

## Determination 2006/58

### Refusal of a code compliance certificate for a set of eight houses with “monolithic” cladding systems at 15, 17, 19 to 23, and 25 Springside Place, New Lynn, Auckland



#### 1. The dispute 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, Determinations Manager, Department of Building and Housing, for and on behalf of the Chief Executive of that Department. The applicant is the Zhang and Liu Family Trust acting through an agent (“the applicant”), and the other party is the Waitakere City Council (“the territorial authority”).
- 1.2 The dispute for determination is whether the territorial authority’s decision to decline to issue a code compliance certificate for 8 houses (“the units”), which range from 2 to 6-years old, because it was not satisfied that the monolithic cladding to the walls of the house complied with clauses B2 “Durability” and E2 “External Moisture” of the Building Code<sup>2</sup> (First Schedule, Building Regulations 1992) is correct.
- 1.3 The question to be determined is whether I am satisfied on reasonable grounds that the monolithic wall cladding as installed to the walls of the units (“the cladding”),

<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).

complies with the Building Code (see sections 177 and 188 of the Act). By “the monolithic wall cladding as installed” I mean the components of the system (such as the backing materials, the flashings, the joints and the coatings) as well as the way the components have been installed and work together.

- 1.4 In making my decision, I have considered the submissions of the parties, the report of the independent 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 6.1. I have not considered any other aspects of the Act or the Building Code.

## 2. The buildings

- 2.1 Each of the eight units is a single-storey detached house, with a garage and storage area basement, situated on an excavated sloping site that is in a low wind zone in terms of NZS 3604<sup>3</sup>. The basements have textured plastered blockwork lower sections, apart from Unit 22 where the blockwork is only partially painted. Other exterior walls are conventional light-timber frame construction on the blockwork walls or intermediate timber-framed floors, and are sheathed with monolithic cladding. Each unit is reasonably simple in plan and form, with 25° concrete tile hipped roofs. The eaves and verges have 600mm wide projections.
- 2.2 Units 17, 19, 21 to 23 and 25 are similar in design, with Unit 25 being a mirror image of the others. These units have a small lower level pitched roof over the basement stairwell with hip and wall-to-roof junctions. Units 15 and 20 are individual designs. The roofs to Units 17 and 20 are at two different levels with additional wall-to-roof junctions.
- 2.3 Each unit has an attached external deck. Apart from the decks to Units 22 and 25, which are cantilevered, the decks are supported on timber beams and columns and have timber balustrades and handrails. The cantilevered decks to Units 22 and 25 have solid membrane floors, while floors to the other decks are of spaced timber slat decking. In Units 15 and 20, porticos extend from the main roofs to form entry canopies supported on circular columns. In Unit 15, a timber-framed pergola extends over the deck.
- 2.4 I note that four separate builders were involved on this complex. One builder built Unit 15, another builder built Unit 20, a third builder built Units 22 and 25, and a fourth builder built Units 17, 19, 21, and 23. The builder of Unit 15 guaranteed workmanship for 10 years and each of the other 3 builders guaranteed that the respective units that they constructed were guaranteed waterproof for 10 years.
- 2.5 The specification makes no mention of treatment to the wall framing, and the expert has noted that he found no evidence of treatment on timber he was able to inspect. I therefore consider that the external wall framing is unlikely to be treated.

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

- 2.6 The external timber-framed walls are clad with a system that is described as monolithic cladding. In this instance it is a “Harditex” system with 7.5mm thick fibre cement backing sheets fixed through the building wrap directly to the framing timbers, and finished with a 2mm thick “Future Proof” proprietary textured finish, followed by a final paint system. A decorative polystyrene band is planted onto the cladding at the intermediate floor level.
- 2.7 Future Proof Industries Ltd issued separate Producer Statements for the plaster texture and paint systems applied to Units 15 and 20 (dated 20 July 2000 and 20 November 2003 respectively). These warranted the system products for 10 years and the workmanship for 5 years. Future Proof Industries Ltd also issued separate Producer Statements that were all dated 18 November 2002 for fixing the Harditex and for the supply and application of the paint and textured products for Units 17, 19, 21 to 23, and 25. These warranted the described items for 10 years. None of the 8 warranties covered damage caused by faulty workmanship, by other builders or subcontractors, or by building movement, etc. As noted by the expert, Future Proof Industries Ltd is not identified as being an authorised applicator on the James Hardie Ltd listings.
- 2.8 I note that the external claddings to Unit 15 were shown on the consented plans to be “Hardiplank” at the upper level with painted “Hardiflex” at the lower level. As noted by the territorial authority, no amended drawings have been supplied nor has an amended consent been issued for this change of cladding. The upper cladding to units 22 and 25 has also been similarly changed, but I note that the territorial authority has approved the change of cladding to these Units.

### **3. Sequence of events**

- 3.1 The territorial authority issued building consents on the following dates:
- 18 November 1999 for No 15
  - 15 March 2001 for Nos 22 and 25
  - 1 March 2002 for Nos 17, 19, and 21
  - 5 March 2002 for No 23
  - 29 July 2002 for No 20.
- 3.2 The territorial authority carried out various inspections during the construction of the houses. The territorial authority passed the pre-lining inspections for Units 15, 17, 19, and 23 and the plaster exterior cladding inspection for Unit 20. None of the units passed the various final inspections carried out by the territorial authority.
- 3.3 On 20 April 2004, the territorial authority wrote separate letters to the applicants in respect of each the units, with the exception of Unit 15. These letters noted that as a result of a recent inspection, the territorial authority required certain items (including cladding items specific to each unit) to be rectified.

3.4 The territorial authority issued separate Notices to Rectify, also dated 20 April 2004, for each of the units, with the exception of Unit 15. The “Particulars of Contravention” attached to the Notices noted that:

You are required to:

- Provide adequate ventilation to the monolithic cladding and into the wall frame space by means of a ventilated cavity or:
- Remove the monolithic cladding and replace with an approved cladding system

3.5 It appears that the territorial authority did not issue a Notice to Rectify for Unit 15, as it had not received amended drawings for the change to the cladding (refer paragraph 2.8).

3.6 An application for a determination was received by the Department on 1 September 2005.

## **4. The submissions**

4.1 The territorial authority wrote to the Department on 6 October 2005 in respect of Unit 15. The territorial authority referred to the building consent, the dates that work commenced, and when the final inspection was carried out. The territorial authority also noted that it had not received any plans showing amendments from the original consent documents. Nor had items noted at the final inspection been rectified. The territorial authority noted that the cladding was installed without a cavity and due to changed inspection procedures, it was unable to be satisfied, on reasonable grounds, that the cladding was code compliant.

4.2 The territorial authority wrote separate letters to the Department dated 7 October 2005 in respect of Units 17, 19 and 20, and dated 17 October 2005 in respect of Units 21 to 23 and 25. In each of these letters the territorial authority referred to the building consent, the dates that work commenced, and when the final inspection was carried out. The territorial authority noted that the cladding was installed without a cavity and due to changed inspection procedures, it was unable to be satisfied, on reasonable grounds, that the cladding was code compliant.

4.3 The territorial authority also forwarded copies of:

- the building consents
- the inspection records
- the Notices to Rectify
- the correspondence with the applicants.

4.4 The applicants forwarded copies of:

- the plans

- one Notice to Rectify
- the producer statements from the cladding installers and from the four separate builders engaged on the project
- the correspondence with the territorial authority
- various invoices for building products.

4.5 Copies of the submissions and other evidence were provided to each of the parties. Neither party made any further submissions in response to the submission of the other party.

4.6 The draft determination was sent to the parties for comment on 3 March 2006. The territorial authority accepted the draft.

4.7 The applicant commented on the draft in a letter received by the Department on 20 March 2006. The letter noted a number of minor errors, queried items that required clarification, and disputed other matters. I have considered these comments and have clarified and amended the draft as I consider appropriate.

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

5.1 The expert inspected the cladding of each unit on the following dates:

- Units 15 and 20 on 17 November 2005
- Units 22 and 25 on 24 November 2005
- Units 17, 19, 21, and 23 on 29 November 2005.

5.2 The expert also furnished reports regarding each unit as follows:

### **5.3 Unit 15**

5.3.1 The report for Unit 15 was completed on 6 December 2005. The expert noted that the appearance of the cladding is generally straight and flat with only minor variations to line and level. Apart from areas of repair, the texture and paint finish appear uniform and sound. The finish of the junctions and transitions is generally to a reasonable standard. The expert also stated that there were no visible control joints in the cladding. There is also evidence that repair and rectification work has been undertaken on the cladding since it was installed.

5.3.2 The expert removed a section of the horizontal polystyrene band, and sections of cladding at the base and head of a window to investigate the construction details. I accept that the locations opened are typical of similar locations around the unit.

5.3.3 The expert noted that there were internal moisture issues relating to the bathroom and ensuite. Non-invasive readings were taken through the interior linings of the exterior walls and the following elevated readings were noted:

- 20% to 25% on the west side of the garage
- 22% and 40% adjacent to both sides of the garage door opening
- over 20% at the base of the bedroom 3 window.

5.3.4 The expert took further non-invasive readings through the exterior of the cladding and the following elevated readings were noted:

- 20% to over 30% around the garage and the sub-floor
- 22% to over 40% adjacent to the garage door opening
- over 30% above the deck.

Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure. The invasive investigations also revealed evidence of initial framing decay.

5.3.5 The expert made the following specific comments on the cladding:

- the edges and backs of the “Harditex” sheets are not sealed
- the cladding is extensively cracked at all wall elevations
- there is no “Inseal” installed behind the vertical cladding joints
- if control joints are installed, they have been covered by the textured and paint finishes and would therefore not be in accordance with the manufacturer’s requirements
- the cladding does not overlap the concrete floors the required 50mm around the garage door and at the front entry terrace
- the base of the cladding is too close to the ground or the paving or is buried in the paving at some locations
- there is no “Inseal” installed at the junction of the base of the cladding and the required capillary gap is not installed at some of these locations
- the bottom edge of the cladding is not sealed or painted
- there are no flashings nor any sealing installed between the horizontal planted bands and the cladding and the contact adhesive has eroded the polystyrene of the bands
- the windows are face-fixed (without sill flashings) and have minimal overlap of the window flange over unsealed fibre cement. There is no drainage gap provided at the sill flange, which has been sealed against the fibre cement – so trapping water within the cladding
- there is no “Inseal” or sealant behind the window jamb flanges or the head

flashings as recommended by the manufacturer

- the window and door head flashings do not have a 75mm upstand, the building paper does not overlap the upstand, and the gap between the flashing and the cladding is sealant filled. The projections of the head flashings past the jamb flanges are not sealed in accordance with the manufacturer's instructions
- while a drip edge is provided at the garage door head, there are no jamb flashings and the head to jamb junction is poorly weatherproofed
- the junction between the front entrance block wall with the cladding is poorly constructed and weatherproofed
- the timber slats and deck framing butt against the cladding with no drainage gap, and with unsealed fixings penetrating the cladding
- the deck balustrades and fence posts are fixed hard against the cladding and the fixing penetrations are inadequately sealed
- some penetrations through the cladding, including the pergola fixings, are inadequately sealed
- the mortar to the hip tiles is cracked at one location.

## **5.4 Unit 20**

5.4.1 The report for Unit 20 was completed on 9 December 2005. The expert noted that the appearance of the cladding is generally straight and flat with only minor variations to line and level. Apart from areas of repair, the texture and paint finish appear uniform and sound. The finish of the junctions and transitions is generally to a reasonable standard. The expert also stated that there were no visible control joints in the cladding. There is also evidence that repair and rectification work has been undertaken on the cladding since it was installed.

5.4.2 The expert removed a section of the horizontal polystyrene band, and sections of cladding at the base and head of a window to investigate the construction details. I am prepared to accept that these samples are indicative of similar details throughout the unit.

5.4.3 The expert noted that there were internal moisture issues relating to the bathroom and ensuite. Non-invasive readings were taken through the interior linings of the exterior walls and the following elevated readings were noted:

- 27% on one side of the garage door opening
- 24% above the ensuite window opening.

5.4.4 The expert took further non-invasive readings through the exterior of the cladding and the following elevated readings were noted:

- 20% to over 30% and above 40% around the garage and the sub-floor
- 30% below the laundry window
- over 22% above the front terrace
- 22% and 40% were also recorded at the polystyrene band cut-out
- 26% to 35% at the window cut-out.

Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure. The invasive investigations also revealed evidence of initial framing decay.

5.4.5 The expert made the following comments regarding the cladding:

- the cladding sheet layout is not fully compliant
- the backs of the Harditex sheets are not sealed
- the cladding is extensively cracked at all wall elevations, exposing the plaster mesh in places, and the sheets are bulging at some locations
- there is no Inseal tape installed behind the vertical cladding joints
- if control joints are installed, they have been covered by the textured and paint finishes and would therefore not be in accordance with the manufacturer's requirements
- the cladding does not overlap the concrete floors the required 50mm around the garage door and at the front entry terrace
- the base of the cladding is too close to the ground or the paving or is buried in the paving at some locations
- there is no "Inseal" installed at the junction of the base of the cladding and the required capillary gap is not installed at some of these locations
- the bottom edge of the cladding is not sealed or painted
- the bands lack flashings in some locations, are poorly sealed, and the contact adhesive has eroded the polystyrene
- the windows are face-fixed (without sill flashings) against unsealed fibre cement, with Inseal behind the window jamb flanges and behind the fibre cement at the sill
- the head flashings to the exterior joinery units do not have a 75mm upstand, the building paper does not overlap the flashing, and the gap between the flashing and the cladding is sealed



- the junction between the front entrance block wall with the cladding is poorly constructed and weatherproofed
- the timber slats and deck framing butt against the cladding with no drainage gap, and with unsealed fixings penetrating the cladding
- the deck balustrades and fence posts are fixed hard against the cladding and the fixing penetrations are inadequately sealed
- some penetrations through the cladding are inadequately sealed.

## **5.5 Units 17, 19, 21 and 23**

5.5.1 I note that these 4 units were constructed by the same builder and share the same general cladding characteristics. Accordingly the references to the 4 separate reports provided by the expert have been combined in the following paragraphs.

5.5.2 The report for Unit 17 was completed on 16 December 2005, with Unit 19 on 17 December 2005, Unit 21 on 19 December 2005 and Unit 23 on 20 December 2005. The expert noted that the appearance of the cladding is generally straight and flat with only minor variations to line and level. The texture and paint finish appear uniform, however the paint finish is not sound. The finish of the junctions and transitions is to a poor standard. The expert also stated that there were no visible control joints in the cladding. There is also evidence that repair and rectification work has been undertaken on the cladding since it was installed.

5.5.3 The expert removed sections of the horizontal polystyrene bands, and sections of cladding at the base of a window to investigate the construction details of Unit 17. I am prepared to accept that these samples are indicative of similar details throughout the building and that these details and those revealed regarding the heads of the exterior joinery units in Unit 15 are also typical of those relating to all 4 units.

5.5.4 The expert noted internal moisture issues relating to the bathrooms and ensuites, evidence of moisture under the lounge carpet in Units 21 and 23, and cracks in internal linings that could be in part attributed to the ingress of moisture. Non-invasive readings were taken through the interior linings of the exterior walls and the following elevated readings were noted:

- Unit 17 - 18% at the top and sides of a lobby window
- Unit 19 - 20% in the entrance lobby skirting.

The expert took further non-invasive readings through the exterior of the cladding and the following elevated readings were noted:

### **Unit 17**

- over 20% to over 30% around the garage and the sub-floor
- over 25% adjacent to the garage door opening
- over 25% above the deck.

**Unit 19**

- over 20% to over 25% around the garage and the sub-floor
- over 25% adjacent to the garage door opening
- over 20% above the deck.

**Unit 21**

- over 25% to over 30% around the garage and the sub-floor
- over 26% adjacent to the garage door opening
- over 20% above the deck.

Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure.

5.5.5 The invasive investigations also revealed some evidence of initial framing decay. The expert also forwarded a sample of affected framing timber to a testing laboratory. The laboratory tested the sample and concluded that it contained spores of a soft-rot fungus. However there was no evidence of decay “on a cellular level”. The expert noted that timber with the same visual characteristics shown on the tested sample was evident in other units of the complex.

5.5.6 The expert made the following comments regarding the cladding:

- there are pin holes in the paint finish and the paint finish adjoining some of the window sills in Unit 19 is blistering and peeling
- the backs of the “Harditex” sheets are not painted nor sealed
- the cladding is extensively cracked at all wall elevations and is bulging at some locations
- there is no “Inseal” installed behind the vertical cladding joints and some of the joints have gaps wider than that recommended by the manufacturer
- if control joints are installed, they have been covered by the textured and paint finishes and would therefore not be in accordance with the manufacturer’s requirements
- the cladding does not overlap the concrete floors the required 50mm at some locations
- the base of the cladding is too close to the ground or the paving or is buried in the paving at some locations
- there is no “Inseal” installed at the junction of the base of the cladding and the required capillary gap is not installed at some of these locations
- the bottom edge of the cladding is not sealed or painted
- building paper is not installed behind some of the sub-floor cladding sheets of Units 17 and 19 and some of the sub-floor framing of Unit 19 is on the ground and is not adequately protected

- there is no gap between the flashings installed between the horizontal planted bands and the cladding, the ends of the flashings are not stop-ended or sealed, and the contact adhesive has eroded the polystyrene of the bands
- some of the planted bands also lack flashings, and at some locations the band that should be installed at the horizontal joints is absent
- the windows are face-fixed (without sill flashings) and have minimal overlap of the window flange over unsealed fibre cement. There is no drainage gap provided at sill flanges, which have been sealed against the fibre cement – so trapping water within the cladding
- there is no Inseal or sealant behind the window jamb flanges, and a bead of sealant has been applied after the window installation
- the window and door head flashings do not have a 75mm upstand, the building paper does not overlap the upstand, and the gap between the flashing and the cladding is sealant filled. The projections of the head flashings past the jamb flanges are not sealed in accordance with the manufacturer's instructions
- while garage door openings have head flashings, the jambs are poorly weatherproofed with no flashings and sealants at the reveals
- the timber slats and deck framing butt against the cladding with no drainage gap, and with unsealed fixings penetrating the cladding
- there is no gap or sealant where the deck balustrades, fence posts and the like are attached to the cladding
- no flashing is installed over the meter box and some penetrations through the cladding are inadequately sealed
- there are no capillary breaks between the apron flashings and the cladding to Units 17 and 19, and the ends of the flashings and the adjoining cladding areas to these units are inadequately weatherproofed with no kickouts and gaps showing at some locations.

## **5.6 Units 22 and 25**

5.6.1 I note that these 2 units were constructed by the same builder and share the same general cladding characteristics. Accordingly the references to the 2 separate reports provided by the expert have been combined in the following paragraphs.

5.6.2 The report for Unit 22 was completed on 14 December 2005 and that for Unit 25 on 15 December 2005. The expert noted that the appearance of the cladding is generally straight and flat with only minor variations to line and level. The texture and paint finish appear uniform, and apart from where cracking has occurred, is sound. The finish of the junctions and transitions is generally to a reasonable standard. The expert also stated that, apart from one vertical joint in the cladding of Unit 22, there were no visible control joints in the cladding. There is also evidence that repair and rectification work has been undertaken on the cladding to Unit 25 since it was installed.

5.6.3 The expert removed sections of the horizontal polystyrene bands, and sections of cladding at the base and head of a window to investigate the construction details of both units. I am prepared to accept that these samples are indicative of similar details throughout the 2 units.

5.6.4 The expert noted internal moisture issues relating to the bathrooms and ensuites, evidence of moisture under the lounge carpets of both units, and cracks in internal linings that could be in part attributed to the ingress of moisture. Non-invasive readings were taken through the interior linings of the exterior walls and the following elevated readings were noted:

#### **Unit 22**

- 19% adjacent to a window in bedroom 1
- over 18% under a bedroom 3 window.

#### **Unit 25**

- 19% to both sides of the kitchen window
- 20% adjacent to the bathroom window.

The expert took further non-invasive readings through the exterior of the cladding and the following elevated readings were noted:

#### **Unit 22**

- over 20% to over 30% around the garage and the sub-floor
- over 25% adjacent to the garage door opening
- over 25% above the deck
- 20% and 25% adjacent at the cut-out of the polystyrene band.

#### **Unit 25**

- over 22% above the west elevation planted band
- over 20% to over 30% around the garage, the front entry, and the sub-floor
- over 28% adjacent to the kitchen window
- over 25% above the deck
- 22% and 24% at the window cut-out.

Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure. The expert also noted that the “Harditex” under the horizontal joints is delaminating.

5.6.5 The expert made the following comments regarding the cladding:

- the cladding sheet layout is not fully compliant
- the edges and backs of the “Harditex” sheets to Unit 22 and the sheets to Unit 25 are not painted nor back sealed

- the cladding is extensively cracked at all wall elevations and is bulging at some locations
- there is no “Inseal” installed behind the vertical cladding joints and some of the joints have gaps wider than that recommended by the manufacturer
- if control joints are installed, then apart from the one correctly formed visible joint at Unit 22, they have been covered by the textured and paint finishes and would therefore not be in accordance with the manufacturer’s requirements
- the cladding does not overlap the concrete floors the required 50mm at some locations
- the base of the cladding is too close to the ground or the paving or is buried in the paving at some locations
- there is no “Inseal” installed at the junction of the base of the cladding and the required capillary gap is not installed at some of these locations
- the bottom edge of the cladding is not sealed or painted
- some of the sub-floor framing is on the ground and is not adequately protected
- the flashings between the horizontal planted bands of Unit 22 are ineffective
- some of the required flashings to the bands are missing, the bands are poorly sealed, and the contact adhesive has eroded the polystyrene of the bands
- the windows are face-fixed (without sill flashings) and have minimal overlap of the window flange over unsealed fibre cement. There is no drainage gap provided at sill flanges, which have been sealed against the fibre cement – so trapping water within the cladding
- the window and door head flashings do not have a 75mm upstand, the building paper does not overlap the upstand, and the gap between the flashing and the cladding is sealant filled
- the top and bottom mitres to the corner windows and the associated head flashings are opening up
- while garage door openings have head flashings, the jambs are poorly weatherproofed with no flashings and sealants at the reveals
- the membrane-coated decks lack flashings or sealants at their junctions with the building and at the perimeters; and there is inadequate protection of the deck framing
- there is no gap or sealant where the deck balustrades, fence posts and the like are attached to the cladding
- the timber framing above the entry to Unit 22 is exposed to the weather and the downpipe at this location lacks a spreader
- no flashing is installed over the meter box and some penetrations through the cladding are inadequately sealed
- there are no capillary breaks between the apron flashings and the cladding, and the ends of the flashings and the adjoining cladding areas to these units are

inadequately weatherproofed with no kickouts and gaps showing at some locations.

- 5.6.6 The expert also noted that there are loose tiles on the Unit 25 roof. The expert also considered that the liquid applied membrane to the decks is not completed in accordance with recognised standards. The membrane to the Unit 25 deck is also puckered at one location.
- 5.7 A copy of the expert's report was provided to each of the parties on 12 January 2006.

## 6. Evaluation for code compliance

### 6.1 Evaluation framework

- 6.1.1 In evaluating the design of a building and its construction, it is useful to make some comparisons with the relevant Acceptable Solution<sup>4</sup>, in this case E2/AS1, 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 some other provision to compensate for that in order to comply with the Building Code.
- 6.1.2 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>5</sup> (refer to Determination 2004/1 *et al*) relating to cladding and these factors are also used in the evaluation process.
- 6.1.3 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.

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<sup>4</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>5</sup> Copies of all determinations issued by the Department can be obtained from the Department's website.

## 6.2 Weathertightness risk

6.2.1 In relation to these characteristics I find that these units:

- are built in a low wind zone
- are a maximum of two storeys high
- are fairly simple in plan and form
- have 600mm eaves and verge projections, which provide good protection to the cladding areas below them
- each has an attached deck, with two units having cantilevered decks
- have monolithic cladding which is fixed directly to the framing
- have external wall framing that is unlikely to be treated, so providing no resistance to the onset of decay if the framing absorbs and retains moisture.

6.2.2 When evaluated using the E2/AS1 risk matrix, the weathertightness risk ratings for the units are as follows:

- for Unit 15, all elevations of the building demonstrate a low rating
- for Unit 20, two elevations demonstrate a low rating and two elevations a medium rating
- for Units 17, 19, 21, 22, 23, and 25, three elevations demonstrate a low rating and one elevation a medium rating.

The matrix is an assessment tool that is intended to be used at the time of application for consent, before the building work has begun and, consequently, before any assessment of the quality of the building work can be made. Poorly executed building work introduces a risk that cannot be taken into account in the consent stage but must be taken into account when the building as actually built is assessed for the purposes of issuing a code compliance certificate.

## 6.3 Weathertightness performance

6.3.1 It is clear from each of the expert's reports that the cladding to all the units of this complex has not been installed in accordance with the manufacturer's requirements. The cladding is unsatisfactory in terms of its weathertightness risk and performance perspectives, and considerable work is required to make the buildings code compliant. The high levels of moisture ingress at several locations and the initial signs of decay found in some of the associated framing are major concerns. Further investigation is urgently required to ensure that the structural integrity of the affected elements has not been compromised.

- 6.3.2 I note the expert's comments as described in paragraphs 5.3.5 and 5.6.6, regarding some roof tile defects for Units 15 and 25, and the expert's concerns regarding the liquid-applied membranes on the decks of Units 22 and 25, described in paragraph 5.6.6.
- 6.3.3 I note that E2/AS1 does not require the provision of a drained cavity behind flush-finished fibre cement sheet cladding on buildings assessed as low-risk. I therefore consider that the wall cladding used on this low-risk house may be fixed directly to the framing.

## **7. Conclusion**

- 7.1 I am satisfied that the current performance of the cladding on each of the units is inadequate because it has not been installed according to good trade practice and is allowing water penetration into the wall framing through defects in the cladding at present. In particular, it demonstrates the key defects listed in paragraphs 5.3.5, 5.4.5, 5.5.6, and 5.6.5. I have also identified the presence of a range of known weathertightness risk factors in all the units. The presence of the risk factors on their own is not necessarily a concern, but they have to be considered in combination with the significant faults identified in the cladding systems. It is that combination of risk factors and faults that indicate that the structure does not have sufficient provisions that would compensate for the lack of a drained and ventilated cavity. Consequently, I am not satisfied that the cladding systems as installed complies with clause E2 of the Building Code.
- 7.2 In addition, the units are 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 units to remain weathertight. Because the cladding faults in all the units are allowing the ingress of moisture at present, they do not comply with the durability requirements of clause B2.
- 7.3 I find that, because of the extent and apparent complexity of the faults that have been identified with this cladding, I am unable to conclude, with the information available to me, that remediation of the identified faults, as opposed to partial or full re-cladding, could result in compliance with clause E2. I consider that final decisions on whether code compliance can be achieved by either remediation or re-cladding, or a combination of both, can only be made after a more thorough investigation of the cladding. This will require a careful analysis by an appropriately qualified expert. Once that decision is made, the chosen remedial option should be submitted to the territorial authority for its comment and approval. If the territorial authority chooses to reject the proposal, then the owner is entitled to seek a further Determination on whether the proposed remedial work will lead to compliance with the requirements of clauses E2 and B2.



- 7.4 Effective maintenance of claddings (in particular of monolithic cladding) is important to ensure ongoing compliance with clauses B2 and E2 of the Building Code and is the responsibility of the building owner. Clause B2.3.1 of the Building Code requires that the cladding be subject to “normal maintenance”, however, that term is not defined in the Act.
- 7.5 I take the view that normal maintenance is that work generally recognised as necessary to achieve the expected durability for a given building element. With respect to the cladding, the extent and nature of the maintenance will depend on the material, or system, its geographical location and level of exposure. Following regular inspection, normal maintenance tasks shall include but not be limited to:
- Where applicable, following manufacturers maintenance recommendations
  - Washing down surfaces , particularly those subject to wind-driven salt spray
  - Re-coating protective finishes
  - Replacing sealant, seals and gaskets in joints.
- 7.6 As the external wall framing of these units is likely to be untreated, periodic checking of its moisture content should also be carried out as part of normal maintenance.
- 7.7 In the circumstances, I decline to incorporate any waiver or modification of the Building Code in this determination.

## **8. The decision**

- 8.1 In accordance with section 20 of the Building Act 1991, I hereby determine that the monolithic cladding systems as installed on each of the units does not comply with clauses B2 and E2 of the Building Code, and accordingly confirm the territorial authority’s decision to refuse to issue code compliance certificates for any of the units.
- 8.2 I note that the territorial authority has issued a Notice to Rectify for each individual unit, with the exception of Unit 15. Notices to fix should now be issued requiring the owners to bring the units into compliance with the Building Code. The notices to fix may list the items to be rectified but they should not specify how compliance is to be achieved as this is for the owners to propose and for the territorial authority to accept or reject. It is important to note that the Building Code allows for more than one method of achieving compliance.
- 8.3 I would suggest that the parties adopt the following process to meet the requirements of paragraph 8.2. Initially, the territorial authority should issue the notices to fix, listing all the items that the territorial authority considers to be non-compliant. The owner(s) should then produce a response to these in the form of detailed proposals, 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.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 26 June 2006.

John Gardiner  
**Determinations Manager**