



## Determination 2009/48

### The issue of a notice to fix for 6-year-old alterations to a house at 21 Woodley Avenue, Remuera, Auckland



#### 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 applicants are the owners, W and C Grace (“the applicants”), and the other party is the Auckland City Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.
- 1.2 This determination arises from the decisions of the authority to refuse to issue a code compliance certificate and issue a notice to fix for 6-year-old alterations to a house because it is not satisfied that a part of the building work complies with the requirements of certain clauses of the Building Code<sup>2</sup> (First Schedule, Building Regulations 1992).

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<sup>1</sup> The Building Act 2004 is available from the Department’s website at [www.dbh.govt.nz](http://www.dbh.govt.nz).

<sup>2</sup> The Building Code is available from the Department’s website at [www.dbh.govt.nz](http://www.dbh.govt.nz).

1.3 I therefore consider that the matters for determination, in terms of section 177(a) and 177(b) of the Act<sup>3</sup> are:

**1.3.1 Matter 1: The deck claddings**

Whether the wall, balustrade, column and deck floor claddings as installed on or around the deck (“the claddings”) comply with Building Code Clause B2 Durability and Clause E2 External Moisture. By “the claddings as installed” I mean the components of the systems (such as the backing materials, the membrane, the tiles, the flashings and the coatings), as well as the way the components have been installed and work together. (I consider this matter in paragraph 6.2.)

**1.3.2 Matter 2: The remaining code requirements for the deck**

Whether the deck complies with other relevant Building Code clauses (E1 Surface Water, and F4 Safety from Falling). (I consider this matter in paragraph 7).

**1.4 Matters outside this determination**

1.4.1 The notice to fix cites contraventions of Clauses B1 Structure, B2 Durability, E1 Surface water, E2 External Moisture, E3 Internal Moisture and G13 Foul Water of the Building Code. However, I note that there are no specific items within the notice that relate directly to Clauses B1, E3 or G13, and I have received no evidence relating to a dispute about them. I have therefore not considered these clauses further within this determination.

1.4.2 The notice is also limited to building work associated with the addition of a new deck. There are no specific items within the notice that relate to the remaining alterations and additions covered by the building consent. This determination is therefore limited to the new deck (“the deck”) as described in paragraph 2.3.

1.4.3 The notice also outlined the requirements for durability of the various building elements and noted that an application for a modification of the requirements could be applied for from the authority, in order to allow the durability periods to commence from the date of substantial completion. I therefore leave this matter to the parties to resolve; it is not considered further in this determination

1.5 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 other evidence in this matter. With regard to the deck claddings, I have evaluated this information using a framework that I describe in paragraph 6.1.

**2. The building work**

2.1 The building work consists of extensive alterations and additions to a house that is situated on a sloping site in a low wind zone for the purposes of NZS 3604<sup>4</sup>. The original house was built in the 1930’s and is timber-framed with a hipped corrugated

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<sup>3</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.

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

metal roof, a timber-framed subfloor, timber weatherboard wall cladding and timber windows.

- 2.2 The building work included in the building consent consisted of extensive alterations and extensions to the original house. The exterior wall claddings and windows match the existing timber weatherboards and windows, with various decorative timber outriggers installed under the eaves. Included in the work were additions to upper and lower walls on the north elevation, including the addition of a new deck.

### **2.3 The deck**

- 2.3.1 The new timber-framed deck extends to the north from the upper level living room, and sits partly above a basement bedroom. The north edge of the deck is curved and is supported on monolithic-clad timber framed columns. The deck floor has a butyl rubber membrane floor over a plywood substrate, with tiles forming the finished surface.
- 2.3.2 The deck balustrade is timber-framed and clad with timber weatherboards to the inner face, timber shingles to the outer face and a timber plate that forms a capping to the top, with a continuous metal handrail fixed to the capping. The central portion of the curved balustrade is cut down to an upstand height, with an open metal balustrade set within the cut-out and the timber capping trimming the opening.
- 2.3.3 The expert noted that he was unable to observe the wall and deck framing, but I note that the specification calls for 'framing not exposed to weather' to be 'H1 tanalised pine No. 1 framing'. The expert took a timber sample from the balustrade framing and forwarded it to a testing laboratory for analysis, and the biodeterioration consultant's analysis confirmed the sample as likely to be equivalent to H1.2. I therefore consider it likely that the deck framing is treated to a similar level.
- 2.3.4 The cladding to the timber framed deck columns is a monolithic cladding system described as stucco over a solid backing. In this instance it consists of fibre cement sheets fixed through the building wrap directly to the framing timbers, and covered by a slip layer of building wrap, metal-reinforced 20mm thick solid plaster and a flexible paint coating.

## **3. Background**

- 3.1 The authority issued a building consent (No. 1997/3801198), dated 3 March 1997, for alterations and additions to the house including the deck, under the Building Act 1991. I have not seen a copy of the consent.
- 3.2 It appears that construction did not commence until about 2001, and the authority carried out various inspections, including a pre-line on 10 October 2002 and a post-line on 15 October 2002 (which appears to have been the last inspection during construction).
- 3.3 The authority did not carry out a final inspection of the house until 12 September 2005, after which a 'site instruction' was issued that identified nine outstanding items (none of which related to the deck). A re-inspection was not called for, and the

authority wrote to the applicant on 30 January 2008 to ‘urging’ them to complete the project.

- 3.4 The authority re-inspected the building work on 14 and 21 January 2009, and wrote to the applicants on 3 March 2009 and attached a notice to fix. The authority stated that it was not satisfied that the building work complied with the Building code in a number of respects, recommending that:

...you engage the services of a suitably qualified person to review the attached NTF and to develop a proposed scope of work, which in their view would address all the areas of contravention. Council will then review this proposal and if it agrees with it, will then advise you as to whether a building consent needs to be applied for.

### **3.5 The notice to fix**

- 3.5.1 The notice to fix, dated 3 March 2009 stated that the authority was not satisfied that the building work complied with the consent, or with some clauses of the Building Code, or with the Building Act. The “particulars of contravention or non-compliance” attached to the notice identified various defects associated with the deck, which are summarised as follows:

- the deck floor changed from timber slats over membrane to tiles on membrane
- the handrail fixed to the top of the balustrade
- the flat timber capping to the balustrade
- the lack of evidence of saddle flashings to the balustrade/wall junctions
- the deck outlet pipe running through the balustrade framing
- the lack of cladding clearance in some areas
- the lack of access to the deck membrane for repair and maintenance
- inadequate size and weatherproofing of the deck overflow pipe
- the unsealed penetration of the outlet pipe through the cladding.

- 3.6 The Department received an application for a determination on 6 April 2009. The Department sought further information on the building work, which was received on 20 April 2009.

## **4. The submissions**

- 4.1 Within the application, the applicants noted that the consent drawings showed timber decking over a butyl rubber membrane, and explained that the deck surface had been changed to tiles as a large protected tree near the deck drops leaves and seeds, making it difficult to keep a timber floor clean.

- 4.2 The applicant forwarded copies of:

- the consent drawings and specification
- the notice to fix dated 6 March 2009

- photographs of leaves on the deck and of the deck framing cavity.
- 4.3 The authority forwarded a CD-Rom that was entitled “Property File”. This contained documents relating to the building work considered in this determination, including:
- the consent drawings
  - the inspection records
  - the correspondence with the applicants.
- 4.4 Copies of the submissions and other evidence were provided to each of the parties. Neither the applicant nor the authority made any further submissions in response to the submissions of the other party.
- 4.5 A draft determination was issued to the parties for comment on 16 June 2009. Both parties accepted the draft without comment.

## **5. The expert’s report**

- 5.1 As mentioned in paragraph 1.4, I engaged an independent expert to provide an assessment of the condition of those building elements subject to the determination. The expert is a member of the New Zealand Institute of Building Surveyors. The expert inspected the deck and its associated elements on 11 May 2009 and provided a report on 28 May 2009.
- 5.2 The expert noted that the workmanship able to be observed generally appeared to be of ‘good quality’. After carrying out destructive testing of part of the balustrade, as described in paragraph 5.3.2, the applicant asked the expert not to carry out any further invasive testing of the building work.

### **5.3 Moisture and timber sample testing**

- 5.3.1 The expert inspected and took non-invasive moisture readings of the interior rooms associated with the deck and no evidence of moisture was observed.
- 5.3.2 The expert removed the open metal balustrade inset along with the timber plate to the side of the balustrade cut-out, in order to observe the underlying framing. The expert took an invasive moisture reading at the bottom of the balustrade stud and noted that the reading was 25%. At the request of the applicant, the expert did not carry out further invasive moisture testing.
- 5.3.3 Observing black marks at the bottom of the stud, the expert forwarded a timber sample to a biodeterioration laboratory for analysis of treatment and decay. The laboratory results confirmed that the sample:
- was boron-treated, probably to an equivalent of about H1.2
  - had well-established ‘early to moderate soft rot’ across the entire depth
  - contained low levels of the toxigenic mould *stachybotrys*
  - was consistent with exposure to moisture levels, typically above 30%, for at least 3 to 5 years

- indicated a loss ‘of a substantial proportion of the original structural integrity in affected areas’
- indicated that further investigation was needed to determine the extent of necessary timber replacement.

5.4 Commenting specifically on the deck, the expert noted that:

**Balustrades**

- there is evidence of moisture penetration and decay at the bottom of the balustrade framing
- the timber capping is flat and the handrail fixing “posts” are set into the timber
- there is evidence of past movement at the capping corner mitre joints
- there appears to be no saddle flashings at the balustrade to wall junctions

**Deck membrane**

- although the membrane under the tiles could not be inspected, there were signs of deterioration observed in the membrane joint under the doors
- there is no fillet to ‘round’ the corner at the turn up to the membrane upstand
- a strip of painted fibre cement sheet is fixed through the membrane upstand to the balustrade, with cracks and corroding nails apparent in some areas
- the membrane of the balustrade upstand is not dressed into the overflow outlet

**Clearances**

- the strip of painted fibre cement sheet between the bottom weatherboard and the deck tiles butts against the deck tiles, allowing moisture to be absorbed
- the weatherboard cladding beside the doors butts against the deck tiles
- the stucco cladding to the framed deck columns butts against the paving

**Penetrations**

- the deck overflow pipe through the upstand is not adequately weatherproofed
- a downpipe is taken through the deck floor framing to the outside, and is not sealed against the weatherboard cladding
- the meter box is not flashed or sealed against the weatherboard cladding.

5.5 The expert also noted that the height of the balustrade handrail is below 1 metre high, and the open metal balustrade inset includes near-horizontal rails that provide toe-holds for climbing.

5.6 A copy of the expert’s report was provided to the parties on 29 May 2009.

## 6. Evaluation for code compliance

### 6.1 Evaluation framework

6.1.1 I have evaluated the code compliance of the deck to this building by considering the following two broad categories of the building work:

- The weathertightness of the deck (Clause E2) and durability (Clause B2 in so far as it relates to Clause E2).
- The remaining code requirements relevant to the deck.

In the case of this deck, weathertightness considerations are addressed first.

6.1.2 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 this house are code compliant. However, in making this comparison, the following general observations are valid:

- Some Acceptable Solutions cover the worst case, so that they may be modified in less extreme cases and the resulting alternative solution will still comply with the Building Code.
- Usually, when there is non-compliance with one provision of an Acceptable Solution, it will be necessary to add one, or more, provisions to compensate for that in order to comply with the Building Code.

## Matter 1: The deck claddings

### 6.2 Weathertightness

6.2.1 The approach in determining whether building work is weathertight and durable and is likely to remain so, is to apply the principles of weathertightness. This involves the examination of the design of the building, the surrounding environment, 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 Department and its antecedent, the Building Industry Authority, have also described weathertightness risk factors in previous determinations<sup>6</sup> (for example, Determination 2004/1) relating to cladding and these factors are also used in the evaluation process.

6.2.2 The consequences of a building element 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 deck and the installation of its building elements to be carefully carried out.

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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.

### 6.3 Weathertightness risk

6.3.1 The deck to this house has the following environmental and design features which influence its weathertightness risk profile:

#### Increasing risk

- the deck is attached to the upper level of a 2-storey house
- the deck is situated partly over a ground floor bedroom
- the deck has a solid floor that is exposed to rain
- the deck balustrade is framed and clad
- the deck framing is treated to a level that will provide only limited protection against decay if the framing absorbs and retains moisture

#### Decreasing risk

- the deck is in a low wind zone
- the existing house has 500mm eaves above the deck to house junctions.

6.3.2 The deck has been evaluated using the E2/AS1 risk matrix. The risk matrix allows the summing of a range of design and location factors applying to a specific building design. The resulting level of risk can range from “low” to “very high”. The risk level is applied to determine what claddings can be used on a building in order to comply with E2/AS1. Higher levels of risk will require more rigorous weatherproof detailing. When evaluated using the E2/AS1 risk matrix, the weathertightness features outlined in paragraph 6.3.1 show that the deck to this house demonstrates a high weathertightness risk rating.

### 6.4 Weathertightness conclusion

6.4.1 I consider the expert’s report establishes that the current performance of the deck is not adequate because it is currently allowing water penetration into the balustrade framing, which has resulted in decay to the inadequately treated timber. I also consider that the moisture penetration and decay is likely to extend beyond the area that the expert was permitted to investigate. Consequently, I am satisfied that the deck does not comply with Clause E2 of the Building Code.

6.4.2 In addition, 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 deck to remain weathertight. Because the faults in the deck are likely to allow the ingress of moisture in the future, the deck does not comply with the durability requirements of Clause B2.

6.4.3 It is clear from the expert’s report that the deck is unsatisfactory in terms of its weathertightness risk and performance perspectives and considerable work is required to make it code compliant. Because of the limited invasive testing that the expert was able to perform, I am unable to conclude on the extent of the faults in the deck. The rectification of the deck will therefore require a careful investigation into the extent of decay and required timber replacement in the balustrade framing, the deck floor framing and associated walls framing.



- 6.4.4 Effective maintenance of claddings is important to ensure ongoing compliance with Clauses B2 and E2 of the Building Code and is the responsibility of the building owner. The Department has previously described these maintenance requirements, including examples where the external wall framing of the building may not be treated to a level that will resist the onset of decay if it gets wet (for example, Determination 2007/60).

## **Matter 2: The remaining code requirements for the deck**

### **7. Discussion**

#### **7.1 The deck drainage**

- 7.1.1 The notice to fix has identified the deck overflow pipe as being of an insufficient cross-sectional area, and I make the following observations in regard to the deck to this house:

- The overflow pipe diameter is a similar size to that of the deck floor outlet.
- The current Acceptable Solution E2/AS1 states:

##### **8.5.10 Gutters**

When an overflow is provided for roofs or enclosed decks... ...the overflow shall have a cross-sectional area equal to 1.5 times the cross-sectional area of the calculated discharge downpipe.

- While the deck was constructed prior to the current version of E2/AS1, the above assists in determining the adequacy of the overflow to this particular deck (refer paragraph 6.1.2).
  - As described in paragraph 6.3.2, this deck is assessed as demonstrating a high weathertightness risk rating, which reinforces the importance of ensuring that sufficient provisions are made for the drainage of water from the deck.
  - The applicant has noted the accumulation of leaf debris from a large tree in the vicinity of the deck, and the difficulty of keeping the deck surface clean when leaves are falling. This leaf debris adds to the risk of blockages to the deck drain, and further reinforces the importance of the deck overflow.
- 7.1.2 Taking into account the above, I am of the opinion that the overflow pipe provided to the deck is not adequate in these circumstances and I am therefore satisfied that the deck does not comply with the requirements of Building Code Clause E1 Surface Water.
- 7.2 I also note the expert's comment in paragraph 5.5 regarding the height of the balustrade and the design of the open metal inset. While this matter was not included in the notice to fix, I am satisfied that the balustrade does not comply with the requirements of Building Code Clause F4 Safety from Falling.

### **8. The notice to fix**

- 8.1 Taking into account the expert's report, I am satisfied that the authority made an appropriate decision to issue the notice to fix. The expert has identified various additional defects, together with evidence of decay in the deck balustrade that

requires further investigation. As outlined in paragraph 7.2, I am also satisfied that the balustrade does not comply with Clause F4. The notice should be modified to take these matters into account (refer to paragraph 9.1).

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

- 9.1 The notice to fix should be modified and reissued to the owner to take account the findings of this determination. The notice to fix can require the owner to bring the building work into compliance with the Building Code but, as noted in previous determinations, I consider that a notice to fix cannot specify how compliance is to be achieved.
- 9.2 In response to the modified notice to fix, the owner should engage a suitably qualified person to undertake a thorough investigation of the deck, including the decay to the balustrade framing, to determine the extent of the defects and damage and produce a detailed proposal describing how the defects are to be remedied. The proposal should be submitted to the authority for approval. Any outstanding items of disagreement can then be referred to the Chief Executive for a further binding determination.

## **10. The decision**

- 10.1 In accordance with section 188 of the Act, I hereby determine that:
- the deck does not comply with Building Code Clauses E2 and B2
  - the deck overflow does not comply with Building Code Clause E1
  - the deck balustrade does not comply Building Code Clause F4
  - the authority is to modify the notice to fix, dated 3 March 2009, to take account of the findings of this determination.

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

John Gardiner  
**Manager Determinations**