



Determination 2009/82

Determination regarding the code compliance of a 12-year-old house with monolithic cladding at 3 Balbriggan Rise, Howick



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, J and M Gibson (“the applicants”), and the other party is the Manukau City Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.

1.2 This determination arises from the decision of the authority to refuse to issue a code compliance certificate for a 12-year-old house because it was not satisfied that it complied with certain clauses of the Building Code² (First Schedule, Building Regulations 1992).

1.3 The matters for determination, in terms of sections 177 and 188 of the Act³, are:

1.3.1 Matter 1: The cladding

Whether the cladding as installed on the house (“the cladding”) complies with Clause B2 Durability and Clause E2 External Moisture of the Building Code. By “the cladding as installed” I mean the components of the systems (such as the backing

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.

³ 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.

materials, the flashings and the coatings), as well as the way the components have been installed and work together.

1.3.2 Matter 2: The durability considerations

Whether the building elements comply with Clause B2 Durability of the Building Code, taking into account the age of the building work.

- 1.4 In making my decision, I have considered the applicants' submission, the reports of the applicants' building consultant ("the consultant"), the report of the expert commissioned by the Department to advise on this dispute ("the expert"), and other evidence in this matter. I have evaluated this information using a framework that I describe in paragraph 6.1.

2. The building work

- 2.1 The building work consists of a single-storey house, which situated on a gently sloping site in a high wind zone for the purposes of NZS 3604⁴. Construction is generally conventional light timber frame, with concrete floor slabs, concrete block foundations, monolithic cladding, aluminium windows and a masonry tile roof.
- 2.2 The house is fairly complex in plan and form, with the 20° pitch gabled roofs set at varying levels. Apart from several areas above bay and corner windows, eaves projections are about 600mm overall, with verge projections at about 300mm. The aluminium windows are bordered with a decorative band and include "corner windows" to various areas.
- 2.3 A monolithic-clad timber framed "chimney" extends through the eaves on the north wall of the living room. An attached timber pergola, supported on monolithic-clad columns, extends from the chimney around the north east corner of the family room. A pergola of similar construction extends above the main entrance to the south.
- 2.4 The monolithic wall cladding consists of 7.5 mm thick fibre-cement sheets fixed directly through the building wrap to the framing, and finished with a textured coating system.
- 2.5 The expert noted no evidence as to timber treatment. The consultant has described the framing as 'kiln dried Radiata pine, which indicates insect protection only'. Given the date of construction in 1996 and the lack of other evidence, I consider the external wall framing is unlikely to be treated to a level that will provide resistance to fungal decay.

3. Background

- 3.1 I have seen no copies of consent documentation or inspection records for the construction of this house. The applicants are the original owners of the house, and the following is based primarily on the background described in their submission.

⁴ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

- 3.2 The authority issued a building consent for the house (No. 960858) in March 1996, under the Building Act 1991, and carried out various inspections during construction. The house was apparently completed in September 1996, with the final inspection identifying three outstanding items. These were subsequently resolved, but a reinspection was not sought at that time.
- 3.3 While preparing to sell the property in 2008, the lack of a code compliance certificate for the house was identified, and the authority was asked to carry out a final inspection. A building consultancy company contracted to the authority (“the authority’s contractor”) inspected the house in August 2008.
- 3.4 During the inspection, the authority’s contractor confirmed that the outstanding items from the 1996 final inspection had been completed. However, due to the monolithic wall cladding, the applicants were advised that the authority now required an ‘independent weathertightness inspection’. A list of ‘approved’ consultants was provided, from which the applicants selected the consultant (“the consultant”).

3.5 The consultant’s first report

- 3.5.1 The consultant inspected the house on 6 September 2008 and provided a report dated 9 September 2008, which described the house construction and various design features considered to be associated with weathertightness problems.
- 3.5.2 The consultant inspected the interior of the house and noted no evidence of moisture penetration. Non-invasive moisture testing on interior wall surfaces was carried out, and no readings above 15% were recorded, with the consultant concluding that there was no evidence of moisture in the wall framing.
- 3.5.3 The consultant also identified various defects and areas which he considered to ‘require some rework to ensure compliance with NZBC clause B2 Durability’.
- 3.6 The applicants forwarded a copy of the report to the authority. In a letter to the applicants dated September 2008, the authority’s contractor advised the applicants to work with the consultant to complete the remedial work, noting:

Any remedial work to injured framing will need to be verified by your expert who will need to issue a final report stating that after completion of the work the building complies with NZ Building Code.

3.7 The consultant’s second report

- 3.7.1 The recommended remedial work was subsequently completed and the consultant reinspected the house and provided a second report dated 11 December 2008.
- 3.7.2 The consultant inspected the areas identified in his first report and noted that a representative from the cladding manufacturer had visited the property to advise on various aspects of the wall cladding.
- 3.7.3 The consultant considered the remedial work to be satisfactory and concluded:

In assessing the remedial works undertaken, it is reasonable to state the constructed external envelope elements of the dwelling would, on reasonable

grounds, comply with NZ Building Code clauses of the period, E2 External Moisture and B2 Durability.

3.8 The applicants forwarded the second report to the authority's contractor under cover of a letter dated 12 December 2008, which requested a code compliance certificate for the house. The authority inspected the house on 22 December 2008.

3.9 The meeting

3.9.1 After receiving no communication following the inspection, the applicants checked with the authority regarding the situation, which led to a meeting with the authority, and the authority's contractor, on 13 February 2009.

3.9.2 According to the applicants, they were informed of the following (in summary):

- The consultant's conclusions were not accepted by the authority yet no clear reason for this was given.
- Regardless of any further reports or testing, the authority would not issue a code compliance certificate due to the age of the construction.
- Although a certificate could have been issued at the time of completion, a determination was the only way to resolve the situation as the authority considered that it was 'not legally permitted to back date a certificate'.

3.10 An agreement for the sale of the house was subsequently made, with the applicants committed to obtaining a code compliance certificate prior to settlement. Several items unrelated to the cladding were identified in the pre-purchase inspection, and these were rectified prior to the application for a determination.

3.11 The Department received an application for a determination on 17 June 2009.

4. The submissions

4.1 The applicants provided a detailed submission that outlined the background to the situation and stated that they believed that the house, in its current condition, complied with the building code requirements that applied at the time of construction.

4.2 The applicants forwarded copies of:

- the consent drawings
- the consultant's reports
- the correspondence with the authority and the authority's contractor.

4.3 The authority acknowledged the application and made a submission in response to the expert's report (refer paragraph 5.8).

4.4 A draft determination was issued to the parties for comment on 13 August 2009. The draft was issued for comment and for the parties to agree a date when the house complied with Building Code Clause B2 Durability.

- 4.5 The parties accepted the draft without comment and agreed that compliance with B2 Durability was achieved on 1 October 1996.

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 Architects. The expert inspected the house on 15 July 2009 and provided a report dated 20 July 2009, which noted that, except for the lack of the gas fire, the house appeared to accord with the drawings.

5.2 The expert noted that, apart from the defects noted below, the cladding generally appeared 'well finished with a uniform surface, free from discolouration, cracks or other signs of premature aging', and the visible parts of flashings appeared to be 'installed competently'. The expert noted that the house had recently been repainted.

5.3 The windows and doors

5.3.1 The expert noted that the aluminium joinery is face-fixed with metal head flashings and no jamb or sill flashings. The expert removed a small section of sealant at the edge of a window jamb flange, and probing identified that no seals were installed between the flange and the backing sheets. I accept that the exposed junction is typical of similar locations elsewhere in the house.

5.3.2 The expert noted that the timber jambs to the entry joinery were installed with the cladding overlapping the edge of the jamb and sealant applied at the junction. The expert scraped away some of the sealant and probing the junction identified that no underlying flashing had been installed. The garage door was installed with a decorative band around the opening and no head or jamb flashings.

5.4 Moisture levels

5.4.1 The expert inspected the interior of the house, taking non-invasive moisture readings internally, and noted some elevated readings and signs of moisture damage at:

- some of the corner windows, with swollen and stained reveals apparent
- the living room carpet below the west apron flashing, with mould and rusting fixings indicating past leaks (although the expert noted that the current invasive moisture level was recorded at only 12%).

5.4.2 The expert took 20 invasive moisture readings through the cladding at areas considered at risk, and noted the following elevated readings:

The corner windows

- 21% in the sill at the north east corner of the family room
- more than 30% in the bay window sill to the living room west wall
- 17% in the sill at the north east corner of bedroom 1

Doors

- 19% in the bottom plate beside the garage east side door
- 30% in the bottom plate beside the family room east doors
- 21% in the bottom plate beside the west garage door
- 17% in the stud adjacent to the west entry door jamb

Pergolas

- 19% in the stud below the pergola penetration at the west entry
- 17% in the east soffit framing below the pergola fixing at the family room
- more than 30% in the framing at the bottom of a pergola column to the entry pergola, with fibrous drillings indicating possible decay.

I note that the lower readings ranged from 12% to 14%. Moisture levels that vary significantly generally indicate that external moisture is entering the structure and further investigation is required.

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

- there are no control joints to walls areas exceeding the 5.4m limit recommended by the manufacturer and there is a crack to a north wall, with recent repainting possibly concealing other cracks
- the cladding to the framed columns extends below ground level, with possible decay in the framing around the structural posts (which are likely to be treated)
- the windows lack seals under the jamb flanges
- the garage door lacks a head flashing, and the timber jambs are unflashed, with moisture apparent
- the corner windows are not weatherproof, with high moisture levels recorded in the corner framing indicating the need for further investigation to establish cause(s) and possible decay in the framing
- the outward-opening family room doors are not weatherproof, with high moisture readings indicating the need for further investigation to establish cause(s) and possible decay in the framing
- although some of the junctions of the pergola timbers with the cladding have been recently sealed, there are elevated moisture levels below fixings, indicating the need for further investigation
- the bottom of the apron flashings lack kick-outs, with recent remedial work relying on sealant for weathertightness. Bare fibre-cement is visible and there is evidence of past leaks into an adjacent living room, indicating the need for further investigation of possible decay in framing associated with the flashings
- the sealant to the top of the meter box is deteriorating.

- 5.6 The expert also made the following comments on the claddings:
- Although there is no clearance from the bottom of the cladding at the main entry paving, the area is recessed and well drained, with no evidence of associated moisture penetration.
 - Although the jambs to the entry door are unflushed, the door is recessed by 900mm, with no evidence of associated water penetration.
 - Although there is a gap under the entry door, the floor is tiled and any moisture blown under the door is unlikely to cause any damage.
- 5.7 A copy of the expert's report was provided to the parties on 21 July 2009.
- 5.8 The authority responded to the report in a letter to the Department dated 4 August 2009. While the authority generally agreed with the report, it made additional observations on areas that it considered 'add to our concerns in relation to other parts of the building'. I have considered these comments as appropriate.
- 5.9 The applicants also responded in a letter to the Department dated 29 July 2009. Comment was made on the ground clearance and the base of the columns which were architectural features only. I have considered these comments during the preparation of this determination.

Matter 1: The wall cladding

6. Evaluation framework for code compliance

- 6.1 In evaluating the design of a building and its construction, it is useful to make some comparisons with the relevant Acceptable Solutions⁵, 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 one or more other provisions to compensate for that in order to comply with the Building Code.

6.2 Weathertightness

- 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. Weathertightness risk factors have also been described in previous determinations⁶

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

(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 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 cladding systems 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.

- 6.3.2 This house has the following environmental and design features which influence its weathertightness risk profile:

Increasing risk

- the house is in a high wind zone
- the house is fairly complex in plan and form, with attached pergolas and corner windows
- the walls have monolithic cladding fixed directly to the framing
- the external wall framing is not treated to a level effective in resisting decay if it absorbs and retains moisture

Decreasing risk

- the house is single-storey
- there are eaves and verge projections to shelter most of the walls.

- 6.3.3 When evaluated using the E2/AS1 risk matrix, the weathertightness features outlined in paragraph 6.3.2 show that one elevation demonstrates a high weathertightness risk rating, two a moderate risk rating and one a low risk rating. I note that, although a drained cavity is now required by E2/AS1 for flush-finished fibre-cement cladding at moderate and high risk levels, this was not a requirement at the time the house was constructed.

6.4 Weathertightness performance: exterior cladding

- 6.4.1 It is clear from the expert's report that the cladding is unsatisfactory as it has not been installed to good trade practice in accordance with the manufacturer's instructions, which has resulted in high levels of moisture penetration and possible decay to the framing.

- 6.4.2 Taking account of the expert's report and the authority's subsequent comments, I conclude that investigation and remedial work is necessary in respect of:
- the lack of vertical control joints and cracks in the cladding (including at the bottom of a column)
 - the lack of clearances at the bottom of the cladding to the columns
 - the lack of clearances at the bottom of the cladding in some other areas
 - the lack of overlaps and capillary gaps between the cladding and the concrete block foundation wall in some areas
 - the lack of seals to the window jamb flanges
 - the lack of adequate weatherproofing to the head and jambs of the garage door
 - the lack of adequate weatherproofing to the corner windows
 - the lack of adequate weatherproofing to the family room doors
 - the lack of adequate weatherproofing to the pergola timber fixings, including at the top of the columns
 - the lack of kickouts to the bottom of the apron flashings
 - the unsealed fixings of the west screen fence through the cladding
 - the deteriorating sealant to the top of the meter box
 - further investigation of the weathertightness at the junctions of the decorative timber frame with the cladding at the west gable end wall
 - investigation of possible decay in framing associated with evidence of current or past moisture penetration, with replacement as required.
- 6.4.3 The inadequate weatherproofing of junctions have contributed to a systemic failure and considerable work is required to make the cladding code compliant, including the removal of cladding and the replacement of any decayed timber. Further investigation is necessary, including the systematic survey of all risk locations, to determine the full extent of timber damage and the repairs required.

6.5 Weathertightness conclusion

- 6.5.1 I consider the expert's report establishes that the current performance of the cladding is not adequate because there is evidence of moisture penetration, and the cladding has not been installed according to the manufacturer's instructions. In particular, it demonstrates the key defects listed in paragraph 6.4.2, which are likely to have contributed to the moisture penetration evident within the external walls.
- 6.5.2 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 authority for its approval.

- 6.5.3 I note that the Department has produced a guidance document on weathertightness remediation⁷. I consider that this guide will assist the owners in understanding the issues and processes involved in remediation work to the cladding in particular, and in exploring various options that may be available to them when considering the upcoming work required to the house.
- 6.5.4 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).

Matter 2: The durability considerations

7. Discussion

- 7.1 The 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 of the building work during 1996.
- 7.2 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 (“durability periods”) “from the time of issue of the applicable code compliance certificate” (Clause B2.3.1).
- 7.3 These durability periods are:
- 5 years if the building elements are easy to access and replace, and failure of those elements would be easily detected during the normal use of the building
 - 15 years if building elements are moderately difficult to access or replace, or failure of those elements would go undetected during normal use of the building, but would be easily detected during normal maintenance
 - the life of the building, being not less than 50 years, if the building elements provide structural stability to the building, or are difficult to access or replace, or failure of those elements would go undetected during both normal use and maintenance.
- 7.4 In this case the delay between the completion of the building work in 1996 and the applicant’s request for a code compliance certificate has raised concerns that various elements of the building are now well through or beyond their required durability periods, and would consequently no longer comply with Clause B2 if a code compliance certificate were to be issued effective from today’s date.
- 7.5 It is not disputed, and I am therefore satisfied, that all the building elements, with the exception of the matters that are to be rectified as described in paragraph 6.4.2, complied with Clause B2 on 1 October 1996. This date has been agreed between the parties, refer paragraph 4.5.

⁷ External moisture – A guide to weathertightness remediation. This guide is available on the Department’s website, or in hard copy by phoning 0800 242 243

- 7.6 In order to address these durability issues when they were raised in previous determinations, I sought and received clarification of general legal advice about waivers and modifications. That clarification, and the legal framework and procedures based on the clarification, is described in previous determinations (for example, Determination 2006/85). I have used that advice to evaluate the durability issues raised in this determination.
- 7.7 I continue to hold that view, and therefore conclude that:
- (a) the authority has the power to grant an appropriate modification of Clause B2 in respect of all the building elements
 - (b) it is reasonable to grant such a modification, with appropriate notification, because in practical terms the building is no different from what it would have been if a code compliance certificate for the house had been issued in 1996.
- 7.8 I strongly recommend that the authority record this determination and any modifications resulting from it, on the property file and also on any LIM issued concerning this property.

8. What is to be done now?

- 8.1 A notice to fix should be issued that requires the owners to bring the cladding into compliance with the Building Code, identifying the items listed in paragraph 6.4.2 and referring to any further defects that might be discovered in the course of investigation and rectification, but not specifying how those defects are to be fixed. It is not for the notice to fix to stipulate directly how the defects are to be remedied and the house brought to compliance with the Building Code. That is a matter for the owner to propose and for the authority to accept or reject.
- 8.2 I would suggest that the parties adopt the following process to meet the requirements of paragraph 8.1. Initially, the authority should issue the notice to fix. The applicants should then produce a response to this in the form of a detailed proposal, based on further investigation as necessary (including investigation of the framing timbers), and 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.
- 8.3 Once the matters set out in paragraph 6.4.2 have been rectified to its satisfaction, the authority may issue a code compliance certificate in respect of the building consent as amended.

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 E2 and B2 of the Building Code, and accordingly I confirm the authority's decision to refuse to issue a code compliance certificate.

9.2 I also determine that:

- (a) all the building elements installed in the house, apart from the items that are to be rectified as described in this determination, complied with Clause B2 on 1 October 1996.
- (b) the building consent is hereby modified as follows:

The building consent is subject to a modification to the Building Code to the effect that, Clause B2.3.1 applies from 1 October 1996 instead of from the time of issue of the code compliance certificate for all the building elements, except the items to be rectified as set out in paragraph 6.4.2 of Determination 2009/82.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 1 October 2009.

John Gardiner
Manager Determinations