



Determination 2014/009

Regarding the code-compliance of drainage work to a house at 79 Mandel Mews, Lower Hutt

1. The matter to be determined

- 1.1 This is a determination under Part 3 of the Building Act 2004¹ ('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 this determination are
 - the owners of the property, A Heath and L Crawford ("the applicants"), acting through an agent
 - Hutt City Council ("the authority"), carrying out its duties and functions as a territorial authority.
- 1.3 The application for determination arises from the applicants' concerns that the foul water drainage at the property did not comply with the Building Code (First Schedule, Building Regulations 1992) at the time of construction.
- 1.4 The matter to be determined² is therefore whether drainage work at the time of construction complied with clause G13 Foul Water of the Building Code that was current at the time the building consent was issued.
- 1.5 In making my decision I have considered the submissions of the parties, the report of the independent expert commissioned to advise me on this dispute ('the expert') and the other evidence in this matter.
- 1.6 The relevant Building Code clause and extracts from the relevant Acceptable Solution and Australian/New Zealand Standard³ are set out in Appendix A.

2. The building work

- 2.1 The house is a single-storey detached building on a flat site with a concrete slab foundation. The drainage design was in accordance with AS/NZS 3500.2⁴.
- 2.2 The building work considered in this determination consists of a 100mm diameter uPVC foul water drain with a rubber ring joint, more specifically a joint in the drainage pipework where the rubber ring was dislodged leading to the drain becoming blocked.

¹ The Building Act, Building Code, acceptable solutions and verification methods, past determinations and guidance documents issued by the Ministry are all available at www.dbh.govt.nz or by contacting the Ministry on 0800 242 243

² Under section 177(1)(a) of the Act

³ Acceptable Solutions relate to a specific clause or clauses of the Building Code. They provide ways to comply with these clauses in the form of specific construction details. Standards are non-mandatory documents that may be referred to in an Acceptable Solution.

⁴ AS/NZS 3500.2:2003 Plumbing and drainage - Sanitary plumbing and drainage

3. The background

- 3.1 On 4 November 2003 the authority issued building consent ABA 231684 for the construction of the house. The inspection schedule attached to the consent included a requirement for drainage inspections including 'Foul Drain pressure tested under load conditions'.
- 3.2 On 11 December 2003 the authority's plumbing and drainage inspector conducted a drains inspection. Tests noted on the inspection form included: '100 [diameter] uPVC Sewer (AS/NZS 3500 method) to subdivision laterals'.
- 3.3 On 9 March 2004 the authority conducted a completion inspection, with the plumbing and drainage inspector noting on the form: 'Plumbing function satisfactory'. A further completion inspection on 15 April 2004 noted that a code compliance certificate could be issued for plumbing and drainage 'on completion of gully dish'. The authority issued a code compliance certificate on 20 April 2004.
- 3.4 On 22 June 2013 the applicants, as subsequent owners, bought and moved into the house. Problems with the toilet blocking became evident about a week later (on or about 30 June 2013). I am not aware if any blockages were experienced by previous owners.
- 3.5 The applicants subsequently engaged a specialist drain inspection firm which used a CCTV camera to examine the drain; that investigation located the source of the blockage just outside the floor slab. According to the applicants' agent, the firm's camera operator identified that the PVC pipe connection was incorrectly installed and that a displaced rubber ring was causing the blockage.
- 3.6 On 27 August 2013 the applicants' agent wrote to the authority saying that the authority's plumbing and drainage inspector could not have witnessed a pressure test under load conditions, which was a requirement of the building consent, as the system would not have held pressure. The problem had since been fixed.
- 3.7 On 6 September 2013 the agent again wrote to the authority. The agent referred to telephone discussions with an authority representative that he said inferred the problem may be earthquake-related and that the authority may have carried out a system pressure test.
- 3.8 The authority responded in a letter dated 17 September 2013, saying it had looked through the building file and interviewed officers as research before responding. After reviewing its process in this building consent application, it believed that its officers had taken all reasonable steps to ensure the building work met the requirements of the Building Code.
- 3.9 The authority said its procedure had always been to conduct a water test at the time of the drainage inspection 'whereby the drains were filled with water to test for leaks'.

This procedure was in place in 2003, as it is now. Should the water not maintain its level or if there are visible signs of leakage, then the inspection is failed.

The drainage inspection on 11 December 2003 was subject to a water test before it was deemed appropriate to backfill the drains. This is shown on the inspection sheet under the heading 'drainage' where the inspector has ticked the boxes demonstrating that pressure testing of the drains has been undertaken.

3.10 The authority also noted the lapse of time since the drains were laid and said that, if there were any issues with the installation, the authority would have expected these to have been identified weeks rather than years later.

3.11 On 24 September 2013 the Ministry received an application for a determination.

4. The submissions

4.1 The applicants' agent provided a written submission and supporting material, including copies of:

- correspondence with the authority dated between 27 August and 17 September 2013 as outlined above
- site and foundation plans
- the building consent and attachments
- the authority's interim drainage inspection report dated 11 December 2003 and completion inspection reports dated 9 March and 15 April 2004.
- photographs of the foul water drainage junction
- CCTV footage of the drainage system compiled by the drain inspection firm (referred to in paragraph 3.5).

4.2 In the agent's view, the issues were:

incorrect installation of the foul water drain system;
i.e. severing of the rubber sealing ring when connecting the outside PVC female pipe to the male angle joint situated at the house concrete floor exit point

failure to apply a foul water drainage system pressure test, a condition of the building consent and attached inspection schedule ...

failure to protect the health of the home owners by not ensuring the competency of persons engaged in the provision of sanitary drainlaying services.

4.3 The agent said the rubber sealing ring which caused the blockage had been forced out of the locating groove due to misalignment of the exterior pipe and the foundation angle elbow. He said this was because excessive force was applied.

As the foul water system was never subjected to a pressure test, a requirement of the building consent and inspection schedule, the fault was never picked up and rectified.

The camera technician [from the drain inspection firm] was adamant that the fault had been there from the initial installation and that no work had been carried out on the drainage system since.

4.4 The Ministry did not receive an acknowledgement of the determination application from the authority or any submission in response to the application.

4.5 On 28 November 2013 I received a letter from the applicants' agent that referred to a New Zealand plumbing manufacturer's technical design manual, its recommendations for hydrostatic testing and commissioning of pipelines used for foul water, and the manual's revision to include the amalgamated Australian and New Zealand Standards. The agent submitting that:

- the water test 'claimed to have been undertaken' by the authority (refer paragraph 3.9) appeared to have been at atmospheric pressure, but the system

would still not have retained water because of the incorrectly installed rubber sealing ring

- the pressure test detailed in AS/NZS 3500.2⁵ and recommended in the manufacturer's manual was a hydrostatic load in excess of atmospheric pressure.

4.6 The agent also noted the authority's advice that the tick in the box under the draining heading ("Foul drain pressure tested under load conditions") indicated that the water test had been undertaken (refer paragraph 3.9); however, the agent understood that the tick was made prior to the issue of the consent and was to indicate a requirement for the inspection to be carried out. The agent concluded with the statement that

... at no stage has [the authority's plumbing and drainage inspector] indicated in writing on any of the inspection documentation that a water test was undertaken and confirmation of test results recorded at the time.

4.7 A draft determination was issued to the parties for comment on 16 December 2013. The applicants and the authority both accepted the draft without further comment in responses received on 20 December 2013 and 10 February 2014 respectively.

5. Expert's report

5.1 As described in paragraph 1.5 I engaged an independent expert, who is a specialist in plumbing and drainage matters, to provide an opinion on the compliance of the building elements subject to determination. The expert undertook a review of the information supplied by the applicant and provided a report to me on 4 November 2013. On 19 November 2013 I sent a copy of the expert's report to the parties.

5.2 The expert noted that the rubber sealing rings sat within a purpose-made groove in the pipe collar and that these would not usually work themselves into an exposed position after correct installation. The expert noted that the displaced rubber ring placed a significant obstacle in the drain flow.

5.3 The expert concluded that:

- the rubber sealing ring in the pipe was most likely misaligned from the time the pipe was installed
- it was highly likely that this would have caused the drain to block previously
- it was highly likely a water test on the drain would have exposed the incorrectly made joint.

5.4 In the expert's opinion, water tests were the normal means for an authority to determine if drains were 'sound and compliant'. He noted the relevant extracts from acceptable solution G13/AS2⁶ and AS/NZS 3500.2 (refer to Appendix A) and said that:

The carrying-out of a flood test will generally satisfy the NZBC [New Zealand Building Code] performance requirement G13.3.1(b), avoid the likelihood of blockage and leakage.

⁵ Australia/New Zealand Standard 3500.2:2003 Plumbing and drainage – Sanitary plumbing and drainage (I note here this Standard superseded AS/NZS 3500.2:1996 on 15 December 2003)

⁶ Compliance Document for New Zealand Building Code Clause G13 Foul Water – Second Edition: Department of Building and Housing (1 July 2001)

6. Discussion

- 6.1 Clause G13.3.2 that was current at the time of issue of the consent required that ‘the drainage system shall ... be constructed to avoid the likelihood of blockage’.
- 6.2 Taking into account the CCTV footage and the expert’s comments I consider it clear that the cause of the blockage was the misalignment of the rubber sealing ring at the junction. I accept the expert’s conclusion that this was the case at the time of construction; and accordingly I consider the drainage work did not comply with the Building Code that was current at the time.
- 6.3 I am of the view that completing a water test under pressure satisfactorily would provide the authority with reasonable grounds to be satisfied that the building work complied with the building consent. It is also my view that a less rigorous test such as a flood test would still have provided reasonable grounds for the authority to be satisfied that the drainage work complied with Clause G13 Foul water, even though this may not have fulfilled the conditions of the building consent.
- 6.4 I also note that, as the blockage has now been remediated by the applicants, it is reasonable to assume that the drainage work is currently compliant with the Building Code.

7. The decision

- 7.1 In accordance with section 188 of the Act, I hereby determine that the drainage work that is the subject of this determination did not comply with Clause G13 Foul Water of the Building Code that was current that the time the building consent was issued.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 14 February 2014.

John Gardiner
Manager Determinations and Assurance

Appendix A

A1 The relevant clause of the Building Code current at the time the consent was issued:

G13.3.2 The drainage system shall:

...

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

A2 The relevant extract from the Acceptable Solution G13/AS2:

6.0 Watertightness

6.1 Testing

6.1.1 All sections of the drainage system shall be tested by water test or air test to ensure watertightness.

A3 The extract from AS/NZS 3500.2:2003, as noted in the expert's report:

Section 13 Testing of sanitary plumbing and sanitary drainage installations

13.1 General

A3 This section specifies requirements for the inspection and testing of
A2 sanitary plumbing and sanitary drainage installations.

A1 All new, repaired or replaced sanitary plumbing and sanitary drainage shall be tested by hydrostatic, air pressure or vacuum testing to demonstrate that they are watertight. Testing shall be conducted prior to the placement of the trench fill (backfill).

A3 The relevant extract from AS/NZS 3500.2:1996:

Section 13 Testing of sanitary plumbing and sanitary drainage installations

12.2 Sanitary drainage testing

12.3.1 Water test

Below-ground drains shall be tested as follows:

(a) A water test shall be applied to every new below-ground drain and to any section of an existing below-ground drain that has been repaired or replaced.

(b) The head of water on any section of drain shall not exceed 3 m.

(c) The test shall be applied by –

(i) sealing all openings except the top of the section of the below-ground drain to be tested;

(ii) filling the below-ground drain with water to the highest level in that section; and

(iii) maintaining the water at this level for a period of –

(A) 10 min for vitrified clay drains, by the addition of measured quantities of make-up water as set out in Item (d); or

(B) 5 min for drains of any other material.

(d) The test is considered to be successful if the quantity of make-up water –

(i) does not exceed 1 L per 30 m length of DN 100 vitrified clay drains;

(ii) does not exceed 1.5 L per 30 m length of DN 150 vitrified clay drains;

or

(iii) is zero during the test period for drains of other materials.

12.3.2 Air test

As an alternative to the water test, an air test may be applied to the completed work, either in its entirety or in sections in accordance with the following:

- (a) The air pressure test shall consist of applying a pressure of 30 kPa to the drain and holding this pressure of 3 min to allow the air temperature to stabilize.
- (b) The air supply shall then be shut off and the time taken for the pressure in the pipe (to drop from 25 kPa to 20 kPa) shall be measured.
- (c) The drain is considered to have passed the test if the time taken is greater than 90 s for pipes of size DN 225 or smaller, or 180 s for pipes of sizes DN 300 and DN 375.

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