Determination 2005/102

Refusal of a code compliance certificate for a building with a "monolithic" cladding system: House 90

1 THE DISPUTE TO BE DETERMINED

1.1 This is a determination of a dispute referred to the Chief Executive of the Department of Building and Housing ("the Chief Executive") under section 17 of the Building Act 1991 ("the Act") as amended by section 424 of the Building Act 2004. The applicants are the two joint-owners (referred to throughout this determination as "the owner"), and the other party is the Auckland City Council. The application arises from the refusal by the territorial authority to issue a code compliance certificate for 5-year old additions to an existing house unless changes are made to its monolithic cladding systems.

1.2 The question to be determined is whether on reasonable grounds the monolithic wall cladding as installed to the new timber-framed external walls and columns of the house ("the cladding"), complies with the building code (see sections 18 and 20 of the Act). By "the monolithic wall cladding as installed" I mean the components of the system (such as the backing sheets, the flashings, the joints and the plaster and/or the coatings) as well as the way the components have been installed and work together.

1.3 This determination is made under the Building Act 1991, subject to section 424 of the Building Act 2004. That section came into force ("commenced") on 30 November 2004, and its relevant provisions are:

> ". . .on and after the commencement of this section,—
>
> "(a) a reference to the Authority in the Building Act 1991 must be read as a reference to the chief executive; and
>
> "(b) the Building Act 1991 must be read with all necessary modifications to enable the chief executive to perform the functions and duties, and exercise the powers, of the Authority . . "

It should be noted that the new legislation does not amend the determination process set out under the 1991 Act, other than to transfer the power to make a determination from the Building Industry Authority ("the Authority") to the Chief Executive.

1.4 This determination refers to the former Authority:

(a) When quoting from documents received in the course of the determination, and

(b) When referring to determinations made by the Authority before section 424 came into force.

1.5 In making my decision, I have not considered any other aspects of the Act or the building code.

2 PROCEDURE

The building

2.1 The building work consists of extensive alterations to an existing house, situated on an excavated sloping site in a medium wind zone in terms of NZS 3604: 1999 "Timber framed buildings". The resultant building ("the house") is generally 2 storeys high, with the floors set at 6 levels. The external walls of the house are of conventional light timber frame construction built on concrete block foundation and retaining walls. The new timber-framed walls are sheathed with monolithic cladding, and the existing brick veneer walls are newly plastered. The house is of a reasonably simple shape with some complex aspects, and with the pitched roofs set at varying levels and having hip, valley, and wall to roof junctions. The eaves projections vary from 200mm to 400mm, with the spoutings providing an additional 125 mm projection. The verges generally have 200mm projections.

2.2 A timber-framed close-boarded deck and associated steps is constructed at a lower level. A cantilevered balcony with a curved timber-framed balustrade is situated outside the main lounge. At the upper levels a small suspended balcony adjoins the master bedroom, and a partially enclosed balconies built over habitable spaces adjoins the lounge. The deck and balconies have timber-framed balustrades. Timber-framed pergolas are fixed to various elevations of the building. A monolithic-clad timber-framed chimney is constructed against one external wall and is set into a lower level roof. I note that the chimney construction differs from the solid masonry shown chimney shown on the consented plans, and not all the pergolas shown on the plans have been constructed.

2.3 The specification calls for the wall framing to be Boron treated, and the owner has produced an invoice that indicates that H1 treated timber was used on the house. I note that the expert commissioned by the Department ("the expert") stated that the where the wall framing can be inspected it appears to be untreated. I am prepared to accept that the external wall framing is H1 treated, but at a level that may not impede rotting if it becomes wet and cannot dry out.

2.4 The new timber-framed external walls and columns of the house that are the subject of this determination are clad with a stucco system that is described as monolithic cladding. In this instance it incorporates 4.5mm Hardibacker sheets fixed through the two layers of building wrap directly to the framing timbers, galvanised reinforcing mesh spaced off the backing, and a 24 to 25mm thickness of three-coat solid plaster finished with a paint system. The existing brick veneered walls have been plastered to match the monolithic cladding.

Sequence of events

2.5 The territorial authority issued a building consent in early 1999.

2.6 According to the owner, the property was fully enclosed by August 1999 and from this date it was progressively lined and decorated. In July 2004 the owner requested the builder to complete the project in order to obtain a code compliance certificate.

2.7 The territorial authority carried out various inspections during the construction of the house and passed the stucco inspection on 27 July 1999, the preline inspection on 13 August 1999, and the ground floor post-line inspections on 19 May 2000 and 28 June 2001. The territorial authority carried out a final inspection on 9 August 2004.

2.8 In a letter to the owner dated 1 September 2004, the territorial authority regretted that the building might not comply with the building code in a number of respects. The territorial authority attached a Notice to Rectify also dated 1 September 2004 to this letter, together with a set of photographs illustrating items of non-compliance. The "Particulars of Contravention" attached to the Notice to Rectify listed requirements under the following headings:

1. Items not installed per the manufacturer's specifications;
2. Items not installed per the acceptable solutions of the building code, (no alternative solutions had been applied for);
3. Items not installed per accepted trade practice; and
4. Ventilated cavity system.

The owner was also required, amongst other items to:

1. Provide adequate ventilation to the monolithic cladding and into the wall frame space by means of either a ventilated cavity or alternative approved system, and ensuring that all issues relating to the above are resolved…

2.9 The owner applied for a determination on 6 October 2004.

3 THE SUBMISSIONS

3.1 In a letter to the Authority dated 6 October 2004, the owner set out the sequence of events leading up to request for a determination, and noted that the construction is a

combination of the existing structure and the new work. The owner also commented in detail on the issues raised by the territorial authority in the Notice to Rectify.

3.2 The owner also forwarded copies of:

- The plans and specifications;
- Some consent documentation;
- The territorial authority's inspection record;
- The Notice to Rectify;
- The correspondence with the territorial authority;
- A letter from the designers dated 5 October 2004, addressed to the Authority, which set out argument as to why the house should be given a code compliance certificate. The letter also noted that the builder involved in the construction carried out work to a high standard and that it was the writer's understanding that the timber framing was constructed from H1 treated timber;
- A letter from builder to the owner dated 15 September 2004, which noted that the first coat of plaster contained a water inhibitor, and that there was no evidence of water penetration into the house. Attached to the letter were as-built details of the window flashings, and an invoice for supplied materials that included H1 treated wall framing;
- A letter from the plasterer to the territorial authority dated 4 October 2004, which described the 3-coat plaster system applied to the backing sheets and existing brickwork; and
- A set of photographs.

3.3 In a covering letter to the Authority dated 28 October 2004, the territorial authority described the Particulars of Contravention and specific construction defects.

3.4 The territorial authority also forwarded copies of:

- The plans;
- Some of the consent documentation;
- The Notice to Rectify; and
- The correspondence with the owner.

3.5 Copies of the submissions and other evidence were provided to each of the parties.

3.6 In a letter to the Department dated 1 June 2005, the territorial authority commented on aspects of the Draft Determination. In particular, the territorial authority is concerned that paragraphs 6.3 and 8.2 indicate a scope of work required to make the

house code compliant. The territorial authority claims that this is not part of the determination.

3.7 In a letter to the Department dated 2 June 2005, the owner responded to the territorial authority's letter of 1 June 2005. It was the view of the owner that it was not enough for the territorial authority to simply refer to the type of construction and suggest that a code compliance certificate could not be issued. The owner considered the draft determination had clarified the position. I have addressed some of the owner's concerns in clause 8.4.

4 THE RELEVANT PROVISIONS OF THE BUILDING CODE

4.1 The dispute for determination is whether the territorial authority's decision to refuse to issue a code compliance certificate because it was not satisfied that the cladding complied with clauses B2.3.1 and E2.3.2 of the building code (First Schedule, Building Regulations 1992) is correct.

4.2 There are no Acceptable Solutions that have been approved under section 49 of the Act that cover this cladding. The current Acceptable Solution, E2/AS1, allows for solid plaster systems with fibre cement backing sheets, but requires that they be fixed on battens to create a 20mm cavity between the sheet and the framing. The previous acceptable solution E2/AS1, which was in force when this consent was issued, allowed for mesh reinforced solid plaster to be applied to fibre cement backing sheets that were face fixed to the framing. The cladding is not currently accredited under section 59 of the Act. I am, therefore of the opinion that the cladding system as installed must now be considered to be an alternative solution.

4.3 In several previous determinations, the Authority has made the following general observations, which in my view remain valid in this case, about acceptable solutions and alternative solutions:

- Some acceptable solutions cover the worst case, so that in less extreme cases they may be modified 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.

5 THE EXPERT'S REPORT

5.1 The expert inspected the building on 10 March 2005, and furnished a report that was completed on 31 March 2005. The expert considered that the plastering had been carried out in accordance with the manufacturer's details. The final coat of sponge finish plaster is of a high standard and the paint finish is in good condition. Good trade practice is evident in terms of the cladding, the plastering and the flashings. The expert removed sections of the plaster between two windows to examine the

flashing details. This investigation led the expert to believe that the external windows and doors are fully flashed and sealed. The expert also removed a portion of vertical joint sealant. The expert's report made the following specific comments on the cladding.

- There is a total absence of the horizontal control joints and there are insufficient of the vertical control joints that are required for this type of cladding;
- Where vertical control joints are installed, they do not meet the requirements for this type of cladding;
- There are no vertical control joints between the cladding plaster and the solid plaster on the existing brickwork;
- There is cracking in the plaster at some locations;
- There are locations where there is either no clearance or insufficient clearance between the base of the cladding and the ground or paving;
- There is insufficient clearance between the base of the cladding and the balcony decks at some locations;
- The required gap at the junction of the base of the cladding and the foundation walls is omitted;
- There are inadequate step-downs from the inner floors onto the decks or balconies at some locations;
- The sill flashing of the east facing lounge window is incorrectly installed, the flashing is jointed, and there are no air seals around the perimeter of this window;
- The tops of the timber-framed balcony and deck balustrades and the plastered columns lack cross falls;
- The ends of some fascias are inadequately finished;
- The nailed fixing of the pergolas to the walls posed a risk to the weathertightness of the cladding;
- The sub floor access door lacks a head flashing and jamb sealants and covers;
- Some penetrations through the cladding are inadequately sealed;
- The outlets to the rainwater head of the master bedroom deck and the connections into the downpipes are undersized and poorly formed; and
- The level and size of the overflow from the upper-level balcony is inadequate, poorly positioned and poorly completed.

5.2 The expert also noted that there were cracks in the solid plaster applied to the existing brick veneer, and that there were inadequate falls to the balcony decks.

5.3 The expert carried out a series of non-invasive and invasive moisture tests at the external walls and at the balcony balustrades and some elevated readings were obtained. The higher readings were as follows:

West elevation

- 21% to 80% non-invasive and 11% to 12.2% invasive at the top of the balcony wall of the master bedroom balcony;
- 25% to 80% non-invasive at the top of the balcony wall of the master bedroom balcony;

North elevation

- 23% non-invasive under the deck to the lower lounge;
- 25% to 80% non-invasive at the top of the balcony wall of the family room balcony;
- 26% non-invasive to bottom of framing around access door;
- 28.4% non-invasive adjacent to the garage wall; and

East elevation

- 23.6% to 55% non-invasive and 10.2% to 11.5% invasive to the sill of lounge window.

Moisture levels above 18% at the exterior of the external walls after cladding is in place generally indicate that external moisture is entering the cladding.

5.4 Copies of the expert's report were provided to each of the parties and both accepted the report. The territorial authority responded by means of a letter dated 14 April 2005. The territorial authority accepted the report, but expressed some concerns about an apparent contradiction in the reference to the moisture readings recorded by the expert. The owner in a letter to the Department dated 26 April 2005 believed that the report supported the issuing of a code compliance certificate for the house and that the moisture readings were not inconsistent. The owner note that the invoices provided showed that H1 treated timber had been used and that while the balcony construction was "working well", some form of additional protection might be required. With regard to control joints, the owner referred to the plastering Producer Statement, which stated that the plastering met the required New Zealand standard.

6 DISCUSSION

General

6.1 I have considered the submissions of the parties, the expert's report and the other evidence in this matter. The approach in determining whether building work complies with clauses B2 and E2, is to examine 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 Authority and the Department have described the weathertightness risk factors in previous determinations (Refer to Determination 2004/01 *et al*) relating to monolithic cladding and I have taken these comments into account in this determination.

Weathertightness risk

6.2 In relation to the weathertightness characteristics, I find that the house:

- Has eaves or verge projections that provide limited protection to the cladding areas below them;
- Is in a medium wind zone;
- Is generally 2 storeys high;
- Is of a reasonably simple shape on plan, with some complex aspects, and with roofs that have hip and wall to roof junctions;
- Has one external deck, and three balconies, one of which is constructed over habitable spaces;
- Has windows and doors that are fully flashed;
- Has lower level roof spaces to limited locations that assist in the ventilation of the external wall cavities above them; and
- Has external wall framing that is unlikely to be treated to a level that would help prevent decay if it absorbs and retains moisture.

Weathertightness performance

6.3 Generally, the cladding appears to have been installed according to good trade practice, but some junctions, edges, and penetrations are not well constructed. These areas are described in paragraph 5.1, and in the expert's report, as being:

- The total absence of the horizontal control joints and the insufficient number of vertical control joints;
- The inadequately installed vertical control joints;

- The lack of vertical control joints between the cladding plaster and the solid plaster on the existing brickwork;
- The cracking in the plaster at some locations;
- The lack of clearance or insufficient clearance between the base of the cladding and the ground or paving;
- The insufficient clearance between the base of the cladding and the balcony decks at some locations;
- The lack of a required gap at the junction of the base of the cladding and the foundation walls;
- The inadequate step-downs from the inner floors onto the decks or balconies at some locations;
- The incorrectly installed sill flashing of the east facing lounge window, the jointed flashing, and the lack of air seals around the perimeter of this window;
- The lack of cross falls to the tops of the timber-framed balcony and deck balustrades and the plastered columns;
- The inadequately finished ends of some fascias;
- The nailed fixing of the pergolas to the walls;
- The lack of a head flashing and jamb sealants and covers to the sub floor access door;
- The inadequately sealed penetrations through the cladding;
- The undersized and poorly formed outlets to the rainwater head of the master bedroom deck and the connections into the downpipes; and
- The inadequate level and size of the overflow from the upper-level.

6.4 I note the owner's reference to the Producer Statement in relation to the provision of control joints. However, in this respect I accept the opinions of the expert and recommend that the territorial authority further investigate the lack of these.

6.5 Notwithstanding the fact that the backing sheets are fixed directly to the timber framing, thus inhibiting drainage and ventilation behind the cladding sheets, I find that there are compensating factors that assist the performance of the cladding in this particular case:

- The cladding generally appears to have been installed according to good trade practice;
- The external doors and windows are fully flashed; and

- The house has lower level roof spaces to limited locations that assist in the ventilation of the external wall cavities above them.

6.6 I consider that these factors help compensate for the lack of a drainage and ventilation cavity, and can allow the house to comply with the weathertightness and durability provisions of the building code.

6.7 I also recommend that the cracks in the solid plaster over the existing brick veneer and the lack of falls to the balcony decks be investigated and that remedial work be undertaken if required.

6.8 I note that one elevation of the house demonstrates a moderate weathertightness risk rating and the remaining elevations a high rating as calculated using the E2/AS1 risk matrix. 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 building as actually built is assessed for the purposes of issuing a code compliance certificate.

7 CONCLUSION

7.1 The moisture tests undertaken by the expert show large variations at the same locations between the invasive and non-invasive readings. These readings were also taken following a prolonged dry spell of weather. Accordingly, I am not certain that the current performance of the cladding is adequate to prevent the ingress of water into the building. Consequently, I suggest that this matter be further investigated to establish whether the cladding system as installed on the house complies with clause E2 of the building code.

7.2 In any event, the house is also required to comply with the durability requirements of clause B2. Clause B2 requires that a building continues to satisfy all the objectives of the building code throughout its effective life, and that includes the requirement for the house to remain weathertight. Because the cladding faults on the house will allow the ingress of moisture in the future, the house does not comply with the durability requirements of clause B2 of the building code.

7.3 I consider that, because the faults that have been identified with this cladding occur in discrete areas, I am able to conclude that satisfactory rectification of the items outlined in paragraph 6.3 is likely to result in the house being weathertight and in compliance with clauses B2 and E2, notwithstanding the lack of a ventilated cavity.

7.4 I note that effective maintenance of monolithic claddings is important to ensure ongoing compliance with clause B2 of the building code. That maintenance is the responsibility of the building owner. The code assumes that the normal maintenance necessary to ensure the durability of the cladding is carried out. For that reason clause B2.3.1 of the building code requires that the cladding be subject to "normal maintenance". That term is not defined and I take the view that it must be given its

ordinary and natural meaning in context. In other words, normal maintenance of the cladding means inspections and activities such as regular cleaning, re-painting, replacing sealants, and so on.

7.5 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.

7.6 I decline to incorporate any waiver or modification of the building code in this determination.

7.7 In response to the territorial authority's letter to the Department of 1 June 2005, I consider that I am entitled to determine whether proposed building work complies with the code, and in fact I have done so in this case. However, the question of whether the work has been properly completed and is code compliant requires careful inspection. I do not believe in this case that the territorial authority's inspections meet this standard. I note that the territorial authority's passed the stucco inspection on 27 July 1999, the preline inspection on 13 August 1999, and the ground floor post-line inspections on 19 May 2000 and 28 June 2001.

7.8 The Notice to Rectify issued on 1 September 2004 listed Particulars of Contravention that included:

- Floor clearances;
- Ground clearances; and
- Flashings.

7.9 I am disturbed to note that these obvious building defects were not discovered during the previous territorial authority inspections. They are also issues that are unrelated to the question of a cavity that the territorial authority has raised. Furthermore, the expert has noted other omissions, such as the lack of control joints and the cracking in the plaster, which are not covered by the Notice to Rectify. It can be seen that the expert's report provides the comprehensive description of the building's outstanding shortcomings that should have been detected before or at the final inspection process and incorporated in the Notice to Rectify.

8 THE DECISION

8.1 In accordance with section 20 of the Building Act 1991, I cannot determine whether the cladding system as installed on the house complies with clause E2 of the building code. However, there are also a number of items to be remedied to ensure that the house remains weathertight and thus meet the durability requirement of the code. Consequently, I find that the house does not comply with clause B2. Accordingly, I confirm the territorial authority's decision to refuse to issue a code compliance certificate.

8.2 I also find that rectification of the items outlined in paragraph 6.3 to the approval of the territorial authority, along with any other faults that may become apparent in the course of that work, will consequently result in the house being weathertight and in compliance with clauses B2 and E2, notwithstanding the lack of a ventilated cavity.

8.3 I note that the territorial authority has issued a Notice to Rectify requiring provision for adequate ventilation, drainage and vapour dissipation. Under the Act, a Notice to Rectify can require the owner to bring each Unit into compliance with the building code. The Authority has already found in a previous determination (2000/1) that the Notice to Rectify cannot specify how that compliance can be achieved. I concur with that view. A new Notice should be issued that requires the owners to bring the cladding into compliance with the building code, without specifying the features that are required to be incorporated. It is not for me to dictate how the defects described in paragraph 6.3 are to be remedied.

8.4 As to the process that should be adopted to meet the requirements of clause 8.3, I suggest the following process. Initially, the territorial authority would issue the Notice to Fix. The owner will then produce a response to this in the form of a technically robust proposal, produced in conjunction with an expert, 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**.** I would also like to add that the Chief Executive might already have decided upon some of the issues that may be raised by the territorial authority in its notice to fix, including the territorial authority's requirement for a ventilated and drained cavity or equivalent.

8.5 Finally, I consider that the cladding will require on-going maintenance to ensure its continuing code compliance.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 18 July 2005.

John Gardiner
Determinations Manager