



ABCB

Building Design Acceptance - A response to the Building Confidence Report Discussion paper

2020

Copyright

© Commonwealth of Australia and States and Territories of Australia 2020, published by the Australian Building Codes Board.



The material in this publication is licensed under a Creative Commons Attribution-4.0 International licence, with the exception of

- Any third party material
- Any trademarks, and
- Any images or photographs.

More information on this CC BY licence is set out at the Creative Commons website (creativecommons.org/licenses/by/4.0)

Enquiries about this publication can be sent to:

Australian Building Codes Board
GPO Box 2013
CANBERRA ACT 2601
Phone: 1300 134 631
Email: ncc@abcb.gov.au
Web: abcb.gov.au

Attribution

Use of all or part of this publication must include the following attribution:

© Commonwealth of Australia and States and Territories 2020, published by the Australian Building Codes Board.

Disclaimer

By accessing or using this publication, you agree to the following:

While care has been taken in the preparation of this publication, it may not be complete or up-to-date. You can ensure that you are using a complete and up-to-date version by checking the Australian Building Codes Board website (abcb.gov.au).

The Australian Building Codes Board, the Commonwealth of Australia and States and Territories of Australia do not accept any liability, including liability for negligence, for any loss (howsoever caused), damage, injury, expense or cost incurred by any person as a result of accessing, using or relying upon this publication, to the maximum extent permitted by law. No representation or warranty is made or given as to the currency, accuracy, reliability, merchantability, fitness for any purpose or completeness of this publication or any information which may appear on any linked websites, or in other linked information sources, and all such representations and warranties are excluded to the extent permitted by law.

This publication is not legal or professional advice. Persons rely upon this publication entirely at their own risk and must take responsibility for assessing the relevance and accuracy of the information in relation to their particular circumstances.

Version history

Original

Publish date: 16 November 2020
Print version: 1.0

This version

Publish date: 16 November 2020
Print version: 1.0
Details of amendments:

Preface

In June 2017, the Building Ministers' Forum (BMF) commissioned Professor Peter Shergold AC and Ms Bronwyn Weir to undertake an independent examination of compliance and enforcement issues in building and construction which impact on the implementation of the National Construction Code (NCC). The resulting Building Confidence Report (BCR), released in March 2018, included twenty-four recommendations to Building Ministers on how to improve the effectiveness of compliance and enforcement systems in the building and construction industry.

The BMF agreed to establish a dedicated BCR Implementation Team in July 2019. The Team was tasked with developing and reporting on a National Framework for the consistent implementation of the BCR recommendations, as well as the design, construction and certification of complex buildings. The Team was located within the Australian Building Codes Board (ABCB) to leverage off the ABCB's resources, expertise and national reach.

BCR recommendations 13 through to 16 cover the process of design documentation including the development and documentation of Performance Solutions and variations to the approved documentation. They have been addressed here together as Design Acceptance.

Comments on this discussion paper should be provided online via the [ABCB's Consultation Hub](#) by **7 February 2021**.

Acknowledgements

The BCR Implementation Team acknowledges the valuable contributions of:

Commonwealth Department of Industry, Science, Energy and Resources
Queensland Department of Housing & Public Works
Victorian Department of Environment, Land, Water and Planning
ACT Environment, Planning and Sustainable Development Directorate
NT Department of Infrastructure, Planning and Logistics
Western Australian Department of Mines, Industry Regulation and Safety
NSW Department of Customer Service
South Australian Department of Planning, Transport and Infrastructure
Tasmanian Department of Justice

Experts Panel

Bronwyn Weir - Construction law
Jennifer Robertson - Corporate governance
Peter Gow - Government policy/engineering
Ari Akritidis - Building surveying
Peter Johnson - Fire engineering
Robert Care – Engineering

Industry Leaders Consultative Group

Master Builders Australia
Housing Industry Association
Strata Community Association
Australian Institute of Building
Australian Institute of Architects
Australian Local Government Association
Australian Institute of Building Surveyors
Engineers Australia
Fire Protection Association Australia
Consult Australia
Property Council of Australia
Association of Accredited Certifiers
Australasian Fire Emergency Service Authorities Council
Australian Industry Group
Master Plumbers Australia

Contents

Preface	i
Acknowledgements	ii
Contents	iii
Glossary and Proposed Terminology	1
Introduction	3
Recommendations	3
Interdependence with other recommendations	4
Implementation requirements	5
Recommendation 13 – Building Approval Documentation	8
Current measures	9
Proposed measures	14
Recommendation 14: Documentation of Performance Solutions	19
Current measures	19
Proposed measures	22
Recommendations 15 and 16: Approval During and After Construction	24
Current Measures	25
Proposed measures	27
Implementation	29
Action 1 – Legislation includes broad / high level obligations	29
Action 2 – Regulation includes detailed obligations	29
Action 3 – Practice Guide	30
References	31
Appendix A: Tasmania Director’s Determination Schedule 1	32
Appendix B: Singapore documentation requirements for building approval	45
Appendix C: Performance Requirement Checklist	59

Glossary and Proposed Terminology

The BCR noted each jurisdiction has developed different ways of describing the same or similar terms and processes. This makes it difficult for governments to compare systems and share results and for businesses and consumers operating across jurisdictions or at a national level. To address this, the BCR recommended development of preferred language for jurisdictions to adopt over time as they revise and amend their laws (BCR recommendation 22).

If agreed by the ABCB and Building Ministers the preferred terms will be consolidated into a Preferred Terms Publication for adoption into State and Territory laws. Current legislative terminology used across Australia has been considered when developing the proposed terminology. The agreed terminology used in the Preferred Terms Publication will not be legal definitions unless adopted by jurisdictions.

This discussion paper proposes the following terms for inclusion in the Preferred Terms Publication:

- **Approval work** means acting as the building approval authority to authorise construction or occupation of a building under building approval legislation.
- **Assessment** means checking, verifying and peer-reviewing building proposals and inspecting and testing installation and construction work to determine whether it meets the performance requirements of the NCC.
- **Building approval** is the final certification that is required before building activity can commence, where building activity includes construction of new buildings, alterations and additions to existing buildings, the relocation of buildings between sites and other structural work. (other terms in common use include building permit and building consent)
- **Building approval applicant** is the owner, an agent of the owner, or the builder, who is an individual who applies for a building approval.

- **Building approval authority** means the legal entity that authorises construction or occupation of a building under building approval legislation of a state or territory.
- **Building surveyor** means an individual registered in the discipline of building surveying. (other terms in common use include building certifier)
- **Certifying** means forming an opinion or giving a certificate required under building approval legislation that a building meets the performance requirements of the NCC and other relevant state or territory legislation.
- **Declaration of Design Compliance** is a written document provided by a responsible design practitioner stating that the design work complies with the requirements of the NCC and any additional requirements of the jurisdiction.
- **Occupancy approval** is the final certification that is required before a building can be occupied. (other terms in common use include occupancy permit, occupancy certificate and certificates of occupancy)
- **Project Product Register** is a list of all products and systems expected to be used for compliance with structural and fire NCC Performance Requirements and is included as part of the building approval documentation.
- **Statutory building surveying work** means approval work, assessment and certifying which building approval legislation required to be done by a registered building surveyor.

Introduction

This discussion paper is a vehicle for seeking public feedback in relation to reforms proposed in response to recommendations 13–16 of the *Building Confidence Report (BCR)*.

Recommendations

Of the recommendations in the BCR, four recommendations addressed the process of design acceptance. These are addressed in this paper as follows:

Recommendation 13: That each jurisdiction requires building approval documentation to be prepared by appropriate categories of registered practitioners, demonstrating that the proposed building complies with the National Construction Code.

Recommendation 14: That each jurisdiction sets out the information which must be included in Performance Solutions, specifying in occupancy permits the circumstances in which Performance Solutions have been used and for what purpose.

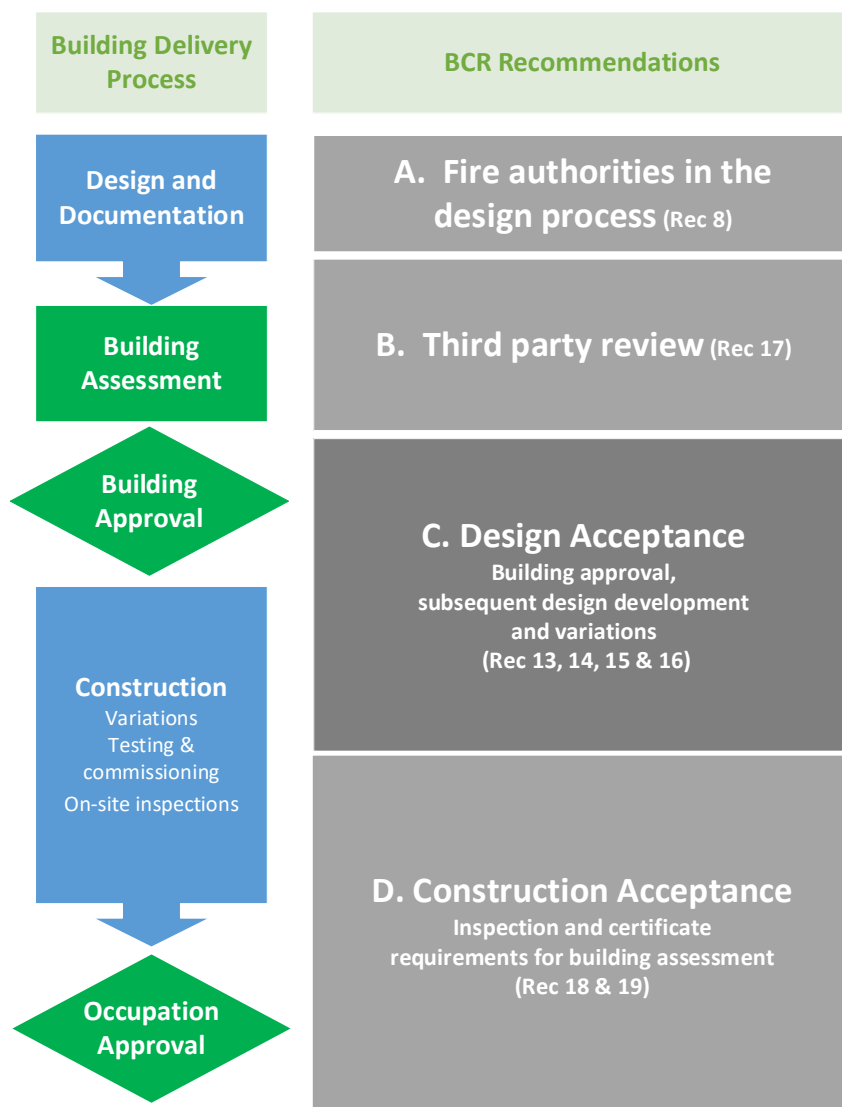
Recommendation 15: That each jurisdiction provides a transparent and robust process for the approval of Performance Solutions for constructed building work.

Recommendation 16: That each jurisdiction provides for a building compliance process which incorporates clear obligations for the approval of amended documentation by the appointed building surveyor throughout a project.

Recommendations 13–16 are specific to Design Acceptance within the Building Delivery phase. Together they seek to improve the standard and compliance of designs:

- as part of the building approval application process
- in relation to design variations made during the construction phase and in some cases constructed building work.

Figure 1: Building delivery process and the BCR recommendations

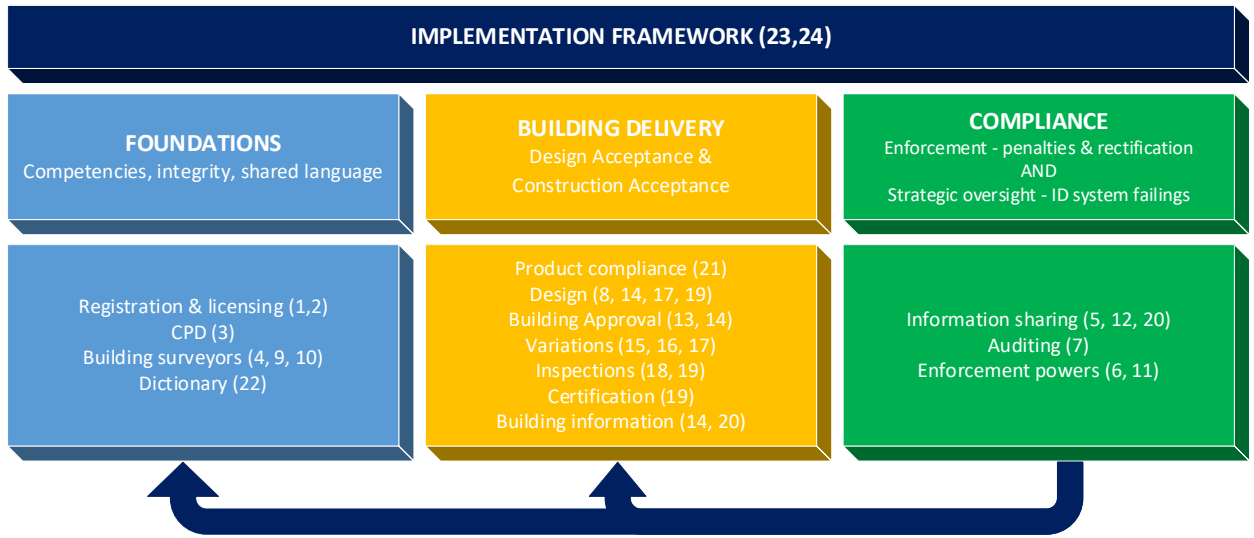


Interdependence with other recommendations

The BCR recommendations propose a suite of interdependent measures designed to improve ‘the effectiveness of compliance and enforcement systems for the building and construction industry across Australia’. Broadly, these measures seek to:

1. bolster the *foundations* of building control systems (recommendations 1–4, 9, 10 & 22)
2. improving mechanisms for design and construction acceptance during the *building delivery* phase (recommendations 8, 13–17, 19 & 20)
3. strengthen *compliance and enforcement* practices (recommendations 5, 6, 7, 11, 12, 20).

Figure 2: BCR implementation framework (Recommendations)



The effectiveness of these proposed measures relies on the implementation of:

1. measures designed to ensure building practitioners are competent, act with integrity and stay up to date with regulatory requirements
2. measures designed to strengthen compliance and enforcement functions
3. other measures designed to improve other elements of the building delivery phase, including product compliance, inspections, certification and building information.

Implementation requirements

The BCR authors included certain implementation requirements against each recommendation. These have been referenced in Table 1 and are discussed in more depth in the subsequent sections.

Table 1: Recommendations 13–16 and associated implementation requirements

BCR Recommendation	BCR Implementation requirements
<p>R13. That each jurisdiction requires building approval documentation to be prepared by appropriate categories of registered practitioners, demonstrating that the proposed building complies with the National Construction Code.</p>	<p>R13.1 Each jurisdiction’s legislation should expressly state that design documentation presented for building approval must:</p> <ul style="list-style-type: none"> a. adequately demonstrate compliance with the NCC b. include any relevant certificates of conformity, accreditations and other prescribed material c. require a declaration by each registered practitioner responsible that he/she reasonably believes that documentation demonstrates compliance with the NCC. <p>R13.2 At a minimum, this recommendation should be implemented in relation to building approvals for higher risk buildings such as many Commercial buildings.</p>
<p>R14. That each jurisdiction sets out the information which must be included in Performance Solutions, specifying in occupancy permits the circumstances in which Performance Solutions have been used and for what purpose.</p>	<p>R14.1 That each jurisdiction sets out the information which must be included in Performance Solutions, specifying in occupancy permits the circumstances in which Performance Solutions have been used and for what purpose.</p>
<p>R15. That each jurisdiction provides a transparent and robust process for the approval of Performance Solutions for constructed building work.</p>	<p>R15.1 In cases where Performance Solutions are introduced for work already constructed there needs to be a transparent and robust process for approval. This should require:</p> <ul style="list-style-type: none"> a. that the documented Performance Solution refers to the fact that it was developed in relation to constructed building work and indicates the reason why the Performance Solution was sought for that work b. that the building surveyor prepares a written statement of reasons for accepting a Performance Solution c. that notification of the request for the approval of a Performance Solution and the outcome of that request be given to the owner d. that the owner must consent or have an appeal right if they object to the use of the Performance Solution e. that the occupancy permit lists all Performance Solutions relating to the work and the date of their approval.

BCR Recommendation	BCR Implementation requirements
<p>R16. That each jurisdiction provides for a building compliance process which incorporates clear obligations for the approval of amended documentation by the appointed building surveyor throughout a project.</p>	<p>R16.1 Design development, variations and product substitutions should be approved by the building surveyor prior to associated work being carried out.</p> <p>R16.2 Where a project involves staged building approvals, the application for building approval should set out the proposed stages and the proposed design schedule.</p> <p>R16.3 Notification points should be agreed to ensure that the design for each stage is properly documented and presented to the building surveyor for approval before any work for that stage commences.</p>

Recommendation 13 – Building Approval Documentation

The BCR highlighted the fact that many building surveyors accept and approve designs based on documentation that is ‘often poor’.¹ This can create significant risks and issues throughout the construction phase and beyond.

The BCR also found that architects and engineers are often engaged early in a project to prepare initial documentation. Detailed construction documentation is then prepared by other practitioners who may not be aware of the assumptions underpinning the original design. This may lead to specific products or design aspects being substituted in a way that compromises the integrity of the original design. This can have a significant impact on the performance and compliance of the built product. The BCR highlighted this as a particular area of concern for fire safety engineering, which often includes “complex Performance Solutions on critical safety matters”.

The BCR’s authors recommended that the standard of approved designs and documentation be addressed ‘as a matter of priority’.

Table 2: Impacts of poor design documentation

On construction	During the construction phase, poor quality designs and documentation can: <ul style="list-style-type: none"> ▪ leave builders unsure how to proceed on site, leading them to improvise or ‘make decisions which may not be compliant with the NCC’² ▪ result in hidden costs to the builder in the form of rectification work ▪ allow builders to cut costs without owners being aware.
On building surveyors	The role of the building surveyor to assess compliance is compromised when the approval documentation lacks the necessary detail against which to assess.

¹ Shergold, P. and Weir, B., *Building Confidence Report: Improving the effectiveness of compliance and enforcement system of the building and construction industry across Australia*, February 2018, p. 28

² *ibid*, p. 28

On cost	Poor documentation has been found to add 10 – 15 per cent to project costs across Australia ³ . The lack of good documentation at the design stage is estimated to cause 60–90% of all variations ⁴ .
On building maintenance	The BCR noted that poor quality drawings may contain insufficient detail to “properly inform building risk and maintenance requirements”. This can affect the performance of the building over its entire lifecycle, creating risks in relation to the amenity and safety of Australia’s built environment. ⁵

Current measures

Some jurisdictions already have regulations that embody the intent of Recommendation 13, while others do not. Table 3 provides a summary comparison.

Table 3: Cross-jurisdictional comparison of documentation requirements for building approvals

Ref.	BCR Requirement	ACT	NSW	VIC	QLD	TAS	SA	WA	NT
R13	Documentation to be prepared by appropriately registered practitioners	×	✓	~	✓	~	×	×	~
R13.1 (a)	Documentation to adequately demonstrate compliance with the NCC	✓	~	~	~	✓	×	×	×
R13.1 (b)	Documentation to include any relevant certificates of conformity, accreditations and other prescribed material	×	×	✓	✓	~	×	~	×
R13.1 (c)	Documentation to include a declaration by each registered practitioner	×	✓	~	~	~	×	×	~

✓ Provisions resemble the recommended approach

³ *Getting it Right the First time: a plan to reverse declining standards in project design documentation within the building and construction industry*, October 2005, p.6

⁴ *ibid*, p. 6

⁵ Western Australia Department of Mines, Industry Regulation and Safety, *Consultation Regulatory Impact Statement Reforms to the approval process for commercial buildings in Western Australia*, December 2019

- × No provisions resembling the BCR recommendation
- ~ Some provisions partially implementing the BCR recommendation

Some jurisdictions already require design documents to be prepared by prescribed categories of registered practitioner (see Table 4). Effective implementation of Recommendation 13 is also reliant on each jurisdiction implementing BCR recommendations 1 and 2, namely:

- architects, engineers, designers and draft persons (among other practitioners) should be registered across all jurisdictions
- jurisdictions should prescribe consistent registration requirements, including compulsory training, competency and experience requirements.

Table 4: Cross-jurisdictional comparison of registration requirements for preparation of design documentation (R13)

ACT	Nil
NSW	Any design, principal design or building practitioner who intends making a compliance declaration (NCC Class 2 buildings and mixed-use buildings with a Class 2 component) is to be registered under a new scheme set out in Design and Building Practitioners Act 2020.
VIC	<p>Building Regulations 2018 defines eight categories of building practitioner. Of those eight categories the following relate to the design professions:</p> <ol style="list-style-type: none"> 1. Draftsperson in the classes of: Building Design (Architectural); Building Design (Interior); and Building Design (Services); and 2. Engineer in the classes of: Civil; mechanical; electrical; and fire safety. <p>Each category has specific requirements outlining minimum levels of experience and competency to undertake those roles which is managed by the Victorian Building Authority.</p> <p>Architects are registered under the Architects Act 1991 which is managed by the Architects Registration Board of Victoria.</p> <p>Registration as a building practitioner allows the ability to be nominated as the responsible practitioner on the building approval for contractual works above \$10,000 or if preparing civil, mechanical or electrical plans or other documentation for permits if that work is done for an engineer.</p>
QLD	<p>Building design is licensed work.</p> <p>Builders can prepare design documentation for their own projects.</p>

TAS	Duties and responsibilities of designers provided under the Building Act 2016 Must hold a license where required under the Occupational Licensing Act 2005. Requirement of licensee to “act within the area of competence”. In the case of staged permits, the building surveyor must approve staging and design.
SA	Nil
WA	Nil Reform process is considering changes.
NT	Building practitioners who issue a compliance certificate (design or construction) that can be relied upon by a building certifier must be registered.

For the most part, jurisdictions have a general requirement that buildings comply with the NCC but do not prescribe specific requirements regarding the documentation itself. Some jurisdictions list the documents that should accompany a building approval but there are no requirements that prescribe how the documentation should demonstrate or communicate compliance.

Table 5 compares the approaches across jurisdictions.

Table 5: Comparison of jurisdictional requirements for evidence of NCC compliance (R13.1 (a))

ACT	Building (Minimum Documentation and Information for Building Approval Applications – Class 2-9 Buildings) Guideline 2019. Minimum documentation requirements for building approval lodgement for Class 1 and 10.
NSW	Under the Design and Building Practitioners Act 2020 (s8), practitioners need to provide a declaration about compliance of designs and building work. Regulations currently under development will provide lodgement requirements for designs, declarations and other documents at various points before, during and after construction.
VIC	Building Regulations 2018 Part 4 (Division 2) prescribe what documents must and may be required for an application to a Building Permit. As part of the reporting procedure to the regulator this data is transferred electronically via the BAMS (Building Activity Management System) portal.
QLD	Documents provided as part of a building development application must demonstrate compliance with building assessment provisions (ss.25, 26 and

	30). The documents relied on are to be listed on the 'Lodgement of building work documentation' (Form 20).
TAS	'Certificate of Likely Compliance' (Form 11A) must be supported by the documentation detailed in Director's Determination Schedule 1 (at Appendix A). Details of Performance Solutions are also to be included. Documentation is to include sufficient information to assess the work in accordance with the Act. Documentation is sufficiently detailed for a licensed builder or a licensed plumber to perform the work in accordance with the documents and the Act.
SA	NCC requirements need to be satisfied before a 'building consent' can be granted, at design stage.
WA	Nil Reform process is considering changes.
NT	Nil

Table 6 compares the approaches across jurisdictions to ensure that the relevant certificates of conformity, accreditations and other prescribed material is included in the building approval documentation.

Table 6: Comparison of jurisdictional requirements for including prescribed material (certificates of conformity, accreditations etc) (R13.1 (b))

ACT	Nil
NSW	Nil
VIC	Regulation 25 requires computations and/or reports necessary to demonstrate compliance. Under Regulation 29 the building surveyor may require further information, including documentary evidence to support the use of a material, product, form of construction or design in a form referred to in clause A5.2 of the NCC. May also request a list of any essential safety measures to be provided for the building or place of public entertainment to which the building approval relates.
QLD	Chain of responsibility legislation for the "required information" to demonstrate fitness for purpose for products to be incorporated into buildings when passed along the chain. (QBCC Act 1991)
TAS	Certificate of Likely Compliance (Form 11A) is to detail the 'documents and matters' that were taken into account.

SA	A decision notice for building consent (building approval) will state what certificates etc. must be furnished with the Statement of Compliance.
WA	Building Act 2011 prescribes the documents that must accompany a building approval. Reform process is considering changes. Regulatory Impact Statement has been prepared for consultation.
NT	Nil

New South Wales and Tasmania are the only jurisdictions whose laws require certain practitioners to provide declarations of compliance. Victoria, Queensland and the Northern Territory legislation creates the option for building surveyors to rely on certificates of compliance issued by certain categories of building practitioner.

Table 7 compares the approaches across jurisdictions.

Table 7: Comparison of jurisdictional requirements for declarations by registered practitioners (R13.1 (c))

ACT	Nil
NSW	Design practitioners who prepare 'regulated designs' issue a compliance declaration (NCC Class 2 buildings and mixed-use buildings with a Class 2 component) to declare whether or not the designs comply with the NCC. Building practitioners must issue a compliance declaration as to whether or not the constructed building complies with the NCC. This declaration must be provided to the 'Principal Certifier' before or when the application for an occupation certificate is made. Regulations currently under development will provide lodgement requirements for regulated designs, declarations and other documents at various points before, during and after construction.
VIC	Building Act 1991 (s.238) provides a building surveyor the ability to rely on a Certificate of Compliance by a registered building practitioner in a prescribed category or class of practitioners. A registered building practitioner must not give a Certificate unless the Certificate states that the registered building practitioner has inspected that building work. Certificates can be relied upon in relation to a design of a building of any Class, or the inspection of domestic building work or prescribed temporary structures. A Certificate must state that the proposed building work, or as constructed building work complies with provisions of the Act and the Regulations. If a Certificate of Compliance is not provided the Relevant Building Surveyor (RBS) is responsible for checking the design for compliance. The RBS may

	cause independent checking to be carried out in order to be satisfied that compliance is achieved.
QLD	Competent persons and Queensland Building and Construction Commission (QBCC) licensees can give design/ specification help by providing a Form 15 to certify that “a building design or specification will, if installed or carried out under the certificate, comply with the relevant building laws”.
TAS	<p>Under the Building Act 2016 the design of the building work or plumbing work is to be in accordance with the standards and requirements of the Act.</p> <p>A ‘Certificate of the Responsible Designer’ (Form 35) is required where a designer is responsible for a part of the design and declares:</p> <ul style="list-style-type: none"> • “The documentation relating to the design includes sufficient information for the assessment of the work in accordance with the Building Act 2016 and sufficient detail for the builder or plumber to carry out the work in accordance with the documents and the Act; • This certificate confirms compliance and is evidence of suitability of this design with the requirements of the National Construction Code.” <p>Building surveyors are to provide a “Certificate of Likely Compliance” (Form 11A) to certify that proposed building work is ‘likely to comply’ with the Act and NCC.</p>
SA	<p>The Statement of Compliance is required prior to the issuing of a Certificate of Occupancy (issued by building certifier or council).</p> <p>At end of construction a Statement of Compliance must be co-signed by builder and owner to confirm that building has been constructed in accordance with the plans (drawings link back to original NCC-linked approval).</p>
WA	<p>Nil</p> <p>Reform process is considering changes.</p>
NT	Registered design practitioners can issue certificates in relation to building work which declare that the designs comply with the NCC and other standards. Those certificates can be relied on by building certifiers when issue building approvals.

Proposed measures

To fulfil the BCR recommendation, it is proposed that the design documentation provided to the building surveyor is sufficiently detailed and robust to meet the following objectives:

- A. demonstrate how compliance with each relevant NCC Performance Requirement will be achieved and document the assessment methods employed in support of the design

- B. allow the building surveyor to conduct a holistic assessment of the project, in particular all the fire safety measures, Performance Solutions and multiple buildings that are connected or integrated
- C. enable the building (or interrelated buildings) to be constructed in accordance with the NCC, nominated legislation and regulations
- D. allow the building surveyor to conduct the compliance assessment during construction
- E. provide information on each of the registered and licensed practitioners responsible for the design, certification and construction.

In order to achieve these objectives, the following measures are proposed:

- M13.1 *Declarations of Design Compliance* providing surety that each practitioner with responsibility for a component of the design confirms that their work complies with the NCC and any additional jurisdictional requirements.
- M13.2 *General requirements* outlining the minimum information to be contained in building approval documentation
- M13.3 *Staged projects requirements* outlining the minimum information to be contained in building approval documentation for staged approvals
- M13.4 *A Project Product Register* included within the building approval documentation; containing relevant certificates of conformity, accreditations and other prescribed material.

Table 8 describes these measures in more detail.

Table 8: Proposed measures responding to Recommendation 13

M13.1 Declarations of compliance	<ul style="list-style-type: none"> a. Practitioners responsible for producing an aspect of the building design must provide a '<i>Declaration of Design Compliance</i>' (assuming that design aspect has compliance implications). b. The requirement to provide a Declaration will apply to the work of each architect, building designer, and engineer including the various sub-classes of engineer, such as fire safety, façade, civil, structural, mechanical, electrical and hydraulic engineers. c. The Declaration will state that the practitioner confirms compliance of the design aspect with the relevant requirements of the NCC, as well as any additional requirements determined by each jurisdiction. (For example: the Queensland Development Code, Part 5 Siting Controls in Victoria, the design quality principles listed in SEPP 65 in NSW and the Health (Public Buildings) Regulations 1992 in WA.) d. Each practitioner providing a Declaration must be appropriately registered as per the BCR National Registration Framework (BCR recommendations 1 and 2).
---	--

	<ul style="list-style-type: none"> e. The Declaration must include details of the practitioner’s relevant qualifications and/or experience specific to the design work. Experience is to take the form of projects that they have worked on and detail the actual involvement. f. Where the design work is undertaken by a practitioner without the necessary registration, a practitioner registered in the appropriate category must supervise and check the work as well as provide a Declaration. g. Projects above a defined risk or complexity level⁶ are required to have a ‘<i>Declaration of Design Compliance</i>’ by a ‘Lead Designer / Designer of Record’ who will ensure each element of the design works together as a whole. h. In carrying out their design acceptance function, the building surveyor may rely on ‘<i>Declarations of Design Compliance</i>’ for specific components of the design once they satisfy themselves that the Declaration was provided by a registered engineer and that the engineer has adequate experience relevant to the building and NCC Performance Requirement/s to which the Declaration relates. In making this determination they can rely on the practitioner register maintained by the relevant jurisdiction. (Links to BCR recommendations 1 and 2). i. In relying on the Declarations, the building surveyor is to assess how the individual components work together in the whole design. Specifically, they are required to critically review any qualifiers, conditions and assumptions that might be included in the Declaration/s to determine how it affects compliance of the project as a whole.
<p>M13.2</p> <p>Documentation requirements (general)</p>	<p>Documentation must include (as a minimum):</p> <ul style="list-style-type: none"> a. details of the registered practitioners with responsibility for the design of the building b. site identification, characteristics and conditions impacting the design (e.g. title, survey plan, soil sampling, climate zone, easements, vegetation, known hazards etc) c. site plan including confirmed boundaries, setbacks, dimensions, levels, directions of the land, north point, existing buildings and other site features that may impact the design d. any Council decision notice or other referral body that conditions the site e. description of the building work to be carried out including the building Class and Type f. NCC Performance Requirement checklist that identifies whether the Deemed-to-Satisfy or Performance Solution pathway was relied on (example is provided at Appendix C) g. complete construction drawings that are fully dimensioned and to suitable scale, including but not limited to: <ul style="list-style-type: none"> i. floor plans, slab plan, floor framing plan, roof plan (including framing and bracing plan), drainage plan and elevations where applicable to the approval stage ii. each elevation with relevant floor levels and heights, design and finishes iii. sections and details showing all building elements and construction methods

⁶ Risk level to be determined by a framework such as existing descriptors in the NCC (Building Classification, Construction Type or Importance Level) or the ABCB’s Complex Buildings draft.

	<ul style="list-style-type: none"> iv. provision for fire safety and fire resistance, showing which elements are fire resisting, the proposed level of fire resistance and any fire compartmentation including sealing and separation details. h. ‘Declaration of Design Compliance’ from each designer responsible for an aspect of the design that is required to comply i. specification that describes the materials to be used and detail their Evidence of Suitability (as per BCA A5.1 and A5.2) in a Project Product Register (see M13.4 below) j. any other Evidence of Suitability (NCC A5.1 and A5.2) relied upon k. any Performance Solution proposed and Verification Method (see Recommendation 14 for further detail) l. prescribed response to fire authority advice (as per Recommendation 8) m. other required third-party review (detail in Recommendation 17) n. any determination made by an Appeal Tribunal where applicable o. where the proposed building work, particularly excavation work, may impact adjacent land, property or services, a ‘Declaration of Design Compliance’ from a relevant engineer (structural, geotechnical etc) and evidence of the neighbouring owner’s consent p. any other documents relied on by the design team. <p>The building surveyor has discretion as to the level and quality of information and documentation that is ultimately accepted and relied upon. They are not to provide an approval without being confident that they have sufficient information.</p> <p>If the building approval documentation is lacking in detail, a request for further information must be made before determining the application. The building surveyor is not to make assumptions or supplement the application with additional material.</p> <p>There may be limited circumstances where it is necessary for the building surveyor to condition an approval. This could be where it is difficult to detail the minimum requirements of bespoke and complex building systems under a Performance Solution, such as hydrant or smoke detectors. To cover these circumstances guidance will be provided to provide direction on what would constitute a valid condition.</p> <p>The building surveyor may also condition an approval to require inspections and/or testing during installation to yield additional documentation to determine compliance.</p>
<p>M13.3 Documentation requirements (staged projects)</p>	<ul style="list-style-type: none"> a. Where any of the detail cannot be provided with the initial approval a ‘staged approval schedule’ detailing when the required information will be forthcoming must be documented in the approval at the first stage. b. Over the ‘stage approval schedule’ the design work is to meet the same minimum documentation requirements. c. There will be a ‘Declaration of Design Compliance’ that covers the full concept to the extent that it has been detailed and provided with the first approval. Further ‘Declarations of Design Compliance’ will cover the subsequent stages, such as basement to ground, full structure, lift cores and final (acoustics, cladding etc).

	<p>d. Later Declarations, for subsequent stages, must include a declaration that the subsequent design aspect does not impede the compliance of all the previous stages</p>
<p>M13.4 Project Product Register</p>	<p>a. Building approval documentation must include a <i>'Project Product Register'</i> (the Register).</p> <p>b. The Register is to be complied by the lead designer on the project.</p> <p>c. The Register must list all products and systems expected to be used for compliance with structural and fire Performance Requirements. Specifically, Section B and C of the BCA Volume One / Part 2.1 and 2.3 of BCA Volume Two. It would also include elements identified as requiring attention arising from any regulators' audit process (Recommendation 7).</p> <p>d. The Register must detail:</p> <ul style="list-style-type: none"> i. product description, ii. application and intended use, iii. compliance with the NCC (and jurisdiction legislation where applicable) including the standard it was tested to and test results; iv. relevant limitations and/or conditions of use; v. installation and maintenance instructions; and vi. where to go for further information. <p>e. The required information would be drawn from the Product Technical Statement template (ABCB's Evidence of Suitability Handbook 2018) which under the Building Product Safety (BCR recommendation 21) is proposed to be mandated information for certain product types.</p> <p>f. Preparing a Register at the design stage would flag for all practitioners involved in the design and construction of the building the specific products proposed to be installed in higher risk applications. It is to be used to help ensure that products used in higher risk applications are investigated thoroughly and evidence of suitability is sought early in the process.</p> <p>g. It is also to provide the information necessary to flag when product substitution occurs and requires further assessment /approval. If changes become necessary throughout the project these are to be addressed through the processes described under BCR recommendation 16 (variations) and the Register should be updated accordingly.</p>

Recommendation 14: Documentation of Performance Solutions

The BCR's authors found that documentation relating to Performance Solutions is poor in general. They observed that 'there is a lack of basic information on matters such as the relevant Performance Requirements and the assessment methods applied'. As a result, there is little assurance that Performance Solutions are approved based on 'empirical analysis, modelling and/or testing'.

Current measures

National Construction Code

The NCC (A2.2) currently requires that one or more of the following Assessment Methods must be used to demonstrate compliance of a Performance Solution:

1. evidence of suitability (A5.1- 6)
2. verification methods (tests, inspections, calculations etc)
3. comparison with the Deemed-to-satisfy provisions
4. expert judgement where physical criteria are unable to be tested or modelled by calculation.

Alternatively, a Performance Solution can be developed as per A2.2 and A5.2 using a:

- a. CodeMark Certificate of Conformity or a Certificate of Accreditation; or
- b. Verification Method listed in the NCC which has 'verified compliance' with the relevant Performance Requirement to which it relates.

This assessment framework provides significant discretion in the supply and acceptance of evidence of compliance.

In response, Performance-Based Design Briefs (PBDBs) were introduced into the NCC. An amendment to NCC 2019 mandates PBDBs under each Volume of the Code as a vehicle for the preparation, analysis and documentation of performance-based solutions. The amendment is effective from July 2021.

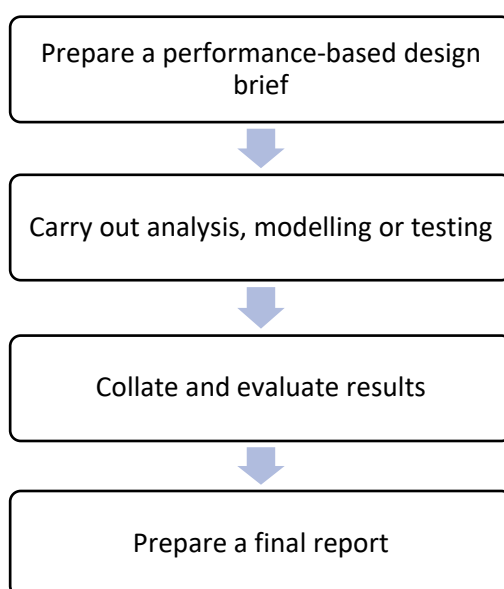
The PBDBs are documents designed to facilitate and record the activities and agreed outcomes of the performance-based design process.⁷ Once implemented, it will become the basis for approval and construction. The PBDB process is summarised in Figure 3 and the Amendment wording is included below.

NCC 2019 Amendment 1

Where a Performance Requirement is proposed to be satisfied by a Performance Solution the following steps must be undertaken:

- a. Prepare a PBDB in consultation with relevant stakeholders.
- b. Carry out analysis, including modelling and/or testing, as proposed by the PBDB.
- c. Collate and evaluate results from (b) against the acceptance criteria in the PBDB.
- d. Prepare a final report that includes:
 - i. all Performance Requirements and/or Deemed-to-Satisfy Provisions identified through A2.2(3) or A2.4(3) as applicable; and
 - ii. identification of all Assessment Methods used; and
 - iii. details of steps (a) to (c); and (iv) confirmation that the Performance Requirement has been met.

Figure 3: PBDB process



⁷ Australian Building Codes Board, *Development of Performance Solutions: Guidance Document*, https://consultation.abcb.gov.au/engagement/developing-performance-solutions/user_uploads/guidancedocumentforperformancesolutions2016.pdf, Version 2.1

The ABCB has provided further guidance on the process in a document titled “Development of Performance Solutions: Guidance Document”.

The building approval documentation requirements proposed in response to BCR recommendation 13 will also apply to the design and approval of performance-based solutions.

Jurisdictional comparisons

In addition to the requirements in the NCC, each jurisdiction imposes its own requirements relating to the documentation of Performance Solutions. These are summarised in Table 9.

Table 9: Documentation of Performance Solutions (cross-jurisdictional comparison)

ACT	Where used must state relevant Performance Requirements and assessment method.
NSW	Requirements to detail Performance Solutions for fire safety are detailed in the Environment Planning & Assessment Regulation 2000. The Design and Building Practitioners Act 2020 contains specific obligations for design practitioners and building practitioners in relation to Performance Solutions, requiring designs (including for variations) are the subject of a declaration and that building work is carried out in consistent with those design/s.
VIC	Requirements to document Performance Solutions on both the Building approval and Occupancy Permit. Includes recording in writing the determination that the Building Surveyor deems a Performance Solution achieves compliance with the Performance Requirements of the BCA. The prescribed building approval form must include specific details that demonstrate these matters. - Part 4 (Division 2) of the Building Regulations 2018 Building regulations also prescribe requirements for documenting information on Performance Solutions related to fire by a registered Building Practitioner that is certifying compliance.
QLD	Certifier must prepare a statement of reasons why they approve the Performance Solution. Requirements for recording on the Occupancy Certificate.
TAS	Owners must acknowledge in writing that they are aware of all Performance Solutions. All Performance Solutions are to be listed on the occupancy permit. Commercial building owners must be provided with a ‘Schedule of Maintenance Prescribed Essential Building Services’ (Form 46) which details the maintenance requirements of all essential safety features, including maintenance arising from the use of Performance Solutions.

SA	Use of Performance Solutions must be recorded in the Occupancy Certificate (Form 2 – ‘Essential Safety Provisions’).
WA	May require a Performance Solution to be included in the ‘Essential Safety Provisions’ required for commercial building prior to building occupation. Class 2-9 buildings – the ‘Certificate of Design Compliance’ must include a statement from the building surveyor on each Performance Solution, including the building standard that it applies to the building work and details of the assessment methods used to establish compliance with the building standard (Building Regulations 2012 (WA) r18A(c)).
NT	No requirements in legislation. Guidelines require documentation to be lodged with the Director regarding assessment method, maintenance requirements and conditions etc.

Proposed measures

While the process for development of Performance Solutions has been addressed under NCC 2019 Amendment 1, there is more detail that can be specified in the project documentation. This should be included in the PBDB Final Report, detailed in Table 10 below. This is to apply equally to Performance Solutions under each Volume of the NCC.

Table 10: Proposed measures responding to Recommendation to document Performance Solutions

M14.1 PBDB Final Report (requirements)	<ul style="list-style-type: none"> a. The building approval documentation provided to the building surveyor must include the PBDB Final Report. b. The practitioner/s responsible for preparing the Final Report must provide a ‘Declaration of Design Compliance’. c. The building surveyor must not participate in the design for the Performance Solution or the preparation of the Final Report. They may provide general advice on how to achieve NCC compliance. (This will be covered in detail under BCR recommendation 9 and has been included in the National Model Code of Conduct for Building Surveyors: prepared to address BCR recommendation 10.) d. The level of detail provided in the Final Report is to be commensurate to the complexity of the Performance Solution being designed.
M14.1 PBDB Final Report (contents)	<ul style="list-style-type: none"> a. The Final Report must include an Overview that contains (as a minimum): <ul style="list-style-type: none"> i. project details and address ii. relevant stakeholders iii. methods of analysis and assumptions iv. acceptance criteria and safety factors agreed by stakeholders

	<ul style="list-style-type: none"> b. The Final Report must include a description of the analysis, modelling and testing that contains (as a minimum): <ul style="list-style-type: none"> i. a description of assessment method or methods used to establish compliance with the relevant Performance Requirements ii. a description of how the Performance Solution is different from the relevant deemed-to-satisfy provision c. The Final Report must include an Evaluation of Results that: <ul style="list-style-type: none"> i. references (and attaches if applicable) any computations, reports, manufacturer's information, certificates, test reports, determinations, Standards etc. that were relied upon in assessing the Performance Solution. ii. includes evidence of a third-party review, in circumstances where one is required (BCR recommendation 17). iii. details any Expert Judgement, including the extent to which the judgement was relied upon and the relevant qualifications and experience of the expert and professional indemnity insurance (if applicable). There should also be evidence that the expert is independent from the practitioner responsible for preparing the Performance Solution. d. The Final Report must include a conclusion that contains: <ul style="list-style-type: none"> i. the Specification of the final design ii. the Performance Requirement with which the Performance Solution complies and whether it wholly or partially satisfies the Performance Requirement iii. specific on-site inspections by the building surveyor or delegate required for construction acceptance iv. all limitations to the design and any conditions of use in particular, any ongoing maintenance or conditions that must be met to ensure the Performance Solution complies over the life of the building v. any other relevant information necessary to assess compliance.
<p>M14.4 Occupancy Certificate requirements</p>	<p>The details of all Performance Solutions must be recorded on the occupancy certificate. This includes:</p> <ul style="list-style-type: none"> a. detail on where Performance Solutions have been used and for what purpose b. any ongoing maintenance or conditions that must be met to ensure the Performance Solution complies over the life of the building.

Recommendations 15 and 16: Approval During and After Construction

There are various circumstances in which variations can occur during construction, as well as after the building is complete.

Design and construct contracts

BCR recommendations 13 and 14 address the adequacy of documentation for the initial approval. Nevertheless, under many commercial arrangements, such as design and construct contracts, it will remain common practice for the design documents to be further developed during the construction process.

By the time these documents are further developed, however, the architect, designer or engineers who prepared the original plans are often no longer involved. This means the building work may be varied without proper consideration of the assumptions underpinning the original design. Significant impacts on the integrity and compliance of the built product may result.

New information

As projects progress through the delivery phase, information may come to light that necessitates a departure from the original design. The use of variations allows for innovation and flexibility in such circumstances.

“The more complex the building project, the higher the likelihood there will be changes to design, specification or other critical elements through the construction phase. While this is considered normal for complex projects, it is an issue that can cause significant problems with overall compliance with the NCC.”⁸

⁸ Queensland Department of Housing and Public Works, Queensland Guidelines for the inspection of class 2 to 9 buildings, June 2012

“It is recognised that design is an iterative process, as designs can change, and these changes can occur at any stage of the project.”⁹

Post-facto approvals

For various reasons, sometimes the built product ends up departing from the approved design. In such cases, this may result in a variation to the building approval being retrospectively applied and assessed by the building surveyor.

These scenarios may or may not be material to the occupancy and use of the building. A post facto approval provides an opportunity for the building to be occupied and any outstanding dispute resolved through contractual mechanisms.

Any process to enable the retrospective approval needs careful consideration, particularly where Performance Solutions are involved. Retrospective approval undermines the principle that Performance Solutions are intended to be ‘prospective’ in nature. In addition, since the work has already been completed, it can be difficult for the building surveyor to undertake a proper and comprehensive assessment of a proposed Performance Solution and its holistic impact on the building.

Where the builder deals directly with the building surveyor, the owner of the building may not know the Performance Solution has been retrospectively approved¹⁰. This may mean the owner is not given the opportunity to agree to changes that may have ongoing maintenance and management implications over the lifespan of the building.

Current Measures

The BCR’s authors observed that:

“Some systems have no clear requirements for building surveyors to approve design development and variations. Others have statutory

⁹ The Warren Centre, *Fire Safety Engineering: Roles of Fire Safety Engineers*, <https://www.sydney.edu.au/content/dam/corporate/documents/faculty-of-engineering-and-information-technologies/industry-and-government/the-warren-centre/the-roles-report-fire-safety-engineering-the-warren-centre.pdf>, March 2020, p. 34

¹⁰ Shergold, P. and Weir, B., *Building Confidence: Improving the effectiveness of compliance and enforcement systems for the building and construction industry across Australia*, February 2018, p. 30

*controls but there is no auditing and enforcement to ensure they are being complied with.*¹¹

Table 11 lists existing measures across the states and territories.

Table 11: Regulation of variations to the building approval (Cross-jurisdictional comparison)

ACT	Provisions for seeking amendment to approved plans.
NSW	The Design and Building Practitioners Act 2020 requires that any variations to declared designs are re-prepared and declared by a design practitioner if they relate to a building element or Performance Solution, or in any other case, documented by the building practitioner. The building practitioner is also obligated to ensure the build is consistent with the designs.
VIC	It is an offence to carry out building work which does not comply with the building approval. A variation to the building approval must therefore be sought before work proceeds. While the owner’s approval should be sought, the registered building surveyor can still approve if appropriate. Where Performance Solutions can be used for constructed building work must include detailed documentation. If approved the Registered Building Surveyor must record their decision. ¹² Variations to the building approval are recorded in the BAMS system and reported to the Victoria Building Authority electronically.
QLD	Building work must proceed in accordance with the building approval.
TAS	Must vary building approval before work can be varied. When work has proceeded not in accordance with building approval building surveyor is to issue direction, notice or order on the responsible person. If they fail to comply, the order may be provided to local government Permit Authority for enforcement. Owner’s approval of all Performance Solutions is required.
SA	Amendments must be submitted to the authority responsible for the original building approval. Should it be deemed a significant change it will require a new application.
WA	Building Act requires that building work complies with building standards and permit authorities have powers to prosecute where a contravention of the Building Act occurs.

¹¹ Shergold, P. and Weir, B., *Building Confidence: Improving the effectiveness of compliance and enforcement systems for the building and construction industry across Australia*, February 2018, p. 31

¹² Victorian Building Authority, *Practice Note 63-2018 Performance Solution Procedures and Documentation*, April 2014

	Where the variation requires a building permit then an application should be made as soon as practicable and prior to the builder submitting a notice of completion under Building Act (s. 33) ¹³ .
NT	All building work must have a valid building approval. The building approval must be varied before approved work can be varied. Building approvals can only be varied on application by the owner.

Proposed measures

Table 12 lists the proposed measures responding to BCR recommendation 15 and 16.

Table 12: Proposed measures responding to BCR recommendations for documentation and approval of variations during and after construction

M15/16.1	The builder is responsible for notifying the building surveyor when there are variations to the approved plans or supporting documents prior to the work being carried out. This includes variations in the work carried out by sub-contractors such as plumbers.
M15/16.2	The building surveyor will determine whether the change affects the way the building complies with the NCC; whether it changes the building approval. If it does not, then the work may be undertaken without further documentation. Even if the variation is covered by self-certification as in the case of plumbers, it is still to be referred to the building surveyor to conduct a holistic assessment.
M15/16.3	If the variation amends how the building complies with the NCC the following applies: <ul style="list-style-type: none"> a. The building approval applicant must document how the variation meets the NCC Performance Requirements. b. Where a variation affects an area of the design that was subject to third party review (BCR recommendations 8 & 17) then the matter must be referred back to the reviewer to assess. c. Where the variation impacts design covered in a Declaration of Design Compliance, a new Declaration must be provided that incorporates the variation. d. The variation must be approved by the building surveyor prior to the work being carried out. In making a determination the building surveyor will need to consider that any amendment is consistent with the approved design as a whole. e. Record the variation as an addendum to the approved plans.
M15/16.4	a. The above obligations (M15/16.1 – M15/16.3) are to be accompanied by offence provisions with significant penalties for builders who do not comply.

¹³ Western Australian Department of Mines, Industry Regulation and Safety, Building Commission, *Industry Bulletin IB 003/2012: Variations and amendment to building work*, 4 May 2012

	<p>b. The building surveyor will have an obligation to inform the state building regulator as soon as they become aware that work has proceeded not in accordance with the building approval.</p>
M15/16.5	<p>There may be occasions where the work does not proceed in accordance with the approved documentation and a variation is required for constructed building work. In these circumstances:</p> <p>a. The variation must be fully documented as per BCR recommendations 13 and 14 (above).</p> <p>b. The building surveyor must prepare a statement of reasons for accepting the variation to the building approval on constructed building work.</p> <p>c. If the variation is not accepted by the building surveyor, they are to undertake the necessary enforcement action to bring about compliance.</p>
M15/16.6	<p>If the variation to the building approval for constructed building work includes a Performance Solution:</p> <p>a. a copy of the documentation and statement of reasons is to be provided to the state regulator</p> <p>b. the owner must be notified of the proposed Performance Solution and have a right of appeal.</p>
M15/16.7	<p>State and territory building regulators to implement audit programs that monitor the compliance of documentation and the approval of variations. This should include the targeting of Performance Solutions as part of post-facto approvals of completed building work.</p>

Implementation

The proposed outcomes can be adopted as nationally agreed principles that are then implemented through one or a combination of the following three actions.

Action 1 – Legislation includes broad / high level obligations

Each jurisdiction includes in its legislation, as appropriate, general high level requirements for industry to comply with each of the elements of the Proposed Outcomes. For example, the documentation supporting a building approval is to demonstrate how the building work will comply with the NCC and relevant legislation.

It will continue to be up to the discretion of the building surveyor to determine the detail they require to be satisfied that the documentation demonstrates compliance.

To achieve national consistency model legislation for adoption in each jurisdiction as appropriate could prepared and coordinated by the ABCB.

Action 2 – Regulation includes detailed obligations

In addition to general high level requirements, each jurisdiction includes in its regulation, as appropriate, detailed requirements for industry to comply with each of the elements of the Proposed Outcomes. This would be a prescriptive approach that details the exact nature of the documentation and process required.

For Class 1 and Class 10 an example is the Tasmanian approach where the minimum requirement for design documentation buildings are detailed in a Director's Determination. Schedule 1 is at Appendix A.

For Class 2–9 the minimum level of documentation could be drawn from the example provided by Singapore, provided at Appendix B.

Where a project is being managed through Building Information Modelling (BIM), the international standard adopted by Australian Standards, *AS/ISO 16739 Industry Foundation Classes (IFC) for data sharing in the construction and facility management industries* would serve as the minimum requirements.

The risk in this approach is that the requirements are set too high. The BCR found that this would lead to unnecessary costs being imposed and may mean the initial approval takes longer. “Owners might also be tempted to avoid the building approval process altogether.”¹⁴

To achieve national consistency, model provisions for adoption in each jurisdiction as appropriate, could be prepared and coordinated by the ABCB.

Action 3 – Practice Guide

The appropriate process for Design Acceptance could be documented in a detailed Practice Guide for use as a reference by each practitioner and the state regulators.

The guiding principles would be included along with more detailed checklists, forms and practice notes. It would provide guidance on the level of design detail expected. For example:

“The design drawings include the selected footing systems, any special site works, means of diverting surface water away from the slab, actual location of control joints in brick and masonry construction (including control joint in internal linings). Location of retaining walls, and requirements for articulation (flexible joints) in storm water and sanitary draining¹⁵.

“It is insufficient to specify cladding on a building over three storeys as Aluminium Composite Panel (ACP) on the basis that the builder will choose the right one. The Panel must be specified as an actual compliant product (e.g ACP with a mineral core containing less than x % PE).”¹⁶

¹⁴ Shergold, P. and Weir, B., *Building Confidence: Improving the effectiveness of compliance and enforcement systems for the building and construction industry across Australia*, February 2018, p.29

¹⁵ Queensland Building and Construction Commission, *Queensland Rectification of Building Work Policy*, October 2014

¹⁶ Tasmania Department of Justice, *Occupational Licensing (Building Surveyors) Code of Practice 2018 – Tasmania*, <https://ablis.business.gov.au/service/tas/occupational-licensing-building-surveyors-code-of-practice-2018/40368>, March 2018

References

Australian Building Codes Board, *Development of Performance Solutions: Guidance Document*, https://consultation.abcb.gov.au/engagement/developing-performance-solutions/user_uploads/guidancedocumentforperformancesolutions2016.pdf, Version 2.1

Getting it Right the First time: a plan to reverse declining standards in project design documentation within the building and construction industry, October 2005

Queensland Building and Construction Commission, *Queensland Rectification of Building Work Policy*, October 2014

Queensland Department of Housing and Public Works, *Queensland Guidelines for the inspection of class 2 to 9 buildings*, June 2012

Shergold, P. and Weir, B., *Building Confidence: Improving the effectiveness of compliance and enforcement systems for the building and construction industry across Australia*, February 2018

Tasmania Department of Justice, Occupational Licensing (Building Surveyors) Code of Practice 2018 – Tasmania, <https://ablis.business.gov.au/service/tas/occupational-licensing-building-surveyors-code-of-practice-2018/40368>, March 2018

The Warren Centre, *Fire Safety Engineering: Roles of Fire Safety Engineers*, <https://www.sydney.edu.au/content/dam/corporate/documents/faculty-of-engineering-and-information-technologies/industry-and-government/the-warren-centre/the-roles-report-fire-safety-engineering-the-warren-centre.pdf>, March 2020, p. 34

Victorian Building Authority, *Practice Note 63-2018 Performance Solution Procedures and Documentation*, April 2014

Western Australia Department of Mines, Industry Regulation and Safety, *Consultation Regulatory Impact Statement Reforms to the approval process for commercial buildings in Western Australia*, December 2019

Western Australian Department of Mines, Industry Regulation and Safety, Building Commission, *Industry Bulletin IB 003/2012: Variations and amendment to building work*, 4 May 2012

APPENDICES



Appendix A: Tasmania Director's Determination Schedule 1

Minimum requirements for design documentation for Class 1 and Class 10 buildings.

(Applicable to Permit Building Work or Notifiable Building Work)

Note: Drawings may be combined with another drawing or omitted if the information is not applicable to the project. The information may also be provided within a schedule, specification or by another consultant.

To be read in conjunction with the National Construction Code and the Explanatory Information at the end of this schedule.

I. All Projects

Item applies to Class 10:

Drawing Title Block Title block on every drawing to contain:	Y
Licensed designer (usually name, licence number, address and contact number)	Y
Drawing number (including revision numbers and date) and number of drawings in set	Y
Project address	Y
Client name	Y

Cover Page	
Designer's name and licence number	Y
Project address	Y
Owner or client name	Y
Land title reference number (certificate folio and volume)	Y
Index of all drawings, specifications, schedules and attachments	Y
Total floor areas of each level and decks	Y
Design wind speed	Y
Soil classification	

<i>Note: A soil classification for Class 10 buildings may not be required for simplistic or small structures or where pre-engineered designs contain a range of soil designs. For large Class 10 buildings the designer must consider whether a soil classification is required.</i>	
Climate zone <i>Note: Class 10 if containing a conditioned space.</i>	
Statutory Bushfire-Prone Area BAL rating (Bushfire Attack Level)	Y
Alpine area (900m above AHD)	Y
Corrosion environment considerations	

Item applies to Class 10:

Other known site hazards (flooding, landslip, dispersive soils, saline soils, sand dunes, mine subsidence, landfill etc.)	
Site Plan (1:200) <i>Note: Site plans may be drawn at different scales where necessary.</i>	Y
The title boundaries, dimensions and directions of the land, including the north point, building line (distance between front of the building and front boundary line). <i>Note: "Standalone" Class 10 buildings (the only building on the allotment), need not be drawn to scale, provided the detailed site plan contains dimensions, set back etc. The sketch or other document must contain the basic information requirements in this part (boundaries, north point, easements etc.) where they can be described.</i>	
The position and dimensions of any drains or service easements on the land	Y
The name of any street or way onto which the land abuts	
The position and dimensions on the allotment of the proposed building or building work <i>Note: A "building" includes part of a building and non-habitable structures such as retaining walls, swimming pools, masts etc.</i>	Y
Driveways, parking areas and kerb crossovers <i>Note: Consideration must be given to surface levels from the road access to the allotment and within the allotment where driveways, parking areas and crossovers are proposed.</i> <i>Note: Plans to consider stormwater flow over driveways, parking areas and crossovers.</i>	
Finished floor and site levels relative to site datum	
The relationship of the proposed building or building work to the boundaries of the land	Y
The position of any buildings on adjoining properties within 3m of the boundary of the land <i>Note: The site plan must indicate any existing buildings, structures, retaining walls, tree removal or the like within 3 metres of the boundary of the land. Where this occurs, further designs may be required detailing any measures of "protection works" under section 121 of the Act. An owner who commissions building work that requires</i>	Y

<i>protection work must notify the relevant adjacent land owner using Form 6 (Building and Protection Work Notice).</i>	
Detailed contours of the land at 0.5m intervals over the building site referenced to a project site datum for all new Class 1 buildings <i>Note: Contours must be detailed over the building envelope of class 1 additions if they are available from recent drawings or plans containing contour information.</i> <i>Note: For Class 1 additions or Class 10 buildings (where the existing ground level over the buildings footprint of the new work exceeds 1m deep) drawing plans must contain sufficient detail regarding dimensions, depths, bulk excavations, cuts, batters and any required methods of drainage control.</i>	
Earthworks (excavations or fill levels relative to the site datum and compaction details) and associated soil and water management strategies	
The position of any existing building, structure or trees or recently removed building or structures on the land and the purpose for which the building or structures is, or was used <i>Note: Abnormal moisture conditions in soil may arise on sites where existing trees or buildings have been removed, dams or in ground swimming pools or tanks filled prior to construction.</i>	

Item applies to Class 10:

<i>Consideration must be given to the correct detailing of site drainage where abnormal site conditions occur.</i> <i>Note: The location of existing building is required where Bushfire protection measures apply.</i>	
Surface and sub-surface site drainage including location of sewer drains, on-site wastewater management systems including their land application area	Y
Levels of overflow relief gully (ORG) rim relative to the lowest sanitary plumbing fixture outlet and the surrounding finished surface level <i>Note: This part also applies to Class 10 buildings that contain sanitary plumbing fixtures.</i>	Y
Levels of inverts to existing and proposed drainage services at point of connection to approved disposal system <i>Note: Include roof stormwater drainage systems to Class 10 buildings (where applicable)</i>	Y

Floor Plan (1:100)	Y
Dimensions (including room dimensions)	Y
Room uses	Y
Floor levels	Y
Facilities	Y
Windows and openings	Y

Location and specification of solid fuel, oil or gas heating appliances	Y
Garage doors	Y
Identification of existing structure	Y
Identify demolition, any asbestos containing material, heritage considerations <i>Note: "Protection Works" may need to be considered when undertaking demolition works. See explanatory box requirements under "Detailed site Plan".</i>	Y
Safe movement and access details (direction of stairs and ramps)	Y
Fire separation requirements	Y

Slab Plan / Floor Framing Plan (1:100) and Details (1:20)	Y
Dimensioned plan and construction details of footings including penetrations, step down details and placement of reinforcement including cover	Y
Nominated founding depth and description of founding material	Y
Dimensioned plan and construction details of slabs including levels, falls or gradients	Y
Slab preparation including materials, thicknesses, compaction requirements, vapour barrier specifications and installation details	Y
Construction details of penetrations, step downs in beams, set downs in slabs and placement details of reinforcement including cover	Y
Sub-floor vents (location and size per metre)	Y

Item applies to Class 10:

<i>Note: Drawings must detail location of sub floor vents required for dead air spaces and cross flow air.</i>	
Sub-floor bracing (masonry shear walls)	Y
Specify dimensions of engaged and isolated piers	Y
Retaining walls, dimensioned and showing position of drainage, founding levels and heights (see Project Specific Information)	Y
Concrete strength, finishing and curing requirements	Y
Specifications and installation details of proprietary and other systems	Y
Show minimum clearances to ground level of flooring system members	Y
Framing drawings or schedules to indicate each structural member, dimensions, orientation, material, grade and size, spacing and span	Y
Joint, support and bearing details	Y

Roof Plan (1:100)	Y
--------------------------	---

Dimensions	Y
Roof sheeting or tile specification including: <ul style="list-style-type: none"> • Roof pitch • Batten spacing • Fixing requirements • Flashing details • Roof drainage 	Y
Roof lights	Y
Roof ventilators	Y
Eaves and overhang information	Y
Show location of roof mounted solar panels, hot water service or air conditioners	Y

Roof Framing / Bracing Plan (1:100)	Y
Indicate details and type of supporting framework, load bearing and non-load bearing parts, lintels, beams, eaves details, roof pitch, ceiling height, roof shape or angle	Y
Framing drawings or schedules to indicate each structural member, dimensions, orientation, material, grade and size, spacing and span	Y
Joint, support and bearing details	Y
Bracing, tie downs and fixings	Y
Roof pitch, eave / overhang details	Y
Show location of roof mounted solar panels, hot water service or air conditioners	Y
Fire rating construction details	Y

<p>Pre-Assembled Roof Trusses (timber or steel)</p> <p><i>Note: Factory manufactured “roof trusses” must be designed in accordance with Part 3.4.0.2 of the Building Code of Australia (ABCB protocol for structural software: including geometric design limitations) where the design is in accordance with AS1720.1 and their manufacture and use complies with the relevant Australian/New Zealand Standards.</i></p> <p><i>Note: As a minimum drawings or specifications must include: ceiling levels (raised, truncated, sloping or flat), roof pitch or angle of roof, truss spacing and layout, skillion roof height at lowest eaves point (as applicable), any boxed gutters or parapets, extent of truss roof system and eaves/gable overhang. Pre-assembled trusses handled and braced in accordance with recommendations contained in AS4440.</i></p> <p><i>Note: Designs may need to detail additional structural work to support imposed loads from pre- assembled roof trusses or products, such as floor slab thickenings, additional pad or strip footings within the footprint of the external walls, special connections, tie downs, lateral restraint and the like.</i></p>	Y
--	---

<i>Note: Where pre-assembled roof trusses are used, drawings or specifications must contain sufficient information to ensure that any point loads imposed by the pre-assembled roof trusses on any supporting framework (lintels, structural framework and the like) are adequately designed to support the loads from the roof framework, coverings and live loads.</i>	
Other Engineered designed products (beams, girders and the like) shall be noted on drawing as being “engineered designed” to a manufacturer’s standard (as applicable) <i>Note: Glue-laminated timber members, I-Beams, and the like must be noted on the drawings to be installed in accordance with current manufacturers printed design manuals (as selected).</i>	Y

Drainage Plan (1:100) (Information may be shown on Site Plan or Floor Plan if legible)	Y
Documentation in accordance with Schedule 2 of the Director’s Specified List	Y

Reflected Ceiling Plan (1:100)	
Indicating ceiling penetrations, skylights, and exhausts fans (for conditioned spaces) <i>Note: The plan is to indicate design of all light fittings (watts per fitting, whether ceiling mounted or downlights or both, lighting control per circuit - dimmers, timers, movement sensors and on/off switches). Where penetrations formed in insulated ceilings, any adjustment to minimum R-value for “ceiling insulation” to be made in accordance with BCA table 3.12.1.1b.</i>	
Room heights	

Elevations (1:100)	Y
All elevations should be drawn	Y
Position of all windows and doors	Y
Ceiling heights and floor levels	Y
Differentiate wall and roof cladding types	Y
Natural ground line dotted	Y
Roof lights / vents, air conditioning units, solar panels or solar hot water	Y

Sections (1:100)	Y
Generally taken through the highest and widest points of the building and should reveal details or facts which are otherwise concealed	Y
Section through stairs (where applicable)	Y
Ceiling / eaves heights and floor levels	Y

Project Specific Information

Note: May be included within drawings, schedules or specifications, including other consultants' documents.

Item applies to Class 10:

Retaining Walls	Y
Dimensioned construction details	Y
Drainage, tanking and protection details	Y
Backfill specifications	Y
Concrete mix, reinforcement placement. Washout requirements	Y
Specifications and installation details of proprietary and other systems	Y

Masonry Construction	Y
Show unreinforced, reinforced or earthwall construction specifications and details	Y
Identify structural and non-structural walls	Y
Reinforcing specified for reinforced walls	Y
Identify fire rating requirements	Y
Masonry unit sizes and bond patterns and tooling of joints	Y
Specification of brick ties and anchorages	Y
Mortar specification	Y
Cavity dimension and clean out specification	Y
Knockout blocks for washout	Y
Control joint location and detail	Y
Specify lintels and bond beams	Y
Weatherproofing and waterproofing details	Y
Flashings, damp proof course and weep holes	Y
Weephole guards (insects, bushfire-prone areas)	Y

Exterior Wall Cladding	Y
Cladding system description, manufacturer, material, pattern and colour, cavity detailing	Y
Fixings, flashings and other details	Y

Exterior Wall Cladding	Y
-------------------------------	---

Sub-floor ventilation	Y
-----------------------	---

Interior Wall Lining	Y
Specify material and system	Y
Wet areas specification (extent and system e.g. membrane, manufacturer and type)	Y

Flooring	Y
Specify material and system	Y

Item applies to Class 10:

Wet Areas	
Waterproofing and water resistance requirements for building elements in “Wet Areas” <i>Note: Designs shall indicate wet area locations; provide wet area specifications, location of propriety fixtures (shower trays etc.) or whether an “open wet floor” system is proposed that requires waterproofing or both. The extent of wet areas must be indicated.</i>	

Fire Safety	Y
Smoke and heat alarms, location and type (interconnection where more than one)	
Emergency lighting (for Class 1b)	
Fire separation details	
Bushfire-Prone Area specifications <i>Note: Specifications to include requirements from AS3959. General construction: subfloor supports, floors, walls, external glazing elements and assemblies, external doors and windows, roofs, verandas and attached carport roofs, penetrations, eaves, fascia, gables, gutters and down pipes, verandas, decks, steps, ramps and landings. Water and gas pipe supply.</i>	Y
Alpine area requirements (900m above AHD)	Y

Safe Movement and Access (including stairs and ramps)	Y
Stair design details, balustrade construction and spacing of openings (gaps <125mm) and handrail details	Y
Clearance height above stair nosings	Y
Winders detail	Y

Dimensions of landings, risers and goings, non-slip nosings	Y
<i>Note: Sections to indicate acceptable ceiling height between levels (2m minimum)</i>	
Method of construction, including aperture size, non-slip requirements	Y
Ramp slope and surface finish	Y
Disability access requirements (for Class 1b)	

Swimming Pools and Pool Spas	
Construction details, waterproofing, drainage, pool water recirculation and filtration systems	
Pool safety barrier details and height	
Gates and latches as part of safety barriers	

Additional Construction Requirements	Y
High wind, earthquake, flood prone, landslide hazards, Bushfire-Prone Areas (others are shown on cover page of example drawings)	Y
Heritage buildings	Y

Glazing	Y
Window and Door systems description (i.e. single or double glazed, tinted or low E glass window and door frame material)	Y
Glazing specification	Y
Opening size for ventilation calculation	Y
Other glazing: <ul style="list-style-type: none"> · Internal glazing specifications including wet area glazing, shower screens, doors · Balustrading system specification (glass and fixings) including height · Overhead glazing, roof or sky lights 	Y
Energy Efficiency details: U Value, Solar Heat Gain Coefficient	Y
Protection of openable windows	Y
<i>Note: The location of certain window openings in buildings require special methods of protection that restricts the opening of a window to prevent a person (especially young children) from falling through the window when open.</i>	

Energy Efficiency	
Also applies to a Class 10 where containing a conditioned space	Y

<p>Building fabric thermal efficiency specification (including climate zone)</p> <ul style="list-style-type: none"> • Walls, ceiling, floors and roof • Insulation location and R-value • Type of Sarking/Wallwrap (Note: consider vapour permeability) 	
Window energy specification (see also under glazing)	
Lighting design plan (see Reflected Ceiling Plan)	
Energy rating documentation	
Building sealing, air movement	
Pipe and services insulation	
<p>Glazing calculator to be supplied if a Deemed-to-Satisfy solution</p> <p><i>Note: Glazing Calculators have been developed by the ABCB to help industry meet the deemed- to-satisfy provisions of The National Construction Code. Once users have entered data into the spread sheet, all calculations are carried out automatically. Calculators can be downloaded from the ABCB website www.abcb.gov.au.</i></p>	
<p>Lighting calculator to be supplied if a Deemed-to-Satisfy solution</p> <p><i>Note: A Lighting Calculator has been developed by the ABCB to help industry meet the deemed- to-satisfy provisions of The Building Code of Australia for maximum lighting power consumption. Once users have entered data into the spread sheet, all calculations are carried out automatically. Calculators can be downloaded from the ABCB web site www.abcb.gov.au.</i></p>	
Under slab or slab edge insulation	

Condensation in Buildings	Y
<p>The building design should provide adequate means of ventilation to the structure to ensure the long term safety of the building.</p> <p>Note: Some considerations may be:</p> <ul style="list-style-type: none"> • Eliminate water vapour generated by occupants, entering roof or wall cavities • Ensure fans are appropriately sized to remove water vapour not just odours. Duct gas appliances, kitchen range hoods, clothes dryers, bathroom exhausts to outside air. • Ensure sufficient makeup air is provided e.g. undercut doors, install vents and open windows more frequently • Provide adequate well-distributed sub-floor ventilation, and use impermeable ground coverings in damp soil areas • Ensure adequate roof ventilation • Introduce ventilated cavities by the use of wall battens spaces and the like for polystyrene, hardboard and cement sheet external wall claddings • Ceiling insulation in preference to roof insulation <p>Note: Insulation should be installed with due consideration of condensation and associated interactions with adjoining building materials. As an example, reflective insulation or sarkings installed on the cold side of the building envelope should be vapour permeable.</p>	

Note: More information on condensation issues can be found on the ABCB website www.abcb.gov.au .	
---	--

Explanatory Information

The above information is the minimum documentation required to obtain a Certificate of Likely Compliance. For guidance on a complete domestic construction project specification, refer to the current NATSPEC Simple Domestic Specification. It is not the intent of this schedule to reduce the standard of Design Specification, but to provide for a mandatory minimum level of documentation.

This Schedule specifies the mandatory minimum level of design details required to be provided by a licensed designer to enable a builder or plumber to undertake the construction of Class 1 and 10 buildings and for a Building Surveyor to assess the works for compliance with the Building Act 2016, National Construction Code and relevant Australian Standards.

The Schedule allows designers the freedom to produce a mixture of graphic designs or specifications or both, provided the design work contains sufficient information and details to comply with the Act.

This Schedule does not diminish the relevant Building Surveyor's right to ask for further design information to be supplied before a certificate of likely compliance can be issued.

Application to Class 10 Buildings and Structures

This Schedule specifically identifies the minimum level of design information required for Class 10 buildings. This is shown by the notation (Y) against particular headings. Designers may only need to provide the required minimum level of documentation for Class 10 buildings where a heading refers to that notation.

Site plans of sheds

Note that the *Occupational Licensing (Building Services Work) Regulations 2016* allows a site plan of a shed (Class 10 or 7b) to be drawn by persons who are not a licensed building services provider.

Documentation Information Requirements

Detailed information provided on drawings or within specifications must be job specific to the proposed project. e.g. structural timber to comply with AS 1684 should instead be expressed as: Joists 150x35 MGP10 @ 450mm c/c.

Performance Design Solutions

Documentation should include all calculations, reports, certificates and manufacturer's information together with a written proposition to support a building solution which is not in accordance with the Deemed-to-Satisfy provisions of the National Construction Code (see Part 1.2 BCA Vol. 2).

Duties of Designers

The Building Act 2016

43. Designers

(1) A person undertaking design work under this Act is to ensure that –

(a) he or she acts only within the area of his or her competence; and

(b) so far as is reasonably practicable –

(i) the design of the building work or plumbing work is in accordance with the standards and requirements of this Act; and

(ii) the documentation relating to the design includes sufficient information for the assessment of the work in accordance with this Act; and

(iii) the documentation relating to the design is sufficiently detailed for a licensed builder or a licensed plumber to perform the work in accordance with the documents and this Act.

(2) A person must not accept an engagement as a designer in respect of work under this Act if that work requires the person to hold a licence under the Occupational Licensing Act 2005 and the person does not hold such a licence.

Appendix B: Singapore documentation requirements for building approval

Preparation of plans for approval

All plans of building works accompanying any permit application shall —

- (a) be in accordance with the provisions of the Act and these Regulations and any other requirement of the Building Commissioner;
- (b) be clear and intelligible;
- (c) bear a title block on the right side of the plan showing, at a minimum:
 - i. the project title;
 - ii. the site address;
 - iii. the document number;
 - iv. the document revision number;
 - v. the document date;
 - vi. the document scale;
 - vii. the author's name;
 - viii. the author's registration number, if applicable;
- (d) be fully annotated with suitable notations and symbols to show or distinguish the different types of materials to be used in the building works;
- (e) contain a full description or generic name in any specification of materials or components given or shown on the plans;
- (f) demarcate clearly the new building works from any existing building;
- (g) delineate clearly any building works to be demolished or removed;
- (h) be numbered serially, where the first plan is numbered as 1 of n and the last plan as n of n (n being the total number of pages of the relevant plans);
- (i) be amended and re-submitted for approval to reflect any variations during construction; and
- (j) comply with such other requirements as the Building Commissioner may specify.

Where a computer program is used in any of the design calculations —

- (a) the details of the program including assumptions, limitations and the like shall be explained; and
- (b) the inputs and outputs from the program shall be endorsed and submitted by the registered person and shall form part of the design calculations submitted.

In addition to the plans and specifications required by regulations, the building surveyor, permit authority or Building Commissioner may require the applicant to produce computations, test reports and such other information as may be necessary to determine compliance with the applicable standards.

Scale of plans

All plans of building works shall be scaled such that the information presented is clearly legible.

Information to be shown on building plans

All building plans shall, where applicable, include the following:

- (a) A site plan showing —
 - i. the location and layout of the site with boundary lines verged in red;
 - ii. the outline of the building to be erected or building in which building works are to be carried out marked;
 - iii. the north point;
 - iv. the number of the lot and adjoining lots;
 - v. the distances between the building work to be carried out and other proposed or existing buildings, and the lot boundary;
 - vi. the existing and proposed platform levels and slopes of the site and adjoining lots;
 - vii. the proposed finished floor level(s) of the ground floor, relative to existing and proposed site levels;
 - viii. the ingress and egress to the site, including all existing and proposed gradients and path(s) of travel to meet access requirements;
 - ix. the various roads constituting the access layout to and within the lot;
 - x. the means of access to the site and to the perimeter of each building for fire fighting vehicles and equipment;

- xi. the location of existing and proposed internal fire hydrants on the site;
and
 - xii. any other feature on or in the vicinity of the site which is likely to be a fire hazard or cause obstruction to fire fighting vehicles and equipment and rescue operations.
- (b) The floor plan of each storey including the roof plan of the building showing —
- i. clear statements indicating the purpose of every room or space in the building;
 - ii. the types of materials to be used for the main elements of the building;
 - iii. the dimensions between columns, corridors, staircase landings and the thickness of walls and columns;
 - iv. the dimensions and details necessary to demonstrate compliance with accessibility standards, including signage, walkways, ramps, landings, stairways, handrails, doors, glazing strips, switches, sanitary facilities, luminance contrast, etc.
 - v. the type of plant, equipment or water tank proposed to be installed and the location of the equipment and every plant room or water tank room;
 - vi. clear statements indicating every part of the building that is to be air-conditioned or mechanically ventilated;
 - vii. in respect of the ground floor, the existing and proposed levels of the site and finished floor level(s); and
 - viii. in respect of the ground floor, the distance between the building and the lot boundary and any existing buildings.
- (c) Cross-sectional views to fully describe all details and configurations of the proposed building, including:
- i. the full height of each storey and the depth of ceiling space;
 - ii. the dimensions of treads and rises of staircases; and
 - iii. the types of materials used in and the thickness of all walls, floors, roofs, ceilings, beams and other related parts of the building.
- (d) Elevational details including, where applicable —
- i. an elevation of each face of the building;
 - ii. the height of each storey and total building height;

- iii. the types of materials to be used for the main elements of the building;
 - iv. the dimensions of openings in external walls;
 - v. door and window schedules detailing dimensions, location and specifications for each door and window; and
 - vi. room elevations to demonstrate compliance with access requirements in sanitary facilities.
- (e) Such other details as the Building Commissioner may require.

Information to be shown on detailed structural plans and design calculations

All detailed structural plans shall, where applicable —

- (a) be signed by the registered person who prepared the detailed structural plans and design calculations, and by an accredited reviewer if applicable;
- (b) bear a certificate from the registered person who prepared and signed the structural plans on the first and last sheets of the plans stating that they have taken into consideration the loads imposed by all the building works as shown in the building plans or any amendment thereto;
- (c) bear a certificate by an accredited reviewer, if applicable, on the first and last sheets of the plans;
- (d) clearly indicate on the respective area of every floor plan, the imposed load for which the floor system or part thereof has been designed;
- (e) show the type or types of foundation to be used;
- (f) contain the specifications of the materials to be used; and
- (g) indicate the fixing and framing details of any external cladding, and safety barriers against falling from a height if applicable.
- (h) detail the roof frame, including design parameters and location of all required roof frame members, sizes, grades, etc.

The design calculations shall —

- (a) contain a contents page;
- (b) be signed and endorsed by the registered person who prepared the detailed structural plans and design calculations;
- (c) bear a certificate by the registered person who prepared the detailed structural plans and design calculations on the first and last sheets of the calculations

stating that, to the best of their knowledge and belief, the design calculations have been prepared in accordance with these Regulations and that they are the person who prepared the design calculations;

- (d) state on the first page the number of pages, and number every page;
- (e) contain a Design Information Sheet giving a summary of the design information including, where applicable:
 - i. all dynamic and static design loads;
 - ii. codes of practice;
 - iii. assumptions;
 - iv. soil investigation report;
 - v. foundation system;
 - vi. wind loads; and
 - vii. other information relevant to the design in question;
- (f) contain a Structural Summary Sheet showing:
 - i. the structural system;
 - ii. the form of the structure;
 - iii. the key structural elements;
 - iv. the provision for overall stability; and
 - v. structural analysis;
- (g) contain a Grouping of Structural Elements Sheet containing a list of designed structural elements that are similar; and
- (h) contain an Analysis and Design of Structural Elements Sheet showing the detailed design and calculations of —
 - i. the foundation;
 - ii. the shearwall, corewall and all structural elements resisting horizontal forces;
 - iii. the column and all vertical loadbearing structural elements;
 - iv. the transfer beams or plates, cantilevers, pre-stressed beams and flat slabs;
 - v. the space truss and portal frame;
 - vi. any shaft, tunnel or connections, or cavern structure;
 - vii. the retaining walls and supporting structures; and
 - viii. the overall structural system under wind loads, if applicable.

- (i) Where the design incorporates a truss system, the documentation should include:
- i. all design parameters;
 - ii. the truss layout highlighting individual truss types and tie down details; and
 - iii. be countersigned by the design engineer to confirm suitability and connectivity with main design and location of point loadings within the building.

Fire safety information to be shown on plans and calculations

All required fire safety features shall be clearly documented including, where applicable:

- (a) the floor plan of each storey including the roof plan of the building showing –
- i. details of all openings and voids penetrating floors including their usage, dimensions and the nature and arrangement of enclosing walls and barricades;
 - ii. the required fire resistance levels (FRL) of all elements of structure, fire doors, shutters, dampers and such other fire safety measures;
 - iii. clear statements indicating the design occupant load for that storey or roof, for which means of escape in case of fire have been provided;
 - iv. the calculation method used to determine the design occupant load;
 - v. details of all means of escape to the exterior at ground level from every part of the floor such as exit doors, corridors, passageways, aisles, gangways, balconies, lobbies, ramps, exit passageways, escape and fire-isolated staircases and areas of refuge;
 - vi. locations of all existing and proposed fire lifts, fire lift lobbies, the fire control centre, fire pumps, water tank rooms and generator rooms;
 - vii. locations of all areas statutory for the storage of flammable liquids or gases, boiler rooms, transformer rooms and any other area of special risk;
 - viii. the types and extent of provision of fire detection and alarm systems and voice communications systems;
 - ix. clear statements indicating the type and ratings of all proposed or existing portable fire extinguishers and their locations;

- x. the type and extent of provision of hydraulic hose reels, sprinklers systems, wet and dry rising mains and other fire extinguishing systems; and
 - xi. the type and extent of provision of smoke control and ventilation systems and their related air or smoke shafts.
- (b) Cross-sectional views to fully describe all details and configurations of the proposed building and associated fire safety works, including:
- i. details of all openings and voids penetrating floors including their dimensions, usage and height of enclosing walls and barricades;
 - ii. sealing requirements for penetrations in fire-resistant elements;
 - iii. details of the junction between the roof and any compartment walls;
 - iv. construction details for fire and smoke compartment boundaries;
 - v. the clear height of all structures or projections directly above the access for fire fighting vehicles and equipment;
 - vi. the clear distance of the external wall from the fire fighting vehicles and equipment access, lot boundary, adjacent buildings and other structures;
 - vii. enlarged details of curtain walling at the junction with the typical floor slab to show the provision of fire stopping or fire cavity barriers.
- (c) Elevational details including —
- i. the provisions of fire fighter access panels on the external walls and claddings; and
 - ii. the clear distance of the external wall from the fire fighting vehicles and equipment access, lot boundary, adjacent buildings and other structures.
- (d) Such other details, particulars or information relating to the building or fire safety works as the Building Commissioner may require.

Information to be shown on detailed fire engineering plans and design calculations

All detailed fire engineering plans and calculations shall, where applicable —

- (a) be signed by the registered person who prepared the detailed plans and design calculations, and by an accredited reviewer if applicable;

- (b) bear a certificate from the registered person who prepared and signed the plans on the first and last sheets of the plans stating that they have taken into consideration the fire safety risks presented by all the building works as shown in the building plans or any amendment thereto;
- (c) bear a certificate by an accredited reviewer, if applicable, on the first and last sheets of the plans;
- (d) include a report identifying and describing each fire safety system installed in the building and its design, features and operational arrangements;
- (e) include all design calculations, computations, test reports and such other information as may be necessary to determine compliance with each applicable standard; and
- (f) for fire safety Performance Solutions, include a copy of the fire engineering report, in accordance with the IFEG.

Information to be shown on plans for air-conditioning and mechanical ventilation systems that incorporate fire safety features

Plans for air-conditioning and mechanical ventilation systems that incorporate fire safety features shall include the following:

- (a) key features of the building in which the system is to be installed;
- (b) a schematic diagram of the overall system showing clearly the key features and their functions, relative locations in the building, lots, sizes, capacities and other essential information including the air distribution design arrangement in the case of air-conditioning and mechanical ventilation systems;
- (c) the layout of the system on every floor plan showing clearly the various parts and their functions, locations, arrangements, sizes, capacities and other essential information;
- (d) necessary cross-sectional views as superimposed on the building or part thereof to fully describe the details and configurations of the system;
- (e) a colour scheme to clearly distinguish the various distinct parts of the system and the different systems from one another;
- (f) for air-conditioning and mechanical ventilation systems, indicate—
 - i. the volumetric rate of flow of air at each point of inlet and outlet of each system including those serving protected staircases, exit passageways,

lobbies, areas of refuge, the Fire Command Centre, fire pump rooms, generator rooms, rooms used for the storage of flammable liquids or gas or other areas of special risk;

- ii. the location of fire compartment walls, floors and air shafts;
- iii. the location of fire dampers;
- iv. the location of smoke detectors; and
- v. the location and function of other fire precautionary features.

Where required by the Building Commissioner, plans shall be accompanied by —

- (a) a report identifying and describing each system installed in the building and its design, features and operational arrangements; and
- (b) design calculations.

Information to be shown on site work plans and pile layout plans

All site work plans and calculations shall, where applicable —

- (a) show the contour lines at intervals of 500 mm in height or spot levels of the existing site and adjoining lands drawn with reference to the ordnance datum;
- (b) show the location of the site formation works;
- (c) show the finished levels, including platform level for the building or buildings and the finished road levels;
- (d) show the slope of any excavation or filling exceeding 1500 mm in depth; and
- (e) show the means of protecting the site formation works against erosion, earthslip, slope failure or instability.

The pile layout plans shall, where applicable, show —

- (a) the types of piles and the specification of materials to be used;
- (b) the location of piles and site investigation boreholes;
- (c) the estimated pile penetration depth for each design zone;
- (d) the minimum embedded pile length into competent stratum, where applicable;
- (e) the unit skin friction and unit end bearing resistance for pile designs;
- (f) the allowable pile bearing capacity before and after deduction of negative skin friction (if applicable) and details of pile joints;
- (g) the allowable total and differential foundation settlement;
- (h) the allowable vibration limit during pile installation; and

- (i) the sectional details of piles and number and type of pile load tests and the location of ultimate pile load tests.

Information to be shown in geotechnical building works plans

The geotechnical building works plans shall, where applicable, include the following:

- (a) plans of any tunnelling support system;
- (b) plans of any excavation and earth retaining structures;
- (c) plans for constructing or stabilising any slope;
- (d) plans of the foundation;
- (e) instrumentation and monitoring plans.

All geotechnical building works plans shall, where applicable —

- (a) be in accordance with the provisions of the Act and these Regulations and any other requirement of the Building Commissioner;
- (b) be signed and endorsed by the person who prepared the plans and calculations;
- (c) bear a certificate by the person who prepared the plans on the first and last sheets of the calculations stating that, to the best of their knowledge and belief, the design calculations have been prepared in accordance with these Regulations and that they are the person who prepared the design calculations;
- (d) state on the first page the number of pages and number every page in the book;
- (e) be accompanied by an Information Sheet giving a summary of the key design and construction information including, where applicable:
 - i. load conditions;
 - ii. codes of practice;
 - iii. assumptions;
 - iv. earth-retaining system;
 - v. tunnel support system;
 - vi. foundation system; and
 - vii. other information relevant to the design and construction;
- (f) be accompanied by an impact assessment report on neighbouring structures and a site investigation report;

- (g) be accompanied by a geotechnical report which shall contain —
 - i. a summary highlighting the key elements of the design and the issues addressed;
 - ii. evaluation and interpretation of existing information and investigation and monitoring results;
 - iii. assessment of geotechnical parameters and groundwater conditions;
 - iv. geotechnical assumptions, analysis, design and calculations;
 - v. geotechnical requirements relating to the design and construction of the geotechnical building works including testing, validating, controlling, inspecting and monitoring;
 - vi. geotechnical reviews; and
 - vii. any other details as the Building Commissioner may require; and
- (h) be accompanied by such other reports as the Building Commissioner may require.

The plans of any excavation and earth retaining structures, or plans for constructing or stabilising any slope, in relation to any geotechnical building works shall include, where applicable —

- (a) layout, sections and details of all excavation and earth retaining works showing:
 - i. subsurface information including plan showing layout of investigation boreholes and surface profile along and across the excavation boundary;
 - ii. maximum depth and extent of excavation at each stage; and
 - iii. profile and nature of the site and its surrounds including ground topography, neighbouring structures, subsurface geological and geotechnical data, and groundwater conditions;
- (b) layout, sections, details and material specifications of earth retaining elements and structures, wall elevation showing the wall founding depth or penetration depth or minimum wall embedment requirement, and overall retaining system;
- (c) layout, sections and details of struts, anchors, soil nails, walers, king posts, bracings, corbels and other structural elements showing types, sizes and material specifications of members to be used, connection details, and where appropriate, inspections and tests to be carried out;

- (a) layout and sections of earth berms or slope showing type of soils, size and location of berms, internal and external drainage provisions and protection measures including against surface weathering;
- (b) layout, sections and details of earth or ground strengthening, improvement or protection works including layout, sections and sizes of all elements, material specifications, details of inspections and tests to be carried out;
- (c) layout, sections and details of permanent support system to the earth retaining system showing details of lateral bracing element, and connection details;
- (d) method and sequence of construction including duration and spatial limits of critical activities;
- (e) details of inspections and tests to be carried out;
- (f) details of any special precautions, groundwater control measures, control and protective measures required during excavation, and installation and removal of any earth retaining element;
- (g) other specifications and relevant particulars; and
- (h) such other details as the Building Commissioner may require.

The foundation plans for the design and construction of foundation for buildings of 30 or more storeys shall contain, where applicable —

- (a) the layout, sections and details of all foundation works showing —
 - i. types of piles or foundation and specification of material to be used;
 - ii. location of piles or foundation and site investigation boreholes;
 - iii. pile or foundation founding depth or pile minimum embedment into competent stratum for each pile or foundation;
 - iv. unit shaft friction, pile base resistance or foundation bearing pressure;
 - v. allowable foundation capacity before and after accounting for negative skin friction where applicable, allowable tension, and lateral load;
 - vi. details of pile reinforcements, pile joints, connection with pilecap, pile shops;
 - vii. allowable total and differential foundation movement; and
 - viii. allowable vibration limit; and
- (b) the number, type of pile or foundation tests, structural integrity tests and location of preliminary test pile or ultimate load tests and site investigation for the tests.

The instrumentation and monitoring plans shall contain, where applicable —

- (a) numbers, types, locations, details and other particulars of instruments for monitoring forces and movement of structural elements, building and ground movements, and variations in the groundwater or piezometric levels;
- (b) frequency and duration of monitoring;
- (c) allowable ground or building movement limits;
- (d) allowable vibration limits;
- (e) where applicable, long-term instrumentation, monitoring and maintenance requirements;
- (f) other specifications and relevant particulars; and
- (g) such other details as the Building Commissioner may require.

Information to be shown in demolition works plans

All demolition works plans shall —

- (a) be accompanied by —
 - i. an impact assessment report on neighbouring structures, including design calculations showing the stability and adequacy of every structural element the structural continuity of which is to be truncated by the demolition works;
 - ii. design calculations showing that the floor is capable of resisting —
 - iii. the load from the debris; or where a demolition machine is intended to be placed on the floor of the building in accordance with the demolition works plans, the load from the demolition machine and the debris; and such reports as the Building Commissioner may require. Each demolition plan shall include, where applicable:
 - (a) the location and site plan of the building to be demolished, including distances between the building to be demolished and adjacent buildings which are not to be demolished;
- (b) structural floor plans showing —
 - i. in respect of each area of each floor plan, the imposed load for which the floor system or part thereof has been designed;
 - ii. the demolition sequence and demolition zone for each floor;
 - iii. the method statement on the handling and disposal of debris;
 - iv. the type and weight of the demolition machine; and

- v. the location of the temporary ramp;
- (c) a layout plan showing the demolition sequence of all —
 - i. beams;
 - ii. columns;
 - iii. walls;
 - iv. slabs; and
 - v. edge parapets;
- (d) the following information on safety and environmental protection measures:
 - i. layout plan, details, material specifications and elevation view of shoring and temporary supports;
 - ii. layout plan, details and material specifications of protective hoardings, covered walkways, catch platform, catch fans, scaffolding, protective screens and safety nets;
 - iii. where a demolition machine is used, the route of safe movement of the demolition machine;
 - iv. where a continuous beam extends from the building to be demolished to an adjacent building and the beam is to be cut off at the boundary of the buildings, the anchorage detail of the existing reinforcement bars of the beam where it is to be cut off.

Each instrumentation and monitoring plan shall include, where applicable:

- (a) the layout and location of other buildings (that are not to be demolished) in relation to the building to be demolished;
- (b) the number, types, location, details and other particulars of instruments for monitoring building and ground movements;
- (c) the frequency and duration of monitoring;
- (d) allowable vibration limits;
- (e) the location of closed-circuit television cameras to monitor the progress of the demolition work, especially for demolition of high-rise buildings.

Appendix C: Performance Requirement Checklist

Volume One

Performance Requirements		Documentation considered	
		DtS Provision/s	Performance Solutions
Structure	BP1.1 BP1.2		
	BP1.3		
	BP1.4		
Fire Resistance	CP1 CP2		
	CP3		
	CP4		
	CP5 CP6 CP7 CP8		
	CP9		
Access & Egress	DP1		
	DP2 DP3		
	DP4		
	DP5		
	DP6 DP8		
	DP9		
	DP7		
Services & Equipment	EP1.1		
	EP1.2		
	EP1.3		
	EP1.4		
	EP1.5		
	EP1.6		
	EP2.1		
	EP2.2		
	EP3.1		
	EP3.2		

	EP3.3		
	EP3.4		
	EP4.1		
	EP4.2		
	EP4.3		
Health & Amenity	FP1.1		
	FP1.2		
	FP1.3		
	FP1.5		
	FP1.6		
	FP1.7		
	FP1.4		
	FP2.1		
	FP2.2		
	FP2.3		
	FP2.4		
	FP2.5		
	FP2.6		
	FP3.1		
	FP4.1		
	FP4.2		
	FP4.3		
	FP4.4		
	FP4.5		
	FP5.1		
	FP5.2		
	FP5.3		
	FP5.4		
	FP5.5		
FP5.6			
Ancillary Provisions	GP1.1		
	GP1.2		

	GP1.3		
	GP1.4		
	GP1.5		
	GP2.1		
	GP2.2		
	GP4.1		
	GP4.2		
	GP4.3		
	GP4.4		
	GP5.1		
Energy Efficiency	JP1		
	JP3		

Volume Two

Performance Requirements		Documentation considered	
		DtS Provision/s	Performance Solutions
General Requirements	Section 1		
Structure	P2.1.1		
	P2.1.2		
Damp & Weatherproofing	P2.2.1		
	P2.2.2		
	P2.2.3		
	P2.2.4		
Fire Safety	P2.3.1		
	P2.3.2		
	P2.3.3		
	P2.3.4		
	P2.3.5		
	P2.3.6		
	P2.4.1		
	P2.4.2		
	P2.4.3		
	P2.4.4		

Health & Amenity	P2.4.5		
	P2.4.6		
Safe Movement & Access	P2.5.1		
	P2.5.2		
	P2.5.3		
	P2.5.4		
Energy Efficiency	P2.6.1		
	P2.6.2		