

**COMMUNICATIONS  
ALLIANCE LTD**



**AUSTRALIAN BUILDING CODES BOARD  
PROPOSAL FOR CHANGE TO THE NATIONAL  
CONSTRUCTION CODE 2019  
COMMUNICATIONS ALLIANCE  
AUGUST 2017**



**PROPOSAL FOR CHANGE  
NATIONAL CONSTRUCTION CODE SERIES**

|                             |  |
|-----------------------------|--|
| <b>SUBJECT</b>              | <b>Telecommunications pathways and spaces</b>  |
| <b>BCA Volume One:</b>      | <b>New Part F6 Telecommunications</b>  |
| <b>BCA Volume Two:</b>      | <b>New 3.8.3.4 and 3.8.3.5 Telecommunications pathways and spaces; Installation requirements</b> |
| <b>Guide to Volume One:</b> | <b>N/A</b>   |
| <b>PCA Volume Three:</b>    | <b>N/A</b>   |

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## The Proposal

### 1. What is the proposal?

#### Introduction

Communication Alliance proposes the inclusion of new provisions in the National Construction Code (NCC) to specify pathways and spaces for telecommunications Carrier cabling and equipment in buildings.

The ABCB will be aware that Communications Alliance, with the assistance of the Department of Communications and the Arts, submitted a proposal for the NCC 2016 which took a broader approach and included, in addition to telecommunications Carrier requirements, the pathways and spaces for customer and related cabling within buildings, specifically on the customer side of the network boundary<sup>1</sup>.

We see the proposed amendment to the NCC as a critical success factor for the efficiency and efficacy of the roll-out of the Australia's biggest infrastructure project – the National Broadband Network – both during the remainder of the current network build and into the future.

The amendment, in our view, has important implications for national economic competitiveness beyond the immediate cost/benefit estimations on which the ABCB normally relies in assessing the worthiness of proposed amendments.

The current proposal recognises the limitations of what is practically and economically possible for inclusion in the NCC. It addresses the primary shortcomings of the current environment, ensuring that buildings will be designed to provide the necessary infrastructure to allow adequate access, cabling pathways and spaces for equipment for telecommunications Carriers in bringing network cabling to the point where the customer connects.

It is estimated that the removal of the customer cabling aspects from the current submission results in a cost saving in the order of 50%, compared to the earlier proposal.

It is recognised that there are additional requirements to address other electrotechnology services within a building but that those are not the subject of this submission.

#### The approach

This proposal specifically addresses the following:

- telecommunications pathways and spaces for Class 1 buildings
- telecommunications pathways and spaces for Class 2, 3, 5, 6 or 9c buildings;
- requirements for sole occupancy unit developments with less than 60 units and for developments with 60 units and above;
- the telecommunications internal lead-in conduit;

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<sup>1</sup> The telecommunications network boundary point is defined in the *Telecommunications Act 1997*.



- main equipment cupboard(s) and equipment room(s);
- vertical riser cupboards and shafts; and
- dedicated or shared pathways from the riser shaft to the tenancy/apartment

The proposed changes to Class 1 buildings reproduces the earlier work carried out by Communications Alliance for the ABCB consultation on the NCC 2016. The proposed changes have been reproduced in Attachment 2 with one change from the earlier submission, in referring to 'telecommunications networks' without the 'open' qualification.

For Classes 2, 3, 5, 6 and 9c, Communications Alliance has taken the opportunity to present the proposed inclusions for NCC 2019 by using the ABCB NCC 2016 public consultation draft as a base document. The proposed requirements in the draft NCC 2016 have been modified and updated to reflect the NCC 2019 proposal (see Attachment 1).

The approach differs from the NCC 2016 requirements in the following:

- Classes 2, 3 and 9c and Classes 5 and 6 have been combined into a single set of requirements as reflected in Table 1 in Attachment 1. This identifies the pathways and spaces required to satisfy the delivery of telecommunications to vertical Multi Dwelling Units (MDUs) of varying sizes and occupancy volumes.
- the equipment space requirements now focus on wall spacial areas rather than on floor area because all equipment installed in a development to meet the requirements for fibre-ready facilities is mounted to a wall, whilst maintaining the required workable and access space in front of the equipment. This space can be as simple as the vacant space directly in front of the equipment or the opening of a door(s) to access a communications cupboard or floor riser cupboard, allowing a technician to work unobstructed or in a confined space, as well as facilitating adequate pathway of egress for the technician in the event of an emergency or evacuation. This leads to a substantive reduction in space requirements as was proposed in the NCC 2016 submission.
- requirements for pathways from the floor communications cupboard or riser cupboard to apartments and or tenancies are now clearly reflected in Table 1, allowing for greater flexibility and a reduction in pathway requirements through the use of shared pathways. This provides the option for the installation of either:
  - a dedicated pathway from the floor communications cupboard or riser cupboard in the form of:
    - a P20 conduit;
    - a P50 truncation conduit that also supports an access panel where the apartments or tenancies P20 conduit meets the truncation conduit; or
    - a cable tray that supports an access panel where the apartments or tenancies P20 conduit meets the cable tray; or



- a shared pathway in the form of a cable tray, allowing for a 100 mm wide reserved space along the length of the cable tray for the telecommunications cable. This also supports an access panel where the apartments or tenancies P20 conduit meets the cable tray.
- each apartment or tenancy on each level is serviced by an individual industry standard nominal rigid white telecommunications P20 conduit.

The requirements have been based on telecommunications access networks using Fibre-to-the-Premises (FTTP) technologies, for vertical high-rise buildings, addressing the greatest needs, but can equally be applied to all access networks including Hybrid Fibre-Coax (HFC) and those using copper or fibre lead-ins for DSL Access Modules (DSLAMs, micro DSLAMs). They can be adapted for horizontal MDUs, that is buildings covered by the NCC Volume One, including factories, campus, shopping centres and the like. The requirements have been designed to be telecommunications Carrier and technology independent.

The proposed changes will facilitate builders and developers when entering into agreements with telecommunication Carriers to customise specific installations for a particular Carriers' needs.

The requirements can cater for designs with mixed premises and tenancies.



## The Current Problem

### 2. What problem is the proposal designed to solve?

Telecommunications has been an essential service for every Australian building - both domestic and commercial – for several decades. It is considered just as important as electricity, water and heating, ventilation and air conditioning (HVAC). Over the years, its services have migrated from basic telephony, to data, to notification of alarm and life-safety services, to internet and cloud access, and are now rapidly progressing to future 'smart' applications.

Unfortunately, the telecommunications industry has experienced challenges in delivering the cabling infrastructure that facilitates such telecommunications services, largely due to the construction industry's oversight of the need for pathways and spaces needed for the cabling reticulation. Such oversight has resulted in less-than-optimal provision of telecommunications cabling, manifested as unsightly surface mounted pathways, grossly more expensive cabling installation, reparation works to building, disruption to the building occupant, and/or limitation of services.

Such impediments could have been alleviated through the provision of adequate pathways and spaces for telecommunications cabling.

A lack of adequate telecommunications pathways and spaces also severely impedes a building's ability to utilise the wireless technologies that will make buildings 'smart' (i.e. via the Internet of Things). A wide range of 'smart' systems are already available to make buildings safer, more efficient, more secure, and to create a better work environment, with countless more systems in development. However, buildings that don't have adequate pathways for the cabling to reach antennas strategically distributed throughout the building will limit, or even prevent their deployment, resulting in a building's failure to provide the benefits of 'smart' technologies.

The application of the emerging *Internet of Things* (IoT) to make buildings 'smart' will also see a surge in cabling needing to be installed, often to a plethora of wireless devices throughout the building. Without adequate pathways and spaces, the building's ability to be 'smart' or 'IoT-ready' will be severely impeded, resulting in the 'smart' cost benefits being severely diminished, i.e. the anticipated gains in energy efficiencies, improved occupant safety and building amenity by being 'smart' may never be realised due to the prohibitively high cost to deploy them in the absence of adequate pathways and spaces.

### 3. What evidence exists to show there is a problem?

Inadequate pathways and spaces for telecommunications services often visibly manifest in unsightly surface-mounted conduits and ducts throughout premises, both inside and out. The problem is faced by both Carriers and premises cabling providers. The financial manifestation is higher costs to provide 'alternative' means to route cabling. It is common practice for cabling installers to increase their base installation rates in projects where there are no suitable pathways and spaces for them, because they



themselves incur higher costs in materials, labour and disputes. These incremental costs are typically passed onto the building occupants.

It is informative to see that connecting an existing (brownfields) premises for FTTP costs \$4405 in comparison to a new (Greenfields) site costing \$2504<sup>2</sup>. This shows a 43% cost differential in retrofitting an existing premises compared to a new site.

According to the recent BICSI cabling survey (see Attachment 4 for details), the median cost increment is 20 to 29 percent. The data is derived from primary research conducted in April 2017, with respondents across the full spectrum of the industry – government and enterprise end-users, consulting engineers, installers and Carriers.

If adequate pathways and spaces were provided by the builder, telecommunications cabling installation costs would reduce accordingly, as the market is mature and very competitive.

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<sup>2</sup> nbn Half Year Results 2017. Slide 14.  
<http://www.nbnco.com.au/content/dam/nbnco2/documents/nbn-financial-results-HY2017-presentation.pdf>



## The Objective

### 4. How will the proposal solve the problem?

The objective of including requirements for telecommunications pathways and spaces in the NCC is essentially to allow for the deployment of new technologies in a cost-effective manner to make buildings safer, more habitable, more energy efficient and allow for the amenity of buildings to be maintained to acceptable standards during the life cycle of the building.

As discussed earlier, in today's connected environment, there is a growing dependence on ICT infrastructure to provide the interconnectivity for communications, building automation, environmental control, security, energy management, smart building services (metering etc.). The ability for a building to readily cater for telecommunications cabling is an essential component to ensure that tenants will not suffer from loss of amenity over time.

The benefit of having telecommunications pathways and spaces in the NCC will facilitate the engagement between builders/developers and telecommunications Carriers to develop solutions that are fit-for-purpose, meeting the needs of the building occupants,

As with electricity and plumbing, communications have become an essential component of a modern dwelling, underpinning the progress of services that are becoming available to a population that expects to enjoy the benefits that come with the advent of smart buildings and smart cities.

### 5. What alternatives to the proposal (regulatory and non-regulatory) have been considered and why are they not recommended?

From a commercial perspective, telecommunications has been an essential ingredient for more than half a century. Service delivery during these decades has been punctuated by many problems in delivering services to the public, often requiring the deployment of substandard and more costly options for the user.

This period without regulation of telecommunications pathways and spaces in buildings has often resulted in the telecommunications industry not being able to provide adequate access to their networks. The information from the nbn and BICSI provides some indication of the current situation.

This proposal is in response to the telecommunications industry's experience in providing telecommunications services. The situation becomes more critical as time goes on with the interconnectedness of an information society. More technology is being deployed in buildings, typically being driven by the building owners seeking improved amenities, safety and security for tenants, along with operational cost savings through sophisticated sensing and control using technology.

We note that the telecommunications industry has been proactive in its engagement with developers, property owners and councils. Where there is





engagement among all parties at the right time in the development phase, positive outcomes have resulted. In Victoria for example, a developer cannot proceed with a development if they do not have an agreement with a telecommunications Carrier in place.

### **Wireless communications**

Wireless communications is commonly, but mistakenly, seen as an alternative to telecommunications cabling, negating the need for cabling within buildings. The following endeavours to explain why, in fact, wireless technologies can increase the cabling requirements within buildings.

As the most commonly used wireless networks – 4G/5G and Wi-Fi – increase in speed and capacity, their RF coverage decreases, requiring more antennas be distributed throughout a building. Mobile coverage is expanding to meet increased data demands by reducing the size and increasing the number of mobile cells, installing antenna systems within buildings and other enclosed spaces and connecting to the main telecommunications network by cabling. Wi-Fi networks are increasing in speed and coverage by using more Wireless Access Points (WAPs) which are wired to the fixed broadband services in premises. In addition to achieving higher speeds, the signals that are being used between the mobile devices are limited to short distances and cannot effectively penetrate building materials such as gyprock, so WAPs need to be deployed in higher densities, therefore requiring more cabling to be installed within the building to connect them.



## The Impacts

### 6. Who will be affected by the proposal?

There are many stakeholders that will benefit from the inclusion of requirements for telecommunications pathways and spaces in the NCC, e.g.:

- building owners will benefit, as the asset will be able to keep up with ongoing technological advancements facilitated by telecommunications infrastructure, as and when they are developed, without being impeded by inadequate pathways, or high capital costs to deploy the technologies. This covers access to very high-speed wireless services from Wi-Fi and cellular/mobile as it can be deployed into every location of a building.
- tenants/occupants will benefit through the ability to access the latest technologies for their business operations without needing to obtain permission from the building owner to have high impact work done. This supports the Federal Government's policy to support the ageing to stay at home<sup>3</sup>.
- the telecommunications industry will benefit through more efficient deployment of the advanced technologies to service clients to businesses, and to occupants of all descriptions, within their homes.
- property developers will benefit through knowledge of what is required to provide access to telecommunications networks; with positive flow-on effects on building utility, aftermarket retrofitting and resale value.
- builders will benefit through the greater efficiency of building to a standard and avoiding ad hoc imposts and time delays.

### 7. In what way and to what extent will they be affected by the proposal?

There are many areas where various parties will be affected, both in economic and non-economic terms. The goal is to improve the present and future function of the buildings as new technologies can be deployed cost effectively, and to allow the amenity provided by the buildings to be in keeping with what is on offer in modern buildings. For example:

- economic impacts, both in costs (such as the initial design of the pathways and spaces) and in benefits, such as those arising from the timely connection of services, in particular for commercial activities.
- aesthetic impacts, including avoiding having cabling and conduit installed on exposed surfaces, both internally and externally, as a part of a retrofit.
- improved focus on compliance, including a positive influence in the use of compliant products and in discouraging the use of low-cost, non-compliant products. With greater certainty in the arrangements for the provisioning of telecommunications pathways and spaces,

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<sup>3</sup> see Ageing and Aged Care Staying at home initiative (<https://agedcare.health.gov.au/older-people-their-families-and-carers/staying-at-home>)



improved understandings between better-informed developers and telecommunications Carriers can lead to an improved level of amenities for the occupant.

- with an increase in the availability of services provided over telecommunications networks, increased savings can be realised through, for example. a reduction of electricity costs resulting from better access to services providing energy management.



## Consultation

### 8. Who has been consulted and what are their views?

Communications Alliance has established a NCC Working Group to develop this proposal. The Working Group is made up of representatives from nbn, Telstra, Optus, Opticomm, the International Copper Association Australia (ICAA), Wood & Grieve Engineers (WGE), the Australian Digital Television Industry Association (ADTIA), VTI Services and the Building Industry Consulting Service International (BICSI).

As a part of the development, BICSI surveyed its members who include end Government and corporate end users, consulting engineers, integrators, installers and Carriers.



## Attachment 1

### **Proposed changes to Volume One of the National Construction Code 2019**

Communications Alliance proposes changes to the National Construction Code to incorporate requirements for telecommunications pathways and spaces.

To present these changes in this submission, the *NCC 2016 Draft for Public Comment*, which was released on 3 June 2015, has been used as a base document. All the pages that contained telecommunications-related changes in the NCC 2016 Draft were extracted and reproduced on the following pages.

For this submission, our proposed changes have been incorporated directly into the text in the red boxes, as relevant. (The red boxes were added to highlight all the telecommunications-related changes in the NCC 2016 Draft).

**Fire-isolated stairway** means a stairway within a *fire-resisting shaft* and includes the floor and roof or top enclosing structure.

**Fire load** means the sum of the net calorific values of the *combustible* contents which can reasonably be expected to burn within a *fire compartment*, including furnishings, built-in and removable materials, and building elements. The calorific values must be determined at the ambient moisture content or humidity. (The unit of measurement is MJ.)

**Fire-protected timber** means *fire-resisting timber building elements that comply with Specification A1.1.*

**Fire-protective covering** means—

- (a) 13 mm fire-protective grade plasterboard; or
- (b) 12 mm cellulose cement flat sheeting complying with AS/NZS 2908.2 or ISO 8336; or
- (c) 12 mm fibrous plaster reinforced with 13 mm x 13 mm x 0.7 mm galvanised steel wire mesh located not more than 6 mm from the exposed face; or
- (d) other material not less fire-protective than 13 mm fire-protective grade plasterboard, fixed in accordance with the normal trade practice for a *fire-protective covering*.

**Fire-resistance level (FRL)** means the grading periods in minutes determined in accordance with **Specification A2.3**, for the following criteria—

- (a) *structural adequacy*; and
- (b) *integrity*; and
- (c) *insulation*,

and expressed in that order.

**Note:** A dash means that there is no requirement for that criterion. For example, 90/–/– means there is no requirement for an FRL for integrity and insulation, and –/–/– means there is no requirement for an FRL.

**Fire-resisting** , applied to a building element, means having an FRL appropriate for that element.

**Fire-resisting construction** means one of the Types of construction referred to in **Part C1**.

**Fire safety system** means one or any combination of the methods used in a building to—

- (a) warn people of an emergency; or
- (b) provide for safe evacuation; or
- (c) restrict the spread of fire; or
- (d) extinguish a fire,

and includes both active and passive systems.

**Fire-source feature** means—

- (a) the far boundary of a road, river, lake or the like adjoining the allotment; or
- (b) a side or rear boundary of the allotment; or
- (c) an *external wall* of another building on the allotment which is not a Class 10 building.

**Fire wall** means a wall with an appropriate resistance to the spread of fire that divides a *storey* or building into *fire compartments*.

**Fixed line footprint** means the geographic area defined by the *appropriate authority as being served by fixed telecommunications network infrastructure*.

**Flashover** , in relation to *fire hazard properties*, means a heat release rate of 1 MW.

**Flammability Index** means the index number as determined by AS 1530.2.

**Flight** means that part of a stairway that has a continuous series of risers, including risers of winders, not interrupted by a landing or floor.

**(Vic, Flood hazard area)**

**Flood hazard area** means the *site* (whether or not mapped) encompassing land lower than the *flood hazard level* which has been determined by the *appropriate authority*.

**Open space** means a space on the allotment, or a roof or similar part of a building adequately protected from fire, open to the sky and connected directly with a public road.

**Open spectator stand** means a tiered stand substantially open at the front.

**Other property** means all or any of the following—

- (a) any building on the same or an adjoining allotment; and
- (b) any adjoining allotment; and
- (c) a road.

**Outdoor air** means air outside the building.

**Outdoor air economy cycle** is a mode of operation of an *air-conditioning* system that, when the outside air thermodynamic properties are favourable, increases the quantity of outside air used to condition the space.

**Outfall** means that part of the disposal system receiving *surface water* from the drainage system and may include a natural water course, kerb and channel, or soakage system.

**Panel wall** means a non-loadbearing external wall, in frame or similar construction, that is wholly supported at each storey.

**Patient care area** means a part of a *health-care building* normally used for the treatment, care, accommodation, recreation, dining and holding of patients including a *ward area* and *treatment area*.

**Performance Requirement** means a requirement which states the level of performance which a *Building Solution Performance Solution or Prescriptive Solution* must meet.

**Performance Solution** means a method of complying with the *Performance Requirements as outlined in A0.4*.

**Personal care services** means any of the following:

- (a) The provision of nursing care.
- (b) Assistance or supervision in—
  - (i) bathing, showering or personal hygiene; or
  - (ii) toileting or continence management; or
  - (iii) dressing or undressing; or
  - (iv) consuming food.
- (c) The provision of direct physical assistance to a person with mobility problems.
- (d) The management of medication.
- (e) The provision of substantial rehabilitative or development assistance.

**Piping**, for the purposes of **Section J**, means an assembly of pipes, with or without valves or other fittings, connected together for the conveyance of liquids and gases.

**Point of connection** for telecommunications means the point where the customer cabling meets the telecommunications network boundary.

**Prescriptive Solution** means a method of satisfying the *Deemed-to-Satisfy Provisions, deemed to comply with the Performance Requirements*.

**Pressure vessel** means a vessel subject to internal or external pressure. It includes interconnected parts and components, valves, gauges and other fittings up to the first point of connection to connecting piping, and—

- (a) includes fire heaters and gas cylinders; but
- (b) excludes any vessel that falls within the definition of a *boiler*.

**Primary building element** means a member of a building designed specifically to take part of the loads specified in **B1.2** ~~or B1.3~~ and includes roof, ceiling, floor, stairway or ramp and wall framing members including bracing members designed for the specific purpose of acting as a brace to those members.

**Smoke growth rate index (SMOGR<sub>RC</sub>)** means the index number for smoke 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.

**Sole-occupancy unit** means a room or other part of a building for occupation by one or joint owner, lessee, tenant, or other occupier to the exclusion of any other owner, lessee, tenant, or other occupier and includes—

- (a) a dwelling; or
- (b) a room or suite of rooms in a Class 3 building which includes sleeping facilities; or
- (c) a room or suite of associated rooms in a Class 5, 6, 7, 8 or 9 building; or
- (d) a room or suite of associated rooms in a Class 9c building, which includes sleeping facilities and any area for the exclusive use of a resident.

**Spread-of-Flame Index** means the index number for spread of flame as determined by AS/NZS 1530.3.

**Stage** means a floor or platform in a Class 9b building on which performances are presented before an audience.

**Stairway platform lift** means a power-operated device for raising or lowering people with limited mobility on a platform (with or without a chair) in the direction of a stairway.

**Standard Fire Test** means the Fire-resistance Tests of Elements of Building Construction as described in AS 1530.4.

**Storey** means a space within a building which is situated between one floor level and the floor level next above, or if there is no floor above, the ceiling or roof above, but not—

- (a) a space that contains only—
  - (i) a lift *shaft*, stairway or meter room; or
  - (ii) a bathroom, shower room, laundry, water closet, or other *sanitary compartment*; or
  - (iii) accommodation intended for not more than 3 vehicles; or
  - (iv) a combination of the above; or
- (b) a *mezzanine*.

**Structural adequacy**, in relation to an FRL, means the ability to maintain stability and adequate *loadbearing* capacity as determined by AS 1530.4.

**Surface water** means all naturally occurring water, other than *sub-surface water*, which results from rainfall on or around the *site* or water flowing onto the *site*.

**Swimming pool** means any excavation or structure containing water and principally used, or that is designed, manufactured or adapted to be principally used for swimming, wading, paddling, or the like, including a bathing or wading pool, or spa.

**Telecommunications pathway** means the pathway used by telecommunications network infrastructure and includes—

- (a) telecommunications entry points; and
- (b) telecommunications equipment rooms or floor distributors; and
- (c) vertical telecommunications risers between *story's*; and
- (d) in a Class 2, 3, 5, 6 or 9c building or a Class 4 part in the *fixed line footprint*, horizontal pathways used up to the *point of connection*.

**Total R-Value** means the sum of the *R-Values* of the individual component layers in a composite element including any building material, insulating material, airspace and associated surface resistances.

**Total System Solar Heat Gain Coefficient (SHGC)** means the fraction of incident irradiance on *glazing* or a *roof light* that adds heat to a building's space.

**Total System U-Value (W/m<sup>2</sup>.K)** means the thermal transmittance of the composite element allowing for the effect of any airspaces and associated surface resistances.



## PART F6 TELECOMMUNICATIONS

### PERFORMANCE REQUIREMENTS

#### FP6.1

To allow occupant access to telecommunications network, suitable spaces and pathways for telecommunications must be provided in a building, appropriate to—

- (a) the function and use of the building; and
- (b) the availability of the telecommunications network infrastructure.

#### Application:

FP6.1 only applies to a Class 2, 3, 5, 6 or 9c building or a Class 4 part of a building.

**PART F6****TELECOMMUNICATIONS***Deemed-to-Satisfy Provisions***F6.0 Deemed-to-Satisfy Provisions**

*Performance Requirement FP6.1* is satisfied by complying with **F6.1**.

**F6.1 Telecommunication pathways and spaces**

- (a) In a Class 2, 3, 5, 6 or 9c building, space for a *telecommunications pathway* must be provided with—
- (i) a telecommunications entry point; and
  - (ii) a telecommunications equipment room; and
  - (iii) telecommunication floor distributors or the like; and
  - (iv) vertical risers connecting telecommunication equipment rooms and floor distributors; and
  - (v) a telecommunications internal lead-in conduit where the building—
    - (A) is a Class 2 or 3 building; or
    - (B) contains a Class 4 part,
- in accordance with **Specification F6.1**.
- (b) The requirements of (a)(iii) and (a)(iv) need not apply to a building with a *rise in storeys* of not more than one.

# SPECIFICATION **F6.1** PATHWAYS AND SPACES FOR TELECOMMUNICATIONS

## *Deemed-to-Satisfy Provisions*

### **1. Scope**

This Specification describes the necessary elements for common *telecommunications pathways* in a building. **Clauses 2, 3 and 5** relate to the pathway requirements and **Clauses 4 and 7** relate to telecommunications spaces.

### **2. Extent of telecommunications pathways**

A *telecommunications pathway* must be provided to the *point of connection* with their number and dimension in accordance with—

- (a) **Table 1** for a Class 2, 3, 5, 6 or 9c building; and  
for a building with a *rise in storeys* of two or more.

### **3. Telecommunications entry point**

A telecommunications entry point in a *telecommunications pathway* must—

- (a) be separated by a distance of not less than 20 m where more than one telecommunications entry points are *required*; and  
(b) use a conduit or the like, as specified in Table 1; and  
(c) connect directly to a telecommunications equipment room.

### **4. Telecommunications equipment rooms**

A telecommunications equipment room must—

- (a) connect directly to the *required* vertical risers

### **5. Vertical risers**

Where a duct, tray, conduit, or the like is used to carry telecommunications network infrastructure it must—

- (a) limit cumulative changes in direction to not more than 180 degrees between access points; and  
(b) have a minimum bend radius of not less than six times the internal conduit diameter where conduit is used; and  
(c) be accessible from each *storey* via a space in accordance with **Clause 6**.

## Deemed-to-Satisfy Provisions

**6. Telecommunications spaces – Floor distributors and riser cupboards**

- (a) A floor distributor must have an area as specified in Table 1, and only serve—
- (i) a storey—
- (A) Containing a telecommunications riser cupboard that should have a door of not less than 750mm wide X 1980 mm high.
- (b) The floor distributor space in (a) may be combined in a building equipment room in a—
- (i) Class 2, 3 or 9c building containing not more than 20 sole-occupancy units; or
- (ii) Class 5 or 6 building with a floor area of less than 2 000 m<sup>2</sup>.

**7. Telecommunications internal lead-in conduit**

In a Class 2 or 3 or 4 building, the *fixed line footprint*, one white conduit, with an internal diameter of not less than 23 mm must—

- (a) connect a floor distributor, combined floor distributor and equipment room or telecommunications riser with—
- (i) a device serving as the network boundary within the sole-occupancy unit, tenancy, or
- (ii) a point on the wall with clear space for termination equipment equivalent to 325 mm wide x 565 mm high x 100 mm deep; and
- (b) comply with the provisions in Table 1.

**Table 1 TELECOMMUNICATIONS PATHWAYS AND SPACES FOR CLASS 2, 3, 5, 6 or 9c BUILDINGS**

| Telecommunications Pathways and Spaces for Class 2, 3, 5, 6 or 9c Buildings   |   |  |  |  |  |   |  |  |  |
|---|---|--|--|--|--|---|--|--|--|
| Number of Sole-Occupancy Units in a building  | Minimum Number of Building Entry Points | Minimum Size of Building Entry Point (nominal industry standard)<br>Note 2 | Minimum total wall spatial area of main equipment room (m <sup>2</sup> ) | Minimum total wall spatial area of main equipment cupboard (m <sup>2</sup> )<br>Note 4 | Minimum total wall area of vertical riser cupboard per storey (width x height) | Minimum number of vertical riser shafts | Dedicated pathway by level: - Riser cupboard to apartment / tenancy in P20 conduit | Dedicated combined pathway by level: - Riser cupboard to apartment / tenancy in conduit and cable tray                 | Shared pathway by level: - Riser cupboard to apartment / tenancy               |
| less than 5   | 1                                       | P50  | 2  | 2  | 400 x 1800   | 1                                       | P20 <sup>Note 6</sup>  | P50 rigid white conduit (truncation) or Cable tray with 100mm min space required and Rigid P20 white conduit<br>Note 7 | Cable tray with 100mm min required space and Rigid P20 white conduit<br>Note 7 |
| 5 to less than 60   | 1                                       | P50  | 2  | 2  | 400 x 1800   | 1                                       |  |  |  |
| 60 to less than 100   | 1                                       | P100   | 5  |  | 400 x 1800   | 1                                       |  |  |  |
| 100 to less than 250  | 1                                       | P100   | 6  |  | 750 x 2000   | 1                                       |  |  |  |
| 250 to less than 500  | 1                                       | P100   | 8  |  | 750 x 2000   | 1                                       |  |  |  |
| 500 to less than 1000   | 1 <sup>Note 1</sup>                     | P100   | 11 <sup>Note 3</sup>   |  | 750 x 2000   | 2 <sup>Note 5</sup>                     |  |  |  |
| 1000 or more  | 1 <sup>Note 1</sup>                     | P100   | 11 <sup>Note 3</sup>   |  | 750 x 2000   | 2 <sup>Note 5</sup>                     |  |  |  |
| <b>Note<sup>1</sup></b> : - It is preferred a second building entry point be provided to allow for telecommunications diversity.  |   |  |  |  |  |   |  |  |  |
| <b>Note<sup>2</sup></b> : - P100 has an OD of 113.9mm with a wall thickness of 4.5mm: P50 has an OD of 60.3mm with a wall thickness of 3.65mm: P20 has an OD of 26.7mm with a wall thickness of 1.7mm.  |   |  |  |  |  |   |  |  |  |
| <b>Note<sup>3</sup></b> : - Based on the occupancy the additional equipment to support in excess of 1000 users would require a min 1500(m <sup>2</sup> ) of space for each group of 200 users.  |   |  |  |  |  |   |  |  |  |
| <b>Note<sup>4</sup></b> : - A main equipment cupboard is utilised where a main equipment room is not available this is only for developments up to a total of up to 60 occupancy units.   |   |  |  |  |  |   |  |  |  |
| <b>Note<sup>5</sup></b> The height and volume of units within the structure would determine the amount of riser shafts being installed.   |   |  |  |  |  |   |  |  |  |
| <b>Note<sup>6</sup></b> : - The dedicated pathway is installed from the riser cupboard located in the common area on each level to the apartment / tenancy, in a rigid white nominal P20 conduit with no more than 3 pre-formed bends.  |   |  |  |  |  |   |  |  |  |
| <b>Note<sup>7</sup></b> : - Access panels are required where the rigid P20 white conduit from the apartment / tenancy meets the truncation conduit or Cable tray. In the instance of cable tray only from the riser cupboard to apartment / tenancy access panels will be installed every 15m or at any change of direction; this is to assist in cable installation and maintenance. |   |  |  |  |  |   |  |  |  |

**Table 13.0 History of adoption of BCA 2015**

| <b>Administration</b>        | <b>Adoption Date</b> |
|------------------------------|----------------------|
| Australian Government        | 1 May 2015           |
| Australian Capital Territory | 1 May 2015           |
| New South Wales              | 1 May 2015           |
| Northern Territory           | 1 May 2015           |
| Queensland                   | 1 May 2015           |
| South Australia              | 1 May 2015           |
| Tasmania                     | 1 May 2015           |
| Victoria                     | 1 May 2015           |
| Western Australia            | 1 May 2015           |

- (b) The purpose of BCA 2015 is to—
- (i) update references to other documents; and
  - (ii) include a Verification Method for structural reliability; and
  - (iii) improve the usability of the barrier provisions; and
  - (iv) expand the requirements for sprinkler protection to aged care buildings; and
  - (v) include a Verification Method for weatherproofing of external walls; and
  - (vi) improve the usability of energy efficiency provisions for air-conditioning and ventilation systems.

## **14.0 Adoption of BCA 2016**

- (a) The 2016 edition of the BCA was adopted by the Commonwealth, States and Territories as set out in **Table 14.0**.

**Table 14.0 History of adoption of BCA 2016**

| <b>Administration</b>               | <b>Adoption Date</b> |
|-------------------------------------|----------------------|
| <u>Australian Government</u>        | <u>1 May 2016</u>    |
| <u>Australian Capital Territory</u> | <u>1 May 2016</u>    |
| <u>New South Wales</u>              | <u>1 May 2016</u>    |
| <u>Northern Territory</u>           | <u>1 May 2016</u>    |
| <u>Queensland</u>                   | <u>1 May 2016</u>    |
| <u>South Australia</u>              | <u>1 May 2016</u>    |
| <u>Tasmania</u>                     | <u>1 May 2016</u>    |
| <u>Victoria</u>                     | <u>1 May 2016</u>    |
| <u>Western Australia</u>            | <u>1 May 2016</u>    |

- (b) The purpose of BCA 2017 is to—
- (i) update references to other documents; and
  - (i) amend the "Introduction" and "General Requirements" as part of the initiative to increase the use of Performance Solutions; and
  - (ii) include new Verification Methods for structural robustness, a building's resistance to bushfires, indoor air quality and energy efficiency; and
  - (iii) include provisions for fire-protected timber; and

- (v) include requirements for telecommunications; and
- (vi) include requirements for farm-type buildings; and
- (vii) include minor technical changes.

|



## LIST OF AMENDMENTS - NCC 2016 - VOLUME ONE

This set of notes has been prepared by the Australian Building Codes Board to assist NCC users in identifying changes incorporated in the 2016 edition of Volume One.

The notes provide a description of major changes made from the previous edition of Volume One. If additional information is required to assist in understanding, interpreting or applying the provisions of the 2016 edition of Volume One, reference should be made to the Guide to Volume One.

While the Australian Building Codes Board has attempted to include all major changes made from the previous edition of Volume One, the Board does not give any warranty nor accept any liability in relation to the contents of this list of amendments.

### List of Amendments

| Reference            | Changes and Commentary   |
|----------------------|--|
| <b>General notes</b> |  |
|                      | The Objectives and Functional Statements have been relocated to guidance material.   |
|                      | The provisions titled "Deemed-to-Satisfy Provisions" at the start of each Part have been restructured and the term 'Building Solution' and reference to A0.10 deleted as they are no longer used within the NCC.   |
|                      | Cross-volume consideration explanatory information has been inserted throughout to advise of relevant NCC Volume Three provisions.   |
|                      | A number of provisions have been amended for cross-volume consistency as a consequence of a review to assist in the usability of Volume Two.   |
| <b>Introduction</b>  |  |
|                      | The Introduction provisions have been amended as part of the initiative to increase the use of Performance Solutions. The changes emphasise that the NCC is a performance-based code.  |
| <b>Section A</b>     |  |
|                      | Provisions in Part A0 have been amended, restructured and relocated as part of the initiative to increase the use of Performance Solutions.  |
| A0.1                 | A new provision has been inserted for 'Compliance with the NCC'. The existing provision 'Adoption' has been relocated to 'Introduction'.   |
| A0.2                 | A new provision has been inserted for 'Meeting the Performance Requirements'. The existing provision 'BCA Volumes' has been relocated to 'Introduction'. Figure A0.2 has been inserted to replace Figure A0.3.   |
| A0.3                 | A new provision has been inserted for 'Prescriptive Solutions'. The existing provision 'BCA Structure' has been amended and relocated to A0.2.   |
| A0.4                 | A new provision has been inserted for 'Performance Solutions'. The existing provision 'Compliance with the BCA' has been amended and relocated to A0.1.  |
| A0.5                 | The existing provision 'Assessment Methods' has been relocated to A0.5. The existing provision 'Meeting the Performance Requirements' is now covered by A0.2.  |
| A0.6                 | The existing provision 'Defined terms' has been relocated from the 'Introduction' to A0.6. The existing provision 'Objectives and Functional Statements' has been deleted as a consequence of relocating the Objectives and Functional Statements into explanatory material. |
| A0.7                 | This provision has been deleted as a consequence of the inclusion of 'Prescriptive Solutions' in A0.3.   |
| A0.8                 | This provision has been deleted as a consequence of the inclusion of 'Performance Solutions' in A0.4.  |



| <b>Reference</b>          | <b>Changes and Commentary</b>   |
|---------------------------|---|
| A0.9                      | This provision has been deleted as a consequence of the relocation of 'Assessment Methods' to A0.5.   |
| A0.10                     | This provision has been deleted.  |
| A1.1                      | The following definitions have been inserted, amended or deleted:   |
| Alternative Solution      | The defined term has been amended to include reference to a 'Performance Solution'.   |
| Assessment Methods        | The defined term has been amended to include the new defined terms 'Performance Solution' and 'Prescriptive Solution' as a consequence of amendments to Part A0 and the deletion of the defined term 'Building Solution'. |
| Building Solution         | The defined term has been deleted as it is no longer used in the NCC.   |
| Boiler                    | A new defined term has been inserted as a consequence of including G2.5.  |
| Cavity barrier            | A new defined term has been inserted as a consequence of including provisions for fire-protected timber.  |
| Effective height          | The defined term has been amended to clarify the lowest storey selected for determination.  |
| Equivalent                | The defined term has been deleted as it is no longer used in the NCC.   |
| Expert Judgement          | The defined term has been amended to include the new defined terms 'Performance Solution' and 'Prescriptive Solution'.  |
| Farming                   | A new defined term has been inserted as a consequence of including provisions for farm buildings and farm sheds.  |
| Farm building             | A new defined term has been inserted as a consequence of including provisions for farm buildings.   |
| Farm shed                 | A new defined term has been inserted as a consequence of including provisions for farm sheds.   |
| Farm vehicle              | A new defined term has been inserted as a consequence of including provisions for farm buildings and farm sheds.  |
| Fire compartment          | The terms 'Objective' and 'Functional Statement' have been removed as these defined terms are no longer used in the NCC.  |
| Fire-protected timber     | A new defined term has been inserted as a consequence of including provisions for fire-protected timber.  |
| Fixed line footprint      | A new defined term has been inserted as a consequence of including a new Part for telecommunications.   |
| Functional Statement      | The defined term has been deleted, as it is no longer used in the NCC.  |
| Non-illuminated exit sign | A new defined term has been inserted as a consequence of including provisions for farm buildings.   |
| Objective                 | The defined term has been deleted, as it is no longer used in the NCC.  |
| Point of connection       | A new defined term has been inserted as a consequence of including a new Part for telecommunications.   |
| Performance Requirement   | The defined term has been amended to include the new defined terms 'Performance Solution' and 'Prescriptive Solution'.  |

| Reference                   | Changes and Commentary   |
|-----------------------------|--|
|                             | <p>Performance Solution A new defined term 'Performance Solution' has been inserted.</p> <p>Pressure vessel A new defined term has been inserted as a consequence of including G2.5.</p> <p>Prescriptive Solution A new defined term 'Prescriptive Solution' has been inserted.</p> <p>Telecommunications pathway A new defined term has been inserted as a consequence of including a new Part for telecommunications.</p> <p>Verification Method The defined term has been amended to include the new defined term 'Performance Solution'.</p>   |
| A1.4 and A1.7               | Reference to 'BCA' replaced with 'NCC' as a consequence of the consolidation of the Introduction and General Provisions of the NCC to provide consistency across Volumes One, Two and Three.   |
| A1.5 and A1.6               | Amended to clarify that the NCC is a performance-based code.   |
| A1.8                        | A new provision has been inserted for explanatory information, as a consequence of the insertion of cross-volume consideration explanatory information included throughout the code to advise of relevant NCC Volume Three provisions.   |
| A2.4                        | Sub-clause (b) has been amended and a new sub-clause (c) has been inserted as a consequence of the deletion of provisions for the determination of group numbers for wall and ceiling linings from Specification C1.10, deletion of provisions for the determination of a material's smoke growth rate index (SMOGR <sub>RC</sub> ) from Specification A2.4, and the adoption of AS 5637.1.  |
| Specification A1.1          | A new Specification has been inserted as a consequence of new provisions for fire-protected timber.  |
| Specification A1.3 Table 1  | <p>The following references have been inserted, amended or deleted:</p> <p>AS/NZS 1200 AS/NZS 1200 'Pressure equipment' has been deleted.</p> <p>AS/NZS 1428.4.1 Amdt 2 of the 2014 edition of AS/NZS 1428 Part 4.1 'Design for access and mobility — Means to assist the orientation of people with vision impairment — Tactile ground surface indicators' has been referenced.</p> <p>AS 1530.4 The 2014 edition of AS 1530 Part 4 'Methods for fire tests on building materials, components and structures — Fire-resistance tests for elements of construction' has been referenced.</p> <p>AS 1720.4 The 2006 edition of AS 1720 Part 4 'Timber structures — Fire resistance for structural adequacy of timber members' has been referenced.</p> <p>AS 1720.5 The 2015 edition of AS 1720 Part 5 'Timber structures — Nailplated timber roof trusses' has been referenced.</p> <p>AS 2293.3 The 2005 edition of AS 2293 Part 3 'Emergency escape lighting and exit signs for buildings — Emergency escape luminaires and exit signs' has been referenced.</p> <p>AS 5146.1 The 2015 edition of AS 5146 Part 1 'Reinforced autoclaved aerated concrete — Structure' has been referenced.</p> <p>AS 5637.1 The 2015 edition of AS 5637 Part 1 'Determination of fire hazard properties — Wall and ceiling linings' has been referenced.</p> <p>AS ISO 9705 AS ISO 9705 'Fire test — Full-scale room tests for surface products' has been deleted.</p> |
| Specification A2.3 Clause 2 | Sub-clause (d)(iii) has been amended to reflect the scope of timber elements to which AS 1720.4 applies, and to exclude fire-protected timber from the sub-clause.   |

| <b>Reference</b>                  | <b>Changes and Commentary</b>  |
|-----------------------------------|--|
| Specification A2.4 Clause 1       | Sub-clause (b) has been removed and the clause restructured as a result of the reduction of scope of the specification.  |
| Specification A2.4 Clause 3 and 4 | Clauses 3 and 4 of Specification A2.4 have been deleted as a consequence of referencing AS 5637.1, which is used for the determination of group numbers for wall and ceiling linings.  |
| <b>Section B</b>                  |  |
| 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.   |
| B1.4(f)(iv)                       | A reference to AS 1720.5 has been added for the design of nailplated timber roof trusses in residential and similar buildings.   |
| B1.4(b)                           | AS 5146.1 'Reinforced autoclaved aerated concrete — Structure' has been included as a referenced document for concrete construction to determine the structural resistance of materials and forms of construction.                 |
| <b>Section C</b>                  |  |
| C1.13                             | A new provision has been included to allow fire-protected timber to be used wherever an element is required to be non-combustible, subject to sub-clauses (a) to (e).  |
| C3.1(a)(iv) and C3.1(a)(iv)(B)    | C3.1(a)(iv) has been amended and a new subclause C3.1(a)(iv)(B) inserted to clarify the requirements for sprinkler protection of carparks.   |
| Specification C1.1 Clause 2.9     | The clause has been amended to exclude fire protected timber elements from the residential aged care building concession.  |
| Specification C1.1 Clause 3.1(d)  | The sub-clause has been amended to include the option for loadbearing internal walls or loadbearing fire walls to be constructed from fire-protected timber for Type A construction.   |
| Specification C1.1 Clause 4.1(e)  | The sub-clause has been amended to include the option for loadbearing internal walls or loadbearing fire walls to be constructed from fire-protected timber for Type B construction.   |
| Specification C1.10 Clause 4      | The clause has been amended and restructured as a consequence of provisions for the determination of group numbers for wall and ceiling linings being removed from the NCC and AS 5637.1 being referenced.                         |
| Specification C1.10 Clause 6      | The clause has been amended as a consequence of provisions for the determination of group numbers for wall and ceiling linings being removed from the NCC and AS 5637.1 being referenced.  |
| Specification C1.13               | A new Specification has been inserted for fire-protected timber.   |
| <b>Section D</b>                  |  |
| D1.6(i)                           | A sub-clause has been included to clarify that the number of persons accommodated must be calculated in accordance with D1.13.   |
| D1.10                             | A sub-clause has been included to clarify that the number of persons accommodated must be calculated in accordance with D1.13.   |
| 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. |
| D2.21(b)(iii)                     | D2.21(b)(iii) has been amended and restructured to exempt Australian Government Security Zones 4 and 5 from the requirements of D2.21(a).  |

| <b>Reference</b>   | <b>Changes and Commentary</b>   |
|--|---|
| D2.25  | A new provision has been inserted as a concession to D2.2 for timber stairways. The concession permits the use of timber within a fire-isolated stairway or fire-isolated passageway subject to certain conditions.   |
| <b>Section E</b>   |   |
| Table E2.2a - Buildings more than 25 m in effective height | Note 2 below 'Class 5, 6, 7b, 8 or 9b buildings' has been amended to clarify when this provision does not apply.  |
| Specification E2.2a Clause 4(d)                            | Clause 4(d) has been amended and restructured to provide a concession to the smoke detector requirements in sprinklered areas in Class 9a health-care buildings where the use of the area is likely to result in spurious signals.  |
| Figure 2 Specification E2.2b                               | For consistency with the amendment to the title of Part H1, reference to 'theatres, stages, and public halls' has been replaced with 'Class 9b buildings'.  |
| Part E4  | As a consequence of amendments to Performance Requirement EP4.1 the Part title has been amended to 'Visibility in an emergency, exit signs and warning systems'.  |
| EP4.1  | <ul style="list-style-type: none"> <li>• A new sub-clause (a) has been included to require sufficient visibility of paths of travel to an exit in lieu of a level of illumination.</li> <li>• A new sub-clause (b) has been included to require a system used to provide a sufficient visibility in (a) to activate instantaneously upon the failure of an artificial lighting system.</li> <li>• Consequently, the existing sub-clauses have been renumbered.</li> </ul> |
| <b>Section F</b>   |   |
| F1.0   | The provision has been restructured as a consequence of the inclusion of a Deemed-to-Satisfy Provision for weatherproofing of an external wall under F1.13.   |
| F1.9(b)(ii)  | 'Termite shields' has been replaced with 'sheet material' to reflect updated terminology.   |
| F1.12  | Provisions amended for consistency with changes to Volume Two of the NCC to improve the usability of the Code.  |
| F1.13(c)   | AS 5146.1 'Reinforced autoclaved aerated concrete — Structure' has been included as a Deemed-to-Satisfy Provision for the weatherproofing Performance Requirement FP1.4. As a consequence, the provision heading has been renamed 'External walls and associated openings' and existing the provisions have been renumbered.  |
| Table F2.1   | <ul style="list-style-type: none"> <li>• A Note has been added to clarify that a reference to 'employees' includes owners, managers, workers and contractors.</li> <li>• Requirements for a washbasin have been relocated to a separate sub-clause to clarify that a washbasin does not need to be associated with a closet pan in a Class 2, 3 building and a Class 4 part of a building.</li> </ul>   |
| 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 in Class 6 and 9b buildings where the total number of persons accommodated in the building is not more than the given number.  |
| F3.1(d)(iv)  | A sub-clause has been included to clarify that the number of persons accommodated must be calculated in accordance with D1.13.  |

| <b>Reference</b>  | <b>Changes and Commentary</b>   |
|---|---|
| FV4.1   | A new Verification Method has been inserted as an option to verify compliance with Performance Requirements FP4.3 and FP4.4(a). FV4.1 is a means for verifying that a building ventilated with outdoor air has suitable indoor air quality. The new Verification Method is applicable to Class 2, 3, 4, 5, 6, 9b and 9c buildings.  |
| FV4.2   | A new Verification Method has been inserted as an option to verify compliance with Performance Requirements FP4.3 and FP4.4(a). FV4.2 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.   |
| F4.3(a)(ii)   | F4.3(a)(ii) has been amended to clarify that the aggregate light transmitting area of a glazed panel or opening cannot be less than 10% of the floor area of the room to which it provides light.   |
| F4.6(a)(i)  | F4.6(a)(i) has been amended to clarify that the ventilating area must be not less than 5% of the floor area of the room required to be ventilated.  |
| FV5.1(b),<br>F5.3(a)(i),<br>F5.4(a) and<br>Specification<br>F5.2 Clause 2 | The spectral adaptation term ( $C_1$ correction) for impact sound insulation rating descriptors $L_{nT,w}$ and $L_{n,w}$ has been deleted to align with international building codes.   |
| Part F6   | A new part has been included to require provision for telecommunication pathways in Class 2, 3, 5, 6 and 9c buildings.  |
| Specification<br>F6   | A new Specification has been included for infrastructure within a telecommunications pathway required by F6.1 which includes provisions for: <ul style="list-style-type: none"> <li>• Telecommunication entry points.</li> <li>• Telecommunication equipment rooms.</li> <li>• Telecommunication floor distributors.</li> <li>• Vertical risers to connect telecommunication equipment rooms and floor distributors.</li> <li>• Telecommunication lead-in conduit.</li> </ul> |
| <b>Section G</b>  |   |
| Part G2   | Part G2 has been re-named as a consequence of the inclusion of new provisions for boilers and pressure vessels.   |
| GP2.2   | The Performance Requirement has been amended to include new defined terms for 'boilers' and 'pressure vessels'.   |
| G2.5 and<br>Specification<br>G2.5   | New provisions for boilers and pressure vessels have been inserted as a result of deleting reference to AS/NZS 1200.  |
| G4.8  | G4.8 has been amended and restructured to clarify the requirements for fire hydrants and fire hose reels.   |
| GV5.1   | A new Verification Method has been inserted as an option to verify compliance with Performance Requirement GP5.1. GV5.1 is a means for verifying that a building has an adequate level of resistance to bushfires.  |
| <b>Section H</b>  |   |
| Part H1   | Part H1 has been re-named 'Class 9b Buildings' to more accurately reflect its content.  |
| Part H3   | A new Part has been inserted containing provisions for farm buildings and farm sheds.   |
| <b>Section J</b>  |   |
| JV2   | A new Verification Method has been inserted as an option to verify compliance with Performance Requirement JP1. JV2 is a means for verifying that a building has suitable energy efficiency measures using a stated value approach.   |

| <b>Reference</b>                 | <b>Changes and Commentary</b>  |
|----------------------------------|--|
| JV3(a)                           | A reference to Class 2 buildings has been included in JV3(a).  |
| JV3(d)(i)(A)                     | An exemption to sub-clause (A) has been included for Class 2 buildings, as requirements for a Class 2 reference building is included in the new Table JV3.                                 |
| JV3(d)(i)(G)                     | A new sub-clause (G) has been included, referring to Table JV3 for requirements for a Class 2 reference building.  |
| JV3(g)(ii)(C)                    | A reference to J1.6(e) has been added to JV3(g)(ii)(C) as a design requirement for floor edge insulation.  |
| Table JV3                        | A new table has been inserted to provide minimum criteria requirements for a Class 2 reference building.   |
| Specification JV Clause 2(a)(ii) | A reference to Class 2 buildings has been included in Clause 2(a)(ii).   |
| Specification JV Table 2a        | Class 2 buildings have been included in the table for occupancy and operation profiles for Class 3 or 9c buildings.  |
| Specification JV Table 2i        | Class 2 buildings have been included in the 'residential part of a hotel or motel' row for heated water supply and consumption rates.  |
| Specification JV2                | A new specification has been inserted to provide requirements for air-conditioning modelling when using the new Verification Method JV2.   |
| J0.2(d)                          | Compensation for the loss of ceiling insulation has been removed from the provision as it is covered by the house energy rating software.  |
| <b>Abbreviations and Symbols</b> |  |
| IWEC2                            | International Weather for Energy Calculations, (IWEC2 Weather Files), Version 2 included as an abbreviation  |
| ppm                              | Parts per million (ppm) included as an abbreviation.   |
| <b>History of BCA Adoption</b>   |  |
| 14.0                             | New provision added in order to set out the adoption date of the 2016 edition of Volume One in each State and Territory and to summarise the purpose of the changes from the 2015 edition. |



## **Attachment 2**

### **Proposed changes to Volume Two of the National Construction Code 2019**

Communications Alliance proposes changes to the National Construction Code to incorporate requirements for telecommunications pathways and spaces for Class 1 buildings.

These changes have been presented to the ABCB as a part of the NCC 2016 Draft for Public Comment, which was released on 3 June 2015.

All the pages that contained telecommunications-related changes in the NCC 2016 Draft were extracted and reproduced on the following pages.



**Fabric**, for the purposes of **Part 2.6** and **Part 3.12**, means the basic building structural elements and components of a building including the roof, ceilings, walls and floors.

**Fire-protective covering** means—

- (a) 13 mm fire-protective grade plasterboard; or
- (b) 12 mm cellulose cement flat sheeting complying with AS/NZS 2908.2 or ISO 8336; or
- (c) 12 mm fibrous plaster reinforced with 13 mm x 13 mm x 0.7 mm galvanised steel wire mesh located not more than 6 mm from the exposed face; or
- (d) other material not less fire-protective than 13 mm fire-protective grade plasterboard, fixed in accordance with the normal trade practice for a *fire-protective covering*.

**Fire-resistance level (FRL)** means the grading periods in minutes determined in accordance with **Specification A2.3** of BCA Volume One, for—

- (a) *structural adequacy*; and
- (b) *integrity*; and
- (c) *insulation*,

and expressed in that order.

**Explanatory information:**

A dash means there is no requirement for that criterion. For example, 90/–/– means there is no FRL for integrity and insulation.

**Fire-resisting**, applied to a *structural member* or other part of a building, means having the FRL *required* for that *structural member* or other part.

**Finished ground level** means the ground level adjacent to footing systems at the completion of construction and landscaping.

**Fixed line footprint** means the geographic area defined by the *appropriate authority as being served by fixed telecommunications network infrastructure*.

**Flammability Index** means the index number determined under AS 1530.2.

**Flashing** means a strip or sleeve of impervious material dressed, fitted or built-in to provide a barrier to moisture movement, or to divert the travel of moisture, or to cover a joint where water would otherwise penetrate to the interior of a building.

**Flood hazard area** means the *site* (whether or not mapped) encompassing land lower than the *flood hazard level* which has been determined by the *appropriate authority*.

**STATE AND TERRITORY VARIATIONS**

**In Victoria the definition of flood hazard area is replaced as follows:**

**Flood hazard area** means the *site* (whether or not mapped) encompassing land in an area liable to flooding within the meaning of Regulation 802 of the Building Regulations 2006.

**Flood hazard level (FHL)** means the flood level used to determine the height of floors in a building and represents the *defined flood level* plus the *freeboard* (see **Figure 1.1.5**).

**Flight** means that part of a stair that has a continuous series of *risers*, including *risers of winders*, not interrupted by a *landing* or floor (see **Figure 1.1.7**).

**Explanatory information:**

A *flight* is the area of a stair that has a continuous slope created by the nosing line of treads. The length of a *flight* is limited to restrict the distance a person could fall down a stair. Quarter *landings*, as shown in **Figure 1.1.7**, are considered sufficient to halt a person's fall and therefore are considered for the purposes of this document not to be part of the *flight*.



**Piping** means an assembly of pipes, with or without valves or other fittings, connected together for the conveyance of liquids.

**Point of entry** for telecommunications—

- (a) in the *fixed line footprint*, means the point where the telecommunications network provider's starter pipe from a pit servicing the allotment passes the property boundary; or
- (b) in other cases, means an *external wall* of the Class 1 or attached 10a building.

**Prescriptive Solution** means a method of satisfying the *Deemed-to-Satisfy Provisions*, deemed to comply with the *Performance Requirements*.

**Pressure vessel** means a vessel subject to internal or external pressure. It includes interconnected parts and components, valves, gauges and other fittings up to the first point of connection to connecting piping, and—

- (a) includes fire heaters and gas cylinders; but—
- (b) excludes any vessel that falls within the definition of a *boiler*.

**Primary building element**, for the purposes of **Part 3.1.3**, means a member of a building designed specifically to take part of the building loads and includes roof, ceiling, floor, stairway or ramp and wall framing members including bracing members designed for the specific purpose of acting as a brace to those members.

**Explanatory information:**

The loads to which a building may be subjected are dead, live, wind, snow and earthquake loads. Further information on building loads can be found in the 1170 series of Standards.

## STATE AND TERRITORY VARIATIONS

**In Queensland delete definition of primary building element and replace with the following:**

**Primary building element**, for the purposes of **Part 3.1.3**, means—

- (a) a member of a building designed specially to take part of the building loads and includes roof, ceiling, floor, stairway or ramp and wall framing members including bracing members designed for the specific purpose of acting as a brace to those members; and
- (b) door jambs, window frames and reveals, architraves and skirtings.

**Private bushfire shelter** means a structure associated with, but not attached to, or part of a Class 1a dwelling that may, as a last resort, provide shelter for occupants from immediate life threatening effects of a bushfire.

**Private garage** means—

- (a) any garage associated with a Class 1 building; or
- (b) any separate single storey garage associated with another building where such garage contains not more than 3 vehicle spaces.

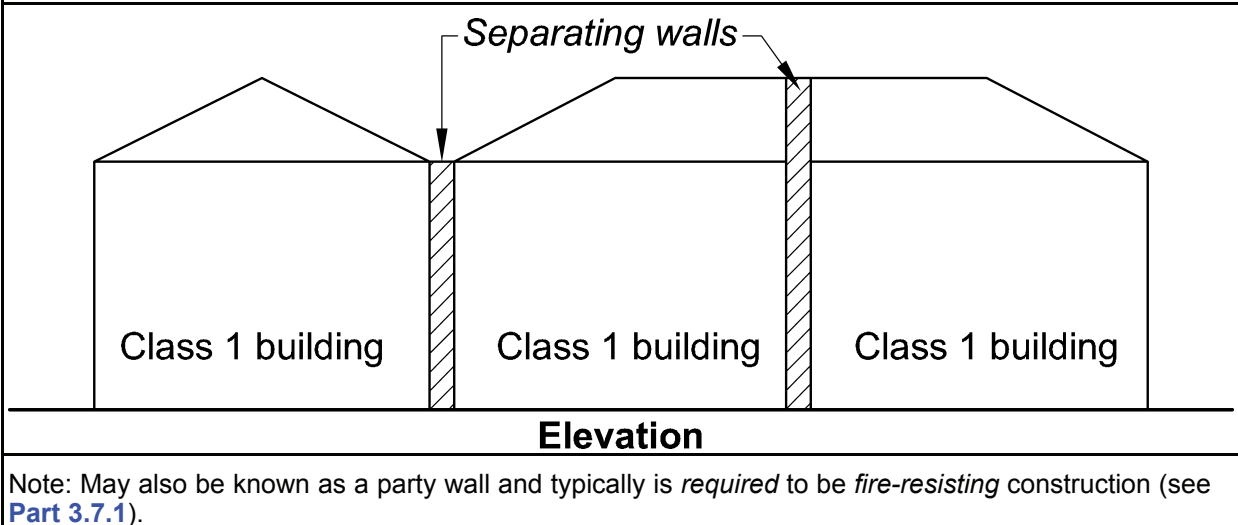
**Professional engineer** means a person who is—

- (a) if legislation is applicable — a registered *professional engineer* in the relevant discipline who has appropriate experience and competence in the relevant field; or
- (b) if legislation is not applicable—
  - (i) a Corporate Member of the Institution of Engineers, Australia; or
  - (ii) eligible to become a Corporate Member of the Institution of Engineers, Australia, and has appropriate experience and competence in the relevant field.

**R-Value (m<sup>2</sup>.K/W)** means the thermal resistance of a component calculated by dividing its thickness by its thermal conductivity.

**Separating wall** means a wall that is common to adjoining Class 1 buildings (see [Figure 1.1.3](#)).

Figure 1.1.3

**SEPARATING WALL**

**Shower area** means the area affected by water from a shower, including a shower over a bath.

**Single leaf masonry** means outer walls constructed with a single thickness of masonry unit.

**Site** means the part of the allotment of land on which a building stands or is to be erected.

**Sitework** means work on or around a *site*, including earthworks, preparatory to or associated with the construction, *alteration*, demolition or removal of a building.

**Smoke-Developed Index** means the index number for smoke developed under AS/NZS 1530.3.

**Spiral stairway** means a stairway with a circular plan, winding around a central post with steps that radiate from a common centre or several radii (see [Figure 3.9.1.4](#)).

**Spread-of-Flame Index** means the index number for spread of flame under AS/NZS 1530.3.

**Standard Fire Test** means the Fire-resistance Test of Elements of Building Construction as described in AS 1530.4.

**Structural adequacy**, in relation to an FRL, means the ability to maintain stability and adequate *loadbearing* capacity under AS 1530.4.

**Structural member** means a component or part of an assembly which provides vertical or lateral support to a building or structure.

**Surface water** means all naturally occurring water, other than sub-surface water, which results from rainfall on or around the *site* or water flowing onto the *site*.

**Swimming pool** means any excavation or structure containing water and principally used, or designed, manufactured or adapted to be principally used for swimming, wading, paddling, or the like, including a bathing or wading pool, or spa.

**Tapered tread** means a stair tread with a walking area that grows smaller towards one end.

**Telecommunications pathway** means the pathway between the customer interface such as a network termination device, telephone point or similar, to the *point of entry*.

**Total energy load** means the sum of the *heating load* and *cooling load* divided by the conditioned *floor area* ( $\text{MJ}/\text{m}^2$  conditioned *floor area. annum*).

**Total R-Value** means the sum of the *R-Values* of the individual component layers in a composite element including any building material, insulation material, airspace and associated surface resistances.

**Total System Solar Heat Gain Coefficient (SHGC)** means the fraction of incident irradiance on *glazing* or a *roof light* that adds heat to a building's space.

| No.  | Date                 | Title  | BCA Clause(s)   |
|--|----------------------|--|---|
| <b>AS 1288</b>                               | 2006                 | Glass in buildings—Selection and Installation<br>Amdt 1<br>Amdt 2  | <b>3.6.0, 3.6.1, 3.6.3, 3.9.2.3, 3.10.1.0, 3.11.6</b> |
| <b>AS 1289</b><br>Method 6.3.3               | 1997                 | Methods of testing soils for engineering purposes<br>Determination of the penetration resistance of a soil — Perth sand penetrometer test<br>Amdt 1  | <b>3.2.2.2</b>  |
| <b>AS 1397</b>                               | 2011                 | Continuous hot dip metallic coated sheet steel and strip - coatings of zinc and zinc alloyed with aluminium and magnesium<br>Amdt 1  | <b>3.4.2.2, 3.5.1.3</b>                               |
| <b>AS 1477</b>                               | <u>2006</u>          | <u>PVC pipes and fittings for pressure applications</u>  | <b>3.8.3.5</b>  |
| <b>AS 1530</b><br>Part 1<br>Part 2<br>Part 4 | 1994<br>1993<br>2005 | Methods for fire tests on building materials, components and structures<br>Combustibility test for materials<br>Test for flammability of materials<br>Amdt 1<br>Fire-resistance test of elements of construction<br><b>[Note: Subject to the note to AS 4072.1, reports relating to tests carried out under earlier editions of AS 1530 Parts 1 to 4 remain valid. Reports relating to tests carried out after the date of an amendment to a Standard must relate to the amended Standard]</b> | <b>1.1.1</b><br><b>1.1.1</b><br><b>1.1.1, 3.7.1.8</b> |
| <b>AS/NZS 1530</b><br>Part 3                 | 1999                 | Methods for fire tests on building materials, components and structures<br>Simultaneous determination of ignitability, flame propagation, heat release and smoke release   | <b>1.1.1</b>  |
| <b>AS 1562</b><br>Part 1                     | 1992                 | Design and installation of sheet roof and wall cladding<br>Metal<br>Amdt 1<br>Amdt 2<br>Amdt 3   | <b>3.5.3.0</b><br><b>3.5.1.0, 3.5.3.0</b>             |
| <b>AS/NZS 1562</b><br>Part 2<br>Part 3       | 1999<br>1996         | Design and installation of sheet roof and wall cladding<br>Corrugated fibre-reinforced cement<br>Plastics  | <b>3.5.1.0</b><br><b>3.5.1.0</b>                      |

## PART 2.4 HEALTH AND AMENITY

### Explanatory information:

#### **OBJECTIVE**

##### **O2.4.1 Wet areas**

The *Objective* is to safeguard the occupants from illness or injury and protect the building from damage caused by the accumulation of internal moisture arising from the use of wet areas in a building.

##### **O2.4.2 Room heights**

The *Objective* is to safeguard the occupants from injury or loss of amenity caused by inadequate height of a room or space.

##### **O2.4.3 Facilities**

The *Objective* is to—

- (a) safeguard occupants from illness caused by infection; and
- (b) safeguard occupants from loss of amenity arising from the absence of adequate personal hygiene facilities; and
- (c) enable occupants to carry out laundering; and
- (d) provide for facilities to enable food preparation; and
- (e) enable unconscious occupants of *sanitary compartments* to be removed from the compartment; and
- (f) safeguard occupants from loss of amenity, by ensuring a building facilitates access to telecommunications.

##### **O2.4.4 Light**

The *Objective* is to safeguard occupants from injury, illness or loss of amenity due to—

- (a) isolation from natural light; and
- (b) lack of adequate artificial lighting.

##### **O2.4.5 Ventilation**

The *Objective* is to safeguard occupants from illness or loss of amenity due to lack of air freshness.

##### **O2.4.6 Sound insulation**

The *Objective* is to safeguard occupants from illness or loss of amenity as a result of undue sound being transmitted between adjoining dwellings.

#### **FUNCTIONAL STATEMENTS**

##### **F2.4.1 Wet areas**

A building is to be constructed to avoid the likelihood of—

- (a) the creation of any unhealthy or dangerous conditions; or
- (b) damage to building elements,

caused by dampness or water overflow from bathrooms, laundries and the like.

##### **F2.4.2 Room heights**

A building is to be constructed to provide height in a room or space suitable for the intended use.

##### **F2.4.3 Facilities**

A building is to be provided with suitable—

- (a) space and facilities for personal hygiene; and

- (b) space or facilities for laundering; and
- (c) space and facilities for the preparation and cooking of food; and
- (d) space or other means to permit an unconscious occupant to be removed from a *sanitary compartment*; and
- (e) means for the sanitary disposal of waste water.
- (f) spaces and pathways to enable the deployment of telecommunication appropriate to the available public telecommunications network infrastructure.

**Application:**

F2.4.3 only applies to a Class 1 building.

**F2.4.4 Light**

- (a) A *habitable room* within a building is to be provided with openings to admit adequate natural light consistent with its function or use; and
- (b) A space within a building used by occupants is to be provided with artificial lighting consistent with its function or use which, when activated in the absence of suitable natural light, will enable safe movement.

**F2.4.5 Ventilation**

A space used by occupants within a building is to be provided with adequate ventilation consistent with its function or use.

**F2.4.6 Sound insulation**

A building element which separates dwellings is to be constructed to prevent undue sound transmission between those dwellings.

**OBJECTIVE****02.4.1 Wet areas**

The *Objective* is to safeguard the occupants from illness or injury and protect the building from damage caused by the accumulation of internal moisture arising from the use of *wet areas* in a building.

**02.4.2 Room heights**

The *Objective* is to safeguard the occupants from injury or loss of amenity caused by inadequate height of a room or space.

**02.4.3 Facilities**

The *Objective* is to—

- (a) ~~safeguard occupants from illness caused by infection; and~~
- (b) ~~safeguard occupants from loss of amenity arising from the absence of adequate personal hygiene facilities; and~~
- (c) ~~enable occupants to carry out laundering; and~~
- (d) ~~provide for facilities to enable food preparation; and~~
- (e) ~~enable unconscious occupants of *sanitary compartments* to be removed from the compartment.~~

**02.4.4 Light**

The *Objective* is to safeguard occupants from injury, illness or loss of amenity due to—

- (a) ~~isolation from natural light; and~~

~~between those dwellings:~~

## PERFORMANCE REQUIREMENTS

### P2.4.1 Wet areas

To protect the structure of the building and to maintain the amenity of the occupants, water must be prevented from penetrating—

- (a) behind fittings and linings; or
- (b) into concealed spaces,

of sanitary facilities, bathrooms, laundries and the like.

### P2.4.2 Room heights

A room or space must be of a height that does not unduly interfere with its intended function.

### P2.4.3 Facilities

- (a) Suitable sanitary facilities for personal hygiene must be provided in a convenient location within or associated with a building, appropriate to its function or use.

- (b) \* \* \* \* \*

This clause has been deliberately left blank.

- (c) Laundering facilities or space for laundering facilities and the means for sanitary disposal of waste water must be provided in a convenient location within or associated with a building, appropriate to its function or use.
- (d) A food preparation facility must be provided which includes—
  - (i) a means for food rinsing, utensil washing and the sanitary disposal of associated waste water; and
  - (ii) a means for cooking food; and
  - (iii) a space for food preparation.
- (e) A *sanitary compartment* must be constructed with sufficient space or other means to enable an unconscious occupant to be removed from the compartment.
- (f) Suitable spaces and pathways must be provided for a building, appropriate to the available public telecommunications infrastructure, to enable occupant access to telecommunications networks.

#### Application:

**P2.4.3** only applies to a Class 1 building.

#### Explanatory information:

For the purposes of **P2.4.3(c)**, waste water includes water that is soiled as a result of clothes washing, mopping floors and other domestic cleaning processes.

### P2.4.4 Light

- (a) A *habitable room* must be provided with *windows* so that natural light, when available, provides a level of *illuminance* appropriate to the function or use of that part of the building.
- (b) Artificial lighting must be installed to provide a level of *illuminance* appropriate to the function or use of the building to enable safe movement by occupants.

|  |                                    |
|--|------------------------------------|
| <u>Access for maintenance of plumbing and drainage</u>                           | <u>Parts B1, B2, B3, C1 and C2</u> |
| <u>Heated water temperature control for facilities used for personal hygiene</u> | <u>Part B2</u>                     |

### **3.8.3.4 Telecommunications pathways and spaces**

A Class 1 building must be provided with a *telecommunications pathway*, and include—

- (a) a point on an internal wall within the Class 1 or Class 10 building with clear space for termination equipment of 565 mm wide x 325 mm high x 100 mm deep; and
- (b) a point on the face of the *external wall* of the Class 1 or attached Class 10a building between 300 mm and 1500 mm from the finished ground level and clear of any obstruction such as an internal corner of a building, balcony, window or another building service within a 450 mm radius; and
- (c) a conduit to connect (a) and (b); and
- (d) where the building is located within the *fixed line footprint*, a pathway from the *point of entry* to the point on the face of the *external wall* must be not less than 100 mm and not more than 140 mm horizontally adjacent to the point in (b).

#### **Explanatory information:**

The clear space required on the internal wall of the Class 1 or Class 10 building in (a) defines the internal boundary of the *required telecommunications pathway* and the transition point to any customer equipment or additional cabling.

Clearances listed in (b) are to ensure the safe and effective operation and installation of premises connection devices on the *external wall* used in fixed line networks. In a building not in the *fixed line footprint*, this point on the *external wall* is considered the building entry point and would define the pathway boundary.

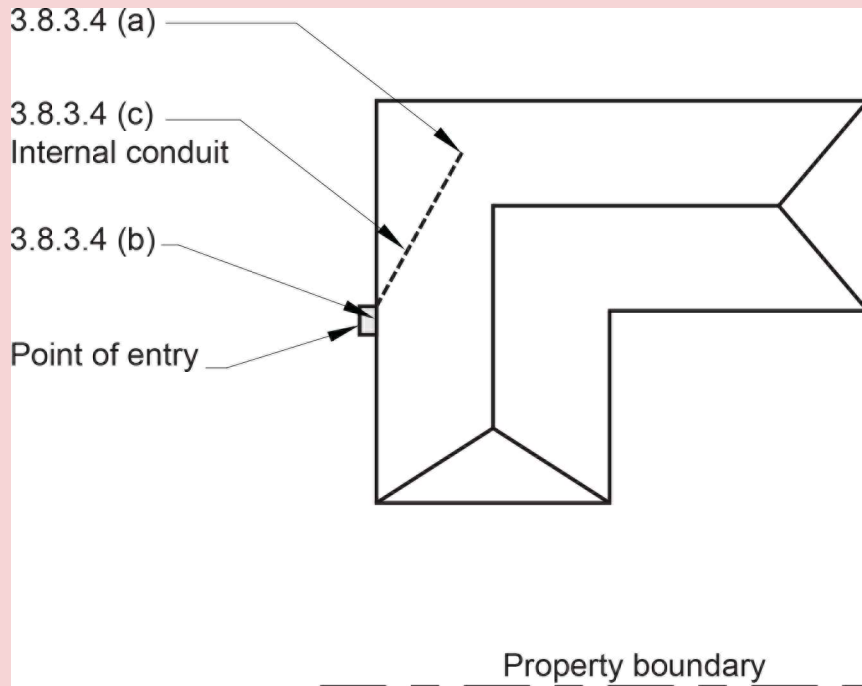
Where a building is located in the *fixed line footprint*, the pathway in accordance with (d) provides a suitable pathway between the external premises connection device and the entry point on the allotment of the telecommunications infrastructure provider's pit and pipe used to service the allotment and defines the *telecommunications pathway* boundary.

#### **Buildings located within and not within the *fixed line footprint***

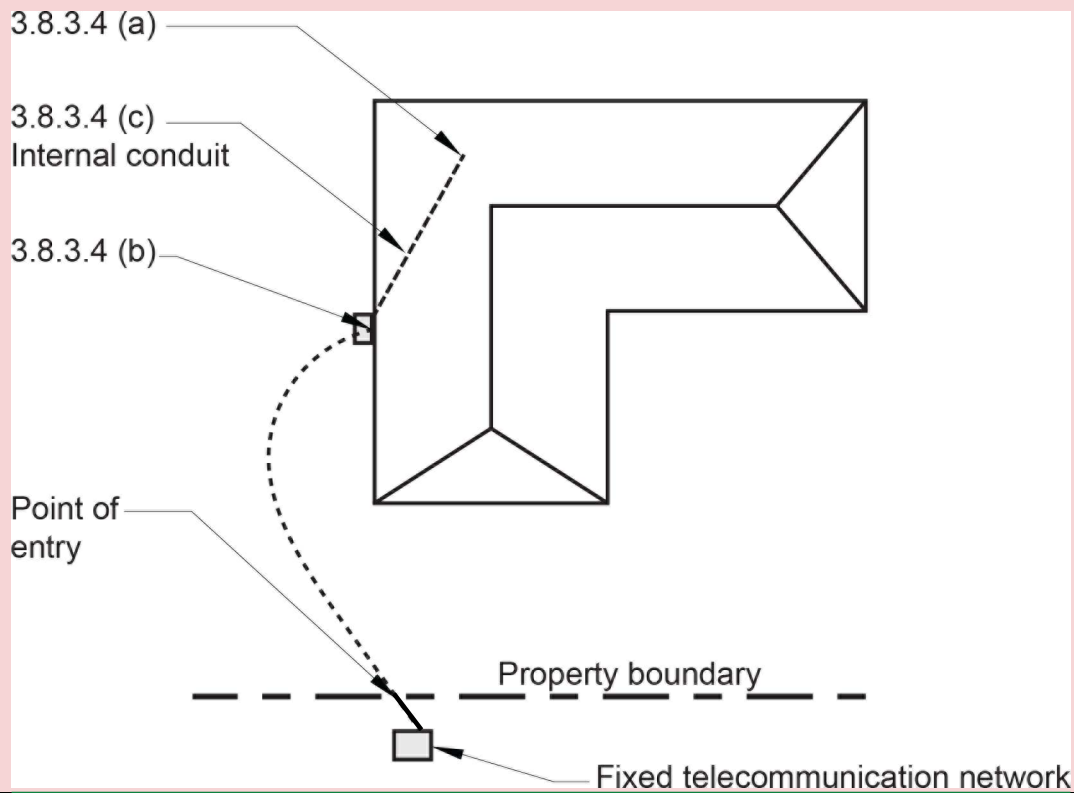
**Diagram a**

Building not located within the *fixed line footprint*

**Buildings located within and not within the fixed line footprint**



**Diagram b Building located within the fixed line footprint**



**3.8.3.5 Installation requirements**

A *telecommunications pathway* required by 3.8.3.4 must—

- (a) be via white conduit complying with AS 1477 with an inside diameter of not less than 23 mm; and
- (b) at changes in direction, use bends that are—



- (i) individually not more than 90 degrees; and
- (ii) cumulatively of not more than 270 degrees; and
- (iii) if installed above ground, have a radius of not less than 100 mm; and
- (iv) if installed below ground, have a radius of not less than 300 mm; and
- (c) where located below ground—
  - (i) be installed with a depth of cover not less than 300 mm; and
  - (ii) where located below a driveway, be installed with a depth of cover not less than 450 mm of *controlled fill*; and
  - (iii) include provision for access to cables at intervals of not more than 50 m.

| Administration     | Adoption Date |
|--------------------|---------------|
| Northern Territory | 1 May 2015    |
| Queensland         | 1 May 2015    |
| South Australia    | 1 May 2015    |
| Tasmania           | 1 May 2015    |
| Victoria           | 1 May 2015    |
| Western Australia  | 1 May 2015    |

- (b) The purpose of BCA 2015 is to—
- (i) update references to other documents; and
  - (ii) include a Verification Method for structural reliability; and
  - (iii) include a Verification Method for weatherproofing of external walls; and
  - (iv) include revised Acceptable Construction Practice for termite management systems.

## 14.0 Adoption of BCA 2016

- (a) The 2016 edition of the BCA was adopted by the Commonwealth, States and Territories as set out in **Table 14.0**.

**Table 14.0 History of adoption of BCA 2016**

| Administration                      | Adoption Date     |
|-------------------------------------|-------------------|
| <u>Australian Government</u>        | <u>1 May 2016</u> |
| <u>Australian Capital Territory</u> | <u>1 May 2016</u> |
| <u>New South Wales</u>              | <u>1 May 2016</u> |
| <u>Northern Territory</u>           | <u>1 May 2016</u> |
| <u>Queensland</u>                   | <u>1 May 2016</u> |
| <u>South Australia</u>              | <u>1 May 2016</u> |
| <u>Tasmania</u>                     | <u>1 May 2016</u> |
| <u>Victoria</u>                     | <u>1 May 2016</u> |
| <u>Western Australia</u>            | <u>1 May 2016</u> |

- (b) The purpose of BCA 2016 is to—
- (i) update references to other documents; and
  - (ii) amend the "Introduction" and "General Requirements" as part of the initiative to increase the use of Performance Solutions; and
  - (iii) include new Verification Methods for structural robustness, a building's resistance to bushfires, indoor air quality and energy efficiency; and
  - (iv) include changes as a result of the Acceptable Construction Practice Review project including the provisions for termite risk management, subfloor ventilation, facilities, light and ventilation and stair construction; and
  - (v) include requirements for overflow of eaves gutters; and
  - (vi) include requirements for telecommunications; and
  - (vii) include minor technical changes.

## LIST OF AMENDMENTS - NCC 2016 - HOUSING PROVISIONS

This set of notes has been prepared by the Australian Building Codes Board to assist NCC users in identifying changes incorporated in the 2016 edition of the Housing Provisions (Volume Two of the NCC).

The notes provide a description of major changes made from the previous edition of the Housing Provisions.

While the Australian Building Codes Board has attempted to include all major changes made from the previous edition of the Housing Provisions, the Board does not give any warranty nor accept any liability in relation to the contents of this list of amendments.

| Reference  | Changes and Commentary  |
|--|---|
| <b>General notes</b>   |   |
| The Objectives and Functional Statements have been relocated to explanatory information.   |   |
| The provisions titled 'Appropriate Performance Requirements' at the start of each Part in Section 3 have been restructured and reference to 1.0.10 deleted as it is no longer used within the NCC. |   |
| Cross-volume consideration explanatory information has been inserted throughout Volume Two to advise of relevant NCC Volume Three provisions.  |   |
| A number of provisions have been amended as a consequence of a review to assist in the usability of Volume Two, including the insertion of additional explanatory information.                     |   |
| <b>Introduction</b>  |   |
| The Introduction provisions have been amended as part of the initiative to increase the use of Performance Solutions. The changes emphasise that the NCC is a performance-based code.              |   |
| <b>Part 1.0</b>  |   |
| Provisions in Part 1.0 have been amended, restructured and relocated as part of the initiative to increase the use of Performance Solutions.   |   |
| 1.0.1  | A new provision has been inserted for 'Compliance with the NCC'. The existing provision 'Adoption' has been relocated to the 'Introduction'.  |
| 1.0.2  | A new provision has been inserted for 'Meeting the Performance Requirements'. The existing provision 'BCA Volumes' has been relocated to the 'Introduction'. Figure 1.0.2 has been inserted to replace Figure 1.0.3.  |
| 1.0.3  | A new provision has been inserted for 'Prescriptive Solutions'. The existing provision 'BCA Structure' has been amended and relocated to A0.1.  |
| 1.0.4  | A new provision has been inserted for 'Performance Solutions'. The existing provision 'Compliance with the BCA' has been amended and relocated to 1.0.1.  |
| 1.0.5  | The existing provision 'Assessment Methods' has been relocated to 1.0.5. The existing provision 'Meeting the Performance Requirements' is now covered by 1.0.2.   |
| 1.0.6  | The existing provision 'Defined terms' has been relocated from the 'Introduction' to 1.0.6. The existing provision 'Objectives and Functional Statements' has been deleted as a consequence of relocating the Objectives and Functional Statements into explanatory material. |
| 1.0.7  | This provision has been deleted as a consequence to the inclusion of 'Prescriptive Solutions' in 1.0.3.   |
| 1.0.8  | This provision has been deleted as a consequence to the inclusion of 'Performance Solutions' in 1.0.4.  |
| 1.0.9  | This provision has been deleted as a consequence of the relocation of 'Assessment Methods' to 1.0.5.  |
| 1.0.10   | This provision has been deleted.  |

| Reference                  | Changes and Commentary   |
|----------------------------|--|
| <b>Part 1.1</b>            |  |
| 1.1.1.1                    | Definitions previously located in separate Parts have been inserted in 1.1.1.2. As a consequence 1.1.1.1 has been deleted.   |
| 1.1.1.2                    | Definitions previously located in separate Parts have been inserted in 1.1.1.2.  |
| 1.1.1.2                    | The following definitions have been inserted or amended:   |
| Alternative Solution       | The defined term has been amended to include reference to a 'Performance Solution'.  |
| Assessment Methods         | The defined term has been amended to include the new defined terms 'Performance Solution' and 'Prescriptive Solution' as a consequence of amendments to Part 1.0 and the deletion of the defined term 'Building Solution'. |
| Building Solution          | The defined term has been deleted as it is no longer used in the NCC.  |
| Boiler                     | A new defined term has been inserted as a consequence of including Part 3.7.3.6.   |
| Equivalent                 | The defined term has been deleted as it is no long used in Part 1.0.   |
| Fixed line footprint       | A new defined term has been inserted as a consequence of the new provisions for telecommunications.  |
| Functional Statement       | The defined term has been deleted as it is no longer used in the NCC.  |
| Objective                  | The defined term has been deleted as it is no longer used in the NCC.  |
| Performance Requirement    | The defined term has been amended to include the new defined terms 'Performance Solution' and 'Prescriptive Solution'.   |
| Performance Solution       | A new defined term 'Performance Solution' has been inserted.   |
| Point of entry             | A new defined term has been inserted as a consequence of the new provisions for telecommunications.  |
| Prescriptive Solution      | A new defined term 'Prescriptive Solution' has been inserted.  |
| Pressure vessel            | A new defined term has been inserted as a consequence of including Part 3.7.3.6.   |
| Telecommunications pathway | A new defined term has been inserted as a consequence of including new provisions for telecommunications.  |
| Verification Method        | The defined term has been amended to include the new defined term 'Performance Solution'.  |
| 1.1.8                      | Cross-volume consideration explanatory information has been inserted throughout Volume Two to advise of relevant Volume Three provisions. 1.1.8 has been amended to explain these inclusions.                              |
| <b>Part 1.4</b>            |  |
| Table 1.4.1                | The following references have been inserted, amended or deleted:   |
| AS/NZS 1200                | AS/NZS 1200 'Pressure equipment' has been deleted.   |
| AS 1477                    | The 2006 edition of AS 1477 'PVC pipes and fittings for pressure applications' has been referenced.  |

| Reference   | Changes and Commentary  |
|---|---|
| AS 1657   | The 2013 edition of AS 1657 'Fixed platforms, walkways, stairways and ladders — Design, construction and installation' has been deleted.  |
| AS 1670.1   | The 2004 edition of AS 1670 Part 1 'Fire detection, warning, control and intercom systems — Systems design, installation and commissioning — Fire' has been referenced.   |
| AS 1720.5   | The 2015 edition of AS 1720 Part 5 'Timber structures — Nailplated timber roof trusses' has been referenced.  |
| AS 5146.1   | The 2015 edition of AS 5146 Part 1 'Reinforced autoclaved aerated concrete — Structures' has been referenced.   |
| <b>Part 2.1</b>                                   |   |
| V2.1.2  | A new Verification Method has been inserted to verify compliance with the Performance Requirement P2.1.1(a)(iii). V2.1.2 is a means for verifying the structural robustness of a building.  |
| <b>Part 2.3</b>                                   |   |
| O2.3(a)(ii) and F2.3.3<br>Explanatory information | The Objective and Functional Statement for heating appliances has been expanded to include boilers and pressure vessels.  |
| P2.3.3  | The Performance Requirement for heating appliances has been expanded to include boilers and pressure vessels.   |
| V2.3.1  | A new Verification Method has been inserted as an option to verify compliance with Performance Requirement P2.3.4. V2.3.1 is a means for verifying that a building has an adequate level of resistance to bushfires.  |
| <b>Part 2.4</b>                                   |   |
| O2.4.3 and F2.4.3<br>Explanatory information      | The Objectives and Functional Statements have been expanded as a consequence of new provisions for telecommunications.  |
| P2.4.3  | A new Performance Requirement has been included for telecommunications.   |
| V2.4.5  | A new Verification Method has been inserted as an option to verify compliance with Performance Requirements P2.4.5(a) and P2.4.5(b)(i). V2.4.5 is a means for verifying that a building has suitable indoor air quality by providing sufficient ventilation of outdoor air. |
| <b>Part 2.6</b>                                   |   |
| P2.6.1<br>Explanatory information                 | The first paragraph of the explanatory information has been deleted to allow for revised guidance material to be developed, which is intended to clarify the intent and application of P2.6.1.  |
| V2.6.2.1  | A new Verification Method has been inserted as an option to verify compliance with Performance Requirement P2.6.1. V2.6.2.1 is a means for verifying that a building has suitable energy efficiency measures using a stated value approach.                                 |
| <b>Part 3.1</b>                                   |   |
| Part 3.1.3  | The Termite Risk Management provisions have been restructured to assist in usability of the Part. No technical change has occurred with this restructure.   |
| <b>Part 3.4</b>                                   |   |

| <b>Reference</b>                      | <b>Changes and Commentary</b>  |
|---------------------------------------|--|
| 3.4.1                                 | The provisions of the Part have been restructured and amended for improved usability and include: <ul style="list-style-type: none"> <li>• Removal of unnecessary duplication.</li> <li>• Insertion of a new figure.</li> <li>• Additional explanatory information.</li> </ul>   |
| <b>Part 3.5</b>                       |  |
| 3.5.2.1                               | <ul style="list-style-type: none"> <li>• Sub-clause (b) has been deleted as a consequence of quantified measures for overflow of eaves gutters being incorporated into the Part.</li> <li>• As a consequence of the deletion of (b), sub-clause (a) has been incorporated into the provision.</li> </ul>   |
| 3.5.2.2(a) and (b)                    | Sub-clauses (a) and (b) have been amended to clarify that the selection of eaves and valley gutters must be in accordance with Table 3.5.2.2 and the selection of box gutters must be in accordance with AS/NZS 3500.3 or AS/NZS 3500.5.   |
| 3.5.2.2(c)                            | The sub-clause has been amended to clarify that the rainfall intensity is a '5 minute duration' rainfall intensity.  |
| 3.5.2.4(b)                            | The sub-clause has been amended to require eaves gutters to be provided with not less than one overflow measure, as specified in Table 3.5.2.3, capable of removing overflow volume specified in Table 3.5.2.4.  |
| 3.5.2.4(d)                            | <ul style="list-style-type: none"> <li>• As a consequence of quantified overflow of eaves gutter requirements being included in 3.5.2.4(b), the existing requirements for high fronted gutters have been deleted.</li> <li>• A new concession has been inserted at sub-clause (d) to not require the overflow measures of 3.5.2.4(b) where a verandah or eave is greater than 450 mm in width and has no lining or a lining sloping away from the building.</li> </ul> |
| 3.5.2.5(b)                            | As a consequence of including quantified overflow of eaves gutter requirements, the provision requiring an overflow measure if a downpipe is installed greater than 1.2 m from a valley has been deleted.  |
| 3.5.2.5(c)<br>Explanatory information | <ul style="list-style-type: none"> <li>• The existing explanatory information has been amended to clarify that a 'heavy rain period' is a storm having 'an average recurrence interval of 20 years'.</li> <li>• New explanatory information included to clarify that where a rainhead overflow measure is used, the overflow discharge should be directed away from the building.</li> </ul>   |
| Table 3.5.2.1                         | <ul style="list-style-type: none"> <li>• Table heading amended to include 'duration' to read 'rainfall duration intensities'.</li> <li>• 5 minute duration rainfall intensity values of the table have been amended to reflect current data and to include additional locations.</li> </ul>  |
| Table 3.5.2.3a                        | New table included for acceptable continuous overflow measures.  |
| Table 3.5.2.3b                        | New table included for acceptable dedicated overflow measures.   |
| Table 3.5.2.4a                        | New table included for the required overflow volume for a continuous overflow measure.   |
| Table 3.5.2.4b                        | New table included for the required overflow volume for a dedicated overflow measure.  |
| 3.5.2.5<br>Explanatory information    | The explanatory information has been amended to reflect the changes to the Part.   |
| 3.5.3.0                               | AS 5146.1 'Reinforced autoclaved aerated concrete' has been included as an Acceptable Construction Manual for wall cladding.   |
| <b>Part 3.7</b>                       |  |

| <b>Reference</b>                | <b>Changes and Commentary</b>  |
|---------------------------------|--|
| 3.7.1.8(b)                      | A new sub-clause (b) has been inserted for separating wall requirements for a Class 1a dwelling located above a non-appurtenant private garage. As a consequence the remaining sub-clauses have been renumbered.   |
| 3.7.1.11                        | A new provision has been inserted for separating floors for a Class 1a dwelling located above a non-appurtenant private garage.  |
| 3.7.2.1                         | The provision has been restructured and amended to clarify that a Class 10a private garage located above or below a Class 1 building is considered to be part of the Class 1 building for the purposes of Part 3.7.2.  |
| 3.7.2.2(b)                      | The provision has been amended to enable the installation of any alarm deemed suitable in accordance with AS 1670.1 in a Class 10a private garage. Explanatory information has been inserted to clarify the application of 3.7.2.2(b).   |
| 3.7.2.3(c)                      | A new sub-clause has been inserted to require interconnection of smoke alarms between a Class 1a dwelling and a non-appurtenant private garage located below the Class 1a dwelling.  |
| 3.7.3.6                         | New provisions for boilers and pressure vessels have been inserted as a result of deleting reference to AS/NZS 1200.   |
| <b>Part 3.8</b>                 |  |
| 3.8.3.2(a)(iv) and (a)(v)       | Requirements for a washbasin have been relocated to a separate sub-clause to clarify that a washbasin does not need to be associated with a closet pan.  |
| 3.8.3.2 Explanatory information | Explanatory information has been amended to clarify the provisions and provide additional guidance.  |
| 3.8.3.4                         | A new provision has been inserted to require provision of telecommunication pathways in Class 1 buildings.   |
| 3.8.3.5                         | A new provision has been inserted to provide installation requirements for telecommunication pathways required by 3.8.3.4.   |
| 3.8.4.2                         | <ul style="list-style-type: none"> <li>Figure 3.8.4.1 has been amended to clarify the method of determining areas of openings for borrowed light.</li> <li>Explanatory information has been inserted to clarify that when a door is used to transmit natural light to an adjoining room, it must do so when in the closed position.</li> </ul> |
| 3.8.5.2(a)(i)                   | Sub-clause (a)(i) has been amended and explanatory information provided to clarify that the size of the openable sash of a window is used when determining the area of ventilation provided, regardless of the window type or restrictions placed on the sash.   |
| 3.8.5.2(b)                      | Explanatory information has been provided clarifying the use of borrowed ventilation from an adjoining room.   |
| 3.8.5.2(c)                      | Explanatory information has been provided clarifying that sub-clause (c) applies only where mechanical exhaust is the sole means of ventilation.   |
| <b>Part 3.9</b>                 |  |

| <b>Reference</b>                              | <b>Changes and Commentary</b>  |
|---|--|
| 3.9.1   | <p>Part 3.9.1 has been restructured and amended for improved usability. The restructure includes:</p> <ul style="list-style-type: none"> <li>• Clarification that a stairway must be designed to take loading forces in accordance with AS/NZS 1170.1.</li> <li>• The inclusion of Deemed-to-Satisfy Provisions for stairways serving non-habitable rooms and the deletion of reference to AS 1657.</li> <li>• The inclusion of Deemed-to-Satisfy Provisions for ramps.</li> <li>• Increasing the minimum height a threshold can be above an adjoining surface before a stairway is required.</li> <li>• Providing an allowance for conditions such as movement of materials due to atmospheric moisture changes or minor deviations related to variations in materials which affect finished stair dimensions.</li> </ul> |
| 3.9.3   | Part 3.9.3 has been amended to include the provisions of Part 3.9.4. As a consequence the Part title has been amended to 'Swimming Pools' and additional explanatory information has been inserted to clarify the requirements.  |
| 3.9.4   | The Part has been deleted as a consequence of the provisions being consolidated into Part 3.9.3.   |
| 3.9.3.0 (a)<br>State and Territory variations | As a consequence of consolidating the water recirculation system requirements of Part 3.9.4 into Part 3.9.3 the State and Territory variations for New South Wales, Queensland, Northern Territory and Western Australia have been renumbered to 3.9.3.0(a).   |
| <b>Part 3.10</b>                              |  |
| 3.10.1.0(h)                                   | The provisions currently contained in 3.11.6(j) have been duplicated for garage doors and other large access doors to assist in usability.   |
| <b>Part 3.11</b>                              |  |
| 3.11.6(c)(ii)                                 | A reference to AS 1720.5 has been added for the design of nailplated timber roof trusses in residential and similar buildings.   |
| 3.11.6(f)(ii)                                 | A reference to AS 5146.1 has been added for autoclaved aerated concrete.   |
| 3.11.7  | The provisions currently contained in 3.4.0.2 have been duplicated for structural software to assist in usability.   |
| <b>Part 3.12</b>                              |  |
| 3.12.0(a)(i)(D)                               | Compensation for loss of ceiling insulation has been removed from the provision as it is covered by the house energy rating software.  |
| <b>History of BCA Adoption</b>                |  |
| 14.0  | New provision added in order to set out the adoption date of the 2016 edition of the Housing Provisions in each State and Territory and to summarise the purpose of the changes from the 2015 edition.   |





## Attachment 3

### Evidence that there is a problem and analysis

In considering the DCWC Report<sup>4</sup>, Communications Alliance has identified a number of assumptions that were made in the absence of data from the telecommunications industry, that should now be reconsidered. It is unfortunate that the assumptions made dramatically skewed the findings of the Report.

#### Market failure

It is the experience of our members that telecommunications Carriers encounter a range of scenarios where there are impediments in connecting a premises as a result of a lack of adequate telecommunication space. These impediments can range from having no provision for pathways or spaces to having substandard pathways such as insufficient or blocked conduiting. These add delay and costs to the works. It is typical that these costs are not itemised, recorded or published. They are often absorbed by the Carrier and ultimately borne by the users of the telecommunications services and through additional building costs.

The nominal figure of 1% selected by DCWC on which the analysis was based appears to bear little relationship to industry experience. In light of the feedback from industry, the BICSI Report and nbn data, the view of our members is that the incidence where there are delays, impediments or obstructions to connecting a premises is closer to 10%. We have elected to choose a figure of 6% as a conservative representative value in our analysis, aware that there are many variables which influence the ability to arrive at a precise figure. These include:

- different building classes involve different arrangements among parties, from individual owner-builders through to large property developers, reflecting a variety of commercial relationships, with varying levels of familiarisation and experience with regulations, auditing processes and financing.
- the obligations of the nbn as the Carrier of last resort who is required by law to provide service to any customer in a service area that requests it, in the absence of any other Carrier of wholesale services.

It should be stated that the financial impact of being without telecommunications services is typically reported in facilities once operational, but seldom reported prior to building occupancy. So empirical data on the latter has been difficult to obtain. That said, their monetised impacts would be very similar, so we believe the following statistics from operational commercial facilities to be representative of the financial impact of delayed communications services due to inadequate telecommunications spaces prior to occupancy, akin to an unplanned outage:

- US\$926 per minute cost due to unplanned telecommunications outage in a small ICT network or data centre<sup>5</sup>.

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<sup>4</sup> Donald Cant Watts Corks *Assessment Report on Cost Implications* 10 July 2015

<sup>5</sup> Ponemon Institute *Cost of Data Center Outages Research Report* January 2016



- US\$8,851 per minute cost due to unplanned telecommunications outage in a large data centre<sup>6</sup>

### **Use of telecommunication services**

It is our expectation that most buildings in Australia will be connected to telecommunicators networks for fixed phone lines, broadband data and IoT connectivity. In this light, the figure of 73% of occupants who demand fixed line services does not correlate well with the actual number of physical telecommunications connections to premises. The ACMA Communications Report<sup>7</sup> provides a better picture of phone line and internet usage.

Further to this, the Ponemon Institute<sup>8</sup> paints a future that will be far more dependent on data, emphasising the need for reliable access to telecommunications services now, stating: *'Cloud computing is in the midst of a...growth spurt today. Goldman Sachs projects a 30 percent CAGR between 2013 and 2018. The Internet of Things will likely drive the next wave of growth. Specifically, IDC predicts the global IoT market will grow to [US]\$1.7 trillion in 2020 from \$655.8 billion in 2014.'*

### **Scope of works**

The Communications Alliance proposal for changes to the NCC 2016 reflected the current thinking at the time, to provide to the ABCB a 'best-practice' approach in the provisioning of communications services to buildings. This included provisioning adequate pathways and spaces into the future, catering for various types of services over the Carrier and customer cabling components of a network.

Not having the visibility of or being able to contribute to the methodology behind the analysis of the NCC 2016 proposal, we are now in better position to provide an optimised proposal that reflects the areas of greatest need and provides a viable approach to facilitate the connection of essential telecommunications services to the building occupants.

The DCWC analysis highlights the excess in the NCC 2016 proposed specifications for the building classes other than Class 1, particularly when the possible coexistence of other services and utilisation of building design was not taken into account as a part of the analysis. An iterative development between the telecommunications and building sectors would have, in our opinion, greatly improved the proposal, the analysis and ultimately led to a favourable outcome.

With the reduction of both the pathway requirements and the spaces requirement in this proposal when compared to the NCC 2016 proposal, and a more realistic market failure rate, the calculated *Cost of Specification* (and subsequent *Net Cost of Specification*) is substantially reduced. Our initial calculations indicate that the *Annual Impact* would be either neutral or provide a net benefit to all building classes.

As described elsewhere in the proposal, one of the fundamental changes to the proposal is in specifying reduced equipment space requirements in terms of wall spacial area, rather than floor area. This reflects the approach that is typically taken

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<sup>6</sup> Ponemon Institute Cost of Data Center Outages Research Report January 2016

<sup>7</sup> Australian Communications and Media Authority Communications Report 2015-2016

<sup>8</sup> Ponemon Institute Cost of Data Center Outages Research Report January 2016



by Carriers today, compared with specifying dedicated floor and distributor space specifically for telecommunications purposes, as was apparently assumed in the DCWC analysis. Telecommunications equipment can be mounted in its own housing so a purpose-built floor distributor room is not required. Typically, such a housing will be located in the general equipment room where other utilities are also located. Utilising telecommunications cupboards in common spaces, including that associated with door access, and typically as used with other utilities, have allowed for a cost reduction in the order of 50%.

In reviewing the DCWC Report, some further observations can be made on the assumptions being made. As an example to consider, the Class 2 (3-story) building type details have been reproduced below.

As mentioned, the *Telecommunications Equipment Room* may not actually be present in all installations and may just be a cupboard or just a common area. Existing vertical risers be in place for other services such as power but can also be utilised for communications cabling. Often in practice, installed communications cabling is installed in common pathways or risers.

With regards to retrofitting, although space for a floor distributor may no longer be available, and hence no masonry and other fixtures costs, there would be costs associated with an installed cupboard etc.

Using the Class 2 (3-storey) example below, the *Telecommunications Equipment room* costing could reduce to around \$2000 and the *Telecommunications spaces Floor Distributor* would be \$0, effecting a 50% reduction in the cost.

| <b>Class 2 (3-storey)<br/>(54 apartments)</b>                             | <b>Current<br/>practice</b> | <b>2016 NCC<br/>proposal</b> | <b>Retrofitting</b>        |
|---|-----------------------------|------------------------------|----------------------------|
| <b>Entry point</b>  |                             |                              |                            |
| Trench  | 855 (30 m)                  | 855 (30 m)                   | 2,700 (45 m)               |
| Conduits  | 750 (30 m)                  | 750 (30 m)                   | 1,350 (45 m)               |
| Saw cutting existing concrete   |                             |                              | 2,250 (90 m)               |
| Demolition of concrete  |                             |                              | 2,700 (45 m)               |
|   | <b>1605</b>                 | <b>1605</b>                  | <b>9000</b>                |
| <b>Telco equipment room (19 m<sup>2</sup>)</b>                            |                             |                              |                            |
| Walls   |                             | 5,319 (46 m)                 | 7,978 (46 m)               |
| Doors   |                             | 1,850 (1)                    | 2,300 (1)                  |
| Lighting  |                             | 450 (1)                      | 600 (1)                    |
|   | <b>nil</b>                  | <b>7619</b>                  | <b>10,878</b>              |
| <b>Vertical Risers - existing <span style="color: red;">Note 2</span></b> |                             |                              |                            |
| Walls   | 5,434 (47 m <sup>2</sup> )  | 5,434 (47 m <sup>2</sup> )   | 5,434 (47 m <sup>2</sup> ) |
| Doors   | 7,400 (4)                   | 7,400 (4)                    | 7,400 (4)                  |
| Sealing   | 1,600 (1)                   | 1,600 (1)                    | 1,600 (1)                  |



|   |               |                             |                |
|---|---------------|-----------------------------|----------------|
|   | <b>14,434</b> | <b>14,434</b>               | <b>14,434</b>  |
| <b>Telco spaces Floor Dist (9 m<sup>2</sup>)</b>                  |               |                             |                |
| Walls   |               | 115.63 (98 m <sup>2</sup> ) |                |
| Doors   |               | 1,150.00 (3)                |                |
| Lighting  |               | 450.00 (3)                  |                |
|   |               | <b>16,131</b>               |                |
| <b>Telco internal lead-in conduit</b>                             |               |                             |                |
| Lead in conduits from riser to individual units termination point |               | 14,025 (561 m)              | 16,830 (561 m) |
| Associated builders works allowance per floor                     |               |                             | 15,000 (3)     |
|   |               | <b>14,025</b>               | <b>31,830</b>  |
| <b>Total net trade</b>  | <b>16,039</b> | <b>53,814</b>               | <b>66,143</b>  |
| + preliminaries and margins                                       | 3362          | 11280                       | 15292          |
| <b>Total</b>  | <b>19,401</b> | <b>65,094</b>               | <b>81,435</b>  |

There also appears to be an anomaly when comparing with larger Class 2 apartment buildings. Retrofitting a 7-storey apartment building works out at \$3057 and an 18-storey at \$2981. It is industry experience that economies of scale lead to a reduction in cost per premises as the size of the building increases. Having said that, it would only take one problematic retrofit to skew the results as there are fewer larger apartment buildings.

### Comparison of NCC 2016 and NCC 2019 proposals

An initial comparison of the NCC 2016 proposal to this proposal for offices (Class 5 buildings) using a 50% reduction in the Cost of Specification and a 6% Market Failure rate, produces a net benefit of \$46 million.

These figures have been provided to demonstrate the impact of a reassessment of the assumptions and the new approach and the marked effect that it has on the outcome of the analysis. The figures have been developed as a guide and have not taken all the detailed calculations as executed in the DCWC Report.

It is useful to understand that with the evolution of technology with the provision of services over copper to services of optic fibre, the traditional space as required to house copper-based distributors (MDFs) are giving way to smaller fibre-based cabinets. The result is that the cost of specification in this proposal may be less than the 'traditional' Current Cost of Practice.

| <b>Class 5</b>        | <b>2016 NCC proposal (best practice)</b> | <b>2019 NCC proposal (minimum spec)</b> |
|-----------------------|--|---|
| Current practice cost | \$132 K                                  | \$132 K                                 |
| Cost of specification | \$250 K                                  | \$125 K                                 |



|  |                 |                |
|--|-----------------|----------------|
| Retrofitting                                 | \$325 K         | \$162 K        |
| No. of new buildings per year                | 2600            | 2600           |
| No of new buildings benefiting from proposal | 26              | 156            |
| Cost of current practice                     | \$346 M         | \$346 M        |
| Gross cost of specification                  | \$658 M         | \$325 M        |
| <b>Net cost of specification</b>             | <b>\$311 M</b>  | <b>-\$21 M</b> |
| Avoidance of retrofitting                    | \$8 M           | \$25 M         |
| <b>Annual impact</b>                         | <b>-\$303 M</b> | <b>\$46 M</b>  |



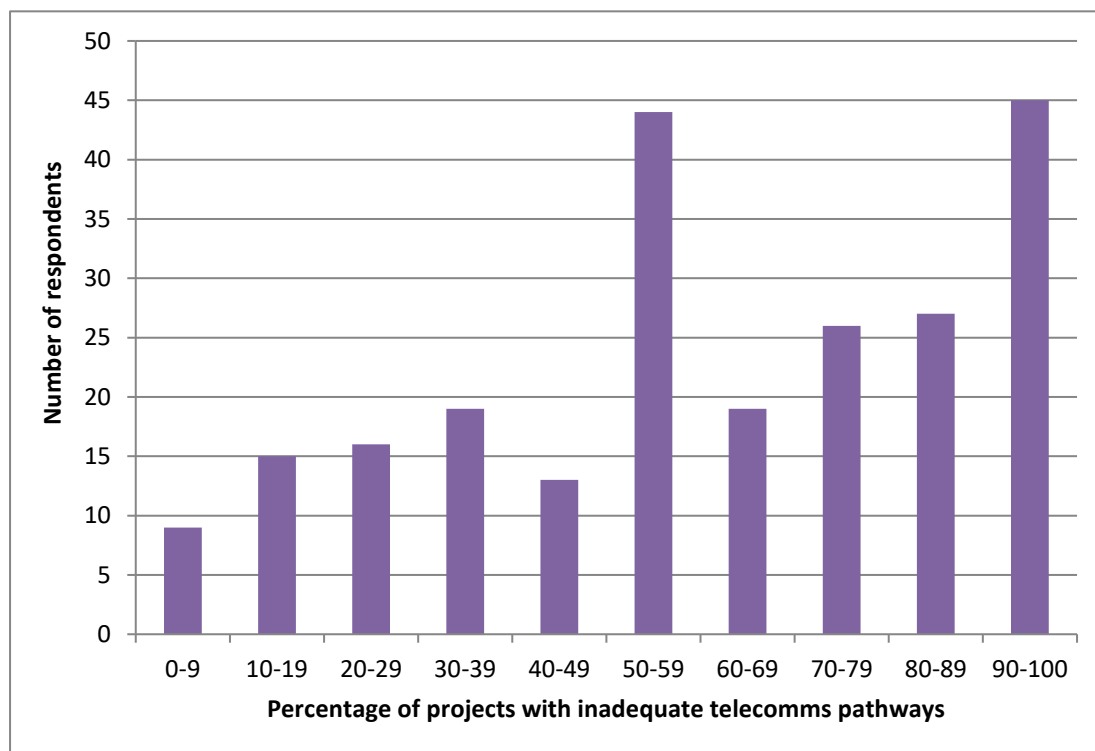
## Attachment 4

### Results from Telecommunications Pathways survey April 2017

BICSI South Pacific, an Australian telecommunications industry association, surveyed its members in April 2017 on their experiences dealing with inadequate or no pathways to deliver telecommunications services into buildings.

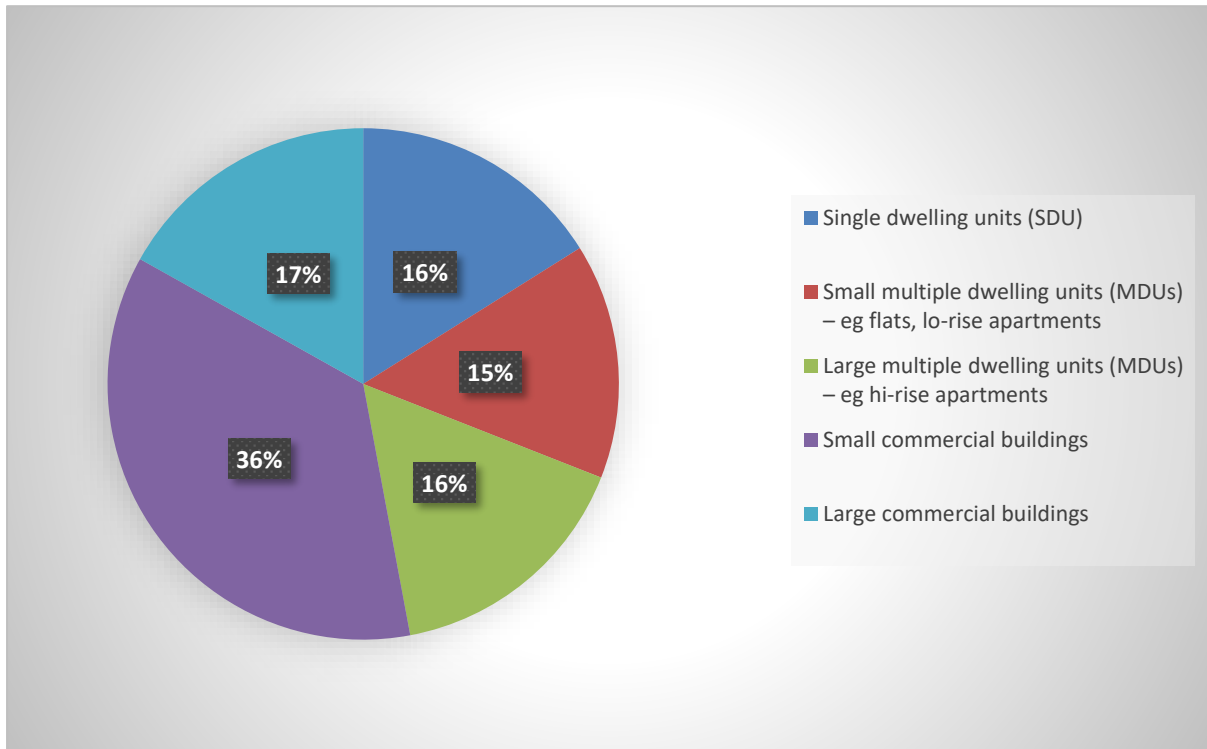
Some 285 members responded to the eight-question survey, providing insight into how commonly inadequate pathways for telecommunications are being encountered, and the costly steps taken to overcome this inadequacy.

#### Q1. What percentage of your cabling projects each year have inadequate telecommunications pathways?

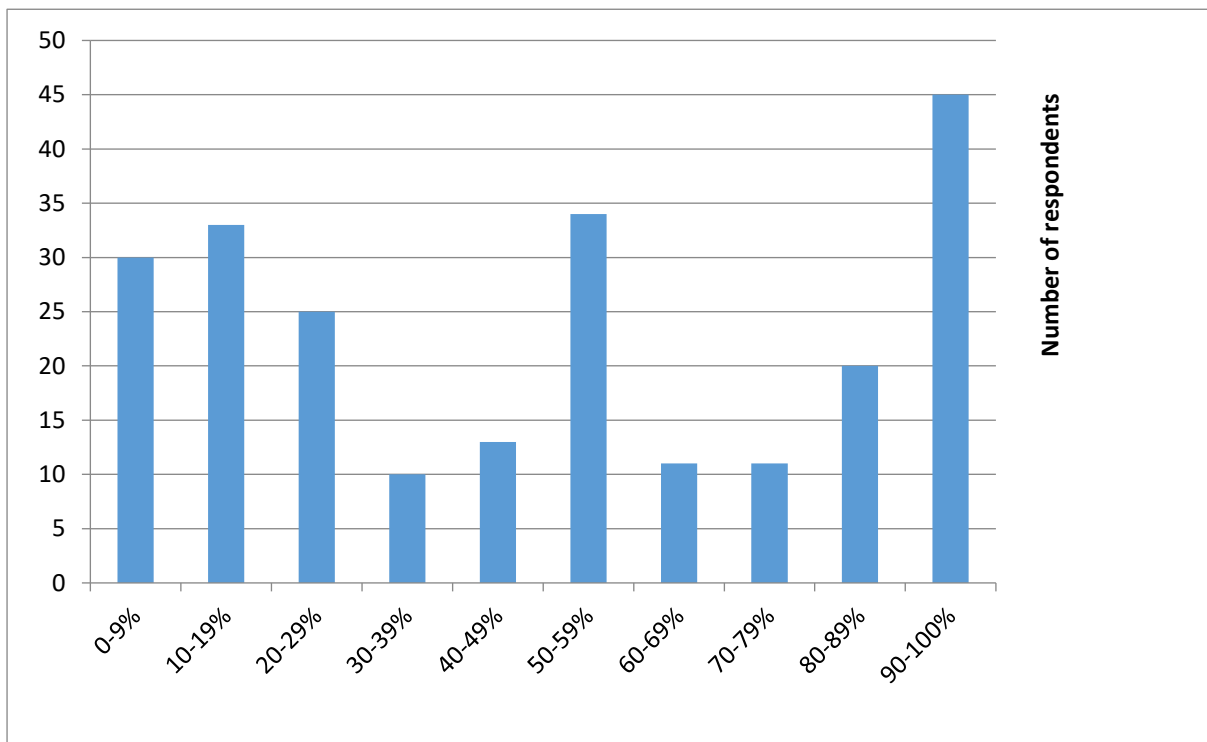




**Q2. What type of building was the most common to have inadequate or no telecommunications pathways?**

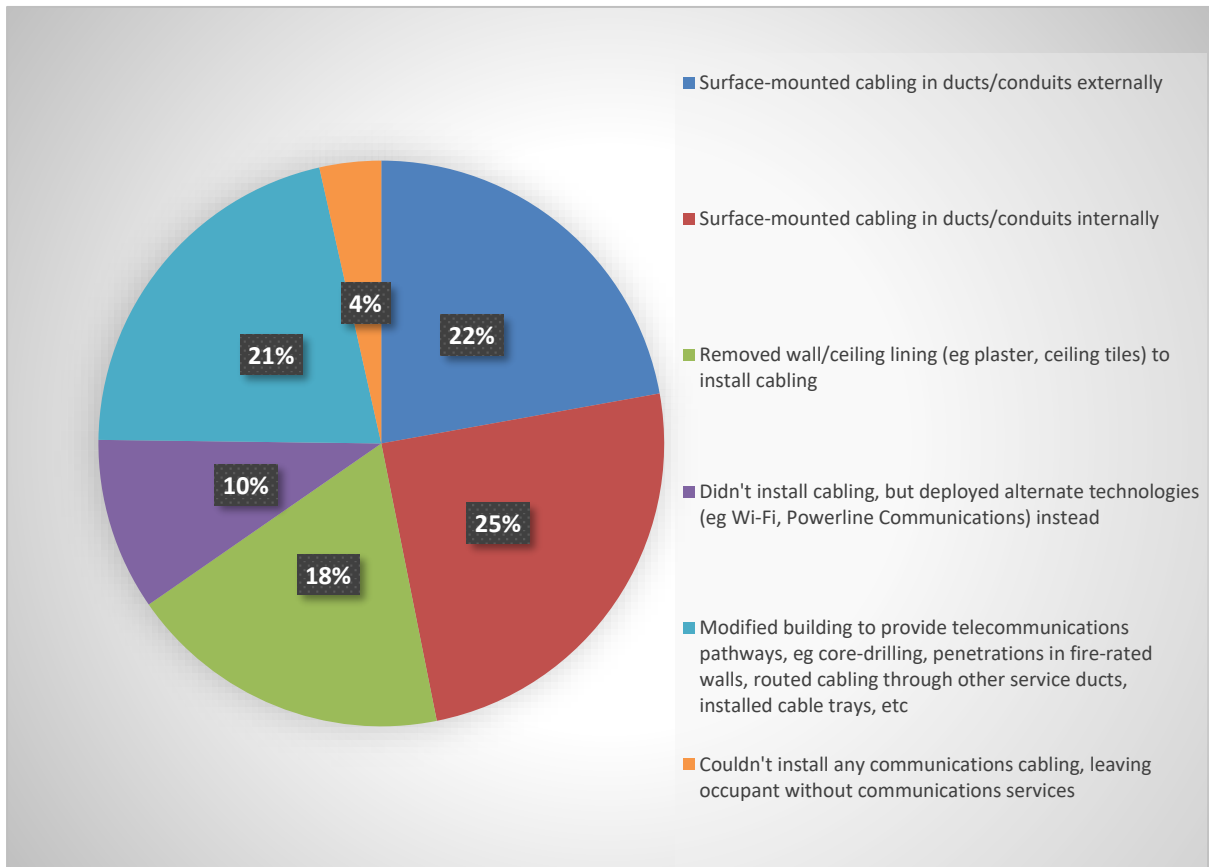


**Q3. Of those projects, what percentage had no telecommunication pathways?**

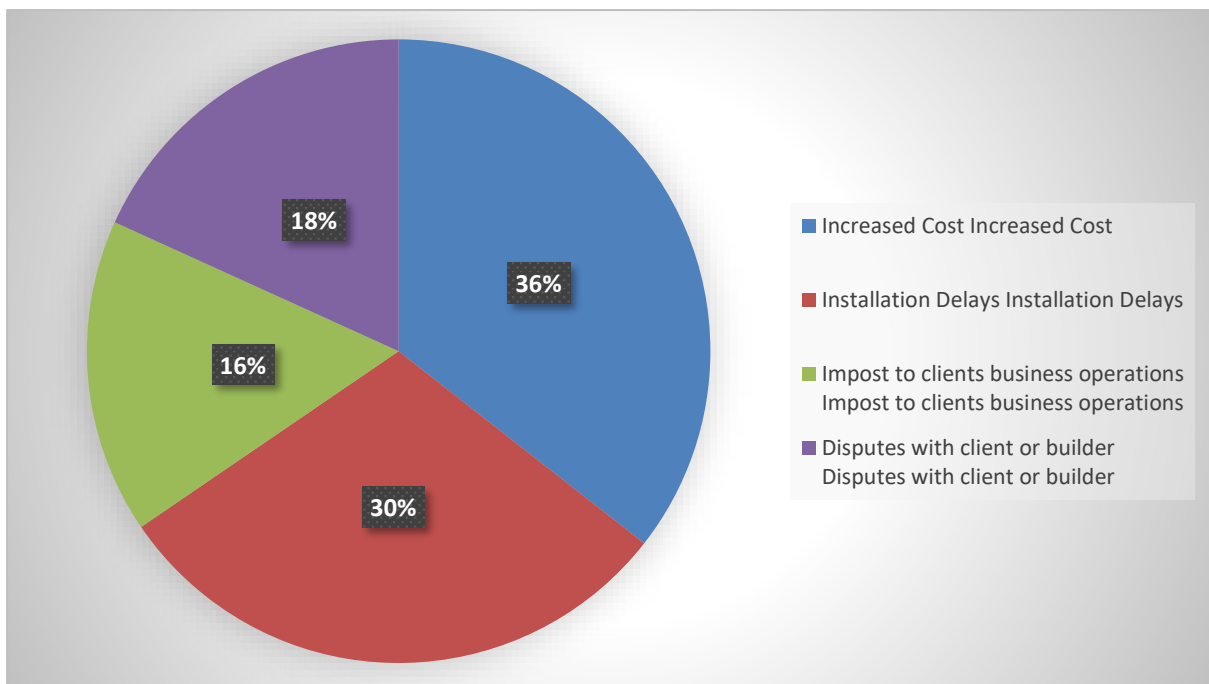




#### Q4. What steps were commonly taken to provide the cabling?



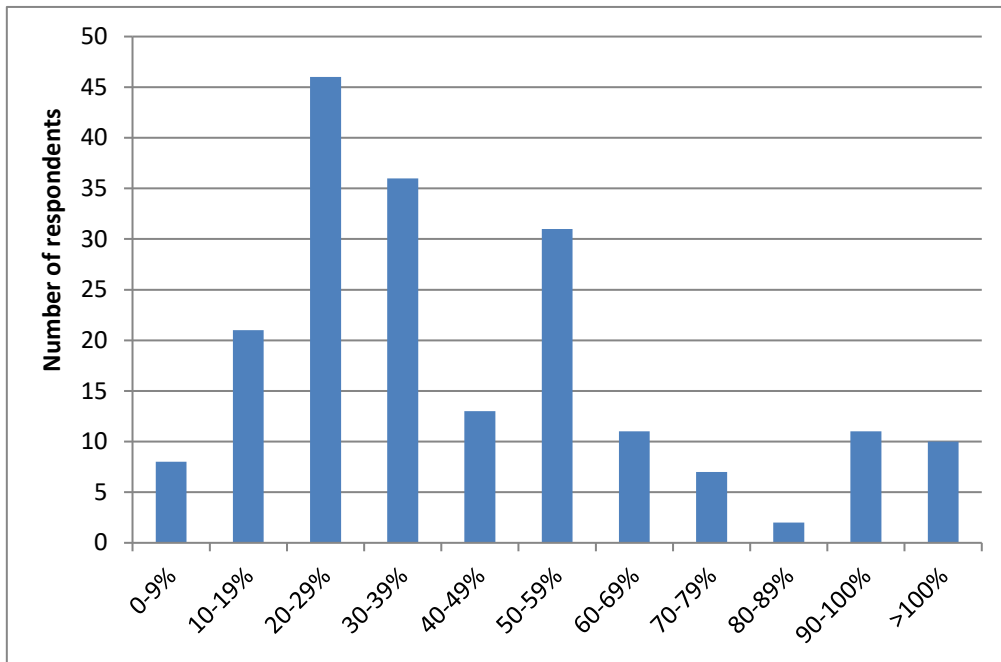
#### Q5. What were the most common financial consequences due to inadequate or no telecommunications pathways?



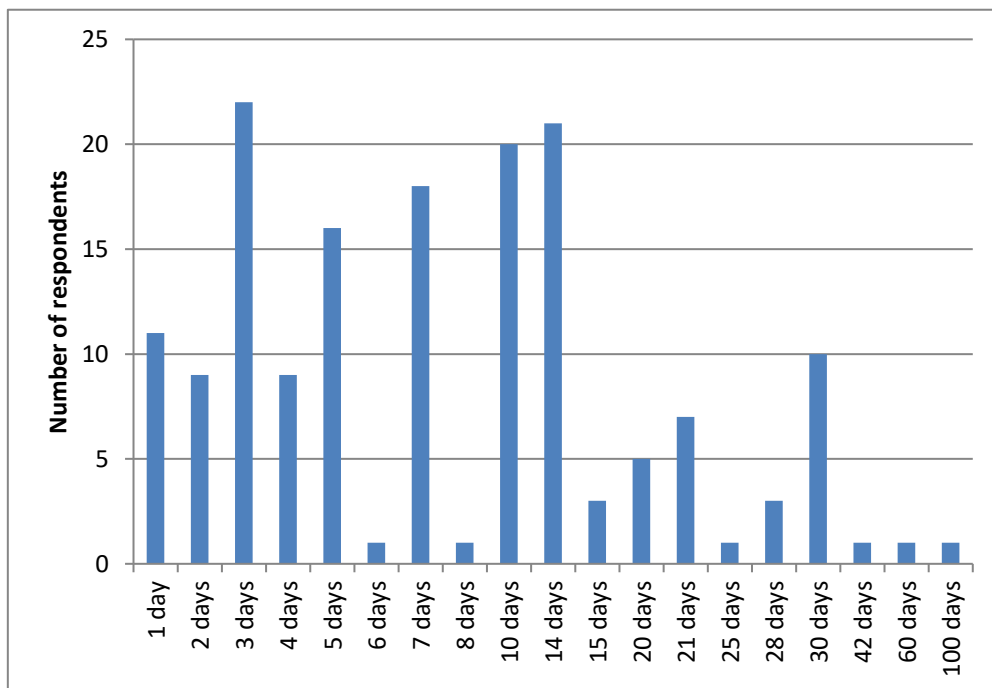




**Q6. If increased cost, what were typical percentage cost increases?**



**Q7. If installation delays, what was the typical duration of the delays?**





**Q8. Has the inadequacy of the telecommunications pathways had a negative impact on the building?**

