

Determination 2005/149

Refusal of a code compliance certificate for a building with a “log” weatherboard cladding system at 142 Princess Street, Waikeno, Waihi

1. The dispute to be determined

- 1.1 This is a Determination of a dispute under Part 3 Subpart 1 of the Building Act 2004 (“the Act”) made under authorisation by me, John Gardiner, Determinations Manager, Department of Building and Housing, for and on behalf of the Chief Executive of that Department. The applicant is Mr McLeod of “Riverlee Homes and Construction Ltd.” (“the owner’s agent”), who is acting on behalf of the joint-owners, Mr and Mrs Smith (“the owner”), and the other party is the Hauraki District Council (“the territorial authority”). The application arises because the territorial authority declined to issue a code compliance certificate for a new house.
- 1.2 The question to be determined is whether I am satisfied on reasonable grounds that the wall cladding as installed to the external walls of the building (“the cladding”), complies with the Building Code (see sections 177 and 188 of the Act). By “the wall cladding as installed” I mean the components of the system (such as the building wrap, the flashings and the joints) as well as the way the components have been installed and work together.
- 1.3 In making my decision, I have not considered any other aspects of the Act or the Building Code.

2. Procedure

2.1 The building

- 2.1.1 The building work consists of a one-storey house situated on a large flat rural site, which is in a high wind zone in terms of NZS 3604. Construction of the house is conventional light timber frame, with a concrete slab and concrete block foundations, aluminium windows and doors, timber weatherboard cladding and a 20° profiled metal roof. The house plan is a simple “boomerang” shape with a gable roof that

extends over verandahs to the front and rear elevations. Eave and verge projections are 350mm; except for the 1500 mm wide verandah overhangs.

2.1.2 In a letter dated 20 September 2005, the owner’s agent (who was also the builder of the house) stated that the timber used for exterior wall framing is 100 mm x 50 mm Douglas fir with “Trucore H1.2 complete penetration” treatment. Based on this evidence I accept that the external wall framing is treated.

2.1.3 The wall cladding is a form of horizontal profiled timber weatherboard, with rebated lapped joints and a curved outer face that provides a “log” appearance. The weatherboards have a fully machined profile with overall dimensions of 141 mm x 34 mm (ref Figure 1). The laps are approximately 25 mm, with a close fitting joint along the bottom edge of the lapped joint that opens out to form a capillary break, the lap also has a small weathergroove in the under lap. The boards have a stain finish.



Figure 1: Cladding profile showing lapped joint

2.1.4 The weatherboard profile does not comply with the relevant sections of NZS 3604 or NZS 3617 or with Acceptable Solution E2/AS1. Accordingly I consider the weatherboard cladding, in the particular profile used on this house, to be an alternative solution (refer to paragraph 4.2).

2.1.5 I note that all elevations of the building demonstrate a low weathertightness risk rating as calculated using the E2/AS1 risk matrix. The matrix is an assessment tool that is intended to be used at the time of application for consent, before the building work has begun and, consequently, before any assessment of the quality of the building work can be made. Poorly executed building work introduces a risk that cannot be taken into account in the consent stage but must be taken into account when the building as actually built is assessed for the purposes of issuing a code compliance certificate.

2.1.6 I note that the parties submitted a very limited amount of information with respect to the procedural aspects of the consent application process and construction phase. A reasonable number of drawings were provided to describe the house itself, although no specification was provided.

2.2 Sequence of events

2.2.1 It appears that the territorial authority issued a building consent early in 2005, as a requirement written onto the approved consent drawings is dated 20 January 2005,

however, it appears that the requirement is likely to have been added by a building certifier (refer to paragraph 5.12).

- 2.2.2 According to the owner's agent, the territorial authority made various inspections during the course of construction in 2005, including testing the moisture content of external wall framing prior to lining installation. The statement that the territorial authority undertook the inspections is in doubt as it appears the owner's agent had engaged a building certifier. On completion of the building, the territorial authority refused to issue a code compliance certificate due to concerns about the adequacy of the cladding, particularly in regard to the lap and detail of the weathergroove.
- 2.2.3 The territorial authority did not issue a Notice to Rectify as required under section 43(6) of the Building Act 1991.
- 2.2.4 The owner's agent applied for a Determination on 4 August 2005.

3. The submissions

- 3.1 In a letter accompanying the application, the owner's agent briefly described the building company's history, explained that the timber used for the cladding on this building was high quality timber, and noted that:

...there would be no benefit in having another weather groove on the top over lap of the cladding. If this was a requirement then a second weather groove would also be on the [competing product] pre primed weatherboard.

- 3.2 In the application, the owner's agent stated that the matter of doubt was that the territorial authority:

...require confirmation that one weather groove on the lap of the cladding is sufficient in order to grant final code of compliance certificate to the home.

- 3.3 The owner's agent supplied:

- copies of the drawings
- samples of the weatherboard cladding.

- 3.4 The territorial authority made no submission.

- 3.5 A copy of the submission from the owner's agent was provided to the territorial authority, which made no submission in response.

4. The relevant provisions of the Building Code

- 4.1 The dispute for Determination is whether the territorial authority's decision to refuse to issue a code compliance certificate because it was not satisfied that the cladding complied with clauses B2.3.1 and E2.3.2 of the Building Code (First Schedule, Building Regulations 1992) is correct.

- 4.2 There are no Acceptable Solutions that have been approved under section 22 of the Act or section 49 of the Building Act 1991 that cover the cladding as installed on this house. The cladding is not currently certified under section 269 of the Act. I am, therefore of the opinion that the cladding system as installed must now be considered to be an alternative solution.
- 4.3 In several previous Determinations, the Department has made the following general observations, which in my view remain valid in this case, about Acceptable Solutions and alternative solutions:
- Some Acceptable Solutions 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.
 - Usually, when there is non-compliance with one provision of an Acceptable Solution, it will be necessary to add some other provision to compensate for that in order to comply with the Building Code.

5. The expert's report

- 5.1 The expert commissioned by the Department to inspect the cladding (“the expert”) inspected the building on 10 August 2005 and 20 August 2005, and furnished a report that was completed on 14 September 2005. The expert noted that the cladding appeared to be of a reasonable standard with no signs of cracking or deterioration. Ground clearances were adequate and penetrations through the cladding appeared to be well sealed. Windows and doors were faced-fixed to the cladding with aluminium head flashings that project beyond the jambs. The expert noted that the building wrap appeared to be a heavyweight Kraft paper, which is suitable for use as a wind barrier.
- 5.2 The expert cut away small sections of the interior lining at the jamb to sill junction of a window, and noted that the construction did not accord with the sill detail shown in the approved consent drawings. The building wrap had not been dressed into the window opening, no flexible flashing tape had been used at the corners, and a strip of “supercourse” cut between the jambs had been used in lieu of a sill flashing. I accept that the location opened is typical of similar locations around the building.
- 5.3 The expert took non-invasive moisture readings at skirting level and other risky locations through interior linings, and noted no elevated readings. A further 7 invasive moisture readings were taken in bottom plates, through interior linings and the exterior cladding, and the following elevated readings were noted:
- 23.5% behind the dishwasher in the kitchen
 - 21% behind the stove in the kitchen
 - 23.6% in the wardrobe of bedroom 2
 - 30.2% through the cladding of the south wall of bedroom 2

- 34.2% through the cladding of the south wall of bedroom 3
- 30.2% through the cladding under the verandah of the living room

5.4 Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure. However, due to the elevated reading recorded under the shelter of the verandah, the expert considered that the high moisture contents might be due to the framing being wet when linings were installed.

5.5 The expert made the following specific comments on the cladding:

- The window head flashings have open ends, do not extend sufficiently past the jambs, lack a drainage gap at the window flange and the cuts at the ends are not sealed. Water penetrating into the window lacks pathways to the outside as there are no sill flashings. There is also inadequate protection of framing at the opening. The air seals were not well compressed, as they were easily removed.
- Some of the joints in boards are poorly constructed – at the oblique corners and within board lengths. Some of the resulting gaps have been filled, while others are left open.

5.6 Copies of the expert’s report were provided to each of the parties.

5.7 The owner’s agent responded with a letter dated 20 September 2005, which included the following points.

- High moisture contents are the responsibility of the territorial authority as pre-line tests were carried out and passed inspection.
- Back flashings are installed as per the consent drawings and were inspected and passed by the territorial authority.
- The overlap of the boards is 26 mm as shown in the submitted samples, not 20 mm as quoted in the expert’s report.
- In regard to board joints, “supercourse” back flashings are used, over heavy weight building paper, behind all corner and other board junctions.
- Gaps to head flashings will be filled prior to the second coat of stain, which is yet to be applied.

5.8 The owner’s agent concluded by noting that:

We consider the report done by [the expert] to be fair and accurate up to the point of what he could visually determine. One point that is of concern to us though is a conversation on site between [the expert] and Mrs Smith the owner, in which [the expert] stated he did not have a problem with the cladding only having one weather groove as they were building all over the country with materials that have no weather grooves. He failed to mention this in his report.

The fact that the cladding on this home has one weather groove on the lap does not inhibit the effectiveness of the cladding due to the design.

The simple facts are the cladding and the back flashing system works, and has done for years. Because of the style of our homes we build more in the rural settings, so mainly in high wind zones throughout the country.

With a recent upgrade in the quality of timber we now use for the cladding, which includes this home in question, we can say with confidence it does stand up to the elements in all weather conditions.

- 5.9 Due to the possibility that the framing may have been wet when linings were installed, the expert inspected the house again on 11 October 2005, and furnished an addendum report that was completed on 12 October 2005.
- 5.10 The expert took a second set of invasive moisture readings from the same locations as those recording elevated moisture levels during the first inspections, in order to determine any change from the readings noted in paragraph 5.3. The expert noted that each location measured showed a significant decrease in moisture content, with the following readings noted:
- 18.2% behind the dishwasher in the kitchen (formerly 23.5%)
 - 16.8% behind the stove in the kitchen (formerly 21%)
 - 20.3% in the wardrobe of bedroom 2 (formerly 23.6%)
 - 24.2% through the cladding of the south wall of bedroom 2 (formerly 30.2%)
 - 23.6% through the cladding of the south wall of bedroom 3 (formerly 34.2%)
 - 25.8% through the cladding under the verandah (formerly 30.2%)
- 5.11 The expert also noted that the house had been exposed to severe weather since the first inspection, and took two additional invasive moisture readings at locations below the window jambs of the west and south windows in bedroom 3. Of the two readings taken one was above 18%, being the framing below the south window that was recorded at 21.3%.
- 5.12 The territorial authority responded in a letter dated 27 September 2005, advising that the territorial authority had refused to issue the first application for a building consent because the cladding was not an Acceptable Solution. The owner's agent then contracted the services of a building certifier and submitted a further application for building consent, which the territorial authority did not consider it could refuse.

6. Discussion

6.1 General

- 6.1.1 I have considered the submissions of the parties, the expert's report and the other evidence in this matter. The approach in determining whether building work complies with clauses B2 and E2 is to examine the design of the building, the surrounding environment, the design features that are intended to prevent the

penetration of water, the cladding system, its installation, and the moisture tolerance of the external framing. The Building Industry Authority and the Department have described the weathertightness risk factors in previous Determinations (Refer to Determination 2004/01 et al) relating to cladding, and I have considered these comments in this Determination.

6.2 Weathertightness risk

6.2.1 In relation to these characteristics I find that the house:

- is built in a high wind zone
- is a maximum of one storey high
- has two open timber decks at ground floor
- is simple in plan and form, with no complex roof to wall junctions
- has eave and verge projections of 350 mm, and 1500 mm wide veranda overhangs on two sides, which will provide some shelter to the walls below
- has cladding which is fixed directly to the framing
- has external wall framing that is likely to be treated, so providing some resistance to the onset of decay if the framing absorbs and retains moisture.

6.3 Weathertightness performance

6.3.1 Generally the cladding appears to have been installed according to good trade practice, but a number of junctions, edges and penetrations are not well constructed. These areas are all as described in paragraph 5.5 and in the expert's report as being:

- the open ends and lack of sealing to the ends of the window head flashings, and the lack of sill flashings to allow adequate drainage to the outside
- the poorly sealed joints at oblique corners and other board junctions.

6.3.2 Notwithstanding the fact that the weatherboard cladding is fixed directly to the timber framing, thus inhibiting drainage and ventilation behind the boards, I have noted certain compensating factors that assist the performance of the cladding in this particular case:

- the cladding generally appears to have been installed to good trade practice
- the house is a simple single storey shape, with no complex junctions or features
- the house has 350 mm eave and verge projections, and 1500 mm wide veranda overhangs on two sides, that provide some protection to the cladding below them

- the external wall framing is likely to be treated to a level that provides some resistance to decay should the timber absorb and retain moisture.

6.3.3 The territorial authority questioned whether one weathergroove on the lap of the cladding would be sufficient to grant final code of compliance certificate to the home. The Building Industry Authority considered the absence of weathergrooves in weatherboards in Determination 2004/19. I have considered the comments made in that Determination and believe the following points are relevant:

- There will be cases where a capillary break can be achieved in another way (as is the case in bevel-backed weatherboards) and it may be unnecessary to machine additional grooves into the overlapping joint. In this instance there is one weathergroove provided plus the lapped joint opens out to provide a capillary break above the bottom tight joint.
- The weathertight performance of the external walls is likely to be limited more by leakage paths through defects in the weatherboards and corner joints, than by the absence of weathergrooves in the lap joints.
- The cladding is thicker than the 19 mm specified for bevel-backed weatherboards in E2/AS1. The weatherboard is 34mm thick spanning studs at 600mm centres. The cladding is unlikely to deflect between supporting framing.

6.3.4 I believe these comments to be relevant in this particular case, and taking into account the factors described in 6.3.2 above, I decide that the absence of one weathergroove in the weatherboard cross-section does not render it noncompliant

6.3.5 I consider the factors listed together in 6.3.2 and 6.3.3 help compensate for the lack of a ventilated cavity and can assist the house to comply with the weathertightness and durability provisions of the Building Code.

7. Conclusion

7.1 I am satisfied that the current performance of the cladding is not adequate because it is allowing water penetration into the building at a number of locations at present. Consequently, I am not satisfied that the cladding system as installed on the building complies with clause E2 of the Building Code.

7.2 In addition, the building is also 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 for the house to remain weathertight. Because the cladding faults on the building have already allowed the ingress of moisture or are likely to allow it in the future, the house does not comply with the durability requirements of clause B2.

7.3 Subject to further investigations that may identify other faults, I consider that, because the faults that have been identified with the cladding system occur in discrete areas, I am able to conclude that satisfactory rectification of the items

outlined in paragraph 6.3.1 is likely to result in the building being weathertight and in compliance with clauses B2 and E2.

- 7.4 I note the expert's comment on the possibility that the moisture in the wall framing may have been present at the time of lining the walls. I agree that decreases in moisture readings between the two inspection appear to indicate that the initial high readings may have been a result of residual construction moisture, with gradual drying out over time. I consider that further monitoring will be necessary to ensure that moisture content levels continue to decline until an acceptable level is reached.
- 7.5 I note that effective maintenance of claddings is important to ensure ongoing compliance with clause B2 of the Building Code. That maintenance is the responsibility of the building owner. The code assumes that the normal maintenance necessary to ensure the durability of the cladding is carried out. For that reason clause B2.3.1 of the Building Code requires that the cladding be subject to "normal maintenance". That term is not defined and I take the view that it must be given its ordinary and natural meaning in context. In other words, normal maintenance of the cladding means inspections and activities such as regular cleaning, re-painting, replacing sealants, and so on.
- 7.6 I emphasise 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 building does not necessarily mean that the same cladding system will be code compliant in another situation.
- 7.7 In these circumstances, I decline to incorporate any waiver or modification of the Building Code in this Determination.

8. The decision

- 8.1 In accordance with section 188 of the Act, I hereby determine that the cladding system as installed does not comply with clause E2 of the Building Code. There are a number of items to be remedied to ensure that the house becomes and remains weathertight and thus meets the durability requirements of the Building Code. Consequently, I find that the house does not comply with clause B2. Accordingly, I confirm the territorial authority's decision to refuse to issue a code compliance certificate.
- 8.2 I also find that rectification of the items outlined in paragraph 6.3.1, to the approval of the territorial authority, along with any other faults that may become apparent in the course of that work, is likely to result in the house being weathertight and in compliance with clauses B2 and E2.
- 8.3 I note that the territorial authority has not issued a notice to fix. A notice to fix should be issued that requires the owners to bring the cladding into compliance with the Building Code, without specifying the features that are required to be incorporated. It is not for me to decide directly how the defects are to be remedied

and the cladding brought to compliance with the Building Code. That is a matter for the owner to propose and for the territorial authority to accept or reject.

- 8.4 I would suggest that the parties adopt the following process to meet the requirements of paragraph 8.3. Initially, the territorial authority should issue the notice to fix, listing all the items that the territorial authority considers non-compliant. The owner should then produce a response to this in the form of a technically robust proposal, produced in conjunction with a competent and suitably qualified person, as to the rectification or otherwise of the specified issues. Any outstanding items of disagreement can then be referred to the Chief Executive for a further binding Determination.
- 8.5 Finally, I consider that the cladding will require on-going maintenance to ensure its continuing code compliance.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 11 November 2005.

John Gardiner
Determinations Manager