

Determination 2006/93

Refusal of a code compliance certificate for a building with a monolithic cladding system at 17 Bradey Road, Pauatahanui, Porirua



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 Mr Swinn (“the applicant”) on behalf of the owner Swinn and Feasey Family Trust and the other party is the Porirua 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 6-year-old house because it was not satisfied that the monolithic cladding system to the walls of the house 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 question to be determined is whether I am satisfied on reasonable grounds that the monolithic cladding as installed to the walls of the building (“the cladding”), complies with the Building Code (see sections 177 and 188 of the Act). By “the monolithic 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 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. 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 large detached house situated on an excavated sloping coastal site, which is in a very high wind zone for the purposes of NZS 3604³. The house comprises a main 2-storey block (with an attached single storey garage at the south end), which is connected by a narrow low-level link to a smaller single storey wing. The resulting L-shape bounds two sides of a courtyard, which is enclosed by plastered concrete block wall with a small projecting “entry annex” that provides the main entrance to the house from beyond the courtyard. Construction is a combination of conventional light timber frame and specifically engineered areas, with concrete slabs and foundations, and concrete block retaining walls to the garage, which has a basement area housing a watertank. The house shape is moderately complex in plan and form with aluminium windows, monolithic cladding, low-pitched profiled metal roofs with monolithic-clad parapets and flat membrane roofs over various “box” projections. A membrane-roofed “pop-up” roof structure projects above a gallery area in the single storey wing.
- 2.2 The top floor of the main block overhangs the lower north wall, and is supported on plastered concrete block columns. A narrow timber deck, with timber slats and balustrade, runs along the south part of the east wall of the main block. A plastered concrete block chimney extends up the west wall of the single storey wing.
- 2.3 I have received no evidence of the treatment, if any, of the external wall framing of the house. The specification calls for wall framing to comply with NZS 3602, which at the time of construction would permit untreated timber, and I therefore consider that the external wall framing is unlikely to be treated.
- 2.4 The cladding is a monolithic cladding system described as stucco over a solid backing. In this instance it consists of 4.5 mm “Hardibacker” sheets fixed through the building wrap directly to the framing timbers, and covered by a slip layer of building wrap, metal-reinforced 20 mm thick solid plaster and a flexible paint coating. The plaster is continuous over the concrete foundation walls, columns and chimney.

³ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

- 2.5 Orico Texture Coatings provided 10-year warranties on materials (27 June 2003) and on workmanship (from 16 June 2003) for the coating system. I have seen no evidence of producer statements or warranties for the cladding system.

3. Sequence of events

- 3.1 The territorial authority issued a building consent (990733) on 23 March 1999, and undertook various inspections during construction, including a pre-line on 8 October 1999. A note (dated 31 May 1999) in the territorial authority’s inspection summary records:

“Amended backing to solid plaster only acceptable if to specification, recommendations of products etc...”.

- 3.2 In a letter to the territorial authority dated 22 June 2000, Mr Parsonson (“the architect”) confirmed that he had observed the construction of the house, and noted that the plaster on riblath over Hardibacker complied with the manufacturer’s specified system and had been checked by a Hardies representative and an inspector from the territorial authority. The territorial authority’s inspection summary does not record the latter, but does record a final inspection on 9 September 2000, with a note “Require copy of engineers inspections”.

- 3.3 It appears that no code compliance certificate was issued, and no further inspection was undertaken until the owners marketed the property for sale in 2005. Another final inspection was carried out on 22 April 2005, and the inspection summary notes that the work was not code compliant although outstanding items were not identified.

- 3.4 The owners subsequently arranged for a “condition” inspection of the house to be carried out by a house inspection company (“the consultant”) on 2 May 2005. The consultant’s report notes that non-invasive testing recorded no elevated moisture levels except at the entrance annex (which was noted as possibly due to a leaking door). The report generally concluded that the house was “in good condition for its age”, although some defects were identified and some repairs and modifications were advised.

- 3.5 In a facsimile to the architect dated 5 July 2005, the applicant attached a copy of the consultant’s inspection report and requested advice as to what needed to be completed as a result of the report’s findings, noting:

As you know, we discovered the Bradey Road house did not have a Code of Compliance confirmed before we moved in and the council is now insisting on any crack issues being sorted out before issuing one. Consequently we have lost the buyers for the house and we are having to go through the process of sorting this out...

- 3.6 I have received no evidence of what, if any, remedial work was subsequently carried out. The owners requested a “re-check” inspection and (following an inspection on 14 February 2006) the territorial authority wrote to the applicant on 16 February 2006, stating that the cracking to the exterior wall cladding on all elevations remained an important problem and noting:

The building work completed does not meet the requirements of the New Zealand Building Code, a Code Compliance Certificate will not be issued by Porirua City Council.

3.7 The territorial authority did not issue a notice to fix as required under section 164(2) of the Building Act 2004.

3.8 An application for a determination was received by the Department on 6 May 2006.

4. The submissions

4.1 Within the application, the applicant stated that the matter for determination was:

Due to a builder/Council mixup, a CCC was never issued. The Council now identifies issues and we need determination on what is now required to qualify for CCC.

4.2 The applicant forwarded copies of:

- the plans
- the consultant's report on the building condition
- some of the correspondence with the architect
- the letter dated 16 February 2006 from the territorial authority
- various other statements.

4.3 The territorial authority made no submission, but forwarded copies of:

- the specification
- some of the inspection records
- engineering calculations and producer statements
- various other warranties and other statements.

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

5. The expert's report

5.1 The expert inspected the claddings of the building on 15 June 2006, and furnished a report that was completed on 30 June 2006. The expert noted that the exterior wall framing was 150mm x 50mm and the plaster thickness appeared adequate, although it appeared to have been poorly maintained with many cracks apparent. The expert noted that adequate numbers of vertical and horizontal control joints had been installed, and ground clearances were adequate in most areas.

- 5.2 The expert noted various variations from the consent drawings, including:
- the omission of the pergola and the roof deck over the garage
 - the garage roof changed from membrane to profiled metal
 - the stucco cladding system amended to incorporate Hardibacker (which appeared not to have been formally approved).
- 5.3 The expert removed a small section of plaster at the sill of a window on the west elevation, and noted that a sill flashing had been installed beneath the plaster. The expert noted that the windows were recessed into the wall thickness, with no head flashings and a weathergroove across the upper reveal as a drip edge. The jambs appeared to be weatherproofed with sealant, with no jamb flashings.
- 5.4 The expert also removed sections of plaster at horizontal and vertical control joints to inspect their construction. A maximum moisture content reading was obtained at this location.
- 5.5 The expert noted that signs of severe moisture penetration were evident in the entrance annex, with wet linings, sodden framing and signs of timber decay. Water marks on the framing in the unlined garages were also noted, along with the presence of slaters indicating moisture. The expert removed a section of lining at the bottom plate of an upper level bedroom, and a moisture reading of 21% was noted. Non-invasive testing was not continued on discovering that the framing was 150 x 50 (as moisture is more difficult to detect with the greater depth of the studs). The expert selected three sample exterior locations on the west elevation to carry out invasive moisture testing, and all three recorded elevated readings. The expert removed small sections of cladding in each location and noted readings and observations as follows:
- 56% at the bottom plate of the lower wall adjacent to a drainage outlet and beside a control joint with corroding mesh and bracing strap, wet fibre cement sheets and framing, and signs of decay in the timber
 - 25% in the timber under a window sill (also below a crack)
 - 25% in the framing at a junction of horizontal and vertical control joints.
- 5.6 The expert made the following comments on the cladding:
- There is no clearance at the bottom of the cladding to the paving beside the living room doors and the verandah to the north, and at the entry annex at the south courtyard wall.
 - The vertical control joints have not been installed in accordance with the manufacturer's instructions, with no Inseal strips behind the joints and evidence of moisture penetration apparent.
 - The inter-storey control joints have not been installed in accordance with the manufacturer's instructions, with plaster filling the joints rather than sealants or flashings.

- There are many cracks in the cladding on all elevations, most (but not all) of which are at control joint positions.
- The joints in the backing sheets are “pouting” in a number of areas.
- The base of the cladding is not in accordance with NZS 4251 (the Code of Practice for solid plastering), with no overlap or drip edge provided. The cladding has an uPVC base moulding set into an edge rebate in the concrete foundation wall (with the plaster continuous over both materials), and moisture is being trapped in the wall.
- The windows are reliant on sealants for weatherproofing, with no jamb or head flashings, gaps are showing and sill flashings are buried within the plaster. Drainage holes in the aluminium windows are blocked, and water is sitting in the sill drainage channel.
- The junction of the courtyard concrete block wall with the cladding is unflushed and a gap has opened.
- The junctions of walls with other materials such as the chimney and column blockwork lack flashings and rely on sealants or plaster for weatherproofing. The horizontal “shoulders” of the chimney appear to lack flashings at the junctions with the stucco.
- While the parapet tops are sloped, the textured cladding allows water to sit.
- The soffit under the overhanging upper floor to the north lacks a drip edge. Drainage holes have been drilled, but cracks and rust stains are apparent.
- The aluminium joinery of the projecting conservatory to the east has been installed into timber frames, and cracks are apparent. While there is no head flashing, the head is sheltered beneath an overhang of about 300mm.
- The projecting box window on the upper east wall has timber trim at the base that traps water.
- The garage door heads lack flashings, weathergrooves or drip edges.
- The base moulding is missing from the bottom of the cladding on the south end of the west wall of the garage, and the bottom of the plaster is eroding.
- The small stone retaining wall butts against the cladding on the south wall of the garage.
- The flat membrane roof above the w.c to the south of the single storey wing is draining back towards the main wall, with water ponding at the junction. The base of the cladding is unprotected, with unpainted fibre cement showing. (Other roof to wall junctions were not inspected but may be similar).

- There are inadequate falls and ponding to some of the membrane-lined internal gutters at the parapets of the main roofs.
- The junctions of parapets with upper walls appear to lack flashings and are reliant on sealant for weatherproofing.
- The stringer of the timber deck to the east butts against the cladding with no drainage gap provided, and the galvanised bolts are rusting.
- The timber deck balustrade butts against the cladding, with no drainage gap.
- The glass beneath the “pop-up” gallery roof slopes back toward a flat sill that allows water to sit (although some protection is provided by the overhang).
- Penetrations through the cladding (including the meterbox) are reliant on sealant that must be well maintained to remain weatherproof, and there are signs of rusting screws and moisture penetration in some areas.
- The slab edge at the front entrance door lacks a rebate.

5.7 The expert also made the following comments:

- There is no record of engineer’s or architect’s inspections (including of bracing).
- The fibre cement backing sheets are fixed with galvanised fixings, which would be unacceptable if the sheets are intended to be bracing, and some bracing straps are severely corroded.
- The garage is unlined and the roof was changed from membrane on plywood to profiled metal, and the bracing appears inadequate.

5.8 On 7 July 2006 copies of the expert’s report were provided to each of the parties.

5.9 Subsequently I have sighted records of the engineer’s inspections, including of bracing.

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 Solution⁴, 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:

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.

- 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 determinations⁵ (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 this house:

- is built in a very high wind zone
- is a maximum of two storeys high
- is moderately complex, with a number of complex roof to wall junctions
- has parapets above most walls
- has monolithic cladding that is fixed directly to the framing
- has external wall framing that is untreated, 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, all the elevations of this house 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

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

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 generally, including the windows, has not been installed according to good trade practice, to the manufacturer's instructions and to the Standard applying now or at the time of construction (NZS 4251⁶). As a result, there are significant defects identified in paragraph 5.6, which are likely to have contributed to the levels of moisture penetration evident within the external walls of this building.
- 6.3.2 I also note the expert's additional comments in paragraph 5.7, and draw these to the attention of the territorial authority.

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. Consequently it is allowing significant water penetration into the walls and decks at a 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 5.6 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 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 extent and apparent complexity of the faults that have been identified with this 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 owner is entitled to seek a further determination on

⁶ New Zealand Standard NZS 4251: Solid plastering; Part 1: 1998 Cement plasters for walls, ceilings and soffits

whether the proposed remedial work will led to compliance with the requirements of clauses E2 and B2.

- 7.4 I draw to the attention of the territorial authority the evidence of timber decay and metal corrosion in several areas, and the likelihood that further investigation may reveal further decay of the untreated wall framing, which could compromise the structural integrity of the building.
- 7.5 Effective maintenance of claddings (in particular of monolithic claddings) 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.
- 7.6 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 should 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.
- 7.7 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.

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 fix. 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 that 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 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 20 September 2006.

John Gardiner
Determinations Manager