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1,000 Chances for Africa
An Initiative of the Federal Ministry for Economic Cooperation and Development (BMZ)

STANDARD DESIGN MANUAL

for Grassroots Sports Grounds

GERMAN DEVELOPMENT COOPERATION

SPORT FOR DEVELOPMENT

IMPRINT

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GIZ is responsible for the content of this publication.

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Commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ), the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH began to work through the 'Sport for Development in Africa' (S4DA) Regional Project in 2014 to establish sport as a means of achieving development objectives in selected African countries.

S4DA aims to create access for children and young persons to development opportunities through sport. In close collaboration with governmental and non-governmental partner organizations, with the private sector and academia, S4DA consults partners, builds sports infrastructure, and qualifies coaches in fostering sustainable development through sport. S4DA makes a significant contribution to the initiative 'More Spaces for Sport – 1,000 Chances for Africa' which was launched by the BMZ.

The present manual has been developed in close cooperation between S4DA, the Section Construction in International Cooperation (GIZ) and local organisations and integrates knowledge on specific local needs and topics.

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Further sources of information
The information in this manual is based on the practical experience of the sport for development infrastructure work activities across Africa and the rules and regulations of the world sport associations:

1. FIFA (Fédération Internationale de Football Association)
2. IHF (International Handball Federation)
3. FIVB (Fédération Internationale de Volleyball)
4. FIBA (International Basketball Federation)
5. INF (International Netball Federation)

PLEASE NOTE
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TABLE OF CONTENTS

Girls playing netball at Valombola Vocational Training Centre, Oshana, Namibia | © GIZ/Addisalem Nega

LIST OF FIGURES

Foreword

The United Nations' *Agenda 2030 for Sustainable Development* emphasises the impact sport has on the lives of children and young people. Through sport, they learn to act in a fair and tolerant manner, grow in self-esteem and develop a willingness to take on responsibility. Sport teaches life skills that empower them to overcome difficult circumstances and take charge of their own future.

Having recognised this potential, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH is employing the notion of 'Sport for Development' as a cross-cutting topic which is linked to other development goals such as education, health promotion, violence prevention, or gender equality.

However, this potential has not yet been sufficiently realised. In order to sustainably implement inclusive, sports-related development projects, viable concepts and trained local staff are needed. However, the most important prerequisite is the availability of sports grounds – for many partners and communities that is the single biggest challenge, because building a sports ground requires a huge amount of expertise and funding.

Together with various partners and constructions experts, GIZ's 'Sport for Development in Africa' (S4DA) Regional Project has constructed and rehabilitated numerous grassroots sports grounds in the course of the years and learned a lot about what needs to be considered. In accordance with S4DA's slogan 'Sports Grounds with Concepts!', we wanted to share that knowledge by preparing a thorough design manual with a standardized planning scheme, giving schools, communities and the general user access to that information.

This manual simplifies the construction of well-designed, easy to maintain grassroots sports grounds. Though it has been developed based on experience gathered in selected African countries, it can be applied in countries across the world. By providing all the necessary information – including knowledge about sports ground surfaces, sections, design-details and drawings – in a manner that is both instructive for experts and comprehensible for non-experts, it guides you through the design process and helps you keep the construction cost-efficient, without compromising on quality.

We would like to thank all those who, by supporting the work of the Regional Project with their expertise and determination, made this manual possible, which we hope will facilitate the construction of many future grassroots sports grounds.

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Introduction

Welcome to S4DA's Standard Design Manual for Grassroots Sports Grounds. Its main aim is to assist partner organisations, communities and institutions in the selection of a design for grassroots sports grounds which can be realised swiftly and in a cost-efficient way.

BACKGROUND

The manual has been developed by the 'Sport for Development in Africa' (S4DA) Regional Project of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ). S4DA seeks to promote sport as a tool for positive youth development, education and the adoption of a healthy lifestyle.

S4DA operates in countries in Sub-Sahara Africa, such as Ethiopia, Kenya, Namibia, Mozambique and Togo. Since 2014, S4DA built or rehabilitated more than 100 sports grounds in rural and urban regions of different African countries with diverse climatic conditions. In addition to generating access to sports grounds, S4DA strengthens the capacities of local partners for operating and using the sports grounds in a sustainable manner – both in terms of technical maintenance and the activities offered.

Finally, the project trains coaches to ensure the use of the sports grounds for 'Sport for Development' (S4D) activities. S4DA combines these three lines of action in the approach 'Sports Grounds with Concepts!'.

PURPOSE

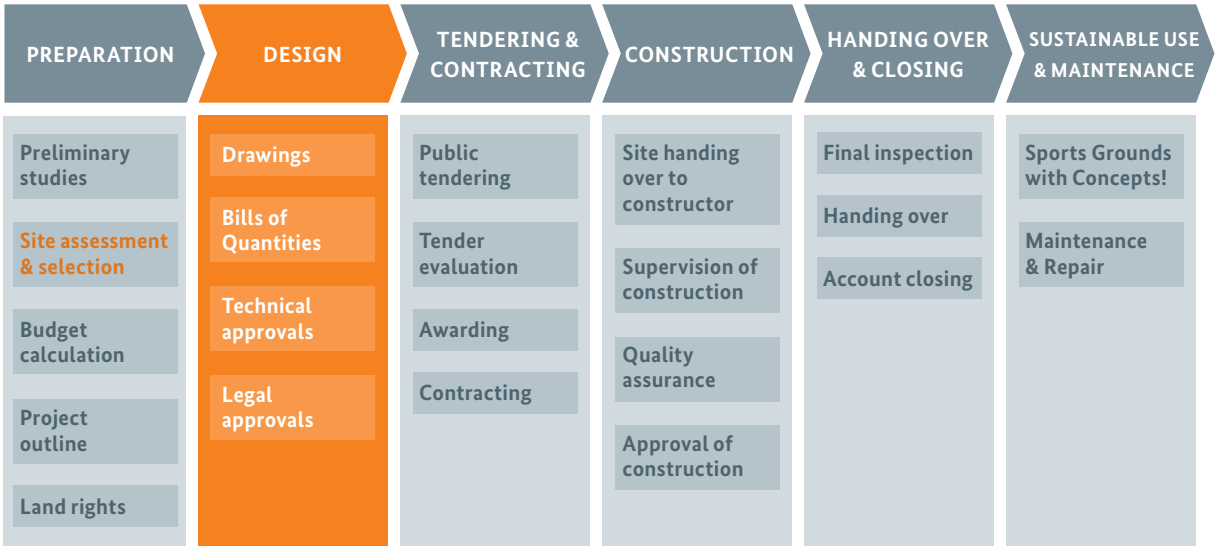
The manual summarizes S4DA's learnings on the design of grassroots sports grounds. The design presented in this manual is easy to understand and applicable in diverse settings across Africa (and beyond). It is meant to facilitate the cost-efficient design of grassroots sports grounds.

A standard design of grassroots sports grounds is a modular system which allows for the creation of customised plans for all climatic conditions, soil types and common types of sports grounds. In the context of international cooperation, it focuses on grassroots sports grounds accessible to the wider public (including marginalised groups), which are being used to offer grassroots sports activities, especially for children and youth.

The standard design considerations mapped in this manual are only few of many steps in the construction process of a grassroots sports ground. To ensure an efficient construction and sustainable usage of sports grounds a thorough project preparation, design, accompaniment of construction, and the development of usage and maintenance concepts is necessary.

This manual focuses only on the design aspect, as visualized in the stage two of the below figure.

FIGURE 1: STANDARD CONSTRUCTION PROCESS



Documents that have proven to be valuable for the design and construction planning of grassroots sports grounds are listed on page 76. Manuals on sustainable use and maintenance can be provided upon request (contact Sport-for-Development-in-Africa@giz.de).

CONTENT

The manual explores all relevant elements for the design of sustainable grassroots sports grounds with different dimensions and surface finishing options, according to the rules of each game.

First, it shows how to find the right sport for the construction of a new sports grounds. Then it introduces the requirements, characteristics and dimensions for each type of sports ground. Further, design details for different surface-option, different types of drainage and additional details such as fences or ramps are presented. For each design element the manual provides guidance on which design is suitable for which conditions.

While the manual contains sample drawings of core design elements, detailed drawings, bills of quantities, material specifications, checklists and templates can be provided by S4DA upon request (contact Sport-for-Development-in-Africa@giz.de).

For guidance on how to maintain grassroots sports grounds see S4DA's Maintenance & Repair Manual. For guidance on how to implement Sport for Development see the methodological manuals in the Sport for Development Toolkit.

PLEASE NOTE This manual presents detailed information in an accessible way, so that the reader can make an informed decision, even if s/he does not have a technical background. However, it is not a do-it-yourself manual: when it comes to realising the actual planning and construction, make sure that a person with technical, civil engineering or architecture knowledge is involved.

S4DA's infrastructure team during a site assessment, Maputo, Mozambique | © GIZ/Addisalem Nega

1 The Right Spot

Designing a grassroots sports grounds starts with finding the right spot. Whether there already is a specific location available for the construction of a sports ground or whether you initially have to search for a suitable spot: assessing the possible site will give you important information for the design and construction of a sports ground. Site assessments should be done by experts to avoid inappropriate design decisions leading to premature deterioration of the construction and risks for those who use the sports ground. During the site assessment, the following technical points should be checked and evaluated.

LOCATION

The sports ground should be suitable for the health and safety of the players and spectators. Make sure that the soil is not contaminated by former land use and that the sports ground is not affected by polluted and unhealthy nearby facilities such as factories, highways or refineries. Also consider whether there is a school or hospital nearby and whether pupils or patients might be disturbed by matches or training activities.

The site should have access to roads and be spacious and safe for external public circulation. It should have activity areas and space for service vehicles, ambulances, fire brigade and other necessary functions. Sufficient external space will also allow for future extensions or redevelopment.

Assess whether there are challenges such as free roaming animals or car owners that use the site as a parking space or drive through. As those behaviours will most likely continue when the sports ground is finished. Thus, you may have to protect the field, e.g. with a fence, which requires extra costs, or by placing large stones as a cost-efficient way to deter cars. A public signboard to create awareness is also important to consider.

TOPOGRAPHY AND SOIL

The construction of a sports ground requires an even surface. Levelling the ground can be challenging and expensive, especially when the soil is rocky. Its condition also affects the construction requirements in terms of drainage and preventing the accumulation of water. Therefore identifying the soil type and studying the topography will help to determine the required earth cutting work, as well as assist with choosing the best surface finish for the sports ground. For example, S4DA found in central and western Kenya that, since the soil is fertile and rainfall plentiful, grass grew well and therefore turf was a possible surface finish. In Mozambique, on the other hand, the soil is sandy and loose, hence turf was not an option. Instead, a sand surface was determined to be the least expensive and most suitable for a sports ground. In general, the user shall identify the soil type and the topography during the site assessment to understand and select the appropriate sports ground surface finishes.

CLIMATE

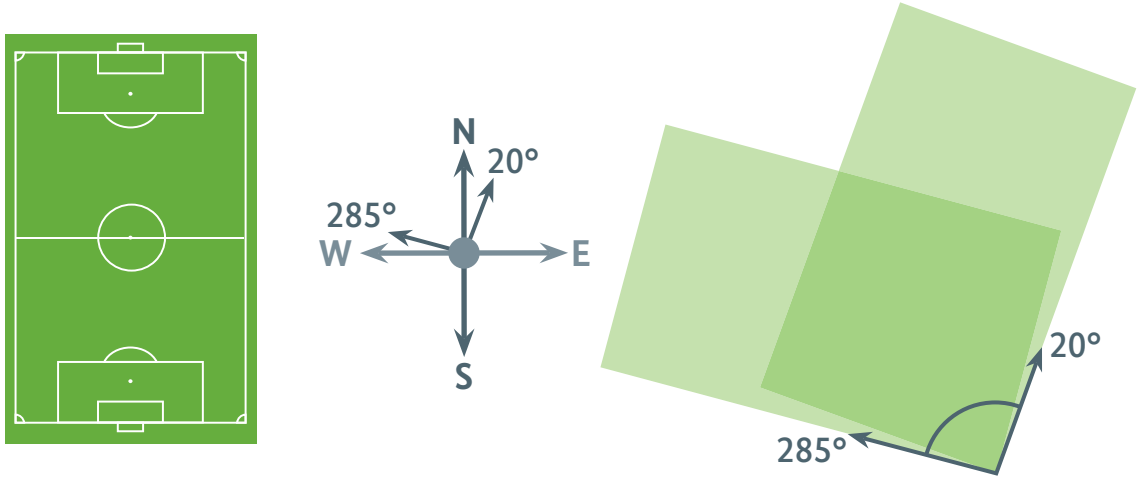
In many regions, the weather conditions differ significantly during the year, particularly where dry and wet seasons alternate. Make sure that you consider both the normal seasonal differences and extreme weather events. Exposure to wind or rain may not only affect the short-term usability but also the structural integrity of the field. Extreme heat or draught, on the other hand, can make the use of asphalt or turf impossible. If the site you are assessing is in danger of being flooded by a nearby river, consider using a more elevated place, or choose a more resilient design that can withstand extreme weather events.

Great care must be taken regarding the angle of the playing field: players must be protected as much as possible from the glare of the sun, especially in the morning and evening, when the sun is low. In order to minimise this effect, the main playing direction should be north-south, between 285° and 20°. The precise angle depends on local circumstances.

TIP

If possible, realize site assessments during the wet season. This will give you a better idea of the impact rain and storm has on the area.

FIGURE 2: SPORTS GROUND ORIENTATION SYSTEM



SEWAGE SYSTEM

Maintaining a sports ground requires having in place the necessary infrastructure for managing excess water. Effective drainage infrastructure is particularly important in high rainfall areas. Chapter 4.1 offers a variety of drainage channels to choose from. But you need to make sure that the excess water can be disposed of. Is there an existing sewage system that can cope with it? If not, you may have to consider extra costs. Also make sure that regular maintenance of the drainage channels will be conducted.

ENVIRONMENT

Building a sports ground can have a considerable impact on the environment. Keep the damage as small as possible and protect forests, waterbodies or historical sites. If the site needs to be cleared before the construction of the sports ground, consider if the future users can contribute to the process, e.g. by undertaking necessary preparations such as levelling or demolishing existing structures. Removing trees, for example, can be very expensive. Personal contributions of the users not only save money but can also instil a sense of ownership.

LEGISLATION AND LAND RIGHTS

Before starting a project, ensure that the necessary land ownership titles have been secured to avoid both legal and non-legal conflicts (Do No Harm). Also consult the official land-use plan for the area and ask the land owner about his/her future development plans for the location. If, for example, the area is designated to be part of a new housing project in the course of the next few years, it may not be wise to invest in a concrete surface, but rather to build a gravel field.

Before designing the sports ground, check the local codes and regulations for the design and construction of sports grounds. The standard design codes are based on the International System of Units, which is in meters, kilos and seconds; make sure there are no misunderstandings due to the fact that other systems of measurement are being used locally.

PLEASE NOTE

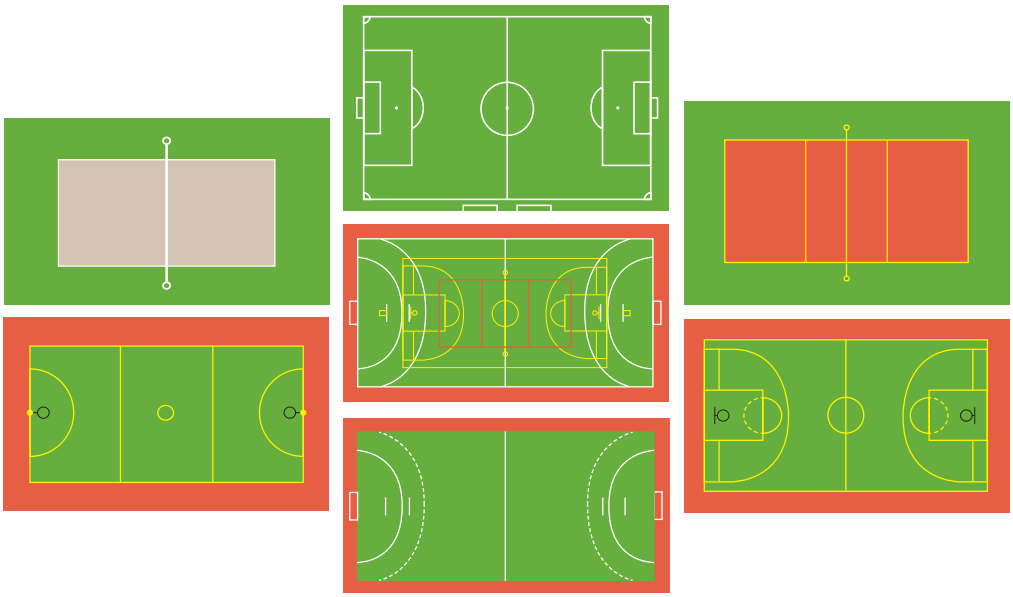
In many African countries women and girls still face challenges when willing to participate in sports. Gender-responsive designed sports grounds can facilitate access to sports for women and girls and provide safe spaces for their empowerment.
A gender-responsive sports ground design starts with selecting a location that is safe to access for girls; with preferring multi-purpose sports grounds over specified ones; the provision of lighting, washrooms or changing facilities; or reducing risks of injuries through sound construction. In some cases fences protecting women and girls from views of spectators may be necessary. All these measures need to go along with sensitisation, awareness-raising and capacity development measures towards changing socio-cultural barriers that prevent women and girls from practicing sport.

By incorporating ramps and other elements, sports grounds also become accessible for persons with disabilities.

Inauguration of a turf football field in Addis Ababa, Ethiopia | © GIZ/Addisalem Nega

2 Sports Ground Designs

This chapter provides descriptions of grassroots sports ground designs for football, basketball, volleyball, handball, netball, beach volleyball, which have been realised by S4DA in the different countries. It also describes how to construct multipurpose courts that can be used for a variety of sports.



2.1 FOOTBALL

Football is one of the most popular sports, with more than 250 million active players worldwide. It is played according to Laws of the Game[1] set forth by the International Football Association (FIFA). While professional matches require either natural or artificial turf for football fields, a grassroots football field – depending on the location, climatic conditions, and availability of construction materials – can be built of different materials such as sand, gravel (dirt), concrete or asphalt.

1 The International Football Association Board (IFAB): *Laws of the Game 2018/2019*.

PLAYING FIELD

For professional matches, FIFA recommends a field size of 105 x 68 m. However, for grassroots football fields, there is a wide variety of sizes according to which these football fields can be built. Due to this flexibility, they can serve as multifunctional public spaces in schools, villages, townships, municipalities, rural areas and densely populated neighbourhoods in cities.

The following dimension types are recommended by S4DA to encourage communities, municipalities and schools to utilise the space they have:

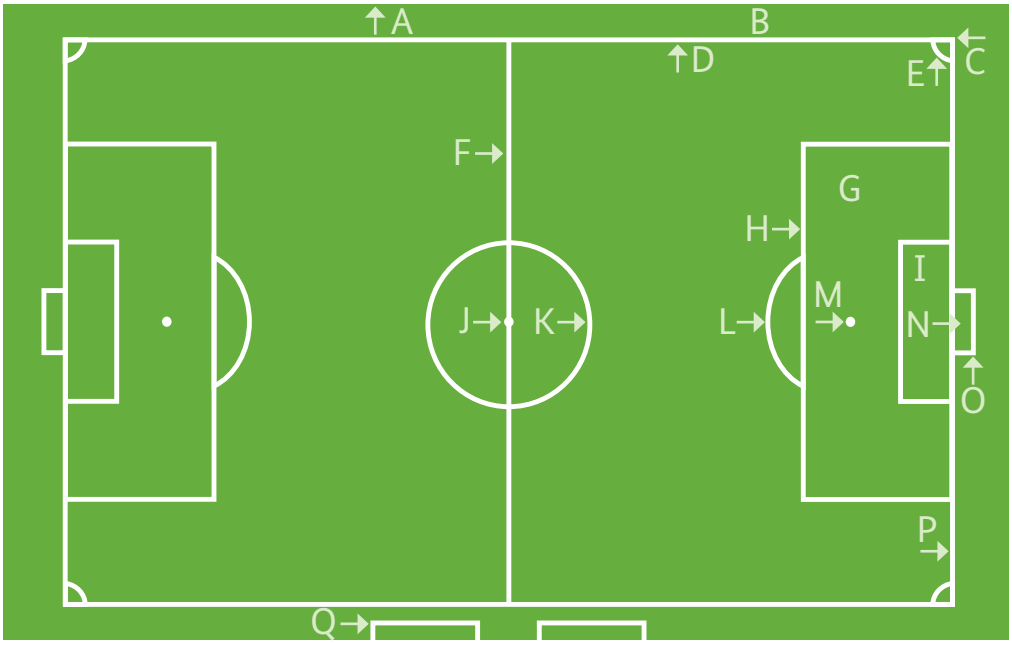
FOOTBALL PITCH TYPE	FOOTBALL PITCH CODE	FOOTBALL PITCH SIZE (Playing area)		MIN. SPACE NEEDED (incl. safety area of min. 2 m on all sides)
		Length (m)	Width (m)	
Type 1	FB - P - 01	110	70	114 x 74 m
Type 2*	**FB - P - 02**	**105**	**68**	**109 x 72 m**
Type 3	FB - P - 03	100	64	104 x 68 m
Type 4	FB - P - 04	91	55	95 x 59 m
Type 5	FB - P - 05	82	50	86 x 54 m
Type 6	FB - P - 06	78	48	82 x 52 m
Type 7	FB - P - 07	73	46	77 x 50 m
Type 8	FB - P - 08	70	42	74 x 46 m
Type 9	FB - P - 09	65	39	69 x 43 m
Type 10	FB - P - 10	60	36	64 x 40 m
Type 11	FB - P - 11	55	37	59 x 41 m
Type 12	FB - P - 12	50	34	54 x 38 m
Type 13	FB - P - 13	46	32	50 x 36 m
Type 14	FB - P - 14	37	27	41 x 32 m

* Recommended by FIFA.

TIP

If the available area is large enough, try to stick to the size recommended by FIFA (105 x 68 m), which is also the standard size for international and top domestic games. If not, measure the available space and select a type that fits.

FIGURE 3: FOOTBALL FIELD PLAYING SURFACE (105 M X 68 M) AND ITS ANNOTATION



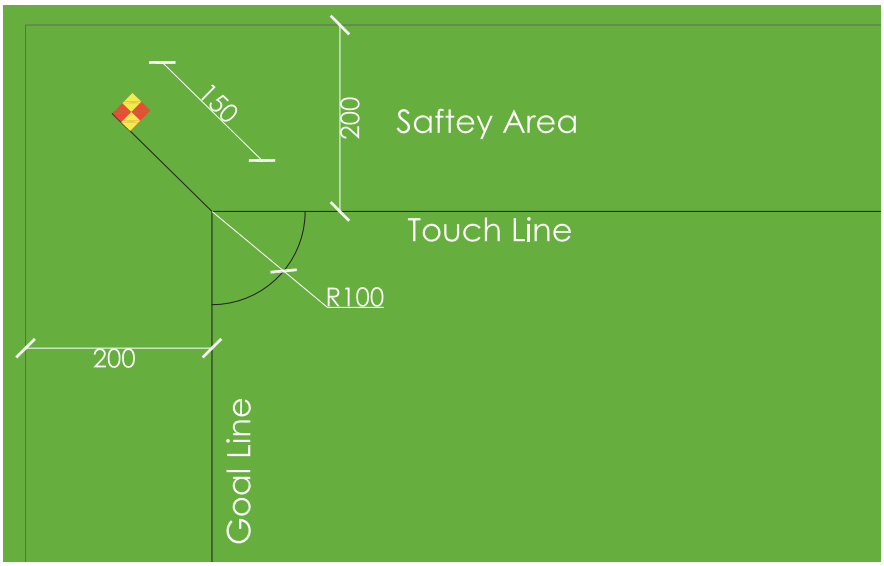
ANNOTATION	DESCRIPTION	REMARK*
A	Safety area minimum limit	Min. 2 m from the touch line
B	Safety area	Should be considered around the playing field
C	Corner flag position	Corner flag height 1.5 m
D	Touch line	Longest side of the pitch
E	Corner arc	Shows the limit of the corner kick area
F	Centre line	Divides the pitch into two
G	Penalty area	40.32 x 16.50 m
H	Penalty box	16.5 m from the goal line for standard size pitch
I	Goal area	18.32 x 5.50 m area
J	Centre mark	Game starting point
K	Centre circle	Radius 9.15 m for standard size pitch
L	Penalty arc	9.15 m radius from the penalty mark
M	Penalty mark	11 m from the goal line
N	Goal net	Rectangular or hexagonal shaped net
O	Goal post	Dia. 10–12 cm circular metal (optional: other shapes)
P	Goal line	The shortest side of the pitch
Q	Technical area	5–10 m, depending on the demand

* The dimensions refer to the standard size (type 2) recommended by FIFA; dimensions for other field types can be provided by S4DA upon request. See imprint for contact details.

CORNER AREA

The corner flag posts must be at least 1.50 m high. They consist of slightly yielding synthetic material, ideally with a special articulated spring joint, so that the flag folds over and then straightens again by itself. It does not have to be exactly perpendicular. The corner area itself is defined by a quarter circle with a radius of 1 m.

FIGURE 4: FOOTBALL FIELD CORNER AND CORNER POST DETAILS

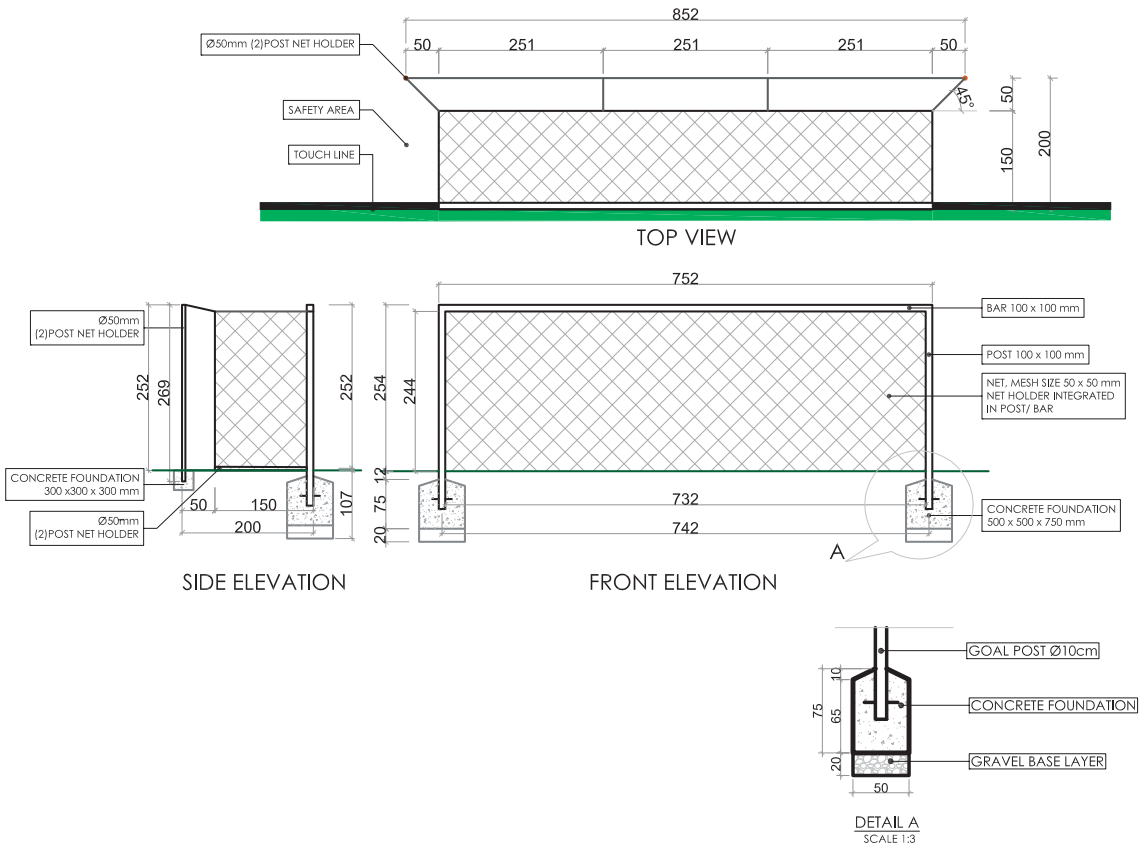


GOALS

The goals are situated at the centre of each goal line. They consist of two vertical posts, joined at the top by a horizontal crossbar. Goalposts and crossbar can be circular, rectangular, square or elliptical in shape with a width of 10–12 cm. They can be made of wood, aluminium or galvanised steel. The standard size of the goal is 7.32 x 2.44 m; however, depending on the size of the playing field, the dimensions of the goal can be adjusted. The following list presents the goal types recommended for different playing field sizes:

GOAL TYPE	GOAL SIZE (INTERNAL) (H x L)	RECOMMENDATION
Type 1	2.44 x 7.32 m	For field type 1–4
Type 2	2.13 x 6.40 m	For field type 5–6
Type 3	2.13 x 4.88 m	For field type 7–10
Type 4	1.83 x 3.66 m	For field type 11–14

FIGURE 5: TYPE 2 STANDARD SIZE FOOTBALL GOAL DETAILS



Goal posts and cross bars are always white. Goal posts must be anchored to the ground in a concrete foundation.

The goal post structure is accompanied by an auxiliary net which stops the ball when a goal is scored. It should be highly durable and light, manufactured in a knotless construction from high-tenacity polypropylene synthetic materials. The recommended colour of the goal net is white.

There are different net holder mechanisms, but due to safety concerns, the recommended type is the post net holder, where the net is suspended behind the goal and tied to the post.

LINE MARKINGS

The *Laws of the Game*[2] state that all line markings for football fields are white and of uniform width, which must be from 10–12 cm.

Creating markings for a football field using a line marker, Ethiopia | © GIZ/Addisalem Nega

2 IFAB: *Laws of the Game 2018/2019*; FIFA: *Football Stadiums – Technical recommendations and requirements.*

A basketball court at a Multipurpose Youth Resource Center in Namibia | © GIZ/Addisalem Nega

2.2 BASKETBALL

When basketball was first played, a peach basket with the bottom still intact was used; now a metal hoop with a net is standard. Basketball is a sport played between two teams of five players each. Its rules are set by the International Basketball Federation (FIBA).[3]

While professional or organised basketball is played indoors – usually on highly polished **wood**, often **maple** –, outdoor surfaces are generally made from standard paving materials such as **concrete** or **asphalt**. Surfaces such as turf, gravel or sand are not suitable for basketball.

PLAYING FIELD

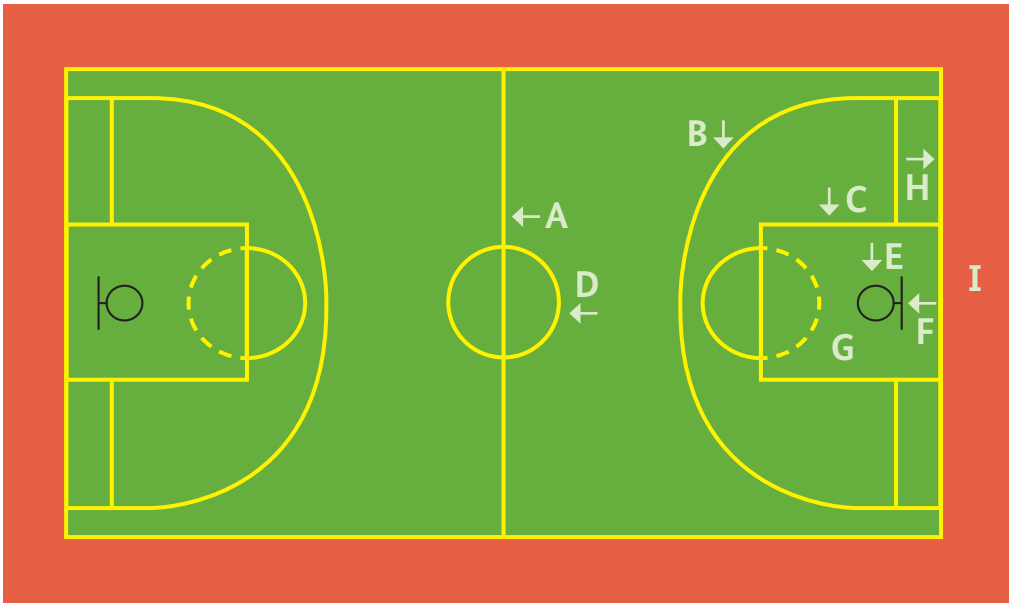
According to the FIBA the basketball playing court 'shall have a flat, hard surface free from obstructions with dimensions of 28 m in length by 15 m in width measured from the inner edge of the boundary line. (...) Any obstruction (...) shall be at least 2 m from the playing court'.[4] Thus, you need a space of min. 32 x 19 m to build a basketball court.

TIP

Basketball court sizes may vary across different leagues and governing bodies. However, S4DA recommends adhering to FIBA specifications.

3 FIBA: *Official Basketball Rules 2018*.
4 FIBA: *Official Basketball Rules 2018*, p. 6.

FIGURE 6: BASKETBALL COURT PLAYING SURFACE (28 M X 15 M) AND ITS ANNOTATION



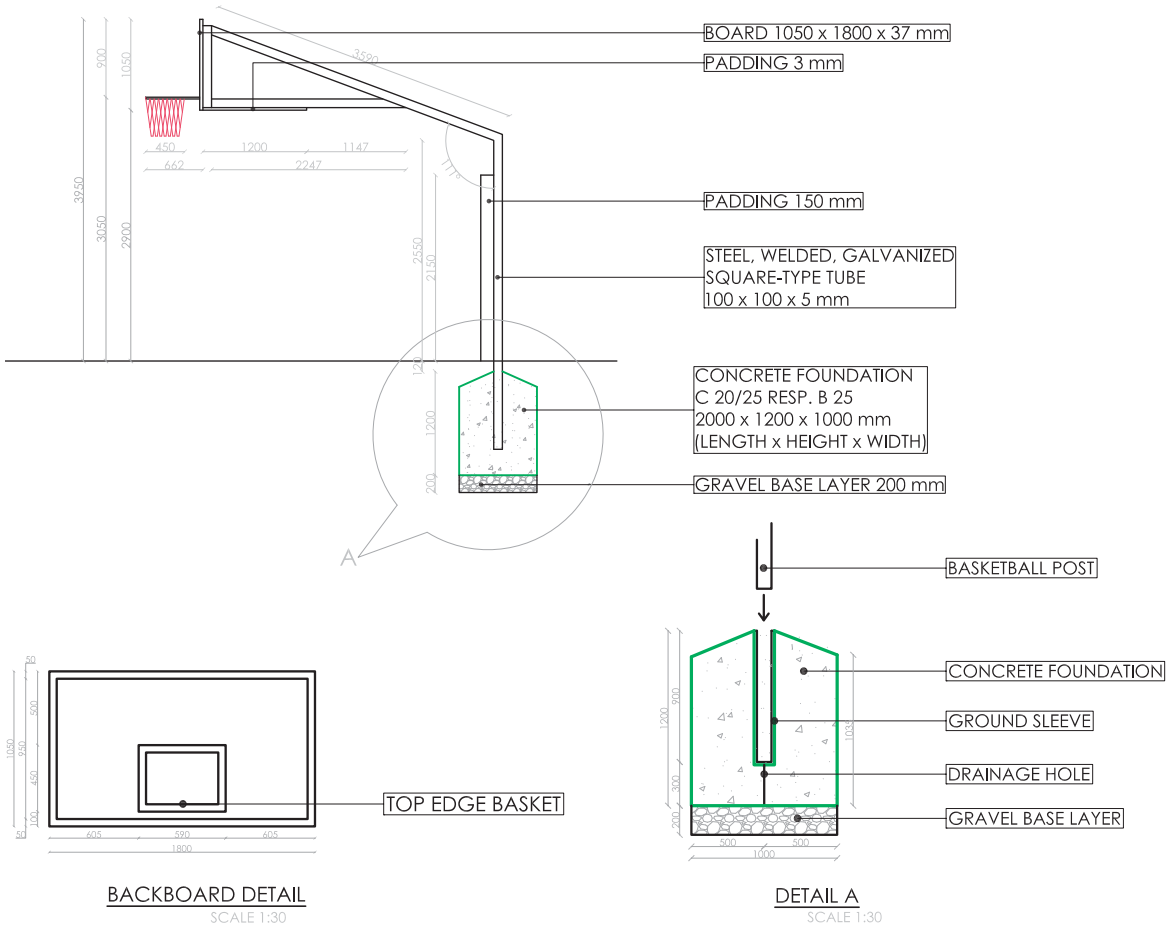
ANNOTATION	DESCRIPTION	REMARK
A	Mid court line	Marked parallel to the end lines from the midpoint of the side lines.
B	Three-point line	The two parallel lines extending from and perpendicular to the end-line, with the outer edge 0.90 m from the inner edge of the side lines. An arc of radius 6.75 m measured from the point on the floor beneath the exact centre of the opponents' basket to the outer edge of the arc.
C	Free throw line	Drawn parallel to each end line. Its furthest edge is 5.81 m from the inner edge of the end line and is 4.9 m long. Its midpoint lies on the imaginary line joining the midpoint of the two end lines.
D	Centre circle	The centre circle is marked in the centre of the playing court and has a radius of 1.80 m measured to the outer edge of the circumference.
E	Basket	See description below.
F	Backboard	See description below.
G	Free throw lane 'the paint'	The area bounded by the free throw lines.
H	Base line (end line)	The shortest boundary lines.
I	Safety area	Min. 2 m around the playing surface.

BACKSTOP UNITS, BACKBOARDS, RING AND NET

A simple backstop unit consists of a backboard, a basket – comprising a ring and a net – and a backboard support structure with padding.

S4DA suggests to use the following type of basketball backstop design:

FIGURE 7: FIXED BASKETBALL BACKSTOP UNIT DESIGN



TIP

Backstop units should be installed by the contractor as per the drawings. Basketball posts that are sold by shops are often not designed for matches, but only for training purposes and therefore do not comply with the specifications needed.

Backboards can be made of different materials such as wood, metal or PVC, though metal is highly recommended for durability. They are either transparent (acrylic glass) or white, marked with a boundary line and an additional rectangle behind the ring. These lines shall be 50 mm in width; their colour is black, unless the backboards are transparent, in which case the lines are white.

The ring is made of solid, 16 to 20 mm thick steel. It has an inside diameter between 450 and 459 mm and is painted orange. The nets are made of white cord and suspended from the rings. They are supposed to slow the ball momentarily as it passes through the basket. The nets are between 400 mm and 450 mm long and have 12 loops so as to attach them to the rings. The upper section of the net is semi-rigid, thus preventing the net from rebounding through the ring, creating possible entanglement, and the ball from becoming trapped in the net or bouncing back up.

LINE MARKINGS

The Official Basketball Rules state that 'all lines shall be of the same colour and drawn in white or other contrasting colour, 5 cm in width and clearly visible'.[5]

Basketball tournament in Maputo, Mozambique | © GIZ/Pinto Barros

5 FIBA: *Official Basketball Rules 2018*, p. 6.

A sample volleyball court at Valombola Vocational Training Centre, Oshana, Namibia | © GIZ/Addisalem Nega

2.3 VOLLEYBALL

Volleyball is played by two teams of six players, separated by a net, on a gravel, sand, concrete or asphalt sports ground. Each team tries to score points by grounding a ball on the other team's court under organised rules stated by the International Volleyball Association.[6]

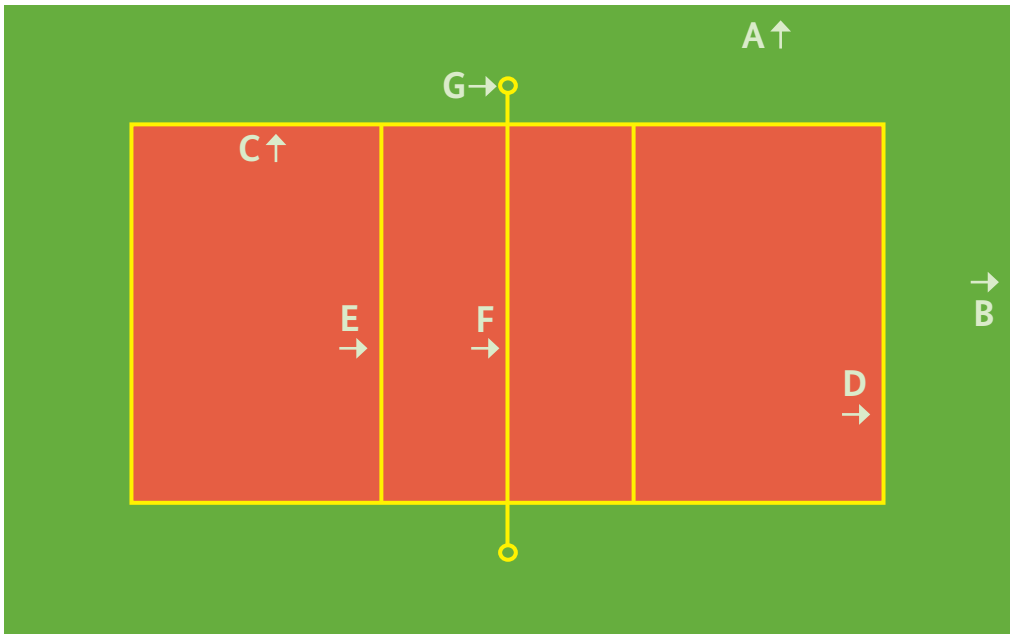
For professional matches, only wooden or synthetic surfaces are allowed. On a grassroots level, however, gravel, concrete, or asphalt are suitable surfaces.

PLAYING FIELD

According to the International Volleyball Federation (FIVB), the playing court 'is a rectangle measuring 18 x 9 m, surrounded by a free zone which is a minimum of 3 m wide on all sides'. Thus, you need a space of min. 24 x 15 m to build a volleyball court.

6 FIVB: *Official Volleyball Rules 2017–2020.*

FIGURE 8: VOLLEYBALL COURT PLAYING SURFACE (18 M X 9 M) AND ITS ANNOTATION



ANNOTATION	DESCRIPTION	REMARK
A	Safety zone limit	3 m from the side line
B	Safety zone limit	3 m from the end line
C	Side line	18 m long
D	End line	9 m long
E	Attack line	3 m from the centre line
F	Centre line	Divides the court in two halves
G	Net post	0.50–1.00 m from the side line

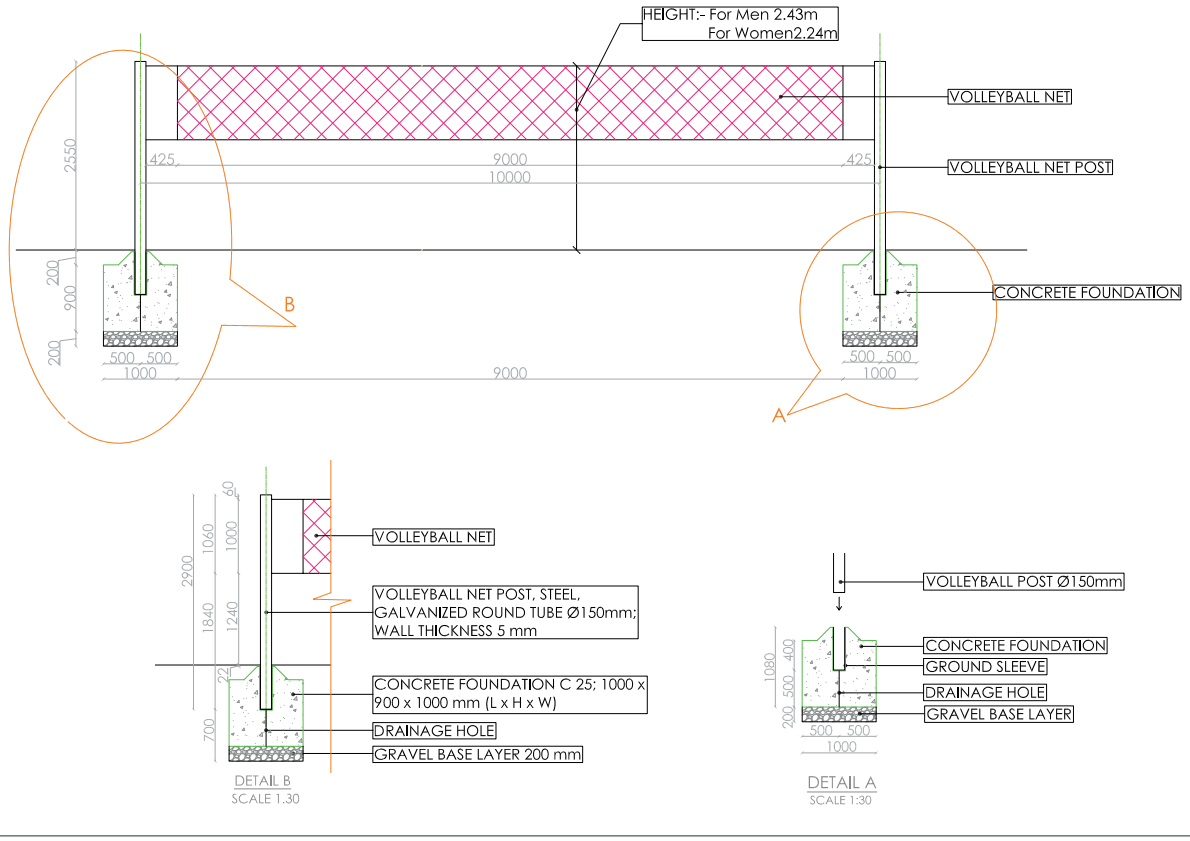
POSTS AND NET

The posts supporting the net are placed 0.50–1.00 m outside the playing court. They are 2.55 m high and should be both adjustable and moveable.

The net is 1.00 m wide and 9.50–10 m long (with 25–50 cm on each side of the side bands), placed vertically over the centre line at a height of 2.43 m for men and 2.24 m for women, and made of 10 cm square black mesh.

A volleyball court in Addis Ababa, Ethiopia | © GIZ/Mulugeta Gebrekidan

FIGURE 9: VOLLEYBALL POSTS AND NET DETAILS



TIP

Whenever possible, volleyball posts and nets should be bought off the shelf to ensure they meet the standards, are safe to use and can be replaced at any time.

LINE MARKINGS

The rules of the game state that 'all lines are 5 cm wide. They must be of a light colour which is different from the colour of the floor and from any other lines'.[7]

A volleyball court with white lines | © GIZ/Addisalem Nega

7 FIVB: *Official Volleyball Rules 2017–2020*, p. 13.

Beach Volleyball court in a rural area at Don Bosco Mondo e.V. in Adwa, Ethiopia | © GIZ/Anteneh Afework

2.4 BEACH VOLLEYBALL

Beach volleyball is similar to volleyball but played by two teams of two players, traditionally on beaches; these days, however, beach volleyball courts can be constructed wherever the users desire.

It requires a thick layer of fine, soft sand to ensure the comfort and safety of the players, who frequently need to dive for the ball.

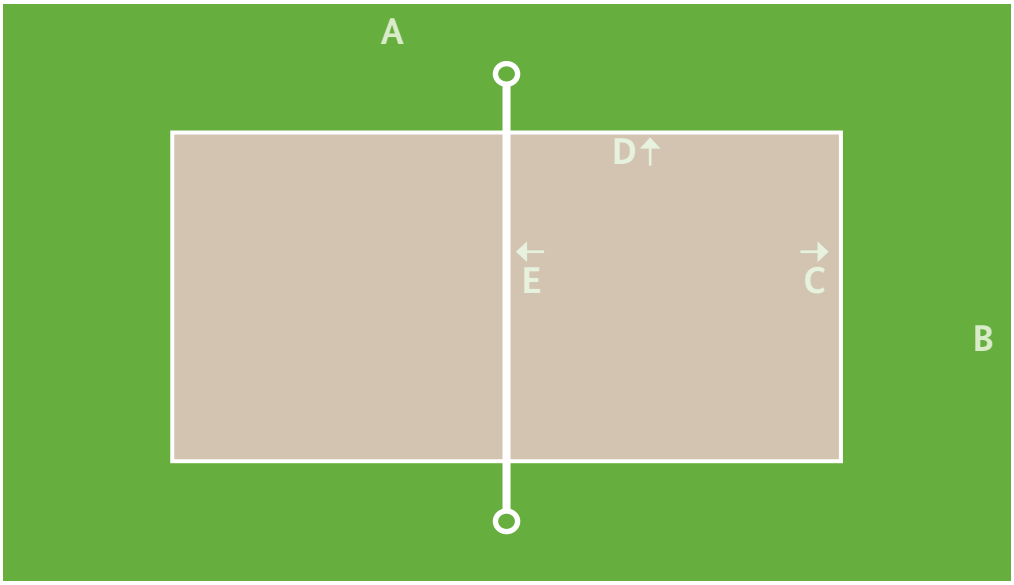
PLAYING FIELD

According to the International Volleyball Federation (FIVB), the playing field 'is a rectangle measuring 16 x 8 m, surrounded by a free zone, which is a minimum of 3 m wide on all sides'.[8] For international games the free zone has to be 5 to 6 m wide; for grassroots sports grounds, S4DA recommends 3 m measured from the sideline and 4 m from the end line ('service zone').

The playing surface must be composed of fine sand that does not contain any dangerous particles such as glass or sharp metal that could cause the players any sort of injury.

8 FIVB: *Official Beach Volleyball Rules 2017–2020*

FIGURE 10: BEACH VOLLEYBALL COURT PLAYING SURFACE (16 M X 8 M) AND ITS ANNOTATION



ANNOTATION	DESCRIPTION	REMARK
A	Free zone	Min. 3 m from the side line
B	Service zone	Min. 4 m from the end line
C	End line	8 m long
D	Side line	16 m long
E	Net	8.5 m long

POSTS AND NET

There is a net in the middle of the court, 2.43 m high for men, and 2.24 m high for women, as measured from the top of net to the playing surface.

LINE MARKINGS

The lines should be 5 – 8 cm wide and must be in a colour which can be distinguished from the colour of the sand. Use a material that will not fade and remains visible throughout the course of the game. This material can be colourful ribbon or rope.

Handball training on asphalt at Bole Preparatory School in Addis Ababa, Ethiopia | © GIZ/Mulugeta Gebrekidan

2.5 HANDBALL

Handball is played by two teams of seven players, according to the Rules of the Game set by the International Handball Federation (IHF).

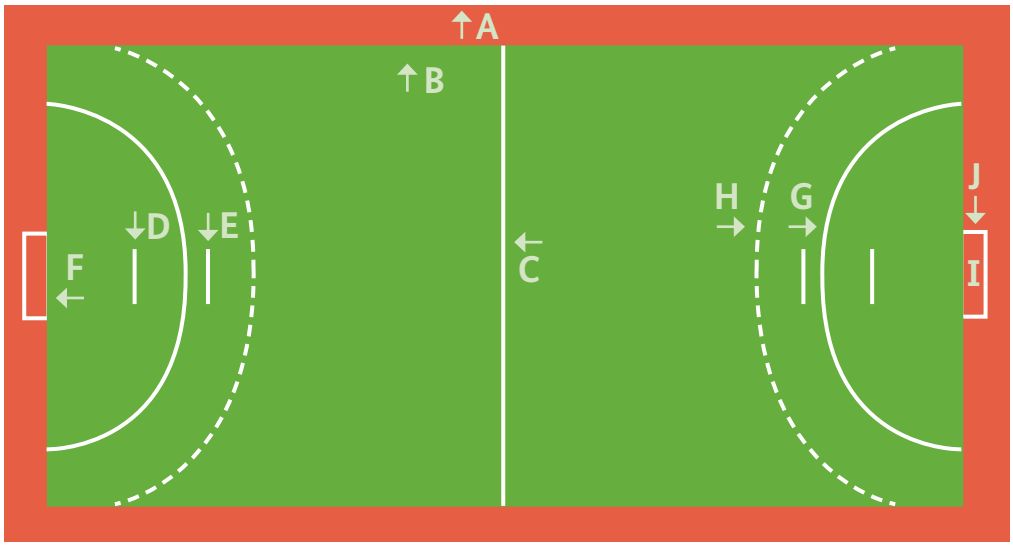
While professional courts are made of wood, on the grassroots level, handball can be played on all surfaces.

PLAYING FIELD

According to the IHF, a handball court 'is a 40 meter long and 20 meter wide rectangle, consisting of two goal areas and a playing area. (...) There should be a safety zone surrounding the playing court, with a width of at least 1 meter along the side lines and 2 meters behind the goal lines'.[9] Thus, you need a space of min. 44 x 22 m to build a handball court.

9 IHF: *Rules of the Game*, p. 4.

FIGURE 11: HANDBALL COURT PLAYING SURFACE (40 M X 20 M) AND ITS ANNOTATION



ANNOTATION	DESCRIPTION	REMARK
A	Safety line	Min. 2 m from the touch line
B	Side line	The longer boundary lines
C	Centre line	Divides the court in two
D	Goalkeeper's restraining line	4 m from the goal line
E	Penalty mark	7 m from the goal line
F	Goal line	The shorter boundary lines
G	Goal area line	Limits the goal area which consists of a 3 x 6 m rectangle and two connecting quarter circle sectors each with a radius of 6 m
H	Free throw line	Drawn 3 m outside the goal-area line.
I	Goal net	Rectangular or hexagonal shaped net
J	Goal post	8 cm square cross section

The goal area line is defined by a 3 m long line directly in front of the goal, parallel to the goal line and 6 m away from it (measured from the rear edge of the goal line to the front edge of the goal-area line) and two quarter circles, each with a radius of 6 m (measured from the rear inner corner of the goalposts), connecting the 3 m long line with the outer goal line. The free throw line is a broken line 3 m outside the goal area line.

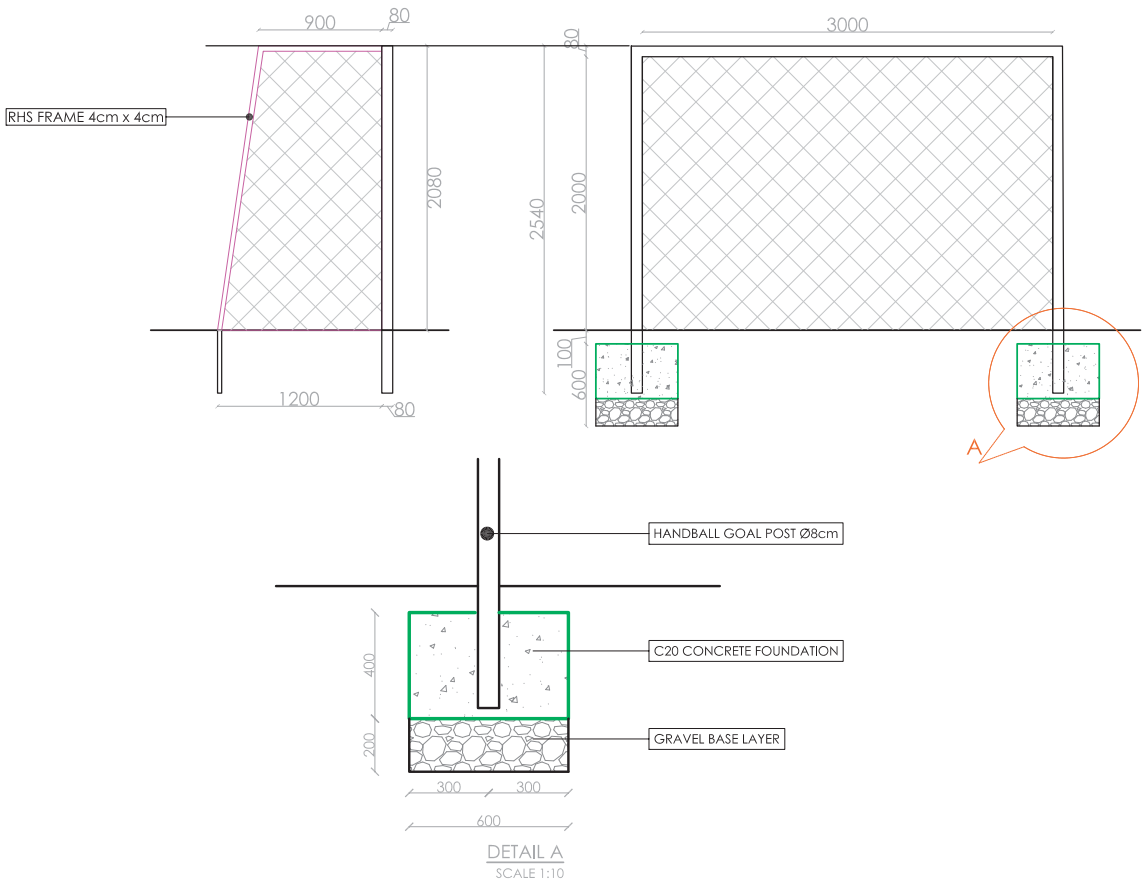
GOALS

The goals are situated at the centre of each goal line. They have an internal dimension of 3 x 2 m. The goals must be firmly attached to the ground.

The goal posts are connected by a horizontal crossbar. The rear sides of the goal posts have to be in line with the outer edge of the goal line. Goalposts and the crossbars must have an 8 cm square cross section.

The three sides which are visible from the court must be painted in bands of two contrasting colours which also contrast with the background.

FIGURE 12: HANDBALL GOAL POSTS AND DETAILS



The goals have a net, attached in such a way that a ball thrown into the goal cannot immediately rebound or pass through the goal.

The net must be highly durable and light and be manufactured in a knotless construction from high tenacity nylon (PP) materials. The recommended colour of the goal net is white.

There are different net holder mechanisms, but due to safety concerns, the recommended type is the post net holder, where the net is suspended behind the goal and tied to the post.

LINE MARKINGS

The Rules of the Game state that 'all lines on the court are fully part of the area that they enclose. The goal lines shall be 8 cm wide between the goalposts, whereas all other lines shall be 5 cm wide'.[10] While colour is not specified, typically white lines are used for competition play and red lines for recreational play on multipurpose courts.

10 IHF: *Rules of the Game*, p. 4

Girls playing netball at a school court in Lokichogio, Kenya | © GIZ/Kathrin Schmid

2.6 NETBALL

Netball is a ball sport played by two teams of seven players on a rectangular court with raised goal rings at each end. The aim is to score goals from within a defined area by throwing a ball into a ring attached to a 3.05 m high post.

The International Netball Federation (INF)[11] states that 'the surface should be wooden (...) but may consist of other material provided it is safe to play on'. For grassroots sports grounds, this can be gravel, concrete or asphalt.

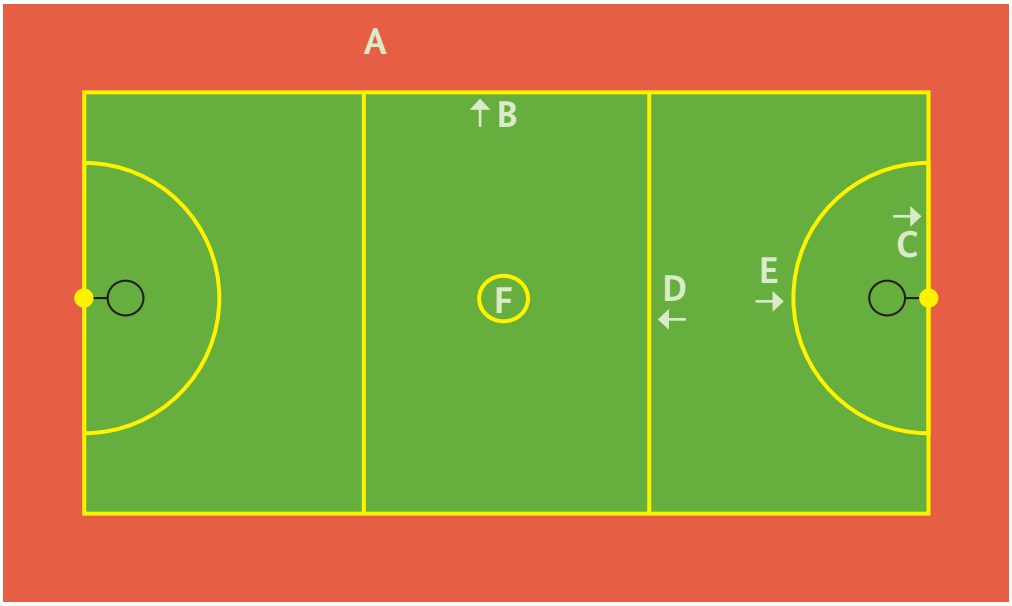
PLAYING FIELD

According to the INF, a netball court is 30.5 m x 15.25m; the 3.05 m wide area around it ('court surround') is part of the field of play. Thus, you need a space of min. 21.35 x 36.6 m to play netball.

The court has two goal posts, one in the centre of either side of the court, and line markings as defined by the rules of the game.

11 INF: *International Rules of Netball*, p. 7.

FIGURE 13: NETBALL COURT PLAYING SURFACE (30.5 M X 15.25 M) AND ITS ANNOTATION



ANNOTATION	DESCRIPTION	REMARK
A	Court surround	3.05 m from side lines
B	Side lines	Longer sides of the court (30.5 m)
C	Goal lines	Shorter sides of the court (15.25 m)
D	Transverse lines	Length equals the length of the goal lines; divides the court into 3 equal parts.
E	Goal circles	Semi-circles with a radius of 4.90 m
F	Centre circle	Full circle with diameter of 0.9 m

GOAL POSTS

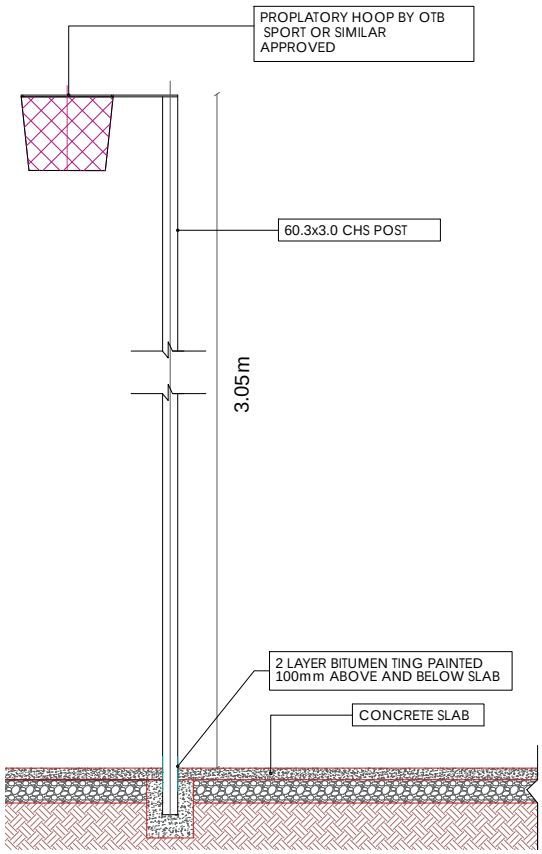
A netball court's goal post consists of a metal pole with a hoop and a net. It is installed at the centre of the goal line at each end of the field. The poles have a total length of 3.75 m, of which 3.05 m are above surface and 0.70 m are anchored in the ground. The metal rings have an inside diameter of 0.380 m. The nets attached to the rings are normally made of rope.

TIP

Whenever possible, buy netball posts and nets off the shelf to ensure they meet the standards, are safe to use and can be replaced at any time.

Girls during a netball match in Windhoek, Namibia | © GIZ/Stefan Oosthuizen

FIGURE 14:
NETBALL GOAL POST DETAILS



LINE MARKINGS

The rules of the game state that 'all lines (...) are 50 mm wide and are part of the court area they outline'. The lines can be painted in yellow or white.[12]

12 INF: *International Rules of Netball*, p. 7.

Asphalt sports ground at Tegere-Id Polytechnic College in Ethiopia | © GIZ/Addisalem Nega

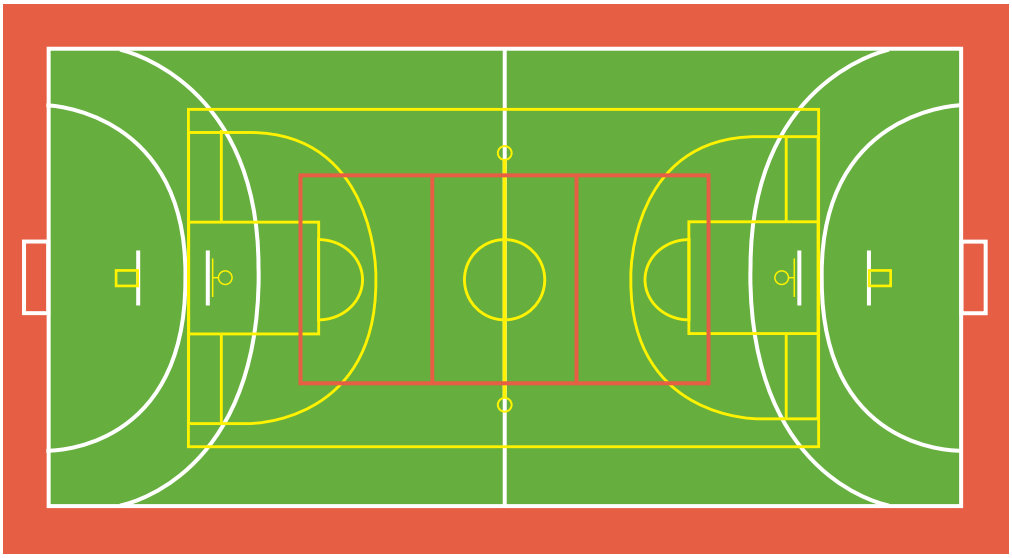
2.7 MULTIPURPOSE COURT

Multipurpose courts are designed to be easily used for different types of sports activities and thus allow for a (cost) effective use of the space. They can accommodate a variety of sport types, but in the experience of S4DA, the combination of handball, basketball and volleyball is the most effective.

PLAYING FIELD

For the multipurpose court to accommodate handball, the size required for the playing field area is 40 x 20 m. The possible surface finishes are concrete or asphalt. The playing field area should be surrounded by a 2 m wide paving area and finished off with a kerbstone.

FIGURE 15: MULTIPURPOSE COURT (HANDBALL + BASKETBALL + VOLLEYBALL) PLAYING SURFACE (40 M X 20 M)

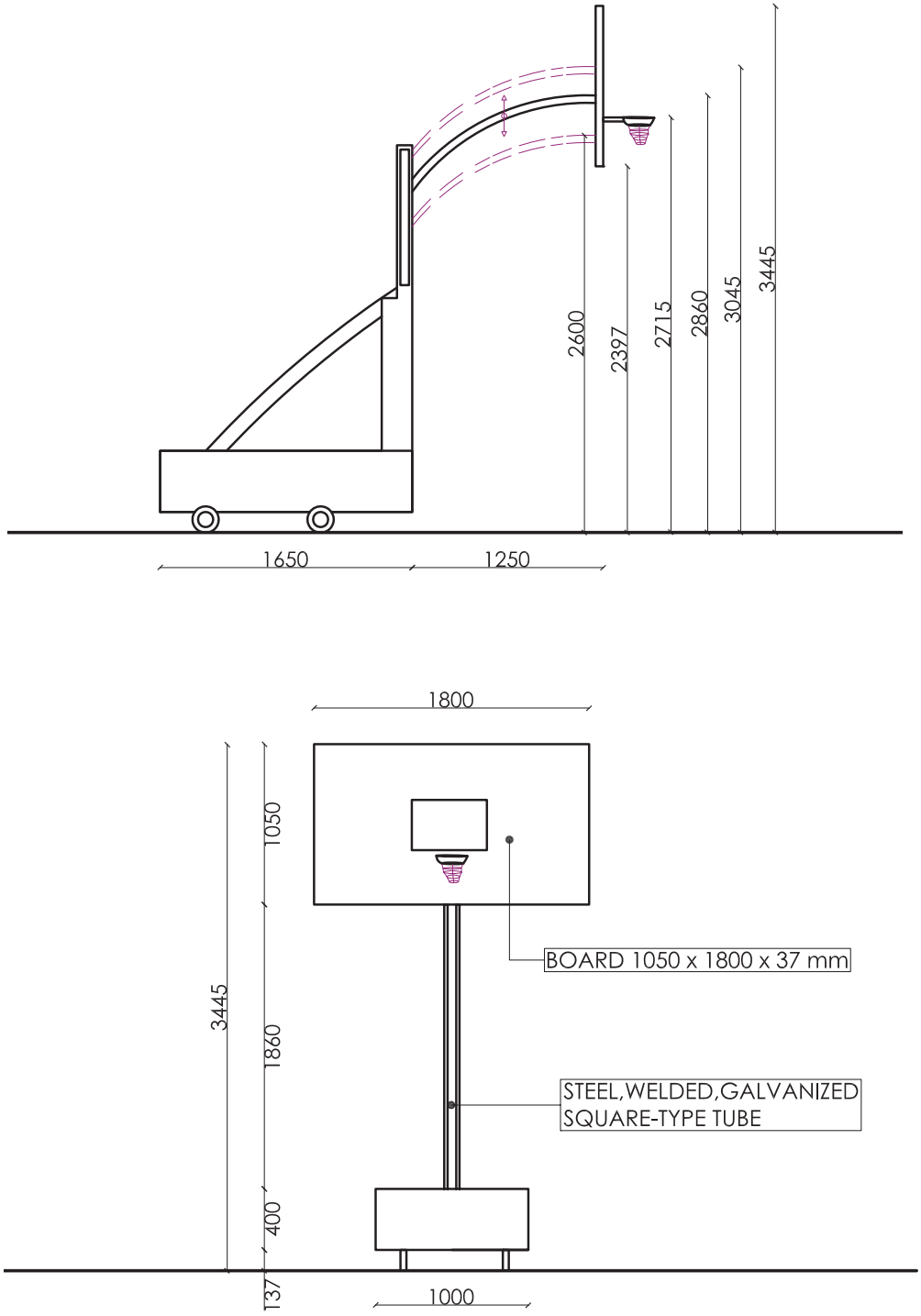


FIXTURES

To play volleyball or handball on a multipurpose field, you need the same goals or nets as described in chapter 2.3 and 2.5: the handball goals remain in place, and the standard volleyball net can easily be taken down and put back up again. For basketball, however, you need a backstop unit which is movable. The two figures below show a typical design of a mobile basketball backstop unit. It consists of a base with 4 wheels and an adjustable lever to which the board is attached.

Moveable backstop unit on a multipurpose court in Maputo, Mozambique | © David Aguacheiro

FIGURE 16: MOBILE BASKETBALL BACKSTOP UNIT DETAILS



LINE MARKINGS

The line markings follow the regulations of each sports ground type; please see chapters 2.2, 2.3 and 2.5 for detailed information. In order to differentiate between the sports, paint the line markings in different colours, preferably white for handball, yellow for basketball and red for volleyball. S4DA recommends only painting the line markings and not the entire playing area in order both to save money and to make sure the court can be used flexibly.

Distinctly coloured line markings for various sports on a multipurpose court in Addis Ababa, Ethiopia | © GIZ/Addisalem Nega

Surface considerations are key to a successful and sustainable construction | © GIZ/Addisalem Nega

3 Surface Designs

This chapter describes the different surface finishes (turf, gravel, sand, concrete or asphalt) to select from. Which surface is best suited for a particular site depends on which sports will be played there, the climate and soil conditions, and the availability of material and funds.

3.1. CHOOSING THE RIGHT SURFACE

When choosing the surface, there is no general rule that can be applied: each surface has advantages and disadvantages. Above all, the sports code, climate, and soil type needs to be considered. These are the options you can choose from. The details of each surface and type are outlaid in the following chapters.

SURFACE TYPE	SPORTS GROUNDS	SOIL TYPE	RAINFALL/ WIND	TEMPERATURE
Turf Type 1	Football, Handball	All soil types	Average and high rainfall area with low evaporation rate	Low temperature and average humidity areas
Turf Type 2	Football, Handball	All soil types	Low and average rainfall area with relatively high evaporation rate	High temperature and low humidity areas
Gravel Type 1	Football, Handball, Volleyball, Netball	Expansive and non-uniform soil strata and soil type	Average and high rainfall areas with low evaporation rate	All temperature and low humidity areas
Gravel Type 2	Football, Handball, Volleyball, Netball	Non-expansive and uniformly low graded natural soil	Low rainfall areas with high evaporation rate	All temperature and low humidity areas

Sand Type 1	Football, Handball	Sand and sandy soil natural ground area with coarse particles (> 6 mm)	Average and high rainfall areas and low wind pressure	All except high temperature areas
Sand Type 2	Football, Handball	Sand and sandy soil natural ground area with fine particles (< 6 mm)	Very low rainfall areas and average wind pressure	
Sand Type 3	Beach Volleyball	All soil types	All climatic conditions	All temperature areas
Concrete Type 1	Small size football fields, Basketball, Handball, Netball, Multipurpose	All soil types, especially for expansive soil	All climatic conditions	All temperature areas
Concrete Type 2	Small size football fields, Basketball, Handball, Netball, Multipurpose	All soil types, especially for non-expansive soils, sandy and rocky areas	All climatic conditions	All temperature areas
Asphalt	Small size football fields, Basketball, Volleyball, Handball, Netball, Multipurpose	All soil types	All climatic conditions	All temperature areas

Turf sports ground at Tegbare-Id Polytechnic College in Ethiopia | © GIZ/Addisalem Nega

3.2. TURF

Turf sports grounds are made from planted natural grass, convenient for playing football or handball. They are comfortable to play on and can be used during all seasons. When well taken care of, turf grounds tend to be more resistant to erosion than sand or gravel. However, both construction and maintenance are expensive – grass needs, among other things, irrigation, regular mowing and fertilisation. As grass is sensitive to climate conditions, turf grounds are only sustainable in high and moderate rainfall areas.

APPLICABLE FOR

Football fields

Handball courts

MINIMUM MAINTENANCE & REPAIR REQUIREMENTS

- Regular mowing works
- Regular watering
- Grass cutting machines
- Natural fertiliser
- Annual grass restoration works
- Planned field utilisation
- Organised maintenance team

SURFACE AND LINE MARKINGS

A turf sports ground requires a thorough preparation of the ground and the appropriate choice of layers – according to soil and climatic conditions – to ensure sustainable growth of the grass.

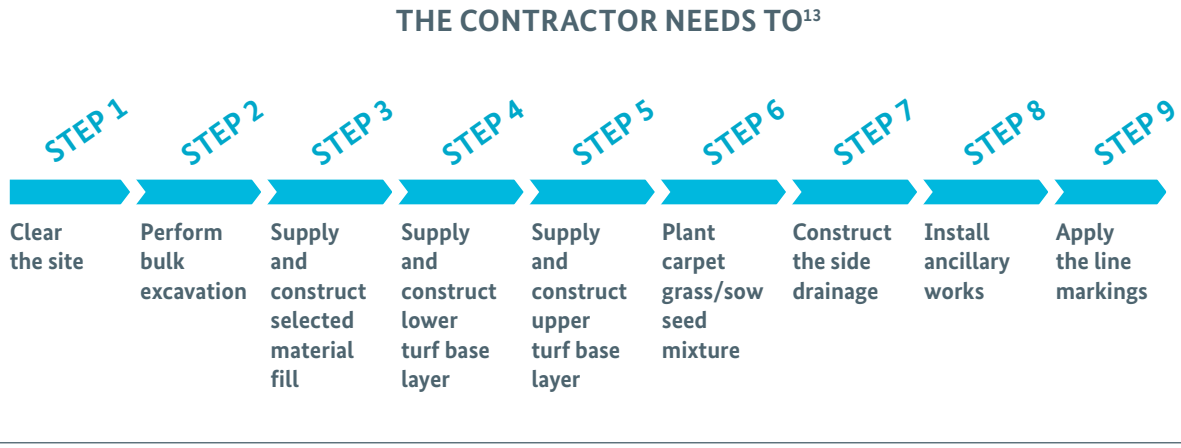
For line markings, calcium carbonate (white gypsum) can be used. Please make sure to **not use any herbicide product** for line marking as it may put players and the environment at risk.

TIP

Test the load bearing capacity of the in situ soil. The deformation should be at least Ev2 >/= 45 MN/m² or more. If the deformation modulus is less than 45 MN/m², soil improving measures will be required.

→ **Make sure to consider a slope of 0.1–0.5%, depending on the amount of rainfall in the region.**

FIGURE 17: TO BUILD A TURF SPORTS GROUND



13 Detailed Bills of Quantity can be provided upon request. See imprint for contact details.

SECTIONS

2 types of turf surface have proven to be suitable, according to the prevailing climatic conditions: type 1 is suitable for environments with expansive soil and high rainfall; type 2 is for very expansive soil with average to high rainfall. To account for these differences, the thickness of the layers for the two turf types must be adjusted:

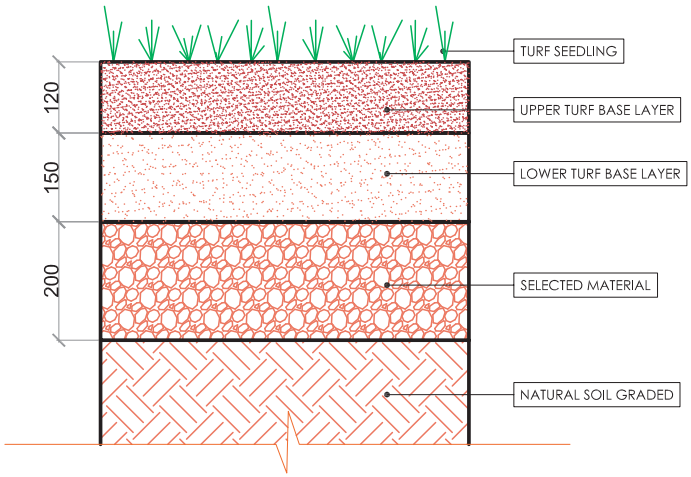
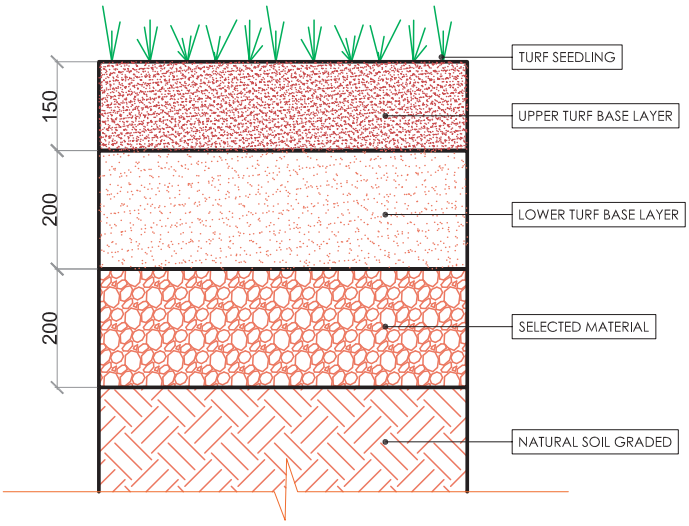
FIGURE 18: TURF TYPE 1	SOIL, RAINFALL AND CLIMATE CONDITIONS
	• All soil types • Average and high rainfall area with low evaporation rate • Low temperature and average humidity areas

FIGURE 19: TURF TYPE 2	SOIL, RAINFALL AND CLIMATE CONDITIONS
	• All soil types • Low and average rainfall area with relatively high evaporation rate (lower turf layer retains more moisture) • High temperature and low humidity areas

Gravel sports ground at Kakuma refugee camp, Kenya | © GIZ/Andrew Oloo

3.3 GRAVEL

Gravel sports grounds are made from natural binding soil, convenient for playing football, handball, volleyball and netball. They are suitable for all dry areas with a high evaporation rate, sandy soil, and for all temperature conditions. They are particularly suitable for intensive sports field utilisation. On the other hand, gravel is quite susceptible to erosion by water and wind, and thus needs regular maintenance. If the necessary building material is available locally, the construction of gravel sports grounds is relatively cheap.

APPLICABLE FOR

Football fields | Handball courts | Volleyball courts | Netball courts

MINIMUM MAINTENANCE & CARE REQUIREMENTS

- Seasonal levelling and compacting works

SURFACE AND LINE MARKINGS

A gravel sports ground requires a solid foundation. If the existing soil is expansive (e.g. black cotton soil), an additional base layer from compacted material has to be provided.

Use local material for the surface layer, unless it does not conform to the finishing and compaction requirements.

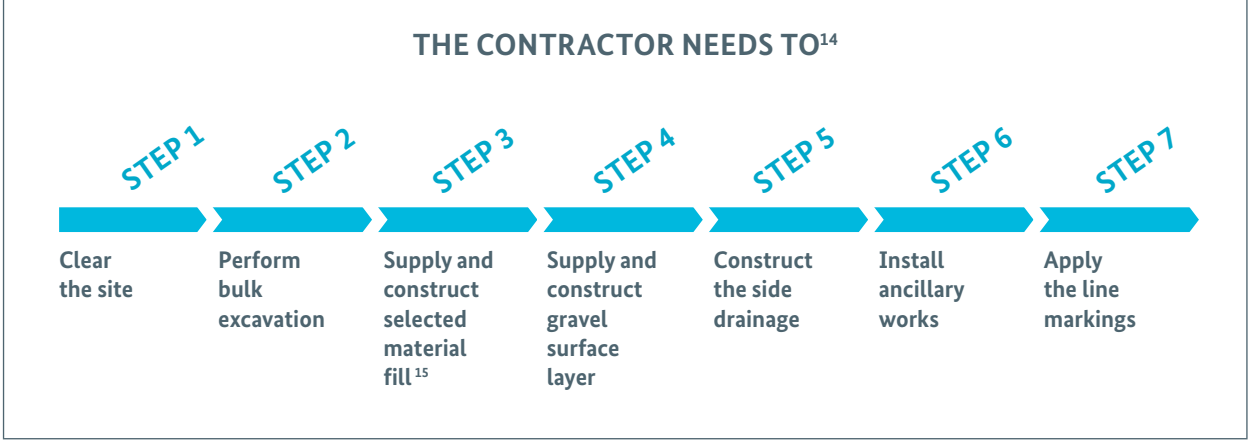
For line markings, calcium carbonate (white gypsum) can be used. Please make sure to **not use any herbicide product** for line marking as it may put players and the environment at risk.

TIP

If no suitable material can be found locally, consider whether it is still cost effective to purchase and transport material from distant sources.

→ Make sure to consider a slope of 0.1–0.5%, depending on the amount of rainfall in the region.

FIGURE 20: TO BUILD A GRAVEL SPORTS GROUND



SECTIONS

There are two different types of gravel surface designs: type 1 is suitable for areas with expansive and non-uniform soil formations, type 2 for non-expansive and uniformly low graded natural soil areas.

14 Detailed Bills of Quantity can be provided upon request. See imprint for contact details.
15 Applicable for gravel type 1 only.

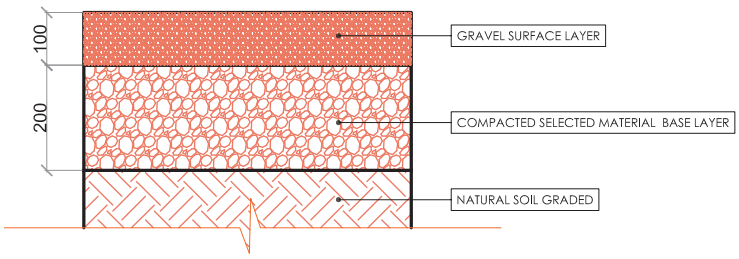
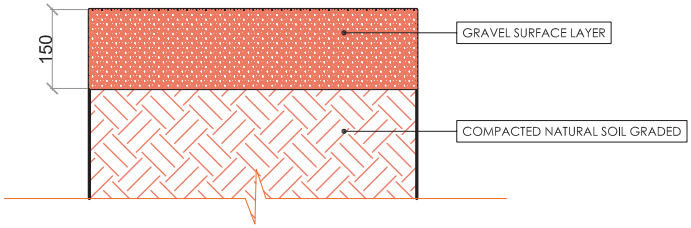
FIGURE 21: GRAVEL TYPE 1	SOIL, RAINFALL AND CLIMATE CONDITIONS
	• Expansive and non-uniform soil strata and soil type • Average and high rainfall areas with low evaporation rate • All temperature and low humidity areas

FIGURE 22: GRAVEL TYPE 2	SOIL, RAINFALL AND CLIMATE CONDITIONS
	• Non-expansive and uniformly low graded natural soil • Low rainfall areas with high evaporation rate • All temperature and low humidity areas

TIP

In general, gravel surfaces are significantly less expensive than concrete or turf surfaces. However, if gravel material needs to be imported, the difference in price will be much lower. It is best to do a cost analysis between surface types of concrete, turf and gravel before deciding on the surface finish.

Sand football field at Albazine Sports Club in Maputo, Mozambique. @GIZ/ Tina Krueger

3.4 SAND

Sand sports grounds, made from natural sand, are convenient for playing football, handball and beach volleyball. Like gravel surfaces, sand surfaces are feasible in areas with sandy soil and more specifically low-lying and low rainfall areas. They can be used in all seasons and are relatively cheap to construct, but they need regular maintenance, as they can be easily eroded by water and wind. There are two types of sand surfaces (type 1 and 2) which are solid and firm, similar to gravel, and one (type 3) which is loose and soft, similar to sand on a dry beach.

APPLICABLE FOR

Football fields (type 1-2)

Handball courts (type 1-2)

Beach Volleyball courts (type 3)

MINIMUM M&R REQUIREMENTS

- Seasonal levelling and compacting works

SURFACE AND LINE MARKINGS

A sand sports ground requires a solid foundation: If the existing soil is too coarse to be sufficiently compacted, an additional base layer from graded sand has to be provided.

For line markings, calcium carbonate (white gypsum) can be used. Please make sure to **not use any herbicide product** for line marking as it may put players and the environment at risk.

FIGURE 23: TO BUILD A SAND SPORTS GROUND

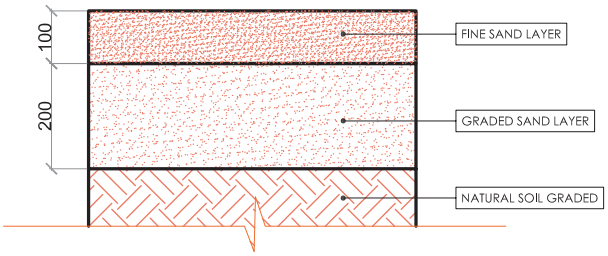
THE CONTRACTOR NEEDS TO[16]

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6
Clear, grade and compact the site	Supply and construct graded sand layer fill (applicable for sand type 1 only)	Supply and construct binding fine sand surface layer	Construct the side drainage or kerbstone [17]	Install ancillary works	Apply the line markings

SECTIONS

Sand type 1 is suitable for areas with very coarse soil. Sand type 2 is suitable for areas with less coarse soil. Sand type 3 needs a special layer of coarse gravel and an integrated drainage system.

FIGURE 24: SAND TYPE 1



SOIL, RAINFALL AND CLIMATE CONDITIONS

- Sand and sandy soil natural ground area with very coarse particles (> 6 mm)
- Average and high rainfall areas
- All except high temperature areas
- Low wind pressure areas

16 Detailed Bills of Quantity can be provided upon request. See imprint for contact details.
17 Applicable for sand type 1 and 2 only; type 3 has different drainage system.

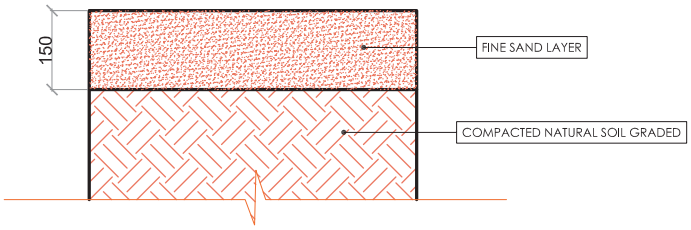
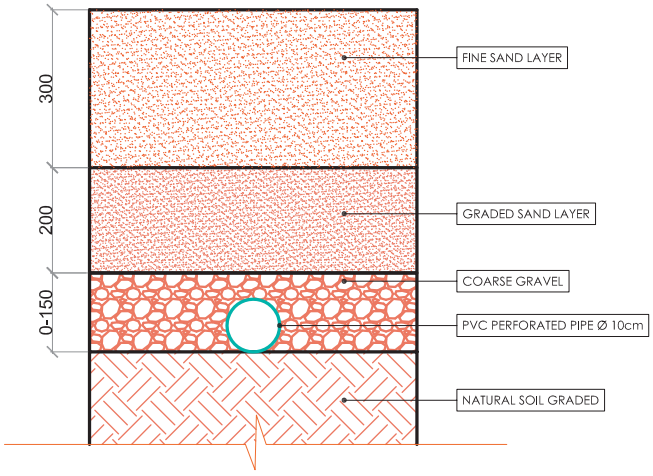
FIGURE 25: SAND TYPE 2	SOIL, RAINFALL AND CLIMATE CONDITIONS
	• Sand and sandy soil natural ground area with fine particles (< 6 mm) • Very low rainfall areas • All temperature areas • Average wind pressure areas

FIGURE 26: SAND TYPE 3	SOIL, RAINFALL AND CLIMATE CONDITIONS
 Section Detail - A	• All soil types • All rainfall and wind conditions • All temperature areas • Surface material: loose sand with fine particles. The sand is very soft, won't compact and produces very little dust.

Netball Court at Valombola Vocational Training Centre, Oshana, Namibia | © GIZ/Addisalem Nega

3.5 CONCRETE

A concrete sports ground surface is made from a mixture of sand, cement, building stone and water. It is best for basketball and multipurpose courts, but also convenient for playing handball, volleyball, netball and small size courtyard football games. They can be built on all soil types and in all climatic conditions. Compared to other surfaces, concrete sports grounds – if constructed properly – need relatively little maintenance. They are especially suitable for intensive utilisation. On the other hand, construction costs are high, especially in remote areas with limited access to materials. Therefore it is important that the construction requirements and specifications are strictly adhered to.

PLEASE NOTE **If constructed properly, concrete sports grounds are very robust and resilient. However, if they do get seriously damaged, it can be extremely difficult to repair them. That's why it is crucial to meet the required construction standards and to maintain them regularly in order to keep small degradations from turning into major problems.**

APPLICABLE FOR

- Football fields
- Handball courts
- Volleyball courts
- Netball courts
- Basketball courts
- Multipurpose courts

MINIMUM MAINTENANCE & REPAIR REQUIREMENTS

- Seasonal maintenance work

SURFACE AND LINE MARKINGS

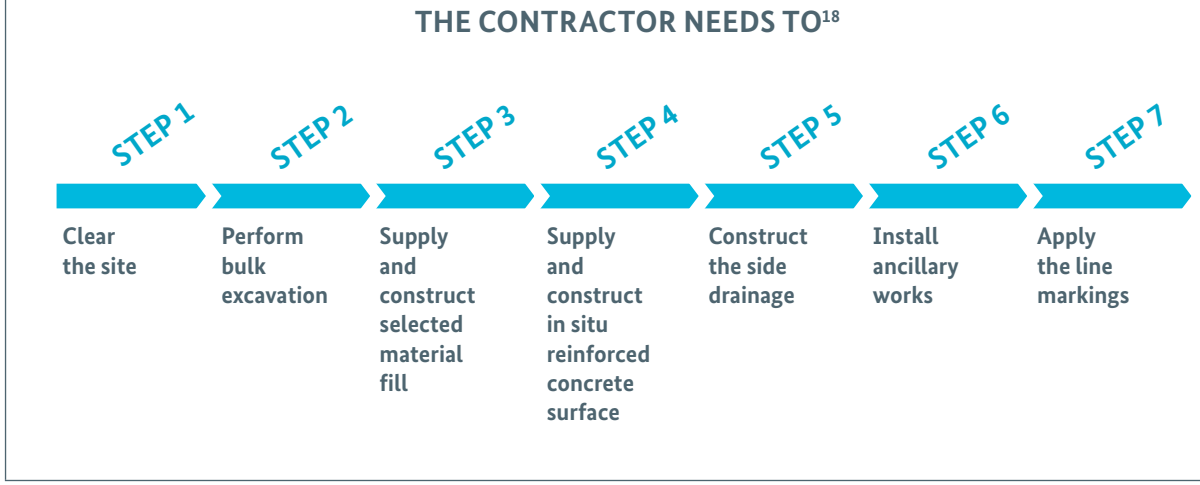
A concrete sports ground requires thorough preparation and construction. Do not forget the expansion joints! S4DA recommends a distance of 5 m between the joint cuttings. Line markings are painted on to the concrete surface using water based outdoor acrylic line paint according to the required colour specification.

TIP

The surface itself can also be painted. However, S4DA advises against it: not only is it more expensive, but the paint degrades quickly, thus increasing maintenance costs significantly.

→ **Make sure to consider a slope of 0.1–0.5 %, depending on the amount of rainfall in the region.**

FIGURE 27: TO BUILD A CONCRETE SPORTS GROUND



TIP

S4DA suggests not painting the entire surface, only the line markings. Otherwise, you will increase the maintenance cost significantly: the colour may look nice at first, but it will not last long, and you will have to paint it over and over again.

18 Detailed Bills of Quantity can be provided upon request. See imprint for contact details.

SECTIONS

There are two types of concrete surface designs. Type 1 is suitable for locations where the base soil strata is unstable or where it is difficult to determine its characteristics. Type 2 can only be built on stable soil strata such as sand or rocky locations.

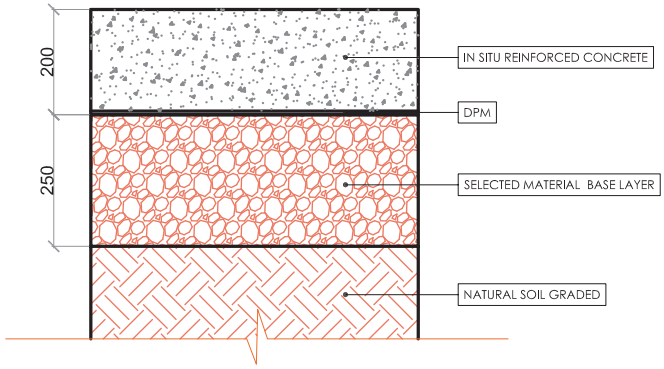
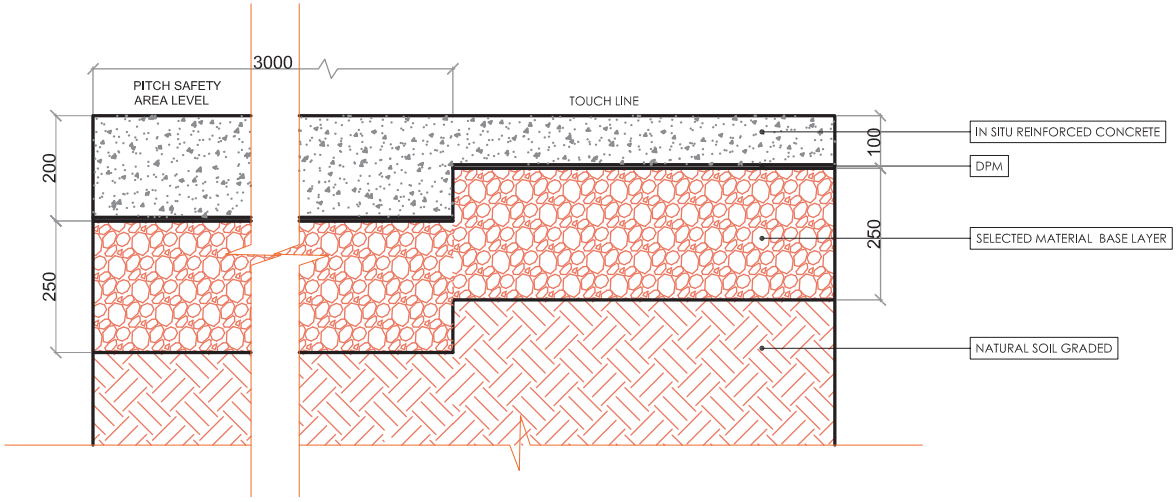
FIGURE 28: CONCRETE TYPE 1	SOIL, RAINFALL AND CLIMATE CONDITIONS
	• All soil types, especially for expansive soil • All climatic conditions • Slab-thickness: 200 mm • Expansion joint depth: 100 mm • Recommended distance between the joint cuttings: 5 m

FIGURE 29: CONCRETE TYPE 2



SOIL, RAINFALL AND CLIMATE CONDITIONS	
• All soil types, especially for non-expansive soils, sandy and rocky areas • All climatic conditions	• Slab-thickness: 200 mm at the peripheral sides/100 mm in the middle • Good surface finish quality required • Expansion joint depth: – 100 mm for 200 mm concrete thickness – 50 mm for 100 mm concrete thickness • Recommended distance between the joint cuttings: 5 m

Asphalt sports ground at Jesuit Refugee Service partner school in Addis Ababa, Ethiopia | © GIZ/Ahadu Gebru

3.6 ASPHALT

Asphalt is a suitable surface for multipurpose courts and convenient for football, handball, volleyball, netball, or basketball. Asphalt surfaces can be built in all climatic and soil conditions, where high utilisation and various purposes are required (e.g. if the space is also used for public events such as school ceremonies). Asphalt is robust, easy to maintain and simple to paint, yet usually cheaper and more adaptable than concrete. That is why it is a common construction material for sports grounds, especially if they are also used as schoolyards and for activities such as school events, ceremonies or community gathering places.

APPLICABLE FOR

- Football fields
- Handball courts
- Volleyball courts
- Netball courts
- Basketball courts
- Multipurpose courts

MINIMUM MAINTENANCE & REPAIR REQUIREMENTS

- Seasonal maintenance work

SURFACE AND LINE MARKINGS

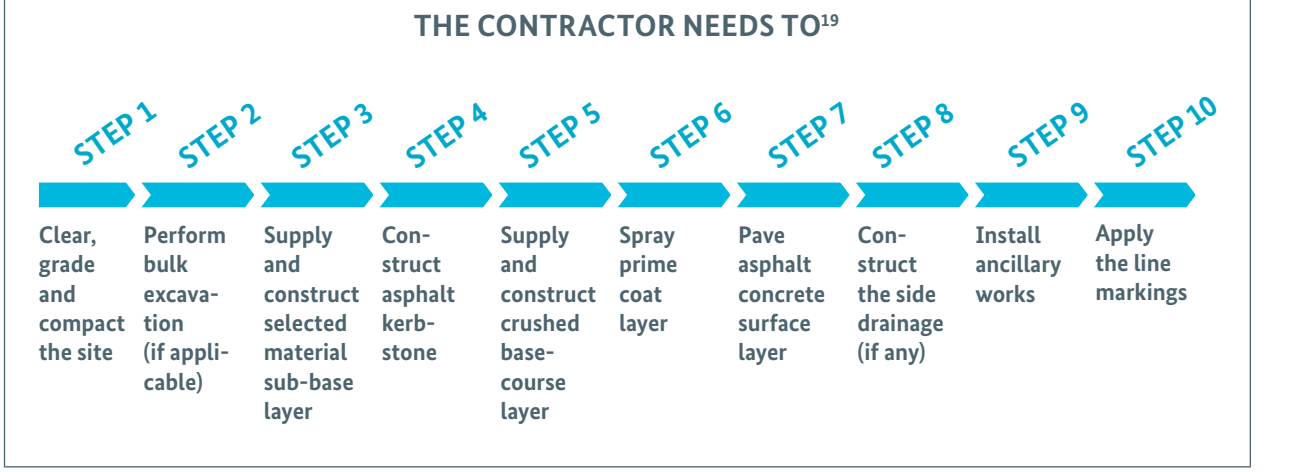
An asphalt sports ground requires the removal of the top soil which has to be replaced with two layers of base material. Make sure they are well compacted as per specifications. The surface consists of a mixture of dark bitumen with sand or gravel, designed for surfacing works of roads, flooring, etc. For line markings, use water based outdoor acrylic line paint according to the required colour specification.

TIP

The surface can also be painted. However, S4DA advises against it: not only is it more expensive, but the paint degrades quickly, thus increasing maintenance costs significantly.

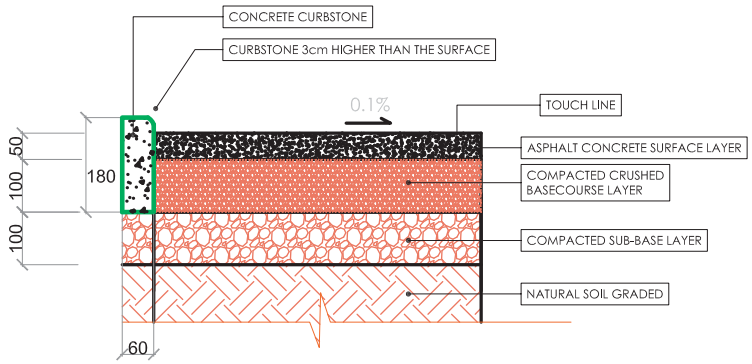
→ Make sure to consider a slope of 0.1–0.5%, depending on the amount of rainfall in the region.

FIGURE 30: TO BUILD AN ASPHALT SPORTS GROUND



19 Detailed Bills of Quantity can be provided upon request. See imprint for contact details.

SECTION

FIGURE 31: ASPHALT	SOIL, RAINFALL AND CLIMATE CONDITIONS
	• All soil types • All climatic conditions • Applicable for courtyard sports grounds. Mainly for schools

Drainage system at a sports ground in Addis Ababa, Ethiopia | © GIZ/Addisalem Nega

4 Complementary Elements

4.1 DRAINAGE SYSTEMS

Drainage systems protect a structure by removing excess water from a given location, thus ensuring long lasting usage. They are crucial for sport facilities.

Below you will find a series of the drainage systems to choose from. Check the rainfall situation in your area and consider which drainage type is most appropriate.

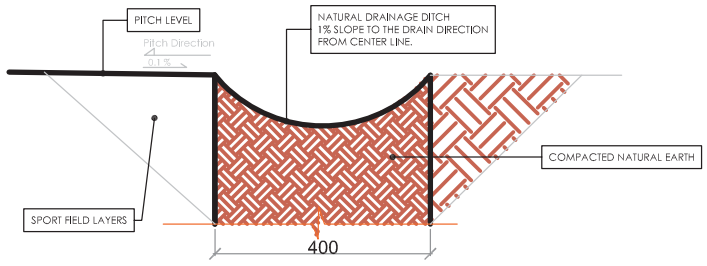
FIGURE 32: DRAINAGE TYPE 1 – NATURAL EARTH CHANNEL	RECOMMENDED APPLICATION
	• For all sports grounds in **low rainfall locations** • For turf and sand sports grounds

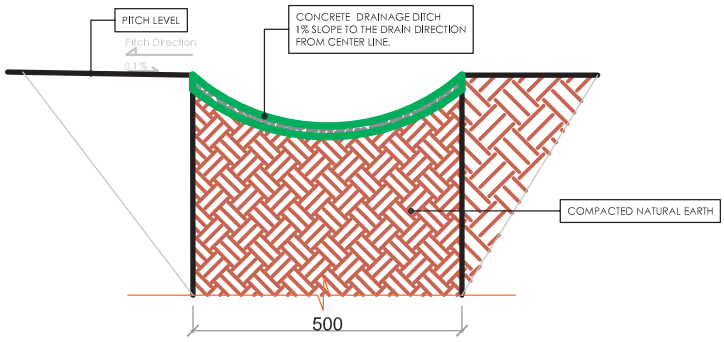
FIGURE 33: DRAINAGE TYPE 2 – CONCRETE DRAINAGE DITCH	RECOMMENDED APPLICATION
	• For all sports grounds in **high rainfall locations** • Requires relatively large space and loose soil surroundings

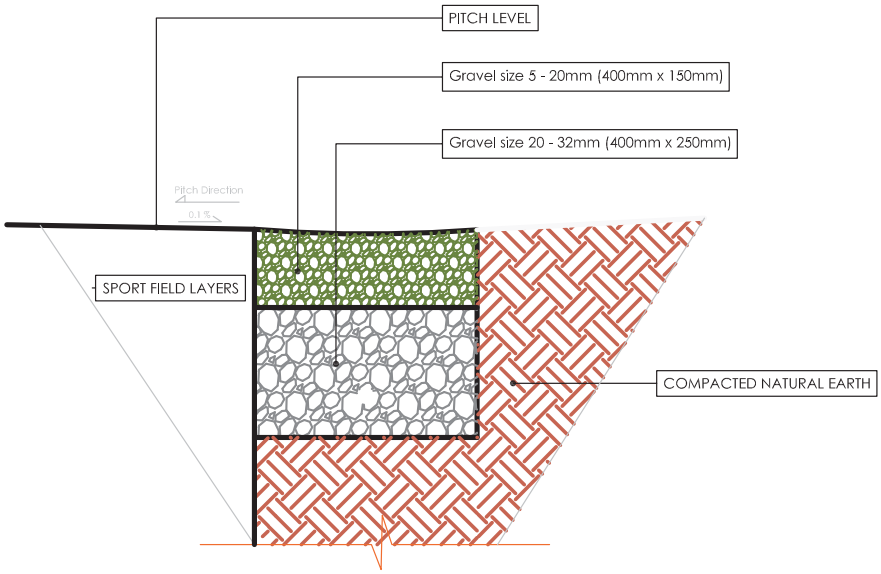
FIGURE 34: DRAINAGE TYPE 3 – GRAVEL DRAINAGE WITHOUT PERFORATED PIPE	RECOMMENDED APPLICATION
	• For sports grounds where the drainage channel should not be visible due to safety concerns • For all (except sand) sports grounds in **average and minimum rainfall areas**

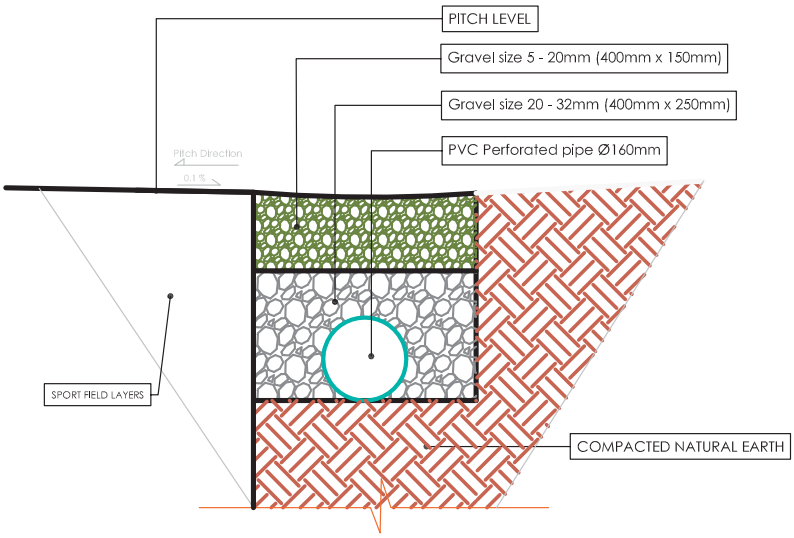
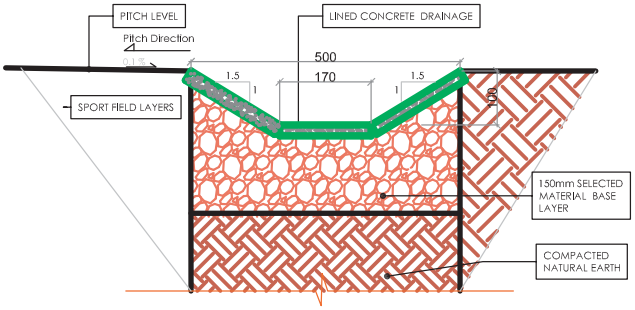
FIGURE 35: DRAINAGE TYPE 4 – GRAVEL DRAINAGE WITH PERFORATED PIPE	RECOMMENDED APPLICATION
	• For sports grounds where the drainage channel should not be visible due to safety concerns • For all (except sand) sports grounds in **high rainfall areas**

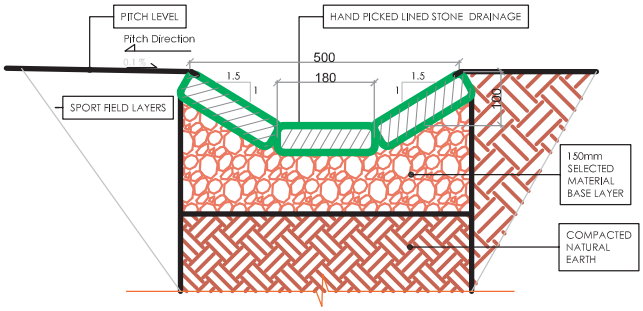
FIGURE 36: DRAINAGE TYPE 5 – PRECAST CONCRETE DITCH



RECOMMENDED APPLICATION

- For all sports ground types and soil conditions in **high rainfall areas**, if precast concrete is easily available

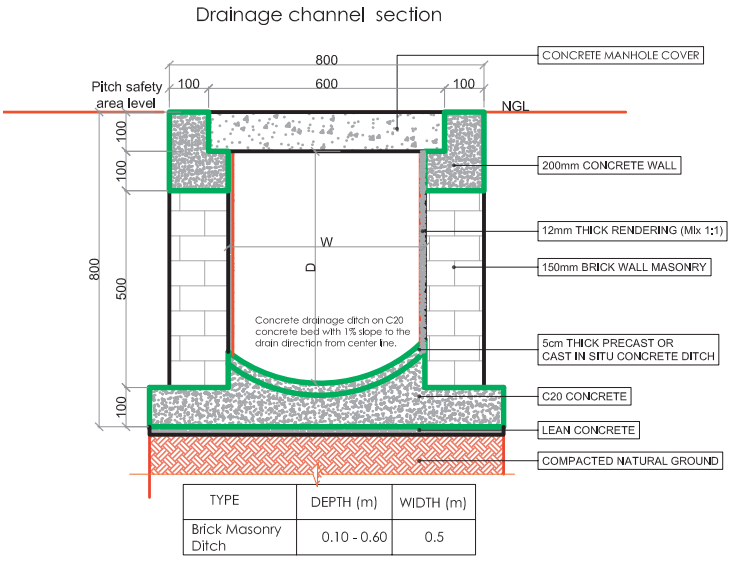
FIGURE 37: DRAINAGE TYPE 6 – STONE DRAINAGE



RECOMMENDED APPLICATION

- For all sports ground types and soil conditions in **high rainfall areas**, if dressed stones are easily available

FIGURE 38: DRAINAGE TYPE 7 – MASONRY DITCH (with manhole and connection channel to the public drainage system)

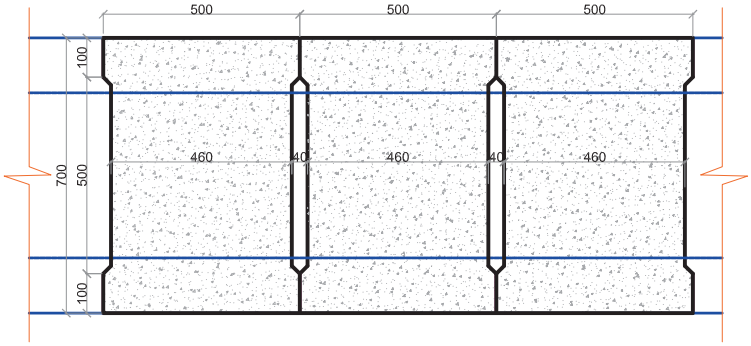


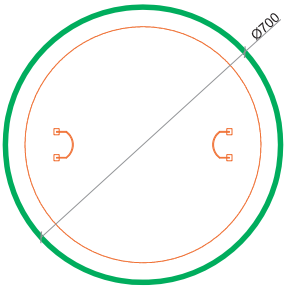
TYPE	DEPTH (m)	WIDTH (m)
Brick Masonry Ditch	0.10 - 0.60	0.5

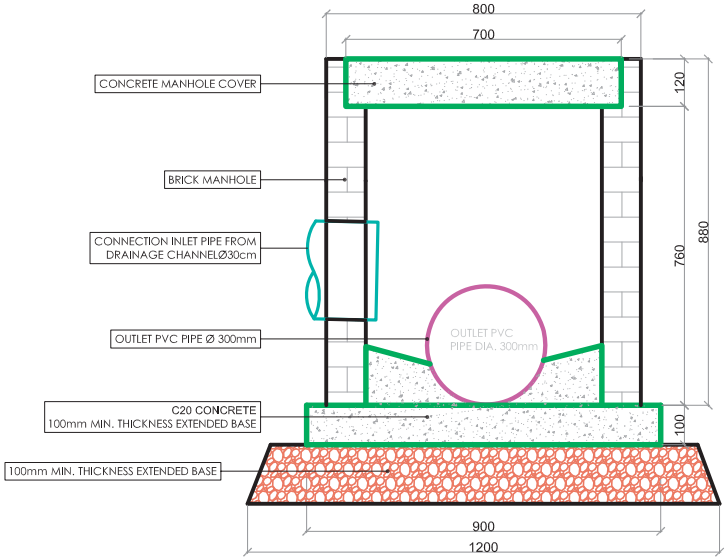
RECOMMENDED APPLICATION

- For all sports grounds in high rainfall areas where spectator seats are located around the court.
- For high rainfall areas

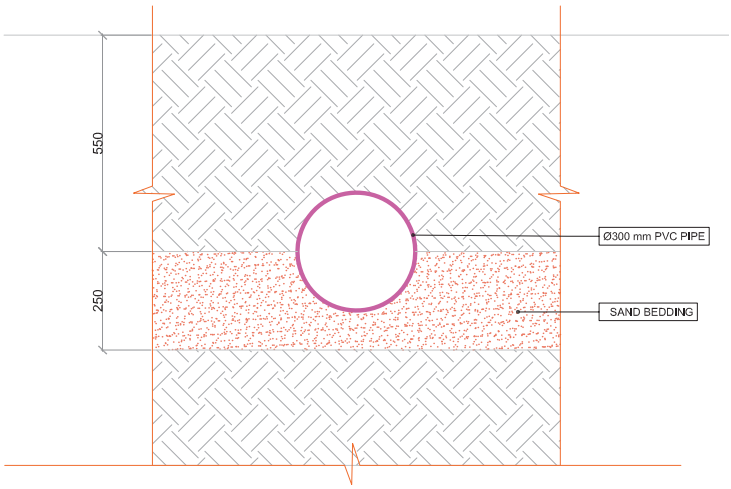
Concrete Drainage Channel Cover Detail







Connection Manhole Detail



Drainage pipe Section C - C

Natural earth channel (drainage type 1) filled with excess water at Entoto Polytechnic College in Addis Ababa, Ethiopia | © Addisalem Nega

OVERVIEW: RELATION OF SURFACE TYPES AND DRAINAGE SYSTEM

SURFACE TYPE	DRAINAGE TYPE 1 natural earth drainage ditch	DRAINAGE TYPE 2 concrete drainage ditch	DRAINAGE TYPE 3 gravel drainage without perforated pipe
Turf(type 1)	☺	☺	☺
Turf (type 2)	☺	☺	☺
Gravel (type 1)		☺	☺
Gravel (type 2)		☺	☺
Sand (type 1)	☺	☺	
Sand (type 2)	☺	☺	
Sand (type 3)			
Concrete (type 1)		☺	☺
Concrete (type 2)		☺	☺
Asphalt		☺	☺

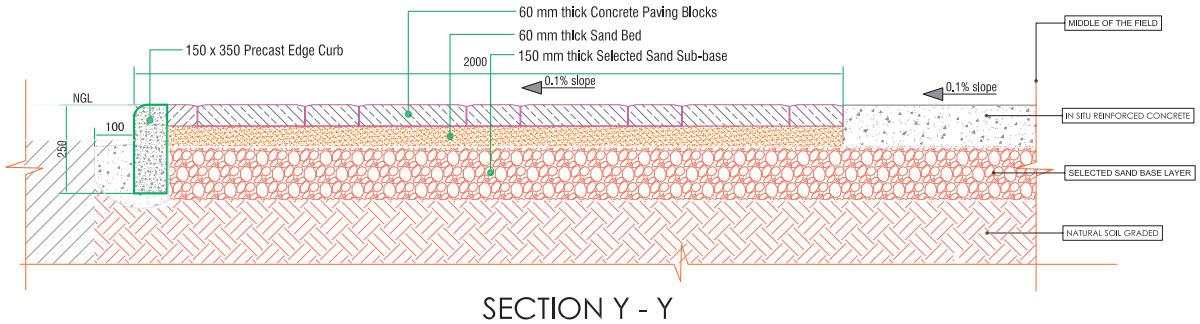
SURFACE TYPE	DRAINAGE TYPE 4 gravel drainage with perforated pipe	DRAINAGE TYPE 5 precast concrete drainage ditch	DRAINAGE TYPE 6 stone drainage ditch
Turf(type 1)	☺	☺	☺
Turf (type 2)	☺	☺	☺
Gravel (type 1)	☺	☺	☺
Gravel (type 2)	☺	☺	☺
Sand (type 1)		☺	☺
Sand (type 2)		☺	☺
Sand (type 3)			
Concrete (type 1)	☺	☺	☺
Concrete (type 2)	☺	☺	☺
Asphalt	☺	☺	☺

Pavement around a basketball court in Valombola, Namibia | © GIZ/Addisalem Nega

4.2 PAVEMENT

It is advisable to build a pavement on the safety area around multipurpose, basketball, handball and netball courts because it allows for clear differentiation between the playing field and the safety area. Furthermore, it prevents erosion of the field margins and dirt entering the playing field.

FIGURE 39: PAVEMENT AROUND THE MULTIPURPOSE COURT



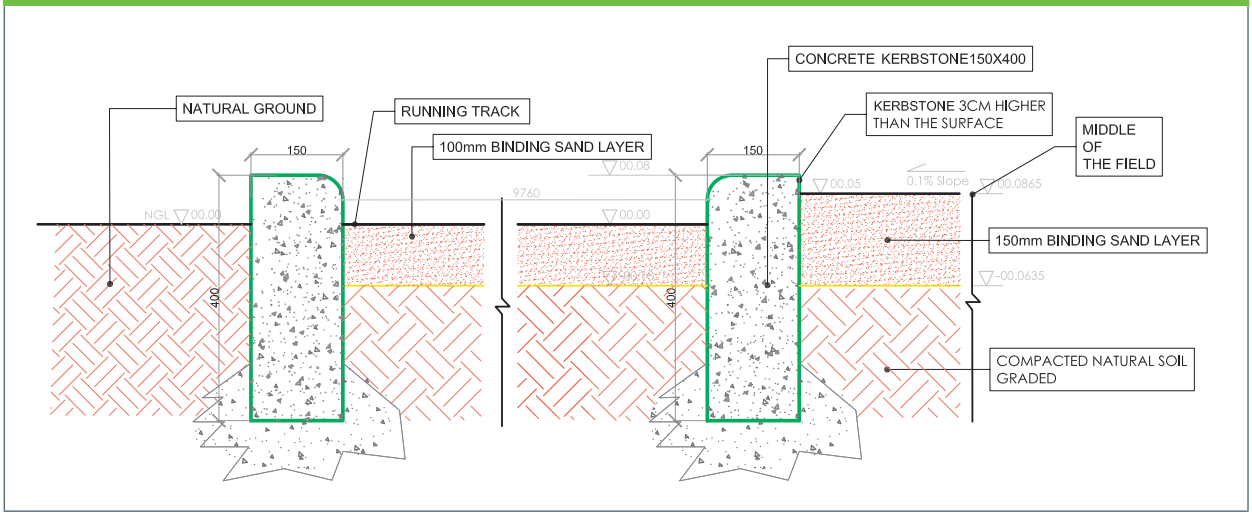
SECTION Y - Y

Kerbstone around a volleyball field in Namibia | © GIZ/Harmony Ahalwa

4.3 KERBSTONE AROUND THE FIELD

A kerbstone, or kerb, is a physical or a visual delineation of a sports ground edge, mainly used for turf, gravel, sand or asphalt surfaces. It helps to contain the various layers of the sports ground and provides protection in the absence of a drainage system.

FIGURE 40: KERBSTONE AROUND RUNNING OR FOOTBALL FIELDS

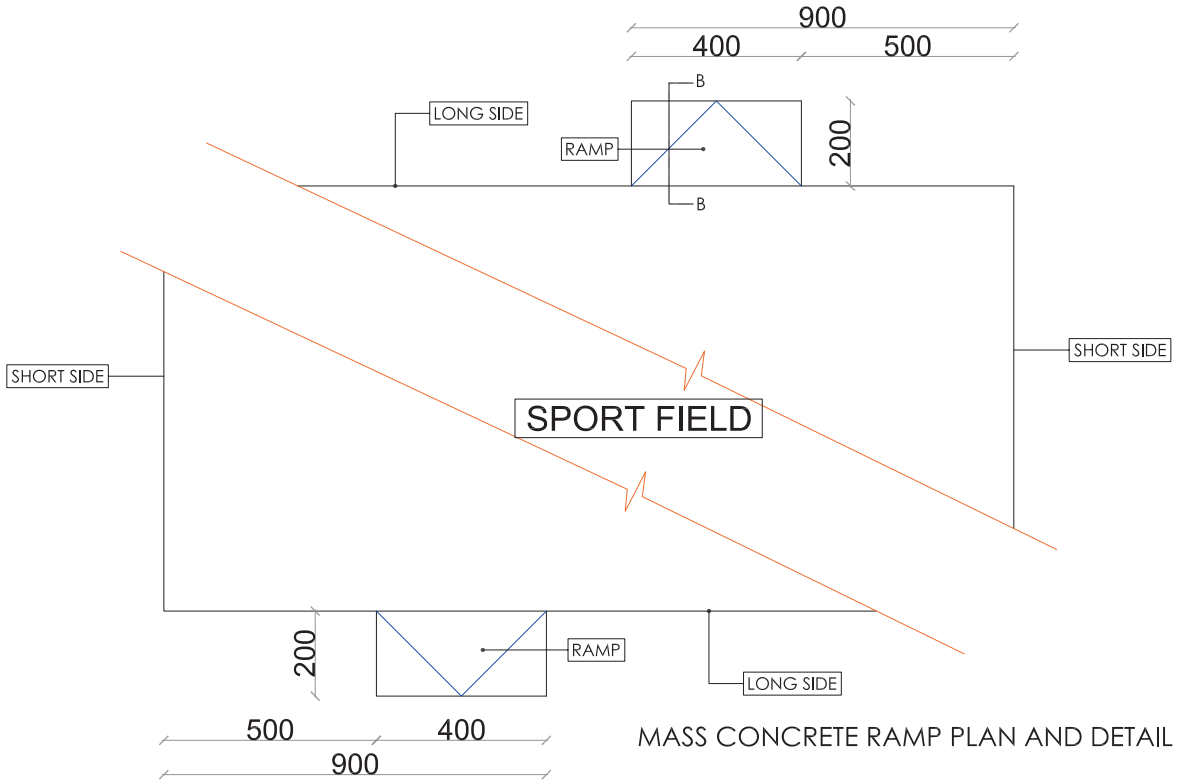


Asphalt sports ground with ramps ensure accessibility, Togo | © GIZ/Akimbi Akpado

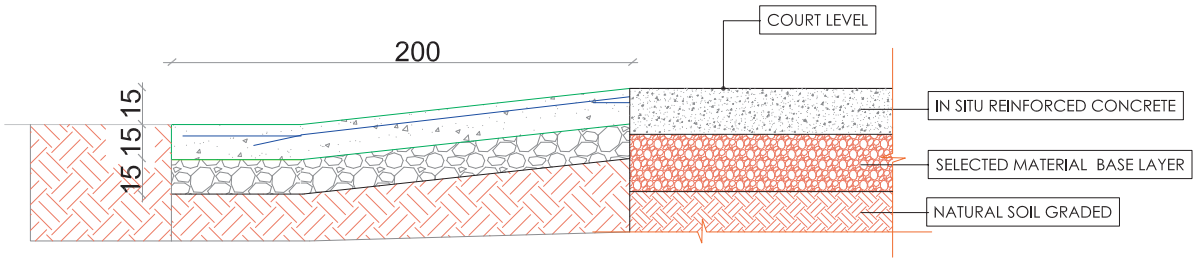
4.4 CONCRETE RAMP FOR PLAYERS WITH LIMITED MOBILITY

Concrete sports grounds with an elevated playing surface can be difficult to access for players with limited mobility. With ramps, this obstacle can be removed. The ramps shall be 4 m long and 2 m wide and positioned 5 m from the goal line on both sides.

FIGURE 41: CONCRETE RAMP DETAILS



MASS CONCRETE RAMP PLAN AND DETAIL



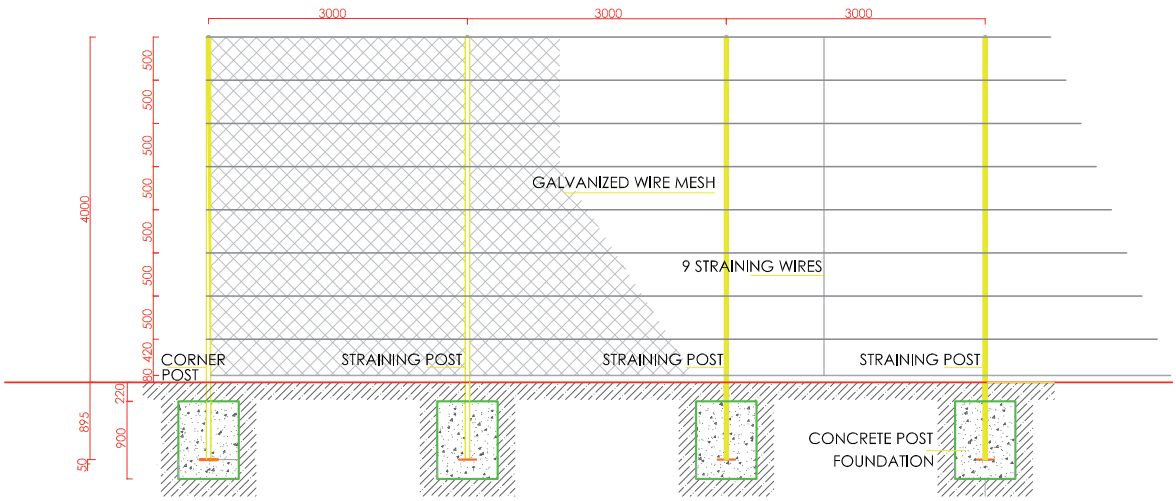
SECTION B - B
Scale 1:2

Fence type 1 around a basketball court in Namibia | © GIZ/Melany Neff

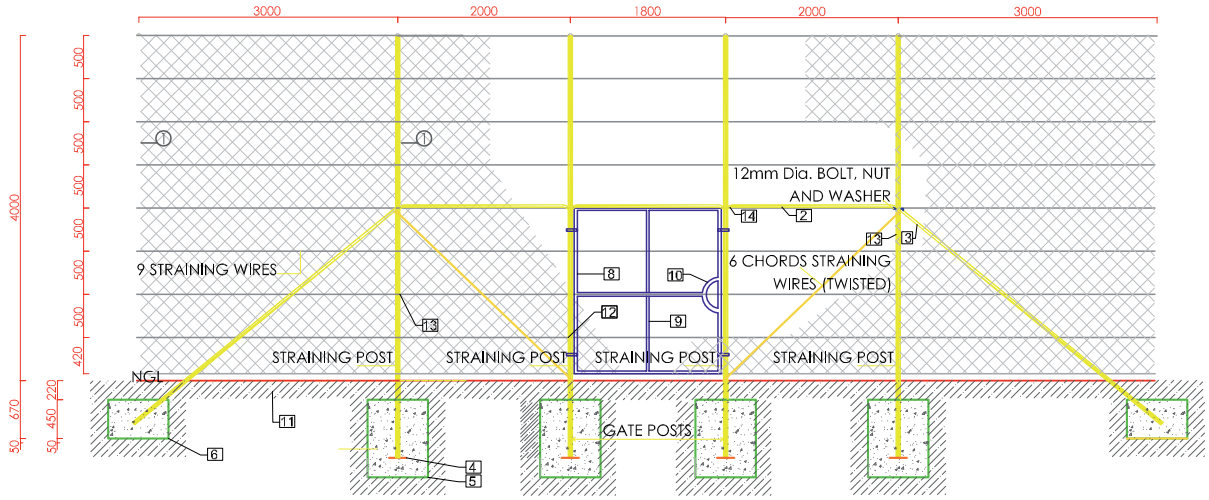
4.5 FENCES

Fences may be needed to protect the sports ground and ancillary works against damage from animals, cars and theft (especially if they are located in a public space), or to prevent the ball from leaving the premises. Fences are additional structures in grassroots sports grounds construction, which can be built if necessary and if the funds are available.

FIGURE 42: FENCE TYPE 1 – BASKETBALL AND MULTIPURPOSE COURT FENCES



FENCING AND CORNER UNIT



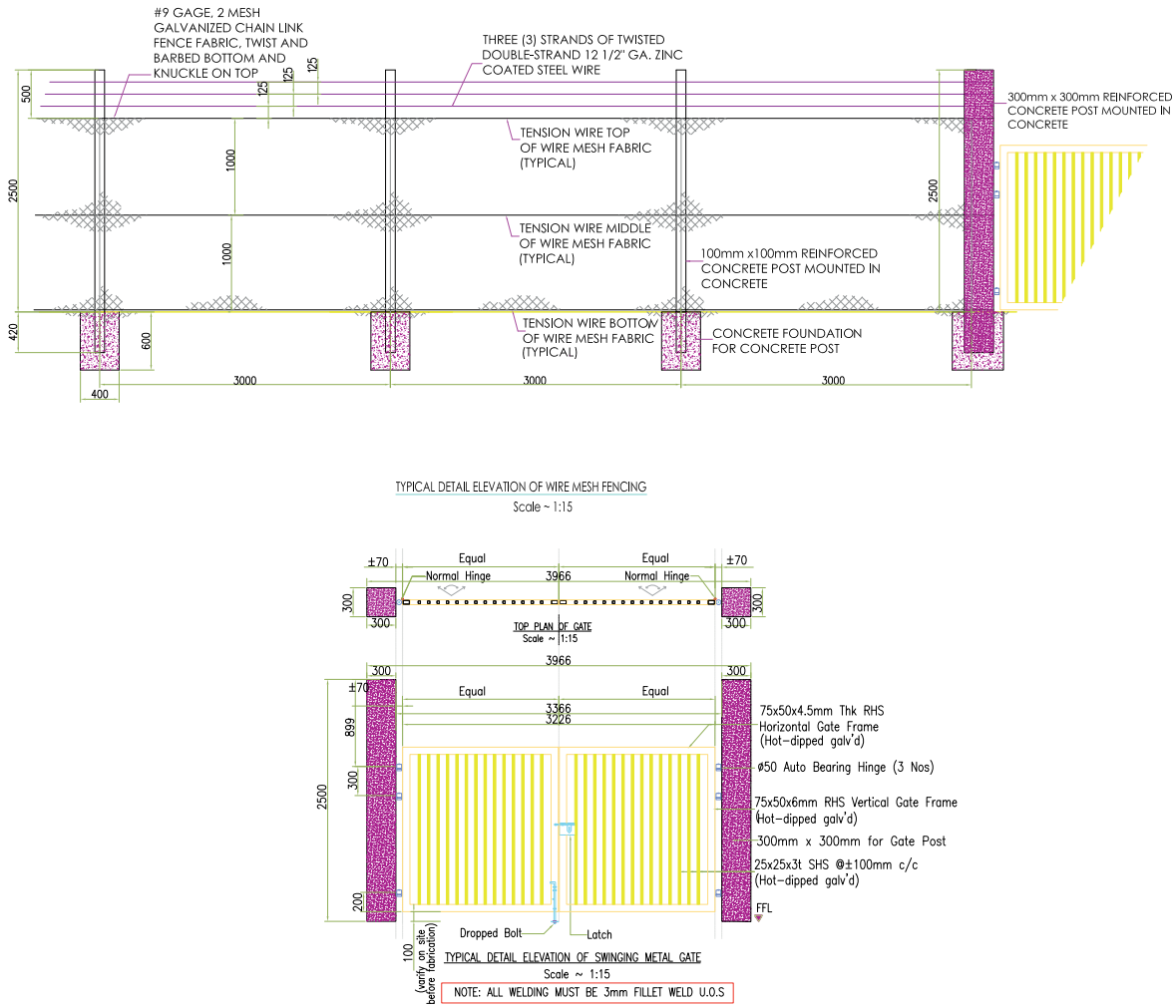
PEDESTRIAN GATE FOR FENCING

NOTE FOR THE PEDESTRIAN GATE:

1. CORNER AND GATE POSTS:76mm OUTSIDE DIAMETER PIPE WTI H 2.0mm WALL THICKNESS AND PRESSED STEEL OR CAST-IRON CAP
2. HORIZONTAL STRUTS:48.5 mm OUTSIDE DIAMETER PIPE WITH 2.0mm WALL THICKNESS FLATTENED AND DRLLED ON BOTH ENDS AS PER DETAIL ON THIS DRAWING
3. STAYS:48.5mm OUTSIDE DIAHETER PPE WITH 2.0mm WALL THICKNESS FLATTENED AND DRILLED ON ONE END AS PER DETAIL
4. FOOTPLATES:200x200x5mm MILD STEEL PLATES WELDED TO PIPES.
5. 600x600x900mm CONCRETE FOOT GS FOR POSTS IN CLASS C25 CONCRETE.
6. 600x600x450mm CONCRETE FOOT GS FOR STAYS IN CLASS C25 CONCRETE
7. DIAMOND MESH: MADE FROM 2.0MM DIAMETER MILD STEEL GALVANIZEO WIRE WITH AN APERTURE SIZE NOT MORE THAN 50x50mm, AND TIED TO STRAINING WIRES AT 500mm CENTRES BY USING STANDARO 1.6mm DIAMETER TYING WIRE.
8. FRAME:48mm OUTSIDE DIAMETER PIPE WITH 2.0mm WALL THICKNES UNLESS OTHERWISE SPECIFIED IN THE PROJECT SPECIFICATIONS
9. BRACING: 4Bmm OUTSIDE DIAMETER PIPE WITH 2.0mm WALL THICKNESS UNLESS OTHERWISE SPECIFIED IN THE PROJECT SPECIFICATIONS.
10. CLOSING MECHANISIM FOR PEDESTRIAN GATE AS SHOWN ON DRAWING
11. SHORT LENGHTS OF HORIZONTAL FENCING WIRES, SECURELY WRAPPED TWICE AROUND POSTS, TO EXTEND BETWEEN GATE AND STRAINING POSTS. THESE WIRES MUST BE INSTALLED AND TIGHTENED BEFORE STRAINING OF FENCE LINE BEGINS.
12. HORIZONTAL FENCING WRIES TO BE SECURELY WRAPPED TWICE AROUND STRAINING POSTS AND SECURED AGAINST SLIPPING BY TYING THE ENDS TIGHTLY AROUND WRIES BY MEANS OF SIX SNUG-TIGHT TWISTS.
13. 12mm DIAMETER MILD STEEL BOLT, NUT AND WASHER.

Type 1 fence can be used for basketball and multipurpose courts in an area where fencing is mandatory for safety reasons and for blocking bouncing balls.

FIGURE 43: FENCE TYPE 2 – SPORTS GROUND FENCES



Type 2 fence can be used for football fields, handball and netball courts in an area where fencing is mandatory for safety reasons.

Inauguration of a multi-purpose sports ground at the Pedagogic University of Maputo, Mozambique |
© GIZ/Yassmin Forte


UNIVERSIDADE PEDAGÓGICA
FACULDADE DE EDUCAÇÃO FÍSICA E DESPORTO

COMPILATION OF PROJECT DOCUMENTS

The following documents have proven to be valuable for designing and constructing grassroots sports grounds. They facilitate the tendering and contracting process and the successful and efficient completion of the project. The documents are to be prepared based on the respective country situation and local conditions.

- **Preliminary studies and project (site) assessment report:**
  show details, facts and figures of the site under consideration, including property ownership, the soil type, status of the location, environment, information about current or future projects in the vicinity and other relevant aspects.
- **Land ownership documents:**
  before a project starts, make sure that the necessary land ownership titles have been secured, so as to avoid future legal claims and non-legal conflicts.
- **Project description:**
  outlines the proposed sports ground in terms of the volume and scope of the work, its purpose and the various stakeholders who will participate in the project.
- **Design drawings:**
  drawings of architectural and sanitary work are required for the construction of the respective sports ground. Based on the demand, the drawings include:
  - Site plan drawings
  - Floor plan drawings
  - Section drawings
  - Detail drawings
  - Ancillary work drawings
  - Other drawings, outlining various systems:
    sanitary, electrical, or mechanical (not provided in this manual)
- **Bill of quantities:**
  show the description of work and cost estimates.
- **Specifications:**
  detailed description of the required materials.
- **Design approval documents:**
  for approval by internal decision makers and official authorities.

PLEASE NOTE
Project document templates can be provided upon request. See imprint for contact details.

GLOSSARY OF TERMS

Ancillary works:	Ancillary works are for example the installing of goal posts in football fields or backstop units in basketball courts, which constitute a separate category in a work item description.
Asphalt:	A mixture of dark bituminous pitch with sand or gravel, used for surfacing roads, flooring, roofing, etc.
AutoCAD drawings:	Automatically computer aided designed drawings.
Bill of quantities:	A detailed statement of work, prices, dimensions, and other details, for the erection of a sports ground or building or any construction work by contract.
Bulk excavation:	Removal or moving of large quantities of soil or rock from a particular area to another to make an area a suitable height and level for a specific construction purpose.
Compaction works:	The method of mechanically increasing the density of soil and create load bearing surface.
Concrete:	A building material made from a mixture of broken stone or gravel, sand, cement, and water.
Deformation modulus:	The modulus of elasticity of a material that deforms according to Hooke's law.
Drainage ditch:	A structure, which drains and removes excess or storm water from a sports ground.
Drainage system:	A network of drains to remove excess water from a sports ground.
Fertiliser:	A chemical or natural substance added to soil or land to increase its fertility.
Grass:	Any of various plants having slender leaves characteristic of the grass family.
Gravel:	Rock fragments or small pebbles typically 2–10 mm in diameter.
Irrigation:	The controlled application of water to turf.
Line marker:	Machine for marking lines on a sports ground.
Maintenance:	The periodically scheduled work required preserving and maintaining a facility. Specifically, maintenance is the management of various sports grounds, drainage and mechanical equipment.

Masonry ditch:	A drainage ditch type made from laying of multiple brick, concrete block, or stone one on top of other in beds of mortar to transport storm water.
Mower:	A grass-cutting machine.
Perforated pipe:	A pipe that is designed to allow water to enter or exit through small holes or slots along the pipe length.
Pesticide:	Any substance or mixture of substances intended for preventing or controlling any unwanted species of plants and animals and which includes any substances intended for use as a plant growth regulator, defoliant or desiccant, including fungicides, herbicides and nematicides.
Precast concrete:	A product produced by casting concrete in a reusable formwork, which is then casted in a controlled environment, transported to the construction site, lifted into place and build accordingly.
Rehabilitation:	The action of restoring a sports ground that has been damaged to its former condition.
Repair:	Short time and urgent activity to ensure the functionality of the sports ground and it also forms part of maintenance schedule.
Sand:	Granular mineral materials ranging from 0.05 mm to 2 mm in diameter, regularly used on pitches because of their good drainage and other physical properties.
Seasonal levelling:	Levelling of damaged sports ground surfaces after a sport tournament occasion or climatic season.
Side drainage:	A structure build around a sports ground to drain or remove excess or storm water from the surface.
Standard Design:	To design items with generally accepted and uniform procedures, dimensions or materials.
Stone drainage ditch:	A drainage ditch type made from laying of one-layer stone in beds of mortar to transport storm water.
Turf:	(1) The grass-covered surface of the ground growing within the upper soil layer. (2) Strips of turf grasses usually with adhering soil used in vegetative planting (also called sod in some countries).

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NOTES