

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U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Ground Floor Plan

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 200
Drawn by	KW		DA04

AFW	Aluminium Framed Window
CW	Concrete Wall
FE	Paling Fence
LT	Lift
MW	Masonry Wall
PB	Planter Bed
ST	Stair
SW	Stone Wall

1 DA Level 1 Plan
1 : 200

0 2.0m 4.0m 6.0m 8.0m 10.0m
1:200

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
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WHALE BEACH NEIGHBOURHOOD CENTRE

DEVELOPMENT APPLICATION

231 Whale Beach Road, Whale Beach

for

Leslie Cassar

Level 1 Plan

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 200
Drawn by	KW		DA05

AFW	Aluminium Framed Window
BA	Frameless Glass Balustrade
CL	Clothesline
CW	Concrete Wall
LT	Lift
MW	Masonry Wall
ST	Stair
SW	Stone Wall
WB	Window Box

1 DA Level 2 Plan
1 : 200

0 2.0m 4.0m 6.0m 8.0m 10.0m
1:200

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
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No.	Revision Description	Date
O	Preliminary Revised DA	06/10/2020
P	Revised Development Application	09/10/2020
Q	Revised Development Application	22/04/2021
R	Revised Development Application	27/05/2021
S	Revised Development Application for Review	7/06/20201
T	Revised DA for Review	27/07/2021
U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE

DEVELOPMENT APPLICATION

231 Whale Beach Road, Whale Beach

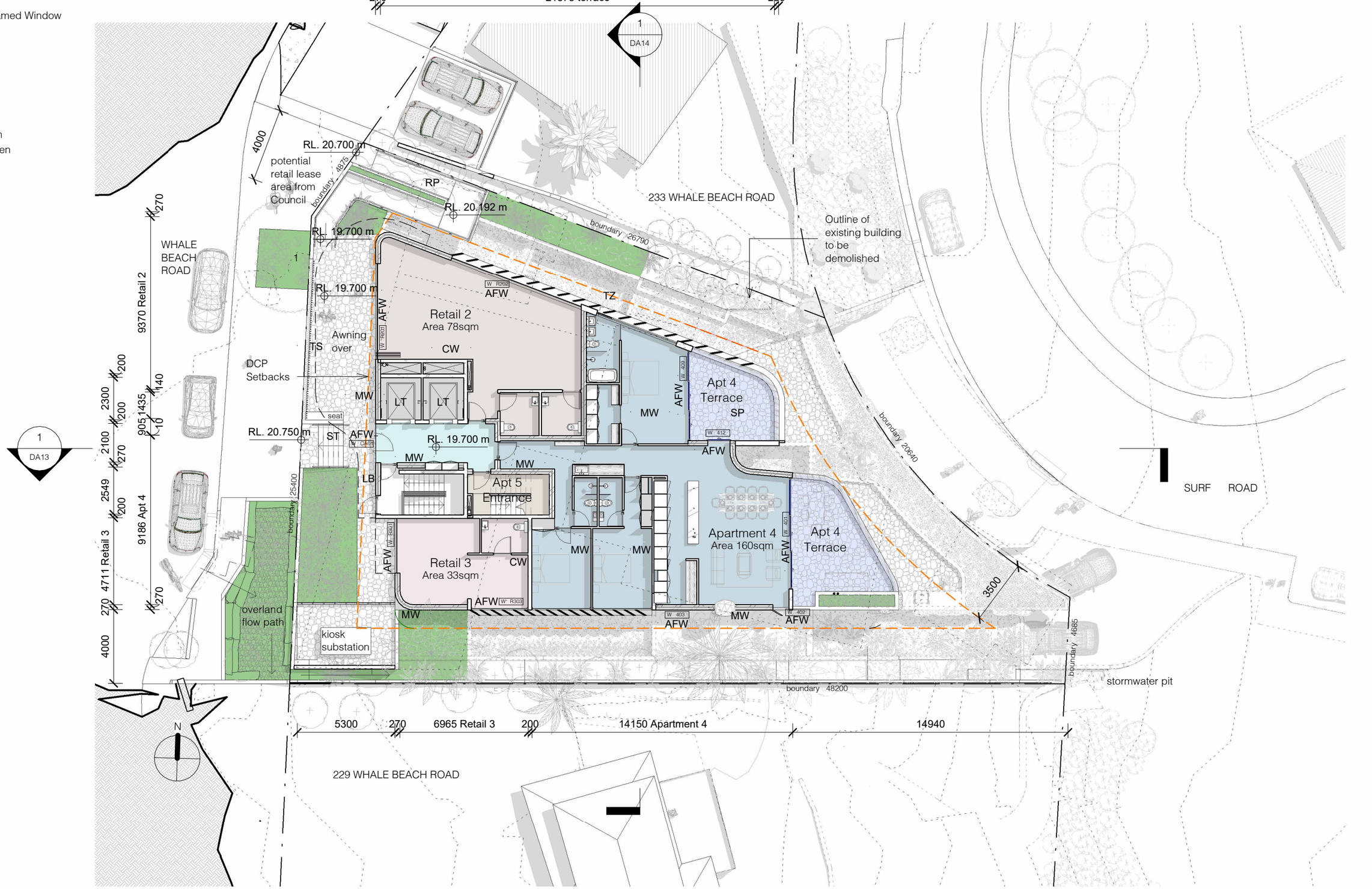
for

Leslie Cassar

Level 2 Plan

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 200
Drawn by	KW		DA06

AFW	Aluminium Framed Window
CW	Concrete Wall
LB	Letterbox
LT	Lift
MW	Masonry Wall
RP	Ramp
SP	Stone Paving
ST	Stair
TS	Timber Screen
TZ	Terrazzo Screen



1 DA Level 3 Plan
1 : 200

0 2.0m 4.0m 6.0m 8.0m 10.0m
1:200

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

acn:093 598 415 abn:58 093 598 415
nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

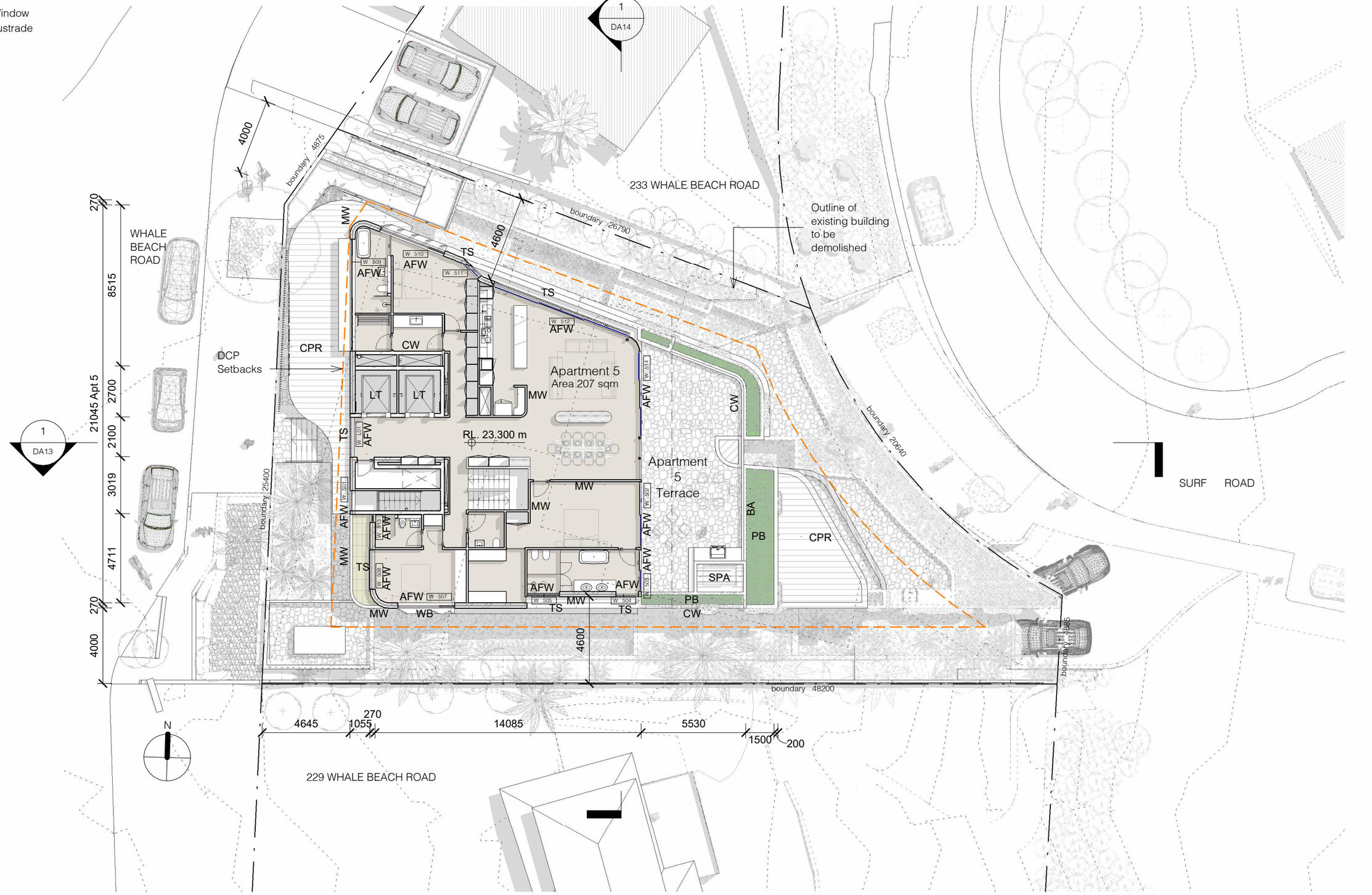
No.	Revision Description	Date
O	Preliminary Revised DA	06/10/2020
P	Revised Development Application	09/10/2020
Q	Revised Development Application	22/04/2021
R	Revised Development Application	27/05/2021
S	Revised Development Application for Review	7/06/20201
T	Revised DA for Review	27/07/2021
U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Level 3 Plan

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 200
Drawn by	KW		DA07

AFW	Aluminium Framed Window
BA	Frameless Glass Balustrade
CPR	Copper Roofing
CW	Concrete Wall
LT	Lift
MW	Masonry Wall
PB	Planter Bed
SPA	Spa
TS	Timber Screen
WB	Window Box



1 DA Level 4 Plan
1 : 200

0 2.0m 4.0m 6.0m 8.0m 10.0m
1:200

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

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nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

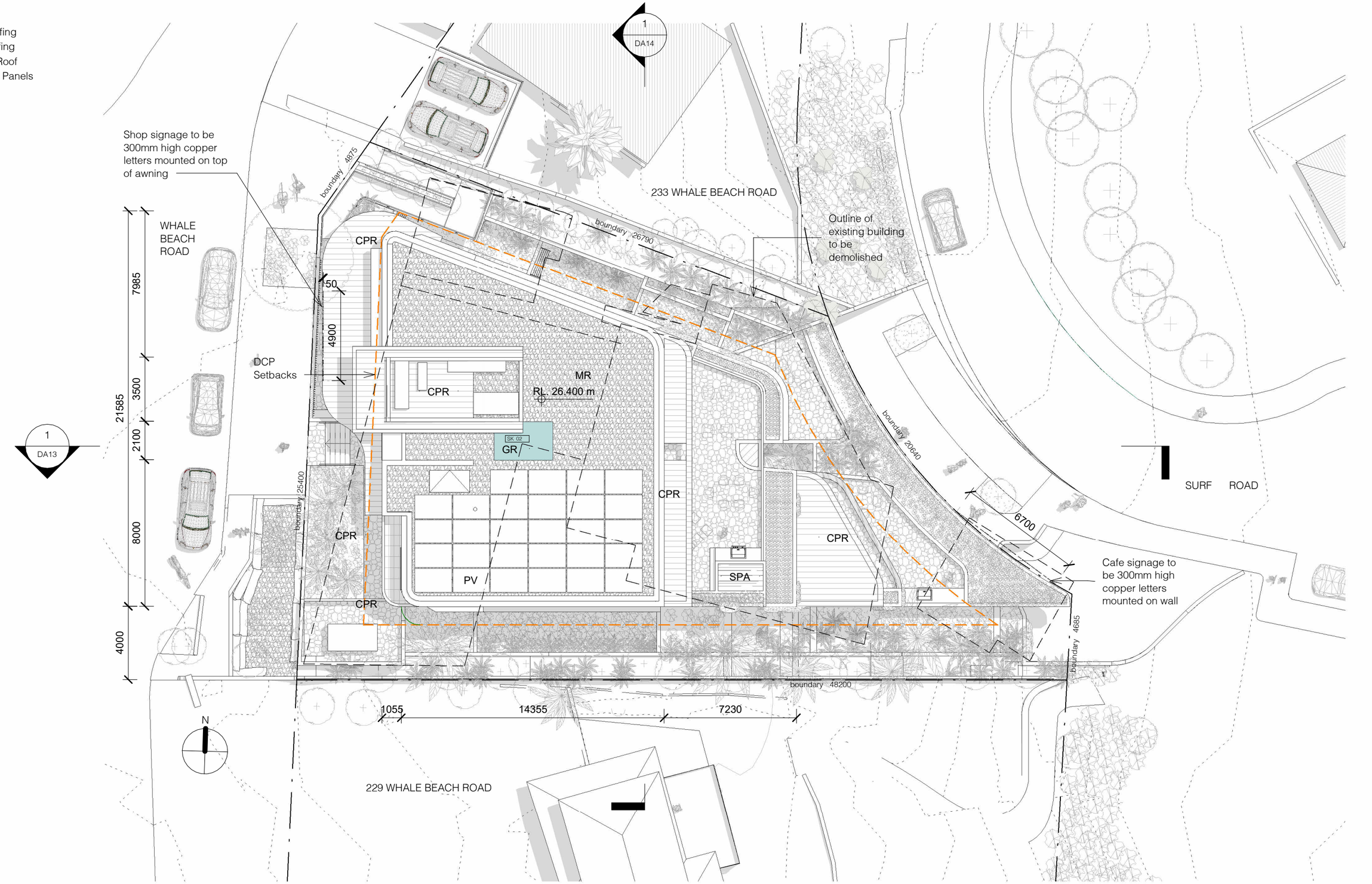
No.	Revision Description	Date
O	Preliminary Revised DA	06/10/2020
P	Revised Development Application	09/10/2020
Q	Revised Development Application	22/04/2021
R	Revised Development Application	27/05/2021
S	Revised Development Application for Review	7/06/20201
T	Revised DA for Review	27/07/2021
U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for Leslie Cassar

Level 4 Plan

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 200
Drawn by	KW		DA08

CPR Copper Roofing
GR Glazed Roofing
MR Membrane Roof
PV Photovoltaic Panels
SPA Spa



1 DA Roof Plan
1 : 200

0 2.0m 4.0m 6.0m 8.0m 10.0m
1:200

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t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

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nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

No.	Revision Description	Date
N	Proposed Revised DA	15/07/2020
O	Preliminary Revised DA	06/10/2020
P	Revised Development Application	09/10/2020
R	Revised Development Application	27/05/2021
S	Revised Development Application for Review	7/06/20201
T	Revised DA for Review	27/07/2021
U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE

DEVELOPMENT APPLICATION

231 Whale Beach Road, Whale Beach

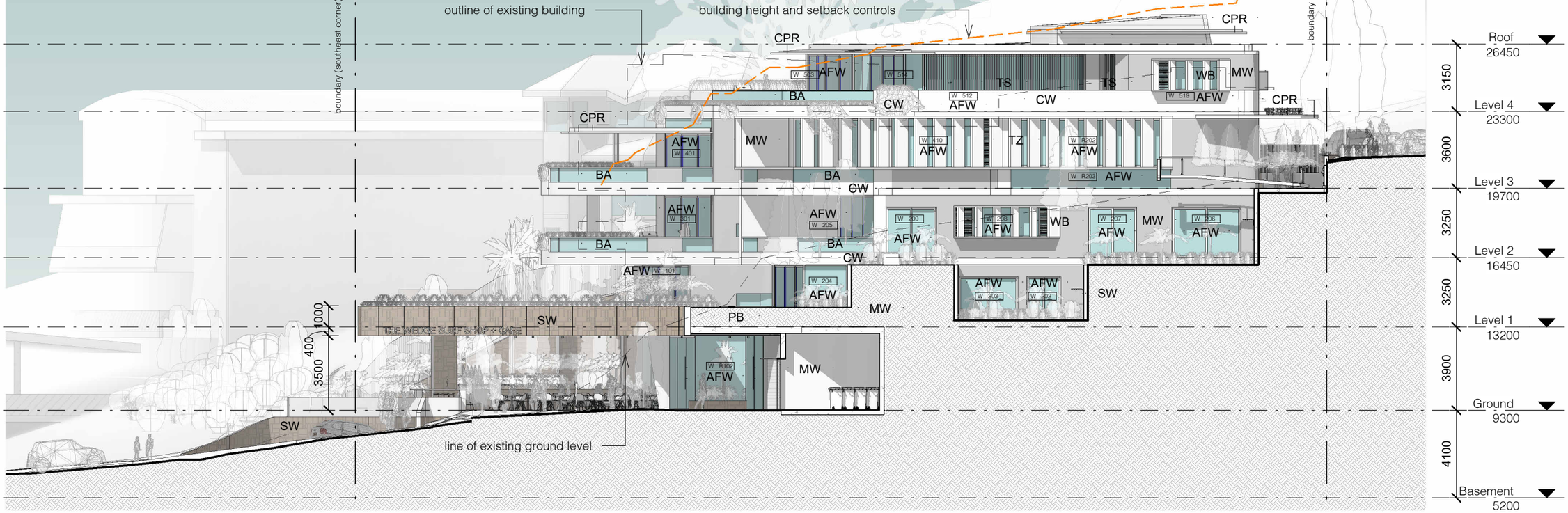
for

Leslie Cassar

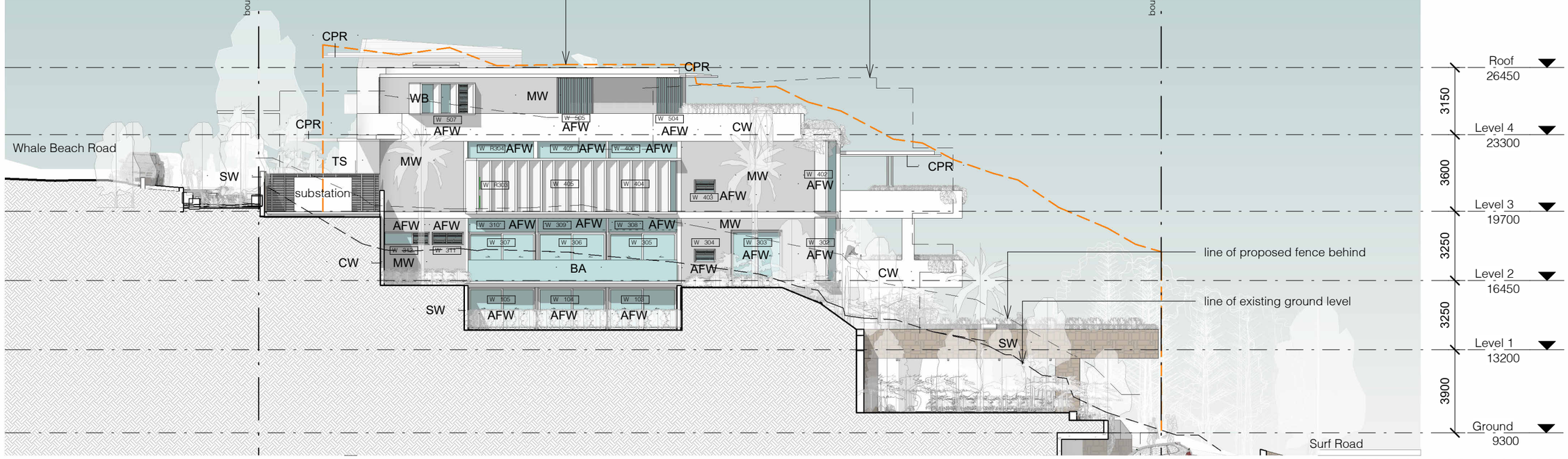
Roof Plan

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 200
Drawn by	KW		DA09

AFW	Aluminium Framed Window
BA	Frameless Glass Balustrade
CPR	Copper Roofing
CW	Concrete Wall
MW	Masonry Wall
PB	Planter Bed
SW	Stone Wall
TS	Timber Screen
TZ	Terrazzo Screen
WB	Window Box



1 North Elevation
1 : 200



2 South Elevation
1 : 200

0 2.0m 4.0m 6.0m 8.0m 10.0m
1:200

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t 02 9918 3843
m 0418 627 024
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No.	Revision Description	Date
M	Development Application	17/04/2020
O	Preliminary Revised DA	06/10/2020
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U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE

DEVELOPMENT APPLICATION

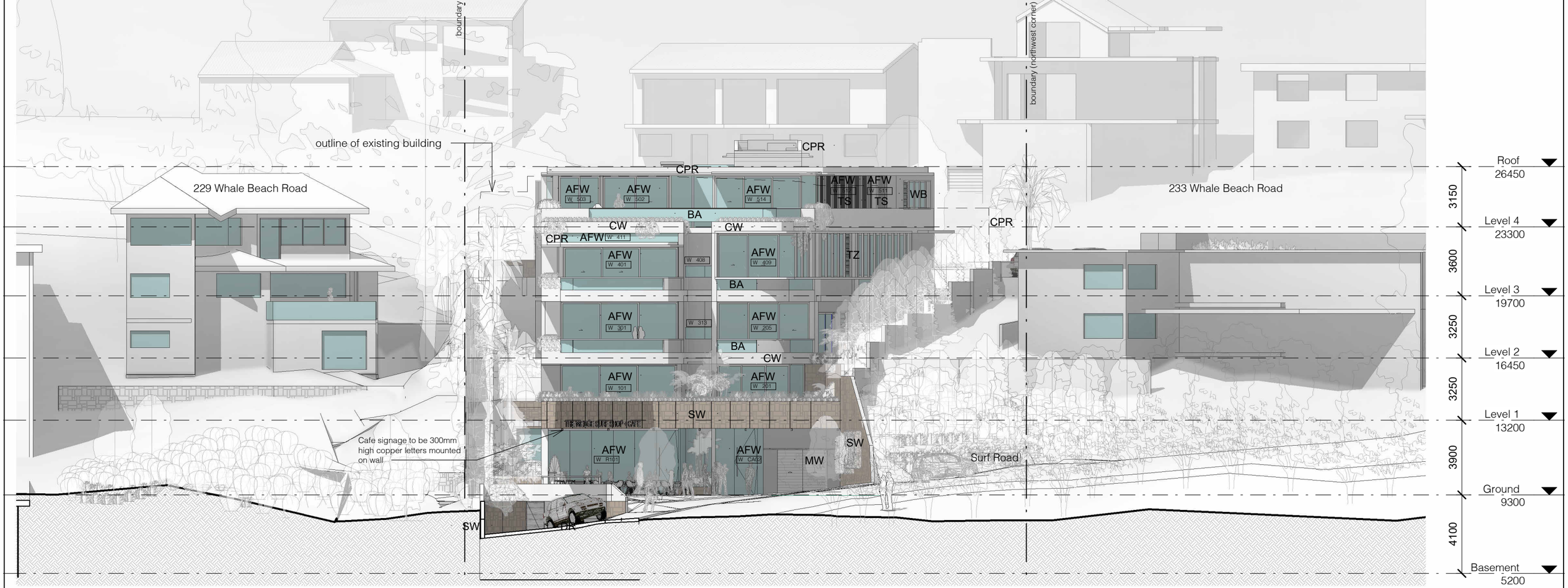
231 Whale Beach Road, Whale Beach

for

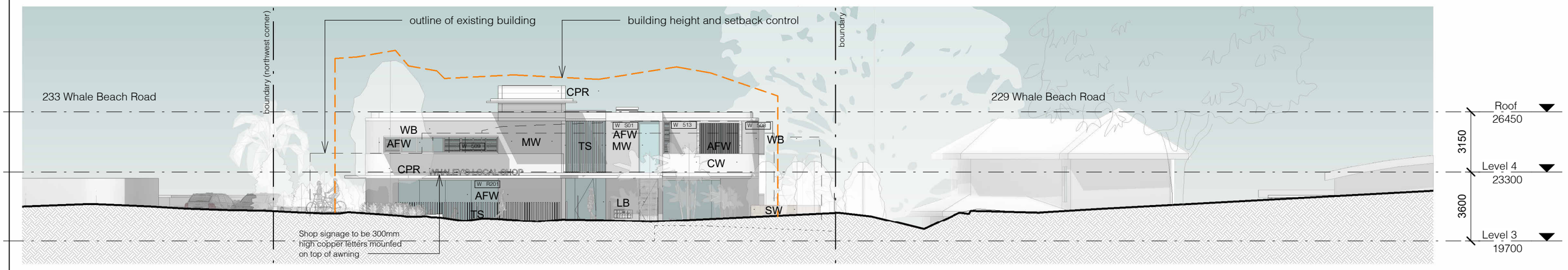
Leslie Cassar

Elevations

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 200
Drawn by	KW		DA10



1 East Elevation
1 : 200



2 West Elevation
1 : 200

AFW	Aluminium Framed Window
BA	Frameless Glass Balustrade
CPR	Copper Roofing
CW	Concrete Wall
DR	Driveway
LB	Letterbox
MW	Masonry Wall
SW	Stone Wall
TS	Timber Screen
TZ	Terrazzo Screen
WB	Window Box

0 2.0m 4.0m 6.0m 8.0m 10.0m

1:200

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No.	Revision Description	Date
M	Development Application	17/04/2020
O	Preliminary Revised DA	06/10/2020
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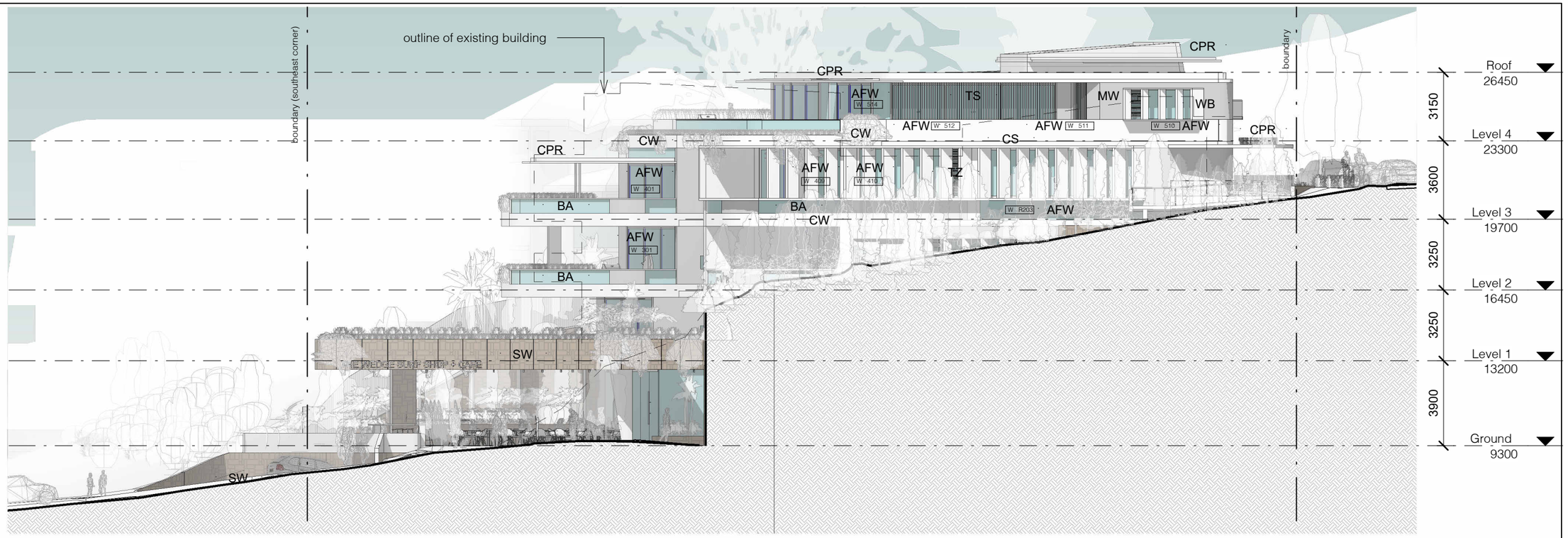
S	Revised Development Application for Review	7/06/20201
T	Revised DA for Review	27/07/2021
U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

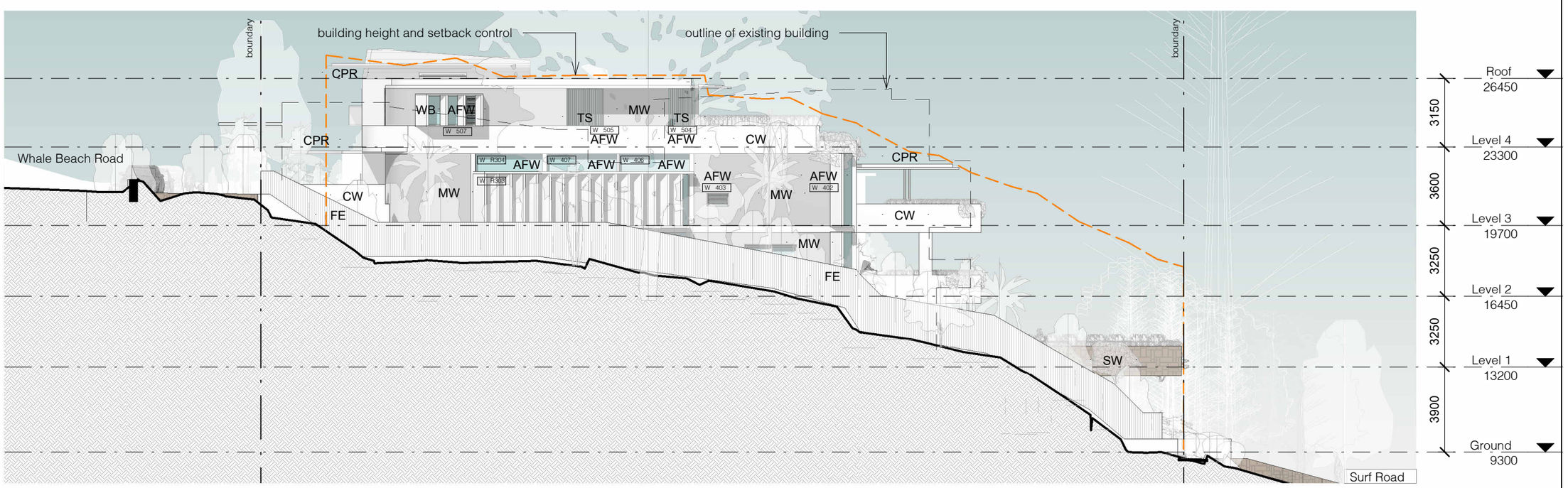
Elevations

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 200
Drawn by	KW		DA11

AFW	Aluminium Framed Window
BA	Frameless Glass Balustrade
CPR	Copper Roofing
CS	Concrete Slab
CW	Concrete Wall
FE	Paling Fence
MW	Masonry Wall
SW	Stone Wall
TS	Timber Screen
TZ	Terrazzo Screen
WB	Window Box



1 North Elevation - on boundary
1 : 200



2 South Elevation - on boundary
1 : 200

0 2.0m 4.0m 6.0m 8.0m 10.0m
1:200

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
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No.	Revision Description	Date
M	Development Application	17/04/2020
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U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE

DEVELOPMENT APPLICATION

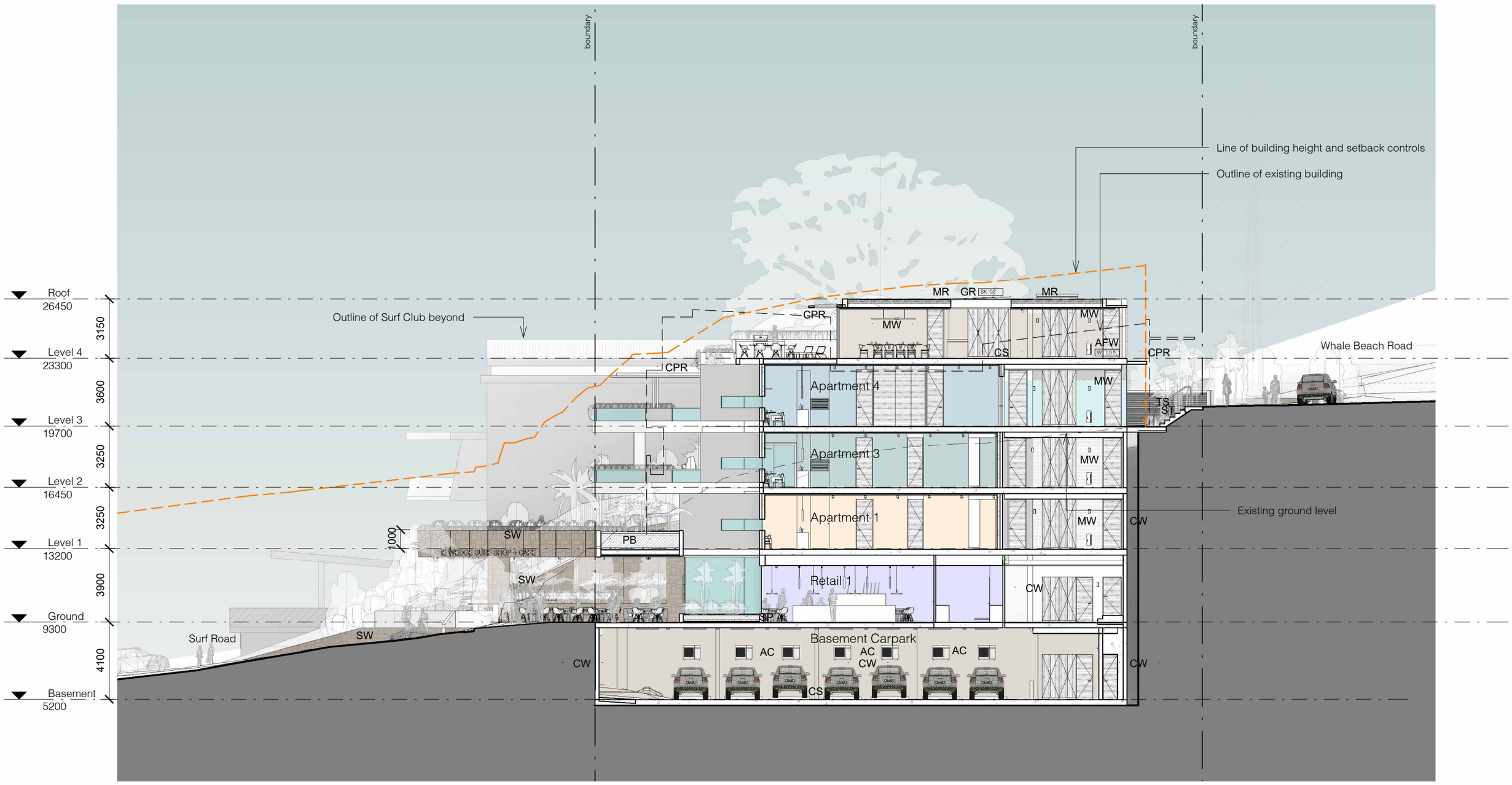
231 Whale Beach Road, Whale Beach

for

Leslie Cassar

Boundary Elevations

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 200
Drawn by	KW		DA12



1 Long Section
1 : 200

AC	AC Condenser	MW	Masonry Wall
AFW	Aluminium Framed Window	PB	Planter Bed
CPR	Copper Roofing	SP	Stone Paving
CS	Concrete Slab	ST	Stair
CW	Concrete Wall	SW	Stone Wall
GR	Glazed Roofing	TS	Timber Screen
MR	Membrane Roof		

0 2.0m 4.0m 6.0m 8.0m 10.0m
1:200

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t 02 9918 3843
m 0418 627 024
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w www.richardcolearchitecture.com.au

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nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

No.	Revision Description	Date
M	Development Application	17/04/2020
O	Preliminary Revised DA	06/10/2020
P	Revised Development Application	09/10/2020
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S	Revised Development Application for Review	7/06/20201
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U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE

DEVELOPMENT APPLICATION

231 Whale Beach Road, Whale Beach

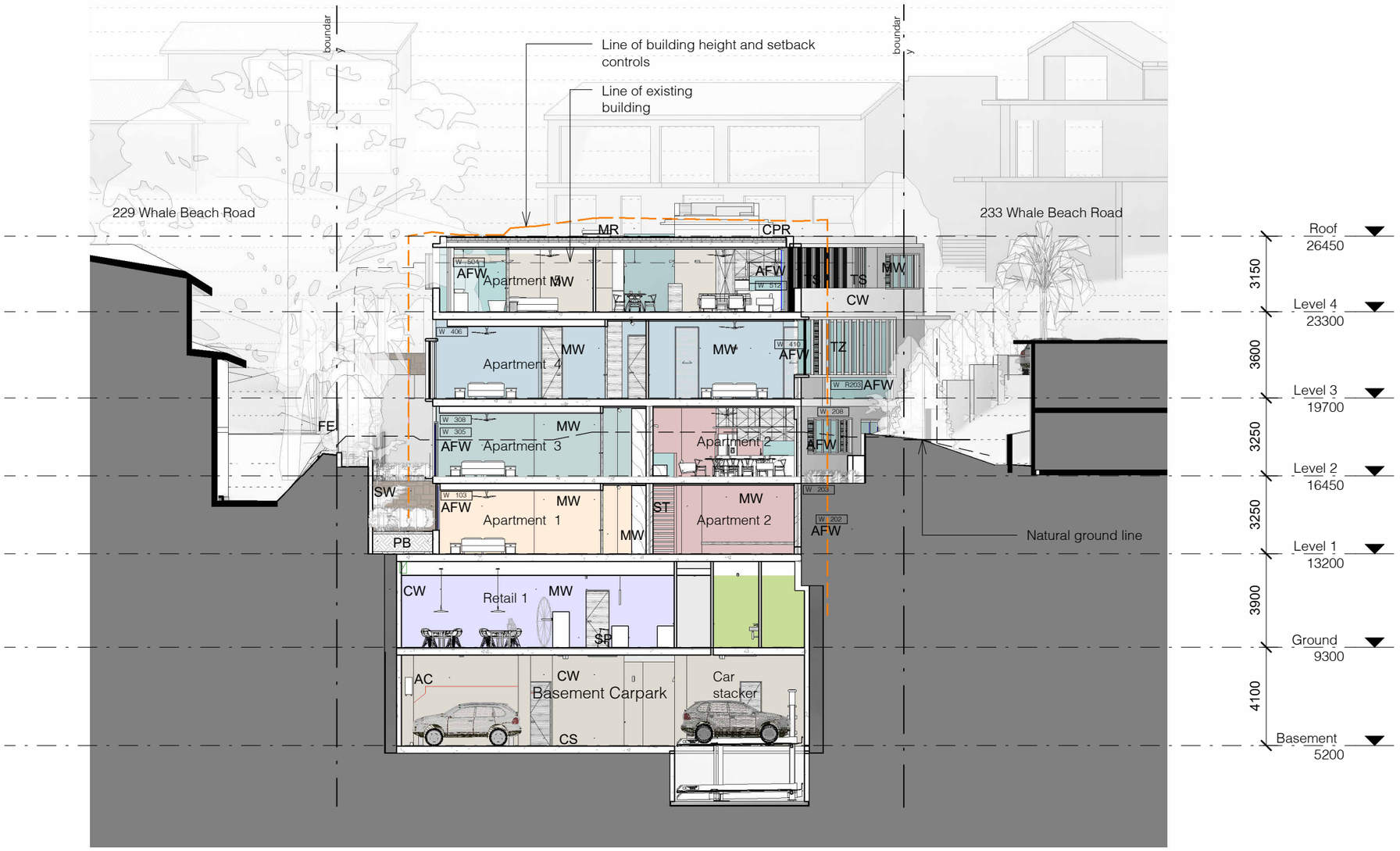
for

Leslie Cassar

Section

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 200
Drawn by	KW		DA13

AC	AC Condenser
AFW	Aluminium Framed Window
CPR	Copper Roofing
CS	Concrete Slab
CW	Concrete Wall
FE	Paling Fence
MR	Membrane Roof
MW	Masonry Wall
PB	Planter Bed
SP	Stone Paving
ST	Stair
SW	Stone Wall
TS	Timber Screen
TZ	Terrazzo Screen



1 Cross Section 1
1 : 200

0 2.0m 4.0m 6.0m 8.0m 10.0m
1:200

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t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

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nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

No.	Revision Description	Date
M	Development Application	17/04/2020
O	Preliminary Revised DA	06/10/2020
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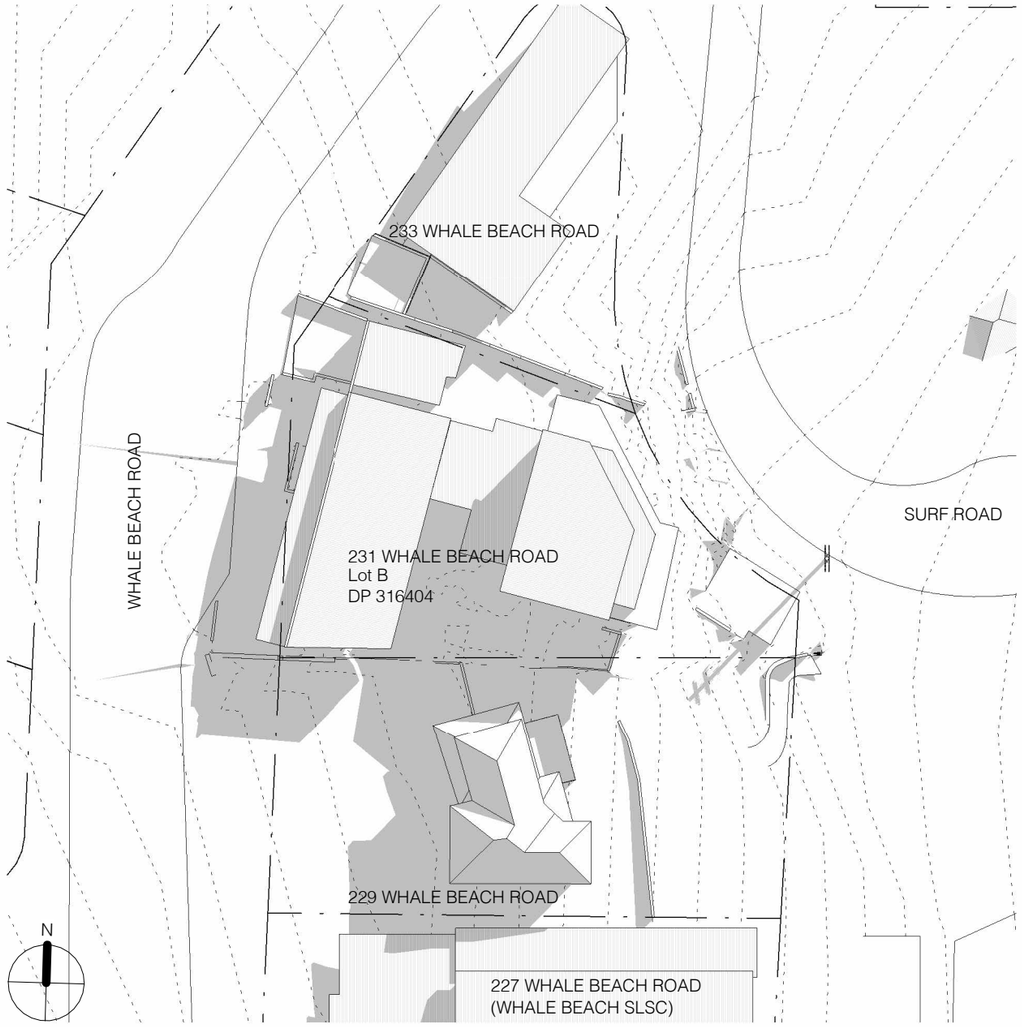
T	Revised DA for Review	27/07/2021
U	Section 8.2 Review	06/08/2021

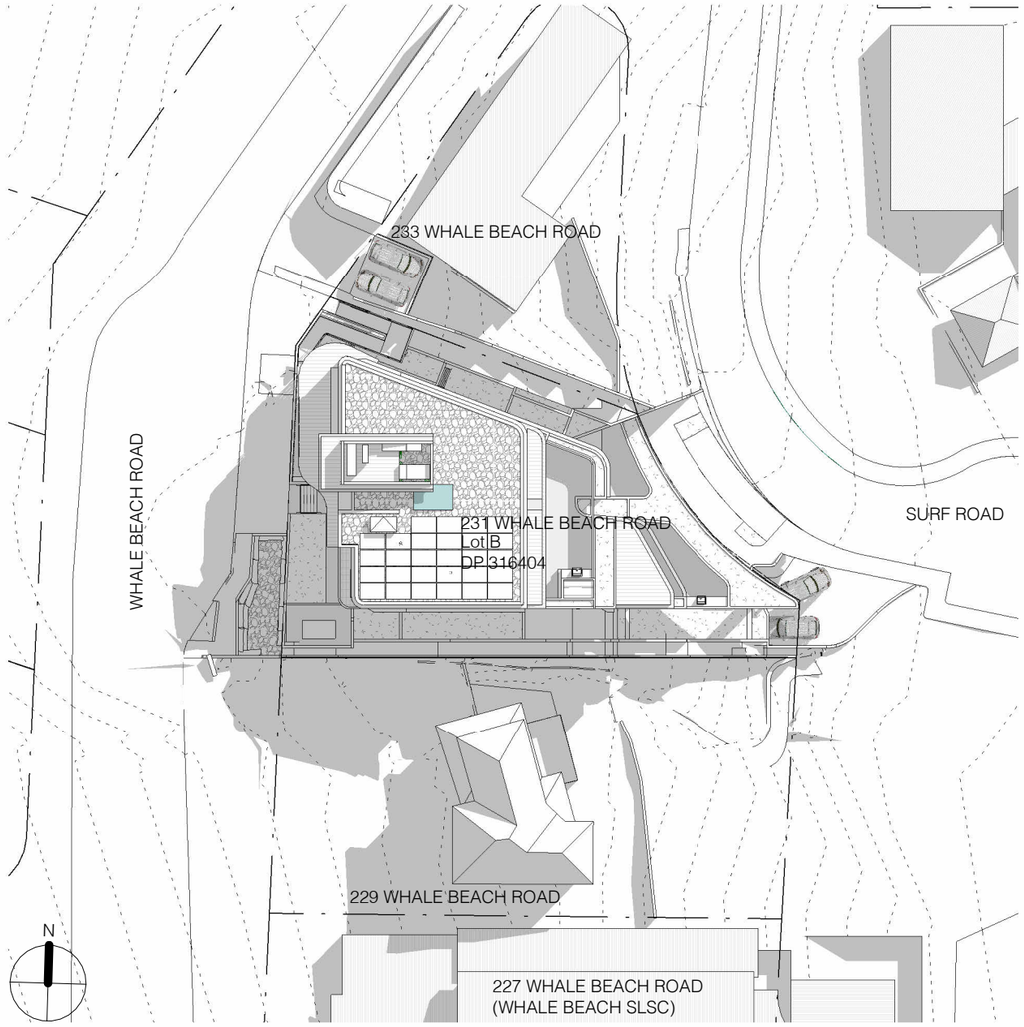
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Section

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 200
Drawn by	KW		DA14



1 June 9am Existing
1 : 500



2 June 9am Proposed
1 : 500

2.8 CERTIFICATION OF SHADOW DIAGRAMS

☑ I/We hereby certify that the shadow diagrams submitted with this proposal are:
- in accordance with the Survey (prepared by a registered Surveyor) which is required to be submitted with the proposal;
- drawn to true – north
- to indicate shadow cast by the proposal at 9am, noon, 3pm and 21 June
- to indicate the shadow cast by existing buildings and structures on the site and in the surrounding area

CERTIFIER'S DETAILS

Title	○ Mr	○ Mrs	○ Miss	☑ Ms	Other:
Given Names	Karla	Family Name	Wilford		
Company	Richard Cole Architecture				
Qualification (i.e Architect, Planner, Consultant, Surveyor)	Architect				

0 5.0m 10.0m 15.0m 20.0m 25.0m
1:500

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
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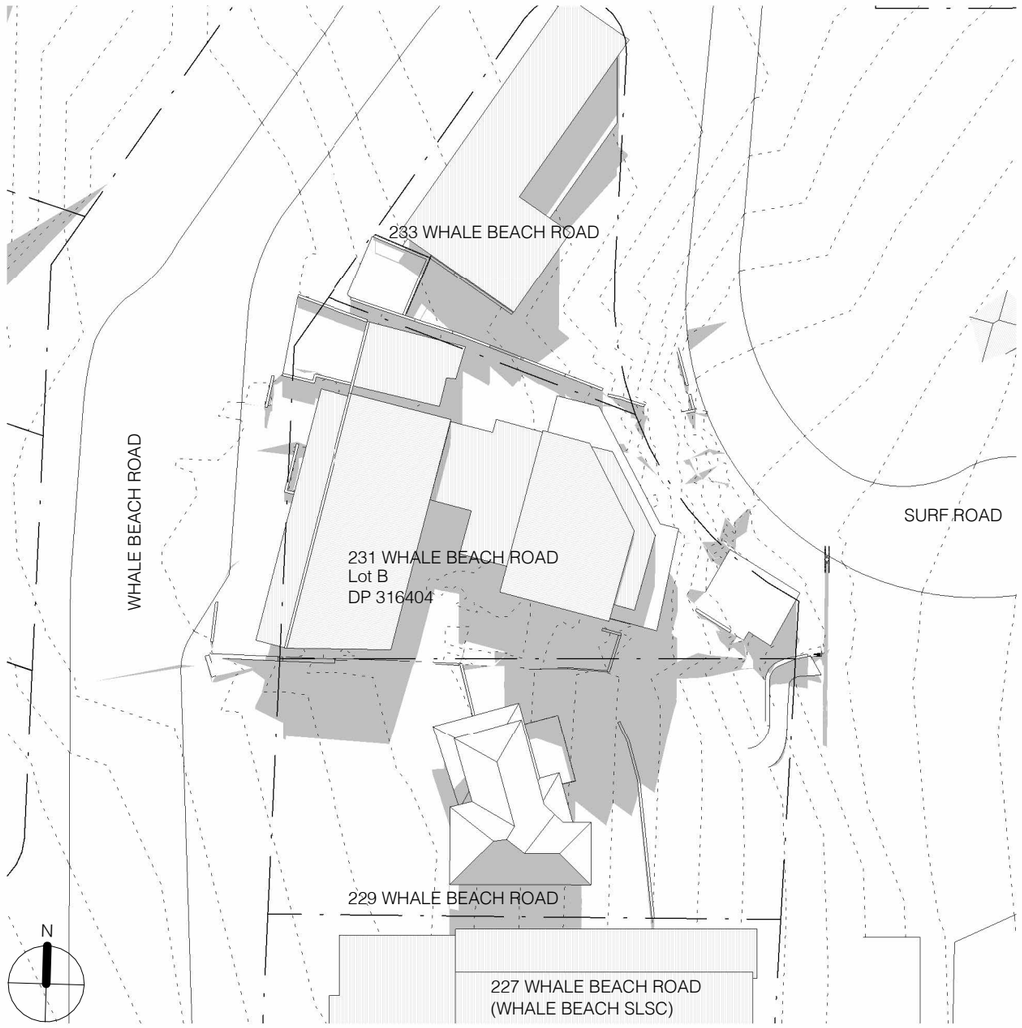
nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

No.	Revision Description	Date
L	Preliminary DA	03/04/2020
M	Development Application	17/04/2020
P	Revised Development Application	09/10/2020
Q	Revised Development Application	22/04/2021
S	Revised Development Application for Review	7/06/20201
T	Revised DA for Review	27/07/2021
U	Section 8.2 Review	06/08/2021

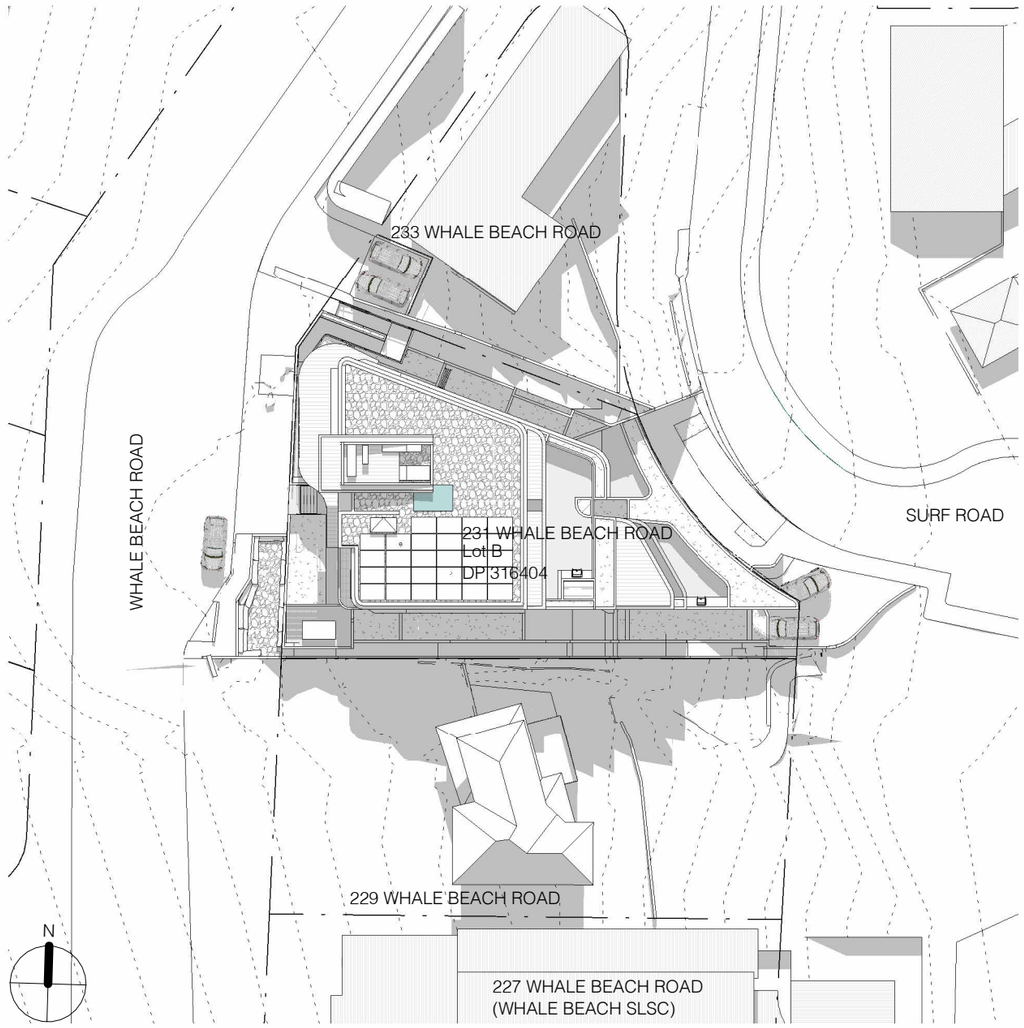
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Shadow Diagram - 900am June 21

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 500
Drawn by	KW		DA15



1 June 12noon Existing
1 : 500



2 June 12noon Proposed
1 : 500

2.8 CERTIFICATION OF SHADOW DIAGRAMS

☑ I/We hereby certify that the shadow diagrams submitted with this proposal are:
- in accordance with the Survey (prepared by a registered Surveyor) which is required to be submitted with the proposal;
- drawn to true – north
- to indicate shadow cast by the proposal at 9am, noon, 3pm and 21 June
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Given Names	Karla	Family Name	Wilford	
Company	Richard Cole Architecture			
Qualification (i.e Architect, Planner, Consultant, Surveyor)	Architect			

0 5.0m 10.0m 15.0m 20.0m 25.0m
1:500

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t 02 9918 3843
m 0418 627 024
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No.	Revision Description	Date
L	Preliminary DA	03/04/2020
M	Development Application	17/04/2020
P	Revised Development Application	09/10/2020
Q	Revised Development Application	22/04/2021
S	Revised Development Application for Review	7/06/20201
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U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE

DEVELOPMENT APPLICATION

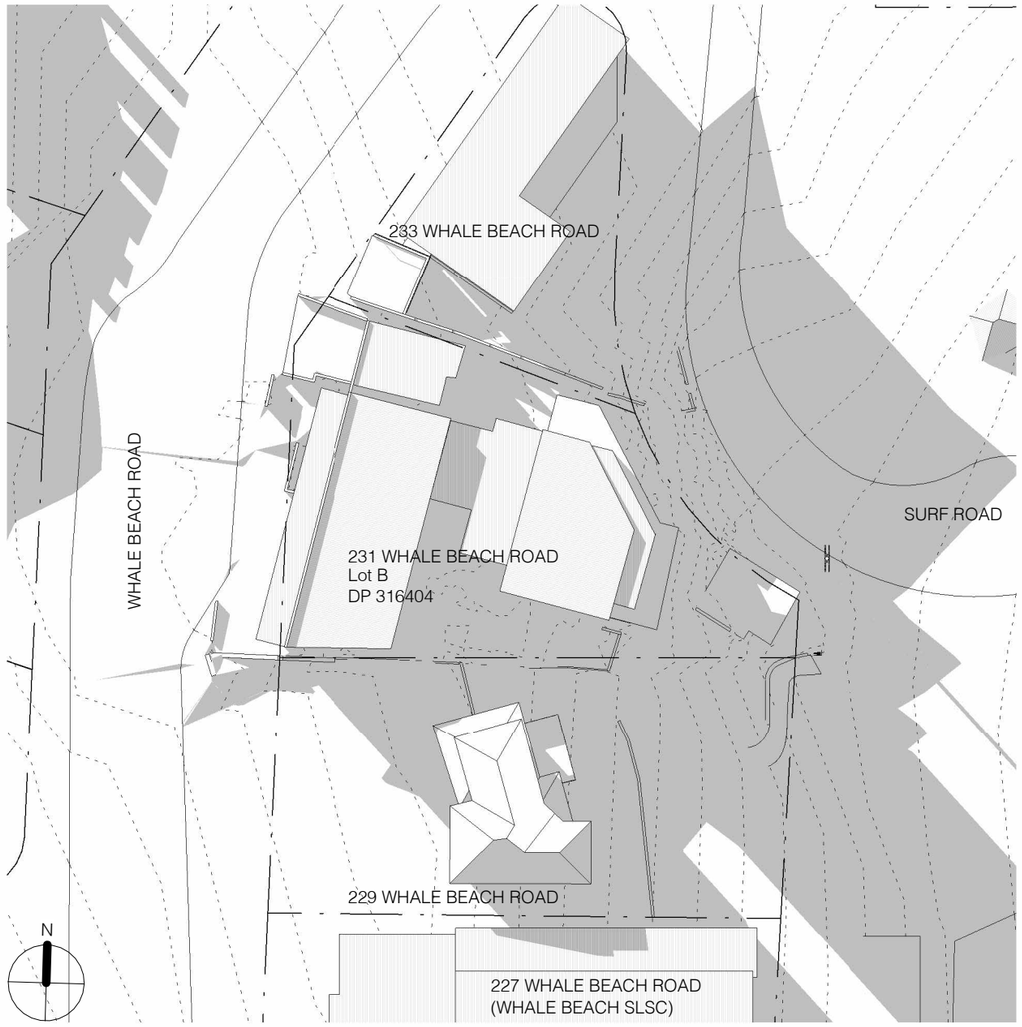
231 Whale Beach Road, Whale Beach

for

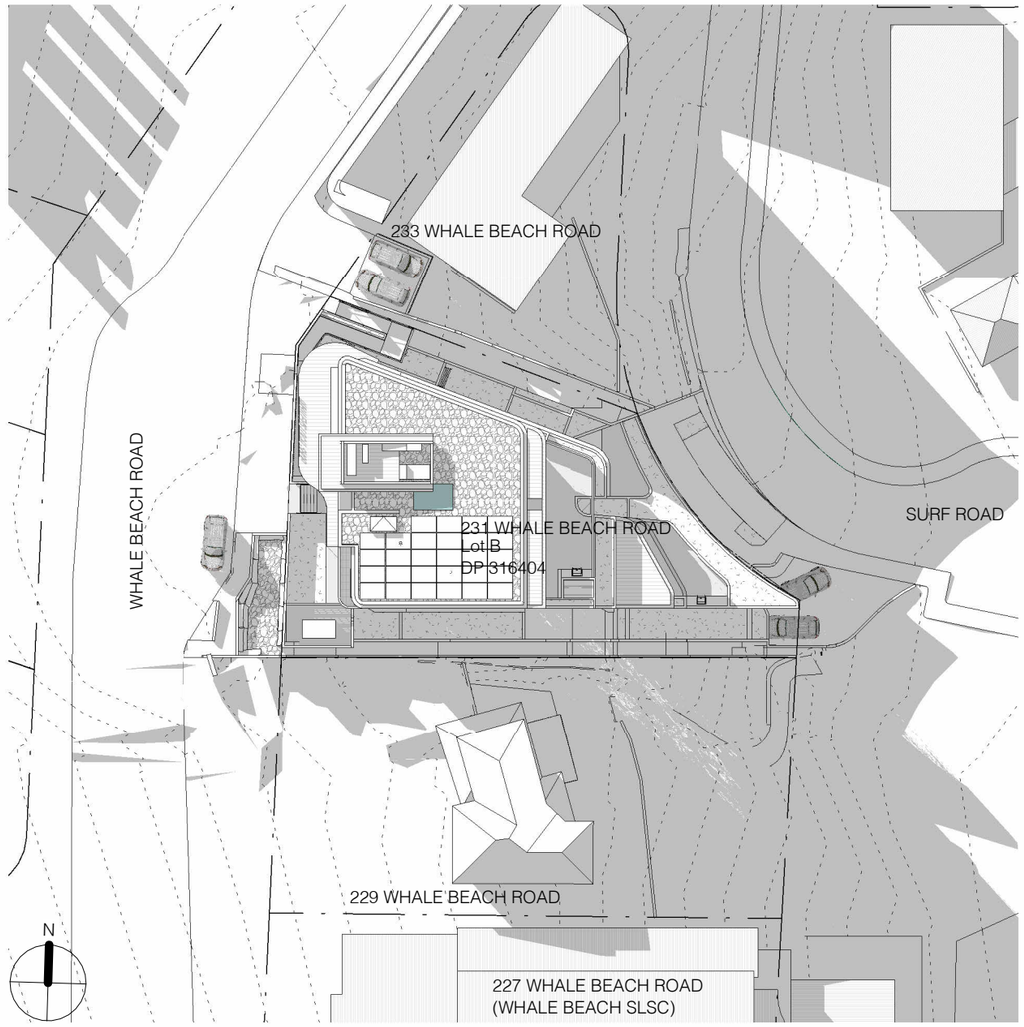
Leslie Cassar

Shadow Diagram - 1200noon June 21

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 500
Drawn by	KW		DA16



1 June 3pm Existing
1 : 500



2 June 3pm Proposed
1 : 500

2.8 CERTIFICATION OF SHADOW DIAGRAMS

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- in accordance with the Survey (prepared by a registered Surveyor) which is required to be submitted with the proposal;
- drawn to true – north
- to indicate shadow cast by the proposal at 9am, noon, 3pm and 21 June
- to indicate the shadow cast by existing buildings and structures on the site and in the surrounding area

CERTIFIER'S DETAILS

Title	○ Mr ○ Mrs ○ Miss ☑ Ms		Other:		
Given Names	Karla	Family Name		Wilford	
Company	Richard Cole Architecture				
Qualification (i.e Architect, Planner, Consultant, Surveyor)	Architect				

0 5.0m 10.0m 15.0m 20.0m 25.0m
1:500

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t 02 9918 3843
m 0418 627 024
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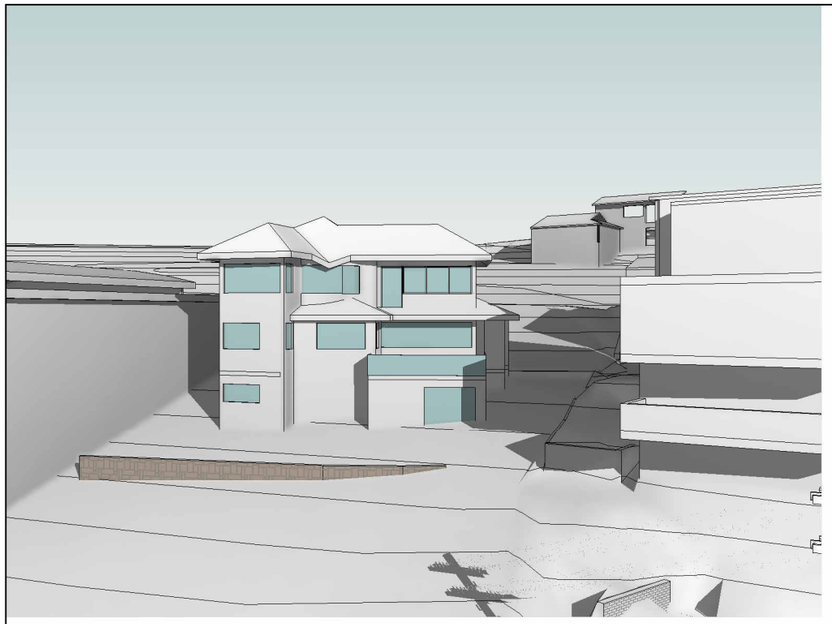
nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

No.	Revision Description	Date
L	Preliminary DA	03/04/2020
M	Development Application	17/04/2020
P	Revised Development Application	09/10/2020
Q	Revised Development Application	22/04/2021
S	Revised Development Application for Review	7/06/20201
T	Revised DA for Review	27/07/2021
U	Section 8.2 Review	06/08/2021

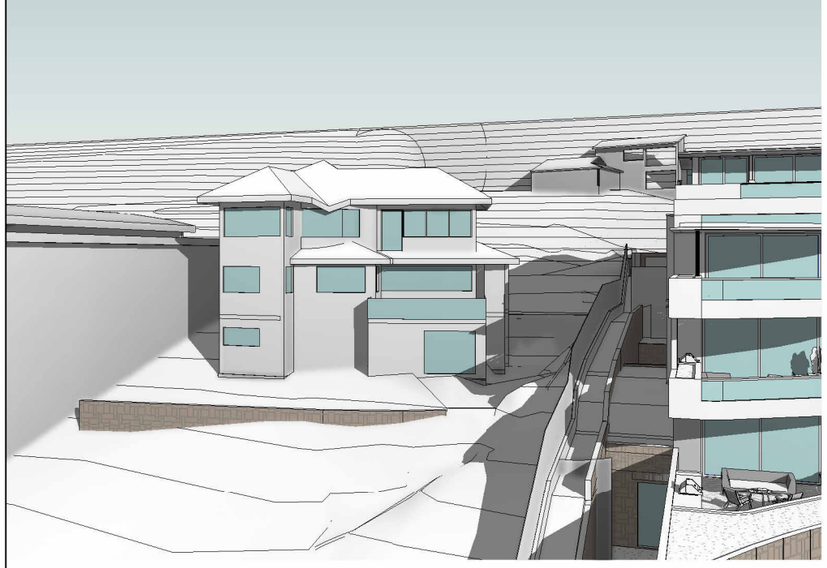
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Shadow Diagram - 300pm June 21

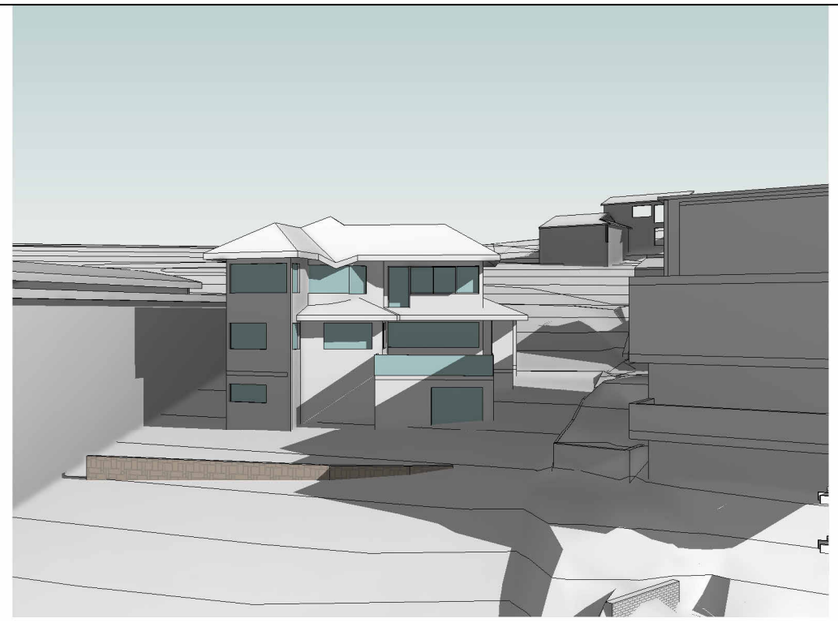
Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 500
Drawn by	KW		DA17



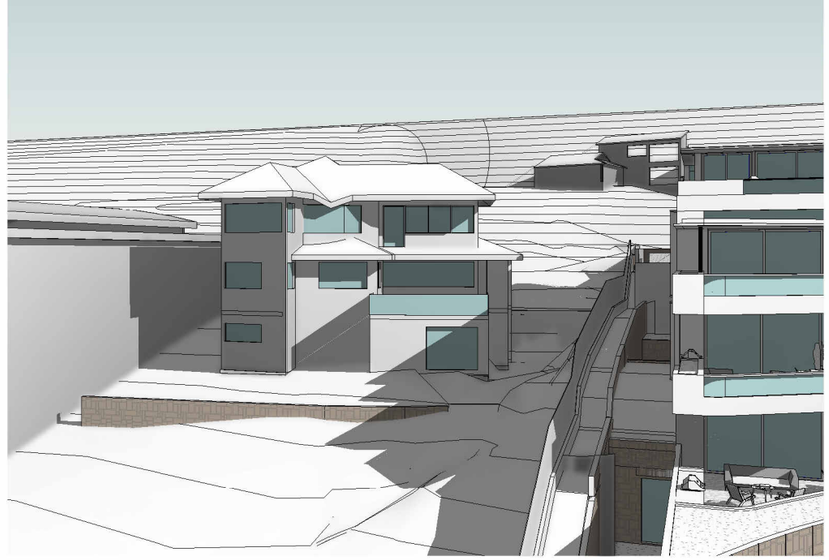
1 Neighbour - Shadow study 900am - Existing



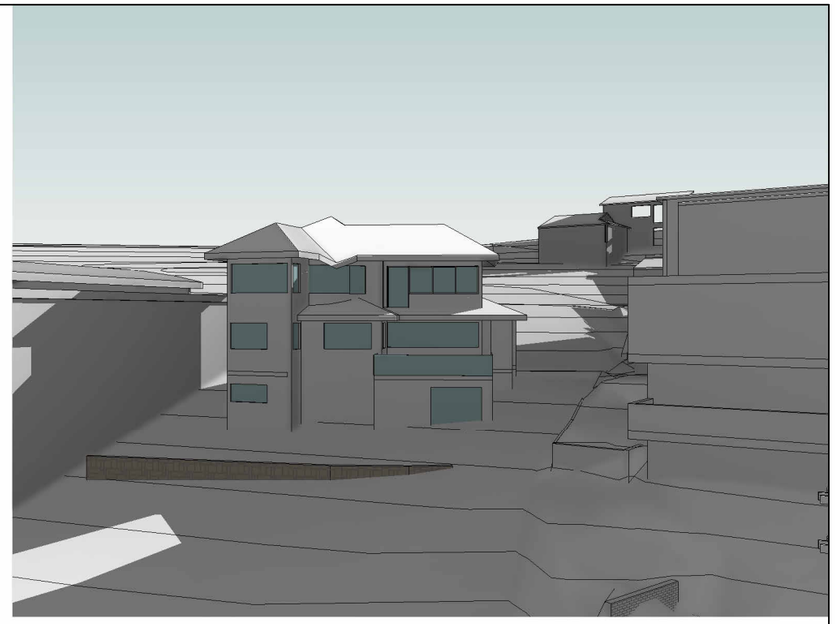
2 Neighbour - Shadow study 900am



3 Neighbour - Shadow study 1200noon - Existing



4 Neighbour - Shadow study 1200noon



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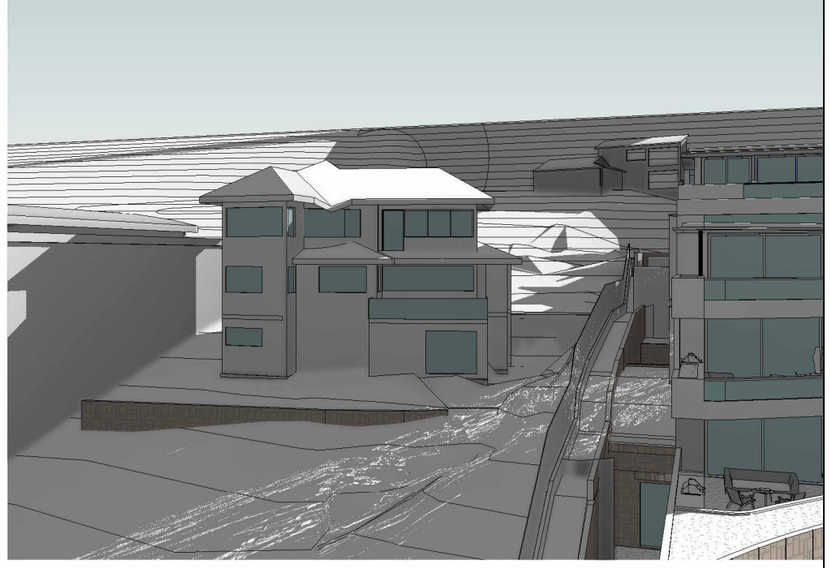


6 Neighbour - Shadow study 300pm

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

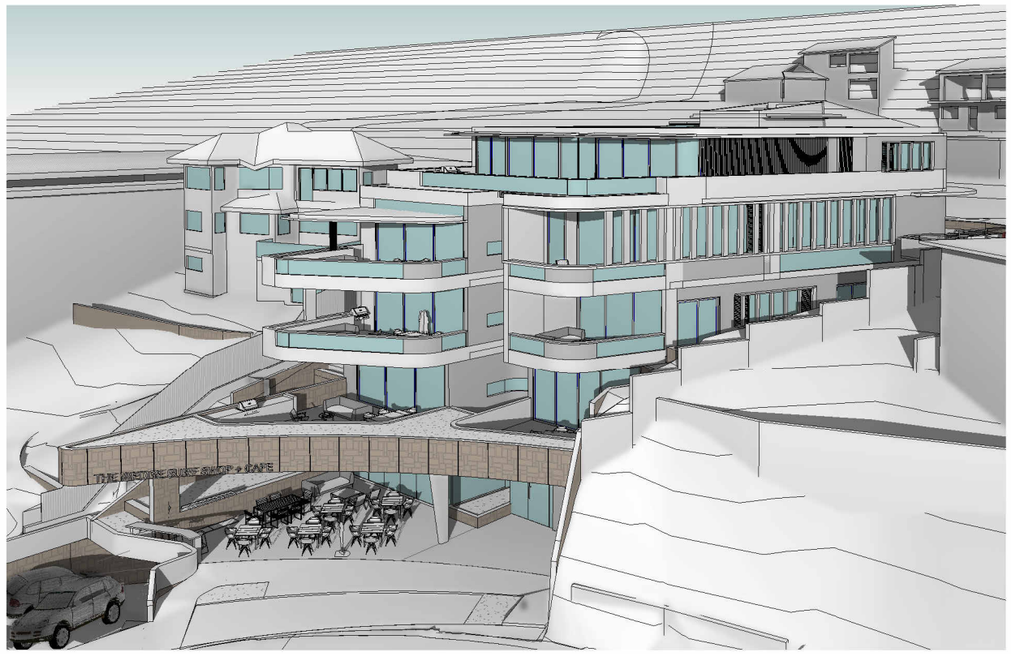
acn:093 598 415 abn:58 093 598 415
nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

No.	Revision Description	Date
L	Preliminary DA	03/04/2020
M	Development Application	17/04/2020
P	Revised Development Application	09/10/2020
Q	Revised Development Application	22/04/2021
S	Revised Development Application for Review	7/06/20201
T	Revised DA for Review	27/07/2021
U	Section 8.2 Review	06/08/2021

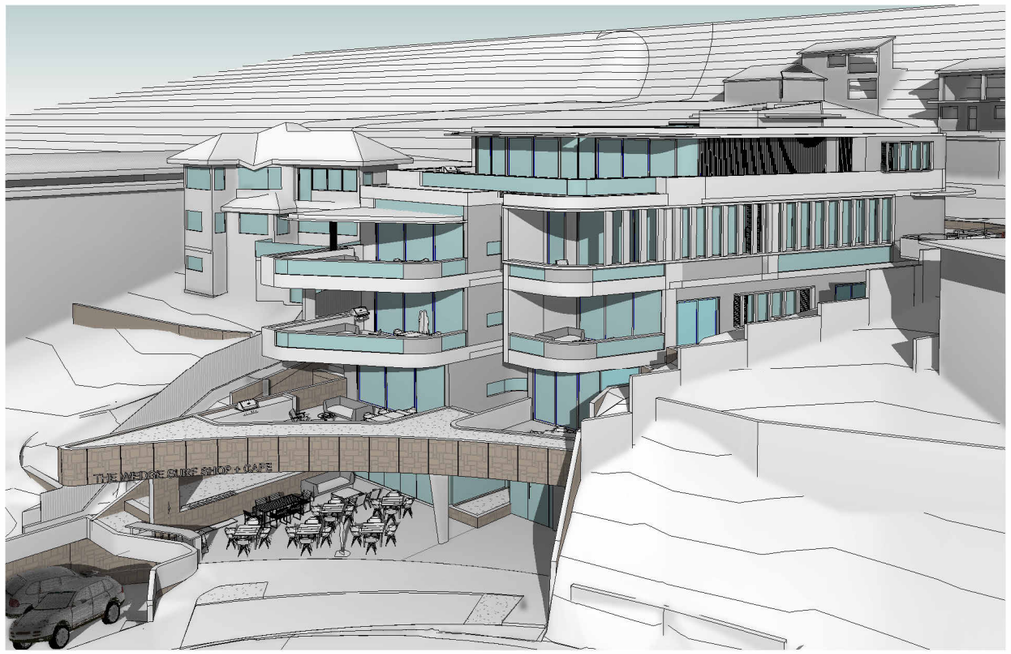
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Neighbouring Shadow Studies

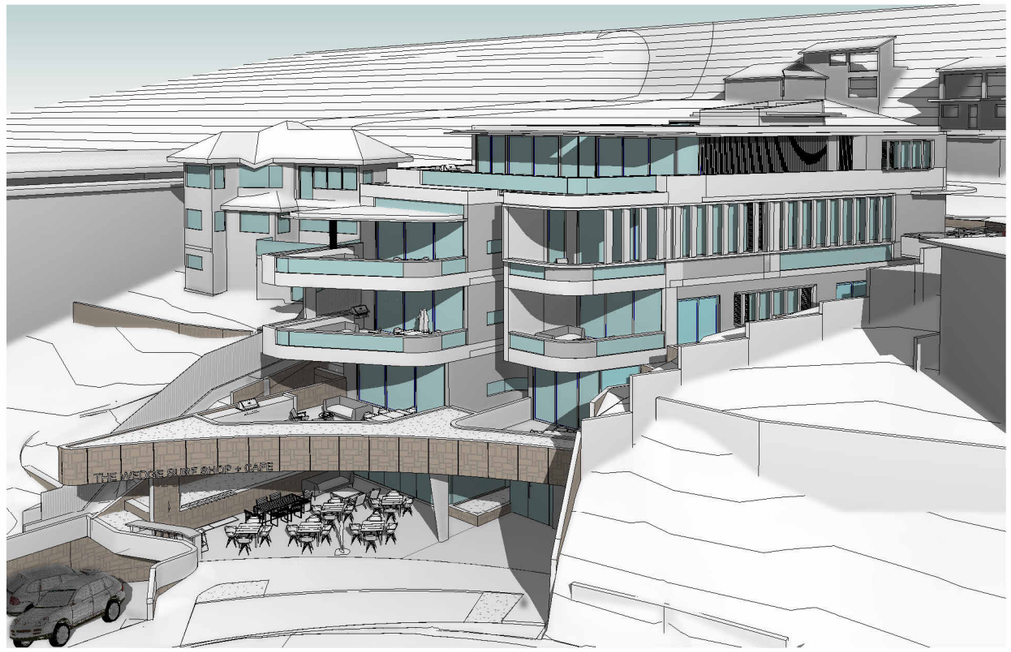
Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	
Drawn by	KW		DA18



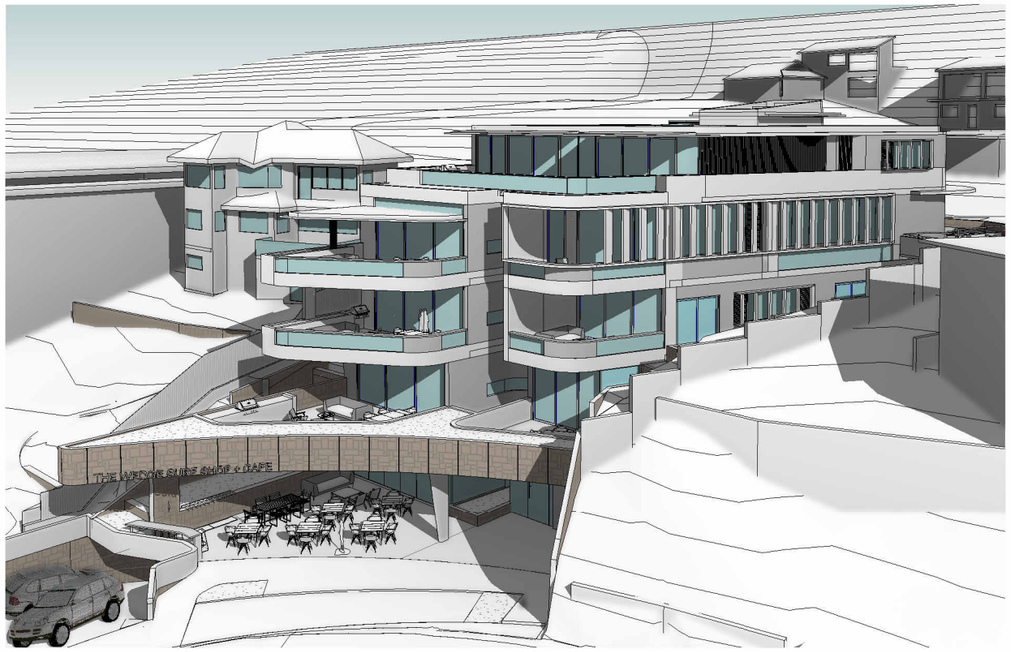
1 Solar Access Northern View - June 22 800am



2 Solar Access Northern View - June 22 900am



3 Solar Access Northern View - June 22 1000am



4 Solar Access Northern View - June 22 1100am

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

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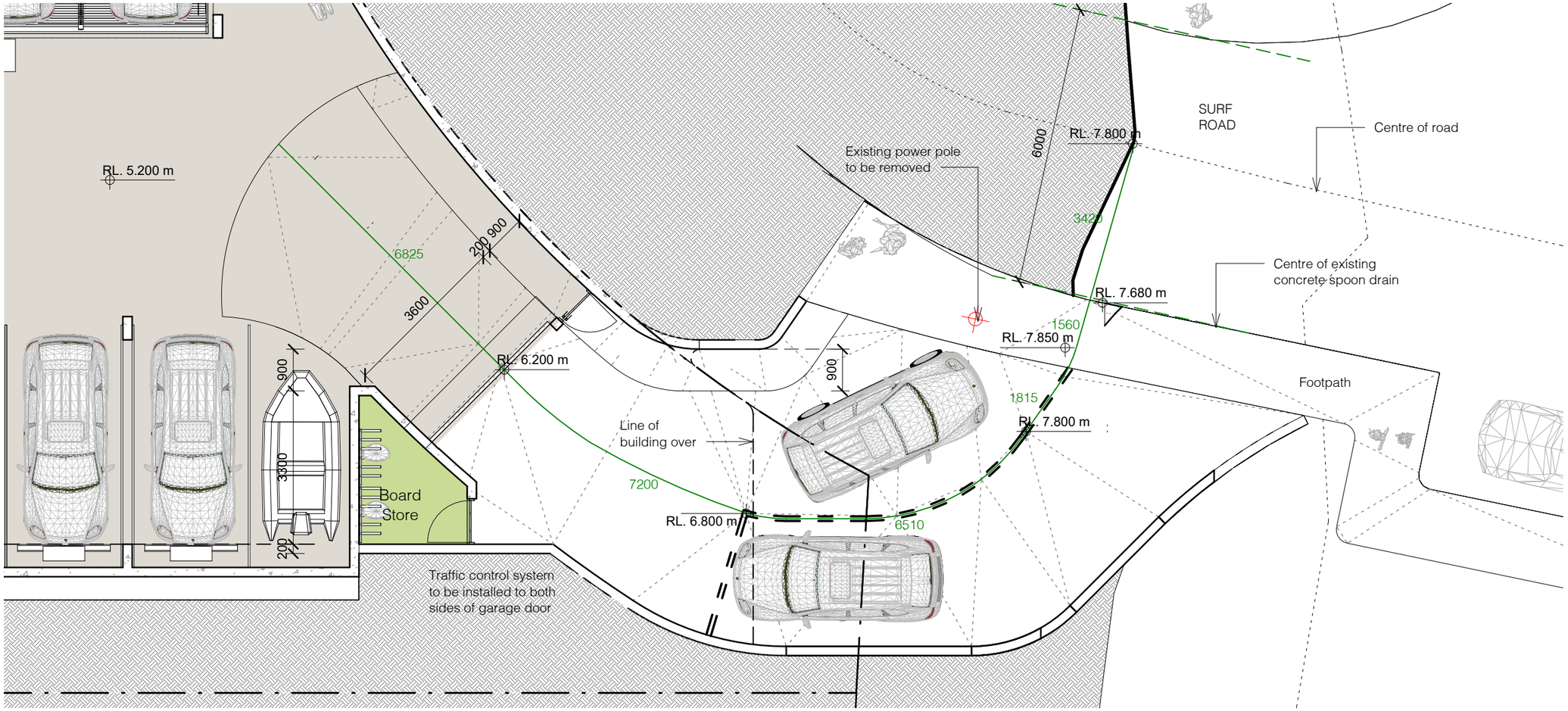
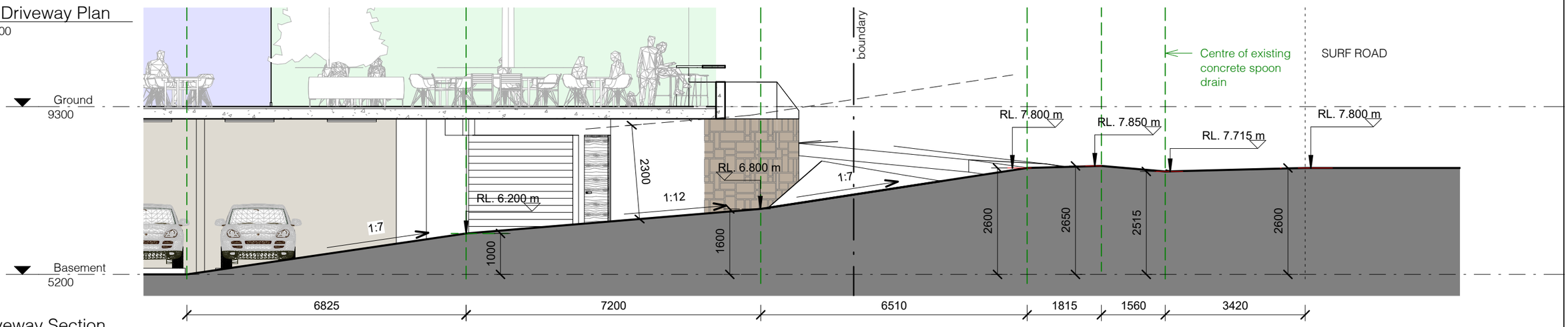
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Solar Access Study

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	
Drawn by	KW		DA19



1 DA Driveway Plan
1 : 100



2 Driveway Section
1 : 100

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m 0418 627 024
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WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Driveway Profile

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 100
Drawn by	KW		DA20

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WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Photomontage - Whale Beach Road

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 1
Drawn by	KW		DA21

VIEW OF EXISTING BUILDING FROM SURF ROAD

VIEW OF PROPOSED BUILDING FROM SURF ROAD

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t 02 9918 3843
m 0418 627 024
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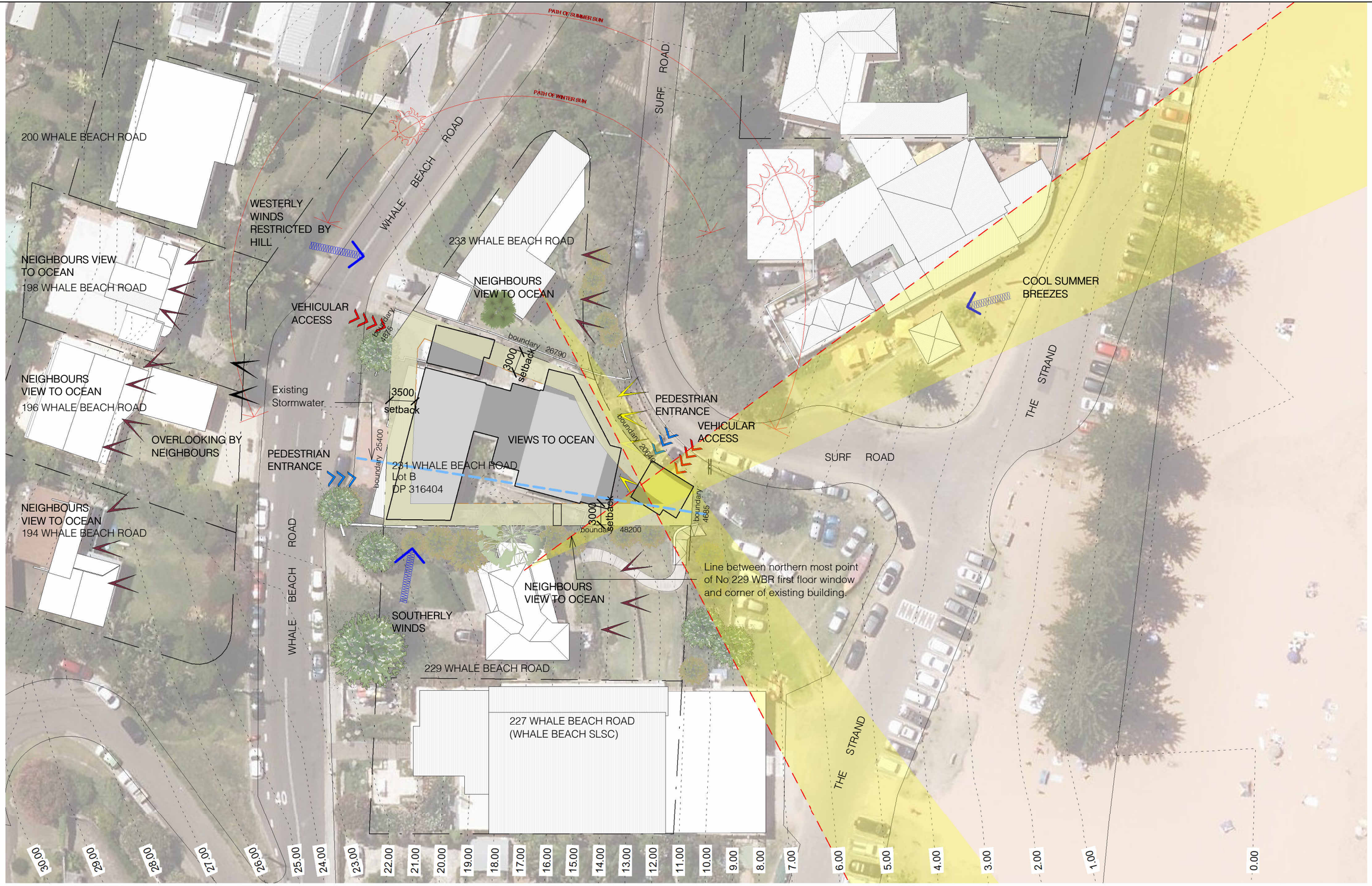
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Photomontage - Surf Road

Project number	1609	Checked by	Checker
Date	AUGUST 2021	Scale	1 : 1
Drawn by	Author		DA22



N

1 DA Site Analysis - Existing
1 : 500

0 5.0m 10.0m 15.0m 20.0m 25.0m
1:500

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
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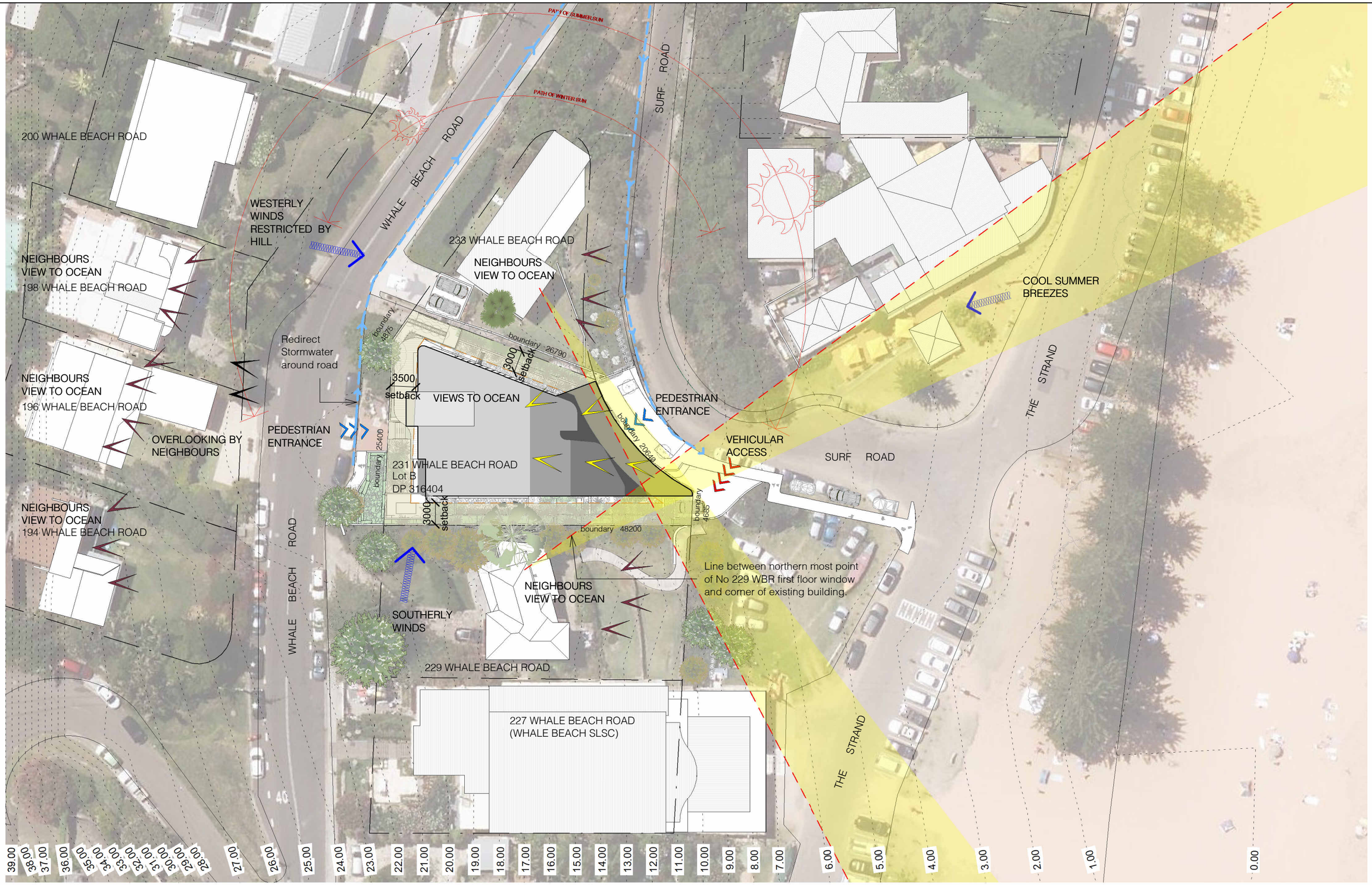
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Site Analysis - Existing

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 500
Drawn by	KW		DA23



1 DA Site Analysis - Proposed
1 : 500

0 5.0m 10.0m 15.0m 20.0m 25.0m
1:500

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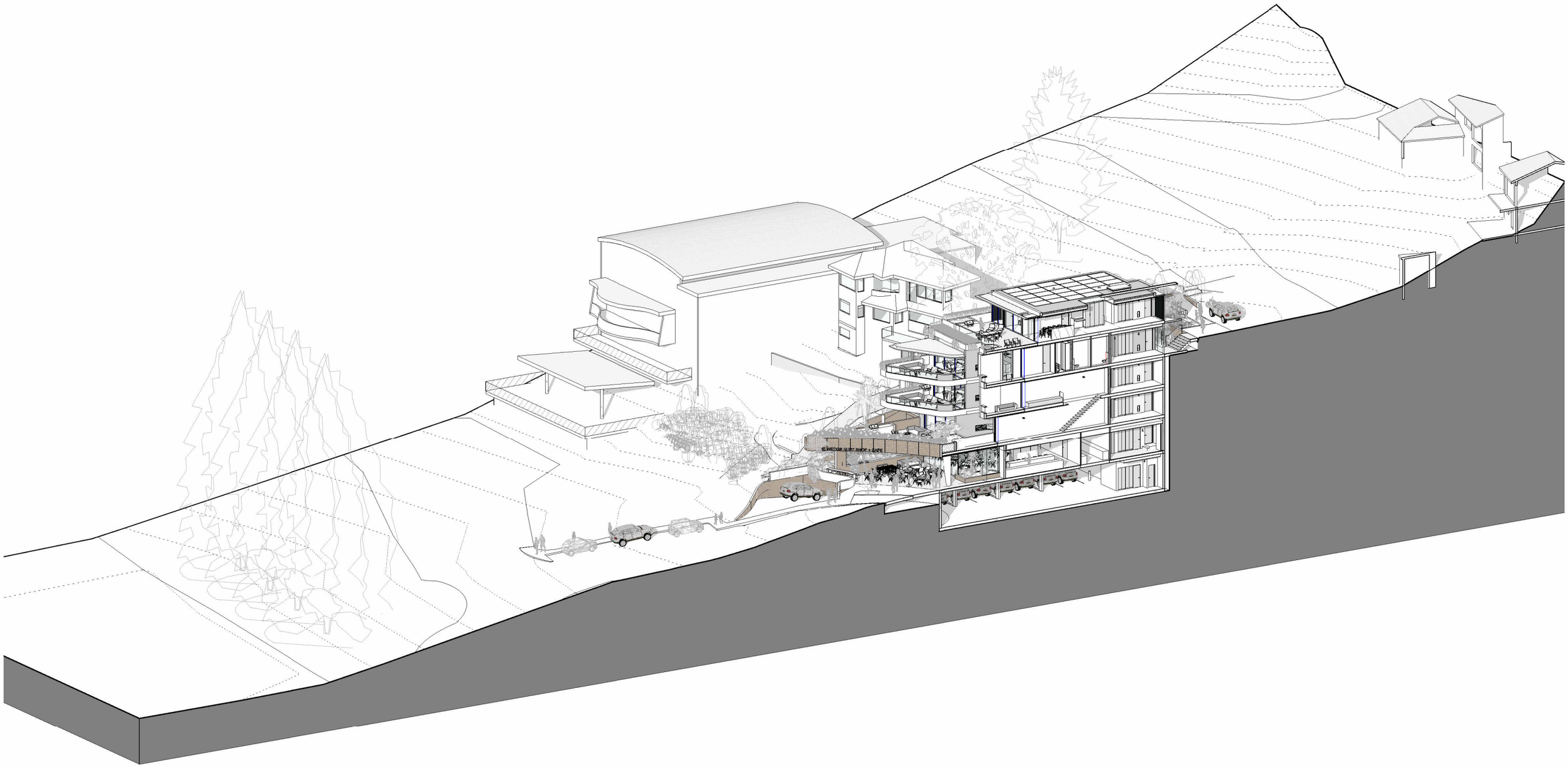
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Site Analysis - Proposed

Project number	1609	Checked by	Checker
Date	AUGUST 2021	Scale	1 : 500
Drawn by	Author		DA24



1 DA Sectional Perspective

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
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WHALE BEACH NEIGHBOURHOOD CENTRE

DEVELOPMENT APPLICATION

231 Whale Beach Road, Whale Beach

for

Leslie Cassar

Sectional Perspective (Site)

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	
Drawn by	KW		DA30

BUILDING HEIGHT

PITTWATER LEP:
8.5 metres or less in height

UNIT 1	COMPLIES
UNIT 2	COMPLIES
UNIT 3	COMPLIES
RETAIL 1	COMPLIES
RETAIL 2	COMPLIES
RETAIL 3	COMPLIES
UNIT 4	COMPLIES
UNIT 5	COMPLIES

COMPLIES

DENSITY AND SCALE

PITTWATER LEP:
Shop Top Housing in B1 Neighbourhood Centre is a maximum of 1 dwelling/ 150 square metres of site area.

SITE AREA = 844 sqm
Number of dwellings = 5

COMPLIES

PITTWATER DCP:
The commercial/retail component of the development must be a minimum of 25% of the gross floor area of the building.
The resubdivision of individual or groups of dwellings subsequent to development consent may be carried out by any method of subdivision including Strata Subdivision, Community Title Subdivision, or Torrens Title Subdivision. Parking spaces, loading bays, and space for any other purpose forming a part of a sole occupancy unit are to be allocated to the dwelling.
Landscaped areas, access areas and signage not forming part of an individual dwelling must be included as common property.

Gross Floor Area = 1213sqm
Proposed Retail GLA = 299 sqm = 25%

Where variation is sought to the minimum requirement for commercial floor space, the applicant is required to justify that the commercial viability of the centre will not be affected in the short or long term and that residents can continue to be provided with a full range of services and facilities.

Note that an external terrace has also been provided for the retail space on the Ground floor level = 72 sqm

COMPLIES

PRIVATE OPEN SPACE

PITTWATER DCP:
For Shop Top Housing, residential flat buildings and multi dwelling housing, private open space at upper levels in the form of front/rear or internal courtyard balconies and terraces are required. The dimension of the balcony should be sufficient so that the area can be usable for recreational purposes (ie a minimum area of 10m2 and a minimum width of 2.4 metres). First floor balconies along the side boundary must bedesigned to limit overlooking and maintain privacy of adjoining residences.
Balconies are prohibited from overhanging public property.

PRIVATE OPEN SPACE

APARTMENT 1	43 sqm
APARTMENT 2	41 sqm
APARTMENT 3	29 sqm
APARTMENT 4	47 sqm
APARTMENT 5	69 sqm

COMPLIES

LANDSCAPE

PITTWATER DCP:
For shop top housing, a planter or landscaped area with minimum area of 4m ^{2} is to be provided as a feature at the ground floor of the front building facade. This feature is to be positioned to soften any hard edges of the building including any ramps, podiums or changes in levels.

For shop top housing, a minimum landscaped area of 20% of the site area, or 35m2 per dwelling, whichever is the greater, shall be provided. For shop top housing development landscaping is to be provided at the front and rear of the development. For development containing 3 or more dwellings, permanent seating is to be provided in the landscaped area.

Above ground gardens are to be incorporated into each dwelling at all levels (other than ground floor).

TOTAL SITE AREA		844 sqm
REQUIRED LANDSCAPED AREA	20%	168.8 sqm
	5 X 35 sqm	175 sqm
LANDSCAPED AREAS		245.70 sqm
Includes 84.3 sqm (10%) of deep soil >3m wide		
ADDITIONAL LANDSCAPED AREA		43.59 sqm
Planter Beds greater than 800mm deep		
TOTAL PROPOSED LANDSCAPE AREA		289.29 sqm = 34.3%

COMPLIES

SOLAR ACCESS

PITTWATER DCP:
The main private open space of each dwelling and the main private open space of any adjoining dwellings are to receive a minimum of 3 hours of sunlight between 9am and 3pm on June 21st.
Windows to the principal living area of the proposal, and windows to the principal living area of adjoining dwellings, are to receive a minimum of 3 hours of sunlight between 9am and 3pm on June 21st (that is, to at least 50% of the glazed area of those windows).
Solar collectors for hot water or electricity shall receive at least 6 hours of sunshine between 8.00am and 4.00pm during mid winter.
Developments should maximise sunshine to clothes drying areas of the proposed development or adjoining dwellings.

APARTMENT 1	COMPLIES WITH 8:00am to 11:00am
APARTMENT 2	COMPLIES WITH 8:00am to 11:00am
APARTMENT 3	COMPLIES WITH 8:00am to 11:00am
APARTMENT 4	COMPLIES WITH 8:00am to 11:00am
APARTMENT 5	COMPLIES WITH 8:00am to 11:00am

COMPLIES WITH OBJECTIVES

OFFSTREET CARPARKING

PITTWATER DCP:
Apartments of 2 or more bedrooms require 2 parking spaces per dwelling. Separate visitor parking is to be provided at a rate of 1 space per 3 dwellings rounded up. Secure bicycle storage facilities must be provided within the building at the rate of 1 bicycle rack per 3 dwellings.

Retail/commercial premises require 1 carparking space per 30sqm GLA, plus the number of on street carparking spaces lost by the development. Retail/commercial carparking spaces should not be restricted or obstructed (eg behind roller doors)

Disabled parking is to be provided at the rate of 3% of the required carparking spaces or 1 car space, whichever is the greater.

APARTMENTS 1 - 5 (2 or more bedrooms each)	10 car spaces
VISITORS	2 car spaces
RETAIL (299 sqm)	10 car spaces
TOTAL REQUIRED CAR SPACES:	22
APARTMENTS 1 - 5 (2 bedrooms each)	10 car spaces
VISITORS (includig 1 disabled space)	2 car spaces
RETAIL	6 car spaces
TOTAL CAR SPACES PROVIDED:	18

COMPLIES WITH OBJECTIVES

SIDE & REAR SETBACKS

PITTWATER DCP:
3.0m along the adjoining side or rear boundary

4.0m setback provided along side boundaries

COMPLIES

FRONT SETBACKS

PITTWATER DCP:
3.5m or established building line, whichever is the greater

AWNINGS

PITTWATER DCP:
Continuous footpath awnings should be provided to the street adjoining business development for weather protection for pedestrians.
Awnings are to comply with the relevant adopted Masterplan for the area. Where there is no Masterplan, new buildings shall provide awnings setback 3.5m from the face of the street kerb.

COMPLIES WITH OBJECTIVES

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
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w www.richardcolearchitecture.com.au

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No.	Revision Description	Date
K	Issued for Review	12/12/2019
P	Revised Development Application	09/10/2020
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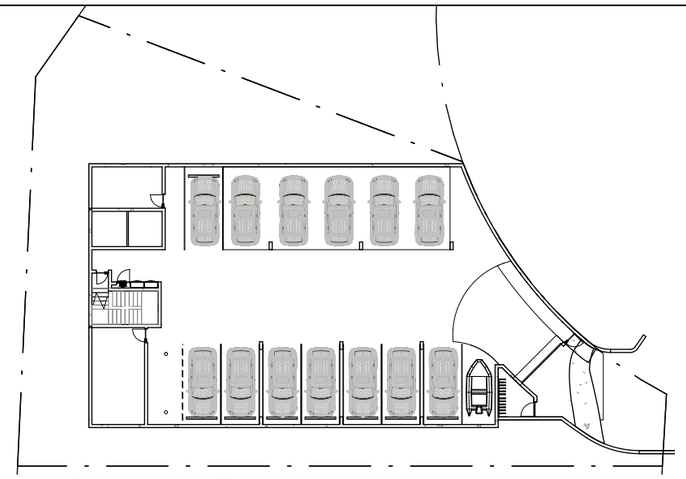
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Compliance Check

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	
Drawn by	KW		DA31



1 Basement GFA
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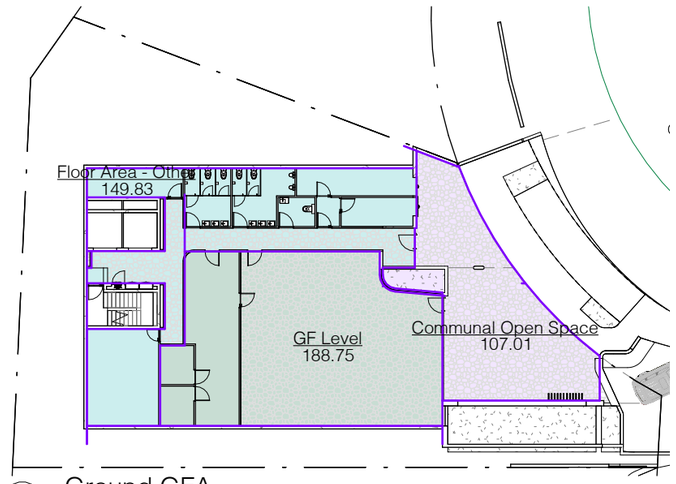

2 Ground GFA
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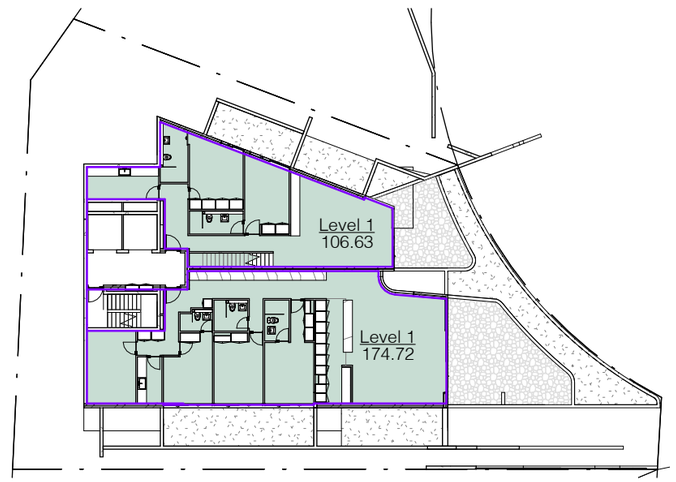

3 Level 1 GFA
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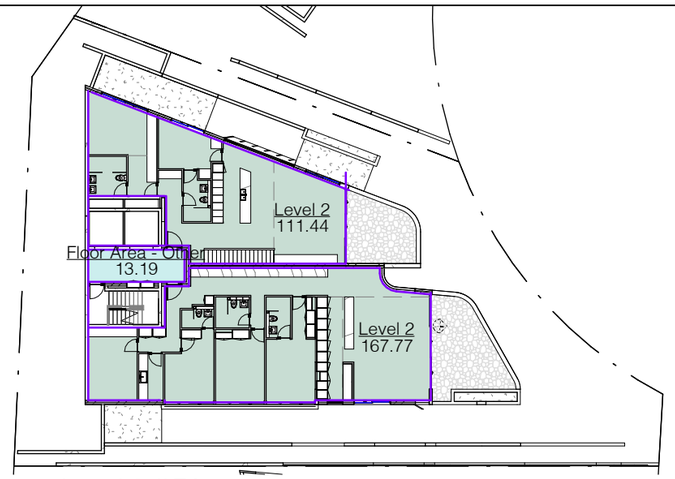

4 Level 2 GFA
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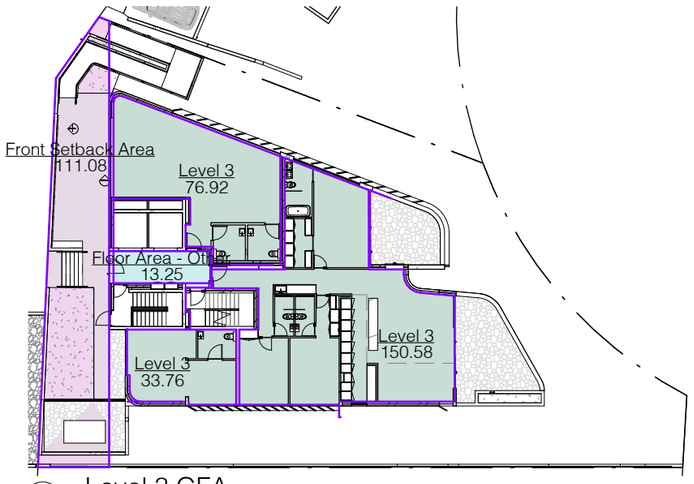

5 Level 3 GFA
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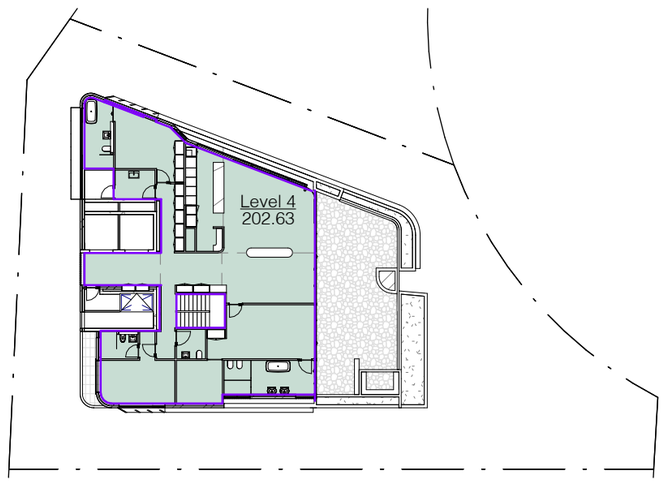

6 Level 4 GFA
1 : 400

Gross Floor Area Schedule	
Level	Area
Ground	188.75
Level 1	281.35
Level 2	279.21
Level 3	261.26
Level 4	202.63
Grand total	1213.19

SITE AREA 844.7 sqm

gross floor area means the sum of the floor area of each floor of a building measured from the internal face of external walls, or from the internal face of walls separating the building from any other building, measured at a height of 1.4 metres above the floor, and includes:

(a) the area of a mezzanine, and

(b) habitable rooms in a basement or an attic, and

(c) any shop, auditorium, cinema, and the like, in a basement or attic,

but excludes:

(d) any area for common vertical circulation, such as lifts and stairs, and

(e) any basement:

(i) storage, and

(ii) vehicular access, loading areas, garbage and services, and

(f) plant rooms, lift towers and other areas used exclusively for mechanical services or ducting, and

(g) car parking to meet any requirements of the consent authority (including access to that car parking), and

(h) any space used for the loading or unloading of goods (including access to it), and

(i) terraces and balconies with outer walls less than 1.4 metres high, and

(j) voids above a floor at the level of a storey or storey above.

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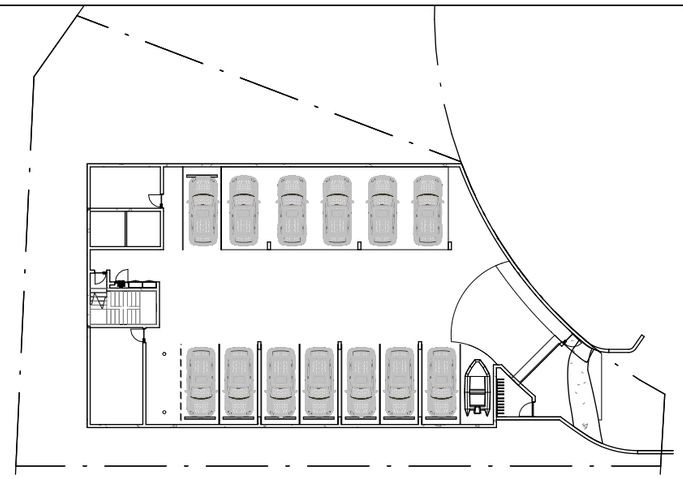
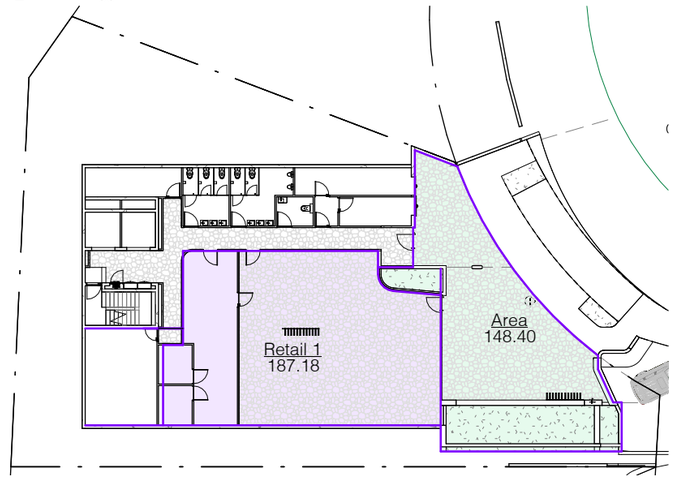
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Gross Floor Area Calculations

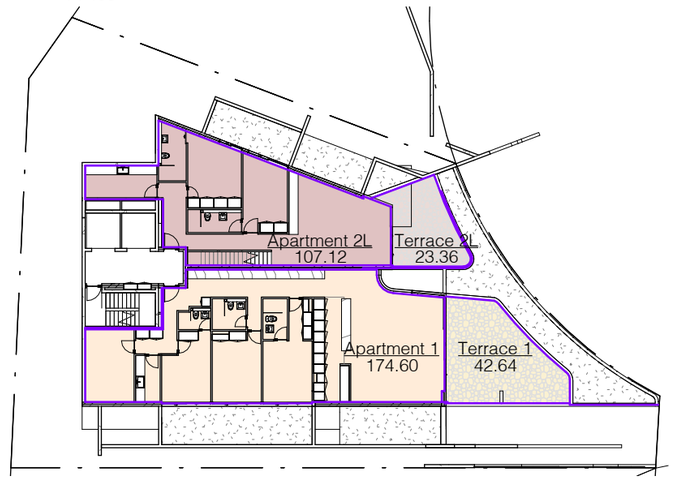
Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 400
Drawn by	KW		DA32



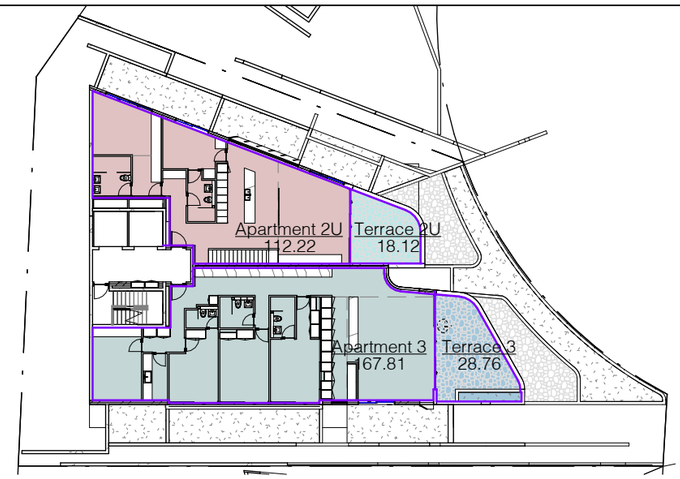
1 Basement - Area Plan
1 : 400



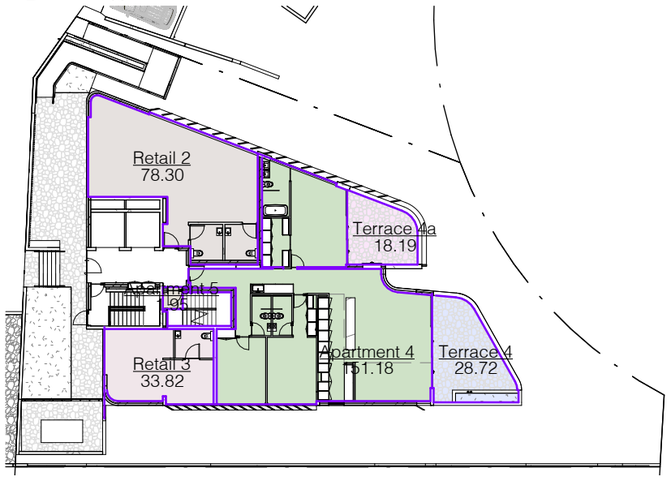
2 Ground - Retail Area Plan
1 : 400



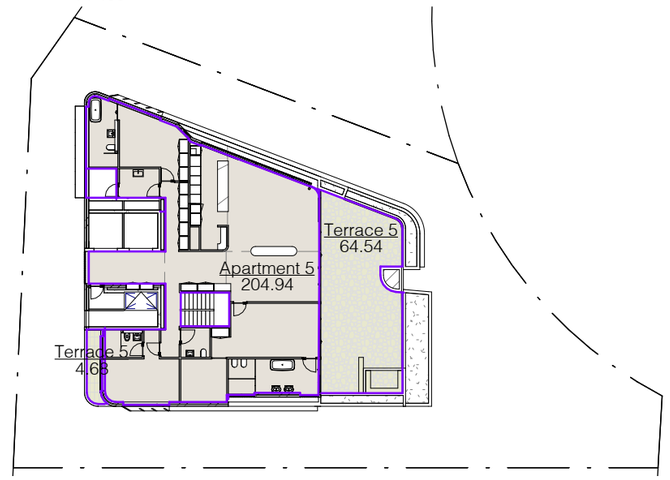
3 Level 1 - Apartment Area Plan
1 : 400



4 Level 2 - Apartment Area Plan
1 : 400



5 Level 3 - Apartment/Retail Area Plan
1 : 400



6 Level 4 - Apartment Area Plan
1 : 400

- Apartment 1
- Apartment 2L
- Apartment 2U
- Apartment 3
- Apartment 4
- Apartment 5
- Area
- Communal Open Space
- Retail 1
- Retail 2
- Retail 3
- Terrace 1
- Terrace 2L
- Terrace 2U
- Terrace 3
- Terrace 4
- Terrace 4a
- Terrace 5
- Terrace R1
- Terrace R2

Area Schedule - Apartments & Tenancies Exterior

Level	Name	Area
Level 1	Terrace 2L	23.36
Level 1	Terrace 1	42.64
Level 2	Terrace 3	28.76
Level 2	Terrace 2U	18.12
Level 3	Terrace 4a	18.19
Level 3	Terrace 4	28.72
Level 4	Terrace 5	69.22
Grand total		229.00

Area Schedule - Apartments Interior

Level	Name	Area
Level 1	Apartment 1	174.60
Level 1	Apartment 2L	107.12
Level 2	Apartment 2U	112.22
Level 2	Apartment 3	167.81
Level 3	Apartment 4	151.18
Level 3	Apartment 5	1.95
Level 4	Apartment 5	204.94
Grand total		919.83

Area Schedule - Retail Interior

Level	Name	Area
Ground	Retail 1	187.18
Level 3	Retail 2	78.30
Level 3	Retail 3	33.82
Grand total		299.30

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

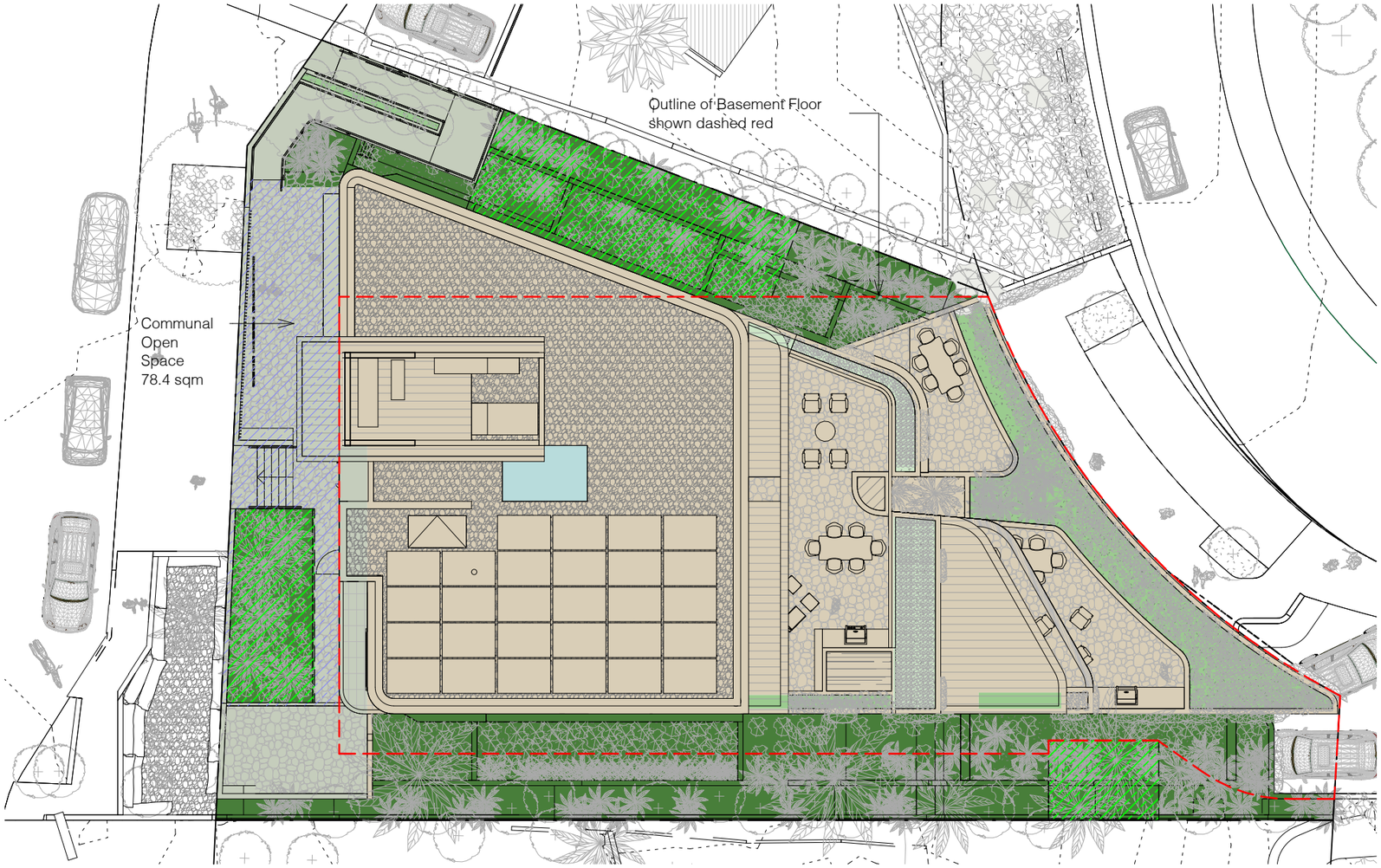
acn:093 598 415 abn:58 093 598 415
nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

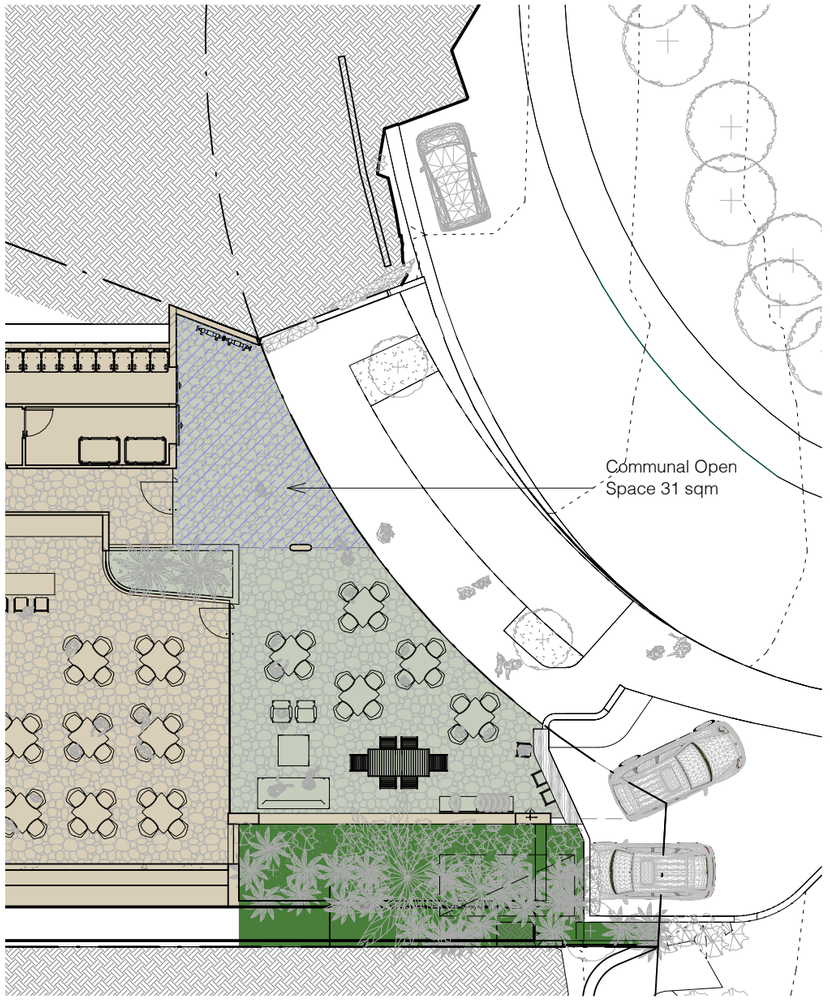
No.	Revision Description	Date
M	Development Application	17/04/2020
P	Revised Development Application	09/10/2020
Q	Revised Development Application	22/04/2021
R	Revised Development Application	27/05/2021
S	Revised Development Application for Review	7/06/20201
T	Revised DA for Review	27/07/2021
U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Area Calculations

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 400
Drawn by	KW		DA33





LANDSCAPE

PITTWATER DCP:

For shop top housing, a planter or landscaped area with minimum area of 4m ^{2} is to be provided as a feature at the ground floor of the front building facade. This feature is to be positioned to soften any hard edges of the building including any ramps, podiums or changes in levels.

For shop top housing, a minimum landscaped area of 20% of the site area, or 35m2 per dwelling, whichever is the greater, shall be provided. For shop top housing development landscaping is to be provided at the front and rear of the development. For development containing 3 or more dwellings, permanent seating is to be provided in the landscaped area.

Above ground gardens are to be incorporated into each dwelling at all levels (other than ground floor).

Residential Flat Buildings, Multi Dwelling Housing and Shop Top Housing
Provided the outcomes of this control are achieved, and the bulk and scale of the development is not increased, the following may be permitted:
Areas with soil depth greater than 800mm above built structures (excluding drainage and waterproof membranes) may be included as landscaped area. Soil depths above built structures less than this will not be included as landscaped area.

TOTAL SITE AREA	844 sqm	
REQUIRED LANDSCAPED AREA	20%	168.8 sqm
	5 X 35 sqm	175 sqm

Pittwater LEP Definition:
"landscaped area " means a part of a site used for growing plants, grasses and trees, but does not include any building, structure or hard paved area.

Site Area = 844.7sqm

Communal Open Space = 109.4 sqm = 13%

Landscaped Area = 245.70 sqm = 29.1%

Deep Soil Planting = 84.3 sqm = 10%
> 3m wide as required by Apartment Design Guide

Additional Landscaped Area = 43.59 sqm = 5.16%
(planter beds greater than 800mm deep)

Total Proposed Landscaped Area = 289.29 sqm = 34.3%

Additional Planter Beds = 16 sqm
(planter beds less than 800mm deep)

Built Upon Area

0 2.0m 4.0m 6.0m 8.0m 10.0m

1:200

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
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WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Landscaped Areas

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 200
Drawn by	KW		DA34

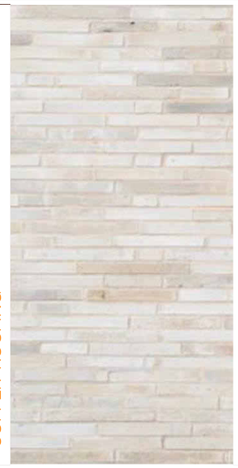
OFF FORM CONCRETE

STONE CLADDING

STONE PAVING

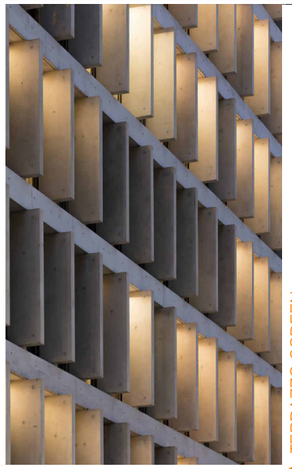
ALUMINIUM WINDOWS

COPPER ROOFING



FACE BRICKWORK

TIMBER LINING BOARDS



TERRAZZO SCREEN

NEIGHBOURS EXISTING WALL

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

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No.	Revision Description	Date
N	Proposed Revised DA	15/07/2020
P	Revised Development Application	09/10/2020
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R	Revised Development Application	27/05/2021
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T	Revised DA for Review	27/07/2021
U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE

DEVELOPMENT APPLICATION

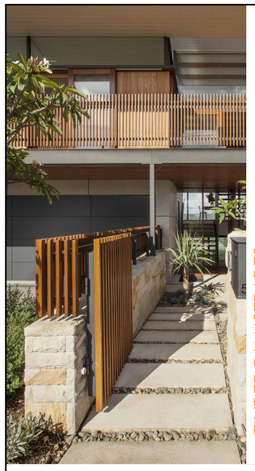
231 Whale Beach Road, Whale Beach

for

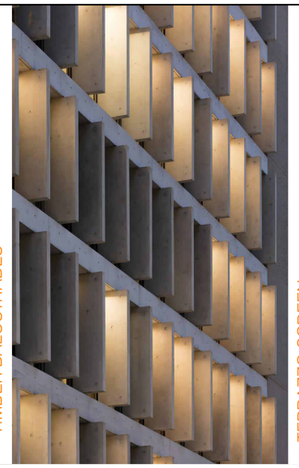
Leslie Cassar

Finishes Board - Surf Road

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 1
Drawn by	KW		DA35

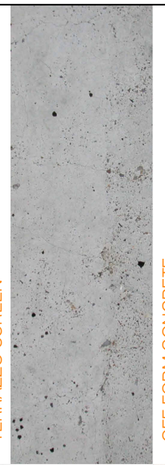


TIMBER BALUSTRADES



TERRAZZO SCREEN

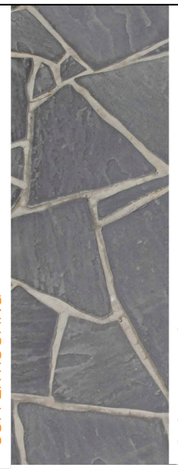
TERRAZZO SCREEN



OFF FORM CONCRETE

TIMBER LINING BOARDS

COPPER ROOFING



STONE PAVING

RIVER PEBBLE ROOF

FACE BRICKWORK

STONE CLADDING

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
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w www.richardcolearchitecture.com.au

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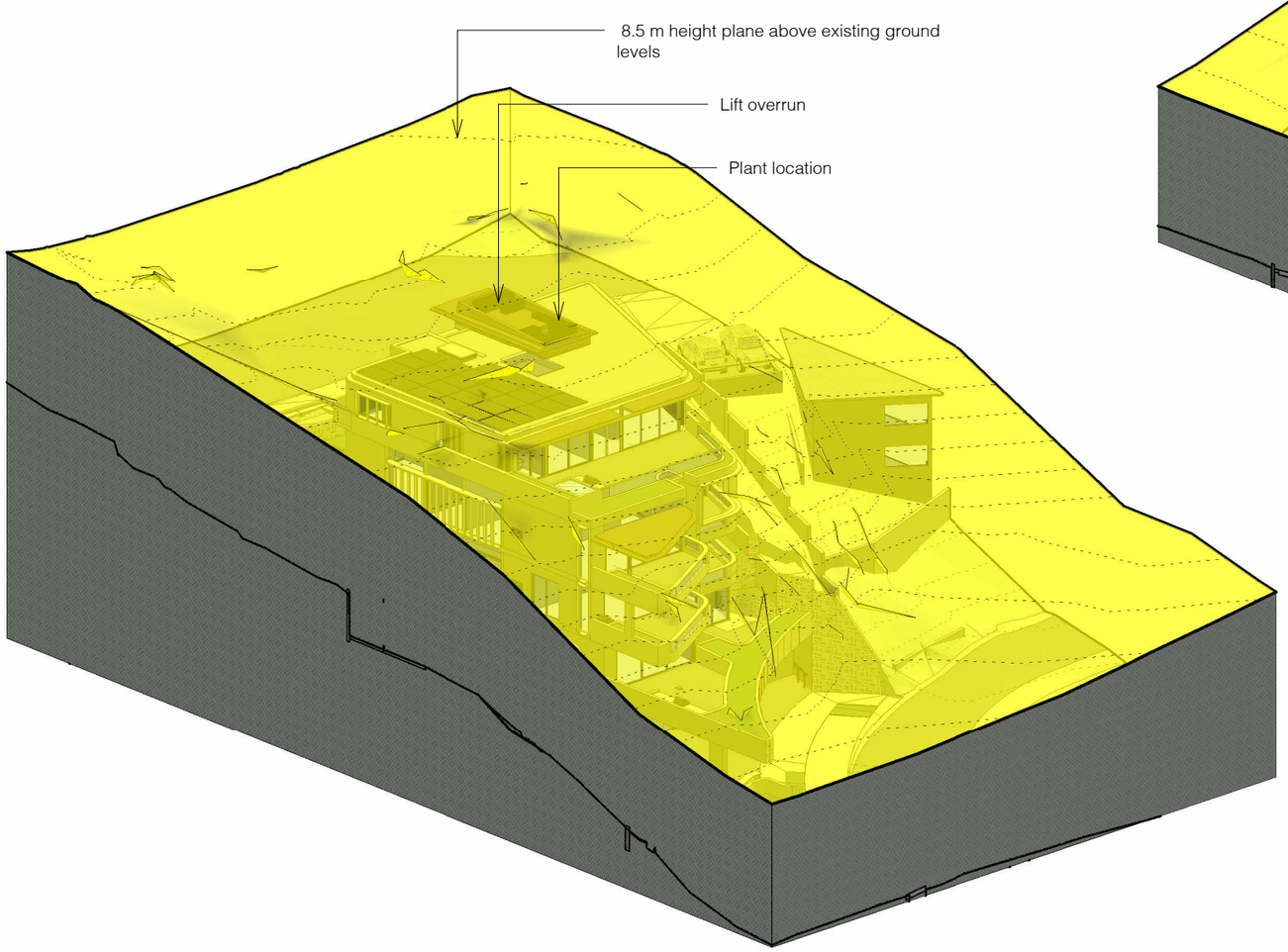
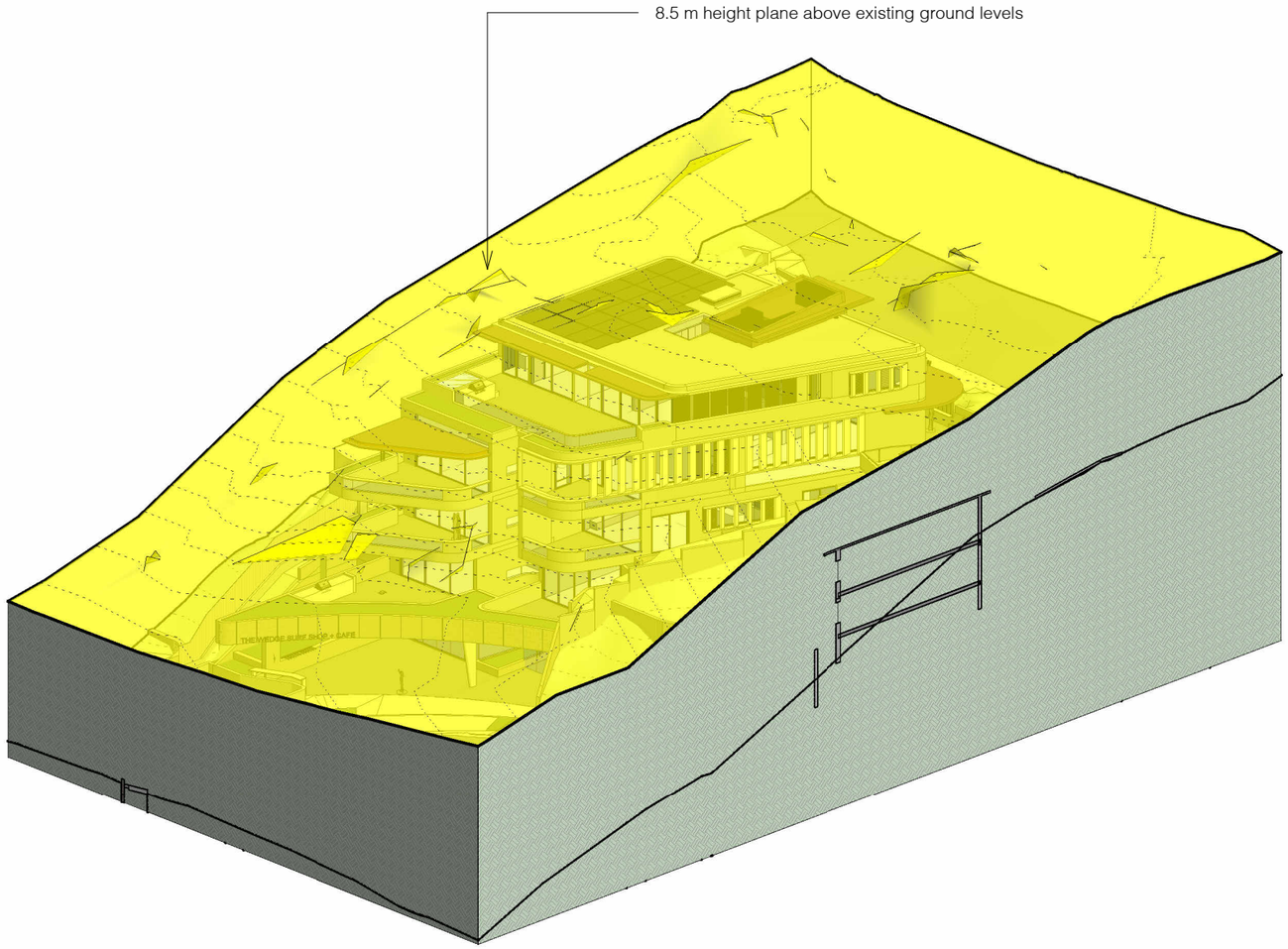
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Finishes Board - Whale Beach Road

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 1
Drawn by	KW		DA36





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WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Building Height Plane

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	
Drawn by	KW		DA37

Window Schedule for BASIX							
Type Mark	Mark	Keynote	Orientation	Area	Length	Unconnected Height	Comments
W	101	AFW	E	18.02	6107	2950	awning
W	102	AFW		0.72	1200	600	
W	103	AFW	S	6.26	3260	1950	
W	104	AFW	S	6.24	3300	1950	
W	105	AFW	S	6.24	3350	1950	
W	201	AFW	E	11.24	3952	2950	awning
W	202	AFW	NE	3.36	1600	2100	
W	203	AFW	NE	5.88	2900	2100	
W	204	AFW	NE	5.83	1977	2950	
W	205	AFW	E	14.36	5156	2950	awning
W	206	AFW	NE	7.78	3240	2400	awning
W	207	AFW	NE	5.52	2300	2400	awning
W	208	AFW	NE	6.83	4880	1400	external screen
W	209	AFW	NE	5.76	2400	2400	external screen
W	301	AFW	E	18.25	6187	2950	awning
W	302	AFW	S	2.66	900	2950	
W	303	AFW		5.76	2400	2400	
W	304	AFW	S	0.60	1000	600	
W	305	AFW	S	7.38	3210	2300	
W	306	AFW	S	7.36	3200	2300	
W	307	AFW	S	7.36	3199	2300	
W	308	AFW	S	2.08	3200	651	
W	309	AFW	S	2.08	3200	650	
W	310	AFW	S	2.09	3260	650	
W	311	AFW	S	0.89	1490	600	
W	312	AFW	S	1.28	2235	600	
W	313	AFW		0.93	1543	600	
W	401	AFW	E	15.73	6051	2600	awning
W	402	AFW	S	2.97	900	3300	
W	403	AFW	S	0.60	1000	600	
W	404	AFW	S	7.70	3210	2400	external screen
W	405	AFW	S	7.68	3200	2400	external screen
W	406	AFW	S	2.89	3260	900	
W	407	AFW	S	2.88	3300	900	
W	408	AFW		0.93	1543	600	
W	409	AFW	E	16.02	4855	3300	awning
W	410	AFW	NE	10.63	4620	2300	external screen
W	411	AFW	E	3.56	6186	575	
W	412	AFW		3.96	1200	3300	
W	501	AFW	E	5.81	2152	2700	awning
W	502	AFW	E	9.52	3625	2700	awning
W	503	AFW	E	5.98	2215	2700	
W	504	AFW	S	3.24	1200	2700	external screen
W	505	AFW	S	4.60	1755	2700	external screen
W	506	AFW		0.86	460	2700	
W	507	AFW	S	4.20	3000	1400	awning
W	508	AFW	W	5.65	2092	2700	external screen
W	509	AFW	W	4.75	5940	800	awning
W	510	AFW		5.04	3600	1400	
W	511	AFW	NE	3.51	1300	2700	external screen
W	512	AFW	N	20.65	7648	2700	external screen
W	513	AFW	W	0.70	511	1700	

Window Schedule for BASIX							
Type Mark	Mark	Keynote	Orientation	Area	Length	Unconnected Height	Comments
W	514	AFW	E	12.26	4540	2700	awning
W	515	AFW	NE	2.72	1002	2700	
W	CA01	AFW		6.93	2340	3300	
W	CA02	AFW		9.07	2640	3500	
W	CA03	AFW		6.36	2185	3050	
W	L01	AFW	W	5.66	2335	2700	external screen
W	R101	AFW	E	23.94	7114	3500	awning
W	R102	AFW		9.57	3139	3050	
W	R201	AFW	W	17.16	5200	3300	awning
W	R202	AFW		17.32	7680	2300	external screen
W	R203	AFW	NE	6.77	7672	900	
W	R301	AFW	W	9.85	3085	3300	
W	R303	AFW	S	7.15	3110	2300	external screen
W	R304	AFW	S	2.79	3100	900	
W	S01	AFW	W	2.86	1160	2700	

Schedule of BASIX Commitments - Refer to BASIX Certificate prepared by Insight Energy

1. Commitments for Residential Flat Buildings

a. Dwellings

i. Water

The applicant must plant indigenous or low water species of vegetation as specified in the certificate

The project includes a spa with volume of 3 kilolitres and a cover

All dwellings must have 4 star rated taps and toilets, and 3 star rated shower heads, dishwashers and clothes washers

ii. Energy

All dwellings are to be connected to a 4 star gas instantaneous hot water system

All bathrooms and laundries are to have ducted exhausts manually operated

All kitchens to have manually operated exhaust fans, gas cooktop and electric oven

All dwellings to have 1 phase airconditioning,

Natural lighting is to be provided as shown in the certificate, all other lighting is to be LED.

The spa to apartment 5 is to have a gas boosted solar water heater.

iii. Thermal Comfort

There is no inslab heating proposed

Construction of floor and walls is to be in accordance with the NatHERS Certificate

b. Common areas and Central Systems/facilities

i.Water

A water tank of at least 5000l is to be installed to collect roof water, and to be connected to common garden areas

ii. Energy

The basement carpark is to have mechanical ventilation

Lighting to the basement is to be fluorescent or LED, connected to sensors or manually operated

THERMAL PERFORMANCE REQUIREMENTS

Mixed Use Development - Thermal Assessment for Residential Apartments 1-5
231 Whale Beach Road, Whale Beach NSW 2107

See NatHERs Certificate for full information
Builder to confirm insulation and glazing requirements in NatHERs Certificate prior to construction

All insulation and glazing must meet BCA and Australian Standard requirements

	Construction	Added Insulation
External walls	270mm Double brick with cavity 200mm Concrete walls	**All Apartments** - No insulation added to external walls
Internal walls	100mm single skin brick	No insulation added
Common Walls	200mm concrete walls separating apartments from stairwell, lift or retail	No insulation added
External Flooring under Apartments	Suspended concrete slab 300mm thickness	No insulation added
Ceilings between Floors	Suspended concrete slab 300mm thick with plasterboard lining beneath	**Apartments 1-4** – No insulation required
Ceiling to roof cavity	**Apartment 4 –** Suspended concrete slab with plasterboard lining beneath (terrace of Apartment 5 above). **Apartment 5** – Suspended concrete slab 300mm thick with plasterboard lining beneath	**Apartment 4 –** R2.0 bulk insulation between suspended concrete and plasterboard ceiling to kitchen/living/dining and pantry zones only. Remainder of ceiling, no insulation required. **Apartment 5** – R2.0 bulk insulation between suspended concrete and plasterboard all ceiling
Roof	Concrete roof above **Apartment 5**	Waterproofing membrane
Ceiling fans	All apartments	Ceiling fans (1200 diameter) one each to living/dining zones, media room and bedrooms.
Fixed floor coverings	Tiles to wet areas Carpet to bedrooms Timber flooring to living, dining, kitchen, pantry, hallways, media and other living zones.	
Glazing - All glazing to be in accordance with BCA standards.	Aluminum frames (draft sealed)	Glazed doors and windows - Single glazed clear – U-value 6.70 SHGC 0.70
Ceiling Penetration		This assessment has been rated with LED downlights and exhaust fans Apartment 1 - Run 8; Apartment 2 – Run 4; Apartment 3 – Run 8; Apartment 4 – Run 6; Apartment 5- Run 5 Dated 21/07/2021

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t 02 9918 3843
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WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

BASIX Requirements

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	
Drawn by	KW		DA39

CW Concrete Wall
DR Driveway
FY Fire Hydrant
LT Lift
MW Masonry Wall
PB Planter Bed
SP Stone Paving
ST Stair
SW Stone Wall

N

1 DA Retail 1 Plan
1 : 100

0 1.0m 2.0m 3.0m 4.0m 5.0m
1:100

200 6280 100 3000 100 4090 100 7600 230

Electrical & Comms
CW
LT
LT
CW
CW
ST
CW
Fire Sprinkler Pump & Tank Room
CW
Female WC
Male WC
ACC WC
Vest.
bulky goods storage
Garbage - Res
Garbage - Comm
MW
1500
1500
MW
CW
8
8
8
Retail 1
RL. 9.300 m
2085
1425
MW
FY
FY
200
1800
100
1900
100
1425
100
3500
6000
5000
9725
Service Bay
SURF ROAD
Outdoor Seating Area
SP
RL. 9.300 m
SW
1650
200
PB
SW
PB
SW
DR
boundary
boundary

200 6280 100 16810 350 10170
23740 10170

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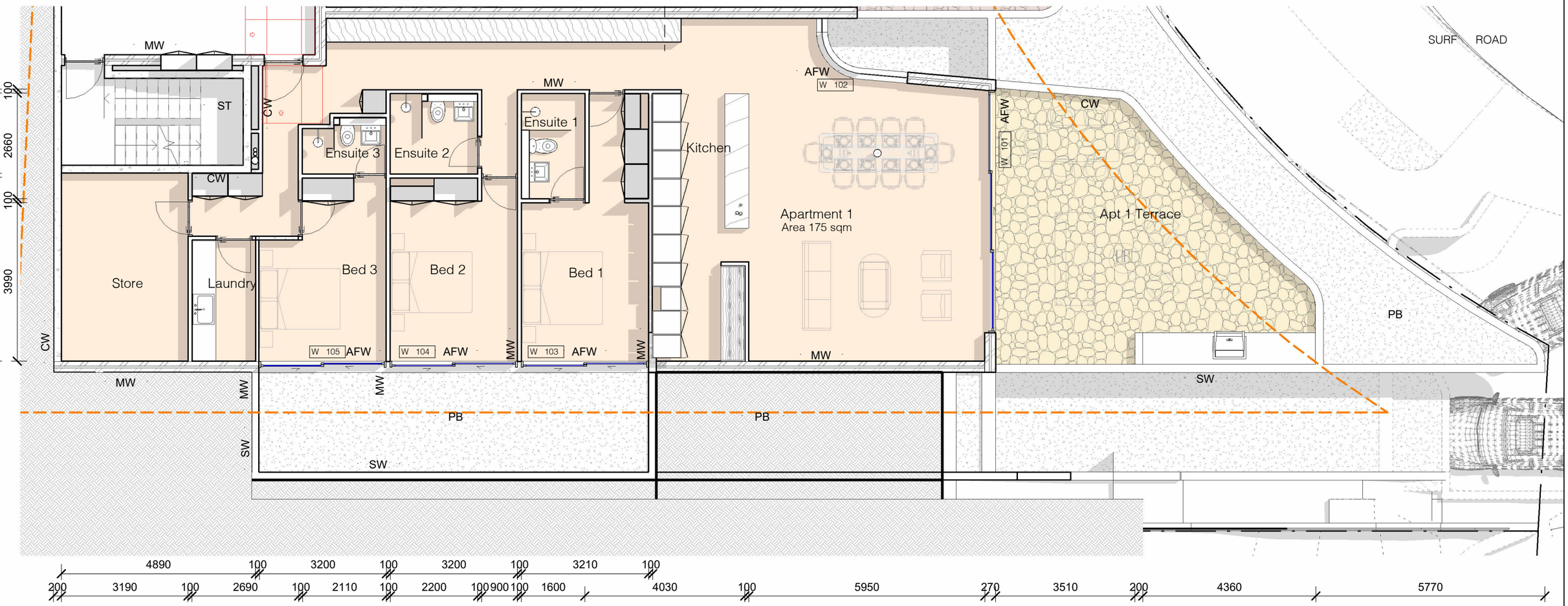
U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

boundary

Retail 1 Plan

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 100
Drawn by	KW		DA40



AFW	Aluminium Framed Window
CW	Concrete Wall
MW	Masonry Wall
PB	Planter Bed
ST	Stair
SW	Stone Wall

1 DA Apartment 1 Plan
1 : 100

0 1.0m 2.0m 3.0m 4.0m 5.0m
1:100

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

acn:093 598 415 abn:58 093 598 415
nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

No.	Revision Description	Date
M	Development Application	17/04/2020
P	Revised Development Application	09/10/2020
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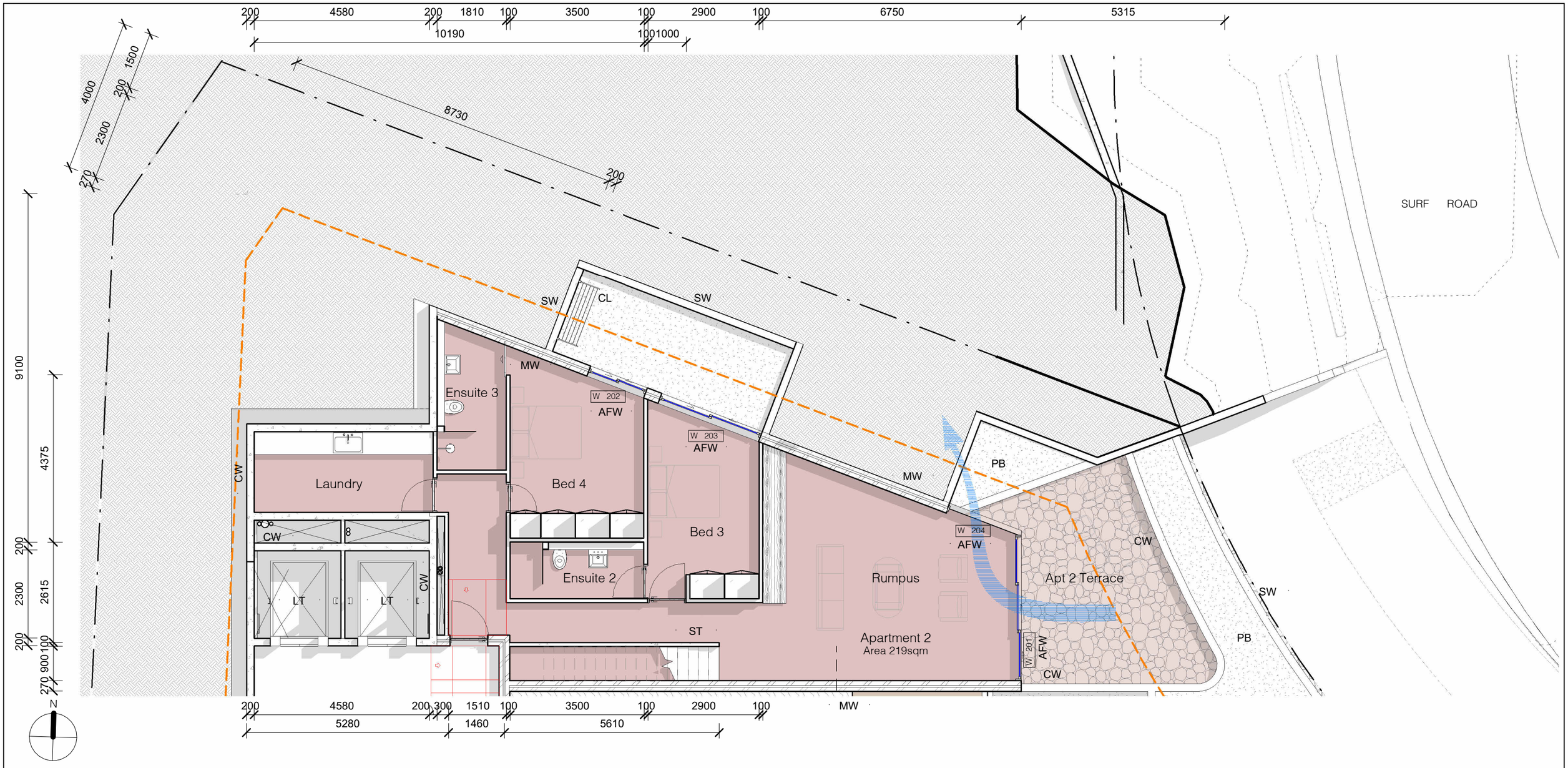
U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Apartment 1 Plan

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 100
Drawn by	KW		DA41



AFW	Aluminium Framed Window
CL	Clothesline
CW	Concrete Wall
LT	Lift
MW	Masonry Wall
PB	Planter Bed
ST	Stair
SW	Stone Wall

1 DA Apartment 2 plan
1 : 100

0 1.0m 2.0m 3.0m 4.0m 5.0m
1:100

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t 02 9918 3843
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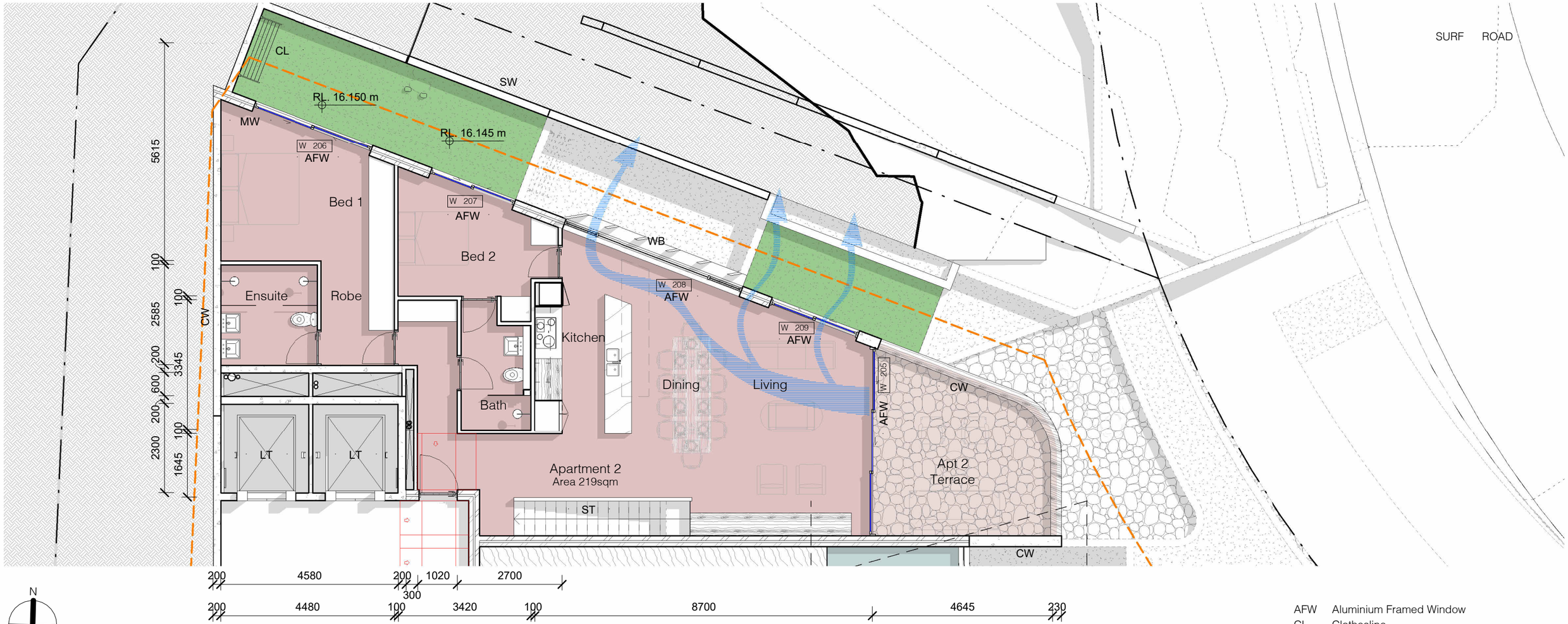
U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Apartment 2 Plan (lower)

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 100
Drawn by	KW		DA42



AFW	Aluminium Framed Window
CL	Clothesline
CW	Concrete Wall
LT	Lift
MW	Masonry Wall
ST	Stair
SW	Stone Wall
WB	Window Box

1 DA Apartment 2 Plan (upper)
1 : 100

0 1.0m 2.0m 3.0m 4.0m 5.0m
1:100

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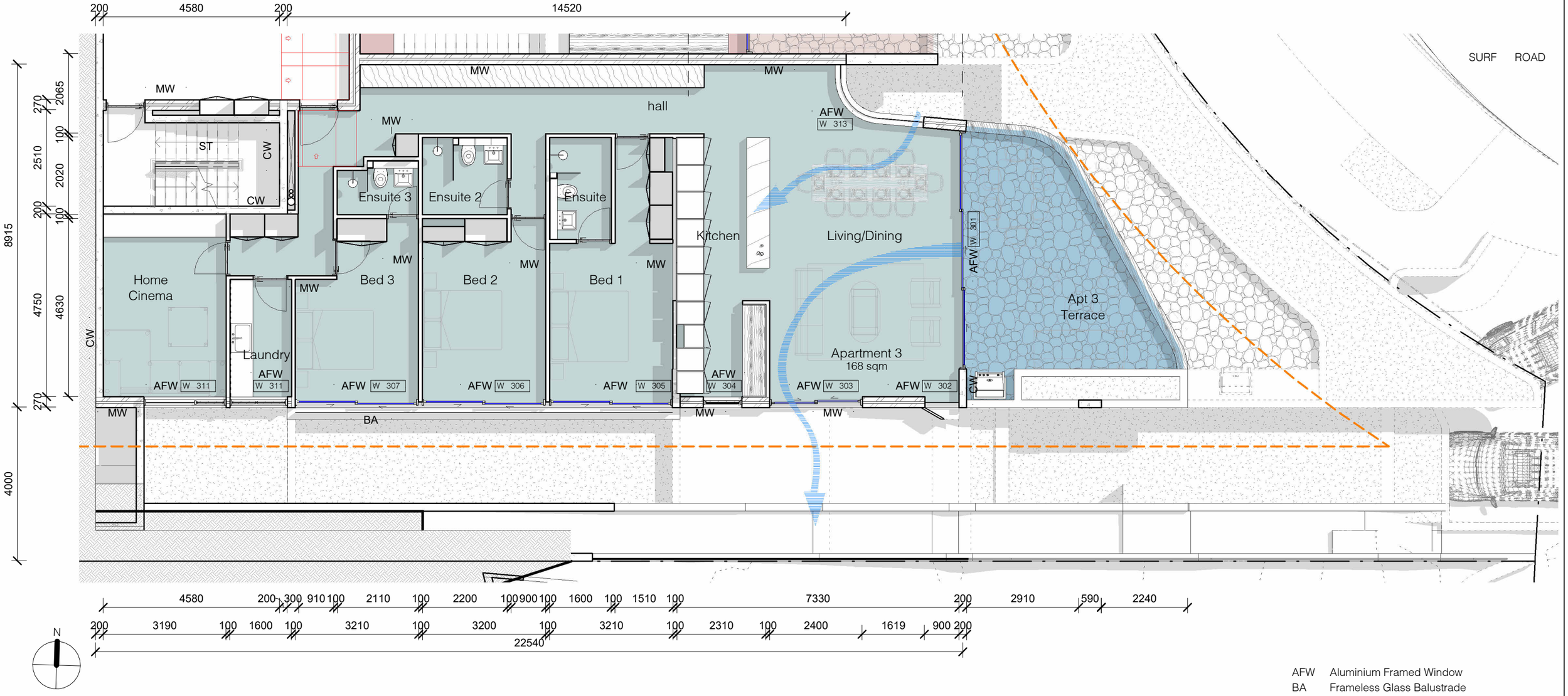
T	Revised DA for Review	27/07/2021
U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for Leslie Cassar

Apartment 2 Plan (upper)

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 100
Drawn by	KW		DA43



AFW Aluminium Framed Window
BA Frameless Glass Balustrade
CW Concrete Wall
MW Masonry Wall
ST Stair

1 DA Apartment 3 Plan
1 : 100

0 1.0m 2.0m 3.0m 4.0m 5.0m
1:100

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t 02 9918 3843
m 0418 627 024
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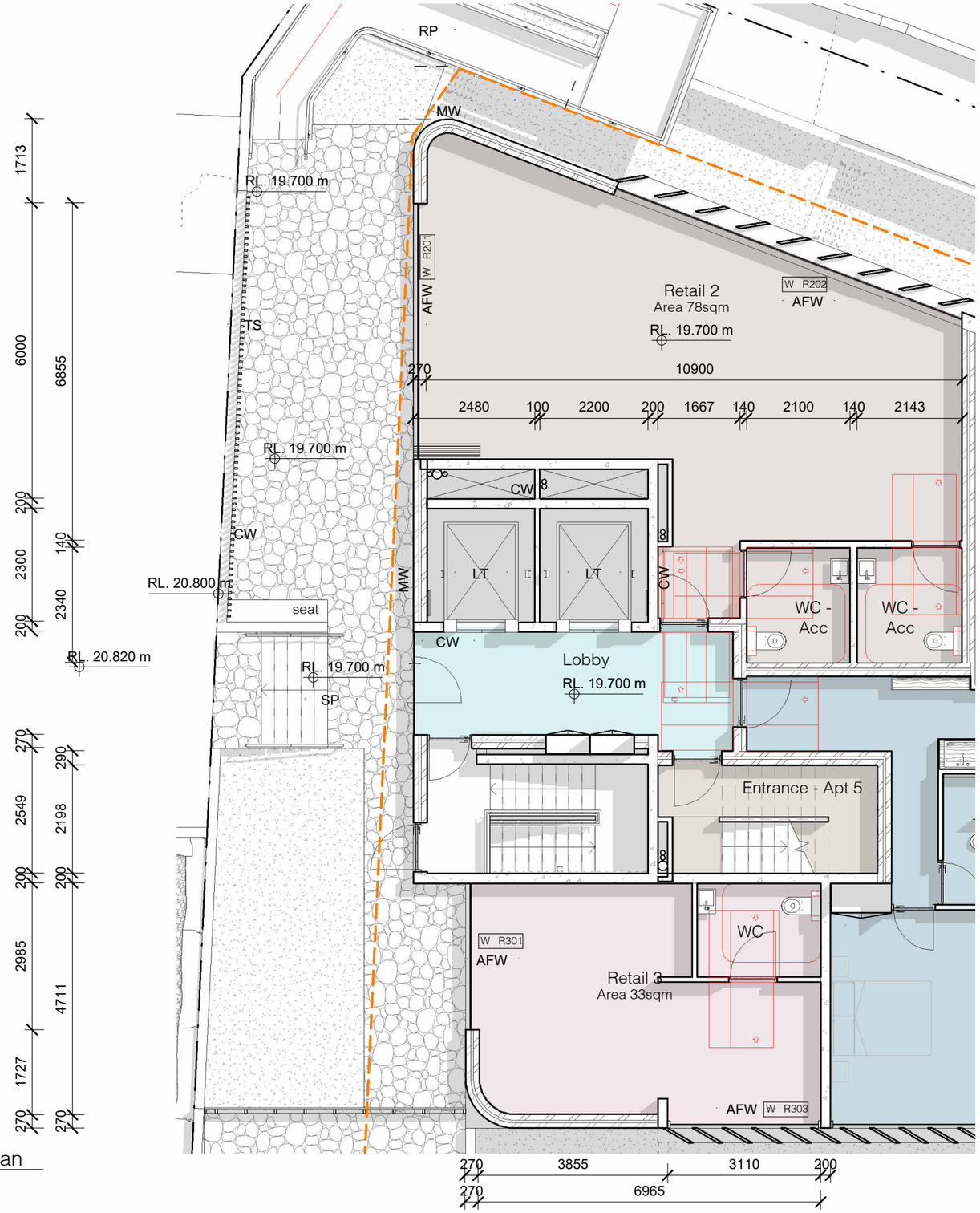
T	Revised DA for Review	27/07/2021
U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Apartment 3 Plan

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 100
Drawn by	KW		DA44



AFW Aluminium Framed Window
CW Concrete Wall
LT Lift
MW Masonry Wall
RP Ramp
SP Stone Paving
TS Timber Screen

N

1 DA Retail 2 & 3 Plan
1 : 100

0 1.0m 2.0m 3.0m 4.0m 5.0m
1:100

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t 02 9918 3843
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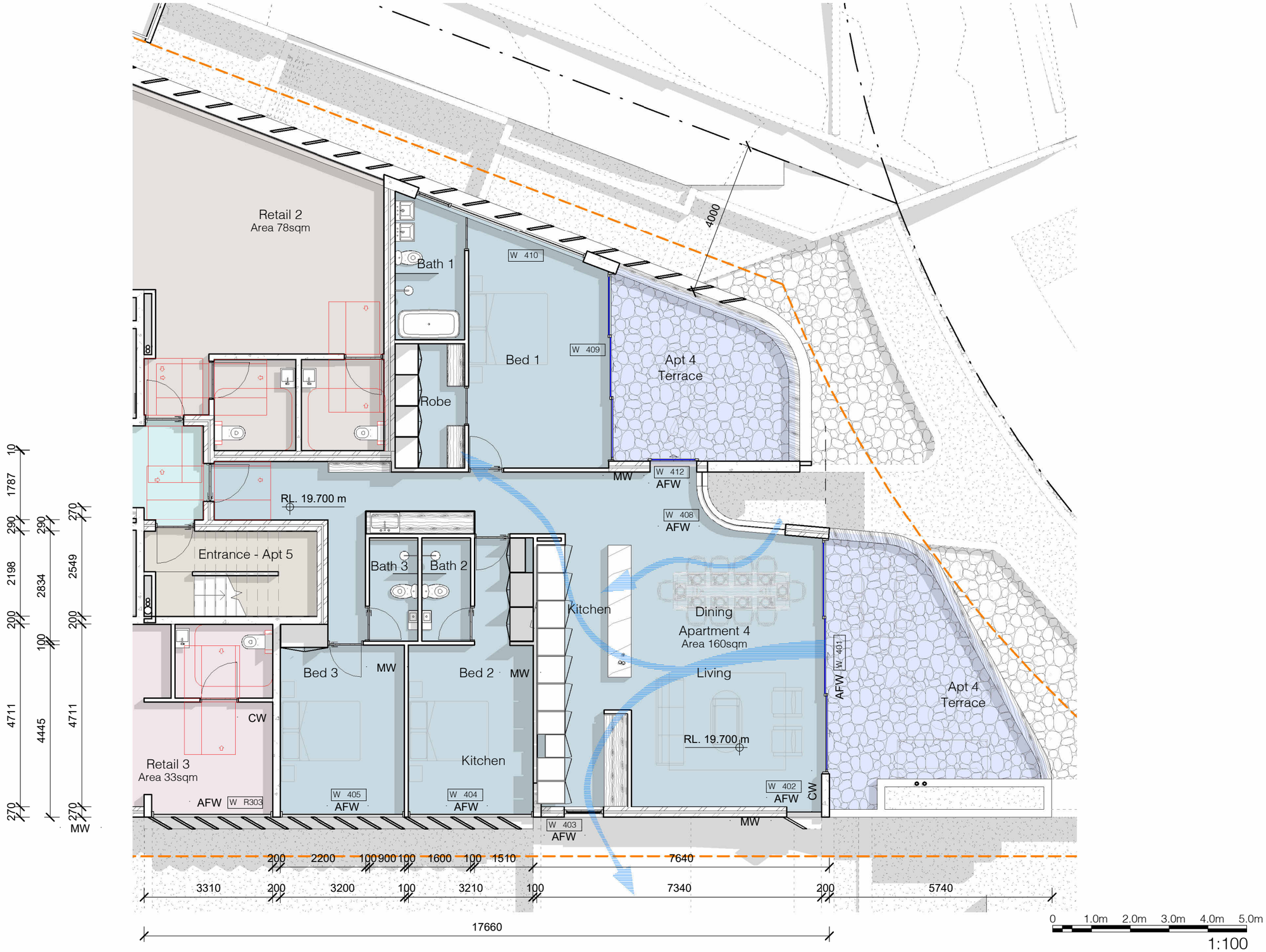
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Retail 2 & 3 Plan

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 100
Drawn by	KW		DA45

AFW Aluminium Framed Window
CW Concrete Wall
MW Masonry Wall



1 DA Apartment 4 Plan
1 : 100

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m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

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WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Apartment 4 Plan

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 100
Drawn by	KW		DA46

WHALE BEACH ROAD

SURF ROAD

AFW	Aluminium Framed Window
BA	Frameless Glass Balustrade
CPR	Copper Roofing
CW	Concrete Wall
LT	Lift
MW	Masonry Wall
PB	Planter Bed
SP	Stone Paving
SPA	Spa
TS	Timber Screen
WB	Window Box

Apartment 5
Area 207 sqm

Ensuite
Bedroom 2
Drying
Laundry
Kitchen
Living
Dining
Lobby
RL. 23.300 m
access hatch over
Bedroom
Hall
Powder
Bathroom
Bedroom 3
Robe
Ensuite
SP
SPA
PB
CPR

4000

N

1 DA Apartment 5 Plan
1 : 100

0 1.0m 2.0m 3.0m 4.0m 5.0m
1:100

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t 02 9918 3843
m 0418 627 024
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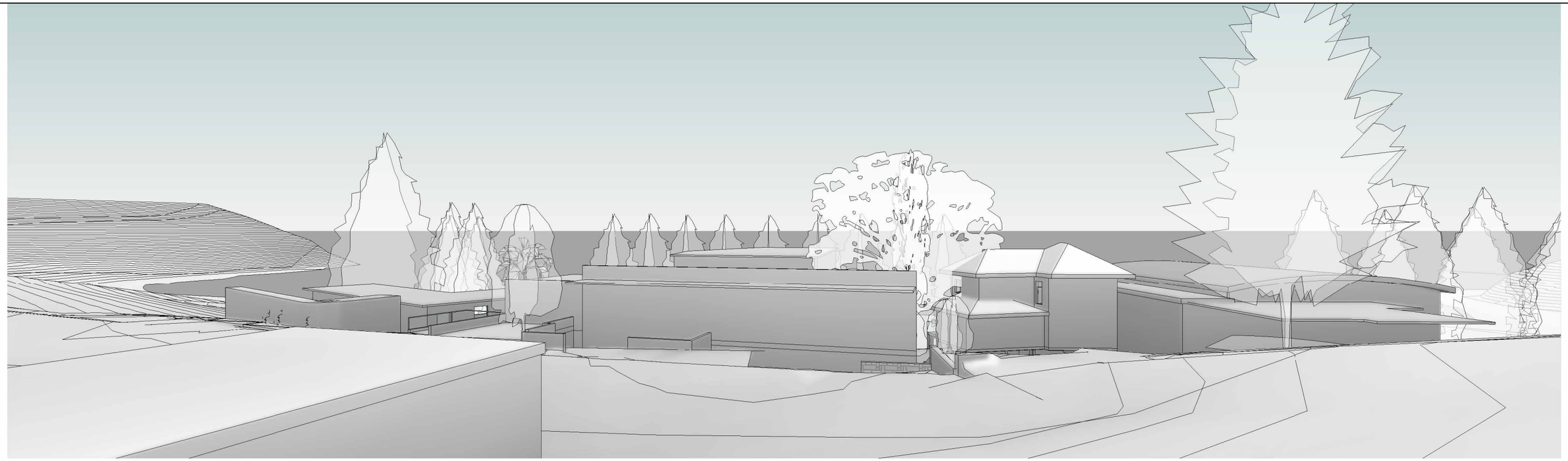
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

Apartment 5 Plan

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	1 : 100
Drawn by	KW		DA47



1 View from 196 Tiled verandah - existing

2 View from 196 Tiled verandah - proposed

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t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

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WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

196 WBR View Impact Study

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	
Drawn by	KW		DA50

1 View from 196 upper balcony - existing

2 View from 196 upper balcony - proposed

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
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WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

196 WBR View Impact Study

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	
Drawn by	KW		DA51

1 View from 194 lower balcony - existing

2 View from 194 lower balcony - proposed

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
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acn :093 598 415 abn :58 093 598 415
nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

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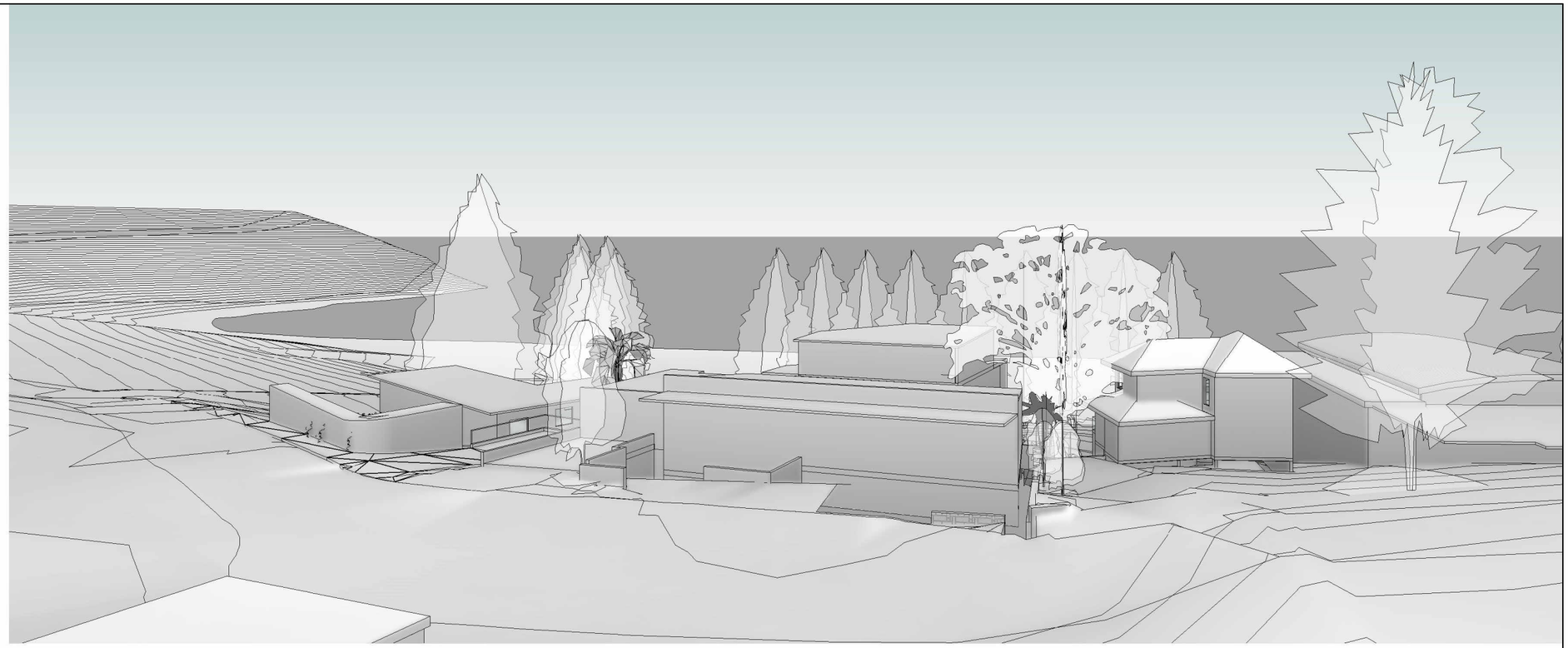
U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

194 WBR View Impact Study

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	
Drawn by	KW		DA52



1 View from 194 upper balcony - existing

2 View from 194 upper balcony - proposed

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
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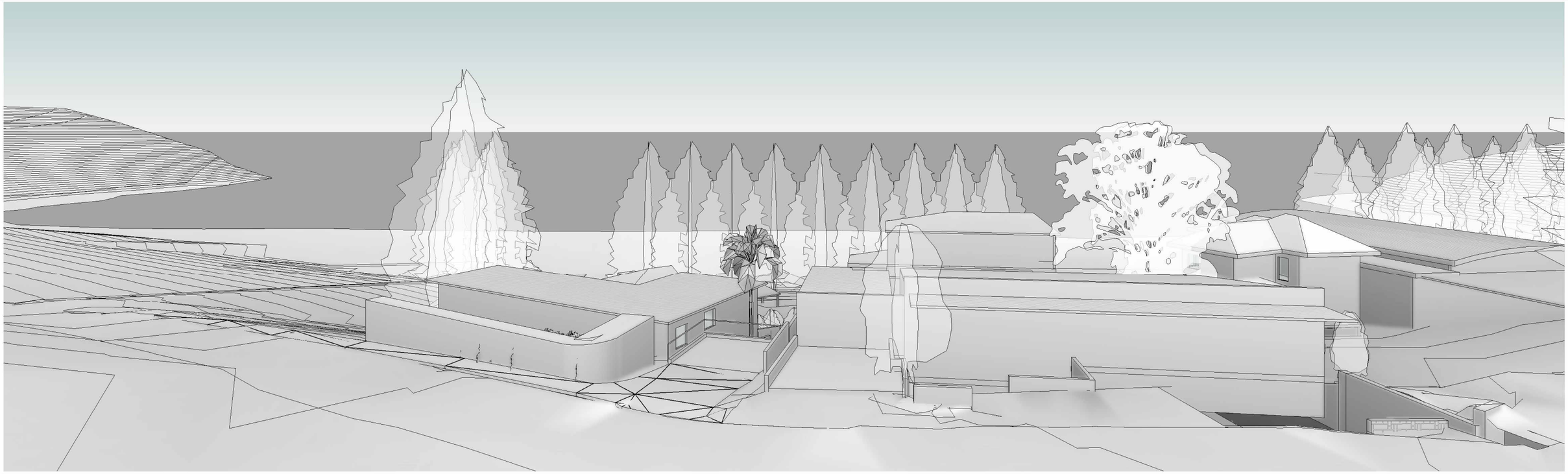
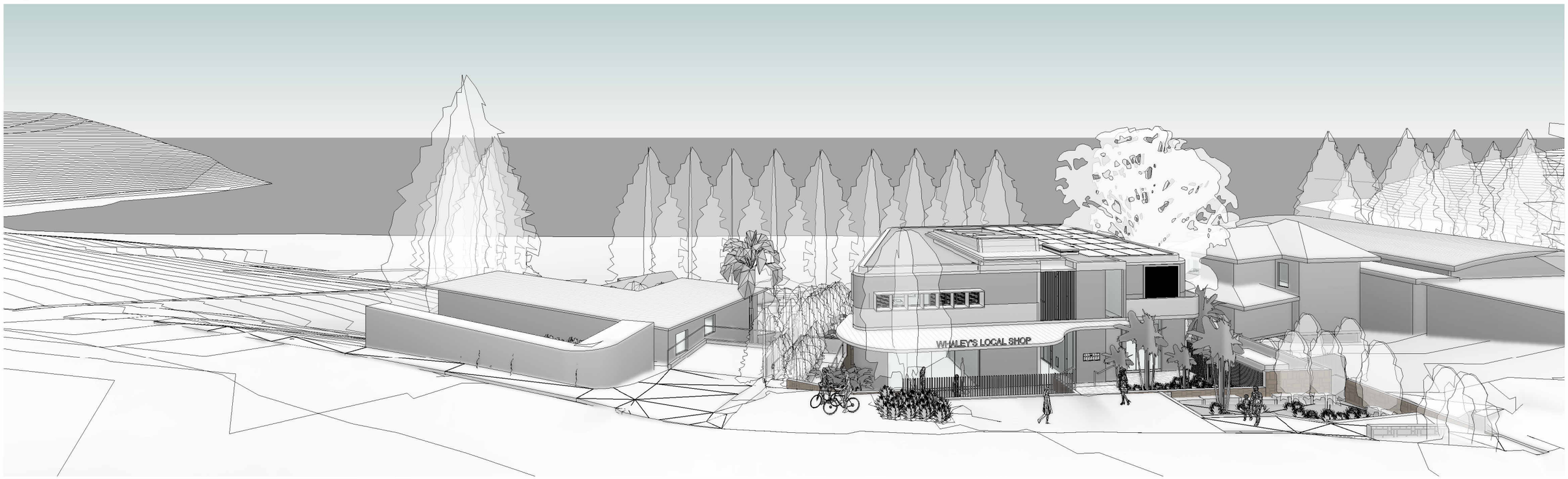
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

194 WBR View Impact Study

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	
Drawn by	KW		DA53



1 View from 198 Balcony - Existing



2 View from 198 Balcony - Proposed

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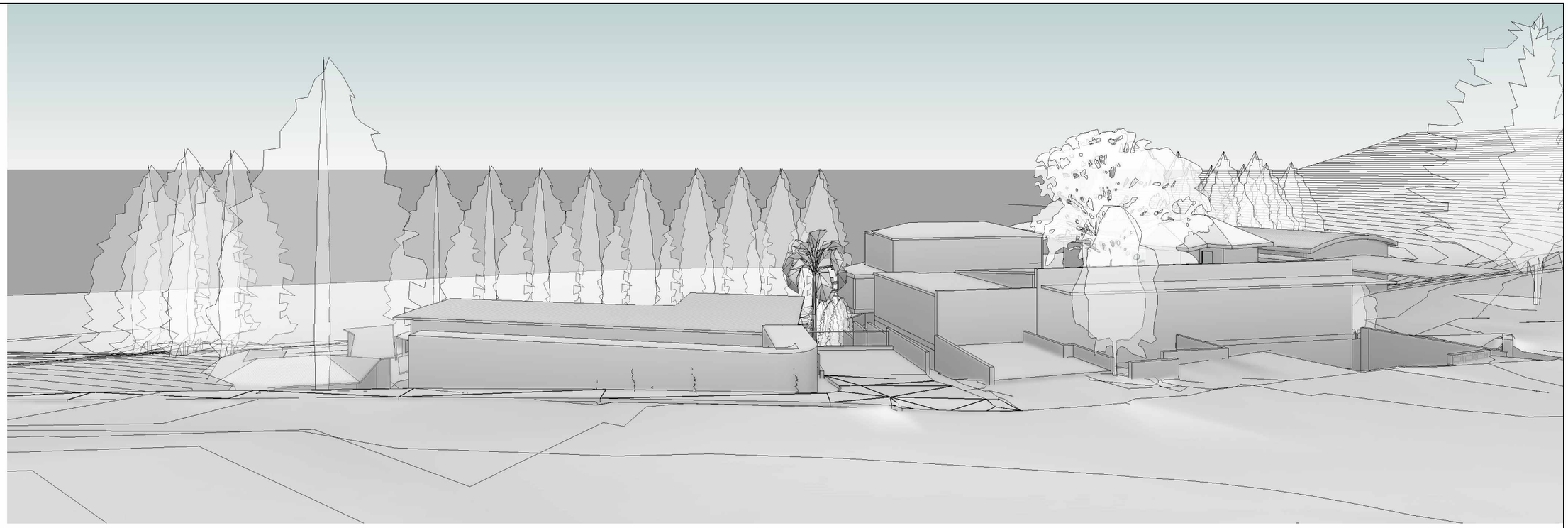
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

198 WBR View Impact Study

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	
Drawn by	KW		DA54



1 View from 200 balcony - existing

2 View from 200 balcony - proposed

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m 0418 627 024
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WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
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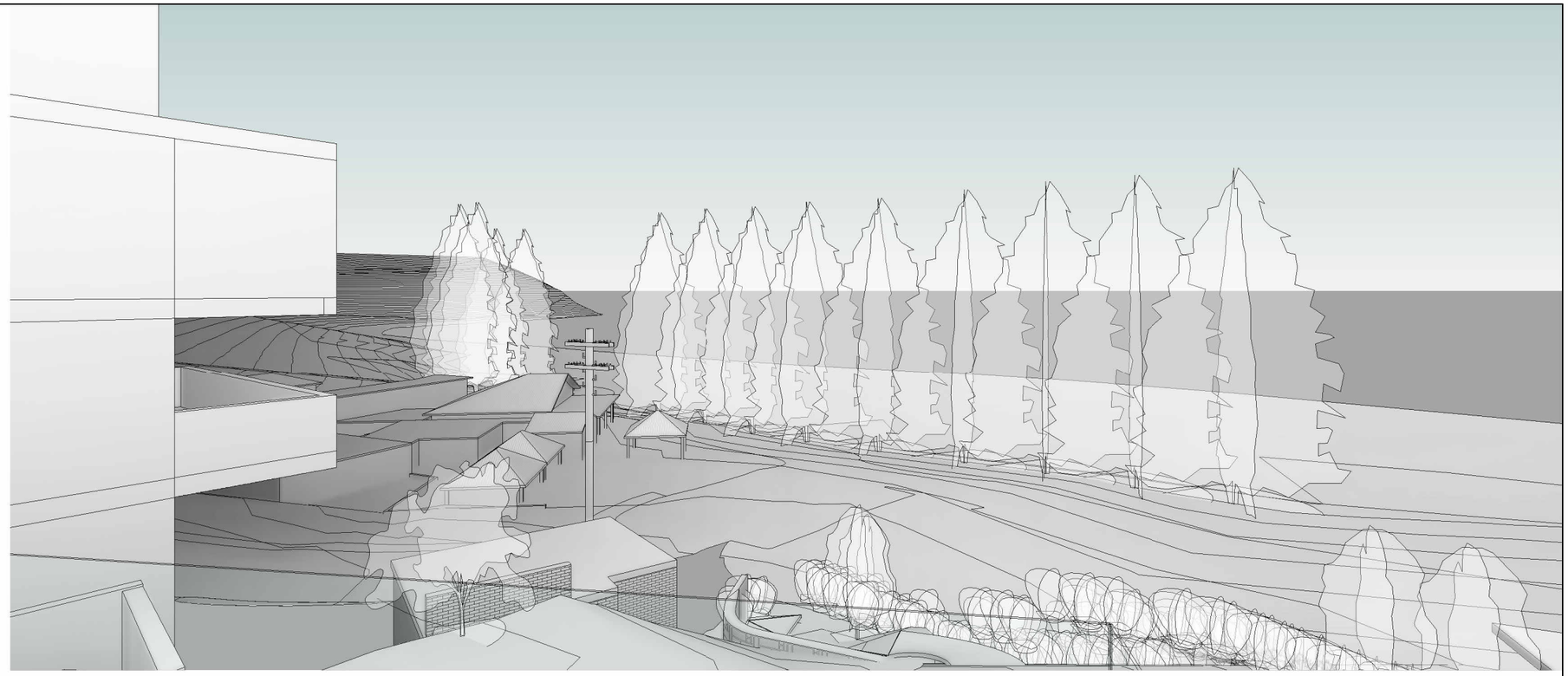
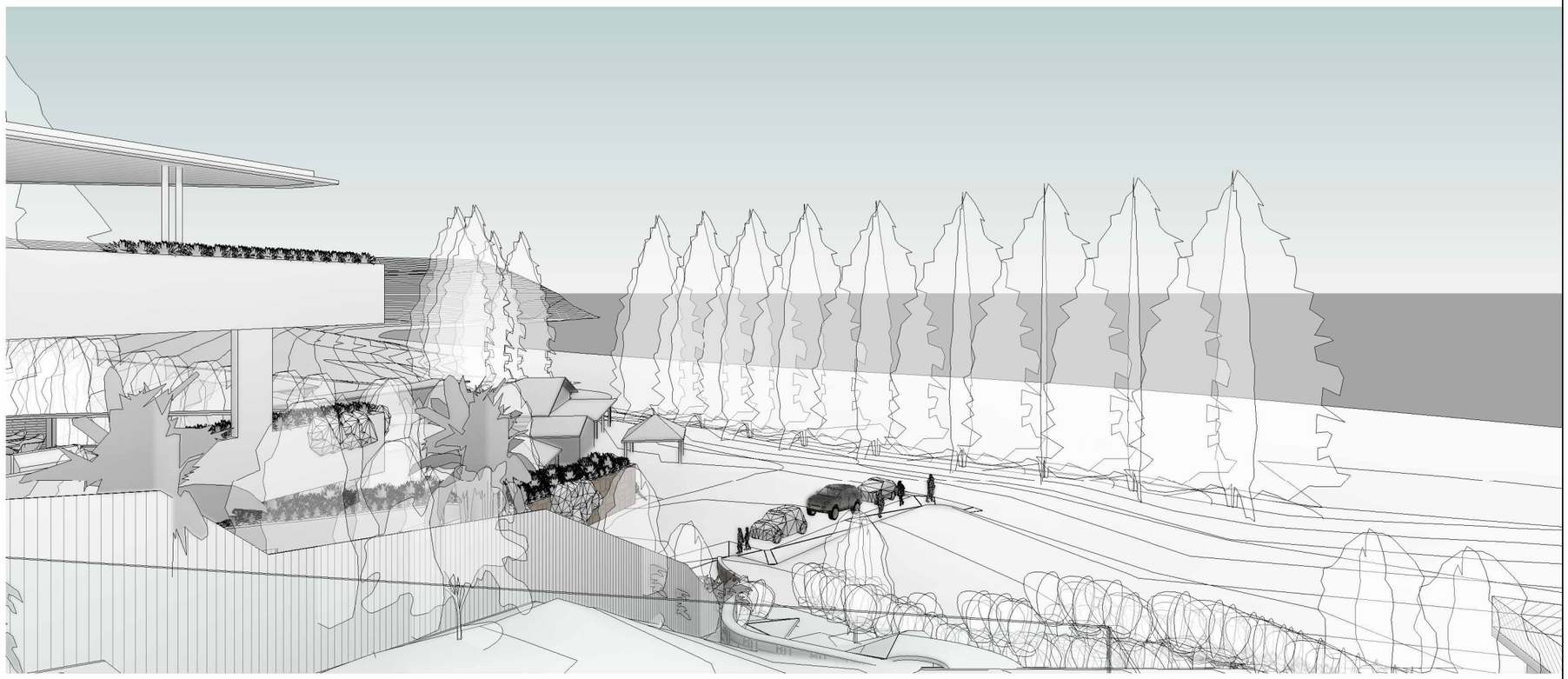
Leslie Cassar

200 WBR View Impact Study

Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	
Drawn by	KW		DA55



1 View from 229 verandah - existing 2



2 View from 229 verandah - proposed 2

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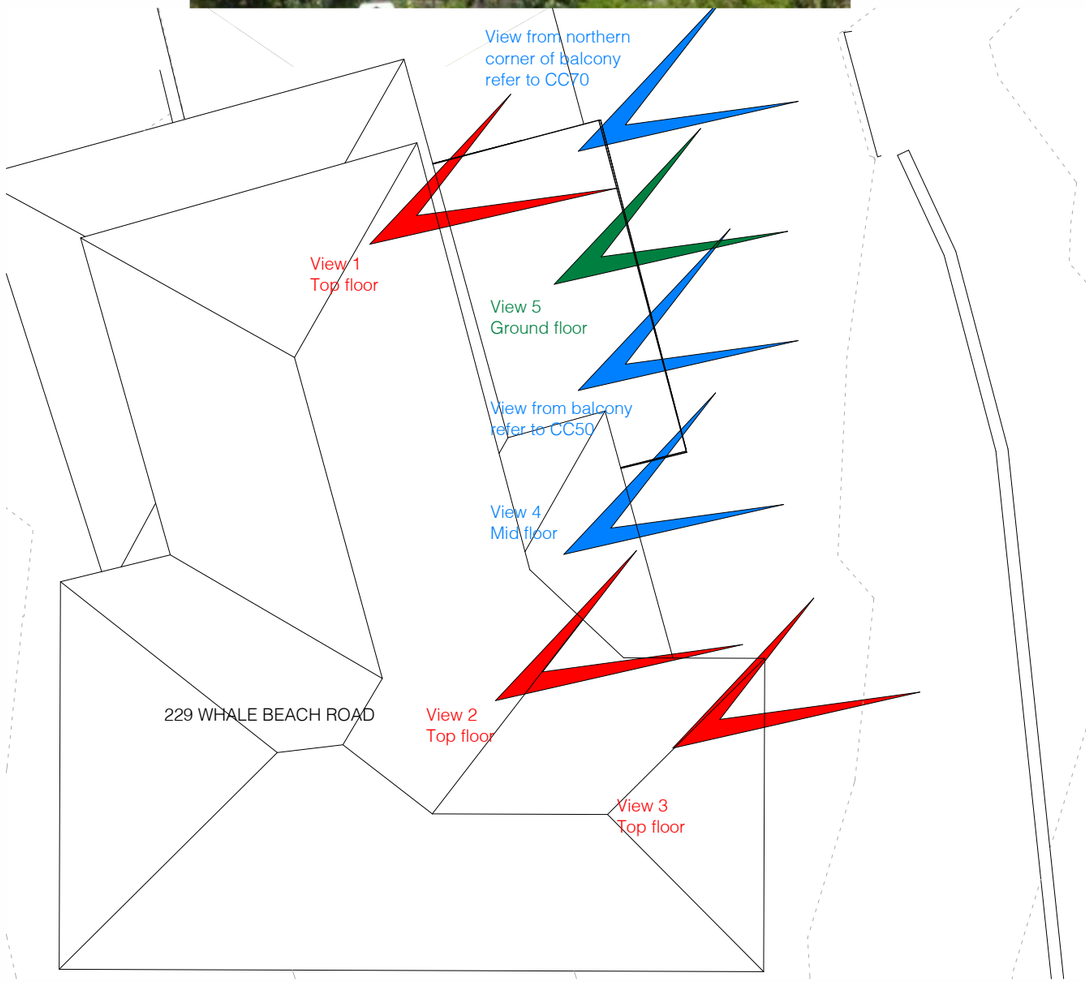
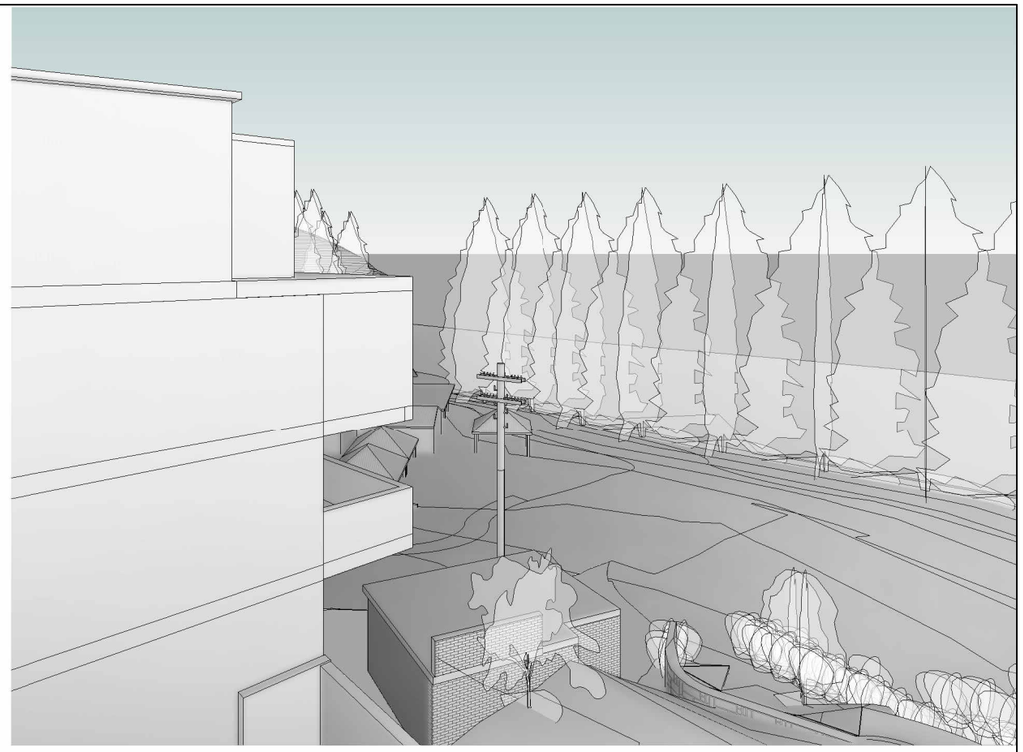
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

229 WBR View Impact Study

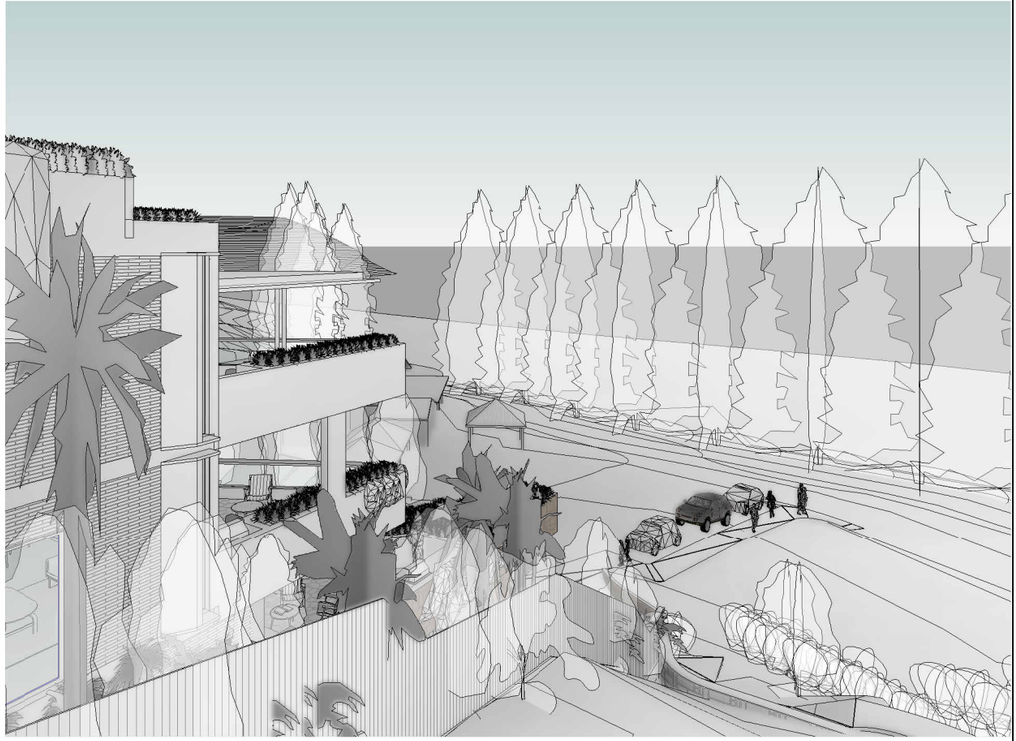
Project number	1609	Checked by	RC
Date	AUGUST 2021	Scale	
Drawn by	KW		DA56



3 View Diagram
1 : 100



1 229 WBR - View 1 (top floor) - existing



2 229 WBR - View 1(top floor) - proposed

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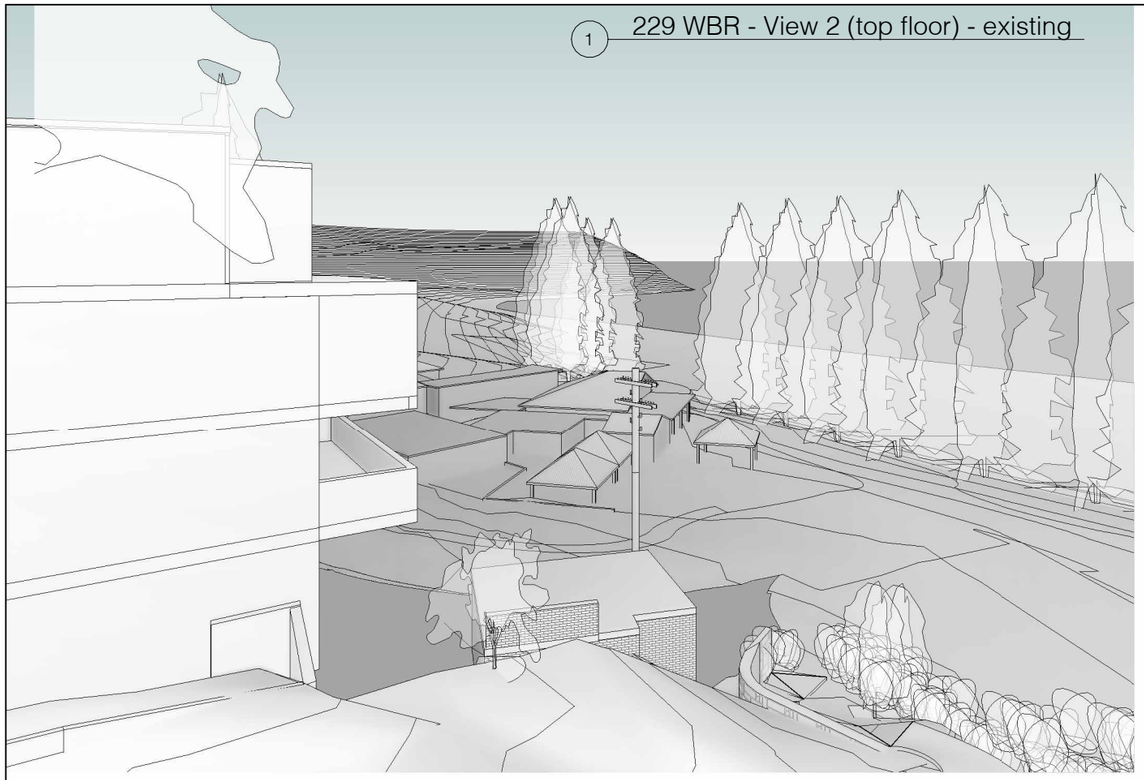
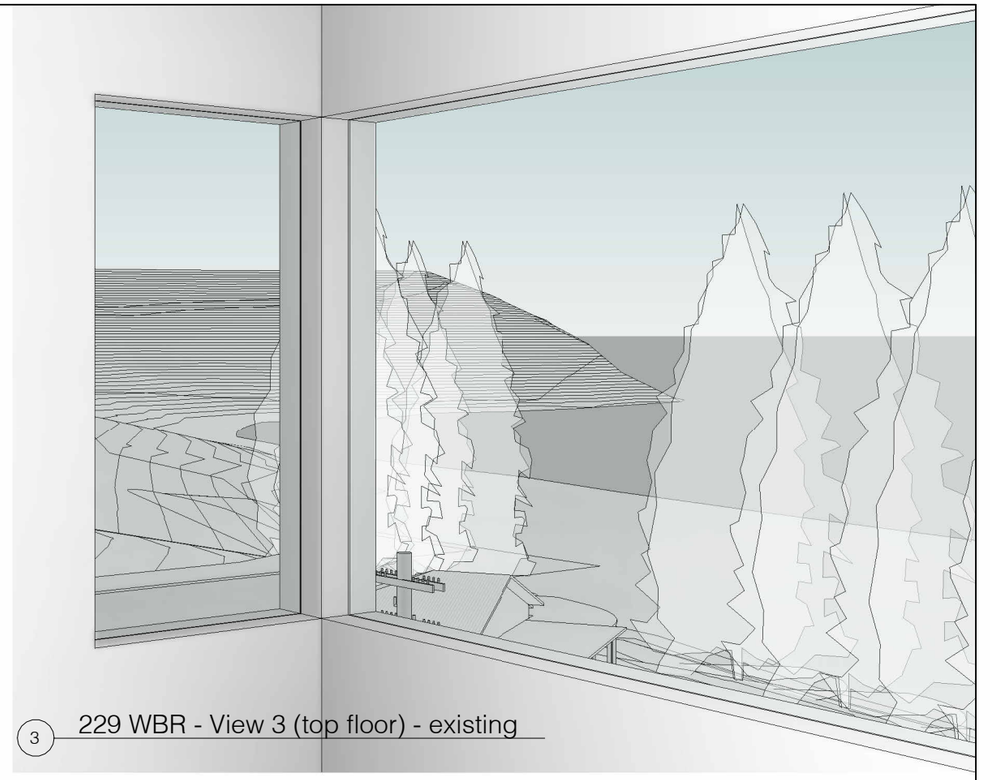
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

229 WBR View Impact Study

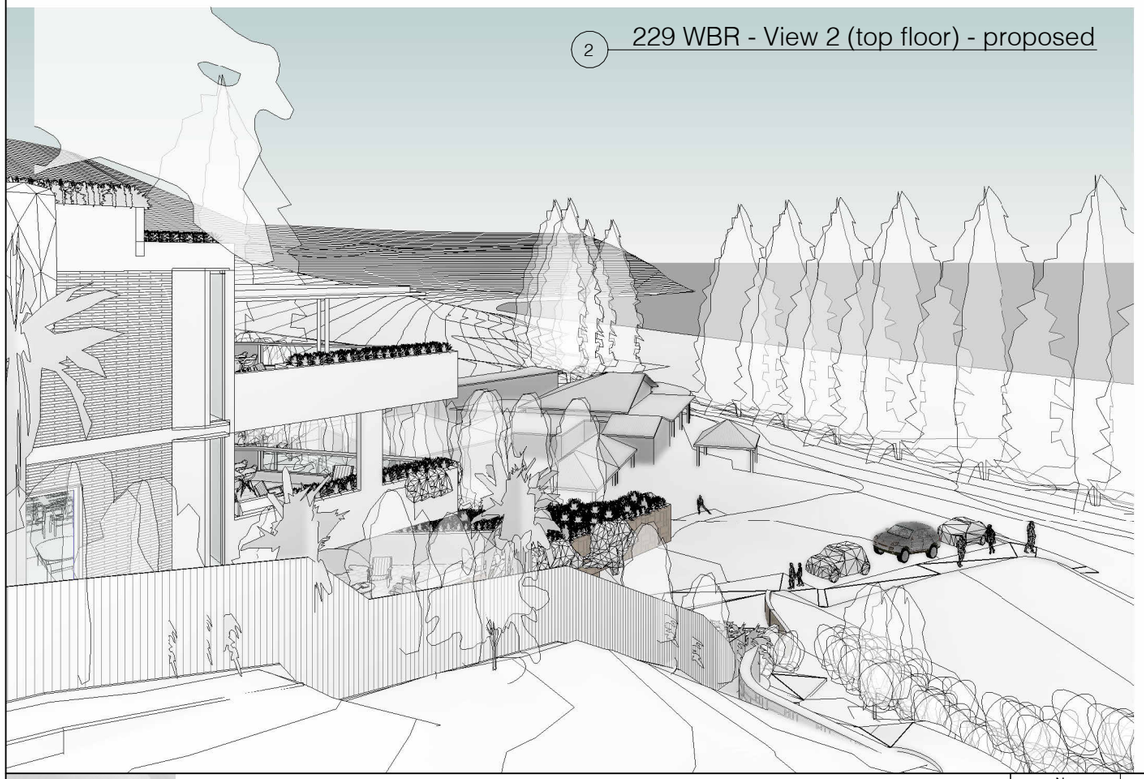
Project number	1609	Checked by	Checker
Date	AUGUST 2021	Scale	1 : 100
Drawn by	Author		DA57



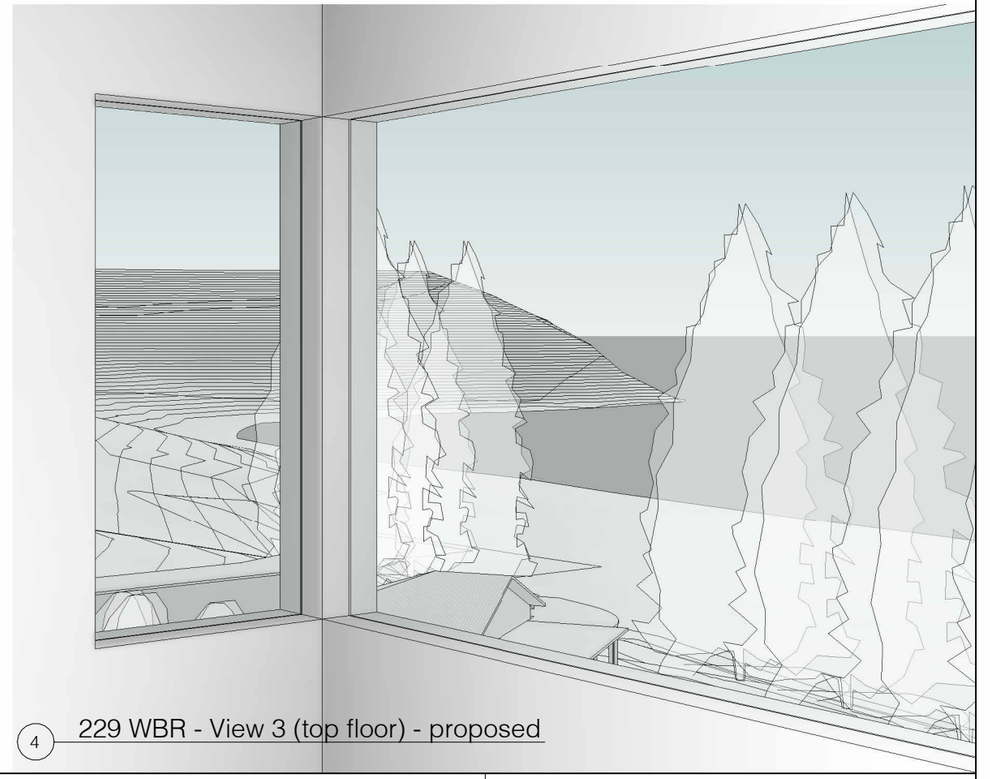
1 229 WBR - View 2 (top floor) - existing



3 229 WBR - View 3 (top floor) - existing



2 229 WBR - View 2 (top floor) - proposed



4 229 WBR - View 3 (top floor) - proposed

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

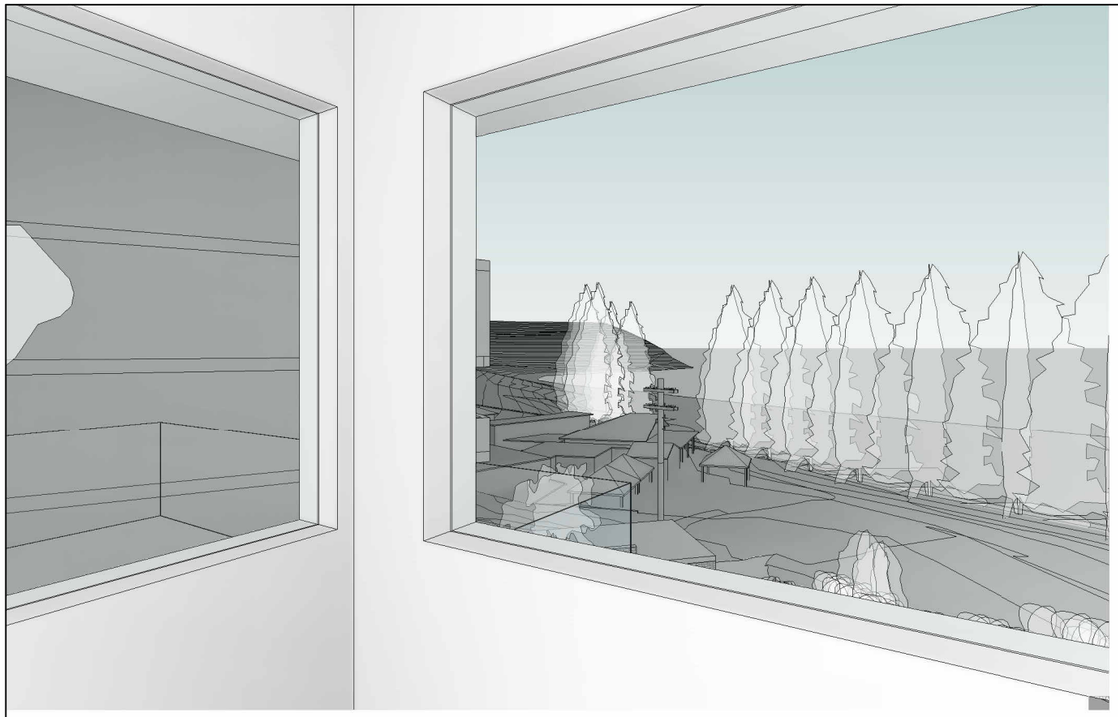
acn :093 598 415 abn :58 093 598 415
nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

No.	Revision Description	Date
M	Development Application	17/04/2020
P	Revised Development Application	09/10/2020
R	Revised Development Application	27/05/2021
S	Revised Development Application for Review	7/06/20201
T	Revised DA for Review	27/07/2021
U	Section 8.2 Review	06/08/2021

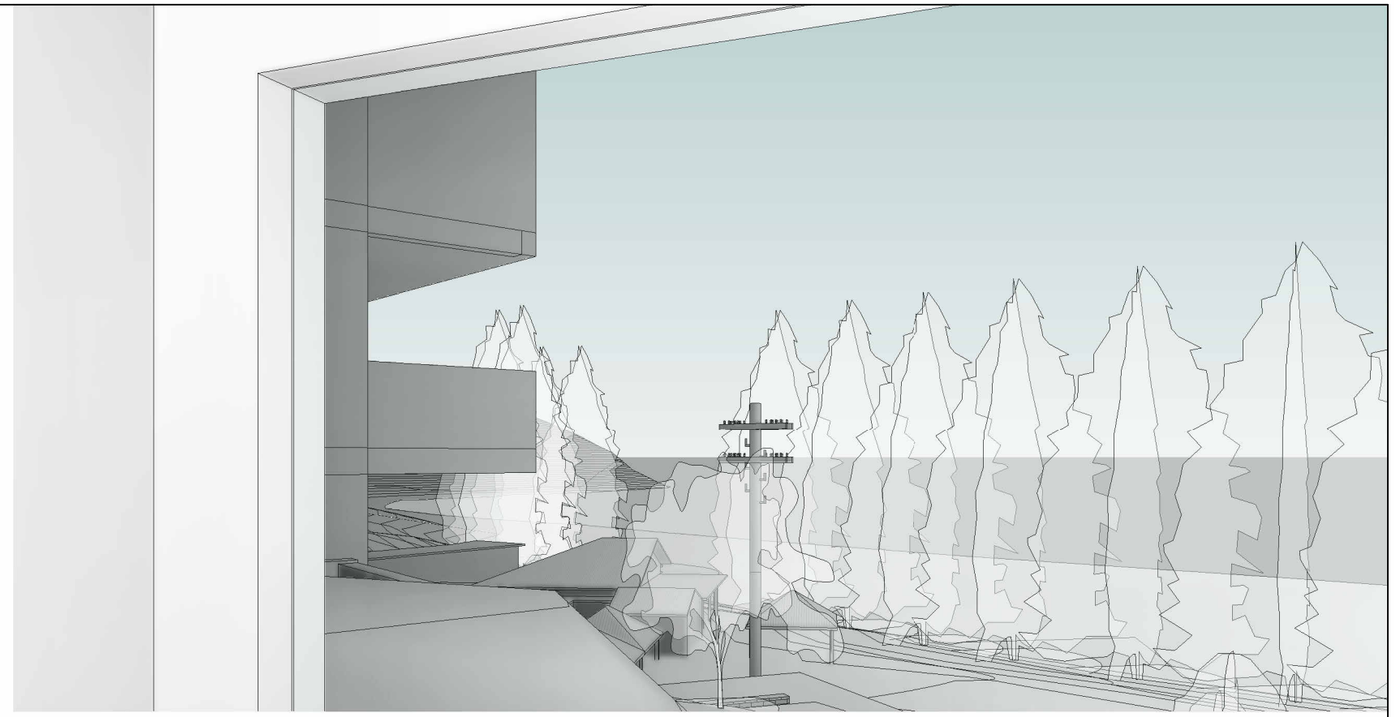
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

229 WBR View Impact Study

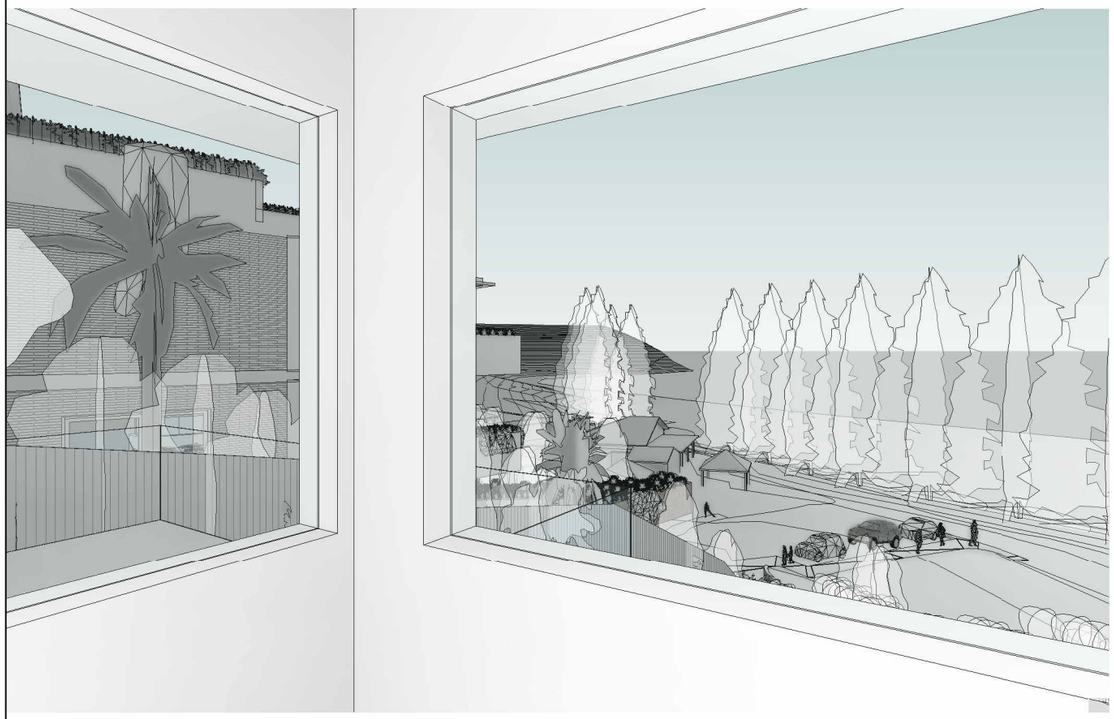
Project number	1609	Checked by	Checker
Date	AUGUST 2021	Scale	
Drawn by	Author		DA58



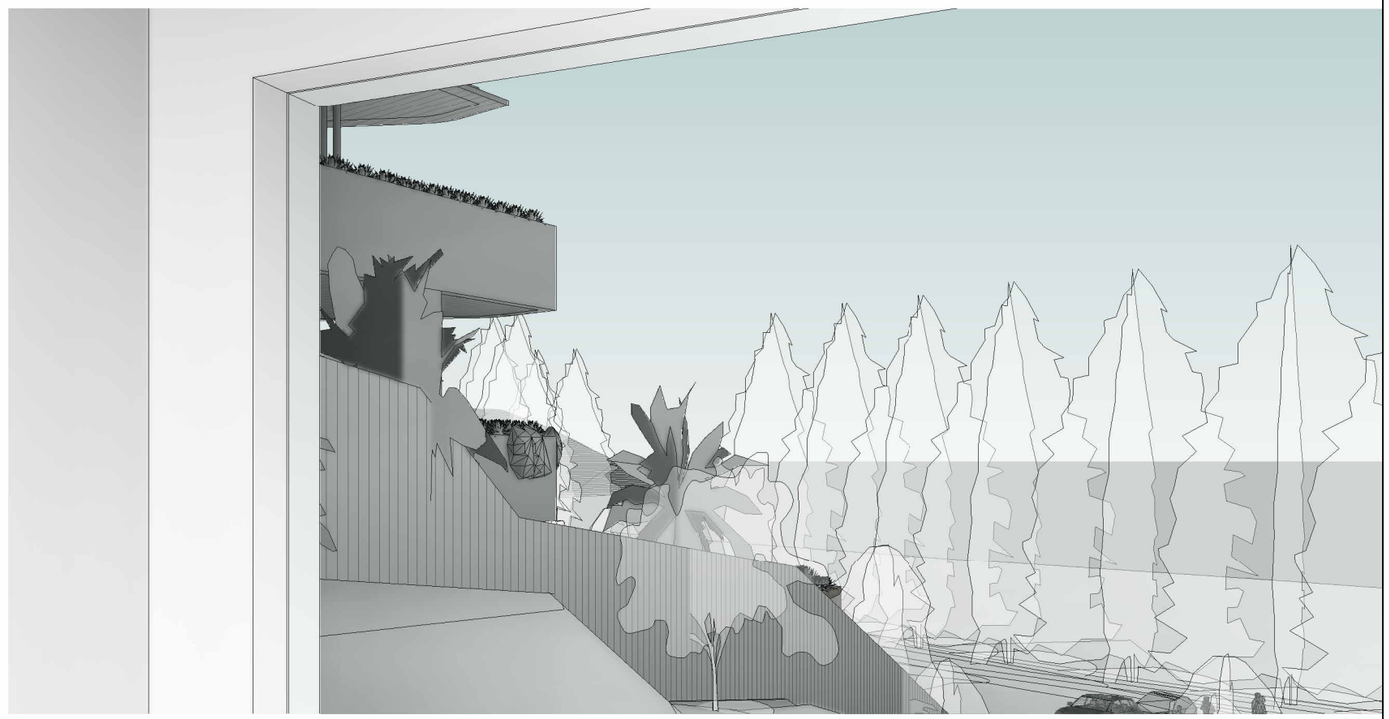
3 229 WBR - View 4 (mid floor) - Existing



1 229 WBR - View 5 (ground floor) - existing



4 229 WBR - View 4 (mid floor) - Proposed



2 229 WBR - View 5 (ground floor)- proposed

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

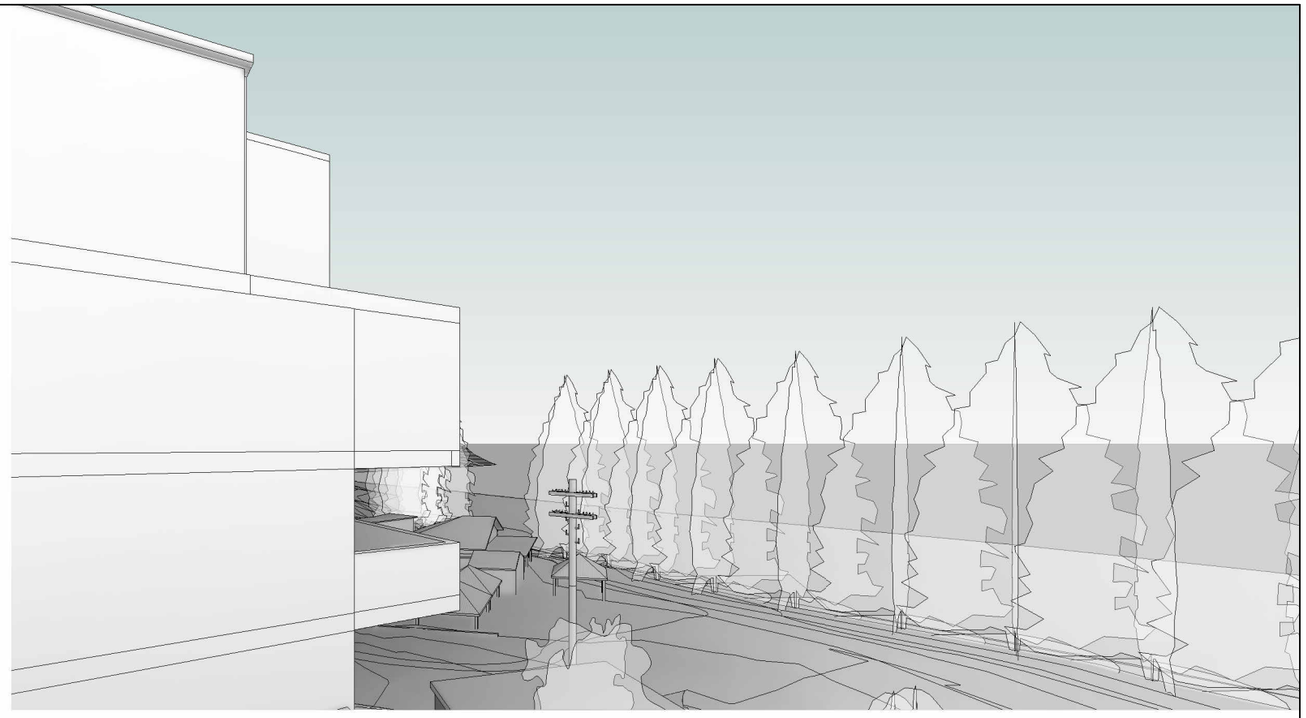
acn:093 598 415 abn:58 093 598 415
nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

No.	Revision Description	Date
M	Development Application	17/04/2020
P	Revised Development Application	09/10/2020
R	Revised Development Application	27/05/2021
S	Revised Development Application for Review	7/06/20201
T	Revised DA for Review	27/07/2021
U	Section 8.2 Review	06/08/2021

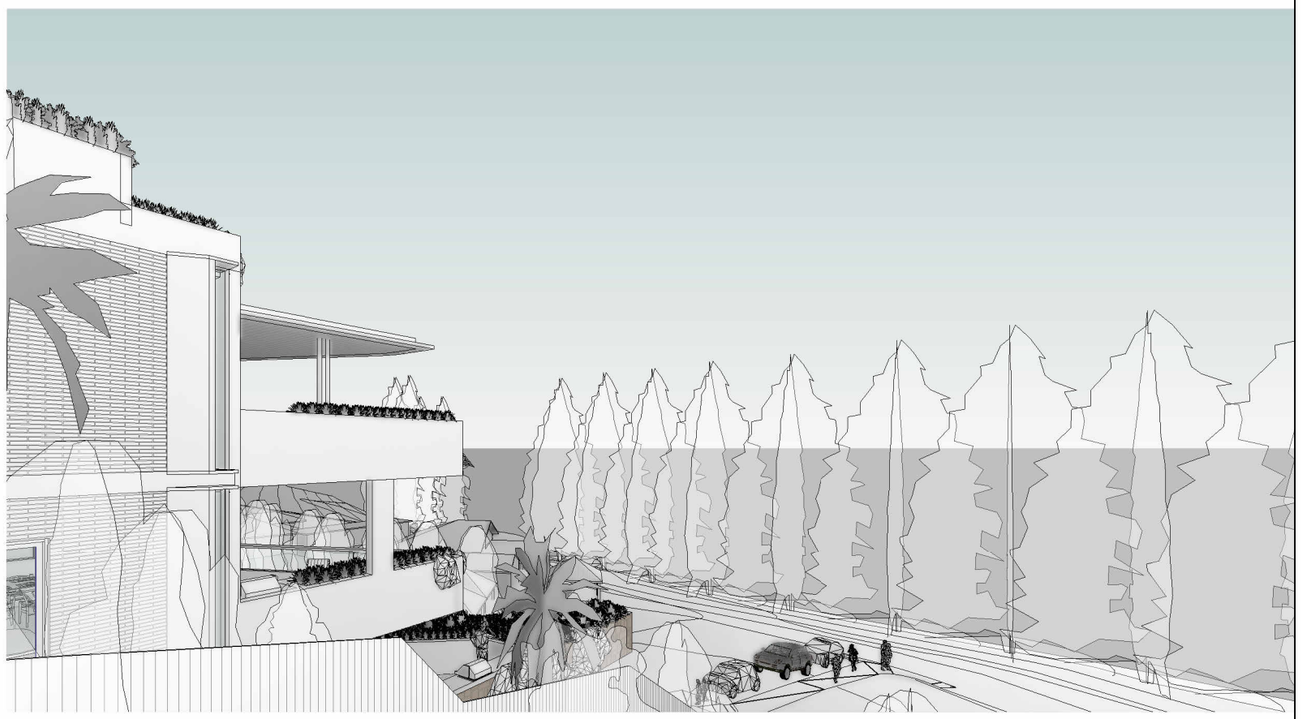
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

229 WBR View Impact Study

Project number	1609	Checked by	Checker
Date	AUGUST 2021	Scale	
Drawn by	Author		DA59



1 229 View from northern corner of balcony - existing



2 229 View from northern corner of balcony - proposed

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

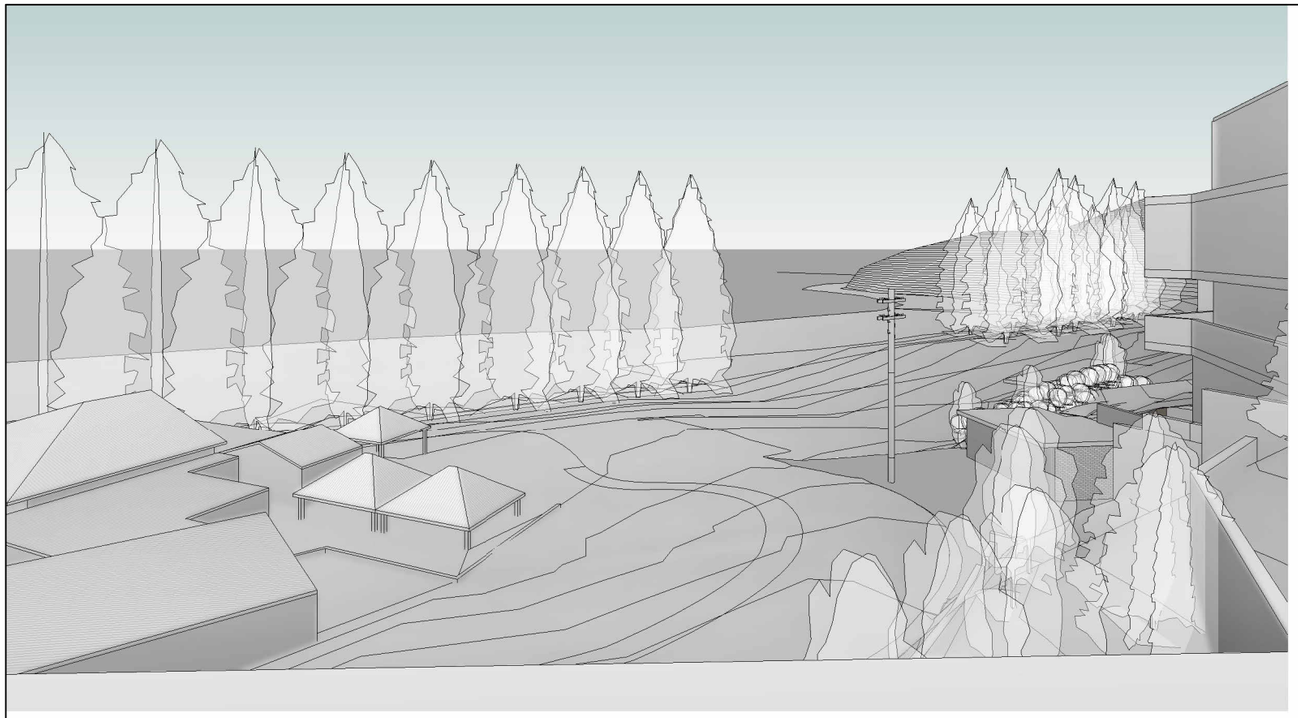
acn :093 598 415 abn :58 093 598 415
nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

No.	Revision Description	Date
M	Development Application	17/04/2020
P	Revised Development Application	09/10/2020
R	Revised Development Application	27/05/2021
S	Revised Development Application for Review	7/06/20201
T	Revised DA for Review	27/07/2021
U	Section 8.2 Review	06/08/2021

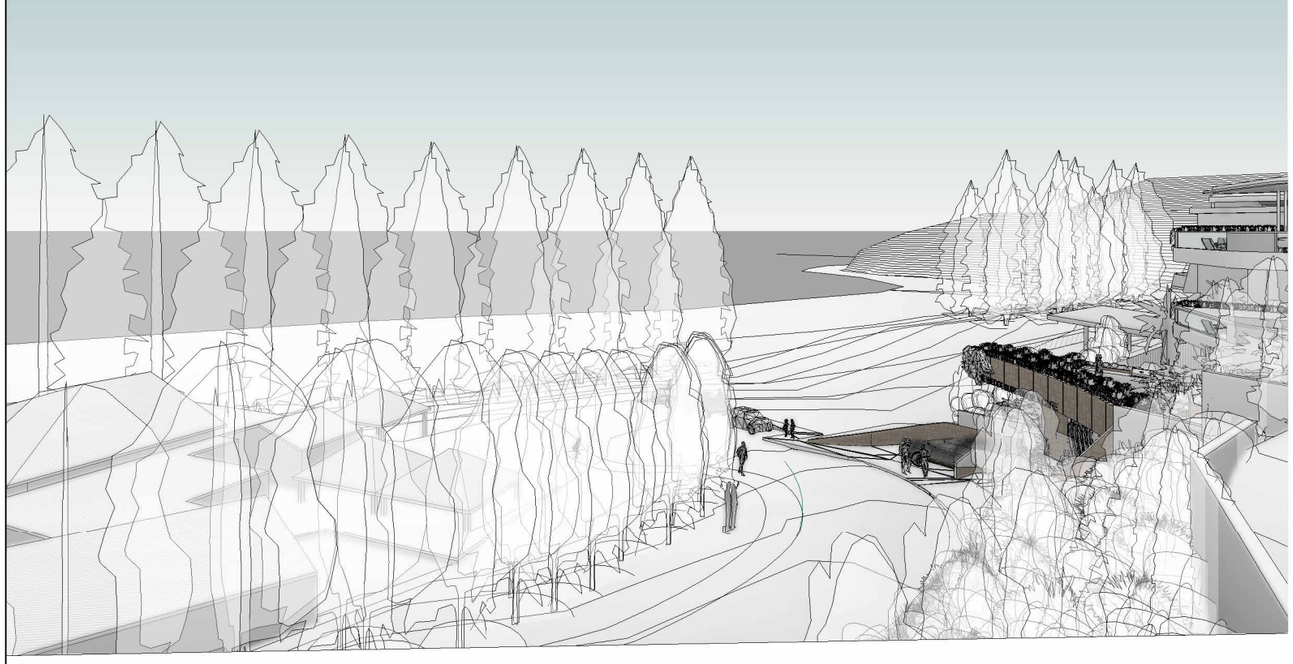
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

229 WBR View Impact Study

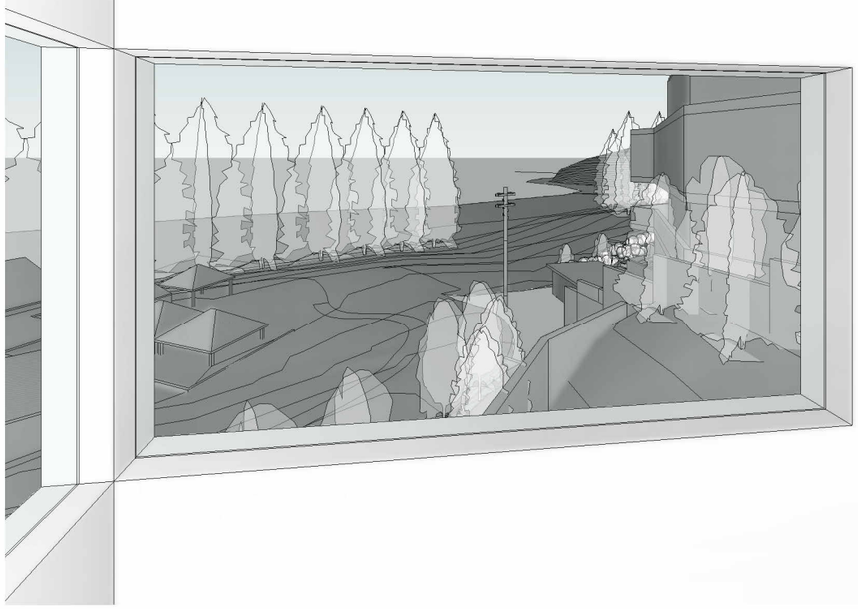
Project number	1609	Checked by	Checker
Date	AUGUST 2021	Scale	
Drawn by	Author		DA60



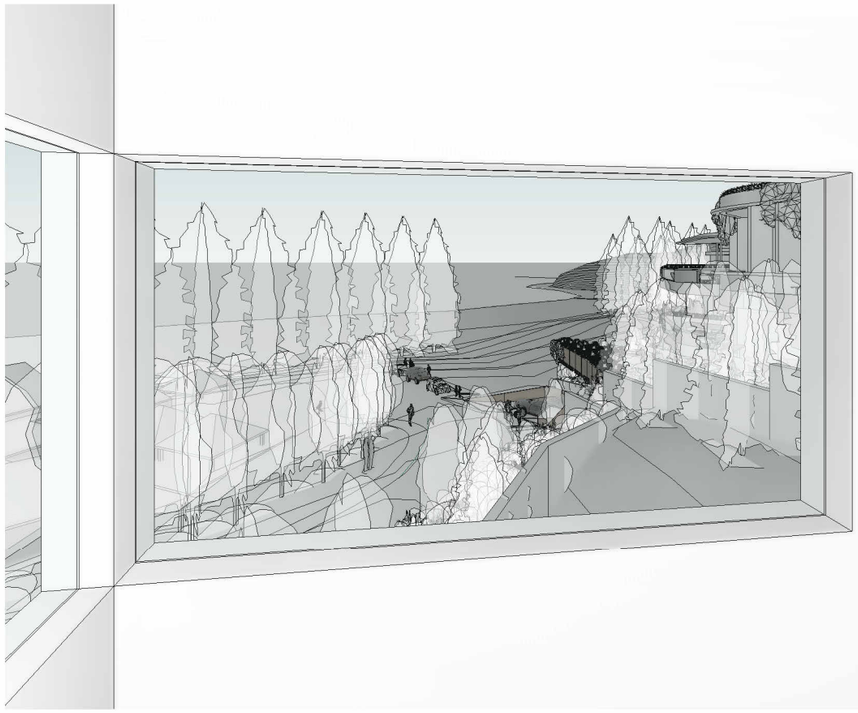
1 233 View from centre of balcony - existing



2 233 View from centre of balcony - proposed



3 233 View from Bedroom - existing



4 233 View from Bedroom - proposed

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

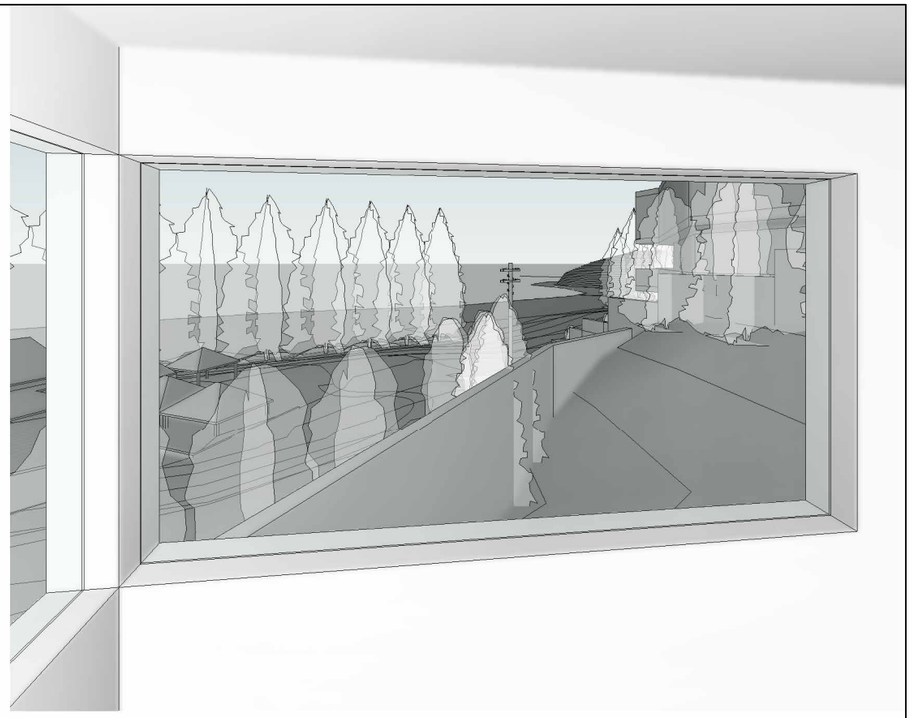
acn:093 598 415 abn:58 093 598 415
nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

No.	Revision Description	Date
M	Development Application	17/04/2020
P	Revised Development Application	09/10/2020
R	Revised Development Application	27/05/2021
S	Revised Development Application for Review	7/06/20201
T	Revised DA for Review	27/07/2021
U	Section 8.2 Review	06/08/2021

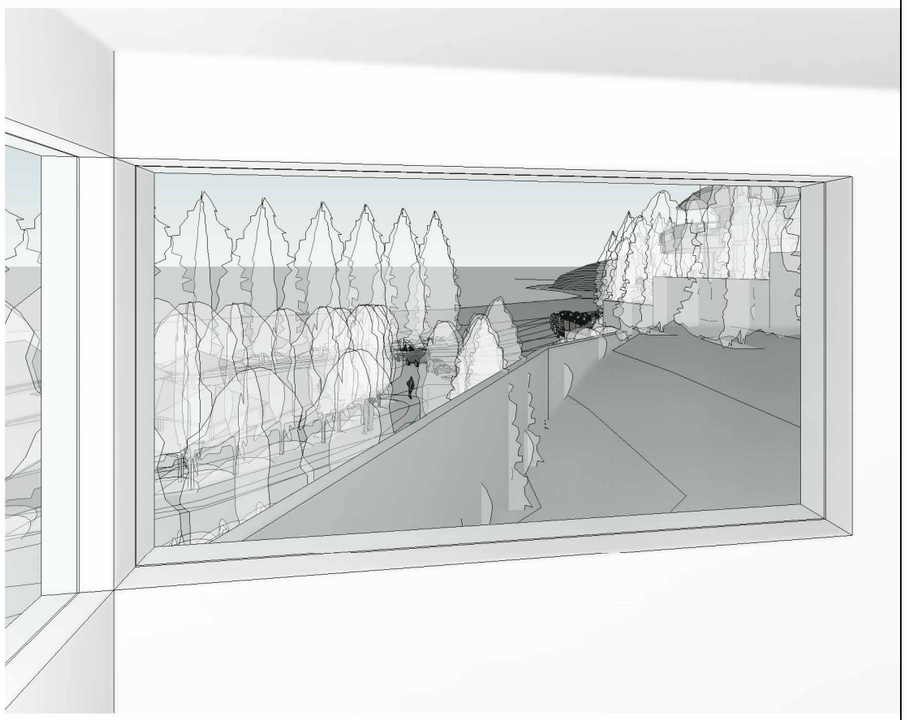
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

233 WBR View Impact Study

Project number	1609	Checked by	Checker
Date	AUGUST 2021	Scale	
Drawn by	Author		DA61



1 233 View from lower bedroom - existing



2 233 View from lower bedroom - proposed

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

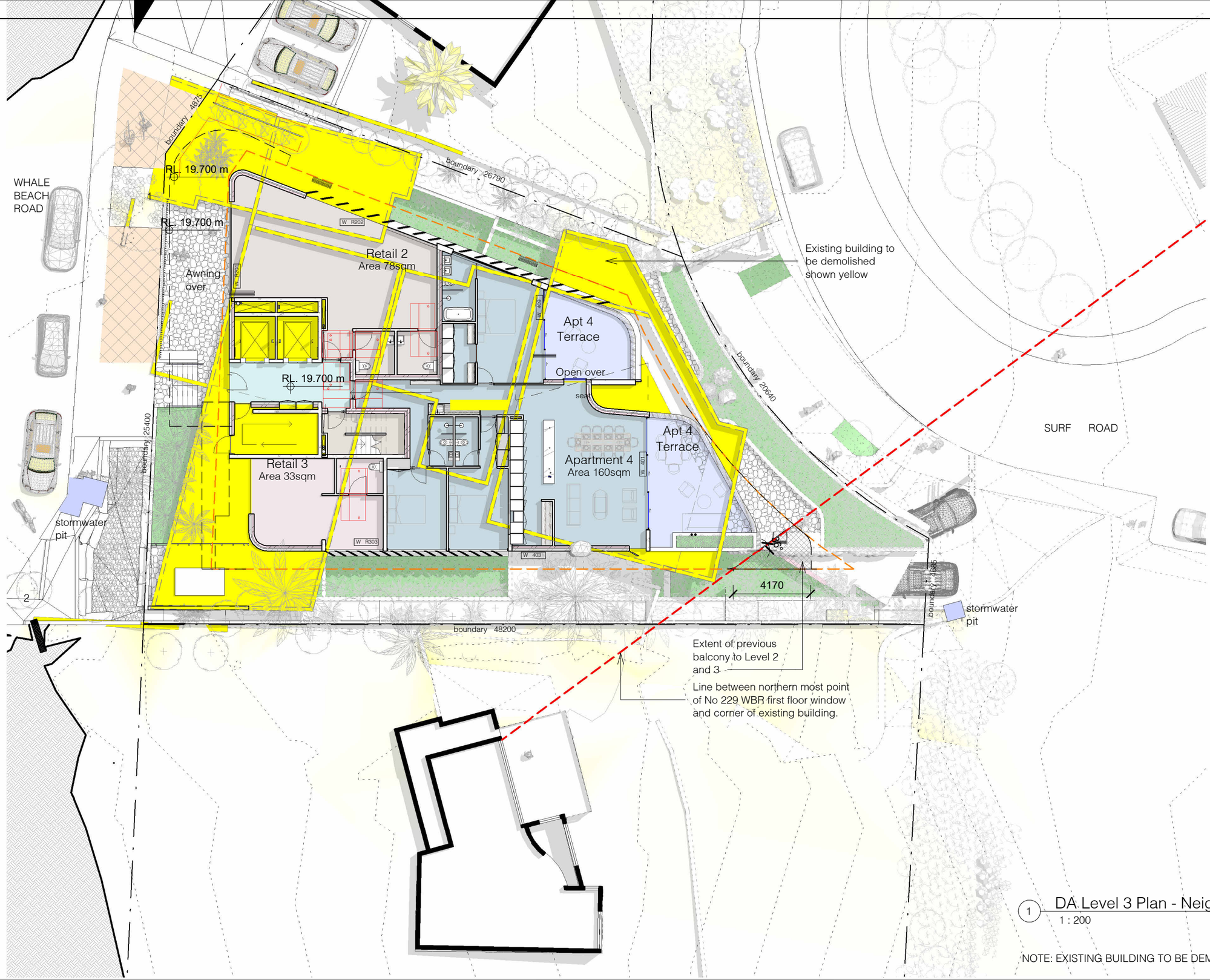
acn :093 598 415 abn :58 093 598 415
nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

No.	Revision Description	Date
M	Development Application	17/04/2020
P	Revised Development Application	09/10/2020
R	Revised Development Application	27/05/2021
S	Revised Development Application for Review	7/06/20201
T	Revised DA for Review	27/07/2021
U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

233 WBR View Impact Study

Project number	1609	Checked by	Checker
Date	AUGUST 2021	Scale	
Drawn by	Author		DA62



1 DA Level 3 Plan - Neighbour View Study
1 : 200

NOTE: EXISTING BUILDING TO BE DEMOLISHED SHOWN TRANSPARENT YELLOW

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

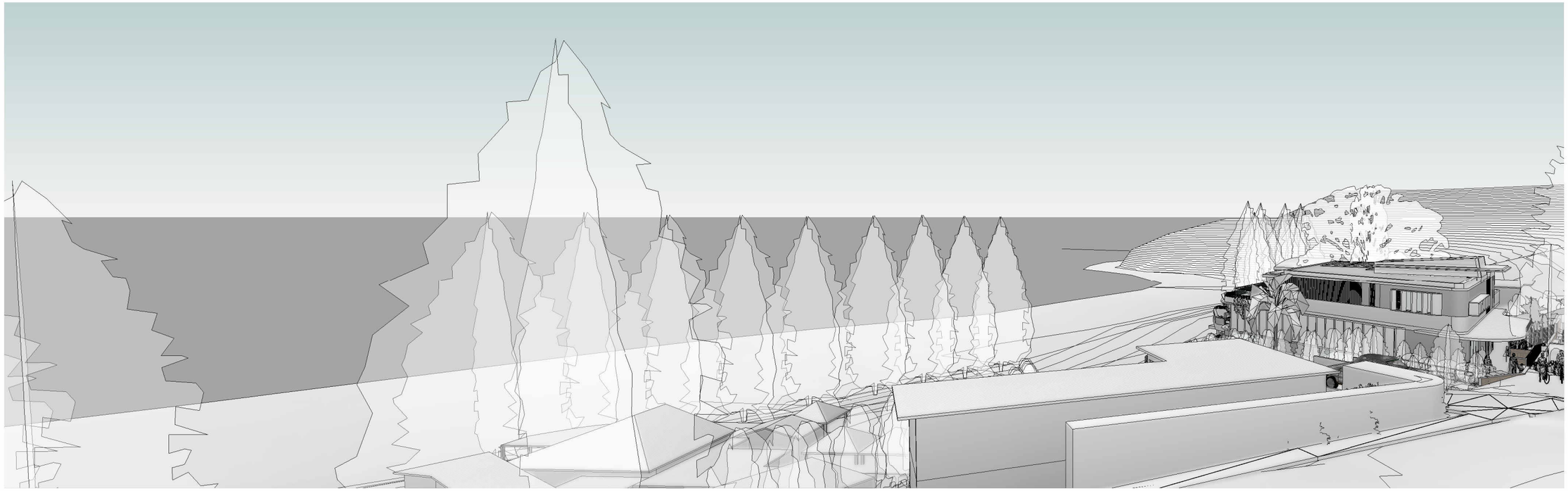
acn :093 598 415 abn :58 093 598 415
nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

No.	Revision Description	Date
J	No.229 WBR View Study	03/12/19
R	Revised Development Application	27/05/2021
S	Revised Development Application for Review	7/06/20201
T	Revised DA for Review	27/07/2021
U	Section 8.2 Review	06/08/2021

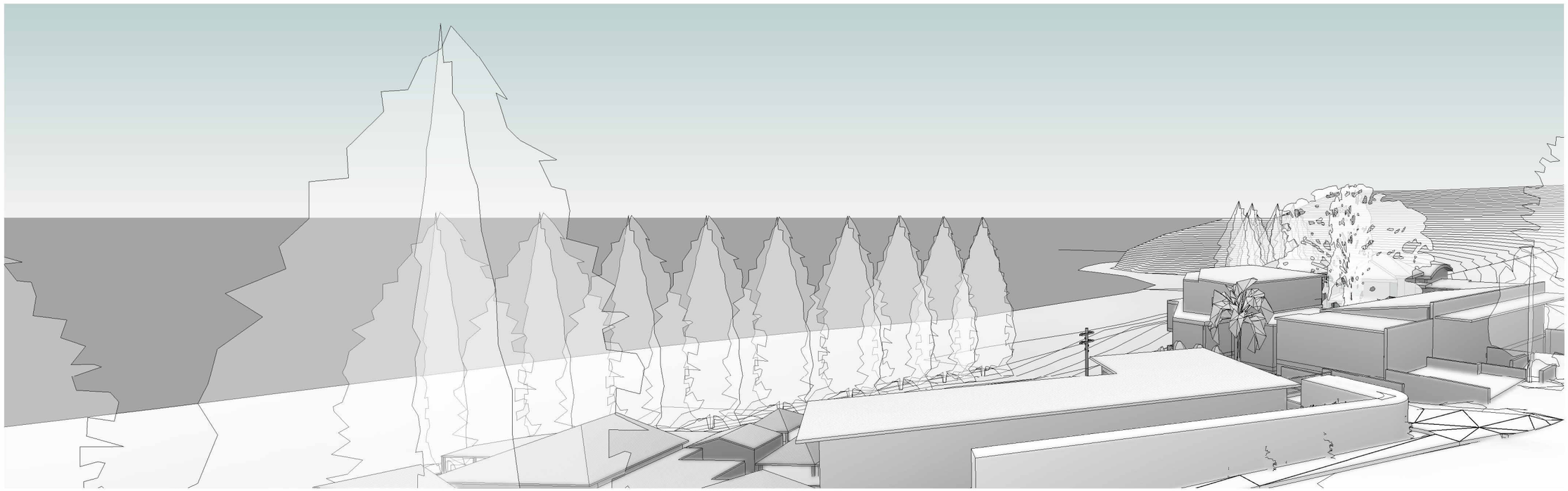
WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

No.229 View Study - Plan

Project number	1609	Checked by	Checker
Date	AUGUST 2021	Scale	1 : 200
Drawn by	Author		DA63



1 View from 202 Balcony - proposed



2 View from 202 Balcony - existing

139 PALMGROVE ROAD, AVALON BEACH NSW 2107
t 02 9918 3843
m 0418 627 024
e mailto:richard@richardcolearchitecture.com.au
w www.richardcolearchitecture.com.au

acn :093 598 415 abn :58 093 598 415
nominated architect : Richard Cole B.Sc.(Arch) (Hons 1) B.Arch.(Hons1) Reg. No: 6538

No.	Revision Description	Date
R	Revised Development Application	27/05/2021
S	Revised Development Application for Review	7/06/20201
T	Revised DA for Review	27/07/2021
U	Section 8.2 Review	06/08/2021

WHALE BEACH NEIGHBOURHOOD CENTRE
DEVELOPMENT APPLICATION
231 Whale Beach Road, Whale Beach
for
Leslie Cassar

No 202 View Impact Study

Project number	1609	Checked by	Checker
Date	AUGUST 2021	Scale	
Drawn by	Author		DA64

Façade

Report

Calculator

Project Summary

Date
15/07/2021

Name
Craig Crowther

Company
Insight Architecture

Position
Architect / Accredited Energy Assessor

Building Name / Address
231 Whale Beach Road, Whale Beach Retail Space 1

Building State
NSW

Climate Zone
Climate Zone 5 - Warm temperate

Building Classification
Class 6 - restaurants, cafes, bars

Storeys Above Ground
4

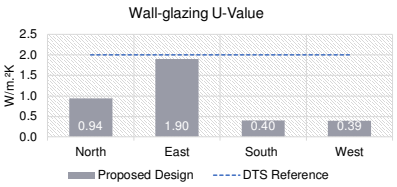
Tool Version
1.1 (April 2020)

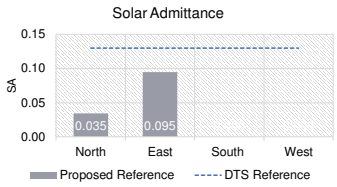
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

Compliant Solution =
Non-Compliant Solution =

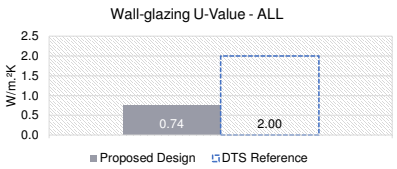
	Method 1				Method 2
	North	East	South	West	All
Wall-glazing U-Value (W/m².K)	0.94	1.90	0.40	0.39	0.74
Solar Admittance	0.03	0.09			
AC Energy Value					5

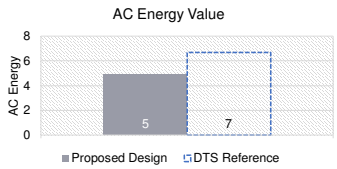
Method 1





Method 2





Project Details

	North	East	South	West
Glazing Area (m²)	9.57395	24.899	0	0
Glazing to Façade Ratio	14%	83%	0%	0%
Glazing References	SG Com Fixed low E	DG Com Low E Sliding		
Glazing System Types	Fixed	Fixed		
Glass Types	Single Glazing - low-E coating	Double Glazed Unit - single low-E coating		
Frame Types	Aluminium	Aluminium		
Average Glazing U-Value (W/m².K)	4.20	2.20		
Average Glazing SHGC	0.61	0.29	0.00	0.00
Shading Systems	Horizontal Device	Horizontal Device	Horizontal Device	Horizontal Device
Wall Area (m²)	56.67	5	97.72	42.18
Wall Types	Wall	Wall	Wall	Wall
Methodology	Wall			
Wall Construction	MASONRY INS R2 FB PB	CONC INS R2 PB	CONC INS R2 PB	CONC INS R2 PB
Wall Thickness	200	175	175	200
Average Wall R-value (m².K/W)	2.54	2.48	2.48	2.54
Solar Absorptance	0.4 0.5	0.4 0.5	0.4 0.5	0.4 0.5

Façade

Report

Calculator

Project Summary

Date
15/07/2021

Name
Craig Crowther

Company
Insight Architecture

Position
Architect / Accredited Energy Assessor

Building Name / Address
231 Whale Beach Road, Whale Beach Retail Space 2

Building State
NSW

Climate Zone
Climate Zone 5 - Warm temperate

Building Classification
Class 6 - restaurants, cafes, bars

Storeys Above Ground
4

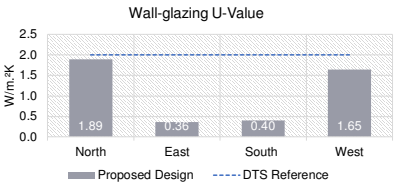
Tool Version
1.1 (April 2020)

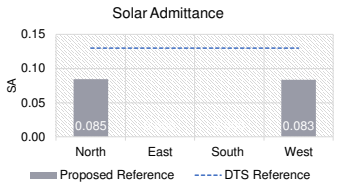
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

Compliant Solution =
Non-Compliant Solution =

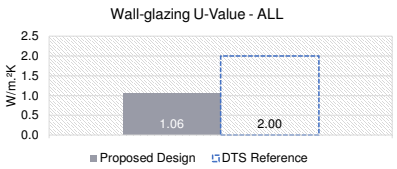
	Method 1				Method 2
	North	East	South	West	All
Wall-glazing U-Value (W/m².K)	1.89	0.36	0.40	1.65	1.06
Solar Admittance	0.08			0.08	
AC Energy Value					11

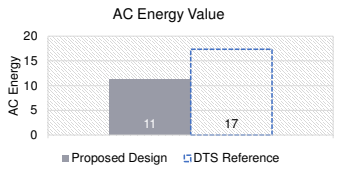
Method 1





Method 2





Project Details

	North	East	South	West
Glazing Area (m²)	24.564	0	0	18.15
Glazing to Façade Ratio	64%	0%	0%	69%
Glazing References	DG Com Low E Fixed SG Com Fixed low E			DG Com Low E Sliding
Glazing System Types	Fixed	Fixed		Sliding Door
Glass Types	Double Glazed Unit - single low-E coating Single Glazing - low-E coating			Double Glazed Unit - single low-E coating
Frame Types	Aluminium	Aluminium		
Average Glazing U-Value (W/m².K)	2.76			2.20
Average Glazing SHGC	0.38	0.00	0.00	0.29
Shading Systems	Horizontal Device	Horizontal Device	Horizontal Device	Horizontal Device
Wall Area (m²)	14	28	43.2	8
Wall Types	Wall	Wall	Wall	Wall
Methodology	Wall			
Wall Construction	DBK Foil Bd R2 PB	DBK Foil Bd R2 PB	CONC INS R2 PB	CONC INS R2 PB
Wall Thickness	250	250	175	200
Average Wall R-value (m².K/W)	2.74	2.74	2.48	2.54
Solar Absorptance	0.4 0.5	0.4 0.5	0.4 0.5	0.4 0.5

Façade

Report

Calculator

Project Summary

Date
15/07/2021

Name
Craig Crowther

Company
Insight Architecture

Position
Architect / Accredited Energy Assessor

Building Name / Address
231 Whale Beach Road, Whale Beach Retail Space 3

Building State
NSW

Climate Zone
Climate Zone 5 - Warm temperate

Building Classification
Class 6 - restaurants, cafes, bars

Storeys Above Ground
4

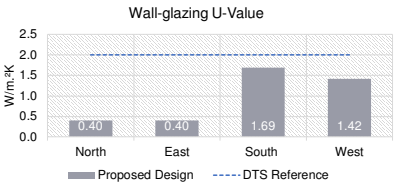
Tool Version
1.1 (April 2020)

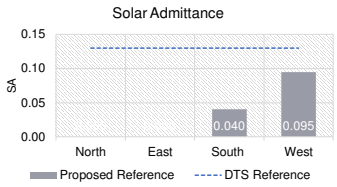
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

Compliant Solution =
Non-Compliant Solution =

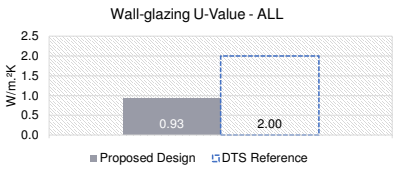
	Method 1				Method 2
	North	East	South	West	All
Wall-glazing U-Value (W/m².K)	0.40	0.40	1.69	1.42	0.93
Solar Admittance			0.04	0.09	
AC Energy Value					4

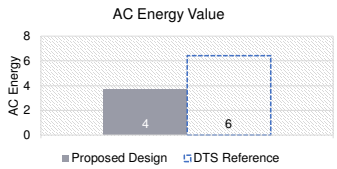
Method 1





Method 2





Project Details

	North	East	South	West
Glazing Area (m²)	0	0	9.943	10.1805
Glazing to Façade Ratio	0%	0%	55%	57%
Glazing References			DG Insul Low E + Fl SG Com FL Low E	DG Com Low E Sliding
Glazing System Types			Fixed	Sliding Door
Glass Types			USER (DEFINED) Single Glazing - low-E coating	Double Glazed Unit - single low-E coating
Frame Types			Aluminium	Aluminium
Average Glazing U-Value (W/m².K)			2.76	2.20
Average Glazing SHGC	0.00	0.00	0.21	0.29
Shading Systems	Horizontal Device	Horizontal Device	Horizontal Device	Horizontal Device
Wall Area (m²)	25.2	18	8.04	7.82
Wall Types	Wall	Wall	Wall	Wall
Methodology	Wall			
Wall Construction	CONC INS R2 PB	CONC INS R2 PB	DBK Foil Bd R2 PB	DBK Foil Bd R2 PB
Wall Thickness	175	175	250	200
Average Wall R-value (m².K/W)	2.48	2.48	2.74	2.54
Solar Absorptance	0.4 0.5	0.4 0.5	0.4 0.5	0.4 0.5

Non-residential Lighting

Class 3 and 5-9 buildings

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Building name/description	Classification
211450 Whale Beach Carpark lighting	Class 7a

Number of rows preferred in table below 4 *(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: Dimming % Area	Adjustment Factor One: Illuminance Turndown	Adjustment Factor Two	Adjustment Factor Two: Dimming % Area	Adjustment Factor Two: Illuminance Turndown	Light Colour Adjustment Factor One	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	Carpark	400.0 m²	93 m	3.9 m	650 W	Carpark - general	480										920 W	**85% of 71%**
2	Store	21.8 m²	20 m	3.9 m	39 W	Storage	60										55 W	**5% of 71%**
3	Plant	12.5 m²	15 m	3.9 m	52 W	Plant room where an average of 160 lx vertical illuminance is required on a vertical panel such as in switch rooms	30										88 W	**7% of 71%**
4	Board Store	5.4 m²	12 m	3.9 m	26 W	Storage	15										***15 W***	**3% of 71%**

Total 767 W

Total 1078 W

if inputs are valid ✓

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THIS LIGHTING CALCULATOR

By accessing or using this calculator, you agree to the following: While care has been taken in the preparation of this calculator, it may not be complete or up-to-date. You can ensure that you are using a complete and up-to-date version by checking the Australian Building Codes Board website (www.abcb.gov.au). The Australian Building Codes Board, the Commonwealth of Australia and States and Territories of Australia do not accept any liability, including liability for negligence, for any loss (howsoever caused), damage, injury, expense or cost incurred by any person as a result of accessing, using or relying upon this publication, to the maximum extent permitted by law. No representation or warranty is made or given as to the currency, accuracy, reliability, merchantability, fitness for any purpose or completeness of this publication or any information which may appear on any linked websites, or in other linked information sources, and all such representations and warranties are excluded to the extent permitted by law. This calculator is not legal or professional advice. Persons rely upon this calculator entirely at their own risk and must take responsibility for assessing the relevance and accuracy of the information in relation to their particular circumstances.

Non-residential Lighting

Class 3 and 5-9 buildings

National Construction Code

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Building name/description	Classification
211450 Whale Beach Retail 1 lighting	Class 6

Number of rows preferred in table below 11 *(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: Dimming % Area	Adjustment Factor One: Illuminance Turndown	Adjustment Factor Two	Adjustment Factor Two: Dimming % Area	Adjustment Factor Two: Illuminance Turndown	Light Colour Adjustment Factor One	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	Café	140.0 m²	69 m	3.6 m	315 W	Restaurant, café, bar, hotel lounge and a space for the serving and consumption of food or drinks											2841 W	**39% of 23%**
2	Kitchen prep area	37.7 m²	31 m	3.6 m	180 W	Kitchen and food preparation area											248 W	**22% of 23%**
3	store	5.5 m²	10 m	3.6 m	15 W	Storage											15 W	**2% of 23%**
4	store	5.5 m²	10 m	3.6 m	15 W	Storage											15 W	**2% of 23%**
5	Plant Fire	29.6 m²	22 m	3.6 m	90 W	Plant rooms with a horizontal illuminance target of 80 lx											94 W	**11% of 23%**
6	Plant Elec	12.8 m²	17 m	3.6 m	30 W	Plant rooms with a horizontal illuminance target of 80 lx											46 W	**4% of 23%**
7	WC Female	11.2 m²	13 m	3.6 m	45 W	Toilet, locker room, staff room, rest room and the like											59 W	**6% of 23%**
8	WC Male	13.5 m²	16 m	3.6 m	70 W	Toilet, locker room, staff room, rest room and the like											71 W	**9% of 23%**
9	WC Accessible	4.7 m²	9 m	3.6 m	15 W	Toilet, locker room, staff room, rest room and the like											25 W	**2% of 23%**
10	Garbage Res	13.7 m²	19 m	3.6 m	15 W	Service area, cleaner's room and the like											37 W	**2% of 23%**
11	Garbage Comm	10.4 m²	16 m	3.6 m	15 W	Service area, cleaner's room and the like											29 W	**2% of 23%**
				Total	805 W											***Total***	3480 W	

if inputs are valid ✓

Non-residential Lighting

Class 3 and 5-9 buildings

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Building name/description	Classification
211450 Whale Beach Retail 2 lighting	Class 6

Number of rows preferred in table below: 3 *(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: Dimming % Area	Adjustment Factor One: Illuminance Turndown	Adjustment Factor Two	Adjustment Factor Two: Dimming % Area	Adjustment Factor Two: Illuminance Turndown	Light Colour Adjustment Factor One	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	Retail 2	65.3 m²	39 m	3.3 m	285 W	Retail space including a museum and gallery whose purpose is the sale of objects											1364 W	**90% of 22%**
2	WC Uni	5.5 m²	9 m	3.3 m	15 W	Toilet, locker room, staff room, rest room and the like											29 W	**5% of 22%**
3	Store	5.9 m²	10 m	3.3 m	15 W	Storage											16 W	**5% of 22%**

Total 315 W

Total 1409 W

if inputs are valid ✓

Non-residential Lighting

Class 3 and 5-9 buildings

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Calculator

Building name/description	Classification
211450 Whale Beach Retail 2 lighting	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	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	Retail 3	29.6 m²	25 m	3.3 m	150 W	Restaurant, café, bar, hotel lounge and a space for the serving and consumption of food or drinks											668 W	**88% of 24%**
2	WC Uni	4.0 m²	8 m	3.3 m	20 W	Kitchen and food preparation area											29 W	**12% of 24%**

Total	170 W

Total	697 W

if inputs are valid ✓