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Our Ref: 16261-L01

Armenco
Mr John Christou

RESIDENTIAL DEVELOPMENT – 31 SANTLEY CRESCENT, KINGSWOOD PROVISION FOR FIRE ENGINEERING (FOR DA SUBMISSION)

We refer to the proposed residential development to be located at 31 Santley Crescent Kingswood NSW, and provide the following in regards to the proposed use of Performance Solutions to address identified variations to the Deemed to Satisfy (DTS) provisions of the Building Code of Australia 2016 (BCA).

The purpose of this document is to assist in the design development process, and to assist the Consent Authority in the determination of the Development Application.

PROJECT DESCRIPTION

The proposed works include the construction of a new mixed use development comprising:

- Basements 1 & 2 – car parking (less than 40 vehicles), ancillary
- Ground Floor – entry lobby, residential units
- Levels 1 to 5 – residential units
- Roof Level – common roof terrace

The site is bounded by Santley Street to the south, and adjoining allotments to the north, east and west.

Egress from the basement levels is via a single fire-isolated exit, that discharges directly into the ground floor entry lobby. Egress from the ground floor residential units is direct to an open space via the main entry lobby, and egress from the above ground residential units is via a single fire-isolated exit that discharges into the ground floor entry lobby.

BCA ASSESSMENT DATA

Table 1: Relevant BCA Assessment Data

BCA Reference	BCA Assessment
Building Classification and Use	Class 2 (residential) Class 7a (car parking)
Rise in Storeys	6
Number of Levels Contained	8
Minimum Type of Construction Required	Type A
Effective Height	Less than 25m (≈ 15m)
Maximum Size of Fire Compartments	To comply for Type A construction

REFERENCED DRAWINGS

Table 2: List of Referenced Architectural Drawings

Drawing No.	Issue	Title	Date Received by Innova Services
DA 001	P1	Site Plan	26-10-2016
DA 100	P1	Basement 2 Floor Plan	02-11-2016
DA 101	P1	Basement 1 Floor Plan	26-10-2016
DA 102	P1	Ground Floor Plan	26-10-2016
DA 103	P1	Level 01 Floor Plan	26-10-2016
DA 104	P1	Level 02 Floor Plan	26-10-2016
DA 105	P1	Level 03 Floor Plan	26-10-2016
DA 106	P1	Level 04 Floor Plan	26-10-2016
DA 107	P1	Level 05 Floor Plan	26-10-2016
DA 108	P1	Roof Terrace Level Plan	26-10-2016
DA 200	P1	North and South Elevation	26-10-2016
DA 201	P1	East and West Elevation	26-10-2016
DA 300	P1	Section A	26-10-2016

PROPOSED VARIATIONS TO BCA DTS PROVISIONS

Outlined below are the proposed variations to the Deemed to Satisfy (DTS) provisions of the Building Code of Australia 2016 (BCA) associated with the subject development. **NOTE:** *At this stage of the design, the identified variations to the DTS provisions of the BCA are not exhaustive, and other variations may arise through the design and development process.*

Protection of Openings in External Walls – BCA Clauses C3.2 & C3.4

- It is proposed to vary the method of protection afforded to openings within the external walls of the building that will be located less than 3m from the side allotment boundaries.

Number of Exits Required (Basement Level) – BCA Clause D1.2

- It is proposed to have a single exit from the basement levels, in lieu of 2 exits as required for a basement with a floor area of greater than 50m².

Exit Travel Distances (Basement Level) – BCA Clause D1.4

- It is proposed to have a travel distance from within the basement levels to a single exit of up to 22m, in lieu of 20m.

Travel via Fire-Isolated Exits – BCA Clause D1.7

- It is proposed to have the fire-isolated exits serving the building discharge into the ground floor entry lobby, in lieu of directly to an open space.

Fire Hydrants – BCA Clause E1.3

- It is proposed to locate the fire hydrant booster assembly external to the building, and within 10m of an external wall to the building

ACHIEVING COMPLIANCE WITH THE BCA

Compliance with the BCA is achieved by satisfying the Performance Requirements. Clause A0.2 of the BCA states that the Performance Requirements can be satisfied by:

- (a) *Performance Solution; or*
- (b) *Deemed-to-Satisfy Solution; or*
- (c) *a combination of (a) and (b).*

Clause A0.3(a) of the BCA states that a Performance Solution must:

- (a) *comply with the Performance Requirements; or*
- (b) *be at least equivalent to the Deemed-to-Satisfy Provisions, and be assessed according to one or more of the Assessment Methods.*

Clause A0.5 of the BCA states that the following Assessment Methods, or any combination of them, can be used to determine that a Performance Solution or Deemed to Satisfy provisions complies with the Performance Requirements:

- (a) *Evidence to support that the use of a material, form of construction or design meets a Performance Requirement or a Deemed to Satisfy Provision as described in A2.2.*
- (b) *Verification methods such as -*
 - (i) *the Verification Methods in the NCC; or*
 - (ii) *such other Verification Methods as the appropriate authority accepts for determining compliance with the Performance Requirements.*
- (c) *Expert judgment*

SUMMARY OF PROPOSED FIRE ENGINEERING STRATEGY

General

A summary of the proposed Fire Engineering Strategy to address the identified variations to the DTS provisions of the BCA is detailed below. **NOTE:** *The final Fire Engineering Strategy for the subject development is subject to change following consultation with all relevant Stakeholders, and may result in design changes.*

Performance Solution 1 - Protection of Openings in External Walls

Proposed Method of Analysis

A Quantitative Analysis is proposed to be undertaken to assess the Performance Solution against the relevant Performance Requirements of the BCA, as permitted under Clauses A0.5(b)(i) & (ii) of the BCA.

A radiant heat assessment is proposed to be undertaken to determine the amount of heat radiation emitted from the subject openings to the allotment boundaries, which will be compared to the heat flux limits nominated under Verification Method CV1 of the BCA. A radiant heat assessment is also proposed to be undertaken to demonstrate that the subject openings will be able to withstand potential heat flux received, in the event of fire in a building on an adjacent allotment. The potential heat flux received will be based on Verification Method CV1 of the BCA.

Proposed Acceptance Criteria

The Performance Solution is to be shown to satisfy BCA Performance Requirements CP2 and CP8 in terms of avoiding the spread of fire between buildings on adjoining allotments. Demonstrating compliance with BCA Performance Requirement CP2 is proposed to be based on Verification Method CV1 of the BCA, which considers both emitted and received radiation.

- **Emitted Radiation** - The emitted radiation from the subject openings is not to exceed the heat flux limitations given by BCA Verification Method CV1 within the boundaries of the adjoining allotments.

- Received Radiation - The Fire Engineering Analysis will adopt a limit of **20 kW/m²** of received radiation at the subject openings. *NOTE: Clause C3.2 of the BCA does not require openings in external walls to be protected where they are located 3m or more from an allotment boundary. When applying Verification Method CV1, a distance of 3m from an allotment boundary equates to a maximum radiant heat exposure of 20 kW/m².* Where radiant heat screens are fitted to the openings, a limit of 25 kW/m² of received radiation at the subject openings is proposed to be considered. This level of radiation represents the limitation in which non-piloted ignition of cotton fabric (e.g. curtains) occurs after prolonged exposure, as referenced in AS 1530.4-2005¹.

Performance Solution 2 – Number of Exits Required / Exit Travel Distances (Basement Level)

Preliminary Fire Safety Strategy

The preliminary fire safety strategy will be based on:

- Designing the single exit as a fire-isolated exit, which exceeds the minimum DTS provisions of the BCA where a stairway serving 2 basement levels can be constructed as a non-fire-isolated exit. Therefore occupants evacuating from the basement levels will not be evacuating vertically through smoke.
- The provision of combined intumescent fire and medium temperature smoke seals to the entry doors into the single fire-isolated exit. The provision of smoke seals significantly reduces the available gap around the perimeter of the doors, through which smoke can flow from the basement levels into the single exit. Thus conditions within the single fire-isolated exit are expected to be improved when compared to the minimum DTS provisions of the BCA.
- The provision of heat detectors throughout the basement levels, to provide occupants with an early warning of fire. The heat detectors will be connected back to the AS 1670.1 smoke detection system that is required to be installed throughout the residential levels of the building. The provision of heat detectors throughout the basement levels exceeds the minimum DTS provisions of the BCA, and is considered to improve the occupant cue time in the event of a fire.
- The provision of an enhanced building occupant warning system throughout the building that includes a verbal directive to instruct occupants to evacuate. Such a system exceeds the minimum DTS provisions of the BCA, and is considered to improve the occupant pre-movement time in the event of an emergency.
- The provision of a mechanical ventilation system to the basement levels, to assist with the venting of smoke.
- The characteristics and use of the basement levels, being a transient area comprising of relatively low occupancy numbers.

Proposed Method of Analysis

A Qualitative Analysis is proposed to be undertaken to compare the Performance Solution against the DTS Provisions of the BCA, as permitted under Clause A0.5(d) of the BCA.

Proposed Acceptance Criteria

The Performance Solution is to be shown to comply with BCA Performance Requirements DP4 and EP2.2 in terms of ensuring occupants are allowed to evacuate from the basement levels safely and in conditions at least equivalent to that of a design that complies with the minimum DTS provisions of the BCA.

¹ Australian Standard, Methods for fire tests on building materials, components and structures, Part 4: Fire-resistance test of elements of construction.

Performance Solution 3 – Travel via Fire-Isolated Exits

Preliminary Fire Safety Strategy

The preliminary fire safety strategy will be based on:

- The provision of an automatic smoke detection and alarm system throughout the common areas of the building to BCA Specification E2.2a (Clause 4) and the relevant provisions of AS 1670.1.
- The provision of a heat detector within each residential unit, located within 1.5m of the unit entry door and connected back to the AS 1670.1 smoke detection system serving the building. These heat detectors will provide occupants within the non-fire affected units with an earlier warning of fire when compared to the minimum DTS provisions of the BCA, and is considered to improve the occupant cue time in the event of an emergency.
- The provision of an enhanced building occupant warning system throughout the building that includes a verbal directive to instruct occupants to evacuate. Such a system exceeds the minimum DTS provisions of the BCA, and is considered to improve the occupant pre-movement time in the event of an emergency.
- The provision of a drop down smoke curtain across the lift landing doors within the basement levels, to mitigate the spread of smoke from the basement levels to the ground floor entry lobby above.
- Fire and smoke separating the residential units on ground floor from the ground floor entry lobby via the provision of fire rated smoke lobbies to each residential unit.
- The characteristics and use of the ground floor entry lobby, which is used as access and egress to and from the residential units and therefore unlikely to be utilised for the storage of combustible materials.

Proposed Method of Analysis

A Qualitative Analysis is proposed to be undertaken to compare the Performance Solution against the DTS Provisions of the BCA, as permitted under Clause A0.5(d) of the BCA.

Proposed Acceptance Criteria

The Performance Solution is to be shown to comply with BCA Performance Requirements DP4 and EP2.2 in terms of ensuring occupants are allowed to evacuate from the residential levels of the building safely and in conditions at least equivalent to that of a design that complies with the minimum DTS provisions of the BCA.

Performance Solution 4 - Fire Hydrants (Radiant Heat Protection to Hydrant Booster)

Preliminary Fire Safety Strategy

The preliminary fire safety strategy will be based on:

- The characteristics and use of the car park entry ramp, being located adjacent to the fire hydrant booster assembly. The car park entry ramp is used for vehicle movement only and does not comprise of stagnant fuel loads. Therefore it is unlikely that a fire will originate within this area.
- Ensuring the fire brigade booster assembly is orientated to face the street, and not into the vehicle driveway, thus mitigating the risks associated with vehicles leaving the car park.

Proposed Methods of Analysis

A Qualitative Analysis is proposed to be undertaken to assess the Performance Solution against the relevant Performance Requirements of the BCA, as permitted under Clause A0.5(b)(ii) of the BCA.

Proposed Acceptance Criteria

The Performance Solution is to be shown to comply with BCA Performance Requirement EP1.3 in terms of ensuring that the location of the fire hydrant booster assembly does not impede fire brigade operations. That is, the attending fire brigades must be capable of safely accessing the booster assembly in the event of fire within the building.

REQUIRED FIRE SAFETY SYSTEMS

The following fire safety systems will be required to be installed throughout the subject development:

- Fire hydrants
- Fire hose reels (excluding residential areas)
- Portable fire extinguishers
- Automatic smoke detection and alarm system
- Building occupant warning system
- Emergency lighting and exit signs

NOTE: *The above list may change or vary during the design and development process, and / or as a result of the future Fire Engineering Report.*

CONCLUSION

In consideration of the above, it is concluded that Performance Solutions can be developed to the DTS provisions of the BCA to ensure the proposed development can achieve compliance with the relevant Performance Requirements of the BCA.

Yours Faithfully

Innova Services Pty Ltd



Jason Powell

Director

C10 Accredited Fire Engineer (BPB0801)
MIEAust, CPEng