

Determination 2008/12

Determination regarding a code compliance certificate for a house with monolithic and weatherboard cladding at 32 English Oak Drive, Albany, North Shore



1. The matter to be determined

- 1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004¹ (“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 of the building, Mr J Mills (“the applicant”) and the other party is the North Shore City Council (“the territorial authority”).
- 1.2 This determination arises from the decision of the territorial authority to refuse to issue a code compliance certificate for a 4-year-old house because it was not satisfied that it complied with Clauses B2 “Durability” and E2 “External Moisture” of the Building Code² (First Schedule, Building Regulations 1992).

¹ The Building Act 2004 is available from the Department’s website at www.dbh.govt.nz.

² The Building Code is available from the Department’s website at www.dbh.govt.nz.

- 1.3 The matter to be determined is whether the cladding as installed to the walls of the building (“the cladding”), complies with Clauses B2 and E2 (see sections 177 and 188 of the Act). By “the cladding as installed” I mean the components of the system (such as the backing materials, the flashings, the joints and the coatings) as well as the way the components have been installed and work together.
- 1.4 In making my decision, I have considered the submissions of the parties, the report of the independent expert (“the expert”) commissioned by the Department to advise on this dispute, and the other evidence in this matter. I have evaluated this information using a framework that I describe more fully in paragraph 6.1.
- 1.5 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.

2. The building

- 2.1 The building work consists of a two-storey detached house situated on a sloping site that is in a high wind zone for the purposes of NZS 3604³. The house is relatively simple in plan and form but with complex features where the flat monoplane roofs intersect with the walls.
- 2.2 The building has two enclosed balconies, both of which are constructed over living spaces. Pergolas are attached to the cladding over each balcony.
- 2.3 I have received no written evidence as to the treatment, if any, of the external wall framing timber.
- 2.4 The walls of the house are clad with a combination of Hardies Linea fibre-cement weatherboards and “HiTex” 50mm “Diamond cavity” EIFS⁴. Both claddings are directly fixed to the framing through the building wrap. The EIFS cladding has a diamond pattern of grooves set into the rear face of the polystyrene sheets intended to provide drainage and ventilation to the EIFS cladding.

3. Background

- 3.1 In 2002 the territorial authority issued building consent No BB/0838802 under the Building Act 1991. The territorial authority carried out inspections during the course of construction with a final inspection taking place on 19 November 2003. A further recheck inspection was carried out on 14 April 2004.
- 3.2 Following a request from the owner for a code compliance certificate, the territorial authority advised them in a letter dated 20 April 2005, that the house exhibited a number of risk factors and the territorial authority also listed some identified defects. Consequently, the territorial authority could not be satisfied on reasonable grounds that the cladding system would meet the requirements of Clauses E2 and B2.

³ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

⁴ Exterior Insulation and Finish System

3.3 The territorial authority did not issue a notice to fix.

3.4 The Department received the application for a determination on 24 September 2007.

4. The submissions

4.1 The applicant forwarded copies of:

- the plans
- the Building Officers' Field Memoranda relating to the final inspections
- the letter from the territorial authority dated 20 April 2005.

4.2 The territorial authority made a submission that the matter to be determined is whether the installed wall cladding complies with clauses E2 and B2 of the New Zealand Building Code.

4.3 The draft determination was sent to the parties for comment on 7 December 2007.

4.4 The applicant accepted the draft without comment. The territorial authority responded in a letter to the Department dated 21 December 2007. The territorial authority accepted the draft but sought comment on specific matters, and noted some minor errors. The substantive matters included:

- comment on the window head flashing to the EIFS
- unsealed gaps to the scribes on the weatherboard
- the absence of ventilation to the balustrade walls required by the manufacturer of the fibre-cement weatherboards
- the vulnerable nature of the penetration of the posts through the top of the balustrades.

I have discussed these matters in paragraph 7.4.

5. The expert's report

5.1 As noted in paragraph 1.4, I engaged an independent expert, who is a member of the New Zealand Institute of Architects specialising in building surveying, to provide an assessment of the condition of those building elements subject to the determination.

5.2 The expert inspected the house on 2 November 2007 and furnished a report that was completed on 9 November 2007. The expert noted several minor changes from the consented drawings, which included a slight variation in the polystyrene cladding sheets, some corrugated steel roofing in lieu of butyl rubber membrane, an additional window to the cloak room, and a slight change to the kitchen windows.

- 5.3 The expert also noted that the cladding systems appeared to be straight and fair and the coating of the EIFS cladding was uniform, well adhered and free from cosmetic defects. The workmanship for the flashings also appeared to be adequate.
- 5.4 The expert took non-invasive measurements throughout the house, followed by a further 18 invasive moisture measurements. While none of the latter readings were especially noteworthy, two readings were significantly higher, indicating the possibility of moisture absorption by the framing at those points. The two areas of concern should be investigated for any further signs of leakage to ensure the long term integrity of the building. As noted in paragraph 5.6, the expert observed signs of leaking at two locations.
- 5.5 The expert removed a small section of cladding at a sill/jamb junction of the garage window on the south elevation and observed that there is a sound flexible flashing behind the sill and jamb and a suitable slope to the external plaster on the sill. This corresponded with the relevant part of the manufacturer's detail. Moisture readings around this detail indicated adequate performance of these weather resistant details. I am prepared to accept that the details revealed at this location would apply to similar situations throughout the building.
- 5.6 Commenting specifically on the cladding, the expert noted that:
- there is a crack adjacent to the garage but this was likely to have been caused by a vehicle
 - The main gutter outlet was restricted where the butyl rubber had flopped down and this is causing ponding and also restricts the potential flow of water. Although moisture readings were low at the time of the inspection, the expert was of the view that moisture was leaking into the wall at this location during periods of heavy rain
 - while there are no control joints, taking into account the dimensions of this building, these are not required
 - the roof flashings where the butynol roofing is turned up behind the cladding are performing adequately
 - some scribes are not fitted tightly against window and door joinery
 - the balcony balustrades have stainless steel cappings with riveted laps and good cross-falls, and saddle flashings appear to be installed. The joints against the pergola posts will have to be maintained to ensure good performance.
 - the pergola stringers are not spaced off the wall, which could allow water to enter the walls through the bolt holes
 - the sealant around penetrations is well painted and flexible but will also require diligent maintenance
 - there are signs of an intermittent leak around the master bedroom deck door

- the balcony deck membranes have insufficient falls and the east and west decks were affected by ponding where the slope was insufficient to allow complete drainage. The recognised minimum slope to achieve compliance with the Building Code is 1.5° and this has not been achieved
- the balcony decks are covered by a liquid applied membrane over which tiles are laid. Water is retained under the tiles, and as these membranes can accommodate very little moisture or thermal movement, it not possible to conclude that the decks will meet the durability requirements of the Building Code
- the deck outlets into the rain-heads appeared to be adequate. However, the West deck overflow penetration through the balustrade requires sealing
- fibre-cement weatherboards require maintenance painting.

5.7 A copy of the expert's report was provided to each of the parties on 8 November 2007.

5.8 In two letters to the Department, dated 27 November and 30 November 2007, the territorial authority expressed concern about three matters from the expert's report:

- The detail where the pergola posts penetrate the balustrade capping.
- The reverse sloping soffit to EIFS junction.
- The EIFS window head flashing detail.

I have discussed these matters in paragraph 7.4 and included additional items in paragraph 6.3.1.

6. Evaluation for code compliance

6.1 Evaluation framework

6.1.1 In evaluating the design of a building and its construction, it is useful to make some comparisons with the relevant Acceptable Solution⁵, in this case E2/AS1, which will assist in determining whether the features of this house are code compliant. However, in making this comparison, the following general observations are valid:

- Some Acceptable Solutions are written conservatively to 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 one or more other provisions to compensate for that in order to comply with the Building Code.

⁵ An Acceptable Solution is a prescriptive design solution approved by the Department that provides one way, but not the only way, of complying with the Building Code. The Acceptable Solutions are available from The Department's Website at www.dbh.govt.nz.

- 6.1.2 The approach in determining whether building work is weathertight and durable and is likely to remain so, is to apply the principles of weathertightness. This involves the examination of 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 Department and its antecedent, the Building Industry Authority, have also described weathertightness risk factors in previous determinations⁶ (for example, Determination 2004/1) relating to cladding and these factors are also used in the evaluation process.
- 6.1.3 The consequences of a building demonstrating a high weathertightness risk is that building solutions that comply with the Building Code will need to be more robust. Conversely, where there is a low weathertightness risk, the solutions may be less robust. In any event, there is a need for both the design of the cladding system and its installation to be carefully carried out.

6.2 Weathertightness risk

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

- is two storeys high and situated in a high wind zone
- is relatively simple in plan and form but has some complex features
- has two balconies that are both constructed over living spaces
- has pergolas that are directly fixed to the cladding
- has polystyrene cladding sheets, the backs of which are grooved which can assist the drainage behind them
- has external wall framing that may not be treated to a level that provides resistance to the onset of decay if the framing absorbs and retains moisture.

6.2.2 The house has been evaluated using the E2/AS1 risk matrix. The risk matrix allows the summing of a range of design and location factors applying to a specific building design. The resulting risk rating can range from 'low' to 'very high'. The risk rating is applied to determine what claddings can be used on a building in order to comply with E2/AS1. Higher levels of risk will require more rigorous weatherproof detailing; for example, a high risk level is likely to require particular types of cladding to be installed over a drained cavity.

6.2.3 When evaluated using the E2/AS1 risk matrix, the weathertightness features outlined in paragraph 6.2.1 show that all elevations of the house demonstrate a high weathertightness risk. I note that, in order to comply with E2/AS1, the fibre-cement weatherboard and monolithic cladding of this building would require a drained cavity.

6.3 Weathertightness performance

6.3.1 Generally the cladding appears to have been installed in accordance with good trade

⁶ Copies of all determinations issued by the Department can be obtained from the Department's website.

practice. However, based on the expert's opinion, I accept that remedial work is necessary in respect of the following:

- the crack by the garage door
- the re-gluing of the butyl-rubber at the main gutter outlet
- the pergola stringers not being spaced off the wall and the unsealed fixing bolts
- the leak around the master bedroom deck door
- sealing between some scribes and window/door joinery
- the inadequate flashing detail where the posts penetrate the balustrade cap flashing
- the insufficient falls to the balcony decks
- the water being retained under the tiles installed on the balcony decks
- the unsealed overflow to the west deck
- the maintenance painting of the Linea weather boards
- the lowering of the gardens at the base of the claddings
- any other defects discovered during the rectification process.

6.3.2 The expert also noted that if the tiles to the balcony decks are to be replaced, then the deck membrane should be checked carefully to ensure there are no installation faults that could lead to a likelihood of leaks. In addition, the membrane should be able to accommodate a degree of thermal or other movement. The master bedroom deck door should be checked for possible leaks and may require maintenance.

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

- Apart from the noted exceptions, the cladding is installed to reasonable trade practice.
- The EIFS cladding has grooves formed in a diamond pattern on the back of the polystyrene that may well assist drainage as is claimed by the manufacturer.

6.3.4 I consider that these factors help compensate for the lack of a fully drained cavity and can assist the building to comply with the weathertightness and durability provisions of the Building Code.

7 Discussion

7.1 I consider the expert's report establishes that the current performance of the cladding is not adequate because it is allowing some water penetration into the building at

two locations at present. That is, the damage by the garage door and main gutter outlet faults. Consequently, I am satisfied that the building does not comply 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 and deck tiling faults on the building are likely to continue to allow the ingress of moisture in the future, the house does not comply with the durability requirements of Clause B2.
- 7.3 Because the faults 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 will result in the building remaining weathertight and in compliance with Clauses E2 and B2.
- 7.4 The territorial authority raised several matters about the building in their submissions on the expert's report and draft determination. These were as follows:
- The detail where the posts penetrate the balustrade capping:
The present detail, as noted by the expert, relies primarily on sealant. I believe that this is inadequate and the detail requires some form of primary means of deflecting water (e.g. an angle flashing) so the sealant becomes secondary to the flashing in deflecting moisture running down the post. I have included this item in paragraph 6.3.1, weathertightness performance.
 - The gaps between the scribes and window/door frames:
I have included this item in paragraph 6.3.1.
 - The reverse slope of the soffits:
I consider these soffits at 5° to be a low slope. They appear to be 500mm wide and the fascia has a drip edge. Table 4.1 of NZSS 3604 shows the soffit to wall joint to be in a sheltered position and at this slope still within the 45° protection zone I consider this detail will meet code requirements.
 - The EFIS window head flashing detail:
The Hitex details use profiled polystyrene sections in conjunction with butyl rubber sill trays and metal head flashings. The details do appear to be slightly unconventional. However in this case, based on low moisture readings taken by the expert and in the absence of any other signs of moisture ingress, I consider that over the past four years the flashing system has demonstrated compliance with clause E2 requirements.
 - The lack of a cavity in the balustrade walls. The factors that could compensate for the absence of a cavity behind the cladding, including the balustrade are discussed in 6.3.3.
- 7.5 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.

- 7.6 Effective maintenance of claddings (in particular monolithic cladding) 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).

8 The Decision

- 8.1 In accordance with section 188 of the Building Act 2004, I determine that the building work does not comply with Clauses E2 and B2 of the Building Code, and accordingly confirm the territorial authority's decision to refuse to issue a code compliance certificate.
- 8.2 I note that the territorial authority has not issued a notice to fix. A notice to fix should be issued that requires the owner 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.
- 8.3 I would suggest that the parties adopt the following process to meet the requirements of paragraph 8.2. Initially, the territorial authority should issue the notice to fix. 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.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 26 February 2008.

John Gardiner
Manager Determinations