

# UNIVERSAL DESIGN GUIDE *for* PUBLIC PLACES

---

Building and Construction  Authority





# UNIVERSAL DESIGN GUIDE

*for* PUBLIC  
PLACES

---

# Foreword

---

Our pioneers led the way in transforming Singapore into the distinctive modern city-state we see today.

We will need to build on these efforts to make our urban landscape more people-friendly and inclusive.

With that in mind, the Building and Construction Authority has been working closely with the built environment industry and the Voluntary Welfare Organisations to promote Universal Design, or Design for All.

Over the years, we have made significant progress in providing barrier-free access to creating an accessible living environment for all Singaporeans – the young, old, and persons with different abilities. But more still can be done. As our population ages, the design of new and existing buildings and public spaces must be further improved to allow our seniors to age-in-place gracefully and confidently.

I hope this Guide – an initiative under Singapore's Action Plan for Successful Ageing – will help raise awareness of senior-friendly designs and support wider adoption of Universal Design. We need more architects, engineers, building owners and developers to join this effort in making our built environment well-connected, so that everyone, regardless of physical abilities, can enjoy active mobility and move around with ease.

We should aim to make Universal Design a pervasive feature in our urban landscape. I look forward to our continued collaboration with industry and community partners to build a more inclusive and liveable home for all.

**Lawrence Wong**

*Minister for National Development*

Published by  
**Building and Construction Authority**  
52 Jurong Gateway Road  
#11-01, Singapore 608550

[www.bca.gov.sg](http://www.bca.gov.sg)

This Guidebook is intended as a guide only. BCA shall not be responsible for any loss, damage or injury that may be suffered by any person in connection with the use of the facilities designed based on the recommendation in this Guidebook.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of the Building and Construction Authority.

Published in 2016

Copyright © 2016 Building and Construction Authority

# Shaping a Better Built Environment

Singapore's population is rapidly ageing. To address the demographic challenges, we must act now. Building an accessible and inclusive built environment is unlike installing plug-and-play equipment. It takes time and effort to incorporate user-friendly features in our buildings.

Over the years, the Building and Construction Authority (BCA) has been actively promoting Universal Design (UD) concepts and working with the industry to incorporate user-friendly features in buildings and public spaces so that everyone – the young, the old, persons with different abilities – can live, work, learn and play in a friendlier living environment.

Today, we have made significant progress. The public sector has taken the lead. Almost all government buildings that are frequently visited by members of the public are accessible.

Along the famous Orchard Road shopping belt, about 90% of the buildings are now barrier-free, which is a marked improvement from 41% in 2006.

Since the introduction of BCA UD Mark Certification Scheme in 2012, more developers, building owners and architects have taken the initiative in applying UD in their developments. Within a short period of three years, BCA has given out 119 Universal Design Mark certifications; of which, there were 10 developments with Platinum certification.

Even with this progress, we recognise that more can still be done. Our tripartite collaboration – BCA, the industry and the Voluntary Welfare Organisations, will continue to encourage our industry professionals, architects, engineers, building owners and developers to always consider the needs and comfort of the users first in their building design.

I hope that this latest publication, the Universal Design Guide for Public Places, will guide the industry in providing practical UD solutions for various public settings in our daily lives.

Together we will shape a better built environment through UD and make Singapore a truly inclusive and age-friendly city.

**Dr John Keung**  
Chief Executive Officer  
Building and Construction Authority

# Contents

## CHAPTER 01

### Introduction

1.1 Definition of Universal Design	10
1.2 Principles of Universal Design	11
1.3 Understanding Users	12
1.4 Width of Accessible Routes	16
1.5 Overview	17

## CHAPTER 02

### Arriving at the Building

2.1 Access Routes from Building to Building	22
2.1.1 External Pedestrian Footpaths	23
2.1.2 Kerb Ramps	26
2.2 Approach to Buildings	28
2.2.1 Entrance Foyers and Lobbies	29
2.2.2 Passenger Alighting and Boarding Points	30
2.2.3 Taxi Shelters	32
2.2.4 Shuttle Bus Bays	34
2.3 Vehicular Environment	35
2.3.1 Vehicular Parking	36
2.3.2 Accessible Parking Lots	38
2.3.3 Family Parking Lots	40
2.3.4 Accessible Lobbies	41

## CHAPTER 03

### Access Around and Within the Building

<b>3.1 Horizontal Circulation</b>	<b>44</b>
3.1.1 Accessible Routes, Corridors and Paths	45
3.1.2 Surface Finishes	49
3.1.3 Entrance Doors	51
3.1.4 Overhead Hazards	53
<b>3.2 Vertical Circulation</b>	<b>54</b>
3.2.1 Ramps	55
3.2.2 Staircases	61
3.2.3 Passenger Lifts	67
3.2.4 Escalators	71
3.2.5 Emergency Evacuation	73
3.2.6 Visual Alarms	77

## CHAPTER 04

### Sanitary Facilities

<b>4.1 Planning and Design</b>	<b>80</b>
<b>4.2 Washroom Accessories</b>	<b>84</b>
<b>4.3 Urinals for the Ambulant Disabled</b>	<b>85</b>
<b>4.4 Water Closet Compartments for the Ambulant Disabled</b>	<b>86</b>
<b>4.5 Accessible Water Closet Compartments Within a Toilet Cluster</b>	<b>88</b>
<b>4.6 Accessible Individual Washrooms</b>	<b>89</b>
<b>4.7 Accessible Individual Washrooms for Assisted Use</b>	<b>91</b>
<b>4.8 Roll-in Shower Stalls for Wheelchair Users</b>	<b>93</b>

## CHAPTER 05

### Wayfinding and Information Systems

<b>5.1 Orientation</b>	<b>100</b>
<b>5.2 Signage</b>	<b>102</b>

## CHAPTER 06

### Facilities and Elements Within the Building

<b>6.1 Illumination</b>	<b>108</b>
<b>6.2 Controls and Operating Mechanisms</b>	<b>109</b>
<b>6.3 Service and Information Counters</b>	<b>112</b>
<b>6.4 Hearing Enhancement Systems</b>	<b>114</b>
<b>6.5 Resting Areas</b>	<b>115</b>
<b>6.6 Drinking Fountains</b>	<b>118</b>
<b>6.7 Public Telephones</b>	<b>119</b>

## CHAPTER 07

### Family-Friendly Facilities

<b>7.1 Lactation Rooms</b>	<b>122</b>
<b>7.2 Child-Friendly Sanitary Facilities</b>	<b>124</b>
<b>7.3 Family Washrooms</b>	<b>130</b>
<b>7.4 Other Family-Friendly Provisions</b>	<b>131</b>

## CHAPTER 08

### Design Requirements for Specific Building Types

<b>8.1 Public Transport Buildings</b>	<b>136</b>
<b>8.2 Hawker Centres and Food Outlets</b>	<b>144</b>
<b>8.3 Supermarkets and Retail Outlets</b>	<b>153</b>
<b>8.4 Community Clubs</b>	<b>161</b>
<b>8.5 Precinct Facilities in Public Housing</b>	<b>168</b>
<b>8.6 Parks and Open Spaces</b>	<b>177</b>

## Top Ten Design Points

<b>Top 10 Family-Friendly Facilities and Features</b>	<b>190</b>
<b>Top 10 Senior-Friendly Facilities and Features</b>	<b>192</b>



CHAPTER

01

# Introduction

---

- 1.1 Definition of Universal Design
- 1.2 Principles of Universal Design
- 1.3 Understanding Users
- 1.4 Width of Accessible Routes
- 1.5 Overview

## 1.1 Definition of Universal Design

"Universal Design is the design of products and environment to be usable by all people, to the greatest extent possible, without the need for adaptation or specialised design."

– Ronald Mace, architect, founder and programme director of The Centre for Universal Design  
*Preiser, Wolfgang F E [2001], Universal Design Handbook, McGraw-Hill, New York*



## 1.2 Principles of Universal Design

The Seven Principles of Universal Design<sup>1</sup>, developed by the Centre for Universal Design, North Carolina State University, with a consortium of universal design researchers and practitioners from across the United States, are:

### Principle 1: Equitable Design

The design is useful and marketable to people with diverse abilities.

### Principle 2: Flexibility in Use

The design accommodates a wide range of individual preferences and abilities.

### Principle 3: Simple and Intuitive

Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills or current concentration level.

### Principle 4: Perceptible Information

The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

### Principle 5: Tolerance of Error

The design minimises hazards and the adverse consequences of accidental or unintended actions.

### Principle 6: Low Physical Effort

The design can be used efficiently and comfortably and with a minimum of fatigue.

### Principle 7: Size and Space for Approach and Use

Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture and mobility.

1. ©Copyright 2006 The Centre for Universal Design, NC State University Raleigh, North Carolina, USA



## 1.3 Understanding Users

Universal Design can be achieved through a good appreciation of the broad range of abilities exhibited by the various user groups in the community.

This guide sets out the full range of requirements and guidelines so that designers are able to work towards an accessible environment where people of different abilities can live independently.

The guide begins with the needs of the following groups of persons of different abilities:

### Infants and Children



- Infants and children are at their early stage of life. They are usually treated as special persons who require physical and cognitive care from their caregivers.
- Family-friendly features are therefore highly recommended for the convenience of infants and children, as well as their caregivers. These include wider corridors for baby carriages, nursing rooms, and appropriate anthropometrically scaled furniture and sanitary fixtures.

### Expectant Mothers



- Expectant mothers experience a host of physiological and emotional changes during pregnancy. Common symptoms include fatigue, lower backache, and difficulties in walking and balancing.
- It is therefore recommended that handrails for additional support and seating should be generously provided along travel routes and where waiting is likely.

### Older Persons



- Older persons are usually characterised as a vulnerable group with high probability of medical conditions, reduced cognitive function and impaired physical capacity. Day-to-day tasks that will pose problems for them are those that require physical strength and sustained effort, in particular tasks related to indoor and outdoor mobility.
- Provisions such as extra handrails for support, slip-resistant floor finishes and other senior-friendly features will enable older persons to move around independently and engage in daily activities.

## 1.3 Understanding Users



### Wheelchair Users

- Wheelchair users often face difficulties with negotiating a change in levels and manoeuvring around in confined and congested spaces.
- The built environment therefore needs to be designed with accessibility features that meet their needs, such as ramps with a gentler gradient, accessible lifts and toilets, and signage that guide them to such facilities.



### The Ambulant Disabled

- Persons with ambulant disability – either temporary or permanent in nature – are likely to exhibit unstable and slow movement.
- Special consideration should be given to ensure ease of access and movement for the ambulant disabled through the careful provision of parking areas, paths, kerbs, pedestrian crossings, street furniture, open spaces and sanitary provisions.



### Persons with Visual Impairment

- The visually impaired rely on the decreased ability of their vision, as well as other aids, to find their way around.
- To better help them move around more independently, it is important to provide physical and sensory cues, such as touch, sound, smell, and tactile or audible information.



### Persons with Hearing Impairment

- As the hearing impaired are not able to receive audio information, all information should be transmitted through other means, such as substituting audio alerts with visual alerts and allowing users to configure the frequency and volume of audible cues.

# 1.3 Understanding Users

Chart Outlining the Profile of Persons of Different Abilities  
Categories adapted from the Enabler Model<sup>2</sup>

User Group \ Special Characteristics Requiring Attention	Infants and Children (up to 8 years old)	Expectant Mothers	Older Persons (more than 50 years old)	Hearing Impaired Persons	Visually Impaired Persons	Physically Injured Persons (upper and lower body)	Wheelchair Users
Difficulty in Interpreting Information							
Poor or Complete Degradation of Sight							
Poor or Complete Degradation of Hearing							
Prevalence of Poor Balance							
Prevalence of Poor Coordination and Orientation							
Poor or Inability in Handling and Fingering							
Poor or Inability in using Upper Extremities							

# 1.3 Understanding Users

Chart Outlining the Profile of Persons of Different Abilities (cont'd)  
Categories adapted from the Enabler Model<sup>2</sup>

User Group \ Special Characteristics Requiring Attention	Infants and Children (up to 8 years old)	Expectant Mothers	Older Persons (more than 50 years old)	Hearing Impaired Persons	Visually Impaired Persons	Physically Injured Persons (upper and lower body)	Wheelchair Users
Poor or Inability in using Lower Extremities							
Limitations of Stamina							
Limitations of Strength							
Vertically and Horizontally Challenged (in terms of height and weight)							
Require Physical Assistance or Supervision							
Require Family-Friendly Facilities							
Use of Movement Aids							
Others			Increased visits to toilets		Use of walking cane to detect obstructions		

2. David Driskell, ed. Design Guide: Universal Access to Outdoor Recreation, PLAE, Inc., Berkeley, California, USA, 1993, p20

## 1.4 Width of Accessible Routes

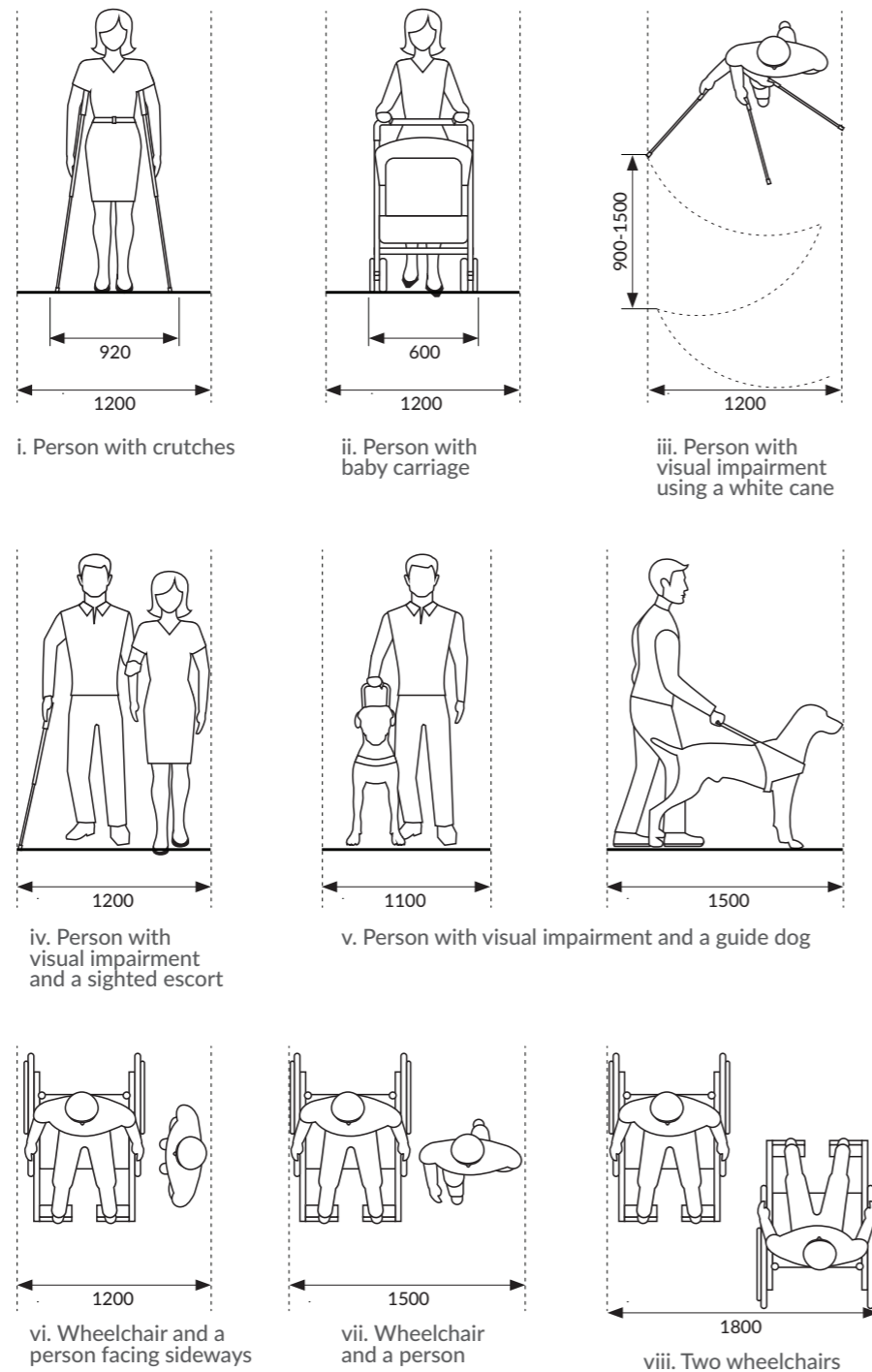


Figure 01. Comfortable walking widths for various users

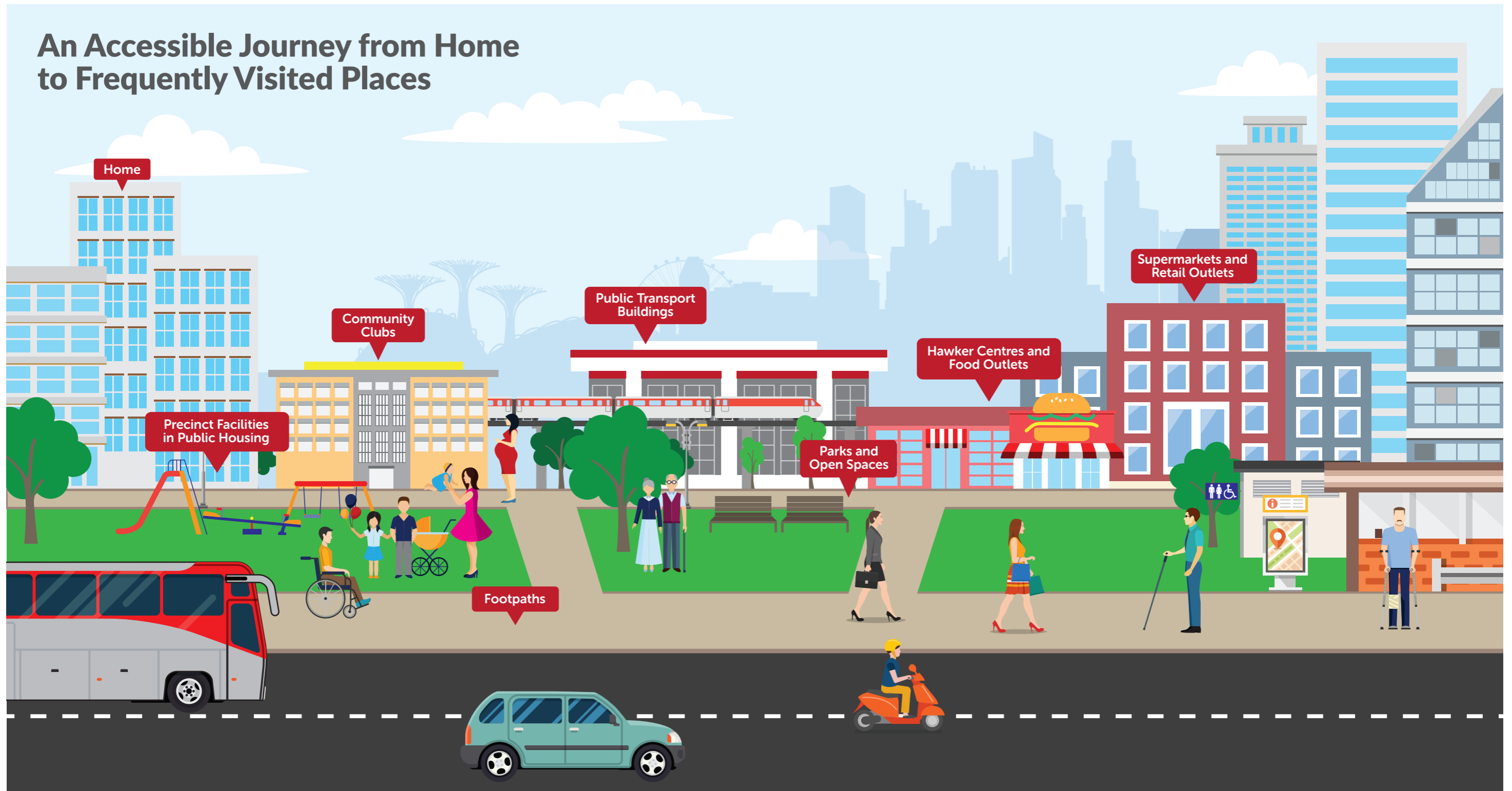
Adequate space allowances should be provided for the various users of an accessible route, with specific dimensions as shown in Figure 01. While users of walking aids can manoeuvre through a minimum door opening of 850 mm in clear width, they require wider passageways or walkways for a more comfortable gait. Crutch tips, often extending down at a wide angle, are a hazard in narrow passageways where they might not be seen by other pedestrians.

## 1.5 Overview

- ➔ With an upstream goal of creating a liveable nation, a set of guidelines have been developed to provide the information essential to achieve usability, safety, comfort and convenience for all users of buildings and public places.
- ➔ The specific objectives of this Guide are:
  - To assist designers and architects to better address the needs of people of different ages and abilities.
  - To promote greater sensitivity and innovation in universal design beyond minimum Code requirements.
  - To achieve a higher standard of universal design for the built environment.
- ➔ The content of this Guide is structured based on a journey that one would typically take from home to public places such as transport facilities, community clubs, parks, hawker centres and supermarkets. Various design aspects along the journey will be covered, including accessible routes to facilities, signage and sanitary provisions.

## 1.5 Overview

### An Accessible Journey from Home to Frequently Visited Places





TO REPORT UNAUTHORISED PARKING  
PLEASE CALL 6471 2290

CHAPTER

02

# Arriving at the Building

2.1 Access Routes from Building to Building

2.2 Approach to Buildings

2.3 Vehicular Environment

## 2.1 Access Routes from Building to Building



The provision of an inclusive built environment starts as the user leaves the house to undertake a journey. Accessible routes should be provided from the house to the nearest buildings and public facilities, and subsequently across the entire journey. Safety is of utmost importance to all users of an inclusive built environment.

### 2.1.1 External Pedestrian Footpaths

*Photos (below): Examples of drops and unexpected variations in level along a path, which may result in slips, trips and falls*



External footpaths and pavements should be designed to ensure a safe and comfortable journey for persons with disabilities, older persons and families with young children. With a fast-ageing population in Singapore, provisions to cater to the needs of older persons who may be frail with poor vision and mobility challenges are especially important.

- ➔ The routes should be as direct as possible and wide enough to cater to families with young children and persons using mobility aids, such as wheelchairs and motorised scooters.
- ➔ Avoid having any drops or unexpected variations in level to prevent slips, trips and falls.
- ➔ The width of the footpath should be designed according to the projected pedestrian volume. A minimum width of 1800 mm is recommended to allow two wheelchairs to pass each other.
- ➔ Where the clear width of an access route is constrained, such as by existing trees, its width may be reduced to 1200 mm for a distance not exceeding 2000 mm.

## 2.1.1 External Pedestrian Footpaths



Figure 02. Accessible features along an external footpath or pavement

- ➔ Obstacles, projections and other protrusions along the routes should be avoided. Street furniture and fixtures should be recessed from the travel path.
- ➔ Adequate and uniform lighting should be provided along the entire travel path. Low lighting level may lead to slips, trips and falls in older persons due to low visibility of hazards such as unexpected variations in levels and ground surfaces.
- ➔ Resting places recessed from the path of travel should be provided at intervals of not exceeding 50 m on long routes. Older persons with decreased stamina or mobility challenges will need resting places along the path.
- ➔ A sheltered path should be provided for effective protection from the weather and a means of connecting buildings.
- ➔ The ground surface should be stable, firm, level, non-slip in both wet and dry conditions, and free from water ponding.

## 2.1.1 External Pedestrian Footpaths



Photos (right):  
Examples of gratings and drain covers  
with appropriate slots and gaps

- ➔ Manholes, gratings and drains should preferably be located to the side of the walkway and levelled with the ground surface. They should not be located at the centre of the path as they may become tripping hazards.
- ➔ Gaps in gratings and walking surfaces should not be more than 12 mm in width and be placed such that their length is perpendicular to the dominant direction of travel. This will help prevent wheels, walking sticks and heels from getting caught in the gaps.
- ➔ Drain covers should be made of materials that are non-slip in both wet and dry conditions. Metal chequered plates, which tend to be slippery when wet, should be avoided.
- ➔ An upstand edge protection of at least 75 mm in height should be provided where there is a direct drop of 200 mm or more along the access route.
- ➔ Good levelling and workmanship of floor finishes should be ensured to avoid undulation and protrusion, which may result in trips and falls. Regular maintenance and renewal of footpath and pavement surfaces is important to ensure a non-slip and level surface.

## 2.1.2 Kerb Ramps



Photo: Detectable warning surfaces at a pedestrian crossing

- ➔ Kerb ramps should be of at least 900 mm in width.
- ➔ The gradient of a kerb ramp, including its flared sides, should be gentler than a gradient of 1:10.
- ➔ A textured surface should be provided so that older persons with an unstable gait can gain a secure foothold.
- ➔ Detectable warning surfaces, in the form of tactile warning indicators, should be provided at both ends of a road crossing. This feature will help remind pedestrians, especially the visually impaired, to be vigilant when crossing the road.
- ➔ Tactile warning indicators should contrast with the background colour of the pavement. For visibility, grey tactile paving should not be installed on grey pavements.

## 2.1.2 Kerb Ramps

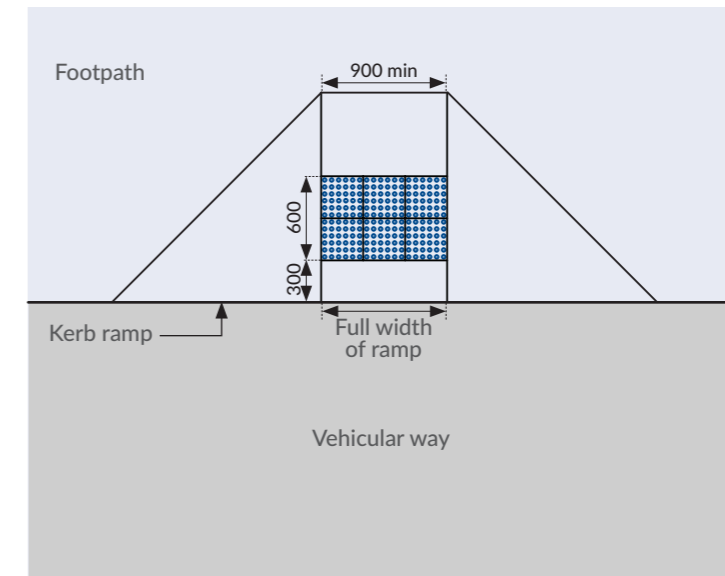


Figure 03a. Application of tactile warning indicator on kerb ramps

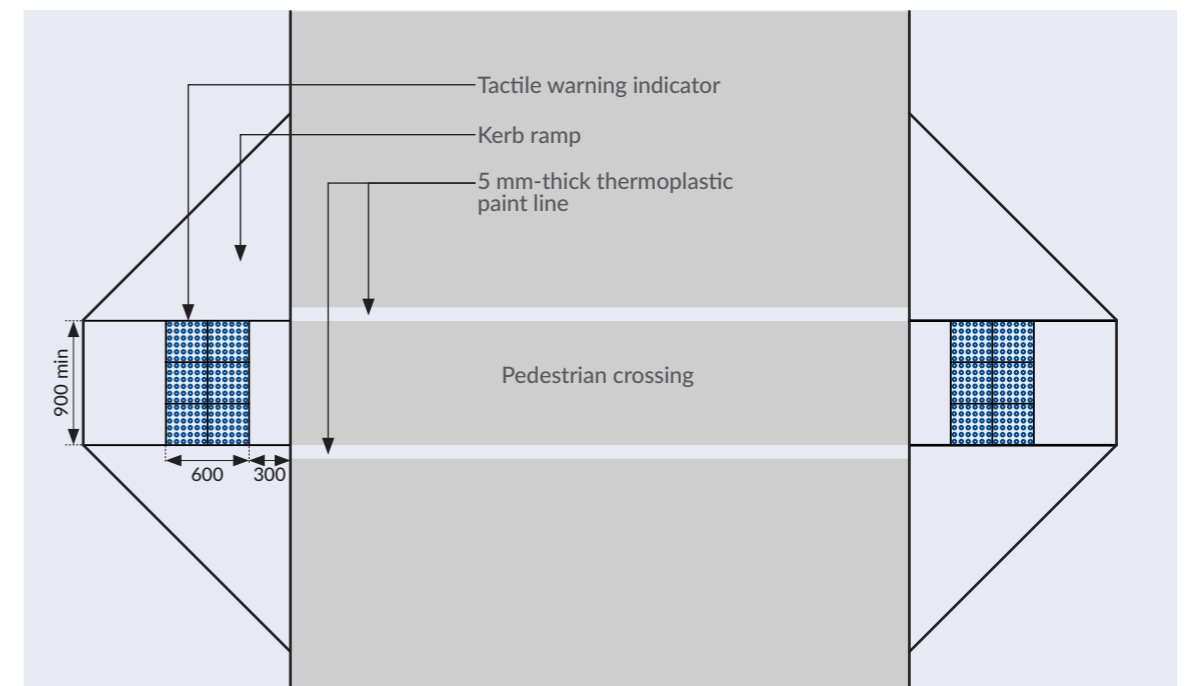


Figure 03b. Application of tactile warning indicators at pedestrian crossings



## 2.2 Approach to Buildings



Building entrances are busy areas with a continuous flow of people walking, waiting, alighting and boarding concurrently. All users should be able to approach and enter the building in a safe and independent manner. The main entrance and all other accesses to the building should be accessible.

Clear and visible signage should be provided to announce the building from afar. Additional signage nearer to the approach and accessible entrances will further assure users that they have reached their destination.

### 2.2.1 Entrance Foyers and Lobbies

Photos (right and below):  
Tactile ground surface indicators to guide users to a building entrance;  
a building directory with floor diagrams;  
an AED located near the building entrance



- ➔ Entry into the building begins at the foyer and lobby. A clear and accessible entrance creates a positive impression and makes the user feel welcome.
- ➔ A pedestrian route of at least 1800 mm in width should be provided to minimise the danger of inadvertently walking into a vehicular access. A greater width may be required where there is a high volume of pedestrian flow.
- ➔ Access pathways to the entrance foyer and lobby should be level. Changes in level should be avoided.
- ➔ All accessible entrance doors should be automated for easy access to the building.
- ➔ A visual link should be provided between the inside and the outside of an entrance door.
- ➔ Sufficient directional cues should be provided at appropriate locations to better orientate users upon entry.
- ➔ A building directory with floor diagrams on durable material should be prominently displayed to indicate the various accessible routes and facilities.
- ➔ Seating is recommended at the foyer and lobby for users to rest comfortably while waiting.
- ➔ An automated external defibrillator (AED) should be provided to treat sudden cardiac arrest.

## 2.2.2 Passenger Alighting and Boarding Points



Photos (above): Examples of an accessible alighting and boarding bay, with suitable buffer zones and seats with armrests

An alighting and boarding bay provides a suitable location for older persons and users of mobility aids, such as walking frames and wheelchairs, to alight from and board vehicles close to the entrance of a building.

At least one designated accessible, sheltered alighting and boarding bay should be provided for each building or complex. The number of bays should be provided according to user volume.

- ➔ Alighting and boarding bays, buffer zones and accessible entrances should be of the same level for ease of movement. A kerb ramp should be provided where there is a change in level.
- ➔ A buffer zone of at least 2500 mm in width between the alighting and boarding bay and the accessible entrance is recommended.
- ➔ Seats with suitable armrests should be provided to assist older persons and the ambulant disabled in sitting down and getting up.

## 2.2.2 Passenger Alighting and Boarding Points

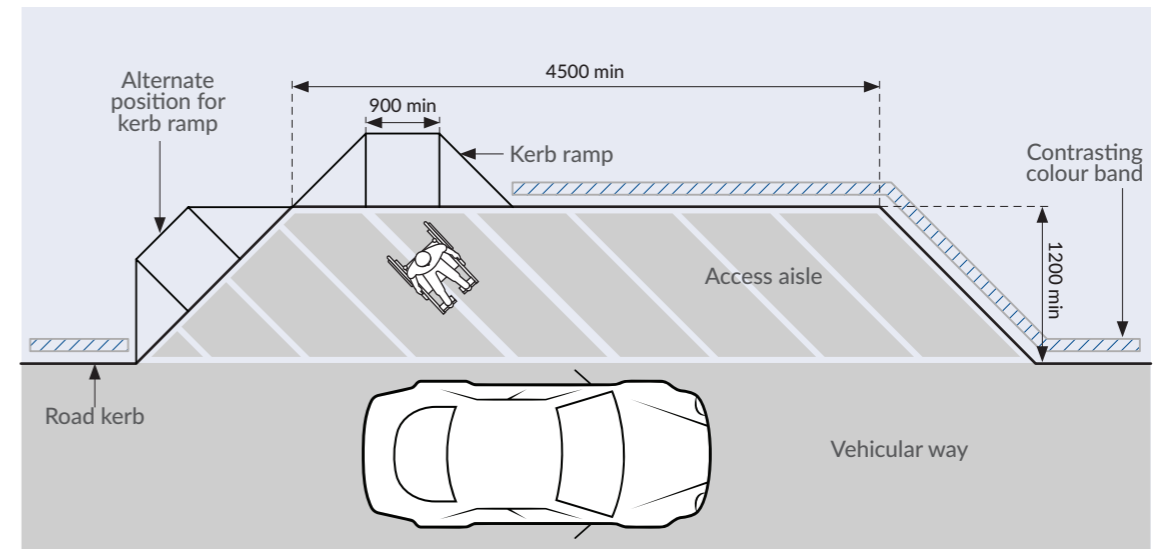


Figure 04a. Alighting and boarding point with kerb ramp and access aisle

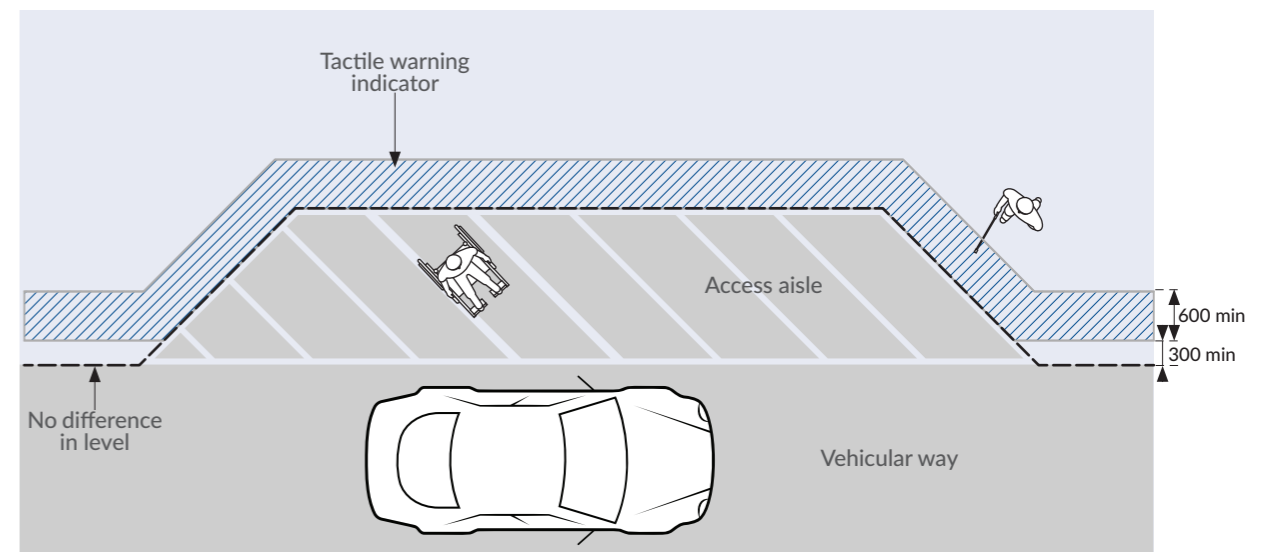


Figure 04b. Alighting and boarding point with no level difference

## 2.2.3 Taxi Shelters

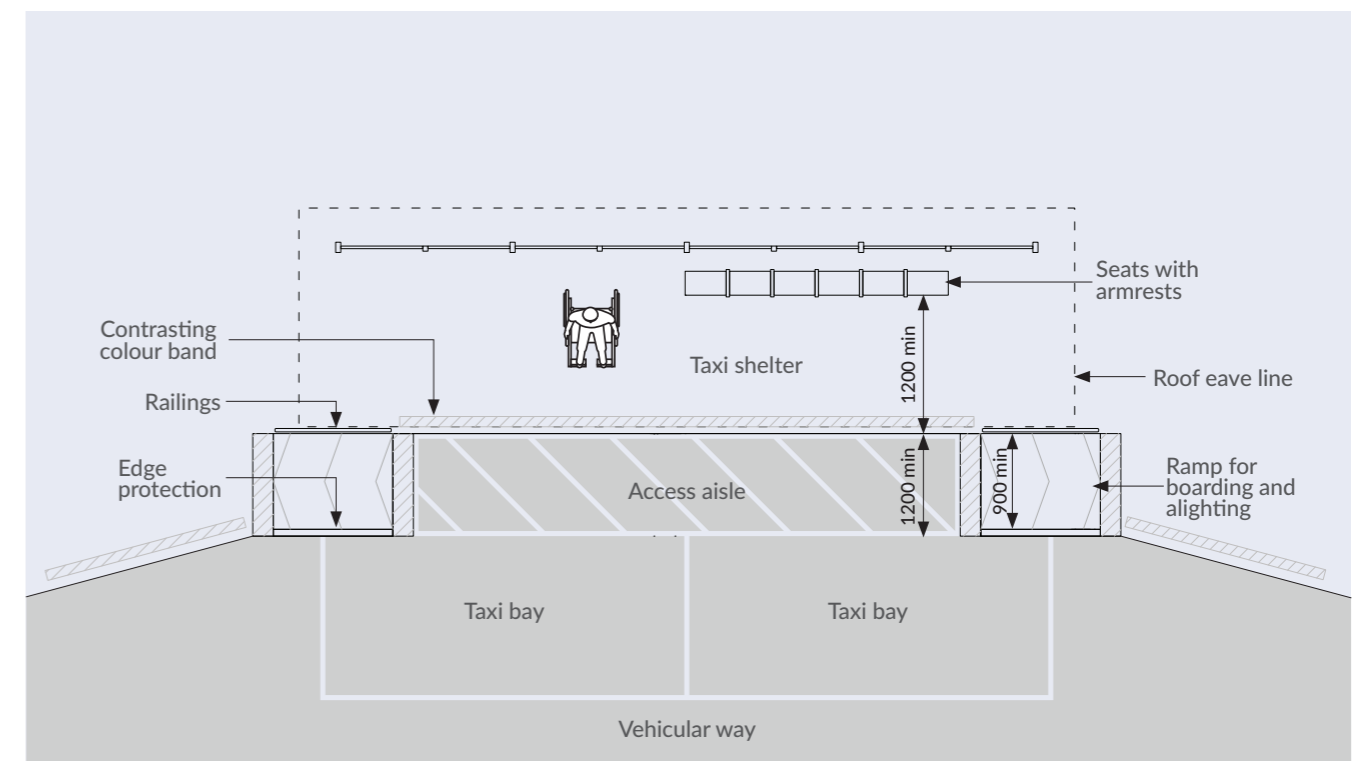


*Photos (right): Seats with suitable armrests and backrest at a taxi shelter; a taxi shelter provided at the level of approach and close to an accessible entrance*

Taxi shelters should be located near to an accessible entrance.

- ➔ A taxi bay should, where possible, be provided at the level of approach for passengers to alight from or board the vehicle.
- ➔ The taxi bay should be segregated from the alighting and boarding bay.
- ➔ Seats with suitable armrests should be provided to assist older persons and the ambulant disabled in sitting down and getting up.

## 2.2.3 Taxi Shelters



*Figure 05. Recommended provisions for taxi shelters*

## 2.2.4 Shuttle Bus Bays



FREE SHUTTLE SERVICE	
Route	Time
 iMM Pick-up/Drop-off Point: Shuttle Bus Bay Level 1, carpark Max capacity: 24 pax/bus	10.30am - 10.30pm Daily 15 min interval
 iMM Pick-up/Drop-off Point: Main Entrance (near Coach Outlet) Max capacity: 40 pax/bus	11.30am to 2pm Mon - Fri, except PH 10-min interval

Photos (above): Shuttle bus bay with suitable seats; waiting area with clearly displayed signage; example of signage with information for shuttle bus services

Where shuttle bus services are provided:

- ➔ Ample waiting spaces should be provided at the sheltered area.
- ➔ Seats with suitable armrests should be provided to assist older persons and the ambulant disabled in sitting down and getting up.
- ➔ Signage should be provided to communicate useful information on the shuttle bus routes, drop-off points, operating hours and service schedules.

## 2.3 Vehicular Environment



Well-designed parking facilities make the building more usable to people with different abilities. Conspicuous and clear design arrangements are generally required to enable orientation and usage of parking facilities. The convenience and safety of drivers and their passengers in accessing a building must be considered in the design of a building.

## 2.3.1 Vehicular Parking

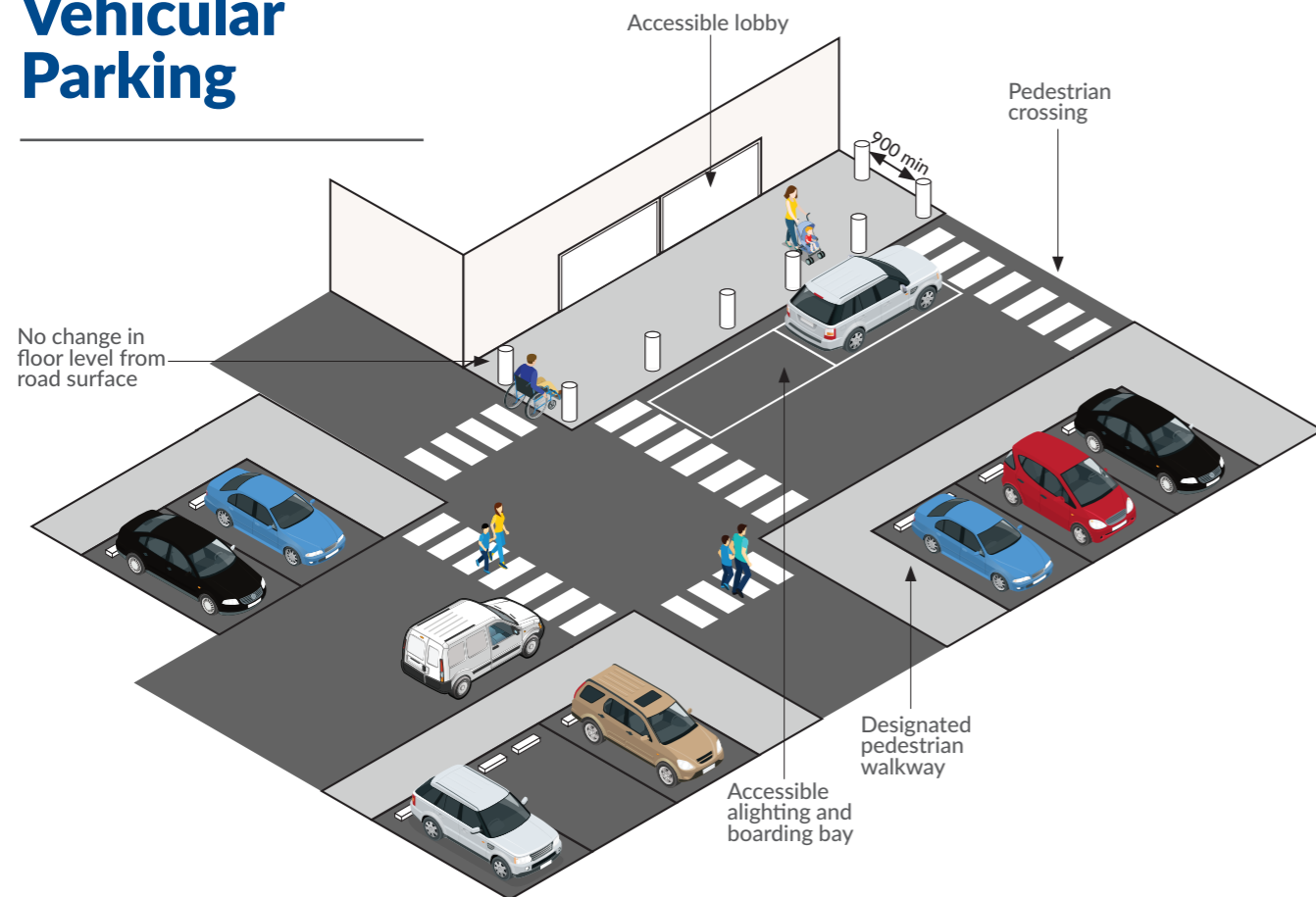


Figure 06. Accessible vehicular park features leading to an accessible lobby

- ➔ A designated accessible alighting and boarding bay should be provided adjacent to the accessible lobby so that persons with bulky mobility aids and baby carriages can alight from or board their vehicles. This will help reduce reliance on the use of the accessible and family car parking lots for such purposes.
- ➔ Clear directional signage should be displayed at appropriate locations ahead of the car park entrance to direct drivers with disabilities to the location of accessible parking lots.
- ➔ An electronic signage system indicating the number and floor location of available accessible parking lots should be provided.
- ➔ Directional signage should be clearly visible from all parts of the car park to enable easier orientation.
- ➔ Designated pedestrian walkways and crossings leading to the accessible lobby should be provided.

## 2.3.1 Vehicular Parking



Photos (above): Designated alighting and boarding bay; an electronic sign indicating the number and floor location of available accessible parking lots; an accessible parking lot located next to the accessible lobby; designated pedestrian walkways and crossings in a vehicular park

- ➔ Sufficient space should be made available for passengers to alight from vehicles and to safely move around parked vehicles to an accessible and safe pedestrian route.
- ➔ Changes in level from the road surface to other spaces should be avoided where possible.
- ➔ Adequate lighting should be provided for accessible routes, lobbies and parking lots to aid in user safety and security.
- ➔ Tactile warning indicators should be in contrasting colours to warn of a hazard, a destination or a change in direction at relevant locations such as doors and ramps.
- ➔ Bollards are recommended to be provided with a minimum clear spacing of 900 mm to demarcate the pedestrian zone. Their colours should contrast with the surrounding flooring material, or otherwise be provided with a coloured or reflected band around their neck to further aid visibility.

## 2.3.2 Accessible Parking Lots



*Photos (below):  
An accessible parking lot next to an accessible lobby; example of an aerated paving that should be avoided*



Vehicle parking lots should be provided specially for vehicles driven by persons with disabilities or their caregivers.

For better access, an accessible parking lot should:

- ➔ Be located next to the car park lobby.
- ➔ Not be located across the driveway from the car park lobby.
- ➔ Should have an access pathway behind or at the side of the lot.
- ➔ Should be in blue background for easy identification from afar.

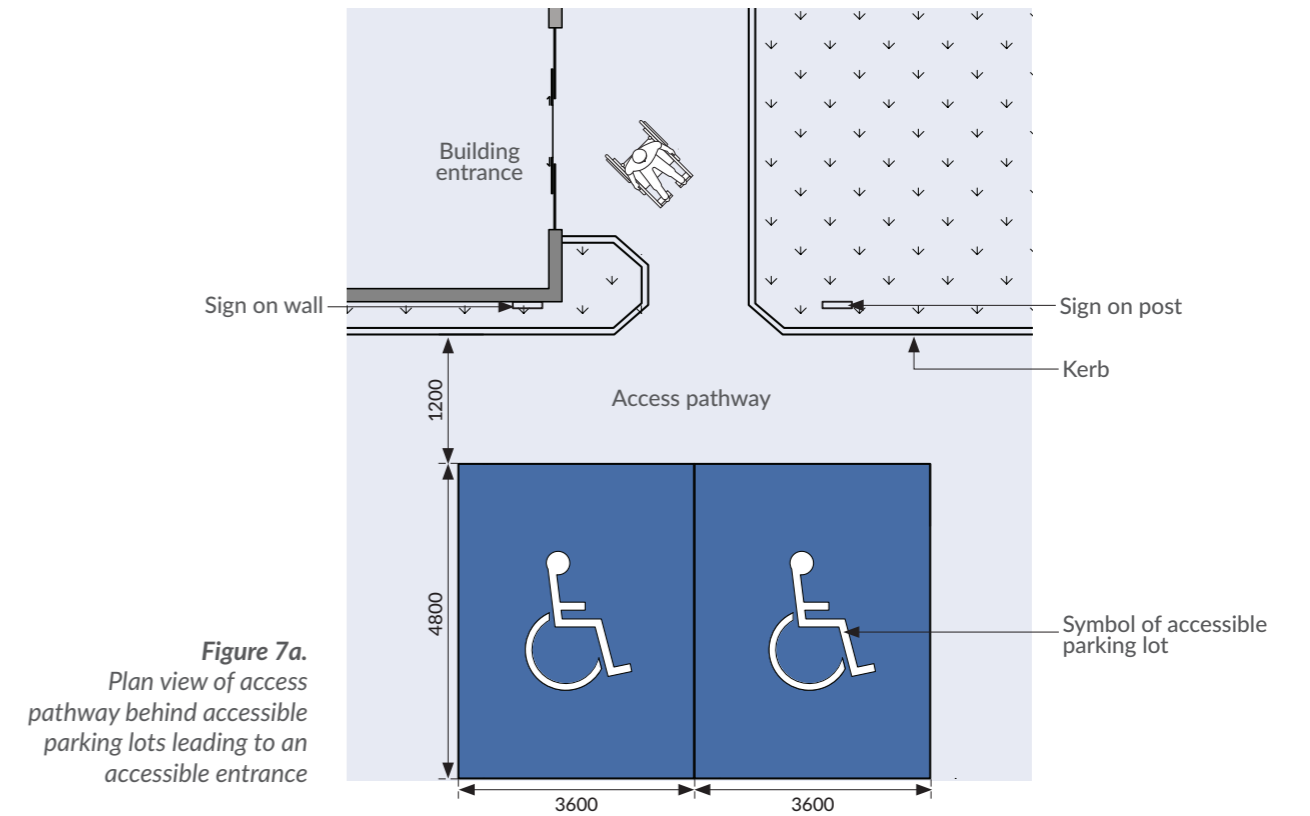
An accessible vehicle parking lot should:

- ➔ Have minimum dimensions of 4800 mm by 3600 mm.
- ➔ Have minimum dimensions of 5400 mm by 3600 mm for parallel parking.
- ➔ Have a firm, level surface without aeration slabs.

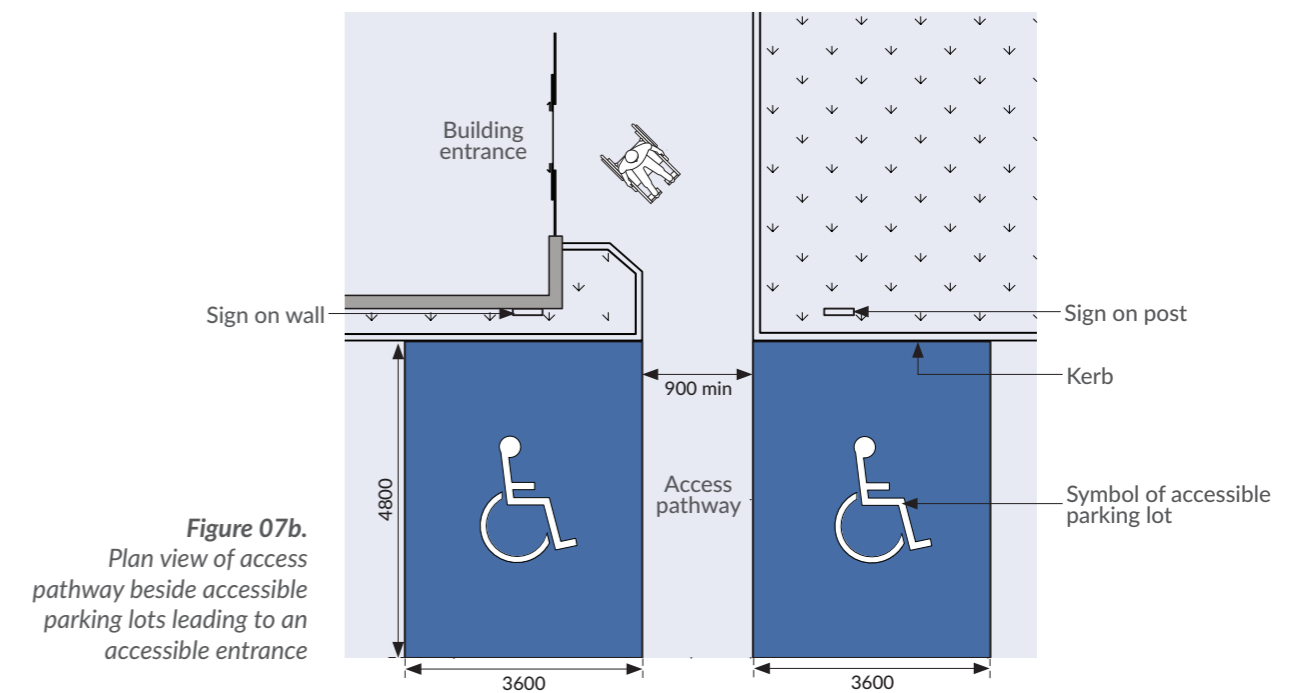
Open-jointed pavers or aerated concrete blocks should be avoided at external vehicle parks and open spaces where pedestrians are required to walk. The voids in the aerated concrete blocks may catch the foot or mobility aids and result in an injury or fall.



## 2.3.2 Accessible Parking Lots



**Figure 7a.**  
Plan view of access pathway behind accessible parking lots leading to an accessible entrance



**Figure 07b.**  
Plan view of access pathway beside accessible parking lots leading to an accessible entrance

## 2.3.3 Family Parking Lots



Photos (right):  
Examples of family parking lots with clear signage for easy identification

Designated family parking lots should be provided for family groups that need larger bays and proximate parking, especially those who are accompanied by children in baby carriages or older persons with bulky mobility aids.

For better access, a family parking lot should:

- ➔ Be located near to the car park lobby.
- ➔ Not be located across the driveway from the car park lobby.
- ➔ Should be provided in a colour that contrasts with the background for easy identification from afar.

A family parking lot should:

- ➔ Have a firm, level surface without aeration slabs.
- ➔ Have minimum dimensions of 4800 mm by 3600 mm.
- ➔ Have minimum dimensions of 5400 mm by 3600 mm for parallel parking.

## 2.3.4 Accessible Lobbies



Photos (right):  
Examples of access pathways leading to and from accessible lobbies and vehicular parks

An accessible lobby should be provided at every car park floor.

- ➔ Access pathways from the vehicular park to the accessible lobby should be level.
- ➔ All accessible entrance doors should be automated for easy access to the building.
- ➔ Seating is recommended at the accessible lift lobby for users to rest comfortably while waiting.
- ➔ At least one top-up machine should be located beside the entrance of an accessible lobby and within reach of wheelchair users.



↑ Big Box JEM | ↻ J-Walk

↑ TOWER B WARDS 60m | ↻ TOWER 35m

CHAPTER

03

COMMUNITY HOSPITAL  
社区医院 Hospital Komuniti  
சமூக மருத்துவமனை

# Access Around and Within the Building

- 3.1 Horizontal Circulation
- 3.2 Vertical Circulation



# 3.1 Horizontal Circulation



Walking is a common and natural activity for most people. But for an older person, it must not be taken for granted that this will be easy. A well-designed building layout, with clear circulation routes that are easy to follow will help older persons get to their destinations safely and comfortably.

## 3.1.1 Accessible Routes, Corridors and Paths

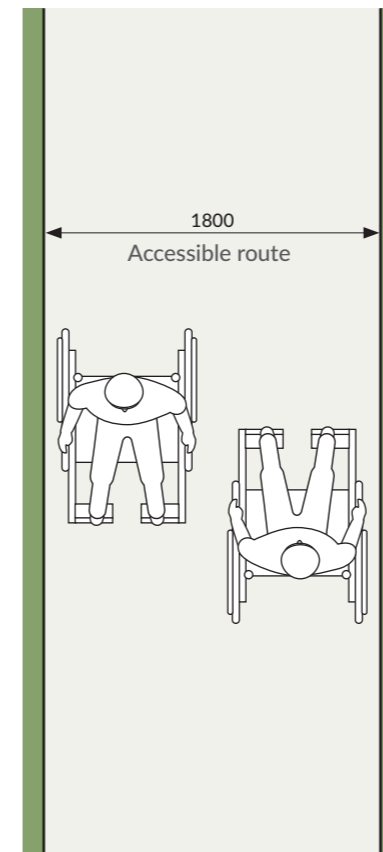


Figure 08. Minimum width of an accessible route, corridor or path

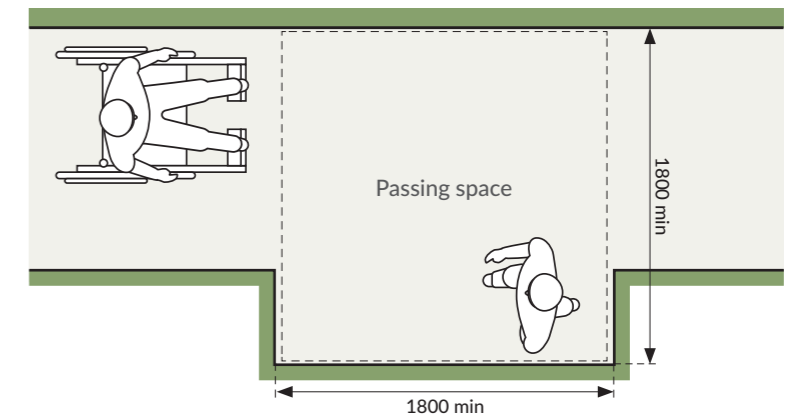


Figure 09. Minimum passing space along a circulation route

Older persons may not be stable in their gait, see their path clearly or recognise changes in floor level. Their physical dimensions and safety should be considered in the design of accessible routes, corridors and paths.

- ➔ The width of an accessible route, corridor or path should be sufficient to enable people to move about in both directions and pass each other with ease. A clear width of 1800 mm will allow two wheelchair users or families with baby carriages to pass each other. The width should be increased according to the projected pedestrian volume.
- ➔ Where a clear width of 1800 mm is not possible, a passing space with the minimum width of 1800 mm and length of 1800 mm should be provided at a maximum distance of 25 m to enable a wheelchair user, or family with a baby carriage, and another person to pass each other.
- ➔ Obstacles and projections such as fire hose reels, columns, service pipes or other protrusions should be avoided.

### 3.1.1 Accessible Routes, Corridors and Paths

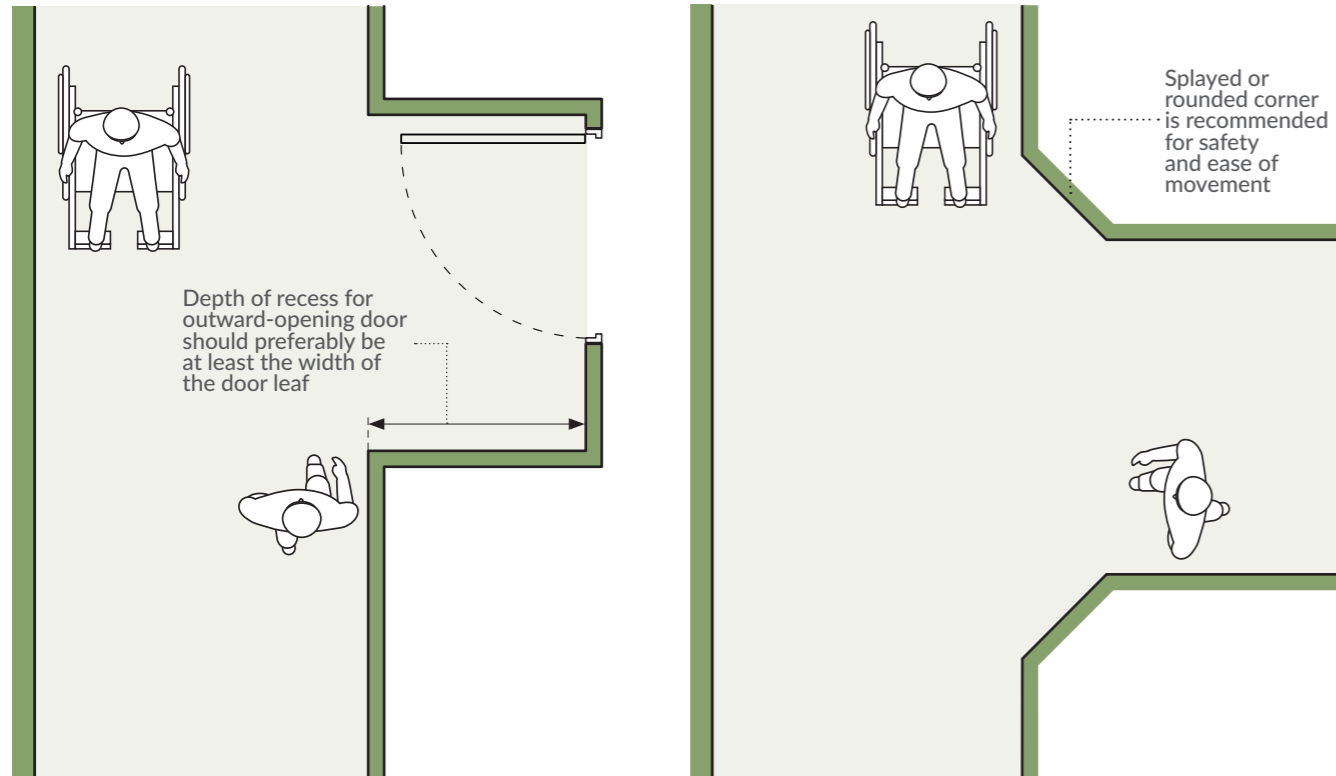


Figure 10. The depth of recess for an outward-opening door

Figure 11. Provision of a splayed or rounded corner along an accessible corridor

- ➔ The depth of recess for an outward-opening door should preferably be at least the width of the door leaf.
- ➔ Adequate and uniform lighting levels should be provided.
- ➔ A splayed or rounded corner should be provided where the corridor turns at 90 degrees to ensure the safety and ease of movement for wheelchair users and older persons with visual impairment.

### 3.1.1 Accessible Routes, Corridors and Paths

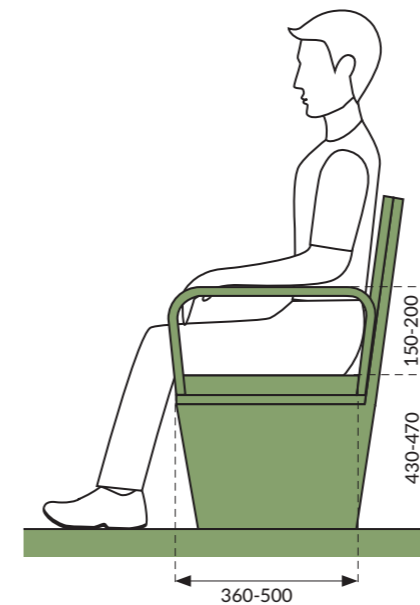


Figure 12. Seat with appropriate armrests and backrest

- ➔ Handrails or trailing bars along long corridors can provide support, balance and directional guidance for older persons who are frail or visually impaired.
- ➔ Seats should be provided at a height of between 430 mm to 470 mm. The depth should be of at least 360 mm but not more than 500 mm.
- ➔ Some of the seats should have armrests and backrest to assist older persons and the ambulant disabled in sitting down and getting up.
- ➔ Armrests, where provided, should be at a height of between 150 mm to 200 mm above the seat, and extend to the front of the seat. This will help support the weight of the user, who may need to lean on them in order to sit down or get up unassisted.

### 3.1.1 Accessible Routes, Corridors and Paths

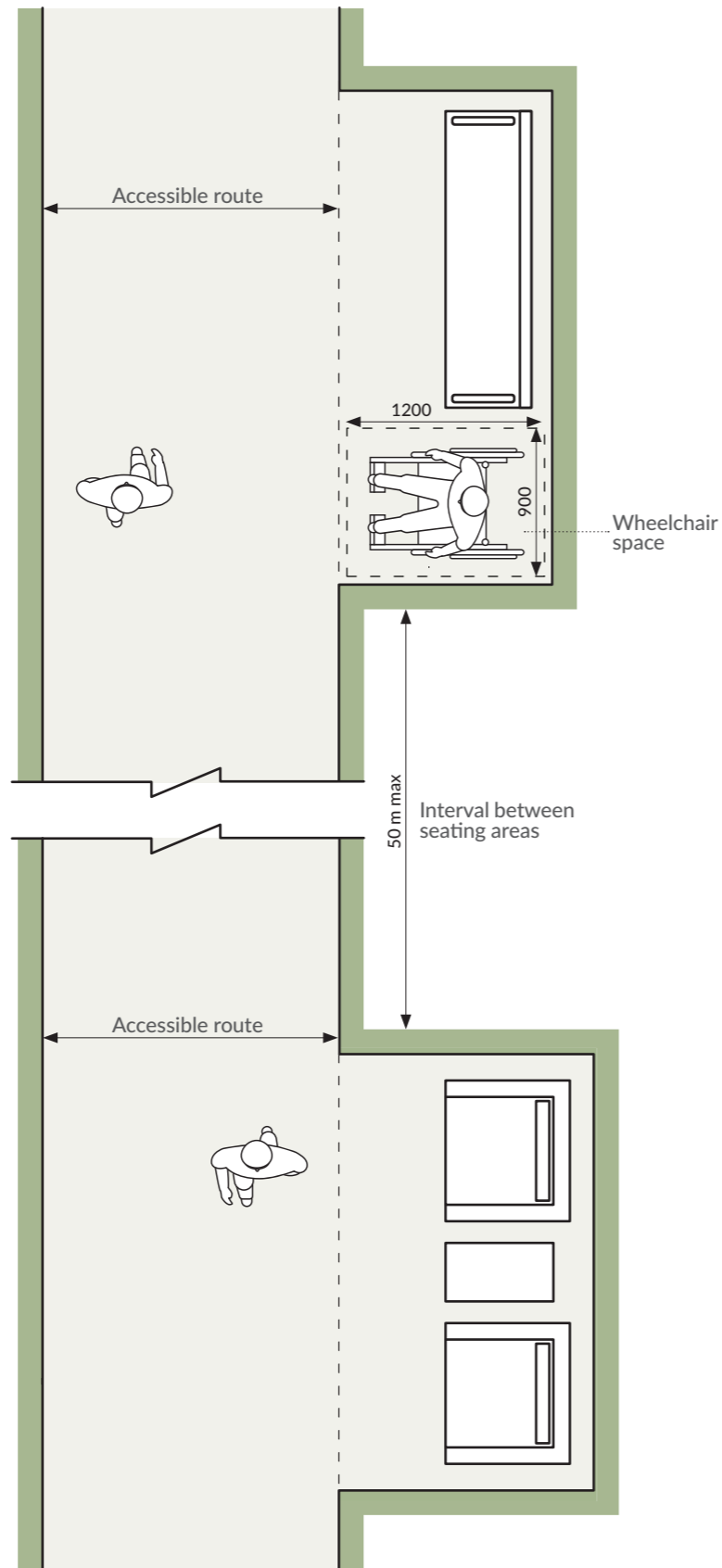
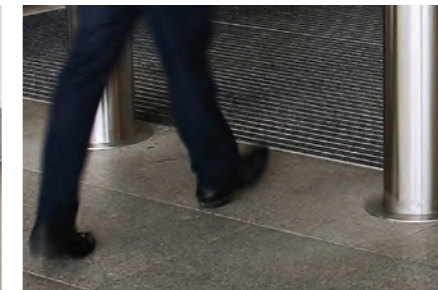


Figure 13. Plan view of seating with space for the wheelchair user and appropriate interval between seating areas

➔ Long paths of travel should be avoided as older persons would have decreased stamina. Resting areas recessed from the path of travel should be provided at frequent intervals of not exceeding 50 m to allow older persons to pause and rest.

➔ A wheelchair space of 900 mm by 1200 mm should be located alongside the seats so that wheelchair users are able to sit together with their able-bodied or ambulant companion.

### 3.1.2 Surface Finishes



Photos (above): Surface finishes of various types - detectable warning surfaces at the start of a ramp; carpet at entrance door; skirting of contrasting tone and colour

- ➔ Surface finishes should be stable, firm, level, durable, slip-resistant and not have any drop or unexpected variation in levels.
- ➔ Skirting should contrast with the walls in tone and colour, so as to provide a clear distinction between the floor and wall.
- ➔ Contrasting colour bands and detectable warning surfaces should be provided where there is a change in level.
- ➔ Highly polished or reflective surfaces should be avoided as their glare will cause discomfort to persons with visual impairment.
- ➔ Carpets and carpet tiles should be securely fixed and have a firm cushion, pad or backing where used in general circulation areas. Their edges, where exposed should be fastened to floor surfaces with trim.
- ➔ Gratings should be located outside the accessible route where possible. Otherwise, they should be set flush with surrounding surfaces and placed such that their length is perpendicular to the dominant direction of travel. The spaces, gaps or openings in the gratings should not be of more than 12 mm in width.

## 3.1.2 Surface Finishes

### Slip Resistance of Floor Finishes

#### Grading Of Slip Resistance

Materials to be used as floor finishes are graded under dry or wet conditions. The grading of the slip resistance of some typically used materials are shown in Table 01.

Material	Slip-resistance*		Remarks
	Dry and Unpolished	Wet	
Clay tiles (carborundum finish)	Very good	Very good	May be suitable for external stairs
Carpet	Very good	Good	
Clay tiles (textured)	Very good	Good	May be suitable for external stairs
Cork tiles	Very good		
PVC with non-slip granules	Very good	Good	
PVC	Very good	Poor to fair	Slip-resistance when wet may be improved if PVC is textured; edges of sheet liable to cause tripping if not fixed firmly to base
Rubber (sheets or tiles)	Very good	Very poor	Not suitable near entrance doors
Mastic asphalt	Good	Good	
Concrete pavers (Interlocking)	Good	Good	
Vinyl tiles	Good	Fair	
Linoleum	Good	Poor to fair	Edges of sheets may cause tripping if not securely fixed to base
Concrete	Good	Poor to fair	If a textured finish or a non-slip aggregate is used, slip-resistance value when wet may be increased to good
Granolithic	Good	Poor to fair	Slip-resistance when wet may be improved to good by incorporating carborundum finish
Cast iron	Good	Poor to fair	Slip-resistance may be acceptable when wet if open treads are used
Clay tiles	Good	Poor to fair	Slip-resistance when wet and polished – very poor
Terrazzo	Good	Poor to fair	Non-slip nosing necessary on stairs; slip-resistance when polished or if polish is transferred by shoes from adjacent surfaces – very poor
Marble/granite	Good	Very poor to fair	Slip-resistance when wet and polished – very poor

Table 01

In Table 01, the gradings are as follow:

**\*Very good**  
Means surface suitable for areas where special care is required, with an approximate coefficient of friction of more than 0.75;

**\*Good**  
Means surface satisfactory for normal use with an approximate coefficient of friction of 0.4 to 0.75;

**\*Poor to fair**  
Means surface below acceptable safety limits with an approximate coefficient of friction of 0.2 to 0.4; and

**\*Very poor**  
Means unsafe surface with an approximate coefficient of friction of less than 0.2.

Refer to Singapore Standard. SS 485 : 2011 Specification For Slip Resistance Classification Of Pedestrian Surface Materials for more information.

## 3.1.3 Entrance Doors



Doors can be the largest obstacle and yet a necessary feature along a circulation route. There is therefore a need to install doors that are easy to operate and wide enough for users to pass through comfortably.

- ➔ Doorways should be level. Changes in level at the accessible entrances should be avoided.
- ➔ Automatic doors of the sliding or swing type should be provided instead of doors that need to be manually opened, where possible and practicable.
- ➔ A minimum opening of at least 850 mm measured between the face of the door and the face of the doorstop should be provided when the door is in a fully opened position.
- ➔ Doors which swing outward should be recessed and not obstruct circulation paths. The depth of recess for an outward-opening door should preferably be at least the width of the door leaf.
- ➔ A visual link should be provided between the inside and the outside of an accessible entrance door.
- ➔ Full-height glass doors and panels should be prominently marked or highlighted with motifs to improve their visibility.
- ➔ Sufficient manoeuvring space should be provided on both sides of a door for users to manoeuvre and for the door to swing or slide safely.

### 3.1.3 Entrance Doors

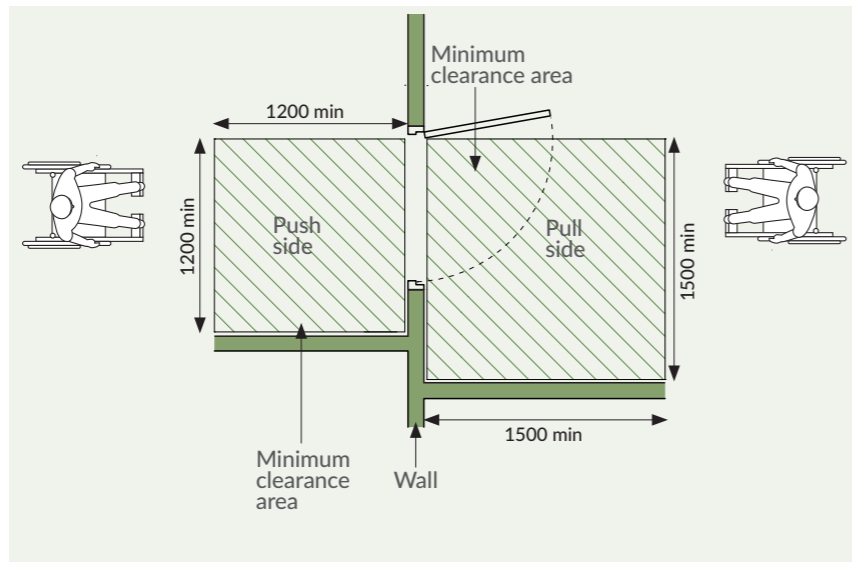


Figure 14. Doorway manoeuvring space on both sides of a door



Photo: Door with U-shaped handle

- ➔ The doorway of a one-way swing door should have manoeuvring spaces on both sides for wheelchair users. The following clear spaces should be provided adjacent to the leading edge of the door:
  - On the pull side, a minimum space of 600 mm adjacent to the leading edge of the door with a minimum clear floor space of 1500 mm by 1500 mm.
  - On the push side, a minimum space of 300 mm adjacent to the leading edge of the door with a minimum clear floor space of 1200 mm by 1200 mm.
- ➔ Older persons may be weak in gripping and turning movements due to reduced muscle strength. Door ironmongery should be carefully selected, with:
  - Low friction hinges that minimise the force needed to open and close the door.
  - Levers and pull handles instead of door knobs, which do not provide adequate grip for persons with impaired hand function.
  - Handles that contrast with the colour of the door.
  - Door-closing devices, only where necessary.

### 3.1.4 Overhead Hazards



Photo: A guardrail to warn and keep users away from areas with low headroom

- ➔ Public circulation areas and pedestrian paths should be free of protrusions and obstructions. Commonly observed protrusions and obstructions, such as directional signs, firefighting equipment, staircases and escalators, can be hazardous to persons with reduced vision.
- ➔ The headroom in pedestrian areas such as walkways, halls, corridors, passageways and aisles, should be of at least 2000 mm.
- ➔ A detectable guardrail or other barriers with a leading edge at or below 580 mm from the floor level should be provided where the headroom of an area adjoining an accessible route is reduced to less than 2000 mm.

## 3.2 Vertical Circulation



Buildings should include suitable means of vertical circulation for all users, in particular older persons and persons with physical and sensory impairments, to move from one level to the other.

### 3.2.1 Ramps



*Photo: Ramp with a gentle gradient that allows for ease of use*

Ramps should be designed as an integral part of a building's means of circulation to facilitate the smooth flow of human traffic. It should serve as a form of safe, easy and comfortable access for all users by providing an appropriate gradient, regular landings and a comfortable travelling distance.

## 3.2.1 Ramps

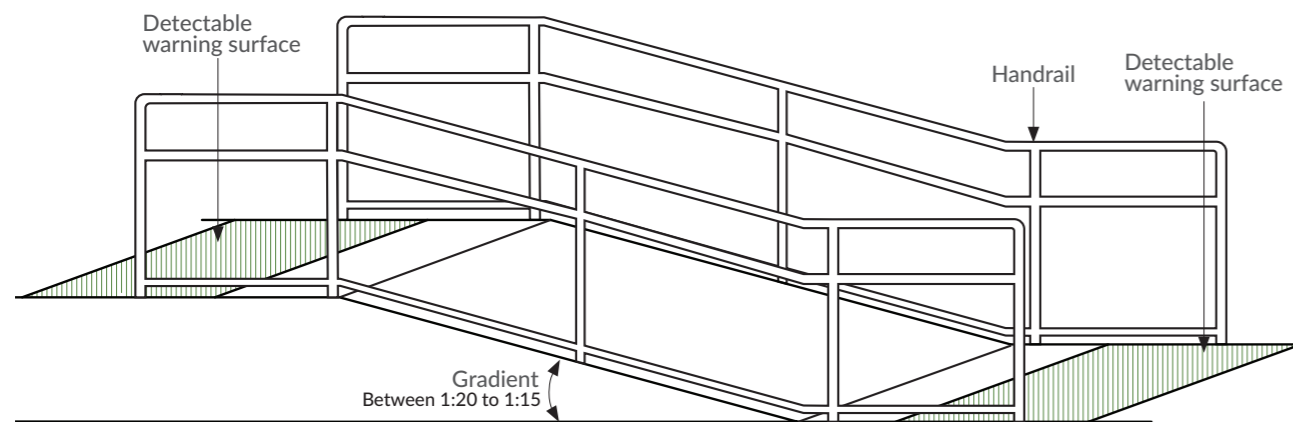


Figure 15. Side elevation of ramp with acceptable gradient

- ➔ Ramps with a steep gradient should be avoided, as wheelchair users will find it physically difficult to manage their balance and may fall over. A gentle gradient of 1:20 to 1:15 is preferred.
- ➔ Curve ramps should be avoided. If used, their recommended gradient should be not be steeper than 1:16.
- ➔ An alternative stepped approach should be provided where a long ramp is unavoidable.

Maximum Slope	Maximum Length
1:20	-
1:16	8000 mm
1:14	5000 mm
1:12	2000 mm
1:10	1250 mm

Table 02. Maximum ramp lengths across a range of acceptable slope gradients<sup>1</sup>

1. Accessibility for the Disabled: A Design Manual for a Barrier Free Environment. United Nations Enable

## 3.2.1 Ramps Landings

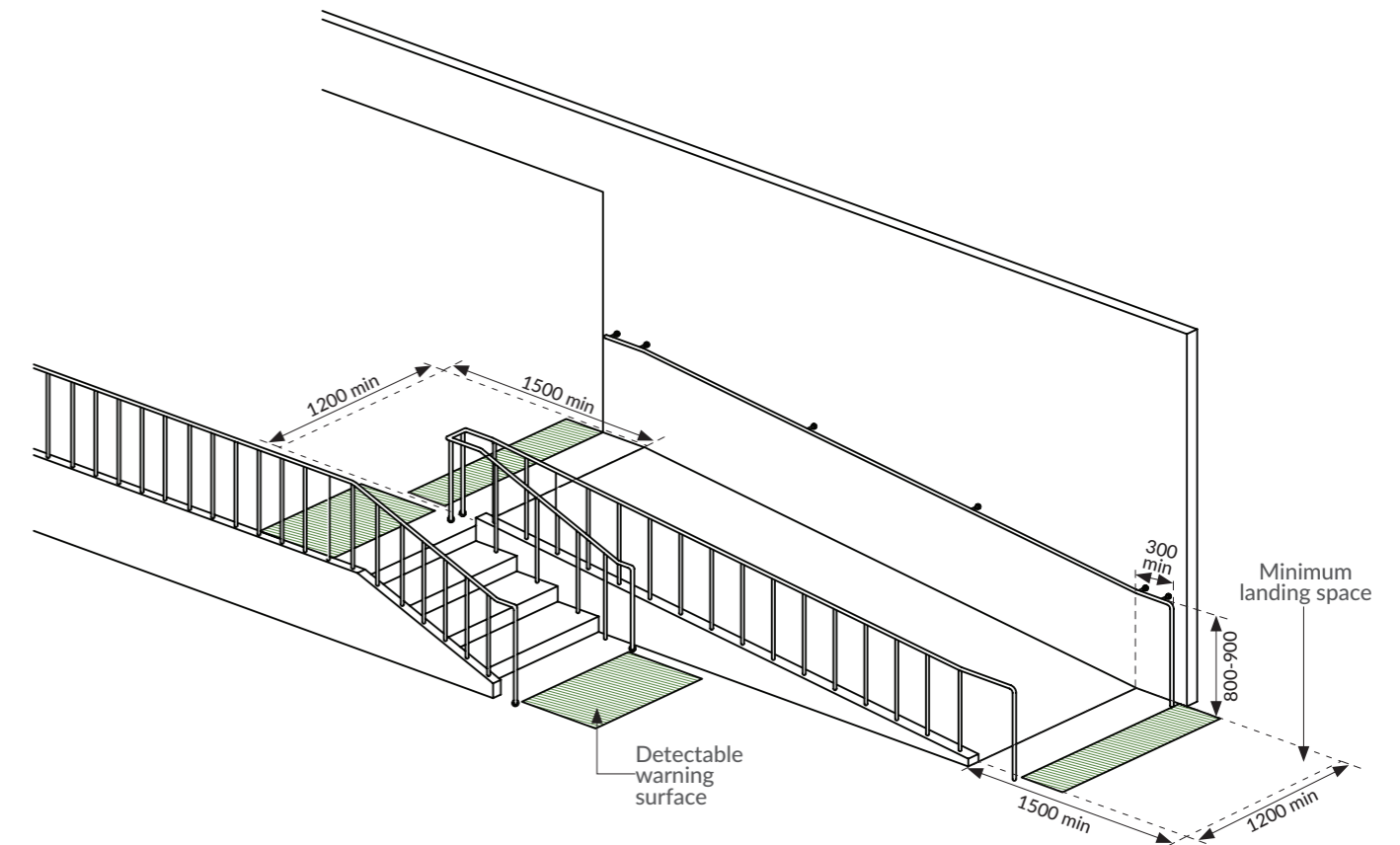


Figure 16a. Ramp with alternative stepped approach and level landings

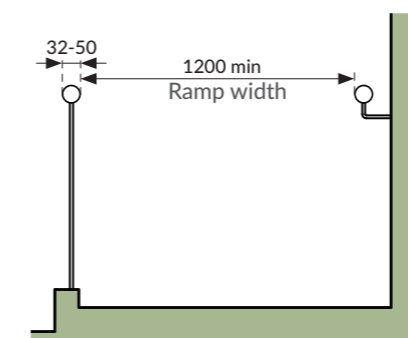


Figure 16b. Recommended width for ramps for accessible use

- ➔ Level landings should be provided at the top and bottom of each run and also where the run changes direction.
- ➔ Landings should not encroach upon any circulation routes.
- ➔ Outdoor ramps and their approaches should be sheltered where possible and have good drainage to prevent ponding.
- ➔ Ramps and their landing surfaces should be non-slip in dry and wet conditions and not obstruct the use of mobility aids.
- ➔ Detectable warning surfaces of a colour that contrasts with the surrounding flooring material should be provided at the start and end of the ramp. Markings to indicate direction of pedestrian flow is also recommended.

## 3.2.1 Ramps

### Landings

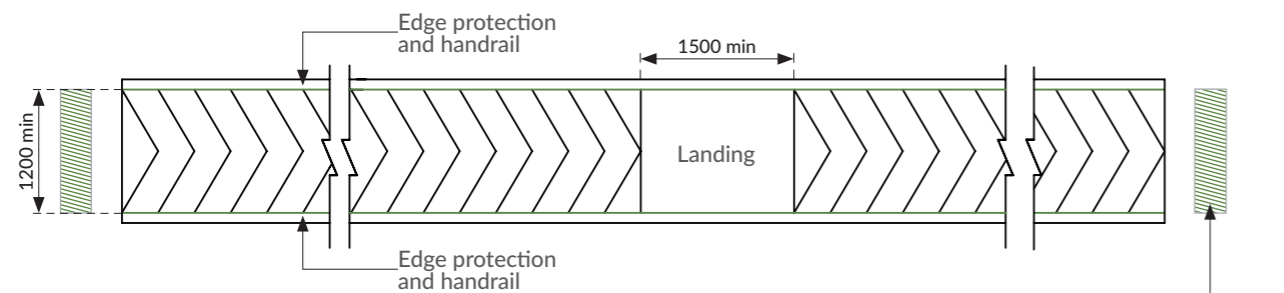


Figure 17a. Plan view of straight ramp

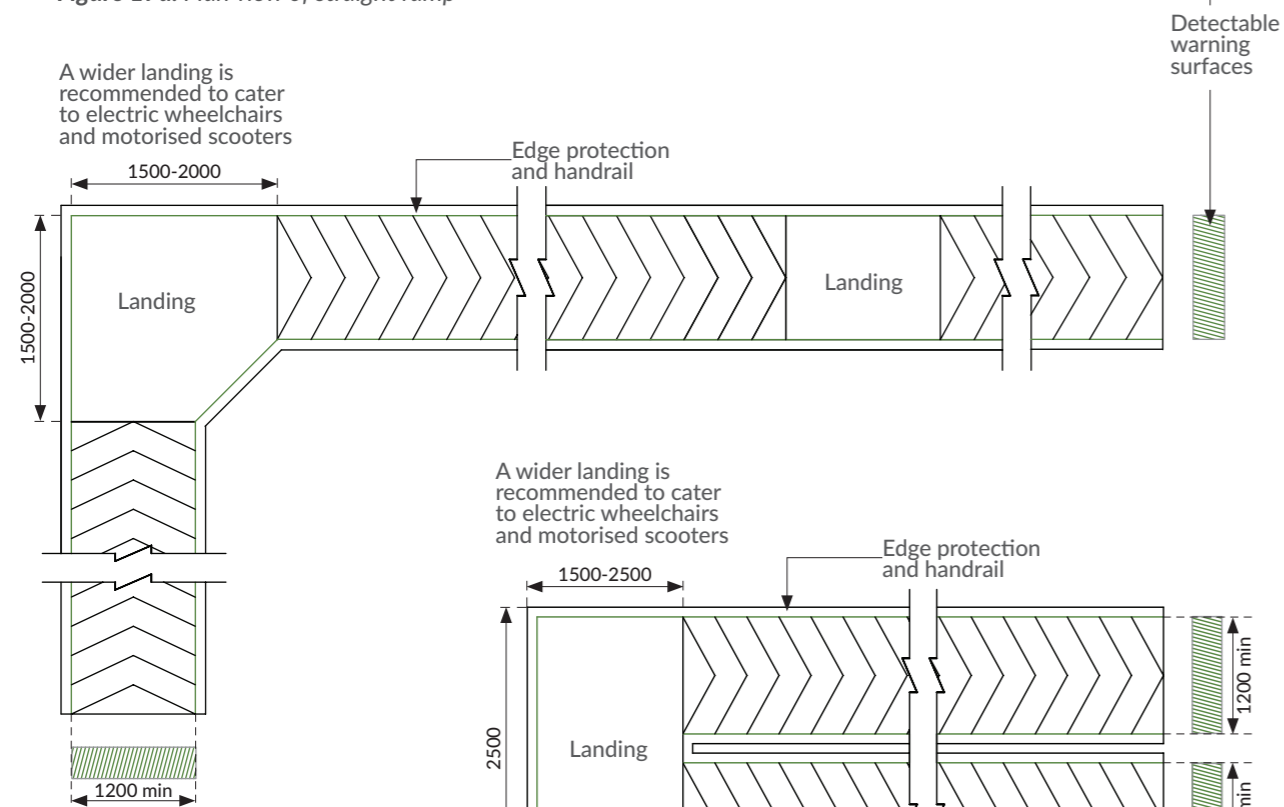


Figure 17b. Plan view of 90-degree turn ramp

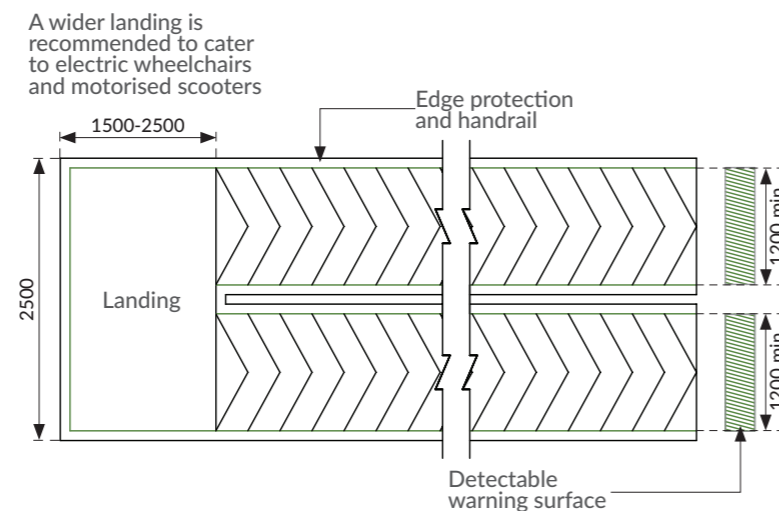


Figure 17c. Plan view of 180-degree turn ramp

- ➔ To facilitate easy manoeuvring and resting, a wider landing of 2000 mm by 2000 mm is recommended for a 90-degree turn ramp. A landing of 2500 mm by 2500 mm is recommended for a 180-degree turn ramp.

## 3.2.1 Ramps

### Handrails



Handrails should be designed for ease of grasping and to allow a firm and comfortable grip.

- ➔ Handrails should:
  - Be slip-resistant.
  - Have a circular section of 32 mm to 50 mm in diameter or an equivalent gripping surface.
  - Be free of any sharp or abrasive elements.
  - Be provided on both sides of a ramp.
  - Be in a colour that contrasts with the background to aid visibility.
  - Have a continuous gripping surface, without interruption or obstructions that can break a handhold.



## 3.2.1 Ramps Handrails

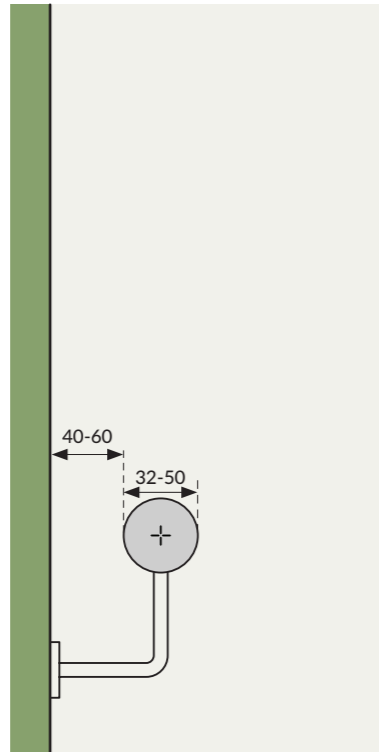


Figure 18a. Appropriate dimensions for handrail in clearance from wall

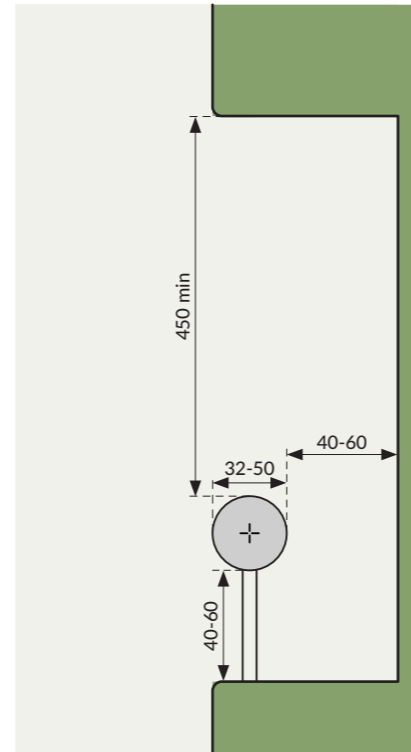
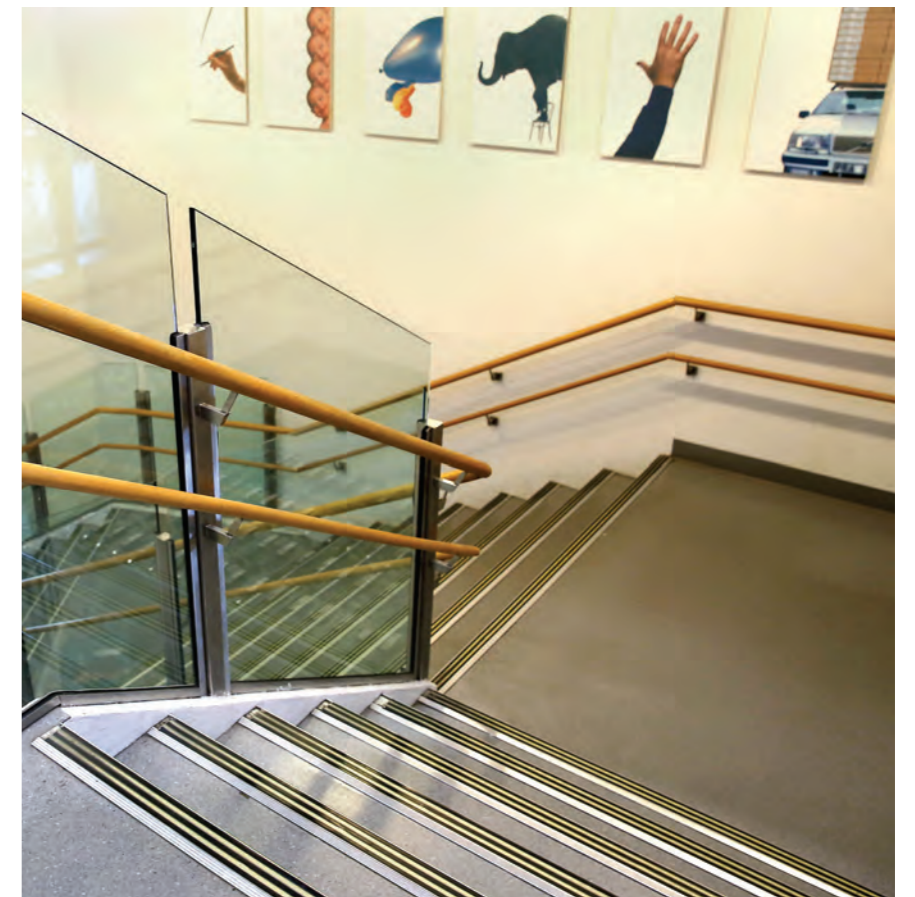


Figure 18b. Appropriate dimensions for handrail in recess

- ➔ Handrails should:
  - Extend at least 300 mm beyond the top and bottom of a ramp.
  - Have a clear space between the handrail and all wall surfaces of:
    - (i) 40 mm.
    - (ii) 60 mm where the wall has a rough surface.
  - Be at a height of between 800 mm to 900 mm from the finished floor surface.
- ➔ A second handrail at a height of between 600 mm to 750 mm is recommended for use by young children.

## 3.2.2 Staircases



The staircase is one of the most important means of travelling between different levels. They should be designed with great attention to appropriate dimensions, materials and detailing of treads and risers, so as to minimise common fall hazards such as slipping and tripping.

Older persons are at a higher risk of falling down the stairs due to their impaired vision, reduced strength and poor balance associated with ageing.

Staircases should therefore be made safe and comfortable for all, including older persons, for access or as part of an exercise routine.

## 3.2.2 Staircases

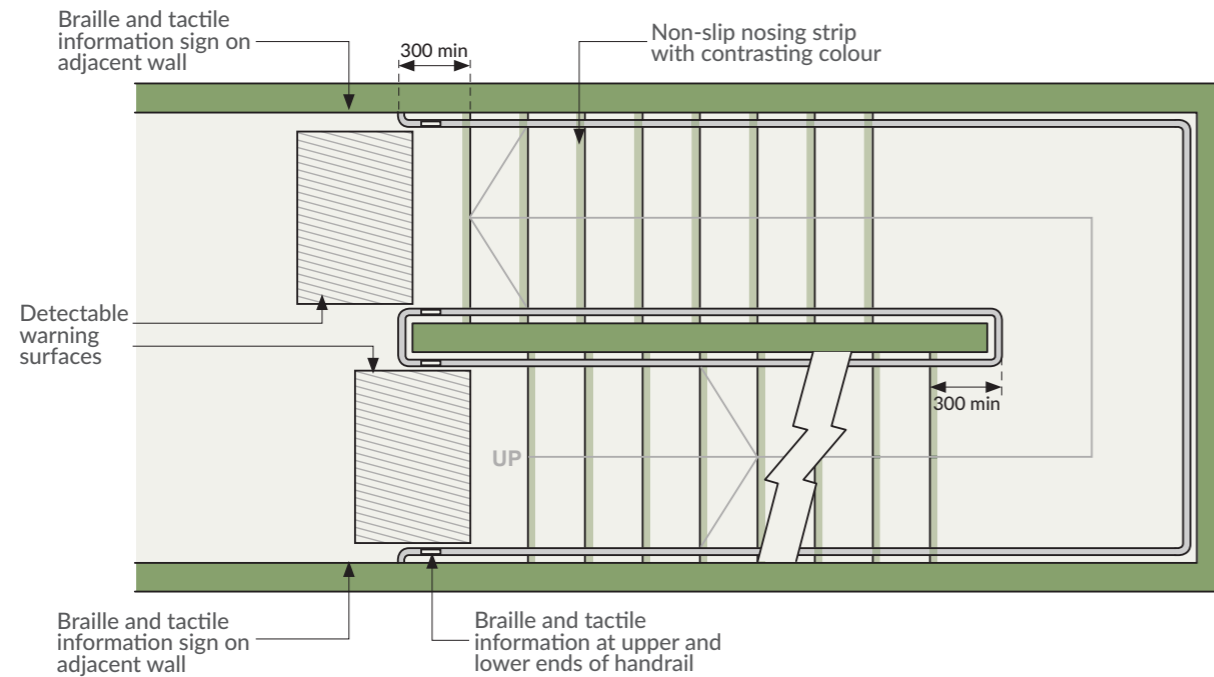


Figure 19. Plan view of staircase

- ➔ Staircases at public places should be at least 1200 mm in width. A greater width may be required where there is a high volume of pedestrian flow.
- ➔ A flight of stairs should have at least 3 risers. The provision of 1 or 2 steps should be avoided as this may result in a trip hazard.
- ➔ An intermediate landing should be provided after a maximum of 16 risers, as older persons with walking difficulties are unable to manage long flights of steps.
- ➔ Floor landings should have a level platform of the same width as that of the staircases.

## 3.2.2 Staircases

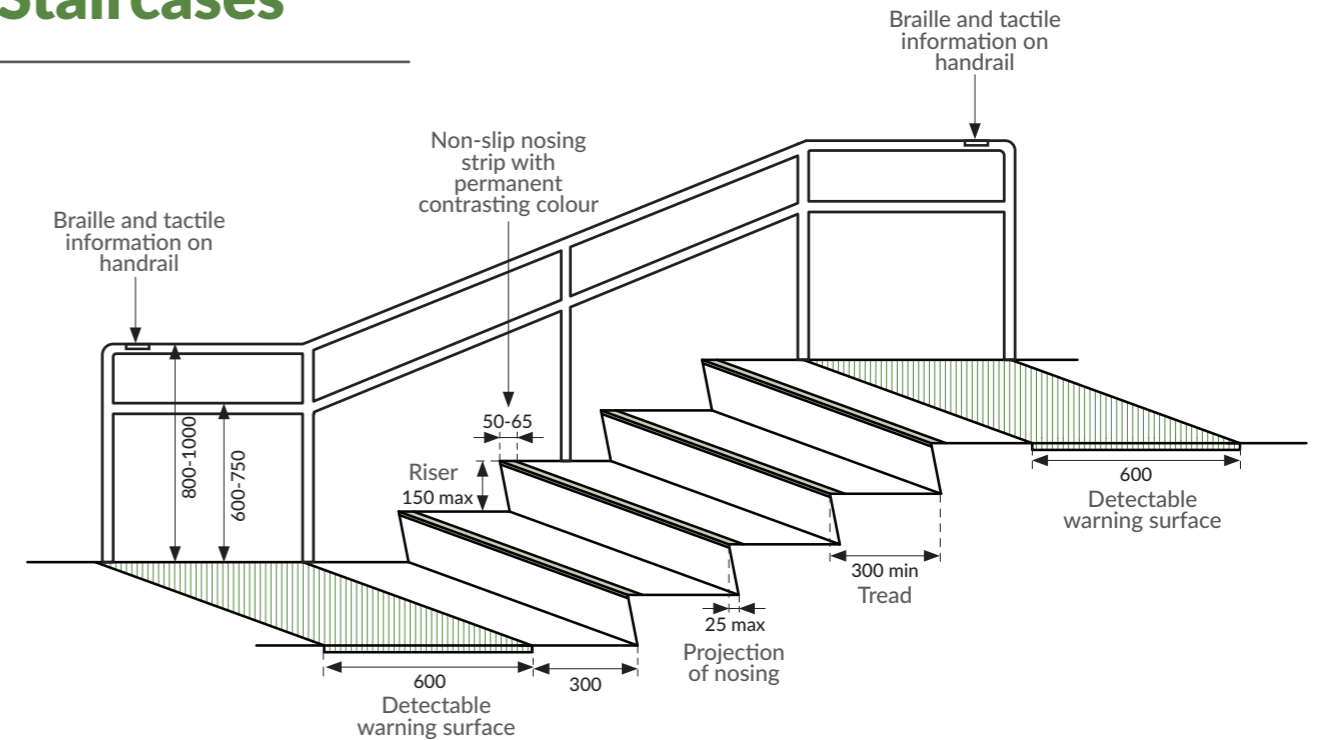


Figure 20. Side elevation of a typical staircase



Photo: Braille and tactile information on handrail

- ➔ Staircases wider than 2300 mm should be divided into segments of between 1100 mm to 1800 mm with the addition of another handrail.
- ➔ Floor finishes of different colours should be used as visual cues to alert users to the presence of stairs, steps and changes in floor level.
- ➔ Detectable warning surfaces be provided at the top and bottom landings.
- ➔ Tactile and braille signs should be installed on adjacent walls or handrail extensions to indicate the floor level for the visually impaired.
- ➔ Staircases should be lit to at least 200 lux. The lighting should be positioned to illuminate both directions of travel without causing shadows while offering adequate contrast between treads and risers.

## 3.2.2 Staircases

### Treads and Risers



*Photo: Open risers and transparent treads that should be avoided*

A gentler pitch for the stairs will allow for greater comfort and ease of use.

- ➔ Risers and treads should be of consistent dimensions throughout a flight of stairs.
- ➔ Risers should not be of more than 165 mm in height and treads should be at least 275 mm.
- ➔ Risers of not more than 150 mm in height and treads of at least 300 mm are recommended for staircases in public circulation areas frequented by older persons.
- ➔ The tread should have a level screed. Outward sloping treads should be avoided.
- ➔ Treads should be of a non-slip finish, with non-slip nosing of a permanent contrasting colour.
- ➔ Nosing should be an integral part of the steps. All steps should be fitted with non-slip nosing strips of between 50 mm to 65 mm in width with a permanent contrasting colour.
- ➔ Open risers and transparent treads should be avoided for staircases.

## 3.2.2 Staircases

### Handrails



Well-designed handrails provide support for users of a staircase. The handrails also enable users to quickly regain their balance after a slip or misstep.

Handrails should:

- ➔ Be slip-resistant.
- ➔ Have a circular section of 32 mm to 50 mm in diameter or an equivalent gripping surface.
- ➔ Be free of any sharp or abrasive elements.
- ➔ Be provided on both sides of the staircase.
- ➔ Have a continuous gripping surface, without interruption or obstructions that can break a handhold.

## 3.2.2 Staircases Handrails



Photo: Additional handrail suitable for use by children

- ➔ Handrails should:
  - Extend 300 mm beyond the top and bottom of a staircase.
  - Have a clear space between the handrail and wall surface of:
    - (i) 40 mm.
    - (ii) 60 mm where the wall has a rough surface.
  - Should contrast with the colour of its background to aid visibility.
  - Be of 800 mm to 1000 mm in height, measured vertically from the pitch line to the top of the handrails.
  - Have ends turned towards the wall or downward to avoid catching clothes, and to indicate the end of the staircase.
- ➔ An additional handrail for children is recommended. It should be between 600 mm to 750 mm in height, measured vertically from the pitch line to the top of the handrail.

## 3.2.3 Passenger Lifts



Photo:  
Lift lobby with tactile  
ground surface indicators  
leading to accessible lifts  
with vision panels

The lift is the most common form of vertical transportation and an integral part of an accessible route. All lifts provided in a building should include suitable provisions for all users, including older persons, and persons with physical and sensory impairments.

- ➔ Lifts and lift lobbies should be sited in a logical location and be clearly visible upon entry or when navigating the building.
- ➔ Lifts should serve all floor levels, including the underground vehicle parks.
- ➔ More than one lift should preferably be provided so that convenient access can be maintained when a lift breaks down or undergoes maintenance.
- ➔ The approach to the landing call button at the lift lobby should have an unobstructed space of at least 900 mm by 1200 mm.
- ➔ The landing call button should be placed at a height of between 900 mm to 1200 mm to accommodate the needs of wheelchair users.

### 3.2.3 Passenger Lifts



Tactile ground surface indicators should be provided on floor surfaces that lead to accessible lifts.



Vision panels should be provided on lift doors so that persons with hearing impairment can signal for help or assistance in the event of an emergency.



A door protective device should be provided to control the closing of lift doors, so as to ensure that doors do not make physical contact with passengers standing in their path. In addition, an audible signal should be provided to alert lift passengers that the doors are closing.



The emergency bell must be connected to a blinking light in the lift car to signal to persons with hearing impairment that the emergency bell has been activated.



Photos (above): Tactile ground surface indicators on the floor surface at a lift lobby; an emergency bell button

### 3.2.3 Passenger Lifts Lift Car Provisions

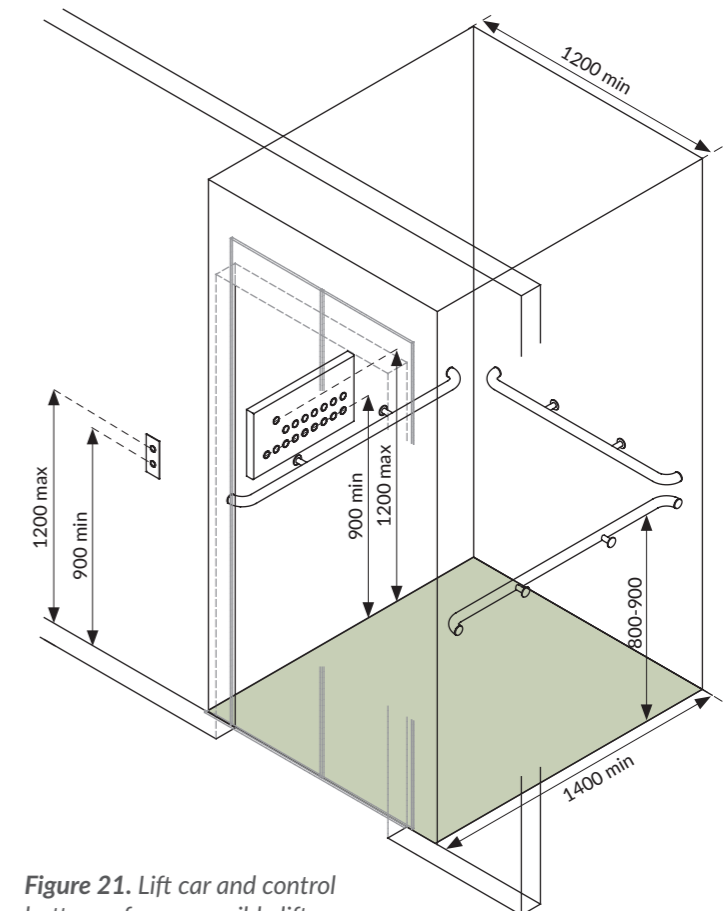


Figure 21. Lift car and control buttons of an accessible lift

Control buttons for the lift should be located to allow easy access by passengers of all abilities and not impede any passengers from having full control of the lift's movement.

The lift car should be large enough for wheelchair users, or to accommodate a number of older persons with bulky mobility aids, or families with children in baby carriages.

- ➔ The internal dimensions should be of more than 1200 mm in width by 1400 mm in depth.
- ➔ At least one set of control buttons inside the lift car should be placed at a height of between 900 mm to 1200 mm above the finished floor level. The control buttons may be placed vertically or horizontally, or both vertically and horizontally.
- ➔ The interior of the lift car should be fitted with at least one mirror to enable a wheelchair user to visually check for any obstacles or people before manoeuvring out.
- ➔ Grab bars should be placed at a height of between 800 mm to 900 mm above the finished floor level, and fixed on both sides and at the rear of the lift car, to provide support for older persons.

### 3.2.3 Passenger Lifts Lift Car Provisions



**Photos (above):**  
Wheelchair user manoeuvring out of the lift with the aid of mirrors and grab bars; seat within a lift; braille and tactile indicators on control buttons in the lift; visual information display system within the lift

- ➔ A visual information display system should be installed to provide information on the location of the lift car, as well as to update on rescue efforts in the event of an emergency.
- ➔ The visual information display panel should have good colour contrast between the wordings and the background to facilitate readability.
- ➔ Braille and tactile marking indicators should be provided and placed to the left of or on the lift call and control buttons. The size of tactile markings should be of between 15 mm to 20 mm, be raised at least 1 mm and have a colour that contrasts with the background.
- ➔ Lift call and control buttons with braille markings should not be touch-sensitive, but be activated by a light pressure.
- ➔ A fold-down seat for passengers who are unsteady on their feet is recommended for lifts in buildings frequented by older persons.

### 3.2.4 Escalators



**Photos (above):**  
Headroom warning; sign on safe use of escalator; safety features on the steps of an escalator

Escalators make vertical travel between the different levels of a building quick and easy. They do not, however, provide a means of access for all and are not suitable for users with baby carriages, mobility aids and dogs.

Some people may feel anxious about using escalators and prefer alternatives such as stairs, ramps or lifts. An alternative means of access should therefore always be provided in association with escalators. The location of alternative access routes should either be readily apparent or clearly signed.

It is highly recommended to arrange escalators in a manner that facilitates continuous movement from floor to floor.

The safety of users on the escalators and landings should be considered when planning and designing the escalators.

- ➔ The width of an escalator should be specified according to the projected traffic volume, and should be of between 580 mm to 1100 mm.
- ➔ Moving handrails should be at a height of 900 mm.
- ➔ Escalators installed in open spaces like the atrium should be provided with additional rail or guard on the incline section outboard of the escalator handrail to prevent users from falling from height.

## 3.2.4 Escalators

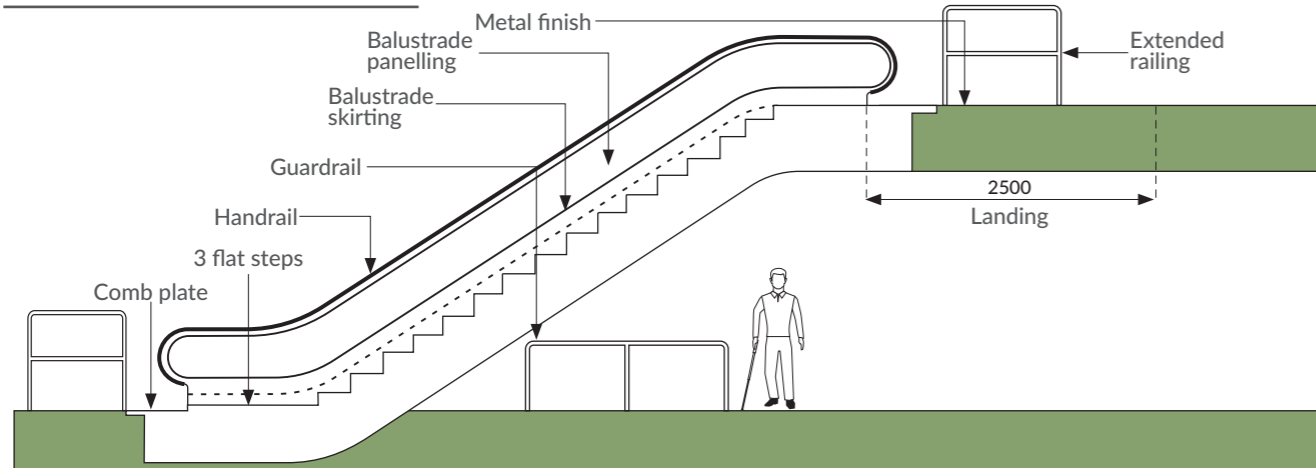


Figure 22. Side elevation of an escalator with safety provisions



Photo: Detectable guardrail under escalators

- ➔ The steps should have a height of not more than 240 mm, or 210 mm if the escalator will be used as an emergency exit route when stationary.
- ➔ The edge of the steps should be clearly differentiated with markings of a contrasting colour.
- ➔ At least 3 flat steps should be provided at the beginning and at the end of the escalator.
- ➔ Railings around the escalator void should be designed to abut the escalators.
- ➔ The provision of a buffer area at the landings is recommended for slower moving passengers and to avoid congestion.
- ➔ Safety railings extending from the escalator handrail should be provided at landings to increase the buffer zones in crowded areas.
- ➔ Headroom warning should be provided under the escalator.
- ➔ Visual and tactile warning indicators should be provided at landings to indicate the presence of an escalator.
- ➔ Clear and conspicuous signs should be provided to indicate the direction of escalator movement.
- ➔ Additional signs should be provided to discourage the transportation of baby carriages and wheelchairs on escalators.

## 3.2.5 Emergency Evacuation



Persons with disabilities (PWDs) can be greatly affected during emergency evacuations. They may find it difficult to move to an assembly area when the evacuation happens due to their age or their limited abilities, such their speed of movement when using mobility aids.

A PWD holding point is a temporary safe space for PWDs to await assistance during an emergency evacuation.

A designated accessible PWD holding point should be provided on all levels of the building in case of emergency situations, and located:

- ➔ Within a fire-fighting lobby.
- ➔ Within a smoke-stop lobby.
- ➔ Along an external corridor.
- ➔ Inside the exit staircase, provided there is no fire-fighting lobby, smoke-stop lobby or external corridor.
- ➔ For buildings without an evacuation lift, an evacuation chair should instead be provided to allow PWDs to be assisted down the stairs.



Photo: Sign leading to a PWD holding point

Refer to Singapore Civil Defence Force, Code of Practice for Fire Precautions in Buildings for more information.

## 3.2.5 Emergency Evacuation



- A PWD holding point should:
- Be adequately sized to accommodate a wheelchair user and to allow the user to manoeuvre easily.
  - Should have a space of at least 900 mm by 1400 mm to allow for easy manoeuvring of the wheelchair.
  - Have an area accessible to a wheelchair so that the wheelchair user can await assistance.
  - Not obstruct or disrupt the escape flow.
  - Be demarcated by dotted rectangle markings, a symbol of access in white against a contrasting green background, and a prominent sign with the words "PWD Holding Point".
  - Be lit adequately via an emergency power supply.
  - Be provided with a suitable communication device, such as a distress button or voice communication, to facilitate communication with the building management team.

## 3.2.5 Emergency Evacuation

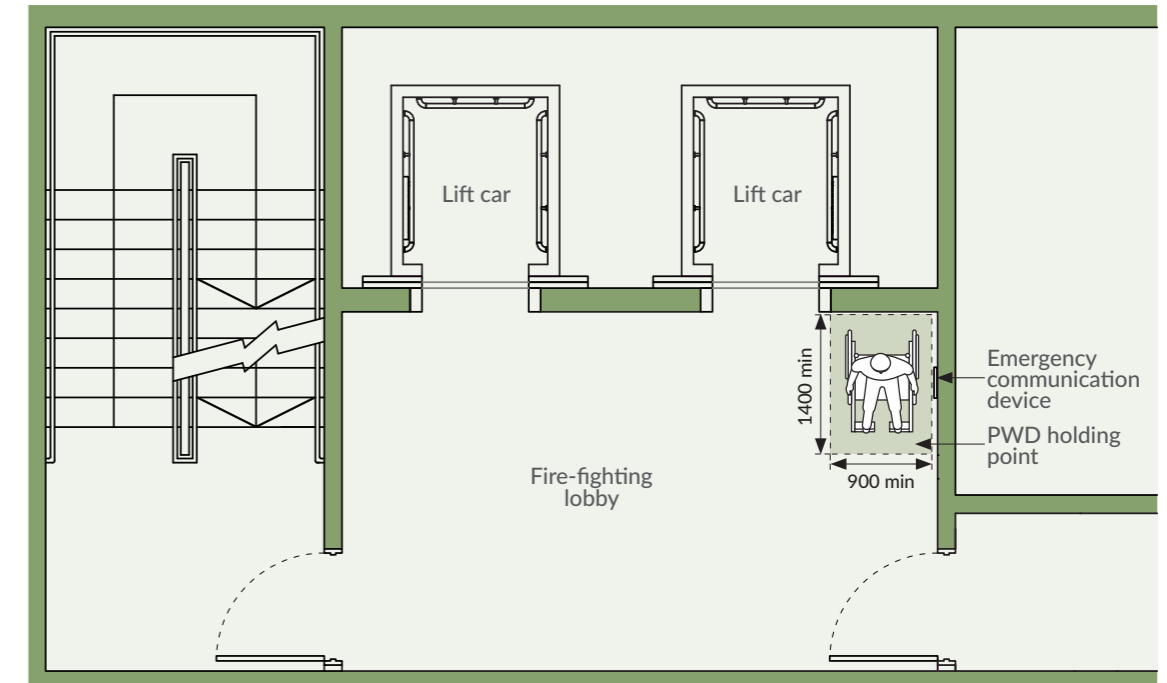


Figure 23a. PWD holding point within a fire-fighting lobby

- The means or device of communication should:
- Be located at between 800 mm to 1200 mm above the finished floor level.
  - Be appropriately labelled.
  - Be provided with prominently displayed and clear instructional signs on its operation.
  - When activated, generate a clear visual indication that the distress signal has been relayed.
- Directional signage should be provided and placed along the accessible routes to direct users to the PWD holding point.



### 3.2.5 Emergency Evacuation

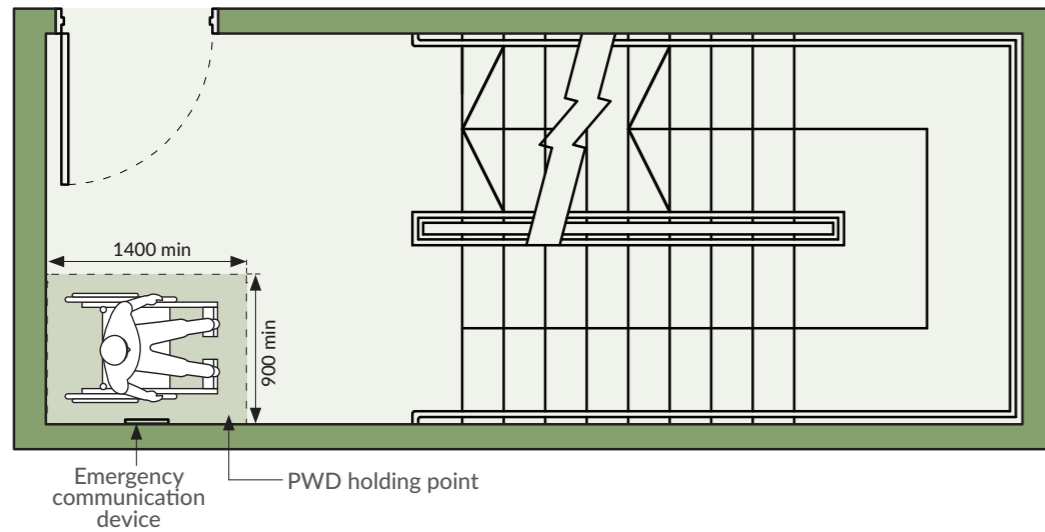


Figure 23b. PWD holding point inside an exit staircase

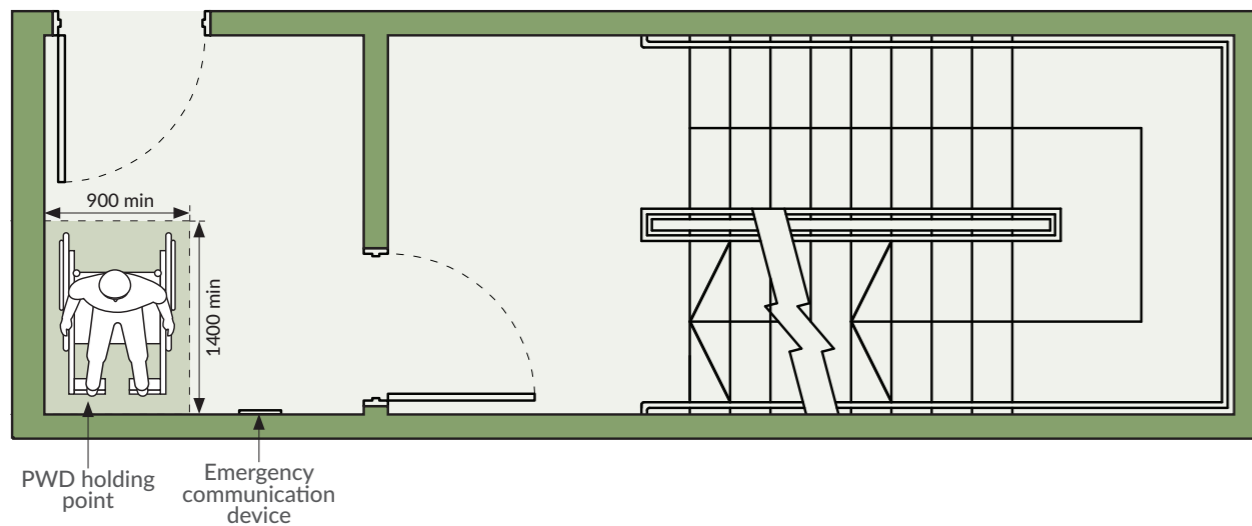


Figure 23c. PWD holding point within a smoke-stop lobby

### 3.2.6 Visual Alarms



Visual alarms are to be provided to alert persons with hearing impairment that the fire alarm has been activated.

- ➔ The visual alarms should be located within the line of sight in building spaces where persons with hearing impairment may be isolated.
- ➔ The visual alarms should be located at all areas including isolated spaces such as toilet cubicles, car parks and lift lobbies.
- ➔ Visual alarm devices can be provided in the form of a flashing beacon or strobe light for use in conjunction with conventional fire alarm systems.
- ➔ A visual information display system should be provided to supplement audio announcements made during emergencies. This will help alert persons with hearing impairment.



CHAPTER

04

# Sanitary Facilities

4.1 Planning and Design

4.2 Washroom Accessories

4.3 Urinals for the Ambulant Disabled

4.4 Water Closet Compartments for the Ambulant Disabled

4.5 Accessible Water Closet Compartments  
Within a Toilet Cluster

4.6 Accessible Individual Washrooms

4.7 Accessible Individual Washrooms for Assisted Use

4.8 Roll-in Shower Stalls for Wheelchair Users

## 4.1 Planning and Design



Photo: Doorless washroom entrance with no difference in level

Sanitary facilities should be designed to accommodate users of all ages, as well as persons with disabilities who may be independent, accompanied or assisted.

These facilities should be located in an accessible part of the building and at a convenient distance from the main entrance, waiting areas and other key facilities.

- Sanitary facilities should be located at every floor level for the convenience of all users.
- The total number of WC compartments should be provided based on demand and in accordance with the requirements of the NEA Code of Practice on Environmental Health (COPEH).
- The minimum number of ambulant disabled toilets and accessible toilets should be provided in accordance with the BCA Code on Accessibility in the Built Environment.
- The entrance to washrooms and communal changing areas should be designed without doors where possible, for the purpose of hygiene and ease of access. WC cubicles, urinals and mirrors should be placed away from the line of sight of the main entrance to ensure the privacy of users.
- Steps or a drop in level at the entrance and within the washroom should be avoided. Where a difference in level is unavoidable, it should be mitigated with a gentle ramp.

## 4.1 Planning and Design



Photo: No steps or drop in level at toilet entrance and within toilet area

- Sanitary facilities should be easily identifiable through well-placed signage, with clear indication of male, female, family-friendly or accessible facilities.
- Clear and simple symbols or words should be used on signs that indicate male and female washrooms. Colour distinctions between male and female, such as blue for male and pink for female, should preferably be provided as visual cues.
- A braille and tactile map, that indicates the location of basins, cubicles and urinals, should be provided on the entrance wall to the toilet.
- Braille and tactile toilet signs should be mounted on the wall next to the latch-side of the entrance door at a distance of 50 mm to 100 mm from the door jamb. They should not be mounted on the door as the sign might not be visible when the door is open.
- Entrance doors, where provided, should not swing into corridors, walkways and accessible routes.
- Non-slip floor finishes should be used in all toilets. Effective drainage should be provided to maintain a dry floor surface.

## 4.1 Planning and Design



Photos (above): Well-designed toilet with adequate illumination, non-slip floor finishes and well-placed toilet accessories; wash basin with grab bars



- ➔ Flooring should not be provided in black or very dark colours as this is not friendly to persons with reduced vision or those with dementia.
- ➔ Sufficient illumination should be provided where possible through the use of natural light. Illumination level is recommended to be at least 200 lux for artificial lighting.
- ➔ Switches for motion sensor lighting, when used within the accessible individual washroom or toilet compartment, should be appropriately located and easily activated by the movement of users in the toilet.

### Provision for Older Persons and the Ambulant Disabled

- ➔ At least one WC compartment should be designed for the ambulant disabled.
- ➔ Grab bars should be provided at the wash basin area to provide support for users in need.
- ➔ Where squatting pans are provided, grabs bars should be provided at appropriate heights and locations.

## 4.1 Planning and Design

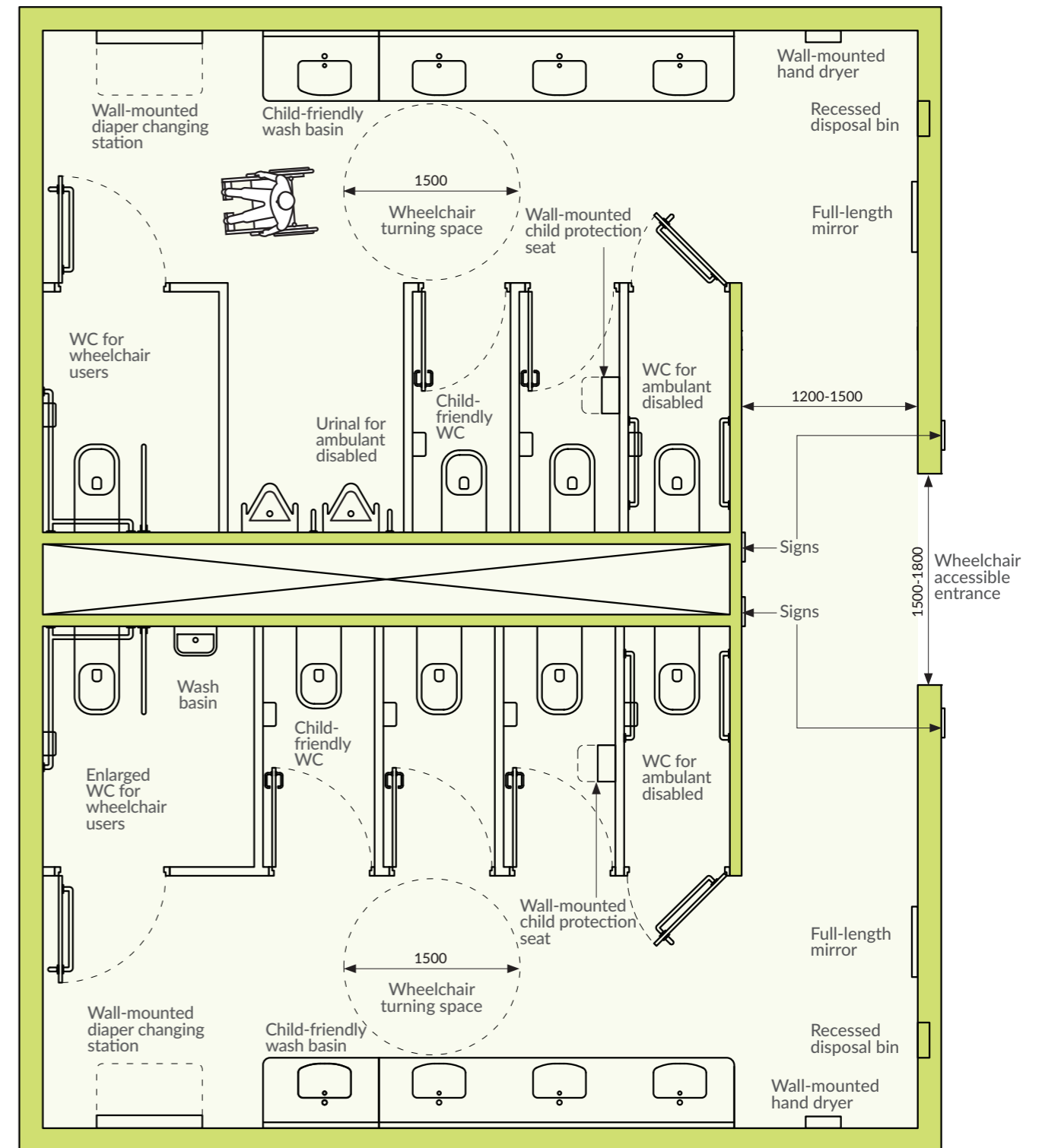


Figure 24. Layout plan of a toilet cluster

## 4.2 Washroom Accessories



**Photos (above):**  
Designated hooks for walking sticks and bags near wash basins; recessed hand dryers and waste bins; a pair of coat hooks in WC compartment

Toilet accessories are essential components for the functioning of sanitary facilities. They should therefore be installed at appropriate positions to ensure universal usage.

- Towel and soap dispensers, hand dryers, waste bins and sanitary bins should be provided in colours and tones that contrast with the walls and floors.
- Accessories should be installed in a manner that does not hinder the main circulation path within the toilet, and positioned such that the operable parts and controls are accessible.
- Hooks for walking sticks and bags should be provided near wash basins for the convenience of users.
- All compartments should be equipped with a coat hook at not more than 1500 mm from the finished floor level. Coat hooks should preferably be installed adjacent to the door and not on the door.

## 4.3 Urinals for the Ambulant Disabled



Urinals for the ambulant disabled should:

- Have grab bars on both sides of the urinal to provide standing support for older persons and the ambulant disabled.
- Have a clear floor space of 750 mm in width by 1200 mm in depth from the location of the grab bars.
- Be of the wall-hung, low-lip type, with a rim of not more than 400 mm from the finished floor level, so they can be used by young children as well.

## 4.4 Water Closet Compartments for the Ambulant Disabled



Photo: Sign for ambulant disabled

A water closet compartment for the ambulant disabled should:

- ➔ Have internal dimensions of a standard compartment with a minimum width of 900 mm.
- ➔ Have grab bars on both sides of the compartment to act as handhold for older persons or the ambulant disabled to stand.
- ➔ Be equipped with a door that provides a clear opening of at least 800 mm.
- ➔ Where its cubicle door opens outward, be carefully planned to minimise the risk of a person colliding with the door. Wherever possible, its door should open against an adjacent wall.
- ➔ Where its cubicle door swings inward, have a minimum clear space of 500 mm in diameter from the edge of the water closet.
- ➔ Be capable of being locked from the inside by a device that is operable with one hand, and which does not require fine finger control, tight grasping, pinching or twisting of the wrist.
- ➔ Have an ambulant disabled sign placed on the outside of its door indicating that the compartment is suitable for use by persons who require the support of grab bars.

## 4.4 Water Closet Compartments for the Ambulant Disabled

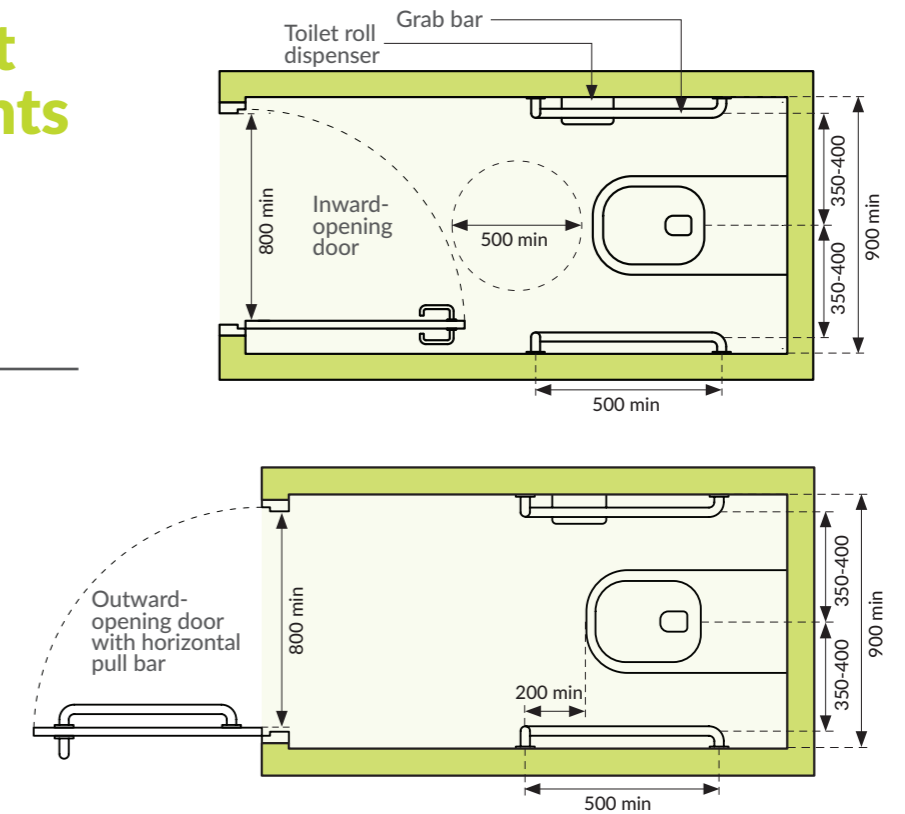


Figure 25. Plan view of water closet compartments for the ambulant disabled with either an inward- or an outward-opening door

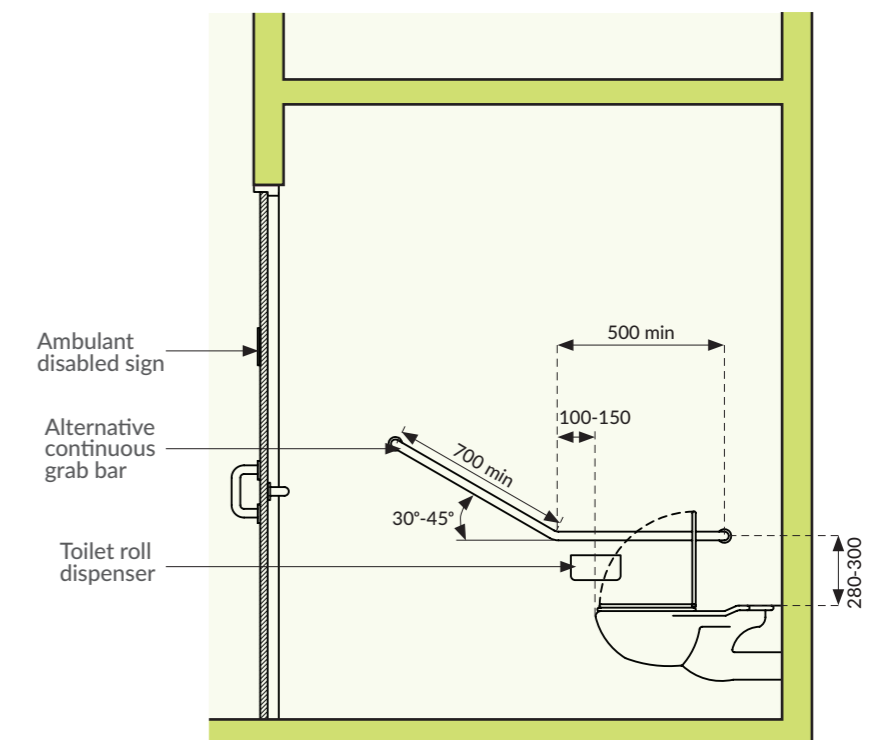


Figure 26. Side elevation of a water closet compartment for the ambulant disabled

## 4.5 Accessible Water Closet Compartments Within a Toilet Cluster

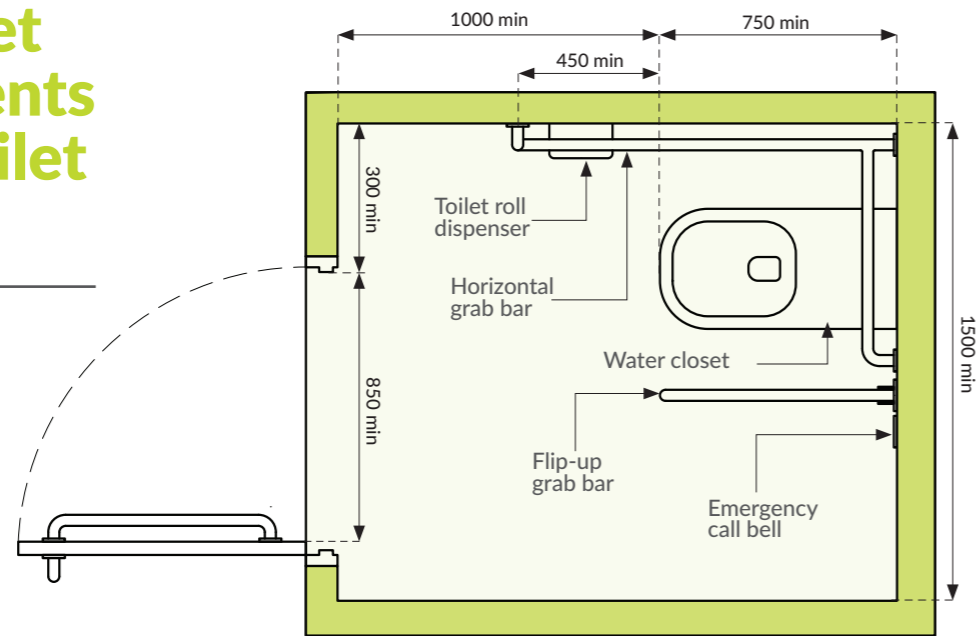


Figure 27. Accessible water closet compartment

An accessible water closet compartment within a toilet cluster should:

- Have clear internal dimensions of at least 1750 mm by 1500 mm.
- Have a door that is easy to operate without the need of strong finger force.
- Be equipped with grab bars.
- Be equipped with an emergency call bell.
- A water closet with sensor-controlled flushing system is preferred.
- Be equipped with two coat hooks mounted on a side wall at two different heights of about 1500 mm and 1100 mm from the finished floor level.
- Be equipped with a self-closing water spray head connected by a flexible hose beside the water closet seat for cleaning purposes.
- Have a toilet roll dispenser that is reachable and does not interfere with the use of grab bars.
- Have at least one basin that is accessible to wheelchair users. Where space permits, a small basin adjacent to the WC within the compartment should be provided for the convenience of the user.

## 4.6 Accessible Individual Washrooms



Photo: Sign for accessible individual washroom with braille markings

At least one unisex accessible toilet should be provided at each floor level of a building and should be clearly identified. Its provision will allow caregivers of the opposite sex to access the sanitary facility together with those who need assistance.

For buildings with higher user traffic, one separate unisex toilet should be provided within a travelling distance of 100 m where possible.

- The corridor leading to the accessible WC compartment should be at least 1200 mm in width, with adequate manoeuvring space for a wheelchair to manoeuvre or turn and for another wheelchair to pass by.
- The layout of sanitary equipment and other fittings should facilitate ease of use by wheelchair users. The design should take into consideration their special needs.

An accessible individual washroom should:

- Have adequate internal dimensions for ease of manoeuvring and use of the facilities.
- Have a door that is easy to operate without the need of strong finger force.
- Be equipped with grab bars.
- Be equipped with an emergency call bell.

## 4.6 Accessible Individual Washrooms

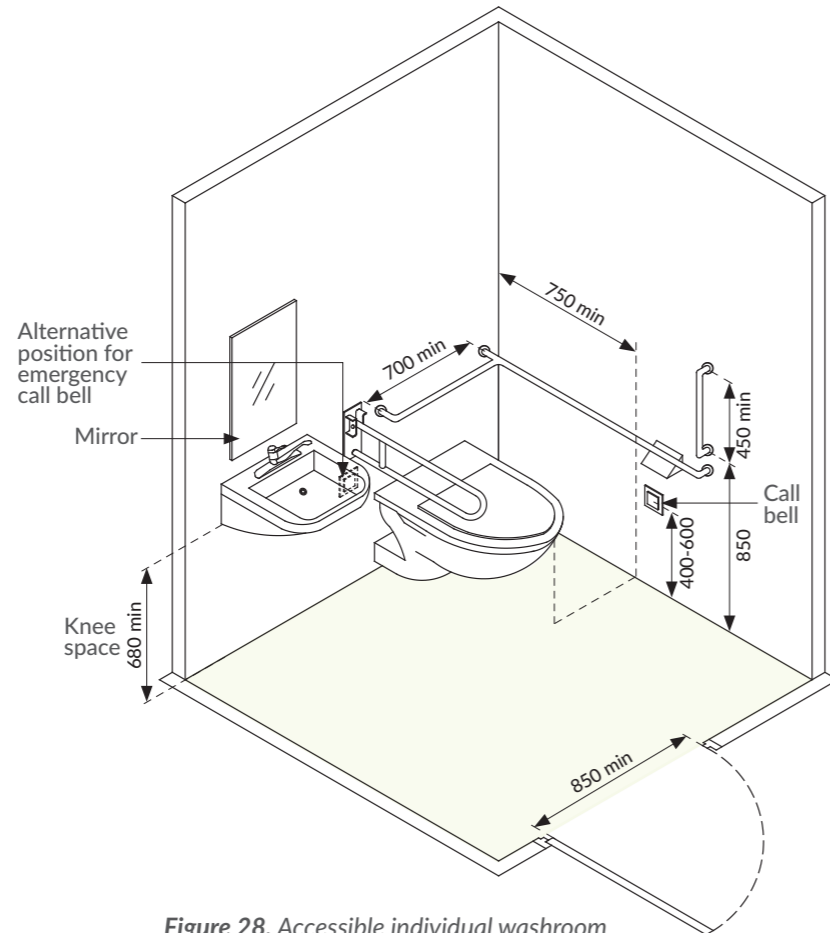


Figure 28. Accessible individual washroom

- ➔ Preferably have a water closet with sensor-controlled flushing system.
- ➔ Have a minimum dimension of 750 mm from the front of the WC pan to the rear wall of the compartment for ease of transfer between the wheelchair and the toilet seat.
- ➔ Have a wash basin at a location that is convenient for users.
- ➔ Have soap and paper towel dispensers placed in close proximity to the accessible wash basin to avoid having users manoeuvre the wheelchair with wet hands.
- ➔ Be equipped with two coat hooks mounted on a side wall at two different heights of about 1500 mm and 1100 mm from the finished floor level.
- ➔ Be equipped with a self-closing water spray head connected by a flexible hose beside the water closet seat for cleaning purposes.
- ➔ Have a toilet roll dispenser that is easy to reach and does not interfere with the use of the grab bars.
- ➔ Provide a mirror that is positioned above the wash basin and at an inclined angle accessible to wheelchair users.
- ➔ Have light switches or any other control buttons at a height of between 800 mm to 1200 mm.

## 4.7 Accessible Individual Washrooms for Assisted Use



Some adults and children with significant mobility and coordination difficulties may need to be laid flat in order to be changed by caregivers.

The facilities should be arranged to provide sufficient space around the changing bench and WC for wheelchair users and their caregivers to manoeuvre around.

Facilities for assisted changing should:

- ➔ Have clear internal dimensions of at least 2500 mm by 2500 mm.
- ➔ Be equipped with grab bars.
- ➔ Have a free-standing or wall-mounted fold-down adult-sized changing bench of at least 1800 mm in length.
- ➔ The changing bench should have a comfortable surface that is suitable for changing and easy to clean.



## 4.7 Accessible Individual Washrooms for Assisted Use

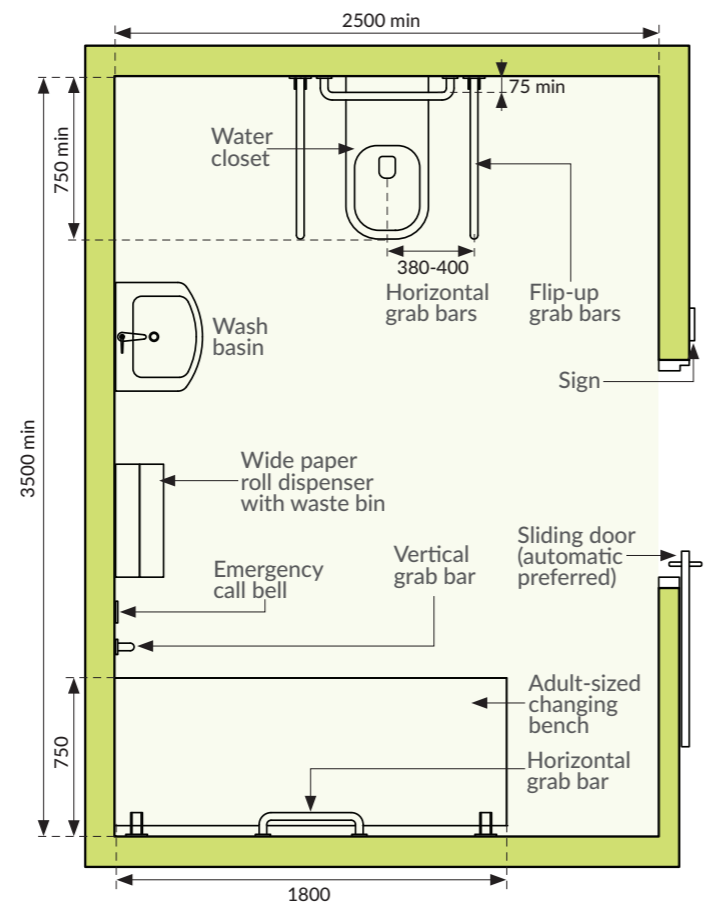
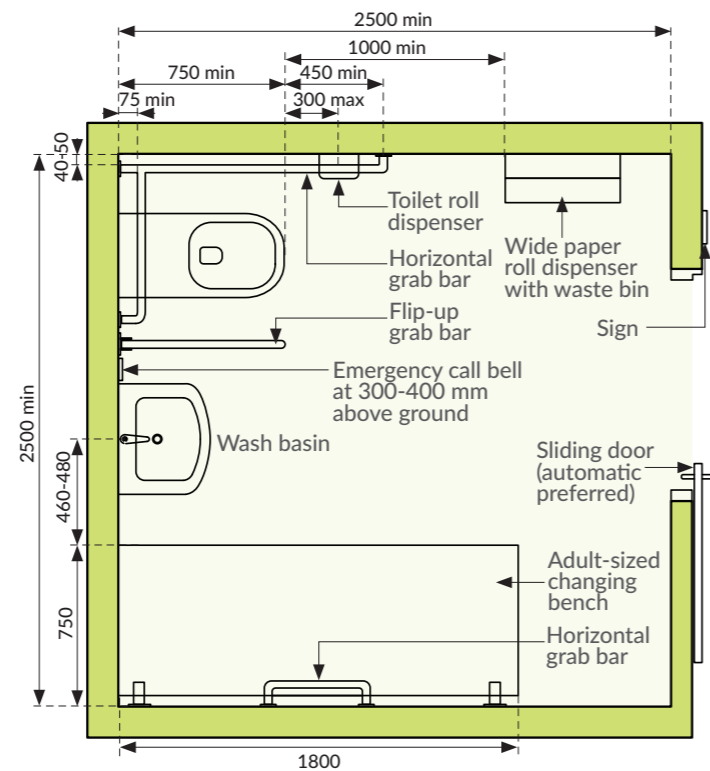


Figure 29. Plan view of two types of accessible individual washroom for assisted use

- ➔ A dispenser with a wide paper roll and a large waste disposal bin should be provided.
- ➔ Toilet accessories should be positioned where it can be easily reached by a caregiver, as well as by a person seated on the WC.
- ➔ The provision of a curtain that can be drawn around the WC area should be considered as this ensures privacy for both the user and the caregiver.
- ➔ Automatic sliding doors should be used where possible.

## 4.8 Roll-in Shower Stalls for Wheelchair Users



- ➔ Wheelchair-accessible or roll-in showers are preferred for users who need to shower from either a seated position, a wheelchair or a bath seat.
- ➔ A roll-in shower should have internal dimensions of at least 1500 mm by 1500 mm and should be equipped with vertical and horizontal grab bars.
- ➔ Adequate space should be provided in the shower compartment for a built-in, free-standing or adjustable wall-mounted seat.
- ➔ Effective visual contrast with the background surface should be provided for the shower seat, grab bars and other accessories, such as towel rails, clothes hooks and mirrors.
- ➔ A well-drained, level and slip-resistant floor surface should be provided.

## 4.8 Roll-in Shower Stalls for Wheelchair Users

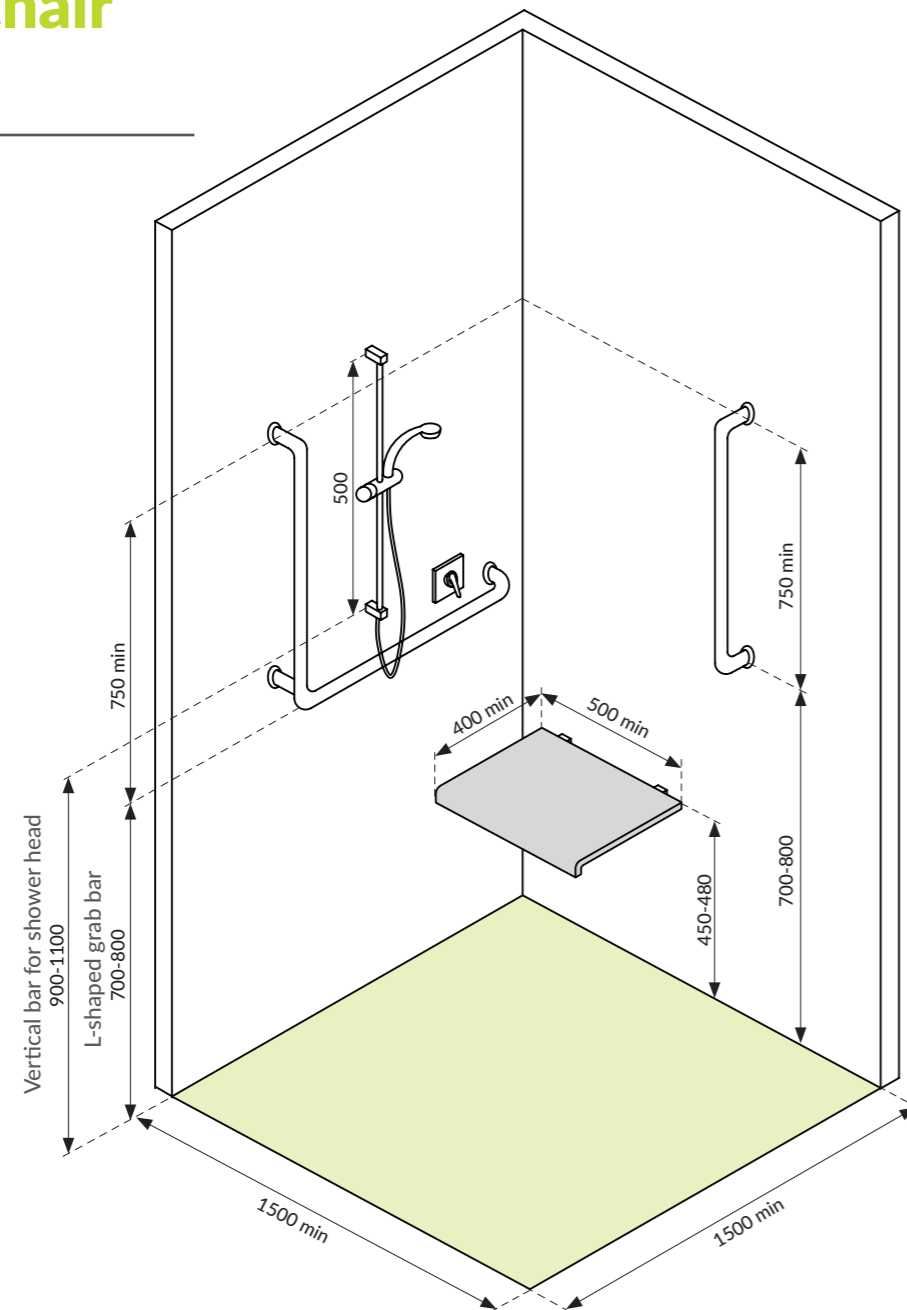


Figure 30. Roll-in shower stall for wheelchair users

### 4.8.1 Shower Seats



- ➔ A shower seat should:
  - Have rounded edges and self-draining, slip-resistant surface.
  - Have minimum dimensions of 500 mm in width by 400 mm in depth for use in either a roll-in shower or an accessible individual washroom with shower facility.
  - Have its seating surface located at between 450 mm to 480 mm from the finished floor level.
  - Be installed on the wall nearest to the controls.
- ➔ For wall-mounted seats, the back wall should be structurally reinforced to provide support. The seat should be able to take a static weight of at least 150 kg.
- ➔ A second fold-down seat may be provided away from the shower for users to dry and change themselves.

## 4.8.2 Tap Controls



Shower and tap controls should be set towards the outside of the bathtub or shower to minimise stooping and bending by the user.



Taps and other controls should have a clear colour contrast and embossed signs indicating hot and cold water supply.



## 4.8.3 Grab Bars



Grab bars should be L-shaped at the shower control wall and placed at the height of between 700 mm to 800 mm from the finished floor level.



The vertical part of the grab bars should be at least 750 mm in height, while their horizontal part should be at least 750 mm in length.



The horizontal part of the grab bars should preferably extend to the adjacent wall where the shower seat is located.



## 4.8.4 Shower Heads



Shower heads and any other discharge points should be positioned away from the bathroom door.



A shower head with adjustable height is recommended. It should also be provided with a flexible hose of at least 1500 mm in length.



Where shower heads are mounted on a vertical bar, the bar should have a minimum length of 500 mm, with its lower end placed at a height of between 900 mm to 1100 mm above the finished floor level. It should be installed without obstructing the use of the grab bars.



CHAPTER

# 05

# Wayfinding and Information Systems

- 5.1 Orientation
- 5.2 Signage

## 5.1 Orientation



A well-designed building layout, with clear circulation routes that are easy to follow, will help people navigate to their destinations.

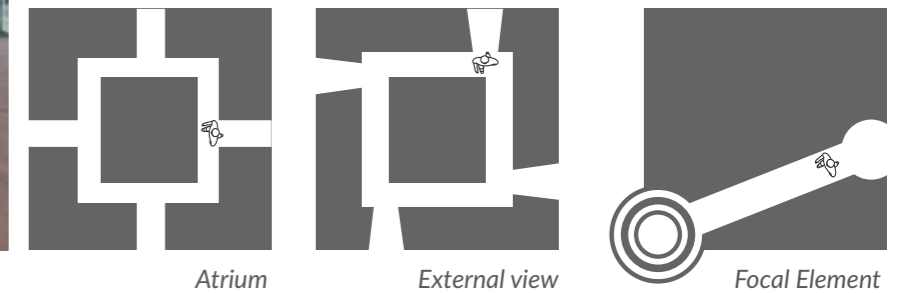
Architects and designers are encouraged to provide, in addition to a good spatial design, clear physical and visual cues for orientation throughout the building.

Refer to Singapore Standard, SS 599 : 2014 Guide For Wayfinding Signage In Public Areas for more information.

## 5.1 Orientation



**Photos (above):**  
Wayfinding cues on the floor leading to a lobby entrance; water feature serving as an orientation device



**Figure 31.** Plan view of three types of reference points used for effective orientation.

A holistic system of wayfinding cues and focal nodes should be incorporated into the design to aid users in orientation.

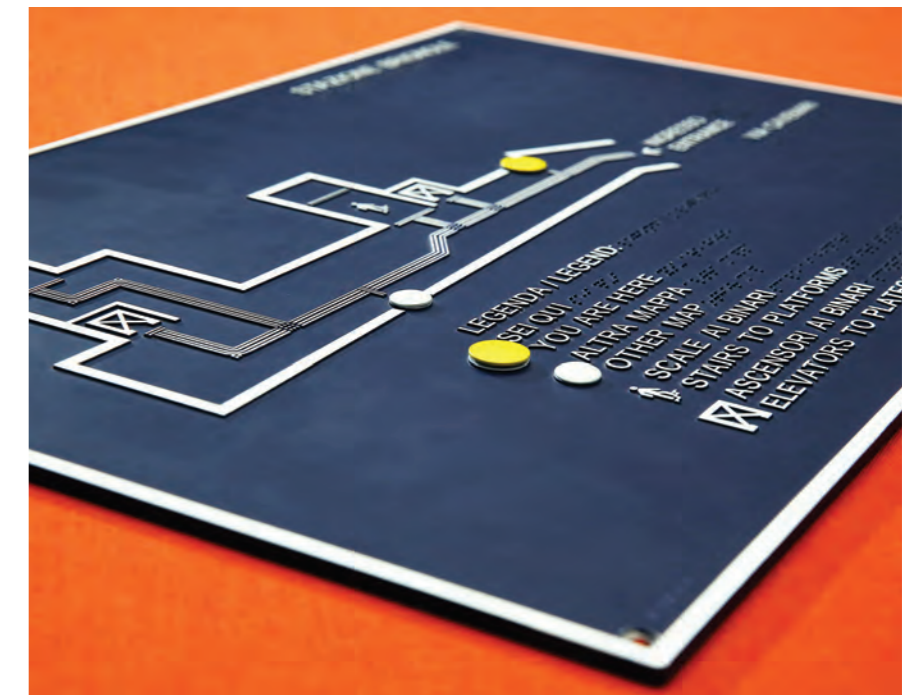
- ➔ Sufficient directional cues should be provided at visible locations to orientate users upon entry.
- ➔ Visual reference points are recommended to facilitate orientation. Atriums, external views, and focal elements such as sculptures and architectural features, are effective cues.
- ➔ Dead end spaces should be avoided where possible. Adequate space should be provided for a wheelchair user to make a turn where dead end spaces are unavoidable.
- ➔ Wayfinding cues through the use of colour patterns and signage on the floor leading to escalators, staircases, lift lobbies and washrooms are recommended for large and complex buildings.

## 5.2 Signage



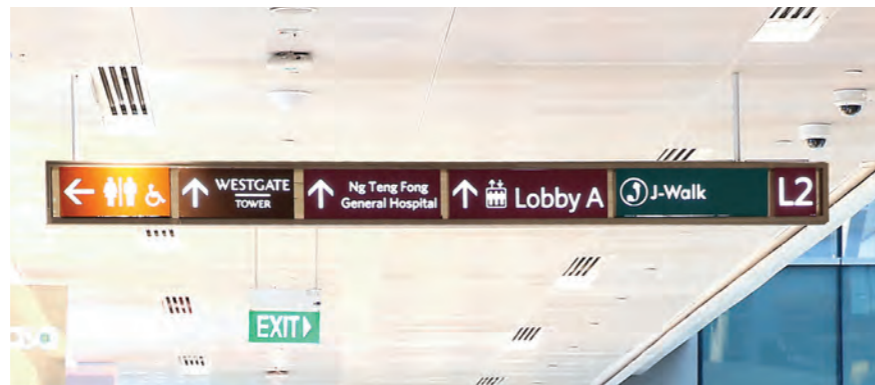
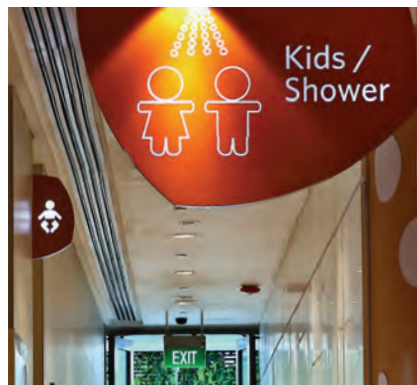
In larger developments, there may be circumstances where the spatial layout is complex. Where this occurs, it is necessary to introduce directional signage to aid users in location identification and wayfinding.

## 5.2 Signage



- ➔ A building directory with maps should be prominently displayed at the entrance lobby and be clearly visible upon entry.
- ➔ Braille directions and maps showing the building layout should be incorporated into the building directory.

## 5.2 Signage



- ➔ Directional and service identification signs incorporating the International Symbol of Access should be displayed at main lobbies and passageways, and at points where there is a change of direction. This will help direct users to the various facilities and destinations in the building, such as lifts, entrances, telephone booths, toilets and vehicle parks.

## 5.2 Signage



Appropriate, well-designed signs should:

- ➔ Display clear and concise information.
- ➔ Have characters that are easy to read and sized in proportion to the intended viewing distance.
- ➔ Have symbols or pictographs that are easy to understand and sized in proportion to the intended viewing distance.
- ➔ Have good colour contrast between the characters and the background.
- ➔ Be accompanied with good illumination of at least 200 lux.
- ➔ Be mounted at a height of about 2100 mm for clear visibility.
- ➔ Be multilingual.
- ➔ Be placed at key decision points.



CHAPTER

# 06

# Facilities and Elements Within the Building

- 6.1 Illumination
- 6.2 Controls and Operating Mechanisms
- 6.3 Service and Information Counters
- 6.4 Hearing Enhancement Systems
- 6.5 Resting Areas
- 6.5 Drinking Fountains
- 6.6 Public Telephones



## 6.1 Illumination



Good illumination is essential for everyone. It enables people to move around safely and independently.

- ➔ An adequate and uniform level of illumination should be provided. Extreme or abrupt differences in the level of brightness should be avoided.
- ➔ Artificial lighting should be sufficiently bright, but not cause glare or shadows that may give rise to optical illusions.
- ➔ Older persons may require two to three times more illumination due to eyesight degeneration.

To achieve adequate illumination, the lighting levels for different types of spaces and activities are recommended in Table 03 below:

Type of Spaces/ Activities	Lux Level
Entrance foyers	200
Circulation areas and corridors	200
Stairs and escalators	200
Toilets	200
Retail sale areas (small)	300
Retail sale areas (large)	500
Restaurant dining areas	200
Reception and information desks	300 - 500

**Table 03.** Lighting levels for different types of spaces and activities

Refer to Singapore Standard. SS 531 : Part 1: 2006 Code of Practice for Lighting of Work Places for more information.

## 6.2 Controls and Operating Mechanisms



Operating controls and devices should be designed to ensure independent and safe operation by users.

The operating controls and devices include:

- ➔ Door handles and locks.
- ➔ Levers and mixer taps.
- ➔ Activation devices, vending machines and vehicle park auto-pay machines.
- ➔ Window openers and locks.
- ➔ Electrical outlets and switches.

## 6.2 Controls and Operating Mechanisms

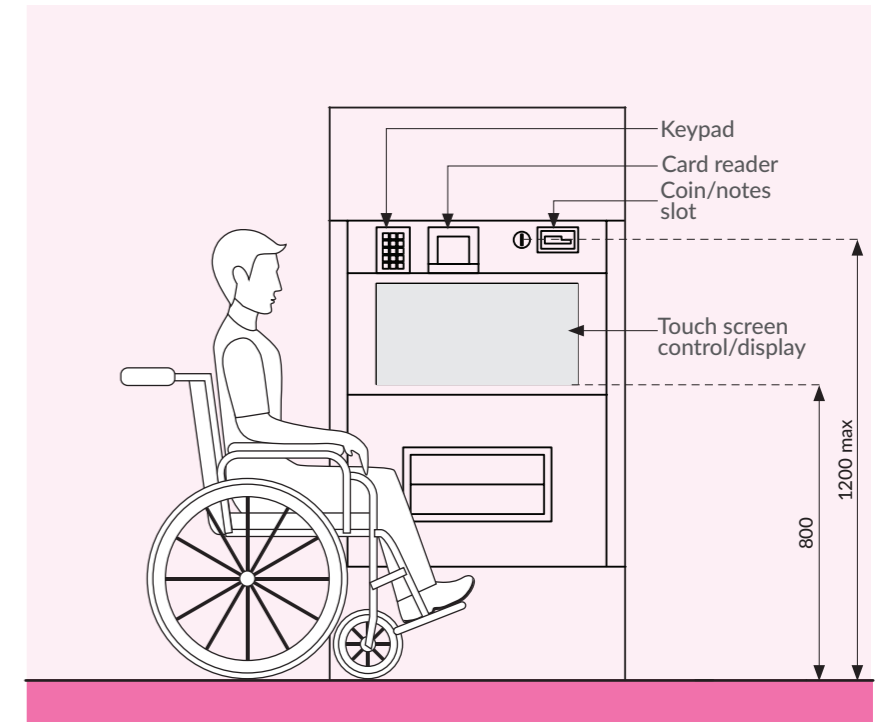


**Photo (above):**  
Controls and operating mechanisms with contrasting colours, as well as clear and logical instructions

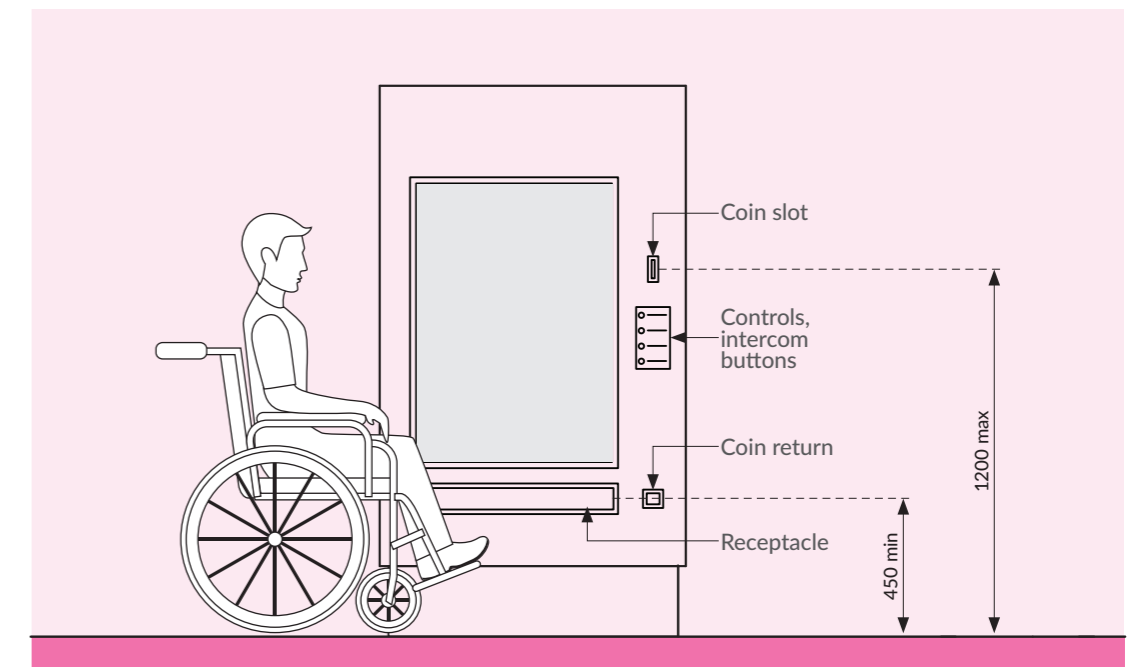


- ➔ Controls and operating mechanisms should be located adjacent to a clear and level floor space of at least 900 mm by 1200 mm.
- ➔ Controls and operating mechanisms should be mounted at a height of between 450 mm to 1200 mm from the finished floor level.
- ➔ Keypads, card readers and intercom buttons should be provided at a height of between 800 mm to 1200 mm from the floor level.
- ➔ The operable part of controls should be of a type that does not require tight grasping, pinching or twisting of the wrist and is easily operable by one hand with a force of 22 N or less.
- ➔ The colours of controls and operating mechanisms should contrast with their background so that they can be seen clearly by older persons with reduced vision.
- ➔ Instructions should be clear and logical, incorporating pictograms in addition to text, where possible.
- ➔ Controls and operating mechanisms should be capable of being illuminated to at least 100 lux.

## 6.2 Controls and Operating Mechanisms

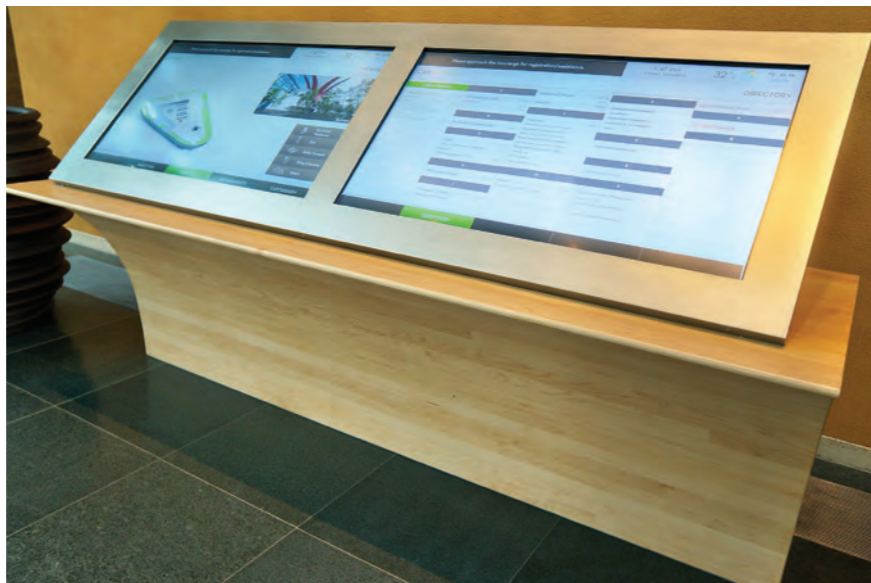


**Figure 32a.** Front elevation of vehicle park auto-pay machine showing the height of its controls and mechanisms within reach of wheelchair user



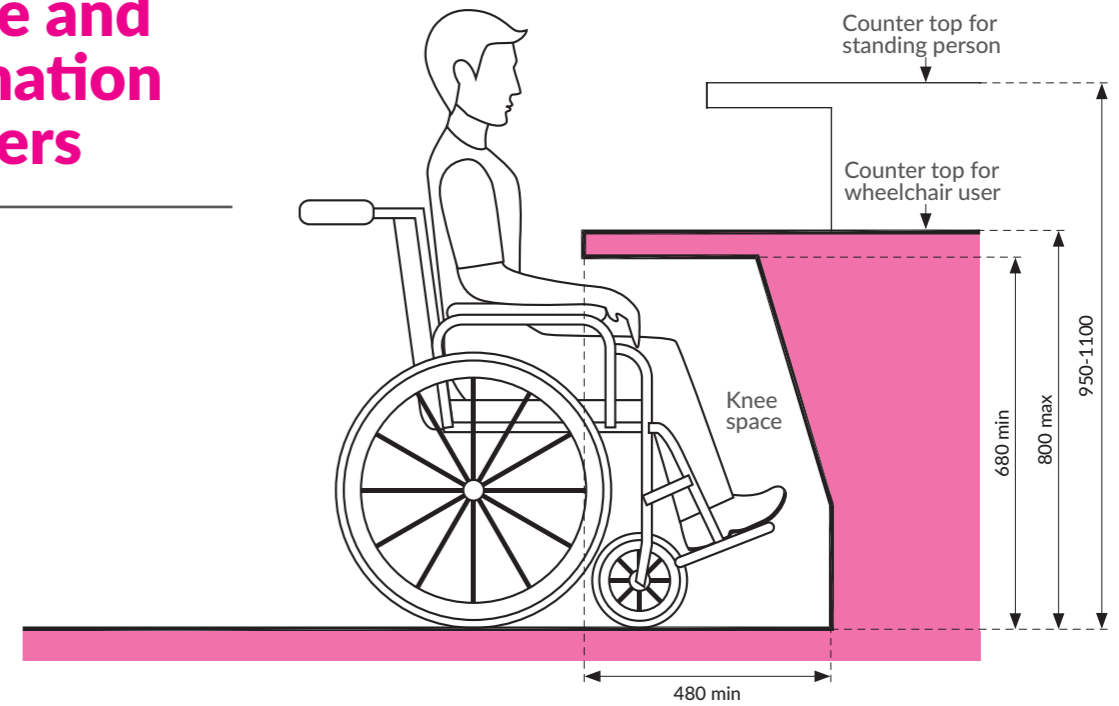
**Figure 32b.** Front elevation of vending machine showing the height of its controls and operating mechanisms of vending machine within reach of wheelchair user

## 6.3 Service and Information Counters



*Photos (right): Accessible service counter of a lower height for wheelchair users; accessible service counter with HES; information display counter with ample knee space for wheelchair users*

## 6.3 Service and Information Counters



*Figure 33. Side elevation of accessible service counter*

Service and information counters should be strategically located and easily identifiable from the main building entrance. Users should be able to approach the counters directly without obstruction.

Information provided at the counters should be available in a variety of formats to cater to users of different needs and abilities.

- ➔ Where service counters are provided, part of the counter should not be more than 800 mm above the finished floor level.
- ➔ A knee space of 680 mm in height and 480 mm in depth should be provided below the countertop so that wheelchair users can access the counter surface.
- ➔ A hearing enhancement system, along with clear signage or a symbol, should be provided.
- ➔ Where information display counters are provided, the bottom edge of the counter should be at a height of between 700 mm to 800 mm above the floor and tilt at an angle of between 30° to 45°.

## 6.4 Hearing Enhancement Systems



A hearing enhancement system enables sound signals to be transmitted to a person with hearing impairment and older persons with hearing aids without the interference of background noise or excessive reverberation.

- ➔ A hearing enhancement system appropriate for the situation and purpose should be provided at:
  - Service and information counters for the public.
  - Function rooms, halls and auditoriums that are used for meetings, lectures, performances or media broadcast.
- ➔ Hearing enhancement systems that operate with induction loop, infrared and radio frequency are commonly used to provide an enhanced level of sound.
- ➔ The international symbol of access for hearing loss should be conspicuously displayed at places where hearing enhancement systems are available.

## 6.5 Resting Areas



Besides the ease of accessibility, the comfort and resting needs of users travelling along a circulation path should also be taken into design consideration. It is important for sufficient seats to be provided so that users can pause and rest.

- ➔ Seats should be provided at frequent intervals of not more than 50 m.
- ➔ The number of seats needed should be determined by usage practicalities and volume of traffic flow.
- ➔ Designated resting areas should be easily accessible and visually linked to the main accessible pathways.



Photos: Seats of varying heights for different users

Recommended Maximum Distance Without a Rest	
Mobility Difficulties	Distance
People with visual difficulties	150 m
Wheelchair users	150 m
People with ambulatory difficulties without walking aid	100 m
People using walking aid, e.g. walking stick	50 m

Table 04. Recommended maximum distance without a rest<sup>1</sup>

## 6.5 Resting Areas

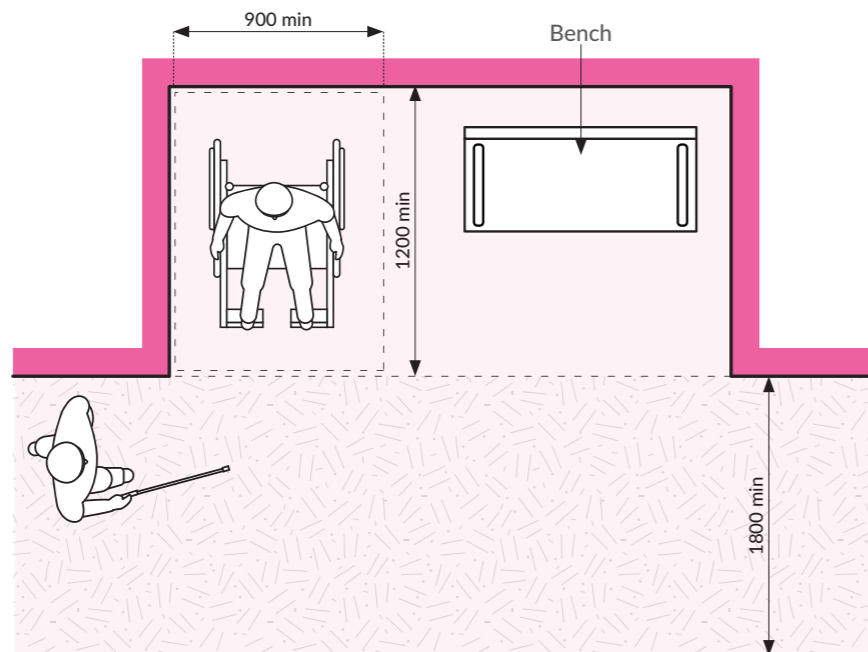


Figure 34. Plan view of recessed seating with wheelchair space along circulation path

- Seats should not have protruding corners and edges, and should be placed at locations that do not obstruct the main accessible route.
- Seats should be placed away from a parapet wall or balustrade that overlooks a void to ensure user safety.
- Seats of different styles and heights should be provided to suit the needs of different users.
- A wheelchair space of at least 900 mm by 1200 mm should be provided beside the seat.

## 6.5 Resting Areas

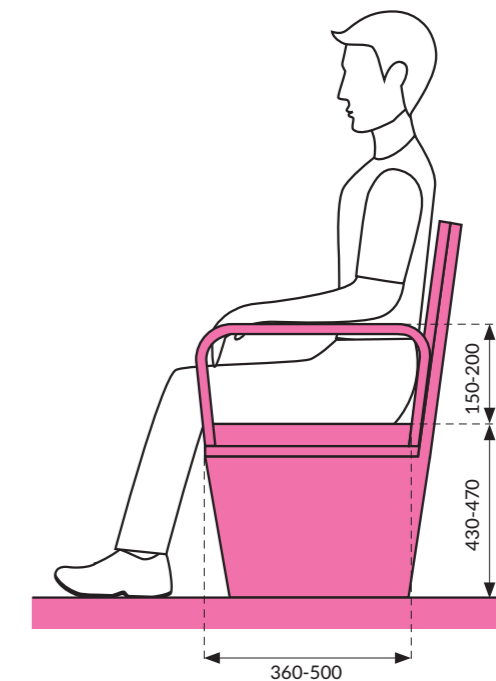


Figure 35. Seat with appropriate armrests and backrest

- Seats should be provided with a height of between 430 mm to 470 mm and a depth of between 360 mm to 500 mm, as this tends to be more comfortable for older people with mobility difficulties.
- Seats should also be provided with armrests and backrest to assist older persons and those with mobility difficulties with sitting down and standing up.
- The height of the armrests should be between 150 mm to 200 mm above the seat and extend to the front of the seat.

## 6.6 Drinking Fountains

The provision of two drinking fountains at different heights brings convenience to standing adults, wheelchair users and children.

Where drinking fountains are provided, the fountain spout should:

- ➔ Have an opening located between 750 mm to 800 mm from the floor or ground surface.
- ➔ Be located at the front of the unit.
- ➔ Direct the water flow in a trajectory that is parallel or nearly parallel to the front of the unit.
- ➔ Provide a flow of water at least 100 mm high to allow for the insertion of a cup or a glass.
- ➔ Be activated by controls at or near the front of the fountain.

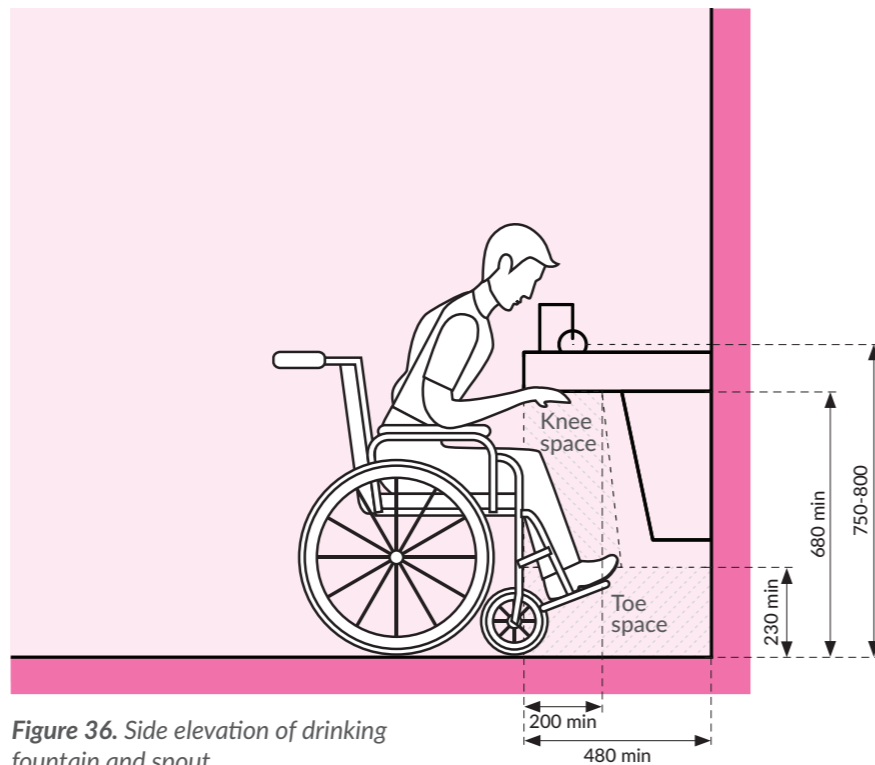


Figure 36. Side elevation of drinking fountain and spout

## 6.7 Public Telephones

- ➔ A seat adjacent to the telephone should be provided for the ambulant disabled, but should not impede the wheelchair user's approach to the telephone.
- ➔ A clear floor space of at least 900 mm in width and 1200 mm in depth should be provided in front of the telephone booth or counter.
- ➔ Counter tops, where provided, should be between 700 mm to 800 mm above the floor level and have a minimum clear knee space of 680 mm.
- ➔ The depth of the counter top should be at least 480 mm.
- ➔ All operable parts of the telephone should be between 800 mm to 1200 mm in height.

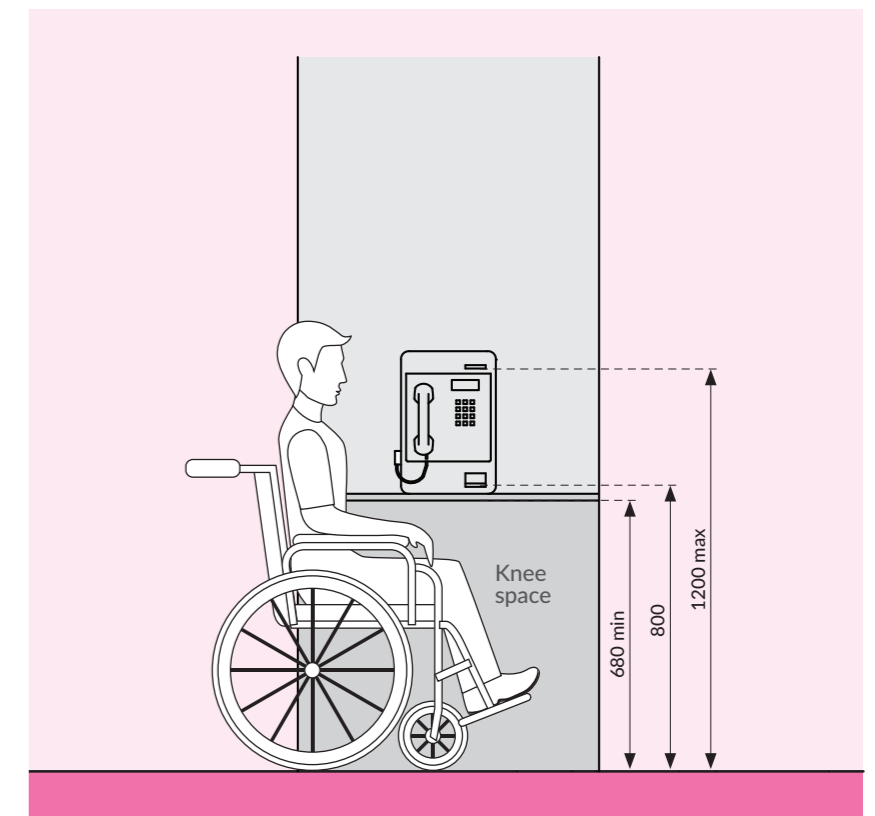


Figure 37. Side elevation of telephone booth



CHAPTER

07

# Family-Friendly Facilities

---

7.1 Lactation Rooms

7.2 Child-Friendly Sanitary Facilities

7.3 Family Washrooms

7.4 Other Family-Friendly Provisions

## 7.1 Lactation Rooms



A lactation room is a dedicated enclosed place where mothers can breastfeed their babies or express milk in a private and comfortable environment.

A lactation room should be equipped with:

- ➔ Comfortable seating, preferably armchairs or similar.
- ➔ Diaper changing stations.
- ➔ Waste containers for the disposal of used diapers.
- ➔ Wash basins with liquid detergent and paper towels.
- ➔ Dispensers for hot and cold water.
- ➔ Vending machines for beverages and diapers.
- ➔ Electrical outlets for breast pumps.
- ➔ Mirrors.

## 7.1 Lactation Rooms



- ➔ The number of lactation rooms provided should be based on the scale of the building and the needs of its users.
- ➔ Lactation rooms should comprise a separate cubicle with door lock and be made available to breastfeeding mothers only.
- ➔ Lactation rooms should be:
  - Located near public amenities and easily accessible.
  - Separated from toilets for hygiene reasons.
  - Well-illuminated and well-ventilated.
  - Safe for infants and young children.



## 7.2 Child-Friendly Sanitary Facilities



Child-friendly sanitary facilities should be provided in public places that are frequented by families with young children. They could be provided as an individual family washroom or incorporated within both the male and female toilet clusters.

### 7.2.1 Water Closets



- At least one child-sized water closet should be provided in each of the male and female toilets. The water closet seat should be at a height of between 250 mm to 350 mm from the finished floor level.
- A seat adaptor with a small seat cover suitable for use by young children may be provided for existing buildings under exceptional circumstances. The hanger holding the seat cover should be mounted at a level that is easily accessible to young children. A portable and stable stool should also be provided as a stepper for young children who may not be able reach the water closet.
- Bath liquid dispensers and a flexible hose with water spray head should be provided in the water closet compartment so that parents or guardians are able to clean their child.

## 7.2.2 Urinals



- ➔ At least one urinal mounted at a height of about 400 mm from the finished floor level should be provided in the male toilet for young children.

## 7.2.3 Wash Basins



- ➔ A child-sized wash basin should be provided to allow young children to wash their hands without assistance. The wash basin should be equipped with sensor-operated taps. The height of the wash basin should be at about 550 mm from the finished floor level.

## 7.2.4 Child Protection Seats

A child protection seat should be provided in one of the water closet compartments for both male and female toilets. This will allow parents to seat their baby safely in the washroom with them.

A child protection seat should:

- ➔ Be equipped with straps that can be extended over shoulders and between legs to ensure the safety of the baby.
- ➔ Be mounted on a solid wall for stability.
- ➔ Be able to accommodate a child weighing up to about 20 kg.
- ➔ Be mounted with its bottom at least 400 mm above the finished floor for easy reach and with adequate space for parents to manoeuvre around the seated child.



Figure 38. Front elevation of child protection seat in WC compartment

Photos (above): Two types of child protection seats: corner-mounted and wall-mounted

## 7.2.5 Diaper Changing Stations



Photos (right):  
Closed and open view of  
diaper changing station

- ➔ A diaper changing station should be provided within every family washroom for use by either parent and in every cluster of toilets for both male and female toilets.

A diaper changing station should:

- ➔ Be stable and equipped with safety straps and barriers lengthwise to ensure the safety of the infants.
- ➔ Have a concave changing surface to ensure comfort and protection of the child.
- ➔ Withstand a static weight of about 130 kg.
- ➔ Be mounted such that the highest edge, or the lip, of the pull-down deck is between 700 mm to 850 mm above the finished floor level when open.
- ➔ Be provided with clear instructions to facilitate safe use.
- ➔ Be provided together with dispensers for bed linens and wet wipes for hygiene purposes.

## 7.2.6 Signage



Photos (above):  
Signage for family-friendly facilities



- ➔ Appropriate directional and service identification signs should be displayed to identify the location of family-friendly facilities.

## 7.2.7 Floor Finishes

- ➔ Non-slip flooring should be provided in toilets and washrooms to ensure the safety of children.
- ➔ Refer to Table 01 under 3.1.2 Slip Resistance Of Floor Finishes for more information on the grading of various slip-resistant materials.

## 7.3 Family Washrooms

A family washroom will benefit a wide range of users, including parents attending to their infants, and young children who need assistance with their toilet activities.

The family washroom should be equipped with:

- ➔ A wash basin with liquid detergent and paper towels.
- ➔ A child-sized water closet and wash basin.
- ➔ Mirrors.
- ➔ A diaper changing station.
- ➔ A child protection seat.
- ➔ A vending machine for sanitary napkins and diapers.
- ➔ Space for baby carriage parking.

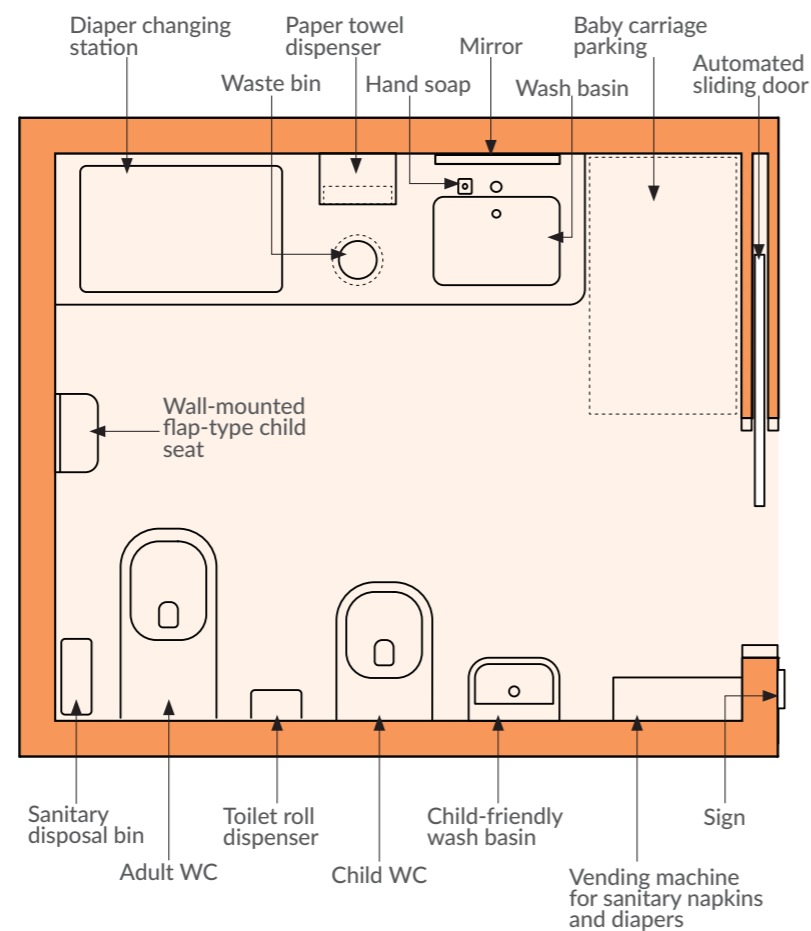


Figure 39. Family washroom with child WC, child protection seat and diaper changing station

## 7.4 Other Family-Friendly Provisions



The provision of the following family-friendly facilities and features are also recommended to allow families with infants and young children greater ease of movement around the premises.

## 7.4.1 Children's Activity Corners and Playrooms



- Outdoor or indoor play equipment for children of various ages and abilities should be provided.
- The floor surface of the children's play area should be cushioned and shockproof to reduce the impact of any fall.
- Adequate seats should be provided near the play equipment for parents supervising their children.

## 7.4.2 Locker Provisions



Depository services for baby carriages or lockers large enough to accommodate baby carriages should be provided at the main entrance. This will allow families to deposit their baby carriages and other heavy belongings.



Baby carriage lockers should be of at least 1000 mm in height, 500 mm in width and 500 mm in depth.



## 7.4.3 Rental Facilities for Baby Carriages and Wheelchairs



- Rental facilities for baby carriages, child buggies and wheelchairs should be considered where applicable.
- The provision of baby carriages and child buggies will allow families with infants and young children greater ease of movement around the premises.
- The provision of wheelchairs would enable older persons and the ambulant disabled to move comfortably around the premises.



CHAPTER

08

# Design Requirements for Specific Building Types

- 8.1 Public Transport Buildings
- 8.2 Hawker Centres and Food Outlets
- 8.3 Supermarkets and Retail Outlets
- 8.4 Community Clubs
- 8.5 Precinct Facilities in Public Housing
- 8.6 Parks and Open Spaces

# 8.1 Public Transport Buildings



A holistic public transport system helps people move about to engage in meaningful activities in everyday life. To ensure that users can commute easily, safely and comfortably, public transport buildings need to be well-planned.

## 8.1.1 Access



- All access routes into the public transport building should be made accessible to wheelchair users and families with baby carriages.
- Accessible sheltered linkways should be provided from the entrances of a public transport building to other facilities in the immediate vicinity, such as bus and taxi shelters, and adjacent developments. Its provision should be considered in the early planning stage of the development.
- Facilities should be provided for a taxi service, and to enable cars to drop off and pick up passengers close to the building entrance.

## 8.1.2 Layout



- ➔ A well-designed, efficient layout that minimises travel distances for commuters walking or using mobility aids is necessary to create a brisk and pleasant travel experience.
- ➔ Backtracking and changes of direction should be minimised where possible with the aim of ensuring a direct line of sight in pedestrian flow and the safety of the travelling public.
- ➔ The layout should be designed to reinforce the recognition of pathways, destinations and functions. For example, commuters are provided an optimal view of the various floor levels at locations leading to escalators and other vertical circulation elements.
- ➔ The layout should enable commuters to swiftly pinpoint the location of the services they require, such as the boarding point or departure area. It is preferred that key facilities are centrally located so that they can be easily identified.
- ➔ A simple, predictable layout would be beneficial in large terminals, such as bus and train stations, to reduce confusion among commuters.
- ➔ The introduction of commercial facilities, or otherwise, should be carefully implemented such that it does not result in congestion, confusion and disorientation among commuters.

## 8.1.3 Circulation



Photos (right and below):  
An accessible automatic fare collection gate; example of a lift that is readily identifiable



- ➔ Movement through the public transport building should be as direct as possible and in a logical sequence, with the following recommendations where:
  - External facilities, sites and building entrances should be linked by an accessible route.
  - Access routes between terminals should be sheltered.
  - Services and facilities should be logically arranged and readily identifiable.
  - Adequate space should be allocated for the projected traffic volume in order to avoid congestion.
- ➔ Meeting spaces should be provided where commuters may meet, both prior to, and after their journey. This will help prevent obstruction to the main circulation.
- ➔ The minimum dimensions that should be provided to enhance circulation within public transport buildings are as follows:
  - Clearance between the Automatic Fare Collection Gate (AFC) and any obstruction on its axis should be of at least 6000 mm in width.
  - Clearance between the escalator's comb line and any obstruction on its axis should be of 6000 mm in width.
  - Width of the connecting underpass and linkbridge should be of at least 6000 mm (without shops) or 7000 mm (where shops are present). Greater width may be required for those that are connected to larger developments.



## 8.1.4 Wayfinding and Travel Information



- Clear wayfinding strategy and signage should be provided to direct commuters.
- Information on directional signage should be provided in large, visible font sizes and easily recognised symbols such that it is easily read and understood by commuters.
- Directional markings should be indicated on floor surfaces to provide additional visual cues that aid in user navigation.
- Clear, concise, accurate and timely information should be made available to commuters travelling on all modes of transport. This will enable them to better plan their journey.
- Timetables, journey time, pricing information, the availability of particular facilities and last-minute updates should all be made available in a range of visual and audible formats.

## 8.1.5 Nursing Rooms and Toilet Facilities



- Nursing rooms and toilet facilities in the public transport building should be accessible from the main concourse level.

## 8.1.6 Resting Areas



All public transport buildings should provide adequate resting areas for commuters who need to wait for the arrival of their public transport.

- Seats of different styles and heights should be provided to cater to commuters of different needs and abilities. Consideration should also be given to seats with armrests to aid older persons and those with mobility difficulties in sitting down and standing up.
- Seat height should be provided between 430 mm to 470 mm as this tends to be more comfortable for commuters with mobility difficulties.
- Seats should visually contrast with the surrounding walls and floor surfaces so that they can be readily identifiable even from afar. The use of floor finishes that are different in texture or colour can be useful in delineating seating areas from adjacent circulation routes or other facilities, particularly in large open-plan buildings.
- Seats should be located away from the main circulation route and in a manner that discourages loitering and the buildup of crowds.

## 8.1.7 Bus, Taxi and Passenger Pick-Up Shelters



- Bus, taxi and passenger pick-up shelters, together with their peripheral access routes, should be made accessible.
- The lighting design for the shelters should cause minimum glare to the motorist. Up-lighters should not be used.
- Benches with suitable armrests and of a contrasting colour to the floor surface should be provided. They should be designed to prevent water stagnation on the bench surface.
- Safety bollards should be provided at the bus shelter at an absolute distance of 600 mm from the road kerb. A clear width of 1500 mm (minimum) and 3000 mm (maximum) should be maintained between the bollards.
- A clear width of 1500 mm should be maintained between the benches and bollards.
- Steps should be entirely avoided at the alighting and boarding area of the bus shelter.

## 8.2 Hawker Centres and Food Outlets



Hawker centres and food outlets are popular destinations for affordable cooked food. In addition to a clean, hygienic and comfortable dining environment, they have to be accessible and user-friendly to all patrons through the provision of appropriate furniture, amenities and clear circulation paths.

### 8.2.1 Access



- Access to a hawker centre or food outlet should be made safe and easily identifiable. Additional visual cues should be provided to aid older persons with cognitive impairment in wayfinding.
- Accessible entry should be provided at all sides of the hawker centre or food outlet, where technically feasible.
- Pedestrian linkage to key amenities, such as transport and community facilities, should be provided to enhance connectivity.
- The hawker centre or food outlet should preferably be located on the ground floor of a multi-storey building. Otherwise, ample access points and means of vertical circulation, such as escalators and lifts, should be provided such that patrons can easily access the hawker centre or food outlet from the ground level.

## 8.2.2 Floor Level and Finishes



- The entire hawker centre or food outlet should be designed as one level without steps or spilt levels.
- Differences in floor levels should be avoided. Where site constraints are present, a gradual ramp or slope of a suitable gradient should be provided instead of a kerb or step to mitigate any difference in floor level.
- Floor finishes should be stable, firm, slip-resistant and durable.

## 8.2.3 Layout



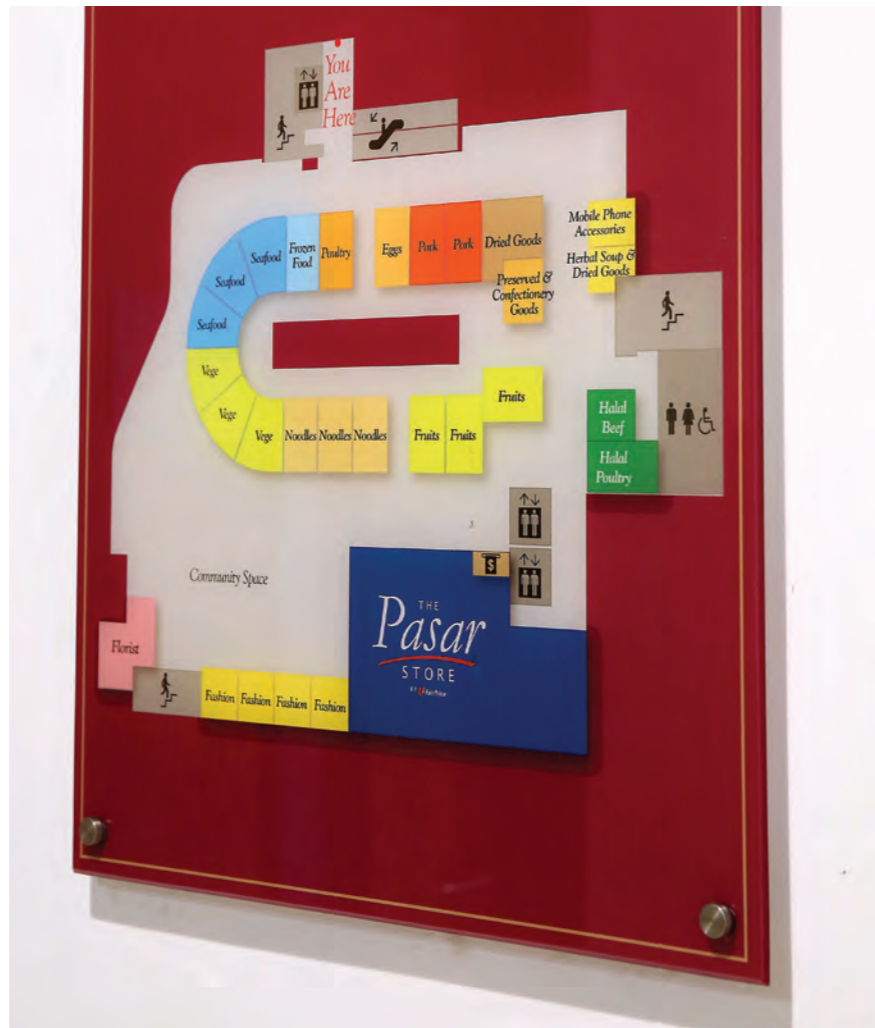
- Food and service counters, seating areas, and toilets should be designed in a manner such that the patrons can manoeuvre easily and not be scalded by hot cooked food.
- The premises should have a clear and logical layout, with unobstructed access routes, to facilitate easy and independent access throughout.

## 8.2.4 Circulation



- A straight and clear passageway should be provided between tables and seats. A clear circulation path of at least 1800 mm in front of stalls and at least 1000 mm at the dining area is recommended.

## 8.2.5 Wayfinding Information



Photos (right and below):  
Examples of clear directional and service identification signs at hawker centres and food outlets



- Clear wayfinding strategy and signage should be provided to direct patrons within the hawker centre or food outlet.
- Information on the signage should be provided in large, visible font sizes and easily recognised pictograms such that it can be easily read and understood.

## 8.2.6 Tables and Seats

Photo (below):  
Table hole for mobility aids

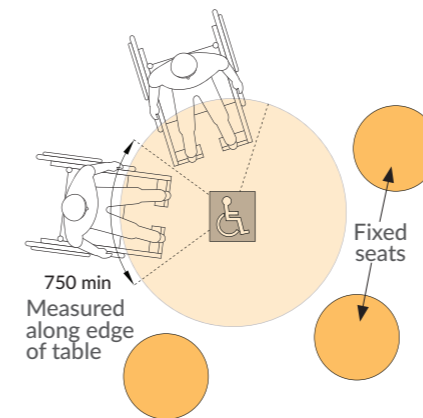


Figure 40. Seating spaces for wheelchair users

A varied, flexible arrangement of tables and seats should be provided to cater to patrons with different needs and abilities, which include families with young children, older persons and wheelchair users.

- Where fixed seating is provided, at least one out of every 10 tables should be set aside for use by two wheelchair users.
- Tables and seats should be selected to provide an effective visual contrast with the surrounding surfaces so that they can be clearly identifiable.
- Materials used for tables and seats should be heavy-duty, corrosion-resistant, easily maintained, durable and not easily stained.
- Height of tables should be between 765 mm to 780 mm from the finished floor level, with a minimum clear knee space of 680 mm in height and 480 mm in depth.
- Height of seats should be 450 mm from finished floor level.
- Clear space between seats should be of at least 750 mm, measured along the edge of the table.

## 8.2.6 Tables and Seats

Photos (right and below):  
Child-friendly tables and seats of a lower height; parking spaces for baby carriages; portable baby chair



### Tables and Seats for Families with Young Children

- At least 5% of the overall seating provision should be designated as family-friendly seating. This may be implemented as a mix of tables and seats of regular height as well as those that are child-friendly.
- Child-friendly tables and seats can be created by lowering regular tables and seats to the recommended height of:
  - 660 mm for child-friendly tables.
  - 370 mm to 400 mm for child-friendly seats.
- Family-friendly seating should preferably be located in close proximity to nursing rooms and toilets.
- Adequate space should be provided between seats to accommodate a baby chair or baby carriage, similar to the provisions made for wheelchair users.
- Adequate baby chairs with the following recommendations should be provided:
  - Baby chairs should have sides and backrests, along with either a safety belt or T-bar.
  - Baby chairs should be stable and easily portable.
  - Baby chairs should be well-maintained to ensure that they are clean, hygienic and safe for use by young children.

## 8.2.7 Counters



- Serving counters, condiment shelves and tray shelves should be designed to cater to patrons of different needs and abilities, with the following recommendations for wheelchair users:
  - Height of serving counters and condiment shelves should not be more than 860 mm and 1200 mm respectively.
  - Tray shelves should be at a height of between 700 mm to 1200 mm to facilitate easy reach.
- Tray return points should be located at convenient locations within reasonable walking distance for patrons to return their trays.

## 8.2.8 Wash Basins



- ➔ Wash basins should be provided within the dining areas, with at least one basin accessible to wheelchair users and another accessible to young children.

## 8.2.9 Nursing Rooms and Toilet Facilities



- ➔ Nursing rooms and toilet facilities should be accessible and conveniently located.

## 8.3 Supermarkets and Retail Outlets



A pleasant shopping experience can be achieved with well-designed routes and signage, as well as thoughtful planning and layout that caters to the convenience of all shoppers.

### 8.3.1 Access



- ➔ Access corridors to all outlets should be unobstructed and seamless.
- ➔ There should not be a change in levels from the access corridor to the outlets. Where a change in level is inevitable, a gradual ramp or slope of suitable gradient should be provided to mitigate any difference in floor level.

### 8.3.2 Circulation



Efficient circulation throughout the supermarket or retail outlet is a key aspect of good shopping experience. Shoppers should be able to move comfortably and without obstruction within the outlet. Aisles that are cluttered or too narrow often impede access for some users.

- ➔ All areas within the outlet should be maintained at one level and access be made available to all display areas and all facilities.
- ➔ An efficient layout with adequate circulation space for wheelchairs, baby carriages and shopping carts should be provided.
- ➔ Adequate width of at least 1500 mm should be provided between aisles to allow wheelchairs, baby carriages and shopping carts to safely pass each other in different directions.

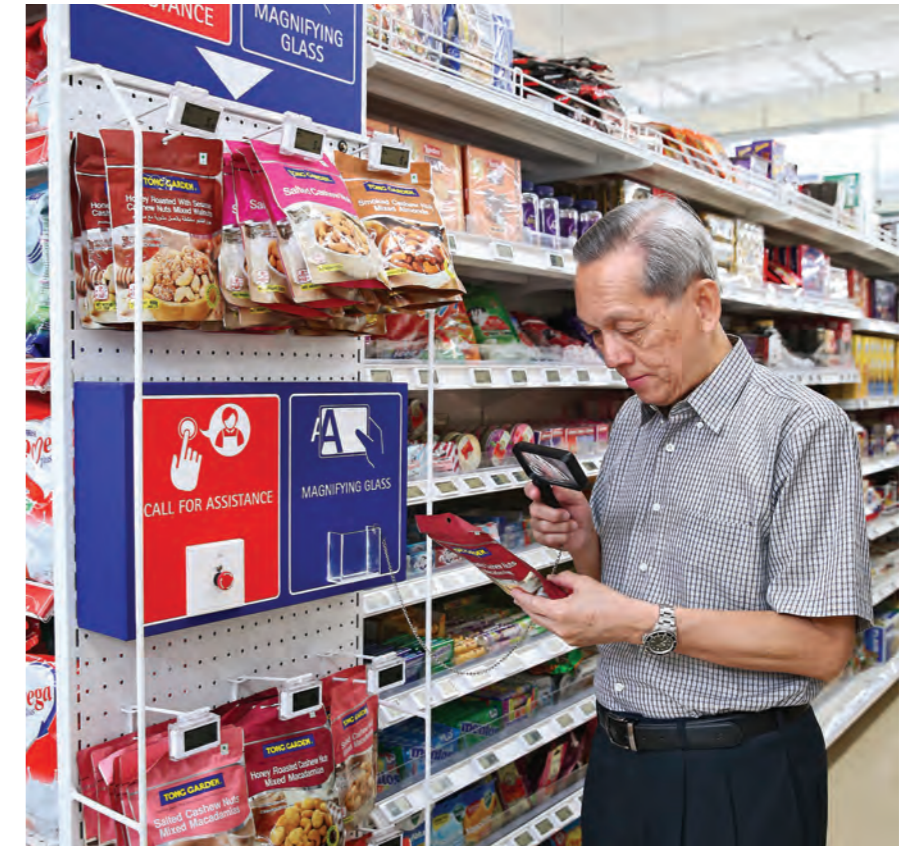


## 8.3.2 Circulation



- ➔ Dead-end aisles should be avoided. If dead ends are inevitable, the turning point at the end of each lane should be wide enough for a wheelchair user to turn around.
- ➔ Walking surfaces should be stable, firm, level and slip-resistant.
- ➔ Obstacles, projections, protrusions and overhead hazards should be avoided along the circulation path.
- ➔ Recessed fixtures, such as doors that open into circulation paths, fire hose reels, pipes and ducts, should be avoided.
- ➔ Splayed or rounded wall corners should be provided where there is a change in corridor direction.
- ➔ Appropriate illumination level should be provided. Care should be taken to avoid or minimise direct and reflected glare.

## 8.3.3 Display and Storage



*Photos (right and below):  
Magnifying glass for older shoppers with reduced vision and conveniently located call button; prominent overhead signs indicating location of products*



- ➔ Display and storage units should be sturdy, stable, adequately illuminated and without sharp edges.
- ➔ Display and storage units should also be made of durable materials that allow for easy maintenance, cleaning and, where appropriate, disinfection.
- ➔ All goods should be displayed in a manner that is visible to all users. Signage indicating product information and prices should be clear and of a contrasting colour with the background.
- ➔ The same product item should be displayed on different shelving levels, between a height of 250 mm to 1200 mm, for easy reach by wheelchair users.
- ➔ A call button should be provided at a height of between 800 mm to 1200 mm and in a prominent, easily accessible area so that shoppers can request for assistance should the need arise.

### 8.3.4 Fitting Rooms



- At least one fitting room should provide sufficient space for wheelchairs and baby carriages, with a recommended size of at least 1000 mm by 1200 mm.
- Privacy fixtures such as a foldable door, swing-out door or curtains should be provided. Doors, where provided, should not encroach into the required space.
- Mirrors should be full length and mounted in a position that can benefit the wheelchair user as well as a shopper in a standing position.
- Bench seats, along with adequate clothing hooks or rails of at least two heights, should be provided.

### 8.3.5 Counters



- Counters should be designed to cater to shoppers of different heights and abilities, including wheelchair users and those who are short in stature.
- A dual-height service or paying counter that is accessible to wheelchair users should be provided. The height of the lower counter should not be more than 800 mm above floor level.
  - Accessible checkout lanes should be designated with a minimum clear dimension of 900 mm to allow for ease of movement between counter aisles.
  - Queue zones should not encroach upon the circulation path.
  - Hearing enhancement system should be provided at all service or paying counters to assist shoppers with hearing impairment and older persons with hearing aids in making payment and seeking enquiries.

### 8.3.6 Waiting Areas



- ➔ Adequate space should be provided by the entrance for shoppers to park their baby carriages, wheelchairs and other bulky mobility aids such as walkers and motorised scooters.
- ➔ Adequate seats with adjacent spaces for wheelchairs or baby carriages should be provided at waiting areas so that shoppers can rest or sort out their purchases.
- ➔ Seat height should range from 430 mm to 470 mm and be easily moved to allow for the creation of extra space.

## 8.4 Community Clubs



Community clubs are social spaces that bring together people of all ages and backgrounds through a variety of programmes. To better cater to everyone in the community, there is a need for community clubs and their facilities to be designed based on universal design principles. This will allow everyone, regardless of his or her needs or abilities, to use the facilities and participate in the programmes.

## 8.4.1 Access



*Photos (right):  
Examples of accessible entry  
to the community club*

- The community club should be designed to maximise its connectivity with surrounding developments and amenities. This will allow users of the community club to enjoy greater accessibility and synergy in the use of the community club and adjacent facilities.
- Accessible entry should be provided at all sides of the community club.
- Differences in floor levels should be avoided where possible. Otherwise, a gradual ramp or slope of suitable gradient should be provided to mitigate any difference in floor level.

## 8.4.2 Customer Reception Areas



- The reception area should be located in a direct, conspicuous and logical position relative to the building's main entrance to enable easy identification even from afar.
- The reception area should also be easy to find from key internal circulation routes, such as the foyer, corridors, stairs or lifts.
- The work surface of the counter should be provided at two different heights to facilitate users of different heights and wheelchair users.
- Hearing enhancement system should be provided at the counter to assist users with hearing impairment and older persons with hearing aids in seeking enquiries.

## 8.4.3 Resting Areas



Communal spaces with adequate seats should be provided so that users can rest or participate in social activities such as reading and chatting.

- Seating facilities should be provided within 50 m intervals along key circulation paths.
- Seating facilities should be placed at non-secluded locations to enable better security and public surveillance.
- A variety of sitting arrangements should be provided to facilitate different programmes and activities.
- Seats should be provided at a height of between 430 mm to 470 mm.
- Some seats should be provided with suitable armrests and backrest to assist older persons in sitting down and standing up.

## 8.4.4 Multi-Purpose Rooms



- Multi-purpose rooms should be in regular shapes for easy arrangement of tables and chairs.
- A sliding or folding partition should be provided between rooms so that a larger room can be created from two or more smaller rooms when required.
- Modular tables and chairs should be light and easy to move around, with legs that can be adjusted to different heights and manners of usage.

## 8.4.5 Function Halls



- The space in the function hall area should be able to spill over to the open outdoor court area during functions and events.

## 8.4.6 Outdoor Courts



- Outdoor courts provide an open space for users to participate in sports, exhibitions and other recreational activities.
- There should be an outdoor court that is linked to the function hall. This will allow the space of the function hall to spill over to the outdoor court area during functions and events.

## 8.4.7 Toilets



- Toilets should be designed with a 'semi-open' concept, where the use of natural light and natural air flow helps illuminate and ventilate the toilet interior.

## 8.4.8 Landscaped Areas



- Soft and hard landscape, shades, seats and other natural elements should be provided to enhance the environment and attract more people to gather and interact at the community club.

# 8.5 Precinct Facilities in Public Housing



Recreational facilities in precincts, neighbourhood parks and common greens are valuable for social interaction and community bonding. It should be a safe and accessible environment conducive for all users. The precinct facilities should be planned and designed to encourage active ageing and socialisation, as well as to facilitate public surveillance. These spaces will entice older persons to come out of their housing units to meet and interact with friends and neighbours.

## 8.5.1 Access

Photos (right and below): Drop-off access; multi-storey car park



The facilities should be designed with seamless connectivity within the precinct as well as to adjacent developments and activity nodes.

### Drop-off Access

A sheltered space should be provided for vehicles to pick up or drop off passengers. The porch serves as an arrival point to welcome residents and visitors to the residential blocks.

- ➔ A drop-off access should connect to the covered pedestrian network.
- ➔ At least one drop-off access should be provided within an 80 m walking distance of a lift lobby.
- ➔ Adequate roof eaves should be provided for effective protection from the weather.
- ➔ Adequate seats should be provided at the waiting area.

### Car Parks

The convenience to residents and visitors should be a key consideration when siting a car park.

- ➔ A sheltered path should be provided to connect the edge of the car park to the lift lobby of residential blocks. Its walking distance should be less than 200 m.
- ➔ Accessible parking lots for wheelchair users within the car park should be located at the ground level and at levels that are directly linked to the residential blocks.

## 8.5.2 Circulation



Pedestrian networks should be planned and designed to maximise convenience and comfort to users.

### Covered Linkways

Covered linkways should provide a seamless connection between residential blocks, and with nearby amenities and activity nodes.

- ➔ Linkways should connect seamlessly to:
  - Nearby public transport facilities such as bus shelters and train stations.
  - All residential blocks and multi-storey car parks.
  - Major activity nodes such as precinct pavilions, child care centres and drop-off accesses.
- ➔ Adequate roof eaves should be provided for effective protection from the weather.
- ➔ Seatings should be provided within 50 m intervals.

### Footpaths

- ➔ All main footpaths that connect to facilities within the housing development should be accessible to all users. All primary routes should be set at a minimum of 1800 mm in width. Greater width may be required where there is heavy flow of pedestrians.
- ➔ The surface finish used for footpaths and pavements should allow for ease of movement by users of different abilities and mobilities. It should be slip-resistant, especially during wet weather.

## 8.5.3 Wayfinding Information

Photos (right and below):  
Example of a clear directional sign;  
example of a precinct map



Clear wayfinding strategy and signage should be provided to guide residents and visitors around the precinct and its facilities.

- ➔ Easily identifiable markers in the form of structures or colours should be provided to help guide older persons with reduced vision or cognitive abilities to their own residential block.
- ➔ Clear signage should be provided to direct residents and visitors towards residential blocks, multi-storey car parks, facilities and nearby transport nodes.
- ➔ Signboards should be installed visibly at or near entrances. More than one signboard may be required for multiple entrances that are located far apart.
- ➔ Precinct maps should be strategically located at:
  - Drop-off accesses.
  - Pedestrian entrances into the precinct.
  - Staircases and lift lobbies at the ground level of multi-storey car parks.
  - Footpath junctions.
  - Lift lobbies at the ground level.
- ➔ Directional signage should be strategically located at:
  - Vehicular entrances and junctions.
  - Footpath junctions.
  - Other decision points.



## 8.5.4 Recreational Facilities



The 3-Generation (3G) Family Playground is a comprehensive set of recreational facilities that cater to children, adults and older persons. It comprises a children's playground, an adult fitness station and an elderly fitness station. The 3G facilities should be centrally located in the precinct and in close proximity to one another. Footpaths that connect the 3G facilities to the lift lobby of each block should also be provided.

### Children's Playgrounds

- Playground space should be sensitively designed to cater to children of all ages and abilities.
- Play equipment should be made of non-toxic materials and have rounded edges.
- Floor surface should be cushioned and shockproof to reduce the impact of any fall.
- Adequate seats should be provided near the children's playground for parents supervising their children.
- The playground and its adjacent seating areas should be well shaded with trees or other shading devices.
- Additional space for wheelchairs or baby carriages should be provided alongside the seating.
- Information, such as warnings, appropriate age and play instructions, should be displayed prominently to guide users on the age appropriateness of the play equipment.

## 8.5.4 Recreational Facilities



### Adult and Elderly Fitness Stations

- A mix of equipment for upper and lower body exercises should be provided at the adult and elderly fitness station.
- Wheelchair-accessible equipment should be provided at the elderly fitness station.
- An open area with seats should be provided adjacent to the adult and elderly fitness station for users to warm up and cool down.
- Signage with clear instructions should be provided to guide users on the age appropriateness of the fitness equipment.

## 8.5.4 Recreational Facilities

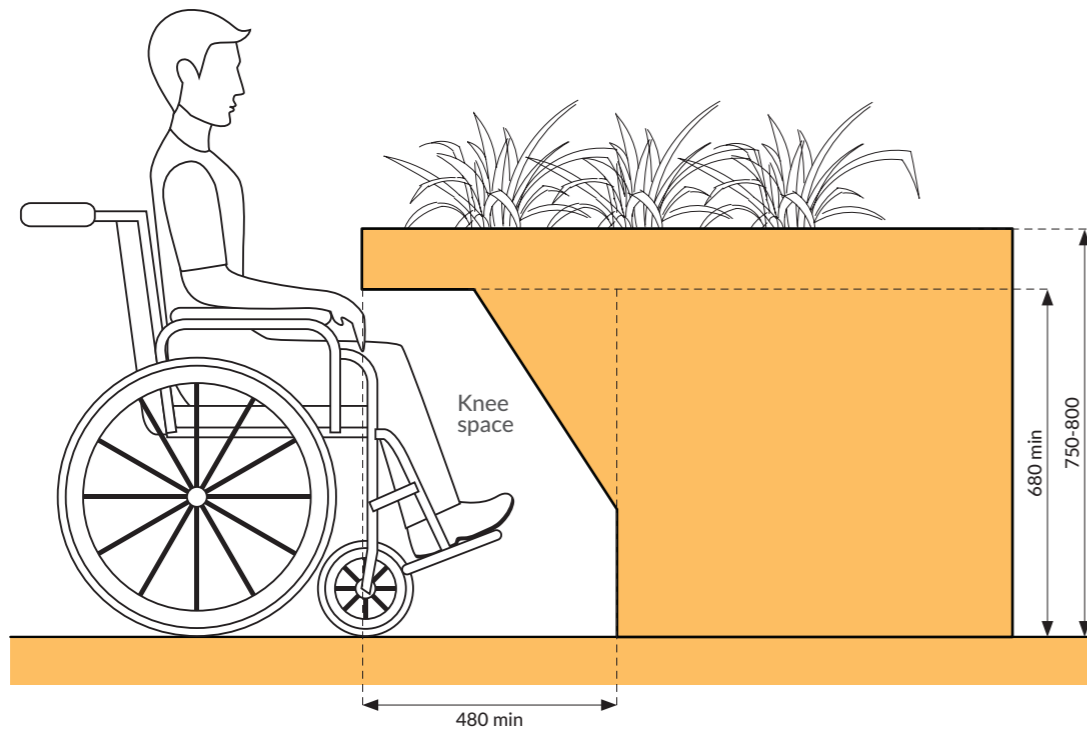


Figure 41. Appropriate planter design for wheelchair users

### Community Gardens

- A large planter box in a regular shape for flexible garden design should be provided.
- Some of the planter boxes should be elevated to a height that allows the wheelchair user to touch, smell and work on the plants.

## 8.5.5 Seating Areas



Seats are needed for resting, people watching and social interaction. The location of seating areas, as well as the arrangement and design of seats, is dependent on the intended function.

- Seats should be provided within 50 m intervals along circulation pathways and around facilities.
- A variety of sitting arrangements should be provided for different uses.
- Additional space for wheelchairs or baby carriages should be provided alongside the seating.
- Seats should be built with armrests and backrest to assist older persons in sitting down and standing up.
- Seats should be provided at a height of between 430 mm to 470 mm.
- Seating areas should be sited to take advantage of shaded areas.
- Seating areas should be placed at non-secluded locations to enable better security and public surveillance.

## 8.5.6 Social and Community Spaces at Void Decks



Older persons should be encouraged to step out of their housing units to meet and interact with fellow neighbours. The provision of a space at the void deck for older persons to hang around and participate in activities is a positive step towards supporting ageing-in-place.

- ➔ The space at the void deck should be located at non-secluded locations to enable better security and public surveillance.
- ➔ An unobstructed view of landscaping and facilities should be provided.
- ➔ Landscaping should be considered at the void deck space.
- ➔ A variety of seating arrangements should be provided to encourage different uses of space and a diversity of interactions.
- ➔ Empty spaces at the void deck can be developed into a Community Living Room or an activity area by residents who share common interests.

## 8.6 Parks and Open Spaces



Parks and open spaces are an integral part of urban living, providing greenery and activity spaces for the public. It is important that they are planned, designed and managed to be accessed, used and enjoyed by everyone, regardless of age or ability. Where possible, open spaces should be designed as part of large-scale developments, while buildings should be located within walking distance from open spaces and recreational facilities.

## 8.6.1 Access



Good connectivity and permeability should be a key consideration for parks and open spaces. This should be provided for pedestrians and cyclists through a network of routes that connect the various public spaces and amenities.

- Clear signage should be provided to guide visitors around parks and open spaces.
- Parks and open spaces should be located close to easily accessible public transport nodes and interchanges.
- At least one outdoor recreation access route should be provided in parks and open spaces to connect key facilities, attractions and outdoor constructed features.

## 8.6.2 Circulation



- A graduated difficulty of access should be applied for outdoor recreational areas. A wide variety of trail types, each characterised by a degree of difficulty, should be provided where possible. Trail types can vary in surfaces, widths, slopes, cross-slopes, lengths, edges and the number of rest stops. The diversity of trail types will accommodate or challenge all visitors, regardless of their abilities. It is therefore not necessary that all facilities be barrier-free. Some circulation routes may be intentionally difficult to negotiate even for the fittest individuals.
- Parks and open spaces should provide, where possible, at least one trail of the lowest difficulty level. Circulation guidelines should describe the standards that apply for the lowest difficulty level.
- A loop circulation at the primary route should be provided in parks and open spaces to connect key facilities and attractions. This will help visitors navigate themselves back to the entrance access or primary route.
- A good system of signage should be provided to enable visitors to the park to choose the type of experience or degree of challenge.

## 8.6.3 Outdoor Recreation Access Routes



- Outdoor recreation access routes should have surfaces that are stable, firm, level, slip-resistant and free from water ponding.
- Routes should be well-lit and clearly defined through the use of textured and visual contrasts.
- Routes used by pedestrians should be of at least 1800 mm in width. Greater width may be required where they connect to key facilities.
- Routes should be level. Where there is a change in level, ramps should not exceed a gradient of 1:25.
- The cross-fall gradient should not be steeper than 1:40.
- Gaps in paving, where provided, should not be more than 10 mm.
- An upstand edge protection of at least 75 mm in height should be provided where there is a direct drop of more than 200 mm along the access route.
- Where steps are necessary to address the steep gradient of a route, an accessible ramp should be provided so that visitors have an alternative means to reach the facilities depending on their abilities.

## 8.6.4 Outdoor Steps



- Outdoor steps should have a clear width of at least 1200 mm.
- Steps should have uniform risers of not more than 150 mm and treads of at least 350 mm.
- The riser and its corresponding tread for outdoor steps are recommended as shown below:

Riser	Tread
120 mm	410 mm
125 mm	400 mm
130 mm	390 mm
135 mm	380 mm
140 mm	370 mm
145 mm	360 mm
150 mm	350 mm

**Table 05.** Recommended tread and riser dimensions for outdoor steps

- Overall height between landings should not exceed 1500 mm.
- Nosing should be conspicuous and of a permanent contrasting material to ensure good visibility. Highlights at tread edges should be of at least 50 mm in depth and extend to the full width of the step.
- Detectable warning surfaces should be used at the approach to the top and bottom of a flight of steps.

## 8.6.5 Wayfinding Information



*Photo:*  
Signboard at park entrance  
highlighting the location of various  
facilities and areas of interest

Signage and other wayfinding information highlight the location of facilities and areas of interest within a park. Visitors should be able to access these information easily, which will help them to assess and prepare for potential challenges, and make informed choices on their own.

- Information should be made available in the form of published guides at information centres and on the internet. References to accessibility and any facilities provided should be included as part of these information.
- The provision of maps in a range of formats – including printed leaflets, display boards and tactile models – will help guide all visitors to a park. The maps should illustrate path gradients, highlighting challenges, such as steep paths, gates or uneven surfaces, as well as facilities, such as car parks, toilets, and information displays.
- Signboards should be installed at or near the entrance. More than one signboard may be required where there are multiple entrances located far apart.
- Signage should be clear, consistent, provided in sufficient colour contrast and easy to understand.

## 8.6.5 Wayfinding Information



*Photo:*  
Directional sign prominently  
highlighting the location of  
facilities and areas of interest

- Information boards should be placed where accessible to all visitors to the park. Pavements leading to the information boards should be unobstructed and of a stable material.
- Directional signs should be placed at least 600 mm away from the outdoor recreation access route or trail. The outer limit of a sign should not overlap with an outdoor recreation access route or trail. It should be placed at a critical decision making point, such as next to entrances, exit points and junctions.
- Headroom clearance of a directional sign should be at least 2100 mm above the ground surface.
- Text used on the sign should be at least 30 mm in height and provided in consideration of the overall size of the panel.
- Illumination for information boards and directional signs, where necessary, should be at a level of at least 200 lux.

## 8.6.6 Outdoor Facilities



*Photos (right):  
Examples of inclusive playgrounds for  
children of various ages and abilities*

### Playgrounds

- ➔ Playground spaces should be sensitively designed to allow for inclusive participation by the physically challenged. There should be a barrier-free access route from the main circulation path to the playground area.
- ➔ Playground equipment should be barrier-free and accessible by the physically challenged.
- ➔ Playground equipment should be stimulating and educational, providing both physical exercise while developing intellectual and social skills.
- ➔ Playground equipment and adjacent seating areas should be well-shaded with trees or other shading devices.

## 8.6.6 Outdoor Facilities



### Fitness Areas

- ➔ At least 50% of the fitness equipment should be suitable for use by older persons.
- ➔ Relevant instructional signboards should be provided for all fitness equipment and be weather- and vandal-resistant.
- ➔ Adequate shade with trees of at least 1800 mm in clearance height should be provided.
- ➔ Adequate seating should be provided around the fitness area.

## 8.6.6 Outdoor Facilities



Photo:  
Accessible viewing area with a shelter  
accessible to wheelchair users

### Resting Areas

- Resting areas of at least 1800 mm in length and 1200 mm in width should be provided within intervals of 30 m along the access route.
- Sufficient space should be provided alongside the seating to accommodate bulky mobility aids such as wheelchairs and pushchairs.
- Some of the seats should have armrests and backrest so as to provide support for visitors who need to rest.

### Planting Areas

- Planting surfaces should have an alternative height from the ground level, with an elevation of not more than 1000 mm above the ground surface.
- Adequate knee space should be provided to allow wheelchair users a forward approach to the planting surfaces.

### Shelters

- Adequate shelters should be provided to protect visitors from the weather. They should be accessible to visitors with bulky mobility aids such as wheelchairs and pushchairs.

## 8.6.6 Outdoor Facilities



### Viewing Areas

- Viewing areas should provide a distinct viewing location for visitors to appreciate scenic views, natural beauty or points of interest away from the main circulation route.
- A clear ground space of at least 1800 mm by 1200 mm should be provided at each distinct viewing location for wheelchair users. The space should be positioned for either forward or parallel approaches to the viewing location.
- An unobstructed view that extends to the entire side of the clear ground space facing the landscape or point of interest should be provided at a height of between 800 mm to 1200 mm from the ground surface.

### Toilets

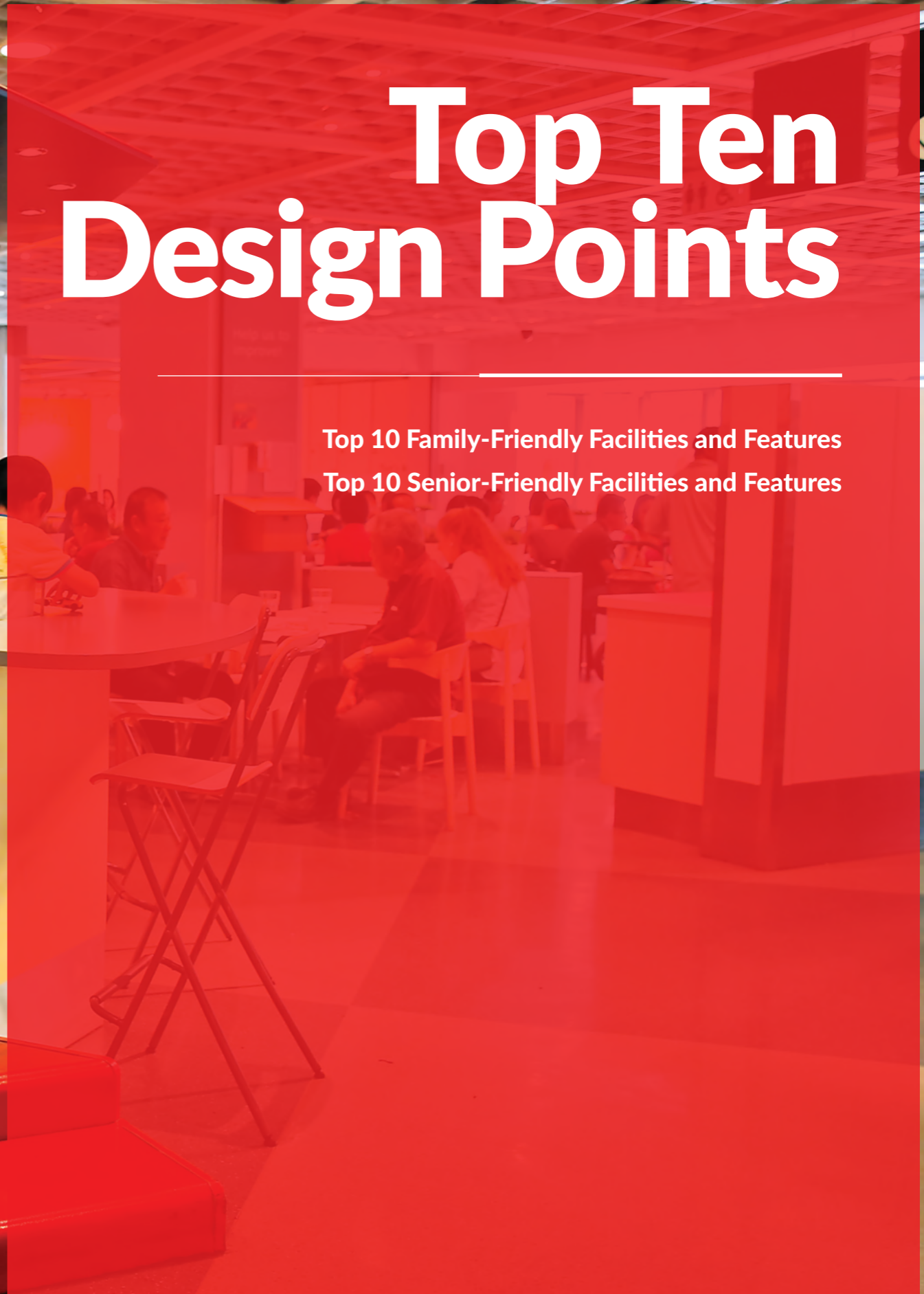
- Toilets should be provided and located near the main areas of attraction such as playgrounds, barbecue areas and picnic areas. At least one accessible toilet should be made available for wheelchair users.



# Top Ten Design Points

Top 10 Family-Friendly Facilities and Features

Top 10 Senior-Friendly Facilities and Features





→ Family room with nursing and diaper changing facilities



→ Family washroom with child-sized sanitary fittings



→ Intuitive wayfinding and good signage



→ Access to online information on user-friendly provisions in the building

Here are the top ten most desirable features that will serve the needs of families with infants or young children.

# TOP 10 FAMILY-FRIENDLY FACILITIES AND FEATURES



→ Family-friendly parking and designated pedestrian walkways and crossings



→ Multi-generational activity or play area



→ Play equipment suitable for children of various ages and abilities



→ Designated space for safe parking of baby carriages



→ Baby chair at food outlet



→ A quiet area for resting, such as a lounge that is acoustically treated



➔ Ramp with a gentler gradient and non-slip floor surface



➔ Strong colour contrast with the surroundings for greater visual clarity (applied where there is change in levels, as well as between walls, floors, furniture or fittings)



➔ Adequate seats with armrests and backrest



➔ Door delay function for lift and automatic doors



➔ Senior-friendly steps with handrails and lower riser height

Here are the top ten most desirable features that will serve the needs of older persons, who may experience a decline in physiological and cognitive functions associated with ageing.

# TOP 10 SENIOR-FRIENDLY FACILITIES AND FEATURES



➔ Access to online information on user-friendly provisions in the building



➔ Intuitive wayfinding and good signage



➔ Space for social interaction and activities



➔ Senior-friendly sanitary facilities



➔ Adequate and uniform lighting, particularly for footpaths and pavements

## References

In preparing this Guide, reference has been made to the following:

National Disability Authority, Building for Everyone – A Universal Design Approach (2012)

Irish Wheelchair Association, 2014, Best Practice Access Guidelines - Designing Accessible Environments Edition 3

Changing Places Consortium, 2012, Changing Places : The Practical Guide

The British Standards Institution, BS 8300:2009 Design of Buildings and Their Approaches to Meet the Needs of Disabled People – Code of Practice

International Organisation for Standardisation, ISO 21542:2011 Building Construction – Accessibility and Usability of the Built Environment

United Nations Enable, Accessibility for the Disabled: A Design Manual for a Barrier Free Environment

Australian Standard, AUS 1428.2-1992 Design for Access and Mobility – Part 2: Enhanced and Additional Requirements – Buildings and Facilities

Buildings Department, 2008, Design Manual – Barrier Free Access, Hong Kong

David Driskell, ed., 1993, Design Guide: Universal Access to Outdoor Recreation, PLAE, Inc., Berkeley, California, USA

Singapore Standard. SS 485 : 2011 Specification for Slip Resistance Classification of Pedestrian Surface Materials

Singapore Standard. SS 531 : Part 1 : 2006 Code of Practice for Lighting of Work Places

Singapore Standard. SS 599 : 2014 Guide for Wayfinding Signage in Public Areas

Singapore Standard. SS 605 : 2015 Guide for age-friendly homes

Singapore Standard. CP 15 : 2004 : Code of Practice for Installation, Operation and Maintenance of Escalators and Passenger Conveyors

Building and Construction Authority, Singapore. Code on Accessibility in the Built Environment 2013

Singapore Civil Defence Force, Code of Practice for Fire Precautions in Buildings

National Environment Agency, Code of Practice on Environmental Health

## Acknowledgement

This Guide is produced with the assistance of:

Agency for Integrated Care

Association of Consulting Engineers Singapore

Housing & Development Board

JurongHealth

Land Transport Authority

People's Association

National Environment Agency

National Parks Board

Ministry of Health

Ministry of National Development

Ministry of Social and Family Development

SG Enable

Singapore University of Technology and Design

SPD

Touch Community Services

Urban Redevelopment Authority

UD Club

BCA colleagues who participated in the photography shoot.

## Notes

# Notes



52 Jurong Gateway Road  
#11-01, Singapore 608550

[www.bca.gov.sg](http://www.bca.gov.sg)

