



## Determination 2011/095

### Regarding the code-compliance of a channel drain around the foundation of a house and garage at 533 Waitoki Road, Wainui, Auckland



#### 1. The matter to be determined

- 1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004<sup>1</sup> (“the Act”) made under due authorisation by me, John Gardiner, Manager Determinations, Department of Building and Housing (“the Department”), for and on behalf of the Chief Executive of that Department.
- 1.2 The parties to the determination are:
- the building owners, Mr M and Mrs S Smith (“the applicants”) acting through their builder (“the builder”)
  - the Auckland Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.
- 1.3 This determination arises from the decision of the authority to refuse to grant an amendment to a building consent for new house and garage because the authority was of the opinion that the relevant building work does not comply with Clause E2 of the Building Code<sup>2</sup>.

<sup>1</sup> The Building Act, Building Code, Compliance documents, past determinations and guidance documents issued by the Department are all available at [www.dbh.govt.nz](http://www.dbh.govt.nz) or by contacting the Department on 0800 242 243.

<sup>2</sup> 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.

- 1.4 The matter to be determined<sup>3</sup> is whether the authority was correct in its decision to refuse to grant the amendment to building consent ABA-1005585/B. In deciding this I must consider whether the elements that make up the building work comply with Clause E2 External Moisture of the Building Code.
- 1.5 In making my decision, I have considered the submissions of the parties, the report of the expert commissioned by the Department to advise on this dispute (“the expert”), and the other evidence in this matter.

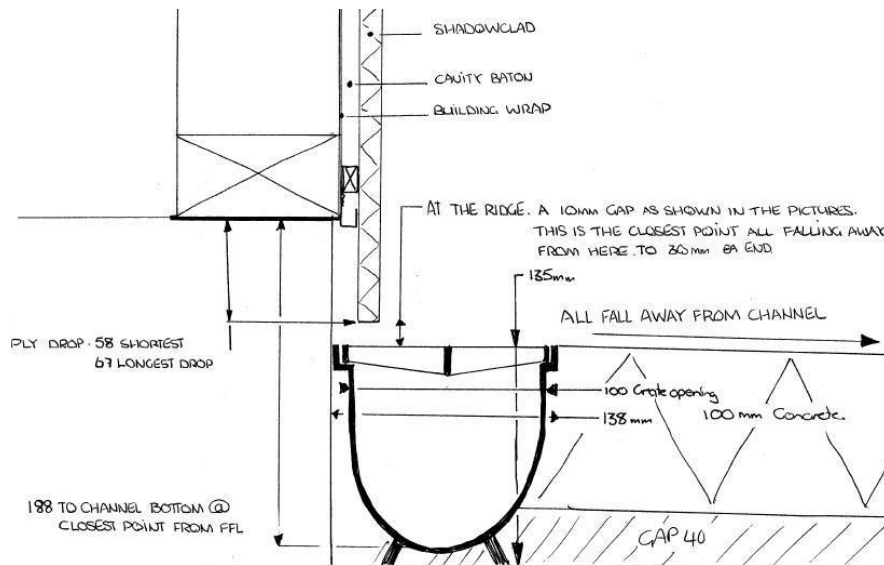
## **2. The building work**

- 2.1 The building work consists of a single storey house and detached garage on a gently sloping section in a rural lifestyle location. The expert has noted that the wind zone for the property is unknown but is likely to be in the high wind zone for the purposes of NZS 3604<sup>4</sup>. I accept the expert’s view that the property’s location just below the ridgeline would afford some measure of wind protection to the buildings.
- 2.2 The timber framed house and garage both have a plywood-and-batten cladding installed over a cavity. The 12mm thick plywood cladding is treated to H3 LOSP, and the bottom plate is treated to H3.1. Aluminium joinery has been used throughout. A low timber deck has been constructed along three sides of the house.
- 2.3 The house has a roof design which is moderately complex in plan and form. The main part of the house has a mono-pitch roof, with a gable roof over that part of the building which includes the entry area. A mono-pitch roof with pillar supports has been constructed over the entrance to the house, and over the three other doors to the deck. These smaller roofs are sloped towards the house.
- 2.4 The garage roof is mono-pitched in design, with a separate mono-pitched roof attached over the entry to the building. The roofs of the house and garage have been clad with profiled metal roofing. The house has eaves protection to most walls and the garage has eaves to all elevations.
- 2.5 A large area of concrete paving has been installed on three sides of the garage and along one side of the house to form a driveway. All paved areas are sloped to fall away from the buildings.
- 2.6 A proprietary black plastic channel drain has been installed along the rear elevations of the house, and around three sides of the garage. The channel drain is made from black polypropylene and is 138mm wide by 135mm deep with a removable grate. The grate has an open area of approximately 60%. Figure 1 shows the channel drain as installed.

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<sup>3</sup> Under sections 177(1)(b), and 177 (2)(a) of the Act

<sup>4</sup> New Zealand Standard NZS 3604:1999 Timber Framed Buildings



**Figure 1: Section of the channel drain-as built (as provided by the applicants)**

### 3. Background

- 3.1 Construction of the house and garage commenced in April 2009, and the buildings were subsequently occupied by the applicants from May 2010.
- 3.2 In March 2011, the builder submitted a drainage plan to the authority showing as-built design details for the plumbing and drainage features that have been installed at the property as an amendment to the issued building consent.
- 3.3 In a letter to the applicants dated 11 April 2011, the authority stated its refusal to grant an amendment to the building consent as:
- [The authority does] not consider your situation falls within the following minimum requirements for compliance to the NZ Building Code ...
- Does not comply with Clause E2.3.3 of the NZ Building Code. ...
  - Does not comply with Clause 10.3.5 and Figure 132 of NZ Building Code E2/AS1<sup>5</sup>.
  - The only similarities in the Acceptable Solutions of E2/AS1 to the installation of your channel drain relates to Clause 7.3.2.1 of E2/AS1. However this refers only to level access for a channel across a door opening ...
- 3.4 In addition the authority described its concerns about the drain as follows:
- the drain in terms of length, fall, capacity and where it discharged
  - the possibility that surface water can flow into the drain because the concrete paving did not have fall away from the drain
  - the cladding was 'sitting hard against the grating ... and may make [its] removal for maintenance difficult'.

<sup>5</sup> Compliance Document for Clause E2 External Moisture, E2/AS1, Third Edition including amendment 4, effective from 1 May 2008 until the close of 31 January 2012

3.5 The authority advised that the applicants had the option of removing the channel drain and lowering the ground levels to achieve compliance with the Building Code, or to seek a determination from the Department.

3.6 The Department received an application for a determination on 30 May 2011.

## **4. The submissions**

4.1 The applicants included, with the application:

- photographs of the building work showing:
  - the fall to the concrete paving
  - the movement of surface water on the concrete paving during a rain event
- the as-built drainage plan, and associated details
- the authority's letter to the applicants dated 11 April 2011.

4.2 The authority did not acknowledge the application or make a submission in response.

4.3 In a letter to the Department dated 9 May 2011, the builder provided the following response to the issues raised by the authority in their letter to the applicants dated 11 April 2011:

- the channel drain was only intended to collect wind-driven water from the walls of the building
- the channel drain has been in use for over a year, and during that time appears to have performed well during wet weather
- the cladding does not sit hard up against the channel grate, and the grate has been designed for removal for maintenance
- the drainage channel system was installed in such a manner to meet the minimum 150mm separation from the finished floor level to an impermeable surface. The separation being 190mm at the highest point of the drain and 210mm at the ends (lowest points).

4.4 The draft determination was sent to the parties for comment on 25 August 2011. The applicant accepted the draft without comment on 30 August 2011.

4.5 The authority made no response to the draft despite being reminded of the need to do so. I consider that the lack of any response from the authority is unacceptable and has caused unnecessary delay in issuing this determination and bringing closure to this matter for the applicant.

## **5. The expert's report**

5.1 As mentioned in paragraph 1.5, I engaged an independent expert to assist me. The expert is a member of the New Zealand Institute of Building Surveyors. The expert inspected the house on 17 June 2011 and provided a report dated 20 June 2011.

- 5.2 The expert noted that generally ‘the quality of the work [is] well above average’. The expert observed that although all of the concrete surfacing that has been laid around the garage and along one side of the house has been contoured so that water drains away from the buildings, the falls are minimal in some places, including near the front door of the house, but this area was partially protected by the porch roof. The expert noted that the channel drains fall to outlets in all cases.
- 5.3 The expert further noted that the top of the concrete paving is generally around 70-100mm below the floor slab and noted that the plywood cladding extends 60-70mm below the cavity closure. The bottom of the channel drain was 120-140mm below the bottom edge of the plywood cladding.
- 5.4 The expert noted that the plywood cladding terminates ‘very close to the [grate of the channel drain] in places’ which raised the possibility of water hitting and bouncing up off the grill and hitting the bottom edge of the plywood cladding. The expert observed, in at least one instance, that the bottom edge of the plywood was not protected by a coating system. The expert was of the opinion that if the edge was not protected ‘water may soak into the plywood in sufficient quantities to cause premature deterioration of the cladding’, and that the effect of water ingress on the bottom plate should also be considered.
- 5.5 The expert noted that potential exists for wind-blown water to flow off the concrete surfacing and, combined with the water running off the walls of the buildings in some conditions, could exceed the capacity of the drains. The expert observed that the channel drain to the house discharged in a garden at one end and to the internal edge of the timber deck at the other: both points of discharge would need to be kept clear of obstruction.
- 5.6 The expert noted that it is unclear how well the channel associated with the garage performs in draining away water. (The application information shows this channel drain discharging to a cesspit.)

## 6. Discussion

- 6.1 The authority has stated that the building work does not comply with Clause E2.3.3 of the Building Code which states:
- Walls, floor, 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.
- 6.2 In my view this performance requirement does not apply to this situation and is satisfied by the installation of a DPM under the bottom plate: there has been no suggestion made that the DPM has not been installed.
- 6.3 I consider the relevant performance requirement is Clause E2.3 2 which states:
- Roofs and exterior walls must prevent the penetration of water that could cause undue dampness, damage to building elements, or both.

## 6.4 The requirements of the Building Code and the application of E2/AS1

- 6.4.1 When evaluating a design for compliance with the Building Code, it is useful to make comparisons with the relevant Acceptable Solution, in this case E2/AS1. However, in making this comparison, the following general observations are valid:
- Acceptable Solutions are by their nature conservative and cover the worst case, so that they may be modified in less extreme cases and the resulting alternative solution will still comply with the Building Code.
  - The requirements of an Acceptable Solution are not mandatory. Building work can comply with requirements of the Building Code, but may not comply with the relevant Acceptable Solution.
  - Usually, when there is non-compliance with the provision of an Acceptable Solution, it will be necessary to consider what compensating features apply to the work in question, and whether reasonable grounds exist to form a view that any deficiencies in achieving the requirements of the Acceptable Solution will be compensated for.
- 6.4.2 The Acceptable Solution for Clause E2, E2/AS1 requires a clearance of 150mm from a concrete floor to an exterior paved surface, with 100mm clearance between the bottom of the cladding to the paved surface. For cladding to an enclosed deck, E2/AS1 requires a minimum clearance of 35mm between the bottom of the cladding and the surface of the deck, and a clearance of 100mm from the floor to deck (refer Appendix A). E2/AS1 says this clearance ‘keeps the bottom edge of the cladding dry, and allows cleaning and painting of the bottom surfaces.’
- 6.4.3 E2/AS1 provides details showing level thresholds to doorways off decks with the provision for the raised removable walking surfaces (timber or tiling) being adjacent ‘wall or balustrade cladding’. The location of the raised walking surfaces is not limited solely to doorways. I note there is no specific requirement for the ventilation of the spaces under covered decks.
- 6.4.4 E2/AS1 also details level thresholds to doorways with a drainage channel installed adjacent the door sill, with the bottom of the drainage channel a minimum of 150mm below a concrete floor. The same detail shows the exterior paving higher than the concrete floor, with the paving sloping away from the drain – no minimum fall is given for the paving.
- 6.4.5 In this case the cladding is H3 treated and is installed over a cavity. The cladding is in a well-ventilated situation and is able to dry after periods of rain.
- 6.4.6 The clearance from the concrete floor to the concrete paving adjacent to the cladding is between 70-100mm. The clearance from the concrete floor to the bottom of the channel drain at its highest point is 180mm. The clearance from the bottom edge of the cladding to the bottom of the channel drain directly below the cladding is 120-140mm. The paved surfaces fall away from the building.
- 6.4.7 The grate to the channel drain has an open area of 60%, and the grating itself has rounded top surfaces. I do not consider the amount of water likely to hit the grate and splash up is sufficient to adversely affect the adjacent building elements.

## 6.5 Conclusion

- 6.5.1 I consider that the channel drain is installed in a manner that does not compromise the building's compliance with Clause E2.3.2. However, I accept the expert's opinion that the clearance from the cladding to the channel drain is minimal at some locations and that these lesser clearances should be increased by trimming back the cladding, corner battens, and similar; and sealing the unpainted bottom edges of these elements: I note the 35mm minimum clearance shown in Figure 18 of E2/AS1 may be used for guidance in this respect. I consider this work is necessary to ensure the building's ongoing compliance with Clause B2 Durability insofar as it relates to Clause E2 External moisture.
- 6.5.2 I acknowledge that the channel drain will require regular inspection and maintenance so that it remains clear of debris, but the performance of the drain is readily observable. I suggest that the end of the channel drain that discharges by the timber deck be extended, so that the discharge point is extended beyond the outer edge of the deck.

## 7. What is to be done now?

- 7.1 The authority should issue a notice to fix that requires the owner to bring the channel drain into compliance with the Building Code, identifying the item listed in paragraph 6.5.1. The notice to fix should not specify how those defects are to be fixed. The applicants should then produce a response to this in the form of a detailed proposal. Any outstanding items of disagreement can then be referred to the Chief Executive for a further binding determination.
- 7.2 Once the matters set out in paragraph 7.1 have been rectified to its satisfaction, the authority should grant the amendment to the building consent, and following that, the code compliance certificate in respect of the building consent as amended.

## 8. The decision

- 8.1 In accordance with section 188 of the Building Act 2004, I hereby determine that:
- the elements that make up the building work do not comply with Building Code Clause B2 Durability
- and accordingly I confirm the authority's decision to refuse to amend building consent ABA-1005585/B in respect of the channel drain.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 31 October 2011.

John Gardiner  
Manager Determinations

## Appendix A: The Acceptable Solution

A.1 The relevant figure from the Acceptable Solution for Clause E2 External Moisture E2/AS1 includes:

### 9.1.3 Bottom of cladding

Separations, clearances to ground level, and overlaps shall be as shown in Figure 65 and Table 18. Clearances to *roof claddings* and *decks* shall be minimum 35 mm – refer to Table 7 and Figure 18. Clearances shall be measured to:

- a) The finished plane of any adjacent horizontal surface, or
- b) The top surface of any adjacent sloped or horizontal apron flashing.

#### COMMENT:

This keeps the bottom edge of the *cladding* dry, and allows cleaning and painting of the bottom surfaces.

