

## Determination 2010/051

### Refusal to issue a code compliance certificate for a 10-year-old house with monolithic cladding at 3/134 Birkenhead Avenue, North Shore



#### 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, the Collie Family Trust (“the applicant”) acting through its lawyer, and the other party is the North Shore City Council (“the authority”), carrying out its duties as a territorial authority or building consent authority. I consider the owner of the other house in the development is a person with an interest in this determination.

1.2 This determination arises from the decision of the authority to refuse to issue a code compliance certificate for a 10-year-old house (“House 3”), because it is not satisfied that the building work complies with certain clauses<sup>2</sup> of the Building Code (First Schedule, Building Regulations 1992). Based on correspondence between the parties, the authority’s primary concerns about the compliance of the building work in House 3 appear to relate to its age and to the weathertightness of its claddings.

<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 The matter to be determined<sup>3</sup> is therefore whether the authority was correct to refuse to issue a code compliance certificate for House 3. In deciding this, I must consider:

### 1.3.1 Matter 1: The external envelope

Whether the external claddings to House 3 (“the claddings”) comply with Clause E2 External Moisture and Clause B2 Durability of the Building Code. The claddings include the components of the systems (such as the monolithic wall cladding, the windows, the roof cladding and the flashings), as well as the way the components have been installed and work together. (I consider this matter in paragraph 7.)

### 1.3.2 Matter 2: The durability considerations

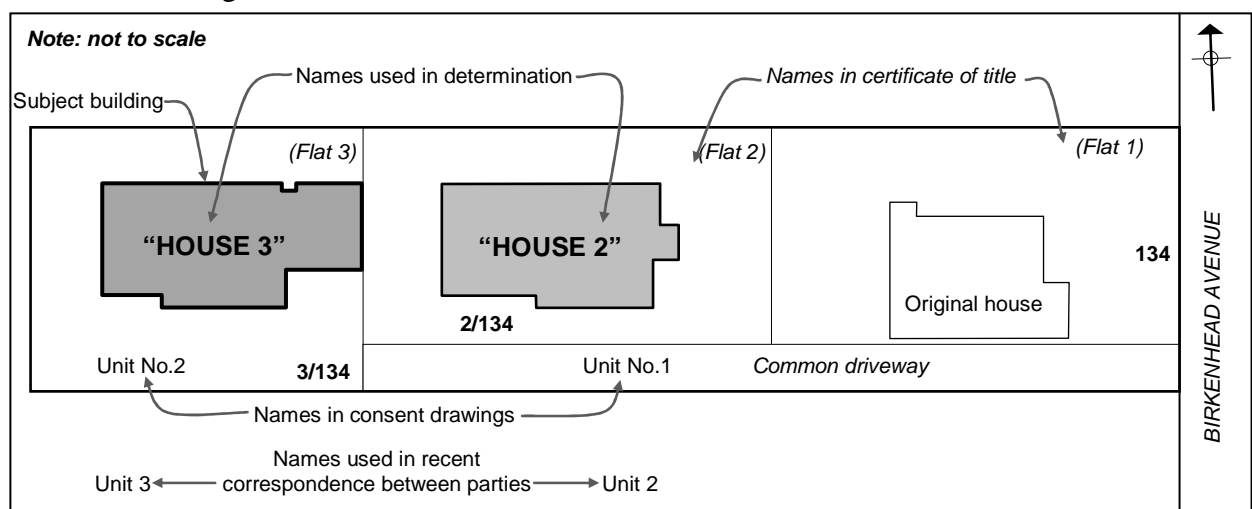
Whether the elements that make up the building work in House 3 comply with Building Code Clause B2 Durability, taking into account the age of the house. (I consider this matter in paragraph 9.)

1.4 I note that House 3 was part of a two-unit development that was constructed under a single building consent. Based on the correspondence between the parties, it appears that the authority, at the applicant’s request, has amended the single building consent for the development, which includes House 3, so that this building now has its own separate building consent (see paragraph 4.11). The matter of amending the building consent is therefore not considered in this determination.

1.5 In making my decisions, 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. With regard to weathertightness, I have evaluated this information using a framework that I describe more fully in paragraph 7.1.

## 2. The development

2.1 House 3 is one of three houses situated on a steep west-sloping site as shown in the following sketch:



<sup>3</sup> Under section 177(b)(i) of the Act

- 2.2 The original property was long and narrow, with an existing 1920's house positioned towards the street at the eastern end. The property was initially sub-divided in 1991 by the then owner to provide two vacant crosslease sections behind the existing house. Each individual house has its own separate land and building title, which defines legal boundaries of the sections.
- 2.3 House 2 and House 3 were constructed on the two rear sections, with the building work for both houses carried out during 1999 and 2000 under a single building consent. Access to House 3 is provided by a shared steep driveway from the street.

### **3. The building work**

- 3.1 The building work for House 3 consists of a detached house that is two-storey in part and is situated on a sloping site in a low to medium wind zone for the purposes of NZS 3604<sup>4</sup>. The steep slope of the site results in the garage wall on the east boundary being almost completely set into the slope, whereas the floor level at the western end of the house is suspended at more than one storey above ground level. House 3 is assessed as having a moderate to high weathertightness risk (see paragraph 7.2).
- 3.2 The foundations and concrete block retaining walls to the garage, the timber pole foundations to the house and the exterior timber retaining walls are specifically engineered. The remaining construction is generally conventional light timber frame, with monolithic and timber weatherboard wall claddings, aluminium windows and profiled metal roofing.
- 3.3 House 3 is fairly complex in plan and form, with 20° pitch hipped roofs at three different levels. The garage roof and several other areas have no eaves projections, while the remaining roofs have eaves of more than 600mm.

### **3.4 The decks**

- 3.4.1 There are two free-draining timber decks attached to the lower floor level of the house. A small entry deck links the south entry with steps leading up the timber retaining wall to the driveway. A timber deck at the north-west corner is recessed beneath the north-west corner of the lower roof. This deck has spaced timber decking and framed monolithic-clad balustrades, with a metal capping to the top.
- 3.4.2 There is also a large enclosed deck opening off the upper floor bedrooms. The deck is recessed beneath the north-west corner of the upper roof and the tiled membrane floor is set down into the slope of the lower roof. The deck balustrades are clad in timber weatherboards with a metal capping to the top.

### **3.5 The claddings**

- 3.5.1 The wall cladding to the ground floor walls is one type of monolithic cladding, which consists of 7.5 mm thick fibre-cement sheets fixed through the building wrap to the framing, and finished with an applied textured coating system. The flush-finished

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<sup>4</sup> New Zealand Standard NZS 3604:1999 Timber Framed Buildings

fibre-cement extends over the north and south returns to the garage concrete block retaining wall.

- 3.5.2 The flush-finished fibre-cement cladding also extends up the two-storey walls of the stairwell on the east and south elevation. The remaining upper walls and the upper deck balustrades are clad in stain-finished cedar rusticated weatherboards, with timber facings at external corners.
- 3.6 The expert took three timber samples from exterior wall framing and forwarded them to a testing laboratory for analysis, and the biodeterioration consultant's analysis confirmed that the samples were untreated. Given this evidence and the date of construction in 1999, I consider that the wall framing of this house is not treated.

## 4. Background

- 4.1 After subdivision in 1991, the property remained undeveloped until the then owner sold the original house on its section in January 1997, retaining the two rear crosslease sections. The drawings for House 2 and House 3 were completed in March 1997 and resource consent for 'two residential units' was granted in July 1997. The owner then sold the two crosslease sections in February 1999.
- 4.2 The authority issued a building consent (No. B 13414) to the owner/developer on 31 March 1999 under the Building Act 1991. The consent was issued for 'two units', with the excavations, pile foundations, stormwater disposal system and exterior timber retaining walls for both properties carried out first.
- 4.3 During April and May 1999, engineering consultants carried out a total of 10 inspections of the pile foundations for both houses and the retaining walls on both sections, together with the stormwater disposal system for the properties. The engineers provided a producer statement dated 22 June 2000 for construction review of 'stormwater disposal, pile foundations'.
- 4.4 The authority carried out inspections of footings and floor slabs of both houses in May 1999. House 2 was completed first, with the authority undertaking various inspections during construction and issuing an interim code compliance certificate for that house on 13 May 2000.
- 4.5 House 3 was then completed and the authority's inspections included pre-line and insulation on 7 April 2000, post-line on 15 April 2000 and a final inspection on 13 June 2000. The authority issued an interim code compliance certificate for this house on 13 July 2000. A later 'checklist for CCC clearance' dated 20 November 2000 for both houses, passed the building work as 'clear for CCC' and noted that a total of 14 inspections had been carried out. However no final code compliance certificate was issued.
- 4.6 On 20 January 2004 the authority issued a pro-forma letter to the owner/developer, in which it explained that weathertightness inspections were required as:
- Consented building works in North Shore City clad with any type of monolithic cladding without a cavity, that have not had specific inspections to deal with weathertightness issues, will be reviewed on a case-by-case basis before

determining if a code compliance certificate can be issued. These properties may already have had a 'final inspection'.

#### **4.7 Request for a code compliance certificate for House 2**

4.7.1 When the owner/developer sold House 2 in February 2004, a code compliance certificate was sought for that house. It appears that the authority carried out a visual inspection of both houses, which identified some cladding problems. It also appears that a field memorandum was subsequently issued, as a handwritten note was added to the pro-forma letter (see paragraph 4.6) stating 'please note Memo 46414 requires a separate cladding inspection. See photos on file.' (I have not seen that record).

4.7.2 In a letter to the owner/developer dated 4 March 2004, the authority acknowledged the request for a code compliance certificate for House 2, described the recent information about the weathertightness and durability of monolithic claddings with no cavity and stated:

As Unit 2 [House 2] is face fixed (monolithic) construction with no cavity we are unable to verify that it fully complies with the Building Code requirements, manufacturer's details applicable at the time and that it will remain durable for the required period... ..council is not in a position to issue a code compliance certificate as per your request.

4.7.3 Within the letter, the authority also stated that the interim code compliance certificate previously issued for House 3 was 'now deemed as being unreliable and will be revoked'. I have seen no evidence that the certificate for House 3 was revoked.

4.7.4 The authority concluded:

Council cannot be satisfied that the cladding system as installed on the above building will meet the functional requirements of Clause E2 External Moisture of the New Zealand Building Code and is therefore unable to issue a code compliance certificate.

4.8 I am not aware of further correspondence until the owner of House 3 prepared to sell in 2007 and sought a code compliance certificate. While contemplating the purchase of House 3, the applicant commissioned a 'pre-purchase report' from a property inspection company ("the inspection company"), which was completed on 12 April 2007 (I have not seen a copy of that report). The applicants then purchased House 3 in June 2007.

#### **4.9 The authority's decision**

4.9.1 In a letter to the applicant dated 7 September 2007, the authority explained that a single building consent had been issued for both houses and noted that a weathertightness inspection of House 3 had been carried out at the owner's request.

4.9.2 The authority explained that allowance for moisture ingress, together with the use of untreated timber framing had become a major problem to the structural integrity of buildings, and cladding systems were now selected to suit the particular weathertightness risks. The authority identified 17 design and construction features that it considered to be risk factors for House 3.

4.9.3 As well as identifying several areas requiring handrails or balustrades, the authority listed the following weathertightness defects for House 3:

1. Lack of threshold height at doorway to upper level deck
2. Height of clearance from deck tiles to weatherboard cladding is insufficient
3. Inadequate clearance between monolithic cladding and parallel apron flashing over the garage roof
4. The monolithic cladding is buried in the ground in places
5. Height of floor level above ground levels is insufficient in places
6. Fibre cement sheets are not sealed on some bottom edges, and in some other places, particularly at a horizontal fibre cement/blockwork junction
7. Holes through bottom of meter box have not been sealed
8. Inadequate kickout provided at bottom of parallel apron flashing above left hand end of garage door
9. The monolithic cladding is showing some cracks and peaked joints
10. Stringer to rear deck not packed off fibre cement cladding, as per manufacturer's requirements
11. The balustrade capping has a flat top
12. Timber decking has not been gapped off fibre cement cladding
13. No evidence of control joints having been installed to fibre cement cladding, as required by manufacturer
14. Bearer ends have not been flashed
15. No overflow has been provided to top level deck

4.9.4 The authority stated that, due to the risk factors and defects, it could not be satisfied on reasonable grounds that the cladding systems complied with clauses E2 and B2 of the Building Code; recommending that a 'Certified Weathertightness Surveyor' investigate the weathertightness of the cladding, confirm the moisture levels in the exterior framing and propose remedial work if necessary.

4.9.5 The authority also noted that the Building Code required certain minimum durabilities of all elements in a building, with the times to commence on the issue of a code compliance certificate, and the age of the construction was a concern.

4.9.6 In regard to the building work covered by the building consent, the authority stated that Unit 2 would also have to be completed, including 'weathertightness remedial work for compliance with Clause E2 External Moisture.' The authority also noted that it had received no response to its letter to the owners of Unit 2 dated 4 March 2004 (see paragraph 4.7.2).

#### **4.10 The inspection company's report**

4.10.1 The applicant engaged the inspection company to advise on the issues and defects identified by the authority in its letter dated 7 September 2007 (see paragraph 4.9). The same inspection company had carried out the pre-purchase inspection of House 3 prior to the applicant's purchase of the property (see paragraph 4.8).

4.10.2 The inspection company reported to the applicant in a letter dated 13 March 2008, which noted that the risk factors identified by the authority should have been covered during inspections of House 3 and can therefore be assumed to have been accepted as complying with the manufacturer's specifications and the building code at the time the interim code compliance certificate was issued.

4.10.3 While the inspection company accepted that, since House 3 was constructed, monolithic cladding had proved to be more prone to moisture problems, its pre-

purchase inspection had found House 3 to be 'well constructed', with 'very good eaves overhang' and non-invasive testing had revealed no 'excessive moisture readings'. The inspection company also noted that a handrail would be installed to the entry steps and a barrier had been installed at the top of the retaining wall as required by the authority.

4.10.4 The inspection company commented on the defects in House 3 listed by the authority, agreeing with items 4, 6, 11, 14 and noting the following in regard to the others (in summary):

- Items 1 and 2: the 3 metre roof overhang prevents any moisture penetration from the lack of threshold height and clearance to the deck tiles.
- Item 3: the cladding clearance to the apron flashing was standard practice and the cladding can be cut back if required.
- Item 5: there is no area where the floor clearance is insufficient.
- Item 7: there are no unsealed holes in the bottom of the meter box.
- Item 8: the bottom of the apron flashing over the garage roof is adequate with moisture levels recorded at only 12%.
- Item 9: there is little sign of cracking, so this must be a minor problem.
- Items 10 and 12: at the time of construction, there were no requirements to provide gaps from the cladding to deck stringers and timber decking.
- Item 13: although there are several walls over 6m, there is no sign of fractures resulting from the lack of control joints.
- Item 15: an overflow from the upper deck can be seen from below.

4.10.5 The inspection company concluded that the interim code of compliance certificate issued on 13 May 2000 for House 3 should be acknowledged by the authority and 'accepted as a full Code of Compliance', stating:

Unit 3 [House 3] was issued with an item Code of Compliance Certificate which we believe should be the commencement date of the B2 Durability of the NZ Building Code. It would therefore be a logical assumption that due to the moisture readings within this property, all being within acceptable levels and with the lack of any sign of deterioration of the property, that this building would meet the E2 External Moisture and B2 Durability. This property (Unit 3) has been constructed to a high standard and shows no sign of weathertight issues or movement.

4.10.6 I note that neither the pre-purchase report nor this report identified the decay in the building which illustrates the limitations of building inspection reports which do not include results of invasive testing. The inspection company's report was provided to the authority on 14 April 2008.

4.11 In the meantime, the lawyer and the authority continued to correspond about the question of splitting the building consent in order to allow the applicant to seek a code compliance certificate for House 3 without involving the owners of House 2. It appears that a new building consent (No. BB 1233982) was subsequently issued for House 3, although I have not seen a copy of that consent (see paragraph 4.14).

4.12 In a letter to the authority dated 30 May 2008, the lawyer advised that the applicant had engaged a builder to carry out the remedial work recommended in the inspection company's report, which would be inspected by the inspection company on completion, with a report provided to the authority after which a code compliance certificate would be expected to be issued.

#### **4.13 The remedial work**

4.13.1 The remedial work to House 3 was subsequently undertaken (with no involvement by the authority); and the inspection company inspected the work and reported to the applicant on 28 January 2009.

4.13.2 The inspection company photographed the areas involved and noted that the following work to House 3 had been carried out:

- The bottom of cladding above the garage roof cut back to increase clearance.
- The bottom of cladding behind the garage cut back to increase clearance.
- The sealing of unsealed sheet edges.
- An additional flashing to the bottom of the apron flashing to the garage roof.
- A metal capping installed over the flat timber capping.
- Where possible, the timber decking has been cut back from the cladding.
- A control joint has been retrofitted into the 8.6m long wall.
- The bearer ends have been flashed.
- A handrail has been installed to the entry steps.
- An additional balustrade has been installed to the top of the retaining wall.

4.13.3 The inspection company concluded that the applicant had:

...done everything possible to bring this property up to acceptable standard of Compliance, as outlined in the [authority's] letter dated 7 September 2007.

However, the [authority] does have the right to revisit and may require further items attending to.

4.14 The lawyer provided a copy of the inspection company's report under cover of a letter to the authority dated 26 February 2009. The lawyer referred to a letter dated 14 August 2008 (which I have not seen) in which the authority had apparently 'insisted on a full weather-tightness inspection' for House 3. The lawyer maintained that any such issues had been resolved and requested a final inspection of House 3 'for the purposes of issuing a Code Compliance Certificate' now that a 'new building consent has now been issued' for House 3 (see paragraph 4.11).

4.15 According to the lawyer, the authority has refused to carry out the requested final inspection of House 3 'until a specialist report is done on the dwelling by a certified weathertightness surveyor from their list of approved contractors.' The inspection company has noted that it is on their list of approved contractors and had submitted a report that the authority 'chose to ignore'. (I have seen no further correspondence from the authority.)



- 4.16 The Department received an application for a determination on House 3 from the lawyer on 22 February 2010.

## 5. The submissions

- 5.1 The lawyer made a submission in the form of a letter to the Department dated 10 December 2009, which outlined the history of the development and of House 3. The lawyer explained that the applicant maintained the authority is acting unreasonably in insisting that House 3 must be ‘inspected, monitored and approved by one of the people on their list’ before a code compliance certificate will be issued for House 3. The costs and timeframe for that process is unreasonable in the circumstances as:

...there is no evidence that the dwelling is a leaky building. While it has some of the features that have been associated with leaky buildings, the inspections that have been done, the remedial works that have been attended to and the test of time in that this dwelling is now over 9 years old, have all pointed to the fact that this dwelling is not at risk.

- 5.2 The applicant submitted copies of:

- the resource consent documentation for the development
- the consent drawings and specification for both houses
- the building consent documentation
- the authority’s inspection summary and some records (later provided)
- the interim code compliance certificate dated 13 July 2000 (later provided)
- some of the correspondence with the authority
- the letter dated 23 March 2009 from the authority.

- 5.3 A draft determination was issued to the parties for comment on 16 April 2010. The authority accepted the draft on 30 April 2010 referring to a typographical error which has been corrected.

## 5.4 The applicant’s response

- 5.4.1 The applicant responded to the expert’s report and the draft determination within the same statement received by the Department on 26 May 2010, which attached the inspection company’s comments (refer paragraph 5.5 below). I have taken the applicant’s comments into account and have amended the determination as I consider appropriate.

- 5.4.2 The applicant noted that the expert’s 76 moisture readings had confirmed that, while there are problem areas, these are ‘not major or insurmountable’. The applicant generally considered that the determination had been ‘a little harsh and unjust in the conclusions reached’ and included the following summarised points:

- The house was ‘well designed and built and met all requirements at the time hence the [passed inspections]’ and had received an interim code compliance certificate.

- There is no objection to the code compliance certificate being ‘back dated to the ... interim [code compliance certificate] as it is unreasonable for the authority to accept that additional liability.
- The decay found by the expert is isolated and there is no extensive decay in this building, which is confirmed by the installed probes.
- The other matters raised by the expert are minor problems of ‘time and fair wear and tear’ that are maintenance issues and are ‘easily fixed’.
- The site drainage is ‘very effective’ as it was handled by three drains and channels in front of the garages, which are regularly maintained.
- The site is at the bottom of a ‘very long sloping drive in a valley well sheltered from all prevailing winds’, and does not represent a ‘medium to high wind risk’.
- The cedar weatherboards were well installed and showed a ‘lack of problems after nearly ten years’ despite being more exposed on the upper storey.

5.4.3 The applicant considered that the problems were limited to the flush-finished fibre-cement walls and had concluded that, while the property inspection company takes:

... the view that targeted repairs are possible, I have always been of the opinion that the [fibre-cement] cladding needs to be removed and replaced with another cladding system similar or the same as the cedar on the upper storeys. This would expose all lower and some upper storey framing for inspection and treatment (with [a liquid preservative] for example) and address window flashing plus allow new moisture barrier material to be installed.

## **5.5 The inspection company’s response**

5.5.1 The inspection company provided the applicant with comments on the draft determination on 7 May 2010. I have considered the comments and have amended the determination as I consider appropriate.

5.5.2 With regard to the draft, the inspection company’s comments included (in summary):

- If the house was passed for code compliance, in 2000, the certificate should have been issued at that time. The pro-forma letter sent 4 years later is retrospective information.
- Once the interim code compliance was issued for the house, it cannot be revoked because of non-compliance when those issues were not part of the Building Code at the time of construction.
- The current problem areas result from flashing failure not cladding failure. Defects identified by the authority were either typical construction at the time or have subsequently been remedied.
- Wording in the testing laboratory’s report is ‘inconclusive and uninformative with regards to Sample 3. It is painting a picture far worse than it is.’ While wood at sample 1 needs replacement, the other two areas are low risk.
- The moisture readings 15% and over are unlikely to rise to a concerning level during wet weather.

- The membrane to the deck outlet and gutter is adequate, with no sign of failure.
- The expert's report does not justify the conclusion that the fibre-cement cladding is unsatisfactory and not installed to manufacturer's instructions.
- The draft determination's interpretation of the expert's findings is extreme and not warranted, as the defects are generally localised or minor.

## **6. The expert's report**

6.1 As mentioned in paragraph 1.5, I engaged an independent expert to assist me. The expert is a member of the New Zealand Institute of Building Surveyors. The expert inspected House 3 on 25 March 2010 and provided a report that was completed on 29 March 2010. The expert took into account the authority's list of risk factors and defects during his assessment of the external envelope.

### **6.2 General**

6.2.1 The expert noted that, except for items noted in paragraph 6.4.3, the quality of the claddings generally appeared reasonable, apart from the flush-finished fibre-cement, with the weatherboards 'well fixed and maintained' and the roofing generally 'above average'. The texture coating to the fibre-cement had also been well maintained and was in reasonable condition, with 'fewer cracks than might be expected' from the defects identified.

6.2.2 The expert noted the various changes from the consent drawings, including:

- the addition of a large full-height window to the west wall of the lounge
- various other changes to doors and windows
- reducing the garage floor area (so adding a small internal gutter at the junction with the stairwell) and omitting eaves to the garage roof
- Changes to the ensuite layout.

### **6.3 Windows and doors**

6.3.1 The face-fixed windows and doors to the flush-finished fibre-cement cladding have metal head flashings, with a fillet of sealant applied to the edge of the jamb flanges prior to application of the textured coating system. The expert scraped a small section of coating and sealant from a jamb and noted that there was no sign of seals behind the window jamb flange.

6.3.2 The joinery in the upper weatherboard cladding was also face-fixed with metal head flashings and rustic plugs installed behind the jamb flanges. The expert observed that all plugs appeared to be well-fitted, with none loose or missing.

### **6.4 Cladding cut-outs and decay analysis**

6.4.1 The expert removed small sections of flush-finished fibre-cement cladding ("cut-outs") from a number of areas to inspect the underlying construction, the condition of the framing timber and to take timber samples.

6.4.2 Cut-outs (with moisture readings in brackets) were made at the following areas:

- cut-out 1 (14%): the south east corner of the stairwell from apparently ‘hard, clean’ timber below the area of severe decay exposed at the end of the apron flashing (sample 1)
- cut-out 2 (19%): the bottom of the north garage wall, adjacent to the junction with the concrete block return wall (sample 2)
- cut-out 3 (19%): the south west corner below the jamb to sill junction of the full-height lounge window (sample 3)

6.4.3 The samples were forwarded to a testing laboratory for decay and preservative analysis. The laboratory’s report dated 28 March 2010 noted that no preservative treatment was detected in the samples and found that:

- samples 1 and 2 contained well established fungal decay which had ‘caused loss of the bulk of the original structural integrity’.
- sample 3 had ‘incipient brown rot’ and was ‘marginal in terms of replacement’.
- timber in the vicinity of sample 1 will need replacement, with samples 2 and 3 requiring further investigation to establish the limits and causes of damage.

## 6.5 Moisture levels

6.5.1 The expert inspected the interior of House 3 and noted no obvious signs of moisture penetration. As his inspection was at the end of a long dry period, the expert considered that non-invasive moisture testing would prove unreliable.

6.5.2 As well as readings in timber at the cut-outs, the expert took about 75 invasive moisture readings from the inside with long probes inserted into bottom plates to record moisture levels at about 10mm behind the cladding. The expert established that the equilibrium moisture contents (“EMC’s”) at known ‘dry’ areas on both floors were 10% to 11%.

6.5.3 The probe readings that varied significantly from the EMC’s (15% and above), included the following moisture levels of bottom plates:

### Roof junctions

- 18% to over 80% below the bottom of the garage apron flashing
- 18% below the bottom of the stairwell apron flashing
- 16% to 18% above the concrete wall and below the north west garage roof
- 15% at the south east corner of the upper level walk-in wardrobe

### Windows and doors

- 15% below ground floor bedroom south window, 15% at the adjacent corner
- 15% at the south west lounge corner beside the full-height window
- 15% and over 40% beside the south garage door

### Lower decks

- 15% at the south east corner of the entry lobby at the entry deck

- 17% at the balustrade to wall junction of the lower north west deck, with 15% in the bottom plate below
- 15% at the north west lower deck junction
- 17% at the north ramp, below the ground floor dining window.

6.5.4 Although moisture levels above 18% generally indicate that external moisture is entering the structure, the prolonged dry weather (combined with the presence of decay and fungal growth in samples below 18%) indicated that some currently lower readings have been, or are likely to be, higher during wetter periods.

6.6 Commenting specifically on the external envelope of House 3, the expert noted that:

**General - flush-finished fibre-cement**

- joints to fibre-cement backing sheets coincide with corners of openings
- although remedial work, including retrofitting control joints, has been recently carried out, some cracks are starting to open up in some areas of the flush-finished fibre-cement cladding
- some pipe penetrations through the flush-finished fibre-cement cladding are poorly sealed
- although the holes in the bottom of the meter box are sealed, the door is loose

**Clearances and overlaps - flush-finished fibre-cement**

- there are insufficient clearances below the cladding at the garage door
- the timber retaining wall west of the garage door is very close to the cladding
- the backing sheets butt against the concrete block base to the north west corner of the garage and the continuous coating does not allow moisture to drain
- the cladding at the north garage wall has been cut back to increase ground clearance, but this has reduced the base overlap to 5mm at cut-out 2

**Windows and doors - flush-finished fibre-cement**

- windows are face-fixed against fibre-cement backing sheets, with no seals behind the jamb flanges, no drainage gap under the sill flange and the coating applied after the window installation
- the garage door lacks a head flashing, with no shelter from eaves (however the inspection company notes an 8 to 10mm slope in the reveal head to shed water)

**Roof junctions - flush-finished fibre-cement**

- the bottom of apron flashings is not weatherproof, with inadequate kickouts, water able to enter behind flashings and extensive decay in at least one location
- the top of the barge flashing to the north west garage wall is not weatherproof, with gaps apparent and elevated moisture levels in the bottom plates below
- the junction of the end of the stairwell internal gutter with the top of the apron risks storm water entering under the apron flashing
- gutter brackets are corroding

### **Weatherboard cladding**

- timber facings to external corners of the weatherboard cladding provide little overlap to the boards, with almost no overlap where boards are cut too short
- at junctions with the flush-finished fibre-cement cladding, weatherboards butt against unsealed fibre-cement backing sheets, with texture coating applied after

### **Decks**

- the entry deck is fixed directly against the flush-finished fibre-cement cladding, with no drainage gap and limited eaves protection at the eastern end
- there are air holes in the liquid-applied membrane to the upper deck gutter, and the membrane is not sufficiently applied over the mesh at the gutter outlets

6.7 In regard to other defects identified by the authority in House 3 (and not included above), the expert noted that:

- although the north ramp from the lower deck and the timber steps from the entry deck butt against the flush-finished fibre-cement cladding, these are below floor level with the cladding open to the exposed sub-floor area.
- where the walls to the lower north west timber deck and the entry deck are recessed and fully protected by the roofs above, the lack of drainage gaps at the deck to wall junctions is unlikely to lead to moisture penetration
- although deck floor threshold and cladding clearances are minimal, the upper deck is recessed and the junctions are fully protected by the roofs above
- the flush-finished fibre-cement cladding above the garage roof apron has been cut back to increase clearances
- a metal capping is installed over the timber capping, with sealant at the ends
- control joints have been retrofitted to the flush-finished fibre-cement cladding
- metal flashings have been fitted to bearer ends
- an adequate overflow from the upper deck discharges through the soffit.

## **6.8 Other matters**

6.8.1 The expert also noted the following:

- The addition of the large full-height window to the west wall of the lounge may have reduced the bracing.
- The fence post fixings to the top of the driveway retaining wall are insecure, and the fence is able to move.
- Joist hangers connect deck joists to the house boundary joist, but this joist appears to be only skew-nailed to the house joists.
- The fixing of the lower deck balustrade to the deck joists may be insufficient.
- A downlight is partly covered with fibreglass insulation.
- There are signs of moisture ingress beside the ensuite shower cubicle.

- The full height lounge windows are not marked as having safety glass.
- The extract fan in the ensuite bathroom exhausts into the ceiling space.

6.9 A copy of the expert's report was provided to the parties on 30 March 2010.

## 6.10 The inspection company's response

6.10.1 The inspection company provided the applicant with comments on the expert's report on 7 May 2010. I have considered the comments and have amended the determination as I consider appropriate.

6.10.2 The inspection company included the following comments (in summary):

- The reduction in bracing by the addition of the window was based on opinion and not calculation (refer paragraph 6.8.1).
- The problem near the apron flashing may relate to a flashing further up the roof (refer paragraph 6.4.2).
- The installation of the fibre-cement was in common practice at the time of construction and had been inspected by the authority.
- The deck details used were in common practice at the time of construction and had been inspected by the authority (refer paragraph 6.6).
- The deck ramp and entry steps are beneath the lower floor level (refer paragraph 6.7).
- Very few of the expert's moisture readings were of concern.
- It was considered that the defects to the cladding were isolated and could be fixed with targeted repairs.
- The method used to install the windows was commonly done at the time of construction, and there is no evidence of failure (refer paragraph 6.6).

## Matter 1: The external envelope

### 7. Weathertightness

7.1 The evaluation of building work for compliance with the Building Code and the risk factors considered in regards to weathertightness have been described in numerous previous determinations (for example, Determination 2004/1).

#### 7.2 Weathertightness risk

7.2.1 House 3 has the following environmental and design features which influence its weathertightness risk profile:

##### Increasing risk

- House 3 is two-storeys in part, complex in plan and form with roof levels that incorporate complex roof to wall junctions
- House 3 has two different types of cladding, both fixed directly to the framing

- an upper level deck, with clad balustrades, is situated over a living area
- a lower level deck has flush-finished fibre-cement clad balustrades
- some walls have no eaves or verge overhangs to shelter the cladding
- the external wall framing is not be treated to a level that provides resistance to decay if it absorbs and retains moisture

#### **Decreasing risk**

- House 3 is fairly sheltered in a low to medium wind zone
- the two north west decks are fully recessed beneath roof overhangs
- lower decks have spaced timber slat floors
- most walls have eaves and verges to shelter the cladding.

7.2.2 When evaluated using the E2/AS1 risk matrix, these features show that one elevation of House 3 demonstrates a moderate weathertightness risk rating and the remaining a high risk rating. I note that, if the details shown in the current E2/AS1 were adopted to show code compliance, both types of cladding on House 3 would require a drained cavity. However, I also note that drained cavities were not a requirement of E2/AS1 at the time of construction.

### **7.3 Weathertightness performance**

#### **The flush-finished fibre-cement cladding**

7.3.1 It is clear from the expert's report that the flush-finished fibre-cement cladding, including the junctions with the roof, is unsatisfactory in terms of its weathertightness performance, which has resulted in moisture penetration and decay to some of the framing. Taking into account the expert's report, I conclude that the areas outlined in paragraph 6.6 require rectification.

7.3.2 Considerable work is required to make the above elements of the external envelope weathertight and durable. Further investigation is necessary, including the systematic survey of all risk locations, to determine causes and full extent of moisture penetration, timber damage and the repairs required.

#### **The weatherboard cladding**

7.3.3 However the weatherboard cladding to the upper level of House 3 generally appears to have been installed in accordance with good trade practice, although taking account of the expert's report, I conclude that remedial work is necessary in respect of the relevant areas included in paragraph 6.6.

7.3.4 I note the expert's comments in paragraph 6.7, and I accept that the thresholds and cladding clearances to the upper deck are adequate in these circumstances.

### **7.4 Weathertightness conclusion**

7.4.1 I consider the expert's report establishes that the current performance of the building envelope is not adequate because there is evidence of moisture penetration and decay



in at least three areas of the untreated timber framing. Consequently, I am satisfied that House 3 does not comply with Clause E2 of the Building Code.

7.4.2 In addition, the building envelope 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 House 3 to remain weathertight. Because the cladding faults on the house are likely to allow the ingress of moisture in the future, the building work does not comply with the durability requirements of Clause B2.

7.5 I consider that final decisions on whether code compliance can be achieved for the monolithic-clad walls to House 3 by either remediation or re-cladding, or a combination of both, can only be made after a more thorough investigation of the cladding and the condition of the underlying timber framing. This will require a careful analysis by an appropriately qualified expert, and should include a full investigation of the extent, level and significance of the timber decay to the framing. Once that decision is made, the chosen remedial option should be submitted to the authority for its approval.

7.6 I note that the Department has produced a guidance document on weathertightness remediation<sup>5</sup>. I consider that this guide will assist the owner in understanding the issues and processes involved in remediation work to the fibre cement cladding, and in exploring various options that may be available when considering the upcoming work required to House 3.

## 8. Other Building Code clauses

8.1 Taking account of the expert's report, I conclude that the following items in House 3 also require attention (associated Building Code clauses are shown in brackets):

- Investigation and/or repairs (in regard to Clause B1) to the:
  - connections of lower deck joists to boundary joists and floor joists
  - connections of the lower deck balustrade to the deck structure
  - insecure connections of fence posts to the timber retaining wall (also relates Clause F4)
- The fibreglass insulation that partly covers a downlight (Clause C1)
- Apparent moisture problems around the shower cubicle (Clause E3)
- The lack of safety glass in the full-height lounge windows (Clause F2)
- The ensuite fan that exhausts into the ceiling space (Clause G4).

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<sup>5</sup> External moisture – A guide to weathertightness remediation. This guide is available on the Department's website, or in hard copy by phoning 0800 242 243

## **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 House 3 during 2000.
- 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 In previous determinations (for example Determination 2006/85) I have taken the view that a modification of this requirement can be granted if I can be satisfied that the building complied with the durability requirements at a date earlier than the date of issue of the code compliance certificate, that is agreed to by the parties and that, if there are matters that are required to be fixed, they are discrete in nature.
- 9.4 Because of the extent of further investigation required into the timber framing and therefore House 3’s structure, and the potential impact of such an investigation on the external envelope, I am not satisfied that there is sufficient information on which to make a decision about this matter at this time.

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

- 10.1 A notice to fix should be issued that requires the owner to bring House 3 into compliance with the Building Code, including the defects identified in paragraph 6.6 and paragraph 8.1, but not specifying how those defects are to be fixed. It is not for the notice to fix to specify how the defects are to be remedied and the building brought to compliance with the Building Code. That is a matter for the owners to propose and for the authority to accept or reject.
- 10.2 In addition, the notice to fix should include the requirement for a full investigation into the extent and the causes of decay in the timber framing, referring also to the need for laboratory testing of framing samples to establish the full extent, levels and structural significance of decay to the framing.
- 10.3 I suggest that the parties adopt the following process to meet the requirements of paragraph 10.1. Initially, the authority should issue the notice to fix. The applicant 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 investigation and rectification or otherwise of the specified matters. Any outstanding items of disagreement can then be referred to the Chief Executive for a further binding determination.

## 11. The decision

11.1 In accordance with section 188 of the Building Act 2004, I hereby determine that:

- the external building envelope does not comply with Building Code Clauses E2 and B2 (insofar as it applies to E2)
- the damaged timber framing does not comply with Building Code Clauses B1 and B2 (insofar as it applies to B1)
- the deck and fence connections do not comply with Building Code Clause B1
- various other elements outlined in paragraph 8.1 do not comply with Building Code Clauses C1, E3, F2, F4 and G4.

and accordingly, I confirm the authority's decision to refuse to issue a code compliance certificate for House 3.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 17 June 2010.

John Gardiner  
**Manager Determinations**