MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HIKINA WHAKATUTUKI

Determination 2015/017

Regarding the refusal to issue a code compliance certificate for 12-year-old alterations to a house with stucco wall cladding at 37 Plantation Road, Cambridge

1. The matter to be determined

1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004[1] ("the current 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 owner of the house, S Kerkhof ("the applicant")
- Waipa 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 to refuse to issue a code compliance certificate for 12-year-old alterations to a house because it was not satisfied that the building work complied with certain clauses[2] of the Building Code (First Schedule, Building Regulations 1992). The authority's concerns regarding compliance of the building work appear to relate to the weathertightness of the stucco wall cladding.

1.4 The matter to be determined[3] is therefore whether the authority was correct to refuse to issue the code compliance certificate. In deciding this, I must consider whether the stucco wall cladding as installed to the additions complies with Clause B2 Durability and Clause E2 External Moisture of the Building Code. The stucco wall cladding as installed includes the components of the system (such as the solid plaster, the reinforcing, the backing materials, the flashings and junctions with windows, roof cladding and decking), as well as the way the components have been installed and

[1] The Building Act, Building Code, compliance documents, past determinations and guidance documents issued by the Ministry are all available at www.dbh.govt.nz or by contacting the Ministry on 0800 242 243.
[2] 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.
[3] Under sections 177(1)(b) and 177(2)(d) of the current Act

work together. This matter also includes the junctions of the stucco with the original house. I consider this in paragraph 6.1.

1.5 Matters outside this determination

1.5.1 When refusing to issue the code compliance certificate, the authority limited its concerns to the weathertightness of the stucco cladding installed to the additions (see paragraph 3.7.2). This determination therefore does not address other clauses of the Building Code or other buildings on the site.

1.5.2 The authority has raised no concerns regarding the age of the alteration work and I note that the owner will be able to apply to the authority for a modification of the durability provisions for the 12-year-old alterations to allow specified periods to commence from the date of substantial completion in 2002. Although I leave this matter to the parties to resolve when the alterations have been made code compliant, I comment on the matter in paragraph 6.2.

1.6 In making my decision, I have considered:

- the submissions of the parties, including:
  - the report of the property inspection company engaged by the applicant to report on the house ("the inspection company")
  - the report of the consultants engaged by the applicant to report on the house ("the building surveyor")
- the report of the expert commissioned by the Ministry to advise on this dispute ("the expert")
- the other evidence in this matter.

2. The building work

2.1 The building work considered in this determination consists of extensive additions and alterations to an existing house on a sloping rural site in a high wind zone as set out in NZS 3604[4]. The house is complex in form and is assessed as having a moderate weathertightness risk.

2.2 The original house

2.2.1 The original building was a simple detached single-storey three bedroom 1960's house ("the original house"), which had a reinforced concrete perimeter foundation wall, concrete pile foundations, timber floor, timber-framed walls, brick veneer wall claddings, timber windows and a hipped roof.

2.3 The 2002 alterations

2.3.1 Extensive alterations and additions were carried out in 2002, which approximately doubled the size of the original house as shown in Figure 1:

[4] New Zealand Standard NZS 3604:1999 Timber Framed Buildings

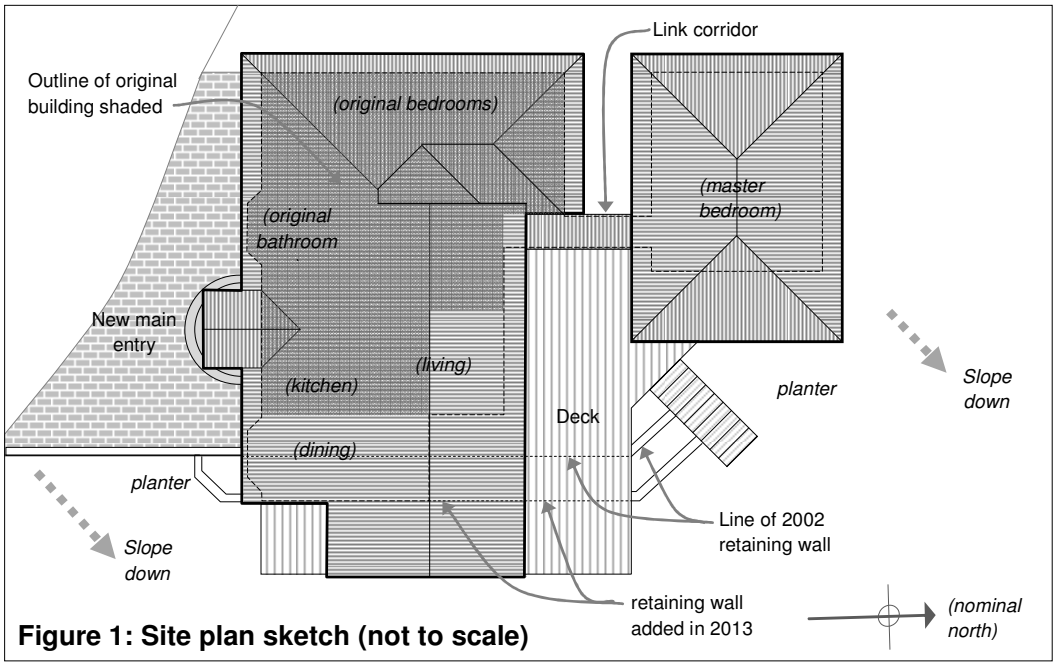

Figure 1: Site plan sketch (not to scale)

2.3.2 The 2002 alterations included:

- demolition of an original detached garage to the south of the house
- a detached addition to the north ("the master bedroom") connected to the original house by a glazed corridor ("the link corridor")
- an extension to the northeast to extend and open up the original living areas
- a large timber deck along the east elevation
- alterations to the main south entry to provide a covered entry and hall ("the entry alterations").

2.3.3 Construction of the additions is generally conventional light timber frame, with timber pile foundations, monolithic claddings, profiled metal roofing and aluminium doors and windows.

2.3.4 The 15° hipped and gabled roofs generally have eaves deeper than 600mm except for the link corridor, the gable end wall above the dining area and the gable end above the reconfigured roof. The new gable roof to living and dining areas and the hipped roof to the master bedroom extend over the deck to the east, with roof overhangs supported on monolithic-clad timber posts. The deck has a spaced timber floor and open metal balustrades.

2.4 The stucco cladding

2.4.1 The cladding to exterior walls to the additions is a solid plaster system described as stucco over a flexible backing. In this instance it consists of 18mm to 22mm thick solid plaster finished with a flexible paint coating system. The plaster is reinforced with metal mesh that appears to be fixed through the building wrap directly to the framing timbers.

2.4.2 The plasterer's quotation describes the stucco system as follows:

> To wire net, apply spray coat system as scratch coat, 2nd coat with mesh, and a top coat consisting of an adobe finish. Price includes rendering block work.

2.5 Timber treatment

2.5.1 Given its age, the original house framing is likely to be a mix of native and treated pine timbers. The inspection company's report noted that the visible roof and framing type 'appears to be Boric treated Pine, Tanalised Pine and Douglas Fir.' However the expert was unable to confirm whether the new framing was treated and the authority's site inspection record noted 'kiln dry' timber.

2.5.2 A statement from the timber manufacturer dated 12 June 2002 stated that the framing was kiln dried timber spray coated with a boron-based preservative which complied with the relevant standards and was 'fit for purpose and fully guaranteed' by the manufacturer. Given the evidence and the date of construction during 2002, I am unable to determine whether the wall framing to these additions is treated to resist fungal decay.

3. Background

3.1 The consent documentation

3.1.1 The consent drawings are stamped as approved on 12 February 2002 and the authority's job record notes that the building consent (No. 28851) was issued under the Building Act 1991 ("the former Act") on 19 February 2002. I have not seen a copy of the building consent.

3.1.2 I note that the consent drawings called for the wall cladding to the additions to be '40mm polystyrene ext. cladding with textured plaster finish' ("EIFS[5]"), although no installation details were included in the drawings.

3.2 Construction

3.2.1 The site inspection summary notes that the authority carried out the following inspections during 2002:

- retaining wall and pile foundations on 27 February
- pre-line plumbing and building on 10 April, with timber noted as 'kiln dry'.

3.2.2 Although not recorded as an inspection, the record includes a note dated 28 May 2002 stating 'seal along sill to stop water ingress', which implies that the authority sighted the finished wall cladding. However, it is not clear whether the authority was aware that the cladding had been changed from plastered EIFS to stucco.

3.2.3 At the time the cladding was installed in 2002, the Acceptable Solution E2/AS1[6] for stucco cladding systems included the incorporation of vertical battens to provide a cavity behind stucco installed on non-rigid backings only. No construction details for the cladding change were submitted to the authority and no amendment to the building consent was issued.

3.2.4 Although the work appears to have been substantially completed by mid-2002, there is no record of a final inspection and no code compliance certificate was issued.

[5] Exterior Insulation and Finish System
[6] The New Zealand Building Code Handbook and Approved Documents, Building Industry Authority 2001

3.3 The first final inspection

3.3.1 I have seen no correspondence between the parties until the applicant prepared to sell the house in 2012. The authority inspected the house on 2 October 2012 and wrote to the applicant on 4 October 2012 noting that the following items needed attention (in summary):

- As-built drawings reflecting changes to consent documentation.
- The corrugated steel flat roof to the link corridor.
- Subfloor piles and framing.
- Disposal of surface water from downpipes.
- Unpainted gable cladding above roofing.
- Lack of balustrades to exterior stairs from deck.
- Lack of safety glass to ensuite windows.
- Valves to hot water cylinder.
- The terminal vent pipe.

3.3.2 The authority also noted that proposed work must be submitted for approval prior to work commencing and concluded:

> Even with all the above work rectified it is likely that [the authority] will be unable to issue a Code Compliance Certificate as the plaster cladding system is not an approved EIFS system, as detailed on plans and has not been installed to enclose the complete floor framing. Council has no details of this construction, no records of inspections or no producer statements to cover this plaster cladding.

3.4 The inspection company's report

3.4.1 The applicant engaged the inspection company which inspected the house on 31 December 2012 and provided a report dated 2 January 2013. The principal focus of the report was on structural soundness and 'watertightness' in regard to the wall cladding.

3.4.2 The inspection company noted that the roof and wall framing able to be sighted appeared to be a mix of 'Boric-treated Pine, Tanalised Pine and Douglas Fir'. Thermal imaging and non-invasive moisture testing were carried out, with elevated readings noted at the bottom of some repaired stucco cracks and at the bottom of some downpipes.

3.4.3 Commenting on the claddings and other items identified by the authority, the inspection company noted the following (in summary):

- The majority of timber piles to the additions lack pile to bearer fixings.
- The lack of soak holes to downpipes.
- Damp ground where exterior ground levels are higher than the subfloor ground level.
- Repaired cracks to stucco, with further repair required.
- The lack of control joints to the stucco.
- Some open lap joints to roof ridge flashings.
- Silicon sealant applied to gable end/roof apron flashing.

- Insufficient pitch to corrugated steel roof to link corridor.
- The lack of top cap to terminal vent pipe.
- The lack of a balustrade to the exterior stairs to the deck.

3.4.4 The report concluded that the house appeared to be 'sound and in watertight condition' although there were items requiring attention, including those identified by the authority.

3.5 The second final inspection

3.5.1 Some work was subsequently carried out and the authority re-inspected the house with the builder on 14 May 2013 and wrote to the applicant on 16 May 2013 confirming matters still to be resolved.

3.5.2 The authority listed the following areas requiring attention (in summary):

- As-built drawings reflecting changes to consent documentation.
- In regard to the stucco cladding
  - an inspection report from a 'suitably qualified person'
  - the bottom of the stucco and to the link corridor and master bedroom.
- Drawings of the proposed retaining wall beneath the family room/lounge deck.
- Additional piles to top of retaining wall beneath dining/family room.
- Additional brace to subfloor below family room.
- Roof flashing to link corridor/master bedroom junction.
- Supports to downpipes running through the subfloor.
- As-built drawing for surface water drainage.
- Lack of balustrades to exterior stairs from deck.

3.6 The building surveyor's report

3.6.1 The applicant engaged the building surveyor who inspected the stucco cladding on 30 May 2013 and provided a 'Cladding Report' dated July 2013 which noted that the cladding had been well maintained and appeared to be 'in a reasonable condition' given its 'eleven years of in service'.

3.6.2 The building surveyor assessed the cladding against the solid plaster standard[7] and BRANZ recommendations for plastering[8] that applied at the time of plaster application. The surveyor also carried out non-invasive moisture testing on interior linings to areas at risk of moisture penetration, with no elevated readings noted.

3.6.3 The building surveyor extracted two full-depth samples from stucco cladding under eaves to the north elevation ("sample 1") and above the deck sheltered by the extended roof to the east elevation ("sample 2") and noted that:

- plaster is applied over heavy duty breathable building paper fixed directly to the framing
- thickness varied from 18mm to 22mm and incorporates metal reinforcing with a mesh size of approximately 15mm

[7] NZS 4251: 1998 Code of Practice for Solid Plastering
[8] BRANZ Good Stucco Practice (1996 Edition)

- blue coloured fibres were visible in the outer layer and the plaster was finished with a paint coating of 1.5mm to 2mm thick
- sample 1 was about 18mm thick, with mesh embedded at about 8mm from the back of the plaster
- sample 2 was about 22mm thick, with mesh not embedded into the plaster.

3.6.4 Commenting on the stucco cladding, the building surveyor noted that:

- the stucco-clad walls of the additions are supported on pile foundations
- it is not known whether the underlying framing incorporates studs at 400mm centres as recommended for stucco over a non-rigid backing
- no control joints were visible, with repaired cracks evident, mainly around windows in the north and west elevations
- metal head flashings but no jamb or sill flashings were visible to aluminium joinery, with:
  - no drainage gap above the head flashings
  - no drainage gap below the sill flanges
  - sealant applied at some junctions of jamb flanges with the plaster.
- the bottom of the stucco around the master bedroom does not sufficiently overlap and protect the bottom plate and boundary joist
- the bottom of the stucco is not formed to provide a drip edge and anti-capillary gap to prevent moisture from wicking into the framing
- there is a large crack at the north west corner above the link corridor roof, at the junction of the fibre-cement infill with the stucco to the north wall
- there is an open joint to an apron flashing at a junction between the original house and the link corridor.

3.7 The authority's refusals to issue a code compliance certificate

3.7.1 Further work was carried out and the building surveyor's report was forwarded to the authority. In a letter to the applicant dated 9 August 2013, the authority noted that no as-built drawings had yet been received, confirmed the stucco deficiencies identified in the surveyor's report, and stated that:

> While the non-invasive moisture readings indicate a dry environment [the authority] is unable to issue a Code Compliance Certificate for these house additions due to the non complying plaster cladding system.

3.7.2 At the applicant's request, the authority carried out a further re-inspection of the alterations on 9 September 2013. The authority wrote to the applicant on the same day, noting that it could not accept an application for a code compliance certificate because:

> ...the external Stucco plaster cladding to additions was changed from the Cavity based [EIFS] plaster system approved for Building Consent and does not enclose the complete subfloor framing.

3.7.3 The authority referred to its letter of 9 August 2013 and concluded:

> Should you wish to replace the cladding to the additions, a separate building consent would be required for this work. If the cladding was replaced and compliant with

> Building Code, Council should be able to issue Code Compliance Certificate for New Cladding and original house additions.

3.8 The applicant met again with the authority and it was suggested that a determination be sought on the matter. The Ministry received an application for a determination on 3 October 2014 and sought further information, which was received from the applicant on 24 October 2014.

4. The submissions

4.1 The applicant's submission

4.1.1 In a letter to the Ministry dated 23 September 2014, the applicant outlined the background to the dispute; noting that advice from the builder lead to the cladding change from EIFS to stucco. The stucco had been applied by a 'certified cladding specialist' recommended by the builder.

4.1.2 When the alterations were substantially completed, the applicant believed that cladding work had been 'carried out in accordance to building regulations and [the authority's] requirements'; although the applicant now believed there had been 'a significant lack of attention on the [authority's] behalf during the inspection process'. The applicant had been unaware of any outstanding matters until preparing to sell the property in 2012.

4.1.3 The applicant referred to the reports from the property inspection company and the building surveyor, which noted 'very low moisture levels' and the applicant holds the view that the alterations are 'sound, durable and water tight in nature.'

4.1.4 The applicant believed that all outstanding work identified since the authority's first final inspection in 2012 had been carried out, but the authority:

> ...will not give us a [code compliance certificate] as they believe the cladding is not done to the current standards of today, even though the cladding was carried out before the new rules were introduced.

4.1.5 The applicant forwarded copies of:

- some consent documentation
- the drawings as amended in August 2013
- the authority's inspection summary
- correspondence from the authority
- the inspection company's report dated 2 January 2013
- the building surveyor's report dated July 2013
- various other statements and other information.

4.2 The authority's submission

4.2.1 In a letter to the Ministry dated 4 November 2014, the authority acknowledged the application and stated that the reasons for its refusal to issue a code compliance certificate for the alterations were as outlined in its letters to the applicant on 9 August and 9 September 2013 (see paragraph 3.7), which were based on issues raised in the building surveyor's report in regard to the stucco cladding.

4.2.2 The authority forwarded copies of:

- the building surveyor's report dated July 2013
- the original building consent drawings.

4.3 A draft determination was issued to the parties for comment on 10 February 2015.

4.4 The authority and the applicant both accepted the draft without further comment in responses received on 18 and 23 February 2015 respectively.

5. The expert's report

5.1 As mentioned in paragraph 1.6, I engaged an independent expert to assist me. The expert is a member of the New Zealand Institute of Architects. The expert inspected the house on 11 November 2014, providing a report dated 16 December 2014 which was forwarded to the parties on the 18 December 2014.

5.2 General

5.2.1 The expert noted that all of the items identified by the authority had been attended to except for those relating to the stucco installed to the walls of the additions. His inspection and report was therefore limited to assessing compliance of the stucco, taking into account the two reports previously commissioned by the applicant.

5.2.2 The expert also noted that a large number of changes had been made from the consented drawings, which included:

- EIFS cladding changed to stucco
- bay window added to south wall of dining room
- hipped roof to southeast corner changed to gable with no roof overhang
- pergola to link corridor omitted
- balustrades added to master bedroom deck as ground levels different
- decks and doors omitted from west bedrooms.

5.3 Moisture testing

5.3.1 The expert noted that the interior appeared 'well finished with no evidence of cracked linings, stained finishes or swollen skirting boards', with non-invasive moisture readings generally within an acceptable range of 12% to 16%. The expert noted that southeast corner of the dining area was exposed due to the lack of roof overhang. Due to the risk of moisture penetration, the expert took an invasive moisture reading into the bottom plate and noted this was 16%.

5.3.2 At the exposed northeast corner of the master bedroom, the expert had noted a repaired diagonal crack from the corner of the full height windows where the bottom of the stucco extended only part way down the perimeter floor joists. Peeling back the corner of the carpet, the expert noted damp underlay, rusting carpet fixings and stained flooring. Invasive moisture readings into the bottom plate at the window jambs were 22% and 24%.

5.4 The wall claddings

5.4.1 The expert observed visible features of the stucco cladding and noted that:

- the stucco appears to be direct-fixed to the framing
- the stucco surface is fairly smooth and painted a dark grey colour
- there is no evidence of control joints in walls longer than 4m
- there is no continuous concrete foundation wall under the stucco walls
- stress cracking is apparent at corners of openings
- the barge board to the east gable end wall is fixed directly over the stucco
- most subfloor exterior framing is enclosed with spaced boards, with plaster butted against the top board and extended only part way down the floor joists
- a small area of direct-fixed fibre-cement infills sub-floor framing between the east deck and the original concrete foundation to the south wall
- there is no drip edge or bell cove to deflect water away from the stucco base.

5.4.2 The expert observed the visible features of the aluminium joinery and noted that:

- windows are face-fixed and slightly recessed from the stucco surface (I note this indicates that joinery was installed prior to the final plaster coat)
- metal head flashings extend past window jambs, with plaster finished hard against the top of the flashing
- the plaster finishes hard up against window jamb and sill flanges.

5.5 Identified stucco deficiencies

5.5.1 The expert also assessed items identified in the building surveyor's report (see paragraph 3.6.4) and confirmed by the authority (see paragraph 3.7.1). Taking into account his inspection, the expert assessed the stucco against relevant standards and good practice guidance at the time of construction.

5.5.2 The expert's findings and opinions are summarised as follows:

Stucco deficiencies	Expert's opinion	Relevant standards/ guides
No continuous concrete foundation	Visually confirmed	NZS 3604[9] NZS 4251[10]
Insufficient overlap to floor joists	Visually confirmed	NZS 4251
No vertical control joints	Visually confirmed	NZS 4251
Insufficient plaster thickness and reinforcing	Building surveyor's core samples	NZS 4251
Insufficient mesh embedment	Building surveyor's core samples	NZS 4251
Lack of sill flashings and gap	Visually confirmed	BRANZ Guide[11]

[9] New Zealand Standard NZS 3604:1999 Timber Framed Buildings
[10] NZS 4251: 1998 Code of Practice for Solid Plastering
[11] BRANZ Good Stucco Practice (1996 Edition)

Stucco deficiencies	Expert's opinion	Relevant standards/ guides
No drip edge/gap above window head flashings	Visually confirmed	NZS 4251 BRANZ Guide
No drip edge to bottom of stucco	Visually confirmed	NZS 4251 BRANZ Guide
Moisture penetration	High moisture readings in master bedroom	Building Code Clause E2
Lack of drainage cavity	Appears to be direct-fixed	NZS 4251
Studs not at 400mm centres	Studs likely to be at 600mm to suit EIFS cladding as per original consent drawings	NZS 4251

5.6 The expert concluded that, taking into account his inspection and the previous reports, the stucco cladding does not comply with the Building Code, nor does it comply with the Standards and building practice guidelines that were relevant at the time the alterations and additions to the house were carried out.

6. Discussion

6.1 Weathertightness of the stucco cladding

6.1.1 The expert's report establishes that the current performance of the building envelope is not adequate because there is evidence of moisture penetration into some bottom plates. Consequently, I am satisfied that the alterations do not comply with Clause E2 of the Building Code.

6.1.2 While the stucco cladding has not been installed in accordance with the relevant standards and best practice guides that were in place in place at the time the work was done, the cladding is for the most part performing as required. The cladding has now been in service for over 12 years. For the majority of the walls, the stucco cladding is also sheltered by good eaves protection.

6.1.3 In addition, while the foundations supporting the stucco cladding are not continuous this is of itself not a requirement of the Building Code, and the defects noted that are leading to moisture ingress do not appear to be related to this. I note remedial work has been completed to the foundations to satisfy the authority's requirements with respect to Clause B1 Structure.

6.1.4 Further specialised investigation is necessary, including the systematic survey of the identified defects, to determine the extent of repairs required. Such a survey is likely to include further invasive moisture and sample testing, and the exposure of framing where necessary in order to determine the extent of past and present moisture penetration, timber damage, and the repairs now required.

6.1.5 In addition to Clause E2, the alterations 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. In particular the stucco system is required to satisfy Clause E2 for a minimum of 15 years although the expected life of the underlying framing is a minimum of 50 years; meaning that effective maintenance of the external envelope is required to ensure it protects the underlying structure for its minimum required life of 50 years. Because the faults in the stucco cladding are allowing the ingress of moisture now and are

likely to do so in the future, the building work does not comply with the durability requirements of Clause B2.

6.1.6 Because of the extent and apparent complexity of the faults that have been identified with the stucco, I am unable to conclude that fixing the identified faults, as opposed to partial or full re-cladding, could result in compliance with clauses B2 or E2. Final decisions can only be made after a more thorough investigation of the stucco, which will require a careful analysis by an appropriately qualified expert. Once that decision is made, the chosen repair option should be submitted to the authority for its consideration and approval.

6.1.7 Effective maintenance of claddings is also important to ensure ongoing compliance with Clauses B2 and E2 of the Building Code and is the responsibility of the building owner. The Ministry 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).

6.2 The durability considerations

6.2.1 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).

6.2.2 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 (refer also paragraph 1.5.2).

6.2.3 However, because of the nature of the present faults in the cladding, the possible condition of the timber framing, 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.

7. What happens next?

7.1 A notice to fix should be issued that requires the owner to bring the stucco into compliance with the Building Code, identifying the items listed in this determination and referring to any further defects that might be discovered in the course of investigation and rectification.

7.2 I suggest that the parties adopt the following process to meet the requirements of paragraph 7.1. Initially, the authority should issue the notice to fix. The applicant should then produce a response to this in the form of a detailed proposal for the house as to the rectification or otherwise of the specified matters. That proposal should be produced in conjunction with a competent person with suitable experience in weathertightness remediation. Any outstanding items of disagreement can then be referred to the Chief Executive for a further binding determination.

8. The decision

8.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the stucco cladding installed to the alterations does not comply with Clauses B2 and E2 of the Building Code and accordingly, I confirm the authority's refusal to issue a code compliance certificate.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 29 April 2015.

John Gardiner
Manager Determinations and Assurance