



Determination 2008/74

Determination regarding a notice to fix for a 6-year-old house with monolithic cladding



1. The matters 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 applicants are the owners, C Hill and L Jones Hill (“the applicants”), and the other party is the Whangarei District Council (“the authority”), carrying out its duties and functions as a territorial authority or building consent authority.
- 1.2 This determination arises from the decision of the authority to issue a notice to fix for a 6-year-old house because it was not satisfied that it complied with Clause B2 Durability and Clause E2 External Moisture of the Building Code² (Schedule 1, 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 I note that the notice to fix is restricted to the cladding, and I therefore consider that the matter for determination is whether the claddings as installed on the house comply with Clauses B2 and E2 (see sections 177 and 188 of the Act). By “the claddings as installed” I mean the components of the systems (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 expert commissioned by the Department to advise on this matter (“the expert”), 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 detached house, which is situated on a steeply sloping rural site in a high wind zone for the purposes of NZS 3604³. The “T” shaped building is 2-storeys in part and fairly complex, with an upper floor over the central part of the house. Construction is conventional light timber frame, with a concrete slab and foundations to the section at the top of the slope and suspended timber floors elsewhere. The house has monolithic cladding, aluminium windows and 23° pitch profiled metal gabled roofs with parapets at all gable ends. Apart from verandas above the main entry, and to the east and west walls of the living room wing, there are no eaves projections.
- 2.2 A small deck, with a membrane floor and monolithic clad balustrades, extends from the corner of the upper level master bedroom on the east elevation, and sits above enclosed areas below. A large timber deck, with spaced timber slats and open balustrades, wraps around the living room.
- 2.3 The expert was unable to identify any treatment to the timber framing. I note that the specification calls for framing to be “boric-treated No.1 framing grade to NZTPA H1 or Origin timeframe MSG”. Given the date of construction in 2000 and the lack of other evidence, I consider the external wall framing to be untreated.
- 2.4 The cladding system to the building is what is described as monolithic cladding, and is a “Harditex” system with 7.5 mm thick fibre-cement sheets fixed through the building wrap to the framing, and finished with an applied textured coating system.

3. Background

- 3.1 The authority issued a building consent (No. 40390) in July 2000 which appears to have been based upon a building certificate for the work issued by Building Certifiers Whangarei Ltd (“the building certifier”).

³ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

- 3.2 Various inspections were carried out by a building certifier during construction, including pre-line inspections on 24 and 29 November 2000. An “interim final” inspection was carried out on 24 January 2002, which ticked the cladding as passed and identified a list of other items that required completion.
- 3.3 I am not aware of any further inspections, or of any correspondence between the original owner and the authority over the following 3 years. The applicants purchased the property in June 2005.
- 3.4 The building certifier lost its approval as a building certifier on 26 March 2003. The authority issued a “Review Building Consent” notice dated 6 September 2005, which listed the inspections carried by the building certifier and noted that a final inspection was still required.
- 3.5 The authority carried out a final inspection on 4 October 2005, which identified various items requiring attention. Item 24 on the list was related to the cladding, and noted:
- Harditex showing numerous cracks – requires assessment from [the applicator] re repair work on site. Note – all repair work undertaken will require inspections by WDC. Note – parapets will require capping to ensure weathertightness.
- 3.6 It appears that repair work was subsequently carried out, without re-inspection by the authority during the work. I am not aware of any correspondence between the applicants and the authority over the following 2 ½ years, and I have received no information as to when the repair work was undertaken.
- 3.7 The authority carried out a re-inspection of the house on 21 April 2008, and noted that all the work listed in the final inspection of 4 October 2005 had been completed, apart from several minor items along with the requirement for a:
- Statement from [the cladding suppliers] cladding has been repaired as per their verbal recommendations.
- 3.8 The authority issued a notice to fix on 30 April 2008, which referred only to the monolithic cladding and stated that, as the repair work had been carried out without the required inspections (refer paragraph 3.5):
- ...Council are unable to ascertain code compliance on E2 (External Moisture) and B2 (Durability) of New Zealand Building Code for wall cladding system.
- The notice to fix specified that in order to remedy the cladding, the applicants must obtain an amendment to the building consent to:
- ...replace cladding system and carry out such building work with inspections from Whangarei District Council as requested in approved amendment or obtain a determination...
- 3.9 The Department received an application for a determination on 12 May 2008.

4. The submissions

- 4.1 The applicants forwarded copies of:
- the specification and the consent drawings

- the inspection records
- the notice to fix dated 30 April 2008
- various other producer statements and other statements.

4.2 Copies of the submissions and other evidence were provided to each of the parties. Neither party made any further submissions in response to the submission of the other party.

4.3 A draft determination was issued to the parties on 18 July 2008. Both parties accepted the draft without comment.

5. The expert's report

5.1 As mentioned in paragraph 1.4, I engaged an independent expert to provide an assessment of the condition of those building elements subject to the determination. The expert is a member of the New Zealand Institute of Building Surveyors. The expert inspected the house on 23 June 2008 and furnished a report that was completed on 7 July 2008.

5.2 The expert noted that the house was generally well maintained, and the work identified as item 24 in the record of the final inspection on 4 October 2005 appeared to have been completed. The cladding cracks had been repaired, and there were no signs of re-cracking.

5.3 The expert noted that the windows are face-fixed against the cladding, with metal head flashings. The installation appeared satisfactory, with the jamb flanges sealed against the cladding.

5.4 Moisture

5.4.1 The expert inspected the interior of the house, taking non-invasive moisture readings internally, and no evidence of moisture was observed, except at the corner window to the master bedroom. The expert investigated this area, and discovered that the moisture had resulted from blocked condensation drainage holes and an unsealed inside sill mitre that allowed moisture to penetrate.

5.4.2 The expert took 8 invasive moisture readings through the cladding, and the following elevated readings and decay were noted:

- 26% in the framing directly below the apron flashing at the kitchen lean-to.
- 19% in the framing at the kitchen window sill (below the above reading).
- 21% in the bottom plate at the northeast corner of the lounge (at the deck).
- 19% in the bottom plate beside the dining area French doors (with only 15% above, at door head height).
- 28% in the bottom plate at the northeast corner of the kitchen (with only 14% above, at the window sill).

5.4.3 I note that the invasive readings indicated that the equilibrium moisture content (“EMC”) ranged from about 12% to 14% at the time of inspection. Moisture levels that vary significantly from the EMC range generally indicate that external moisture is entering the structure and further investigation is required.

5.5 Commenting specifically on the cladding, the expert noted that:

- there are no vertical control joints, or horizontal inter-storey control joints on any of the external walls
- the fibre-cement sheets to the sub-floor areas are unpainted
- at the timber framed subfloor areas, the deck bearers are bolted directly through the cladding into the framing, with no allowance for drainage
- the timber decking butts against the cladding, with no allowance for drainage
- there is an unpainted timber packer beneath the dining room deck doors
- the bottom of the apron flashings lack kickouts, with unsealed gaps and the flashing upstands turned into the cladding at the ends, allowing moisture to penetrate into the framing
- at the ends of parapet apron flashings, the roof extends over the gutter and exposes gaps in the cladding and unpainted fascia timber
- the fascias are embedded into the coating of the cladding, and the timber behind the gutters is unpainted in some areas
- the junction of the living room ridge flashing to the upper wall is poorly weatherproofed.

5.6 The expert did not inspect the upper deck, so could not confirm whether saddle flashings had been installed at the junctions of the clad balustrades with the walls.

5.7 A copy of the expert’s report was provided to the parties on 8 July 2008.

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 Solutions⁴, 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 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.

⁴ 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.

6.2 Evaluation of cladding for E2 and B2 Compliance

6.2.1 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 determinations⁵ (for example, Determination 2004/1) relating to cladding and these factors are also used in the evaluation process.

6.2.2 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.

6.3 Weathertightness risk

6.3.1 In relation to these characteristics I find that this house:

- is built in a high wind zone
- is a fairly complex building that is two storeys in part
- has monolithic cladding fixed directly to the framing
- has an enclosed deck, with a membrane floor and monolithic-clad balustrades, situated above enclosed areas below
- has a timber deck, with spaced decking, attached to the ground floor
- has no eaves projections to protect the cladding, and parapets to all gable ends
- has external wall framing that is not treated to a level that will provide resistance to the onset of decay if the framing absorbs and retains moisture.

6.3.2 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 level of risk can range from 'low' to 'very high'. The risk level 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 a particular type of cladding to be installed over a drained cavity.

6.3.3 When evaluated using the E2/AS1 risk matrix, the weathertightness features outlined in paragraph 6.3.1 show that all elevations of this house demonstrate a high weathertightness risk rating, and would require a drained cavity in order to comply with the current requirements of E2/AS1. However, I also note that a drained cavity was not a requirement of E2/SA1 at the time that the building was constructed.

⁵ Copies of all determinations issued by the Department can be obtained from the Department's website.

6.4 Weathertightness performance: exterior cladding

- 6.4.1 Generally the claddings appear to have been installed in accordance with most of the manufacturer's specifications. Accordingly, taking account of the expert's report, I conclude that remedial work is necessary in respect of the defects outlined in paragraph 5.5.
- 6.4.2 I note that the upper deck has clad balustrades that intersect with the exterior walls, and I consider that the presence of saddle flashings at these junctions must be verified as part of the remedial work.
- 6.4.3 I also note that "numerous cracks" in the cladding were identified during the final inspection on 4 October 2005 (refer paragraph 3.5), which took place more than 3 ½ years after the previous inspection in January 2002. I have no information as to when those cracks occurred, or how much time may have elapsed before repair work was undertaken. I also note that the parapet cappings were not installed until the recent remedial work, after some years of exposure of the monolithic clad tops.
- 6.4.4 In view of the untreated timber framing, I am concerned that, during the past 6 years, sufficient moisture penetration may have occurred to result in decay in the timber framing. I therefore consider that investigation of the timber condition, with timber replacement as necessary, will be necessary as part of the remedial work.

7. Discussion

- 7.1 I consider the expert's report establishes that the current performance of the cladding is not adequate because it is currently allowing water penetration into the building. Consequently, I am satisfied that the house does not comply with Clause E2 of the Building Code.
- 7.2 In addition, the building work 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 house may allow the ingress of moisture in the future, the building work does not comply with the durability requirements of Clause B2.
- 7.3 Because the faults identified with the claddings occur in discrete areas, I am able to conclude that satisfactory investigation and rectification of the items outlined in paragraphs 5.5, paragraph 6.4.2 and paragraph 6.4.4 will result in the house being brought into compliance with Clauses B2 and E2.
- 7.4 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 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. What is to be done now?

- 8.1 I note that that the authority has issued a notice to fix that requires the cladding to be replaced. Under the Act, a notice to fix can require the owner to bring the additions into compliance with the Building Code. The Building Industry Authority has found in a previous Determination 2000/1 that a Notice to Rectify (the equivalent to a notice to fix under the Building Act 1991) cannot specify how that compliance must be achieved. I concur with that view.
- 8.2 The authority should now issue a new notice to fix that requires the owners to bring the building up to compliance with the Building Code, incorporating the investigations and defects listed in paragraphs 5.5, 6.4.2, and 6.4.4, and referring to any further defects that might be discovered in the course of that work. The notice to fix should not specify how those defects are to be fixed, that is a matter for the owner to propose and for the 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 authority should issue the new notice to fix. The owner should then produce a response to this in the form of a detailed proposal, 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 be referred to the Chief Executive for a further binding determination.

9. The decision

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

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 11 August 2008.

John Gardiner
Manager Determinations