



## Determination 2011/082

# Regarding the refusal to issue a code compliance certificate for a 7-year-old house with monolithic cladding at 116 Panorama Drive, Enner Glynn, Nelson

### 1. The matters 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. The applicant is the owner, Harris Family 09 Ltd (“the applicant”), and the other party is the Nelson City Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.

1.2 This determination arises from the decision of the authority to refuse to issue a code compliance certificate for a 7-year-old house because it was not satisfied that the building work complied with certain clauses<sup>2</sup> of the Building Code (First Schedule, Building Regulations 1992). The authority’s concerns about the compliance of the building work primarily relate to its age and weathertightness.

1.3 The matter to be determined<sup>3</sup> is therefore whether the authority was correct in its decisions to refuse to issue a code compliance certificate for the house. In deciding this matter, I must consider:

#### 1.3.1 Matter 1: The external envelope

Whether the external building envelope of the house complies with Clause B2 Durability and Clause E2 External Moisture of the Building Code. The building envelope includes the components of the systems (such as the monolithic cladding, the windows, the decks, the roof cladding and the flashings), as well as the way the components have been installed and work together. (I consider this in paragraph 6.)

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<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.

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

### 1.3.2 Matter 2: The durability considerations

Whether the building elements comply with Clause B2 Durability of the Building Code, taking into account the age of the house. (I consider this in paragraph 7.)

- 1.4 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 detached house with an attached garage, which is situated on a sloping site in a very high wind zone for the purposes of NZS 3604<sup>4</sup>. The house is assessed as having a low to moderate weathertightness risk (see paragraph 6.2).
- 2.2 Construction is generally conventional light timber frame, with some specifically designed elements. The building has a concrete slab and foundations to the garage, timber pole foundations to the house, concrete block retaining walls, monolithic wall cladding, aluminium windows and profiled metal roofing. The 15° pitch roofs have eaves projections that are generally deeper than 600mm. Above the recessed main entry door on the north elevation, a timber pergola extends to the north and is supported on hollow steel posts fixed to low-level concrete block wing walls.
- 2.3 Although the building is fairly simple in plan, the form is more complex; with wall to roof junctions at timber-framed parapet walls between the house and garage (“the garage/house parapet wall”) and at the east end of the garage (“the garage parapet wall”). The house hipped roof forms a lean-to against the garage/house parapet wall, while the gabled garage roof extends from the latter to the garage parapet wall.
- 2.4 A free-draining timber deck extends along most of the west elevation, stepped down to accommodate interior level changes. The deck floor is spaced timber slats and the balustrades are monolithic-clad, with timber cappings. A second smaller timber deck extends from the garage along the east elevation beside a timber retaining wall.
- 2.5 The drawings call for deck balustrade framing to be H3 treated, and the specification calls for wall framing to comply with NZS 3602<sup>5</sup>, which at the time of construction would permit untreated timber provided that the moisture content of the timber was kept below 18%. The expert has noted that the timber framing is Douglas fir. Given the date of construction in 2003 and the lack of other evidence, I consider the external wall framing to be untreated.

### 2.6 The wall claddings

- 2.6.1 The monolithic cladding is a system described as solid plaster over a rigid backing. In this instance the rigid backing consists of spaced timber sarking installed diagonally and fixed through the building wrap directly to the framing timbers. The sarking is covered by a slip layer of heavy duty bitumen-based building paper and metal-reinforced 25mm thick solid plaster with a flexible paint coating.

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

<sup>5</sup> New Zealand Standard NZS 3602:1995 Timber and Wood-based Products for Use in Building

- 2.6.2 The low concrete block wing walls at the main entry are strapped with timber sarking and covered with solid plaster to match the house. The sides of the deck balustrades are clad in 6mm thick fibre-cement sheets fixed through the building wrap to the balustrade framing, which are finished with an applied textured coating system.

### 3. Background

- 3.1 The authority issued a building consent (No. 030310) for the house on 14 April 2003 under the Building Act 1991. A copy of the consent was not included in the documents provided in the application for determination.

- 3.2 A structural engineer reviewed specifically designed elements and the authority carried out various other inspections during construction in 2003. The authority's inspection summary is not clear, but it appears that pre-line and postline inspections were carried out during September 2003, with pre-plaster and plaster inspections during November 2003.

- 3.3 Although it appears that the house was substantially completed by the end of 2003, no final inspection was carried out until 8 February 2005, when the authority identified some outstanding items including 'seal cracks in stucco'.

- 3.1 The authority re-inspected the house on 23 August 2006. In its standard checklist, the authority 'checked and rejected' various items, including items identified as 'stucco sealed and painted' and 'exterior weatherproof'. Along with some outstanding documentation and other items, the authority noted the following in regard to the external claddings:

Cracks to stucco – meter box – garage roof – entrance way at wall – major cracking to south wall horizontal and vertical.

Junction to house wall with garage roof – both ends have potential leak areas

Cracking to concrete under supporting steel posts next to front door.

- 3.2 The engineer issued a 'producer statement – construction review' on 19 February 2007 for the following specifically designed elements:

1. Pole platform structure including bearers, poles, foundations & bracing
2. Reinforced concrete block retaining walls and overheight foundation walls
3. Upper storey bracing to house
4. Garage door lintel beam, posts & foundations
5. Support of stucco cladding on timber poles & bearers & edge joists.

- 3.3 Other items were apparently completed and documentation supplied as required. On 11 July 2008, the applicant formally advised the authority of completion and requested a code compliance certificate for the house.

- 3.4 A further inspection was carried out on 3 October 2008. The inspection record notes 12 items that required attention and which were largely weathertightness related. It appears that a re-inspection based on this list was conducted on 8 June 2010 with all items ticked other than

1. Cracks to stucco; meter box, garage roof, entrance way wall. Major cracking to south wall. Horizontal and vertical cracks.

2. Junction to house wall with garage roof – both ends have potential leak areas.

### **3.5 The authority's refusal to issue a code compliance certificate**

3.5.1 In a letter to the applicant dated 8 July 2010 the authority referred to the 'final re-inspection carried out on 8 June 2010. The authority stated:

Due to the age of the consent and the condition of the plaster cladding and the time of this final re-inspection [the authority] will need a 'E2 based' weather tightness report by an independent consultant. The following is a list of items to be addressed by the report:

1. A targeted inspection of the plaster cladding system in the areas that have a large number of cracks appearing. Some of these areas are as follows:
  - Around the meter box
  - Parapet to garage roof
  - Entrance way
  - Two storey wall to the south face

3.5.2 The authority also noted that the durability requirements of the Building Code commenced from the time of issue of the code compliance certificate and concluded that, as it was about 7 years since construction commenced, it would not issue a code compliance certificate due to the time elapsed, as it could not:

...be satisfied on reasonable grounds that the work now meets all the requirements of the building code, especially B2 durability and E2 external moisture.

3.6 The Department received an application for a determination on 14 July 2011.

## **4. The submissions**

4.1 The applicant forwarded copies of:

- the drawings and specifications
- the authority's inspection records
- some correspondence with the authority
- various other statements and information.

4.2 The authority made no submission to the application.

4.3 A determination was issued to the parties for comment on 11 August 2011.

4.4 The authority accepted the draft determination and provided copies of the inspection record dated 3 October 2008 (which also records the re-inspection of 8 June 2010) and the letter to the owner dated 8 July 2010. I have amended the determination to take account of the information provided.

4.5 The owner accepted the draft determination, noting concern at the findings identified in paragraph 5.6, and commenting that 'window and door flashings on the east wall and sills on the north wall below window (sic) have all been inspected by [the authority] and no concerns were raised at the time.' The owner also commented that the elevated moisture readings around the veranda and deck 'must be largely due to

the very high rainfall' experienced prior to the expert's site visit and that the house and veranda has also been recently water blasted.

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

5.1 As mentioned in paragraph 1.4, 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 26 July 2011, providing a report dated 27 July 2011.

5.2 The expert's overall impression was of 'poor standard' workmanship, with many locations showing a 'reliance on sealants as a first line barrier to the entry of moisture'. There were many cracks in the stucco, which had been repaired by painting over. No vertical control joints were observed.

### **5.3 Windows and doors**

5.3.1 The expert noted that the windows are face-fixed, with metal head flashings. The expert removed a small section of cladding at the jamb to sill junction of a north window, and noted the heavy weight waterproofing slip layer and the inadequate embedment of mesh within the plaster. I accept that this exposed junction is typical of similar locations elsewhere in the building.

5.3.2 At the jamb and sill, there is an additional strip of wrap over the slip layer, which is folded and returned back in behind the window flange (which I note was a common traditional method of flashing jambs of windows in stucco cladding). A similar strip of wrap is folded into the sill flange, which I note does not appear to drain to the outside. A polystyrene band is planted under the sill flange and plastered to form a projecting window 'sill'.

### **5.4 Other destructive testing**

5.4.1 The expert removed sections of plaster to investigate the underlying construction at the following locations around the north entry:

- the end of the concrete block west wing wall beneath the north steel post
- the bottom of the timber-framed northeast corner of the kitchen
- the bottom of the timber-framed north end of the house/garage parapet wall.

5.4.2 The expert noted that the low concrete block wing walls were strapped and clad with solid plaster to match stucco elsewhere. At the bottom of timber-framed walls, the expert noted that the stucco continued past bottom plates onto foundation walls, with no drip edges and anti-capillary gaps.

5.4.3 The expert also removed plaster at the north end of a parapet wall, at a crack above the end of the gutter. The parapet apron flashing extends around the parapet end above the gutter. The expert observed that the apron upstand finished in line with the back of timber sarking, leaving a hole that may allow moisture into the stucco.

## 5.5 Moisture levels

5.5.1 The expert inspected the interior of the house, taking non-invasive moisture readings internally, and noted no evidence of moisture. However, moisture damage to linings was noted adjacent to a garage door jamb.

5.5.2 The expert took invasive moisture readings through the cladding at cut-outs and other areas considered at risk; noting the following elevated readings:

- over 40% in timber sarking below the steel pergola post (see paragraph 5.4.1)
- 23% in bottom plates at the cut-outs around the entry (see paragraph 5.4.1)
- over 40% in timber sarking under the garage gutter to house wall junction
- 18% at the top of the deck balustrade framing, with 20% at the bottom
- 18% and 36% in jamb trim studs to windows in the garage/house parapet wall.

I note that the lowest invasive readings were recorded at 12%. I also note that the inspection was carried out in winter, and I consider that the recorded moisture levels are likely to be higher than would be expected at warmer times of the year.

However, moisture levels that vary significantly generally indicate that external moisture is entering the structure and further investigation is required.

5.6 Commenting specifically on the external envelope, the expert noted that:

### **Stucco – general**

- there are no vertical control joints installed to walls longer than 4m, and there are many stucco cracks (particularly on the east elevation of the parapet wall)
- the solid plaster extends over concrete foundation walls with no way of draining moisture trapped in the cladding to escape to the outside
- at all cut-outs, mesh reinforcing was not sufficiently embedded into the plaster

### **Windows and doors**

- there is no drainage gap from stucco above the head flashings and also at the sill flange to polystyrene sill, which allows moisture to become trapped
- sills lack flashings, with folded waterproofing at the sill flanges not drained to outside
- a garage door jamb crack allows moisture to penetrate and damage linings

### **Timber decks**

- there is no drainage gap at the junction of decking with some walls
- there are no control joints installed in the flush-finished fibre-cement cladding to the balustrades, with cracks apparent in some areas
- the balustrades have flat timber cappings, with top-fixed handrails
- the balustrade framing is exposed at the south junction with the house

### Roofs

- the end of the garage gutter is embedded into the stucco, with moisture penetration into the underlying sarking
- metal cappings to parapet walls have insufficient cover over the stucco, particularly when taking into account the very high wind zone
- the south end of the parapet wall is not weatherproof, with an incomplete apron flashing allowing moisture to penetrate behind the stucco
- the ends of beams to the entry pergola are not fixed to the roof
- the flexible boot flashing to a vent pipe is not weatherproof
- steel posts to the pergola and to the northwest corner of the roof are corroding.

5.7 A copy of the expert's report was provided to the parties on 2 August 2011.

## Matter 1: The external envelope

### 6. Weathertightness

6.1 The evaluation of building work for compliance with the Building Code and the risk factors considered in regards to weathertightness have been described in numerous previous determinations (for example, Determination 2004/1).

#### 6.2 Weathertightness risk

6.2.1 This house has the following environmental and design features, which influence the weathertightness risk profile of the house:

##### Increasing risk

- the house is in a very high wind zone
- two walls extend to form roof parapets, resulting in some complex junctions
- the stucco cladding is fixed directly to the framing
- there is an attached timber deck, with monolithic-clad balustrades
- the external wall framing is not treated to a level that provides resistance to decay if it absorbs and retains moisture

##### Decreasing risk

- the house is one-storey-high and reasonably simple in form
- most of the stucco cladding is sheltered by eaves.

6.2.2 Using the E2/AS1 risk matrix to evaluate these features, two elevations are assessed as having a medium risk rating and two a low rating. If details shown in the current E2/AS1 were adopted to show code compliance, a drained cavity would be required for the solid plaster cladding at all risk levels. However, I note that this was not a requirement at the time of construction.

### **6.3 Weathertightness performance**

- 6.3.1 It is clear from the expert's report that the external envelope is unsatisfactory in terms of its weathertightness performance and durability, which has resulted in moisture penetration to some sarking and framing. Taking into account the expert's report, I conclude that the areas outlined in paragraph 5.6 require rectification.
- 6.3.2 Considerable work is required to make the external envelope weathertight and durable. Further investigation is necessary, including the systematic survey of all risk locations, to determine causes and full extent of moisture penetration, any timber damage and the repairs required.

### **6.4 Weathertightness conclusion**

- 6.4.1 I consider the expert's report establishes that the current performance of the building envelope is not adequate because there is evidence of moisture penetration into the sarking behind the stucco and the framing of the external walls of the house. Consequently, I am not satisfied that the external walls and roof comply with Clause E2 of the Building Code.
- 6.4.2 In addition, the building work is required to comply with the durability requirements of Clause B2. Clause B2 requires that a building continues to satisfy all the objectives of the Building Code throughout its effective life, and that includes the requirement to remain weathertight. Because cladding faults will allow the ingress of moisture in future, the house does not comply with the durability requirements of Clause B2.
- 6.4.3 I consider that final decisions on whether code compliance can be achieved by either remediation or re-cladding, or a combination of both, can only be made after a more thorough investigation of the cladding and the condition of the underlying timber framing, which will require a careful analysis by an appropriately qualified expert. Once that decision is made, the chosen remedial option should be submitted to the authority for its approval.
- 6.4.4 The Department has produced a guidance document on weathertightness remediation<sup>6</sup>. I consider that this guide will assist the owner in understanding the issues and processes involved in remediation work to the stucco cladding in particular, and in exploring various options that may be available when considering the work that will be required to bring the house into code compliance.
- 6.4.5 Effective maintenance of claddings is important to ensure ongoing compliance with Clauses B2 and E2 of the Building Code and is the responsibility of the building owner. The Department has previously described these maintenance requirements, including examples where the external wall framing of the building may not be treated to a level that will resist the onset of decay if it gets wet (for example, Determination 2007/60).

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<sup>6</sup> Weathertightness – Guide to remediation design. This guide is available on the Department's website, or in hard copy by phoning 0800 242 243.



## **Matter 2: The durability considerations**

### **7. Discussion**

- 7.1 The authority has concerns about the durability, and hence the compliance with the Building Code, of certain elements of the building taking into consideration the completion of the house in 2003 or 2004.
- 7.2 The relevant provision of Clause B2 of the Building Code requires that building elements must, with only normal maintenance, continue to satisfy the performance requirements of the Building Code for certain periods (“durability periods”) “from the time of issue of the applicable code compliance certificate” (Clause B2.3.1).
- 7.3 In previous determinations (for example Determination 2006/85) I have taken the view that a modification of this requirement can be granted if I can be satisfied that the building complied with the durability requirements at a date earlier than the date of issue of the code compliance certificate, that is agreed to by the parties and that, if there are matters that are required to be fixed, they are discrete in nature.
- 7.4 Because of the extent of further investigation required into the timber framing and therefore the house’s structure, and the potential impact of such an investigation on the external envelope, I am not satisfied that there is sufficient information on which to make a decision about this matter at this time.

### **8. What is to be done now?**

- 8.1 The authority should issue a notice to fix that requires the owner to bring the house into compliance with the Building Code, identifying the defects listed in paragraph 5.6 and referring to any further defects that might be discovered in the course of investigation and rectification, but not specifying how those defects are to be fixed. It is not for the notice to fix to specify how the defects are to be remedied and the building brought to compliance with the Building Code. That is a matter for the owner to propose and for the authority to accept or reject.
- 8.2 I suggest that the parties adopt the following process to meet the requirements of paragraph 8.1. The applicant should produce a response to the notice to fix in the form of a detailed proposal for the house as a whole, produced in conjunction with a competent and suitably qualified person, as to the rectification or otherwise of the specified matters. Any outstanding items of disagreement can then be referred to the Chief Executive for a further binding determination.

## **9. The decision**

- 9.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the external building envelope does not comply with Clause E2 and Clause B2 of the Building Code, and accordingly I confirm the authority's decision to refuse to issue a code compliance certificate for the house.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 9 September 2011.

John Gardiner  
**Manager Determinations**