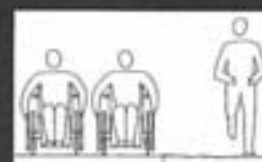
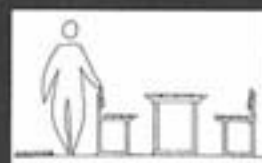
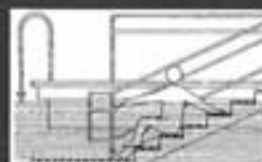
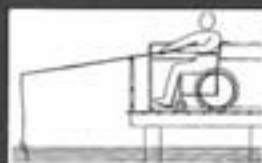
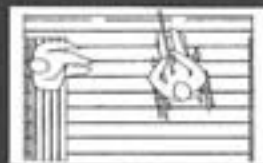


# OUTDOOR RECREATION FOR EVERYONE

THE ADAPTATION OF OUTDOOR ACTIVITY  
AREAS FOR THE USE OF THE DISABLED

IRMA VERHE  
THE FINNISH ASSOCIATION  
OF SPORTS FOR THE DISABLED



OUTDOOR RECREATION  
FOR EVERYONE

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Painatuskeskus oy

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Irma Verhe

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## FOREWORD

Nature has often remained a distant world to a handicapped person, something to be peered at from behind a window, even though, for many, the essential motive for outdoor activity is the mental harmony acquired from experiences in nature.

This book attempts to find a new approach to the outdoor and recreation activities of the handicapped and other ambient disabled. The book is intended for designers, decision makers, organisers of outdoor and recreation services and for the disabled themselves, in order that it may provide new ideas and views for outdoor pursuits.

Despite their growing popularity, many outdoor and recreational environments still remain inaccessible to the ambient disabled, even though the reason for this is not primarily due to a lack of money. It is really related to the matter of the general human concept i.e., whether designers of outdoor routes, downhill skiing centres and other similar outdoor recreation areas regard people of various physical qualities as potential patrons of these facilities.

For a long time, it has been the aim and also the legal obligation, to achieve accessibility within the built environment, particularly in public spaces. With the use of this book we wish to participate in developing our outdoor activity areas into functional environments that respect the needs of the handicapped, the elderly and the ambient disabled.

The starting point for the book concerns urban pavements and their inadequate provision of outdoor activity space for the ambient disabled. Therefore we have compiled a study which consists of text and illustrations, the use of which will assist designers in the creation of better outdoor environments and areas.

We wish to express our gratitude to the author of this book, the architect, *Irma Verhe* for a challenging and pioneering work. We also thank the sponsors of this publication - the Ministry of Education and the Ministry of the Environment - for their financial support.

The classic fairy tale of the race between the rabbit and the tortoise, in which the tortoise reaches the goal before the otherwise faster rabbit, has kindled our thoughts into adapting a similar approach to the design of our outdoor environments. A little bit of inventiveness is required to allow a person in wheelchair to go and pick his berries in a swamp. With our book we wish to accelerate this kind of development in the design of our outdoor environments.

Our book is intended equally for decision makers, designers and the disabled themselves. We also wish the book to be used in the design of the environment surrounding hospitals, rehabilitation institutes, special schools and similar establishments.

The book consists of guidelines and recommendations for authorities and organisers involved in the exercise, health care, tourism and environments sectors. The publication deals with the most popular activities that take place on land, on water and in the air. The aim is to create more accessible, obstacle free environments.

In addition to the undersigned, the editorial staff has included *Majja Könkkölä* and *Eero Heinonen* from the National Association of the Disabled, the Disabled Persons Planning Service, *Kimmo Aaltonen* from the Ministry of Education, *Jarmo Ikonen* from Jyväskylä University and *Pekka Häätinen* from the Finnish Association of Sports for the Disabled. We wish to say thank you to all members of the editorial staff for their input in this work. We also wish to thank the architect, *Meri Mäkipentti* for her work in translating this book from Finnish into English.

We hope that our book becomes worn out in the hands of the designers and users of our outdoor environments.

Helsinki, April, 1st 1995.

The Finnish Association of Sports for the Disabled



Pertti Pousi  
Director

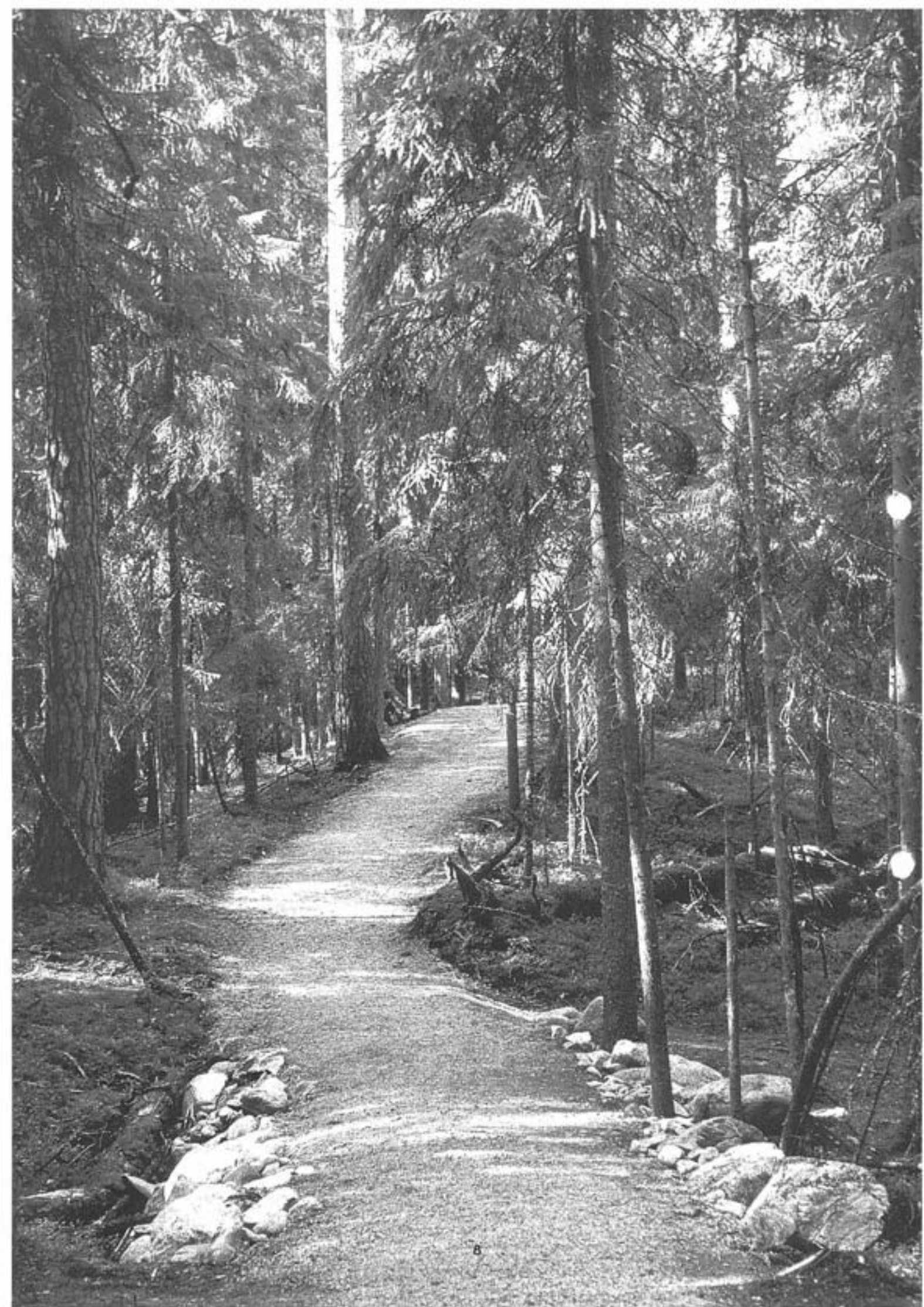


Kari Koivumäki  
Chairman of the  
Editorial Staff

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# PREFACE

The disabled are people whose ability to move has diminished or become limited due to age, illness or a handicap; e.g. senior citizens and the elderly, chronically ill, sensory disabled (i.e. visually handicapped and deaf and hard of hearing), mentally handicapped, ambulant disabled, wheelchair users, and other people dependent on the use of aid equipment besides wheelchair users. In addition, expectant mothers and those with baby prams and pushchairs are classified as ambient disabled.

This book concentrates on providing guidelines, according to which outdoor activity areas and places can be built to suit the disabled. Other users of outdoor activity areas, besides the disabled, also benefit from the recommended improvements and none of these proposals compromise the activity environment from the overall users' point of view.

The guide is intended to serve: municipalities, elected officials as well as civil servants, organisers of handicapped and national health services, various service, care, rehabilitation and education institutions, organisers of recreation services, travel and camping business, designers, builders and users of these services besides persons with disabilities.

The material is based on practical experience, on the knowledge of disabled activity area users and on information obtained from Finnish and foreign publications.

The disabled must be provided with opportunities to participate in and enjoy outdoor activities or to follow them as spectators. Due to their circumstances the disabled and the chronically ill are confined indoors for the majority of time. They, too, may wish to participate in outdoor recreation and enjoy activities in nature. Outdoor activities assist fitness and can refresh an individual both physically and mentally. Those in good condition become more independent in their daily activities.

A disabled person often needs an assistant in order to achieve closeness to nature. The assisting persons or instructors must be able to estimate the abilities of the handicapped person and to choose the correct procedures to partake in these activities. Becoming acquainted with and aware of nature, refreshes and enhances the life of a severely handicapped person. Finding one's limits as an individual or as a group in outdoor pursuits, encourages and instills confidence in one's own problem solving abilities, inventiveness and decision making, besides developing one's concentration.

In order to make it possible for all people to use outdoor facilities we need instructors who know and understand the special disability groups, the activity areas that have no obstacles and the types of

activities that are adapted for the disabled.

During the last few decades purpose built outdoor activity and leisure areas, as well as theme parks, have become increasingly popular. These places, together with their adjoining accommodation facilities, can also be built to suit the disabled. Even some minor adjustments can make moving outside and in nature considerably easier.

This guide offers design solutions which, when carefully considered and executed, greatly improve the access of the disabled to outdoor activities. Good design creates environments that serve the needs of all outdoor activity users.

Roads leading to a resort in nature, car parking places at the resort, correctly built trails and paths as well as properly functioning service facilities are all necessary requirements. It is fundamentally important that attention should be paid to the changes in level and to the suitability of ancillary spaces for the disabled. In addition to these, it is important to build well signposted short routes and nature trails close-by. Trails that are well maintained are a basic requirement, as many people cannot deviate from the paths into the natural landscape.

Accommodation and restaurant services must be available for long term outdoor activities.

The guide describes the most popular outdoor activities and sports of the disabled as well as the locations where these activities take place, i.e. on land, in water and in air. Many activities and sports have been adapted for special groups. In addition, special technical devices have been developed for disabled sports and physical activities.

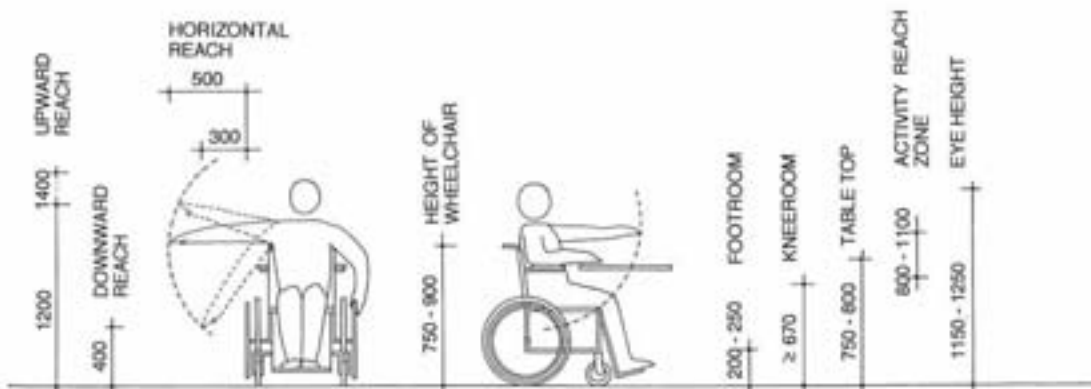
In order to avoid frustration and disappointment, each person must choose an individually suitable form of activity that corresponds to his or her abilities and strengths. New forms of activity gradually develop dexterity and balance and they can give the individual the joy of independent mobility.

The practice of a new form of sport is best begun with the assistance of an experienced instructor. As a result the individual learns the correct technique and the proper use of possible equipment and protective clothing.

Inspiring information on the opportunities available and access to recreation areas and places is also needed in a form suitable for the sensory and mentally disabled. Brochures must give information on the suitability of nature resorts for the disabled and, in particular, on nature trails that are easily passable.

Various disabled organisations give extra information on activities available.

MANUALLY OPERATED WHEELCHAIR USERS ARE FITTER THAN PERSONS USING ELECTRIC WHEELCHAIRS. THOSE WITH THE USE OF THEIR ARMS CAN REACH UP TO 1400mm AND DOWN TO 400mm ABOVE GROUND LEVEL.

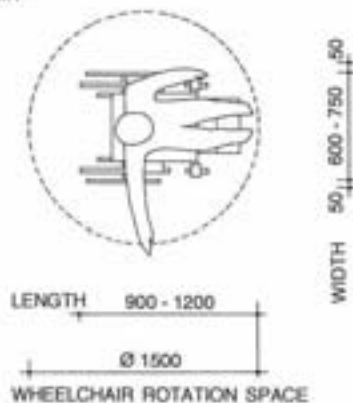


PERSONS MUST BE ABLE TO USE THEIR OWN PERSONAL WHEELCHAIRS.

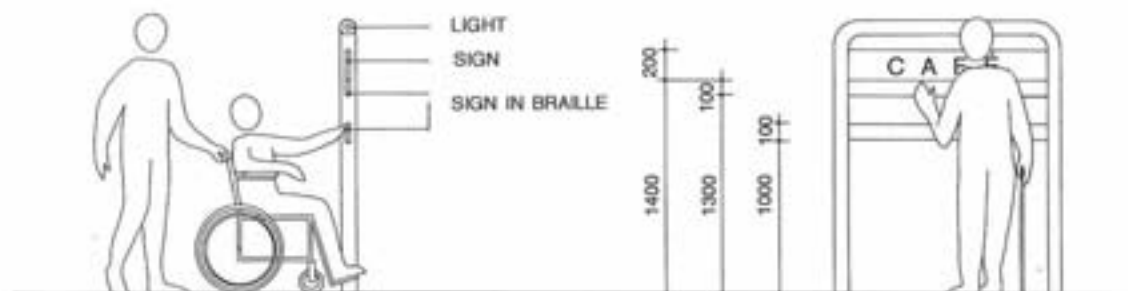
LARGE WHEELS MAY BE EITHER AT THE BACK OR FRONT OF A WHEELCHAIR.

THERE ARE VARIOUS MODELS FOR DIFFERENT USES:

- INDOOR USE
- OUTDOOR USE
- SPORTS:
  - GAME CHAIRS
  - THROW AND PUSH CHAIRS FOR ATHLETICS
  - RACING CHAIRS



SPACE REQUIRED FOR A MANUALLY OPERATED WHEELCHAIR 1:50



SIGN AND SIGN IN BRAILLE 1:50

# I PHYSICAL ACTIVITIES OUTDOORS AND IN ANCILLARY SPACES

## 1 GENERAL REQUIREMENTS

A disabled person in an obstacle free environment is an equal any other person. An environment suitable for the disabled is also suitable for children and the elderly.

Public buildings should be fully accessible to the disabled without any restrictions. The same should be recommended for different outdoor recreation areas and for their associated service and maintenance buildings. It is not always possible to meet with all the requirements set by the needs of the disabled, especially in environments that are already built, but minor adjustments can remove many obstacles.

### 1.1. SIGNPOSTING AND INFORMATION

Signposting can be based on either seeing, hearing or feeling. Signs must be designed so that they serve all disabled. The following can be used for signing: maps, symbols, embossed maps and models, name plaques, diagrams, light and sound signals and loud speaker announcements. In addition to these, one can use guiding colours, materials and various structures in buildings.

The disabled need more than the normal amount of reliable and inspiring information concerning recreation and sports facilities. Information gives them the knowledge as to whether it is possible to move in an activity area or route alone or whether one requires an assistant. Detailed information is needed concerning public transport, bus stops, toilets, changing rooms, services, kiosks, special routes for the disabled and their level of difficulty, telephones, opening times etc.. With this information one can feel confident when moving outdoors. In principle it is good to construct all routes and spaces so that they are suitable for the disabled. The visually disabled must be able to acquire information either by phone or on tape. Recorded information functions as a verbal map and describes access to the site and the possibilities it offers for recreation.

#### MAPS

An illustrative map of the outdoor recreation or nature area must be prepared. The map informs a

visitor of the approaches to the area, its routes and activities and the services it offers. This information is important when planning possible visits. The same map is also used for all information concerning the area - for brochures, posters and advertisements.

#### THE GUIDE MAP

A guide map must be erected either in the parking area or by the entrance to the recreation area. It provides information on the services in the area and their accessibility. Road and route crossings must be signposted.

If the area has restrictions for the disabled, visitors must be informed of these upon entry using the guide map. These restrictions must also be made clear in all information concerning the area.

Guide maps and plans of all floors must also be provided concerning the buildings in the area.

The wheelchair symbol can be used when the site meets with the set requirements for obstacle free mobility.

Illustrative embossed maps can be provided for the visually disabled. These also serve other patrons - particularly when the maps have clear contrasting colours. Information that might otherwise be difficult to distinguish on a map, such as paths, roads, buildings, hazardous areas etc., can be made clearer with the use of different surface textures. The texts can be either embossed or in Braille.

With the use of embossed maps and associated tape recorded information the visually impaired and the blind can visit the area.

#### SIGNS

Signs which are able to be read close up are placed along the route at the height of a person standing, 1400-1600 mm from ground level. Texts in Braille are placed at a height of 1300-1400 mm. It is preferable that both texts are placed on the same signboard.

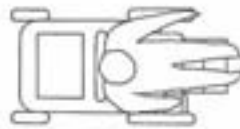
A sign situated above a route must be placed so that the height of its bottom edge is 2200-2400 mm from the ground. Collision with signs must be prevented.

A sign placed at the beginning of each route describes the character of the route, its length and method of signposting etc.. In addition to this, a

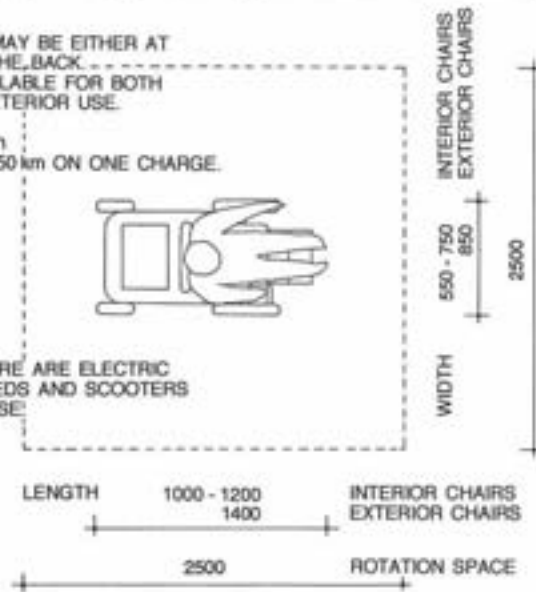
PERSONS USING ELECTRICALLY OPERATED WHEELCHAIRS OFTEN HAVE LIMITED ABILITIES.



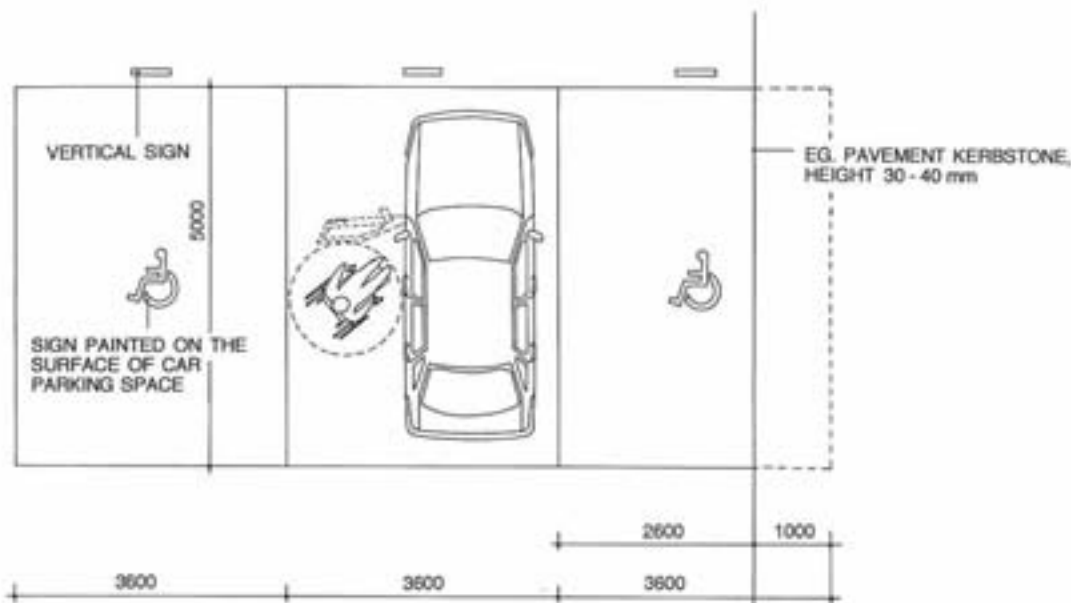
LARGE WHEELS MAY BE EITHER AT THE FRONT OR THE BACK. CHAIRS ARE AVAILABLE FOR BOTH INTERIOR AND EXTERIOR USE. HEAVY SPEED 6-15 km/h USABLE FOR 15-50 km ON ONE CHARGE.



IN ADDITION, THERE ARE ELECTRIC TRICYCLES, MOPEDS AND SCOOTERS FOR OUTDOOR USE.



SPACE REQUIRED FOR AN ELECTRICALLY OPERATED WHEELCHAIR 1:50



DISABLED CAR PARKING 1:100

note must be provided concerning the level of physical ability required or the unsuitability for either the disabled or for those with allergies.

The sign for the area must also give clear contact information concerning the people in charge of maintenance of the area.

A sign at a site must be placed so that it is easily detected.

Signs associated with a door should be placed on the wall next to the door, adjacent to the opening edge.

If a separate entrance for the disabled is provided, it must be clearly marked upon the approach to the area or site with international wheelchair symbols. When appropriate, the symbol must be used to mark car parking, routes, entrances, lifts and hygiene facilities. The symbol has a white image on blue or black background.

## 1.2. ACTIVITIES OUTDOORS

### ACCESS

#### BY PUBLIC TRANSPORT, MOTORCAR, BICYCLE OR BY FOOT

In order to make the recreation and activity area accessible to all, it must be reached by public transport. Busses with lowered floors are becoming more common and thus facilitate the travel of the disabled. Bus stops must be situated as close as possible to the recreation place or starting point of a nature trail. The bus stop can be named according to the recreation place and the route to the site from the stop should be clearly signposted. The stop should be sheltered and it must have a 500 mm high bench with back and arm supports.

The majority of the disabled come to the recreation place by private cars as public transport is rarely a suitable option. Therefore one must be able to get as close as possible to the activity place by car.

Car parking designated for the disabled must be situated as close as possible to the entrance, activity place or starting point. When the whole parking area cannot be built close enough to the entrance, special disabled car parking must be provided separately.

Disabled car parking spaces must be situated next to a pavement, or built at least 3600 mm wide in order to make it possible to position a wheelchair next to a car. A suitable length for a car parking space is 5000 mm.

### DROP-OFF AND PICK-UP POINTS

One must be able to drive a car, and preferably a coach carrying a group of people, to an area immediately in front of a disabled entrance. In winter or in rain it is often difficult or even impossible for the disabled to travel long distances from a vehicle to an activity area.

Pick-up points should be provided with a canopy, a bench and adequate lighting. Minimum free height under the canopy must be 2200 mm.

A sheltered and comfortable preparation area must be reserved for the disabled by the starting point to the outdoor recreation area and routes, so that they can wait for their transport and prepare themselves for the route. The starting area should be equipped with benches and a sign board giving information on the recreation area, its routes, rest places and other facilities. The starting area can be separated from the main route with fences, planting or lines painted on asphalt. Disabled car parking must be situated immediately next to the starting area and escort traffic is directed through the starting area.

### ROUTES

The surface material of a route must be hard, even and non-slippery. Suitable surface materials include asphalt, concrete, crushed limestone, fine gravel or hoggin, certain paving stones and tiles. Paving must not be uneven or slippery and the grouting between the stones must not exceed 5 mm. Loose sand or gravel must be avoided.

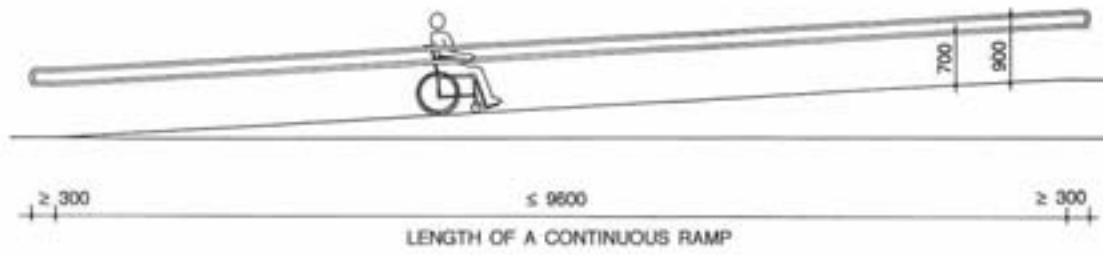
The orientation of the visually impaired is facilitated with the use of material and colour contrasts on the route's surface. Outside the main route, a coarser and more widely grouted paving may be used as long as level and easily passable paths for the disabled are also provided. Sets and cobbles create good contrasts on the edge of the route, but they are not suitable for the paving of the route itself.

Upstands by the edge of the route are not desirable without a handrail as they may cause a risk of stumbling.

Differences in levels on the route must be solved with gently sloping ramps and steps.

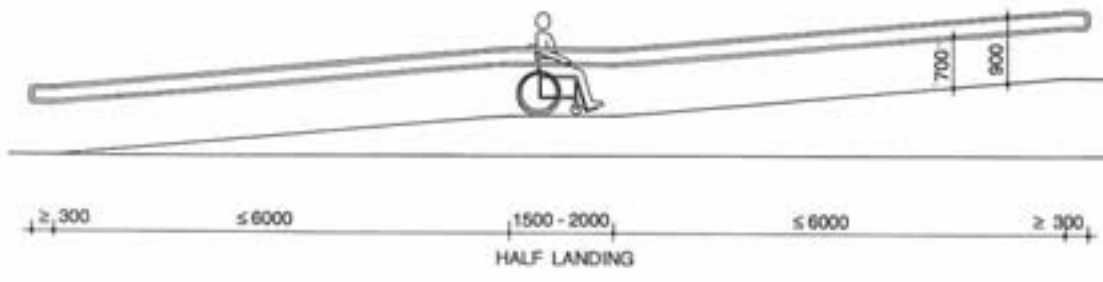
Clearing routes of snow as well as salting and gritting make it possible for the disabled to use the routes in winter.

The width of the route must be 1200-1800 mm. In order for a wheelchair to pass another the route needs to be 1800 mm wide. Over short distances, gates and openings along the route may be temporarily narrowed down to 900 mm in width. When a narrow route of 900 mm bends, widening or



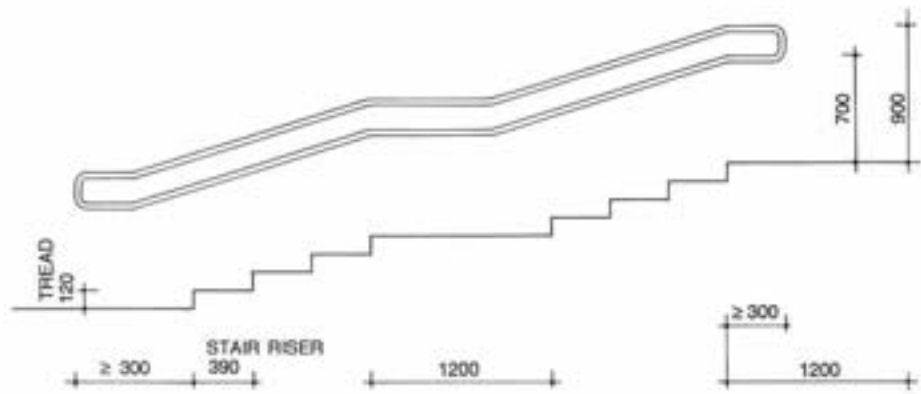
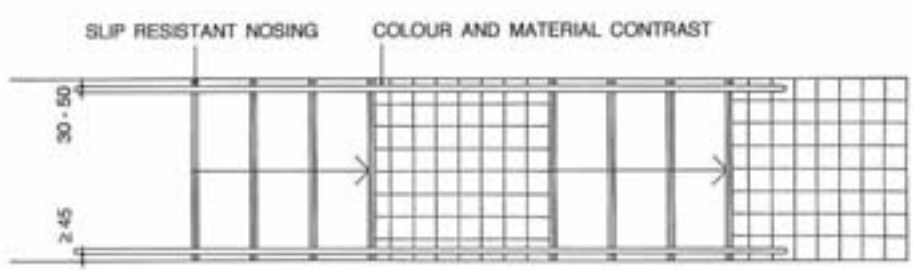
LENGTH OF A CONTINUOUS RAMP

GRADIENT OF A RAMP 1:20 i.e. 5% 1:100



HALF LANDING

GRADIENT OF A RAMP 1:12.5 i.e. 8% 1:100



STAIR WITH A SHALLOW GRADIENT 1:50

bevelled by the turning point is needed. The area required by a turning wheelchair is a circle, 1500 mm in diameter. The equivalent area required by a large, fast electric outdoor wheelchair is approximately 2500 x 2500 mm.

The free height of a route outdoors must be 2200 mm.

Collision with obstacles is prevented by protective railings and upstands, street furniture, plant boxes, fences and other similar structures. Obstacles, such as lamp posts, sculptures or fountains which have a surrounding zone of a contrasting material provide a warning of danger.

Street furniture, lamp posts, litter bins and bicycle stands must be placed outside the route.

Tables and benches for resting must be placed at escort traffic pick-up points and along the route at approximately 100 m intervals.

Gates must open easily and close automatically. The free width of a gate must be at least 900 mm. The locking mechanism should be at a maximum height of 850 mm from the ground.

Changes in direction along the route are helpful for the visually disabled. Routes crossing and merging must be at right angles in order to facilitate orientation. Freely meandering park paths cause difficulties for the visually disabled.

## RAMPS AND STEPS OUTDOORS

Changes in level along a route must be designed as ramps. In addition to these, gently sloping steps must be built. When using walking sticks or crutches it is safer to travel upwards using gentle steps rather than a ramp. A ramp is also difficult for people whose ankles are stiff.

The recommended gradient of a ramp outdoors is 5% i.e. 1:20. The maximum gradient of a ramp is 8% i.e. 1:12, but in this case the length of the ramp may not exceed 6000 mm. The required landing is preferably 2000 mm long, (minimum 1500 mm). A ramp may not have a lateral gradient.

A wheelchair falls over easily when the gradient exceeds the recommended percentage.

The minimum width of a ramp is 900 mm.

The ramp must be straight; turnings and curves should be placed on even ground.

In case the edge of the ramp is not level with or beneath the level of the surrounding terrain, or it is not bordered by a wall, it must have a protective upstand of a minimum 50 mm in height.

A ramp is slippery when wet, snowy or icy. Therefore, if possible, ramps should be sheltered or should be provided with a heating system.

Outdoor steps must be gently rising. The riser

should not exceed 120 mm, a suitable tread being 390 mm. Steeper steps may cause degenerative arthritis to people with rheumatoid arthritis.

Handrails are required on both sides of ramps and steps and should extend 300 mm past the start and finish of any ramp or series of steps. The handrail must be continuous and must also include landings. The ends of the handrail must be bent either down or to the side.

Two handrails on top of each other are recommended. The top handrail should be 900 mm, and the bottom handrail should be 700 mm above the ramp or tread nosing. The protruding ends of the handrails can thus be joined and the danger of becoming entangled with the handrails is eliminated. The lower handrail on steps is for children and short people, on a ramp it serves wheelchair users.

The handrail must be designed such that one's fingers grip it easily. Its cross section is either a circle, 30-50 mm in diameter, or a rounded profile, the diameter of which is 25-30 mm and the circumference 120-180 mm. The distance of the handrail from a wall or other structures is at least 45 mm.

Suitable materials for ramps and steps include asphalt, concrete and meshplate. When using wood, steps and ramps must be made out of unplanned planks at right angles to the direction of movement. The distance between planks should be a maximum of 5 mm.

Ramps and steps must be clearly marked with material contrasts and they must be well illuminated. For the visually disabled, the danger of falling created by steps and other changes in level, must be prevented with the use of protective railings or gates.

Steps down must be placed at the side of a route, in its direction or at right angles to it, not on the route or at its continuation. At the approach to flights of steps, a warning zone, the same width as the route, can be created by using contrasting materials and colours. The beginning of steps downwards must be well illuminated.

## PAVEMENT KERBSTONES

In order to prevent a visually disabled person from accidentally straying onto a roadway, the pedestrian route or pavement must be separated from the road with a 30-40 mm high kerbstone. The height of the kerbstone is a compromise which is beneficial for the visually disabled, but causes problems for, amongst others, people with wheelchairs.

For the disabled, the maximum height of a pedestrian zebra crossing kerbstone is 30-40 mm. After the kerbstone, the maximum gradient of the pavement may be 6%. Gentle sloping or local

lowering of the kerbstone and its surroundings at pedestrian crossings and routes, facilitate the crossing of roads and streets.

As an alternative, the road can be raised at zebra crossings.

The pedestrian crossing must meet with the pavement at right angles. A visually disabled person takes a right angle turn from a kerbstone when crossing a road. A guide dog is taught to walk and stop according to the location of kerbstones.

The beginning of a zebra crossing can be marked with a 1200 mm long contrasting material and colour zone that is as wide as the pedestrian crossing and bordered by the kerbstone.

Different sound devices can also be used at street crossings.

## ENTRANCES

A disabled route must be continuous and have no steps when travelling from the edge of the site, via the disabled parking area, into the main entrance of a building. The visually disabled can be directed to the entrance with a sound device positioned above the entrance.

The disabled must be able to use the same route into a building as other people. If the entry to an old existing building is impossible to arrange with the use of a ramp, due to an excessive change in level, separate entry for the disabled must be provided at ground level.

A doorbell and possible door phone must be placed adjacent to the door. A lift from the point of entry to the main entrance level must be provided inside the building.

## LANDINGS ADJACENT TO THE ENTRANCE, SURFACE MATERIALS, CANOPIES AND LIGHTING

At the entrance level, outside a front door, an adequate landing must be provided which allows wheelchair turning and the opening of the door. In addition to the space needed by the door to open, free space of 1500 x 1500 mm is required. The landing should be big enough to allow two wheelchairs to pass each other. The ramp leading to the landing must be placed in such a manner that opening the door does not hinder its use.

The entry of water and snow into a building can be prevented by forming a channel in the ground outside the door, the surface of which is covered by a fine-meshed grille. The holes in the grille must be a maximum of 5 mm wide and the opening size a maximum of 5 x 30 mm, so that guide dogs paws, walking sticks and crutches, shoe heels and wheelchairs do not get caught.

Asphalt, concrete, paving, fine-meshed grille and wood are all suitable surface materials for entrance landings. Floor gratings and draught lobby mats

must be carefully designed so that they do not hinder the use of a wheelchair.

The minimum free height under an entrance canopy must be 2200 mm and the area under the canopy must be well illuminated. The sheltered areas may be equipped with seating for those waiting for a taxi or an escort.

The lighting must be adequate, even and non-glare. The routes and signs placed within the area and on the sites must be well illuminated. Lamp posts should be consistently positioned on the same side of the route.

Places where there are possible dangers or changes from the norm, must be more efficiently lit or must use different colour lighting.

## SIGNBOARDS, DOORBELLS, BUZZERS AND PRESS-BUTTONS

The name plaques and numbers must be situated outside buildings at a height of 1400-1600 mm in a visually clear position close to the front door.

Doorbells at an entrance must be placed in an easily detectable position so that a person can reach the doorbell and press-buttons from a wheelchair. The suitable height from the ground is 800-1100 mm and the minimum distance from a corner is 400 mm. The best height for a solitary button is 850 mm from the ground.

The press-button must not be too stiff so that people with diminished manual strength may also use it.

## EXTERNAL DOORS, DRAUGHT LOBBIES

Automatically operated sliding or swinging doors are recommended for the physically disabled.

Automatically operating front doors must be able to be opened from such a distance that when they swing onto a route they will not cause any danger of collision. The door can be equipped with a sensor which prevents a collision taking place.

There must be a minimum free doorway width of 900 mm. Doors must not be so heavy that they prevent operation.

The maximum height of thresholds must not exceed 20 mm, but preferably doors should have no thresholds.

Draught lobbies must be spacious enough for wheelchairs. When doors open outwards, the required width of a lobby is 1300 mm and the length 1500 mm, this allows adequate space for both a wheelchair and a swinging door (900 mm).



### 1.3. ACTIVITIES INDOORS

#### FURNISHINGS, EQUIPMENT AND FITTINGS

The space required for wheelchair mobility and turning must be taken into consideration when furnishing spaces. Furnishings must be clearly distinguished from their surroundings and they must not have sharp corners or protrusions. Children and the elderly also benefit from interior design solutions that facilitate independent activities.

#### WAITING ROOMS, CAFETERIAS AND EXTERIOR SPACES; TABLES AND SEATS

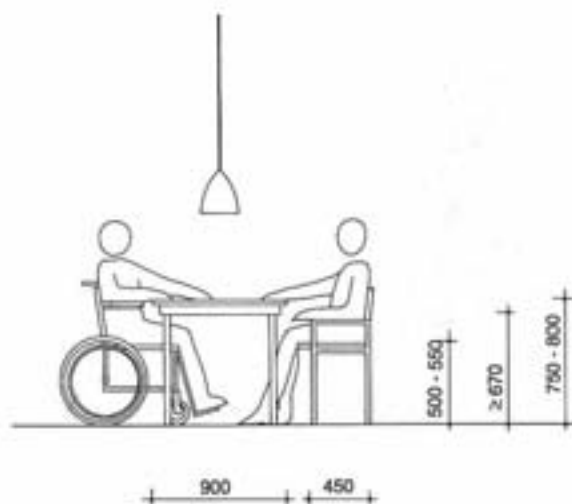
Due to individual needs and the varying sitting time of a motion disabled person, seats of varying heights are required. When sitting down for a long time, the

normal sitting height is approximately 400-450 mm. Seats any higher than this prevent adequate circulation to the legs. Suitable height for short term sitting, when an individual must be able to sit down and get up without difficulty, is 500-550 mm.

Appropriate table height is 750-800 mm, which allows the table to be used with chairs and wheelchairs of different heights. The kneeroom under a table that allows wheelchair use, must be at least 670 mm high, 800 mm wide and 600 mm deep. Appropriate tables for wheelchair users must be provided in cafeterias and restaurants.

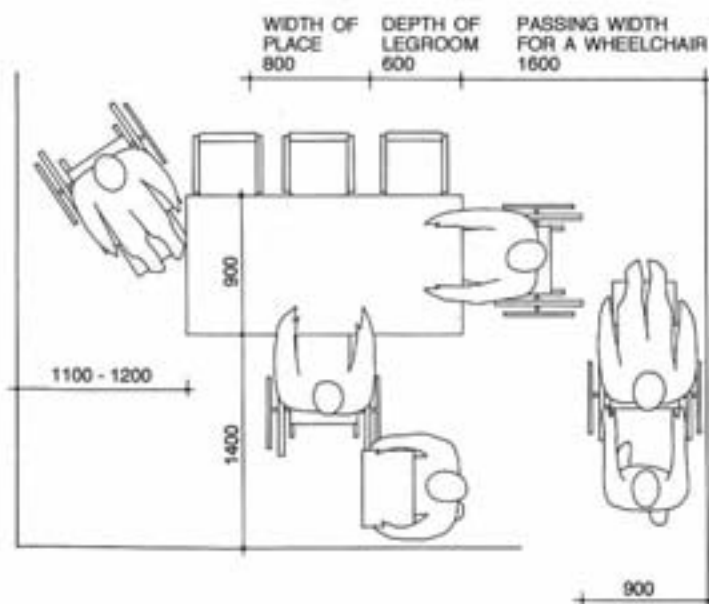
#### SERVICE AND SELF SERVICE COUNTERS

Service and self service counters are normally designed for adult people standing up. The service counter must also have a lower part for wheelchair



- STABLE SEATS OF DIFFERENT HEIGHTS:
- NORMAL SITTING HEIGHT 400 - 450 mm
  - PERSONS WITH STIFF HIPS OR JOINTS 500 - 550 mm
  - SHORT PEOPLE AND CHILDREN 300 mm
  - HORIZONTAL SEAT WITH FRONT EDGE ROUNDED
  - BACK AND ARM RESTS

TABLE AND CHAIR IN WAITING ROOMS AND CAFÉS 1:50



SPACE REQUIRED FOR A WHEELCHAIR IN A CAFÉ AND A RESTAURANT 1:50

users, short people and children. For these people, a suitable table height is 750-800 mm. Access must be provided for a wheelchair close to a self service counter.

For the visually impaired, a guiding line from the door to reception can be painted either on the floor or on a wall, when necessary.

## COAT STORES

Some coat stores must be designed for use by wheelchair occupants. A suitable height for hooks or a clothes bar is 1100-1400 mm from the floor, but some hooks or a part of the bar must be placed even lower. The coat stores must be placed in a recess or must be protected so that the visually disabled do not collide with them or hit their heads.

## PUBLIC TELEPHONES AND PHONE BOOTHS

One must be able to reach a public telephone from a wheelchair.

Preferably the telephone should be placed on a 600 mm deep, 750-800 mm high table, and a minimum of 400 mm from the corner. The maximum height of a coin slot in a wall mounted telephone is 800-900 mm from the floor. Legroom, a minimum of 670 mm high, 800 mm wide and 600 mm deep is required under the telephone.

Plastic hoods or other protective structures around the telephone, that protrude into a passageway, are not allowed as they provide a risk of collision for the visually disabled. The acoustic partitions required

around a telephone are achieved by placing telephones in recesses.

An amplifier in the telephone is required for people with hearing aids. The deaf can only use image and text telephones. The markings on the phone and instructions for use must be made readily accessible and easily detectable, especially for the visually disabled. The emergency phone must be accessible for all.

## CHANGES IN LEVEL

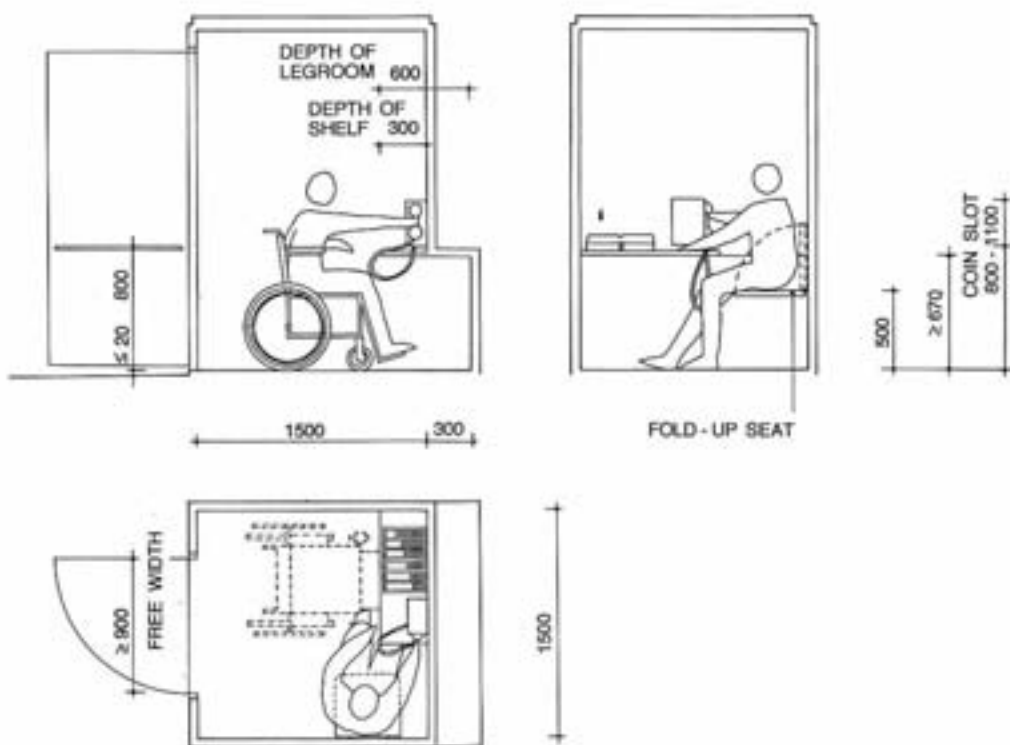
### STAIRS AND RAMPS INDOORS, ANTI-SLIP DEVICES

Inside buildings the riser of a gently sloping stair is 120 mm and the tread 390 mm. The rule of thumb for the dimensions of a staircase is  $2 \times \text{riser} + \text{tread} = 630 \text{ mm}$ .

The minimum free width of a stair must be 850-900 mm. Alongside the stair a 600 mm wide zone with handrails on both sides can be built for those who can support themselves with both hands.

The shape of the stair nosing must be safe. A foot may get caught in stairs with open treads or notched steps. Preferably all stairs within the same building should be similar to one another. Circular staircases are not suitable for the disabled.

A contrast must be made at the top of each flight of stairs. This can be realised with an anti-slip strip, lighting or with grooves in the nosing. Anti-slip devices, grooves, surface treatment and mats that stay firmly in place reduce the risk of slipping.



PHONE BOOTH 1:50

Within buildings the gradient of a ramp must not exceed 1:12,5 i.e. 8 % and a ramp must have landings at least every 6000 mm. The minimum length of a landing is 1500 mm. Inside buildings a ramp is not recommended for changes in level of more than 1000 mm. The dimensions of ramps indoors are similar to those outdoors.

The surface material of a ramp must be non-slip even when wet. Wet areas in buildings must not have ramps. (The sloping of floors in wet areas is only acceptable for water drainage.)

Stairs and ramps must be equipped with handrails and, when necessary, with railings similar to those on outdoor steps and ramps.

## LIFTS

The international minimum interior dimensions for a disabled lift cage are: depth 1400 mm and width 1100 mm. The free width of a lift doorway must be at least 900 mm. There must be adequate free space directly in front of the lift. New lifts have a  $\pm 10$  mm accuracy when stopping at different floor levels.

The lift buzzers and buttons must be accessible by wheelchair users and be also suitable for people with visual impediments. The height of the buttons must be 850-1100 mm from the floor, (the suitable height of a solitary button is 850 mm) and the minimum distance from a corner must be 400 mm.

Automatic sliding doors on lifts are easiest to use. Sound signals facilitate the orientation of the visually disabled.

Vertical lifts of 900 x 1400 mm can be used for minor changes in level.

Separate short rise lifts can be used, mainly in old buildings, where normal lifts are impossible to accommodate.

## ROUTES

### CORRIDORS, THOROUGHFARES AND INTERIOR DOORS IN BUILDINGS

Corridors that are suitably wide enough for the disabled have a minimum width of 900 mm. A 1800 mm wide passageway allows the encounter and passing of two wheelchairs. In addition, space is required for the turning of a wheelchair.

A corridor must be 1400 mm wide for the manoeuvre of a wheelchair when turning into a room through a normal doorway (free width 850 mm). If the corridor is narrower, the doorway must be wider. Glass doors that are difficult to identify, ramps, steps, columns, changes in direction etc. must all be marked in order to draw attention and to prevent collisions.

Doors must be easy to manoeuvre and they must not open into the passageway. Swing doors must not be used.

To facilitate the closing of a outward opening door, a horizontal pull handle must be fixed to the inner face (hinge side) of the door, at a height of 800 mm. It must be possible to open locks with one hand without difficulty.

The minimum free width of a doorway is 850 mm and the height 2100 mm. The threshold may be a maximum of 20 mm high. Interior glass doors and kickplates must be constructed the same way as front doors.

A minimum free space, of 300 mm, but preferably 450-550 mm, must be provided next to the opening side of the door. This dimension also depends on the width of the opening area or corridor.

An easily manoeuvrable sliding door is a good alternative to a normal door.

### DOOR HANDLES, SWITCHES BUZZERS AND PRESS-BUTTONS

The design of door handles, switches, buzzers and press-buttons must be simple and must allow use by one hand only. Door handles, switches, buzzers and buttons must be positioned in the same way as front door bells and buzzers. The coin slots and buttons of automatic machines must be accessible by wheelchair users.

A door phone can be installed for the disabled at entrances, and, for example, alarm buzzers can be placed in toilets and changing rooms.

## THE QUALITIES OF SPACES

Lighting needs to be strong, direct but non-glaring. General lighting is complemented with spotlights when required. The lighting is directed to signs, routes, changes in route levels, entrances, lifts and possibly hazardous areas that provide a risk of collision or falling. Lighting can also be used to emphasise, for example, colour and surface contrasts at the edge of level changes.

The colour effect must be as close to natural light as possible.

Acoustics that vary according to the size, shape and surface materials of spaces facilitate the orientation of the visually disabled. Spaces must not reverberate or have excessive damping in order that they can convey the right impression to those whose hearing is impaired. Good acoustic characteristics are beneficial to all.

Parts of building, separate structures, furniture, signs and other details can be made distinguishable from each other and from their background with the use of different shades of colour. Varying materials can form extra contrasts if necessary.

The choice of materials must favour durable and easily maintainable alternatives. In addition to materials that cause allergies such as chrome and

nickel, surfaces, textiles and plants that collect dust, must be avoided.

Spaces must be well ventilated and free of cigarette smoke.

## SPECTATOR STANDS

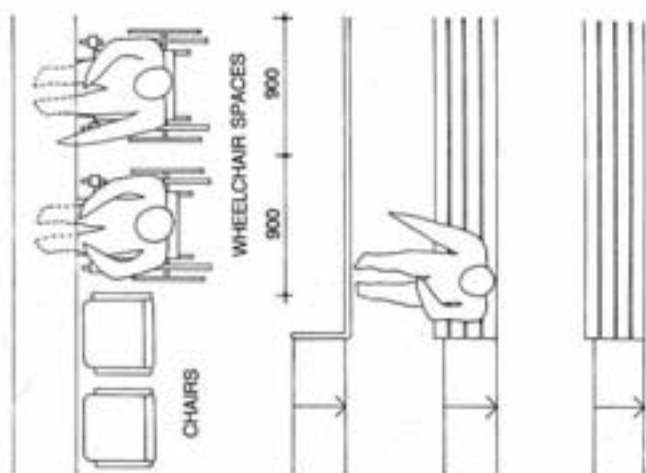
An adequate number of wheelchair places must be reserved in both assembly spaces and sports spectator stands. The access to spectator facilities must be made free of obstacles and steps.

Free space must be reserved for wheelchairs and

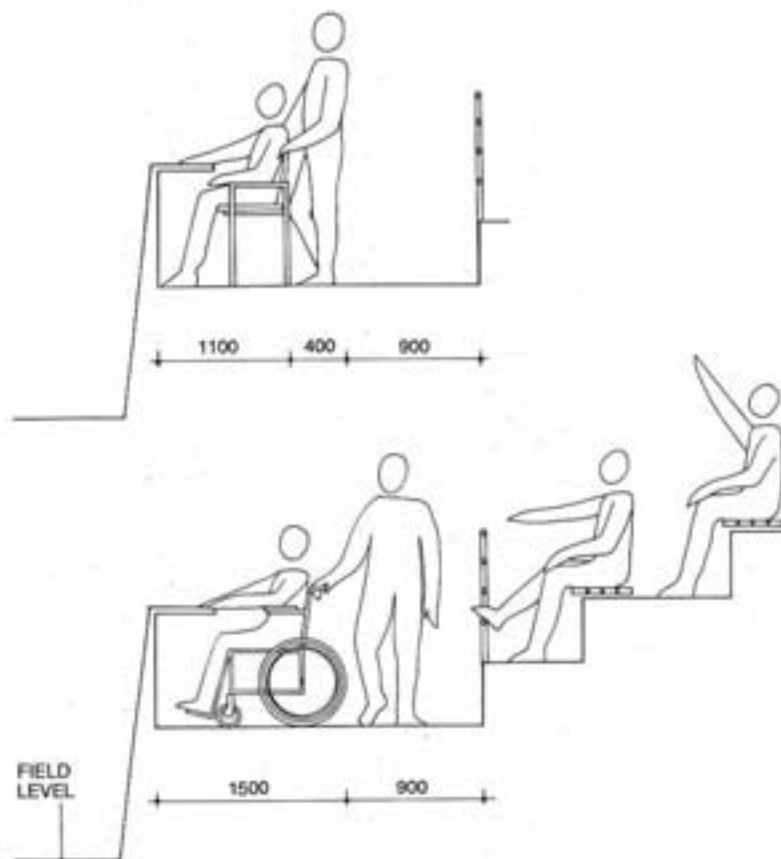
other loose chairs in halls where seating is permanently fixed. (Space for a wheelchair is 900 x 1500 mm). An induction loop system and good opportunities for visual contact are required for those whose hearing is impaired.

Assistant accompanied wheelchair places in outdoor spectator stands must be raised slightly from the level of the sports field. Wheelchair places and benches can be heated or insulating cushions may be provided.

A canopy to protect against rain is required in outdoor spectator stands.



WHEELCHAIR ACCESS TO SPECTATOR STANDS EITHER ON THE SAME LEVEL OR VIA A SHALLOW RAMP.



DISABLED PERSONS SPACES IN SPECTATOR STANDS

## 1.4. HYGIENE AND CHANGING

### TOILETS

Disabled toilets for both sexes must be situated close to an entrance and close to changing rooms. One of the changing room toilets must be situated so that it can be used with an assistant of the opposite sex. As a general guideline, at least one disabled toilet must be placed in connection with each group of public toilets.

All surfaces must be easy to clean and must dry quickly, light colours are preferable.

Good ventilation guarantees the change of air and the prevention of excessive humidity.

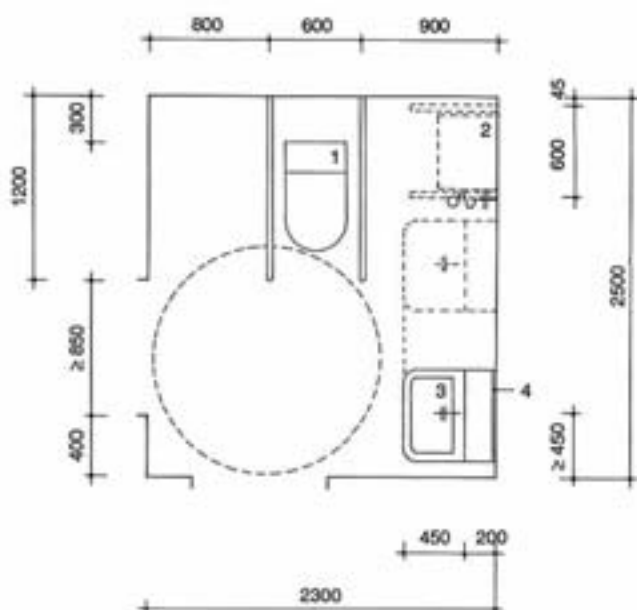
### THE DISABLED TOILET I.E. WHEELCHAIR TOILET

The preferred minimum size of a disabled toilet is 2500 x 2300 mm.

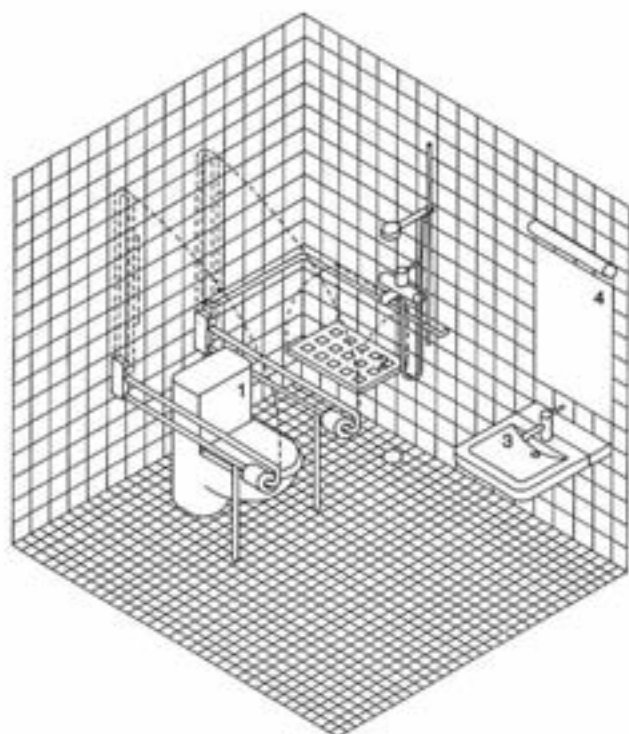
The minimum free width of the door must be 850 mm and the threshold must be as low as possible, maximum 20 mm. An outward opening door must have a pull handle on the inside face, at a height of 800 mm and 45 mm from the surface of the door.

The toilet must provide enough space for a possible assistant and for a wheelchair to turn inside (Ø 1500 mm unobstructed space).

Free space of 800 mm for the wheelchair must be provided on both sides of a 460 (-500) mm high toilet seat. The seat must be equipped on both



1. TOILET SEAT, (HEIGHT 460 mm), AND LONG ARM SUPPORTS (HEIGHT 800 mm) THAT ARE FIXED TO WALL AND CAN BE FOLDED UP, 300 mm PAST THE FRONT EDGE OF THE SEAT ON BOTH SIDES. PAPER ROLL HOLDER INCORPORATED INTO ARM SUPPORTS.
2. FIXED 400 x 500 mm SHOWER SEAT THAT CAN BE FOLDED UP ONTO THE WALL, HEIGHT 500 mm. THERMOSTATIC FAUCET AND A LEVER OPERATED MIXER TAP, HAND SHOWER USABLE WITHIN 700 - 2000 mm HEIGHT RANGE.
3. SLIDING 450 x 550 mm WASH BASIN, HEIGHT 800 mm, KNEEROOM BENEATH  $\geq 670$  mm, LEVER OPERATED MIXER TAP.
4. MIRROR, BOTTOM EDGE HEIGHT 900 mm, TOP EDGE HEIGHT 1800 - 2000 mm. SOAP AND PAPER TOWEL HOLDER MAX. 900 mm HEIGHT AND HOOKS 1100 - 1400 mm HEIGHT.



DISABLED TOILET i.e. WHEELCHAIR TOILET 1:50

sides, at a distance of 600 mm from one another, with 1200 mm long and 800 mm high foldable handrails with posts and a paper roll holder.

A sink must be installed so that it can be used when sitting in a wheelchair. A good sink is approximately 450 x 550 mm and its front edge is straight. The height of the sink is approximately 800 mm and beneath it kneeroom must be provided, a minimum of 670 mm high and 800 mm wide. The sink must be installed 200 mm from the wall and the minimum distance to its centre point must be 450 mm.

Easily manoeuvred lever operated mixer taps, with long levers and long, high taps are desirable.

A disabled toilet may also be provided with a shower. The hand shower must be be adjustable between a height of 700-2000 mm. The shower is equipped with a folding 500 mm high seat and a handrail or support handles. Floor heating is ideal for a disabled toilet with a shower.

The mirror is situated above the sink so that its bottom edge is a maximum of 900 mm from the floor

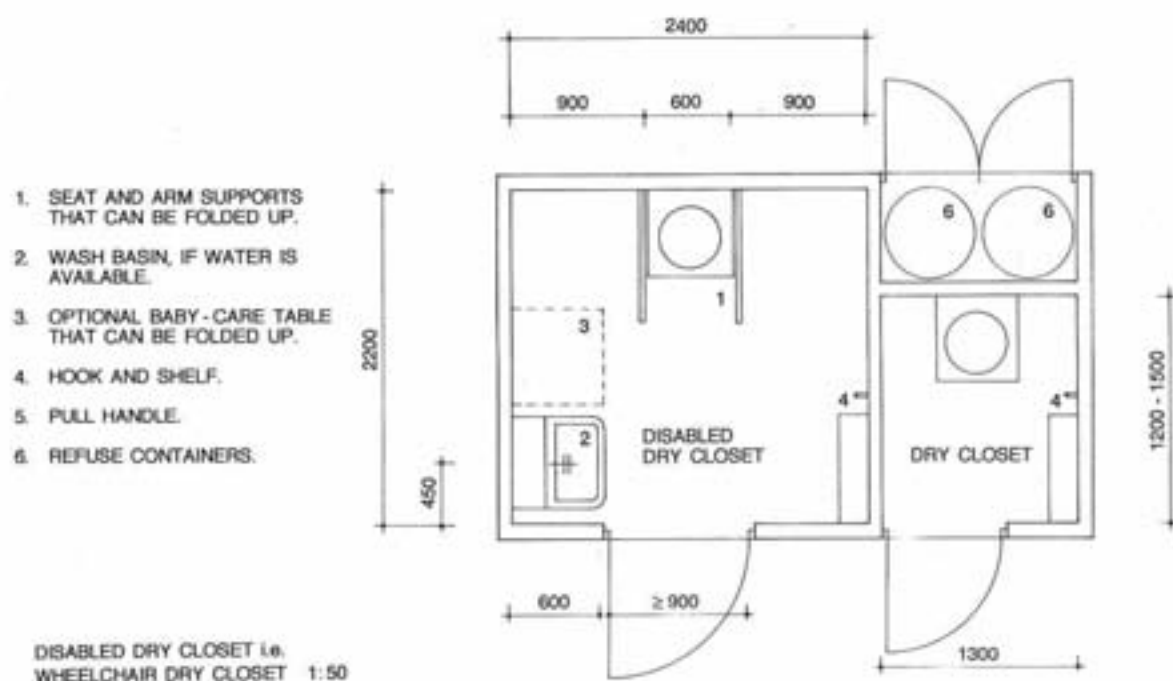
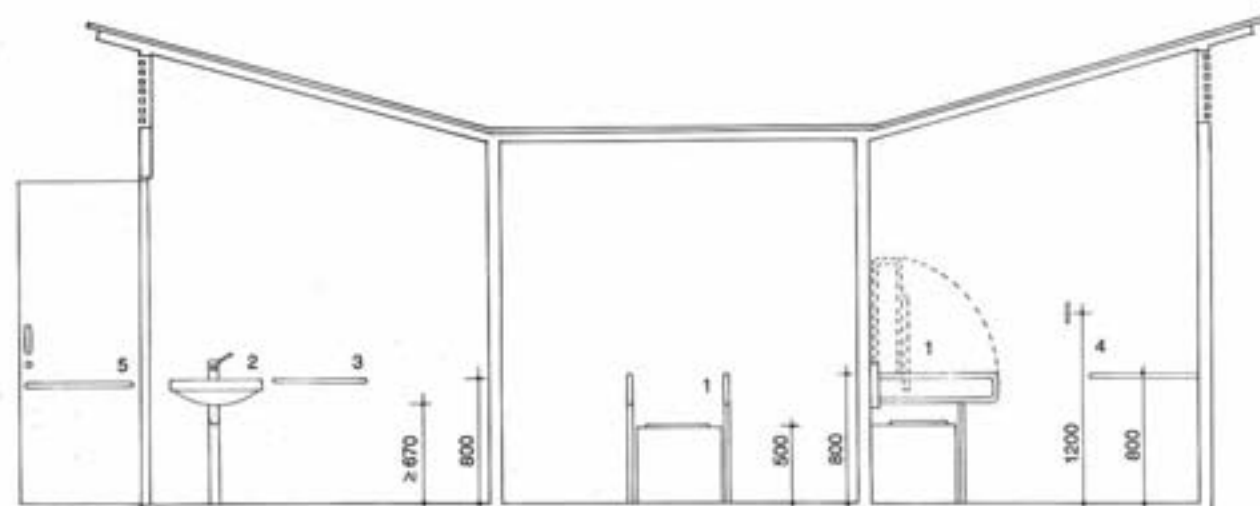
and the top edge 1800-2000 mm from the floor.

A large toilet is particularly useful for people with small children. In addition, an extra baby care table can be installed in the disabled toilet. No loose mats must be placed in the toilets.

If it is not possible to provide a large toilet, as an alternative, two disabled toilets that function as each other's mirror images can be built. Their minimum size must be 1500 x 2500 mm or 1800 x 2200 mm. Hygiene spaces in accommodation facilities can also be built according to this principle; either a large toilet + shower or right and left handed toilets + showers, from which one can select the most suitable.

#### THE DRY CLOSET I.E. WHEELCHAIR LATRINE

Dry closets or compost closets in outdoor activity areas are built according to the same dimensional principles as disabled toilets. Dry closets must provide for the washing of hands.



A covered and fenced in area with lidded litter bins should be reserved next to the dry closets. The bins must open up easily from a height that is accessible from a wheelchair, i.e. approximately 700 mm from the ground. The lid of the refuse container can be sloping.

Refuse can be sorted at collection points and some of it can be composted.

## CHANGING ROOMS

Lockers reserved for the disabled in changing rooms may be situated next to benches or positioned completely separately. On the wall above the benches there must be hooks at varying heights, at 1100-1400 mm.

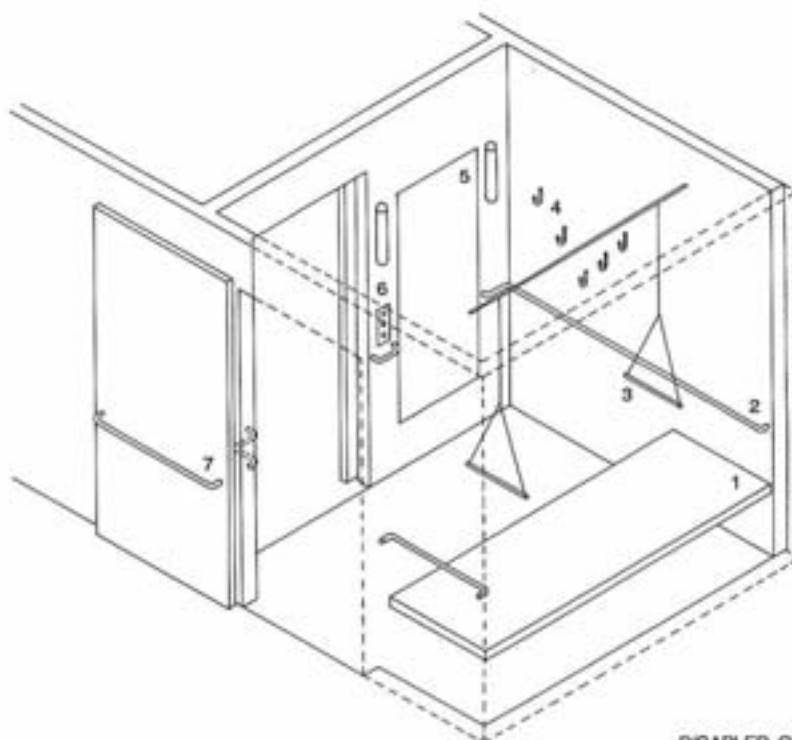
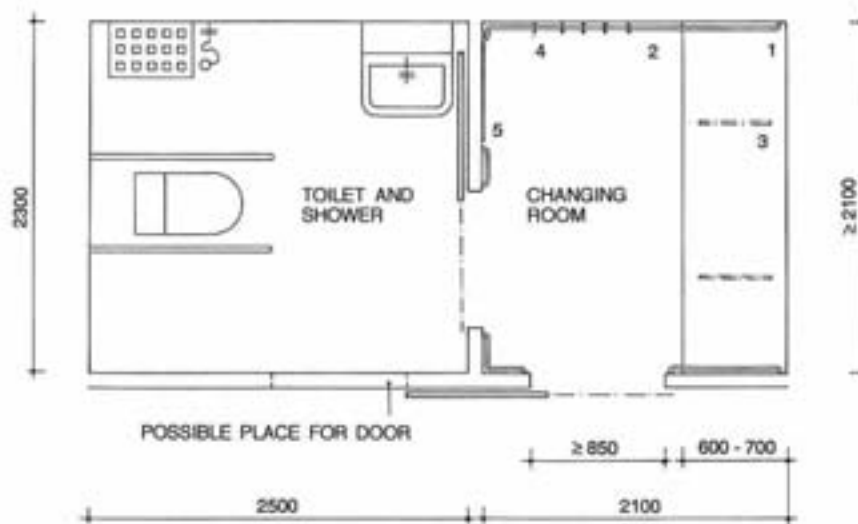
A 1300 mm unobstructed space is required in front of the lockers in order for people in wheelchairs to use the lockers unassisted. The ideal height of the clothes bar and hooks in lockers varies between

1100-1400 mm. The numbers on the lockers must be made out of raised, easily distinguishable embossed letters.

The suitable width of a changing room bench is 600 mm and its height is 500 mm.

A bunk that facilitates dressing and undressing when lying down must be provided for the disabled. Its ideal width is 600-700 mm, height 500 mm and length 2000 mm. Thin, plastic covered padding can be used on the bunk. A base that is too soft does not give adequate support when an individual is getting up. A trapeze above the bunk facilitates change of posture and provides support when getting up.

As an alternative to a large changing room, small 2100 x 2100 mm changing cubicles can be designed for the disabled. There must always be at least one changing cubicle for each sex.



1. BUNK, HEIGHT 500 mm.
2. SUPPORT RAIL, HEIGHT 900 mm.
3. GLIDING SUPPORT TRAPEZES ON CEILING TRACK.
4. CLOTHES HOOKS AT VARIOUS HEIGHTS FROM 1100 - 1400 mm.
5. MIRROR, HEIGHT 300 mm FROM THE FLOOR, TOP EDGE HEIGHT 1800 - 2000 mm.
6. SWITCHES AND SOCKETS, HEIGHTS 400 - 1100 mm.
7. HORIZONTAL PULL HANDLE ON THE DOOR, HEIGHT 800 mm.

DISABLED CHANGING ROOM, TOILET AND SHOWER 1:50

## WASH ROOMS

At least one shower point must be designed and equipped to suit the disabled. The size of a shower point is 1300 x 1300 mm or 900 x 1600 mm, or, alternatively, a partition between two showers can be omitted.

There must be no changes in level on a wash room floor, only a gentle slope to allow drainage. In addition, floor heating is recommended.

Horizontal support rails must be installed on all walls of a shower point at 900 mm above the floor and at 500 mm from the wall for roller board users. The support rail must be 30-50 mm in diameter and it must be fixed at a minimum of 45 mm from the wall.

A firm, movable shower chair and a bench must be provided in the wash room. A fixed, folding 400 x 500 mm seat can also be installed in the shower.

Hot water pipes are either built inside the walls or otherwise protected. Covers to floor drainage wells must stay firmly in place.

Separate wash rooms can be designed for the disabled and also for families with small children. Changing rooms for such facilities can either be built

separately or they can be shared with other patrons.

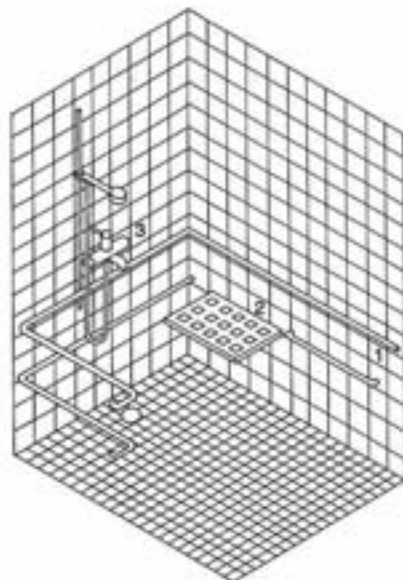
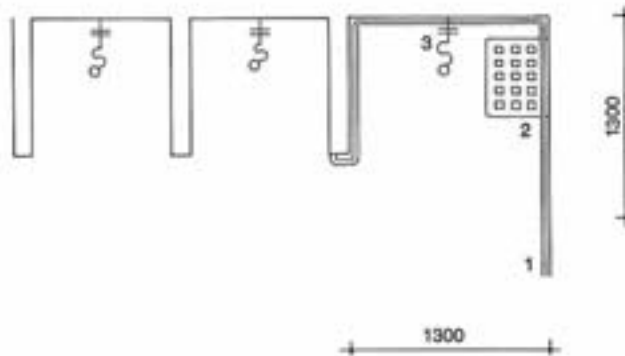
Separate shower and changing cubicles can be built for the disabled. One must be able to turn around in a wheelchair in the wash space. The minimum size of a changing cubicle is 2100 x 2100 mm. The shower point can also be situated in a 2500 x 2300 mm disabled toilet that is equipped with a shower. (See as before).

Alarm bells must be provided in toilets, changing and wash rooms, in order to provide help when necessary.

## SAUNAS

The sauna must be spacious in order to accommodate at least two wheelchairs or roller boards simultaneously.

A flat, stone surfaced wall stove can be installed low down or the stove can be built inside the floor so that its surface is level with the floor. This allows the heat to be directed to a low level. The stove must be well protected by rails to prevent wheelchair users or the visually disabled from hurting themselves.



1. SUPPORT HAND RAILS AT HEIGHTS 900 mm AND 500 mm AROUND THE SHOWER, TOP ONE CONTINUES TO CHANGING ROOMS.
2. SHOWER SEAT, POSSIBLE TO FOLD DOWN, 400 x 500 mm, HEIGHT 500 mm.
3. THERMOSTATIC FAUCET, LEVER OPERATED MIXER TAP, HAND SHOWER ADJUSTABLE TO HEIGHTS 700 - 2000 mm.

DISABLED SHOWER 1:50



The sauna benches are a minimum of 400-600 mm deep, the top bench is 1000 mm deep and 2000 mm wide. The lowest level is 500 mm high and the next levels are placed a maximum of 300 mm higher, so that it is possible to pull oneself up on the benches by using of one's hands and arms.

In order to facilitate the move from the chair, support handles must be fixed between the wheelchair position and the benches at 500 mm and 900 mm from the floor.

In addition, stairs must be built to facilitate access to the top bench. The width of the stairs is 600 mm and the riser approximately 120 mm. The stair is equipped with support rails on both sides. (If the stair is used with the help of walking sticks or crutches, the required width is 900 mm.)

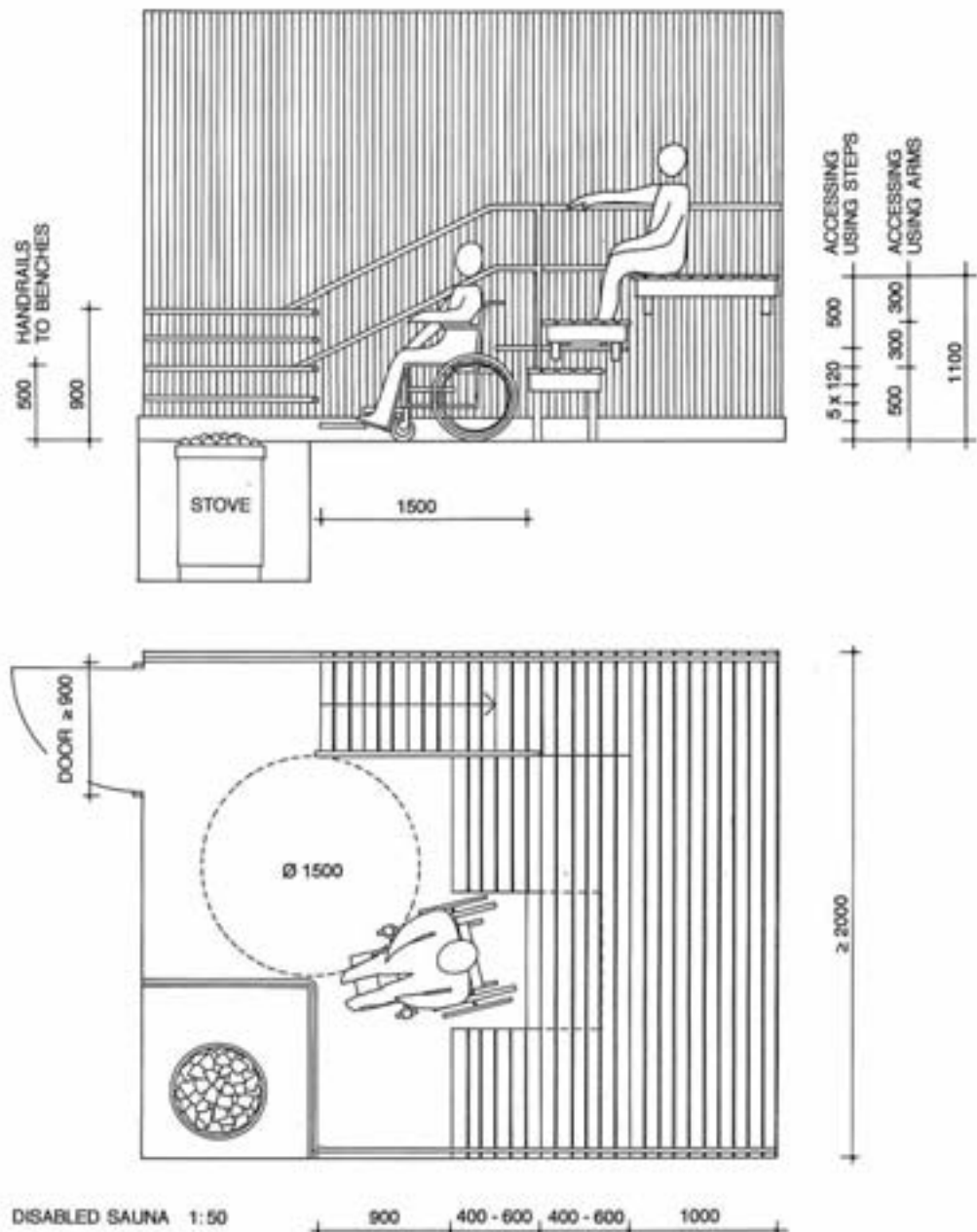
The use of chairs that have metal parts that heat up, is not recommended in saunas. Roller boards and shower chairs that are made out of wood are available.

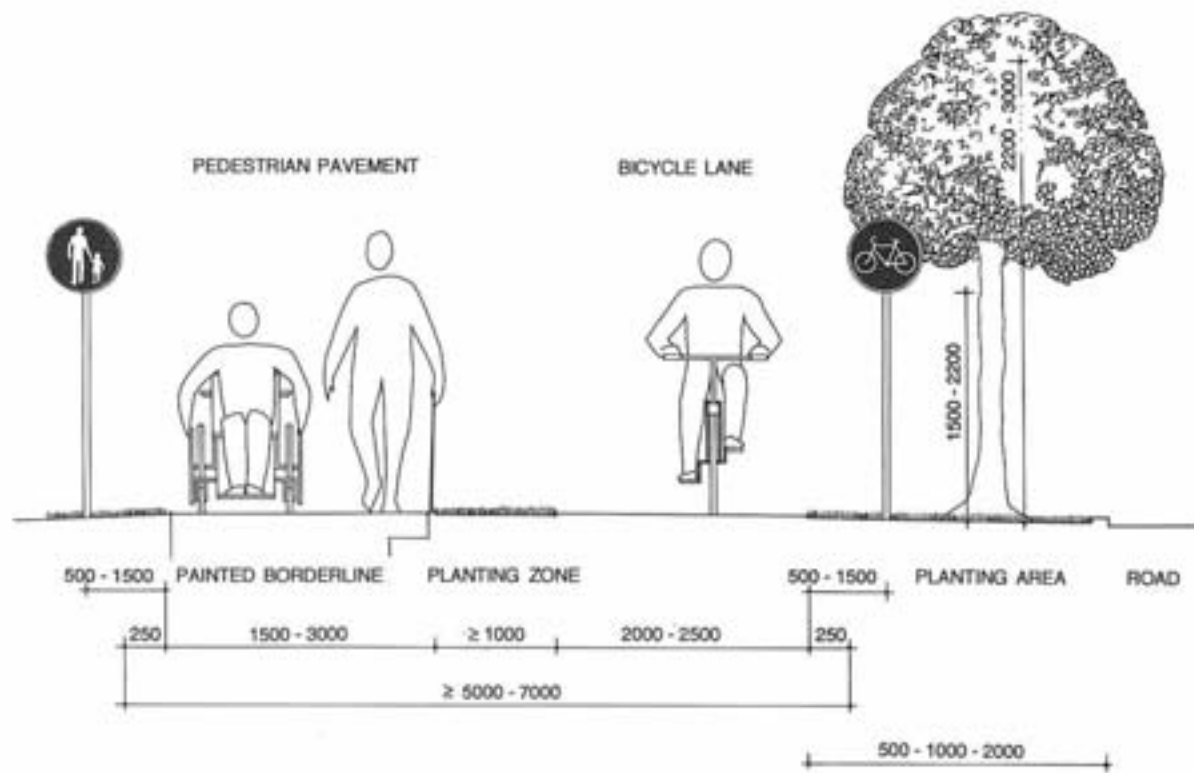
## 1.5. ACCOMMODATION FACILITIES

Outdoor recreation areas and nature sites may offer various types of accommodation for long term stays. The simplest facilities include camp sites with small cabins for hire. Motels and hotels with rooms with washing facilities offer the best services.

The same requirements that concern other disabled spaces also apply to accommodation facilities. It is important that there is vehicular access to the entrance and that the entrance is level.

The minimum free width of a doorway must be 900 mm and the threshold may be a maximum of 20 mm high. Particular attention must be paid to the manoeuvrability of the doors. The spaces inside buildings must be spacious enough for wheelchair use. The accommodation spaces must be equipped with telephones and possible emergency phones.





PAVEMENT AND BICYCLE LANE



## II DAILY OUTDOOR RECREATION AND EXERCISE

### 2. OUTDOOR RECREATION ROUTES IN BUILT-UP AREAS

The design of outdoor recreation routes in built-up areas is determined by their use throughout the year, the development of exercise equipment, the maintenance of the routes by machines and the requirements set by different recreation route users including families with children, the elderly and the disabled.

Routes that are located in peaceful, pollution free and pleasant surroundings must be easily accessible. During the winter months access to a ski track should also be possible using skis.

Routes of varying degrees of difficulty can be combined so that a user can select a combination that best suits him or her in both length and character.

A light traffic or recreation route which passes through a built-up area and its surroundings, provides an easy route for daily outings, recreational activities and visits to the shops etc. This type of route is suitable for walking, outings with children and pushchairs, for bicycles and for taking a dog for a walk. By adjusting the amount of grit put on the route during winter, the route can also be used for skiing and sledging with children. In addition to being used for exercise and recreation, an easy route can also be suitable for people in wheelchairs, the elderly, users of kick sledges or walking frames as well as other ambient disabled.

An easy route must be situated in the immediate vicinity of a residential area. The route must offer various alternatives for passage and it must be accessible from a number of connection points within the area.

An illuminated exercise trail or path is a route having a medium level of difficulty. It is built on terrain with relatively gentle gradients and is intended for efficient exercise such as skiing in winter in order to keep fit. It must be located within a residential area, or must be close to a school, a sports institute or a sports hall. It must be possible to proceed in either direction from all entry points along a track.

An exercise track is a demanding route intended for competitions and very efficient fitness exercise. During winter months it, too, is converted into an exercise or competition skiing track. A route of this kind is normally built adjacent to a facility such as a

sports institute or an exercise complex. Small scale sports events may be organised on an exercise track.

#### 2.1. THE DESIGN OF LIGHT TRAFFIC ROUTES

A light traffic lane is passable by foot, wheelchair, bicycle, moped and disabled bicycle.

The required width of a busy lane suitable for pedestrians and bicycles is 5000-7000 mm.

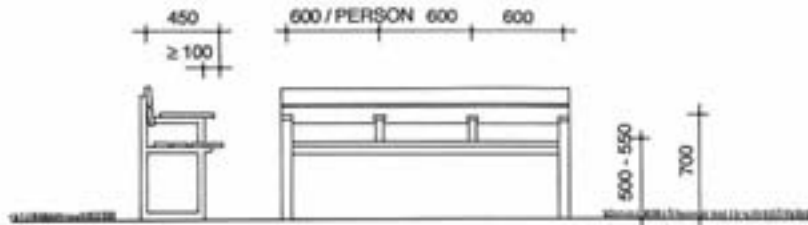
A pedestrian lane (1500-3000 mm wide) and a bicycle lane (2000-2500 mm wide) must be separated from each other with a central zone that is at least 1000 mm wide. The width of the protection zones on either side must be 250 mm.

A route of this kind, where pedestrians and bicycles are clearly separated, is safe for many disabled people to use. As a result, the visually impaired, for example, will not accidentally stray into a lane intended for bicycles.

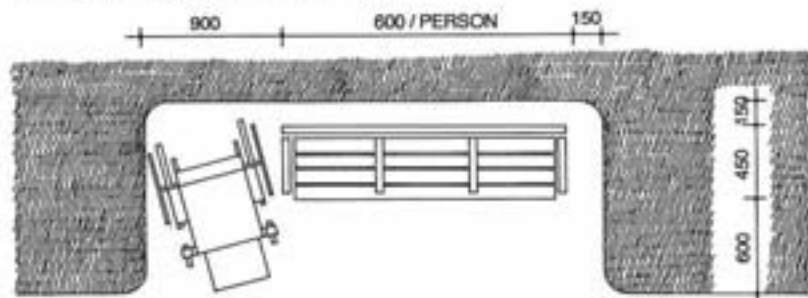
#### GRADIENTS, UNOBSTRUCTED HEIGHT AND TRAFFIC SIGNS

The maximum gradient of any slope exceeding 6 metres in length is 8 % i.e. 1:12,5. The lateral gradient must not exceed 2 %. The minimum unobstructed height of a light traffic route is 2200 mm, (preferably 2500 mm). Maintenance machinery usually requires a height of 2800-3000 mm.

Signs intended for pedestrians and bicyclists must be installed in a manner that does not hinder maintenance or cause danger to route users. Signs must be located above a route in accordance with the dimensions previously mentioned, or must be situated by the side of a route at an adequate distance from the edge.



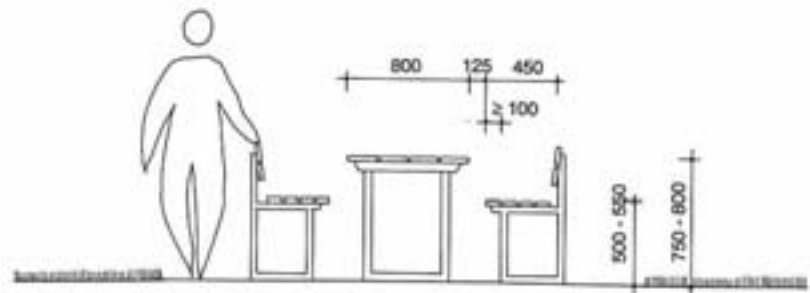
SEATS OF DIFFERENT HEIGHTS:  
 NORMAL SITTING HEIGHT 400 - 450 mm  
 STIFF JOINTS OR HIPS 500 - 550 mm  
 CHILDREN AND SHORT PEOPLE 300 mm



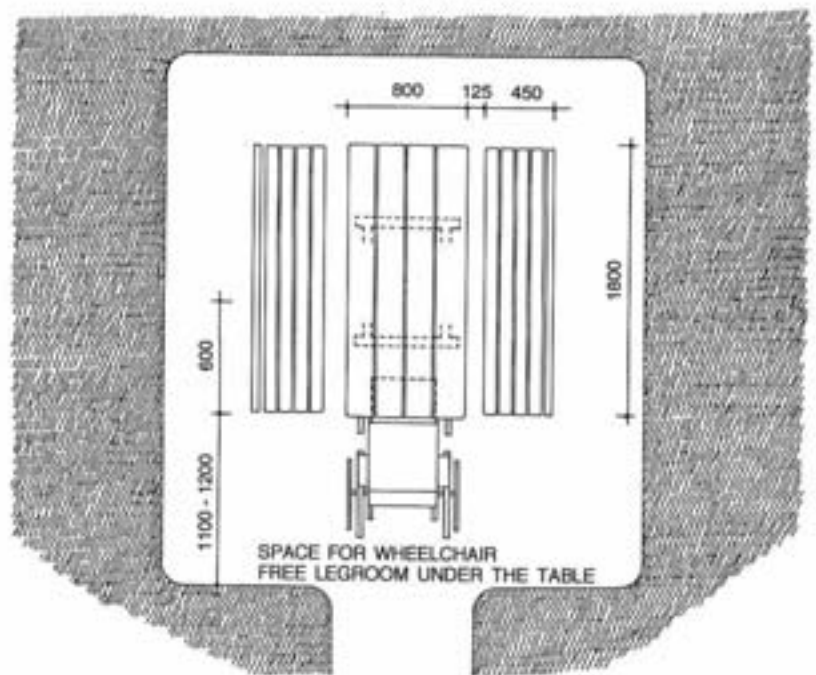
BENCHES IN SHADE, IN SUN AND PROTECTED FROM WIND.

PATH

RESTING BENCH 1:50



SHRUBS FOR PRIVACY AND FOR WIND PROTECTION



PICNIC AREA, OUTDOOR EATING PLACE 1:50

## SEPARATION FROM ROADWAYS

A light traffic route should be built separately from vehicle roadways. If this is not possible a light traffic route must be separated from a roadway with an upstand and a green zone. The zone must be covered with grass or planted with bushes.

The border between a pavement and a road must be marked with a kerbstone. At zebra crossings the kerbstone must be lowered to a height of 30-40 mm. Kerbstones that are over 40 mm high are not suitable for the disabled.

Level crossings must provide adequate visibility and warning of a crossing ahead can be made using a change in surface materials. Whenever possible, roadways should use either an over or underpass to cross pedestrian routes, thus allowing light traffic to remain at ground level.

## SURFACE MATERIALS

A route must be well illuminated, must have gentle inclines and its surface must be smooth, hard and non-slip. Asphalt is usually used as it is a durable and easily maintainable material. A good gravel surface is also possible. Flat non-slip paving stones are another option and can be used either in city centres, for aesthetic reasons or to mark an entrance.

A 350-500 mm wide edge indicator zone should be provided on the right side of a route for the visually impaired. The zone functions using material or colour contrasts. On routes surfaced with gravel the zone must be indicated using either saw chippings or crushed limestone. In addition to a painted border line on asphalt surfaces, loose stones and grass at the side of a route function as edge indicators. Paving stones and cobbles are also suitable edge indicators on asphalt paths.

At points along a route such as road crossings or intersections with either service traffic or other light traffic routes, the surface material of the route can be altered in order to alert attention. The change of surface material can be made using concrete paviors, the pattern and direction of which can be detected by the stick of a visually impaired person.

## RESTING PLACES

Resting places equipped with seats must be provided along light traffic routes. A suitable interval between resting places is either 5 minutes walking time or 250 m distance, both are appropriate for the

elderly and persons who tire easily. Shorter routes may have seating for the elderly and the severely

disabled placed at 100 m intervals.

Longer routes of more than 3 km should have resting places after each kilometre. Resting points at a minimum of 400 m intervals may also be necessary after significant ascents.

Some rest areas should offer protection from wind, and a canopy should be built over a resting place when required.

In addition to normal 400-450 mm high seats, a resting place should also provide seats of varying heights. Some of the seats (500-550 mm) must be suitable for people whose joints are stiff and who sit in semi standing positions. Seats 300 mm high must be provided for children and short people.

The seats must always have arm and back supports. If a 500 mm high seat is used by people in wheelchairs, it must be equipped with demountable or folding arm rests.

Space must be provided by the side of seats for a wheelchair or a push chair, in order to keep a route clear of such objects during a rest break.

An eating or picnic place can also be built along an outdoor recreation route.

A picnic place should have a solid table which can be used by people in wheelchairs and should also have benches of appropriate heights at both sides of the table. In addition to a 400-450 mm sitting height, the provision of a 500-550 mm sitting height allows those people whose joints are stiff to sit down and get up without undue effort.

Knee or legroom that is at least 670 mm high and 800 mm wide is required under a table for wheelchair users.

A toilet that is suitable for both the disabled and families with small children, must be provided along any route that is several kilometres in length. Its dimensions must allow ample space for an assisting person to accompany a wheelchair user.

A latrine or compost closet that is suitable for use in a natural environment, provides a good and feasible solution when confronting the question of toilet provision. The approach to a toilet must have a surface that is smooth and hard, and the entrance must be level. A refuse collection point can be situated by the toilet. (see drawing and picture at 1.4. and 4.3.)

## 2.2. THE DESIGN OF EXERCISE ROUTES

### EXERCISE TRAILS AND TRACKS

The surface of an exercise track consists of fine gravel or wood chippings and must have a minimum width of 3000 mm. Protection zones which are 1000 mm wide are required at both sides of a track.

The width of a skiing track base which is suitable for skate skiing must be 5000-6000 mm, and more than this when the track is inclined. Particular attention must be paid to the length of routes and the number of ascents. Demanding descents must be avoided. Resting places must be provided after ascents.

A suitable exercise track for the disabled has a surface made of fine gravel, asphalt or wood chippings. A track with an asphalt surface must be provided next to a surface of wood chippings to cater for wheelchair users and roller-skiers. The minimum width of a route that has both a sub-base and a surface finish must be 3000 mm. On flat terrain additional 1500 mm protection zones must be provided on both sides of an exercise track. Protection zones on steep descents must be double or triple in width.

The routes must be designed so that they can be used in one direction only.

The gradients of a disabled route must not exceed 1:12,5 i.e. 8 % over a maximum distance of 6 m and must not exceed 5-7 % over long descents. The lateral gradient in both directions must be 1 %.

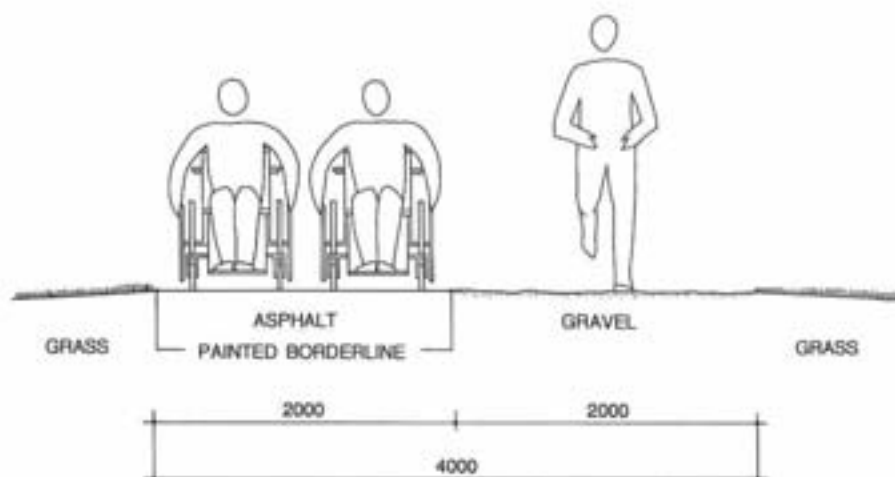
### EXERCISE EQUIPMENT

An area providing exercise equipment must be built in connection with an exercise track and is usually constructed at the end of a track in a place protected from the wind.

The most important equipment includes back and stomach muscle apparatus, press and lift apparatus, hanging bars and benches for stretching. In addition, a balance bar and apparatus developing agility can be situated along an exercise track. Apparatus that is used lying down must be placed under canopies. Instruction boards concerning the use of apparatus must be located next to the equipment. When properly instructed the visually impaired can also use the exercise apparatus. Exercise apparatus can also be adapted for wheelchair users.

### SERVICE SPACES

Hygiene spaces and routes must meet the requirements of the ambient disabled. Kiosks, automatic machines and cafés at exercise areas must be designed in accordance with the needs of the motion disabled. A storage space is required for the various equipment associated with an exercise track. Refuse collection and disposal is carried out using large, interchangeable rubbish bags or containers. At larger recreation centres skips are used. It should be possible for a person with weak arm muscles to open the lid of a refuse container.



DISABLED EXERCISE TRACK 1:50

### 3. PARKS, PLAYGROUNDS AND GARDENS

#### 3.1. PARKS

There are various types of parks including city parks, greens in residential areas, playgrounds, recreation grounds and parks in institutions. Theme parks include animal parks, amusement parks and botanical tree gardens (i.e. arboretums).

Parks provide an opportunity for the inhabitants of cities or institutions to participate in daily recreation.

Parks offer the chance to stroll or sit peacefully away from the noise and pressure of everyday life. They allow people opportunities to study plants and to occasionally observe birds, insects and other animals.

#### ACCESS, ORIENTATION AND SIGNS

Parks must be easily accessible for the ambient disabled. Routes to and within a park must be well defined and the park itself must be clearly separated from traffic zones.

Orientation in a park must be simple. A rectilinear system of co-ordinates is the best and the easiest solution.

Large parks must provide signs that are also suitable for the visually impaired. An embossed information board at park gates gives a visually impaired person an overall impression of the area. In addition, embossed maps can also be prepared for individual use. Landscaping within a park can be described in Braille by using boards attached to railings or handrails. When the Braille is waxed, it is also readable in the rain.

Various sound sources that either communicate spoken messages or send out signals can be used to facilitate the orientation of the visually impaired. It is also possible to build a guide wire into the ground surface.

#### PARK ALLEYS, SURFACE STRUCTURES AND GROUND CONTOURS

Changes in surface material can act as a guide and a warning to the visually impaired by providing information on crossings, arrivals and exits to a park and on any steps that may lie ahead. Changes in surface materials may denote different areas. Ground contours may suggest borders e.g. the raised edges of a playing field.

Freely meandering park paths cause difficulties for the visually disabled. Orientation is facilitated if a park has clear avenues that can be travelled along without having to make significant changes in direction. The

surface materials of main park avenues and secondary paths must differ from one another.

Park paths must have gentle features and be even and densely surfaced. Unnecessary changes in level must be avoided as they impede the travel of the visually impaired and ambient disabled. Park paths must be well illuminated. Orientation is improved if lights are positioned to correspond with a main route.

Playgrounds often form part of a park. The visually impaired can be prevented from accidentally straying onto a play area by choosing the correct location of a playground and by protecting it with both plants and small structures.

Prickly or thorny plants must be avoided in parks and playgrounds.

#### VEGETATION

A pleasant and lush environment is created in parks by selecting interesting plants that blossom at different times of the year. In northern climates evergreens guarantee verdancy throughout the year.

Dense vegetation encloses space and provides protection from wind, traffic, dust and noise. Large trees and bushes offer shade from excessive sunshine and the wind whistling in the branches of trees provides various sound experiences for the visually impaired. Various kinds of blossoming and fruit bearing flowers, trees and bushes also offer opportunities to experience smell and taste. The changing seasons can be experienced by using plants. Different types of plants attract different types of animals and this, again, provides an opportunity to observe birds and insects.

#### WATER

The sound of fountains and waterfalls assist the orientation of the visually impaired, but a person must be protected from falling into any pools which are situated below the level of the ground. Pools can be separated from their surroundings by using contrasting ground materials.

Handrails can lead a person to a water feature.

#### RESTING PLACES AND STREET FURNITURE

Resting places with seats must be provided at 25-





100 m intervals along park paths, in both sunny and shady spots. A surface material that differs from the main material of the route may be used for resting places.

The design of park furniture must take into account the requirements of wheelchair users and the visually impaired.

### 3.2. PLAY AREAS AND PLAYGROUNDS

Playgrounds must have both sunny and shady areas that are protected from the wind. In addition to play frames and equipment, they must also offer various ground surfaces and contours as well as vegetation. Raised sandpits and troughs can be arranged for children in wheelchairs, in order to allow them to play with sand and water. A playground must be functional for both disabled children and disabled parents. Play equipment that is designed for children under school age may be too small for the mentally deficient.

#### ADVENTURE PARKS AND ADVENTURE PLAYGROUNDS

Playgrounds are intended to provide inspiring areas that respond to and develop the abilities of disabled children.

The purpose of an adventure park is to bring enjoyment to a child while developing his or her motor co-ordination. Adventure playgrounds must not be too sterile and safe as children can become bored and frustrated. Playgrounds must be challenging and exciting.

An adventure park can be connected to a hospital or a school, or situated in a suitably peaceful place within a residential area. It must be easily accessible by public transport, school bus and private car. A playground must be visible to passers-by and people in the neighbourhood in order to deter youth vandalism.

#### IMPORTANT ELEMENTS IN AN ADVENTURE PARK:

As a contrast to the indoor life that most disabled children lead, an adventure playground must provide space, a tangible landscape and fresh air.

Open green space is required for various ball games and kite flying. Sand and gravel pitches are suitable as playgrounds for wet weather use.

It is desirable to allow disabled children to touch the trees and bushes in a park. Climbing trees can be exciting. With the help of an instructor, a house or a hut can be built out of trees and branches.

A playground must not contain poisonous plants.

A playground should consist of a landscape which has minor variations in ground profile, such as mounds and slopes. In addition, a play park must have trees and bushes. It must provide a water feature, a small pond or a pool and sand for various types of play.

Brooks, waterfalls and pools that can be crossed by a bridge, provide variety in children's play. A bridge can be used for throwing small objects into water, or for following the flow of water. The depth of a water pool can be based on the amount of water required for paddling and playing with toy boats (approximately 300-400 mm). The pool surrounds must slope away from the edge of the pool.

A sand playing area must be similar to a bathing beach i.e. a large sandy area must be located near water. Children in wheelchairs must have direct access onto an area of sand from a path or a boardwalk.

Appropriate routes for the disabled, must be built in the landscape. They include ramps to a slide on a hillside and wooden footbridges across soft sand. Good routes also serve parents who are taking their children for walks. A playground must be fenced and equipped with a gate that can be locked.

The surface of a park path must be sufficiently dense and the routes must be wide enough to allow two wheelchairs to pass one another (1800 mm).

A building at a playground provides shelter from the rain and the cold. It may house toilets, showers, drying rooms and storage. In addition to an office area, space is also required for various indoor group playing activities, for art work and for the cooking and serving of food.

Old car tyres and bedswings with padding are suitable to use as swings. A bedswing provides various alternatives for swinging: it can be used for lying down either on the back or stomach, or it can be used by a number of children at the same time. A suitable height for a bedswing from the ground is 150-250 mm.

People in wheelchairs can use swings that have been adapted and little children can be provided with safety seat swings.

A good swing must be equipped with arm and back supports as well as chain shields. Seesaws must be firmly fixed to the ground. The base of a swing area can be made out of a soft and flexible material. For safety reasons people must be prevented from approaching swing areas from the side. This can be done by planting bushes at the side of swings and by leaving sufficient free space in front of and behind swings.

Equipment that is suitable for playground use includes climbing frames that are made out of wood, car tyres and ropes. Playground equipment allows a child to climb along ladders, travel down slides and

jump into piles of foam plastic. Climbing frames and slides must be accessible via ramps in addition to steps. Obstacle free space is required in front of a slide in order to prevent collision with another person. Running under a slide must also be prevented.

A giant air mattress for jumping can be installed at a playground.

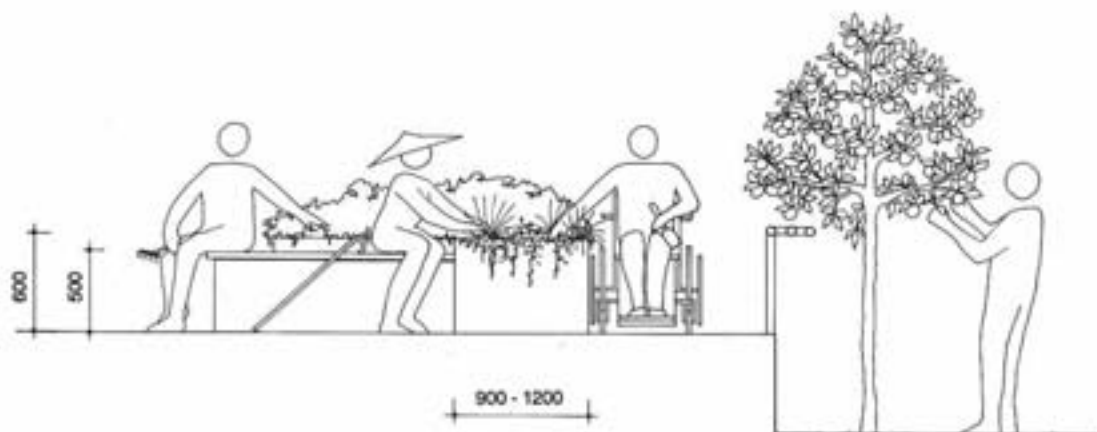
Bars, blocks of wood and stairs are all suitable for balancing exercises.

An outdoor fireplace or a barbecue can be built in a sheltered and covered area. Children enjoy open fires and outdoor cooking can form a part of the

adventure. Wheelchair access must be provided to any safe fireplace.

Even in an adventure playground, children need a quiet and peaceful area that must be separated from other activities using, for example, vegetation. A play house can act as a place for peaceful play, but must also be accessible by wheelchair.

Playgrounds must have a sufficient number of qualified full time instructors who can introduce children to games and various types of play. Whenever necessary, an instructor should invent new activities for the children in a playground. An instructor makes a playground work.

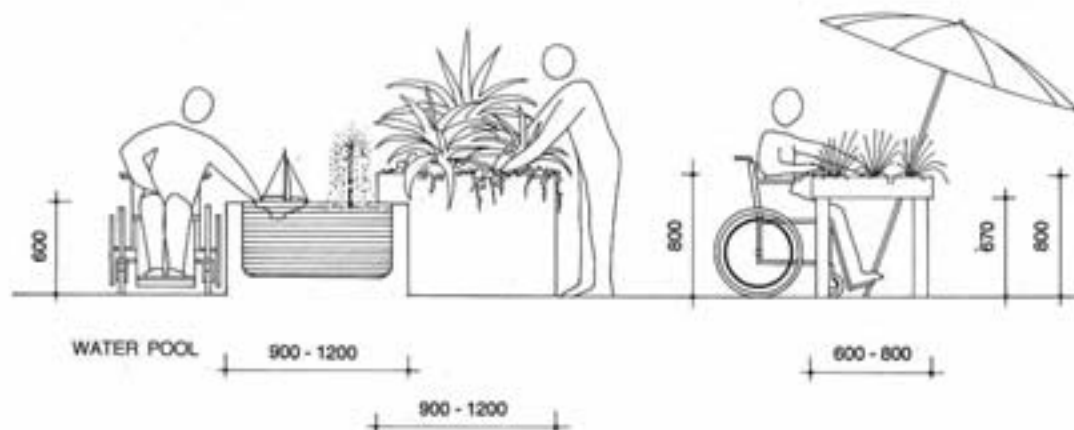


WIDENED EDGE FOR SEATING AND GARDENING

LOWERED PLANTING EASILY ACCESSIBLE FROM A WHEELCHAIR

PLANTING BASIN FOR PEOPLE WHO FIND IT DIFFICULT TO LEAN DOWN

PLANTING BOX AT TABLE HEIGHT, ACCESSIBLE BY WHEELCHAIR



### 3.3. GARDENS

A garden may be located either in a park, in a yard, on a terrace, on a balcony, or in a conservatory attached to either a single dwelling, a terraced house or a block of flats. It may also form part of the exterior spaces surrounding an institution.

Botanical gardens are special gardens which the ambient disabled must be able to visit at various times of year in order to study the changing flora.

A traditional garden attached to a single house or a terraced house is the most traditional type of garden. A small private garden area in a home or service centre for the elderly allows an individual the opportunity to work with plants. Opportunities for the disabled to participate in gardening according to their individual abilities, can be arranged on the exterior spaces attached to a block of flats or an institution.

A garden situated on a balcony, on a terrace or in a conservatory provides the chance to garden on a small scale. Greenhouses and conservatories lengthen the otherwise short gardening season.

#### GARDENING AND PLANTING ARRANGEMENTS

Creating an easily maintainable garden is probably too demanding for a disabled person to achieve without outside help. Looking after a lawn is difficult for an ambient disabled person. A garden must be easily accessible. Changes in level are unnecessary, but can be overcome using gentle ramps.

In order to reach fruit etc., the height of vegetation can be restricted by cutting and tying back. Low vegetation can be planted in a raised flowerbed, a trough or a wall, while higher vegetation can be planted on a lower level. The selection of plants should be determined by the various maintenance requirements of different species. Tools and techniques that alleviate work should be used.

As a gardener must be able to reach his or her plants, flowerbeds should be raised sufficiently to allow an individual to work, either standing up without leaning over or sitting down in a wheelchair. A suitable working height for a wheelchair occupant is approximately 600 mm from the ground and for a person who has difficulties in leaning down, the height is approximately 800 mm from the ground. Planting boxes must be narrow, only 900-1200 mm wide.

Part of a planting box edge should be widened to create a working surface for tools etc. in order to avoid unnecessary leaning down. The surface may also be used as a seat.

Alternatively, hotbeds or boxes with legs can be built for gardeners who are confined to wheelchairs. Kneeroom for a wheelchair, 670 mm high, must be

provided under a box. The choice of plants in boxes of this type is limited to those having short roots.

Plant basins similar to the ones mentioned previously can also be placed on balconies, terraces and in conservatories.

As the soil in plant basins dries more rapidly than it does in the natural conditions found on flat ground, irrigation is required more often in dry weather. It is also possible to build an irrigation system within a raised plantation basin.

Planting must be surrounded with a paved area in order to allow mobility within a garden. Smooth and level concrete paviers are an example of an appropriate surface material.

#### SEATING AREAS

Sheltered and pleasant seating and rest areas form an inherent part of a garden. They should be located in both sunny and shady positions. Like parks, large gardens must also provide resting points and appropriate seating along garden paths.

A roofed terrace or a pergola which is covered with vegetation both offer protection from excessive sunshine and also provide shelter from either rain or heat. In addition, sun blinds and parasols can also be provided. Glazed and covered exterior space and sheltered courtyards lengthen the time that a garden may be used. A warm area for sitting and resting is created by using materials that retain heat, such as wood and brick. Infra-red heaters provide extra heat.

#### WATER FEATURES

A suitable height for a water pool in a garden adapted for disabled use, is 600 mm from the ground. For example, a pool can be built using fibreglass laid on concrete foundations.

A water feature can become even more interesting if it includes the sound and movement of water. The water in a fountain or a waterfall can be circulated using an electrically operated pump.

#### GREENHOUSES AND GARDEN SHEDS

Greenhouses in Nordic climates extend the growing season. The maintenance that a greenhouse may require must not be regarded as a burden. Irrigation, heating and ventilation can be arranged automatically whenever necessary.

Like a garden, a greenhouse must also be easily accessible and possible to use by a disabled gardener. The suitable width of a passageway in a greenhouse is approximately 1500 mm.

In addition to storage, a garden shed may provide space for working. The internal and external areas of a shed must be level with each other, the door must be sufficiently wide and the shed must be spacious enough for a wheelchair to turn full circle.



All terrain vehicle.



### III OUTDOOR RECREATION AND NATURE ACTIVITIES

#### 4. OUTDOOR RECREATION AREAS

Outdoor activity and recreation areas often utilise maintained natural forests and waterways. These areas may provide guided recreation paths and tracks as well as boating routes. In addition, the areas may offer different types of services for hikers and those people participating in outdoor activity. The opportunity to take part in outdoor activity should be guaranteed for the ambient disabled. In order to make the outdoors accessible to the disabled, recreation routes should be built accordingly.

##### 4.1. OUTDOOR RECREATION RESORTS

###### OUTDOOR RECREATION AREAS IN BUILT-UP AREAS

Built-up areas provide parks, gardens and outdoor activity areas for outdoor recreation. Outdoor activity areas often consist of a dense network of paths which allow the disabled to use the area more effectively.

###### RECREATION AREAS

Maintained natural forests have special characteristics in terms of their landscape and biology, and are different from those commercial forests which also provide recreational activities. Maintained natural forests may consist of virgin forests in their natural state, park areas that require careful maintenance and areas that are used for commercial pursuits. Commercial forests are also suitable for recreation.

The purpose of a nature reserve is to protect and preserve a large original landscape as a complete entity, but many preservation areas are also suitable for outdoor activity and recreation as long as the activity respects the conservation conditions of the area.

Besides having preservation purposes, national parks also provide sights and scenery that are often free and accessible for the general public. These parks are strictly protected and disturbance or damage to the natural landscape is prohibited.

Generally, natural parks are areas that retain their natural character and are intended primarily for scientific purposes. Some natural parks, in which

travel is otherwise forbidden, can be visited using pre-designated routes.

Inland waterways and areas of sea offer extensive and varied opportunities for boating and other water sports.

The disabled can participate in water sports if a natural shoreline is improved and equipped appropriately, and also when fishing, boating and swimming jetties are designed and built to suit the particular requirements of the disabled. In addition to normal rowing boats, sailing boats and motor boats, extra equipment can be provided in the form of pontoons, canoes and inflatable boats.

###### EXERCISE AND SPORTS CENTRES

Special exercise and activity centres offer good opportunities for various sports. In the future the intention is to organise outdoor pursuits using various nature activity centres. They serve as starting points for hiking, recreation and boating routes as well as service areas for berry and mushroom pickers, orienteers, ramblers and skiers. These nature activity centres include information centres, activity and recreation areas maintained by local councils, commercial tourist and recreation centres, sports training centres and other institutions and centres that may provide appropriate services for people participating in outdoor pursuits.

Centres that offer a 24 hour on-call service should provide a check-in point by a reception desk, where a hiker or a skier can report his or her route plans and register his or her departure. If help is required a person using a recreation route can alert the registration station by activating an electronic transmitter.

###### CULTURAL SIGHTS

Many historic and cultural sights are located in environments which could provide disabled access. Castles, ruins, manor houses, stately homes, museum buildings and boats are valuable and should be protected, but disabled access to these sights should be arranged whenever possible.

## 4.2. ACTIVITIES IN NATURE WITHIN OUTDOOR RECREATION AREAS

Nature offers opportunities for various types of activities, such as berry and mushroom picking, hunting, fishing, bird observation and photography. The natural environment can provide either challenge and adventure or relaxation from daily routines. Nature also possesses symbolic meaning when observing growth and development. In addition, the changing scenery and varying seasons of a natural landscape may provide a rich environment for observation and experience.

### BERRY AND MUSHROOM PICKING

Berry picking and mushroom picking are suitable for the disabled when the terrain is relatively easy to move across. Berry and mushroom picking combine excitement with the joy of discovery.

### HUNTING

Besides the direct use of animal prey, reasons for hunting include the experience of nature, social contact within a group and the excitement provided from pursuing and catching animals.

The disabled can participate in hunting where there is no pursuit of game. In organised hunts a disabled person can remain on the ground protected by a shelter or may be positioned in a hunting tower.

Boats that are equipped with bow ramps and that have flat bottoms can allow a hunter to access reed bed areas in order to shoot game birds. In the winter a snowmobile can be used to gain access to a hunting ground.

In addition, the disabled can participate in rifle sports at shooting ranges.

### RAMBLING AND ORIENTEERING

The challenges offered by a natural environment, particularly by a wilderness, can give an individual the opportunity to explore and exceed one's limits and to prove one's abilities and skills. Hiking in the wilderness emphasises those experiences associated with the surrounding environment. In an untouched landscape only those areas that are easy to cross and which have a level and dense terrain are suitable for the ambient disabled.

Orienteering is suitable for the disabled as long as the ground terrain is level and easy to travel across. Orienteerers can either move alone or take turns in leading a group with the aid of a compass. The confidence of a hiker is increased by rewarding experiences and independent achievement.

For an orienteering area to be suitable for wheelchair users it must have sufficiently wide paths, roads and

fields.

Brightly coloured maps, embossed maps, compasses in Braille and vibration compasses which indicate deviations from correct directions by the use of vibration, can all be provided for the visually impaired.

### MOVING WITH AN ALL TERRAIN VEHICLE AND A MOTOR SLEDGE

Disabled access to a natural environment is facilitated using assistants, various all terrain vehicles, and in the winter by snowmobiles and dogsleights.

All terrain vehicles are suitable for people who otherwise cannot independently see or experience nature from anywhere closer than a road. Wheelchair users, for example, can effortlessly travel across a natural landscape by using an all terrain vehicle. On trips using all terrain vehicles, assistants are required at points such as ditch crossings etc.

In the winter snowmobiles are suitable for all those people who can use all terrain vehicles in the summer. Routes can be built specifically for snowmobiles.

### CAMPING

Camping is also suitable for the ambient disabled, as a form of recreation in a natural landscape.

### MOVING ON WATER

Rowing, canoeing and sailing are suitable activities by which the ambient disabled can travel across water and are also activities which do not harm the natural environment. Noisier motor boating and water skiing are also suitable for the disabled.

Nature activities on water are currently being developed. There are pontoon boats and boats that can be steered with joy-sticks, both of which are suitable for use by the disabled. Hiking with Indian canoes or rowing boats is a sport in which wheelchair users can also participate. White water rafting in large inflatable boats, designed especially for a group of people, can be an exciting experiment and one in which many disabled people can take part. A wheelchair can be attached to an inflatable boat and act as a replacement for one of its seats.

### SWIMMING AND DIVING

In order for the motion disabled to enjoy swimming and diving, suitable changing facilities, access into water and appropriate bathing jetties must be provided.

Moving in water is easy for the disabled due to the buoyancy created by water. Diving can begin after initial instruction has been provided by a local diving club. A diver must always have a diving partner.

In practice, a wet or a dry suit is necessary for diving, due to the coldness of water.

## ANGLING AND ICE FISHING

Angling is an activity that provides many people the opportunity to experience nature. It is both exciting and challenging.

Angling and fishing are possible for the disabled at specially selected places. Good fishing positions include manmade riverbanks, fishing jetties and boats. The disabled can board boats either with the help of an assistant or by using a suitable jetty.

Ice fishing in the winter can be an enjoyable activity for the disabled assuming that a suitable access point onto ice is provided. Wheelchair users and people with great difficulties in moving can use snowmobiles in order to gain access to the ice.

## WINTER ACTIVITIES

Skiing is a traditional outdoor activity in nature. Skiing is a versatile sport even for the disabled, as long as the skiing terrain is not too demanding. The blind can ski with the help of an assistant.

People who have difficulties in retaining their balance can ski on ice and, if necessary, can use walkers with skis to give extra support. Skiing on ice eliminates tiring ascents. The paraplegic can use ski sledges and pulks. A ski sledge on skis is also suitable for hiking in the natural environment.

Downhill skiing is also suitable for many disabled when visiting larger downhill skiing centres. Some of the slopes must be suitable for children and the disabled, and skiing centres must provide lifts that can also be used by the disabled. The safety of slopes can be increased using various signalling systems. Skiing instructors who specialise in adapted skiing are often essential for the disabled. Assistants are often necessary for the blind. Equipment includes downhill ski sledges.

In the winter the ambient disabled can use pulks that are pulled by animal teams, this allows trips to be made to rest cabins. Horse drawn sleighs provide opportunities for winter rides.

A snowmobile with an attached sleigh provides the best aid equipment for winter activities.

Skating, sledging and ice hockey are all other activities that can take place on ice in addition to skiing and animal drawn rides using pulks. Sledge sailing is possible on open lakes or seabays.

## 4.3. BUILDINGS AND STRUCTURES IN OUTDOOR RECREATION AREAS

### INFORMATION CENTRES AND HUTS

Information centres are information and exhibition buildings that serve the visitors to national parks and recreation areas. The exhibitions describe the landscape of an area, its phenomena and the opportunities it offers for activities. Information centres are important for the ambient disabled as they provide facts for the disabled concerning their possible use of the area.

An information centre displays maps of the national park or the recreation area, instructions for its use and also sells fishing licences. Permanent exhibitions and audio-visual shows familiarise a visitor with the theme of an information centre e.g. nature within the area, its biology and meaning. In addition, hire services may be provided (e.g. all terrain vehicles and snowmobiles). An information centre can also complement school education.

Cafés, hygiene facilities and sheltered exterior spaces serve the visitors to recreation areas. For the disabled it is important to pay attention to level entrances, low information desks, spacious clothes and toilet facilities as well as cafés and easily accessible auditoriums and exhibition spaces. Equipment may also include telephones, first aid equipment, water taps and rest areas situated in the outdoors which can be used while the centre is closed.

### REST CABINS

Rest cabins serve as resting places during daytrips and also as accommodation spaces, provided that they are suitably well equipped. The cabins are intended for temporary one night stays and equipment is very primitive; only a hard bunk, fire wood and refuse collection are available.

Changes in level must be overcome using gently sloping steps and ramps. Doors must be wide and easy for the disabled to use. The interior of a rest cabin must be spacious enough to allow an area for movement in order to keep warm. A fireplace can be situated in the middle of the space and should be positioned at table height so that a disabled person can use it.

### LODGES

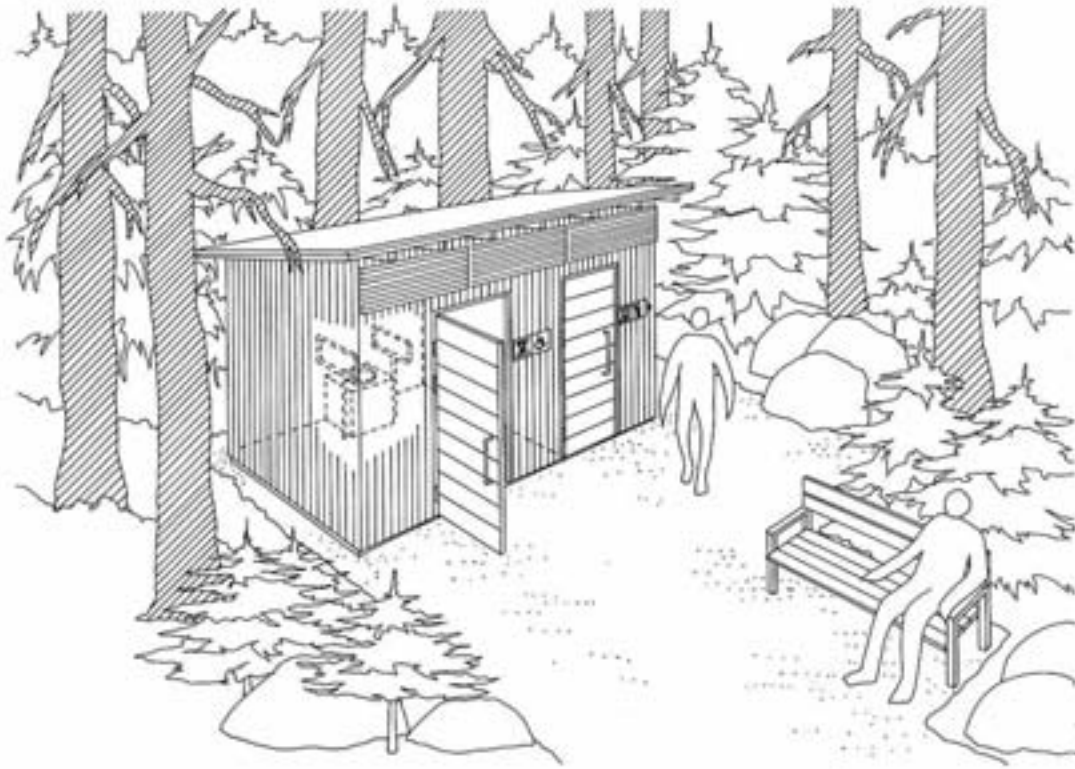
Lodges are required at recreation centres situated outside built-up areas. They serve skiers, bicyclists and other people. Lodges are used for resting, warming-up and enjoying refreshments.

The principles that were mentioned previously concerning disabled access, entry and mobility indoors, apply to all buildings within recreation areas.

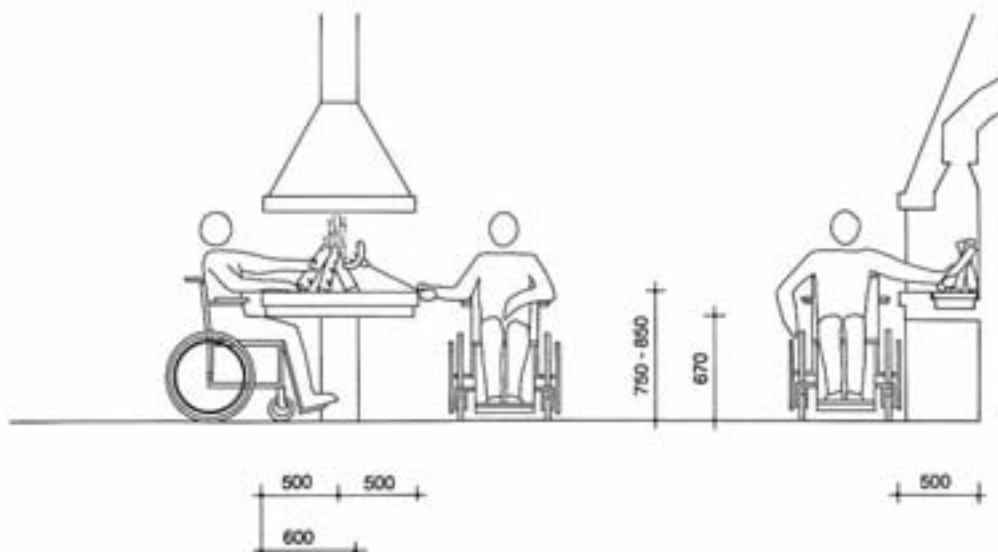
Cafés, toilets, changing rooms and wash rooms in lodges must also be designed to suit the disabled. In addition to cafés, lodges can provide various meeting rooms and service spaces (e.g. ski maintenance and office use) for the organisation of competitions and sports events.

## REST AREAS

Rest areas for temporary rest must be located at 1 km intervals on all routes that are suitable for the disabled and at 250 m intervals on very short routes. The simplest rest place consists of a bench located along a route. Suitable furniture for a rest area will



REST CABIN - DISABLED AND ORDINARY DRY CLOSETS AND REFUSE CONTAINERS



DISABLED FIRE PLACE 1:50



include a table with benches on both sides. Rest areas that are used in the winter must be covered and protected from the wind. Ample space is required to provide shelter from rain. It must allow for general movement and warm-up exercises. A refuse container with a lid which can be easily lifted must be located sufficiently close to a dining area and the emptying of this container must be carried out regularly. Some of the rest areas must be equipped with (dry) closets.

## FIRE PLACES

Along a route that is either 3 km or 5 km long a sheltered area must be provided which allows the disabled to sit by a fire. Minimum equipment includes a fireplace, benches and a table that is possible to use while sitting in a wheelchair. Refuse collection must be organised in the same manner as in rest areas.

A fireplace that is suitable for the disabled must be built at table height. Enough kneeroom must be provided under its front edge (minimum height 670 mm). A wheelchair user must be able to reach the back of a fireplace in order to replenish it with wood. If a cauldron, a pot or a smoke oven is used above the fire, the fireplace must be lower. A wheelchair occupant then uses the fireplace from the side. A low fireplace can warm the knees of a person sitting in front of it.

A (dry) closet and a refuse collection point should be located adjacent to a fire place.

## ACCOMMODATION / CAMPING PLACES AND LEAN-TOS

On routes that are suitable for the disabled the distances between overnight lodging places should be approximately 5-10 km.

A night lodging place must be equipped like fire places; a table and a bench combination, a fireplace, access to water and a disabled (dry) closet or a disabled water closet must all be provided.

### THE CAMPING PLACE

A smooth, level and relatively large area must be reserved for camping, in order to pitch tents sufficiently far apart from one another. An area of approximately 70 m<sup>2</sup> is required per tent.

### THE WASHING PLACE AND THE JETTY

On summer routes a bathing beach is a suitable place for washing.

A jetty provides a facility for washing, swimming and other recreational use. For the disabled, access into water is easier via a jetty and gentle steps than from the shore line.

## 4.4. ACCOMMODATION FACILITIES IN OUTDOOR RECREATION AREAS

Accommodation facilities offering various standards and price categories must be provided adjacent to outdoor activity and recreation areas. Less expensive alternatives, such as campsites and youth hostels, must also be available for the disabled.

### CAMPSITES

Campsites often provide hygiene facilities, adapted toilets and refuse collection points for the disabled. Cafés, shops and laundrettes at well equipped campsites must also be suitable for use by the disabled. In addition, spacious cabins that are suitable for the disabled may also be available.

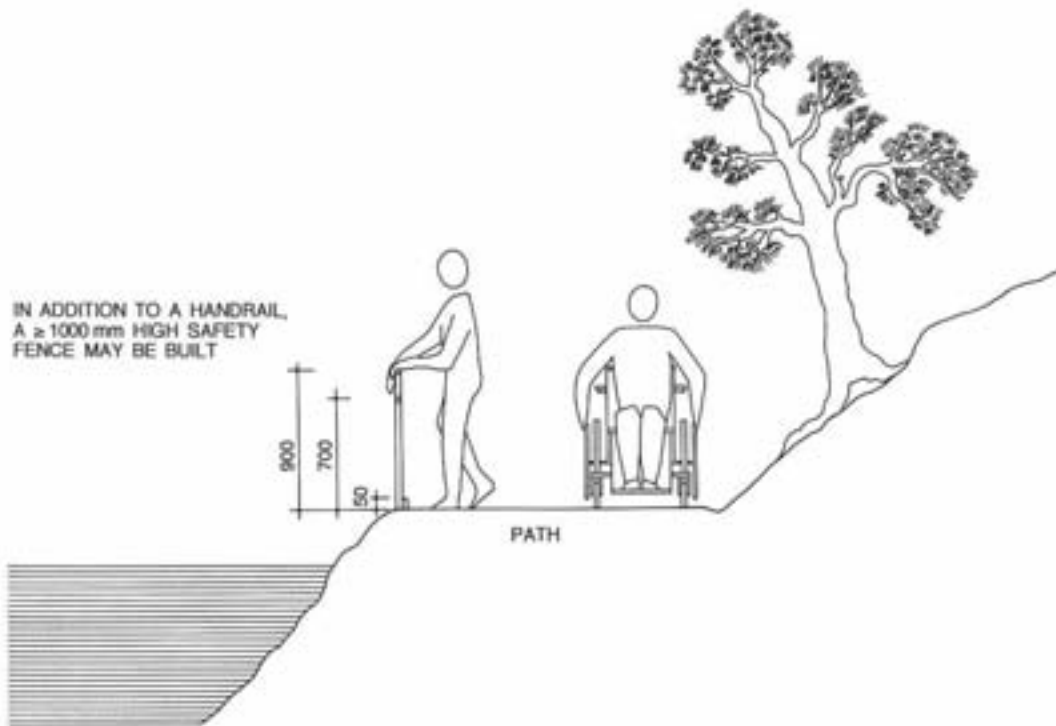
### FOREST LODGES AND SHELTER CABINS

Wheelchair access to cabins which have been located at suitable intervals along a route, must be level and have no stairs or must be possible via gently sloping steps and a ramp. Interiors must be spacious enough to allow a wheelchair to turn full circle and move about freely. For the visually impaired the risk of collision with sharp corners and furniture must be eliminated. Fireplaces for the disabled must be placed at table height, preferably in the middle of a space.

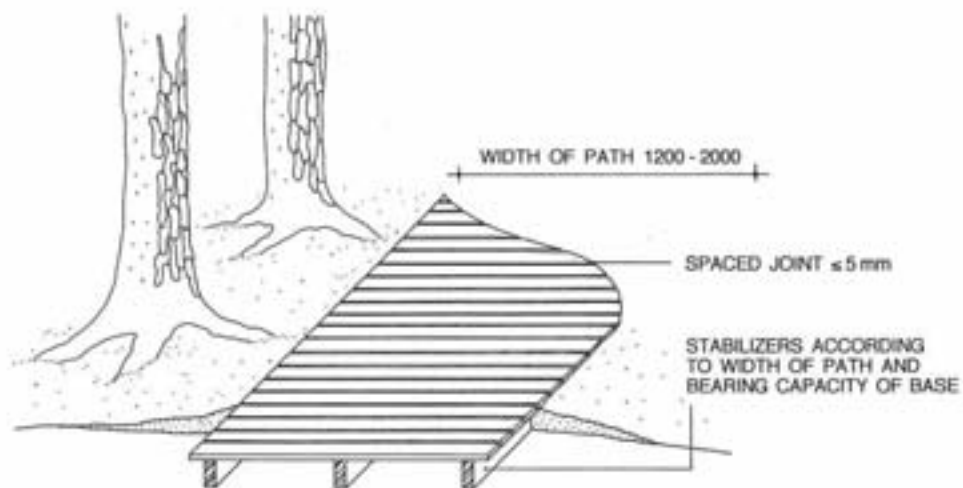
### YOUTH HOSTELS AND HOLIDAY VILLAGES, MOTELS AND HOTELS

The requirements which allow facilities to be used by the disabled apply to all accommodation spaces: disabled access to a point near an entrance must be possible by car, entry to a building must be obstacle free and preferably level (a threshold must be a maximum of 20 mm high), doors must be sufficiently wide (the free width of external doors must be 900 mm and internal doors 850 mm), rooms and hygiene facilities must be spacious.

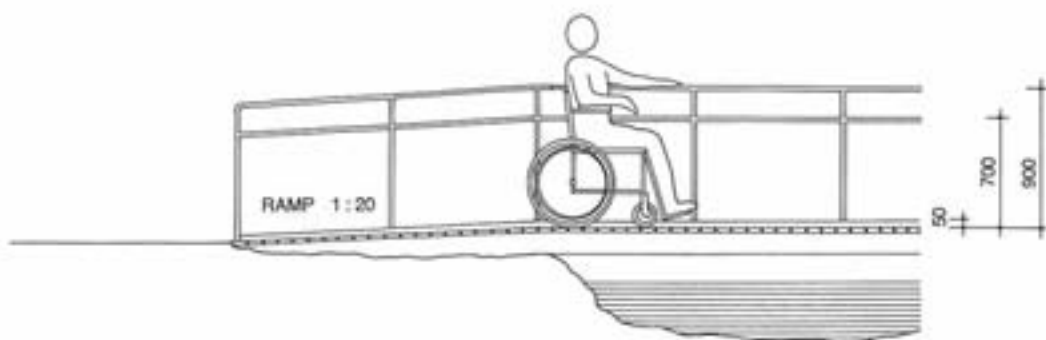
Annually published booklets describe accommodation that is suitable for the disabled.



SAFETY FENCE AT A PRECIPICE 1:50



BOARDWALK ON UNSTABLE GROUND 1:50



BOARDWALK (BOARDS LAID AT RIGHT ANGLES TO DIRECTION OF TRAVEL) BRIDGE OVER A DITCH OR A BROOK 1:50

## 5. ROUTES IN OUTDOOR ACTIVITY AND RECREATION AREAS

Adapted paths, structures, signs, buildings and good access are all prerequisites for providing a suitable outdoor recreation area for the disabled.

### 5.1. OUTDOOR ACTIVITY ROUTES

Outdoor activity routes include natural trails, totally or partly purpose-built recreation routes and skiing tracks during the winter months. Boating routes include those designed for the recreational use of natural waterways. Routes within built-up areas may include light traffic and pedestrian roads as well as exercise tracks. Other routes include bridleways and snowmobile tracks.

Routes can connect various zones and recreational resorts to form a larger area. Rambling and hiking routes can form a long network of routes.

A nature trail is a route particularly intended for nature activities. When considering recreational routes for the motion disabled, nature trails are often the most suitable.

Hiking routes in a recreation area are usually well signposted and intended for longer term recreation. Parts of those routes may be suitable for the handicapped and other ambient disabled.

Rambling routes in the wilderness may or may not be signposted and are intended for more demanding long term hiking. Only minor parts of these routes are suitable for the disabled. The disabled can gain access to the wilderness by using all-terrain vehicles and snowmobiles.

### ACCESS

A light traffic route or a footpath in a built-up area can be designed so that it intersects with a nature trail or passes through a guided starting point to a route. Whenever possible a public transport stop must be situated close to a route. Disabled car parking spaces must be provided by a starting point.

There is often a barrier for vehicular traffic between a road and a nature trail. This is usually a gate that must be easy to open even when sitting in a wheelchair. Alternatively, the gate can also be an open structure that prevents cars from passing through but does not obstruct pedestrians and wheelchairs. The gate should be possible to open from either direction and should close automatically. The free width of a gate opening must be 900 mm.

If a nature route is used at night, it must be well illuminated. Dark surfaces, such as asphalt and wet sand, absorb light and consequently lighting for such surfaces is required at short intervals.

### SIGNPOSTING AND INFORMATION

Brochures describing outdoor recreation areas must give detailed information concerning the suitability of the areas for the disabled and must guide people to nature trails and routes that are easy to use. Information for the visually impaired can be either by taped messages or by phone. Embossed maps can also be used.

Paths and services intended for the disabled must be marked with a disabled symbol. When describing paths, their lengths and levels of difficulty for various disability groups must be clearly noted.

An information board located at the starting point of a route gives information about all the services available along the route. It must give data on accessibility, services, sights, rest and break areas, telephones and instructions as well as on aspects that may limit the travel of the motion disabled. If a path leads past water, approach and access to the water must be guided.

The visually disabled may use a recorded tape as a guide on a nature trail, instead of a map. The tape must describe the progress along a route and the stopping points.

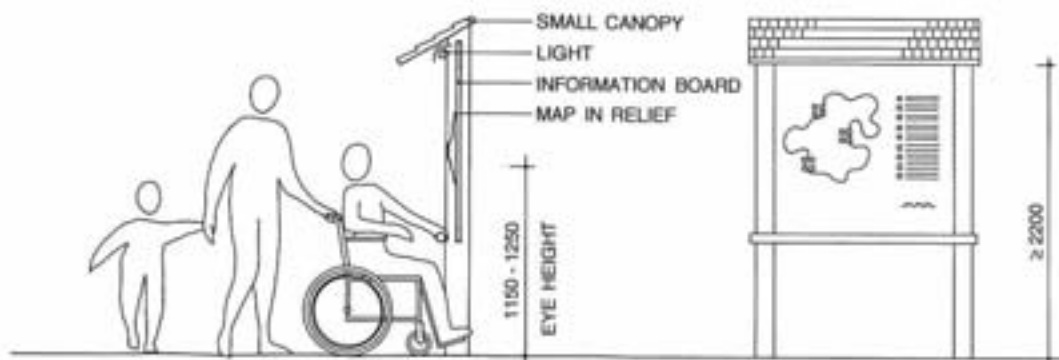
Signs which are based on hearing, such as listening posts, can be used in closely controlled situations. They convey information via loudspeaker or earphones.

Information boards must be located along a route at sufficiently short distances and they must be clear and easy to read.

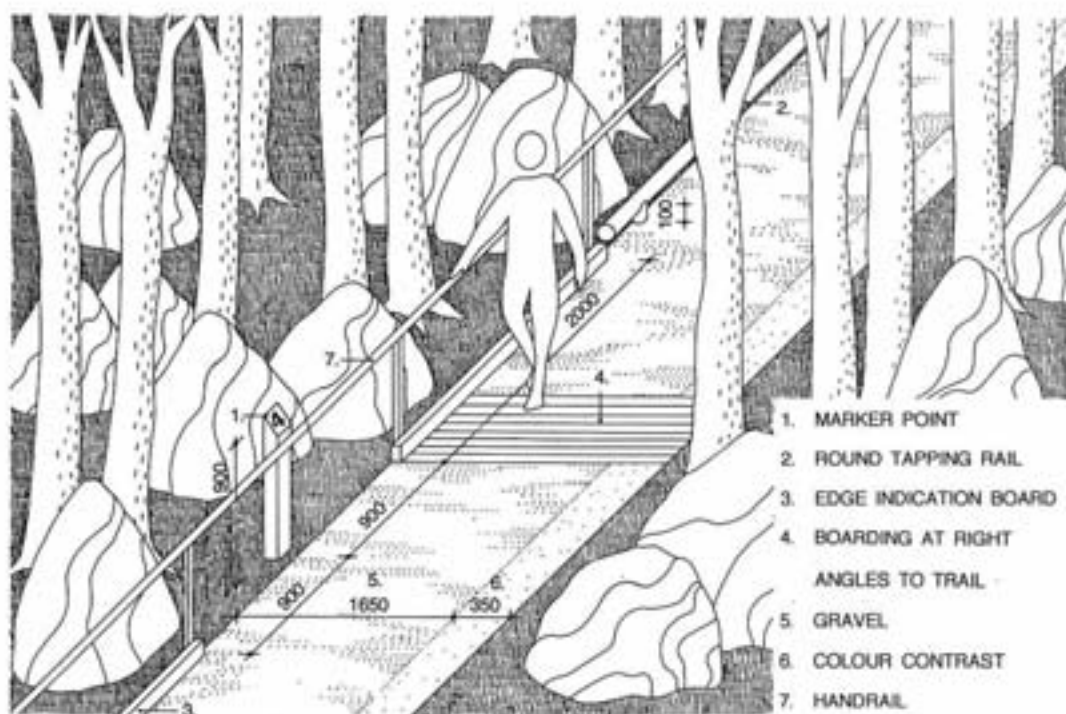
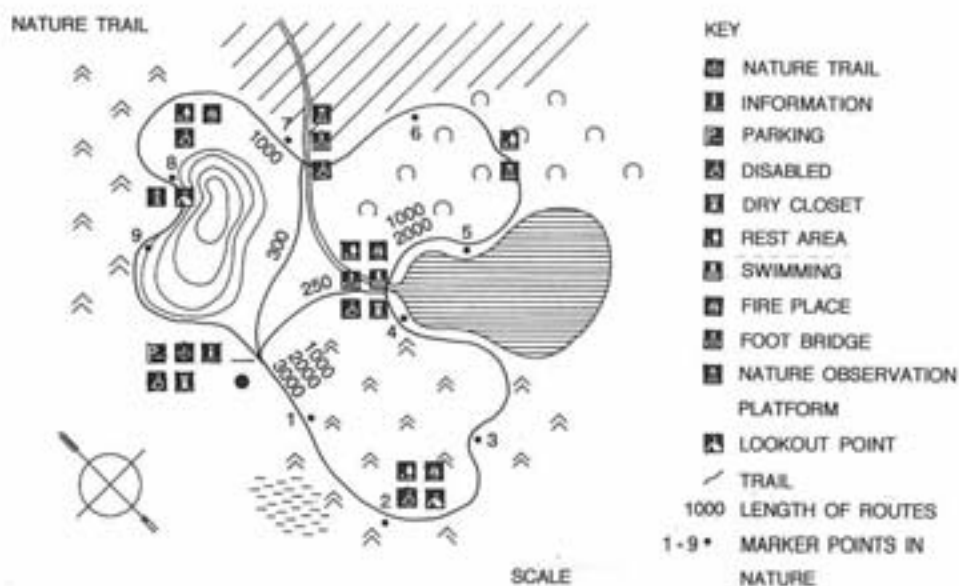
A route must be marked either with ribbons, by painting or with identification marks attached to posts.

### REST AREAS

Rest areas with appropriate seating must be provided along a nature route. They must be located at points which are significant for either their scenery or their observation of nature. Eating and picnic areas as well as toilets for the disabled are also required.



NATURE TRAIL INFORMATION BOARD 1:50



MARKER POINT IN NATURE, EDGE INDICATION CONTRAST 1:50

## 5.2. THE DESIGN OF NATURE TRAILS

Nature trails are manmade routes that allow an individual to observe phenomena in nature. Guided markers along nature trails can highlight valuable or interesting scenery, the history of the landscape and its different areas and vegetation, animals or individual plants.

Outdoor activity areas, such as nature trails and hiking routes, offer challenges to the disabled to independently and actively participate in outdoor recreation and to be motivated by the presence of a certain amount of risk. The natural elements can present a challenge when they are confronted in the wilderness. They must be overcome and a nature trail must be completed. Pursuits in nature are at their most interesting when one's own abilities are balanced with the demands created by the environment.

Nature trails can be attached to recreation or camping areas, information centres, hospitals and institutions or bathing spas.

### ROUTE LAYOUTS

In the layout of a nature route, it is important that the route should pass through varying scenery which is as natural and as untouched as possible. The close proximity of water enhances a recreation route and increases the pleasure gained. Seeing and experiencing different types of plant and animal life make a nature trail interesting.

A nature trail can also be built in a manmade landscape and can pass through historic places and enlighten the history and present day situation of an area. It can also give information on the socio-economic and industrial use of a landscape.

The layout and inclines of a nature route must be carefully designed and gradients of more than 1:20 i.e. 5 % should be avoided (on trails for the disabled 1:12,5 in maximum lengths of 6 m.) Lateral gradients are not allowed, but draining must be taken into consideration.

### TRAIL SURFACES

A carefully constructed and well maintained path is a significant part of a nature route. The surface of a path must be smooth, non-slip and hard.

The path must be built out of levelled and compacted gravel, the surface of which is made of smooth and dense fine gravel.

A boardwalk, made out of planks placed at right angles to the direction of travel, must be built across damp and soft areas. (Wheelchair wheels are not caught in gaps if the planks are set at right angles to the direction of travel.) Because a wooden surface is

always slippery when wet, a boardwalk must be as level and smooth as possible.

A bridge that is constructed according to the principles of a boardwalk can be built across ditches and brooks. It must be equipped with handrails on both sides and, whenever necessary, it should also have railings. In addition, a bridge can incorporate 50 mm high edge indicators that prevent wheels from slipping over the edge of the bridge. The gradient on a bridge must not exceed 1:20 and its minimum width must be 1200 mm.

### TRAIL WIDTHS AND LENGTHS

The width of a trail must be 1800 mm. However, trail widths are often increased to 2000-3000 mm due to the number of trail users. The minimum width of a route even at its narrowest points must be 1200 mm.

The recommended lengths of nature trails for the elderly and for those with diminished strength who may use aid equipment, are between 300 m and 1500 m. Routes that are approximately 3000 m long are suitable for fit wheelchair users and the visually impaired. Even on short routes, it is recommended that shortcuts back to the start should be provided.

### MARKERS IN NATURE

Markers must be used to highlight interesting sights in the landscape and to point out natural phenomena along a nature trail.

The marker symbols can be attached to wooden or metal posts which are then placed in a consistent and informative manner along a route. Marker numbers must provide a colour contrast with their background and must also be embossed. The numbers are referred to either in a separate leaflet, a guide written in Braille or on a recorded information tape. Alternatively, a marker can consist of a board that describes a sight with the use of text and pictures. The text and pictures on such a board must be sufficiently large and easily comprehensible.

### MARKING THE TRAIL FOR THE USE OF THE VISUALLY IMPAIRED

A path that is suitable for the visually impaired must use an edge indicator based on colour contrast. An indicator consists of a 350-500 mm wide zone at the edge of a path and is made out of wood chippings or crushed limestone.

A nature trail, as a whole or in part, can also be equipped with a wooden handrail for the most severely visually disabled. Nylon rope can be used as an alternative.

An edge indicator or a tapping rail that blends into

the landscape, can also be made out of planks or round timbers. Both markings can be used on a route, a plank can be used to denote either a resting area, a marker in nature or a bench. It must start and finish 2000 mm before and after the indicated spot. The areas between the indicated spots can be marked with round timbers. A handrail should always be used with an edge indicator in order to eliminate the risk of stumbling.

The closeness of a marker can be indicated with a change of ground surface material using, for example, planks or timbers laid perpendicularly to the direction of travel. A break in the edge indicator, (e.g. at a distance of 900 mm,) can also act as an efficient warning. A handrail must be continuous.

If a nature trail is surrounded or bordered by a steep precipice, a ramp or water etc., a railing is required on the edge of the path in addition to a handrail.

## NATURE OBSERVATION

In addition to plants, an individual on a nature trail can study birds, butterflies, insects and water animals all in various different types of habitat. Wheelchair access to water is also desirable.

Observation hides and bird watching towers that are approached using ramps, may be erected along a nature trail and can be used for the observation of wild animals and birds. The location of a tower can be determined by the position of bird resting places. Observation hides offer protection from the rain and provide opportunities for long term observation. It must be possible for the disabled to access and use easily both hides and towers. The approach to both must be either level or be possible using a ramp.

## 5.3. THE DESIGN OF OUTDOOR ACTIVITY AND RECREATION ROUTES

The layout of a route is determined by the use, natural conditions and property rights associated with the area through which the route passes. Design of a layout must take into account the progress and safety along a route, the terrain's resistance to erosion, aspects concerning nature preservation and the sights and activities that may take place along a route.

The design of routes intended for disabled use, must take into account the hardness and smoothness of a surface material and must avoid gradients that are too steep. Progress and safety along a route are greatly improved using boardwalks

and bridges (e.g. at swamps and marshes,) and by using railings at steep hillsides and at other places where there may be risk of falling.

Good signposting serves all users of a route. Hazardous areas must be clearly marked with warning symbols. Good visibility and warning signals must be provided at intersections between recreation routes and roadways. Roads having heavy traffic must cross a light traffic route using an under or overpass, thus allowing the light traffic to remain at ground level.

Basic route types include the ribbon route and the circular route. Hiking routes are usually of the ribbon type. The circular route, which provides opportunities to return to the start using shortcuts, is normally best suited for the ambient disabled. Recreation routes that are attached to either rehabilitation centres, elderly homes or similar institutions, should preferably be built as circular routes on level terrain. They may gradually become longer and must be suitable for travelling by foot, wheelchair, kick sledge or a sledge on wheels.

## SPACE REQUIRED BY HIKING AND SKIING ROUTES

The basic form of a route track consists of a trail that is travelled along in single file. It is suitable for hiking and rambling and is only used by a small number of people at any one time. Narrow paths are not usually suitable for people with difficulties in moving, except where the terrain is naturally level and the surface is firm.

The minimum route width for the disabled is 900 mm, but should preferably be 1500-1800 mm. During the winter the width of the route is maintained using snow ploughs.

The suitable width of an outdoor recreation route is 2000-3000 mm which allows for machine maintenance. The required diameter of a turning circle for a normal wheelchair is 1500 mm. An electric wheelchair requires a space of 2500x2500 mm for turning and resting.

The width and the height of a route vary according to the type of terrain. More space is required at intersections and on those routes that are used for maintenance and service.

A snowmobile route requires more space than a footpath.

Busy routes consist of separate lanes travelling in both directions.

Giving way to other route users is more difficult on skis than when travelling on foot, as skiing speed is faster. Therefore more space is required. Skiers also need more space when the snow is very deep.

Ample overtaking space and good visibility that covers an entire slope are required during long descents.

The width of the base required beneath a skiing track is 500-1000 mm, the width of the route is 2000 mm and the height 3000 mm. Tracks that run alongside one another require a width of 2500 mm and a route width of 3500 mm. Skate skiing tracks alongside one another require a width of 6000-8000 mm.

## SURFACES ON OUTDOOR ACTIVITY ROUTES

The base of a route must be kept as natural as possible. On a route, there must not be any obstacles which might hinder travel. The entire length of a route must be maintained constantly in order to prevent parts of it deteriorating and becoming less passable than others.

The route base must be load bearing, smooth, non-slip and durable. Hoggin is a suitable surface material as it blends well into nature. The best surface for a path is created by laying a permeable hard-core base and surfacing it with crushed stone and well compacted hoggin. Muddy areas are avoided by drainage, the spreading of hoggin and, in damp

areas, by laying planks set at right angles to the direction of movement.

A route that is also designed for use by the disabled may not have gradients exceeding 1:20 i.e. 5 % and the path must not have lateral gradients. (Short ascents, a maximum of 6 m long, may have gradients of 1:12,5 i.e. 8 %.)

## STRUCTURES ON AN OUTDOOR ACTIVITY ROUTE

Bridges must be built over brooks or ditches. The widths and load bearing capacities of bridges must take into account their possible use by maintenance traffic.

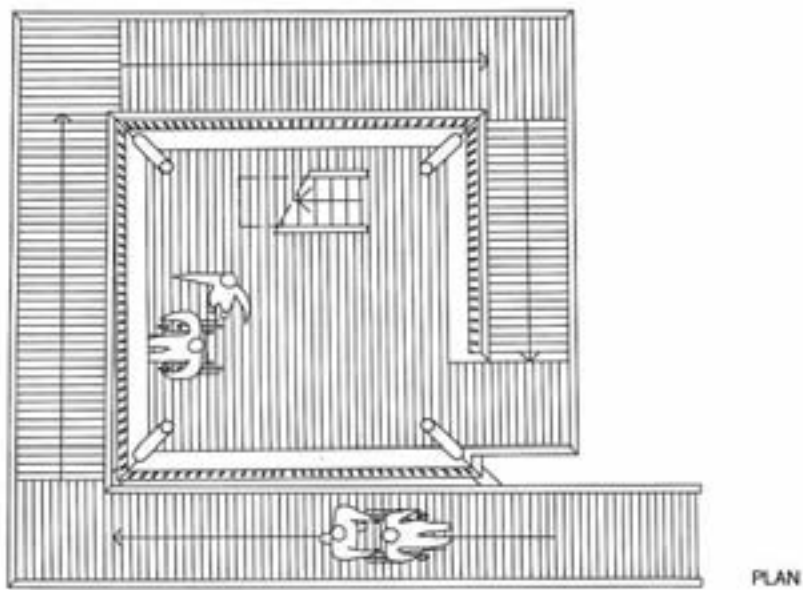
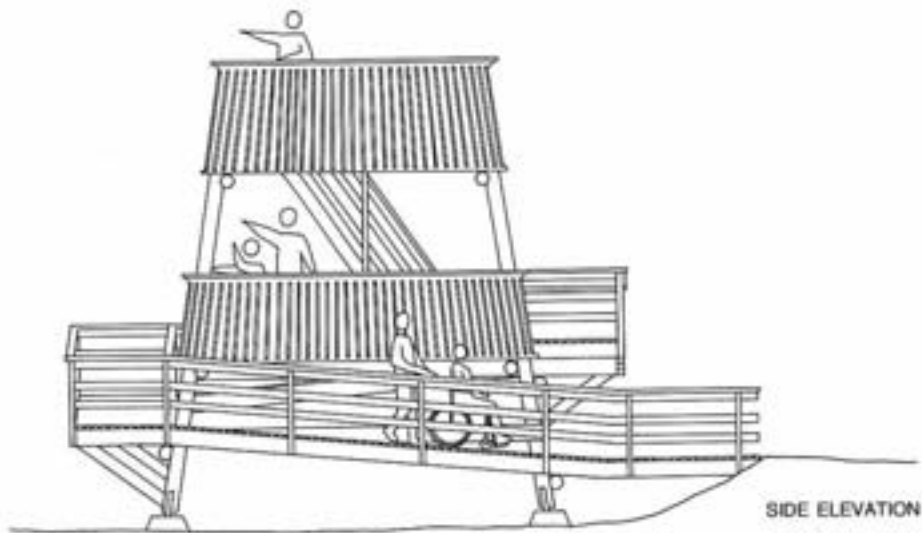
A boardwalk constructed out of planks set at right angles to the direction of travel must be constructed whenever a marsh or a swamp has to be crossed or when the terrain is such that it cannot sustain hard wear.

Steep ascents require gentle steps and ramps. Ramps must be straight.

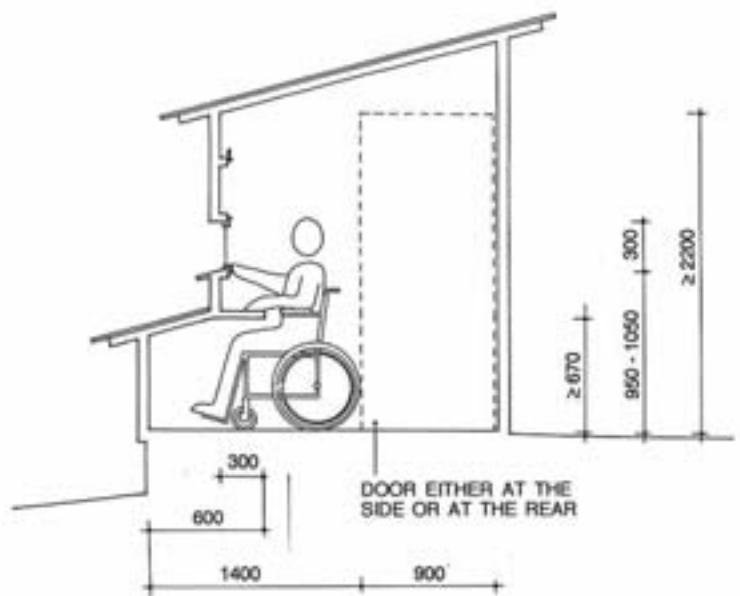
Handrails and railings are required on bridges, ramps and at the edges of precipices.

Under and overpasses at busy road and route intersections provide added safety.





DISABLED BIRD WATCHING TOWER 1:100



DISABLED OBSERVATION HIDE 1:50



## 6. BIRD WATCHING TOWERS AND OBSERVATION HIDES

Many disabled people participate in bird watching which can be a rewarding form of outdoor recreation, particularly during spring and autumn migration. One way of observing birds is sitting in a car and watching with binoculars. Small resting points for the disabled can be provided near the areas that birds favour, such as sea bays, lakes and swamps.

However, nothing replaces access to the outdoors. Observation hides and bird watching towers allow the habitat of birds and other animals to be followed.

Information on bird watching towers and observation hides must be readily available and extensive and observation areas must be well documented (e.g. via maps and brochures) so that they are found easily. A nature trail guide can be prepared which describes a bird lake, its surrounding environment and its associated observation points.

Good car parking facilities at a moderate distance from the bird watching towers and observation hides, are necessary for the motion disabled.

### 6.1. THE BIRD WATCHING TOWER

When watching bird habitat, an observer obtains a much higher viewing point from a bird tower than he or she would get from ground level.

In order for the disabled to be able to use to a tower, access from a car parking area must be well signposted, suitably short and passable by wheelchair. The ascent of a tower takes place by using a gently rising ramp (gradient 1:12,5) which has to meet the requirements of the disabled mentioned earlier in this book. The ramp must be separate from the tower structure, in order to prevent vibration caused by descending and ascending people, which might disturb binocular observation.

The observation platform must have room for a number of wheelchairs. Above a platform suitable for the disabled, there may be a higher top platform accessible by a ladder. A good bird watching tower also offers shelter from rain and wind.

The materials and colours used on a bird watching tower must blend with the surrounding nature.

### 6.2. THE OBSERVATION HIDE

A bird and nature observation hide and which is suitable for the disabled, can be built at ground level, for example on a hillside from where there are good views over a bird resting area.

An observation hide must be approached on a gently sloping and even surfaced path, either from the back or from the side. The entry takes place either on the same level or via a gentle ramp. The door of a hide must be suitable for wheelchair users. Depending on the width of the hide there must be one or more viewing slots in the front wall of the hide. The glazing of the slots can take the form of opening flaps which must not be too large or heavy. The recommended opening size for weak arms is 300 x 850 mm and the appropriate height of an opening from floor is 950-1050 mm. Underneath the opening a 300 mm wide sill is required, beneath which kneeroom space, 600 mm deep and minimum 670 mm high, must be provided. The best solution projects the kneeroom outwards from the opening wall in order to provide closeness to the opening window.

The length of a small hide must be approximately 2300 mm. The minimum required width is 2000 mm. The height must be approximately 2200 mm, i.e. sufficient for standing.

If possible, openings directed towards glaring sun should be avoided, as a hide which is in shade and amongst vegetation is more difficult to detect.

The construction materials and colours of a hide must blend with the surrounding landscape.

## 7. CAMPSITES AND CAMPING CENTRES

Camp life and tenting are suitable ways for the disabled to become more familiar with nature. Despite an individual's disabilities, camping can provide an opportunity to confront the challenges of nature.

Campsites are areas reserved for overnight or long term stays where people can either pitch tents or park caravans. Besides hiking, they also serve car and bicycle travel. The majority of campsites have cabins for hire. Campsites are classified into different categories according to the services and hygiene facilities they offer. The star rated classification must be clearly visible within the area, on signs as well as in campsite brochures.

A camping centre is a campsite intended for youth activities and offers guided activities mostly during the summer months. School activities and a few day courses also take place at camping centres. A campsite provides good opportunities to live and study in a natural landscape, but may sometimes be designed for a particular group, such as the disabled.

### 7.1. THE DESIGN OF CAMPSITES AND CAMPING CENTRES

#### SIGNPOSTING AND INFORMATION

Brochures and information concerning camping and campsites must give detailed accounts of the campsites and adjoining services which may be suitable for disabled use. An information board with maps and signs to guide people to various service facilities must be erected at a campsite.

#### TERRAIN, ROUTES, SURFACES, VEGETATION AND LIGHTING

If the requirements of the ambient disabled are taken into account during the design of a campsite, the contours of the terrain must also be designed accordingly.

Traffic access to a campsite must be good. Car parking spaces for the disabled must be reserved close to the camp entrance. A camp must also provide car parking for visitors. The surface materials of roads and paths, as well as their connection to the surrounding terrain, must all be suitable for the ambient disabled.

Whenever possible the requirements of the disabled must be taken into consideration during the

design of foot paths. At least main pedestrian routes should be passable by wheelchair. These routes must not have steps, high thresholds etc.. Surfaces on paths and grassy areas must be level and firm. Routes and spaces that serve campers must be well illuminated when it is dark.

Trees and bushes on a campsite give needed relief and shelter from wind and sultry heat. Ground vegetation must be durable and self-propagating. Plants that may cause allergies must be avoided.

#### ACCOMMODATION; TENT PITCHES, CABINS AND LARGER INDOOR ACCOMMODATION FACILITIES

Campsite cabins can be small 4-6 person accommodation spaces that can be used either throughout the year or only during summer months. The zone in front of a cabin, the porch if present, and the entrance itself must be easily passable. Cabins must also have enough space for disabled accommodation and have clothes hooks and storage facilities at a height that is suitable for use by the disabled.

A camp building on a campsite that is intended for use throughout the year, usually also offers education and conference spaces besides accommodation, food preparation and dining facilities. Large accommodation should be divided into smaller units. At least some of these areas must have enough space for a wheelchair to turn full circle and must provide equipment that is suitable for the disabled.

#### SERVICE SPACES AND AREAS; RECEPTION AND INFORMATION POINTS, KIOSKS, SHOPS, CAFÉS AND RESTAURANTS, HYGIENE FACILITIES, FOOD PREPARATION AND EATING PLACES

An office space that is also suitable for use by the disabled, is required adjacent to the entrance of a campsite. A site must have at least one public telephone and it can be located near this office.

Camp instructors require office space where items, such as first aid equipment, may be kept. An information point equipped with a site map and an information board must be located close to the office.

The dimensions of sales counters, entrances and shops must be suitable for the disabled.

Cafés and restaurants help to raise the quality of a campsite. The disabled must be able to move around in all interior spaces and on any outdoor terraces provided.

Well organised, simple and easily maintained hygiene spaces are essential when camping in nature. Changing and wash spaces, saunas, toilets and laundry rooms must be suitable for the disabled. Dry closets are recommended for small campsites.

Canopies located at sheltering points can function as food preparation and eating places.

Some cooking and dining facilities can be located indoors. They should function as spacious kitchen-dining combinations. Dining areas must be equipped spaciouly with solid furniture.

Cooking spaces and barbecue areas must provide adequate kneeroom for wheelchair users at both food preparation points and at the dining table. A fireplace must be built at table level, to take into account its possible use by the disabled.

Food preparation spaces at large campsites are rather institutionalised and often a separate canteen with ancillary spaces is required. The entrance, service counters and furniture at these facilities must be suitable for the disabled. A canteen can also be used as a study space.

Refuse containers must be situated where required. Refuse collection and disposal, including refuse and water services for caravans, must be catered for.

## ACTIVITY AREAS; PLAYGROUNDS AND PITCHES, MEETING PLACES, SWIMMING FACILITIES AND JETTIES, COVERED ACTIVITY SPACES

Children's play areas that are equipped with swings, climbing frames, sandpits and other play equipment, must be located in an easily controllable area that is protected from vehicle traffic.

A pitch must be provided for volleyball, football and athletics and around its edges there may also be places for running, throwing and jumping. A track of a suitable length can be cleared in the landscape for exercise activities.

An outdoor lecture area for various educational activities can be located in a peaceful spot within a camp.

An evening fire place with related performance areas that can also be used for teaching, must be

sheltered from the wind and be directed towards the evening sun. A camp fire must be located at an adequate distance from trees and bushes.

Seating for the disabled must be provided by a camp fire.

Large campsites may have separate areas for festivals which may be equipped with a bandstand and a spectator stand. Sloping terrain is best suited for this. Some of the spectator places must be suitable for the disabled and a spectator stand must provide enough space for people moving in wheelchairs.

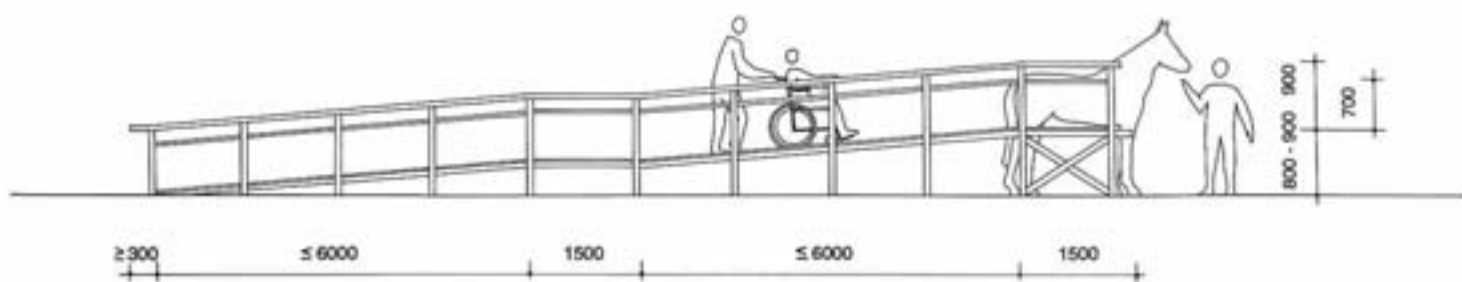
A bathing beach or area must be suitable for swimmers of varying skills, but must also be safe for those who cannot swim at all. A special area can be provided for swimming instruction. A diving point can be built adjacent to a jetty that is suitable for the disabled. Swimming lanes with appropriate walls for turning can be built next to a jetty.

A bathing beach must also provide opportunities for changing. When necessary, changing cubicles or a changing canopy can be built. (see 1.4. Hygiene and Changing)

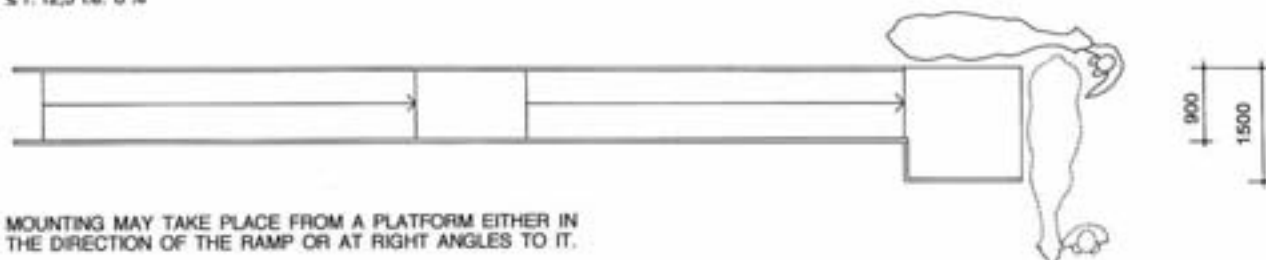
Stores for boating equipment and special jetties that are suitable for the disabled can be built for rowing, sailing and canoeing. In addition, space must be provided ashore for boat storage. Campsites often offer opportunities for boat hire. Wheelchair access must be provided to a boating beach. (see 17. Jetties and 20. Boating)

On rainy days activities in camps can take place under canopies, indoors or in large tents. Space must be provided for the storage of equipment used in various activities.

Indoor meeting and television rooms provide extra enjoyment for those camping in bad weather.

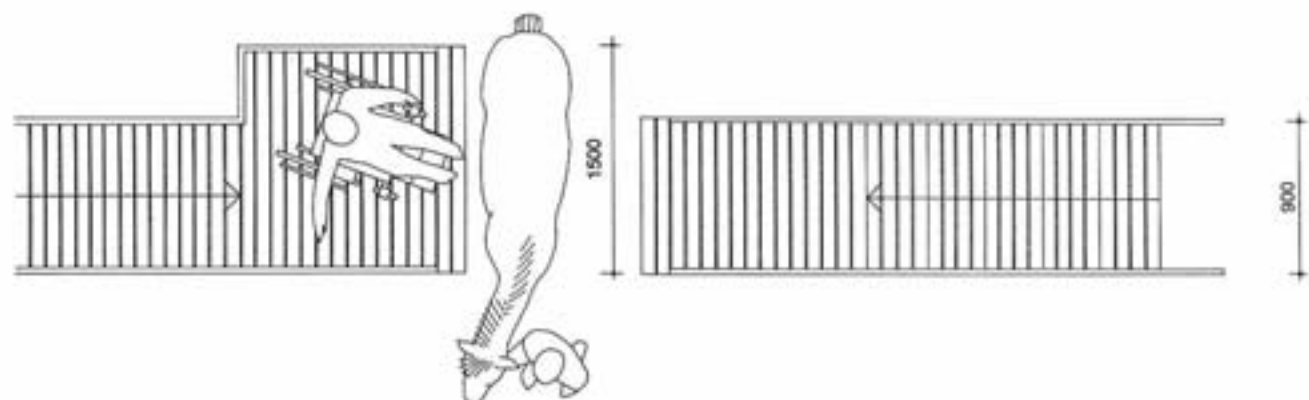
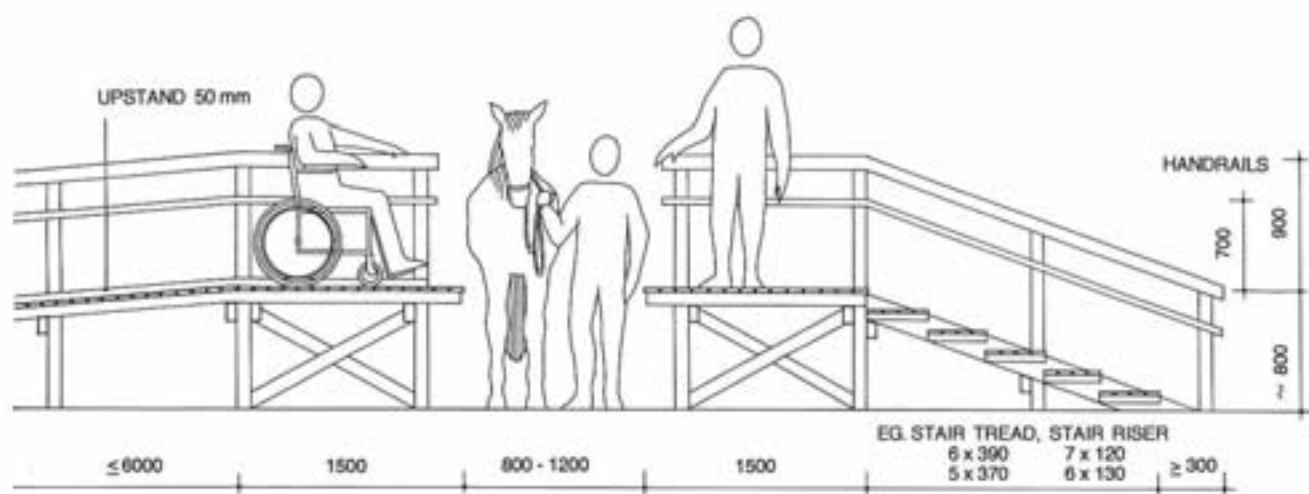


$\leq 1:12,5$  i.e. 8%



MOUNTING MAY TAKE PLACE FROM A PLATFORM EITHER IN THE DIRECTION OF THE RAMP OR AT RIGHT ANGLES TO IT.

MOUNTING RAMP 1:100



RAMP AND STEPS 1:50

## IV PHYSICAL EXERCISE, OUTDOOR ACTIVITIES AND THEIR LOCATIONS

### 8. HORSEBACK RIDING AREAS AND MANÈGES

Horseback riding areas provide an opportunity to ride outside either in an arena or on a cross-country bridgeway or on a route, or to ride inside in a manège i.e. riding hall. In addition to access to a riding area, an obstacle free route must be provided which allows the disabled to reach stables and spectator areas.

The aim of disabled equestrian sports is to learn horsemanship and riding skills. The varying physical conditions of various disability groups do not demand different structural and construction solutions; they only require a sufficiently large free area and a functional structure for mounting. The most important structural adaptations are a ramp to facilitate mounting outdoors and a mounting point by the side of a manège.

Well functioning service and maintenance spaces are necessary in disabled horseback riding.

#### 8.1. THE ENVIRONMENT

Roads leading to a riding centre must be well signposted.

A peaceful waiting area that is accessible by car must be located in the area immediately surrounding of a riding centre. This area is used as a pick-up point, as a preparation area and as a place to become familiar with the structures, routes, resting points and associated services within a resort. These activities are preferably carried out with the help of a well lit information board. The area must be equipped with seats and must have planting or fencing to provide shelter.

As the control of a horse is harder for a disabled person than for others, the surroundings and routes associated with a centre must be spacious and well illuminated. They must also be peaceful and safe in terms of traffic.

Riding centres offer interesting leisure activities for the disabled without the need for active participation in riding itself. Therefore routes and entrances to spectator areas, paddocks and stables must be accessible by wheelchair. The floor in a stable must be smooth and passages must be roomy. In addition, access or a peephole into the stall of a docile horse can be provided for wheelchair users.

Spectator stands at riding tracks must provide places for wheelchairs. Particular attention must be paid to illumination and acoustics in indoor riding arenas.

The requirements of the disabled must be taken into account in the design of spectator stands and their ancillary spaces.

A riding track can also have a 'drive-in' disabled stand where the disabled can follow races while sitting in a car. Ground level at such a stand must be higher in order that an individual sitting in a car can see over the spectators standing at the side of the track.

Ticket offices, refreshment stands and automatic vending machines must be well illuminated and accessible by wheelchair.

A cross-country riding route must provide enough space for a horse and a rider as well as for an assistant leading the horse. The minimum free width of the route must be 2000 mm. The minimum height free of branches and other obstacles must be 3500 mm from the ground.

A cross-country riding route must be well signposted. Observation points plus task and nature markers to develop riding skills, can be added to routes if desired. The dismounting points at such places must have purpose built ramps for the disabled.

#### 8.2. STRUCTURES WHICH FACILITATE MOUNTING

Various equipment can be used for disabled riding. The aim is to create an independent collaboration between the rider and the horse.

##### THE RAMP

Wheelchair users can mount a horse from a small platform which has ramp access.

The ramp must be firm and solid and its maximum gradient must be 1:12,5 i.e. 8 %. Its length must not exceed 6000 mm without a landing and it must be equipped with 900 mm high railings and handrails. Using the contours of the terrain the length of the ramp can be shortened. If the ramp is 900 mm wide and has handrails with a suitable grip, a person in a

## 9. GOLF COURSES

wheelchair can pull him or herself up. The top platform must be large enough for a wheelchair and an assistant. The surface material of an exterior ramp must not become slippery in wet conditions.

In order to facilitate mounting, the ramp can be supplemented with a firm platform that is equipped with stairs. The width of the stairs must be 900-1000 mm, the riser 120-130 mm and the tread approximately 400 mm.

A horse is lead between two platforms which are located opposite each other. The height of the platform depends on the sizes of both the rider and the horse. (When riding a pony, the height is different from when riding a large horse.) When a platform is fractionally too low it is possible to mount a horse either independently or with the help of an assistant, but it is difficult to use a platform that is too high.

### THE HOIST

A disabled person can be lifted onto a horse with a transportable or fixed hoist. A horse must be trained if it is to be used with the device, otherwise it can become nervous.

### THE MOUNTING PLACE BY THE SIDE OF THE MANÈGE

A small gate to facilitate mounting can be built by the side of a riding arena in a manège. The gate opens downwards. Supports are fixed to its bottom and railings to its side. Behind the rails of the arena there is a platform or a spectator stand which has suitable ramp access for a wheelchair.

As an inspiring, challenging and rehabilitative game, golf is suitable for all ages and for various disability groups, i.e. the visually impaired, the ambulant disabled, the paralysed and wheelchair users, including, in principle, all those who can move on the course and hit the ball with a club.

Disabled golf is most widely practiced in the USA, where there are a number of 3-hole practice courses associated with some rehabilitation institutions.

### 9.1. THE COURSE

Golf is played outside on a 9 or 18-hole landscaped grass course. Golf courses are extensive and during the game one may easily travel 7-8 km. The game also takes a lot of time (3-4 hours).

With the exception of water hazards and sand traps, the course contours are relatively shallow and gentle and the surfaces are covered with dense grass.

Parts of the course that are either 3, 6 or 9 holes long and that have gentle contours are suitable for the disabled. These courses should also be noted in separate route maps.

Roads to courses must be clearly signposted. Upon entry to a course, an information board that describes the area and provides a map, must be readily accessible in order to provide orientation in the area.

Arrival at a golf course usually takes place by private car. Disabled car parking spaces should be provided close to any part of a course that is suitable for the disabled.

Special routes on the course can be built for golf buggies which can be equipped with folding seats and can be useful for carrying clubs.

A wheelchair can be developed for playing golf. It should have wide wheels and allow entry onto a putting green and also provide a good putting posture.

A club house that contains a café and/or a restaurant, besides players' changing and washing facilities, is often built adjacent to a golf course. These spaces should also be easily accessible by wheelchair.

Brochures on golf courses should give information on the suitability of courses for the disabled and the level of facilities that the courses provide.

## 10. ARCHERY AND SHOOTING RANGES

The disabled can practice archery both outdoors and indoors and can compete with those without disabilities in joint clubs and competitions. Most often the disabled practice archery with a normal bow (i.e. an Olympic division bow) or with a compound bow. A compound bow is easier to draw and is hence more suitable for the severely disabled.

Activities at shooting ranges consist of shooting at still or moving targets with air or gun powder weapons, either pistols or rifles. Competition is part of the activity.

### 10.1. THE ARCHERY RANGE

An archery range is a sporting complex that serves both ordinary and competition archery. It may consist of outdoor ranges with spectator stands, canopies and parking areas as well as indoor archery ranges housed in a separate building.

Clearly signposted access must be provided to an archery range. Disabled car parking spaces must be situated within the immediate vicinity of the range.

Competition and practice tracks consist of 5 m wide and 90 m long greens where the direction of aim is to the north. A 5 m track caters for two archers at any one time. Round targets and a background are located at the end of the track.

The green must be dense and hard for disabled use.

Canopies for archers, preferably as wide as the range, may be located behind the shooting line.

Besides being used as equipment maintenance areas and cover from rain, the canopies provide shelter for those waiting their turn to draw.

A spectator stand must be connected to a competition track and it can be located behind the shooting line. The disabled must also have access to the stand.

An equipment store is used for the storage of targets, arrows etc..

Well equipped ranges can provide equipment maintenance areas, cafés and other club and assembly facilities.

Toilets, changing and wash spaces can be connected to indoor archery ranges or located in a separate building. However, the distance from a car parking area and the range to these spaces must not be too long.

Obstacle free access for the disabled must be provided to the range as well as to the buildings and other associated spaces.

### 10.2. THE SHOOTING RANGE

Outdoor shooting ranges are suitable for the disabled when the following are provided: easy access by car, car parking spaces in the near vicinity of the shooting range, spacious, gently inclined and densely surfaced routes, maintenance and service spaces together with their entrances designed for disabled use, and clear signposting in the area.

The disabled must also have the opportunity to follow shooting as spectators.



## 11. BICYCLING

Bicycling is a good outdoor activity and exercise sport for many disabled. When necessary an ordinary bicycle can be replaced by adapted tricycles or hand manoeuvred bicycles which have been specially developed for the disabled.

The visually disabled can cycle on an ordinary bicycle or on a tandem bicycle together with an assistant.

Bicycle riding gives opportunities for the young disabled to enjoy their surroundings and the company of other young people.

A helmet is an essential part of equipment for all cyclists.

### 11.1. BICYCLE TRACKS

Good, smooth surfaced and well lit bicycle tracks with shallow contours facilitate bicycling. They are safe and consequently suitable for wheelchair racing.

### 11.2. BICYCLES ADAPTED FOR THE DISABLED

There are numerous adapted bicycles available for the disabled. The cyclist either sits on a separate seat or in his or her own wheelchair that has already been attached to the bicycle.

A tricycle is suitable for people whose balance is not adequate when sitting in an upright position on a bicycle. Tricycles have been developed for both adults and children. The tricycle can be operated either by foot or by hand, and can function using lightweight gears.

For example, the CP.-disabled practice cycling using tricycles. Children who do not learn to run or swim can still learn to ride a bicycle or a tricycle.

Tandem bicycles are suitable for the CP.-disabled, limb-amputees and the visually impaired. The principle of cycling for the visually impaired is that it is assisted by a person who can see. As a result the visually impaired and the blind can also move in difficult terrain.

There is an adaptation of the tandem bicycle where the person at the back uses a hand wheel and the one in the front uses pedals while sitting in a chair.

Cycl-One is a manually operated wheel with gears that has been attached to the front of a wheelchair. Cycl-One provides variation to wheelchair race practice.

The Row Cycle is a rowing wheel that operates on

the principle of a railway inspection trolley. It is suitable for the outdoor exercise of people with lower extremity disabilities.

### 11.3. CROSS-COUNTRY BICYCLING

Cross-country bicycling is a new form of outdoor activity for the disabled. The ambulant disabled require the adaptation of steering and pedals according to their disabilities.

Special Mountain Racing wheelchairs have been developed for wheelchair users. They are equipped with wide cross-country tyres, larger front wheels, drum brakes and steering sticks as well as two racing rims.



CYCL - ONE



## 12. BALL GAMES

Ball games are refreshing and bring variation to disabled exercise. The games often develop into a form of activity that maintains physical fitness and stamina. Most ball games require adaptation or special rules designed to suit the disabled. Some of the adapted ball games have developed into official competition games in their own right, even at Olympic level.

The game must be such that it can be played with a minimum amount of skill. It must be suitable for a relatively unfit player and each member of a team must play an active role in the game. The rules should remain as close to normal as possible in order to maintain the character of the game. It is also the intention in severely handicapped games that the disabled person should be the one who participates, not his or her assistant.

Games pitches for the ambient disabled must be easily accessible by public transport and private car. Disabled car parking spaces must be provided close to a pitch, and a route with a level hard surface must extend from the car parking to the pitch.

The necessary changing and wash rooms, toilets, stores and possible cafés and spectator stands must be designed with regard to the needs of the disabled.

### 12.1. BOCCIA AND PETANQUE

Boccia which is played outside in parks and on sports fields is popular amongst the disabled. Boccia requires accuracy and concentration, but the game is easy for beginners to learn.

Petanque and boules are related to boccia.

Boccia is played on a level 6 m x 15 m grass or fine gravel surface. The pitch has a 1,25 m x 6 m throwing area, which is divided into 1 m x 1,25 m throwing squares.

Two teams of one, three or six people take turns in throwing balls.

### 12.2. WHEELCHAIR TENNIS

Wheelchair tennis is suitable for the disabled whose upper body is strong. The wheelchair is considered to be part of the player.

The rules of the game and the court are the same as is ordinary tennis with the exception that the ball may bounce twice. Some top players hit the ball quite normally after one bounce.

Suitable exterior surface materials for the court include all weather surfaces and asphalt.

### 12.3. BADMINTON

Badminton is suitable for the mildly CP.-disabled, arm disabled, wheelchair users and people with disabilities in their lower extremities. Badminton can also be played as a team game.

In the severely handicapped game the net is raised to two meters, the intention being to shorten the length of trajectory of the shuttle cock. At the same time the length and the width of the court are reduced.

### 12.4. FOOTBALL

Football is played by the cerebral palsied and lower-extremity amputees. Crutches can be used to provide support, but otherwise the rules are the same as normal.

No special equipment or adaptations are required in football.

## 13. ATHLETICS AND WHEELCHAIR TRACK AND ROAD RACING

Athletics are suitable for the disabled with particular adaptations to each sport and its rules, according to individual disabilities. In athletics the disabled are classified by different competition categories, in order to guarantee fair competition. For many, competition is the motivation for physical activity.

### 13.1. THE SPORTS FIELD

In the summer athletics take place outdoors on sports fields and in the winter inside sports halls. The sports fields do not require structural adaptation, but routes and maintenance spaces must be easily accessible for the disabled.

Traffic accesses must function properly. Bus stops and car parking spaces must be situated close to a sports field.

Routes to the sports field, ticket offices, cafés and maintenance facilities must be well signposted, safe and provide obstacle free wheelchair access.

Wheelchair places must be provided in the spectator stands and they must be raised from field level and usable with an assistant. Spectator stands should be covered and preferably heated.

Changing and wash rooms as well as toilets and equipment stores must be spacious.

Automatic machines, such as telephones, must be located at a suitable height for wheelchair users.

### 13.2. SPORTS ACTIVITIES

The visually impaired can take part in running events that are carried out on a smooth surface with the help of a guide runner or sound signals. They can also participate in throwing sports, long jumping and triple jumping. The blind can also run with a guide or on a track which has a guide wire at its side.

The mentally disabled compete in runs of varying distances, in shot putting, in high and long jumping as well as in the javelin.

The athletic sports, their rules, events and categories for the hearing impaired are the same as those for people without disabilities.

The deaf often take part in ordinary athletic events.

Besides being able to participate in throwing and jumping sports, amputees can compete in smooth track races by either sitting or standing. Wheelchair users compete in track racing. The contestants may use prostheses. In throwing sports, specially individually manufactured casting chairs can be used.

Wheelchair track and road racing for ambient disabled wheelchair users, take place either on sports fields, running tracks or on streets. Specially built racing chairs are used in wheelchair track racing. Besides two rear wheels, a racing chair can also have either one or two front wheels.



## 14. SKIING

Traditionally in the Nordic countries, cross-country skiing has always been a very popular form of winter sport. Skiing, as a form of physical activity, is suitable for many disability groups. As such, it is often suitable without adaptation for the elderly, mentally disabled and hearing impaired, who in other forms of physical activities require adaptation or special equipment.

The deaf, the blind and the visually impaired and limb-amputees can all develop into skilful skiers. Instructors must know the limitations of the disabled.

### 14.1. THE ENVIRONMENT

Signposting to skiing areas and centres must be very thorough. The traffic access must function properly for both public transport and private vehicles. Car parking spaces for the disabled must be reserved close to the starting points of tracks and close to any café or maintenance building. A spacious building functions as a warming up and resting place for disabled skiers.

Tracks that are suitable for the disabled should be deeply grooved, and preferably illuminated and clearly signposted, and should pass through terrain which has gentle contours.

Tracks and mounds that are suitable for skiing practice can be made on level ground or on a gentle slope, (e.g. next to a school).

### 14.2. SKIING

A visually impaired skier needs a seeing partner or a guide skier to accompany him or her. Deeply grooved, machine made hard tracks support skis from the sides. Gentle hills and curves are suitable and safe for a visually disabled person on a skiing trip.

Both, strongly built people with lower extremity amputations and those with upper extremity amputations can ski.

The lower extremity amputees practiced skiing in the skating style long before the style became familiar to able-bodied skiers.

People with cerebral palsy can ski without using any adaptations or they can adapt special techniques or use aid equipment. As the CP.-disabled often have difficulties in perception, ski tracks must be good and have no interruptions. The sides of tracks must be hard so that sticks can provide the necessary

support. Signposting along tracks must be clear and the symbols and colours used must remain consistent throughout the entire ski route.

Walkers with skis assist skiers who have difficulties with balance.

### 14.3. SLEDGE SKIING

Sledge skiing or 'sit-n-skiing' is suitable for skiers who cannot ski in the upright position. The sport requires a strong body frame and healthy arms and hands. It develops the muscular balance of the upper body.

Sledges weigh 4-5 kg and are either reinforced plastic pulk type sledges or tube framed ski sledges that are equipped with seats. A cushion must be provided in the seating section of the sledge. The height of the back support depends on the individual using the sledge. Material fixed onto a pulk offers protection from the snow and the cold.

Usually the skis are attached to the sledge using quick locking bindings. The sledge should have safety straps, especially if a person wishes to turn the sledge around by using the sticks to lift the sledge up while remaining seated. The sticks consist of normal skiing sticks that have been modified and shortened to the required length.

In the summer one can use either roller skis under the skiing sledge, rollers attached to the sledge, or sledges that move on wheels.



## 15. DOWNHILL SKIING CENTRES

Downhill skiing has a particularly rehabilitating effect on a disabled person, as an individual can control his or her body better with skis than without. The differences in abilities between various disability groups on ski slopes vary greatly.

Winter Paralympics for the disabled have been held since 1976. In competition the disabled are classified into different categories according to their handicaps.

### 15.1. THE ENVIRONMENT

Arrival at a downhill skiing centre or an alpine piste must be clearly signposted. Access must function smoothly both by public transport and by private car. A separate disabled car parking area, a heated service building and a level assembly area must be reserved close to any lift station and downhill ski slope which is suitable for the disabled.

Besides ski slopes and accommodation, downhill skiing centres often offer other services and activities. All these facilities must also be accessible for the disabled.

### 15.2. DOWNHILL SKI SLOPES

Some disabled people can ski on normal slopes. It is advantageous to build a separate specially equipped slope area for the elementary training of different disability groups. Factors that distract concentration and disturb learning are reduced when a ski slope is enclosed. The level of assimilation is also lowered and the transfer from one learning phase to another is accelerated. A slope complex consists of three areas:

An elementary learning area has very gentle curves. It is 100-200 m long, approximately 40 m wide and it is preferably entirely separated from a main slope area. However, an elementary learning slope can also be located at the bottom end of a main slope. The slope ends with a 2-3 m high counter bank. Preferably this part of the slope should have its own minilift.

An intermediate slope area uses the lower part of a main slope which can be reached by lift at an exit station built halfway up the slope. The intermediate slope area serves as a practice zone for turning techniques which have been previously learnt during elementary training.

A full slope area is a downhill area that extends the full length of a main slope and can be reached by lift at the top exit station. Combinations and variations of different techniques are possible on a full slope area.

### SPECIAL REQUIREMENTS

When adapting skiing centres for the disabled, either new slopes can be built or an old slope can be reorganised so that it is gentle and its technical installations suit the disabled.

The conspicuousness of structures on a slope area must be emphasised due to the slow perception, impaired vision, or restricted mobility of limbs of different disability groups. In addition, for reasons of security, the lift columns, the boundaries of the exit points and the edge zone of the slope area must be emphasised. To further emphasise structures, signals that are clearly distinguishable from their surroundings, such as different colours, shapes and contrasts etc. can be used. These signals may consist of surface structures, background patterns or light and sound signals.

#### LIGHT AND SOUND SIGNALS

Sensory impact on adapted slopes can be increased by the use of sound and light beacons. Electric flashlights on poles or tubes can be used.

Signals which warn of a lift line are red and green. They either warn off the skier or redirect him or her in another direction. Light signals on edge zones are blue and orange - each edge has its own colour.

Instead of flashlight beacons, more efficient direction lights for the severely visually impaired can be created on the edge zone by directing halogen lights towards a traversing line.

Loud speakers attached to light beacons are warning signs that are easily distinguished, even by the severely visually disabled. They function as a sound gate announcing the beginning and end of a slope area. In addition, sound associated with light, acts as a meter by which edge distances can be judged. The sound may be an interrupted signal, recurring on one side of a slope and continuous on the other. Extra, less efficient, buzzers can be attached to lift columns.

Lift columns must also be covered with padding for up to approximately 2 metres above the surface of the snow.

#### LIFTS

A clearly distinguishable mound must be built at the top exit place of the lift, in order to mark a safe exit point. In addition, a photocell can be installed on two columns erected either side of the exit point. When the lift has passed the photocell, the skier hears a sound signal that acts as a call to exit.

For the visually disabled, the most suitable lifts are

two person lifts in which a disabled person can travel with an assistant.

An adapted chair lift is suitable for special disability groups; below-knee amputees can use the lift independently, the chair lift is safe for thigh amputees, but sitting down and getting up from the lift are difficult for the upper-extremity ambulant. A chair lift is also the easiest option for sledgers. The latest monoski sledge models can be taken onto a lift without assistance.

Leg-amputees can use an anchor lift fairly well, but the upper-extremity disabled and thigh-amputees need an assistant. The latest anchor lift models are also suitable for downhill sledges.

Children who are afraid of using the lift, find it easier to use the plate type of lift which takes off slowly with a pull, unlike an anchor lift. Upper-extremity and thigh-amputees can use the lift together with an assistant.

#### SERVICE BUILDINGS

A warm area for rest, first aid, equipment maintenance and recreation must be provided in the immediate vicinity of an adapted slope area, and should be at the level of a lift gate. An individual leaving the service area can easily glide to the lift station after receiving one light push. The ramp functions as a slowing device for a person arriving from the direction of the slope.

An area for the storage and maintenance of equipment must be directly in front of the building, at the same level, and preferably heated, e.g. a space that is like a garage and where fitting of equipment (e.g. skis) or sitting in equipment (e.g. sledges) can take place in peace and without haste. Exit from the maintenance area, (e.g. via an 'up and over door') must occur from the front of the building and must provide a slide towards a lift station.

It is recommended that these service facilities would be attached to a café-restaurant either below, next to or at the side of a slope. Besides the café-restaurant, other service and accommodation spaces associated with a slope area must be spaciouly dimensioned and easily accessible for the motion disabled.

### 15.3. DOWNHILL SKIING

Limb-amputees and the elderly who have previous experience of the sport do not necessarily need an adapted slope in order to participate in downhill skiing. They may cope well on standard slopes.

Some limb-amputees use prosthesis, some upper-extremity amputees use one ski stick, and thigh-amputees, instead of using ski sticks, ski on one normal length ski and usually use outriggers which flip up into crutches when necessary.

A skier with CP.-disability has to be able to walk without aid equipment and stand, for short periods, on one leg at a time. The control of compulsive movement in cerebral palsied children is improved with the body control that is achieved from downhill skiing.

A skier with visual impairments always requires a personal guide. Usually a guide skis in front of a visually impaired skier or behind a totally blind skier. They both wear orange vests with black texts. One or two sticks and a short rope between the guide and the skier can be used for extra aid. Alternatively, the guide and the visually impaired skier can travel down the slope holding each other's hands.

### 15.4. DOWNHILL SLEDGE SKIING

Spinal cord disabled, bilateral lower-extremity amputees and severely CP.-disabled, use three types of downhill ski sledges.

Wheelchair users ski downhill on pulk like sledges which have been built onto one or more skis. A monoski built on one ski or downhill sledges built on two or more skis are best suited for long, even and gentle slopes. A sledge may be equipped with telescopic spring suspension, and can be steered by using either folding outriggers, the centre of gravity of a skier's body, sticks at the sides of the sledges or a steering wheel.

Learning begins on a specially reserved quiet area of the slope or on a slope that is specifically intended for sledge use.

Downhill skiing pulks do not have skis but have steel tracks on the bottom of the pulk. A skier steers the pulk by using either ice picks or a long pole with a pointed tip.

## 16. ICE SKATING RINKS AND ICE TRACKS

### 16.1. THE ENVIRONMENT

During the cold period, sports fields and pitches are normally frozen over to form ice rinks. Large population centres also have indoor skating rinks and artificial ice tracks. Sports field and sports hall changing rooms can be used for changing equipment and for warming up. Changing rooms need to be spacious and a disabled toilet must be provided.

In addition, natural ice on lakes and on the sea is suitable for the ploughing of ice tracks.

Access to skating tracks, ice tracks and rinks must function smoothly and be possible either by public transport or by private car. Disabled car parking must be provided in the immediate vicinity of the ice track. Routes must be clear of snow and covered with a layer of grit. Skating rinks must be illuminated.

### 16.2. ICE SKATING, BANDY AND ICE-HOCKEY

Skating is suitable for all those who are capable of holding themselves upright without support. For some ambulant disabled skating provides positive treatment. Ankle supports and specially adapted skating boots can be used when necessary.

The visually disabled can skate with an assistant, either in pairs, or as a group in line formation.

The visually impaired can play ice hockey by using a large coloured ball and by adapting the rules of the game.

### 16.3. ICE TRACK SLEDGING

Ice track sledging takes place on skating rinks. Ice track sledging is suitable for the disabled whose hands function normally. The manual strength required is not as great as in sledge skiing as the ice makes the sledge easier to move. People with spinal damage, bilateral lower-extremity amputation and cerebral palsy can all participate in ice track sledging. The light ice track sledge moves on blades and is manufactured according to each sportsman's individual requirements. As an example, a person can move forward using roller ski sticks with hard metal tips.

### 16.4. SLEDGE ICE-HOCKEY

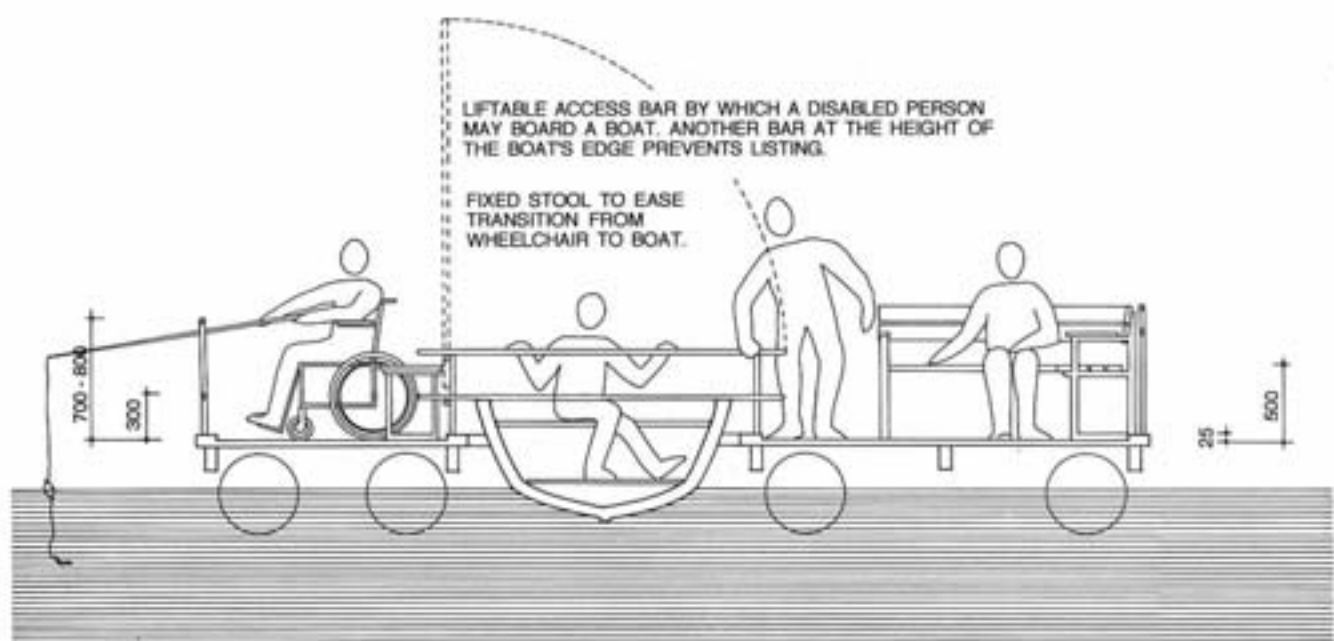
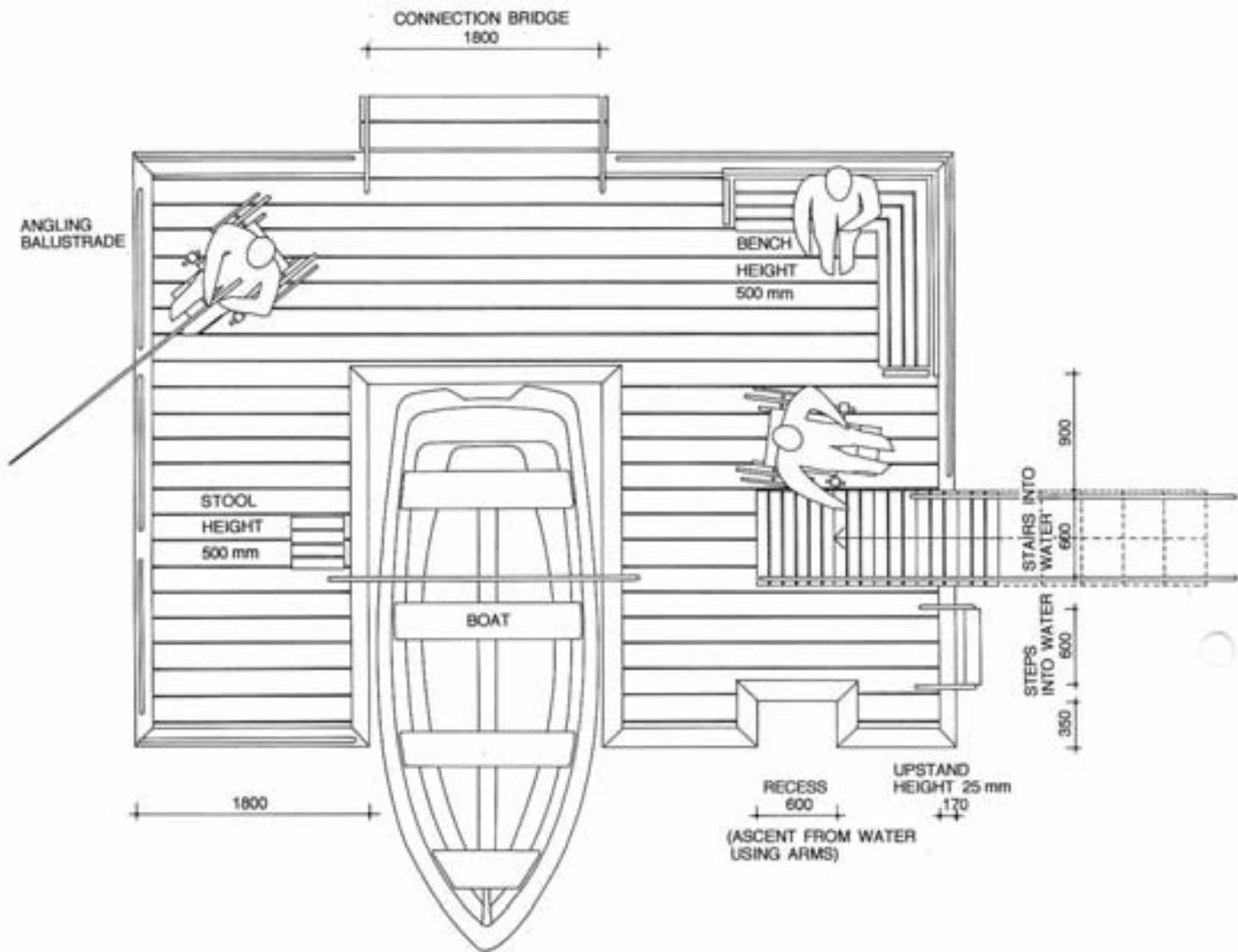
Sledge ice-hockey is played sitting in a sledge. In principle, the rules are the same as in ordinary ice-hockey. The sport can be played by all people with disabilities in the lower extremities.

The team consists of twelve people, only six of whom are on the ice at any one time. The pitch is a normal ice-hockey rink with goals. The playing time is 3 x 15 minutes.

Under a tube framed ice-hockey sledge there are speed skate blades. The sledge is pushed by using sticks that have sharp points at their ends. The sticks are also used for hitting the puck.

For safety the players wear helmets and face masks and the goal keeper wears fully protective clothing and equipment.





COMBINED BOAT, ANGLING AND SWIMMING JETTY FOR DISABLED 1:50



## 17. JETTIES

There must be an intention to offer the disabled equal opportunities for boating. They must have obstacle free access to all spaces associated with boat harbours, including maintenance, service and hygiene spaces. Harbours include home, guest and security marinas.

In addition, disabled access must be provided to small passenger vessels and connection boats.

### 17.1. BOAT JETTIES

The best type of boat jetty for the disabled in home and guest marinas is a firm fixed pontoon jetty. Transfer from a jetty to a boat and back again is possible using a pontoon jetty, despite possible differences in water level.

The suitable width of a jetty is 1800 mm.

A jetty may be made of concrete or may be surfaced with boarding fixed at right angles to the direction of travel. The gaps between the boarding may be a maximum of 5 mm wide.

A sound signal can be installed on a jetty for the blind and the visually impaired.

A jetty can be equipped with 900 mm and 700 mm high handrails and 50 mm high upstands at the edges. If necessary, a handrail that is a minimum of 1000 mm high (preferably 1100 mm) plus a protective net can also be used.

In order to improve safety, the part of a jetty without handrails can be equipped with an edge upstand that is 25 mm high. An upstand can be positioned either on one side of the jetty or on both, and it will still be possible for the disabled to board a boat over such a barrier.

High motor and sailing boats are safely accessed using a gangplank from a pontoon jetty or by using a hoist.

Access to a pontoon jetty must be made using a gently sloping (maximum gradient 1:20 i.e. 5 % and maximum 1:7 when travelling with an assistant) connection bridge that is equipped with 700 mm and 900 mm high handrails at both sides.

Changes in level at connection points on the bridge are not allowed if they prevent the manoeuvre of a wheelchair or provide a risk of falling.

A hoist must be provided if the difference in level between a boat and a jetty exceeds 400 mm.

### 17.2. QUAYS AND JETTIES FOR CONNECTION BOATS

A gangplank suitable for disabled use, must be provided at connection boat and vessel terminals. A gangplank must be equipped with handrails and railings and its maximum gradient must not exceed 1:12,5 i.e. 8 %. The recommended gradient is 1:20 i.e. 5 %. In addition to a ramp a gangplank can be equipped with gentle stairs.

The minimum free distance between the handrails of the gangplank is 900 mm, the recommended distance is 1200 mm. The railings can be made, for example, out of protective mesh or canvas.

A gangplank can be made using grilles, the maximum hole size of which is 5 x 30 mm. As an alternative, non-slip boarding can be used, in the middle of which a series of 300 mm long and 30 mm high timber strips have been fixed. (Wheelchair users can avoid the strips.)

A removable gangplank is not suitable for very large changes in level (over 300 mm).

### 17.3. QUAY BERTHS FOR BOATS USED BY THE DISABLED

One must be able to moor disabled boats on a jetty either along the side or by the stern in order to facilitate boarding. (Normal narrow boat berths are suitable for bow mooring.)

A disabled boat berth must be marked with disabled symbols so that it is easily identifiable from the water when arriving at the harbour.

See also            18. Boating,  
                          19.2. Angling Jetty and  
                          20.2. Bathing Jetties



## 18. BOATING

Almost all disabled people are able to steer a boat independently and consequently they can practice boating as equally as others.

The issue of boarding boats confronts most disabled people, particularly those in wheelchairs. An individual can be lifted into smaller boats by assistants or by the use of a special hoist. An individual may also manoeuvre him or herself with the use of his or her arms. Access to boats is facilitated using adapted boat jetties.

Special aid equipment and adaptations have been developed for motor and sailing boats. They allow the disabled the opportunity to enjoy boating.

### 18.1. SAILING

Many disabled people can enjoy sailing independently and do so as equals to others. Arms and at least one functioning hand are required. Special seats for steering a boat and competing have been developed for wheelchair users.

For years disabled sailors have participated in track races, in different keel and light boat categories and in sailing competitions on the open sea and archipelago.

Depending on one's disabilities, boarding from a jetty onto a boat is carried out either by foot, by the use of one's arms or by crawling.

Disabled people sailing on larger sailing vessels often have specially designed seats. Access into the boat cabin is facilitated by the installation of a stair lift. A hydraulic hoist can be mounted on a sailing boat jetty to allow access to boats. For example, a wheelchair user can board a boat independently with the use of a remote controlled hoist.

#### SAILING BOATS SUITABLE FOR THE DISABLED

The 2.4 m R boat (earlier name MINI 12) has increased boating activities amongst the disabled. The disabled can use this one person keel boat to participate in championship level boat races together with other sailors.

An Optimist Dinghy is suitable for a young person who can sit without support, use his or her hands and move from one side of the boat to another.

Larger boat types that are suitable for the disabled include Lightning, My, H-boat and Hobie-Cat catamaran.

In Sweden a small size keelboat named Samba is used.

In the United States a 20-foot keelboat for a crew of 2-3 is used.

A trimaran type boat called Challenger has been designed in England for the disabled. It is

accessible by wheelchair directly from low shore level.

A sailing boat called Freedom Independence has been designed in the United States for the disabled. Standard equipment on the boat includes two folding seats, the use of which allows a sailor to move easily from one side of the boat to another.

On a windsurfer an individual can sail either alone or together with an assistant

### 18.2. CANOEING

Canoeing is a versatile form of activity that can take place in many different sea, lake, rapid, river and pool surroundings and in various types of canoes. Canoeing is also suitable for the visually impaired. A reasonable level of controlled balance is required by a canoeist. Both the kayak and the Indian canoe are suitable for the disabled. Spacious, level bottomed canoes suitable for the disabled and which have had their stability improved can be used for recreation and fishing.

It is useful to learn the basics of canoeing in a swimming pool with the assistance of an instructor. Rolling and escape from a capsized canoe can also be learnt in a pool.

#### THE KAYAK AND THE INDIAN CANOE

A two seater kayak is suitable for canoeing with an assistant, particularly when the disabled activity is based on the interaction with another person.

The visually disabled can also use a two seater kayak when a guide sits at the rear and is responsible for the pedals.

More equipment can be fitted in an Indian canoe and it is therefore more suitable for hiking with a canoe.

If necessary, canoes and rowing boats can be made more stable using 'trimaran levels'.

At the outset, getting into a canoe may require an assistant, as access from normal jetties to a canoe is troublesome and climbing ashore without a jetty is difficult. An individual can manoeuvre him or herself from a wheelchair into a canoe on land, or climb into it from a canoeing jetty. By using the paddle behind one's back it is easy to get into a canoe.

The shore must be either level or gently sloping. Canoes must be able to be easily pulled ashore and fixed onto the ground from the beneath.

#### SHOOTING THE RAPIDS

A person participating in canoeing can sometimes get caught in the whirl of a rapid, either voluntarily or

accidentally.

Essential equipment for rapid shooting includes a life jacket, a helmet and floats for the lower extremities that bring the legs to the surface and prevent collisions occurring for those people with spinal injuries. A canoeist must not fix him or herself to a seat by using safety straps.

Latest white water rafting methods include the use of an inflatable boat. A number of people can fit into the boat, but one person has to be an experienced rapid shooter who can also steer the boat.

## BASE POINTS

Modestly equipped base points or canoeing and rowing centres with attached service buildings are necessary for disabled canoeing.

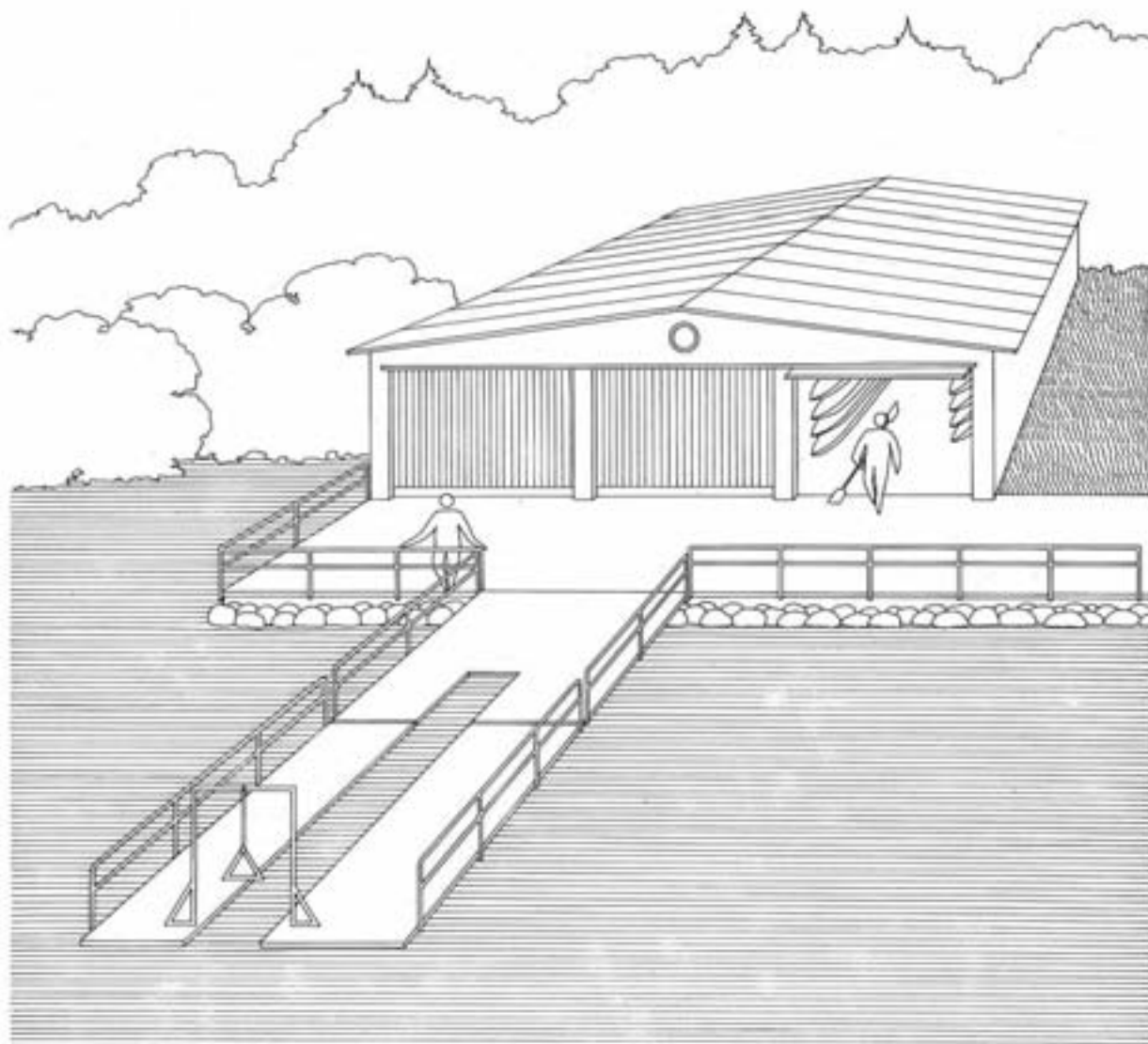
Car parking, toilets, changing and washing facilities that have correct dimensions, and a jetty to allow access to boats must all be provided for the disabled at canoeing centres.

## CANOE JETTIES

The suitable height of a canoe jetty from the surface of the water is 450 mm. It is good to provide a permanently fixed jetty if there are no changes in water level, but a pontoon jetty always maintains a constant height above the water surface. The minimum width of a jetty must be 1500 mm, preferably 1800 mm. The gradient of a ramp leading to a jetty must not exceed 1:12,5 i.e. 8%.

The jetty may have a ramp or a hoist, or a trapeze may be built on the jetty in order to allow an individual to get into a canoe. In addition, a recess can be designed for a boat in the middle of a jetty intended for disabled use.

For the blind and the visually impaired a sound beacon can be installed on a jetty.



CANOEING JETTY

### 18.3. ROWING

Rowing, like canoeing, requires body balance and good control of the hands. Many wheelchair users are good rowers. When necessary the visually disabled can row together with a partner that can see. Rowing is a sport that revives muscular fitness. Rowing boats that are equipped with fixed seats require less strength than boats with sliding seats. The ribs of traditional wooden boats give support to a rower if needed.

The structure of outrigger racing boats requires the jetty edge to be a maximum of 150 mm from water surface.

### 18.4. MOTOR BOATS

A few outboard motor boats have been built for the disabled.

Boarding a boat from the shore or a jetty takes place with the use of a bow ramp built onto a fore hatch. Rudder and motor control devices can be operated while sitting in a wheelchair. The boat drains automatically.

A bow ramp, a swimming lift, a special steering system and a water jet are all provided in an adapted motor boat designed for boating in Finland.

Tracker pontoon boats are catamaran boats designed for wheelchair users in America.

### 18.5. WATER SKIING

As a physically demanding form of exercise, water skiing is suitable for the disabled whose hearing or seeing is impaired. The visually impaired can be directed by using whistle signals from a towing boat. Water skiing is also suitable for people who have one strong leg and a good sense of balance.

Water skiing can be practiced holding the same pull rope as an assistant, or by using a ski bar. This method teaches good skiing posture.

### WATER SKI BOARDS

Water skiing is also possible with the use of an adapted water ski board or a sledge. As a sport it is suitable for nearly all wheelchair users. Skis are available to suit varying degrees of skill and range from models designed for beginners to skis which are physically very demanding.

A water ski board has an adjustable seat and foot support, which assist a stable sitting position while leaning on the knees.

Departure can take place from a jetty, but it is done more easily when directly in water, where the skier can settle him or herself onto the floating board. An assistant may also be in the water and can support the board as departure takes place.

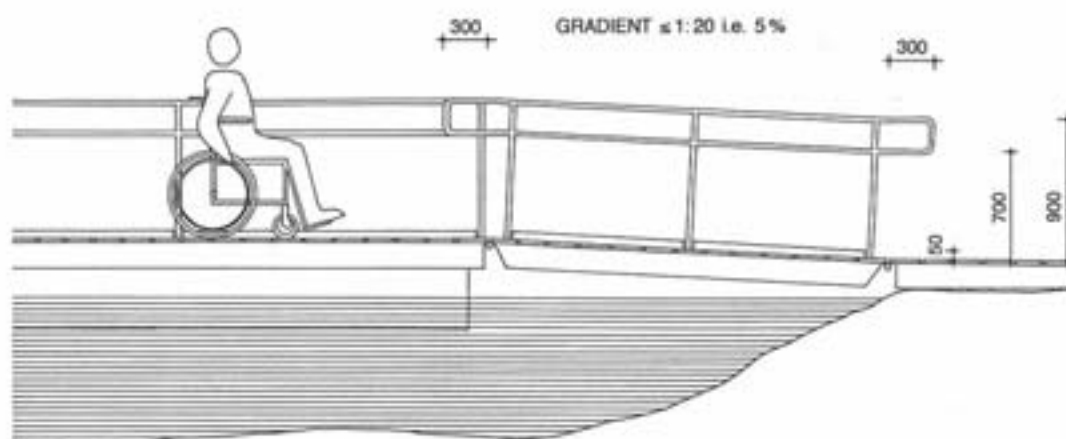
In addition to the provision of life jackets for safety reasons, wet or dry suits are usually needed due to the coldness of water and as a preventive measure against cracked skin.

### 18.6. SAILING SHIPS

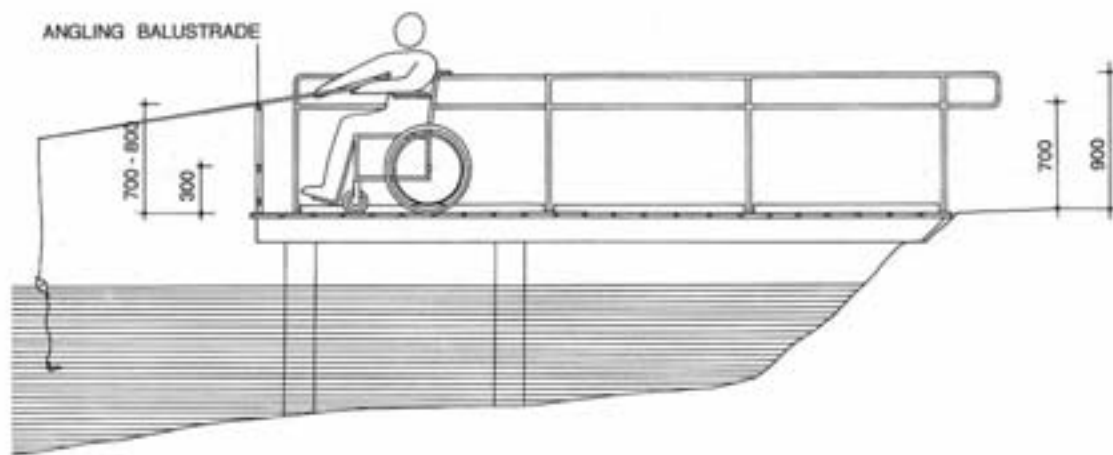
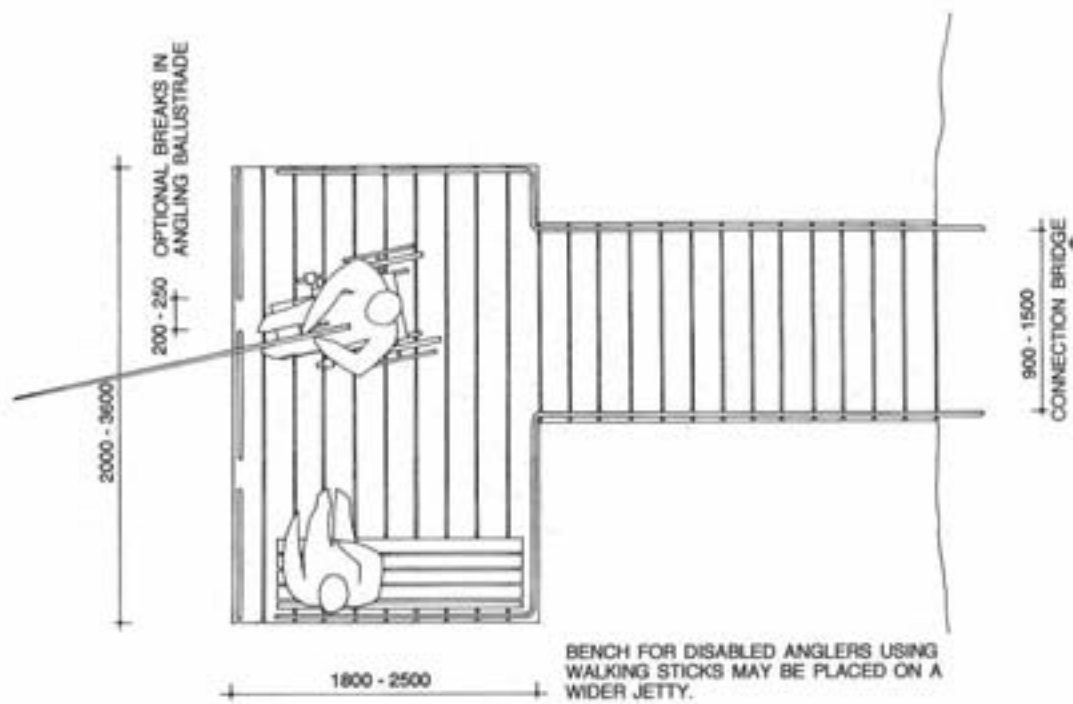
In England and Holland there are sailing ships that are adapted for disabled use. Half the crew on the sailing ship Lord Nelson was disabled.

Traditional yawls and galleasses can also be adapted for disabled sailing ship training.

The entrance stairs and doors of vessels must be adequately wide and easily passable. Separate stair lifts can be installed and support handles can be fixed onto passageways. Ironmongery for fastening wheelchairs is required on deck by the helm and by the areas where the sails are handled. Cabins must be designed for the use of the disabled and a disabled toilet must be provided on board.



JETTY CONNECTION BRIDGE 1:50



DISABLED ANGLING JETTY 1:50

## 19. FISHING

Disabled fishing is popular and particularly well suited for the enjoyment of nature and water. It requires little physical strength and it can be carried out with varying degrees of expertise. Fishing techniques and rods vary according to sea, lake, river, shore and bank conditions.

If a disabled person is able to hold the rod he or she is also able to fish. The difficult part of fishing may arise when gaining access to water or a boat.

### 19.1. THE FISHING STATION

Riverbank fishing stations which are protected are suitable for the disabled. One must have access to a fishing station via a gently sloping path. It must have a minimum width of 1500 mm and have a sufficiently hard surface. Behind the path there should be a fence or bushes to give protection from the wind. Rest places and a disabled toilet should be situated on the path.

Preferably fishing stations should be designed to suit one person at a time and should be situated along the shore at, for example, 3 metre intervals. The fishing station itself can consist of a platform (minimum 900 mm wide and 1200 mm deep) with handrails and upstands at its edges. The maximum horizontal distance from the end of the platform to the water is 300 mm. It is preferable if the water flows from the right to the left of the angler.

### 19.2. THE ANGLING JETTY

Easy access by wheelchair must be provided to a disabled angling jetty.

A suitable angling jetty consists of an even, 1800-2500 x 2000-3600 mm platform that projects into the water and which is equipped with handrails and barriers to prevent falling. The connection between the jetty and the shore must be either level or gently sloping.

Access to floating jetties is provided via a ramp that can adapt itself to changes in water level.

One can fish from a jetty by sitting either in a wheelchair or on a bench. In addition, a small table that can be reached from a wheelchair can be provided for baits etc..

A jetty or an angling platform must be equipped with edge upstands and handrails at 700 mm and 900 mm heights. In addition, an extra railing can be built, if necessary, at a height of 1000 mm to prevent falling. At the end of the jetty, the railing can have openings at specific intervals or it can be made lower, 700-800 mm high, in order to facilitate the handling of rods.

The suitable height of an edge upstand which can prevent a wheelchair from slipping over the edge is 50-70 mm.

A solid wooden 150-200 mm high beam, that does not interfere with the landscape or with fishing, can be fixed onto an angling jetty or onto an even surface close to water. This prevents manually operated wheelchairs from falling over the edge of the jetty.

### 19.3. FISHING FROM A BOAT

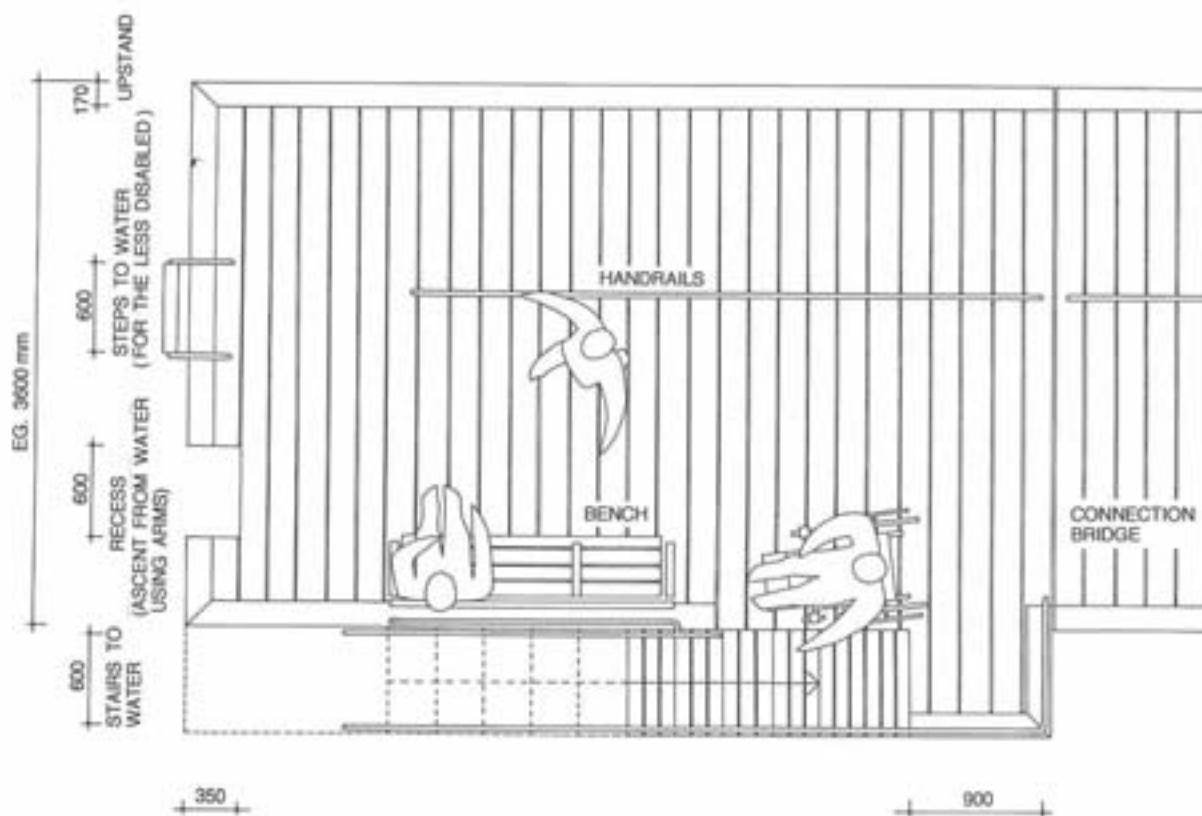
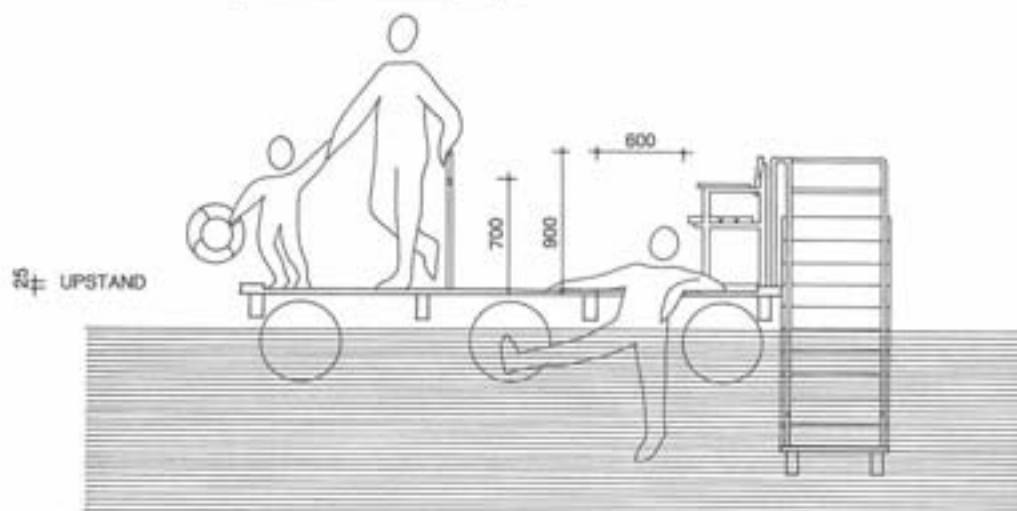
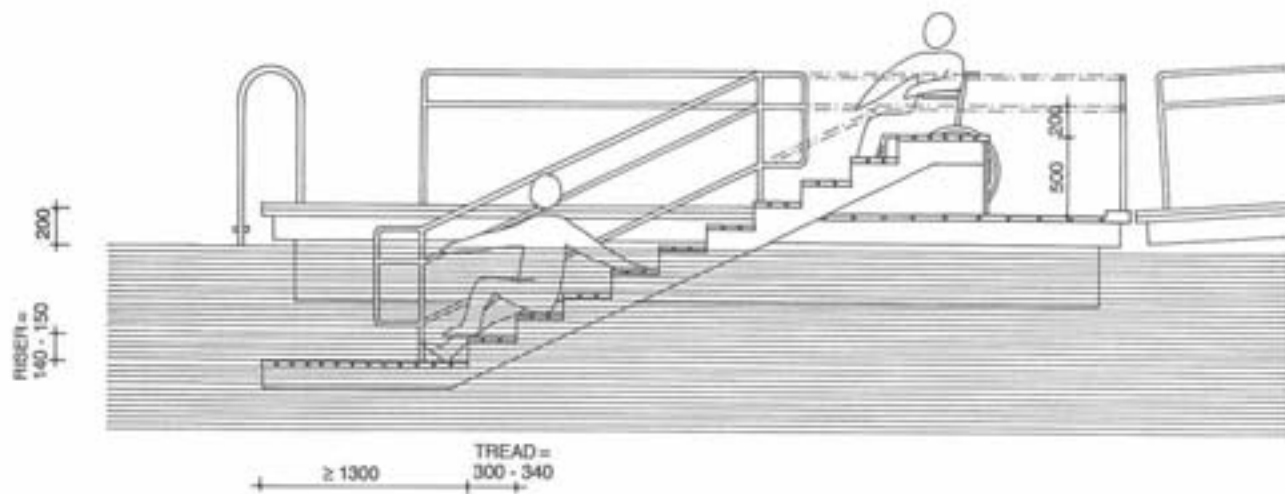
The traditional forms of fishing include angling with a rod, spinning and net fishing from a boat. A solid, easily manoeuvred rowing boat or motor boat are most suitable for the disabled.

Access to a boat is facilitated by a boat jetty which has been designed for the motion disabled.

### 19.4. ICE FISHING

In the winter, the motion disabled can use snowmobiles to access ice and can fish with either a rod or a net.

A ski sledge is also suitable for ice fishing. When travelling in a natural landscape for long periods without having the opportunity to warm up, a heat bag attached to a sledge can be used.



DISABLED SWIMMING JETTY 1:50



## 20. BATHING BEACHES

The requirements of the disabled must always be taken into account during the design of the routes, jetties, furniture and signs associated with a bathing beach.

Bathing beaches can be a part of a larger activity area, such as a camp site or a recreation area.

### 20.1. THE ENVIRONMENT

#### ACCESS

Roads, light traffic routes and routes on recreation areas, all of which lead to a bathing beach must be well signposted. Signs must be clearly located so that finding the correct route, space or changing room is easy even for the visually impaired.

Beaches must be marked on the map of a recreation area. Brochures and maps can provide information about the services and facilities provided on a beach and on their level and suitability for the disabled.

It is also preferable to provide access to a beach by public transport. Car parking spaces for the disabled must be reserved in the immediate vicinity of a beach. A ground surface must be sufficiently hard and gradients must be gentle to allow for wheelchair use.

Correct information and facts about travel distance will facilitate orientation. A signalling device can be provided on a beach for the visually disabled. When necessary it assists the swimmer to orientate him or herself towards the beach by listening out for music or other sounds.

#### ROUTES ON THE BEACH AND SUN BATHING

Access by wheelchair must also be provided to buildings, sun bathing areas, jetties and areas of water. It is recommended that a main route is surfaced with concrete paving slabs, asphalt or wooden boarding.

The best solution to allow travel on a soft sandy beach is to provide wooden board-walks along which it is possible to move with either a wheelchair or a baby push chair.

Areas protected from wind are best suited for sun bathing. Dense grass as a surface material is better for the disabled than fine sand or smooth rock.

#### CHANGING CUBICLES AND TOILETS

Spacious changing facilities must be located along a surfaced route. The general design guide lines concerning changing and wash spaces can also be applied to the design of beach facilities.

Good disabled changing cubicles must have interior dimensions of 2100 x 2100 mm and be either connected to or separated from other changing facilities. Besides the disabled, families with small children can also use these cubicles.

The entrance to changing facilities must be either level or via a gentle ramp. The door must be wide. Ample space for a wheelchair to turn full circle is required inside a cubicle. In addition, a bunk must be provided to allow a person to lie down.

Disabled toilets must also be situated within a group of toilets. A disabled toilet must be located close to other beach activities and must be accessible without effort.

Disabled changing and toilet areas can be marked with a wheelchair symbol.

#### KIOSKS AND CAFÉS, FURNITURE AND EQUIPMENT

The service and sales counters at beach kiosks and cafés must be placed at a height that is suitable for the disabled. In addition, it must be possible to enter sales offices, and access to tables at cafés, both inside and outside on terraces, must be guaranteed. Automatic vending machines, refuse containers, public telephones etc. must be designed and positioned so that they can also be used by children, the disabled and the elderly. They may be situated under a rain shelter.

### 20.2. BATHING JETTIES

In order to swim or dive, accessing water by wading from the shore is difficult and is sometimes impossible for many disabled. Access to water is ensured by an adapted jetty. A ramp leading from the shore into water can also provide access.

For a bathing jetty to be suitable for the disabled, it must have ample space for wheelchairs, consequently a jetty needs to be wide enough, (minimum 1800 mm). A bench for resting can also be positioned on a jetty.

Handrails on the jetty at heights of 900 mm and 700 mm facilitate access and travel, particularly for the visually impaired and the motion disabled. In addition, a 50-70 mm high edge upstand can be provided.

The gaps between planks on a jetty may not exceed 5 mm.

Descending into and ascending from water is possible for the disabled with the use of adapted

steps and a recess in a jetty.

Steps, 600-700 mm wide, start from above a jetty at a height of approximately 500 mm. This makes it possible to access the steps directly from a wheelchair. There are handrails on both sides of the steps at a height of 150-200 mm. Access to the steps from the side is made possible by shortening one of the handrails above the jetty. The gentle steps (riser 140-150 mm and tread 300-340 mm) finish on an underwater platform. In addition, normal, ladderlike steps, 600 mm wide, are required on a jetty.

Besides steps, a recess that facilitates the ascent from water can also be built at the end of a jetty. The recess must be 600 mm wide and 350 mm deep in order to make it possible for an individual to pull him or herself up by using his or her arms.

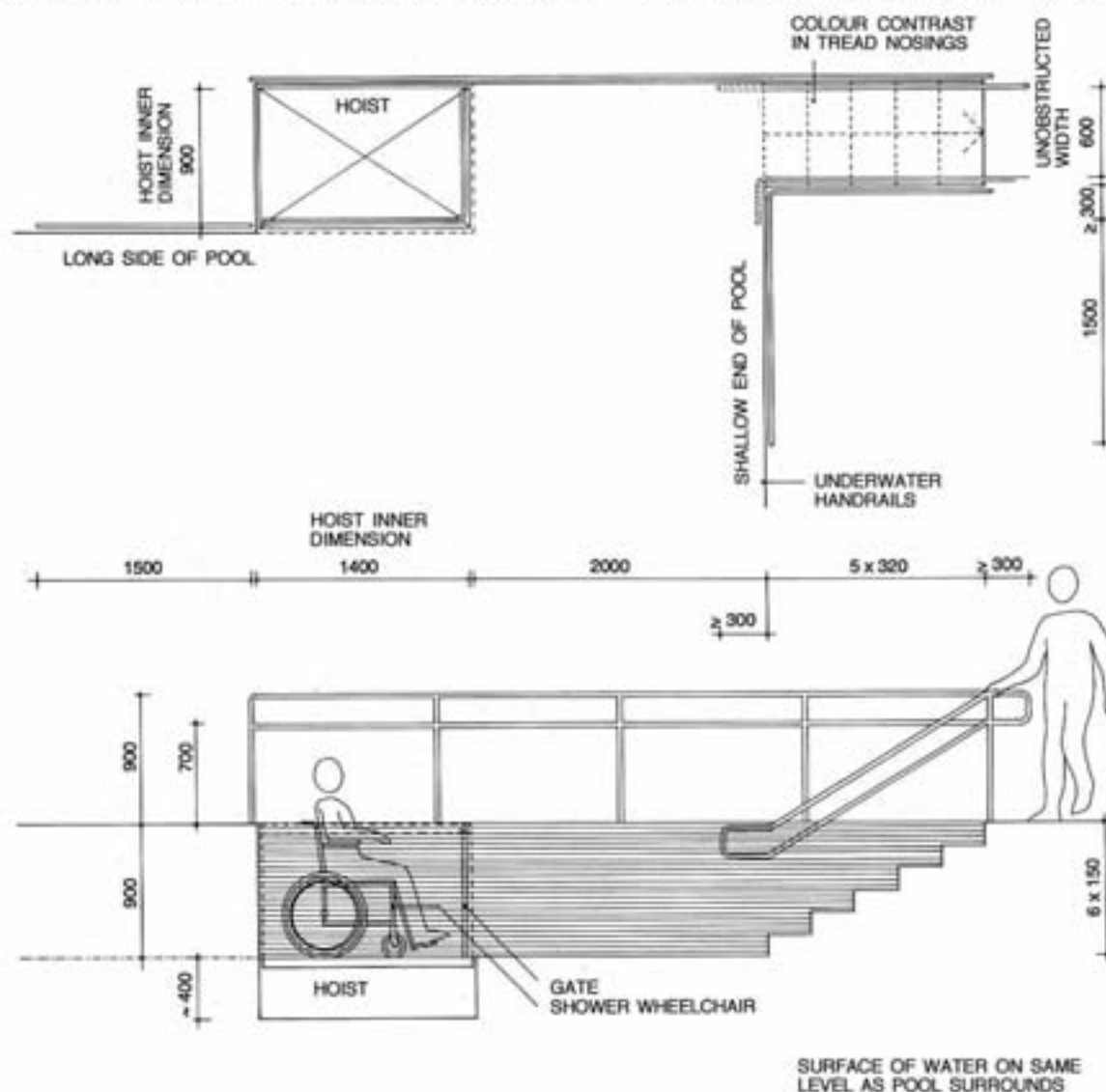
It is recommended that the top of the jetty is no more than 200 mm above water level. In this case, the jetty

is most probably a pontoon jetty. Access to the jetty must be provided with the help of a gentle ramp that can adapt to changes in water level. A ramp must be equipped with handrails and when necessary, railings can also be installed.

The edges of a jetty should be marked with contrasting colours.

Brightly coloured buoys can be placed in water to guide the visually impaired. A swimming area for swimmers with visual impairments must also be clearly marked. The swimmers can also be guided by using sound signals. A sound beacon must be positioned at a point on a jetty where a person can ascend from water safely, without bumping into any objects.

An individual who wishes to move from a wheelchair to sit on the ground or on a jetty, can use a gentle step, the riser of which should be 150-165 mm, the tread 400-500 mm and the width 400-500 mm.



POOLSIDE STEPS AND HOIST 1:50

## 21. OUTDOOR SWIMMING POOLS

It is recommended that the ambient disabled learn to swim in controlled circumstances in a swimming pool where, unlike natural waters, there are neither fluctuations of water temperature nor waves and currents. The temperature of water must usually be above normal, (+26° - + 28°C,) and for people with disabilities in locomotory systems, it must be even higher (+30°C). Access to a pool is provided by steps and a poolside hoist.

Information on outdoor swimming areas must be extensive and easily available.

Water parks must be designed to suit all people.

Team ball games that are played in water, provide a new dimension to those who cannot participate in similar activities on dry land.

### 21.1. THE ENVIRONMENT

#### ACCESS

Bus stops, drop off and pick up points, car parking spaces, entrances, ticket offices, kiosks and cafés must all be suitable for the motion disabled. Access for the disabled must also be provided to spectator stands at swimming pools.

Particular attention must be paid to orientation. Spaces indoors and outdoors must be well signposted in order for the visually impaired to proceed without difficulty.

Spaces and routes must be spacious enough for wheelchair use. It is recommended that spaces that serve swimming areas are located at ground level in order to avoid undue changes in level.

#### CHANGING AND WASH ROOMS, SAUNAS AND TOILETS

Changing and wash rooms, saunas and toilets must be suitable for the ambient disabled. It is recommended that special changing and wash spaces should be built for families and the disabled. The disabled may then use the facilities with the help of an assistant.

The design of wash spaces must allow for wheelchair use. It is preferable that the disabled have their own shower spaces which are connected to spacious changing cubicles. Wash spaces must be situated as close as possible to a swimming pool.

Saunas must be spacious enough for wheelchair users.

Each toilet group must have a disabled toilet. Stairs and ramps as well as saunas, changing and wash rooms must all be equipped with handrails.

Interior spaces must be well illuminated in order to

avoid being dazzled when moving into sunshine. Surface materials must be easily maintained and durable. Floor materials must not be slippery even when wet. Wet spaces require efficient ventilation.

In order to prevent excessive noise, particular attention must be paid to acoustics in hygiene spaces which have hard surfaces.

For the motion disabled, moving in these spaces can be facilitated using different colour contrasts.

#### KIOSKS AND CAFÉS, FURNITURE AND EQUIPMENT

See 20. Bathing Beaches.

#### SURFACE MATERIALS OUTDOORS

Exterior surfaces must be dense, even and non-slip. Suitable surfaces for a route include asphalt, concrete slabs and wooden planks laid at right angles to the direction of movement. Grass growing on sun bathing areas must be firm and non-yielding.

The area around a pool must be paved with frostproof tiles (preferably not those with a 'knobbly' surface) and must not cause a risk of slipping, or must be surfaced with non-slip rubber or plastic flooring.

### 21.2. THE SWIMMING POOL

Pool details must be safe and apparatus must be easily operated.

Descent into a pool always takes place at the shallow end. The depths of water in different areas of a pool must be clearly marked. The recommended pool depth for the disabled is 1000-1200 mm at the shallow end and approximately 1800 mm at the deep end. A suitable depth for water gymnastics is 1200 mm and the suitable width of a level part of a pool is 1000 mm.

Water jets and sound signals which indicate turning points can be provided in a pool for the visually impaired.

#### POOL EDGE DETAILS

The disabled must be able to cross a foot wash basin on the edge of a pool using a bridge. Free space must be reserved at the side of a pool for wheelchairs.

The surface of water must be level with a surrounding area. This is an ideal solution for the disabled as access to and from water is easiest where there is a minimal need for steps. This

enables equipment to be handled easily during swimming instruction and allows an instructor to get closer to swimmers, both of which improve the general feeling of security.

Pool edge details are associated with maintenance and cleaning; large pools must have level deck overflow channels, but for smaller pools only an opening for cleaning is required. The overflow channel of an outside pool must have a small lip to prevent water draining back into the pool. It is easy for a swimmer to grip an edge that is grooved. A channel must have dense mesh positioned under a grille in order to filter rubbish. During the winter the channels must be covered in order to avoid frost damage.

In order to help perception, the edge of a pool must be marked with contrasting colours and materials.

The edge or surrounding surface of a pool must not be too slippery. The area reserved for the disabled to descend into water must, at least, be equipped with handrails to avoid risk of slipping.

Underwater handrails facilitate both movement in water and swimming instruction. They must be built within the depth of a pool wall, i.e. the handrail must not project at any point from the line of the pool edge. Handrails must be situated at 50-100 mm below water level and be 30-50 mm in diameter. A handrail can run for the entire length of a pool surround or for at least one long and one short side.

At the side of the pool there should be 500 mm high seats which are preferably heated and which provide an opportunity for rest before or after swimming. These seats will also stimulate the return of normal circulation and body temperature after ascent from a pool.

## ACCESS TO AND FROM THE WATER; STEPS, POOL HOIST AND SLIDE

Direct descent into water can take place either by dropping down from a pool edge, by using steps equipped with handrails, travelling down a slide or by using a pool hoist.

Gentle steps can allow entry down into a pool. The steps must be situated outside the main swimming area and along the long side of a pool at its shallow end.

The steps must have handrails on both sides at heights of 700 mm and 900 mm and at a distance of 600 mm apart. Steps, 900 mm wide, and which also have handrails, can be built next to the narrower steps (600 mm wide) for those people who move

with the help of walking sticks or crutches. The riser height of the steps must be 120-150 mm and the tread 320-400 mm. At least the horizontal surfaces of the nosings must be marked with contrasting colours.

A pool hoist that operates using water or air pressure, facilitates the transfer of the severely handicapped into water. In the top position the lift platform will be level with the pool surrounds above water. When it descends it travels deep enough to allow a swimmer to move effortlessly into the pool. The lift has a gate that can be opened under water. Demountable protective railings must be provided around a pool hoist.

In certain situations, for example, in bathing spas, descent into water can take place via a slide. From a wheelchair it is possible to gain direct access onto a plastic slide if it is positioned 500 mm above the edge of a pool. The sides of a slide must be 200-300 mm high and with the use of hands, can be used as a braking device.

## 22. AVIATION CENTRES

Flying activities for wheelchair users include hang gliding, glider flying, ultralight aircraft flying and flying with motorised planes.

Flying radio-controlled model aeroplanes is also suitable for the ambient disabled.

### 22.1. LIGHT AIRCRAFT AIRFIELDS

Flying activities take place from airfields. The airfield area must be well illuminated and easily accessible. For safety reasons, guides, maps and brochures define the boundaries of the various areas and must indicate their approved routes of access.

Disabled car parking spaces must be situated as close to the service facilities and airfield as possible. Permission is always required from the air traffic controller if a vehicle is to be used on the airfield.

Connections outside and inside buildings must be arranged along well lit, wheelchair accessible routes. Cafés, toilets, changing and wash rooms must be spacious enough for wheelchair users. Automatic machines and telephones must be situated so that people in wheelchairs can reach them.

Access to air-traffic control, the machinery hall and to the most important technical facilities must also be accessible by wheelchair.

If the aviation centre provides accommodation facilities, they must be designed taking into account the spatial and dimensional requirements of a wheelchair.

### 22.2. FLYING, GLIDING AND JUMPING

Wheelchair users can fly a light aircraft which has manual steering. For example, a four-seater one-engine propeller plane equipped with manual steering can be flown by a wheelchair user.

Wheelchair pilots have their own international organisation called The Wheelchair Pilots' Association. It was founded in Florida in 1970 and its member countries include the USA, Canada, Great Britain, Germany, Australia, Japan and Finland.

Ultralight aircraft are also suitable for the disabled.

Parachute jumping for wheelchair users, particularly at first, is carried out in joint jumps i.e. in tandem. A disabled jumper is tied to a partner without a handicap. The partner is responsible for the handling of the parachute and the landing. The jump can end either in water or on a rescue canvas supported by about twenty people.

When hang gliding, the lower part of a person's body is positioned in a 'bag'. A disabled person may have an assistant during take off and landing.

Chair hang gliders have wheels attached to their underside.

New types of motorised gliders are very suitable for disabled use.

A wheelchair user can travel in a hot air balloon as long as the basket is provided with a door.





## V SPECIAL ISSUES

### 23. APPENDIXES

#### 23.1. APPENDIX 1, LAPLAND FROM THE DISABLED POINT OF VIEW

Finnish Lapland is an important tourist and recreation place. As a hiking area the northern most part of Finland has a unique nature. The fields are barren and the fells are often easily passable. The crossing of brooks, rivers and rapids may sometimes cause problems for the disabled.

The summer and winter provide opportunities for completely different types of activities. Theme trips are organised to Lapland; for example summer hiking, fishing trips, autumn nature treks and skiing trips in the spring.

#### ACCESS AND CONNECTIONS

Lapland can be reached by car, coach and bus, as well as by train and air using follow-on connections by bus.

#### ACCOMMODATION AND RESTING PLACES

Guidebooks that are published annually give information on disabled accommodation facilities, rooms and their availability. Holiday centres offer various types of accommodation; hotels, motels, recreation lodges, private and home accommodation, cabins, chalets, camp sites and hiking huts for both overnight stays and breaks. Prior confirmation of accommodation availability must always be made.

There are already many completed cooking, rest and break places in Lapland and many more are being designed.

Break cabins are partly old log floating and reindeer herding huts, which are not always suitable for the motion disabled. The timber built Lapp huts have a raised fireplace, surrounded by benches in the middle. The larger Lapp huts have space for seven wheelchairs. The lean-tos have fireplaces at their fronts.

#### ACTIVITY POSSIBILITIES

##### DOWNHILL AND CROSS-COUNTRY SKIING

Downhill skiing centres that have gentle, wide slopes and that provide chair lifts are suitable for the disabled.

A suitable skiing terrain has shallow contours. One

must have the choice of various marked routes of different lengths and levels of difficulty. Resting places where one can warm up and have a picnic must be situated at short intervals from one another (4-6 km).

Ski and sledge rental places, warm up places and service spaces at skiing centres must be designed with the disabled in mind. (If they are to be suitable for disabled use, this includes provision of a disabled toilet.)

The café, restaurant and accommodation facilities must be accessible for the motion disabled.

##### MOTOR SLEDGING, SLEDGES PULLED BY ANIMAL TEAMS AND ALL TERRAIN VEHICLES

The disabled have the opportunity to use the snow for activities, such as hiking trips, and to visit sites that are otherwise impossible for them to reach. Suitable vehicles include snowmobiles and dogsleights.

During the snowless season the disabled can use an all terrain vehicle to move around in the wilderness. Resting places and cabins must be suitable for the disabled.

Prior to a trip, hikers must find out about suitable accommodation as well as the accepted snowmobile and all terrain vehicle routes.

##### HIKING IN THE WILDERNESS

Hiking in easily passable terrain is suitable for the disabled. Guided trips, the lengths of which are determined by the participants, are most suitable for the disabled. Cabins and huts adapted for the disabled are required for rest breaks and accommodation. In an area suitable for the disabled there should be an information centre giving active information about hiking and rambling routes.

##### ANGLING

Angling and fishing are possible in rivers and lakes where adapted fishing stations have been built for the disabled. Boats for hire and fishing licences must be available on site.

##### SHOOTING THE RAPIDS

At certain places it is possible to shoot the rapids in guided inflatable boats, even when sitting in a wheelchair. Holiday centres have the required equipment for hire on site.

## 23.2. APPENDIX 2, THE DESIGN OF THE CLOSE ENVIRONMENT SURROUNDING INSTITUTIONS

### THE ORGANISATION OF THE YARD AREAS AND ASSOCIATED ENVIRONMENT FOR THE USE OF THE DISABLED IN RECREATION AND EDUCATION INSTITUTIONS AND RECREATION CENTRES

#### PARKING AND PICK-UP POINTS

- Close to an entrance.
- Separate from the rest of the yard and pathways.
- Private cars, minibuses, coaches.

#### ENTRANCES

- Covered, preferably accessible from a vehicle under a canopy.
- Ample space for a number of wheelchair users.
- Changes in level solved with gentle ramps and steps with handrails.
- Floor grilles, fine-meshed so that wheels do not get caught in them.
- Name plaques, press-buttons and buzzers accessible for wheelchair users.
- Doors adequately wide and light, preferably automatically operated.
- Sound signal leading to the entrance for the visually disabled.

#### ROUTES; PEDESTRIAN ROADS AND PATHS, EXERCISE PATH OR TRAIL

- Pedestrian path network around the yard, suitable for walking and wheelchairs, for both the elderly, in homes for the elderly, and for children that practice cycling and play with walkers and prams.
- Marked routes of varying lengths to near-by woods, must start and finish at the same place.
- Preferably pedestrian routes should not cross roadways.
- Gently sloping pedestrian routes, no lateral gradient.
- Changes in level solved with steps and ramps with handrails. Material and colour contrasts to facilitate perception of top and bottom end of ramps and stairs.
- Bridges with handrails over soft and wet areas.
- Snow clearing and gravelling in the winter.

The free width and height of the path must be suitable for snowploughs.

- Kick sledges and walking frames the most common equipment of the elderly.
- Safe associated environment also for the hearing disabled.

#### SURFACE MATERIALS

- The surface of the pedestrian routes should be dense, even and non-slip.
- Asphalt, gravel, hoggin, limestone and level and thinly grouted paving.
- Crossings, entrances etc. can be marked with material differences.
- Wood surfaces at right angles to the direction of movement, narrow gaps.

#### RESTING PLACES

- Frequent, at 25-200 m intervals.
- Resting areas away from the main route, space for a wheelchair or a pram.
- Solid benches of adequate height with back and arm rests should be placed along the routes and at resting places.

#### SIGNPOSTING

- Entrances, car parking places etc.,
- Lengths of pedestrian routes.
- Sights.
- Map of the area and an embossed map for the disabled, preferably indoors.
- Signs illuminated.
- Signs for the visually disabled; embossed letters, contrasting colours, Braille, embossed maps.

#### SEATING AND MEETING PLACES

- Patios and terraces having warm aspects, wind protection, shade in the summer, partial cover.
- Solid tables and seats with back and arm rests, correct sitting height, access to the table by wheelchair.
- Garden swings.
- Fireplaces
- Disabled toilet close-by.

#### GARDENING

- Possibility to participate in gardening, maintenance of flower beds etc.
- Raised planting boxes.
- Own garden patches.



### 23.3. APPENDIX 3, AIDS FOR THE OUTDOOR RECREATION OF THE DISABLED

#### GAMES AND PLAY

- Gravel pitches and grass fields for ball games.
- Basketball basket, badminton net.
- Snooker table.
- Park chess, curling in the winter.
- Snow play areas and a slide for children in the winter.

#### CHILDREN'S PLAY AREA

- Low swings, soft base, running under the swing prevented.
- Climbing frames and slides, with handrails.
- A large sandpit.
- Free grass area and gravel pitch for children's play and games.
- Water.
- Carts on wheels and bicycles.
- Disabled toilet close-by.

#### PLANTING

- As protection from wind.
- Differentiation of various functions with the use of vegetation.
- Different types of trees, bushes, shrubs and flowers, evergreens.
- No plants that cause allergies or that are poisonous.

#### WATER POOLS

- The sound of water guides the visually disabled.
- Water play areas for children.
- The calming effect from looking at water.

#### LIGHTING/ILLUMINATION

- Outdoor recreation routes well illuminated during dark seasons, guiding effect.
- Entrances can be marked with lights.
- Steps and ramps must be well illuminated.
- Parks, gardens and water gain more dimension with illumination.

There is an ample amount of literature available concerning hiking and moving in nature that is worth studying when planning a trip.

When planning a nature trip for the disabled one must ensure beforehand that the route is suitable for the disabled and that, if necessary, help can be reached.

The equipment for outdoor and nature recreation is intended to reduce or remove the restrictions to activities created by a disability. Various specially designed equipment has been developed for different sports.

Instructors of adapted activities in municipalities, associations and organisations can give assistance when choosing the various equipment and finding out about different places of acquisition.

Shops and dealers that import activity and aid equipment give advice on the fitting and use of the products they represent.

Some equipment, such as small supporting devices, handles and back supports that facilitate use, may need to be individually manufactured. Small workshops may manufacture some parts specially to suit one's individual needs and they will attempt to investigate and make the appropriate adaptation of individual equipment.

More equipment for loan or hire must be available in outdoor activity recreation places, holiday villages and recreation centres.

### 23.4. APPENDIX 4, OUTDOOR RECREATION EQUIPMENT

When purchasing outdoor recreation equipment, it is best to seek the advice of expert dealers in order to discover the appropriate products. The equipment must always be chosen according to one's individual needs.

Recreation equipment shops participate in the development of the equipment and base their selection on the wishes of their clientele. When necessary, it is possible to have individually fitted equipment and clothes ordered from the manufacturer directly.

## OUTDOOR ACTIVITY VEHICLES AND EQUIPMENT:

	See:
- ALL TERRAIN VEHICLE	4., 4.2.
- ALPINE SLEDGE AND STICKS, DOWNHILL SKI SLEDGE, DOWNHILL SKIING PULK	15., 15.2.
- ANIMAL SLEIGHS	4., 4.2.
- CANOE, KAYAK	18., 18.2.
- CASTING CHAIR (athletic throwing)	13.
- CROSS-COUNTRY BICYCLE AND FOUR WHEEL CROSS-COUNTRY BICYCLE	11., 11.3.
- CYCL-ONE (manually operated bicycle)	11., 11.2.
- DISABLED ROWING BOAT	18., 18.3.
- ELECTRIC WHEELCHAIR	1.
- GOLF BUGGY AND GOLF CART	9.
- HANG-GLIDER	22., 22.2.
- HOT AIR BALLOON	22., 22.2.
- ICE SLEDGE	16.
- INDIAN CANOE	18., 18.2.
- INFLATABLE BOATS FOR RAPID SHOOTING	4., 4.2., 18., 18.2.
- KAN-SKI WATER SKI	18., 18.5.
- KICK SLEDGE AND KICK SLEDGE WITH WHEELS	2., 23.2.
- LIGHT AIRCRAFT	22., 22.2.
- MONOSKI ALPINE SLEDGE	15., 15.4.
- PONTOON BOAT	18., 18.4.
- RACING CHAIR	13., 13.2.
- ROLLER BOARD	1., 1.4.
- ROW CYCLE	11., 11.2.
- 2,4 m R SAILING BOAT (= MINI 12)	18., 18.1.
- SCOOTER	1.
- SHOWER CHAIR	1., 1.4.
- SKI SLEDGE, SKIING PULK, SKI SLEDGE AND SKI FRAME i.e. WALKER WITH SKI	14.
- SNOW SLEDGE	4., 4.2.
- SUPPORT FRAME i.e. WALKING FRAME	1.
- TANDEM	11., 11.2.
- TRICYCLE	11., 11.2.
- WATER SKI BOARD	18., 18.5.
- WHEELCHAIR	1.
- ULTRALIGHT AIRCRAFT	22., 22.2.



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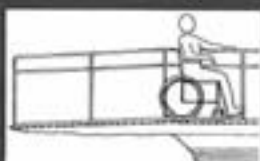
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THE BOOK MAY BE ORDERED FROM:  
THE FINNISH ASSOCIATION OF SPORTS FOR THE DISABLED  
KUMPULANTIE 1 A, 00520 HELSINKI, FINLAND  
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