

Determination 2005/115

Refusal of a code compliance certificate for a building with a “monolithic” cladding system at 45 Halsey Drive, Lynfield, Auckland – House 100

1 THE DISPUTE TO BE DETERMINED

- 1.1 This is a determination of a dispute referred to the Chief Executive of the Department of Building and Housing under section 17 of the Building Act 1991 (“the Act”) as amended by section 424 of the Building Act 2004. The applicant is the territorial authority and the other party is one of the joint owners of the property (referred to throughout this determination as “the owner”). The application arises from the refusal by the territorial authority to issue a code compliance certificate for 2-year old alterations to a house more than 30 years old unless changes are made to its monolithic cladding system.
- 1.2 The question to be determined is whether on reasonable grounds the external wall cladding (“the cladding”), which is applied to the walls of this house, complies with the building code (see sections 18 and 20 of the Act). By “external wall cladding as installed” I mean the components of the system (such as the backing sheets, the flashings, the joints and the plaster and/or the coatings) as well as the way the components have been installed and work together.
- 1.3 This determination is made under the Building Act 1991 subject to section 424 of the Building Act 2004. That section came into force (“commenced”) on 30 November 2004, and its relevant provisions are:
- “ . . . on and after the commencement of this section,—
- “(a) a reference to the Authority in the Building Act 1991 must be read as a reference to the chief executive; and
- “(b) the Building Act 1991 must be read “with all necessary modifications to enable the chief executive to perform the functions and duties, and exercise the powers, of the Authority . . . ”

It should be noted that the new legislation does not amend the determination process set out under the 1991 Act, other than to transfer the power to make a determination from the Authority to the Chief Executive of the Department of Building and Housing.

- 1.4 This determination refers to the former Building Industry Authority ("the Authority")
- (a) When quoting from documents received in the course of the determination, and
 - (b) When referring to determinations made by the Authority before section 424 came into force.
- 1.5 In making my decision, I have not considered any other aspects of the Building Act or the building code.
- 1.6 The house itself is described in paragraphs 2.1 to 2.4 and paragraph 8 sets out my decision.

2 PROCEDURE

The building

- 2.1 The building is a large detached house situated on a gently sloping site in a moderate wind zone in terms of NZS 3604. The house is on two levels, with ground floor bedrooms, family room and garage, and first floor living, kitchen/dining, and bedroom areas. Construction of the first floor is conventional light timber frame, with the ground floor walls of concrete block and timber framing with a concrete slab and foundations. The recent building alterations include the construction of a new entrance canopy that forms a carport, new stairs from the ground floor to the first floor, a deck extension over an open garage area, new aluminium windows and doors to the east and north elevations and re-cladding of most of the first floor exterior walls.
- 2.2 The house shape is simple in plan, with the original 17.5° pitched roof clad in concrete tiles. The new deck has a floor of butyl rubber membrane laid over plywood and timber-framed balustrades faced with monolithic cladding on both sides and the top. The roof is made up of simple hips, valleys and monopitches, with 600 mm wide eave projections over all walls apart from the new roof above the staircase, which has approximately 3 metres length of external wall. The new deck and entrance canopy are timber framed and supported on timber posts clad with brick veneer. The timber-framed parts of the exterior walls are clad in monolithic cladding, with a small amount of original cedar cladding, and the concrete block walls are plastered.
- 2.3 The framing and plywood to the new deck extension and balustrades are H3 treated, supported by invoices supplied by the owner. I have seen no evidence as to the treatment, if any, of the timber used in the original exterior walls of the existing house.

- 2.4 The new cladding to the exterior walls of the first floor, and to the small areas of timber framed walls to the ground floor, is what is described as monolithic cladding. As specified in its technical information of June 1998 (“the manufacturer’s instructions”), it incorporates fibre cement sheets fixed through the building wrap directly to the framing timbers and finished with a jointing, textured coating and painting system. The manufacturer’s instructions include details for flashings at various junctions, and refer to (but do not specify) the sealants, jointing systems and coatings, and state that they all have to be provided by a single supplier. For the purposes of this determination, the manufacturer of the jointing and coating system is regarded as the manufacturer of this cladding system; despite the fact that the fibre cement backing sheets are proprietary to another manufacturer. All coating products and the associated components are supplied by the manufacturer. There is no reference made to requirements for the final paint coating system. An independent organisation carried out an appraisal of the cladding system in 1995 (although the certificate was withdrawn in July 2004).
- 2.5 The installer issued a “Producer Statement” for the coating system, dated 24 July 2002, which noted the products used on this house, and a “Warranty” for the quality of the supplied product from the manufacturer of the coating system.

Sequence of events

- 2.6 The territorial authority issued the building consent number on 22 February 2002 for “Additions to deck, entrance, stairway, enclose carport and new carport on existing pad”. The consent did not cover the re-cladding of the first floor walls and none of the “conditions / endorsements” attached to the consent referred to the cladding.
- 2.7 The territorial authority made various inspections during the course of construction including a “Postline check list” on 16 May 2002, which noted that the inspection applied to “Entrance and stairwell only”.
- 2.8 The territorial authority carried out a final building inspection on 11 December 2003 and noted in the comments to the “Final Check List”:
- No cavity to cladding upstairs and deck
 - Downstairs fibre cement sheet with jointers – O.K
 - Concrete block – plastered – O.K
- 2.9 The territorial authority wrote to the owner on 16 February 2004, stating that it had inspected the house and regretted that it may not comply with the building code in a number of respects, describing the territorial authority’s concerns in regard to weathertightness problems involving buildings clad with monolithic claddings. The territorial authority attached to this letter two Notices to Rectify, both dated 13 February 2004, which both included “Particulars of Contravention” in regard to the house.
- 2.10 The “Particulars of Contravention” attached to the first Notice to Rectify, “Notice to rectify building work No. 1776”, noted that:
- A site inspection of the above property carried out on February 3 2004 revealed that the exterior cladding of the new building constructed at the above address is a monolithic cladding system with no provision for ventilation of the wall

space, and furthermore the exterior claddings have been installed otherwise than in accordance with the manufactures *[sic]* specifications, the acceptable solutions of the building code and accepted trade practices as detailed below.

1. The following items have not been installed per the manufactures *[sic]* specifications
 - The exterior cladding system is to finish a minimum 100mm above paved surfaces or 175mm above unprotected ground. These clearances have not been achieved.
 - Control joints at a maximum of 5.4m centres, vertically are required. Control joints have not been installed.
 - A 6mm gap (horizontally) is required between the back of the cladding and foundation wall. This has not been achieved.
 - The minimum finished floor level to finished ground level is 150mm to paved surfaces. This clearance has not been achieved.
 - Horizontal surfaces are to be formed with sufficient fall to prevent water from ponding on them. The deck barriers have flat horizontal surfaces.
 - The bottom edge of the fibre-cement sheet is required to be sealed; this has not been achieved.
2. The following items have not been installed per the acceptable solutions of the building code, (no alternative solutions have been applied for)
 - The distance between finished floor level and finished paving of 150mm has not been achieved.
3. The following items have not been installed per accepted trade practice
 - The bottom edge of the aluminium joinery has been sealed to the cladding; this should be left open to allow water egress.
 - At the junction between horizontal surfaces (i.e. top of barrier) and a vertical surface (i.e. house wall) flashings are required. The deck barrier/house junction has no flashing installed.
 - All flashings are to be installed in such a way as to direct water away from the building, and prevent ingress of moisture, at the junction between the garage roof and bedroom wall (above the garage door). This has not been achieved.
 - A minimum clearance of 50mm is required between the cladding and adjacent surfaces. There is minimal clearance between the terrace and wall claddings.
 - Penetrations through the cladding system shall be as waterproof as the cladding itself. There are a number of penetrations through the cladding that should be protected with rubber flanges and silicon.
4. Ventilated cavity system
 - The Council has recently received information which shows that monolithic cladding systems without a cavity, provision for adequate ventilation, drainage and vapour dissipation will, in the likelihood of leakage and/or the effect of residual moisture, cause irrevocable damage to the structural elements of the building.

The territorial authority also noted that:

The Council cannot be satisfied that the cladding system as installed on the above building meets the Functional Requirement of Clause E2 External Moisture of the Building Code...

Also that the owner was required to:

Provide adequate ventilation to the monolithic cladding and into the wall frame space by means of either a ventilated cavity or alternate approved system...

- 2.11 The “Particulars of Contravention” attached to the second Notice to Rectify, “Notice to rectify building work No. 1777”, noted that:

A site inspection of the above property carried out on February 3rd 04 revealed that a large portion of the exterior cladding of the building constructed at the above address has been replaced without the benefit of a building consent.

Also that the owner was required to:

Lodge with the council an application, within 28 days from the date of this notice, a building consent to (a) remove the existing cladding system that is not covered by building consent[as described], (b) provide all necessary information that may be requested to allow a building consent application to be processed, to reclad those areas not covered by the previously mentioned building consent...

- 2.12 The lawyer for the owners replied on their behalf to the territorial authority on 16 March 2004. The letter set out a chronology of relevant events and discussed the points raised in the Notices to Rectify 1776 and 1777, noting that:

We understand that the requirement for a cavity stipulated in the Notice to Rectify reflects a new policy instigated by the Council in early December 2003 which requires all new buildings, and renovations to existing buildings, using monolithic claddings, regardless of their design, to incorporate a ventilated cavity.

By any standards, the retrospective application of this policy to buildings under construction or, as in this case, actually completed, prior to the notification of the policy, is grossly unfair, and draconian in its cost implications....

Other comments made in the letter may be summarised as:

- While the cladding system did not constitute an acceptable solution under the building code, it had been approved by the territorial authority as an alternative solution on numerous occasions;
- The owner had received advice from a consultant (“the consultant”) that, apart from some minor items which the owners are prepared to remedy, the Notices to Rectify were not justified;
- The consultant had also noted the presence of various mitigating features in the house;
- The owner had been specifically informed by a building official of the territorial authority that the application for the building consent did not need to include the recladding, as a building consent was not required for this work; and
- The inspections carried out by the territorial authority did not raise any issue as to the lack of a building consent for the recladding until the final inspection.

The letter also noted that:

Where building work has been undertaken without a building consent, but nonetheless complies with the Building Code it would be unreasonable to require the building work to be demolished and a notice to rectify purporting to require demolition in such circumstances is invalid...

- 2.13 The territorial authority responded on 4 April 2004, confirming the two Notices to Rectify and noting that:

We believe that the Notices to Rectify Building Work No. 1776 and 1777 are valid and the Council cannot issue a Code Compliance Certificate....

The territorial authority went on to say:

The Council must satisfy itself on reasonable grounds that the building complies with the code at the time the building is inspected, not at the time the consent was issued.

The territorial authority offered to meet with the owner and the owners expert, and noted that:

If a satisfactory solution is not agreed upon, the only practical course will be for your client to refer the matter to the Building Industry Authority for a determination.

- 2.14 The lawyer for the owners replied to the territorial authority on 14 May 2004, noting that:

We note that your letter does not provide any substantive response to the concerns we have raised in relation to the "blanket" application of the new Council cladding rules, or the representations made to our client by [the territorial authority's building official] in relation to the need for a Building Consent...

- 2.15 The territorial authority responded on 31 May 2004, confirming the points made in their letter of 4 April 2004, and noting that:

...notwithstanding the fact that a building consent may have been issued and a building has been built in accordance with a consent, Council is still required to satisfy itself on reasonable grounds when issuing a Code Compliance Certificate (CCC), that the building complies with the Building Code (not the building consent) at the time the certificate is issued.

The territorial authority went on to say:

...it is Council's view that any solution would need to include ventilation of the wall framing...

The territorial authority also responded to the claim that the owner was informed that a building consent was not needed for the recladding work by noting that:

[The building official] is fully aware of what does and does not require a building consent and he categorically denies that he told [the owner] that she did not need consent to reclad the existing structure.

- 2.16 The owner applied for this determination on 21 September 2004.

3 THE SUBMISSIONS

3.1 The owner forwarded a lengthy submission, made up of notes, statements and reports. The owner outlined the facts leading up to the application for this determination, noting that:

- Building work was completed by the end of September 2002, however some external landscaping work remained to be done which was not completed until November 2003.
- A Final Inspection was requested in December 2003, however the inspection was terminated as soon as the inspector discovered that some of the cladding was of monolithic construction without a drainage cavity. This action was taken as a result of a new “blanket policy” which had taken effect 6 days before the inspection.
- A further inspection was performed in early February 2004.
- Two weeks later we received two Notices to Rectify (NTR), numbers 1776 and 1777. NTR 1777 requires that we strip the cladding from the entire upper storey of our house and reclad it with a new covering incorporating a ventilated cavity.
- [The owner’s expert] performed a site inspection in late February 2004 and subsequently compiled a report which is attached to this submission...
- [The owner’s expert] made the following comment regarding moisture ingress: A visual inspection of the interior showed no signs of moisture ingress... ...there were no signs of any damp-smelling interior areas. No invasive testing was carried out as this was not considered to be necessary.

The owner also noted that the owner’s expert:

...believes that the majority of the alleged defects are either “minimal concerns” or invalid and do not constitute non-compliance with the building code.

The owner went on to discuss in some detail the matters covered by the two Notices to Rectify.

3.2 The owner responded to the issue of the lack of building consent for the recladding work raised by the territorial authority in the “Particulars of Contravention” attached to Notice to Rectify No. 1777, and the main points can be summarised as follows:

- The owner was advised by the owner’s designer and a building official of the territorial authority that no consent was required, as the recladding constituted refurbishment;
- The owner’s designer made enquiries to the Authority, and an official confirmed that, when maintenance is done for cosmetic purposes, a consent is not required; and
- The territorial authority made various inspections while recladding work was being undertaken, and no inspectors raised any objection to the lack of consent.

3.3 The owner went on to respond in detail to the points raised by the territorial authority in regard to defects in the house construction in the “Particulars of Contravention” attached to Notice to Rectify No. 1776, and the main points can be summarised as follows:

In regard to cladding and floor clearance:

- The entrance foyer area has paving sloping away from the house and is covered with a 5 metre deep and 4.5 metre wide entrance canopy; and
- The timber-framed section of wall adjacent to the open garage area is sheltered by the deck overhang and the paving is sloped to direct water away from the walls.

In regard to control joints:

- The only wall over the length recommended by the manufacturer as requiring control joints is the south wall;
- The cladding has been in place for more than two years and is over 32-year old framing and sits above a 32-year old concrete block basement; and
- There is no evidence of any cracking or movement.

In regard to a gap between back of cladding and foundation wall:

- The territorial authority made no mention of the need for a gap during inspections;
- To achieve a gap would necessitate the replacement of all monolithic cladding to the relevant wall sections of the ground floor;
- The areas of timber framing to the ground floor are sheltered by the entrance canopy and deck overhangs; and
- There is negligible risk of moisture penetration at the bottom wall plate, so there is little point in making any change to a completed house.

In regard to flat tops to deck barriers:

- A sloping top to the parapet can be achieved but there is little point as there is no habitable space under the balcony;
- There has been no sign of moisture under the balcony during the two years it has been in place; and
- The parapet framing is H3 treated timber.

In regard to the sealing of the bottom of the fibre cement sheet:

- The bottom edge of the sheet was sealed with the exterior textured coating and topcoat.

In regard to an opening at the bottom of the window sill:

- The builder advises that a sealant strip was used to seal behind the bottom flange of the aluminium windows; and

- The owner's expert advises that an opening along the bottom of the windows is not a normal requirement and would be a source of water ingress if finished that way.

In regard to the flashing of the deck barrier to wall junction:

- Precautions against cracking and leaks have been taken by extending the epoxy layer vertically and horizontally against the walls for at least 100 mm;
- There is no evidence of any water ingress; and
- To install a flashing now would require cutting through the epoxy layer which is performing well.

In regard to the flashing of the garage roof to wall junction:

- The flashing in question clearly slopes away from the bedroom wall; and
- No sign of water ingress has ever been noticed even during the heaviest downpour.

In regard to cladding clearance at the deck to wall junction:

- The minimum clearance provided is 20 mm;
- The deck surfaces slope at about 2o towards gutters;
- Down pipes and gutters are provided that easily cope with the heaviest downpours;
- Water cannot accumulate to a depth where the clearance might become a problem;
- There has been no sign of moisture under the balcony during the two years it has been in place;
- The deck framing is H3 treated timber;
- The butyl membrane extends up behind the cladding for at least 150 mm above the level of the tiles; and
- To cut back the cladding now would risk cutting through the butyl membrane leading to more danger of water ingress not less.

In regard to sealing of penetrations through the cladding:

- This should have been done by the coating applicator and can be complied with.

In regard to a ventilated cavity system:

- The provision of ventilation of the wall framing is not a requirement of the building code; and

- The envelope of the house is simple with no complex roof/wall intersections, and has only the upper storey clad in monolithic cladding.

The owner also supplied copies of:

- The architect's brief for the house renovations;
- The plans and specifications;
- The consent documentation;
- The territorial authority's inspection documentation;
- Relevant correspondence with the territorial authority;
- Correspondence between the owner's lawyer and the territorial authority;
- A history of events;
- Correspondence by email between the architect and an official of the Authority;
- The as-built detail of the deck balustrade;
- The coating applicator's "Producer Statement" and the coating supplier's warranty of materials;
- The report from the owner's expert; and
- A letter from the builder containing the invoices for H3 treated timber.

3.4 The territorial authority acknowledged the application for this determination on 29 September 2004, followed by a letter on 28 October 2004 which stated that:

As detailed in the NTR the areas of contravention relate to six (*sic*) clauses of the Building Code, namely:

- E2 external moisture

Specific construction defects may be grouped into the following areas:

- Ground clearances
- Control joints
- Flashings
- Horizontal surface fall requirements, and
- Insufficient means of dissipation of water where the water passes through the exterior cladding.

The territorial authority also supplied copies of:

- The building consent documentation;
- The building inspection records; and

- The Notices to Rectify with the attached “Particulars of Contravention”.

3.5 The copies of the submissions and other evidence were provided to each of the parties. Neither the owner nor the territorial authority made any further submissions in response to the submissions of the other party.

3.6 In a letter to the Department dated 1 July 2005, the territorial authority commented on aspects of the draft determination. In particular, the territorial authority is concerned that paragraphs 6.10, 6.11 and 8.2 indicate a scope of work required to make the house code compliant. The territorial authority claims that this is not part of the determination.

4 THE RELEVANT PROVISIONS OF THE BUILDING CODE

4.1 The dispute for determination is whether the territorial authority’s decision to refuse to issue a code compliance certificate because it was not satisfied that the cladding complied with clauses B2.3.1 and E2.3.2 of the building code (First Schedule, Building Regulations 1992) is correct. Those provisions of the building code say:

Clause B2 DURABILITY

B2.3.1

Building elements must, with only normal maintenance, continue to satisfy the performance requirements of this code for the lesser of the specified intended life of the building, if stated, or:

(a) The life of the building, being not less than 50 years, if:

(i) Those building elements (including floors, walls, and fixings) provide structural stability to the building, or

(ii) Those building elements are difficult to access or replace, or

(iii) Failure of those building elements to comply with the building code would go undetected during both normal use and maintenance of the building.

(b) 15 years if:

(i) Those building elements (including the building envelope, exposed plumbing in the sub floor space, and in-built chimneys and flues) are moderately difficult to access or replace, or

(ii) Failure of those building elements to comply with the building code would go undetected during normal use of the building, but would be easily detected during normal maintenance.

Clause E2—EXTERNAL MOISTURE

E2.1 The objective of this provision is to safeguard people from illness or injury, which could result from external moisture entering the building.

E2.2 Buildings shall be constructed to provide adequate resistance to penetration by, and the accumulation of, moisture from the outside.

E2.3.2 Roofs and exterior walls shall prevent the penetration of water that could cause undue dampness, or damage to building elements.

4.2 There are no Acceptable Solutions that have been approved under section 49 of the Act that cover this cladding. The cladding is not accredited under section 59 of the Act. I am therefore of the opinion that the cladding system as installed can be considered to be an alternative solution.

4.3 In several previous determinations, the Authority has made the following general observations, which in my view remain valid in this case, about acceptable solutions and alternative solutions:

- Some acceptable solutions cover the worst case, so that in less extreme cases they may be modified and the resulting alternative solution will still comply with the building code; and
- 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.

5 THE EXPERT'S REPORT

5.1 The Department commissioned an independent expert ("the expert") to inspect and report on the cladding. The expert inspected the building and furnished a report, noting that the cladding appeared to have been installed generally in accordance with the manufacturer's instructions at the time of construction, and that, with the exception of some minor cracking, the quality of the coating was generally even and sound. The sealing of services and plumbing penetrations generally appeared weathertight, and the cladding was observed to form a continuous weathertight surface behind all obstructions.

5.2 The expert noted that the completed alterations differed from the drawings in several respects, the only significant deviation being that the garage was not enclosed but was left as an open carport.

5.3 The expert took non-invasive moisture readings through interior linings of external walls throughout the house. These readings did not show raised moisture levels. 4 further readings were taken through holes drilled through the exterior cladding into the bottom plate to the new staircase ground floor wall, the sill plate under an original timber window in a reclad first floor bedroom wall and at two locations into the top plate to the new deck balustrade. Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure. There was evidence of moisture penetration at both locations in the top plate of the enclosed balustrade, where readings of 27.8% and 28.4% were recorded. The other locations did not show raised moisture levels.

5.4 The expert's report made the following specific comments on the cladding:

- Existing timber windows in the reclad walls to the first floor extend up under the soffits with new timber scribes fitted at the jambs and the new cladding fitted up to the underside of the original timber sills. The moisture content below a jamb/sill junction showed no elevated moisture in the framing indicating that the window junctions have been performing adequately;
- The new aluminium joinery is face-fixed with metal head flashings installed in accordance with the manufacturer's instructions. Removal of a small section of sealant at the jamb of the new deck door revealed a fillet of sealant which extended 2 mm back between the joinery flange and the fibre cement with no evidence of an extra seal behind, suggesting that the sealant was applied after fitting the joinery unit instead of before as specified in the manufacturer's instructions. However, there is no evidence of higher moisture levels around and below the windows, indicating that the jamb details have been performing adequately;
- The new deck door had no sill flashing, with the flange fitted over the butyl rubber upstand. This door was part of a large corner joinery unit. The mitre of the bottom flange at the corner was open, although inspection showed that the seal below the inner aluminium section is intact. However, the performance at the sills of the corner windows is entirely dependent on maintenance of the sealants;
- Roof to wall intersections are protected with lead apron flashings with kick-outs to the lower ends that appear adequate;
- While the house is plastered to give a uniform appearance, most of the lower floor walls are texture-coated concrete block with smaller sections of flush-finished fibre cement cladding over timber framing. The upper floors are also flush-finished fibre cement cladding over timber framing. There is a small section of two-storey monolithic cladding to the new staircase, which is less than 5.4 metres in height. There is no evidence of horizontal cracking and all heights are within the limits recommended by the manufacturer so no horizontal control joints are considered necessary;
- No vertical control joints in the cladding are evident. The manufacturer specifies control joints to be provided at 5.4 metre centres from corners. This limit has been exceeded on the upper wall to the south elevation and there is a crack in the cladding below one window of this wall. This crack was in line with the opening, indicating that the joints of the fibre cement backing sheets have not been offset from the window corner as specified by the manufacturer. The lack of this offset and the lack of a control joint may both have contributed to the crack;
- While there is a step that provides a limited drip edge between the upper wall cladding and the lower concrete block, the bottom edge of the fibre cement sheets are coated with a sprayed finish, meaning that the finish is continuous

with the plaster finish to the concrete block below. However, there is no evidence of moisture penetration at this junction;

- Penetrations by services are sealed with sealant, although the screw fixings of one deck light fitting have not been sealed. The cladding and coating is continuous behind plumbing pipes. There is no indication of water penetration;
- The ground clearances to the finished floor level are generally adequate except for a small (less than 2 metres) section of the new staircase wall, not protected by portico or deck overhangs, where clearance to finished floor level is 90 mm and to the lower edge of the cladding is 20 mm. However, the paving has an adequate fall away from the timber framed walls and there is no indication of moisture entry in these areas;
- At the upper floor deck, the clearance between the finished deck surface and the lower edge of the wall cladding varies between 30 mm and 70 mm. There is no indication of moisture entry to the wall framing in these areas;
- The deck is finished with tiles over a butyl rubber membrane with an upstand against wall and balustrade framing and a perimeter gutter with outlets to each end. Falls appear adequate with no evidence of significant ponding or of any leaks into the carport or soffit below;
- The new deck has balustrades clad in flush finished fibre cement on both sides and the top. The balustrade abuts the exterior walls at both ends. There is no evidence of moisture penetration at these balustrade/wall junctions and adjacent wall framing showed no raised moisture content;
- The top to the balustrade is flat, rather than the minimum fall of 1 in 10 specified in the manufacturer's instructions. The top plate of the enclosed balustrade shows high levels of moisture at 27.8% and 28.4% indicating moisture penetration. However, visual inspection via a hole drilled into the wall space below the top plate indicated that the lower framing appeared dry and sound with no evidence of decay or mould;
- As well as the crack to the upper south wall, there are three cracks to the north face of the enclosed balustrade to the new deck. These may be due to movement in the structure or to defects in the cladding or coating;

5.5 The expert concluded that there is evidence of moisture ingress related to:

- The flat top to the flush-finished fibre cement clad deck balustrade.

5.6 The expert also noted a number of areas which seemed to have been performing adequately to date, but which did not demonstrate good trade practice and were of concern in the longer term. These were:

- The lack of a control joint to the upper south wall cladding;
- The crack under a window on the upper south wall cladding;

- The reliance on maintenance of the sealant at the sill mitre of the corner deck windows;
- The reliance on edge sealant to the jambs of the new aluminium windows; and
- The cracking to the flush-finished fibre cement cladding to the deck balustrade.

5.7 Copies of the expert's report were provided to each of the parties. The owner responded by fax on 23 March 2005. The owner stated that he was impressed with the open-minded approach of the expert, which he said was different from the "close-minded blanket rule" approach of the territorial authority. The owner pointed out that H3 timber had been used to construct the balustrade framing. The owner did not agree with the expert's statement that the cladding had been amended from the consented plans. The owner was prepared to undertake any work that he was directed to do to rectify the cladding.

5.8 In a letter to the Department dated 29 March 2005, the territorial authority acknowledged receipt of the expert's report. The territorial authority suggested that there was also failure of clause B2 (durability) regarding the house, and noted the report supported the territorial authority's decision not to issue a code compliance certificate.

6 DISCUSSION

General

6.1 I acknowledge that there may have been confusion over whether a building consent was required for the recladding of the upper floor, but consider that this issue does not alter my consideration of the weathertightness of the house. Whether or not a consent was required, the cladding must comply with clause E2 of the building code.

6.2 I have considered the submissions of the parties, the expert's report and the other evidence in this matter. The approach in determining whether building work complies with clause E2.3.2, is to examine 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.

Weathertightness risk

6.3 Research data and experience, both internationally and locally, indicates that the impact of weathertightness problems in monolithic clad houses can be minimised if good and effective design and construction practices are followed.

6.4 The installation of exterior cladding to manufacturer's specifications and to accepted good trade practice is an important but not the only requirement to ensure good weathertightness performance.

6.5 The next priority is to reduce the ability of moisture to get through the cladding by using design measures that minimise the effects of the rain impacting on the walls.

6.6 Important matters for consideration are:

- Data show a strong relationship between the width of the eaves and the incidence of wall leaks. An effective deflection mechanism, such as eaves greater than 600 mm wide, has been shown by Canadian data to manage more than 90% of rain incidence;
- While most reported leaks are substantially caused by defects in the cladding that require little or no wind pressure differential, I believe that buildings in high and very high wind zones (as defined by NZS 3604) are likely to experience wind pressure differentials and thus a higher risk of water ingress;
- Taller buildings result in an effective increase in the catchment area of the wall. Available data suggests a clear correlation between higher number of storeys and an increased incidence of leaking;
- Complex roofs and overall envelope shapes where the roofs frequently intersect with the walls on upper floors create opportunities for leaks into the wall; and
- Recent data also shows that decks and balconies that are exposed in plan and/or cantilevered from the external walls are the most frequent location for water leaks.

6.7 Any likely penetration of moisture through the cladding can then be countered by a combination of effective drainage, ventilation of the drainage cavity and moisture tolerance in the external wall framing timber. In particular:

- The structure should allow water that has penetrated the cladding to drain out as quickly as possible. It is believed that generally a drainage cavity should be provided behind the outer cladding barrier in monolithic construction;
- The design of the outer walls should allow walls to dry to the outside once moisture penetrates the cladding and the moisture barrier. If walls do not dry, decay fungi can become established in as little as 3 months. Until scientific data on the optimum depth and configuration of the ventilation mechanism in New Zealand conditions is available, I believe that the drainage cavity should be not less than 20 mm deep; and
- The external walls should have some degree of decay resistance or moisture tolerance to allow for situations when moisture circumvents the cladding and moisture barriers and moisture levels in the timber rise to more than 18%.

6.8 In relation to these characteristics, I find that this house:

- Has eave projections that are greater than 600 mm wide that provide good protection to the cladding beneath them. This applies to all walls, except for a

small section of wall, around the new stairs, that has no eave or verge projections;

- Is in a moderate wind zone;
- Is a maximum of two storeys high;
- Has exterior windows and doors that are flashed only at their heads;
- Has an overall envelope that is simple in plan, with a roof system of simple hip, valley and wall to roof junctions;
- Has an enclosed deck on the first floor that is exposed in plan, and is partly constructed over an open garage area. The deck has a framed and clad balustrade with a flush finish to all sides and a flat top;
- Has H3 treated plywood beneath the deck membrane and H3 treated framing to the deck and balustrade, which is effective in delaying the onset of decay;
- Has monolithic cladding to the first floor, to the deck balustrades and to limited parts of the lower floor, which is fixed directly to the framing with no drainage cavity; and
- Has external walls to the older parts of the house which are likely to have been constructed with untreated timber, which would provide no decay resistance if it gets wet and cannot dry out.

Weathertightness performance

- 6.9 I consider that, while in most respects the cladding appears to have been installed according to good trade practice and to the manufacturer's instructions, this does not apply to a number of areas.
- 6.10 There is one area, as set out in paragraph 5.5, that is experiencing current moisture penetration. This is the top of the new deck balustrade.
- 6.11 There are some additional defective areas, as set out in paragraph 5.1, which if not remedied, will eventually allow the ingress of moisture behind the cladding. These are:
- The cracking in the flush-finished fibre cement to the new deck balustrade;
 - The crack in the wall cladding under the window on the south elevation; and
 - The lack of a control joint in the wall cladding to the timber framed wall on the south elevation; and
 - The lack of sealing to the fixings of the deck light.
- 6.12 There are further defects that may affect the durability of some elements within the house. These are set out below:

- The reliance on edge sealant at the jambs to the aluminium doors and windows; and
- The reliance on maintenance of the sealant at the sill mitre of the corner windows to the new deck.

6.13 Notwithstanding the fact that the cladding is fixed directly to the timber framing, thus inhibiting drainage and ventilation behind the cladding sheets, I find that there are compensating factors that assist the performance of the cladding in this particular case. These are:

- Generally, and notwithstanding the deficiencies that have been identified, the cladding appears to have been installed according to good trade practice and to manufacturer's specifications;
- Apart from the jamb sealant outlined in paragraph 6.12, the house has exterior windows and doors that are flashed at their heads only;
- Apart from the cracking outlined in paragraph 6.11, the coating and finish to the cladding appears to be in good condition, with no current evidence of cracking;
- The house has overall eaves projections, over most of the walls, that are greater than 600 mm that will give protection to the top of the wall framing; and
- Apart from the single area outlined in paragraph 6.10, there is no current evidence of moisture penetration into, or accumulation within, the external wall cavities.

6.14 I consider that these factors adequately compensate for the lack of a drainage and ventilation cavity and can allow the house to comply with the weathertightness and durability provisions of the building code.

6.15 Apart from the wall identified in paragraph 6.11, I accept that control joints in the cladding are not required to any of the other walls of the house.

6.16 I acknowledge the territorial authority's concern regarding:

- The cladding clearances near the entry, but accept that these are adequate considering the protection offered by the new portico to most of the area and the slope of the paving away from the wall;
- The cladding clearances at the deck, but accept that these are adequate considering the surface drainage provided and the upstand of the deck membrane against the framing;
- The junction of the deck balustrade with the external wall cladding, but accept that these appear to be performing adequately;

- The junction of the upper cladding with the lower concrete block, but accept that the junction is sealed with the coating, provides a small step that can act as a drip edge and appears to be performing adequately; and
- The junction of the entrance canopy roof against the wall, but accept the expert's advise that the apron flashings appear to be adequate.

6.17 I note that one elevation of the house demonstrates a high weathertightness risk rating while other elevations demonstrate medium risk, as calculated using the E2/AS1 risk matrix. 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 CONCLUSION

7.1 I find the expert's report establishes that there is evidence of external moisture entering the building in one location as listed in paragraph 6.10. Accordingly, I find that the cladding on this building at this time does not comply with clause E2.3.2 of the building code.

7.2 The building 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 house to remain weathertight. Because the additional cladding faults listed in paragraph 6.11 in this building are likely to allow the ingress of moisture in the future, the house does not comply with the durability requirements of clause B2.

7.3 I also find that, because the faults in this cladding occur in discrete areas, I am able to conclude that rectification of the identified faults is likely to bring the cladding into compliance with the code. Once the cladding faults listed in paragraphs 6.10 and 6.11 have been satisfactorily rectified, this house should be able to remain weathertight and thus comply with both clauses E2 and B2.

7.4 I note the additional defects listed in paragraph 6.12 that may affect the durability of some elements in other areas of this house, and conclude that regular careful inspection and maintenance of the sealant by the owner, with any signs of potential moisture entry points repaired and resealed promptly, should ensure durability of these elements to comply with clause B2.

7.5 I note that effective maintenance of monolithic claddings is important to ensure ongoing compliance with clause B2 of the building code. That maintenance is the responsibility of the building owner. 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 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 cleaning, re-painting, replacing sealants, and so on.

- 7.6 It is emphasised that each determination is conducted on a case-by-case basis. The fact that a particular cladding system has been found as being code compliant in relation to a particular building does not necessarily mean that the same cladding system will be code compliant in another situation.
- 7.7 I decline to incorporate any waiver or modification of the building code in my determination.

8 THE DECISION

- 8.1 In accordance with section 20 of the Act, I determine that the house is not weathertight and, therefore the cladding does not comply with clause E2. There are also a number of items to be remedied to ensure it remains weathertight and thus meet the durability requirements of the code. Consequently, I find that the house does not comply with clause B2. Accordingly, I confirm the territorial authority's decision to refuse to issue the code compliance certificate.
- 8.2 I also find that, once the items of non-compliance that are listed in paragraphs 6.10 and 6.11 are rectified to the approval of the territorial authority, together with any other instances of non-compliance that become apparent in the course of rectification, the cladding as installed on the house will comply with the building code, notwithstanding the lack of a ventilated cavity.
- 8.3 I note that the territorial authority has issued a Notice to Rectify requiring provision for adequate ventilation, drainage and vapour dissipation. Under the Act, a notice to fix can require the owner to bring the house into compliance with the building code. The Authority has already found in a previous determination (2000/1) that the Notice to Rectify cannot specify how that compliance can be achieved. I concur with that view. A new notice to fix should be issued that requires the owners to bring the cladding into compliance with the building code, without specifying the features that are required to be incorporated. It is not for me to dictate how the defects as described in paragraph 6.10 and 6.11 are to be remedied.
- 8.4 I would suggest that the parties adopt the following process to meet the requirements of clause 8.3. Initially, the territorial authority should issue the 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 technically robust proposal, produced in conjunction with an expert, 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. As indicated earlier in this determination, the Chief Executive might already have decided upon some of the issues that may be raised by the territorial authority in its notice to fix, including the territorial authority's requirement, if any, for a ventilated and drained cavity or equivalent.

- 8.5 Finally, I consider that the cladding on the building will require on-going maintenance to ensure its continuing building code compliance.
- 8.6 In response to the territorial authority's letter to the Department of 1 July 2005, I consider that I am entitled to determine whether proposed building work complies with the code, and in fact I have done so in this case. However, the question of whether the work has been properly completed and is code compliant requires careful inspection. I do not believe in this case that the territorial authority's inspections meet this standard. I note that the territorial authority's inspection described in a "Final Checklist" dated 11 December 2003 did not make any specific reference to cladding deficiencies, apart from the comment that there was no cavity.
- 8.7 The Notice to Rectify issued on 14 April 2004 listed Particulars of Contravention that included:
- Floor clearances;
 - Ground clearances;
 - Control joints; and
 - Flashings.
- 8.8 I am disturbed to note that these obvious building defects were not discovered during the December 2003 final inspection. They are also issues that are unrelated to the question of a cavity that the territorial authority has raised. It can be seen that the expert's report provides the comprehensive description of the building's outstanding shortcomings that should have been detected before or at the final inspection process and incorporated in the Notice to Rectify.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 1 August 2005.

John Gardiner
Determinations Manager