



Determination 2020/009

Regarding the compliance of a washing machine and an instantaneous water heater with the Building Code at 82 Rainbow Falls Road, Kerikeri

Summary

This determination considers the compliance of a washing machine with Clause G13 Foul water of the Building Code. The determination also considers the compliance of an instantaneous water heater without a safe tray with Clauses E3 Internal water and G12 Water supplies.

1. The matter to be determined

- 1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004 (“the Act”) made under due authorisation by me, Katie Gordon, Manager 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:
 - the owners of the building, D and J Cottle (“the applicants”) represented by an agent (“the agent”)
 - Far North District Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.
- 1.3 This determination arises from the purported decision of the authority to refuse to issue a code compliance certificate for a newly constructed house. The refusal arose because the authority is not satisfied that the installation of the drainage connection to the washing machine and lack of a safe tray under the instantaneous water heater complies with the Building Code (First Schedule, Building Regulations 1992).
- 1.4 The matter to be determined² is therefore whether installation of the washing machine complies with Clause G13.3.1 Foul water³ and the instantaneous water heater complies with Clause E3.3.2 Internal moisture and Clause G12.3.7 Water supplies. In deciding this matter, I must consider the waste water connection for the washing machine and the safe tray requirements for the instantaneous water heater.
- 1.5 In making my decision, I have considered the submissions of the parties, and the other evidence in this matter.

¹ The Building Act and Building Code are available at www.legislation.govt.nz. The Building Code is contained in Schedule 1 of the Building Regulations 1992. Information about the Building Act and Building Code is available at www.building.govt.nz, as well as past determinations, compliance documents and guidance issued by the Ministry.

² Under sections 177(1)(a) of the current Act.

³ In this determination, references to sections are to sections of the Act and references to clauses are to clauses of the Building Code.

2. The background and building work

- 2.1 The authority issued building consent (BC-2017-699/0) for a single-storey detached house on 3 February 2017. The house comprises: kitchen, dining and living areas; a master bedroom (with walk-in wardrobe and ensuite); a second bedroom, a bathroom and a single garage. The house is one of approximately 45 similar houses built in a retirement village development.
- 2.2 A front-loading washing machine, located in the garage, is connected to a DN40⁴ trapped waste pipe. A proprietary flexible drainage hose attached to and supplied with the washing machine connects it to the trapped waste pipe via a 25mm diameter spigot. The flexible drain hose is connected to the spigot with a hose clamp.

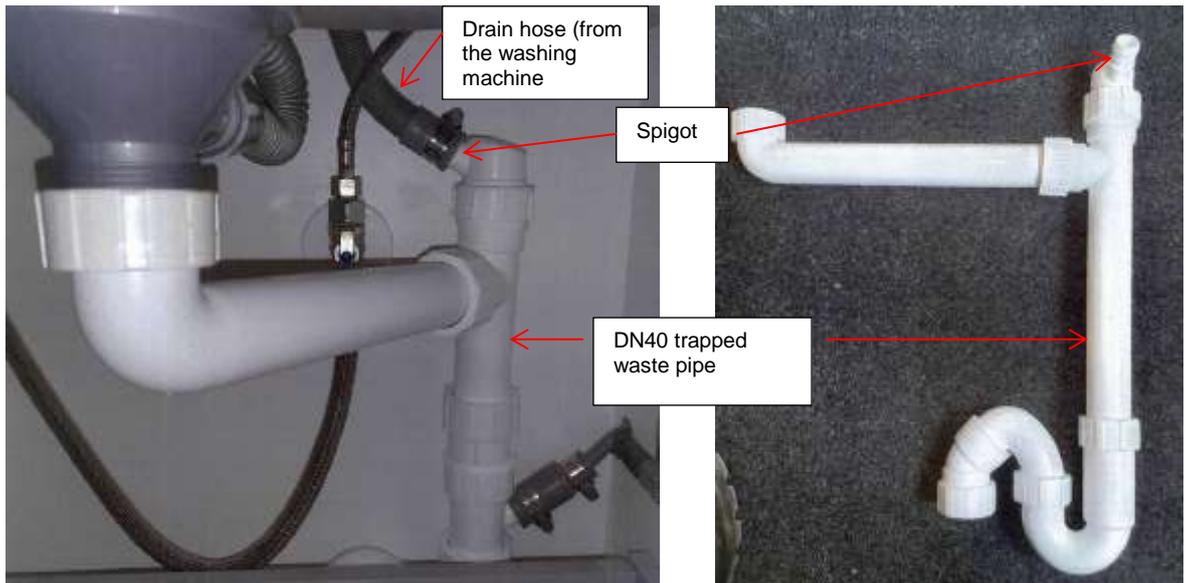


Figure 1: Photographs of the appliance connections and DN40 trapped waste pipe

- 2.3 The instantaneous water heater is a continuous flow gas hot water heater located in the roof space above the walk-in wardrobe. The water heater can heat up to 32 litres per minute, with a nominal capacity of 26 litres per minute at a 25°C rise. The water heater has a gas supply, a cold water inlet, and a hot water outlet.
- 2.4 Between May and June 2019, the agent and authority were in discussion regarding safe tray requirements for the instantaneous water heater. The agent stated in the submission provided with the application that the authority failed the final inspection because the “Gas Safety & Compliance certificate” issued by the water heater installer confirmed that the heater was installed as per the manufacturer’s instructions, which include the installation of a safe tray that had not been installed. The authority considered the water heater was not installed either in accordance with the manufacturer’s instructions or with the Building Code.
- 2.5 On 6 August 2019 the agent also emailed the authority regarding the “failed” inspection for the front-loading washing machine due to the flexible drain hose connection to the spigot. The agent noted the washing machine installation instructions showed the use of a flexible drain hose to a spigot on the trapped waste pipe.

⁴ DN40 – a waste pipe with a nominal inside (bore) diameter of 40mm.

- 2.6 On 9 August 2019 the agent received an email from the instantaneous water heater manufacturer. The email stated the installation instructions call for a drip tray to “offset any issues that may occur with water leaks and claims for damage and repair”.
- 2.7 The email set out two compliance pathways through either G12/AS1⁵ or G12/VM1⁶. Paragraph 6.11 of G12/AS1 says that the appliance should be installed in accordance with the manufacturer’s instructions. To satisfy G12/VM1 the installer can follow either AS/NZS 3500.1⁷ or AS/NZS 3500.4⁸, with the latter stating, in clause 5.4.2, that an instantaneous water heater does not require a safe tray.
- 2.8 The dispute was not resolved, and the Ministry received an application for a determination on 13 September 2019.

3. The submissions and the draft determination

- 3.1 The initial submissions from the parties are summarised below.

Washing machine connection	Instantaneous water heater safe tray
Agent’s initial submission	
<ul style="list-style-type: none"> The trapped waste pipe provides two options for connecting appliances into the DN40 waste a 20mm spigot for a dishwasher and a 25mm spigot for a washing machine. Each spigot matches the diameter of the flexible drain hoses from those appliances. AS/NZS 3500.2⁹ clause 13.25.1(b) states a “clothes-washing machine shall be connected into a trapped waste pipe not smaller than DN 40”. “Connected” is defined in AS/NZS 3500.0¹⁰ as “the short section of pipe connector that connects the supply to a fixture”. The installation instructions show that connection to a spigot is acceptable. A dishwasher has a higher rate of discharge (20 litres / min) and connects via a 20mm spigot. There should not be any concern with a washing machine (with a discharge rate of 15 litres / min) connecting via a 25mm spigot. 	<ul style="list-style-type: none"> AS/NZS 3500.4 clause 5.4.2 states “instantaneous water heaters do not require safe trays”. The water heater, between uses, contains less than 50mls of water. The installation meets AS/NZS 3500.4, which does not require safe trays, and therefore complies with Clause G13.

⁵ Acceptable Solution for Clause G12 Water supplies.

⁶ Verification Method for Clause G12 Water supplies.

⁷ Australian/New Zealand Standard AS/NZS 3500 Plumbing and drainage Part 1: 2015 Water services.

⁸ Australian/New Zealand Standard AS/NZS 3500 Plumbing and drainage Part 4: 2015 Heated water services.

⁹ Australian/New Zealand Standard AS/NZS 3500 Plumbing and drainage Part 2:2015 Sanitary plumbing and drainage.

¹⁰ Australian/New Zealand Standard AS/NZS 3500 Plumbing and drainage Part 0: 2003 Glossary of terms.

Authority's submission dated 16 October 2019	
<ul style="list-style-type: none"> • Figure 2 in G13/AS1¹¹ shows a DN40 standing pipe connected to a 40mm diameter discharge pipe. A flexible discharge pipe from the appliance is shown entering the top of the standing pipe. • G13/AS1 ensures the water seal to the trap is not lost to prevent odours entering a building. • The developed length of the discharge pipe has not been confirmed. The flexi-pipe connection is part of the developed length of pipe. • The installation instructions state the drain hose shall be placed "above 800mm to prevent siphon"¹². • An alternative solution proposal with supporting technical documents or statement from the trap manufacturer was not provided. • AS/NZS 3500.2 provides for the pumped discharge for a washing machine to be connected into a trapped waste pipe not smaller than DN40. • The condensation drain from the clothes dryer is connected to the trapped waste pipe and does not provide for an air gap. AS/NZS 3500.2 is the compliance pathway for this connection. 	<ul style="list-style-type: none"> • The water heater does not have a safe tray to protect building elements from moisture damage. Clause G12.3.7(b) requires a water supply system to be installed in a manner that avoids the likelihood of leakage. • The consented plans included a note that the water heater would be installed as per the manufacturer's specifications, which state: "It is important that a suitably drained [safe tray] be fitted where damage could be caused by discharge from the water heater. Provision must be made for the safe disposal of any leaking water." • AS/NZS 3500.4, clause 5.4.1 requires concealed water storage tanks to be placed on safe trays.
Agent's submission dated 18 October 2019	
<ul style="list-style-type: none"> • All appliances are connected to a trapped waste pipe above the water seal of the trapped waste. • A loss of the water seal was more likely from a sink due to the higher volume. • The compliance pathway is through AS/NZS 3500.2, clause 13.25.1(b). • The condensate from the clothes dryer is pumped into a holding tank, which can be manually emptied or pumped out via the condensate drain. The discharge rate is 1 litre / min. • G13/AS1 and AS/NZS 3500.2:2018 do not contain requirements for discharge from a condensing appliance. 	<ul style="list-style-type: none"> • An instantaneous water heater cannot be classified as a water storage tank. It can hold up to "one [litre] of water" within the heat exchanger and the surrounding pipes. • The installation of an instantaneous water heater without a safe tray complies through AS/NZS 3500.4, which is cited in G12/VM1.

3.2 A draft determination was issued to the parties for comment on 31 January 2020.

3.3 On 4 February 2020 the agent accepted the draft determination without further comment.

3.4 On 25 February 2020 the authority accepted the draft determination without further comment.

¹¹ Acceptable Solution for Clause G13 Foul water.

¹² The installation instructions provided with the authority's submission shows the drain connection either via a stand pipe or a spigot. For a spigot connection the instructions say "[t]he height of the drain hose [at its highest point] should be between 500 – 800 mm from ground level."

4. Discussion

4.1 General

- 4.1.1 The building consent for this work was issued on 3 February 2017. The Acceptable Solutions, and the relevant standards referenced in Clauses G12 and G13 at the time the consent was issued, are as follows:

Clause	Acceptable Solution, effective date	Standard(s) cited
G12 Water supplies	G12/AS1 Amendment 10, effective 1 Jan 2017 to 31 Mar 2019	AS/NZS 3500 Plumbing and drainage Part 1:2015 Water services Part 4:2015 Heated water services
G13 Foul water	G13/AS1 and G13/AS3 Amendment 6, effective 1 Jan 2017 to 31 March 2019	AS/NZS 3500 Plumbing and drainage Part 2:2015 Sanitary plumbing and drainage
Note: AS/NZS 3500 Plumbing and drainage Part 0: 2003 'Glossary of terms' is a secondary reference to the above standards.		

4.2 The flexible drain connection from the washing machine

- 4.2.1 The authority is of the view the washing machine must be connected via a 40mm diameter discharge pipe into the trapped waste pipe. The authority does not believe a smaller diameter flexible drain connection to a spigot on the trapped waste pipe complies with Clause G13.

- 4.2.2 The applicable performance requirement is Clause G13.3.1, which states:

The plumbing system shall be constructed to:

- (a) convey foul water from buildings to a drainage system,
- (b) avoid the likelihood of blockage and leakage,
- (c) avoid the likelihood of foul air and gases entering buildings, and
- (d) provide reasonable access for maintenance and clearing blockages.

- 4.2.3 The authority has referenced Figure 2(c) in G13/AS1 (refer Appendix A.1), which shows a flexible pipe from a washing machine discharging into a DN40 pipe that branches off the trapped waste serving the laundry tub. The authority is of the view that drainage connection to the washing machine should be in accordance with this figure.

- 4.2.4 I note that Figure 2(a) from G13/AS1 (refer Appendix A.1) also specifically provides for the connection of a dishwasher inlet (via a spigot) into a trapped waste pipe. The agent has noted that the discharge from the washing machine is at a lower rate than for a dishwasher. In this case, the discharge pipe is replaced by the spigot - the developed length (from the spigot to the water trap) is approximately 400mm.

- 4.2.5 Paragraph 3.3.1 of G13/AS1 also says (emphasis added):

A water trap shall:

- a) Be located as close as possible to the sanitary fixture or sanitary appliance it serves,
- b) Have a discharge pipe with a developed length not exceeding 1.2 m measured **between the water seal and either the sanitary fixture outlet or the sanitary appliance discharge point, ...**

- 4.2.6 In my view, paragraph 3.3.1 of G13/AS1 also makes it clear that the developed length is taken from the trap to the point where the washing machine discharges into the DN40 waste water drain at the spigot. The developed length does not include the flexible drain connection, which is part of the appliance and not part of the waste water drain.
- 4.2.7 G13/AS3 also references sections of AS/NZS 3500.2 that can be used as an Acceptable Solution for plumbing and drainage and includes a section that covers washing machines.
- 4.2.8 Clause 13.25.1 of AS/NZS 3500.2 says:
The pumped discharge from domestic clothes-washing machines shall be connected ...
(b) into a trapped waste pipe not smaller than DN 40...
- 4.2.9 AS/NZS 3500.0 defines the terms used in AS/NZS 3500.2, which defines a “connection” as:
The short section of pipe connector which connects the supply pipe to a fixture
- 4.2.10 In this case, the washing machine is connected via the spigot and flexible drain pipe into the DN40 trapped waste pipe. AS/NZS 3500.2 only prescribes the size of the trapped waste pipe, it does not provide any detail regarding the connection between the washing machine and the trapped waste pipe.
- 4.2.11 The authority has also referred to Figure 4.37.2.10 from AS/NZS 3500.5.2012¹³, which details typical connections of washing machines. The figure shows a variety of connections similar to Figure 2 from G13/AS1, with a flexible hose entering the top of a DN40 stand pipe. However, I note these connections are described as “typical” and not a prescriptive list of the only compliant connections. I also note this standard is not cited by any of the Clause G13 Acceptable Solutions.
- 4.2.12 The authority has referenced the installation instructions regarding the minimum height of the flexible drain pipe to prevent syphoning. For a spigot connection, the instructions note the drain pipe must be a minimum height of “between 500 – 800 mm” above the floor. The photographs of the installation provided by the agent and the authority clearly show the drain pipe above the level of the drain to the laundry tube – indicating a height above the floor of over 700mm.
- 4.2.13 I am of the view the flexible drain pipe connects the washing machine to an appropriately sized trapped waste pipe as required by clause 13.25.1 of AS/NZS 3500.2. The flexible pipe connection meets G13/AS3 via AS/NZS 3500.2 and subsequently complies with Clause G13.3.1.

4.3 Safe tray to the instantaneous water heater

- 4.3.1 The authority considers the instantaneous water heater requires a safe tray to comply with the Building Code because the building consent noted the installation will be in accordance with the manufacturer’s instructions. These instructions state:

It is important that a suitably drained [safe tray] be fitted where damage could be caused by discharge from the water heater.

¹³ Australian/New Zealand Standard AS/NZS 3500 Plumbing and drainage Part 5:2012 Housing installations

- 4.3.2 The authority is of the view the instantaneous water heater does not comply with Clause G12.3.7 which says:

Water supply systems must be installed in a manner that—

...

(b) avoids the likelihood of leakage....

- 4.3.3 As stated in paragraph 2.6 the agent received an email from the supplier, which stated the requirement for a safe tray is to “offset any issues that may occur with water leaks and claims for damage and repair”. I note the compliance pathway using paragraph 6.11 of G12/AS1 that states the instantaneous water heater must be installed as per the manufacturer’s instructions.

- 4.3.4 The requirement for safe trays under water tank installations arises from Clause E3 Internal moisture where Clause E3.3.2 says:

Free water from accidental overflow from sanitary fixtures or sanitary appliances must be disposed of in a way that avoids loss of amenity or damage to household units or other property

Paragraph 5.2.3 of G12/AS1 (refer Appendix A.2) says an acceptable method of meeting this clause by “locat[ing] a safe tray below the water tank”.

- 4.3.5 Clause E3.3.2 must be read in conjunction with Clause E3.1(b) that says the Objective of this provision is to “protect household units and other property from damage caused by free water from another household unit in the same building.” Clause E3.3.2 does not apply in this case as the house is a fully detached building and therefore cannot suffer any ill effects from free water coming from “another household in the same building”, or cause such ill effects to another household.
- 4.3.6 Irrespective of this, paragraph 5.2 of G12/AS1 refers to safe trays being required to “water tank installations”. “Water tanks” are defined in G12/AS1 as “a covered fixed container for storing hot or cold water”. For the reasons set out in paragraphs 4.3.10 and 4.3.11 below I do not consider the instantaneous water heater is a container for storing water.
- 4.3.7 Another method of compliance is through G12/VM1, which states AS/NZS 3500.4 can be used as a Verification Method for water supply systems. Clause 5.4 of AS/NZS 3500.4 sets out the requirements for protection against damage from leaking water for concealed and unconcealed water storage tanks (refer to Appendix A.3).
- 4.3.8 Clause 5.4.1 of AS/NZS 3500.4 sets out the requirements for concealed water storage tanks:
- All water containers, cold water storage tanks, cold water storage tank-fed heaters or storage water heaters that are installed in roof spaces, in cupboards or otherwise concealed shall be placed on safe trays conforming with Clause 5.4.3.
- 4.3.9 Clause 5.4.2 of AS/NZS 3500.4 sets out the requirements for unconcealed water storage tanks (emphasis added):
- Unconcealed water storage tanks, installed inside buildings on or above a floor surface that is impervious to water and suitably drained to a trapped or untrapped floor drain or an external doorway, do not require safe trays.
- ...
- All other unconcealed water storage tanks that are installed inside buildings shall be installed with safe trays conforming with Clause 5.4.3 and safe wastes conforming with Clause 5.4.4.

NOTE: Free outlet-type storage water heaters, not exceeding 13.5 L capacity, and **instantaneous water heaters do not require safe trays.**

4.3.10 The instantaneous water heater is installed in the roof space, so if it is classified as one of the types of water storage tanks described in clause 5.4.2 of AS/NZS 3500.4 it would need a safe tray to satisfy this standard. The definitions for this standard are set out in AS/NZS 3500.0, which contain the following:

- Storage tank is defined as a “container for storing water”
- Storage water heater is defined as a “water heater that incorporates a thermally insulated container in which the water is heated and stored for subsequent use”
- Instantaneous water heater is defined as an “unvented water heater in which the heat energy is applied only while the water flows to an outlet”.

4.3.11 From these definitions I consider it is clear that an instantaneous water heater is not considered to store water; it has no container that has the capacity to store water. An instantaneous water heater only heats water that passes through it when in use.

4.3.12 Therefore, I am of the view instantaneous water heater does not require a safe tray because:

- it is not of the type included in clause 5.4.2 of AS/NZS 3500.4, and
- Clause E3.3.2 and paragraph 5.2.3 of G12/AS1 do not apply as the building is a detached dwelling.

4.3.13 I consider the installation of the instantaneous water heater without a safe tray complies with Clause G12.3.7 and is not required to comply with Clause E3.3.2.

5. The decision

5.1 In accordance with section 188 of the Building Act 2004, I hereby determine that:

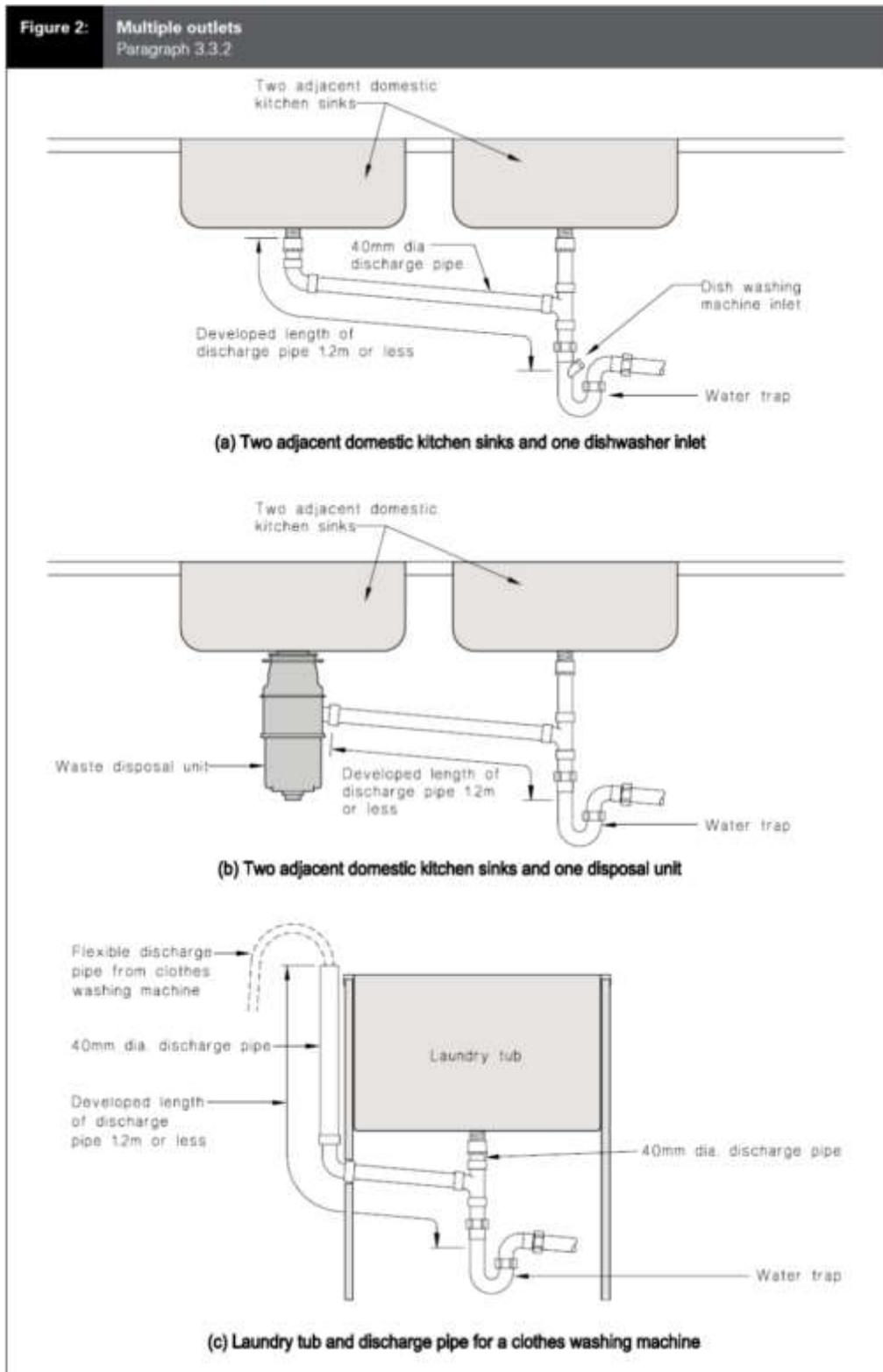
- the washing machine connection to the trapped waste with the fixed flexible drain connection complies with Building Code Clause G13.3.1, and
- the instantaneous water heater installed without a safe tray complies with Building Code Clause G12.3.7 and is not required to comply with Clause E3.3.2.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 13 May 2020.

Katie Gordon
Manager Determinations

Appendix A:

A.1 Figure 2 from Acceptable Solution G13/AS1 Sanitary plumbing:



A.2 The relevant paragraphs from G12/AS1 say:

5.2 Water tank installation

5.2.1 Location

Water tanks in roof spaces shall be located and supported as detailed in Figure 4.

5.2.2 ...

5.2.3 Safe trays

Performance E3.3.2 requires water to be prevented from penetrating another *household unit* within the same *building*. An acceptable method of preventing water damage is to locate a safe tray below the *water tank* (see Figure 4). The safe tray shall incorporate an overflow pipe with a minimum *diameter* of 40 mm. Where the tank overflow discharges into the safe tray the *diameter* of the drain shall be greater than the overflow pipe from the tank and comply with Paragraph 5.2.2.

A3 Clause 5.4 from AS/NZS 3500 Plumbing and drainage Part 4:2015 Heated water services says:

5.4.1 Concealed water storage tanks

All water containers, cold water storage tanks, cold water storage tank-fed water heaters or storage water heaters that are installed in roof spaces, in cupboards or otherwise concealed shall be placed on safe trays complying with Clause 5.4.3. The safe trays shall be drained by safe wastes complying with Clause 5.4.4.

Notwithstanding the above requirements, mains pressure water heaters may be installed on a safe tray without a safe waste, provided a leak protection device is fitted adjacent to the cold water inlet and upstream of any expansion control valve.

NOTE: See Clause 5.9.3(f) and Figures 5.9.3(A) to 5.9.3(D).

5.4.2 Unconcealed water storage tanks

Unconcealed water storage tanks, installed inside buildings on or above a floor surface that is impervious to water and suitably drained to a trapped or untrapped floor drain or an external doorway, do not require safe trays.

A mains pressure water heater with a leak protection device fitted adjacent to the cold water inlet and upstream of any expansion control valve does not require a safe waste.

All other unconcealed water storage tanks that are installed inside buildings shall be installed with safe trays complying with Clause 5.4.3 and safe wastes complying with Clause 5.4.4.

NOTE: Free outlet-type storage water heaters, not exceeding 13.5 L capacity, and instantaneous water heaters do not require safe trays.