GROUPDLA

Building Code of Australia 2016

Report for BCA Compliance

PROJECT NAME: Sydney Opera House – Renewal Project – Front of House – Creative Learning Centre – For SSD Submission - Rev B1

DATE: 7 September 2018

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Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
A	2.12.2015	High Level Concept Review (100%)	Brett Clabburn / Director Shane Berry / Specialist Regulations Consultant	
B	12.4.2016	High Level (50%) Schematic Design Review	Brett Clabburn / Director Shane Berry / Specialist Regulations Consultant	
C	10.5.2016	High Level (90%) Schematic Design Review	Brett Clabburn / Director Shane Berry / Specialist Regulations Consultant	
D	8.6.2016	High Level (100%) Schematic Design Review	Brett Clabburn / Director Shane Berry / Specialist Regulations Consultant	
E	24.10.2016	For DA2b Submission	Brett Clabburn / Director Shane Berry / Specialist Regulations Consultant	
A1	12.5.2017	FOR TENDER	Brett Clabburn / Director Shane Berry / Specialist Regulations Consultant	
B1	7.09.2018	FOR SSD Submission	Brett Clabburn / Director Shane Berry / Specialist Regulations Consultant	

Table 1 – Revision History

1.0 Executive Summary

The report is for the assessment of the Front of House project Creative Learning Centre (CLC) only, of the Sydney Opera House Renewal Project to assess compliance with the Building Code of Australia 2016 Amendment 1 ("BCA"). The information submitted at this stage of the design is not considered to be detailed to the extent where the development of a full BCA report is possible and therefore this report is preliminary only, at high level, suitable for SSD Submission.

The following items have been noted as items of interest at this stage of the review. The items have been considered non-compliant require further review against the detailed design, or may be able to be justified as an Performance Solution:

Item No.	Query or DTS Non- Compliance	Suggested Resolution	BCA Clause	BCA Performance Requirements
1	Entry Lobby 1 Door D/GR-05 and existing Entry Lobby door south, have been illustrated with a fire rating of -/60/30 in lieu of -/120/30 as required by the FRL plans.	Fire Safety Engineer has confirmed the feasibility of a Performance Solution, refer Section 10.4 of Front of House FER 243928-08 Rev C02 dated 24 November 2017.	C3.5	CP2, CP8
2	Inadequate fire hose reel coverage. Areas cut off by the fire compartmentation Design as follows: • Store 1 (G503) • Store Rooms (G510-512)	Fire Safety Engineer has confirmed the feasibility of a Performance Solution, refer Section 10.5 of Front of House FER 243928-08 Rev C02 dated 24 November 2017.	E1.4	EP1.1
3	Altered Fire Stair 17 Arrangement: • Internal fire stair discharge in lieu of direct to open space. • Lift and stair within the same shaft. • Cupboards within the stair.	Fire Safety Engineer has confirmed the feasibility of a Performance Solution, refer Section 10.3 of Front of House FER 243928-08 Rev C02 dated 24 November 2017.	D1.7, C2.11, D2.7	CP2, DP2, DP4, DP5 EP2.2
4	Closed out.	-	-	-
5	CLC – A 1:40 landing is required to the new entry door GR-18, in lieu of the currently illustrated/proposed 1:10 & 1:13.	Access Consultant to confirm the feasibility of a Performance Solution.	D3.1, Premises Standard,	DP1, DP2

Item No.	Query or DTS Non- Compliance	Suggested Resolution	BCA Clause	BCA Performance Requirements
6	Omission of smoke detectors within 1.5 m of the Lobby fire doors.	Fire Safety Engineer has confirmed the feasibility of a Performance Solution, refer Section 10.4 of Front of House FER 243928-08 Rev C02 dated 24 November 2017.	E2.2	EP2.2
7	FHR adjacent Entry Lobby G.508 exit is located greater than 4 m form the exit (actual appears 4.2 – 4.3m).	Design change to illustrate compliance.	E1.4	EP1.1
8	No ambulant WC will be provided. A drop down rail has been illustrated to the ACC wc G.506.	Access Consultant to provide a justifiable Performance Solution.	F2.4	FP2.1
9	A number of floor to ceiling heights have been illustrates at less than permissible under the DTS of the BCA: • Store 1 G503 – Less than 2.1 m • ~~Entry Lobby G.501: Less than 2.1 m~~ • Other area TBC by the architect.	Ergonomics Consultant to confirm the feasibility of a Performance Solution.	F3.1	FP3.1
10	The following wall and ceiling lining materials do not meet the required fire hazard properties rating of Group 3: • White birch timber. • Slotted plywood. Furthermore, these linings are attached to fire rated elements and are combustible.	Fire Safety Engineer has confirmed the feasibility of a Performance Solution, refer Section 10.1 of Front of House FER 243928-08 Rev C02 dated 24 November 2017.	C1.10, C1.1	CP2, CP4
11	Entry Lobby 1 Door D/GR-05 swings against the direction of egress from the CLC.	Fire Safety Engineer has confirmed the feasibility of a Performance Solution, refer Section 10.2 of Front of House FER 243928-08 Rev C02 dated 24 November 2017.	NSW D2.101, NSWD2.19(b)(v)(B)(aa)	DP2

Item No.	Query or DTS Non- Compliance	Suggested Resolution	BCA Clause	BCA Performance Requirements
12	Isolation of smoke detection at certain times of CLC use due to spurious alarms.	Fire Safety Engineer has confirmed the feasibility of a Performance Solution, refer Section 10.6 of Front of House FER 243928-08 Rev C02 dated 24 November 2017. Note: Strict conditions of approval have been nominated with the FER.	E2.2	EP2.2

Table 2 – DtS Non-compliances

In order for Group DLA to confirm the design complies with the BCA the following items listed in Table 3 below are required to be clarified, submitted, illustrated, etc. as the case may be:

Item No.	Item	Comment	BCA Clause
A	FRL Plans.	The plans require a minor update to capture the proposed fire rated ceilings through out the existing Stores G555A, B & C and corridor G555 if relevant. And to illustrated Store G503 as fire separated.	Various
B	Structural Engineers confirmation of the pending FRL plans.	Once the FRL plans have been completed the Structural Engineer will need to review and confirm compliance or otherwise. There may or may not be issues with regard to in adequate existing fire ratings.	Part C
C	ALL - Performance Solutions – General	The various design team members are requested to advise of any/all known performance solutions at this stage of the design.	BCA
D	Closed out	-	-
E	Closed out.	-	-
F	No Scale Bar.	Regardless of the nominated scale, the plans are required to contain an accurate scale bar. This has been addresses on some plans but not all.	-
G	Further clarification in relation to the selected “Principal Pedestrian Entrance” and a Premises Standards review in general.	Further comment from the access consultant is pending sought. Confirmation of compliance with regard to the upgrade requirements of the *affected part* of the project will also be required from the Access Consultant. The access Consultant will need to confirm whether or not any of the existing lifts will required an upgrade as a result of the *affected part* related provisions of the Premises Standard. If the external path to the CLC is considered the affected part then upgrading or a Performance Solution to address any issue will be required. Access Consultant to advise further.	Premises Standard

Item No.	Item	Comment	BCA Clause
H	Closed out	-	-
I	Closed out	-	-
J	Section J2 Report	The Cundall BCA Section J2 Report is to be updated to reflect the current design, i.e. assessment of new door D/GR-19 & new door and window D/GR-18. It currently references doors GR-15 and GR-12, which have now been illustrated as internal doors.	J2
K	Wall, Floor and Ceiling Lining's	BCA Fire Hazard Test Reports required for confirmation of compliance or otherwise. Please note the specific requirements for each of the chosen linings detailed in Section 4.0 – C1 Below. A number of items still require confirmation to compliance and were not included in the Fire Hazard Property Spread Sheet Reviews.	C1.10
L	Closed out.	-	-

Table 3 – Request for Further Information

2.0 Introduction

The report is for the assessment of the Front of House project known as the Creative Learning Centre (CLC) only, of the Sydney Opera House Renewal Project which do not detail sufficient information to allow a full BCA report to be produced.

The report is prepared based on a review of the documentation listed in Table 4 and the information provided by the client and is intended for their use only.

Reporting Team

The information contained within this report was prepared by Shane Berry, Accredited Certifier Grade A1 (BPB0721) and reviewed by Brett Clabburn, Accredited Certifier Grade A1 (BPB0064) from Group DLA.

Current Legislation

The applicable legislation governing the design of buildings is the Environmental Planning and Assessment Act 1979.

The relevant version of the BCA for a project is determined in accordance with clause 98 of the Environmental Planning and Assessment Regulation 2000, and is based on the date on which a valid construction certificate is applied for.

Whilst we await final confirmation on the building approval mechanism, we believe it is likely to be a Crown project. The provisions of Section 6.28 (Crown Building Work), of this act require that the building work be carried out in accordance with the Building Code of Australia (BCA). The application of compliance with the particular version of the BCA is the date on which tenders are issued. In this case the application of the provisions of the BCA 2016 is the relevant code.

All new works are required to comply with the current/relevant BCA. It is expected that a number of existing deficiencies with regard to existing compliance will be noted as the design progresses. Rectification is required in some instances due to the potential for the proposed works to make certain situations worse in terms of fire safety. Notwithstanding this, any project team required upgrades of the existing building fire services and egress provisions have been discussed below.

In regards to BCA 2016, the changes are minimal that relate to this building and as such do not have a material effect on the design of the building. These changes have been outlined below in order to assist the relevant disciplines. Consultants are to be aware that it is expected that this building will be a BCA 2016 compliant building.

Changes as a result of BCA 2016 – Applicable to the Sydney Opera House Project Only:

- Clause A1.1 – Performance Solution: The term Alternative Solution has changed to Performance Solution.
- Clause A1.1 – *Boiler*: A new defined term "*boiler*" has been inserted as a consequence of including Specification G2.2.
- Clause A1.1 – *Effective height*: The defined term has been amended to clarify the lowest storey selected for determination, in line with the way we determine *rise in storeys* of a building.
- Clause A1.1 – *Fire-protected timber*: A new defined term has been inserted as a consequence of including provisions for *fire-protected timber*.
- Clause A1.1 – Functional Statement & Objective – These terms have been deleted and are no longer used in the BCA.
- Clause A1.1 – Pressure vessel: A new defined term "*pressure vessel*" has been inserted as a consequence of including Specification G2.2.
- Clause A1.8 – Explanatory Information: A new Clause introduced to advise that any BCA detailed explanatory information is non-mandatory.
- Specification A3.1 – AS/NZS 1428.4.1-2014 Amendment 2 has been adopted. Design for access and mobility — Means to assist the orientation of people with vision impairment — Tactile ground surface Indicators.'
- Specification A3.1 – AS 1530.4-**2014** has been adopted. Methods for fire tests on building materials, components and structures — Fire resistance tests for elements of construction.
- Specification A3.1 – AS/NZS 1668.1-**2015** has been adopted. The use of ventilation and air conditioning in buildings — Fire and smoke control in buildings. Mechanical Engineer to note.
- Specification A3.1 – AS 1670.1-**2015** has been adopted. Fire detection, warning, control and intercom systems — System design, installation and commissioning — Fire. Electrical and Fire Services Engineer to note.
- Specification A3.1 – AS 1670.4-**2015** has been adopted. Fire detection, warning, control and intercom systems — System design installation and commissioning — Sound systems and intercom systems for emergency purposes. Electrical and Fire Services Engineer to note.
- Specification A3.1 – AS 1905.1-**2015** has been adopted. Components for the protection of openings in fire-resistant walls — Fire-resistant doorsets.
- Specification A3.1 – AS 2293.3-2005 has been adopted. Emergency escape lighting and exit signs for buildings — Emergency escape luminaires and exit signs.
- Specification A3.1 – AS/NZS 3500.3 - **2015** has been adopted. Plumbing and drainage — Stormwater drainage. Hydraulic Engineer to note.
- Specification A3.1 – AS 5637.1-2015 has been adopted. Determination of fire hazard properties — Wall and ceiling linings. AS IOS 9705 has been deleted.
- Verification Method BV2 - A new Verification Method has been inserted to verify compliance with Performance Requirement BP1.1(a)(iii). BV2 is a means for verifying the structural robustness of a building.
- Clause C1.13 – New Clause included to allow fire-protected timber to be used wherever an element is required to be non-combustible, subject to certain things as noted in the clause.
- Specification C1.13 – New Specification included for fire-protective timber.
- Specification C1.10 – Amended to illustrate that we are no longer use AS IOS 9705 or AS/NZS 3837 for determining the materials group numbers for fire hazard properties. The new Standard is AS 5637.1.
- Clause D1.13 - The provision has been amended to clarify that it is to be used to determine the number of persons accommodated for certain Deemed-to-Satisfy Provisions. It is not intended to restrict the number of occupants using a building.
- Clause D2.13 – The provision has been amended to allow dimension tolerances for stair (step construction.)
- Clause D2.25 – New Clause included to permit the use of timber within a fire-isolated stairway or fire-isolated passageway subject to certain conditions.
- Clause F2.3(a) - Clarification has been added that sanitary facilities for males and females must

be separate unless otherwise permitted.

- Table F2.3 - Clarification has been added that sanitary facilities for patrons need not be provided shopping centres and department stores where the total number of persons accommodated in the building is not more than the 600.
- Verification Method FV4.1 - A new Verification Method has been inserted as an option to verify compliance with Performance Requirements FP4.3 and FP4.4(a). It is a means for verifying that a building ventilated with outdoor air has suitable indoor air quality.
- Verification Method FV4.2 – A new Verification Method has been inserted as an option to verify compliance with Performance Requirements FP4.3 and FP4.4(a). It is a means for verifying that a carpark ventilated with outdoor air has suitable indoor air quality. The new Verification Method is applicable to Class 7a buildings only.

Premises Standard

As of 1 May 2011 new buildings and existing buildings being refurbished have to comply with the Disability (Access to Premises – Building) Standards ("Premises Standards") under the Commonwealth Disability Discrimination Act 1992.

The main requirement to come from the Premises Standard relates to the upgrading of the *affected part*[1], including the principal pedestrian entrance and the paths to the area of new works. The definition of *affected part* is limited to the area between (and including) the principal pedestrian entrance and the new work. This may include the requirement to upgrade the following existing areas:

- Entrances
- Accessible sanitary facilities.
- Lifts to upper storeys, either upgrade or provide lifts if they are not existing.
- Passing and turning spaces in corridors.

Various concession or relaxations do apply to certain items mentioned above.

A consideration for upgrade via the Premises Standard is applicable to the following existing building situations:

- Where an application for a Construction Certificate ("CC") or Complying Development Certificate ("CDC") has been received and the applicant for the works is the building owner or building manager; or
- Where an application for a CC or CDC has been received and the building is leased & occupied by a single tenant; or
- The works as deemed Crown development.

Fire Brigade

Fire & Rescue NSW ("FRNSW"): The EP&A Regulations 2000, Clause 144, requires buildings the subject of Construction Certificate approval to be referred to FRNSW. Clause 144 refers to EP&A Regs defined Category 2 Fire Safety Provisions[2]. If any of these measures are required to be considered as an alternative solution due to DtS non-compliances identified within a design, and the floor area of a fire compartment exceeds 2000 m^2 or the floor area of the building exceeds 6000 m^2, the Clause 144 referral to the FRNSW is required. It is common practice to adopt this process on Crown projects under a

[1] *An affected part is: (a) the principal pedestrian entrance of an existing building that contains a new part; and (b) any part of an existing building, that contains a new part, that is necessary to provide a continuous accessible path of travel from the entrance to the new part.*

[2] *Category 2 fire safety provision means the following provisions of the Building Code of Australia, namely, CP9, EP1.3, EP1.4, EP1.6, EP2.2 and EP3.2 in Volume One of that Code.*

voluntary submission. This design currently contains the following DtS non-compliance Category 2 Fire Safety Provisions or BCA Performance Requirements: EP2.2

The process involves initial input from FRNSW at the Fire Engineering Brief Questionnaire ("FEBQ) stage and then official Lodgement of the Performance Solution Report by the PCA or Crown Certifier.

Under recent changes to the legislation the brigade are required to respond within10 advising whether or not they will be proceeding with a review and providing the Initial Fire Safety Report. If so the have not more than 28 days form the initial to provide their report or the PCA can choose to invoke the provisions of Clause 144(6A)(c) and issue the Construction Certificate after 28 days of officially lodging the Clause 144 application; further consultation is required on this issue. This may see a requirement for a peer review by an independent C10 accredited fire safety engineer.

At this stage in the design we have noted possible Performance Solutions that require report and consent to the brigade, i.e. egress issues, booster access, etc.

Limitations

- This report did not include assessment of the documentation against the provisions of the Disability Discrimination Act 1992 or (access to premises buildings) Standards 2010.
- This assessment is limited to the developed documentation at the date of this report and as referenced within the "Documentation Assessed" section of the Report.
- Any roof top plant or the like has been assessed as open to the sky.
- The travel distances have been assessed on an open plan basis with an allowance made for travel around pending fitout partitions. It cannot be taken as accurate when considering future fitout parameters.

Historic Fire Engineering

It is recognised that there are a large number of Fire Engineered Reports (50+) that have been created over time for the Sydney Opera House various projects. Whilst we will not be conducting a review of these existing FER's we will however require confirmation from the Fire Safety Engineer that the FOH project design will not adversely affect or contravene any of the parameters or Alternative Solutions noted in the these existing FER's.

Upgrade Strategy

The Department of Planning are required to consider whether or not the existing building be brought up to a current level of fire safety (fire upgrades) as part of their required Section79C consideration. However, it is recommended that an over-arching strategy document is produced by the Fire Safety Engineer which will detail a justifiable approach to dealing with the existing limitations of the Sydney Opera House and those detail within the past FER's.

This Fire Engineered Strategy document will be required to be legalised via inclusion within the Front of House State Significant Development as a referenced document, and more importantly, call up in one of the SSD Conditions. Further consultation with the project Town Planner and Fire Safety Engineer, however we have had discussions with the Fire Safety Engineer and they are partial to this approach.

Please also note the Premises Standard upgrade comments for persons with disabilities as noted above.

3.0 Building Description

The Project

The overall project consist of a budget of $202 million for the initial design phase. The Front of House project is only a portion of this amount. The project related works consist of:

- Creative Learning Centre (CLC)

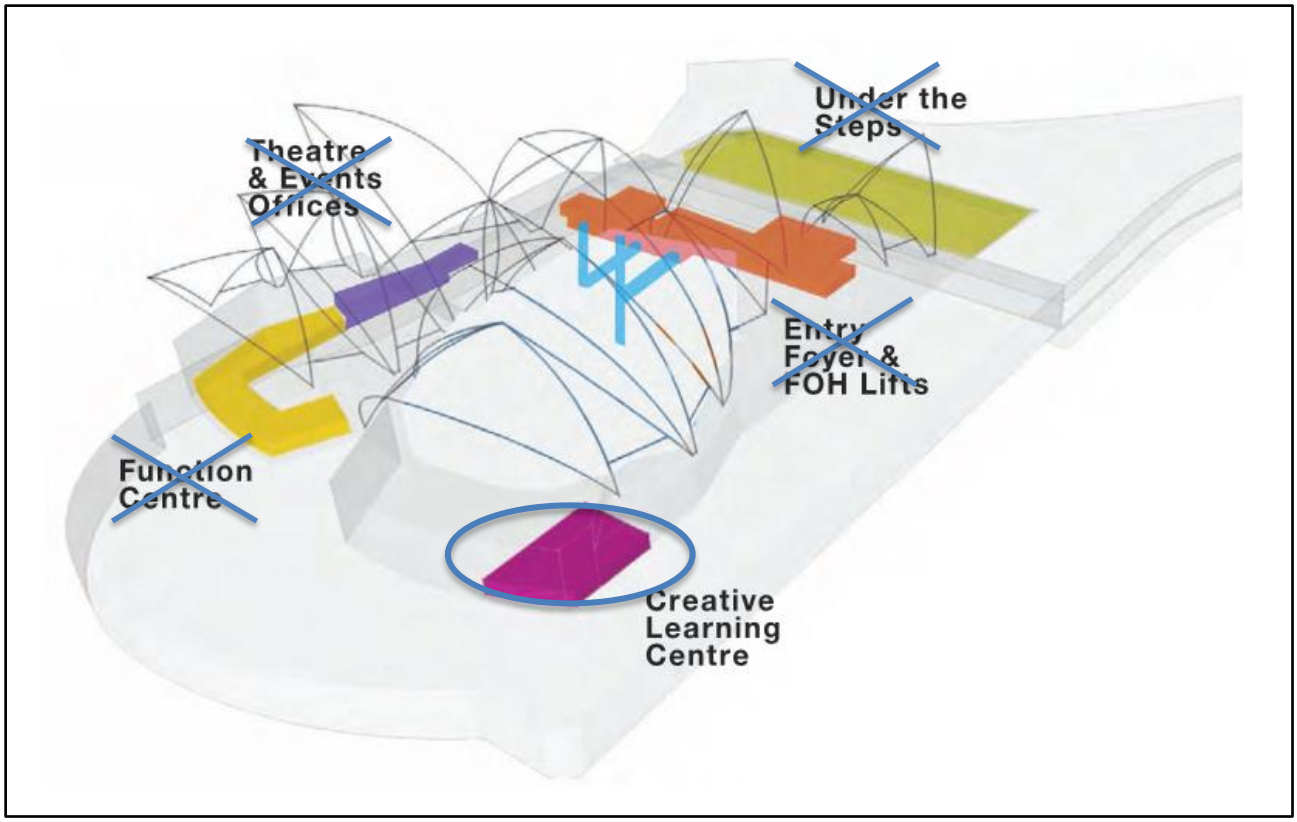

Figure 1 – FOH Area of works

Building Description (Front of House Only)

Building Use & Class of Occupancy:	Class 9b *entertainment venue*
Type of Construction:	A
Floor Area of Building:	TBC by SOH
Max Fire Compartment Size:	TBC by architect/SOH
Rise in Storeys:	TBC by SOH
Levels Contained:	TBC by SOH
Effective Height:	>25 m <50 m
Climate Zone:	5

The Building Classifications are subject to change pending a review of historic approvals documentation.

Documentation Assessed

This report is based on the following documentation

Description	Drawing No.	Rev	Date
Architectural Drawing Set DA Issue – Tonkin Zulaikha Greer	-	D	19.02.2018
Letter - Changes to toilet and patron numbers as a result of the SOH Stage 1 Renewal Projects (JST TMP, JST SAVE, Entry Foyer, Function Centre, Under the Steps, Creative Learning Centre and Concert Hall upgrades) issued by Ian Cashen dated 13 April 2017.	-	-	13.04.2017
Arup Level +12, Ground Compartmentation Review (Phase 2 Update) Plan	Level +12, Ground	-	22.09.2016
Fire Engineered Report 243928-08 - Arup	-	C02	24.11.2017

Table 4 – Documentation Assessed

4.0 BCA Requirements

The following assessment will provide an overview of compliance with the BCA and identify issues that require attention at this particular stage of the development.

The architectural plans are yet to be developed to the extent that a complete BCA assessment can be concluded and therefore this report is preliminary only.

Section A – General Provisions

The BCA Classifications in relation to the overall SOH will need further consideration. A review of previously requested historic approval documentation remains outstanding.

Section B – Structure

The impact of the development in relation on the existing building will need to be considered by the Structural Engineer. All new works are required to comply, including an assessment by the Engineer against the earthquake provisions.

The mirrored walls/doors are required to comply with the human impact provisions of AS 1288-2006.

Section C – Fire Resistance & NSW H101

C1 – Fire Resistance and Stability

Architectural fire rating (FRL) plans have been developed off the back of the recent Fire Compartmentation Plans dated 22 September 2016. Fire ratings for this project are to be in accordance with Table 3 of BCA Specification C1.1, see Appendix A, except where dictated by past Fire engineering Reports which see a general requirement for 60 minutes to non-loadbearing reports. The plans require a minor update to capture the proposed fire rated ceilings through out the existing Stores G555A, B & C and corridor G555 if relevant. And to illustrated Store G503 as fire separated.

All new fire rated ceilings, floor, walls etc. are required to have the appropriate FRL tested system which achieves fire rated in both directions, even the new proposed fire rated ceiling and its supports, i.e. PRP2. We recommend providing the product System Number to Group DLA for review at your earliest convenience.

BCA Specification C1.1 Clause 2.4 & 4.1(b) illustrates the restrictions on using combustible wall cladding. Such non-compliant products include but are not limited to certain Alucabonds, Apolic, Kingspan, timber, etc. Fire engineered alternative solutions may be possible but unlikely for areas around the exits and above the fire services. Please advise of any locations where such products are to be used in the form of colour coded elevations, for further assessment.

The Fire Hazard Properties of floor linings and floor coverings, wall and ceiling lining's, and other material as noted within Clause C1.10, must comply with the provisions of Specification C1.10 and NSW Specification C1.10, as noted in Table 5 below. This includes but is not limited to the following linings, noting that the CLC is a fully sprinklered area:

- Any specialist acoustic linings or treatments for acoustics.
- RF4 - Resilient Flooring - CRF of not less than 1.2. Compliant - Closed out.
- WS2 - Wobbly Panel to ceiling – Group 1, 2 or 3. Compliant, refer FER - Closed out.
- AP1 – Acoustic Panel – Group 1, 2 or 3. BCA fire test report required for review.
- SMC - Barrisol Ceiling - Group 1 or 2. Compliant - Closed out.

- MP8 – TBC not listed in A-0000 Rev C – Group 1 or 2. BCA fire test report required for review.
- CUR2 – Movable Felt Panels – Group 1 or 2. BCA fire test report required for review.
- TV1 – As applied to walls - Group 1, 2 or 3. BCA fire test report required for review.

It is recommended that the Fire Hazard Property Test Reports of the various linings and coverings are submitted to this office for a compliance check prior to installation. Notwithstanding this they will be required to be verified prior to the issuance of the OC, which is often too late in the case of the use of non-compliant materials.

Item	Location	Requirement
Floor linings or coverings	All floor areas throughout the complex, except fire isolated stairs	*CRF of no less than 1.2
Floor linings or coverings	Fire isolated stairs	CRF of no less than 2.2
Wall and ceiling linings	Fire isolated stairs, non-sprinkled Public corridors	**Group Number 1
Wall and ceiling linings	Auditorium – Non-sprinkled	Group Number 1 or 2
Wall and ceiling linings	Auditorium – Sprinkled	Group Number 1, 2 or 3
Wall and ceiling linings	General Areas	Group Number 1, 2 or 3

Table 5 – Fire Hazard Properties

Note: CRF stands for critical radiant flux, which is a BCA defined term as follows – "Critical radiant flux means the critical heat flux at extinguishment as determined by AS ISO 92391.1 – 2003." And for buildings not fitted with a sprinkler system complying with Specification E1.5, must have a maximum smoke development rate of 750 percent-minutes.*

*Note**: Group Number is a BCA defined term as follows – "Group number means the number of one of 4 groups of materials used in the regulation of fire hazard properties and applied to materials used as a finish, surface, lining, or attachment to a wall or ceiling." The group numbers must be determined in accordance with AS 5637.1 - 2015 and for buildings not fitted with a sprinkler system complying with Specification E1.5, must have—*

- *a smoke growth rate index not more than 100; or*
- *an average specific extinction area less than 250 m 2/kg.*

The Wobbly Panels have been tested as follows:

- Non-slotted plywood – Group 3, refer Certificate of Assessment HF07ANK5366 No.862 by CSRIO dated 13 July 2006.
- Slotted plywood – Group 4, refer Certificate of Assessment HF07ANK5366 No.861 by CSRIO dated 13 July 2006.
- Both products have an average specific extinction area of less than 250 m^2/kg.

Therefore the Wobbly Panels containing the slotted plywood are not permitted to be used, and the Wobbly Panel containing the non-slotted plywood can only be used in non-public areas.

The following wall and ceiling lining materials do not meet the required fire hazard properties rating of Group 3:

- White birch timber.
- Slotted plywood – Wobbly Panels

Furthermore, these linings are attached to fire rated elements and are combustible. Fire Safety Engineer has confirmed the feasibility of a Performance Solution, refer Section 10.1 of Front of House FER 243928-08 Rev C02 dated 24 November 2017.

C2 – Compartmentation and Separation & NSW H101

The fire engineered strategy requires a certain amount of fire separation to the proposed new discharge at Stair 17, this has been illustrated in the FRL Plans.

From the FRL plans we can note that the fire compartmentation sizes have not been increased.

The Fire Safety Engineer requires the cupboards within the lobby shall be fire rated to achieve required FRL of -/120/30, provided with medium temperature smoke seals (tested to AS1530.7) and locked shut (permanently locked if access is not required by the House). Detection shall be provided where required by AS1670.1 to provide early warning.

Altered Fire Stair 17 Arrangement has a Lift and stair within the same shaft. Fire Safety Engineer has confirmed the feasibility of a Performance Solution, refer Section 10.3 of Front of House FER 243928-08 Rev C02 dated 24 November 2017.

C3 – Protection of Openings

It is understood that the proposed fire doors to the CLC are to either be glass or timber with a vision panel. Consideration to the following will need to be given in terms of design:

- Vision panel design - DDA requirements for the size and location of the panel. Refer AS 1428.2 and liaise further with the Access Consultant.
- Vision panel design - The Fire Safety Engineer will also need to approve the size of the panels.
- Vision panel design - There may or may not be a conflict with the required size of the panels v's the parameters in the testing Standard and permitted exceptions. There may or may not be a requirement for the door design to be tested as a bespoke model.
- Glass doors – The required FRL rating of -/120/30 may not be achievable and the Fire Safety Engineer has confirmed that this is a justifiable Performance Solution.

Furthermore attachments to fire doors may not be permissible without further fire door testing. Permissible variations to the original fire door fire tests are set out in the testing Standard AS 1530.4. Please advise of the chosen option for further consideration against this point.

Entry Lobby 1 Door D/GR-05 and existing Entry Lobby door south, have been illustrated with a fire rating of -/60/30 in lieu of -/120/30 as required by the FRL plans. Fire Safety Engineer has confirmed the feasibility of a Performance Solution, refer Section 10.4 of Front of House FER 243928-08 Rev C02 dated 24 November 2017.

Door D/GR-17 is require to achieve an FRL of not less than -120/30. This door is proposed to be repurposed and therefore is required to be provided with a new unconditional installation certificate from the installing contractor. If this is an issue a new door and jamb is required to be installed.

Section D – Access & Egress

D1 – Provision for Escape

All paths of travel are required to have a minimum unobstructed width of not less than 1000 mm, however, main entry-exit locations for the public/patrons will require a minimum width proportional to the number of potential evacuating occupants in these areas.

Altered Fire Stair 17 Arrangement:

- Internal fire stair discharge in lieu of direct to open space.
- Lift and stair within the same shaft.
- Cupboards within the stair.

Fire Safety Engineer has confirmed the feasibility of a Performance Solution, refer Section 10.3 of Front of House FER 243928-08 Rev C02 dated 24 November 2017. .

The BCA maximum permitted travel distances are 20 m to an exit or to a point in which travel in two different directions to two different exits is available, 40 m to the nearest exit of the two measure back from the starting point and 60 m between alternative exits measure through the point of choice. The proposed design does not increase existing travel distances, and reduces them in a number of cases.

D2 – Construction of Exits

Table 6 illustrates the various requirements for the various stair scenarios for your convenience, however it is noted that there are currently no new or altered stairs proposed as part of the design.

Proposed handrails require further design consideration as it is understood that they may be design to match the existing handrails. A justifiable Alternative Solution form the Access Consultant will be required.

The BCA does not allow for single steps, such designs are seen as a risk issue for slips/trips/falls as they are difficult to see as the change in level is not obvious.

The exit doors and doors in the path of travel to exits have not been illustrated with compliant push bars.

Door D/GR-19 and D/GR-18 are required exit doors and therefore required to function as such, i.e. push bar even if they contain auto failsafe release of locking on fire trip, exit signage above and adequate width.

Entry Lobby 1 Door D/GR-05 swings against the direction of egress from the CLC. Fire Safety Engineer has confirmed the feasibility of a Performance Solution, refer Section 10.2 of Front of House FER 243928-08 Rev C02 dated 24 November 2017.

Stair	Access for person with Disabilities	Handrails	Balustrade	Slip Resistance	Treads, Risers, Widths, Other	TGSI	Common Issues
Fire Isolated Stair	**NO** - Only minor provisions made for egress.	**YES** - 1 handrail required which must resemble that required by the accessibility provisions, i.e. • 180° handrail turndown or return to wall, 300 mm past last riser. • 30 to 50 mm diameter with a 270° clearance around the top of the handrail, • 50 mm clearance to back of handrail, and to a height of 600 mm above the handrail. • Located between 865 mm and 1 m above nosing line. And must be at consistent height through the stairs and landings. • Continuous rail, no handhold breaks. • Clear area for 270° to the top of the handrail. *Ref: BCA D2.17, D3.3(a)(iii) & Cl 12 of AS 1428.1-2009.*	**YES** - No less than 865 mm above stair nosing lines, no less than 1 m above landings. No openings greater than 300 mm OR in the case of rails, top rail, mid rail and bottom rail required. No gaps greater than 150 mm above nosing line and 460 mm between rails. *Ref: BCA D2.16(g)(h)(i)*	**YES** - P3 rated slip resistance and highlighted nosing's to no less than 30% luminance contrast to the background. Nosing widths to be between 50 & 75 mm. Strip may be set back 15 mm from the front edge of the nosing but where it is not set back the luminance contrast must not extend down the riser by more than 10 mm. The lip between the tread and strip must not exceed 3 mm, or 5 mm where the edges are chamfered. *Ref: BCA D2.13, D2.14, D3.3(a)(iii) & Cl 11, 7.2, 7.3 of AS 1428.1-2009.*	**Tread -** 250 to 355 mm. **Riser** - 115 to 190 mm. **Quantity** - Must be between 550 to 700 when applying (2 x Riser + Tread.) **Open Riser** - Permitted to 125 mm. **Stair Width** - Minimum unobstructed width of 1000 mm, measured clear of handrails. Note: 1000 mm clear width will only allow for 100 persons, occupancy quantity review may be required. **Stair Height Clearance** - No less than 2 m. *Ref: BCA D2.13, D1.6*	**NO**	- Lip of the nosing strip excessive in height. - No site allowance for balustrade tolerances. - If separate handrail and balustrade is not used, this usually causes a conflict with the requirement to have the same heights throughout the landings and stairs. - Tread and riser dimensions not constructed uniform in dimension.
Fire Isolated Stair & Communication Stair	**YES**	**YES** - Fully accessible handrails required to both sides as follows: • 180° handrail turndown or return to wall, • 30 to 50 mm diameter with a 270° clearance around the top of the handrail, • 50 mm clearance to back of handrail, and to a height of 600 mm above the handrail. • Located between 865 mm and 1 m above nosing line. And must be at consistent height through the stairs and landings. • Continuous rail, no handhold breaks. • Clear area for 270° to the top of the handrail.	**YES** - No Less than 865 mm above stair nosing line, no less tanh 1 m above landings. No openings greater than 125 mm. No climbable members between 150 and 760 mm where the floor level is 4 m or more above the surface beneath. *Ref: BCA D2.16(g)(h)(ii)*	**YES** - P3 rated slip resistance and highlighted nosing's to no less than 30% luminance contrast to the background. Nosing widths to be between 50 & 75 mm. Strip may be set back 15 mm from the front edge of the nosing but where it is not set back the luminance contrast must not extend down the riser by more than 10 mm. The lip between the tread and strip must not exceed	**Tread -** 250 to 355 mm. **Riser** - 115 to 190 mm. **Quantity** - Must be between 550 to 700 when applying (2 x Riser + Tread.) **Open Riser** - Not permitted, must be opaque. **Riser Splay back -** Be vertical or max 25 mm. **Stair Width** - Minimum unobstructed width of 1000 mm, measured clear of handrails. Note: 1000 mm clear width will only allow for 100 persons, occupancy quantity review may be required. **Stair Height Clearance** - No less than 2 m.	**YES -** Required to the top and bottom of landings. No requirement for the mid landing. Note: It is understood that BMPX are seeking an alternative solution to delete TGSI in this case. Access consultant to confirm. *Ref: BCA D3.8, AS/NZS 1428.4.1-2009*	- Lip of the nosing strip excessive in height. - Outer handrail not continuous due to allowing for fire hydrant equipment. - No site allowance for balustrade tolerances. - If separate handrail and balustrade is not used, this usually causes a conflict with the requirement to have the same heights throughout the landings and stairs. - TGSI are not desirable in most cases and therefore an Alternative Solution by an accredited access consultant will be required, which usually required dome indicator buttons on the handrails. - Tread

Stair	Access for person with Disabilities	Handrails	Balustrade	Slip Resistance	Treads, Risers, Widths, Other	TGSI	Common Issues
		Ref: BCA D2.17, D3.3(a)(ii) & Cl 11 & 12 of AS 1428.1-2009.		3 mm, or 5 mm where the edges are chamfered. *Ref: BCA D2.13, D2.14, D3.3(a)(iii) & Cl 11, 7.2, 7.3 of AS 1428.1-2009.*	*Ref: BCA D2.13, D1.6*		and riser dimensions not constructed uniform in dimension.
Nom-fire Isolated required exit stair & Communication Stair	**YES**	**YES** - Fully accessible handrails required to both sides as follows: • 180° handrail turndown or return to wall, • 30 to 50 mm diameter with a 270° clearance around the top of the handrail, • 50 mm clearance to back of handrail, and to a height of 600 mm above the handrail. • Located between 865 mm and 1 m above nosing line. And must be at consistent height through the stairs and landings. • Continuous rail, no handhold breaks. • Clear area for 270° to the top of the handrail. *Ref: BCA D2.17, D3.3(a)(ii) & Cl 11 & 12 of AS 1428.1-2009.*	**YES** - No Less than 865 mm above stair nosing line, no less tanh 1 m above landings. No openings greater than 125 mm. No climbable members between 150 and 760 mm where the floor level is 4 m or more above the surface beneath. *Ref: BCA D2.16(g)(h)(ii)*	**YES** - P3 rated slip resistance and highlighted nosing's to no less than 30% luminance contrast to the background. Nosing widths to be between 50 & 75 mm. Strip may be set back 15 mm from the front edge of the nosing but where it is not set back the luminance contrast must not extend down the riser by more than 10 mm. The lip between the tread and strip must not exceed 3 mm, or 5 mm where the edges are chamfered. *Ref: BCA D2.13, D2.14, D3.3(a)(iii) & Cl 11, 7.2, 7.3 of AS 1428.1-2009.*	**Tread -** 250 to 355 mm. **Riser** - 115 to 190 mm. **Quantity** - Must be between 550 to 700 when applying (2 x Riser + Tread.) **Open Riser** - Not permitted, must be opaque. **Riser Splay back -** Be vertical or max 25 mm. **Stair Width** - Minimum unobstructed width of 1000 mm, measured clear of handrails. Note: 1000 mm clear width will only allow for 100 persons, occupancy quantity review may be required. **Stair Height Clearance** - No less than 2 m. *Ref: BCA D2.13, D1.6*	**YES -** Required to the top and bottom of landings. No requirement for the mid landing. Note: It is understood that BMPX are seeking an alternative solution to delete TGSI in this case. Access consultant to confirm. *Ref: BCA D3.8, AS/NZS 1428.4.1-2009*	- Lip of the nosing strip excessive in height. - Outer handrail not continuous due to allowing for fire hydrant equipment. - No site allowance for balustrade tolerances. - If separate handrail and balustrade is not used, this usually causes a conflict with the requirement to have the same heights throughout the landings and stairs. - TGSI are not desirable in most cases and therefore an Alternative Solution by an accredited access consultant will be required, which usually required dome indicator buttons on the handrails. - Tread and riser dimensions not constructed uniform in dimension.

Stair	Access for person with Disabilities	Handrails	Balustrade	Slip Resistance	Treads, Risers, Widths, Other	TGSI	Common Issues
Interconnecting Communication Stair (between tenancy levels not required as fire egress/exit)	**YES**	**YES** - Fully accessible handrails required to both sides as follows: • 180° handrail turndown or return to wall, • 30 to 50 mm diameter with a 270° clearance around the top of the handrail, • 50 mm clearance to back of handrail, and to a height of 600 mm above the handrail. • Located between 865 mm and 1 m above nosing line. And must be at consistent height through the stairs and landings. • Continuous rail, no handhold breaks. • Clear area for 270° to the top of the handrail. *Ref: BCA D2.17, D3.3(a)(ii) & Cl 11 & 12 of AS 1428.1-2009.*	**YES** - No Less than 865 mm above stair nosing line, no less tanh 1 m above landings. No openings greater than 125 mm. No climbable members between 150 and 760 mm where the floor level is 4 m or more above the surface beneath. *Ref: BCA D2.16(g)(h)(ii)*	**YES** - P3 rated slip resistance and highlighted nosing's to no less than 30% luminance contrast to the background. Nosing widths to be between 50 & 75 mm. Strip may be set back 15 mm from the front edge of the nosing but where it is not set back the luminance contrast must not extend down the riser by more than 10 mm. The lip between the tread and strip must not exceed 3 mm, or 5 mm where the edges are chamfered. *Ref: BCA D2.13, D2.14, D3.3(a)(iii) & Cl 11, 7.2, 7.3 of AS 1428.1-2009.*	**Tread -** 250 to 355 mm. (Public) **Tread** - 240 to 355 mm. (Private) **Riser** - 115 to 190 mm. **Quantity** - Must be between 550 to 700 when applying (2 x Riser + Tread.) **Open Riser** - Not permitted, must be opaque. **Riser** **Splay back -** Be vertical or max 25 mm. **Stair Width** - Minimum unobstructed width of 1000 mm, measured clear of handrails. Note: 1000 mm clear width will only allow for 100 persons, occupancy quantity review may be required. **Stair Height** - No less than 2 m. *Ref: BCA D2.13, D1.6*	**YES -** Required to the top and bottom of landings. And around base of stair stringer or stair when it can be considered as an overhead obstruction within 2 m from floor level. *Ref: BCA D3.8, AS/NZS 1428.4.1-2009*	- Lip of the nosing strip excessive in height. - No site allowance for balustrade tolerances. - If separate handrail and balustrade is not used, this usually causes a conflict with the requirement to have the same heights throughout the landings and stairs.

Table 6 – BCA Stair Provisions

D3 – Access for People with Disabilities

Refer Access Consultants Report.

Table 6 above illustrates the specific requirements for the various stairs.

The existing and proposed performance of hearing augmentation is required to be reviewed by the Access Consultant. The Access Consultant is to advise if there are any shortfalls in relation to BCA compliance for further consideration.

The new external glazing requires the markings (decals) in accordance with AS 1428.1-2009, none have been illustrated at this stage.

All – The doors or door frames require a 30% colour contrast to the walls in accordance with S 1428.1-2009, this has not been illustrated in a number of options including the mirrored doors and new Wobbly Panel doors.

A 1:40 landing is required to the new entry door GR-18, in lieu of the currently illustrated/proposed 1:13 & 1:10. Or the Access Consultant to confirm the feasibility of a Performance Solution.

The external ramp from Door GR-19 and associated handrails are required to be reviewed and confirmed compliant by the Access Consultant or otherwise.

Section E – Services & Equipment

E1 – Fire Fighting Equipment

Further assessment of the updated architectural plans illustrating the locations of the relevant existing and proposed fire hydrants and fire hose reels is required.

There are a number of area where there will be no fire hose reel coverage due to the proposed fire compartmentation changes. The hose of the fire hose reel is not permitted to pass through fire and smoke doors. Fire Safety Engineer has confirmed the feasibility of a Performance Solution, refer Section 10.5 of Front of House FER 243928-08 Rev C02 dated 24 November 2017. The areas are:

- Store Room G.503.
- ~~Egress Corridor G.555~~ FHR provided.
- ~~Entry Lobby G.501 Considered part of the fire isolated stair, cupboards justified in FER.~~
- Combined Store G555A,B
- Store G555C

The Fire Safety Engineer had commented with regards to new works requiring sprinkler protection to BCA and AS 2118.1-1999. This is not expected to extend to the site infrastructure meeting this requirement.

E2 – Smoke Hazard Management

The existing smoke hazard management systems are required to be carried over into the new and refurbished areas.

It is not proposed to install BCA required smoke detectors within 1.5 m of the Lobby fire doors. Its is understood that *"The solution would be based upon the risk areas being provided a means of detection and the lobby being maintained completely free of any loose combustibles/furniture. The lobby in effect forms a protected discharge path from the fire-isolated stair and*

would therefore need to be managed in the same manner" as advised by the Fire Safety Engineer. Fire Safety Engineer has confirmed the feasibility of a Performance Solution, refer Section 10.4 of Front of House FER 243928-08 Rev C02 dated 24 November 2017.

Isolation of smoke detection at certain times of CLC use is proposed due to spurious alarms. The Fire Safety Engineer has confirmed the feasibility of a Performance Solution, refer Section 10.6 of Front of House FER 243928-08 Rev C02 dated 24 November 2017. Strict conditions of approval have been nominated with the FER.

E3 - Lift Installations

NA to CLC.

E4 – Emergency Lighting, Exit Signs and Warning Systems

Further assessment of the developed documentation is required before an assessment against this part of the BCA can be completed. It is noted that the architectural RCP's do not currently illustrate exit signage, however the illustrated emergency lighting component appears adequate.

The BCA requires the following Emergency Lighting, Exit Signs and Warning Systems for this development, if the systems are proposed to be replaced or altered:

- Emergency lighting and exit signs are required to be installed throughout the building in accordance with the provisions of the BCA and AS 2293.1 - 2005.
- Sound Systems and Intercom Systems for Emergency Purposes (SSIPSEP, formerly EWIS) in accordance with AS 1670.4-2004 as required by the fire engineered strategy. And BCA Clause H2.14.

Any proposed exit signs installed at a height in excess of 2.7 m above floor level may require an alternative solution from the fire safety engineer. Further confirmation from the electrical consultant is required.

The Fire Safety Engineer should confirm the proposed design is adequate for the egress from Stair 17 into the CLC. If a design is proposed that does not meet the above provisions a justifiable Performance Solution may be required.

Section F – Health & Amenity

F2-F2.4 Sanitary Facilities

Proposed changes to the existing sanitary facilities will require the new works to comply the provisions of the BCA *inter alia* AS 1428.1-2009. (CLC)

An overall reassessment of the Opera House's Facilities will be required if the proposed facilities reduce the number of existing facilities or the design increases the current occupant capacity in anyway. However the House has confirmed that the number of occupants has not been increased and that the number of facilities has not been decreased. *Ref: Letter - Changes to toilet and patron numbers as a result of the SOH Stage 1 Renewal Projects (JST TMP, JST SAVE, Entry Foyer, Function Centre, Under the Steps, Creative Learning Centre and Concert Hall upgrades) issued by Ian Cashen dated 13 April 2017.*

F3 – Room Sizes

The ceiling height must be not less than—

- Generally, 2.4 m; and
- More than 100 persons accommodating the area, 2.7
- A habitable room excluding kitchen; 2.4 m

- A corridor, passageway, or the like — 2.4 m & 2.7 for more than 100 persons; and
- a bathroom, shower room, sanitary compartment, airlock, tea preparation room, pantry, store room, garage, car parking area, or the like — 2.1 m; and
- a commercial kitchen — 2.4 m; and
- above a stairway, ramp, landing or the like — 2 m measured vertically above the nosing line of stairway treads or the floor surface of the ramp, landing or the like.

The architect is to advise any locations where the above minimum ceiling height dimensions have not been achieved, however at this stage of the design we have identified the following areas:

- Store 1 G.503: From (TBC) down to 700 mm, in lieu of not less than 2.1 m.
- ~~Entry Lobby G.501: Less than 2.1 m (TBC), in lieu of not less than 2.4 m.~~

This issues will need to be addressed by an Ergonomics Consultant as a Performance Solution if deemed feasible by the Ergonomics Consultant.

It is noted that a number of ceiling heights are at the compliant limits and therefore no allowance for buildability has been made. An increase of 20 – 40 mm is recommended in these areas.

The Digital Learning G.509 ceiling is positioned slightly lower than 2700 mm to the northern end however as this part can be considered a school use no less than 2400 mm is permitted and therefore compliance is achieved.

Ceiling heights need to be dimensioned on the plans for further assessment.

F4 - Light and Ventilation

Further review of the developed documentation is required before an assessment against this part of the BCA can be completed.

Artificial lighting must be provided to all rooms in accordance with AS/NZS 1680.0-2009.

CLC - The mechanical engineer will also be required to confirm compliance with regard to the amount of supply outside air to the CLC based on the proposed number of occupants rather than Table D1.13 or any occupant quantity table in the mechanical Standards.

Section G – Ancillary Provisions

G3 – Atrium Construction

The project design is not consider to require any enhancements to the existing fire safety systems as a result of our review of this Part of the BCA.

Part H – Theatres, Stages, Public Halls,

N/a, refer Part H101.

Part I – DELETED

N/a

Section J - Energy Efficiency

All new works are to comply with Section J.

The building is located within Climate Zone 5.

Compliance with Section J is required for this development, for new or altered works only, as follows:

- BCA Part J0 – Energy Efficiency – Noted, no action required.
- BCA Part J1 – Building Fabric – There are no material changes to the existing building envelope line, the works are within a space that is considered *conditioned space* under the BCA.
- BCA Part J2 – Glazing – Submission of an ABCB approved glazing calculator and details of the U and SHGC values of the proposed new external entry doors to the CLC noted as D/GR-18 and D/GR-19. Relaxations exist within the ABCB Handbook 2010 - Applying Energy Efficiency Provisions to New Building Work Associated with Existing Class 2 to 9 Buildings – Section 2.6.
- BCA Part J3 – Building Sealing – Details of compliance with this provision are required to be illustrated within the architectural documentation, i.e. air infiltration seals and self-closing doors nominated to the new external doors D/GR-18 and D/GR-19.
- BCA Part J4 – DELETED.
- BCA Part J5 – Air-conditioning and Ventilation Systems – Certification from the mechanical consultant will be required.
- BCA Part J6 – Artificial Lighting and Power – Certification from the electrical consultant will be required.
- BCA Part J7 - Hot Water Supply and Swimming Pool and Spa Plant – Installation and Commissioning Certification from the Plumbing Contractor will be required prior to the issuance of the Occupation Certificate if new hot water supply is proposed. Compliance with the NCC Plumbing Code of Australia required.
- BCA Part J8 – Access for Maintenance and Facilities for Monitoring – Design Certification from the services consultant will be required in relation to BCA Clause J8.3, prior to the issuance of the Crown Building Works Certificate.

NSW Part H101 – Entertainment Venues

Further assessment of the developed documentation is required against this part of the BCA.

However at this particular stage in the design, further consideration will need to be given to the following provisions:

- NSW H101.2 – No material changes proposed.
- NSW H101.3 – No material changes proposed.
- NSW H101.4 - No material changes proposed.
- NSW H101.5 or 6 – No material changes proposed.
- NSW H101.11.1 – N/A for CLC.
- NSW H101.11.2 – N/A for CLC.
- NSW H101.12.3 – N/A for CLC.

- NSW H101.12.4 – N/A for CLC.
- NSW H101.12.5 - N/A for CLC.
- NSW H101.12.6 – N/A for CLC.
- NSW H101.12.7 – N/A for CLC.
- NSW H101.14.3 – N/A for CLC.
- NSW H101.18 or 18.1 – No material changes proposed.
- NSW H101.19 – Any alterations to the main switchboard will need to consider the implications of this provision – SF.
- NSW H101.20 - Any alterations to the lighting will need to consider the implications of this provision.
- NSW H101.22 – N/A for CLC.

A number of the NSW H101 Clauses have not considered to warrant assessment under this project because the nature of the proposed works is not significant to the extent that these existing condition should be upgraded at this stage. These have been left off the above list accordingly.

5.0 Essential Fire & Other Measures

This section is to be completed post a review of the AFSS and the pending Fire Engineered Report.

Below is a list of essential fire safety services that are required/expected to be installed / designed for the building, and the relevant standards of performance for each measure to be designed/constructed to.

Fire Safety Measure	Standard	BCA Clause(s)	Existing Fire Safety Measures	Proposed Fire Safety Measures
Access panels, doors & hoppers to fire resisting shafts	AS 1530.4 – 2005	C3.13	☐	☐
Atrium provisions • Detection & alarm system • SSISEP • Sprinklers • Smoke exhaust • Stair pressurisation	-	G3.8, Spec G3.8	☐	☐
Automatic fail safe devices	-	C3.8, D2.21, Spec C3.4	☐	☐
Automatic fire detection & alarm systems	AS 1670.1 – 2004 AS 1668.1 – 1998	Spec E2.2a	☐	☐
Automatic fire suppression systems	AS 2118.1 – 1999	Spec E1.5	☐	☐
Building occupant warning system	AS 1670.1 – 2004 AS 2118.1 – 1999	E2.2, E1.5	☐	☐
Emergency lifts	-	E3.1, E3.4, E3.5, E3.10 and Spec E3.1	☐	☐
Emergency lighting	AS 2293.1 – 2005	E4.2, E4.4	☐	☐
Exit signs	AS 2293.1 – 2005	E4.5, NSW E4.6 & E4.8	☐	☐
Fire alarm monitoring system	AS 1670.3 – 2004 AS 4428.6 – 1997	Spec E2.2, Spec E1.5	☐	☐
Fire control centres and rooms	-	E1.8, Spec E1.8	☐	☐
Fire dampers	AS 1668.1 – 1998	Spec E2.2a	☐	☐
Fire doors	AS 1905.1 – 2005	Spec C3.4(fire doors), C3.10 (lift doors)	☐	☐
Fire hose reel systems	AS 2441 – 2005	E1.4	☐	☐
Fire hydrant systems	AS 2419.1 – 2005	E1.3	☐	☐
Fire seals (protecting openings in fire resisting components of the building)	AS 4072.1 – 2005 AS 1530.4 – 2005 AS 1038.15 – 1995	C3.12, C3.13, C3.15	☐	☐
Fire shutters	AS 1905.2 – 2005	Spec C3.4	☐	☐

Fire Safety Measure	Standard	BCA Clause(s)	Existing Fire Safety Measures	Proposed Fire Safety Measures
Fire windows	-	Spec C3.4	☐	☐
Lightweight construction	-	C1.8, Spec C1.8	☐	☐
Mechanical air handling systems *(Strike out which are N/A)* • Auto shutdown • Zone smoke control • Stair pressurisation	AS/NZS 1668.1 – 1998 AS 1668.2 –2012	E2.2, Spec E2.2a, Spec E2.2b	☐	☐
Perimeter vehicle access for emergency vehicles	-	C2.4	☐	☐
Portable fire extinguishers & fire blankets	AS 2444 – 2001	E1.6	☐	☐
Safety curtains in proscenium openings	-	NSW H 101.10 NSW H 101.10.1	☐	☐
Smoke and heat vents	AS 2665 – 2001	Spec E2.2c, Spec G3.8 & NSW H101.22	☐	☐
Smoke dampers	AS 1668.1 – 1998	C3.15, E2.2, Spec C2.5, Spec G3.8	☐	☐
Smoke detectors & heat detectors (Residential)	AS 1670 – 2004 AS 3786 – 1993	Spec E2.2a Spec E2.2a	☐	☐
Smoke doors	-	Spec C3.4, C2.5, D2.6	☐	☐
Solid core doors	-	C3.11, NSWC3.11(d)(ii)	☐	☐
Sound systems and intercom systems for emergency procedures	AS 1670.4 – 2004 AS 4428.4 – 2004	E4.9, Spec G3.8	☐	☐
Standby power systems	-	Spec G3.8	☐	☐
Wall wetting sprinklers & drencher systems	AS 2118.1 – 1999	C3.2, C3.4, C3.8, C3.11, D1.7, D1.8, Spec G3.8	☐	☐
Warning and operational signs	-	C3.6, E3.3, D2.23 & Spec E1.8	☐	☐
Other Measures:				
Paths of Travel	-	D1.6	☐	☐
Alternative Solution, Report No. _____, issued by _____, dated _____ (List main items) • • •	-	*(List Performance Clauses)*	☐	☐

Appendix A
Fire Ratings Required

Table 3 – Type A Construction: FRL of Building Elements

Building Element	Class of Building – FRL (in minutes) Structural Adequacy/Integrity/Insulation			
	Class 2, 3 or 4 part	**Class 5, 9 or 7 (car park)**	**Class 6**	**Class 7 (other than carpark) or 8**
External Wall (including any column and other building element incorporated therein) or other external building element, where the distance from and fire-source feature to which it is exposed is:				
For Loadbearing Parts:				
Less than 1.5m	90/90/60	120/120/120	180/180/180	240/240/240
1.5m to less than 3m	90/60/60	120/90/90	180/180/120	240/240/180
3m or more	90/60/30	120/60/30	180/120/90	240/180/90
For Non-Loadbearing Parts:				
less than 1.5m	- /90/90	- /120/120	-/180/180	-/240/240
1.5m to less than 3m	- /60/60	- /90/90	-/180/120	-/240/180
3m or more	- / - / -	- / - / -	-/-/-	-/-/-
External Column not incorporated in an external wall, where the distance from any fire source feature to which it is exposed is:				
Loadbearing columns	90/-/-	120/-/-	180/-/-	240/-/-
Non-loadbearing columns	- / - / -	- / - / -	-/-/-	-/-/-
Common Walls and Fire Walls:				
	90/90/90	120/120/120	180/180/180	240/240/240
Internal Walls – Fire Resisting lift and stair shafts:				
Loadbearing	90/90/90	120/120/120	180/120/120	240/120/120
Non-Loadbearing	- /90/90	- /120/120	-/120/120	-/120/120
Bounding ***Public Corridors*** public lobbies and the like:				
Loadbearing	90/90/90	120/ - / -	180/ - / -	240/-/-
Non-Loadbearing	- /60/60	- / - / -	- / - / -	- / - / -
Between or Bounding ***Sole Occupancy Units***:				
Loadbearing	90/90/90	120/ - / -	180/ - / -	240/-/-
Non-Loadbearing	- /60/60	- / - / -	- / - / -	- / - / -
`Ventilating, pipe, garbage and like ***shafts*** not used for the discharge of hot products of combustion:				
Loadbearing	90/90/90	120/90/90	180/120/120	240/120/120

Building Element	Class of Building – FRL (in minutes) Structural Adequacy/Integrity/Insulation			
	Class 2, 3 or 4 part	Class 5, 9 or 7 (car park)	Class 6	Class 7 (other than carpark) or 8
Non-Loadbearing	- /90/90	- /90/90	- /120/120	- /120/120
Other Loadbearing Internal Walls, Internal Beams, Trusses and Columns:				
	90/ - / -	120/ - / -	180/-/-	240/-/-
Floors:	90/90/90	120/120/120	180/180/180	240/240/240
Roofs:	90/60/30	120/60/30	180/60/30	240/90/60

See concessions in Spec C1.1 for concessions to these above tabulated requirements, as this may reduce or remove fire rating requirements subject to certain criteria, and haven't been captured in this report.