



Determination 2009/73

Refusal to issue a code compliance certificate for a 6-year-old house with plastered brick cladding at 68 Birches Road, Prebbleton, Christchurch

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, M and V Schwass (“the applicants”), acting through their lawyer (“the lawyer”), and the other party is the Selwyn District 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 6-year-old house because it was not satisfied that it complied with the building consent and with certain clauses of the Building Code² (First Schedule, Building Regulations 1992).

1.3 The matters for determination, in terms of sections 177(a), 177(b)(i) and 188 of the Act³, are:

1.3.1 Matter 1: The external envelope

Whether the brick cladding as installed on the house (“the cladding”) complies with Clause B2 “Durability” and Clause E2 “External Moisture” of the Building Code. By “the brick cladding as installed” I mean the components of the systems (such as the brick veneer, the plaster, the flashings and the coatings), as well as the way the components have been installed and work together.

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.

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 The evidence in this matter

- 1.4.1 The applicants engaged a member of the New Zealand Institute of Building Surveyors (“the expert”) to inspect and report on the cladding (refer paragraph 5). The expert sought further advice from a specialist consultant (“the brick consultant”) in regard to the brick cladding (refer paragraph 6.1). I accept that the expert and the brick consultant have provided me with independent expert advice on the cladding.
- 1.4.2 In making my decision, I have considered the submissions of the parties, the expert’s report, the brick consultant’s report, and the other evidence in this matter. I have evaluated this information using a framework that I describe in paragraph 7.1.

2. The building work

- 2.1 The building work consists of a large single-storey house and a linked garage, which is situated on a flat rural site. The expert describes the site as ‘relatively exposed’, and I have therefore assumed it to be in a high wind zone for the purposes of NZS 3604⁴. Construction is generally conventional light timber frame, with concrete foundations and floor slabs, plastered brick veneer cladding, several panels of fibre-cement weatherboards, aluminium windows and 35° pitch profiled metal roofs.
- 2.2 The house is fairly complex in plan and form, with the garage attached to the house by a flat-roofed link. The garage has a simple hipped roof, while the hipped and gabled roofs to the house are set at two levels. Eaves and verge projections vary from about 200mm to 500mm.
- 2.3 I have received no information as to the timber framing to this house. The authority’s preline inspection on 29 April 2003 describes the timber as ‘dry frame – lazerframe’. Given the date of construction in 2003 and the lack of other evidence, I consider the external wall framing to be untreated.
- 2.4 Apart from a small amount of fibre-cement weatherboard cladding to the link walls, the house and garage are clad in plastered brick veneer. This consists of 70mm brick veneer with brick ties that bridge a 40mm cavity and fix through the building wrap to the framing. The exterior face of the brickwork is covered with a solid plaster and flexible paint coating system.

3. Background

- 3.1 The authority issued a building consent for the house dated 21 February 2003 (No. 030004) under the Building Act 1991 (“the former Act”).
- 3.2 The authority carried out various inspections during construction, including a preline inspection on 29 April 2003 and the record notes that the bricklayer was advised that

⁴ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

‘all brickwork to be inspected at half height’ and also that ‘all cavities minimum of 40mm’. It appears that no inspection of the half-height brick veneer was carried out.

- 3.3 The final inspection of the house was carried out on 22 August 2003, and the record lists a number of items to be completed, including:

Vent holes top of plastered brick. The cavity – bricks had holes open – now covered with plaster [brand name of system]. “Looking into”.

- 3.4 A re-inspection of the house was not carried out until 1 May 2008, and the record includes the following items in regard to the brick cladding:

Vent holes required to brickwork.

Hole to be sealed at junction of gutter/lintel bar on side of entrance.

Window heads to be sealed to soffits

Unpaved ground adjacent to dwelling to be 150mm below finished floor level.

- 3.5 A further re-inspection dated 9 September 2008 recorded a pass and the record notes that ‘all items from 1/5/08 have now been completed’. The applicants then applied for a code compliance certificate

3.6 The authority’s decision

- 3.6.1 In a letter to the applicants to the applicants dated 6 November 2008, the authority stated that it was unable to issue a code compliance certificate for the building work.

- 3.6.2 The authority noted that the durability requirements of the Building Code commenced from the time of issue of the code compliance certificate. It was more than 5 years since completion of the work and, due to the time that had elapsed, the authority could not:

...now be satisfied on reasonable grounds that the building work and elements will continue to satisfy the durability provisions of the Building Code for the prescribed period after the Code Compliance Certificate has been issued.

- 3.6.3 The authority also raised concerns regarding the lack of inspections of the brickwork and the cladding-related items identified in the inspection of August 2003, which implied

...that the brickwork was non-complying for some time and the durability of some elements may have been compromised during this time.

- 3.7 The applicants subsequently engaged the expert to inspect the house and to provide an opinion on the authority’s decision to refuse to issue a code compliance certificate for the building work. The expert’s report is outlined in paragraph 5.

- 3.8 The Department received an application for a determination on 1 May 2009. The authority acknowledged the application and provided a submission on 14 July 2009 which noted that it had not received a copy of the application until 3 July 2009.

4. The submissions

- 4.1 In a letter to the Department dated 16 June 2009, the lawyer stated that the issue for determination related to the brick veneer and the letter from the authority refusing to issue a code compliance certificate was ‘at the heart of the dispute’.

4.2 The lawyer forwarded copies of:

- the expert's report, which included
 - the brick consultant's report
 - the authority's inspection records
 - the letter from the authority dated 6 November 2008
 - some instructions from the brick manufacturer
 - various extracts from relevant standards
- some of the consent drawings
- various other information.

4.3 The authority made a submission in a letter to the Department dated 14 July 2009, in response to the applicant's submission. The authority made various comments on the applicants' expert's report, which concluded that it had concerns 'about all the other deficiencies he identified in the building'. The authority also commented on the brick consultant's report, noting that it was a 'general overview of brick construction' as he had not visited the site.

4.4 The authority forwarded copies of :

- the building consent
- part of the specification
- some of the inspection records
- a statement by the authority's building inspector.

4.5 I note that the authority's submission was subsequent to the first draft determination, and has therefore been taken into account during the preparation of the second draft determination.

4.6 A first draft determination was issued to the parties for comment on 10 July 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.

4.7 The authority responded in a letter to the Department dated 28 July 2009, which noted that it believed that the house 'as a whole never complied due to the lack of inspections and deficiencies in the brick veneer cavity'. The authority made various general comments on the draft determination which are summarised as follows:

- A certificate of acceptance 'is the correct way to address the unauthorised plaster and paint coating'.
- The 'principal reason for refusing to issue the code compliance certificate was that the work does not comply with the building consent'.
- No inspections of the brick cavity were carried out during construction, which would have identified the defects and allowed these to be remedied.
- '[M]ould growth' on the building wrap, as identified by the expert, demonstrates that the cavity is not adequately drained and vented . . . '.

- 4.8 In regard to the general comments above, I make the following observations:
- Under section 96 of the Act, a certificate of acceptance cannot be issued, as the house was constructed under a building consent and the authority carried out inspections during construction.
 - The transitional provisions of section 436 of the Act apply as the building consent was issued under the Building Act 1991. Therefore, whether or not a code compliance certificate is to be granted depends on, in terms of section 43(3) of the former Act, whether the authority is 'satisfied on reasonable grounds' that the completed building work complies with the Building Code.
 - I have assessed the expert's observation of 'limited mould' on the back of the building wrap to one of the cut-outs. Taking into account the observed dryness of the cavity, together with the low moisture levels and lack of moisture damage to the timber framing, I consider that the building wrap is fulfilling its expected function in protecting the framing.

I have considered the authority's remaining comments and amended the determination as appropriate.

- 4.9 With respect to a date when the building elements complied with Clause B2, the authority submitted that certain elements complied with Clause B2 in June 2003 but added 'the house as a whole never complied due to the lack of inspections and deficiencies in the brick veneer cavity'. The applicant's lawyer submitted that compliance with Clause B2 was achieved when the applicant's 'took possession of the house and received their first utility accounts in August 2003'.
- 4.10 I concur with submission made by the applicant's lawyer and accept that it is reasonable to assume that the building work complied with Clause B2 at the time the applicants took possession in August 2003. I have therefore taken the Clause B2 completion date to be 1 September 2003.
- 4.11 In response to the authority's submission, I do not accept that work is not code compliant simply because it has not been inspected. I also do not accept the authority's position with respect to the defects in the brick veneer.

5. The expert's report

- 5.1 As mentioned in paragraph 1.4.1, the applicants 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.
- 5.2 The expert inspected the house on 4 June 2009 and provided a report that was completed on 5 June 2009. The expert noted that the exterior of the house generally appeared to be in 'good condition', with maintenance to an acceptable level.
- 5.3 The expert noted that, due to the waterproofing provided by the painted plaster surface to the bricks, the cladding can be described as a 'bottom vented face sealed rainscreen', rather than as conventional brick veneer; and should therefore be assessed as an alternative solution.

5.4 The expert used a metal detector to locate the positions of brick ties in 7 locations, which he considered to provide a representative sample for the building. The expert marked the positions where ties were located, noting that the spacings generally accorded with the manufacturer's instructions.

5.5 Investigation of moisture levels in the brick cavity

5.5.1 The expert inspected the interior of the house and no evidence of moisture entry or damage was observed. The expert removed sections of lining at two locations in order to inspect the cavities. I accept that the areas exposed are typical of similar locations elsewhere in the building.

5.5.2 The expert observed the framing and removed the building wrap, noting:

- the moisture level in the timber bottom plate was 9% (west wall bedroom 2)
- the moisture level in the bottom plate was 12%, with the timber showing no signs of water stains or damage (south wall, master bedroom)
- the back of the building wrap showed minor mould growth, although the cavity appeared dry (south wall, master bedroom).

5.6 In regard to the requirements for brick veneer in NZS 3604, the expert made the following comments on the brick cladding:

- The cavity is generally 40mm wide but is reduced to 35mm in some areas, due to protruding mortar and some of the fibreglass insulation bulging against the building wrap.
- The 84mm conventional brick ties suggest satisfactory embedment into mortar.
- There are mortar droppings at the bottom of the cavity and on brick ties in some areas.
- Although weep holes are generally spaced at 800mm centres, spacing exceeds this limit in some isolated locations.
- Some of the weep holes have been reduced in size by the exterior plaster.
- There is no continuous 10mm gap between the top brick course and the soffit.
- The brick window sills are not sloped at 15°, having only nominal falls.
- In one area on the south elevation, bowing of the foundation has resulted in a small ledge under the veneer.
- The requirements in NZS 3604 are based on unpainted clay brickwork, rather than brickwork that is plastered and painted.
- The brick manufacturer's instructions note that, when brickwork is plastered or painted, the number of weep holes may be reduced by up to 50% (there remains more than the required 50% in this cladding).

5.7 Commenting on other aspects of the cladding, the expert noted that:

- the ends of gutters are embedded in the plaster coating
- there are no scribes to the window jambs in the weatherboard cladding.

5.8 Deterioration since construction

- 5.8.1 The expert considered that, as some weep holes were partly obstructed by the exterior plaster (see paragraph 5.6); these would have been present at the final inspection in August 2003. The inspection record's note (see paragraph 3.3) was therefore in reference to vent holes in the top of the brickwork and not to weep holes.
- 5.8.2 The expert also noted that there was no evidence of any deterioration of the cladding as a result of the minor defects not being remedied for about five years after completion of the building work. In the unlikely event that any moisture had penetrated the brickwork, the cavity would have protected the framing.
- 5.9 The expert concluded that, despite some workmanship deficiencies identified in the brick veneer construction, the plastered brick cladding was still capable of meeting the weathertightness and durability requirements 'over the remainder of its code life in its current condition'.

6. The brick consultant's report

- 6.1 The expert sought further advice on the brick construction from the brick consultant, who I accept as an industry-acknowledged specialist in the use of brick veneer. The brick consultant studied photographs and other information supplied by the expert, and provided a report dated 3 February 2009.
- 6.2 The brick consultant described the general functions of a conventional brick veneer cavity, including the following summarised comments:
- A conventional brick veneer system is so robust that it can accommodate a high degree of faulty workmanship without any serious failure.
 - Clay bricks are dense and have limited absorbency, so most water runs off the external face. After very prolonged soaking, water will eventually run down the inside and drain out via weep holes.
 - The use of a 40mm cavity is based on convention rather than testing, and a clear 20mm drained cavity (as in other claddings) would likely be sufficient.
 - The standard requirements for brick veneer are based on bare brick surfaces.
- 6.3 The consultant described how the plaster and paint coatings affect the performance of this brick cladding, including the following summarised comments:
- This house has a 35mm to 40mm cavity with some ventilation, a rebated floor slab, 70mm brick veneer and an exterior waterproof coating.
 - Water will be repelled at the surface of the cladding, meaning that defects identified in the cavity are compensated for by the outer waterproofing provided by the plaster and paint coatings.
 - Any failure leading to water penetration would be an unlikely isolated situation, rather than as a result of expected normal conditions.
 - For this plastered brickwork, the need for any vent holes or weep holes is questionable. However, it is prudent to provide some redundancy, so a reduction by up to 50% is considered acceptable.

- The coated bricks to this house can be contrasted with a concrete blocks, which only require two coats of paint in order to comply with the code.

6.4 The brick consultant concluded that, while the brick workmanship ‘leaves something to be desired’, the nature of the cladding system used in this house provides additional safeguards. The brick consultant saw no reason why the cladding system should not be watertight and considered that it was:

...highly unlikely that the required timeframes for durability would be affected in any way that would lessen the life span of this structure.

7. Evaluation for code compliance

7.1 Evaluation framework

7.1.1 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.

Matter 1: The wall cladding

8. Weathertightness

8.1 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 (for example, Determination 2004/1) relating to cladding and these factors are also used in the evaluation process.

8.2 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.

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.

8.3 Weathertightness risk

8.3.1 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 some complex roof junctions
- 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 in height
- there are eaves and verge projections to shelter most of the walls
- the plastered brick veneer cladding incorporates a cavity of variable width
- there are no decks attached to the house.

8.3.2 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. Higher levels of risk will require more rigorous weatherproof detailing. When evaluated using the E2/AS1 risk matrix, the weathertightness features outlined in paragraph 8.3.1 show that all elevations demonstrate a low weathertightness risk rating.

8.4 Weathertightness performance

8.4.1 Taking account of the expert's report, I conclude that remedial work is necessary in respect of:

- the ends of some of the gutters, which are embedded in the plaster
- the lack of scribes to the window jambs in the fibre-cement weatherboard cladding.

8.4.2 I have considered the brick consultant's comments on this cladding as outlined in paragraph 6.3, which corroborate the expert's comments (refer paragraph 5.6). I therefore accept that these areas identified by the expert are adequate in the circumstances.

8.4.3 I also accept the assertion that the plaster and paint coating has converted the cladding from a conventional brick veneer system (as considered by the expert in paragraph 5.6) into an alternative cladding system.

8.5 The consented cladding system

8.5.1 The cladding system covered by the building consent consisted of a single-skin brick veneer separated by a cavity and building wrap from the structural timber framing. The brick veneer is designed to provide a rain screen, with the cavity and building wrap designed to prevent moisture that may penetrate the brick or the mortar from coming into contact with the timber framing. The cavity is drained to the exterior by

gaps in the mortar of the lowest course of bricks, with the junction of the brick with the concrete slab above ground but below floor level.

- 8.5.2 A single-skin brick veneer takes advantage of the water adsorbing properties of fired clay bricks. Those properties mean that, although a skin of brick is not completely water repellent or water-proof, moisture can be intercepted by absorption into the bricks and released later by evaporation into the interior cavity or to the exterior.
- 8.5.3 The authority has concerns that the cavity in some areas may be reduced to nothing by the concurrence of the defects identified by the expert. I consider that to be extremely unlikely as the expert considers the cavity to be a minimum of 35mm. However, in the unlikely event that this does occur, it will be at rare individual points that, with the added barrier afforded by the building wrap, are unlikely to significantly impede the drainage of the cavity or endanger the timber framing.

8.6 The cladding system as installed

- 8.6.1 For this particular cladding, a solid plaster and paint coating system has been applied to the exterior face of the bricks. The effect of the plaster and paint is that the brick skin has been made water-repellent to external moisture. This cladding has therefore become a monolithic cladding system installed over a drained cavity to the low-risk walls of this house. I note the same opinion was taken with respect to a modified brick veneer in Determination 2008/35.
- 8.6.2 The effect of the change in the nature of the cladding has resulted in the authority's requirements for drainage and drying provisions no longer being applicable for this particular cladding, where the plaster and coating system more than compensates for the minor deficiencies identified in the cavity and allows the cladding to comply with the weathertightness and durability provisions of the Building Code.

8.7 Weathertightness conclusion

- 8.7.1 I consider the expert's report establishes that the current performance of the cladding is adequate because it is preventing water penetration into the house at present. Consequently, I am satisfied that the building complies with Clause E2 of the Building Code.
- 8.7.2 However, the building work 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.
- 8.7.3 Because the faults identified with the cladding occur in discrete areas, I am able to conclude that satisfactory rectification of the items outlined in paragraph 8.4.1 will result in the house being brought into compliance with Clauses B2.
- 8.7.4 It is emphasised that each determination is conducted on a case-by-case basis. Accordingly, the fact that particular cladding systems have been established as being code compliant in relation to a particular building does not necessarily mean that the same cladding systems will be code compliant in another situation.

- 8.7.5 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

9. Discussion

- 9.1 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 2003.
- 9.2 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).
- 9.3 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.
- 9.4 In this case the delay between the completion of the building work in 2003 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.
- 9.5 I am satisfied, that all the building elements complied with Clause B2 Durability on 1 September 2003 (refer paragraphs 4.9 and 4.10). I acknowledge that this date has not been agreed between the parties.
- 9.6 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.

9.7 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 2003.

9.8 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.

10. What is to be done now?

10.1 A notice to fix should be issued that requires the owners to bring the cladding into compliance with the Building Code, identifying the two items listed in paragraph 8.4.1, 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.

10.2 Once the matters set out in paragraph 8.4.1 have been rectified to its satisfaction, the authority may issue a code compliance certificate in respect of the amended building consent (refer paragraph 11.2(b)).

11. The decision

11.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the cladding does not comply with Clause B2 of the Building Code, and accordingly confirm the authority's decision to refuse to issue a code compliance certificate.

11.2 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 September 2003.
- (b) the building consent is hereby amended 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 September 2009 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 8.4.1 of Determination 2009/73.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 3 September 2009.

John Gardiner
Manager Determinations