



A Bureau Veritas Group Company

Regulatory Compliance Report

12 Worrobyl St, North Balgowlah

Prepared for: Willowtree Planning
Date: 13 April 2022
Revision: A

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1. Executive Summary

Development Overview

The proposed development is for Alterations and additions to an existing dwelling located at 12 Worrobil St, North Balgowlah.

Compliance Summary

As Registered Certifiers we have reviewed the concept architectural design documents prepared by Sam Crawford Architects (refer appendix A) for compliance with the current building assessment provisions, i.e. the Building Code of Australia 2019 Amendment 1 (BCA).

This report has been prepared to assess the project against the Building Code of Australia to enable issuance of construction approvals. Further assessment of the design will be undertaken as the design develops to ensure compliance is achieved prior to approval being issued

Further Assessment

The assessment of the design documentation has revealed that the following additional information is required in order to complete the assessment, and/or the following areas need to be further reviewed.

No.	Further Information / Review Required	Report Reference
1	Staircase details	
2	Barrier details/elevations	

Documentation to enable assessment and demonstrate compliance will be required to address the above items prior to approval.

The application for Construction Certificate shall be assessed under the relevant provisions of the Environmental Planning & Assessment Act 1979 (As Amended), Environmental Planning & Assessment Regulation 2021 and the Environmental Planning & Assessment (Development Certification and Fire Safety) Regulation 2021.

2. Introduction

The proposed development comprises of Alterations & Additions to an existing, freestanding residential dwelling house. Currently the dwelling is 3 storeys above natural ground level, with proposed alterations including internal and external works associated with the dwelling.

The site is located within the Northern Beaches Council.

This report is based upon the review of the design documentation listed in Appendix A of this Report

The report is intended as an overview of the relevant provisions of the Building Code of Australia for assistance only. Detailed drawings and associated review will still be required as the final design is developed.

The applicable legislation governing the design of buildings is the Environmental Planning and Assessment Act 1979. This Act requires that all new building works must be designed to comply with the BCA.

The version of the BCA applicable to the development, is version that in place at the time of the application to the Registered Certifier for the Construction Certificate. For the purposes of this Report, BCA 2019 Amendment 1 has been utilised as the version of the BCA applicable at the time of preparation this Report.

2.1. Building Assessment Data

Summary of Construction Determination:

Classification	1a
Number of Storeys	4
Rise In Storeys	3
Type of Construction	N/A
Effective Height (m)	N/A

2.2. Council Development Approval

A Development Approval will be required from the Local Authority for the development. A copy of the Development Approval conditions, and approved drawings will be required prior to the issuing of the Building Approval for that component of works.

The proposed development must not be inconsistent with the endorsed drawings and all relevant conditions will need to be satisfied and accurately reflect the construction issue drawings.

2.3. Copy of Certificate of Title:

A copy of the Certificate of Title is required. Where it is proposed to construct any part of the building over, under or within an easement, the consent of the relevant authority and Council is required prior to the issue of the Construction Certificate.

3. Structure

3.1. Structural Provisions:

New structural works are to comply with the applicable requirements of BCA Part B1, including AS/NZS 1170.0-2002, AS/NZS 1170-1-2002, AS/NZS 1170.2-2011 and AS 1170.4-2007.

Depending on the importance level of the building as determined by AS/NZS 1170.0-2002, the non-structural elements of the building, including partitions and ceilings, may be required to comply with the seismic restraint requirements of AS 1170.4-2007. Where this is required, certification will be required confirming that the design of the seismic restraints comply with AS 1170.4-2002.

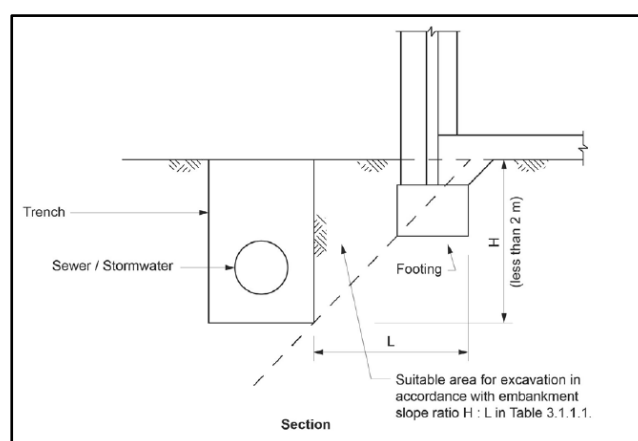
All new glazing is to comply with AS1288-2006, and AS2047-2014.

Prior to the issue of the Construction Certificate, structural certification is required to be provided by a Professional Engineer registered on the National Engineering Register.

3.2 Site Preparation: (BCA Vol 2, Cl 3.1.1.1 and 3.1.1.2)

Earthworks are to be undertaken in accordance with 3.1.1.1 and 3.1.1.2 of the BCA

All trenches specifically excavated for services such as Stormwater, Sewer, Gas, Water and Electricity must be excavated in accordance with Table 3.1.1.1 and the figure below, if encroaching on building foundations and footings.



All surface water must be diverted away from the building during all stages of construction and at completion in accordance with 3.1.3.3

Termite management systems are to comply with AS 3660.1 or have been tested and passed the test required by Section 5 of AS3660.3

Building element	Termite management system or options
Concrete slab-on-ground: Slab perimeter or external wall perimeter	Slab edge exposure Sheet material Granular Material Chemical
Concrete slab-on-ground: Penetrations/control joints/area beneath the slab	Sheet material Granular Material Chemical
Suspended floors	Sheet material Granular Material Chemical
Attachments to buildings	Termite Management system to the attachment Inspection zone between attachment and building.

3.3 Footings and Slabs: (BCA Vol 2, CI 3.2)

Footings and slabs, including internal and edge beams, must be founded on soil with an allowable bearing pressure as specified in 3.2.2.3 and in accordance with requirements specified by a suitably qualified person.

Vapour barriers must be installed under the slab-on-ground construction for all Class 1 buildings – to the specifications in 3.2.2.6

Edge rebates for slab-on-ground, stiffened raft or waffle raft with masonry cavity must comply with the provisions in 3.2.2.7

Concrete used in construction must comply with AS 3600 and 3.2.3.1

Steel Reinforcement must comply with AS 2870 and 3.2.3.2 and be designed to engineers' specifications.

The foundation where the footing is to be located must be classified in accordance with AS 2870. Table 3.2.4.1 General definition of site classes specifies the types of classes for specific foundational types.

Footing and slab construction, including size and placement of reinforcement, must comply with the relevant provisions of this part and the following details:

- i. Stiffened raft Class A,S,M,M-D and H-D sites
- ii. Stiffened raft Class A,S,M,M-D and H sites

3.4 Masonry: (BCA Vol 2, CI 3.5)

Masonry, weatherproofing of Masonry and Masonry veneer construction is to be constructed in accordance with AS 3700, AS 4773.1 and AS 4773.2.

Masonry veneer walls must not be greater than 8.5m in height when measured above the adjacent finished ground level.

Masonry veneer walls must have a minimum veneer thickness of 90mm and have a nominal mortar joint thickness of 10mm. Vertical articulation joints must be provided in masonry veneer walls in accordance with 3.3.5.12 – having a width not less than 10mm and be filled with a compressible foam or polystyrene filler and flexible sealant.

A clear cavity width between the internal and external wall courses on the ground floor and first floor of 25mm must be maintained, and the cavity must be drained outside the building through the utilisation of weepholes.

Damp-proof courses and flashings must comply with AS/NZS 2904 or the provisions set out in 3.3.5.7 in the BCA. DPC and Flashings are to be installed in accordance with 3.3.5.7

Steel lintels must be installed to comply with 3.3.5.12 and sized in accordance with Table 3.3.5.5

Isolated masonry piers supporting metal roofs are to be designed and constructed in accordance with AS 3700, AS 4773.1 and AS 4773.2.

3.5 Framing: (BCA Vol 2, CI 3.5)

Timber framing is to be designed and constructed in accordance with AS 1720.1, AS 1720.5, AS 1684.2, AS 1684.3 AS 1684.4, AS 1860.2.

Structural steel is to be designed and constructed in accordance with AS 4100 or AS/NZS 4600. Structural steel members must be protected against corrosion in a accordance with 3.4.4.4.

3.6 Roof & Wall Cladding (BCA Vol 2, CI 3.5)

The specified roofing type for the development is roof tiling. As the current architectural drawings specify terracotta tiles – it is to be as per the requirements of AS 4597.

As more detailed drawings are made available, it is to be confirmed that the proposed new roofing section has a pitch note less than 15 degrees and not more than 35 degrees.

New metal sheet roofing portions are to be installed in accordance with AS1562.1 and Part 3.5.1. Metal sheeting must be protected from corrosion in accordance with Table 3.5.1.1. Flashings, fasteners, guttering and downpipes must be compatible with each other as described in Tables 3.5.1.2a to 3.5.1.2d to prevent adverse chemical reactions that will corrode elements of the roofing system.

4. Damp and Weatherproofing

4.1. Rainwater Management

The BCA stipulates that a drainage system for the disposal of surface water resulting from a storm having an average recurrence interval –

- i. 20 years must
 - a. Convey surface water to an appropriate outfall; and
 - b. Avoid surface water damaging the building
- ii. 100 years must avoid the entry of surface water into a building

Stormwater drainage systems serving the building are to comply with AS3500.3 - 2018.

Design certification from a NER registered engineer is to be provided as part of the Construction Certificate documentation.

4.2. Weatherproofing and Rising damp

All Roofs and external walls (including openings around windows and doors) are to prevent the Ingress of water that could cause

- i. Unhealthy or dangerous condition, loss of amenity for occupants and
- ii. Undue dampness or deterioration of building elements.

Moisture from the ground must be prevented from causing—

- i. Unhealthy or dangerous condition, loss of amenity for occupants and
- ii. Undue dampness or deterioration of building elements.

4.3. Weatherproofing

BCA Compliance with the performance provisions of Weatherproofing of external walls is verified by the method specified in V2.2.1 of BCA 2019 Amdt 1 Volume 2. A final test report on the procedure is required to verify compliance with V2.2.1

5. Fire Safety

5.1. Spread of fire

A Class 1 building must be protected from the spread of fire from—

- i. Another building other than an associated Class 10 building and
- ii. The allotment boundary, other than a boundary adjoining a public road or public space.

Compliance with P2.3.1(a)(i) to avoid the spread of fire between buildings on the same allotment is verified when

- i. the external walls and any openings in the external walls of a building, less than 1.8 m from another building, are capable of withstanding 92.6 kW/m² of heat flux for 60 minutes; and
- ii. the external walls extend to the underside of a non-combustible roof covering or non-combustible eaves lining in accordance with 3.7.2.4.

Compliance with P2.3.1(a)(ii) to avoid the spread of fire from an allotment boundary is verified when—

- i. the external walls and any openings in the external walls of a building, less than 0.9 m from an allotment boundary, are capable of withstanding 92.6 kW/m² of heat flux for 60 minutes; and
- ii. the external walls extend to the underside of a non-combustible roof covering or non-combustible eaves lining in accordance with 3.7.2.4.

There are no proposed buildings on the allotment other than the existing dwelling, thus there are no requirements to assess spread of fire between buildings.

5.1. Fire hazard Properties (BCA Vol 2, CI 3.7.1.2)

Though properties of some materials are combustible or contain combustible fibres – they may be used wherever a non-combustible material is required in the housing provisions set out in 3.7.1.1 of the BCA.

New plasterboard wall and ceiling linings are suitable for use, as well as FC Cement sheeting. Proposed sarking materials are to be verified that they do not exceed 1mm in thickness and have a flammability index of <5. A Test report prepared in accordance with the requirements of A5.2 is to be provided as part of the Construction Certificate documentation.

The fire hazard properties of other materials used in Class 1 buildings must comply with 3.7.1.2 (a) & 3.7.1.2 (b) of the BCA.

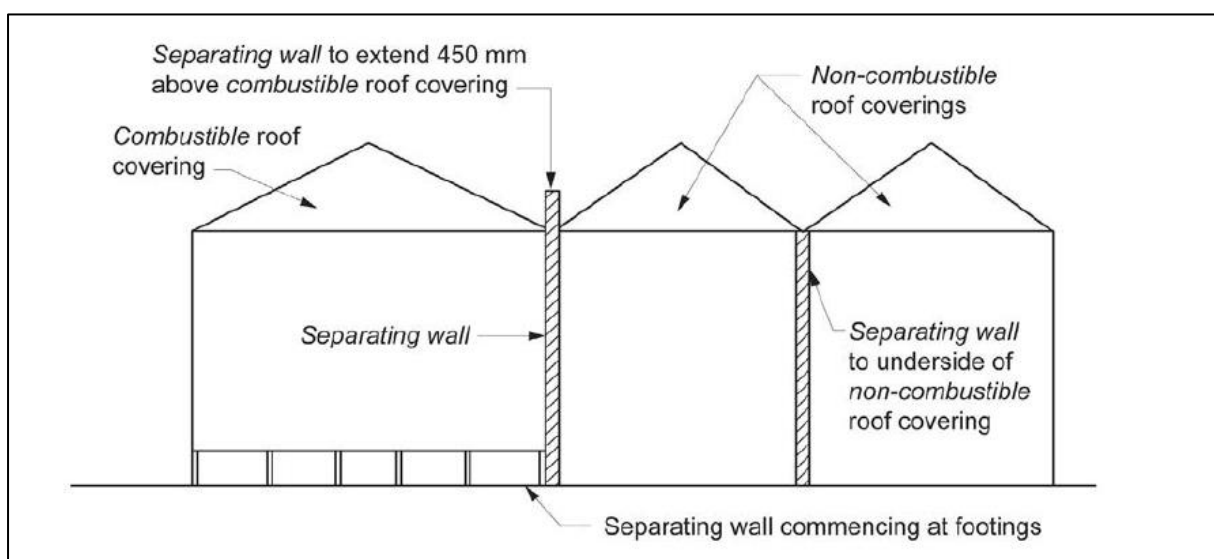
5.3 Fire separation

External walls must comply with 3.7.2.4 of the BCA if the wall is less than:

- i. 900mm from an allotment boundary other than the boundary adjoining a road alignment or other public space; or
- ii. 1.8 m from another building on the same allotment other than a Class 10 building associated with the Class 1 building or a detached part of the same Class 1 building

A Separating wall between Class 1 Buildings, must –

- i. Have either
 - a. A minimum FRL of 60/60/60
 - b. Be of masonry construction not less than 90mm thick and;
- ii. Commence at the footings or ground slab and;
- iii. Extend –To the underside of the roof covering (for non-combustible roof coverings) as shown in the figure below.



The external walls of the proposed development are >900mm from each side boundary thus new openings for doorways and windows do not require protection and the external walls need not achieve an FRL of 60/60/60.

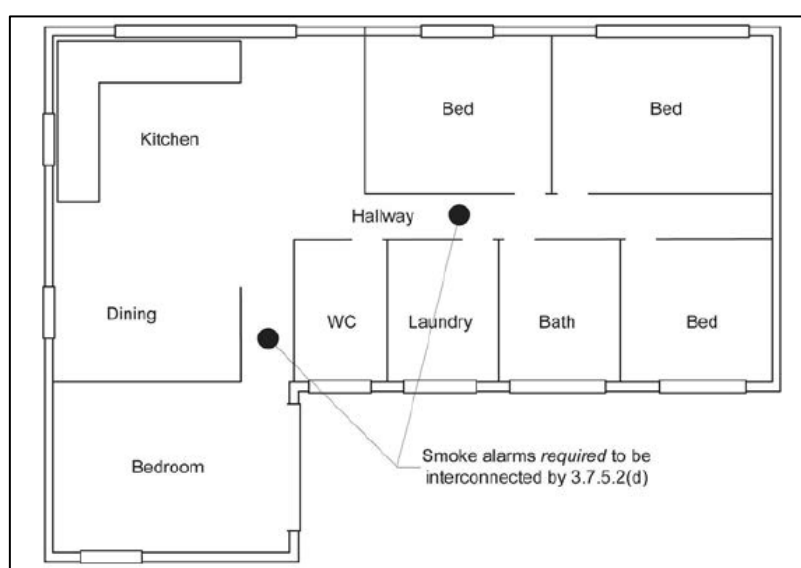
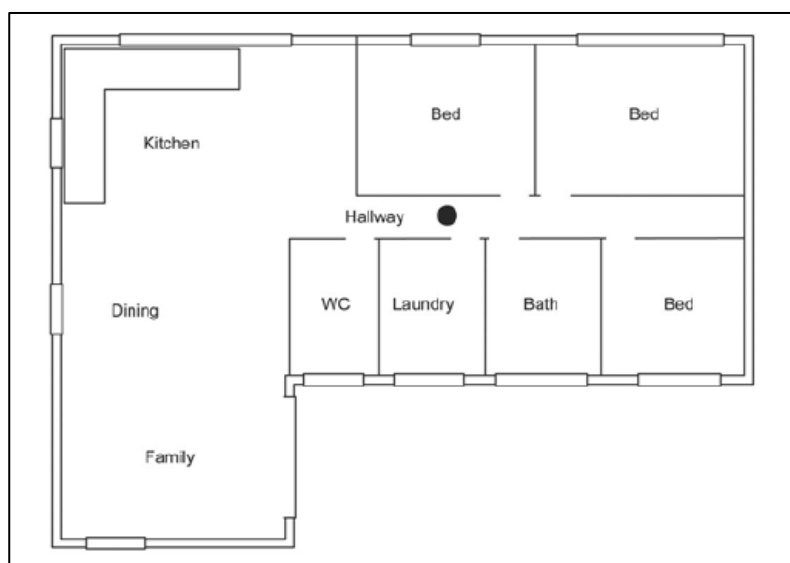
The subject development is one dwelling thus has no separating wall requirements under this part.

5.4 Smoke Alarms

Smoke alarms are to be provided for the residence in accordance with part 3.7.5.3 of Volume 2 of the BCA. The installation of smoke alarms is to comply to AS 3786-2014. The below images are indicative of typical locations of smoke alarms given different configurations of floor plans for residential dwellings. 3.7.5.3 (a) specifies that any storey containing bedrooms, every corridor or hallway associated with a bedroom, or if there is no corridor or hallway, in an area between the bedrooms and the remainder of the building.

The smoke alarm is required to be connected to the consumer mains electricity source and is also required to be provided with a secondary power source i.e. a source of power to supply the smoke alarm if the primary power source becomes unavailable (outage, service maintenance etc.)

The smoke alarms on ground floor, first floor and second floor of the proposed residential dwelling are required to be interconnected and fed from the same circuit as per the electrical wiring standards AS 3000-2018. The smoke alarms are required to be installed 300mm away from the corner junction of the wall and ceiling, and range between 500mm-1500mm from the high point an apex of a raked ceiling.



6. Health and Amenity

6.1. Floor Wastes

Floor wastes to be provided within bathrooms and laundries. The floor shall be sloped towards these wastes.

The proposed laundry is to include a floor waste.

6.1. Waterproofing

Building elements in wet areas within must be waterproof/water resistant in accordance with Table 3.8.1.1 and comply with AS3740

Internal Wet Areas

Internal wet areas throughout the development (e.g. bathrooms, laundries) shall be waterproofed in accordance with AS3740 - 2010 requirements.

Further review will be undertaken as the design develops with respect to the specification of waterproofing membrane, provision of water-stops at doorways etc.

External above Ground Membranes

All external above ground areas (balconies etc.) shall be protected by a waterproofing system in accordance with AS4654 Parts 1 and 2 – 2012.

For external balconies the waterproofing membrane must have a vertical upward termination height in accordance with the table below dependant on the wind class of the site. The wind class is determined by the structural engineer.

Wind Class Regions A & B	Wind Class Regions C & D	Ultimate Limit State Wind Speed	Termination Height (mm)
N1	-	34	40
N2	-	40	50
N3	C1	50	70
N4	C2	61	100
N5	C3	74	150
N6	C4	86	180

6.2 Room Heights

Heights of rooms and other spaces must be not less than-

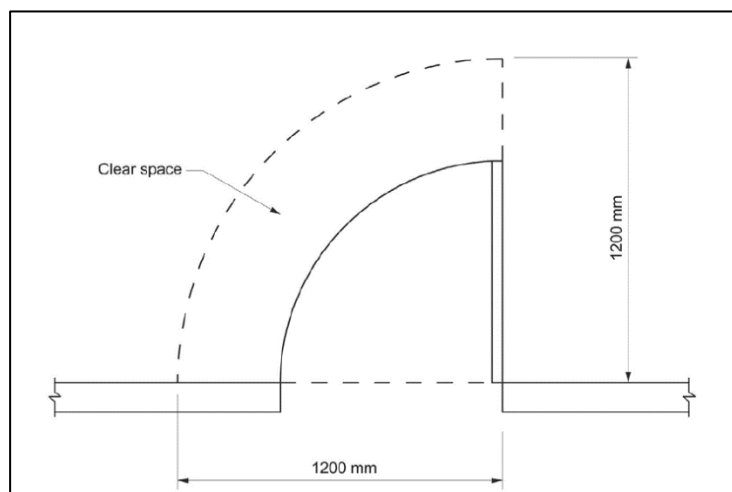
- i. In a habitable room excluding a kitchen – 2.4m and
- ii. In a kitchen - 2.1m
- iii. In a corridor, or passageway – 2.1m and
- iv. In a bathroom, shower room, laundry, sanitary compartment, airlock, pantry, storeroom, garage, car parking area or the like – 2.1m;
- v. In a room or space with a sloping ceiling or projections below the ceiling within the provisions of 3.8.2.2 of the BCA comply with 3.8.2.2 (i) and (ii)
- vi. In stairway, ramp, landing or the like – 2.0m measured vertically above the nosing line of stairway treads or the floor surface of a ramp, landing or the like.

The proposed alterations and additions achieve a minimum of 2.4m ceiling height for all habitable rooms, as well as 2m ceiling height achieved above staircase.

6.3 Facilities

A Class 1 building must be provided with the items set out in provision 3.8.3.2 of the BCA

The construction of sanitary compartments must include a door that opens outwards, slides, or be readily removable from the outside of the compartment, unless there is a clear space of at least 1.2m between the closet plan within the sanitary compartment and the doorway as per the figure below.



All proposed sanitary compartments in the dwelling achieve the specified requirements set out in these provisions, and do not require lift-off hinges for the removal of unconscious occupants.

6.4 Light

Natural Lighting

Natural Lighting must be provided to all habitable rooms, having an aggregate light transmitting area measured exclusive of framing members, glazing bars or other obstructions of not less than 10% of the floor area of the room and are open to the sky or face a court or other space open to the sky or an open verandah, carport or the like.

Minimum natural lighting requirements are achieved for all proposed habitable spaces and rooms.

Artificial Lighting

Sanitary compartments, bathrooms, shower rooms, airlocks and laundries must be provided with artificial lighting if natural light in accordance with the relevant provisions of 3.8.4.2 is not available—

- i. at a rate of not less than one light fitting per 16 m² of floor area; or
- ii. in accordance with AS/NZS 1680.0.

6.5 Ventilation

Ventilation must be provided to a habitable room, sanitary compartment, bathroom, shower room, laundry and any other room occupied by a person for any purpose by any of the following means specified in the provisions 3.8.5.2

Except for an exhaust fan from a sanitary compartment, laundry, kitchen or bathroom, Performance Requirement P2.4.5 is satisfied for a mechanical ventilation system if it is installed in accordance with AS 1668.2.

Sanitary compartments must not open directly into a kitchen or pantry unless—

- i. access is by an airlock, hallway or other room, (see Figure 3.8.5.2); or
- ii. the sanitary compartment is provided with an exhaust fan or other means of mechanical exhaust ventilation.

Architectural plans are to specify the inclusion of a mechanical exhaust system for all bathrooms/laundries that are not provided with natural ventilation.

All new habitable areas (that are not sanitary compartments or the like) are served by natural ventilation.

6.6 Sound Insulation

The separating walls between the proposed dwellings must have an $R_w + C_{tr}$ (airborne) not less than 50 and be of the type specified in 3.8.6.2 (b).

A wall required to have sound insulation must continue to – the underside of the roof above; or a ceiling that provides the sound insulation required for the wall.

The $R_w + C_{tr}$ sound insulation rating required by 3.8.6.2(a)(i) must be determined in accordance with AS/NZS ISO 717.1, using results from laboratory measurements or comply with Table 3.8.6.1a to Table 3.8.6.1d and the relevant provisions of 3.8.6.4 of the BCA.

Masonry walling construction must be laid with all joints filled solid, except for articulation joints complying with 3.3.5.13, including those between the masonry and any adjoining construction.

Timber-framed construction – timber studs and perimeter members must be installed as follows:

- i. Noggings and like members must not bridge between studs supporting different wall leaves.
- ii. All timber member at the perimeter of the wall must be securely fixed to the adjoining structure and the joints must be caulked so there are no voids between the timber members and the wall.

Services are prohibited to be chased into concrete or masonry separating walls. Specific Development Consent conditions will relate to this matter.

Plumbing waste/supply lines and ducts within separating walls are to be provided with access to the the pipe; and not open into any habitable room, other than a kitchen; and must be firmly fixed as per the specifications detailed in 3.8.6.5 (b). Electrical outlets such as powerpoints and switchgear must be offset from each other by no less than a 100mm.

As the development is a singular dwelling, there is no requirement to review the sound insulation requirements of this section.

6.2 Condensation management

Pliable building membranes installed to an external wall must:

- achieve compliance with AS 4200.1, and
- be installed in accordance with AS4200.2, and
- be a vapour permeable membrane (applicable as the development is in climate zone 7); and
- be located on the exterior side of the primary insulation layer or the wall assembly and except for the single skin mason and single sin concrete be separated from water sensitive materials.

Exhaust systems must achieve a minimum flow rate of 25L/s for bathrooms and sanitary compartments must discharge directly or via a duct to outdoor air or to a roof space that is ventilated.

Kitchens and laundries to achieve a minimum flow rate 40L/s and discharge directly or via a shaft or duct to outdoor air.

Exhaust systems discharging directly or via a shaft or a duct to a roof space must be through evenly distributed systems. Openings for minimum flow requirements must have a total unobstructed area of 1/300 of the respective ceiling area if the roof pitch is greater than 22°. 30% of the total unobstructed area required for exhaust being

discharged directly or via a shaft or duct to outdoor air must be located not more than 900 mm below the ridge or highest point of the roof space.

Wind Class Regions A & B	Wind Class Regions C & D	Ultimate Limit State Wind Speed	Termination Height (mm)
N1	-	34	40
N2	-	40	50
N3	C1	50	70
N4	C2	61	100
N5	C3	74	150
N6	C4	86	180

7 Safe Movement and Access

7.1 Stairway and Ramp Construction

A Stairway must be designed to take loading force in accordance with AS/MZS1170.1 and must have –

- Not more than 18m and not less than 2 risers in each flight; and
- Comply with the following dimensions specified in the figure below

Stair type	Riser (R) (see Figure 3.9.1.4 below)		Going (G) (see Figure 3.9.1.4 below)		Slope relationship (2R+G)	
	Max	Min	Max	Min	Max	Min
Stairs (other than spiral)	190	115	355	240	700	550
Spiral	220	140	370	210	680	590

Stairs are to be constructed in which risers do not have any openings that would allow a 125mm sphere to pass through between the treads.

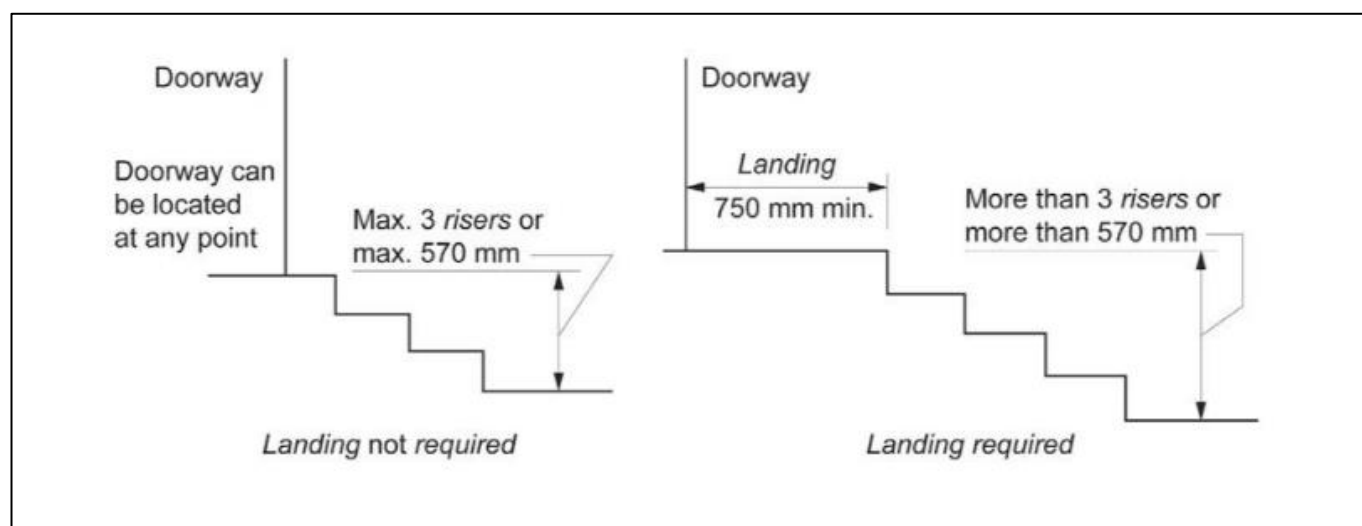
External Ramps serving an external doorway or a ramp within a building must be designed to take loading forces in accordance with AS/NZS 1170.1 and have a gradient not steeper than 1:8. and be provided with landings complying with the provisions of 3.9.1.5.

The adoption of BCA 2014 introduced a requirement for slip resistance of stairway treads and ramp surfaces. The requirements are as follows:

Application	Surface conditions	
	Dry	Wet
Ramp steeper than 1:14	P4 or R11	P5 or R12
Ramp steeper than 1:20 but not steeper than 1:14	P3 or R10	P4 or R11
Tread or landing surface	P3 or R10	P4 or R11
Nosing or landing edge strip	P3	P4

Landings must be not less than 750mm long and where this involves a change in direction, the length is measured from 500mm from the inside edge of the landing as per the figure below. Landings must also comply with the provisions set out in 3.9.1.5 Landings.

Landings are required as per below:

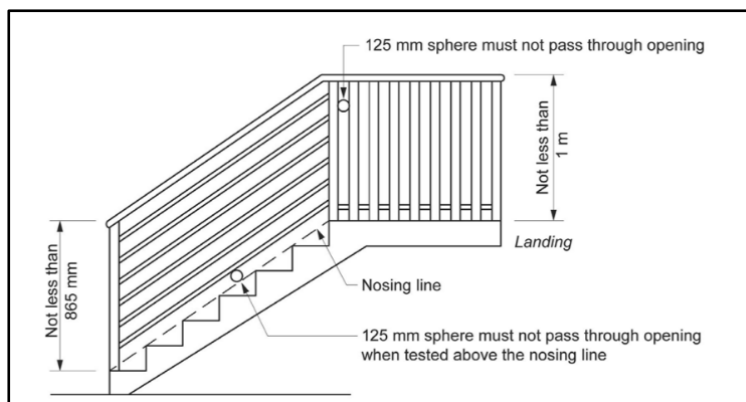


7.2 Barriers and Handrails

Balustrading to a minimum height of 1000mm with a maximum opening of 124mm in any direction should be provided adjacent to balconies, landings, corridors etc where located adjacent to a change in level exceeding 1000mm, or where it is possible to fall through an openable window located more than 4m above the surface beneath. See figure below.

Where it is possible to fall more than 4m to the surface below, the balustrade shall not contain any horizontal or near horizontal members that facilitate climbing between 150 – 760mm above the floor.

Handrails should generally be provided at a minimum height of 865mm alongside of all ramps and stairs that have a change of level of >1m to the surface below.



As the design develops, stair details as well as balustrade details are to be provided in elevations, as part of the Construction Certificate documentation.

8 Energy Efficiency

8.1 Energy Efficiency

As the proposal is a residential dwelling, a BASIX certificate dated within 3 months is required to be lodged with the Development Application. This certificate will cover all sections and requirements specified by the provisions of 3.12, detailing the energy rating the building must achieve to comply to these provisions.

8.2 Building Fabric (Part J1)

Roof and Ceiling Construction (Part J1.3)

For a deemed-to-satisfy solution roofs and or ceilings are to be constructed to provide 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 floor; and
- (iii) in climate zone 7, R3.7 for an upward direction of heat flow; and
- (iv) in climate zone 8, R4.8 for an upward direction of heat flow;

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.

Where the layer of insulation is penetrated by the percentages as tabled below, additional upgrading of the remainder of the insulation level is required.

To achieve compliance with J0.2 (c) a roof that has a metal sheet roofing fixed to metal purlins, metal rafters or metal battens and does not have a ceiling lining or has a ceiling lining fixed directly to those metal purlins, metal rafters or metal battens must have a thermal break. The thermal break to be consisting of a material with a R-Value of not less than R0.2, installed at all points of contact between the metal sheet roofing and its supporting metal purlins, metal rafters or metal battens.

Floors (Part J1.6) and External Walls

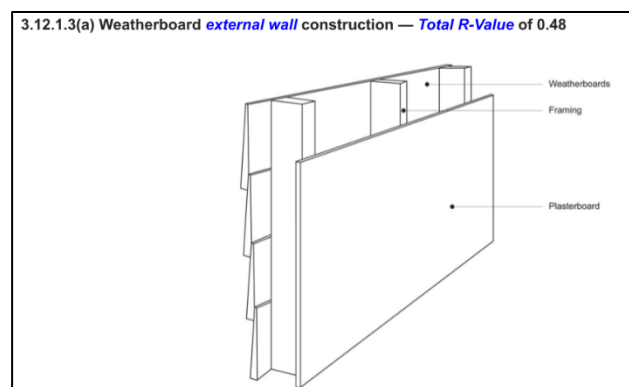
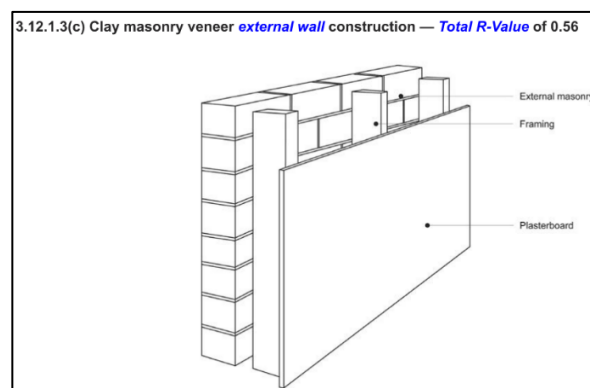
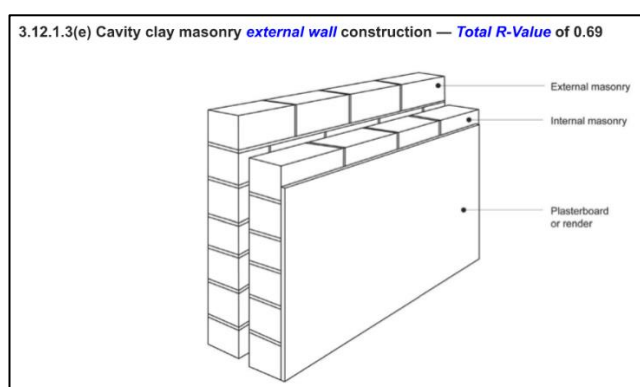
Floors are to achieve an R rating specified in Table 3.12.1.5a.

External Walls in climate zones 1,2,3,4 and 5 must achieve a minimum Total R-Value of 2.8; or

Climate zones 6 & 7 achieve a minimum Total R-Value of 2.8

Climate Zones 8, achieve a minimum total R-Value of 3.8

The proposed construction type is to be denoted in the Construction Certificate documentation. Typical total R-Value is specified below for these types of construction.



8.3 External Glazing

The aggregate conductance of the glazing in each storey of the building must not exceed the allowances specified in 3.12.2.1.

The aggregate solar heat gain of the glazing in each storey of the building must comply with the provisions of 3.12.2.1 (b).

Tables 3.12.2.1a to 3.12.2.1h specify provisions required to be satisfied in relation to Standard air movement, High air movement, and other ventilation openings.

8.4 Building sealing (Part 3.12.3)

External Windows and Doors

- a) A door, openable window or the alike 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 AS2047; or
- c) A seal to restrict air infiltration –
 - (i) For the bottom edge of a door, must be draft protection device; and
 - (ii) For the other edged 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.

Exhaust fans

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

Construction of ceilings, walls and floors

A seal to restrict air infiltration must be fitted to each edge of the external doors and openable windows. The seals may be foam or compressible strip, fibrous seal or the like. The main entry doors must have either an airlock, or self-closing doors, or a revolving door.

Ceilings, walls, floors and any openings such as a window frame, door frame, roof light frame or the like must be constructed to minimise air leakage in accordance with the below when forming part of –

- (i) The envelope; or
- (ii) In climate zones 4, 5, 6, 7 or 8

Construction required by above must be –

- (iii) Enclosed by internal lining systems that are close fittings at ceiling, wall and floor junctions; or
- (iv) Sealed at junctions and penetrations with –
 - (A) Close fitting architrave, skirting or cornice; or
 - (B) Expanding foam, rubber compressible strip, caulking or the like

The above does not apply to openings, grilles or the like required for smoke hazard management.

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.

8.5 Air Movement

Air movement must be provided to habitable rooms in accordance with Table 3.12.4.1

Air movement required by the above specification may be provided through an opening from an adjoining room (including an enclosed verandah) if it complies with 3.12.4.1.

Ventilation Openings

In Climate zones 1,2,3,4 and 5, the total ventilation opening area required by Table 3.12.4.1 to a habitable room must

- i. Be connected by a breeze path complying with (b) to another ventilation opening in another room or space; or
- ii. Be provided by a minimum of two ventilation openings located within the same habitable room, with each ventilation opening having an area of not less than 25% of the area required by Table 3.12.4.1

Air Conditioning

Air conditioning (if installed) and ventilation systems must be designed to comply with the following provisions:

- Be capable of being deactivated when the building or part of a building being served by that system is not occupied;
- Where motorised dampers are in place, they should close when the system is deactivated
- Where 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;
- Time switches should be provided to control an air-conditioning system of more than 2kW_r and a heater of more than 1kW_{heating} used for air-conditioning and be capable of switching electric power on and off at variable pre-programmed times on variable pre-programmed days.
- Ductwork and fittings in an air-conditioning system should have insulation complying with AS/NZS 4859.1 and have an insulation R-Value greater than or equal to:-
 - for flexible ductwork R1.0; or
 - for cushion boxes, that of the connecting ductwork; or
 - That specified in Table J5.5

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

Mechanical:

- Be capable of being deactivated where the building or part of the building served by that system is not occupied
- Time switches must be provided to a mechanical ventilation system with an air flow rate of more than 1000 L/s, capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days;

8.6 Services

Heating and cooling ductwork

Heating and cooling ductwork and fittings must achieved the material R-value in 3.12.5.3(d) as well as other specifications in the same section.

Insulation of Services

Thermal insulation for central heating water piping and heating and cooling ductwork must-

- i. Be protected against the effects of weather and sunlight;
- ii. Be able to withstand the temperatures within the piping or ductwork; and
- iii. Use thermal insulation material in accordance with AS/NZS 4859.1.

Artificial Lighting

Interior decorative and display lighting

Interior decorative and display lighting, such as for a foyer mural or art display, must be controlled -

- Separately from other artificial lighting; and
- By a manual switch for each area other than when operating times of the displays are the same in a number of areas (e.g. where in a museum) in which case they may be combined; and
- By a time switch in accordance with Specification J6 where the display lighting exceeds 1 kW

Window display must be controlled separately from other display lighting exceeds 1kW.

Exterior artificial lighting

Artificial lighting attached to or directed at the façade of the building if it exceeds a total of 100W must;

- Use LED luminaires for 90% of the total lighting load; or
- Be controlled by a motion detector in accordance with Specification J6 of the BCA;
- When used for decorative purposes, such as façade lighting or signage lighting, have a separate switch in accordance with Specification J6.

9 Appendix A - Reference Documentation

The following documentation was used in the assessment and preparation of this report:

Drawing No.	Title	Issue	Date	Revision
01	Garage Plan	A	-/2/22	
02	Lower Floor Plan	A	-/2/22	
03	Mid-Level Floor Plan	A	-/2/22	
04	Upper-Level Floor Plan	A	-/2/22	
05	Upper-Level Floor Plan	A	-/2/22	
06	Elevation	A	-/2/22	
07	East Elevation	A	-/2/22	
08	West Elevation	A	-/2/22	

Drawing No.	Title	Issue	Date	Revision
09	Section X-X	A	-/2/22	
10	Shadow Diagrams and Site Plan	A	-/2/22	