NSW GOVERNMENT

Practice Standard for Professional Engineers

Requirements for Professional Engineers registered under the *Design and Building Practitioners Act 2020*

DRAFT 2023

CONTENTS

Acronyms and definitions

Term / Acronym	Description
AFEG	Australian Fire Engineering Guidelines
AS	Australian Standard
BCA	Building Code of Australia
Body corporate	has the same meaning as in the *Corporations Act 2001* of the Commonwealth, such as a company, or partnership.
Building element	Has the same meaning as section 6 of the DBP Act.
Building Regulator	NSW Fair Trading/Office of the NSW Building Commissioner
Building work	Has the same meaning as section 4 of the DBP Act.
CC	Construction Certificate, has the same meaning as Section 6.4 of the EP&A Act.
Class 2 building	Has the same meaning as in the NCC. A Class 2 building is a building containing two or more sole-occupancy units, where each sole-occupancy unit is a separate dwelling.
Class 3 building	Has the same meaning as in the NCC. A Class 3 building is a residential building providing long-term or transient accommodation for a number of unrelated persons, for example: a boarding house, guest house, hostel, lodging house, or the residential part of a hotel or motel.
Class 9c building	Has the same meaning as in the NCC. A Class 9c building is a residential care building where 10% or more of persons who reside there need physical assistance in conducting their daily activities and to evacuate, but does not include a hospital.
DA	Development Application
DBP Act	*Design and Building Practitioners Act 2020*
DBP Regulation	Design and Building Practitioners Regulation 2021
The Department	The Department of Customer Service
Design Compliance Declaration	Has the same meaning as Section 8(1) of the DBP Act.

Term / Acronym	Description
EN Standard	European Standard
EP&A Act	*Environmental Planning and Assessment Act 1979*
ISO	International Organisation for Standardisation
NCAT	NSW Civil and Administrative Tribunal
NCC	National Construction Code. The NCC includes the Building Code of Australia and the Plumbing Code of Australia.
NSW Planning Portal	The digital portal where documents such as regulated designs and compliance declarations will be lodged.
OC	Occupation Certificate, has the same meaning as Part 6 of the EP&A Act.
PBDB	Performance-based Design Brief
Performance solution	Has the same meaning as in the NCC.
Professional Engineer	A person who is registered *under the Design and Building Practitioners Act 2020* to carry out *professional engineering work* in a prescribed area of engineering. *Note:* See Section 1.4 below for information on prescribed areas of engineering.
Professional Engineering work	Has the same meaning as section 31 of the DBP Act. *Note:* See Section 1.3 below.
Regulated building	A building that is regulated under the DBP Act, prescribed in section 12 of the DBP Regulation. A building where the building, or a part of the building, is a class 2, 3 or 9c building.
Regulated design	Has the same meaning as section 5 of the DBP Act.
RAB Act	*Residential Apartment Buildings (Compliance and Enforcement Powers) Act 2020*
Secretary	Secretary of the Department of Customer Service
WHS Act	*Work Health and Safety Act 2011*

1. Introduction and purpose

1.1 Purpose of the Practice Standard for Professional Engineers

The Practice Standard for Professional Engineers has been developed to prescribe the standard expected of a registered Professional Engineer by their engineering peers and the community in fulfilling their duties under the *Design and Building Practitioners Act 2020* (the DBP Act).

Compliance with this Practice Standard is a condition of registration for all Professional Engineers registered under the DBP Act.

This Practice Standard prescribes:

- professional and legal expectations for registered Professional Engineers;
- a Professional Engineer's responsibilities to the community; and
- how the Building Regulator will assess a Professional Engineer's compliance with the Practice Standard.

This Practice Standard should be understood in conjunction with other requirements and conditions of registration imposed on Professional Engineers, including:

- the *Code of Practice for Professional Engineers,* set out in Division 2, Part 2, Schedule 4 of the Design and Building Practitioners Regulation 2021 (DBP Regulation);
- the conditions of registration imposed on design practitioners, principal design practitioners or building practitioners, where the Professional Engineer is registered as one or more types of practitioner under the DBP Act;
- the *Building and Development Certifiers Act 2018*, where the engineer is undertaking certification work or work on behalf of a registered certifier.

1.2 Legal status

The Practice Standard for Professional Engineers is prepared by the Secretary of the Department of Customer Service under the section 50 of the DBP Act.

The requirements set by this Standard are in addition to obligations imposed by the Design and Building Practitioners Regulation 2021 (the DBP Regulation), under other legislation and by contract.

Compliance with this Practice Standard is a condition of registration for all Professional Engineers registered under the DBP Act when working on 'professional engineering work'.

Failure to abide with the requirements set out in this standard may be a breach of a practitioner's registration as a Professional Engineer under the DBP Act and may:

- constitute an offence under the DBP Act; or
- be grounds for disciplinary action, including suspension or cancellation of the practitioner's registration.

This document should not be used as a substitute for a Professional Engineer referring directly to the legislation that governs their practice.

Engineers are encouraged to obtain independent legal advice where required.

Engineers who are not required to be registered under the DBP Act may use this practice standard as a guide for best practice.

Compliance with this Practice Standard does not form a condition of registration for a design practitioner, principal design practitioner or building practitioner under the DBP Act. Information on the obligations of a design practitioner, principal design practitioner or building practitioner under the DBP Act is available on the NSW Fair Trading website.

1.3 What is professional engineering work?

An engineer must be registered as a 'Professional Engineer' under the DBP Act to carry out professional engineering work on regulated buildings constructed within NSW.

The DBP legislation defines professional engineering work as work that:

- is engineering work in a prescribed area of engineering;[1]
- requires or is based on the application of engineering principles and data;
- requires applying these principles and/or data to an engineering related design or engineering related construction, production, operation or maintenance activity;[2]
- is not carried out in accordance with a prescriptive standard;[3] and
- is carried out directly in relation to the design or construction of a class 2, 3 or 9c building in NSW, or building with a class 2, 3 and/or 9c part in NSW.[4]

Only work which meets all five elements of the definition is captured by the DBP legislation.

It is acknowledged that there is other engineering work conducted to support the construction of a class 2, 3 or 9c building, such as the surrounding civil infrastructure. In line with the definition outlined above, this engineering work is not captured under the Act.

The DBP legislation does allow that an engineer who is not registered as a 'Professional Engineer' may carry out professional engineering work if they are under the direct supervision of a registered Professional Engineer authorised to do that work. Section 5 of this document outlines supervision requirements.

The definition of professional engineering work is designed to be consistent with the definition of 'professional engineering service' used in Queensland and Victoria and their respective Professional Engineers registration schemes.

1 See Part 1.4 of this document, 'Areas of engineering that require registration'.
2 Section 31(1) of the DBP Act.
3 Section 31(2) of the DBP Act.
4 Section 14 of the DBP Regulation.

Note: For the avoidance of doubt, an engineer located interstate or internationally who is working on regulated buildings (Class 2, 3, and 9c) being constructed in NSW, must:

- be registered as a 'Professional Engineer' under the DBP Act; or
- be directly supervised by a 'Professional Engineer' registered under the DBP Act.[5]

The *Guidance on Professional Engineering Work* document available on the NSW Fair Trading website provides further guidance of the elements of the professional engineering work definition and provides examples of what is and is not captured under the DBP Act.

1.4 Areas of engineering that require registration

The DBP Act prescribes six areas of engineering which require registration under the Act.[6] A Professional Engineer registered under the DBP Act is only authorised to do professional engineering work within their class of registration.

These six areas are defined in Schedule 1 of the DBP Regulation[7] and are listed below:

- **Civil engineering**
  An area of engineering that involves the research, design, construction and maintenance of the built environment.
- **Electrical engineering**
  An area of engineering that involves equipment, devices, plant and systems that use electricity, electronics and electromagnetism.
- **Fire safety engineering**
  An area of engineering that involves the application of engineering principles and rules to the following:
  - the fire performance of a material, structure or building;
  - the selection of a fire system suitable for a particular building, including components of the systems,
  - the safety and behaviour of a person in the event of a fire;
  - the prevention, detection and suppression of fire.
- **Geotechnical engineering**
  An area of engineering that involves the mechanics of soil and rock and the application of the mechanics to the design and construction of foundations, retaining structures, shoring excavations and ground bearing structures for buildings and other systems constructed of, or supported by, soil or rock, but does not include activities involving only geology or earth science.

5 See Part 5 of this document, 'Supervision Obligations'.
6 Section 32 of the DBP Act.
7 Schedule 1, Division 4 of the DBP Regulation.

- **Mechanical engineering**
  An area of engineering that involves work carried out in machines, structures, processes and systems involving mechanical elements.
- **Structural engineering**
  An area of engineering that involves the prediction and calculation of:
    - the stability, strength and rigidity of built structures; and
    - how structures and buildings resist and transfer natural and other forces.

While the areas of engineering have broad meanings, registration is required only where a person is carrying out professional engineering work in these six areas, and that work is carried out directly in relation to the design or construction of a regulated building under the Act, as described in Part 1.3 of this document '*What is professional engineering work?*'.

For example, while the building of roads is within the scope of civil engineering, a person doing that engineering work is not required to be registered as that work is not carried out directly in relation to the design or construction of a class 2, 3 or 9c building (including mixed-use buildings). Professional engineering work in an area of engineering not included above, such as mining, chemical, environmental, biomedical, technology, and telecommunications, is not currently required to be registered in New South Wales under the DBP Act.

1.5 Interaction with other obligations under the Design and Building Practitioners Act

A practitioner's registration as a Professional Engineer is distinct from registration as a design practitioner, principal design practitioner or building practitioner under the DBP Act.

A design practitioner in an engineering class is required to maintain registration in the related professional engineering class under DBP legislation, e.g. a Design Practitioner – Mechanical Engineering must hold a registration as a Professional Engineer – Mechanical. This Practice Standard only applies to their registration as a Professional Engineer.

For design work on a regulated building (i.e. class 2, 3 or 9c), a design practitioner who is registered under the DBP scheme, is responsible for the preparation, supervision, or coordination of regulated designs[8] and providing a design compliance declaration for the regulated designs.

The design compliance declaration includes:

- whether the designs comply with the requirements of the *Building Code of Australia;*
- whether other standards, codes or requirements have been applied in preparing the design;
- that the regulated design, as far as is reasonably practicable, integrates:
    - other aspects of building work related to the design, and
    - other regulated designs for the building work, including designs prepared by other design practitioners.

[8] Section 9 of the DBP Act.

'Integration' of designs means that the designs required to construct a building have been co-ordinated to ensure consistent and complete outcomes between designs, and that no further designs (or consequential variations) are necessary to immediately construct the building.

Professional Engineers can provide engineering advice on a class 2, 3 or 9c building but they cannot make design compliance declarations, or lodge documents required under the DBP Act related to those buildings unless they are also a design practitioner in the relevant class.

Where an engineer works for a body corporate and the body corporate holds registrations in the relevant class, the body corporate can make a design compliance declaration on behalf of the engineers doing the work.

The DBP legislation allows that the holder of a design practitioner — body corporate class of registration is authorised to do anything that another registered design practitioner can do. The body corporate can lodge designs and compliance declarations if they have an individual employee who holds the relevant class of registration and is authorised to sign-off on work on behalf of the body corporate.[9]

[9] Schedule 1, Section 7 of the DBP Regulation.

2. General duties of an engineer

2.1 Code of practice for Professional Engineers

Schedule 4, Division 2 of the DBP Regulation prescribes the mandatory *Code of Practice for Professional Engineers*. Compliance with the Code is a condition of registration for all Professional Engineers.

The Code sets out that a Professional Engineer has a duty to act in professional manner and abide by standards expected by community and must:

- act with honesty, and integrity,
- act and carry out the work, in good faith,
- not unreasonably discriminate against a person or organisation,
- not knowingly act or enter into conduct that could bring, or tend to bring, the profession of engineers into disrepute,
- take all reasonable steps to protect the health and safety of the community when carrying out professional engineering work, including by doing the following:
    - identifying hazards,
    - assessing risks,
    - implementing appropriate strategies to manage risk, and
    - take all reasonable steps to manage and avoid foreseeable adverse impacts of professional engineering work on the natural environment.

The Code further sets out that Professional Engineers have a duty to:

- act within level of competence and expertise,
- maintain satisfactory level of competence,
- act in best interests of client, unless this is contrary to the public interest,
- deal and communicate with clients and others in a professional manner,
- provide information to clients,
- avoid conflicts of interest,
- maintain confidentiality,
- not misinform or mislead,
- manage and resolve disputes, and
- appropriately supervise non-registered persons undertaking professional engineering work.

The Code does not supersede or affect the duty of Professional Engineers to comply with the requirements placed on them by other Acts and laws in Australia.[10]

A failure to meet a requirement under the Code is an offence under section 56 of the DBP Act and is grounds for disciplinary action, including suspension or cancellation of registration and a maximum penalty of $33,000 for individuals.

[10] Schedule 4, Section 8 of the DBP Regulation.

2.2 Fit for purpose

A registered Professional Engineer must ensure designs for professional engineering work comply with the National Construction Code (NCC) and the Design Brief[11] that forms part of their contract of engagement. A fit for purpose obligation requires that professional engineering designs must be capable of being used for the purpose for which the Professional Engineer was contracted.

This obligation is enforceable by the regulator as a condition of registration.

The obligation for the counterparty to accept the engineer's advice and for a contractor to construct strictly in accordance with that design rests with the counterparty and contractor, not the professional engineer. However, it is expected that Professional Engineers play a proactive role in all stages of the build process and will attend sites as necessary to see that work is being carried out in accordance with the designs.

Note: For the avoidance of doubt, this requirement sits separately to the duty of care owed under section 37 of the DBP Act and does not operate as an expansion of that duty. Part 2.3 of this document provides more detail on the duty of care requirements.

In considering whether a professional engineer's work is fit for purpose, the Building Regulator will have regard to the following:

Requirement	Relevant factors
The work must satisfy the requirements set out in the contract of engagement.	The contract of engagement should define the contractual obligations and outcomes and include a statement of purpose clearly and carefully stated for which the engineer's services were to be provided, insurance requirements, etc.[12] The statement of purpose may include the principal's design, cost and timing requirements for the design, such as: • performance obligations, • scope obligations, • quality obligations, or • technical requirements.
The work must comply with all applicable legislative requirements.	Professional Engineers must comply with obligations set out in the DBP Act, EP&A Act and any other relevant legislation.

[11] See Part 3.1 of this document, 'Design Briefs'.

[12] This Practice Standard does not address the commercial aspects (such as fees payable) of the contract between engineers and their client.

Requirement	Relevant factors
The work must be carried out in accordance with the National Construction Code.	A Professional Engineer must ensure that their work complies with the requirements of the NCC before it is provided to another practitioner for building work. The DBP Act requires that building work is carried out in accordance with the NCC.
Final work must be complete and ready for use for the stated purpose.	A Professional Engineer must ensure that where final work is provided to another person to be used in professional engineering work or building work that the work is complete and free of defects, errors or omissions (i.e. if used by that other person, it would enable that person to complete the work for the intended purpose).
The work must be within the Professional Engineer's area of competency.	A Professional Engineer can only do professional engineering work within their area of engineering (listed on their registration). The Code of Practice for Professional Engineers sets out that a Professional Engineer must only carry out professional engineering work authorised by the professional engineer's registration and within their competence or expertise. Breaching this duty, the Professional Engineer will be liable under the DBP Act.
The Professional Engineer must take reasonable steps to coordinate with other designers working on a project to deliver the intended outcome as per their contractual arrangement.	A Professional Engineer must work to provide compliant professional engineering work to a design practitioner or principal design practitioner, and work with other practitioners to ensure that the designs will enable a registered building practitioner to deliver compliant building work. The DBP Act requires that regulated designs integrate to ensure that designs for all building elements will deliver a compliant, safe and resilient building. Under the Act, design practitioners have an obligation to ensure their designs integrate with other relevant designs to deliver a compliant completed building, rather than the discrete parts of the building alone being compliant.[13]

[13] See Part 1.5 of this document, 'Interaction with other obligations under the Design and Building Practitioners Act'.

Requirement	Relevant factors
The Professional Engineer should provide guidance to the building practitioner, where appropriate, on how to implement the professional engineering work.	A Professional Engineer should provide appropriate support to a building practitioner to implement the engineer's work. The Professional Engineer should take reasonable steps to proactively seek to provide this support, rather than waiting to be asked by the building practitioner, noting that the level of support required is likely to vary depending on the complexity and risk of the building project.

2.3 Duty of care

Part 4 of the DBP Act establishes a statutory duty of care that a person who carries out construction work exercise reasonable care to avoid economic loss caused by defects.

The duty of care is distinct from the registration framework for Professional Engineers under the DBP Act. The duty of care is owed by *any* person who carries out construction work and is not limited to the practitioners registered under the Act.

The duty is owed to the owners of the land (and each subsequent owner) on which the construction work is carried out.

The duty of care cannot be contracted out of or delegated.

Under the DBP Act, construction work is defined broadly to cover building work, the preparation of designs for building work and the manufacture or supply of building products used for building work. It also extends to anyone who supervises, coordinates, project manages or otherwise has substantive control over any of that work.

2.4 Insurance

It is a requirement of the DBP Act that a registered Professional Engineer must not carry out professional engineering work if they are not adequately insured for that work and must be able to provide evidence to NSW Fair Trading that the engineer is insured upon request.[14]

The DBP Act and Regulation provide that a Professional Engineer can be covered by either an individual policy, a partnership policy, or a corporate policy. If a company or partnership is providing professional indemnity insurance for a Professional Engineer, the company's insurance policy must indemnify the Professional Engineer for all liability incurred when the engineer was registered as an employee and was performing professional engineering work on behalf of the company or partnership.[15]

[14] Section 33 of the DBP Regulation.

[15] Section 74 of the DBP Regulation.

When determining if a policy provides an adequate level of indemnity, the Professional Engineer, or the company or partnership providing indemnity insurance for the Professional Engineer, must take into account the following matters:

- the nature and risks associated with the work typically carried out,
- the volume of the work typically carried out,
- the length of time that the Professional Engineer has been registered,
- a reasonable estimate of claims that could be brought against the Professional Engineer on the above,
- the financial capacity of the individual, company or partnership, and
- any limits, exceptions, exclusions, terms or conditions of the policy.[16]

Professional Engineers are encouraged to obtain independent financial advice and/or insurance advice as required.

[16] Section 77 of the DBP Regulation.

3. Design phase obligations

3.1 Design brief

A design brief defines and clarifies the project requirements for the proposed building work. The design brief should set out any elements considered essential or desirable by the client for the project.

A Professional Engineer required to prepare a design brief must ensure that the brief covers the range and quality of services required, relevant statutory requirements and appropriate design standards (including relevant provisions of the NCC), documentation standards, interpretation of the requirements of the project and a description of the engineer's responsibilities. The Professional Engineer should ensure that they expressly prescribe all elements that are required to achieve the proposed deliverables.

The completed design brief must be submitted as a return brief to the client, for confirmation of the scope of design, the purpose for the completed building, and any specific requirements to be included in the design.

A Professional Engineer must ensure they account for review of workshop drawings and samples and on site inspections that will be required to ensure the engineering work complies with the NCC and any other required standards.

3.2 Performance solutions

A performance solution is one of two pathways of achieving compliance with the NCC. The other pathway is a deemed-to-satisfy solution. A performance solution is required where a deemed-to-satisfy solution is not used to demonstrate that work complies with all relevant performance requirements, or that the solution is at least equivalent to the deemed-to-satisfy provisions. While the bespoke nature of a performance solution enables flexibility and innovation, it also requires careful and detailed assessment so that the building solution can meet the performance requirements of the NCC.

Where a Professional Engineer prepares a performance solution report, the report must comply with the requirements prescribed in the Section 5 of the DBP Regulation and the NCC.

Note: If a performance solution is required on a new or existing regulated building, a design practitioner who is registered under the Design and Building Practitioner scheme must prepare, supervise or coordinate preparation of the regulated designs.

Professional Engineers can provide engineering advice on a regulated building but they cannot prepare regulated designs, make design compliance declarations, or lodge documents related to regulated buildings unless they are also a design practitioner in the relevant class.

3.3 Existing structures

When undertaking modification or remedial work on an existing building, Professional Engineers should seek advice from the applicable certifier to confirm the relevant

requirement for compliance with the NCC and associated standard before starting building works. Advice should be sought in particular when undertaking modification or remedial work where physical restraints, or heritage aspects are present and may affect the building works.

If the relevant development approval requires full compliance with the current NCC and associated Australian Standards, all modification work and replacement works must be brought into compliance.

If the applicable development approval does not require full compliance with NCC and associated Australian Standards , the Professional Engineer must list the specific areas of non-compliance to latest codes and standards for consideration by the client. This is for the Professional Engineer's future reference and also to enable the client the ability to manage any risks that may exist.

3.4 Workshop drawings

Workshop drawings are drawings produced by a Professional Engineer or a designer that provide sufficient detail of proposed building work to allow work to commence.

Workshop drawings often provide sufficient information for work on prefabricated components to commence offsite, for example sheet metal ductwork or windows.

Workshop drawings should align the contractor's proposals with the construction set of documents taking into account any required modifications specific to the systems being offered.

Workshop drawings should include:

- measurements and specifications for the architect/design practitioner;
- notes that identify changes from the original designs;
- information necessary to fabricate the product so that it complies with the NCC and any other prescribed standard; and
- information necessary to install the product/system so that it complies with the NCC and any other prescribed standard.

Where workshop drawings constitute a regulated design under the DBP Act, the drawings must be subject to a design compliance declaration by a registered design practitioner.

Workshop drawings prepared by a registered Professional Engineer must identify any areas of final coordination required before the design practitioner can make a design compliance declaration on the professional engineering work. It is the responsibility of the design practitioner to ensure that the regulated design, as far as is reasonably practicable, integrates with other aspects of building work related to the design, and other regulated designs for the building work, including designs prepared by other design practitioners.

Note: Under the DBP Act, building work *cannot* commence on *any* building element covered by the DBP Act before the relevant designs have been declared by the design practitioner (and are therefore issued 'for construction' designs), even where the relevant workshop drawings have been completed.

3.5 Working with design practitioners

Regulated designs must, as far as is reasonably practicable, integrate with other related designs and other aspects of the building work.[17] The integration of designs is essential for better designed buildings.

It is essential that Professional Engineers engaged to prepare designs do not operate in silos. Professional Engineers have a positive obligation to coordinate with design practitioners to integrate details of related building work and other regulated designs with their work, and to support registered design practitioners to achieve this integration for the overall building designs.

For example, a design prepared by a structural engineer would require integration with designs prepared by and not limited to the 'architectural' or 'building design' design practitioner, and the fire safety engineer.

This obligation exists both if a Professional Engineer is providing specialist advice to a design practitioner or if they are also registered as a design practitioner and preparing regulated designs themselves.

[17] Section 8 of the DBP Regulation.

4. Construction phase obligations

4.1 On site inspections by a Professional Engineer

Inspections of professional engineering work must be carried out by a registered Professional Engineer or an engineer under the direct supervision of a registered Professional Engineer. Part 5 of this document outlines supervision obligations.

Where a Professional Engineer is preparing designs or reports that will be used in building work, the Professional Engineer must ensure that the final work provides for sufficient on site inspections by a Professional Engineer, including where and when work should not progress without first carrying out an on site inspection by a Professional Engineer.

The site inspections must be appropriate for the scope of works that the Professional Engineer has designed, to check that the building work will comply with the professional engineer's designs/report.

A Professional Engineer undertaking an on site inspection must:

- detect observable non-compliance issues;
- determine whether the building work is built in accordance with the relevant approvals, plans and specifications of the design, and the NCC and relevant standards;
- provide a recommendation to the certifier, where appropriate, where a written direction notice is required; and
- abide by all site work health and safety requirements.

All findings from an inspection should be retained as evidence of the inspection, including photo and/or video record of the inspection. At the completion of an on site inspection, the Professional Engineer should complete an inspection report, including:

- the address of the property at which the inspection was carried out;
- the identity of the inspecting Professional Engineer;
- when the inspection occurred;
- the designs and/or engineering report against which the inspection was undertaken;
- a declaration that the inspected building work(s) complies with the relevant professional engineering work design or report; and
- the findings from the inspection(s).

Any limitations from the inspection undertaken should be explicitly included. This might include items such as any areas/items that were not accessible and testing that was not able to be undertaken.

The inspection report should be made available to relevant parties to support practitioners to deliver compliant building work.

If a Professional Engineer has concerns regarding the compliance of work or safety of a project or considers it necessary to ensure the project is compliant and safe, the Professional Engineer should provide a recommendation to the certifier that additional inspections by the certifier are necessary beyond the minimum mandatory inspections required. In providing this

recommendation, the Professional Engineer should consider the scope of their professional engineering work and the building's complexity.

The requirement to undertake on site inspections will impose additional costs on the professional engineer. Variations to the any contracted schedule of inspections and the respective costs should be communicated to the client in a timely manner in line with the *Code of Practice for Professional Engineers*.

4.2 Temporary works

Temporary works that involve professional engineering work must be completed by a registered Professional Engineer.

This work must be clearly documented and communicated in a manner tailored to the needs and knowledge of the person working off it, to ensure that other parties can follow the designs/reports to produce safe and compliant temporary works.

Where this work does not relate to a building element or performance solution, for example installation of cranes or scaffolding, a registered Professional Engineer can prepare the designs/reports without a design practitioner making a design compliance declaration.

Where the work relates to a building element, for example temporary shoring and ground anchors, this work must be declared by a registered design practitioner.

All professional engineering work in relation to temporary works must comply with relevant legislation and codes, including the duties required by the WHS Act, and should comply with all relevant standards.

5. Supervision obligations

5.1 Providing direct supervision of unregistered persons

If a person is doing professional engineering work, they must be a registered Professional Engineer or doing the work under the direct supervision of a registered Professional Engineer. This requirement is set in section 32 of the DBP Act.

The *Code of Practice for Professional Engineers* specifically extends this duty. Under the Code, a Professional Engineer also has a duty to ensure that an unregistered person under their supervision does not carry out professional engineering work unless:

- the work is within the Professional Engineer's competence and expertise,
- the work is carried out competently, and
- the work is carried out in accordance with the requirements prescribed by the DBP Act and Regulation and other relevant laws.[18]

This ensures that the Professional Engineer is ultimately responsible for any work carried out by an engineer that they are required to directly supervise. Any resulting complaints, investigations or disciplinary action associated with the professional engineering work will be directed at the Professional Engineer.

The obligation to satisfy the requirements of 'direct supervision' rests with both the unregistered engineer who is being supervised, as well as the registered Professional Engineer who is supervising. Failure to satisfy these elements will result in significant consequences for both parties.

For failing to meet the direct supervision requirements, the unregistered engineer could face a penalty of up to $55,000 or an on-the-spot fine of $5,500, and the supervising Professional Engineer risks disciplinary action, including possible cancellation of their registration.

5.2 Requirements for providing direct supervision

To meet the requirements of direct supervision under the DBP Act, it is required that:

The supervision must be direct.

The supervising Professional Engineer and the unregistered engineer must have direct contact with each other. Supervision cannot be provided through a third person. Direct contact may include:

- face to face meetings,
- video conferencing,
- email and telephone calls, and
- direct supervision and approval of draft designs.

[18] Schedule 4, Section 19 of the DBP Regulation.

The level of direct supervision required will vary depending on the context of the work. However, even if an unregistered engineer demonstrates high levels of expertise, direct supervision must be maintained at all times.

The supervising engineer must be a registered Professional Engineer whose registration authorises them to carry out the professional engineering work and the work must be within their area of competence and experience.

Before agreeing to directly supervise an unregistered engineer, a Professional Engineer should ensure they fully understand the work required and that the work falls within the scope of work authorised by their class of registration and is within their competence and expertise.

A Professional Engineer must also ensure that they have capacity to adequately supervise the unregistered engineer.

The supervising Professional Engineer must instruct, oversee and evaluate the supervised engineer in the carrying out of the work.

The Professional Engineer must be involved and supervising in all stages of the professional engineering work. The Professional Engineer must ensure that the professional engineering work carried out by the supervised engineer is carried out to a standard expected of a registered Professional Engineer at all times.

The Professional Engineer must have sufficient control over the work conducted by the unregistered engineer, and should be satisfied that, at all times, the unregistered engineer is exercising appropriate knowledge, skill, judgement and care.

The Professional Engineer must ensure the work is carried out in accordance with the requirements prescribed by the DBP Act and Regulation, including the Code of Practice, or another Act or law. They must take responsibility for the professional engineering work being delivered.

Appropriate records must be maintained by the supervising registered Professional Engineer.

Records should be kept that clearly provide evidence of the direct supervision over all types of professional engineering work including the approval of draft designs. Records may be electronic or hard copy and may include:

- records demonstrating reviews and comments,
- emails,
- checklists,
- records of face to face meetings and video conferencing, including file notes and meeting minutes,
- records of telephone calls, and
- any other documents indicating instructions of review of work.

The *Guidance on Professional Engineering Work* document available on the NSW Fair Trading website provides further guidance to help Professional Engineers understand their obligations regarding direct supervision.

6. Independent third party review obligations

This section of the Practice Standard sets out obligations for independent third party review by a registered Professional Engineer where a review has been requested by a registered building certifier.

Although not mandated by this document, a registered Professional Engineer may also consider recommending to the relevant certifier that an independent third party review of professional engineering work is undertaken on any complex or high risk building projects they are engaged to work on.

Independent third party review is considered best practice on complex or high risk buildings, as they can allow design issues to be identified and rectified earlier in the process.

6.1 Duty when undertaking independent third party review

A registered Professional Engineer who undertakes an independent third party review of designs related to a regulated building is carrying out professional engineering work. The Professional Engineer undertaking an independent third party review should be professional and respectful, and promote a sense of collaboration.

Where a registered Professional Engineer has been engaged as an independent third party peer reviewer to produce a certificate or report verifying the suitability of the building component, form of construction or design, they must:

- be registered in the relevant area of practice;
- be competent to perform that professional engineering work (having regard to the features of the design, building complexity and any performance solutions used);
- be impartial and exercise independent judgement;
- declare any real or potential conflicts of interest and declare any relationship to the person whose work is to be reviewed (i.e. was not involved in the design and construction of the project under review and is not currently working on any projects involving the builder/developer);
- ensure the scope of work and timing of report being provided to relevant parties is clear, with all exclusions expressly stated in the engagement documentation;
- have all designs and reports relevant to the independent third party review, and request additional documentation as required to ensure the Professional Engineer can produce a compliant certificate or report on the suitability of the building component, form of construction, or design;
- respect and keep confidential any confidential information and intellectual property;
- otherwise act in the interest of their client, the public and in accordance with the *Code of Practice for Professional Engineers.*

It is expected that a Professional Engineer undertaking an independent third party review will:

- Review the calculations which inform engineering work and designs, it is expected that at the minimum a reasonable sample of calculations will be checked;
- Identify and prioritise critical issues, whether or not they have previously been identified;

- Review relevant designs, reports, calculations and documentation and assess whether they meet the requirements of the NCC.

A Professional Engineer undertaking an independent third party review does not take responsibility for the original designs being reviewed, however, the Professional Engineer will be liable for their own conduct as they are undertaking professional engineering work.

For the avoidance of doubt, a Professional Engineer is subject to all professional engineering requirements including those specified in the DBP Act, DBP Reg and this Practice Standard. This includes that a Professional Engineer undertaking a third party review is required to comply with fit for purpose requirements set out in Part 2.2 of this document.

A Professional Engineer must not issue a certificate or report of suitability until they are satisfied that the relevant design complies with the Design Brief, relevant Australian Standards, the NCC and all other relevant codes and standards.

6.2 Third party review requested by a building certifier

As part of the certification process, a registered certifier may request engineering work be reviewed by an independent engineer. Where the certifier requests a review of 'professional engineering work' as defined in the DBP legislation[19], then the work must be reviewed by a registered Professional Engineer.

Because the role of a certifier is generalist in nature, they are permitted to rely upon specialists for relevant matters and disciplines, such as structural engineering. A certifier may request a third party be engaged to test and review work and provide a certificate or report that the work is compliant with the NCC and other relevant standards. The certifier can rely on this as suitable documentary evidence to the work's compliance with the required standard.

Building work subject to development consent under the *Environmental Planning and Assessment Act 1979* (EP&A Act) (including a complying development certificate) is subject to mandatory on site inspections, with certain buildings and elements subject to mandatory inspection at certain points based on the building's classification.[20] A principal certifier can also require additional mandatory inspections based on the complexity and the relative risk of the work.[21] The certifier may request that a specialist be engaged to review relevant work, which can include engagement of a registered Professional Engineer.

Evidence of suitability

The *Practice Standard For Registered Certifiers Volume One* (published October 2022) provides that a certifier can only rely on a certificate or report verifying the suitability of a building component, form of construction or design where the certificate or report:

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19 See Part 1.3 of this document, 'What is professional engineering work?'.

20 Part 8 of the Environmental Planning and Assessment (Development Certification and Fire Safety) Regulation 2021.

21 Part 4 of the *Practice Standard For Registered Certifiers Volume One.*

- provides the basis on which verification of suitability has been made in a form that can be subjected to scrutiny; and
- refers to any standards, specifications, software or other publications or documents relied upon in verifying suitability.

The NCC provides that evidence to support that the use of a material, product, form of construction or design meets a Performance Requirement or a Deemed-to-Satisfy Provision may be in the form of:

> "(e) A certificate or report from a *professional engineer* or other *appropriately qualified person* that —
>
> (i) certifies that a material, product, form of construction or design fulfils specific requirements of the BCA; and
>
> (ii) sets out the basis on which it is given and the extent to which relevant standards, specifications, rules, codes of practice or other publications have been relied upon to demonstrate it fulfils specific requirements of the BCA."[22]

6.3 Inspections for independent third party review

As the first step, it should be determined whether an on-site inspection is required to be conducted.

Consistent with the required standard of conduct for a building certifier, if engaged to undertake an independent third-party review, a Professional Engineer undertaking an on site inspection must:

- detect observable non-compliance issues;
- determine whether the building work is built in accordance with the relevant approvals, plans and specifications of the design, and the NCC and relevant standards;
- provide advice to the certifier, where appropriate, where a written direction notice is required; and
- abide by all site work health and safety requirements.

A Professional Engineer must not:

- perform poor quality inspections or inspections that are not on site (i.e. cannot be done virtually); or
- inspect only a portion of building work covered by the designs under review.

The Professional Engineer must ensure they are aware of any additional inspection requirements that the certifier or consent authority has imposed on the project.

If the Professional Engineer considers that reinspection is required, they should notify the certifier. The certifier will then document and communicate the unsatisfactory inspections to the building approval applicant.

[22] A5G3 of the NCC 2022

Other Inspection approaches

An inspection may comprise of a combination of approaches to confirm requirements have been met, including visual inspections, destructive testing, documentation inspection and witness testing. These inspection methods are further detailed below:

Visual Inspection

Visual inspection is a means of confirming that what is provided appears to satisfy the engineering requirements. It is a means of giving confidence that the works appear to have been completed. It will involve attending site to physically observe the professional engineering work. A visual inspection requires a physical site inspection but can be further supported by photographic or video evidence.

Multiple visual inspections may be required to close out the requirements of the design brief, and NCC (and other prescribed standards). It may also be required that visual inspections are undertaken at specific stages of an installation, e.g. before an item becomes hidden. When undertaking on site visual inspections, a checklist of items can be helpful to co-ordinate the inspection.

Destructive Testing

Destructive testing may be necessary in situations where a key element of the professional engineering work is not visible and therefore destruction of something is required to gain visual access or the material properties of a building component are required to be verified by testing.

Where destructive testing is thought to be necessary, the relevant certifier should endorse the destructive testing in order for it to be carried out.

Documentation checking

Documentation checking is a means of evidencing that an item has been completed, satisfies mandatory standards and is fit for purpose. Multiple documentation checks may be required to close out the mandatory design and performance requirements. For example for fire safety engineering work, documentation checking could comprise of:

- drawings,
- certificates,
- management plans,
- design confirmations,
- fire matrices,
- test reports,
- engineers' reports,
- correspondence, and
- commissioning reports.

Witness testing

Witness testing is a means of evidencing that the required functionality the building work is provided and that it satisfies the required performance requirements. It is a means of proving that the work has been completed.

It involves attending site and witnessing the building operating, or specific systems within the building. For example, witness testing may involve development of a test plan, or simulating specific engineering requirements.

Multiple witness tests may be required to close out the independent third party review. This may be due to the size of the project and the requirements, due to items being incomplete/not working as required at the time of witnessing, a staged phasing of the systems integration and handover or many other reasons.

The extent of witness testing is at the discretion of the registered Professional Engineer undertaking the independent third party review and will involve consideration of the systems being reviewed and their complexities.

6.4 Certificate or report of independent third party review

A Professional Engineer undertaking an independent review must produce a certificate or report that meets the requirements set out in the NCC[23] (see Part 6.1), including:

- a register of the design documentation reviewed;
- details of the review scope, including date/s of review, who conducted the review, scope of the review and any exclusions;
- declarations of any conflicts of interest;
- a completed inspection report that details when the work was inspected;
- details of assumptions, calculations or verification work undertaken to assess compliance (e.g. with NCC and referenced standards), including test results if applicable;
- outcomes of the review, including decisions, recommendations and issues; and
- a log of queries raised and responses given (where required).

Any amendments or variations that were made to the design because of the independent third party review process must also be recorded in the report.

Note: If the designs under review are regulated designs under the DBP Act, any amendments or variations made to the design must be prepared by a registered design practitioner in the relevant class, or under the direct supervision of a design practitioner in the relevant class. A Professional Engineer can only amend or vary a regulated design directly if they are also registered as a design practitioner in the relevant class.

[23] A5G3 of the NCC 2022

7. Obligations for engineers acting as experts in legal proceedings

Engineers may be called upon to prepare an expert witness report to identify a cause of failure or express an opinion on a matter which falls within their expertise.

Any expert witness engaged to provide a report or opinion in legal proceedings or proposed proceedings must comply with the Expert Witness Code of Conduct, set out in Schedule 7 of the *Uniform Civil Procedure Rules 2005.*

An expert witness report is often used as evidence in Court and must represent the independent, unbiased opinion of the expert. Presenting false or misleading testimony may be an offence. Before giving evidence in court proceedings, Professional Engineers are encouraged to get independent legal advice on their obligations and read court produced guidance material.

A registered Professional Engineer is required to comply with the Code of Practice. This does not affect the duty of a registered Professional Engineer to comply with requirements placed on the Professional Engineer under other Acts or laws.[24] This includes the requirement to comply with the Expert Witness Code of Conduct.

A Professional Engineer should not provide expert evidence where they hold a conflict of interest. This would breach the *Code of practice for Professional Engineers*.[25]

A failure to meet a requirement under the Code is an offence under section 56 of the DBP Act and is grounds for disciplinary action, including suspension or cancellation of registration and a maximum penalty of $33,000 for individuals.

7.1 Duty when providing expert evidence in court proceedings

Before starting any work in a matter, a Professional Engineer must ensure they understand the scope of work they are being required to provide an expert opinion on.

The Professional Engineer should read the legal brief thoroughly and seek more detailed instructions from the client if it is not clear what needs to be addressed in the report.

The legal brief should detail the following things:

- who is the client,
- where is the building,
- a history of the problems with the building and the general facts about the construction of the building,
- whether an insurance claim has been lodged and/or proceedings commenced in respect of the defects affecting the building,
- the purpose of the report,

[24] Schedule 4, Section 8 of the DBP Regulation.

[25] Schedule 4, Section 15 of the DBP Regulation.

- copies of all relevant documents including the strata plan, any other reports obtained by the client, surveys completed by residents of the building, the relevant expert witness code of conduct or equivalent, and
- what specific questions are to be answered in the report.

If the brief asks the Professional Engineer to undertake work outside of their registration or expertise, the Professional Engineer must advise the client that they cannot provide an opinion on those matters that fall outside of the engineer's registration or expertise.

Substance of court required expert witness reports

An expert report for a building defects claim should clearly state the registered Professional Engineer's observations, any investigations they have carried out and the results of those investigations, the final opinion and the reasoning for it.

The report should include:

- a statement of facts (these should be contained in the brief and cover the facts that are not in dispute in the matter);
- a summary of key features in the report (to demonstrate that all questions asked in the brief have been addressed);
- a list of all documents referred to in the report, with relevant extracts of those documents attached and copies of those document in full available to the client upon request;
- a list of all standards, theories, codes, laws, or industry standard practices that have been used/consider in reaching the conclusion detailed in the report, how those standards have been used in preparing the advice, and why those standards should be relied on; and
- details of any other issues that the Professional Engineer considers relevant to the reading of the opinion provided in the report, including issues that may fall outside of the initial reference but are nonetheless relevant (for example relevant standards that could impact interpretation).
- include only independent and unbiased facts and opinions. The Professional Engineer is not to make submissions on behalf of their client's argument;
- where the Professional Engineer has been instructed to provide expert evidence on a matter outside of their expertise, include a statement that the Professional Engineer is not registered and/or competent to provide an opinion on that matter; and
- be written in plain English so it is accessible for readers who do not have background in professional engineering. If technical terms are used, the report should include a glossary of those terms.

If the Professional Engineer subsequently changes their opinion in any material respect, the Professional Engineer must advise their client immediately and provide a supplementary report, stating the change of opinion at the earliest opportunity.

8. Additional Obligations for Specific Registrations and Specific Professional Engineering work

This Practice Standard includes additional obligations for Professional Engineers registered under specific classes and/or working in specific areas.

This section includes the following:

8.1 Additional obligations for electrical engineers

Application

This section applies to all engineers registered under the DBP Act in the 'Professional Engineer – electrical' class.

Design

Electrical services must be fully coordinated with all other services and building elements. The installation must fully comply with the requirements of the NCC, AS/NZS 3000 Wiring Rules and all other applicable Codes and Standards.

A Professional Electrical Engineer must design all work carried out in relation to equipment, devices, plant and systems that use electricity, electronics and electromagnetism in a regulated building with consideration of the following:

- Locations with potentially congested services paths (e.g. building cores, plant areas and riser entries) must be checked to unsure that sufficient space is available to install the services and that the required separation requirements between services can be maintained.
- Assessment must be made for the requirement of a lightning protection systems to the requirements of AS 1768. An appropriate lightning protection system must be provided to suit the building's risk factors.
- Hard wired smoke alarms must be provided to the requirements of AS 3786 and are provided with a 10 year life lithium backup battery and mute function.
- Accessible vertical services risers should be provided on all floors of the building to ensure the future accessibility of the services for maintenance purposes.

Electrical Supply Authority provisions and requirements must be incorporated within the electrical design. An application for the electrical supply connection must be submitted to the relevant Electrical Supply Authority. The network connection arrangement and required supply capacity availability must be confirmed and approved by the Electrical Supply Authority, prior to completion of the electrical design.

Electrical maximum demands must be calculated to determine the required building supply and include a minimum of 20% spare capacity.

Detailed calculations must be provided for:

- congested services paths spatial requirements,
- electrical maximum demands,
- electrical protection grading; lighting levels, and
- NCC section J6 energy requirements.

Manufacturer's shop drawings should be reviewed and approved by a registered Professional Engineer prior to equipment manufacture. Systems and equipment to be reviewed include but are not limited to custom switchboards, EV charging systems, emergency lighting control systems, intercom systems and communications systems.

Additional provisions regarding cabling

- All cabling is neatly run and fixed to cable supports at regular intervals. Cabling is not to be supported or fixed to other services. Unsupported cabling is not permitted.
- Removable access panels must provide for access to all concealed cabling and services.
- Cable draw-in systems must be provided within all inaccessible building spaces where cabling is installed to allow for future rewiring.
- Appropriate separation and segregation have been maintained between high voltage cabling, low voltage cabling, extra-low voltage cabling, communications cabling and other services.
- Equipment and cable support systems installed in areas prone to physical damage e.g, carparks, are provided with suitable protection such as guards, covers or bollards.
- Equipment and cable support systems installed externally must be constructed of UV resistant materials and are adequately weatherproofed.
- Cabling must not obstruct access panels.
- Equipment and cable support systems in common areas and external areas must be robust and vandal resistant.

Additional provisions regarding switchboards

- Switchboards, equipment, cabling, supports and outlets must be labelled to indicate the switchboard origin, circuit designation and equipment function.
- Signage must be provided to indicate the main switchboard location and earth stake locations. All switchboard and equipment cupboards/rooms must be provided with signage to indicate the services enclosed.
- Laminated schematic diagrams and typed circuit schedules are provided adjacent to all switchboards.

Additional provisions regarding lighting

- Light fittings installed below ceiling spaces must be connected via plug tops and not directly hard wired to allow for removal to future maintenance.
- Lighting circuits must be provided with controls and sensors to comply with NCC section J6 energy requirements.
- All lighting and power subcircuits must be provided with separate combination circuit breaker/residual current device protection.
- Each sole occupancy unit must contain a minimum of two lighting circuits and two general power sub-circuits. Fridges must be provided with an additional separate sub-circuit. Mixed sub-circuits are not permitted.

Additional provisions regarding communications

- A Master Antenna Television (MATV) system must be provided to distribute all available free to air television signals to each sole occupancy unit.
- Where available, each sole occupancy unit should be provided with national broadband network (NBN) facilities. As a minimum, living areas, studies and the main bedroom should be provided with one RJ45 Category 6a outlet cabled back to a central distribution hub.

- Where available, each sole occupancy unit should contain a dedicated equipment cupboard to accommodate the unit's distribution board, NBN equipment, data hub and MATV distributor.

Additional provisions for electric vehicles (EV)

- Where a building is planned to contain dedicated EV charging bays, provisions for EV charging must be included within in the electrical demand calculations at the rate of one 7KW charger per 5 onsite vehicle parking spaces.
- Where installed, EV charging installations should be provided with sub-metering billing facilities.

Inspection

A Professional Electrical Engineer must carry out quality inspections throughout the construction phase and ensure that the installation is fully compliant with the design drawings, standards, and codes.

A minimum of 10% of all services that will be concealed by building elements must be inspected in person by the registered Professional Electrical Engineer prior to concealment. The majority inspections must be undertaken in the early stages of construction to ensure any issues are addressed before construction progresses.

Through construction, and prior to concealment, services to be inspected include, but are not limited to:

- inground conduits,
- in-slab installations,
- in-screed installations,
- in-ceiling installations,
- underfloor installations, and
- wall cavity installations.

Remaining services in concealed locations must be photographed and submitted to the registered engineer for review and sign-off. Any defective or non-compliant works detected must be re-exposed and rectified to the registered Professional Electrical Engineer's requirements.

Before handover, systems and equipment requiring inspection by the registered Professional Electrical Engineer include but are not limited to:

- energy meters,
- programmable lighting controllers,
- EV chargers,
- PV inverters,
- MATV equipment,
- communications equipment,
- security systems,
- circuit breaker trip settings, and

- emergency lighting test systems.
- There are no sharp edges that will cause potential damage to cabling, particularly where wiring leaves cable support systems or where cables pass through penetrations in metal framing.

Testing and handover

All electrical systems are to be fully commissioned, adjusted and programmed.

Commissioning test results demonstrating pass conditions are to be provided to the registered electrical engineer for review for the following equipment and systems:

- MATV signal levels at the outlets,
- communications cabling performance,
- RCD operation,
- earthing impedances,
- lightning protection systems,
- metering, and
- protective switchgear operation.

Emergency lighting log-books or automated testing results in accordance with AS 2293 are to be provided to the registered electrical engineer for review and approval.

All testing and commissioning must to be carried out in accordance prescribed Standards and manufacturer's requirements.

8.2 Additional obligations for fire safety engineers

Application

This section applies to all engineers registered under the DBP Act in the 'Professional Engineer – fire safety' class.

Australian Fire Engineering Guidelines

A Professional Fire Safety Engineer must refer to the Australian Fire Engineering Guidelines (AFEG) for best practice guidelines when undertaking fire safety engineering work in NSW.

Consultation with Fire and Rescue NSW

From 1 August 2023, building owners have obligations under the Environmental Planning and Assessment (Development Certification and Fire Safety) Regulation 2021 to ensure that a person who develops a performance-based design brief for a performance solution for a fire safety requirement in the building requests the Fire Commissioner comments on the brief.[26]

This obligation applies to the building owner if the building is class 2-9 and a construction certificate is required for the building work. The request must be made during development of the performance solution. The Fire Commissioner is then required to give notice their intention to provide comments on the performance-based design brief within 10 working days of the request being made.

A Professional Fire Safety Engineer must take reasonable steps to assist the relevant building owner to ensure the required procedure is adhered to.

Construction and commissioning

A registered Professional Fire Safety Engineer must ensure their engagement agreement includes the engineer's involvement in the construction and commissioning stages of a project. For the construction stage, this must include:

- facilitating the realisation of the design intent (i.e. confirming that the engineer's designs are being followed);
- identify aspects that are crucial to fire safety;
- develop a critical elements/functions register for fire safety systems;
- carry out supplementary analysis on required changes to the design, including liaison with relevant stakeholders; and
- determine that the necessary fire safety system components are installed as specified.[27]

For the commissioning stage, where a performance-based design is used the Professional Fire Safety Engineer must:

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[26] Division 3 of the Environmental Planning and Assessment (Development Certification and Fire Safety) Regulation 2021.

[27] Section 1.3.2.2. of the AFEG.

- set system performance criteria for the fire safety system; and
- certify that the commissioning has shown the system performance is likely to meet these criteria.[28]

The scope and extent of the Professional Fire Safety Engineers involvement in the construction and commissioning stages should be determined as part of the process to develop the fire engineering report, as it is not possible to provide a cost-effective estimate prior to commencement of this process.

Inspections

The on site inspection should ensure that:

- all explicit requirements of any fire safety engineering performance solutions are subject to inspection;
- particular attention is given to innovative or unique aspects of the fire safety engineering design;
- any deemed-to-satisfy requirements expressly relied on in the fire safety engineering design are inspected;
- a confidence check of any deemed-to-satisfy items not expressly relied on in the fire safety engineering design is conducted. This may include:
    - a test of the fire detection and alarm system to confirm the building receives a fire alarm to initiate evacuation;
    - a check that means of egress is available from the building so that occupants would be able to evacuate;
    - a check that compartmentation appears to generally be provided as required in the design so that fire would likely be restricted and key escape routes (e.g. fire isolated stairs) are provided;
    - a visual check of the external façade of the building (predominantly to identify any potential areas of combustible cladding that may not have been picked up as part of the fire safety engineering, e.g. timber);
    - a check that, if provided in the design, sprinklers are provided. Where provided a test of the sprinkler system should be undertaken, e.g. testing to confirm receipt of signal at panel and associated ancillary equipment such as pumps operating;[29]
    - a check that, if provided in the design, hydrants are provided to enable a means of fire brigade intervention; and
- for active fire safety measures, sub-systems and single system testing is carried out to ensure the sub-systems interface with each other and the system as a whole operates as intended.

When undertaking an on site inspection of the fire engineering work, the registered Professional Fire Safety Engineer may have regard to:

[28] Section 1.3.2.3. of the AFEG.

[29] Note, this does not need to be a test involving discharge of water.

- *AS 4655 (2005) Fire Safety Audits*. This standard set out an approach to undertaking fire safety audits. This standard is now repealed however may still provide useful guidance and context for undertaking fire safety inspections.
- *AS 1851 (2012)* Routine service of fire protection systems and equipment. This standard sets out guidance in relation to on-going maintenance of fire safety measures and may provide useful context around inspection of fire safety measures.

Change of use

Where a building is to be altered or change its use/NCC classification, a Professional Fire Safety Engineer working on that building work must:

- ensure fire-safety levels are maintained during refit and refurbishment activities;
- ensure the final building meets the requisite fire safety level of the new NCC classification;
- contribute to obtaining the necessary approvals for the altered building;
- examine any fire engineering design carried out on the existing building to determine if it still applies; and
- evaluate alterations to future use or occupancy change and include this in their performance based design brief (PBDB) for the client's attention.

Final Approval

Unless that building certifier is appropriately qualified and registered, the certifier will rely on a Professional Fire Safety Engineer to carry out inspections and certification of the fire safety systems. In particular, the Professional Fire Safety Engineer must review the following:

- that the conditions of the regulatory approval have been met;
- that the construction and commissioning meet the fire safety design requirements; and
- that appropriate management and maintenance regimes have been clearly defined.

The Professional Fire Safety Engineer must ensure that all on-completion documentation has been met or submitted. This may include:

- that on completion tests have been satisfactorily carried out, including pressure tests, evidence of fire alarms and fire brigade acceptance, smoke exhaust systems, security doors release (where appropriate), booster pumps, smoke/fire detectors, etc;
- the certification of water storage tank capacity, flow rates, pump operation, etc;
- the fire rating certificates including for structural elements, services penetrations, etc;
- that the requisite equipment registration is in place;
- that operations manuals have been submitted; and
- that short and long-term maintenance requirements (including equipment replacement regimes) have been documented.

Management and use of building post occupation

The Professional Fire Safety Engineer must ensure that appropriate management and maintenance regimes have been defined before an occupation certificate is issued for the

building. This documentation must be provided to the certifier and building owner in the form of a building manual.

The building manual is required to assist building owners in maintaining their buildings and or practitioners who test, maintain and repair fire safety systems. The building manual must clearly identify all limitations and assumptions of the fire safety design, and the maintenance requirements for the building fire safety strategy.

The Professional Fire Safety Engineer may also provide advice for:

- the development of emergency evacuation procedures and associated training. These procedures need to be consistent with the fire engineering design, particularly in the method of warning occupants and the evacuation strategy; and
- listing any limitation on fuel loadings and use of evacuation routes.

Independent third party review by a Professional Fire Safety Engineer

Subject to the requirements prescribed by the project's certifier, a Professional Fire Safety Engineer undertaking an independent third party review must:

- use the guidance of the AFEG as the benchmark for the review;
- conduct sufficient inspection of all fire safety items relied on in the fire safety engineering design to confirm that the requirements of the fire safety engineering design are met in the as-built condition, including (but not limited to):
  - structural fire resistance,
  - compartmentation,
  - means of egress,
  - fire safety systems,
  - fire brigade intervention, and
  - fire safety management;
- ensure the decisions made in the PBDB process have been followed in the analysis and conclusions;
- carry out calculation checks as appropriate to determine the quality of the analysis; and
- ensure that the report conforms to the requirements of the AFEG and includes the appropriate items from AFEG Part 2.

Final Report

The conclusions of a third-party review must be documented.

The report from the reviewer needs to be explicit and constructive in its approach, so that any deficiencies in the design and fire engineering report can be remedied expeditiously. In particular:

- assertions and assumptions need to be substantiated and referenced in the manner that the AFEG suggests for the fire engineering report itself;[30]

[30] Section 2 of the AFEG.

- check calculations should be sufficiently detailed to enable comprehension and evaluation; and
- the suggested remedial actions need to be clearly identified.

8.3 Additional obligations for geotechnical engineers

Application

This section applies to all engineers registered in the 'Professional Engineer - geotechnical' class.

Shoring design

The principal purpose of a shoring system is to enable an excavation to be made without causing any damage to land or structures surrounding the excavation.

A person designing and/or undertaking an excavation has a duty of care to support the neighbouring land. Section 177 of the *Conveyancing Act 1919* sets out that:

> "(2) A person has a duty of care not to do anything on or in relation to land (the supporting land) that removes the support provided by the supporting land to any other land (the supported land).
>
> (3) For the purposes of this section, supporting land includes the natural surface of the land, the subsoil of the land, any water beneath the land, and any part of the land that has been reclaimed."

A Professional Geotechnical Engineer must therefore design shoring systems for a serviceability condition to limit the deflections and settlements of the shoring system to ensure that no damage occurs to neighbouring structures as a consequence of the removal of the ground by the excavation processes.

As it is impossible to design a shoring system that undergoes no deflection during excavation, deflections and settlements must be minimised to the point that no damage occurs to neighbouring structures. If the depth of excavation does not allow this directly adjacent to the shoring system, underpinning or other support to the neighbouring structure must be provided.

A Professional Geotechnical Engineer must assess the structures and services to be supported by the shoring system for their tolerance to vertical and horizontal movements without obtaining any damage. This must occur before finalising any designs or making a recommendation relating to the type of shoring system that would be appropriate to support the land and existing structures. The Professional Geotechnical Engineer must also ensure they have received any necessary assessments of neighbouring structures from a structural engineer to support their assessment.

Regulated Design

When working on designs for shoring and underpinning on a regulated building, a Professional Geotechnical Engineer must have reference to the design requirements set out in the *Design and Building Practitioners - Particulars for Regulated Designs Order 2022* published on 24 February 2022.

The Order sets out the specific elements to be included in the plan, cross-section drawings, and elevation drawings for shoring and underpinning.

The regulated design must also include evidence that reasonable steps have been taken to identify the footings of all structures within the zone of influence of the designed excavation and the plan location and depth of any services.

Ground anchors

Where possible, a Professional Geotechnical Engineer must use removable encroaching ground anchors over destressed anchors under neighbouring properties.

A Professional Geotechnical Engineer must work with the registered building practitioner to fulfil the project's obligations with respect to ground anchors that access neighbouring land.[31]

Before work commences, if an encroaching ground anchor is being proposed, the building practitioner must provide the following to the Building Regulator:

- A 'ground anchor installation right document' which demonstrates that permission has been received to install the ground anchor on neighbouring land and the proposed location of the anchor;
- A document detailing:
  - the process for destressing the temporary encroaching ground anchor; and
  - the time the destressing will occur; and
- information on the location (both plan and elevation) of the remnant components of the ground anchor system in the encroached land

If the ground anchor is a removable encroaching ground anchor, the building practitioner must also detail:

- the process for the removal of a removable anchor tendon; and
- the time the removal will occur.

Regulated Design

When working on designs for ground anchors on a regulated building, a Professional Geotechnical Engineer must have reference to the design requirements set out in the *Design and Building Practitioners - Particulars for Regulated Designs Order 2022* published on 24 February 2022.

The Order sets out the specific elements to be included in the plan, cross-section drawings of the anchors, elevation drawings of the anchor system, and detail drawings of the structural connection between the anchor system and any wall or shoring system.

The regulated design must also include evidence that reasonable steps have been taken to identify the footings of all structures within the zone of influence of the designed excavation and the plan location and depth of any services.

31 Division 3A of the DBP Regulation.

8.4 Additional obligations for mechanical engineers

Application

This section applies to all engineers registered under the DBP Act in the 'Professional Engineer – mechanical' class.

Design

When designing systems for regulated buildings, a registered Professional Mechanical Engineer should consider the general amenity of the design and installation of the mechanical services. Designs must comply with the NCC and any relevant standards.

A Professional Mechanical Engineer should ensure designs allow that all mechanical services systems and equipment can have maintenance work carried out by an authorised person in a safe and efficient way, including where the expected life of the mechanical services system or equipment will require ongoing maintenance across the life of the building.

Where appropriate for the building, a Professional Mechanical Engineer should also:

- place exhaust air discharge locations to minimise nuisance to openable windows, air intakes and adjacent neighbours;
- place air conditioning equipment to minimise acoustic issues and other nuisance issues for neighbours; and
- consider the application of other standards not specified in the NCC e.g. AS4254.1 for hanging duct work.

Testing and handover

Where mechanical work is professional engineering work, the registered Professional Mechanical Engineer must:

- ensure all as-built documentation and operation and maintenance manuals are created or updated as part of the project works;
- ensure testing and commissioning is carried out in accordance prescribed standards;
- copies of the operation and maintenance manuals, commissioning results and baseline data and schematics for fire safety systems are left in an accessible place on site; and
- otherwise comply with the duty imposed by Section 26 of the WHS Act.

8.5 Additional obligations for structural engineers

Application

This section applies to all engineers registered under the DBP Act in the 'Professional Engineer – structural' class.

Minimum requirements for structural engineering design

Structural engineering documents must reflect the scale/scope of the project, with specifications that include (as a minimum) the following:

- Australian Standards or other standards used for the design;
- design assumptions (such as allowable bearing pressure for a pad footing);
- a list of design assumption verifications to be undertaken during construction (such as confirm bearing capacity);
- material specifications for design elements (such as steel grade, concrete type etc);
- design loads including reference to any load factors applied;
- maintenance timeframes (such as time to first maintenance of painted steelwork);
- notification stages for inspections (e.g. concrete elements after installation and chairing of reinforcement but before concrete placement);
- sufficient detail to allow a building practitioner to construct the structural elements in conjunction with other referenced drawings (e.g. architectural); and
- compliance with duties outlined in Section 22 of the WHS Act.

Post tensioning

Where post tension design is undertaken, the following items must be considered, and appropriately documented:

- restraint from walls etc. and any requirements for temporary isolation;
- column stiffness used in design;
- crack control;
- any joints; and
- any additional reinforcement required by the main building engineer for actions such as seismic or mine subsidence.

Registered Professional Engineers must coordinate designs to avoid clashes on post tensioning, noting in particular the requirements for pans and anti-burst reinforcement. Particular care should be taken to ensure any post-installed anchors are located to avoid post tensioning elements. This will require consideration of balustrade and façade fixing points.

Piling

Where the piling design is undertaken, the following items must be resolved before a Professional Structural Engineer provides work to a registered Design Practitioner for the purpose of making a design compliance declaration:

- the geotechnical information being used (ensuring complete disclosure of geotechnical information made available to either party);
- settlement calculations include relevant revisions of geotechnical information;
- no discrepancies between drawings, specifications and testing requirements;
- load inputs are comparable (i.e. working loads vs ultimate loads) with that provided in structural design;
- reflection of the helix combined with geotechnical settlement. Multiple helixes should be spaced as shown in the IPENZ Practice Note 28 Screw Piles: Guidelines for Design, Construction & Installation if additional bearing capacity is to be utilised (being conscious of compatibility in a varying soil profile).[32]

Other designers

The following design interfaces must be considered by the Professional Structural Engineer in preparing designs or reports:

- **Geotechnical**
  Information used for the design of the structure must be specific to the site, well understood and parameters used in design to be referenced in structural engineering drawings. Any ambiguity should be clarified prior to declaration of the designs.
  Where relevant, the integration of geotechnical designs with structural components must include:
  - ground conditions and design parameters for pavements,
  - groundwater and water table,
  - in ground contamination requirements,
  - batters, retaining walls, etc; and
  - construction requirements in relation to construction over services, vibration requirements for impacts on existing buildings (based on geotechnical advice) and dewatering impacts on surrounding properties.

- **Fire Safety**
  The structural engineer must have regard to the fire rating and fire separation, smoke exhaust and egress requirements as prepared by a registered fire safety engineer or design practitioner.

- **Architecture**
  The structural engineer is to coordinate their design with elements that affect their design including but not limited to finishes, specified floor use, dimensions, levels and set-outs.

[32] This is intended to ensure screw piles are designed to AS2159, taking into consideration the IPENZ Practice Note 28 Screw Piles: Guidelines for Design, Construction & Installation. Torque should not be used as the sole verification of capacity in any structure over two stories, or where settlement is a critical design element for the structure. While not mandatory, testing of screw piles is recommended.

- **Other practitioners/elements:**
  - Landscape Architectural Design (Loads on suspended structures (eg, planter beds, green roofs); and groundwater.)
  - Hydraulic (Plumbing and drainage penetrations)
  - Services, including:
    - Requirements for construction over and adjacent to existing services;
    - duct penetrations;
    - exhaust ventilation, e.g. basements, toilets, laundries, bathrooms, kitchens;
    - electrical items e.g. earthing requirements, lightning protection, blast loadings, etc; and
    - seismic restraint of services – requires input from hydraulic and mechanical engineers.

Review

Where applicable in a project, the registered Professional Structural Engineer must review and approve the following:

- geotechnical design parameter verification records (will have been reviewed prior to construction of relevant element);
- concrete test results such as cylinder test results (additional early age concrete test approvals required in post tensioning slabs);
- post installed anchor test results where required;
- certificate for fire rated paint system if utilised;
- certificates for any modular/offsite elements that have been certified by other designers or engineers; and
- pile design parameter verification (including torque (where relevant), depth and testing results as required by design).

Independent third party review of designs by a structural engineer

Where a Professional Structural Engineer has been commissioned by a certifier to carry out an independent third party review of design work, the structural engineer must address the following in their report as relevant to the project under review:

- Punching shear check
- Corbels
- Seismic resistance of system
- Transferred load paths
- Earth retaining systems
- Anticipated crack and deflection performance
- Perimeter basement walls performance (e.g. water seepage)

8.6 Additional obligations when undertaking engineering work on a basement

Application

This section applies to all registered Professional Engineers undertaking professional engineering work on a basement.

Basement structures

If the client has not expressly stated its requirements for basement wall construction in its design brief or stated 'purpose', the registered Professional Engineer must obtain a direction from the client before commencing design of those elements.

Perimeter basement walls must be designed to be dry after construction unless specifically stated in the design brief that it is acceptable for the building to have wet walls.[33]

If wet walls have been explicitly stated as being acceptable in the design brief or 'purpose' for which the building is to be constructed, the Professional Engineer undertaking design of a basement structure must work with the relevant other practitioners to ensure that:

- no long-term reduction in water table levels adjacent the built structure will occur;
- no leaching of adjacent ground material adjacent the building will occur;
- water flow rates in the basement will be limited in volume and disposed of as required by regulators and water authorities;
- water will be collected and directed to drainage points, preventing nuisance flows across paths of travel, with the drainage system being of adequate size and with appropriate falls;
- appropriate consideration is given to joints in construction to prevent water entry/transmission through the slab;
- no storage units or other moisture sensitive uses or materials are used adjacent to any wet walls; and
- all services and materials adjacent the wall are designed and constructed of moisture resistant materials.[34]

[33] A 'dry' wall is one in which there is no through-wall seepage but in which there may be some damp areas. A 'wet wall' is one in which there is 'through wall' seepage.

[34] Such as screens, storage area enclosures, cable trays, air vents, switchboards, electrical fittings, mechanical exhaust systems to basements and car parks being of suitable capacity to handle increased air humidity, anti-rust fixings, and building plant.

8.7 Additional obligations when undertaking engineering work on a façade

Application

This section applies to all registered Professional Engineers undertaking professional engineering work on a building's façade.

Façade engineering

Façade engineering is defined in this section as referring to professional engineering work in relation to the façade of a regulated building. There is no class of façade engineer under the DBP Act.

Where work on a façade is professional engineering work, this work must be done by a registered Professional Engineer in the class relevant to the work being carried out. This may include a Professional Engineer registered in the civil engineering class, structural engineering class or mechanical engineering class.

Design brief

The Professional Engineer undertaking façade engineering work must ensure that their engagement agreement (whether it is a design and construct or design only agreement) prescribes:

- the requirements for performance solutions to demonstrate compliance with the NCC;
- the design and provision of any and all related support structures not shown on the façade drawings (steel, aluminium, stainless steel, glass etc.);
- that all materials and work will be fit for the purpose defined in the engagement agreement or design brief; and
- the quality review/on site inspections the Professional Engineer will undertake.

The design brief should include:

- design loadings;
- design parameters, if required, referencing the documents on which these are based;
- project interfaces, such as roofs, membranes, drainage, etc;
- scope of services for which the Professional Engineer undertaking façade; engineering work has been engaged, including the project brief provided by the client
- expected life of the work;
- maintenance obligations;
- appearance/aesthetics;
- waterproofing[35]/weatherproofing;
- anti-corrosion requirements;
- accessibility for future inspections; and

[35] Currently, in the BCA there are no Deemed to Satisfy clauses relating to waterproofing.

- cleaning/decolourisation.

Design stage

Where a Professional Engineer is coordinating the façade engineering work, they must coordinate and incorporate other relevant façade works commissioned to other trades, and other building elements which may require having an interface with the main façade system.

A Professional Engineer must consider the following when preparing façade designs:

- the NCC Classification, including the edition of the NCC to be used, the class of building, type of construction and importance level,
- durability and design life (if nominated by the client),
- environmental considerations, including:
- weather proofing and condensation,
- corrosion,
- thermal insulation,
- air infiltration,
- fire resistance and fire/smoke separation,
- acoustic and noise,
- glass replacement.
- movements of façade and structure, including facade's movements, displacement limits, and non-typical movements particularly on the corners. If required, the Professional Engineer should request a building movement report from the structural engineer.
- environmentally sustainable design (ESD),
- design actions:
    - loading, including wind (e.g. is there a wind tunnel report), maintenance, awnings and balustrades, temporary/construction loads, and temperature/thermal loads,
    - earthquakes,
    - reflectivity,
    - glazing manifestation,
- set out: existing structure/new structure,
- fabrication and installation tolerances,
- infestation,
- packing and transportation,
- windows operability and louvre requirements,
- building maintenance system (e.g. confirm if there is a planned methodology or report)
- testing and prototyping, including:
    - All site built systems to be 100% site hose tested,
    - All pre-engineered systems to be tested to AS2047 or AS4284.

A Professional Engineer should also include in the design criteria and discuss with the client how framing systems will be selected, including test reports and data sheets, with regards to:

- testing for water proofing,
- structural adequacy, and movement capacity,

- coating, corrosion and durability,
- thermal and acoustic properties,
- fabrication and installation,
- availability and warranty,
- function, hardware and accessibility, and
- drain and water proofing upturn or trench drain.
- How the glazing is selected, including data sheets, with regard to:
- dimensional limitation including curvature limitation,
- structural thickness and deflection,
- safety glass requirements, and post breakage behaviour and redundancy,
- reflectivity, visible light transmission, UV, and solar heat gain coefficient,
- acoustic properties,
- thermal fracture risk,
- manufacturer, processing, transportation and installation, and
- aesthetic requirements.

Hold points

Where the Professional Engineer undertaking façade engineering work includes review/on site inspections in the engagement agreement, the following hold points are recommended:

1. Design – prior to ordering of façade material including safety in design workshop report
2. Fabrication of individual components
3. Fabrication
4. Installation

Where relevant to the project, the relevant engineer should consider the following in undertaking appropriate reviews/inspections at these hold points.

Design	Samples
• contract works programme • design documentation, calculation and shop drawing programme • proposed paint / coating / finishing systems and nominate applicator • the materials and components in accordance with specification requirements • structural movement and building joint data from structural engineer • design in-principle shop drawings and calculations • structural silicone - glazing procedures • full shop drawings and calculations	• preliminary precast samples/examples for tender assessment • samples of each type of glass • samples of precast panel samples to show final colour and finish. • samples of various colours of aluminium sheet façades • samples of all façade components, including but not limited to gaskets, sealants, insulation, setting blocks, brackets, anchors, fastenings, bracings, inserts, cappings, sleeves, flashings, closures, trims, extrusions

Design	Samples
• concept - erection methodology • test procedures acknowledged. • material certification • issue of samples and materials schedule • design structural certifications • notice of prototype weather test • fixing test report • appearance prototype • weather performance test report / weather test certificate • other test reports as noted	• samples of composite metal cladding, finished weld for steel, finished folded stainless steel cladding sections • finished rolled steel section where required • samples of finished stainless plate / sheet samples for each finish and thickness • samples of each extrusion and associated trim and cover strips that are exposed to view with its designated finish applied. samples should show the maximum range in finish that will be provided for this project.

Fabrication	Installation
• detailed programme for fabrication indicating interfaces with prototype testing and main contract • structural certification of fabrication • certificates for components and supplied items • shipping documents for materials and supplied items • glass heat treating and heat soaking certification • steel coatings test report • aluminium coatings test report • sealant testing and manufacturers report and review of sealant application/use shop details for the project • weld test results • quality assurance manual and quality plan (fabrication) • notice of factory inspection, if required • quality assurance records	• programme for installation showing interface with fabrication and main contract • work (installation and erection) method statement • nominated persons responsible for supervision • sealant test report • fixings in concrete test report • notice of on-site quality control samples • lightning protection test results • site water test reports • structural certification of temporary works • notification that installed prototype is prepared for inspection • notification for inspection by consultants for each floor or new system • structural certification of installation • quality assurance documentation • quality assurance records • as built drawings • maintenance manual

Independent third party review by a Professional Engineer undertaking façade engineering work

Where a registered Professional Engineer is asked to provide a suitability assessment for façade work, the engineer must ensure the following issues in relation to the façade are addressed in any certificate or report:

- Fixings and penetrations
- Seismic resistance of system
- Transferred load paths
- Anticipated crack and deflection performance
- Waterproofing systems

8.8 Additional obligations when undertaking engineering work on vertical transportation

Application

This section applies to all registered Professional Engineers undertaking professional engineering work on vertical transportation in a building.

Vertical transportation engineering

Vertical transportation engineering refers to professional engineering work for the operation and integration of a vertical transportation product in a building, including a design that relates to how the vertical transportation product will integrate with an applicable building element of the building to achieve compliance with the Design Brief, NCC and other relevant standards.

Where vertical transportation work is professional engineering work, this work must be done by a registered Professional Engineer in the class relevant to the work being carried out, such as the electrical engineering class, mechanical engineering class. The DBP Act does not establish a specific 'professional engineer' registration for vertical transportation work.

Importantly, designs relating to vertical transportation engineering in a regulated building must also be prepared, supervised or coordinated by a registered 'design practitioner – vertical transportation'.

Design brief

The vertical transportation engineering design brief must:

- confirm the project objectives and priorities, including the functional use and operation of the development, redevelopment or maintenance work;
- agree and list enhancements which go beyond the base line statutory requirements, including where vertical transportation requirements will exceed requirements in the NCC and national and international standards for Lifts, Escalators, and Moving Walks;
- define and agree the quality performance criteria of the vertical transportation systems:
- lift traffic assessment criteria, population, waiting time and handling capacity;
- quality lift traffic analysis performance requirements;
- special needs and access requirements to comply with the NCC and other prescribed requirements such as the DDA and the Apartment Design Guide SEPP;
- specific building functional requirements;
- building design life span, vertical transportation system life span;
- define the use of lifts in the event of fire and or emergency;
- extent of compliance with special needs and disabled access requirements;
- noise and acoustics requirements;
- define and agree on the level of redundancy provided to the passenger lifts or other forms of vertical transportation;
- the means of transportation of goods

- define the design reviews to be completed;
- define the sustainability requirements;
- define the type and number of inspections to be completed during construction; and
- ensure expectations are reasonable and attainable.

As part of design process, the registered Professional Engineer should define the requirements of the systems in detail, including functional requirements such as:

- Stretcher Requirements and size
- Pit ladder access
- Emergency access doors enclosed shaft limit
- Emergency Lift Car roof access
- Fire rating doors
- Clear Lift car dimensions with reference to handrails
- Power supplies to Emergency Lifts and Automatic Rescue Device
- Interfaces and operation in fire and emergency
- Extreme Weather and Events
- Enhanced Safety Features for lifts and escalators
- Motor Vehicle Lift Requirements

The Professional Engineer must record if there is a conflict between the NCC and relevant standards with regards to the design and installation of a system and how they intend to meet the functional requirements of the system.

Certification of the product

Where the registered Professional Engineer undertaking professional engineering work on vertical transportation in a building is only responsible for the integration of the vertical transportation product, the registered Professional Engineer can rely on certificates of compliance from an authorised person, such as from the supplier, where this certificate complies with the requirements under the DBP Act, *Work Health and Safety Act 2011* and the *Building Product Safety Act 2017*.

Quality

The registered Professional Engineer must:

- Maintain a Quality Checklist for the various stages of the design in accordance with ISO9001.
- Early in the design phase provide detailed information for the building occupant that describes the quality of the Vertical Transportation system proposed indicating performance rating and redundancy in a clear and concise manner for relevant existing and future stakeholders.

- follow a structured design and coordination methodology over a period of defined project stages such as the process defined in Building Services Research and Information Association (BSRIA).[36]
- Check and verify all interfaces and connections with other design disciplines including but not limited to;
    - building and structure;
    - acoustics
    - earthquake and seismic resistance;
    - fire ratings and openings;
    - mechanical ventilation;
    - power supplies, cable redundancy topology;
    - interfaces for fire systems, security and communications;
    - certificates for relevant items of equipment and elements e.g. lift doors; and
    - registration of plant with SafeWork NSW.

Testing and handover

The registered Professional Engineer should:

- complete all required testing and commissioning requirements listed in the design documentation, referenced standards, and manufacturer's recommendations;
- check and verify all interfaces and connections with other design disciplines;
- provide design certification indicating;
    - statutory requirements
    - coordination and interface statutory requirements
    - non-statutory other requirements
    - enhancements, departures and exclusions
- review operational and maintenance manuals;
- arrange a meeting with the client and other stakeholders to present the systems, how they function and how the instruction and operational procedures will enable the client to occupy and operate the systems successfully and efficiently, including any trouble shooting procedures;
- provide a User Guide for the building occupant at completion of the works that details:
    - the quality of the Vertical Transportation in terms of performance rating and redundancy in a clear and concise manner for relevant existing and future stakeholders;
    - the interfaces and expected operation in the event of various situations such as, fire and power loss.
- list client and end user responsibilities;
- after the meeting, conduct a tour of the building to systems or other relevant areas to familiarise the client and other stakeholders of equipment/system locations and access routes for operation and maintenance;

[36] BSRIA-BS-BG 6_A Design Framework for Building Services [5th 2018]

- when conducting maintenance, arrange a meeting with the occupants and client to present how the systems have functioned, illustrate that all defects have been rectified (where relevant) and maintenance have been carried out; and
- when conducting maintenance, arrange a tour to all plant rooms and other relevant areas to show that these have been maintained properly as per records and have been kept in a manner commensurate with the age of equipment.

Independent third party review of vertical transportation designs by a Professional Engineer

Where a Professional Engineer has been commissioned by a certifier to carry out an independent third party review of design work, the engineer must ensure that the number, position and requirements of the vertical transportation products are confirmed in line with the design brief.

The extent of the review shall be relevant to the size and complexity of the project.