COMMON ISSUES SEEN BY REGULATORS

TOP FIVE GEOTECHNICAL RFIS AND HOW TO AVOID THEM

May 2024

engineering new zealand
te ao rangahau

CONTENTS

At Engineering New Zealand, we have recognised that many of the requests sent by building consent authorities (BCAs) in the consent process are similar across the country. However, many BCAs and engineering firms have traditionally operated in silos, leading to a lack of awareness of common shared issues. There's immense potential for us to break down these barriers and foster greater collaboration to improve the design and consenting process.

This case study is based on a webinar series that aims to provide information to engineers and regulators about the common requests for information (RFIs) that are issued by BCAs across New Zealand, and how to proactively avoid them.

1: INTRODUCTION

The case study outlines five common geotechnical-related RFIs experienced by the Engineering Services Team at Christchurch City Council (CCC) and were presented by Marie-Claude Hébert, a Senior Geotechnical Engineer.

2: BACKGROUND INFORMATION

COMMON TERMS

BCA = Building Consent Authority: an organisation registered under Section 273(1)(a) of the Building Act 2004, responsible for issuing building consents and performing other functions as outlined in the Act.

RFI = Request for Further Information: a formal inquiry made by the BCA to seek clarification or additional details regarding a submitted building consent application.

BCO = Building Consent Officer: a building consent officer is a building official responsible for processing building consent applications.

NZ Building Code = New Zealand Building Code: prescribes the functional requirements for buildings and the performance criteria that buildings must comply with in their intended use.

PS1 = Producer Statement for Design: a document provided by a design professional, such as an engineer or architect, to certify certain aspects of a building's design.

CHRISTCHURCH CITY COUNCIL'S ENGINEERING SERVICES TEAM

At Christchurch City Council, the Engineering Services Team is a multidisciplinary team of engineering specialists providing technical support to the Building Consenting Unit, as well as the Resource Consent Unit and the Regulatory Compliance Unit. Within the team there are fire, civil, structural, mechanical and geotechnical engineers. Not every BCA in New Zealand has an in-house engineering services team, but most will have external technical experts that they can consult as required.

THE BUILDING CONSENT PROCESS AT CHRISTCHURCH CITY COUNCIL

When a building consent application is received, all submitted documentation is first reviewed by a Vetting Officer, who checks it before passing it to a BCO for processing. Depending on the scope of work, the complexity or the information included as part of an RFI response, a BCO may request input from the Engineering Services Team as part of the building consent review process. The Engineering Services Team will provide the required technical support, verify the proposed compliance pathway for demonstrating compliance with the NZ Building Code, assist to ensure that sufficient information has been provided to support the design, and review and request that the applicant confirm the proposed construction quality assurance process.

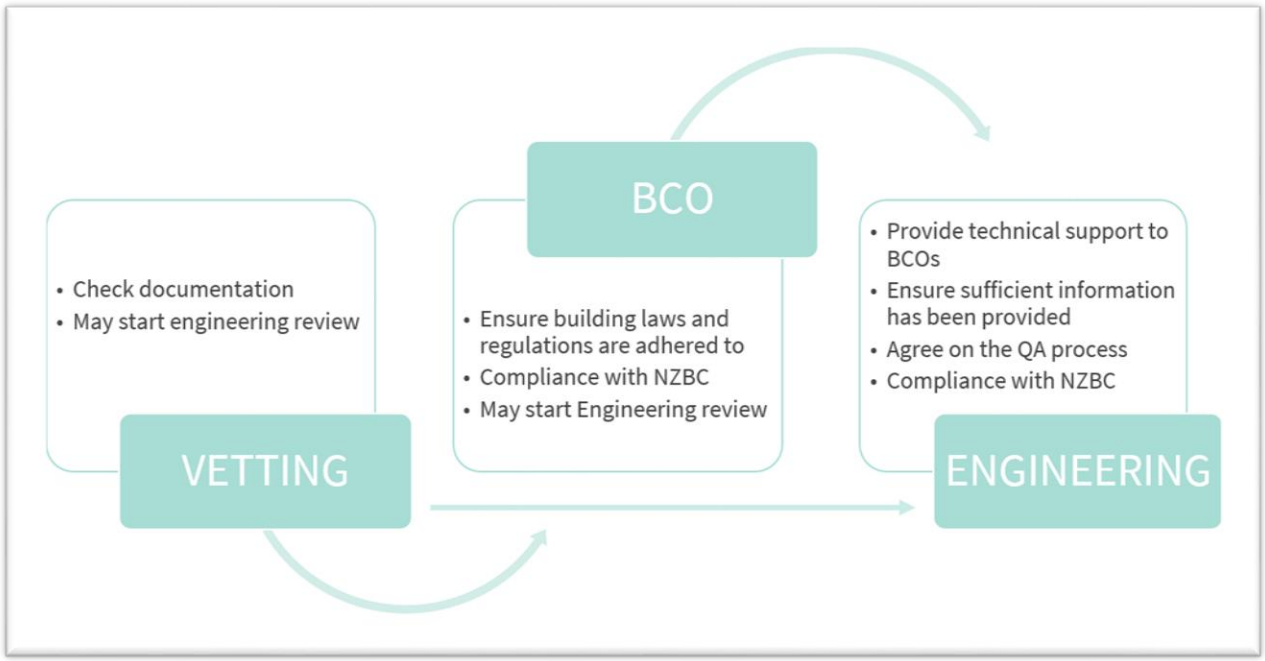

Figure 1 provided by Christchurch City Council

RECORD KEEPING

The Council is also the record keeper, so it is important to have detailed and finalised consent documentation against the property file.

3: COMMON GEOTECH RFIS

The RFIs generated by the geotechnical reviewers seem to be due to one of three reasons:

- Insufficient or inappropriate documentation has been provided to support the consent application.
- Lack of coordination between the different disciplines within the project.
- The geotechnical engineer has not provided sufficient information to support the design.

The examples given show that coordination and communication between a design team is crucial. Early in the project, the role of the geotechnical specialists must be defined. In some cases, the geotechnical specialist may need to be involved during multiple stages, such as a geotechnical investigation to assess the ground conditions when the design is not detailed, providing geotechnical assumptions for the structural engineer to include in their design and a review of the design drawings to confirm that the finalised design is suitable for the site based on their geotechnical recommendations. Having appropriate coordination and communication is likely to reduce the need for RFIs during the consenting process.

RFI 1: DESIGN DRAWINGS DO NOT MATCH THE GEOTECHNICAL RECOMMENDATIONS

In this RFI, the BCA has been provided with a geotechnical report which provides an assessment of ground conditions, geotechnical hazards and geotechnical recommendations for development. The structural and architectural documentation includes a foundation solution which is not in line with the geotechnical recommendations. For example, the geotechnical report recommends for the foundations 'shallow piles with concrete footings based on the ground conditions' and the structural documentation shows the foundations are to be 'simple ground bearing perimeter beams and slabs, with the Geotechnical Engineer providing acceptable ground bearing capacities and improvement schemes are required.' The discrepancy does not necessarily mean that the proposed design is not appropriate, however the BCA requires reasonable grounds to assume that the proposed foundation solution is appropriate from a geotechnical standpoint. This is often achieved by asking the applicant to provide evidence that the geotechnical engineer has reviewed the final design drawings.

RFI examples

- *Please request the geotechnical engineer to review the design drawings and confirm that they are consistent with their recommendations/suitable from a geotechnical standpoint.*
- *Considering that they will be conducting inspections and that the provided foundation design is not in line with the recommendations in their geotechnical report, please ask the geotechnical engineer to review the proposed design (including retaining walls) to confirm that it is suitable for the site.*

In these cases, the RFI might include a specific reference that points toward the difference between the geotechnical report and the structural design, for instance:

- the depth to the base of the gravel raft detail
- the geotechnical parameters assumed by the structural engineer in the design
- the ultimate bearing capacity assumed in the design or
- the expected performance under seismic loading.

Additional geotechnical investigations or assessment may be required, but this will be at the discretion of the geotechnical engineer.

How to avoid this RFI

- The design team, including project managers, architects, builders and design engineers must foster good communication so that expectations are met early. For instance, if a geotechnical design review will be required, or the geotechnical engineer will need to be involved in the construction monitoring, this should be communicated early in the project.
- If there are changes to your geotechnical recommendations, ensure that the geotechnical report is amended or provide a response to the client (email, letter, addendum) that can be appended to the consent documentation to justify the discrepancy.

RFI 2: DESIGN DRAWINGS ARE INCOMPLETE AND REFERENCE "BY OTHERS"

There are cases where engineering drawings state work will be specified "by others", however the information from the others is not provided. The information provided to the BCA must provide reasonable grounds that the design will meet the requirements of the NZ Building Code and it must include sufficient

design drawings and specifications for the proposed works to be constructed on site. Drawings that reference “by others” are considered incomplete and not suitable as construction drawings. If the works are indeed designed by others, another set of design drawings, specifications and PS1 (as requested) must be provided. This case is often seen when a geotechnical engineer provides recommendations for a specifically designed reinforced gravel raft and the structural engineer is designing the foundations. The structural engineer may have only been engaged to design the concrete slab foundations and therefore does not cover the gravel raft in their PS1 or on the design drawings. This is not appropriate as a PS1 (and subsequent PS4) is requested to support a specific design. It should be noted that if the proposed works do not fall within the scope of NZS3604—for example, if the ground is liquefiable and does not meet the definition of “good ground”—any foundation solution will be considered a specific engineer design (SED). In such cases, a compacted gravel platform of any thickness, with or without reinforcement, should be supported with a PS1 and design details. Additionally, its construction must be monitored by a suitably qualified engineer.

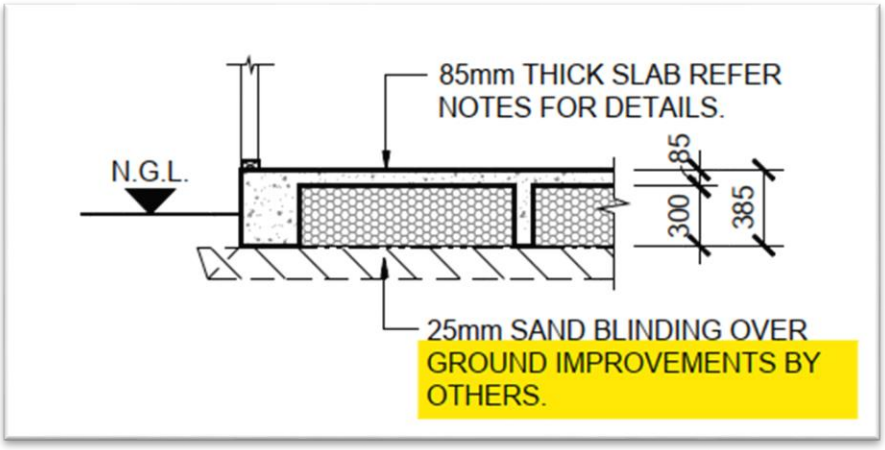

Figure 2 provided by Christchurch City Council

In another similar scenario, the structural engineer may write “as per geotechnical report” on the design drawings. This is ambiguous because it is not clear if the gravel raft is covered by the structural engineer’s design, the associated PS1 and subsequent PS4 or if the structural engineer is expecting the geotechnical engineer to cover the design. A supporting document like a geotechnical report is typically not relied upon for design details on a construction drawing. As stated above, the construction drawings must include sufficient design drawings and specifications for the proposed works to be constructed on site.

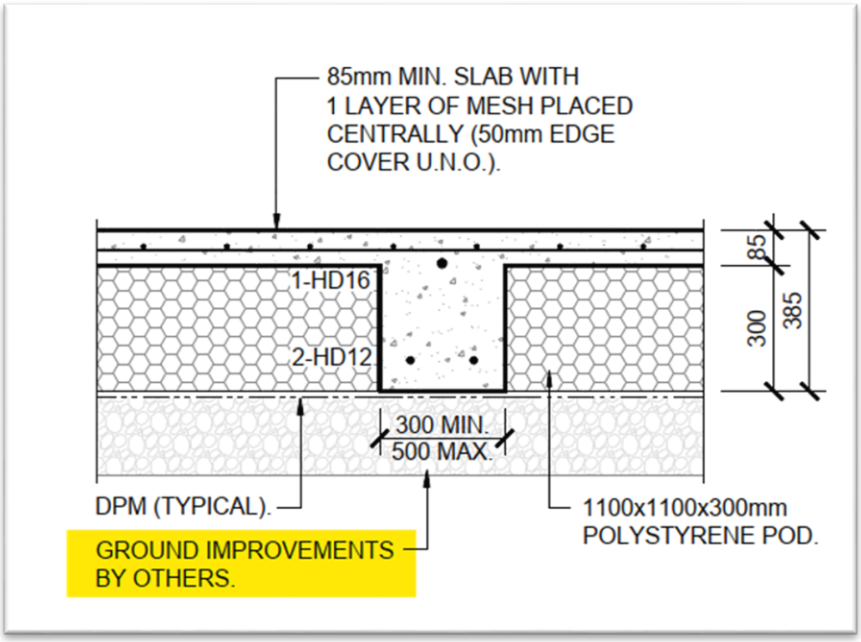

Figure 3 provided by Christchurch City Council

Example RFIs

- *Please provide the ground improvement drawings, the PS1 and inspection schedule*
- *Please clarify whether the PS1 covers the gravel raft and if not, provide a PS1 and the design details for the gravel raft.*
- *Please clarify who is responsible for the ground improvement design. If it is the structural engineer, please update the PS1 to list the gravel raft and provide details of the construction monitoring. If it is the geotechnical engineer, please provide the ground improvement details, design drawings, PS1 and inspection schedule from the geotechnical engineer.*

How to avoid this RFI

- Ownership of the design is identified at the beginning of the project:
  - PS1, Construction Monitoring, PS4 Engineer
  - If there are any exclusions, these must be covered by another engineer
- Include **all details** on design drawings, don't reference another report (for example, a geotechnical report)

RFI 3: REFERENCE TO WORK 'TO BE COMPLETED ON SITE'

Consenting authorities can't consent hypotheticals or unknowns. For example, it is not acceptable to state "to be confirmed" on the design drawings if the excavation depth for the foundation design has not been determined. Instead, a minimum (or in some cases maximum) excavation depth must be included on the design drawings. Another unacceptable scenario, the geotechnical engineer has recommended screw piles, but the finalised screw pile design has not been provided. If additional investigations are required that cannot be undertaken at the time of building consent (i.e. if there is an existing building in the way), a condition can be added to the consent that additional investigations will be conducted during construction,

however a complete design which meets the requirements of the NZ Building Code must be provided to the BCA at the time of building consent.

Example RFIs

- *Please confirm the proposed depth of the excavation.*
- *Please provide the finalised pile design.*

How to avoid this RFI

- Designs must be finalised before applying for building consent
- Include design details in your consent documentation.

RFI 4: THE SCOPE OF THE GEOTECHNICAL REPORT DOES NOT MATCH THE SCOPE OF THE PROPOSED WORKS.

A geotechnical engineer may not know that a past report has been provided to support a building consent application for a different project on the same site. The original report may be thorough and detailed but may not provide sufficient recommendations.

An example is where a geotechnical report considered a series of Importance Level 1 and Importance Level 2 buildings and offices for a site with high liquefaction vulnerability. The geotechnical report was thorough, complete, and gave recommendations for the proposed buildings' foundation solutions. However the consent was lodged for the installation of ground fuel tanks, which had not been considered in the original geotechnical report. Some of the information within the geotechnical report was useful for the design, but for the underground fuel tanks, it's possible that completely different design considerations may be needed. The expectation is that the geotechnical reports are specifically written considering the proposed building work. In this example, the required excavations are more significant now that an underground tank is being installed– there may be additional design considerations such as uplift and the effects of groundwater, meaning additional assessments may be required. There may also be a requirement for clarification regarding the construction monitoring, especially if significant excavations are proposed next to existing buildings. Clarification might also be required on the Importance Level.

Another example that often occurs in Christchurch, is where geotechnical reports were prepared for the repair of the building or dwelling following the Canterbury Earthquake Sequence. A geotechnical report was prepared to support the proposed repair. Years later, a building consent applicant has provided the same geotechnical report to rebuild a multi-unit apartment block on that site. While there was a geotechnical report prepared for the site, it wasn't for the same scope and the design implications are different whether you're repairing a one storey cottage or building a large multi-unit residential building. In this case, you need an updated geotechnical report that addresses the proposed works.

Example RFIs

- *The geotechnical report does not reference the scope of works. Please ask the geotechnical engineer to review the proposed works to confirm that they are in line with the recommendations in their geotechnical report. Special consideration should be giving to the excavations required for the new underground fuel tanks. Additional investigations or assessments may be required, at the discretion of the geotechnical engineer.*
- *The provided geotechnical report does not relate to the site or building work subject to this building consent application. Please supply a geotechnical report for the subject site and current building proposal. Please provide the finalised pile design.*

How to avoid this RFI

For the geotechnical engineers, this can be hard to prevent because the geotechnical report may be provided to the BCA without their knowledge. It is important to have clear communication with the client and set expectations about the limitations of the geotechnical report.

For the other members of the project team, if there is any doubt if a previous geotechnical report is suitable to support a new project, contact the original author to clarify. This is especially important if there is reliance on the geotechnical engineer to complete inspections or construction monitoring.

RFI 5: GEOTECHNICAL PARAMETERS

For design of buildings, geotechnical parameters are used by the designer to define the ground conditions assumed in their design. If there is no geotechnical involvement required, it can be appropriate for a structural engineer to complete the design – for example in Christchurch, this is possible at a site with confirmed TC2 performance and medium liquefaction vulnerability. However, you still need to log your investigations – for example if you use data from the NZGS database, or if you had previous knowledge of the site to justify the geotechnical parameters that you used. If any geotechnical investigation data is used to inform a design, the logs of the investigations must be provided with the consenting documentation.

If an engineer is designing a building, needs geotechnical parameters and is unsure how to characterise the ground conditions, input from a geotechnical engineer is required. If calculation sheets are provided as part of a consent application with assumptions on ground conditions, these should be justified.

Example RFI

- *The provided geotechnical report did not provide geotechnical design parameters for retaining wall design. Please ask the geotechnical engineer to review the structural design documentation to confirm (or otherwise) that the parameters adopted in design of the retaining walls are suitable and that the proposed design is appropriate for this site.*
- *Please ask a suitably qualified geotechnical engineer to review your foundation drawings and confirm that the proposed design is suitable for this site. Specifically, the geotechnical engineer must confirm: 1. geotechnical design parameters adopted in design of the posthole footings (i.e. friction angle of 30 degrees and Su=50kPa) are appropriate.*
- *Please provide a section through the site showing the inferred subsoil strata about the ground surface and commentary on the geotechnical design parameters adopted.*

- *Insufficient geotechnical information was provided. Please clarify the geotechnical parameters used for the foundation design of the exterior kitchen. Please provide logs of any geotechnical investigations considered in the design.*

How to avoid this RFI

- If no geotechnical involvement is required, justify the geotechnical parameters:
  - Using investigations
  - Data from the New Zealand Geotechnical Database
  - Previous knowledge of the site
- If a geotechnical engineer is involved:
  - Coordination is required between the structural engineer and geotechnical engineer.
  - Contact the geotechnical engineer if parameters are required for your calculations.
- Provide all logs of geotechnical investigations used to make design assumptions.

4: LESS COMMON GEOTECH RFIS

RFI 1: PS1 AND ALTERNATIVE SOLUTIONS

A BCA must understand the means of compliance of a design – how is your design compliant with the NZ Building Code? The diagram below shows compliance pathways for meeting the NZ Building Code. On the right are verification methods and acceptable solutions, both of which are part of cited standards. On the left are alternative solutions, meaning that you are demonstrating compliance for a solution that is not within a cited standard or verification method. For example, the 2012 MBIE guidance on “Repairing and rebuilding houses affected by the Canterbury earthquakes” is not a cited standard, meaning that any solutions used within that guidance fall under an Alternative Solution. In this case your PS1 would need to make reference to “Alternative Solution” rather than “Acceptable Solution”.

Some designs may have a mix of acceptable solutions, verification methods and alternative solutions. In this case it is important to have a letter, or a document appended to your PS1 explaining the method of compliance for each different aspect of the design.

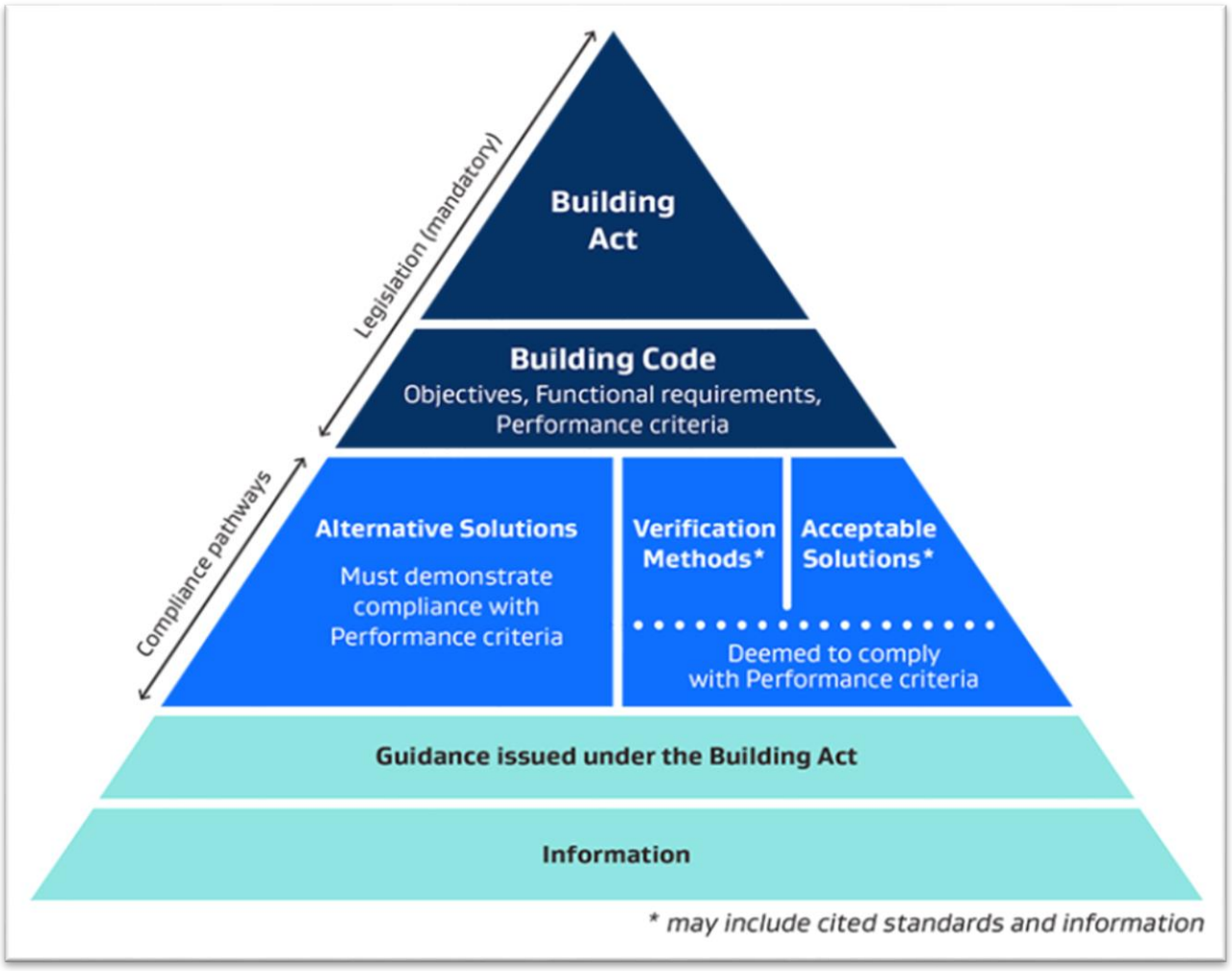

Figure 4 Regulation framework from MBIE website

Potential RFI

- Please amend the PS1 to tick "alternative solution as per attached schedule" rather than "compliance documents". The proposed works was undertaken to an MBIE guidance which falls under an alternative solution.

RFI 2: INSUFFICIENT INVESTIGATIONS FOR PROPOSED WORKS

MBIE has released useful guidance regarding the expected geotechnical investigations to characterise liquefaction vulnerability at different sites. In Canterbury, there is guidance for repairing and rebuilding houses that give indication on the amount and depth and types of investigations expected. It is possible to supplement your geotechnical investigation with nearby data from the NZGD, but it is important to undertake an appropriate amount of investigations to sufficient depth.

Figure 5 from MBIE website

Potential RFI

- Insufficient geotechnical investigations have been undertaken to support the proposed design. For a development of this nature (three storey building with 10 residential units) reference to deep geotechnical investigations is expected to characterise the liquefaction hazard.

RFI 3: GEOTECHNICAL INVESTIGATION DATA

In a geotechnical report it is important to provide a site plan showing the location of the geotechnical investigations that you have completed and those that have been considered in the design. An example is shown (from the NZGS database) identifying the location of the boreholes and the CPTs. This is important to demonstrate that the investigations are relevant to the proposed design and considering the role of the BCA as record keepers of site-specific information.

Also, as mentioned previously in this document, logs of all geotechnical investigations considered in the design must be provided. For instance, if you complete a shallow investigation comprising a few hand-augered boreholes and scala penetrometer tests but also looked at the NZGD for nearby deep geotechnical investigations (such as nearby bore holes and cone penetration tests), you should be providing all the logs in your report and the investigations should be shown on your site plan.

The outputs of any analysis software used should be included.

Figure 6 provided by Christchurch City Council

Potential RFI

- Please include a site plan showing the locations of any geotechnical investigations considered in the design.
- Please provide the logs of all geotechnical investigations considered in the design.

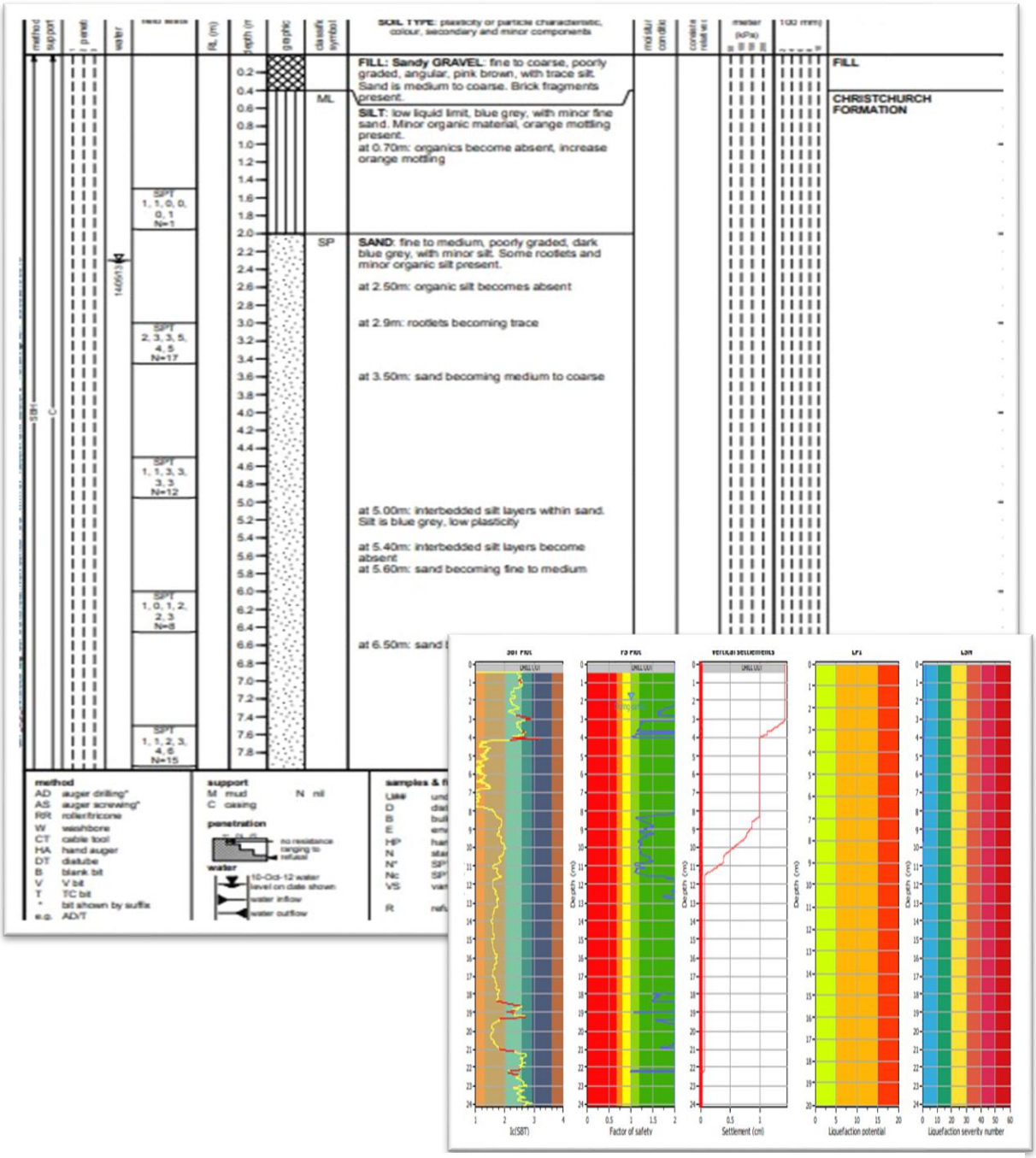

Figure 7 provided by Christchurch City Council

RFI 4: PROXIMITY TO BOUNDARY EXCAVATIONS

Here is an example where the edge of the footing is one metre from the edge of the boundary, but the proposed reinforced gravel raft ground improvement extends to 1.2 metres beyond the building footprint.

The end result may not be drastic, but we need to consider that you can't build it the way it has been drawn. The consented drawings must provide a compliant solution that is buildable as shown.

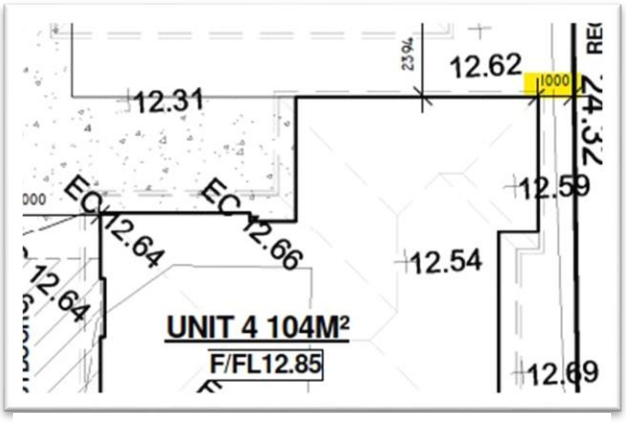

Figure 8 provided by Christchurch City Council

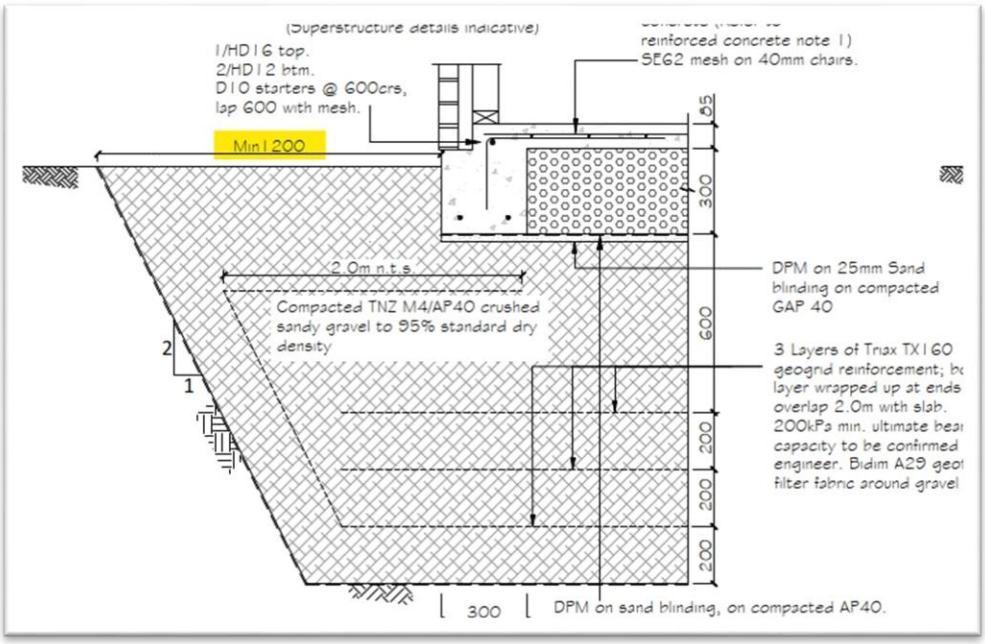

Figure 9 provided by Christchurch City Council

With the documents provided this way, it raises many questions demonstrating that the construction drawings are not acceptable:

- Are you going to place the geo grid differently or will the excavation have to be done differently?
- Will you have to cantilever the slab?
- Is there any sort of redesign that's required in the corner part of the building?
- Is there a building adjacent to the proposed excavation where there may be stability concerns? Are temporary stability measures required? Or additional construction monitoring to suit conducting such a big excavation in proximity to another building?

Potential RFI

- The design drawings show that ground improvement will extend 1200 mm beyond the building footprint. This will extend across the property boundary for units 3 and 4. Please submit a revised detail that will be retained within the property boundary.

RFI 5: EXCAVATIONS AND GROUNDWATER

When you excavate near groundwater, you have to maintain stability so you can't affect neighbouring sites. When you excavate within groundwater, there might also be planning implications that are beyond the building consent so in some cases the Regional Council will be involved. If you are dewatering and storing water on site, that can also lead to planning implications. If you are planning to dewater, you should contact your council's duty planner to ensure you're meeting the requirements of the district plan. It is important to have the right specialists involved.

Potential RFI

We understand that excavations for the gravel raft will extend below the water table. Please clarify if dewatering or additional stability measures will be required during works.

RFI 6: LACK OF PILE DESIGN DETAILS

The final screw pile design with the layouts, the calculations and the PS1 must be provided at the time of consent. BCA cannot consent unknowns or preliminary designs.

In this example, pile capacities are determined, but it states contractor to confirm design prior to fabrication as well as the final layout and propping to be confirmed, this is not sufficient for consent.

Potential RFI

- Please supply PS1 and design details for screw piles

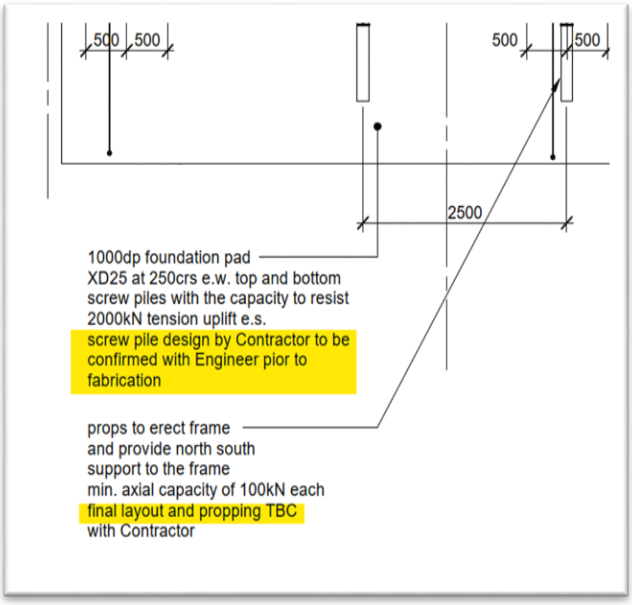

Figure 10 provided by Christchurch City Council

RFI 7: PRESENCE OF PEAT AND ORGANIC SOILS

Peat can settle over time due to weight (surcharge) and decay (consolidation). Sites underlain by peat or significant organic soils (i.e. potentially compressible soils) are at risk of static settlement and potential differential settlement. If you are not a geotechnical engineer, but you're undertaking bearing capacity checks with hand-augered boreholes and peat or significant organic material is present in the upper three metres, you must engage someone who is qualified to give you advice on how to proceed. If you're not sure what else is needed, get in touch with the geotechnical engineer for further input. It's always better to address issues early rather than later in the consenting process. If you encounter peat within your shallow excavations (typically three metres), you need to investigate further to see how thick that layer is. You need to confine the peat layer and have an understanding of how your design will meet the requirements for the expected settlement of the building.

Table 1: Hand Auger Intervals and Observations.

Location	Interval (m bgs)	Observations
HA-1	0 – 0.35	Sandy, gravel and cobble
	0.35 – 0.6	Dark silt w/ brick and concrete (sample collected)
	0.6 – 1.5	Tan sand, likely imported
	1.5 – 2.1	Blue/grey natural silt, groundwater encountered at 1.9 m (apparently perched over the clay layer)
	2.1 – 2.4	Clay
	2.4 – 2.5	Dark organic peat (sample collected)
HA-2	0 – 0.35	Sand, gravel and cobble
	0.35 – 0.75	Dark silt w/ coal and brick fragments (sample collected)
	0.75 – 1.0	Tan sand, likely natural
	1.0 – 1.2	Tan silty sand, beginning to be moist
	1.2 – 2.0	Blue/grey silty clay, groundwater encountered at 1.9 m (apparently perched over the clay layer)
	2.0 – 2.2	Clay (sample collected)
	2.2 – 2.4	Dark organic peat.

Figure 11 provided by Christchurch City Council

Potential RFI

- The foundation for the warehouse is proposed to be founded where peat soils were encountered during the environmental investigation. Please clarify how the subgrade conditions will achieve the bearing capacity requirements set out within the structural design.
- Peat was encountered at the termination depth of the hand-augered boreholes. Please clarify how the thickness of the peat layer was determined. If other investigations were undertaken, please provide the logs.
- Please request the geotechnical engineer to comment on long term settlement of the peat/organic soil layer.

5: WHAT CAN YOU DO?

Documents

Communicate clear expectations to your client regarding the limits of your geotechnical report and any possible additional works.

Coordination

Document any changes to design recommendations. Issue statements of coordination or letters of design review, especially if the geotechnical input was early in the project.

Design

Make sure that ground conditions are appropriately characterised and support design assumptions with data and explanations.

6. Q&A

The webinar was concluded with the following question and answer session. Answers by Marie-Claude Hébert and Martin Pratchett.

Are the MBIE modules 1-6 also an alternative solution? And are most retaining wall designs an alternative solution in this case?

MP: As this is not an acceptable solution or a verification method, and so therefore yes it will be an alternative solution, and you would need to include in your PS1 as an alternative solution.

MCH: Some of the MBIE guidance or modules reference cited standards, for instance, Module 6 retaining walls, references NZS1170 so it can still reference cited standards within that module, but the module itself is not an acceptable solution it is an alternative solution. So even though we're all using it in our designs, it would still fall under an alternative solution. For instance, all of the foundation solutions for TC2 and TC3 in Christchurch that are within the MBIE guidance for repairing and rebuilding houses, those are all alternative solutions.

I'm working for a small council in land development engineering, geotechnical reports are provided with some subdivision applications, which then requests specific geotechnical assessments of the building platform for the building consent stage. We typically require applicants to provide that external specialist advice with us checking and confirming compliance, listening to this presentation, it appears that CCC is doing geotechnical designs advice for applicants. Is that correct?

MCH: No, that's not correct. We have a different team that does design for council assets, but it's nothing to do with building consent, and they still need to apply for building consent when they do that. So in your example of the subdivision report that comes in and one of the conditions is “at the time of construction a geotechnical report is required for each individual lot or bearing capacity check,” that needs to be done by an external geotechnical engineer. The role of the Engineering Services team is to do regulatory reviews to make sure that provided designs meet the requirements of the Building Act and the Building Code. And in

Christchurch, with the Canterbury Earthquake Sequence, we had quite a few buildings coming in through as alternative solutions, so many of our foundations are not NZS3604 and we need that specialist input.

MP: Yes, I think so. By the way that I took your presentation and from other engineers working with councils throughout New Zealand in a similar role, is that we need to determine if we have reasonable grounds for the consent to proceed. That doesn't mean that you're doing an in-depth review on every single thing. It just means that you're making sure that you have reasonable grounds.

MCH: Yes, so it is a regulatory review, we are not doing a peer review. We have to reach that reasonable grounds have been met and sometimes, the Building Consent Officer is able to address some of these concerns without input from a geotechnical reviewer. The proximity to the boundary, for instance, a BCO may be able to notice that and address it without input from us. The same with the geotechnical parameters, if you get a design for a large commercial shed, and there's no geotechnical report the Building Consent Officer will be able to ask, "please clarify how these geotechnical parameters were assumed."

Does your council have expectations/requirements for temporary works that will be required for permanent works e.g. vertical excavations on our property boundary?

MCH: I can answer that from a geotechnical perspective, but it would be good to get advice from a senior Building Consent Officer, but my understanding is that if the temporary works will eventually fit into permanent works, then definitely you need that design to be included in your building consent documentation. So we've had recently a major commercial consent where they have to build these temporary retaining walls to be able to fit the machinery in there, i.e. enabling works. They originally put in a consent for enabling works but then realised that one of the walls was going to remain as a basement wall. So, a consent that had come in as enabling works actually turned into permanent works. We had to change our approach. So, it's important to establish whether it's actually just enabling works or whether it's something that will eventually remain. For instance, batters, if you're excavating as part of the enabling works, but those battered slopes are going to stay forever - we see that sometimes in resource consents where you need to do your earthworks, you actually have to prepare some roads for your machinery to go through, but you're putting these batters that stay there forever, we will have a condition on the consent for the geotechnical engineer or engineering geologist to go on site to confirm their suitability at the end.

And sheet piling if they say we're going to do sheet piling and we are excavating and concerned about stability. Then we need to do an additional investigation for construction monitoring by the geotech. That's important to know now because we put the construction monitoring as a condition on the consent and also whether you have CM1, CM2, CM3 or CM4 under your producer statement. But for those sheet piles, if you're going to put them in, excavate and eventually remove them, we don't need to have that finalised design of the sheet piles but we still need to know - what are your planned inspections.

MP: Something that I had seen from other councils around the country as well, is asking for temporary work sequencing. And so this is particularly relevant where you have work right up against the boundary. Architects might want to put a retaining wall right on the boundary, for example, and then how is that going to work on the temporary case. Sometimes you might have a structure a metre away from the boundary on the neighbouring property, and then you're going to have all sorts of issues on how you support that structure on the temporary case, are you're going to be undermining it. How is that realistically going to work? If you've got a vertical cut? And in soils, are they going to remain stable? What if it's right next to our road for example. One of the things that I think would be quite good in the future for

one of these presentations is around construction sequencing and temporary works, because that's turning into a major form of RFIs as well - are you seeing that as well?

MCH: Yes, I think for us, we've gotten pretty good at including the construction monitoring as a condition on the consent. So, if the works undertaken and the right specialists weren't involved, or one of our inspectors goes and sees that the documents don't match what is on the conditions, they can advise early. And for major commercial projects, they're often staged consent. So, you'll have enabling works first and then you can have your ground improvement and then your foundation. With the staging, the construction sequence is usually well understood. Proximity to boundaries is a big one, because, under B1 of the NZ Building Code you can't affect the stability of neighbouring sites, neighbouring buildings, and so on. So even if you're creating a kind of temporary instability and your retaining wall will fix it, you still can't endanger or adversely affect the stability of the neighbouring site during your works. So, it's quite important to have the right specialists involved.

Do you request these PS2s or geotech sometimes, what are the jobs that require one? I have generally seen PS2s from engineers, but not from geotechs

MCH: We do in Christchurch require PS2s for some geotechnical jobs. Typically we ask for a geotech PS2 if the proposed works are: four storeys or above or significant IL3 or IL4 and above or complex geotechnical design or a new/uncommon alternative solution. Complex geotechnical design is a bit subjective.

So, what we recommend is that if you're unsure whether PS2s is required, you can apply for a pre-application meeting and based on the information that you provide then, we can let you know whether we think that a geotechnical PS2 is required.

Once again, this is only for Christchurch City Council, each different council might have different requirements for PS2s because they don't have an engineering services team and so on. The goal is to determine compliance with the Building Code, but this is what we've decided works well in Christchurch.

LINK TO GEOTECH REPORT TEMPLATE

https://www.engineeringnz.org/documents/1707/Geotech_report_template.pdf