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Compliance Document for New Zealand Building Code Clause D1 Access Routes – Second Edition

Prepared by the Department of Building and Housing

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Users should make themselves familiar with the preface to the New Zealand Building Code Handbook, which describes the status of Compliance Documents and explains alternative methods of achieving compliance.

Defined words (italicised in the text) and classified uses are explained in Clauses A1 of the Building Code and in the Definitions at the start of this Compliance Document.

D1: Document History

	Date	Alterations	
First published	July 1992		
Amendment 1	December 1993	p. 12, Table 5 p. 15, 4.4.2, 4.5.2	p. 30, 12.0, 12.1
Amendment 2	19 August 1994	pp. i and ii, Document History p. vii, Contents p. viii, References pp. ix and x, Definitions p. 1, 1.0, 1.0.1, 1.0.2 p. 3, 1.2.1 p. 4, Figure 2 p. 6, 1.7.1 p. 6A, 2.1.1, 2.1.2, 2.1.3, 2.1.4 pp. 6B, 6C, 6D, Table 1A p. 6D, 2.2.1 p. 7, 3.1.4	p. 10, Figure 11 p. 11, 4.1.3 p. 12, Table 5, 4.1.4, 4.1.8 p. 13, 4.4, 4.4.1 p. 14, Figure 17 p. 15, 4.4.3 deleted, Figure 18, 4.5, 4.5.1, 4.5.2, 4.6, 4.6.1, 4.6.2 p. 10, Table 1A pp. 33 to 35, Index
Amendment 3	1 December 1995	p. ii, Document History p. viii, References	p. 15, 5.1.1
Second edition	28 February 1998	Document revised – second edition issued	
Amendment 4	1 July 2001	p. 2, Document History, Status p. 11, References p. 13, Definitions	p. 25, Figure 8 p. 30, 4.2.1 Comment p. 41, 6.0.7 Comment p. 46, 12.0.1

Note: Page numbers relate to the document at the time of Amendment and may not match page numbers in current document.

Document Status

The most recent version of this document, as detailed in the Document History, is approved by the Chief Executive of the Department of Building and Housing. It is effective from 1 July 2001 and supersedes all previous versions of this document.

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New Zealand Building Code Clause D1 Access Routes

This Clause is extracted from the New Zealand Building Code contained in the First Schedule of the Building Regulations 1992.

FIRST SCHEDULE—*continued*

Clause D1—ACCESS ROUTES

Provisions	Limits on application
OBJECTIVE	
D1.1 The objective of this provision is:	
(a) Safeguard people from injury during movement into, within and out of *buildings,*	
(b) Safeguard people from injury resulting from the movement of vehicles into, within and out of *buildings,* and	
(c) Ensure that *people with disabilities* are able to enter and carry out normal activities and functions within *buildings*.	Objective D1.1(c) shall apply only to those *buildings* to which section 25 of the Disabled Persons Community Welfare Act 1975 applies.
FUNCTIONAL REQUIREMENT	
D1.2.1 *Buildings* shall be provided with reasonable and adequate access to enable safe and easy movement of people.	Requirement D1.2.1 shall not apply to *Ancillary buildings* or *Outbuildings*.
D1.2.2 Where a *building* is provided with loading or parking spaces, they shall be constructed to permit safe and easy unloading and movement of vehicles, and to avoid conflict between vehicles and pedestrians.	
PERFORMANCE	
D1.3.1 *Access routes* shall enable people to:	
(a) Safely and easily approach the main entrance of *buildings* from the apron or *construction* edge of a *building*,	
(b) Enter *buildings*,	
(c) Move into spaces within *buildings* by such means as corridors, doors, stairs, ramps and lifts,	
(d) Manoeuvre and park cars, and	
(e) Manoeuvre and park delivery vehicles required to use the loading space.	

FIRST SCHEDULE—*continued*

Provisions	Limits on application
D1.3.2 At least one *access route* shall have features to enable *people with disabilities* to: (a) Approach the *building* from the street boundary or, where required to be provided, the *building* car park, (b) Have access to the internal space served by the principal access, and (c) Have access to and within those spaces where they may be expected to work or visit, or which contain facilities for personal hygiene as required by Clause G1 "Personal Hygiene".	Performance D1.3.2 shall not apply to *Housing*, *Outbuildings*, *Ancillary buildings*, and to *Industrial buildings* where no more than 10 people are employed.
D1.3.3 Access routes shall: (a) Have *adequate* activity space, (b) Be free from dangerous obstructions and from any projections likely to cause an obstruction, (c) Have a safe cross fall, and safe slope in the direction of travel, (d) Have *adequate* slip-resistant walking surfaces under all conditions of normal use, (e) Include stairs to allow access to upper floors irrespective of whether an escalator or lift has been provided, (f) Have stair treads, and ladder treads or rungs which: (i) provide *adequate* footing, and (ii) have uniform rise within each flight and for consecutive flights, (g) Have stair treads with a leading edge that can be easily seen,	

FIRST SCHEDULE—*continued*

Provisions	Limits on application
(h) Have stair treads which prevent children falling through or becoming held fast between treads, where open risers are used,	Performance D1.3.3 (h) shall not apply within *Industrial buildings, Outbuildings* and *Ancillary buildings.*
(i) Not contain isolated steps,	Performance D1.3.3 (i) shall not apply with *Detached Dwellings* or within *household units* of *Multi-unit Dwellings,* or to *Outbuildings* and *Ancillary buildings.*
(j) Have smooth, reachable and graspable *handrails* to provide support and to assist with movement along a stair or ladder,	Performance D1.3.3 (j) shall not apply to isolated steps.
(k) Have *handrails* of *adequate* strength and rigidity as required by Clause B1 "Structure",	
(l) Have landings of appropriate dimensions and at appropriate intervals along a stair or ramp to prevent undue fatigue,	
(m) Have landings of appropriate dimensions where a door opens from or onto a stair, ramp or ladder so that the door does not create a hazard, and	
(n) Have any automatically controlled doors *constructed* to avoid the risk of people becoming caught or being struck by moving parts.	
D1.3.4 An *accessible route*, in addition to the requirement of Clause D1.3.3, shall:	
(a) Be easy to find, as required by Clause F8 "Signs",	
(b) Have *adequate* activity space to enable a person in a wheelchair to negotiate the route while permitting an ambulant person to pass,	

FIRST SCHEDULE—*continued*

Provisions	Limits on application
(c) Include a lift complying with Clause D2 "Mechanical Installations for Access" to upper floors where: (i) *buildings* are four or more storeys high, (ii) *buildings* are three storeys high and have a total design occupancy of 50 or more persons on the two upper floors, (iii) *buildings* are two storeys high and have a total design occupancy of 40 or more persons on the upper floor, or (iv) an upper floor, irrespective of design occupancy, is to be used for the purposes of public reception areas of banks, central, regional and local government offices and facilities, hospitals, medical and dental surgeries, and medical, paramedical and other primary health care centres,	
(d) Contain no thresholds or upstands forming a barrier to an unaided wheelchair user,	
(e) Have means to prevent the wheel of a wheelchair dropping over the side of the *accessible route*,	
(f) Have doors and related hardware which are easily used,	
(g) Not include spiral stairs, or stairs having open risers,	
(h) Have stair treads with leading edge which is rounded, and	

FIRST SCHEDULE—*continued*

Provisions	Limits on application
(i) Have *handrails* on both sides of the *accessible route* when the slope of the route exceeds 1 in 20. The *handrails* shall be continuous along both sides of the stair, ramp and landing except where the *handrail* is interrupted by a doorway.	
D1.3.5 Vehicle spaces and circulation routes shall have:	
(a) Dimensions appropriate to the *intended use*,	
(b) Appropriate crossfall, and slope in the direction of travel,	
(c) *Adequate* queuing and circulation space, and	
(d) *Adequate* sight distances.	
D1.3.6 Vehicle spaces for use by *people with disabilities*, shall, in addition to the requirements of Clause D1.3.5, be:	
(a) Provided in sufficient numbers,	
(b) Located to avoid conflict between vehicles and people using or moving to or from the space, and	
(c) Easy to find as required by Clause F8 Signs.	

Contents

References

Amend 4 Jul 2001

For the purposes of New Zealand Building Code compliance, acceptable reference documents include only the quoted edition and specific amendments as listed below.

		Where quoted
Standards New Zealand		
NZS/AS 1657: 1992	Fixed platforms, walkways, stairways and ladders – Design, construction and installation (known as the SAA Code for fixed platforms, walkways, stairways, and ladders)	AS1 11.0.3
NZS 3114: 1987	Specification for concrete surface finishes *Amend: 1*	AS1 Table 2
NZS 3116: 1991	Interlocking concrete block paving	AS1 Table 2
Amend 4 Jul 2001 NZS 4121: 2001	Design for access and mobility – Buildings and associated facilities	AS1 11.0.1, 12.0.2
Standards Australia		
AS 2890:-	Off street parking	
Part 1: 1993	Car parking facilities	AS1 10.1, 10.2
Part 2: 1989	Commercial vehicle facilities	AS1 11.0.2
AS/NZS 3661:-	Slip resistance of pedestrian surfaces	
Part 1: 1993	Requirements	VM1 1.0.2, AS1 2.1.1, 3.1.4, Table 2
Part 2: 1994	Guide to the reduction of slip hazards	AS1 2.1.3
British Standards Institution		
BS 585:-	Wood stairs.	
Part 1: 1989	Specification for stairs with closed risers for domestic use, including straight and winder flights and quarter or half landings	AS1 4.5.3
BS 5395:-	Stairs, ladders and walkways	
Part 2: 1984	Code of practice for the design of helical and spiral stairs	AS1 4.4.1

Definitions

This is an abbreviated list of definitions for words or terms particularly relevant to this Approved Document. The definitions for any other italicised words may be found in the New Zealand Building Code Handbook.

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*.

Accessible Having features to permit use by *people with disabilities*.

Accessible route An *access route* usable by *people with disabilities*. It shall be a continuous route that can be negotiated unaided by a wheelchair user. The route shall extend from street boundary or car parking area to those spaces within the *building* required to be *accessible* to enable *people with disabilities* to carry out normal activities and processes within the *building*.

Accessible stairway A *stairway* having features for use by *people with disabilities*. *Buildings* required to be *accessible* shall have at least one *accessible stairway* leading off an *accessible route* whether or not a lift is provided.

Adequate *Adequate* to achieve the objectives of the *building code*.

Building has the meaning ascribed to it by the Building Act 1991.

Common ramp A ramp which is used, or intended to be used by the public whether as of right or not, and is not a *service ramp* or *accessible* ramp.

Common stairway A *stairway* which is used, or intended to be used, by the public whether as of right or not, and is not a *private stairway*, *service stairway* or *accessible stairway*.

Handrail A rail to provide support to, or assist with the movement of a person.

Household unit means any *building* or group of *buildings*, or part of any *building* or group of *buildings*, used or intended to be used solely or principally for residential purposes and occupied or intended to be occupied exclusively as the home or residence of not more than one household; but does not include a hostel or boardinghouse or other specialised accommodation.

Kerb ramp means a short ramp either cutting through a kerb or built up to the kerb.

Main private stairway A *private stairway* intended to provide access to and between frequently used spaces such as living areas, kitchens and garages, and includes all exterior *private stairways*.

Minor private stairway A *private stairway* not on a main thoroughfare, and intended to provide infrequent access to a single room which is not a living area or kitchen.

Nosing The rounded projecting edge of a stair tread.

People with disabilities means any *person* who suffers from physical or mental disability to such a degree that he or she is seriously limited in the extent to which he or she can engage in the activities, pursuits, and the processes of everyday life.

Amend 4
Jul 2001

Pitch line The line joining the leading edge or *nosings* (if any) of successive stair treads within a single flight of a *stairway*.

Private stairway A *stairway* used, or intended to be used, by the occupants of a single *household unit*.

Secondary private stairway A *private stairway* other than a *main* or *minor private stairway*, intended to provide access to another floor containing only bedrooms, bathroom or similar accommodation.

Service ramp means a ramp that is used, or intended to be used, infrequently by service personnel to gain access to spaces for the purposes of maintenance and the movement of goods.

Service stairway means a *stairway* that is used, or intended to be used, infrequently by service personnel to gain access to spaces for the purposes of maintenance and the movement of goods.

Stairway A series of steps or stairs with or without landings, including all necessary *handrails* and giving access between two different levels.

Threshold A sill to an external door, or the floor under an internal door.

Verification Method D1/VM1

1.0 Slip Resistance

1.0.1 Compliance with the slip-resistant performance of NZBC D1.3.3 (d) may be verified by confirming that the walking surface under the expected conditions of use has a coefficient of friction (μ) of no less than:

$$\mu = 0.4 + 0.0125\ S$$

where S is the slope of the walking surface expressed as a percentage.

1.0.2 Measurement of the coefficient of friction shall be in accordance with AS/NZS 3661.1.

Acceptable Solution D1/AS1

1.0 General Criteria

1.1 Location

1.1.1 *Accessible routes* shall be provided to give direct access to the principal entrance to the *building* where practical. If it is not practical, the alternative most direct practical route to the space served by the principal entrance shall be used. The route shall have signs complying with NZBC F8.

1.1.2 Where a site has separate *buildings* as part of a single complex, *accessible routes* shall not deviate substantially from the convenient or direct route commonly used.

1.1.3 Where *accessible* units of *Community service buildings* are provided, an *accessible route* shall connect all *accessible* units to reception areas, offices, shops, dining rooms, kitchens, laundries, ablution blocks, recreation rooms and any other communal facilities.

1.1.4 Figure 1 illustrates an acceptable solution with provision for *people with disabilities* to approach *buildings*.

1.1.5 *Access routes* which are part of an *escape route* shall also comply with NZBC C2.

1.2 Slope

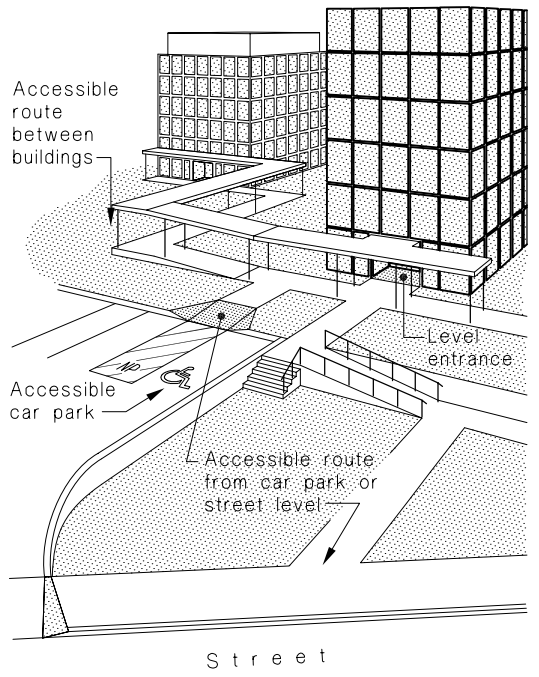
1.2.1 Slope in direction of travel

Acceptable slopes for different types of *access routes* are shown in Figure 2.

1.2.2 Cross fall

Where the surface of an *access route* is subject to wetting, the surface shall have a cross fall of no less than 1 in 100. The surface of any *access route* shall not have a cross fall of more than 1 in 50.

Figure 1: **Approaching a Building**
Paragraph 1.1.4



1.3 Changes in level

1.3.1 Except in *household units* or where permitted by Paragraph 1.3.2, a single isolated step shall not be permitted but the change of level shall be constructed as a ramp complying with Paragraph 3.0.

1.3.2 Threshold weather stops projecting no more than 20 mm above the *threshold* finished surface are acceptable.

COMMENT:
Threshold weather stops greater than 20 mm should be designed as ramps complying with Paragraph 3.0. Height changes at doorways are particularly inconvenient for wheelchair users as it requires complex manoeuvring to get over the change in level while opening the door.

Figure 2: **Acceptable Slopes for Ramps, Stairways and Fixed Ladders**
Paragraph 1.2.1

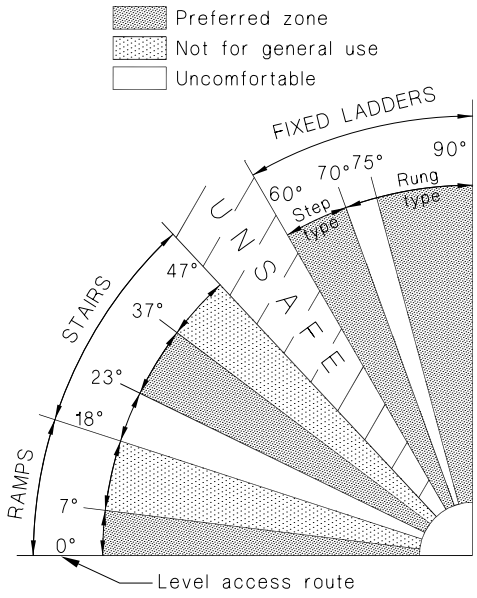


Figure 3: **Height Clearances Along Access Route**
Paragraph 1.4.1

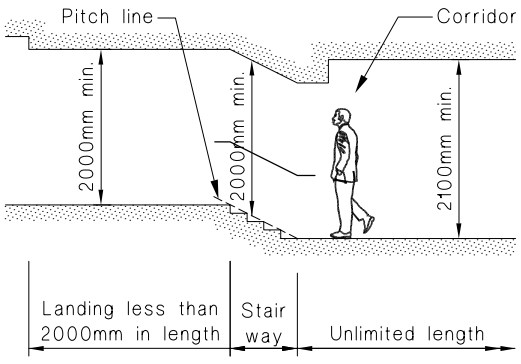


Table 1: **Height Clearances**
Paragraph 1.4.1

Prone access spaces (e.g. sub-floor access, limited length)	450 mm
Crawl spaces for servicing (30 m max length)	800 mm
Pedestrian *access routes* (unlimited length)	2100 mm
Landings, *stairways* and corridors (less than 2 m in length)	2000 mm

1.4 Height clearances

1.4.1 *Access routes* shall have height clearances complying with Table 1 and as shown in Figure 3.

COMMENT:
Particular care must be taken to ensure that there is adequate height clearance between the *pitch line* and the underside of an upper tread where spiral *stairways* are used.

1.5 Obstructions

1.5.1 A minor projection is permitted within the required clear width of an *access route* if it is designed to minimise the risk of injury or impact, and the projection is located:

a) More than 1600 mm above floor level and projects less than 200 mm into the *access route* (Figure 4),

b) Within the height 800 mm to 1600 mm above floor level and projects less than 60 mm into the *access route*, (Figure 4),

c) Less than 800 mm above floor level and projects less than 100 mm into the *access route* (Figure 4).

COMMENT:
Light fittings less than 1600 mm above the floor would need to be recessed into the wall. A projection of 60 mm is sufficient to allow for electrical sockets, signs on walls, etc.

Figure 4: **Safe Minor Projections**
Paragraphs 1.5.1 and 1.5.2

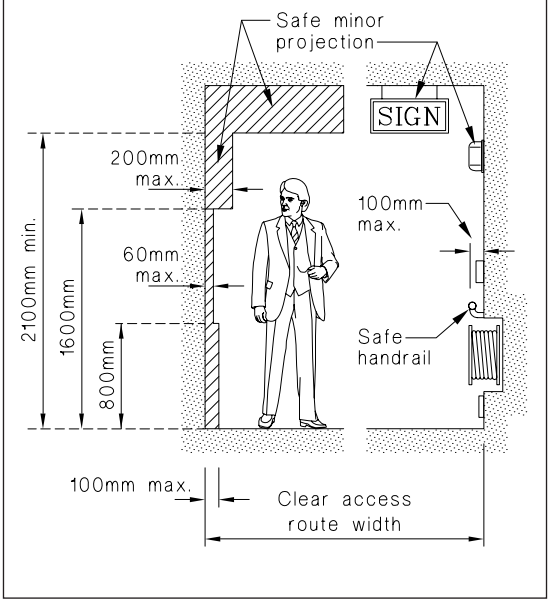
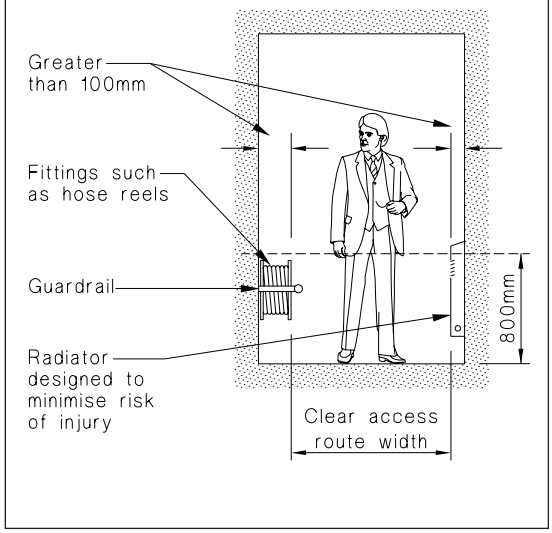


Figure 5: **Protection from Major Projections**
Paragraph 1.5.3



1.5.2 Handrails may be considered a minor projection if they project no more than:

a) 100 mm into the *access route* (see Figure 4), or

b) In the case of a centre *handrail*, 300 mm into a landing (see Figure 25).

1.5.3 Major projections (see Figure 5) are permitted if:

a) The clear width of the *access route* is provided between the faces of the projections, and

b) The transition between the face of the wall and the face of the projection is designed to minimise the risk of injury by impact.

1.5.4 Dangerous projections – Windows, fittings or other dangerous obstructions may project into the space adjacent to an *access route* (see Figure 6) if users are protected from the projection by:

a) A kerb provided at floor level which defines the extent of the projection, or

b) A *handrail*, guard-rail, or other protection at sill level.

COMMENT:

1. Many *people with disabilities* require better lighting than is normally provided to highlight obstructions. This applies particularly with respect to the elderly and those with impaired sight.

2. Illumination should also highlight doors, signs, counters and other areas.

3. Lighting designers should avoid glare and sudden sharp changes in lighting levels. Diffused types of lighting are preferred.

Figure 6: **Protection from Dangerous Projections**
Paragraph 1.5.4

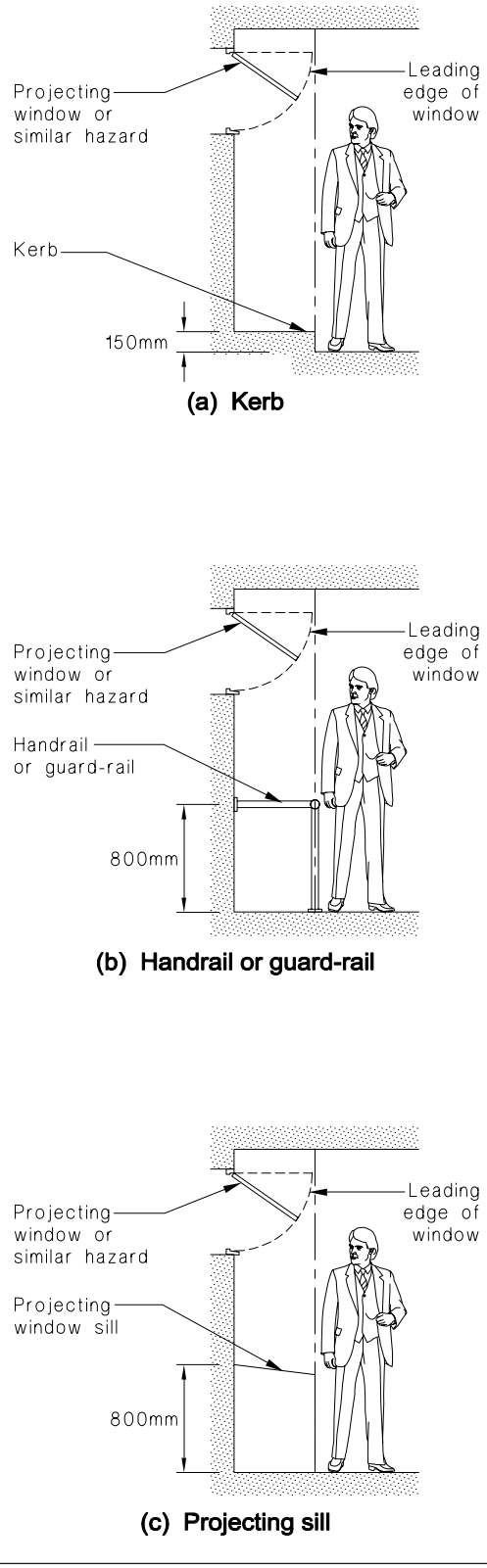
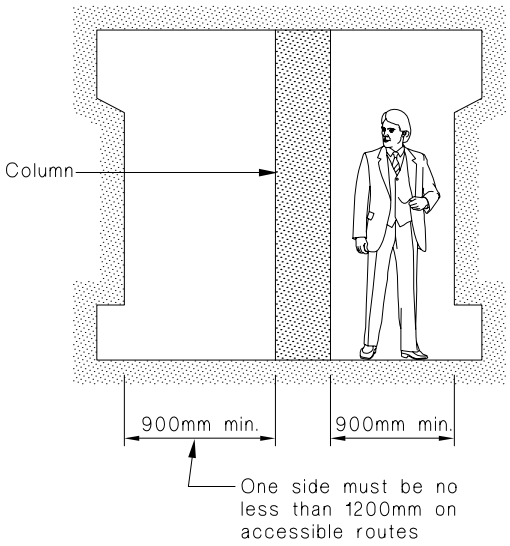


Figure 7: **Protection from Isolated Columns**
Paragraph 1.5.5



1.5.5 Isolated columns are permitted in an *access route* (see Figure 7) provided that:

a) The column can be readily seen during normal use of the *building*, and

b) A clear passage of no less than 900 mm is available on both sides; and, on an *accessible route*, a clear passage of no less than 1200 mm is available on at least one side.

1.6 Structural stability

1.6.1 The *access route* including *handrails* shall comply with the strength and stiffness requirements of NZBC B1.

1.7 Barriers

1.7.1 Barriers to prevent falling from the *access route* shall comply with NZBC F4.

COMMENT:

Barriers and *handrails*, having different functions, are considered separately in the *building code*. A barrier (or balustrade on a stair) is required to prevent people falling where there is a sudden change in level. A *handrail* is a graspable rail designed to guide and support people using a *stairway* or ramp. A *handrail* may be attached to or form the top of a barrier where the height is appropriate.

1.8 Lighting

1.8.1 Artificial lighting complying with NZBC G8 shall be provided along the *access route*.

2.0 Level Access Routes

2.1 Slip resistance

2.1.1 Level *access routes* to which the public has access, including level *accessible routes*, shall have a mean coefficient of friction μ, of not less than 0.4 when tested in accordance with AS/NZS 3661.1 (see D1/VM1). Requirements for ramps and *stairways* are given in Paragraphs 3.1.4 and 4.1.4.

COMMENT:

1. *Access routes* to which the public have access include walking surfaces such as decks, patios and steps on the approach to the main entrance to *Housing*, and common areas of *Communal Residential* and *Multi-unit dwelling* accommodation.
2. For other *access routes* a coefficient of friction of less than 0.4 may be acceptable, but account should be taken of the effectiveness of the surface when worn or wet.

2.1.2 For a level *access route* which is intended to remain dry under normal usage, any of the commonly used walking surfaces listed in Table 2 will provide *adequate* slip resistance ($\mu > 0.4$).

COMMENT:

1. A cleaning regime should be established by the *building* owner to effectively maintain the slip resistance of the walking surface.
2. Whenever a normally dry surface is wet, such as from cleaning or isolated spillage, at a time when the public have access, adequate signage should be used to identify the hazard. (Many walking surfaces which are slip resistant in the dry become very slippery when wet and can be the cause of slip injuries as pedestrians are unaware of the rapid change of slip resistance and have not altered their gait accordingly.)
3. Slipping may still occur on slip resistant walking surfaces as other factors such as the use of unsuitable footwear or unusual gaits also influence slip resistance.

2.1.3 The walking surface for a level *access route* which may become wet during normal usage (for example, outdoor *access routes* or entranceways where water can be tracked indoors when it is raining) shall be selected from the list of acceptable wet slip resistant surfaces given in Table 2.

COMMENT:

1. Testing as prescribed by D1/VM1 may be used to supplement Table 2.
2. The manner in which a surface wears will affect the slip resistance. This is particularly relevant to wet slip resistant surfaces if wear results in a polishing of the surface.
3. Allowing the surface texture to become clogged with dirt (through inadequate cleaning regimes) or the buildup of polishes or waxes can similarly impair slip resistance. (This comment is applicable for both dry and wet surfaces.) Guidance on the maintenance of slip resistance is given in AS/NZS 3661.2.

Table 2: Acceptable Slip Resistance for Walking Surfaces
Paragraphs 2.1.2, 3.1.4 and 4.1.4 c)

Walking surface[12]	Level surface[1]		Sloping surface[2] or stairs[3]		Typical values for coefficient of friction (wet)
	Acceptable dry slip resistance	Acceptable wet slip resistance	Acceptable dry slip resistance	Acceptable wet slip resistance	
Timber					
Uncoated smooth	Yes	No	No	No	0.20 – 0.35
Uncoated profiled[4]					
– across profile	Yes	Yes	Yes	Test	0.35 – 0.60
– along profile	Yes	No	No	No	0.15 – 0.20
Coated (paint, polyurethane, etc)	Yes	No	No	No	0.10 – 0.30
Coated and sand/grit impregnated[5]	Yes	Yes	Yes	Yes	0.55 – 0.90
Portland cement concrete					
Smooth trowelled finish (Class U3)[6]	Yes	No	Yes	No	0.30 – 0.45
Broomed (Class 5 or 6)[6] or wood float finish (Class U2)	Yes	Yes	Yes	Yes	0.65 – 0.85
Coated (paint, polyurethane, etc)	Yes	No	No	No	0.20 – 0.30
Coated and sand/grit impregnated[5]	Yes	Yes	Yes	Yes	0.55 – 0.90
Exposed aggregate finish					
– rounded aggregate	Yes	Test	Yes	Test	0.40 – 0.70
– crushed aggregate	Yes	Yes	Yes	Yes	0.60 – 0.90
Asphaltic concrete	Yes	Yes	Yes	Yes	0.60 – 1.00
Marble and granite					
Polished surface[7]	Yes	No	No	No	0.10 – 0.20
Honed finish[8]	Yes	Test	Yes	Test	0.10 – 0.60
Flamed finish	Yes	Yes	Yes	Yes	0.50 – 0.80
Fully sandblasted surface[8]	Yes	Test	Yes	Test	0.30 – 0.50
Patterned sandblasted surface	Yes	Test[9]	Yes	Test[9]	0.15 – 0.45
Split slate	Yes	Test	Yes	Test	0.40 – 0.55
Terrazzo					
Polished	Yes	Test	No	No	0.15 – 0.45
Honed	Yes	Test	Yes	Test	0.20 – 0.60
Sandstone	Yes	Yes	Yes	Test	0.55 – 0.65
Ceramic tiles					
Unglazed					
– smooth finish	Yes	Test	Yes	Test	0.10 – 0.60
– profiled	Yes	Test[9]	Yes	Test[9]	0.10 – 0.65
– grit finish	Yes	Test[10]	Yes	Test[10]	0.35 – 0.65
Glazed					
– smooth or polished finish[7]	Yes	No	No	No	0.10 – 0.20
– profiled	Yes	Test[9]	Yes	Test[9]	0.10 – 0.45
– grit finish	Yes	Test[10]	Yes	Test[10]	0.45 – 0.60
Clay pavers					
Wire cut	Yes	Yes	Yes	Test	0.50 – 0.70
Smooth texture	Yes	Test	Yes	Test	0.30 – 0.65

Table 2: Acceptable Slip Resistance for Walking Surfaces (cont'd)

Walking surface[12]	Level surface[1]		Sloping surface[2] or stairs[3]		Typical values for coefficient of friction (wet)
	Acceptable dry slip resistance	Acceptable wet slip resistance	Acceptable dry slip resistance	Acceptable wet slip resistance	
Concrete pavers					
Dry press concrete	Yes	Yes	Yes	Test	0.45 – 0.70
Interlocking concrete block paving[11]	Yes	Yes	Yes	Test	0.45 – 0.70
Moulded surface (e.g. simulated slate or concrete cobbles)	Yes	Test	Yes	Test	0.35 – 0.75
Compressed fibre-cement sheet					
Uncoated	Yes	Yes	Yes	Test	0.45 – 0.65
Coated (paint, polyurethane, etc)	Yes	No	No	No	0.10 – 0.30
Coated and sand impregnated[5]	Yes	Yes	Yes	Yes	0.55 – 0.90
Rubber tiles/sheeting					
Smooth	Yes	Test	Yes	Test	0.20 – 0.60
Profiled	Yes	Test[9]	Yes	Test[9]	0.35 – 0.60
Vinyl and linoleum					
Smooth or with imprinted pattern	Yes	Test	Yes	No	0.25 – 0.50
Profiled (studs or ribs)	Yes	Test[9]	Yes	Test[9]	0.30 – 0.70
Grit/flaked finish	Yes	Test	Yes	Test	0.30 – 0.70
Carpet					
Tufted or loop pile[13]	Yes	Yes	Yes	Yes	0.55 – 0.70
Artificial turf[13]	Yes	Yes	Yes	Yes	0.65 – 0.80
Timber composites (chipboard, cork tiles, etc)					
Uncoated	Yes	No	Yes	No	0.35 – 0.45
Coated (paint, polyurethane, etc)	Yes	No	No	No	0.10 – 0.30
Coated and sand/grit impregnated[5]	Yes	Yes	Yes	Yes	0.55 – 0.90
Anti-slip tapes[14]	Yes	Yes	Yes	Test	0.40 – 0.85

See page 20 for notes to Table 2.

Table 2: Acceptable Slip Resistance for Walking Surfaces (cont'd)

Notes:

1. Level surfaces including surfaces with slopes no steeper than 1:50.
2. Sloping surfaces with slopes greater than 1:50 but less than 1:10 for wet conditions, or less than 1:8 for dry conditions.
3. Acceptability as shown is based on stair treads without slip resistant *nosings*. When testing stair treads without *nosings* acceptability for slip resistance from AS/NZS 3661.1 should be based on a slope of 1:10. With slip resistant *nosings* at least 50 mm wide, acceptability criteria for stair treads is based on the requirements for level surfaces.
4. Profile at right angles to direction of pedestrian traffic. Algal growth on uncoated timber walkways significantly reduces slip resistance when wet and requires regular removal, e.g. by high pressure waterblasting.
5. The sand/grit, which is sprinkled over the complete surface of the final paint coating, should be a hard angular material such as silica sand or calcined bauxite. The particle size should not be less than 0.2 mm so that it is not submerged by the coating and not greater than about 2 – 3 mm so that it remains tightly bound to the surface. If overpainted, testing is required to establish acceptability of slip resistance.
6. Concrete surface finishes complying with NZS 3114.
7. Glazed or polished surfaces are unsuitable in either wet or dry conditions for sloping surfaces or for stairs, even though test measurements may indicate adequacy, because of the effect of foot placement. Note also that when tested in the dry, very smooth surfaces can give anomalous high readings arising from slip-suction effects between the test slider and the test surface.
8. The coefficient of friction can vary significantly with the extent of surface preparation.
9. It is noted in AS/NZS 3661.1 that the slip resistance tests prescribed in that Standard may not be suitable for heavily profiled (or patterned) surfaces. The Standard references other tests which may be more suitable for such surfaces.
10. When the grit finish has a "feel" rougher than 80 grit sandpaper, the surface may be deemed to have acceptable wet slip resistance, for either level or sloping surfaces or for stair treads, without testing.
11. Interlocking concrete block paving to NZS 3116.
12. To meet durability requirements of NZBC B2, the surface should have at least a five year life under normal maintenance.
13. Validity of the listed typical values for coefficient of friction is uncertain as the test methods may not be applicable to carpets.
14. Anti-slip tapes will normally require regular replacement to remain effective. To ensure foot contact, tapes should be placed at right angles to the line of travel and be spaced at no more than 150 mm centres.

2.1.4 Except in *Housing*, the transition zone between any part of the *access route* which is intended to remain dry under normal usage and that part of the *access route* which may become wet during normal usage shall be provided with:

a) Water absorbent matting across the width of the effective walkway with a sufficient dimension in the direction of the pedestrian traffic to remove water which may be tracked by footwear, or

b) An extension of the wet slip resistant walking surface for sufficient distance from the point at which water can be tracked indoors (normally from the entrance portal) to allow water to be shed from footwear, or

c) A combination of a) and b) above.

COMMENT:

1. The dimension of the transition zone in the direction of pedestrian traffic is dependent upon the usage, however either:

   a) The absorbent matting should be of sufficient size to allow for at least one (preferably two) contacts between each foot with normally spaced footfalls. (As a guide, the minimum dimension is 1.8 m, but this could be reduced if the design of the entranceway restricts the spacing of the footfalls, e.g. an entranceway incorporating a revolving door), or

   b) The wet slip resistant walking surface should extend typically 6 m to 10 m from the entrance portal.

2. The absorbent matting should be either fixed in place (e.g. by a mat well) or should adequately grip the underlying flooring and should be of a design (e.g. with a heavy rubber backing) which will not curl up at the edges.

3. A cleaning/replacement regime should be established by the *building* operator to ensure the ongoing effectiveness of the matting.

2.2 Width

2.2.1 The clear width of an *accessible route* shall be no less than 1200 mm.

COMMENT:
Handrails and other minor obstructions complying with Paragraphs 1.5.1 and 1.5.2 are permitted to intrude into this width.

2.3 Protection from falling

2.3.1 Where the surface of an *accessible route* is more than 25 mm above the adjacent ground, protection is to be provided by either a 75 mm upstand (kerb) or a low barrier rail.

3.0 Ramps

3.1 Slope

3.1.1 The maximum acceptable slopes for ramps are given in Table 3. The choice of slope must take account of the type of use and risk of slipping.

3.1.2 *Service ramps* steeper than 1 in 8 shall have footholds complying with Figure 8 and Table 4.

3.1.3 *Accessible ramps* shall have an upstand no less than 75 mm in height on any drop-off side of a ramp (see Figure 9).

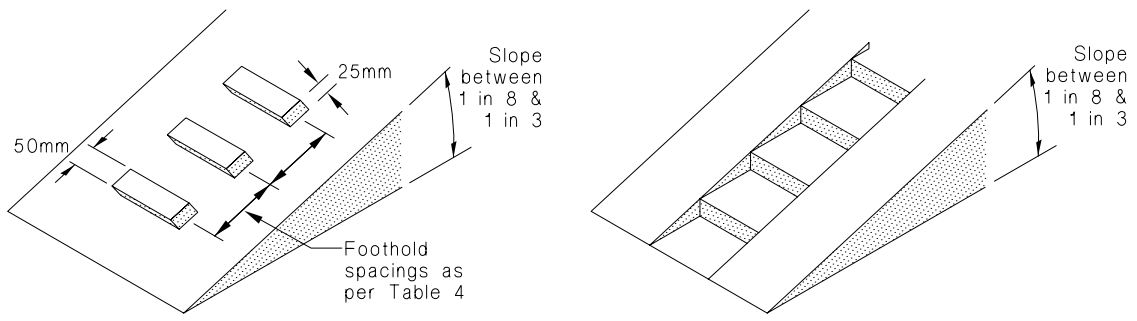
Table 3: Acceptable Ramp Slopes
Paragraph 3.1.1

Type of ramp	Maximum slope
Accessible ramp	1:12
Common ramp subject to wetting	1:10
Common ramp normally dry	1:8
Service ramps	1:3

Table 4: Foothold Spacing for Service Ramps
Paragraph 3.1.2

Ramp slope	Spacing (mm)	
	Goods carried	No goods carried
1:6	360	460
1:5	330	430
1:4	300	400
1:3	280	380

Figure 8: Service Ramps Footholds
Paragraph 3.1.2



(a) Cleats (b) Steps

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3.1.4 Slip resistance – Any slip resistant surface complying with Table 2 is acceptable for the ramp surface.

COMMENT:

1. The slopes to which Table 2 applies are limited. See Notes 1 and 2 to that table. The minimum mean slip resistance permitted by AS/NZS 3661.1 for sloping surfaces increases with the gradient of the surface. (See D1/VM1.)
2. Glazed or polished walking surfaces are normally unsuitable for *common ramps* (see Table 2, Notes).
3. Comments to Paragraphs 2.1.2, 2.1.3 and 2.1.4 for level *access routes* also apply to *common ramps*.

3.2 Width

The clear width of an *accessible* ramp shall be 1200 mm.

3.3 Landings

3.3.1 Landings shall be level, and be provided at the top and bottom of all ramps. For any ramp steeper than 1 in 33, intermediate landings are to be provided at the vertical intervals given in Table 5 and Figure 9.

Figure 9: Accessible Ramps
Paragraphs 3.1.3, 3.3.1, 3.3.3, 6.0.3, 6.0.4 and 7.0.2

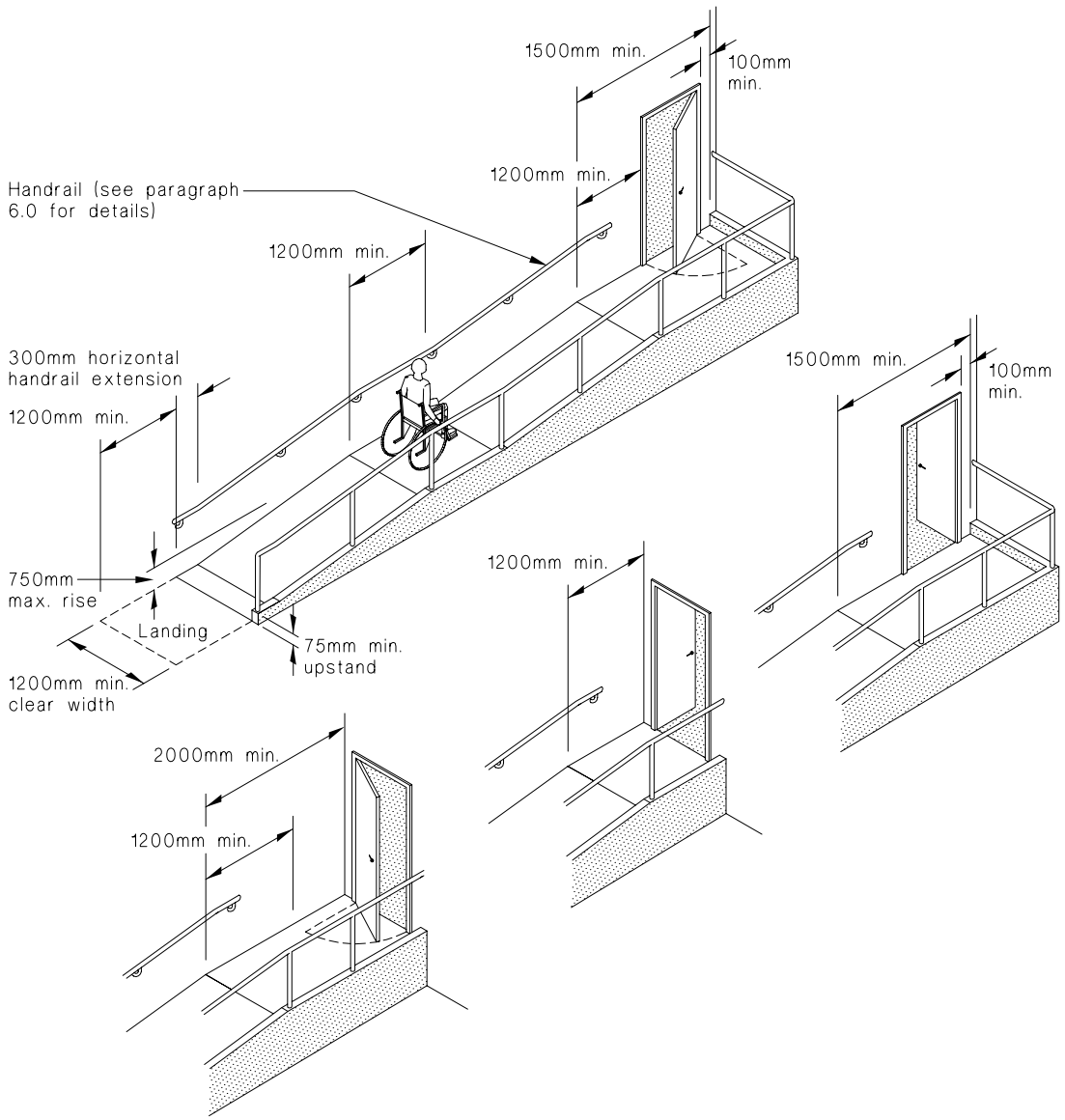


Table 5: Landings
Paragraphs 3.3.1 and 3.3.3

Ramp type	Maximum rise between landings (mm)	Length of landing (mm)
Accessible	750[1]	1200
Other	1500	Ramp width but need not be greater than 900

Note:
1. 750 mm is the reasonable maximum level difference for a person to negotiate in a wheelchair.

3.3.2 Landing width shall be no less than the minimum width of the ramp it serves.

3.3.3 Landing length shall comply with Table 5 and Figure 9.

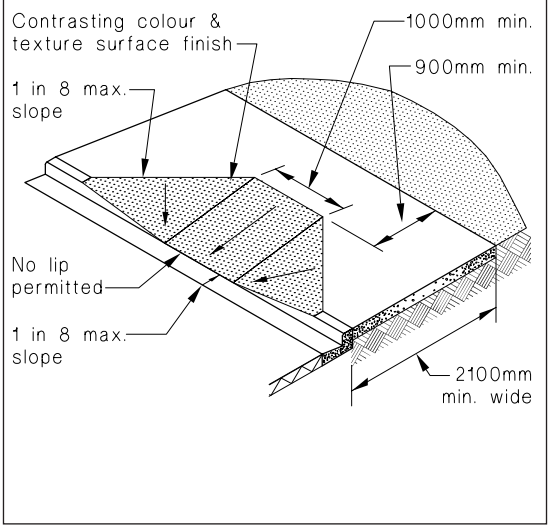
3.4 Kerb ramps

3.4.1 *Kerb ramps* (see Figure 10) shall have:

a) A slope of no greater than 1 in 8, and

b) Colour and texture contrast with the adjacent footpath.

Figure 10: Minimum Dimensions for Kerb Ramps
Paragraph 3.4.1



COMMENT:
Kerb ramps allow the safe and easy movement of wheeled trolleys and prams, as well as wheelchairs.

4.0 Stairways

4.1 Pitch, risers and treads

4.1.1 Acceptable *stairway pitch line* slopes, and step riser heights are given in Table 6 and Figure 11.

COMMENT:
1. The values given in Table 6 are based on recent research in North America. The often used design rule of twice the rise plus the going (2R+G) does not always lead to safe *stairway* geometry and can exclude some safe moderate pitch stairs.
2. Stairs having a *pitch line* slope of less than 23° do not permit a person to use the stair with an acceptable gait. Dangerous falls occur where the rhythm of movement is broken.

4.1.2 The method of measuring risers and treads is shown in Figure 12. If a landing on an outside *stairway* is formed by ground sloping across the width of the flight, the rise is measured at mid-width.

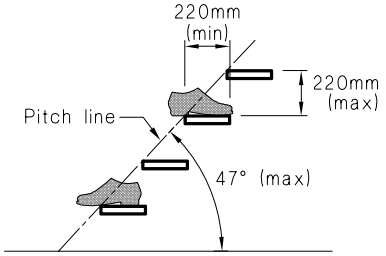
4.1.3 Uniformity – Riser height and tread depth for all steps in one flight, shall be uniform within the tolerance of ± 5 mm measured at the centreline on straight flights and at the *pitch line* on curved and spiral flights.

COMMENT:
The foot is normally only lifted a few mm above the treads during ascent. A minor variation in riser height can cause someone to stumble.

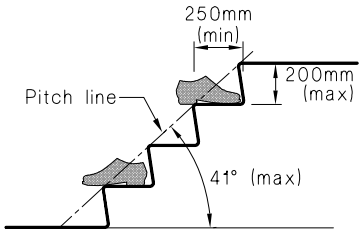
Table 6: Design Limits for Stairs
Paragraphs 4.1.1, 4.1.4 a), 4.4.2, 4.5.1 a) and Figure 17

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

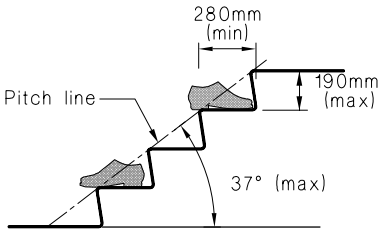
Figure 11: **Pitch, Risers and Treads for Stairs**
Paragraphs 4.1.1, 4.1.4, 4.4.2, 4.5.1 a) and Figure 17



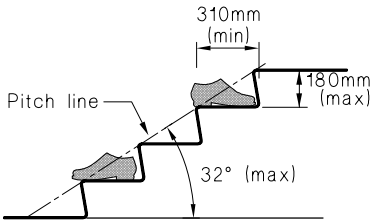
Service stairways and minor private stairways



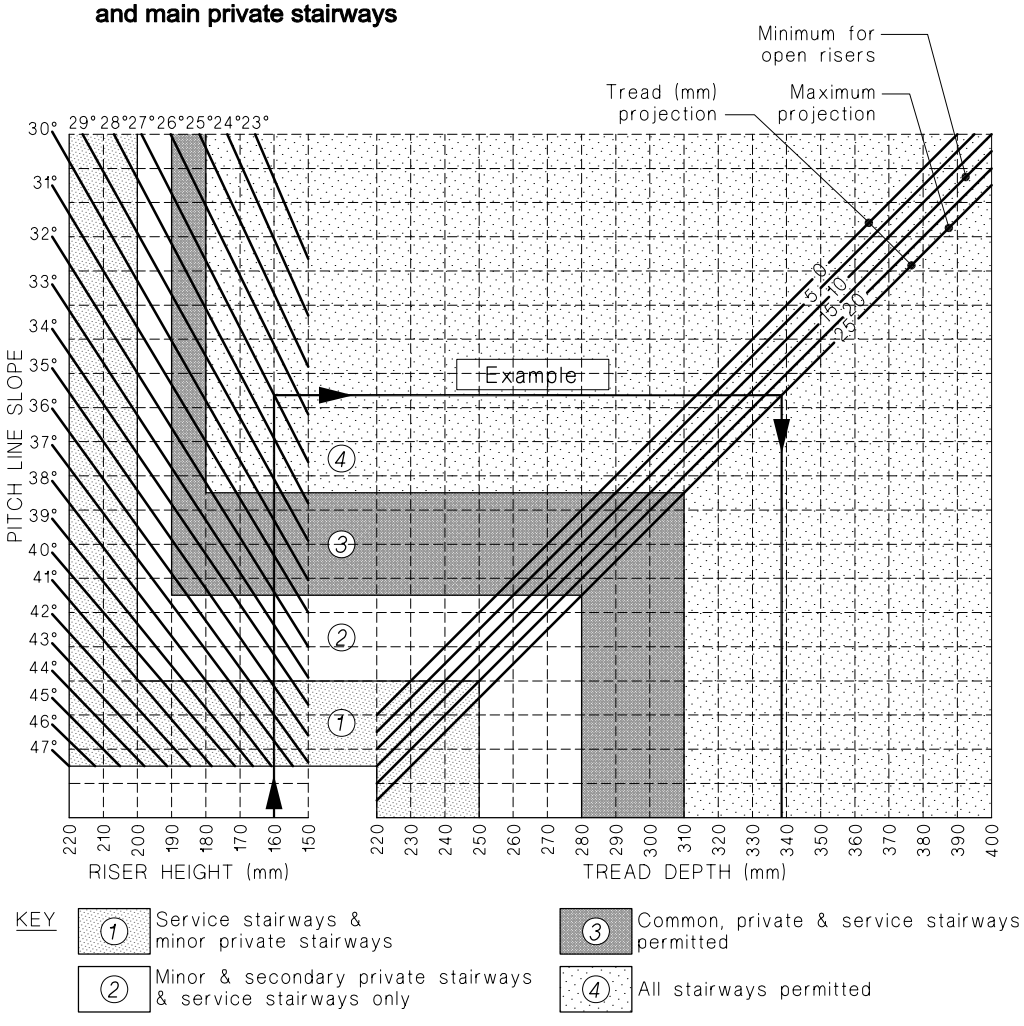
Secondary private stairways



Common stairways and main private stairways



Accessible stairways



Example of accessible stairway

For a riser height of 160mm, pitch line slope of 27° and tread projection of 25mm, the design tread depth is 340mm.

Figure 12: Measurement of Rise and Tread Depth
Paragraphs 4.1.2 and 4.1.6

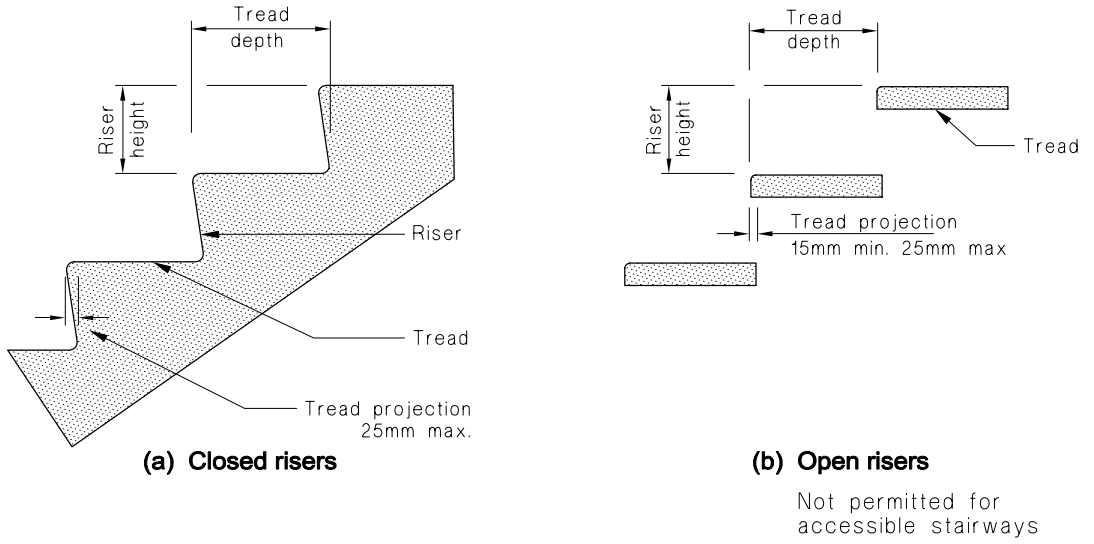
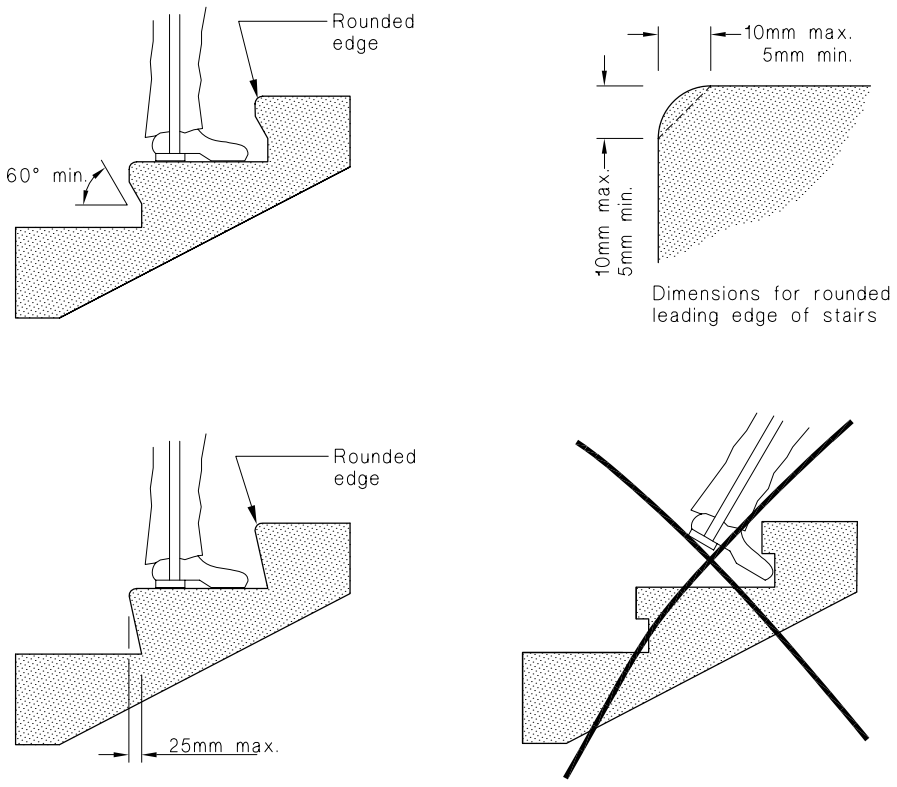


Figure 13: Accessible Stairway Projections
Paragraph 4.1.7



4.1.4 Stair treads – Acceptable stair treads (see Figure 11) have:

a) A tread depth of no less than that specified in Table 6,

b) A level surface,

c) Slip resistant surfaces complying with Table 2.

COMMENT:

1. Adequate tread depth is essential for *stairway* safety. Analysis of *stairway* related accidents shows that overstepping of treads is a common cause of accidents.

2. Glazed or polished surfaces are normally unsuitable for stair treads unless the stairs are fitted with slip resistant *nosings*. (See Table 2, Notes 3 and 7.)

4.1.5 Service stairs having treads less than 250 mm in depth shall have open risers.

4.1.6 Tread projection – Figure 12 illustrates acceptable projections for the leading edge of successive stair treads. Limiting dimensions are:

a) For open risers – 15 mm minimum and 25 mm maximum,

b) For closed risers – nil projection minimum, and 25 mm maximum.

4.1.7 Leading edges of treads or *nosings* (if any) on *accessible stairways* shall:

a) Be rounded to avoid a sharp edge (see Figure 13), and

b) Be colour contrasted with the rest of the tread.

COMMENT:

Visibility of the stair tread is essential for stair safety. The difference between two dark colours does not necessarily provide sufficient tonal contrast to allow the edge of the tread to be seen by a *person* with impaired vision. The lighting levels required by Paragraph 4.5 are essential for *stairway* safety.

4.1.8 Open risers

a) To prevent children falling or becoming held fast, the space between treads shall not permit the passage of a 100 mm sphere in areas frequented by children under 4, or a 130 mm sphere where frequented by children of 4 and 5 years of age.

b) Open risers are not to be used within *accessible stairways*, and may be used on *common stairways* only if both the following criteria are satisfied:

   i) there is an *accessible stairway* available as an alternative, and

   ii) leading edges of the *nosings* are colour contrasted with the rest of the tread.

COMMENT:

1. Paragraph 4.1.8 a) does not apply to stairs within *Industrial Buildings*, *Outbuildings* or *Ancillary buildings*, or other *stairways* in areas not frequented by children under 6 years of age.

2. Open risers are hazardous to ambulant *people with disabilities*. People who wear leg braces or prosthetic devices need a solid riser to guide the foot up over the riser to the next step and to maintain balance.

4.2 Width

4.2.1 The acceptable width between *handrails* of a *common stairway* or *accessible stairway*, is no less than 900 mm.

COMMENT:

While no minimum width is given for *stairways* within *household units* it should be noted that:

C/AS1 Table 3.2 requires any *stairway* which is an *escape route* in *purpose group* SR *(Multi-unit dwellings)* to be no less than 850 mm wide. This is also a practical minimum requirement for any *private stairway*.

Narrow *private stairways* can make the movement of furniture difficult, if not impossible.

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Figure 14: **Landings Not Required at Door Locations**
Paragraph 4.3.1

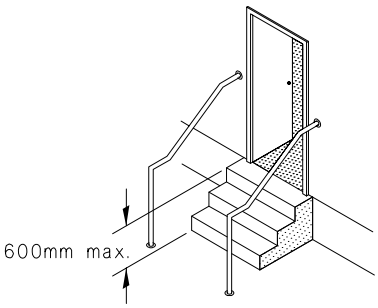


Table 7: **Rise Between Landings**
Paragraph 4.3.2

Stairway type	Maximum rise between landings (m)
Private	4.0
Service	4.0
Common	2.5
Accessible	2.5

4.3 Landings

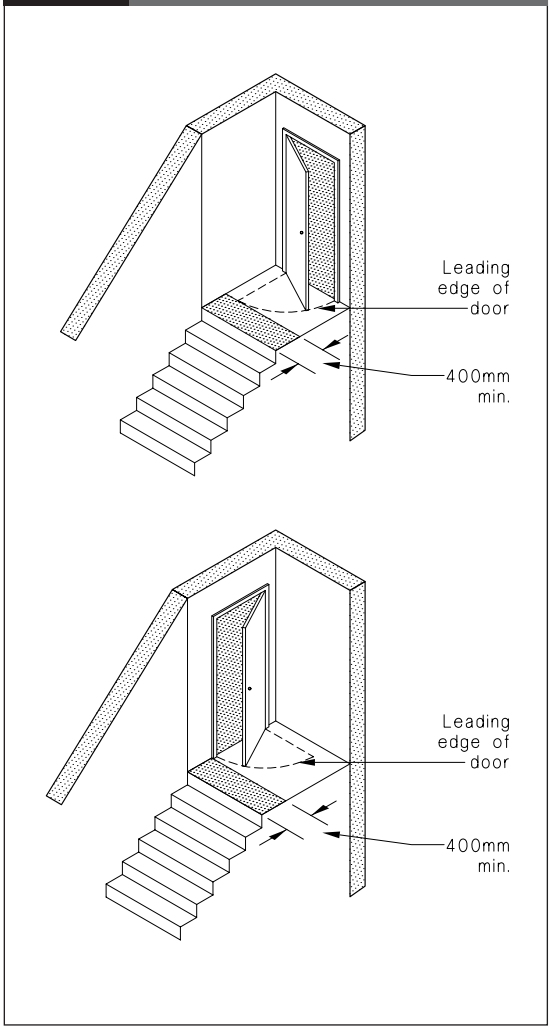
4.3.1 Landings required – Landings shall be provided at the top and bottom of every flight of stairs, ramp or ladder, or where a door opens into the *stairway*. A landing need not be provided between a flight and a door where the rise of the flight is no more than 600 mm and the door slides or opens away from the steps (see Figure 14).

4.3.2 The maximum rise between successive landings shall comply with Table 7. (See also Figure 25.)

4.3.3 Landing width shall be no less than the minimum width of the *access route* it serves.

4.3.4 Landing length shall be no less than 900 mm.

Figure 15: **Clearances at Door Locations**
Paragraph 4.3.5



4.3.5 Obstructions – Landings shall be clear of any permanent obstruction. A clear space of at least 400 mm across the full width of the landing shall be available beyond the outer arc formed by any opening door (see Figure 15).

4.3.6 Arresting a falling user – The line of sight between landings more than 8.0 m apart vertically shall be broken by one or more of the following methods:

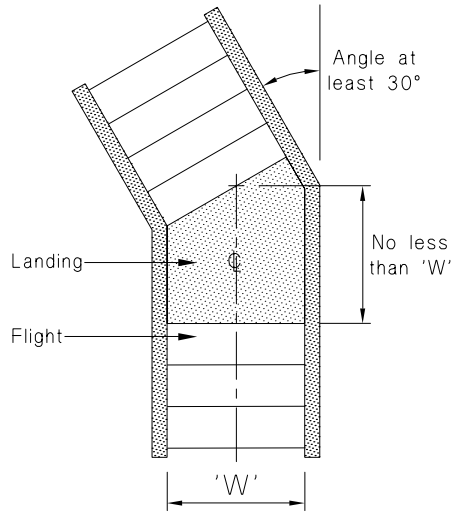
a) Off-setting the alignment of adjacent flights.

b) Changing the direction of at least one flight by a minimum angle of 30° (see Figure 16).

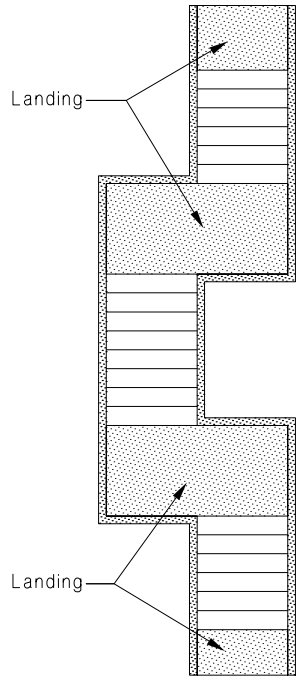
c) Providing a landing of no less than 1800 mm in length.

Figure 16: Stairway Direction Changes at Landings
Paragraph 4.3.6

Direction changes limit the potential accident fall distances to one flight.



(a) Change in direction within a stairway



(b) Offset within stairway

Figure 17: Curved Stairway with Tapered Treads
Paragraphs 4.4.1 a) and b) and 4.5.2

Note: Tread depth and riser height measured on the pitch line shall comply with Table 6 and Figure 11.

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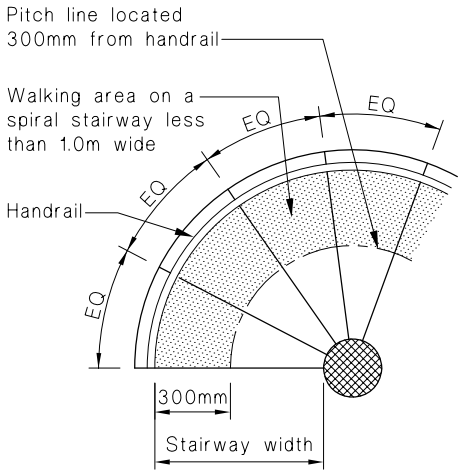
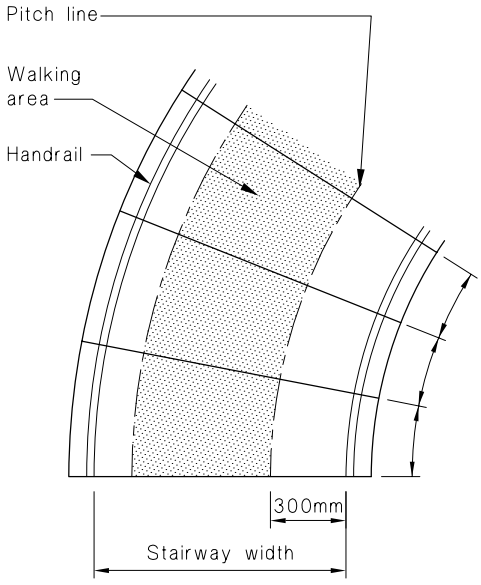


(a) Spiral stairway width less than 1000mm

(Private and service stairway only)



(b) Curved stairway width 1000mm or greater

(Acceptable as an accessible stairway where handrails are installed on both sides as shown)

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4.4 Curved and spiral stairways

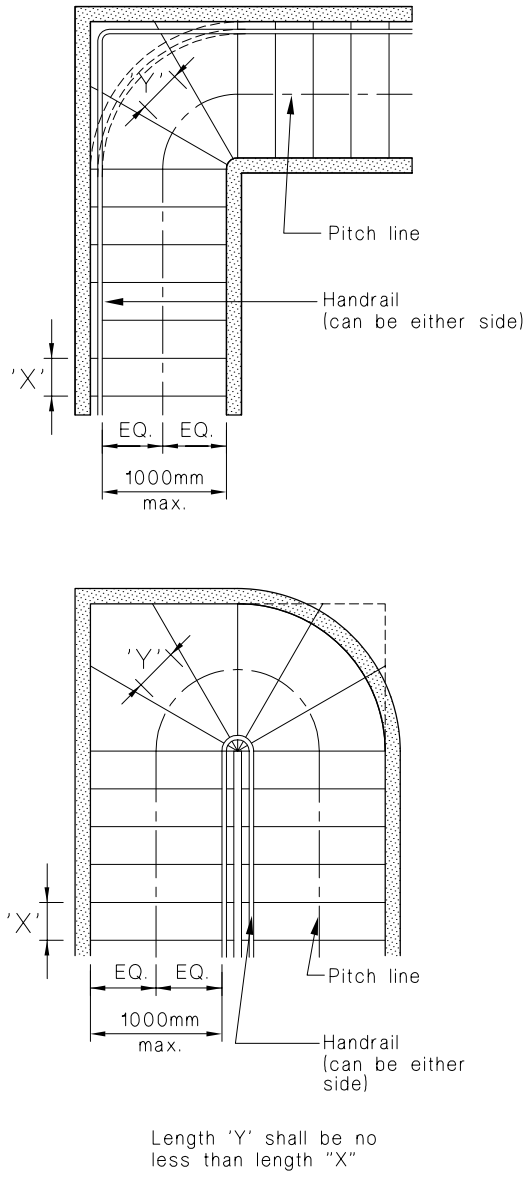
4.4.1 Curved and spiral stairways with tapered treads shall have their *pitch line* located:

a) For a spiral stairway of width less than 1000 mm – as shown in Figure 17 (a)), and

b) For a curved stairway of width 1000 mm or greater – as shown in Figure 17 (b)).

BS 5395: Part 2 is an acceptable solution for spiral *stairways* having a diameter of no less than 1500 mm.

Figure 18: Stair Winders
Paragraphs 4.5.1 and 4.5.2



COMMENT:

1. The dimensions of Figure 17 are based on the assumption that people walk up and down only on the outside of a narrow *stairway*, but both the inside and outside of wider *stairways*.
2. Spiral *stairways* complying with BS 5395.2 and being less than 1500 mm in diameter (measured to the inside of *handrail*), may be acceptable as an additional means of access to spaces adequately served by alternative *access routes*.

4.4.2 Consecutive tapered treads shall have uniform taper angles. *Pitch line* slope, riser height and tread depth along both *pitch lines* shall comply with Table 6 and Figure 11.

4.5 Stair winders

4.5.1 Winders are acceptable on *private stairways* and *service stairways* provided that all the following conditions are satisfied:

a) Riser heights and tread depths on the *pitch line* comply with Table 6 and Figure 11.

b) Riser height is uniform and the same as that on the adjoining straight flights of stairs.

c) Tread depth on the *pitch line* is no less than that on adjoining straight flights of stairs.

d) Winders have a uniform taper angle.

e) Consecutive winders do not turn through an angle of more than 180°.

4.5.2 For a *stairway* width of less than 1000 mm the *pitch line* shall be located as shown in Figure 18. For widths of 1000 mm or more, the *pitch line* shall be located as shown in Figure 17 (b)).

4.5.3 BS 585: Part 1 is an acceptable solution for winders on *stairways* having a width of between 770 and 1200 mm.

4.6 Visibility of stair treads

4.6.1 To ensure that the leading edge of stair treads can be easily seen, the lighting levels given in Table 8 shall be provided.

4.6.2 Except for external *private stairways*, switches for *stairway* lighting shall be able to be activated at:

a) The top of the *stairway*,

b) The bottom of the *stairway*, and

c) Any intermediate landings having access to or from any floor.

5.0 Fixed Ladders

5.1 General

5.1.1 Types of fixed ladders

a) Step-type ladders (see Figure 19),

b) Rung-type ladders (see Figure 20),

c) Individual rung-type ladders (see Figure 24).

Rung-type ladders shall not be used where frequent access and the carriage of tools, equipment or materials are required.

COMMENT:

1. Where ladders are proposed, due consideration needs to be given to all relevant factors affecting the user's safety including:
   - the reason for access (e.g. plant servicing or inspection of passive *building elements* such as roofs)
   - the intended frequency of use
   - the need to carry tools or materials by hand.

   Rung-type ladders are not considered suitable for any part of an *access route* to a lift machine room or similar mechanical plant room where service access is required at least monthly and tools or materials need to be carried. Rung-type ladders are however considered appropriate to areas such as roofs, pits, silos, towers, chimneys and tanks where access is required infrequently and tools and materials are only occasionally carried.
2. Ladders are acceptable in *Housing* for access to infrequently used spaces such as attics and lofts.

5.1.2 Ladder enclosures – People shall be protected from falling from all fixed ladders which rise more than 6.0 m above the ground level or rise from a landing or platform. An acceptable solution for safety hoops and longitudinal straps (see Figure 21) shall have:

a) Hoops and straps fabricated from 50 mm x 8 mm grade 250 steel,

b) Hoops dimensioned as shown in Figure 21, and spaced at no more than 1000 mm intervals,

c) The highest hoop level with the top of the barrier on the platform being accessed, and

d) The lowest hoop 2.5 m above the ground or platform.

Table 8: Lighting for Stairways
Paragraph 4.6.1

Luminaire type	Lighting output Watts/m²	
	Private and service stairways	Accessible and common stairways
Incandescent (plastic shade)	20	30
Incandescent (general diffusing enclosure)	25	35
Flourescent 36/58 W cool white (enclosed diffusing fitting)	7	10
Flourescent compact single ended 16-38 W (enclosed diffusing fitting)	10	15
Discharge 50/80 W mercury or high pressure sodium (enclosed diffusing fitting)	7	10

Notes:
The values given are based on:
– 150 lux at tread level for *accessible* and *common stairways*.
– 100 lux at tread level for *private* and *service stairways*.
– A stair lobby 7 m by 4 m including two landings and a single flight of stairs.
– Light coloured walls and ceilings and medium coloured floors.

5.1.3 Location – A fixed ladder within an *access route* shall be located to avoid danger to *persons* working or walking beneath the ladder while it is being climbed.

5.1.4 Landing width shall be no less than the width of the ladder it serves.

5.1.5 Landing length shall be the width of the ladder it serves, but no less than 1.5 m if required by Paragraph 5.1.7.

Figure 19: Step-type Ladder
Paragraphs 5.1.1 a) and 5.2.1

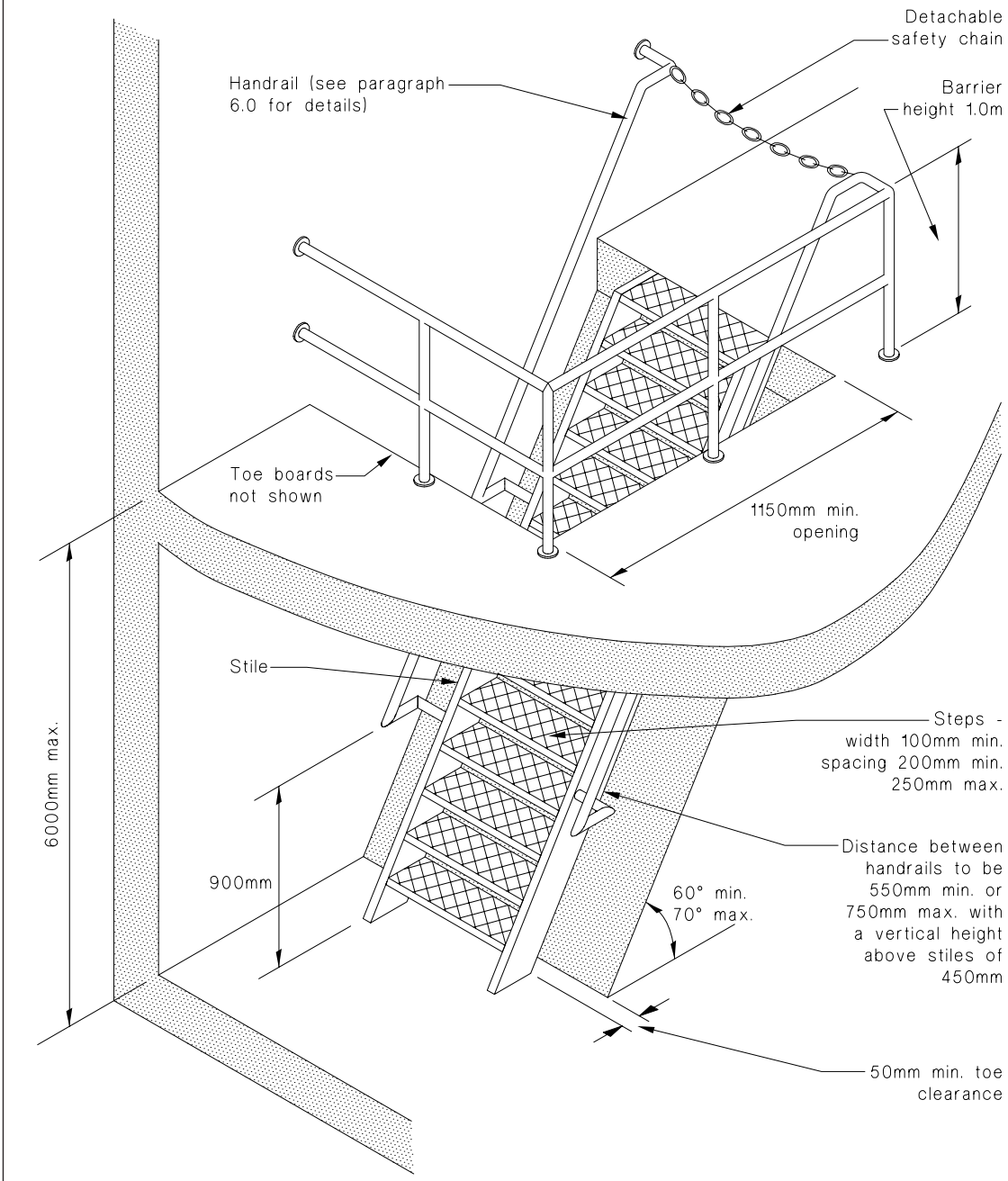


Figure 20: **Rung-type Ladder**
Paragraphs 5.1.1 b), 5.1.7 b) and 5.3.1

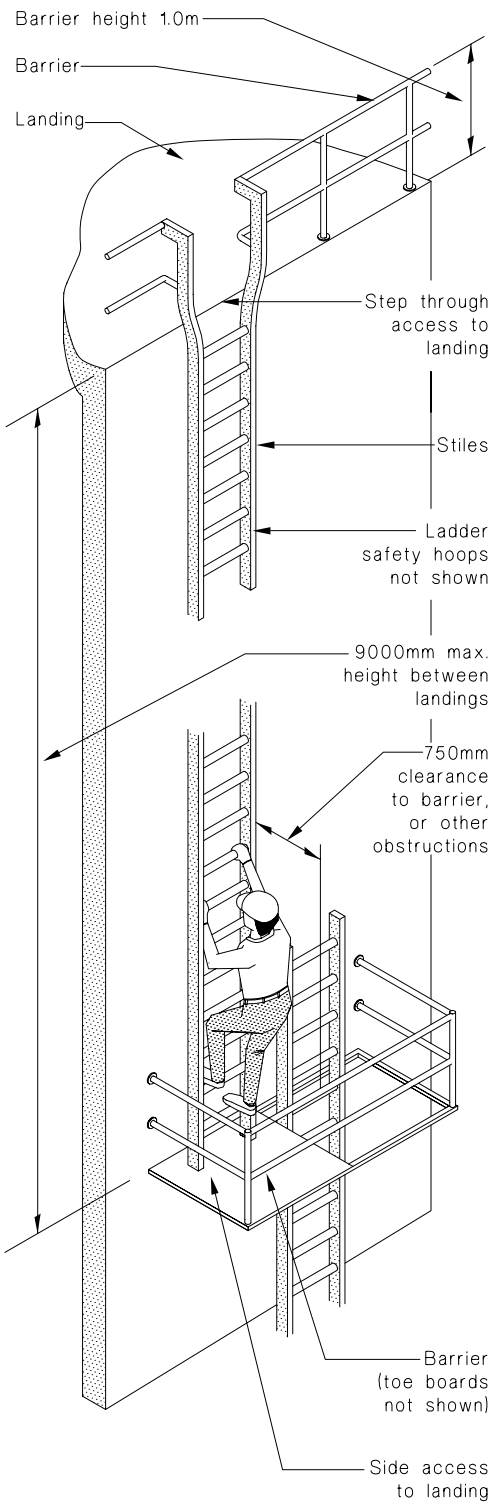
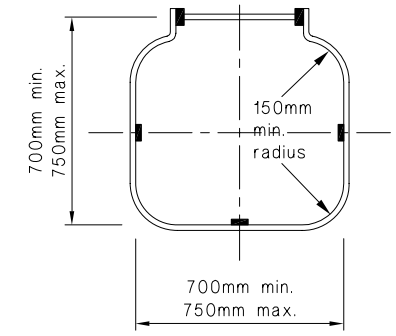
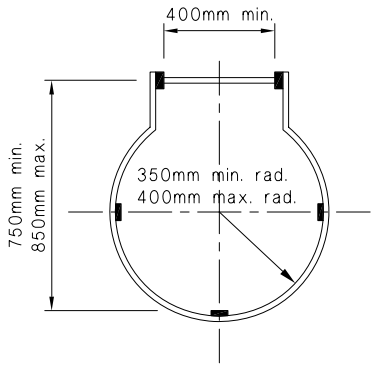


Figure 21: **Ladder Safety Hoop Dimensions**
Paragraph 5.1.2



(a) Rectangular pattern



(b) Circular pattern

5.1.6 Uniformity – The distance between successive rungs or treads within the same ladder installation must be uniform within a tolerance of ± 5.0 mm.

5.1.7 Arresting a falling user – An installation with more than one ladder section and a total height exceeding 6.0 m, shall in addition to a ladder enclosure, have:

a) A direction change between successive ladders at each landing, or

b) Successive ladders offset at each landing (see Figure 20), or

c) Landings no less than 1.5 m long.

5.2 Step-type ladders

5.2.1 Step-type ladders (see Figure 19) shall have:

a) **A slope** of between 60° and 70° from the horizontal,

b) **Treads** no less than 100 mm wide and spaced evenly at between 200 mm and 250 mm centres,

c) **A width** between stiles of no less than 450 mm,

d) **A height** between landings of no more than 6.0 m,

e) **Clearances** of at least:

i) 50 mm for hand movement along the *handrail*,

ii) 50 mm between the treads and any solid objects behind the ladder,

f) **Horizontal openings at landings** of not less than 1150 mm (see Figure 19), and

g) **Handrails** which:

i) are fitted on both sides of the ladder,

ii) are spaced between 550 mm and 750 mm apart,

iii) are located at a vertical distance above the stile of no more than 450 mm,

iv) commence no less than 900 mm above floor level,

v) extend above the upper landing by no less than 900 mm to connect with a barrier (if any), and

vi) are constructed to comply with Paragraphs 6.0.1 to 6.0.6.

Figure 22: Step Through Access to Landings from Rung-type Ladders
Paragraphs 5.3.1 and 5.3.2

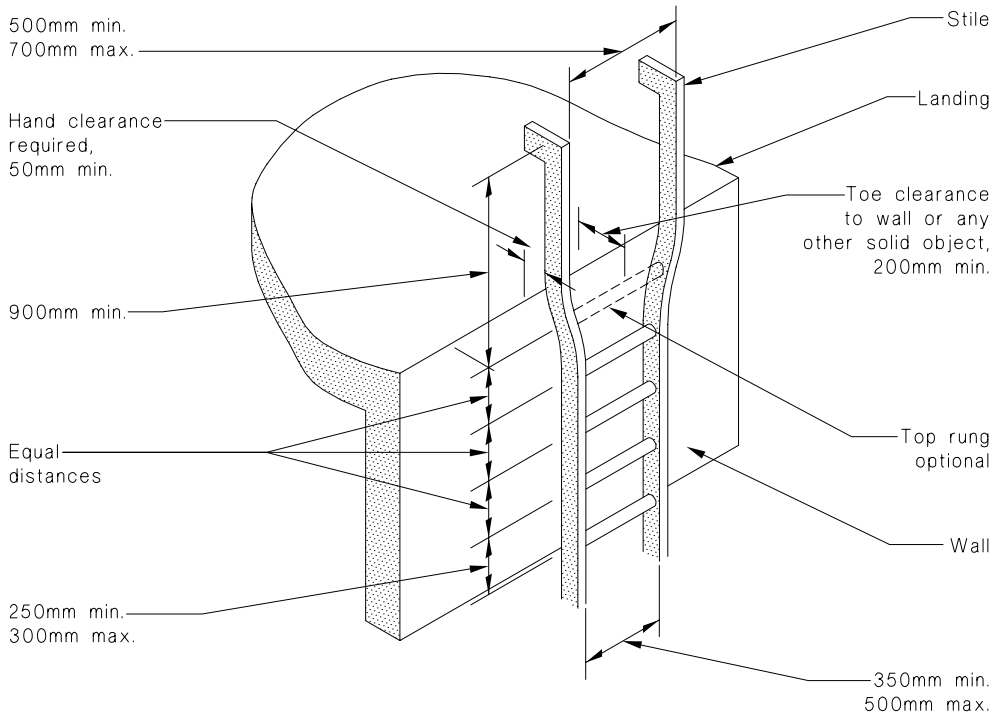
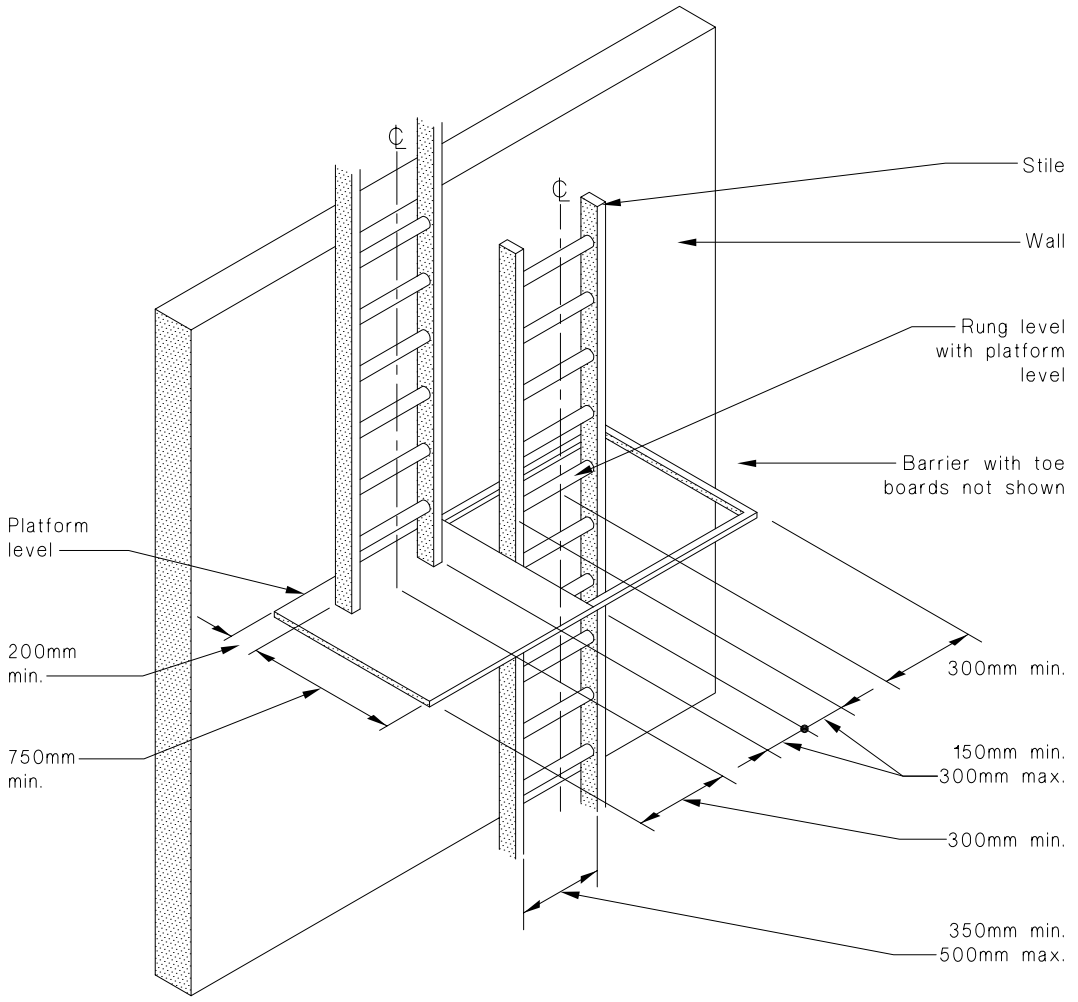


Figure 23: **Side Access to Landings from Rung-type Ladders**
Paragraphs 5.3.1 and 5.3.2



5.3 Rung-type ladders

5.3.1 Rung-type ladders (see Figures 20, 22 and 23) shall have:

a) **A pitch line slope** of between 70° and 90° from the horizontal,

b) **Rungs** of no less than 20 mm diameter and spaced evenly at between 250 mm and 300 mm centres,

c) **A width** between stiles of no less than 350 mm or more than 500 mm,

d) **A height** between landings of no more than 9 m, and

e) **Clearances** of at least:

i) 750 mm between the rungs and any obstruction behind the climber,

ii) 300 mm from the ladder centre line to each side,

iii) 50 mm for hand movement along the stiles where the stiles extend above a landing, and

iv) 200 mm between the rungs and any solid objects behind the ladder.

5.3.2 Access to landings (see Figures 22 and 23).

a) Ladder stiles shall extend to the height of the barrier, but no less than 900 mm above the landing.

b) Toeboards shall not extend across ladder openings.

c) For step-through access, stile spacing above the landing shall be between 500 mm and 700 mm, and the top rung either level with, or one full rise below, the landing.

d) For side access to landings, the spacing from the nearest stile to the landing shall be between 150 mm and 300 mm, and the top rung must be level with the landing.

5.4 Individual rung-type ladders

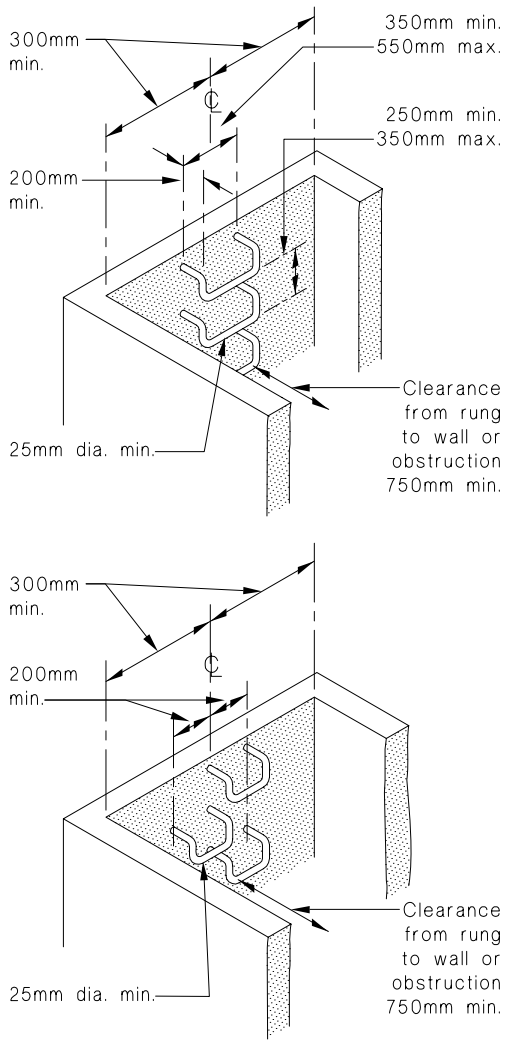
5.4.1 Individual rung-type ladders (see Figure 24) shall have:

a) **Rungs** of no less than 25 mm diameter, shaped to prevent the foot slipping off sideways, and spaced evenly at between 250 mm and 350 mm centres,

b) **A tread width** on each rung of between 300 mm and 550 mm, except that for staggered rungs this may be reduced to 200 mm, and

c) **Height and clearance** limitations as for rung-type ladders (see Paragraphs 5.3.1 d) and e)).

Figure 24: Individual Rung-type Ladders
Paragraphs 5.1.1 c) and 5.4.1



6.0 Handrails

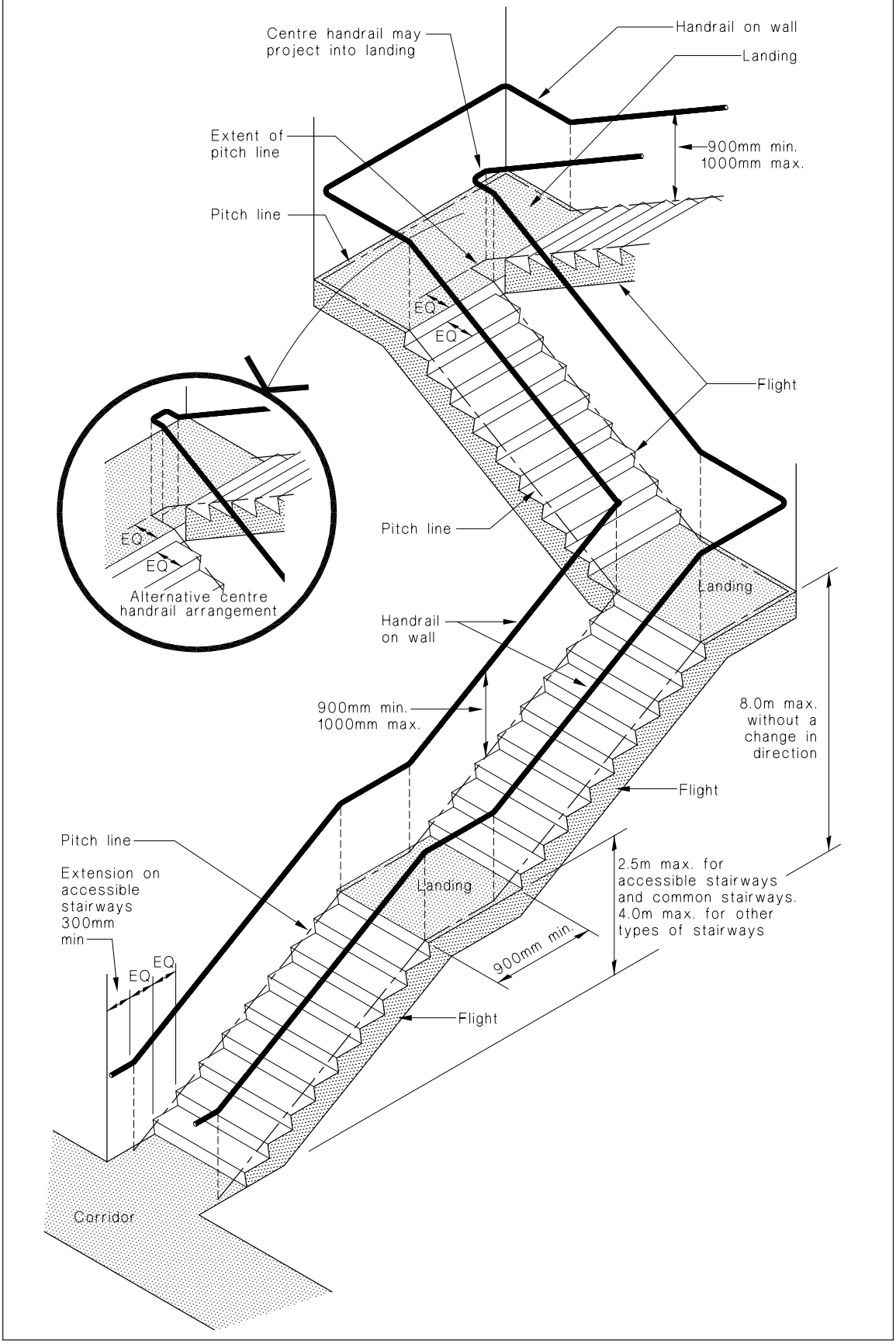
6.0.1 All *accessible stairways* shall have *handrails* on both sides (see Paragraph 6.0.3). All other *stairways* with a width of 2.0 m or less and having two or more risers, shall have *handrails* on at least one side. For a *stairway* of two or three risers within, or giving access to a *household unit*, the *handrail* may be omitted.

COMMENT:

1. Wherever possible, *handrails* should be continuous on all *access routes*. On *private stairways* a *handrail* may be considered continuous if the continuity is interrupted by newel posts.

2. A single riser is an isolated step which by NZBC D1.3.3 i) is permitted only within *Detached dwellings* or within *household units* of *Multi-unit dwellings*, and in *Outbuildings* and *Ancillary buildings*.

Figure 25: Handrails and Landings for Stairways and Ramps
Paragraphs 1.5.2, 4.3.2, 6.0.2, 6.0.3, 6.0.4 and 6.0.5



6.0.2 Any *stairway* which exceeds 2.0 m in width shall:

a) Have *handrails* on both sides and, where the width exceeds 4.0 m, shall also have an intermediate *handrail* provided at the centre of the *stairway*, or

b) If the *stairway* is essentially an outdoor architectural feature and not required to be an *accessible stairway*, have at least one *handrail*. Examples of such *stairways* are those leading to civic areas, or to decks on *Housing*.

COMMENT:
A central rail gives all users a rail to use for safety purposes. On *stairways* in public *buildings*, such as sports stadia, intermediate rails are also effective for crowd control. The 2.0 m width is a comfortable width for three people, two of whom can grasp a rail if anyone trips.

6.0.3 Accessible stairways and accessible ramps – *Handrails* shall be provided on both sides of *accessible stairways* and on both sides of *accessible* ramps where the ramp slope is steeper than 1 in 20. The *handrails* shall be continuous except where doors are located on landings (see Figures 9 and 25).

6.0.4 Slope of handrails – *Handrails* shall have the same slope as the *pitch line*, begin no further than the second riser from the lower end of the *stairway*, and extend the full length of the *stairway* they serve. Except that, where the *handrail* serves an *accessible stairway* or *accessible* ramp, a 300 mm (minimum) horizontal extension shall be provided at each end of the *handrail*, as shown in Figures 9 and 25.

6.0.5 The first riser shall be located a sufficient distance back from the corner where the two walls meet, to accommodate the extended *handrail*, as shown in Figure 25.

6.0.6 Height of handrails – *Handrails* shall be positioned between 900 mm and 1 m above the *pitchline* (see Figure 25).

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. Refer to B1/AS2 for *handrail* structural design requirements.

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6.0.8 A graspable *handrail* profile shall have:

a) A flat or convex upper surface,

b) Arrised or radiused edges,

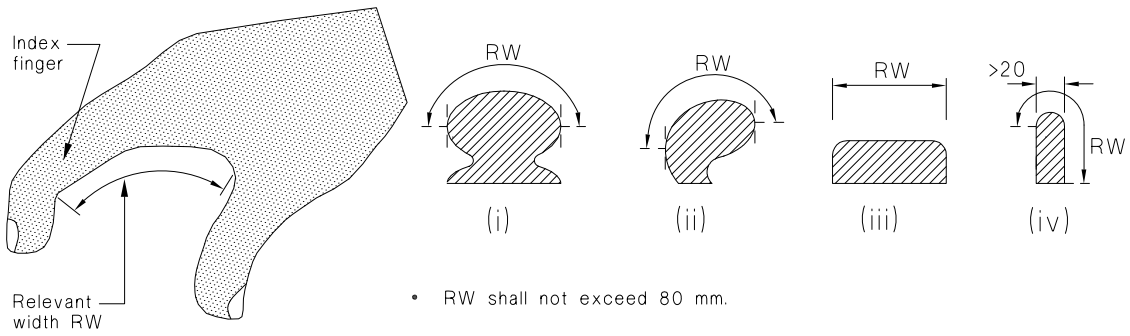
c) A minimum cross section width of 20 mm, and

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.

6.0.9 Acceptable *handrail* profiles for *accessible stairways* and *accessible* ramps are shown in Figure 26 (b).

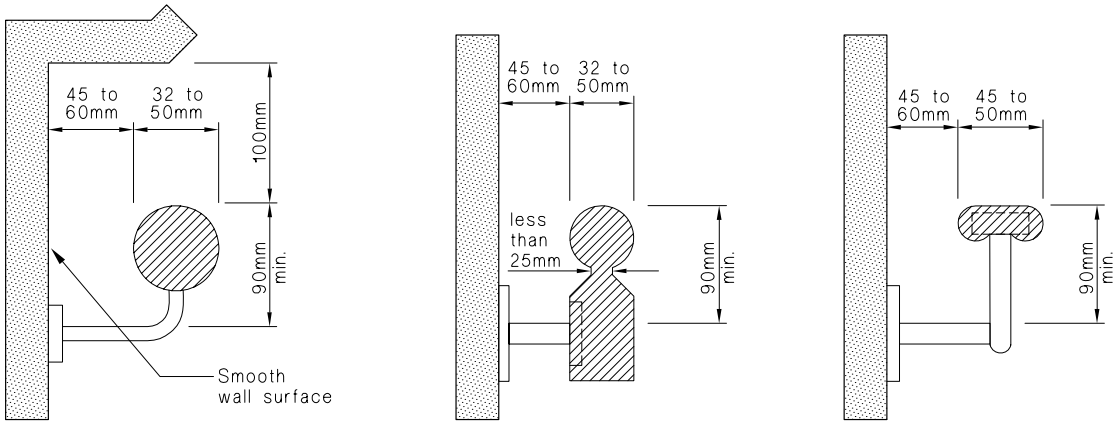
COMMENT:
In most circumstances a *handrail* is used with a light grip to steady the user of a *stairway* or ramp. Ambulant *people with disabilities* use *handrails* for both leverage and support, and wheelchair users often need to firmly grip the rails to pull themselves along, particularly on ramps. In those circumstances a profile offering an adequate grip is important.

Figure 26: Handrail Profiles and Clearances
Paragraphs 6.0.8 and 6.0.9



- RW shall not exceed 80 mm.
- RW (relevant width) is measured around the upper surface perimeter of the handrail section between the vertical tangents on either side.
- Variations in shape are acceptable provided the effective grip is not reduced. For example, the side faces shown as vertical in details (iii) and (iv) are still acceptable even if slightly curved or sloped up to 5° from vertical.
- See fig. 26 (b) for wall clearances.

(a) Determination of relevant width for private and common stairways



The profiles shown comply with the provisions for accessible handrails.

The clearances apply to all handrails and the maximum dimension must be used for rough textured wall surfaces.

(b) Acceptable profiles and clearances for accessible stairways

7.0 Doors and Openings

7.0.1 Lobby doors – Where doors open into a lobby, the clear space between open doors shall comply with Figure 27. Where doors, including those providing access to sanitary facilities, are used within an *accessible route* and a *person* must open the door towards the wheelchair, an unobstructed wall space of not less than 300 mm shall be provided at the side of the door adjacent the handle (see Figure 27 (b)).

COMMENT:

1. *People with disabilities* generally find sliding doors more convenient than hinged doors.
2. Sliding doors may be installed in places where a hinged door would otherwise hinder circulation or manoeuvrability, but may only be installed in accordance with any requirements for *escape routes*.

7.0.2 Other doors where located on *accessible routes* shall comply with Figure 9.

7.0.3 Width – *Accessible* doors shall have at least 760 mm clear opening.

7.0.4 Visibility – Doors which swing in both directions shall incorporate glazing to provide adequate visibility for a *person* using the door. Acceptable glazing is shown in Figure 28. *Accessible* doors shall be of a colour that contrasts with their surroundings.

COMMENT:

1. Glass doors set in a largely glazed wall and wooden panel doors set in a similarly panelled wall are difficult to locate by those with visual impairment.
2. Door handles should contrast with the door.

7.0.5 Door handles – *Accessible* doors shall be openable with one hand and have a lever action operation for handles, locks and latches. Handles shall be between 900 mm and 1200 mm above floor level. Pull handles or push plates are acceptable only where doors are not latched.

COMMENT:

1. People who use wheelchairs must have one hand free to propel the chair through the open door.
2. Door knobs with a twist or turn action do not provide an adequate grip for people with hand impairments.

7.0.6 Revolving doors and turnstiles – Where revolving doors or turnstiles are used within an *accessible route*, an alternative hinged or sliding door shall be provided (see Figure 29).

7.0.7 Frameless glass doors shall comply with NZBC F2.

8.0 Places of Assembly

8.1 Spaces for wheelchairs

8.1.1 The number of spaces in rooms and areas used for public meetings, entertainment, and assembly, shall be provided on the scale of 2 for up to 250 seats provided, plus 1 for every additional 250 seats.

8.1.2 Spaces for wheelchairs shall be located immediately adjacent to other seating, as shown in Figure 30.

8.2 Access to performance areas

8.2.1 An *accessible route* shall be provided to a podium or stage area.

9.0 Accessible Accommodation Units of Communal Residential Buildings

9.1 Number of units to be provided

9.1.1 The number of *accessible* accommodation units to be provided in hotels, motels and other *Communal Residential buildings* providing accommodation for the public shall be no less than that given in Table 9.

Figure 27: **Doors and Openings**
Paragraph 7.0.1

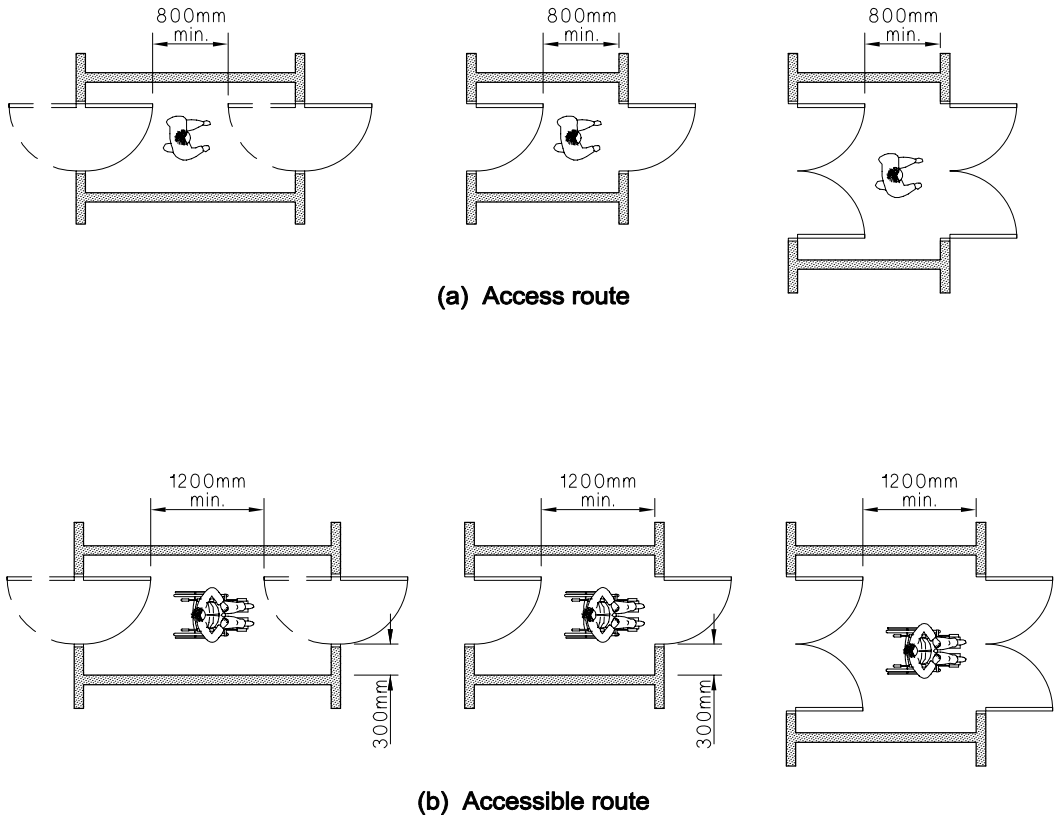


Figure 28: **Acceptable Glazing for Visibility**
Paragraph 7.0.4

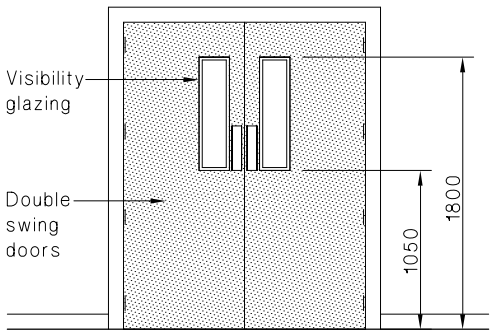


Figure 29: **Revolving Door with Accessible Side Hung Door**
Paragraph 7.0.6

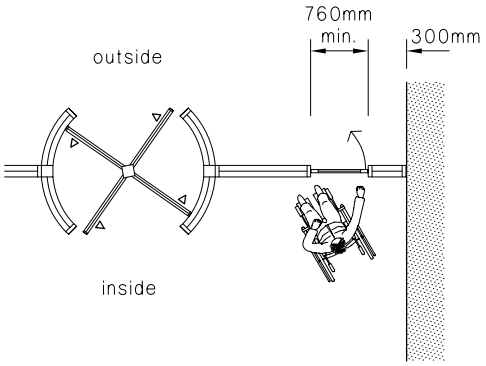


Figure 30: **Seating Spaces for Wheelchairs**
Paragraph 8.1.2

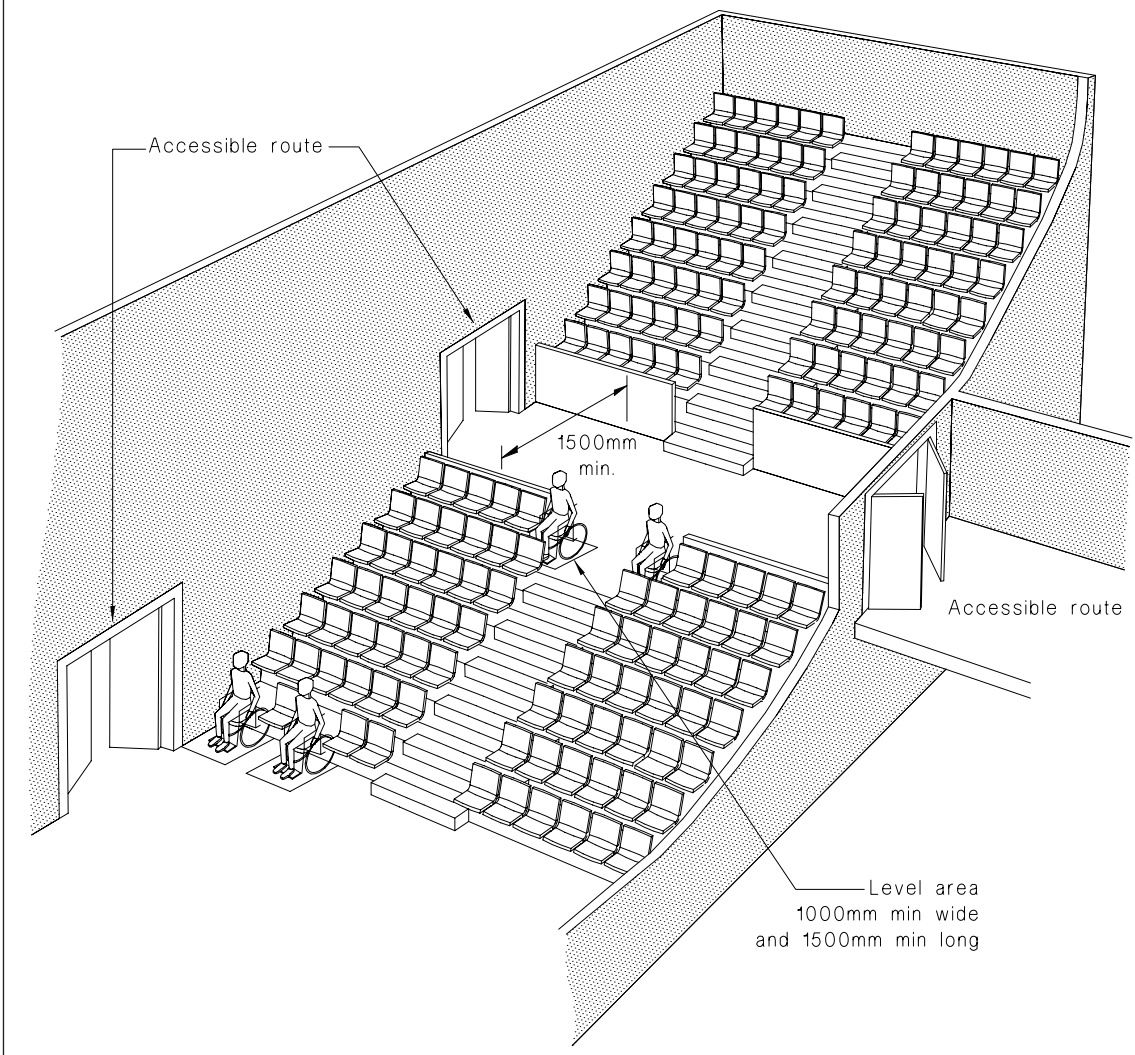


Table 9: **Accessible Accommodation Units**
Paragraph 9.1.1

Total number of guest units	Number of accessible units to be provided
0 – 9	1
10 – 25	2

Plus 1 unit for every additional 25 guest units provided.

9.2 Facilities to be provided

9.2.1 *Accessible* accommodation units shall have:

a) Toilet and bathroom facilities complying with G1/AS1.

b) Kitchen facilities complying with G3/AS1.

c) Bedrooms, sitting and dining areas with sufficient floor area for a 1500 mm diameter wheelchair turning circle.

10.0 Movement of Vehicles

10.1 Car parking areas

10.1.1 AS 2890: Part 1 as modified by Paragraph 10.2 is an acceptable solution for car parking areas and circulation routes.

COMMENT:
The width of an *accessible* car park is given in AS 2890.1 Figure 2.2 as 3.2 m, but it is noted in 2.4.1 (b) (ii) of the Standard that if there is an adjacent obstruction the width of all car parks should be increased by 300 mm. In the case of an *accessible* car park an obstruction would include a kerb or garden which would prevent the movement of a wheelchair.

10.2 Modifications to AS 2890

10.2.1 AS 2890: Part 1 is modified as follows:

Clause 4.7 Lighting: After final sentence add a new sentence – "These lighting provisions may exceed the performance criteria of NZBC D1 and G8."

Appendix C: Delete and replace with:

"*Accessible* car parking spaces shall be provided on the scale of:

1 for up to 10 total spaces provided

2 for up to 100 total spaces provided

plus 1 more for every additional 50 spaces

when car parks are provided in or associated with a *building* which is *accessible*."

11.0 Alternative Acceptable Solutions

11.0.1 Accessible routes – The access provisions of NZS 4121 are an acceptable solution for *accessible routes*, but may exceed the requirements of NZBC D1.

11.0.2 Commercial vehicles – AS 2890: Part 2 is an acceptable solution for loading spaces and circulation routes for commercial vehicles, but may exceed the requirements of NZBC D1.

11.0.3 Access routes for service and maintenance personnel – NZS/AS 1657 is an acceptable solution for fixed platforms, walkways, *stairways*, and ladders, but provisions may exceed the requirements of NZBC D1.

12.0 Lifts

12.0.1 For the purposes of determining whether a lift must be provided for *people with disabilities* to access upper floors, the design occupancy shall be determined using C/AS1 Paragraph 2.3.7 and Table 2.2. Amend 4 Jul 2001

COMMENT:
Alternative design occupancies being less than derived from Table 2.2, must be justified with clear supporting information. Table 2.2 already takes account of effective floor area reductions for normal furnishings associated with a given activity, such as desks or workstations in offices. However, in a factory situation with fixed machinery, actual operator numbers may be acceptable as the *occupant load*. Amend 4 Jul 2001

12.0.2 *Building* size may also be used to determine the need for a lift for *people with disabilities*. NZS 4121 is an acceptable solution based on gross floor area.

Index D1/VM1 & AS1

All references to Verification Methods and Acceptable Solutions are preceded by **VM** or **AS** respectively.