



# **A Guidebook on Creating Sporting & Recreational Activities For Persons with Disabilities**

***OFFICE OF THE CHIEF COMMISSIONER FOR PERSONS WITH DISABILITIES***

**Ministry of Social Justice & Empowerment, Govt. of India**



A Guidebook on Creating Sporting and  
Recreational Activities for  
Persons with Disabilities

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New Delhi

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## ***Disclaimer***

The information provided in this book incorporates recommendations from international best practice guidelines. The purpose of this book is to serve as a resource planning guide for people involved in design, construction, management and maintenance of inclusive sporting and recreational facilities in India. This book is neither meant to be used as an exclusive design guide nor as a training manual.

It must be noted that the suitability of construction and architectural materials, as well as their availability and pricing, varies regionally and is project specific. Although detailing explicit materials and quoting exact costs are beyond the scope of this book, an attempt has been made to provide generic technical and architectural advice. The reader should therefore use the recommendations provided in this book as guidance only and seek professional advice from specialists before finalising any design or commencing any construction/ refurbishment. In this text it has not been feasible to avoid individual names of products or manufacturers, because of their common usage. In none of these instances should the appearance of such a name be taken to be a recommendation. Also where attempt has been made to provide a list of available products and their manufacturers, not all available resources may have been listed. In most cases, alternative products or manufacturers will have to be considered. It is for the reader to seek professional guidance.

The risks associated with sports and other listed activities are complex and each situation must be judged on its own merits. It may not be reasonable for readers simply to follow instructions in this book without proper assessment of individual participants and circumstances. Neither the authors nor the publisher can accept responsibility for any consequences which might result from decisions made on the basis of the advice given therein.

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Message

MINISTER OF SOCIAL  
JUSTICE & EMPOWERMENT  
GOVERNMENT OF INDIA  
SHASTRI BHAWAN, NEW DELHI-110001  
31st May, 2007



### ***MESSAGE***

It gives me great pleasure that the office of Chief Commissioner for Persons with Disabilities has taken the initiative to publish 'A Guidebook on Creating Sporting and Recreational Activities for Persons with Disabilities'. I am sure this positive and innovative step will prove to be a milestone in promoting health, physical strength, endurance and social integration of persons with disabilities in India. We know, sports instill self-discipline, competitive spirit, sense of self-respect and ultimately gives a feeling of achievement and attainment.

I believe that both Government and Public/Private organizations will widely use this guidebook to create sporting and recreational activities for persons with disabilities. I will be happy if our National Institutes take the initiative and set trends for others to follow.

I congratulate the Office of Chief Commissioner for Persons with Disabilities for this creative initiative.

-Meira Kumar (Smt.)

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## ***Foreword***

Physical fitness is important for all human beings irrespective of age or physical ability. Staying fit and active enables people with disabilities to maintain an optimal level of independence and control weight gain which can otherwise have an adverse effect on their independence and the quality of life.

It is imperative that sports and recreational facilities are barrier-free and adapted to the needs of all people equally. Often, most facilities are inaccessible to persons with disabilities. There are no disabled friendly equipments and trained personnel. Also, the literature for designing inclusive facilities is not available.

The Guidebook on Creating Sporting and Recreational Facilities for Persons with Disabilities' is an attempt by the Office of Chief Commissioner for Persons with Disabilities, Ministry of Social Justice and Empowerment, Government of India towards bridging this gap. The purpose of this book is to serve as a guide for people involved in planning, designing, construction, management and maintenance of inclusive sporting and recreational facilities.

We appreciate the effort of Ms. Shivani Gupta, Mr. Sachin Verma and Mr. Vikas Sharma of Access Ability, an organisation in the field of design and management of inclusive environments and promotion of independent living for persons with disabilities who have compiled this Guidebook.

While, information from international best known practices have been included in this Guidebook, its adaptability to the Indian context has been kept in view. The technical dimensions for different infrastructure are based on the literature review of national level guidelines on access published by the O/o CCPD and the CPWD.

This initiative is a humble beginning to consolidate the efforts of a large number of people already engaged in creating a barrier free environment for mainstreaming people with disabilities in all walks of life. We sincerely hope that this Guidebook becomes an important tool for all those who are concerned with planning, designing, constructing, managing and maintaining such inclusive sporting and recreational faculties in India and elsewhere. Although much care has been taken for accuracy of information, we welcome any feedback which may help us improve it further. Dated: May, 2007

Dr. Manoj Kumar Chief  
Commissioner for Persons With  
Disabilities

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## ***Acknowledgements***

With the completion of this guidebook, we have only made a beginning. Beginning of a quest for inclusion, independence and joy, for all who believe in the spirit of sports and recreation. The importance of this guidebook as a resource to create sporting and recreational opportunities for persons with disabilities will only be proven in time, but the fact that it is one of the first steps in that direction brings much joy and happiness. Compiling this guidebook has been a long, tiring and difficult task, yet full of

excitement, which was made easy by the encouragement and support showered to us from all.

First and foremost, we would like to thank the Office of Chief Commissioner for Persons with Disabilities (CCPD) and specially Mr. T.D. Dhariyal (Dy. Chief Commissioner), for his valuable inputs and encouragement in putting together this guidebook. We also sincerely appreciate the foresight of Mr. Rakesh Garg, Chairman cum Managing Director, NHFDC, in realising the importance of promoting sports and recreation for Persons with disability in India.

Also, we will like to thank Mr. Anuj Bhandari, a graphic designer by profession and a very patient friend, who spent many sleepless nights in designing and redesigning the cover page and layout of this book.

We wish to extend our appreciation and gratitude to the Indian Spinal Injuries Centre (ISIC), to allow us to inspect, interview and take pictures of various sporting and recreational activities that are being offered at their premises and to Ms. Pragya, Mr. Mohit Soni and Mr. Pradeep Lal for their contribution towards disabled sports and recreation in India.

Very special thanks to Rajiv Virat, Sunil and Vijay who are inspirations for everyone. And last but not the least, we will like to thank all our friends and family for instilling in us the belief that anything in life can be accomplished with hard work.

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**AccessAbility**  
<http://accessability.co.in>



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### ***Introduction***

#### **1.1 The Guidebook**

This guidebook has been compiled to encourage sporting and recreational activities for persons with disabilities. It provides useful information on a range of selected activities with an aim to assist agencies interested in providing sporting cum recreational activities for persons with disabilities. The intent of this guidebook is to provide comprehensive information to the reader on various aspects of a particular activity, so as to make decision making easier. For each activity the aspects covered are:

- Benefits expected from the activity for different disabilities
- Infrastructure requirements that includes accessibility standards that may be followed where there are some special requirements
- Aids and Appliances that may be required to make the activity more accessible to various disabilities
- Staff requirement including the kind of training the staff must have before supervising these activities
- Safety guidelines that may be required to be followed for each activity.

There are a total of 20 activities that have been detailed in this guidebook. These 20 activities have been selected from an array of activities that are practiced in different parts of the world by the disabled. The criterion of choosing these activities has been:

- Activities that may be suitable for most if not all disabilities
- Their suitability to the Indian climate and topography
- Cost effectiveness in developing the activity
- Ease in maintaining the activity
- Activities that may not required highly specialized staff (who may not be very easily locatable in India) to supervise
- Requiring not too highly specialized aids and appliances (that may not be very easily available in India)

Additionally, the guidebook also provides some good examples of such activities being practiced in various part of the world.

#### **1.2 Importance of Sporting and Recreational Activities for Persons with Disabilities**

Disabled people and rehabilitation professionals recognize the importance of sports and recreation in rehabilitation and healthy living of persons with disability. People with disabilities and chronic illnesses have a tendency to be less active due to their physical limitations. This inactivity can lead to:

- a decrease in cardio-respiratory fitness,
- osteoporosis,
- an increase in dependence on others,
- a decrease in social interactions,
- increased depression, tension and anger;
- Secondary complications.

**2**

Sports and recreation offers the opportunity to build self-confidence and focus on possibilities instead of dwelling on the disability. Competition improves sports skills. It allows individuals to experience the excitement of competition and the thrill of victory as well as the agony of defeat. These experiences help prepare individuals to face the adversity of a disability in their lives and

to learn to bounce back in the face of challenge and change.

Sport instills self discipline, a competitive spirit, and comradeship. Its value in promoting health, physical strength, endurance, social integration, and psychological wellbeing is of little doubt. It is not difficult to understand why sport is so important for the wellbeing of people with disability.

## **Beneficial aspects of sport**

### **Treatment**

Sport is increasingly being used as treatment complementing the conventional methods of physiotherapy. It helps to develop strength, coordination, and endurance. Some sports develop selected groups of muscles - for example, weight lifting and archery help to strengthen the arm muscles of paraplegic patients, enabling them to gain independence in self care activities.

Wheelchair sport such as basketball helps develop coordination as the disabled person has to propel the wheelchair and learn to pass, catch, and intercept the ball. Swimming is generally accepted as a valuable form of exercise and treatment facilitating, among other things, coordination, endurance, strengthening of back and leg muscles, and weight loss.

### **Social benefits**

Another important aspect of sport is the opportunities it provides for disabled people to establish social contacts. Disability that persists can cause deterioration of disabled people's attitudes towards themselves and result in self pity, disruption of self esteem, and social isolation. An adverse psychological reaction may be reinforced by the embarrassed attitude of the able bodied members of the community. Participation in sport can help physically disabled people to regain self esteem, promotes the development of positive mental attitudes, and helps them to come to terms with their disability and achieve social reintegration.

### **Sport for recreation**

Over the years, the realisation that recreational aspects of sport are important has led to the development of a wide range of outdoor activities, water sports, and indoor sports. Although integrated sport is desirable for all members of society, totally integrated facilities are not always possible. The sports that have become available to disabled people can be classified as:

-activities in which they may participate on equal terms with little or no modification (such as bowls, darts, archery, swimming, riding, table tennis);

**-existing sport that has been modified (such as wheelchair basketball, darts, javelin throwing, weightlifting);**

**3**

### **Competitive sport**

Increasing interest in sport has resulted in the development of competitive games. The competitive aspect of sport is important as it indicates a measure of attainment. As with sports for the able bodied, there are established rules and regulations for each sport, adapted for the disabled. Different rules and classifications have been worked out for particular sports to enable disabled people to compete on equal terms.

Disabilities recognised for international competitions:

- Paraplegia
- Amputation
- Locomotor disorders



- Cerebral palsy
- Cognitive Disabilities
- Visual impairment
- Hearing impairment

## **Medical aspects**

It is important that doctors assess the abilities of a person with disability and their cardiorespiratory function, which will help them to advise if precautions are indicated. Some medical conditions may prevent people from participating in a particular sport. For example, people with low cardiorespiratory endurance, retinal detachment, or hernias are precluded from strenuous activities. A person with a healed cervical spine fracture or fused cervical spine should be advised against playing a contact sport such as rugby. Sports with risks of cuts and falls cannot be advocated for people with haemophilia.

## **Physical disabilities**

The severity of disability may limit the availability of sporting activities that he or she will be able to pursue. Some sporting activities such as angling, kite flying, and bird watching require very little physical effort, whereas others such as wheelchair basketball, riding, and sailing require coordination and strength in one or both arms.

## **People with learning difficulties**

There are no reasons for restricting the participation for persons with cognitive disabilities but caution must be exercised when selecting sports for those with associated secondary physical limitations. Persons with genetic disorders may have associated, potentially dangerous physical abnormalities such as congenital heart disease. In persons with Down's syndrome the potential instability of the atlanto axial joint is of particular concern. Hyperextension or severe flexion of the cervical spine may produce severe neurological deficits or even death caused by compression of the lower brain stem and upper spinal cord. Opinions differ as to whether people with Down's syndrome should be allowed to take part in a contact sport. While USA has no restriction placed on participation if there is no evidence of instability or the joint has been stabilized, In the United Kingdom, however, recommendations are that any activity likely to put

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undue strain on the cervical spine should not be encouraged. Riding is not advisable for persons with cognitive disabilities who have communication difficulties or behavioral disorders.

## **Epilepsy**

The term "epilepsy" includes different forms of seizures with a wide range of severity and control. Although they are able to take part in any sport, restrictions are placed on their activities. Epileptic people who continue to have occasional seizures may require consideration. The unpredictability of having seizures, requires cautioned advice. Health and Safety concerns indicate that persons who are prone to seizures should not be allowed to participate in any water sport. The normal function of a life jacket while doing activities like rowing and sailing, is to turn the wearer on his or her back; a person who has suffered a seizure and is wearing a life jacket has a risk of airway obstruction by the tongue falling back. People with epilepsy should be advised to take part in sporting activities where they do not endanger themselves or others and should be accompanied by someone who is familiar with their needs.

## **Visual impairment**

People with visual impairment are generally fit unless there are other secondary disabilities. Their movements, however, are not as free as those of people who have no visual impairment.

The fear of falling or crashing against hard objects leads to stiffness of posture and movement. Sport and physical activity develop a sense of orientation in space and dynamic balance, and also, as with other disabilities, they help the visually impaired person to overcome frustrations and social isolation.

Visually impaired people are able to take part in many track and field events. Javelin, shot put and club throwing have been practiced by blind athletes for many years. Blind people have a tendency to deviate from their course, which is usually corrected by a calling system. Similarly, in howls the location of the jack is indicated by holding the arm of the bowler in that direction. Blind people are capable of swimming and their training does not materially differ from that of sighted people.

## **Hearing impairment**

People with hearing impairments are capable of playing all sports that are open to people with normal hearing. Some aids that would help in better integration of persons with hearing impairments are display screen/boards with written rules, visual signals to show start or finishing of the game, display boards to indicate scores. Sign language interpreters can also be involved.

## **Assessment**

Disabled people tend to seek information and advice from their doctor, who may not be fully aware of all aspects of the particular sporting activity being contemplated. Though, in competitive sport the disabled person is examined by a doctor or member of the paramedical profession, usually a physiotherapist, both of whom are familiar with the classification systems. Attempts have been made over the years to improve classifications, basing them on people's abilities rather than disabilities.

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## **Activities**

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### **2.1 Martial Arts**

Martial Arts Martial Arts is a popular sport and the popularity is growing rapidly among individuals with disabilities. There are currently many styles of martial arts. While each one is different from the other, they all work on the same basic principles, but have been changed to meet the needs of the participants. There is a martial arts style for everyone; classes can be specialized just for children or designed for the whole family to train together. Martial arts are broadly divided into two styles, hard and soft, based on the way a person uses their energy in training. This allows people the choice of the type of training that will fit their needs.

Karate, one of the oldest types of Martial Arts, focuses on both physical and mental power. It combines smooth, flowing movements with sudden kicks and strikes. Karate covers a broad spectrum of self-defense, and is practiced by men, women, and children of all ages and abilities. People practicing karate need not to have full use of their limbs, and it can be practiced from a sitting position or even from the floor. Karate only requires some ability to move, a desire to learn, and a commitment to hard work. Wheelchair karate, which is a fairly new sport, was introduced at the 1992 Paralympics Games and is continuing to grow as a sport.

The martial arts have benefits for people of all ages and health levels. The fact that a person has a disability should not limit or prevent them from training in martial arts. For example Tai Chi is one form of martial arts that may be of special interest to persons with disability. It is not a vigorous type of exercise and can be an excellent choice for an individual who lacks physical

conditioning or the self-confidence. Tai Chi is a gentle repetitive exercise that required continuous motion of joints, accompanied by deep, diaphragmatic breathing, the exercises can improve flexibility, range of motion, muscle strength, and balance.

### **2.1.1 Benefits expected**

Persons with the following disabilities will benefit from martial arts :-

- Persons with vision impairments
- Persons with mental retardation
- Persons with hearing impairments
- Persons with physical impairments.
- Multiply disabled persons like deaf blind, cerebral palsy, tetraplegia etc



Benefits of different forms of Martial Arts include:

- Promotion of physical fitness.
- Deeper mental awdationareness and self control.
- Respect and an understanding of oneself and others.
- Improvement of range of motion, balance, endurance, coordination, concentration, flexibility and stamina.



- A strong social dimension from which many friendships can be fostered.
- Promotion of relaxation and reduction of stress.
- Improved lung capacity.
- Improved function of the digestive system.
- Enhancement of cardiovascular and respiratory function.
- Improved balance and posture.
- Prevention of falls:
- Increased flexibility and range of motion of joints.
- Reduction of pain.
- Improved attention and concentration.
- A practical method of self defense.

### **2.1.2 Infrastructure**

Martial arts can be practiced both outdoors and indoors. In case being practiced indoors, a hall may be suitable and for outdoor practice, it can be practiced on any firm ground. Outdoors it may be practiced on a grass lawn too..

## Indoor Practice Hall

- Must not have any changes in levels
- The floor finish should be non slippery. Ceramic tiles must be avoided. Wooden floor or linoleum are recommended
- The entrance door to the hall should be no less than 900mm wide.
- The illumination level within the hall must be no less than 300 lux
- For the facility to be used by persons with vision impairment, it is important to ensure for:  
-Adequate colour contrast - there should be adequate (30 point difference in LEV) colour and tonal contrast between the floor and the walls of the hall. Also have colour contrast between the wall and the ceiling.

-Avoidance of glare - the floor finish must be non glary. Also in case there are windows that bring natural light, care must be taken that they do not produce glare. Venetian blinds may be used to cut on glare.

- Preferably be on the ground floor. In case on upper floors should be accessible by either an elevator or a gentle ramp with a gradient no more than 1:15. For design specifications for ramps please check the annexure

- A toilet facility should be provided close to this hall. It should be an accessible facility.

Design specifications of an accessible toilet are given in the annexure

- Changing rooms will need to be provided in proximity to the Martial Arts training facility. There are three main points to consider when designing a changing room that will be used by disabled people:

-It is important that adequate illumination, appropriate colour and tonal



contrast be incorporated in the changing room.

- The changing facility should be accessible to persons using wheelchairs and should also have adequate sitting areas for persons with ambulatory disabilities such as ones who may be using crutches and will need to sit down. Some wheelchair users may need to transfer to a bed or a bench to be able to dress and undress their lower body.
- Where space constraints restrict providing adequate maneuvering space in the common changing area to facilitate independent use by persons using wheelchairs, it may be considered to design the toilet in a larger space to provide at least one accessible toilet-cum-changing room. This decision will, however, depend upon the number of wheelchair users who are expected to visit the facility. Whereas providing a combined toilet-cum-changing room may be appropriate for a facility that is only frequented by a couple of wheelchair users but where the facility will be used for training e.g. a team of wheelchair users, such as for Paralympics, it is imperative that the common changing rooms be designed appropriately to reflect the expected usage.  
Please check the annexure for design specifications for an accessible common toilet-cum-changing facility.
- The hall should be very well ventilated.
- The minimum space requirement  
The ceiling height should be minimally 3600mm.  
A room of 9 m X 15 m will be sufficient for about 12 students.  
The hall should preferably be rectangular in shape.  
The minimum space requirement per student is about 11 square meter.

## Outdoor practice Area

Outdoor practice areas can be created in a way that they add additional interest. A semi covered space such as a pergola may be considered. Martial Arts can be practiced in the open air on

grass. The minimum space requirements for both indoor and outdoor facility remains the same. Other design considerations that need to be followed are:

- The outdoor space should completely be on one level
- There needs to be a paved pathway (1800mm wide) leading to the activity area from the entrance. Pathway design needs to include the following:
  - The pathway should be levelled and obstacle free
  - Warning blocks should be laid before an obstacle, if any, and where the pathway turns
  - The pathway to have a maximum of 150mm high edge protection on both sides, which may be used to provide guiding clues by persons with vision impairments who use guiding canes. Or else, have tactile guiding blocks laid along the entire length of the pathway.
- A toilet facility should be provided close to this hall. It should be an accessible facility. Design specifications of an accessible toilet are given in the annexure.
- Adequate changing facilities, as detailed in the 'Indoor Practice Hall' above, need to be provided in proximity to the training area. Please refer to the annexure for ' design details of the changing area. There should be a drinking water facility near the area.



### **2.1.3 Aids and Appliances**

There are no special aids or appliances that are required for practicing martial arts. The regular aids that are required for martial arts are:

- Training floor mats
- Martial arts uniform
- General Training Equipment -such as ankle and wrist weights -
- Sparring gear - head guard, shin guard, wrist gloves, chest guard etc.
- Weapons, if required, should have handles adapted for persons with low dexterity.

### **2.1.4 Staff**

A qualified martial arts instructor with understanding of disability will be able to coach persons with disabilities. It is important that he or she be aware of the limitations and the abilities of various disabilities so as to design suitable training programmes. 'Having a physiotherapist to assist the martial arts instructor in putting together a training' schedule is advisable. For pupils with hearing impairments, it is advisable for the instructor to have the knowledge of sign language.

Martial arts exercise schedules may have to be adapted for persons with disabilities.' Initially it may be required to have one to one sessions with the instructor before getting into a group.

### **2.1.5 Safety Guidelines**

While martial arts training is not a dangerous activity, some safety guidelines that need to be followed are:

- The flooring should be resilient and non slippery.
- Do not have any sharp edges in the area where the activity is being held.
- Floor mats must be used for persons with poor balance. Care must be taken to ensure that the floor mats are appropriately fixed/ tied down at edges so that they do not move when someone is standing and training on them.
- Also persons with poor balance may be encouraged to use a head guard.
- Before starting martial arts it is important that the instructor evaluates each student's strengths, endurance and physical challenges such as spasticity, hypertonicity, hypotonicity etc.



- A talk with the student's guardians, carers and physician is advisable to know of any restrictions and medication the pupil may be on.
- The instructor must be aware of the student's medical condition, such as epilepsy, so that they are prepared in case a seizure occurs.

The sessions need to be customised based on student's personality, behaviour and attention span.

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## 2.2 Yoga

Yoga is an ancient Indian practice the purpose of which is for each individual to be healthy, both physically and mentally, and be able to reach his or her highest potential as a person. Yoga can be as beneficial for individuals with disabilities through both the physical postures and breath-work. Each pose can be modified or adapted to meet the needs of the student. Yoga asanas can also be performed while seated in a chair or wheelchair.

The yoga asanas tone and strengthen the muscles and increase flexibility. The different asanas, particularly the twists and inversions, stimulate internal organs, as well as the nervous system, and promote circulation in all the body's major organs and glands.

Practicing yoga demands paying close attention to breathing thereby helping steady and focus the mind into a state of meditation. As the mind becomes more focused and directed, concentration improves as does a sense of mental balance.

The relaxation that occurs during yoga practice can be physical, mental and emotional. When we are completely relaxed we consume very little energy or 'prana', and more energy is preserved within the body to help maintain its healthy functioning.

### 2.2.1 Benefits Expected

Persons with any kinds of disability will benefit from practicing yoga, including:

- Persons with vision impairments.
- Persons with mental retardation.
- Persons with hearing impairments.
- Persons with physical impairments.
- Multiply disabled persons like deaf blind, cerebral palsy, tetraplegia etc.



Overall health benefits from practicing yoga can be seen in:

- Digestive system. Bending and stretching poses help move and stimulate the digestive system.
- Cardiovascular and cardiopulmonary systems. Specific types of yoga can be a good form of aerobic exercise that increases one's heart rate. The practice of pranayama helps expand lung capacity and heart strength.
- Lymphatic system. This is a primary component of an individual's immune system. Unlike blood, the lymphatic system has no pump. Instead it relies on muscle activity and body movement for circulation. Physical activity and stretching (yoga asanas) propel lymph, and also develop strong muscles that continually encourage lymph movement. Regular practice of pranayama stimulates the action of the lungs, diaphragm and thorax which are a primary pump for the lymph fluid.



- Skeletal system and muscular systems. Asanas encourage the individual to keep his or her body in proper alignment. Regular yoga practice strengthens the muscles and increases overall flexibility.

Apart from this yoga helps in:

- Enhanced Motor coordination.
- Increased body awareness and orientation.
- Developing focus and improving concentration.
- Reduced stress and depression.

### **2.2.2 Infrastructure**

The infrastructure required for yoga is same as the requirements of martial arts (please refer to the Infrastructure section of Martial Arts) As an addition for yoga it may be considered to have a few raised platforms of height 500mm width 900mm and length-1800mm to aid students on wheelchairs to transfer easily to do the mat exercises..

### **2.2.3 Aids and Appliances**

Advantage of incorporating yoga practice as part of an individual's exercise program is that it does not require any special equipment. Typically, only a yoga mat or rug is required. However, having some facial tissue within arms reach comes in handy during breathing exercises when the individual needs to clear his/ her nostrils. Yoga props such as blocks and straps aid in practicing an asana safely.

### 2.2.4 Staff

A qualified yoga instructor with some basic understanding of disability will be able to coach persons with disabilities. It is important that he or she is aware of the limitations and the abilities of various disabilities so as to design suitable training programme. Having a physiotherapist to assist the yoga instructor in putting together a training schedule is advisable.



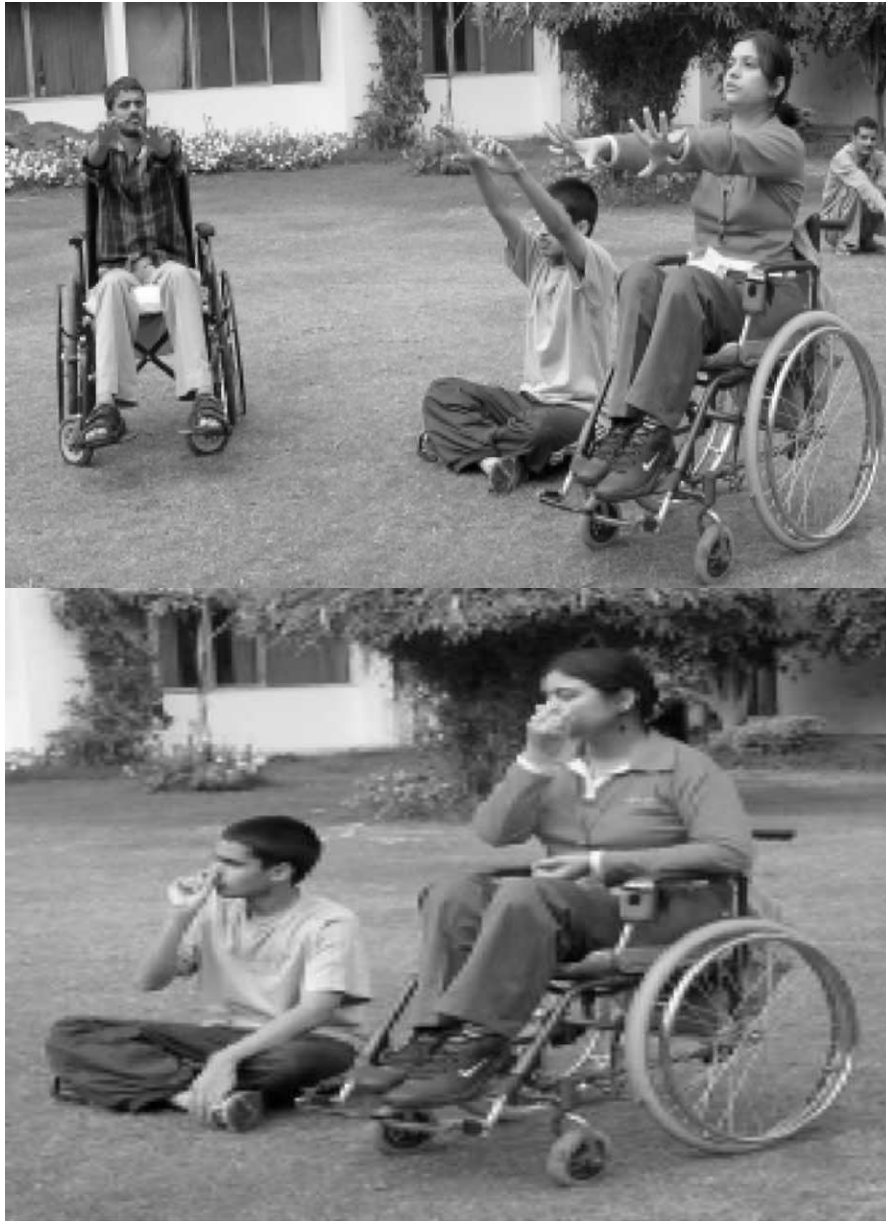
**In a yoga class for individuals with disabilities, yoga asanas are modified or adapted, and may require instructor's active assistance to perform. The instructor may be required to get the disabled person into and out of a posture. Practice must be started with one-to-one yoga instruction, then progress to group classes when the individual is ready. For pupils with hearing impairments, it is advisable for the instructor to have the knowledge of sign language.**

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### 2.2.5 Safety Guidelines

- Before starting yoga it is important that the yoga instructor evaluates the student's strengths, endurance and physical challenges such as spasticity, hypertonicity, hypertonicity etc. A talk with the student's guardians, carers and physician is advisable to know of any restrictions and medication the pupil may be on.
- The instructor must be aware of the student's medical condition, such as epilepsy, so that they are prepared incase a seizure occurs.
- The sessions need to be custom made based on pupil's personality, behavior and attention span. For example for someone who is hyperactive and easily distracted the session may incorporate lesser asana and more of pranayama exercises.
- Do not have any sharp edges in the area where the activity is being held





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## 2.3 Gardening

Gardening is one of the most popularly practiced hobby around the world. When one thinks of gardening the image that comes to mind is of a person bending and kneeling. But with a few adaptations gardening can be as enjoyable an activity for persons with disabilities as for the non disabled persons.

### 2.3.1 Benefits Expected

Persons with any kind of disability will benefit from gardening, including:-

- Persons with vision impairments.
- Persons with mental retardation.
- Persons with hearing impairments.
- Persons with physical impairments.
- Multiply disabled persons like deaf blind, cerebral palsy, tetraplegia etc.

The benefits that persons can get from gardening include:

- It makes one feel relaxed and calm.

- Retreating to a garden can renew energy, create a sense of peace and restore wellbeing.
- Working in the garden digging, planting, weeding, and raking is good exercise.
- In a garden one can create and control their environment; which can be empowering.
- It assists in improving eye-hand coordination and physical endurance.
- Provides an opportunity to utilise one's creativity and the visible results enhance self-confidence.
- The garden neither judges nor discriminates. It's a safe environment where people of all ages, backgrounds, and abilities can come together, connected by the, simple fact that we all rely on the earth to survive.

### 2.3.2 Infrastructure

A garden designed to Universal Design standards will be accessible to all. An accessible garden must use containers, raised beds and vertical gardens to raise planting areas within easy reach, and a collection of tools that enable people with disabilities and others who have difficulty using conventional gardening tools to enjoy gardening.

For the garden to be accessible it should not have any changes in level. Some other basic design principles that need to be considered while building an accessible garden are:-

- Have accessible parking bays at the main entrance of the accessible garden.

Design specifications of an accessible parking are given in the annexure.

- Have an accessible toilet near the garden. Design specifications of an accessible toilet are given in the annexure.

• The use of different sounding wind chimes and audible water features can be a good orientation tool to persons with vision impairments. • Have a tools shed in the garden which is connected by the pathway and is on the same level.

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- Heights of all tools, containers and planters should be reachable from a sitting position on a wheelchair
- There should be provision of sitting areas for persons with ambulatory disabilities.
- Care must be taken to ensure that the plants do not encroach on the pathway and that clear headroom of 2 meters is available along the entire circulation area.

### Paved Pathway

• For safe movement in the garden, it is important that a firm, well drained, level, hard surface is provided especially for people using assistive mobility equipment or people whose balance and coordination is impaired. Some suggestions of materials that may be used for making the pathway include brick paving, concrete paves, crushed stone (compacted), or checkered tiles.



- This pathway must connect all parts of the garden from the main entrance.
- Have a maximum of 150mm high edge protection on both edges of the pathway to provide guidance to persons with vision impairments using guiding canes.
- Have tactile warning blocks at the beginning and end of the pathway and also where the pathway turns. Also having a different textured and coloured pave in front of any facility like benches, water fountain etc will be a guiding tool to persons with vision mpairments.

• **The width of the pathway if planned to be one way, should be 1500mm and if planned to be two way should be 2000mm.**



## **Water**

Water should be available, close to the garden site and in a paved area so the ground does not get muddy. Place the spigot at 600mm to 900mm above ground and use hand levers

## **Flower Pots**

- The flower pots used should range in a height of 400mm to 600mm so that anyone can easily work easily on them.

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- The diameter of the pot should not be more than 1500mm when useable from all sides.
- Pots lower than 400mm height can be placed over a ledge to give them appropriate height

## **Raised Beds**

- Raised beds are large bottomless boxes that contain soil and permit drainage below. Height of the sides can vary from 450mm for a child, to 600mm for someone seated in a chair next to the bed, to 750mm to a meter high for the standing gardener who has difficulty bending downward.
- Bed width should be a maximum of 1500mm if accessible from all sides or 750mm if used from only one side. Seating ledges should range from 200mm to 350mm wide.
- Raised beds can be made of various materials such as brick, stone, wood etc.



### **Table Planters**

These are shallow soil filled trays supported on legs. The depth of these trays is about 200mm to 250mm. There needs to be clear knee recess ranging from 500mm to 680mm high.



### **2.3.3 Aids and Appliances**

Gardening tools should be efficient, comfortable, easy to use, and long-lasting. The tools used should be long handled, light weight and easy to grip. Extra straps may be used to assist for a better grip of tools for persons who have impaired hand dexterity.

The tools should be in bright colours, other than green, so that they are visible to persons with low vision.

**Simple adaptations like inserting tool handles into the foam rubber used for pipe insulation can help those with limited grasp. Attach small gardening tools to the wrist and forearm with splints or with straps may be very effective.**

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### **2.3.4 Staff**

While there is no requirement for a trained staff to assist in gardening but presence of an occupational therapist can be of great benefit especially to assist in adapting the tools to suit various disabilities.

Apart from an occupational therapist having a few garden assistants is advisable to help all disabled persons who may require help in gardening.

### **2.3.5 Safety Guidelines**

While there can be very few expected accidents in gardening, but some points that may be considered are:

- The use of chemicals and insecticides in the garden can be done with the assistance of a garden helper to avoid any accidents.
  - Constant presence of assistants is also required to act immediately in case of an emergency
  - The pathway floor finishes used should be slip resistant when wet
- All tools should be kept properly and not scattered around so as to avoid becoming trip hazards.*

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## **2.4 Swimming and Aquatic Therapy**

For many people with disability swimming is one of the few forms of pleasurable exercises available and it has several intrinsic advantages over other sports. It is an excellent recreational, competitive and therapeutic activity that can be enjoyed indoors or outdoors. Swimming provides freedom to many disabled people who are otherwise immobile; and it may be a welcome challenge to many who lead a relatively sheltered risk free life. Disabled swimmers may not swim very powerfully, but this does not matter as long as they are able to stay afloat. Aquatic therapy or pool therapy consists of an exercise program that is performed in the water. It is a beneficial form of therapy that is useful for a variety of medical conditions. Aquatic therapy uses the physical properties of water to assist in patient healing and exercise performance. Adapted aquatics are techniques that emphasize on swimming skills modified or adapted to accommodate individual abilities.

Usually used for people with disabilities, adapted aquatics focuses on skills including

**pool entry and exit and swimming skill development.**



### 2.4.1 Benefits Expected

Conditions in which Aquatic therapy and swimming are particularly beneficial are:

- Sensory Disorders
- Limited Range of Motion
- Muscular Weakness
- Poor Motor Coordination
- Pain
- Spasticity
- Perceptual/Spatial Problems
- Balance Deficits
- Respiratory Problems
- Circulatory Problems
- Depression/Poor Self-Esteem
- Cardiac Diseases
- Joint Replacement
- Motor Learning
- Orthopedic Injuries / Trauma
- Obesity
- Prenatal
- Neurological (MS)
- Osteoporosis
- Rheumatology (Arthritis)
- Persons with mental retardation

Benefits that swimming provides to the swimmer are:

- Excellent form of aerobic exercise which increases cardiovascular function.

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Water buoyancy reduces stress on joints and improves balance and agility

- An individual's weight while in the water is only about 10% of normal weight.

Water provides resistance, which improves muscle strength. This is especially beneficial when strengthening of specific muscle groups such as back muscles in persons with chronic low back pain or leg muscles in persons with incomplete paraplegia.

- Helps increase stamina and perseverance.
- Improves confidence and comfort in and around water.
- Increase in social interaction.



### **2.4.2 Infrastructure**

- Accessible parking should be provided close to the entrance. Design specifications of an accessible parking are given in the annexure.
- The route from the accessible parking till the pool should be step free. The route should be 1500mm wide minimally.
- Bare feet on wet floor surfaces make movement more difficult and more dangerous for the ambulant disabled person. Therefore the floor finish in the pool and shower area to be carefully selected to be slip resistant even when wet.

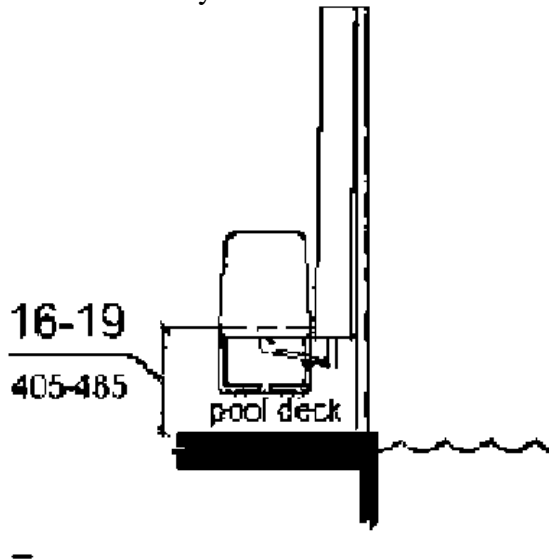


### **Entering the Pool**

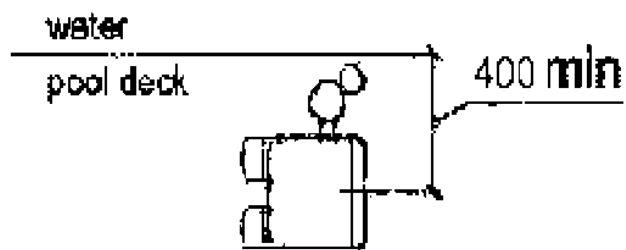
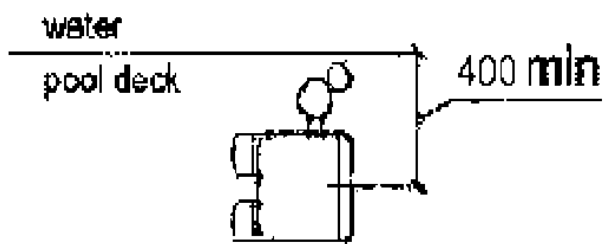
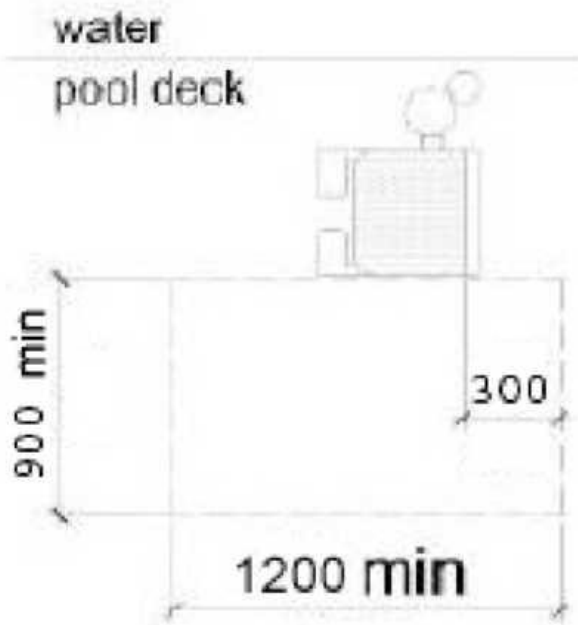
- For a pool more than 91 linear meter two accessible means of entry, one primary and one secondary should be provided for each public use and common use swimming pool. The primary means of accessible entry being either a swimming pool lift or a sloped entry. The secondary means of entry being swimming pool lift, sloped entries, transfer wall, transfer system or pool stairs. The design specifications of all these entry systems are detailed below.
- In an indoor facility a ceiling hoist may also be used instead of a pool lift
- Where the pool is less than 91 linear meter at least one accessible means of entry should be provided—either a swimming pool lift or a sloped entry.
- There must be a provision for accessible toilets, shower areas and dressing rooms near the pool. Design specifications of these are in the annexure.

## Design Specifications for a Swimming Pool Lift

- The pool lift should be located where the water in the pool does not exceed 1200mm.
- In the raised position, the centerline of the seat should be located a minimum of 400mm over the deck from the edge of the pool. The deck surface between the centerline of the seat and the pool edge shall have a slope not greater than 1:48
- On the side of the seat opposite the water, a clear deck space should be provided parallel with the seat. The space should be a minimum of 900mm wide and should extend forward a minimum of 1220 mm from a line located 300mm behind the rear edge of the seat. The clear deck space should have a slope not greater than 1:48
- The height of the lift seat should be a minimum of 400mm to a maximum of 500mm measured from the deck to the top of the seat surface.
- The seat should be a minimum of 400 mm wide.
- Footrests should be provided and should move with the seat. Armrest (where provided) on the transfer side of the lift should be removable or should fold clear of the seat when the seat is in the raised (load) position
- The lift should be designed so that the seat will submerge not more than 450mm to a water depth below the stationary water level.







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### Design Specifications for a Slope Entry

- The slope provided should be minimum 900mm wide with a gradient not more than

1:12

- Aquatic chairs may be provided to the users at the deck. The disabled user can leave their wheelchair on the deck and transfer to the aquatic chair to get into the pool via the slope entry.
- The slope must extend to 600mm minimum to 750mm maximum, below the stationary water level. This is important for the individuals using the slope entry to get buoyant.
- Where the slope entry has a slope greater than 1:20, a landing at both the top and bottom of the ramp is required. At least one landing should be located between 600mm and 750mm below the stationary water level. Landings should be a minimum of 900mm in width and 1500mm in length.
- The slope entry may be a maximum of 750mm at 1:12 slope before an intermediate landing is required.
- Adding a solid wall on the side closest to the water can enhance safety.
- Handrails must be provided on both sides of the slope entry. Handrail extensions are only required at the top but not at the bottom (in the water).
- The clear width between the handrails should range from 800mm to 950mm. The height of the handrail must range from 850mm to 950mm.



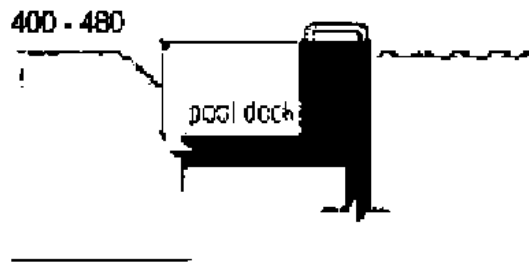
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### **Design Specifications for Transfer Walls**

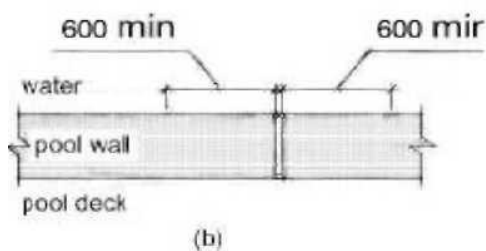
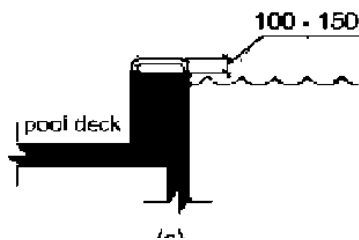
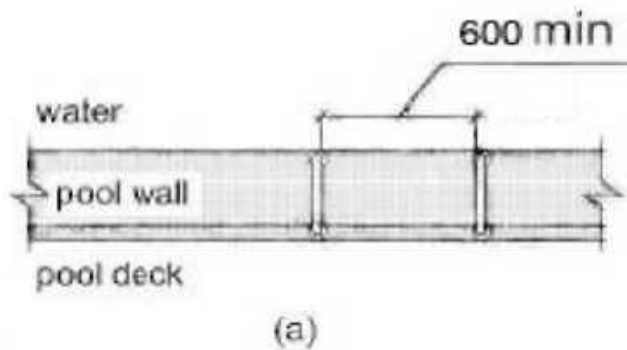
- A transfer wall is a wall along an accessible route that allows a person to leave a mobility aid and transfer onto the wall and into a pool.
- Transfer walls must have at least one grab bar which is perpendicular to the pool and extend the full width of the wall so that a person can use them for support to get into the water.
- The top gripping surface should be 100mm to 125mm above the wall to provide leverage to the person using the bars.
- If only one bar is provided, the clearance of 600mm should be provided on both sides of the bar. If two bars are provided, there should be a clearance of 600mm between the two bars.
- A clear deck space of minimum 1500mm X 1500mm, with a slope not more than 1:48, must be

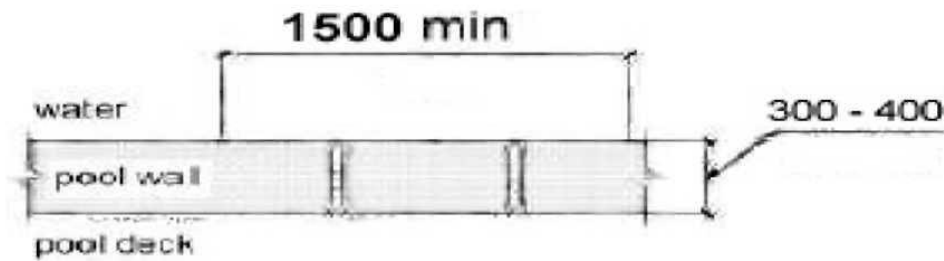
provided at the base of the transfer wall to allow persons using a wheelchair to turn around and access the wall.

- The height of the transfer wall should be between 480mm (minimum) and 500mm maximum from the deck.
- The transfer wall should be minimally 300mm to 400mm wide. The length of the wall should be minimally 1500mm wide, centered on the clear deck space.
- The surface of the transfer wall must have rounded edges and be of a non-abrasive finish.



**Transfer Wall Height**





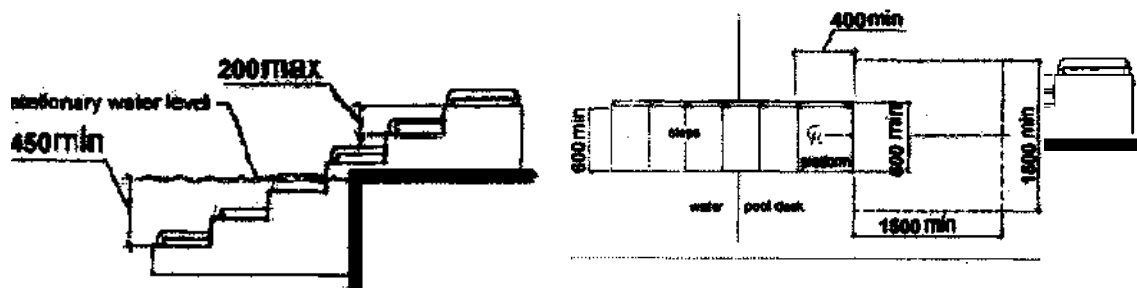
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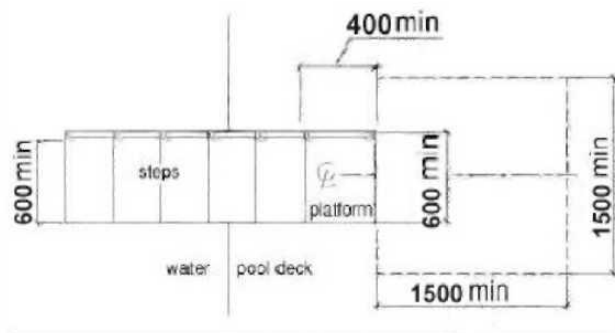
## Design Specifications of a Transfer System

- A transfer system consists of a transfer platform and a series of transfer steps that descend into the water. Users need to transfer from their wheelchair or mobility device to the transfer platform and continue transferring into the water, step by step, bumping their way in and out of the pool.
- Each transfer system must have a platform on the deck surface minimally 480mm deep and 600mm wide, that provides enough space for the person to transfer, maintain balance and maneuver easily on the top..
- The height of the transfer platform should be between minimum of 480mm to a maximum of 500mm.
- A clear deck space of minimum 1500mm X 1500mm, with a slope not more than 1:48, must be provided at the base of the transfer system to allow persons using a wheelchair to turn around and access the platform.
- This space must be centered along a minimum of 600mm unobstructed side of the platform.
- The maximum height of each transfer step should be 200mm, although shorter heights are recommended. Tread depth of the steps being a minimum of 350mm and maximum of 420mm.
- The steps must extend into the water a minimum of 450mm below the stationary water level.
- The surface of the transfer system must have rounded edges and be of a non-abrasive finish.
- Grab bars must be provided atleast on one side of each step and the transfer platform. The bar must not obstruct transfer onto the platform. The height of the grab bar must be a minimum of 100mm to a maximum of 150mm above each step.

OR

- As a continuous grab rail serving each step and the platform. The rail must not obstruct transfer onto the platform. The height of the continuous grab rail must be a minimum of 100mm to a maximum of 150mm above each step nosing.





Pool Deck and Transfer System

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## Accessible Pool Stairs

- Accessible pool stairs are designed to provide assistance with balance and support from a standing position when moving pool deck into the water and out.
- The steps must have a uniform riser of 150mm and tread of 300mm. Open risers are not allowed.
- The pool stairs must have handrails on both sides. The distance between the two rails must be 500mm minimum to 600mm maximum.
- Handrail extensions are required on the top of the landing of the stairs and not on the bottom.
- The height of the handrails must be 850mm to 950mm from the step nosing.
- Handrail if mounted on wall must have a clearance of 400mm between the wall and the rail.

### 2.4.3 Aids and Appliances

The main aids required will be either a swimming pool lift or an aquatic chair for the slope entry. These are important because either one of these have to be used as the primary entrance to the pool.

Apart from this it will be important to have safety equipment like air tube floats, shoulder floats, items for pool games like a ball, weight equipment, foam bars, aquadynamic balance rings, fins etc.



### 2.4.4 Staff

Physiotherapists, with experience in hydrotherapy, should be able to supervise aquatic

therapy for persons with disabilities while for swimming it is advisable to have a swimming coach along with the physiotherapists to assist. For pupils with hearing impairments, it is advisable for the instructor to have the knowledge of sign language.



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### 2.4.5 Safety Guidelines

Swimming pools are intrinsically unsafe areas but some common hazards include:

- Wet surfaces and bare feet, a combination of which increases the likelihood of slipping.
- Unclothed bodies and hard surfaces increase the likelihood of injury if slips or trips occur.
- Deep water areas where poor swimmers may get into difficulties.
- Shallow water areas where diving by unskilled persons may lead to spinal or head injuries of a serious nature.
- Diving boards, which when used by unskilled persons, or when not properly supervised, can be a source of serious injury.

Points that may be important to consider are:

- The floor finish in the pool vicinity should be non-slip with no sharp edges.
- It is advisable to refer persons with multiple disabilities to a doctor before starting this activity.
- Persons suffering from epilepsy and seizures should avoid this activity lest they get a seizure while in water. In case swimming, they must swim with someone who can handle seizures. Also the lifeguard must be aware of how best to assist persons having seizures.
- It is important for the disabled person to feel confident before they can be left alone
- In case of a swimming pool be sure to have life guards deployed on duty when swimming is in progress

There are many ways to communicate with and to teach individuals with disabilities in an adapted aquatics program. The following are some ideas that one can implement in the aquatic setting:

- Use physical guidance and Braille to help teach skills.

- Teach swimming skills on a floor mat on the pool deck before moving to the water.
- Use support equipment to help improve stability in water.
- Use hands to help stimulate independent movements.
- Use cues to help trigger movement responses.
- Start in the shallow end and progress to deeper water.
- Always communicate to the swimmer at all times, even if swimmer is non-verbal.
- Encourage independence as often as possible.

• *Use skill checklist to track progress.*

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## **2.5 Therapeutic Horse Back Riding**

Therapeutic riding is an emerging field in which horses are used as a tool for physical therapy, emotional growth and learning. Many riders experience a connection with the horse that few sports can create. For those riders who cannot walk, the horse is their vehicle of transport. Not only does this help raise their self-esteem but it also teaches them essential skills. It improves balance, creates trust and creates a friendship between rider and horse.

### **2.5.1 Benefits Expected**

Horse riding is beneficial for a range of disabling conditions. Some of them are mentioned below:

- Amputee
- Brain Injuries
- Cardiovascular Accident/Stroke
- Cerebral Palsy
- Down's Syndrome
- Emotional Disabilities
- Hearing Impairments
- Learning Disabilities
- Multiple Sclerosis
- Muscular Dystrophy
- Post Polio
- Spina Bifida
- Spinal Cord Injuries
- Visual Impairments



The benefits of horseback riding are as numerous as the types of disabilities and conditions served. Therapeutic riding experience can bring physical, emotional and mental rewards. Because horseback riding gently and rhythmically moves the rider's body in a manner similar to a human gait, riders with physical disabilities often show improvement in flexibility, balance and muscle strength.

For individuals with mental or emotional disabilities, the unique relationship formed with the horse-can lead to increased confidence, patience and self-esteem. The sense of independence experienced through horseback riding benefits all who ride.

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### **2.5.2 Infrastructure**

The infrastructure required is no different from a regular horse riding facility that includes a stable and a riding arena. It is recommended to have a mounting platform to get on the horse.

### **2.5.3 Aids and Appliances**

Adaptive riding equipment ranges from custom-made products tailored to fit the needs of a particular rider to multi-purpose products used for a variety of riders with different disabilities. A few examples include:

Walker Belt

Walker Belt is worn around the waist and provides two secure hand holds for persons walking beside the rider. The hand holds allow the 'side-walkers' to keep the rider firmly



positioned in the saddle.



#### Therapeutic Saddle

Therapeutic saddle provides a much more stable base for the rider as it has an extra support element for the back and a large, easily grasped handle in the front.



#### Mounting Ramp

A mounting ramp allows an easier mounting access for a person who uses a wheelchair for mobility or a person who may have difficulty with the traditional mounting procedure.

#### Helmet

A helmet is an important safety equipment which protects the riders from any serious head injuries and must be worn at all times.



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### 2.5.4 Staff

The staff required is a therapeutic riding instructor. In case it is difficult to get one it may be considered to have a riding instructor who will work as a team with an occupational therapist and/ or a physiotherapist. For persons with hearing impairments, it is advisable for the instructor to have the knowledge of sign language.

### 2.5.5 Safety Guidelines

- It is important that physical and occupational therapists, along with the instructors and primary caregivers develop individualized riding plans with educational, recreational and therapeutic goals for each rider.
- Initially the rider must be given ample opportunity to become acquainted to the horse and vice versa.
- The rider must always wear a helmet.
- There should be ample time given to the disabled rider to recognize their abilities and limitations before progressing into next practice stages

- The riding instructor must select a horse to match the rider's age, skill, experience and size.
  - Inspect all riding equipment to ensure that it is free of damage and secured properly.
  - Riders should wear properly-fitted, sturdy leather boots with a minimal heel. Clothing should be comfortable and not too loose.
  - Use safety stirrups that break away in the event of a fall.
  - Riders should ride on open, flat terrain and should not attempt jumps or stunts unsupervised.
- Riding should be avoided when medicated or tired.



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## 2.6 Scaled Models

Many people depend on touch to gain primary information from the environment. Especially for persons with vision impairments touch provides a sense of scale, design, shape, rather the complete understanding of an element in the environment. The element explained verbally definitely does not create the same image as may be formed from touch. A scaled model gives a real experience of the world to persons with vision impairments. Scale models are models of large objects such as airplanes, ships, automobiles, animals, anatomical models etc that are made to a scale that can be felt.

Scaled models in an outdoor facility can greatly increase the learning for persons with vision impairments apart from increasing the aesthetics of the place. Having scaled models will also, in a large environment, serve as landmarks and way finding tools, assisting in orientation of persons with vision impairments.

### 2.6.1 Benefits Expected

Scaled models will be of maximum benefit to the blind and the deaf blind. They will also benefit children with cognitive disabilities. The benefits gained will mostly be in the form of good learning experience and an opportunity to know about things they have only heard of.

When carefully selected, these models can also be used as means of promoting arts that will

enhance the overall aesthetic appeal of the facility.

### **2.6.2 Infrastructure**

Depending upon the size of the model it can be placed either indoors or outdoors. If placed outdoors it may be important to have some shade over the model. The material used for the model must be safe for touch and not get too hot to touch in summers.

There should be levelled access up to the model.



### **2.6.3 Aids and Appliances**

**None, except disposable gloves may be needed for people who are prone to hypersensitivity against the material/ coating of the model.**

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### **2.6.4 Staff**

None, except someone to give an audio description of the model to persons with vision impairment.

### **2.6.5 Safety Guidelines**

*There are negligible risks involved in this activity. The choice of material used should be well considered. The final finish of the model should be smooth and non abrasive. There should be no sharp corners in the model. The material should not get too hot in summers, making it difficult to touch.*

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## **2.7 Cycling**

Apart from good health and mobility cycling for the disabled is also a competitive sport played in the Paralympics since 1988.

### **2.7.1 Benefits Expected**

Cycling is beneficial for a range of disabling conditions. Some of them are mentioned below:

- Amputee
- Autism
- Brain Injuries
- Cardiovascular Accident/Stroke
- Cerebral Palsy
- Down's Syndrome
- Emotional Disabilities
- Hearing Impairments
- Learning Disabilities
- Mental Retardation
- Multiple Sclerosis
- Muscular Dystrophy
- Post Polio
- Spina Bifida
- Spinal Cord Injuries
- Visual Impairments
- Deaf blind
- Persons with mental retardation



According to the National Forum for Coronary Heart Disease Foundation, UK, regular cyclists enjoy a fitness level equal to that of a person ten years younger. Also cycling at least 40 km a week reduces the risk of heart disease to less than half that for non-cyclists who take no other exercise.

Second to walking, cycling is probably the cheapest and the most eco-friendly mode of transport. It is a mode of travel that can provide mobility to persons confined due to poor mobility.

Bicycles are also the healthiest mode of travel producing absolutely no pollution - they are a lot quieter too.

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Cycling is an activity that can be enjoyed by persons with disabilities along with their friends and family, hence increasing bondages and fun.

### **2.7.2 Infrastructure**

Cycling can be practiced on a regular athletic track, on lanes, sidewalks and roads. As a competitive sport it is either played as a track event at a velodrome or a road event.

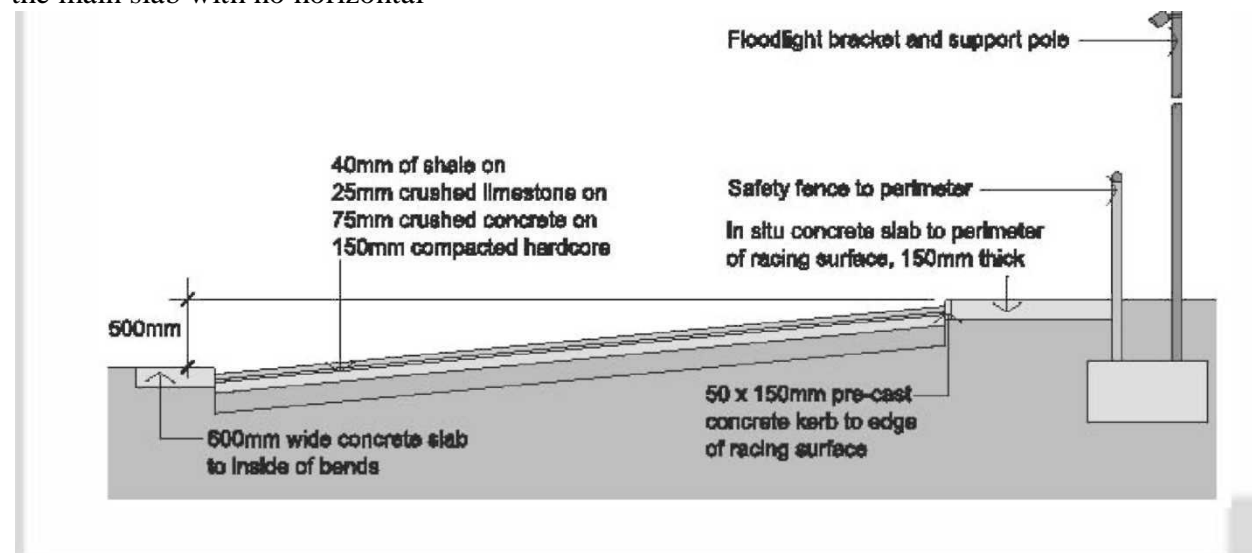
## Basic Design Specifications of Some Tracks

### Velodrome

Cycling as a sport is mostly practiced in a velodrome. Modern velodromes feature steeply banked oval tracks, consisting of two nearly 180-degree circular bends connected by two straights. Velodromes may be built either indoors or outdoors. Outdoor velodromes are much more common as an outdoor venue does not require the added expense of a building, making them much more affordable.

The track length is measured on a special line 20 cm up from the inside of the track. The length of the track multiplied by a round number of laps or half laps should result in 1000 m. Olympic standard velodromes are minimum 250 metres in circumference. Other velodromes can range from 133 m to 500 m, although 250 metres is the most popular and the length used in all major events. A 250 m track would bank in a range around 45°, while a 333 m track would bank in a range around 32°. Velodrome tracks can be surfaced with many different materials, ranging from wood, to synthetics, to concrete.

All tracks must have a standard set of markings. Between the infield and the actual track there is the blue band that is typically 60 cm wide. The blue band is not an official part of the track. The velodrome should have a track fence about 750mm high all around the track. Along the bottom of the fence, trackside, there must be a well-designed and fitted kickboard to a height of at least 250mm. Safety run of needs must be provided where track surface and the slow run meet at the bottom of the track, a curved run-off must join the two different angles. The width of this strip on a concrete track should be 1m. This strip must be poured and finished at the same time as the main slab with no horizontal



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The ground area required to build a track only, with a concourse 5m wide around the track but not including seating or amenities, would be:

Track (m)	Length (m)	Width (m)
250	116	78
333.3	138	97

Apart from this there should be space for parking the bicycles, accessible toilets and dressing room facility (as per annexure)

### Closed Road Racing Service

Closed road racing circuits serve two main functions, both of which are complementary to the development of international road racing:

- A means of training by competition in surroundings not affected by other road users.

- A form of road racing that will attract the public, thus making it a spectator sport.

### Design Specifications

Small circuits at multi-use sites should be at least 0.5km in circumference.

These are suitable for introducing newcomers to cycling and for basic training.

Closed road circuits of 1km circumference are suitable for most local and regional level activity, although 3-5km circuits are necessary for national competitions.

A circuit width of 6-8m is recommended.

If the nature of the circuit restricts the width, a minimum width of 5m is acceptable.

The finish area width must be 7-8m.

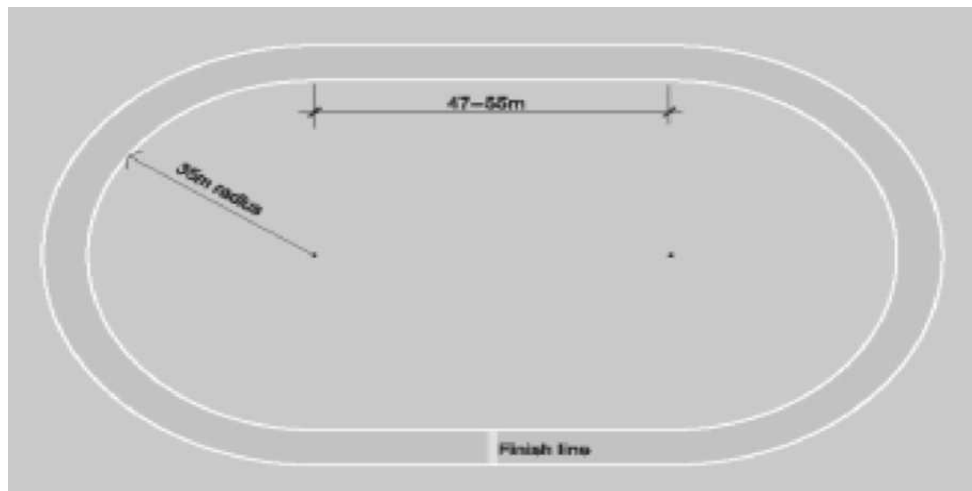
Closed road circuits are used for races similar to those on open roads and therefore should simulate this if possible with hills and bends.

## Grass Track

Grass tracks are used for a similar range of events to those held on most cycle tracks. Typically, a grass track is marked out around a cricket field or other sports pitch.

The site for a grass track should be reasonably flat with minimal undulation on the surface. There should be a good quality of grass cover and the grass should be as short as possible. Riders may not be allowed on the track if it is wet, and especially not after long, dry spells as a baked hard surface may not produce enough grip.

The surface should be monitored for dangerous materials such as glass and stones and these should be removed.



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The length of a grass track is largely dependent on the size and shape of the ground available.

Typically tracks may be 250-400m long and often follow the perimeter of a cricket ground or go around a grass athletics track, but an ideal size is 333m. The following guidelines are to assist with measuring a track:

- Place two marks in the ground 47-55m apart.
- Scribe a radius of 35m outside each pointing a semi-circle.
- Join each semi-circle with the home straight and back straight lines.
- Perimeter flags can be placed at 5m intervals with a small plate on the peg giving the distance, that is, 90m, 85m and so on.

Pegs or flags are used to mark out grass tracks with the inner boundary of the track placed at least 200mm inside the inner boundary of the track. The pegs should not be larger than 200x40x15mm, and must be at an angle with the ground of not more than 45°, with the tops of the pegs pointing away from the white line. The inside edge of all grass tracks should be marked with a 40mm-wide white line. On all grass tracks, the finish should consist of three 25mm-wide parallel white lines. All lines must be distinctly marked across the track with the two outside lines not more than 300mm apart - the centre line is the finishing line.

### **2.7.3 Aids and Appliances**

Athletes with cerebral palsy compete on road and track using standard racing bicycles. Athletes with balance difficulties compete on tricycles, but only in Road events.

Athletes with a visual impairment compete on tandem bicycles, both Road and Track, with a sighted pilot. Amputees and riders with other permanent physical disabilities, compete on road and track, using standard racing bicycles. Athletes who are wheelchair users are unable to ride a standard racing bicycle, or tricycle those with severe lower limb disabilities, compete in road events using three-wheeled handcycles.

Cycling helmet is important to be worn by all cyclists.

For persons with hearing impairments, it is recommended to have screen display boards, visual signals and written rules and regulations of the game.





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#### **2.7.4 Staff**

A coach may be required if cycling needs to be practiced as a competitive sport. In case of pursuing it as a recreational activity it can be practiced by persons with disabilities with their family, friends and therapists.

#### **2.7.5 Safety Guidelines**

- It is advisable to consult an occupational therapist to look at the adaptations that may be required by different disabilities before cycling.
- A helmet must always be worn when cycling.
- First aid box must be available at the facility.
- The track must be maintained as per standards.

The cycles must be regularly checked and maintained.





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## 2.8 Basketball

Basketball is among the oldest and most established of wheelchair sports. It was introduced over fifty years ago as a rehabilitation and recreational pursuit for people with spinal cord injuries. However, fairly rapidly, it became a much more organised and competitive activity; it also slowly paraplegics, amputees, and people with conditions such as spina bifida, brittle bones, cerebral palsy, multiple sclerosis and persons with sensory impairments such as deafness and blindness.



Wheelchair basketball is one of the most popular disabled sporting activity because there are no added adaptations in infrastructure required for it. It retains the 10 feet high basket ring and a standard basketball court. While there are some minimal adaptations required for basketball for the blind. Wheelchair basketball is also a part of the

### **Paralympics and Special Olympics while deaf basketball is part of deaf sports. 2.8.1 Benefits Expected**

Persons with any kinds of disability will benefit from participating in basketball, these may include:-

- Persons with vision impairments.
- Persons with mental retardation.

- Persons with hearing impairments.
- Persons with physical impairments.

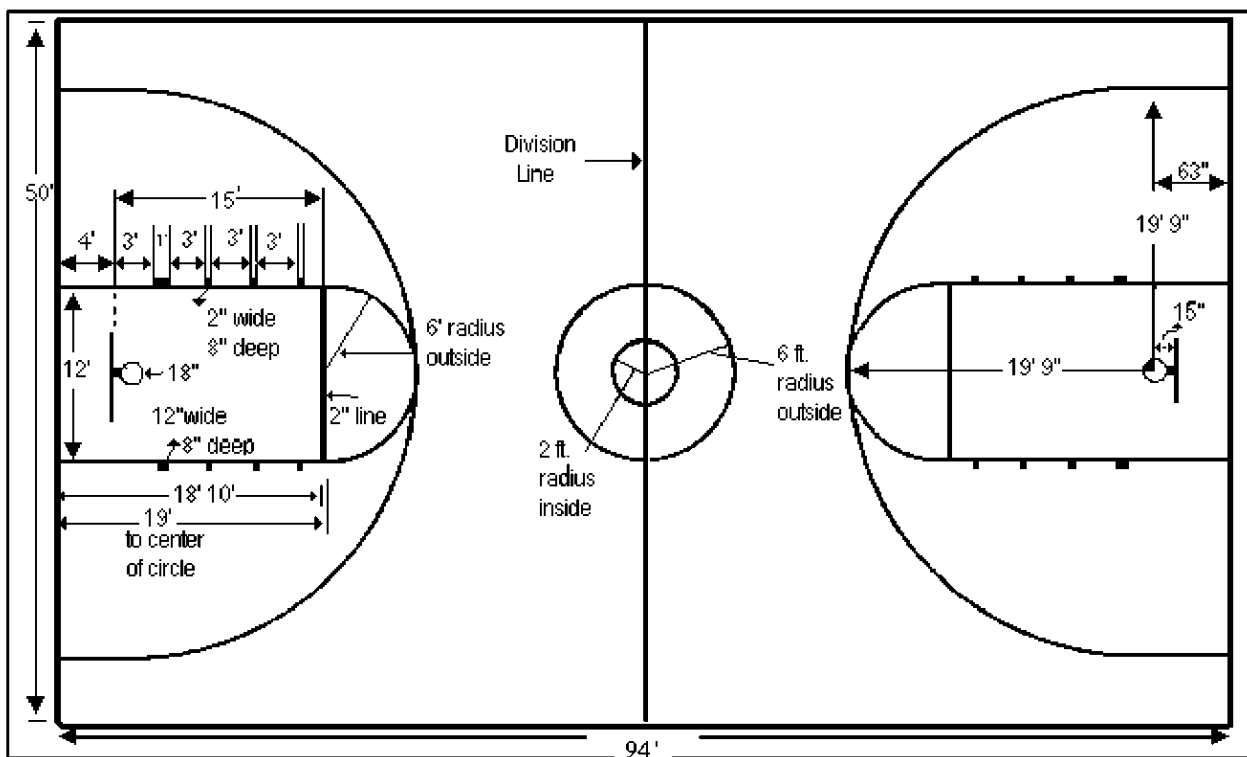
Benefits that basketball for the disabled offer are:

- Since it is a team activity it helps in building a team spirit and builds skill and strategy.
- Basketball can be played as a mixed sport with disabled and non-disabled persons in the team, which enhances inclusion.
- It can be played as a competitive activity with opportunities to participate in International sporting events.
- Helps in maintaining muscle tone and general good health.
- Does not need any expensive adaptations except for some minor adaptations to the basketball for visually impaired and sports chairs for the wheelchair basketball players. It is an activity with low maintenance costs.

### 2.8.2 Infrastructure

- Basketball can be played both in an indoor court and an outdoor court. The courts built will be same as the courts built for non disabled basketball. Basic design of a basketball court is given on the next page;

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Depending on where the court is located there should be accessible toilet and dressing rooms (as per specifications given in the annexure) which can be used by the disabled players.

- The route to the basketball court should be leveled and accessible to players with disabilities.
- The illumination level at the basketball court should be 1500 lux.
- Also there needs to be a wheelchair storage space of about 15 square meter.

### 2.8.3 Aids and Appliances

Basketball Wheelchairs are the main requirement for wheelchair basketball. These are light weight with adjustable centre of gravity. There should be a strap around the thighs to avoid fall.

The adaptations required for persons with vision impairments are as follows:

- Have a basketball with a small bell in it so that a person with vision impairment can get to know of its location through the sound.
- Have the two boards emit different sounds so that the players can distinguish the position of their board from the opponents through the sound.



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To recognize the scored ball, install a bell at center of ring by a squeezed spring joined to the most of the set at the back of basketball board In this situation if the ball hits the ring, net or board, its vibration cannot cause the bell to ring, unless a goal is scored.

- To distinguish the internal square of the basketball board from the outer one, cover this section with a thin metal coating. In this way upon any hit by the player receives a different sound.
- Cover the non playing outer part of the court (upto one meter wide) with a surface which can be easily distinguished from the playing court area surface. Here if the player goes out of the court by mistake, through foot touching, he feels the floor differences and notices his withdrawl from the court and returns back.
- For persons with hearing impairments, it is recommended to have screen display boards, visual signals and written rules and regulations of the game.



### **2.8.4 Staff**

An athletics instructor with a good understanding of different impairments should be able to coach this game. It would be advisable for them to have a knowledge of sign language to coach the persons with hearing impairments

### **2.8.5 Safety Guidelines**

The wheelchair participant of basketball should:

- Drink enough water. This is especially important for athletes with spinal cord injuries.
- Double amputees, athletes with high-level spinal cord injuries and those with limited sitting balance should keep their anti-tip (safety) casters in place during all practices and games.
- All players should use their anti-tip (safety) casters when participating in drills that increase the possibility of the wheelchair tipping over to the rear.
- If the wheelchair has brakes attached, these should either be removed or placed in a position to avoid interfering with the athlete's hands when he or she pushes forward on the wheels or hand rims.

Players with spinal cord injuries should be alert to the potential for skin breakdown. Loose clothing, cleanliness and frequent checks for redness are

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essential. In addition, cushions should be used at all times. The player should lift themselves off of the cushion at regular intervals.

- Players should wear hard shoes that fit properly. This is especially critical for players with little or no feeling in their lower extremities, because poor-fitting shoes may cause pressure sores. Hard shoes will also help protect all players from foot injuries caused by contact with other players wheelchairs.

To avoid Head Injuries it is important for them to learn to fall properly from a wheelchair, which may prevent serious injury to a player. Helpful tips include:

- When falling forward, the player should try to fall far enough in front of the wheelchair to prevent entanglement. This maneuver will also help to elongate the player's body, thus lessening the risk of leg injury caused by the weight of the upper body landing upon the legs. Extending the arms to "cushion" the fall also reduces the risk of leg injury.
- When falling to the side, it may be best to tuck the arms close to the chest and turn so that the upper back and shoulder areas absorb the impact. This maneuver prevents injury to wrists or shoulders but should be used only if the fall is unlikely to cause leg injury.
- Falls to the rear are safest when the player quickly leans forward into a tuck position and grasps the frame of the wheelchair. This maneuver allows the back of the wheelchair to absorb

most of the impact. However, if the wheelchair has a low back without handgrips, the player may need to turn and "cushion" the fall with an extended arm.

- Regardless of the direction of a fall, the player must be careful to avoid head injury. This is done best by quickly tucking the head tightly to the chest or shoulder (inclined away from the area of impact).

Safety tips for basketball for the blind:

- Have the pole on which the board is fixed, in a contrasting colour so that it is easily distinguishable

*Consider having a 20mm thick foam put around the pool up to a height of 2 meters from the floor to avoid an accident in case a blind person collides with it.*

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## **2.9 Fishing**

Fishing is one of the world's most popular recreational activities. It is a relaxing and entertaining sport that can be enjoyed by all ages. Fishing also represents one of the easiest activities to adapt to people's individual needs. Specialized equipment, including rods, reels, line, rod holders, and tackle are available around the world. Even without the special aids it is an activity that a disabled person can enjoy with their family and friends.

For individuals who use wheelchairs, the biggest barrier to participation in fishing is accessibility. The piers and the fishing areas are generally inaccessible.

By providing some accessibility and the right equipment several disabled persons can enjoy this activity.



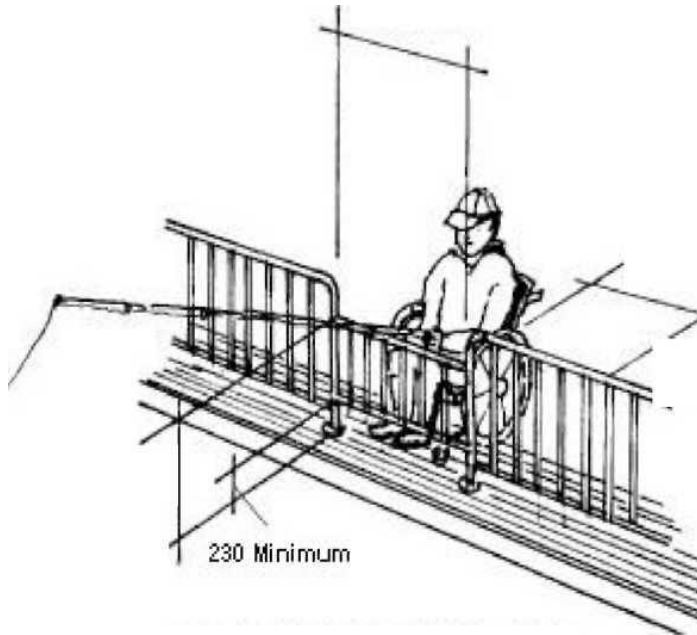
### **2.9.1 Benefits Expected**

Fishing is an activity that can be enjoyed by a person with any disability. The benefits they can gain are:

- Increases social inclusion and provides an opportunity for a fun activity with family and friends.
- Increases patience and learning to handle joys of a good catch or sadness of catching none.
- It is an activity that can be done irrespective of physical capabilities.

### **2.9.2 Infrastructure**

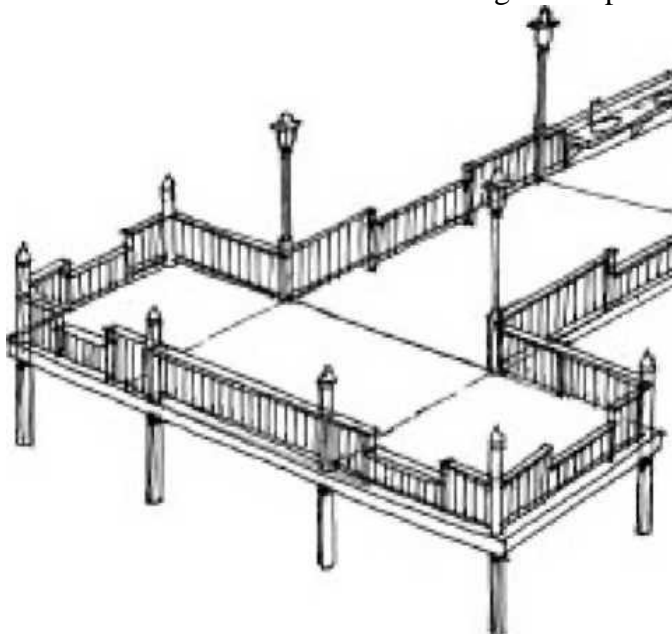
- There should be an accessible route till the fishing area or the pier. The accessible route provided should preferably be 1500mm (wide) or more but not be less than 900mm. The route should be free of any obstacles till the height of 2500mm from the ground.
- The floor of the accessible route should be even, rammed and firm. In case there is any change in level along the route, it should be managed with gentle slopes with a gradient of not more than 1:12.
- There should be an edge protection 50mm (minimum) high above the ground or deck surface.



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Handrails should be provided all around the fishing pier or deck. Of these at least 25% should be at the maximum height of 850mm, the rest 75% of the railings however should be lowered to allow for persons with disability to fish.

- These lower areas must be located in a variety of locations on the fishing pier or platform to give people a variety of locations to fish.
- There should be clear space of 1200mm x 760mm in front of the pier for a person to park their wheelchair while fishing.
- There should be 1800mm wide turning radius provided on the pier.



### 2.9.3 Aids and Appliances

There is a very wide range of adapted fishing equipment that is available. Some of these are listed below:

Fish Easy is a simple attachment to the wheelchair that allows the wheelchair user to keep the bait tray, net etc at an accessible height and a distance, also have the fishing rod attached to the wheelchair frame.



### **Wrist Saver Rods is an ergonomically designed spinning rod.**

The handles are bent to fit an angler's hand in such a way to keep the angler's wrist straight instead of bent as is done with straight rods. The Wrist Saver rod straightens your wrist and relieves stress.



A fishing Rod Strap is a very useful adaptation for someone with a weak grip such as tetraplegics, persons with arthritis etc. It is a wrist strap that holds the fishing rod.

Automatic fishing Rods will be good for all persons with disabilities to be able to throw the bait into water easily.



#### **2.9.4 Staff**

There is no specially trained staff required for fishing. Any person with some basic knowledge of fishing may be able to assist.

#### **2.9.5 Safety Guidelines**

- There should be adequate drinking water carried when going for fishing.

**A disabled person must recognize their limitations and rest when tired as the walk till the pier can be exhausting.**

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- For ambulant disabled, they must walk carefully till the water body edge that may be muddy and wet. It is recommended to take regular resting intervals



- Persons on wheelchairs must make sure that their wheelchair is braked right. It may be a good idea to choke the wheels with an additional stone or a stick.

Another important issue is the weather in all its forms. Many disabled people are not accustomed to being outdoors for extended periods. They run a greater risk, then, of heatstroke, sunstroke, severe sunburn and are more susceptible to catching colds. Extra caution should be taken by the disabled person to stay as cool or as warm as possible, depending on conditions. Sitting in a shaded location for fishing is a good idea on a hot sunny day.

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## 2.10 Lawn Tennis

Tennis is a competitive recreational activity in which participants hit a tennis ball back and forth over a net and attempt to outplay their opponent by placing the ball in strategic areas of the court. Tennis has become more popular recently among individuals with disabilities. Wheelchair tennis follows the same rules as able-bodied tennis, except the ball is allowed to bounce twice. The second bounce can be either inside or outside the court boundaries.



Wheelchair tennis was developed by American Brad Parks in 1976. Since then, it is one of the fastest growing sports for individuals with disabilities. Today, the International Tennis Federation (ITF) Wheelchair Tennis Committee is the governing body for Wheelchair Tennis and is advised by the International Wheelchair Tennis Association (IWTA). The ITF aims to provide, promote and develop opportunities for men, women and children with disabilities to participate in recreational and competitive wheelchair tennis at all levels from novice to the professional player.

### 2.10.1 Benefits Expected

Lawn tennis may be played by persons with different disabilities. These include:

- Spinal Cord Injuries.
- Post polio.
- Amputee.
- Multiple Sclerosis.
- Muscular Dystrophy.
- Spinal Bifida.
- Hearing Impaired.
- Person with vision impairment may be able to play this sport too, with some adaptations but is not as popular.

The benefits expected from playing lawn tennis include:

- Wheelchair tennis is played in the same court as able bodied tennis therefore it is a very socially active game.
- Disabled players can play against or with non disabled players therefore it increases inclusion.
- It is an International sporting activity; thus there is an opportunity to participate in International sporting events by persons with disability.
- Promotes good health.

### **2.10.2 Infrastructure**

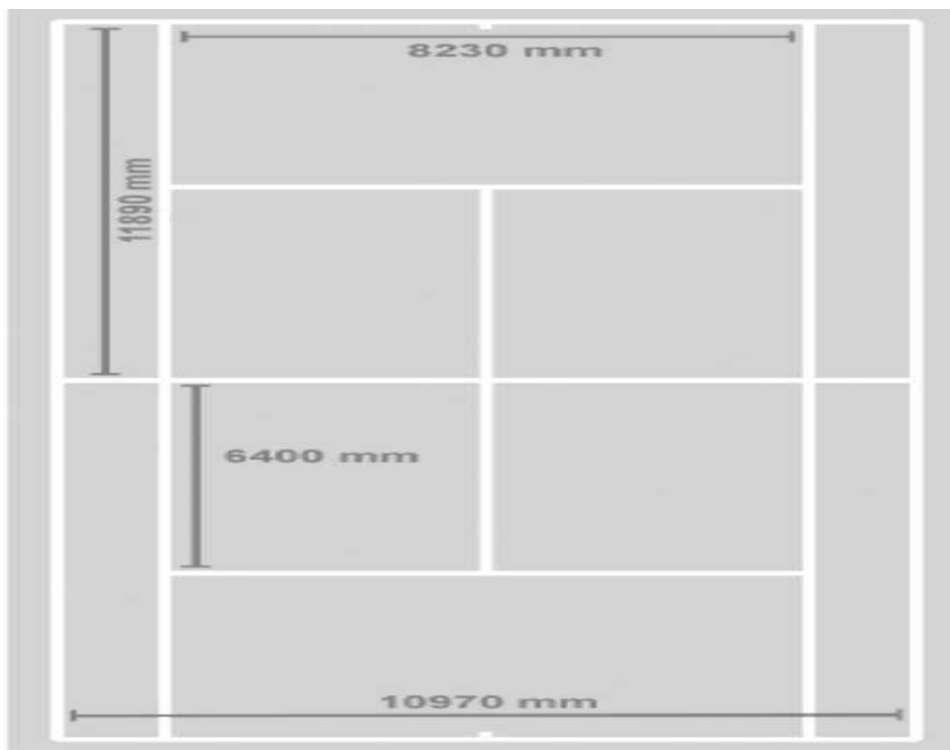
The infrastructure required for wheelchair lawn tennis is the same as the regular tennis court. There are three types of courts based on their



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floor finish namely clay, hard and grass. Hard tennis courts made of cement or coated asphalt are the best for wheelchair tennis.

- Apart for this, the court must have facilities for an accessible changing room cum toilet (design specifications are given in the annexure)



### 2.10.3 Aids and Appliances

- Wheelchair tennis requires only a few pieces of equipment: a tennis racquet, ball and a wheelchair. No modifications are necessary for the racket and the ball.
- A Tennis wheelchair is lighter than everyday chairs to allow the athlete flexibility of movement making the game more spectacular. The wheelchair is considered part of the player ; therefore, general rules of contact apply. To keep the player stable on the chair, a positioning strap across the waist and/or thighs is used.
- Grip devices are designed specifically for players who do not have the grip

strength to hold a racquet. Athletic tape and an Ace bandage wrap are two simple solutions to maintain a proper grip.

- Arm and leg prosthetics are available for individuals who are amputees. Arm prosthetics can be adapted to grasp a tennis racquet.
- For players with vision impairment, a modified ball that emits a steady audio signal. The net and the boundaries of the court also emit their own different, easily distinguishable audio signals. Thus, a sonic "image" is transmitted to the players, who form mental maps of the game and play it.
- For persons with hearing impairments, it is recommended to have screen display boards, visual signals and written rules and regulations of the game.

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#### **2.10.4 Staff**

A regular tennis coach with an understanding of wheelchair tennis will be a good person to assist. For persons with hearing impairments, it is advisable for the instructor to have the knowledge of sign language.

#### **2.10.5 Safety Guidelines**

The participant of wheelchair tennis should:

- Drink enough water. This is especially important for athletes with spinal cord injuries.
- Double amputees, athletes with high-level spinal cord injuries and those with limited sitting balance should keep their anti-tip (safety) casters in place during all practices and games.
- All players should use their anti-tip (safety) casters when participating in drills that increase the possibility of the wheelchair tipping over to the rear.
- If the wheelchair has brakes attached, these should either be removed or placed in a position to avoid interfering with the athlete's hands when he or she pushes forward on the wheels or hand rims.
- Players with spinal cord injuries should be alert to the potential for skin breakdown. Loose clothing, cleanliness and frequent checks for redness are essential. In addition, cushions should be used at all times. The player should lift themselves off of the cushion at regular intervals. Players should wear hard shoes that fit properly. This is especially critical for players with little or no feeling in their lower extremities, because poor-fitting shoes may cause pressure sores. Hard shoes will also help protect all players from foot injuries caused by contact with other players' wheelchairs.

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### **2.11 Ten Pin Bowling**

Ten-pin bowling is a competitive sport and recreation in which a player (the "bowler") rolls a bowling ball down a wooden or "synthetic" (polyurethane) "lane" with the objective of scoring points by knocking down as many pins as possible. It is popular sport, enjoyed by people the world over. Bowling is a listed Paralympic sport and has gained tremendous participation by the disabled. Bowling has lately become fairly popular in India and there are now annual national level championships. Bowling has also become more prevalent in the media in recent years, with the continued popularity of bowling publications and the appearance of films centered around the culture of the sport. However, the sport continues to face challenges in India in garnering mainstream coverage of the athletic aspects of the game, especially for disabled players.

#### **2.11.1 Benefits Expected**

Bowling is one of the few sports that offer huge recreation and socialization opportunities for persons with disabilities. Enthusiasts can progress to become champions and participate in

several national and international level competitions including the Paralympics. Bowling can be enjoyed by persons with a range of disabling conditions such as:

- Amputee
- Autistic Spectral Disorder
- Brain Injuries
- Cardiovascular Accident/Stroke
- Cerebral Palsy
- Down's Syndrome
- Emotional Disabilities
- Hearing Impairments
- Learning Disabilities
- Mental Retardation
- Multiple Sclerosis
- Muscular Dystrophy
- Post Polio
- Spina Bifida
- Spinal Cord Injuries
- Visual Impairments

Mental Health Disorders



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### 2.11.2 Infrastructure

Bowling is an indoor sport that requires professional installation of the Bowling alley  
Standard Installation: The 1040mm wide, 18m long lane is bordered along its length by "gutters"  
- semicircular channels designed to collect errant balls. There is a "foul line" at the end of the  
lane nearest to the bowler. Behind the foul line is an "approach" approximately 4500mm long  
used to gain speed and leverage on the ball before  
delivering. 18m from the foul line, where the lane terminates, it is joined to a roughly 600mm  
long, 1040 wide surface of durable and impact-resistant material called the "pin deck" where  
each rack of pins is set. Bowling lanes, including flat gutters, kickbacks and approach, are  
generally constructed of wood or other synthetic (polyurethane)  
materials that offer low friction. The materials used have generally to be pre-approved by the  
regulatory authority. The Tenpin Bowling  
Federation of India' regulates this sport in India.



The infrastructure required for disabled persons to participate in the sport is no different from the standard installation, except that consideration must be given to ensure:

- A high slip-resistance in the flooring material used in the 'Approach' to the Bowling Lane.
- Selection of appropriate colours for the flooring, walls, Bowling Balls, Ball Stacks and Pins to ensure there is sufficient colour and tonal contrast between these and their backgrounds to enable easy recognition by persons with vision impairment.
- There should be no level differences from the entrance of the facility to the Foul Line just before the Bowling Lane
- Sufficient lighting within the facility -an illumination level of 300 lux throughout the facility is preferable.
- The Foul line should be about 1 inch wide along the entire width of the lane and should be distinctly marked upon (or embedded between the lane and approach) to contrast sharply, in colour and tone, from the floor surface, the lane and the approach.

These features do not incur any extra cost when considered in the planning stage of a new installation.



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### 2.11.3 Aids and Appliances

Pin characteristics, the bowling ball and the bowling surface are regulated by the international regulatory organisations. A bowling ball is a round ball made from rubber, urethane, plastic, reactive resin (solid, particle, or pearl) or a combination of these materials. Ten-pin bowling balls generally have a set of three holes drilled in them, one each for the ring and middle finger, and one for the thumb; however, rules allow for up to five finger holes.

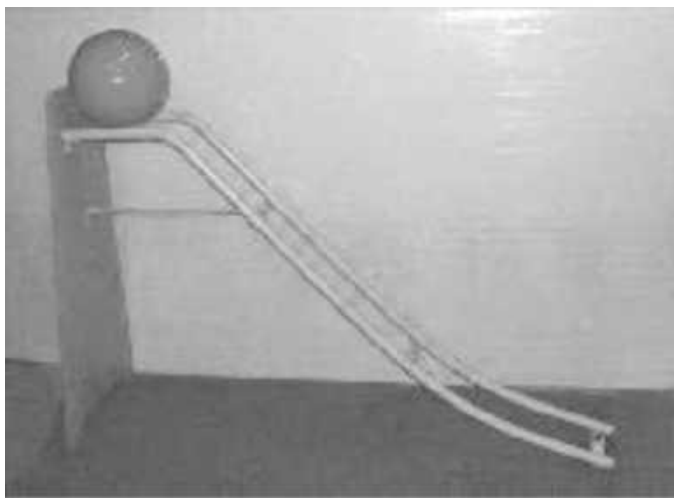
The balls can easily be customized, and can feature specially sized finger holes (in the case of ten-pin balls) and the balls are available in various colours. It may be a good idea to select the colour of the balls so that it appropriately contrasts from the ball stacks, flooring and the pins to enable easy recognition by persons with vision impairment. Some readymade adaptations available internationally include 'Handle Bowl' and 'Ball Guide Ramp'. The handle ball is a standard plastic bowling ball which has a unique grip that retracts back into the ball once released. These are ideal for people with limited hand or wrist strength or those who have difficulty bending down. They can also be used by bowlers sitting down.

The 'Ball Guide Ramp' assists users with a weak grip or limited mobility to bowl. The ramp is placed in front of a lane and lined up for a direct path to the pins. The bowler simply gives the ball a slight push to send it rolling down the alley. This can be used from a sitting or standing position thereby making it easier for persons with limited mobility or balance, weak grip, severe vision loss and cognitive impairments such as poor orientation to participate. It is easily available internationally and is light weight, strong and stackable

for storage. Although not yet commercially available in India, this may be fabricated by a skilled carpenter or manufactured in aluminium.

The pins can also be customised by choosing a colour that makes them contrast from the bowling alley and the background enabling easy identification by persons with vision impairments.

For persons with hearing impairments, it is recommended to have screen display boards, visual signals and written rules and regulations of the game



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During Bowling, it is recommended that participants wear special slip resistant shoes and protective gloves. Because of the rise in popularity, many companies are now making bowling balls and apparel for professionals as well as for recreational bowlers. Although adapted gloves and shoes may be required by those with limited mobility or hand dexterity. For persons with hearing impairments, it is advisable for the instructor to have the knowledge of sign language.



### **2.11.4 Staff**

Staff required is a Bowling Instructor and a Physiotherapist. The physiotherapist is required to screen the balance and cognitive abilities to ensure safe participation in the sport. The Physiotherapist and the Bowling Instructor will need to work jointly to prepare individualized training sessions for persons with severe disabilities.

### **2.11.5 Safety Guidelines**

1. It may be necessary to screen participants as bowling is not advisable for people with severely impaired balance, unless they use an assistive mobility device. Also it is not advisable to include people with severe cognitive impairments that affect their orientation due to safety concerns.
2. All participants should be encouraged to wear the appropriate gear, especially the suitable gloves and shoes.
3. Flooring material should be carefully selected so that it is high slip-resistant.

Where participants are allowed to bring beverages into the facility, appropriate maintenance should be carried out to check there are no wet areas from any spillage to avoid slip hazards.

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### **2.12 Table Tennis**

Table Tennis is clearly the most non-discriminatory sport on the Olympic and Paralympic programs. It does not matter if you are tall or short. It doesn't matter if you are an expert or a youngster. Most importantly, it doesn't matter if you are agile or play more stationary in a wheelchair. Table tennis is an enjoyable and fast-paced recreational competitive activity for individuals with disabilities. Two of the main reasons for its popularity are that it can be played almost anywhere and it can be easily adapted to meet an individual's ability level.



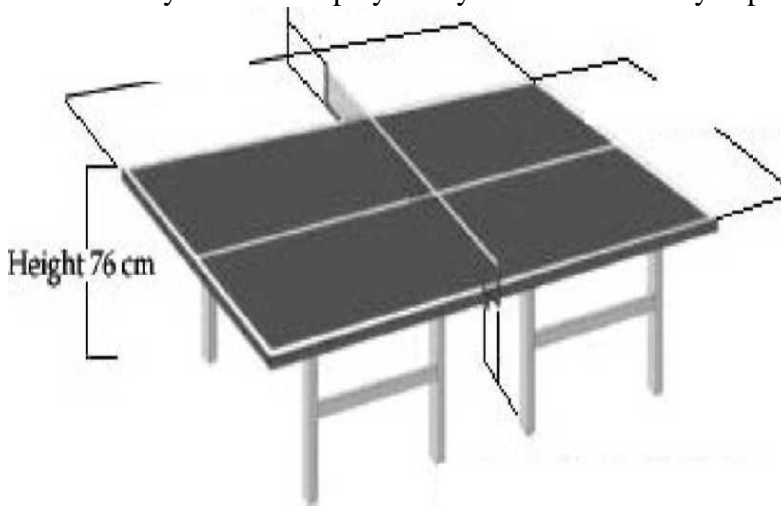
#### **2.12.1 Benefits Expected**

People with any kind of disability can participate in table tennis. Table tennis is everyone's game! It is both a recreational and a competitive sport. The benefits one can get from the game include:

- Development of quick reflexes.

- Improve balance and coordination.
- Is a sport that can be played between able bodied and the disabled therefore increasing inclusion and social interaction.

It is an activity that can be played anywhere without any expensive infrastructure and aids.



### 2.12.2 Infrastructure

There is no specific infrastructure required for table tennis. All that is required is adequate space to place the tennis table and free circulation space around it. Design specifications of a tennis table are given below:

**Net Height 15.25 cm**

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### 2.12.3 Aids and Appliances

- There is no added equipment required apart from the tennis table, racquet and a ball.
- For persons with a weak grip Velcro straps may be used to have a better grip of the racquet.
- For persons with vision impairments - Showdown is a good substitute to table tennis.

Showdown is a cross between table tennis and air hockey for individuals with visual impairments. It is played on a table 3600mm long, 1200mm wide and 880mm high. The paddles are 380mm x 90mm. A 380mm "center screen" divides the table into two sections with sunken "goal pockets" at each end. The ball is filled with ball bearings to create a sound so players can hear the location of the ball.

- For persons with hearing impairments, it is recommended to have screen display boards, visual signals and written rules and regulations of the game.

### 2.12.4 Staff

No special staff is required for table tennis except an instructor. For persons with hearing impairments, it is advisable for the instructor to have the knowledge of sign language.



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## 2.13 Archery

Archery is a sport that almost anybody can take up regardless of any disability. Even though this sport is very physically demanding, it is one sport that disabled athletes can compete on an equal basis with able-bodied people. In fact wheelchair target archery has been a Paralympic sport for more than 30 years, and still going strong. Paralympic archery is an adaptation of the sport of archery for athletes with a disability. Competition is conducted under the rules of the International Archery Federation with some minor modifications. Athletes participate in three classes, one for standing athletes and two for wheelchair athletes.

Blind Archery is the most recent sport to have official status within International Blind Sports Association (I.B.S.A.). For archers who cannot see the target a tactile sight is used. This is a pointer mounted on a tripod, which the archer lightly touches with the back of the hand to determine the arrows' direction and elevation. Visually impaired archers shoot with two types of bows, recurve and compound. For safety reasons a spotter is with the archer at all times. During competitions a spotter is allowed only to call the value of the arrow strike.

There are several styles of archery such as Target archery, Field archery, Clout archery and 3-D Archery. In this guide however, only Target Archery has been discussed in some detail.



2.13.1 Benefits Expected Archery can be practiced by persons with any kind disability with some adaptations. The benefits of archery include:

- A disabled person having a chance to compete in the same arena as the able bodied persons.
- It gives a boost to self esteem.
- Also provides an opportunity to get some exercise.

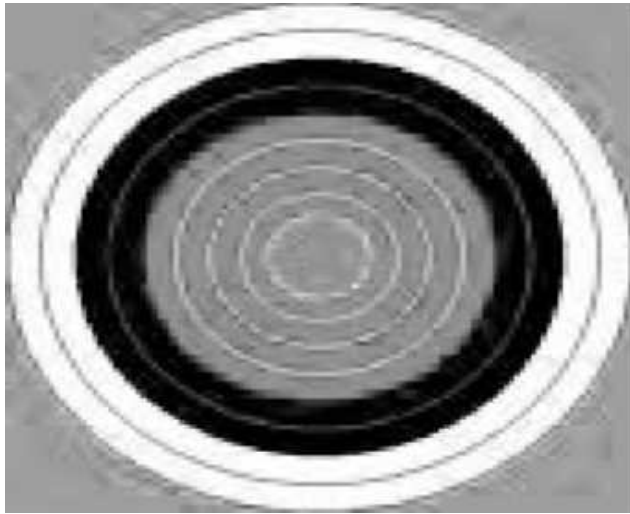
**It improves concentration and attention.**

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### **2.13.2 Infrastructure**

Archery for the disabled has no special infrastructural requirements, other than a regular archery centre. Target archery is the most popular form of archery, in which members shoot at non-moving circular targets at varying distances. All types of bow - longbow, bare bow, recurve and compound - can be used. Target archery competitions and practiced may be held indoors or outdoors. Indoor distances are 18 m and 25 m. Outdoor distances range from 30 m to 90 m. Targets are marked with 10 evenly spaced concentric rings, which have score values from 1 through 10 assigned to them. In addition, there is an inner 10 ring, sometimes called the X ring. This becomes the 10 ring at indoor compound competitions. Outdoors, it serves as a tiebreaker with the archer scoring the most X's winning. Archers score each end by summing the scores of their arrows. Line breakers, an arrow just touching a scoring boundary line, will be awarded the higher score.

Additional care needs to be taken that there is an accessible route leading to the event space. Also an accessible toilets should be provided in close proximity (Design specifications for the accessible toilet are as per the annexure).



### 2.13.3 Aids and Appliances

The regular archery equipment will be used also by the disabled participants. Additional aids that may be used for persons with vision impairments include a target pointer that is fixed on a tripod that they can lightly touch to get a clue of the direction of target.

Wheelchair archery does not require any special accessories. However, some people prefer to remove the armrest to improve aim. For others, a recurve 48-inch bow is recommended because the bow is lighter and easier to control. For persons with little arm strength, devices to help hold the bow may be allowed. Quadriplegics may have an assistant to help place the arrow in the bow, but verbal advice is against the rules.

For persons with hearing impairments, it is recommended to have screen display boards, visual signals and written rules and regulations of the game.

### 2.13.4 Staff

**For archery it may be important to have an archery instructor. An Occupational therapist may evaluate the abilities of a disabled person and may be able to advise some adaptation for ease in practicing. For persons with hearing impairments, it is advisable for the instructor to have the knowledge of sign language.**

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### 2.13.5 Safety Guidelines

It is important to remember that a bow if used carelessly can cause serious harm and safety rules should be applied when shooting. A common sense approach to safety should always be taken, and no one should be put at any risk by foolish or inconsiderate actions. Some pointers for the participants are as follows:

- Never point a bow and arrow loaded or unloaded at another person. It should only be pointed towards the target.
- Do not shoot an arrow straight up into the air. One does not know where it's going to land. It could hit another person, or oneself.
- Never shoot an arrow into the distance not knowing where it might land. It's possible one could hit someone.
- Children must be supervised at all time. Even if they are not shooting, they should be supervised to make sure they don't stray into the path of an arrow.
- Targets should be set up in such a way that no person can be bit by a stray arrow.
- Backstops or nets should be used wherever possible.
- Check arrows regularly for damage. If any defects are found, avoid using them accidentally.

- Bowstrings also need to be checked regularly and if found damaged, must be replaced.
- The Bow should be checked for twisting or cracking. If it's damaged in any way, it should not be used.
- Always make sure the arrows used are the correct length for the bow. If unsure, the instructor must be asked for advice.
- Don't draw the bowstring back, or release it if there is no arrow on it. This can result in damage to the bow.
- No one should stand at the target end when shooting is taking place, no matter how far off to the side they might be.
- If two or more archers are shooting they should stand side by side. Never stand in front of anyone who is shooting.
- Before walking to the target to retrieve arrows make sure everyone has finished shooting.
- When pulling arrows from the target make sure nobody is standing behind or they could get the rear end of an arrow in the eye or face.
- Stop shooting if there is the slightest chance of anyone crossing in front of you or the target.
- Never step forward of the shooting line.

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## 2.14 Gymnasium

Fitness is important, whatever the age or physical ability. Whether it's improving ones mood and energy levels, or staying off illnesses from arthritis to coronary heart disease, regular physical activity is a simple way to make life healthier and more enjoyable. Living with a disability does not have to mean leading a sedentary lifestyle.

Exercise Gymsnasiums have always been popular with fitness and sports enthusiasts and there is enough medical evidence to support that regular training in a gym helps keeping fit and active. Unfortunately, the debate about fitness and diet seems to exclude disabled people; it's almost as though if someone is disabled, he or she can't be fit.

It is interesting to note that a study of disabled gym users in UK revealed that when it comes to exercise, disabled people have demonstrated regularity and consistency - they are almost twice more likely to be using the gym, at any given point in time, than non-disabled users. On the contrary, most gyms assume that people with disabilities don't want to work out and research into the fitness industry reveals that facilities are often inaccessible, lacking disabled friendly training machines and other equipment, and staff does not have the right levels of awareness and training to work effectively with disabled people.



### **2.14.1 Benefits Expected**

Exercise is as important for disabled people as for anyone else. It is essential to maintain good heart and lung health through aerobic exercise, as well as reducing the risk of osteoporosis through weight-bearing exercise. Gyms offer the facilities to undertake various different kinds of exercise regimes including endurance building exercises, weight training and aerobic exercises. In comparison with non-disabled people, persons with reduced mobility are highly prone to gain weight due to reduced level of activity. Weight is an important issue for people with disabilities as putting weight on can put extra stress on joints, causing adverse affect on their level of independence and the quality of life. Gyms offer opportunities for disabled people to keep their weight in check.

Upper body work-outs are a good way to improve and stabilise posture, build strength in the shoulders and chest. This benefits persons with limited mobility and poor lower body control to improve their independence in activities of daily living.

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Finally, participation in a sport is important in keeping fit and active, Exercising regularly in a gym helps in developing muscle strength, endurance and stamina thereby enabling disabled people to participate more effectively in sports. Unfortunately, not all disabled people are able to participate in sports due to limitations imposed by the severity of disability. Light physical exercises in the gym may be the only option available to them to maintain a certain level of fitness.

Exercising in a gym is beneficial for a range of disabling conditions, including:

- Amputee.
- Autism.
- Brain Injuries.
- Cardiovascular Accident/Stroke.
- Cerebral Palsy.
- Down's Syndrome.
- Emotional Disabilities.
- Hearing Impairments.
- Learning Disabilities.
- Mental Retardation.
- Multiple Sclerosis.
- Muscular Dystrophy.
- Post Polio.
- Spina Bifida.
- Spinal Cord Injuries.
- Visual Impairments.



### **2.14.2 Infrastructure**

Exercise gyms are generally indoor facilities. These involve installing various fitness equipments



in a large hall. The total area required for a gym depends on the types and quantity of exercise equipment that will be installed.

Accessibility requirements for a gym are similar to those of any other indoor facility. Care must be taken to ensure accessibility features such as:

- Use of appropriate colours so that the walls, flooring and the doors have adequate tonal and colour contrast between them. It is also important to ensure that the equipment contrasts in colour from the background wall and floor.
- There should be sufficient indoor lighting. A maintained illuminance level of 300 lux will be acceptable for most persons with vision impairments.
- The flooring should be slip resistant. If carpeting is used, then a thin pile (less than 6.5 mm) carpet should be selected and the ends of the carpet should be securely fixed to the floor.
- There should be adequate wheelchair maneuvering space (minimum aisle width of 900 mm) between the exercise equipment, as also between equipment and walls. There should be provision of wheelchair turning space (a minimum circular diameter of 1800 mm) at regular intervals throughout the gym. Also there should be provision of adequate space (at least 750 mm width x 1200 mm length) in front of all fitness equipment to enable approach by wheelchair users.

Changing areas, lockers and toilet facilities should also be accessible. (Please see annexure for design specifications of these areas.)

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- There should be no level differences within the gym. Where changes in level are unavoidable, a **ramp** with a maximum gradient of 1:12 should be installed with handrails **fixed** on **both** sides of the ramp, at a height of 900 mm from the furnished floor surface. In case, it is not possible to provide a ramp of this specification then consideration must be given to install a 'platform lift'.
- There should be ample designated accessible parking spaces in close proximity to the gym entrance.
- The approach pathway from the car park to the gym should be level or gently sloping with a maximum gradient of 1:12.
- Where the gym is not located on the ground floor, it should be accessed by a lift of minimum 1200mm x 1400 mm dimension. The controls of the lift should incorporate Braille and raised letters, and should be positioned between heights of 800 mm and 1100 mm from the lift floor surface.

As with most other indoor facilities, when accessibility is considered at the planning stage of a new construction, the additional cost incurred is only a fraction (about 3%) of the project cost.

### **2.14.3 Aids & Appliances**

Key to ensuring inclusive gym facilities is selecting appropriate and inclusive fitness equipment. With the mushrooming of gym equipment manufacturers there are now several different types of training equipment available in the Indian market. Unfortunately though, there are hardly any domestic manufacturers specialising in inclusive fitness equipment.

The lack of availability of accessible fitness equipment can no longer be used as an excuse for exclusive fitness facilities as several local manufacturers also produce customised gym equipment that are tailor made to the specific request. Furthermore, inclusive fitness equipment hardly requires any additional investment or additional space. It simply ensures that the gym is functional for more users than ever before.

The Inclusive Fitness Initiative (United Kingdom) has worked alongside the industry to create the accredited list of fitness equipment, the only list of its kind anywhere in the world. In the UK,

this accredited equipment list is the definitive guide to the most inclusive fitness equipment available on the market and is a good starting point for anyone planning on starting an inclusive gym facility.



## Selecting Appropriate Equipment

In order to ensure that as many disabled people as possible can benefit from both a cardiovascular and resistance based workout, the Inclusive Fitness Initiative (UK) recommends a minimum package of fitness equipment be installed (please note that

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**wherever possible, this minimum should be exceeded). This minimum package includes the following key pieces:**

- Treadmill
- Upright and/or recumbent cycle
- Upper body ergometer
- Leg curl
- Leg extension/leg press
- Upper body multistation and/or a range of accredited upper body resistance equipment
- Package of small equipment

Inclusive Design features to consider when selecting or customising gym equipment:

- Adjustable seat - that is height adjustable and can also be removed/ flip up/ swing out.
- The workstations that should have a clear floor space of at least 750 mm wide x 1200 mm long so people in wheelchairs can approach them.
- Braille description on cardiovascular machines, weights and controls/ tags on other equipment.
- Cardiovascular work-out equipment, such as treadmills and pedometers, with talking/ audio feedback options.
- Adjustable height of workstations and long, low grips so that persons on wheelchair may use the equipment from a sitting position in their wheelchair.
- Consider procuring additional fitness equipment that people can use without needing to use their legs e.g. Arm Cycles (some models can be clipped onto the wheelchair), Wheelchair Treadmills' that allow wheelchair users to wheel (instead of needing to run) on the belt, etc
- Features for deaf participants such as a blinking green light for people who can not hear, the

timed beeps that announce when it is time to end the training on the particular machine.

- Operable parts of the equipment contrast in tone and colour from the rest of the machine.
- Straps and Handgrips on weights and operable parts of equipment. The straps and handgrips need to contrast in colour from the rest of the equipment.

Raised icons, that contrast from in colour and tone from the background, on control buttons.



#### **2.14.4 Staff**

The staff required in a Gym include a qualified Gym Instructor / Trainer and a Physiotherapist. Both the professionals will need to work as a team to be able to assess each individual's abilities, plan appropriate goals, and deliver adapted training

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programs for all. The Fitness Instructors should be trained in disability awareness and must be able to identify the abilities and limitations of each kind of disability enabling them to deliver a safe and effective workout for disabled people. For persons with hearing impairments, it is advisable for the instructor to have the knowledge of sign language.

#### **2.14.5 Safety Guidelines**

- Participants with a health or mobility problems should always check with their doctor before embarking on an exercise programme.
- The exercise programme should be prepared to match individual abilities and limitations, giving special consideration to person's cardiovascular status.
- None of the equipment should have sharp edges to avoid injuries to persons with vision impairments and/or low skin sensation.
- Equipment seat should be well padded as some categories of disabled people as also people with certain medical conditions such as diabetes may have reduced skin sensation making them prone to develop pressure sore areas.

- Staff should be trained in identifying emergencies specific to disabled people such as pressure areas, orthostatic hypotension, autonomic dysreflexia, etc. Staff should also know how to attend to such emergencies.
- Emergency alarms having auditory as well as visual input that can alert persons with hearing and vision impairments should be installed.
- There should be clear Emergency Evacuation policy and staff should be trained to assist/escort disabled people in the event of an emergency. It should also be a policy to provide a tour of the entire facility to all new participants who have vision impairments so that they are familiar with the layout of the premises.
- First aid kit should be available and at least one staff member should be trained in provision of first aid.
- Staffing level should be adequate so as to provide direct supervision and provision of additional support (e.g. adjusting weight stacks/ start positions and programming consoles etc) to disabled users within the fitness suite. Having a system of supervision will also ensure that staff is able to quickly identify emergencies and, if needed, shut down equipment promptly.
- In case provision of such staffing level is not possible, consider introducing a 'Gym Buddy system' where non-disabled volunteers work alongside disabled gym users and can provide adequate assistance, as and when needed. Benefits of a Gym Buddy system include increased opportunity for socialisation for the disabled participants. To implement such a buddy system effectively, it is essential that the volunteers be

trained in disability awareness, communication etiquette and in identifying emergencies specific to their disabled buddies.



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## 2.15 Golf

Golf is a sport in which individual players or teams hit a ball into a hole using various clubs, and also is one of the few ball games that does not use a fixed standard playing area. Golf is played on an area of land designated as the course.

The course consists of a series of holes. A hole means both the hole in the ground into which the ball is played as well as the total distance from the tee (a pre-determined area from where a ball is first hit) to the green (the low cut area surrounding the actual hole in the ground). Most golf courses consist of eighteen holes.

In terms of at least its own rules, Golf is a sport that has been able to accommodate amputees, players with mobility impairments and visually impaired golfers with ease.

For amputees, only one rule has been clarified; prosthetic limbs are not regarded as mechanical aids for playing golf. Players who use wheelchairs or electric buggies are obviously unable to get into a pot bunker, they are given a two-shot penalty and can then play the ball from behind the bunker.

Blind golf is outstanding in the area of disabled sports and includes only minor modifications to the standard rules of golf. The principle of playing is that blind or partially sighted golf players

have a sighted instructor who assists the golfer in describing distance, direction and characteristics of the hole and helps with club head alignment behind the ball, prior to the stroke. From this point, the golfer is on his own, and it is her/his skill that determines the resulting stroke.

Other than the instructor, there is only one relaxation to the standard rules: blind or partially sighted golfers are allowed to ground their club in hazard .



### **2.15.1 Benefits Expected**

Golf is a game that can be played by persons with any kind of disability without requiring too many adjustments. It is an excellent sport for people with a wide range of physical or mobility impairments. Not only is it a fun and challenging game, it can also be therapeutic and great low-impact aerobic exercise that gets you out into the open air.

It also demands absolute concentration and can help one rediscover their decision-making capabilities. Every aspect of golf involves decision-making; where the ball is lying, the swing and placement of the shot, which club to use and even the weather conditions.

**Golf is considered to be a very social game. Golf clubs are as much social clubs. Those who are involved in serious competition have the added advantage of travel. It is a game that provides equality. One can play against an old woman or a very agile young man but still have a fair chance to win.**

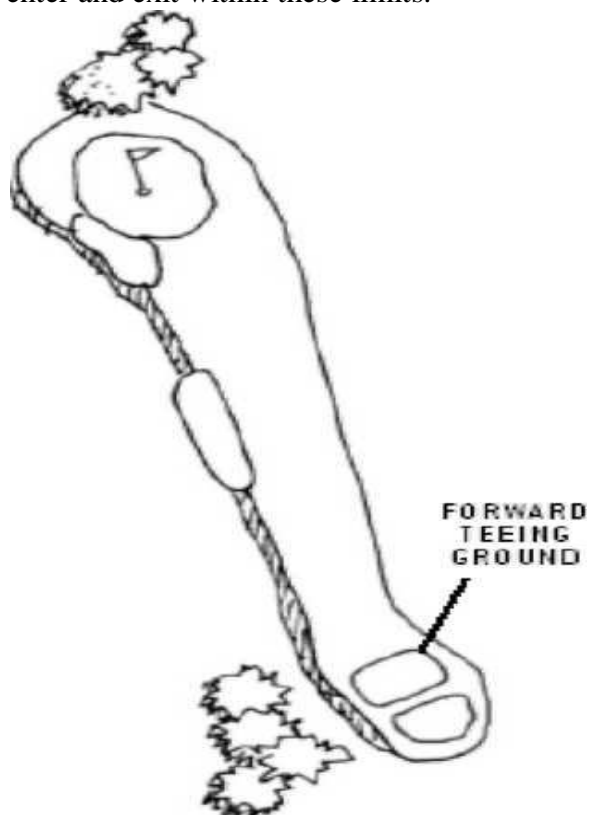
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### **2.15.2 Infrastructure**

Accessible routes serving teeing grounds, practice teeing grounds, putting greens, practice putting greens, teeing stations at driving ranges, course weather shelters, bag drop areas and course toilet rooms, should be at least 1200 mm wide. However, where handrails are also provided, accessible routes should be at least 1500 mm wide. The route must have a clear head space of 2m from the ground. The surface of the path should be even and firm with any change in level managed by a slope no more than 1:12 gradient. Where curbs or other constructed barriers prevent wheelchairs and golf cars from entering a fairway, openings of at least 1500mm wide should be provided at intervals not exceeding 69 m.

The "teeing ground" is the starting place for a hole of golf.

A rectangular area usually two club-lengths in depth, the teeing ground's borders are defined by the outside limits of two "tee-markers." Teeing area must allow golf cars to enter and exit within these limits.



Forward Teeing Ground—The forward teeing ground for each hole must be connected by the accessible route or have access for the golf cart.

Multiple Teeing Grounds—If one or two teeing grounds are provided for a hole, only the forward teeing ground should be accessible by the accessible route. If three or more teeing grounds are provided for a hole, two teeing grounds should be accessible. This will allow persons with disabilities to play from different tees **appropriate to their skill level**.

Each putting green must be so designed and constructed that it allows a golf cart or a wheelchair to enter and exit.

The green must be connected to the golf cart passage or the accessible route.



Course weather shelters must be designed and constructed to allow a golf car or a wheel chair to enter and exit, and have a clear floor or ground space of 1500mm by 2400mm minimum.

**This space will allow a golf cart to be driven directly into a weather shelter.**



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### 2.15.3 Aids and Appliances

There are many assistive devices on the market that enable golfers with disabilities to play the game. These include specially-designed golf clubs, mobility devices, gripping aides, practice facility equipment such as automated ball teeing devices, ball retrieval aides, etc. some of these aid are described below:

Adapted Clubs are hinged design makes it possible by allowing the club to "lie" more flat than conventional golf clubs. This enables the golfer to attain a better "hit" because the sole of the club head lies "flat" or parallel to the ground: It's simple: more clubface on the ball = better golf hit.



Putter Heads of several kinds are available. These heads are designed to eliminate the unwanted wrist action adding radial stability and forcing the golfer to putt from the shoulders.



Adapted Tee's there are several adaptations for the tee that eliminates the need for bending and stooping for teeing the ball. Similarly there are easier retrievers of ball from the ground too that prevent bending. An adapted grip for finger amputees may be used for gripping the club. An individual accessible golf cart enables golfers to continue to enjoy the game of golf. These



carts can be driven over greens and tees with no impact to the turf. They can be driven in rough terrain. They have a swivel seat that makes entry and exit easy. One can play sitting on an elevated seat setting.

For persons with hearing impairments it is recommended to have screen display boards, visual signals and written rules and regulations of the game.

#### **2.15.4 Staff**

A golf instructor as a member of staff is required to train persons with disability. Apart from this all persons can be assessed by an Occupational Therapist to evaluate and recommend the adapted aids that may be required by the person. For persons with hearing impairments, it is advisable for the instructor to have the knowledge of sign language.

#### **2.15.5 Safety Guidelines**

- Do not swing your club until you know that others in your group are at a safe distance. Likewise, keep your distance when others are swinging. Be aware to steer clear of trouble.
- When practicing your swing, never swing in the direction of another player. There may be pebbles, twigs or other matter in the grass that could fly up and injure a playing partner.
- Do not hit the ball until you are certain that the group ahead of you is out of range.
- If your ball appears headed toward another player or another group, give them a warning by yelling. Never throw clubs in anger. In addition to being rude and childish, it could also be dangerous.

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#### **2.16 Aerobics**

Aerobics is a form of exercise that involves rapid stepping patterns, performed to music with cues provided by an instructor. Aerobics is one of the healthiest forms of exercise. The literal meaning of aerobics is with oxygen i.e. aerobics helps us to use oxygen more efficiently by conditioning the heart and lungs. This helps in the reduction of stress and in weight control. Aerobic exercises have a wide range of benefits. It encourages cardiovascular and muscular fitness and increases flexibility. Aerobics workouts are great for building a stronger heart and leaner body, lowering cholesterol and improving sleep patterns. Since aerobics is practiced with music it becomes a fun exercising regime easy to follow and continue.

##### **2.16.1 Benefits Expected**

Aerobic exercise helps push the heart and circulation. This stress forces the body to adapt causing many changes which benefit in many ways. The health benefits of aerobic exercise are important, Not only does it help control weight; it also limits the chances of developing many common illness and diseases.

- The heart enlarges and increases its blood stroke volume.
- Resting heart rate slows, less than 60 beats per minute indicates good physical fitness.
- Oxygen is used more efficiently resulting in increased fat burning during exercise. This creates a positive body composition change, more muscle, less fat.
- More energy available and increased endurance.
- Reduced risks in developing diabetes and other diseases.
- Increase in good cholesterol, decrease in bad cholesterol.
- More efficient cardiovascular system.
- Help in coping with all other emotional and psychological stress.

Aerobics is an exercise that can be done by persons with any disability including:

- Amputee.
- Autism.
- Brain Injuries.
- Cardiovascular Accident/Stroke.

- Cerebral Palsy.
- Down's Syndrome.
- Emotional Disabilities.
- Hearing Impairments.
- Learning Disabilities.
- Mental Retardation.
- Multiple Sclerosis.
- Muscular Dystrophy.
- Post Polio.
- Spina Bifida.
- Spinal Cord Injuries.
- Visual Impairments.

Deaf blind.

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### **2.16.1 Infrastructure**

Aerobics can be done both outdoors and indoors. Outdoors it may be done in the lawn, but there must be a provision to play music. Indoors it can be done in any room or a hall. but here too, there has to be a provision to play music.

For the benefit of persons who may be hard of hearing it may be useful to have some sound insulation in the indoor hall where aerobics is being practiced.

### **2.16.2 Aids and Appliances**

For persons with vision impairment the instructor will need to demonstrate the movement and link the movement to language, including the name of the exercise and muscle involved.

For the deaf blind physical assistance and/or Braille can be used. The physical assistance and braille needs to be explained, so the participant knows what to do. The instructor can then simplify all the moves to one touch cue or a sign cue that the participant will understand. An example would be if the instructor wants the participant to march in place as part of a low impact aerobics routine. Once the concept is understood the instructor does the sign for soldier, or taps the individual's knee to signal marching. The participant now knows he will march for eight counts then a new cue will be given for the next move.

In wheelchair aerobics the individual moves his/her arms up in the air, out to the sides, punches down, or twists at the hips for eight counts or more to elevate the heart rate. If the individual can move his/her legs they can move their legs at the same time as their arms. The idea is to increase the heart rate and amount of energy expenditure. Any amount of movement can elevate the heart and if this is continued for over five minutes it is considered aerobic.

### **2.16.3 Staff**

An aerobics instructor working as a team with a physiotherapist is needed in case of wheelchair aerobics.

### **2.16.4 Safety Guidelines**

- Participants, who want to begin aerobic, should consult their doctor for a heart and lung assessment.
- Participants who have suffered an injury in the past should have a muscle-skeletal assessment performed by a doctor before commencing aerobics.
- Footwear specifically designed for aerobics is recommended. Good fit, stability, secure lacing and good forefoot cushioning are important features of an aerobics shoe.
- Participants should choose clothing that fits well and has good moisture transfer properties.

- Classes should begin at a moderate pace to allow all participants to warm up adequately.
- All aerobics areas should be well lit. The temperature in the aerobics area should be maintained at a moderate level, with good ventilation.

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## ***Aerobics***

- The floor should be specifically suited to aerobics. Sprung wooden floors or padded over concrete are the most suitable surfaces.
- All aerobics session should begin with a gentle warm-up and stretching.
- In novice classes, or where a new technique is involved, a second instructor should be available to move among the participants and correct any faults.
- Participants with injuries that may be related to poor technique should seek advice from their instructor about how to improve or correct their technique.
- First aid facilities should be available at all fitness centres.
- Foot biomechanics play a large part in overuse injuries of the lower limb and their correction with orthotic devices (specific arch supports) is often very helpful.

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## **2.17 Athletics**

Athletics are a group of field and track sports including running, throwing and jumping. Some sports that are clubbed under athletics are long jump, high jump, racing, javelin throw, shot-put, discus throw etc. Athletics are competitive sports and require regular practice. Athletics is one of the few arenas today where the participants are judged strictly on their merit. Therefore in athletics it is their ability which is important, and not their disability.

### **2.17.1 Benefits Expected**

Persons with various disabling conditions may participate in athletics. Some of these include:

- Amputee.
- Autism.
- Brain Injuries.
- Cardiovascular Accident/Stroke.
- Cerebral Palsy.
- Down's Syndrome.
- Hearing Impairments.
- Learning Disabilities.
- Mental Retardation.
- Multiple Sclerosis.
- Muscular Dystrophy.
- Post Polio.
- Spina Bifida.
- Spinal Cord Injuries.
- Visual Impairments.
- Deaf blind.

Some benefits that any person, including athletes with disability can derive from athletics are:

- Regular exercising regime resulting in good health.
- A competitive spirit and the confidence to face the world.
- Quality of perseverance and never give up spirit.
- An opportunity to challenge oneself.
- Ability to control weight gain.
- Learn to accept both success and failures.
- Opportunity to participate in National and International sporting events.

## 2.17.2 Infrastructure

The infrastructure requirements of athletes with disability are no different from non disabled athletes. Apart from the regular athletic tracks and field for disabled athletes it must be ensured that:

- There are accessible parking (design specifications as per annexure) provisions outside the venue.
- There is an accessible route leading to the main areas and facilities in the venue.
- There must be provision of an accessible toilet in the venue (design specifications as per the annexure).

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There must be accessible dressing area facilities available for the disabled athletes (design specifications as per the annexure).

## 2.17.3 Aids and Appliances

Athletes on wheelchairs will require a good sporting wheelchair that is light weight, easy to propel and preferably three wheeled. A sports wheelchair is very specialised and is built for the sole purpose of a particular sport in terms of speed, maneuverability and strength. It is important to have a, right sport wheelchair, not only so one can be competitive, but also because of safety issues such as the stability and strength of the chair.

For persons with blindness and low vision some modifications used are as follows:



**For racing events** a guide runner may be used. The guide and blind runner hold opposite ends of a 750mm length of rope loosely between 2nd and 3rd fingers. In early stages of guide running, a shorter rope may be used to increase confidence. Lengthen rope as runner gains confidence, since longer rope allows a more natural arm swing. A short tether (arms in unison) work well for some guide/competitor combinations.

Don't tie or knot around fingers or wrist since a fall could dislocate a joint. Start by walking, then jogging and then running on a track or other smooth running surface. The guide runs either alongside or slightly behind the runner. Competitors have varying opinions in regards to running on either the inside or outside of the guide. Give runner only minimal information about conditions such as need to pass slower runners etc.



**For relay racing**, apart from having a running guide, the important thing is the exchange of batons. The primary difference in the exchange is increased communication between the runners and a modified hand-off. The waiting runner begins to yell the runner's name at standard intervals of one second or so and the approaching runner yells "go" when in position. The awaiting runner holds the arm straight out from his/her side, rather than straight behind, but the receiving hand is still held in the traditional way. The approaching runner swings down on the waiting runner's arm and slides the baton to the right and into the waiting hand. Obviously, this exchange is more complex than normal and takes a good deal of practice to be efficient.

**For shot put and discus throw** having a regular setup, i.e. an inset concrete or raised steel ring and a stop board in the front are very convenient for persons with vision impairments to use as they get tactile information on where to throw and the direction to throw in. A towel or other article left just outside the back center can help for exact lining up at rear of ring for initiating the approach. If there is only a painted circle instead of a ring or stop board, affix a raised rope under two-inch tape over the painted circle and place towels or other articles just outside the front and back of ring for orientation. It may also be considered to make kick box more easily visible by taping in cross hatching or in stripes on it with black or brightly colored two inch tape.

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**In long jumping**, the major difficulties are staying on the running approach, hitting the board without fouling and landing safely in the pit. The most independent and efficient adaptation is "calling." Place the jumper on the runway at a three step approach distance, place the caller facing jumper at end of sand pit, have caller yell "Here" and ask jumper to point directly at caller to verify alignment. Then have caller yell through cupped hand, "Okay-ready-go!-go!-go!-go!" The caller also has an abort command ("Stop!") if the jumper veers off the runway.

The board is adapted by making a lightly powdered three-foot section of runway three feet or so short of the pit. The jump distance is measured from the "footprint" in the powder, rather than in the usual way. Teaching when/where to jump is the same as with sighted jumpers. That is, by having the jumper count steps, not by telling the jumper when to jump.

The board can be made more visible with black or brightly colored stripes of two-inch vinyl tape. Orange cones may also be placed on each side of the take-off board for competitors with low vision. The last ten to twenty feet of runway can also be marked on both sides with two-four inches of brightly contrasting tape. If tape does not stick to the runway, it can be tacked down with small nails with large heads.

**In high jump** the major problem is the jumper's inability to locate the crossbar. As such, the only way high jump can be accomplished is through placing raised starting marks on the runway, then practicing the number of steps at which the jump is to be made. The direction of the run up can be done by hanging a beeper or other sound source such as a caller on the bar or one on each of the crossbar standards. The learning part of this event is the most difficult and will require a good deal of task analysis, starting first with no crossbar and working up to using one.

The crossbar is generally striped black and white, but it can be made even more visible by

hanging strips of two-inch black or bright orange tape from the crossbar. If the tape hangs about one foot, the bar is much more easily seen. Bright markers on the runway can also aid low vision jumpers in their approaches.

#### **2.17.4 Staff**

A well trained and qualified physical training instructor will be a good asset in supervising athletic activities for persons with disabilities. For persons with hearing impairments, it is advisable for the instructor to have the knowledge of sign language.

#### **2.17.5 Safety Guidelines**

- Dehydration can occur in as little as 30 minutes during rigorous exercise and will hamper performance, especially in the heat. One needs to be aware of the warning signs of dehydration: dizziness and light-headedness, muscle cramps, nausea and headache. Dehydration can cause a dangerous increase in body temperature leading to heat exhaustion and heat stroke. Therefore it is important to dehydrate.

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Carbohydrates are the most efficient source of energy for any kind of physical activity. They are body's primary fuel for exercise and they require less oxygen to burn than either protein or fat, therefore must be taken in the diet. Most importantly the limit of a disabled person must be recognized beyond which it is not advisable to push in practice or in competition. It is important that the instructor and the parents be responsive to complaints of injury from athletes of all ages. They should be aware that any athlete who is not playing up to skill level may be suffering from a significant injury.

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### **2.18 Badminton**

Badminton is a racquet sport played by either two opposing players (singles) or two opposing pairs (doubles), who take positions on opposite halves of a rectangular court that is divided by a net. Players score points by striking a shuttlecock with their racquets so that it passes over the net and lands in their opponents' half of the court.

Badminton is a Special Olympic's game but is an activity that can be played for recreation or for competition. At high levels of play, the sport demands excellent fitness; players require aerobic stamina, strength, and speed. It is also a technical sport, requiring good hand-eye coordination and the development of sophisticated racket skills

#### **2.18.1 Benefits Expected**

Badminton is a sport that can be played by persons with varying abilities. Some of the disabling conditions for which badminton may be suitable include:

- Spinal Cord Injuries
- Post polio
- Amputee
- Multiple Sclerosis
- Muscular Dystrophy
- Spinal Bifida
- Hearing Impaired
- Autism
- Learning Disabilities
- Mental Retardation

Badminton is as much a fun activity as a competitive sport, therefore it can be enjoyed with family and friends. Since it does not need too many adaptations it can be played anywhere

including ones backyard. Other benefits may include:

- It can be played by persons with fairly low level of fitness and ability.
- It is a very good exercise for all-round fitness
- It helps in maintaining weight
- It is a very social game thus gives opportunities for inclusion
- Good for the cardiovascular system

## 2.18.2 Infrastructure

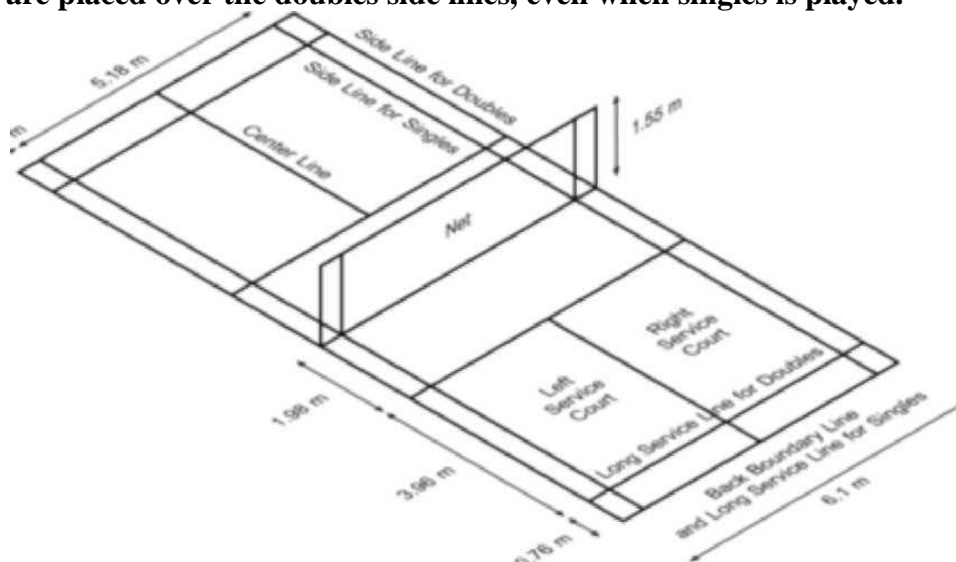
The badminton court required for disabled players and the non disabled is the same. The regular court is rectangular and divided into halves by a net. Courts are almost always marked for both singles and doubles play, although the laws permit a court to be marked for singles only. The doubles court is wider than the singles court, but the doubles service court is shorter than the singles service court.

The full width of the court is 6.1 metres, and in singles this width is reduced to 5.18 metres. The full length of the court is 13.4 metres. The service courts are marked by a centre line dividing the width of the court, by a short service line at a distance of 1.98 metres from the net, and by the outer side and back boundaries. In doubles, the

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service court is also marked by a long service line, which is 0.78 metres from the back boundary.

**The net is 1.55 metres high at the edges and 1.524 metres high in the centre. The net posts are placed over the doubles side lines, even when singles is played.**



## 2.18.3 Aids and Appliances

There are no special aids that are required for badminton except the shuttlecock and the racquet. The racquet may be adapted in length if required and velcro straps may be tied in the hand to get a better grip of the racquet.

## 2.18.4 Staff

If badminton is being played as a recreation, then any person who knows the game can assist. But in case is being played for participation in competition, then having a trained instructor may be useful. For persons with hearing impairments, it is advisable for the instructor to have the knowledge of sign language.

## 2.18.5 Safety Guidelines

- Persons playing the game from their wheelchair must have a strap attached to the wheelchair that is tied across the thighs to prevent falling off the chair. Also all players should use their anti-tip (safety) casters to prevent the wheelchair tipping over to the rear.
- Drink enough water. This is especially important for athletes with spinal cord injuries.
- Do not throw the racquet in anger as it may hurt someone

Have first aid available

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## 2.19 Volleyball

Volleyball is a team sport which can be played by disabled and able-bodied. It can be played by persons of any age. Volleyball is a uniquely universal sport as it includes persons of minor disability as well as people who are more severely disabled. Top international sitting teams use setters who are double leg amputees and these athletes are much faster in on-court movement. Volleyball is a game played at the Paralympics and the Special Olympics.

Volleyball practice is economical, especially for sitting volleyball since no expensive prostheses or wheelchairs and no special sport equipment is needed. All that is needed is floor space, a rope or net and a ball.



### 2.19.1 Benefits Expected

Volley ball can be played by persons with varying locomotor disabilities some of them include:

- Spinal cord injury.
- Amputee.
- Post polio.
- Spinal Bifida.
- Cerebral Palsy.
- Brain Injuries.
- Also it can be played by persons with hearing impairments, learning and mental retardation.

The benefits of playing volleyball include:

- Increased balance.
- Good exercise and stamina building activity.
- Helps in building a team spirit.



- Game that does not discriminate in abilities.
- Can provide an opportunity to participate in international sports arena.

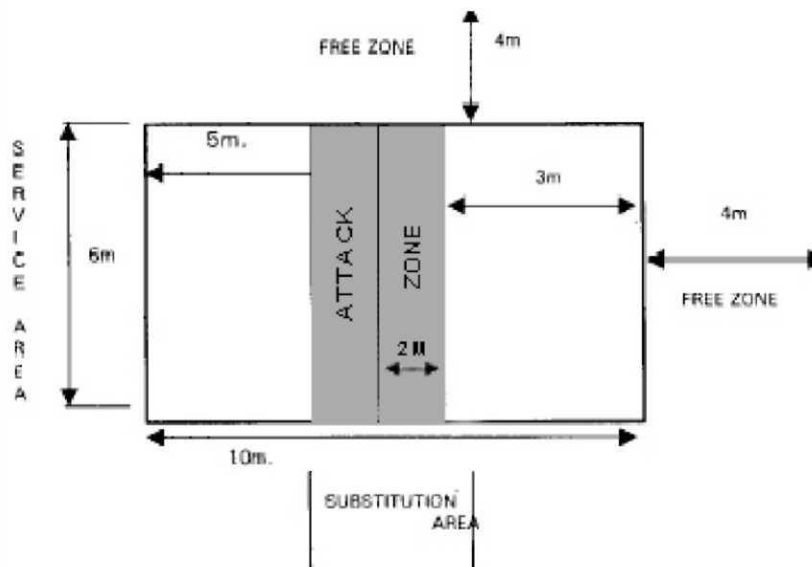
### 2.19.2 Infrastructure

The court size and height of the net are modified for sitting volleyball. Modifications to gym space are acceptable for local play, as long as both courts are equal in size. Most programs use a normal net that is 1m wide and 10m long, attached to the standards of a 9 x 18m court.

The regulation sitting court size is 6 x 10m. Boundary lines are included in the court. The centerline divides the court into two courts, 6 x 5m each. The net is 1.15m for men and 1m for women.

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Regarding the zone lines, the attack lines are drawn parallel to the centerline and 2m from the middle of the centerline. The service zone is marked with two lines, each 15cm long and placed inside the service zone at the end of each court, 20cm behind and perpendicular to the end line. Both are drawn as an extension of each sideline.



### 2.19.3 Aids and Appliances

There are no special aids and appliances that are required to play this game

Key rule modifications to sitting volleyball are:

- The position of each player is determined and controlled by the position of their bottoms. This means that the hand(s) and/or leg(s) may lie in the attack or free zone outside the court. "Bottom" is defined as the upper part of the body, from shoulder to one's buttocks.
- Touching the opponent's court beyond the centerline with a hand is permitted, if some part of the penetrating hand remains either in contact with or directly above the centerline.
- To contact the opponent's court with any other part of the body is forbidden. The player may penetrate into the opponent's space under the net, provided there is no interference from the opponent.
- The player is not allowed to lift his/her bottom from the court when executing any type of attack-hit.
- The back-row player may perform any type of attack-hit from any height, if at the time of the hit the bottom does not touch or cross over to the attack line.
- The player must have contact the court with some part of the upper part of the body at all times when playing the ball, except when making a defensive free zone play. In such defensive play, a loss of contact with the court is permitted for a moment.

- The referee's official hand signal of "lifting from the court" is raising the upper hand and forearm positioned parallel to the floor and mirror imaging the lower hand and forearm.

**Referees in sitting volleyball must stand to the sides of the court because of the height of the net and the fact that the players are in a seated position.**

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### **2.19.4 Staff**

A trained athletics instructor should be able to supervise and assist in this game. For persons with hearing impairments, it is advisable for the instructor to have the knowledge of sign language.

### **2.19.5 Safety Guidelines**

- Players should warm-up and cool-down before and after every game and training session. Current research indicates that the inclusion of stretching in warm-up does not reduce the risk of injury.

- First Aid must be available.
- Participants must not hang to the net.
- Wooden or synthetic elastic surfaces are recommended for volleyball. Concrete or other hard surfaces are not suitable. The surface should be dry and defect free.

The playing area should be safe and suitable including sufficient area around the margin of the court, padded posts and referee stand, good lighting and no post guide wires.

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## **2.20 Shooting**

Shooting is a very versatile sport. Most people irrespective of their abilities are able to participate in it. It can be enjoyed by men and women, by youngsters and senior citizens, and by individuals or members of a team. It is also a sport that can be enjoyed and participated in by persons with Disabilities.

Shooting apart from being a competitive sport is also a fun sport. It is a sport that almost every family member can enjoy together. It is also a sport that boys and girls, or men and women, can participate in together. There are several different categories of target shooting sport. They are generally divided based on the type of gun used for target shooting. These include:

- Rifle shooting.
- Handgun Shooting.
- Shotgun Shooting.
- Action Shooting.

### **2.20.1 Benefits Expected**

Persons with various disabling conditions may participate in shooting. Some of these include:

- Amputee.
- Mild Cerebral Palsy.
- Hearing Impairments.
- Multiple Sclerosis.
- Muscular Dystrophy.
- Post Polio.
- Spina Bifida.
- Spinal Cord Injuries.
- Visual Impairments.
- Deaf blind.

Benefits that a person can get from shooting include:

- It is a sport that can be practiced in a group for enjoyment or individually, giving one an opportunity to practice at their own pace.
- It is a sport that a person can enjoy for his/her whole life. Starting practice young, one can continue to practice even when old.
- Increases strength, stamina, hand-eye coordination and fine motor skills.
- Shooting sports are primarily mental sports. Experienced marksmen think sport shooting is 90% mental. Concentration levels are sharpened and expanded. One enhances problem solving skills.
- It is a sport that encourages and teaches personal responsibility

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### **2.20.2 Infrastructure**

Shooting ranges can be both outdoors or indoors. The infrastructure required for target shooting is the same with no difference from a regular shooting range. Disabled people may practice in a regular shooting range.

### **2.20.3 Aids and Appliances**

There is a wide range of equipment available in the market that can be used by both able and disabled shooters. Some basic equipment for shooting includes:

- Target with a target stand.
- Guns.
- Ammunition.
- Shooting glasses..
- Hearing protectors.
- Range equipment.
- Spotting scope.

For persons with physical impairments and hearing impairments the same equipment is used. Persons with vision impairments may use rifles that are equipped with a telescope that converts light into sound. Sound is transferred by means of a headphone or earphone to the visually impaired participant. The rifle may also be equipped with a laser-based aiming device with an acoustic output.

### **2.20.4 Staff**

A shooting instructor is required for training. The trainer may team with a therapist to work out techniques that are allowed as per the sport rules and regulations but assist disabled persons to practice easily. For persons with hearing impairments, it is advisable for the instructor to have the knowledge of sign language.

### **2.20.5 Safety Guidelines**

- The gun should be always pointed to a safe direction.
- As a matter of habit the participant should remember never to keep their finger on the trigger except when shooting.
- When the gun is not in use it should be always kept unloaded.
- One needs to be absolutely sure of the target and also be aware of the area beyond the target. Never fire in a direction in which there are people or any other potential for mishap.
- It is important to know how to operate a gun before handling it. One must know its basic parts, how to safely open and close the action and remove any ammunition from the gun or magazine. Gun's mechanical safety device is never foolproof therefore nothing can ever replace safe gun handling.
- Like any other equipment, a gun needs to be properly maintained and kept clean. Before cleaning the gun, one must make sure that it is unloaded.

- Right ammunition must be used for each gun. It can be identified by information printed on the box and sometimes stamped on the cartridge.
- Shooting glasses and hearing protectors should be worn by all shooters and spectators.

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## 2.21 Cricket for the Blind

Persons with visual impairment were initiated into cricket through radio commentary. In the 1970s, blind people were seen hit by the cricket virus, and playing with empty tins as the ball and sticks as the bat.

This was the beginning of the audio game. With the passing of time the sticks changed to bats and tins changed into audio balls. The National Institute for the Visually disabled developed the ball (hard plastic ball with ball bearings inside) that is in use today.



Blind people have taken to the sport in a big way all

over the world. But, in India, it is more than just a sport for them. In a country where cricket has been elevated to the status of a religion, it provides them with recreation and helps build their confidence. On the cricket field, they learn about leadership, discipline, will power and initiative. Cricket projects blind people as positive and active human beings with emotions, capabilities and ambitions, thus fostering social integration.

The basics of Blind Cricket are as follows;

- The game is played with an audio ball made of hard plastic and filled with tiny ball bearings
- Bowling is underarm and the ball has to pitch once before the mid pitch
- The bowler gives an audio clue before bowling and the batsmen gives an audio clue when he is ready
- The wickets are screwed together to ensure they are aligned
- The boundaries are 45 yards from the pitch
- A team comprises 11 players

A match is played between two teams of 11 players comprising a minimum of 4 totally blind players.

The rules of the game have been adapted as follows;

The team of 11 comprises partially sighted players and totally blind players. The game of blind cricket is single-ended; that is, there is only one batsman at a time. The batsman is permitted a caller who will stand behind the wicket-keeper and may give the batsman a 'call' as to whether

the ball is 'straight', 'off or leg'.

All forms of dismissal from sighted cricket apply except for catching. Partially sighted players who avoid going out when batting are obliged to retire after either scoring 30 runs or facing 8 overs. Similarly, a totally blind batsman must retire after facing 16 overs. Bowling restrictions also apply to categories of players

### 2.21.1 Benefits Expected

- Promotion of physical fitness.
- Deeper mental awareness and self control.

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- Respect and an understanding of oneself and others.
- Promotion of relaxation and reduction of stress.
- It can be played as a competitive activity with opportunities to participate in International sporting event. It is an activity of low maintenance cost.

### 2.21.2 Infrastructure

**The pitch:** All International matches will be played on a surface mutually agreeable to the participating teams.

Preference of the W.B.C.C. is always turf or synthetic grass surfaces. The middle of the pitch has to be clearly marked with a line across. Lines shall be drawn to make an area, which measures ten feet from the middle stump at each end. The line will be drawn at each batting end on leg side and off side.

This line is so marked to indicate where the Runner shall stand.

The pitch is 22 yards long and 3 yards wide.

Wide ball markings are made at both ends of the pitch on either side of the wickets at a distance of 2 feet from the outside of the leg and off stumps.

**The Ground:** The boundaries are measured 40 metres in a circle around the pitch and indicated by a white line with flags set at intervals.



### **2.21.3 Aids and Appliances**

- Bat: The regular cricket bat to be used with standard specifications.
- Ball: The ball used is made of nylon tubing woven around a wire frame. Inside the ball are bottle tops and lead weight to give the ball an audible sound when bowled or thrown.
- Wicket: Each wicket shall consist of three tubular stumps (either metal, plastic, or wood). The colour of the wickets shall be fluorescent orange or yellow.
- Protective clothing: Players may also wear gloves and helmet while fielding.

### **2.21.4 Staff**

A cricket coach with an understanding of blind cricket will be required.

### **2.21.5 Safety Guidelines**

- All participants should be encouraged to wear the appropriate safety gear.
- A first aid kit should be available and at least one staff member should be trained in provision of first aid.

Proper colour contrasts should be maintained.

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## ***3 Important Reference Addresses***

### **3.1 Martial Arts**

Israel Sports Centre for the Disabled  
123 Rokach Street,  
Ramat Gan,  
Israel, 52535  
Phone: +972-3-5754444

Fax: +972-3-7511649  
E-mail: [disport@inter.net.il](mailto:disport@inter.net.il)  
Web: <http://www.iscd.com>

International Blind Sport Association  
IBSA Judo Sub-committee  
Chairperson  
Jean-Claude Prieur  
70 rue Romain Rolland  
91550 Paray-Vieille-Poste  
France  
Mobile: +33 (0)6 09 78 48 74  
Fax: +33 (0) 1 69 84 84 54  
E-mail: [jcprieur3@wanadob.fi](mailto:jcprieur3@wanadob.fi)  
Web: <http://www.ibsa.es/eng/>

International Paraplegic Association  
Mr. Michael Barredo  
President  
c/o IBSA  
215 El Grande Corner Tropical Streets  
BF Homes  
Las Pinas City  
Philippines  
Tel:+63 2 8260733  
Fax:+63 2 8208636  
Email: [ibsa\\_president@skyinet.net](mailto:ibsa_president@skyinet.net)  
Website: <http://www.paralympic.org>

International committee of Sports for the Deaf  
528 Trail Avenue  
Frederick, Maryland 21701  
USA  
fax:+1 301 620 2990  
e-mail:[info@ciss.org](mailto:info@ciss.org)  
<http://www.deaflympics.com/>

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### **3.2 Yoga**

Indian Spinal Injuries Centre  
Sector C5, Vasant Kunj  
New Delhi 110070  
India  
Web: [www.isisonline.org](http://www.isisonline.org)

Israel Sports Centre for the Disabled  
123 Rokach Street,  
Ramat Gan,  
Israel, 52535  
Phone:+972-3-5754444

Fax: +972-3-7511649  
E-mail: [disport@inter.net.il](mailto:disport@inter.net.il)  
Web site: <http://www.iscd.com>

Rehabilitation Institute of Chicago  
345 E. Superior St.  
Chicago  
Illinois  
60611  
<http://www.richealthfit.org/>

The Clarke School for the Deaf "Sadhana"  
No.3,3ra Street,  
Dr. Radhakrishna Road,  
Mylapore,  
Chennai - 600 004

### **3.3 Gardening**

Touch 'n' Smell  
P. Pushpangadan, A. N. Sharga, R. K. Roy  
and K. Kulshreshtha  
National Botanical Research Institute (NBRI)  
Rana Pratap Marg, Lucknow - 226 001  
India  
Tel: +91 0522 205831-35  
Fax: +91 0522 205839/205836  
E-mail: [pushpangadan@satyam.net.in](mailto:pushpangadan@satyam.net.in)

Gardening for the Disabled Trust  
The Secretary  
Hayes Farmouse  
Hayes Lane  
Peesmarsh  
East Sussex  
TN31 6XR UK  
Fax: 01580 852120  
Web: [www.gardeningfordisabledtrust.org.uk](http://www.gardeningfordisabledtrust.org.uk)

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Thrive  
The Geoffrey Udall Centre,  
Beech Hill,  
Reading, RG7 2AT  
UK <http://www.thrive.org.uk/>

### **3.4 Swimming & Aqua Therapy**

Swimming Association of India for Disabled  
Dr.V.K.Dabas  
29, LNIPE, Shakti Nagar,  
Gwalior - 2



Ph: 0751-5000921, 5000928  
Mobile: 9425122613  
Email: info@swimaidindia.org  
Web: <http://www.swimMdmndia.org/>

Indian Spinal Injuries Centre  
Sector C5, Vasant Kunj  
New Delhi 110070  
India  
Web: [www.isisonline.org](http://www.isisonline.org)

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Ramat Gan,  
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Fax: +972-3-7511649  
E-mail: [disport@inter.net.il](mailto:disport@inter.net.il)  
Web: <http://www.iscd.com>  
International Paralympics Committee  
Swimming Technical Committee  
Ms. Anne Green  
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Australia  
Phone: +61-8-9355-5517  
Email: [anne.ipcswimming@bigpond.com](mailto:anne.ipcswimming@bigpond.com)

International Blind Sport Association  
IBSA Swimming Sub-Committee  
Chairperson  
Jane D. Blaine  
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Vancouver, BC V5R 6B2  
Canada  
Tel: 1 604 325-8638  
Fax: 1 604 325-1638  
E-mail: [jane@bcblindsports.bc.ca](mailto:jane@bcblindsports.bc.ca)

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Special Olympics Bharat (India)  
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Upper Concourse  
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International committee of Sports for the Deaf  
528 Trail Avenue  
Frederick, Maryland 21701  
USA  
fax: +1 301 620 2990  
e-mail: [info@ciss.org](mailto:info@ciss.org)  
<http://www.deaflympics.com/>

### **3.5 Therapeutic Horse Back Riding**

Princess Academy Of Equitation  
Bangalore Palace Grounds,  
Bellary Road Entrance  
Opp. Talisma Software  
Bangalore 560080  
Phone: +91-80-2361 7331 / 2361 0695  
Mobile: +91-80-5671159 / 56711513 / 5611509 / +91-98450 46680  
Email: [pae\\_mys@hotmail.com](mailto:pae_mys@hotmail.com)

South African Sports Association for the Physically Disabled  
Disability House, House 31,  
Rand Refinery Estate,  
Refinery Road,  
Germiston, 1400  
South Africa  
Phone: +27 11 873 9191  
Email: [iris@sasapd.org.za](mailto:iris@sasapd.org.za)  
Web: <http://www.sasapd.org.za>

Federation of Riding for Disabled  
P.O. Box 886  
Werribee  
Vic. 3030  
Australia  
Telephone: 61 3 9731 7282  
Fax: 61 3 9731 7395  
[frdi@rda.org.au](mailto:frdi@rda.org.au)  
<http://www.frdi.net/index.htm>

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North American Riding for the Handicapped Association (NARHA)  
PO Box 33150  
Denver,  
CO 80233

USA  
fax:(303)252-4610  
skdietrich@narha.org  
<http://www.narha.org/>

### **3.6 Cycling**

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E-mail: [disport@inter.net.il](mailto:disport@inter.net.il)  
Web: <http://www.iscd.com>

South African Sports Association for the Physically Disabled  
Disability House, House 31,  
Rand Refinery Estate,  
Refinery Road,  
Germiston, 1400  
South Africa  
Phone: +27 11 873 9191  
Email: [iris@sasapd.org.za](mailto:iris@sasapd.org.za)  
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+ 91 11 243 63422 (Fax)  
Web: <http://www.specialolympics.org/>

### **3.7 Basketball**

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PRC  
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E-mail: [prckirkee@yahoo.co](mailto:prckirkee@yahoo.co).

#### **International committee of Sports for the Deaf**

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e-mail: [info@ciss.org](mailto:info@ciss.org)  
<http://www.deaflympics.com/>

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Ramat Gan,  
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Fax: +972-3-7511649  
E-mail: [disport@inter.net.il](mailto:disport@inter.net.il)  
Web: <http://www.iscd.com>

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109-189 Watson Street  
Winnipeg  
Manitoba  
R2P 2E1  
Canada  
1-204-632-6475  
1-204-697-2734  
E-mail: [IWBFPresident@aol.com](mailto:IWBFPresident@aol.com)  
Web: <http://www.iwbf.org/>

Florida School for Deaf and Blind  
Outreach Services  
Florida School for the Deaf and the Blind  
207 N. San Marco Avenue

St. Augustine, FL 32084  
E-mail: [dayc@fsdb.k12.fl.us](mailto:dayc@fsdb.k12.fl.us)

Great Britain Wheelchair Basketball Association  
GBWBA Office  
Suite B - Technology Centre  
Epinal Way  
Loughborough  
LE11 OQE  
UK  
E-mail: [c.bethel@gbwba.org.uk](mailto:c.bethel@gbwba.org.uk)  
Web: <http://www.gbwba.org.uk/>

### **3.8 Fishing**

British Disabled Angling Association (BDAF)  
9 Yew Tree Road  
Delves  
Walsall  
West Midlands  
WS5 4NQ  
Phone : 01922 860 912  
Email: [terry@bdaa.co.uk](mailto:terry@bdaa.co.uk)  
Web: [www.bdaa.co.uk](http://www.bdaa.co.uk)

**Michigan Adaptive Sports**  
Michigan Adaptive Sports  
P.O. Box 569 Keego Harbor, MI 48320  
<http://www.michiganadaptivesports.org/>

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### **3.9 Lawn Tennis**

Delhi Lawn Tennis Association  
Pradeep Lal  
R.K. Khanna Tennis Stadium,  
1, Africa Avenue,  
New Delhi-110029,  
India  
Phone: 011-26193955  
Fax: 011-26173159

South African Sports Association for the Physically Disabled  
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Rand Refinery Estate,  
Refinery Road,  
Germiston, 1400  
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Phone: +27 11 873 9191  
Email: [iris@sasapd.org.za](mailto:iris@sasapd.org.za)

Web: <http://www.sasapd.org.za>

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Fax: +91 11 617 3159/6193955  
Email: [aitaten@del3.vsnl.net.in](mailto:aitaten@del3.vsnl.net.in) / [aita@vsnl.com](mailto:aita@vsnl.com)  
Website: <http://www.itftenms.com/wheelchair/>

Special Olympics  
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+ 91 11 243 63422 (Fax)  
Web: <http://www.specialolympics.org/>  
International Committee of Sports for the Deaf  
528 Trail Avenue  
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USA  
fax:+1 301 620 2990  
e-mail: [info@ciss.org](mailto:info@ciss.org)  
<http://www.deaflympics.com/>

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### **3.10 Ten Pin Bowling**

British Wheelchair Bowls Association (BWBA)  
Station Road  
East Preston  
West Sussex  
BN16 3AJ  
Tel: 07932 791519  
E-mail: [ianblackmore@bwba.org.uk](mailto:ianblackmore@bwba.org.uk)  
Web: [www.bwba.org.uk](http://www.bwba.org.uk)

American Blind Bowlers Association  
320 South Gramercy Place  
Apt. 205  
Los Angeles CA 90020  
(213) 384-9613  
Web: <http://www.americanblindbowlers.com/index.asp>

International Committee of Sports for the Deaf  
528 Trail Avenue

Frederick, Maryland 21701  
USA  
fax:+1 301 620 2990  
e-mail: info@ciss.org  
<http://www.deaflympics.com/>

International Blind Sport Association  
IBSA Ten Pin Bowling Sub-Committee  
Mr McKinley Young  
Chairman  
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Washington, DC 20011  
USA  
E-mail: mkyou@starpower.net

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New Delhi 110070  
India  
Web: [www.isisonline.org](http://www.isisonline.org)

Israel Sports Centre for the Disabled  
123 Rokach Street,  
Ramat Gan,  
Israel, 52535  
Phone:+972-3-5754444  
Fax: +972-3-7511649  
E-mail: [disport@inter.net.il](mailto:disport@inter.net.il)  
Web: <http://www.iscd.com>

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International Paralympics Committee  
Mr. Oeivind Eriksen  
Alf Proysens vei 10  
2315 Hamar  
Norway  
Phone: +47-62-54-51-34  
Fax: +47-62-54-50-04  
E-mail: [oeierik@online.no](mailto:oeierik@online.no)

British Wheelchair Table Tennis Association  
Denise Barnett  
Secretary, BWTTA  
3 Brentford  
Wellingborough  
Northants  
UK  
Web: <http://www.wheelpower.org.uk/sports/dyncat.cftn?catid=16977>

International Blind Sport Association  
IBSA Showdown Bowling Sub-Committee  
Jaroslav Pata  
Chairman  
E-mail: [prague.cbsa@seznam.cz](mailto:prague.cbsa@seznam.cz)

### **3.12 Archery**

Grand National Archery Society  
Ray Fields  
48 Chimney Court  
Shilling Close  
Tilehurst  
Reading  
Berks.  
RG30 4EN  
Web: <http://www.gnas.org/cU8abled/index.cftn>  
International Blind Sport Association  
[www.ibsa.es](http://www.ibsa.es)

International Paralympics Committee  
Archery Technical Committee  
Ms. Ann Webb  
79 Duxmoor, Onibury  
Craven Arms  
Shropshire SY7 9BQ  
Great Britain  
Phone: +44-1584-85-63-08  
Email: [ipcarchery@btinternet.com](mailto:ipcarchery@btinternet.com)



United Foundation for Disabled Archers  
P.O. Box 251,20 NE 9th Ave.  
Glenwood, MN 65334  
(320) 634-3660  
[info@ufifdaclub.com](mailto:info@ufifdaclub.com)  
Web: <http://www.uflfdaclub.com>

### **3.13 Gymnasium**

Stoke Mandeville Stadium  
Guttmann Road  
Aylesbury  
Bucks  
HP21 9PP  
Tel: 01296 484848  
Fax: 01296 461130  
Email: [stoke.mandeville@leisureconnection.co.uk](mailto:stoke.mandeville@leisureconnection.co.uk)



Indian Spinal Injuries Centre  
Sector C5, Vasant Kunj  
New Delhi 110070  
India  
Web: [www.isisonline.org](http://www.isisonline.org)

### **3.14 Golf**

South African Disabled Sports Association  
King David Golf Course  
80 Palotti Road,  
Montana.  
South Africa  
021 934 5682  
Web: <http://www.sadga.co.za>

#### **American Blind Golf Association**

7634 Benassi Drive  
Gilroy, CA 95020  
USA  
Web: <http://www.abdga.org/>  
International Blind Golf Association  
Email: [roger.matas@internationalblindgolf.org](mailto:roger.matas@internationalblindgolf.org)  
Web: <http://www.internationalblindgolf.org>

European Disabled Golf Association  
Web: <http://www.edgagolf.com/>

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Canadian Amputee Golf Association  
P.O. Box 6091, Stn. A  
Calgary, Alberta  
Canada  
T2H 2L4  
Email: [canamps@caga.ca](mailto:canamps@caga.ca)  
Web: [www.caga.co](http://www.caga.co)

US Deaf Golf Association  
Email: [mailto:President@usdeafgolf.org](mailto:mailto:President@usdeafgolf.org)  
Web: <http://www.usdeafgolf.org>

### **3.15 Athletics**

International Paralympics Committee  
Athletics Technical Committee  
Mr. Chris Cohen  
3 Cowham Close  
Alfreton, Derby DE55 7HG

Great Britain  
Phone: +44-1773-833099  
Email: ccohenipc@aol.com

International Blind Sport Association  
Athletics Sub-Committee  
Jack Todd  
Chairman  
South Carolina School for the Deaf and the Blind  
355 Cedar Springs Road  
Spartanburg, SC 29302  
USA  
Phone: +1-864-577-7640  
Fax +1-864-577-7649  
E-mail: jtodd@scsdb.k12.sc.us  
www.ibsa.es

International Committee of Sports for the Deaf  
528 Trail Avenue  
Frederick, Maryland 21701  
USA  
fax: +1 301 620 2990  
e-mail: info@ciss.org  
<http://www.deaflympics.com>

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**Special Olympics**  
Special Olympics Bharat (India)  
Room No. 3027  
Upper Concourse  
Stand - 20  
Jawahar Lal Nehru Stadium  
Lodhi Road Complex  
New Delhi -110003  
+ 91 11 243 62423; + 91 11 243 62424  
+ 91 11 243 63422 (Fax)  
Web: <http://www.specialolympics.org/>

### **3.16 Badminton**

Badminton Sports Association of India for Challenged  
45, Osborne Road,  
Behind Naga Theatre;  
Bangalore - 560 042, India  
Fax: + 91 80 25361788  
Email: bsaic@redifimail.com  
Web: <http://www.bsaic.org>

**International Badminton Association for the Disabled**  
General Secretary Ton Velberg

Tel: +31 (0)6 - 21 20 07 21  
<http://www.rolli-badminton.de>

International Committee of Sports for the Deaf  
528 Trail Avenue  
Frederick, Maryland 21701  
USA  
fax:+1 301 620 2990  
e-mail: [info@ciss.org](mailto:info@ciss.org)  
<http://www.deaflympics.com/>

### **3.17 Volleyball World Organization Volleyball for Disabled**

Mr. Gerard Brouwers  
Wilgenstraat 19  
4726 BC Heerle  
The Netherlands  
Phone: +31-165-304048  
Email: [brouwers.gerard@home.nl](mailto:brouwers.gerard@home.nl)

European Committee Volleyball for Disabled  
Tarthorst 609 6708 HV Wageningen,  
Netherlands  
Email: [mail@ecvd.hu](mailto:mail@ecvd.hu)

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Web: <http://www.ecvd.hu>  
**International Committee of Sports for the Deaf**  
528 Trail Avenue  
Frederick, Maryland 21701  
USA  
fax:+1 301 620 2990  
e-mail: [info@ciss.org](mailto:info@ciss.org)  
<http://wvm.deaflympics.com/>

### **3.18 Shooting**

**Disabled Target Shooting Great Britain**  
email: [rosiebpsa@fsmail.net](mailto:rosiebpsa@fsmail.net)  
web: <http://www.dtsgb.org.uk>

International Shooting Committee for Disabled  
Veldstraat 27,  
9250 Waasmunster,  
Belgium  
Phone:32-52-462236  
Email: [wvl@bigfoot.com](mailto:wvl@bigfoot.com)  
Web: <http://www.shootonline.org/>

**International Blind Sport Association**  
Shooting Sub-Committee  
Timo Nistrom

Otavankatu 10 C 14  
0100 Mikkeli  
Finlandia  
Phone: + 358 40 3024 205  
Fax: + 358 40 3800 431  
E-mail: nystrom.timo@pp.inet.fi  
E-mail: timo.nystrom@teliasonera.com

### **National Rifle Association**

Disabled Services Dept.  
11250 Waples Mill Rd.  
Fairfax, VA 22030  
USA  
Web: <http://www.nrahq.org/compete/disabled.asp>

International Committee of Sports for the Deaf  
528 Trail Avenue  
Frederick, Maryland 21701  
USA  
fax: +1 301 620 2990  
e-mail: [info@ciss.org](mailto:info@ciss.org)  
<http://www.deaflympics.com/>  
Email: [bsaic@rediffmail.com](mailto:bsaic@rediffmail.com)  
Web: <http://www.bsaic.org>

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## **3.19 Cricket for the Blind**

National Institute for the Visually Handicapped  
(Ministry of social justice and empowerment)  
116, Rajpur road, Dehradun (U.A)- 248001  
India  
Phone: +91-0135-2744979,2744387 (PBX) 2744491  
Fax: +910135-2748147.  
E-mail: [nivh@sancharnet.in](mailto:nivh@sancharnet.in)

Score Foundation  
125 B, Shahpur Jat, New Dehli-110049  
Tel: +91-(0)11-26494582  
Fax: +91-(0)11-26494581  
E-mail: [inspiration@eyeway.org](mailto:inspiration@eyeway.org)

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## **4. Sports Played Internationally**

### **4.1 Paralympics**

- Archery
- Athletics

- Boccia
- Bowls
- Cycling
- Equestrian
- Rowing
- Sailing
- Shooting
- Swimming
- Table Tennis
- Volleyball
- Wheelchair Basketball
- Wheelchair Dance Sport
- Wheelchair Fencing
- Wheelchair Rugby
- Wheelchair Tennis
- Alpine Skiing
- Ice Sledge Hockey
- Nordic Skiing

## **Wheelchair Curling**

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### **4.2 Sports Played Internationally**

- Alpine skiing
- Aquatics
- Athletics
- Badminton
- Basketball
- Bocce
- Bowling
- Cross-country skiing
- Cycling
- Equestrian
- Figure skating
- Floor hockey
- Football
- Golf
- Gymnastics
- Power lifting
- Roller skating
- Sailing
- Snowboarding
- Snowshoeing
- Softball
- Short track speed skating
- Table tennis
- Team handball
- Tennis
- Volleyball

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### **4.3 Sports for the Deaf**

- Alpine skiing
- Athletics
- Badminton
- Basketball
- Beach volleyball
- Bowling
- Cross-country skiing
- Curling
- Cycling
- Football
- Handball
- Ice hockey
- Judo
- Karate
- Orienteering
- Shooting
- Snowboard
- Swimming
- Table tennis
- Tae kwon do
- Tennis
- Volleyball
- Water polo
- Wrestling

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## ***5. Annexure***

### **4.1 Technical Guidance**

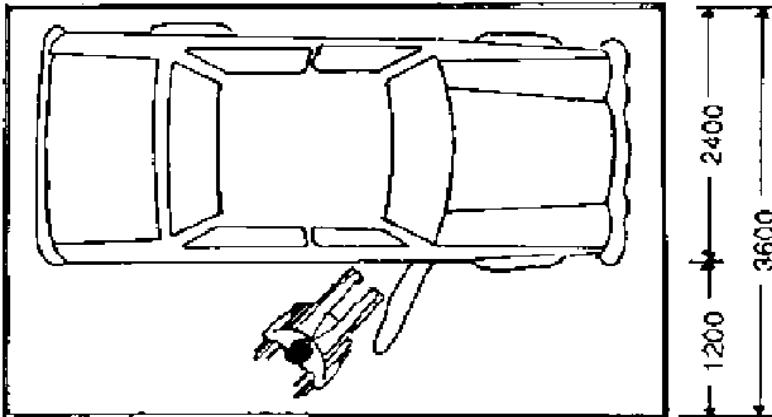
#### **4.1.1 Accessible Parking**

The number of parking places provided for disabled persons should be appropriate for the type and use of the facility that they serve. Wherever possible these should be provided close to the entrance and every effort should be made to provide accessible parking at the same level as the entrance to the building.

The accessible parking should:

- Ideally be sheltered to provide cover from rain and other adverse weather conditions.
- Have minimum dimensions 4800 mm x 3600 mm;
- Have a firm, level surface without aeration slabs
- The parking to be provided closest to the entrance
- There should be a 900mm wide clear path
- leading to the entrance of the premises from the parking
- The parking bay needs to be well signed with the international symbol of disability clearly displayed on the floor as well as at the end on a post installed the end.
- Clear directional signage is installed from the main entrance of the facility.
- The parking managers need to make sure that it is used by appropriate people
- Should be referred to as 'Accessible Parking' and not 'Handicap Parking' or 'Disabled Parking'

The receptionists and security guards should be aware of the location of accessible parking and also the accessible approach path from the parking to the building entrance to be able to guide people appropriately, including during telephone.



### 5.1.2 Design Specifications for Ramp

**Gradient:** A ramp gradient of 1:15 is considered adequate and a gradient of 1:12 is the absolute maximum. A ramp gradient of 1:12 is too severe for many wheelchair users to use independently and may result in the wheelchair 'flipping' backwards when ascending. The wheelchair may also be difficult to control when descending. Wherever possible, a ramp should never be steeper than 1:15. Where a ramp is provided, steps should also be provided as an alternative means of moving between different levels.

**Width:** The minimum requirement for the clear unobstructed width of a ramp (i.e.

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between handrails) is 1200 mm

**Landings:** Landings should be provided along the length of the ramp, at intervals of every 5 metres for a gradient of 1:12 and every 10 metres for a gradient of 1:15 or 1:20. Landings along the ramp should be at least the width of the ramp, not less than 1500 mm long (1800mm preferred) and clear of any door swing or other obstruction.

There should always be a landing at the top of the ramp and ramps should not connect straight to doors as wheelchair users will need a leveled platform at the end of ramp to provide them with sufficient manoeuvring space to negotiate opening the door.

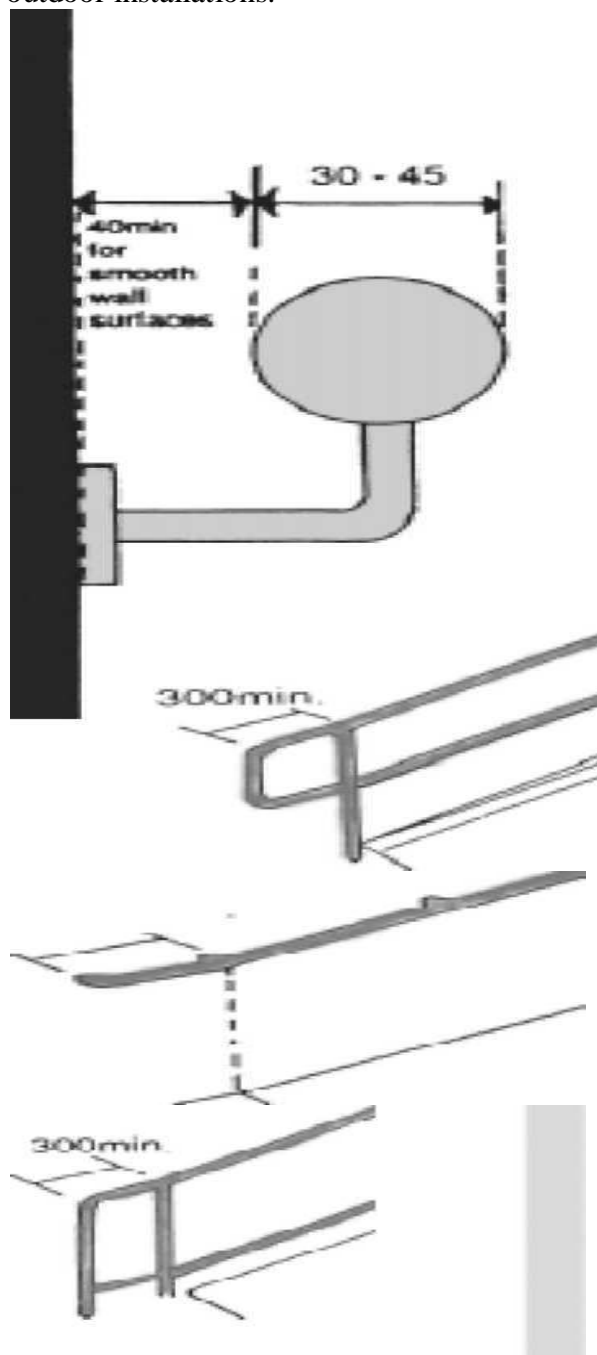
**Handrails:** Handrails are extremely important features and must be designed to be easy to grasp and to provide a firm and comfortable grip so that the hand can slide along the rail without obstruction. Many disabled persons rely upon handrails to maintain balance or prevent serious falls.

Handrails may be provided with Braille/ tactile markings at the beginning and the end to give information to people with visual impairment.

Handrails should: -

- Have a circular section of 30-45 mm in diameter; Be free of any sharp or abrasive elements;
- Have a minimum clear space of 40mm from the wall
- Have continuous gripping surfaces, without interruptions or obstructions that can break a hand hold. It is preferable to install L-shaped brackets for this purpose;
- Be continuous, on both the sides, even at the intermediate landings;
- Be provided on both sides of the ramp;
- Extend at least 300 mm beyond the beginning and the end of the ramp. The ends of the handrail should return back to the railing or be grouted in the wall or in the floor so as to prevent any injury to the users;
- Be installed at a height of 900 mm to 1000mm;

Be finished so as to contrast in colour and luminance with the background against which it will be viewed; and • Be made of a material that will not get hot in the direct sunlight, especially in outdoor installations.





**Ramp Surface:** The materials selected for the surface finish of a ramp should be firm and easy to maintain. Whilst the surface finish should be as smooth as possible to prevent tripping hazards and to provide an easy travel surface for wheelchairs, it must also be slip resistant, especially when wet.

Slip resistant surfaces can be formed using several materials

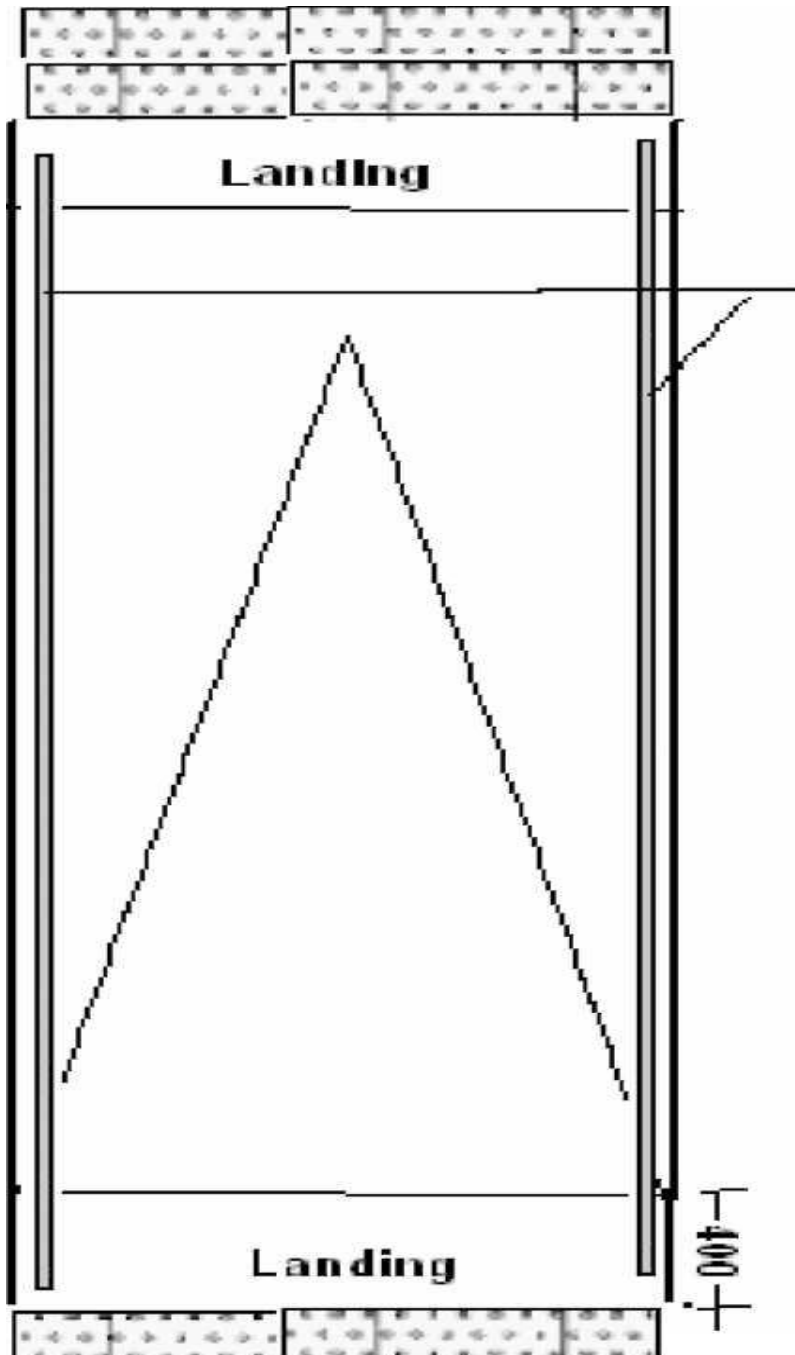
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including concrete, brick paving, paving slabs or a concrete or similar base covered with an applied slip resistant coating (paint, grit in an epoxy carrier etc.).

The surface finish should be hard wearing and suitable for the volume of traffic the ramp is likely to experience. To prevent damage caused from cracking or flaking affecting the surface finish, the materials chosen should be ones which can 'flex' in use.

The surface of an internal ramp should be covered with a slip resistant vinyl or rubber flooring, which will provide the confidence for a disabled person to use the ramp.

**Lighting:** Ramps should be obvious both during the day and at night, when artificial lighting should ensure that a maintained illuminance level of 150 lux minimum at ramp surface level is provided.



**Tactile Warning Blocks:** There need to be warning blocks at the beginning and end of each ramp. The warning blocks are to be laid 400mm before the beginning and the end of the ramp. The tactile warning blocks are indicated by yellow coloured blocks in the picture above.

**Safety:** The space under the ramp to be cordoned off either by putting handrails or building a wall in front of it. This space can also be used as storage area if required.

### 5.1.3 Stairs

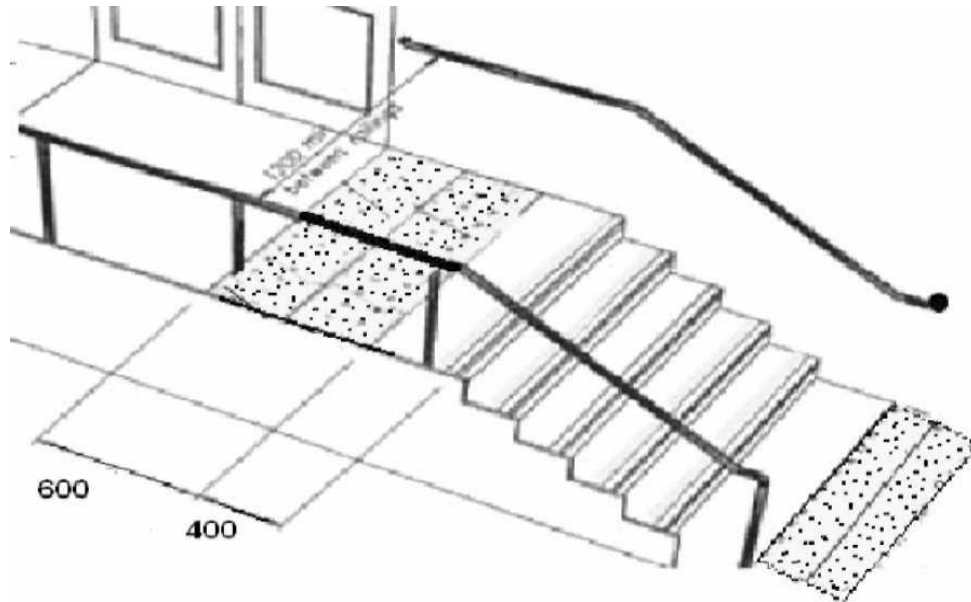
The following points need to be considered throughout the facility where stairs exist or are being built:

- Riser and tread should be of uniform dimensions throughout. Risers should not be higher than 150 mm and the treads should not be less than 300 mm deep.
- Open risers to be avoided as these are a hazard for persons with impaired mobility.
- Have continuous handrails on both sides even on landings. Design specifications for handrails as explained in the previous section on Ramps
- The nosing of the stairs needs to be contrast, in colour and tone, with the tread.

- The space under the stair case to be cordoned off either by putting handrails or building a wall in front of it. This space can also be used as storage area if required.

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- There should be a maintained illuminance level of 150 mm on the stair surface.
- Tactile warning blocks should be installed at the beginning and end of each flight of stairs. The warning blocks are to be laid 400mm from the beginning and the end of each flight of stairs. The tactile warning blocks are indicated by yellow coloured blocks in the picture below.



### 5.1.4 Elevator

**Signage:** Lifts designated for use by people with disabilities should be marked with proper signage and directional signs be provided from all other entrances of the building to the accessible lift.

**Minimum Lift Size:** 1200 mm wide by 1400mm deep.

**Door:** The lift door should have a clear opening of not less than 900 mm.

There should be no gap or difference in level between the lift door and the floor surface at each level. If such a gap is unavoidable, then it should not be more than 12 mm.

**Call Buttons:** The call button located outside the lift should have a clear floor space of at least 900 mm x 1200 mm with no obstruction placed to prevent a wheelchair user from reaching the call button. The call buttons should:

- Be installed at a height between 900 mm and 1100 mm from the furnished floor surface;
- Contrast in colour and tone from the background wall;
- Have lettering in Braille and also in raised letters; and
- Be illuminated

**Elevator (Internal) Controls:** The control panel should: -

- Have a clear floor space of at least 900 mm x 1200 mm with no obstruction placed to prevent a wheelchair user from reaching it;
- Be placed at a height of between 900 mm and 1200 mm from the floor level; and
- Have buttons with Braille and raised letters and in sharp contrast, in tone and

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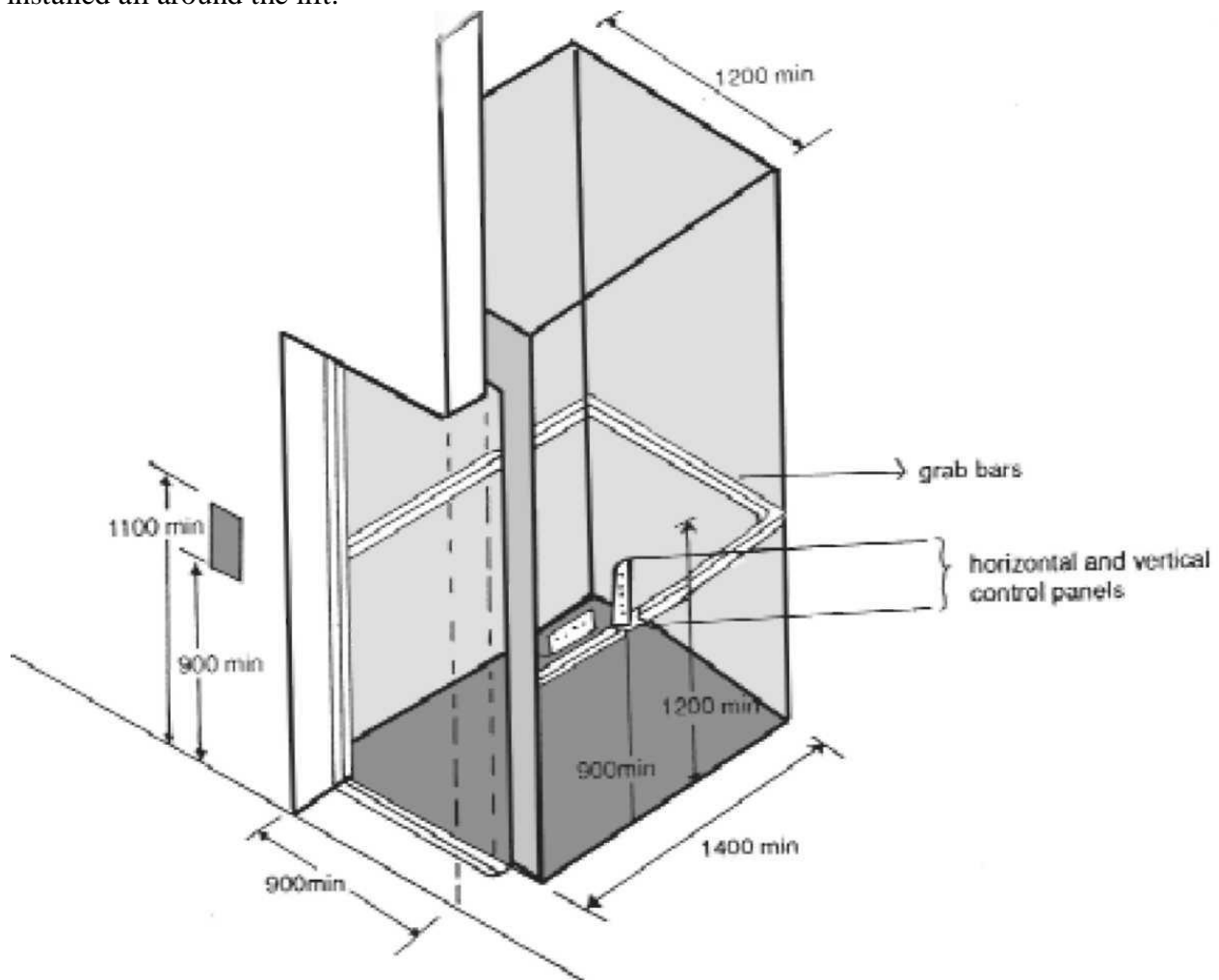
colour, from the background to aid people with visual impairments.

**Grab bars should: -**

- Be placed horizontally, at a height of 900 mm from the floor level; and
- Be fixed on both sides and at the rear of the lift.

**Other accessibility features:**

- The lift should have a voice announcement system along with a visual display to indicate the floor level
  - The lift should have a mirror on the rear wall to aid people on wheelchairs to see behind them, without needing to turn around.
- The emergency communication system should be coupled with an induction loop system installed all around the lift.



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### 5.1.5 Doors

**Width:** The clear opening width of an entrance door should be greater than 900mm. Where double leaf doors are used at least one of the leaves should have a clear opening width of 900mm.

Standard revolving doors and turnstiles should not be used as wheelchair users cannot negotiate these. Where these doors are unavoidable, they should be supplemented with a standard swing open or an automatic door, with a clear opening width of 900mm installed alongside these doors. It must be noted here that it is possible for wheelchair users, ambulant disabled and visually impaired users to use the larger revolving doors' often found in larger retail stores or shopping centres (3m diameter)

**Opening Space:** The space into which the door opens should be unobstructed on the side next to the leading edge for at least 300mm, unless the door opens automatically, or it is reasonable to anticipate assistance

**Door Closures:** The door closers should be adjusted to the minimum force necessary to open the doors (maximum 22 to 25 Newton's). A regular maintenance contract should be set up to ensure that the door closers are checked at regular intervals.

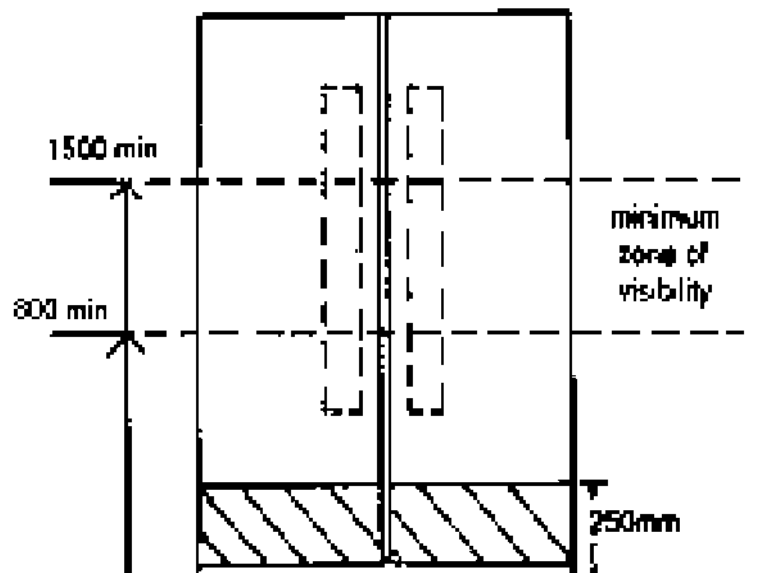
**Glass Doors:** Glass doors should be clearly distinguishable particularly for visually impaired

people. This can be achieved by detailing, the use of a colour strip or other features (manifestation). However, the manifestation chosen must be clearly visible with the background against which it will be viewed. This applies equally during the day, the night or in artificial light.

**Vision Panels:** Vision panels should be provided on doors in accessible corridors and circulation routes. Vision panels should extend below the middle rail of a door, providing a zone of visibility from a height of 900mm to 1500mm from the finished floor level to enable the wheelchair users and people with short stature to see through the panels.

**Thresholds:** Door thresholds should be flush, to avoid the danger of a person tripping up when entering or leaving a building. Where thresholds are unavoidable, they should not be higher than 20 mm and must be bevelled.

**Door Hardware:** Door furniture must be easy to use and identify. Lever handles are preferred because they are easier to turn and grip than round knobs. The lever handle should return towards the door at the end to assist people with restricted dexterity. Door handles should be located between 900mm and 1200mm above floor level. To assist people with visual impairments, door furniture e.g. door handles, finger plates, locks and kick plates should contrast,



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in terms of colour and luminance, with the door.

**Door Colours:** The door, the door frame and the surrounding wall should contrast adequately, in tone and colour, with each other. Contrasting the door frame alone will assist visually impaired people in identifying the presence of a feature but it will take them longer to establish what that feature actually is.

**Doormats:** Installing doormats enables visually impaired people to identify the door, but if these are not installed appropriately they can pose obstacles to persons with limited mobility.

Doormats should be recessed to be flush with the floor, firm and close fitting to the mat well.

### 5.1.6 Design Specifications for Accessible Toilet

**Size:** The accessible toilet should be no less than 1800 X 2350mm if a wall hung water closet. But in case a floor mounted water closet is used the minimum dimensions of the toilet should be 1800mm X 2550mm

**Door:** Apart from general door specifications described above, the toilet door should have the following additional accessibility features:

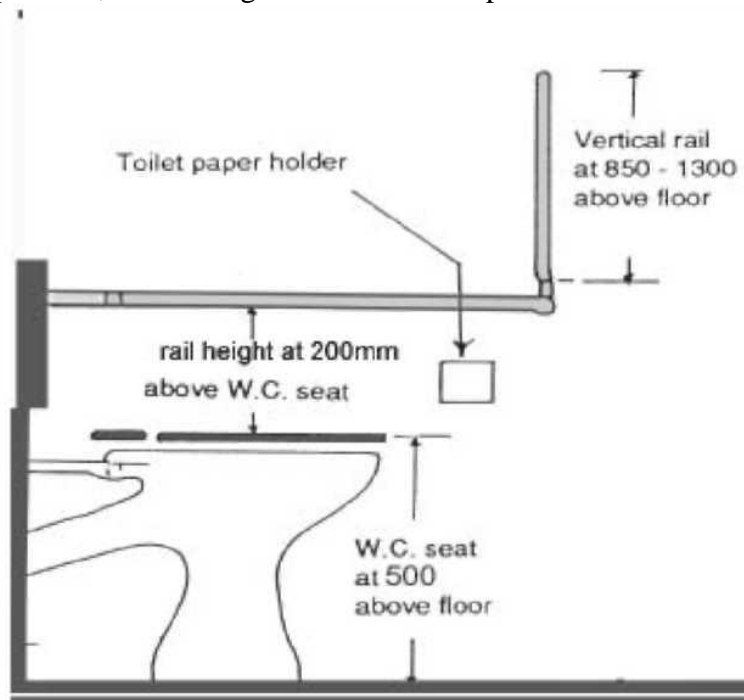
- Should either be an outward opening door or a sliding type. It should not be an inward opening door.

- Be provided with a horizontal pull-bar, at least 600 mm long, on the inside of the door, located so that the end closer to the hinge is 130 mm from the hinged side of the door and at a height of 1100 mm
- Be capable of being locked from the inside by a device that is operable by one hand, activated by a force not more than 22 N and which does not require fine finger control, tight grasping, and pinching or twisting of the wrist.

**Grab Bars:** Grab bars assist persons with mobility and balance problems to use the water closet safely. These should:

- Have a circular section of 30-45 mm in diameter;
- Be free of any sharp or abrasive elements
- Be mounted at a height between 200 mm from the water closet seat;
- One horizontal grab bar should be mounted on the side wall closest to , the water closet extending from the rear wall to at least 450 mm in front of the water closet seat;
- Another horizontal grab bar should be mounted on the wall behind the water closet and be at least 750 mm long; and

Where possible, a vertical grab bar should be provided on the side wall adjacent to the water



closet.

**Water Closet:** This should:

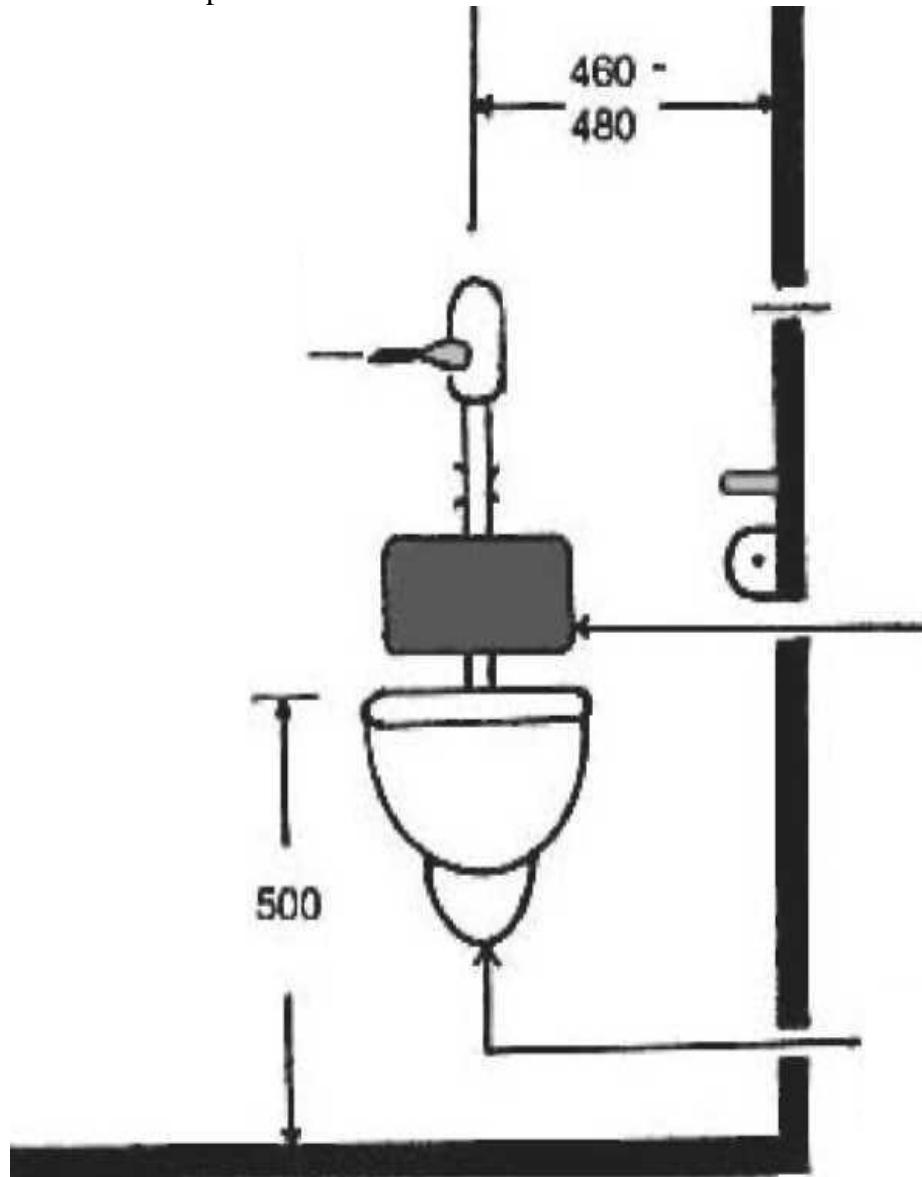
- Be located between 460 mm to 480 mm from the centerline of the water

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closet to the adjacent wall and have a clear dimension of 750 mm from the front edge of the water closet to the rear wall to facilitate side transfer; The top of the water closet seat should be 500 mm from the floor;

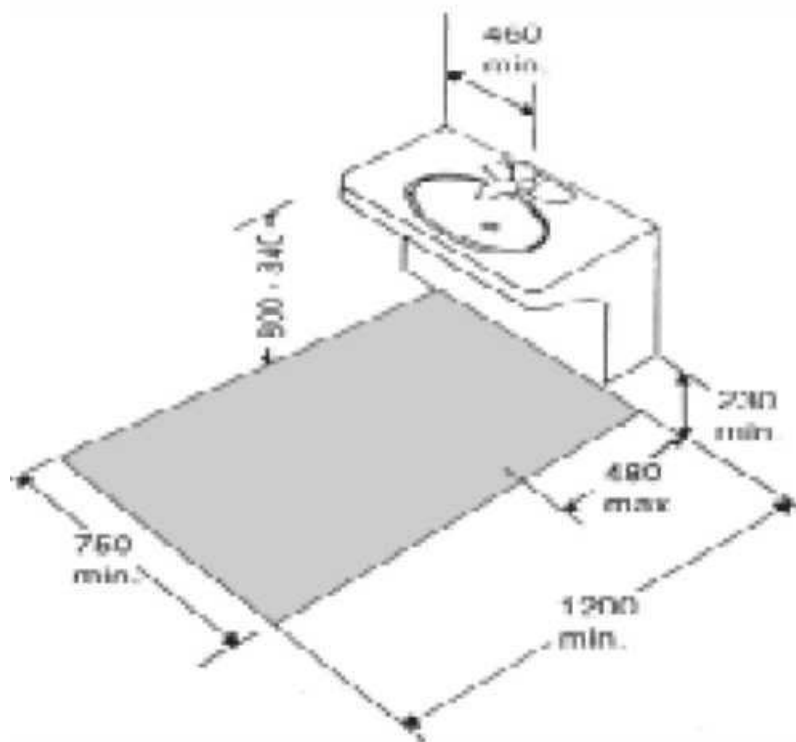
- Have a back support where there is no seat lid or tank. A back support reduces the chance of imbalance or injury caused by leaning against exposed valves or pipes;
- Preferably be of wall-hung or corbel type as it provides additional space at the toe level;
- Where water cistern is used, the cover should be securely attached;
- Have flush control which is lever type or automatic and located on the transfer side of the water closet. The flush control should not be located more than 1100 mm from the floor; and

- It is preferable to provide a water jet spray mounted that is installed below the grab bars, at not more than 300 mm from the front edge of the seat and at a height between 50 mm and 250 mm from the top of the water closet seat.



**Wash Basin:** To comply with accessibility requirements the wash basin:

- Be of a standard size with dimensions of approximately 520 mm x 410 mm;
- Be mounted such that the minimum distance between the centerline of the fixture and the side wall is 460 mm;
- Be mounted such that the top edge is between 800 mm and 840 mm from the floor;
- Have a knee space of at least 750 mm wide by 200 mm deep by 750 mm high with an additional toe space of at least 750 mm wide by 230 mm deep by 300 mm high;
- Have a minimum clear floor space of 750 mm wide by 1200 mm deep, of which a maximum of 480 mm in depth may be under the wash basin; Have the hot water and drain pipes within the knee space or toe space properly insulated; and
- Have automatic or lever type faucets chair user's spouse may be their carer.



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#### Additional Considerations:

- There should be adequate colour and tonal contrast between the fixture, walls and the flooring. This is to enable easy recognition by persons with vision impairments.
- There should be provision for an emergency alarm that may be used by disabled persons to summon help. The alarm should be installed on the transfer side next to the water closet with controls at two heights - one at 900mm and the other at 100 mm from the floor surface - so that it is operable from a sitting position on the WC as well as from the floor, in case the person summoning help has fallen in the toilet.
- Where more than one accessible toilet is provided, a left and right hand transfer option should be made available.
- Consider providing at least one unisex toilet in the facility. This enables assistance to be given by someone of the opposite sex e.g. in situations where a wheelchair user's spouse may be their carer.

#### 5.1.7 Accessible Shower area

**Size:** Minimum internal space should be 2300 mm X 2400mm if the shower room includes a water closet. In case of shower cubicle without a WC, the minimum space required is 1800 mm x 2200 mm. The clear wheelchair maneuvering space in front of both the shower and the water closet should be 1800mm X 1800mm. Enclosures for the shower cubicle should not obstruct transfer from wheelchair onto shower seat.

**Entrance:** Doors should comply with the guidance provided in the previous section on doors. The shower area should have a level entry. If it is not possible to provide a level entry then the level difference should be 20 mm high, beveled at a slope of 1:2.

**Shower Seat:** A shower seat should be provided that:-

- Be self-draining, non-slip and with rounded edge;
- Be on the wall nearest to the controls;
- Have a minimum dimension of 400 mm wide extending the full depth of the cubicle, less a



space required for the shower curtain; and

- Have its top 500 mm from the floor.
- May be hinged to be able to fold up after use

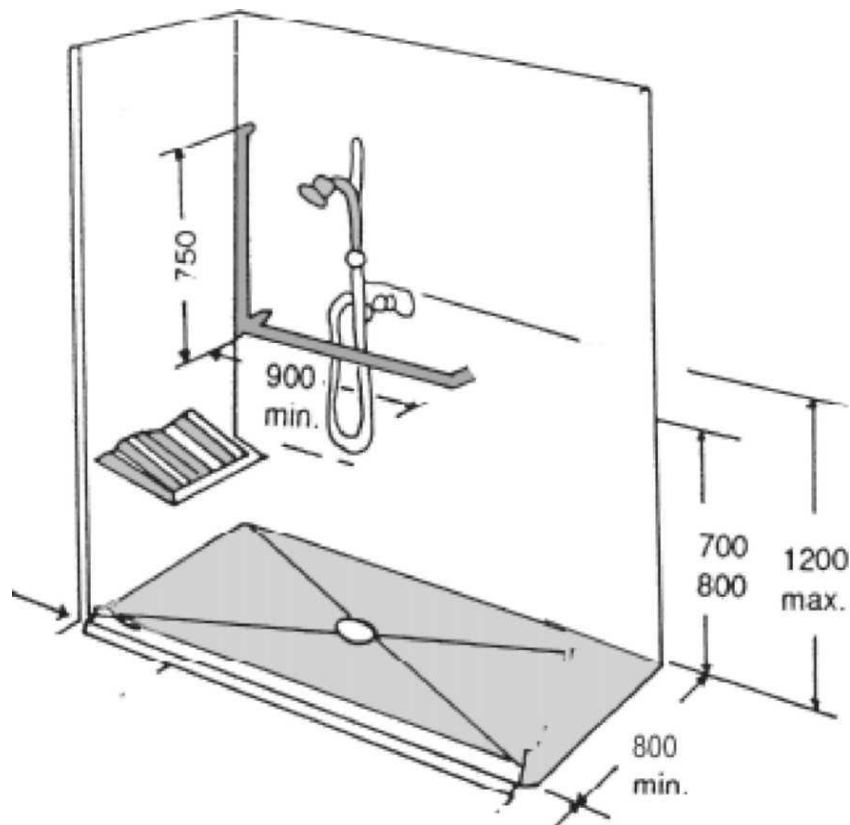
**Grab Bars:** The shower cubicle should:-

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

**Shower Head:** It is preferable to have a hose type shower head that:-

- Be of the handheld type;
  - Be provided with a hose not less than 1500 mm long; and
- Allows for use in fixed position.

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**Towel Rail** should be installed between heights of 900 mm and 1100 mm from floor level, reachable from the shower seat

### 5.1.8 Changing/Dressing Areas

Disabled users may prefer the privacy of an individual cubicle and, wherever possible, these should be provided. At least one accessible changing -cum-shower cubicle should be provided in both ladies and gents changing areas.

Additionally, consider providing a unisex accessible changing room complete with shower and toilet. Dedicated accessible changing areas enable assistance to be given by someone of the opposite sex e.g. in situations where a wheelchair user's spouse may be their carer.

Key accessibility requirements for changing areas:

### Signage

- Changing areas should be clearly signposted.

Locate signs on wall adjacent to door edge to allow easy identification of the changing facilities

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**Door** should comply with the guidance given above in subsection on doors.

## **Layout**

- sufficient space is provided for manoeuvring wheelchairs - minimum clear turning diameter of 1800 mm
- allowance is made for a wheelchair user to change without obstructing other users
- direct access is provided to the shower area from the changing room

## **• Accessible toilet provision is in very close proximity to the changing area.**

### **Sitting Benches**

- All benches must have a minimum depth of 450 mm (ideally 500 mm) and be set at a height of 500 mm to allow easy transfer from a wheelchair. These should have a smooth finish to surfaces and edges.
- Additional non-toxic foam matting will be necessary to lay over the benching as extra protection for people with sensitive skin. The matting should be kept readily available in a convenient store.

### **Lockers**

- Sufficient lockers should be set at heights between 400 mm and 800mm and be at least 300 mm wide.
- Ten per cent of lockers should be at least 1200 mm high to accommodate mobility aids and so on. Ideally some full-height lockers must be provided.
- Locks must be positioned no higher than 1150 mm and be easy to operate one-handed by a person with poor dexterity or limited hand or arm strength.
- Locks and lockers should incorporate tactile numbers.
- Where there are large banks of lockers some form of orientation assistance should be given, for example by using very strong colour contrasts and/or symbols and by replicating this as part of the key design.

### **Towel & Coat Hooks**

Alternate coat hooks should be located between 900 mm and 1200 mm above floor level to enable use by wheelchair users.

**Colour Contrast:** There should be adequate colour and tonal contrast between fittings, walls, ceilings, floors and so on to assist persons with vision impairments.

#### **5.1.9 Selecting Colours**

Two colors that contrast sharply to someone with normal vision may be far less distinguishable to someone with a vision disorder. Persons with vision disabilities need colours to contrast sharply against the background for them to successfully identify the objects, walls and obstacles. The way to ascertain adequate contrast is to use Light Reflectance Values (LRV). A LRV difference of 30 percent is required between surfaces/ objects for them to be distinguishable by most people with vision impairments. LRV figures can be easily obtained from most suppliers of paints and materials.

Some design guidelines to assist in orientation and navigation of visually impaired:

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- **Critical Surfaces:** Walls should contrast from ceiling and floor.
- **Sudden changes in level:** Any sudden changes in levels should be marked with a contrasting

colour from the level flooring to warn people with vision impairments.

- Toilets: The sanitary ware in toilets should contrast from the background as should the grab bars.
  - Stairs: Nosing should be well contrasted from the risers and the treads so that people can easily distinguish between the steps.
  - Handrails: Handrails on stairs, ramps and single steps should contrast from the background.
  - Doors: Doors should contrast from the adjoining wall, door frames should contrast from both the door and the adjoining wall, and door hardware should contrast from the door.
  - Switches and sockets: switches, sockets and other operable controls should contrast from the background
  - Skirting: skirting should, unless it is intended to be used as a handrail, ideally be the same colour or harmonise with the colour of the wall.
  - Free standing obstacles: free standing obstacles such as pillars, furniture and bins should contrast from their background so that people with reduced vision are able to identify these as hazards
- **Signage: text and symbols on the signage should contrast from the frame and the entire sign frame should contrast from the background.**

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## *Annexure*

### **5.2 Supplier Addresses & Other Related Information**

<b>Category</b>	<b>Contact details</b>	<b>Items</b>
<b>Sports Wheelchair</b>	Otto Bock Healthcare India Pvt. Ltd. A-1/7, Ground floor Safdarjung Enclave, Near Kamal Cinema Market, New Delhi-110029 Phone: 91 11 51654144/51654145 Fax: 91 11 51654146 eMail: delhi@indiaottobock.com Web: <a href="http://indiaottobock.com/">http://indiaottobock.com/</a>	All kinds of wheelchairs and mobility aids
	<b>SAGE</b> Everest Engg. 184-A, Peeragari village Near Ramlila Park New Delhi - 87 Tel. 011 5587151/5673476	All kinds of wheelchairs and mobility aids
	<b>Callidai Motor Works</b> 28, Desika Road, Mylapore Chennai - 600 004 Ph - 044 2499 1609 / 2499 5185 Mob-098840 49007 Email - bhargavsundaram@vsnl.com	All kinds of wheelchairs and mobility aids

<b>Sporting Equipment &amp; Events For The Deaf</b>	<b>All India Sports Council of the Deaf</b> 8, Ramakrishna Ashram Marg, (Northend Complex) New Delhi-HO Delhi -110001 Tel. 011 23364624	
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category	Contact details	Items
	<b>Delhi Sports Council for the Deaf</b> J-10 Saket, Malviya Nagar. Delhi- 110017 Tel. 011 265227303	
<b>Sporting Equipment For The Blind</b>	<b>Advance Engineering Works</b> 22, Lytton Road, Dehradun - 248001 Tel. 0135 2654530 Fax. 0135 2052606 Email. advanceengworks@yahoo.co.in	Audible Playing Balls etc.
	<b>Asian Power Cyclopes</b> Rochipura, Majra, Dehradun -248171 Tel. 0135 2620488 Fax. 0135 2620961	Audible Playing Balls etc.
	<b>Sparsh Products</b> 151-5, Rajpur Road, Dehradun - 248001 Tel. 0135 3099873 Fax. 0135 2650944 Email. sparshp@vsnl.com Web. www.sparshproducts.com	Audible Balls and Flying Discs etc.

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## 5.2 Estimated Costs

The following list can be used as a reference to derive total costs for some areas. However it may be noted that the mentioned costs are estimated only and may or may not include labour costs, taxes etc, and is based on information provided in the Delhi Schedule of Rates (DSR-2002 edition) and other sources. It is strongly recommended that the costs be reviewed as per latest prevalent rates and factors like installation, taxes, and labour etc be taken into account while estimating the total costs.

1. Item: Construction of Hall/Room  
Description: Hall/Room only with no additional features  
Approx Cost: 875.00 (Rs/Sq Ft)
2. Item: Construction of Pergola like structure  
Description: Four side open, with fixed roof and leveled cemented flooring  
Approx Cost: 645.00 (Rs/Sq Ft)

3. Item: Construction of paved pathway  
 Description: Raised pathway, with 150mm high edge protection on both sides  
 Approx Cost: 128.00 (Rs/Sq Ft)
4. Item: Construction of raised flower beds  
 Description: Plastered brick walls on all sides  
 Approx Cost: 219.00 (Rs/Sq Ft)
5. Item: Construction of outdoor hard court  
 Description: Cement/Concrete surfaces with drainage etc.  
 Approx Cost: 423.00 (Rs/Sq Ft)
6. Item: Construction of fishing pier  
 Description: Platform type  
 Approx Cost: 925.00 (Rs/Sq Ft)
7. Item: Construction of Swimming Pool  
 Description: Excluding excavation, handrails etc.  
 Approx Cost: 900.00 (Rs/Sq Ft)
8. Item: Construction of Ramps  
 Description: Basic ramp, cemented floor finish, excluding handrails, floor options.  
 Approx Cost: 170.00 (Rs/Sq Ft)
9. Item: Ceramic Tactile Tiles  
 Description: 30cm x 30cm  
 Approx Cost: 110.00 (Rs/Sq Ft)
10. Item: Handrails  
 Description: Stainless Steel  
 Approx Cost: 8491.00 (Rs/rmt)



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