

Determination 2009/32

The code compliance of the foundations to a relocated house at 146A Barrack Road, Mount Wellington, Auckland



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 applicant is the owner, N Beasley (“the applicant”) and the other party is the Auckland City Council (“the authority”) carrying out its duties and functions as a territorial authority or building consent authority. I consider the builder of the house to be a person with an interest in this matter.
- 1.2 The determination arises from the authority’s decision to issue a code compliance certificate for work to a relocated house and the resulting dispute between the applicant and the authority is about the adequacy of the remedial work required to make the work code compliant.

¹ The Building Act 2004 is available from the Department’s website at www.dbh.govt.nz.

- 1.3 I therefore take the view that the matters for determination in terms of sections 177(a) and 188(b) of the Act are:

Matter 1: The code compliance certificate

Whether the authority's decision to issue a code compliance certificate for the house was correct.

Matter 2: The proposed remedial work

Whether the scope of the remedial work proposed by the authority ("the remedial work") is sufficient to result in the building work complying with the Building Code² (Schedule 1, Building Regulations 1992).

- 1.4 I note that both parties agree that the foundations, subfloor and decks do not comply with the Building Code in various respects. In order to determine Matter 2, I will therefore need to address the following areas of the building work:

The foundations

The extent to which the foundations, as installed to the house, comply with Clause B1 "Structure" and Clause E2 "External Moisture". By "the foundations, as installed" I include the perimeter walls, the subfloor vents, the piles and the subfloor fixings. I consider this matter in paragraph 8.2.

The entry decks and stairs

The extent to which the entry decks comply with Clause D1 "Access Routes" and Clause F4 "Safety from Falling". I consider this matter in paragraph 8.3.

- 1.5 I note that the concerns raised by the applicant are restricted to the foundations, the subfloor and the decks of the house, and this determination is therefore limited to considering those elements of the consented building work.
- 1.6 In making my decisions, I have considered the applicant's submission, the report of the expert commissioned by the Department to advise on this dispute ("the expert") and the other evidence in this matter.
- 1.7 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 work

- 2.1 The building is a small single-storey house that was relocated onto a gently sloping site that is located in a medium wind zone for the purposes of NZS 3604³. The original house was built in the 1950's and was cut into two sections for moving onto new foundations. The resulting building is a simple 'L-shape' with a profiled metal hipped roof and new brick veneer cladding.
- 2.2 The building work covered by the building consent includes the new foundations and their connections to the house, the work required to join the relocated sections to make the building weathertight, including the brick cladding, and the connections to

² The Building Code is available from the Department's website at www.dbh.govt.nz.

³ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

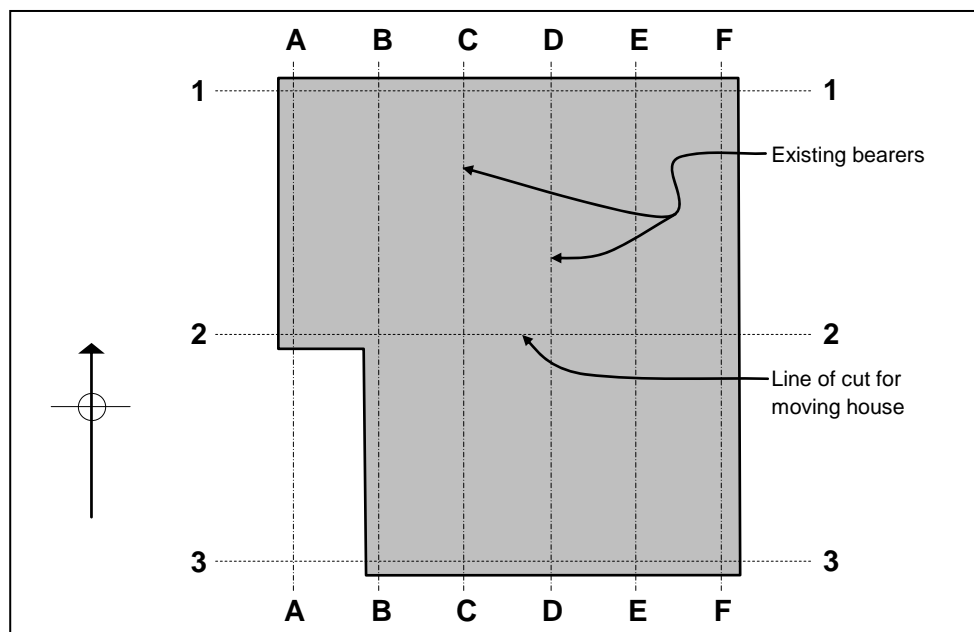
onsite services. The work covered by the building consent does not include work pertaining to the original building, other than the connections from the building to the foundations and the work to join the two sections of the building together.

- 2.3 The construction is conventional light timber frame, with concrete masonry perimeter foundation walls, timber piles, timber floor framing and brick veneer wall cladding. Two small timber decks, and steps, provide access at the main entry to the west and the back door to the north.

2.4 The foundations

- 2.4.1 The foundation wall is a 190mm concrete block wall on a reinforced concrete strip footing, with a concrete block bond beam along the top of the wall.

- 2.4.2 An approximate plan (with gridlines A to F indicating bearer positions) is shown below:



- 2.4.3 The original 100mm x 75mm bearers are retained, with new bearers added to the west and east (gridlines A and F). The original bearers were cut (at gridline 2) when the house was moved in two sections. The piles supporting the bearers are 125mm x 125mm timber posts set into concrete footings.

3. Background

- 3.1 The authority issued a building consent for the building work (No. AC/0207653) on 5 November 2002, under the Building Act 1991.

- 3.2 The authority carried out the following inspections during construction:

- Set-out and piles on 12 November 2002
- Strip footings on 19 November 2002

- Perimeter blockwork on 3 December 2002

- 3.3 No further inspection was carried out until the authority completed a final inspection on 26 February 2004. This inspection identified several minor items that required rectification, none of which related to the foundations or sub-floor, and these items passed a re-inspection the following day.
- 3.4 The authority issued a code compliance certificate on 25 May 2004. The applicant purchased the property later that year, and shortly after discovered defects in the sub-floor structure.
- 3.5 Subsequent correspondence between the applicant and authority resulted in a series of offers of compensation from the authority, all of which were declined by the applicant.

3.6 The applicant's schedule of work

- 3.6.1 In April 2005, the applicant engaged a property inspection company ("the inspection company") to inspect the sub-floor and advise on remedial work. The inspection company inspected the sub-floor of the house and provided a schedule of items that required attention. This schedule was forwarded to the authority.
- 3.6.2 The schedule included a number of defects identified in the foundations. The defects that were accepted by the authority are summarised as follows:
- some piles are not aligned with bearers
 - some joints in bearers are not directly over piles
 - pile missing beside access door
 - connectors and fixings are lacking between joists, bearers and piles
 - bracing connections are lacking
 - some joist hangers are missing
 - bearers do not land on bond beam as per consent drawings (the authority accepts this but only where the cantilever is excessive).
- 3.6.3 The defects that were not accepted by the authority are summarised as follows:
- the bond beam to top of the foundation wall is only 200mm and lacks a nib (the authority contends the beam complies with B1 but does not comment as to its compliance with E2)
 - there is no damp proof course between the piles and bearers (the authority contends this requirement is not applicable to timber piles, which I accept)
 - under-floor insulation is lacking (the authority contends the floor is part of the original relocated house, which I accept)
 - the positions of base ventilators are inadequate (the authority contends the minimum ventilation requirements for compliance are achieved, which I accept)

- the ground in the sub-floor area requires covering to reduce the ingress of moisture from the ground (the authority contends this is not a code requirement).
- 3.6.4 The authority estimated the probable costs of the accepted defects, and made another offer in a letter to the applicant dated 10 October 2005. The applicant did not accept the offer, and discussions and correspondence continued without resolution.
- 3.7 On 18 June 2007, the authority visited the site and suggested that it should arrange for the builder to remedy the defects. In a letter to the applicant dated 25 July 2007, the authority noted that the builder was prepared to carry out the work, which would be inspected by an appropriately qualified consultant, and asserted that the satisfactory completion of this work would settle the matter.
- 3.8 Further discussion and correspondence followed regarding the scope of the work required, and the authority produced a revised scope of work (“the remedial work”) dated 29 January 2008. The applicant did not consider the remedial work sufficient to ensure code compliance.
- 3.9 An application for a determination was received on 12 November 2008, and the Department sought clarification from the applicant, requesting confirmation that the matter to be determined was the extent of the work proposed by the authority.
- 3.10 In an email to the Department dated 2 December 2008, the applicant confirmed that she wished the determination to continue and stated:
- I disagree with the proposal from the [authority], January 2008, on how to remedy my sub flooring and any other omitted issues.

4. The submissions

- 4.1 The applicant made a submission which included a detailed description of the background to the current situation. The applicant explained how she had relied on the code compliance certificate when purchasing the house four years ago and described her attempts to have the defects remedied since that time.
- 4.2 The applicant forwarded copies of:
- some of the consent drawings
 - the inspection records
 - the code compliance certificate
 - the correspondence with the authority
 - various other information.
- 4.3 The authority did not make a submission in response to the application for a determination.
- 4.4 The draft determination was issued to the parties for comment on 10 February 2009.
- 4.5 The authority accepted the draft without comment.

4.6 The applicant accepted the outcome of the draft determination in a letter dated 22 February 2009. The letter included a photograph of bearers along Grid F that were out of alignment with the piles, one of which was described as ‘not even touching [the] pile’. The applicant sought advice as to what remedial work would be appropriate. The applicant also requested that the determination consider the actions of the authority and its regulatory, and administrative, functions when completing the work.

4.7 In response the applicant’s submission I note the following:

- The bearers along Grid F were reported on by the expert, and are described in the 5th bullet point in paragraph 6.3.5.
- The Building Code is a performance-based document. There are several possible remedies available to the parties make the work code-compliant and it is not appropriate for a determination to specify a particular course of action.
- A determination is unable to consider and apportion liability for defective work.
- The Department is not able to investigate the actions of an authority, in the manner sought by the applicant, by way of a determination under section 177 of the Act.

5. The legislation and the Compliance Documents

5.1 Relevant provisions of Clause D1 Access include:

D1.3.3 Access routes shall

- (j) have smooth, reachable and graspable handrails to provide support and to assist with movement along a stair or ladder.

5.2 Relevant provisions of Compliance Document D1/AS1 include:

4.0 Stairways

- 4.1.3 Uniformity – Riser height and tread depth for all steps in one flight, shall be uniform within the tolerance of +/- 5mm measured at the centreline on straight flights...

Table 6: Design Limits for Stairs

Table 6: Design Limits for Stairs Paragraphs 4.1.1, 4.1.4 a), 4.4.2, 4.5.1 a) and Figure 17			
Stair	Maximum pitch	Maximum riser height (mm)	Minimum tread (mm)
Service, minor private	47°	220	220
Secondary private	41°	200	250
Common and main private	37°	190	280
Accessible	32°	180	310

6.0 Handrails

6.0.1 All *accessible stairways* shall have *handrails* on both sides ... All other *stairways* with a width of 2.0 m or less and having two or more risers, shall have *handrails* on at least one side. For a *stairway* of two or three risers within, or giving access to a *household unit*, the *handrail* may be omitted.

6.0.7 *Handrails* shall have a profile which can be readily grasped by an adult hand and shall be installed in a way that avoids the likelihood of personal injury ...

5.3 The relevant provisions of Clause E2 External Moisture include:

E2.3.5 *Concealed spaces* and cavities in *buildings* must be constructed in a way that prevents external moisture being accumulated or transferred and causing condensation, fungal growth, or the degradation of *building* elements.

5.4 The relevant provisions of Clause F4 Safety from Falling include:

F4.3.1 Where people could fall 1 metre or more from an opening in the external envelope or floor of a building, or from a sudden change of level within or associated with a building, a barrier shall be provided.

6. The expert's report

6.1 As mentioned 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 Architects and is an expert in building forensics.

6.2 The expert inspected the house on 29 December 2008 and provided a report dated 16 January 2009, noting that his inspection was limited to the foundations and entry decks.

6.3 The foundations

6.3.1 The expert noted that the brick veneer was well constructed, with no cracks that would indicate movement in the perimeter foundation wall to date.

6.3.2 The expert noted that the consent drawings were limited in detail and did not include any specific engineering design, with structural aspects of the foundations to accord with the relevant requirements of NZS 3604.

6.3.3 The expert noted that the pile height above the ground varied from 450mm at the South to 1200mm to the North. At the hole provided for access to the sub-floor, a section through the concrete blockwork was exposed and the expert could see a vertical reinforcing bar protruding from the blockwork.

6.3.4 The expert assessed the foundations against the requirements of NZS 3604 (refer paragraph 2.4.2 for grid line references). The expert noted that the original bearers were retained, with new bearers added along grid lines A and F.

6.3.5 Commenting specifically on the foundations (section and table references are to NZS 3604), the expert noted that:

- although piles are generally at 1300mm centres maximum, a pile is missed at the north end of grid E resulting in spacings beyond the maximum
- some piles are not centred on the concrete footings
- the bearers are not fixed to the piles
- the bearer on grid line A is cantilevered by 900mm, which exceeds the maximum cantilever of 300mm specified in section 6.12.4
- the original bearers at grid lines A and F are suspended from the floor joists, and confirmation is needed whether the resulting cantilever complies with Table 7.2, considering the span of the roof
- the bearers at grid lines D and E are out of line with the piles, and short lengths of smaller secondary bearers are used to achieve alignment, but these may not be sufficient to transfer loads adequately
- some joints in the bearers are not centred over the piles to provide a 45mm landing as required by section 6.12.7, and there are no connectors across the joints
- where the original bearers were cut for moving the house, they have not been reconnected adequately, relying on a timber plate nailed to the old and new joists on either side of the cut which is not adequate to resist earthquake loads
- there are no braced piles or connections between the foundation wall and piles to transfer horizontal loads between the house and the foundations
- the bond beam at the top of the foundation wall is 200mm with a flat top, in lieu of the 250mm bond beam shown in the consent drawings and specified in Figure 6.14, so any water that might have entered the brick cavity would not be drained to the exterior
- there is no connection between the wall and floor structure as specified in Figure 6.16, reducing resistance to earthquake movement

6.3.6 The expert also noted that the top of the bond beam has no 50mm concrete nib to protect the framing from moisture running down the brick veneer cavity.

6.3.7 The expert made the following additional comments on the foundations:

- although the exposed blockwork at the access hole shows that the blockwork cells are not all filled in accordance with the consent drawings, solid filling of foundation walls is only required for those cells containing reinforcing.
- although the foundation wall lacks vents along the south wall, the vents provided exceed the minimum requirements specified in NZS 3604 section 6.14.1 and there are no signs of moisture problems at the south end.

6.4 The entry decks and stairs

6.4.1 The expert also assessed the timber decks and steps at the main entry and the northern back door, and noted that these were generally within the requirements of Clause F4 with the exception of the fall height from the deck at the northern exterior door. (However, I note that the stairs must also comply with Clause D1, and I address that matter in paragraph 8.3.2.)

6.5 The proposed remedial works

6.5.1 The expert also assessed the authority's proposed remedial work, including the attached sketches.

6.5.2 Commenting on the attached sketches, the expert noted that:

- the top of the foundation wall is incorrectly shown close to the floor joists, whereas it is about 150mm below the joists and 50mm below the bearers
- the flat top of the wall is not addressed.

6.5.3 The expert made the following comments with respect to the proposed scope of works:

Revised Scope of work 29/01/08		Expert's summarised comment
Item	Summarised requirement	
1	Check levels of bearers and adjust	No areas seen that needed level adjustments to comply with code.
2	Install ribbon plate to top of foundation wall as shown in attached sketches	Sketches incorrect as they show the top of the foundation wall close to the floor joists. The top is actually about 150mm below the joists and 50mm below the bearers
3	If bearing at bearer joints inadequate, fit structural brackets and connections.	Requires structural engineer's assessment in regard to some areas such as cantilevered bearers.
4	Install bracing as shown in attached sketch	Bracing is required to an engineer's design.
5	Check bearers for deviation and adjust over the bearing of piles (may require additional side supports to pile or additional piles).	Grid lines D and E also have unsupported joints, so new bearers could be a more economic solution.
6	Skew nail floor joists to bearers.	Fixings required, but there is limited access for nailing, and other fixings may be more appropriate.
7	Leave temporary bearer lines and piles	Further explanation required as the meaning is unclear.
8	Provide graspable handrail to entry	Although a handrail is provided, I note that it does not comply with D1 (refer paragraph 8.3.2)

6.6 A copy of the expert's report was provided to the parties on 22 January 2009.

Matter 1: The code compliance certificate

7. Discussion

- 7.1 I note that the authority appeared to carry out regular inspections during construction of the consented work. However, it has subsequently been shown that the inspections failed to identify various items that did not comply with the Building Code.
- 7.2 I also note that the authority has accepted that various items do not comply with the Building Code. I consider that the areas of non-compliance in the consented work are significant and should have been identified during inspections by the authority.
- 7.3 I therefore consider that the authority's decision to issue the code compliance certificate was incorrect as it was based on inadequate inspections and information. I am able to conclude that the authority did not have reasonable grounds on which to issue a code compliance certificate for the consented work.

Matter 2: The remedial work

8. Discussion

- 8.1 As outlined in paragraph 1.4, in order to assess the adequacy of the remedial work proposed by the authority, I need to address the extent of non-compliance of the foundations, entry decks, and stairs as built.

8.2 The foundations

- 8.2.1 I accept the expert findings with respect to the foundations, in particular:
- I conclude that the subfloor ventilation is sufficient to comply with Clause E2
 - I conclude that the perimeter foundation wall complies with Clause B1 but that it does not comply with Clause E2 because of the drainage of the brick cavity
 - I consider the piles themselves comply with Clause B1, except as noted by the expert where individual piles are not centred in their concrete footing, are absent, or are and are misaligned with respect to the subfloor framing above.
 - I conclude that the subfloor framing, and its connection to the house does not comply with Clause B1.
- 8.2.2 I also note the expert's comment in paragraph 6.3.6, and conclude that remedial work is necessary with respect to the omission of a nib to the top of the bond beam. I am therefore satisfied that the work does not comply with Clause E2 of the Building Code.

8.3 The entry decks and stairs

- 8.3.1 The deck of the northern exterior door exceeds the 1.0m fall height contained in Clause F4.3.1 and the deck therefore does not comply with Clause F4.

- 8.3.2 I consider the stairs to both decks are “common and main private” stairs, as defined in D1/AS1. Table 6 of D1/AS1 requires common and main private stairs to have a maximum pitch of 37 degrees, with a maximum riser height of 190mm, and a minimum tread depth of 280mm.
- 8.3.3 There are 5 risers to the stairs to the northern deck which has a total height of 1020mm; the risers therefore exceed Table 6 in D1/AS1. I note also that stair risers are required to be uniform and within the tolerances noted in paragraph 4.1.3 of D1/AS1. The risers to the northern deck exceed that tolerance limit.
- 8.3.4 Graspable handrails are required for the stairs to both decks comply with Clause D.1. The profile of the handrail provided to the stairs is not adequate and does not comply with Clause D1.
- 8.3.5 I conclude that remedial work is necessary in respect of the entry decks and stairs, and I am therefore satisfied that decks and stairs do not comply with either Clause D1 or F4 of the Building Code.

8.4 The remedial work

- 8.4.1 Taking account of the expert’s report and comments as outlined in paragraph 6.5.3, I am satisfied that the remedial work proposed by the authority on 29 January 2008 will not result in the consented work becoming code compliant.

9. What is to be done now?

- 9.1 The authority should withdraw its proposed scope of work and develop a revised proposal that includes rectification of the items outlined in paragraphs 6.3.5, 6.3.6, 8.3.1, 8.3.2 and 8.3.4. In this respect I note the expert’s comments that further investigation is needed to confirm certain aspects of the work. Any outstanding items of disagreement can then be referred to the Chief Executive for a further binding determination.

10. The decision

- 10.1 In accordance with section 188 of the Building Act 2004, I hereby determine that:
- (a) the consented work does not comply with Clauses B1, D1, and E2 of the Building Code and I reverse the authority’s decision to issue a code compliance certificate
 - (b) the remedial work proposed by authority is not sufficient to result in the building work complying with the Building Code.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 30 April 2009.

John Gardiner
Manager Determinations