

## Determination 2007/13

### Refusal of a code compliance certificate for a building with a monolithic cladding system at 237 Paremoremo Road, Albany



#### 1. The matters to be determined

- 1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004<sup>1</sup> (“the Act”) made under due authorisation by me, John Gardiner, Determinations Manager, Department of Building and Housing (“the Department”), for and on behalf of the Chief Executive of that Department. The applicants are the owners, Mr and Mrs Natautama (“the applicants”) and the other party is the North Shore City Council (“the territorial authority”).
- 1.2 The matter for determination is the territorial authority’s decision to refuse to issue a code compliance certificate for a house because it was not satisfied that it complied with clauses B2 “Durability” and E2 “External Moisture” of the Building Code<sup>2</sup> (First Schedule, Building Regulations 1992).

<sup>1</sup> The Building Act 2004 is available from the Department’s website at [www.dbh.govt.nz](http://www.dbh.govt.nz).

<sup>2</sup> The Building Code is available from the Department’s website at [www.dbh.govt.nz](http://www.dbh.govt.nz).

- 1.3 The matters for determination are whether:

**Matter 1: The Cladding**

the cladding as installed to the walls of the building (“the cladding”) complies with 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.

**Matter 2: The durability considerations**

the elements that make up the building work comply with clause B2, taking into account the age of the building.

- 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 advise on this dispute (“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.

**2. The building**

- 2.1 The building work consists of a detached house situated on a sloping site which is in a high wind zone for the purposes of NZS 3604<sup>3</sup>. The house is generally two storeys high, with ground floor projections to all elevations and a basement garage beneath the single-storey southwest end of the building. Construction is conventional light timber frame, with a concrete slab to the basement and a timber-framed sub-floor elsewhere, concrete block perimeter foundations and retaining walls, aluminium windows and monolithic wall cladding.
- 2.2 The house shape is fairly simple in plan and form, with 27° pitch pressed metal tile hip roofs over lower and most upper roofs, with two gables projecting to the northeast and southeast. Eaves projections are generally 450mm wide and verges are 300mm except for parts of the northwest and southeast lean-tos where there are no verge projections and the gutter is the only eaves projection. Large curved-top windows (with decorative borders) are installed within the northeast and southeast gable walls. The latter gable projects about 600mm above the entry, with paved steps and monolithic clad balustrades leading up from the driveway to the landing, which has tiles over a fibre-cement substrate.
- 2.3 An attached timber-framed deck, with spaced timber slats and metal and glass balustrades, extends from the entry landing to the east corner, where the deck is recessed beneath the lower roof (which is supported by a monolithic-clad column at the east corner).
- 2.4 The expert noted that the age, condition and appearance of the external framing he was able to inspect suggested that the timber was boric treated. Although the

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<sup>3</sup> New Zealand Standard NZS 3604:1999 Timber Framed Buildings

specification calls for wall framing to comply with NZS 3602 (which at the time of construction would permit untreated timber), based on the expert's observations I accept that the timber is likely to be borically treated and therefore has some limited resistance to fungal decay.

- 2.5 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. The inter-storey bands and window borders are polystyrene fixed over the unsealed fibre cement backing sheets, prior to the application of the coating system.
- 2.6 I have received no evidence of producer statements or warranties for the cladding.

### **3. Sequence of events**

- 3.1 The territorial authority issued building consent number A10566 on 13 March 1996 and undertook various inspections during construction, including a preline inspection on 2 August 1996. There are no records of any further inspections, but it appears that the work was substantially completed by the end of 1996.
- 3.2 It appears that no further inspections were carried out until the applicants requested a code compliance certificate and the territorial authority carried out a final inspection on 18 January 2005.
- 3.3 The final inspection identified a number of outstanding items, and also noted "call for a weathertight inspection as monolithic cladding with no cavity has been used." The territorial authority subsequently carried out a visual inspection and wrote to the applicants on 4 February 2005, stating 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. The territorial authority also stated that, due to the age of construction, it could not verify compliance of other building elements with the durability provisions of the code.
- 3.4 The territorial authority did not issue a notice to fix as required under section 164(2) of the Building Act 2004, and I am not aware of any further correspondence between the parties.
- 3.5 On 30 August 2006, the Department received an application for a determination from the owners.

## **4. The submissions**

- 4.1 Within the application, the applicants noted that the matters for determination were the weathertightness and durability issues raised in the territorial authority's letter dated 4 February 2005.
- 4.2 The applicants forwarded copies of:
- the consent drawings and specification
  - the consent documentation
  - some of the inspection records
  - the letter from the territorial authority dated 4 February 2005
  - various producer statements, calculations and other statements.
- 4.3 Copies of the applicants' submission were provided to the territorial authority, which made no submission in response.
- 4.4 A copy of the draft determination was sent to the parties for comment on 6 December 2006. Both parties accepted the draft determination.

## **5. The expert's report**

- 5.1 The expert inspected the claddings of the building on 9 October 2006, and furnished a report that was completed on 13 October 2006. The expert noted that the cladding generally appeared to demonstrate a "failure to observe the manufacturer's instructions".
- 5.2 The expert noted that the two curved-top windows had plastered polystyrene border bands, with the sill band projecting out from and beyond the jambs. Other windows and doors were face-fixed with metal head flashings and no sill flashings. The expert scraped away small sections of coating at the head and jamb of a window, to inspect the installation. I accept that these locations are typical of similar locations around the house.
- 5.3 The expert took non-invasive moisture readings through internal linings of exterior walls throughout the house, and noted elevated readings and signs of moisture damage at skirting level in the garage, living room and family room. Almost 70 invasive moisture readings were taken through the wall cladding, at window sills, bottom plates and other risky areas, and 38 readings were over 21% (equivalent to 18% when adjusted for boric treatment) as follows:
- 22% to more than 40% at window and door sills.
  - 26% to more than 40% in bottom plates.

- 28% to 30% below the inter-storey polystyrene band.
- 23% below roof to wall junctions at the entry gable wall.
- 24% to more than 40% in the framing at the top of the monolithic clad entry balustrade and at balustrade to wall junctions

Moisture levels above 18% (equivalent to 21% for boric treated) recorded after cladding is in place generally indicate that external moisture is entering the structure.

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

- there are no vertical control joints in five walls where the cladding length exceeds the 5.4m limit between such joints recommended by the manufacturer
- the inter-storey cladding junction at the garage walls is unflushed, with the flat topped polystyrene band fixed over unsealed damp fibre-cement backing sheets
- there are numerous cracks in the cladding (including in line with window jambs, indicating that the backing sheet layout does not accord with the manufacturer's instructions), with popped nailheads in some areas
- there is no anti-capillary gap where the cladding overlaps the lower concrete block foundation wall
- there are no clearances from the cladding to paving at the garage and entry areas, and soil covers the bottom of the cladding in a number of areas (including against parts of the monolithic-clad entry balustrades)
- the timber slats of the deck butt against unsealed fibre-cement (with no drainage gap) at the walls and column cladding
- the windows are fixed against unsealed fibre-cement, with no seals behind the jamb flanges and the coating applied after installation. There are no drainage gaps at the window sill flanges and above the head flashings – risking moisture being trapped within the framing
- the curved top window have no head flashings, relying on the polystyrene borders for weathertightness. The borders are fixed over unsealed fibre-cement, with the cladding coating continuous, and the flat topped sill bands butt against the window sill flanges – with no drainage gap
- at the entry landing, moisture is penetrating through the tiled surface into the fibre-cement substrate, with water staining and fungi apparent on the underside and dampness in the framing and subfloor area indicating a lack of ventilation
- the flat plastered tops of the entry balustrades are inadequately flashed at the tops and at the junctions with the walls – and moisture is entering the framing, with signs of decay in the timber

- exterior light fixings and cable penetrations through the cladding are unsealed (with signs of decay), and the meter-box lacks a head flashing
  - the roof to wall junctions are poorly weatherproofed, with gaps, bare timber and unsealed fibre-cement showing in some areas.
- 5.5 The expert also noted that polythene had been laid over the subfloor soil, but water was ponding in the foundation trenches and the subfloor space was inadequately ventilated.
- 5.6 A copy of the expert's report was provided to each of the parties on 17 October 2006.

## Matter 1: The Cladding

### 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 Solution<sup>4</sup>, 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 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<sup>5</sup> (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.

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<sup>4</sup> 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](http://www.dbh.govt.nz).

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

## 6.2 Weathertightness risk

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

- is built in a high wind zone
- is a maximum of two storeys high
- is fairly simple in plan and form
- has a spaced timber deck at ground floor level
- has eaves of 450mm and verge projections of 300mm over most walls
- has monolithic cladding that is fixed directly to the framing
- has external wall framing that is likely to be treated to a level that will provide some resistance to the onset of decay if the framing absorbs and retains moisture.

6.2.2 When evaluated using the E2/AS1 risk matrix, all elevations of this house demonstrate a moderate weathertightness risk rating. The matrix is an assessment tool that is intended to be used at the time of application for consent, before 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 It is clear from the expert's report that the monolithic cladding installed on the house is unsatisfactory in terms of its weathertightness risk and performance, and considerable work is required to make the building code compliant. The work is likely to include replacement of decayed timber and re-cladding of the house.

## 6 Discussion

7.1 Taking into account the expert's report, I am satisfied that the current performance of the monolithic cladding is inadequate because it has not been installed according to good trade practice and to the manufacturer's instructions. In particular, the cladding demonstrates the key defects listed in paragraph 5.4, which are likely to have contributed to the significant and widespread levels of moisture penetration evident within the external walls of this building. I have also identified the presence of a range of known weathertightness risk factors in this house. 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 faults identified in the cladding system. It is that combination of risk factors and faults that indicate that the structure does not have

sufficient provisions that would compensate for the lack of a drained and ventilated cavity. Consequently, I am not satisfied that the cladding system as installed complies with clause E2 of the Building Code.

- 7.2 In addition, the house 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 life, and that includes the requirement for the house to remain weathertight. Because the cladding faults on the building are allowing the ingress of moisture now and will do so in the future until repairs have been made, the house does not comply with the durability requirements of clause B2.
- 7.3 I also note the expert's comment in paragraph 5.5, and draw the subfloor dampness and lack of ventilation to the attention of the territorial authority.
- 7.4 I find that, because of the extent of moisture penetration and apparent complexity of the faults that have been identified with the cladding, I am unable to conclude, with the information available to me, that remediation of the identified faults, as opposed to partial or full re-cladding, could result in compliance with clause E2. I consider that final decisions on whether code compliance can be achieved by either remediation or re-cladding, or a combination of both, can only be made after a more thorough investigation of the cladding. This will require a careful analysis by an appropriately qualified expert. Once that decision is made, the chosen remedial option should be submitted to the territorial authority for its comment and approval. If the territorial authority chooses to reject the proposal, then the applicants are entitled to seek a further Determination on whether the proposed remedial work will led to compliance with the requirements of clauses E2 and B2.

## **Matter 2: The durability considerations**

### **8 Discussion**

- 8.1 As set out in paragraph 3.3, it appears that the territorial authority has concerns about the durability, and hence the compliance with the building code, of certain elements of the building, taking into consideration the completion date of the building at the end of 1996.
- 8.2 The relevant provision of clause B2 of the Building Code recognises that building elements must, with only normal maintenance, continue to satisfy the performance requirements of the Building Code for certain periods ("durability periods") "from the time of issue of the applicable code compliance certificate" (clause B2.3.1).
- 8.3 The territorial authority has sought a waiver of this requirement so that the durability period commences from a date earlier than the date of the issue of the code compliance certificate.
- 8.4 In previous determinations (refer Determination 2006/85 et al) I have taken the view that a waiver can be granted if I can be satisfied that the building complied with the



durability requirements at a date agreed to by the parties and that, if there are matters that are required to be fixed, they are discrete in nature.

- 8.5 Because of the extent of the defects in the cladding, and the possible consequential impact on the building's timber framing and therefore its structure, coupled with the lack of evidence I have regarding the compliance of the remaining building elements other than the cladding, I am not satisfied that I have sufficient information on which to make a decision about this matter. However, the matter may be referred to the Department for a further determination once the cladding and all associated work has been made code compliant.

## **9 The decision**

- 9.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the cladding does not comply with clauses B2 and E2 of the Building Code, and accordingly confirm the territorial authority's decision to refuse to issue a code compliance certificate.
- 9.2 I note that the territorial authority has not issued a notice to fix as required by section 164(2). A notice to fix should be issued that requires the applicants to bring the building into compliance with the Building Code. The notice to fix may list the defects but it cannot specify how the defects are to be fixed. That is a matter for the applicants 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.
- 9.3 I would suggest that the parties adopt the following process to meet the requirements of paragraph 9.2. 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 detailed 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 2 February 2007.

John Gardiner  
**Determinations Manager**