



Determination 2015/084

Determination regarding the code compliance of fixings to plywood cladding on a 9-year-old house at 7 Surfers Avenue, Waihi Beach



Summary

This determination considers the compliance of nailing to plywood cladding to a house located in a sea spray zone: galvanised mild steel nails had been installed instead of stainless steel nails. The determination considers the compliance of the plywood in relation to Building Code Clauses B1 Structure and E2 External moisture, and the remedial work done to date by the owner.

1. The matters 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 and Assurance, Ministry of Business, Innovation and Employment (“the Ministry”), for and on behalf of the Chief Executive of the Ministry.

1.2 The parties

1.2.1 The parties to the determination are:

- the current owner of the house, S Baker (“the applicant”)
- the Western Bay of Plenty District Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.

1.2.2 I consider the original builder of the house, M Mackay, (“the builder”), as a person with an interest in this determination. Mr Mackay was granted approval as a licensed building practitioner (“LBP”) on 31 July 2012; he was not an LBP at the time the original work was consented in 2005.

¹ The Building Act, Building Code, Acceptable Solutions, Verification Methods, past determinations and guidance documents issued by the Ministry are all available at www.building.govt.nz or by contacting the Ministry on 0800 242 243.

1.3 The reason for the application

1.3.1 The application for this determination arises because:

- the house was constructed under a building consent issued to the builder in 2005 and was issued with a code compliance certificate in 2006; the house was sold twice times before the applicant purchased it in 2012
- in 2014, the applicant noted rust stains appearing around the plywood nail fixings and carried out repairs (“the repairs”), which included punching existing nails, treating rust, filling and priming old nail holes, then installing new stainless steel fixings prior to repainting
- after investigating the problem and seeking advice from the authority, the applicant halted the work pending confirmation that his repair work to date would comply with the relevant provisions of the Building Code.

1.4 The matters to be determined² are therefore whether:

- the original plywood cladding complies with Building Code Clauses B1 Structure, E2 External Moisture and B2 Durability³ (I consider this matter in paragraph 8.2)
- the repairs carried out to date on the non-structural plywood wall cladding comply with Clauses E2 and B2 (I consider this in paragraph 8.3.1)
- the repairs carried out to date on the structural plywood cladding comply with Clauses B1 and B2 (I consider this in paragraph 8.3.4).

1.5 Matters outside this determination

1.5.1 This determination is limited to questions of compliance of the cladding although the applicant’s submission raises issues regarding the potential liability for any defects. Under section 177 of the Act, I can only determine certain matters; the following issues raised by the applicant are not determinable under section 177:

- the authority’s possible failure to identify fixing defects during inspections
- the appearance of the paintwork, if that issue does not affect compliance.

1.5.2 The application for this determination does not include the remaining building work undertaken under the building consent for this house or other aspects of the plywood installation. This determination is limited to the consideration of the original fixings to the plywood claddings and the repairs carried out to date by the applicant.

1.6 In making my decision, I have considered the submissions from the parties, the report of the expert commissioned by the Ministry to advise on this dispute (“the expert”) and the other evidence in this matter.

2. The building work

2.1 The building work considered in this determination consists of fixings to plywood-clad walls of an existing single-storey house situated on a level coastal site in a high wind and sea spray corrosion zone⁴ for the purposes of NZS 3604⁵.

² Under section 177(1)(a) of the Act

³ 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.

⁴ According to the Project Information Memorandum for the building work

⁵ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

2.2 Construction is conventional light timber frame, with concrete foundations and floor slab, plywood and profiled metal wall claddings, aluminium joinery and a profiled metal ‘butterfly’ roof, with oblique eaves above the west and east walls.

2.3 The plywood wall cladding

2.3.1 The wall cladding to most of the walls is H3.1 treated 12mm thick plywood, with 9mm wide x 5mm deep grooves at 150mm centres. The plywood is fixed through 20mm timber battens and the building wrap to the framing. The timber battens form a cavity between the plywood sheets and the building wrap.

2.3.2 The manufacturer’s 2005 instructions call for 60 x 2.8mm nail fixings for plywood installed over a cavity and stated that when the cladding:

...is being installed in sea spray zones⁶ and for all zones where it is being used as cladding and bracing [my emphasis], use stainless steel or silicon bronze fasteners. Stainless steel or silicon bronze fasteners must also be used in all situations when H3 CCA treated plywood claddings are being used.

For all other situations, hot dipped galvanised fasteners are acceptable.

2.3.3 The relevant Acceptable Solution for Clause B2 of the Building Code in 2005⁷ required a minimum durability of 15 years for non-structural wall cladding and 50 years for structural cladding, which included bracing elements.

2.4 The manufacturer’s current instructions

2.4.1 The manufacturer’s current instructions call for stainless steel fixings to be used in Zone D (the former sea spray zone) and the current BRANZ Appraisal states:

Coastal locations can be very corrosive to fasteners, especially locations within distances of up to 500m from the sea including harbours, and 100 metres from tidal estuaries and sheltered inlets, and otherwise as shown in NZS 3604 Figure 4.2. these coastal locations are defined in NZS 3604 as Zone D. To achieve a 50 year serviceable life, [the proprietary plywood] sheets must be fixed with stainless steel fasteners.

2.4.2 The plywood cladding is also used as wall bracing (“the structural cladding”), with panels at the northeast, southeast and southwest corners, and beside the main north entry. The manufacturer states that ‘the brace element may be fixed over cavity battens’ and calls for the structural plywood cladding to be:

...fixed with 60 x 3.15mm nails to 150mm centres to perimeter of bracing element at no less than 7mm from sheet edge and at 300mm centres to intermediate studs.

3. Background

3.1 The authority issued a building consent No. 73781 for the house in October 2005 to the original builder. The consent conditions included:

The cladding is to be installed on a cavity as set out in the plans and approved, and strictly in accordance with the manufacturer’s installation instructions.

3.2 The authority carried out various inspections and issued the code compliance certificate on 12 June 2006. The builder sold the house to the first owner in July 2006. Ownership changed in December 2006 and the applicant became the third owner in early 2012.

⁶ Within 500m of sea according to NZS 3604 at the time

⁷ Acceptable Solution B2/AS1, 1 April 2004, Table 1

3.3 The repairs

- 3.3.1 While undertaking routine maintenance in 2014, the applicant noticed rust stains around the plywood nail fixings. On investigation, he discovered that water had penetrated into nail holes sometime in the past and the galvanised nails had started to rust. He also observed that some filling and painting had been carried out previously as rust stains had not been visible when the house was purchased in 2012.
- 3.3.2 The applicant noticed that some plywood sheets were bowing and nails were lifting and sought advice from local builders, the authority, and the cladding manufacturer. Although some nails were completely 'rusted out' and able to be replaced, most nails could not be removed without damaging the plywood.
- 3.3.3 The applicant then carried out repairs to the two most affected sides of the house, which included punching existing nails, treating rust, then filling and priming old nail holes prior to repainting the cladding. As part of the repairs, the applicant also installed new stainless steel fixings between each of the original galvanised nails.

3.4 The reason for the problem

- 3.4.1 Concerned about continuing corrosion of the galvanised nails despite repairs, the applicant sought further advice from the cladding manufacturer and obtained the relevant 2005 installation instructions for the product.
- 3.4.2 In an email to the authority dated 5 March 2015, the applicant noted that discussions with the manufacturer confirmed that the plywood fixings 'should have been 60mm stainless nails' given the house's proximity to the ocean and stated:
- So now that I know that my repairs are being done correctly, I guess I'm now seeking clarification of what to do next. Given the expense of re-nailing the house with stainless nails before repainting, is there any logical course of action to seek remuneration from any party who allowed this property to be built contrary to the then current [manufacturer's] installation specifications?
- 3.4.3 In an email to the applicant dated 9 March 2015, the authority recommended the applicant seek a determination on the compliance of the fixings and stated:
- Rightly or wrongly Code Compliance Certificate has been issued. According to the manufacturer's technical manual the [cladding] was not installed with stainless steel nails as recommended. However the issue would be has the cladding and associated fasteners failed to meet the 15 year durability requirement of the Building Code (B2).
- 3.5 The Ministry received an application for a determination on 23 April 2015.

4. The submissions

4.1 The applicant's submission

- 4.1.1 The applicant made a submission, explaining the background to the situation and the reason he sought a determination. The applicant described the damage found, the investigations undertaken and the repairs carried out to date, concluding:
- I feel that despite my best efforts to achieve a satisfactory repair, the problem is only once again being delayed until the rust breaks through the repair again.
- 4.1.2 The applicant forwarded copies of:
- relevant extracts from:
 - the consent documentation
 - BRANZ Appraisal No.764 (2011)

- Acceptable Solution B2/AS1, 1 April 2004, Table 1
 - the cladding manufacturer's 2005 instructions
 - the code compliance certificate
 - photographs of the original fixings prior to and following the repairs
 - correspondence with the authority.
- 4.2 The authority made no submission in response, but acknowledged the application in a form received on 7 May 2015.

5. The expert's report

5.1 As mentioned in paragraph 1.6, I engaged an independent expert who is a member of the New Zealand Institute of Architects to assist me. The expert visited the site on 29 May 2015, providing a report completed on 12 June 2015 which was forwarded to the parties on 16 June 2015.

5.2 General

5.2.1 The expert noted that he had been asked to assess the following items (in summary):

1. distance of the house from the sea
2. repairs undertaken and the state of original unrepaired fixings
3. relevant requirements for plywood fixings
4. fixings called for in the consent documentation
5. inspections of the plywood fixings
6. manufacturer's recommendations for fixings in this corrosion zone
7. whether the plywood is used as structural bracing
8. whether current repairs to date will comply with relevant code clauses.

5.2.2 The expert inspected the plywood cladding with the applicant and noted:

- As well as the proximity to the sea, west and east exterior walls are high and exposed due to the butterfly roof with oblique eaves that provide little protection despite the eaves overhang.
- The west elevation has not yet been repaired and some rusting and popping nails are apparent. The bottom edges of the sheets are swelling above the horizontal joint and also at the base of the wall.
- The bottom edges of plywood cladding are recognised as vulnerable to moisture damage if not protected by paint taken over the edge and up the back face. (I note that paragraph 9.8.9 of E2/AS1 in 2005 stated:
 For claddings required to have a 50-year durability, plywood treated to H3 (LOSP)⁸ shall be painted on all edges and the outer face with a latex exterior paint system...)
- Due to the vulnerability of bottom edges, it is important to maintain clearances above ground or paving and also to maintain an anti-capillary gap above horizontal flashings.

⁸ Light organic solvent preservative

5.2.3 The expert took a small sample of plywood for analysis and the laboratory report dated 3 June 2015 confirmed that the sample was treated to an equivalent of H3.1.

5.3 Opinions on questions posed by the Ministry

5.3.1 The expert commented on the items he was asked to assess as follows (in summary):

Items	Expert's comments	
1	Distance of house from sea	Surf beach is about 370m away. Easterly winds carry sea spray well beyond the house location. Estuary is about 224m away but is less of a risk.
2	Original unrepaired areas	Original fixings generally 60mm long annular grooved nails – difficult to remove (degree of corrosion adds to difficulty). One nail removed by the applicant was 40mm long.
	Current repair work to date	Applicant punched original fixings, applied rust treatment, primed area, filled with window putty. Re-nailed between original fixings with stainless steel nails.
3	Requirements of Clause B2	Minimum durability of 15 years for non-structural wall cladding and 50 years for structural cladding, which includes bracing elements (see paragraph 2.4.2).
	NZS 3604 in 2005	<u>Sea spray zone</u> : defined as within 500m of sea <ul style="list-style-type: none"> • stainless steel fixings for structural bracing • galvanised steel for non-structural cladding
	NZS 3604 current	<u>Zone D</u> : 'Coastal areas with high risk of windblown sea spray salt deposits within 500m of the sea...' <ul style="list-style-type: none"> • stainless steel fixings for structural bracing • galvanised steel for non-structural cladding
4	Consent documentation - fixings	No specification for fixings – calls only for installation to accord with the manufacturer's specifications.
5	Inspections of fixings	No specific reference to cladding fixing
6	Manufacturer's instructions	60 x 2.8mm stainless steel in sea spray zones 60 x 3.16mm stainless steel when used as bracing.
7	Plywood as structural bracing	Bracing panels at external corners and beside entry.
8	Compliance of repairs to non-structural panels	Durability requirement of 15 years after the CCC issued in 2006, which is a further 6 years. Repairs likely to be satisfactory, with any further corrosion unlikely to result in non-compliance with Clause E2 and B2.
	Compliance of repairs to structural bracing panels	Unable to confirm continuing structural integrity due to: <ul style="list-style-type: none"> • continuing corrosion of original nails over 50 years • unknown length of all original nails • additional new fixings result in edge penetrations at 75mm centres, which could weaken ability to maintain bracing capacity due to the edges deteriorating over 50 years.

5.4 Outcome

5.4.1 The expert concluded that repairs completed to date and proposed for remaining areas are likely to comply with the relevant parts of Clause E2 and B2, given the drained cavity, providing:

- clearances above ground and the horizontal joint are attended to
- the paint coating to the plywood is regularly maintained.

5.4.2 However, the expert concluded that the braced panels may not comply with the requirement to remain structurally sound for the 50 years minimum required by the Building Code. The bracing panels therefore do not comply with Clause B2 insofar as it applies to Clause B1 and the expert suggested that:

...it should be necessary to completely remove the sections of cladding that are bracing panels and reinstate them all in accordance with the manufacturer's instructions and to ensure full compliance with the NZ Building Code.

5.5 The addendum to the expert's report

5.5.1 On 19 August 2015 and in response to the submissions received from the parties (refer paragraphs 6.2 to 6.5) I sought further comment from the expert.

5.5.2 The expert provided an addendum on 6 September 2015, which I summarise as follows:

- The manufacturer's manual current at the time was the version published in June 2003, stated that the plywood was treated with LOSP (H3.1) and required:
 - A 2-3mm expansion gap between sheets at the vertical joint.
 - Type 316 stainless steel fixings when the product is used in sea spray zones or where the cladding is used as a bracing element.
 - Priming and paint galvanized or anodised aluminium flashings for coastal regions.
 - Cut edges to be sealed, and bottom edges of sheets and inside shiplap joints to be primed or pre-coated if painting or staining.
- NZS 3604:1999 current at the time, required fixings to be Type 304 or 316 stainless steel in a sea spray zone (500m from the sea or 100m from tidal estuaries). The house is 370m away from the surf beach and 224m from a tidal estuary.
- The extract supplied by the applicant (refer paragraph 6.5) is from the manufacturer's 2007 installation instructions and shows an expansion gap of 5mm as opposed to 2-3mm. The 2007 detail also shows the nail going through the weather-groove, placing it further away from the sheet edge.
- If the sheets have been installed without the inner lap fixed at the vertical joint (noting this has not been confirmed over the whole area of cladding), the installation is not in accordance with the manufacturer's details and would be in conflict with NZS 3604:1999. However the remedial work is not going to help in this regard.

6. The draft determination and submissions in response

6.1 A draft determination was issued to the parties for comment on 29 June 2015.

6.2 In a response received on 10 July 2015 the authority noted it did not accept the draft determination, noting the following:

1. [In reference to the expert's report] is it possible to determine whether or not plywood bracing was installed directly onto wall framing (behind wall cavity and building wrap), rather than plywood bracing panel fixed over wall cavity? Would the outcome of the Determination be different?
2. Having to know that fact would also allow for better scoping of any remedial work.

3. Could the Determination also suggest/recommend follow up action either by the applicant or by the [authority] in this instance?

6.3 In a response received on 17 August 2015, the applicant did not accept the first draft determination and submitted the following (in summary):

- The applicant received advice that:
 - the additional fixing at 75mm strengthened the bracing, and that if there was to be failure it would be the galvanized fixings
 - the manufacturer's current nailing requirements for plywood cladding have been reduced from that which was originally specified
 - it was highly unlikely that the framing was rebated and the bracing sheets therefore applied directly to the framing
 - without a destructive investigation no guarantee could be given that any moisture ingress has not affected the battens
- The builder had not adhered to the manufacturer's installation instructions of the time for fixing, and this is the cause of the plywood bowing between the nails when subject to normal temperature variances.
- The incorrect nailing, with one single nail through both sheets 7-8mm from the ends of the top sheet, has allowed for moisture and sea spray to penetrate between the sheets and caused the galvanized nails to rust.
- There is inadequate overhang to the bottom plate and inadequate ground clearance.

6.4 The applicant also referred to the following additional issues he had observed in the construction, noting that in his view the code compliance certificate should not have been issued:

- A significant amount of the ceiling insulation was not correctly installed.
- The internal circuit board was incorrectly wired ('the whole house was wired through one RCCB⁹') and should not have received an electrical certificate of compliance (the property file does not include a copy of this certificate).
- The heat pump was wired directly to mains supply with no means of isolation either internally or externally.
- The dishwasher was not individually switched and could not be isolated.

6.5 With the submission the applicant provided:

- an extract from the manufacturer's installation instructions detailing the vertical lapped joint (the detail is not marked with a version number or date)
- a number of photographs identifying various defects in the cladding

6.6 On 15 September 2015, I sought from the parties confirmation of whether the plywood bracing was direct-fixed, copies of the authority's inspection records, and confirmation as to whether the authority held a copy of the electrical energy works certificate.

6.7 On 17 September 2015, the authority advised it did not hold a copy of the electrical energy works certificate and that it wasn't standard practice at that time for the authority to request one.

⁹ Residential Current Circuit Breaker

- 6.8 On 23 September 2015, the applicant advised he had removed a power point to observe behind the bracing sheet, and noted that ‘there is definitely no internal bracing sheet. Just the batten over the building wrap.’
- 6.9 In a response to a request for further information, by email on 7 October 2015 the applicant advised that the stainless nails used were ‘2.8mm x 60mm, Grade 316 stainless annular grooved’.

7. The structural engineer’s comment and parties comments in response

- 7.1 I engaged a second independent expert (“the structural engineer”) who is a Chartered Professional Engineer to assist me. The structural engineer reviewed the information in the first expert’s reports and the draft determination, and provided an opinion by email on 13 November 2015 which was forwarded to the parties on 19 November 2015. The structural engineer was asked to comment on two issues:
- whether or not the structural integrity of the ply bracing panels has been affected by the additional nail fixings around the perimeter of braces, and
 - confirm new fixing requirements to nail off the bracing panels.
- 7.2 In regards to the additional nail fixings, the structural engineer referred to NZS 3603:1993, noting that the minimum spacing allowed for nail diameter of 3.2mm in Radiata Pine is 40mm (65mm for other timbers), and 2.8mm diameter nails this would be 35mm (or 55mm for other timbers). Nails should be no closer than 3 nail diameters to the edge of the sheet. The structural engineer concluded that the additional nail fixings around the perimeter of the plywood, bringing the centres to 75mm, would have no effect on the structural integrity of the plywood bracing panel.
- 7.3 The structural engineer compared the fixing type and length in the manufacturer’s 2015 plywood cladding manual, the Acceptable Solution E2/AS1, and the manufacturer’s plywood bracing specification (EP1 as below). I have summarised this information in the following table:

	2015 cladding manual *	E2/AS1 **		2014 plywood bracing specification ***
		Paint finish	Stain or unfinished	
Fixing type	60 x 28 FH 316 stainless	60 x 2.8 FH 316 stainless Annular groove	65 x 3.2 FH 316 stainless Annular groove	60 x 2.8 FH galvanized or stainless
Distance from edge no less than	7mm	-	-	7mm
Minimum penetration	None stated	30mm		
<u>Spacing</u>				
Perimeter studs	150mm	-	-	150mm
Internal studs	300mm	-	-	300mm

* For sea spray zones where the ply is fixed on cavity battens

** On cavity battens

*** EP1 (ply one side), for thicknesses up to 12mm

- 7.4 The manufacturer's manual specifies that sheet joints should not be nailed through the overlap from the top sheet and that the two sheets should be nailed off independently. The structural engineer noted:

I understand that there is evidence that the existing nailing to the underlap, despite having some protection from the overlapped sheet, are rusting out. If no sheets are removed and the old and new nailing patterns follows the recommendations then the underlap edge of each sheet will be relying on just the existing fixings. In terms of B1 structure and the bracing panels this is unacceptable, the underlap edges need to be exposed and re-nailed to EP1 requirements. If it is accepted that nailing through overlaps is possible then in my opinion 60x2.8mm 316 stainless steel annular groove nails at the above spacings satisfy the structural requirement for EP1 braces and therefore comply with Clause B1...

- 7.5 The applicant provided further comment by email, dated 24 November 2015, noting that there appears to be no nailing off of the underneath sheet with it relying on the single nail penetration through both sheets at the overlap. The applicant noted it would be impossible to lift any top overlapping sheets without damaging the plywood, and the problem could only be corrected by removing all of the cladding.

8. Compliance of the plywood fixings

- 8.1 In order for me to form a view as to the code-compliance of the original fixings and of the repairs carried out to date; I need to establish what evidence is available. In this case, the evidence includes:

- annotated photographs taken by the applicant before and during repairs
- relevant technical information at the time the building consent was issued
- the Acceptable Solution B2/AS1, 1 April 2004, Table 1
- the expert's report on the repaired and unrepaired areas of the cladding
- the structural engineer's opinion on the structural integrity and fixing.

8.2 The compliance of the original plywood fixings

- 8.2.1 Taking account of the expert's report, I am satisfied that the original fixings to the plywood cladding did not accord with the building consent requirement for the cladding to be installed in accordance with the manufacturer's 2005 instructions as outlined in paragraph 2.3.2.
- 8.2.2 I note the applicant's photographs prior to his repairs and the expert's description of damage to unrepaired areas of plywood cladding (see paragraph 5.2.2) and I consider that:
- There is no current indication that the cladding is failing to satisfy Clause E2. However, there is sufficient evidence to suggest that the galvanised fixings will not be sufficiently durable to satisfy the 15-year durability period for a non-structural cladding required by Clause B2.3.1(b) (refer Appendix A).
 - the original fixings to the cladding bracing panels will not meet the requirements of Clause B1 to remain structurally sound for the 50 years minimum required by Clause B2.3.1(a).

8.3 The compliance of the repair work

- 8.3.1 Taking account of the expert's report, I am satisfied that the repairs completed to date and the repairs proposed to the remaining cladding will meet the performance requirements of Clauses E2 and B2 for the plywood cladding to remain weathertight for the 15 years minimum required by the Building Code.
- 8.3.2 The applicant has questioned the bowing of the plywood sheets at vertical joints leading to small cracks / gaps at the sheet joints. The plywood is installed over a ventilated cavity, the cracks / gaps are small, and grooves formed in the sheet junction will assist in directing any water entering any opening down the joint: in my opinion the limited extent of any water ingress will not lead to the cladding failing to satisfy Clause E2.
- 8.3.3 I also consider that visual discolouration of the paint coating caused by any recurrence of corrosion to the original punched nails in repaired areas would be an aesthetic issue that does not affect the cladding's compliance with Clauses E2 and B2. Any moisture penetration as a result of corrosion is expected to be minor and would be drained by the cavity without causing any undue dampness or damage.
- 8.3.4 However, ongoing corrosion to the original nails in the cladding acting as bracing providing stability to the structure is a different matter. Taking account of the expert's report and the structural engineer's comment in regard to the bracing panels, I make the following observations on the completed and proposed repairs:
- The bracing panels are required to perform as intended for a minimum of 50 years. During that time the original galvanised fixings will continue to corrode.
 - The repairs carried out by the applicant will not mitigate the incorrect nailing of the plywood underlaps as these are fixed with galvanised nails.
 - The addition of new stainless steel nails to the overlapped sheets will result in edge penetrations at 75mm centres: this will not have an adverse effect on the structural integrity of the plywood.
 - The original fixings may not all be at the required length, as evidenced by the discovery of a 40mm long nail during repairs carried out to date.

8.4 Conclusion

- 8.4.1 Taking account of the experts report, I am satisfied that the original fixings to the plywood cladding did not accord with the 2005 building consent requirement for the cladding to be installed in accordance with the manufacturer's instructions for fixings to be of stainless steel. The expert's report and the other evidence has also satisfied me that the original fixings do not comply with Clauses B1, B2 of the Building Code.
- 8.4.2 While the cladding currently satisfies Clause E2, the original fixings are failing and in my view will not be not sufficiently durable to satisfy the 15-year period required by Clause B2.
- 8.4.3 The expert's report also provides me with reasonable grounds to conclude that completed and proposed repairs to the cladding will comply with the relevant parts of Clause E2 and Clause B2 of the Building Code.
- 8.4.4 However, the plywood cladding that acts as bracing panels must also continue to meet the structural requirements of the Building Code. Taking into account the

comments of the structural engineer, I conclude that the incorrectly nailed underlap means that the bracing panels do not comply with Clause B1 of the Building Code.

- 8.4.5 I note the coastal location of this particular house and the additional deterioration expected from wind-blown salt spray. Effective maintenance of claddings is important to ensure ongoing compliance with Clauses B2 and E2 of the Building Code and is the responsibility of the building owner. The Ministry has previously described these maintenance requirements (for example, Determination 2007/60¹⁰).

8.5 Clause G9 Electricity

- 8.5.1 The applicant has questioned the compliance of the electrical installation (refer paragraph 6.4). Energy works, of which Electricity is a part, is self-certifying and for the work described is required to be certified by a registered electrician.
- 8.5.2 The applicant is able to make a complaint on the matter to the Electrical Workers Registration Board¹¹ about the compliance of the work.

9. The decision

- 9.1 In accordance with section 188 of the Building Act 2004, I hereby determine that:
- the plywood cladding installed as part of the consented work did not comply with Building Code Clauses B1 Structure, B2 Durability, and E2 External moisture
 - the repairs carried out to date to the plywood wall cladding comply with Clause E2 External Moisture, and Clause B2.3.1(b) with respect to Clause E2
 - the repaired plywood cladding bracing panels do not comply with Building Code Clause B1.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 23 December 2015.

John Gardiner
Manager Determinations and Assurance

¹⁰ Determination 2007/60 Regarding code compliance certificate for a house with monolithic and weatherboard wall cladding systems (Department of Building and Housing) 11 June 2007.

¹¹ Refer <http://www.ewrb.govt.nz/complaints/> for further information

Appendix A

A.1 The relevant clauses of the Building Code include:

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 subfloor 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.
- (c) 5 years if:
 - (i) the *building elements* (including services, linings, renewable protective coatings, and *fixtures*) are easy to access and replace, and
 - (ii) failure of those *building elements* to comply with the *building code* would be easily detected during normal use of the *building*.