

Determination 2023-012

Regarding the decision to issue a code compliance certificate for alterations to an existing dwelling

58 Moncks Spur Road, Redcliffs, Christchurch

Summary

This determination considers the decision by an authority to issue a code compliance certificate for building work undertaken to alter an existing detached dwelling. The determination considers the compliance of specific elements of the building work against the requirements of the building consent and the Building Code, taking into account all the information now available.



Contents

1. The matter to be determined	3
Issues outside this determination.....	4
2. The building work.....	4
The original dwelling.....	5
The altered building.....	5
Figure 1: Altered upper floor (not to scale)	6
3. Background	6
4. Submissions	7
The owner	8
The authority	9
The builder	10
The drainlayer	11
5. Expert’s report	11
6. Discussion	11
The legislation.....	11
Step in the concrete floor slab in ensuite extension lower ground level floor	12
Subsurface drainage coil next to foundation wall	16
Figure 2: Excavation to west side of ensuite extension.....	19
Figure 3: Sloping concrete surface to south side of ensuite extension	19
Foul water drain and backfill	20
Floor joists fixed to lower ground level walls	26
The foundation wall to the bathroom extension	29
Surface water sump	33
Location of rainwater downpipe	36
Surface water drain.....	38
7. Conclusion.....	41
8. Decision.....	43
APPENDIX A.....	44
Figure 4: Extract from plan “Block Wall Design” S-01 (not to scale)	44
Figure 5: “As built” plan (not to scale).....	44

In this determination, unless otherwise stated, references to “sections” are to sections of the Building Act 2004 (“the Act”) and references to “clauses” are to clauses in Schedule 1 (“the Building Code”) of the Building Regulations 1992.

The Act and the Building Code are available at www.legislation.govt.nz. Information about the legislation, as well as past determinations, compliance documents (eg Acceptable Solutions) and guidance issued by the Ministry, is available at www.building.govt.nz.

1. The matter to be determined

- 1.1. This is a determination made under due authorisation by me, Peta Hird, Principal Advisor Determinations, Ministry of Business, Innovation and Employment (“the Ministry”), for and on behalf of the Chief Executive of the Ministry.¹
- 1.2. The parties to the determination are:
 - 1.2.1. the owner of the dwelling, J McAlpine (“the owner”), who applied for this determination
 - 1.2.2. Christchurch City Council (“the authority”), carrying out its duties as a territorial authority or building consent authority
 - 1.2.3. the licenced building practitioner concerned with the relevant building work, M O Brown (“the builder”).
- 1.3. I consider the registered certifying drainlayer, E Raika (“the drainlayer”), is a person with an interest in the matter.
- 1.4. This determination arises from the decision by the authority to issue a code compliance certificate dated 19 September 2018. This was for alterations to an existing detached dwelling that were the subject of building consent number BCN/2015/12622.
- 1.5. The owner believes the code compliance certificate should not have been issued. They contend:
 - 1.5.1. the building work does not comply with the building consent, and
 - 1.5.2. specific elements of the building work do not comply with the Building Code, namely Clauses B1 Structure, E1 Surface water, E2 External moisture, and G13 Foul water.
- 1.6. The matter to be determined² is the authority’s decision to issue a code compliance certificate for building consent BCN/2015/12622.

¹ The Building Act 2004, section 185(1)(a) provides the Chief Executive of the Ministry with the power to make determinations.

² Under section 177 (1)(b) and 2(d).

- 1.7. In deciding this matter, I must consider whether the relevant building work complied with the building consent.³ I will also consider whether particular building elements as built comply with the Building Code.⁴ In making my decision I will consider all the information that is now available.

Issues outside this determination

- 1.8. I have not considered all the building work associated with the building consent, only those specific elements of the building work that have been raised as items of concern by the owner (see tables 1 to 8, from page 12).
- 1.9. I have not considered how the authority performed its duties and responsibilities. An assessment of how the authority performed its duties and responsibilities is not a matter for determination under section 177 of the Act.
- 1.10. The authority's inspection records and the fact that it issued the code compliance certificate when some building work was not in accordance with the plans and specifications approved in the building consent indicates it approved some variations to the building consent on site.⁵ I have taken those approvals into account as they relate to the scope of building work for which the code compliance certificate was issued. However, for the reasons discussed in paragraph 7.7, this determination does not consider authority's decision to accept or approve those variations or whether each variation met the requirements of either section 45(4)(a) or (b)⁶.
- 1.11. The owner is of the view that some of the variations were not discussed with and agreed to by the owner (for example, the change in the construction methodology used for the foundation wall to the bathroom extension). These are contractual issues between the owner, the builder, and the chartered professional engineer ("the engineer"⁷) and are not a matter for determination under section 177.

2. The building work

- 2.1. The building work involved alterations to an existing detached dwelling at 58 Moncks Spur Road, Redcliffs, Christchurch ("the property").

³ Section 94(1)(a)

⁴ Section 17

⁵ Sections 45(4)(a) and 45A (minor variations to building consents).

⁶ Section 45(4), an application for an amendment to a building consent must, - (a) in the case of a minor variation, be made in accordance with section 45A; and (b) in all other cases, be made as if it were an application for a building consent, and this section, and sections 48 to 51 apply with any necessary modifications.

⁷ For the purposes of this determination, the term "the engineer" refers to a specialist engineering consultancy company as opposed to any one individual. Several individuals working for the same engineering consultancy provided the PS1, PS4, structural calculations, and undertook construction monitoring on site related to the building consent BCN/2015/12622.

The original dwelling

- 2.2. The building consent application indicates the dwelling was first constructed in the 1950s. It is in a large residential area on a moderately steep sloping site in Moncks Bay.
- 2.3. The building is two storeys high. The upper floor contained three bedrooms, a bathroom, toilet, and a combined kitchen, lounge, entry space and laundry. There was a deck and external stair along the north elevation of the lounge. The lower ground floor contains a garage and storage space. In this determination, “basement” refers to the part of the lower ground floor that was existing before the alterations were carried out.
- 2.4. The lower ground floor external walls are constructed using concrete blockwork in conjunction with a ground bearing concrete floor. The upper floor, wall framing, and roof are all constructed of timber.
- 2.5. The original external wall cladding was a brickwork veneer over a cavity.

The altered building

- 2.6. The building work associated with the building consent increased the area of the dwelling (refer to figure 1). The work included, but was not limited to:
 - 2.6.1. remodelling and enlarging the bathroom on the south side of the building (“the bathroom extension”)
 - 2.6.2. extending the west side of the building to create a new ensuite and wardrobe for Bedroom 2 (“the ensuite extension”)
 - 2.6.3. extending the Lounge, Bedroom 1, and Bedroom 2 to the north side of the building (“the north elevation extension”)
 - 2.6.4. new roof structures to suit the upper floor additions, including associated profiled metal roof cladding, gutters, and downpipes
 - 2.6.5. new surface water drainage
 - 2.6.6. new concrete blockwork foundation walls with plaster finish to support the new upper floor additions, complete with new 100mm thick reinforced concrete floor slabs
 - 2.6.7. alterations and additions to the foul water plumbing and drainage systems for the new ensuite and extended bathroom.

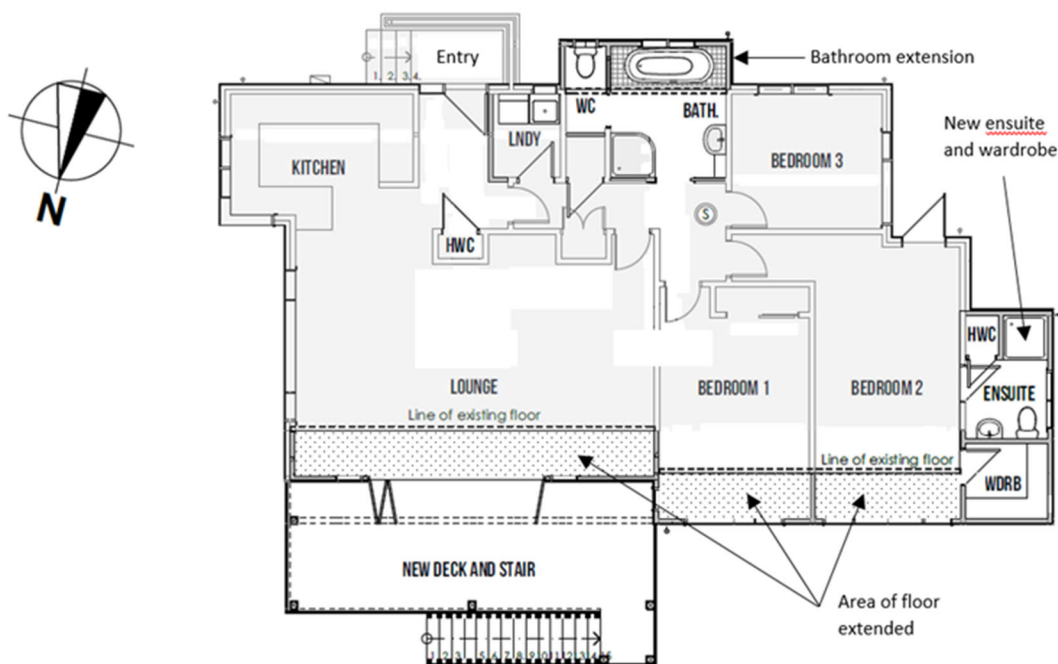


Figure 1: Altered upper floor (not to scale)⁸

3. Background

- 3.1. Building consent BCN/2015/12622 was granted by the authority on 26 February 2016 subject to several requirements for “construction documentation”. These were to be provided by the owner and included, but were not limited to:
 - 3.1.1. a Producer Statement – Construction Review (PS4) from the “nominated structural consultant” for certain specific engineering design building elements
 - 3.1.2. an “as-laid drainage plan at [the] time of [the] drainage inspection”.
- 3.2. The building consent was also issued with a “schedule of specified inspections”. This included a notification to the owner that there was a requirement for the authority to conduct inspections related, but not limited to, “pre-pour foundation”, “subfloor”, “drainage”, and “final”. The document also stated:

Destructive investigations may be required if work is covered in prior to the [authority’s] inspections taking place.
- 3.3. The plans and specifications that accompanied the building consent included a Producer Statement – Design (PS1) from the engineer, dated 18 December 2015. The PS1 referred to part of the building work associated with the building consent and compliance of the design with Clause B1 Structure. The PS1 also referred to

⁸ Reproduced from plan A03, revision A2, dated 18 December 2015.

construction monitoring to be conducted by the engineer as the building work progressed, this included, but was not limited to:

Inspect excavation base for piles and footings

Inspect steel for concrete footing prior to concrete pour

- 3.4. On 31 May 2016, the owner applied for an amendment to the building consent to extend the roof overhang on the east and west sides of the dwelling. This was approved by the authority on 30 June 2016. The amended plans indicate that the rainwater downpipe located at the northwest corner of the dwelling was to be fixed to the north elevation extension wall.
- 3.5. On 25 July 2016, building work commenced on site. The authority subsequently conducted inspections as the building work progressed. I have included relevant details from those inspections in tables 1 to 8 (from page 12).
- 3.6. On 5 July 2017, the engineer provided a Producer Statement – Construction Review (PS4) for part of the as-built work and stated its compliance with respect to clause B1 Structure.
- 3.7. The authority conducted five “final” inspections between 5 July 2017 and 10 August 2018.
- 3.8. On 26 February 2018, the authority issued a written notice under section 95A of the Act refusing to issue the code compliance certificate because the building work was not yet complete.⁹
- 3.9. On 16 August 2018, the owner applied for a code compliance certificate.
- 3.10. On 19 September 2018, the authority issued a code compliance certificate.
- 3.11. On 2 March 2020, the Ministry received an application for a determination.

4. Submissions

- 4.1. During this determination, the parties made several submissions, including in response to drafts of the determination that were provided for their comment.¹⁰ I have summarised general points raised in the submissions below, and the substantive submissions on the particular elements of building work are included in tables 1 to 8.

⁹ Section 93(2)(b)(i). The decision by the authority to issue the written notice is not considered in this determination.

¹⁰ A first draft of this determination was issued to the parties for comment on 8 September 2021. A second draft was issued on 31 May 2022. The builder and drainlayer did not make submissions in response to the second draft.

The owner

- 4.2. The owner is of the view that specific elements of the building work do not comply with the building consent or certain clauses of the Building Code. The owner submits the authority did not have reasonable grounds to consider that the building work complied with the building consent, and it was the authority's "job to make sure all the correct documentation, inspections and sign offs are completed, and that a [dwelling] is built to [the standard of the Building Code], before issuing the code [compliance certificate]".
- 4.3. The owner provided some photographs dated 3 June 2019 and 3 August 2019 which show moisture present on some surfaces of the concrete blockwork and floor slab that form the new lower ground floor area under the ensuite extension.
- 4.4. On 16 August 2021 the owner contacted the Ministry and raised an issue related to the surface water drain that had been laid as part of the building work across the north side of dwelling. I have included this in my considerations (refer to table 8).
- 4.5. In response to a request for further information from the Ministry about the surface water drain, the owner clarified some details and provided copies of:
 - 4.5.1. a plan indicating the location of the relevant surface water drain
 - 4.5.2. a Producer Statement – Construction (PS3) dated 25 June 2017, and an as-built drainage plan, from the drainlayer.¹¹ The PS3 stated the scope of work covered by the statement included the "stormwater drainage system", but it did not indicate the relevant Building Code Clause E1 Surface Water
 - 4.5.3. a CCTV inspection log sheet from a specialist drainage surveyor dated 16 August 2021
 - 4.5.4. still shots taken from the CCTV recording taken by the specialist drainage surveyor.
- 4.6. The owner provided some additional information related to the matter to be determined, including background information regarding the multiple "final" inspections conducted by the authority between August 2016 and August 2018.¹² The owner also provided copies of:
 - 4.6.1. some records from the engineer (several emails and photographs)¹³

¹¹ The authority's records indicate it "accepted" the PS3 and as-built drainage plan on 13 February 2018.

¹² I note the dates provided by the owner do not match the five "final" inspection records provided by the authority which range in date between 5 July 2017 and 10 August 2018.

¹³ An email dated 21 March 2022 from a third party (acting on behalf of the engineer) to the owner, it suggests that photographs provided by the engineer of the steel reinforcement (prior to concreting) for the bathroom and ensuite extensions are dated 22 August 2016 though there is "no Site Visit Note" from the engineer for that date.

- 4.6.2. the Producer Statement – Construction Review (PS4) from the engineer dated 5 July 2017
- 4.6.3. an email from the engineer to the builder dated 27 June 2018 which suggests remedial work to the ends of the floor joists by installing proprietary “plates...between each joist and wall plate”
- 4.6.4. an email from the builder to the engineer dated 19 March 2018 which stated the reason for the change in the connection of the ends of the floor joists was because there was a restriction to the height of the block wall, so that the bottom edge of the weatherboards would be at the same level around the entire building¹⁴
- 4.6.5. an internal email within the engineer’s offices dated 22 August 2016 which states, “here is the drawing that the builder sketched showing the reinforcing layout that they are using at the back of the [dwelling]”. On 21 March 2022, the owner provided a further copy of the hand drawn sketch.

The authority

- 4.7. On 23 March 2020, the authority provided information related to the building consent. The information included, but was not limited to, copies of:
 - 4.7.1. the building consent certificate dated 26 February 2016
 - 4.7.2. the building consent processing records, and associated requests for further information
 - 4.7.3. the code compliance certificate dated 19 September 2018 and supporting documentation
 - 4.7.4. the building consent plans and specifications
 - 4.7.5. the authority’s site inspection records, including photographs taken during the inspection
 - 4.7.6. the geotechnical report dated 12 November 2015
 - 4.7.7. the records related to the amendment to the building consent (see paragraph 3.4).
- 4.8. Some of the authority’s site inspection records relate directly to the concerns raised by the owner and the content of those records that is relevant to the matters considered in this determination is summarised in tables 1 to 8. The summary below records the dates and outcomes of some of the relevant inspections:

¹⁴ As shown on building consent plans A04 and A05, revision A2.

5 July 2017: Subfloor drainage “Pass” – drains laid to required minimum fall as per Acceptable Solution G13/AS1

5 July 2017: Final “Fail” – building work incomplete

25 January 2018: Final “Fail” – building work incomplete; no site reports from the engineer were on site [construction monitoring was required] covering all aspects highlighted within the conditions and advice notes [of the building consent]

14 February 2018: Final “Fail” – Photographic evidence, Producer Statement – construction (PS3), and statement on construction methodology required from the person who installed or supervised the drainage.

13 July 2018: Drainage “Pass” – refer to final inspection report regarding as-built plumbing and drainage information still to be provided.

13 July 2018: Final “Fail” – building work incomplete; all engineer’s inspections completed¹⁵; updated as-built plumbing and drainage information to be available on site at the next inspection.

10 August 2018: Final “Pass”.

- 4.9. In a “Code Compliance Summary” report, dated 19 September 2018, the authority referred to “as built” drainage systems information it had received from the registered certifying drainlayer prior to the issue of the code compliance certificate.
- 4.10. In its submission, the authority disagreed with the comments made by the owner in response to the first draft determination. It submitted that its role is to be satisfied on reasonable grounds that building work will or does comply, and “that does not include a forensic analysis of all work”.
- 4.11. The authority also stated that “the commentary about the permissions or lack of permissions for various amendments/variations are not part of the determination process” and it would not comment on those matters.

The builder

- 4.12. The builder made a submission regarding the step in the concrete floor slab, and included some photographs of the building work, a copy of the authority’s inspection notice from 10 August 2018, a diary entry from 28 December 2016 which included a hand-drawn sketch and specification for the revised reinforced concrete

¹⁵ The engineer’s inspections were possibly completed on or before 5 July 2017 when the engineer issued their Producer Statement – Construction Review (PS4). However, the engineer may have undertaken additional construction monitoring in the respect of the altered floor joists after the issue of the PS4.

foundation for the bathroom extension, and copies of two site visit notes from the engineer, dated 30 August 2016 and 7 March 2017.

The drainlayer

- 4.13. The drainlayer made a submission regarding the foul water drain and the surface water sump (refer to tables 3 and 6).

5. Expert's report

- 5.1. The Ministry engaged an independent expert to provide advice on the matter. The expert is a Registered Building Surveyor with the New Zealand Institute of Building Surveyors. The expert inspected the dwelling on 6 August 2020 and 28 October 2020, and provided a report dated 16 March 2021. The report was offered to the parties and person with an interest on 18 March 2021.
- 5.2. The expert noted the building work has largely been completed in accordance with the building consent plans with a few exceptions. These included the location of the downpipe on the northwest corner of the building, the formation of the concrete step in the lower ground level, and the use of poured in-situ concrete foundations instead of the concrete block foundations specified on the building consent plans.
- 5.3. I have summarised the relevant parts of the expert's report in tables 1 to 8.

6. Discussion

- 6.1. The matter to be determined is the authority's decision to issue a code compliance certificate for building work to alter an existing dwelling, that was carried out under building consent BCN/2015/12622.
- 6.2. The owner has raised concerns that some of the building work does not comply with the building consent or specific clauses of the Building Code, namely B1 Structure, E1 Surface water, E2 External moisture, and G13 Foul water. The owner's concerns have been summarised in the tables below, along with the submissions from others, information from the building consent application plans and specifications, and the expert's observations.

The legislation

- 6.3. When exercising a decision to issue a code compliance certificate, an authority must consider section 94 which states:

Matters for consideration by building consent authority in deciding issue of code compliance certificate

(1) A building consent authority must issue a code compliance certificate if it is satisfied, on reasonable grounds, —

(a) that the building work complies with the building consent...

- 6.4. Previous determinations (for example 2008/030¹⁶ and 2021/008¹⁷) have established a two-step process for making a decision under section 188 to confirm, reverse or modify the authority’s decision to issue a code compliance certificate. The first step is to consider whether the building work was completed in accordance with the building consent. If the building work, or some elements of the building work, do not comply with the building consent, then I need to consider whether the building work complies with the Building Code.
- 6.5. Section 17 provides “all building work must comply with the building code to the extent required by [the] Act...”. To assess the compliance of the building work with the Building Code, I will consider all of the information now available.

Step in the concrete floor slab in ensuite extension lower ground level floor

Table 1

<p>Submissions of the owner</p> <p>The step constructed in the lower ground floor under the ensuite extension was not on the consented plans and therefore is work that is not in accordance with the building consent.</p> <p>The step allows moisture, to seep into the existing basement and the new lower ground floor, “indicating [a] lack of or failure of [the] prescribed tanking”. (Clause E2)</p> <p>Several of the engineer’s photographs showed the timber shuttering, steel reinforcement and damp-proof membrane for the “step” in the lower ground floor level of the ensuite extension, prior to concreting.</p> <p>The owner provided photographs from 3 June 2019 and 3 August 2019 (ie after the code compliance certificate was issued), which show small areas of moisture on the surface of the lower ground floor walls and floor.</p> <p>The owner confirmed that “the west of [the dwelling] ...did have a problem with moisture ingress” into the basement before the building work started.</p>
<p>Submissions of the builder</p> <p>The sub-floor space is used for car parking and storage and “is expected to have a certain amount of dampness and air movement”. It is “not designed as a totally dry habitable space with no [damp-proof course] on [the] ground”.</p>

¹⁶ The issuing of a code compliance certificate for a multi-storey apartment building. Issued 5 May 2008. At paragraph 1.6.

¹⁷ Regarding the authority’s decision to issue a code compliance certificate for a new dwelling. Issued 4 May 2021. At paragraph 6.1.2.

<p>The builder also provided several photographs of the formation of the step in the lower ground floor level prior to concreting.</p> <p>Prior to starting building work on site, the owner advised the builder “of dampness and excessive water issues in [the] basement”. Since completion of the construction the “basement moisture levels are significantly reduced” and referred to similar observations by the expert in this regard.</p>
<p>Plans and specifications</p> <p>The designer’s and engineer’s plans do not include a step in the concrete floor slab under the ensuite extension.</p>
<p>Inspection records</p> <p>Pre-pour foundation, 22 August 2016: Photographs show steel reinforcement, damp-proof membrane and step formed in lower ground floor under the ensuite extension. The report confirms the engineer was also on site at the time of the authority’s inspection.¹⁸</p> <p><i>(I note the authority did not record or acknowledge the change or variation from the plans in respect of the formation of the step in the lower ground level.)</i></p> <p>Blockwork, 30 August 2016: Photographs show the concreted step in lower ground level floor is completed.¹⁹</p> <p>30 August 2016: The engineer completes site visit notes to confirm their on-site observations and includes reference to “step ups in foundation”.</p> <p>5 July 2017: The engineer completes a Producer Statement – Construction Review (PS4).</p> <p>16 August 2018, the builder provides a copy of the PS4 from the engineer to the authority.</p>
<p>Expert’s report</p> <p>The expert noted the presence of the concrete step built into the basement below the ensuite. This step is not indicated on the approved building consent plans, but the expert noted “this variance from the consented documents does not make the building non-compliant with the mandatory provisions of the [Building Code]”.</p> <p>The expert provided photographs from 6 August 2020 and 28 October 2020 that were taken during inspections at the property after periods of heavy rain. These photographs did not indicate any moisture present in the lower ground level area under the ensuite extension, and the expert observed “no sign of any dampness below the ensuite”. The expert noted “the ground was dry and dusty” in the subfloor spaces under the dwelling.</p> <p>The expert also included reference to a photograph and handwritten notes provided by the owner, dated 3 June 2019. These showed a small area of dampness caused by “seepage into the [lower ground level] from under the step...”.</p>

¹⁸ I have not received a copy of a site inspection report from the engineer dated 22 August 2016.

¹⁹ It is not clear when the concrete was poured but I have assumed it was sometime between 22 August 2016 and 30 August 2016.

Compliance with the building consent

- 6.6. The plans and specifications submitted with the building consent application do not show a step in the lower ground floor nor provide any details related to it. The plans show the lower ground level was to be at constructed at one level.²⁰ Therefore, the step formed in the lower ground level area of the ensuite extension has not been constructed in accordance with the plans that were approved when the building consent was issued.
- 6.7. It is not clear why the step was constructed, other than perhaps due to the slope of the existing external ground adjacent to the building. However, the step was in place at the time the authority conducted its pre-pour inspection on 22 August 2016. The inspection report did not formally record the variation in the as-built construction from the building consent plans. Regardless, the authority's inspection report did include photographs of the formed step and noted the installed damp-proof membrane and steel reinforcement prior to concreting. This is a clear indication that the authority inspected the building work, including the formed step, and recorded the outcome as "pass".
- 6.8. Based on the authority's inspection, it appears the variation to form the step was accepted by the authority. Therefore, I consider this variation forms part of the building consent for which the code compliance certificate was issued.
- 6.9. The formation of the step was also subject of an inspection by the engineer. A copy of the engineer's photographs shows the timber shuttering, steel reinforcement, and damp-proof membrane prior to concreting. The photographs are undated, but may have coincided with, or been around the time of, the pre-pour inspection by the authority on 22 August 2016 (refer to footnote 13).²¹ Considering the photographic evidence of the engineer's inspection, I am of the view this element of the building work was covered by the engineer's Producer Statement – Construction Review (PS4) dated 5 July 2017.

Compliance with the Building Code

- 6.10. The owner has raised concerns regarding the ingress of external moisture into the lower ground floor, partly because of the construction of the step under the ensuite extension. Therefore, I have considered compliance of the as-built construction in respect of Clause E2 External Moisture.
- 6.11. The lower ground level floor, the step, and lowest part of the external wall to the new ensuite extension are in contact with, or close proximity to, the ground.

²⁰ Plan sheets A11, A12, A13 (all revision A2), and S-01 revision 2.

²¹ The authority's pre-pour foundation inspection report dated 22 August 2022 confirms the engineer was on site at the time of the authority's inspection "checking bearing compaction". However, the Ministry has not received a copy of any report from the engineer for 22 August 2022.

6.12. The objective of clause E2 External moisture is to safeguard people from illness or injury that could result from external moisture entering the building. The functional requirement in respect of clause E2 External Moisture states:

Buildings must be constructed to provide adequate resistance to penetration by, and the accumulation of, moisture from the outside.

6.13. Clause E2.3.3 states:

Walls, floors, and structural elements in contact with, or in close proximity to, the ground must not absorb or transmit moisture in quantities that could cause undue dampness, damage to building elements, or both.

6.14. The terms “undue dampness” and “damage” are not defined in the Building Act or Building Code. However, “undue dampness” was considered in previous Determination 2014/062²² “to be a level of moisture that has, or will, result in detrimental effects on building elements, or the building occupants, or both”. It also found that “damage” such as decay in framing, did not need to have occurred to satisfy the test of “undue dampness”.

6.15. Evidence provided by the owner indicates some localised and small areas of moisture ingress has occurred under the ensuite extension at the lower ground level. However, the expert did not observe any evidence of moisture ingress and neither did the authority in its inspection records.

6.16. The owner has provided evidence of moisture ingress. However, I am of the view this is not sufficient to establish non-compliance with clause E2.3.3. From the evidence available, I cannot determine whether moisture ingress has been or would continue to occur at a level or quantity that results in detrimental effects on the building elements (ie the reinforced concrete floor and blockwork walls). Consequently, I am unable to determine whether the structural integrity or durability of these building elements has or will be affected for the intended life of the building.

6.17. As well as any likely effects of moisture ingress, compliance must be assessed in terms of the use of this space and level of amenity. This part of the building is not a habitable space²³; rather it is used for storage with access from the exterior. A person will ordinarily only be expected to be in the space on an intermittent basis and for short periods of time.

6.18. I am of the view there is insufficient information to conclude that a level of moisture has or will result in detrimental effects to the building occupants bearing in mind the intended use of the space and the intermittent activities expected in that space.

²² Regarding the refusal to issue a code compliance certificate and the issue of a notice to fix. Issued 17 December 2014. At paragraph 8.3.1.

²³ Refer Clause A2 – Interpretation, definition of “habitable space”.

Subsurface drainage coil next to foundation wall

Table 2

<p>Submissions of the owner</p> <p>The owner confirmed “the west of [the dwelling] ... did have a problem with moisture ingress” into the lower ground level before the building work started. The owner requested the designer include a new drainage coil, because without this, “there is nothing to stop seepage into the step and subsequently the [lower ground level]”.</p> <p>A drainage coil adjacent to the foundation wall to the west elevation ensuite has not been installed, and so the building work is not in accordance with the approved building consent plans (reproduced in Appendix A, figure 4).</p> <p>On 30 August 2021, the owner provided a copy of an “as built” plan to the Ministry (reproduced in Appendix A, figure 5). The plan has hand-written notes on it which state the drainage coil pipework was “deleted” and replaced with a sloping concrete surface to fall away from the foundation.²⁴ The plan indicates this relates to the area of the ensuite extension. It also included annotation that three coats of bituminous tanking were applied to the vertical outside face of the new reinforced concrete blockwork wall.</p> <p>The owner submits the authority had accepted the revised design from the builder but “was remiss” in doing so. The owner contends the sloping concrete surface “still does not pick up the surface water and move it away” to the sump.</p> <p>Regarding the expert’s observations about a lack of evidence of moisture ingress into the lower ground level, the owner submitted “it actually takes two to three days of constant rain for the water to soak in far enough to seep through to the [lower ground level]” and that this is the moisture that the drainage coil “was designed to catch”.</p>
<p>Submissions of the builder</p> <p>The designer’s drainage plans show no drainage coil.</p> <p>The builder provided “as-built” information to the authority on 16 August 2018 which shows an alternative means of compliance (reproduced in figure 5). This relies on replacing the subsurface drainage coil with a sloping concrete surface to direct any water away from the foundation wall and applying a bituminous coating to the concrete and surface of the wall to act as a tanking membrane to prevent moisture ingress into and through the wall.</p> <p>The builder contends the replacement of the drainage coil with a sloping concrete surface “was discussed in depth on site with [the authority’s] inspector” due to a lack of information on the building consent plans. The builder stated, “it was decided to form a pitched concrete topping” to be sealed and backfilled, and the plans did not state a requirement for protection to the tanking. The builder also noted that due to downhill site cross flow of the natural ground the sloping surface “would deter water from ponding against the foundation” wall, and moisture cannot absorb into the wall due to the combination of the external plaster cladding finish and proprietary seal product applied to the external face of the wall.</p>

²⁴ It is not clear who wrote the hand-written notes and signed the plan. Regardless, a copy of the plan was attached to an email dated 16 August 2018 from the builder to the authority and formed part of the documentation submitted in support of the application for the code compliance certificate.

(It is unclear whether the builder's reference to the "sloping concrete surface" and "pitched concrete topping" are the "concrete topper" shown at the foundation toe in figure 5 and/or the finished concreted ground level (which is sloping) on the south side of the extension as shown in the photograph in figure 3.)

Plans and specifications

The designer's plans do not show a subsurface drainage coil to be laid adjacent to the ensuite extension foundation wall.

However, a drainage coil is shown on the engineer's specific engineering design drawing²⁵ that was included in the approved building consent plans (refer to Appendix A, figure 4).

The corresponding "new block wall plan" does not correctly cross-reference to this detail; it refers to the detail being on plan sheet S-02 when it is on plan sheet S-01.

Inspection records

Final, 5 July 2017: Floor and cladding clearances achieved as per Acceptable Solution E2/AS1 – External moisture.

Final, 14 February 2018: No evidence that the subsurface drainage coil has been installed as per the engineer's building consent plan to the bathroom extension.²⁶

Final, 13 July 2018: Concrete channel to be installed at rear of new extension to deflect surface water away from the dwelling.

Final, 10 August 2018: Perimeter of new foundation has now been rendered finished. Concrete channel²⁷ has been installed to the rear of the dwelling to deflect surface water.

(A photograph shows a sloping ground level to rear (south side) of ensuite extension that has been concreted, and the reinstated ground to the west side of the ensuite extension complete with grass – see figure 3.)

Expert's report

The expert excavated an area of the ground along the west side of the ensuite to a depth of approximately 200mm, exposing "the horizontal surface of what appeared to be the toe [of the] foundation".

The expert confirmed there was no drainage coil found, and no sloping concrete topper at the toe of the foundation as shown in the as-built drawing. The expert stated that, regardless of the "as-built" information provided by the builder, the concrete surface adjacent to the foundation wall has been laid flat and there is no provision for any water to be drained away from the wall.

²⁵ S-01 revision 2, titled "Block Wall Design", dated December 2015

²⁶ The inspection report refers to the "bathroom extension", but the relevant detail on the engineer's plan (S-01, revision 2) for the "bathroom extension" does not show a drainage coil; rather it is the detail on plan S-01 for the ensuite extension that includes a drainage coil.

²⁷ Based on the inspections and this photograph, I understand the inspection record references to "concrete channel" to mean the concreted area of ground on the south side of the ensuite visible in the photograph in figure 3, not the "concrete topper" shown in the as-built drawing in figure 5.

There was “a thin coating of liquid applied membrane evident up to approximately 200mm each side of the horizontal-to-vertical junction of the concrete.^[28] There was no protection provided for the tanking. The tanking was just exposed to the backfill”.

In the expert’s opinion, there was no justification for not installing the drainage coil, but “there is no evidence of this omission causing a breach of the mandatory provisions of the [Building Code]”.

Compliance with the building consent

- 6.19. The building consent plan sheet²⁹ shows a 100mm diameter drainage coil to the west side of the ensuite extension (see Appendix A, figure 4). It is not clear from the building consent plans whether the drain coil was intended also run across the south side of the ensuite extension foundation wall.
- 6.20. The builder’s submission is clear that no drainage coil was installed, and the expert confirmed that to be the case at the west side of the ensuite extension (see figure 2).
- 6.21. The builder submits that the revised detail that omitted the drainage coil (Appendix A, figure 5) was discussed with the authority’s inspector on site. The builder provided an “as built” plan to the authority on 16 August 2018. This was after the final inspection by the authority on 10 August 2018 but before the code compliance certificate was issued on 19 September 2018. The as-built plan indicates the drainage coil was not installed and it was replaced by a sloping concrete surface at the toe of the foundation (the “concrete topper”) and the application of a liquid applied tanking membrane to both the west and south sides of the ensuite extension (refer to Appendix A, figure 5).
- 6.22. The expert’s observations confirm the sloping concrete surface was not constructed in the area excavated on the west side of the extension (refer to figure 2). Further, the extent of the liquid applied tanking membrane shown on the as-built plan provided by the builder was also not evident on the west side.
- 6.23. Regarding the drainage coil, the “concrete topper” and the tanking membrane, it is clear that the building work was not completed in accordance with the plans submitted with the building consent application, nor is the work in accordance with the as-built plans provided to the authority. Therefore, I am of the view that the building work was not been completed in accordance with the building consent and the test under section 94(1)(a) of the Act has not been met.
- 6.24. The authority’s inspection record dated 13 July 2018 stated a requirement for a “concrete channel” to be formed to the rear of the new extension. It was not clear what the authority meant by “concrete channel”, nor whether it was referring to the ensuite extension or the bathroom extension. Regardless, the inspection record

²⁸ Insufficient information has been provided for me to determine what liquid applied tanking membrane product was used, and whether it was applied in accordance with the manufacturer’s instructions.

²⁹ S-01, revision 2, titled “Block Wall Design”

of 10 August 2018 notes a “concrete channel has been installed” and includes a photograph of the south side of the ensuite extension. The photograph shows a concreted sloping surface at ground level on the south side of the ensuite extension (figure 3).³⁰ This suggests that this particular variation (ie the addition of the sloping concrete surface in this location) was accepted by the authority, and I consider this forms part of the building consent for which the code compliance certificate was issued.

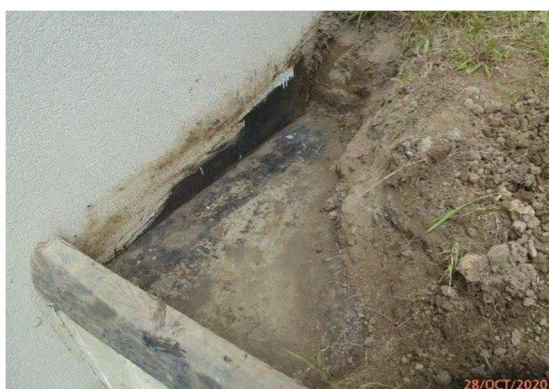


Figure 2: Excavation to west side of ensuite extension³¹

Note: No drainage coil has been installed, the horizontal concrete surface is level, and the 200mm strip of liquid applied tanking is exposed. No protection provided to the tanking.



Figure 3: Sloping concrete surface to south side of ensuite extension³²

Compliance with the Building Code

- 6.25. The installation of a subsurface drainage coil of this nature, placed at the base of foundation walls, is generally intended to avoid the effects of any hydrostatic water pressure that might otherwise build-up against the wall.³³ In this case, the depth of the foundations and the limited number of courses of blockwork wall below finished ground level, means any potential effects of hydrostatic water pressure on the wall itself would be minimal or negligible. I have received no evidence to indicate non-compliance with clause B1 as a result of the effects of any water.
- 6.26. The lowest part of the external wall and rendered surface finish are in contact with, or in close proximity to, the ground. Therefore, I have also considered compliance with clause E2 External moisture, specifically clause E2.3.3.

³⁰ The “concrete channel” referred to here is separate and distinct from the building work described in paragraphs 6.21 and 6.22, and as shown in Appendix A, figure 5.

³¹ Dated: 28 October 2020

³² Dated: 10 August 2018.

³³ Clause B1.3.3 (e) – water and other liquids.

- 6.27. It is evident from the expert's observations that the finished ground level (made up of soil and grass) is higher than the exposed liquid applied tanking product, and it has been placed directly against the rendered surface of the foundation wall along part of the west elevation.
- 6.28. Further, due to the lack of information provided about the liquid-applied tanking product that was used, I have insufficient information to confirm if the tanking has been applied in accordance with the manufacturer's instructions (including, but not limited to, the provision of any protection to the tanking product that may have been required).
- 6.29. Together, these have the potential of allowing external moisture to be absorbed into and through the wall (while noting the wall is constructed of reinforced concrete blockwork).
- 6.30. I also note, there is no clear record that the authority inspected this element of the building work prior to the reinstatement of the finished ground.
- 6.31. I have already concluded in paragraphs 6.16 and 6.18 that there is insufficient information to determine non-compliance with clause E2.3.3. I extend that to include the omission of the drainage coil and concrete topper, as well as the lack of information about the liquid-applied tanking membrane used (including the possible effects of the finished ground level in contact with the wall being higher than the tanking).

Foul water drain and backfill

Table 3

<p>Submissions of the owner</p> <p>The owner raised concerns about the foul water drain from the ensuite on the west side of the building to an existing services connection. The owner is concerned about inadequate fall along the drain, and the bedding and backfill material used around it.</p> <p>"[V]ery little fall has been used" and "CCTV also shows sagging of the new pipes".</p> <p>Backfill used for the drain "is not stabilized as instructed by the geologist's report submitted for the consent. No stabilizing lime was used for any backfill around the sewer [and] storm water pipes".</p> <p>The owner queried whether any sagging in the pipework could be observed due to the concreted surface above it.</p> <p>The authority "failed to observe the sagging pipes, lack of fall, poor joints and permeable backfill" and did not instruct the builder to "uncover the drains for the required inspection".</p> <p>Drainage specialist report (commissioned by the owner)</p> <p>The owner provided a copy of a foul water stormwater drainage report dated January 2020 from a drainage specialist following two site inspections conducted in September 2019. The</p>
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report described work the specialist considered was not compliant with the building consent documents “or [was] outside industry standards”. The report:

- stated the “foulwater [sic] and stormwater drainage bedding material is AP20^[34] but should be lime stabilized SAP20^[35]”
- stated, “if the excavated material is used as backfill the addition of hydrated lime prevents surface water migrating through the clay based soils”
- referred to Acceptable Solution G13/AS2³⁶, section 5.3 “construction methods”, subsection 5.3.1 b), which states “Figure 7 [Bedding and backfilling] gives acceptable methods for bedding and backfilling of the drainage pipes listed in Table 1 [Materials for drainage pipes] except where... scouring of the trench is likely due to unstable soils”
- referred to the geotechnical investigation report dated 12 November 2015, specifically section 6.4 regarding backfilling of all service trenches in loess soil with low permeability materials
- stated that a camera survey³⁷ of the foul water pipework “shows a section of dipped pipe with subsequent loss of grade...reference [clause] G13 performance G13.3.[2](f)”.³⁸
- stated, “if the [drainage coil] pipework had been installed, as detailed on the consented [plan titled] Block Wall Design S-01, the backfilled excavation would not be filled with surface water runoff”.

The camera survey of the newly installed foul water drain extended for approximately 23m along the drainage pipe.³⁹ The recordings show varying depths of standing water and foul water matter in the invert of the pipe, as well as some displaced joints at junctions between lengths of pipework, and at one joint signs of roots from vegetation passing into the drain. The initial 1m length of the drainage pipe showed the greatest depth of standing water and foul water deposits.

Submissions of the drainlayer

“[T]he appearance of a tide line in a drain is not sufficient evidence to assume that drains have been previously blocked.”

“[T]he joints...were connected using a clear primer. This would not be visible [on] a camera inspection conducted some years later...”.

³⁴ AP20 – a crushed coarse aggregate material with a maximum particle size of 20mm.

³⁵ SAP20 – Scoria 20mm all passing. Scoria is a rock that contains many bubble-like cavities and is used as a drainage material.

³⁶ *Ministry of Business, Innovation and Employment Acceptable Solutions and Verification Methods for New Zealand Building Code Clause G13 Foul Water*, second edition, amendment 5, effective from 14 February 2014 to 30 May 2017.

³⁷ I note, the report from the drainage specialist from January 2020 pre-dates the camera survey video recordings dated 17 March 2020.

³⁸ Clause G13.3.2(f) - The drainage system shall be constructed to avoid the likelihood of damage from superimposed loads or normal ground movement.

³⁹ Due to the length of the drain surveyed (at 23m) and the dimensions of the dwelling as stated on the designer’s plans, it is reasonable to assume the survey included both new and existing sections of the foul water drainage.

The authority “did not ask for the building work to be uncovered because detailed pictures taken, submitted, and stored on file [by the authority] are deemed sufficient evidence for the means of the inspection. This is normal practice...”

When the foul water “drains were laid and subsequently passed by the [authority’s] inspector” these met the requirements of clauses G13.3.2 (b) and (c).

On 25 June 2017, the drainlayer completed and signed a Producer Statement – Construction (PS3), which indicated compliance with clause G13 and included an as-built drainage plan.⁴⁰

Plans and specifications

The designer’s plan states, “all plumbing [and] drainage to comply with AS/NZS 3500”.⁴¹ A general note on the same plan also states, “proposed drainage to be in accordance with [clause] G13...or AS/NZS 3500: Part 2.2”.

The plan specifies a 100mm diameter foul water drain laid at a fall of 1:100.⁴² The drain extends from the new ensuite extension in a southerly direction, then turns east to connect into an existing foul water drainage system. The same drain also receives the foul water from the new bathroom extension and laundry tub.

Also included in the approved consent documents was a geotechnical investigation report dated 12 November 2015. The report was drafted by a company that specialises in providing geotechnical and construction services. The report states:

all service trenches in loess soil shall be backfilled with low permeability materials (including lime stabilisation if loess material is used) so that excavations do not become points of entry for surface water run-off.

The building consent

The ‘Schedule of specified inspections’ dated 25 February 2016 issued by the authority with the building consent certificate included a requirement for the authority to conduct ‘drainage’ inspection(s).

The ‘Building Consent Construction Documentation and Advice Notes’ issued by the authority with the building consent certificate included a requirement to “provide as-laid drainage plan at time of drainage inspection”.

⁴⁰ A copy of the PS3 and as-built drainage plan was sent to the authority, by the builder, on 16 August 2018. However, based on the authority’s records titled “CCC Statement of Compliance” and “Code Compliance Summary”, a previous copy appears to have been received by the authority on or before 13 February 2018.

⁴¹ SP02, revision 3, dated 3 February 2016, titled “Site drainage plan”. For the purpose of this determination, based on the date the building consent was granted and issued, I take it to be Part 2, second edition 2003, titled “Sanitary Plumbing and Drainage”.

⁴² AS/NZS 3500.2:2003, Table 3.2 titled “Minimum grades of drains” states for a 100mm diameter drain, the minimum grade is 1.65%; Appendix B “Pipe grades conversion table” states this equates to a ratio (gradient) of 1 in 60. A fall of 1:100 for a 100mm diameter foul water drain is an option under *Ministry of Business, Innovation and Employment Acceptable Solution G13/AS2 Drainage* (second edition, amendment 5 effective from 14 February 2014), table 2 subject to a maximum 122 discharge unit loading and the requirements of paragraph 5.2.2 of the G13/AS2.

Inspection records

Drainage, 5 July 2017: “Fail”. Missed inspection – Building work covered up and inaccessible. Photographic evidence, Producer Statement Construction (PS3), and statement on construction methodology required from the person(s) who installed or supervised the drainage.

Subfloor drainage 25 January 2018: “Fail”. Drainage inspection to be addressed.

Final, 25 January 2018: Noted failed previous subfloor and drainage inspections.

Final, 14 February 2018: Drainage inspection for connections to the new bathroom was not undertaken. Photographic evidence, Producer Statement – Construction (PS3), and statement on construction methodology, required from the person who installed or supervised the drainage.⁴³

Final, 13 July 2018: Plumbing and drainage; updated as-built to be on site for the re-inspection.⁴⁴

Expert’s reportFoul water drain

On 28 October 2020, the expert arranged for another inspection of the foul water drainage using a CCTV camera inserted into the drain through the main vent on the south wall of the ensuite. The expert confirmed that the second camera survey indicated:

- the pipe had a negative fall (or back fall⁴⁵) for the first 1.5m
- the drain was holding water up to 20 percent of the depth of the pipe
- there was minimal fall along the drain for the next 4m then the pipe dipped and was holding more water
- there was a tide mark halfway up the sides of the pipe indicating past blockages
- from the southwest corner of the dwelling across to the rear porch the CCTV indicated the drain was between 450mm to 490mm below ground surface and the fall was calculated to be 1:65⁴⁶ which exceeds the minimum fall specified on the building consent drainage plan of 1:100
- the drain drops steeply by 300mm at a distance of 11.7m from the head of the drain
- no primer was visible at any of the joints in the drain
- several of the joints were not pushed tightly together, leaving a ridge for obstructions to catch on
- at distances of 12.3m and 16.9m from the head of the drain, joints in the pipes were only inserted halfway into the collars, which indicates these two defective junctions are a high risk of future failure.

⁴³ It is not clear why this statement included reference to requiring a PS3 when it appears the authority was already in possession of one on or before 13 February 2018.

⁴⁴ It is not clear why the authority requested an updated as-built plan or if one was ever provided. I have received no information to indicate any updated plan was provided after 13 February 2018 and prior to issue of the code compliance certificate on 19 September 2018.

⁴⁵ New Zealand standard *AS/NZS 3500.0:2003, Plumbing and drainage, Part 0: Glossary of terms* - “fall” – the difference in level between two points in the direction of flow; “back fall” – the difference in level between two points in the opposite direction to the designed flow.

⁴⁶ New Zealand standard *AS/NZS 3500.0:2003, Plumbing and drainage, Part 0: Glossary of terms* - “grade (or gradient)” – The inclination expressed as a ratio or percentage of unit rise to horizontal distance, example 1:65 describes a rise or fall of 1mm for every 65mm length of pipe.

The expert compared Acceptable Solution G13/AS2⁴⁷, specifically paragraph 3.5 ('Gradient of drains'), and the foul water drain installed at the property.⁴⁸

- paragraph 3.5.1 a) states drains shall be laid at an even grade. The expert noted that "the drain has either not been laid to an even grade or it has settled due to inadequate compaction of the backfill".
- paragraph 3.5.1 b) states drains shall have no obstructions to flow. The expert noted "some of the pipe joints are not fully inserted into the joint, resulting in a lip for obstructions to catch on".
- paragraph 3.5.2 states drains shall be installed at the maximum practicable gradient. The expert noted the 300mm drop at a distance of 11.7m from the head of the drain, "so the first 11.7m of the drain could have easily been laid with 300mm more fall".
- paragraph 3.5.3 states the gradient of drainage pipes shall be not less than what is required in Table 2 ('Drain discharge unit loading and minimum gradients') for the relevant discharge unit⁴⁹ loading, ie a minimum gradient of 1:120 for a 100mm diameter pipe. The expert noted "the consented drainage plan shows a gradient of 1:100. The gradient on the drain was considerably less than the 1:120 in G13/AS2 or the 1:100 shown on the consented plans, in places where the pipe dips".

The expert provided an assessment of compliance with Clause G13 Foul water. The expert was of the view that the foul water drainage is non-compliant with clause G13.3.2 (b)⁵⁰ because "the drain has negative fall in places and the tide mark visible halfway up the side of the drain is evidence of the drains being partially blocked at times. The drain has not been constructed to avoid the likelihood of blockage". However, the expert could not confirm if compliance with clause G13.3.2 (c) had been achieved because "the quality of the joints [could] not be verified".

Backfill

The expert confirmed he had excavated an area above the foul water drain to a depth of 400mm and no lime was evident in the backfill.

The expert also noted that Acceptable Solution G13/AS2 does not give acceptable methods for bedding and backfilling where scouring of the trench is likely due to unstable soils, which the expert identified at the subject property.

The expert referred to the geotechnical investigation report dated 12 November 2015 and stated, "the backfilling of the drain has not been completed in accordance with the consent documentation. The lack of lime stabilisation could be the cause of the [foul water] drain having a dip resulting in a negative fall in places, which has lead [sic] to a failure to meet the mandatory provisions in [clause] G13".

⁴⁷ Second edition, Amendment 5, effective from 14 February 2014 until 30 May 2017.

⁴⁸ Although the expert assessed compliance of the building work against an Acceptable Solution, I note this is not the only means of demonstrating compliance with the Building Code (see section 23 of the Act) and the plans specified AS/NZS 3500 as the means of compliance.

⁴⁹ Acceptable Solution G13, definitions: "discharge unit" – the unit of measure for the discharge (hydraulic load) in the plumbing system, and is based on the rate, duration and frequency of discharge from a sanitary fixture or sanitary appliance.

⁵⁰ Clause G13.3.2 (b) – The drainage system shall...be constructed to avoid likelihood of blockage.

Compliance with the building consent

- 6.32. The evidence provided by the drainage specialist commissioned by the owner, and the Ministry's expert, confirms the foul water drain does not have the minimum fall required, and the backfilling of the drain has not been completed using low permeability materials specified.
- 6.33. The as-built documentation provided did not confirm whether the backfill was stabilised with the low permeability material specified. I have also received no information that suggests the omission of the stabilising low permeability material was subject of a variation to the building consent agreed to by the authority during the course of the building work.
- 6.34. For these reasons, I am of the view that the building work to install the foul water drainage does not comply with the building consent.

Compliance with the Building Code

- 6.35. Clause G13.3.2 of the Building Code states:

The drainage system shall:

...

(b) Be constructed to avoid the likelihood of blockage,

(c) Be supported, jointed and protected in a way that will avoid the likelihood of penetration of roots or the entry of ground water,

...

(f) Be constructed to avoid the likelihood of damage from superimposed loads or normal ground movement

- 6.36. The evidence in this case indicates the inadequate fall along parts of the foul water drain and displaced joints do not avoid the likelihood of blockage. The drainage system has not been supported, jointed, or protected in a way that has avoided the likelihood of the penetration of roots or the entry of ground water.
- 6.37. I consider the installed drainage system, with only normal maintenance, is not durable enough to satisfy the performance requirements of the Building Code. Non-compliance with clause G13 is already evident, for example, in areas of the drainage system where standing water is present.
- 6.38. Based on the evidence in this case, I am of the view that the building work to install the foul water drain does not comply with the Building Code.

Floor joists fixed to lower ground level walls

Table 4

<p>Submissions of the owner</p> <p>Notching⁵¹ of the floor joists installed for the ensuite and north elevation extensions differs from the approved building consent plans, and they were left with no extra strengthening or bracing or fixing to the foundation wall. This is as a result of the ends of the floor joists being notched and fixed (in part) to timber stringers bolted to the lower ground level walls.</p> <p>The date of the Producer Statement – Construction Review (PS4) issued by the engineer on 5 July 2017 preceded the discussions regarding the notched ends and fixings of the floor joists which occurred between “March 2018 to June 2018”. As such, the PS4 does not cover this item. This aligns with information about retrofit subfloor fixings the engineer referred to in an email to the builder and owner dated 27 June 2018. The email stated that if the builder was to install a particular proprietary subfloor fixing between each floor joist and the wall plate it should be okay.</p>
<p>Submissions of the builder</p> <p>The designer’s plans show no connection detail to the block wall, and details 15 and 16 on plan sheet A16 state, “to match existing”.</p> <p>In an email to the engineer dated 19 March 2018, the builder stated that the reason for the change in the connection of the ends of the floor joists was because there was a restriction to the height of the block wall, so the bottom edge of the weatherboards was at the same level around the entire building.</p>
<p>Plans and specifications</p> <p>The designer’s plans⁵² all indicate the new timber floor joists to the north and west extensions were to be seated on top of the new reinforced concrete block external walls.</p> <p>Where the new floor joists were connected to the existing walls of the dwelling, they were to be fixed to a timber stringer secured to an existing boundary joist located on top of the supporting blockwork wall below.</p>
<p>Inspection records</p> <p>Subfloor, 5 July 2017⁵³: “Pass” - 190 x 45mm floor joists at 600mm centre-to-centre spacings, and 140 x 45mm timber stringers⁵⁴ bolted at 600 – 700mm spacings to the blockwork walls.</p>

⁵¹ For the purposes of this determination, the term “notching” refers to a portion of the depth of the floor joist that is cut out that reduces the effective depth of the joist. This is described in *New Zealand Standard 3604:2011 Timber-framed Buildings*, section 7, sub-section 7.1.7, and figures 7.7 (C) and 7.8.

⁵² A11 revision A2, A12 revision A2, A13 revision A2, and A16 revision A2 (details 15 and 16).

⁵³ The overall inspection outcome was “Fail” due to some work being “covered or inaccessible” and solid blocking missing at the mid-span of the floor joists.

⁵⁴ A horizontal framing timber on edge fixed to the side of a concrete or concrete masonry wall, to support the ends of joists or rafters.

(Photographs included with the report show the ends of the floor joists cut ('notched') to sit partly supported on the top of the basement walls and partly on timber stringers bolted to the walls.)

Subfloor, 25 January 2018: "Fail"

- Floor joists have been notched over the existing blockwork with a large cut out.
- Floor joists are sitting on a stringer but there are no connections from the floor joists to the stringer.
- Designer to provide updated details showing means of compliance.

(Photographs included with the report show the ends of the floor joists "notched", as above).

Subfloor, 14 February 2018: "Fail" (same observations as 25 January 2018 subfloor inspection)

Subfloor, 13 July 2018: "Pass"

- Reviewed updated details provided by the engineer for subfloor fixings (connection of floor joists to timber stringers).
- Remediation work undertaken at engineer's direction.

(Photographs included with the report show prefabricated galvanized nail plates or cleats in place that secure the floor joists to the timber stringer fixed to the blockwork walls.)

Expert's report

The expert reviewed the construction of the 190 x 45mm thick floor joists in the lower ground floor area under the north extension to Bedrooms 1 and 2. The expert observed the ends of the floor joists have been cut ("notched") to bear partly onto a timber stringer bolted onto the internal face of the concrete blockwork basement wall and partly onto the top of the wall.

At one end the 190mm deep floor joists have been notched by 60mm, so 130mm bears onto the supporting basement wall on one side. On the opposite side of the basement the floor joists have been notched by 80mm, so 110mm of the timber bears on the timber stringer.

The expert noted that the floor joists are spaced 600mm apart, and the horizontal distance between supporting walls is 675mm. The timber stringer is 90 x 45mm in size and fixed with bolts and washers at 600mm centre-to-centre spacings. Specialist brackets have been used to fix the timber stringer to the floor joists as per the manufacturer's installation instructions.

The expert compared the construction against *New Zealand Standard NZS 3604:2011 – Timber-Framed Buildings*, Table 7.1(a).⁵⁵ This table indicates that 90 x 45mm 'structural grade 8' (SG8) floor joists, for a 1.5kPa loading (dry in service), can span a maximum of 1.25m where the joists are at 600mm centre-to-centre spacings.

The expert considered the size of the timber stringers used in the basement, and the size and centre-to-centre spacing of the bolt fixings used to secure them to the basement walls. The expert used comparative data available from NZS 3604:2011 to undertake an analysis of the as-built construction and concluded that it "is stronger than the recommended solution" in the standard.

⁵⁵ NZS 3604:2011 as referenced in *Ministry of Business, Innovation and Employment Acceptable Solution and Verification Methods for Building Code clause B1 Structure*, Amendment 12, effective from 14 February 2014.

Compliance with the building consent

- 6.39. The plans submitted with the building consent application do not indicate notched ends of the floor joists or installation of the additional timber stringers. As such, the building work has not been constructed in accordance with the plans that were approved when the building consent that was granted and issued.
- 6.40. However, it is apparent from the authority's records that a variation to the building consent was accepted by the authority on site, as was its assessment and acceptance of the compliance of the building work (along with the observations of the engineer⁵⁶). I consider this variation forms part of the building consent for which the code compliance certificate was issued, and that the building work to install the floor joists complies with the building consent as amended by the approved variation.

Compliance with the Building Code

- 6.41. I have considered the compliance of the floor joists and have relied on the following information:
- 6.41.1. The email from the engineer to the builder and owner dated 27 June 2018.
 - 6.41.2. The assessment and acceptance of compliance of the as-built construction by the authority as a result of its subfloor inspection on 13 July 2018.
 - 6.41.3. The assessment of compliance by the expert as summarised in table 4.
- 6.42. I have received no other information, such as structural calculations or other specialist engineering advice, that raises questions about the compliance of the as-built construction of the floor joists or the associated fixings between the relevant building elements.
- 6.43. In conclusion, I am of the view that the as-built construction of the floor joists fixed to the lower ground level blockwork walls complies with Clause B1 Structure.

⁵⁶ The Producer Statement – Construction Review (PS4) issued by the engineer is dated 5 July 2017. I note this pre-dates the authority's subfloor inspection records of 25 January 2018 and 13 July 2018. As such, the PS4 does not include the remedial work to the floor joists. This is notwithstanding the authority's inspection records which indicate the engineer did subsequently detail and direct the remedial work.

The foundation wall to the bathroom extension

Table 5

<p>Submissions of the owner</p> <p>The owner submits the foundation wall to the bathroom extension was not constructed in accordance with the building consent. It was designed to be built from reinforced concrete blockwork but was constructed using poured in-situ concrete instead. This meant the plan dimensions were “reduced so that when the cladding was installed it overhung the foundation”. The result was a Z-shaped flashing at the base of the wall did not fit.</p> <p>The owner provided a copy of the engineer’s Producer Statement – Construction Review (PS4) dated 5 July 2017, as well as several of the engineer’s photographs showing the timber shuttering, steel reinforcement, and damp-proof membrane for the bathroom extension foundation wall, prior to concreting.</p> <p>The revised foundation detail was passed by the authority in its inspection on 13 July 2018.⁵⁷</p> <p>With reference to the expert’s observations, the owner submits “the foundation varied in both materials used and dimensions from [the building consent] plans”.</p> <p>The owner contends the authority should not have agreed to the revised foundation detail.</p>
<p>Submissions of the builder</p> <p>Regarding the change in construction methodology for the bathroom extension on the south side of the dwelling (from reinforced concrete blockwork to poured reinforced in-situ concrete) the builder referred to the engineer’s sketch “on [a] random diary page”⁵⁸, and engineer’s “site visit note” dated 30 August 2016; the builder stated this includes the “rear bathroom extension foundation which is also included in the engineers site photos”.</p> <p>The builder provided ‘before’ and ‘after’ photographs of the construction of the foundation wall.</p> <p>The builder also provided information in support of their view on “just how little loading there actually is on this foundation” and the site photographs show “reinforcing steel and the excessive size and depth of the in-situ foundation bearing onto solid undisturbed clay”.</p>
<p>Plans and specifications</p> <p>The designer’s plans⁵⁹, and the engineer’s plan sheet⁶⁰, indicate that the foundation wall to the south elevation bathroom extension should have been constructed using new reinforced concrete blockwork supported on reinforced concrete foundations.</p> <p>The plans⁶¹ specified the inclusion of a horizontal ‘Z’-shaped flashing to be installed over flashing tape and building wrap. The lower vertical face of the flashing was to extend over the</p>

⁵⁷ I note the authority agreed to the revised foundation construction during the foundation (pre-pour) inspection on 22 August 2016, albeit the authority’s report also states the engineer was “to detail [the] foundation for [the] rear of [the] dwelling” and works could “continue once [the] engineer has undertaken [their] site report”.

⁵⁸ I have received conflicting information from the parties regarding who drew the sketch.

⁵⁹ SP03 revision A2, and A13 revision A2.

⁶⁰ S-01 revision 2 titled “Block Wall Design”

⁶¹ Detail 15 on plan A16 revision A2

top of the reinforced concrete block foundation wall. The upper vertical face of the flashing was to extend up the outside face of the timber floor construction, behind the external weatherboard cavity construction.

Inspection records - authority

Pre-pour foundation, 22 August 2016: "Pass"

- Confirmed with engineer on site the detail for tying footing into dwelling.
- Block wall footings to dwelling inspected.
- Engineer to detail foundation to the rear of the dwelling.
- Approved to continue once engineer has undertaken site report.

(Two photographs showed steel reinforcement, timber shuttering, and damp-proof membrane (prior to concreting) for the new bathroom extension located at the south elevation of the dwelling.)

Final, 13 July 2018: "Fail"

- Perimeter of new foundation to be packed out and plastered to match the existing foundation.

Final, 10 August 2018: "Pass"

- Perimeter of new foundation has now been rendered finished.

Inspection records - engineer

Inspection by the engineer on 22 August 2016, and their report dated 30 August 2016 with associated photographs.

The engineer's Producer Statement – Construction Review (PS4) dated 5 July 2017.

Expert's report

The expert confirmed the construction of the foundation wall to the south elevation bathroom extension varies from the consented plans that were approved as part of the building consent.

The foundation wall has been constructed using poured in-situ concrete whereas the plans submitted with the building consent application show reinforced concrete block. The expert noted "the face of the concrete finishes flush with the framing line".

To compensate for this variation the expert stated that "[T]o bring the face of the plaster out to line up with the face of the cladding and to match the original foundation to cladding junction, polystyrene has been attached to the concrete foundation and plastered. A PVC...moulding has been fitted to the bottom of the polystyrene".

The expert made the following observations about the "plastered polystyrene" that is fixed to the outside surface of the concrete foundation:

- The plastered polystyrene is a cladding material.

- Acceptable Solution E2/AS1⁶² states that “clearance to ground levels...shall be” 100mm above paved surfaces and 175mm above unpaved surfaces for all cladding types except masonry veneers.⁶³
- The bottom of the plastered polystyrene is approximately 30mm below the ground surface, and the ground has been “scraped back” to allow the plastered polystyrene to be fitted so low.
- The bottom of the timber weatherboards along the south side of the dwelling between the bathroom extension and the rear porch is closer to the unpaved surface than that described in E2/AS1.
- When the ground is paved, the plastered polystyrene will be buried deeply into the paving, which does not comply with clause E2.3.3.
- The plastered polystyrene is a building element,⁶⁴ and depending on the type of polystyrene used, it may absorb moisture when buried into the paving resulting in the surface coating blistering.
- Without destructive testing, the expert was unable to determine which type of polystyrene was used.
- Referring to Acceptable Solution E2/AS3⁶⁵, the expert noted that a cited detail in CP 01:2014⁶⁶ shows plastered polystyrene can be buried into the ground if there is a capillary break to prevent moisture transfer up into the cladding above.
- A ‘Z’ shaped metal flashing at the base of the weatherboard forms the required capillary break.
- If the polystyrene or plastered coating were to break down due to moisture absorption, it is unlikely to affect any of the building elements in proximity to it.

Compliance with the building consent

6.44. The foundation wall for the bathroom extension was specified in the building consent plans to be constructed of reinforced concrete blockwork, but the wall was constructed using reinforced in-situ concrete. As such, the wall was not constructed in accordance with the plans that were approved when the building consent was granted and issued.

⁶² Ministry of Business, Innovation and Employment *Acceptable Solution and Verification Methods for Building Code clause E2 – External Moisture, E2/AS1*, 3rd edition, amendment 6, effective from 14 February 2014 until 30 May 2017.

⁶³ E2/AS1, paragraph 9.1.3, Figure 65, and Table 18.

⁶⁴ Defined in Clause A2, as any structural or non-structural component and assembly incorporated into or associated with a building. ...

⁶⁵ Detail 1 – Wall/footing junction: Slab on ground concrete masonry or in-situ wall: EIFS (Exterior Insulation and Finish Systems).

⁶⁶ Concrete and concrete masonry construction, including Cement and Concrete Association of New Zealand (CCANZ) CP 01:2014, Code of Practice for Weathertight Concrete and Concrete Masonry Construction dated January 2014.

- 6.45. However, the inspection records indicate that the change of construction methodology for the foundation wall was accepted by the authority on 22 August 2016.
- 6.46. Further, the use of the plastered polystyrene in conjunction with the Z-shaped flashing as noted by the expert is not in accordance with the building consent plans. However, the authority's inspection records dated 13 July 2018 and 10 August 2018 do include reference to this additional building work and the final inspection recorded a "pass".
- 6.47. In summary, the building work to construct the foundation wall to the bathroom extension is not in accordance with the plans originally approved by the authority. However, the authority's inspection records indicate it accepted the variations to the building consent prior to issuing the code compliance certificate. I consider this variation forms part of the building consent for which the code compliance certificate was issued. The building work to construct the foundation wall complies with the building consent as amended by the approved variation.

Compliance with the Building Code

- 6.48. I have considered compliance with Clause B1 Structure of the reinforced concrete foundation wall for the bathroom extension, and relied on the following information:
- 6.48.1. The authority's foundation inspection, prior to concreting, on 22 August 2016.
 - 6.48.2. The inspection by the engineer on 22 August 2016, and their report dated 30 August 2016, and associated photographs.
 - 6.48.3. The engineer's Producer Statement – Construction Review (PS4) dated 5 July 2017.
- 6.49. I have received no other information, such as other engineering advice, that may raise questions about the compliance of the as-built construction of the foundation wall.
- 6.50. In consideration of all these factors, I am of the view that the as-built construction of the foundation wall complies with clause B1.
- 6.51. I have also considered compliance of the building work with Clause E2 External Moisture. This relates to the additional work to install a polystyrene product in close proximity to, or in contact with, the ground at the base of the external wall and the inclusion of a 'Z'-shaped flashing.
- 6.52. I have considered compliance with clause E2, and relied on the following information:

- 6.52.1. The assessment of compliance by the authority as recorded in its inspection records dated 13 July 2018 and 10 August 2018 prior to the issue of the code compliance certificate.
- 6.52.2. The expert's opinion that despite being unable to determine the type of polystyrene used and its performance, the 'Z'-shaped flashing forms a capillary break and any moisture absorption in the polystyrene is unlikely to affect any of the building elements in close proximity to it.
- 6.53. In consideration of all these factors, I am of the view that the as-built construction of the foundation wall complies with clause E2.

Surface water sump

Table 6

Submissions of the owner

The owner is of the view that the installation of the surface water sump to the south-west corner of the dwelling was added as a variation to the building consent. The owner contends the sump has not been installed correctly, in that the inlet connection (from a drainage coil behind a garden retaining wall) is lower than the outlet connection to the surface water drainage system.

"The [surface] water now [flows] east to west towards the sump and had nowhere to go except seep down through the soil and [into] the basement" where previously the slope of the land (prior to the building work) was away from the dwelling to the driveway area. This building work was "a variation added to the project, [so] the garden wall along the south boundary" could be "redone" and was not part of the approved building consent.⁶⁷

The owner also provided a copy of a hand-drawn sketch of the sump by the drainlayer. The sketch shows a grate on top of a silt trap with the inlet pipe connection annotated as "water in from retaining wall", and a lower-level outlet pipe connection annotated as "water out".⁶⁸ The sketch also shows "sediment silt trap" at the bottom of the sump (below the level of the outlet pipe connection). However, the owner is of the view that the outlet connection has been installed higher than the inlet connection.

The owner referred to the failed inspection by the authority on 5 July 2017 in relation to the surface water sump and is of the view that the building work is still incomplete.

The owner referred to the expert's observations about the surface water sump and stated that it "has not been constructed to [the] drainlayer's "as built" diagrams".

The owner noted the "sump still has no 'Y' junction or capping", and the authority issued the code compliance certificate without this being remediated.

⁶⁷ The determination does not consider the construction of the timber pole retaining wall. It did not form part of the application for building consent, and the parties have not raised its construction as an item of dispute.

⁶⁸ The sketch of the installed silt trap drawn by the drainlayer does not indicate a 'Y' junction fitting, as shown in E1/AS1 figures 8 and 9.

<p>Drainage specialist report (commissioned by owner):</p> <p>In a report dated January 2020, a drainage specialist stated the “existing sump – located at the level area beside the retaining wall is not compliant with [Clause] E1 Surface water” and the as-built information provided by the drainlayer is inconsistent with the drainage specialist’s observations.</p> <p>The outlet pipe from the sump “has been installed higher than the [drainage coil pipework] connection from the retaining wall, this has the effect of submerging the upstream [drainage coil] pipework”.</p> <p>The report goes on to state that the “surface water from this area discharges into the sump, [and] the sump is not trapped by a submerged outlet”, and “the [drainage coil] pipework discharging to the sump is required to have a trapped outlet before entering the downstream [surface water] system”.</p>
<p>Submissions of the builder</p> <p>The designer’s drainage plans show no sump or connection point into the stormwater system.</p>
<p>Submissions of the drainlayer</p> <p>“[T]here is a solid lid on the top of the sump which stops floatable solids from entering the drain. This negates the need for a submerged outlet”.</p> <p>The authority and subsequent experts have mistakenly labelled the sump as a bubble up sump. A silt trap was installed, not a bubble up sump. The difference is that a silt trap catches the silt at the bottom of the sump. There is not a need for a ‘Y’ junction in this type of sump because that is reserved for driveways and areas where oil and other chemicals are a factor. The sump was never required to have a ‘Y’ junction or cap⁶⁹.</p> <p>The drainlayer did complete a Producer Statement – Construction (PS3) dated 25 June 2017, and this included reference to “stormwater drainage systems”.⁷⁰ Attached to the PS3 was an as-built drainage plan which included reference to the sump that was installed.</p>
<p>Plans and specifications</p> <p>The designer’s or engineer’s plans do not include a requirement to install a surface water sump close to the south-west corner of the dwelling.</p>
<p>Inspection records</p> <p>Final, 5 July 2017: “Fail”</p> <ul style="list-style-type: none"> • Location of sump – rear of dwelling. Sump for surface water and retaining wall drains has not had a ‘Y’ junction added and has not been capped to retain silt. <p>Final, 25 January 2018: “Fail”</p> <ul style="list-style-type: none"> • Sump for surface water/retaining wall drains has not had a ‘Y’ junction added and has not been capped to retain silt. <p>Final, 14 February 2018: “Fail”</p>

⁶⁹ The reference to “cap” is in response to the authority’s inspection records dated 5 July 2017 and 25 January 2018.

⁷⁰ I note the PS3 did not confirm compliance with the relevant Building Code Clause E1 Surface Water.

- Still to complete surface water sump which does not comply with a Type 1^[71] (new grate and filter required to prevent debris from entering sump to satisfy performance with E1).

The final inspection reports dated 13 July 2018 and 10 August 2018 do not refer to the sump.⁷²

Expert's report

The expert made some observations about the surface water sump installed adjacent to the southwest corner of the dwelling, noting it is intended to take groundwater from behind the timber retaining wall and surface water from the south side of the dwelling.

The expert stated the sump was not part of the building consent, and neither was the recently constructed timber retaining wall. The sump is not shown on the building consent plans.

The expert stated the "sump is not constructed as recommended in [Acceptable Solution] E1/AS1" (surface water). It "does not have a submerged (or trapped) outlet to prevent floatable solids entering the drain".

The outlet from the sump was higher than the inlet from the retaining wall which means the pipe leading behind the retaining wall will be completely submerged before the water starts to flow out of the outlet.

Compliance with the building consent

6.54. The plans submitted with the building consent application do not include the surface water sump. However, the information provided by the owner and the inspection records from the authority indicate a variation to install the sump was accepted by the authority. Therefore, I consider this variation forms part of the building consent against which the code compliance certificate was issued.

Compliance with the Building Code

6.55. The authority's inspection reports dated 5 July 2017, 25 January 2018, and 14 February 2018 all indicate the sump has not been installed correctly.

6.56. The authority's inspection record of 13 July 2018 does not refer to the sump at all, and it is not clear whether the authority considered the sump complied with the Building Code in July 2018, or that it had simply not re-inspected the sump.

6.57. Regardless, subsequent investigations by the drainage specialist commissioned by the owner, and the expert (after the code compliance certificate was issued) indicate the surface water sump has not been installed correctly.

6.58. The drainlayer stated "there is a solid lid on the top of the sump which stops floatable solids from entering the drain. This negates the need for a submerged

⁷¹ Type 1 sump: refer to Acceptable Solution E1/AS1, Amendment 9, effective 14 February 2014, paragraphs 3.6.1 and 3.6.2, and Figure 8.

⁷² It is not clear what remedial work (if any) had been done to the sump between the February and July inspections by the authority.

outlet”. However, this information is contrary to the sketch of the installed sump provided by the drainlayer which shows a “grate” has been installed.⁷³

- 6.59. Regardless of the contradictory evidence received about what type of lid and sump that have been installed (including the presence or otherwise of a submerged outlet), there is information that indicates the inlet and outlet connections to the sump have not been formed correctly. Consequently, water will only flow out of the outlet once the water is higher than the inlet, at which point the sump would be almost full. This means the drainage system does not use gravity flow and does not avoid the likelihood of blockages at the sump.
- 6.60. Based on the evidence, I am of the view the building work to install the surface water sump does not comply with the Clause E1.3.3(a) Surface Water.

Location of rainwater downpipe

Table 7

<p>Submissions of the owner</p> <p>A rainwater down pipe was not installed in accordance with the approved building consent plans to “the northwest corner” of the building.</p> <p>The owner referred to the expert’s observations about the location of the rainwater downpipe.</p> <p>The owner also submits the associated surface water drain has been “incompetently laid” and sticks out of the ground “in a large lump of concrete above ground level and is a tripping hazard”.</p>
<p>Submissions of the drainlayer</p> <p>The drainlayer completed a Producer Statement – Construction Review (PS3) on 25 June 2017. This included an as-built drainage plan, which shows the rainwater downpipe on the west side of the dwelling near to the north-west corner of the dwelling.⁷⁴</p>
<p>Plans and specifications</p> <p>The designer’s plans⁷⁵ associated with the granting and issuing of the building consent all indicate a rainwater downpipe was to be located on the north elevation extension close to the northwest corner.</p> <p>The designer’s plans⁷⁶ associated with the amendment to the building consent that was granted by the authority on 30 June 2016 also show the rainwater downpipe on the north elevation extension close to the northwest corner.</p>

⁷³ A photograph provided by the owner in October 2020 shows a solid lid, as does a photograph attached to the authority’s inspection report dated 5 July 2017.

⁷⁴ The authority’s records confirm it accepted the PS3 and as-built drainage plan on or before 13 February 2018.

⁷⁵ Plan numbers A04 revision A2, A05 revision A2, A07 revision A2.

⁷⁶ Plan numbers A04 revision A3, A05 revision A3 and A07 revision A3.

Inspection records

Final (5 July 2017)

- Spouting and downpipes fitted and connected to stormwater drainage system.

(Photographs show the position of the relocated downpipe on the west elevation of the new extension at the northwest corner of the dwelling.)

Expert's report

The expert confirmed an 80mm diameter rainwater downpipe has been installed on the west side of the ensuite extension near to the northwest corner of the dwelling.

The expert stated this "minor variation from the consented documents does not make the building non-compliant with the mandatory provisions of the [Building Code]".

The stormwater drain "which has been laid to take discharge from [the] downpipe is close to the ground surface and is protected with a layer of concrete" which "is above the ground".

Compliance with the building consent

6.61. The as-built location of the downpipe is different to that shown on the building consent plans. However, the authority's inspection records (specifically the photograph attached to the report dated 5 July 2017) suggest the variation to change the location of the rainwater downpipe was accepted by the authority. Therefore, I consider this variation forms part of the building consent against which the code compliance certificate was issued.

Compliance with the Building Code

6.62. The authority's inspection report dated 5 July 2017 did not indicate any Building Code compliance issues with the alternative location for the downpipe, and neither did the expert.

6.63. Given the lack of evidence to the contrary, I am of the view that the location of the rainwater downpipe complies with Clause E1 Surface Water.

6.64. The other issue I need to consider is the concern raised by the owner regarding a short section of the below ground surface drain (that extends from the bottom of the rainwater downpipe) that is apparently protected with concrete. The owner is of the view this creates a "tripping hazard".

6.65. Based on the as-built drainage plan provided by the drainlayer, it appears a short section of surface water drain is located under the concrete access path and associated step, that extends around the north elevation extension at ground level. The expert's report included several photographs dated 28 October 2020 that showed a small section of raised concrete that is adjacent to the concrete access path located on the edge of a grassed area. The top surface of the raised area of concrete is slightly lower than the 'step' formed in the concrete path adjacent to it.

- 6.66. The grassed area is level with the top of the raised section of concrete. Although the size of the raised area of concrete is unknown, it appears to be similar to the step formed in the concrete path adjacent to it. Therefore, I have assumed it is the raised section of concrete on the edge of the grassed area is the item for concern for the owner.
- 6.67. It would appear, based on the reference to AS/NZS 3500 in the designer’s drainage plan⁷⁷, these short sections of concrete have been installed to achieve the cover required over the pipe to prevent the likelihood of damage for the purpose of compliance with clause E1.3.3(f).⁷⁸
- 6.68. Regarding the owner’s concerns about the concrete step creating a tripping hazard, the relevant clause is D1 Access routes.⁷⁹ Clause D1.3.3 states that access routes shall ...(i) not contain isolated steps. However, the limits on application state that this clause does not apply to detached dwellings. Accordingly, the concrete ‘step’ is not in contravention of the Building Code.
- 6.69. Further, the raised section of concrete in the grassed area does not form part of the concrete path that acts as an access route around the dwelling, and it appears to be no different to the isolated step adjacent to it, which does form part of the concrete path.

Surface water drain

Table 8

Submissions of the owner

The relevant surface water drain is from the rainwater downpipes “in the centre of the north wall to the...[existing] sump on the west side of the house”.

The surface water drain that had been laid as part of the building work across the north side of dwelling “is slumping and has also not been laid correctly”. “[T]he stormwater pipe has been laid with no grade and [is] 100% full of water at all times”.

The owner referred to the designer’s plans that confirms the drainage was to be laid in accordance with AS/NZS 3500 (refer to “plans and specifications” below).

The owner also referred to a “missed drainage inspection” by the authority who “asked for photographic evidence [and] a PS3 and a statement from the person who supervised the drain laying” and failed to get the drains uncovered for inspection.

⁷⁷ SP02 revision A3.

⁷⁸ Table 6.2.5 ‘Minimum pipe cover – finished surface to top of pipe’ in AS/NZS 3500.3:2015 states that in areas not subject to vehicular loading, without a pavement, for single dwellings, the minimum cover is 100mm.

⁷⁹ Clause A2 Interpretation: **access route** a continuous route that permits people and goods to move between the apron or construction edge of the building to spaces within a building, and between spaces within a building.

Drainage specialist inspection log (commissioned by the owner)

A CCTV inspection log sheet dated 16 August 2021 stated “the [storm water drainage] line has been laid with no grade and is holding 100% [water] throughout” the length of the 100mm diameter drain. This same information was also recorded on a marked-up site drainage plan provided to the owner by the drainage specialist.

Still shots from the CCTV recording indicated varying depths of standing water in the surface water drain, the majority of which was 100% full at 1.6m, 4.5m, and 10.4m from the sump.⁸⁰

In an undated letter to the owner, the drainage specialist stated, “In regards to the north side of the house, the storm water system currently in place should have been laid higher at the down pipe end or lowered further down into the existing sump or both to create the required fall, [and is] currently not fit for purpose...”.

Submissions of the drainlayer

The drainlayer completed a Producer Statement – Construction Review (PS3) on 25 June 2017.⁸¹ This included an as-built drainage plan, which shows the surface water drain laid across the north elevation extension to the dwelling, that serves two rainwater downpipes, and connects to an existing drainage system to the west of the dwelling.⁸²

Plans and specifications

The designer’s plan SP02⁸³ indicates a new 100mm diameter surface water drain to be laid to the north of the dwelling in an east to west direction. This drain is to connect into an existing stormwater drain located to the west of the dwelling. The new surface water drain is to receive the rainwater from two new downpipes located on the north elevation extension of the dwelling. The designer’s “site drainage plan” states “all plumbing [and] drainage to comply with AS/NZS 3500”.⁸⁴

The plan states the below ground surface water drain was to be laid with a minimum fall of 1:100. The same plan also refers to compliance with AS/NZS 3500 (I have taken that to mean part 3, “Stormwater drainage”, dated 2015); table 6.3.4 requires a minimum fall of 1:120 for a 100mm diameter pipe.

The geotechnical investigation report dated 12 November 2015 (refer to table 3) that formed part of the building consent documents also required the backfill to the drains to be low permeability materials (including lime stabilisation if loess material is used).

Inspection records

Drainage, 5 July 2017: “Fail”

⁸⁰ Not the sump referred to in table 6 above. This existing sump is located several metres from the north-west corner of the new extension to the dwelling.

⁸¹ I note the PS3 did not confirm compliance with the relevant Building Code Clause E1 Surface Water. However, the “scope of work covered” by the PS3 included the “stormwater drainage systems”.

⁸² A copy of the PS3 and as-built drainage plan was sent by the builder to the authority on 16 August 2018. However, the authority’s records titled “CCC Statement of Compliance” and “Code Compliance Summary” suggests a previous copy had been received by the authority on or before 13 February 2018.

⁸³ SP02 revision A3 dated 3 February 2016.

⁸⁴ The drainage plan does not specify which part or version of *Australian/New Zealand Standard 3500* applies. Based on the date the building consent was issued, I take it to be Part 3 “*Stormwater drainage*”, 2015.

- Missed inspection by the authority. The “work is now covered or inaccessible”.
- Photographic evidence is required to prove compliance with the consented documentation.
- A PS3 is required from the person who installed, completed, or supervised the work.
- A detailed construction methodology including timelines and materials used is required.

Final, 5 July 2017: “Fail”⁸⁵

- Spouting and downpipes fitted and connected to stormwater drainage system.

Drainage, 13 July 2018: “Pass”

Final, 13 July 2018: “Fail”

- Updated as-built drainage plan to be on site for re-inspection.

Final, 10 August 2018: “Pass”⁸⁶

Expert’s report

The stormwater flows freely and discharges into the sump along the west boundary. There is no breach of clause E1 Surface Water.⁸⁷

Compliance with the building consent

- 6.70. It is not clear if the authority inspected the below ground surface water drainage. The drainage inspection record dated 5 July 2017, suggests the drainage was already covered over and inaccessible at that point in time. Regardless, there was a requirement in the schedule of inspections included in the building consent to inspect the “drainage”.
- 6.71. Further, the as-built documentation provided did not confirm whether the backfill was stabilised with the low permeability material specified. As such the authority had no information to confirm that the correct stabilised backfill had been used.
- 6.72. Despite the observations made by the expert in October 2020, subsequent investigations by a drainage specialist commissioned by the owner in August 2021, has established the surface water drain is holding varying depths of standing water in the surface water drain, the majority of which was 100% full.
- 6.73. Taking into consideration the drainage specialist’s inspection log and camera survey results from August 2021, I am of the view the surface water drain close to the

⁸⁵ Although the overall outcome from the inspection was “fail” it did not appear the reported failure was related to the stormwater drainage system installed.

⁸⁶ If an updated drainage plan was presented to the authority by the drainlayer and/or the builder on or before 10 August 2018, I have not seen a copy. Regardless, a copy of the PS3 from the drainlayer and as-built drainage plan was provided to the authority, by the builder, on 16 August 2018.

⁸⁷ I note the surface water drain was covered over at the time of the expert’s observations, and the expert did not undertake a camera survey of the surface water drain concerned.

north of the new extension does not have the minimum fall specified building consent.

Compliance with the Building Code

6.74. Building Code clause E1.3.3 states that:

Drainage systems for the disposal of surface water shall be constructed to:

(a) Convey surface water to an appropriate outfall using gravity flow where possible,

(b) Avoid the likelihood of blockages,

...

6.75. In this case, the authority appears to have relied on a Producer Statement – Construction (PS3) dated 25 June 2017 and an as-built drainage plan provided by the drainlayer. These were accepted by the authority on 13 February 2018. The PS3 included reference to “stormwater drainage systems” but it did not indicate the means of compliance.

6.76. However, there is evidence that the below ground surface water drain does not have an adequate fall and is holding water. Therefore, the drainage system does not convey surface water using gravity flow and does not avoid the likelihood of blockages, which would result in a need to clear the drains at frequency beyond that considered ‘normal maintenance’.⁸⁸

6.77. It is not clear whether the items of non-compliance with the building consent or the Building Code are because of the drainage not being laid correctly when it was first installed, or as a direct result of the backfill not being stabilised with low permeability material, or a combination of both. Regardless, the non-compliance with clause E1 is evident.

6.78. Based on the evidence in this case, the building work to install the surface water drain close to the north elevation extension does not comply with clause E1.

7. Conclusion

7.1. The following building work has not been constructed in accordance with building consent BCN/2015/12622:

7.1.1. The subsurface drainage coil to the west side of the ensuite extension foundation wall.

7.1.2. The foul water drainage.

⁸⁸ Clause B2.3.1 requires building elements must, with only normal maintenance, continue to satisfy the performance requirements of the Building Code for the periods specified.

- 7.1.3. The surface water drainage.
- 7.2. The following building work was the subject of variations accepted by the authority during the project and form part of the building consent for which the code compliance certificate was issued:
 - 7.2.1. The construction of the step at the lower ground level of the ensuite extension
 - 7.2.2. The means of fixing of the floor joists to the lower ground level walls along the north extension and ensuite extension.
 - 7.2.3. The construction of the foundation wall to the bathroom extension using in situ reinforced concrete.
 - 7.2.4. The installation of an additional surface water sump close to the south-west corner of the dwelling.
 - 7.2.5. The location of the rainwater downpipe near to the north-west corner of the dwelling, on the west elevation.
- 7.3. I am satisfied the following building work complies with the Building Code (the relevant clause in brackets):
 - 7.3.1. The floor joists fixed to the lower ground level walls (B1).
 - 7.3.2. The foundation wall to the bathroom extension (B1).
 - 7.3.3. The location of the rainwater downpipe to the northwest corner of the new extension to the west elevation of the dwelling (E1).
- 7.4. I am of the view the following elements of the building work do not comply with the Building Code:
 - 7.4.1. The new foul water drainage (G13).
 - 7.4.2. The new surface water sump located close to the south-west corner of the dwelling (E1).
 - 7.4.3. The new surface water drainage laid close to the north elevation extension (E1).
- 7.5. Insufficient information has been provided to establish:
 - 7.5.1. If the ingress of external moisture (E2), possibly as a result of the construction of the step in the lower ground level under the ensuite extension, has been at a level or in quantities that has, or will, result in detrimental effects on the building elements or the building occupants. Consequently, I am also unable to form a view on whether the structural

integrity or durability of the relevant building elements has or will be affected for the intended life of the building.

- 7.5.2. If the omission of the subsurface drainage coil along the west side of the ensuite extension foundation wall has or will contribute to the possible ingress of external moisture into the lower ground floor level (E2).
- 7.6. In determining the authority's decision to issue a code compliance certificate, the relevant test is section 94. Under subsection (1)(a), there must be reasonable grounds to be satisfied that the building work complies with the building consent.
- 7.7. Variations in the as-built work and the authority's decision to accept or approve those variations are a relevant consideration for deciding to issue a code compliance certificate. However, because I have concluded that some aspects of the building work do not comply with the approved variation and do not comply with the Building Code, I am electing to reverse the code compliance certificate without taking the additional step of considering whether each variation met the requirements of either section 45(4)(a) or (b) of the Act.

8. Decision

- 8.1. In accordance with section 188 of the Building Act 2004, I determine particular elements of the building work, as identified in this determination:
- 8.1.1. have not been constructed in accordance with building consent BCN/2015/12622
- 8.1.2. do not comply with the Building Code, and
- 8.1.3. accordingly, I reverse the authority's decision to issue the code compliance certificate.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 26 May 2023.

Peta Hird

Principal Advisor Determinations

APPENDIX A

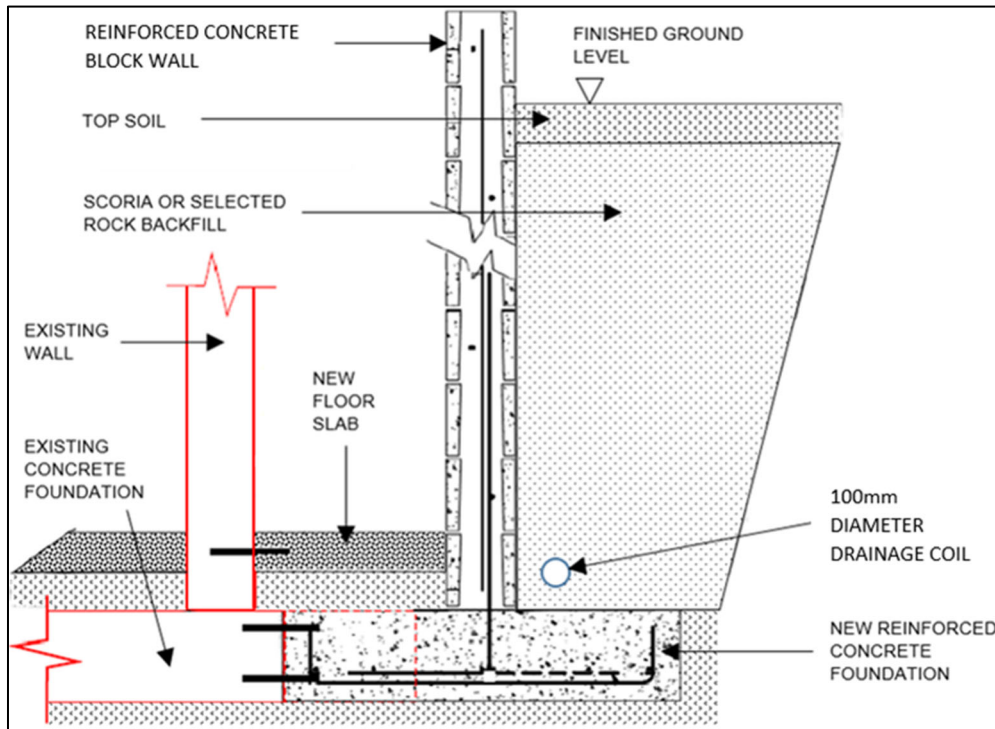


Figure 4: Extract from plan “Block Wall Design” S-01 (not to scale)

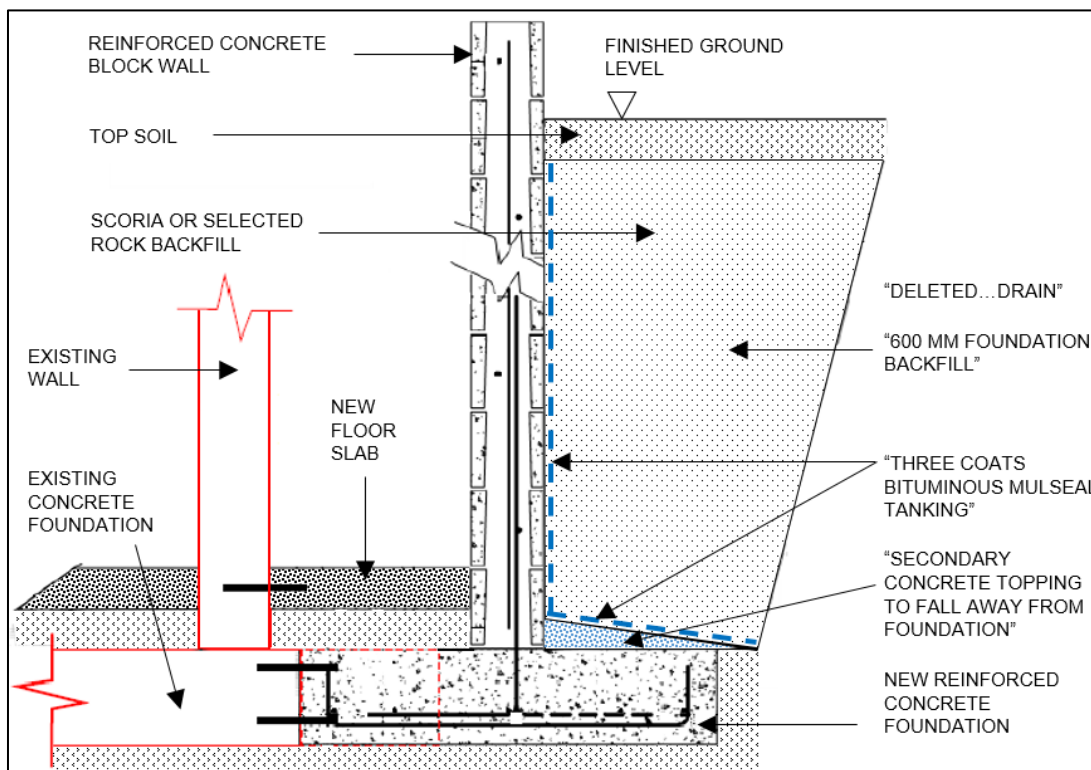


Figure 5: “As built” plan (not to scale)