

Rethinking Urban Recreation Space Through Vertical Expansion

Gulshan, Dhaka

By
A. K.M. Abdur Rahaman
09208015

SEMINAR II

Submitted in partial fulfillment of
the requirements for the degree of
Bachelor of Architecture
Department of Architecture
BRAC University

2014

Abstract

This paper focuses on the possibilities of adaptation of the urban recreational spaces of going vertical, based on the theory of high rise to tackle the land scarcity issue and making the lands for recreational activities more efficient. With the ever growing population and limited land area, accommodating all the essential facilities for a desired standard of living has become a challenge for most parts of the world. While the idea of going vertical has been used mostly for residential and commercial purposes, the demand of area for recreational use has also gone higher. To balance the need within limited land area, rethinking the way of accommodating recreational facilities, enhancing social interaction and multiplying the usable area to increase the efficiency of the lands are the main area of exploration of this paper. The paper mainly draws information from the existing but smaller scale solutions of sports, recreation and community activities, international guidelines of sports offering different scales and the opinions of the people deprived from these essential recreational facilities. The aim of the research is to set an example of the possible solutions within the context of Dhaka, Bangladesh – which is one of the most densely populated countries and facing the issue of recreational spaces badly, which could be used in other contexts as well facing similar kind of situation.

Keywords : Sports, community, urban recreation, social interaction

Acknowledgement

I would like to thank my thesis advisor, Sir Shams Mansoor Ghani and Miss Nesfun Nahar Nipa and also my design instructors Abul Fazal Mahmudun Nobil and A. K. M. Shirajuddin for their constant encouragement, patience and support regarding the project. I would also like express my gratitude towards my batch mates for their critical observation and valuable comments on the thesis and also to the individuals outside BRAC University for providing all kind of necessary support throughout the whole period of work.

CHAPTER 01: BACKGROUND OF THE PROJECT.....Page 06

- 1.1 Project Brief**
- 1.2 Project Introduction**
- 1.3 Aims and Objectives**
- 1.4 Proposed Program**

CHAPTER 02: SITE APPRAISAL.....Page 09

- 2.1 Site Location**
- 2.2 Site and Surroundings**
- 2.3 Population analysis**
- 2.4 Climatic condition**
- 2.5 SWOT Analysis**

CHAPTER 03: LITERATURE REVIEW..... Page 18

- 3.1 Urban recreational space and its role:**
- 3.2 Need for open space and potential spaces in Dhaka city**
- 3.3 Recreational activities within a structure**
- 3.4 Types of sports and requirements**
- 3.5 Definition of Community gardening and its benefits**

4.1 Introduction

4.2 Chosen Projects

4.2.1 Adidas Futsal Park

4.2.2 City Hall Rooftop Garden

4.2.3 Sports and Administration Centre in Skanderborg

4.2.4 Herstedlund Community Center

4.2.5 Clayton Community Center

4.2.6 BLUA's Civic Sports Center

4.2.7 East Oakland Sports Center

5.1 Proposed Program

5.2 Rationale of the Program

5.3.1 Community Club

5.3.2 Community Garden

5.3.3 Theatre

5.3.4 Multi-purpose Hall

CHAPTER 06: Design Development.....Page 72

6.1 Conceptual development

6.2 Form placement

6.3 Form development

6.4 Design drawings

6.5 Model pictures

6.6 Perspective views

CHAPTER 07: Conclusion.....Page 84

CHAPTER 01: BACKGROUND OF THE PROJECT

- 1.5 Project Brief**
- 1.6 Project Introduction**
- 1.7 Aims and Objectives**
- 1.8 Proposed Program**

This chapter contains the overview on the proposed project stating its potentiality, objectives and motives of getting chosen to give a brief idea on it. It also provides a general idea on the chosen site and its surrounding as well as the basic programs which are to be accommodated by the project.

1.1 Project Brief:

Project Title : “Rethinking Urban Recreation Space Through Vertical Expansion”

Site Location and Area : Road-109, Gulshan, Dhaka.

Client : Public Private Partnership (PPP)

1.2 Project Introduction: The project is about rethinking the urban recreation space that used to or desired to exist in the modern ways of living in an urban area. By the term ‘urban recreation space’, we generally think of open green spaces such as fields, parks etc. used by the city dwellers to pass their leisure times to escape from the monotony of urban busy life. However, with the rapid growth of urbanization and commercial needs, these spaces which are essential for both physical and mental refreshment and development of the people living in the cities are getting compromised, resulting environmental degradation, lack of social interaction and in some cases – turning the cities into a jungle of concrete leaving hardly any spaces for these.

While the people living in such community are getting affected because of the deprivation from recreational spaces, the most adversely affected ones are the children. The healthy development of physical, intellectual, emotional and social aspects of the children are essential for growing up and to lead rewarding lives which heavily depends on getting the chance of performing physical activities and interacting with the others of the community – urban open spaces work in this case the most effectively. Other than the children, the health of the general people as well as the sense of community demand such space for meet ups and performing physical activities.

This particular project is to deal with such problems in the context of Dhaka city, one of the most densely populated cities of the world, with only 6% in the old portion and 12% in the new portion of open green space which is quite low than recommended ratio suggested by the experts. Due to the scarcity of open space in many areas, the city is unable to give regular recreational opportunities to its residents thus misses out an essential factor to ensure the desired quality of living.

In the cases of land scarcity, the idea of going vertical is being used to ensure more efficient use of land space when building structures. Using the same idea, the project focuses on rethinking the urban recreational space by going vertical to offer access to more people to perform physical activities and mental relaxation using lesser space of land.

1.3 Aims and objectives:

- To offer recreational opportunities to the residents of a particular area facing lack of open spaces, utilizing far more less land space by going vertical.
- Providing recreational facilities to the people of different age group living in the area.
- Adding more green to contribute to the environment while enabling more people use the land space.
- Increasing the sense of community among the residents living in the area through increasing social interaction.

1.4 Proposed Programs:

Playground facilities -

Outdoor :

- Mini-football Field, tennis Court, Badminton Court, Basketball Court, Mini-cricket field, Volley ball, Squash court, Hand ball

Indoor :

- Table tennis, pool, bowling, esports

Community facilities -

- Community club, community gardening

General facilities -

- Food court, theatre, multi-purpose hall, shops, skating track, Car parking

CHAPTER 02: SITE APPRAISAL

2.1 Site Location

2.2 Site and Surroundings

2.3 Population analysis

2.4 Climatic condition

2.5 SWOT Analysis

2.1 Site Location

While selecting the site for the project which is about offering recreational facilities to the residents of a particular area of a city facing inadequacy of playground or other recreational facilities, these were the initial considerations -

- The site should be in a residential area where it is easily accessible for the residents of the area
- Already offering similar use but less effectively
- Well connected to the city as well for more diverse interaction welcoming outside community

As city corporation is already approaching to create recreational space for the Gulshan community by rethinking the space of recently demolished wonderland and Gulshan Youth Club is existent with many of its facility with limited capacity while some of the others are ineffective due to it's limitation of space.

Issues influencing the selection:

- Connectivity
- Accessibility
- High-rise development around
- Residential area

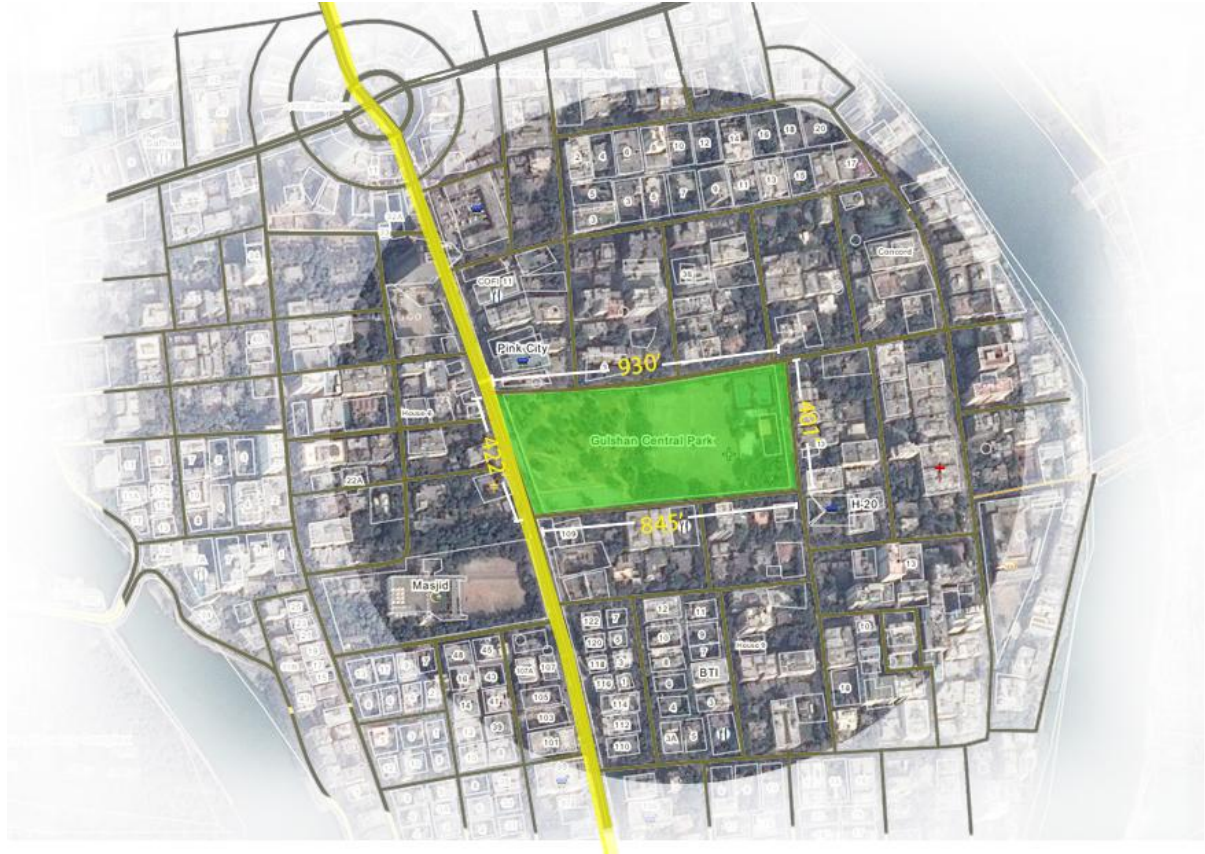


Fig 2.1: Location of the site. **Source:** Google Earth Map

2.2 Site and Surroundings

Location : Road – 109, Gulshan, Dhaka.

Area : 3,65,180 Sq. Ft. (Approx.)



The site has been renowned place, not only in the particular area but also to the city as here one of the most popular recreational facilities for children, “Wonderland”, existed on the West portion of the site. It’s been a great attraction for the people, especially children of the whole city having very little opportunity of amusement available in the other locations of the city.

The short scaled amusement park introduced new kinds of rides and means of joy provided recreation to a great scale until biggest amusement parks and other recreational opportunities became available.

Gulshan Youth Club – another big reason for this place to be known by many is still heavily active with it’s sports programs taking place daily. Also, occasional exhibition and fair takes place in the grounds of the club, making it’s activities more diversified. The youth club is situated on the east portion of the site having a large field in the middle and other recreational facilities on the East edge. However, apart from the sports facilities, zones for children, ladies, senior citizens are not active enough.

On the opposite side of the road on the west, Gulshan Thana is situated which strengthens the security of the area greatly. As security is a big issue to draw people in a public space, this strong point of the makes the possibilities a lot easier.

Along with the main road on the opposite side, commercial buildings and hotels are situated which generates some foreign people's activity too. One of the renowned hotels of Dhaka, "Westin" is situated within less than 0.15 kilometers of the site. Recreation facilities do have a high chance of attracting foreign people to the site with ease.

As long as the shoppers are concerned, "Pink city" is one of the most favorite locations of the shoppers which is situated just on the opposite side of the adjacent north side road of the site. This opens up the opportunity to attract the shoppers to the recreational activity and also source of income generation.



Fig 2.2 : Site Plan

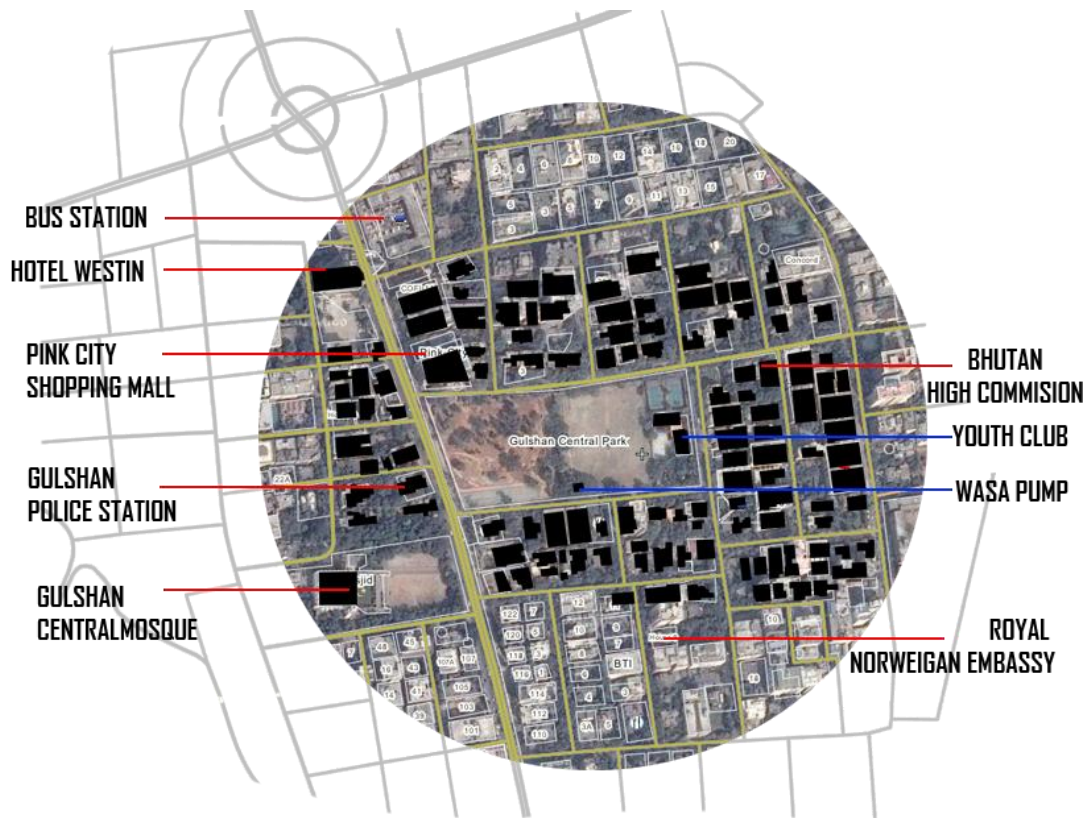


Fig 2.3: Site surroundings



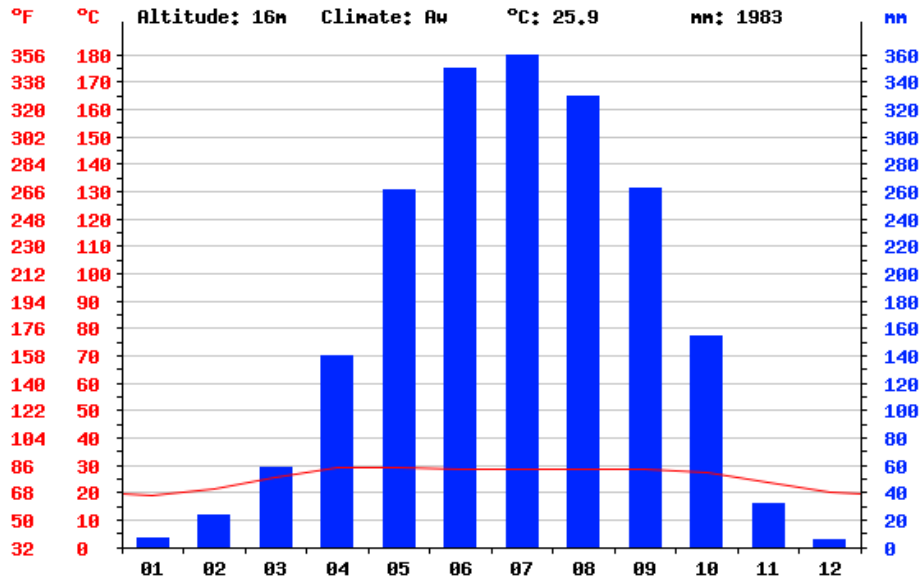
Fig 2.4: Green mapping and road network



Site photographs

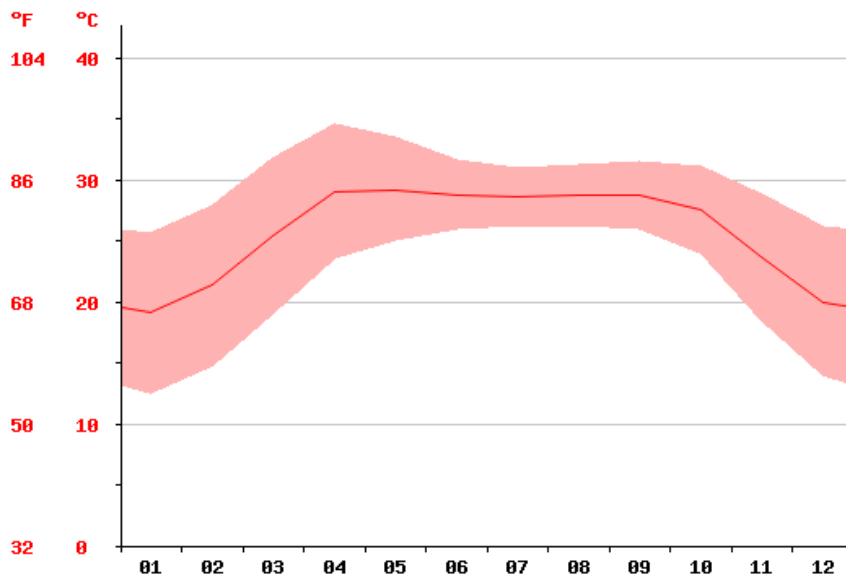
2.3 Climatic Condition

Climate Graph



The driest month is December with 6 mm. Most precipitation falls in July, with an average of 360 mm.

Temperature Graph



The warmest month of the year is May with an average temperature of 29.2 °C. In January, the average temperature is 19.1 °C. It is the lowest average temperature of the whole year.

Climate Table

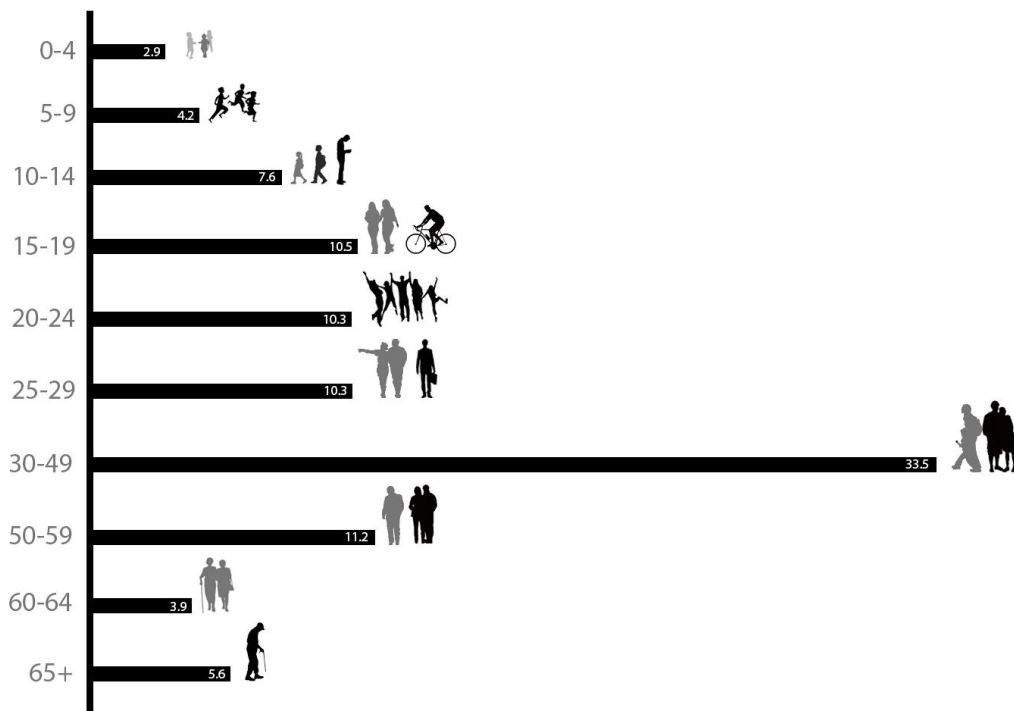
month	1	2	3	4	5	6	7	8	9	10	11	12
mm	7	23	58	140	261	350	360	330	262	154	32	6
°C	19.1	21.4	25.4	29	29.2	28.8	28.6	28.7	28.8	27.5	23.7	20
°C (min)	12.5	14.8	19	23.5	25	25.9	26.2	26.2	26	23.9	18.5	13.9
°C (max)	25.7	28	31.8	34.6	33.5	31.7	31	31.3	31.6	31.2	28.9	26.2
°F	66.4	70.5	77.7	84.2	84.6	83.8	83.5	83.7	83.8	81.5	74.7	68
°F (min)	54.5	58.6	66.2	74.3	77	78.6	79.2	79.2	78.8	75	65.3	57
°F (max)	78.3	82.4	89.2	94.3	92.3	89.1	87.8	88.3	88.9	88.2	84	79.2

The difference in precipitation between the driest month and the wettest month is 354 mm. The average temperatures vary during the year by 10.1 °C.

2.4 Population Analysis

Population of the area around of the chosen site is highly required for calculating the possible users of the project and also the age group among them. Here goes the total population of Gulshan Thana and the percentage of the groups based on age :

Total Population : 2,53,050



PERCENTAGE OF POPULATION IN AGE GROUP

2.5 SWOT Analysis

Strengths:

- Has roads on all sides of the site which includes 60' wide main road on the west side of the site.
- Secured area having local police station just on the opposite side of the front road
- Mostly surrounded by residential buildings on it's north, east and south side making it easily accessible for the people living around.
- Most parts are noise less due to being surrounded by residential area.
- Good amount of existing vegetation

Weakness:

- Main road on the west often face traffic congestion.
- Pedestrian conditions is not satisfactory as pavement is mostly missing on the south side and on the east side, vendors blocking the pavements.
- Existing car parking issue.
- High land value

Opportunities:

- Providing parking space for solving the existing issue
- Can become a very effective community gathering space
- Helping to preserve vegetation while increasing the efficiency of the land
- Place for recreation and healthiness

Threats:

- Nearby buildings may face noise disturbance
- Becoming a point of attraction can cause more traffic congestion in the existing roads

3: LITERATURE REVIEW

3.1 Urban recreational space and its role:

3.2 Need for open space and potential spaces in Dhaka city

3.3 Recreational activities within a structure

3.4 Types of sports and requirements

3.5 Definition of Community gardening and its benefits

CHAPTER 03 : LITERATURE REVIEW

3.1 Urban recreational space and its role:

By urban recreational space, we generally understand an open space in the urban area where the dwellers go for recreation and refreshment by performing outdoor activities within nature, escaping from the monotonous urban life style held with concrete structures. Such open spaces are essential for the dwellers of the city as they have great influence on both physical and psychological health, social development and sense of community. Apart from the dwellers, these spaces add up to making the environment greener and keep the cities in livable condition. However, it is not mandatory for the public spaces to be an open green land always, there are many other types of space that actually works as a place of recreation and social interaction.

According to DOE, [1] The following typology illustrates the broad range of open spaces that are of public value:

1. parks and gardens – including urban parks, country parks, forest parks and formal gardens;
2. outdoor sports facilities (with natural or artificial surfaces and either publicly or privately owned) – including tennis courts, bowling greens, sport pitches, golf courses, athletic tracks, school and other institutional playing fields, and other outdoor sports areas;
3. amenity green space (most commonly, but not exclusively in housing areas) – including informal recreation spaces, communal green spaces in and around housing, and village greens;
4. provision for children and teenagers – including play areas, kickabout areas, skateboard parks and outdoor basketball hoops;
5. green corridors – including river and canal banks, amenity footpaths and cycleways;
6. natural and semi-natural urban green spaces – including woodlands, urban forestry, grasslands (eg. meadows), wetlands, open and running water, and rock areas (eg. cliffs);
7. allotments and community gardens;
8. cemeteries and churchyards; and
9. civic spaces, including civic and market squares and other hard surface areas designed for pedestrians.

Then question comes why these spaces are needed and what influence do they have on the residents of the city on a broader sense. The benefits of having such place according to a research [2] carried out by an organization of sefton -

Trees

- The contribution made by both individual trees and the level of tree cover is an important aspect of greenspace. They enhance visual amenity, offer wildlife value and act as a buffer. Their role may be relevant within each of the following criteria.

Visual Amenity

- The views into and from the site, and the relationship of the site to adjacent or linked spaces, regardless of whether the site has public access.
- What the site offers in terms of outlook, variety in the urban scene or as a positive element in the landscape.

Quality

- The way a greenspace contributes to the appearance of the surrounding area or townscape in terms of landscape and design.
- The contribution that plentiful and visually attractive greenspaces make to regeneration.Recreation and Wellbeing
- The informal and formal recreational facilities that a site provides, or the potential of the site to provide these in the future to people of all ages.
- The health benefits provided by greenspaces, including allotments.
- The ability of urban greenspaces to act as green corridors that allow people to move through the urban area into the surrounding countryside.

Wildlife and Habitat Value

- The habitats and wildlife provided on the site, including sites identified in habitat surveys of the North Merseyside Biodiversity Action Plan, as well as sites supporting protected species.

- The value of sites containing natural areas which people have easy access to, and provide opportunities for public enjoyment and environmental education.
- The potential to enhance or create habitat and to meet targets laid down in the North Merseyside Biodiversity Action Plan.
- The 'green corridor' function provided by greenspaces that provides an opportunity for wildlife to move through the urban area.

Cultural and Community Resource

- Where the site reflects a particular period of development, contains historic or archaeological remains or is identified as an area of search for remains.
- Where the site has social importance within its neighbourhood e.g. site for community events or historical association.

Strategic functions

- Openness – The open character provided by greenspace within the urban area and how it affects people's perception of how built up an area is.
- Buffer - This includes any feature within the site which provides a visual screen or shelter or helps to reduce noise e.g. belts of trees and boundary walls. It also refers to any buffer provided by a site to separate different land uses, including transport corridors.

Individual urban greenspace sites are designated whether they provide one, several or many of these benefits, rather than only when they provide all of them.

Now, there are many human and environmental factors and trends that point to the need for a strategic approach to open space and recreation. According to the research done at the city of Marion, [3] the key factors are:

- Open spaces play a key role in people's physical and mental health and wellbeing by providing settings for participation in recreation, physical activity, social gatherings, relaxing

- Open spaces need to link with walking and cycling networks to facilitate opportunities for physical activity
- Higher expectation by the community that open spaces will be equitably distributed, accessible, safe, of high quality and provide diverse settings to meet the needs of user groups
- Open spaces can build community capacity through providing settings where people can interact and socialise
- With the ageing population there is a need for access to open spaces with appropriate amenities within walking distance of residences
- Young people want open spaces with recreation facilities that provide physical challenges and also quieter spaces for socialising with friends
- Increasing living densities increase the environmental, recreational, cultural and environmental value of open spaces
- There is a greater awareness of the need to protect and enhance the natural environment
- Protection and improvement of water quality and water conservation
- Risk management and safety
- Open spaces offer significant opportunities for tourism and economic benefits

Consultation with the community and other stakeholders revealed the following:

- A diversity of open space and recreation opportunities are needed to cater for people of all ages and interests
- Open spaces are valued as visual relief to the urban environment
- Coastal open spaces should be preserved for environmental and recreational purposes
- Access and safe linkages for walking and cycling are critical to their levels of use
- Amenities, including playgrounds and shade, need to be appropriately located and well maintained
- Facilities should be provided in open spaces for casual use such as tennis courts, basketball rings, soccer goals

- Open spaces and recreation settings should be designed to maximize safety
- Facilities are required for structured traditional sports
- Youth need facilities for unstructured recreation that cater for a range of active and passive interests for both females and males
- Open spaces should be landscaped so they are environmentally sustainable, enhance biodiversity and minimise water use
- Open spaces provide opportunities for the development of tourist destinations and experiences

3.2 Need for open space and potential spaces in Dhaka city

The city of Dhaka is one of the most densely populated city around the world and the number of population in the city is ever growing due to it's high centralization. To meet up the demand of its population, the land spaces are rapidly getting covered up by new structures made for economic purposes leaving very few open spaces for recreational outdoor activities. According to the research on "Urban life and use of public space in Dhaka" – [4] Cities, like Dhaka, in the developing countries are mostly built-up areas due to the pressure of rapid urbanization. Here the roads are crowded with vehicles and air is laden with lead, smoke etc. Within the junk of concrete and polluted environment the green open areas are very essential inside the city for its environmental and ecological balance. Other than this passive need, one of the primary need of open spaces in urban life is for recreational purposes during the leisure time. The importance of recreation in people's physical, intellectual and emotional development is now undisputed. It has been reported repeatedly that one of the major reason for crime in Dhaka city is the lack of proper and adequate recreational facilities [Siddique, 1991: 315]. Indeed, recreational facilities and open spaces, which are accessible to the general public, provide an integral and necessary part of urban living, particularly in areas of high density. In our cultural and climatic context, we have the tradition to perform many leisure activities in outdoor spaces in urban life. Such leisure activities are Travel like walking or wandering; Personal Care and Exercise like sports, active play; Sleeping for relaxation; Eating during picnic or dining out; Social and Institutional Activities like meeting, talking, parties etc.; and Cultural and Communication Activities like hobbies, passive play etc. For passive recreation open spaces like parks and gardens and for active recreation playfields/grounds, stadiums, open-air theater etc. are essential within a city boundary. Moreover, some functional uses like *Chawk* or open market, congregational fields or *Eidgah*, political meeting places etc. have been traditionally occupying the urban open spaces in our context. In the historical city of Dhaka, commonly called Old Dhaka,

large scale public gathering space was limited to a number of chawks, rather the whole city had small scale and intimate public open spaces in the *mahallas*. Traditionally such informal public open spaces, like street corners, court yards etc., helped to generate local social activities and ensured social control. Similar informal and intimate open spaces are rare in new Dhaka in spite of its organic morphological character and spontaneous development. Only a few spaces are kept open in planned residential areas which are also being swallowed day by day. The scarcity of required open spaces, both in public and private realm, has restricted and changed our lifestyles to a great extent. The urbanity in Dhaka rarely gets the scope to use the urban open spaces for their recreational need. People at present are more home bound, thereby, has changed into a more individuated, self-centered, and mechanical society in turn [Nilufar, 1997]. However, in spite of growing densification of built-up areas in newer parts of Dhaka, a number of medium and large scale open spaces are scattered in the city. Such areas often found to be misused by anti-social occurrences, thereby resulting into dehumanized areas. It is believed that role of urban public spaces, both at community and metropolitan level, is important to improve the social ties and social control for future generations. The present survey reveals that the precious open spaces of Dhaka are highly used and there also remains a great demand of more open spaces in our urban life. Therefore, it seems that in a dense city like Dhaka the existing open spaces need to be more effective for public interaction; besides, more open spaces need to be created according to public need.

The stock of open spaces in a city is important for the present and future of its urban life. To have a right picture of the present use and also to prepare future proposals it seems essential to have the facts and figures regarding the existing stock of open spaces. However, with multiplicity of controlling agencies, such figures are not readily available for Dhaka. Traditionally, the maintenance and control of open spaces of Dhaka have been shared by the authority of Public Works Department and RAJUK [previous DIT]. Being influenced by a political decision, at present, most of the open spaces and parks in local areas are handed over to the Dhaka City Corporation [DCC] authority as they collect tax from the citizens. The Arbory Culture Department of PWD only takes care of the large green areas of Dhaka. Beside these, other governmental agencies are responsible for their respective open areas like Zoo, Stadiums, Botanical Gardens etc.; and several open spaces are under the authority of different institutions. As a result, in absence of any central control or legal binding such figures rarely determined and reported for Dhaka City. Although PWD has a list of their open spaces; it has been found that Dhaka City Corporation [DCC] has no complete list of the open spaces under their authority. Besides, the stock of open spaces under other

agencies and different institutions still remains uncovered. DMDP Structure Plan claims that at the city or metropolitan scale, Dhaka has a fair representation of recreational open spaces, both for active and passive recreation, though arguably not enough. [Dhaka Structure Plan, Vol.-I, 84: 1995]At present it seems imperative to identify and quantify the available stock of open spaces in Dhaka city. However, such an endeavor needs immense resources. Within the given limitation, this present research tries to identify the potential open under different government agencies like DCC, PWD etc. within the city boundary. Data has been collected from the Zonal offices of DCC. In this way a list of open spaces has been prepared and the areas have been identified in Dhaka city map. [see attached Map] However, the attached list does not include the right-of-way, landing space, road-side island, median, round-about etc. The stock of public open spaces under DCC control is approximately 190 acres and under PWD is 302 acres. This two authority cover 0.768 sq. miles of area, which is only 1.4% of Dhaka's land. However, many other authorities have vast areas, which also contribute to public use. The following list delineates the information collected as part of this investigation.

3.3 Recreational activities within a structure

- Indoor type football :

Indoor variants of association football, including:

- Futsal, is a variant of association football that is played on a smaller field and mainly played indoors. It can be considered a version of five-a-side football. Futsal is a game played between two teams of five players each, one of whom is the goalkeeper. Unlimited substitutions are permitted. Unlike some other forms of indoor football, the game is played on a hard court surface delimited by lines; walls or boards are not used. Futsal is also played with a smaller ball with less bounce than a regular football due to the surface of the pitch. The surface, ball and rules create an emphasis on improvisation, creativity and technique as well as ball control and passing in small spaces.
- Five-a-side football: Five-a-side football is a variation of association football in which each team fields five players (four outfield players and a goalkeeper). Other differences from football include a smaller pitch, smaller goals, and a reduced game duration. Matches are played indoors, or outdoors on AstroTurf or artificial

grass pitches that may be enclosed within a barrier or "cage" to prevent the ball from leaving the playing area and keep the game flowing.

- Indoor soccer: Indoor soccer, indoor football, arena soccer, or six-a-side football in the United Kingdom, is a game derived from association football adapted for play in an indoor arena such as a turf-covered ice hockey arena or skating rink. The term "indoor soccer" is so well known as a description of the different style of the game that it is even used to describe similar fields which are built outdoors.

Indoor soccer is one of several distinct variants of the game of association football designed for play in indoor arenas. Indoor soccer is most popular in the United States, Canada and Mexico, with several amateur, collegiate and professional leagues functioning. It is also played in Brazil, where it is called showbol.

For these kind of sports, artificial grass which is known as turfs can be a effective solution as they are going to be built on hard surfaces. Here goes the definition of turf, their advantages and disadvantages [5] :

Artificial turf is a surface of synthetic fibres made to look like natural grass. It is most often used in arenas for sports that were originally or are normally played on grass. However, it is now being used on residential lawns and commercial applications as well. The main reason is maintenance—artificial turf stands up to heavy use, such as in sports, and requires no irrigation or trimming. Domed, covered, and partially covered stadiums may require artificial turf because of the difficulty of getting grass enough sunlight to stay healthy.

Advantages

- Artificial turf can be a better solution when the environment is particularly hostile to natural grass. An arid environment or one where there is little natural light are examples.
- Artificial turf can withstand significantly more use than natural grass and can therefore be used much more frequently. This allows sports ground owners to generate more income from their facilities.
- Ideal for holiday homes when maintenance of lawns is not practical. It is also a solution for elderly home-owners who find the upkeep of lawns too much hard work. Artificial turf can be vacuumed, broom cleaned or hosed over.
- Suitable for roof gardens and swimming pool surrounds.

- Some artificial turf systems allow for the integration of fiber-optic fibers into the turf. This would allow for lighting or advertisements to be directly embedded in a playing surface, or runway lighting to be embedded in artificial landing surfaces for aircraft.

Disadvantages

- Some artificial turf requires infill such as silicon sand and/or granulated rubber. Some granulated rubber is made from recycled car tires and may carry heavy metals which can leach into the water table. Alternative sources of infill may provide a safer solution.
- There is some evidence that periodic disinfection of artificial turf is required as pathogens are not broken down by natural processes in the same manner as natural grass. Despite this, a 2006 study suggests certain microbial life is less active in artificial turf.
- Friction between skin and older generations of artificial turf can cause abrasions and/or burns to a much greater extent than natural grass. This is an issue for some sports: for example, football in which sliding maneuvers are common and clothing does not fully cover the limbs. However, some third-generation artificial grasses almost completely eliminate this risk by the use of polyethylene yarn.
- Artificial turf tends to retain heat from the sun and can be much hotter than natural grass with prolonged exposure to the sun. This can be reduced by the application of water prior to use of the playing field.
- In comparison with earlier generations of artificial turf, modern turfs are more permanent installations and are not as easily removed and replaced for individual sports. For instance, with earlier generations of turf, a multi-purpose stadium could have one turf set up for American football, roll it up, and replace it with a turf for, for instance, baseball or soccer. With sand and/or rubber infill and some solutions adopted for fixing the artificial turf, modern artificial turf installations do not lend themselves to easy removal. This is part of the reason why short-pile turfs remain in use in indoor American football, which shares arenas with hockey and basketball teams, requiring easy removal of turf when the game is finished.
- Line markings for differing sports are sewn into artificial turf, making line markings permanent. In most cases with natural grass, line markings can be painted on with temporary paint and removed (washed away) or it dissipates with rain or general irrigation. Line markings in artificial turf for multiple sports are achieved by sewing in contrasting colours during production or 'cutting in' during installation. This creates a cluttered appearance and is usually unacceptable for professional sports. (Prior to the adoption of modern turfs, there were five stadiums hosting both MLB and NFL teams; as

of 2012, there will only be one, and there has also been a rise in soccer-specific stadiums in this time frame.) Temporary line marking solutions for artificial turf have not yet been adopted.

Art facilities and community exhibition:

An **art centre** or **arts center** is distinct from an art gallery or art museum. An arts centre is a functional community centre with a specific remit to encourage arts practice and to provide facilities such as theatre space, gallery space, venues for musical performance, workshop areas, educational facilities, technical equipment, etc.

Developmental Benefits of Art

Motor Skills: Many of the motions involved in making art, such as holding a paintbrush or scribbling with a crayon, are essential to the growth of fine motor skills in young children. According to the National Institutes of Health, developmental milestones around age three should include drawing a circle and beginning to use safety scissors. Around age four, children may be able to draw a square and begin cutting straight lines with scissors. Many preschool programs emphasize the use of scissors because it develops the dexterity children will need for writing.

Language Development: For very young children, making art—or just talking about it—provides opportunities to learn words for colors, shapes and actions. When toddlers are as young as a year old, parents can do simple activities such as crumpling up paper and calling it a “ball.” By elementary school, students can use descriptive words to discuss their own creations or to talk about what feelings are elicited when they see different styles of artwork.

Decision Making: According to a report by Americans for the Arts, art education strengthens problem-solving and critical-thinking skills. The experience of making decisions and choices in the course of creating art carries over into other parts of life. “If they are exploring and thinking and experimenting and trying new ideas, then creativity has a chance to blossom,” says MaryAnn Kohl, an arts educator and author of numerous books about children’s art education.

Visual Learning: Drawing, sculpting with clay and threading beads on a string all develop visual-spatial skills, which are more important than ever. Even toddlers know how to operate a smart phone or tablet, which means that even before they can read, kids are taking in visual information. This information consists of cues that we get from pictures or three-dimensional objects from digital media, books and television.

“Parents need to be aware that children learn a lot more from graphic sources now than in the past,” says Dr. Kerry Freedman, Head of Art and Design Education at Northern Illinois

University. “Children need to know more about the world than just what they can learn through text and numbers. Art education teaches students how to interpret, criticize, and use visual information, and how to make choices based on it.” Knowledge about the visual arts, such as graphic symbolism, is especially important in helping kids become smart consumers and navigate a world filled with marketing logos.

Inventiveness: When kids are encouraged to express themselves and take risks in creating art, they develop a sense of innovation that will be important in their adult lives. “The kind of people society needs to make it move forward are thinking, inventive people who seek new ways and improvements, not people who can only follow directions,” says Kohl. “Art is a way to encourage the process and the experience of thinking and making things better!”

Cultural Awareness: As we live in an increasingly diverse society, the images of different groups in the media may also present mixed messages. “If a child is playing with a toy that suggests a racist or sexist meaning, part of that meaning develops because of the aesthetics of the toy—the color, shape, texture of the hair,” says Freedman. Teaching children to recognize the choices an artist or designer makes in portraying a subject helps kids understand the concept that what they see may be someone’s interpretation of reality.

Improved Academic Performance: Studies show that there is a correlation between art and other achievement. A report by Americans for the Arts states that young people who participate regularly in the arts (three hours a day on three days each week through one full year) are four times more likely to be recognized for academic achievement, to participate in a math and science fair or to win an award for writing an essay or poem than children who do not participate.

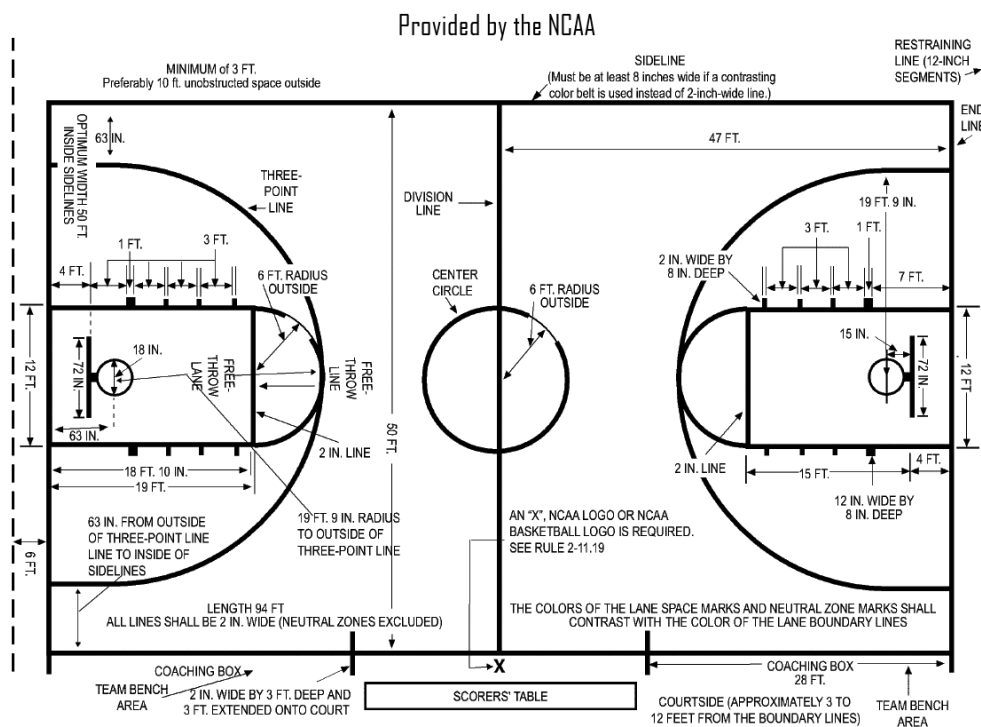
3.4 Types of sports and requirements

Basket Ball :

Basketball courts come in different shapes and sizes and colors. In the NBA, the court is 94 feet by 50 ft (28.65m by 15.24m). Under International Basketball Federation (FIBA) rules, the court is minutely smaller, measuring exactly 28 m by 15 m (91'10.4" by 49'2.6"). A high school court is slightly smaller, at 84' by 50' and some elementary schools have courts measuring 74' x 42'. In amateur basketball, court sizes vary widely. The baskets are always 10' (3.05m) above the floor (except possibly in youth competition). Basketball courts have a three-point arc at both baskets. A basket made from behind this arc is worth three points; a basket made from within this line, or with a player's foot touching the line is worth two points.

The free-throw line, where one stands while taking a foul shot, is located within the three-point arc.

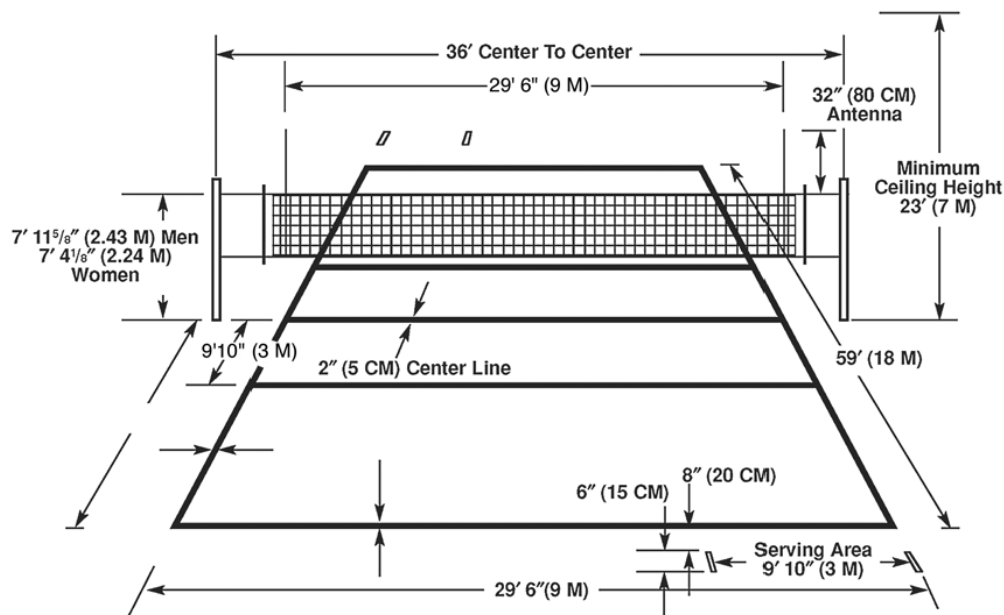
The height of the underside of the roof structure, or the ceiling if there is one, above the floor is specified by each sport's governing body, and this is a critical design factor. Badminton, tennis and trampolining require an unrestricted height of 9.1m for international competition, while 7.6m is necessary at C level in all sports except those for which height is not critical. In general a basketball court should have a minimum clearance of 25 feet (7.7m), although a ceiling height of at least 27 feet (8.23m) is recommended.



Volley Ball :

A volleyball court is 18 m (59 ft) long and 9 m (29.5 ft) wide, divided into 9 m x 9 m halves by a one-meter (40-inch) wide net. The top of the net is 2.43 m (8 ft 0 in) above the center of the court for men's competition, and 2.24 m (7 ft 4 in) for women's competition, varied for veterans and junior competitions.

The minimum height clearance for indoor volleyball courts is 7 m (23 ft), although a clearance of 8 m (26 ft) is recommended.



Five, Six and Seven-a-side football

Five-a-side, six-a-side and seven-a-side football may be played indoors or outdoors. The pitch may be enclosed by rebound boards (barriers), fences or walls or the game can be played to goal lines and touchlines on open spaces. Five, six and seven-a-side football is played on a range of surfaces that include:

Outdoors

- Natural grass
- Long pile artificial football grass
- Sand filled artificial grass
- Sand filled needle punch surfaces
- Polymeric surfaces
- Macadam

Indoors

- A range of indoor sports hall floorings including timber, composites, vinyl and linoleum sheet materials, textiles and carpets
- Long pile artificial football grass
- Sand filled artificial grass
- Polymeric surfaces

Pitch dimensions

It must be rectangular and the length of the touchline must be greater than the length of the goal line. Where possible the ratio of length to width should be 2:1. If a pitch is surrounded by fences, walls, etc and is marked with goal lines and touchlines, adequate run-offs need to

be provided to ensure players do not injure themselves by running into the surround structures. The run-offs should be surfaced with the same surface as the playing area. Where the pitch is located on an open area (e.g. a grass playing field) run-offs should also be provided so that spectators, team officials, etc do not stray too close to the pitch. This can be done by marking additional lines or using portable cones to designate the outer boundaries of the run-offs.

Five and six-a-side pitches				
	Length		Width	
Min.	25.0m		16.5m	
Max.	50.0m		35.0m	
Run-off when applicable	Minimum	2.0m	Minimum	2.0m
	Recommended	3.0m	Recommended	3.0m
Seven-a-side pitches				
	Length		Width	
Min.	50.0m		30.0m	
Max.	60.0m		40.0m	
Run-off when applicable	Minimum	2.0m	Minimum	2.0m
	Recommended	3.0m	Recommended	3.0m

Mini-soccer

Mini-soccer is normally played outdoors. Traditionally the game has been played on natural grass but the increasing number of artificial grass pitches has led to a number of Leagues allowing the use of these alternative forms of surface, particularly where inclement weather makes natural grass pitches unusable.

Pitch dimensions

Where pitches are located within enclosed areas run-offs should be provided to ensure players do not injure themselves by running into surrounding fencing, hoardings, spectators and other obstacles. The run-offs should be surfaced with the same surface as the playing

area. Where the pitch is sited on an open area (e.g. a grass playing field) run-offs should also be marked so that spectators, team officials, etc do not stray too close to the pitch. This can be done by marking additional lines or using portable cones to designate the outer boundaries of the run-offs.

Under 10s / 9s		
	Length	Width
Min.	45.75m	27.45m
Max.	54.90m	36.60m
Run-off	3.0m	3.0m
Overall size		
Min.	51.75m	33.45m
Max.	60.90m	42.60m
Under 8s / 7s		
	Length	Width
Min.	27.45m	18.30m
Max.	45.75m	27.45m
Run-off	3.0m	3.0m
Overall size		
Min.	33.45m	24.30m
Max.	51.75m	33.45m

Futsal :

Futsal may be played indoors or outdoors on a range of surfaces that include:

Outdoors

- Artificial grass – all types
- Sand filled needle punch surfaces
- Polymeric surfaces
- Macadam

Indoors

- A range of indoor sports hall floorings including timber, composites, vinyl and linoleum sheet materials, textiles and carpets
- Long pile artificial football grass
- Sand filled artificial grass
- Polymeric surfaces

Pitch dimensions

The game is played to goal lines and touchlines on open spaces without barriers. If a pitch is surrounded by fences, walls, etc adequate run-offs need to be provided to ensure players do

not injure themselves by running into the surround April 2005 FA Guide to indoor and outdoor areas for small sided football, mini-soccer and futsal structures. The run-offs should be surfaced with the same surface as the playing area.

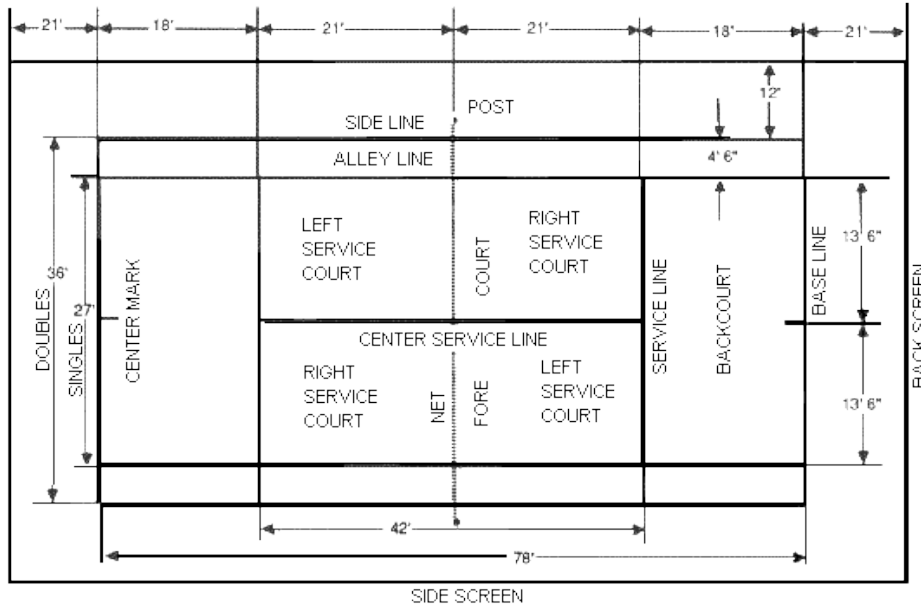
Where the pitch is located on an open area (e.g. a grass playing field) run-offs should also be provided so that spectators, team officials, etc do not stray too close to the pitch. This can be done by marking additional lines or using portable cones to designate the outer boundaries of the run-offs.

	Length		Width	
Min.	25.0m		15.0m	
Max.	42.0m		25.0m	
Run-off enclosed pitches	Minimum	2.0m	Minimum	2.0m
	Recommended	3.0m	Recommended	3.0m
Run-off open space pitches (min)	2.0m		2.0m	
Futsal pitch dimensions - international matches				
	Length		Width	
Min.	38.0m		18.0m	
Max.	42.0m		22.0m	
Run-off enclosed pitches	Minimum	2.0m	Minimum	2.0m
	Recommended	3.0m	Recommended	3.0m
Run-off open space pitches (min)	3.0m		3.0m	

Tennis :

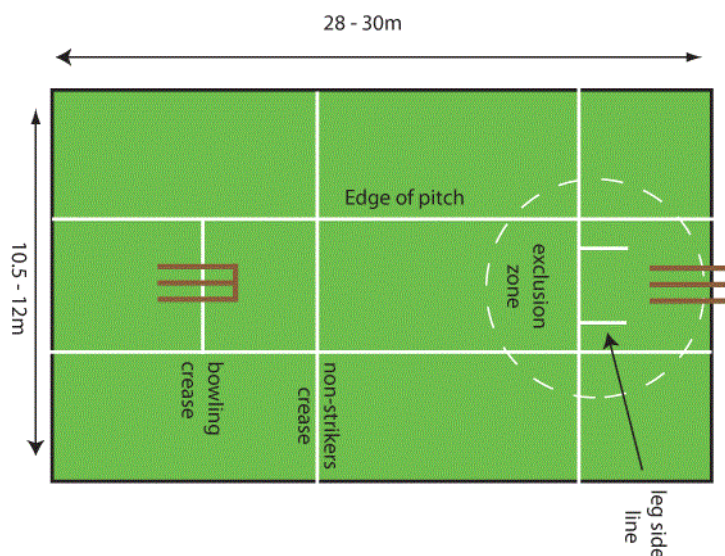
Tennis is played on a rectangular flat surface, usually of grass, clay, concrete (hard court) or a synthetic suspended court. The dimensions of a tennis court are defined and regulated by the International Tennis Federation (ITF) governing body and are written down in the annual 'Rules of Tennis' document. The court is 23.78 meters (78.0 feet) long, 10.97 meters (36.0 feet) wide. Its width is 8.23 meters (27.0 feet) for singles matches and 10.97 meters (36.0 feet) for doubles matches. The service line is 6.40 meters (21.0 feet) from the net. Additional clear space around the court is needed in order for players to reach overrun balls for a total of 18.3 meters (60 feet) wide and 36.7 meters (120 feet) long. A net is stretched across the

full width of the court, parallel with the baselines, dividing it into two equal ends. The net is 1.07 meters (3 feet 6 inches) high at the posts, and 0.914 meters (3.00 feet) high in the center. The net posts are 3 feet (0.91 m) outside the doubles court on each side or, for a singles net, 3 feet (0.91 m) outside the singles court on each side.



Indoor Cricket :

The court must be no less than 28 metres (a touch under 92 feet) and no more than 30 metres (a tad under 98 foot, 6 inches) in length. It will be no less than 10.5 metres (34 foot, 6 inches) and no more than 12 metres (close enough to 39 foot 4 inches) in width, and the "top net" should be no less than 4 metres (13 foot is near enough) and no more than 4.5 metres (14 foot 9 inches) above the playing surface.



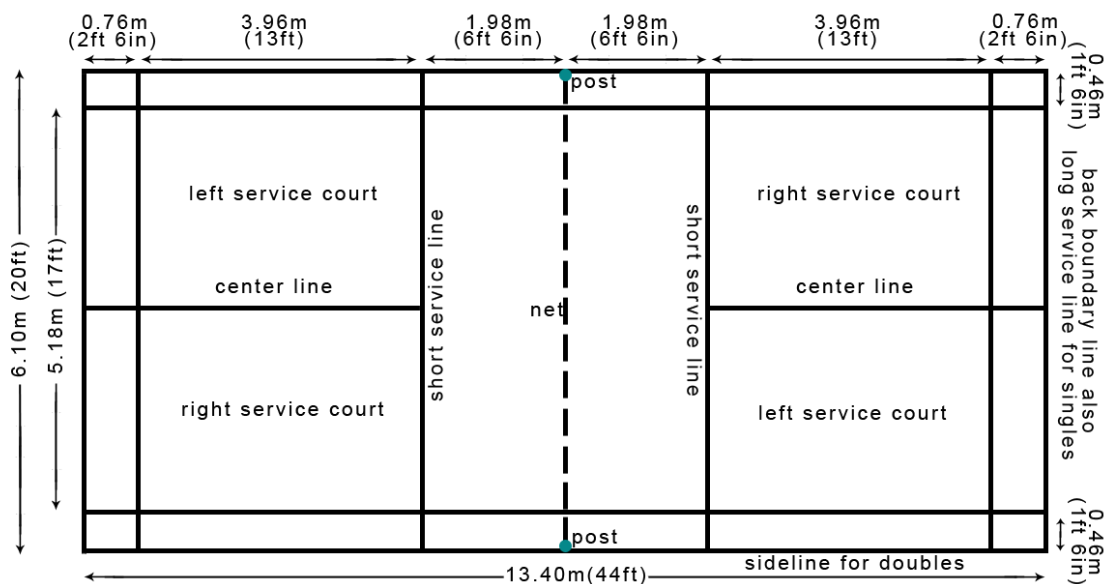
Badminton :

The court is rectangular and divided into halves by a net. Courts are usually marked for both singles and doubles play, although badminton rules permit a court to be marked for singles only.^[10] The doubles court is wider than the singles court, but both are of same length. The exception, which often causes confusion to newer players, is that the doubles court has a shorter serve-length dimension.

The full width of the court is 6.1 metres (20 ft), and in singles this width is reduced to 5.18 metres (17 ft). The full length of the court is 13.4 metres (44 ft). The service courts are marked by a centre line dividing the width of the court, by a short service line at a distance of 1.98 metres (6 ft 6 inch) from the net, and by the outer side and back boundaries. In doubles, the service court is also marked by a long service line, which is 0.76 metres (2 ft 6 inch) from the back boundary.

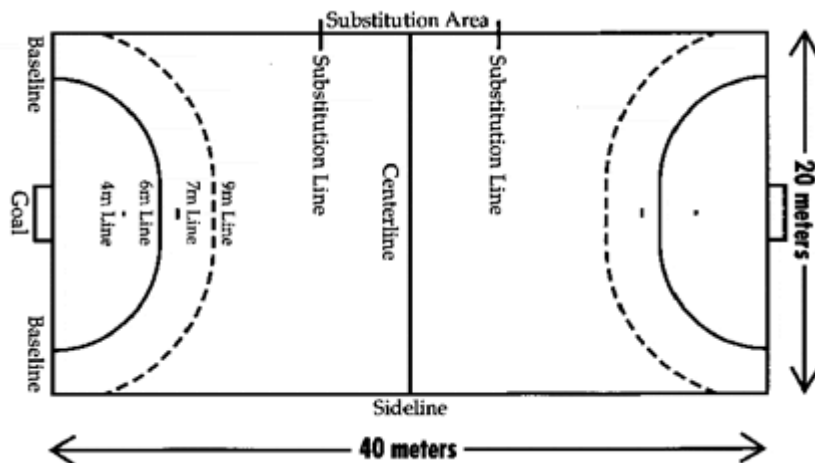
The net is 1.55 metres (5 ft 1 inch) high at the edges and 1.524 metres (5 ft) high in the centre. The net posts are placed over the doubles sidelines, even when singles is played.

The minimum height for the ceiling above the court is not mentioned in the Laws of Badminton. Nonetheless, a badminton court will not be suitable if the ceiling is likely to be hit on a high serve.



Handball :

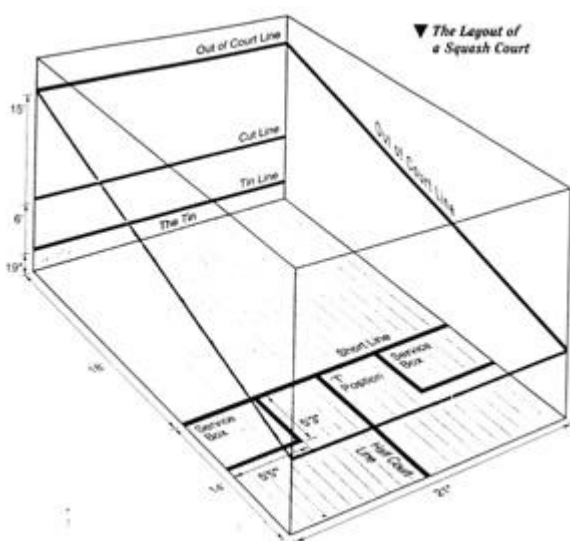
Handball is played on a court 40 by 20 metres (131 ft x 66 ft), with a goal in the center of each end. The goals are surrounded by a near-semicircular area, called the zone or the crease, defined by a line six metres from the goal. A dashed near-semicircular line nine metres from the goal marks the free-throw line. Each line on the court is part of the area it encompasses. This implies that the middle line belongs to both halves at the same time.



Squash :

Squash is a racquet sport played by two (singles) or four players (doubles) in a four-walled court with a small, hollow rubber ball. The players must alternate in striking the ball with their racquet and hit the ball onto the playable surfaces of the four walls of the court.

The game was formerly called squash racquets, a reference to the "squashable" soft ball used in the game.



3.5 Definition of Community gardening and its benefits

A **Community garden** is a shared green space which is planned, designed, built and maintained by some community members for the use and enjoyment of the entire community. Community gardens may be solely used to raise food for gardeners and/or the surrounding community, a decorative formal garden, an educational or rehabilitative facility.

The benefits of community gardening according to community gardens of Dallas-

Community Organizing

- Community gardens increase a sense of community ownership and stewardship.
- Community gardens foster the development of a community identity and spirit.
- Community gardens bring people together from a wide variety of backgrounds (age, race, culture, social class).
- Community gardens build community leaders.
- Community gardens offer a focal point for community organizing, and can lead to community-based efforts to deal with other social concerns.

Cultural Opportunities

- Community gardens offer unique opportunities for new immigrants (who tend to be concentrated in low-income urban communities) to:
 - Produce traditional crops otherwise unavailable locally,
 - Take advantage of the experience of elders to produce a significant amount of food for the household,
 - Provide inter-generational exposure to cultural traditions,
 - Offer a cultural exchange with other gardeners,
 - Learn about block clubs, neighborhood groups, and other community information.

- Community gardens offer neighborhoods an access point to non-English speaking communities.
- Community gardens allow people from diverse backgrounds to work side-by-side on common goals without speaking the same language.

Youth

Community gardens offer unique opportunities to teach youth about:

- Where food comes from
- Practical math skills
- Basic business principles
- The importance of community and stewardship
- Issues of environmental sustainability
- Job and life skills
- Community gardening is a healthy, inexpensive activity for youth that can bring them closer to nature, and allow them to interact with each other in a socially meaningful and physically productive way.

Food Production

- Many community gardeners, especially those from immigrant communities, take advantage of food production in community gardens to provide a significant source of food and/or income.
- Community gardens allow families and individuals without land of their own the opportunity to produce food.
- Community gardens provide access to nutritionally rich foods that may otherwise be unavailable to low-income families and individuals.
- Urban agriculture is 3-5 times more productive per acre than traditional large-scale farming!
- Community gardens donate thousands of pounds of fresh produce to food pantries and

involve people in processes that provide food security and alleviate hunger.

Health

- Studies have shown that community gardeners and their children eat healthier diets than do non-gardening families.
- Eating locally produced food reduces asthma rates, because children are able to consume manageable amounts of local pollen and develop immunities.
- Exposure to green space reduces stress and increases a sense of wellness and belonging.
- Increasing the consumption of fresh local produce is one of the best ways to address childhood lead poisoning.
- The benefits of Horticulture Therapy can be and are used to great advantage in community gardens.

Green Space

- Community gardens add beauty to the community and heighten people's awareness and appreciation for living things.
- Community gardens filter rainwater, helping to keep lakes, rivers, and groundwater clean.
- Community gardens restore oxygen to the air and help to reduce air pollution.
- Community gardens recycle huge volumes of tree trimmings, leaves, grass clippings, and other organic wastes back into the soil.
- Community gardens provide a place to retreat from the noise and commotion of urban environments.
- Community gardens provide much needed green space in lower-income neighborhoods which typically have access to less green space than do other parts of the community.
- Development and maintenance of garden space is less expensive than that of parkland.
- Scientific studies show that crime decreases in neighborhoods as the amount of green space increases.

CHAPTER 04: CASE STUDY

4.1 Introduction

4.2 Chosen Projects

4.2.1 Adidas Futsal Park

4.2.2 City Hall Rooftop Garden

4.2.3 Sports and Administration Centre in Skanderborg

4.2.4 Herstedlund Community Center

4.2.5 Clayton Community Center

4.2.6 BLUA's Civic Sports Center

4.2.7 Vertical Gymnasium Chacao

4.1 Introduction

Real life projects both inside and outside the country related to the project development are to be studied for outlining the project program and set it's concept. The chapter will focus on the projects that are built already and are to be built picked as the subject of study.

4.2 Chosen Project

4.2.1 Adidas Futsal Park

Project overview :

Location : Shibuya, Tokyo

Area : 14,000 sq. ft.

Construction year : 2001



More than just a destination or a name on the map, each neighborhood in Tokyo functions almost like a self-contained miniature city, with its own business district, shopping arcade, and residential quarter. And generally, huddled in the center of all the hustling and bustling activities is a transportation hub, like Shibuya Station. Exist as part of the Tokyu Department Store, it boasts 8 rail and metro lines, including 3 privately operated railways, the N'EX express train to Narita Airport and a newly built terminal station from famed architect Tadao Ando. Not to mention the 20+ bus lines that roll into the station and numerous taxi stands in between. Just beyond the maddening horde and the human scramble, however, is a quieter, joyful existent. High above the Shibuya Station, or more accurately right above it, is the adidas FUTSAL PARK.

Constructed in 2001 as an introduction to 2002 FIFA World Cup (hosted by Japan and South Korea), the adidas FUTSAL PARK promotes a miniature version of soccer, futsal, on a

14,000 square-foot pitch and commands a breathtaking 270-degree view of Shibuya. Inspired by a former playground on site before the construction of the transportation complex, the FUTSAL PARK hosts nightly tournaments among adults, professional game viewing venues, and J-Frontage, futsal school for toddlers and children. Its almost a marvel of urban planning, to maximize usage of spaces not generally associated with activities such as futsal.

4.2.2 City Hall Rooftop Garden

Project overview :

Location : Chicago, USA.

Area : 20,300 sq. ft.



Chicago's most famous rooftop garden sits atop City Hall, an 11-story office building in the Loop. City Hall and the adjacent Cook County building appear to most people as one building spanning a city block bounded by LaSalle, Randolph, Clark and Washington streets. First planted in 2000, the City Hall rooftop garden was conceived as a demonstration project - part of the City's Urban Heat Island Initiative - to test the benefits of green roofs and how they affect temperature and air quality. The garden consists of 20,000 plants of more than 150 species, including shrubs, vines and two trees. The plants were selected for their ability to thrive in the conditions on the roof, which is exposed to the sun and can be windy and arid. Most are prairie plants native to the Chicago region.

Like all green roofs, the City Hall rooftop garden improves air quality, conserves energy, reduces stormwater runoff and helps lessen the urban heat island effect. The garden's plants reflect heat, provide shade and help cool the surrounding air through evapotranspiration, which occurs when plants secrete or "transpire" water through pores in their leaves. The water draws heat as it evaporates, cooling the air in the process. Plants also filter the air, which improves air quality by using excess carbon dioxide to produce oxygen.

The rooftop garden mitigates the urban heat island effect by replacing what was a ballasted, black tar roof with green plants. The garden absorbs less heat from the sun than the tar roof, keeping City Hall cooler in summer and requiring less energy for air conditioning. The garden also absorbs and uses rain water. It can retain 75% of a 1 inch rainfall before there is stormwater runoff into the sewers.

4.2.3 Sports and Administration Centre in Skanderborg

Project overview :

Location : Jutland, Denmark

Area : 1,98,314 sq. ft.

Competition: 2013, 1st prize in PPP competition

Architect: schmidt hammer lassen architects

schmidt hammer lassen architects has, in collaboration with contractor KPC A/S and engineering company Bascon A/S, won the competition to design the new Sports and Administration Centre in Skanderborg, Denmark. The 18,000 square metres project holds new administrative facilities for Skanderborg Municipality in combination with new sports facilities for the use of the entire community. The aim is a complex which sets new standards, supporting an innovative and multidisciplinary work culture as well as being a dynamic, attractive and vibrant gathering point for citizens of Skanderborg. With the winning proposal, Skanderborg gains a project that is informal, open, accessible and in close contact with the natural surroundings.



The new complex is located in a recently established natural resort, Anebjergskov, in the northern part of Skanderborg. The complex consists of several buildings which, with no clear distinction between front and back, interact with the natural surroundings. Functionally, the project is divided into four zones: arrival, meeting centre, sports facilities and administration centre. All functions are linked together by the arrival area that runs through the entire complex. From the arrival area a direct view into the hall of the city council and the sports centre can be obtained, contributing to the experience that the functions of the building are informal and accessible to the citizen.



“With our project we create an architectural reinterpretation of the contact point between citizens and the municipality. The functions of the building are open and accessible and the project makes good use of the great potential of the surrounding landscape”, explained John Foldbjerg Lassen, founding partner at schmidt hammer lassen architects. “It is a place where citizens meet and interact in an open and dynamic setting – in the middle of nature.”

In the administration centre, with 700 work spaces, a dynamic and flexible interior office design creates the surroundings for an attractive working environment. The sports centre consists of a double hall that can be divided into two handball fields with seating capacity for 1,700 spectators. The design of the double hall makes it possible to open towards the outdoor landscape, offering the opportunity to organize events taking place both indoors and outdoors.



Active outdoor areas

It has been architecturally important to create a robust complex that appears inviting for all citizens, no matter their social background, age or culture. That is why the outdoor arrival areas are designed to be open and inviting. The outdoor areas invite active use and are carefully integrated alongside the parking areas in the undulating landscape. The architectural idea is to create an experience where buildings and landscape merge together.

“The landscape plays an active part in how to experience the entire complex. We create a place where inside and outside merge – a place that invites active use and relaxation – both during and after opening hours”, explained Trine Berthold, associated partner at schmidt hammer lassen architects. “Here citizens can come to receive guidance from the municipality staff and enjoy nature, play, run, get challenged and be inspired.”



Sustainable measures

Several sustainable measures are incorporated in the design of the building, such as optimized use of daylight, natural ventilation and an efficient building envelope. Green plants are used on selected facades as solar screening while indoor green walls increase biodiversity and contribute to a good indoor climate. The aim is to be certified DGNB Silver. The project is expected to be completed in autumn 2016.

schmidt hammer lassen architects has extensive experience in designing multifunctional buildings and is currently working on the completion of Dokk1 in Aarhus, the largest public library in Scandinavia, with rental offices, light rail station and fully automatic car park. In Malmö, Sweden, Malmö Live is being built and will be the new culture centre of the Oresund Region, facilitating a concert hall for the city's symphonic orchestra, congress facilities and a hotel. Dokk1 is expected to be completed in 2014, and Malmö Live will be inaugurated in summer 2015.





4.2.4 Herstedlund Community Center

Project overview :

Location : Albertslund, Denmark

Area : 9418 sq. ft.

Architect: Dorte Mandrup Arkitekter Aps



Architectural Concept

Community Centre Herstedlund provides the framework for joint activities for a new residential area, housing approximately 600 families.

The site plan, designed by Juul & Frost, is based on the idea of “the forest and the glades”. We elaborated on this theme as we designed the building as a large stylized tree at the edge of a glade.

The programme of the building had to be very open and with the possibility to grow along with the new inhabitants. The community centre should be able to incorporate many different ages and interests over time, and many types of communities from the informal meeting around an event, summer festival, a big football or presentation to the special interests and common eating.



site plan

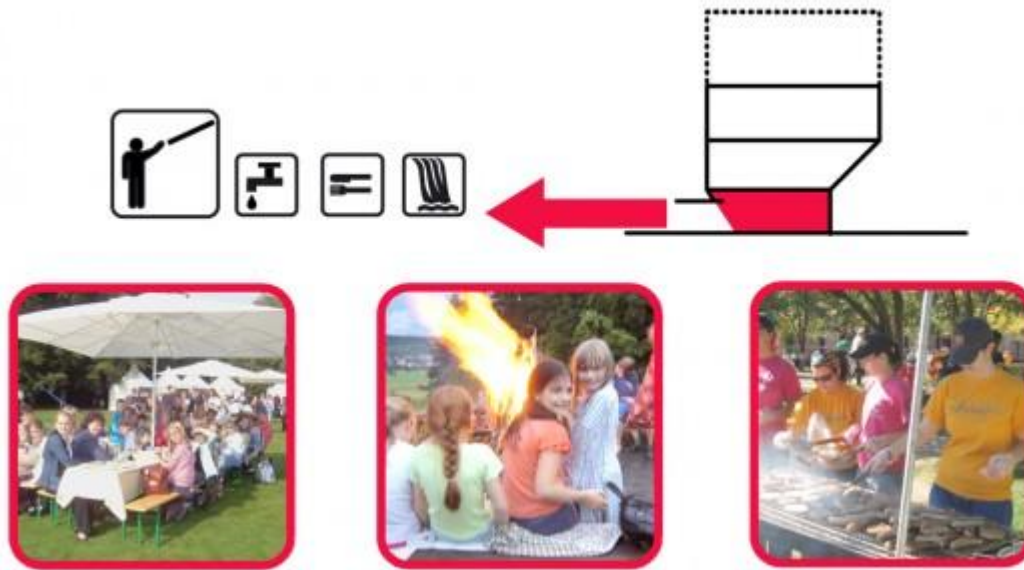
It will be a local user-driven house of culture where it is possible for multiple independent users to use the building at the same time. The building provides space for all kinds of smaller cultural events in the broadest sense.

It should be available to be used at all hours for teaching, dancing, sports, theatre, aerobics, yoga, barbecue, lectures, bridge tournament, children's theatre and weddings.

Spatial Disposition

To exploit the square feet available we cross-programmed the scheme to use the building and surrounding area both independently and in a flow of spatial connections.

To emphasize the possibility of mix use, you may enter the building on both ground floor and directly to the first floor by an outdoor staircase.



Outside space diagram

In the following passage, we describe the different types of space and connections:

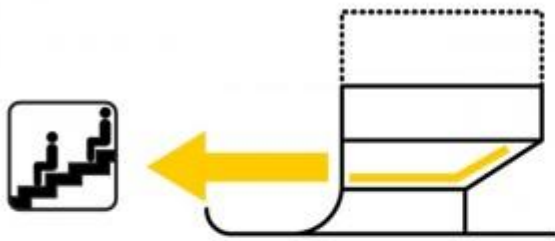
- Ground level: Kitchen and toilet facilities. Staircase and lift connects the rest of the building.
- 1st. floor: Performance space, custodian / disposal
- 2nd. Floor: Multipurpose area, toilets and additional stocking space
- 3rd. floor: Roof terrace

The Community Centre is surrounded by common outdoor activities. There is direct access to the toilets so that they can be used for all outdoor activities.

A skate board ramp climbs the wall on one side, mountaineering wall on the other and through a hatch in the wall the indoor kitchen is connected to an outdoor barbequing area and eating facilities.

In summer time, the kitchen is the heart of outdoor events from summer festivals to Friday bars or spontaneous get-togethers. In the winter the kitchen could also be used as a satellite kitchen for private events in the settlement in addition to events in the building.

The Performance Space on the first floor extends the building's layout by adding a staircase for audience to the volume. The walls lean out and emphasize a stage floor measuring approximately 50 sqm.



Auditorium diagram

It is possible to close the room by shutting a sliding gate in the wall towards the entry. When closed, the stage floor may also be used for smaller events, when there is a need for a smaller spatial area. This is where the adults are drinking coffee after eating together, and this is where the hip hop dance team works out.

When open the Performance space is connected by an open staircase to the multipurpose area on the second floor.

The multipurpose space is the largest common space measuring 125 m². Connecting the performance space is the perfect spatial combination for common eating and parties. Clearance and stowage of tables and food leftovers can be done without disturbing the simultaneous serving of drinks and warming up the dance floor.

The multipurpose space could also be the framework for bridge tournament or serve as a large meeting room which can function independently of the other floors.



The Roof terrace offers 145 m² on the third floor under the sun. It has direct access from the main staircase and lift and contains a water line and a small enclosed court yard for ball playing. It is an out door space, covered with a net catching basket balls astray. It serves as a withdrawn out door space for joint events and complements common activities in the building.

Design and Materials

The construction is concrete columns and a deck construction of Filigree slabs. Stabilizing concrete elements represents the lift / stair case core.

The closed facades are self-supporting sandwich elements in steel.

Glass panels consist of energy glass with wood / alu -frames.

External cladding is carried out in a combination of solid or perforated anodized aluminium plates.



Interior walls are made of concrete and plaster.

The floor on the ground level is slip-resistant vinyl and the overlying levels are floors made with sealants free painted industrial floors.

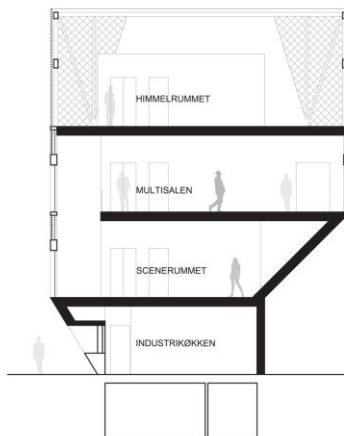
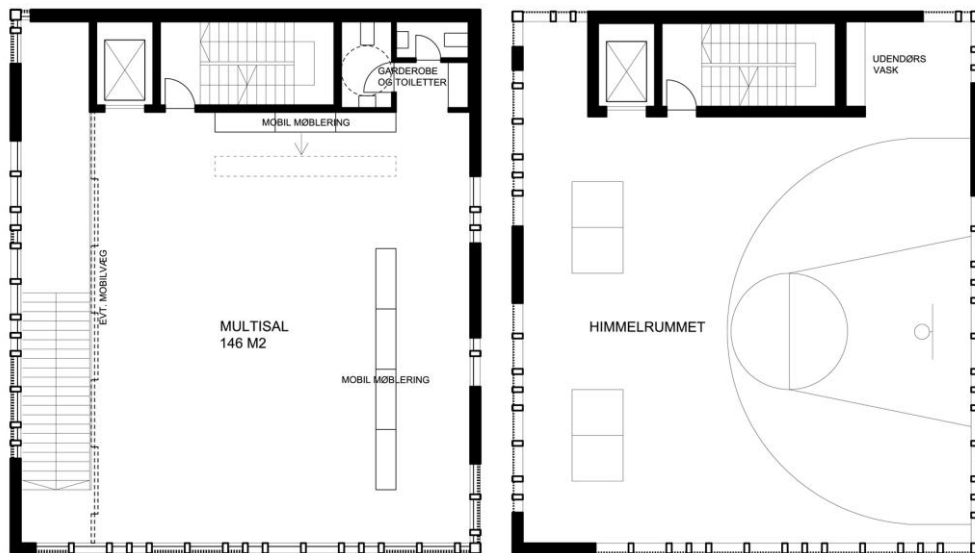
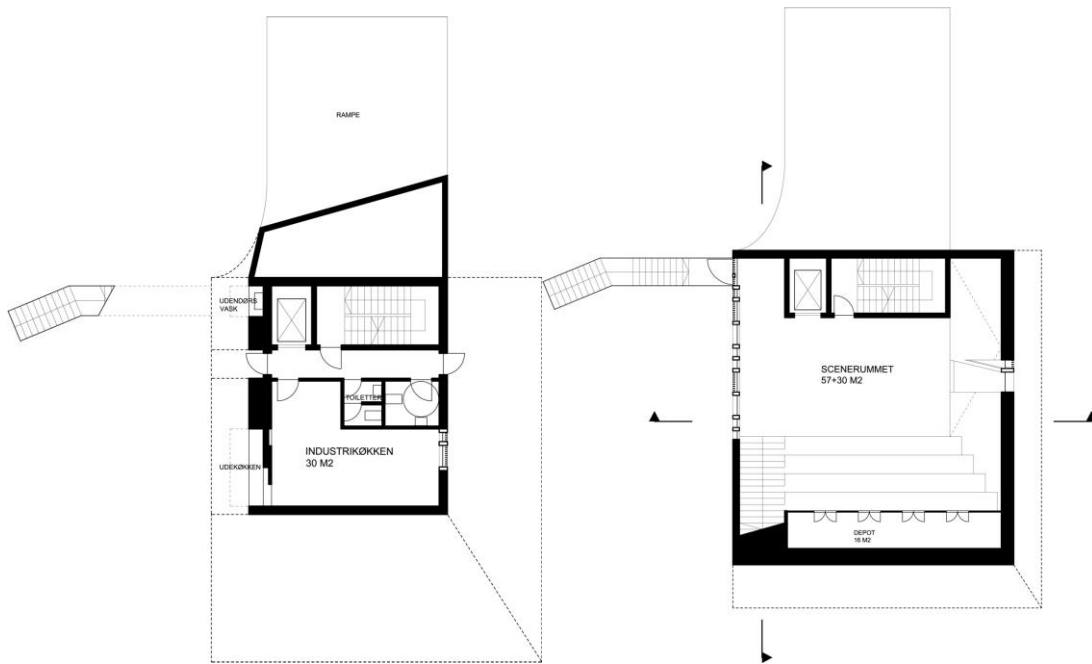
The roof terrace is coated with rubber granules.

Ceilings are constructed of fibre glass stretched lanes with underlying acoustic absorbents and basic lighting.

Sustainability

The project meets the Tier 2 Energy, and has the following environmental initiatives included:

- Solar panels on top of the stair cases in combination with soil heating.
- Differential ventilation principles (Full mechanical, hybrid and control ventilation).
- Possibility for thermo active decks using soil heating for cooling in the summer.
- Collected Rainwater is used for flushing.
- Omission of hot water in toilets.
- Motion-controlled taps and lighting.



4.2.5 Clayton Community Center

Project overview :

Location : Clayton, Victoria, Australia.

Area : 46284 sq. ft.

The Clayton Community Centre co-locates a Fitness and Aquatic Centre, Library, Auditorium and Theatre, Youth and Family Services Centre, Maternal & Child Health facility along with Preschool and Arts facilities creating a dynamic ‘one-stop-shop’ for social and recreational services. Also included is a new community Medical and Dental clinic. The planning makes these facilities “legible” and encourages exploration so that users of one facility may be attracted to others on offer. In this way the design seeks to engender a sense of community, ownership and pride.



The architectural expression intentionally contrasts with the adjacent environment using a unified deep red skin and canted glazed walls to provide a high degree of transparency. The large glazed volumes of the Aquatic zone (north facing) and the Library zone (facing Centre Road) were each given a canted wall and roof to “book end” the building.



Ease of access, personal amenity and security are key issues that have been addressed in the design of the Centre. A prominent Main Public Entry provides access to the Library and

Aquatic Centre via a foyer with a Café. Adjacent is an internally located Theatre. Further on, the Clayton Art Room and Youth and Family Services facilities adjoin a large landscaped Courtyard accessed via a covered verandah that leads through to the Preschool and Medical Clinic. The east-west courtyard is a key feature of the masterplan as it provides increased northern orientation and separates the Aquatic/Fitness functions from the rest of the facilities. A Pre-school is located at the rear arm of the site with its discrete drop off and secure playground bordering the Council's western car park. A dedicated entry is also provided here with lift and stair access to the Medical Centre at first floor level.



The architectural design addresses the security for staff and visitors with clear site lines from the reception/control desk that will allow staff to monitor the traffic to toilets, meeting rooms, treatment room corridors and the administrative office zone. Staff facilities have been separately zoned from public areas.



The design ensures visitors and staff will find the centre accessible, safe and inviting – the transparent butterfly roof unifies the various elements; well conceived pathways lead people through the Centre; health treatment rooms are positioned at the perimeters to maximise natural light; and sunshades protect the pool area whilst allowing dappled light to penetrate.



The Centre's ESD credentials were ensured with a considered building orientation design response to site restraints and opportunities, exploration and correct selection of building fabric (eg double glazing), and finally rainwater collection and harvesting for its landscaped



Clayton
Centre
Architectural Services / Architecture

gardens.



Clayton
Centre
Architectural Services / Architecture

4.2.6 BLUA's Civic Sports Center

Project overview :

Location : Hangzhou, China

Area : 5,02,674 sq ft

Adjacent to the Qian Jiang River, the site of the Hangzhou Civic Sports Center is a connector between the natural and urban life of the city. BLUA designed this center based on the idea of an urban plaza while also wanting to create an icon for the lack of large-scale commercial facilities and distribution of leisure spaces. Inspired by mountains and their connection with sports, as well as the fact that the Hangzhou government carries out mass sports activities to promote national fitness, a popular favorite being mountain climbing, the concept for this design has granted it the name "Sports Hill".



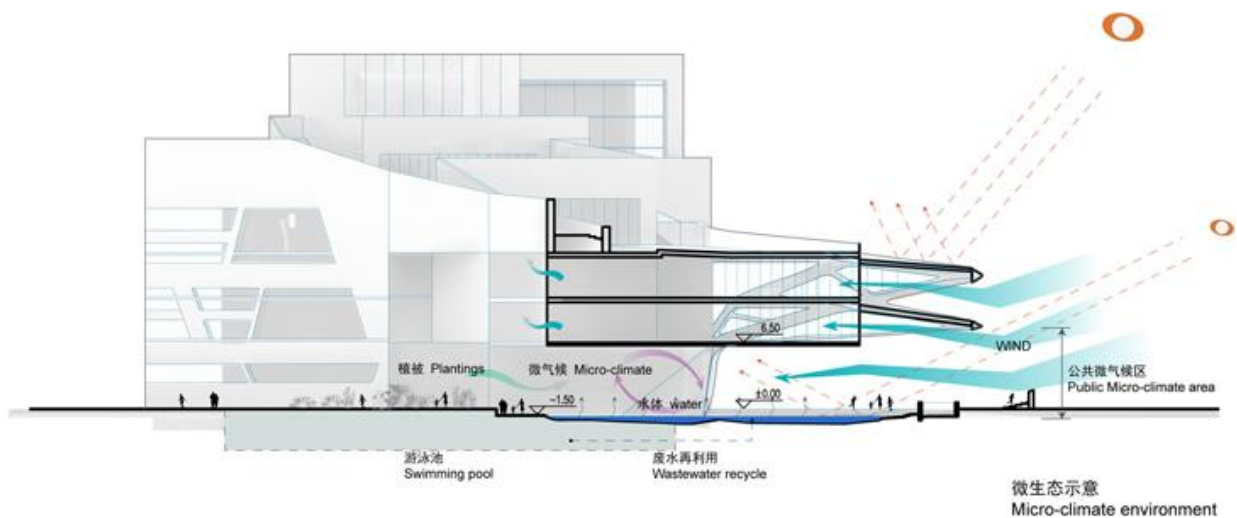
The podium and the 42 meter tower follow a stacked design in order to contrast the complexity of the 70 meter tower. The roof is interconnected to make a continuous, differentiated sports landscape with cascading sports fields and pathways. Internally the spaces are arranged according to their purpose, and whether they are "active" spaces or "inactive". Sports activities are located on the lower part of the tower and the podium where activities such as basketball, volleyball, badminton, and tennis can be found. The top of the tower is deemed as a relatively "inactive" area and is filled with offices, accessories, and the VIP Club. The steel frame of the podium becomes the major structural piece for the curtain wall and also houses the circulation element for the façade.

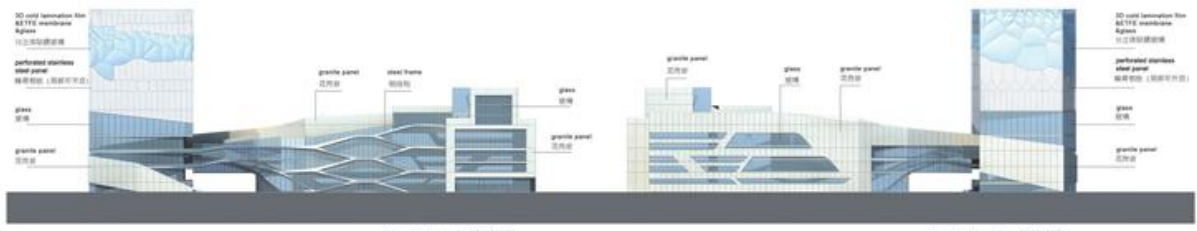


The sunken plaza is 1.5 meters underground, which connects with the entry square by folding shaped steps, becoming a big open space designed as a microclimate ecological environment. The cantilevered plaza roof and canopies offer the sunken area shade while the plant-life and water features cool the air underneath through natural convection and evaporative cooling. This area contains public amenities such as gift shops, bookstores, and cafés, and also interacts with the swimming pool behind the curtain wall on the first floor of the complex, creating a lively water environment. All the swimming pools are contained within a grand open space and can be entered from the south façade or from the civic square.



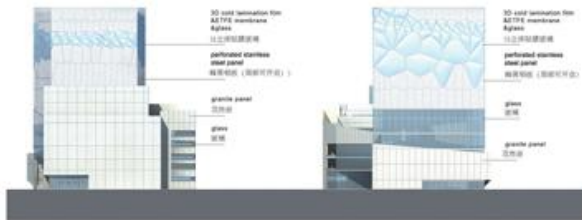
The main tower and podium is wrapped with three folding pieces covered with cellular aluminum. The twisted-folding shape has a dynamic trend of an upward spiral that also determines the density of the skin texture. Faceted crystalline geometry with crystal patterns in 3D cold lamination film, ETFE membrane, and honeycomb glass structure, heighten the sense of irresolution between flatness and depth as well as correlate graphic or pattern effects with mass inflections. The design features massive membrane bubble windows orientated to allow views out to all angles of the city. The perforated stainless steel panel on the wall strengthens the crystal shape, making this building an iconic attraction landmark for the city.





South Facade 南立面

North Facade 北立面



East Facade 东立面

West Facade 西立面



工程投资分配

本方案作为一个大规模规格的全民健身中心，需要一个辨识度高、标志性的外观来增强其在城市中的存在感，使之成为一个区域的地标性建筑。我们考虑到要用有限的投资做到最醒目的效果，因此合理分配工程投资成为了我们此次设计的重点之一。

在本次方案中，我们把大跨度大空间的球类综合馆和游泳馆进行了整合，设置在主体为三层的楼房中，采用9米×9米的统一柱网，主楼采用8.4米×9.0米的标准柱距。从结构主体的角度来控制建造成本。在外立面材质上，80%以上都采用了常规材质，仅在70米塔楼的12层到17层之间的局部表皮采用了比较独特的异形贴膜玻璃，使得本工程在可控的投资预算下能彰显出地标建筑的特点。

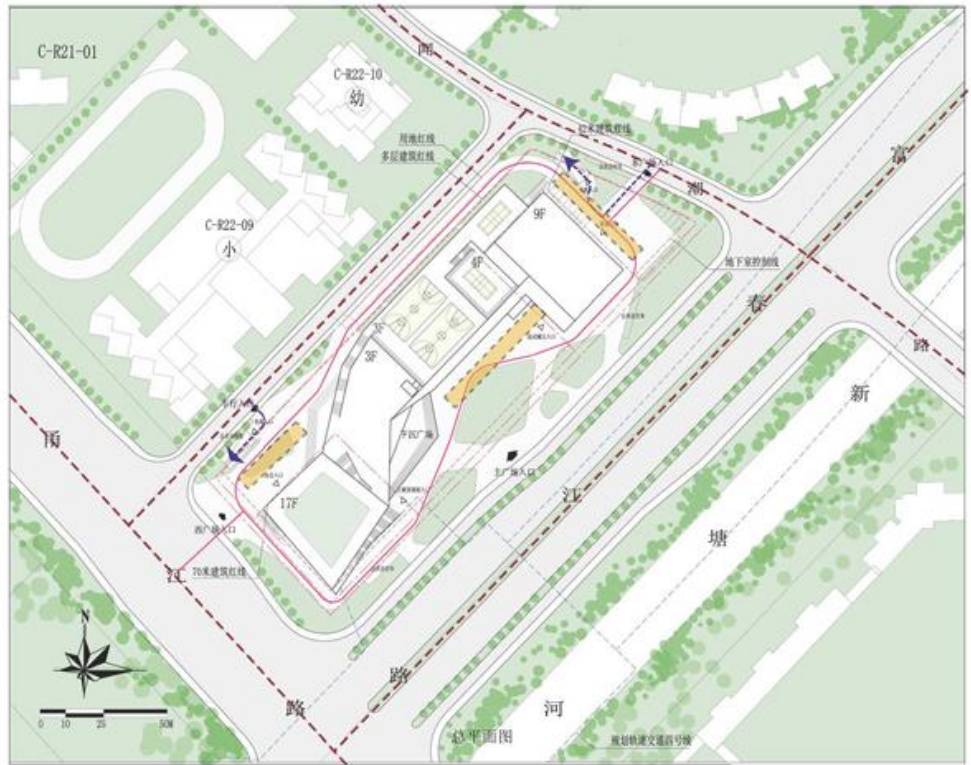
交通

机动车主要通过东侧及北侧车行入口进入场地，机动车停车位分为地面停车及地下车库，地面停车位沿地块内东侧广场集中布置，地下车库的出入口分别布置在场地北面的东、西两侧，地面非机动车停车位主要集中在基地的四个角落，考虑作为公共自行车停放点，另外地下一层局部也布置了地下自行车库，分别位于两栋塔楼正下方。

消防

本方案利用地块内7米宽的环形车行道及广场硬铺装地作为主要消防环道，围绕在主体建筑周边，主楼在南边及西边落地，副楼南边及东边落地，三个入口广场均可以满足作为消防登高面的要求。

- 车行流线
- 地下车库入口
- 消防流线
- 消防登高面



4.2.7 Vertical Gymnasium Chacao

Project overview :

Location : Caracas, Venezuela

Area : 10,763 sq ft

Architect: Urban Think tank Group

Limited land and high crime rates in the dense informal settlements and slums of Caracas made it unsafe for children to play and participate in sports. Local architects transformed a rundown sports field in Chacao's Barrio La Cruz into Chacao Vertical Gym (Gimnasio Vertical), a four-story sports, recreation, and cultural event facility. Taking cues from residents who are unable to expand out, the architects built up on the 1,000-square-meter (10,700 sq. ft.) site without displacing any families. The popular new public space, with 15,000 users a month, has helped to reduce crime in this barrio by over 30% by offering a safe, open space that nurtures fair play, tolerance, and a civic community through sports competition.

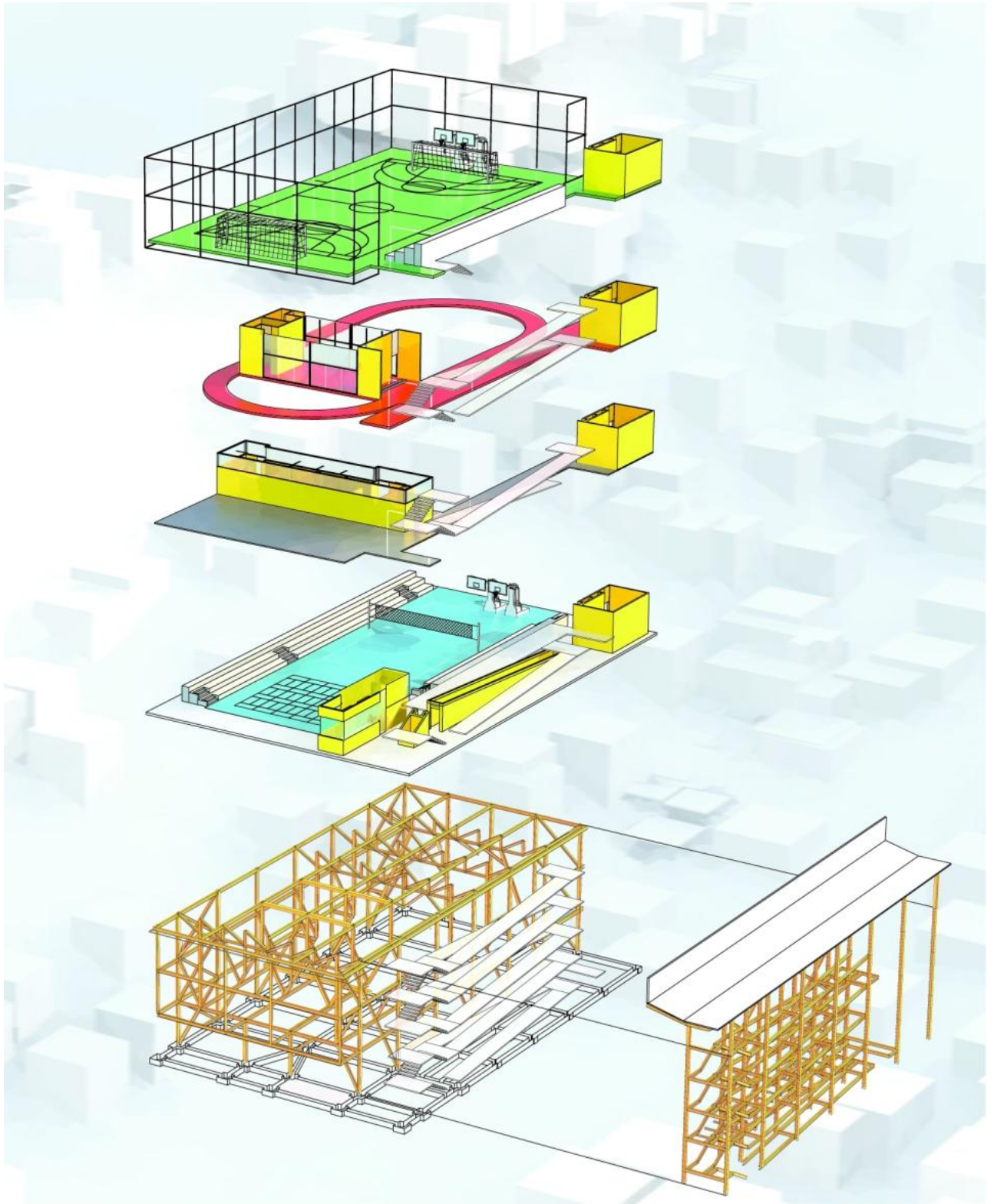


Based on the initial 2002 Chacao design, UTT developed a building system as a kit of parts in 2004, which allows flexible design and construction. Stacked volumes are reassembled and programmed for different locations in response to local needs. Caracas's government is constructing four additional Gimnasios Verticales—Baruta GV includes an outdoor market;

Los Teques GV has an aquatic sports center; Ceiba GV incorporates a library and metro cable station; and El Dorado GV includes space for informal vendors.



A prefabricated bolted-steel construction system is erected onsite. A ramp provides access at every level, eliminating the expense of an elevator. The latest design incorporates recycled materials, wind towers, solar panels, and rainwater collection to reduce environmental impact and operational costs. UTT is changing the way people think in other parts of the world about sports areas in dense, low-income neighborhoods. Hybrid Vertical Gyms are proposed for several New York City public schools, as well as in Rusaifah, Jordan, and Hoograven, the Netherlands, which is planning a dynamic sport, cultural, and commercial complex



CHAPTER 05: PROGRAMME AND DEVELOPMENT

5.1 Proposed Program

5.2 Rationale of the Program

5.3.1 Community Club

5.3.2 Community Garden

5.3.3 Theatre

5.3.4 Multi-purpose Hall

5.1 Proposed program

Entrance.....8200 sq. ft.

Main lobby

Information center

Washroom

Floor Lobbies

Administration.....4620 sq. ft.

Admin Lobby

Waiting Room

Director's office + washroom

General office

Board room

Washroom

Service.....6400 sq. ft.

Maintenance staff room

Security room

Mechanical

Electrical

Generator

Storage

Loading/Unloading

Food Court.....6,370 sq. ft.

- Eating zone
- Service counter
- Food storage
- Food preparation
- Washing area
- Trash storage

Sports Facilities.....

- Multi-purpose community field 16,800 sq. ft.
 - Gallery
- Mini-cricket (x 4) 19220 sq. ft.
 - Pitches
 - Runoff area
 - Sitting Area
- Five / Six-a-side Football (x 4) 25,600 sq. ft.
 - Pitches
 - Runoff area
 - Sitting area
- Badminton (x 4) 12,600 sq. ft.
 - Courts
 - Runoff area
 - Sitting area
- Basket Ball (x 3) 18,000 sq. ft.
 - Courts
 - Runoff area
 - sitting area
- Volley Ball (x 4) 19,200 sq. ft.
 - Courts
 - Runoff area
 - sitting area
- Tennis (x1) 6,430 sq. ft.

- Courts
- Runoff area
- sitting area
- Handball (x4) 9,600 sq. ft.
 - Courts
 - sitting area
- Squash (x5) 3,150 sq. ft.
 - Courts
 - sitting area
- Locker Area (Men and Women) 16,820 sq. ft.
 - Shower
 - Changing room
 - Lockers
 - Towelling
- Indoor games 18,360 sq. ft.
 - Bowling zone
 - Pool zone
 - E-sports zone
 - Table tennis
 - Board games

Swimming Facilities.....7670 sq. ft.

- Swimming Pool (Adult)
- Trainers Room
- Changing Room
- Locker Room
- Maintenance
- Juice Bar

Movie theatre (x 1).....7,300 sq. ft.

- Lobby
- Theatre hall
- Machine room
- Storage

Shops.....4,100 sq. ft.

- Souvenir shop
- Retail sports shop

Multipurpose hall..... 7,800 sq. ft.

- Lobby
- Hall
- Backstage
- Washroom

Community Club..... 9,250 sq. ft.

- Club meeting space
- Exhibition space
- Fitness center
- Library
- Computer zone
- Lounge and cafe

Community Garden..... 43,750 sq. ft.

- Plantation plots
- Equipment store
- Sitting area
- Gardeners Room

General facilities..... 26,770 sq. ft.

- Jogging track
- Skating track
- Plantation and sitting

5.2 Rationale of the program

As the project focuses on delivering recreation to the people by becoming a successful public space built on vertical means, creating interest and assuring pulling factors in the project is vital.

5.2.1 Community Club:

As the social bonding is among the residents of the city is getting weaker and becoming almost non-existent, such club will provide the opportunity to get together and share the views within the community for a better living. This shall work as a pulling factor for the residents to come close and know more about themselves and work for the community.

5.2.2 Community Garden:

Recreation have different meanings for the people of different age. For the senior citizens who have the urge but cannot find a place within their home to grow a garden, this will be there place to grow flowers or other plants. In this way, not only the project authority has to work on vegetation, but also the community will help the project to be green automatically on their own.

5.2.3 Movie Theatre

The movie theatres are also a kind of place for recreation that also generates side income by selling foods and souvenirs. Movie theatres are not widely available in the area, so such facility will contribute a lot to the people who might not be interested in physical activity of recreation.

5.2.4 Multipurpose hall

For a richer sense of community and also a great necessity, such hall will be able to host ceremonies, exhibitions of the community works, seminars etc. often required by large group of people.

CHAPTER 06: Design Development

6.1 Conceptual development

6.2 Form placement

6.3 Form development

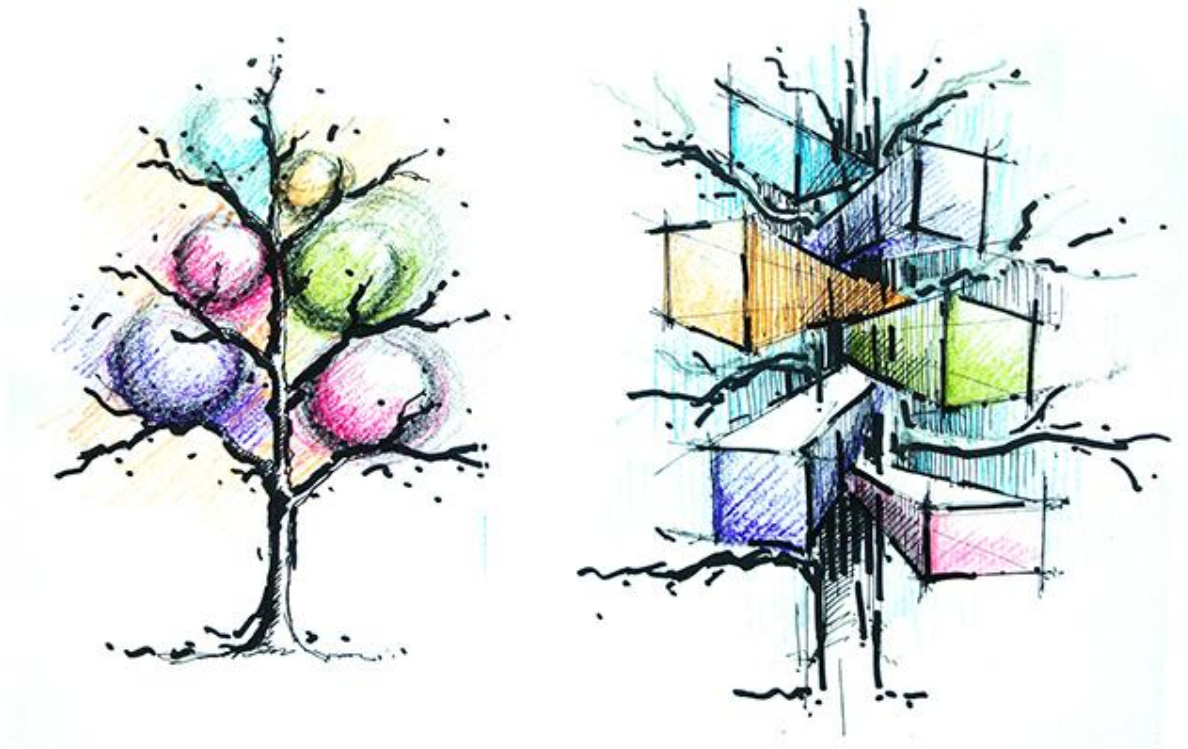
6.4 Design drawings

6.5 Model pictures

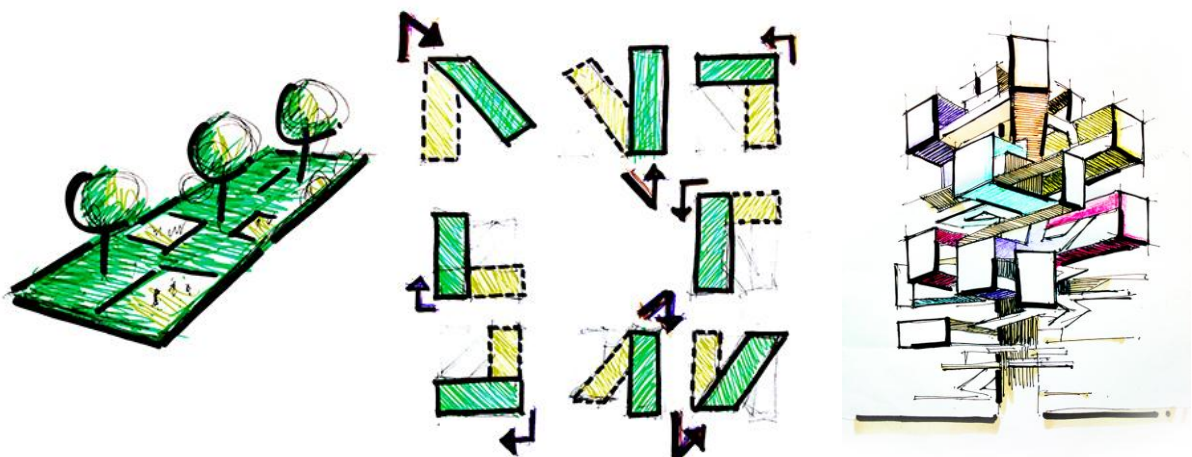
6.6 Perspective views

6.1 Conceptual development

The project has been initially imagined as a tree house, a structure placed in the branches of a tree which is traditionally used for playing by the children and in some cases observing nature in the forest. As the project focuses on hosting playfields and recreational activities in a structure that will go vertical, the structure could be compared to a tree house and this also gives a vision of the possible form development.



Then comes how the structure will start going vertical and host the facilities in its way. As it will be a place of urban relief – a green strip has been imagined and this will be going upwards by folding in different directions through a continuous process.



6.2 Form Placement

First of all, placing the form in the site had to be done by keeping in mind that the climatic intervention with the surroundings has to as minimum as possible. As the structure was going to be a tall one, the shadow casted by it would have been a long one as well.

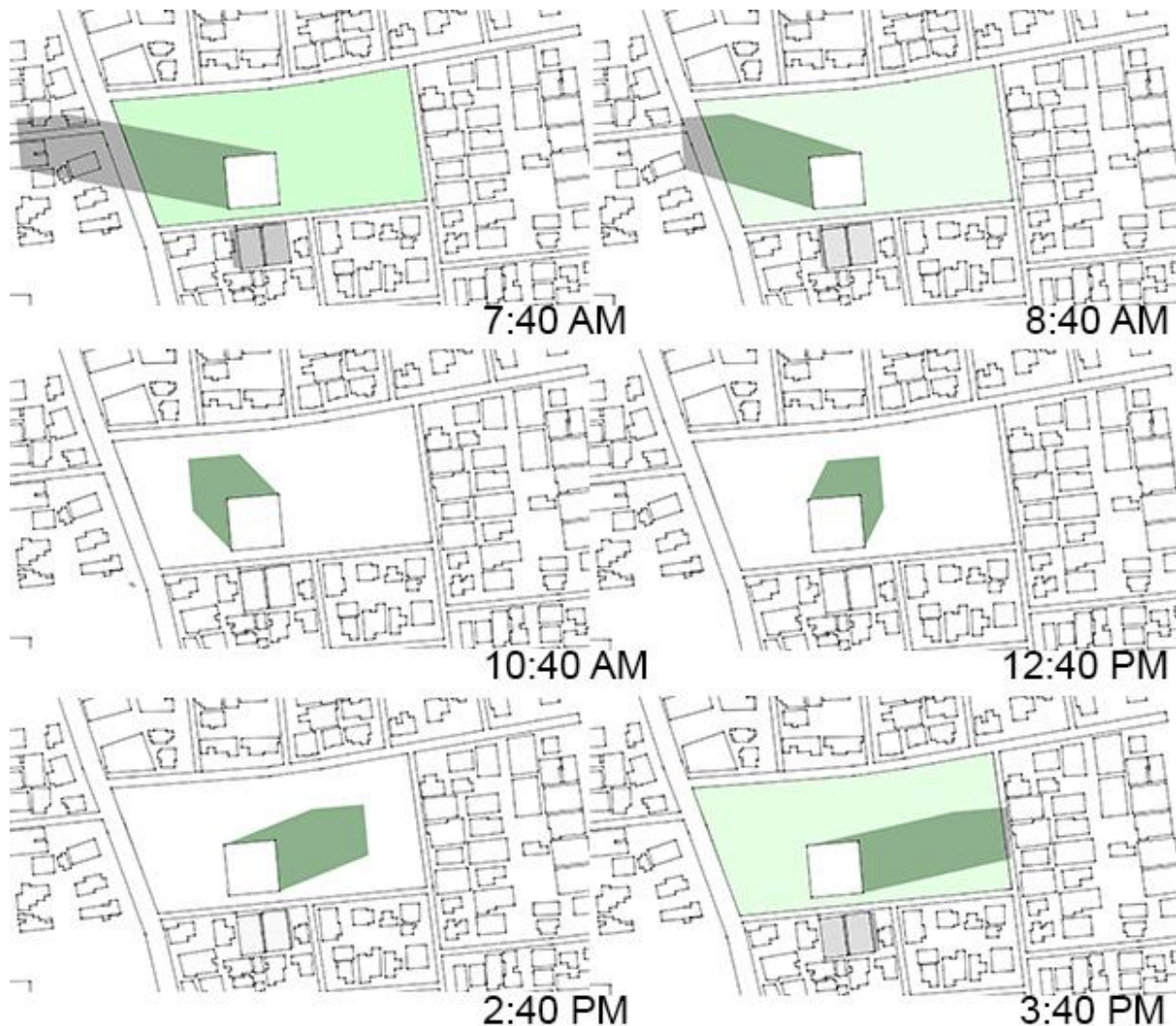
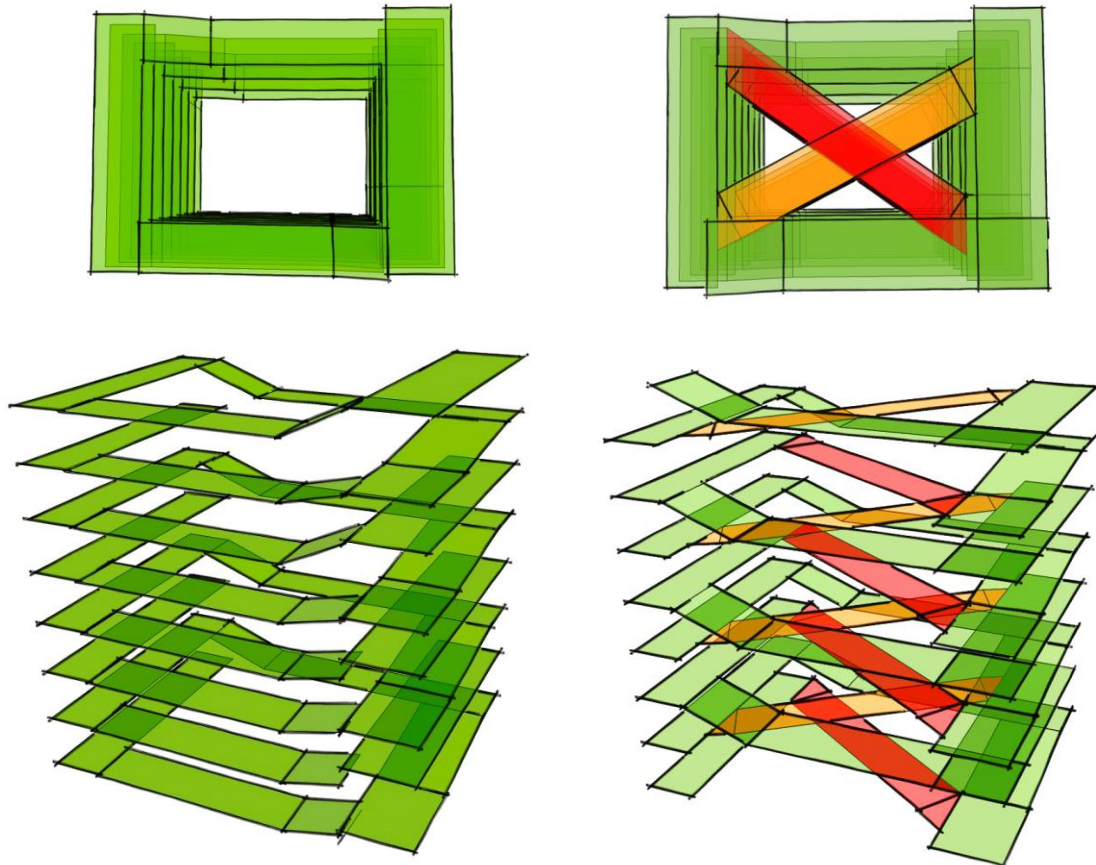


Fig : Shadow casted by the structure at different time through the day (Month of May)

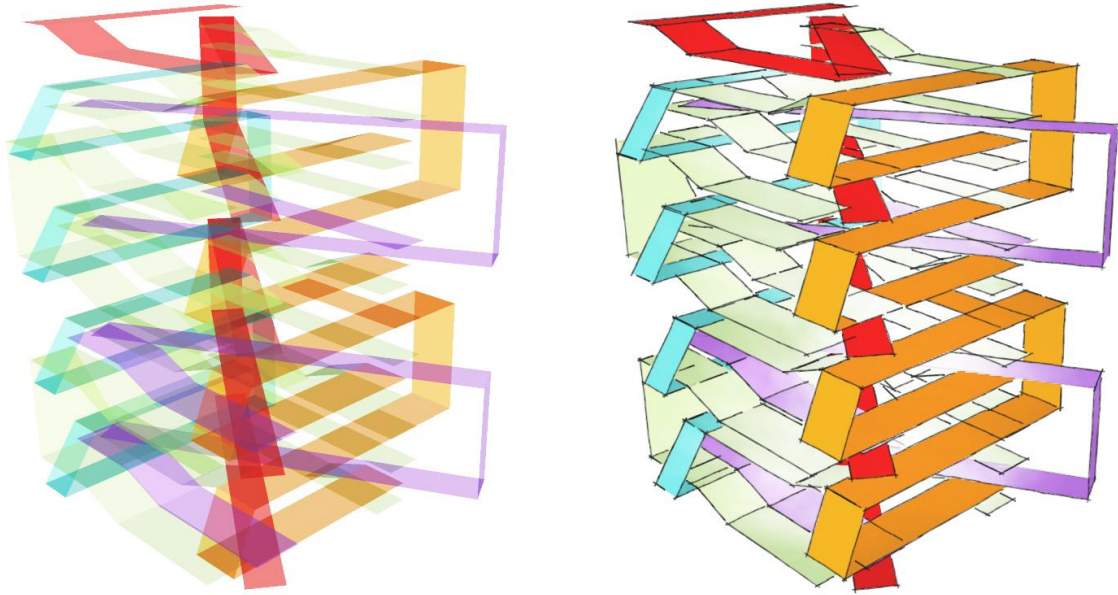
To ensure sunlight to the surrounding buildings as much as possible throughout the day, the structure has been placed near to the south-west side of the site. This also provided a sense of containment of the fields on the east by the community. However, as the main approach point of the site is also from the west side, setback had to be given to provide a proper aperture while entering the site.

6.3 Form development

As the form is supposed to be generated from a folding strip according to the concept, initially the folding has been done in a regular rotation. Through this, a void space has been found contained by the folding strips which would work as an atrium, required for indoor type games sensitive to rain.



However, an open land recreation space such as park does not follow a regular pattern, rather the flow of the circulation within it happens in a more organic way. To break the monotony of the regular rotation, diagonal folding has been introduced. Through this, the folding of the strips changes it's rotation two times in every typical cluster and the regularity of the internal flow is broken.



The chosen way of folding was not only targeted for breaking the regularity of the internal circulation and space flow, but also to ensure that the sunlight enters the community garden plates most of the time as well as internal plates used for sports. The structure also ensures minimal obstacle to the existing wind flow for causing less impact on the surroundings.

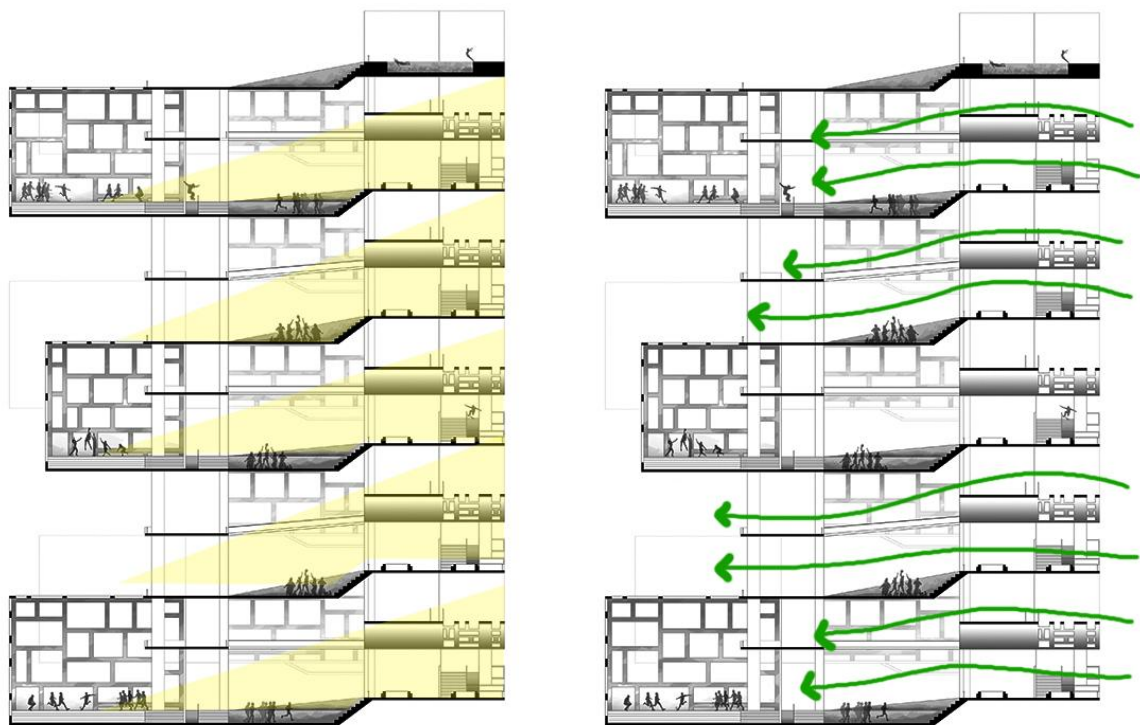
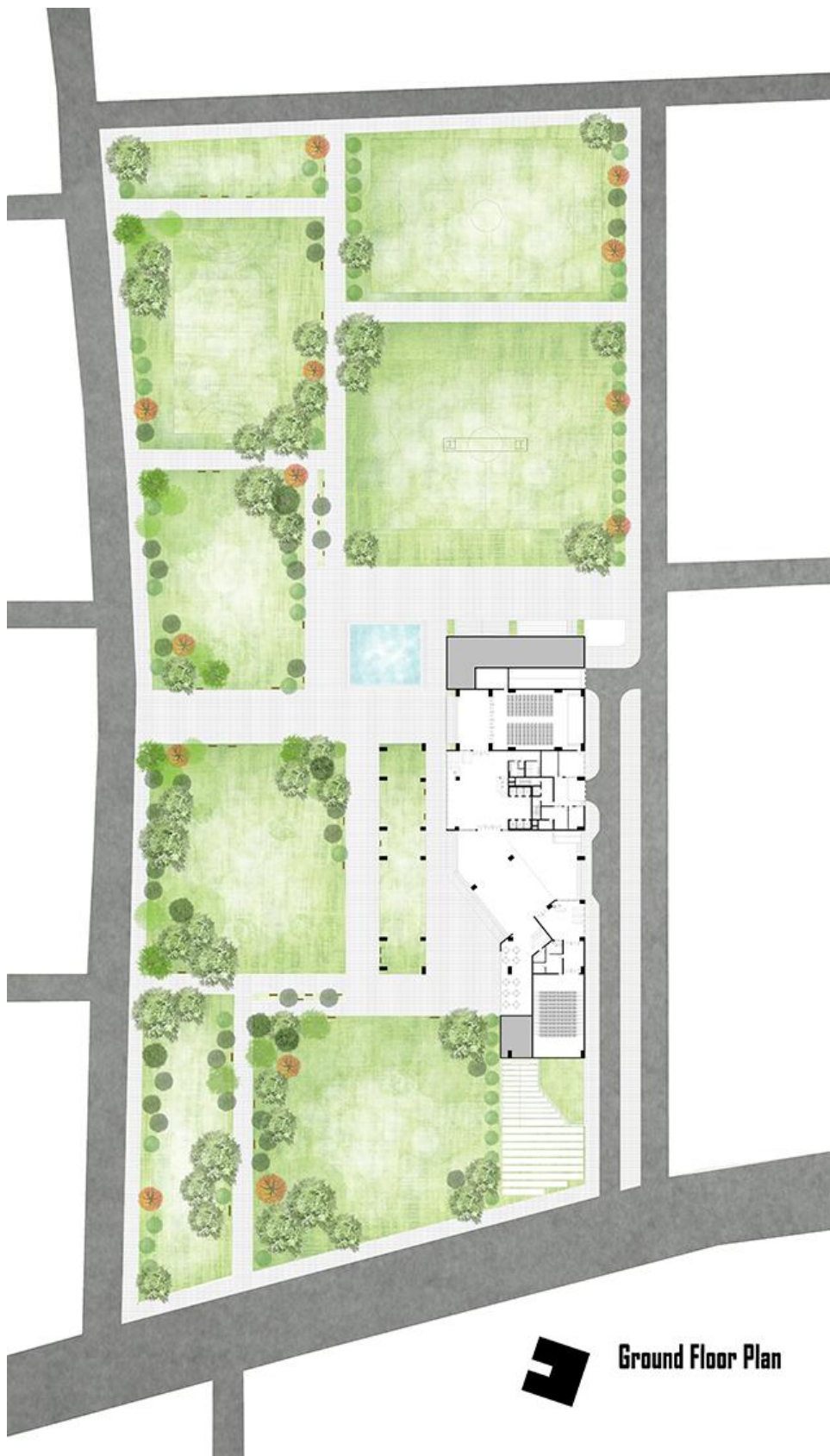
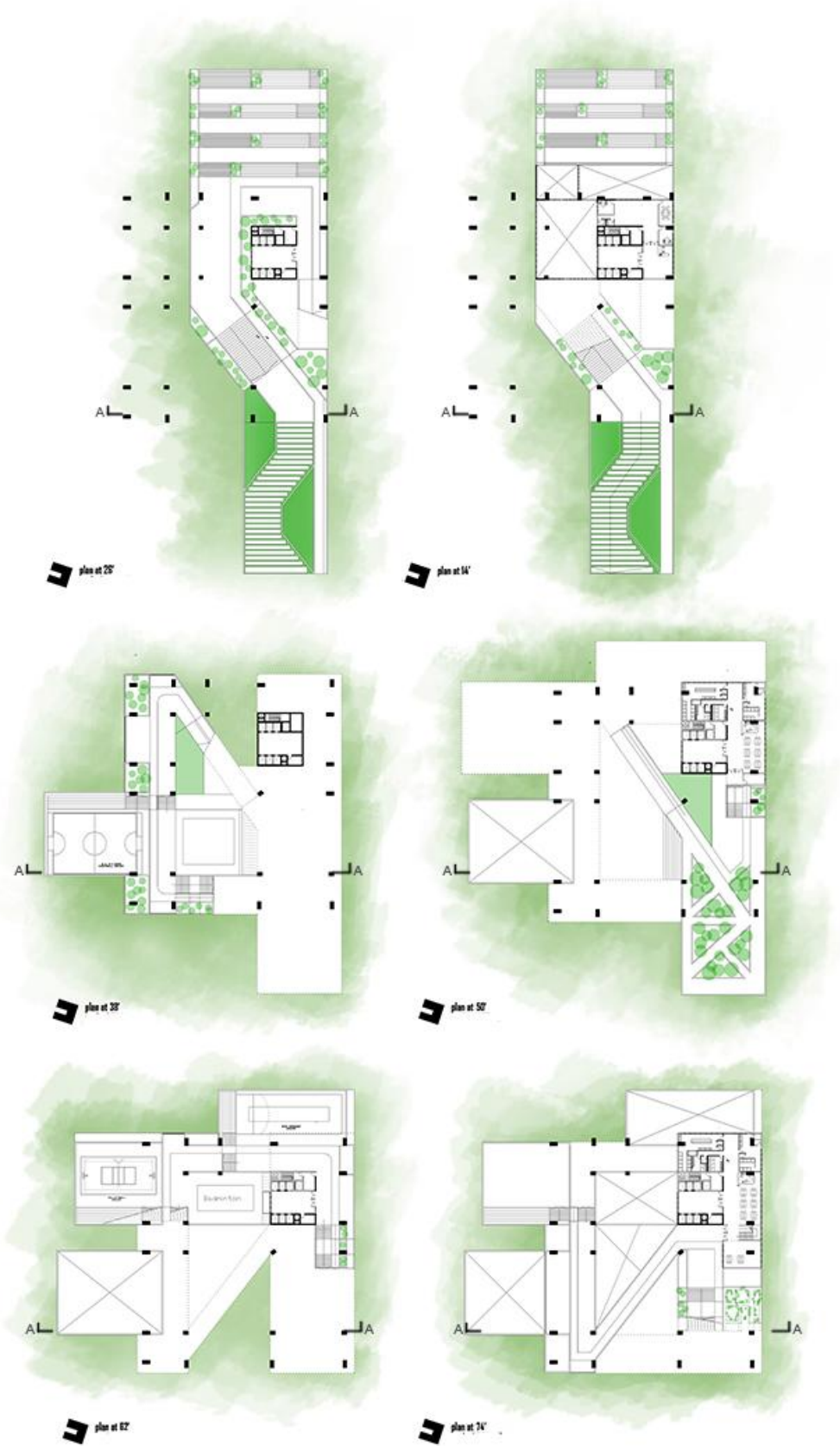


Fig : Sunlight entry and wind flow through the structure

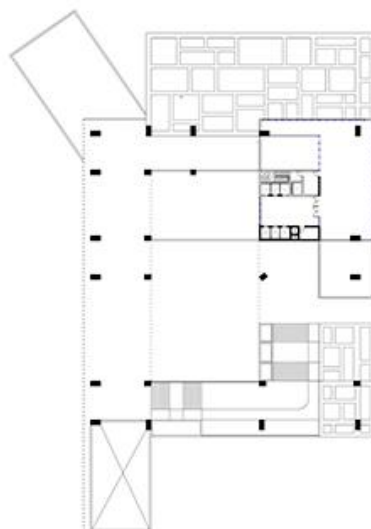
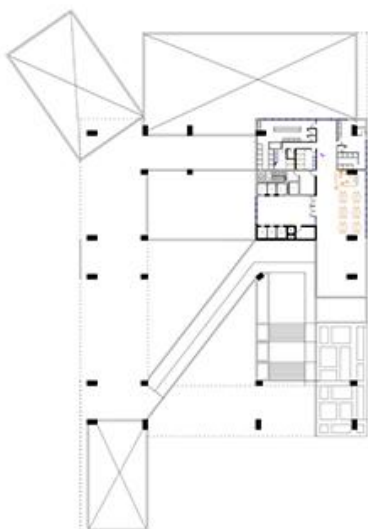
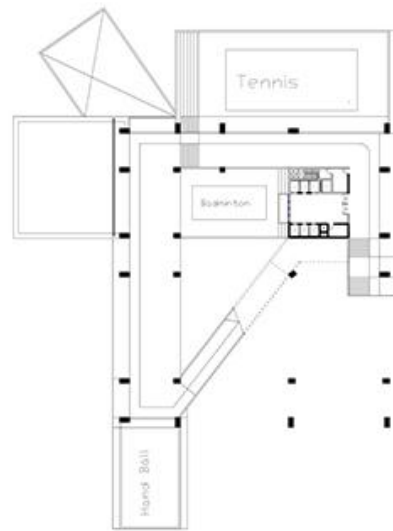
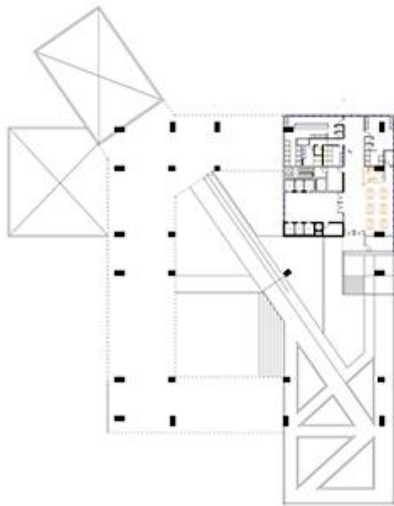
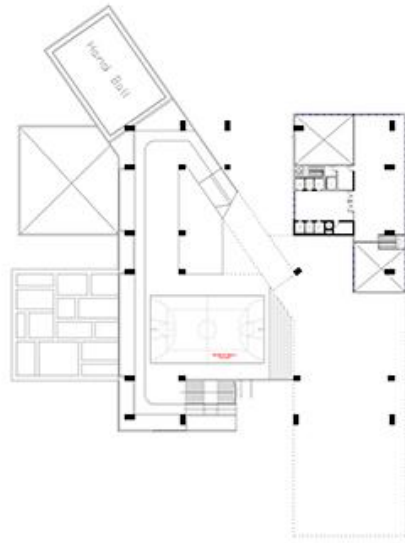
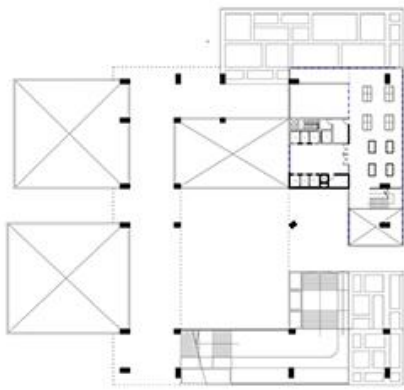
6.4 Design drawings

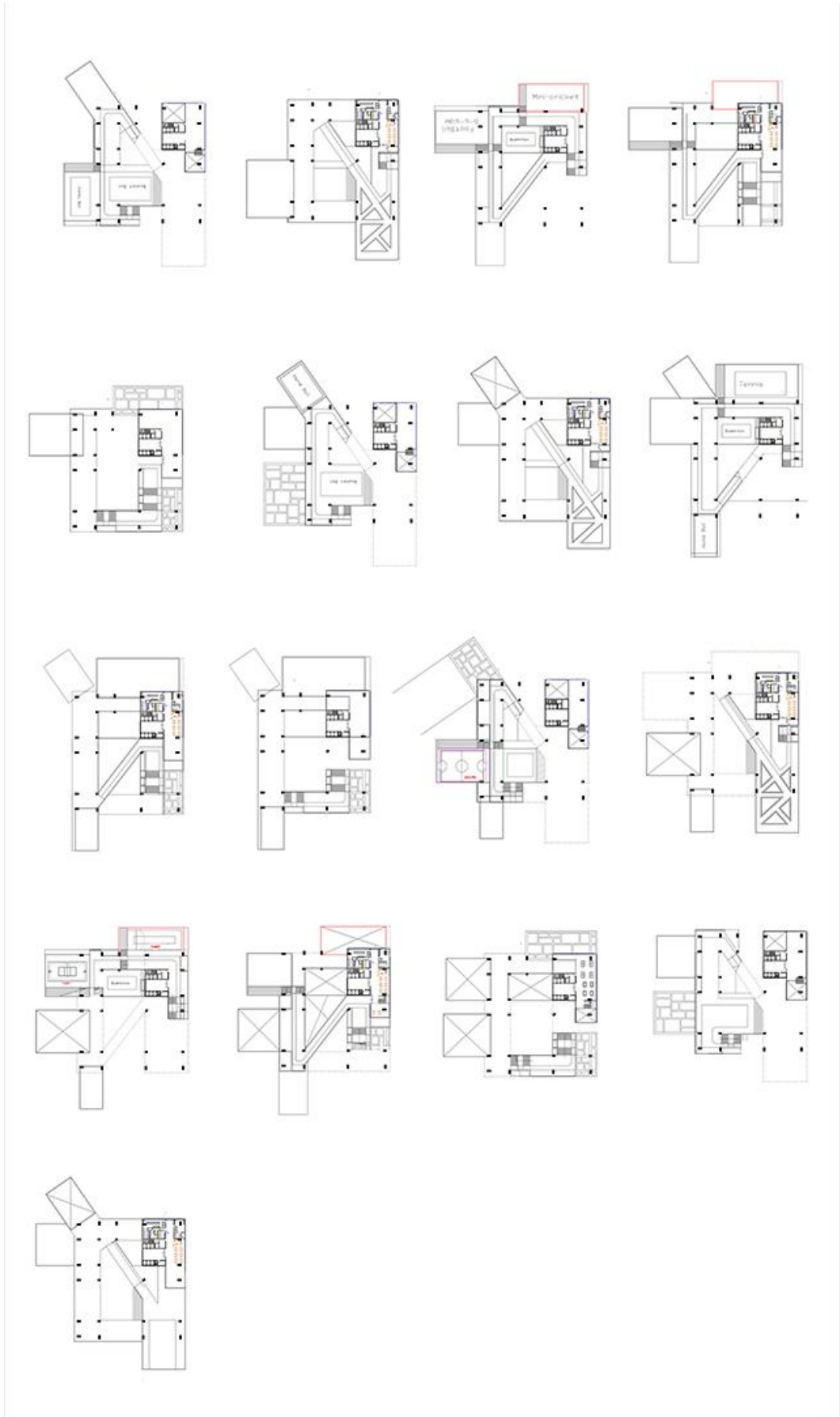


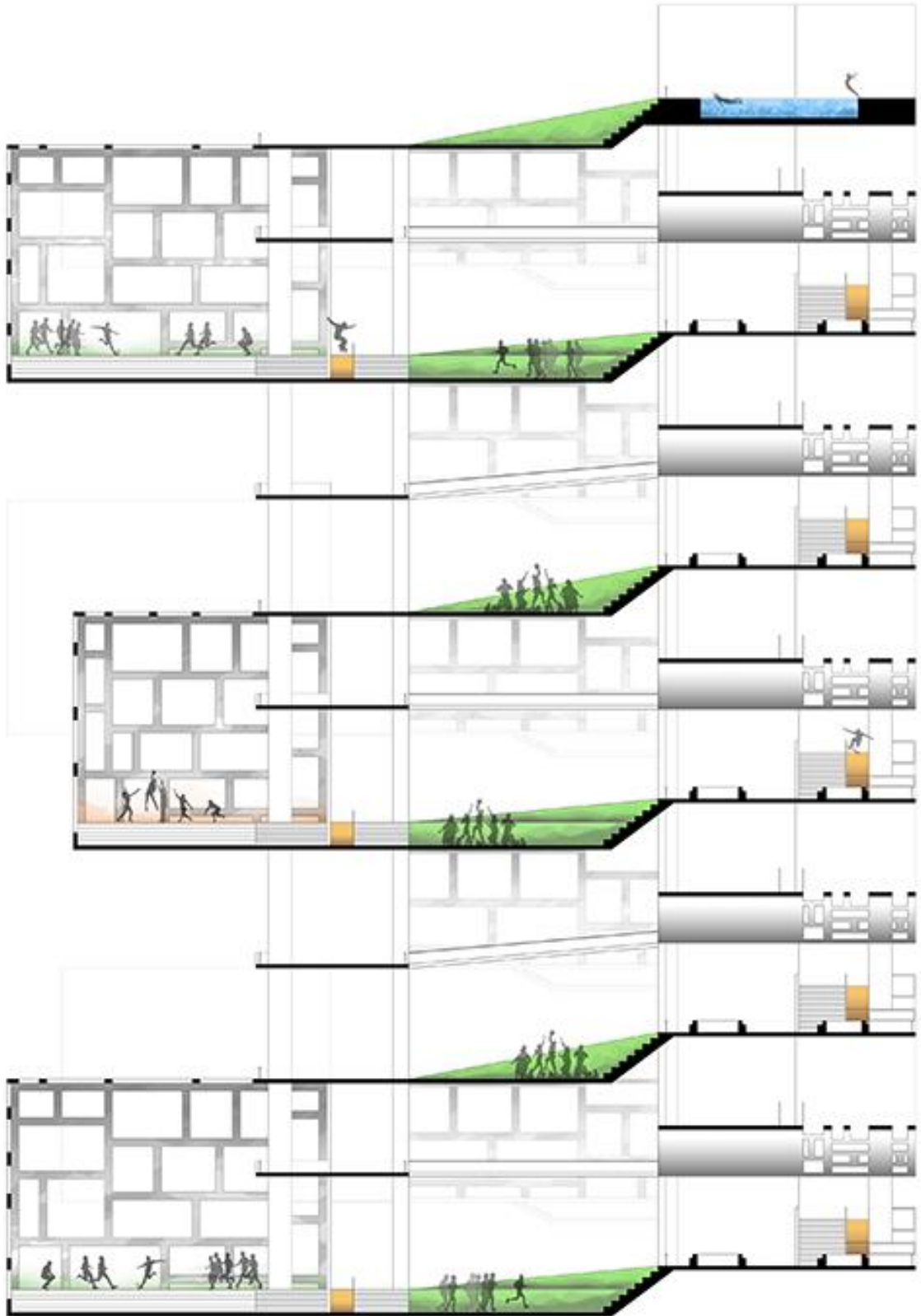
Ground Floor plan (Not to scale)



Floor plan at 14', 26', 38', 50', 62' and 74' (Typical cluster) (Not to scale)

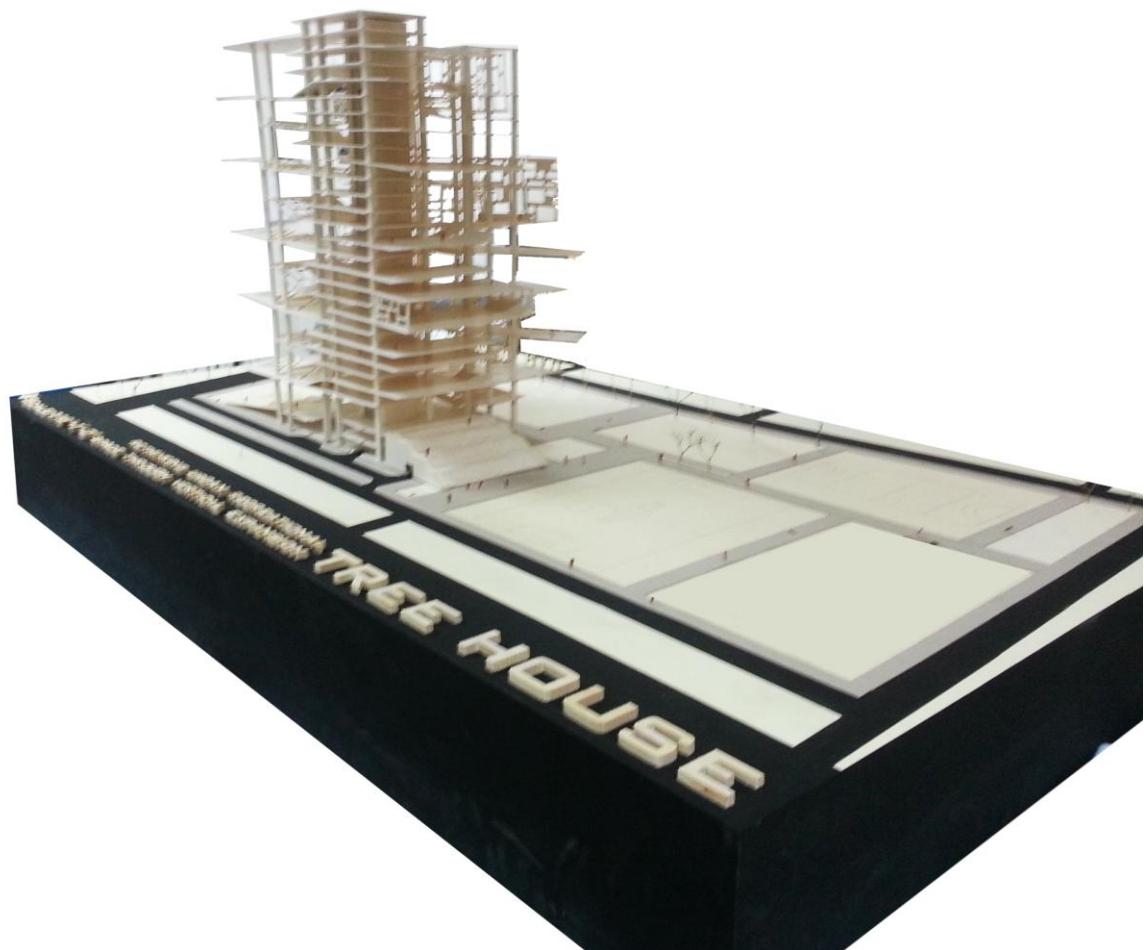
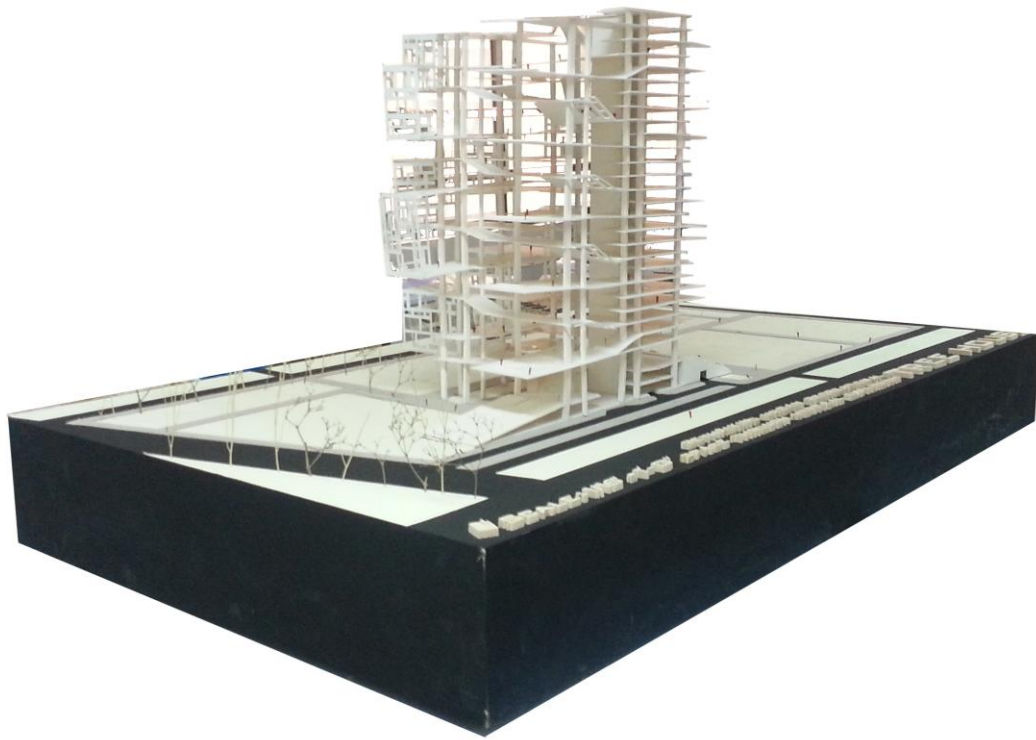




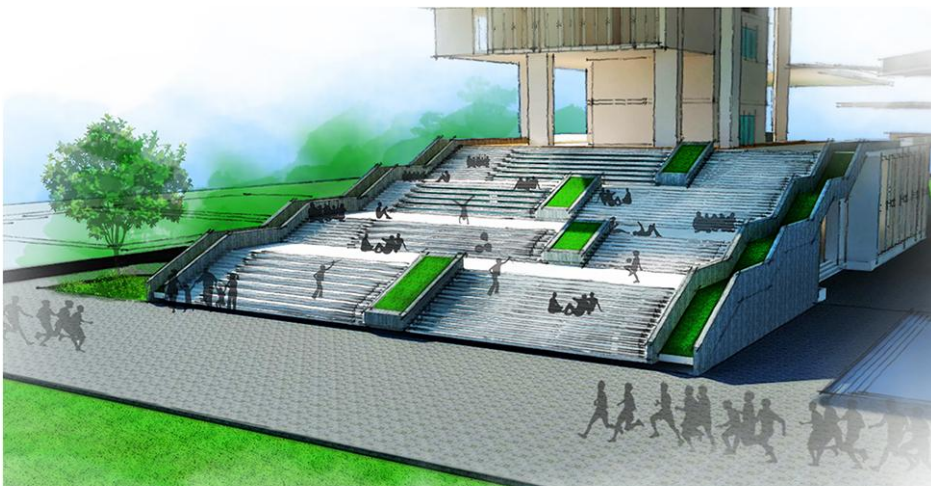
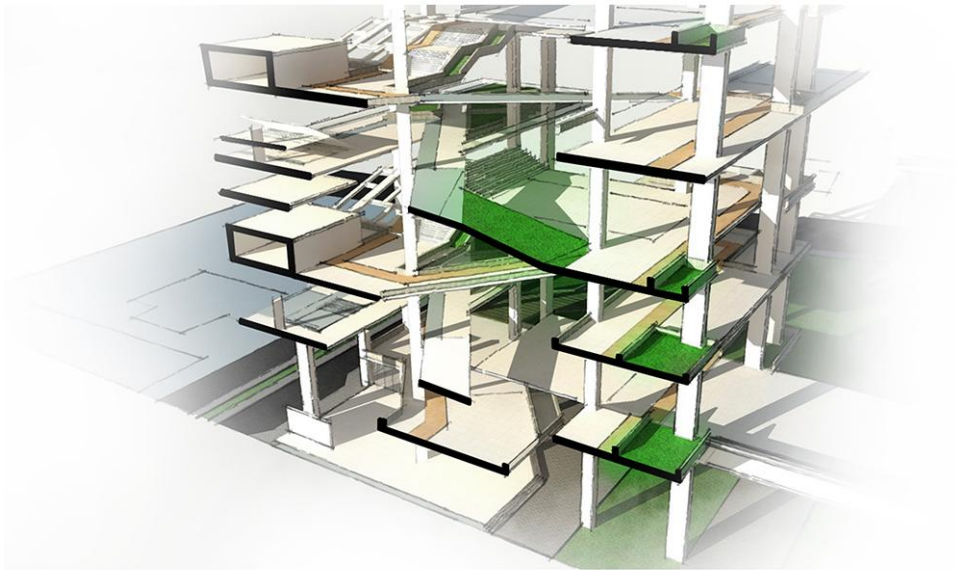


Tower section AA (Not to scale)

6.5 Model Pictures



6.6 Perspective views



Sectional perspective, Community Garden and Community Field Gallery

CHAPTER 07: Conclusion

Rethinking recreational spaces in the urban context by going vertical has been the core idea of the project and gives a vision with countless possibilities through which the structure can be manipulated and modified according to the needs of different contexts. Going vertical with playfields, gardens and recreational open spaces might not be desired by many as people are accustomed to experience such places horizontally spread on the ground.

However, changing situation often leads us to rethink the way we perceive and experience things and adapt to a newer solution. As we can already see such implementation in a smaller scale, possibly we are not far away from seeing implementation of this 'going vertical' idea to solve the recreational needs. Lastly, the project leaves an example with high flexibility which can be used to adapt to different context with different needs while causing as low as possible impact on the surroundings and the nature itself.

REFERENCE:

1. www.planningni.gov.uk/index/policy/policy_publications/planning_statements/pps08-open-space
2. www.sefton.gov.uk/devplan/local_plan/written/cpt13.htm
3. [www.marion.sa.gov.au/webdata/resources/files/OS_Strategy_Section_1_-_Context\[1\]](http://www.marion.sa.gov.au/webdata/resources/files/OS_Strategy_Section_1_-_Context[1])
4. www.academia.edu/245120/Urban_life_and_use_of_Public_Space_in_Dhaka
5. www.sapgroup.com/index.php/grounds-maintenance/products-2/synthetic-grass/
6. www.e-architect.co.uk/denmark/sports-administration-centre-skanderborg
7. inhabitat.com/skanderborg-sports-administration-centre-merges-the-outdoors-with-the-indoors/skanderborg-sports-admin-centre-schmidt-hammer-lassen-2/?extend=1
8. www.archdaily.com/34043/community-centre-herstedlund-dorte-mandrup-arkitekter/
9. <http://inhabitat.com/blua%E2%80%99s-civic-sports-center-is-a-naturally-cooled-artificial-mountain-in-hangzhou-china/>
10. <http://www.evolo.us/architecture/hangzhou-civic-sports-center-blua/>
11. http://openarchitecturenetwork.org/projects/vertical_gym
12. <http://www.sportengland.org/media/32339/Comparative-Sizes-Checklist-April-2011>

APPENDIX

Ergonomics

Eating Place

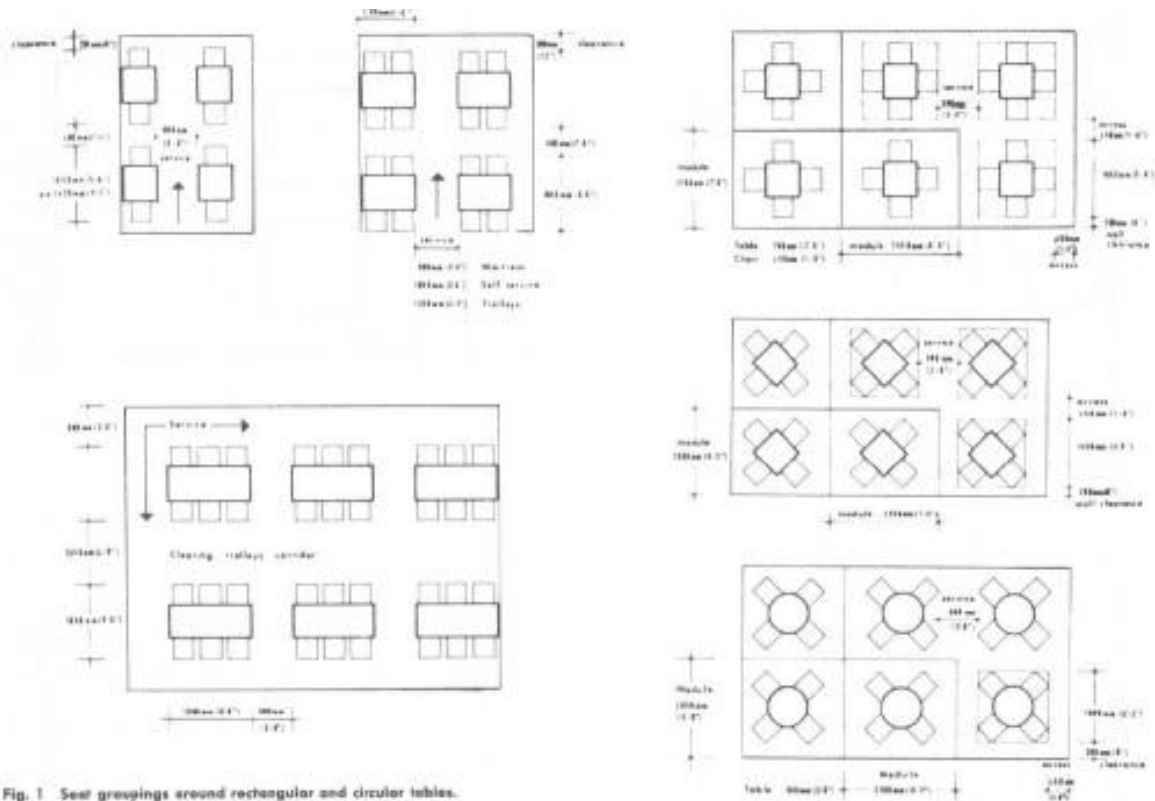


Fig. 1. Seat groupings around rectangular and circular tables.

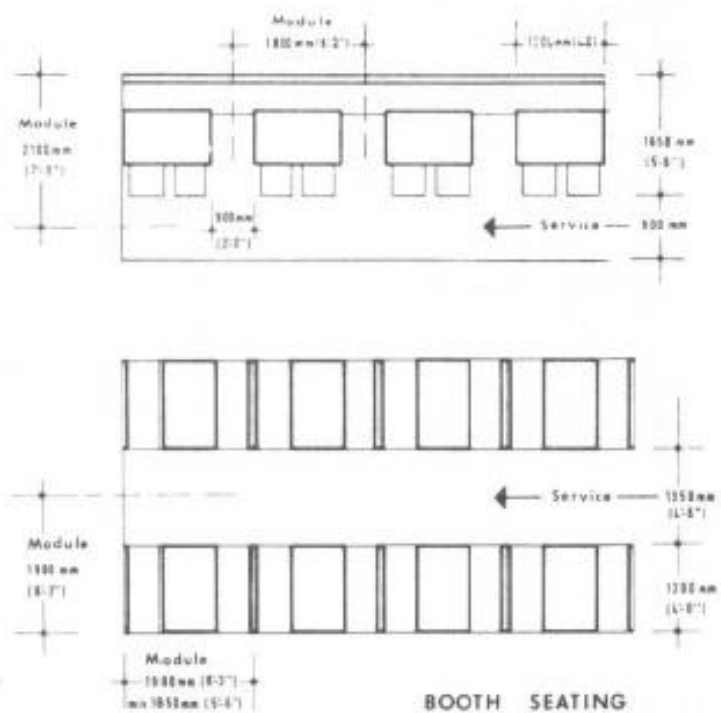
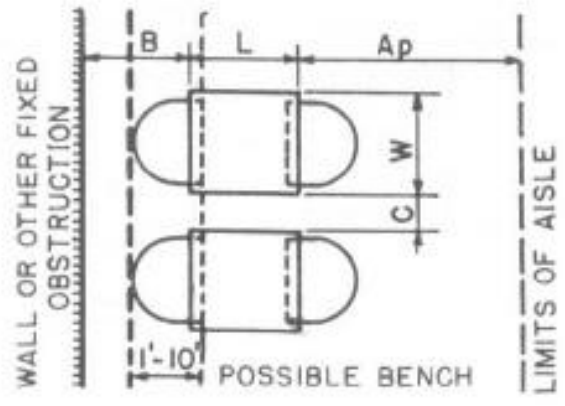
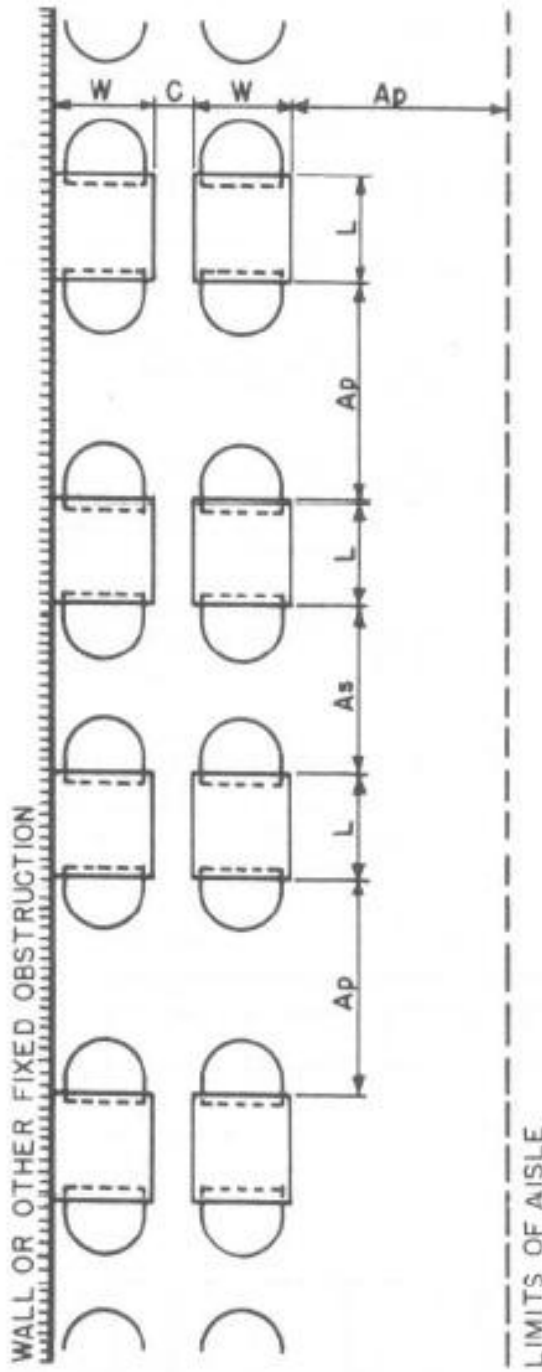


Fig. 2. Banquette seating arrangements and limiting dimensions including space for access and service.

Fred Lawson, *Restaurant Planning and Design*. The Architectural Press, Ltd., London, 1973.

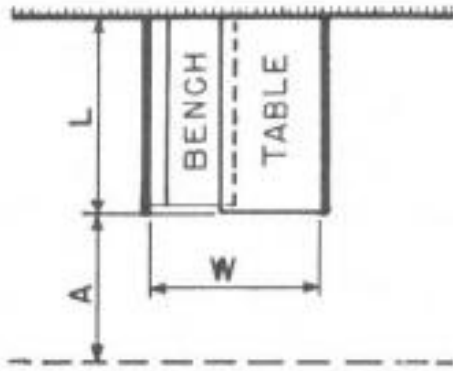


	Abs. Min.	Des. Min.	Comfortable
Ap Public circ'n	3-0	3-6	3-9
	to	to	to
	4-6	5-0	5-0
As Service aisle	3-6	4-0	4-0
	to	to	to
	4-6	5-0	5-6
B To wall	1-8	2-0	2-0
	to	to	to
	2-0	2-6	3-0
C Between units	0	6	
	to	to	1-0
	8	1-0	
Length	1-8	2-3	2-4
	to	to	to
	2-0	2-4	2-6
Width	1-8	2-2	2-4
	to	to	to
	2-0	2-3	2-6

all dimensions in feet and inches

	Abs. Min.	Des. Min.	Comfortable
Ap: Public circ'n	*1-10	2-3	3-0
	to	to	to
	4-6	5-0	5-0
As Service aisle	3-0	3-6	3-9
	to	to	to
	3-6	4-0	4-0
C Between units	0	4	6
	to	to	
	3	6	
Length	1-8	3-3	2-4
	to	to	to
	2-0	2-4	2-6
Width	1-8	2-2	2-4
	to	to	to
	2-0	3-3	2-6

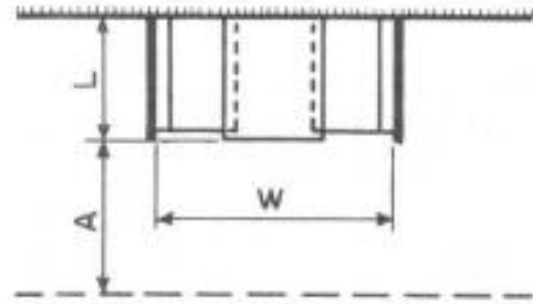
* Lower range only if chairs, etc., do not project into aisle



2 PERSONS SIDE BY SIDE

	Abs. Min.	Des. Min.	Comfortable
Service A and pub. circ'n	2-6	3-0	3-6
Length	3-6	3-9	4-0
Width	3-0	3-3	3-6

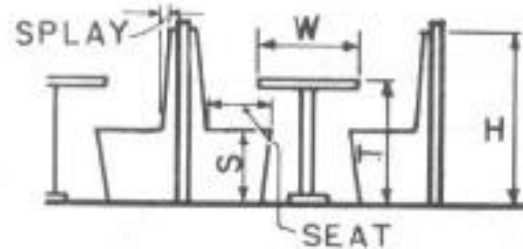
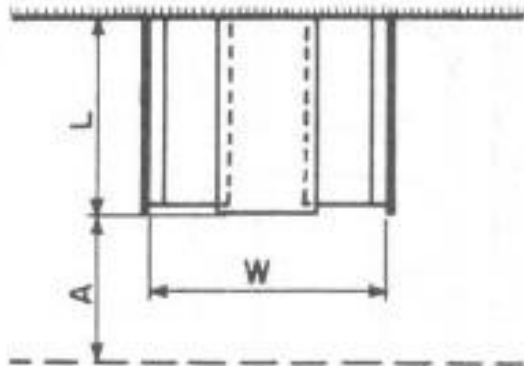
Note: This type not ordinarily recommended.



2 PERSONS FACE TO FACE

	Abs. Min.	Des. Min.	Comfortable
Service A and pub. circ'n	2-6 to 3-0	3-0 to 4-0	3-6 to 5-0
Length	2-0	2-2 to 2-6	2-6
Width	4-10 to 5-6	5-2 to 5-6	5-8 to 5-10

dimensions in feet and inches



4 PERSONS

	Abs. Min.	Des. Min.	Comfortable
Service A and pub. circ'n	2-6 to 3-0	3-0 to 4-0	3-6 to 5-0
Length	3-6	3-9 to 4-0	4-0 to 4-2
Width	4-10 to 5-6	5-2 to 5-6	5-8 to 5-10

BOOTH FURNITURE HEIGHTS

	Abs. Min.	Des. Min.	Comfortable
H	3-0 to 3-6	3-6	4-0
S	1-5 to 1-6	1-5 to 1-6	1-6
T	2-5	2-5 to 2-6	2-6
W	1-8 to 2-0	2-0 to 2-2	2-4 to 2-6
Seat	1-4 to 1-5	1-5 to 1-6	1-6 to 1-8

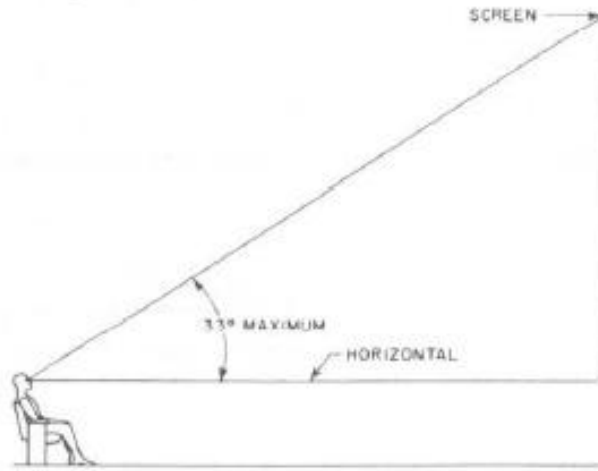


Fig. 1. Method of determining minimum distance from screen to first row of seats

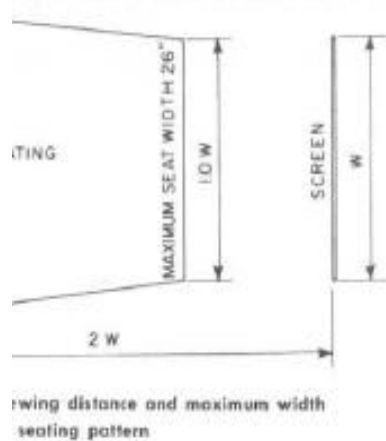
General guide:

1. The first row of seats should be no closer to the screen than a position determined as follows: The angle formed with the horizontal by a line from the top of the projected picture to the viewer in a front-row seat, exceed 33 deg.

2. The maximum viewing distance should be no greater than twice the width of the widest picture to be projected.

3. The width of the seating pattern should vary from 1 times the widest projected picture of the first row to 1.3 times at the row farthest from the screen.

Projected picture widths should not exceed 35 ft for stand and 35 mm film, 45ft for Cinemascope 35 mm film, and 65ft for 70mm film.



Viewing distance and maximum width seating pattern

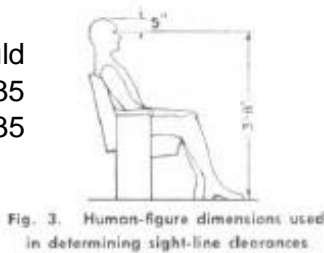


Fig. 3. Human-figure dimensions used in determining sight-line clearances.

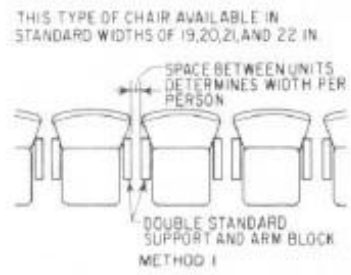


Fig. 5. Methods of obtaining wider spacing for chairs nearest screen

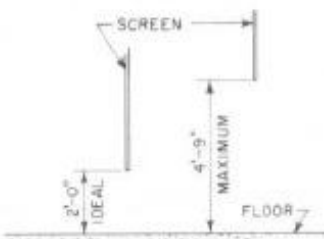


Fig. 4. Height of screen above floor of first row of seats

Maximum spacing for first row is 26 in.

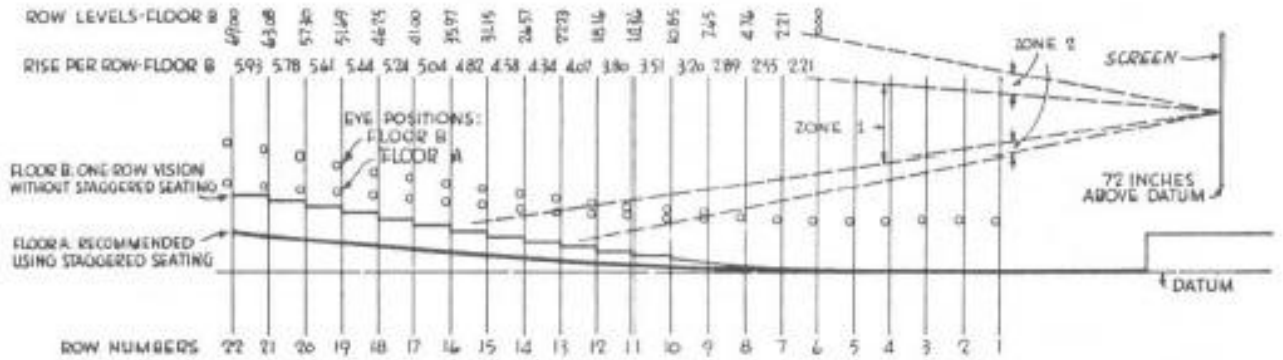


Fig. 6 Single-slope auditorium. On ground sloping 3 ft or more downward toward screen. Without staggered seats, risers required starting tenth row.

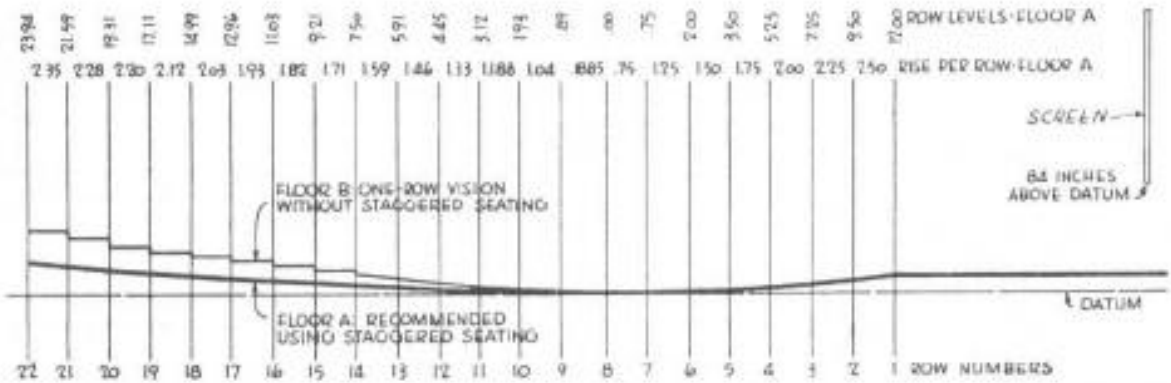


Fig. 7 Double-slope auditorium. On level ground, or on ground sloping less than 3 ft in any direction. First six rows aligned to allow view of entire screen.

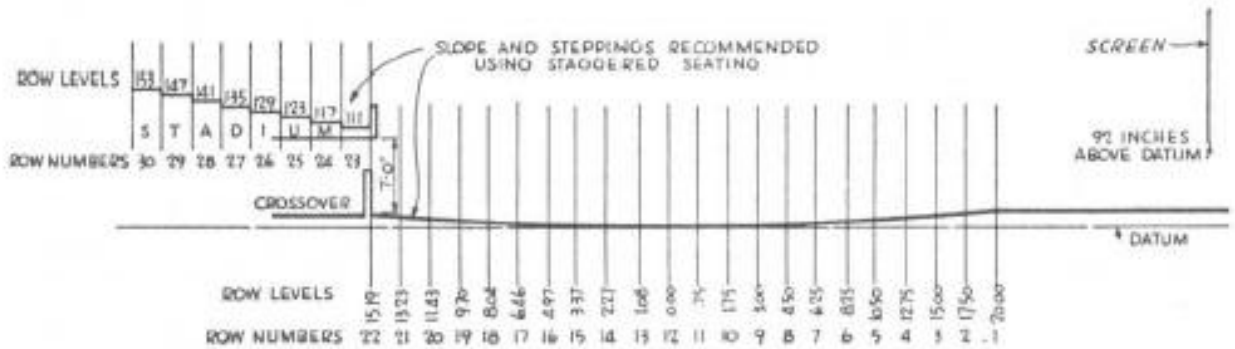


Fig. 8 Double-slope auditorium with stadium. On level ground or on ground sloping less than 3 ft in any direction. Seats in at least first six rows aligned. Crossover under first few rows of stadium saves seating area. Staggered seating and minimum clearance in crossover prevent intermediate steps.

Source: Joseph De Chiara (1990). Time saver's standard for building types. Singapore: McGraw-Hill, Inc.

Auditorium

Sight lines

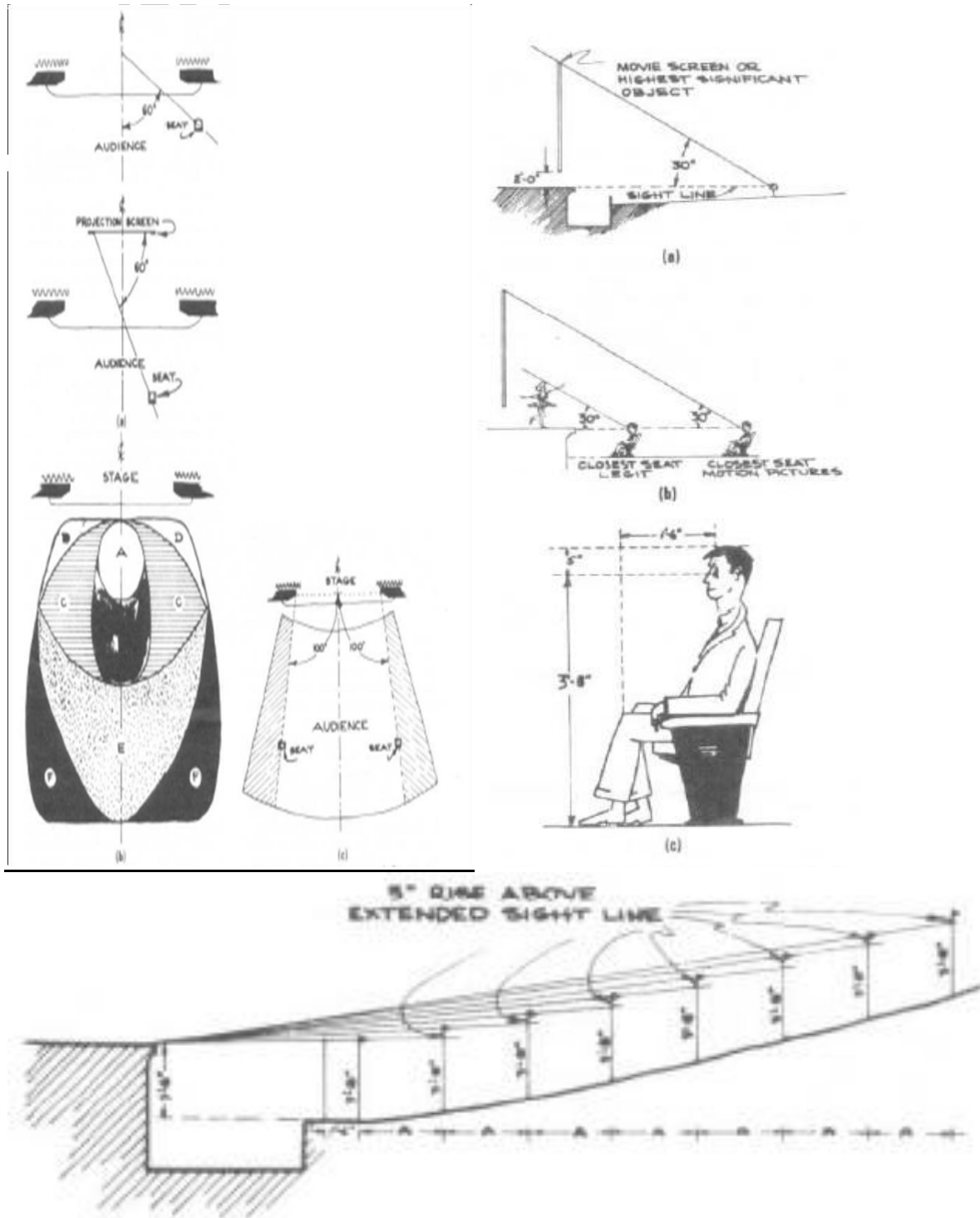


Fig: Floor slope for unobstructed vision

Source: Joseph De Chiara (1990). Time saver's standard for building types. Singapore: McGraw-Hill, Inc.

Backstage

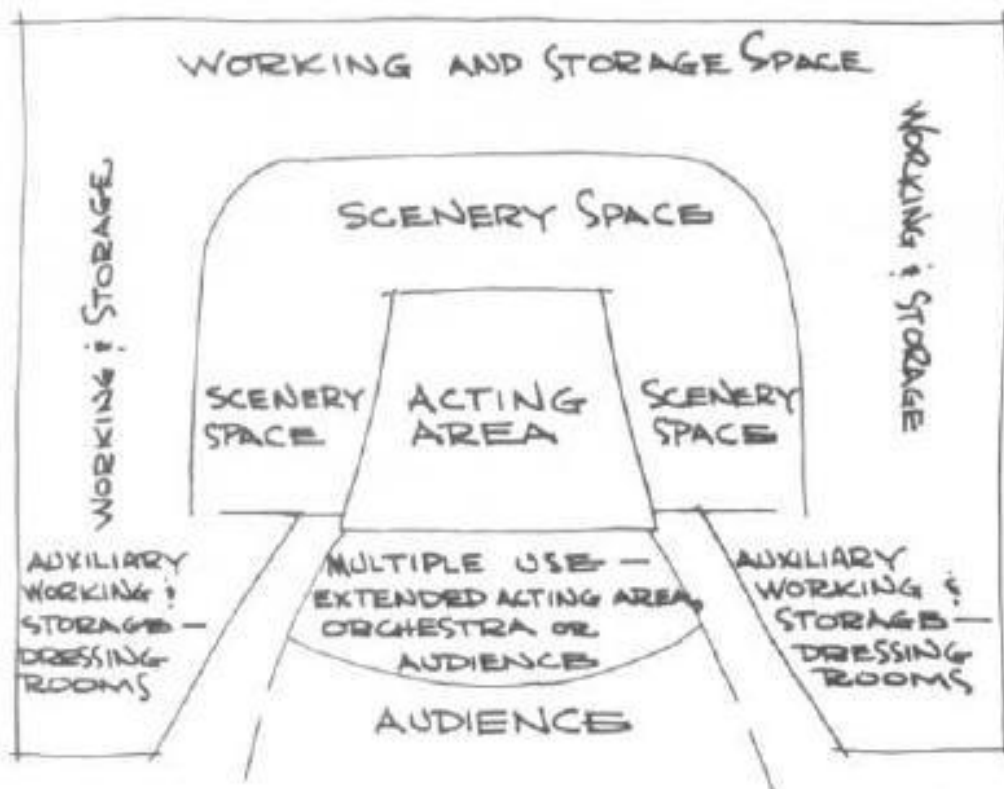


Fig: position of back stage areas relative to each other

Source: Joseph De Chiara (1990). Time saver's standard for building types. Singapore: McGraw-Hill, Inc.

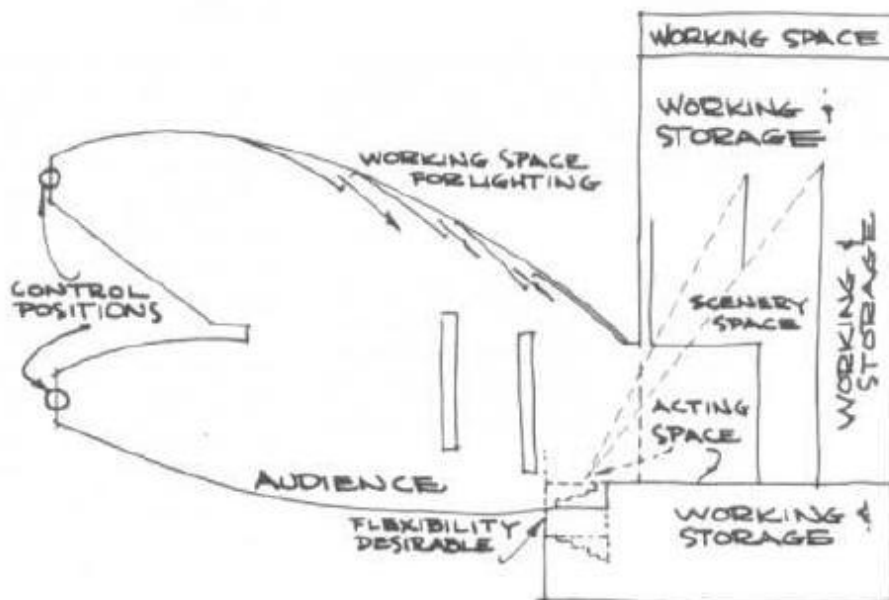


Fig: position of back stage areas relative to each other

Source: Joseph De Chiara (1990). Time saver's standard for building types. Singapore: McGraw-Hill, Inc.

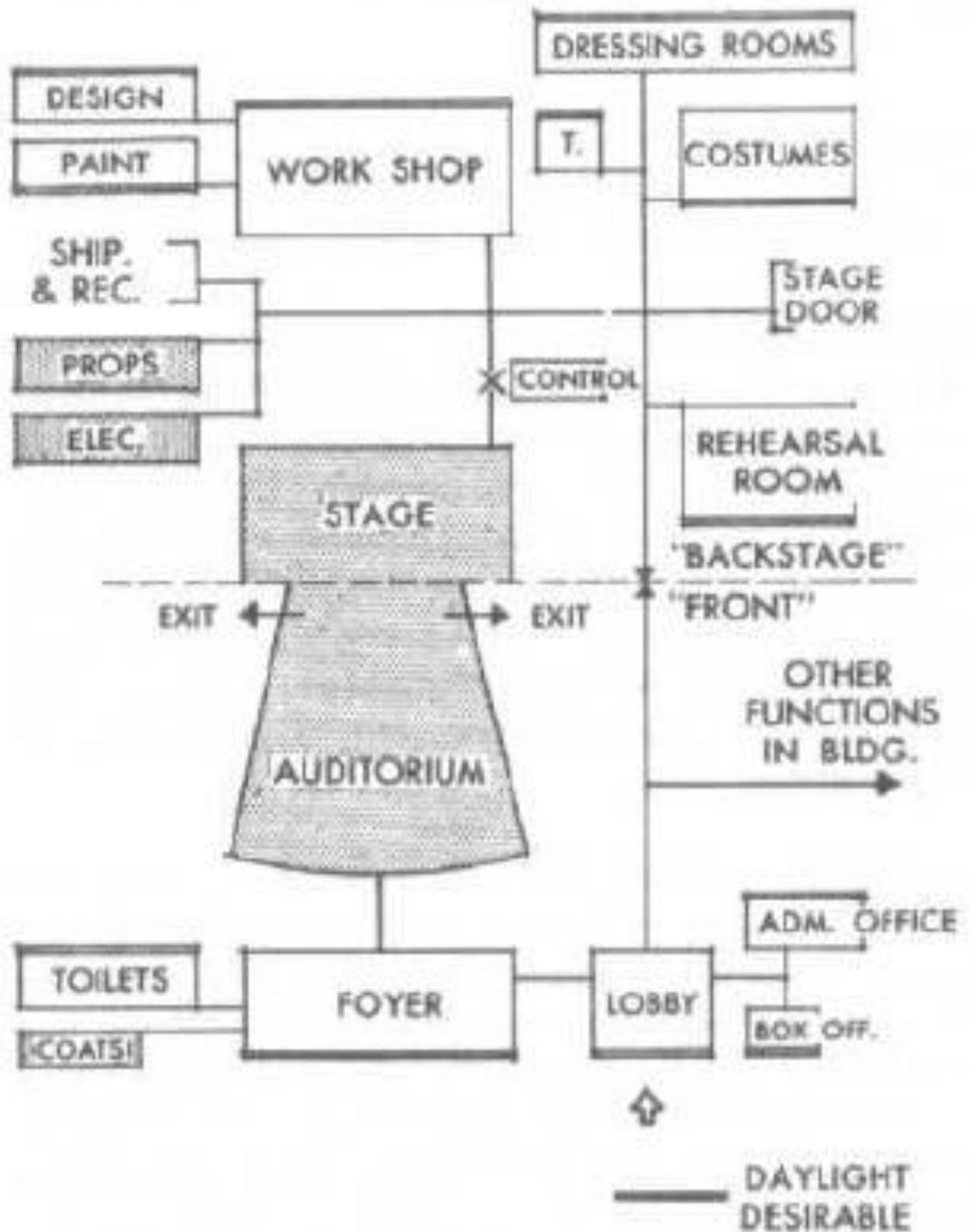


Fig: Organization Chart
 Source: Joseph De Chiara (1990). Time saver's standard for building types. Singapore: McGraw-Hill, Inc.

Library:

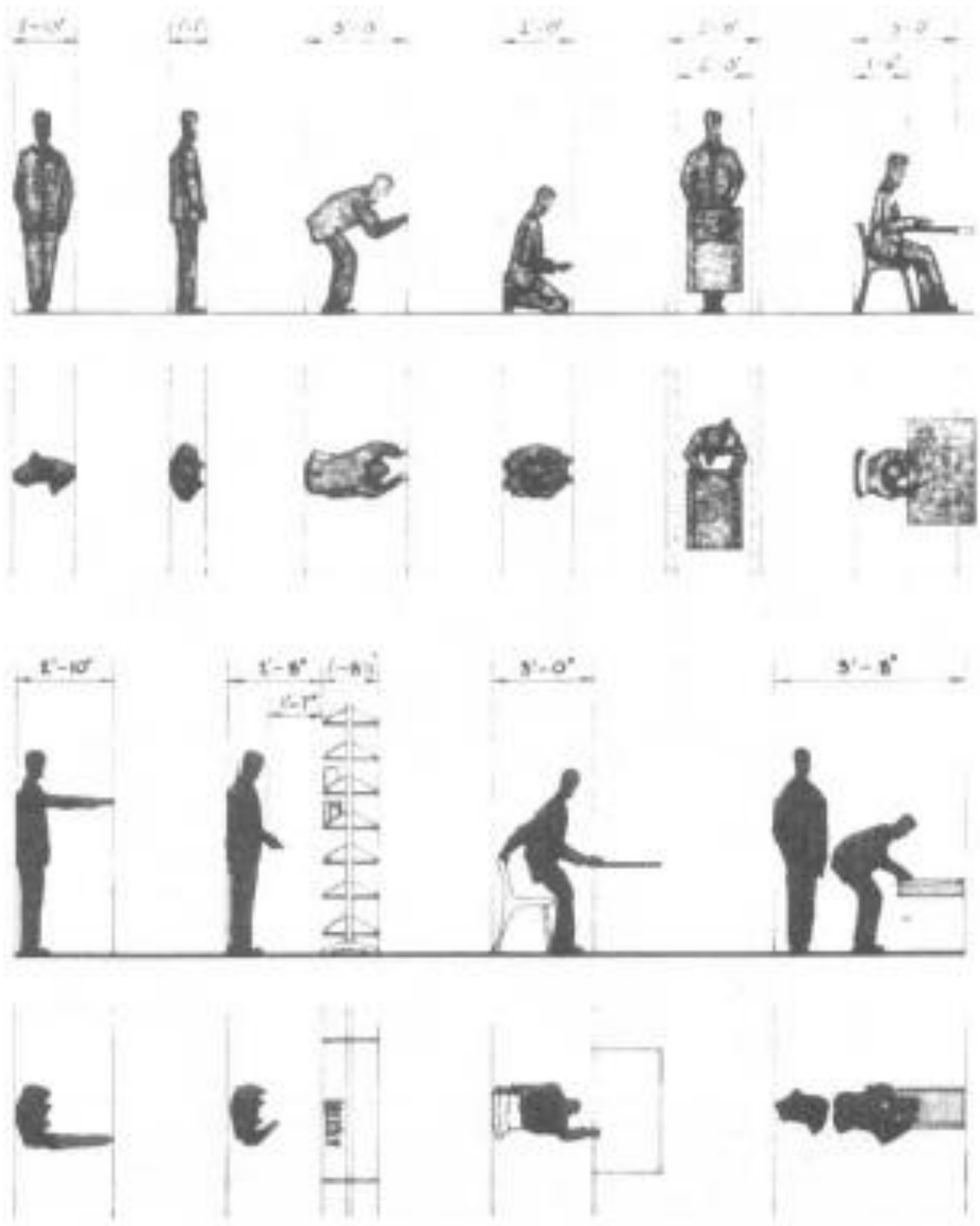


Fig: Minimum clearance for various body positions

Source: Joseph De Chiara (1990). Time saver's standard for building types. Singapore: McGraw-Hill, Inc.

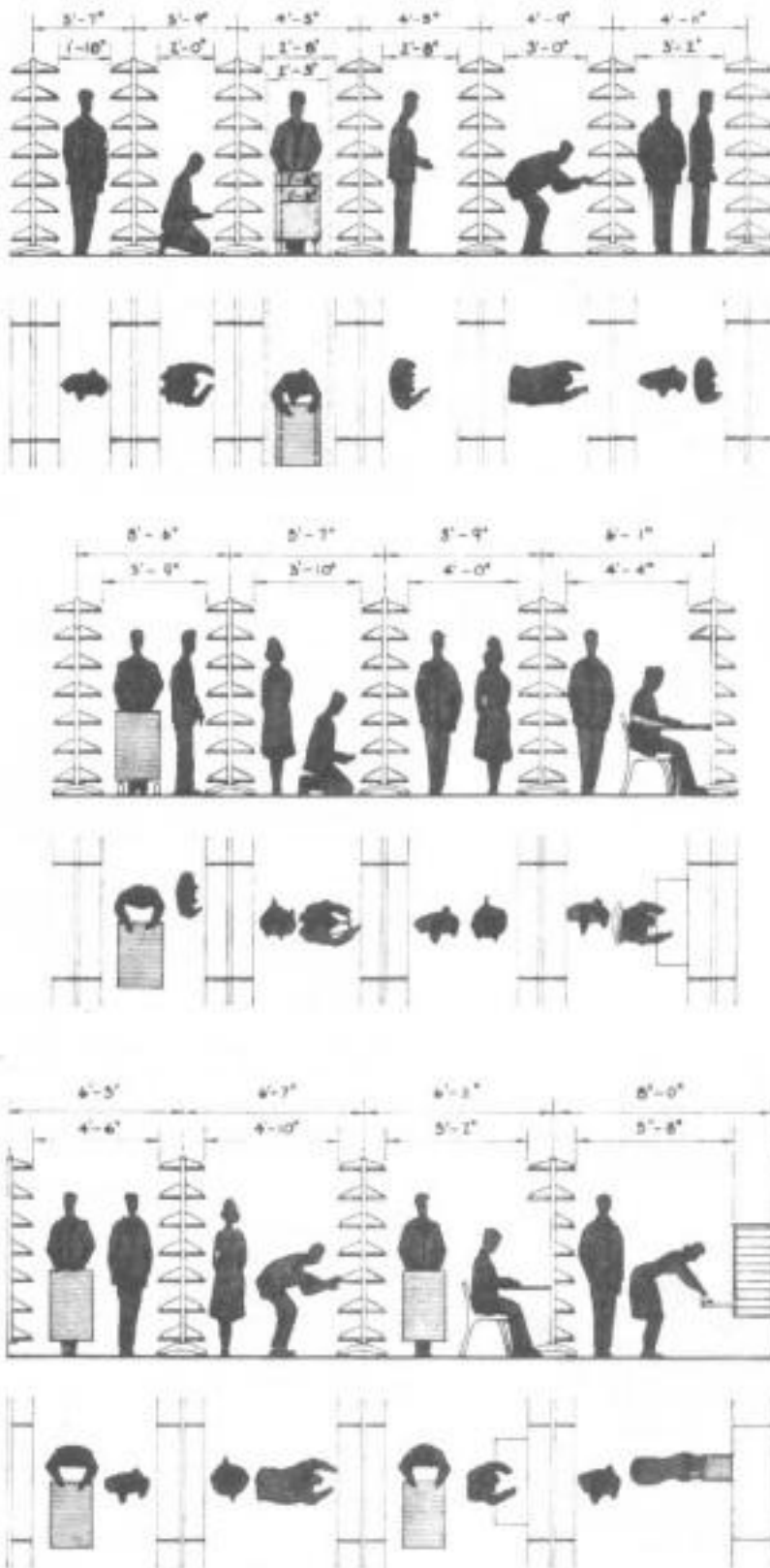


Fig: Minimum clearance for various body positions
 Source: Joseph De Chiara (1990). Time saver's standard for building types. Singapore: McGraw-Hill, Inc.