Determination 2013/049

Regarding the refusal to issue a code compliance certificate for 7-year-old building work at 550 Whitecliffs Road, Coalgate

1. The matters to be determined

1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004[1] ("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 owner of the house, G McArthur ("the applicant")
- Selwyn 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 7-year-old building work because it was not satisfied that the building work complied with certain clauses[2] of the Building Code (First Schedule, Building Regulations 1992).

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:

1.4.1 Matter 1: The external building envelope

Whether the external building envelope of the building complies with Clause E2 External Moisture and Clause B2 Durability of the Building Code. The envelope includes the components of the systems (such as the block walls, the remaining wall

[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, 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 Act

claddings, the roof cladding and the windows), as well as the way the components have been installed and work together. (I consider this in paragraph 6.)

1.4.2 Matter 2: Other Building Code clauses

Whether the building complies with the remaining Building Code clauses relevant to the building work. (I consider this in paragraph 7).

1.5 Matters outside this determination

1.5.1 The completed building was constructed under two building consents as illustrated in Figure 1. The initial work was carried out under building consent No. BC 031695 ("the first consent"). A second consent (BC 081592) was subsequently issued; a code compliance certificate was issued for this consent on 8 February 2011. The determination is limited to the building work in the first consent.

1.5.2 In its submission for this determination, the authority added its concerns about a change in the positioning of the building to a more elevated location than it apparently had issued the consent for. I note that the building consent drawings do not include a site plan or street address; I also note that the authority visited the site during construction of both consents and no concerns were raised about the siting of the building.

1.5.3 In regard to the authority's concerns regarding implications of the increased altitude on wind and snow loading, I have addressed this as part of Matters 1 and 2. In regard to the resolution and updating of records containing the legal description of the property, I leave such matters to the authority to resolve in due course.

1.6 In making my decision, I have considered the submissions from the parties, the report of the expert commissioned by the Ministry to advise on this dispute ("the expert"), and the other evidence in this matter.

2. The building work

2.1 The completed house is situated on a large steeply sloping rural site in a zone requiring specific design with respect to wind and snow loading. The building platform is to the north of the isolated site, with a long driveway providing access from the road. The house is fairly simple in plan and form, and is assessed as having a low weathertightness risk.

2.2 The completed house is shown in Figure 1 and comprises:

- The first consent (BC 031695), the subject building work, consisting of an L-shaped house section ("the house") connected to a separate garage/storage building ("the garage") via a glazed passage ("the link").
- The second consent (BC 081592), which is a two-storey extension to the south, providing two additional bedrooms and a games room (not considered in this determination).

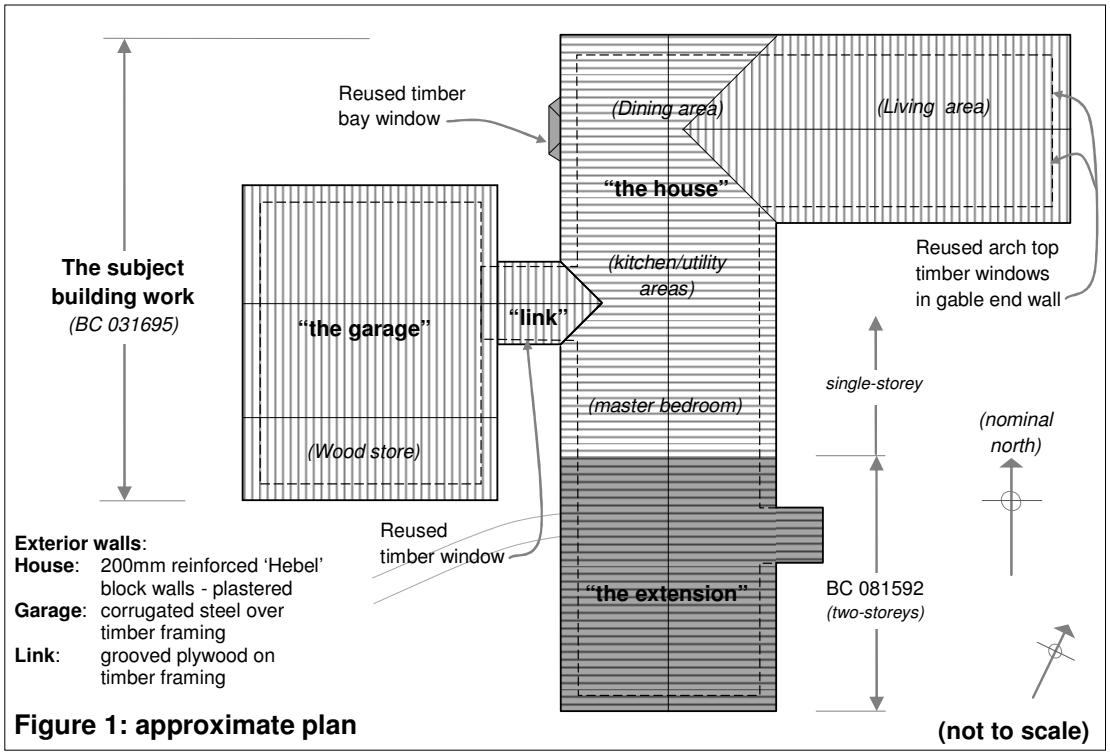

Figure 1: approximate plan

2.3 Construction is a mix of conventional light timber frame and reinforced lightweight masonry, with concrete foundations and floor slabs, plastered masonry and corrugated metal wall claddings, plywood cladding to the link and profiled metal roofing and timber windows. The 30° pitch gable roofs have eaves and verges of more than 600mm overall, with a 15° pitch lean-to roof above the garage wood store.

2.4 The exterior walls

2.4.1 The walls of the house are a proprietary system of reinforced autoclaved aerated concrete blocks ("AAC blocks") and the specification calls for the blockwork to 'fully comply with the requirements laid out in the [proprietor's] blockwork instruction manual'. The exterior walls are plastered with a 16mm thick two-coat mesh-reinforced plaster system.

2.4.2 The timber framed garage is clad in horizontal corrugated steel and the drawings call for 'all exterior claddings' to be 'fixed over ex 50 x 25 H3.1 treated vertical battens' and the building wrap to the framing. The timber framed link is clad in grooved plywood with a rough-sawn finish.

2.4.3 Although I have not seen the relevant sections of the specification, I note the authority required a 'schedule of timbers including treatment levels' (see paragraph 3.2.1) prior to issuing the building consent; I therefore make the assumption that a schedule is likely to have been submitted and approved. Given the date of construction in 2005, I consider that the external wall framing in the link and the garage is likely to be treated.

3. Background

3.1 The first design

3.1.1 The applicant initially applied for building consent on 22 December 2003, based on an original two-storey design (which I have not seen). This was issued with a Project Information Memorandum ("PIM") on 13 February 2004 which specified the site as having an altitude of 480m with a snow load of 1.62kPa and a wind speed requiring specific design.

3.1.2 The PIM also included various standard conditions, including requirements specific to:

- glazing
- thermal insulation
- timber treatment
- onsite sewerage treatment and disposal
- water supply.

3.2 The second design

3.2.1 The proposed design was subsequently reduced in size and the authority received amended plans on 30 July 2004 (which I have not seen) for a one-bedroom house with a basement garage. The authority responded on 2 August 2004 with nine areas where further information was required before consent could be issued. Included in that list was the provision of 'a complete schedule of timbers including treatment levels'.

3.2.2 The authority also required a truss design based on a snow load of 1.62 kPa and wind conditions requiring specific design, with the engineer 'to specify wind speed' and 'written confirmation from the design engineer ("the first engineer") that he will carry out the following inspections and will issue a Producer Statement Construction Review to the [authority] upon completion of the work'. The elements to be covered included the following (excluding those elements superseded by the subsequent amended design):

> Excavation for foundations
>
> Reinforcing steel in foundations before concrete is poured.
>
> DPC/mesh to floor garage slab (concrete floor)...
>
> Reinforcing and grouting of Hebel block work
>
> Structural steelwork, timber beams and bolted timber trusses
>
> Roof bracing.

3.2.3 The authority received a facsimile from the first engineer on 2 November 2004, which provided some additional information and also stated that he would 'undertake the inspections detailed and provide a Producer Statement Construction Review.'

3.2.4 The authority issued the original building consent (No. BC 031695) to the applicant on 8 March 2005 under the Building Act 1991, with the legal description of the site noted as 'Lots 1-2 DP 70746'. The intended use of the building appears to be incorrectly described as:

> 2 Bedroom domestic dwelling with basement studio and garage
> (Basement = 172sqm, First floor = 267sqm.)

It is noted that on 22 December 2004, the authority amended the PIM, and the description of the intended use appears to more correctly describe the building work as:

> 1 Bedroom domestic dwelling with basement garage...
> (Basement = 41sqm, First floor = 198sqm.)

3.3 The third design (as constructed)

3.3.1 Before construction commenced, the proposed building was redesigned, and drawings dated 7 March 2005 were received by the authority on 11 March 2005.

3.3.2 The amended design was for a single-storey one bedroom house with a linked garage building as described in paragraph 2. The first engineer provided an additional producer statement dated 8 March 2005 for 'design of garage and revised siting of building platform in respect of the requirements of B1 and B2'.

3.3.3 At some time during the next few months, the applicant terminated the engagement of the first engineer and engaged another engineer ("the second engineer"). According to the applicant, there were delays and problems in obtaining the first engineer's records, but all required inspections were apparently carried out.

3.3.4 The second engineer submitted a Producer Statement – Design dated 28 June 2005, which was restricted to 'structural engineering design services' in respect of 'roof support beams and connection details'. (I note that a copy of this statement was also provided but dated 9 February 2009.)

3.4 Construction of the building

3.4.1 The authority carried out three inspections during 2005 and 2006 as follows:

- pre-pour plumbing and drainage on 5 May 2005, which noted that the engineer would carry out foundation and floor slab inspections and stated 'will require producer statement from engineer re his inspections' (I have not seen any inspection records from either the first engineer or the second engineer)
- an inspection on 13 October 2005, which referred to the following:
  - all blockwork completed
  - roof cladding 'almost complete'
  - minimum R-values of 2.2 required for ceiling spaces
  - minimum R-values of 2.5 required for skillion roof 'with clear void between top layer of building paper and insulation of 25mm'
  - the link roof changed from flat to pitched
  - the inspection noted 'producer statement coming' but it is not clear what this was for
  - the inspection recorded ' all looking OK' and noted that re-inspection was not required
- sanitary and stormwater drainage on 7 March 2006, with the record noting 'building presently lockup stage'.

3.4.2 The work under the first consent was substantially completed and the house was occupied in early 2006; no final inspection was carried out. In the meantime, the second consent was issued for the two-storey extension, which provided a bedroom on the upper level and a bedroom and games room in the basement level.

3.5 The final inspections

3.5.1 The authority did not carry out a final inspection until 27 April 2009, and the inspection record notes that the second consent was underway. The authority listed 7 items requiring attention as follows:

1. Paint seal all raking gable soffits
2. Exterior timber window joinery to complete seal
3. Plastering [proprietary] panels: gaps – blocks to close voids
4. Seal coat shadow [plywood] cladding
5. Gas certificate re installation gas stove
6. Complete seal bathroom ceiling. All other work to date in ceiling space OK.
7. Plumbing solar heating P/S [producer statement].

3.5.2 No further inspection was carried out until two years later, when the authority re-inspected the work completed under the first consent on 17 June 2011. The notes in the inspection record are unclear, but they appear to indicate that the outstanding items from the final inspection are complete and states 'owner to complete CCC application and post to [the authority]'.

3.6 The refusal to issue a code compliance certificate

3.6.1 In a letter to the applicant dated 6 January 2012, the authority noted the age of the building work and explained the durability requirements of the Building Code. The authority noted that more than seven years had passed since the building consent had been issued and, due to the time elapsed since then, it

> ...cannot now be satisfied on reasonable grounds that the building work and elements will continue to satisfy the durability provisions of the Building Code for the prescribed period after the Code Compliance Certificate has been issued.

3.6.2 The authority also gave the following additional reasons for its refusal to issue a code compliance certificate:

1. The following required inspections were not carried out:

- C7: closing in of any plumbing
- C64: inspection of wet area/shower ceiling/tanking walls and floor substrate prior tiling.
- Cladding (a): Midway through panel installation to check fixings jointing and window flashings prior to cavity system.

2. The specifications and drawings for windows states aluminium double glaze window and second hand timber were installed as noted by our inspector.
3. The [authority] did not receive the Producer Statement Construction Review from the engineer for the inspections specified on the building consent.
4. Also on the PIM was requested: Cladding Producer statement and confirmation that your water supply is of a satisfactory standard which were not received.

3.6.3 The authority concluded that it could not be satisfied that the house complied with Building Code Clauses 'B1, B2, and E2, E3 and could be F2 & H1', noting that a determination could be sought on its decision.

3.7 The applicant apparently tried to clarify and resolve the items identified by the authority without success and the Ministry received an application for a determination from the applicant on 13 March 2013.

4. The submissions

4.1 The applicant's submission

4.1.1 In a detailed submission the applicant noted that when the second consent had been issued it was assumed that a code compliance certificate must have already been issued for the first consent. The applicant explained that the design was changed to a single level house shortly after the building consent was issued and the authority was 'rather confused about the changes and has invented others'. The applicant considered that communication with the authority had been very difficult, with:

- references to irrelevant items (such as Unispan and AAC panels)
- misaddressed letters
- confusion as to inspection requests, 'barely legible' inspection notices and changing lists of requirements
- producer statements forwarded to the authority and mislaid
- authority staff not understanding areas such as UV water treatment
- lack of answers to queries, and inability to discuss outstanding issues.

4.1.2 The applicant also responded in detail to issues raised by the authority and included the following points (in summary, using the authority's numbering as noted in paragraph 3.6.2):

- In regard to missing inspections (item 1):
  - the inspector stated that pre-line plumbing inspection requirements should be covered by a producer statement, which was provided
  - no mention was ever made during inspections about bathroom tanking, with walls finished with waterproof paint and the concrete floor 'sealed'
  - the cladding inspection description does not apply as construction is AAC blockwork not panels, so there is no 'cavity system'.
- In regard to the re-used timber windows (item 2):
  - only three windows are timber, with the remaining aluminium
  - although the drawing note is confusing, it refers to a 'main timber bay window', with the specification noting that some windows are to be 'supplied by owners'
  - two timber windows are sheltered from prevailing winds and the third has been strengthened with toughened glass panes
  - no problems were raised about their use during inspections.
- In regard to the engineers' construction review (item 3):
  - as far as the applicant is aware all inspections were carried out
  - there were two structural engineers and all paperwork received was forwarded to the authority
  - the first engineer's paperwork was difficult to obtain and the second engineer's records are 'currently in storage'

- construction photos show the work was 'properly completed'
- the lack of earthquake damage is 'a strong indicator that its structural integrity is highly sound'
- the second engineer redesigned the roof structure to improve its strength even though the original design had been approved.

- In regard to the PIM requirements (item 4):
  - a cladding producer statement has been sent to the authority on 'numerous occasions'
  - a UV water steriliser unit was purchased in September 2005 for the building and was shown to the inspector and described in writing to the authority.

4.1.3 The applicant provided copies of:

- the consent drawings
- the letter from the authority dated 6 January 2012
- the first engineer's Producer Statement – PS1 – Design dated 8 March 2005
- the second engineer's Producer Statement – Design dated 28 June 2005
- the producer statement for plaster cladding dated 7 June 2006
- summary of earthquake inspection dated 10 May 2011, showing no damage
- the invoice for the UV water steriliser unit plus 1 micron filter dated 7 September 2005
- various other photographs, statements, invoices and information.

4.2 The authority's submission

4.2.1 The authority made a submission dated 28 March 2013; which outlined the background of the building, expanded on some of the points made in its refusal to issue a code compliance certificate and stated that its opinion remained as expressed in its letter of 6 January 2012.

4.2.2 The authority also noted that it had discovered that the PIM and building consent were 'issued in error' for the incorrect property; and the completed building is sited 40m higher than stated in the PIM. This has the effect of increasing the snow loading and wind design loads for the building.

4.2.3 In responding to some of the applicant's submissions on points made in its refusal to issue a code compliance certificate, the authority noted:

- Irrespective of words used, the 'exterior cladding/block work' required an inspection 'midway through to check the fixing, joining and window flashings' and this was not carried out (item 1).
- In regard to the re-used timber windows (item 2):
  - the specification cannot be read as indicating timber windows
  - drawings do not detail any owner-supplied joinery
  - no heat loss calculations have been done to demonstrate that the change does not adversely affect compliance with Clause H1.

- In regard to the engineers' construction review (item 3):
  - consent records confirm the requirement for the engineer to carry out inspections and issue a producer statement for construction review
  - the producer statements provided are all for design not construction
  - the lack of earthquake damage to the building is 'not a strong indicator of its strength given its distance from the epicentre'.
- Although a UV water steriliser unit has been installed, 'this does not demonstrate that the unit is providing potable water, nor will it provide potable water when the water is turbid' (item 4).

4.3 A draft determination was issued to the parties for comment on 17 July 2013. The owner accepted the draft without comment.

4.4 The authority did not accept the draft in a submission dated 31 July7 2013. The authority submitted that (in summary):

- The consent was not granted but issued on 8 March 2005 (I note the authority's' letter dated 28 March 2013 says the consent was 'granted' on this date)
- The authority considers the consent was 'granted and issued under the Building Act 1991' and not the Building Act 2004 because the transition provisions under section 433 came into effect on 31 March 2005
- The inspection carried out on 13 October 2005 'requested a producer statement design, details on the purlin rafter fixings and how H1 would be achieved in the skillion ceiling …'
- The authority 'would not be able to agree a date [when the building complied with Clause B2] as certain elements … have never complied'
- No consent amendment has been sought for the change to the roof linking the garage and the house.
- 'The plans are clear' in that they showed high strength reinforcing steel to the cable-end bond beam.
- The actual wind speed is likely to be higher than 62m/s (refer paragraph 6.2.1) given that the deck elevation has been measured at 530m.

The authority also noted typographical errors and similar that I have subsequently amended.

4.5 In response to the authority's submission I note that having seen the inspection record dated 13 October 2005 I do not believe it is now possible to take the authority's meaning from that inspection in terms of a requested producer statement.

5. Expert's report

5.1 General

5.1.1 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 Building Surveyors and inspected the house on 23 April 2013, providing a report completed on 20 May 2013. The parties were provided with a copy of the report on 17 June 2013.

5.1.2 The expert described the construction quality as including some 'areas of poor workmanship' and some maintenance required. The AAC block walls to the house appeared to be 'well aligned and straight', with no evidence of cracking to the 16mm thick plaster. Floor slab clearances to ground levels and cladding overlaps generally complied with manufacturers' recommendations and appeared satisfactory.

5.1.3 The expert noted the following variations from the consent drawings:

- Recycled timber windows used in gable end, bay window and south link wall.
- The door to the south wall of the link has not been installed.

5.1.4 The expert observed that the rough sawn plywood to the link was unsealed and beginning to deteriorate, while the garage corrugated steel cladding was missing some fixings.

5.2 The windows

5.2.1 The expert noted that aluminium window installation appeared to accord with the drawings, which do not show drip edges to head reveals or air seals between timber and block reveals. Windows are recessed within the AAC block walls, with plastered sloping sill blocks, metal flashings to heads, jambs and sills and interior timber reveals and trim. The lack of air seals risks windblown water penetration around windows, which can lead to dampness within the walls although damage is likely to be limited to timber reveals and packers.

5.2.2 The re-used timber windows have timber jamb facings and solid timber sills, with metal flashings visible beneath sills. The expert noted that the windows appeared to be heart rimu, with no visual evidence of decay. The arch-top windows and the bay window are pre-1930 with wide facings, while the link window has narrow facings and appears to date from the 1950's. The expert noted that the re-used timber windows fail to meet any recognised wind pressure standards.

5.2.3 The window heads to the bay window and the link window are sheltered beneath soffits. However, the arch-top windows to the east gable end wall are more exposed to rain, with the timber jamb facings extended to follow the arched tops and no visible flashings.

5.3 Compliance of the building work

5.3.1 The expert visually assessed the building work, noting:

- Clause B1 Structure
  - there is no evidence of any significant settlement or cracking
  - cracking to the exposed concrete floor slab is cosmetic, with repairs carried out using what appears to be an epoxy resin
  - there is no evidence of earthquake damage
  - specialist assessment of the aluminium windows is needed, as these are manufactured for wind speeds up to 50m/s, which is below the 62m/s specified in the consent documents
- Clause B2 Durability
  - identified defects affecting durability are outlined in paragraph 5.3.2

- Clause E1 Surface Water
    - the site and features provide sufficient provision to manage surface water drainage
- Clause E2 Weathertightness
    - the construction was not suitable for invasive testing but there were no visible signs of current moisture penetration
    - floor slab clearances to ground levels and cladding overlaps generally comply with manufacturers' recommendations
    - there is no visible cracking to the plastered AAC walls, despite the lack of visible control joints
- Clause E3 Internal Moisture
    - the existence of an underlying membrane to walls and floors could not be confirmed, but
        - the painted plaster to walls is in good condition and mosaic tiles to the bathroom walk-in shower have satisfactory falls to outlets (although grouting is deteriorating)
        - although the finish to window timber reveal is deteriorating from shower splash and requires protection to ensure durability, the timber currently appears sound with no elevated moisture levels
- Clause F4 Safety from falling
    - there were no areas of concern identified for the subject building work
- Clause F2 Hazardous Building Materials
    - there are no areas of concern, with safety glass installed where required
- Clauses G1 to G4, G7 and G8
    - facilities, ventilation, lighting and electricity all appear satisfactory and compliant
- Clauses G12 and G13 – Water supplies and Foul Water
    - services appear operational and effective
    - the UV treatment system was sighted.

5.3.2 In regards to Clause B2 Durability (insofar as it applies to Clauses E2) the expert noted:

- the plywood cladding and the soffit lining lack protective finishes
- some fixings are missing from the corrugated garage wall cladding
- plaster is incomplete above the bay window
- the plywood cladding and soffit linings are unpainted
- the exposed timber bay window is unlikely to withstand high wind pressures
- all windows lack air seals and have poorly applied sealants
- the tops to the re-used arch windows have curved timber facings to the tops, with no head flashings or seals to prevent water penetration.

5.3.3 The expert made the following additional comments:

- Although there are no visible control joints in the AAC block walls, there is no evidence of cracking in the plaster coating after about seven years.
- There is a lack of drip edges or grooves at head reveals to prevent water tracking across the surface. (I note that the rough plaster finish will limit water likely to reach window heads.)
- There is an area at the southwest corner excavated by more than a metre for the basement to the extension. (I note that this work is part of the second consent and is not covered by this determination.)

Matter 1: The external envelope

6. Weathertightness

6.1 The use of the timber windows

6.1.1 The authority maintains that consent documents clearly indicate that windows will be aluminium despite some confusing notes on drawings. I concur with that view, but I also note the authority's tacit acceptance implied by inspection notes restricted to weathertightness concerns about the re-used timber windows.

6.1.2 I therefore consider that the code compliance of the timber windows as installed must be addressed. Due to their varying locations and characteristics, each window needs to be assessed separately and I note the following relevant features:

Subject	Comment
The re-used windows have no performance information for their ability to withstand maximum wind speeds for the building site.	The arched windows and the link window are not on walls exposed to the strongest prevailing winds. However, the bay window is exposed to prevailing winds.
The link window	This window is well sheltered on three sides by other parts of the building, with a limited exposure to the south.
The arched windows	On gable end exposed to south-east. Narrow windows supported by heavy timber mouldings and made up of small panes of glass – improving ability to withstand wind pressures without damage. Similar windows in old churches have a history of use in many exposed areas in rural New Zealand.
The bay window	Exposed to prevailing winds, with panes apparently replaced with 'toughened glass'. However, panes held in place with putty with limited strength to withstand high winds. The expert noted evidence of water staining and replacement of a mullion.

6.1.3 Due to the more sheltered locations and/or characteristics, I have reasonable grounds to be satisfied that the arched windows and the link window are capable of

withstanding the maximum wind pressures likely to be experienced. However those windows must also meet other requirements of the Building Code, and this is addressed below.

6.2 Weathertightness performance

6.2.1 Generally the claddings and walls appear to have been installed in accordance with reasonable trade practice and the manufacturer's instructions at the time. I have considered the areas outlined in paragraph 5.3.3 and I am of the view that these are acceptable in the particular circumstances. However, taking account of the expert's report and the other evidence, I conclude that the following areas further investigation and remedial work:

Windows

- the inability of the timber bay window to withstand high wind pressures
- specialist assessment of the aluminium windows is needed, as these are manufactured for wind speeds up to 50m/s, which is below the 62m/s specified in the consent documents
- the lack of air seals and inadequate sealants to all windows
- the lack of head flashings or seals to the tops of the re-used arch windows

Painting and maintenance

- missing fixings to corrugated garage wall cladding
- incomplete plaster above the bay window
- unsealed plywood cladding and soffit linings.

6.3 Weathertightness conclusion

6.3.1 I consider the expert's report establishes that the current performance of the building envelope is adequate because there is no evidence of moisture penetration through the claddings at present. Consequently, I am satisfied that the building work complies with Clause E2 of the Building Code.

6.3.2 However, the building work is also required to comply with the durability requirements of Clause B2. Clause B2 requires that a building continue to satisfy all the objectives of the Building Code throughout its effective life, and that includes the requirement to comply with Clause E2 for certain minimum periods. In the case of the exterior walls to this building, weathertightness must take into account the following durability requirements of Clause B2:

- 15 years for wall claddings to the timber-framed link and garage, as these are easily inspected and moderately difficult to replace
- 50 years for the structural AAC block walls, as these provide structural stability to the building and undetected moisture penetration into the walls may lead to damage to the underlying reinforcing.

6.3.3 Because the identified cladding faults occur in discrete areas, I am able to conclude that satisfactory investigation and rectification of the areas outlined in paragraph 6.2.1 will result in the building continuing to comply with Clause E2 for the required durability periods set out in Clause B2 of the Building Code.

6.3.4 It is emphasised that each determination is conducted on a case-by-case basis. Accordingly, the fact that a particular cladding system has been established as being code-compliant in relation to a particular building does not necessarily mean that the same cladding system will be compliant in another situation.

6.3.5 The expert has noted areas requiring maintenance, which is 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 (for example, Determination 2007/60).

7. Matter 2: Other Building Code clauses

7.1 The following takes into account the expert's comments and other evidence; and concludes on the compliance of the building work with the remaining clauses of the Building Code.

7.2 Clause B1 Structure

7.2.1 Taking account of the expert's report, there is no evidence that an engineer carried out the required inspections during construction; the producer statements are limited to the structural design of various elements in the building. Notwithstanding that, there is no evidence of significant structural problems after seven years, including a period of significant earthquake activity.

7.2.2 Although I take the view that the building work as constructed is likely to comply with Clause B1, there are also some concerns about the AAC block wall reinforcing and also the implications, if any, of snow loading on the roof given the actual altitude of the building site. I therefore consider that an engineer's report on these matters is required to provide assurance that the structure is likely to comply with Clauses B1 and B2.

7.2.3 In addition, taking account of its characteristics and location, I am not satisfied that the exposed bay window is capable of resisting the maximum wind pressures likely to be experienced on this site.

7.3 Clause E3 Internal Moisture

7.3.1 The expert's report indicates that bathroom finishes have protected against moisture penetration into the walls to date and I am therefore satisfied that the building work currently complies with Clause E3.

7.3.2 However the deterioration of the shower mortar and the timber reveal to the full height window in the bathroom indicates that the building work is unlikely to remain resistant to internal moisture. I therefore conclude that the building work does not comply with Clause B2 insofar as it applies to E3.

7.4 Clause F2 Hazardous building materials

7.4.1 Although not raised by the expert, glazing to the recycled timber bay window may not meet the requirements of NZS[4]4223.3 (in respect of fixed panes less that 500mm

[4] NZS 4223:Part 3:1999 Glazing in Buildings Part 3 – Human Impact Safety Requirements

from the floor and greater than 500mm in width). The dimensions of the window and the glass used should be verified against the requirements of the standard.

7.5 Clause G12 Water supplies

7.5.1 The authority accepts that a UV steriliser unit has been installed, and it is correct to observe that that the effectiveness of the UV treatment will be determined by the water's turbidity. However, the photos supplied by the applicant (and supported by the invoice) show that the water entering the treatment unit is filtered through a 1 micron filter.

7.5.2 A 1 micron filter will ensure water entering the UV steriliser unit is not turbid. The presence of the filter in conjunction with the UV steriliser provides clear grounds on which to be satisfied that the water is potable; any additional testing of the water is considered unnecessary.

7.6 Clause H1: Energy efficiency

7.6.1 The authority maintains that installation of re-used timber windows in lieu of the specified double-glazed aluminium windows raises concerns about the reduced thermal performance of the building envelope.

7.6.2 I note that the building consent was issued in December 2004, based on the acceptable solution for Clause H1 (H1/AS1) at that time, which referenced NZS 4218:1996[5] as a means of compliance. That standard accepted single glazing providing it was within 30% of the total wall area.

7.6.3 I have therefore considered the R-values for the walls of this building; and compared these with the minimum R-values required for solid construction in Climate Zone 3, in NZS 4218:1996 Table 2. I note the following (the relevant R-values in the standard are shown in brackets):

- The garage and link are non-inhabitable spaces separate from the house section, and the re-used timber window in the link is therefore not part of the thermal envelope of the house.
- The walls are 200mm thick plastered AAC block work, which the manufacturer states will have an R-value of about 1.72 (compared to 1.0).
- Although there are two re-used timber windows within the thermal envelope, the remaining 14 windows are double-glazed with a value likely to be about 0.33 (compared to 0.18 for single glazing).

7.6.4 Although the inspection records indicate that ceiling and roof insulation was installed, I cannot confirm the R-value of that insulation. However taking into account the increased insulation values of the walls and the installation of double glazing to the majority of the windows, I consider it likely that insulation meeting the minimum R-value specified in Table 2 was installed.

7.6.5 I therefore consider that the thermal envelope as constructed would have exceeded the minimum R-values required at the time of construction, as set out in NZS 4218:1996 Table 2 for Climate Zone 3. I am therefore satisfied that the building work complies with Clause H1.

[5] New Zealand Standard NZS 4218:1996 Energy Efficiency – Housing and Small Building Envelope

7.7 Other clauses – conclusion

7.7.1 Taking account of the expert's report and the other evidence I am satisfied that, apart from areas outlined below, the building work complies with the other remaining clauses of the Building Code. However, I consider that the following areas require attention:

- In regard to Clauses B1 and B2, a structural engineer's investigation and report on the adequacy of:
  - the AAC block walls, taking into account the lack of engineer's inspections and the possibility of standard reinforcing used in lieu of high grade as specified
  - the roof structure, taking into account the increased snow loading resulting from the actual altitude of the building site being higher than that used for the structural design.
- In regard to Clause B2 insofar as it applies to Clause E3:
  - protection from shower splash for the timber reveal to the shower
  - deteriorating mortar to mosaic tiles in the bathroom.
- In regard to Clauses F2 and B1, sufficient evidence is required to establish that
  - the glazing to the bay window complies with Clause F2
  - all the windows comply with Clause B1 in terms of the wind speed for which they have been designed and for which they experience

8. Modification of the durability periods in Clause B2.3.1

8.1 I note that the age of the building work will also raise concerns regarding compliance with Clause B2.3.1, taking into consideration the age of the building work and the alleged delay in seeking a code compliance certificate.

8.2 The relevant provision of Clause B2 of the Building Code requires that building elements must, with only normal maintenance, continue to satisfy the performance requirements of the Building Code for certain periods ("durability periods") "from the time of issue of the applicable code compliance certificate" (Clause B2.3.1).

8.3 I continue to hold the views expressed in previous relevant determinations; that an authority, following the appropriate application from the owner, has the power to grant a modification to the Building Code requirements of an existing building consent without a determination (refer also to the article titled 'Modification of durability periods' in Codewords Issue 39, August 2009[6]). I am of the view that a modification of this requirement can be granted if the authority 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.

8.4 The authority has stated it would not be able to agree on a date as to when the building work complied, as certain elements such as the unpainted plywood and

[6] Codewords articles are published by the Ministry and are available on the Ministry's website at www.dbh.govt.nz/codewords-index

soffit never have complied. In response I note that the Building Code is performance-based; the building has been in use for seven years and has suffered no apparent ill-effects from the recent Canterbury earthquakes, exposure to the elements over that period, and the like. In my view any outstanding matters of compliance can be verified and/or remedied. I also note that the building has a low weathertightness risk.

8.5 I leave the date for a modification of Clause B2.3.1 to the parties to resolve in due course. I strongly suggest that the authority record this determination and any modifications resulting from it, on the property file and also on any LIM issued concerning this property.

9. Conclusion

9.1 Taking into account the expert's report and the other evidence, I am satisfied that whilst the building work is compliant in some respects, there are aspects of it that do not comply with the Building Code and others where further information is required to establish compliance (refer paragraphs 6.2.1, 7.4.1 and 7.7.1). Therefore I consider the authority was correct to refuse to issue the code compliance certificate.

9.2 I note also that the building consent requires amendment to reflect the building work as constructed (refer paragraph 3.4.1 and 5.1.3). I leave this to the parties to resolve in due course.

10. The decision

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

- the building work does not comply with Clause B2 of the Building Code insofar as it applies to Clauses E2 and Clause E3
- there is insufficient information to establish on reasonable grounds that the AAC block walls and the roof structure comply with Clauses B1 and B2 of the Building Code

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

10.2 I have insufficient evidence to be satisfied that the glazing to the bay window complies with Clause F2 of the Building Code, and that all the windows comply with Clause B1 in terms of the wind speed for which they have been designed and which they experience.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 2 September 2013.

John Gardiner
Manager Determinations and Assurance