



Determination 2009/94

Determination regarding the code compliance of a seven year old house with monolithic cladding at 23 Quedley Court, Eastern Beach, Manukau



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 applicant is the owner and builder of the house, L Coppins (“the applicant”), 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 seven year old house because it was not satisfied that it complied with Clauses B2 and E2 of the Building Code (First Schedule, Building Regulations 1992).
- 1.3 The matter for determination, in terms of sections 177(b)(i) and 188 of the Act², is whether the decision of the authority to refuse to issue a code compliance certificate was correct. In making this decision I have considered the following matters:

¹ The Building Act, Building Code, Compliance documents, past determinations and guidance documents issued by the Department are all available at www.dbh.govt.nz or by contacting the Department on 0800 242 243

² 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.

1.3.1 Matter 1: The claddings

Whether the claddings as installed on the house (“the claddings”) comply with Clause B2 Durability and Clause E2 External Moisture of the Building Code. By “the claddings as installed” I mean the components of the systems (such as the backing 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 other 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 applicant’s submission, the reports of the property inspection company engaged by the applicant (“the inspection company”), 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 two-storey house situated on a gently sloping site in a high wind zone for the purposes of NZS 3604³. Construction is conventional light timber frame, with a concrete floor slab, concrete block foundations, brick veneer and monolithic wall claddings, aluminium windows and asphalt shingle roofing.

2.2 The house is fairly simple in plan and form, with a garage (“the single garage”) at the northeast, beside the recessed north entry, and another garage (“the double garage”) extending from the west corner. The hipped roof of the latter forms a lean-to against the upper walls, with no verges to its east and south walls. Elsewhere, the 18° pitch gabled and hipped roofs have eaves and verge projections of about 600mm overall.

2.3 The applicant has supplied a ‘Treatment Certificate’ dated 3 July 2001, which states that the framing to the upper level walls and the bottom plates to the lower level was ‘H3 LOSP treated’, with the remaining lower floor framing untreated. Given the evidence, I consider the external wall framing to the upper floor and the lower floor bottom plates are treated to a level that will provide resistance to fungal decay.

2.4 The house is considered to have a moderate weathertightness risk rating (see paragraph 6.3).

2.5 The decks

2.5.1 The upper level living and dining areas extend out from the east wall, with enclosed decks filling in the northeast and southwest corners. These decks have membrane floors and glass balustrades; and are supported on monolithic-clad columns.

2.5.2 Two attached timber decks sit below the upper decks. These decks have spaced timber slat floors and continuous timber bench seats to the eastern edges, which continue around the columns. The northern deck extends along a recess beneath the upper living room, to meet the projecting wall of a ground floor games room.

³ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

2.6 The wall claddings

- 2.6.1 Except for the walls to the side of the double garage and adjacent north entry recess, the ground floor walls are clad in brick veneer, with the upper monolithic cladding overlapping the top of the brickwork. On the west elevation, the brick steps down to the mid-floor landing level of the interior stairwell.
- 2.6.2 The monolithic cladding to the remaining walls 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. Planted polystyrene mouldings form texture-coated window 'sills' and another decorative band runs across the north gable end wall.

3. Background

- 3.1 I have seen no copies of the building consent or inspection records for the construction of this house. The applicant is the original owner and builder of the house; and the following is based on his descriptions of the background.
- 3.2 The authority issued a building consent for the house (No. 012187) in June 2001, under the Building Act 1991. The consent drawings showed the monolithic cladding as solid plaster over fibre-cement backing sheets.
- 3.3 According to the applicant, the change to textured flush-finished fibre-cement was approved by the authority's inspectors during construction. The authority carried out various inspections during construction and, according to the applicant:
- There were no issues with Council inspectors regarding the cladding during the construction of this house and all inspections were signed off.
- 3.4 According to the applicant, the house was substantially completed in March 2002, with the lower timber decks completed at a later stage.
- 3.5 While preparing to repaint the house in early 2009, the applicant asked the authority about a final inspection and was advised that a weathertightness report was required before an inspection would be carried out.

3.6 The inspection company's first report

- 3.6.1 The applicant engaged the inspection company, which completed a first report on 17 February 2009. I have not seen a copy of that report; the following is based on the applicant's submissions and a second report prepared by the inspection company.
- 3.6.2 The inspection company visually inspected the interior of the house and noted no evidence of moisture penetration. Non-invasive moisture testing was carried out, and no elevated readings were recorded.
- 3.6.3 The inspection company identified various defects and areas considered to be at risk of moisture penetration, including:
- vertical cracks in the cladding
 - the lack of vertical control joints
 - the lack of cladding clearances at the main entrance

- the lack of cladding clearances above the garage roof
- connections between the deck posts and bearers
- a deck downpipe not connected to the stormwater.

3.6.4 The first report was forwarded to the authority in February 2009.

3.7 The inspection company's second report

3.7.1 The inspection company inspected the remedial work during and after completion, and provided a second report. I note that a copy supplied to the authority was dated 20 March 2009, although the final report is dated 30 March 2009.

3.7.2 During the remedial work, a small section of lining was removed to expose the bottom plate to the entry recess, which the inspection company noted was 'durable and dry all along the side wall and up at a higher level'.

3.7.3 The inspection company inspected the interior of the house and noted no visible evidence of moisture penetration. Non-invasive moisture testing was carried out to the inside of the external walls, with moisture levels measured between 9% and 12%.

3.7.4 In regard to the previously identified defects, the inspection company noted that:

- The joints at the vertical cladding cracks were cleaned, primed, resealed, waterproofed and repainted.
- In the circumstances, vertical control joints are not considered necessary.
- The lack of cladding clearance at the entry is acceptable, as the bottom plate is well above the exterior paving and is dry.
- The lack of cladding clearance above the garage roof is acceptable, given the underflashing and satisfactory weatherproofing of the roof to wall junctions.
- Bolted connections have been installed between the deck posts and bearers, and the posts have been boxed in above the bench seats.
- The downpipe from the south deck has been refitted and connected.

3.7.5 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 applicant subsequently applied for a code compliance certificate. The authority's contractor carried out a plumbing and drainage final inspection on 9 April 2009, and the inspection record identifies several items to be completed and producer statements to be provided. The record also states 'refer to notes under building final inspection', but I have not seen a copy of any final building inspection record.

3.9 In a letter to the inspection company dated 28 April 2009, the authority's contractor noted that the submitted weathertightness reports had been assessed and stated that the following areas still needed to be addressed (in summary):

- amended drawings to reflect the change in cladding system (which apparently was subsequently supplied)
- detailed information on the substituted cladding to allow assessment
- the upper level deck construction, as these are above a habitable space (I note that the upper decks are open below and not over any enclosed areas)
- a maintenance plan to ensure ongoing weathertightness
- the lack of control joints
- the elevated moisture levels recorded in the original preline inspection, with no inspection recorded for the upper monolithic cladding
- the affect of the recent remedial work on the bracing elements.

3.10 In a letter to the owner dated 6 May 2009, the authority stated that its contractor had recommended that it should not issue a code compliance certificate because:

The report provided along with the remedial work still does not provide sufficient evidence for the Council to be reasonably satisfied that the building complies with the Building Code related to E2 and B2.

3.11 The Department received an application for a determination on 13 July 2009.

4. The submissions

4.1 In a letter dated 22 May 2009, the applicant outlined the background to the situation, noting that the matters raised by the authority's contractor 'were all dealt with during the construction of the house'.

4.2 The applicant forwarded copies of:

- the consent drawings and specification
- the inspection company's second report dated 30 March 2009
- the final plumbing and drainage inspection record
- the correspondence from the authority's contractor and the authority
- various other information.

4.3 The authority acknowledged the application but made no submission.

4.4 A draft determination was issued to the parties on 23 September 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. The parties agreed that compliance with B2 Durability was achieved on 1 March 2002.

4.5 The authority accepted the draft without comment.

4.6 The applicant did not accept the draft and submitted a letter from a legal advisor and a draughtsman. The submission reiterated the points made in the application regarding the building work having been 'signed off' during construction, and that the applicant should not be expected to 'meet standards that didn't apply at the time'.

The applicant accepted the findings of the expert's report with regard to the upper decks.

- 4.7 I acknowledge the applicant's comments but note that the performance requirements of the Building Code, with respect to Clause E2 External Moisture, have not changed to any significant extent in the time since the house was built in 2001. In so far as this work is concerned, it was required to comply with the Building Code under the former Act (Building Act 1991) to the same extent as it is required to do under the current Act.

5. The expert's report

- 5.1 As mentioned in paragraph 1.4, I engaged an independent expert to provide an assessment of the condition of those building elements subject to the determination. The expert is a member of the New Zealand Institute of Building Surveyors; and inspected the house on 17 August 2009, providing a report on 25 August 2008.
- 5.2 The expert noted the following variations from the consent drawings:
- The cladding has changed from solid plaster to textured fibre-cement.
 - The upper deck surfaces are membrane in lieu of timber.
 - The monolithic panels above lower windows have changed to brickwork.
 - There are minor changes to the windows.
- 5.3 The expert noted that the recent remedial work and repainting had given a 'good clean appearance to a generally well maintained property'. However, the expert also identified moisture penetration and defects as outlined below.
- 5.4 The expert noted that the aluminium joinery is face-fixed against the fibre-cement backing sheets, with metal head flashings and no jamb or sill flashings. The expert removed a small section of cladding at a sheltered west window jamb, and 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.
- ### **5.5 Control joints**
- 5.5.1 The expert noted that the cladding manufacturer recommends vertical control joints to walls areas exceeding 5.4m limit, and expansion joints in walls exceeding 14.4m.
- 5.5.2 The expert noted that recent repair work to the cladding cracks had resulted in the sealant over joints giving the appearance of control joints. However, the expert noted that where the bottom of backing sheet joints could be seen, the joints were often butted too tightly to provide satisfactory control joints.
- 5.5.3 The expert removed a small section from the bottom of the cladding to the west elevation, where a spaced joint was observed; noting that inseal tape was installed under the backing sheets and sealant was applied within the joint.

5.6 Moisture levels

5.6.1 The expert inspected the interior of the house, taking non-invasive moisture readings internally, and noted an elevated reading at the single garage wall and signs of moisture damage from rusting carpet fixings:

- beneath the upper level utility room window
- beneath the upper level main bedroom window
- beside the door from the upper level dining room to the deck.

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

The garage and entry area

- 23% in the bottom plate to the side wall of the single garage
- 18% in the bottom plate at the recessed main entry
- 20% at the junction of the double garage verge with the upper wall
- 19% in the bottom plate below the above

The upper decks

- 23% and 28% at the northern deck to wall junction of the north deck
- 21% and 38% at the southern deck to wall junction of the south deck
- more than 40% at the lounge deck to wall junction of the north deck
- more than 40% at the dining room deck to wall junction of the south deck
- 32% in the north east corner of the north deck, with 24% in the adjacent soffit
- more than 40% in the south east corner of the south deck
- two at 32% below the top fixed balustrade posts.

Other junctions

- 20% under the upper level utility room window sill
- 19% under the upper level east lounge window sill
- 20% and 24% at the brick step-down to the west stairwell wall

I note that the lower readings ranged from 13% to 14%. Moisture levels that vary significantly generally indicate that external moisture is entering the structure and further investigation is required.

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

General

- there are no vertical control joints installed in the cladding
- at the brick step-down, there is only about 20mm overlap of the cladding onto lower and side brickwork, and moisture penetration is apparent at the corners
- the bottom of the cladding is below the paving at the side walls of the garages and the recessed entry, and moisture has penetrated into bottom plates

- the junction of the double garage east verge with the wall is not weatherproof, with moisture penetrating into the adjacent framing

Windows and doors

- the window and door jambs lack seals under the jamb flanges, and moisture penetration is apparent under some windows

(I also note that window sills appear to be sealed against the decorative sills, with no drainage gaps to allow trapped moisture to escape to the outside).

The decks

- the deck to wall junctions are not weathertight, with gaps apparent and high levels of moisture recorded in the deck framing
- the external corners of the decks are not weathertight, with gaps apparent and high levels of moisture recorded in the deck framing
- the metal balusters are top-fixed through the deck membrane, and moisture is penetrating into the deck framing below.

5.8 The expert considered that more extensive invasive investigation is required, particularly in regard to the upper decks and adjacent wall framing.

5.9 A copy of the expert's report was provided to the parties on 26 August 2009.

5.10 The applicant responded to the report in a letter to the Department dated 3 September 2009, which attached a timber 'Treatment Certificate' and a warranty for the recent recoating. The applicant's comments on the report included (in summary):

- At the garage and entry walls, the slab polythene has been taken about 300mm up the walls, and the bottom plates are H3 treated.
- The garage-to-wall junctions are well sealed and have never leaked.
- The expansion and control joints were installed, but are covered by the coating.
- Sealing behind joinery jamb flanges has only been required since 2005, and was not required when the house was constructed.
- The deck framing is 'tanalised' and any deck to wall gaps can be sealed, and any moisture penetrating deck to wall junctions can run down the brick cavity.
- The top-fixed metal balusters can be sealed to prevent further moisture penetration.

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 Solutions⁴, which will assist in

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.

determining whether the features of the building work 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.

6.2 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, and 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 determinations (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 two-storeys high
- the walls have monolithic cladding fixed directly to the framing, with brick veneer to the lower walls

Decreasing risk

- the house is fairly simple in plan and form
- there are eaves and verge projections to shelter most of the walls

- there are enclosed decks attached to the upper level
- most of the external wall framing is treated to a level effective in resisting decay if it absorbs and retains moisture.

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

6.4 Weathertightness performance: exterior cladding

6.4.1 Generally the cladding appears to have been installed in accordance with good trade practice. However, taking account of the expert's report, I conclude that further investigation and remedial work is necessary in respect of:

- the lack of vertical control joints, together with a history of past cracking
- the lack of adequate overlaps to the brick step-down on the west elevation
- the lack of cladding clearances and capillary gaps at the garage/entry walls
- the lack of adequate flashings at the garage verge to upper wall junctions
- the lack of seals to window jamb flanges and drainage gaps to sill flanges

The decks

- the inadequate weatherproofing and high moisture levels associated with:
 - the deck to wall junctions
 - the external corners of the decks
 - the top-fixed metal balusters.
- further invasive investigation, particularly in regard to the upper decks and adjacent wall framing.

6.4.2 Notwithstanding the fact that the cladding is fixed directly to the timber framing, thus limiting drainage and ventilation behind the cladding, I have noted the following compensating factors that assist the performance of some of the cladding in this particular case:

- Apart from the noted exceptions the cladding is installed to good trade practice, is well-maintained, and is currently in good condition.
- The cladding overlaps the brick veneer, providing some drainage capacity via the lower cavity.
- Most of the timber wall framing is treated, and moisture penetration appears limited to areas where defects have been identified.

6.4.3 I consider that these factors help compensate for the lack of a drained cavity and can assist the building to comply with the weathertightness and durability provisions of the Building Code.

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 it is allowing water penetration at present. Consequently, I am satisfied that the building does not comply with Clause E2 of the Building Code.
- 6.5.2 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 house may allow the ingress of moisture in the future, the building work does not comply with the durability requirements of Clause B2.
- 6.6 Because the faults identified with the cladding occur in discrete areas, I am able to conclude that investigation and satisfactory rectification of the areas outlined in paragraph 6.4.1 will result in the house being brought into compliance with Clauses B2 and E2.
- 6.7 It is emphasised that each determination is conducted on a case-by-case basis. Accordingly, the fact that a particular cladding system has been established as being code compliant in relation to a particular building does not necessarily mean that the same cladding system will be code compliant in another situation.
- 6.8 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.

Matter 2: The durability considerations

7. Discussion

- 7.1 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).
- 7.2 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.

- 7.3 In this case the delay between the completion of the building work in 2002 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.
- 7.4 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 6.4.1, complied with Clause B2 on 1 March 2002. This date has been agreed between the parties, refer paragraph 4.4.
- 7.5 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.
- 7.6 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 2002.
- 7.7 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 I note that the authority has not issued a notice to fix. 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 6.4.1 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 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 owner 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), 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 6.4.1 have been rectified to its satisfaction, the authority may issue a code compliance certificate in respect of the building consent as amended.
- 8.4 I note that the expert has identified some variations from the consent drawings (see paragraph 5.2), and I leave that matter to the parties to resolve.

9. The decision

- 9.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the claddings do 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 March 2002.
 - (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 March 2002 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 6.4.1 of Determination 2009/94.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 28 October 2009.

John Gardiner
Manager Determinations