

Determination 2006/61

Refusal of a code compliance certificate for a building with a “monolithic” cladding system at 4B Arirang Rise, Pinehill



1. The dispute 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, Determinations Manager, Department of Building and Housing, for and on behalf of the Chief Executive of that Department. The applicant is the owner, Mr Calcott (“the applicant”), and the other party is the North Shore City Council (“the territorial authority”).
- 1.2 The dispute for determination is whether the territorial authority’s decision to decline to issue a code compliance certificate for a 10-year-old house because it was not satisfied that the monolithic cladding complied with clauses B2 “Durability” and E2 “External Moisture” of the Building Code² (First Schedule, Building Regulations 1992) is correct.

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 questions to be determined are:

Issue 1: The cladding

Whether I am satisfied on reasonable grounds that the monolithic 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 monolithic wall cladding as installed” I mean the components of the system (such as the backing sheets, the flashings, the joints and the plaster and/or the coatings) as well as the way the components have been installed and work together.

Issue 2: The additional durability considerations

Whether certain building elements, which have 5 and 15-year durability requirements, comply with clause B2 of the Building Code considering the time that has elapsed since the elements were constructed.

- 1.4 In making my decision, I have considered the submissions of the parties, the report of the independent expert commissioned by the Department to inspect the house (“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. I have not considered any other aspects of the Act or the Building Code.

2. The building

- 2.1 The building work consists of a two-storey house situated on a sloping site, which is in a high wind zone for the purposes of NZS 3604. The house has four different levels, with the two ground floor levels set to accommodate the slope of the site. Construction is conventional light timber frame, with concrete slabs and foundations, concrete block retaining walls, aluminium windows and monolithic wall cladding. The house shape is complex in plan and form, with 30° pressed metal hip and mono-pitched roofs over the upper levels and the lower garage projection to the south. Other ground floor projections have 15° hip and mono-pitched lean-to roofs at varying levels. Eaves projections are 500mm above ground floor walls and vary from 220mm to 320mm above upper walls, with no verge projections. Timber steps and deck areas lead up to the house from the southwest driveway, with a monolithic clad balustrade that butts into the wall at the entry. A small spaced timber deck extends from the southwest wall of the dining area, with the roof extending as a canopy above. Further timber decks extend to the north from the family and kitchen areas.
- 2.2 I have received no evidence as to the treatment of the wall framing timbers. I note that the building consent was issued on 30 December 1994, and the expert observed that this date suggests that the house may have been built prior to the introduction of untreated timber framing. However the territorial authority has noted in a letter to the applicant (refer paragraph 3.3) that the exterior wall framing is untreated. I therefore consider that the external wall framing is unlikely to be treated.

- 2.3 The cladding system on the building is what is described as monolithic cladding, and consists of 7.5 mm thick fibre cement sheets fixed through the building wrap to the framing, and finished with an applied flush-finished textured coating system.
- 2.4 I have seen no evidence of producer statements or warranties for the cladding.

3. Sequence of events

- 3.1 The territorial authority issued a building consent on 30 December 1994 and carried out various inspections during the course of construction, including prior to lining installation and following lining installation. The final inspection was undertaken on 21 December 1995, and the inspection summary notes that a list of items to be rectified was left with the owner and that a “recheck is required”. It appears that no further inspections were made until the owner applied for a code compliance certificate.
- 3.2 In response to a request for a code compliance certificate, the territorial authority carried out a visual “recheck” inspection on 11 October 2004, and the inspection summary notes “Face fixed Harditex – therefore left weathertightness letter with builder”. The inspection record also notes:

It would appear that the cladding has deteriorated since the last inspection – cracks noted to east and west elevation. I advised the builder that a full report would be documented at the weathertightness inspection.

- 3.3 The territorial authority carried out a visual “weathertightness” inspection on 16 November 2004. In a letter to the owner dated 29 November 2004, the territorial authority stated that the Building Code required the durability of the cladding to be 15 years and that of the timber framing to be 50 years. The territorial authority also noted that the inspection process for monolithic claddings had changed since the time that the building consent for the house was processed. The territorial authority listed certain weathertightness risk factors identified with the building, together with a list of defects and stated that, due to the risk factors and defects, it could not be satisfied on reasonable grounds that the cladding system complied with clauses E2 and B2 of the Building Code.
- 3.4 The territorial authority did not issue a Notice to Rectify as required under section 43(6) of the Building Act 1991.
- 3.5 An application for a determination was received by the Department on 11 November 2005.

4. The submissions

- 4.1 In a note accompanying the application, the applicant noted that, due to a past dispute with the builder, he was unable to supply detailed documentation.

4.2 The applicant forwarded copies of:

- the building plans
- the letter from the territorial authority.

4.3 The territorial authority a submission in the form of a letter to the department dated 15 March 2006, which summarised the consent and inspection processes related to the building work, and noted that:

In regards to this application for a determination, the matters of doubt are:

- *Whether the installed cladding system complies with clauses B2.3.1 and E2.3.2 of the Building Code.*
- *Whether all other building elements incorporated in this building comply with clause B2 of the Building Code, considering the age of construction.*

4.4 The territorial authority forwarded copies of:

- the building plans
- some of the consent documentation
- the inspection records
- the letter to the applicant.

4.5 Copies of the submission 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.

4.6 A copy of the draft determination was forwarded to the parties for comment on 28 March 2006. The territorial authority accepted the draft.

4.7 In a letter to the Department dated 11 April 2006, the applicant requested an extension of time and commented on the draft determination, including that:

- builders had advised him that untreated timber framing was not used before 1997, while the building consent for this house was issued in December 1994
- the roof framing is stamped as treated, so the wall framing should be the same
- the moisture readings are based on the expert's doubtful opinion that the timber framing is untreated, so analysis of a timber sample may be necessary
- it should not be possible for the framing to be closed in without appropriate inspections and "proper care and standards being adhered to with the exterior cladding"

- the expert and the territorial authority should have contacted the builder for his response on the comments in paragraph 5.4 on materials and poor workmanship.

4.8 In a letter to the applicant dated 20 April 2006, the Department explained and clarified how the timber treatment of the external wall framing related to the determination, including that:

- While interdependent, the weathertightness of the cladding is a separate matter to the treatment level and durability of the external wall framing
- the determination notes the likely treatment as part of the description of the house, but this does not affect the conclusion and decision
- further investigation and analysis of the timber may be carried out, but this is not obligatory
- while the expert considered the timber was probably treated, the territorial authority's opinion differed – which results in uncertainty as to the treatment
- if the timber is boric treated, it will provide some limited protection against decay, but opinions differ as to the extent of protection afforded
- the fact that the roof framing is stamped as treated does not necessarily indicate what, if any, treatment was used for the wall framing.

4.9 The applicant verbally advised the Department on 20 June 2006 that no further submission would be made.

5. The expert's report

5.1 The expert inspected the claddings of the building on 9 and 13 February 2006, and furnished a report that was completed on 17 February 2006. The expert noted that the cladding was of a “generally poor standard with disregard of manufacturers specifications”.

5.2 The expert took non-invasive moisture readings through interior linings at skirting level, under windows and at other risky areas throughout the house, and noted a number of elevated readings. The expert also noted signs of moisture damage to skirtings, linings and carpet fixings in the garage and front entry. Musty odours were also noted in the family and dining areas, and in the ground floor toilet, despite the inspections taking place following a relatively dry season.

5.3 More than 90 invasive moisture readings were taken through the wall cladding, at window sills, bottom plates and other risky areas, and more than 60 elevated readings were recorded. Areas where elevated readings were recorded are as follows:

Northeast elevation

- 19% to 22% around the door and window to the family room

- 19% to 23% at cracks in the two storey section of cladding
- 21%, 24% beneath the window sill of the ground floor toilet
- 22%, 28% beneath the pipe penetrations through the toilet wall
- 20%, 21% beneath the window sill of the ground floor study
- 18% to 24% in the bottom plate, door and window sill of the garage
- 18% to 21% in the bottom plate of the upper ensuite, below roof junctions

Northwest elevation

- 19% to 20% beneath the window sills of the family and dining areas
- 18% to 31% in the bottom plate of the dining area

Southwest elevation

- 18% to 31% beside the full-height windows of the living room
- 24% to 32% at the junction of the external stair balustrade with the entry wall
- 18% to 20% in the bottom plates beside the entry door
- 18% in the bottom plates beside the garage door
- 19%, 20% beneath the window sill of the upper level bedroom 2

Southeast elevation

- 19% to 20% in the bottom plate of the garage wall
- 19% to 21% beneath the window sills of the garage
- 19% to 20% beneath the meter box
- 21% to 22% under the garage roof to wall junction
- 28% under the pipe penetration
- 18% to 24% under the ensuite, study and kitchen window sills

Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure. The expert noted that the readings were not adjusted for timber treatment.

As noted in paragraph 2.2, I consider that the timber is unlikely to be treated and that no adjustment to the moisture readings, on account of treatment, is therefore necessary. However, I also note that if the timber were boron-treated, the unadjusted

readings (as noted above) of 21% or more would still indicate the presence of moisture in the framing.

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

- no control joints have been provided, and there are cracks and bulges to cladding joints, external and internal corners and sheet joints under windows
 - there are no vertical control joints in the 6m southeast lower wall, or in the 8.9m southeast, 5.7m northeast and 7.2m northwest upper walls - where the wall dimensions exceed the 5.4 m limit between control joints for flush-finished fibre cement recommended by manufacturers of this type of cladding
 - no horizontal control joint has been provided on the two-storey wall to the northeast elevation
- the overlap of the cladding over the concrete foundation walls is less than the 50mm recommended by manufacturers of this type of cladding
- the cladding butts against the timber of the deck areas, and against the paving at the entry
- the projections of the aluminium head flashings past the window jambs are poorly sealed and the end of the raking head flashing is not stop-ended
- windows are face-fitted against unsealed fibre cement, with no flashings at jambs or sills and no evidence of any sealant behind jamb flanges. The coating beside the dining area window jamb is cracked, with bare fibre cement exposed
- there is no head flashing to the garage door
- the bottoms of the apron flashings at roof to wall junctions are poorly weatherproofed, with no kickouts, gaps, gutters and fascias buried in the coating, unsealed fibre cement and poor flashings
- the junction of the external entry stair balustrade to the wall is poorly weatherproofed, and cracking and moisture penetration is evident
- pipe penetrations are unsealed or poorly sealed, and the meter box relies on sealant for weatherproofing.

5.5 A copy of the expert's report was provided to each of the parties on 28 February 2006.

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 Solution³, which in this case is 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 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.

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 determinations (refer to Determination 2004/1 *et al*) 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 building:

- is built in a high wind zone
- is a maximum of two storeys high
- has spaced timber decks from ground floor areas
- is complex in plan and in form, with many wall to roof junctions

³ 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.

- has no verge projections and eaves projections that vary from 220mm to 500mm
- has monolithic cladding which is fixed directly to the framing
- has external wall framing that is unlikely to be treated, so providing no resistance to the onset of decay if the framing absorbs and retains moisture.

6.2.2 When evaluated using the E2/AS1 risk matrix, these factors show that all elevations of the building demonstrate a high weathertightness risk. 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.

6.3 Weathertightness performance

6.3.1 I find that the monolithic cladding system generally, including the windows, does not appear to have been installed according to good trade practice. As a result, there are significant defects identified in paragraph 5.4, which are likely to have contributed to the moisture already evident in many areas in the external walls of this house.

7. Conclusion

7.1 I am satisfied that the current performance of the monolithic cladding is not adequate because it has not been installed according to good trade practice and is allowing water penetration into the walls at a significant number of locations at present. I have also identified the presence of some known weathertightness risk factors in this design. The presence of the risk factors on their own is not necessarily a concern, but they have to be considered in combination with the significant defects, identified in paragraph 5.4, in the cladding system. It is that combination of risk factors and defects, together with the current moisture penetration, that indicate that the structure does not have sufficient provisions that would compensate for the lack of a full drainage cavity. Consequently, I am satisfied that the cladding system as installed on 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 faults on the building are likely to allow the ingress of moisture in the future, the house does not comply with the durability requirements of clause B2.

7.3 I find that because of the apparent complexity and extent of the defects that have been identified in this house, I am unable to conclude, with the information available to me, that remediation of the identified defects, as opposed to partial or full recladding, could result in compliance with clauses B2 and E2. I consider that any

final decisions on whether code compliance can be achieved by either remediation or recladding, or a combination of both, can only be made after a more thorough investigation of the cladding and underlying wall framing. This will require a careful analysis by an appropriately qualified expert as to the correct remedial option to be followed. Once that decision has been made, it should be submitted to the territorial authority for its comment and approval. If the territorial authority chooses to reject the proposal, then the owner is entitled to seek a further Determination that will rule on whether the proposed remedial work will comply with the requirements of clauses E2 and B2.

7.4 Effective maintenance of claddings (in particular of 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. Clause B2.3.1 of the Building Code requires that the cladding be subject to “normal maintenance”, however, that term is not defined in the Act.

7.5 I take the view that normal maintenance is that work generally recognised as necessary to achieve the expected durability for a given building element. With respect to the cladding, the extent and nature of the maintenance will depend on the material, or system, its geographical location and level of exposure. Following regular inspection, normal maintenance tasks shall include but not be limited to:

- where applicable, following manufacturers’ maintenance recommendations
- washing down surfaces, particularly those subject to wind-driven salt spray
- re-coating protective finishes
- replacing sealant, seals and gaskets in joints.

7.6 As the external wall framing of this building is likely to be untreated, periodic checking of its moisture content should also be carried out as part of normal maintenance.

Issue 1: The cladding

8. The decision

8.1 In accordance with section 188 of the Act, I hereby determine that the monolithic cladding system as installed does not comply with clauses E2 and B2 of the Building Code. Accordingly, I 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 rectify. A notice to fix should be issued requiring the owners to bring the house into compliance with the Building Code. The notice to fix may list the items to be rectified but it should not specify how compliance is to be achieved as this is for the owner to propose and for the territorial authority to accept or reject. It is important to note that the Building Code allows for more than one method of achieving compliance.

- 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 a notice to fix, listing all the items that the territorial authority considers to be 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.

Issue 2: The additional durability considerations

9. Discussion

- 9.1 I note that 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 “from the time of issue of the applicable code compliance certificate”.
- 9.2 As set out in paragraph 3.3, the territorial authority has concerns about the durability, and hence the compliance with the Building Code, of certain elements within the building, taking into account the completion of the building in 1995. In the draft determination sent to the parties in March 2006 I made an interim decision on the matter of the durability by determining that there be a waiver or modification of the Building Code requirements relating to durability. Since then, I have received some general legal advice on waivers and modifications. As this advice is not clear, I subsequently have sought clarification of some aspects of that advice.
- 9.3 Until I receive the clarification will I suspend making a decision about the additional durability considerations. This will enable me to now determine matters related to the compliance of the cladding so that the steps outlined in paragraph 8.3 can commence. I will issue a second determination limited to the durability considerations as soon as possible.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 29 June 2006.

John Gardiner
Determinations Manager