



Department of Local Government,
Industry Regulation and Safety



A General Inspection Snapshot Report Nine Glazing

(Class 2–9 building permits issued 2021–2023)

April 2026

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Executive summary

Under the *Building Services (Complaints Resolution and Administration) Act 2011* (the CRA Act) the Building Commissioner can audit the work and conduct of registered building service providers.

The Department of Local Government, Industry Regulation and Safety – Building and Energy Division (Building and Energy) has an audit program that monitors whether registered building surveyors are complying with their registration obligations and if their technical building surveying work is meeting the applicable building standards.

The findings of audits are used to educate building industry participants, inform policy development, and improve compliance levels. Where non-compliant outcomes are identified during an audit, the matter is brought to the attention of the building surveyor, and in high-risk instances, evidence of any required correction or building remediation must be provided to Building and Energy.

Glazing is installed in buildings, primarily to provide sources of natural light and ventilation, it is also commonly used as a barrier to falls. Glazing products represent a significant potential for harm if they are not fit for purpose or are incorrectly installed.

Building and Energy undertook a general inspection (snapshot) into glazing, consistent with its Building Compliance Audit Strategy 2012–2024 (Audit Strategy). Building and Energy often undertake ‘snapshot’ inspections of a small sample of work, to inform itself and industry on emerging practices and areas requiring focus.

This report details the findings of Building and Energy’s investigation, into how building standards are applied through the certification process for glazing of Class 2–9 buildings, by building surveying contractors. Building and Energy reviewed certificates of design compliance, and certificates of construction compliance for buildings where a building permit was issued between May 2021 and May 2023, with 22 sites selected for investigation.

Prior to publishing this report, Building and Energy have shared its findings with key industry bodies, including the Australian Institute of Building Surveyors, Royal Institute of Chartered Surveyors, Australian Glazing and Windows Association, Housing Industry Association of Western Australia, and the Master Builders Association for comment, to assist with the education and understanding of industry participants.

Findings

The main component of this investigation was a technical review of approval documentation, that the building surveyor had relied upon to confirm compliance with the applicable building standards for Class 2–9 buildings. The investigation of the 22 sites included 466 inspection items, of which 62 per cent demonstrated compliance.

The investigation found that the most common areas requiring improvement relating to design documentation referenced by approval certificates were:

- limited information provided to ensure the structural provisions of the NCC and referenced standards have been adequately applied to glazing systems;
- details inconsistently provided for the vertical separation of external glazing systems in building of type A construction;
- specification and design details were lacking for glazing systems used for barriers to prevent falls.
- energy efficiency assessments inaccurately prepared; and
- glazing installation certificates not referenced within the certificate of construction compliance or were inaccurate when present.

Actions

Building and Energy will present findings to registered building surveyors. Current building industry reforms being led by Building and Energy in response to the Building Confidence Report will also consider minimum levels of documentation for glazing. Further information on the WA building industry reforms can be viewed at [Building and Energy industry reforms](#).

Consideration will also be given to the inclusion of a second phase of the investigation to determine if the identified actions have been effective in improving compliance relating to the design and installation of barrier systems.

Glossary of terms, acronyms and abbreviations

Applicable building standards	In general, the applicable building standards for the proposed building work is the NCC.
Building and Energy	A division of the Department of Energy, Mines, Industry Regulation and Safety.
Building classification	A categorisation system for buildings of similar risk levels based on use, hazard and occupancy.
Building Services Acts	A suite of laws governing building control.
Building permit	Permission granted by the permit authority for building work to be carried out.
Building surveyor contractor	Registered individuals, partnerships or companies that undertake to carry out building surveying work and issue approval certificates.
CCC	Certificate of construction compliance.
CDC	Certificate of design compliance.
Compliance Demonstrated	The design documentation includes sufficient information to demonstrate compliance with the applicable building standards. (this information may have been provided in the form of drawings or included or described in specifications or other technical documents including performance solutions).
Compliance inspections	Inspections undertaken to monitor the work and conduct of registered builders and building surveying contractors to determine whether all the requirements for registration are being met.
Deemed-to-Satisfy (DTS)	Prescribed provisions that demonstrate compliance to the Performance Requirements of the NCC of Australia.
Design Criteria	These criteria form the basis of the design for structural and other components and systems for the building and are based on the use, scale and location of the building.
Design Documentation	Drawings, specification, and technical documents referenced on a certificate of compliance that demonstrate a building will comply with the applicable building standards.
General inspections	Inspections undertaken to monitor how well the building Service Acts are operating and how well the applicable building standards are being applied.
NCC	National Construction Code.
Performance solutions	A method of complying with the Performance Requirements of the NCC other than by a Deemed-to Satisfy Solution.
Permit Authority	Unless otherwise prescribed, this is usually the local government in whose district the building or incidental structure is, or is proposed to be, located.

1. Background

In July 2021, Building and Energy published its 2021–24 Audit Strategy. The Audit Strategy takes a risk-based approach to minimising harm, and the associated Audit Priorities Statement 2023-2024 details the audit activities Building and Energy intends to undertake within a defined period in response to identified areas of construction that pose the greatest risk to public safety.

Audit activities within the Audit Priorities Statement 2023–2024 are defined as either Compliance Inspections or General Inspections. Glazing is identified within this statement for General Inspection.

General inspections and publications that relate directly to this subject that were undertaken within the 2021–24 Audit Strategy period include:

- **General Inspection (Investigation) Report Eight - Barriers (balustrades)**
- Industry Bulletin 138 titled **Weatherproofing - Windows and Doors**, published in May 2021 following cyclonic events to clarify areas of concern including:
 - Documentation
 - Wind classification
 - Site exposure
 - Window testing
 - Water penetration resistance testing
 - Doors
 - Labelling
 - Installation

A general inspection of glazing technical aspects within certificates of compliance for Class 2–9 buildings issued by registered building surveyor contractors was identified in the audit priorities statement for the 2023–2024 financial year. The documentation referenced in these certificates has been relied on by the building surveyor practitioner to confirm compliance with the applicable building standards.

2. Objective and scope

2.1 Objective

The objective of Building and Energy's general inspections is to monitor how well the building service Acts are operating.

This general inspection is intended to determine how well applicable building standards are being applied to the certification of glazing documentation (including glazed balustrades) within a sample of Class 2–9 buildings, in response to inspection data collected through audit and complaints activities to gain insight into:

- Current industry practices regarding glazing design and documentation.
- How the building surveyor has been satisfied that the applicable building standards have been addressed in the certification documentation.

Outcomes will inform the Building Commissioner, building industry and related professions of opportunities for improvements in the application of building standards to glazing design documentation.

2.2 Scope

A target minimum of 20 Class 2–9 buildings with a minimum of two buildings per building surveyor contractor were selected. Building selections included a variety of applicable wind actions as calculated through Australian Standard AS/NZS 1170.2 Structural Design Actions – Wind Action, with a minimum of four buildings located within each of the wind regions "A" through "D".

Buildings eligible for selection received building approval between 1 May 2021 and the 1 May 2023 which required certification for compliance with the 2019 National Construction Code Volume 1 Amendment 1.

Approvals documentation was selected from 10 Permit Authorities (four metropolitan and six regional). The selected samples included certificates issued by 11 Building Surveyor Contractors (nine metropolitan and three regional), representing the work of 17 Building Surveyor Practitioners, with a variety of registration levels and experience.

3. Methodology

Permit authorities were requested to provide approval documentation for the selected sites which fitted into the above scope. A total of 22 Certificate of Design Compliance/Building Permit document sets and 13 Certificate of Construction Compliance/Occupancy Permit document sets were received.

For the technical element of this general inspection, Building and Energy reviewed all referenced documentation listed on the design compliance certificate against the applicable building standards. For this purpose, Building and Energy utilised an in-house software-based review system which consists of all desktop inspection points that may be applicable during a technical inspection for glazing.

Each applicable inspection point was carefully considered by Building and Energy, and a determination was made as to whether compliance has been demonstrated. Inspection points that have not demonstrated compliance were then risk ranked using a risk matrix.

When each inspection was finalised, a report was generated for the site. Reports are provided to the building surveyor contractor at the completion of the general inspection. The report documents inspection points which have been identified as not demonstrating compliance along with the allocated risk ranking.

In instances where the allocated risk level is 'very low' or 'low', the items identified in the report are brought to the building surveyor contractors' attention to address in future certifications and to assist in understanding obligations.

Where the allocated risk level is 'medium', the building surveyor contractor is required to ensure that procedures are put in place to guarantee that compliance is adequately demonstrated in future certifications. Where the allocated risk level is 'high', the building surveyor contractor is required to provide evidence to Building and Energy technical staff that procedures will be put in place to ensure that the items which are of concern will not be repeated on future certifications. Additionally, for high-risk items, evidence is required to be supplied advising actions taken to remedy non-compliances.

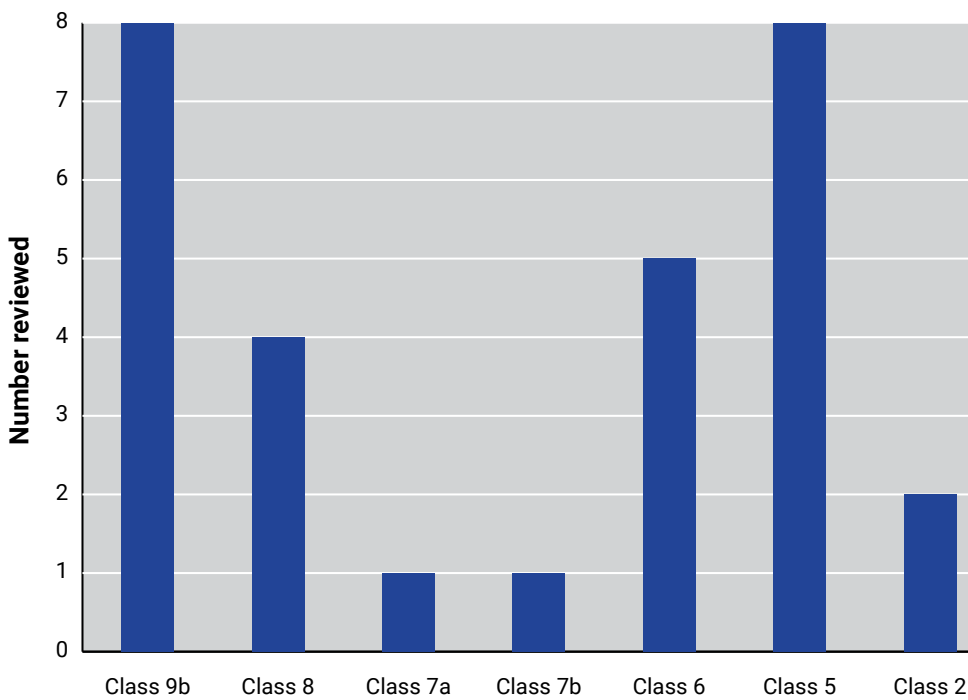
4. Summary of inspections and findings

Within this general inspection (investigation) Building and Energy conducted the technical inspections of building surveying work of nine metropolitan and two regionally based building surveyor contractors and one regional permit authority. This included 14 level one and 3 level two building surveyor practitioners across 22 sites.

For those 22 sites reviewed, Building and Energy conducted the technical inspection of 22 CDCs and 13 CCCs for new and altered Class 2-9 buildings. Where possible, the selected CCCs related to a CDC that had also been selected for inspection.

The range of building classifications reviewed is shown below in figure 1.

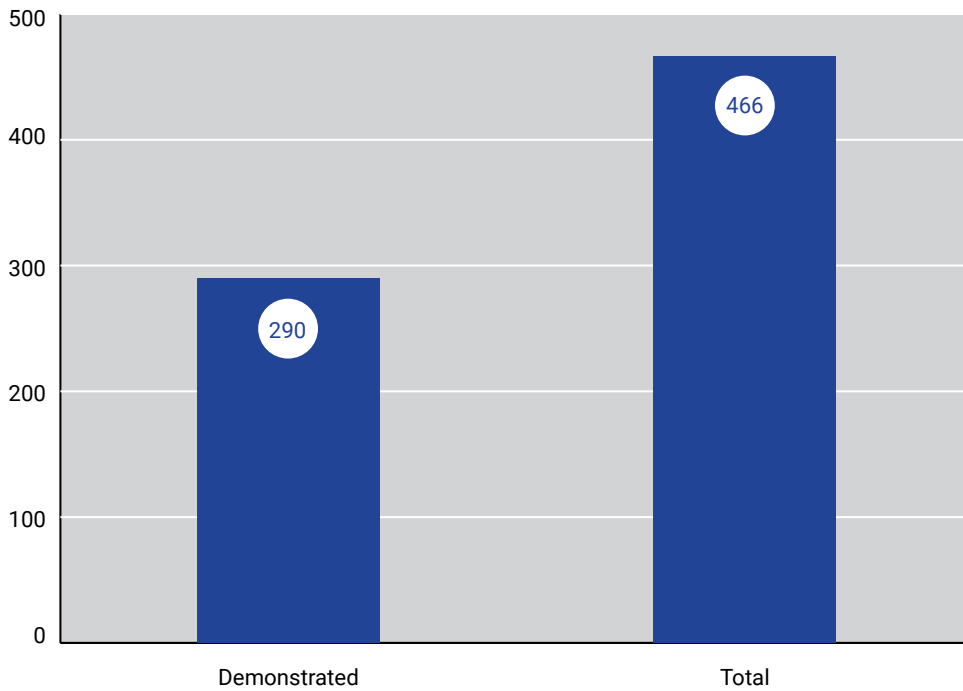
Figure 1: Building Classification Range



During the 22 technical inspections a total of 466 inspection points were assessed by Building and Energy. Of these, 290 inspection points (62 per cent) were assessed as having demonstrated compliance.

Figure 2 below shows overall inspection items compliance demonstrated.

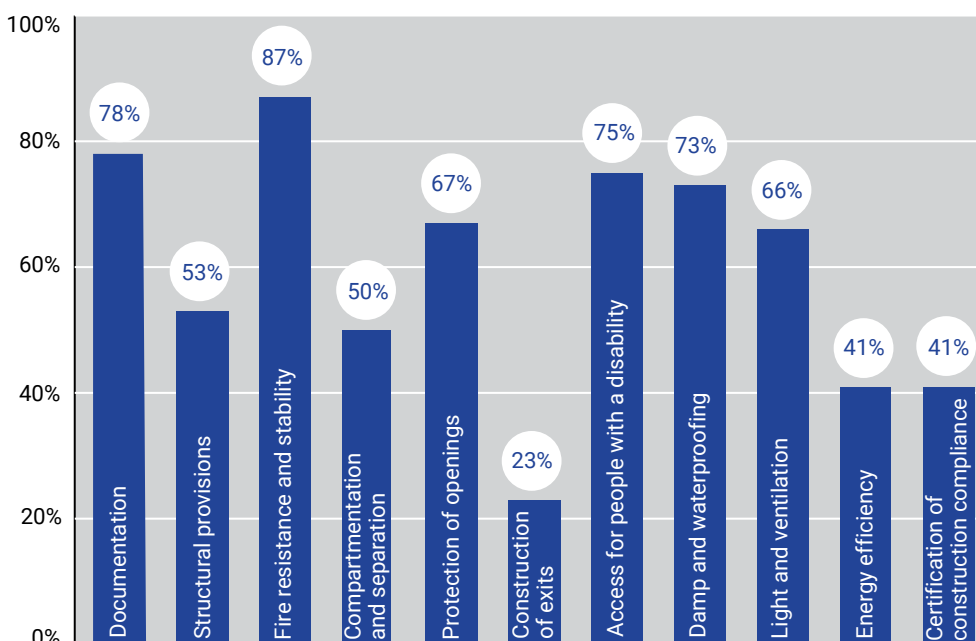
Figure 2: Overall Inspection Items with Compliance Demonstrated



The findings revealed a variation of compliance rated between categories (see figure 3). The figures shown are percentages indicating where an inspection item is applicable, and compliance has been demonstrated in the documentation referenced on the certificate.

Technical reviews of CCCs included a review of the certificate and the referenced documents by Building and Energy but did not include a site inspection.

Figure 3: Compliance Demonstrated per Category



5. Class 2–9 Certificate of Design Compliance (CDC) – areas requiring attention

The following compliance categories were identified as areas requiring attention during the inspection of CDCs, due to the recorded rate of demonstrated compliance.

5.1 Structural provisions

Ensuring that the structural provisions for glazing have been correctly considered and incorporated into the design documentation is an essential part of ensuring the structural integrity of the building. While there is not an expectation for building surveyors to review structural designs and calculations for correctness; ensuring that the designs have considered the correct applicable criteria for the building type, locality and conditions is a key part of the building surveyor's role.

The demonstration of the individual action provisions, as they apply to glazing, returned a low demonstrated compliance rate predominantly attributed to:

- incorrect or unreferenced standard used for structural design;
- incorrect design criteria considered in structural design; and
- design criteria elements not considered or missing from structural design.

5.2 Compartment and separation

The area with low demonstrated compliance within the compartmentation and separation section of the NCC was vertical separation of openings in external walls for type A construction. The NCC nominates minimum separation and/or multiple options of construction requirements to prevent the spread of fire vertically through the building.

Compliance with the 'deemed to satisfy' provisions of this clause should be demonstrated through design documentation by provision of architectural and structural sectional details including nomination of construction materials and dimensions of elements.

The low demonstrated compliance percentage recorded for this inspection element in the certificates inspected typically reflected insufficient appropriate information provided in the referenced design documentation.

5.3 Construction of exits

Areas of focus within the 'Construction of Exits' section of the inspection were, barriers to prevent falls (NCC reference D2.16) and protection of openable windows (NCC reference D2.24).

Barriers throughout buildings are provided to protect occupants from fall risks that exceed 1.0m in height from areas such as balconies, stairs, ramps, and decks. The design and construction of barriers is required to comply with the relevant performance requirements of the NCC. This includes structural provisions and fall prevention provisions which safeguard people from injury. Should a barrier system fail to satisfy these provisions the consequences have potential for significant injury and may include the loss of life. The requirements of the NCC are demonstrated by the provision of barrier design documentation that includes:

- the location of the barrier, including identification of building elements supporting the barrier, to ensure compatibility and verify the suitability of the proposed fixings, for example ensuring there is sufficient offset from edge of slab for fixings;
- critical dimensions relating to the heights, openings and climbability;
- detail of the installation and materials proposed, including relevant Australian Standards applicable to the material and design;
- information and documentary evidence, demonstrating the barriers resistance to actions appropriate for the use and location of the building (design criteria). The design criteria should be determined by a professional engineer or appropriately qualified person and include but is not limited to:
 - imposed actions for barriers determined in accordance with AS/NZS 1170.1 being dependent on the type of occupancy/uses for the part of a building in which the barrier is located; and
 - wind actions, as appropriate and as they apply to each barrier on the building being determined in accordance with AS/NZS 1170.2. Wind actions should consider the barrier's location noting that those located on the corner of the building, or at higher levels, will generally receive higher loads.

Protection of openable windows requirements are provided to protect occupants from the fall risk of window openings where it is possible to fall greater than 2.0m from a bedroom or early childhood centre window or greater than 4.0m for windows in other situations.

The low demonstrated compliance percentage recorded for construction of exits in the certificates inspected typically reflected insufficient appropriate information provided in the referenced design documentation.

5.4 Energy efficiency

The NCC requires a building (including its services) to have features that facilitate the efficient use of energy appropriate to:

- the function and use of the building;
- the level of human comfort required for the building;
- solar radiation being utilised for heating and controlled to minimize energy for cooling;
- the energy sources of the services, and
- for conditioned spaces, achieving an hourly regulated energy consumption during hours of operation.

Typically, in the approval certificates reviewed during the compliance inspection building fabric, glazing, and building sealing were addressed in a referenced energy efficiency report that included 'deemed to satisfy' compliance information and performance solutions for those elements.

The referenced design documents in the approval certificates reviewed provided a low rate of demonstrated compliance in the following areas:

- wall-glazing construction;
- sealing of roof lights; and
- facilities for energy monitoring.

For the identified areas of energy efficiency with low rates of demonstrated compliance, the energy efficiency reports mentioned above, frequently contained either limited, contradictory or inaccurate information.

6. Actions

Building and Energy will present the findings of this general inspection to registered building service providers at metropolitan and regional information sessions providing specific guidance for areas requiring attention.

Additionally Building and Energy will present findings and provide advice at industry stakeholder information sessions.

Consideration will also be given to the inclusion of a second phase of the investigation to determine if the identified actions have been effective in improving compliance relating to the design and installation of barrier systems.

7. Appendices

7.1 Role and powers of Building and Energy

Western Australia (WA) has a suite of laws governing building control, including the *Building Act 2011* (the Building Act), the *Building Services (Complaint Resolution and Administration) Act 2011* (the BSCRA Act), and the *Building Services (Registration) Act 2011* (the Registration Act).

The BSCRA Act empowers the Building Commissioner to monitor any building or building service in WA to verify how building services have been or are being carried out, and how building standards have been or are being applied.

The Building Commissioner is able to designate Building and Energy officers to review approval documentation and to inspect buildings during construction and after the completion of building works.

The Registration Act provides a framework for registering building surveyors and builders and includes disciplinary provisions to manage sub-standard work and conduct by a registered building service provider.

For a new building of any classification that requires a building permit, the Building Act requires a registered building surveyor to sign a certificate of design compliance (CDC) for the building design. The CDC contains a statement to the effect that if the building is completed in accordance with the plans and specifications that are referenced in the certificate the building will comply with each applicable building standard.

Additionally for new Class 2–9 buildings that require a building permit, the Building Act requires a registered building surveyor to sign a certificate of construction compliance (CCC) for the completed building. The CCC contains a statement to the effect that the building has been completed in accordance with the plans and specifications that were referenced in the CDC, and as such the building complies with each applicable building standard.

Further information about the role of Building and Energy is available on the [Building and Energy](#) website.

7.2 Building approvals

The building approval process for WA is legislated under the Building Act and associated Building Regulations 2012 (WA) (the Building Regulations). This legislation controls the application of building standards for the design and construction of buildings and incidental structures and sets out when a building permit is needed for building work.

The Building Act generally requires a building permit for the construction of a new building and an occupancy permit to allow a building to be occupied (applies to class 2–9 only). As part of the process for getting a building permit, a building surveyor needs to sign a certificate of design compliance (CDC) stating that if the building is completed in accordance with the plans and specifications, the building will comply with each applicable building standard that applies to it. For an occupancy permit a building surveyor needs to sign a certificate of construction compliance (CCC) stating the building has been completed in accordance with the plans and specification specified in the CDC.

The permit authority (usually the local government in whose district the dwelling will be built) can grant building permits and occupancy permits if satisfied that the application for a permit addresses the requirements of the *Building Act 2011* and the Building Regulations. The permit authority can request further information to assist it in considering an application (if there is an error) and impose conditions on the grant of a building permit if necessary.

The builder named on the building permit is responsible for ensuring that the building is constructed in accordance with the building permit (including any conditions) and the applicable building standards.

Building Surveyors must be satisfied that the building has been constructed in accordance with the approval documentation prior to signing a Certificate of Construction Compliance.

The Building Act gives the permit authority powers to monitor and inspect building work to ensure compliance with these requirements. The Building Act also provides permit authorities with the power to issue building orders to remedy or stop building work, and to prosecute builders and owners for non-compliance.

7.3 Building standards

The Building Regulations, made under the Building Act, set out a general position as to applicable building standards, as well as a series of qualifications for particular circumstances and types of building.

The general position is that the applicable building standards are those set out as the performance requirements in the BCA in effect at the time the building application is made or were in effect 12 months before the building permit application was made.

The BCA is a comprehensive set of building standards that is the product of a series of efforts by the commonwealth, state and territory governments during the 1960s, 70s and 80s to develop a uniform national position on building standards.

The BCA was first published in 1988 and has been revised several times. In 2008 the Council of Australian Governments agreed to develop a national code covering building plumbing, electrical, and telecommunications standards. The National Construction Code (the NCC) was published in 2011. To date the NCC only encompasses building and plumbing standards.

The NCC consists of three volumes. Volume One of the NCC deals with building standards for Class 2–9 buildings (multi-residential, commercial, industrial and public buildings); Volume Two deals with building standards for Class 1 and Class 10 buildings (residential and non-habitable buildings and structures); and Volume Three deals with plumbing standards. The term BCA refers to Volumes One and Two of the NCC.

The BCA sets out minimum performance requirements that buildings must achieve. A performance requirement can be satisfied through the use of a deemed-to-satisfy (DTS) solution, a performance solution (previously known as an alternative solution) or a combination of DTS and performance solutions.

A DTS solution is one that follows the prescriptive DTS requirements contained in the BCA. These requirements may cover materials, components and/or construction methods that are to be used and design factors that are to be considered.

A performance solution is any solution other than a DTS solution that satisfies the stated performance requirement. DTS solutions are typically the 'time proven' methods of construction that are known to produce an acceptable outcome. Such methods may however prove to be inefficient or come with other intrinsic limitations. Performance solutions by contrast are flexible and allow for the development of innovative construction methods and products.

For a DTS solution these assessment methods are:

Compliance with the DTS provisions of the BCA.

For a performance solution these assessment methods are:

- provision of certain types of documentary evidence;
- verification through the conduct of tests, inspections, calculations;
- expert judgement, and
- comparison with the DTS requirements.

Part A2 of the BCA Volume One contains the acceptance of design and construction provisions. This part outlines the options that can be used as evidence to support that the use of materials, products or forms of construction meet the NCC requirements.

7.4 Additional resources

[Compliance Inspection Report Four - Technical building surveying inspections 2021–2023](#)

[Industry Bulletin 144 - Technical Documents](#)

[Information and obligations for building surveyors](#)

[Building and Energy complete industry bulletins list](#)

7.5 Feedback

Feedback on the content of this report can be submitted via be.info@lgirs.wa.gov.au.

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