Determination 2007/16

Determination regarding code compliance of a house at 1 Marine Parade, Herne Bay, Auckland

1. The matter 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, Determinations Manager, Department of Building and Housing ("the Department"), for and on behalf of the Chief Executive of that Department. The owner is the Marine Parade Trust ("the applicant") and the other party is the Auckland City Council ("the territorial authority").

1.2 The matter for determination is the territorial authority's decision that it was not satisfied that the building complied with clause E2 "External Moisture" of the Building Code[2] (First Schedule, Building Regulations 1992).

[1] The Building Act 2004 is available from the Department's website at www.dbh.govt.nz.
[2] The Building Code is available from the Department's website at www.dbh.govt.nz.

1.3 The matter to be determined is whether the cladding as installed to the walls of the building ("the cladding") complies with clause E2 (see sections 177 and 188 of the Act). By "the cladding as installed" I mean the components of the system (such as the backing materials, the flashings, the joints and the coatings) as well as the way the components have been installed and work together.

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.

1.5 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.

2. The building

2.1 The building work consists of alterations and additions to a detached house situated on an excavated sloping site, which is in a high wind zone for the purposes of NZS 3604[3]. The altered house is three storeys high and is relatively complex in plan and form, with some curved wall sections. Construction is generally conventional light timber frame constructed on timber-framed floors. The pitched roof is surrounded by parapet walls and has no eaves or verge projections.

2.2 There are two large balconies situated at the north elevation of the house. The existing balcony at the lower level has not been amended in the later house alterations. The second existing balcony at first floor level has been completely renovated, with the exception of some supporting posts and beams. Both balconies have glazed metal balustrades and each of the decks has tiles laid over bituminous sheet membranes. A timber-framed pergola, supported on metal posts and beams, is constructed over the upper balcony. A wide flight of steps, with metal or timber-framed and monolithic-clad balustrades, leads up to the main entrance.

2.3 I have not received any information as to the treatment, if any, of the external wall framing timber. Given the time when the extensions were built it is unlikely that the timber framing was treated.

2.4 The majority of the external walls of the house are clad with "Quick Clad" expanded polystyrene sheets, which are fixed through the white plastic building wrap to the framing. The sheets are finished with a 4mm thick glass fibre-mesh reinforced plaster system. The later extensions to the house are clad with 80mm thick sheets, the curved wall sections have 10mm thick multiple sheet layers and the existing stucco walls, apart from the basement areas, are overlaid with 30mm thick sheets. Some of the existing stucco clad basement walls are coated with new plaster.

2.5 I have not received any warranties or producer statements relating to the cladding.

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

3. Sequence of events

3.1 The original house was constructed in 1946 and a series of additions and alterations were carried out prior to the introduction of the Building Act 1991. A building consent was issued by the territorial authority in July 1993 for modifications to the lowest level floor and the garage. A second building consent was issued by the territorial authority on 19 August 1999 for a swimming pool and associated work. The territorial authority issued a third building consent on 16 December 1999 to further extend the building.

3.2 The building work associated with the swimming pool passed a final inspection on 20 July 2000 but the work completed under the other two consents did not pass final inspections. No code compliance certificates have been issued for any of the work carried out under the 3 consents.

3.3 A fourth building consent was issued by the territorial authority for a boundary wall on 14 November 2000. Nationwide Building Certifiers Group Ltd ("the building certifier") duly inspected the work and issued a code compliance certificate on 6 December 2000.

3.4 The territorial authority carried out an inspection of the property on 15 March 2004. In a letter to the applicants dated 16 April 2004, the territorial authority noted that in light of new information, it was not satisfied that the cladding system on the house complied with clause E2.

3.5 The territorial authority attached a Notice to Rectify, also dated 16 April 2004, to this letter. The "particulars of contravention or non-compliance" attached to the notice listed requirements under the following headings:

1. Items not installed per the acceptable solutions of the building code.
2. Items not installed per accepted trade practice.
3. Ventilated cavity system.

The notice also stated that the applicant was to:

> Provide adequate ventilation to the monolithic cladding and into the wall frame space by means of either a ventilated cavity or alternative approved system, and ensuring all issues relating to above are resolved.

3.6 A firm of consultants ("the first consultant") inspected the property on 7 October 2004 and in a letter dated 15 October 2004 set out a list of building deficiencies.

3.7 A second firm of consultants (" the second consultant") inspected the building work as at 1 March 2005 and produced a report dated 15 April 2005. In summary, the report noted that while some remedial work was required, the problems were not systemic. There was only one area of moisture ingress and this was in the basement study/office. The higher risk areas appeared to be confined to the basement areas and the deck balustrades. The second consultant considered that, once the lower area

cladding had been rectified, the re-cladding of the upper 2 floors of the house with the addition of a ventilated or drained cavity was not necessary.

3.8 In a letter dated 16 June 2005, the territorial authority acknowledged the receipt of a "scope of works" that had been provided by the second consultant on 13 May 2005. The territorial authority generally accepted the proposals set out in that document. However, it required moisture probes to be inserted in the top floor external walls if those walls were not going to be re-clad.

3.9 A third firm of consultants was engaged to inspect the property and it produced a report dated 4 August 2005, which pointed out various defects in the building at that time.

3.10 A firm of consulting chemists conducted an examination of the cladding forwarded to it on 21 December 2005. This firm summarised its findings in a letter dated 22 December 2005.

3.11 The territorial authority issued a notice to fix in regard to the swimming pool on 15 December 2005. The notice stated that the swimming pool fencing did not comply with the requirements of the Fencing and Swimming Pools Act 1987, and listed the areas of contravention.

3.12 An application for a determination was dated 6 September 2006.

4. The submissions

4.1 In a covering letter to the Department dated 6 September 2006, the applicant described the background to the matters in question. The applicant identified the builder who carried out the lower area but could not identify the builder and cladding applicator who worked on the upper levels.

4.2 The applicant also queried whether the moisture probes referred to by the territorial authority would form part of the building cladding and whether there was any basis for the territorial authority to insist on the probes as a condition for granting a code compliance certificate. Also, would the installation of the probes make the building code compliant? The specific matters set out in the application were:

> Whether the following building work complies with the Building Code: [state details of the building work]
>
> (i) Do the cladding and other aspects of the ground floor of the Building comply with the Building Code?
>
> (ii) Do the cladding and other aspects of the top two floors of the Building comply with the Building Code?
>
> (iii) If the answer to (ii) is no then:
>
> a. Would moisture probes of the kind referred to by the Council in its letter of 16 June 2005 form part of the cladding on the Building;

b. Is there any basis for the Council to insist upon the installation of such probes as a condition of granting a code of compliance certificate.

c. If the answer to (b) above is yes, will the cladding and other aspects of the top two floors of the Building comply with the Building Code and in particular the requirements in relation to weathertightness and related issues if moisture probes of the kind referred to by the Council in its letter of 16 June 2005 are installed and monitored as suggested by the Council.

(iv) If the answer to (ii) and to (iii)(b) or (c) is no, then what actions need to be taken by the Applicant in order for the Building to achieve compliance with the Building Code?

4.3 The applicant forwarded copies of:

- the plans
- some consent documentation and inspection records
- the Notice to Rectify and the notice to fix
- the correspondence with the territorial authority
- the reports from the 3 consultants who inspected the work.

4.4 In a letter to the Department dated 13 September 2006, the territorial authority noted what it considered to be the areas of contravention.

4.5 The territorial authority forwarded copies of:

- the plans
- the consent documentation and inspection records
- the Notice to Rectify and the notice to fix
- the correspondence with the applicant and other interested parties.

4.6 Copies of the submissions and other evidence were provided to each of the parties.

4.7 A copy of the draft determination was forwarded to the parties on 27 November 2006. The territorial authority accepted the finding in the draft that the cladding system does not comply with clauses B2 and E2. The territorial authority also stated:

> Over the last year the department has issued a number of determinations relating to the code compliance of cladding as installed. In Council's experience, the matter in dispute has been inaccurately documented. In practice the matter in dispute is whether the scope of work necessary to achieve code compliance is that documented in Council's Notice to Fix or as identified by the department's assessor. Council's view is that to provide clarity and certainty for the applicant, the matter in dispute should be amended to reflect this. This change would need to be approved by the applicant as well as Council.

4.8 In particular, the territorial authority is concerned that paragraphs 5.4 and the renumbered 10.3 indicate a scope of work required to make the house code compliant. If the matter in dispute is not amended, the territorial authority would reissue a notice to fix based on information contained in the determination and other sources.

4.9 The applicant's legal advisor wrote to the Department on 13 December 2006, stating that the draft determination was accepted, subject to some amendments that were attached to the letter. The applicant asked for some matters to be clarified so that the particular questions posed at the time of the application were answered. The applicant also asked what actions it needed to take in order for the building to achieve compliance with the Building Code.

5 The expert's report

5.1 As discussed in paragraph 1.4, I engaged an independent expert to provide an assessment of the condition of those building elements subject to the determination. The expert is a member of the Institute of Building Surveyors.

5.2 The expert inspected the house on 26 October 2006, and furnished a report that was completed on 31 October 2006. The expert noted that the coatings were generally uniform, well adhered and not discoloured. However, other workmanship was variable, especially at complex junctions and at the junctions between the new and existing claddings. The expert noted that the polystyrene cladding did not have any horizontal or vertical control joints but, having regard to the recommendations for such joints by the manufacturers of a comparable cladding material, considered that they were not required on this building. The expert cut away the plaster at a window sill/jamb junction to examine the construction. I am prepared to accept that the details revealed by this inspection apply to other similar locations throughout the building.

5.3 The expert took non-invasive moisture readings internally and recorded some "borderline" readings and one elevated reading. The expert noted three locations where there was evidence of moisture penetration. The expert then took invasive moisture readings into the wall framing and the following higher levels were recorded, being 22%, 25%, 25%, 29%, 32%, 76%, and 90%. Moisture levels above 18% recorded after cladding is in place generally indicate that moisture is entering the structure. The expert noted that as the readings were taken after weeks of intermittent rain, they probably represent the high end, but not the peak, of seasonal moisture content variation.

5.4 Some of the investigative drillings made by the expert produced evidence that the framing at some locations is decayed.

5.5 Commenting specifically on the cladding, the expert said:

The polystyrene-backed cladding

- there is no capillary gap between the back of the backing sheets fixed over the original stucco plaster and over the original basement wall. However the expert considered that, if the stucco is in reasonable condition, then this omission would not pose a problem.
- there is no capillary gap installed between the base of the cladding and the original stucco plaster at the west elevation dining room extension
- there is no base angle where the cladding has been cut away at the two balcony decks
- the sill flashings of the exterior joinery units installed in the polystyrene clad walls do not extend across the full width of the sill and there are no sill trays or sealant between the sill and jamb flashings
- there is no flashing installed at the edge of the balcony deck tiles above the cladding and no drip edges are installed
- the balcony balustrade fixings penetrate the plaster and are inadequately sealed
- the junction between the cladding and the gutter to the entrance extension roof lacks a flashing
- the first-floor balcony beam penetrations through the cladding are inadequately sealed, as are the rainwater and window screen brackets
- there are inadequate membrane corner and flashing terminations at the first-floor terrace
- the tops of the fence and balustrade walls lack cross-falls and saddle flashings and the walls are cracked at some locations.

The solid plastered walls

- there are no relief joints in the plastered surfaces and the plaster is cracked at some locations, especially several vertical and horizontal junctions with the polystyrene backed claddings
- the sill flashings to the windows are ineffective and do not provide adequate waterproofing at the junction with the plaster behind them. The plaster is also cracked at these locations.

5.6 Copies of the expert's report were provided to each of the parties on 13 November 2006. The territorial authority confirmed receipt of the report in a letter to the Department dated 17 November 2006 but made no comment on the report itself.

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[4], in this case E2/AS1, which will assist in determining whether the features of this house are 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 antecedent, the Building Industry Authority, have also described weathertightness risk factors in previous determinations[5] (refer to Determination 2004/1 *et al*) relating to cladding and these factors are also used in the evaluation process.

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 its installation to be carefully carried out.

6.2 Weathertightness risk

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

- is built in a high wind zone
- is three storeys high
- is relatively complex in plan and form
- generally has no eaves projections that could protect the cladding

[4] 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.
[5] Copies of all determinations issued by the Department can be obtained from the Department's website.

- has two external balconies
- has external wall framing that may not be treated to a level that provides resistance to the onset of decay if the framing absorbs and retains moisture.

6.2.2 When evaluated using the E2/AS1 risk matrix, three elevations of the house demonstrate a high weathertightness risk and the remaining elevation a very high risk. 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.

7 Discussion

7.1 Taking into account the expert's report, which reported on the cladding of the whole house, I am satisfied that the current performance of the cladding installed on this house is inadequate because it has not been installed according to good trade practice. In particular, the cladding is at present allowing water penetration into the walls through defects in the cladding, which in turn may have led to the framing timber rotting at some locations. In particular, the cladding demonstrates the key defects listed in paragraph 5.5.

7.2 I have also identified the presence of a range of known weathertightness risk factors in this house. The presence of the risk factors on their own is not necessarily a concern, but they have to be considered in combination with the significant faults identified in the cladding system. It is that combination of risk factors and faults that indicate that the structure as a whole does not have sufficient provisions that would compensate for the lack of a drained and ventilated cavity. Consequently, I am not satisfied that the cladding system as installed complies with either clause B2 or clause E2 of the Building Code.

7.3 I note that the territorial authority has issued a notice to fix in relation to the swimming pool but I have seen no documentation showing that a code compliance certificate has been issued for the pool. While the compliance of the pool has not been included as an issue in this determination, I urge the territorial authority to clarify this issue and, if appropriate, investigate whether the pool is now code compliant or not.

7.4 The applicant has raised some questions relating to the territorial authority's suggestion that permanent moisture probes be installed into the cladding. In discussing these questions, I make no comment as to the efficacy or otherwise of such probes. While these probes may assist monitoring of moisture ingress into the cladding, I do not accept that their installation in any way affects the code compliance of a building. While they may indicate whether compliance with clause E2 is being achieved, they do not in any way contribute to compliance with E2 and will not therefore make the house code compliant. Such probes cannot form part of the cladding of the building in terms of the Building Code. Section 18 of the Act

does not require building work to achieve performance criteria additional to or more restrictive than the Building Code requires. Accordingly, I am of the opinion that the territorial authority cannot insist on the installation of probes as a condition for granting a code compliance certificate. Determination 2006/63 also discussed this issue.

8. My response to the parties' submissions on the draft determination

8.1 In response to the territorial authority's letter to the Department of 30 November 2006, I consider that I am entitled to determine whether proposed building work complies with the Building Code, and in fact I have done so in this case. However, as noted in paragraph 10.3, my concern in this case is also that the work described in paragraph 5.5 may not turn out to be sufficient to achieve compliance, and in any event whether the work has been properly completed and is code compliant is a matter that can only be determined after careful inspection. I note that the territorial authority's inspection, described in a "Final Checklist" dated 3 July 2003, did not specify any cladding defects.

8.2 The Notice to Rectify issued on 16 April 2004 listed Particulars of Contravention that included numerous references to elements of the external cladding that did not, in the opinion of the territorial authority, comply with the requirements of the Building Code.

8.3 It can be seen that the expert's report provides a comprehensive description of the building's outstanding shortcomings. Most of these could have been detected during the territorial authority's original inspection process.

8.4 Regarding the applicant's response to the draft determination, I consider that the draft addressed the specific questions raised by the applicant in its application. However, I have amended the text in paragraphs 7.1, 7.2, and 7.4 to provide the greater clarity requested by the applicant. I have also corrected some paragraph numbering errors.

8.5 As regards the actions needed to make the building code compliant, I refer to paragraphs 10.3 and 10.4, which describe the actions to be taken by the applicant and the territorial authority.

9 Conclusion

9.1 I find that, because of the extent and apparent complexity of the faults that have been identified with the cladding, I am unable to conclude, with the information available to me, that remediation of the identified faults, as opposed to partial or full re-cladding, could result in compliance with clauses B2 or E2. I consider that final decisions on whether code compliance can be achieved by either remediation or re-cladding, or a combination of both, can only be made after a more thorough investigation of the cladding. This will require a careful analysis by an appropriately qualified expert. Once that decision is made, the chosen repair option should be

submitted to the territorial authority for its comment and approval. If the territorial authority chooses to reject the proposal, then the applicants are entitled to seek a further determination on whether the proposed remedial work will led to compliance with the requirements of clauses B2 and E2.

9.2 Effective maintenance of claddings (in particular monolithic cladding) is important to ensure ongoing compliance with clauses B2 and E2 and is the responsibility of the building owner. Clause B2.3.1 requires that the cladding be subject to "normal maintenance", however, that term is not defined in the Act.

9.3 I take the view that normal maintenance is that work generally recognised as necessary to achieve the expected durability for a given building element. With respect to the cladding, the extent and nature of the maintenance will depend on the material, or system, its geographical location and level of exposure. Following regular inspection, normal maintenance tasks should include but not be limited to:

- where applicable, following manufacturers' maintenance recommendations
- washing down surfaces, particularly those subject to wind-driven salt spray
- re-coating protective finishes
- replacing sealant, seals and gaskets in joints.

9.4 As the external wall framing of this house is unlikely to be treated, periodic checking of its moisture content should be carried out as part of normal maintenance.

10 The decision

10.1 In accordance with section 188 of the Act, I hereby determine that the building does not comply with clauses B2 and E2 of the Building Code, and accordingly confirm the territorial authority's decision to refuse to issue a code compliance certificate.

10.2 I note that the territorial authority has issued a Notice to Rectify that also required provision for adequate ventilation, drainage and vapour dissipation. Under the Act, a notice to fix can require the owner to bring the additions into compliance with the Building Code. The Building Industry Authority has found in a previous Determination 2000/1 that a Notice to Rectify (the equivalent to a notice to fix under the Building Act 1991) cannot specify how that compliance is to be achieved. I concur with that view.

10.3 A new notice to fix should now be issued that requires the owners to bring the building up to compliance with the Building Code, identifying the defects listed in paragraph 5.5 and referring to any further defects that might be discovered in the course of rectification, but not specifying how those defects are to be fixed. That is a matter for the applicants to propose and for the territorial authority to accept or reject. It is important to note that the Building Code allows for more than one method of achieving compliance.

10.4 I would suggest that the parties adopt the following process to meet the requirements of paragraph 10.3. Initially, the territorial authority should issue the new notice to fix, listing all the items that the territorial authority considers to be non-compliant. The owner should then produce a response to this in the form of a detailed proposal, produced in conjunction with a competent and suitably qualified person, as to the rectification or otherwise of the specified issues. Any outstanding items of disagreement can then be referred to the Chief Executive for a further binding determination.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 14 February 2007.

John Gardiner
Determinations Manager