



DWARKA FOOTBALL STADIUM

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V YEAR, B.ARCH.

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DECLARATION

I, **Christin K. M. Mathew**, here by solemnly declare that the thesis work undertaken by me, titled **DWARKA FOOTBALL STADIUM** is my original work and whatever information I have incorporated in the form of photographs, text, data, maps, drawings, etc., from different sources, has been duly acknowledged in my report.

Date: 18.07.2022

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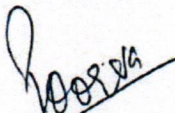
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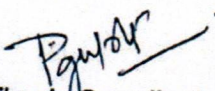
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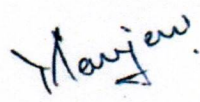
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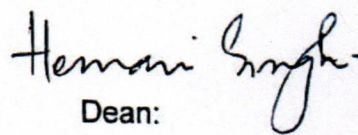

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Abstract

As India's economy is growing at a rapid speed we need to capitalise on the sports aspect of the economy by creating school centres and stadiums so that more travelling related to sports will increase. India is slowly increasing our literacy rate but for the students who are not good at studying and are interested in sports, they have not such facilities to pursue forward if they are from under privilege household. We need to help and support the next generation by creating facilities where they can improve the skills in aspects of sports. To achieve such a goal we need to encourage people not only interested in undertaken sport to represent India but also to the common people of the country who live the life day by day working in an office about the advantages of exercise and how it helps our mind and body for the daily activities. To design a place like this we need to study about many things which includes for basic facilities we need to create a housing facility which would be undergarments control where the individual doesn't profit on this real estate, we need to understand the orientation of different sports and the sizes of the number of sports we are providing in this side. Planning the aspect according to the requirements given by the government as well as to improve the state of the people living around the place we have to consider the basics site aspects and need a thoro understanding of the building lows of the place. Three main buildings in the site was the stadium which was a landmark of the site required to be permissible from all the nodes, the next facility was an indoor sports centre which contains gymnastics, shooting, swimming, squash, badminton, etc. The housing facility was the third building block to be created.

Thesis Introduction

Chapter 1

Introduction





There aren't many champions in a nation with over a billion citizens. Many good athletes go unnoticed. A lot of them go unnoticed while being deserving of it. Sports as a career is yet uncharted area in India, where the sporting culture is quite poor.


Do we consider "sports" to be a job when we think of it as a past time, a way to relax, or a way to stay fit? Only one person out of ten is thought to choose athletics as a career. When asked why, the obvious response we receive is that there is no scope. We may appreciate why playing sports is seen as a recreational pastime only appropriate for high school or college students, and that no one plays sports professionally.

Despite having a large population, India always finishes last in the Olympic medal count. Due to inadequate funding, athletes' hopes of representing India with gold in the Olympics remain unfulfilled. India continues to lack quality coaches, enough facilities, and other helpful government programmes, which prevents it from taking home gold.

The Indian Constitution classifies sports as a state topic. In India, the state government distributes funds for the growth of sports and sports infrastructure in accordance with the property. There is no particular strategy used in creating sports infrastructure across the nation. Another significant problem is the lack of land available for the construction of sports facilities. Furthermore, little effort has been made to date to promote sports infrastructure by using a PPP model to guarantee the adequacy of these facilities. India travels to Asia to see how sports businesses might profit from the region's infrastructure.

Sports programmes are frequently used as tools for crime prevention, according to a research. Only thirteen of the 24 papers that qualified for our systematic review and meta-analysis integration were actually used. We discovered a modest impact of sports programme participation on outcomes related to criminality. Participants demonstrated a statistically significant reduction in behaviours like aggression or antisocial conduct. We also looked at psychological outcomes, such as self-esteem or mental health, which were both considerably enhanced by sports participation.

India at the Olympics				
				
				
IOC code	IND			
NOC	Indian Olympic Association			
Website	olympic.ind.in 			
Medals	Gold	Silver	Bronze	Total
Ranked	10	9	16	35
58th				
Summer appearances				
1900 • 1904–1912 • 1920 • 1924 • 1928 • 1932 • 1936 • 1948 • 1952 • 1956 • 1960 • 1964 • 1968 • 1972 • 1976 • 1980 • 1984 • 1988 • 1992 • 1996 • 2000 • 2004 • 2008 • 2012 • 2016 • 2020				
Winter appearances				
1964 • 1968 • 1972–1984 • 1988 • 1992 • 1994 • 1998 • 2002 • 2006 • 2010 • 2014 • 2018 • 2022				
Other related appearances				
 Independent Olympic Participants (2014)				

India at the Asian Games				
				
IOC code	IND			
NOC	Indian Olympic Association			
Medals	Gold	Silver	Bronze	Total
Ranked 5th	155	201	316	672
Summer appearances				
1951 • 1954 • 1958 • 1962 • 1966 • 1970 • 1974 • 1978 • 1982 • 1986 • 1990 • 1994 • 1998 • 2002 • 2006 • 2010 • 2014 • 2018				
Winter appearances				
1986 • 1990 • 1996 • 1999 • 2003 • 2007 • 2011 • 2017				

India at the Commonwealth Games				
				
CGF code	IND			
CGA	Indian Olympic Association			
Website	olympic.ind.in			
Officials	708			
Medals	Gold	Silver	Bronze	Total
Ranked 4th	181	173	149	503
Commonwealth Games appearances (overview)				
1934 • 1938 • 1950 • 1954 • 1958 • 1962 • 1966 • 1970 • 1974 • 1978 • 1982 • 1986 • 1990 • 1994 • 1998 • 2002 • 2006 • 2010 • 2014 • 2018 • 2022				

Indian representation in international sports events

Image Source: Wikipedia

INDIA'S BEST EVER MEDAL TALLY



India's six-year Olympic medal track record

Image Source: India Today Group

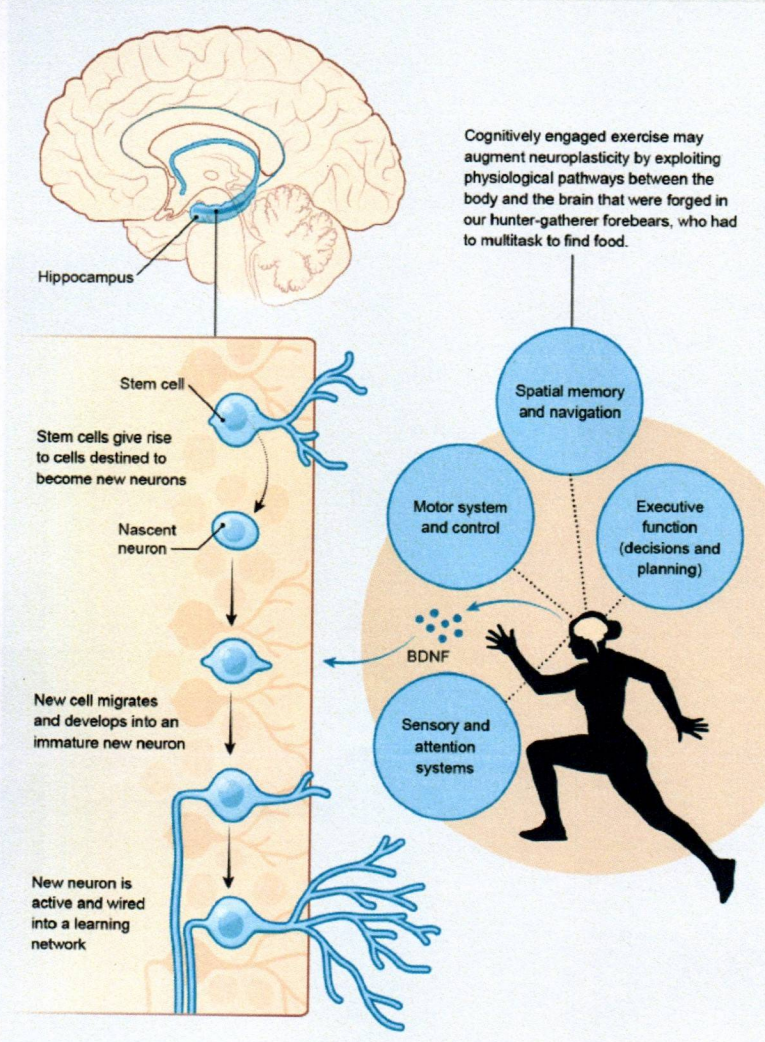
Sporting Culture

India has a very strong culture of sports, as seen by the creation of our own martial arts (Kalaripayattu, Silambam, Varma Kalai, etc.) and gymnastics (Mallakhamb). In addition to improvements in physical and mental health, Ayurveda and yoga asana have also been established in India. But shortly after achieving freedom, we departed from our origins. Even though at the time the world was heading towards globalisation and individuals with intellectual curiosity and a desire to discover new things were more in demand, sports were delegated to the underclass rather than required for everyone to have healthy lives.

There been research done on neuro activities of an active person and sedentary person and it showed that the brain connecting receptors work faster and efficiently of a person who is active while solving complex problem. Sports is not just for the people who are actively pursuing for international events but also for people who work in offices to perform the activities efficiently.

New Neurons in Aging Brains

Exercise leads to beneficial changes in the adult brain, including the birth of new neurons and increased connections among existing neurons. One of the ways in which physical activity seems to induce this neuroplasticity is by increasing production of a protein called brain-derived neurotrophic factor (BDNF), which promotes neuron growth and survival. Recent research suggests that cognitively engaging the brain during physical activity enhances this process.



Why Your Brain Needs Exercise

Image Source: Tami Tolpa

Economical Aspects

There is a barrier between sports and the prevailing economic standard of the populace, according to research into the cultural aspects of sports. It raised the question of why the government should invest more money in sporting events given that our economy is still in development and that there are still many individuals in our nation who are less fortunate. In order to lower the crime rate in the cities and to give people a place where they may express themselves freely, architects in another Brazilian economy built a cultural and sports complex. Not all people are created equally; an intellectual may excel in sports but struggle academically, while a person who excels in sports may struggle academically. As a result, we must give places like schools or places where people may improve their skills in order to advance economically.

To gather and hone the skills in individual sports, we need to build the infrastructure where they can compete, analyse how well they are, and learn how to develop. By understanding Maslow's Hierarchy of Needs, we can give the kids who are talented in sports from different states the chance to come to one area to perform and improve while giving them access to all of their basic needs and the best facilities the nation has to offer so that they might be able to compete in.



Basic in Maslows Hierarchy of Needs

Image Source: Simple Psychology

Aim

The aim to create iconic stadium which becomes an anchor for the sports facility and the residential building around it.

Objective

1. Iconic creative stadium
2. Create indoor sports facility
3. Create a housing facility
4. Interactive spaces between the buildings
5. Structural aspects of the stadium
6. Visual aspects inside the stadium

Scope and Limitations

Scope

The scope of the project is to achieve a space where, people from all aspects of our country sponsored by the government improve their skills and potentially represent India in an International level and win those events. Thus, increasing India's rank in International sports events.

Limitation

Due to the span of the project and the detailing importance inside the project and to achieve all the basic aspects of buildings with different typology is difficult with the time duration which is provided in a semester.

A lot of aspects discussed in the thesis will not be able to brought into detail.

Background Research

Chapter 2

Background Research

Area of Research

1. Basic needs of the sport personal from different states

Orientation of all the outdoor quotes and facilities with respect to the sun angles and spectative preference.

2. Orientation of outdoor sports

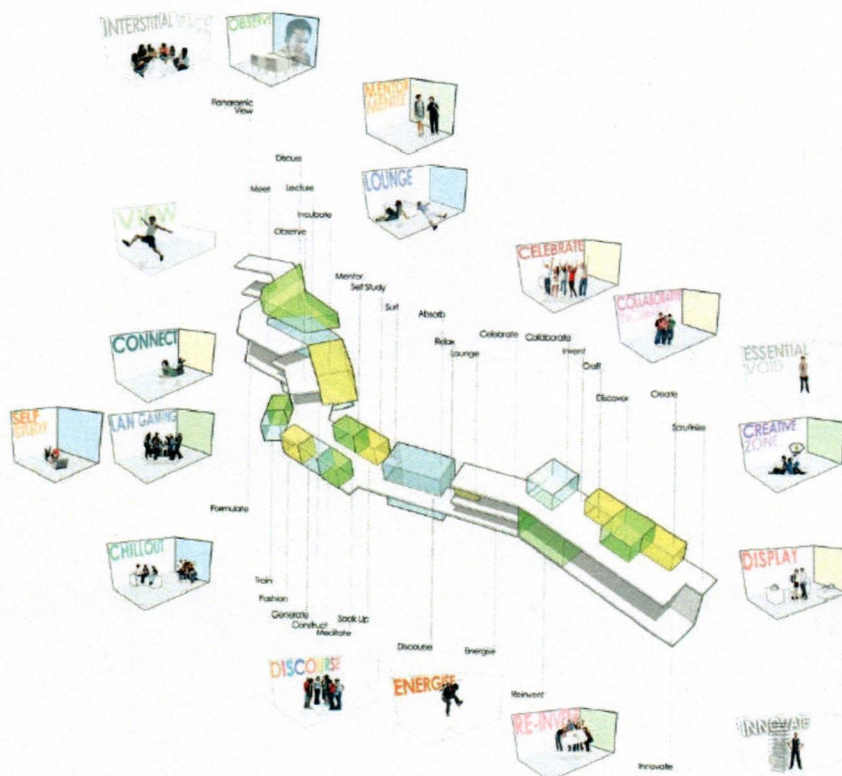
Coat and seal dimensions for all the sports facility involved in the Olympic events.

3. Sports specification

Basic requirement such as housing energy water and sanitary requirements to be analysed with cohesion to the sports facility and understand base how the facility cannot be missus by private individuals.

Basic needs of the sport personal from different states

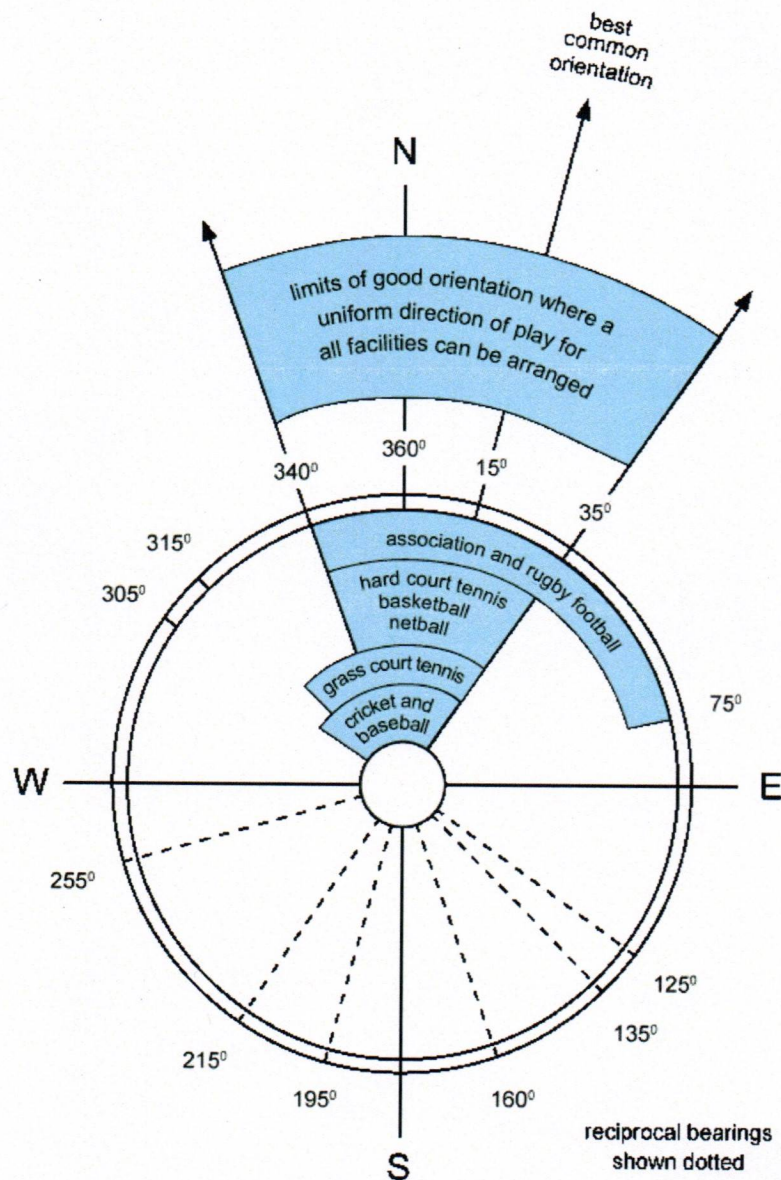
We must maintain it as a component of the sports facility in order to give amenities to the sporting personnel while preventing anyone from profiting from it. It would resemble a studio apartment in some ways, and the building should have a caretaker to look after it when it is not in use, keeping the drilling unit in great shape and ensuring that it has all it needs to survive in the state where it is migrating. In the building itself, there would be common areas that would resemble a classroom, and we should give spaces for them to engage in those areas. The structure should be long-lasting enough to ensure that the residents' economic standing is unaffected. Housing should be affordable and available to everyone who has relocated from their home states to further their education.



Features to be in the housing facility other than the basics

Image Source: Archdaily

Orientation of Outdoor Sports



Oreantation of Outdoor Sports

Image Source: DLGSW

Limits of excellent orientation If it is possible to organise all amenities in a single direction: sports including tennis, basketball, bowling, croquet, handball, lacrosse, and netball between 20° west and 35° east of the equator

soccer, five-a-side, Australian rules, Gaelic, rugby league, and rugby union are all forms of football that are played between 20° west of north and 45° east of north.

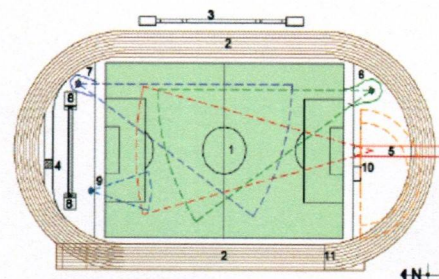
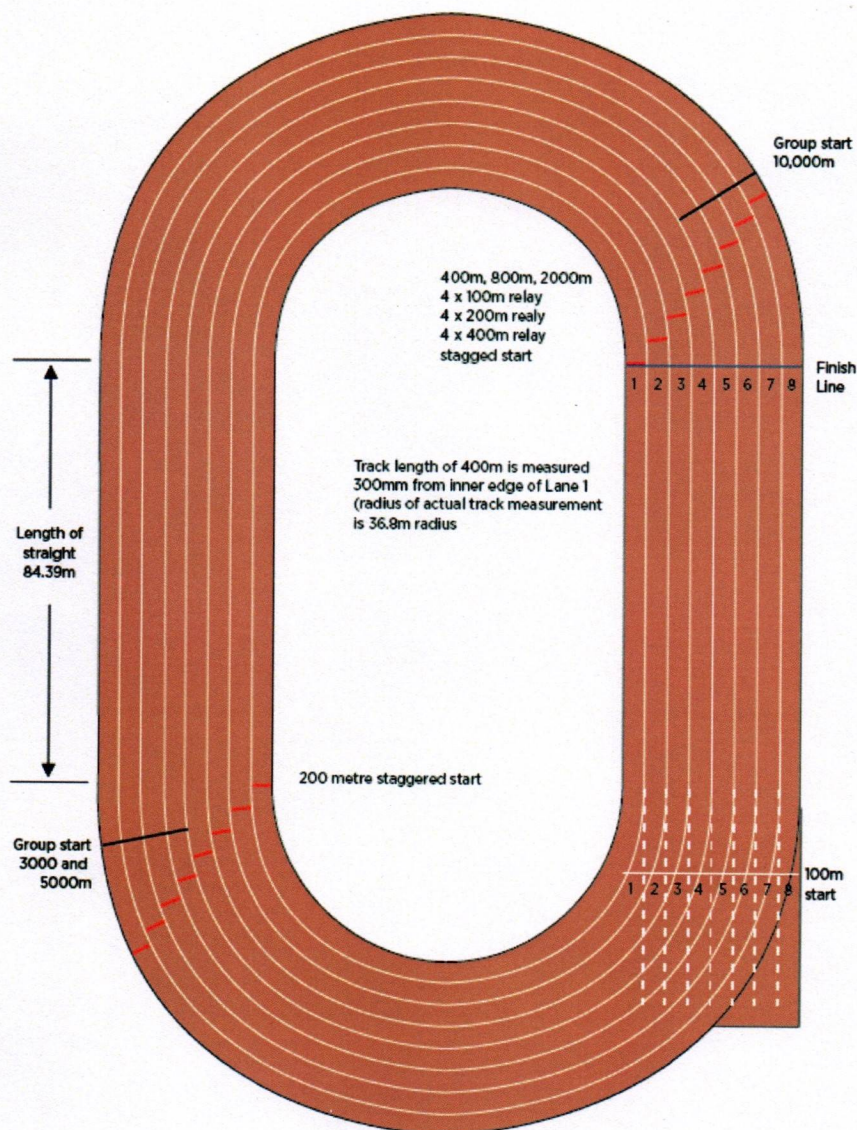
between 45° west of north and 45° east of north, hockey, polo, and polocrosse are played.

between 45° west of north and 35° east of north, play baseball, cricket, or softball.

Additionally, one must take into consideration prevailing winds. Strong winds have the ability to cause more issues in athletics than the irritation brought on by the setting sun. It should not be necessary for athletes to deal with severe gusts as they reach the finish line. Pole vaulters shouldn't be subjected to severe headwinds or crosswinds. Throwing the discus into a headwind works best.

Sports Specification

ATHLETICS



1. Football pitch
2. Standard track
3. Long and Triple jump
4. Water jump
5. Javelin
6. Hammer
7. Discuss
8. Pole vault
9. Shot put
10. High jump
11. Finish line
12. High jump

Basic of a 8 Lain Track

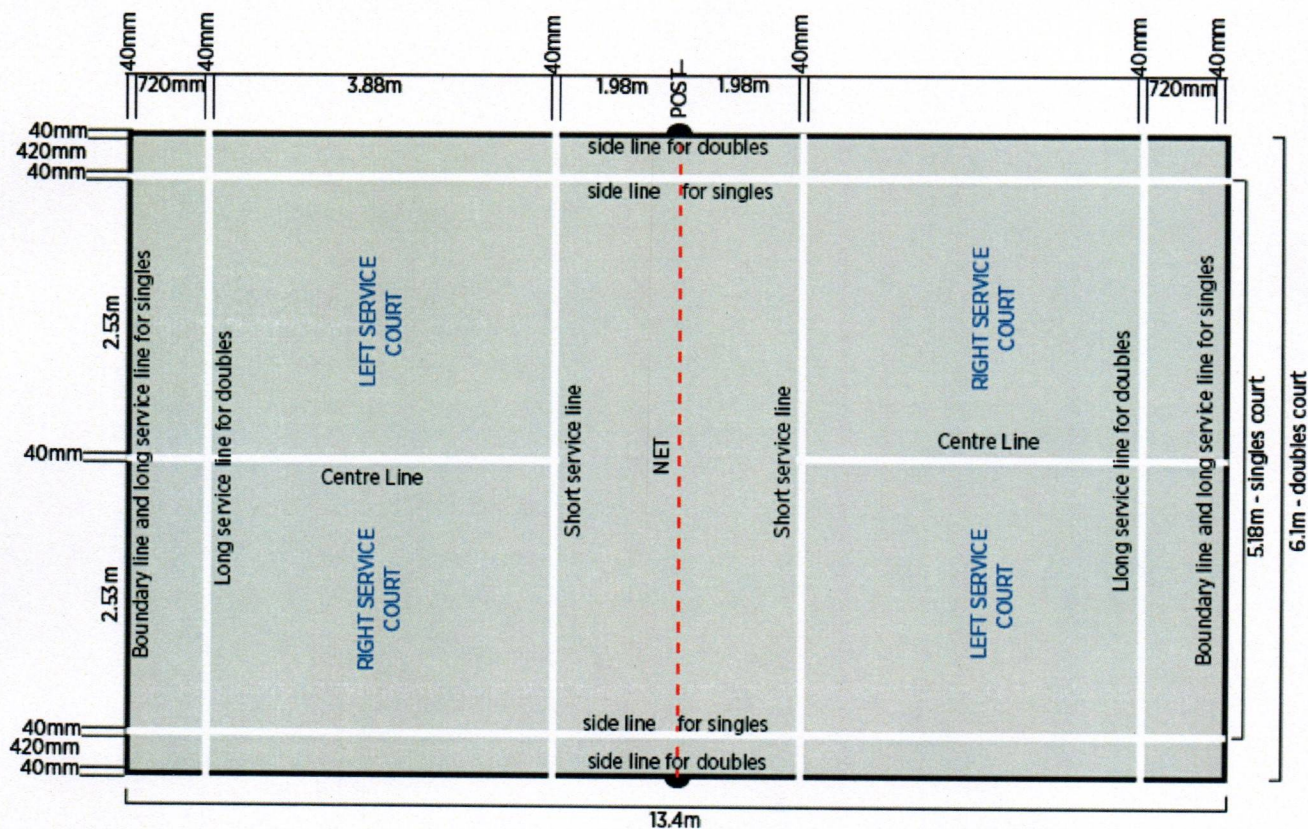
Image Source: DLGSW

Track events include sprint, middle distance, hurdle and steeplechase events. The 400m oval track forms the basis of a multi-sports arena and its dimensions are dependent on the requirements of other sports.

The competition area for track events includes the following:

Oval track with at least four lanes and safety zones measuring no less than 1m on the inside and outside. Straight with minimum of six lanes for sprints and hurdles. Steeplechase track as for oval track with a permanent water jump. There are three basic types of track surface synthetic, unbound mineral (cinder) and grass.

BADMINTON



Badminton court

Image Source: DLGSW

Dimensions:

The badminton court is 13.4m long and 6.1m wide. For singles the court is marked 5.18m wide. The lines marking out the court are easily distinguishable and coloured white or yellow. The lines are 40mm wide.

A court may be marked out for singles only. The back boundary lines also become the long service lines and the posts or the strips of material representing them are placed on the side lines. The diagonal full length of the full court is 14.366m.

Posts:

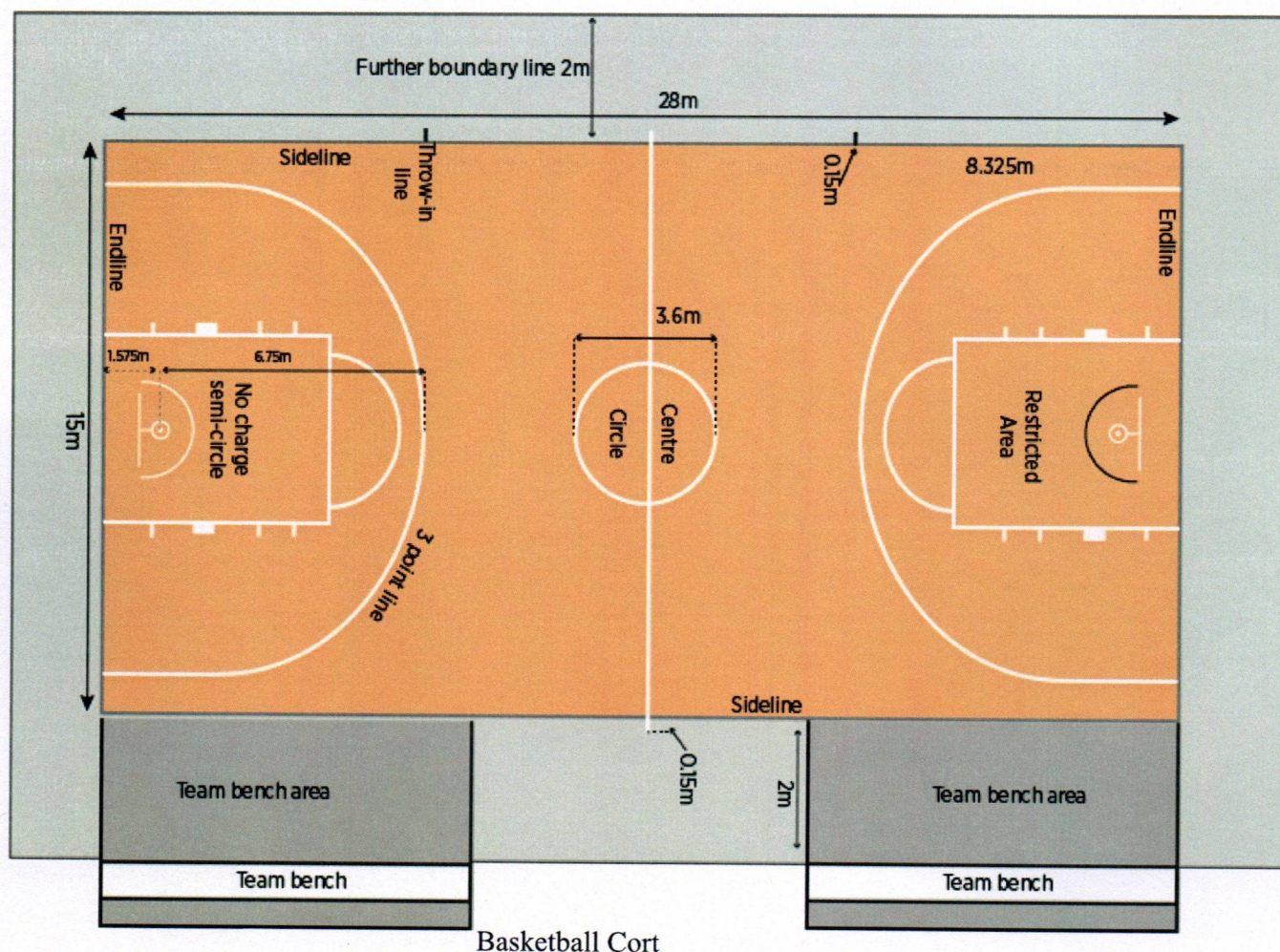
The posts are 1.55m high from the surface of the court and remain vertical when the net is strained. The posts are placed on the double side lines irrespective of whether singles or doubles is played. The posts or supports must not extend into the court beyond the side lines.

Net:

The net is 760mm in depth and a minimum of 6.1m wide. The top of the net from the surface of the court is 1.524m at the centre of the court and 1.55m over the side lines for doubles.

There must be no gaps between the ends of the net and the posts. If necessary, the full depth of the net at the ends is tied to the posts.

BASKETBALL



Basketball Court

Image Source: DLGSW

Dimensions:

The court is a flat, hard surface free from obstructions, 28m long and 15m wide, measured from the inner edge of the boundary line.

The backcourt is the team's own basket, inbounds part of the backboard and the part of the playing court limited by their own endline, side lines and centre line.

The front court consists of the opponents' basket, inbounds part of the backboard and the part of the playing court limited by the endlines behind the opponents' basket, side lines and inner edge of the centre line nearest to the opponents' basket.

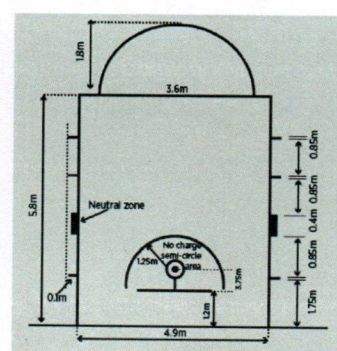
Lines:

All lines are white, 5cm wide and clearly visible.

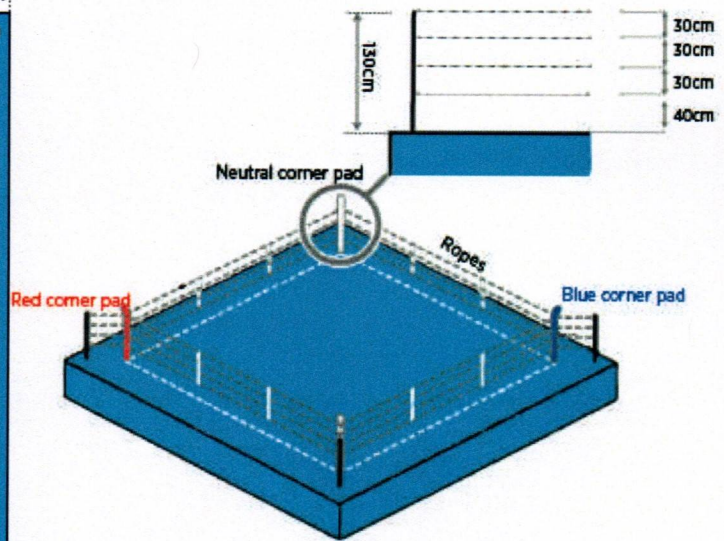
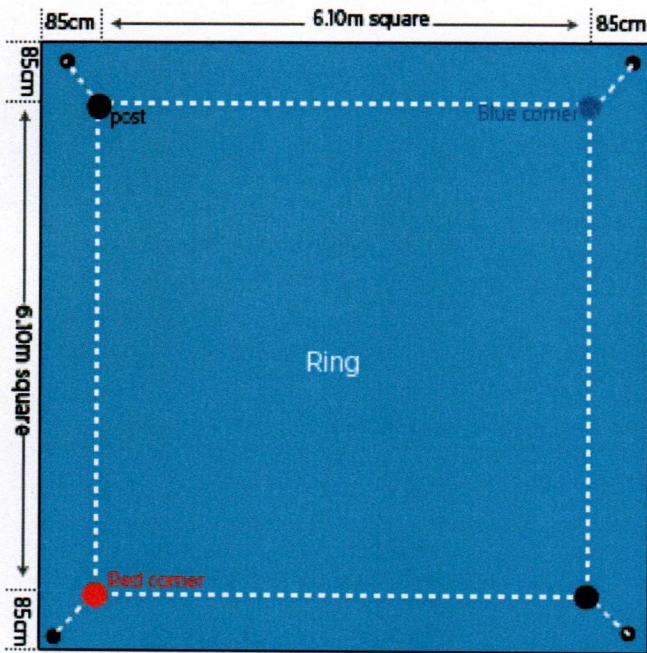
Spectators:

All spectators must be seated at a distance of at least 5m from the outer edge of the boundary line of the playing court.

The International Basketball Federation (FIBA) is the international governing body for basketball. FIBA has introduced 3x3 as an official basketball discipline to increase grassroots participation in basketball.



BOXING



Boxing Ring

Image Source: DLGSW

Boxing

Boxing is a sport in which two participants of similar weight fight each other with fists in gloves in a series of one to three minute intervals called rounds. The bout takes place in a roped area called a ring.

Boxing India is governed by the International Boxing Association (AIBA) Technical and Competition rules.

Ring and canvas size:

For all AIBA Competitions, the ring is 6.10m square inside the line of the ropes. The size of the apron extends 85cm outside the line of the ropes on each side, including additional canvas necessary to tighten and secure it. The height of the ring is 100cm from the ground.

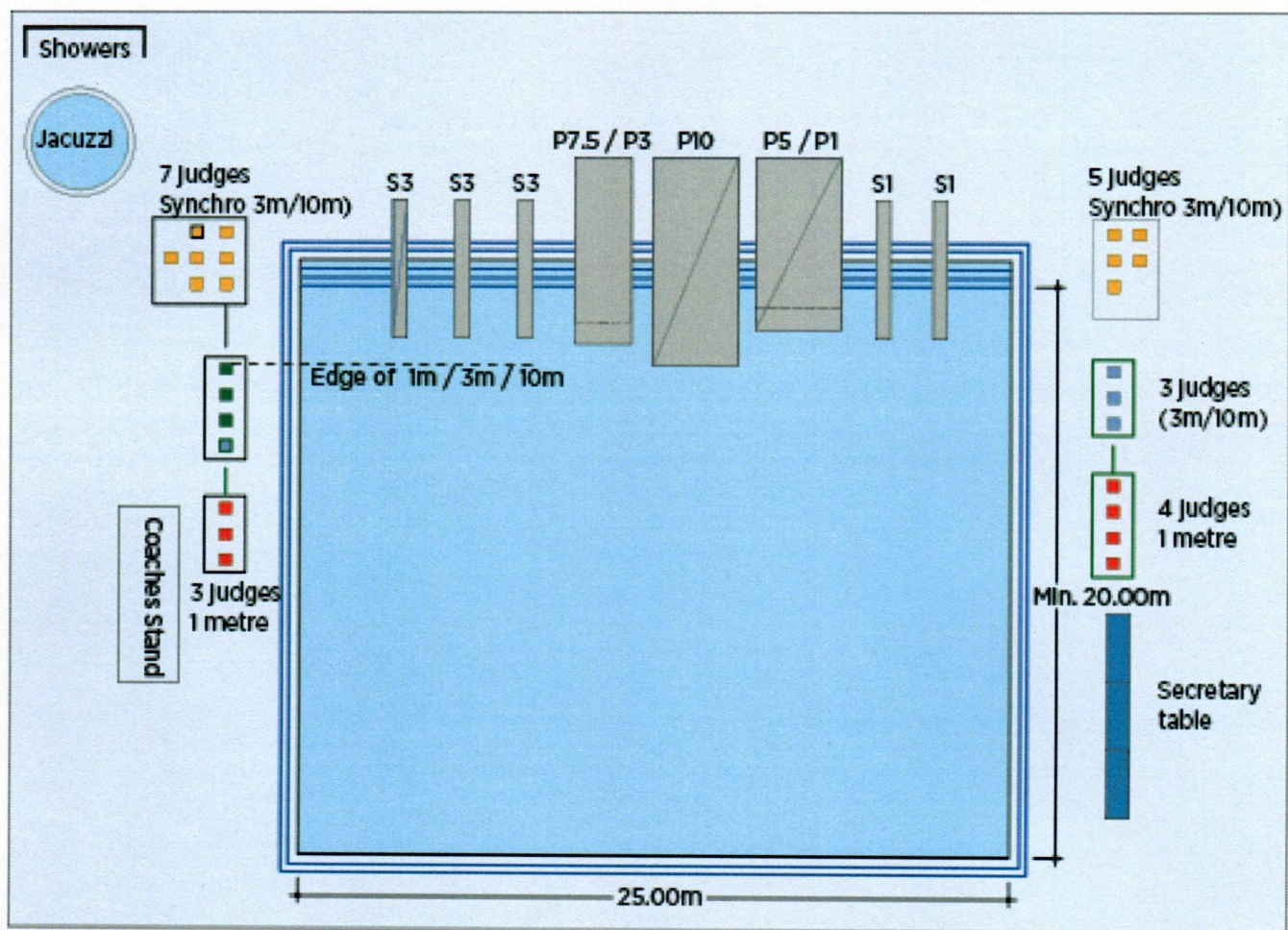
Platform and corner pads:

The platform is 7.80m squared, level and free from any obstructing projection. It is fitted with four corner posts with 4 corner pads to prevent injury to the boxers.

Corner pads are arranged as follows:

- In the near left side corner - red.
- In the far left side corner white.
- In the far right side corner-blue.
- In the near

DIVING



Diving Pool

Image Source: DLGSW

Diving installations are located either indoor or outdoor in aquatic facilities and are generally separated from the swimming area.

The minimum size for a diving pool is 25m wide and 20m long. The overall dimensions can be increased to suit other activities such as synchronised swimming and water polo.

A competition pool is equipped with two 1m and two 3m springboards and a diving tower with take-off platforms at 5m, 7.5m and 10m. Platforms also exist at 1m and 3m heights as training tools.

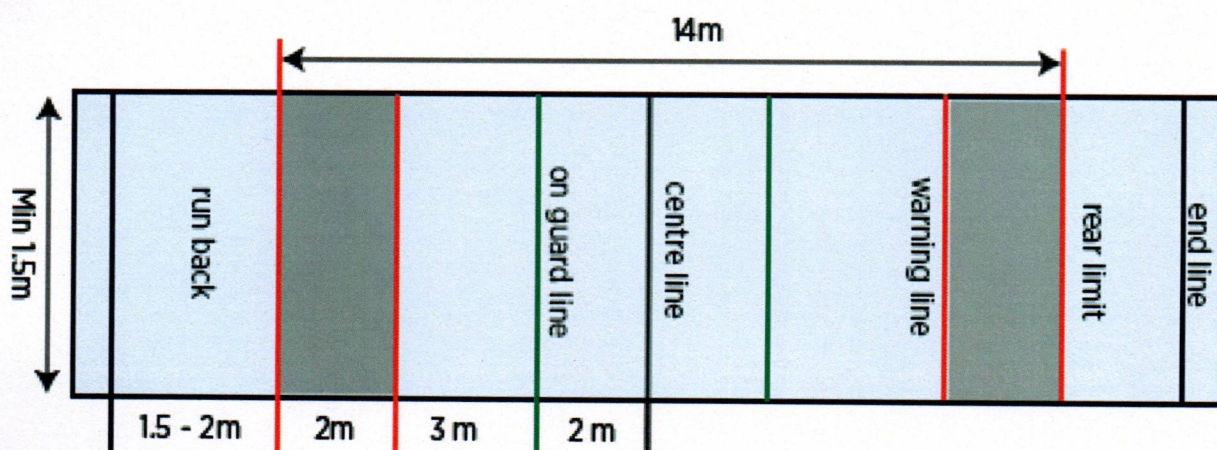
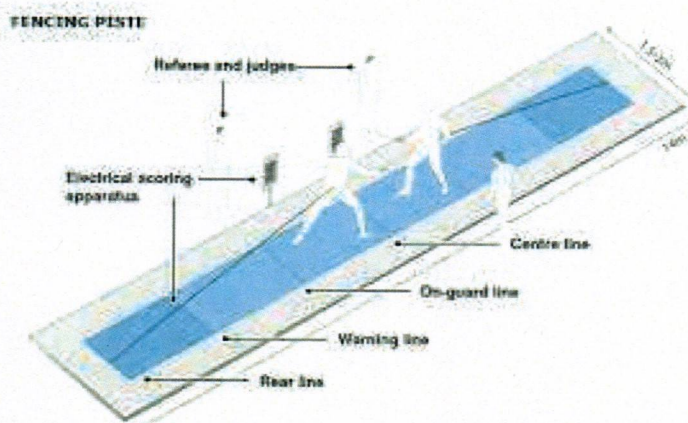
The water temperature is a minimum of 26° Celsius. The colour of the walls are white or pale blue.

A bubbler is installed on the pool floor to provide a compressed air cushion of bubbles to protect divers from injury.

In the diving pool the water depth is a minimum of 1.8m at any point.

In outdoor pools, it is recommended that spring boards and platforms are to face north in the northern hemisphere and south in the southern hemisphere.

FENCING



Fencing Piste

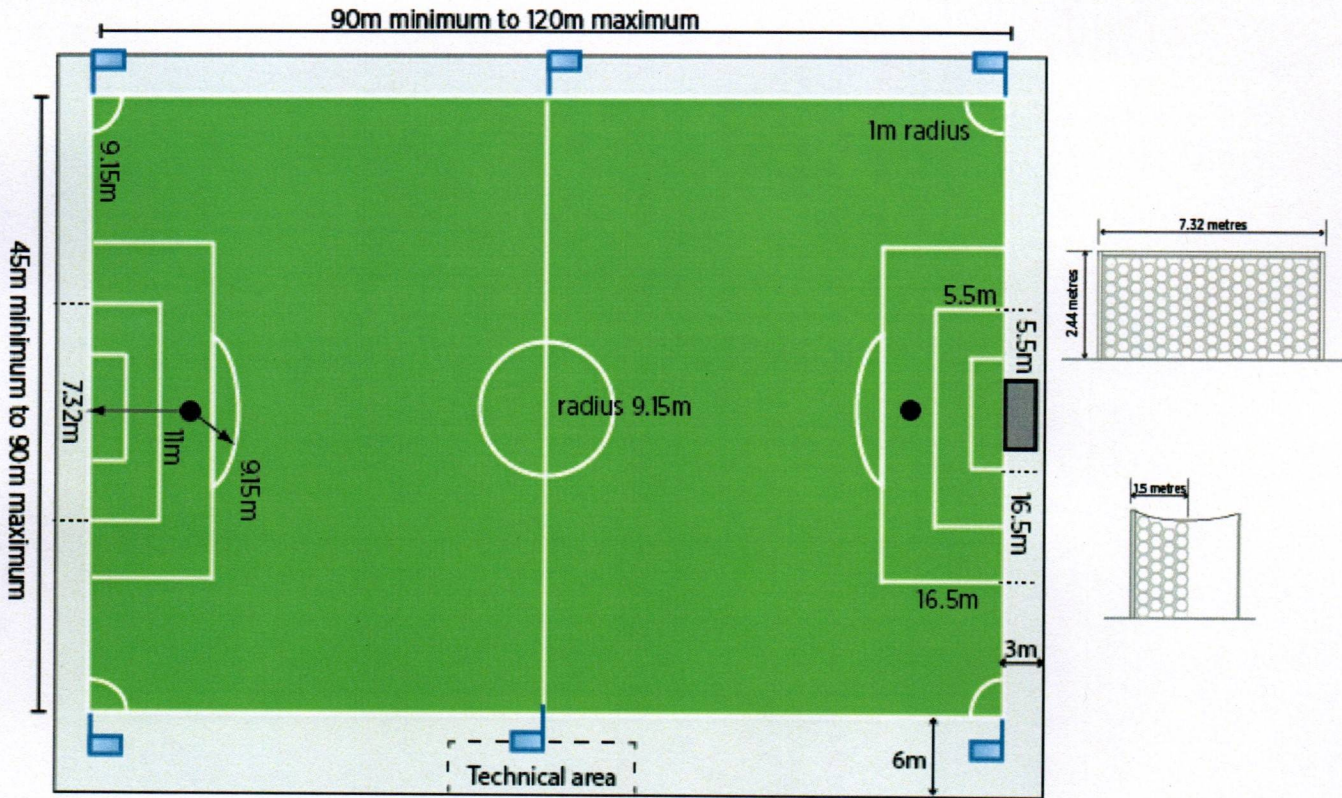
Image Source: DLGSW

The field of play has an even surface. The portion of the field of play used for fencing is called the piste. The piste is from 1.5m to 2m wide and 14m long. Five lines are drawn very clearly on the piste at right angles to its length, as follows:

- One centre line which is drawn as a broken line across the whole width of the piste.
- Two on-guard lines at 2m on each side of the centre line. These are drawn across the whole width of the piste.
- Two lines at the rear limits of the piste, which are drawn across the whole width of the piste, at a distance of 7m from the centre line.

The last 2m of the piste before the rear limit lines are clearly distinguished by a different colour of the piste, to make it easy for the fencers to be ware of their position on the piste.

FOOTBALL



Football Field

Image Source: DLGSW

Field surface:

Matches may be played on natural or artificial surfaces, according to the rules of the competition. The colour of artificial surfaces is green.

Field markings:

The field of play is rectangular and marked with lines called boundary lines. The two longer boundary lines are touch lines and the two shorter lines are goal lines. It is divided into two halves by a halfway line, which joins the midpoints of the two touch lines.

The centre mark is at the midpoint of the halfway line. A circle with a radius of 9.15m is marked around it.

Marks are made off the field of play, 9.15m from the corner arc and at right angles to the goal lines and the touch lines, to ensure defending players retreat this distance when a corner kick is taken.

The length of the touch line is greater than the length of the goal line.

All lines are not more than 12cm wide.

Length (touch line):

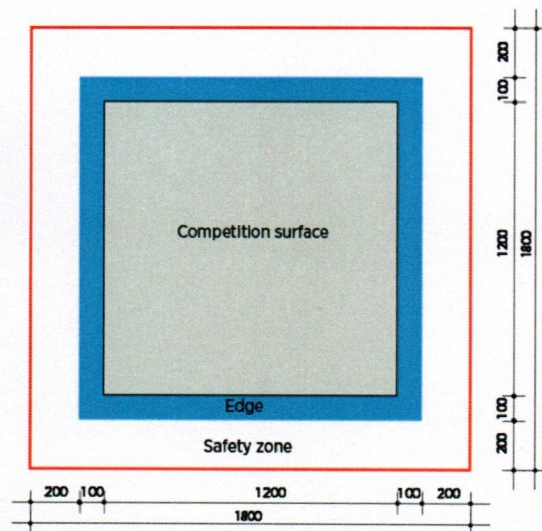
Minimum 90m, maximum 120m

Width (goal line):

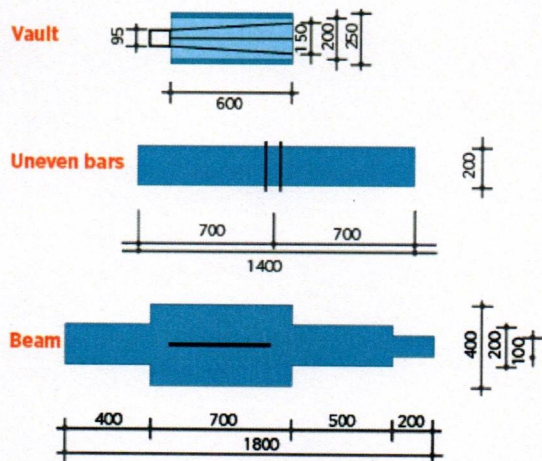
Minimum 45m maximum 90m.

For senior football the recommended field dimension is 105m long and 68m wide.

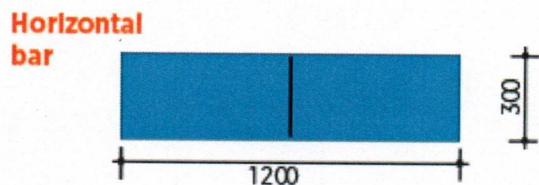
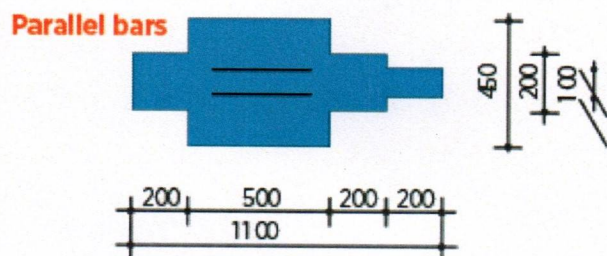
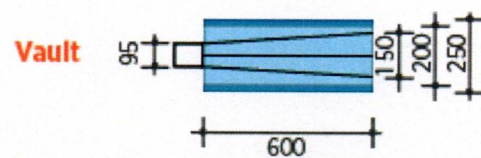
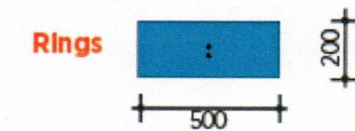
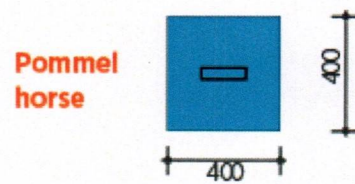
GYMNASTICS



Competition area for artistic gymnastics



Women's artistic gymnastics floor layout



Men's artistic gymnastics floor layout

Image Source: DLGSW

Rhythmic includes five apparatus: rope, hoop, ball, clubs and ribbon. However, only four of these are used in a two year competition cycle.

The performance area is slightly larger than artistic gymnastics, a 13m x 13m square. The surface is horizontal, even and without gaps.

The border is horizontal, even and at the same height as the performance area. It is 50cm in area.

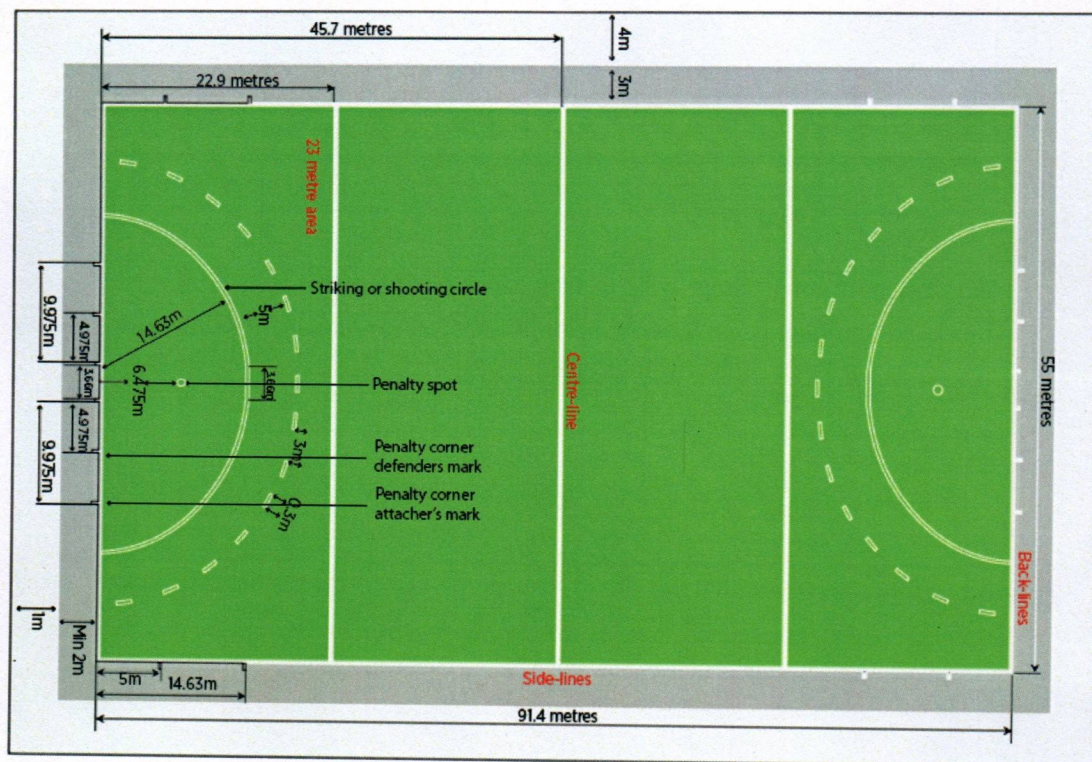
The safety zone is kept totally free as a surrounding zone around the performance area and the border. It is horizontal, even and without gaps. The safety zone is 200cm.

Aerobic Gymnastics requires the ability to perform continuous complex and high intensity movement patterns to music, which originates from traditional aerobic. Aerobic gymnasts can compete in following classes:

- Individual Men's, Individual Women's, Mixed Pairs, Trio, Group (of 5 gymnasts),
- Aerobic Step (8 gymnasts)
- Aerobic Dance (8 gymnasts)

The performance area for single events is 7m x 7m and the performance area for duo, trio and groups is 10m x 10m. The competition area is surrounded by a black delimitation strip.

HOCKEY



Hockey Field

Image Source: DLGSW

All forms of hockey are governed by the rules of hockey as set down by the International Hockey Federation (FHI).

Field of play:

Pitch boundary:

The pitch on which field hockey is played is 91.4m long and 55m wide. This boundary is marked on the turf and the shorter lines are called backlines.

Penalty spot:

From the center of the baseline, this point is marked 6.475m towards the inside of the pitch with a width 0.2m.

Goal area:

Goal Post:

Each goal post is 2.14m high and 0.05m wide. The goals posts are white.

Goal:

Each post is placed 1.83m away from the center of the backline, one on either side, with a depth of 1.2m. This makes the total goal width 3.66m.

Run-off

The playing surface extends at least 2m at the backlines and one metre at the side lines with an additional unobstructed one metre. This equates to a total of 3m at each end and 2m at each of the sides of the field. These are minimum requirements with the recommended areas being 5m at each end and 3m at each side of the field.

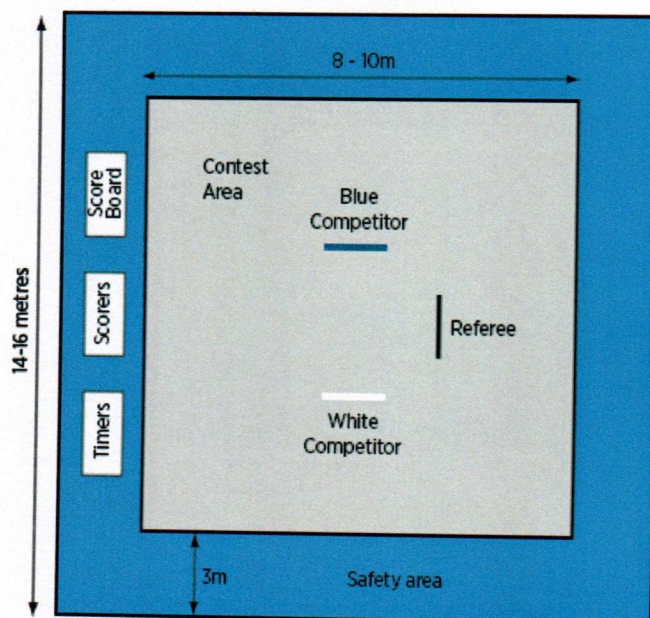
JUDO

The competition area is a minimum of 14m x 14m and is divided into two zones.

The inner zone called the contest area is a minimum of 8m x 8m to a maximum of 10m x 10m. The outer zone is the safety area and is a minimum of 3m wide.

The contest area is a different colour to the safety area.

When using two or more adjoining competition areas, the common or shared safety area is 4m. A free zone, a minimum of 50cm, must be maintained around the entire competition area.



Judo competition area

Image Source: DLGSW

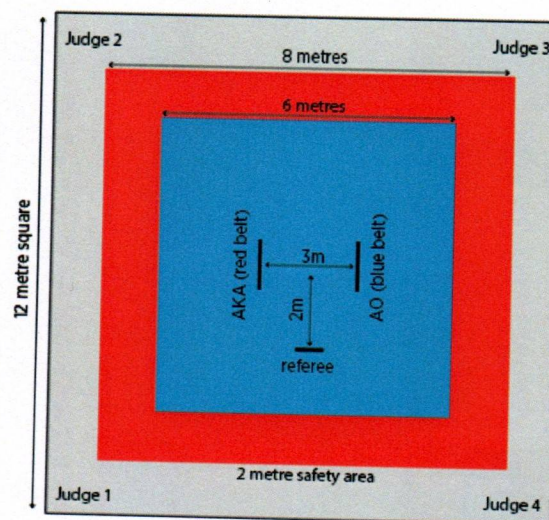
KARATE

WKF karate competition has two disciplines: spar ring (kumite) and forms (kata). Both competition areas are flat and devoid of hazards. Competitors may enter either as individuals or as part of a team.

Kumite competition area:

The competition area is an 8m square with an additional 2m on all sides as a safety area. A line half a metre long must be drawn 2m from the centre of the competition area for positioning the Referee.

Two parallel lines each one metre long and at right angles to the Referee's line, are drawn at a distance of 1.5m from the centre of the competition area for positioning the competitors. Each judge is seated at the corners on the mat in the safety area.



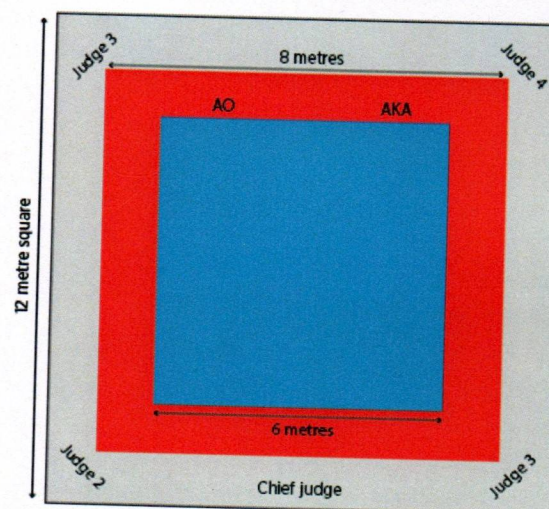
Kumite competition area

The Match Supervisor is seated just outside the safety area, behind, and to the left or right of the Referee.

The score supervisor is seated at the official score table, between the scorekeeper and the timekeeper.

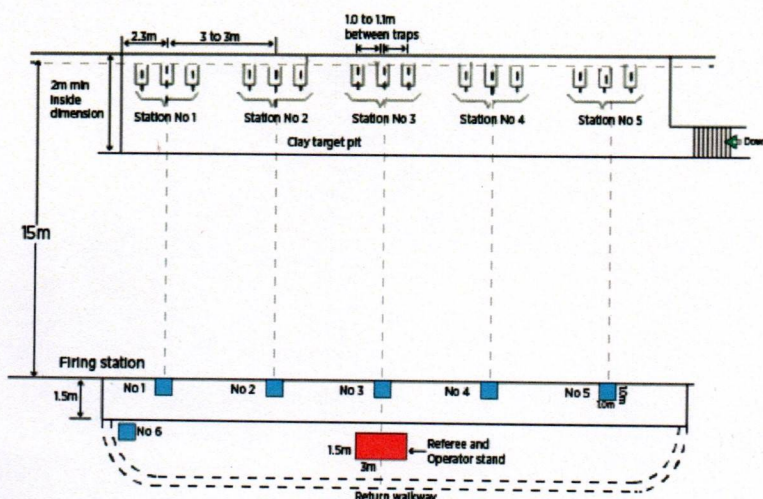
Kata:

The competition area for Kumite is used for Kata. The Chief Judge sits in the centre position facing the contestants and the other four Judges are seated at the corners of the competition area.

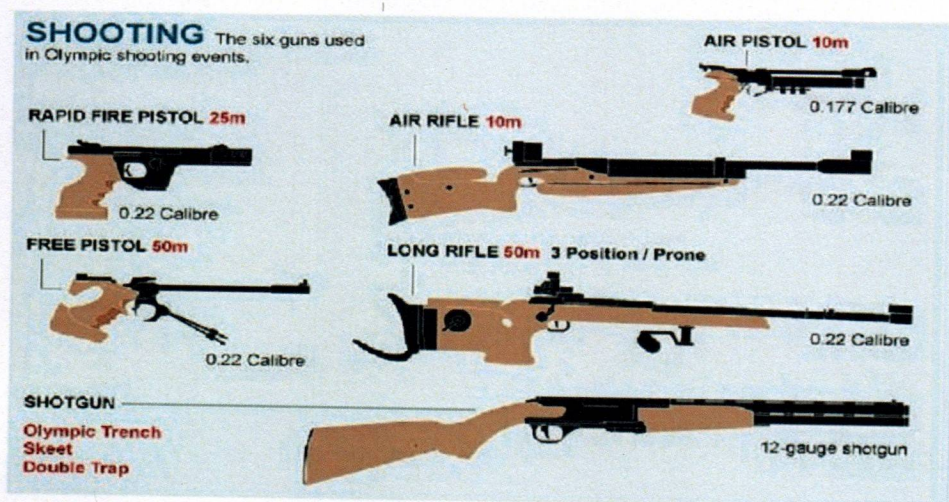
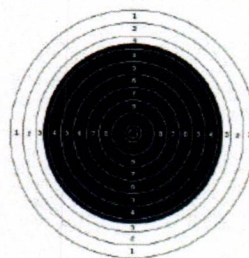


Kata competition area

SHOOTING



50 Meter Rifle Target



shooting range

Image Source: DLGSW

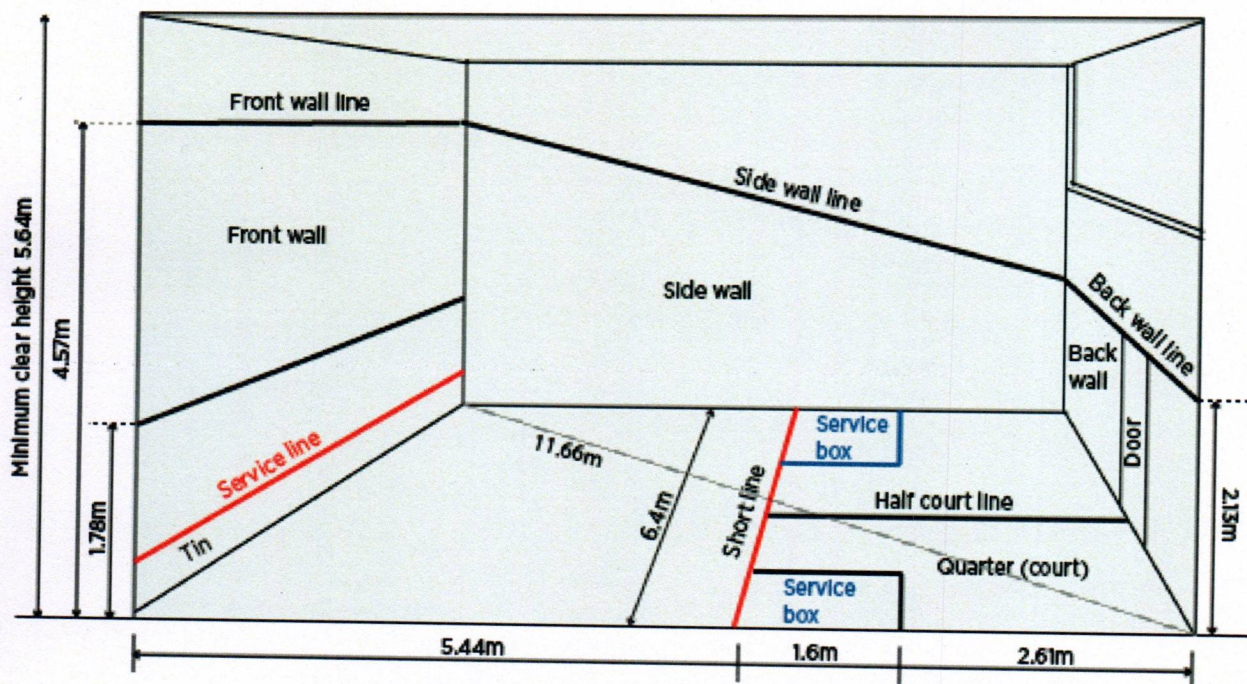
The International Shooting Sport Federation (ISSF) is recognised by the International Olympic Committee as the sole controlling body of International Amateur Shooting Sports at international and worldwide levels of competition. The ISSF controls the technical regulations in all the target shooting disciplines including pistol, rifle, running target and shotgun.

The Olympic programme of the shooting consists of 15 different events over three disciplines. These are rifles, pistols and shotguns. Range standards for 800m, 50m, 25m, 10m rifle and pistol ranges. Outdoor ranges are constructed so that the sun is behind the shooter as much as possible during the day. There must be no shadows on the targets.

Recommended features to be included in the design and construction of the range:

- If possible, the range is surrounded by walls for safety reasons.
- Transverse baffle systems to be provided between the firing line and line of targets to prevent accidental exit of unaimed shots
- 50m and 25m are outdoors where possible, but can be indoors if required by legal or climatic conditions
- 300m ranges are at a minimum 290m open to the sky.
- 50m ranges are at a minimum 45m open to the sky
- 25m ranges are at a minimum 12.5m open to the sky

SQUASH



Squash Court

Image Source: DLGSW

Dimensions

The dimensions of a standard squash court are:

Length of court is 9.75m.

Width of court is 6.4m.

Diagonal is 11.665m.

Height from floor to lower edge of front wall line is 4.57m.

Height from floor to lower edge of back wall line is 2.13m.

Height from floor to lower edge of service line on front wall is 1.780m

Height from floor to top of the tin is 4.8m.

Distance to nearest edge of short line from back wall is 4.26m.

Dimensions of service boxes is 1.600m.

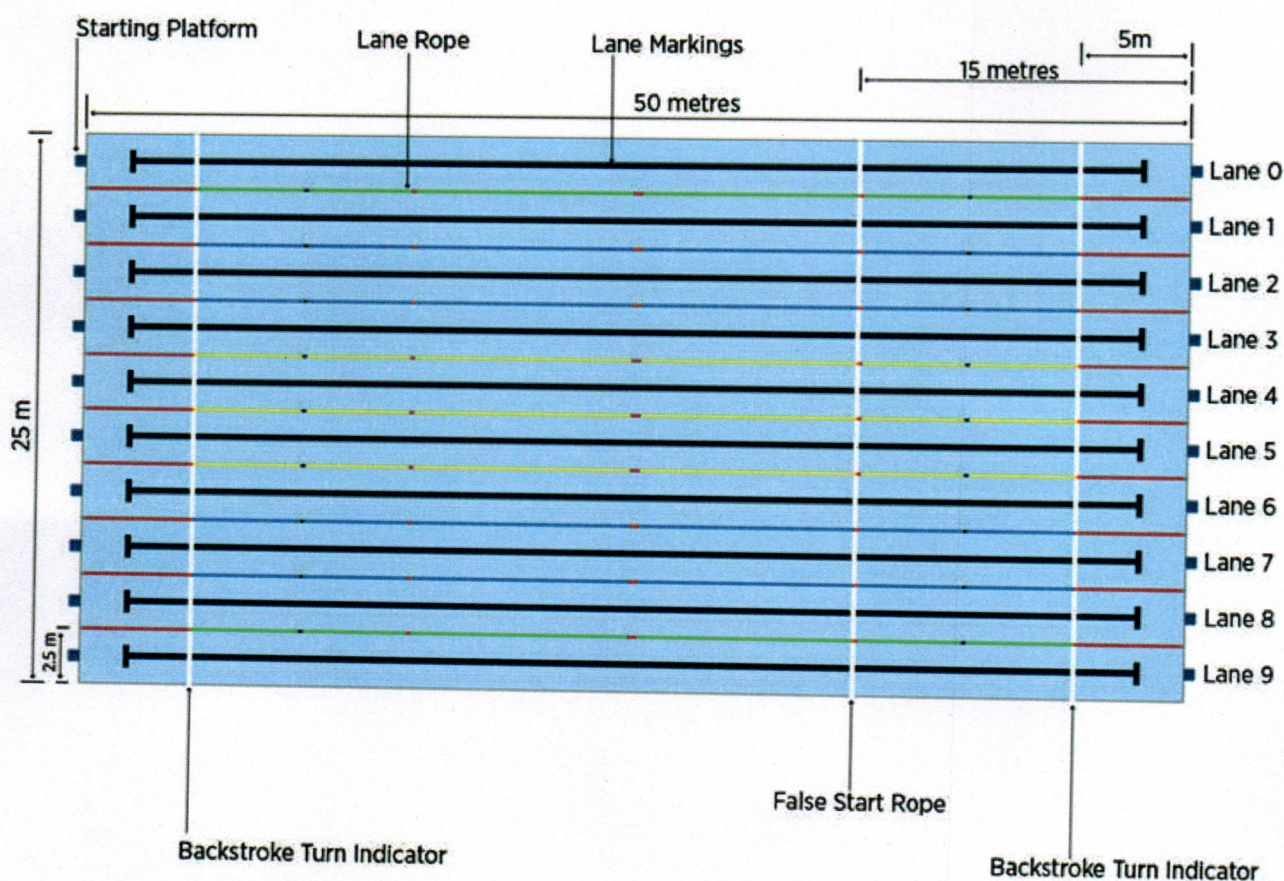
Width of all lines and upper section of tin is 5cm.

Minimum clear height above court floor is 5.640m

A squash court is a rectangular box with four vertical walls of varying height. These walls are known as the front wall, side walls and back wall. The front wall line, side wall line, back wall line and upper 50mm of the tin are shaped to deflect any ball that strikes them.

The court has a level floor and a clear height above the court area. The length, width and diagonal of the court are measured at a height of 10cm above the floor. Squash courts are also used for racquetball

SWIMMING



Swimming Pool

Image Source: DLGSW

The Federation Internationale de Natation (FINA) is the world governing body for aquatic sports such as swimming, diving, waterpolo, synchronised and open water swimming. FINA rules are used to manage state, national and international events such as the World Championships and the Olympics.

Dimensions:

Standard pools are either 25m or 50m long.

Depth:

For pools with starting blocks, the minimum depth is 1.35m, extending to at least 6.0m. A minimum depth of 1.0 metre is required for pools without starting blocks.

Lanes:

According to FINA rules World Championships require 8 lanes and Olympic Games require 10 lanes. The lanes are a minimum of 2.5m wide, with two spaces of at least 2.5m wide outside of the first and last lanes.

Starting platforms:

Starting platforms are from 0.5m-0.75m high above the water surface. The surface area is at least 1.5m square and covered with a non-slip material.

TABLE TENNIS

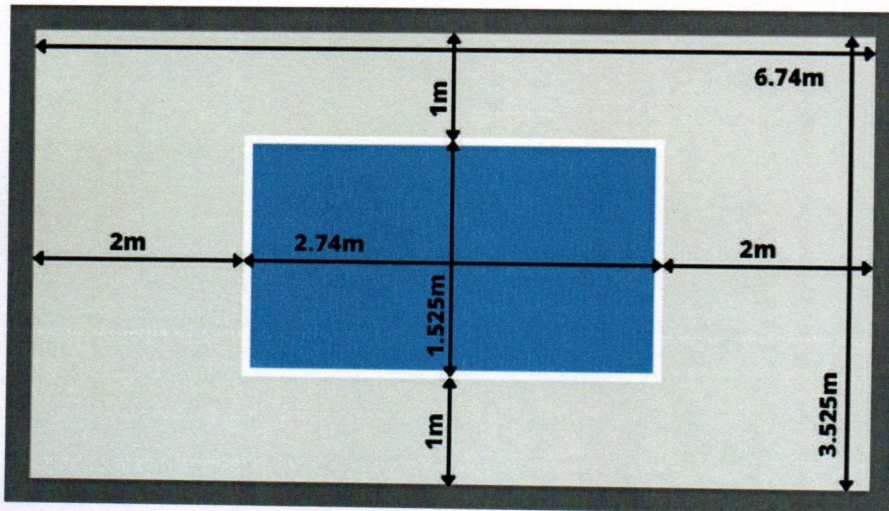
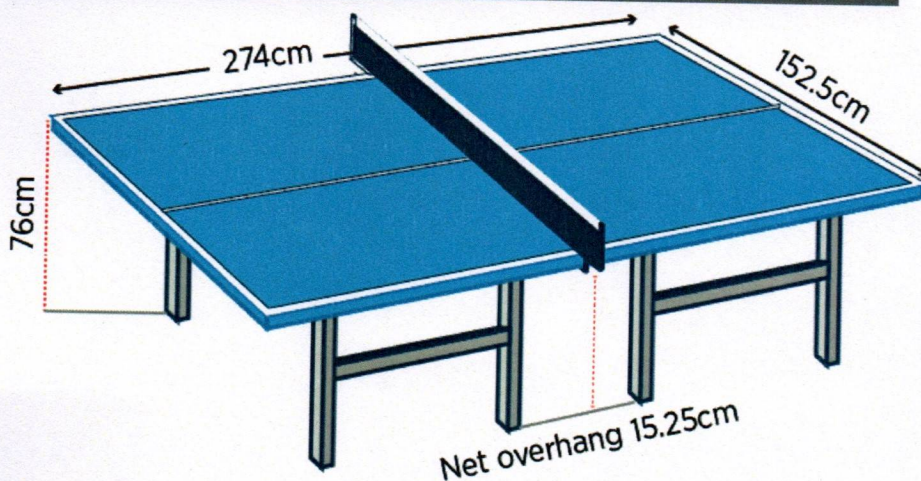


Table Tennis

Image Source: DLGSW



The table:

The upper surface of the table, known as the playing surface, is 2.74m long and 1.525m wide and is horizontal 76cm above the floor. The playing surface does not include the vertical sides of the tabletop. The playing surface yields a uniform bounce of about 23cm when a standard ball is dropped on to it from a height of 30cm.

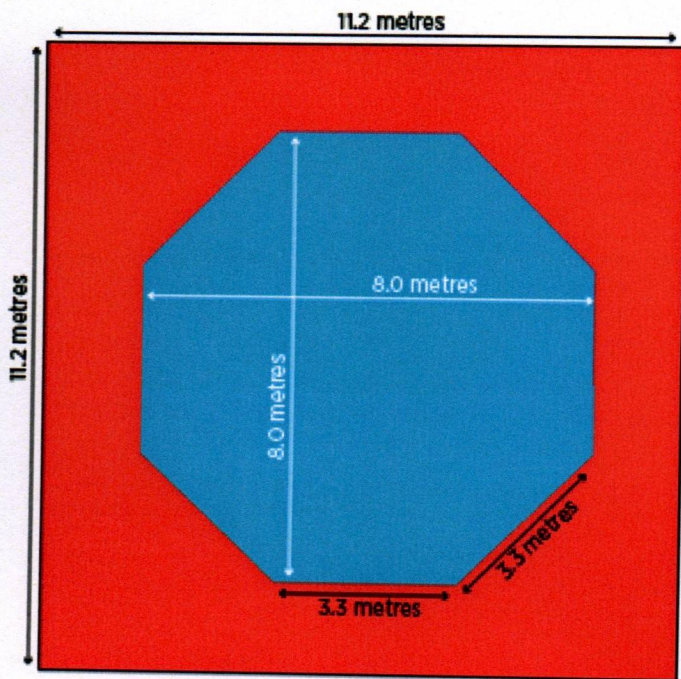
The playing surface is a matte surface and dark coloured. There is a white side line, 2cm wide, along each 2.74m edge and a white end line, 2cm wide, along each 1.525m edge.

The playing surface is divided into two equal courts by a vertical net parallel to the end lines. For doubles, each court is divided into two equal half courts by a white centre line, 3mm wide, running parallel with the side lines. The centre line forms part of each right half court.

The net assembly:

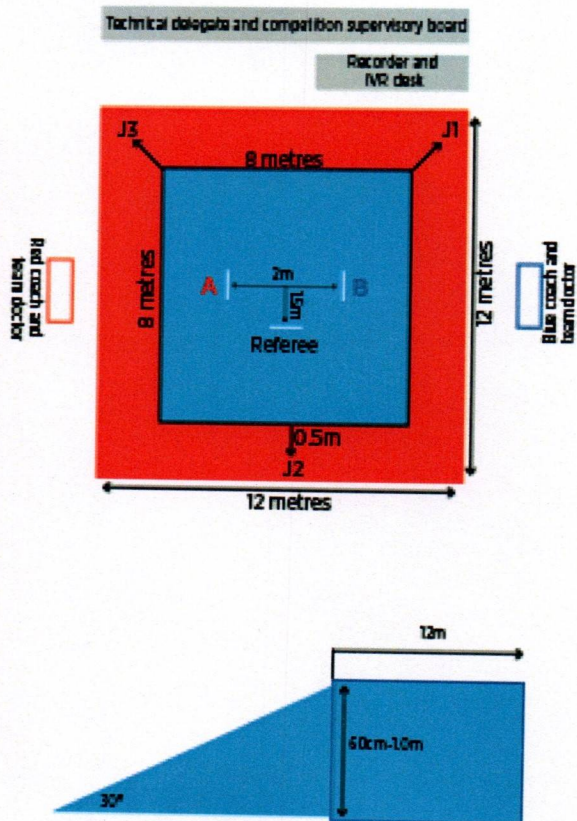
The net assembly includes the net, its suspension and the supporting posts, including the clamps attaching them to the table. The net is suspended by a cord attached at each end to an upright post 15.25cm high. The outside limits of the post are 15.25cm outside the side line. The top of the net is 15.25cm above the playing surface. The bottom of the net, along its whole length, is as close as possible to the playing surface. The ends of the net are attached to the supporting posts from top to bottom.

TACKWONDO



Octagonal competition area

Image Source: DLGSW



Square competition area and platform

Competition area:

The contest area is a flat, non-slip mat. The contest area can be installed on a platform 0.6m-1m high from the base.

The colour scheme of the mat's surface must avoid giving a harsh reflection, or tiring the contestant's or spectator's eyesight. The colour scheme is also appropriately matched to the contestant's equipment, uniform and the surface of the contest area.

There are two shapes used on competition. In both shapes the contest area and safety area are different colours.

Square shape:

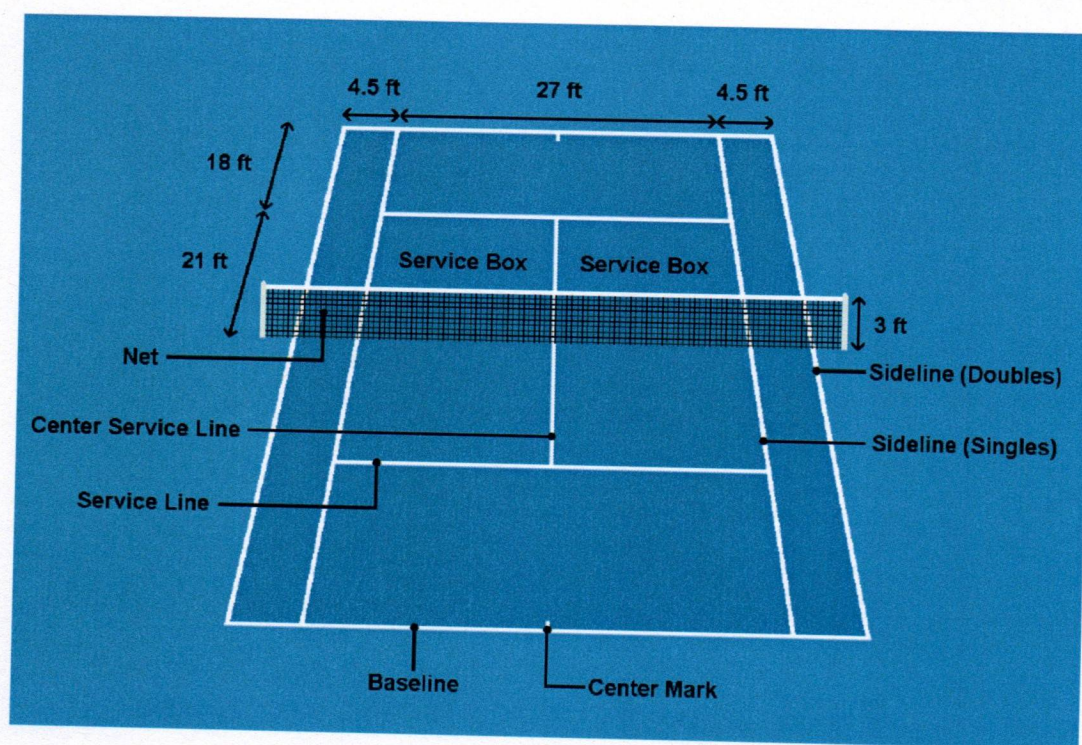
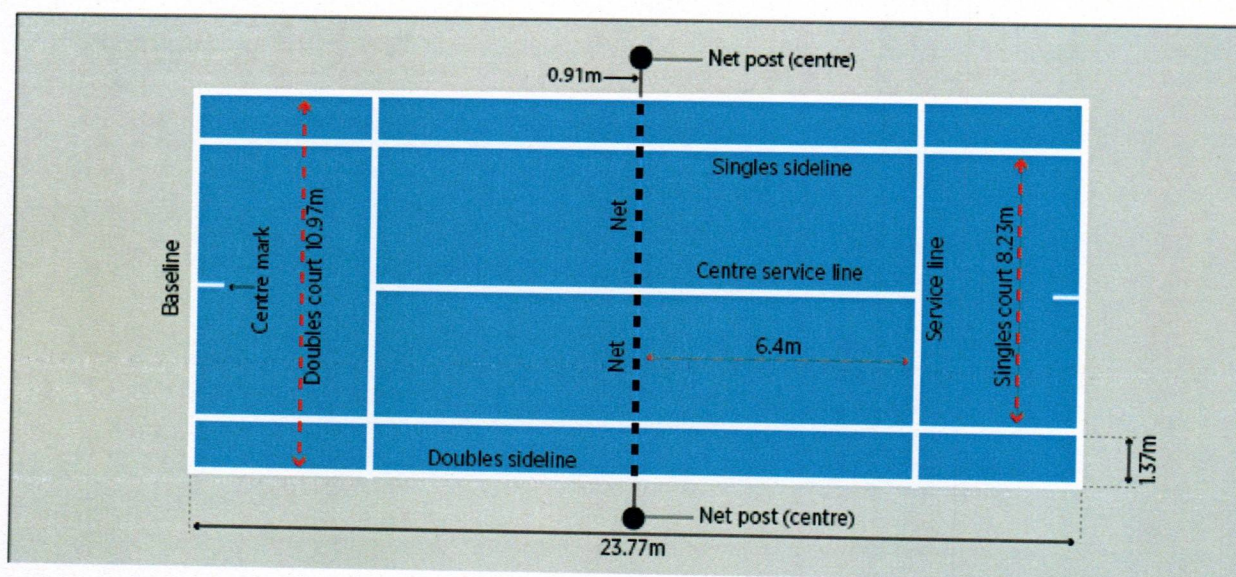
This competi

on area includes the contest area and safety area. The contest area is a 8m x 8m square and a safety area of 2m to 4m. The total size of the competition area which includes the contest area and safety area is 10m x 10m to a maximum of 12m x 12m.

The coaches are positioned at a point 1m or more from the centre point of the outer line of each contestant's side.

The inspection desk is near the entrance of the competition area for the inspection of the contestants' protective equipment.

TENNIS



Tennis Court

Image Source: DLGSW

The court is 23.77m long and for singles matches, 8.23m wide. For doubles matches the court is 10.97m wide. The court is divided into two equal areas by a net suspended by a cord or metal cable attached to two net posts. The net is 1.07m high and is fully extended to that it fills the space between the two nets posts. The net is 0.914m high at the centre, where is held down tightly by a white strap. A white band covers the cord or metal cable and the top of the net.

For doubles matches the centre of the net posts are 0.914m outside the doubles court on each side. For singles matches the centres of the net posts are 0.914m outside the singles court on each side.

VOLLEYBALL

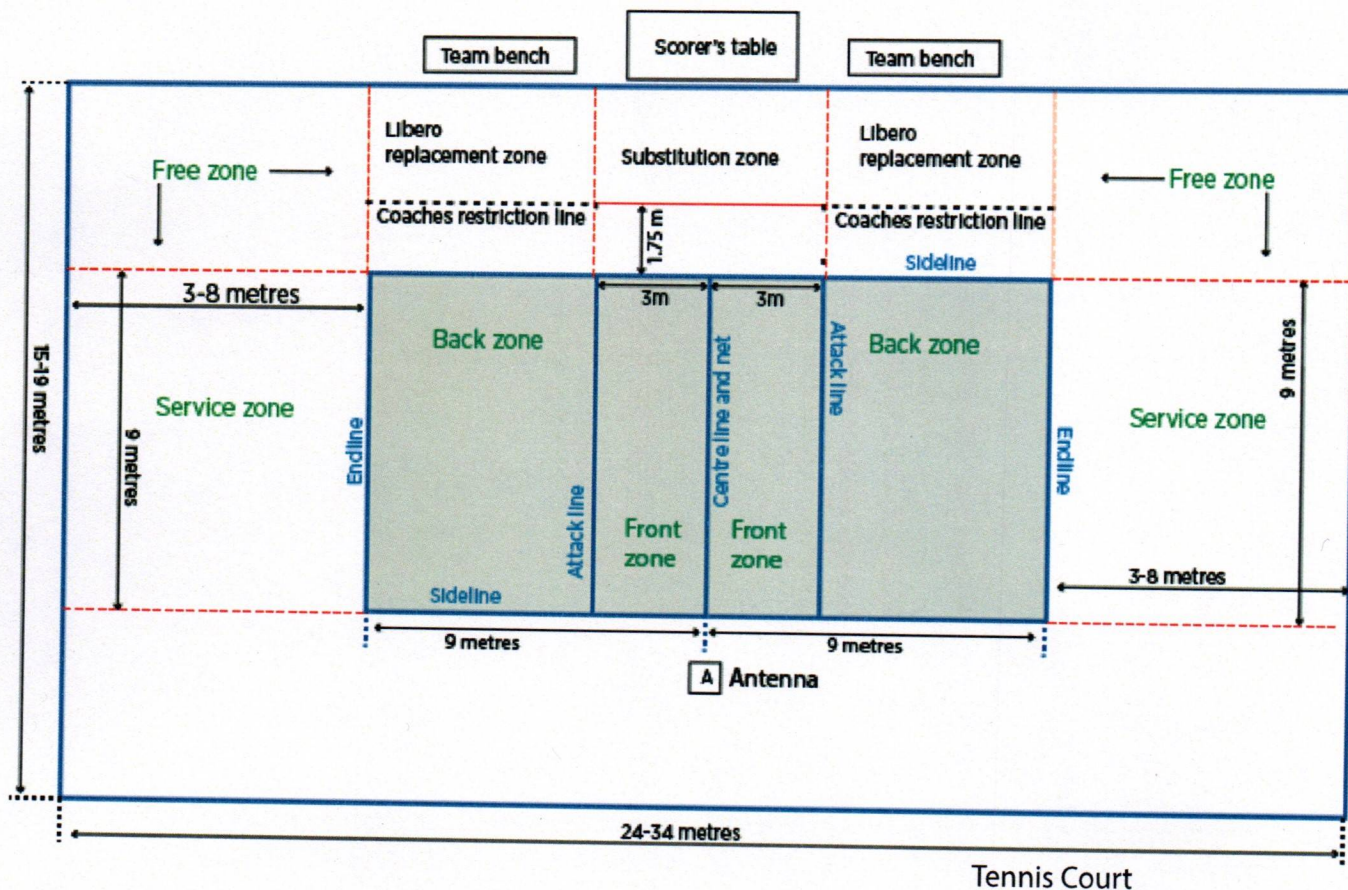


Image Source: DLGSW

The international governing body for volleyball is Federation Internationale de Volleyball (FIVB) who provide the rules for the sport.

The playing area:

Dimensions:

The playing court is 18m long and 9m wide and is surrounded by a free zone 3m wide on all sides. The space above the playing area is known as the free playing space and is a minimum of 7m high from the playing surface. For FIVB, world and of ficial competitions, the free zone measures a min imum of 5m from the side lines and 8m from the ends lines. The free playing space is a minimum of 7m high from the playing surface.

Playing surface:

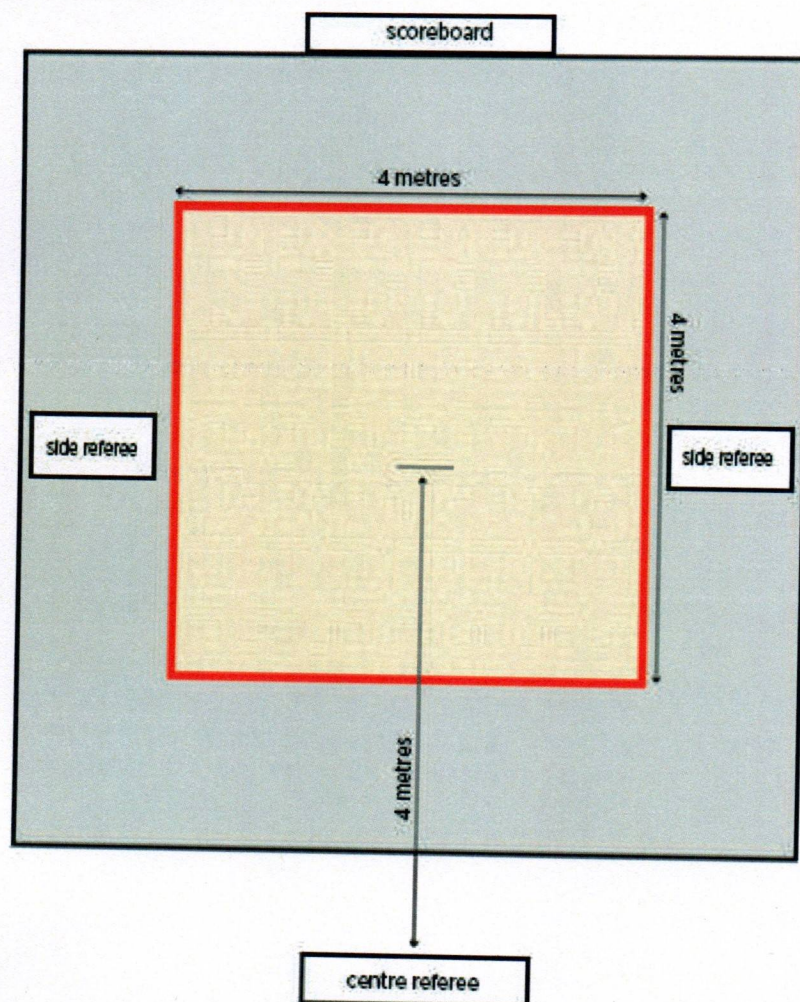
The playing surface is flat and a light colour. For FIVB, world and official competitions, only a wood en or synthetic surface is allowed. White colours are required for the lines. Other different colours are required for the playing court and free zone.

Zones and areas: The front zone on each court is limited by the axis of the centre line and the rear edge of the attack line. The front zone extends beyond the side lines to the end of the free zone.

Line markings:

All lines on the court are 5cm wide and are a light colour different from the colour of the floor.

WEIGHTLIFTING



Weightlifting Stage

Image Source: DLGSW

For the sport of weightlifting the field of play relates to the area of competition which contains:

- Competition platform and stage
- Technical Officials' and Competition Management tables
- Warm-up area.

Platform:

Two types of platforms are authorised for use by the IWF Competition and training/ warmup platforms. Both types of platforms must meet the authorised specifications.

Competition platform:

The platform is a 4m square and made of wood, plastic or any solid material and covered with a non-slip material.

The height of the platform is between 50mm and 150mm.

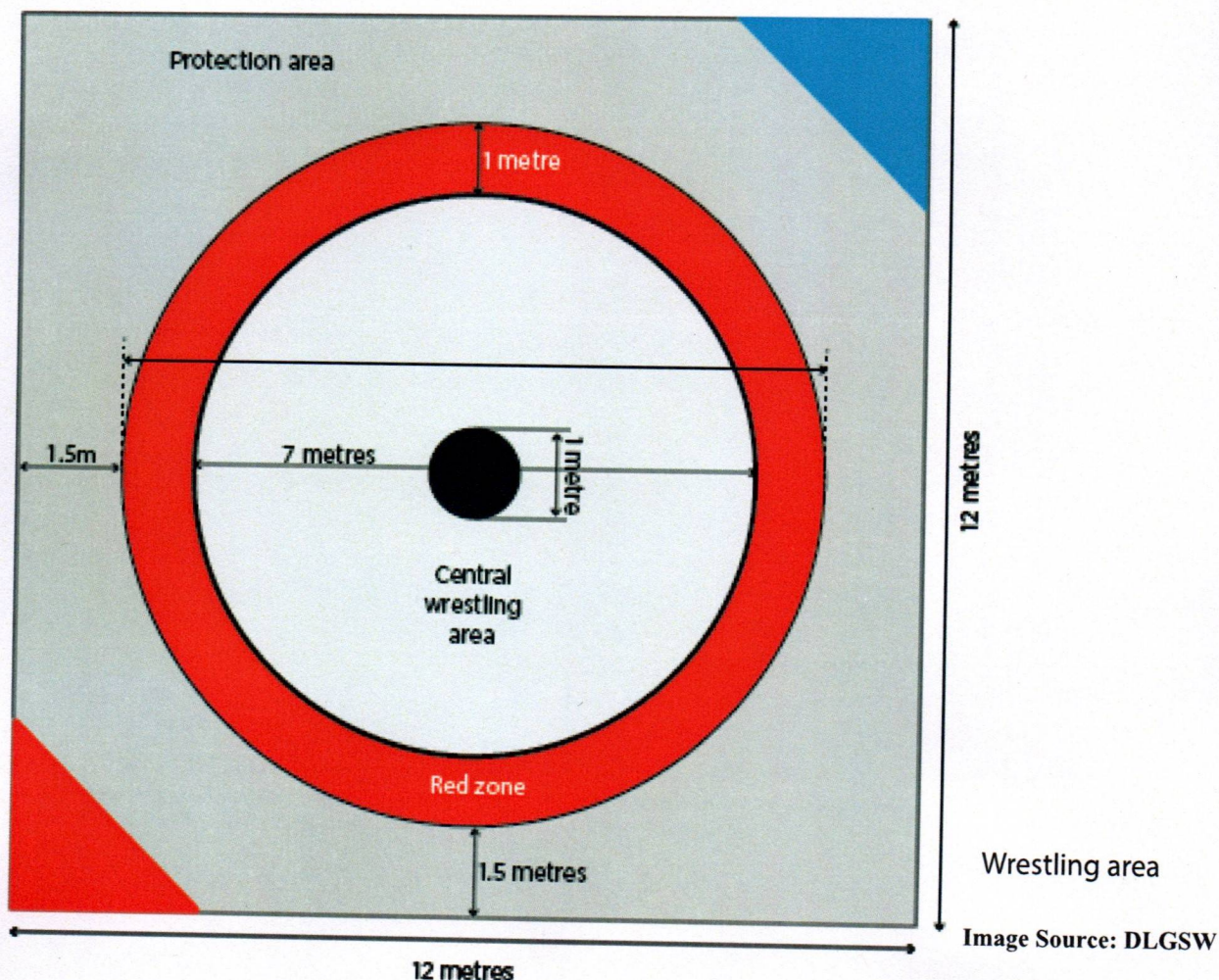
If the floor surrounding the platform is the same or similar colour, the top edge of the platform must have a different coloured 150mm line. A clear one metre area surrounding the platform is compulsory. This area must be flat and free from any obstacles.

If the platform is above ground level, a restraining bar at least the width of the platform must be fixed to the stage, at least one metre in front of the platform.

Warm-up platform:

The warm-up platform is 3m wide and 2.5-3m long.

WRESTLING



A new FILA approved mat has a 9m diameter and a 1.5m border and is mandatory in Olympic Games, Championships and Cups. For all other international competitions mats must be approved/sanctioned but not necessarily new.

For Olympic Games and World Championships, warm up and training mats must also be new and approved by FILA.

A red band, one metre wide, forms an integral part of the wrestling area. It is drawn along the circumference on the inside of the 9m circle. This is known as the red zone.

The central circle in the middle of the mat is one metre in diameter. The inside part of the mat inside the red circle is the central wrestling area. It is 7m in diameter. The protection area is 1.5m wide.

Surrounding the central circle is a band 10cm wide. For Greco Roman wrestling an 8cm wide line splits the circle into two parts. Two perpendicular lines, 40cm from each other, are called in side hand line and inside line. The colour of the lines are red.

The covering and free space around the mat is 2m. The colour of the protection area is different than the mat.

For all Olympic Games, World and Continental Championships, the mat is installed on a platform not higher than 1.1m or lower than 0.50m.

Case Study

Chapter 3

Willmote Allianz Riviera

FOOTBALL STADIUM

TECHNICAL SPECIFICATIONS

Licensing authority: CITY OF NICE

Project owner: NICE ECO STADIUM

Promoter: ADIM CÔTE D'AZUR

Constructors: VINCI CONSTRUCTION FRANCE, VIA ITS SUBSIDIARIES : DUMEZ CÔTE D'AZUR, GTM SUD, GTM TP CÔTE D'AZUR TRIVERIO CONSTRUCTION, CAMPENON BERNARD SUD-EST ET FARGEOT LAMELLÉ COLLÉ (OWNED BY ARBONIS)

Solar Farm: EDF ENR Solaire

Design team

Architect: WILMOTTE & ASSOCIÉS

Building Engineering (Stadium): EGIS BÂTIMENT

Infrastructure Engineering: EGIS FRANCE

Technical Control Office: BUREAU VÉRITAS

Health and safety coordinator: BUREAU VÉRITAS

Fire safety coordinator: PCA SUD-EST

Area

Site area: 14 ha

Stadium: 54,000 sqm, 36,180 seats

Year : 2013



Image Source: Archdaily

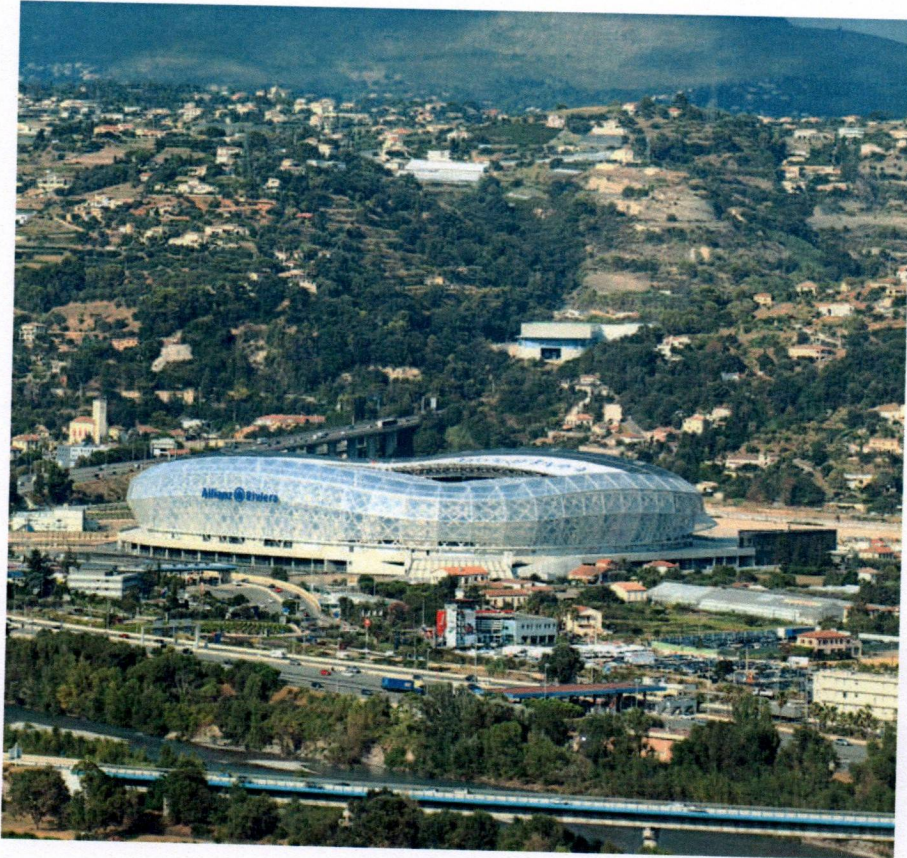
Introduction

In December 2009, the city of Nice launched an international competition for the construction of a new 30,000-seat stadium capable of hosting large international competitions. The stadium would sit at the heart of the Eco Valley in the Plaine du Var, named an 'Operation of National Interest' (OIN) in March 2008, and was to be the first flagship project in the new district.

The competition programme – the product of a public-private partnership – included three projects to be built in a seismic zone, each with a different completion date:

- a stadium with 30,000 seats, multi-purpose facilities (sports and concerts), UEFA approved, well-integrated with its urban environment, and in line with sustainable development principles
- the Musée National du Sport (National Sports Museum)
- a real estate development plan (PIA) including 29,000m² of retail space designed to animate the area

The Wilmotte & Associés / VINCI Concessions team submitted their proposal on 10 September 2010, and the city of Nice awarded them in October.

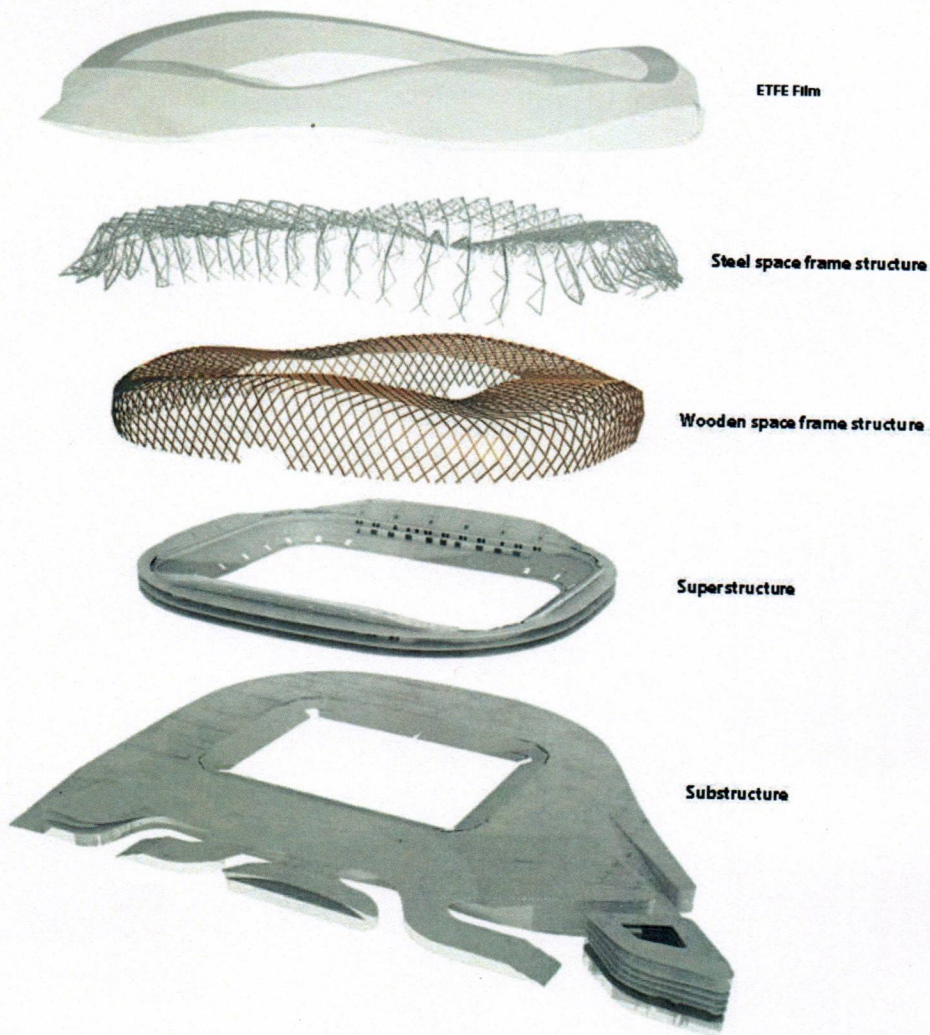


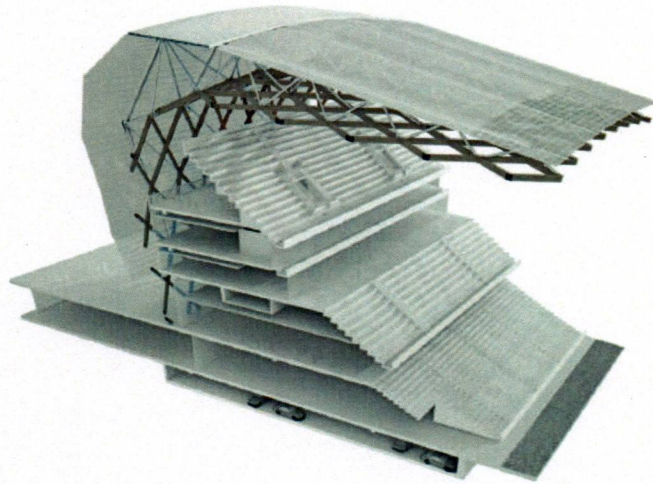
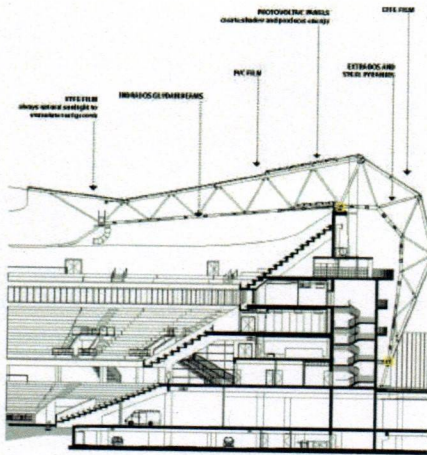
Architectural frame

The architectural team was transparent and special attention was paid to stadium skin, eliminating the distinction between inside and outside and animating both interior and exterior of the building. This concept was achieved with the largest timber-metal space frame ever built clad with a translucent membrane (ETFE)

Structure frame

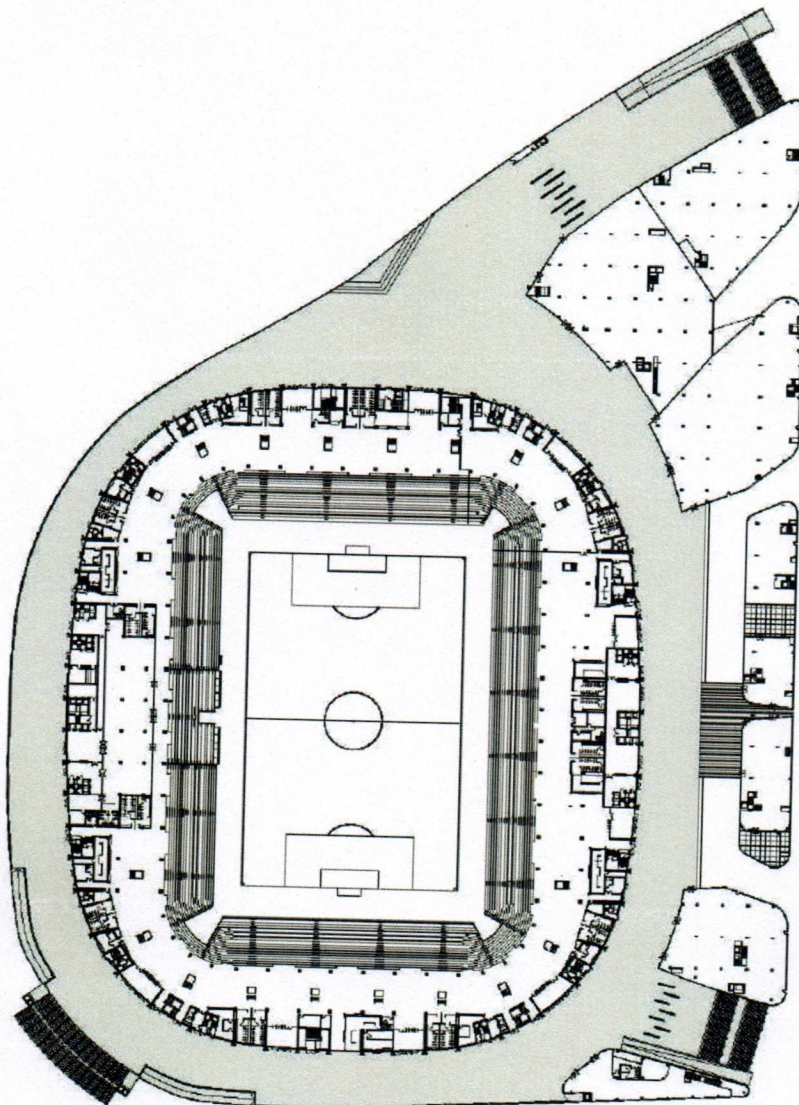
Sustainability was of paramount importance throughout the design and construction process. Roof-mounted photovoltaic modules provided a large proportion of the building's electrical needs. Rainwater is collected from the roof and stored for which irrigation and toilet usage. In addition, ventilation stacks harness the revealing wings to provide natural ventilation to interior spaces.

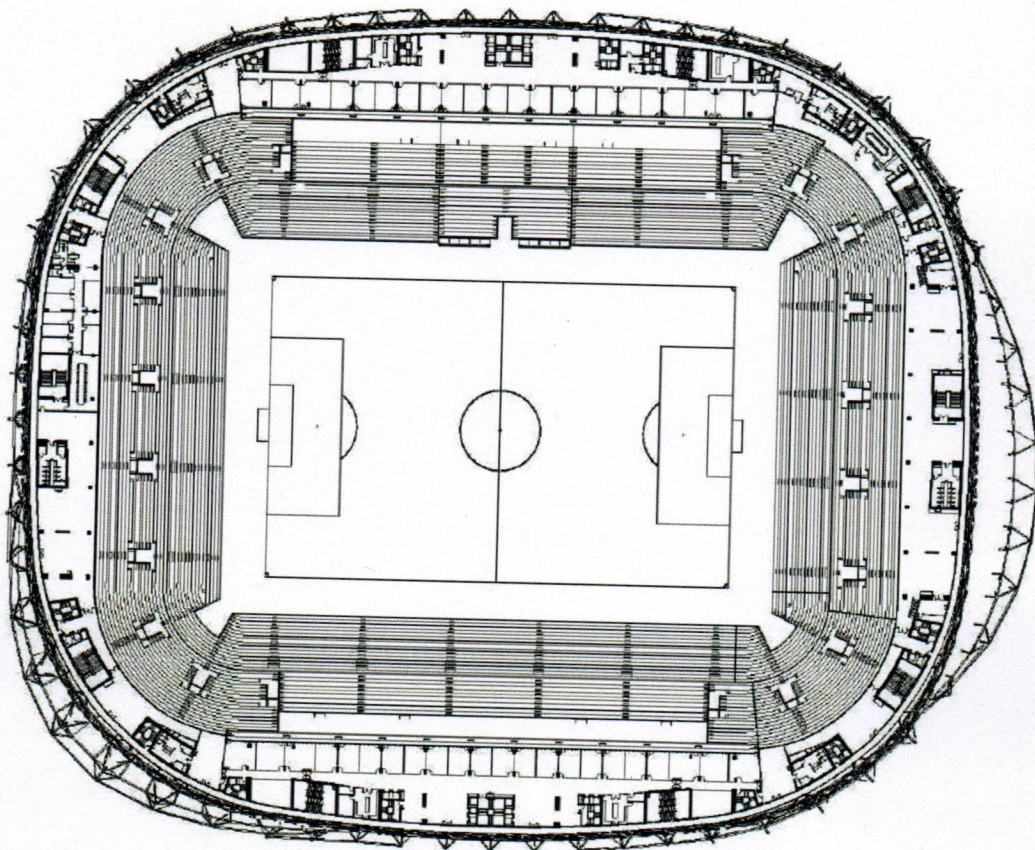
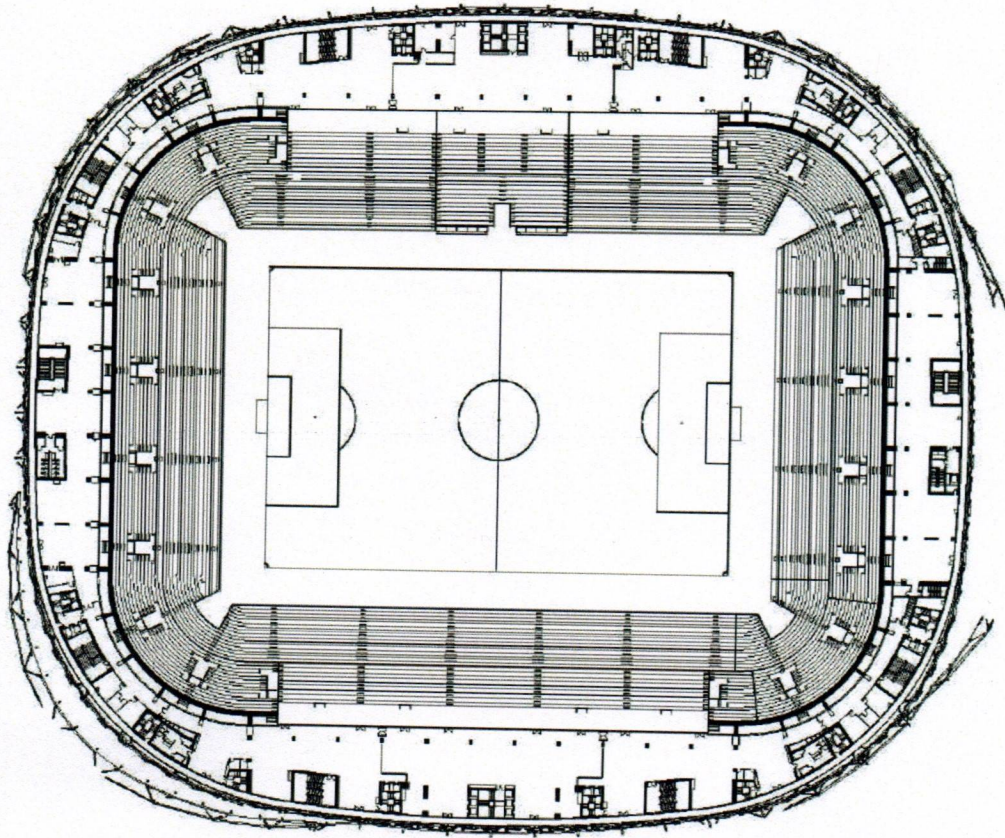


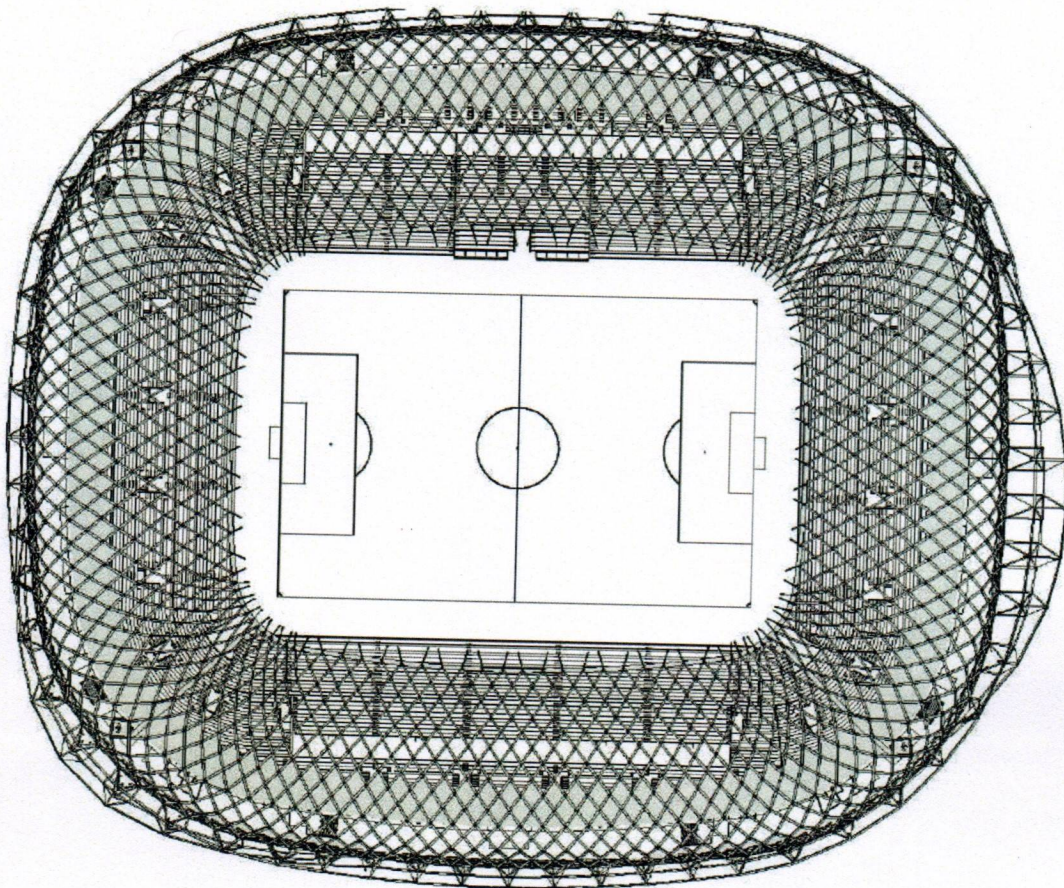
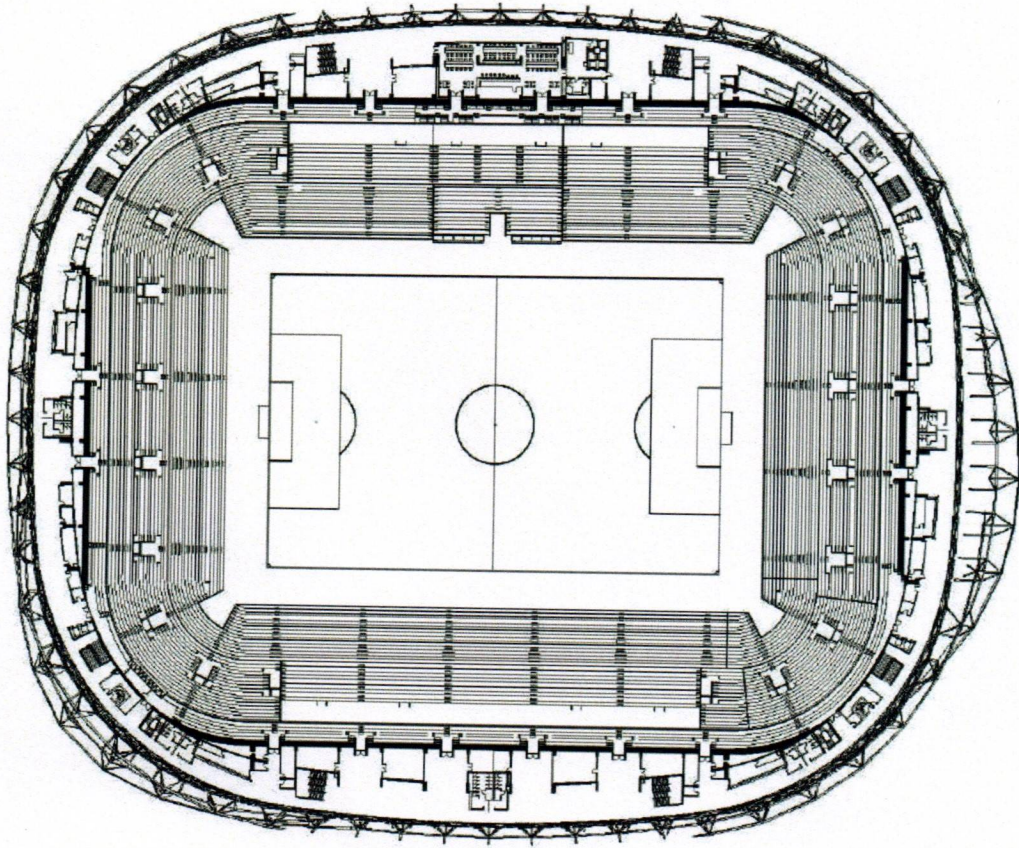


Reason of choice

1. Area program 30,000 people
2. Sustainability in stadium
3. Use of truss system and modern materials to to reduce carbon emission
4. Material use loss and steel







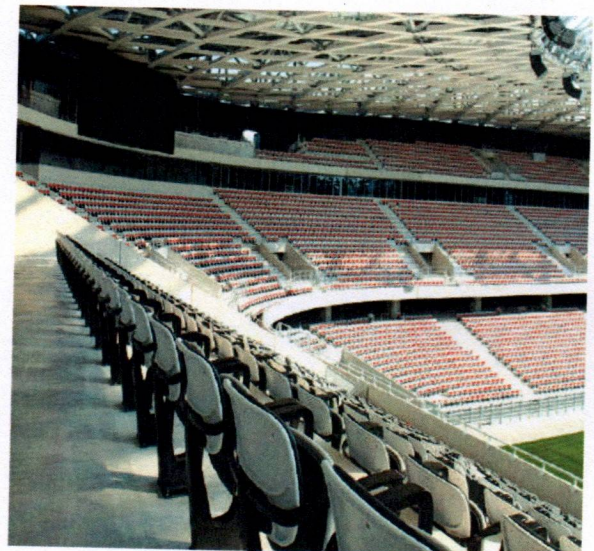
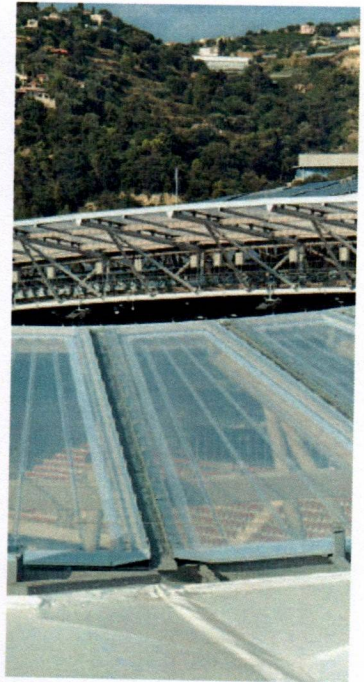
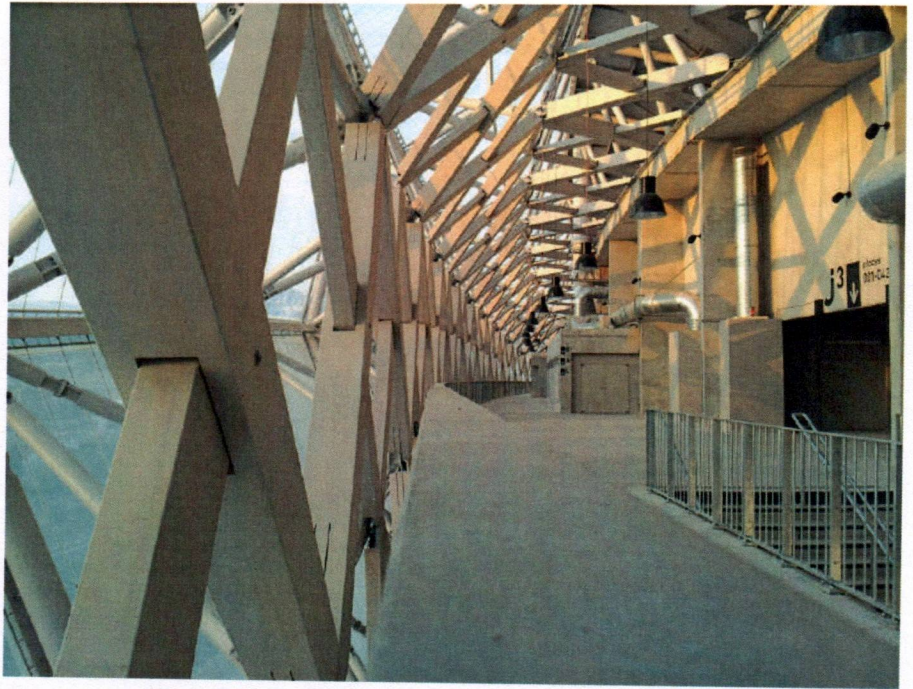
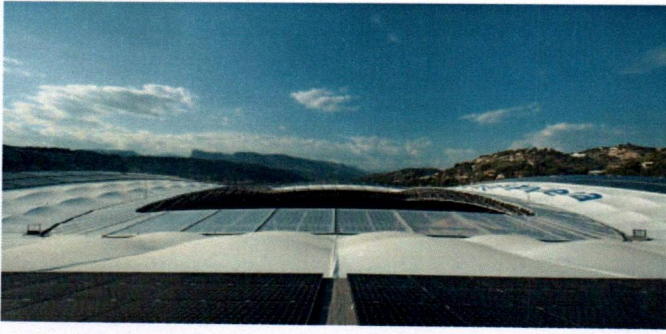


Image Source: Archdaily



Inferences

With further review and understanding of the structural associated architecture aspects it's one of its kind with a lot of aspects in sustainability inculcated in aspects of water recycling system and light transparency Hitachi se perfect balance of it stadium with sustainability aspect as well as modern look to it.

BBVA Compass Stadium

FOOTBALL STADIUM ,

TECHNICAL SPECIFICATIONS

Architects: Populous

Location: Houston, United States

Manufacturers : Duo-Gard

Civil Engineer : WGA

Landscape Architect : Clark Condon

Construction Manager : Manhattan Construction Company

Structural Engineer : Walter P. Moore & Associates

Area: 340,000 .sqm

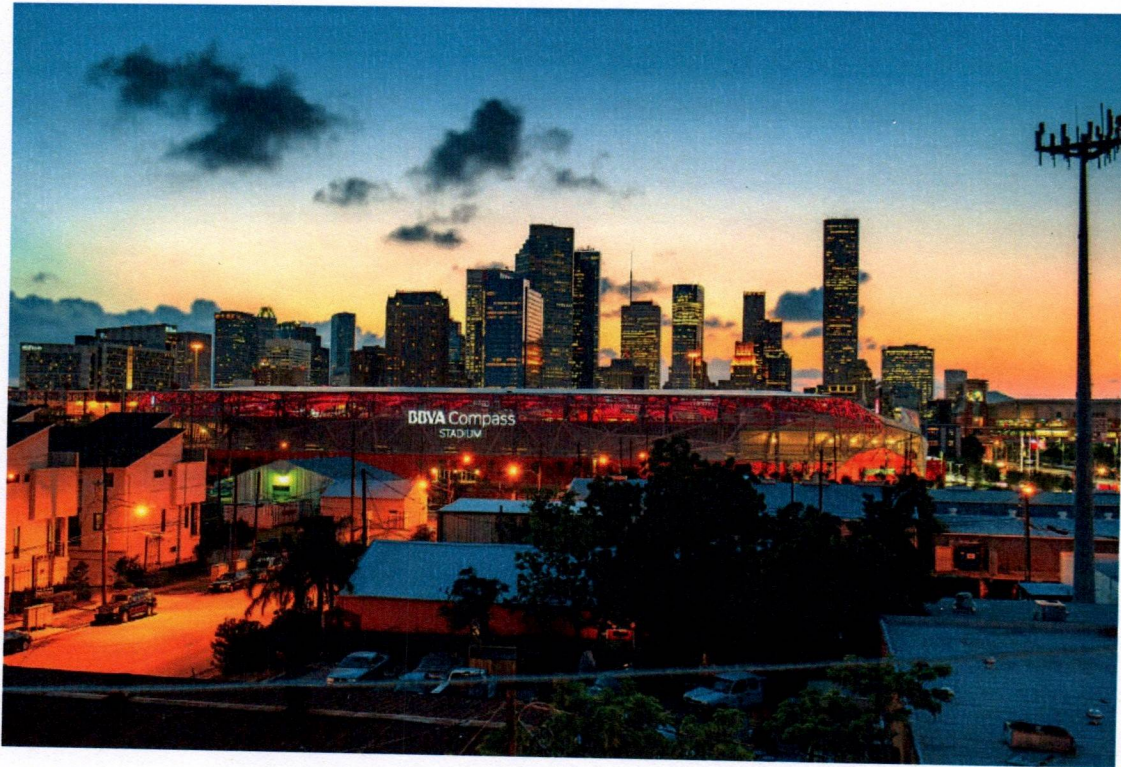
Year : 2012



Image Source: Archdaily

Introduction

BBVA Compass Stadium is designed to be the core of Houston's East Downtown Redevelopment Plan. With a 22,000 seat capacity, its primary use is as a soccer stadium. However it can also accommodate lacrosse, rugby or concerts. To create something specifically as an architectural icon is a challenge in itself; Populous additionally had to design the stadium within the constraints of an extremely tight construction budget of \$60M.

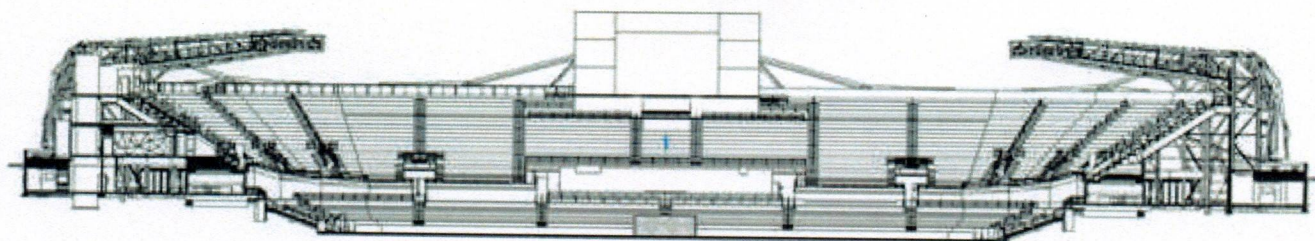


Reason of choice

1. International standard of rooms provided for services.
2. Types of services to be achieved in a stadium
3. Understand different types of foot foot in a stadium

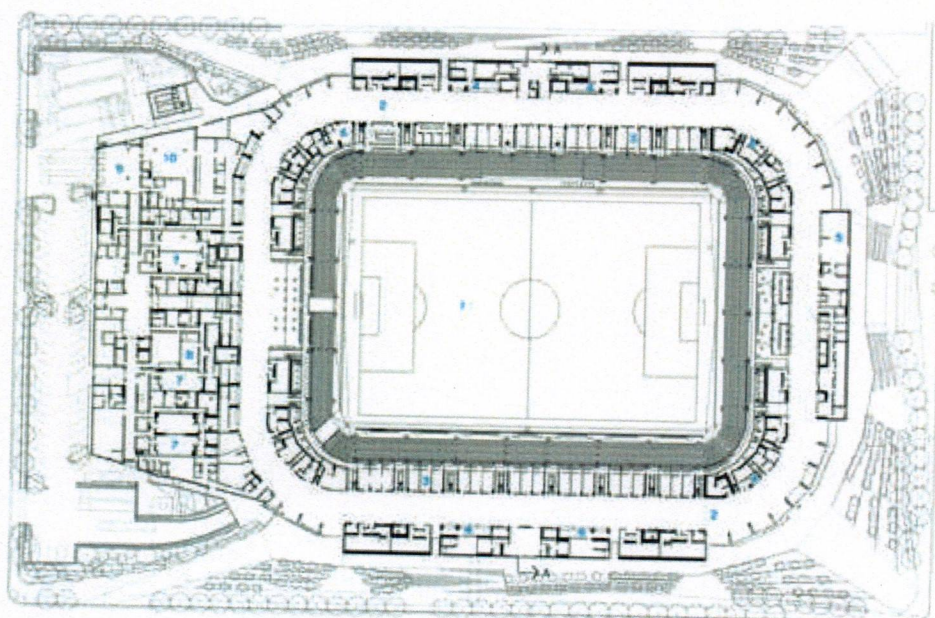


Image Source: Archdaily



SECTION A-A

0 50 FT.
15 M.



MAIN CONCOURSE

0 100 FT.
30 M.

- 1 STADIUM BOWL
- 2 CONCOURSE
- 3 SUITES
- 4 CONCESSIONS
- 5 TEAM STORE
- 6 MEDIA/PRESS
- 7 LOCKER ROOMS
- 8 TRAINING ROOM
- 9 LOADING
- 10 COMMISSARY WAREHOUSE



Image Source: Archdaily



Inferences

Study helped in understanding the flow of different people using the stadium as well as a better understanding of how VIP reach there particular station. The study provides a understanding of how to achieve a create stadium which is fully functional.



Image Source: Archdaily

Leutschenbach

School

TECHNICAL SPECIFICATIONS

Architect: Christian Kerez

Location: Leutschenb Saatlenfussweg 3, 8050 Zurich, Switzerland

Team: Christian Scheidegger (Project manager), Lukas Camponovo, Andrea Casiraght

Structural Engineer: Dr. Schwartz Consulting, Zug, Joseph Schwartz with dsp, Zurich, Walter Kaufmann, Mario Monotti

Constraction Management: BGS, Rapperswil

Area: 11.500sqm

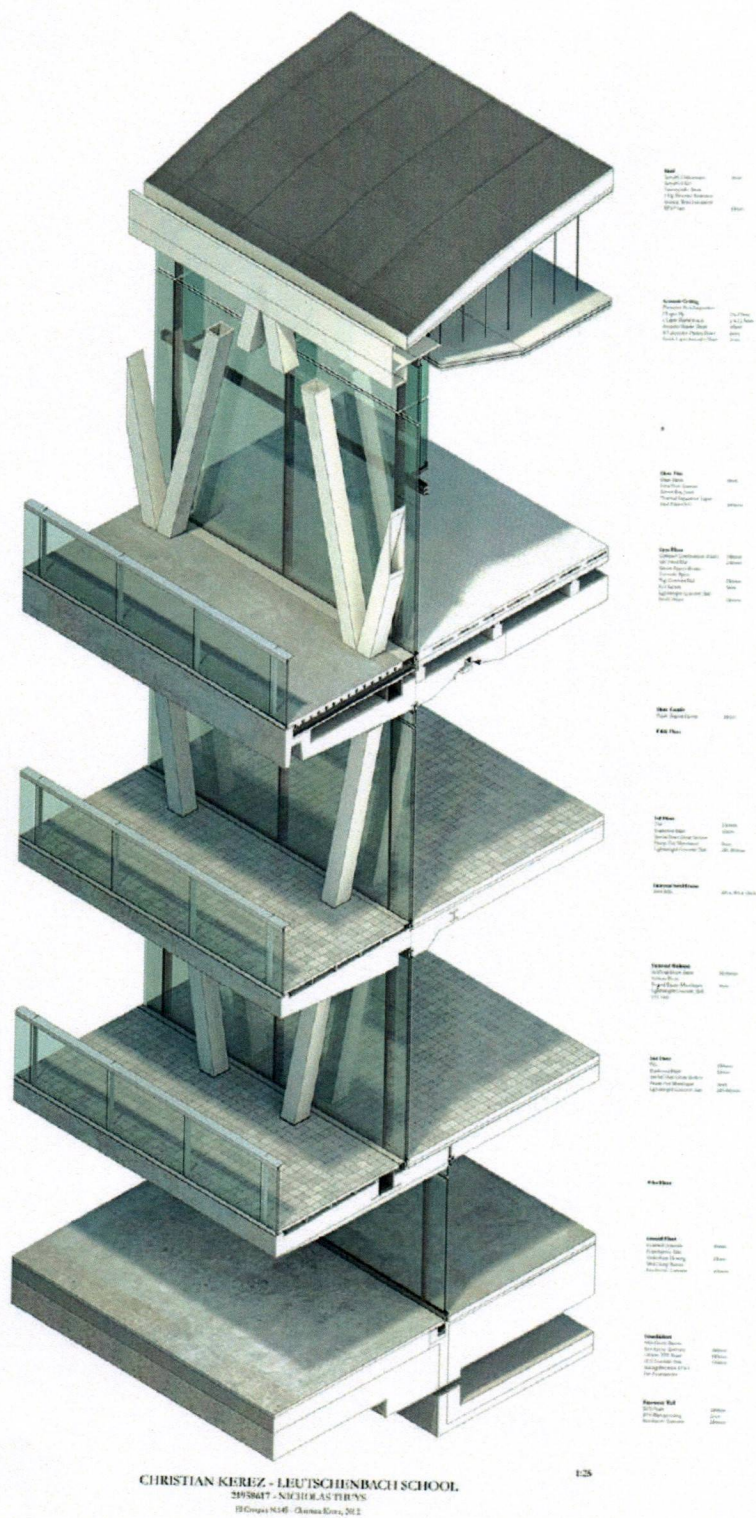
Year : 2009





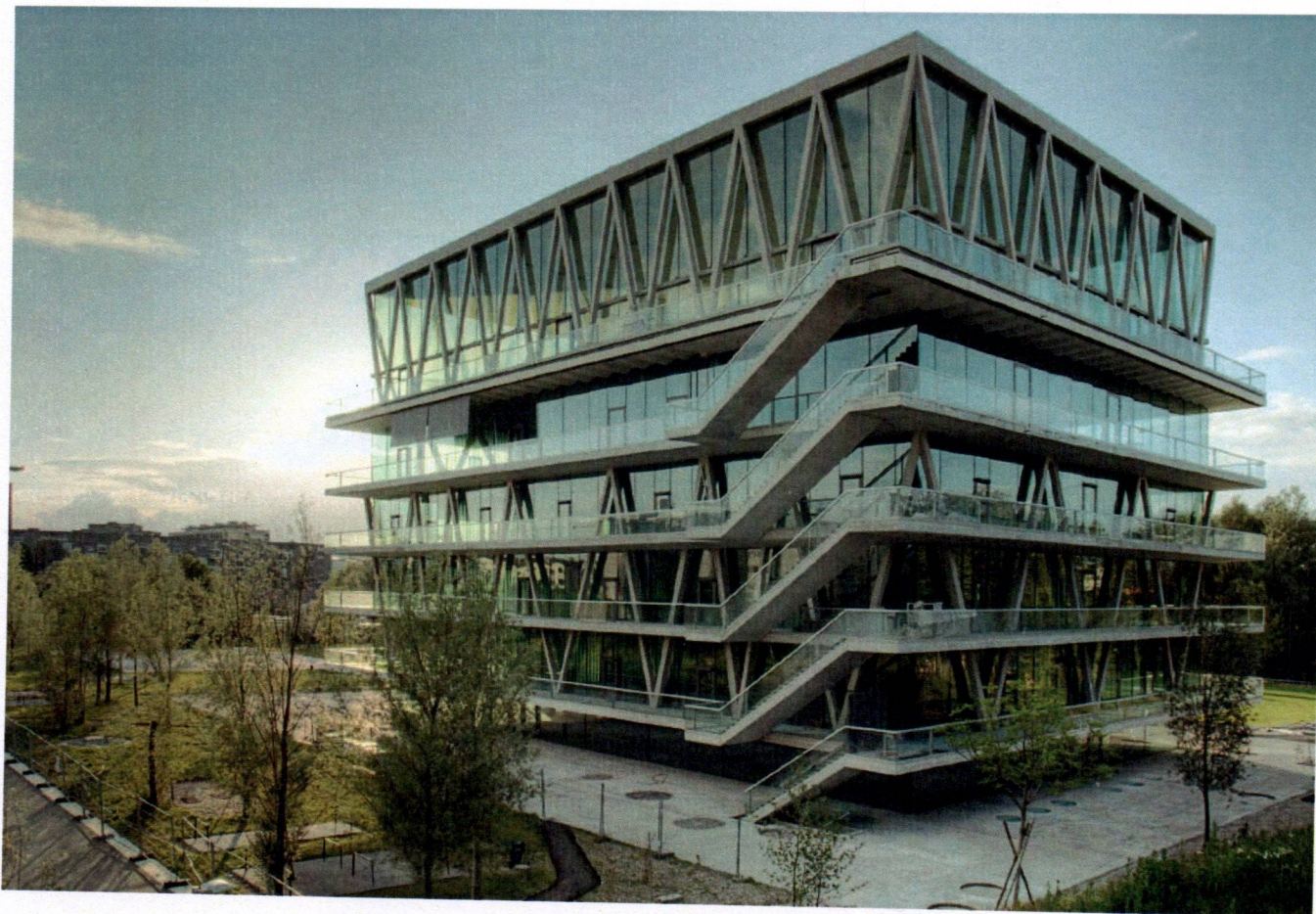
Introduction

All the room inside the buildings were reduced to the lowest common denominator start up top one another with public functions accommodated in mezzanine floor. The classrooms house three- story Steel frame structure; the geminism of approximately the same height is surrounded by a continuous structure resembling that of the classroom block. The result is not of the school building, but a structure that consist of repeating reference on multiple levels. On the ground floor, the building is contracted into a minimal core area.



Reason of choice

1. Similar identity in terms of design ideology
2. Complexity of steel structure is solving the spanning concern
3. Vertical typology of long span
4. Material use glass and steel



Inferences

The understand is to figuring out the aspect of staggering floors with the lack of interruption from structural elements like columns and beams thus help's in introducing different indoor sports with different room heights in one building.



Image Source: Archdaily

SUTD

housing

TECHNICAL SPECIFICATIONS

Consultants: LOOK Architects, Surbana International Consultants

Location: Singapore

Associate: Lee Liting

Team Members: Chow Khoo Toong, Widyanto Hartono Thenearto, Anton Siura, Anton Siura, Doan Quang Vinh, Jeff Lau Jeh Farn , Karno Widjaja.

Area: 46865 sqm

Year : 2014



Image Source: Archdaily

Introduction

Designed by look Architects in collaboration with Surbana International Consultants, campus housing (3 hostel blocks and 2 staff apartment blocks) and sports facilities for SUTD (Singapore University of Technology and Design) have been brought to fruition, realizing the university 's vision for a walkable, 24/7 campus that has academic, housing and recreational facilities within close proximity of one another. Capturing in the build form SUTD,s educational pedagogy of collaborative learning, the residential-recreational precincts liberally interspersed with pockets of interaction spaces, setting up the platform for an open, creative environment.

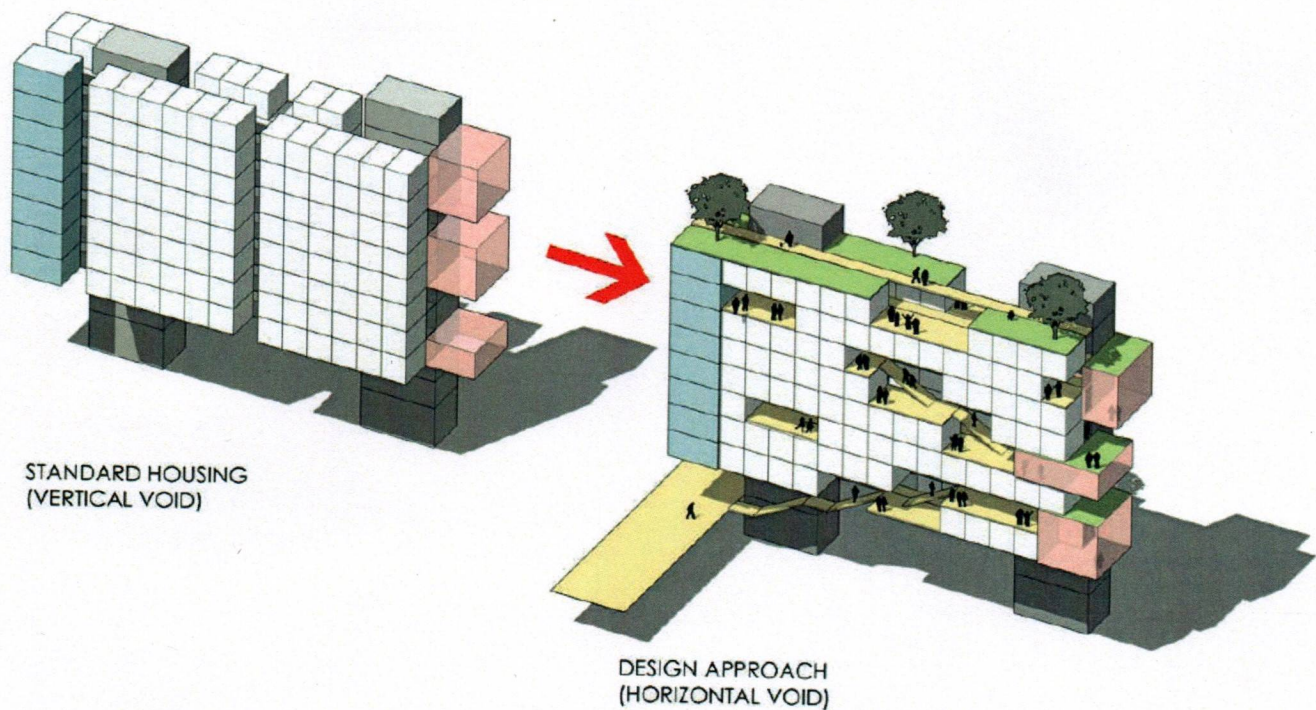


Reason of choice

1. Integration of the housing componen with the sports facilities complexes
2. A similar scale intervention to help undstand the functions of a housing element within a sports precinct.



Image Source: Archdaily



Inferences

The close connection of the hostel and sports complex can help develop a positive relation since the hostels will be occupied by the athletics and sports persons.

Creation of interesting open spaces at different points of the corridor can help open up the design towards a better social interactive space, as well as allowing light and ventilation for the longer corridors.

Pedestrian connections between different building at an upper level can help in clearing up the ground space for vehicular movement.

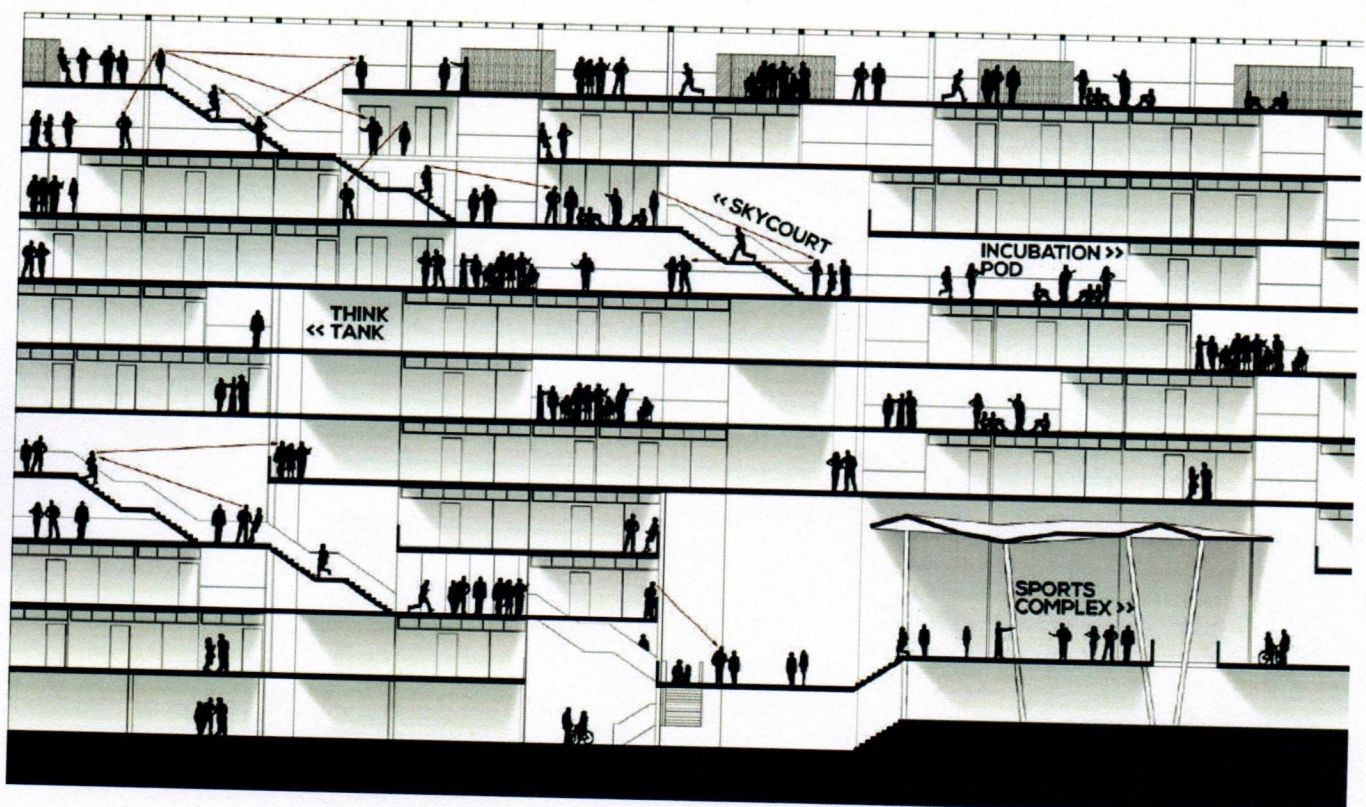


Image Source: Archdaily

Vertical Gym

Sports Center

TECHNICAL SPECIFICATIONS

Architect: Urban-Think Tank

Location: Chacao, Caracas, Venezuela

Client: Municipality of Chacao, Leopoldo Lopez

Project Team: Alfredo Brillembourg & Hubert Klumpner, Mateo Pinto, Matias Pinto, Jose Nunez, Marielly Casanova, Eduardo Kairuz, Francisco Martin, Ricardo Toro.

Sustainability Engineering: Guy Battle, Battle McCarthy

Electrical Services: Freddy Ferro

Graphic Design: Integral / Ruedi Baur

Sport Coordinator: Jose Miguel Perez

Construction Management: Luis Torres

Area: 4,000 sqm

Year : 2003



Image Source: Archdaily

Introduction

As of the 10th of August the community of El Dorado, a municipality of Sucre, celebrated the inauguration of their new Vertical Gym

(VG) 1. The building offers over seven thousand square meters over 7 stories: 4 layered levels dedicated to athletic facilities supported atop a concrete base that offers spaces for local businesses, municipal offices, and the renovation of a pre-existing subterranean parking structure – a model previously proven successful with the pilot project in the neighborhood of Santa Cruz, Chacao, in 2003.

The Vertical Gym covets the title of the largest sports complex in the country and the second innovative prototype developed by Urban-Think Tank (U-TT) led by architects Alfredo Brillembourg & Hubert Klumpner. The project has been presented both inside and outside of the country alongside its local Venezuelan representative José Miguel Pérez Gómez, and responds to the dire lack of public athletic venues in the dense city of Caracas.

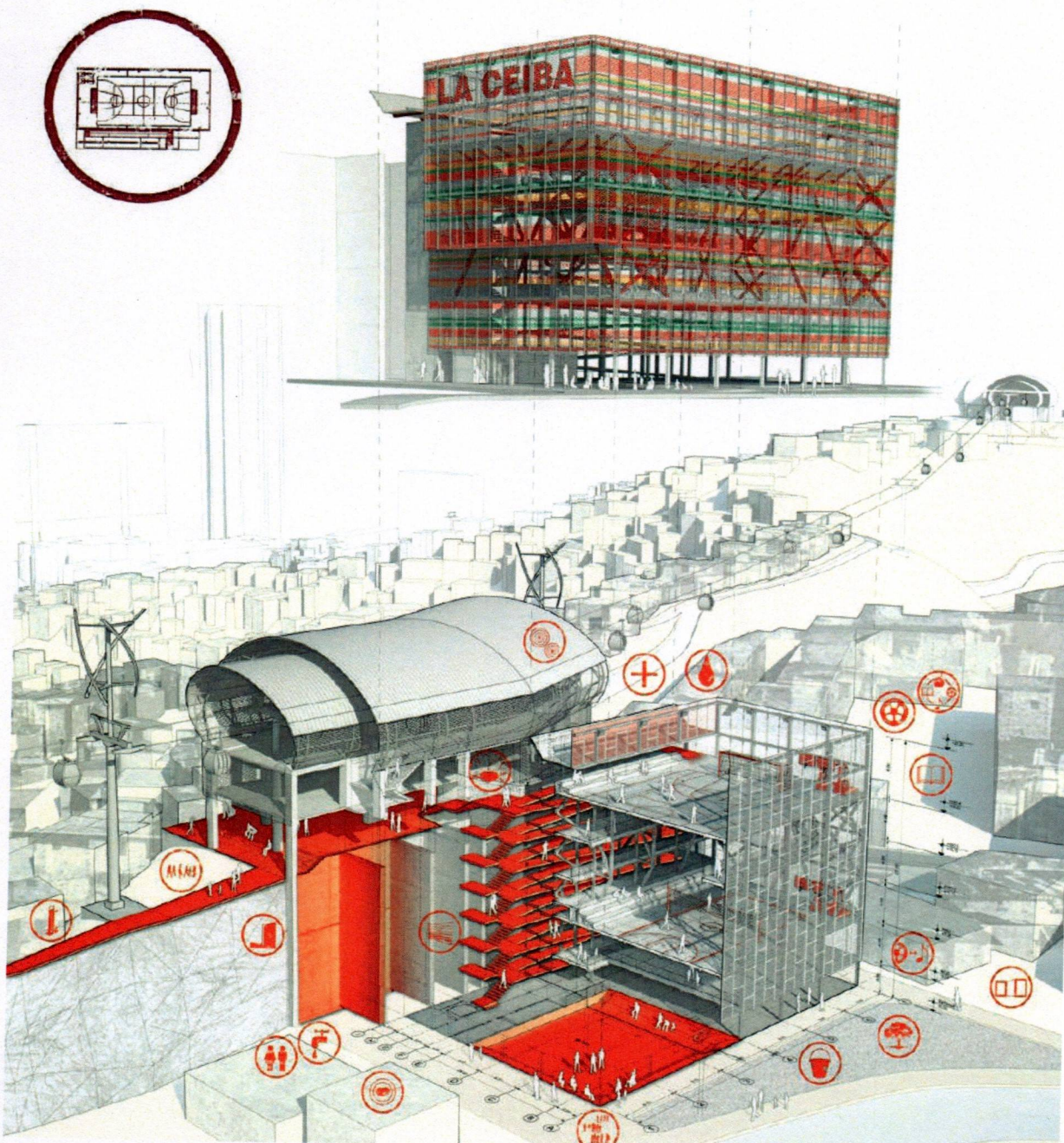


Image Source: Archdaily

Reason of choice

1. One of the very few examples of a multi storey sports facility around the globe.
2. Use of steel for construction of the modules.
3. The flexible modular nature of the design can be adapted to the need and means of diverse clients, whether by building specific parts, or in phases over time.



Image Source: Archdaily



Image Source: Archdaily

Inferences

The flexible modular design can be adapted to the need and means of diverse clients, whether by building specific parts, or in phases over time. the modular nature of the design creates a flexible nature to the usable space allowing various type of sports to indulge and interact.

The steel structures can add to the transparency of the structure as well as efficiency in the layout of services.

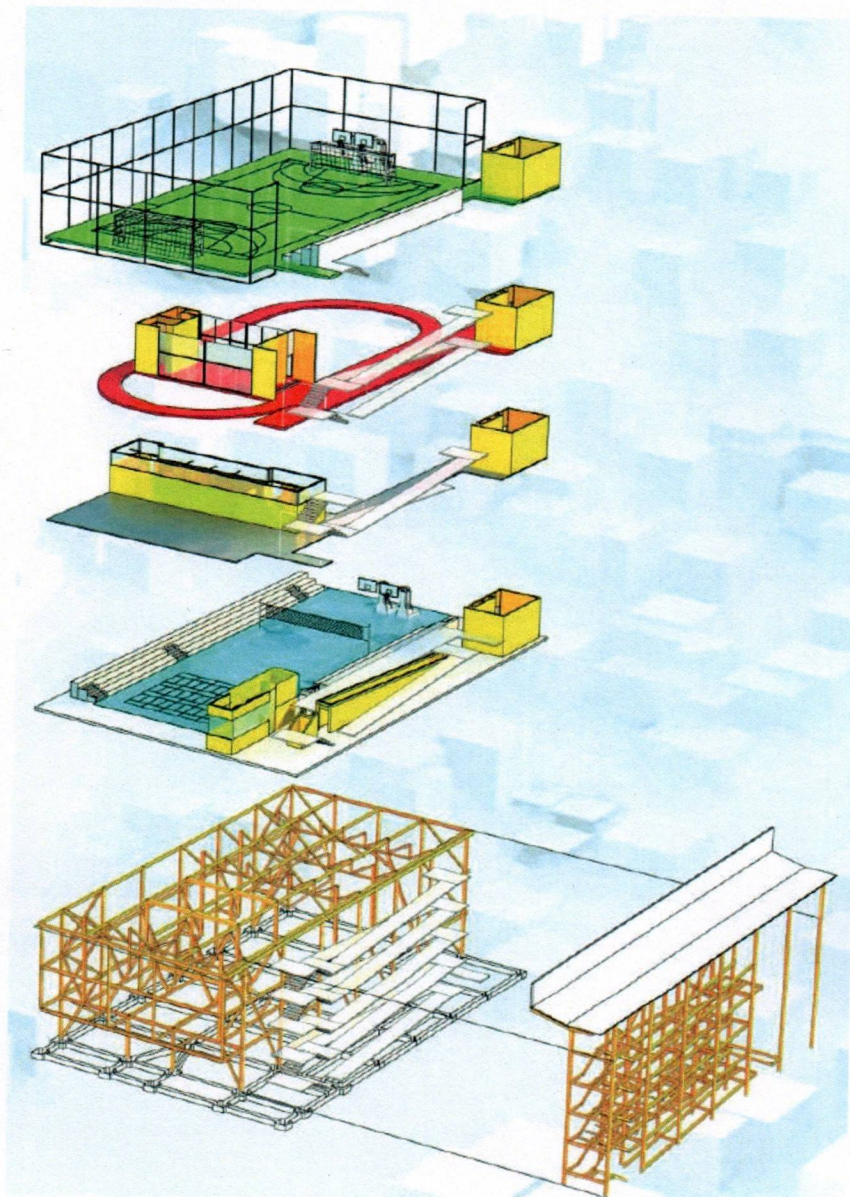


Image Source: Archdaily

Site Analysis

Chapter 4



Image Source: Google maps

Site Analysis

Site Location in Dwarka

Dwarka is a sub-city and a diplomatic enclave located in South West Delhi district of National Capital Territory of Delhi in India. The district court that functions under the Delhi High Court for South West Delhi is located in Dwarka.

The sub-city is located near to Indira Gandhi International Airport. It is among the largest sub-city in Asia. Dwarka is organized into sectors and mainly has Cooperative Group Housing Societies as residential options. It is one of the most sought-after residential areas in New Delhi. The sub-city also has the largest rooftop solar plant in the Union territory of Delhi.

Site Information



Map of India

INDIA



Map of Delhi



P5 SPORTS FACILITIES / COMPLEX / STADIUM / SPORTS CENTRE

Showcasing the site in land use Plan for delhi 2041

Image Source: dda.org.in

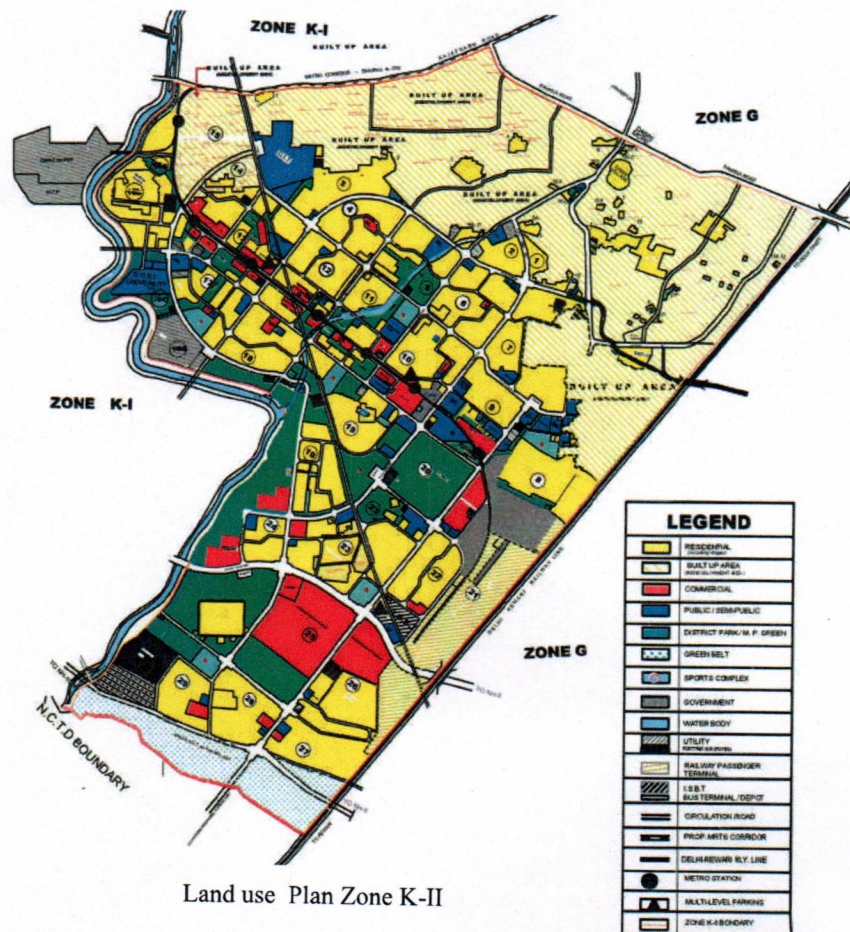
Site Detail

Sports Center

- Site Area: 244834.8 sqm (60.5 acer)
- Ground Coverage: 25% 61,208.7 sqm (15.1 acer)
- Permissible FAR: .75
- Permissible Build UP: 1,83,626.1 sqm (45.3 acer)
- Setbacks: 12m
- 2ECS/100sqm

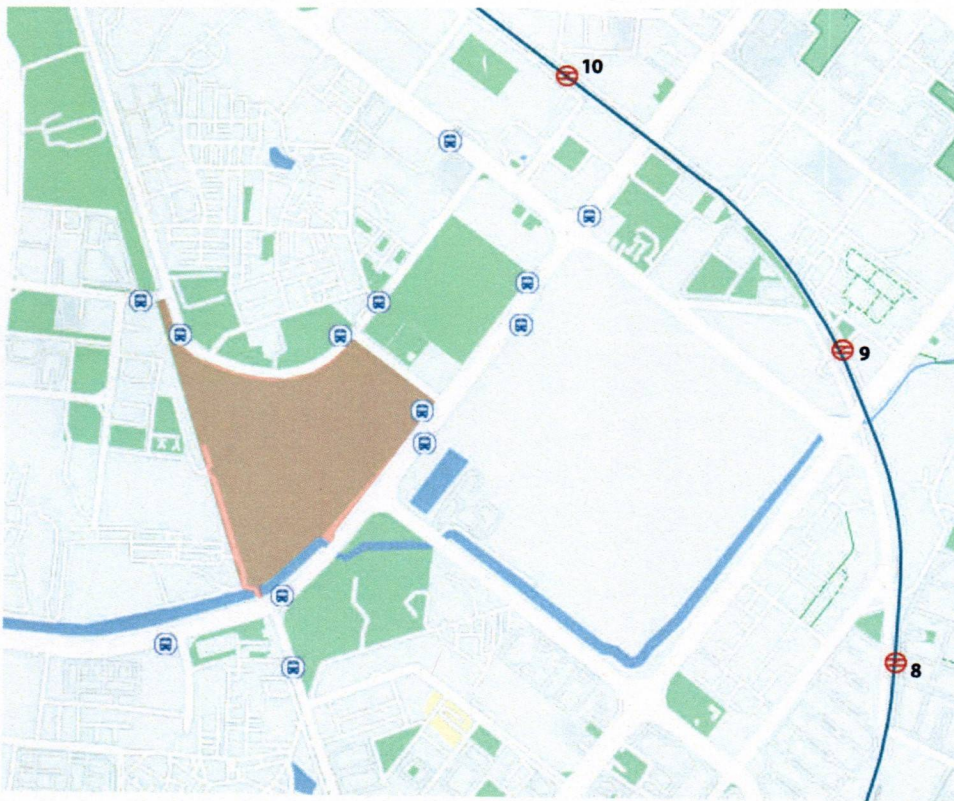
Group Housing

- Site Area 17,875.88 sqm (4.4 acer)
- Ground Coverage: 33.33% 5,958sqm
- Permissible FAR: 1.25
- Permissible Build UP: 35,751.78sqm
- Setbacks: 10m
- 2ECS/100sqm





Land use Plan Zone K-II

Image Source: dda.org.in

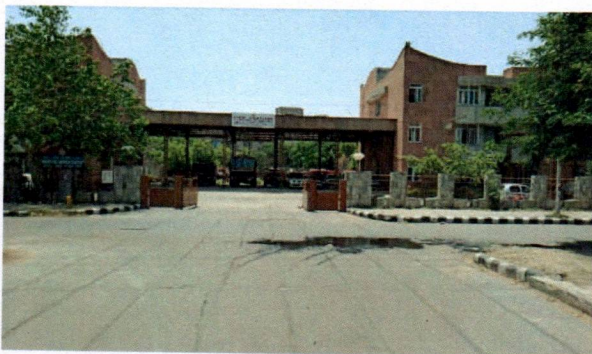


Map of Nearest Public transport

 Metro with sector
 Bus Stop

- Fire Station Dwarka 4.7KM
- Shahabad MD Pur Railway Station 3.4KM
- Indira Gandhi Hospital 2.5KM
- DCP Office District Dwarka sec 19 New Delhi 1.4KM
- Dwarka sec-10 Metro Station 1.8KM
- Indira Gandhi Airport 15.1KM

Image Source: Google maps



Fire Station Dwarka



Indira Gandhi Hospital



Shahabad MD Pur Railway Station



DCP Office District Dwarka sec 19 New Delhi

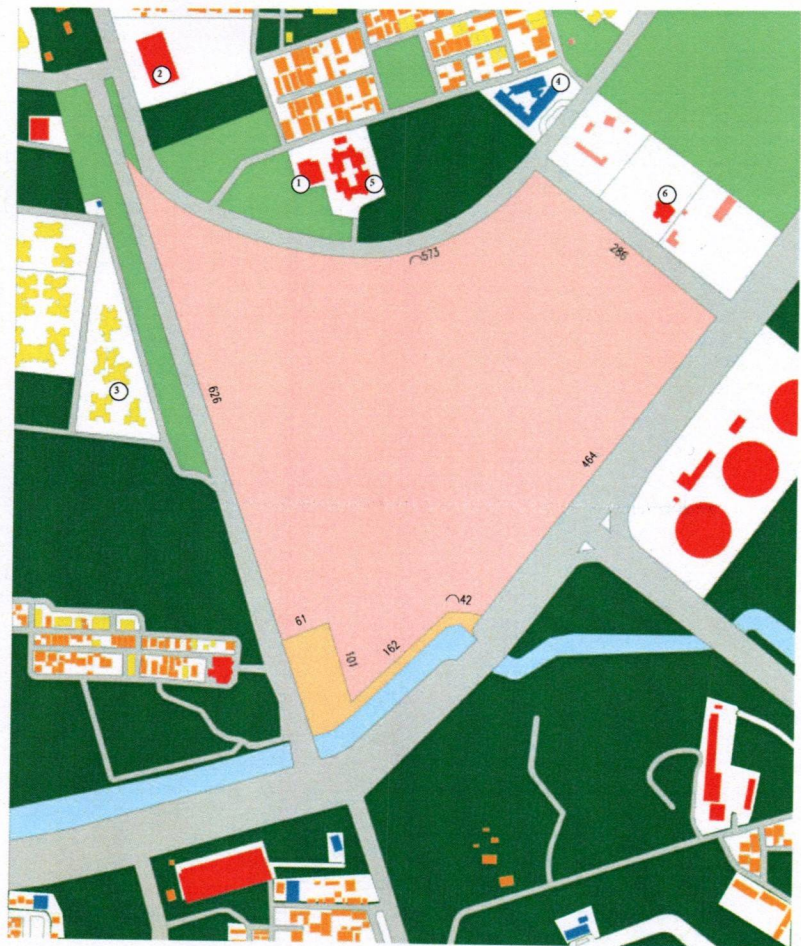
Image Source: Google maps

Neighbourhood



Existing site

- | | |
|--|--|
| ■ Institutional | ■ Road |
| ■ Residential | ■ Drain |
| ■ Commercial | ■ Barren |
| ■ Mixed Land use | ■ Controlled vegetation |
| ■ Public | ■ Uncontrolled vegetation |



Build use plan

Image Source: Author



(1.) DDA Community Hall



(2.) S.O.S.E.(School of Specialised Excellence)



(3.) Kohinoor Residency



(4.) Vardhaman Mall

Image Source: Google maps



(5.) St. Mary's School



(6.) All India Football Federation

S.W.A.T Analysis

STRENGTH

The site has a good connectivity with all public transport which includes the international airport, railway station, bus stations and Delhi metro.

WEAKNESS

There is a noise problem around the site do you in the week days.

OPPORTUNITY

The land which is empty around the site which are majorly allotted for residential properties and a big park will enhance the stadium and increase its uses.

THREAT

There is gonna be a garbage disposal area near the drainage which is being constructed.

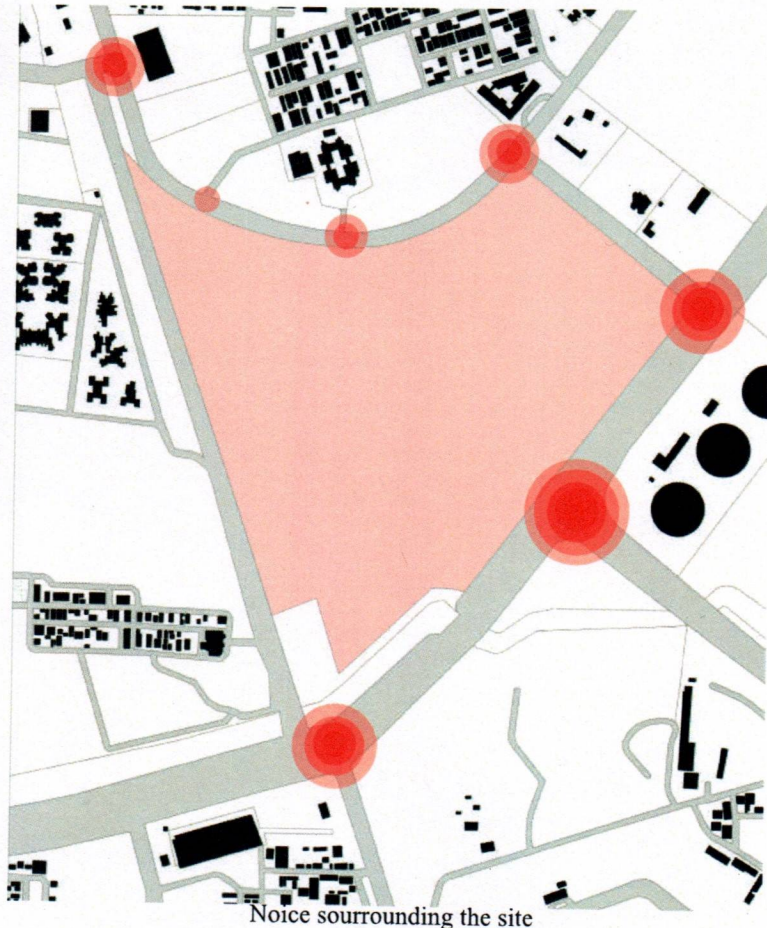
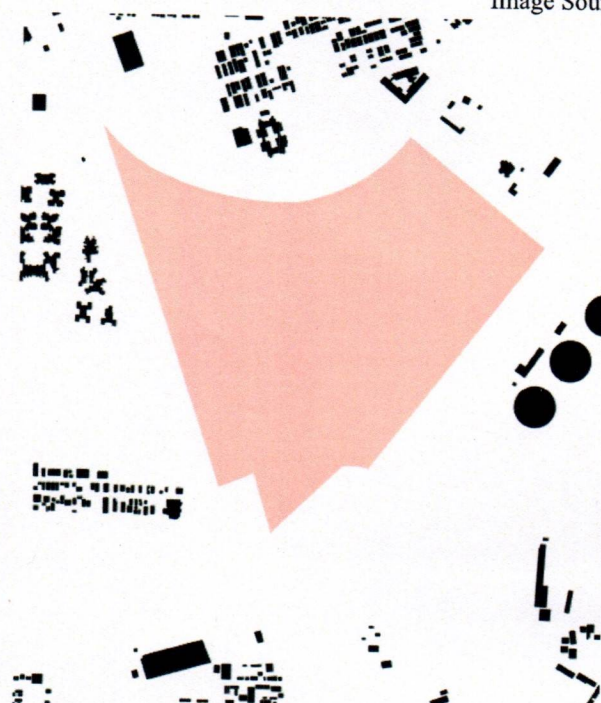


Image Source: Author



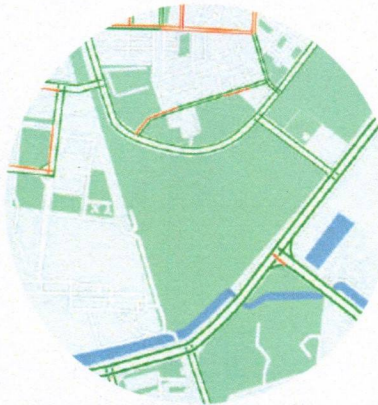
Green area



Nolis plan

Image Source: Author

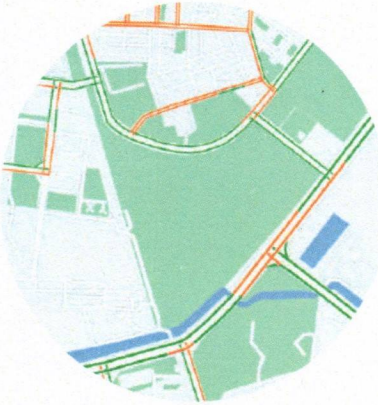
Traffic Analysis



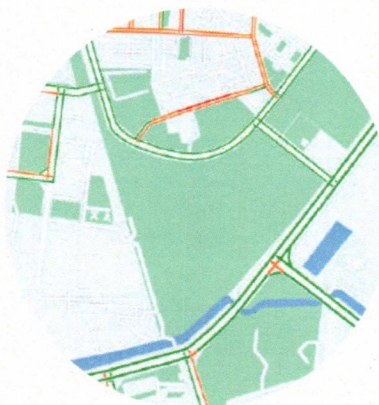
8 AM



4 PM

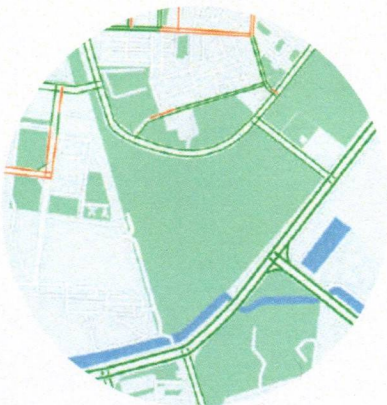


8 PM

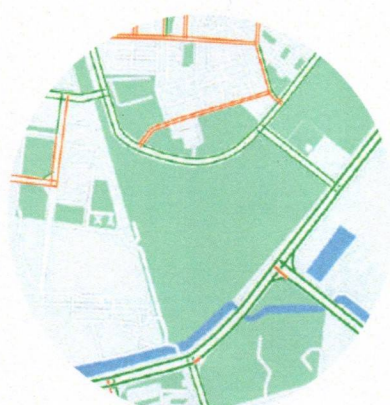


12 PM

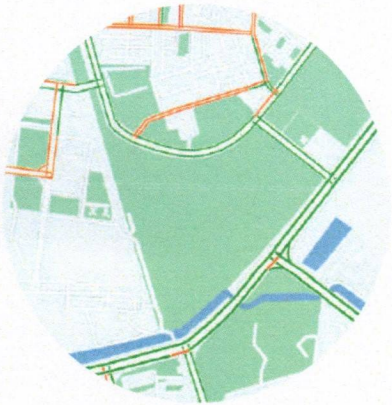
Weekday Traffic



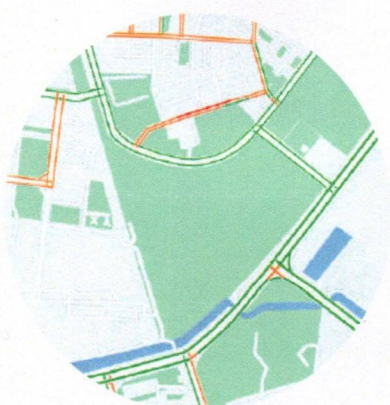
8 AM



4 PM







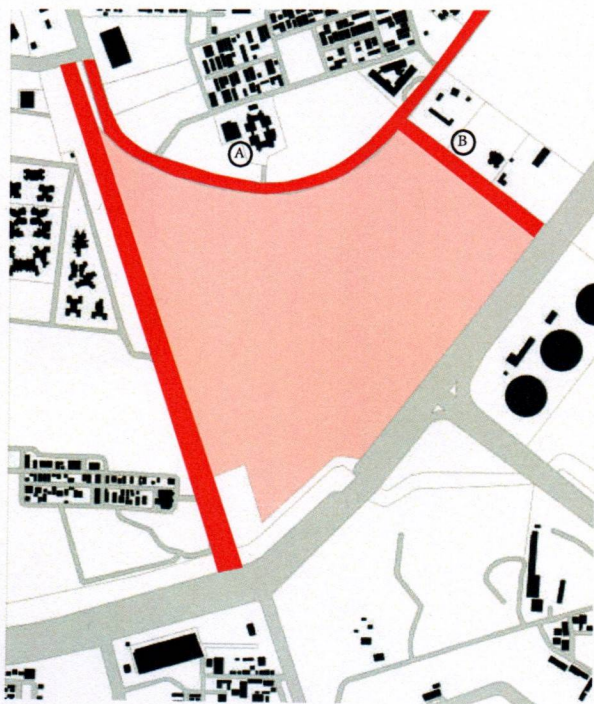
8 PM



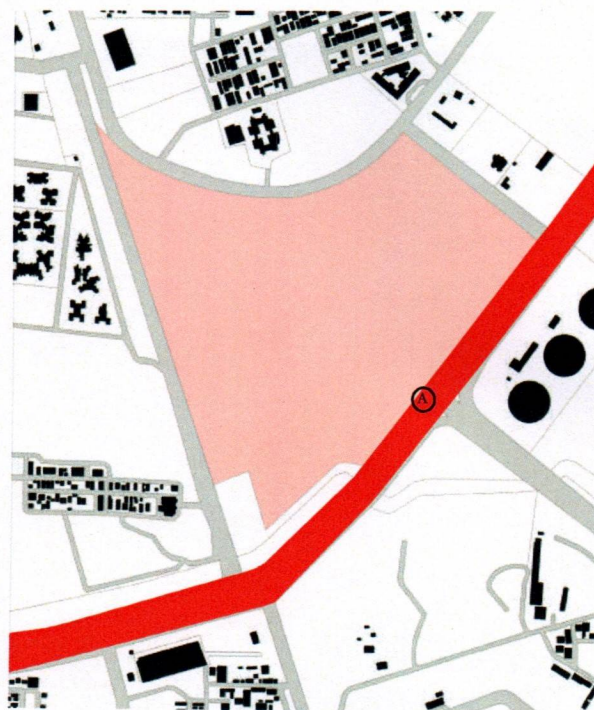
12 PM

Weekend Traffic

Fast    Slow 
Image Source: Google maps

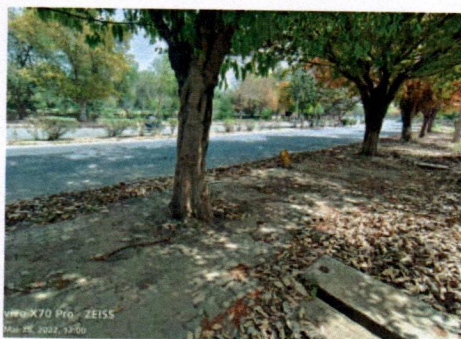


30 M wide road

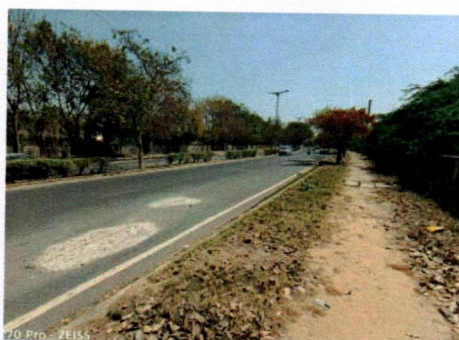


60 M wide road

Image Source: Author



30 M wide road (A)

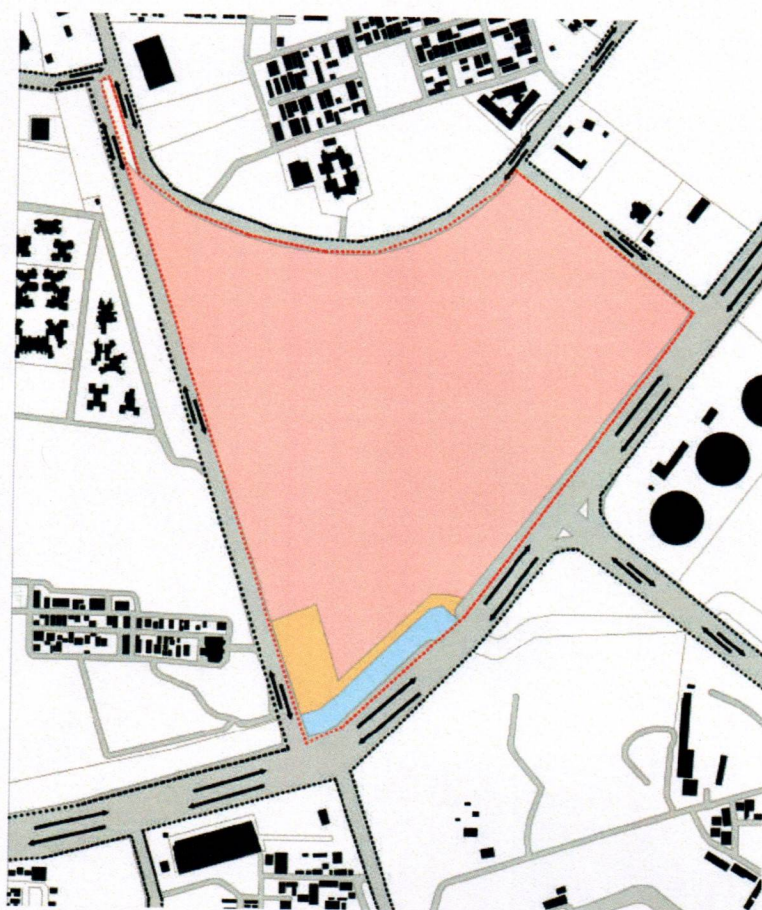


30 M wide road (B)



60 M wide road (A)

Image Source: Author



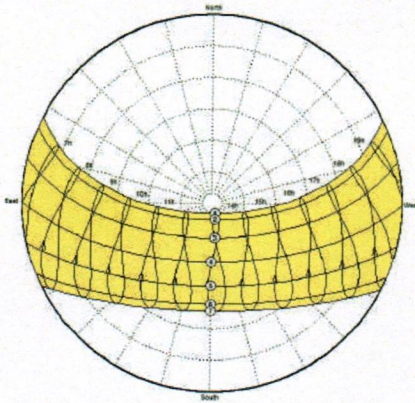
Pedestrian Walkway and vehicular flow



Image Source: Author

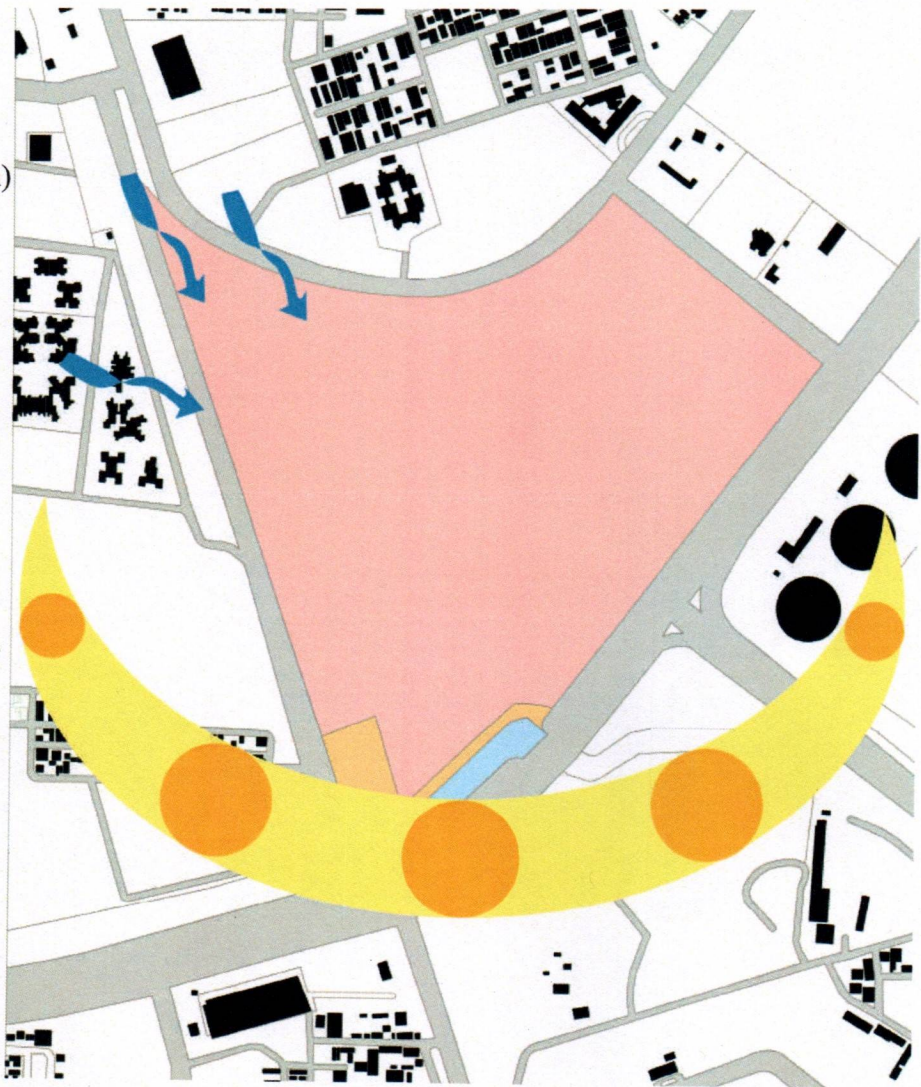
Climate Analysis

There is a very climate in Delhi. The temp in summer (Apr - Jul) is very high, while winter (Dec - Jan) is very cold. During the summer, the average temp can reach 45°C, while in the winter, it can reach 22°C to 5°C



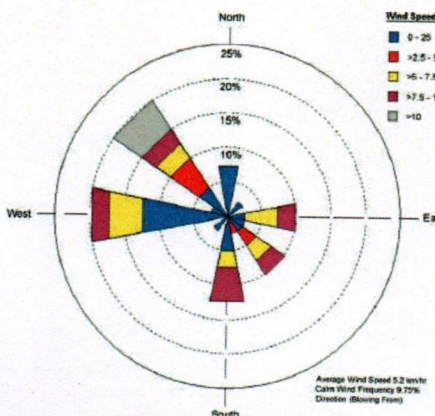
1. 22 June
2. 22 May - 23 July
3. 20 Apr - 23 Aug
4. 20 Mar - 23 Sep
5. 21 Feb - 23 Oct
6. 19 Jan - 22 Nov
7. 22 Dec

Solar path at Delhi

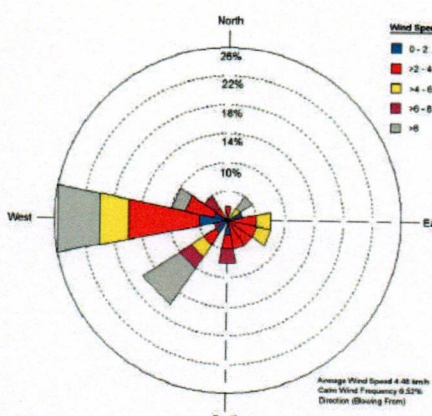


Weekend Traffic

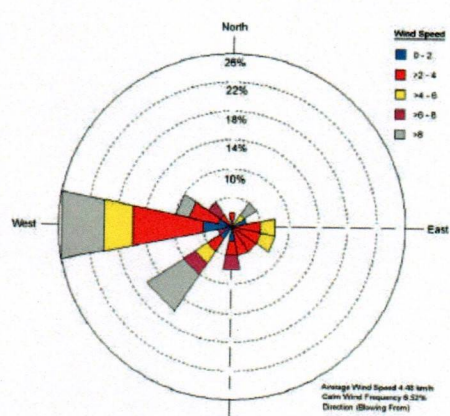
Image Source: Author



Summer Winds

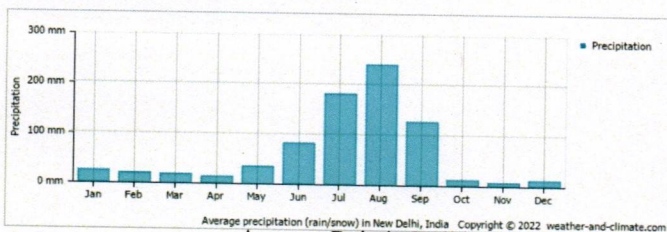


Winter Winds

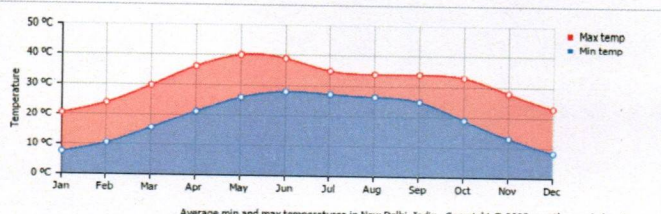


Monsoon Winds

Image Source: Arun Srivastava



Average Rain in Delhi

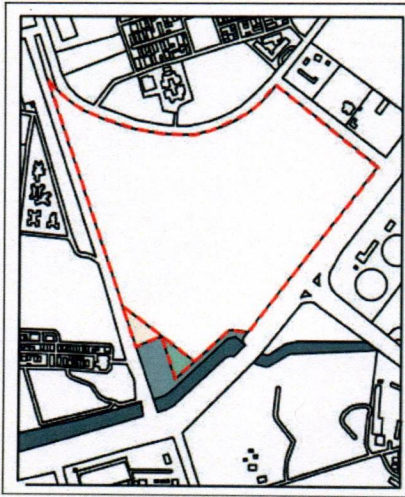


Average min & max temp in Delhi

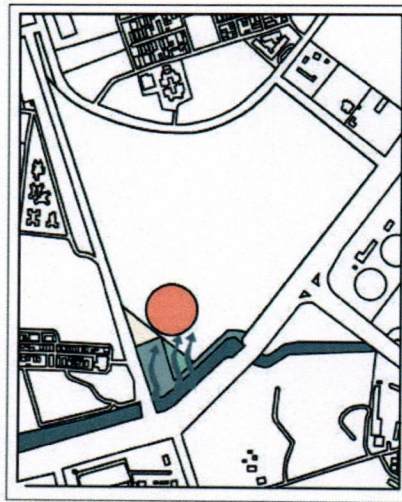
Image Source: weather-and-climate.com

Design Development

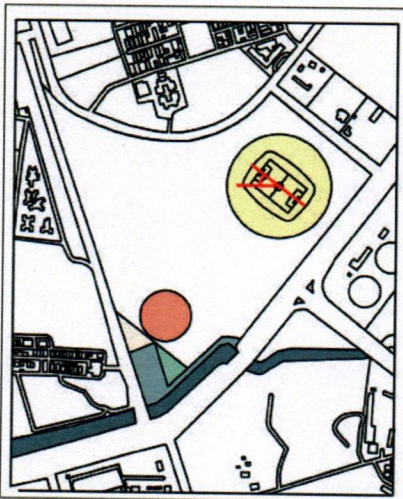
Chapter 5



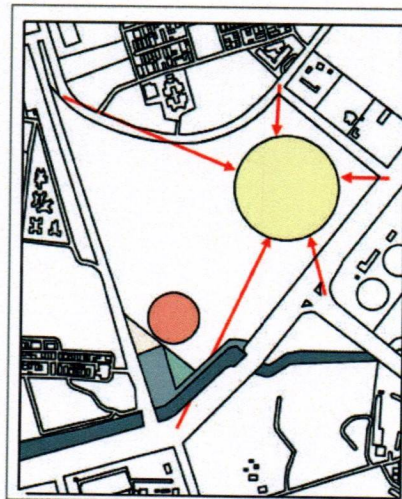
Creating a buffer by vegetation and service buildings to keep the open drainage smell from the site.



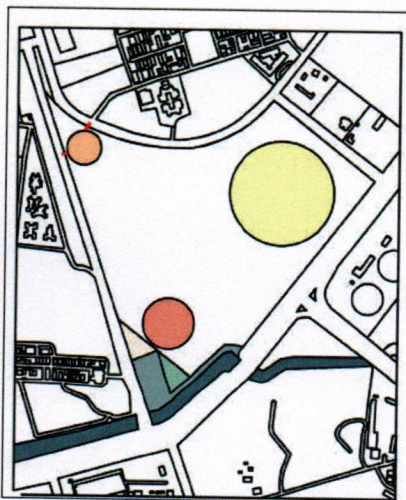
Provided a indoor sports centre in the area because it has fix windows and the temperature is artificially manipulated.



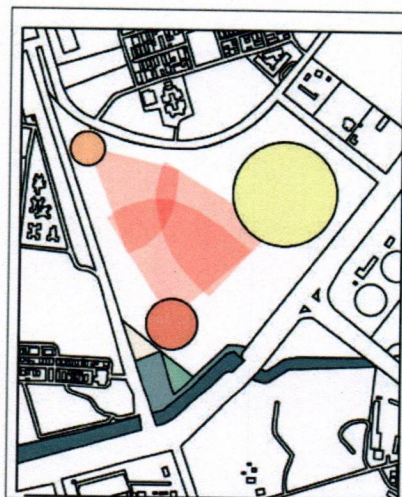
The stadium was placed according to the orientation provided by the FIFA guidelines.



Stadium was located in an area where it becomes an landmark to the site from all the junctions.



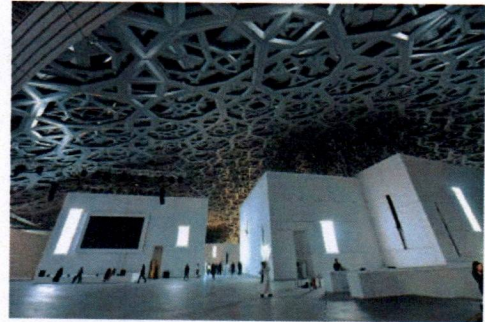
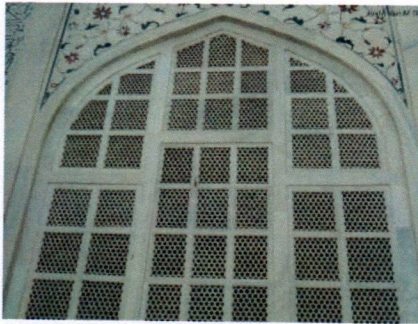
The housing facility was provided in a corner so that it has access to the road on both sides



Due to the site being very big and the span to reach different corners is huge the main building blocks should create visual permeability to direct a person.

Zoning

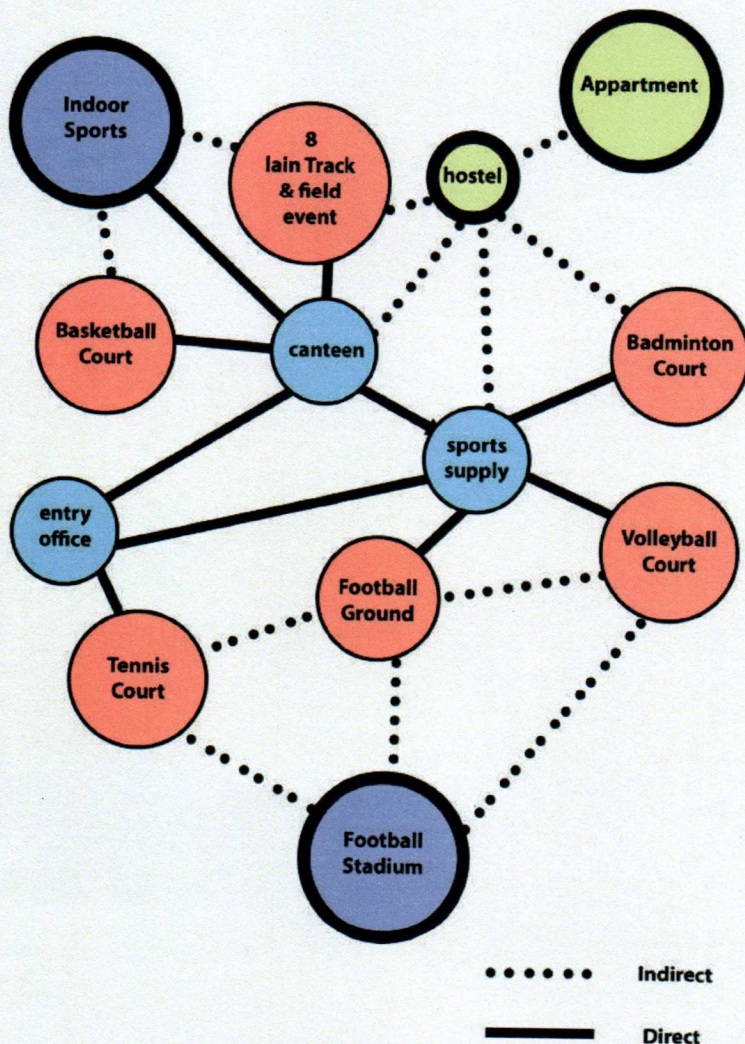
Concept



The concept of the stadium was created with elements of Taj Mahal and the constructibility of Louvre museum in Dubai. The jalties were heavily inspired by the jalties in Taj Mahal with the twist in material to construct an erect fasad.

Bubble Diagram

The three major building blocks are not connected directly but indirectly due to the different typologies and different specification of security required.

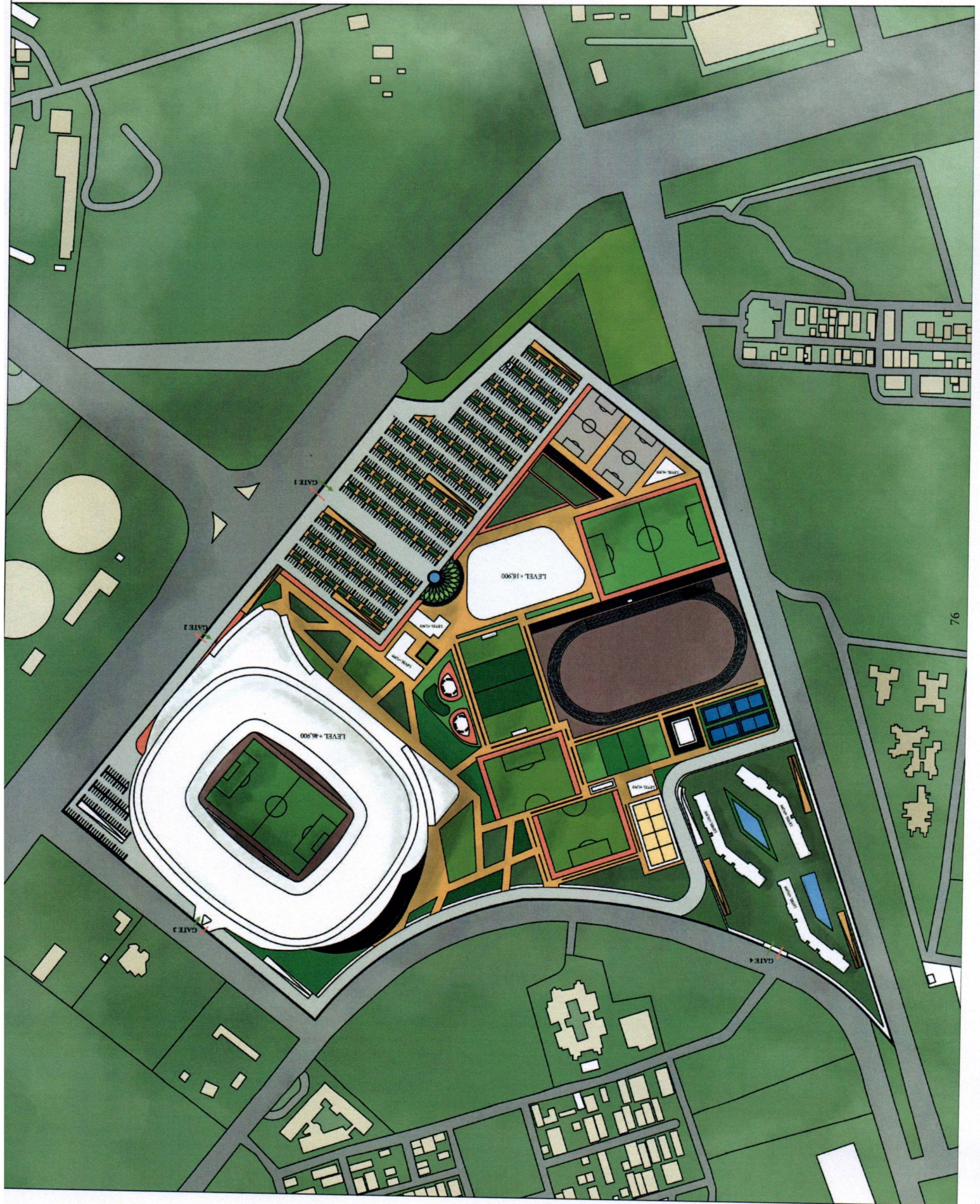


Final Design

Chapter 6



0 20 40 80 Meters



Legend

- Concession
- Vendor
- Toilets & Janitor Room
- Vertical Shaft
- Medical Room
- Lobby Area
- VIP/ VVIP Lobby Area

NORTH GATE

WEST GATE

EAST GATE

SOUTH GATE

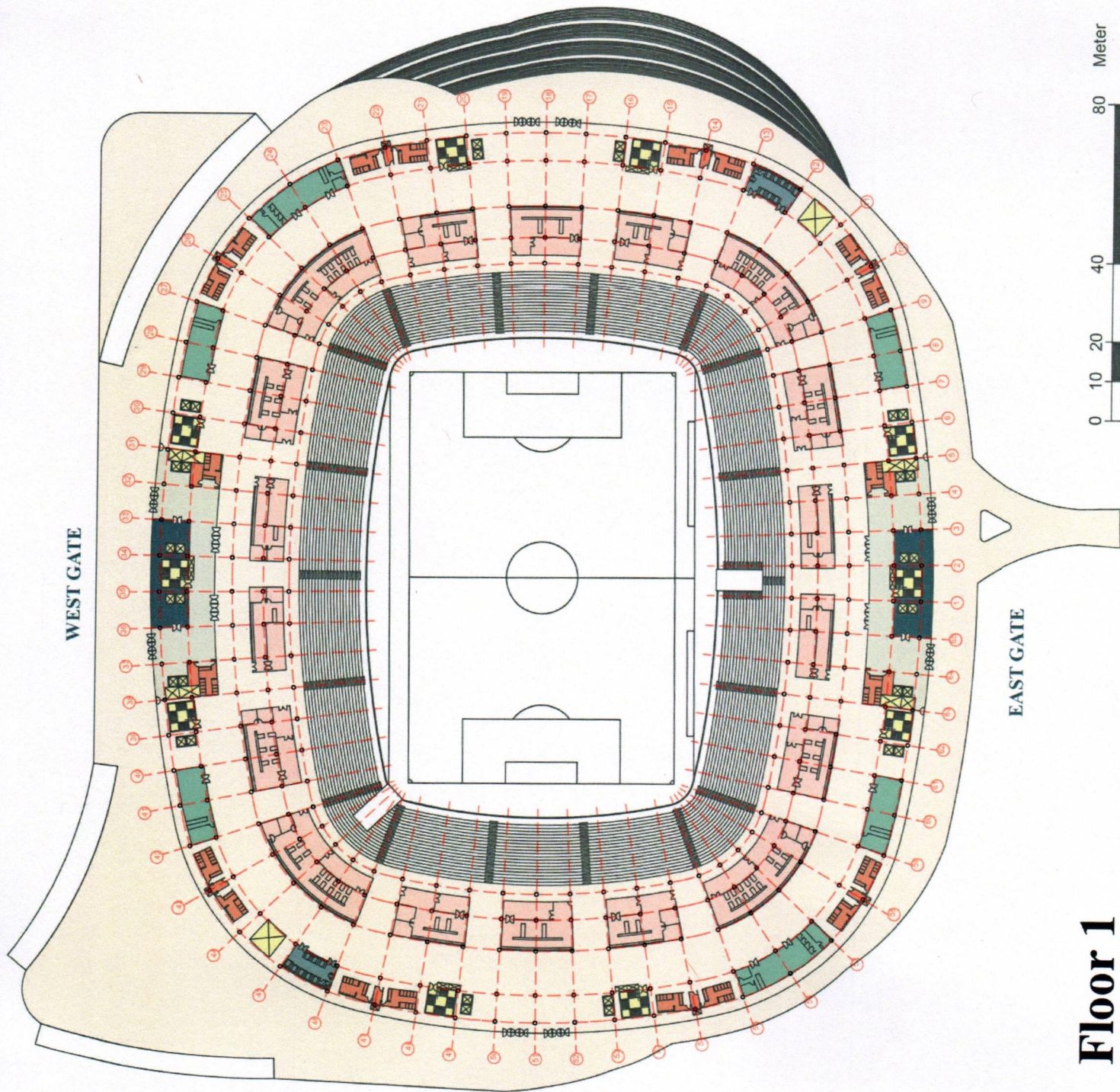


Meter

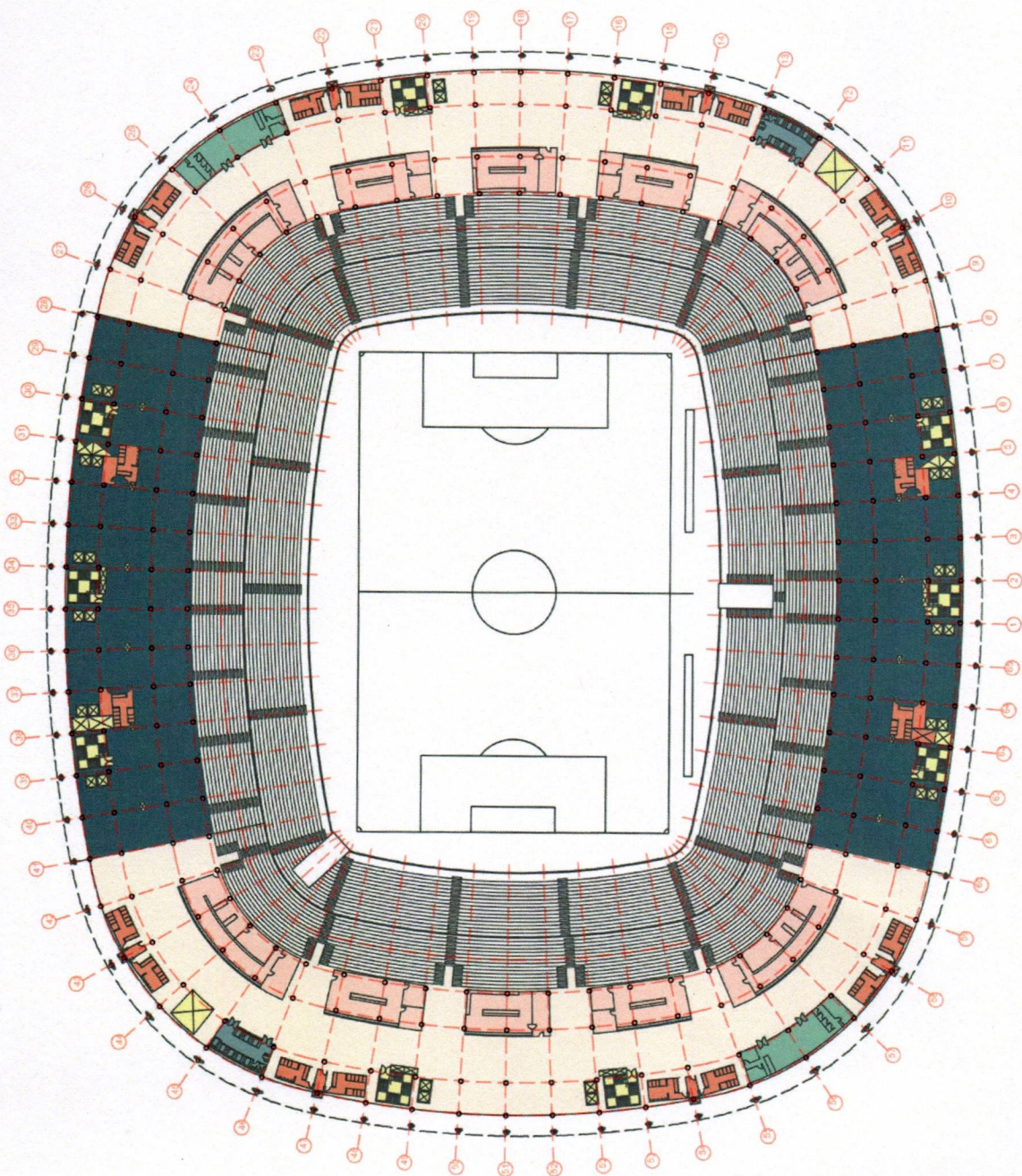
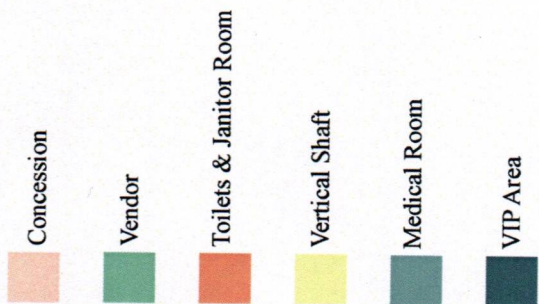


77

Floor 1



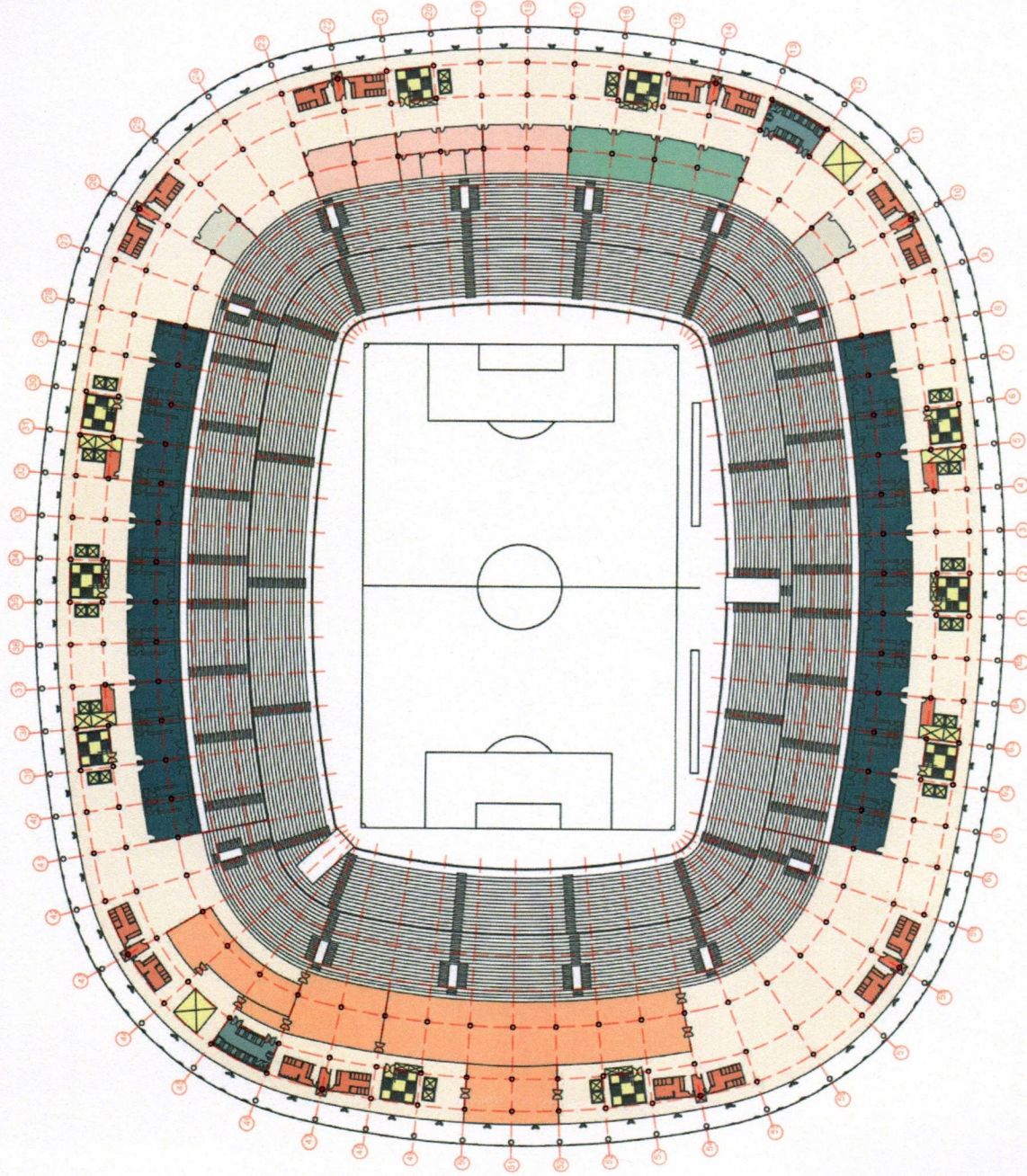
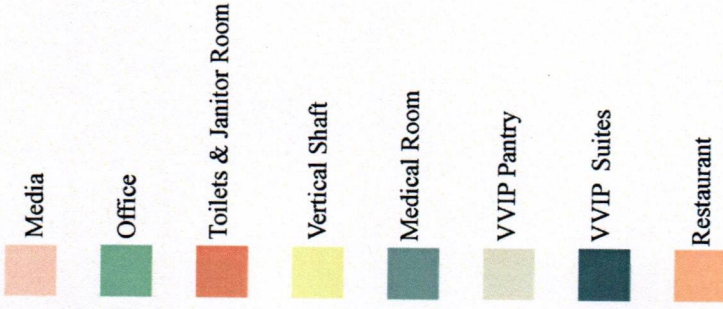
Legend



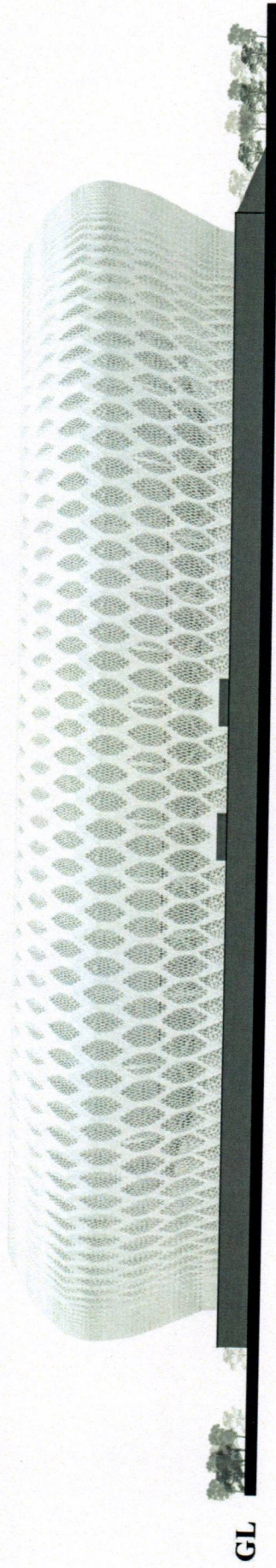
Floor 3



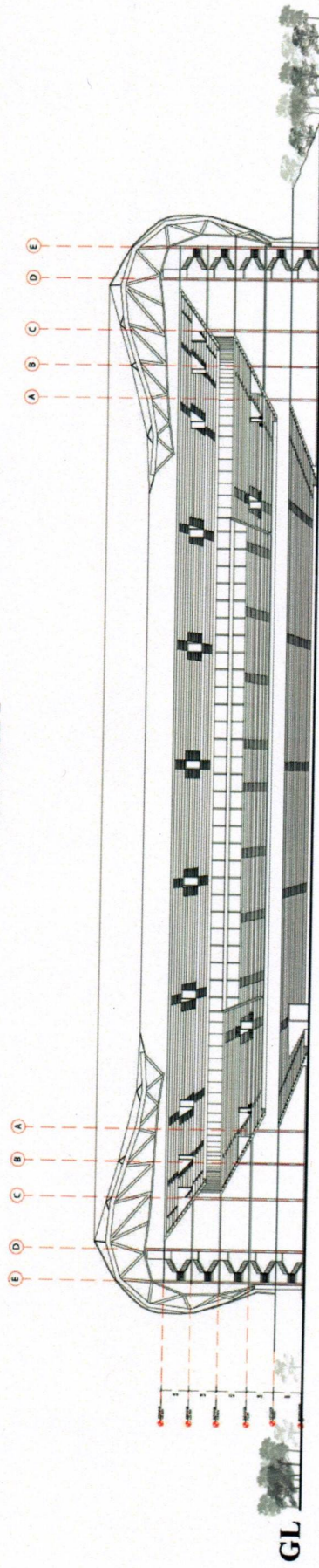
Legend



Floor 4

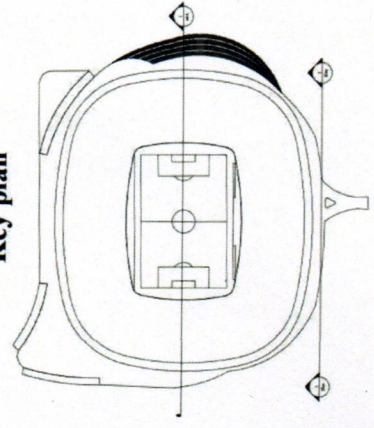


Elevation 1



Section 1

Key plan



Construction

Superstructure

Timber Truss

Space Frame

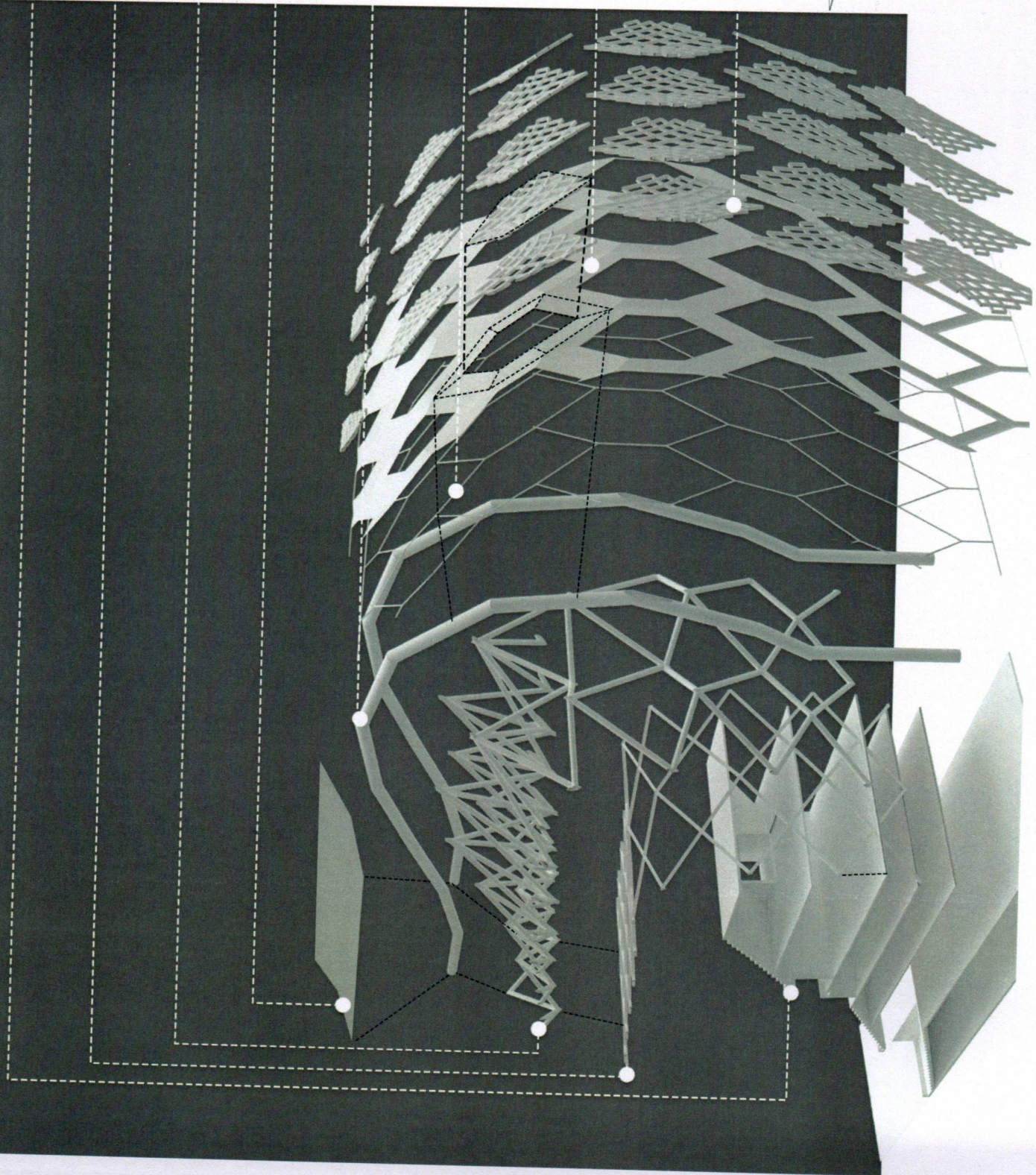
Envelope of
Cantilever

Spinal Column

Hexagon
Steel Grid

Hexagon
Steel Frame

Steel Jali



Concrete



Wood



Steel with
Black Paint



Fiber Roof-
ing Sheet



Steel with
Black Paint



Steel with
White Paint



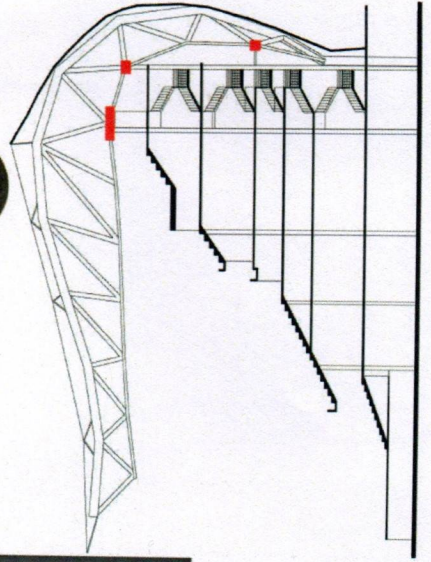
Steel with
White Paint



Steel with
White Paint



Steel with
White Paint



C-Value

Key to diagram:

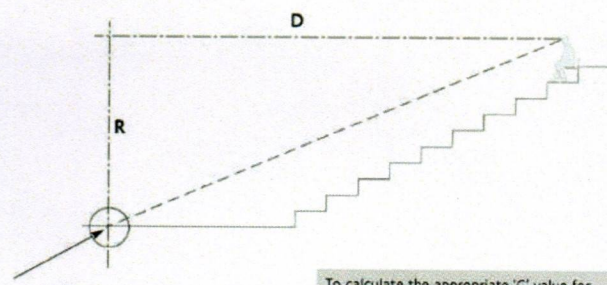
C = the 'C' value

D = the horizontal distance from the eye to the point of focus

N = the riser height

R = the vertical height to the point of focus

T = the seating row depth



To calculate the appropriate 'C' value for the sport to be viewed, the following formula applies:

$$C = \frac{D(N+R)}{D+T} - R$$

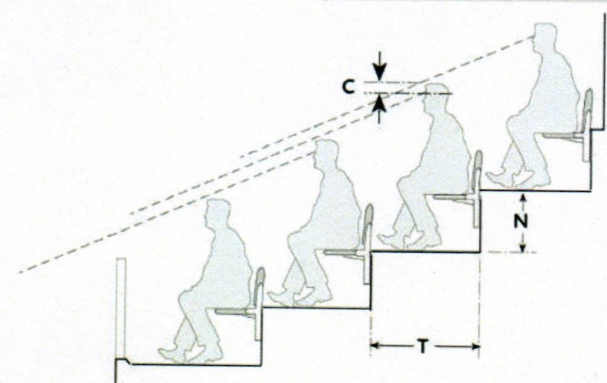
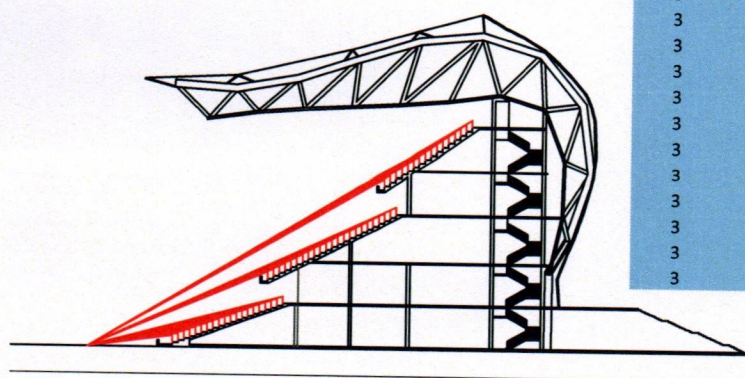


Image Source: Green Guide, p.109

C-Value (mm)	Description
60	Need to look between heads in front
90	Can see well with head tilted backwards
120	Optimal viewing standard
150	Can see well even if over spectators with hats



C-value of Dwarka Football Stadium

LVL	row	step height (N)	dist. from field (D)	Height above field (R)	seating row depth (T)	C value	UNITS
TEAR 1							
1	1	0.3	12.32	0.6	0.8		
1	2	0.3	13.12	0.9	0.8	0.231034	Meter
1	3	0.3	13.92	1.2	0.8	0.218478	Meter
1	4	0.3	14.72	1.5	0.8	0.207216	Meter
1	5	0.3	15.52	1.8	0.8	0.197059	Meter
1	6	0.3	16.32	2.1	0.8	0.18785	Meter
1	7	0.3	17.12	2.4	0.8	0.179464	Meter
1	8	0.3	17.92	2.7	0.8	0.171795	Meter
1	9	0.3	18.72	3	0.8	0.164754	Meter
1	10	0.3	19.52	3.3	0.8	0.158268	Meter
1	11	0.3	20.32	3.6	0.8	0.152273	Meter
1	12	0.3	21.12	3.9	0.8	0.146715	Meter
1	13	0.3	21.92	4.2	0.8	0.141549	Meter
1	14	0.3	22.72	4.5	0.8	0.136735	Meter
1	15	0.3	23.52	4.8	0.8	0.132237	Meter
1	16	0.3	24.32	5.1	0.8	0.128025	Meter
1	17	0.3	25.12	5.4	0.8	0.124074	Meter
1	18	0.3	25.92	5.7	0.8	0.120359	Meter
1	19	0.3	26.72	6	0.8	0.11686	Meter
1	20	0.3	27.52	6.3	0.8	0.113559	Meter
TEAR 2							
2	1	0.42	25.4	9.79	0.8	0.108244	Meter
2	2	0.42	26.2	10.21	0.8	0.105037	Meter
2	3	0.42	27	10.63	0.8	0.102014	Meter
2	4	0.42	27.8	11.05	0.8	0.099161	Meter
2	5	0.42	28.6	11.47	0.8	0.096463	Meter
2	6	0.42	29.4	11.89	0.8	0.093907	Meter
2	7	0.42	30.2	12.31	0.8	0.091484	Meter
2	8	0.42	31	12.73	0.8	0.089182	Meter
2	9	0.42	31.8	13.15	0.8	0.086994	Meter
2	10	0.42	32.6	13.57	0.8	0.08491	Meter
2	11	0.42	33.4	13.99	0.8	0.082924	Meter
2	12	0.42	34.2	14.41	0.8	0.081029	Meter
2	13	0.42	35	14.83	0.8	0.079218	Meter
2	14	0.42	35.8	15.25	0.8	0.077486	Meter
2	15	0.42	36.6	15.67	0.8	0.075829	Meter
2	16	0.42	37.4	16.09	0.8	0.074241	Meter
2	17	0.42	38.2	16.51	0.8	0.072718	Meter
2	18	0.42	39	16.93	0.8	0.071256	Meter
2	19	0.42	39.8	17.35	0.8	0.069852	Meter
2	20	0.42	40.6	17.77	0.8	0.068502	Meter
2	21	0.42	41.4	18.19	0.8	0.067204	Meter
2	22	0.42	42.2	18.61	0.8	0.065953	Meter
2	23	0.42	43	19.03	0.8	0.064749	Meter
TEAR 3							
3	1	0.56	41.32	22.93	0.8	0.113846	Meter
3	2	0.56	42.12	23.49	0.8	0.111724	Meter
3	3	0.56	42.92	23.93	0.8	0.111876	Meter
3	4	0.56	43.72	24.49	0.8	0.109865	Meter
3	5	0.56	44.52	24.93	0.8	0.110044	Meter
3	6	0.56	45.32	25.49	0.8	0.108135	Meter
3	7	0.56	46.12	25.93	0.8	0.108338	Meter
3	8	0.56	46.92	26.49	0.8	0.106521	Meter
3	9	0.56	47.72	26.93	0.8	0.106744	Meter
3	10	0.56	48.52	27.49	0.8	0.105012	Meter
3	11	0.56	49.32	27.93	0.8	0.105251	Meter
3	12	0.56	50.12	28.49	0.8	0.103598	Meter
3	13	0.56	50.92	28.93	0.8	0.103852	Meter
3	14	0.56	51.72	29.49	0.8	0.10227	Meter
3	15	0.56	52.52	29.93	0.8	0.102536	Meter
3	16	0.56	53.32	30.49	0.8	0.10102	Meter

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