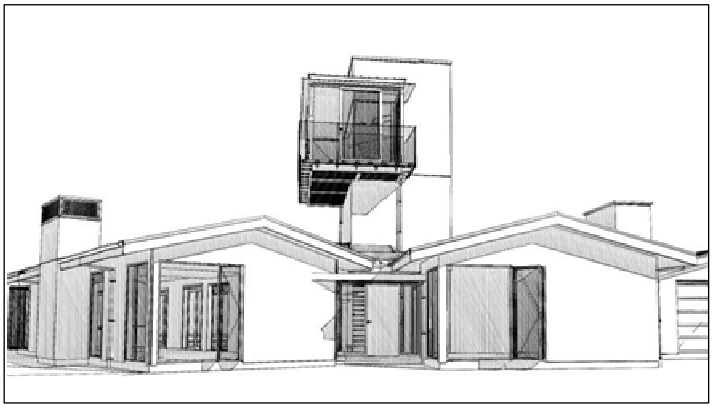
MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HIKINA WHAKATUTUKI

Determination 2013/034

Regarding the refusal to grant building consent for a house constructed with proprietary structural insulated panels faced with magnesium oxide board at 137-139 Dublin Street, Martinborough



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 owners of the proposed house, L and G Roberts ("the applicants"), acting through the supplier of the structural insulated panels ("the supplier")
- South Wairarapa District Council ("the authority"), carrying out its duties as a territorial authority or building consent authority.

1.3 I consider BEAL (the New Zealand company that carried out the appraisal of the structural insulated panels) and the supplier to be persons with an interest in this determination.

1.4 The determination arises from a decision by the authority to refuse to grant building consent for the proposed house because it considered it had received insufficient information to be satisfied that the proposed building would comply with Clauses E2 and B2[2] of the Building Code (Schedule 1, Building Regulations 1992).

[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 and clauses are to sections of the Act and clauses of the Building Code.

1.5 The matter to be determined[3] is therefore whether the authority was correct to refuse to grant the building consent. In deciding this, I must consider the compliance of the proposed building work based on the documentation provided in the building consent application.

1.6 This determination is restricted to the concerns identified by the authority in its letter to the Ministry of 28 March 2013 (refer paragraph 3.14).

1.7 In making my decision I have considered the submissions from the parties and the other evidence in this matter. Details of the documentation provided to the determination are listed in Appendix A.

2. The building work

2.1 The building work consists of a largely single-story building that is complex in plan and form with three connected wings and a central 'tower'. The house is proposed as one of the first to be built with the supplier's SIP system. The SIP system is used for the roof panels, elevated floors, and bracing and internal surface to all external walls. The SIP also provides the internal surface to wet area walls.

2.2 The exterior cladding is a proprietary monolithic cladding system known as EIFS[4] and is described as 12mm thick light weight modified acrylic plaster system on a solid backing. In this instance it consists of 50mm EPS fixed over 20mm EPS battens and building wrap to the SIP panels or steel framing, with a fibreglass mesh reinforced plaster system finished with a 3-coat coating system. The specifications call for the use of proprietary flashings and control joints to the exterior cladding.

2.3 I note a cladding system from the same manufacturer using 40mm or 60mm thick EPS is appraised by BRANZ[5] as an external wall cladding system for buildings within the scope limitations of E2/AS1, for all risk scores excluding those requiring specific engineering design, and for locations in wind zones up to and including 'very high'.

2.4 The roofing is corrugated pre-finished metal roofing over 45mm battens over the SIP panels and generally has eaves and verge projections over the single story wings of up to 800mm; the tower has a monopitch roof of the same cladding type and an internal gutter.

2.5 The structural insulated panels

2.5.1 The SIPs are prefabricated panels formed from a core of expanded polystyrene ("EPS") sandwiched between 12mm thick magnesium oxide board ("the MgO board"), which is adhered to both sides. 141mm thick EPS is used for wall panels and for roof panels. Panels are 1220mm x 2440mm and are fabricated to suit the design, with MgO board adjusted at edges to accommodate required top and bottom plates and specific joints. The technical manual for the SIP system details two alternative methods of jointing the panels, by either a 'box spline' or a timber spline.

[3] Under sections 177(1)(b) and 177(2)(a) of the Act
[4] Exterior Insulation and Finish System
[5] BRANZ appraisal certificate 476 (2006) Amended 31 January 2012

2.5.2 The SIP system has a current appraisal[6], which states that the system will comply with Clauses B1, B2, E2, F2 and H1[7] as an alternative solution, providing the system is 'designed, used, installed and maintained' according to the conditions described in the certificate. The scope of the appraisal includes the following conditions likely to be relevant to the use of panels within the walls of this building:

- Buildings to be within the scope of E2/AS1.
- The panels to be installed by trained personnel licensed by the manufacturer and installed in accordance with instructions.
- Panels not to be left exposed to the weather for more than 6 months.
- Drawings to show pertinent structural, electrical and service pipe information.
- Adequate ventilation and heating for spaces where moisture may be generated.

2.5.3 Subject to the above conditions, the appraisal certificate concludes that the installed SIP system will

- prevent the penetration of moisture that could cause undue dampness or damage to building elements
- have a serviceable life of at least 50 years
- provide a barrier to the passage of water vapour and not increase the risk of moisture damage resulting from condensation
- not present a health hazard to people
- provide a high degree of insulation.

3. The background

3.1 On 15 November 2012 the consent application was submitted to the authority and was assessed by a contractor working on behalf of the authority ("the contractor"). In a 'request for information' dated 11 December 2012 the contractor noted that, in respect to the SIP system, the prime areas of concern were in relation to structure and weathertightness, noting that the technical information needed to be supported with in-service history for comparable buildings in comparable climates. The contractor also noted concerns as to the lack of certified installers for the system, particularly as the building was complex.

3.2 In an email to the authority on 12 December 2012, the contractor noted his concerns regarding structure and weathertightness, and that there were no certified installers for the system, and stated his main concern was 'in relation to installation'.

3.3 A consulting engineer was engaged to undertake a peer review of the structural engineering aspects of the proposed house based on structural drawings, a discussion with the design engineer, and the supplier's structural data. In a letter dated 12 December 2012 the consulting engineer advised that he was 'satisfied on reasonable grounds that these documents will comply with B1 (structure) of the

[6] BEAL Appraisal C 1130 [OCT 2012]
[7] I note that the appraisal does not list E3 in section 2.1 titled 'Building Regulations' but provides comment at 12.1 and 12.2 in reference to water vapour only.

Building Code.' The consulting engineer enclosed a signed PS2 Producer Statement – Design Review, dated 22 December 2012.

3.4 In a letter dated 12 December 2012 a Canadian supplier of the product advised that he would be training 'the first people involved with installation' of the SIP system in New Zealand.

3.5 On 17 December 2012 the contractor provided an 'alternative solution assessment summary' to the authority. The summary concluded that sufficient information had been provided to establish compliance with Clauses C3, C6, E3, F2 and H1. The contractor was of the view that the BEAL appraisal did not adequately deal with the areas of concern in relation to clauses B2 and E2, and noted (in summary):

- Sufficient structural data and supporting information was provided to establish compliance (B1), though the supplier's technical manual did not provide much detail and drawing details were 'conspicuous by their absence.'
- No substantial supporting data had been provided to support compliance in New Zealand climatic conditions (B2).
- When compared with similar 'sandwich type' insulated panel systems it appears the SIP system would meet the performance requirements of Clause E2, but there is no supporting information to clearly demonstrate compliance of the system as a whole under New Zealand conditions.

3.6 On 19 December 2012 the contractor advised the architect that the assessment had been completed and that 'more information in relation to the results of the system testing is required to show compliance with B2 Durability and E2 External Moisture.' The contractor referred to opinions provided as being primarily in relation to the system being used in North American conditions and that information appropriate and relevant to New Zealand was required; the contractor suggested information be provided on what testing was undertaken and to what standard, the results of the testing, and analysis against the selected standard.

3.7 On 8 January 2013 the contractor wrote to the architect and BEAL, commenting on the assessment and noting that as there was no in-service history in New Zealand there was a reliance on laboratory testing to establish compliance. The contractor identified his concerns as being that

- a large portion of the test information was based on tests undertaken by Intertek[8] in Canada, and no consideration or opinion was given on how the product might perform under New Zealand climatic conditions
- the BEAL testing was not carried out in accordance with E2/VM1 along with other standards
- the BEAL test facility is not IANZ or equivalent accredited for testing the weathertightness of claddings to the procedures of AS/NZS 4284, and the personnel undertaking testing should be appropriately qualified

[8] The testing was carried out by a laboratory in the commercial and electrical division (British Columbia) of Intertek. Intertek is a global group providing auditing and inspection, testing, qualification and certification services.

- insufficient information has been provided in relation to durability in respect of the SIP system being used as a structural cladding system; the system as a whole should be tested in respect of durability as used under New Zealand conditions.

3.8 On 15 January 2013 BEAL provided information to the contractor that BEAL considered to be the key information used in the appraisal process, and that would give assurance that all essential issues relevant to New Zealand conditions and the Building Code had been properly considered. On 17 January 2013 BEAL provided a copy of its weathertightness testing procedure (I note that this is a general description of the procedure and not specific to the test carried out on the SIP being considered in this determination.)

3.9 On 16 January 2013, in an email to BEAL and copied to the authority, the contractor acknowledged that due to the nature of the SIP system, testing in strict accordance with E2/VM1 for example was 'not always relevant or applicable' and that it was for this reason BEAL had used its own 'product performance criteria'. The contractor requested a copy of the relevant criteria used by BEAL and sought information on recognition or accreditation of the criteria by a recognised body, or details of similar systems that had been tested using those criteria.

3.10 The contractor also sought further information on the basis and reasoning for the conclusions reached on the test results, and assurance that the testing data had been reviewed by someone who was 'appropriately qualified and experienced'.

3.11 On 21 January 2013, the contractor forwarded a letter to the architects stating that the authority had completed its assessment of the SIP system and that it was 'rejected' on the grounds that the system is yet to establish an 'acceptable track record' in New Zealand, also as it was being used for the entire building the consequences of failure were high, and that the outcomes and results of testing needed to be reviewed by appropriately qualified and experienced personnel and that any further testing should be undertaken in an appropriately accredited test facility.

3.12 On 19 March 2013 I wrote to the parties seeking confirmation of the matter in dispute and further documentation and information on the issues raised in the application for determination.

3.13 On 27 March 2013, the agent provided a copy of the consent application and an outline of the sequence of events by email.

3.14 On 28 March 2013. the authority responded by email stating its view that

> [The authority] is not satisfied that the appraisal performed [by BEAL] in support of the manufacturer's cladding system is sufficient in order for the [authority] to form a decision on reasonable grounds that the system tested would satisfy the performance requirements of B2 and E2.

3.15 The authority also sought for the determination to consider the adequacy of BEAL's testing methods and appraisal process, and provided documents from its records.

3.16 A draft determination was issued to the parties and persons with an interest on 6 June 2012. Both parties accepted the draft without comment, and no further comment was received from the persons with an interest.

4. Discussion

4.1 The matter for determination is whether the authority correctly exercised its powers of decision when it refused to grant building consent. Section 49 of the Act requires '[An 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.'

4.2 The authority has identified its concerns as being compliance of the SIP 'cladding system' with Clauses B2 and E2 (refer paragraph 3.14).

4.3 In this instance the SIP system is not functioning as a cladding system but provides the structure, insulation and interior facing. The exterior wall and roof cladding, along with joinery installation and external junction details, make use of proprietary systems commonly used and with a known performance history in New Zealand; in addition the cladding is over a drained cavity and building wrap. The SIP system is not exposed to the elements other than at the soffits.

4.4 It is my view therefore that the performance requirements of Clause E2 do not apply to the SIP system as it is proposed to be used in this building, and accordingly I consider the authority was incorrect when it refused to grant building consent on those grounds.

4.5 The documentation

4.5.1 The Act allows the authority to set reasonable requirements for the documentation that accompanies applications for building consents. The authority is entitled to set minimum requirements to ensure that the proposed building work is clearly documented and to require the applicant to clearly demonstrate and document how compliance is to be achieved for those areas it considers unclear.

4.5.2 The documents supporting the building consent application must provide sufficient instruction and certainty on those areas of the building that are specifically designed elements or alternative solutions. The documentation must describe how that solution is to be achieved through the construction process, detail critical features, and allow the authority to appropriately inspect the construction of that work and to assess it against a coherent set of consent documents.

4.5.3 Although not a matter raised by the authority for consideration in this determination, I note that there appear to be some details in the consent documentation that require clarification; for example the architectural drawings refer to engineer's drawings for (as an example) base fixing details but this is not clear on the engineer's drawings. Though outside the matter to be determined I consider that the deficiencies in the drawings need to be adequately resolved prior to the grant of building consent.

4.5.4 The authority's concerns arose from the testing and interpretation of test results for New Zealand conditions, and the authority has specifically requested that the determination consider the adequacy of BEAL's testing methods and appraisal process.

4.5.5 In response to the authority's request I note that an assessment of the BEAL testing methods and appraisal process is not a function of the determination process and is better carried out by accreditation bodies such as JASANZ[9] and IANZ[10].

5. The decision

5.1 In accordance with section 188 of the Act, I hereby determine that the authority was incorrect in the exercise of its powers of decision in refusing to grant building consent for the reasons provided, and accordingly I reverse the authority's decision.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 21 June 2013.

John Gardiner
Manager Determinations and Assurance

[9] Joint Accreditation System of Australia and New Zealand: the government-appointed accreditation body for Australia and New Zealand responsible for providing accreditation of conformity assessment bodies in the fields of certification and inspection.
[10] International Accreditation New Zealand (part of the Testing Laboratory Registration Council)

Appendix A

A.1 Copies of documents supplied by the parties:

The applicants

BEAL appraisal C1130, dated October 2012 and various test reports relevant to the SIP system.

Analysis by a firm of architects and engineers of racking tests carried out on the SIP system at SCION.

BRANZ statement: Testing of Class S and Class H EPS supplied by Bondor NZ Ltd (manufacturer of structural insulated panel systems using EPS cores)

Various reports and testing results from Intertek for the Canadian supplier's magnesium oxide board and structural insulated panels.

A letter from Telarc SAI Ltd confirming continued registration for Long Plastics (a specialised moulder, cutter and designer of expanded polystyrene sheets, shapes and products).

Application for building consent

The authority

Building consent processing checklist (undated)

Producer Statement PS2 Design Review, dated 12 December 2012, completed by a consulting engineer

BEAL appraisal C1130

Various correspondence between the authority, the authority's contractor, BEAL