

## Determination 2009/12

### The code-compliance of timber barriers to a deck, stair and pool at 14 Rawhitiroa Road, Kohimarama, Auckland

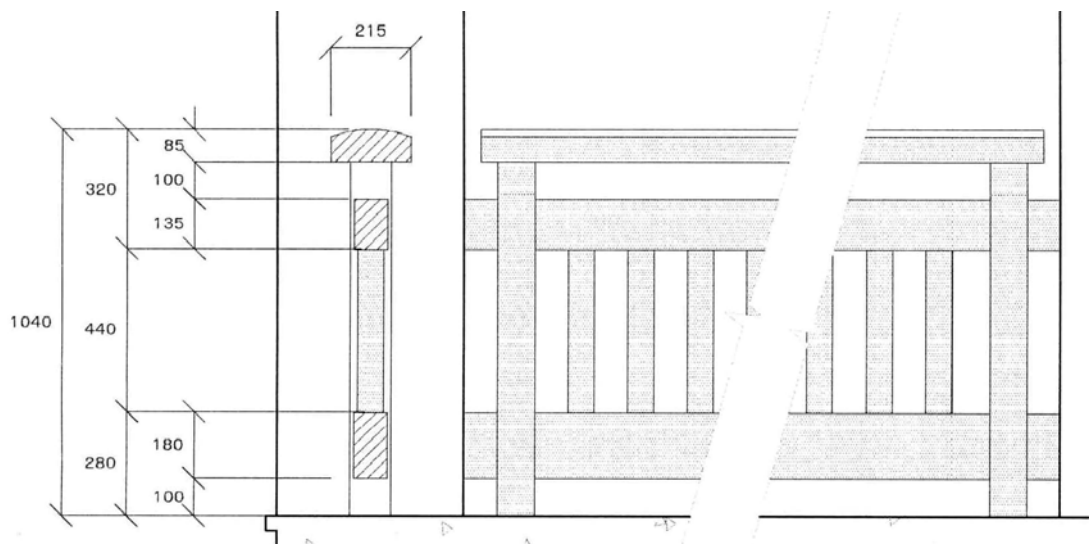


Figure 1: The as-built barrier to the lower-level terrace

## 1 The matter to be determined

- 1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004<sup>1</sup> (“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 the Department. The applicant is the owner, Mr P Chalmers (“the applicant”), acting through an architect. The other party is the Auckland City Council (the authority) carrying out its duties and functions as a territorial authority or building consent authority.

<sup>1</sup> The Building Act 2004 is available from the Department’s website at [www.dbh.govt.nz](http://www.dbh.govt.nz).

- 1.2 I take the view that the matter for determination, in terms of section 177(a)<sup>2</sup> of the Act is whether the timber barriers to the deck and exterior stair of a house comply with Clause F4 of the Building Code<sup>3</sup> (Schedule 1, Building Regulations 1992).
- 1.3 In addition, and in response to the submission made by the authority (refer paragraph 6.3), I have also been asked to determine whether the barrier to the stair complies with Clause F4 in respect of the fencing of a swimming pool.
- 1.4 In making my decision, I have considered the submissions of the parties and the other evidence in this matter. This determination does not consider the compliance of the barriers around the adjoining swimming pool area that is subject to a separate building consent.

## 2 The building work

- 2.1 The building work that is the subject of this determination consists of sets of timber barriers 1040mm high that protect upper-level decks, lower-level terraces (“the installed Barriers”), and the barrier to the main stair. The installed barriers are constructed from solid Cedar and consist of the following finished size members:

- 135mm x 135mm posts.
- 215mm x 85mm radiused top rails.
- 100mm x 180mm bottom rails.
- 100mm x 135mm intermediate top rails.
- 90mm x 90mm balusters at 180mm centres.

There are 100mm high gaps between the two top rails and between the base of the bottom rail and the deck or terrace floor levels. The barriers are secured to the adjoining concrete with stainless steel pegs, refer Figure 1.

- 2.2 The stair barrier has a 215mm x 85mm shaped top rail and 90mm x90mm balusters at 180mm centres, refer Figure 2.

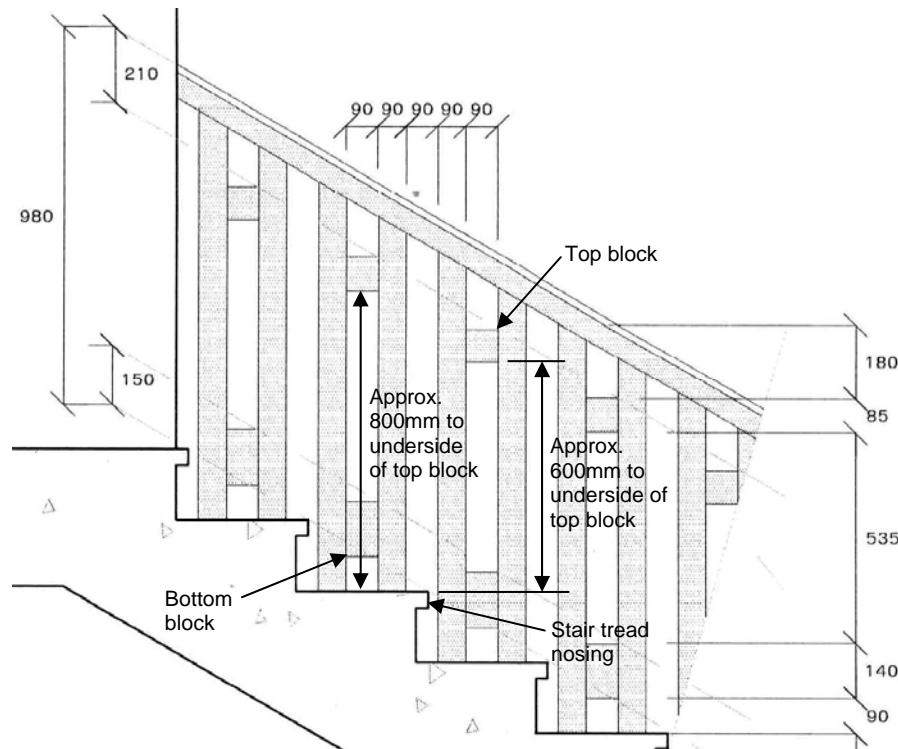
## 3. Background

- 3.1 The authority issued a building consent for the house sometime after August 1999.
- 3.2 The authority undertook inspections during the construction of the house and carried out a final inspection on 6 May 2008.
- 3.3 The authority issued a second building consent (No AC/01/14948) for a new pool and associated fencing on 24 September 2001.

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<sup>2</sup> 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.

<sup>3</sup> The Building Code is available from the Department’s website at [www.dbh.govt.nz](http://www.dbh.govt.nz).



**Figure 2: The as-built barrier to the stairs**

3.4 The authority wrote to applicant on 24 July 2008 stating it could not issue code compliance certificates in respect of either consent. The authority also listed certain items that were required to be addressed. In one of these items the authority said:

Council considers that the wooden barriers, though mostly over 1m in height constructed to all deck levels and terraces which includes the main stairs leading from the dwelling (kitchen/dining level) to the pool area, do not comply with the building code.

3.5 I note that the authority does not appear to have issued a notice to fix for the items that it listed in its letter of 24 July 2008. The applicant's architect has informed me that, apart from the question of the barriers, all the listed items have been, or will be, attended to. However, the authority has issued a Notice to Rectify (which should have been a notice to fix under the current Act) to rectify certain matters pertaining to the pool consent.

3.6 The application for a determination was received by the Department on 14 November 2008.

## 4. The submissions

4.1 In a covering note to the application, the applicant's architect set out the relevant Clause F4 references. The submission described the barriers in detail and I summarise the reasons that were put forward to show that they were code-compliant and exceeded the requirements of Acceptable Solution F4/AS1.

- The barrier members were all "massive" compared with the requirements of F4/AS1 and the barrier itself has a "thickness" or depth. This meant that a child "cannot get a proper grip or purchase to aid climbing of the barrier".

- The thick members and the protruding top rail at a child’s head height have “a very inhibiting effect”.
- The extra barrier height, together with the width of the top rail, meant that the distance for a child’s hands to reach over to obtain a purchase is greater than the 850mm from the lowest “toe-hold” point set out in F4/AS1.
- The applicant and the architect were completely satisfied that the objectives of Clause F4 had been met
- The authority’s inspection officer was “happy” with the barriers during an initial site visit.

4.2 The applicants forwarded copies of:

- details showing the construction of the typical barriers
- the letter from the authority to the applicant dated 24 July 2008
- a set of photographs showing the barriers.

4.3 The authority forwarded its job file, which contained some relevant documents.

## 5 The legislation and the compliance documents

5.1 Relevant provisions of the Act are:

### 17 All building work must comply with building code

All building work must comply with the building code to the extent required by this Act, whether or not a building consent is required in respect of that building work.

5.2 Relevant provisions of the Building Code are:

### CLAUSE F4—SAFETY FROM FALLING

#### PERFORMANCE

**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 in level within or associated with a building, a barrier shall be provided.

**F4.3.3** Swimming pools have a depth of water exceeding 400mm, shall have barriers provided.

#### Limitation

Performance F4.3.3 shall not apply to any pool exempted under section 5 of the Fencing of Swimming Pools Act 1987.

**F4.3.4** Barriers shall:

- Be continuous and extend for the full extent of the hazard,
- Be of appropriate height,
- Be constructed with adequate rigidity,
- Be of adequate strength to withstand the foreseeable impact of people and, where appropriate, the static pressure of people pressing against them,
- Be constructed to prevent people from falling through them, and

- (g) Restrict the passage of children under 6 years of age when provided to guard a change of level in areas likely to be frequented by them.

5.3 The relevant information from Compliance Document F4/AS1 includes:

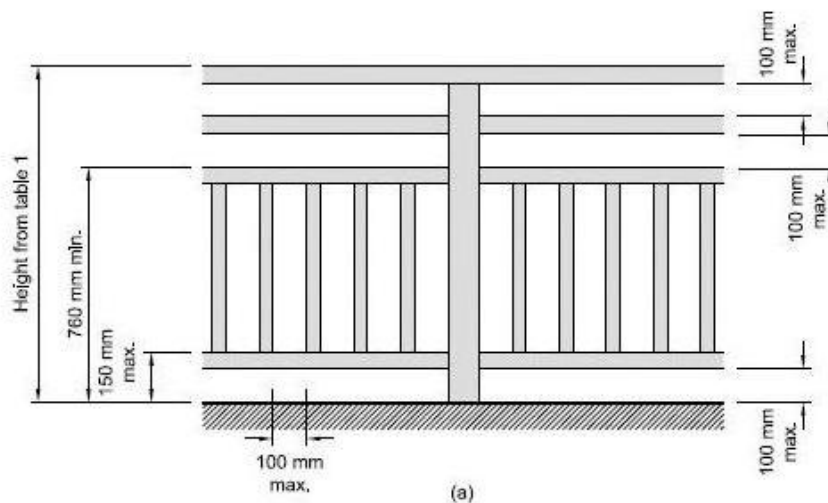
**Table 1: Minimum Barrier Heights**  
Paragraph 1.1.1, Figures 1-5

Building type	Location	Barrier height (mm) (Note 1)
Detached dwellings and within <i>household units</i> of multi-unit dwellings	Stairs and ramps and their landings	900
	Balconies and decks, and edges of internal floors or mezzanine floors	1000

Note:

1. Heights are measured vertically from finished floor level (ignoring carpet or vinyl, or similar thickness coverings) on floors, landings and ramps. On stairs the height is measured vertically from the *pitch line* or *stair nosings*.
2. A landing is a platform with the sole function of providing access.

**Figure 1: Barriers in areas likely to be frequented by children under 6 years of age – mesh and composite**  
Paragraph 1.2.1 a)



5.4 Relevant provisions from the Schedule of the Fencing of Swimming Pools Act 1987 (“the Schedule”) are:

**Means of compliance for fences under this Act**

**Height**

**1**

- (1) The fence shall extend—
  - (a) At least 1.2 metres above the ground on the outside of the fence; and
  - (b) At least 1.2 metres above any permanent projection from or object permanently placed on the ground outside and within 1.2 metres of the fence.
- (2) Notwithstanding subclause (1) of this clause, where the fence is constructed of perforated material, netting, or mesh and any opening in the material, netting, or mesh has a dimension (other than the circumference or perimeter) greater than

10mm, the fence shall extend at least 1.8 metres above the ground or the projection or object.

#### **Ground clearance**

##### **2**

Any clearance between the bottom of the fence and ground level shall not exceed 100mm.

#### **Materials**

##### **3**

All materials and components shall be of a durable nature and shall be erected so as to inhibit any child under the age of 6 years from climbing over or crawling under the fence from the outside.

##### **4**

Except where the fence is horizontally close-boarded or is made of perforated material, netting, or mesh, the spacing between adjacent vertical pales, panels, or other posts shall not exceed 100mm at any point.

##### **5**

All fencing supports, rails, rods, and wires, that are not vertical, and all bracing that is not vertical, shall be inaccessible for use for climbing from the outside.

##### **5A**

Notwithstanding clause 5 of this Schedule, a fence may have horizontal supports, rails, rods, or wires, that are accessible for use for climbing from the outside, and horizontal bracing that is accessible for such use, if—

- (a) The distance between any 2 of them at any point is at least 900mm; and
- (b) There is no other support, rail, rod, wire, or bracing (other than a vertical rail) between the same 2 at any point.

5.5 The relevant sections from NZS 8500<sup>4</sup> include:

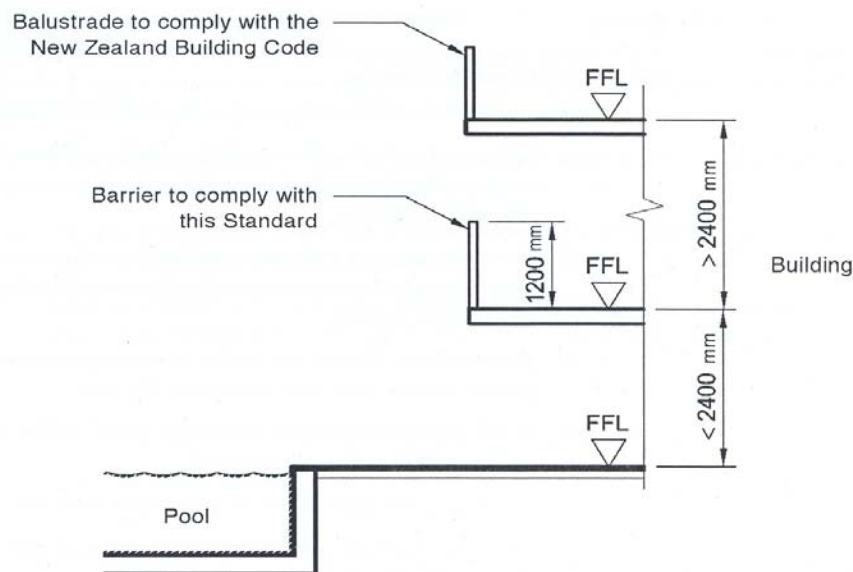
#### **3.8 Balcony**

Where a balcony projects into the immediate pool area (see figure 3.9) the following shall apply:

- (a) Where the distance from the floor of the balcony to the finished floor level is less than 2400mm, and where windows and doors to the balcony do not comply with 3.6 and 3.7, the balcony shall include a pool safety barrier which complies with the requirements for a barrier in this Standard.

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<sup>4</sup> NZS 8500: 2006 Safety barriers and fences around swimming pools, spas and hot tubs

**Figure 3.8 (part) includes:**

## 6 The draft determinations

- 6.1 The draft determination was sent to the parties for comment on 3 December 2008.
- 6.2 The applicant accepted the draft but raised the matter of a separate building consent relating to the construction of the adjoining pool, spa and associated fencing. The applicant has suggested that the question of the pool fencing be specifically excluded from this determination.
- 6.3 The authority did not accept the draft and forwarded comments in a letter to the Department dated 11 December 2008. In general terms, the letter stated:
- There were 2 separate consents issued for the property, one for the construction of the house and one for a pool, spa and associated fencing.
  - The consent for the swimming pool is subject to a notice to fix.
  - The determination will affect the pool barrier required by the pool consent, which has not been installed in accordance with original consent.
  - There was concern that the determination had not addressed the issue relating to pool barriers. Accordingly, while the authority accepted that the barrier to the upper balcony was not required to meet the requirements for pool fencing, this did not apply to the stair barriers that were less than 2400mm above the pool level.
  - The authority accepted the decisions reached in the draft determination regarding the barriers other than that to the stair.
- 6.4 The authority has provided along with its comments, copies of the consent documents relating to the pool consent, and correspondence with the architect and photographs showing the relationship of the balcony and stair barriers to the pool. I note that this information had not been made available to me, by either party, at the time the first draft determination was issued for comment.

- 6.5 The second draft determination was sent to the parties for comment on 21 January 2009. Both parties accepted the draft with no further comment.

## 7. Discussion

### 7.1 The balcony barriers

- 7.1.1 The as-built barrier is similar to that shown Figure 1(a) of F4/AS1, which is listed as being suitable for areas frequented by children less than 6 years of age. In comparing the Figure 1 with Figure 1(a) the following is noted:

Figure 1(a) of F4/AS1	The as-built barrier (refer Figure 1 herein)
Height (from Table 1) is 1000mm	Height is 1040mm
The top of the bottom rail is 150mm above the floor	The top of the bottom rail is 280mm above the floor
The distance between the top of the bottom rail and the top of the next rail above is 610mm.	The distance between the top of the bottom rail and the top of the next rail above is 575mm
Size of the top member is not indicated	The top rail is relatively wide at 215mm
Contains no openings that a 100mm diameter sphere could pass through	Maximum opening is 90mm wide

- 7.1.2 Several years ago, the predecessor to the Department commissioned a series of tests on a range of types of 1000mm high barrier constructions at a childcare centre. The traditional Figure 1(a) barrier could not be climbed by any of the 2 year olds. Children aged 3 years and more could climb most of the test barriers. Consequently, barriers that could not be climbed by 2 year olds were considered acceptable and the typical designs are given in F4/AS1.
- 7.1.3 A barrier with a 200mm wide top rail was tested and it proved more difficult to climb than a similar barrier with a 50mm wide top rail. Consequently, the 215mm wide profiled top rail on the installed barriers, with a minimum edge thickness of about 75mm makes the barrier more difficult to climb than if it had, say, a 30mm diameter metal top rail that a child could easily grasp. As noted by the architect, the shape of the top rail means that a child will need to reach over to the outside to obtain a grip. The distance from the outside edge of the top rail to the top of the bottom rail equates to the same dimension on the Figure 1(a) barrier if that barrier had a 30 diameter top rail. In addition, the thick sections of all the members of the installed barriers would tend to make the barrier less attractive for climbing for small children because they are not easily grasped by a small hand.
- 7.1.4 Consequently, taking the features and dimensions of the installed barriers into account, I am of the view that the barriers would be as difficult for small children to climb as a Figure 1(a) barrier. I am therefore of the view that the installed barriers would comply with Building Code Clause F4.3.4(g). I also accept that the barriers comply with all the other relevant sub-clauses of Clause F4.3.4.



## 7.2 The stair barrier

7.2.1 The applicant has requested that the determination excludes consideration of the pool barriers. While I accept that the immediate pool barriers are outside the scope of this determination, I am of the opinion that I must consider the stair barrier itself in terms of pool safety.

7.2.2 A comparison of the as-built stair barrier with Figure 4 of F4/AS1 is as follows:

Figure 4 of F4/AS1	The as-built stair barriers (refer Figure 2 herein)
Minimum height requirement is 900mm	Height is 980mm
The distance between the top of the bottom rail and the top of the next rail above is 610mm.	The distance between the top of the bottom rail and the top of the next rail above is 620mm
Rail spacing to be 100mm maximum	Gap between baluster spacings is 90mm
Size of the top member is not indicated	The top rail is relatively wide at 215mm
Contains no openings below the bottom rail that a 150mm diameter sphere could pass through	Maximum opening is 90mm wide

7.2.3 Based on the above comparisons and with the exception of the requirements of Clause F4.3.3, I accept that that the stair barrier complies with Clause F4.

## 7.3 The stair barrier as a pool barrier

7.3.1 The lower parts of the stair barrier also forms part of the perimeter fence to a swimming pool and as such is required to comply with Clause F4.3.3.

7.3.2 I accept that the stair falls within the category of a balcony described in Clause 3.8(a) of NZS 8500.

7.3.3 However, as the stair barrier is less than 1.2 metres above the exterior ground level, I do not accept that the barrier complies with the requirements of Clause 1 of the Schedule. Nor, as the underside of the upper blocks are only 800mm above the stair tread (only 535mm between upper and lower blocks), does it comply with Clause 5A of the Schedule, which requires at least 900mm between horizontal supports. In addition, the lower set of blocks between the balusters affords toeholds that would assist children under the age of 6 to climb the barrier.

7.3.4 I am of the opinion that if the 900mm distance set out in Clause 5A is achieved, this will offset the 1.2 metre height requirement of Clause 1. In this case there are blocks in front of, and behind, each stair tread nosing (refer to Figure 2 herein). If the lower blocks only are removed then the distance between the stair tread nosing and the underside of the upper blocks behind the stair tread nosing becomes approximately

800mm, and the distance between the stair tread nosing and the underside of the upper blocks in front of the stair tread nosing becomes approximately 600mm.

- 7.3.5 If all blocks are removed the last dimension is exceeds 900mm which satisfies Clause 5A. This combined with the wide handrail (refer paragraph 7.1.3) with the gripping distance of the 215mm wide top rail taken into account, would give an extended gripping distance. I am of the opinion that, as this distance can be used as an acceptable comparison with the criterion set out in Clauses 1 and 5A, the stair barrier will meet the requirements of Clause 5A. The barrier would therefore comply with the requirements of the Building Code as an alternative solution.

## **8 What is to be done now?**

- 8.1 I suggest that the authority issues a notice to fix that requires the owner to bring the stair barrier into compliance with the Schedule. The notice should identify the remedial work set out in paragraph 7.3.4. It is important to note that the Building Code allows for more than one method of achieving compliance.

## **9 The decision**

- 9.1 In accordance with section 188 I hereby determine that:

- the timber barriers comply with Clause F4 of the Building Code with respect to forming a code-compliant barrier to the deck and stairs
- the lower part of the stair barrier does not comply with Clause F4.3.3 of the Building Code.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 3 March 2009.

John Gardiner  
**Manager Determinations**