

Determination 2006/54

Safety barrier to a house deck at 22 Caroline Heights, Omaha Beach, Warkworth

1 The matter to be determined

- 1.1 This is a determination under Part 3 Subpart 1 of the Building Act¹ 2004 (“the Act”) made under due authorisation by me, John Gardiner, Determinations Manager, Department of Building and Housing, for and on behalf of the Chief Executive of that Department. In this determination, references to sections are to sections of the Act unless otherwise stated.
- 1.2 The applicants are P Luyt and M Roughton (“the owners”) acting through Chris Scott Architects (“the architect”). The only other party is the Rodney District Council (“the territorial authority”).
- 1.3 The matter for determination arises out of amendments purported to be made by the territorial authority to a building consent issued by a building certifier who had ceased operations. The relevant amendment was in respect of the proposed safety barrier to a deck (“the barrier”).
- 1.4 I take the view that the matter to be determined is whether the proposed barrier complies with clause F4 “Safety from falling” of the Building Code² (the First Schedule to the Building Regulations 1992).
- 1.5 In making my determination I have not considered any other aspects of the Act or of the Building Code.

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

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

2 The barrier

2.1 The barrier is shown in Figure 1.

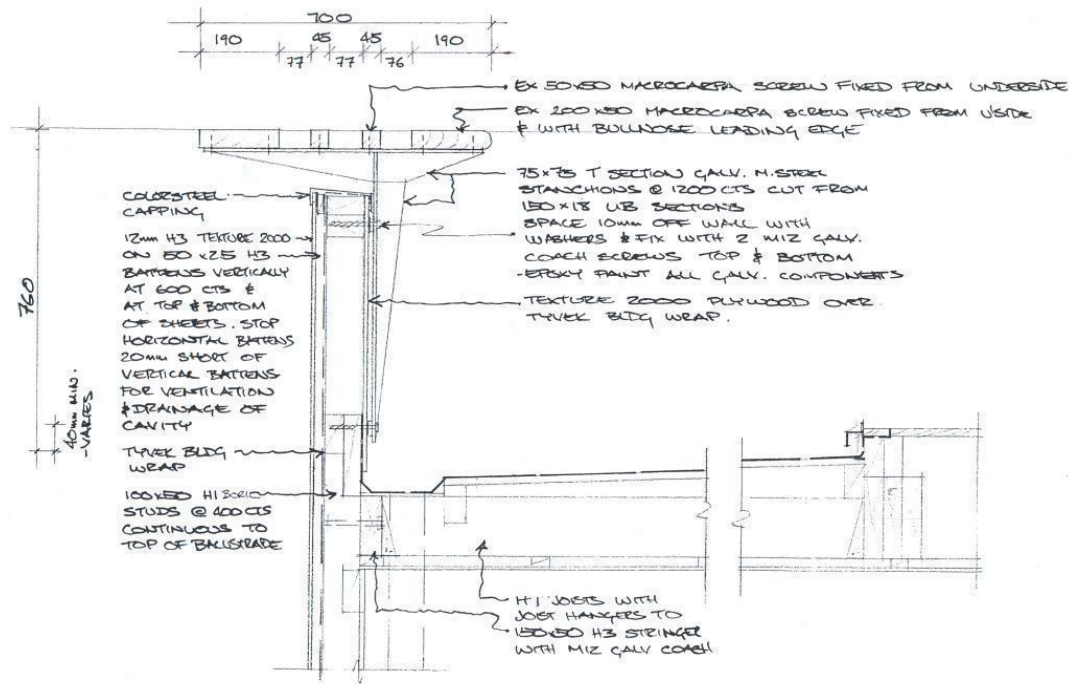


Figure 1: Detailed cross-section through the proposed barrier

3 Background

3.1 The owners engaged the architect to design alterations to their house, including the installation of the proposed barrier, and engaged a building certifier to check the plans and specifications for building consent purposes. The building consent was duly issued by the territorial authority in reliance on a building certificate issued by the certifier. However, in 2004, when the alterations were substantially completed in accordance with the building consent, the building certifier went out of business and its functions were transferred to the territorial authority. The territorial authority then advised the owners that it had amended the building consent, and in particular that:

The deck barrier as designed does not comply with the NZ Building Code F4 Safety from Falling. The barrier is to be 1000 mm high or obtain a determination from the Department of Building and Housing that the barrier as designed is in compliance.

The owners accordingly applied for this determination.

3.2 As to the design of the barrier, in 1999 the architect wrote to the then Building Industry Authority (“the Authority”) for advice as to an earlier version of the proposed barrier intended for another house. An officer of the Authority responded as follows:

Your proposed barrier is a combination of two “alternative solutions” I have sometimes suggested to designer. They are:

Type 1, a 760 mm high barrier with no toeholds with a top horizontal width of 450 mm, with the top constructed so that children cannot easily run along (eg by using slats or planting etc), and

Type 2, a 1000 mm high barrier with horizontals (but with no gaps over 100 mm) and with a 200 mm inside horizontal return at the top.

Type 1 is taken from a USA Industrial Standard for the protection of adults . . .

Please note that this is my personal opinion based on the information you have provided and offered on a ‘no liability’ basis. . . .

The architect appears to have followed that advice in respect of “Type 1” when developing the barrier shown in Figure 1.

4 The building Code and the Acceptable Solution

4.1 The relevant provisions of clause F4 of the building code are:

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.

F4.3.4 Barriers shall:

- (b) Be of appropriate height,
- (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.

4.2 The relevant provisions of the acceptable solution F4/AS1 are:

1.1.1 Acceptable minimum barrier heights are given in Table 1.

Table 1: Minimum Barrier Heights Paragraph 1.1.1		
Building type	Location	Barrier height (mm) (Note 1)
Detached dwellings and within household units of multi-unit dwellings	Stairs, landings, ramps or edges of internal floors	900
	External deck or external balcony	1000
All other <i>buildings</i> , and common areas of multi-unit dwelling	Stairs or ramps	900
	All locations other than stairs or ramps	1000
<p>Note:</p> <p>1. Heights are measured vertically from floor level (ignoring floor coverings) on floors, landings and ramps, and from <i>pitch line</i> or <i>stair nosings</i> on stairways.</p> <p>2. A landing is a platform with the sole function of providing access. A platform used as a space for people to congregate is described as a deck or balcony.</p>		

1.2.1 Buildings frequented by young children

Barriers located in any part of a *building* likely to be frequented by children under the age of 6 years shall have:

- a) No openings which will permit the passage of a sphere greater than given by Table 2, and
- b) No toeholds between the heights of 150 mm and 760 mm above floor level (or stair *nosing*) . . .

Table 2: Acceptable Opening Sizes for Barriers (Note 1)
Paragraphs 1.2.1 a), 4.0.2 b) c)

Age group	Examples of application (Note 2)	Maximum sphere diameter (mm)
Children under 4	Housing, early childhood centres, shopping malls, health care facilities	100
Children of 4 and 5	Cinemas, motels, halls, churches, bridges with pedestrian access	130

Note:

1. Opening size restrictions are chosen on the basis of child head and chest dimensional statistics.
2. Because the barrier opening size is determined by the age and likely presence of children, and not by the classified use of the *building*, it is reasonable to expect different parts of a *building* to have different requirements. For example, in a public hall children may be expected in a public gallery, but not in a gallery reserved for lighting equipment or musicians. In shopping malls children are expected in public areas, but not in areas for the preparation of food or the unloading and reception of stock.

5 The submissions

5.1 The architect submitted:

Comparison with F4/AS1

NZBC F4/AS1 1998 clause 1.2.4 allows for a barrier 700 high and 700 wide where there is fixed seating. The [barrier] complies with this clause except it is higher at 760 mm and it has no fixed seating. On this basis we believe that the barrier can be accepted as an alternative solution [which I take to mean a solution that does not comply with an acceptable solution or a verification method specified in a guidance document but does comply with the Building Code].

Comparison with US standard NBS IR 76 1131

Determination 2002/4 . . . accepted US standard NBS IR 76 1131 as an alternative solution. Under this standard the barrier is required to be 1219 mm high, less the width of the top. Under this formula the barrier at 760 high would be required to be 458 wide. At 700 wide the barrier exceeds the American standard.

5.2 The territorial authority submitted:

The [architect's submission] draws on situations involving entertainment areas [and] areas such as lecture rooms with fixed seating. . . .

The domestic situation is entirely different . . . Decks are places where both furniture and children’s toys, tricycles are used. . . [Children will use] whatever is available to climb barriers. . . .

It is this Council’s opinion that the barrier in question does not meet clause F4 of the building regulations for the following reasons:

- 1) The effective height in a domestic high use situation as a deck is insufficient to stop people including children from falling.
- 2) The flat top of the barrier encourages people and children to both sit and walk on the top of this barrier.

5.3 I prepared a draft determination (“the draft”) which concluded that the barrier did not comply with clause F4 of the Building Code. I sent the draft to the parties for comment. The territorial authority made no comment. The owners submitted information about the background to the application for determination, which I have included in this revised draft, and disputed specific comments, see 6.3 below.

6 Discussion

6.1 Background

6.1.1 The owners feel understandably aggrieved at the course of events, saying in response to the draft:

We put a great deal of thought and diligence into the design of this alteration on our house and spent a substantial amount of money on design and engineering and council consents to make sure that everything was compliant from the onset of this project. . . . We employed a reputable architect [who] proposed this balustrade detail [and] supplied full detail and working drawings to [the building certifier]. They came back to us with a number of queries from [the territorial authority] We addressed these issues accordingly - there were no queries on the balustrade design.

We are now essentially faced with a reconstruction that we are in no financial situation to complete. We feel we built to a very high standard with no shortcuts taken, [and] have followed the whole building process as close to the letter as anyone is able and suddenly the rules have been changed on us and we are being told to rectify something that was never considered incorrect in the first place.

6.1.2 Even though I sympathise with the owners, see 7.2 below, the unfortunate background to this determination is cannot be taken into account in my decision as to whether the barrier complies with the Building Code.

6.2 Comparison with F4/AS1

6.2.1 The barrier specified in paragraph 1.2.4 of F4/AS1 is stated as being intended for “a balcony or mezzanine floor accommodating fixed seating”. I agree with the territorial authority that it cannot be applied to a house deck. Accordingly, the barrier must be considered as being a proposed alternative solution claimed to comply with clause F4 of the Building Code but not with the acceptable solution F4/AS1. That acceptable

solution is not the only means of complying with the building code, but it may be used as a guideline or benchmark when assessing other solutions³.

- 6.2.2 I recognise the territorial authority's concerns about children using furniture and the like to climb over safety barriers and running along the top of barriers. However, that concern applies equally to barriers complying with F4/AS1, so that the territorial authority is in effect saying that F4/AS1 should be amended so as to take account of those concerns. Such an amendment cannot be made except by the consultative procedures of section 29 (or, in situations of urgency, section 30). That being so, I cannot take account of the territorial authority's concerns in that respect.

6.3 Protecting people from falling over the barrier

- 6.3.1 In Determination 2002/4 the then Building Industry Authority ("the Authority") said that a barrier complying with NBS IR76-1131, the US *Model Performance Standard for Guardrails* issued by the National Bureau for Standards ("the US Standard") "will safeguard people [from the risk of falling over the barrier] to a greater extent than one that complies with F4/AS1".

- 6.3.2 I accept the arguments and conclusions set out in Determination 2002/4, and on that basis conclude that the proposed barrier must be accepted as complying with the Building Code in respect of people falling over the barrier.

- 6.3.3 I note that the Government currently has before it a recommendation that clause F4 be amended by adding a new provision F4.3.4(h) to the effect that barriers shall not readily be used as seats, with the application of that provision being limited to buildings having classified uses other than as Housing. No such amendment has yet been made, but even if it had it would make no difference to this determination because the barrier is in a building classified as "Housing".

6.4 Restricting the passage of children under 6 years of age

- 6.4.1 Clause F4.3.4(g) of the Building Code required that barrier in areas likely to be frequented by children under 6 years of age must restrict the passage of such children. In that respect the barrier complies with paragraph 1.2.1 of F4/AS1. However, paragraph 1.2.1 relates to barriers 1000 mm high, so that the question is whether the barrier restricts children under 6 from climbing over it to at least the same extent as a 1000 mm high barrier complying with paragraph 1.2.1.
- 6.4.2 Factors to be taken into account as possibly compensating for the lesser height of the barrier are the internal overhang of the top of the barrier together with its rounded edge.
- 6.4.3 Tests commissioned by the Authority⁴ established that the acceptable solution is 100% effective for children under 3 but can be climbed by many 3 year olds and by most 4 year olds. It is legitimate to conclude that the acceptable solution will prevent

³ *Auckland CC v NZ Fire Service* 19/10/95, Gallen J, HC Wellington AP336/93, partially reported at [1996] 1 NZLR 330

⁴ See the article "Climbing great heights" in *BIA News* No. 108, November 2000.

children under 3 from climbing over it and will restrict but not prevent older children from climbing over it.

6.4.4 The question then becomes whether the barrier will restrict children over 3 but not over 6 from climbing over it to the same extent as would an F4/AS1 barrier 1000 mm high and with no toe-holds between the heights of 150 mm and 760 mm above floor level. In other words, would it be at least as difficult for such children to climb the barrier as to climb an F4/AS1 barrier.

6.4.5 In the draft, I said that I considered that, particularly for children of 4 or 5, the 760 mm barrier, despite the internal overhang with its rounded edge, would not be as difficult to climb as an F4/AS1 barrier.

6.4.6 The owners responded by saying:

We appreciate that . . . your concern lies in the 5-6 year old age group. We dispute this as we believe that the children in this age group that we are associated with have enough sensibility to make a rational judgement on the danger of climbing at this height. Any child that's going to take this sort of risk at this age is surely just as capable of climbing anywhere else in the house and causing injury -- and could certainly climb to a 1 metre balustrade with as much ease as they could climb our design of balustrade. With our balustrade being 760 mm wide with open vision areas of 50 mm, a child can see quite clearly how high above the ground this is from a standing position on the deck. If they were to climb on top (they would need something to stand on to do so) they have 760 mm to realise they've made a mistake. Should they fall, with the interior overhang being wider than the exterior overhang, they are more likely to fall inwards and there are a number of grab hold options because of the gaps in the top. If the same child as to climb up to an approved 1 metre balustrade that they probably can't see over the top of from the ground, if they were to lose their balance and topple, apart from a possible 150 mm flat cap on the top, there is absolutely nothing for them to grab hold of.

6.4.7 I have carefully considered that response, but it has not changed my conclusion that the 760 mm barrier would not be as difficult to climb as a 1,000 mm F4/AS1 barrier. In particular, I am not convinced that children in the 3 to 6 age group, when faced with the challenge of climbing a barrier, can in fact be relied on to make the rational judgments envisioned by the owners. I do not accept that such children would need something to stand on in order to climb the barrier given that most such children can climb a 1,000 mm F4/AS1 compliant design.

6.4.8 I have the power to grant waivers or modifications of the Building Code, but consider that it would not be reasonable to do so in this case because the owners' problems cannot be allowed to affect questions of life safety, particularly for future owners of the house (I understand that houses in New Zealand change ownership comparatively frequently, on average about every 7 years).

7 Conclusion and observation

7.1 For the reasons set out above, I conclude that the barrier does not comply with the Building Code in respect of restricting the passage of children.

- 7.2 As to what is to happen now, I observe, but do not decide, that it appears to be open to the territorial authority to:
- (a) Accept an undertaking from the owners to the effect that work to bring the barrier to compliance with clause F4 may be deferred for an agreed period up to two years in duration or before the house is transferred to new owners, whichever is the sooner. The building consent would have to be amended to cover that work, and
 - (b) Issue the code compliance certificate when satisfied that the barrier complied with clause F4.

8 Decision

- 8.1 In accordance with section 188 I hereby:
- (a) Determine that the barrier does not comply with clause F4 of the Building Code.
 - (b) Confirm the territorial authority's decision to refuse to issue the code compliance certificate.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 12 June 2006.

John Gardiner
Determinations Manager