



## DOHA 2022 WORLD CUP STADIUM

By

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Submitted to the College of Engineering  
in partial fulfillment of the requirements for the degree of  
Bachelor degree in Architectural Engineering

Palestine Polytechnic University

May 2015



## CERTIFICATION

Palestine Polytechnic University

The senior project entitled :

**DOHA 2022 WORLD CUP STADIUM**

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In according with the recommendation of the project supervisor and the acceptance of all examining committee members ,this project has been submitted to the Department Of Architectural and Civil Engineering in the college of engineering and Technology in partial fulfillment of the requirements of the department for the degree of Bachelor of Engineering .

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A handwritten signature in blue ink, consisting of stylized, overlapping loops and a long horizontal stroke extending to the right.

**Department Chairman**

A handwritten signature in blue ink, featuring a cursive name at the top and a large, bold, stylized flourish below it.

## TO

Those who blessed my life as mentors :

Adv. RAJAI ABUKHALAF

HANAN ABUKHALAF

Prince. GHAZI BIN MUHAMMAD

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Professor. Dr. DAWOOD ZAATARI

adv. SULEIMAN ABU SNEINEH

To those I may have missed this project is dedicated to you , too .

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## ABSTRACT

After that Qatar won hosting the World Cup in 2022 was bound to meet all FIFA requirements of infrastructure and athletic fields serve the World Cup and because Qatar has the atmosphere of a hot ranked among the most heat and moisture areas of the world it was necessary to take this into account and be taken into account when designing the study the design of the stadium and get approval from the International Committee of FIFA.

My studies were taken into account all the necessary utilities and facilities for the stadium was chosen as its location in the State of Qatar, Doha, in the port area by the Qatari Supreme Committee for Heritage and give the competition a period of design until 2015 , and it should be noted that the location is close to all the most vital in Doha areas.

The study of these theories have created a kind of linkage in office with the local and international community and how important and blending diverse cultures and deal with them, whether natives or residents visiting their welcome.

# CHAPTER 1

## INTRODUCTION

### CHAPTER 1

- 1.1 Background of project
- 1.2 Purpose of the study
- 1.3 Scope of the study
- 1.4 Research methodology
- 1.5 Research structure

## 1.1. Background of the project

Qatar currently plays a prominent role in the fields of sports, investing sport as a means to improve the formulation of relations, and strengthen friendships with the countries of the world. Qatar has expressed interest in a clear and effective for all countries of the world.

Touched on the subject of being the most important issues that constitute a point of attraction for the Arab States and the courtship of knowledge and mutual culture between the Western and Eastern countries, which was the first time the world to get the state such as Qatar a chance to host the World Cup event with the knowledge that the population of the State of Qatar are eager to football incredibly like a part of their daily lives.

Bring the World Cup a great economic return and the addition of international friendships and even he can community of mixing closely and encourage skilled workers to give experiences and known international community on the most important monuments and cultural addition to the social, this reflection factor of international, regional and local planning.

## 1.2. Purpose of the study

- The success of the project to obtain approval from FIFA.
- Add esthetic icon and landmark.
- Tourism attraction.
- Increase the revenue of the host country .

## 1.3. Scope of the study

- Difficulty communicating with consultants and specialists with experience
- Lack of local case studies dedicated to this event stadiums
- The lack of scientific research

## 1.4. Research Methodology

Adopted research methodology hierarchically and gradually as a general for the understanding of the main chapters, and specific methodology to be logically for design and analysis in addition to planning , respect to circulation zones even to functional, to assist in the design process in the next phase, in addition to that it was in accordance with the environmental analytical for the hosted country of world cup.

## 1.5. Research structure

Search consists of six chapters included studies of all aspects of the international stadium for the World Cup according to the standards of the host country for the World Cup was to split the class as follows:

### 1. Chapter one:

Description of the project, purposes, and research methodology to reach the best results and give a theoretical background for the project.

### 2. Chapter two:

Historical background and according to the schedule sequence of origination named until the present time.

### 3. Chapter three:

Study Planning Criteria and follow the curriculum by logical analysis and synthesis schematic of the stadium from the furthest point even get to the stadium .

### 4. Chapter four:

Includes the standards and principles of architectural design, each of the basic components of the stadium including enclosed spaces or open or semi-open, according to a central point of stadium access to other functional facilities .

### 5. Chapter five:

Includes case studies and use the first two methods in terms of intellectual and philosophical and spatial design, and other familiar with the situation according to the steps that have been used in the planning and design methodology that will examine in the fourth quarter.

### 6. Chapter six:

Has been a strategy in the selection of the site, and an analysis of the site, which was chosen in accordance with the Qatari Higher Committee, which met to compete in the selection of design.

# CHAPTER 2

## HISTORY OF STADIUM

### CHAPTER 2

- 2.1 Greek
- 2.2 Roman

## 2. History of Stadium

### 2.1. Greek

The stadium was first produced by the ancient Greeks to fulfill a religious and social need (Figure 2.1.a). (Handbook of sport and recreation building design, 1981).

The ancestral prototypes for modern sports facilities of all kinds are the stadia and hippodromes of ancient Greece (as far as we can tell) in the eighth century BC. (Stadia, 2007).



(Figure 2.1.a Greek sport facilities).  
(Olympic and Stadium, 2002)

#### 2.1.1. Stadia

Greek stadia (foot racecourses) were laid out in a U-shape. Some, following the pattern of Greek theatres, were cut out of a hill side so that banks of seats with good sightlines could be formed naturally, while others were constructed on flat ground. (Stadia, 2007).

Stadia built on the flat existed at Ephesus, Delphi and Athens. The one at Delphi was almost 183m long by 28m wide, had a shallow bank of seats along one side and around the curved end, and the judges' seats were at the midpoint of the long side – very much as in a modern facility. The stadium at Athens was first built in 331 BC, reconstructed in AD 160 and reconstructed again in 1896 for the first modern Olympic games. In this form it can still be seen, accommodating up to 50 000 people in 46 rows (Figure 2.1.b). (Stadia, 2007).



(Figure 2.1.b. The U-shaped Sunken stadium at Athens, first built in 331 BC for the stages of foot races).  
(Stadia, 2007)

#### 2.1.2. Hippodromes

These courses for horse and chariot races were roughly 198m to 228m long and 37m wide and were laid out, once again, in a U-shape. Like Greek theatres, hippodromes were usually made on the slope of a hill to give rising tiers of seating, and from them developed the later Roman circuses, although these were more elongated and much narrower. (Figure 2.1.c). (Stadia, 2007).

## 2.2.Roman

The militaristic Romans were more interested in public displays of mortal combat than in races and athletic events. (Figure 2.2 a.) (Stadia, 2007).

### 2.2.1.Circuses

These circuses were U-shaped equestrian racecourses with the straight end forming the entrance and accommodating the stalls for horses and chariots. (Figure 2.2 b.) (Stadia, 2007).

Seats rose in tiers along the straight sides of the U and round the curved end, the lower seats being in stone and reserved for members of the upper classes, the upper seats made of wood. (Stadia, 2007).

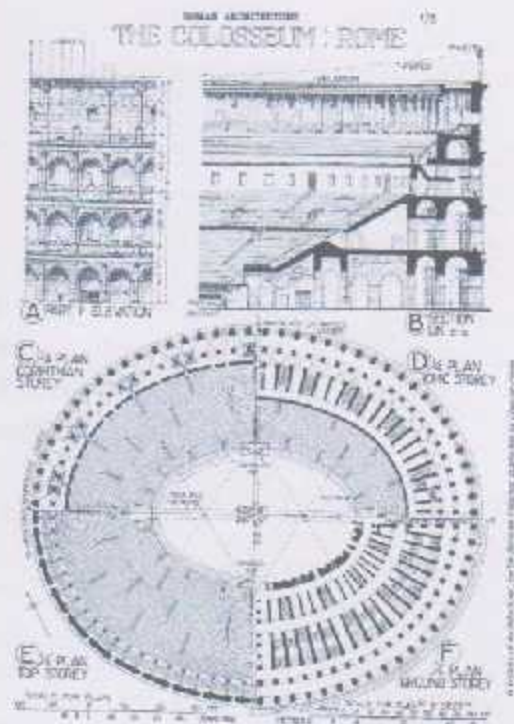
### 2.2.2.Amphitheater ( Colosseum - Flavian)

The Flavian Amphitheatre in Rome better known as the Colosseum from the eighth century onwards, is the greatest exemplar of this building type and has seldom been surpassed to this day as a rational fusion of engineering, theatre and art. (Figure 2.2 c.) (Stadia, 2007).

Construction began in AD 70 and finished 12 years later. (Stadia, 2007).

Spectators had good sight lines to the arena below, the latter being an ellipse of roughly 88m by 55m bounded by a 4.6 m high wall. There were 80 arched openings to each of the lower three storeys (with engaged columns and encircling entablatures applied to the outer wall surface as ornamentation), the openings at ground level giving entrance to the tiers of seats. (Stadia, 2007).

The term 'arena' is derived from the Latin word for 'sand' or 'sandy land', referring to the layer of sand that was spread on the activity area to absorb spilled blood. (Stadia, 2007).



(Figure 2.2 c The Colosseum of Rome ( AD 82) was built for gladiatorial combat and not for races. The great stone and concrete drum fused engineering, theater and art more successfully than most modern stadia). (Stadia, 2007)

# CHAPTER 3

## P LANNING STANDARDS

### CHAPTER 3

- 3.1 Site topography
- 3.2 Orientation
- 3.3 Safety and security
- 3.4 Site accessibility
- 3.5 Parking

### 3.1. Site topography

The topography, or physical features, of the site is extremely important.

Understanding the physical properties (the need to process large pits and therefore high cost) and geological (will reveal which by scanning Cop grave example, groundwater, soil bearing, the ills of the uses of the land as a place to lay waste which need in such a case the cost of high health to be treated) and urban planning and legislation (land use surrounding the site itself, which need the presence of consultants city planning specialists or getting approval). (UEFA, 2004).



(Figure 3.2 a show relationship to physical surrounding area) (UEFA, 2004).

### 3.2. Orientation

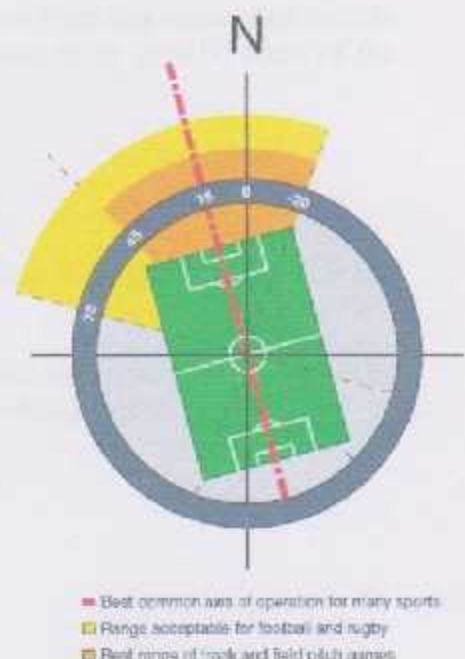
When planning the orientation of the pitch, the primary consideration is its position in relation to the sun and prevailing wind. (Football Stadiums, 2004).

Football are played during all seasons, An ideal orientation for the playing area is to have its longitudinal axis running north-south, or perhaps northwest-southeast. (Figure 3.3 a) (Stadia, 2007).

Assuming a north-south orientation, the main TV camera positions should be in the west stand (main stand) to avoid problems caused by the glare of the sun. (Football Stadiums, 2004).

North-south orientation is generally considered best, as it means that, in the evening, the setting sun will not hinder the vision of one team more than the other. (Football Stadiums, 2004).

It is particularly important that any deviation from a north-south direction is kept to a minimum if the stadium and pitch are not covered. (Football Stadiums, 2004).



### 3.3. Safety and security

Police and related security systems are vital considerations in modern stadia. (Stadia, 2007)

Every section of the stadium, including access and exit points, turnstiles, the main concourse, fire doors, VIP areas, and all player and media areas, should comply fully with national and local safety regulations and standards, with regard to both fire protection and health and safety. (UEFA, 2004)

The stadium design must include control rooms and meeting rooms for security staff, as well as adequate facilities for the police and first aiders. Furthermore, provision must be made for easy, direct vehicle access for emergency services. (UEFA, 2004)

#### 3.3.1. Facilities for police and security officials

Content police control room, two cells with toilets, refreshment and rest room facilities for police, waiting and information room, and mass arrest facilities – requiring two compounds each to take a group of say 30 spectators, if this is required. (Stadia, 2007).

Facilities such as a police muster room, a charge room and detention cells for male and female prisoners within the stadium itself. (Football Stadiums, 2004).

##### 3.3.1.1 Police control room

The control room is the hub from which the stadium security officer and their team, together with representatives of the local authorities and emergency services, monitor and control all aspects of crowd safety and stadium management.

Control room with glass screen overlooking the sports pitch, with video screen consoles in the room (This is the nerve centre from which the entire venue). (Stadia, 2007).

police control room that all security operations should be monitored, decisions should be taken and instructions given through telephone, wireless and public radio broadcasts. (Stadia, 2007)

It is also important that camera orientation can be controlled from this room, and be able to traverse sideways and elevate up and down as well as zooming in to specific areas of the crowd, perhaps identifying individual spectators. (Stadia, 2007).

#### 3.3.2. Fire safety and prevention

Modern stadiums are built using non-flammable materials such as concrete and fire protected steel. (UEFA, 2004).

Stadium designers should always work closely with the local fire department on their fire strategy, It may be also advisable to employ specialists within the design team. (UEFA, 2004).

#### 3.3.3. Architectural design

Slippery surfaces should be avoided for floors, there should be adequate lighting, clear signage, wide concourses and easy access and exit points, and non-flammable materials should be used throughout. (UEFA, 2004).

#### **3.3.4. Safety barriers and handrails (UEFA, 2004)**

Barriers should be installed wherever there is a risk of falling, or where there is a need to guide spectators. Safety Barriers should be designed to resist horizontal loads and forces.

Vomitory and radial gangway barriers should be designed to minimise the obstruction of sight-lines.

The handrails or safety barriers on the front row of the upper tiers are particularly important.

These can be placed lower than regular handrails, as the space in front of a seat is not considered as a circulation route in most building regulations, and hence the standard specifications are not applicable.

Care needs to be taken to ensure that these handrails do not impede the vision of the spectators, yet it should be robust enough to provide adequate safety.

At the end of the aisle gangways, the edge of the tiers on the upper levels will require high handrail (110cm) in order to prevent falls in this circulation area.

#### **3.3.5. Operational safety (UEFA, 2004)**

The audio quality of the public address (PA) system needs to be high in order to ensure that important or emergency announcements are clearly audible throughout the venue.

All turnstiles, safety barriers, evacuation doors and exits must be fully operational and free of any obstacles.

#### **3.3.6. Scoreboards and video walls (UEFA, 2004).**

Serve a vital purpose in terms of safety, as they can be used to transmit video and text instructions to the stadium public in the event of an emergency.

#### **3.3.7. Segregation of rival supporters**

The prevailing wisdom is that any form of fencing between the pitch and the spectators, or between groups of spectators, causes a sense of enclosure that is not in keeping with the modern-day football match experience. (UEFA, 2004).

#### **3.3.8. Specific safety requirements**

Public passageways and stairways in the spectator areas should be clearly marked, as should all gates leading from the spectator areas into the playing area and all exit doors and gates leading out of the stadium. (Football Stadiums, 2004).

All public passageways, corridors, stairs, doors and gates must be kept free of any obstructions that could impede the free flow of spectators. (Football Stadiums, 2004).

### 3.4.Site accessibility

Access to the stadium site needs careful study as the existing infrastructure may be inadequate. Rail, underground, tram, airport and road (from local roads to motorways) networks will all need to be able to cope with increased demand on event days. (UEFA, 2004).

In terms of pedestrian access, safe and ample space (pavements, plazas, parks, etc.) should be available within the area surrounding the stadium in order to accommodate the large numbers of people who will be congregating on match days. (UEFA, 2004).

Pedestrian routes should provide easy access to all private and public transport facilities, including car parks, railway and underground stations, tram and bus stops, taxi ranks, etc.. (UEFA, 2004).

so that it well located for all types of transportation and so accessibility to stadium from the neighborhood , and movement within the stadium itself , should be easy and unrestricted . (Handbook of sport and recreation building design,1981 ) .

In the process of studying easy access must take into account the population growth in the future. (Stadium & Building Sport, 2004).

### 3.5.Parking

Parking is most convenient if located in the area immediately surrounding the stadium, and at the same level as the exits/entrances. (Stadia , 2007)

Signage at each entry point to the parking area there should be signs guiding visitors to their individual parking positions and if possible communication links with the transport control centre should be installed. (Stadia , 2007).

#### 3.5.1. Parking for spectators

Bus space per 120 spectators, but public transportation; we suggest that one bus per 240 spectators. (Football Stadiums, 2004).

Motorcycles and bicycles must be determined as part of the brief. (Stadia , 2007) .

#### 3.5.2. Parking for disabilities spectators

Recommend that at least 6 percent, should be the spaces closest to the stadium entrance gates, with easy access to ramped pedestrian routes. (Football Stadiums, 2004).

#### 3.5.3. Parking for players

This should be inside the stadium, immediately outside the dressing rooms and isolated from the public. (Football Stadiums, 2004).

Parking space for team buses should be provided for each team of players , FIFA-recommends at least two bus spaces plus ten car spaces. (Football Stadiums, 2004).

These spaces should always be secure and separate from other parking areas and from each other, and give direct access to the players' changing areas without coming into contact with the public . (Stadia , 2007) .

### **3.5.4. Parking for VIP**

Preferably, these vehicles should be parked inside the stadium. (Football Stadiums, 2004).

### **3.5.5. Parking for media**

Extensive areas must be provided parking as many as 10 spaces may be incorporated into the general parking areas, provided they are adjacent to the cable access points numbers of television and broadcast vehicles . (Stadia , 2007) .

### **3.5.6. Parking for emergency services**

Parking facilities separate from the public-access routes, immediately adjacent to, or inside, the stadium must be provided for police vehicles, fire engines, ambulances and other vehicles of the emergency services and for the vehicles of disabled spectators. (Football Stadiums, 2004)

# CHAPTER 4

## DESIGN STANDARDS

### CHAPTER 4

- 4.1 playing area
- 4.2 Players and officials
- 4.3 Spectators
- 4.4 VIP and Hospitality facilities
- 4.5 Media

## 4.1. playing area

Open space area represent centralization point of stadium and focal point of players, officials, spectators and television audiences , in addition to vehicles of the emergency services.

### 4.1.1. Layout and Dimensions

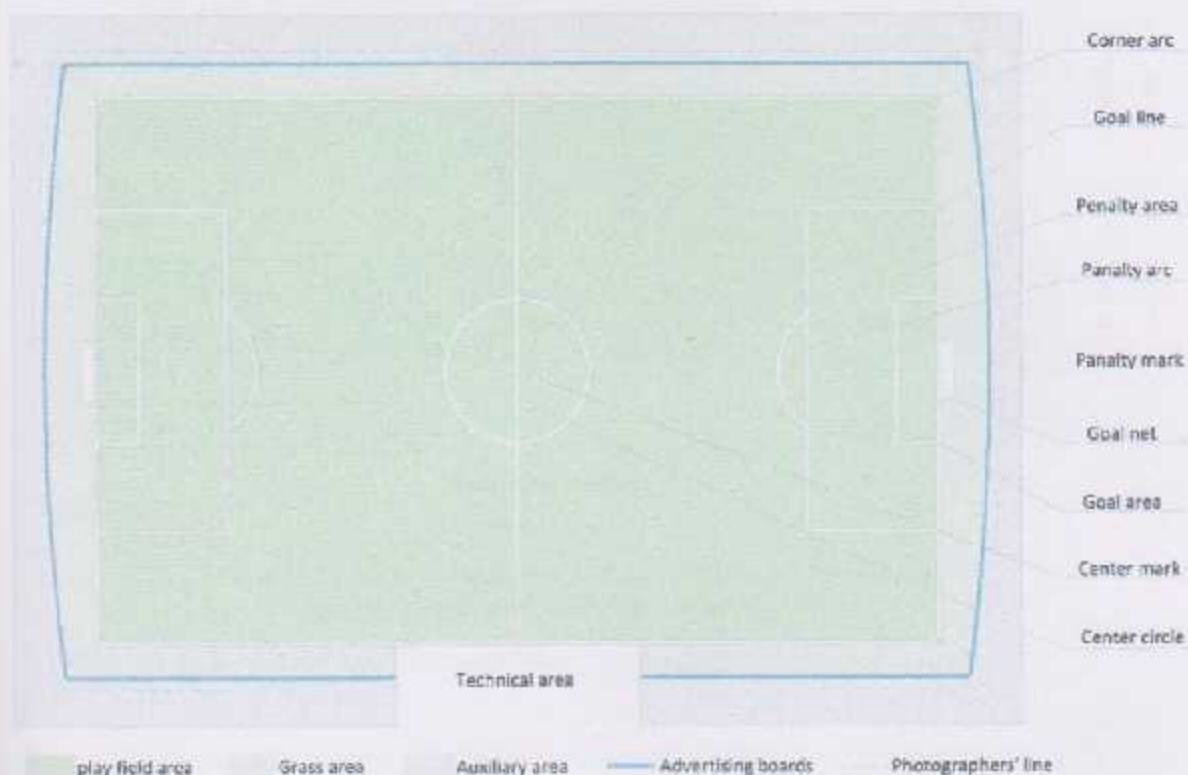
#### 4.1.1.1. Layout (Figure 4.1.a)

Consist of play field ,grass ,auxiliary ,control area and other pitch side position ( advertising board ,security staff ,photographer's ,barrier's lines ,TV camera ) .

. **Play field area:** is the playing surface for the game of football made of turf, where include players of tow team and referees .

. **Grass area:** where players can warm up and the circulation of assistant referees.

. **Auxiliary area:** allow for the circulation of ball boys and girls, medical staff, security staff and the media.



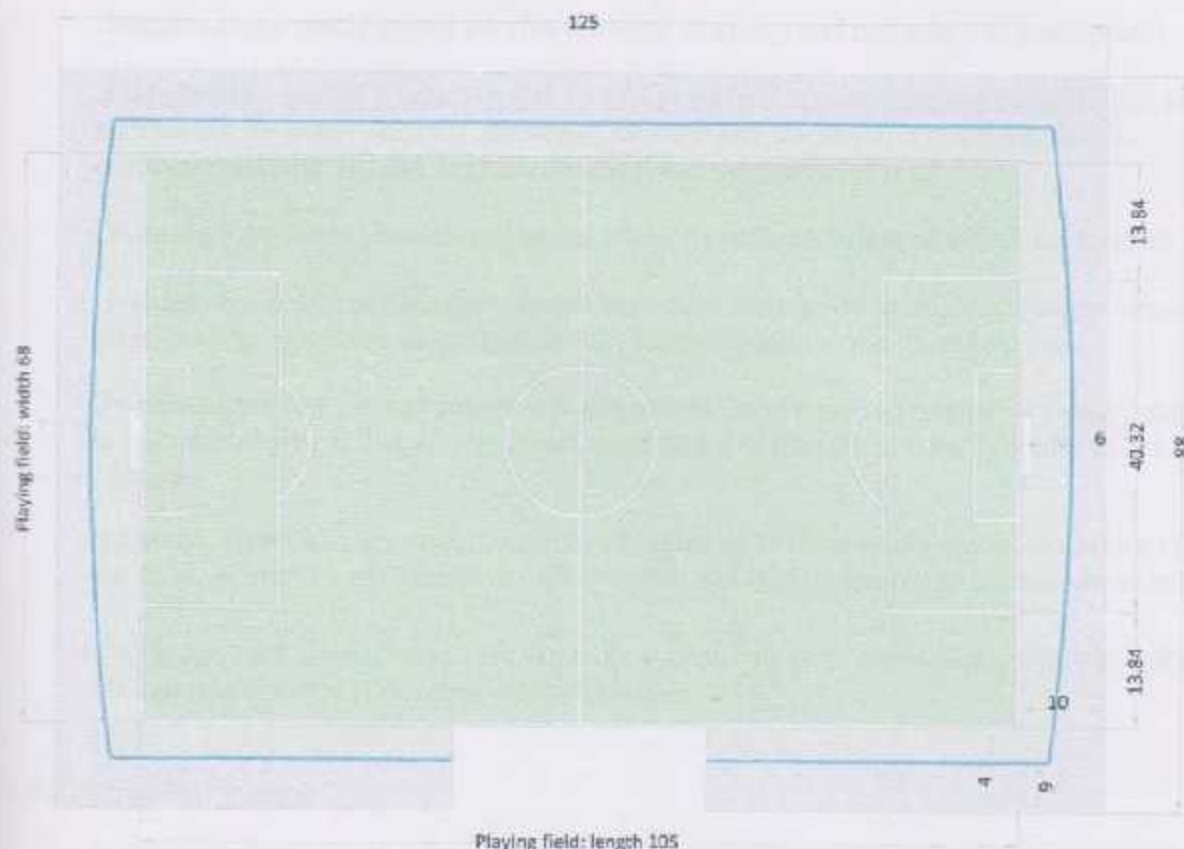
( Figure 4.1.a show master component of playing area).Modified  
by Author. (Football Stadiums, 2004).

#### 4.1.1.2. Dimensions (Figure 4.1.b)

. **Play field area:** recommended dimensions is 105m x 68m , These dimensions are obligatory for the FIFA World Cup™ . (Football Stadiums, 2004)

. **Grass area:** overall grass area dimension of: length: 115m, width: 78m. (Football Stadiums, 2004)

. **Auxiliary area:** overall playing field and auxiliary area dimension of: length: 125m, width: 88m. (Football Stadiums, 2004)



( Figure 4.1.b. show dimensions of all major component of playing field area) Modified by Author (Football Stadiums, 2004).

## 4.1.2. Play field

### 4.1.2.1. Natural grass surface (Stadia, 2007).

Roll grassplanning must be based on local conditions and depend on the laws of nature and suitability for its particular climatic and physical environment and the season of play, like air movement, humidity and temperature levels.

**.Advantage :** aesthetically attractive and it is less injurious to players who fall than most alternative finishes.

**.Disadvantage :** grass cannot survive the same intensity and frequency of punishment.

**.Installation :** should be smooth and free from surface unevenness, and possibly laid to a slight fall for water disposal, resistance to wear and disease, and suitability for its particular climatic and physical environment and the season of play.

**.Mowing :** the latest grass should be cut when it reaches a height of 40mm for football

**.Irrigation :** Traditionally grass pitches have been watered by sprinklers systems, mixed with fertilizer and weed-control additives – seeps directly to the grass root zone.

**.Maintenance :** the actual lifetime will depend on factors such as Intensity of wear, play is possible all year round giving 500 or more hours of play per annum specially in hot climate.

the active approach uses pumps, usually activated by water-sensing electronic devices in the field, to literally suck the water off the pitch and into underground storage chambers.

**.Drainage :** the dimensions of the drainage system can vary, depending on the amount of rainfall and climatic conditions. (Football Stadiums, 2004).

## 4.1.3. Auxilliary area

Consist photographers and mobile/fixed camera positions, as well as the security staff and match stewards, should flexibility material surface for movement within this area.

Designed to a finished thickness of 13 mm of polyurethane binder. (Stadia, 2007).

### 4.1.3.1. Photographers and reporters, TV cameras

With technological and industrial evolution it Consideration needs to be given to the designated positions of photographers whether mobile/fixed camera and in other cases there are cameras with long arms, which are mainly associated with the media room.

### 4.1.3.2. Security staff

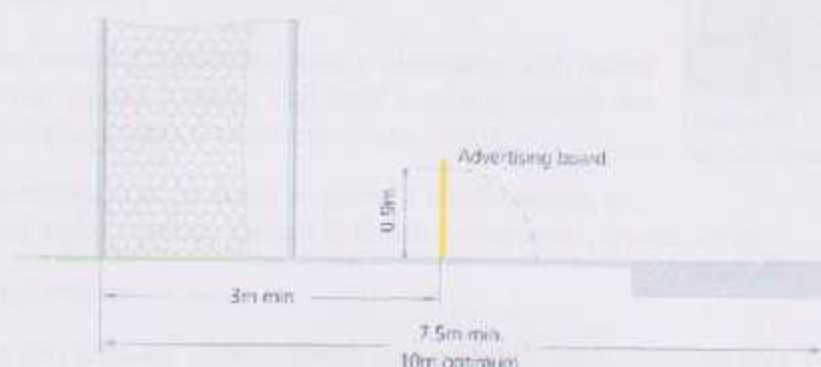
Can't dispense from police and/or security personnel in or near the playing area, need to be located along the full perimeter of the pitch-side areas.

### 4.1.3.3. Advertising board line

Located around the playing field as a line represents two basic axes in case of function - (revenue, protected zone for players and officials).

should not obstruct of the spectators' sight-lines, normally have a height of 90 -100cm and the minimum distances between the boundary lines of the playing field and the advertising boards should be 4 - 5m Behind the goal lines: 5m, reducing at an angle to 3m near the corner flags. (Figure 4.1.1) (Football Stadiums, 2004)

Led display screen, Rubber in top and bottom edges; 5m x 0.9m. (www.ecvv.com, 1994).



(Figure 4.1.1 show dimensions as minimum dimension of advertising board).  
(Football Stadiums, 2004)

## 4.2. Players and officials

Private zone Located in playfield level to easily access from main entrance of its zone to the functions facilities of players and officials then to playfield.

### 4.2.1.players facilities

#### 4.2.1.1. Circulation (Figure 4.2.a)

It is essential to ensure that the teams are able to arrive at and depart from the stadium in complete safety. (UEFA, 2004).

Exclusive parking zones should have direct access to the dressing rooms and the players' lounge.(UEFA, 2004).

should be directly linked with the media area and the team administrative offices and if possible also with the team directors' suite or chairman's box. (Stadia, 2007).

Corridor and door widths should be generous: 1.2m is a minimum width, and 1.5m preferable. (Stadia, 2007).

The whole area should be secure against unauthorized entry.

#### 4.2.1.2. Player dressing - change -locker room

Dressing rooms need to have direct access to the pitch via the tunnel. (UEFA, 2004).

Two such rooms should be provided for visiting teams each changing room should contain a locker, bench seat and hanging space for each individual player (including reserves). (Figure 4.2.b)(Stadia, 2007).

Each such space being between 600mm and 900mm wide and at least 1200mm deep. In the case of football FIFA requires twenty of these positions, and the requirements for rugby will be very similar. (Stadia, 2007).

Finishes must be robust and easily cleanable, and recent forms of non-slip plastic matting and hard wearing carpets are ideal for the changing rooms themselves. (Stadia, 2007).

Good ventilation is essential to prevent condensation, as well as a heating and/or cooling system in the changing areas. (Stadia, 2007).



(figure 4.2.b. show contains of players at dressing room). (UEFA, 2004).

#### 4.2.1.3. Massage rooms

At least two massage table or bench is required in each changing area. (Stadia, 2007).

#### 4.2.1.4. Washing and toilet facilities

Washing facilities should be directly accessible from the changing area, without going through the toilets. (Stadia, 2007).



( Figure 4.2.c. show schematic relationship between team dressing room , massage and baths).

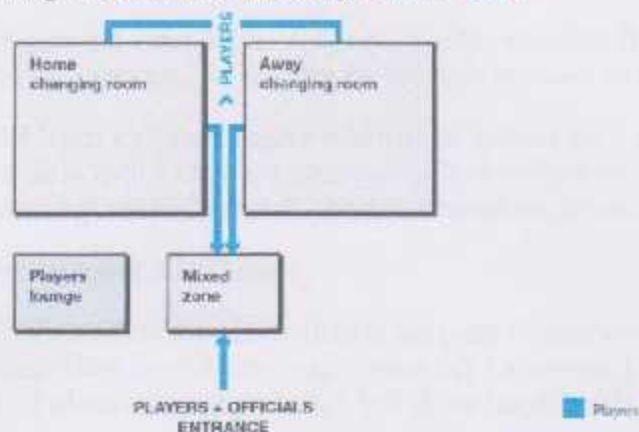
Modified by Author. (Football Stadiums, 2004).

#### 4.2.1.5. Players' lounge (Figure 4.2.d.)

It should be comfortable and secure and have its own catering facilities. (Stadia, 2007).

It may also include TV screens and a games area. It should be located close to the players' car park, with direct, or at least simple, access to the stadium seating area allocated for use by players and their families. (Stadia, 2007).

A players' bar and games area where players can relax after a game or training session - (it should be equipped with a light refreshment kitchen). (Stadia, 2007)



(Figure 4.2.1 d. show schematic relationship between players and players lounge). Modified by Author. (Football Stadiums, 2004).

#### 4.2.1.6. Warm-up area (Figure 4.2.e.)

This is a large open indoor space, directly accessible from the dressing rooms, , Some stadiums include an artificial grass surface in the warm-up area. (UEFA, 2004).



(Figure 4.2.e. show schematic relationship between team area and warm-up area) Modified by Author. (Football Stadiums, 2004)

### 4.2.2. Official facilities

#### 4.2.2.1. Referee's and linesman change room (Figure 4.2.f.)

Four spaces allowing 2.5m<sup>2</sup> per official, with associated lockers. (Stadia, 2007).

A slightly separate area within the room should be provided with a table and chair for report-writing. (Stadia, 2007).

It should be close to, the teams' dressing rooms in minimum size: 24m<sup>2</sup>. (Football Stadiums, 2004).

Should be air conditioned and centrally heated, have easily cleanable floors and walls of hygienic material, have non-slip floors and be brightly lit. (Football Stadiums, 2004).

Referees' areas should have: clothes-hanging facilities or lockers for 4 people, 4 chairs or bench seating for 4 people, a table with 2 chairs, a massage table, a refrigerator, a tactical demonstration board, a telephone (external/internal) and a television set. (Football Stadiums, 2004).

#### 4.2.2.2. Referee's and linesman toilet and shower

Toilet and sanitary facilities should be immediately adjacent to, and with direct private access from, the dressing room. They should have a minimum of: 2 showers, 1 washbasin with mirror, 1 urinal, 1 WC (seat), 1 electric shaving point, 1 hair dryer and 1 sink for cleaning boots. (Football Stadiums, 2004).

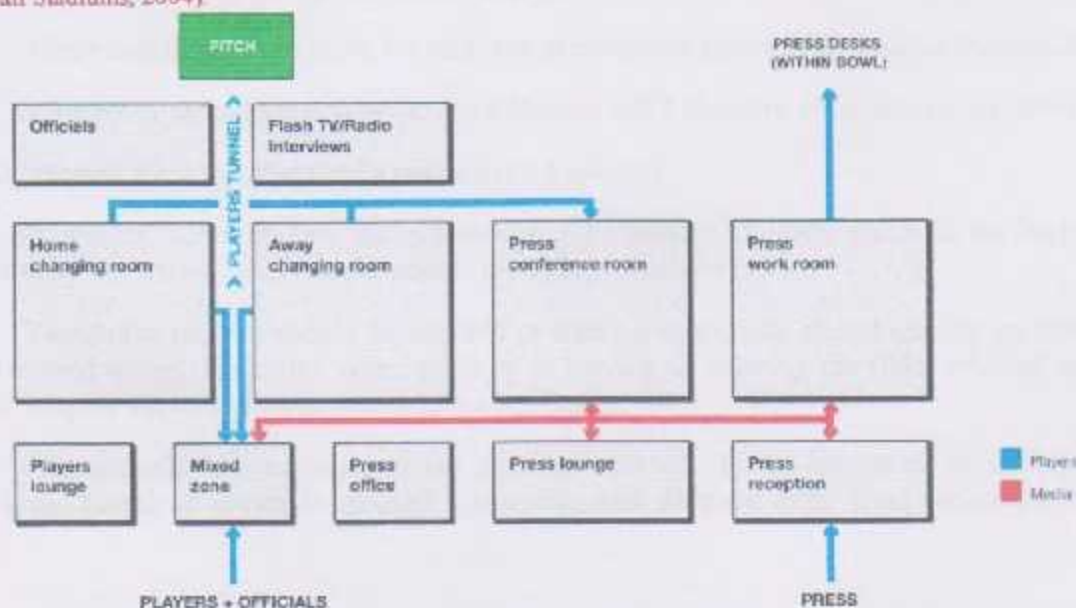
#### 4.2.2.3. Media - conference and interview room (Figure 4.2.g.)

The media reception desk should be equipped with all facilities needed for dealing with information seekers, including telephone/data points, monitoring screens and electrical power outlets, as first-class sound system and have good sound insulation, and all mechanical systems must be silent in operation. (Stadia, 2007).

It should provide approximately 100 seats for reporters and be equipped with an appropriate sound system. (Football Stadiums, 2004).

At one end of the room, preferably at the end nearer to the access door from the dressing rooms, a platform should be erected to accommodate coaches, layers, press officers and interpreters as required. A backdrop which can be easily adapted with various designs should be installed. (Football Stadiums, 2004).

At the other end of the room, facing the platform, a podium should be erected, allowing at least ten television electronic news-gathering (ENG) crews to set up their cameras and tripods. (Football Stadiums, 2004).



(Figure 4.2.g. show schematic relationship between players' and press media facilities)  
(Stadia, 2007).

#### 4.2.2.4. Medical examination room stadium

There should be a room of at least 25m<sup>2</sup>, equipped with one examination table 600mm wide, accessible from three sides, two portable stretchers, kept alongside the pitch during games, washbasin, glass cabin for medications, treatment table, oxygen bottle with mask, blood pressure gauge, heating apparatus, such as a hotplate, for instruments and possibly some physiotherapy equipment. (Figure 4.2 h.) (Stadia, 2007).

#### 4.2.2.5. Dope testing facilities (Figure 4.2.2.d)

Probably require a room of at least 16m<sup>2</sup>, equipped with one desk, two chairs, one basin, one telephone, toilet comprising WC, washbasin and shower. Near the dope testing room there should be a waiting area with seating for eight people. (Stadia, 2007).



Modified by Author (Figure 4.2 i. show dope testing rooms) (Football Stadiums, 2004).

#### 4.2.2.6. Dressing rooms for ball boys and ball girls

There should be a two room for each sex at minimum size: 40m<sup>2</sup>. (Football Stadiums, 2004).

Each room should have: 2 WCs, 2 washbasins and 2 showers. (Football Stadiums, 2004).

#### 4.2.2.7. Access team for playfield area as crowd control

At events where players and referees may be subject to attack (such as the hurling of missiles) by the crowd, safety requirements are stringent. (Stadia, 2007).

Telescopic tunnels should be capable of being extended or closed quickly so that they may be used during the match when a player is leaving or entering the field, without causing unduly lengthy viewing obstruction. (Figure 4.2 j.) (Stadia, 2007).

Alternatively, the entrance to the playing area may be by means of an underground tunnel, the mouth of which is situated a similarly safe distance away from spectators. (Stadia, 2007).

### 4.3. Spectators

The number of spectators to be accommodated effect on capacity of stadium .

Establishing what kind of spectator will patronize a given stadium (in terms of socio-economic group and other relevant characteristics) is crucial to getting the whole philosophy of comfort, shelter. (Stadia , 2007)

#### 4.3.1. Spectators viewing

##### 4.3.1.1. Optimum viewing distance (Stadia , 2007)

Calculation of maximum viewing distance is based on the fact that the human eye finds it difficult to perceive anything clearly that subtends an angle of less than about 0.4 degrees – particularly if the object is moving rapidly.

Viewing distance at no more than 150m between the extreme corner of the field and spectator's eye, with an absolute maximum of 190m, the centre spot on the field, generally referred to as the 'optimum viewing circle', this circle in the case of football would have a radius of 90m. (Figure 4.3.a.)

The spectators are not sitting at ground level but are raised above the ground by as much as 20 or 30m in a large stadium.

In big stadia the effect of this elevation must be taken into account by calculating the direct distances from the elevated spectators to the centre of the field.

##### 4.3.1.2. Viewing angles and sight lines (Stadia , 2007)

The term 'sight line' it refers to the spectator's ability to see the nearest point of interest on the playing field (the 'point of focus') comfortably over the heads of the people in front , so not a distance.

Viewing areas which hopefully satisfies criteria: the spectator areas are large enough to accommodate the required number of viewers and maximum viewing distances have been kept within defined limits.

Must be calculated many times over for each individual row in a stadium this is because the optimum viewing angle varies with both the height of the spectator's eye above pitch level and its distance from the pitch must be repeated.

##### 4.3.1.3. C values for wheelchair users (Stadia , 2007)

'C' value is the assumed distance between the sightline to the playing area (or activity area), and the centre of the eye of the spectator below (Figure 4.3.b.) ,in general 150mm would be an excellent design value, 120mm very good, and 90mm reasonable.

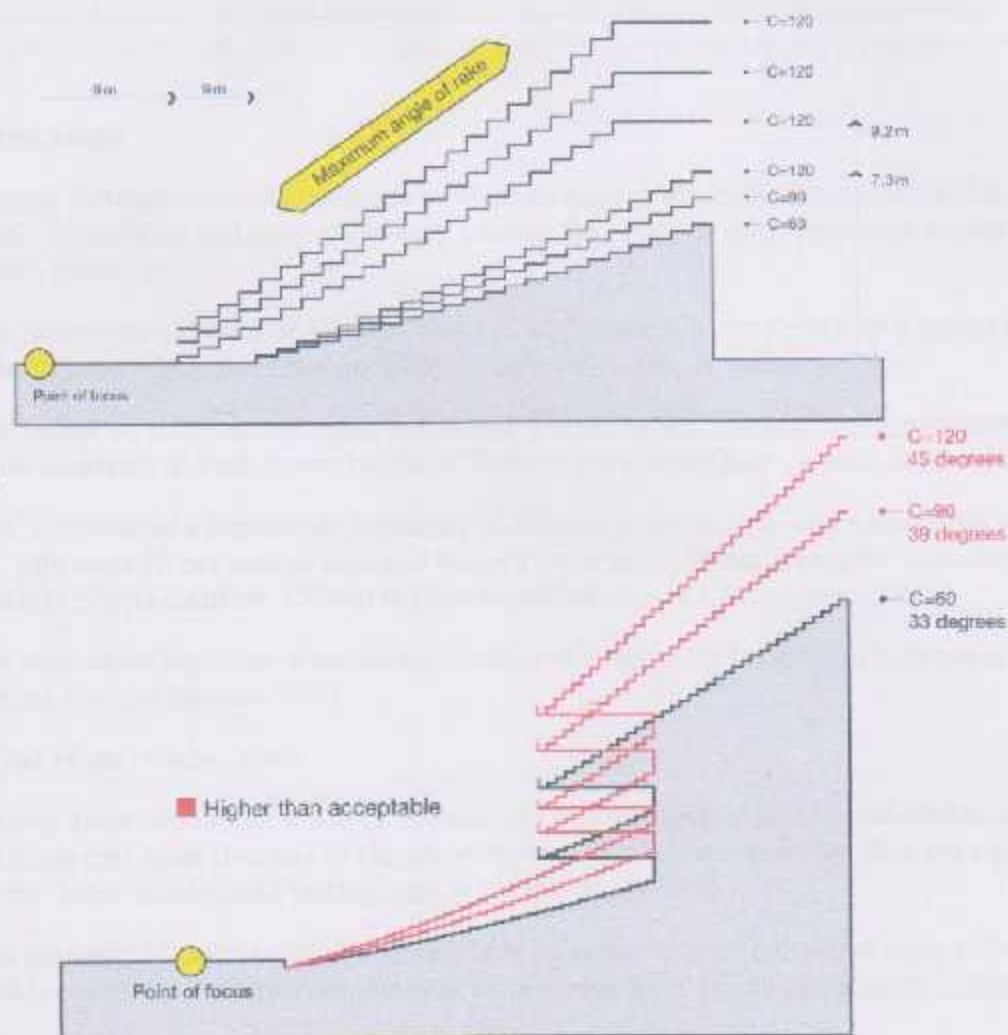
recommends that wheelchair users should be able to enjoy the same C value as other spectators – say 90mm – even when the spectators sitting immediately in front of them rise to their feet .

#### 4.3.1.2. Use of computer calculations (Stadia, 2007).

Possibly because the calculations are so complex, or because some designers are reluctant to have the clean geometry of their architectural concepts degraded by real-life considerations, it is strongly recommended that computer analysis, using tried and tested programs, be applied to the task. Professional practices.

#### 4.3.1.2. Decide the distance between the front row of seats and the point of focus

(Figure 4.3.c.)



(Figure 4.3.c. show quality of vision improve by increasing of height at 120 mm of c-value is very good).  
(Stadia, 2007).

## 4.3.2. Spectators seating

### 4.3.2.1. Recommended seating (Figure 4.3.d)

Cost category (approx)	Stadium capacity	Typical seating configuration	Typical forms of structure, modes of access, etc.
Very high:	30 000 to 50 000	Over 50 rows total, in 3 or 4 tiers. 3rd or 4th tiers are usually introduced to overcome site restrictions, or to accommodate a plethora of V/P boxes and similar facilities, and not for increased capacity.	

(Figure 4.3.d. show recommended typical seating configuration as a stadium capacity in addition to cost). (Stadia, 2007)

### 4.3.2.2. Dimensions

Seating dimensions must be such as to allow enough space, both side-to-side and from front to back, for comfort and must allow easy passage for police or other personnel during emergencies. (Stadia, 2007).

The maximum numbers of seats is 28 in a row, 7 seats in a row served by a gangway on one side, or 14 seats where there is a gangway on both sides. (Stadia, 2007)

Seats must be safety and comfort individual, affixed to the structure and comfortably shaped, with backrests of a minimum height of 30cm to provide support. (Football Stadiums, 2004).

The recommend a reasonable minimum of 465mm without arms, and a minimum width of 500mm with arms 95 per cent of men and women are within 480mm across the shoulders, and Seat height affects comfort, 450mm is Recommended. (Figure 4.3.2.a) (Stadia, 2007).

To achieve reasonable leg-room, a minimum distance of 85cm from backrest to backrest is recommended. (Football Stadiums, 2004).

### 4.3.2.3. Type of seat (Stadia, 2007).

Tip-up seats : minimum width of 500mm and 460mm without arms ,comfortable and safety and these cost more than any of the above types, and are less robust, but they are rapidly becoming the most widely-used seating type in stadia. (Figure 4.3.f)

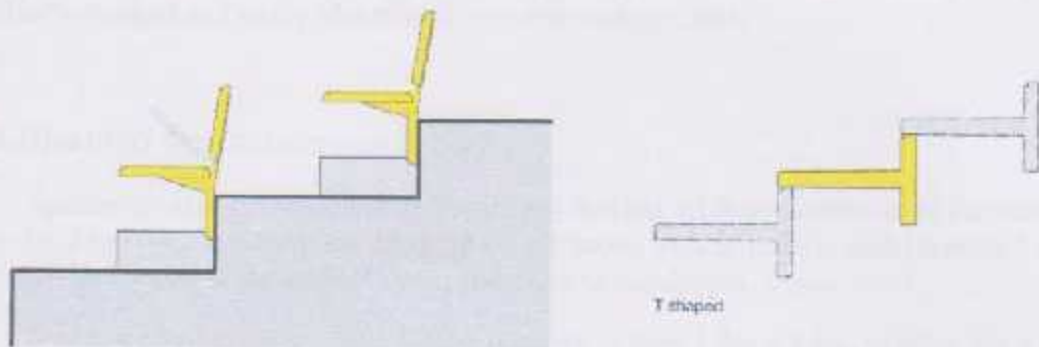
The majority of seating will almost certainly be in the form of individual seats with backs very probably the tip-up kind they are the most comfortable type, giving the greatest width of seat way.

### 4.3.2.5. Seat, nose, riser and tread fixings (Stadia, 2007).

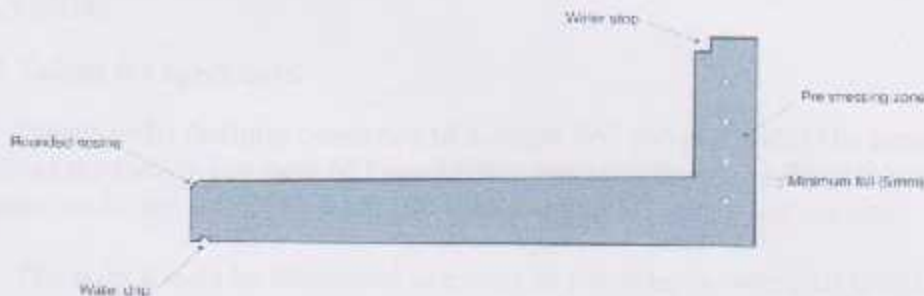
Seats can be fixed either on lengths of linked framing, or on individual frames, to cope with stadium geometry. (Figure 4.3.g)

Preferably stainless steel, which does not add much to the overall cost of seating, but greatly enhances appearance and durability.

Frames fixed to the vertical surface and keeping clear of the floor or tread are easier to clean around, and less prone to corrosion, but they need a minimum riser height of around 200mm for concrete risers, which may not always be available. (Figure 4.3.2.d)



(Figure 4.3.2.d show riser fixed Retractable- tip up seat and show t-shape of pre-casting concrete)  
Modified by Author. (Stadia, 2007)



(Figure 4.3.2.g show details of seat pre-casting concrete). (Stadia, 2007)

#### 4.3.2.7. Seat materials, knishes and colors (Stadia, 2007).

Seating materials must be weather-resistant, robust and comfortable, plastics - polypropylene (the most widely used), polyethylene, nylon, PVC or glass reinforced plastic.

double-skin forms is sustainable but the material ultimately does burn it may produce toxic fumes.

color is helps to reduce the feeling of emptiness when there are only a few spectators.

Some colors perform better by maintaining their color thus reducing the effects of brittleness caused by ultraviolet rays.

#### 4.3.2.8. Cleanabilitys (Stadia, 2007).

The seat must be designed to drain easily and not hold water, Cleaning around and under the seat should also be easy.

#### 4.3.2.10. Numbering

Each seat should be capable of accepting a seat number regards to ticket so easily access of spectators. (Stadia, 2007).

All seats should be numbered in a way that makes them clearly, easily and immediately identifiable. (Football Stadiums, 2004).

with a ticket for, say, Sector B, Row 22, Seat 9, the spectator should find the route to the seat clearly marked and easily identifiable. (Football Stadiums, 2004).

### **4.3.3.Disabled Spectators** (Figure 4.3.h.)

Spectators who use wheelchairs should not feel cut off from spectators in the main body of the stand and because ambulant disabled people move with difficulty, such identified seats might best be located at the ends of rows, and close to vomitories. (Stadia, 2007).

Designated wheelchair space should measure at least 1.4m x 1.4m, to allow for a helper to sit alongside the wheelchair user.(Figure 4.3.i.) (Stadia, 2007).

Disabled spectators should have their own dedicated entrance gate from which they may have direct wheelchair access to their viewing area.(Figure 4.3.j.) (Football Stadiums, 2004).

### **4.3.4.Toilets**

#### **4.3.4.1 Toilets for spectators**

Private toilet facilities consisting of a single WC and sink should be considered throughout the facility in a ratio of 1 per 5,000 spectators, for use by those requiring greater assistance, including disabled people and young children.(Football Stadiums, 2004).

The units should be distributed as evenly as possible, including all levels of a multi-tiered stand, with no seat more than 60 metres from a usable toilet and preferably on the same level. (Stadia, 2007)

Toilets should lead off concourse areas, be easily and safely accessible, and be on the same level as the concourse. They must never lead directly off stairs: if a change of level is essential at that point it should be in the form of a ramp. (Stadia, 2007).

Stadium toilets should, wherever the overall stadium layout allows, be located against an outer wall to allow for natural light and natural ventilation. (Stadia, 2007).

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Ratio based on an 80:20 male:female ratio which would be suitable for many current stadia, and which could be distributed evenly throughout the building, the male unit incorporates a unisex cubicle for wheelchair users, opening off the corridor so that both men and women have access to it. (Figure 4.3.k.) (Stadia, 2007).

The recommended minimum number of WCs and sinks is 20 and seven respectively for every 1,000 women and 15 WCs and/or urinals (approximately one-third should be WCs and two-thirds urinals) and five sinks for every 1,000 men. (Figure 4.3.1.) (Football Stadiums, 2004).

To avoid overcrowding between spectators entering and leaving toilets there should be a one-way access system, or at least doors which are sufficiently wide to permit the division of the passageway into in and out channels. (Football Stadiums, 2004).

#### **4.3.4.2 Toilets for disabled people**

In the case of toilets for disabled people, that wheelchair-accessible WCs should be located as close as possible to the seats for disabled spectators, with a maximum horizontal travel distance of 40 metres. (Stadia, 2007).

There is two types of WC compartment should be considered special cubicles for people in wheelchairs and the ambulant disabled people. (Figure 4.3.m) (Stadia, 2007).

The numbers of each type of WC for wheelchair users, there is one accessible WC per 15 wheelchair spectator spaces. (Stadia, 2007).

#### **4.3.5. Other facilities** (Figure 4.3.n.)

##### **4.3.5.1. First aid**

First aid rooms must offer a comfortable environment, a central first aid room must be provided and located in a position that allows easy access from inside and outside the stadium for all spectators, including wheelchair users, and also for emergency vehicles. (UEFA, 2004).

In addition, every sector of the stadium must have its own clearly signposted first aid room, so that spectators do not have to cross between segregated sectors if they require attention or treatment. (UEFA, 2004).

Doors and passageways should allow easy access for stretchers and wheelchairs, while walls and floors should be smooth and easy to clean, Should be sufficient storage space for all the required medical provisions. (UEFA, 2004)

##### **4.3.5.2. Public telephones**

Despite the increasing popularity of mobile phones and the reduction in the use of public telephones, an adequate number of public telephones should be provided in and around the stadium. (Football Stadiums, 2004).

#### 4.3.5.4. safety / security system

It is essential that event holders and stadium safety/security authorities are capable of communicating clearly with spectators inside and outside the stadium by means of a sufficiently powerful and reliable public address system. (Football Stadiums, 2004).

Should control centre located in, or immediately adjacent to, the stadium control room, in a position where the operator has a clear, unobstructed view of the whole stadium. (Football Stadiums, 2004).

### 4.4. VIP and Hospitality facilities

#### 4.4.1. VVIP areas and VIP areas

VIP packages may include services such as use of restricted access lounges, individual catering and hostess services, and possibly even hospitality fronted by ex-players or celebrities. (UEFA, 2004).

In both cases, VIP seating, either in the VIP enclosure or in private boxes, should be designed to offer greater comfort and space than the standard seats. (UEFA, 2004).

The directors' box or president's enclosure, is generally categorized as a VVIP area, especially in larger stadiums. (Figure 4.4 a.) (UEFA, 2004).



( Figure 4.4.a. show schematic functional in VIP zone ). (Football Stadiums, 2004)

#### 4.4.1.1.VVIP area (Football Stadiums, 2004).

(Very Very Important Persons) such as dignitaries, celebrities and politicians.

**Position :**Next to the VIP area.

**Access :**The VVIP access route should be designated high security and protected from any public interference. Security vehicles should accompany the vehicles of the VIPs .

**Seats :** Seats should be numbered and separated from the VIP seats by means of a movable barrier. The seating area should be constantly staffed by security personnel.

**Capacity :**The total number of seats should be determined by the stadium's owner, if provided, it should include a reception area and lounge area.

**Reception area :**A dining room large enough for 25 diners and TV sets should be provided.

**Lounge area :** A private lounge of approximately 20m<sup>2</sup> should be provided for use by the FIFA President to have private meetings at major international matches and the FIFA World Cup™.

**Toilets :** For the VVIP area, toilets should be separate from those of the VIP area.

#### 4.4.1.2.VIP area (Football Stadiums, 2004).

**Position:** In the centre of the grandstand in which the players' dressing rooms are situated, in an elevated position above the playing area, partitioned off from the public seating areas.

The VIP tribune should always be located in the main stand and be accessible to the dressing rooms, media facilities and administrative offices.

**Access :** The VIP area should have its own private entrance from outside, separate from the public entrance points, leading directly to the reception area and from there directly to the viewing area.

There should be an escalator between floors which should be connected to both normal and emergency power.

People who need to go to the dressing room area (e.g. delegates, observers, etc.) must have direct and secured access from the VIP box to the dressing rooms.

**Seats :**Seats should be individually numbered and of good quality.

They should be well upholstered, with armrests, be covered by a roof and should provide a perfect, unrestricted view of the playing area.

Adequate legroom between the rows is essential to enable the occupants to enter or leave without disturbing other seated guests.

**Capacity :**provide VIP area seating for at least 300 people .

#### **4.4.2. FIFA VIP lounge** (Football Stadiums, 2004)

The FIFA VIP lounge must be big enough to accommodate 500 guests per match at each venue and 2,000 at the venues of the opening and final matches.

#### **4.4.3. Guest room or directors' lounge**

This is used for entertaining invited guests of the host club, and the area of the room is usually of the order of 60 to 100m<sup>2</sup>. (Stadia, 2007)

The space needs to be directly linked to the directors' facilities of the host club and preferably have direct access to the directors' viewing area, but need not overlook the pitch. (Stadia, 2007).

#### **4.4.4. Visitors room**

This area is for use by the directors and guests of the visiting club. (Stadia, 2007)

The room area should be about 60 to 100m<sup>2</sup> and be directly linked to the directors' facilities of the host club with direct access to the directors' viewing area. (Stadia, 2007)

#### **4.4.5. Sponsors lounge**

This is a space used by the sponsors of the club or individual event to entertain their invited guests. (Stadia, 2007).

It can consist of one or more private hospitality boxes (see above) or be provided as a completely independent space which, when not being used by the sponsor, is let out for general entertainment purposes. (Stadia, 2007).

The approximate area might be 50 to 150m<sup>2</sup> and it need not overlook the pitch. (Stadia, 2007).

#### **4.4.6. Hospitality seats**

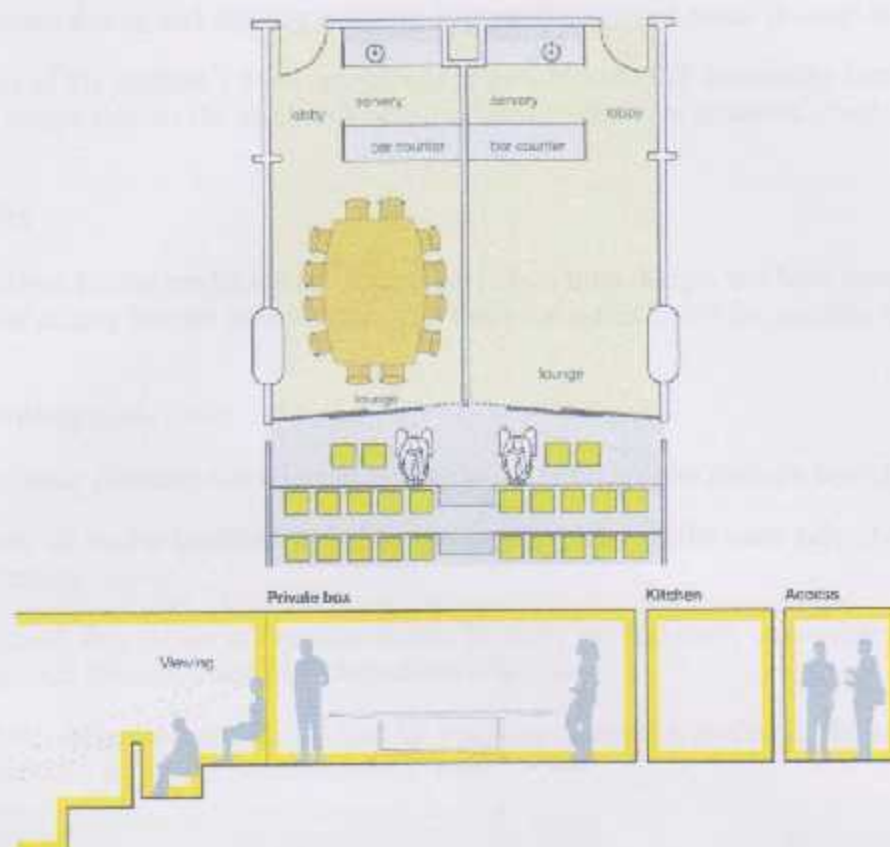
Hospitality seats are those stadium seats allocated for the commercial hospitality programme or the commercial affiliate hospitality programme and which are in the sector designated by FIFA as containing the best first-category seats (after the Tribune of Honour seats used for dignitaries) for each match. (Football Stadiums, 2004).

Commercial hospitality packages will include the use of hospitality infrastructure (such as cloakrooms, welcome desks, lounges, reception areas and dining areas) parking and transportation services; match programmes, commemorative gifts; and other related services and/or products such as accommodation, transport or tourism. (Football Stadiums, 2004)

#### **4.4.7. Private box lounge -Sky boxes .**

Executive suites which has a common lounge where box-holders can meet other holders for socializing or business , It should have a food servery, bar and access to private toilets. (Stadia, 2007)

These suites are similar in principle to club enclosures (see below) but they provide higher standards of comfort and style, and probably a higher degree of privacy to cater for more demanding customers willing to pay higher prices. (Stadia, 2007).



(Figure 4.4.b. show arrangement private viewing in VIP boxes) (Football Stadiums, 2004).

#### 4.4.8. Business seats

Business seats are generally defined as being more comfortable/spacious seats (usually cushioned armchairs) allocated in the best position in main and/or facing stands. (Football Stadiums, 2004).

#### 4.4.9. Club enclosures

Club enclosures are 'exclusive' sections or levels of the general stadium (Figure 13.3) with their own restaurants, bars and toilets, and very comfortable seating, catering for affluent patrons who are willing to pay a premium for superior facilities. (Stadia, 2007).

It may have its own individual toilets, which should not be combine or shared with other users. (Stadia, 2007).

#### 4.4.10. Private facilities

Range of seating standards Demand for superior standards of comfort and refreshment facilities, and the willingness or ability to pay for these benefits, varies from person to person. (Stadia, 2007).

Five-star private dining and viewing facilities in centrally situated areas. (Football Stadiums, 2004)

Many of the stadium's most prestigious or best-located VIP hospitality facilities are reserved or designated for the stadium's or home team's corporate sponsors. (Football Stadiums, 2004).

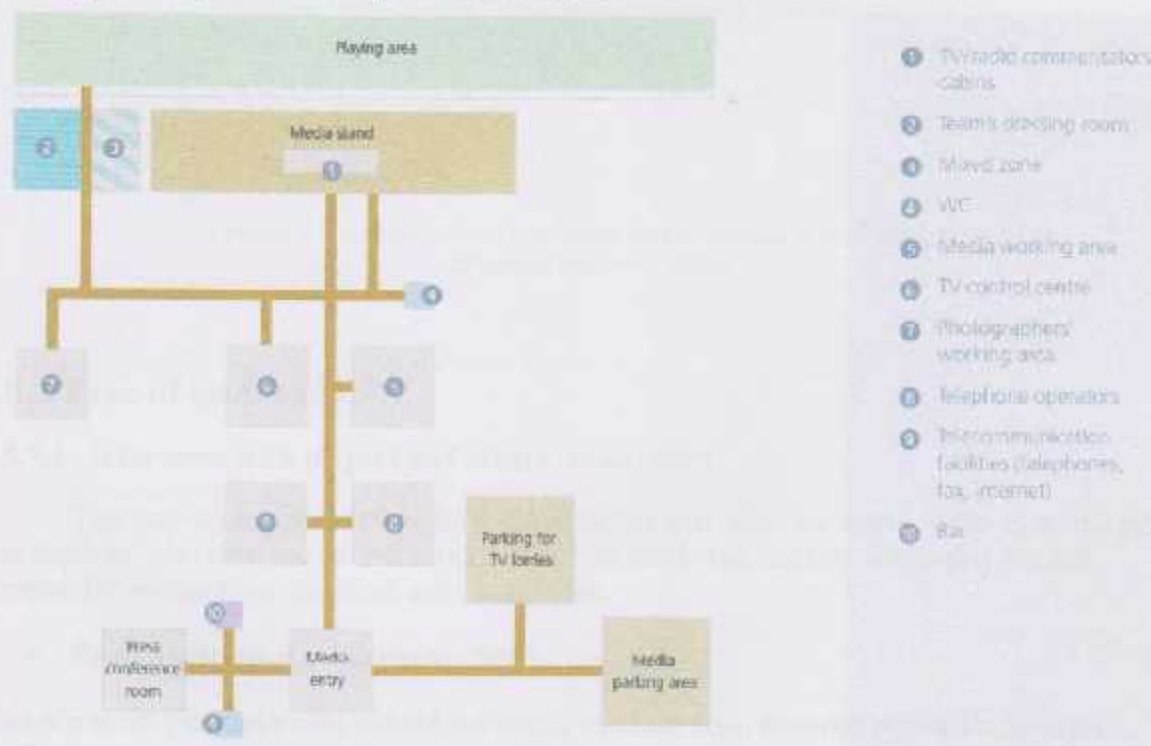
## 4.5. Media

Facilities for the media are an integral part of stadium design, not least because of the large sums of money that are nowadays earned from the media rights for sporting events. (Stadia, 2007).

### 4.5.1. Planning (Stadia, 2007).

Four basic planning considerations which will influence the stadium layout as a whole.

- First, all media facilities should be grouped together on the same side of the stand as the team dressing rooms.
- Second, this cluster of facilities should be close to, and easily accessible from, the parking zone for television and radio broadcast vehicles.
- Third, these facilities should also be relatively close to a section of the parking area set aside specifically for media representatives' cars.



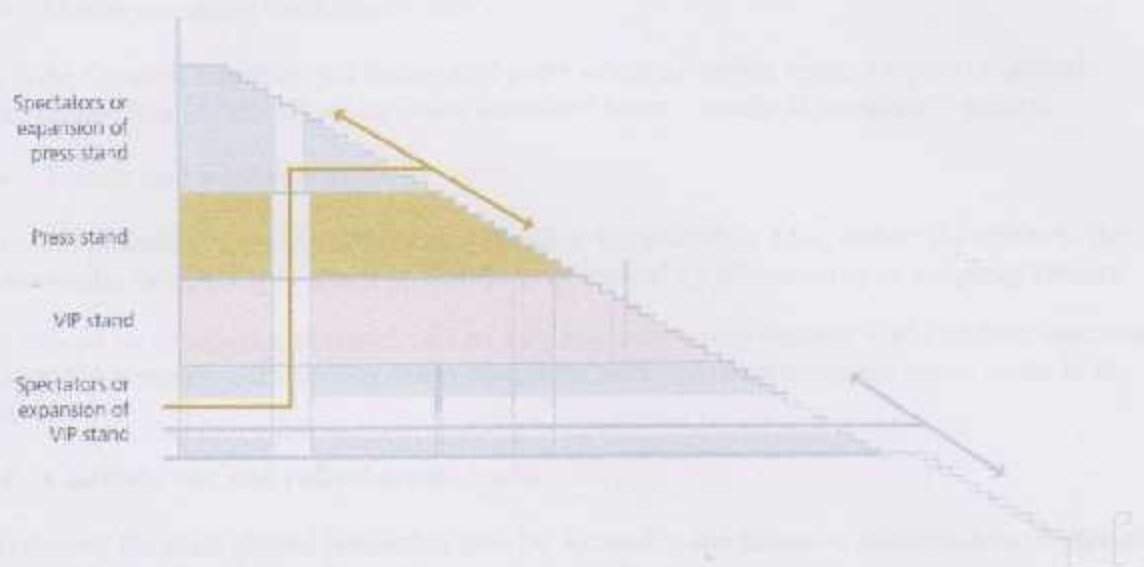
( Figure 4.5.a. show functional relationship in media facilities ) (Football Stadiums, 2004).

#### 4.5.1.1. Location and design (Stadia, 2007).

The press seating area must be located along one side of the stadium (a side not facing the sun during daytime matches) with excellent views over the pitch area. This side should be on the same side as the dressing rooms.

It must be under cover and must be separated from the public seating area by a well defined barrier.

Access should be via a separate protected entrance route that is well supervised, linking back to other press facilities within the stadium. This entry route could be combined with VIP access.



( Figure 4.5 b. show vertical circulation media facilities in door stadium ).  
(Football Stadiums, 2004).

#### 4.5.2. Type of media activity

##### 4.5.2.1. Interviews with players and others (Stadia, 2007).

This activity happens inside the stadium before and after the match, away from the pitch, and requires interview rooms and support facilities inside the stadium, preferably but not necessarily overlooking the pitch and central area.

- **Press conference room** (Stadia, 2007).

This is a multi-purpose room, around the media entrance area, intended primarily for press conferences.

The decoration scheme should be pleasant but not distracting, and allow space on the wall behind the dais, and on the dais front, for information panels.

TV and recording facilities are often required and a control room at the rear of the space is useful.

- **Press lounge** (Stadia, 2007).

This must be a comfortable room in the same general area fitted with movable comfortable chairs and low tables.

The decoration and lighting should be attractive and conducive to relaxation, the floor should be carpeted, and the room should have acoustically absorbent materials fitted to walls and ceiling.

- **Media reception desk** (Stadia, 2007).

This is the focus of inquiries and the control point where all media visitors report on arrival before proceeding to the various facilities described below, access is completely secure.

- **Toilets and washrooms** (Stadia, 2007).

These will probably be provided immediately after the reception desk, before the routes to the various media facilities split apart, so that they are passed by all incoming or outgoing visitors.

They should be to superior standard, and be hygienic with easily cleaned wall and floor surfaces, facilities for cleaning and washing down should be provided, with a trapped waste outlet in the floor.

- **Canteen, bar and refreshments** (Stadia, 2007).

Refreshment facilities should preferably also be located in the common entrance area, where all visitors will pass them before the various routes divide up.

A good quality eating and drinking area is required, pleasant and attractive but also robust.

- **Stadium press officers' room** (Stadia, 2007).

The press officers' room will be a standard office of about 150 m<sup>2</sup> with desks and chairs, space for filing cabinets, office equipment and cupboards, and preferably with a large wall pin board.

- **Secretariat** (Stadia, 2007).

A standard secretarial office of about 100m<sup>2</sup> should be provided close to the press officer's room.

- **Mixed zone** (Football Stadiums, 2004).

In a new stadium, a mixed zone should be provided.

This is a large, clear space between the players' dressing rooms and the private exit door through which the players must pass when leaving the stadium to their team buses.

The purpose of the mixed zone is to permit representatives of the media to talk to and interview the players as they pass through.

It is essential to have separate access for the media and the players. There should be room for approximately 250 media personnel (including cameramen and technicians) and the area must be inaccessible to the public.

The area should either be permanently under cover or there should be facilities for covering this area at major matches. For major matches, the mixed zone should be separated from the media area.

The space required will vary according to the importance of the match but it should be at least 200m<sup>2</sup>.

#### **4.5.2.2. Direct coverage of the event (Stadia, 2007).**

- Press seats for the use of newspaper and magazine reporters. The seats must have an excellent view of the pitch and the central area of the stadium.

- Cabins for radio and television commentators, again with an excellent view of the pitch and central area.

These seats can be enclosed or in the open, and commentators are most likely to want to be near the main TV platform.

- **Television studios (Stadia, 2007).**

They should be located in such a way that players and coaches can reach them easily from the dressing rooms at the end of the match.

Provision should be made for at least three television studios for major matches, each of approximately 25 m<sup>2</sup> and a minimum height of 4m, to allow for television sets and lighting.

In addition, one television studio should afford a panoramic view over the pitch.

A studio with panoramic views of the stadium is often required by TV broadcasters for hosting transmission of an event.

A large window, with obstructed views of the Stadium, is preferred.

This can be remote from the other media facilities, and need not be accessible to the players.

- **Television control area (Stadia, 2007).**

The television companies will want a control room adjacent to the interview studio.

- **Telephone room (Stadia, 2007).**

This room must have excellent ventilation, which may be either natural or artificial; must be acoustically quiet; and must be fitted with a number of separate telephone positions, each with an acoustic hood for privacy, and a shelf for writing.

- **Commentators cabins**

They should be located so as not to face the sun.

Commentators' cabins should be provided in a central location to the side of the pitch, with excellent viewing and open able windows to allow the noise of the crowd in if wanted. (Stadia, 2007).

All commentators must be able to comfortably see all parts of the central area and pitch, and preferably also the players' entrance to the field, while seated comfortably at their desks. (Stadia, 2007).

Cabins should open off a secure and protected lobby area. (Stadia, 2007).

Normally there will be three commentators per cabin, sitting at least 1.5m to 1.8m apart at individually serviced positions, separated by transparent soundproof screens, so the total area required for such a three persons cabin will be approximately 15m<sup>2</sup>. (Stadia, 2007).

Finishes there must be a 'quiet' floor (carpet or rubberized finish to eliminate impact noise), acoustically absorbent walls and ceilings, and sound-resistant doors with acoustic sealing round the edges, partitions between cabins must be sound-resistant. (Stadia, 2007).

They should include a flat surface for writing and should be well lit. (UEFA, 2004).

A television monitor for each position should be built into the desk in a slanting position so as not to obscure the view of the pitch for the commentary team. Commentary positions should be separated from spectators by Plexiglas™ or other suitable means for the purpose of acoustic separation.

A telephone plug must be installed in each commentary position. Two power plugs should be provided at each position. Requirements will increase dramatically for major matches. (UEFA, 2004).

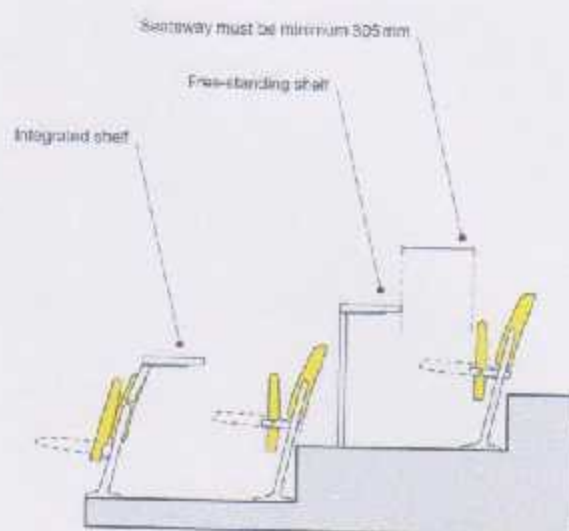


( Figure 4 5.c. show area in front of radio and press work area in outdoor of room )  
(Football Stadiums, 2004).

- **The seating** (Stadia, 2007)

The press seats themselves should have either a folding or fixed desk top.

Seat width should be at least 500mm, and to allow comfortable working conditions, which may involve writing, making telephone calls and using a computer, there should be ample space between seats, and lighting, to allow coverage of nighttime events.



( Figure 4.5 d: show radio desk seating details )  
(Football Stadiums, 2004).

- **Television infrastructure - Camera platforms**

In television in particular, flexibility is required in order to accommodate newly developing technologies to maximize coverage. Lighting requirements change according to technical developments. (Stadia, 2007).

- **Unilateral coverage**

At each unilateral camera position in the main stands and behind the goals, a feed of the international sound should be available. Space of approximately 2m x 3m per camera should be provided alongside the multilateral cameras. (Stadia, 2007).

There should be clearly defined and separate sectors behind the advertising boards behind each goal, measuring approximately 2m x 2m per camera. In both cases, the exact number of positions. (Stadia, 2007).

# CHAPTER 5

## CASE STUDIES

### CHAPTER 5

#### 5.1 Functional and conceptual case studies

## 5.1. Case study

### 5.1.1. Functional Case study

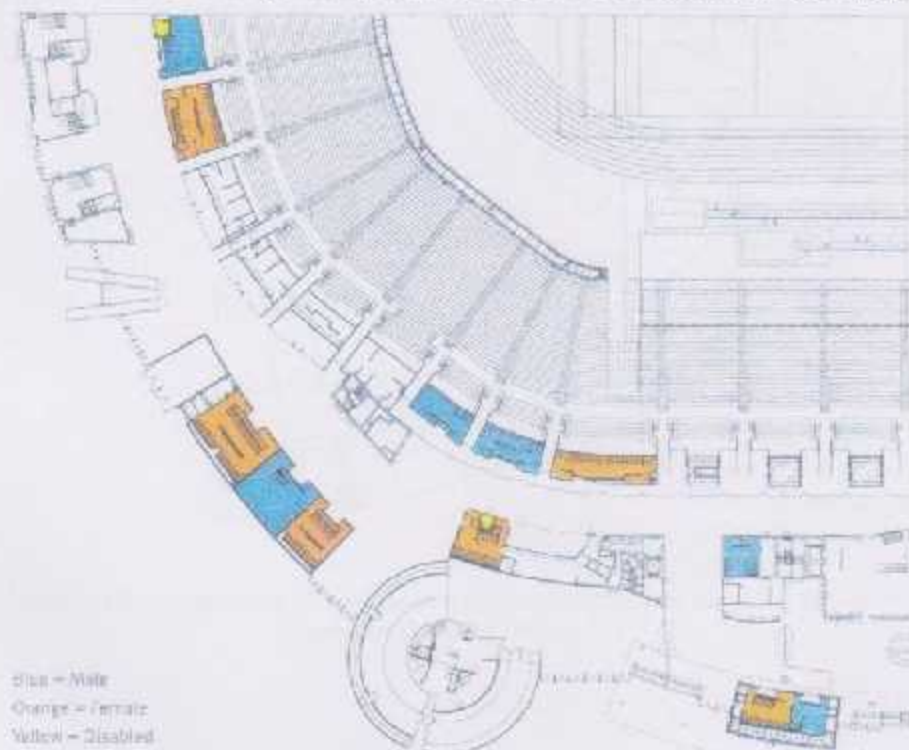
#### 5.1.1.1. Toilets of spectators (sports architecture, 2001).

Project data	Architect	Chronology	Project Information	Economic information
Name : Australia Stadium Location : Homebush Bay, Sydney	Architects: Rod Sheard	Design : March 1995 Open : March 1999	Site area : 39.5 acre Total number seat : 110,000	Construction cost : \$463 million

One W.C per 600 male spectators , one hand basin per 300 , and one urinal per 70 , and for female one W.C. and one basin per 35 female spectators .

The male - female ration ; 70 : 30 for general spectators and 60 :40 for hospapility resulting in average 67 : 33 .

To establish suitable numbers , expert guidance must be sought ,taking into account local regulations and the fact that provision for females should be more generous than the minimums - ( because research shows that in general , females need twice as much time as males ) .



(Figure 5.1 a plan showing good distribution of toilets at Stadium Australia ,Sydney)  
( sports architecture , 2001 ) .

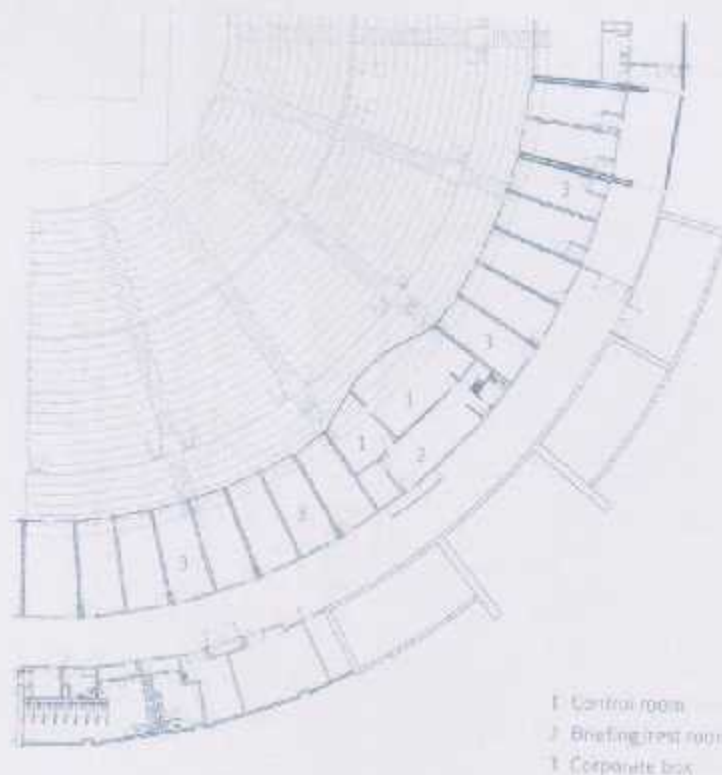
#### 5.1.1.2. Control suite ( sports architecture , 2001 ).

Project data	Architect	Chronology	Project Information	Economic information
Name : Millennium Stadium Location : Cardiff, Wales	Architects: Rod Sheard	Design : January 1996 Open : June 1999	Site area : 13.7 acre Total number seat : 72,500	Construction cost : £94 million

Control suite which safety and security personnel ( including representative of the emergency services , first aid operatives and if appropriate , the police ) .

Theses suite are usually glass-fronted rooms or canines overlooking the pitch and spectators area .

Control suite should adjoining a waiting / meeting room , toilet and refreshment facilities.



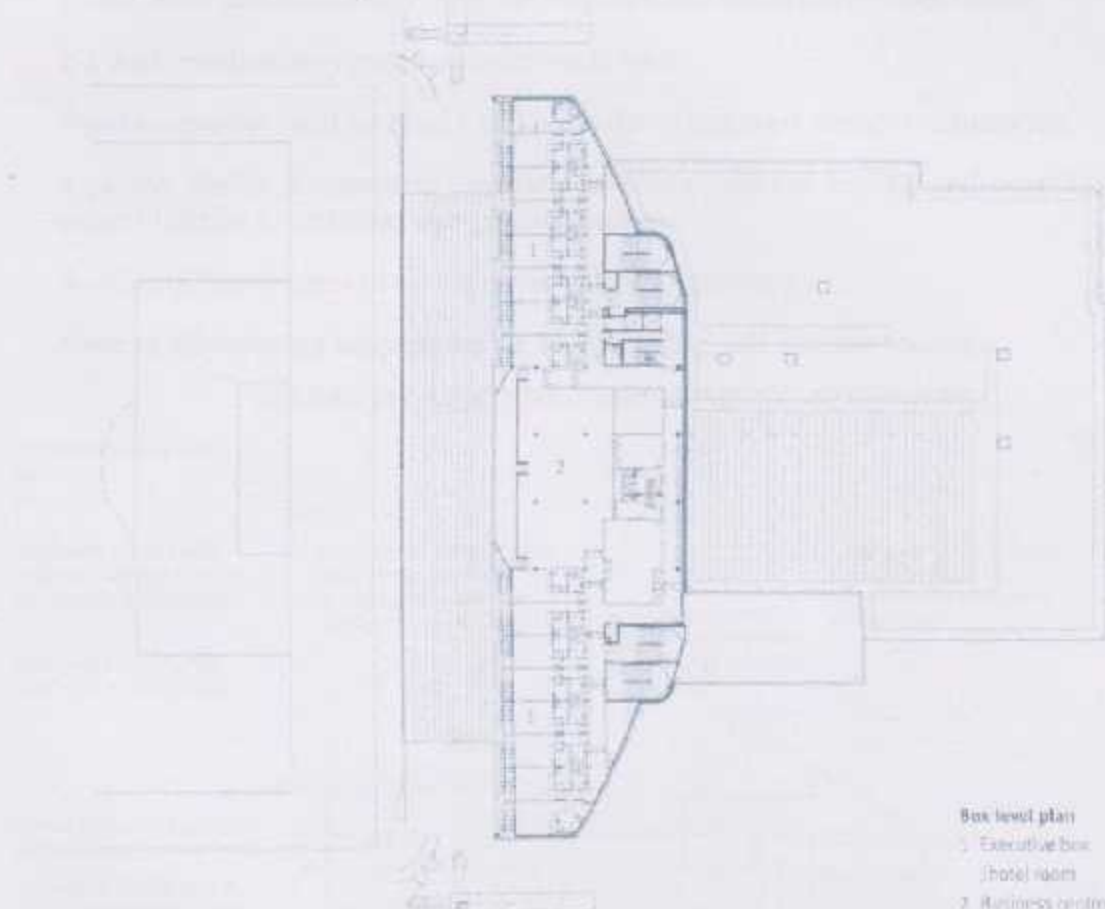
( Figure 5.1 b. plan showing Control room at Millennium Stadium Australia ,Wales).  
( sports architecture , 2001 ).

### 5.1.1.3.Vip box's ( sports architecture , 2001 ).

Project data	Architect	Chronology	Project Information	Economic information
Name : Alfred McAlpine Stadium Location : Huddersfield ,England	Architects: Rod Sheard	Design : October 1991 Open : November 1993	Site area : 51 acre Total number seat : 25,000	Construction cost : £15 million

16 private hospitality boxes on level 3 and a central bar and restaurant .

Suit offers clear views to the pitch and is fitted with television sets , dining tables and servery units , in addition can be interconnected to provide greater flexibility for letting for function during none - event days.



( Figure 5.1.c. plan showing suits boxes and central business service )  
( sports architecture , 2001 ).

## 5.1.2. Conceptual Case study

### 5.1.2.1. Sustainable Concept ( sports architecture , 2001 ).

Project data	Architect	Chronology	Project Information	Economic information
Name : Blue Wings Stadium Location : Suwon ,South Korea	Architects: Samoo Architects & Engineers	Design : 1996 Open : Y...)	Site area : NA Total number seat : 44,000 World cup : 2002	Construction cost : \$230 million

the key environmental strategies adopted for design include :

- 1-containers that store retain water for irrigation and retain storm water runoff .
- 2-a dual reticulation system to recycle waste water.
- 3-gas co-generation of electricity and hot water to minimise energy consumption.
- 4-passive design measures to provide ventilation , natural cooling and warming , and natural lighting to minimise energy consumption.
- 5-eco-profiling systems to ensure environmental friendless.
- 6-use of subterranean temperature for winter heating and summer cooling.

#### WINTER – ENVIRONMENTAL CONTROL STRATEGY – WEST SECTION

Climate temperature range  
Max 8 deg C  
Min -11 deg C

Penetration of low altitude  
winter sun can contribute to  
space heating in stadium/shelter

Pre-warmed air from atrium  
supplied to occupied areas

Inclined roof to optimum/tilt  
reduces heat losses and  
assists buffering of internal  
cold formed spaces

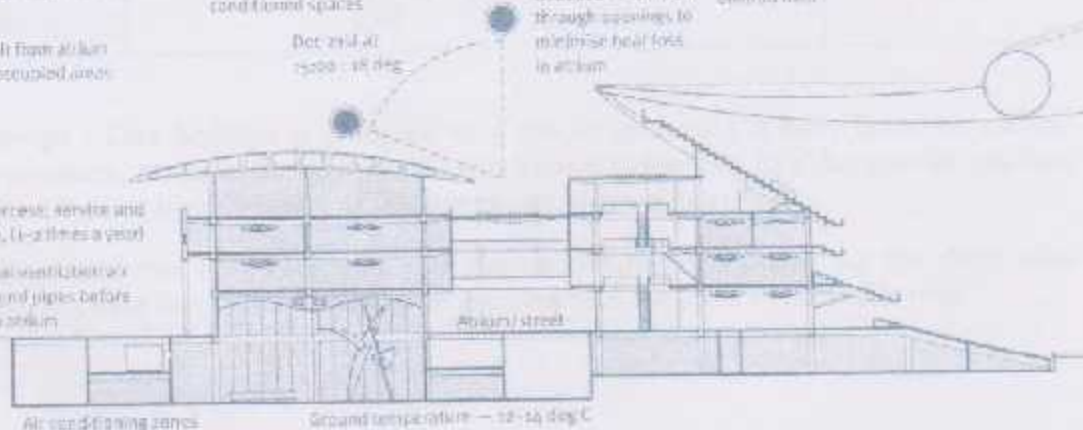
Det. temp. at  
15:00 : 18 deg

Reduced ventilation  
through openings to  
minimise heat loss  
in atrium

Openings in public walls kept  
closed to minimise air  
infiltration from the external  
open context

Perimeter for access, service and  
maintenance, (1-2 times a year)

Pre-heating of ventilation air's  
through ground pipes before  
delivery into atrium



( Figure 5.1.d: section show environmental strategies for blue wings stadium )  
( sports architecture , 2001 ).

### 5.1.2.2.Philosophic Concept (stadia, 2007) :

Project data	Architect	Chronology	Project Information	Economic information
<b>Name :</b> Moses Mabhida <b>Location :</b> Durban, South Africa <b>Owner :</b> Durban Metropolitan UniCity	<b>Architects:</b> Gerkan, Marg and Partners	<b>Design :</b> February 2006 <b>Open :</b> November 2005 <b>World cup :</b> 2010	<b>Site area :</b> 80,000 sq.m <b>Total number seat :</b> 70,000	<b>Construction cost :</b> \$450 million

**Land mark Design :** The stadium is named after a giant of a man, Moses MbhekiMncaneMabhida, who was one of those who helped to forge and maintain the powerful United Front that eventually saw the creation of a democratic and non-racial South Africa .

**Concept Design :** The shape of the iconic arch was inspired by the "Y shape" on the South African flag .

**Facade Design :** The facade of Moses Mabhida Stadium allows for natural ventilation and creates an incredible sense of space .

**Entertainment Design:** The grand centre arch, 106 m high, the SkyCar takes visitors up to its highest point, where can get out and enjoy breathtaking, panoramic views of the city and ocean

Project data	Architect	Chronology	Project Information	Economic information
<b>Name :</b> The Oita Stadium <b>Location :</b> Oita, Japan <b>Owner :</b> Oita Prefecture	<b>Architects:</b> KishoKurokawa	<b>Design :</b> 1998 <b>Open :</b> 2001 <b>World cup :</b> 2002	<b>Site area :</b> 92,00 sq.m <b>Total number seat :</b> 40,000	<b>Construction cost :</b> \$210 million

**Concept Design :** Oita Stadium is designed as a simple geometric sphere, based on ancient Japanese symbolism , It was designed affectionately known as the 'Big Eye' because the stadium is shaped like a big eye looking upwards that can open and close its eyelid.

The gentle curvature not only blends in with the surrounding landscape, but the shape also provides a perfect base for the use of deliberate gaps between the seats a retractable roof.

### 5.1.2.3. Multiple concept ( stadium , 2007 ) .

Project data	Architect	Chronology	Project Information	Economic information
Name : Allianz Arena Location : Munich, Germany Owner : Arsenal Holdings plc	Architects: Herzog & De Meuron	Design : February 2004 Open : 22 July 2005 World cup : 2006	Site area : 90 acre Total number seat : 60,000	Construction cost : £470 million

**Concept Design :** The design concept is based upon three principles; firstly, the presence of the stadium as an illuminated body that can change its appearance; secondly the development of a procession-like arrival of fans, in a landscaped area; and thirdly, to develop a crater-like interior of the stadium itself.

**Shape :** This is a translucent luminous body consisting of large shimmering white, diamond-shaped ETFE cushions, each of which can be illuminated separately in white, red or light blue, the colours of the two clubs.

**Colours :** The colours of the cushions can be controlled digitally so that the home team playing in the stadium can be identified from the outside.

**Urban Icon :** The changing appearance of the stadium enhances its attraction as an urban monument even for people who are not interested in football.

**Structural :** Both the shell and the structural skeleton of the stadium are designed throughout to implement these three key concepts.

**Approach :** Hence, the main stairs along the outside of the shell follow the line of greatest slope underscoring the procession like approach of visitors to the stadium.

**Car parking :** The car parks are laid out between the underground station and the stadium so as to create an artificial landscape for the arrival and departure of the fans.

# CHAPTER 6

## SITE AND LOCATION

### CHAPTER 6

- 6.1 Urban (Built Environmental Analysis )
- 6.2 Natural analysis

## 6. Proposed site and location

### 6.1. Urban (Built Environmental Analysis )

#### 6.1.1. Locational analysis

Location	Latitude & Longitude:	Project Information	Owner/INVESTOR
Name: Doha Port Location: Doha ,Qatar	Latitude: 25° 17' 40" N Longitude: 51° 31' 21" E	Site area : 300,000 sq.m Infrastructure : Yes	Owner : Qatar Olympic Committee-Government

Urban site located in the north-east of the city of Doha , the most important commercial , tourism space and contrast to the Doha Corniche, but according to Higher Committee Qatari Heritage has proceeded to cancel the commercial port area and turn it into the southern region between Doha and Mesaieed step planning to separate land use.



#### The proposed site analysis

The proposed site as the picture shown below is sensitive to the heart of the center region and a visual complement to the composition of the Urban Planning Ring Coast, a strategic location for tourists and merchants.

A magnet for tourists, which the optical axis of each of the Doha International Airport coming from the sky, which gives the Spirit is direct to the site, which is the biggest point of attraction and according to the space available.

Corniche Road lively street from the south and the north in addition to the east.

Just directly freely Island Pearl of discrimination attractive country distance of 6 km from the north-east and dimension for the tourists from the Corniche Street Terminator to the direction of Lucille from a tourist point for restaurants and merchants owners personalities freely estimated distance of 2 km and 3 km airport.

Located near the site of a distance of 500 m only Islamic Cultural Center outstanding which expresses the heritage of the country and civilization.



(Figure 6-1.b, show site location and main zones marked on whole area) Author



### 6.1.7. Accessibility and circulation Transportation analysis

cover all modes of movement in the area including pedestrian , car , bus , etc .

provision for each of these modes in terms of circulation , parking and drop off points regards to micro site location .



( Figure 6.1.1. show circulation near to site location ) Author.

## 6.2.Natural Analysis

### 6.2.1.Climate

#### Heat :

Desert climate warm and a little rainy winters and hot, humid summers.

The temperature in the summer up to more than 40-50 ° C, measured in the open air, but much more than if we add temperatures resulting from the reversal or stored buildings as a result of the heat conductive material to heat and increasing humidity affect sensation warmly atmosphere.



### Wind :

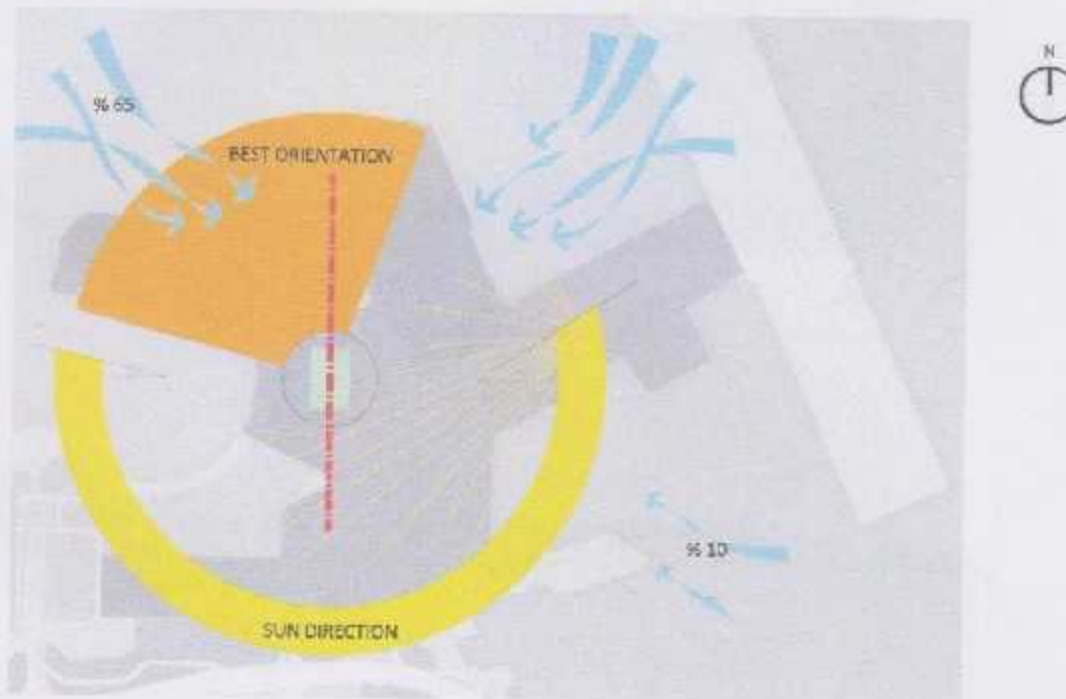
65% of moderate and heavy winds blowing from the north-east and north-western directions .

10% of moderate wind South easterly winds.

The inverse relationship between temperature and humidity in the air ratios, and this is reflected in the summer to reach the coastal area to between 80% - 90%.

### Rain :

Lacking rainfall in summer



( Figure 6.2 a: show sun direction and best orientation for football stadium in orange color and the percentage of wind in most event directions Author

### 6.2.2. Water

Water elements could be good inputs for concept development , to be aware of water situation in the area .

Water is available in abundance, where the site is located within the Arabian Gulf waters.

### 6.2.3. Vegetation

To understand what type of trees are included in the site , so can define the identity of a site some times .

phoeuixcanaliensis , coplinicia alba ,Bismar Kia nobilini, and Chameropeshumilis palms, especially since the age of one tree more than 300 years.

#### 6.2.4. Topography

To understand if site has slope or not , and in the site section show the level differences in the site .



( Figure 6.2.b. show plan and section at site to understand topography of site ) Author

# CHAPTER

# 7

## Drawing

### CHAPTER 1

- 7.1 Site plan
- 7.2 Plans
- 7.3 Elevations
- 7.4 Section
- 7.5 Perspectives

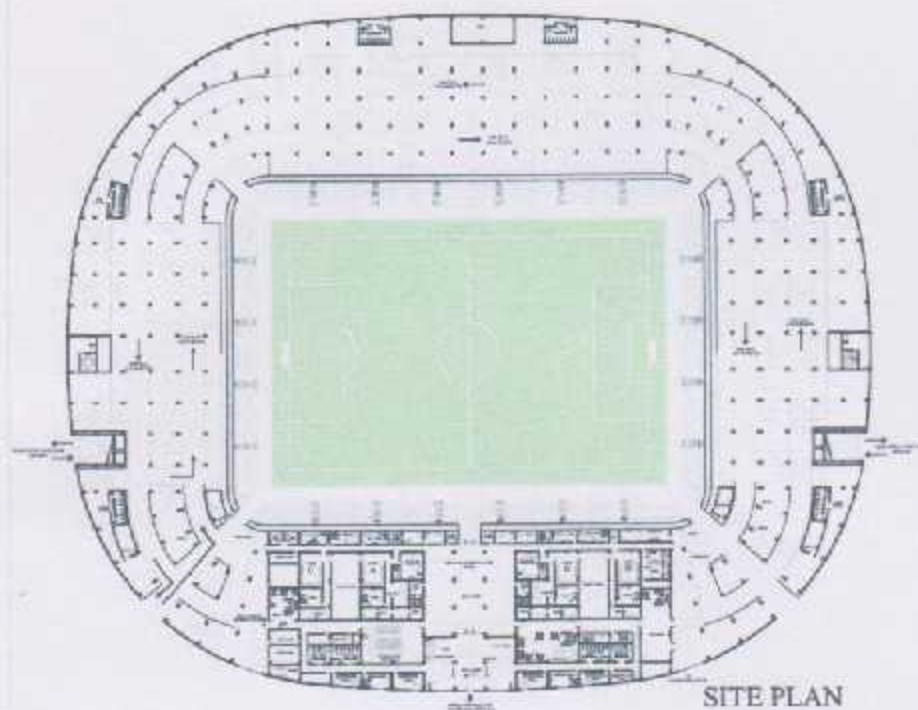
## 7.1.Site plan



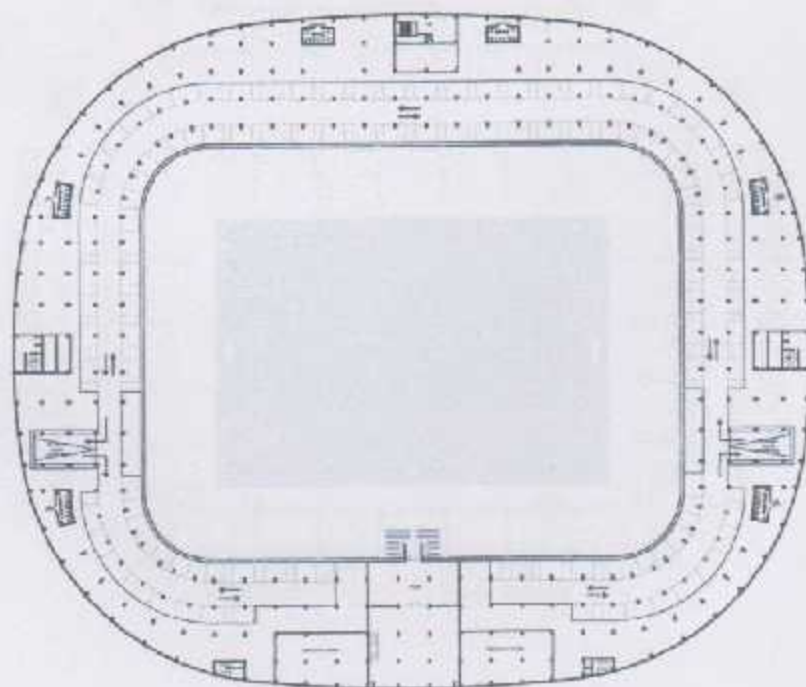
SITE PLAN

## 7.2.plans

### 7.2.1.Ground floor plan

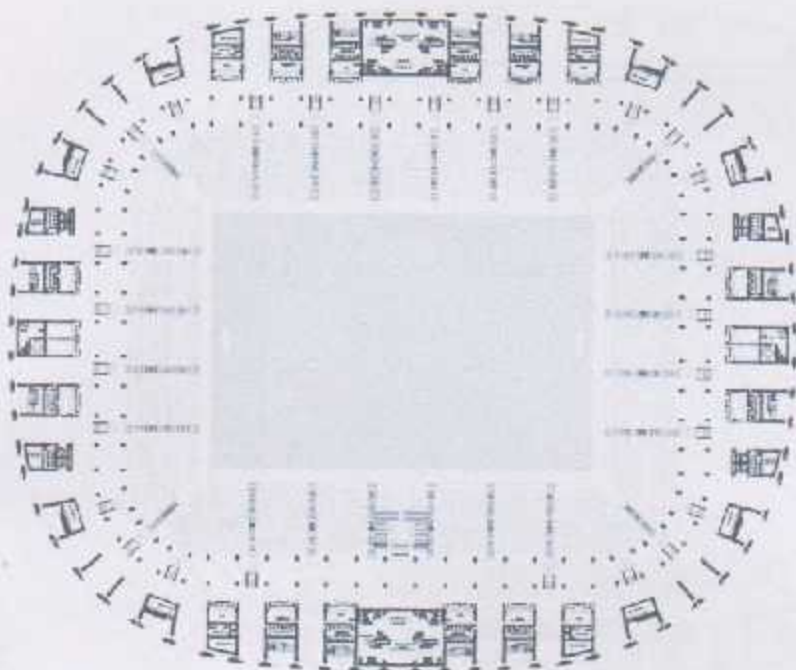


### floor plan

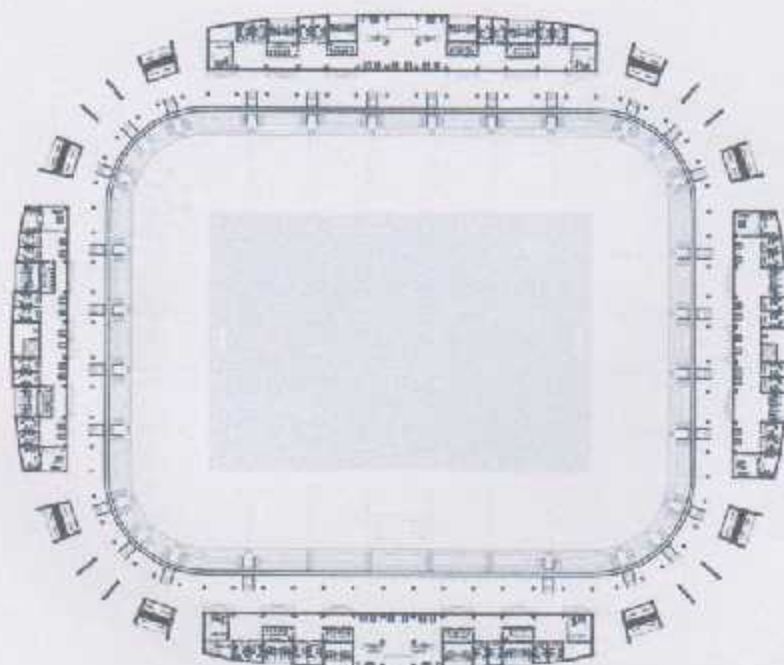


### 7.2.2.First

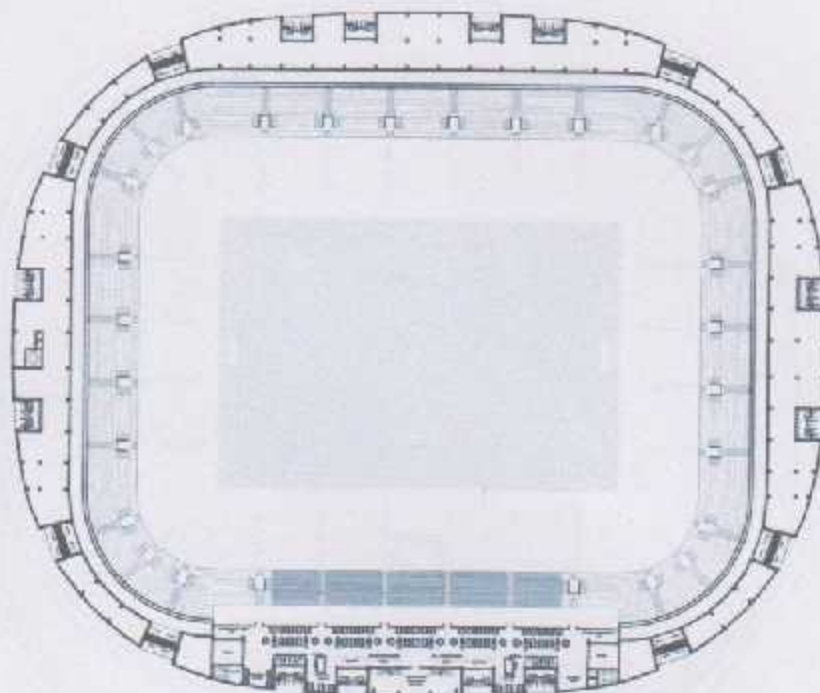
### 7.2.3. Second floor plan



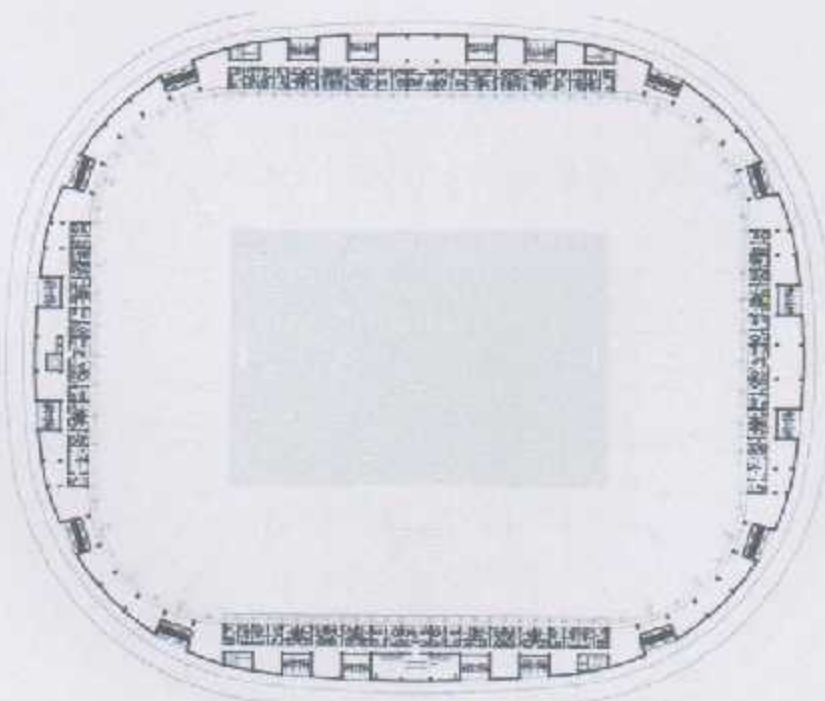
### 7.2.4. Third floor plan



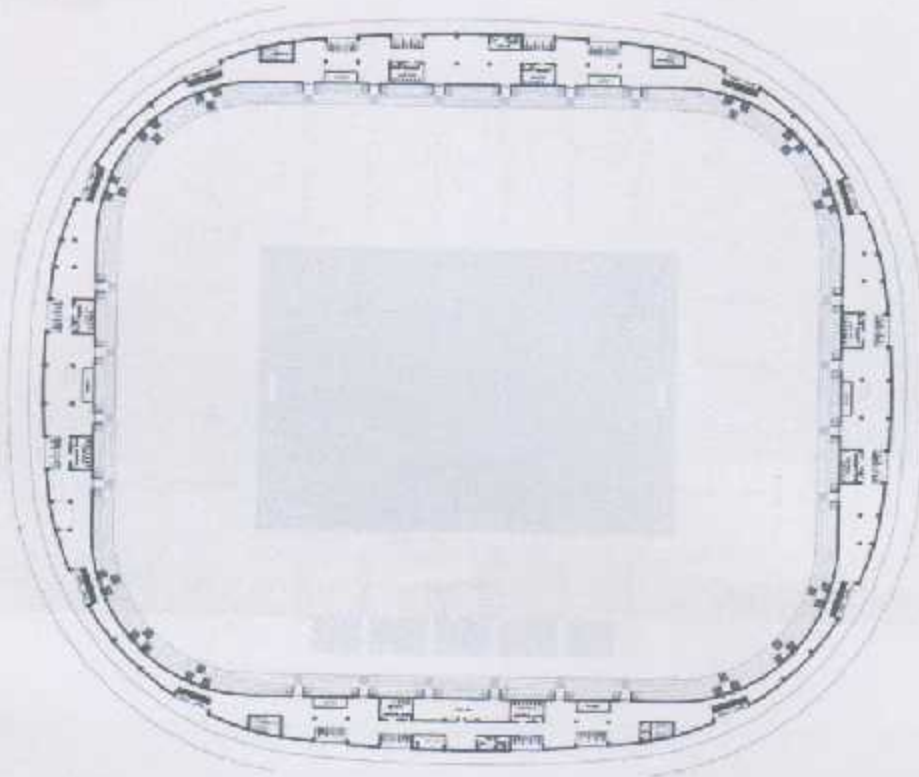
#### 7.2.5. Fourth floor plan



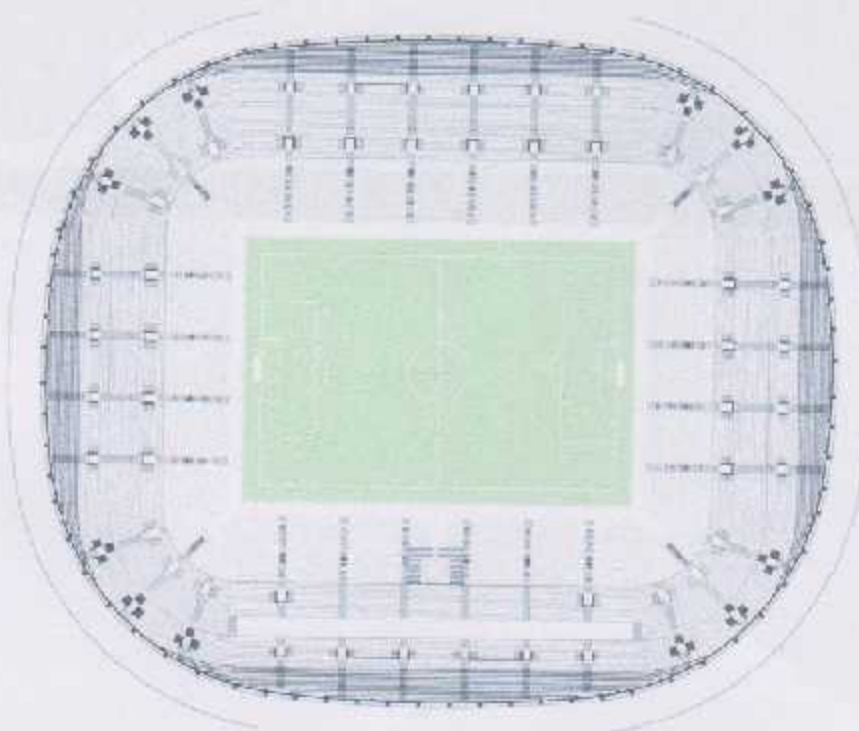
#### 7.2.6. Fifth floor plan



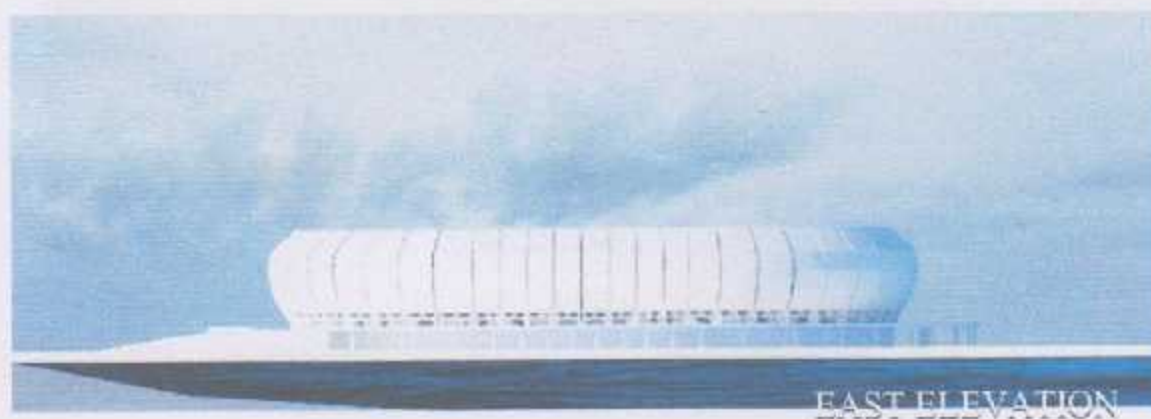
### 7.2.7. Sixth floor plan



### 7.2.8. Seventh floor plan



### 7.2.9.Elevations





#### 7.2.10. Section

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## REFERENCES

## REFERENCES

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	v	www. sc.qa

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