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Government of India
Ministry of Road Transport & Highways
Transport Section
Transport Bhawan, 1, Parliament Street, New Delhi-110001

Dated 16th November 2021

OFFICE MEMORANDUM

Subject: Accessibility Guidelines for Bus terminals/Bus stops- Public Consultation reg.

The undersigned is directed to say that this Ministry has been entrusted with the task of developing Comprehensive Accessibility Guidelines for Road Transport Infrastructure including bus terminals/bus stops under the Accessible India Campaign. A copy of the draft guidelines is enclosed.

2. These guidelines cover the planning and design aspect of areas in bus ports/bus terminals and bus stops, so that these areas can be made accessible to all. The ease of use of the facility by end users shall dictate the success or otherwise of the facility. The areas of engagements, such as Parking, Bus Port/Terminal/Stops and Bus Boarding/Alighting, have been taken up at length in this document for making them fully accessible. The aim is to ensure seamless inclusion of Divyangjans, irrespective of their disability, in the context of accessibility to such infrastructure.

3. It is requested that the suggestions/comments to these draft guidelines, if any, may be sent to the Joint Secretary (MVL, Transport & Toll), Ministry of Road Transport and Highways, Transport Bhawan, Parliament Street, New Delhi-110 001 on the email: **comments-morth@gov.in** within a period of **thirty days i.e. not later than 16th December 2021**.

Encl. As above.

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Copy to:

1. NIC- with a request to upload on whats new and road transport tab of MoRTH website
2. JS, DePWD (roy.tarika@gov.in)
2. AIC section, DePWD (aic-depwd@gov.in)- for wider publicity to public.



ACCESSIBILITY GUIDELINES FOR BUS TERMINALS AND BUS STOPS

NOVEMBER, 2021



Government of India
MINISTRY OF ROAD TRANSPORT & HIGHWAYS



ACCESSIBILITY GUIDELINES FOR BUS TERMINALS AND BUS STOPS

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MINISTRY OF ROAD TRANSPORT & HIGHWAYS**

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1. Introduction

1.1 Background

Universal Design is the process of designing the environment favourable to all people regardless of their age, size, ability or disability. The transport facilities and adjunct infrastructure available to the public should be designed in a way that it is accessible by all people. Creating a barrier-free environment is a prerequisite for creating an all-inclusive public facility which includes people with cognitive disabilities in people affected by barriers group.

Ministry of Road Transport & Highways, Government of India (MoRTH) has undertaken various initiatives over the past years to make the public transport efficient and reliable to the general public. There are guidelines available on universal accessibility but there have been very limited attempts to develop comprehensive guidelines for road transportation to improve accessibility for Persons with disabilities for services in Bus terminals and Bus Stops.

These guidelines focus significantly on extending accessibility options to following people affected by barriers:

- Wheelchair users
- People with limited walking/ movement abilities
- People with visual impairment or low vision
- People with hearing impairment
- Elderly and infirm persons
- Pregnant ladies
- Children

1.2 Need of these Guidelines

Person with disability means any individual who has a physical or mental impairment that, on a permanent or temporary basis, substantially limits one or more major life activities, has a record of such impairment, or is regarded as having such impairment. There are various kinds of disabilities as defined in the Rights of Persons with Disabilities Act, 2016, a snapshot of which is reproduced below:

A. Locomotor disability (a person's inability to execute distinctive activities associated with movement of self and objects resulting from affliction of musculoskeletal or nervous system or both), including —

- (a) "leprosy cured person" means a person who has been cured of leprosy but is suffering from —
- i loss of sensation in hands or feet as well as loss of sensation and paresis in the eye and eye-lid but with no manifest deformity;



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- ii manifest deformity and paresis but having sufficient mobility in their hands and feet to enable them to engage in normal economic activity;
 - iii extreme physical deformity as well as advanced age which prevents him/her from undertaking any gainful occupation, and the expression "leprosy cured" shall construed accordingly;
- (b) "cerebral palsy" means a Group of non-progressive neurological condition affecting body movements and muscle coordination, caused by damage to one or more specific areas of the brain, usually occurring before, during or shortly after birth;
- (c) "dwarfism" means a medical or genetic condition resulting in an adult height of 4 feet 10 inches (147 centimeters) or less;
- (d) "muscular dystrophy" means a group of hereditary genetic muscle disease that weakens the muscles that move the human body and persons with multiple dystrophy have incorrect and missing information in their genes, which prevents them from making the proteins they need for healthy muscles. It is characterized by progressive skeletal muscle weakness, defects in muscle proteins, and the death of muscle cells and tissue;
- (e) "acid attack victims" means a person disfigured due to violent assaults by throwing of acid or similar corrosive substance.
- (f) "Any other affliction of musculoskeletal or nervous system or both resulting in a person's inability to execute distinctive activities associated with movement of self and objects"

B. Visual impairment —

- (a) "blindness" means a condition where a person has any of the following conditions, after best correction -
- i total absence of sight; or
 - ii visual acuity less than 3/60 or less than 10/200 (Snellen) in the better eye with best possible correction; or
 - iii limitation of the field of vision subtending an angle of less than 10 degree.
- (b) "low-vision" means a condition where a person has any of the following conditions, namely: —
- i visual acuity not exceeding 6/18 or less than 20/60 upto 3/60 or upto 10/200 (Snellen) in the better eye with best possible corrections; or
 - ii Limitation of the field of vision subtending an angle of less than 40 degree up to 10 degrees.



C. Hearing impairment—

- (a) "deaf" means persons having 70 DB hearing loss in speech frequencies in both ears;
- (b) "hard of hearing" means person having 60 DB to 70 DB hearing loss in speech frequencies in both ears;

D. "**speech and language disability**" means a permanent disability arising out of conditions such as laryngectomy or aphasia affecting one or more components of speech and language due to organic or neurological causes.

E. Cognitive disability results in a physical or mental impairment that substantially limits one or more major life activities, including difficulty with orientation, concentration, judgment, problem solving skills, and coping skills. In addition, individuals with cognitive disabilities may have compromised short term memory, and may lack the ability to seek and act on directions, to process information, and to communicate their needs.

Any infrastructure designed need to take into consideration the aforementioned disabilities so that it can be easily accessible by all. These guidelines covers all these aspects so as to make the bus terminals and stops universally accessible. The following para covers the snapshot of clauses of the Rights of Persons with Disabilities Act, 2016, relevant to these guidelines.

1.3 Training Requirements

1.3.1 All buses, bus terminal operators, Bus Terminal & Bus Shelter Operator specific guidelines

Bus Terminal & Bus queue shelter operator shall display signage's throughout the terminal and shelter including terminal building having clear vision without any obstructions. The points of arrival and departure shall be clearly indicated with basic information about bus terminal in accessible format.

- Signage for all spaces in the terminal building reserved for persons with disability or reduce mobility should be clearly indicated to discourage the use by other passengers.
- Bus Terminals and bus queue shelter operator shall endeavour to ensure that parking spaces are reserved and located in the close proximity to the terminal building for persons with disability or reduced mobility. Bus terminal operator shall provide ramps at least at the main entrance/exit to the terminal building for easy access by persons with disability or reduced mobility.
- Bus terminal and bus queue shelter operator shall ensure that all points of access open to the public are accessible to persons with disability or reduced



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mobility.

- Provision of helpdesk to be made which shall provide all necessary information to assist a disabled passenger.
- All areas and services in the terminal building that are open to the public shall be accessible to persons with disability or reduced mobility. All equipment provided for use by general public such as telephones, internet service, etc. should also be accessible to persons with disability or reduced mobility including those with sensory impairments.
- Bus information system should be positioned in such a way to ensure its readability by people in wheelchair and those with visual impairment. Provision of audible announcements should be made for people who are not able to use visual displays such as blind and with learning disability.
- Bus terminal operator shall ensure that persons with disability or reduced mobility are transported within the terminal in the same condition, comfort and safety as those available for other passengers. The bus terminal operator should ensure that the assistive devices being used to assist a disabled passenger should be available at the terminal.
- The Bus Terminal operator shall ensure that the facilities at the terminal are accessible to persons with disability or reduced mobility during their transit through the bus terminal area.
- Bus Terminal operator shall provide ambulance facility for the passenger on arrival and departure at the Bus Terminal upon advance request by the passenger/representative/bus.
- Bus Terminal operator shall make appropriate provision for ambulift at the bus Terminal to enable persons with disability or reduced mobility to embark/disembark the bus without inconvenience. Such provision may be made in coordination with bus management staff sitting in the terminal areas or operating the systems, if required. Bus terminal can have provision of towable ramp linked to bus entry-exit should be made.
- Any charge that bus terminal operator make, the same should be displayed on their respective website and terminal building display signs security, and checking staff at bus terminal shall conduct training program, as per the training module provided by concerned authority, for all personnel engaged in passenger services for sensitization and developing awareness for assisting persons with disability or reduced mobility and to ensure that they are well briefed about their responsibilities.

The training may include but not limited to the following:



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- a) Barriers faced by persons with disability or reduced mobility, including attitude, environment and organisation, and suggestions for removing such barriers.
- b) Information on the range of disabilities, including hidden or less visible disabilities.
- c) Skills needed for assisting persons with disability or reduced mobility.
- d) Communication and interpersonal skills for interacting with persons with disability or reduced mobility.
- e) Health and safety information.
- f) General awareness about relevant regulations.

The operators shall ensure that all its employees are imparted disability related basic training and refresher training at appropriate interval.

Disability related training provides practical overview and is relevant in particular to those providing assistance to persons with disability or reduced mobility. It increases understanding of the whole range of impairments so that personnel are aware of how to interact with persons with disability or reduced mobility and to tackle negative perceptions and attitudes towards such passengers.

In addition to basic training, operators should provide specific training for personnel who may be required to provide direct assistance to persons with disability and/or persons with reduced mobility.

Operators shall ensure that adequate training is provided to all its service providers, staff handling bus operations and sub-contractors responsible for providing assistance services.

It shall be the responsibility of bus terminal operator to ensure that security staff positioned at bus terminal undergoes disability-related training.

Buses shall ensure that passengers and emergency procedures training is combined with disability awareness training for assisting persons with disability or reduced mobility inside the bus and white entry- exits.¹

1.4 General Requirements

- Operators shall formulate a detailed procedure for transit of persons with disability or reduced mobility and publish the same on their website. Operators including the travel agents shall ensure that web content conforms to the Web Content Accessibility Guidelines so as to make it more accessible to persons with disabilities. Operators shall display disability policy and guidance for persons with disability or reduced mobility on the main page of their website.
- Operator shall develop in-house document on handling persons with disability or reduced mobility, which should be used for strict compliance by all employees. Such a document and the proof of its compliance shall be made available. Such



document/manual should be readily available for reference of all personnel required in handling such persons.

- Operator shall document their responsibility with regard to the travel of persons with disability or reduced mobility, and make it available on their website.
- All assistive devices shall be provided without any extra cost to the persons with disability or reduced mobility within India.
- Operators, both the buses and bus terminals, shall ensure availability of low floor accessible buses at the terminals to enable easy boarding and alighting of passengers.
- In case of transfer between bus and terminal, the terminal operators shall ensure smooth and hassle-free transportation of persons with disability or reduced mobility.

Where wheelchairs or other mobility equipment or assistive devices are lost or damaged whilst being handled at the bus terminal, the passenger to whom the equipment belongs shall be compensated by the terminal authority responsible for such loss or damage.

1.5 The Rights of Persons with Disabilities Act, 2016 ⁱⁱ

The clauses relevant to this guideline are reproduced below:

- (a) The appropriate Government shall ensure that the persons with disabilities enjoy the right to equality, life with dignity and respect for his or her integrity equally with others.
- (b) The appropriate Government shall take steps to utilise the capacity of persons with disabilities by providing appropriate environment.
- (c) No person with disability shall be discriminated on the ground of disability, unless it is shown that the impugned act or omission is a proportionate means of achieving a legitimate aim.
- (d) No person shall be deprived of his or her personal liberty only on the ground of disability.
- (e) The appropriate Government shall take necessary steps to ensure reasonable accommodation for persons with disabilities.
- (f) No establishment shall be granted permission to build any structure if the building plan does not adhere to the rules formulated by the Central Government under section 40.

(Section 40: The Central Government shall, in consultation with the Chief Commissioner, formulate rules for persons with disabilities laying down the standards of accessibility for the physical environment, transportation, information and communications, including appropriate technologies and systems, and other facilities and services provided to the public in urban and rural areas.)



Accessibility Guidelines for Bus terminals and Bus Stops

- (g) The appropriate Government shall take measures to protect persons with disabilities from being subjected to torture, cruel, inhuman or degrading treatment.
- (h) The appropriate Government shall take suitable measures to provide,
 - i Facilities for persons with disabilities at bus stops, railway stations and airports conforming to the accessibility standards relating to parking spaces, toilets, ticketing counters and ticketing machines;
 - ii Access to all modes of transport that conform the design standards, including retrofitting old modes of transport, wherever technically feasible and safe for persons with disabilities, economically viable and without entailing major structural changes in design;
 - iii Accessible roads to address mobility necessary for persons with disabilities. ⁱⁱⁱ

1.6 Coverage under the Guidelines

The guidelines cover the planning and designing aspect of areas in bus terminals and bus stops visited by the disabled persons so that these areas can be made accessible for all. The ease of use of the facility by the end users shall dictate the success or the failure of the facility. The following flowchart presents the areas of engagements of the “persons with disabilities” and planning and design considerations in respect to these areas as covered in these guidelines.



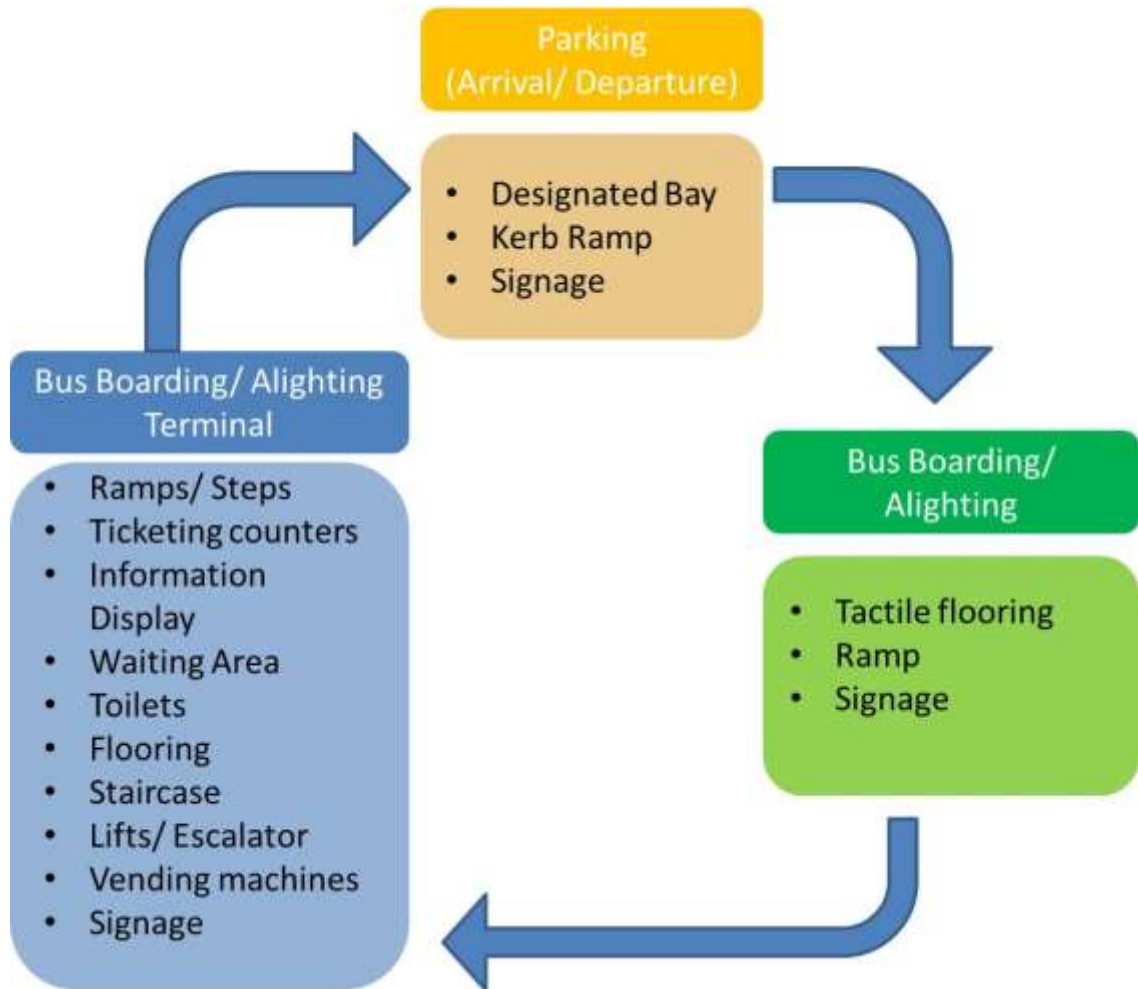


Figure 1- Flowchart representing steps from parking to bus boarding/alighting

2. Mobility Devices and Space Allowances

2.1 Introduction

Persons with Disabilities use several devices to overcome the specific conditions. Therefore, anthropometrics is used to ensure that dimensions in a building such as doors, doorways, passenger areas, reception desks, rest areas, relationship between desk and wheelchair, toilets are designed appropriately. Adequate space should be allocated for persons using mobility devices, e.g. wheelchairs, crutches and walkers, white cane etc. as well as those walking with the assistance of other persons.

These dimensions are required to suit and meet the Mobility Devices.

2.2 Wheelchair User

Dimensions of a standard wheelchair are extremely important and helps to get standards for space allowance, reach range etc. of a wheelchair user. Electric wheelchairs may be of a larger dimension, much heavier and do not have the same manoeuvrability/ capability as manual wheelchairs.

2.2.1 Manual wheelchairs

Dimensions for consideration as per harmonized guidelines CPWD:

Description	Dimension
Wheelchair Open	
Length	1000 - 1200 mm
Width	650 - 720 mm
Height	910-950mm
Wheelchair footrest	350 mm (deep)
Wheelchair castor width	12 mm
Seat height	480mm
Arm rest height	760mm
Lap height	675 mm
Wheelchair Folded	
Width	300 mm
Height of armrest	760 mm

iv

Structure of wheelchair and name of each part (standard type)

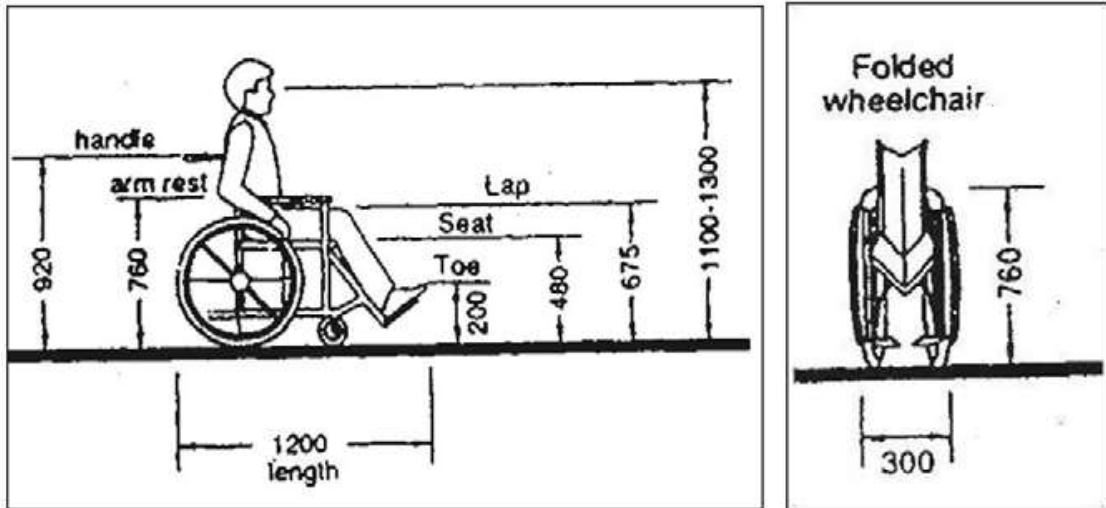


Figure 2- Wheelchair standard dimensions

2.2.2 Accessibility of Wheelchair

A wheelchair has a footplate and leg rest attached in front of the seat. The footplate extends about 350 mm in front of the knee. The footplate may prevent a wheelchair user from getting close enough to an object.

Hence, at least 350 mm deep and 700 mm high space under a counter, stand, etc. should be given. The access to the wheelchair will be by handrail in the continuity

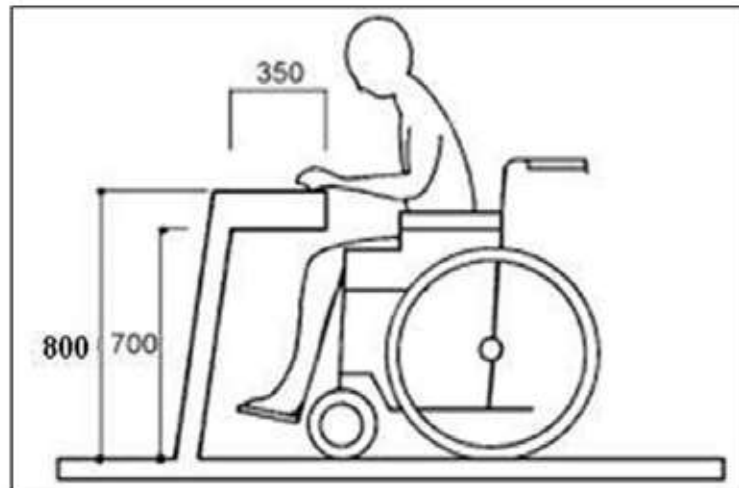


Figure 3- Knee Clearance

2.2.3 Wheelchair User Area

The minimum clear floor or ground area required accommodating a single, stationary wheel chair and occupant is:

Description	Dimension
Wheelchair User Area	
Length	1200 mm
Width	900 mm

2.2.4 Circulation Dimensions

The minimum clear floor ground area for a wheelchair to turn is 1500 mm whereas it may be ideal to provide 2000 mm.

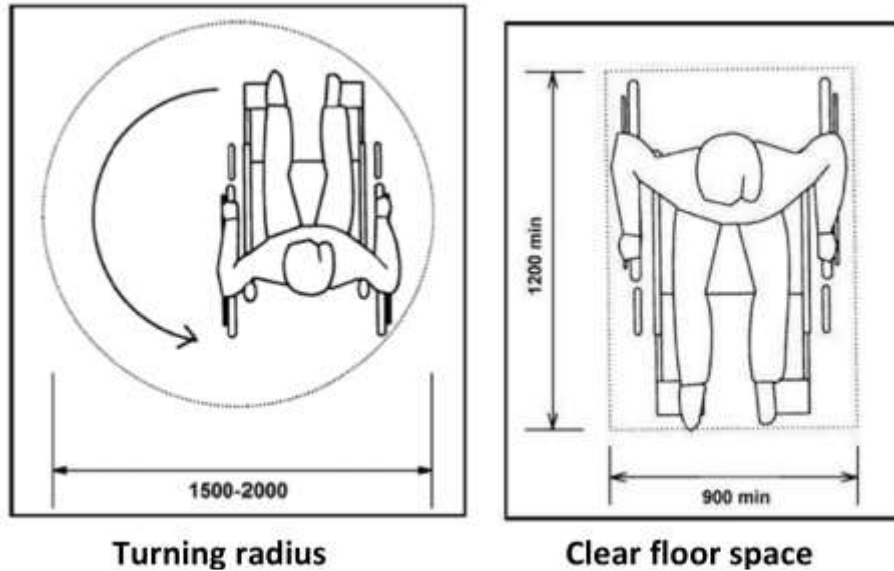


Figure 4 - Turning radius & Clear floor space

2.2.5 Reach Range

A wheelchair user's movement pivots around his or her shoulders. The range of reach (forward and side; with or without obstruction) of a wheelchair user should be taken into consideration.

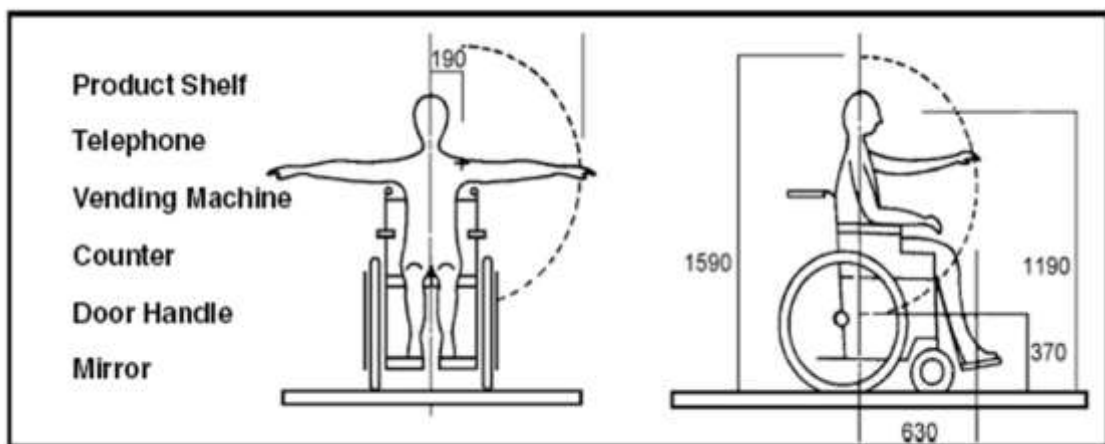
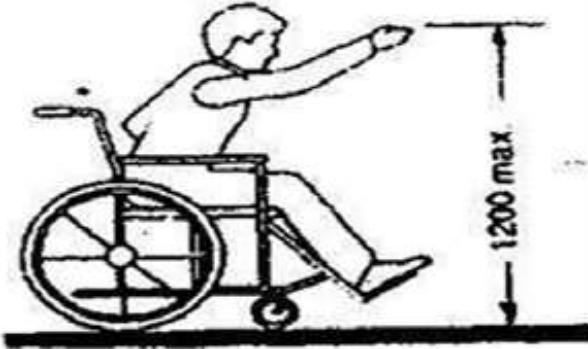

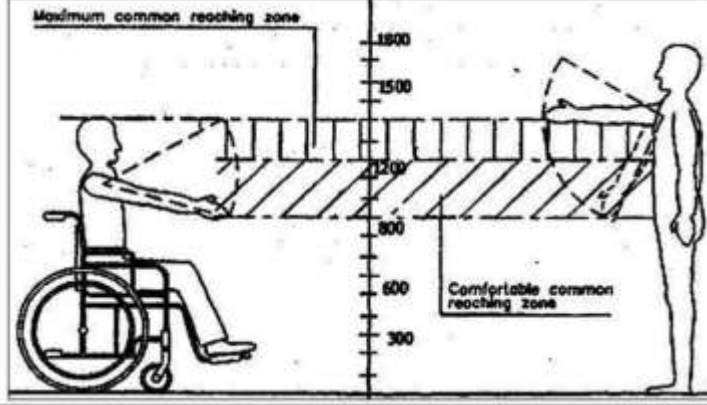
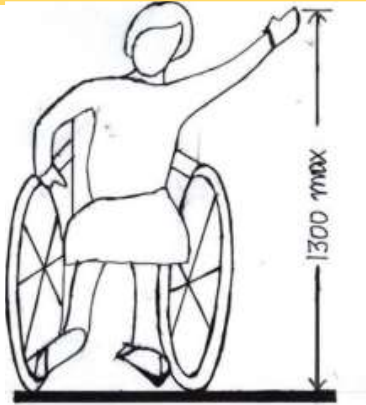
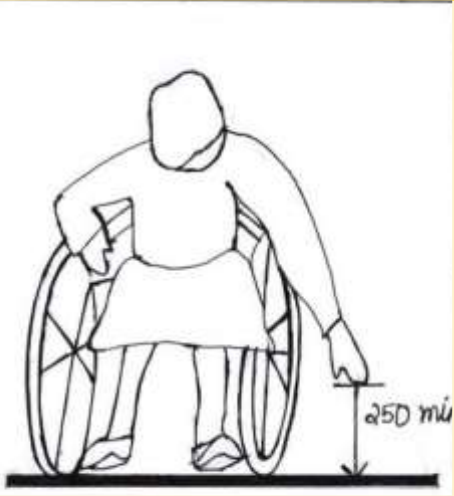
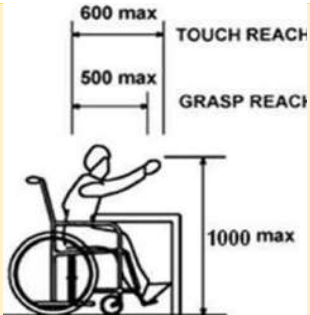


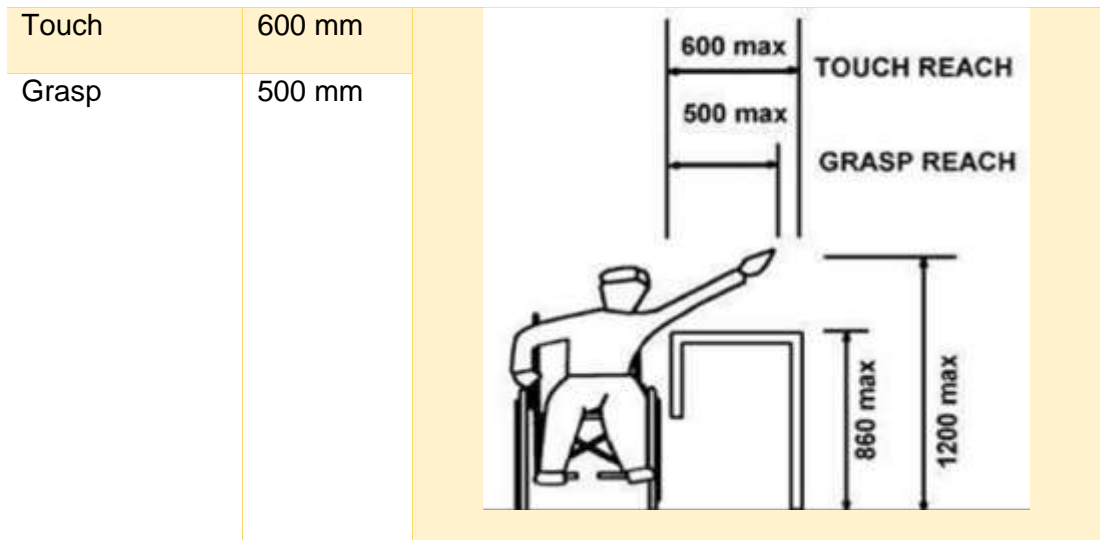
Figure 5- Range of reach of wheel chair user

2.2.6 Reach without obstruction^v

Reach		Without Obstructions
Type	Forward	
Highest	1200 mm	
Lowest	380 mm	
Common (Most Appropriate)	800-1200 mm	
Type	Sideways	

Reach		Without Obstructions	
Highest	1300 mm		
Lowest	250 mm		

Reach		With Obstructions (Max. 500mm deep)	
Type	Forward		
Highest	1000 mm		
Touch	600 mm		
Grasp	500 mm		
Type	Sideways		
Highest	1200 mm		
Lowest	860 mm		



2.2.7 Vision Zone

Vision zone is 900 - 1800 mm and all signage should be designed based upon these dimensions.

The smallest letter should not be less than 15 mm.

Map and information panels along pathways should be placed at a height between 900 mm and 1800 mm. ^{vi}

No obstruction should be there in the vision zone.

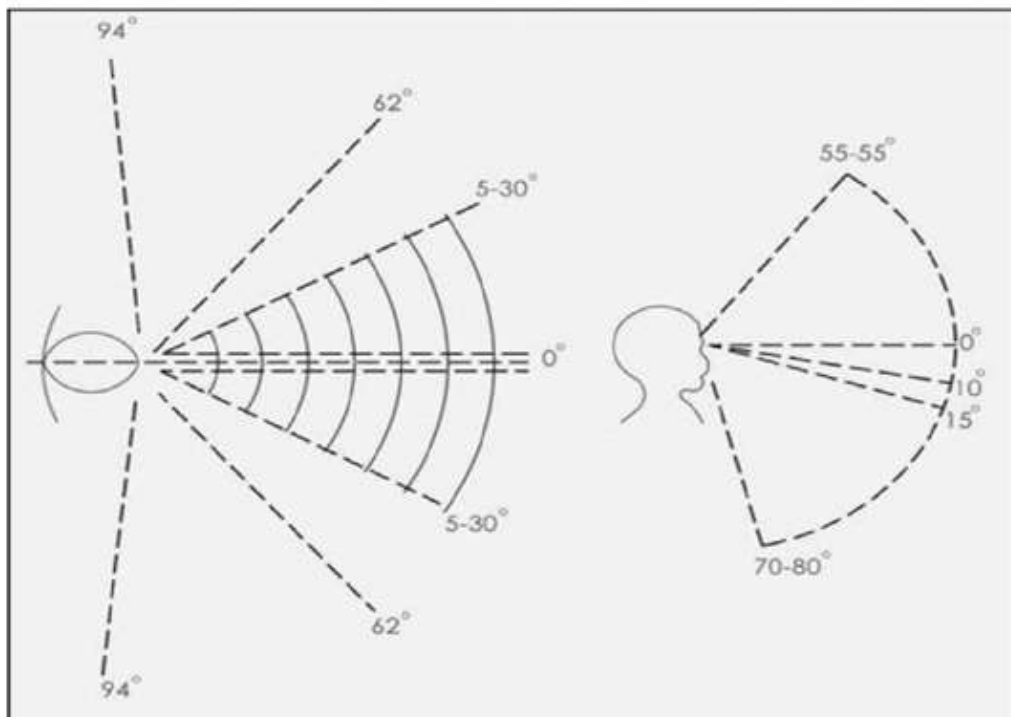


Figure 6- Field of Vision

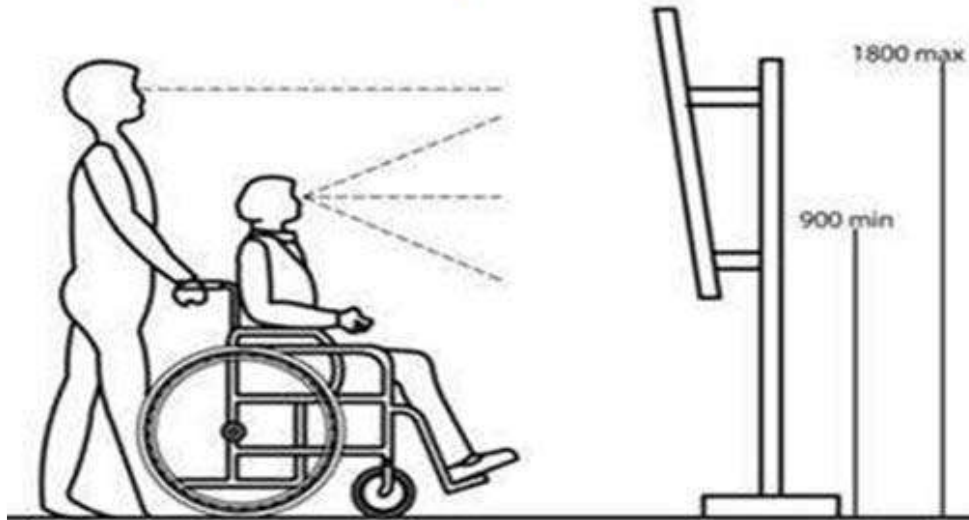


Figure 7-Vision Zone

2.2.8 Heights and Widths

Height of Controls: Electrical	
Switches (Light)	800 – 1100 mm
Switches (Power)	400 - 500 mm
Doors/ Windows	
Handles	
Doors	900 – 1000 mm (900mm minimum clear width)
Windows (Controls)	750 – 900 mm
Space required under the Counter	350 mm deep for wheelchair footrest
Entrance/ Exit Door	
Minimum Width of Entrance/ Exit door	900 mm

Minimum front approach doorways space	1200 mm
Minimum Latch approach doorways space	1250 mm

2.3 Space allowance for Crutch User

Although people who use walking aids can manoeuvre through door openings of 900 mm clear width, they need wider passageways 920mm for comfortable gait.

Crutch tips, often extend down out at a wide angle, are a hazard in narrow passageways where they might not be seen by other pedestrians.

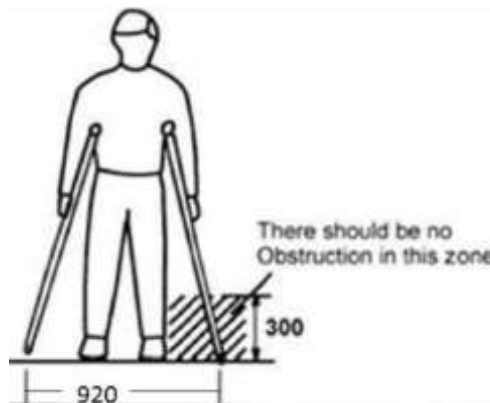


Figure 8- Space requirement for crutch user

2.4 White Cane User

Protruding objects, such as directional signs, tree branches, wires, guy ropes, public telephone booths, benches and ornamental fixtures should be installed with consideration of the range of a person with vision impairment white cane.

A barrier or sounding object to warn blind or visually impaired persons should be provided under stairways or escalators. Walkways, halls, corridors, passageways, aisles, or other circulation spaces should have clear headroom to minimize the risk of accidents.

The radial range of the white cane is a band 1200 mm wide.

Any obstacle above 600 mm cannot be detected by the white cane. If there are projections above this height, then the projections have to be reflected at the floor level in terms of level or textural differences. ^{vii}

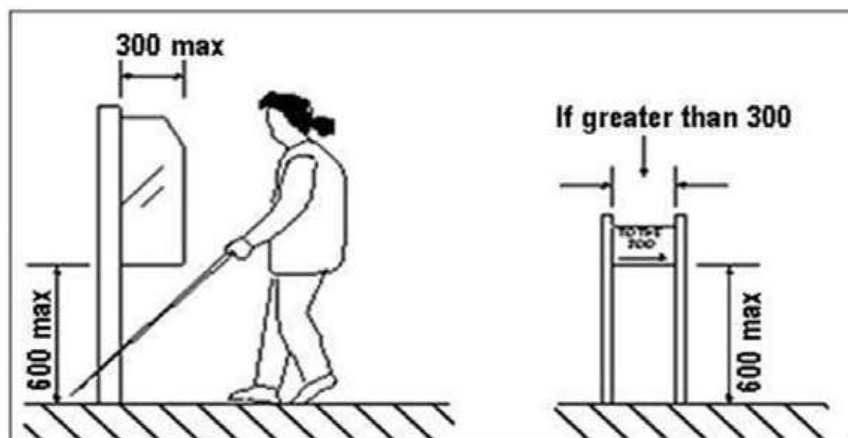


Figure 9- Radial range and object detection by the visually impaired

2.5 Handrails

2.5.1 General

Handrails/ grab bars are extremely important features and must be designed to be easy to grasp and to provide a firm and comfortable grip so that the hand can slide along the rail without obstruction. Many Persons with Disabilities and elderly rely upon handrails/ grab bars to maintain balance or prevent serious falls. Handrails may be provided with Braille/ tactile markings at the beginning and the end to give information to people with visual impairment.

2.5.2 Handrail with Braille Information Panel

Handrail should:

- Be slip-resistant with round ends.
- Have a circular section of 38-45 mm in diameter.
- Have a minimum clear space of 50 mm from the walls.
- Be free of any sharp or abrasive elements.
- Have continuous gripping surfaces, without interruptions or obstructions that can break a hand hold.

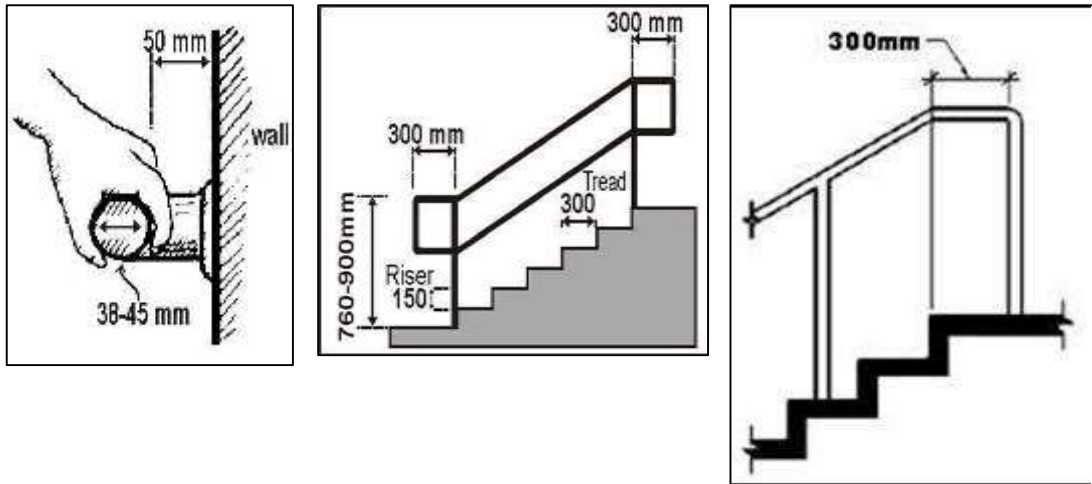


Figure 10- Grab bar details Figure 11-Handrails for steps Figure 12- Handrails for extension

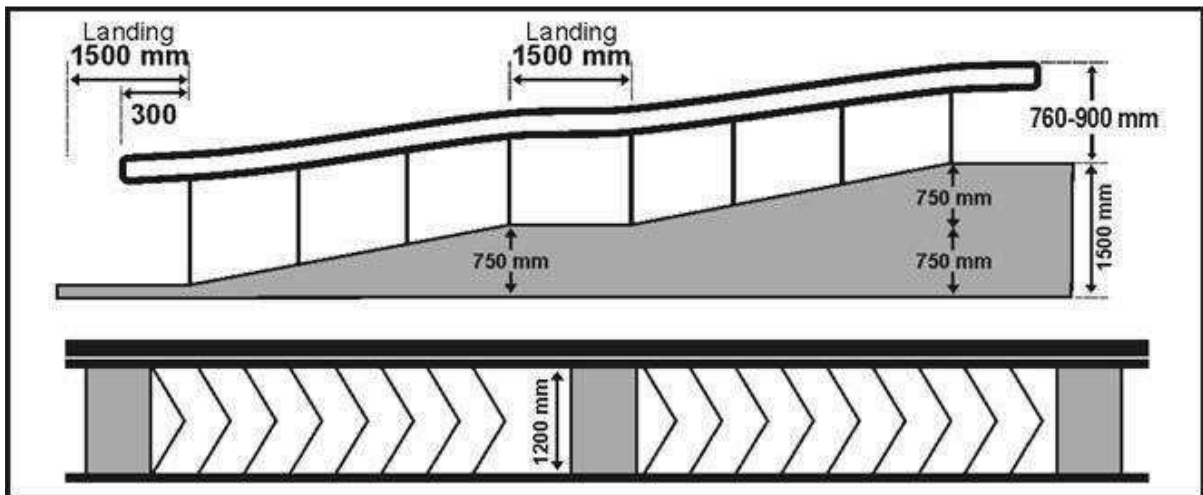


Figure 13- Handrails for ramps

2.5.3 Handrails Standards

A ramp run with a vertical rise greater than 150 mm should have handrails that: are on both the sides are placed at a height of between 760 mm and 900 mm above the floor level handrails must be continuous on both sides & even at landings.

Extend horizontally for a distance of not less than 300 mm beyond the top and bottom of the ramp to provide support for persons who may need help to negotiate the ramp not project into another path of travel. ^{viii} Provision of continuous handrail along corridor can be provided. This can be installed where staircases, ramps and corridors are provided. Handrails to have braille engravings.

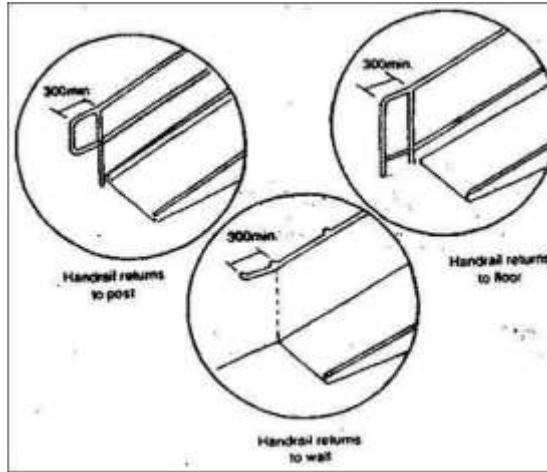


Figure 14- Typical handrail extensions

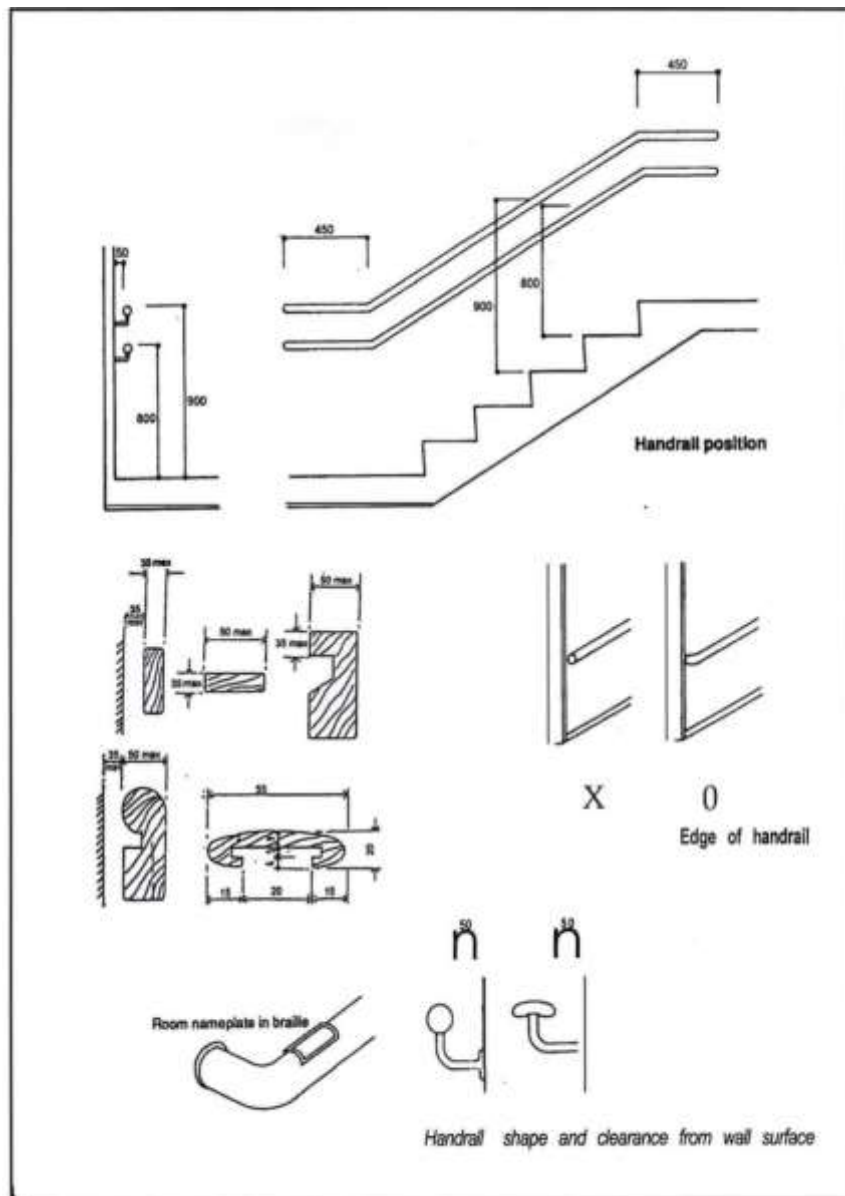


Figure 15- Handrail details

2.6 Grab Bar

Grab bars/ rails should be manufactured from a material which contrasts with the wall finish (or use dark tiles behind light-coloured rails), be not too warm /cold to the touch and provide good grip. It is essential that all grab rails are adequately fixed, since considerable pressure will be placed on the rail during manoeuvring. In rural areas, indigenous materials such as bamboo/ wood/ other can be used for making grab bars in toilets.

Grab bars should: -

- Be slip-resistant with round ends.
- Preferably have knurled surfaces.
- Have a circular section of 38-45 mm in diameter.
- Be free of any sharp or abrasive elements.
- Have a minimum clear space of 50 mm from the wall be installed at a height of 760 mm to 900 mm be able to bear a weight of 250 kg.

2.7 Lift

2.7.1 Size

- The minimum size of the lift should be 1500 mm wide by 1500mm deep wherever possible, 13 passenger lift to be provided, which allows easy manoeuvrability of wheelchair user.
- Each lift to have a mirror at the back so that a wheelchair user can see which floor they have reached. The mirror should be located in a way that the floor number to be easily indicated in the mirror.
- Lift locations should be clearly signposted from the main pedestrian route, and recognizable through design and location. It should be located near to the entrance door so that persons with disabilities don't have to search or move more in the building premises to search them. They should be easily seen from the accessible route without any hindrances in the route.
- Provision of foot operated lifts should be considered.

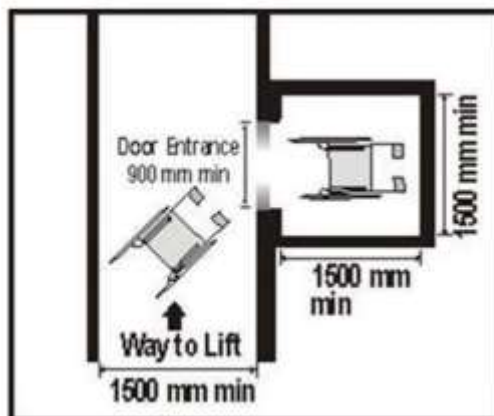


Figure 16- Placement of Lift accessories

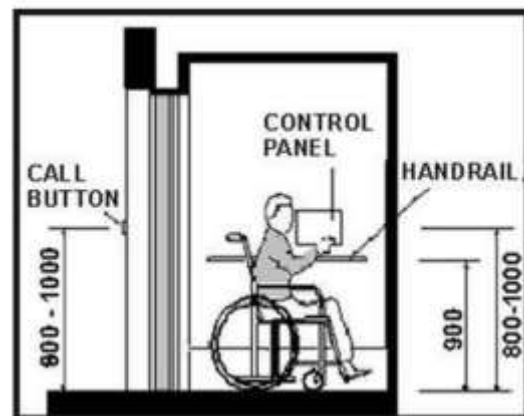


Figure 17-Size of Lift

2.7.2 Door

- The lift door should have a clear opening of not less than 900 mm and contrasting in colour from the adjoining wall.
- There should be no difference in level between the lift door and the floor surface at each level. The gap between the lift door and building floor should not be more than 12 mm.
- Time of closing of an automatic door should be more than 5 seconds and the closing speed should not exceed 0.25 meters per second.

2.7.3 Call Button

The call button located outside the lift should:

- Have a clear floor space of at least 900 mm x 1200 mm with no obstruction placed to prevent a wheelchair user from reaching the call button; and
- Be installed at a height between 800 mm and 1000 mm.
- The call to be connected to the guard which handles the lifts mobility at the ground surface and also to the help desk for persons with disabilities.
- Provision of call button at foot level in addition to hand operated level should be provided.

2.7.4 Control Panel

The control panel should:

- Have a clear floor space of at least 900 mm x 1200 mm with no obstruction placed to prevent a wheelchair user from reaching it; Be placed at a height of between 800 mm and 1000 mm from the floor level
- Have buttons with Braille/ raised letters and in sharp contrast from the background to aid people with visual impairments.
- The control panels to be regularly maintained and the buttons with braille/ raised letters to be clean by dry materials on regular basis to avoid any dirt or damage.
- Provision of horizontal control panel should be given.

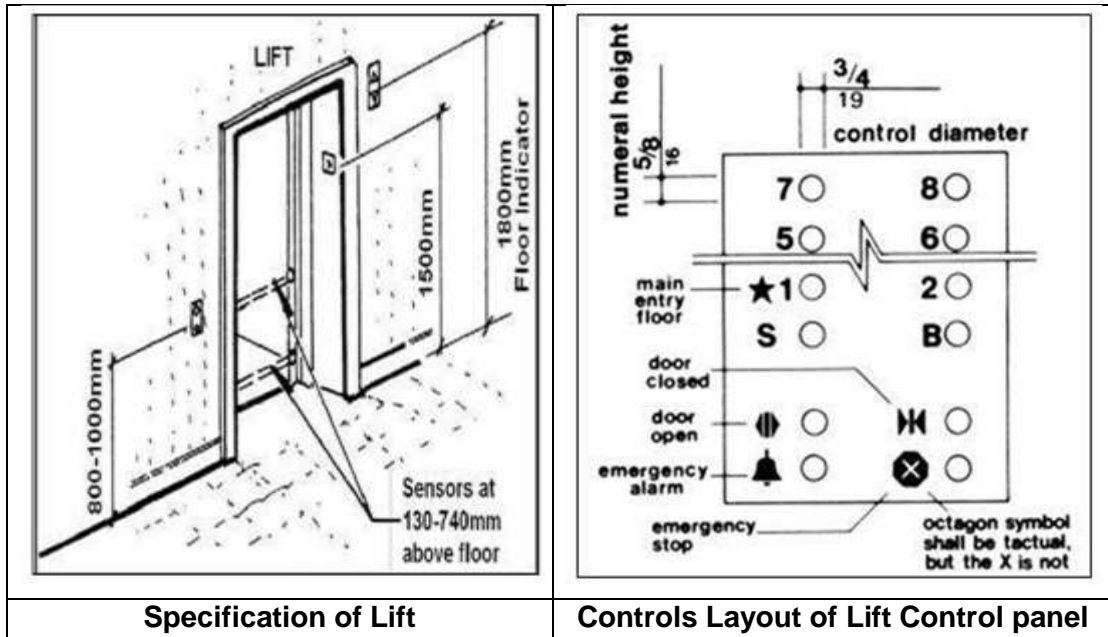


Figure 18- Specifications of Lift; Controls layout of lift control panel

2.7.5 Audio and Visual Indicators

- The lift should have a voice announcement system along with a visual display to indicate the floor level and also the information that the door of the cage is open or closed for entrance or exit
- The announcement system should be clearly audible i.e. the announcement should be 50 decibel.
- The visual indicators can be digital and can be hung from ceiling or wall hung signage

2.7.6 Other facilities

- The use of visually and acoustically reflective wall surfaces should be minimized within the lift car as visual reflections can cause discomfort and affect the visual acuity of people with visual impairments.
- The floor of the lift car should be slip resistant and have similar frictional qualities to the floor of the lift landing to decrease the risk of stumbling.
- The provision of a mirror on the wall of the lift car opposite the lift door is a positive aid to navigation for wheelchair users. It allows the wheelchair user to see if anyone is behind them and also to see the floor indicator panel. The mirror should not extend below 900 mm from the lift floor to avoid confusing people with impaired sight.
- The emergency communication system should be coupled with an induction loop system installed all around the lift. Telephone units, where provided, should have an inbuilt inductive coupler to assist persons using hearing aids.

3. Bus Terminal Exteriors including Parking Areas

3.1 Approach to Building

- A passenger alighting and boarding point should be provided at the level of approach for Persons with Disabilities to alight from and board a vehicle.
- Pedestrian facilities should be planned in an integrated manner so as to ensure a continuous pedestrian flow
- Where transfers have to be made from a vehicular surface to a pedestrian surface, the driveway and the pavement or footpath surfaces should be blended to a common level or ramped.
- Difference in level between the driveway and footpath level surface should be avoided. Where the difference is unavoidable, such drop shall have a kerb ramp.

3.2 Passenger alighting and drop off points

A passenger alighting and boarding point should provide an access aisle of at least 1500mm wide by 6000mm long adjacent and parallel to the vehicle pull-up space the accessible aisle must be at the same level as the vehicles have a kerb ramp.

Tactile floor guidance to be provided from the building drop off area leading up to entrance of the building.

3.3 Access to building

An access route should be provided connecting all major entrances & exits of the building from the alighting and boarding point of taxi stands and car park lots for Persons with Disabilities.

In multi storey buildings, the accessible entrance must have an accessible route leading to the elevators.

Easy access to assistance by transit agency personnel must be there. Use of an easily identifiable way finding system using symbolic communication to be provided. Availability of transit station maps at numerous locations throughout the station must be provided.

The accessible entrance, if different from the main entrance, should be located adjacent to the main entrance and not at the rear of the building. The accessible entrance should be clearly signed and easy to locate. Symbol should be displayed at all other non-accessible entrances to direct Persons with Disabilities to the accessible entrance.

Capacity of side walks

Width of side walks	Capacity in number per Hours	
	All in one direction	In both direction

Accessibility Guidelines for Bus terminals and Bus Stops

1.50m	1200	800
2.00m	2400	1600
2.50m	3600	2400
3.00m	4800	3200
4.00m	6000	4000

A clear, firm and level landing of at least 1800mm x 1800mm should be provided on either side of the entrance door.

The clear width of the accessible entrance door should not be less than 900mm, preferable 1m and the width of the corridors or passageways leading to and from such access door should not be less than 1200mm. ^{ix}

Internal floor surfaces should be anti-skid/ non-slip and of materials that do not impede the movement of wheelchairs/other mobility aids. If mat is provided it should be flushed with the floor finish.

Persons with visual impairments find it easier to locate doors if there is a texture difference in the floor around the doorway from the rest of the flooring. It is generally good practice to make tactile flooring on either side of the door but care must be taken to ensure that the top end of the tactile flooring are flush with the rest of the flooring.



Figure 19- Tactile flooring pathway



Figure 20- Tactile flooring

In addition to tactile pavers leading to the main entrances, beepers may be put at all main entrances to enable people with visual impairments to locate them.

A tactile layout plan of the building along with Braille and audio systems should be provided at the entrance for people with visual impairments.

Glazed entrance doors must have manifestations on the glass preferably at two levels i.e. one between 800 to 1000mm and another between 1400 to 1600mm above the floor. The manifestation should be contrasting in colour from the immediate background and be minimally 1500 mm high.

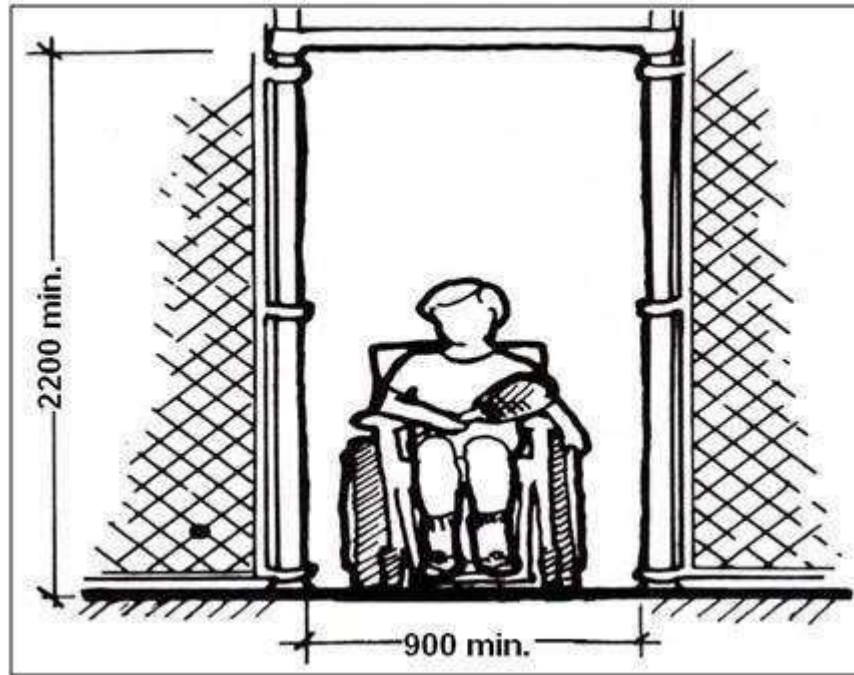


Figure 21- Standard dimensions for door

3.4 Floor surfaces

- Floor surface should be stable, firm, level and slip-resistant and preferably matt finish and should not have any projections, drops, or unexpected variation in level.
- Complex patterns should be avoided. Floor patterns that could be mistaken for steps, for example stripes, should not be used for floors in corridors. Floors should be levelled. If this is unavoidable, the slope of floors should be no greater than 1:20. If greater, floor should be designed as ramp.

For people with low vision, lines of brightly coloured tape may be placed on the floor surface to assist mobility in poorly lighted areas.



Figure 22- Brightly coloured tape on floor surface

Where carpets are used in circulation area (and cannot be avoided), they should:

- Be securely fixed on the floor
- Have firm cushion, pad or backing; and
- Have exposed edges of carpets fastened to floor surface and trim along the entire length of the exposed edge.



Figure 23- Tactile provision in carpet areas

3.5 Passage Way

Continuity of the pedestrian pathway shall be maintained to a minimum width of 1200 mm behind the auto/ taxi stand.

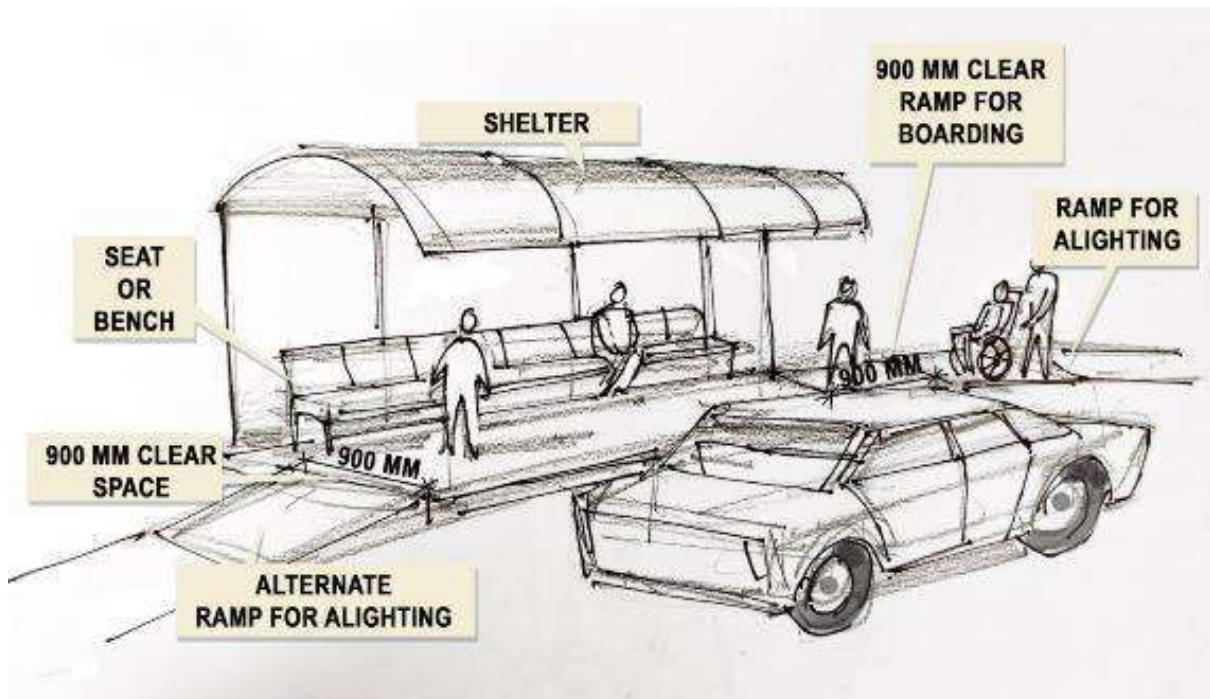


Figure 24- Layout for accessible taxi/car boarding

3.6 Walks and Paths

Walks should be smooth, hard and have levelled surface suitable for walking and wheeling. Irregular surfaces as cobble stones coarsely exposed aggregate concrete, bricks etc. often cause bumpy rides and should be avoided. Walkways /pathways should be shaded.

Minimum walk way width for two-way traffic should be 1800 mm. However, in exceptional cases (such as around trees/poles etc.); the width could be 1500 mm.

Capacity of side walks

Width of side walks	Capacity in number per Hours	
	All in one direction	In both direction
1.50m	1200	800
2.00m	2400	1600
2.50m	3600	2400
3.00m	4800	3200
4.00m	6000	4000z

The walkway should not have a gradient exceeding 1:20.

When walks exceed 60 meter in length it is desirable to provide rest area adjacent to the walk at convenient intervals of 30 meter for bench/ resting seats. For comfort, seat height should be between 450 mm-500 mm, have a backrest and hand rests at 700 mm height.

Texture change should be provided for persons with vision impairment in walkways adjacent to seating by means of warning tactile pavers. Avoid gratings and manholes in walks.

The provisions of guard rails along walkway with suitable access should be provided for guiding pedestrian safety.

3.6.1 Levels, grooves and gratings

- Passing over different levels and grooves, vertical level changes up to 6 mm may not need edge treatment.
- To prevent a wheelchair from getting its casters caught in a drainage ditch or grating cover, install grating with a narrow slot not more than 10mm wide, perpendicular to the direction of movement.
- Grating should be flushed with finished ground level. Treat the grating with a non-slip finish.

3.6.2 Tactile pavers: guiding & warning blocks

Tactile guiding blocks (Line-type)- This block indicates a correct path/route to follow for a person with visual impairment. It is recommended to install one/two rows of tactile

guidance tiles along the entire length of the proposed accessible route (Care must be taken to ensure that there are no obstacles, such as trees, poles or uneven surfaces, along the route traversed by the guidance blocks. Also, there should be clear headroom of at least meters height above the tactile guidance blocks, free of protruding objects such as overhanging tree branches and signage, along the entire length of the walk.

3.6.3 Tactile warning blocks (Dot-type)

This block indicates an approaching potential hazard or a change in direction of the walkway, and serves as a warning of the approaching danger to persons with visual impairments, preparing them to tread cautiously and expect obstacles along the travel path, traffic intersections, doorways, etc. They are used to screen off obstacles, drop-offs or other hazards, to discourage movement in an incorrect direction, and to warn of a corner or junction. Two rows of tactile warning tiles should be installed across the entire width of the designated accessible pathway, before intersections, building entrances, obstacles such as trees, and each time the walkway changes direction.

Warning blocks should be placed 300mm at the beginning and end of the ramps & stairs, at landings and entrance to any door. When any obstruction appears, the warning tiles must be used to indicate the obstruction.

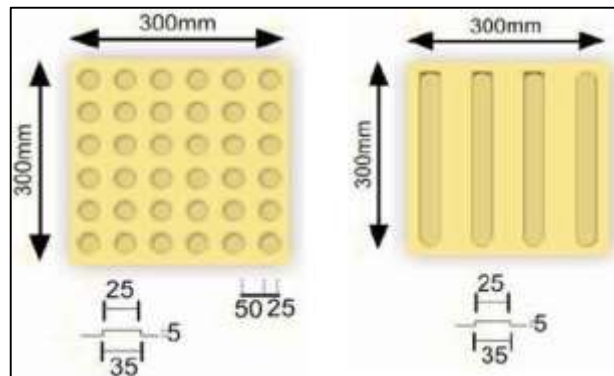


Figure 25- Warning blocks & Guiding blocks

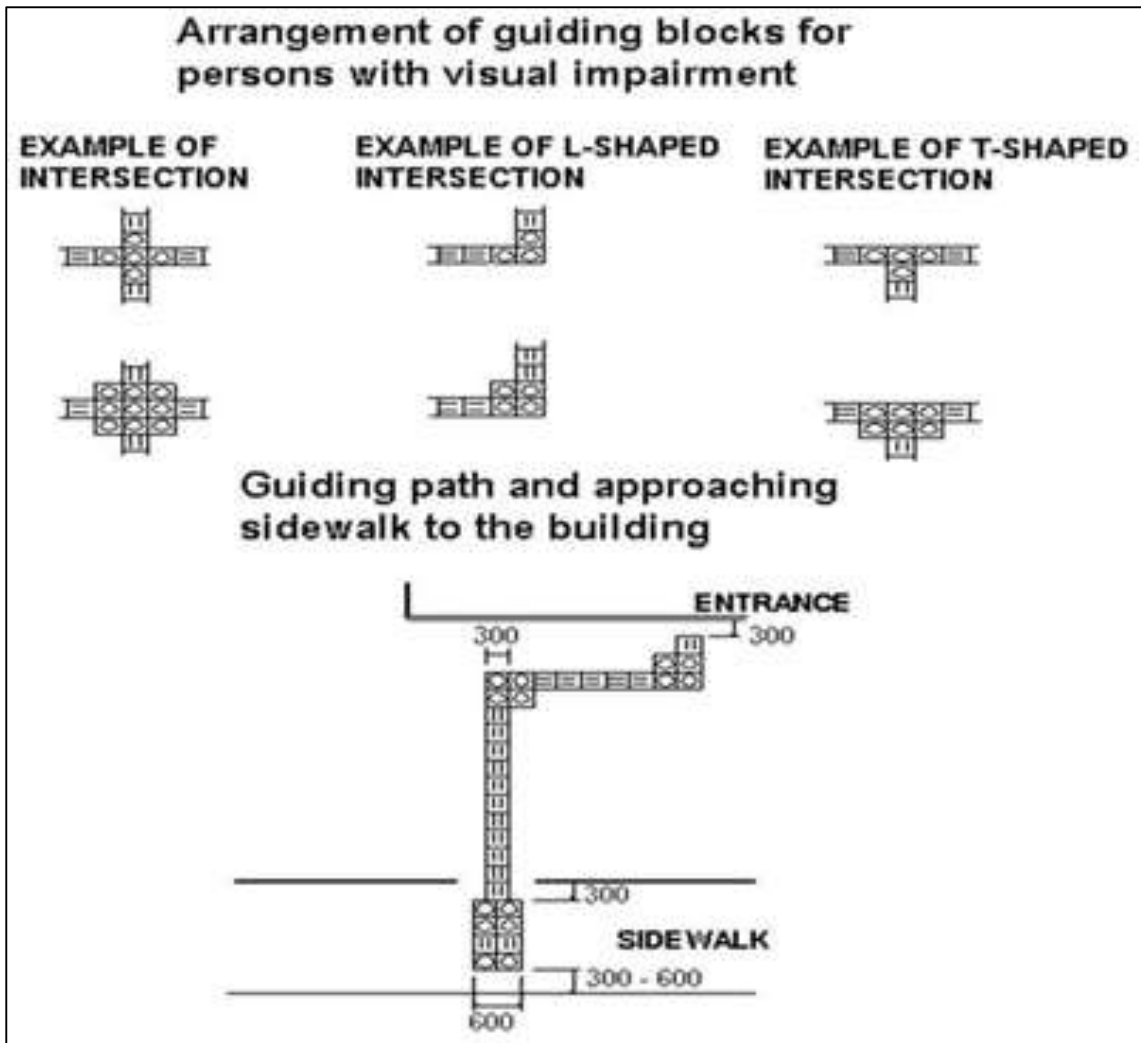


Figure 26- Configuration and layout of tactile pavers: guiding and warning

3.6.4 Protruding objects

Objects projecting with the lower edge of the projection at or below 300 mm and upper edge of the projection minimally 1200 mm above the finished walk surface are detectable by the white cane, and these may protrude into the walks to an extent that allows wheelchair passage.

Objects mounted with their leading edges between 300 mm and 2200 mm above the finished walk surface should not protrude more than 100 mm into the walks.

Hazard protection should be provided if objects project more than 100 mm into an access route and their lower edge is more than 300 mm above the ground. Hazard protection associated with such objects should take the form of a kerb or other solid barrier so that person with visual impairment can detect the hazard using a cane. The hazard protection should not extend beyond the front edge of the object, nor should it be set back more than 100 mm from its front edge.

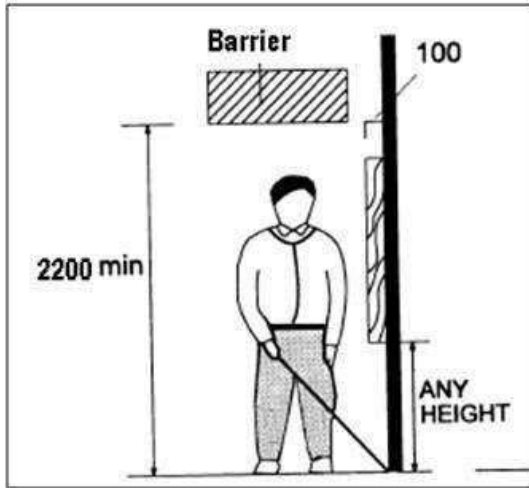


Figure 27- Protruding obstacles placed in a niche obstacles

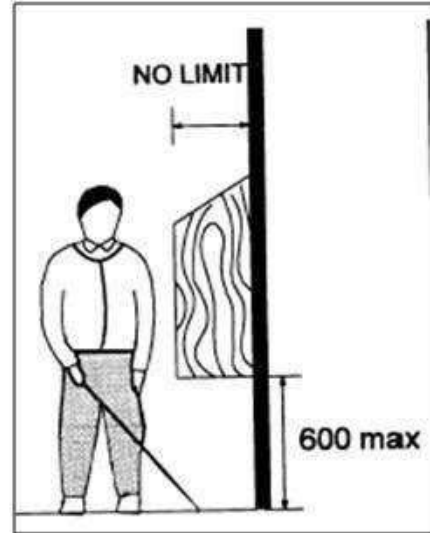


Figure 28- Clearance from protruding obstacles

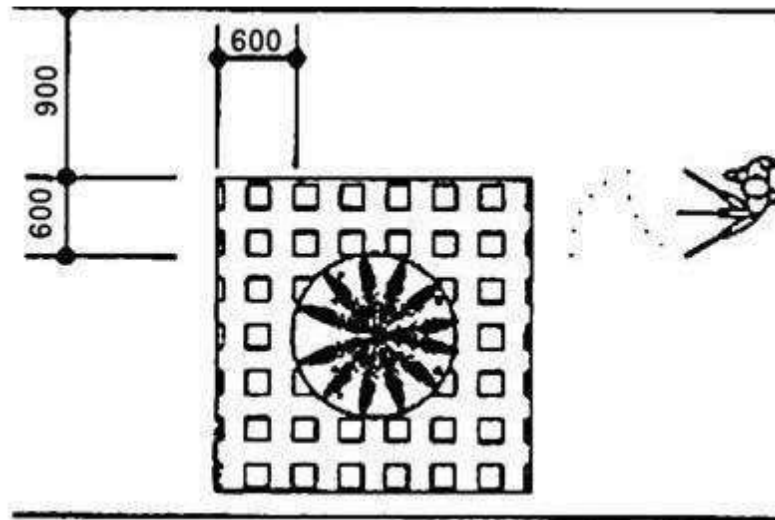


Figure 29- Placement of obstacles outside path of travel

3.7 Lighting for walkways

- Lighting should illuminate the walkway lighting fixtures not exceeding a height of 4m from ground level should be provided.
- Lighting must be provided every 20 – 30m, focusing light on the walkways. A whiter light source, for example high-pressure sodium, is preferable for the aesthetic effect and for better colour definition, which benefits those with poor sight.
- White lighting at average 35-40 lux is recommended to ensure colour contrast of tactile pavers and visible at night to persons with low vision.

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- Under no circumstances the lighting pole should interfere with the clearance of the walkway. Light pole may preferably be located within the tree-planting zone. Lower level light poles are preferred to avoid shadow where there are high trees.
- Platforms should be well illuminated with at least 100 lux levels or more for better visibility, high contrast and legibility.
- A good level of lighting should be provided not only at walkways and platforms but also at other important spaces such as stairs, ramps and underpasses, other station environment. Good lighting is not only essential for people with low vision but also provide feeling of personal security to other passengers.
- Wall mounted footlight at ramp is recommended. Lighting along the tactile path can be proposed on pathways. It shall work as protective element as well, to avoid wheels from dropping off.

3.8 Car Parking

There shall be reserved parking for persons with disability within 30m of accessible entrances.

3.8.1 Location

- Accessible parking lots that serve a building should be located nearest to an accessible entrance and / or lift lobby within 30 meters. In case the access is through lift, the parking shall be located within 30 meters.
- The accessible route of 1200 mm width is required for wheelchair users to pass behind vehicle that may be backing out.
- The car park entrance should have a height clearance of at least 2400 mm.

3.8.2 Accessible Car Parking Lot

The accessible car parking lot should: -

- Have minimum dimensions 5000 mm×3600 mm;
- Have a firm, level surface without aeration slabs; and
- Wherever possible, be sheltered.

Where there are two accessible parking bays adjoining each other, then the 1200mm side transfer bay may be shared by the two parking bays. The transfer zones, both on the side and the rear should have yellow or white cross-hatch road markings.



Consideration should be given to the distribution of spaces for use by the Persons with Disabilities in accordance with the frequency and persistency of parking needs. Lighting has to be provided in the parking zone whether open parking or covered parking area.

Two accessible parking lot should be provided for every 25 car parking spaces.

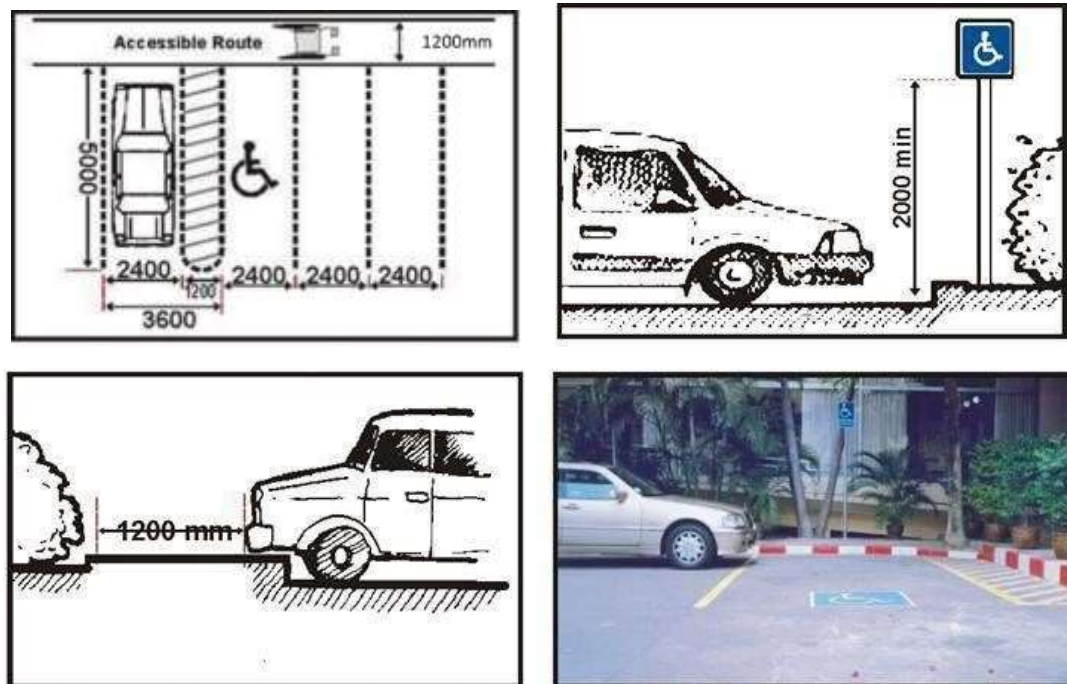


Figure 30- Accessible parking standards

3.9 Taxi/Auto Rickshaw Stands

3.9.1 General

- Provision of accessible taxi boarding areas with minimum 900mm clear space, waiting area and level boarding platform.
-
- At least one accessible route should be provided from the alighting and boarding point of the taxi stand to the walkway that leads to the accessible building entrance.
- Guiding blocks should be provided along the accessible walkway from the taxi stand to the building entrance for the aid of persons with vision impairments.
- A taxi bay should, where possible be provided at the level of approach for Persons with Disabilities to alight and to board the vehicle.

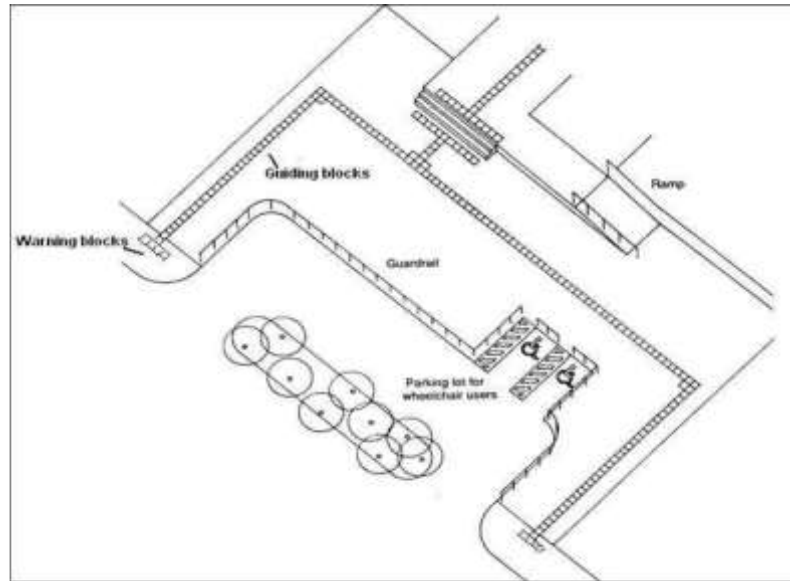


Figure 31- Warning blocks & guiding blocks

- Where transfer has to be made from a vehicular surface to a pedestrian surface, the driveway, pathway or walkway should be blended to a common level or be ramped.
- Directional signs should be installed to direct Persons with Disabilities to an accessible entrance.
- The sign indicating the presence of a Taxi/Auto Rickshaw Stand shall be on a vertical pole and the sign should be visible after dark (35 – 40 Lux).

4. Bus Terminal Interiors

4.1 Sidewalk/ Pathways

4.1.1 Sidewalk/ Pathways Design

Sidewalk should:

- Constructed with a non-slip material and surface should be different from rest of the area;
- Be along the entire length of the road;
- Be not more than 150mm high;
- Be preferably 1800 mm wide, with a bare minimum of atleast 1200 mm ;
- Have warning tactile blocks for persons with visual impairments;



Figure 32- Sidewalks & pathways

- Tactile should also be placed before any obstruction
- Preferably have well defined edges of paths and routes by use of different colors and textures;
- Have no obstacles or projections along the pathway. If this is unavoidable, there should be clear headroom of at least 2100 mm from the floor level;
- Have tactile warning blocks installed next to all entry and exit points from the pathway.
- The walkway should be cross vehicular traffic. Warning blocks at 300mm before and after finishing of the walkway should be provided.
- Provision of signage's (way finding system) at relevant places must be provided

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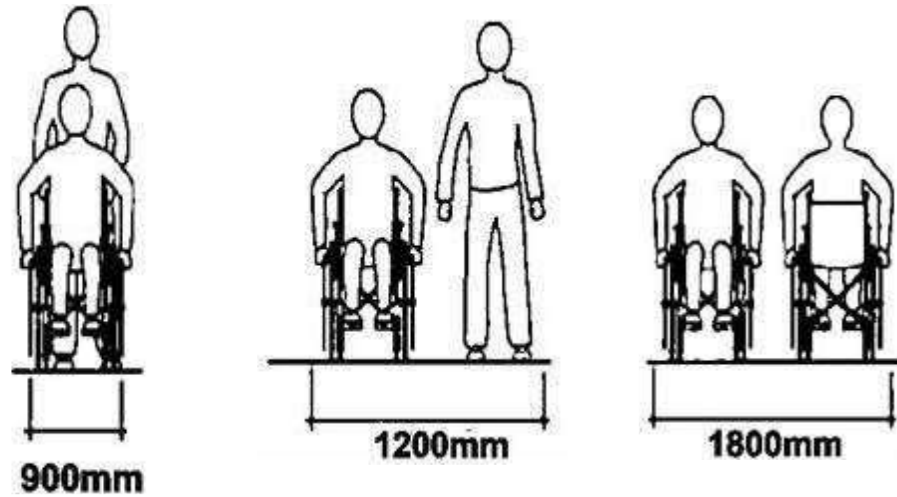


Figure 33- Dimensions for wheelchair user & person walking along

4.2 Pedestrians crossing

Pedestrian crossing could be broadly classified as

- i) At Grade crossing – At grade pedestrian crossing are those where the pedestrian cross the carriageway at the same level
- ii) Grade separated crossing- At grade separated pedestrian crossing are those where the pedestrian cross the carriageway at a level different from vehicular movement

4.2.1 At Grade Crossing

With respect to location aspects, such crossing could be classified as:

- i. Pedestrian crossing at intersection
- ii. At grade pedestrian crossing away from intersections

Pedestrian crossing should controlled crossing. And should be integrated with overall design of intersection

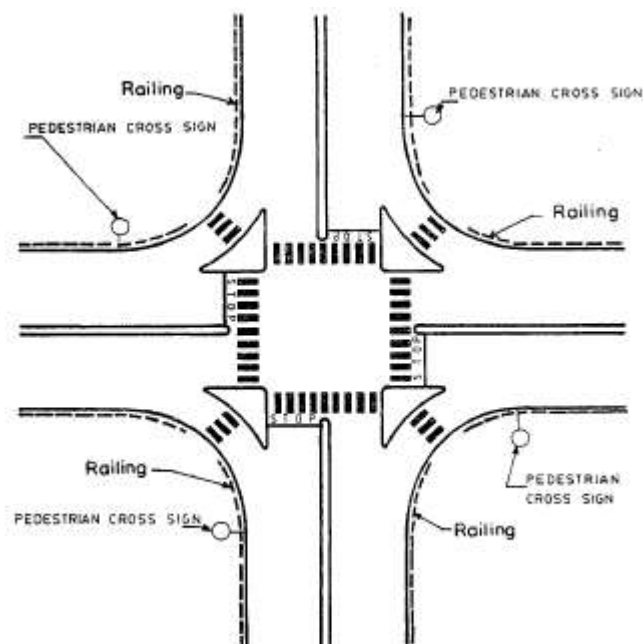


Figure 34- Typical design of crossing intersection At Grade separated crossing

At grade separated crossing should be provided where volume of pedestrian is more and cycle time for pedestrian crossing increase 120 sec.

Types of grade separated crossing:-

- 1) Underpass
- 2) Foot over bridges

4.3 Stairs

- Stairs should not be the only means of moving between floors. They should be supplemented by lifts/or ramps.
- Treads should be 300 mm deep and risers not higher than 150 mm. There should be no more than 12 risers in one flight run. The stairs landing should be minimally 1200mm deep.
- The stairs should have minimum 1500mm clear width.
- Steps should be of a consistent height and depth throughout the staircase.
- Projecting nosing and open stairs should not be provided to minimize the risk of stumbling. Also, spiral stairs should be avoided.
- Handrail for stairs should extend not less than 300 mm beyond the top and bottom step.

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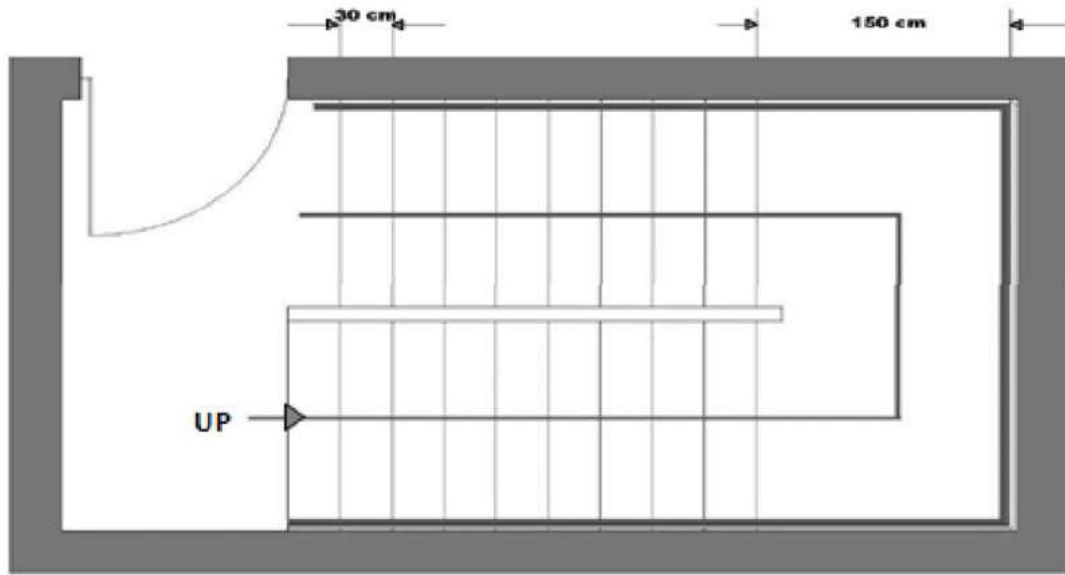


Figure 35- Continuous and extended handrail

Warning blocks should be installed 300 mm before the beginning and 300 mm after the end of each flight of steps to aid people with visual impairments complying.

There should be colour contrast between landings, and the steps. Step edges must contrast in colour to the risers and the treads. Contrast colour bands 50 mm wide should be provided on edge of the tread.



Figure 36- Placement of warning blocks for steps



Figure 37- Warning blocks at landings

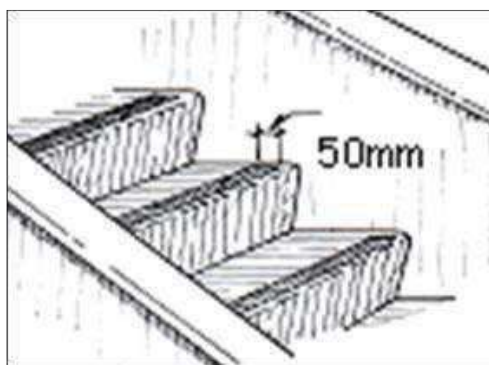


Figure 38- Colour contrast for step edges

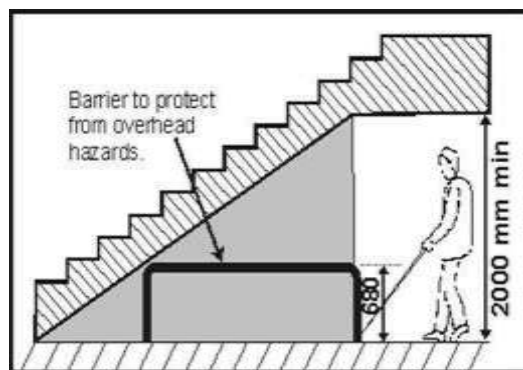


Figure 39- Typical detail of walkway

Accessibility Guidelines for Bus terminals and Bus Stops

4.4 Internal Corridors and Accessible Routes

The minimum clear width of an accessible route should be 1500mm to allow both a wheelchair and a walking person to pass except when additional manoeuvring space is required at doorways. Where space is required for two wheelchairs to pass, the minimum clear width should be 1800mm.

4.5 Resting benches/seats

In long paths of travel resting areas should be provided at frequent intervals not exceeding 30 meters.

Seat surface heights are crucial to the comfort of individuals if seating is to be used for prolonged periods. If a seat is too high or too low, or if there are no arm or back rests, a person may experience considerable discomfort as a result of poor posture. They may also have difficulty rising from a seated position if the seat is set too low, or if it has no armrests. Sitting on a slight slope can be very uncomfortable for wheelchair users.

Guidance on conventional seat heights varies over the range of 420-580mm, with a median height of 470-480mm and a common height being between 450mm and 475mm. Seat heights slightly greater than the normal 450mm are more convenient for people with restricted mobility.

Although conventional seating to these dimensions will meet the needs of most disabled people, there are some who find perch-type seating, against which people half lean and half sit, easier to use. Perch seating is recommended at a height of 700mm.

If space permits, it is helpful for people of restricted growth (and children) if there are some seats at a lower level than the standard height. Where possible, seats of varied height and width, ie higher and/or wider than standard seating, should also be provided for people of large stature or those with restricted leg movements. Offering seat designs that provide alternate seat heights may be feasible and, for instance, 490mm and 585mm will meet the requirements of most people. Seat widths are recommended to be a minimum 500mm.



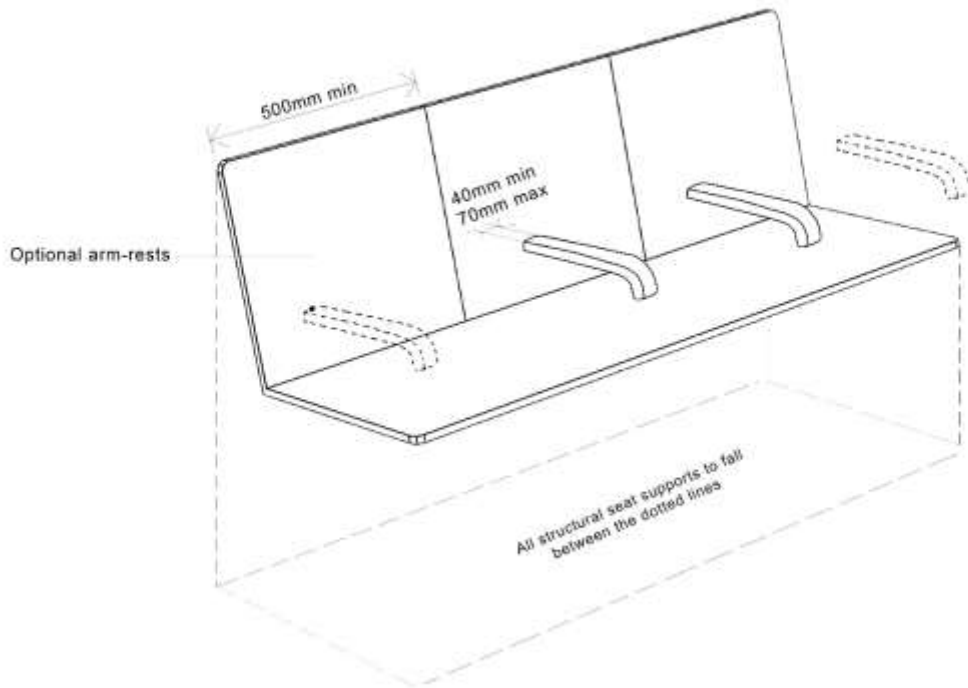


Figure 40- Seating's for persons with disabilities

4.6 Protruding objects

Obstacles, projections or other protrusions should be avoided in pedestrian areas such as walkways, halls, corridors, passageways or aisles.

4.7 Floor surfaces in corridors

- Avoid carpeting. If carpet is used, it should be fixed firmly with a pile not higher than 12mm. Tactile material in carpet foam can be added.



Figure 41- Tactile provision in carpet areas

Accessibility Guidelines for Bus terminals and Bus Stops

4.8 Doors leading into corridors

- Doors should not open outwards from rooms directly into a frequently used corridor, with the exception of doors to accessible toilets and service ducts.
- Where a door opens into an infrequently used corridor such as emergency exit, the corridor width should allow a clear space of 900 mm within the corridor when the door is open. Such doors should be located clear of any sloping floor surfaces in the corridor.
- Any door that opens towards a frequently used corridor should be located in a recess at least as deep as the width of the door leaf.
- The leading edge of any door that is likely to be held open should “contrast visually” with the remaining surfaces of the door and its surroundings to help identification by visually impaired people. The architrave should contrast visually with the wall surfaces surrounding the doorway.

4.9 Tactile guidance Path along the internal corridors and accessible routes

Along the accessible corridor and route connecting the entire building, a tactile floor guidance path for independent movement of persons with visual impairments should be provided. Tactile guidance path have to be laid out in the entire building premises connecting all the public utilities and locations and building entrance and exits.

4.10 Gratings

Grating located along the exterior circulation should:

- Preferably be covered;
- Have spaces not greater than 12 mm wide in one direction and
- Have long dimension across the dominant direction of travel ^x

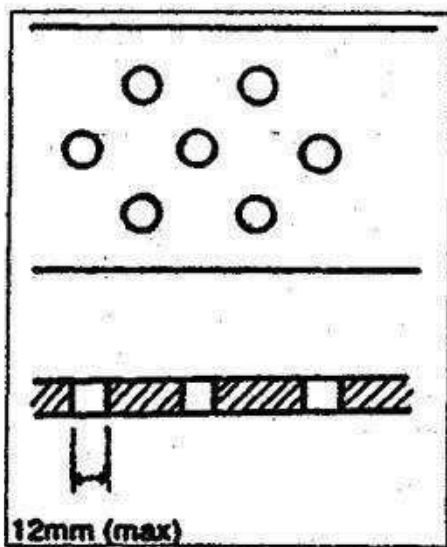


Figure 42- Grating Width

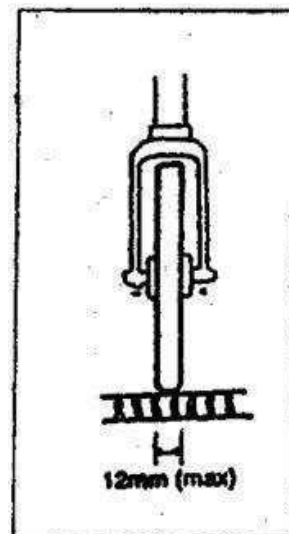


Figure 43- Wheelchair Castor Width

Accessibility Guidelines for Bus terminals and Bus Stops



Figure 44- Preferred design of gratings

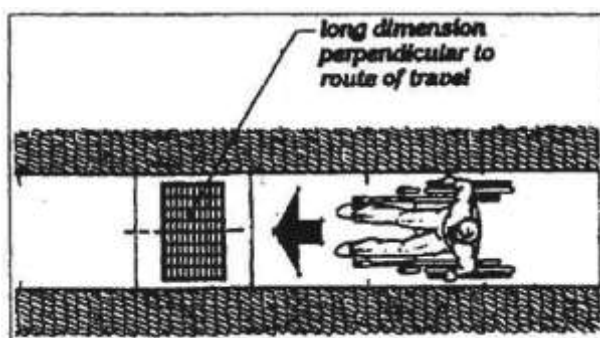


Figure 45- Installation Guide

4.11 Doors

4.11.1 General

- Doorways should be levelled.
- Wherever revolving doors or turnstiles are installed they should be supplemented with an auxiliary side-hung (swing type) door with 900mm minimum clear opening width.
- Bathroom (toilets/washroom) doors should swing out/ should be two way opening type so that the person inside does not fall against the door and block it. In case there is not much space available, consideration should be given to the use of sliding or folding doors, which are easier to operate and require less wheelchair manoeuvring space.
- Door should not be too heavy to operate and should not require a force of more than 20 N to operate.
- Automatic doors should have a push button system to open them.
- All external doors should have warning blocks installed 300mm before entrances. Foot operated latches should also be provided in the door.

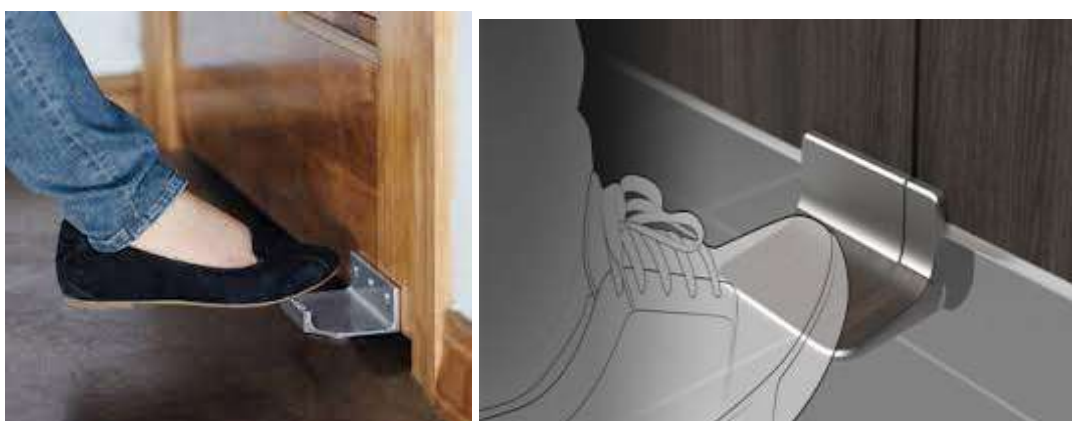


Figure 46- Foot operated latches on the door

4.11.2 Clear width

Accessibility Guidelines for Bus terminals and Bus Stops

The minimum clear opening of doorways should be 900mm, measured between the face of the door and the face of the door stop with the door open at 90°.

4.11.3 Thresholds

There should be no thresholds. If thresholds are unavoidable, they should not exceed 12 mm and those exceeding 5 mm should be bevelled.

4.11.4 Double-leaf doors

In case the door has two independently operated door leaves, at least one active leaf should comply with required norms.

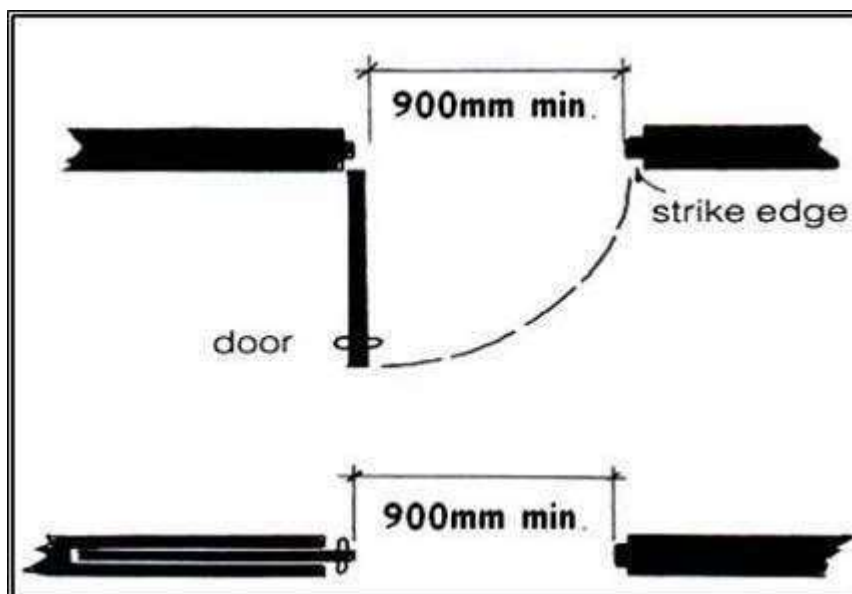


Figure 47- Clear door width

4.11.5 Manoeuvring space at doors

A distance of 650 mm should be provided beyond the leading edge of door to enable a wheelchair user to manoeuvre and to reach the handle. Wheelchair manoeuvring spaces should be free of any obstructions and space should be provided on the side of the door handle in the following manner: On the pull side, a minimum space of 650 mm; On the push side, a minimum space of 300 mm;

For two-way swing door, a minimum space of 300mm.

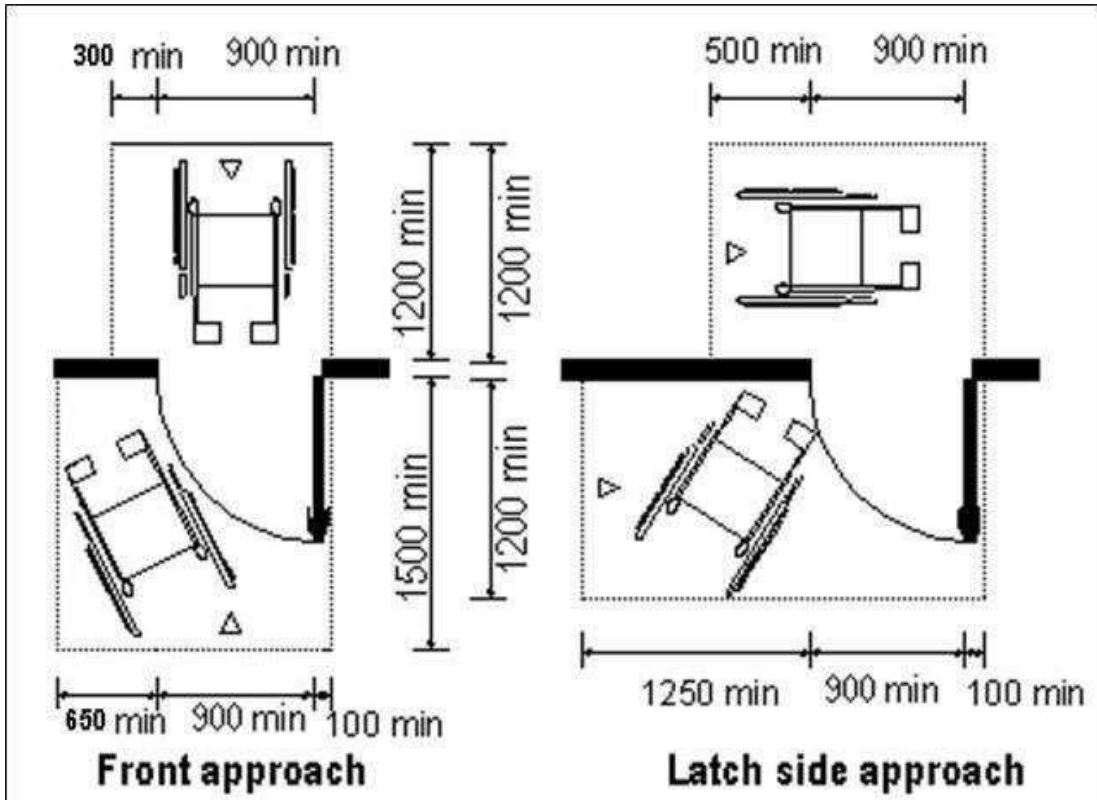


Figure 48- Manoeuvring space needed for wheelchair users to approach doors

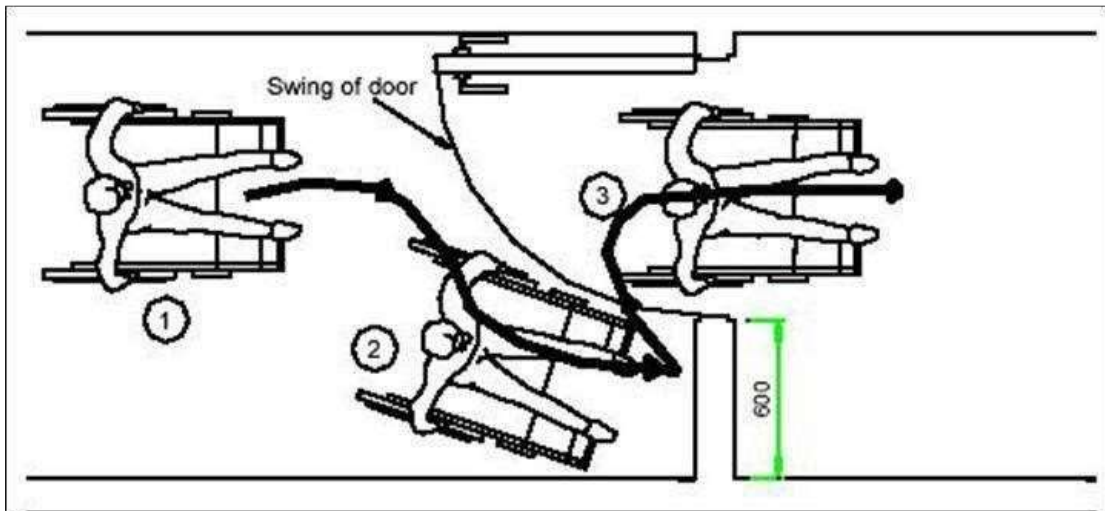


Figure 49- Position taken by wheelchair when negotiating door in passageway

4.12 Two doors in series

The minimum space between two hinged or pivoted doors in series should be 1200 mm plus the width of the door swinging into that space.

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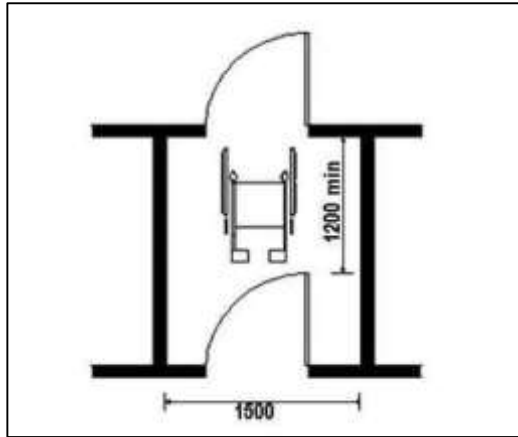


Figure 50- Space between two doors

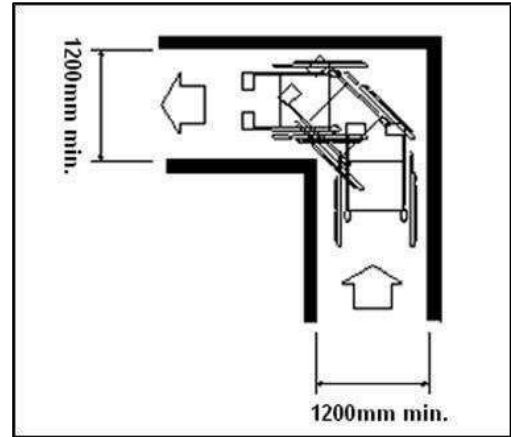


Figure 51- Space for wheelchair in 90° turn

4.13 Wheelchair manoeuvring space

To enable wheelchair users to approach doors, manoeuvring space is needed. Corridor should have a width of at least 1200 mm to allow a 90° turn to be made through a door. In narrow spaces sliding doors may be preferable.

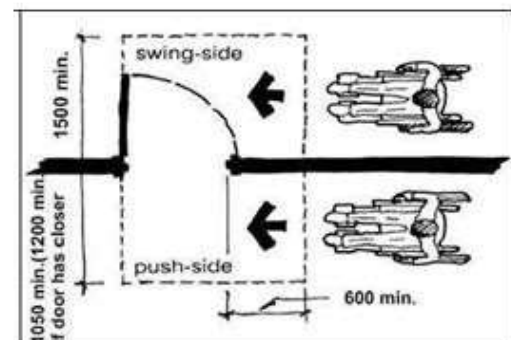
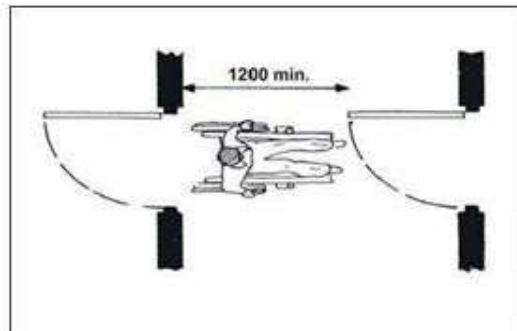


Figure 52- Manoeuvring space needed for wheelchair users to approach doors

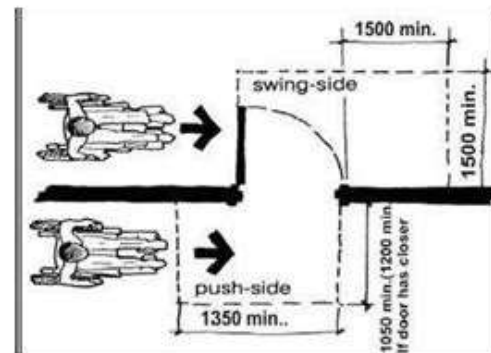
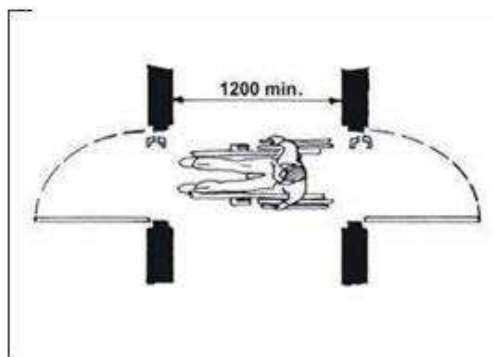


Figure 53- Manoeuvring space needed for approach doors

4.14 Door hardware

- Operable devices such as handles, pulls, latches and locks should be operable by one hand.
- Not require fine finger control, tight grasping, pinching or twisting to operate; and be mounted at a height of 850 mm to 1100mm from the floor. For easy identification by persons with visual impairment all door furniture should contrast visually with the surface of the door.
- The location and design of latch and push/pull handles should be consistent throughout a building. To facilitate the closing of a door by wheelchair users (for example, a water- closet compartment, that does not have a self-closing mechanism), the door should have a horizontal handle, provided on the closing face of the door, approximately 760 mm from the floor.

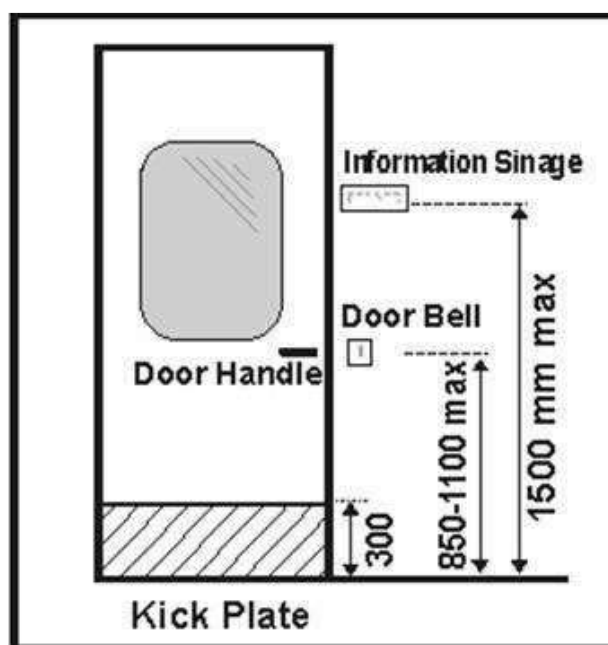


Figure 54- Door hardware location

4.15 Door handles

- The following characteristics are recommended:
- Push –pull mechanisms that require no grasping;
- Lever handles to be preferred on latched doors;
- It is safer to use D shaped handles as they reduce the risk of catching on clothing, or injuring from the exposed lever end.

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- Doorknob is not recommended, as it does not provide adequate grip for persons with impaired hand functions.

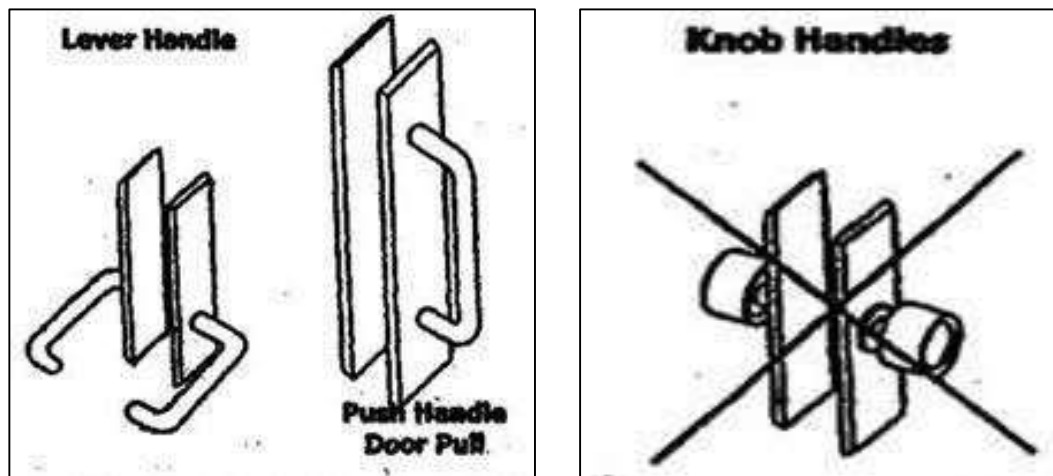


Figure 55- Lever handle, push handle & knob handles

4.15.1 Sliding/ folding doors

Operating hardware should be exposed and usable from both the sides when the door is fully open.

4.15.2 Door opening force

The maximum force for pushing or pulling or sliding a door should be 20N.

4.15.3 Door closure

The sweep period of the door should be adjusted, so that from an open position of 90 degrees the door does not take less than 3 seconds to move to a semi-closed position.

4.15.4 Vision panel

All two-way swing doors or doors in general circulation areas should be provided with vision panels giving a visibility from a height of 800 mm to 1500 mm. This will enable both the wheelchair user and the ambulatory disabled to be noticed by a person on the opposite side in order to prevent him/her from being accidentally struck by the door.^{xi}

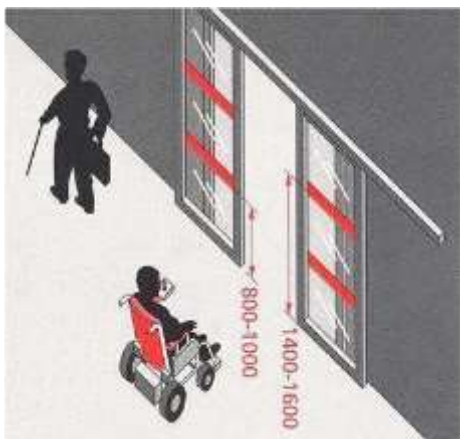


Figure 56- Glass door markings

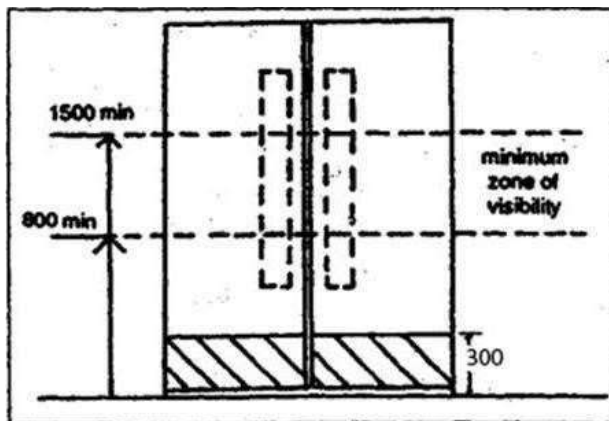


Figure 57- Recommended visibility zone

4.15.4.1 Kick-plate

- Kick- plates of 300-400 mm height are recommended for doors in high- use in order to protect the push side of doors from damage.

4.15.4.2 Door identification

- To help people with impaired sight to see doors, the door and frame should be in a colour which contrasts with the adjoining wall.
- The door should not be of a highly polished/ reflective material such as stainless steel.

4.15.4.3 Glass doors

The presence of a glass door should be made apparent, with permanent manifestation at two levels, within 800 mm to 1000 mm from the floor and within 1400 mm to 1600 mm from the floor contrasting visually with the background seen through the glass in all light conditions. The edges of a glass door should also be apparent when the door is open.

Note: If a glass door is adjacent to, or is incorporated within, a fully glazed wall, the door and wall should be clearly differentiated from one another, with the door more prominent. To achieve this, the door may be framed on both sides and the top by an opaque high-contrast strip at least 25 mm wide.

4.16 Windows

- Windows should have handles/ controls in accordance.
- Should provide an unobstructed viewing zone for wheelchair users between 600mm and 1400mm.
- Curtain or Venetian blind controls/ropes should be at 800-1000 mm height from the finished floor level for wheelchair users/short stature persons.

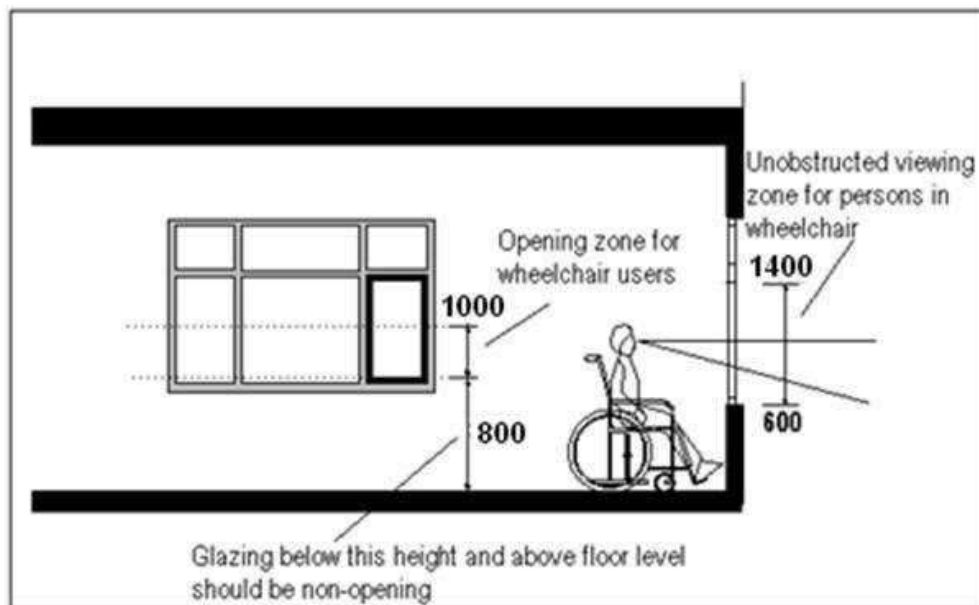


Figure 58- Standards for accessible window Controls and Operating Mechanism

4.16.1 Faucets/taps

Faucets and other controls designated for use by Persons with Disabilities should be hand operated or electronically controlled. Provision of foot operating taps should be included as well. Hand-operated controls should:

- be operable by one hand;
- require no tight grasping, pinching or twisting of the wrist;
- require a force less than 22 N to activate; and
- Have handles of lever type (not self-closing) operable with a closed fist.



Figure 59- Lever handle tap



Figure 60- Long handle tap

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Figure 61- Foot operating tap

- To cater for visually impaired people, controls should be colour-contrasted with the surrounding face plate panel and the face plate should similarly contrast with the background wall on which it is mounted. Information should preferably be in relief (embossed letters/ symbols accompanied with Braille information) for tactile reading.
- To aid operation for people with impaired co-ordination or impaired sight, switches should have large push plates, operable by one hand.

4.16.2 Clear Floor Space

A clear and level floor space of at least 900 mm x 1200 mm should be provided at controls and operating mechanisms designated for use by Persons with Disabilities. Where a forward approach is used, a clear knee space of at least 900 mm wide, 480 mm deep and 750 mm high should be provided, which may overlap the clear floor space by a maximum of 480 mm.

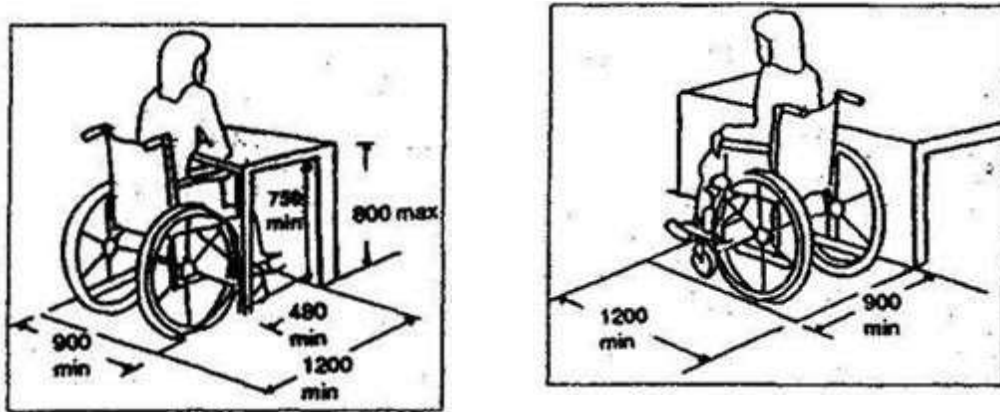


Figure 62- Space clearance for control operations

4.17 Electrical points, Controls and Outlets

The operable part of controls such as vending machines, electrical switches, wall sockets and intercom buttons should be: located adjacent to the clear floor space; located at a height of between 600 mm to 1100 mm from the floor with the exception of vending machines where the upper limit is relax- able by a maximum of 100 mm; to cater for wheelchair users, controls should be placed not less than 400 mm from room corners.; operable by one hand; of a type that does not require tight grasping, pinching or twisting of the wrist; and operable with a force less than 22N.

Wheelchair with electric charging must have charging station facility at terminals.

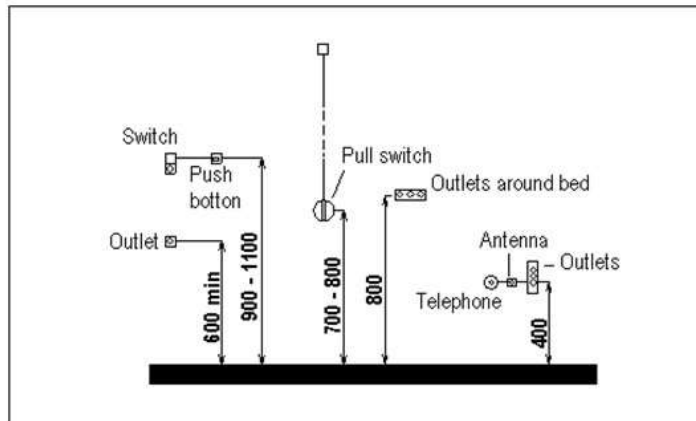


Figure 63- Location of Electricals Sockets, Controls

4.18 Reservation, Ticket and Information Counters

- Should have clear floor space of at least 900 mm x 1200 mm in front of the counters;
- There should be at least one low counter at a height of 750 mm to 800 mm from the floor with clear knee space of 750 mm high by 900 mm wide by 480 mm deep.
- At least one of the counters should have an induction loop unit to aid people with hearing impairments;
- The counters should have pictographic maps indicating all the services offered at the counter and at least one of the counter staff should be sign language literate.
- Prominent signage to be displayed without any obstructions in the view.
- Induction loop with signage to be provided.



Figure 64- Reservation and Information Counters

Ticket Gates

At least one of the ticket gates should: -

- Be minimum 900 mm wide to allow a wheelchair user through; and Have a continuous line of guiding blocks for people with visual impairments.
- A passenger alighting and boarding point complying with should be provided at the level of approach for Persons with disability.
-

4.19 General Treatment of Surfaces and Devices

- To cater for visually impaired people, controls should be colour-contrasted with the surrounding face plate panel and the face plate should similarly contrast with the background wall on which it is mounted. Information should preferably be in relief (embossed letters/ symbols accompanied with Braille information) for tactile reading.
- To aid operation for people with impaired co-ordination or impaired sight, switches, etc. should have large push plates, operable by one hand.
- There has to be reservation of seating by providing reserved signage on the seatings. It should be indicative on the seat by providing a sticker which signifies reserved for Persons with disabilities. There has to be provision for helpdesk. Helpdesk should also assist people with human assistant for Persons with disabilities with the wheelchair availability. Proper signage & information to be displayed too for the same.

Seating Spaces

Seating space, such as those provided at counters, tables, or work surfaces for persons in wheelchairs should have a clear and level floor space of not less than 900 mm x 1200 mm.

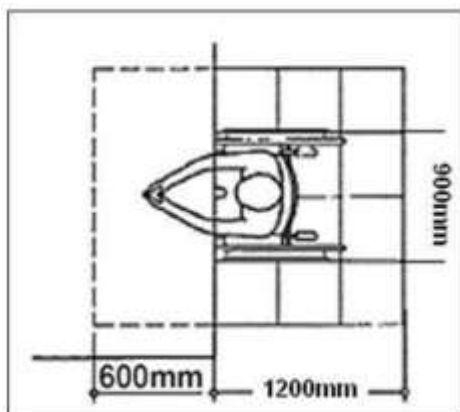


Figure 65- Clear Floor Space for wheelchair

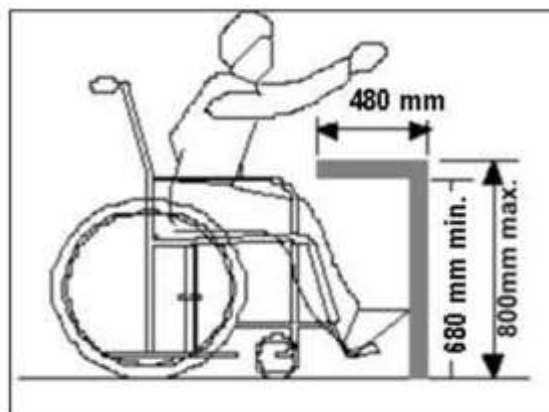


Figure 66- Counter tops/table height

4.20 Other Facilities

This includes provision of cloakrooms, public counter, service counters, ticket counters and counters at cloakroom with high and low portion. Audio aid should be provided for hearing impaired persons nearby information booth. According to the terminal space

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and area available, restaurants and cafes can be given keeping in mind the need of disabled people in mind. Baby care room should be provided in the terminal area.

4.20.1 Drinking Water Fountain

- Drinking water coolers or taps should:
 - have a clear floor space of at least 900mm x 1200mm;
 - have a clear knee space between the bottom of the apron and floor or ground of at least 750mm wide, 200mm deep and 680mm high;
 - have a toe space not less than 750mm wide, 230mm high
 - have a water glass provision;
 - free standing or built -in-drinking water coolers or taps not having a knee space should have a clear floor space of at least 1200mm wide x 1200mm in front of the unit
 - Warning tiles before drinking water to be provided
- All wall-mounted drinking water provision in an alcove is preferred, because it does not create a hazard for persons with visual impairments.
- The provision of two drinking facilities at different heights is very convenient for standing adults, people in wheelchairs and children.
- The 100mm high water flow is to allow for the insertion of a cup or glass.

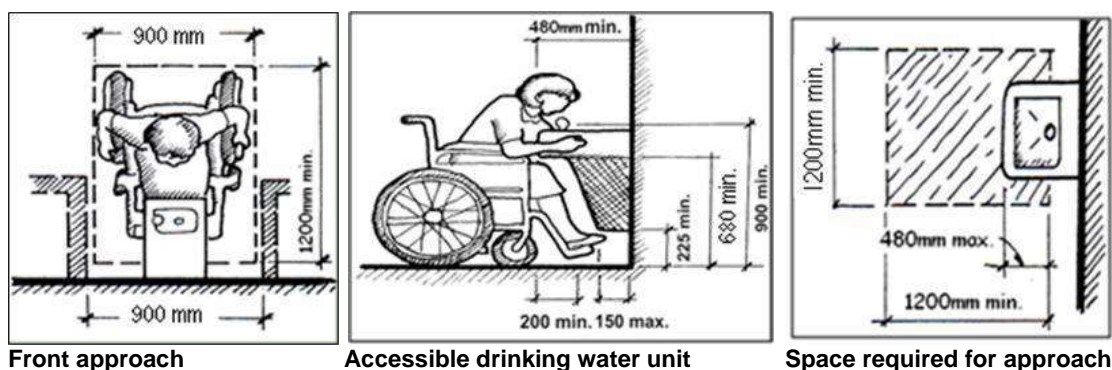


Figure 67- Drinking water fountain

4.20.2 Public Telephone

4.20.2.1 General

- Where payphones are provided, at least one payphone should be made accessible.

4.20.2.2 Clear Space

- A clear space of not less than 900mm by 1200mm should be provided in front of the telephone booth or counter.

4.20.2.3 Counter Top

- Counter tops, where provided, should be between 650mm and 800mm from the floor and have a minimum clear knee space of 680mm high.
- The depth of the counter top should be not less than 480mm.

4.20.2.4 Telephone Booth

- The opening of the telephone booth should have a clear width of at least 900mm.



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- The enclosed space should have dimensions of at least 900mm by 1200mm that should not be restricted by fixed seats

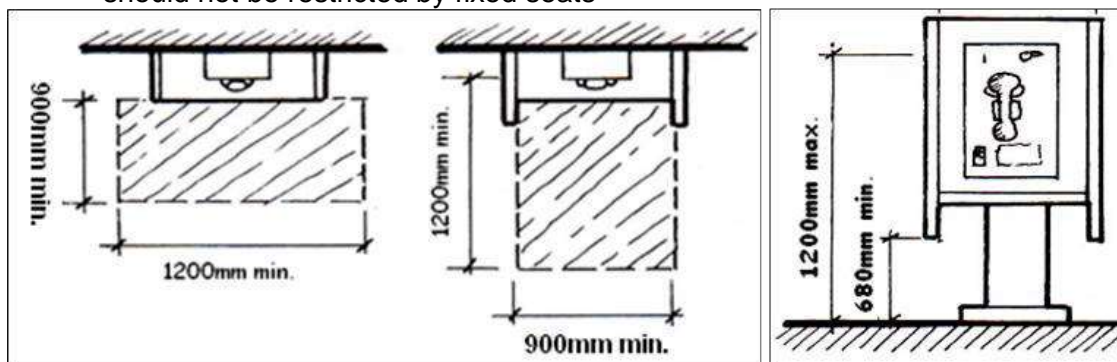


Figure 68- Space allowance for telephone counter & Telephone height

4.20.2.5 Height

- The height of all operable parts of the telephone should be between 800mm and 1200mm

4.20.2.6 Telephone Cord

- The minimum length of the cord should be 900mm

4.20.2.7 Signage

- The International Symbol of Access should be displayed to identify the location of such telephones

4.20.2.8 Mailbox / Dropbox

- The mail / drop box slot should be located at the height of maximum 1200mm.
- It should have a clear floor space of 900 X 1200mm.

4.20.2.9 Vending Machine

- The coin slot must be located at height of 1200mm or less
- It should have a clear floor space of 900 X 1200 mm.
- Operating buttons should be in raised numbers and in contrasting colours.

4.20.2.10 ATM- Money Machine

- It should have a clear floor space of 1200X 1200 mm.
- Control buttons should be between 800mm and 1000mm height from the floor.
- Control buttons should be in raised numbers/ Braille and in contrasting colours.

5. Toilets

5.1 Access to Toilet Facility

5.1.1 General

- Signage at accessible toilet entrance should be clearly visible and should comply with the International Symbol of Accessibility.
- Where urinals are provided, it has to be ambulant disabled.

5.2 Unisex Accessible Toilets (multi-use)

- Unisex accessible toilet allows Persons with Disabilities to be assisted by attendant of the same or opposite gender. In all public buildings, one unisex accessible toilet should be provided in each toilet block on each floor. Apart from this all toilet blocks must have one cubicle suitable for use by persons with ambulatory disabilities.
- The unisex toilet should have: -
 - Minimum internal dimensions of 2200 X 2000 mm minimum.
 - The layout of the fixtures in the toilet should be such that there is a clear maneuvering space of 1800mm x 1800mm in front of the water closet and wash basin in the accessible toilet unit.
 - All fixtures and utilities should provide a clear space of 900mm x 1200 mm for wheelchair users to access them.
 - Have clear space of not less than 900 mm wide next to the water closet
 - Be equipped with a door, water closet, Grab bars, Wash basin and all washroom accessories for persons with disabilities.
 - Have the toilet roll dispenser and hand water faucet mounted below the grab bars and at not more than 300 mm from the front edge of the seat and at a height between 50 mm and 200 mm from the top of the water closet seat.
 - Be equipped with a cloth hook mounted on a side wall not more than 1200 mm from the floor and projecting not more than 40 mm from the wall; and
 - Where possible, be equipped with a shelf of dimensions 400 mm x 200 mm fixed at a height of between 900 mm and 1000 mm from the floor.



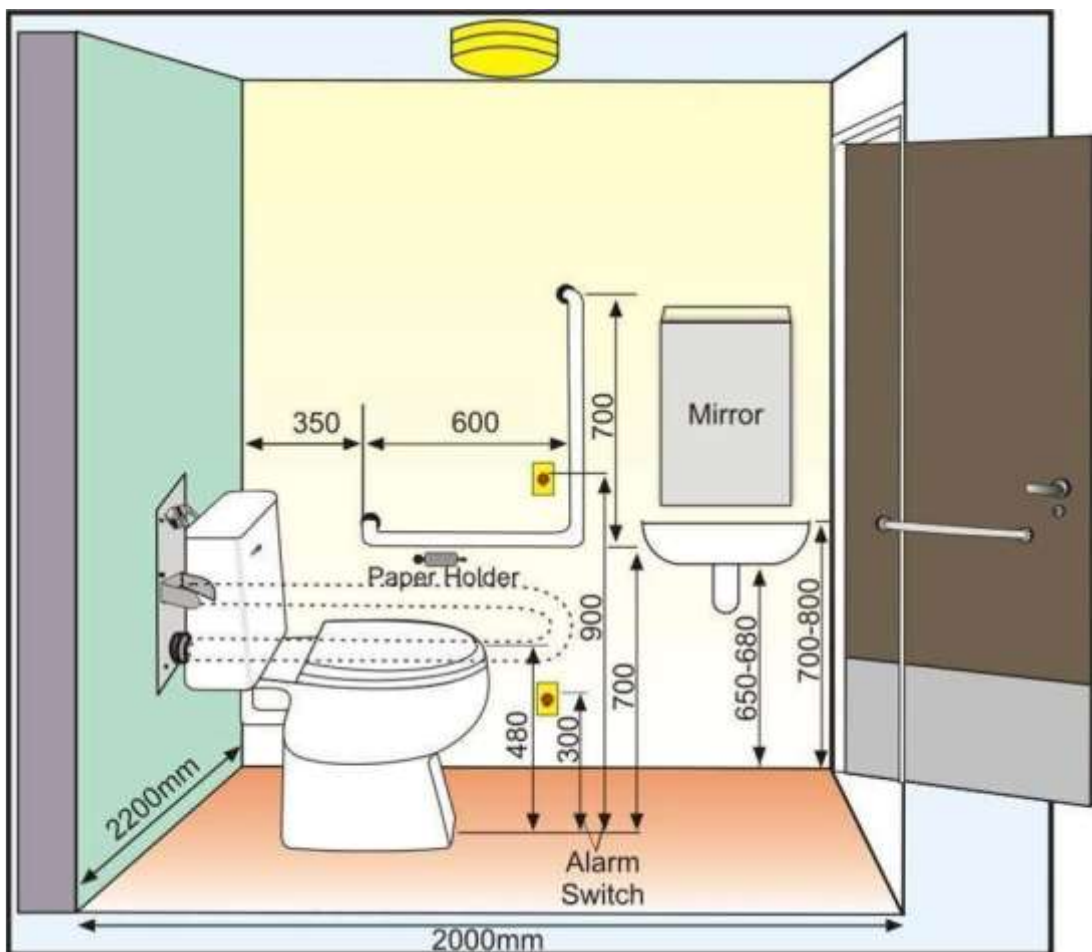


Figure 69- Layout plan of unisex accessible toilet

- Alarms with strings attached should also be provided at least on the three walls
- Grab bars near basin must be provided
- Provision for door opening with foot as well should be made or provision for Automatic door opening may be made
- Emergency call buttons should be provided in bathroom or washroom
- Shower - water flow has to be controlled and option of bucket and mug has to be there
- Folding bench with good weight bearing to allow change of clothes etc. to be provided
- Provision of foot latch should be provided in doors in toilet

5.2.1 Toilet Cubicle for Wheelchair Users

Where a toilet cubicle for the wheelchair user is provided, it should conform to the dimensions of accessible toilet.

5.2.2 Toilet cubicle for Ambulatory Disabled

In a set of toilets (for ladies or for gents), there shall be one WC for the use of the ambulant disabled persons.

5.2.3 Toilet Doors

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Essential requirements for toilet door:-

The toilet door should be either an outward opening door or two-way opening door or a sliding type and should provide a clear opening width of at least 900 mm.

Be provided with a horizontal pull-bar, at least 600 mm long, on the inside of the door, located so that it is 130 mm from the hinged side of the door and at a height of 1000 mm.

Be capable of being locked from the inside by a device that is operable by one hand, activated by a force not more than 22N and which does not require fine finger control, tight grasping, pinching or twisting of the wrist.

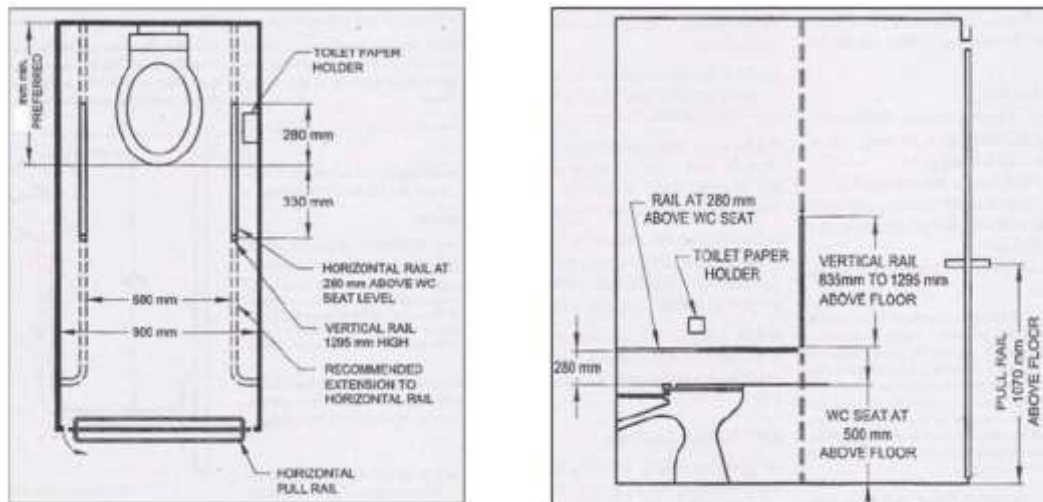


Figure 70- WC Compartment for the Ambulant Disabled

5.2.4 Water Closet

- Be located between 460 mm to 480 mm from the centerline of the water closet to the adjacent wall.
- It should have a clear dimension of 750 mm from the front edge of the water closet to the rear wall to facilitate side transfer.
- The top of the water closet seat should be 450 to 480 mm from the floor when the water closet does not have the required height, the necessary height may be obtained by providing a circular base under the water closet. The base so provided must not protrude beyond the circumference of the base of the water closet.
- There should be an adequate clear floor space of at least 1350 mm depth and 900 mm width, both in front and on the transfer side, adjacent to the water closet.
- Have a suitable back support to reduce the chance of imbalance or injury caused by leaning against exposed valves or pipes.
- Preferably be of wall-hung or corbel type as it provides additional space at the toe level.
- Where water cistern is used, the cover should be securely attached.

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- The flush control should either be lever type or automatic, and located on the transfer side of the water closet. The flush control should not be located more than 1000 mm from the floor.
- Where more than one accessible toilet is provided, a left and right hand transfer option should be made available.

5.2.5 Water Closet Grab Bars

- Water closets should be provided with grab bars, be mounted at a height between 200 mm and 250 mm from the water closet seat.
- One L-shape grab bar: 600mm long horizontal and 700mm long vertical should be mounted on the side wall closest to the water closet.
- A hinged type horizontal grab bar should be installed adjacent to the water closet at a distance of 320mm from the center-line of the WC, between heights of 200 mm - 250 mm from the top of the water closet seat and extending 100 to 150 mm beyond the front of the water closet.
- An emergency alarm cum call switch should be provided within easy reach on the wall near water closet at two levels: at 300mm and 900mm from the floor level to allow user to call for help in case of an emergency.

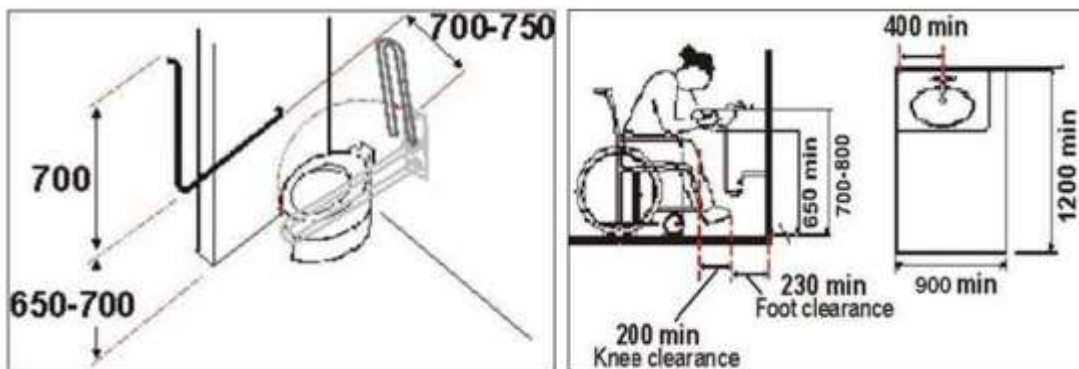


Figure 71- Grab bars specifications Washbasin Specifications

5.2.6 Washroom Accessories

- Washroom accessories should comprise the following:
 - A mirror installed in a way to have the bottom edge at a height of not more than 1000 mm from the floor and mirror should be tilted at an angle of 30 degree for better visibility of wheelchair user
 - Towel and soap dispensers, hand dryer and waste bin positioned such that the operable parts and controls are between 800 mm and 1000 mm from the floor.
 - Accessories should be placed in close proximity to the basin, to avoid a person with wet hands wheeling a chair.
 - There has to be no hindrance at the door, which may lead to hazard or cause obstruction to wheelchair user.

5.2.6.1 Additional Considerations

There should be adequate colour and tonal contrast between the fixtures, walls and the flooring. This is to enable easy recognition by persons with visual impairments. There should be a visual emergency alarm in the toilet.

5.2.7 Urinals

- At least one of the urinals in the Gents toilets on each floor should have grab bars installed on each side and in the front of the urinal to support ambulant Persons with Disabilities (for example, crutch users).
- The front bar is to provide chest support the sidebars are for the user to hold on to while standing.
- Urinals shall be stall-type or wall-hung, with an elongated rim at a maximum of 430 mm above the finish floor.
- A clear floor space 760 mm by 1220 mm should be provided in front of urinals to allow forward approach. Urinal shields (that do not extend beyond the front edge of the urinal rim) may be provided with 735 mm clearance between them.
- Flush controls should be located not more than 1200 mm from the floor.
- Where urinals for the ambulatory disabled are provided, they should comply with the following as illustrated. ^{xii}

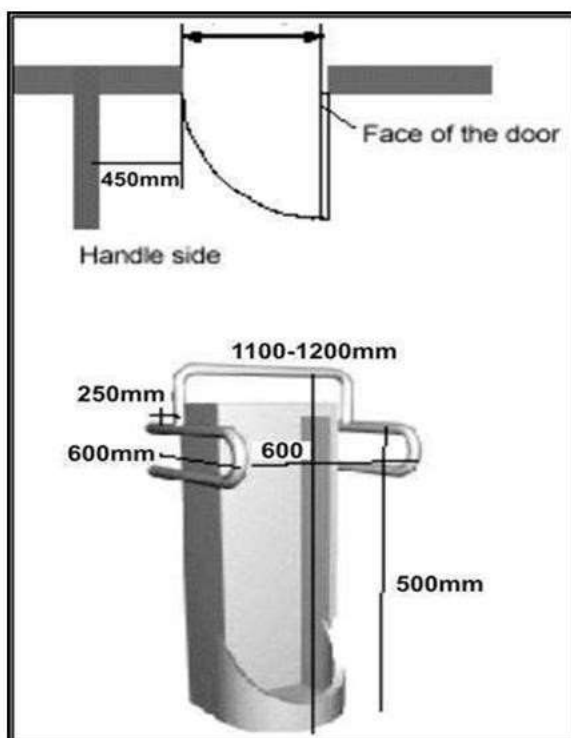


Figure 72- Urinal with chest support grab bar

5.3 Signage of accessible toilets

- All unisex accessible toilets should have signage.

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- For individual accessible cubicles in Ladies and Gents toilets are provided signage as per Figure below.



Figure 73- Signage for Unisex toilet, Gents and Ladies

- For the benefit of the persons with vision impairment, all general toilets should have male pictogram in triangle or female pictogram in circle, marked on plates with raised alphabets and Braille put on wall next to door latch. Additional signage can be provided on the door as well.
- A distinct audio sound (beeper/clapper) may be installed above the entrance door for identification of the toilets.
- A clear floor space 760 mm by 1220 mm should be provided in front of urinals to allow forward approach. Urinal shields (that do not extend beyond the front edge of the urinal rim) may be provided with 735 mm clearance between them.

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5.4 Shower Cubicles

5.4.1 Size

- Shower cubicles should have minimum interior dimensions of 2000 mm x 2200 mm.
- A toilet cum shower room will have minimum interior dimensions of 2400mm x 2500mm.
- The minimum clear floor space in front of the shower entrance should be 1350mm x 900 mm with the 1350 mm dimension parallel to the shower entrance.
- The floor of the shower should be slip-resistant.

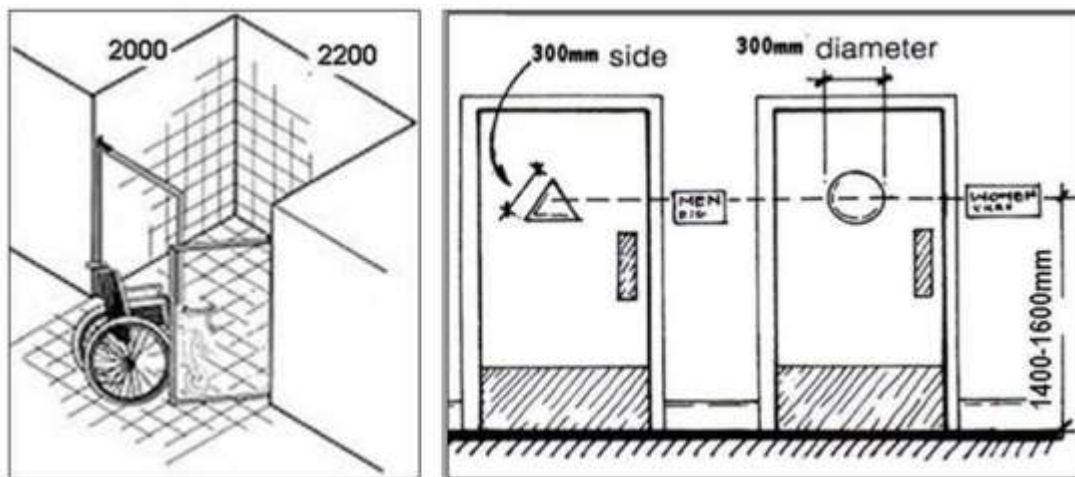


Figure 74- Shower Cubicle Placement of signage

5.4.2 Grab bars for the shower cubicle

Grab bars for the shower cubicle should have :-

- Have one L-shaped bar or two grab bars in L-shaped configuration between 700 mm and 800 mm from the shower floor.
- Have one grab bar at least 750 mm long installed vertically with another at least 900 mm long mounted horizontally as shown in the Figure.



Figure 75- Roll in shower cubicle

5.4.3 Stationary, Fittings and Accessories

- A shelf should be provided for toiletries between 400-800 mm.
- All shower controls should be at a distance of 500 mm from the rear wall.
- Shower controls should be installed between 750 mm to 1000 mm from the floor.
- The adjustable and detachable shower head (telephone shower/ hand-held shower), with a minimally 1500 mm long hose, should be installed between 800 mm and 1200 mm from the floor.
- Where the shower head is mounted on a vertical bar, the bar should be installed so as not to obstruct the use of grab bars.

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- Curbs for the roll-in shower cubicle should not be more than 10 mm high, beveled at a slope of 1:2.
- Enclosures for the shower cubicle should not obstruct transfer from wheelchair onto shower seat.

5.4.4 Shower seat

- A wall mounted shower seat, preferably fold up kind.
- The shower seat should be positioned such that the distance between the centreline of the water closet and the adjacent wall is 450 mm to 480 mm, and the distance between front edge of the water closet and the rear wall is 650 mm. The top of the shower seat should be at a height of 450 - 480 mm from the floor.
- There should be an adequate clear floor space of at least 1350 mm depth and 900 mm width, both in front and on the transfer side, adjacent to the water closet.
- Be self-draining, non-slip and with rounded edge;
- Be on the wall nearest to the controls;
- Have a minimum dimension of 400 mm wide extending the full depth of the cubicle, excluding space required for the shower curtain. ^{xiv}



6. Fire Evacuation Needs

Emergency Egress

Provision of accessible means of egress from all public use areas and facilities is as vital a component as accessible ingress.

6.1 Alarm Panels

- Placement (accessibility) and visibility of alerting devices is very important.
- Fire alarm boxes, emergency call buttons and lighted panels should be installed between heights of 800mm and 1000 mm from the finished floor surface.
- These should be adequately contrasted in colour and tone from the background wall and should be labelled with raised letters and also in Braille.

6.2 Alerting Systems

- In emergency situations, it is critical that people are quickly alerted to the situation at hand, for persons with disability the following needs to be considered:
- Audible alarms with „Voice Instructions“ should be installed that can help guide them to the nearest emergency exit. As an alternative to the pre-recorded messages, these alarms may be connected to central control room for on-the spot broadcasts.
- Non – auditory alarms (visual or sensory) to alert persons with hearing impairments should be installed at visible locations in all areas that the building users may visit (including toilet areas, storerooms etc.). Non-auditory alarms include flashing beacons.

6.3 Evacuation Plans

- Evacuation plans that clearly indicate the designated emergency evacuation routes as well as location of refuge areas should be displayed at all public areas of the building.
- These should contrast strongly against the background. Where possible, these should incorporate raised letters and tactile routes, and Braille for benefit of persons with visual impairments.

6.4 Emergency Evacuation Routes

In buildings or facilities, or portions of buildings or facilities, required to be accessible, accessible means of egress shall be provided in the same number as required for exits by local building/fire safety regulations (National Disability Authority, 1998).

- Designating evacuation routes shall be at least 1500 mm wide, to ensure a wheelchair user and an able bodied person are able to pass each other along the route. The route should be free of any steps or sudden changes in level and should be kept free from obstacles such as bins and flower pots etc.



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- An exit stairway to be considered part of an accessible means of egress shall have a minimum clear width of 1500 mm between handrails and shall either incorporate an area of refuge within an enlarged floor-level landing or a horizontal exit.
- Orientation and direction signs should be installed frequently along the evacuation route and these should preferably be internally illuminated.
- Whilst the emergency lighting provided by traditional overhead emergency lighting luminaires, conforming to the Indian Standard IS: 9583-1981: Emergency Lighting Units, is acceptable for people who are visually impaired.
- Exit signs shall be in accordance with IS: 4878-1968. Exit signage should also be available in tactile format in the evacuation route.
- Along the emergency route, tactile floor guidance for persons with visual impairments should be provided.
- Braille engraving on the handrail of refuge areas to be given

Note: Fireproof doors along circulation paths that are not exclusively egress routes generally require a force greater than 25 N to operate, rendering several disabled people dependent on others to negotiate these doors. While it is essential to cater safety measures for unpredictable emergencies, it is also important to provide an accessible environment to disabled persons. Consider holding the doors open with magnetic catches or floor springs that are connected with the fire alarm system

6.5 Provision of Refuge Areas

- A refuge area, also known as an area of rescue assistance, is a place of relative safety where persons who may not be able to negotiate inaccessible egress routes may await rescue assistance.
- Where a required exit from an occupiable level above or below a level of accessible exit discharge is not accessible, refuge areas shall be provided on each such level (in a number equal to that of inaccessible required exits).
- Every required area of refuge is to be accessible from the space it serves by an accessible egress route.
- Every area of refuge shall have direct access to an exit stairway.
- Each area of refuge must be separated from the remainder of the story by a smoke barrier having minimally one hour fire resistance rating. Each area of refuge is to be designed to minimize the intrusion of smoke.
- The size of the refuge to provide at least two accessible areas each being not less 750 mm by 1200 mm. The area of rescue assistance shall not encroach on any required exit width. The total number of such areas per story shall be not less than one for every 200 persons of calculated occupant load served by the area of rescue assistance.
- All stairs next to the refuge should have a clear width of 1500mm between the handrails.
- A method of two-way communication, with both visible and audible signals, shall be provided between each area of rescue assistance and the primary entry.



7. Signage

7.1 Introduction

Signs are important to people who are unfamiliar with their surroundings. They are to provide information. They can inform the user of a route, a hazard, or a facility.

Signs also communicate an identity for the building or environment they serve. Signage contributes greatly to the aesthetics and first impression of a building. Signs must be clear, concise, and consistent. They should be accurate, correct in initial presentation, correct while updating the time, and checking it to make that it continues to be correct. Timing of information is also important. The information has to be correct in initial stage as well as during the journey. The timings has to be properly modified and updated in the journey too, so that the people with different disabilities shall also access in time.

A signage system also increases person's awareness of their surroundings and aids orientation within the environment. The location of signs should ideally be part of the process of planning the building and environment. A good and successful sign system should minimize anxiety and confusion. It must be easy to understand and not place Persons with Disabilities at a disadvantage. Universal signage cuts across the regional/cultural and language barriers as even a common lay man can understand the symbols and pictograms.

People need clear information about the purpose and layout of spaces to maintain a sense of direction and independent use of a building. Often visual and tactile information is reinforced by audible information. Information may take the form of visual information (e.g. signs, notice boards), audible information (e.g. public address and security systems, induction loops, telephones, and infrared devices), or tactile information (e.g. signs with embossed lettering or Braille).

The effectiveness of signage system in a terminal building would depend on :

- the location, accessibility, layout and height of signs;
- the size of lettering, symbols and their reading distances;
- the use of tactile letters and symbols;
- visual contrast and lighting;
- the finished surfaces of materials used for signs and symbols;
- the simultaneous use of audible cues;
- Integration with any other communication systems.

7.2 Signage for accessibility

International symbol of accessibility (wheelchair sign) should be displayed at approaches and entrances to car parks to indicate the provision of accessible parking lot for Persons with Disabilities within the vicinity.



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Directional signs shall be displayed at points where there is a change of direction to direct Persons with Disabilities to the accessible parking lot.

A tactile/sensory map of the entire facility should be included at the accessible entrance of the terminal building. Along with that, information on buses transiting and bus platform should be available in accessible formats.

Where the location of the accessible parking lot is not obvious or is distant from the approach viewpoints, the directional signs shall be placed along the route leading to the accessible parking lot.

Accessible parking lot should be identifiable by the International Symbol of Accessibility in accordance to the Section. The signs should not be obscured by a vehicle parked in the designated lot. Vertical signs shall be provided, to make it easily visible, the sign should be at a minimum height of 2000 mm.

Provision for pictographic signage should be made especially for the people with mental disabilities.

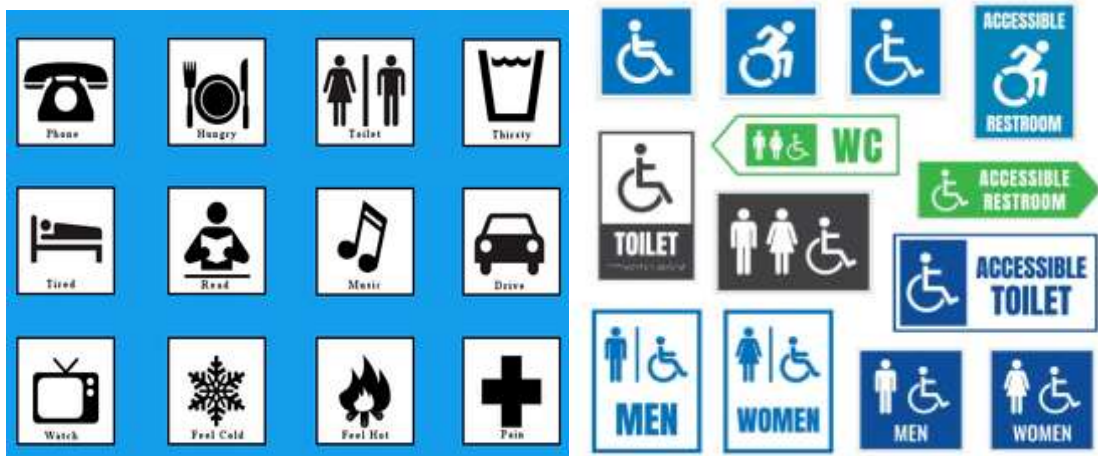


Figure 76- Pictographic signage for the people with disabilities at bus terminal



Figure 77- Pictographic signage for the people with disabilities at bus terminal

7.3 Signage Provisions

- Information and direction signs should be provided at junctions of circulation routes and key destinations such as doorways, at reception points, at facilities

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such as telephones, drinking water facility, toilets, and in areas where hearing enhancement systems are fitted.

- Directional signs should readily identify and provide a logical sequence from a starting point to a point of destination and a clear indication of return routes to named exits. The names of destinations should be consistent throughout the signing system.
- A clear indication of the existence of steps or ramps on a route should be provided at both ends of the route.
- Signs to facilities for Persons with Disabilities should incorporate the International Symbol for Accessibility.
- A building should include spaces where announcements can be transmitted through a hearing enhancement system. Signs should be provided to inform persons with hearing impairment of locations in the building where these systems are fitted, and where they can obtain the necessary equipment for hearing enhancement systems.
- Universally recognized symbols/pictograms should be used to replace text, wherever possible. Other symbols should supplement text, but should not be used in isolation. Symbols are an essential aid for people with learning difficulties.
- A wall mounted or ceiling hung information board should be provided at lift landings, floor level landings of staircases, and at other major decision points (junctions/intersections) in main circulation routes.
- Provision of digital signage & audio signage at bus stops must be there

7.4 Types of Signage

According to the purposes it serves, Signage can be of following types:

- Directional
- Information
- Identification
- Instructive
- Health & Safety

7.4.1 Directional Signage

(For Way-finding- with arrows along travel routes) are usually wall mounted or overhead signs and include directional arrows to direct users to specific areas or



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elements within an area. This can incorporate provision of signage at navigational decision points.



Figure 78- Directional signage for ramp

7.4.2 Information

Provide detailed info- including maps & directories with 'You are here' labels. Inform users about the features and facilities of a place or space. Information signs include directions, maps, building identification signs, notices and interpretative signs.

7.4.3 Identification

To signify arrival. Also called Destination Sign, usually identify entrances, street addresses, buildings, rooms, facilities, places and spaces.

7.4.4 Instructive

To give instruction for operating a device, way finding, etc. ^{xv}

7.4.5 Health & Safety

Provide lifesaving directives and/ or mandatory rules to be followed



Figure 79- Instructive signage



Figure 80- Health & Safety signage

7.5 Location

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Signs should be provided at all sites, campus, developments and buildings in appropriate locations including approach to building / facility / service, entrance / exit, main lobby or reception, public facilities such as library, toilets etc., departments and offices, fire exits and parking and garages.

A good signage scheme should cover all public buildings, spaces, and facilities including transportation infrastructure and should include locations such as:

- Approach to building / facility / service Entrance / exit
- Main lobby or reception
- Public facilities such as library, toilets etc.
- Departments and offices
- Fire exits
- Parking and garage

7.6 Universal Signage

To make signage universally usable, following components must be kept in mind:

- Colour contrast Signs
- Character, Content and Layout
- Pictograms and accessibility symbols
- Positioning
- Viewing Distance
- Lighting (measured in lux)
- Material and surface finish
- Alternative formats etc. embossed letters with Braille (Audio/ Visual information, Maps and models)



Figure 81- Signage with embossed letters and Pictogram

7.7 Colour Contrast Signs

Contrasting colours should be used to differentiate the figures from the background on the signboard. The commonly employed colours are white for the figure and blue for

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the background. The colours of signboard should also contrast with the surrounding surface so as to be clearly distinguishable. The colour combinations red/green and yellow/blue should not be used in order to avoid confusing persons who are colour blind. Avoid using shades of the same colour in the sign and avoid using same colours as safety signs. The recommended colour contrast between the letters and background is a 70 point LRV difference. Information from signs can be conveyed by the colour of lettering and brightness differentials between the letter and background colours. Safety signs use primarily red, yellow and green as information colours. For other signs it is preferable to use Blue and White Colours.

7.8 Basic principles for Colour Contrast:

- Text should contrast with sign background
- Sign should contrast with environment
- Light levels (measured in Lux)
- 70% contrast between wall and sign panel
- Avoid shades of colours
- Avoid using same colours as safety signs
- Maximum 5 colours
- Non-reflective surface

7.9 Signage Typeface and Style

Sign typefaces must be standard, legible and clearly discernible. Simple fonts are recommended such as Arial, Helvetica Medium, Futura etc. Usage of too many type sizes on any one sign should be avoided. Also italics or script texts should be avoided.

7.9.1 Basic principles

- Sans serif font (A sans serif font is a family of fonts that does not have the small feature called “serifs” at the end of strokes. Pixilation makes sans-serif fonts appear cleaner than serif fonts and they are therefore widely used for on-screen text.
- Common sans serif fonts include: Microsoft Arial, Arial Black, Trebuchet MS, Verdana, etc. Be aware that in some sans-serif fonts capital “l” and lower case “l” will appear exactly identical (e.g. Arial). Thus use them with caution.)
- Should be mix of Upper and lower case
- Should be Left justified
- Should be Tactile embossed with Braille
- Minimal use of bold
- Consistent font stem widths
- Avoid italics, condensed text, light stems

7.9.2 Positioning the Signage

- Signs should be located where they are clearly visible. A person with low vision may be able to read a sign if they can approach the sign for close up viewing.
- Wall-mounted signs that contain detailed information; timetables, maps or diagrams, should be centered around 1400mm from the ground, with the bottom edge not less



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than 900mm from the finished floor level and the top edge up to 1800mm from the finished floor level

- Braille and tactile signage should be placed at a height between 900 mm to 1500 mm (ideal location at 1050 mm) above the finished floor level
- Duplicating detailed signs and instructions, especially safety notices, should be located at high and low levels, i.e. at 1600 to 1700mm and at 1000 to 1100mm to allow convenient close viewing by wheelchair users.
- Signs should be positioned in way that the reader does not obstruct circulation paths. Position projecting or ceiling suspended signs above head height at 2300mm from floor level. Although it is important that the sign does not create a head height obstacle, it is equally important that the size of the lettering increase in proportion to the distance from the reader.
- The size of lettering on signage is mentioned below.

Viewing Distance	Height of letters
2 - 3 meters	15 mm
6 meters	20 mm
8 meters	25 mm
12 meters	40 mm
15 meters	50 mm
25 meters	80 mm
35 meters	100 mm
40 meters	130 mm
50 meters	150 mm

7.9.3 Signage material

Signage Material should be non-reflective, preferably matt finish. It should have non glary and non-glossy surface. Natural and artificial light should be such so as not to produce glare on the signage surface.

The material of all signage should be chosen so as to reduce wear and tear and possible damage by vandalism and at the same time easy to maintain. Some suggested materials for signage are wood, acrylic, Aluminum Composite Panel (ACP).

7.9.4 Alternative formats-tactile signs

Common alternative formats can be used to assist people with visual impairments who are best able to interpret information through hearing or touch. Embossed letters, raised pictograms and raised arrows are tactile features that can be incorporated into signs, which can be particularly helpful to persons with visual impairment. It is important to provide both Braille and audio inputs to signage for persons with visual impairments. Providing only Braille does not make the signage accessible, as a large number may not use Braille.

7.9.4.1 Braille specification



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A system of touch reading for people who are blind or vision impaired that employs raised dots, evenly arranged in quadrangular letter spaces or cells. Braille symbols are formed within units of space known as Braille cells. A full Braille cell consists of six raised dots arranged in two parallel rows each having three dots. The dot positions are identified by numbers from one through six. Sixty-four combinations are possible using one or more of these six dots. A single cell can be used to represent an alphabet letter, number, punctuation mark, or a whole word.

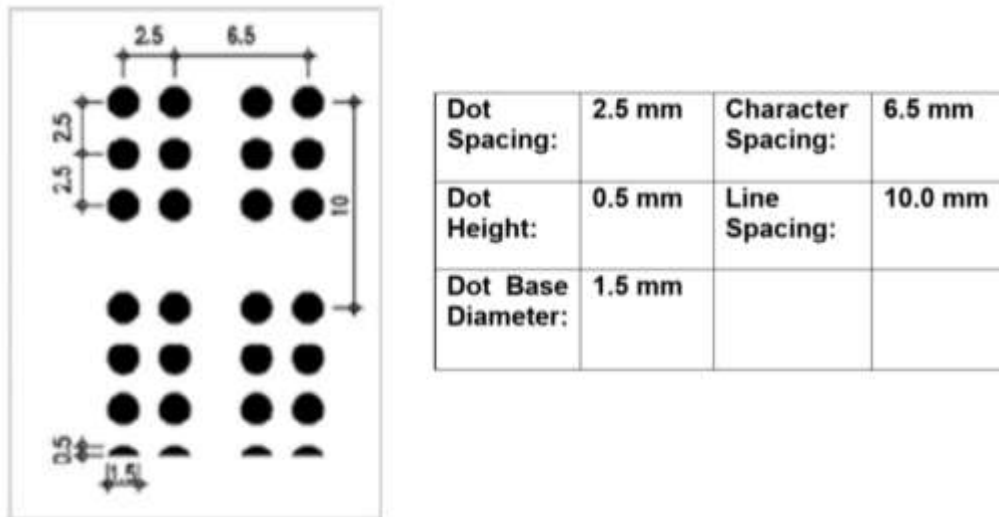


Figure 82- Braille Specifications

7.9.4.2 Maps & Models

- A map or model can be particularly helpful, especially to visually impaired people who may be unable to read signs, and to people with hearing impairments who may not be able to understand verbal directions.
- A tactile map or model is a useful way of providing information to visually impaired people and people with hearing impairments who wish to navigate around a building.



Figure 83- Tactile Map



Figure 84- Tactile and Audio map

7.9.4.3 Audio Signs/Audio information

- Audible announcements are helpful to most people but particularly to those with visual impairment.
- It is essential that there is a significant difference between the level of background noise and the level of the signal or announcement.
- The higher the signal to noise ratio (the difference in decibels dB. between signal and ambient) the better for communication.
- People with hearing impairment require at least a +5dB S/N ratio.
- In environments that are noisy, any spoken information should be repeated at least once.
- Audible alarm systems should operate at least 15dB over the prevailing sound level, with a maximum of 120dB

7.9.5 Lighting/ Signage Illumination

Signs should be well and evenly lit with uniform lighting over the surface of the sign of between 100 and 300 lux. Minimum acceptable level of lighting for directional signage, maps and text panel is 200 lux.

Lux: Lux is the standard unit of luminance. It is used as a measure of perceived intensity of light. Below are a number of examples of what a variety of lux would correspond to in every day terms:

Illuminance	Example
1 lux	Moonlight
400 lux	A brightly lit office
400 lux	Sunrise or sunset on a clear day
1000 lux	Typical TV studio lighting
32000 lux	Sunlight on an average day (min)
100000 lux	Sunlight on an average day (max)

Figure 85- Lux values

7.10 Lift signage

Where lifts are provided in a building they shall be accessible to and usable by Persons with Disabilities at all levels used by the general public or staff. Lifts should be marked with the symbol of accessibility and directional signs be provided to the lifts.

- Signs indicating the location of an accessible lift should be provided in a location that is clearly visible from the building entrance.
- The sign should incorporate a representation of the International Symbol for Access).

Accessibility Guidelines for Bus terminals and Bus Stops

- A sign indicating the number of the floor should be provided on each lift landing on the wall opposite the lift. It is also recommended to install a floor directory of the main facilities and services available on the lift landing, along with an accessible emergency egress route that clearly indicates the location of nearest refuge areas for Persons with Disabilities.

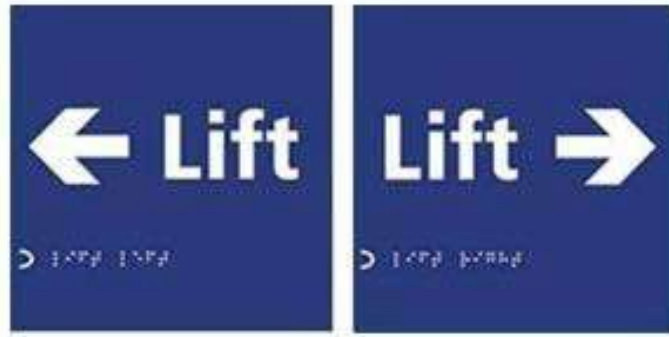


Figure 86- Way finding signage for lift location

8. Road Crossings

8.1 Road Intersections

- Pedestrian crossings should be equipped with traffic control signal;
- Constructing traffic islands to reduce the length of the crossing is recommended.
- Guide strips should be constructed to indicate the position of pedestrian crossings for the benefit of people with visual impairments;
- Road bumps are helpful in reducing the speed of traffic approaching the intersection.

8.2 Median Refuge/Islands

- Raised islands in crossings should: -
 - Be cut through and level with the street have kerb ramps, complying with Norms at both the sides and have a level area of not less than 1500 mm long in the middle.
 - A colored tactile marking strip at least 600 mm wide should mark the beginning and the end of a traffic island, to guide pedestrian with visual impairments to its location

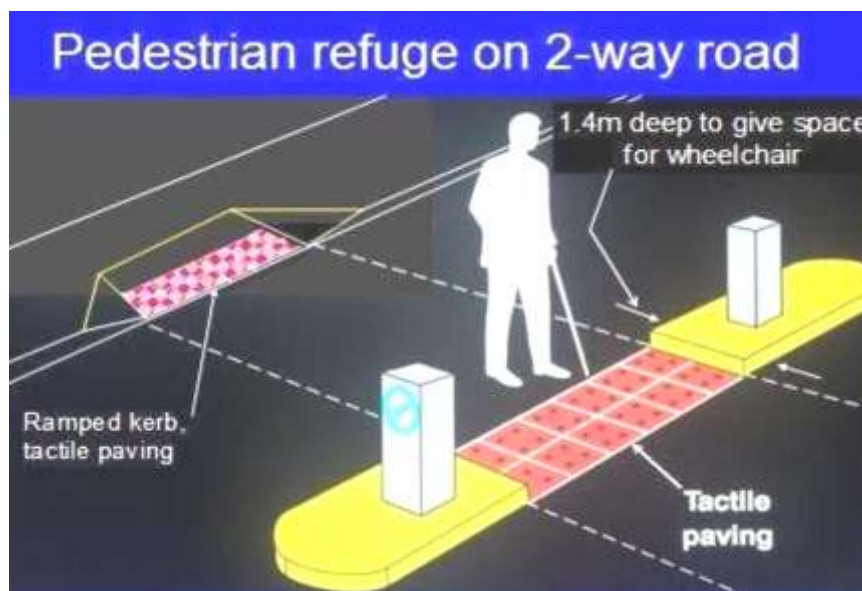


Figure 87- Median refuge/island

Accessibility Guidelines for Bus terminals and Bus Stops

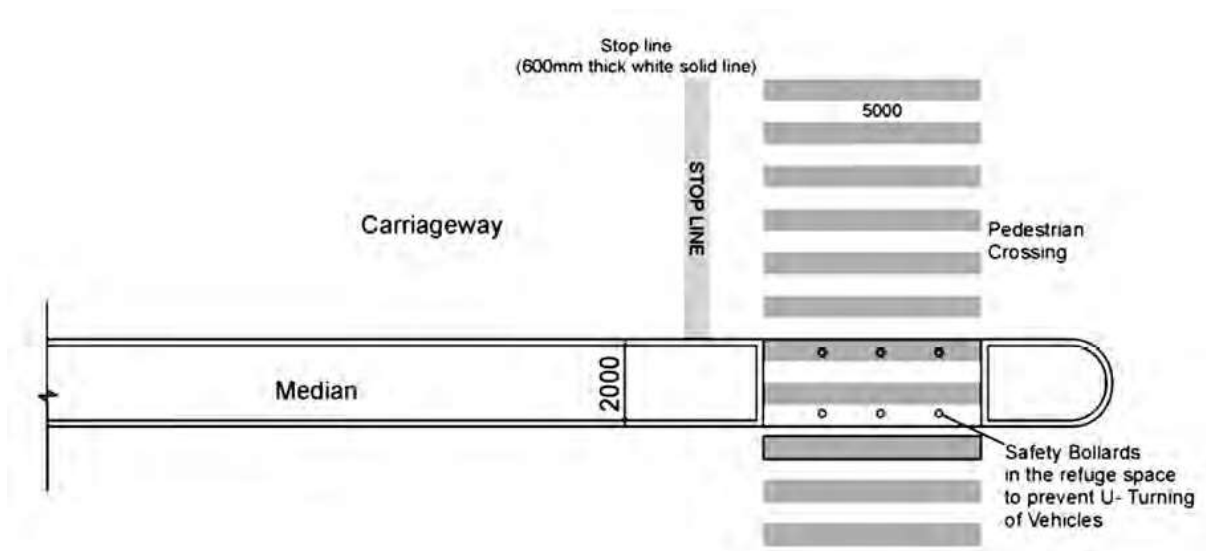


Figure 88- Pedestrian Refuge on Two Way Road



Figure 89- Median Pedestrian Refuge on Two-Way Road & signal Traffic

- Pedestrian traffic lights should be provided with clearly audible signals for the benefit of pedestrians with visual impairments.
- Acoustic devices should be installed on a pole at the point of origin of crossing and not at the point of destination.
- The installation of two adjacent acoustic devices such as beepers is not recommended in order to avoid disorientation.
- The time interval allowed for crossing should be programmed according to the slowest crossing persons.
- Acoustical signals encourage safer crossing behavior among children as well.

8.3 Kerb ramp

Kerb ramp is provided where there are inaccessible routes due to differences in level; and inaccessible building entrances due to difference between indoor and outdoor levels.

Accessibility Guidelines for Bus terminals and Bus Stops

Kerb ramp is useful for a smooth transition, to overcome changes in level between the footpath and the road carriageway, at each pedestrian crossing on opposite sides of the street and in the vicinity of building entrances. Absence of kerb ramps prevents persons with disabilities and reduced mobility from crossing streets.

- Standard kerb ramps are cut back into the footpath (flush with roadway), at a gradient not greater than 1:12 with flared sides providing transition in three directions. At street intersection and turnings kerb ramps should be provided
- Width of the kerb ramp should not be less than 1200 mm.
- Tactile warning strip shall be provided on the kerb side edge of the slope, so that persons with vision impairment do not accidentally walk onto the road.
- The ramps should be flared smooth into the street surface and checked periodically to make sure large gaps do not develop between the gutter and street surface.
- It is desirable to provide two kerb cuts per corner. Single ramp located in the center of a corner is less desirable. Separate ramps provide greater information to pedestrian with vision impairment in street crossings.

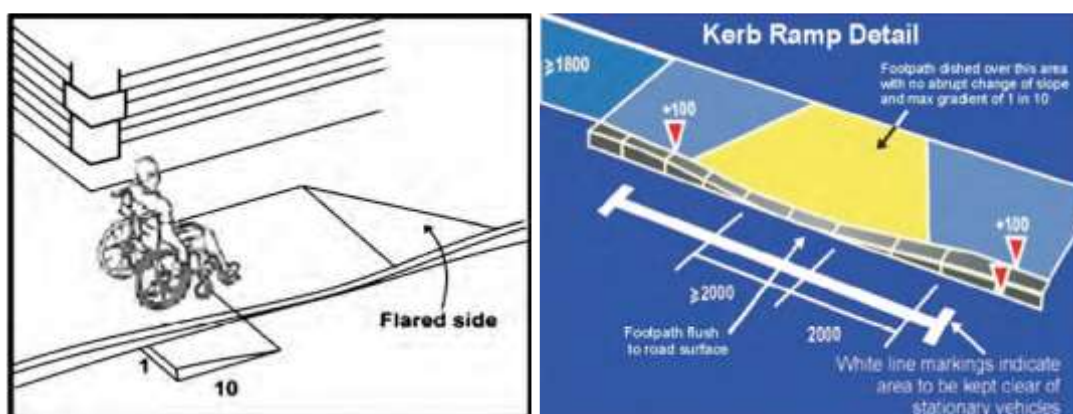


Figure 90- Kerb Ramp

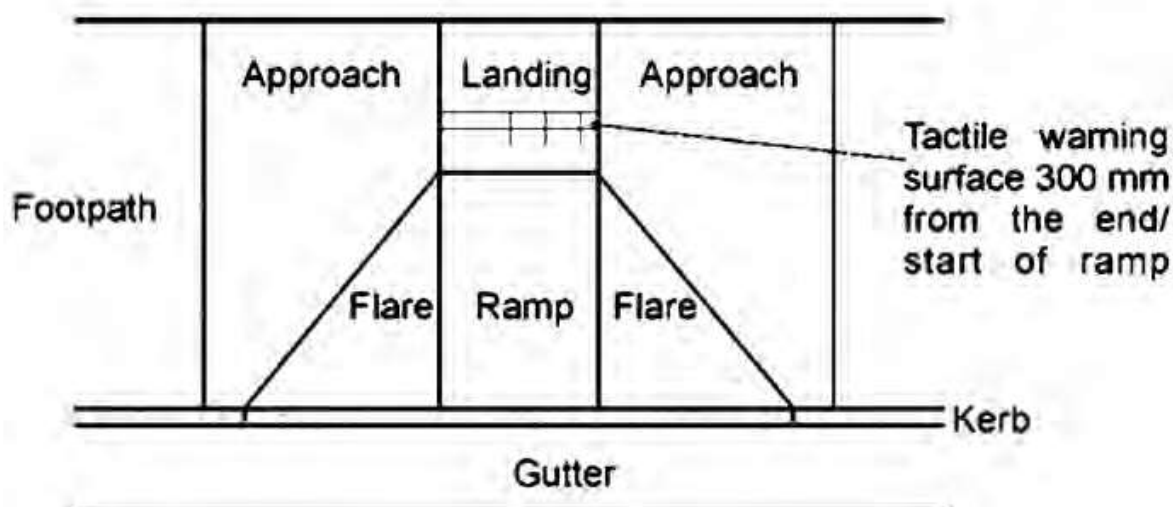


Figure 91 - Kerb Extension at Street Intersection

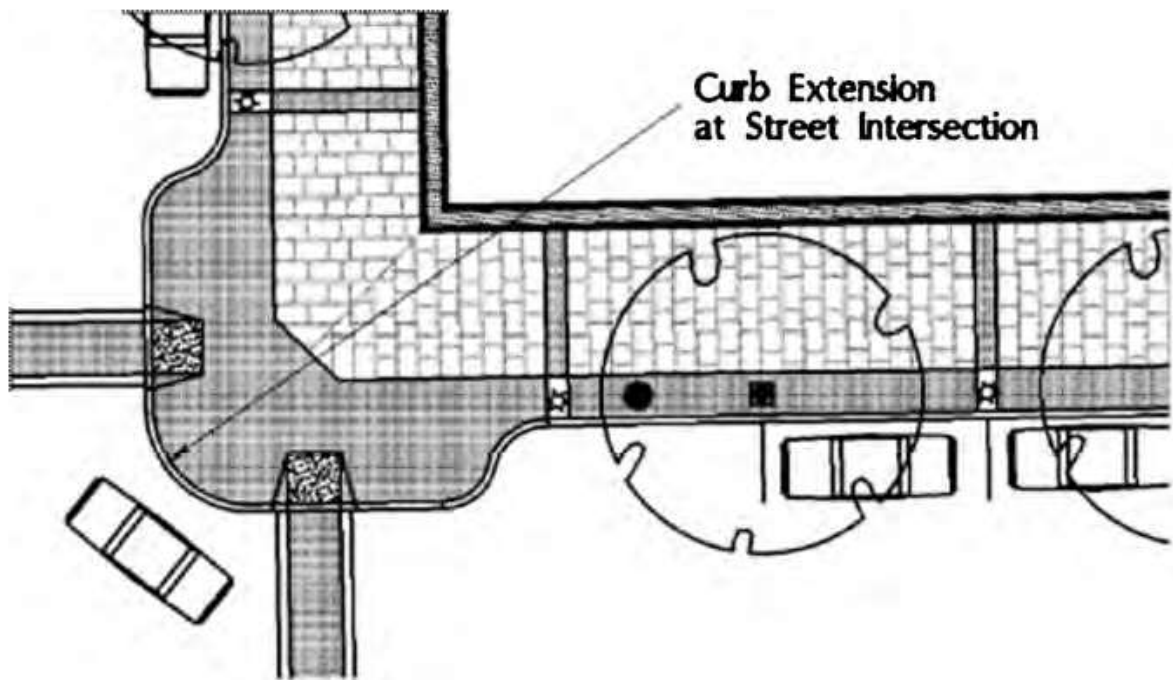


Figure 92a -Recommended Design for a Kerb Ramp

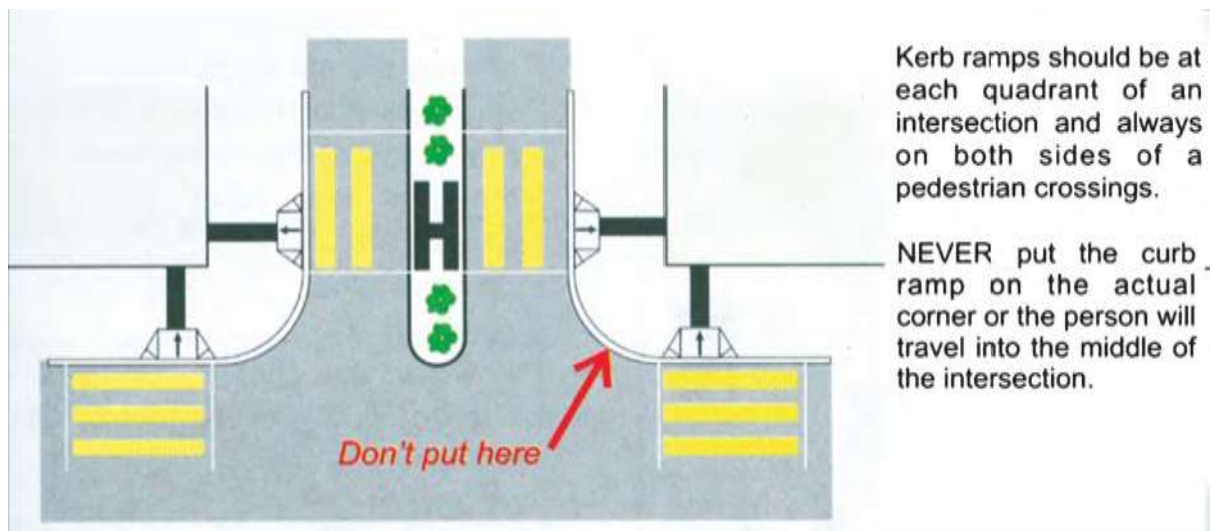


Figure 92b - Plans of Kerb Ramps at Intersections

- Provision of synchronized audio as well as pictorial Traffic signal at major road crossing should be there.
- Acoustic devices should be provided at Traffic signals along with green/Red man ('WALK' signal) installed on the pole at the crossing with the following arrangement.

8.3.1 Design Considerations

- An exterior location is preferred for ramps to provide wheelchair access to different floors.
- Indoor ramps are not recommended because they take up a great deal of space. Ideally, the entrance to a ramp should be immediately adjacent to the stairs.

8.3.2 Ramp configuration

Ramps can have one of the following configurations:

- a. Straight run 90 turn
- b. Switch back or 180 turn

Where pathways meet the road a kerb ramp is required. The kerb ramp should conform to specification given in situation where pathways meet the road / a kerb ramp is provided and any crossing involved, a tactile pathway along the road crossing shall be provided for persons with visual impairments.

8.3.3 Level changes

Kerb ramps

- are provided where the vertical rise is less than 150 mm;
- should have a slip-resistant surface;
- should be designed not to allow water accumulating on the walking surface; do not require handrails;
- should not project into the road surface;
- should be located or protected to prevent obstruction by parked vehicles; and
- should be free from any obstruction such as signposts, traffic lights, etc.

Accessibility Guidelines for Bus terminals and Bus Stops

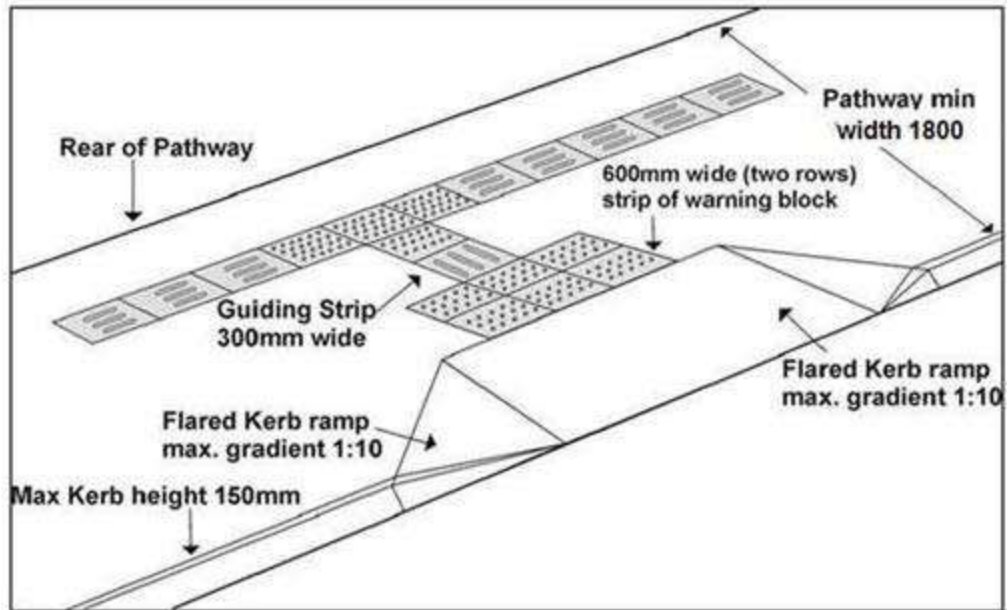


Figure 93- Kerb ramp detail

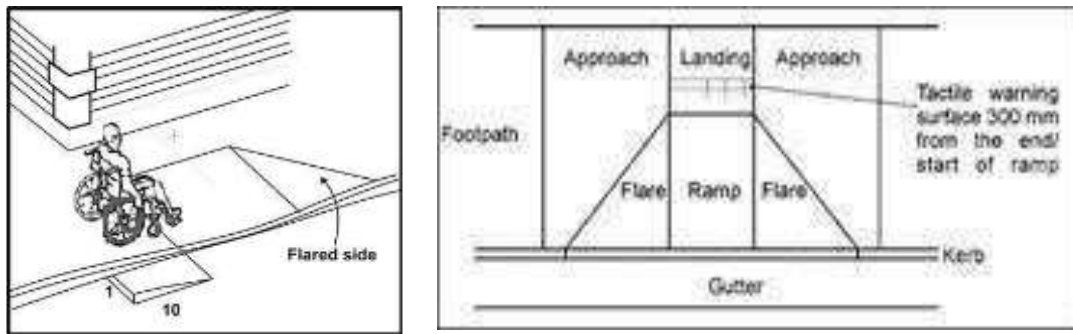


Figure 94- Kerb extension at street & Ramp Requirements intersection

8.3.4 Gradient

The gradient of a kerb ramp should not be steeper than the flared sides should not be more than 1:10.

8.3.5 Width

The width should not be less than 900mm min.

8.3.6 Flared Sides

Kerb ramps should have flared sides where pedestrians are likely to walk across them as shown in the figures. The gradient of the flared side should not be steeper than 1:10.

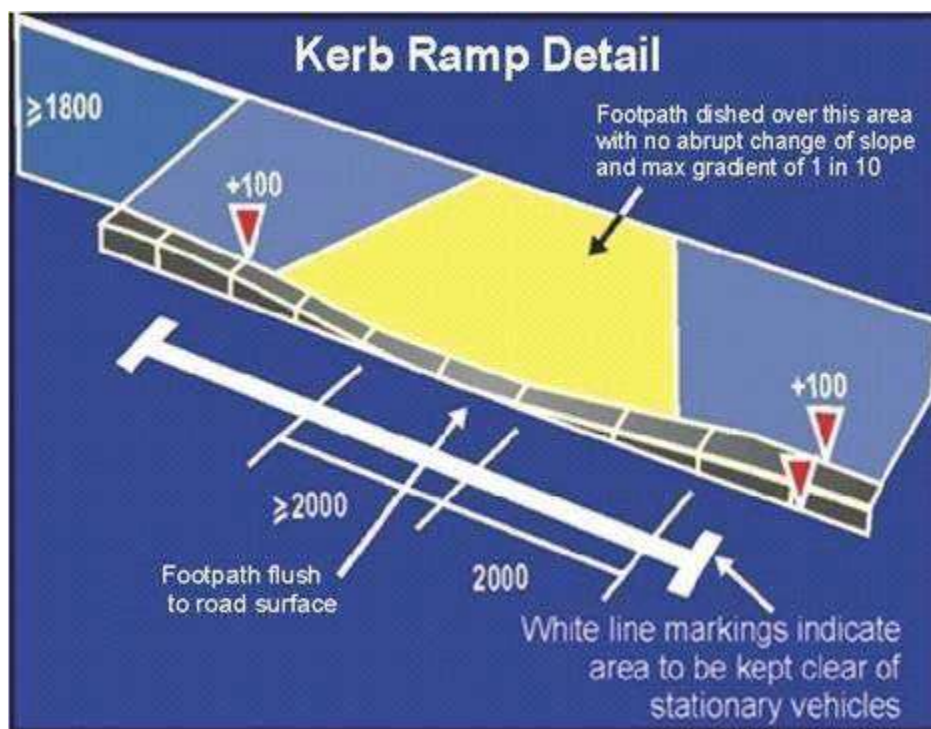


Figure 95- Kerb ramp detail

8.4 Ramps

8.4.1 General

- Ramps allow persons in wheelchair to move from one level to another. However, many ambulant Persons with Disabilities negotiate steps more easily and safely. Hence, it is preferable to provide accessibility by both steps and ramps.
- Where the horizontal run of the approach ramp exceeds 9000 mm length, an alternative stepped approach in addition to the ramp approach, should be provided for people with ambulatory disabilities.
- Where there is a large change in elevation that requires multiple ramps and landing combination, other solutions such as elevators should be considered.
- Single row of tactile warning blocks should be placed at beginning and end of each ramp at also at the beginning and end of each run.

Accessibility Guidelines for Bus terminals and Bus Stops

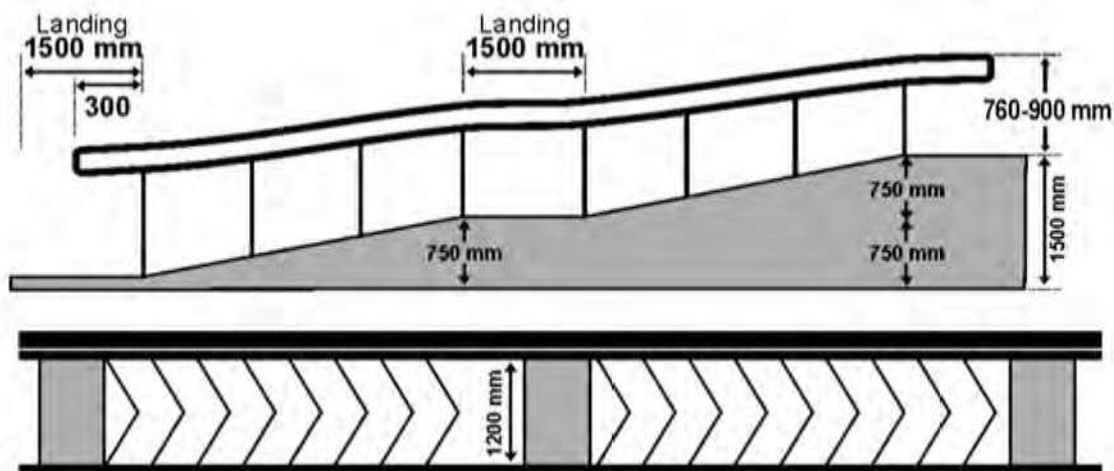


Figure 96- Ramp Design

Level difference	Minimum gradient of Ramp	Ramp width	Handrail on both sides	Comments
≥ 150 mm ≤ 300 mm	1:12	1200 mm	✓	
≥ 300 mm ≤ 750 mm	1:12	1500 mm	✓	Landings every 5 meters of ramp run.
≥ 750 mm ≤ 3000 mm	1:15	1800 mm	✓	Landings every 9 meters of ramp run.
≥ 3000 mm	1:20	1800 mm	✓	Landings every 9 meters of ramp run.

Figure 97- Minimum Specifications for Ramps

8.4.2 Gradient

It should be noted that the gradient should be constant between landings. The recommended gradients for ramps are given in the Table.

Level difference	Minimum gradient of Ramp	Ramp Width	Handrail on both sides
≥ 150 mm ≤ 300 mm	1:12	1200 mm	✓
≥ 300 mm ≤ 750 mm	1:12	1500 mm	✓
≥ 750 mm ≤ 3000 mm	1:15	1800 mm	✓
≥ 3000 mm	1:20	1800 mm	✓

Figure 98- Gradient

In all the above cases, the landings should be given after every 9 meters of ramp run.

Accessibility Guidelines for Bus terminals and Bus Stops

8.4.3 Width

The minimum clear width of a ramp should be 1200 mm.

8.4.4 Surface

- Ramps and landing surfaces should be slip resistant
- Outdoor ramps and their surface should be designed to prevent water from accumulating on the walking surfaces.

8.4.5 Landings

- Ramps should have a level landing at the top and bottom of each run and also where the run changes direction as shown in the figure.
- should:-
 - Be provided at regular intervals of not more than 9000 mm of every horizontal run.
 - Have a level platform of not less than 1500 mm.

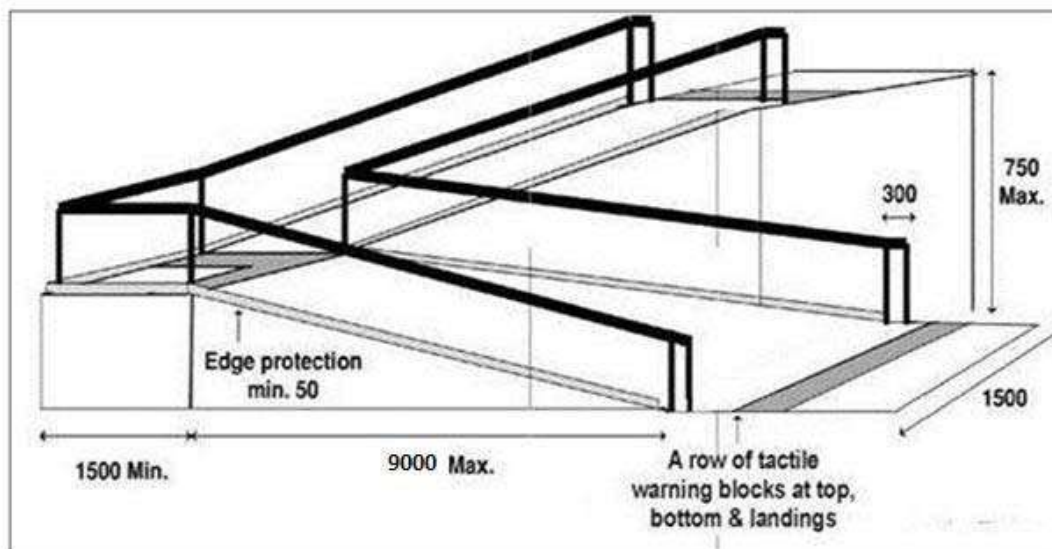
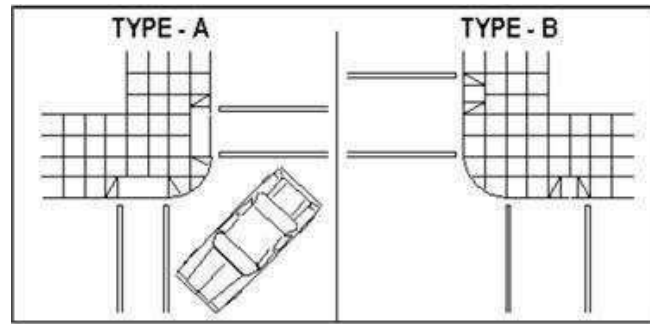


Figure 99- L-shape ramp with landing

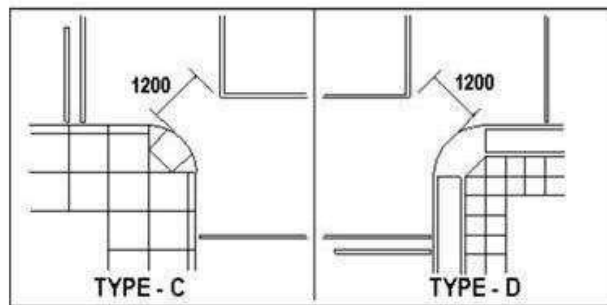
8.5 Kerb Ramps at Walkways and Pedestrian Crossings

Kerb ramp at pedestrian crossing should be wholly contained in the area designated for pedestrians use figure. At the pedestrian crossings, i.e. for the kerb ramps, tactile floor guidance should be provided. Zebra crossings should be in 3D texture to be easily detectable by persons with visual impairments.

Accessibility Guidelines for Bus terminals and Bus Stops



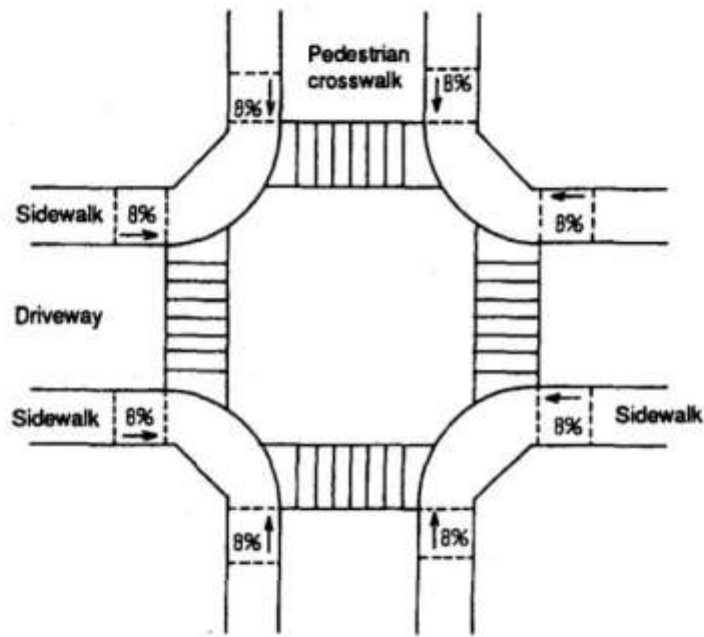
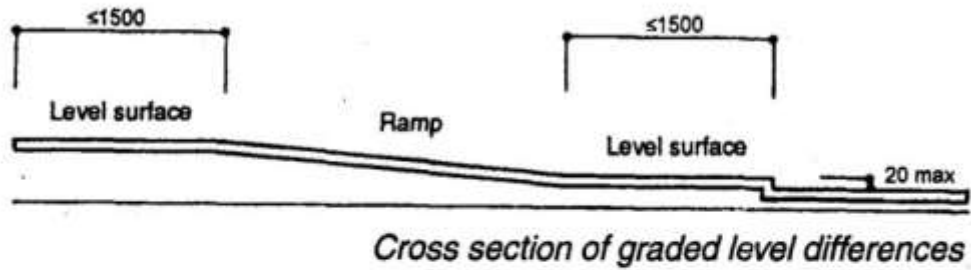
Desirable



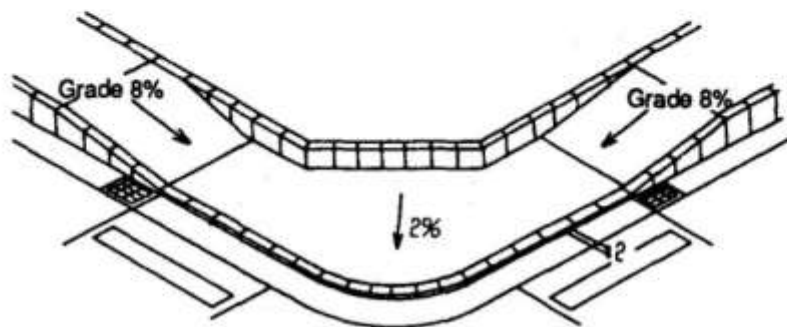
Undesirable

Figure 100- Kerb ramp placements at turnings

Road Crossing



Sidewalk grading (at intersection)



Sidewalk Fences

Figure 101- Ramps & Road Crossing details

9. Bus stop

9.1 Ramp design at the Bus Stop^{xvi}

- Bus stops should be located adjacent to the bus linear line of travel so that the bus does not need to pull over to the left. It is recommended to place the bus stop at the far side of the intersection than the near side.
- Far side located bus stops result in increased efficiency of the bus movement. They tend to reduce the travel time thereby saving time and fuel on the entire route.
- Near side bus stops at the intersection make it difficult for buses to manoeuvre in mixed traffic conditions when turning right and are often hindered by left moving vehicles. This often creates conflicts and accidents. Far side located bus stops allow pedestrian crossing at the rear end of the bus.

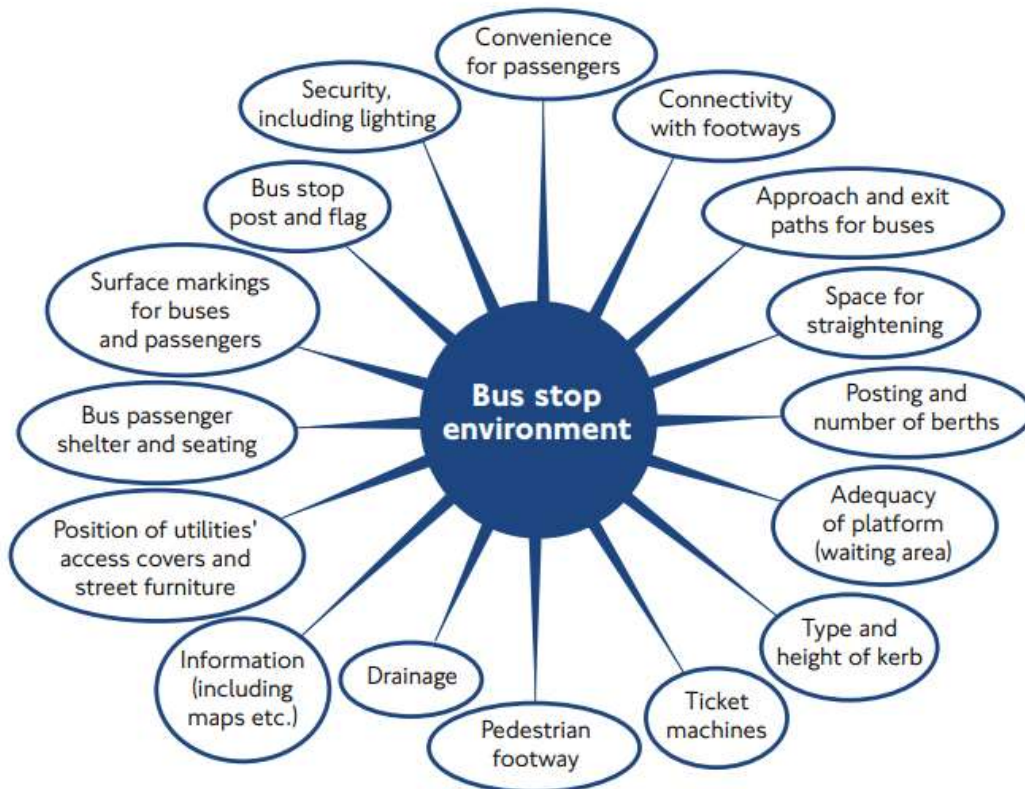


Figure 102- Bus stop environment

- It may also be necessary to provide additional dropped kerb crossings and/or crossing facilities in the vicinity of the stop as part of any bus stop improvements.
- The passenger waiting area, or platform, where bus passengers board and alight needs to be designed to allow sufficient space for the stop infrastructure, such as shelters, as well as pedestrian through movements.
- Poor, or inadequate, street lighting can contribute to issues of personal security. Good levels of illumination should be provided at bus stops.

Accessibility Guidelines for Bus terminals and Bus Stops

- The tactile towards the bus/ boarding door should be warmer blocks.
- Signage's and braille form information panels to be provided on the bus stops to make it accessible for visually impaired.
- Reservation should be done on seating space by indicating with correct symbols being marked on the seating's for Persons with disabilities.
- A clean passenger waiting area improves the passengers' environment. Litter bins should be provided but care needs to be taken in locating litter bins to reduce nuisance, such as smells and flies, and avoid obstruction to pedestrian and passenger movement.

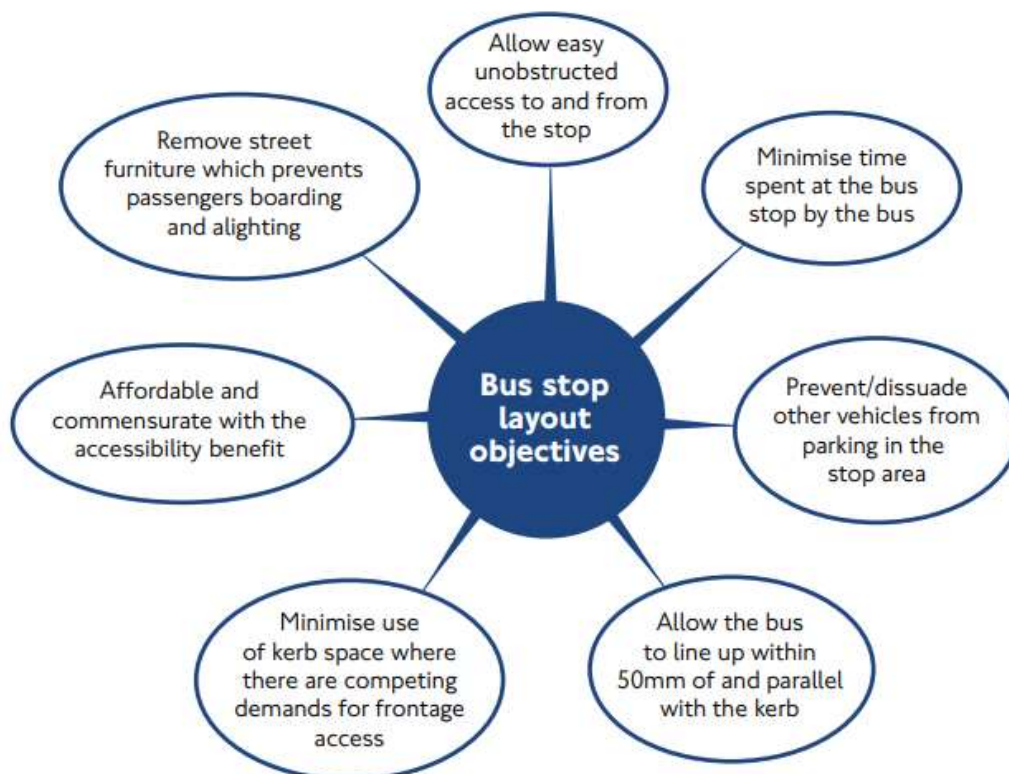


Figure 103- Bus stop layout objectives

9.2 Bus stop layout objectives

A well-designed bus stop will provide features which co-ordinate with the facilities of the low-floor bus and minimise vertical height and horizontal gap distances.

- Allow easy unobstructed access to and from the stop
- Remove street furniture which prevents passengers boarding and alighting
- Affordable and commensurate with accessibility benefit
- Minimise use of kerb space where there are competing demands for frontage access
- Allow the bus to line up within 200mm of and parallel with the kerb
- Prevent/dissuade other vehicles from parking in the stop areas
- Minimise time spent at the bus stop by the bus

Bus layout design considerations:-

- Various configurations of bus stop areas are available to accommodate passenger waiting area, boarding and alighting. Curb side stops are typically installed on existing sidewalks. The length of the stop curb may be painted a distinctive colour to prevent or discourage parking.
- Design the sidewalk adjacent to the bus stop boarding and alighting area to be wide enough to handle the expected levels of pedestrian activity and for two people using wheelchairs to pass each other travelling in opposite directions when two way traffic is frequent.
- Provide double sided signs for visibility from both directions and reflectorized or illuminated signs for night time visibility.
- Police call boxes for transit systems are typically placed in rail stations or at large bus terminals. Providing call boxes at bus stops aids in establishing a safe environment, especially at stops that area less patronized or are located in sub urban or rural areas.

9.3 Bus stop waiting area environment

Street lighting: Inadequate street lighting can contribute to issues of personal security. Good levels of illumination should be provided at all bus stops and should aim to achieve a distribution of light that is spread evenly with uniformity. White light is preferable as this can improve colour rendering qualities and can have a positive impact on users with a secured environment.

Utilities: Utilities are likely to be present at bus stop locations and can affect the positioning of bus stop flags and passenger shelters. Service covers can also create long term problems at the bus stop owing to access requirements to the equipment. Consideration should be given to the boarding and alighting zone to avoid access difficulties during maintenance works.

Litter: A clean passenger waiting area improves the passengers' environment. Litter bins should be provided but with consideration of locating litter bins to reduce nuisance, such as smells and flies, and avoid obstruction to pedestrian and passenger movement. They should also be emptied regularly by the local authority.

Drainage: Poor drainage, resulting in water 'ponding' on the footway around the passenger waiting area or at the carriageway kerbside, can affect the passenger environment. Ponding may also result from defective carriageway repairs, or blocked drains. In freezing conditions ponding on footways can turn to ice, creating dangerous conditions for pedestrians. Ponding at the kerbside can result in passengers being splashed by passing traffic (or the bus) and it is, therefore, important that good drainage is provided and that footways in the vicinity of the bus stop are level to ensure surface water drains off efficiently.

Green infrastructure: Green infrastructure – including street trees, woodlands and individual elements such as green walls – is hugely important to London, delivering significant environmental, economic and social benefits including improved air quality,



Accessibility Guidelines for Bus terminals and Bus Stops

mitigation of the urban heat island effect, floodwater management and reduced traffic speeds. Unlike other highway assets, trees and other vegetation are dynamic, living and growing organisms.

Under certain circumstances green infrastructure can have negative impacts such as obstruction of street lights and sight lines, low branches and conflicts with buildings or other infrastructure. These conflicts can largely be avoided through good planning of new bus stops in relation to green infrastructure. Adequate maintenance, inspection and monitoring of green infrastructure at bus stops should help identify and reduce conflicts before they occur.

9.4 Kerb profiles and height

Kerb heights:-

For new facilities, highway authorities and developers should aim to provide a kerb height of 140mm, as this allows for future road resurfacing. Existing kerb heights of between 100mm and 140mm are unlikely to require alteration. However, where kerbs are already being altered at bus stops e.g. to build a bus boarder, consideration should be given to the use of higher kerbs to reduce the step height and reducing the gradient of the ramp deployed for wheelchair access. This will improve access for all bus users including disabled people.



Figure 104- Wheelchair accessibility to bus

The kerb form is also important to consider. It is sometimes difficult for a bus driver to position their vehicles close to kerbs of traditional design; they are not easily seen from the driver's cab position and the driver will wish to avoid damage to the vehicle, particularly with 90 degree cornered kerbs which can cause wheel damage. It is, therefore, recommended that smooth angled face kerbs should be considered, particularly at new developments.

Carriageway and footway cross falls:-

- Where kerb heights are altered, carriageway and footway crossfalls will need to be carefully considered. As a general rule, carriageway crossfalls in the region of 1 in 40, or 2.5%, should not present any additional difficulties for low-floor buses. For carriageway crossfalls steeper than 2.5%, regrading of the carriageway should be considered.
- Footway crossfalls are also important and a steep backfall from the kerb is undesirable. A gradient of no more than 1 in 25 or 4% is advisable. To achieve this, designers may have to regrade lengths of footway to maintain adequate crossfalls or introduce complex drainage arrangements. A common problem with bus boarders is that works are only undertaken on the build-out, leading to steep crossfalls. Ideally, footways should be regraded to align from the back of the footway but this can add considerably to the cost of works.
- Maintaining bus stop accessibility
- Small changes to the bus stop environment can make bus stops accessible.
- Highway authorities need to be aware of the impacts of any interventions such as the positioning of street furniture or changes to the bus stop kerb. Any intervention in the bus stop area that prevents a bus being able to pull up parallel to the kerb and deploy its ramp should be avoided.

Audio information:-

- This helps to provide independent audio information to help blind and partially sighted people find their way around the network independently.

9.5 Bus stop bypass design accessibility principles

Bus stop bypasses can give rise to concerns about accessibility that do not apply to most other types of bus stops and that need to be specifically addressed in any design proposals.

It is essential that bus stop bypasses are designed to consider the complications that can arise for pedestrians boarding or alighting the bus at a bus stop. This includes consideration not just for those with a visual impairment but for all those with mobility impairments including passengers with prams or pushchairs or those carrying heavy luggage.

The following accessibility issues therefore need to be addressed through the design process:

- The ability of anyone with a visual, hearing, mobility or cognitive impairment to find the crossing point and to reach the island and then find the bus stop from the island
- The level of comfort and confidence for those crossing the cycle track; particularly in areas with more pedestrians. This includes cyclists being encouraged to act courteously, slowing down on the approach to a crossing and giving way as necessary
- The consistency of basic layout designs. This should ensure that anyone who has been guided through using one bus stop bypass is able to use any such facility with confidence, even though dimensions and other design details will be location specific. Bin location must be away from wheelchair ramp to avoid stray animal.

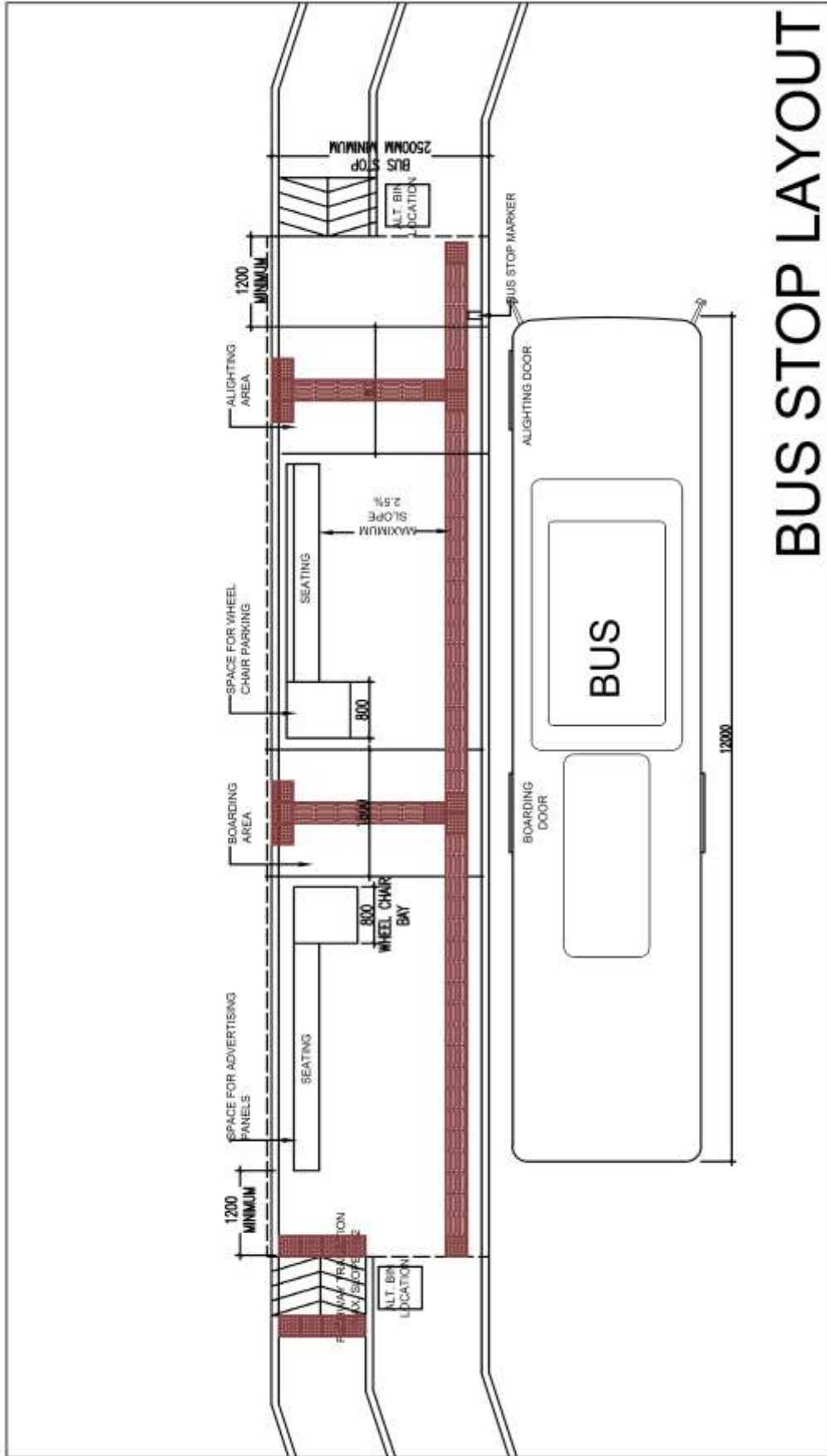


Figure 105- Bus stop layout

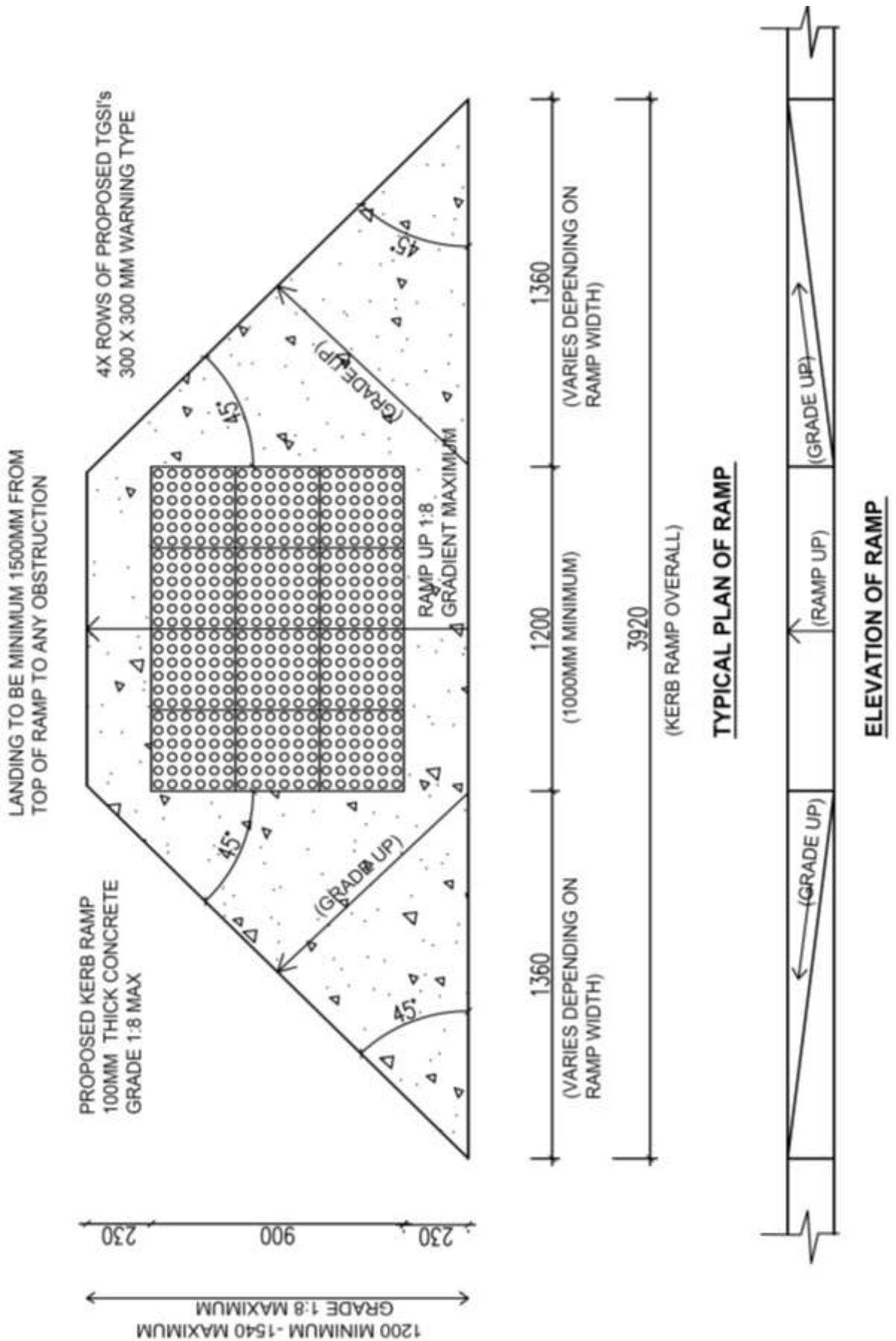
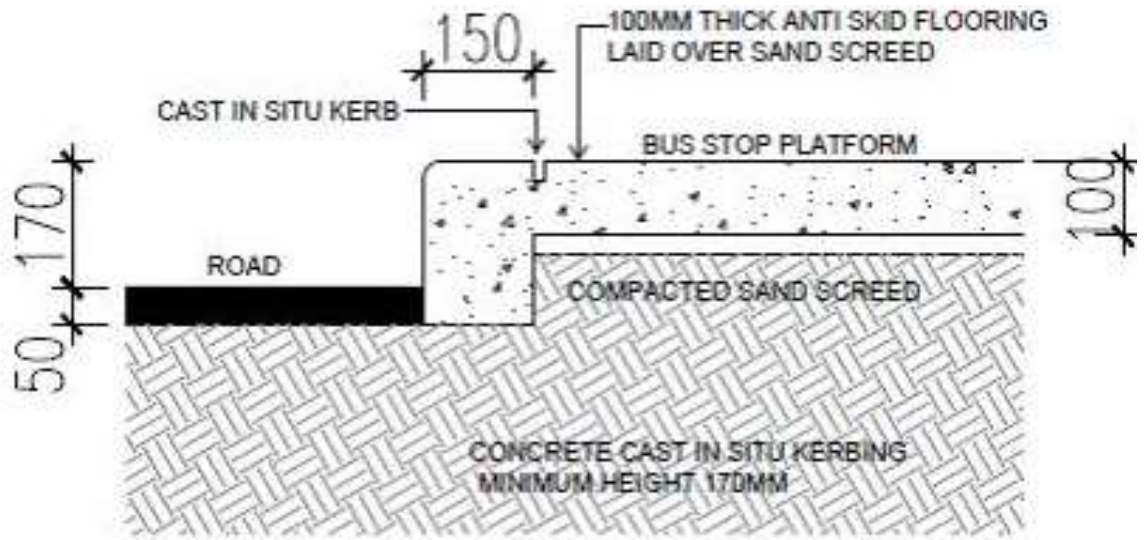


Figure 106- Bus Stop Ramp detail

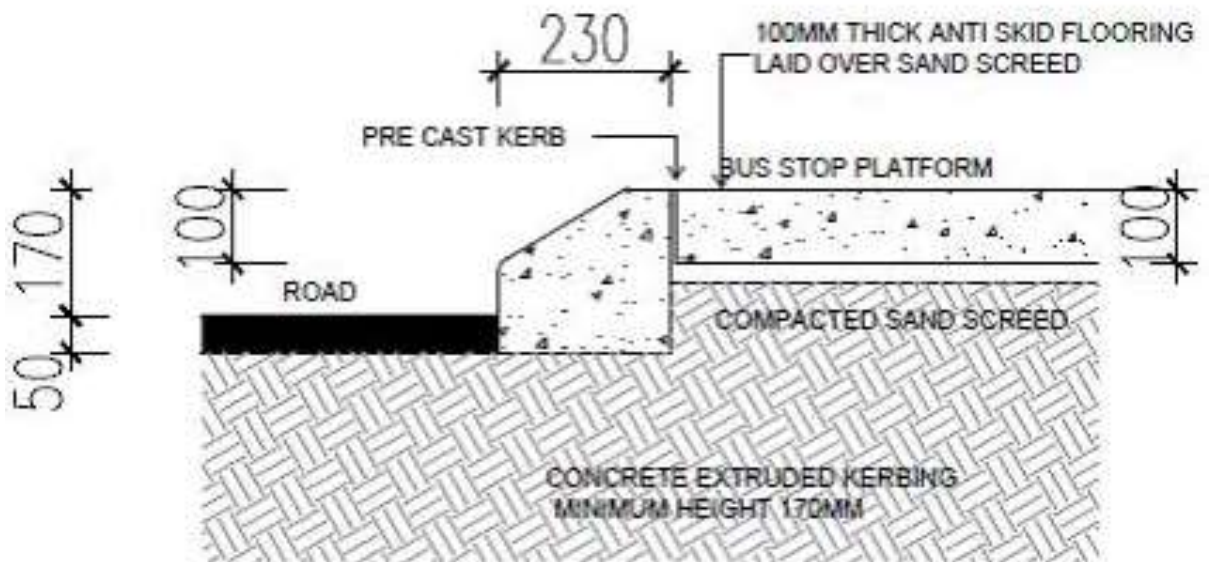


Accessibility Guidelines for Bus terminals and Bus Stops

Wheelchair bay should be minimum 900 mm in the bus stop design. The grade for the ramp at bus queue shelter is maximum 1:8 with the width of 1200 mm varying till 1540 mm maximum. For the barrier types, there can be pre cast kerb or cast in situ kerb. Both the details are mentioned below with measurements.



BARRIER TYPE KERB DETAIL



SEMI-MOUNTABLE KERB DETAIL

Figure 107- kerb details

10. Buses and Service Providers

10.1 Land Transport

Buses, trams, taxis, mini-buses and three-wheelers should be designed as far as practicable to include facilities that can accommodate people with disabilities.

10.2 Accessible buses

Accessible buses should have the following features:

- Bus doors should be at least 1200 mm wide;
- Should be low floor;
- Have handrail and footlight installed; and
- Have apparatus such as a hydraulic lift or pull-out/foldable ramp installed in the doorway for mobility aided users/ prams.
- Wheelchair spaces
 - Space for a wheelchair should be provided in an appropriate position, without preventing other passengers from getting on and off
 - The location of that space should be as indicated, inside and outside the bus, using the standard symbol for wheelchair accessibility
 - Wheel stoppers and wheelchair safety belts should be provided
 - Clearing marking of the edge of any steps (contrasting band on leading edge of step)
 - Colour contrasted bell pushes
 - Audible announcements at bus stops of service number/ destination of the next bus
 - Bell pushes within reach of a seated passenger
- Alighting Buzzers
 - An appropriate number of alighting buzzers should be provided in positions that are easily accessible for seated or standing passengers; and
 - The push button of an alighting buzzer should be clearly visible; of adequate size, installed at 900 mm to 1200 mm from the bus floor level and display the information in Braille/raised numbers as well.

Accessibility Guidelines for Bus terminals and Bus Stops



Figure 108- Low floor bus boarding from road level and bus stand platform

- Information Signs
 - Information on the names of all stops along a bus route should be indicated inside the bus by displaying the text in a suitable position; and
 - Information on a route and its final destination should be displayed outside the bus in large text, especially on the front and side of the bus. This information should be in a bright contrasting colour and be well illuminated by an external light to make it readable in the dark.

10.3 Taxi, Rail & Water Transport

Persons with disabilities arriving at bus terminal through Taxi or public transport must be able to use foldable ramps to get in and out of them while remaining seated in the wheel chairs.



Figure 109- Accessible taxi



Figure 110- Accessible ferry

10.4 Ramp design inside buses

10.4.1 Accessibility provisions in the Intra city Buses

Manually operated sunken type wrap over ramp for wheel chair of Persons with Disability (PWD) shall be fitted at entrance door and shall meet the requirements as given in the AIS 153 & Urban Bus Specification manual. The ramp shall have width of 800 mm minimum with anti-slip coating and load carrying capacity of 300 kg minimum. Provision of anchoring of wheel chair shall be made suitably such that anchored wheel chair shall not create undue hindrance to free flow of movement of other fellow commuters. Suitable provisions shall be made for visually impaired commuters also necessary provisions to comply the requirements of Disabilities Act 2016 or latest applicable as on date.

An audio-visual signal shall be provided at the service doors for the convenience of passengers that shall be affected during the door opening and closing cycle and for the entire duration of door in open condition. A warning electronic chime shall be installed at the exit door only. This chime is activated before opening or closing of the exit door.

The bus should be fitted with air-suspension system at front and rear axle. The suspension system should be fitted with shock absorbers, suitable for trouble free operation and jerk free comfortable ride in urban roads. The full air suspension system both at front & rear should be with stabilizer bar and kneeling arrangement of minimum 60 mm at front & rear left side severally and/ or simultaneously. The reference point of measurement of kneeling shall be the center line of exit & entrance at bus floor level under unladen condition.

10.4.2 Ramp provision in Intra-city Buses

Accessibility Guidelines for Bus terminals and Bus Stops

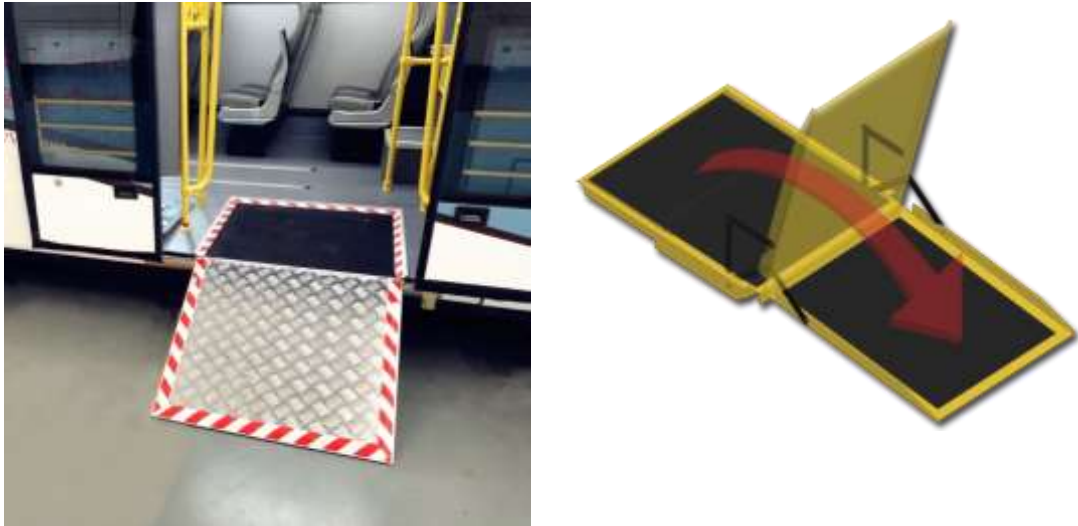


Figure 111- Bus ramp for persons with reduced mobility

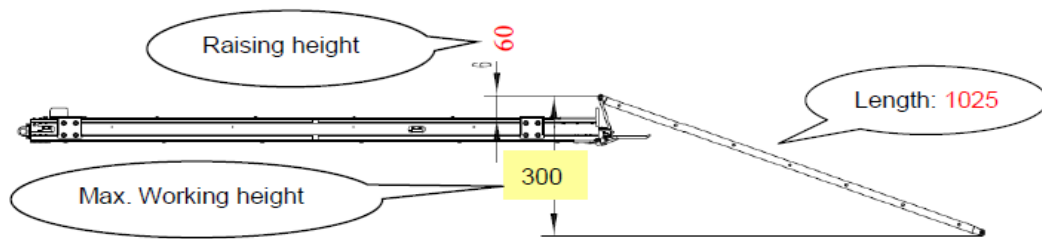


Figure 112- Section of Bus ramp for low rises buses

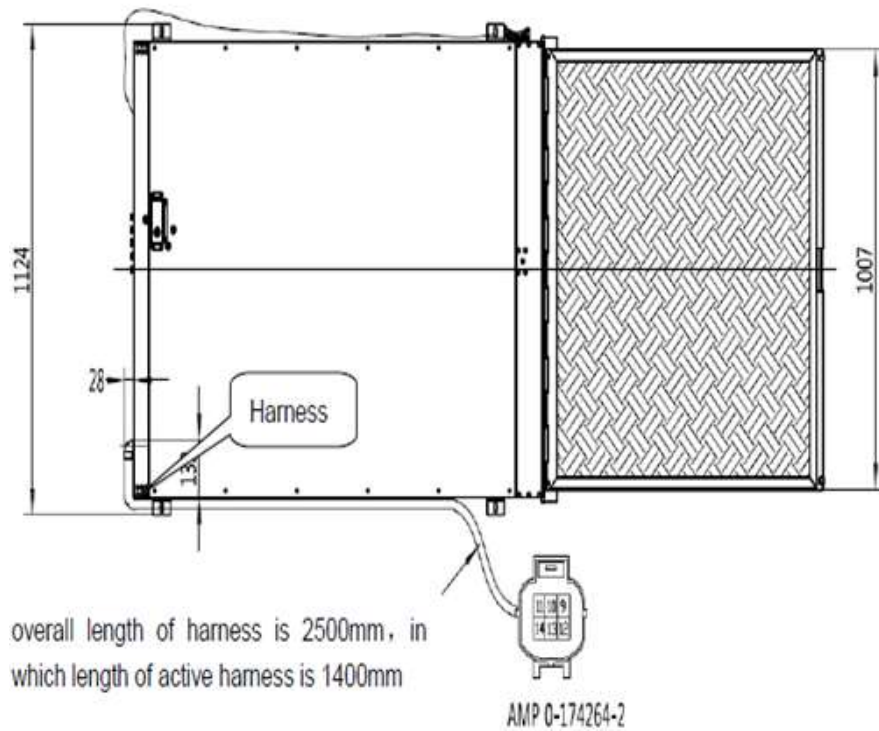


Figure 113- Wheelchair ramp detail

Accessibility Guidelines for Bus terminals and Bus Stops

Manual Wheelchair Ramp can be applied for bus, and can be installed on the vehicle floor. It is installed on the vehicle floor, when need it. It just requires unfolding the ramp by a dedicated person. The operation of aluminum wheelchair ramps is easy, simple, independent and wholly manual, because it doesn't need to connect with vehicle electric system. This wheel chair ramp is suitable for all types of Indian low floor vehicle.

Repairs has to be made to footways and pedestrian areas within and outside the terminal building. Barricading should be done while repair work by continuous rail, audible warning and lamps, temporary footways.

10.5 Ramp provision in Inter-city Buses

There are no guidelines for provisions in inter city buses for persons with disabilities. Following provisions should be incorporated in the inter-city bus design manual/guidelines.

10.5.1 Type 1 - Below emergency door-special door of Bus

This wheelchair lift platform extends out from vehicle floor, raises to vehicle floor or down to ground. When not in use, the platform can be folded under vehicle floor to make sure, there is enough room for doorway. There is a non-slippery platform to put the wheelchair on. ^{xvii}

The lift is gravity down meaning the pump runs up only. It saves electricity when gravity is decline. Manual lift operation facility provided for use in emergency when there is no power.



Figure 114- Emergency door for bus

10.5.2 Type 2 – Installed under step

The wheelchair occupant, attendant or driver can operate it by operating switches. This wheelchair lift platform extends out from vehicle floor, raises to vehicle floor or down to ground. If you do not use it, the platform can be folded under vehicle floor to make sure, there is enough room for doorway. There is a non-slippery platform to put the wheelchair on. ^{xviii}



Figure 115- Platform installed under step of bus

10.5.3 Type 3 – Wheel chair lift with extra height

It occupies very little vehicle space. It is stable, non-skid platform with automatic inboard and outboard roll stops. It accommodates most wheelchairs and scooters to move inside the bus easily. Moreover, because the platform folds when stowed, no raised-roof modification for your personal vehicle is required-even when a long platform is necessary for larger wheelchairs and power scooters. The lift is quiet and easy to maintain. ^{xix}

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Figure 116- Platform installed in buses for accessibility of wheelchair

Separate wheelchair parking space to be provided in the bus. It has to be supported with emergency stop/alarm button. There has to be space given for holding clutches. Reserved seats & priority seating to be given in the buses. Information display in audio or video format in all buses, bus stops and terminals to be provided.

11. Checklist for pre-commissioning

A comprehensive checklist is given below to review the accessibility of infrastructure and facilities created, before commencement of operations, for ready reference.

Building Name:-

Area :-

Date of inspection:-

Inspection done by:-

1. MAIN ENTRANCE	YES	NO	NOT APPLICABLE	REMARKS
▪ Is the main entrance of the building accessible?				
▪ Are there any steps at the entrance?				
▪ Do the steps have a handrail?				
▪ Are there handrails on both the sides?				
▪ Is there a ramp?				
▪ Does the ramp have a railing?				
▪ Are there handrails on both the sides?				
▪ Is the clear door width at least 1000 mm?				

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<ul style="list-style-type: none"> ▪ Can the entrance door be operated independently? ▪ Is the height of the door handle between 800 mm and 1000 mm? 				
2. RAMPS	YES	NO	NOT APPLICABLE	REMARKS
<ul style="list-style-type: none"> ▪ Is there a ramp next to the stairs? ▪ Is the location of the ramp clearly identifiable? ▪ Is the ramp gradient no steeper than 1:12? ▪ Is there a landing of at least 1500 mm x 1500mm, at 9m intervals provided? ▪ Is there a landing at every change in direction? ▪ Is there landing at the top and bottom of every ramp? ▪ Is the minimum width of the ramp 1500 mm? ▪ Are there continuous handrails, on both sides, at a height between 760 mm – 900 mm? ▪ Is the surface of the ramp non-slip? ▪ Is there an edge protection on both sides of the ramp? 				
3. PARKING	YES	NO	NOT APPLICABLE	REMARKS
<ul style="list-style-type: none"> ▪ Are there accessible parking facilities? ▪ Is the number of accessible parking spaces sufficient? ▪ Are the designated spaces wide enough 3600mm x 5m? ▪ Are accessible parking spaces marked by the international symbol of accessibility? ▪ Accessible parking spaces are not misused or used by non-disabled people? 				



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<ul style="list-style-type: none"> ▪ If the drop-off area has a kerb, is there a kerb ramp leading to the pathway? 				
<ul style="list-style-type: none"> ▪ Is the drop-off area marked by signage? 				
<ul style="list-style-type: none"> ▪ Is there an accessible path of travel from the drop-off area to the main entrance? 				
<ul style="list-style-type: none"> ▪ Does the accessible entrance permit access to an elevator? 				
<ul style="list-style-type: none"> ▪ Is the accessible entrance clearly identifiable? 				
<ul style="list-style-type: none"> ▪ Is the landing surface non-slippery? 				

4. RECEPTION & INFORMATION COUNTERS	YES	NO	NOT APPLICABLE	REMARKS
<ul style="list-style-type: none"> ▪ Are the counters easily identifiable? 				
<ul style="list-style-type: none"> ▪ Is the counter at two heights? 				
<ul style="list-style-type: none"> ▪ Is a part of the counter lowered to accessible height of 800 mm? 				
<ul style="list-style-type: none"> ▪ Is a loop induction unit installed at the counter? 				
<ul style="list-style-type: none"> ▪ Are there tactile pictographic maps of the building near the counter? 				
<ul style="list-style-type: none"> ▪ Is the counter well illuminated? 				

5. DOORS	YES	NO	NOT APPLICABLE	REMARKS
<ul style="list-style-type: none"> ▪ Are there any automatic doors at the entrance? 				
<ul style="list-style-type: none"> ▪ Can the doors be operated without much effort? 				
<ul style="list-style-type: none"> ▪ Do automatic doors have sufficient long opening intervals? 				
<ul style="list-style-type: none"> ▪ Are push buttons for automatic doors located at a maximum height of 1m? 				



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<ul style="list-style-type: none"> ▪ Is there sufficient space beside the latch side of the doors (450-600mm)? 				
<ul style="list-style-type: none"> ▪ Are accessible door placed adjacent to the revolving doors and turnstiles? 				
<ul style="list-style-type: none"> ▪ Are glazed doors marked with a colour band at eye level? 				
<ul style="list-style-type: none"> ▪ For double leaf doors, is the width of one of the leaves at least 1m? 				
<ul style="list-style-type: none"> ▪ Do doors fitted with spring closers have an extra pull handle? 				
<ul style="list-style-type: none"> ▪ Is manual door accessories/hardware (handle, lock pull etc.) lower than 				

800mm?

6. CORRIDORS	YES	NO	NOT APPLICABLE	REMARKS
<ul style="list-style-type: none"> ▪ Is the minimum unobstructed width of corridors at least 1500 mm? 				
<ul style="list-style-type: none"> ▪ Does the corridors width allow maneuvering through doors located along its length? 				
<ul style="list-style-type: none"> ▪ Are differences in level, bridged with by ramps or lifts? 				
<ul style="list-style-type: none"> ▪ Can a sightless person with a cane detect all protruding objects with in the corridor? 				
<ul style="list-style-type: none"> ▪ Are all over hanging obstructions mounted above a minimum height of 2200mm? 				
<ul style="list-style-type: none"> ▪ Can a person with low vision, identify all obstacles in the corridor? 				

7. LIFTS	YES	NO	NOT APPLICABLE	REMARKS
<ul style="list-style-type: none"> ▪ Is there an accessible path leading to the elevator? 				
<ul style="list-style-type: none"> ▪ Is the clear door opening width 1m or more? 				



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<ul style="list-style-type: none"> ▪ Are the minimum internal dimensions of the elevator 1500 mm x1500 mm minimum or having 13 persons capacity? 				
<ul style="list-style-type: none"> ▪ Is the height of the call button (outside the lift) between 800 mm – 1m, from the floor level? 				
<ul style="list-style-type: none"> ▪ Is the control panel placed at a height between 800 mm – 1m, from the floor level? 				
<ul style="list-style-type: none"> ▪ Is there an audio and video system installed in the lift indicating arrival at a floor? 				
<ul style="list-style-type: none"> ▪ Are there Braille/raised numbers on the control panel? 				
<ul style="list-style-type: none"> ▪ Is the elevator provided with a handrail on the three sides? 				
<ul style="list-style-type: none"> ▪ Are the handrails mounted at a height between 800 mm and 1m? 				
<ul style="list-style-type: none"> ▪ Is the elevator door easy to identify? 				
<ul style="list-style-type: none"> ▪ Is the emergency intercom provided inside the elevator? 				
<ul style="list-style-type: none"> ▪ Are there tactile or Braille instructions for the communication system? 				
<ul style="list-style-type: none"> ▪ Is the emergency intercom usable without the voice communication? 				
<ul style="list-style-type: none"> ▪ Is the door opening/closing interval long enough? 				
<ul style="list-style-type: none"> ▪ Is the finish of the elevator floor skid-resistant? 				
8. STAIRS	YES	NO	NOT APPLICABLE	REMARKS
<ul style="list-style-type: none"> ▪ Is the minimum width of the stairs 1200mm? 				
<ul style="list-style-type: none"> ▪ Are there continuous handrails, on both sides, at a height between 760mm-900mm? 				



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<ul style="list-style-type: none"> ▪ Is the handrails installed in the centre of the stair width, which is more than 3m wide? 				
<ul style="list-style-type: none"> ▪ Is the landing length not less than 1200mm? 				
<ul style="list-style-type: none"> ▪ Are the step edges of a different colour or texture easily identifiable by low-vision & vision impaired persons? 				
<ul style="list-style-type: none"> ▪ Are there warning blocks installed at the beginning and end of all flights? 				
<ul style="list-style-type: none"> ▪ Is the location of emergency (fire escape) stairs clearly identifiable? 				
<ul style="list-style-type: none"> ▪ Does the height of the risers is 150 mm maximum & tread 300 mm minimum? 				
<ul style="list-style-type: none"> ▪ Do treads have a non-slip surface? 				
<ul style="list-style-type: none"> ▪ Are the risers having open gaps in the steps? 				
9. HANDRAILS	YES	NO	NOT APPLICABLE	REMARKS
<ul style="list-style-type: none"> ▪ Are handrails mounted at a height between 760mm – 900 mm? 				
<ul style="list-style-type: none"> ▪ Are handrails easy to grip? 				
<ul style="list-style-type: none"> ▪ Are handrails securely attached? 				
<ul style="list-style-type: none"> ▪ Do handrails extend horizontally 300 mm at the top and bottom of every staircase or ramp? 				
<ul style="list-style-type: none"> ▪ Are the ending of the handrails grouted in the ground or turn downward? 				
<ul style="list-style-type: none"> ▪ Is the space between the handrails and the wall no less than 50mm? 				
<ul style="list-style-type: none"> ▪ Are the handrails painted in contrast colours to be easily indefinable? 				



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<ul style="list-style-type: none"> ▪ Are there tactile strip/ Braille plates identifications on the handrails for emergency stairs & floor levels? 				
10. TOILETS	YES	NO	NOT APPLICABLE	REMARKS
<ul style="list-style-type: none"> ▪ Are there accessible toilets for Persons with Disabilities? 				
<ul style="list-style-type: none"> ▪ Are the toilets easily identifiable? 				
<ul style="list-style-type: none"> ▪ Is there sufficient space of 2m x 2.2m inside the toilets to manoeuvre a wheelchair? 				
<ul style="list-style-type: none"> ▪ Are water closet (WC) and bidets mounted at a height between 450mm – 480mm? 				
<ul style="list-style-type: none"> ▪ Is the space between the WC and the closest adjacent wall, fitted with a grab bar is between 450 mm – 500mm? 				
<ul style="list-style-type: none"> ▪ Is the accessible washbasin mounted at a height between 750mm – 850mm? 				
<ul style="list-style-type: none"> ▪ Is the lower edge of the mirror positioned at a height not exceeding 1m? 				
<ul style="list-style-type: none"> ▪ Are the accessible showers provided with a folding seat? 				
<ul style="list-style-type: none"> ▪ Are the grab bars installed near WC and showers at a height between 750 – 850 mm? 				
<ul style="list-style-type: none"> ▪ Do grab bars have a diameter of 38 mm? 				
<ul style="list-style-type: none"> ▪ Do wall mounted grab bars have knuckle space 50 mm? 				
<ul style="list-style-type: none"> ▪ Are grab bar non slippery? 				
<ul style="list-style-type: none"> ▪ Can the grab bars withstand the load of 200kg minimum? 				
<ul style="list-style-type: none"> ▪ Are faucets easy to grip and operate with one hand? 				
<ul style="list-style-type: none"> ▪ Are shower fixtures with at least 1500 mm long hoses? 				
<ul style="list-style-type: none"> ▪ Are hot water pipes insulated or covered? 				
<ul style="list-style-type: none"> ▪ Is the toilet equipped with an emergency alarm system? 				



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<ul style="list-style-type: none"> ▪ Can doors be locked from inside and releasable from outside under emergency situations? 				
<ul style="list-style-type: none"> ▪ Are flushing arrangements, dispensers and toilet paper mounted between 300mm and 800mm? 				
<ul style="list-style-type: none"> ▪ Are flushing equipments easy to operate? 				
<ul style="list-style-type: none"> ▪ Is the floor material skid proof, well drained and waterproof? 				
<ul style="list-style-type: none"> ▪ Do pivoted doors open outwards? 				

11. CANTEEN	YES	NO	NOT APPLICABLE	REMARKS
<ul style="list-style-type: none"> ▪ Is there a circulation path of at least 900 mm wide to allow a wheelchair user to move around the eating outlet? 				
<ul style="list-style-type: none"> ▪ Are the cash and service counter height below 800mm? 				
<ul style="list-style-type: none"> ▪ Is the table accessible with a height of 750mm to 850mm and knee space of 750mm wide and 480mm deep? 				
<ul style="list-style-type: none"> ▪ Do the table with fixed stools have accessible spaces for wheelchairs? 				

12. DRINKING WATER	YES	NO	NOT APPLICABLE	REMARKS
<ul style="list-style-type: none"> ▪ Is the Water tap accessible? 				
<ul style="list-style-type: none"> ▪ Can it be easily manoeuvred by a person with poor hand function? 				
<ul style="list-style-type: none"> ▪ Is the area dry? 				
<ul style="list-style-type: none"> ▪ Are glasses provided? 				



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13. SIGNAGES	YES	NO	NOT APPLICABLE	REMARKS
<ul style="list-style-type: none"> ▪ Are accessible spaces identified by the international symbol of accessibility? 				
<ul style="list-style-type: none"> ▪ Are there directional signs indicating the location of accessible facilities? 				
<ul style="list-style-type: none"> ▪ Are maps, information panels and wall-mounted signs placed at a height between 900mm and 1800mm? 				
<ul style="list-style-type: none"> ▪ Are signs clear, simple and easy to read? 				
<ul style="list-style-type: none"> ▪ Is the colour of signs clearly distinguishable? 				
<ul style="list-style-type: none"> ▪ Is the surface of the sign processed so as to prevent glare? 				
<ul style="list-style-type: none"> ▪ Is the sign supplement by a text in embossed letters or in Braille available next to information signs? 				
<ul style="list-style-type: none"> ▪ Is the lettering size proportional to the reading distance? 				

14. EMERGENCY EXITS	YES	NO	NOT APPLICABLE	REMARKS
<ul style="list-style-type: none"> ▪ Are emergency exits clearly marked with directional arrow signs? 				

15. PUBLIC TELEPHONES	YES	NO	NOT APPLICABLE	REMARKS
<ul style="list-style-type: none"> ▪ Are there public telephones accessible to wheel chair users? 				
<ul style="list-style-type: none"> ▪ Is there at least one telephone in the building equipped with a loop induction unit? 				
<ul style="list-style-type: none"> ▪ Are the numerals on the telephone raised to allow identification by touch? 				



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<ul style="list-style-type: none"> ▪ Is there proper signage directing to the public telephone? 				
<ul style="list-style-type: none"> ▪ Are the heights of the operable parts of the telephone between 800mm and 1m? 				
<ul style="list-style-type: none"> ▪ Is there a clear knee space of 750mm? 				

16. RESTING FACILITIES	YES	NO		REMARKS
<ul style="list-style-type: none"> ▪ Where there are large spaces, are resting facilities provided at 30 meters of intervals? 				
<ul style="list-style-type: none"> ▪ Is there an adjoining space for a wheelchair next to benches and public seats? 				
<ul style="list-style-type: none"> ▪ Are public seats with height of 450-480mm? 				
<ul style="list-style-type: none"> ▪ Are knee spaces at accessible tables with a height of 750mm and knee space of 750mm wide and 480mm deep? 				



12. References

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