

1. PURPOSE

To help define specific engineering design (SED) structural works, outside the limits of NZS 3604:2011 *Timber framed buildings* or NZS 4229:2013 *Concrete masonry buildings not requiring specific engineering design*, that can be inspected solely by a Queenstown Lakes District Council (QLDC) Building Control Officer (BCO) or will require construction review by the design engineer and when both parties will need to inspect/observe the SED works.

By developing this guidance BCOs will be able to apply a more consistent approach to requesting a Producer Statement – *Construction Review (PS4)* from the engineer and when an Application For 3rd Party verification (AF3P), allowing engineers observation in lieu of QLDC inspections, is appropriate.

It is hoped that by reducing the application of a PS4 condition for SED elements that the value of a PS4 in determining compliance for more complex structural designs will increase. Other benefits include;

- **Reduced cost to the building consent applicant.**
Currently applicants often seek inspections from both QLDC and the structural engineer for SED elements creating additional expense to the project. When QLDC relies on an engineer's monitoring and PS4 a BCO does not need to inspect the specific design elements, resulting in less chargeable time spent on site.
- **Reduction in inspection waiting times.**
When an engineer is engaged to provide a PS4 it can free up council inspection times i.e., after an initial BCOs inspection on staged foundation construction where siting has been checked the BCO will not need to revisit for the remaining foundation stages as the engineer will monitor the work.
- **Expediate CCC process.**
Each item of construction documentation requested on the building consent can potentially hold up issuing a CCC. If a project does not require an engineer to monitor, then no PS4 needs to be requested and reviewed.

Additionally, this guide will aid BCOs, owners, engineers, builders and project managers to understand all parties' roles and responsibilities in ensuring that, when a PS4 is required by QLDC, BCOs will be satisfied that the monitoring was undertaken to an acceptable level giving the BCO reasonable certainty that the works comply with the building consent.

This guidance is intended for structural SED at this stage however guidance may be updated to include fire safety engineering at a later date.

2. BACKGROUND

Where QLDC BCOs are not expected to have the technical knowledge, qualification or training to review or inspect complex specifically designed building works, reliance is typically placed on the engineer's own design review and monitoring processes. These reviews aid QLDC to be reasonably satisfied that the design complies with the building code and that the completed works comply with the building consent.

The accepted way to document these design reviews and construction monitoring as a means of compliance is to request Producer Statements from the engineer.

For specifically engineered design a Producer Statement – *Design (PS1)* will be requested as part of the building consent application. A PS1 demonstrates to the BCO that in the opinion of the engineer the design will achieve compliance with the relevant clauses of the Building Code. For particularly complex or high-risk

designs, or as part of QLDCs auditing process, the PS1 may need to be accompanied by a Producer Statement – *Design Review* (PS2) from an independent reviewer.

If when processing a building consent application, the BCO decides the consent is to be issued with a requirement for construction monitoring by the engineer. Then a PS4 is to be provided by the engineer at Code Compliance Certificate (CCC) application. The PS4 demonstrates to the BCO that in the opinion of the engineer the construction work complied with the consented design.

However, the application of PS4 conditions for relatively simple or low risk building work that BCOs do have the technical competency to inspect had increased over previous years.

There appear to be four key reasons for this.

- **PS1 states a level of construction monitoring (CM).**
When the processing BCO is undertaking their review, they see the PS1 notes a particular CM level and therefore places a PS4 requirement on the issued building consent documents without full assessment of building work complexity.
- **Inconsistent CM levels on PS1s.**
In the past the level of construction monitoring (known as CM 1-5) specified by structural engineers on their PS1 has been used for guidance by BCOs to determine if a PS4 is required. Inconsistent specification by design engineers has contributed to BCOs also being inconsistent in their approach.
- **Building consent applicant ticks engineer PS4 on the checksheet.**
Currently an applicant provides a checksheet to support their building consent application. The checksheet includes a section where the applicant identifies what construction documentation and producer statements they will provide. Often the engineer PS4 section is ticked by the applicant with no discussion or agreement with the engineer and the processing BCO places a PS4 requirement on the issued building consent documents.
- **On site decision by BCO.**
When the inspecting BCO on site assumes a PS4 is required and after checking the plans or PS1 CM level requests construction monitoring and a PS4 from the engineer without consideration of the processing BCO's decision.

QLDC created the first, internal version, of this guidance to address the issue. This version expands on the original document to include guidance for the private sector.

3. OUTLINE OF PS4 PROCEDURE

QLDCs approach will focus on complexity and risk of SED design. In all cases the decision to impose a PS4 condition on the consent rests solely with the BCA as it is the BCA which must decide what evidence is required to be satisfied that the work has been completed as per the approved building consent and is compliant with the building code.

When processing a building consent application, the BCO assesses the work as being of low risk and within the inspecting BCOs competency no PS4 will be requested and QLDC will undertake the inspection of the works.

For more complex or high risk designs the building consent will be issued with a condition that a PS4 is to be provided by the engineer for construction monitoring. For example...

STRUCTURAL ENGINEER: *Structural Engineer: Provide Producer Statement – Construction Review (PS4) and schedule of site monitoring certifying the building work has been built in accordance with the approved design.*

(From QLDCs IS 25 *Building Consent Conditions, Construction Documentation & Advice Notes*)

The recipient of the building consent is responsible for ensuring that the engineer is engaged, discussing with the engineer at what stages they will want to observe the works and making sure the builder is aware of the requirement for the engineer to monitor the work.

For each site visit the engineer will provide site monitoring records to the builder in reasonable time that they are available on site for BCOs to check and ensure that monitoring is being undertaken. Upon completion of the project the engineer will, if satisfied work has been completed as per the design, issue a PS4 to the CCC applicant to be provided to QLDC as evidence of compliance with the consented design.

The issuance of a Code Compliance Certificate (CCC) will be dependent on the PS4 being received and accepted by the BCA. The PS4 must be accompanied by the engineer's construction monitoring records and other documents requested by either QLDC or the engineer such as...

- Producer Statement – *Construction* (PS3) from the contractors involved in the construction of the SED works.
- PS4 or certificate from a Geotechnical engineer confirming ground conditions are as assumed for the design.
- Concrete delivery dockets confirming concrete strength.

The following sections provide guidance for QLDC BCOs, Engineers and Project Managers or Builders and outline their respective roles and responsibilities.

4. PROCESSING BCO

When processing a building consent application, the processing BCO is tasked with deciding what type of construction monitoring is appropriate for the BCA to be satisfied the works are compliant. Whether this can be inspected by QLDC inspecting BCO or if an engineer will need to inspect the works.

When an applicant ticks 'Yes' for an engineer's PS4 in the Construction Documentation and producer Statements section of the application checklist this can be overridden by the BCO if they determine that the PS4 is not required.

The CM levels indicated on an engineer's PS1 should only be used as an indication of risk due to an inconsistent approach among engineers to specify the level required. Following the EngNZ Construction Monitoring Service Matrix a small job with experienced contractors and minor risk (most residential and light commercial buildings) will have level CM2, inspecting selected stages of the work.

A CM level of 3 or above will likely require a PS4 condition as CM3 and above require regular visits i.e. twice weekly which is not typically the way QLDC inspects work.

An engineer's proposed monitoring schedule can be used to help determine if a PS4 is required. They may state 'Council to inspect' but they may only have made the statement because they are based outside of the district and are unwilling to travel for the purpose of monitoring. However, they could do remote monitoring or engage a local engineer to undertake the monitoring and provide a the PS4. Alternatively, they may provide a list of stages they would expect to see if engaged but this may just be a standard part of their process and the inspections could be undertaken by a BCO instead.

A PS1 is not conditional on the engineers specified CM level or monitoring schedule. It is for the BCO to determine the appropriate level of monitoring required to establish compliance.

Although not always obvious, the extent of specifically designed building elements that can be included in a design without engaging a structural engineer is reasonably extensive. These elements may have PS1 documentation available but monitoring and a PS4 would not be expected for the installation of these elements or systems. However, in some cases a PS3 from an accredited installer may be required so the conditions of the CodeMark, BRANZ appraisal or PS1 should be checked.

Some examples included below...

- **CodeMark design solutions**
 - Engineered raft foundation systems (Firth Ribraft, Allied Superslab)
 - Engineered wood products (J Frame, Lumberworx I-Beam)
- **Elements designed using publicly available software or design tables.**
 - Engineered steel beams (BRANZ Lintels and Beams calculator)
 - Engineered timber beams (DesignIT, Prolam)
- **Various barrier and balustrade systems**
- **Proprietary connections and solutions** (Mitek, Pryda)
- **Engineered Trusses** (Pryda, Mitek)
- **Engineered garages and sheds** (Versatile, Totalspan, Goldpine etc)

Building work that requires a suitably qualified engineer to design doesn't always require the same level of technical expertise to inspect. For example, simple raft slabs and foundations, stand-alone beams and portals or sheet bracing elements which are clearly detailed on the consented plans will be able to be inspected by a BCO. In this case a PS1 would still be required at consent application but monitoring and a PS4 from the design engineer should not be required for issuance of the CCC.

See [Table 1](#). for examples of designs which do not require a PS4 condition and those that do.

If it is the applicant's preference that the engineer undertake the inspections instead of QLDC they can make an Application for Third Party inspection (AF3P).

When a PS4 condition is determined to be required the condition wording provided on IS25 can be edited, if needed, to specify which elements QLDC requires the engineer to monitor. For example, the raft slab to the ground floor may be typically detailed and can be inspected by a BCO but the midfloor is suspended concrete which is high risk and should be inspected by the engineer.

When determining the schedule of QLDC inspections consider the aspects of construction that the engineer is unlikely to check, for example, even when a PS4 has been requested for a complex raft slab QLDC will still need to attend to check other aspects of the inspection such as siting, membranes etc.

The specific procedures for producer statements are outlined in the BCAs technical procedures BS-03 *BC Processing (2.5 Producer Statements)* and BS-08 *CCC Processing (4.1.3 Producer Statements)*.

5. INSPECTING BCO

The inspecting BCO is tasked with checking that the required monitoring is being done and, if the monitoring is to be done by the BCA, then undertaking and recording the inspection of the SED work.

The QLDC inspecting BCO will check the plans and consent conditions, if there is a PS4 condition they will confirm with the builder that an engineer has been engaged and has or will monitor the construction. They will request to see any engineer's site notes or ask that they be available at the next inspection.

If the engineer's notes are not available when specified by the BCO and they cannot be sure that the engineer is monitoring the works effectively they may refuse to carry out the inspection and stop further inspections until the information is received. Without evidence of an engineer's monitoring and if QLDC inspections are missed a CCC will not be able to be issued as QLDC will not be able to be satisfied that the works are compliant.

When a PS4 condition is in place the BCO will only look at aspects of the inspection that the engineer will not be responsible for. Some examples are the siting of the building, waterproof tanking, NZS3604 structural elements etc.

The BCO may choose to inspect the SED works being monitored by an engineer. For example, if they spot an obvious flaw or if directed to by their team leader as part of QLDCs auditing process. This would be in addition to the engineers monitoring.

Where there is no condition on the consent for a PS4 the BCO will inspect the SED works. However, if the BCO determines that because of complexity or because of questionable quality of workmanship the BCO is not satisfied that they have the experience or training to assess the compliance of the works the BCO can, after discussion with their team leader, request that the engineer inspect the works, provide site notes and a PS4.

If the SED construction differs from the consented plans due to changes made after the consent was issued or if there are construction details missing from the consented plans that the builder has constructed without written advice and additional detailing from the engineer, then the BCO can fail the inspection and request a variation or amendment to the consent detailing the changes and accompanied by an updated PS1 from the designer. The work will then be reinspected against the engineers updated design and details.

The specific procedures for producer statements are outlined in the BCAs technical procedure BS-05 *BC Inspections (5.1 Structural Engineers)*,

6. ENGINEER

When an engineer is engaged to undertake a design, they should also be prepared to monitor the construction and provide a PS4 or help arrange with another engineer to do so.

Once an engineer has been engaged to undertake construction monitoring and provide a PS4 they will advise the consent holder of the construction stages they need to observe.

It is the engineer's decision if they will need to attend the site or if the work can be observed remotely via video or with photographs.

Following the engineer's inspection, they will issue a site note or similar which should include the following information, as a minimum...

- The name of the person inspecting the work.
- The name of the contact on site.
- The date and time of the inspection.
- The address and building consent number.
- Description of works or parts of the works being observed.
- Any instructions given and how they have been resolved.
- Description of any changes identified and how these have been resolved.
- Any additional details issued to the builder.

It is good practice for the engineer to include photographs with the site note showing the elements inspected.

Quality site notes are an essential tool to help the BCA be satisfied that the structure is compliant and gives confidence that the engineer is checking the works to the expected degree in order for the BCA to accept the engineers PS4 as evidence of compliance.

Upon completion of the SED work the engineer will issue a PS4 to the Owner or builder. This will be signed by a chartered professional engineer who either undertook, supervised or reviewed the engineer monitoring the work. The PS4 will be accompanied by the engineers site notes or a schedule of those notes along with any PS3 or geotechnical input that the structural engineer requested and reviewed.

7. OWNER/PROJECT MANAGER/BUILDER

The builder is responsible for reading the consent conditions and ensuring that an engineer has been engaged to undertake construction monitoring when required by a PS4 condition.

They will agree, with the engineer, the stages that the engineer will want to observe (this schedule may have been included with the engineers PS1 and be included with the PS4 condition on the consent) and the amount of notice which the engineer will require to undertake the inspection.

The plans and details should be checked prior to construction commencing and any missing or unclear details resolved in the form of a construction advice note or similar from the engineer which should be available on site for QLDC BCO particularly where there is no condition for a PS4.

They will ensure that the engineer provides any site notes to the builder either at the time of the site visit or shortly thereafter and that these are available for the BCO at the next QLDC inspection.

At certain stages the builder may need a QLDC inspection even when the engineer is monitoring the SED works as the engineer is unlikely to look at certain aspects of the works such as the siting of the building, tanking, drains etc. They should refer to the schedule of required inspections provided with the consent and seek advice from the Building Services team if in doubt.

Where a PS4 is not a required document but the builder considers it better that an engineer undertakes the monitoring they can lodge an Application for Third Party inspection (AF3P).

It is the responsibility of the builder to advise the consent holder to engage an engineer for construction monitoring when a PS4 condition is part of the building consent, an Application for Third Party inspection (AF3P) has been approved by QLDC or an inspecting BCO has requested engineer monitoring and PS4.

Once the project is complete it is the responsibility of the CCC applicant to obtain a PS4 and accompanying documents from the engineer when required and provide it along with the CCC application.

8. LINKS TO FURTHER INFORMATION

[QLDC Building Services - Contact Us](#)

[QLDC Building Services - Application forms - find AF3P application here](#)

[EngNZ - Guidelines on Producer Statements](#)

[EngNZ - Construction Monitoring Services - Guide to CM levels and Matrix](#)

[EngNZ - Construction Monitoring - What to look for.](#)

[EngNZ - Example construction monitoring site visit record](#)

[MBIE - Building Performance - Producer Statements](#)

[MBIE - Guidance on use of Producer Statements](#)

TABLE 1. Low Risk and High Risk

Low Risk – PS4 generally not required	<ul style="list-style-type: none"> - Importance Level 1 (IL1) buildings (steel, timber or masonry construction) - Specifically designed barriers with fall height less than 3m - Drain bridging unless site has geotechnical or stability issues. - Retaining walls, up to 2.5m high without surcharge and not on steep sites. - Residential Pools - Pergolas - IL 2 Buildings generally designed from NZS3604:20111 or NZS 4229:2013 but with additional SED elements such as... <ul style="list-style-type: none"> o TC1 Raft slabs (Waffle slab) with change in floor levels of 600mm or less. o Isolated beams, steel, timber or concrete up to 8m span. o Steel or timber cantilever beams supporting external decks up to 2.5m. o Brick or stone cladding steel lintels or shelf angles. o Engineered Trusses, single span and not supporting other beams or trusses. o Isolated residential portal frames. o Sheet bracing. o Strip or pad foundations on good ground.
Higher Risk – PS4 required	<ul style="list-style-type: none"> - Buildings of IL3 or higher. - IL 2 Buildings generally designed from NZS3604:20111 or NZS 4229:2013 but with additional SED elements making up >50% for a single level building or >25% for two or more levels. - IL2 buildings with complex or riskier features such as... <ul style="list-style-type: none"> o Cantilevered concrete beams. o Multiple interconnecting beams and/or portals. o Slabs with additional foundation requirements such as piles through layers of fill. o Slabs with change of level over 600mm. o Suspended concrete floors. o Masonry or concrete shear walls. o TC2 and TC3 Raft slabs (used where liquefaction is an issue) - Retaining walls over 2.5m high. - Retaining walls supporting suspended concrete floors. - Retaining walls on steep sites.

The processing BCO will need to consider the nature, risk and complexity of the SED building work and assess if it is reasonable to inspect by QLDC inspecting BCOs.

As not all designs will fit the examples above, discussion with others in the processing team and with the inspections team leader can help clarify decisions when necessary. If in any doubt after discussion, then a PS4 condition should be placed on the consent.