

# Determination 2023/039

## Compliance of handrails to an external stair with Clause D1 *Access routes*

**26 Lilburn Crescent, Massey, Auckland**

### Summary

This determination considers whether building work carried out to install two handrails to an external stair to a dwelling complies with Building Code Clause D1 *Access routes*. The determination considers whether the as-built handrails are “graspable” in accordance with clause D1.3.3(j), and the requirements of the relevant acceptable solution.



**Figure 1: The stair handrails<sup>1</sup>**

<sup>1</sup> Figures 1 to 3 in this determination have been reproduced from photographs provided by the builder.

In this determination, unless otherwise stated, references to “sections” are to sections of the Building Act 2004 (“the Act”) and references to “clauses” are to clauses in Schedule 1 (“the Building Code”) of the Building Regulations 1992.

The Act and the Building Code are available at [www.legislation.govt.nz](http://www.legislation.govt.nz). Information about the legislation, as well as past determinations, compliance documents (eg, acceptable solutions) and guidance issued by the Ministry, is available at [www.building.govt.nz](http://www.building.govt.nz).

## 1. The parties and matter to be determined

- 1.1. This is a determination made under due authorisation by me, Charlotte Gair, Manager Advisory, Determinations, Ministry of Business, Innovation and Employment (“the Ministry”), for and on behalf of the Chief Executive of the Ministry.<sup>2</sup>
- 1.2. The parties to the determination are:
  - 1.2.1. Housing New Zealand Limited,<sup>3</sup> the owner of the property (“the owner”).
  - 1.2.2. T Hickling, the licenced building practitioner who carried out the building work, and who applied for the determination (“the builder”).<sup>4</sup>
  - 1.2.3. Auckland Council, carrying out its duties as a territorial authority or building consent authority (“the authority”).
- 1.3. This determination arises from the authority’s view that handrails installed to an external stair to the owner’s dwelling are not “graspable” and therefore do not comply with Clause D1 *Access routes*.
- 1.4. The matter to be determined, under section 177(1)(a), is whether two handrails, constructed as part of an external stair (“the stair”) that serves as an access route to the dwelling, comply with clause D1.3.3(j).
- 1.5. In deciding this matter, I will consider whether the as-built handrails are “graspable”, as required by D1.3.3(j), and the application of Acceptable Solution D1/AS1<sup>5</sup> (“**D1/AS1**”).

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<sup>2</sup> The Building Act 2004, section 185(1)(a) provides the Chief Executive of the Ministry with the power to make determinations.

<sup>3</sup> As identified in record of title NA68A/341. Housing New Zealand Limited is held by Kāinga Ora–Homes and Communities, a Crown entity established by the Kāinga Ora–Homes and Communities Act 2019.

<sup>4</sup> References to the builder in this determination include the agent acting on behalf of the builder; the agent also represented the owner.

<sup>5</sup> Acceptable Solution D1/AS1 *Acceptable solutions and verification methods for New Zealand Building Code Clause D1 Access routes*. Second edition, Amendment 6, effective from 1 January 2017.

## Issues outside the determination

- 1.6. I have not considered any other aspects of the Act or of the Building Code, including:
  - 1.6.1. the Building Code compliance of the stair or any other parts of the balustrade other than the handrails, or of the other building work detailed in the building consent
  - 1.6.2. the compliance of the handrails with any other performance criteria in clause D1 (other than clause D1.3.3(j)) or any other clause of the Building Code
  - 1.6.3. the decision by the authority in relation to the building consent, or any decision by the authority relating to an application for a code compliance certificate.

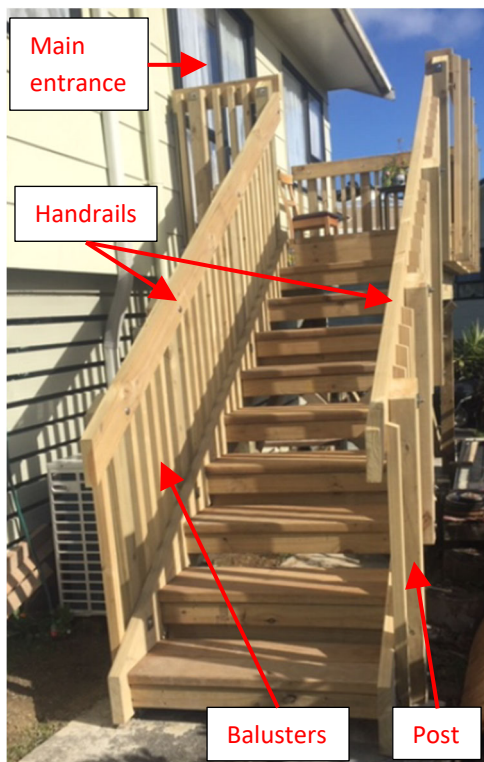
## 2. The building work and background

- 2.1. The stair was constructed under a building consent granted by the authority on 25 May 2023.<sup>6</sup>
- 2.2. The dwelling is single-storey; however, the finished floor level is higher than the surrounding ground. The stair leads to a deck and provides access to the main entrance of the dwelling. Refer to Figure 2.
- 2.3. The stair is constructed of timber. The balustrade of the stair includes (refer to Figures 2 and 3):
  - 2.3.1. 90mm square posts, interspersed with 42mm square balusters
  - 2.3.2. 140mm deep x 45mm wide handrails on each side of the stair, bolted to the inside of the posts.<sup>7</sup>
- 2.4. The builder has advised, and provided photographs showing, the distance from the top of the posts and balusters to the top of the handrail (refer to Figure 3).

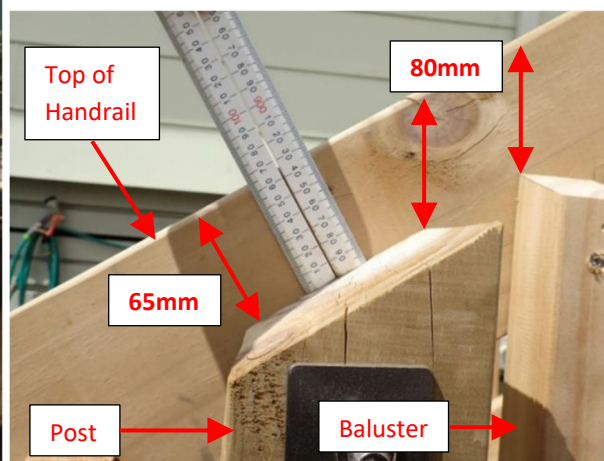
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<sup>6</sup> Building consent number BCO10367457, for the replacement of an existing deck and external stair. There was no means of compliance with clause D1 specified in the application for building consent, however the approved plan S02 issue A note "Stair configuration to be compliant with D1/AS1".

<sup>7</sup> The approved building consent plans do not specify the type, size, treatment, or fixings for the handrails to the stair; they only specify the handrail to be installed around the deck.



**Figure 2: The stair**



**Figure 3: Outside view of balustrade**

- 2.5. On 9 August 2023, the authority carried out a final inspection of the building work associated with the building consent. The inspection failed for several reasons<sup>8</sup>; in relation to the stair handrails the inspection record states, “Handrail to be made graspable, does not comply with D1/AS1, [relevant width<sup>9</sup>] exceeds 80mm”.
- 2.6. The builder responded to the authority by email, later that day, stating they considered clause D1.3.3(j) was satisfied.
- 2.7. On 14 August 2023, the authority replied to the builder, stating the handrail did not comply with paragraphs 6.0.6 to 6.0.8 and Figure 26 of D1/AS1, because:
- The handrail must have a maximum graspable width of 80mm, where your hand is unimpeded for the entire length of the handrail,...
- 2.8. On or about 7 September 2023, the authority advised the builder (following receipt of the application for determination, which included further photographs) that it had initially considered the balusters were too close to the top of the handrail,

<sup>8</sup> The inspection record refers to a requirement to install additional fixings, however, these do not affect whether the handrails are ‘graspable’; therefore, these fixings are not included in this determination.

<sup>9</sup> Acceptable Solution D1/AS1, Figure 26, describes ‘relevant width’ (RW) as being ‘measured around the upper surface perimeter of the handrail section between the vertical tangents on either side’.

“impeding your hand as it passed down the handrail”. The authority referred to Determination 2017/009<sup>10</sup>, saying:

It states that the handrail must be graspable and that the measured top and clear sides of your 140mmx45mm [handrail] exceeds the maximum [relevant width of] 80mm specified in D1/AS1 fig26.

- 2.9. However, the authority went on to note that as the stair was “to the back of the house...and you can pass your hand freely [along] both sides”, the authority would accept the stair as “complying with the intent of the building consent”.
- 2.10. On 21 September 2023, the builder sought confirmation of the authority’s position, given the new deck and stair “are situated at the main access for the building occupants...”.
- 2.11. The authority replied to the builder the same day, stating, since the stair “is to the main entry, then it definitely needs a graspable handrail in accordance with D1/AS1 fig 26...”.

### 3. Submissions

#### The builder

- 3.1. The builder submits (in summary):
  - 3.1.1. The owner “has specifically requested that all deck<sup>11</sup> handrails must be comprised of 140 x 45mm” timber.
  - 3.1.2. “The handrail has been installed in the upright position allowing the top of the rail to be graspable. The top of the rail is positioned to have a minimum of 30mm clear from any obstruction throughout, ie, [to the] top of [the] barrier post/s.”
  - 3.1.3. The stair handrail design is “not specifically detailed in D1/AS1 [paragraphs] 6.0.6 to 6.0.8, [and] fig 26, however...D1/AS1 is an acceptable solution only and is not the sole defining interpretation of what is, and what is not, a graspable handrail”. The diagrams in figure 26(a) “are only examples - there are other possibilities”.
  - 3.1.4. The “relevant width” of the handrail is 45mm. “Our interpretation of Fig 26: D1/AS1, (iii), is that RW [relevant width] does not exceed 80 mm on the

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<sup>10</sup> Determination 2017/009 *Regarding compliance with Clause D1 in regards to the use of balustrade capping as a handrail in a house* (dated 18 February 2017).

<sup>11</sup> In this case, the deck handrails are specified on building consent plan S10 revision A to be 90 x 45mm timber, however, the item of dispute between the parties is the handrails to the stair and not the deck. Therefore, for the purposes of this determination, I have assumed the builder was referring to the handrails to the stair.

current handrail between the **vertical tangents** on either side and is graspable for an **adult hand**. Fig 26 of D1/AS1 also states: *variations in shape are acceptable provided the effective grip is not lost*. We believe our design achieves the objectives set out [in] D1/AS1, [paragraph] 6.0.8.”<sup>12</sup>.

### The authority

- 3.2. The authority has not made a submission. However, its views are set out in correspondence with the builder (as referenced above), and have been incorporated and discussed in the determination, where appropriate.

### The owner

- 3.3. The owner has not made a submission regarding this determination.

## 4. Discussion

- 4.1. The matter to be determined is whether the two as-built stair handrails comply with clause D1.3.3(j).

### The legislation

- 4.2. Sections 3 and 4 set out the purposes and principles of the Act respectively. I consider that the relevant purposes and principles for this determination include section 3(a)(i) and (b), and section 4(2)(a)(i) and (2)(q)(ii).

- 4.3. Section 17 provides:

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.

- 4.4. Clause D1 is the relevant Building Code clause in this case. An objective of clause D1.1 is to:

(a) safeguard people from injury during movement into, within and out of *buildings*,

- 4.5. The relevant functional requirement is in clause D1.2.1:

**D1.2.1 Buildings** shall be provided with reasonable and adequate access to enable safe and easy movement of people.

- 4.6. The relevant performance requirement for the stair handrails is in clause D1.3.3(j):

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<sup>12</sup> The builder provided copies of several pages from D1/AS1, complete with hand-written notes indicating (in their view) compliance with paragraph 6.0.8, items a) to d) inclusive, and their interpretation of Figure 26, including what is a ‘vertical tangent’.

**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,

- 4.7. Clause D1 relates to access routes; “access route” is defined in Clause A2 *Interpretation* as:<sup>13</sup>

**access route** a continuous route that permits people and goods to move between the apron or *construction* edge of the *building* to spaces within a *building*, and between spaces within a *building*.

**Clause D1.3.3(j)**

- 4.8. Clause D1.3.3(j) requires handrails to be smooth, reachable, and graspable. In this case, the parties have not disputed whether the two as-built handrails are smooth or reachable. Therefore, I have not considered these two criteria further.
- 4.9. The words “graspable” or “grasp” are not defined in Act or Building Code. The Oxford English Dictionary (OED) states “graspable” means “that may be grasped”, while “grasp[ed]” is defined as “to seize and hold firmly with the hand”.<sup>14</sup>
- 4.10. I consider it is appropriate to interpret the meaning of “graspable” and “grasp” in light of the objective and functional requirements of clause D1, which include to safeguard people from injury, and to enable safe and easy movement. Regarding the handrail profile and the ability of a person to “grasp” the handrail, in my view it must be able to adequately support and assist a person moving up or down the stair, as well as to help arrest an accidental fall should one occur.

**Acceptable Solution D1/AS1**

- 4.11. Section 19(1)(b) provides that a building consent authority must accept compliance with an acceptable solution as establishing compliance with the Building Code (see also section 22(2)). However, an acceptable solution is only one means of establishing compliance with the provisions of the Building Code; it “is not the only means” (section 23).
- 4.12. In this case, an approved plan associated with building consent BCO10367457 states the “stair configuration [is] to be compliant with D1/AS1”. Regardless, I note the building consent plans do not specify the size of the handrails to be installed for the stair. However, from the drawn details, it can be inferred the intention was to use handrails that were rectangular in profile.

<sup>13</sup> An access route may contain features such as corridors, doors, stairs, ramps, and lifts: clause D1.3.1(c).

<sup>14</sup> Oxford English Dictionary (online publication), accessed on 27 November 2023.

4.13. The relevant paragraphs of D1/AS1 relating to handrails are in part 6.0, in particular, 6.0.7 and 6.0.8, and Figure 26(a) (copy provided below):<sup>15</sup>

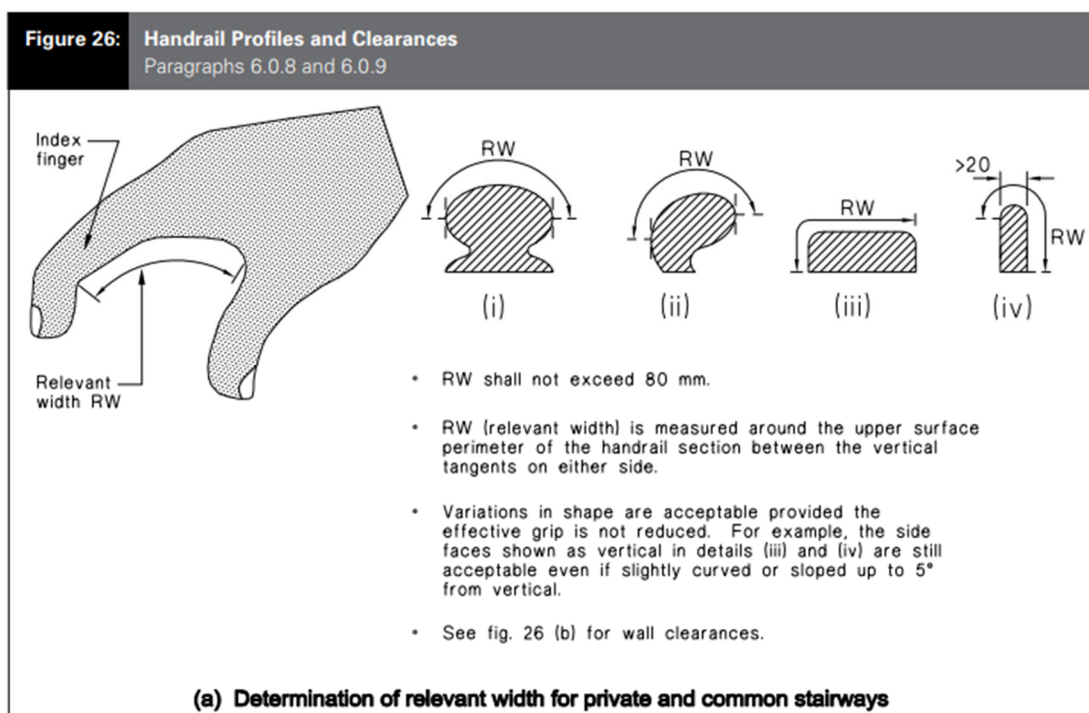
**6.0.7 Handrail profiles** – *Handrails* shall have a profile which can be readily grasped by an adult hand and shall be installed in a way that avoids the likelihood of personal injury. An acceptable *handrail* shall be shaped and located to ensure that, under normal usage, a person’s hand will not contact adjacent walls, supporting brackets or fixings, or any other obstruction.

**COMMENT:**

It is important that in the event of stumbling on a stairway or ramp an adult, even with a small hand, can firmly grasp the handrail to prevent a fall.

**6.0.8** A graspable *handrail* profile shall have:

- a) A flat or convex upper surface,
- b) Arrised or radiused edges,
- c) A minimum cross section width of 20 mm, and
- d) A “relevant width” (as illustrated in Figure 26 (a)) across the top surface of no greater than 80 mm. Figure 26 (a) and (b) indicates some acceptable profiles but others may also be acceptable.



<sup>15</sup> Figure 26(b) is not relevant to this determination as it relates to acceptable handrail profiles for accessible stairways and ramps; the stair in this case is not required to be accessible (under section 118).



## Whether the handrails comply with D1/AS1

4.14. The authority considers the as-built handrails are not graspable and that they exceed the maximum relevant width of 80mm specified in Figure 26(a).

### Paragraph 6.0.7

4.15. Paragraph 6.0.7 requires handrails to have a profile which can be “readily grasped” by an adult hand, and paragraph 6.0.8 sets out the requirements for a “graspable handrail profile”. The ‘comment’ below paragraph 6.0.7 also assists, referring to an adult with even a small hand being able to “firmly grasp” the handrail to prevent a fall.

4.16. Paragraph 6.0.7 also requires handrails to be installed in a way that avoids the likelihood of personal injury, and they are to be shaped and located so a person’s hand will not contact supporting brackets or fixings or any other obstruction.

4.17. Based on the photographs and measurements provided by the builder, I am of the view that the handrails have been installed in a way that avoids of the likelihood of personal injury. The difference between the top surface of the handrail and the top of the posts and balusters is between 65mm to 80mm (refer to Figure 3). It is therefore possible to slide a hand up or down the length of the handrail without contacting an obstruction. I also note the authority accepts a hand “can pass...freely [along] both sides” (refer to paragraph **Error! Reference source not found.**).

### Paragraph 6.0.8

4.18. In terms of paragraph 6.0.8(a), (b) and (c) for a “graspable handrail profile”, both of the handrails in this case have flat upper surfaces, arrised or radiused edges, and a minimum cross-section width of 20mm.

4.19. Paragraph 6.0.8(d) requires “A ‘relevant width’ (as illustrated in Figure 26(a)) across the top surface of no greater than 80 mm”. I consider the handrails in this case meet this requirement, as they are 45mm “across the top surface”.

4.20. However, in the authority’s view, the relevant width of the handrails (also denoted as “RW” in Figure 26(a)) is greater than 80mm. The builder does not accept this, stating that the profile of the as-built handrail complies with the requirements in paragraph 6.0.8, and while its profile may not be exactly replicated in Figure 26(a), these are only examples and other options are allowable.

### Figure 26(a)

4.21. Paragraph 6.0.8(d) states that Figure 26(a) indicates some acceptable handrail profiles, but “others may also be acceptable”. Figure 26(a) provides further details of how the relevant width of a handrail should be measured, stating “RW (relevant

width) is measured around the upper surface perimeter of the handrail section between the vertical tangents on either side”.

- 4.22. The illustration of a hand in Figure 26 demonstrates the area of a person’s grasp that the relevant width must fit within (essentially between the base of the thumb and the joint closest to the fingertip).
- 4.23. The parties hold differing views as to how the example profiles in Figure 26 should be interpreted. The profile most similar to the owner’s handrails is the one shown in example (iii). The authority in its correspondence to the builder has stated the handrail must have a “maximum graspable width of 80mm”, however, this is not what the example profiles show in Figure 26, or what paragraph 6.0.8(d) specifies.
- 4.24. Example (iii) in Figure 26(a) shows that the top surface of the handrail, plus a portion of one side constitutes the relevant width, and this must fit within the portion of a person’s grasp as shown in the figure. The top of the handrails in this case is only 45mm wide.
- 4.25. In my view, the profile of the owner’s handrails meets the description of the measurement of “relevant width” in Figure 26(a) (ie “measured around the upper surface perimeter of the handrail section between the vertical tangents on each side”). The vertical tangents are the sides of the handrail, and the distance between them is 45mm. An adult’s hand will fit easily over this and down the side to provide a firm grasp. Figure 26(a) also states “Variations in shape are acceptable provided the effective grip is not reduced”. I consider the “effective grip” of the handrails is not reduced by their profile in this case, and they will provide a graspable support for anyone using the stair.

### **Conclusion**

- 4.26. Taken together, I am of the view that the as-built handrails in this case meet the requirements of D1/AS1, therefore, compliance with clause D1.3.3(j) has been achieved.

### **Determination 2017/009**

- 4.27. The authority has referred to Determination 2017/009 in support of its position. In that case the handrail was determined not to comply with clause D1.3.3(j).
- 4.28. Determinations are decided upon the facts of the case they relate to, and many factors may influence the decision in a particular case. However, I note the handrail in Determination 2017/009 had some similarity in shape (but not construction) to the owner’s handrail in this case, and also in terms of having a flat top surface and vertical sides. However, in that determination, the handrail (which had a 25mm wide top surface, and 21mm deep sides) was found not to be graspable because its top surface was too narrow and its sides too short. This meant that “only a small

segment of the user's fingers can be in contact with the actual handrail".<sup>16</sup> This is different to the owner's handrails, which have a wider top and deeper sides, and where there is no suggestion that it does not provide an adequate surface area to grip onto.

## 5. Decision

- 5.1. In accordance with section 188 of the Building Act 2004, I determine the two handrails, constructed as part of an external stair that serve as an access route to the owner's dwelling, comply with clause D1.3.3(j) of the Building Code.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 1 December 2023.

**Charlotte Gair**  
**Manager Advisory, Determinations**

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<sup>16</sup> Determination 2017/009 at paragraph 4.3.1.