Determination 2016/052

Regarding the compliance of a relief drain from the safety valve to a hot water cylinder in a three-year-old house at 890 Levels Store Road, Timaru

Summary

This determination considers the compliance of a PVC foul water drainage system to a house where the temperature and pressure relief valve from a storage water heater discharge directly into the foul water system. The storage water heater is connected to a solid fuel wetback and a solar water heater as uncontrolled heating sources.

1. The matter to be determined

1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004[1] ("the Act") made under due authorisation by me, John Gardiner, Manager Determinations and Assurance, Ministry of Business, Innovation and Employment ("the Ministry"), for and on behalf of the Chief Executive of the Ministry.

1.2 The parties to the determination are:

- the owner of the house, P Dickson, who applied for the determination ("the applicant")
- Timaru District Council ("the authority"), carrying out its duties as a territorial authority or building consent authority.

1.3 The plumber who carried out the work ("the first plumber") is included as a person with an interest in the determination.

1.4 The authority issued a building consent in 2011 and a code compliance certificate in 2013 for the house. This determination arises because the applicant claims the authority failed to ensure the building work complied with certain clauses[2] of the Building Code (Schedule 1, Building Regulations 1992). The applicant's concerns relate to the failure of the PVC drainage system into which the temperature and pressure relief ("TPR)") valve from the storage water heater[3] ("SWH") was discharging.

[1] The Building Act, Building Code, compliance documents, past determinations and guidance documents issued by the Ministry are all available at www.building.govt.nz or by contacting the Ministry on 0800 242 243.
[2] In this determination, unless otherwise stated, references to sections are to sections of the Act and references to clauses are to clauses of the Building Code.
[3] The term "storage water heater " is a defined term used in the Acceptable Solutions and Verification Method for Clause G12 Water Supplies

1.5 The matter to be determined[4] is the authority's exercise of its powers of decision in issuing the building consent and the code compliance certificate for the house. In deciding this matter, I must consider whether the information available at the time the building consent was approved was adequate to establish, on reasonable grounds, that the drainage system would comply with Clauses B2 Durability, and G13 Foul Water of the Building Code if constructed in accordance with the plans and specifications. I must also consider whether the drainage system complied with the Building Code that was current at the time the code compliance certificate was issued.

1.6 This determination is limited to the compliance of the drainage system as described herein. It does not consider any other matters of compliance, other building elements, or any matters associated with contractual relationships between the parties.

1.7 In making my decision, I have considered:

- the submissions of the parties
- the reports commissioned by the applicant from:
  - the second plumbing company ("the second plumber")
  - the third plumbing company ("the third plumber")
- the report from the PVC pipe manufacturer (" the drain manufacturer") commissioned by the first plumber
- the other evidence in this matter.

2. The building work and background

2.1 The building work consists of the SWH installed during the construction of a single-storey detached house. Drains from sanitary fixtures run in 65mm and 100mm PVC[5] pipes that drain into a 100mm PVC foul water drain installed under the concrete floor slab as shown schematically in Figure 1.

2.2 The storage water heater

2.2.1 The SWH is connected to a solar and wetback system as uncontrolled heat sources. The SWH is valve-vented and fitted with a temperature and pressure relief valve ("TPR valve") and cold-water expansion valve. The TPR valve is a safety device (one of several) that automatically releases hot water from the SWH in the event that pressure or temperature in the SWH exceeds safe levels.

2.2.2 As originally built under the consent, the TPR and cold-water expansion valves, plus a drain from a safe tray under the SWH, run to a trapped tundish. The approved consent shows a 65mm drain running a short distance from the SWH to the 100mm PVC foul water drain – it is the use of the 65mm pipe from the tundish that has given rise to this determination.

[4] Under sections 177(1)(a), 177(2)(a) and 177(2)(d) of the Act
[5] Unplasticised Polyvinyl Chloride (PVC-U) used for pipe installations and suitable for below ground installations.

2.3 The consent documentation

2.3.1 The applicant applied for building consent in March 2011. The foundation and drainage plan called for a 20mm diameter copper relief drain to discharge into the under-slab PVC drain. The plan, 03-B dated 23 May 2011, notes "Foul Water Drainage in compliance with AS/NZS 3500".

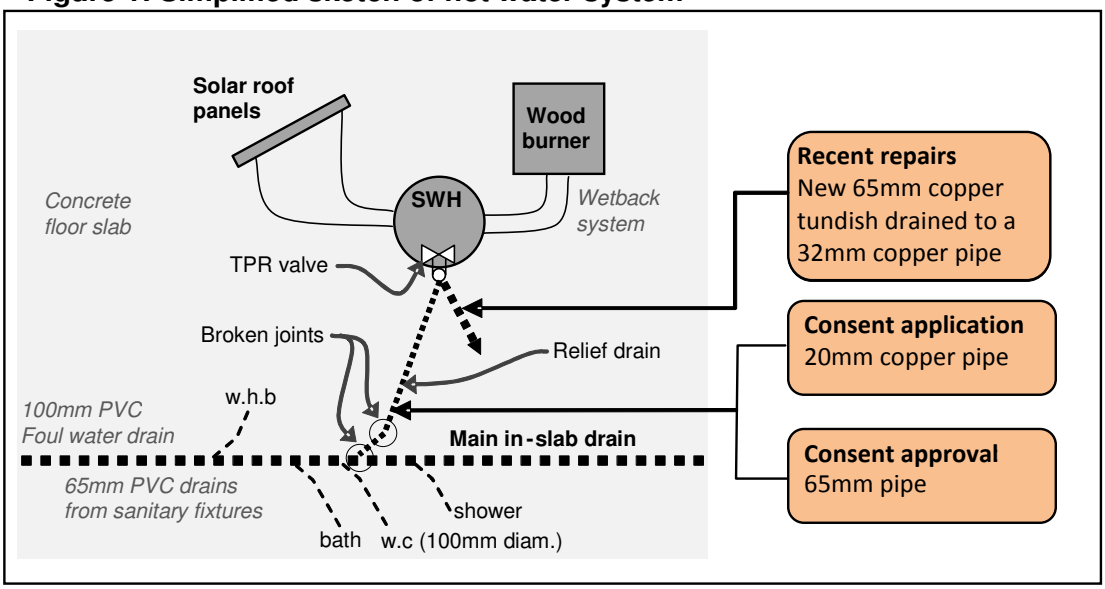
2.3.2 In a letter to the applicant dated 11 July 2011, the authority requested various amendments to the proposed drainage, including:

> Cylinder drain as shown is non compliant. All drains under slab min of 65mm – cylinder drain may discharge over a trapped tundish above floor.

2.3.3 The drainage plan (03-C) drawing was amended on 18 July 2011 to show a TPR drain of 65mm diameter – the material for the pipe was not specified, but the reference to copper was removed and the notation to this pipe is identical to those used for the remaining PVC foul water drains from the sanitary fixtures.

2.3.4 The authority approved the revised drawing as compliant with AS/NZS 3500.2[6] and subsequently issued building consent No. 71021 for construction of the house. I have not seen a copy of the building consent.

Figure 1: Simplified sketch of hot water system



2.3.5 The first plumber completed under slab drainage in December 2012 and the authority approved a pre-pour inspection on 14 December 2012 that included a test of drain joints prior to back filling the trenches.

2.3.6 Pipework from the SWH to the wetback and solar heating systems was completed by April 2013, with the hot water system connected in June 2013. The authority subsequently completed final inspections and issued a code compliance certificate for the house. I have not seen a copy of the code compliance certificate.

2.4 The drainage failure

2.4.1 In June 2014, the first plumber returned to 'reset' the TPR valve due to 'the wet back boiling over'. Problems with the drainage system within the concrete slab became apparent by October 2015, with the plumber called out to clear drain blockages. On

[6] AS/NZS 3500 Plumbing and drainage, Part 2: 2003 Sanitary plumbing and drainage

the second occasion, camera inspection of the drainage pipework identified that a break at the bath to main junction was allowing shingle to enter the drain.

2.4.2 The applicant engaged a second plumbing company ("the second plumber"), who investigated the problem and reported to the applicant in a letter dated 29 October 2015. The second plumber located the problem area with a camera and opened up the bathroom floor to expose the failed junction. The second plumber noted that 'the 100mm junction servicing the bathroom area had sheared off at the socket' and gave two options for the failure (incorrect pipe bedding, or the pipe being laid under stress).

2.4.3 The applicant met on-site with the authority and the first plumber on 6 November 2015. The plumber considered that for the joint to break 'it would need to be under some real stress'.

2.4.4 On 13 November 2015, the first plumber again camera-inspected the drain and discovered 'another break at the bend from the hot water drain to the main drain.' The plumber opened the floor slab to repair the break on 16 November, with the authority in attendance. The break at the 45^{o} bend in the hot water drain was repaired.

2.4.5 At the authority's request, the first plumber forwarded the failed joint to the pipe manufacturers to be examined. The laboratory report dated 25 November 2015 noted the following (in summary):

- The fitting had failed at the junction with the pipe socket, and had completely sheared.
- The cross section at the point of fracture was deformed.
- The PVC thickness was measured at 3.15mm at the point of failure, which exceeded the minimum standard[7] of 3mm.

2.4.6 The applicant's insurance company had requested a second opinion on the pipe failure and a third plumbing company ("the third plumber") was engaged to carry out an independent inspection. The third plumber investigated the hot water system and examined photographs of the failed joint and included the following comments (in summary):

- The mains pressure cylinder has wetback and solar heating.
- It is difficult to control cylinder temperatures and it appears that some valving was replaced[8]. Excessive amounts of hot water would have caused the PVC pipe to expand and contract until the joint failed.
- The failed junction is less than 2m from the hot water cylinder – the joint has separated but has not sheared.

2.4.7 The third plumber stated that:

> we believe the pipe and fittings have failed because of excessive heat for which the [drain] pipe is not designed to cope with.
>
> A copper waste pipe could be installed as a safety measure to dispel heat should the cylinder exceed the valving temperature specification.

[7] AS/NZS1260:2009 PVC-U pipes and fittings for drain, waste and vent application
[8] The expansion valve on top of the solar panels was apparently replaced in August 2015

2.4.8 In a letter to the applicant dated 16 December 2015, the authority referred to an inspection carried out on 14 December 2012, noting that the inspected building work as in accordance with the building consent. The authority noted the failed pipework was close to the SWH, and that in the opinion of the officer of the authority the PVC pipe failed due to excessive amounts of hot water.

2.4.9 In a letter to the applicant dated 22 January 2016, the first plumber confirmed 'adjusting' the TPR valve in June 2014 when the wet back was 'boiling over'. The plumber stated:

> [the hot water cylinder] has wetback and solar coils which are two uncontrollable heat sources. The [TPR] valve was repaired which appears to have settled to discharge occurrences. … It is our opinion that the valve would have been a contributing factor for the expansion and contraction of the pipe that failed.

2.5 The repair work

2.5.1 The applicant engaged the third plumber to replace the drain from the SWH with a new 65mm copper tundish that drained into a new 32mm copper relief pipe extending under the concrete slab directly to the building exterior.

2.5.2 In a letter to the authority dated 26 May 2016, the applicant described the situation and the repairs. In regard to the authority granting the building consent, the applicant noted (in summary):

- the original application plan called for a 20mm copper pipe connecting to the foul water drain under the slab to take the flow from the TPR valve which the designer considered necessary to provide for uncontrolled hot water release from the solar and wetback systems
- because the authority considered the above was not compliant, the pipe was changed and the 65mm PVC pipe was installed.

2.5.3 The authority responded in a letter to the applicant dated 14 June 2016, noting (in summary):

- The designer had originally called for a 20mm copper pipe to connect to the under slab drainage; paragraph 6.7.2 of G12/AS1 required the 'continuous to the exterior of the dwelling'[9]
- The designer changed the drain to 65mm PVC, which was approved by the authority as it was considered 'compliant to AS/NZS3500.2'[10].
- The under slab installation of the drainage pipework was also approved during construction as compliant.
- Recent guidance provided from BRANZ[11] and the Ministry (refer Appendix A.4) give recommendations and indicate that 'the same problem has national significance.'

2.5.4 The Ministry received an application for a determination on 24 June 2016. The Ministry sought further clarification and information from the parties, which was received on 2 August 2016.

[9] G12/AS1 paragraph 6.7.2 d) calls for the relief valve drain to be a copper pipe and to 'discharge in a visible position'
[10] According to AS/NZS3500.2, drains installed in or under a floor slab are to have a minimum diameter of 65mm.
[11] *Ensuring hot water pipes are up to standard in a building* (BRANZ) Retrieved from http://www.level.org.nz/water/water-supply/hot-water-supply/hot-water-pipes/

3. The submissions and the draft determination

3.1 The initial submissions

3.1.1 The applicant provided copies of:

- the original drainage plan submitted in March 2011
- the revised drainage plan approved for the building consent
- the first plumber's as installed drainage plan
- the second plumber's report dated 29 October 2015
- the third plumber's report dated 9 December 2015
- correspondence with the authority
- various photographs associated with the repair work
- various other excerpts from G12/AS1, guidance and other information.

3.1.2 The authority's submission dated 24 June 2016 set out its view on the matter to be determined. The authority explained that the cause of the failure was not known until the third plumber's report suggested that 'the drains had been subjected to excessive temperatures'. The authority noted that it had initially been satisfied 'when processing and inspecting the works' that the drains were compliant. It felt the failure of the PVC pipe was due to a TPR valve failure. Notwithstanding this view, the authority noted it had published local guidance 'to ensure future drainage material used in the district is of copper and extends to the exterior of the building.'

3.1.3 The first plumber's submission on 10 July 2016 took the form of a 'record of events', which set out the background to the situation. The plumber described the work carried out to resolve problems in October and November 2015. (I have incorporated the first plumber's record into the background in this determination.)

3.1.4 The first plumber provided copies of:

- the report from the pipe manufacturer dated 25 November 2015
- the letter to the applicant dated 23 June 2016.

3.2 The draft determination and submissions in response

3.2.1 A draft determination was issued to the parties and the first plumber for comment on 17 September 2016. The draft concluded that the drainage system as originally consented and installed did not comply with Clause G13 of the Building Code.

3.2.2 The applicant initially responded on 21 September 2016, and submitting (in summary):

- The designer did not change the relief drain from 20mm copper to 65mm PVC, but rather changed the relief drain 'from 20[mm] copper to 65[mm] as requested by [the authority]'.
- It was left for the first plumber to use best practice for the installation.

3.2.3 In a response received on 30 September 2016, the authority did not accept the draft determination, expressing its view that the determination would have a significant impact on the industry, and submitting (in summary):

- AS/NZS 3500.2: 2003 does not mention water temperature.
- The authority did not receive a copy of the guidance published by the Ministry.
- The drainage as originally designed 'was incorrect under AS/NZS 3500.2' and was rectified.
- The designer was aware of the uncontrolled heat sources to the cylinder and should have been aware that if the thermostat failed on the cylinder there would be uncontrolled water temperature discharging into the drain – the designer should not expect the authority to be a quality assurance advisor.

3.2.4 The applicant sent a further submission on 3 October 2016, noting that the original plans specified a 20mm copper pipe which accorded with the Acceptable Solution; the amended plans did not refer to PVC or copper; and the first plumber installed the PVC relief drain with the knowledge of the wetback and solar installations.

3.2.5 The first plumber made no submission in response to the draft determination.

4. Discussion

4.1 General

4.1.1 The clauses of the Building Code that are relevant to the delivery of water supplies and drainage are: Clause G12 – Water supplies for the provision of a safe hot water system; Clause G13 – Foul water for the conveyance of foul water to a drainage system; and Clause B2 – Durability for the respective building elements.

4.1.2 Clause G12.3.8 requires vessels that produce or store hot water be provided with safety features that 'a) relieve excessive pressure; and b) limit temperatures to avoid the likelihood of flash steam production in the event of rupture.

4.1.3 This hot water system includes solar and wet back heating, which provide heat sources that cannot be controlled by an energy cut-out device. Therefore, a TPR valve is used to relieve excess pressures and ensure that the valve-vented SWH operates safely to prevent rupture.

4.1.4 Clause G13 requires the safe disposal of foul water from sanitary fixtures to prevent illness and the loss of amenity and sets out requirements for adequate plumbing and drainage to safeguard people from infection or contamination of the water supply.

4.1.5 The relevant provision of Clause G13 is:

> **G13.3.2**
>
> The drainage system shall:
>
> (a) convey foul water to an appropriate outfall,
>
> (b) be constructed to avoid the likelihood of blockage,
>
> (f) be constructed to avoid the likelihood of damage from superimposed loads or normal ground movement.

4.1.6 Clause B2.3.1 requires building elements, with only normal maintenance, to continue to satisfy the performance requirements of the Building Code for a specified minimum time period, refer Appendix A.1.

4.2 The Acceptable Solutions

4.2.1 The Acceptable Solution G12/AS1 sets out the requirements for pipes from the TPR valve as follows:

> **6.7 Relief valve drains**
>
> 6.7.2 Relief valve drains shall:
>
> a) Be of copper pipe,
>
> b) Have no restrictions or valves,
>
> c) Have a continuous fall from the relief valve to the outlet,
>
> d) Discharge in a visible position which does not present a hazard or damage to other building elements (except when used in association with free outlet storage water heaters),
>
> e) Have a minimum diameter of the same size as the valve outlet.

4.2.2 The drainage plan notes 'Foul Water Drainage in compliance with AS/NZS 3500'. AS/NZS 3500.2, with some modification, is cited as a means of compliance for Acceptable Solution G13/AS3 Plumbing and drainage. AS/NZS 3500.2 states that foul water drains are to have a minimum diameter of 65mm. It was this requirement that lead to the authority seeking a 65mm diameter foul water drain instead of the 20mm drain shown on the original drainage plan.

4.2.3 It is noted that the TPR valve drain as consented and as installed was run to a trapped drain located above the slab and not to a floor waste gulley: this is an alternative solution to that cited in G13/AS, but one that would have been considered a compliant solution, apart from the materials used.

4.2.4 While the discharge from a TPR valve (and a cold water expansion valve) is not foul water, if a TPR valve is to discharge to a foul water drain then it is required not to damage that system. AS/NZS 3500.2 (and AS/NZS 3500.5[12]) both provide for drain lines from a TPR valve to charge the trap of a floor waste gulley (refer Appendix A.3).

4.2.5 Section 2 of AS/NZS 3500.2 requires the selection and use of materials be fit for their intended purpose, and states:

> Factors to be taken into account in the selection shall include, but not be limited to, the following:
>
> (a) The type of usage likely to occur and the nature of the wastewater and the other matter to be conveyed.
>
> ...
>
> (e) The range of temperatures from the discharge that the sanitary plumbing and drainage system will be exposed to.

4.2.6 I consider the minimum durability period for the foul water drain is 50 years as this element is difficult to access and replace. I also note paragraph 5.8 of Acceptable Solution G13/AS2 has the following comment with respect to the durability of drains installed under buildings:

> **Comment**:
> Drains located under buildings must meet the Durability Performance requirement of B2.3.1 (a), that is the life of the building being not less than 50 years

4.2.7 I consider the minimum durability period for the TPR valve and a visible relief drain is 5 years, as both elements are easy to access and replace, and failure is easily detected during normal use of the building.

[12] AS/NZS 3500 Plumbing and drainage, Part 5: 2000 Domestic installations - current at the time the consent was issued

4.3 The available guidance

4.3.1 Prior to the consent being lodged with the authority, warnings of the dangers of overheating within drain lines from TPR valves and the need to use appropriate pipe materials had been issued by the Ministry and some SWH manufacturers.

4.3.2 In April 2010, the Ministry issued guidance[13] regarding TPR valve relief drains which explained the function of relief valves, referred to requirements included in the compliance documents for drain lines from TPR valves to be copper, and noted:

> The [Ministry] has received several enquiries about drain lines from pressure relief and temperature and pressure relief valves discharging to a PVC-U plumbing and drainage system. In some cases, the PVC-U pipes and stacks have melted causing a failure of the plumbing system and extensive damage.
>
> It appears that this is due in part to the increasing use of solar water heating, and other heat sources that cannot be controlled by an energy cut-out device, requiring relief valves to discharge to prevent hot water cylinder explosions.
>
> Relief valves are designed to reset after discharging and can discharge again and again until the heat source is reduced or a fault, such as replacing a failed thermostat, is fixed.
>
> …
>
> Acceptable Solution G12/AS1, and Standards AS/NZS 3500.4:2003 (cited in G12/VM1) and NZS 4067:1998 all require:
>
> - the drain line form the relieve valve to be copper
> - discharge to an appropriate place that does not cause damage to the building.
>
> AS/NZS 3500.2 (cited in G13/AS3) says the range of temperatures likely to discharge to the plumbing and drainage system must be taken into account when selecting materials for use in the plumbing system. Therefore, if the drain line discharges over a tundish into the plumbing system, the plumbing system has to be constructed of a material that will take the high temperature discharge from relief valves.
>
> Failure to comply with these simple requirements could cause the PVC-U plumbing system to melt when a relief valve discharges, resulting in a failure of the plumbing system.

4.3.3 I also note that in October 2010 installation instructions for a commonly used brand of SWH included the following:

> **Warning**: As the function of the temperature pressure relief valve on the water heater is to discharge high temperature water under certain conditions, it is strongly recommended the pipe work downstream of the relief valve be capable of carrying water exceeding 93°C. Failure to observe this precaution may result in damage to pipework and property.

4.4 The compliance of the system as consented and installed

4.4.1 The drainage drawing submitted with the consent application in March 2011 showed a 20mm diameter copper drain line from the TPR valve located under the concrete slab discharging directly into the 100mm diameter foul water drain. The 20mm diameter copper pipe is therefore considered part of the foul water drainage system: AS/NZS 3500.2 requires any foul water drain to be a minimum diameter of 65mm.

---

[13] *Drains from hot water cylinder relief valves, Guidance for plumbers, plumbing designers and building consent authorities,* (April 2010) Department of Building and Housing: Codewords 41.

The 20mm diameter pipe therefore did not satisfy the means of compliance stated in the consent documents, being AS/NZS 3500.2.

4.4.2 I note that the 20mm copper TPR valve drain could have been run to the overflow relief gully trap located outside the building, or via a wastewater pipe (minimum diameter 40mm) to discharge into a floor waste gully inside the building: both scenarios would have required an assessment to be made of the pipe materials used to receive the discharge from the TPR valve.

4.4.3 In July 2011, the drainage plan was revised, at the authority's request, to provide a 65mm diameter foul water drain within the concrete slab, which satisfied AS/NZS3500.2 with respect to the minimum diameter. The revised drainage plan no longer specified copper as the material to be used for the relief drain, though it is reasonable to interpret the plan as calling for PVC given the notation and line style used is identical to the other PVC foul water drains noted on the plan.

4.4.4 The original design proposal[14], using a copper pipe, was in accordance with G12/AS1 in respect of the material used, however, the means of discharge into the foul water drainage system was not in accordance with paragraph 6.7.2(d) of G12/AS1, or AS/NZS 3500.2.

4.4.5 Given the design and installation of the hot water system, the discharge of high temperature water from the TPR valve into the PVC foul water drain was a very likely occurrence. I am satisfied that the effects of the high temperature water discharging from the SWH via the TPR valve into the PVC drainage system was not taken into account in the design, approval, and installation of the hot water system in this house.

4.4.6 The revised drainage plan did not address, and the authority did not request, information regarding potential damage to the foul water drains from the likely impact of high water temperatures from the heating sources to be connected to the SWH.

4.4.7 Under Clause B2.3.1(a) the foul water drain is required to meet the requirements of Clause G13 for a minimum of 50 years; the drain failed after about three years. It cannot be said to have satisfied the requirements of the Building Code with respect to Clauses B2.3.1(a) and G13.

4.4.8 I am therefore satisfied that the SWH TPR valve drain, as consented and as originally installed, did not comply with Clauses B2.3.1(a) and G13 of the Building Code.

4.5 The building consent

4.5.1 The party's submissions have included issues of liability and insurance claims; I note that these issues are outside the matter for determination. However, the applicant has sought a determination on the authority's exercise of its powers of decision in issuing the building consent.

4.5.2 Under Section 49(1) of the Act the authority must grant a building consent:

> ... if it is satisfied on reasonable grounds that the provisions of the building code would be met if the building work were properly completed in accordance with the plans and specifications that accompanied the application.

[14] I have not seen a fully copy of the consent documents and my comments are based on the copies of plans only provided by the applicant.

4.5.3 I have concluded that the authority did not have reasonable grounds to be satisfied that the proposed drainage system would comply with the Building Code and therefore did not correctly exercise its powers of decision in issuing the building consent.

4.5.4 Under section 94(1)(a) of the Act, an authority can only issue a code compliance certificate if it is satisfied, on reasonable grounds, that the building work complies with the building consent. Although the drainage system complied with the building consent, I have concluded that the building consent was not correctly issued because the work did not satisfy the Building Code, and accordingly I am of the view the code compliance certificate should not have been issued.

4.5.5 In a previous determination[15] I have considered the reversal of a building consent where the consent was relied upon, noting that there must be compelling reasons for me to reverse the building consent. In this case, the remedial work has addressed the building element that did not comply with the Building Code and I am satisfied that the drainage system is now in compliance with the Building Code. Although the authority incorrectly exercised its powers in making its decisions to issue the building consent and the code compliance certificate, there are no compelling reasons to reverse the authority's decisions.

5. The decision

5.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the drainage system as proposed in the application for building consent and as installed did not comply with Building Code Clauses B2 Durability, and G13 Foul water, and therefore the authority incorrectly exercised its powers in making its decisions to issue the building consent and the code compliance certificate.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 1 November 2016.

John Gardiner
Manager Determinations and Assurance

[15] *Determination 2011/119: The issue of building consents and code compliance certificates for three buildings on land that has subsided,* Department of Building and Housing (23 December 2011)

Appendix A

A.1 Relevant clauses of the Building Code referred to in this determination

Clause B2.3.1

Building elements must, with only normal maintenance, continue to satisfy the performance requirements of this code for the lesser of the specified intended life of the building, if stated, or:

(a) the life of the building, being not less than 50 years, if:

(i) those building elements (including floors, walls, and fixings) provide structural stability to the building, or

(ii) those building elements are difficult to access or replace, or

(iii) failure of those building elements to comply with the building code would go undetected during both normal use and maintenance of the building.

(b) 15 years if…:

(c) 5 years if:

(i) the building elements (including services, linings, renewable protective coatings, and fixtures) are easy to access and replace, and

(ii) failure of those building elements to comply with the building code would be easily detected during normal use of the building.

A.2 Relevant paragraphs from Acceptable Solutions referred to in this determination that were current at the time the consent was granted

Acceptable Solution G12/AS1 Water Supplies (third edition, amendment 7)

6.7 Relief valve drains

6.7.1 Relief valve drains … shall be fitted to:

a) Temperature/pressure relief valves,

b) Pressure relief valves, and

c) Expansion control valves

6.7.2 Relief valve drains shall:

a) Be of copper pipe,

…

d) Discharge in a visible position which does not present a hazard or damage to other building elements (except when used in association with free outlet storage water heaters),

Acceptable Solution G12/AS2 Water Supplies (third edition, amendment 7)

5.0 Installation of Solar Water Heaters

5.0.1 Solar water heaters must be installed in accordance with the requirements of AS/NZS 3500 Part 4: 2003, unless modified by this Acceptable Solution.

5.0.2 Water storage tanks that form part of a solar water heater must have drain pipes that:

a) have an easily reached isolating valve, and terminate with a cap or plug to empty the vessel for maintenance, or

b) terminate outside the building with a cap only.

6.0 Hot water supply system

6.11.3 Storage water heaters shall have:

…

b) Connections compatible with the pipe material used, and

c) Drain pipes (for every storage water heater of more than 45 litres capacity) which:

i) have a conveniently located isolating valve, and terminate with a cap or plug suitably located to easily empty the vessel for maintenance, or

ii) terminate outside the building with a cap only.

Acceptable Solution G13/AS1 Foul water sanitary plumbing (second edition, amendment 3)

3.4.6 Charging floor wastes

The water seal of a trapped floor waste discharging directly to the foul water plumbing system shall be maintained by (see Figure 4):

a) A charge pipe of not less than 32 mm diameter from a tap or a drain from a hot or cold water relief valve, which shall drain over a tundish so that the air gap is maintained,

…

A.3 Relevant sections of the Australian/New Zealand Standards current at the time the building consent was granted

AS/NZS 3500.2:2003

Section 2 Materials and Products

2.3 Selection and use of materials and products

Materials and products used in sanitary plumbing and drainage shall be selected to ensure they are fit for their intended purpose.

The pipes and fittings shall be selected from those listed in Appendix C, unless otherwise approved by the authority having jurisdiction.

Factors to be taken into account in the selection shall include, but not be limited to, the following:

(b) The type of usage likely to occur and the nature of the wastewater and the other matter to be conveyed.

...

(e) The range of temperatures from the discharge that the sanitary plumbing and drainage system will be exposed to.

4.6.7 Floor waste gullies

4.6.7.8 Discharges from tundishes

… tundishes receiving discharges from water heater drains,… and the like, may discharge to a floor waste gully. …

4.6.8 Charging floor waste gullies

4.6.8.1 General

Where a floor waste gully is located in a position that cannot receive a waste discharge, the water seal shall be maintained by one of the following means:

…

(c) A charge pipe from a tap set or a drain from a hot water relief valve, which shall drain over a tundish so that the air gap is maintained …

4.6.8.2 Installation

The charge pipe shall be in the size range of DN 6 to DN15.

Section 11 Fixtures and appliances

11.21 Connection of tundishes

Tundishes may be connected-

(a) to a wastepipe not smaller than DN 25 in accordance with clause 4.6.7.8;

(b) to a trapped wastepipe not smaller than DN 40 in accordance with Appendix D; or

(c) to a fixture trap.

…

A.4 Guidance published by the Ministry

Drains for hot water cylinder relief valves

Guidance about the function of pressure relief valves in plumbing and drainage systems, including discussion of the requirements in Acceptable Solution G12/AS1.

Published 1 April 2010

What do the Acceptable Solutions and Verification Methods say?

Acceptable Solution G12/AS1, and Standards AS/NZS 3500.4: 2003 (cited in G12/VM1) and NZS 4607: 1989, all require:

- the drain line from the relief valve to be in copper
- discharge to an appropriate place that does not cause damage to the building.

AS/NZS 3500.2 (cited in G13/AS3) says the range of temperatures likely to discharge to the plumbing and drainage system must be taken into account when selecting materials for use in the plumbing system. Therefore, if the drain line discharges over a tundish into the plumbing system, the plumbing system has to be constructed of a material that will take the high temperature discharge from relief valves.

Failure to comply with these simple requirements could cause the PVC-U plumbing system to melt when a relief valve discharges, resulting in a failure of the plumbing system.