



## Determination 2009/88

### Determination regarding a code compliance certificate for a five-year-old house with monolithic cladding at 6A Rarere Road, Takapuna



#### 1. The matters to be determined

- 1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004<sup>1</sup> (“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 P Kiely (“the applicant”), acting through the architect for the house (“the architect”) and the other party is the North Shore City Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.
- 1.2 The matter for determination, under section 177(b)(i) of the Act<sup>2</sup>, is whether the authority’s decision to refuse to issue a code compliance certificate for the house was correct. The authority’s decision arose because it was not satisfied that the house complied with certain clauses of the Building Code (First Schedule, Building Regulations 1992).

<sup>1</sup> The Building Act, Building Code, Compliance documents, past determinations and guidance documents issued by the Department are all available at [www.dbh.govt.nz](http://www.dbh.govt.nz) or by contacting the Department on 0800 242 243.

<sup>2</sup> 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 In order to determine this matter I must consider under section 177(a) of the act:

**1.3.1 Matter 1: The monolithic cladding**

Whether the external envelope for the house (“the external envelope”) complies with Clause B2 Durability and Clause E2 External Moisture of the Building Code. The external envelope includes the wall and roof claddings, the windows, the decks and the retaining walls, their configuration, components and junctions with other building elements.

**1.3.2 Matter 2: The durability considerations**

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

1.4 In making my decision, I have considered the submissions of the parties, the report of the expert commissioned by the Department to advise on this dispute (“the expert”), and the other evidence in this matter. I have evaluated this information using a framework that I describe more fully in paragraph 6.

## **2. The building work**

2.1 The building work consists of a two-storey house on a gently sloping site, which is in a high wind zone for the purposes of NZS 3604<sup>3</sup>. Construction is a mix of specifically engineered steel and conventional light timber frame, with concrete slabs and foundations, concrete block foundation walls, aluminium windows and monolithic wall cladding. The house is a fairly simple rectangular shape, with a 25° pitch metal hipped roof that has eaves varying from the gutter only to about 570mm.

### **2.2 The decks**

2.2.1 An enclosed deck (“the north deck”), situated above the ground floor rumpus room, extends from the upper level living area. The deck has a tiled membrane floor and monolithic-clad balustrades with metal handrails. A proprietary metal louver canopy above the deck is supported from metal posts.

2.2.2 A second enclosed deck with monolithic-clad balustrades, is set into the hipped roof to form a roof terrace (“the roof deck”). The deck floor is spaced timber slats installed over membrane.

2.3 The monolithic cladding is a system described as solid plaster (“stucco”) over a flexible backing of building wrap, which is covered by a 25mm thick metal-reinforced solid plaster and a flexible paint coating. The stucco is installed over 20mm H3 treated battens that are fixed through the building wrap to the framing, to provide a cavity behind the cladding.

2.4 The expert has noted that he was unable to observe the framing. However, the authority has supplied a copy of a letter from the timber supplier dated 19 February 2004. The timber supplier confirms that all pre-nailed wall framing delivered to the building site had ‘been constructed with the exclusive use of H1 L.O.S.P treated timber as per your instruction’. Based on this evidence, I consider that the wall

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<sup>3</sup> New Zealand Standard NZS 3604:1999 Timber Framed Buildings

framing of this house is likely to be treated to a level that will provide resistance to fungal decay.

- 2.5 The house has been assessed as having a high weathertightness risk (refer paragraph 7.3).

### **3. Background**

- 3.1 The authority issued a building consent (No. BB/07997/02) to the builder on 7 October 2002, under the Building Act 1991.
- 3.2 The authority carried out various inspections during construction, including a pre-line inspection on 3 May 2003, a pre-plaster inspection on 7 May 2003 and a post-line inspection on 16 May 2003. The authority carried out a final inspection on 1 April 2004, and the inspection summary notes several items to complete, including:
- Balustrade and safety barriers do not comply with F4 and D1 of the building code.  
No top fixed rails and the top of barrier to be on a 15° slope.
- 3.3 Early in 2008, an amendment to the building consent was approved to add cappings and handrails to both decks, presumably to satisfy the above requirements, and a final inspection was requested.
- 3.4 The authority re-inspected the building on 8 May 2009, and identified four items that required attention in a 'building officers field memorandum' of the same date. The field memorandum also noted '[weathertightness] issues to be addressed by [weathertightness] inspection team – standard letter supplied'.

### **3.5 The authority's position**

- 3.5.1 The authority subsequently carried out a visual weathertightness inspection, which noted that the cladding was installed over a drained cavity, identified various features and risk factors associated with the house, and listed the following defects:
1. Cracks visible to cladding in places.
  2. No flashing provided to top of meter box.
  3. Holes in corners of meter box and around wires are not sealed.
  4. Cladding to ground clearances inadequate in places.
  5. Cladding to tiled deck clearance not adequate.
  6. No vertical control joints have been installed in cladding to deck balustrades.
  7. A downpipe discharges onto the upper level deck.
  8. Fence post is bolted through the cladding.
  9. Cracks in deck tiles.
  10. Fixing penetrations for extension to deck barrier.
  11. Penetration of posts through upper level deck.
- 3.5.2 In a letter to the owner dated 9 June 2009, the authority appeared to consider the stucco to be 'direct fixed monolithic cladding'. The authority explained that the 'allowance of moisture ingress, together with the use of untreated timber framing, has become a major problem to the structural integrity of buildings' and it now

usually required 'invasive moisture testing and investigation' in order to be satisfied about the compliance of direct fixed monolithic cladding systems.

3.5.3 The authority listed certain risk factors identified with the building, together with a list of 7 defects. (I assume that the last 4 items from the list in paragraph 3.5.1 were mistakenly omitted.) The authority stated that, due to the risk factors and identified defects, it could not be satisfied on reasonable grounds that the cladding system complied with Clauses E2 and B2 of the Building Code.

3.5.4 The authority also noted that the Building Code required certain minimum durability periods for all elements in a building, with the times to commence on the issue of a code compliance certificate. Due to the age of the building, the authority could not be satisfied on reasonable grounds that the building elements would meet the performance requirements of Clause B2 of the Building Code.

3.5.5 As a 'way forward', the authority advised the engagement of an 'appropriately qualified and experienced consultant' to investigate the weathertightness of the cladding, confirm the moisture levels in the exterior framing and propose remedial work if necessary. The authority stated that, providing all required remedial work was satisfactorily completed within a year, a code compliance certificate would be issued that applied from the date of substantial completion, suggested as 1 April 2004.

3.5.6 The authority noted that if the applicant chose not to follow the above process, an application for a determination could be made, noting:

The matters for determination would be compliance with E2 External Moisture for the cladding systems as installed, and B2 Durability for all elements of your building.

3.6 The Department received an application for a determination on 6 July 2009.

## **4. The submissions**

4.1 In a letter dated 26 June 2009, the architect noted that the authority had mistakenly referred to the cladding as 'direct fixed', whereas it had been installed over a cavity and was detailed 'in all functional respects in accordance with E2/AS1'. Although there were some minor defects that could be easily remedied, the architect considered the authority's requirement for invasive testing and a weathertightness report as unnecessary and expensive. The building had been designed and detailed to meet the code requirements, built in accordance with good trade practice, and inspected by the authority during construction. The architect concluded that:

...there is no evidence that the building is failing to meet the requirements of the Building Code and, notwithstanding that there may be minor defects in the cladding system, it is performing in accordance with the NZ Building Code.

4.2 The architect forwarded copies of:

- the consent drawings and specification
- the consent documentation
- the inspection records

- the correspondence from the authority
  - various other information.
- 4.3 The authority acknowledged the applicant's submission, and forwarded copies of:
- the pre-plastering inspection record
  - a letter from the timber supplier dated 19 February 2004
  - a producer statement and warranty for the deck membrane system.
- 4.4 A draft determination was issued to the parties on 4 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.
- 4.5 The architect accepted the draft but submitted that a notice to fix was unnecessary as it was 'unreasonably bureaucratic ... and will create unnecessary costs for [the owner]', and that having a notice to fix issued would also 'suggest the building has failed to meet the provisions of the Building Code'. The architect instead suggested an amendment be made to the 'building officers field memorandum' of 8 June 2009 (refer paragraph 3.4).
- 4.6 Both the notice to fix and the field memorandum serve a similar purpose but, in my opinion, the notice to fix is the appropriate legislative response as it formalises the outcome of the field memorandum. If the work is satisfactorily completed, the issuing of the code compliance certificate will serve as the concluding statement as to the building's compliance.
- 4.7 The authority also accepted the draft but sought to have two items included in paragraph 5.8 of the expert's report being the gate post bolted through the cladding, and the RHS post penetrating the north deck.
- 4.8 I believe the gate fixing is already referred to in paragraph 7.4.1 (bullet points 9). However, the expert considered the weatherproofing of the RHS post was adequate.
- 4.9 Both parties agreed that compliance with Clause B2 was achieved on 1 April 2004.

## **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 5 August 2009 and provided a report on 7 August 2009.
- 5.2 The expert noted the following variations from the consent drawings:
- There are several changes to the east windows.
  - The position of the south access door to the garage has changed.
  - The sill flashing to the semi-recessed windows extends to the plaster face.
  - The balustrade handrails to the decks are side-fixed in lieu of top-fixed.
  - The roof deck surface is timber in lieu of tiles.

- 5.3 The expert noted that, apart from the defects noted below, the cladding was ‘generally finished to a high standard’, with the stucco ‘generally smooth, uniform and free from discolouration or other signs of premature aging’, and the visible parts of flashings appeared to be ‘installed to a good standard.’

#### **5.4 The windows**

- 5.4.1 The expert noted that most of the windows and doors were “semi-recessed” by the thickness of the stucco, with the edge of metal head flashings visible. The bottom edges of uPVC jamb flashings were also visible, and overlapped the upstand to the metal sill flashings, which extended out to the face of the plaster. The expert noted that the details appeared satisfactory and were generally in accordance with NZS 4251<sup>4</sup> at the time of construction.
- 5.4.2 Two louver windows installed to the master bedroom ensuite and dressing room were recessed by about 60mm. The details for these recessed windows are also generally as shown in NZS 4251 at the time of construction, with the exception that membrane flashings are used instead of metal.
- 5.4.3 The expert noted that moisture levels below both types of windows were low, and concluded that the windows appeared to be performing adequately to date.

#### **5.5 Control joints**

- 5.5.1 The expert noted that horizontal and vertical control joints had been installed. The expert cut through the plaster at a vertical control joint immediately above the flashing of the horizontal joint, and noted that the joint had been formed by cutting a groove through the outer plaster coats, which was then filled with sealant and coated.
- 5.5.2 The expert noted that, where vertical control joints were installed most cracking was restricted to these. This suggested that the joints appeared to be performing adequately, although some maintenance was required in some areas where sealant was pulling away from the plaster.

#### **5.6 The decks**

- 5.6.1 The expert noted that the north deck had an adequate slope, with no signs of ponding. The membrane upstands appeared adequate, and there was no evidence of moisture penetration.
- 5.6.2 The expert noted that the roof deck floor above the membrane was spaced timber slats that require regular maintenance to ensure satisfactory drainage. No evidence of moisture penetration was apparent.

#### **5.7 Moisture testing**

- 5.7.1 The expert inspected the interior of the house and took non-invasive moisture readings internally around the house and no evidence of moisture was noted, except beneath an opening skylight window. The expert considered that this was likely to

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<sup>4</sup> NZS 4251 Code of practice for solid plastering

be due to the skylight being open during rain, noting that it was left open during his inspection.

- 5.7.2 The expert took 15 invasive moisture readings through the cladding at high risk locations, and the readings varied from 9% to 16%. Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure.
- 5.7.3 The expert noted that the readings were taken in mid-winter following heavy rain, so were likely to represent the 'high end of season variation'. The expert considered that the incorporation of the drained cavity appeared sufficient to prevent any moisture penetrating the cladding faults from reaching the framing.
- 5.8 Commenting specifically on the cladding, the expert noted that:
- there are no vertical control joints to the balustrade of the north deck and to the north end of the west elevation, and there are cladding cracks to these areas
  - there are some other minor isolated cracks at bottom corners of the cladding, which appear to be due to impact damage
  - the cracking requires further investigation, to ensure that cause(s) are remedied to avoid recurrences following repairs
  - the bottom of the cavity lacks vermin-proofing
  - the retro-fitted balustrade cappings have welded 'saddle' flashings that overlap the cladding at the wall junctions, and these require sealing to the cladding
  - the post penetrating the north deck balustrade has a metal 'collar', which is loose and unsealed
  - the membrane to the rainwater head at the north deck is torn, and also not protected with UV protective paint
  - the meter box has no top flashing and is unsealed
  - some service penetrations through the cladding are unsealed or poorly sealed.
- 5.9 The expert also made the following comments on the claddings:
- Although there is limited clearance from the bottom of the cladding to the paving at the entry/garage area, the paving is well drained and reasonably sheltered by the eaves, with no evidence of associated moisture penetration.
  - Although there is limited clearance from the bottom of the cladding to the north deck tiles, the deck is well drained, the membrane upstand is adequate and there is no evidence of associated moisture penetration.
- 5.10 The expert also recommended that the owner should be provided with a 'comprehensive maintenance manual' because:
- ...the building envelope is complex, and a good standard of inspection and maintenance will be required to ensure its continued performance and that the various risk details do not in fact lead to any non-compliances.
- 5.11 With regard to the remaining items identified in the final inspection on 8 May 2009, the expert noted that the architect had advised that:

- an engineer's confirmation of the roof deck barrier was available
- a safety barrier would be installed to limit window W2.4 to 100mm opening
- the architect would seek a supplier's certificate for the entry corridor glazing.

5.12 A copy of the expert's report was provided to the parties on 11 August 2009.

## 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 Solutions<sup>5</sup>, which will assist in 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 one or more other provisions to compensate for that in order to comply with the Building Code.

## Matter 1: The monolithic cladding

### 7. Weathertightness

7.1 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 determinations<sup>6</sup> (for example, Determination 2004/1) relating to cladding and these factors are also used in the evaluation process.

7.2 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.

### 7.3 Weathertightness risk

7.3.1 This 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, with the resulting level of risk ranging from 'low' to 'very high'. This house has the following features which influence its weathertightness risk profile:

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<sup>5</sup> 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](http://www.dbh.govt.nz).

<sup>6</sup> Copies of all determinations issued by the Department can be obtained from the Department's website.

**Increasing risk**

- the house is in a high wind zone
- the house is two-storeys high
- while the basic form of the house is fairly simple, additional design features have resulted in some complex junctions and intersections
- two enclosed decks are situated above lower rooms of the house
- some walls have no eaves projections to shelter the walls

**Decreasing risk**

- most walls have eaves projections to shelter the walls
- the walls have stucco cladding fixed over a drained cavity
- the external wall framing is treated to a level that provides some resistance to decay if it absorbs and retains moisture.

7.3.2 When evaluated using the E2/AS1 risk matrix, these features show that all elevations of the house demonstrate a high weathertightness risk rating. I note that the stucco cladding to this house is installed over a drained cavity, which is in accordance with the current requirements of E2/AS1.

**7.4 Weathertightness performance**

7.4.1 Generally the cladding appears to have been installed to good trade practice and in accordance with NZS 4251 at the time of construction. However, taking account of the expert's report, I conclude that remedial work is necessary in respect of:

- the lack of vertical control joints to the north deck balustrade and part of the west elevation
- the cracks in the cladding
- the cracks in the deck tiles
- the sealing of the saddle flashings at the junction of the wall and the balustrade capping
- the weathertightness of the balustrade capping at the junction with the wall
- the completion of the collar flashing to the penetrations to the balustrade capping
- the membrane to the rainwater head at the north deck
- the weathertightness of the meter box
- the weathertightness of the services penetrations, and fixings installed through the cladding.

(I note several additional items identified in the authority's weathertightness inspection, see paragraph 3.5.1, and I have included these within the above.)

7.5 I note the expert's comments in paragraph 5.9, and accept that these areas are adequate in the circumstances.

## **7.6 Weathertightness conclusion**

- 7.6.1 I consider the expert's report establishes that the current performance of the external envelope is adequate because it is preventing water penetration into the wall framing at present. Consequently, I am satisfied that the house complies with Clause E2 of the Building Code.
- 7.6.2 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 alterations may allow the ingress of moisture in the future, the building work does not comply with the durability requirements of Clause B2.
- 7.7 Because the faults identified occur in discrete areas, I am able to conclude that satisfactory rectification of the items outlined in paragraph 7.4.1 will result in the cladding being brought into compliance with Clause B2.
- 7.8 I note the expert's comment in regard to the particular need for maintenance to the complex envelope of this house. 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 (for example, Determination 2007/60).

## **Matter 2: The durability considerations**

### **8. Discussion**

- 8.1 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 date of the building during 2004.
- 8.2 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).
- 8.3 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.

- 8.4 In this case the delay between the completion of the building work in 2004 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.
- 8.5 It is not disputed, and I am therefore satisfied that all the building elements, with the exception of those items that are to be rectified, complied with clause B2 on 1 April 2004. This date has been agreed between the parties, refer paragraph 4.9.
- 8.6 In order to address these durability issues, I sought some clarification of general legal advice about waivers and modifications. I have now received that clarification and the legal framework and procedures based on this clarification are described in previous determinations (for example Determination 2006/85) and are used to evaluate the durability issues raised in this determination.
- 8.7 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 2004.
- 8.8 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.

## **9. What is to be done now?**

- 9.1 I note that the authority has not issued a notice to fix. A notice to fix should now be issued that requires the owner to bring the building into compliance with the Building Code, identifying the items listed in paragraph 7.4.1 and referring to any further defects that might be discovered in the course of 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.
- 9.2 I suggest that the parties adopt the following process to meet the requirements of paragraph 9.1. 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, 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.
- 9.3 With regard to the remaining items identified in the final inspection on 8 May 2009, I note the expert's comments in paragraph 5.11 and accept that these items appear to be in the process of being resolved. I also note that the expert has identified some

variations between the consent drawings and the house as constructed, and I leave that matter to the authority to resolve with the owner as it considers appropriate.

## **10. The decision**

10.1 In accordance with section 188 of the Act, I determine that the external envelope does not comply with Clause B2 of the Building Code insofar as it relates to Clause E2, and accordingly I confirm the authority's decision to refuse to issue a code compliance certificate.

10.2 I also determine that:

- (a) all the building elements installed in the building, apart from the items that are to be rectified as described in this determination, complied with Clause B2 on 1 April 2004.
- (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 April 2004 instead of from the time of issue of the code compliance certificate for all building elements except the items to be rectified as set out in paragraph 7.4.1 of as set out in Determination 2009/88

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 13 October 2009.

John Gardiner  
**Manager Determinations**