

## Determination 2006/44

### Refusal of an amendment to a building consent for a change to monolithic-clad parapets at 234 Southfield Drive, Lincoln



#### 1. The dispute 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, Determinations Manager, Department of Building and Housing, for and on behalf of the Chief Executive of that Department. The applicant is Mr Nutira of David Reid Homes Ltd. (“the applicant”), and the other party is the Selwyn District Council (“the territorial authority”).
- 1.2 The dispute for determination is whether the territorial authority’s decision to decline to approve an amendment to the building consent in regard to the parapets for this partly constructed house because it was not satisfied that the parapet design complied with clauses B2 “Durability” and E2 “External Moisture” of the Building Code<sup>2</sup> (First Schedule, Building Regulations 1992) is correct.
- 1.3 The question to be determined is whether I am satisfied on reasonable grounds that the monolithic-clad parapets of this building (“the parapet system”), proposed to be installed in lieu of the metal cappings specified in the consent drawings, will comply

<sup>1</sup> The Building Act 2004 is available from the Department’s website at [www.dbh.govt.nz](http://www.dbh.govt.nz)

<sup>2</sup> The Building Code is available from the Department’s website at [www.dbh.govt.nz](http://www.dbh.govt.nz)

with the Building Code (see sections 177 and 188 of the Act). By “the monolithic-clad parapets” I mean the components of the parapet system (such as the backing sheets, the flashings, the joints and the plaster and the coatings) as well as the way the components have been installed and work together. I note that the territorial authority has not referred to the remaining areas of cladding as being an issue for this house. Accordingly consideration of them does not form part of this determination.

- 1.4 In making my decision, I have considered the submissions of the parties, the report of the independent expert commissioned by the Department to advise on this dispute (“the expert”), and the other evidence in this matter. I have evaluated this information using a framework that I describe more fully in paragraph 6.1. I have not considered any other aspects of the Act or the Building Code.

## 2. The building

- 2.1 The building is a one-storey detached house situated on a flat site that is in a high wind zone for the purposes of NZS 3604<sup>3</sup>. Construction is generally conventional light timber frame, with a concrete slab and foundations, monolithic wall cladding and recessed aluminium windows. The house is a moderately complex shape, with the 4° profiled metal roof set at three different levels. Each roof section is separated and bounded by monolithic-clad parapets, which have complex stepped tops with chamfered corners and membrane lined gutters. The parapets between each roof section are located above interior walls below. Several small 15° concrete tile roofs form lean-tos against the main walls.
- 2.2 The drawings describe the wall framing as H3.1, although the expert commissioned by the Department to inspect the parapets (“the expert”) has noted that he found no evidence of treatment on timber he was able to inspect. The applicant has supplied invoices from the timber supplier (refer paragraph 4.11), which indicate that the framing to the exterior walls, including internal parapets, is H3 treated. Based on this evidence, I consider that the external wall framing and internal parapet framing is likely to be H3 treated. However, I also consider that the internal wall framing below that section of parapet within the building perimeter is unlikely to be treated.
- 2.3 The cladding system is what is described as monolithic cladding, and is a 40 mm “Insulclad” polystyrene system fixed over 50 mm x 20 mm polystyrene battens which form a drained cavity over the building wrap. The cladding is finished with a proprietary mesh reinforced plaster system and a flexible acrylic paint system.
- 2.4 The proposed parapet system includes the wrapping of the framing timbers with building wrap, the installation of a sloped polystyrene top packer above sheets, battens and framing, and the wrapping of the top with “Protecto EIFS tape” (“Protecto”), which is extended down each side to about 50 mm below the bottom level of the top plate. The plaster coating is applied over the Protecto tape, concealing the tape from view. The Protecto manufacturer has provided a set of details dated April 2005 together with instructions for use dated April 2004.

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

- 2.5 The supplier of the cladding, Plaster Systems Ltd., has supplied a letter dated 8 September 2005 supporting the proposed parapet system, providing that the Protecto tape is used strictly in accordance with the manufacturer's recommendations, and the owners inspect all parapets at least annually. Plaster Systems Ltd., also note that a two coat high build acrylic membrane is intended to be provided to the tops of the parapets, in addition to the standard paint system used elsewhere on the cladding.

### 3. Sequence of events

- 3.1 The territorial authority issued a building consent for the house on 25 February 2005. The consent drawings included a note requiring the parapet construction to comply with "NZBC E2/AS1 fig 130", which shows a continuous metal capping with a sloped top.
- 3.2 Construction took place during 2005 and, at the time of the expert's visit in December, building work appeared to be complete with the exception of minor items and landscaping work. I have received no evidence of what inspections were undertaken by the territorial authority.
- 3.3 It appears that around September 2005, the applicant sought approval for the substitution of parapet cappings with the proposed parapet system, supplying the territorial authority with the following information:
- technical information on the Protecto tape parapet system, dated April 2004
  - BRANZ Appraisal Certificate No 450 (2004) for Protecto tape
  - the supporting letter from Plaster Systems Ltd. dated 8 September 2005.

I note that the technical information and appraisal include the requirement for parapet tops to have a minimum 15° slope.

- 3.4 In a report "Request for alternative solution" dated 19 September 2005, the territorial authority noted that the proposal replaced the E2/AS1 over-flashing with additional paint coats and Protecto tape under the plaster, and observed that E2/AS1 covers monolithic-clad balustrades but not parapets as the latter "are considered to be a more risky location". The territorial authority also noted that:

*The parapet design for this house has a very high number of changes in direction (over 150) together with numerous re-entrant junctions.*

The territorial authority considered the weathertightness of the proposed parapet system and declined to grant approval unless further evidence was provided, noting:

The proposal should not be granted because:

- The proposed paint system is less robust than, and because the 'Protecto Tape' does not sufficiently compensate for, the absence of a metal flashing.
- The many direction changes of the parapets will lead to an increased risk of leaks.

- The use of 'Protecto Tape', when considered to be part of the flashing system does not meet the required 50 year durability requirement.

3.5 The applicant applied for a Determination in regard to the proposed parapet system, which was received by the Department on 3 November 2005.

#### 4. The submissions

4.1 The applicant noted in the application that the "Matter of doubt or dispute" is a:

*...a determination on suitability of alternative solution to weatherproofing parapet tops to a sante-fe style EPS on timber framed dwelling.*

4.2 The applicant forwarded copies of:

- the elevations and typical parapet detail
- the "Request for alternative solution" from the territorial authority
- technical information on the Protecto tape parapet system, dated April 2005
- the supporting letter from Plaster Systems Ltd, dated 8 September 2005

4.3 The territorial authority forwarded copies of:

- some of the building consent documentation:
  - the typical parapet detail
  - E2/AS1 Figure 130: Parapet with metal capping for EIFS
- some of the information supplied by the applicant with the request for approval:
  - the Protecto tape parapet system information, dated April 2004
  - BRANZ Appraisal Certificate No 450 (2004) for Protecto tape
  - the supporting letter from Plaster Systems Ltd. dated 8 September 2005

4.4 In a letter to the Department dated 15 November 2005 that accompanied the documents, the territorial authority noted that the information supplied by the applicant differed in some respects from that supplied at the time of the request for approval of the proposed parapet system, including the following:

- The typical parapet detail did not include the added notes regarding the slope to the top, the additional paint coatings and the timber treatment.
- The technical information on the Protecto tape parapet system, dated April 2005, was not included.

4.5 In a facsimile to the expert dated 19 December 2005, and forwarded to the Department on 4 January 2006, the applicant noted that the proposed parapet system would incorporate two forms of weatherproofing; the Protecto tape and the additional paint coating. The applicant also noted that the house was still under construction and that the parapets had been almost completed as proposed because:

*The cladding was continued to maintain weathertight integrity to the dwelling due to delays in accepting this proposed method. The final (second method) of a membrane paint coating has yet to be applied as I await the finding of this determination process.*

4.6 Copies of the submissions and other evidence were provided to each of the parties. Neither party made any further submissions in response to the submission of the other party.

4.7 The draft determination was forwarded to the parties for comment on 27 March 2006.

4.8 The territorial authority did not accept the draft and in a letter to the Department dated 7 April 2006, it questioned the risk assessment of the house, and the acceptance of the slopes to the tops of the parapets, noting that:

*In summary, we believe that this is an "extreme risk" given the above issues, together with the fact that the parapet has numerous changes of direction.*

4.9 I have considered the territorial authority's opinion in the light of the features and potential risks of the parapets discussed in paragraph 6.3 and make the following observations:

- As explained in Paragraph 6.2.2, in addition to applying the risk matrix I also took account of the standard of the building work as executed which must also be considered when deciding if building work complies with the building code.
- My acceptance of the slope to the tops of the parapets is based on consideration of the quality of the work as built.
- I note the additional evidence provided by the applicant that the framing to the exterior walls is H3 treated, which lowers further the potential risks to the external wall framing (refer paragraph 4.11).

4.10 I maintain the views expressed in the draft determination that this is a moderate risk building and consider that no change to the draft is necessary.

4.11 The applicant accepted the draft. However, in a letter to the Department dated 5 May 2006, the applicant questioned the need to provide capping flashings to those parapets located above internal walls, noting that they are constructed from H3 treated framing and are independent of the framing below. The applicant supplied invoices from the timber, which indicate that parapet and external wall framing is H3 treated, and I have amended paragraph 2.2 accordingly.

However, I maintain the view that the internal parapets are more risky than those above the external walls despite the treatment of the framing timbers, as water

penetrating the upper framing can potentially migrate to framing below leading to - risking decay in the untreated timber. I have therefore made no change to the requirement for capping flashings to those parapets located above internal walls.

## 5. The expert's report

- 5.1 The expert inspected the parapets and associated cladding on the building on 21 December 2005, and furnished a report that was completed on 13 January 2005. The expert noted that control joints are not specified by the manufacturer as necessary for the dimensions of cladding used on the walls of this building. The expert noted that the parapets generally appeared to be installed according to the Protecto tape manufacturer's instructions, with no visible signs of cracking in the parapet cladding. The expert observed that "in general the standard of workmanship and finish to the parapets is good, both vertical and horizontal lines were straight with curved edges well formed". The expert noted that parapet tops were about 230 mm wide, with a textured plaster finish and a slope that varied between 9° and 11°.
- 5.2 The expert removed 3 small sections of cladding near corners and junctions of the parapets, and noted the building wrap over the framing, the polystyrene cavity battens, the protective tape under the plaster and the mesh reinforcing of the plaster coating. I accept that these locations are typical of similar locations around the building.
- 5.3 The expert took 9 invasive moisture readings through the parapet cladding at locations considered to be risky, and the highest reading recorded was 9%.
- 5.4 The expert made the following specific comments on the parapets:
- some of the slopes to the parapet tops appear inadequate
  - rainwater overflow pipes lack flanges and seals contrary to the manufacturer's instructions, and the end of a pipe is flush with the cladding face
  - the bottom edges of polystyrene sheets are exposed above outlets to rainwater heads, and above the membrane gutters at internal corners
  - there was a single mesh layer at one junction where plaster was removed
  - the junctions of the EIFS with the fibre cement cladding of the framed chimney structures appear unflashed and inadequately weatherproofed, and the bottom of the fibre cement is unsealed.

5.5 Although other areas of the wall cladding were not the subject of his inspection, the expert also made the following additional observations:

- the meter box lacks flashings but appears to be weathertight
- the end of the apron flashing at the junction of the tile roofs with the cladding is inadequately weatherproofed - with no kick out, the fascia buried in the plaster and exposed polystyrene showing
- the profiled metal roof cladding has been poorly patched in some locations.

5.6 A copy of the expert's report was provided to each of the parties on 19 January 2006.

5.7 In a letter to the Department dated 6 February 2006, the territorial authority noted that the matter for determination is the refusal to approve an alternative design for the parapets, and not whether the building has been built contrary to the consent documents.

## 6. Evaluation for code compliance

### 6.1 Evaluation framework

6.1.1 In evaluating the design of a building and its construction, it is useful to make some comparisons with the relevant Acceptable Solution<sup>4</sup>, which in this case is E2/AS1, which will assist in determining whether the proposed parapet system for this house will be code compliant. However, in making this comparison, the following general observations are valid:

- Some acceptable solutions cover the worst case, so that they may be modified in less extreme cases and the resulting alternative solution will still comply with the Building Code.
- Usually, when there is non-compliance with one provision of an acceptable solution, it will be necessary to add some other provision to compensate for that in order to comply with the Building Code.

6.1.2 The approach in determining whether building work is weathertight and durable and is likely to remain so, is to apply the principles of weathertightness. This involves the examination of the design of the building, the surrounding environment, the design features that are intended to prevent the penetration of water, the cladding system, its installation, and the moisture tolerance of the external framing. The Department and its antecedents, the Building Industry Authority, have also described weathertightness risk factors in previous determinations (refer to Determination 2004/1 *et al*) relating to cladding and these factors are also used in the evaluation process.

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<sup>4</sup> An Acceptable Solution is a prescriptive design solution approved by the Department that provides one way, but not the only way, of complying with the Building Code. The Acceptable Solutions are available from the Department's website at [www.dbh.govt.nz](http://www.dbh.govt.nz).

6.1.3 The consequences of a building demonstrating a high weathertightness risk is that building solutions that comply with the Building Code will need to be more robust. Conversely, where there is a low weathertightness risk, the solutions may be less robust. In any event, there is a need for both the design of the cladding system and the quality of its installation to be carefully carried out.

## 6.2 Weathertightness risk

6.2.1 In relation to these characteristics I find that the building:

- is built in a high wind zone
- is a maximum of one storey high
- is fairly complex in plan and in form
- has monolithic cladding which is fixed over a drained cavity, which providing additional protection to the framing
- has parapets, with complex corners and junctions, over most external walls and over some internal walls
- is proposed to have monolithic cladding over the sides and tops of the parapets
- has internal wall framing that is unlikely to be treated, so providing no resistance to the onset of decay if the framing absorbs and retains moisture
- has external wall framing that is likely to be treated, so providing resistance to the onset of decay if the framing absorbs and retains moisture.

6.2.2 When evaluated using the E2/AS1 risk matrix, these weathertight features show that three elevations of the building demonstrate a moderate weathertightness risk and one a high risk rating. The matrix is an assessment tool that is intended to be used at the time of application for consent, before the building work has begun and, consequently, before any assessment of the quality of the building work can be made. Poorly executed building work introduces a risk that cannot be taken into account in the consent stage but must be taken into account when the building as actually built is assessed for the purposes of issuing a code compliance certificate.

## 6.3 Weathertightness performance

6.3.1 Generally the partly completed parapet system appears to have been installed according to good trade practice. However some junctions, edges and penetrations are not well constructed, and these areas are as described in paragraph 5.4 and in the expert's report as being the:

- lack of protruding ends and sealing to overflow pipes
- exposed bottom edges of polystyrene above rainwater heads and gutters



- lack of adequate weatherproofing of the junctions with the chimney claddings.
- 6.3.2 I note the expert's comments on the slopes to the tops of the parapets. However, I accept that the recommendations of the Protecto manufacturer and of the appraisal have reduced from a 2004 requirement for a minimum 15° slope to the top of EIFS clad parapets to a 2005 requirement for a minimum 10° slope. I therefore consider that the manufacturer's instructions for this proposed parapet system currently include the requirement for a minimum 10° slope to parapet tops. I note that the slopes to the parapets of this house are at the lower margin of the manufacturer's requirements, but consider that they are adequate for this moderate risk situation.
- 6.3.3 I note the expert's comment on the lack of a double layer of mesh at some corners and junctions of the parapets, but consider that the absence of cracking indicates that the mesh within the plaster is providing adequate reinforcing in this case.
- 6.3.4 As E2/AS1 makes clear, there are circumstances where the combination of risk factors applying to a particular building on a particular site may mean that the building will perform satisfactorily, and therefore be code compliant, with construction features that are alternative solutions. It is essential that such features be considered on a case-by-case basis, as the Act requires, ensuring that all the circumstances are properly considered. I accept that the requirement for metal cappings to parapet tops may be conservative for some situations, and that the potential risk can be reduced if the parapet system is carefully detailed and constructed to ensure that weathertightness risks are managed.
- 6.3.5 I note that there is a section of parapet that is located within the bounds of the roof, where there is a greater risk of damage to internal wall framing should moisture penetrate into the untreated framing. For such internal sections of parapet, I therefore consider that capping flashings in accordance with E2/AS1 are required over the tops of these parapets.
- 6.3.6 I accept that the Protecto tape manufacturer has produced a set of standard details and installation instructions, which appear to be carefully considered and detailed to cover a variety of situations. If these details are appropriately used to suit the specific junctions, and if the parapets are carefully constructed in accordance with the manufacturer's instructions, the proposed parapet system can reasonably be expected to exclude moisture from the external walls of this building and thus lead to compliance with clause E2, and if properly maintained, clause B2.
- 6.3.7 I note that the external wall parapets of this house are at a height that will permit easy access for regular inspections and maintenance of the weatherproofing system.
- 6.3.8 In the case of this building, I have no record of what inspections may have been carried out to date by the territorial authority. It is in the interests of all the parties to ensure that inspections of work critical to the eventual compliance of the building with the building code are specified by the territorial authority and carried out at critical stages in the parapet construction.
- 6.3.9 Notwithstanding the fact that the proposed parapet system lacks an external over-flashing, thus inhibiting ease of inspection and replacement, I have also noted certain

compensating factors that may assist the performance of the proposed system in this particular case:

- the external walls of this building incorporate cavities to provide drainage and drying of moisture that may penetrate the cladding system, so contributing to the durability of the wall framing
- the incomplete parapet system generally appears to have been installed to good trade practice in accordance with the manufacturer's instructions
- the parapet system, as constructed to date, is currently weathertight, with low moisture contents recorded in the external walls
- the parapet system, as constructed to date, has a protective flashing tape under the plaster
- the proposed parapet system will have additional paint coatings installed around the parapet tops
- the external wall parapets of this building are readily accessible for regular inspection and maintenance
- the external walls of this building appear to have framing that is treated to a level that will provide resistance to the onset of decay if the framing absorbs and retains moisture.

6.3.10 In the case of the external walls of this building, I consider that these factors will help compensate for the lack of parapet cappings in accordance with E2/AS1, and can assist the building to comply with the weathertightness and durability provisions of the Building Code.

6.3.11 Although other cladding areas are beyond the scope of this Determination, I note the expert's comments in paragraph 5.5 and draw these to the attention of the territorial authority.

## **7. Conclusion**

7.1 There are some factors in the case of the external wall parapets to this building, as outlined in paragraph 6.3.9, which can compensate for the absence of parapet cappings and assist the parapets to comply with the weathertightness provisions of the Building Code.

7.2 In addition, the parapet system is 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, and that includes the requirement for the building to remain weathertight. Because there are some faults in the parapet system as constructed to date that are likely to allow the ingress of

moisture in the future, the proposed parapet system on the building does not comply with the durability requirements of clause B2.

- 7.3 Subject to further investigations that may identify other faults, I consider that, because the faults that have been identified with the parapet system occur in discrete areas, I am able to conclude that satisfactory rectification of the items outlined in paragraph 6.3.1 is likely to result in the proposed parapet system for external walls remaining weathertight and in compliance with clauses B2 and E2.
- 7.4 Because of the additional future weathertightness risks associated with the internally located parapets I consider that the proposed system for parapets located above internal walls does not comply with the durability requirements of clause B2.
- 7.5 I note that effective maintenance of claddings is important to ensure ongoing compliance with clause B2 of the Building Code. That maintenance is the responsibility of the building applicant. The code assumes that the normal maintenance necessary to ensure the durability of the cladding is carried out. For that reason clause B2.3.1 of the Building Code requires that the cladding be subject to “normal maintenance”. That term is not defined in the Act and I take the view that it must be given its ordinary and natural meaning in context. In other words, normal maintenance of the cladding means inspections and activities such as regular checking, cleaning, re-painting, replacing sealants, and so on.
- 7.6 It is emphasised that each determination is conducted on a case-by-case basis. Accordingly, the fact that a particular parapet system has been established as being code compliant in relation to a particular building does not necessarily mean that the same parapet system will be code compliant in another situation.
- 7.7 In the circumstances, I decline to incorporate any waiver or modification of the Building Code in this determination.

## **8. The decision**

- 8.1 In accordance with section 188 of the Act, I determine that there are reasonable grounds to suppose that the proposed alternative solution for the parapets to the external walls of this building, if carefully completed in accordance with the manufacturer’s instructions, and if subject to careful maintenance, will comply with the requirements of clauses B2 and E2 of the building code.
- 8.2 I also find that rectification of the items outlined in paragraph 6.3.1 is likely to result in the proposed alternative solution for the parapets to the external walls of this building remaining weathertight, and in compliance with clause B2. Work to correct these items may expose additional associated defects not yet apparent. All rectification work is to be completed to the approval of the territorial authority
- 8.3 I also find that the proposed alternative solution for the parapets above interior areas of this building is not in compliance with clause B2.

8.4 In the case of the external wall parapets, I find that because of the compensating factors in this case, the lack of parapet cappings is not, on its own, sufficient grounds to refuse to issue approval for an amendment to the building consent.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 22 May 2006.

John Gardiner  
**Determinations Manager**