



Determination 2017/059

Regarding the refusal to issue a code compliance certificate for a 20-year-old house with mixed claddings at 26 Papaunahi Road, Bowentown



Summary

This determination is concerned with the compliance of a 20-year-old house. The determination considers the authority's reasons for refusing to issue the code compliance certificate and whether the house complies with the requirements of the Building Code.

1. The matter to be determined

- 1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004¹ ("the Act") made under due authorisation by me, John Gardiner, Manager Determinations and Assurance, Ministry of Business, Innovation and Employment ("the Ministry"), for and on behalf of the Chief Executive of the Ministry.
- 1.2 The parties to the determination are:
 - the owners of the building, R and J Hulme ("the applicants")
 - Western Bay of Plenty District Council ("the authority"), carrying out its duties as a territorial authority or building consent authority.
- 1.3 This determination arises from the decision of the authority in 2005 to refuse to issue a code compliance certificate for what was at that time an eight year old house. The 2005 refusal arose because the authority was not satisfied that building work complied with certain clauses² of the Building Code (First Schedule, Building Regulations 1992). The authority's concerns related to the weathertightness and durability of the monolithic cladding.

¹ The Building Act, Building Code, compliance documents, past determinations and guidance documents issued by the Ministry are all available at www.building.govt.nz or by contacting the Ministry on 0800 242 243.

² In this determination, references to sections are to sections of the Act and references to clauses are to clauses of the Building Code.

- 1.4 The matter to be determined³ is therefore the authority's exercised of its power of decision in refusing to issue the code compliance certificate for the reasons given in its letter dated 14 January 2005 (see paragraph 3.3.2).
- 1.5 In deciding whether to confirm, reverse or modify the authority's decision, I must consider whether the external building envelope of the house complies with Clause E2 External moisture and Clause B2 Durability of the Building Code that was in force at the time the original building consent was issued, taking into account that the house is now some 20 years old. The building envelope includes the components of the systems (such as the wall claddings, the roof claddings, the decks and the windows) as well as the way components have been installed and work together. This matter includes compliance with Clause B1 Structure, as it relates to the weathertightness of the house.
- 1.6 In making my decision, I have considered the report of the expert commissioned by the Ministry to advise on this dispute ("the expert") and the other evidence in this matter.

1.7 Matters outside this determination

- 1.7.1 In its refusal, the authority limited its concerns to items associated with the clauses outlined above (see paragraph 3.3.2) and this determination does not address other clauses of the Building Code.
- 1.7.2 I also note that the applicants can apply to the authority for a modification of durability provisions to allow the durability periods specified in Clause B2.3.1 to commence from the date of substantial completion in July 1997. Although I leave this matter to the parties to resolve in due course, I have taken the anticipated modification into account when considering the claddings.

2. The building work

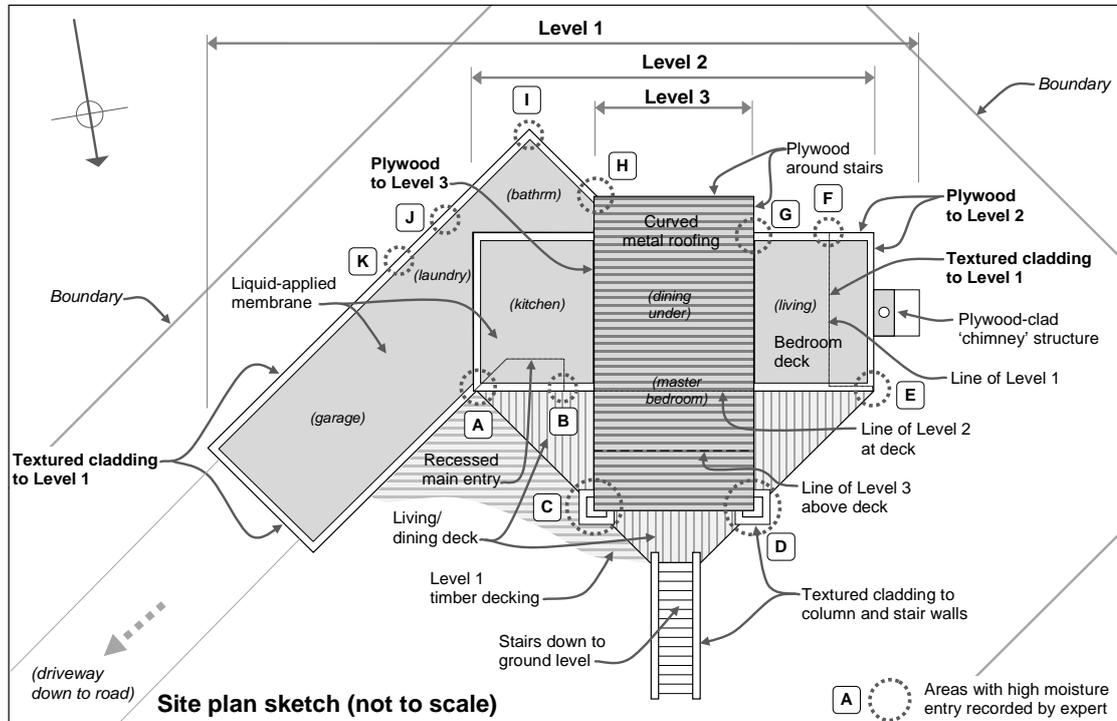
- 2.1 The building work consists of a detached house, which is three storeys high in part and is situated on a gently sloping coastal site in a very high wind zone⁴ as described in NZS 3604⁵. The house has a 'boomerang' shaped plan as shown in Figure 1 and is fairly complex in form. It is assessed as having a high to very high weathertightness risk.
- 2.2 As shown in Figure 1, the house accommodates the following:
- Level 1:
 - the recessed main entry, foyer and staircase to the south
 - in the single-storey east wing, the garage, laundry and bathroom
 - in the west wing, family room/dining/kitchen area opening onto paving and a pergola to the north
 - a large bedroom opening onto decking to the north and west
 - Level 2:
 - open-plan kitchen, dining and living area, with the staircase to the south

³ Under sections 177(1)(b) and 177(2)(d) of the Act

⁴ According to the bracing calculations

⁵ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

- a triangular-shaped deck to the north, with exterior stairs providing access to ground level to the north
- Level 3:
 - ensuite and the staircase to the south
 - the master bedroom opening onto a roof deck above the Level 2 living area to the west (“the bedroom deck”) and a small deck to the north.

Figure 1: Approximate plan

- 2.3 Construction is a mix of specifically engineered steel framing and conventional light timber framing; with concrete masonry foundations, concrete floor slab on grade, timber framed floors to upper levels, plywood and monolithic claddings, profiled metal and membrane roofing, and aluminium windows.
- 2.4 The flat membrane roofs and deck are set at various levels, with external walls extended to form metal-capped parapets. The curved corrugated steel skillion roof to Level 3 has no eaves, with gutters fixed against timber fascia boards.
- 2.5 The architect’s standard specification called for timber framing to be ‘pressure treated using Tanalith preservatives or similar to the NZ Timber Preservative Council hazard class to suit its particular location.’ However, the expert identified the exposed framing in the unlined garage as Douglas Fir, and I accept that the exterior wall framing is likely to be untreated Douglas Fir.

2.6 The decks

- 2.6.1 The house has attached decks on all of the three levels. On Level 1, spaced timber decking at ground level forms an entry deck that extends along the north elevation and the west elevation. Most of the ground level decking is sheltered below the Level 2 overhangs.
- 2.6.2 On Level 2, the kitchen/dining/living area opens onto a large triangular deck, that has spaced hardwood decking and open metal balustrades. The deck is supported by steel beams and a portal frame that extends to support Level 3 and the curved roof above.

The lower parts of the steel posts are timber framed to form plinths with sloping sides clad in textured cladding. An exterior staircase, with monolithic-clad balustrades, provides access to ground level to the north.

- 2.6.3 On Level 3, a small timber framed deck with spaced hardwood flooring and open metal balustrades extends to the north from the master bedroom below the curved roof. The master bedroom also opens onto an enclosed roof deck to the west, situated above the Level 2 living area. The bedroom deck floor is liquid-applied membrane, with open metal balustrades fixed to parapet upstands at the deck edges.

2.7 The wall claddings

- 2.7.1 The wall cladding to Level 1 is a proprietary monolithic flush-finished fibre-cement system⁶ (“the textured cladding”) consisting of 7.5 mm thick fibre-cement sheets which are fixed directly through the building wrap to the framing and finished with an applied textured plaster coating system and acrylic paint coating. The textured cladding is also installed to the exterior staircase balustrades and column plinths.
- 2.7.2 The walls to Levels 2 and 3 are clad in 12mm thick cedar plywood, with 9mm wide x 5mm deep grooves at 100mm centres and tongue in groove joints. The plywood sheets are fixed through the building wrap directly to the framing and contribute to bracing. The plywood cladding extends down to Level 1 of the south staircase and is installed on a framed chimney structure to the west.
- 2.7.3 The plywood cladding was originally finished with a proprietary water repellent preservative treatment, which was described in the manufacturer’s data sheet as ‘a clear, paintable, penetrating aqueous emulsion water repellent and preservative.’ The cedar plywood was left as unpainted until at least 2013⁷, but is now painted.

3. Background

- 3.1 The authority issued a building consent (No. 57798) to the applicants on 28 February 1997 under the Building Act 1991.

3.2 Construction during 1997

- 3.2.1 The authority carried out various inspections during construction, including a pre-line inspection on 11 June 1997.
- 3.2.2 During construction the architect issued a number of variation orders to the builder, with copies provided to the applicants (it is not clear that the authority had been provided with copies). Changes in regard to the claddings included:
- Changing the cladding to textured cladding.
 - Substituting the plywood cladding.
 - Substitute a different waterproofing membrane.
 - Applying clear wood preservative to all plywood sheet cladding.

⁶ Specified in the architect’s variation orders as the fibre-cement sheets to be installed in accordance with manufacturer’s instructions of February 1996

⁷ Google street-view image capture April 2013

- 3.2.3 A guarantee dated 24 July 1997 noted that the house had been inspected ‘and the dwelling has been approved by the Company’s inspector’. The architect issued the builder with a ‘certificate of practical completion’ on 25 July 1997.
- 3.2.4 The authority carried out a final inspection on 16 September 1997, and in a letter to the applicants dated the same day noted that the following items required attention before a code compliance could be issued:
1. Provide handrail on both internal stairs
 2. Provide a barrier at the side of the upper stair to comply with [clause] F4
 3. Provide manufacturer’s details for the membrane on the roof and decks and a producer statement confirming that the product has been applied in accordance with the manufacturer’s instructions.
- 3.2.5 According to the inspection summary, the authority re-inspected the house on 28 May 1998, but I have not seen a copy of that inspection record or of any relevant correspondence between the parties.

3.3 The 2004 final inspection and refusal to issue a code compliance certificate

- 3.3.1 On 21 November 2004, the applicants requested a further final inspection, which was carried out on 30 November 2004. An internal memo dated 1 December 2004 noted:

[Textured] cladding has been installed in place of [EIFS cladding] as shown on plans. The condition of the cladding is in reasonable condition given the time it has been standing (30/1/97). No ventilated cavity provided, has been recently repainted but is showing signs of movement on the joints and a couple of corners. Protrusions into exterior claddings I would suspect don’t have flashings and are reliant on sealants.

This information needs to be provided:

Roof over garage area needs a producer statement on the installation of the roof. Membrane is showing signs of movement. There is no visible sign of leaks but have some reservations.

- 3.3.2 In a letter to the applicants dated 14 January 2005, the authority refused to issue a code compliance certificate because it was not satisfied on reasonable grounds that the building work complied with the Building Code. The authority stated it was not satisfied that the textured cladding complied with Clause E2.

3.4 The response to the refusal

- 3.4.1 The applicants sought information from the architect, who responded on 4 February 2005 attaching technical information, correspondence, completion statements and variation orders issued during construction for changes to claddings (see paragraph 3.2.2).
- 3.4.2 The builder carried out ‘a visual inspection’ of the house on 31 January 2005. In a letter to the applicants dated 17 March 2005, the builder stated that he considered that the house ‘is sound and does not present as a leaky building’.
- 3.4.3 In a letter to the authority dated 22 March 2005, the applicants provided copies of letters and information collected from the architect and builder and asked the authority to reconsider its decision. The applicants expressed surprise at the refusal to issue a code compliance certificate as there ‘had been no significant problem’ since the house was built.
- 3.4.4 The authority responded on 5 May 2005, noting that it had reviewed the situation but would not change its decision.

3.4.5 I have seen no record of any further correspondence between the parties over the following 12 years. The Ministry received an application for a determination on 13 March 2017 and sought additional information, which was received from the authority until 21 March 2017.

4. The submissions

4.1 The applicants' submission

4.1.1 The applicants set out a brief background to the current situation and noted their view that the authority had 'no intention' of issuing the code compliance certificate because of the water ingress risk associated with the textured cladding.

4.1.2 The applicants provided copies of:

- the drawings
- the refusal to issue a code compliance certificate dated 14 January 2004
- various letters and information from the builder and the architect.

4.2 The authority's submission

4.2.1 In response to the Ministry's queries, the authority confirmed on 27 March 2017 that:
...our decision to decline the code compliance certificate has not changed; so far we have not seen or [been] provided with any other documents or information to change our decision.

4.2.2 In addition to the applicants' information, the authority provided copies of:

- the consent documentation
- the building consent
- records of inspections during construction
- the final inspection records of 15 September 1997 and 30 November 2004
- correspondence with the applicant, including information received from the architect and the builder
- various producer statements, certificates, statements and other information.

4.3 A draft determination was issued to the parties for comment on 7 July 2017.

4.4 The authority responded on 17 July 2017, accepting the draft without further comment.

4.5 The applicants responded on 21 July 2017, accepting the decision and noting the issues raised in the expert's assessment relate to the textured cladding. The applicants advised that in 2014 the aged and weathered plywood cladding had been replaced with treated pine plywood that was then painted.

5. The expert's report

5.1 As mentioned in paragraph 1.6, I engaged an independent expert who is a member of the New Zealand Institute of Building Surveyors to assist me. The expert inspected the house on 23 May 2017, providing a report that was completed on 14 June 2017 and forwarded to the parties on 15 June 2017.

5.2 General

5.2.1 The scope of the expert's inspection was to assess whether the building work complies with Clauses B2 and E2 of the Building Code that was in force at the time the original building consent was issued, taking into account the 20-year-old age of the house.

5.2.2 The expert noted that the house generally appeared to accord with 'the overall intent' of the consent drawings except for:

- the replacement of EIFS⁸ with textured cladding
- the other product changes recorded in the architect's variation orders as outlined in paragraph 3.2.2.

5.2.3 The expert observed that the house was 'well presented and is being well maintained' although some flashings, penetrations and junctions rely on silicone sealant for weathertightness. The expert considered that generally the standard of materials and quality of internal finishing was 'good'. However, some of the manufacturer's installation instructions were not followed externally, but the standard of finish can be considered as being 'satisfactory'.

5.3 Moisture investigations

5.3.1 The expert inspected the interior, taking non-invasive moisture readings at areas associated with high risk locations. Interior readings were all 'within the normal range', but exterior readings on the surface of the textured cladding indicated that moisture in the underlying framing 'may be excessive in some locations'.

5.3.2 Taking account of the above and of the high risk features, the expert took 17 invasive moisture readings through the textured cladding. The expert recorded the following readings (refer Figure 1 for location of areas shown in brackets):

- over 80% in deck soffit at garage/Level 2 deck junction (Area A)
- 18% in bottom plate at entry recess under wall/deck junction (Area B)
- 27% to over 80% in east column plinth (Area C)
- 36% to over 80% in west column plinth (Area D)
- 48% to over 80% in the northwest wing wall under living area (Area E)
- 20% in bottom plate to the southwest corner to Level 1 bedroom (Area F)
- over 80% in bottom plate at the southwest textured cladding/plywood junction (Area G)
- 38% in bottom plate at the southeast textured cladding/plywood junction (Area H)
- 33% in bottom plate at south corner of bathroom (Area I)

⁸ Exterior Insulation and Finish System

- 23% in bottom plate at laundry door (Area J)
- 25% to 26% at laundry window (Area K).

5.3.3 I note that readings over 18% generally indicate that moisture is entering the framing and further investigation is needed. The expert's inspection was in late autumn and followed several months of above average rainfall, so the expert's readings likely represent the peak of expected seasonal variation with lower readings expected during drier months.

5.3.4 The expert also noted that the ease of inserting the moisture probes indicated that the timber was likely to be decayed in those particular areas.

5.4 The wall claddings

5.4.1 Taking account of his moisture investigations and the current age of the house, the expert assessed the design features and construction of the external building envelope for weathertightness and durability, and made the following observations.

5.4.2 In regard to clearances and base details:

- The plywood cladding to the framed chimney and the textured cladding to the west wing wall lack clearance from the ground.
- The ground floor decking butts against the bottom of the textured cladding, with no drainage at the junction.
- Although the cladding overlap to the foundation is about 50mm, no anti-capillary gap and seal has been provided in accordance with the textured cladding manufacturer's 1995 installation instructions.
- The plywood/membrane clearance is also insufficient in some areas.

5.4.3 In regard to joinery installation:

- Windows are face-fixed, with metal head flashings extended 30mm past jambs and no sill flashings (common practice at the time).
- The horizontal joint flashings form the head flashing for many of the windows in the plywood walls.
- Probing behind joinery flanges indicated that no jamb seals are installed.

5.4.4 In regard to sheet layout for the textured cladding:

- There are no vertical control joints installed in walls where dimensions exceed the 5.4 m limit recommended by the manufacturer.
- Some sheet joints align with window jambs, with peaking evident.
- There are some cracks and peaks in the cladding, likely due to the lack of control joints.

5.4.5 In regard to cladding penetrations:

- Steel I-beams supporting decks penetrate claddings, with sealant only at the junctions – and cracks are apparent at some junctions, with high moisture levels in lower framing.
- Some other service penetrations are inappropriately sealed or flashed.

5.4.6 In regard to the roof cladding:

- The curved corrugated roofing includes an overlap of only 20 to 30mm to gutters, rather than the 50mm minimum expected.
- Edges of the corrugated roofing are rapidly corroding.
- Some downpipes are disconnected from gutters.
- Some downpipes discharge close to membrane/cladding junctions.
- The liquid applied membrane is peaking and wrinkling over the garage – likely due to thermal movement of the substrate.

5.4.7 In regard to roof and deck parapets:

- Metal parapet cappings lack fall, with joints not properly overlapped and sealed.
- Parapet/wall junctions lack saddle flashings and rely on sealant.
- Deck balustrades are fixed to the top of deck upstand cappings, with penetrations reliant on sealant for weathertightness.

5.5 Summary

5.5.1 The expert considered that the very high moisture levels and evidence of loss of strength in timber framing were ‘typical enough to cause serious concern’ and without appropriate remedial work ‘there will be an increasing likelihood of more wood decay and consequent deterioration of the timber framing’.

5.5.2 The expert concluded:

In order to establish the nature and extent of the weathertightness issues and to recommend appropriate remedial work it will be necessary that a comprehensive survey of the dwelling be carried out.

6. The external building envelope

6.1 I note that an application can be made to the authority for a modification of durability requirements to allow durability periods to commence from the date of substantial completion in 1997. Although that matter is not part of this determination (see paragraph 1.7.2), I have taken the age of the house into account when considering the performance of the exterior building envelope.

6.2 Weathertightness performance

6.2.1 It is clear from the expert’s report that roof and wall claddings have not been installed in accordance with good trade practice or applicable manufacturer’s recommendations in some critical respects. I also note that the expert did not carry out invasive testing of timber framing behind the plywood cladding, which is likely to have experienced similar moisture penetration and damage in areas associated with high risk junctions and intersections (such as deck/wall junctions, parapet/wall junctions and balustrade/deck upstand penetrations).

6.2.2 Taking account of the expert’s report, I conclude that considerable work is required to make this house weathertight and durable. Further investigation is necessary, including a systematic survey and timber testing of all risk locations associated with

both wall claddings, to determine the full extent of moisture penetration, timber damage and the repairs required.

6.3 Weathertightness conclusion

- 6.3.1 I consider the expert's report establishes that the current performance of the building envelope is not adequate because there is evidence of extensive moisture penetration into the timber framing over an extended period of time. Consequently, I am satisfied that the cladding currently does not currently comply with Clause E2 of the Building Code and also did not comply with Clause E2 for the full 15 year period required by Clause B2.3.1 of the Building Code. Due to the level of water entry and damage observed by the expert, I am also satisfied that the framing does not with Clause B1 of the Building Code.
- 6.3.2 The durability requirements of Clause B2 include a requirement for wall claddings to remain weathertight for a minimum of 15 years. Although the original cladding is now 20 years old, the moisture levels and timber condition observed by the expert indicate that moisture has penetrated the cladding over an extended period and is likely to have resulted in significant decay and damage to the untreated framing. I take the view that such moisture penetration indicates that the claddings did not meet the minimum life required by the Building Code and I am therefore satisfied that the building envelope did not comply with the durability requirements of Clause B2.
- 6.3.3 The expected life of the underlying structure is considerably longer and claddings need to protect the underlying structure of the house for the further 30 years required for the structure to meet its minimum life of 50 years. Because cladding faults will continue to allow moisture into framing in the future, the building work does not comply with the durability requirements of Clause B2 as it applies to Clause B1.
- 6.3.4 Final decisions on whether code compliance can be achieved by remediation or re-cladding, or a combination of both, can only be made after a more thorough investigation of the external envelope and of the condition of the underlying timber framing. This requires a careful analysis and timber testing by an appropriately qualified expert, with the chosen remedial option submitted to the authority for its approval.
- 6.3.5 I note that the Ministry has produced various guidance documents on weathertightness remediation which will assist the owners in understanding the issues and processes involved in remediation work to the cladding, and in exploring various options that may be available.

6.4 Maintenance

- 6.4.1 Although a modification of durability provisions will mean that many areas of the claddings have already met the 15 years required by the Building Code, the expected life of the building as a whole is considerably longer. Careful maintenance is needed and must continue to ensure that claddings continue to protect the underlying framing for its minimum required life of 50 years for the structure.
- 6.4.2 Although the expert describes the house as currently well maintained, I note the following in regard to past maintenance:
- Wall claddings have been recently repainted and their condition prior to that maintenance cannot be assessed – particularly in regard to the wall claddings and the numerous complex junctions that are reliant on sealant.

- Intermittent water entry had occurred at the unlined garage wall/deck beam junction, which was resolved with sealant application – and similar leaks are likely to have entered framing behind claddings and linings.
- Images captured in April 2013⁹ indicate that claddings may not have been well maintained for the 16 years prior to those images – with the cedar plywood surface exposed and showing significant variations in colour.
- The water repellent preservative applied to the plywood may have reduced in its effectiveness over time and allowed moisture to wick into the plywood and into adjacent vulnerable junctions.

6.4.3 The apparent lack of past maintenance would have resulted in the extent, level and significance of moisture penetration and likely decay now apparent in many areas of the untreated framing, which affects the extent of consequential investigation and repair now required to those areas.

6.4.4 Effective maintenance is important to ensure ongoing compliance with the Building Code and is the responsibility of the building owner. The Ministry has previously described maintenance requirements associated with the external building envelope, 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).

7. The durability considerations

7.1 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).

7.2 In many previous determinations 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.

7.3 However, because of the extent of further investigation required of the claddings, the condition of the timber framing and therefore the structure of the house, 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.

8. What happens next?

8.1 The applicants should develop and submit a detailed proposal to the authority to address the matters of investigation and non-compliance, produced in conjunction with a suitably qualified person experienced in weathertightness remediation and submitted to the authority for its consideration and approval. Any outstanding items of disagreement can then be referred to the Chief Executive for a further binding determination.

⁹ Google Maps Streetview

9. The decision

9.1 In accordance with section 188 of the Building Act 2004, I hereby determine that, in regard to the Building Code that was in force at the time the building consent was issued in 1997:

- some of the timber framing does not comply with Clauses B1 and B2
- the exterior building envelope does not comply with Clauses E2 and B2

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

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 26 July 2017.

John Gardiner
Manager Determinations and Assurance