

## Determination 2009/103

### The compliance of a roof to part of a new house at 28D Rata Street, Oxford, Waimakariri



#### 1. The matters to be determined

1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004<sup>1</sup> (“the Act”) made under due authorisation by me, John Gardiner, Manager Determinations, Department of Building and Housing (“the Department”), for and on behalf of the Chief Executive of that Department.

#### 1.2 The parties

1.2.1 The parties to the determination are:

- the owners, Mr and Mrs Eldershaw (“the applicants”), acting through an agent
- the Waimakariri District Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.

1.2.2 I note that the agent for the applicants is a building inspection company which undertakes some building control functions on behalf of the authority (“the authority’s contractor”).

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<sup>1</sup> The Building Act, Building Code, Compliance documents, past determinations and guidance documents issued by the Department are all available at [www.dbh.govt.nz](http://www.dbh.govt.nz) or by contacting the Department on 0800 242 243

- 1.2.3 The conservatory design and building company, Ultimate Design & Renovation (“the conservatory company”) has been included as a person with an interest in the determination
- 1.3 The matter for determination, in terms of section 177(a) of the Act<sup>2</sup>, is whether the roof to the conservatory of the new house (“the conservatory”) has been built in accordance with the building consent, and complies with Clauses B2 Durability and E2 External Moisture of the Building Code.
- 1.4 This dispute arises because the authority’s contractor is not satisfied that the fall of the roof complied with the building consent drawings or with certain clauses of the Building Code (First Schedule, Building Regulations 1992).
- 1.5 I note that the authority’s contractor has restricted the matter to be determined to the roof of the conservatory and this determination is therefore restricted to the roof to the conservatory.
- 1.6 In making my decision, I have considered the submissions of the parties, the report of the expert commissioned by the Department to advise on this dispute (“the expert”), and the other evidence in this matter.

## **2. The building work**

- 2.1 The building work covered by the original building consent consists of a single-storey house on a flat site, which is in a low wind zone for the purposes of NZS 3604<sup>3</sup>. The house is assessed as having a low weathertightness risk.
- 2.2 Construction of the house is conventional light timber frame, with a concrete slab and foundations, aluminium windows and brick veneer wall cladding. The house is simple in plan and form, with a 25° pitch profiled metal hipped roof and eaves projections of about 500mm.

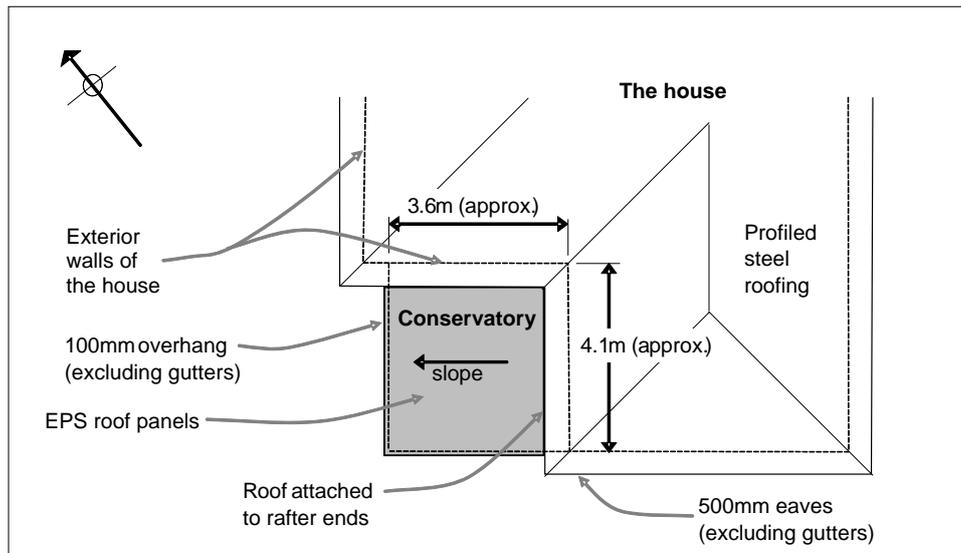
### **2.3 The conservatory**

- 2.3.1 The conservatory was added under an amendment to the original building consent following the completion of the exterior of the house. The conservatory has conventional aluminium windows, with brick veneer and timber framing up to sill height, apart from ranchsliders to the northwest wall. The exterior brick walls to the main house are retained, along with ranchsliders from the living room.
- 2.3.2 The conservatory occupies the internal corner to the west of the house as shown below:

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<sup>2</sup> In this determination, unless otherwise stated, references to sections are to sections of the Act and references to clauses are to clauses of the Building Code.

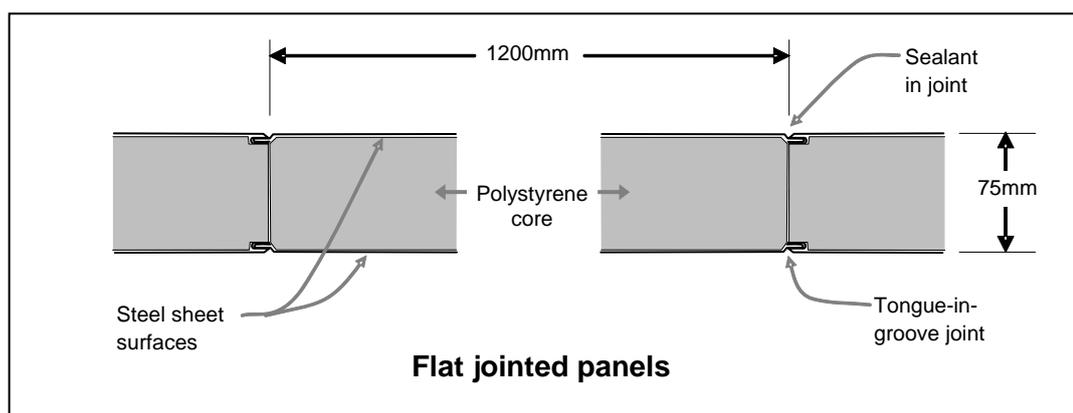
<sup>3</sup> New Zealand Standard NZS 3604:1999 Timber Framed Buildings



- 2.3.3 The conservatory roof that is the subject of this determination is a polystyrene sandwich panel system attached to the eaves of the main house, with the roof falling to the northwest. At the upper end, the roof is attached to a timber plate fixed to the ends of the house rafters while the side of the roof butts against the house eaves, with apron flashings at the junctions.

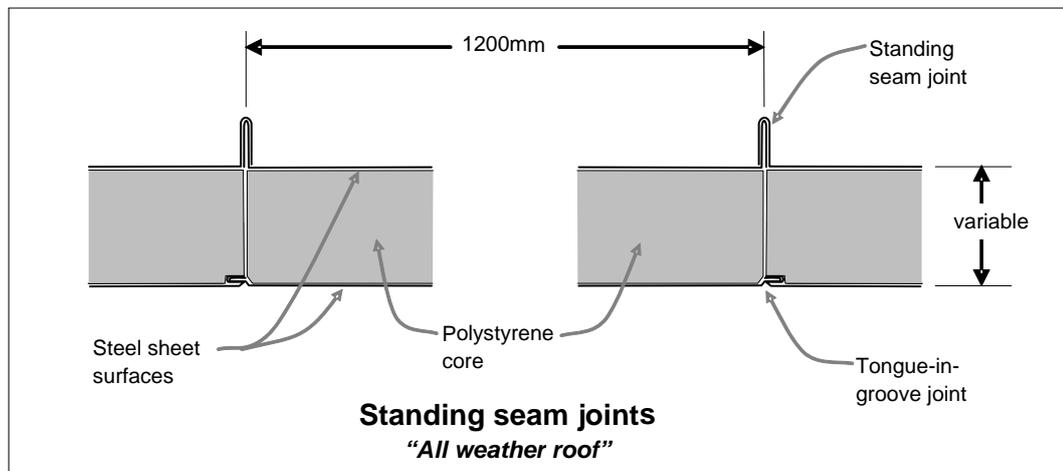
## 2.4 The roof panel system

- 2.4.1 The roof is constructed using prefabricated panels, with the panel joints parallel to the fall of the roof. The consent drawings show the roof at a minimum pitch of  $1.5^\circ$ , with a gutter at the northwest end and the junction between the end of the roof and the gutter covered by a metal “Z” flashing.
- 2.4.2 The roof panels are 1200mm wide and 75mm thick; and incorporate a polystyrene core sandwiched between pre-finished flat steel sheets as shown below:



- 2.4.3 The edges of the steel outer faces are folded to incorporate a tongue-in-groove joint system. Sealant used on the exterior results in the joints sitting slightly proud of the roof surface.
- 2.4.4 I note that the consent drawings do not specify the particular roof panel system used; and from the manufacturer’s descriptions of its products it appears that the flat-jointed system is intended for use as wall cladding. The systems described by the

manufacturer as ‘roofing’ include the product described as an ‘all weather roof’ (shown below). The all weather roofing panel incorporates a vertical mechanical seal and the manufacturer recommends a minimum roof pitch of 4°.



### 3. Background

- 3.1 The authority issued a building consent for the dwelling (No. 08/0521) in 2008, under the Building Act 2004. I have not seen a copy of the consent. It appears that construction was completed during 2008. The applicants subsequently engaged the conservatory company to prepare drawings for the conservatory addition.
- 3.2 According to the stamp on the drawings, the amendment to the building consent was approved on 13 November 2008. The authority’s contractor carried out inspections of the conservatory during construction, with the slab and foundations passed on 21 November 2008.
- 3.3 On 1 March 2009, the authority’s contractor inspected the conservatory roof to assess the ‘roof pitch and connections’. The inspection record notes that the work did not comply with the consent drawings and amendments were required, stating:
- Site instruction  
roof pitch not 1.5° as specified on plans (only 1.0°). Producer statement reqd from [the manufacturer] confirming the roofing product can be installed to the lower pitch.
- 3.4 The conservatory company subsequently arranged for a design and drafting company to ‘independently ascertain the correct pitch of the roof’. A quantity surveyor for the design and drafting company visited the site, measured the conservatory heights and calculated the resulting roof pitch as 1.48°.
- 3.5 The authority’s contractor re-inspected the conservatory roof on 21 March 2009, and wrote to the applicants on 22 May 2009, attaching photographs of the roof. The authority’s contractor stated that work to the roof was needed ‘before consideration will be given to issuing the Code Compliance Certificate’, noting that a notice to fix would be issued if the following was not resolved:

**Non-complying Items:**

1. The conservatory roof pitch differs from what has been consented... Please note that the correct pitch has been achieved where the conservatory roof meets the dwelling fascia area...
2. There is noticeable sag to the roof surface, which is difficult to show in photos.
3. Water is ponding on the roof surface... ...dripping from the flashings... ...and the rivet...

3.6 In a response to a request by the conservatory company for 'formal verification', the design and drafting company wrote to the conservatory company on 27 May 2009 confirming the results of its site visit (refer paragraph 3.4). As the base dimensions measured on site were within an accuracy of +/-10mm, the company considered that the calculated roof pitch is close enough to be 'deemed compliant with the approved consent documentation'.

3.7 In a letter dated 8 June 2009, the conservatory company attached the above letter and asked the Department for 'a determination to resolve the situation on the roof pitch'.

3.8 The Department sought further information, and on 27 July 2009 received an application for a determination from the authority's contractor on behalf of the applicants.

## **4. The submissions**

4.1 The authority's contractor forwarded copies of:

- the conservatory drawings and specification
- the inspection records pertaining to the conservatory roof
- the letter to the applicants dated 22 May 2009, with the attached photos.

4.2 The conservatory company forwarded copies of:

- the conservatory drawings
- the letter dated 27 May 2009 from the design and drafting company.

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

5.1 As mentioned in paragraph 1.6, I engaged an independent expert to provide an assessment of the conservatory roof. The expert is a member of the New Zealand Institute of Building Surveyors. The expert inspected the roof on 21 August 2009 and provided a report on 25 August 2009.

5.2 The expert inspected the interior of the conservatory, taking non-invasive moisture readings internally, and no evidence of moisture was noted.

5.3 The expert noted that the conservatory generally appeared to be constructed to a 'standard expected by a qualified builder or tradesman', although the roof panel joints appeared to rely on sealant for weathertightness.

## 5.4 The conservatory roof slope

- 5.4.1 Using a digital level, the expert first measured average slopes for each roof panel, recording falls of 1.5° and 1.6° at the mid-span of the roof. Using the same technique, a fall of 1.5° was also recorded at the sloping junction of the main roof with the conservatory roof. (I note that these results accord with the average fall calculated by the design and drafting company.)
- 5.4.2 The expert then used a 1.8m long conventional level along the edge of the roof, with the lower end packed up to the horizontal. The resulting fall was measured at 30mm over the 1.8m length, which equated to a roof slope of less than 1°. The expert also observed areas where water has ponded on the roof surface.
- 5.5 Commenting specifically on the conservatory roof, the expert noted that:
- the conservatory roof pitch varies from about 1° to 1.6°
  - the panel joints rely on sealants for weathertightness
  - the edges of the apron flashings rely on sealant for weatherproofing
  - the flashing at the gutter acts as a ‘dam’ that impedes drainage from the roof, and water is ponding over a panel joint.
- 5.6 A copy of the expert’s report was provided to the parties, and the conservatory company, on 31 August 2009.
- 5.7 A draft determination was issued to the parties and the conservatory company for comment on 18 September 2009. Both parties accepted the draft without comment.

## 6. The legislation

- 6.1 The relevant sections of the Act are:
- 49 Grant of building consent**
- (1) A building consent authority must grant a building consent if it is satisfied on reasonable grounds that the provisions of the building code would be met if the building work were properly completed in accordance with the plans and specifications that accompanied the application.
- 94 Matters for consideration by building consent authority in deciding issue of code compliance certificate**
- (1) A building consent authority must issue a code compliance certificate if it is satisfied, on reasonable grounds,—
- (a) that the building work complies with the building consent...
- 6.2 The relevant provisions of the Clause E2 of the Building Code are:
- E2 External moisture**
- Performance**
- E2.3.1** Roofs must shed precipitated moisture...
- E2.3.2** Roofs and exterior walls shall prevent the penetration of moisture...
- E2.3.7** Building elements must be constructed in a way that makes due allowance for the following:
- (a) the consequences of failure...

## **7. Discussion**

### **7.1 The consented work**

- 7.1.1 The conservatory company maintains that the pitch of the conservatory roof is 1.5o, which accords with the consent drawings and the authority should therefore approve the conservatory roof as constructed. The authority's contractor maintains that the pitch of the conservatory roof, as constructed, is only 1o; and therefore does not accord with the consent drawings.
- 7.1.2 I note that the drawings call for the work to meet the minimum requirements of the Building Code. The roof pitch was noted as 1.5o minimum, although the particular roof panel system is not clearly specified and the manufacturer specifies 4o for roofing panels.
- 7.1.3 Metal flashings are clearly detailed and the flashings are installed in accordance with the consented drawings. However, as the pitch of the constructed roof varies from 1o to 1.6o the roof pitch does not accord with the consent drawings
- 7.1.4 The consented slope of 1.5o was such that it would be difficult in practical terms to achieve a roof that would completely shed water. The departure from the manufacturers' specified slope has resulted in a non-compliant roof.
- 7.1.5 I therefore am of the view that the amendment to the building consent was incorrectly granted, as the details shown in consented plans were such that there was a high risk that compliance with the Building Code would not be achieved in regard to this particular roof panel system.

### **7.2 Evaluation of compliance with Clauses E2 and B2**

- 7.2.1 The authority's contractor has submitted photographic evidence of ponding and water penetration through the conservatory soffit. I am of the opinion that the water penetration was onto surfaces that would not have lead to water staining, or similar, that would have been observed by the expert (refer paragraph 5.2).
- 7.2.2 The manufacturer of the roof panels recommends a minimum pitch of 4o minimum for the all weather roof standing seam panels, and it is not clear whether the manufacturer recommends the flat-jointed roof panel system for particular situations such as this conservatory roof
- 7.2.3 The expert's report, the manufacturer's information and the other evidence has satisfied me that:
- the roof pitch varies from about 1<sup>o</sup> to 1.6<sup>o</sup>, and allows water to pond in some localised areas
  - the panel junctions rely on a flat tongue-in-groove joint system for weathertightness, with sealant applied to the outside surface
  - the flashing at the gutter acts as a 'dam' that impedes the shedding of water from the roof, and the joint system is allowing water ponding in that area to penetrate through to the underside of the soffit

- the reliance on sealants for weatherproofing at the panel joints and the edges of the apron flashings are likely to result in moisture penetration in the future
- although timber framing is unlikely to be affected by moisture, the area is used as a living space with carpet floor covering.

### **7.3 Conclusion**

7.3.1 I conclude that the conservatory roof has not been built in accordance with the consent drawings, nor does it comply with Clauses E2 and B2 of the Building Code.

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

8.1 I am satisfied that the authority's contractor made an appropriate decision to refuse to approve the conservatory roof. Remediation work is now required to bring the conservatory roof into compliance with the Building Code. I note that the expert suggests two possible ways by which the roof could be made code compliant.

8.2 A notice to fix should now be issued to take account the findings of this determination, identifying the areas listed in paragraph 7.2.3, but not specifying how those defects are to be fixed. That is a matter for the owner to propose, as an amendment to the building consent, and for the authority to accept or reject.

8.3 I suggest the remedial work should be undertaken as a second amendment to the building consent.

## **9. The decision**

9.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the conservatory roof does not comply with Building Consent and Building Code Clauses B2 and E2.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 20 November 2009.

John Gardiner  
**Manager Determinations**