MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HIKINA WHAKATUTUKI

Determination 2016/004

Regarding the weathertightness of some 19-year-old stucco plaster walls to a house at 467 Mill Road North, Invercargill (to be read in conjunction with Determination 2015/040)

Summary

This determination considers the compliance of particular external walls of the house with respect to weathertightness and durability. The walls are not under eaves that would provide shelter from the weather, and the joinery is not installed in accordance with the manufacturer's instructions.

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 current owner of the house, J Blomfield ("the applicant")
- Southland District Council ("the authority"), carrying out its duties as a territorial authority or building consent authority.

[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.

1.3 I have previously described certain building matters regarding this house in Determination 2015/040 ("the first determination"). The current determination arises because the authority is still not satisfied that the existing 19-year-old south and east exterior walls of the house comply with certain clauses[2] of the Building Code.

1.4 The matter to be determined[3] is therefore whether the south and part of the east exterior walls comply with Clauses B1 Structure, B2 Durability, and E2 External Moisture of the Building Code. The subject walls include the components of the system (such as the timber wall framing, the windows and the doors, and the stucco cladding) as well as the way the components have been installed and work together.

1.5 In making my decision, I have considered the evidence gathered for the first determination, the report of the second expert commissioned by the Ministry to advise on this dispute ("the expert"), and the other evidence in this matter.

1.6 Matters outside this determination

1.6.1 The first determination issued on 1 July 2015 described certain building matters regarding the exterior walls of this house. As a result of that determination, the authority issued a building consent covering remedial work to the west and part of the east external walls of the house ("the repair consent"), which is now substantially complete. This determination does not consider work done under the repair consent.

1.6.2 The original south and east walls were constructed under building consent 1995/1098 issued on 23 November 1995 for the original house. This determination is limited to work done under that consent, and does not consider the later building consent issued in 2003 for the ensuite extension and reclad under the repair consent.

1.6.3 This determination is limited to the exterior walls outlined in paragraph 1.4 because the authority has raised concerns about the weathertightness of the stucco wall cladding to those areas. This determination does not consider other exterior walls or other clauses of the Building Code covered in the first determination.

2. The building work

2.1 The building is a single-storey detached house, with conventional light timber framing, a concrete slab and foundations, aluminium windows, monolithic wall cladding, and a profiled metal hipped roof. A lean-to veranda extends along the long northern face of the building and around the northeast corner as shown in Figure 1 (see over page).

2.2 The subject walls

2.2.1 The subject walls are part of the original house completed in about 1996 and are beneath eaves about 600mm deep overall. The walls are clad in stucco plaster over a solid backing, which consists of 4.5mm fibre-cement backing sheets fixed through the building wrap directly to framing timbers and covered by a slip layer of building wrap, wire netting-reinforced 22mm solid plaster, and a flexible paint coating.

[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] Under sections 177(1)(a)

2.2.2 Timber sample tests carried out for the first determination indicated that framing was likely to have been boron-treated to a level at least equivalent to H1.2. For this determination, a further six samples from the subject walls were tested and 'strong positive' tests for boron indicated a treatment level significantly higher than H1.2. I am therefore satisfied that the framing to the subject walls is treated to a level that will provide a high level of resistance to timber decay.

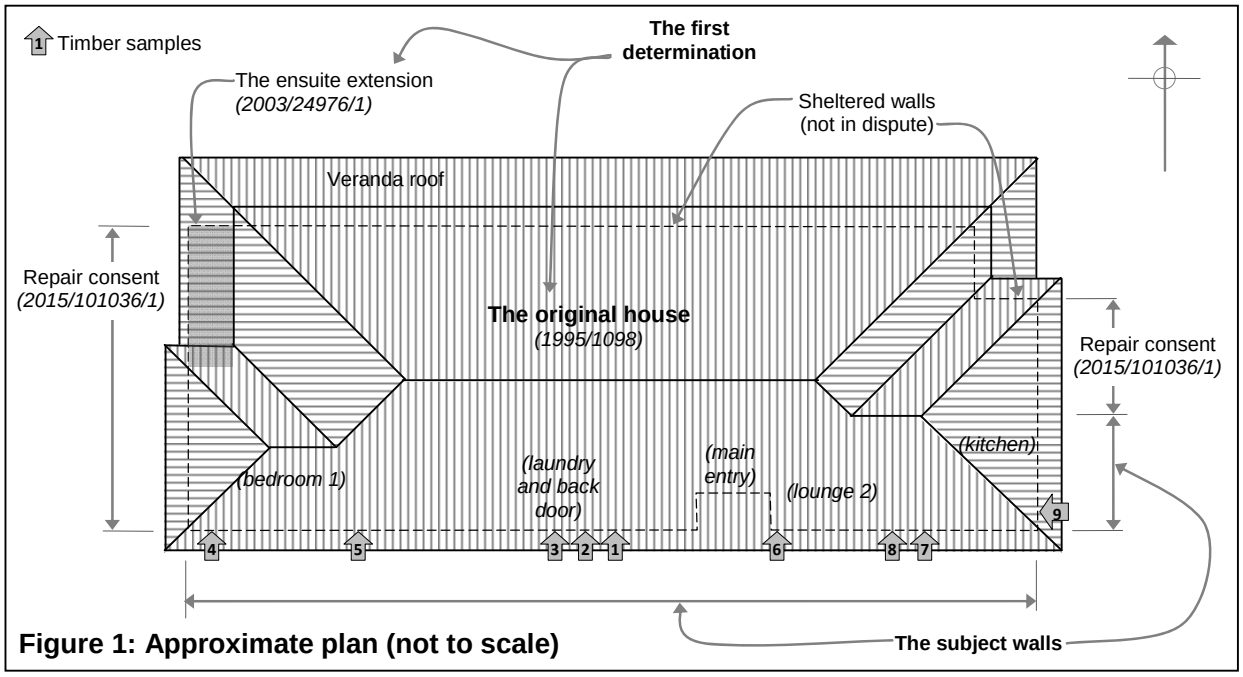

Figure 1: Approximate plan (not to scale)

3. Background

3.1 The authority issued building consent no. 1995/1098 to the original owners on 23 November 1995 under the Building Act 1991 ("the former Act") and the house was substantially completed by the end of 1996. The applicant purchased the property from the original owners in 2007, with no code compliance certificate having been issued for the house.

3.2 The applicant applied for a code compliance certificate for the house in 2013 and, following a final inspection, the authority issued a notice to fix. After a visit and letter from the authority, the applicant applied for the first determination on 11 March 2015.

3.3 The first determination

3.3.1 The first determination found that the house did not comply with certain clauses of the Building Code, and concluded that 'remedial work, investigation and/or maintenance' was necessary to certain areas including:

- the lack of weathertightness of windows and doors in the original house, the ensuite extension and the partially installed dining area door (E2)
- the moisture penetration and damage to the bottom plates (B1, B2 and E2)
- additional investigation to:
  - establish the condition of the bottom plates generally by invasively measuring moisture levels and testing samples where moisture levels are high or there are other signs of damage.

- confirm the cause(s) of the leaks that resulted in decay to framing in the laundry and master bedroom

3.3.2 With regard to the external envelope, the first determination concluded that the timber wall framing did not comply with Clauses B1 and B2, and the stucco cladding did not comply with Clauses E2 and B2 of the Building Code that was in force at the time consents were issued.

3.3.3 The first determination accordingly confirmed the authority's refusal to issue a code compliance certificate. Because the applicant was not the original owner, it also reversed the decision to issue the notice to fix dated 23 April 2013 but suggested that if the applicant wished to obtain a code compliance certificate:

> …a detailed proposal should be developed and submitted to the authority for its approval. That proposal should address the matters of non-compliance and investigations ... and should be produced in conjunction with a suitably qualified person experienced in weathertightness remediation.

3.4 Subsequent repairs

3.4.1 The applicant subsequently submitted a proposal (which I have not seen) for remedial work to some parts of the house, and the authority issued building consent no. RBW/2015/101036/1 for recladding the west and part of the east walls together with some other repairs.

3.4.2 However no work was proposed for the south wall and, in a letter to the applicant dated 5 October 2015, the authority noted that:

> ...as yet, no attempt has been made to resolve the issues relating to the cladding on the south wall. At this stage, this work must be consented by Council and undertaken at any time but no Code Compliance Certificates for any other building consents relating to the dwelling will be issued until this work is complete.

3.4.3 The authority considered that insufficient investigation had been carried out for it to be satisfied that 'the exterior cladding to the south wall is completely watertight.' The authority therefore concluded that:

> To move forward, a complete assessment of the south wall must be undertaken by a weathertightness expert with his acceptance that he bears the liability for his work and findings.

3.4.4 During his visit, the expert (refer paragraph 1.5) observed that the recladding work appeared to be complete as well as repairs to the plumbing leak in the laundry wall. He was advised by the applicant that the final inspection of the repair work was pending.

3.5 The applicant contacted the Ministry, which sought clarification on the situation from the authority. In an email dated 16 October 2015, the authority noted that it could not base its decision on the report provided to the Ministry for the first determination, and that it had asked the owner to engage an expert to provide a separate weathertightness assessment specifically directed to the authority.

3.6 In a subsequent email dated 27 October 2015, the authority submitted (in summary):

- the west wall is being reclad on a cavity system under the new consent
- walls under the veranda are sufficiently sheltered from external weather so are considered adequate

- the remaining original windows and doors in the south and east elevations do not have flashings installed in accordance with the manufacturer's instructions and should be assessed for weathertightness
- the report provided to the Ministry for the purpose of the first determination was not a full weathertightness assessment.

3.7 The Ministry received an application for a determination on 29 October 2015.

4. The submissions

4.1 The parties did not make written submissions and submitted no additional information beyond that provided for the first determination.

4.2 A draft determination was issued to the parties for comment on 22 January 2016.

4.3 On 29 January 2016 the applicant accepted the draft without further comment.

4.4 In a response received on 2 February 2016, the authority accepted the draft generally but noted that it expected that a new paint system be applied to the stucco plaster before the code compliance certificate can be issued.

5. The expert's report

5.1 As discussed in paragraph 1.5, I engaged a second independent expert to provide an assessment of the condition of the subject walls. The expert is a member of the New Zealand Institute of Building Surveyors. The expert inspected the subject walls on 12 November and 1 December 2015, providing a report on 7 December 2016.

5.2 General

5.2.1 The expert inspected the original stucco cladding of the house, with particular focus on the subject walls. The expert noted that the paint coating to the subject walls appeared to be original and observed that control joints had been installed in accordance with standard practice at the time of construction. The lack of stress cracking suggested that the installed control joints were operating effectively.

5.2.2 The expert considered that the stucco was due for repainting, but was 'in very good condition for its 19 years in service.' He observed that the stucco appeared 'to be sound and free from any significant defect and giving the appearance of being undertaken by a qualified tradesperson.'

5.2.3 The expert also noted that windows are installed with the stucco face finished and sealed against planted polystyrene facings and sills, which were common details at the time of construction. Although joinery lacked head flashings, the expert considered that the proximity of the eave overhang provided good deflection of rainwater, with no evidence of moisture penetration as a result of the omission.

5.3 The first expert's report

5.3.1 The expert took into account the assessment of the cladding by the first expert, which had provided evidence for the preparation of the first determination. The expert noted that the first expert's report had found no obvious defects to the south wall. However, the first expert had identified isolated timber damage in a laundry wall assumed to be due to a past intermittent leak from a plumbing pipe which had since been repaired.

5.3.2 The expert noted that decay analysis of samples taken by the first expert from laundry framing did not allow definitive conclusions as to the locations and reasons for the timber damage. (I note that the first determination concluded that further investigation was required for this area – see paragraph 3.3.1).

5.4 Moisture investigations of the subject walls

5.4.1 The expert took non-invasive moisture readings on the interior faces of the subject walls, at bottom plate lines and around windows. All readings were below 14% and were considered normal for the 'cold south face of the dwelling.'

5.4.2 The expert also removed a small section of coating and polystyrene sill from the sill/jamb junction of the south bathroom window to observe the underlying construction. The expert recorded an invasive moisture reading of 15% and observed no evidence of moisture penetration, with sealant appearing in good condition.

5.4.3 To further investigate the condition of framing in the laundry area, the expert removed skirtings and made cut-outs through the lining (see Figure 1). The expert forwarded timber samples for analysis and recorded invasive moisture readings of:

- 18% at the past plumbing leak, with water stains and decay evident (Sample 1)
- 21% at mid-point of the bottom plate with timber appearing sound (Sample 2)
- 14% at the sill/jamb junction with timber appearing sound (Sample 3).

5.4.4 The expert also took invasive moisture readings through the stucco into bottom plates at four other locations on the south and east walls, recording readings from 18% to 20%, which were not considered concerning on the cold south wall. However, after receipt of the laboratory report for Samples 1 to 3 (see paragraph 5.5.1), the expert returned to the site to undertake additional investigation.

5.4.5 To further investigate the condition of the bottom plate, the expert removed trim and made cut-outs through the lining (see Figure 1) and observed that the timber 'in every location was of visually sound timber, free from any obvious moisture, staining, mould or degradation.'

5.4.6 To confirm the condition of the timber, the expert forwarded six further timber samples for analysis from the following locations:

- bottom plate near south west corner of bedroom 1 (Sample 4)
- bottom plate near south east corner of bedroom 1 (Sample 5)
- bottom plate near south west corner of lounge 2 (Sample 6)
- bottom plate near south east corner of lounge 2 (Sample 7)

- sill trimmer under lounge 2 window jamb (Sample 8)
- east bottom plate at the south end of kitchen (Sample 9).

5.5 Decay analysis

5.5.1 The first laboratory report dated 17 November 2015 reported:

- Sample 1: laundry bottom plate at east corner
  - moderate brown rot and early soft rot
  - unsound and should be replaced.
- Sample 2: laundry mid wall bottom plate:
  - light to moderate brown rot
  - unsound and should be replaced.
- Sample 3: laundry window trimmer:
  - light brown rot
  - unsound and should be replaced.

5.5.2 The second laboratory report dated 4 December 2015 reported that all samples tested 'strongly positive for boron' and also reported:

- Sample 4: bedroom 1 bottom plate west end:
  - occasional hyphae
  - sound and may be left in situ provided moisture levels below 18%.
- Sample 5: bedroom 1 bottom plate east end:
  - light to moderate brown rot
  - unsound and should be replaced (see paragraph 5.5.3).
- Sample 6: lounge 2 bottom plate west end:
  - light brown rot
  - unsound and should be replaced (see paragraph 5.5.3).
- Sample 7: lounge 2 bottom plate east end:
  - occasional hyphae
  - sound and may be left in situ provided moisture levels below 18%.
- Sample 8: lounge 2 window sill trimmer:
  - light brown rot
  - unsound and should be replaced (see paragraph 5.5.3).
- Sample 9: kitchen bottom plate east corner:
  - occasional hyphae
  - sound and may be left in situ provided moisture levels below 18%.

5.5.3 In regard to high levels of boron recorded in the samples, the laboratory also noted:

> Given the fact that brown rot decay was established in samples 5, 6 and 8, despite the fact that the conditions were not conducive to the establishment of decay suggests that the decay may have been established in the wood prior to boron treatment. Possibly the supplier knew this and accordingly treated the timber with high levels of boron. The decay is not advancing in such timber [my emphasis] and it could possibly be left in situ.

5.6 Summary

5.6.1 Although the laboratory analysis revealed timber damage to some areas of the timber framing, the expert could find no evidence that this had resulted from moisture entry through the stucco cladding or the joinery junctions. He therefore considered that the framing condition was 'not necessarily related to a weathertightness failure.'

5.6.2 Aside from the leaking pipe to the laundry wall, the expert concluded that there was no evidence that stucco to the subject walls had suffered from moisture penetration over the past 19 years. He therefore considered it likely that timber damage had been sustained before delivery to the site and prior to the high level of boron treatment.

5.7 A copy of the expert's report was provided to the parties on 18 December 2015.

6. Discussion

6.1 General

6.1.1 I note that the investigations called for in the first determination (see paragraph 3.3.1) were not carried out by the applicant prior to seeking this determination. The condition of bottom plates remote from identified leaks and defects had therefore not been established. In addition, I have no evidence that the authority received any detailed proposal to address all investigations called for in the first determination (see paragraph 3.3.3). The authority has issue a building consent for only part of the remedial work arising from the first determination.

6.2 The plumbing leak

6.2.1 The expert's report for this determination confirms the findings of the first determination that some of the timber framing associated with the past plumbing leak is significantly damaged, and therefore does not comply with Clauses B1 and B2 of the Building Code.

6.2.2 It is clear from the expert's report that the laundry walls around the past plumbing leak require remediation in the form of exposure of the framing and replacement of some areas of the bottom plates and associated framing.

6.3 The subject walls remote from the plumbing leak

6.3.1 In regard to the remaining areas of the subject walls, I note the following:

- The expert has concluded that, in his opinion, the stucco cladding to the subject walls is in good condition and has performed satisfactorily over the past 19 years, beyond the minimum durability required by the Building Code.

- The expert observed that all timber framing remote from the plumbing leak appeared sound, with no visual evidence of water penetration or damage over the past 19 years (see paragraph 5.4.5).
- Notwithstanding the good condition and lack of defects identified in the wall cladding and exterior joinery, the laboratory analysis of samples indicates that some areas of the framing had suffered some damage at some stage (see paragraph 5.5.2).
- The laboratory reported that such damage may have occurred prior to timber delivery, because the high level of boron treatment identified in samples suggested that this may have been applied by the supplier to compensate for the condition of the framing (see paragraph 5.5.3).
- Given the above scenario, the condition and high treatment level of the framing would be expected to be consistent throughout the remaining framing to the original walls of the house.
- The decay observed by the first expert was related to defects in joinery installation to the east and west walls. When damaged timber was replaced and the original cladding was removed as part of the consent for repairs to these walls, it is reasonable to expect the authority inspected areas of exposed framing, and assessed this as visually sound before allowing cladding installation to proceed.
- Due to the visually sound timber observed, the lack of moisture penetration and the lack of cladding defects likely to result in moisture penetration, the expert concurred with the laboratory's view that decay damage is likely to have been present in the framing prior to construction of the original house.

6.4 Conclusions

The stucco cladding

6.4.1 The expert's report and the other evidence provide me with reasonable grounds to conclude the stucco cladding is currently weathertight and I am therefore able to conclude that the subject walls comply with Clause E2 of the Building Code. The expert's observations of the underlying construction also satisfy me that the subject walls have remained weathertight over the past 19 years.

6.4.2 The durability requirements of Clause B2 include a requirement for wall claddings to remain weathertight for a minimum of 15 years. A modification of the durability provisions to allow provisions to commence from the date of substantial completion in 1996 will mean that the subject wall cladding has already met the minimum life required by the Building Code for the cladding.

6.4.3 It is emphasised that each determination is conducted on a case-by-case basis. Accordingly, the fact that a particular cladding system has been established as being code-compliant in relation to a particular location on a particular building does not necessarily mean that the same cladding system will be code compliant in another situation.

The timber framing

6.4.4 Taking account the expert's observations and the laboratory results, I consider that the high level of boron treatment and the damage identified in the tested timber samples are indicative of the condition of the timber framing throughout the original wall framing to this house. The satisfactory condition of the stucco cladding, remote from the laundry area, makes it unlikely that the timber framing has deteriorated since the original house was completed.

6.4.5 I take the view that the likelihood of pre-existing damage described by the laboratory best fits the circumstances. I consider that any damage to timber remote from identified defects is most likely to have been sustained prior to the timber's supply for construction, with high levels of boron treatment applied as compensation.

6.4.6 After 19-years of in-service performance there is no evidence of distress in the building arising from a failure of B1 Structure. The expert's observations of the underlying construction remote from the plumbing leak also satisfy me that the subject wall framing has not deteriorated structurally. The expert's report and the other evidence provide me with reasonable grounds to conclude that, apart from possible adverse effects from the historical leak to the laundry area, the timber framing satisfies Clause B1 Structure.

6.4.7 I am therefore satisfied that the current condition of the original framing is historic and pre-existing; and that the framing has not deteriorated due to moisture ingress over the past 19 years. Given appropriate maintenance of the wall cladding, the highly-treated framing is unlikely to suffer structurally significant deterioration over the next 31 years. For the subject walls remote from the past plumbing leak, I am therefore able to conclude that the timber framing also complies with B2 insofar as it relates to Clause B1 of the Building Code.

6.5 Maintenance

6.5.1 The expert has noted that the 19-year-old stucco cladding appears not to have been repainted since its installation and I consider that maintenance is well overdue. I note that the poor condition of the paintwork may have contributed to the slightly elevated moisture levels noted in some of the original framing of the south wall.

6.5.2 A modification of the Code's durability provisions will allow the durability periods stated in B2.3.1 to commence from the date of substantial completion in 1996, meaning that the wall claddings have already met the 15-year minimum durability period required by the Building Code. The painting of the stucco is a maintenance issue and as the claddings are beyond the required 15 year durability period the maintenance does not need to be addressed as a condition of issuing the code compliance certificate.

6.5.3 However, the expected life of the building itself is a minimum of 50 years and careful attention to the performance of the claddings is needed to ensure that the external envelope continues to protect the underlying structure for its minimum required life of 50 years.

6.5.4 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 Ministry 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). I suggest the applicant attend to the maintenance to ensure that the external envelope continues to protect the underlying structure.

7. The decision

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

- timber framing in the vicinity of the past plumbing leak in the laundry wall does not comply with Clause B2 of the Building Code that was current at the time the original consent was issued
- timber framing in the remaining subject walls complies with Building Code Clauses B1 Structure, and B2 Durability
- wall cladding to the subject walls complies with Building Code Clauses E2 External Moisture, and B2 Durability.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 4 February 2016.

John Gardiner
Manager Determinations