

Determination 2008/59

Refusal of a territorial authority to issue a code compliance certificate for a building with a monolithic cladding at 36 Wylie Street, Rotorua



1. The matter to be determined

- 1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004¹ (“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. The applicants are the owners K and P Lines (“the applicants”), and the other party is the Rotorua District Council (“the territorial authority”).
- 1.2 This determination arises from the decision of the territorial authority to refuse to issue a code compliance certificate for 3-year-old alterations to a building because it is not satisfied that the building work complies with Clause E2 of the Building Code² (First Schedule, Building Regulations 1992).
- 1.3 The matter for determination is whether the wall cladding as installed on the additions (“the cladding”) complies with Clause E2 External Moisture of the Building Code. By “the cladding as installed” I mean the components of the system

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.

(such as the backing materials, the flashings, the joints and the plaster and/or the coatings) as well as the way the components have been installed and work together.

- 1.4 I note that the territorial authority has raised no concerns in regard to the plastering of the existing concrete block walls and brick veneer, and this determination is therefore limited to the cladding on the additions.
- 1.5 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.
- 1.6 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 2-storey extensions and associated alterations to two elevations of an existing detached house situated on a sloping site, which is in a medium wind zone for the purposes of NZS 3604³. The original house was built during the 1960’s, and was a 2-storey building with conventional light timber frame construction, concrete slab and foundations, concrete masonry walls to the ground floor walls, brick veneer cladding to the first floor walls, aluminium windows and a pressed metal tile gable roof. The eaves and verge projections to the original house are about 600mm overall.

2.2 The new building work

- 2.2.1 The building work includes plastering of the existing concrete block walls and brick veneer, extensive internal alterations, and extensions to the western half of the north elevation (“the front additions”) and the eastern half of the south elevation (“the rear additions”).
- 2.2.2 In the front addition, the garage is extended, and the master bedroom above is extended to accommodate an additional bathroom.
- 2.2.3 The rear addition has allowed the replacement of the original ground floor rumpus room with 3 new bedrooms, together with an extension to the kitchen and dining areas on the first floor.
- 2.2.4 The additions have low-pitched profiled metal roofs, and are bounded by 2-storey parapet walls that extend back into the body of the original sloping roof.

2.3 The new decks

- 2.3.1 An existing upper deck to the north has been extended, and a new deck projects from the dining area to the south, with external stairs linking to a new ground floor deck.

³ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

- 2.3.2 The extended front deck has monolithic-clad balustrades and a membrane floor that sits partly above the garage area below. A monolithic-clad corner column extends up from the balustrade to meet flying beams that project from the walls.
- 2.3.3 The new rear decks have spaced timber slat floors, with monolithic-clad balustrades to the stairway and the upper deck.
- 2.4 The expert has noted that he was unable to confirm whether the wall framing is treated. I note that the territorial authority's record of the pre-line inspection in October 2003 notes that H3 framing is used for the balustrades and parapets, and H1 framing is used elsewhere. However, given the date of construction of the additions, I am unable to determine the particular level and type of treatment that is described as "H1" by the territorial authority. I therefore consider that the wall framing of the additions may not be treated to a level that will provide resistance to fungal decay.
- 2.5 The monolithic cladding is a system described as solid plaster over a solid backing. In this instance it consists of 4.5mm "Hardibacker" sheets fixed through the building wrap directly to the framing timbers, and covered by a slip layer of building wrap, under metal-reinforced solid plaster finished with a flexible paint coating system. The expert has noted that the plaster was applied in three coats.

3. Background

- 3.1 The territorial authority issued a building consent (No. 9985) on 22 November 2001, and work began on the foundations in January 2002. The work appears to have stopped, as no further inspections were carried out until September 2003, when the territorial authority carried out a foundation inspection and noted in the inspection record "new builder employed".
- 3.2 The territorial authority carried out a pre-line inspection on 16 October 2003 and the inspection record noted that the balustrade and parapet framing was H3 treated, and wall framing was "H1KD".
- 3.3 On 9 February 2004, the Department's antecedent, the Building Industry Authority, issued a media release announcing amendments to the Acceptable Solution E2/AS1 for solid plaster over a rigid backing, which required these claddings to be installed over a drained cavity. This announcement meant that, from that date onwards, direct fixed solid plaster claddings needed to be treated as alternative solutions.
- 3.4 The builder sought clarification from the territorial authority on the implications of this new requirement. In an email to the builder dated 11 February 2004, the territorial authority confirmed that the cladding could proceed without a cavity, providing inspections were called for at key stages of the work, noting:
- On satisfactory completion of the project as required by the building consent and NZBC a Code of Compliance Certificate [sic] will be issued.
- 3.5 On 11 February 2004, the territorial authority carried out a flashing inspection of windows, parapets and deck handrails, and the inspection record notes:
- Metal flashings above doors and windows fitted so that they go up behind the hardibacker sheets and the building paper behind the sheets. And the windows

are sealed down the sides with silicon sealer to the hardibacker sheets. The parapets will be flashed over the top of the plaster and have a 15° slope on them. The handrails have a butynol flashing over them and going up behind the hardibacker wall board cladding where handrails meet a wall.

Another plaster inspection was carried out on 25 February 2004, and the metal reinforcing was approved before plaster was applied.

- 3.6 On 21 January 2005, the territorial authority carried out a final inspection that identified several outstanding items. No further inspections were carried out until the territorial authority carried out a “final recheck” inspection on 11 January 2008, which noted that the outstanding items had been completed. The territorial authority also noted cracks in the plaster.
- 3.7 In a letter to the applicants dated 11 February 2008, the territorial authority advised that as-built plans must be submitted and the cracks in the plaster repaired.
- 3.8 A re-check inspection on 31 March 2008 recorded that the cracks had been repaired and as-built drawings had been submitted, and the record notes:
- Works comply with consented/amended plans. The CCC can be issued.
- 3.9 On 7 April 2008, the territorial authority carried out an “CCC assessment”, which noted that a statement from the plasterer was needed to:
- ...stipulate plaster system installed to relevant STD re construction joints.
- 3.10 The applicants were unable to locate the plasterer, who no longer lived in the area and, in a letter to the applicants dated 24 April 2008, the territorial authority noted that it was unable to verify that the cladding was installed in accordance with NZS 4251⁴ and stated:
- On the basis of our observations in relation to the failures in the cladding system, Council is unable to issue a Code Compliance Certificate.
- 3.11 The Department received an application for a determination on 12 May 2008.

4. The submissions

- 4.1 In a statement accompanying the application the applicants outlined the history of the project, noting the satisfactory inspections during construction, describing their inability to contact the plasterer and explaining that, believing a code compliance certificate would be issued, they had entered into a contract to sell the house. The applicants stated:
- The owners believe they have completed all remedial work as stipulated by the RDC as the requirement of issuing the CCC. The RDC have not given a Notice to Fix – instead they have simply refused to issue the CCC.
- 4.2 The applicants forwarded copies of:
- the drawings and the consent documentation

⁴ New Zealand Standard NZS 4251: Solid plastering; Part 1: 1998 Cement plasters for walls, ceilings and soffits

- the inspection records
 - the correspondence from the territorial authority
 - various other statements, invoices and photographs.
- 4.3 The territorial authority made a submission dated 13 May 2008, which summarised the background of the project, noting that the cracks that appeared in the cladding were most likely to indicate movement stress resulting from a possible absence of construction joints in the cladding. The territorial authority concluded that:
- ...based on what we now know about the construction methods used compared to what is acceptable today coupled with the defects identified in [the submission] is that the alteration as constructed fails to meet the NZ Building Code B2 and E2.
- (I note that the cladding was required to comply with NZS 4251, notwithstanding any particular requirements of the specification or the territorial authority at the time of the building consent.)
- 4.4 The territorial authority forwarded copies of photographs of the south elevation, which showed cracks above the dining area window before and after repair.
- 4.5 Copies of the submissions and other evidence were provided to the parties, which made no submission in response.
- 4.6 The draft determination was sent to the parties for comment on 17 June 2008. The territorial authority accepted the draft.
- 4.7 In a submission to the Department dated 24 June 2008, the applicants made comments on the draft, which are summarised as follows:
- The potential for leaks to this type of cladding was known about at the time but it was agreed that the work was able to proceed without a cavity.
 - The territorial authority inspected the work and the builder had met the territorial authority's requirements. This included inspection of the mesh reinforcing to the plaster and the control joints. The applicant questioned the adequacy of the inspections by territorial authority.
 - The applicant questioned the territorial authority's ability to add new defects that had not featured in earlier inspections of the work.
 - The applicant noted that the same territorial authority that passed the original work would be involved in assessing the code-compliance of the remedial work.
 - The applicant questioned why the territorial authority could not make a definitive decision about what work was necessary to fix the cladding and suggested it was the territorial authority's responsibility to advise what needs to be done. The applicant sought advice with respect to the territorial authority's responsibility for the completed building.
- 4.8 In response to the last bullet point, I note that while the territorial authority is responsible for determining whether a particular building complies with the Building Code it is not responsible for determining how compliance is to be achieved. The

Building Code is a performance-based document and this gives owners a choice as to how compliance can be achieved.

5. The expert's report

5.1 As discussed in paragraph 1.5, 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 New Zealand Institute of Building Surveyors. The expert inspected the house on 25 May 2008, and furnished a report that was completed on 6 June 2008.

5.2 The expert noted that the plaster wall cladding was “generally straight and fair”, although various defects to the extensions were apparent and a number of cracks had been recently repaired and painted.

5.3 The expert also noted that, with the exception of the items outlined in paragraph 5.6, the “workmanship of the visible part of the roof flashings appeared adequate”. The expert also noted that penetrations through the cladding appeared to be adequately sealed.

5.4 Windows and doors

5.4.1 The expert noted that the windows and doors were recessed, with metal head flashings and no jamb or sill flashings, apart from a retro-fitted sill flashing to the front bedroom window.

5.4.2 The expert removed a small section of cladding at the jamb to sill junction of the door to the upper rear deck, and noted that the installation did not include jamb or sill flashings, and the window had been installed without sealing behind the jamb flange.

5.4.3 The expert removed another small section of cladding at the jamb to sill junction of the door to the lower paved rear patio, and noted water damage to the building wrap. The expert noted that the installation did not include jamb or sill flashings, although in this case the window had been installed against sealing between the jamb flange and the backing sheets.

5.5 Moisture observations

5.5.1 The expert inspected the interior of the house and noted some movement cracks at junctions between walls and ceilings. Non-invasive moisture readings were elevated at several areas.

5.5.2 The expert took invasive moisture readings through the cladding at areas considered to be at risk of moisture penetration. All readings taken were elevated as follows:

5.5.3 The front additions

- 24% and 26% in the framing below the master bedroom window.
- 33% in the framing below the beam to wall junction.
- Over 40% in the framing below the bottom of the apron flashing.

5.5.4 The rear additions

- 22% in the framing below the kitchen window.
- 19% in the framing beside the crack at the side of the window.
- 21% in the bottom plate beside the door to the upper timber deck.
- 21% and 23% in the bottom plate to the west of the lower bedroom doors.
- 27% in the bottom plate at the cut-out beside the lower bedroom doors.
- 38% in the bottom plate beneath the west gutter to wall junction.

Moisture levels over 18%, or which vary significantly after cladding is in place, generally indicate that external moisture is entering the structure.

5.6 Commenting specifically on the wall and roof claddings, the expert noted that:

The wall areas

- there are no vertical control joints in walls where dimensions exceed the 4m length limit between such joints recommended in NZS 4251⁵
- there are no horizontal control joints in the 2-storey high parapet walls
- despite recent repairs, there are movement cracks in some areas of the plaster
- the positions of some of the recently repaired cracks indicate that the joints of the backing sheets line up with the window jambs in some areas
- there is insufficient clearance from the bottom of the plaster to the ground or paving in some areas
- the bottom of the plaster continues down to ground level in some areas, allowing moisture to “wick” up towards the bottom plate of the framing

The windows and doors

- most of the windows and doors lack sill and jamb flashings, with some jambs not sealed behind the flanges, and associated moisture penetration is apparent
- there are gaps in the plaster below the flashing at the head to jamb junctions, allowing moisture penetration into the framing
- the plaster over the recess at the window sills is almost flat, allowing moisture penetration into the unflashed door and window sills
- the retro-fitted sill flashing to the front bedroom window does not continue under the window jambs, allowing moisture penetration into the junction

Other junctions

- the timber deck and stairs lack a drainage gap between the timber decking and the stucco wall or balustrade cladding, with the timber butting against or buried in the plaster so allowing water to be trapped at the junctions
- there is no evidence of any saddle flashing at the junction of the flying beam with the front wall, and the timber below has high moisture levels

⁵ New Zealand Standard NZS 4251: Solid plastering; Part 1: 1998 Cement plasters for walls, ceilings and soffits

- the bottom of the apron flashings are not weathertight, with no kickouts, unsealed plaster and holes in the plaster at the ends of the gutters – , and the timber below has very high moisture levels
- the parapet to the rear extension, where it extends into the body of the existing roof, has exposed unsealed fibre-cement backing sheets below the plaster.

5.7 The expert also noted that, although there is no evidence of top and saddle flashings to the clad balustrades, there is no sign of any associated moisture penetration. I note that the inspection records indicate that the balustrades have membrane flashings (refer paragraph 3.5).

5.8 The expert concluded that the cladding had not been installed to the manufacturer's instructions or to NZS 4251, which was operative at the time of construction. In view of the extent of non-compliance, the expert considered that:

...consideration should be given to recladding the plaster areas of the alterations and additions on the hardibacker system. A drained cavity would be required.

5.9 A copy of the expert's report was provided to each of the parties on 30 May 2008.

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 Solutions⁶, 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 are written conservatively to 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 one or more other provisions 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 determinations⁷ (for example, Determination 2004/1) relating to cladding and these factors are also used in the evaluation process.

⁶ 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.

⁷ Copies of all determinations issued by the Department can be obtained from the Department's website.

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 building extensions:

- are built in a medium wind zone
- are a maximum of two storeys high
- are complex in plan and form
- have solid plaster cladding that is directly fixed to the framing
- have parapets to three elevations and eaves projections of about 500mm overall
- have two upper level attached decks, with monolithic-clad balustrades
- have a monolithic-clad column and monolithic-clad beams
- have external wall framing that may not be treated to a level that will provide resistance to the onset of decay if the framing absorbs and retains moisture.

6.2.2 The building has been evaluated using the E2/AS1 risk matrix. The risk matrix allows the summing of a range of design and location factors applying to a specific building design. The resulting level of risk can range from 'low' to 'very high'. The risk level is applied to determine what claddings can be used on a building in order to comply with E2/AS1. Higher levels of risk will require more rigorous weatherproof detailing; for example, a high risk level is likely to require a particular type of cladding to be installed over a drained cavity.

6.2.3 When evaluated using the E2/AS1 risk matrix, the weathertightness features outlined in paragraph 6.2.1 show that all of the elevations of these extensions demonstrate a high weathertightness risk rating.

6.2.4 Under the Building Act I am required, as is the territorial authority under section 436, to consider the Code Clause E2 requirements applicable at the date of the building consent in 2001, and I note that at that time the relevant acceptable solution E2/AS1 permitted direct-fixed solid plaster on a rigid backing, without the incorporation of a cavity. In contrast, the current E2/AS1 requires a drained cavity for all risk exposures for this cladding type. However, in 2001 there would have been stringent requirements governing the construction of any direct fixed stucco system in such a high risk building, which would necessarily have needed to incorporate the requirements of NZS 4251.

Matter 1: The cladding

7. Discussion

- 7.1 Taking into account the expert's report, I am satisfied that the current performance of the cladding installed to the extensions on this house is inadequate because it has not been installed according to good trade practice or to manufacturer's recommendations at the time of construction. In particular, the monolithic cladding demonstrates the key defects listed in paragraph 5.6 and is allowing significant moisture penetration into the walls through these defects.
- 7.2 I have also identified the presence of a range of known weathertightness risk factors in these extensions. 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 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 Clause E2 of the Building Code.
- 7.3 In addition, the extensions are 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 house to remain weathertight. Because the cladding faults on the extensions are allowing moisture penetration in some locations now, or are likely to allow the ingress of moisture in the future, the extensions do not comply with the durability requirements of Clause B2.
- 7.4 Because of the extent and apparent complexity of the faults that have been identified with the cladding, I am unable to conclude how the faults are to be fixed and how the building can be brought into compliance with Clauses B2 and E2.
- 7.5 I consider that final decisions on whether code compliance can be achieved by either targeted repairs 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 consideration and approval.
- 7.6 I note that the Department has produced a guidance document⁸ on weathertightness remediation (available on the Departments website or in hard copy by calling the Department on 0800 242 243). I consider that this guide will assist the owners in understanding the issues and processes involved in remediation work and in exploring various options that may be available to them when considering the upcoming work required to the extensions.

⁸ External moisture – A guide to weathertightness remediation

8. What is to be done now?

- 8.1 A notice to fix should be issued that requires the owners to bring the house into compliance with the Building Code, identifying the items listed in paragraph 5.6 and referring to any further defects that might be discovered in the course of investigation and rectification, but not specifying how those defects are to be fixed. It is not for the notice to fix to stipulate directly how the defects are to be remedied and the house brought to compliance with the Building Code. That is a matter for the owners to propose and for the territorial authority to accept or reject.
- 8.2 I would suggest that the parties adopt the following process to meet the requirements of paragraph 8.1. Initially, the territorial authority should issue the notice to fix. The owners 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.

9. The decision

- 9.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the cladding to the extensions does not comply with Clauses E2 and B2 of the Building Code, and accordingly confirm the territorial authority's decision to refuse to issue a code compliance certificate.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 9 July 2008.

John Gardiner
Manager Determinations