

## " Nefertari Medical City "

" Pediatrics , Gynecological and Obstetrics Hospitals  
and Cancer Research Center , Nefertari (1) , Qattara  
Depression "

by :

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# Introduction

## Introduction :

### What?

- The Problem :

- Egypt is no. 63 according to world health organization's ranking.
- Egypt is no.80 among the worst states in the children death rate among the 221 countries.
- Nefertari is an new city which need a high medical services.

### Why?

- In the last indicators there is 5.08 of 1000 adult die
- They main cause of death is the :
  - Heart diseases.
  - Stroke .
  - Liver Disease.
  - Kidney Disease .
- There is 2.5 million baby birth / year .
- In the latest indicator there is 21 of 1000 baby die
- 58% of the died babies are because of :
  - Problems in their respiratory system
  - The low medical service
  - Premature birth
  - The diseases

year	1992	2000	2005	2008	2013
internation al	90	47	30	23	21
local	110	54	41	30	28

### How?

- Our project will solve the problem through :
- Make Excellent medical services
  - Decrease the % of children death
  - Increase the women knowledge .
  - Give the mammies & their children the advices .

Table(1)  
Unicef indicators

### Objectives:

- Improve the health care environment for patients & staff.
- Improve resources utilization (bed , supplies & facilities).
- Standardization the provision of health care & prepare our medical city for accreditation.

### Goal:

- We aim to be the leading & best healthcare establishment by providing the medical services using the best means.
- the goal of our pediatrics hospital is make children healthy as "Healthy child healthy world" .

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## **(1) Executive Report:**

### **(1-1) Introduction**

- The location of the project in the center of western desert ,Nefertari city ,It is in the development plan for the western desert, under the vision of Egypt 712.The medical city area is 370 FD , it consists of General hospital – trauma hospital – pediatric hospital -Gynecological & Obstetrics Hospital- Research centers –Resort & commercial tower.
- Our project consists of pediatric hospital ,Gynecological & Obstetrics Hospital and Cancer Research center.

### **(1-2) Design Development Phases:**

- First programming & studies phase:  
we start with feasibility studies for the project ,studying and analyzing similar medical cities projects, analyzing Egypt health rates and indicators in comparison with other countries .  
we found that its important we must improve children health & mothers knowledge.  
We put our vision to Nefertari medical city
- Second pre schematic phase:  
we determine concept of design for our medical city layout, collecting data for our architectural program , using Egyptian code for hospitals, visiting similar projects and analyzing examples.  
Then we develop master plan and design concept , in parallel to programmatic concepts studies , studying sustainable techniques we can use in the project and plans development.
- Preparation of detailed drawings phase:  
we start to focus on details of the project by: studying of materials recommendation needed in hospital , HVAC systems needed in each space , blow up drawings for each space to check medical equipment's dimension in different hospital departments, making detailed layout sections ,and studying hardscape & soft scape in it.

### **(1-3) Project Conclusion:**

- Concerning about the health and welfare of the child is the beginning of better world “ Healthy Child , Healthy World “.

## (2) Site Analysis

### (2-1) Location :

- The Site is located in the center of western desert .
- It is in the development plan for the western desert, under the vision of Egypt 712.
- It is 200km Cairo from the east , 70km from El-Alameen from north and 100 km from Alexandria from east .
- The City located at main roads including the way to Cairo , Faoum and El-Alameen



### (2-2) Neighborhood Context :

- A conceptual master plan , for Nefertari , showing the projects that will be executed in the future in the area surrounding the medical city , under the Vision of Egypt 712.

#### Land Parceling:

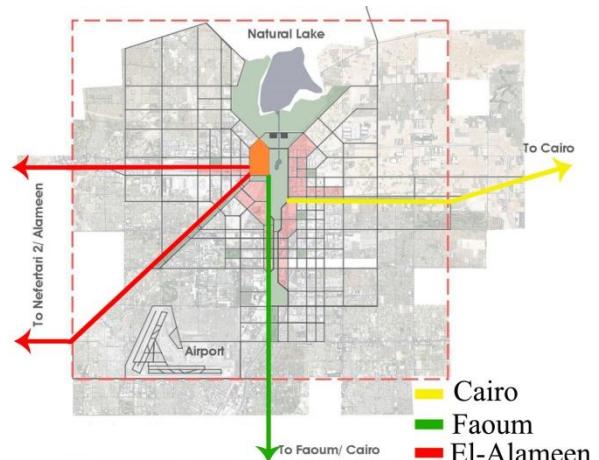
01-(200.0 FD):	Entertainment
02-(280.0 FD):	Healthcare
03-(80.0 FD):	Educational
05-(40.0 FD):	Educational
06-(200.0 FD):	Sports
07-(40.0 FD):	Educational
08-(80.0 FD):	Cultural
09-(160.0 FD):	Business
10-(150.0 FD):	Commercial
11-(60.0 FD):	Business
12-(50.0 FD):	Commercial
13-(40.0 FD):	Business
14-(40.0 FD):	Mixed
15-(60.0 FD):	Business
16-(40.0 FD):	Mixed
17-(40.0 FD):	Mixed
18-(50.0 FD):	Mixed
19-(40.0 FD):	Mixed
20-(40.0 FD):	Mixed
21-(60.0 FD):	Mixed

Central Park- (1000 FD)

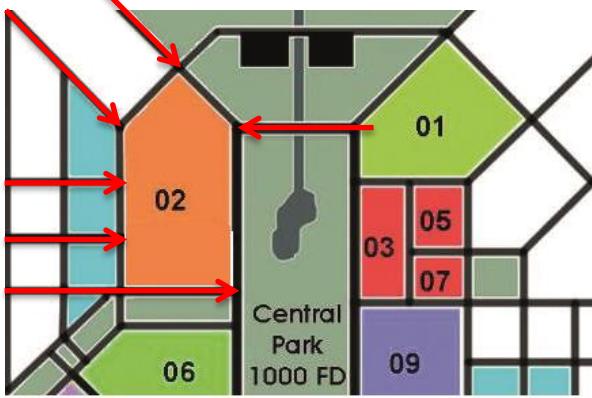
#### City Center Area: 3,000 FD

- Business - استعمالات إدارية
- Commercial - استعمالات تجارية
- Cultural - استعمالات ثقافية
- Entertainment - استعمالات ترفيهية
- Public Parks - حدائق عامة
- Educational - استعمالات تعليمية
- Healthcare - استعمالات صحية
- Mixed - استعمالات مختلطة
- Sports - استعمالات رياضية

Fig. (2-3)  
Neighborhood context



## (2) Site Analysis



Zoom in on our Site , Neighboring projects , and its accessibility from existing and suggested roads .

	استعمالات إدارية - Business
	استعمالات ترفيهية - Entertainment
	حدائق عامة - Public Parks
	استعمالات تعليمية - Educational
	استعمالات صحية - Healthcare
	استعمالات مختلطة - Mixed
	استعمالات رياضية - Sports

Fig. (2-4 )

Neighborhood context & the surrounding local roads

### (2-3 ) Dimensions :

- The Total length ( $L$ ) = 1880 M
- The length ( $L_1$ ) = 1433 M
- The Total width ( $W$ ) = 915 M
- The Inclined side ( $I$ ) = 646 M

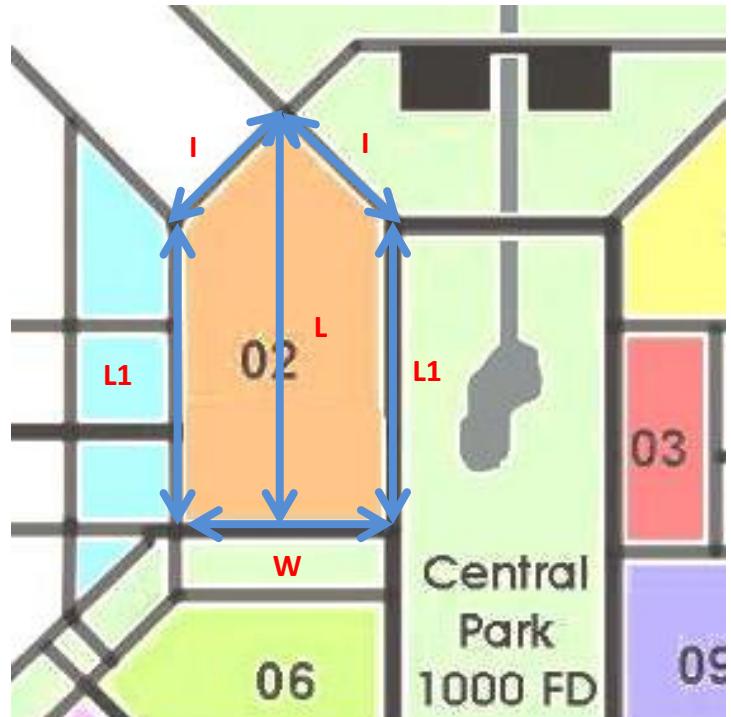


Fig. (2-5)  
The Project Site Dimensions

### (2-4) Legal Issues :

- According to the graduation project (given information) :
  1. Sustainable buildings .
  2. The built area =20 % .
  3. all buildings are colored with white .
  4. The used materials can be fabricated in Egypt .
  5. Systems to be achieved in the project is :
    - Waste recycling systems.
    - 50% of building energy depends on solar energy .
    - Drainage systems for rain and washing the streets.

## (2) Site Analysis

### (2-5 ) Natural Physical Features :

#### (2-5-1) Topography

- About 133 m below sea level.
- A flat area with a little hills surrounding.
- Qattara is an irregularly shaped area between latitudes of  $28^{\circ}35'$  and  $30^{\circ}25'$  north and longitudes of  $26^{\circ}20'$  and  $29^{\circ}02'$  east.
- It extends about 285 kilometers (km) SW-NE and 135 kilometers N-S.

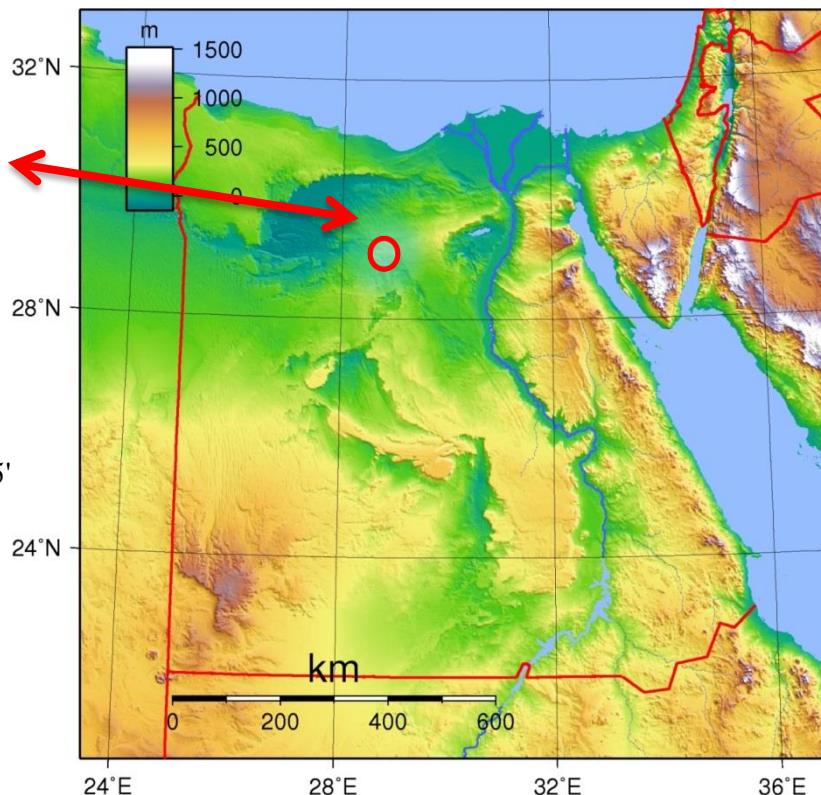


Fig. (2-6)  
Egypt Topography Map

#### (2-5-2) Soil Type:

- The soil type is limestone .

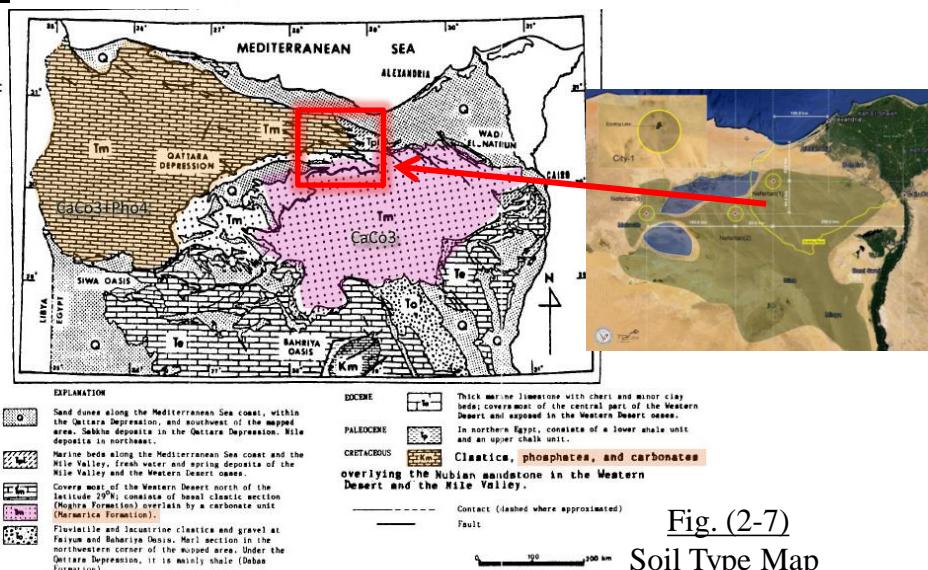


Fig. 2. Geological map of northwestern Egypt (modified from the Geological Survey of Egypt, 1981).

Fig. (2-7)  
Soil Type Map

#### (2-5-3) Ridges and Peaks :

- There is no ridges and peaks in Qattara.



Fig. (2-8)  
Sand Dunes



Fig. (2-9)  
Sand Dunes

## (2) Site Analysis

### (2-6 ) Man Made Environment:

- This site lies in an empty undeveloped environment , there is no man made environment surrounding it . However , it is subject to the development plans of Egypt 712 , like : 1-The Central Park .  
2- the building surrounding the project

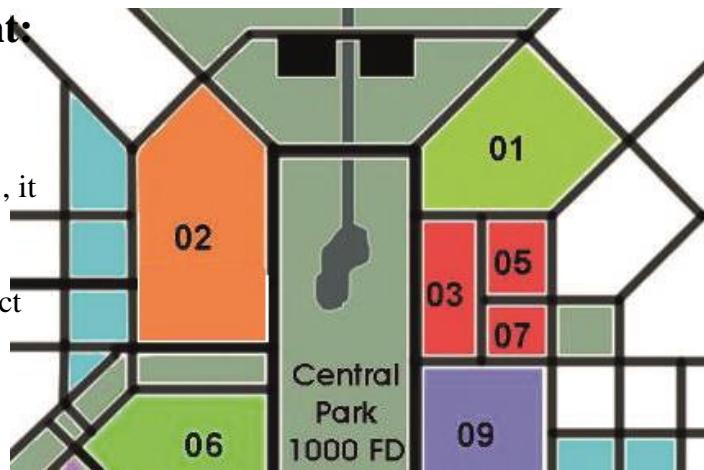


Fig. (2-10)  
Man made environment

### (2-7 ) Circulation :

#### (2-7-1) Main Roads :

- The City Located at Main Roads Including the Way to Cairo , Faoum and El-Alameen.

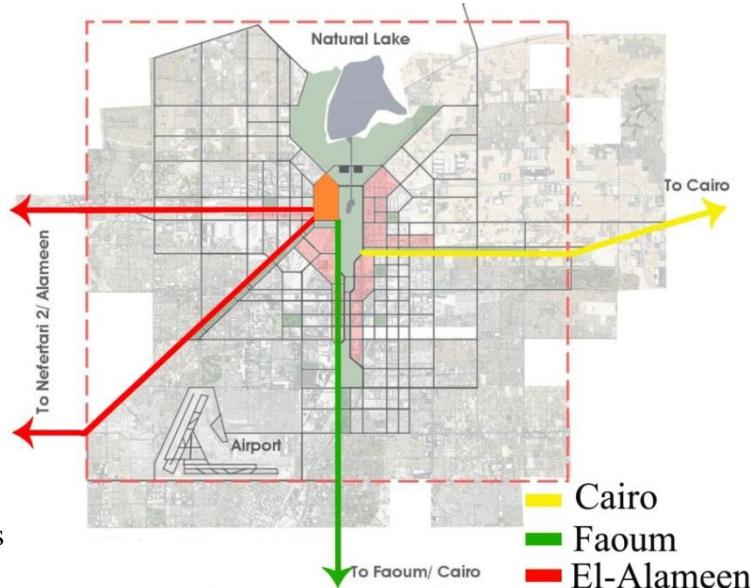


Fig. (2-11)  
The Main Roads

#### (2-7-2) Local Roads :

- The red colored lines referred to the local roads surrounding the site .

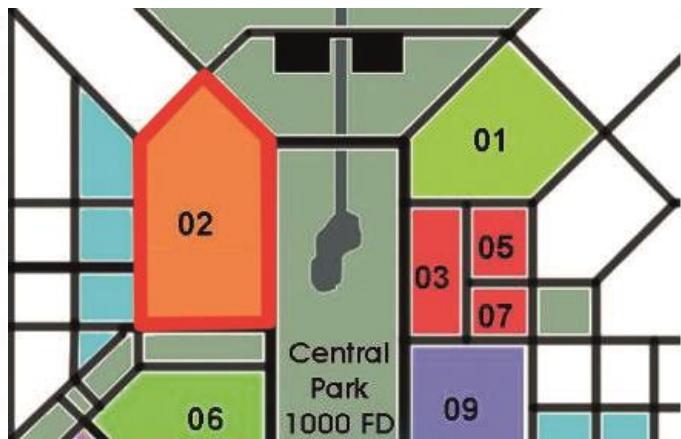


Fig. (2-12)  
The Local Roads

#### (2-7-3) Nearby Airports:

- The figure indicates the near airports from our site.

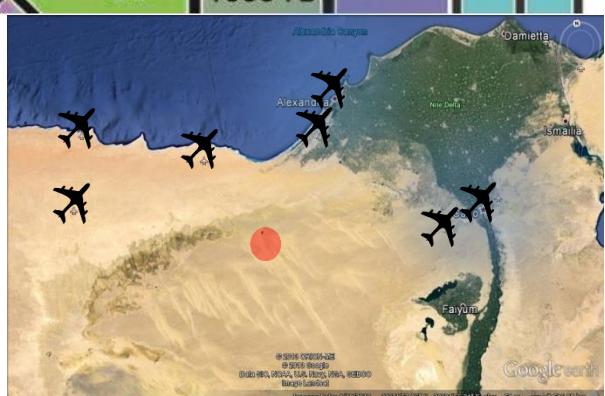


Fig. (2-13)  
The Nearby Airports

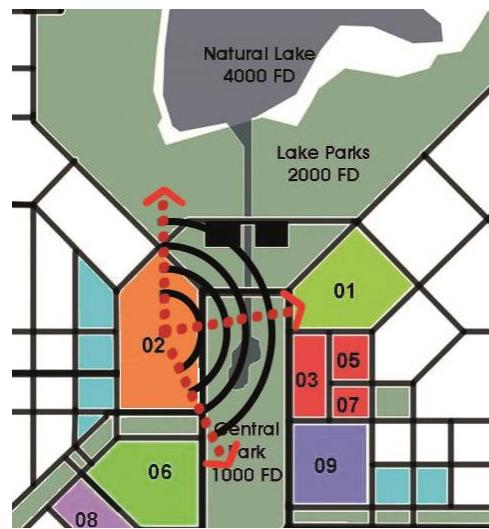
## (2) Site Analysis

### (2-8 ) Sensory :

#### (2-8-1) Visible :

- This site is located on the central park & Natural lake which is a good view.

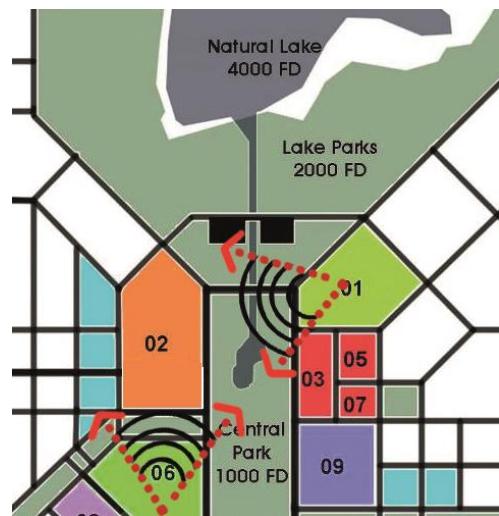
Fig. (2-14)  
The Visible Sensory



#### (2-8-2) Audible:

- This site is located near to the entertainment zone <01> & the sports zone <06> which is a source of noise.

Fig. (2-15)  
The Audible Sensory



### (2-9) Cultural:

#### (2-9-1) Land use:

- The Qattara depression has neither settlements nor nomadic herders it supports no commercial activity.
- The site is located near to the siwa oasis & mogra oasis

#### (2-9-2) Population:

- The siwa oasis population is near to 30,000 peson
- The Mogra oasis is uninhabited.

#### (2-9-3) People activities :

- In siwa oasis people work in :
  - Tourism.
  - Agriculture.
  - shepherd

#### (2-9-4) Language :

- The language used in siwa oasis is the masagaya language which is used in Algeria & Morocco .

## (2) Site Analysis

### (2-10 ) Climatic :

#### (2-10-1) Direct Solar Radiation:

- The location lies in green area which indicated in the green box , This area shows that the direct solar radiation on our site is from 6.6 to 7.0 kWh/m<sup>2</sup> per day

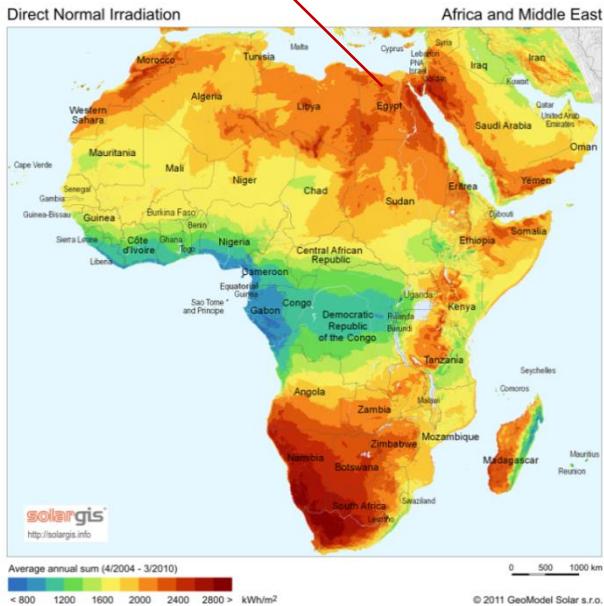


Fig. (2-16)  
Direct Irradiation Map

#### (2-10-2) Sun Path & Rays :

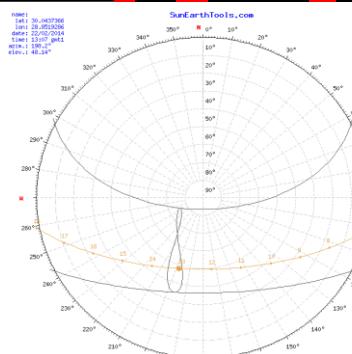


Fig. (2-18)  
Sun Path Diagram

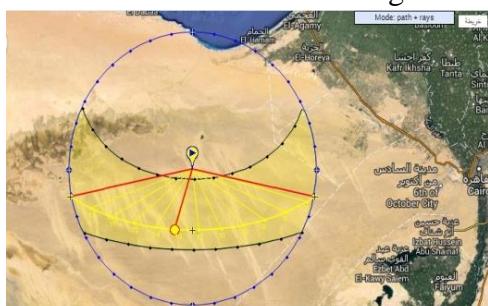


Fig. (2-20)  
Sun Path Diagram

### Egypt Annual Average Of Direct Solar Radiation

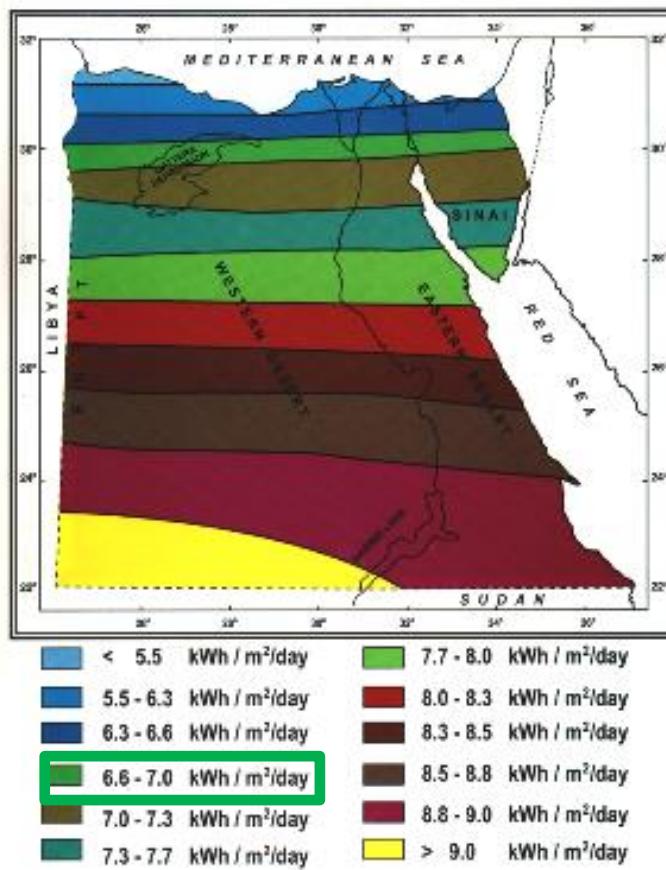


Fig. (2-17)  
Egypt Direct Solar Radiation Map

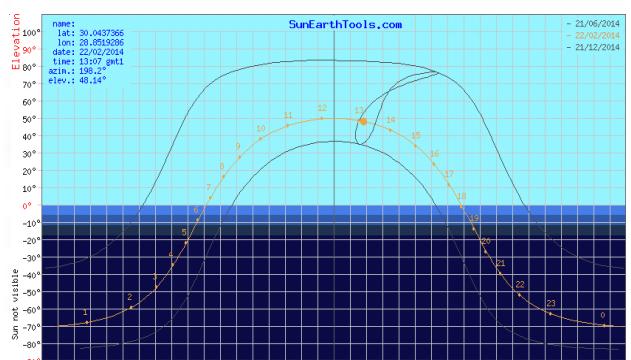


Fig. (2-19)  
Sun Path Chart

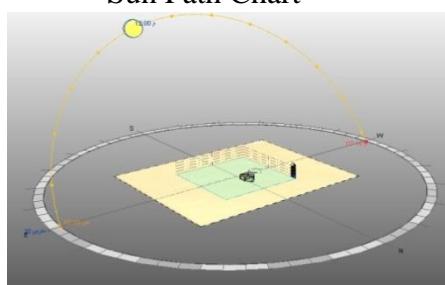


Fig. (2-21)  
Sun Path in 3D

## (2) Site Analysis

### (2-10-3) Humidity , Pressure , Wind Direction & Wind Speed :

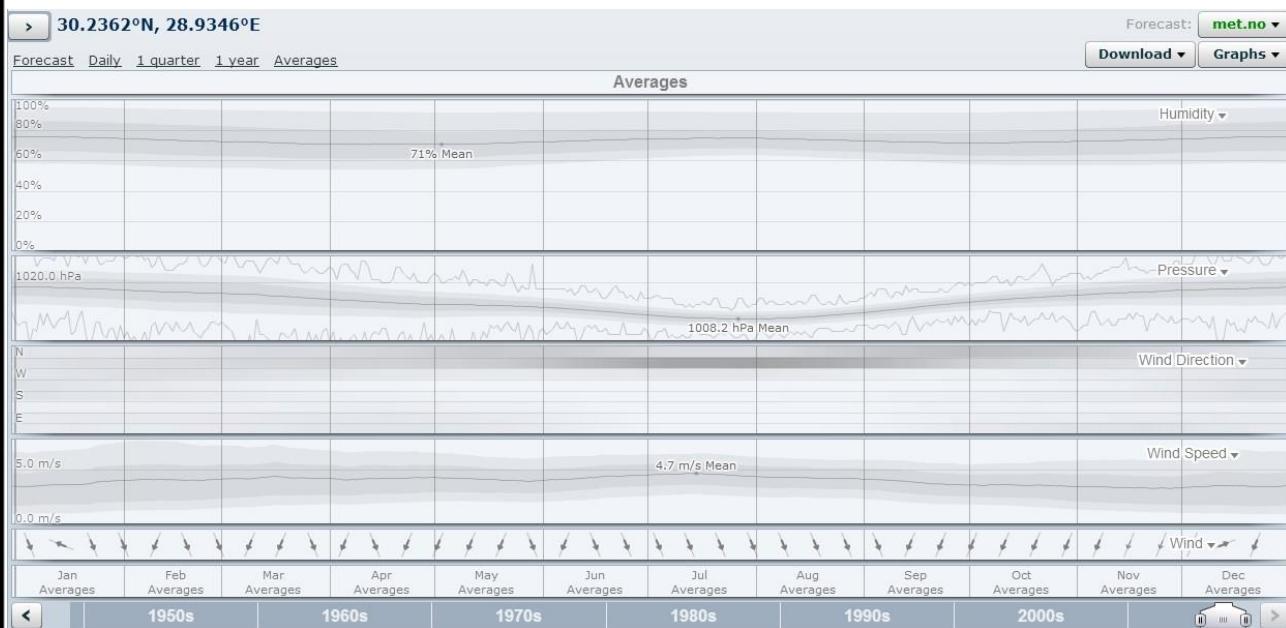


Fig. (2-22)

Humidity , Pressure ,  
Wind Direction & Wind Speed Diagram

- Humidity ranges from 60 to 80% with average 71% .
- The prevailing wind direction is the north west direction .
- Average pressure value 1008.2 hpA .
- The average wind speed is 4.7 m/s .

### (2-10-4) Temperature :

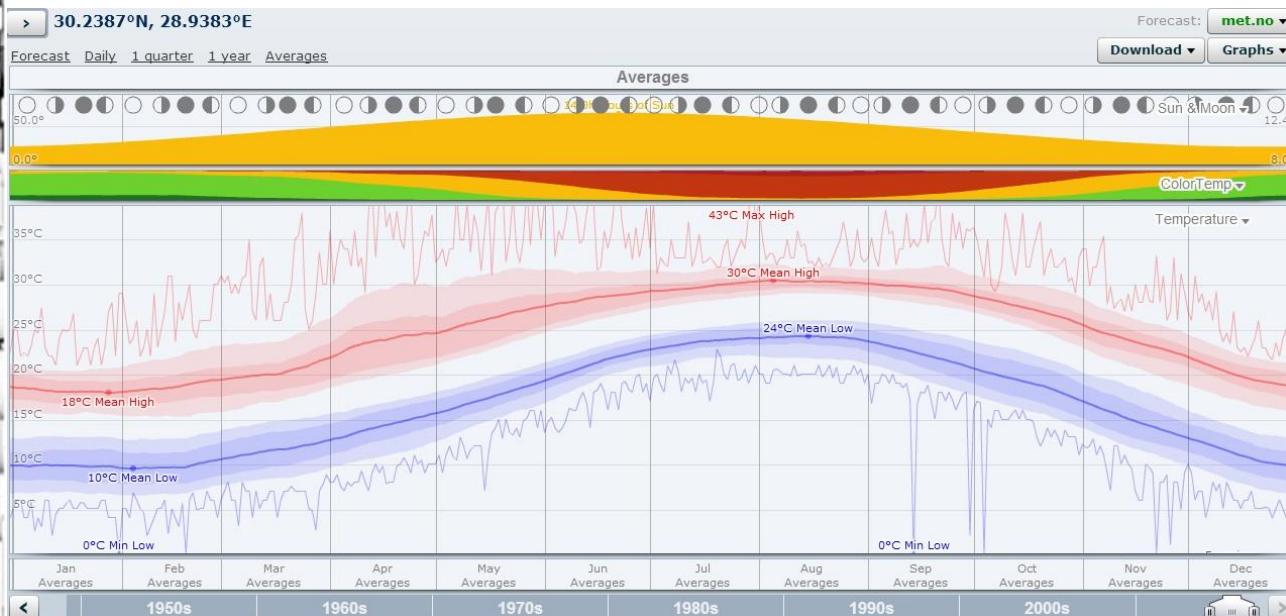


Fig. (2-23)

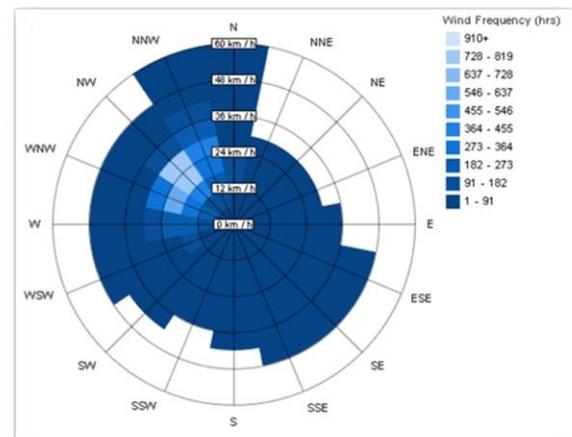
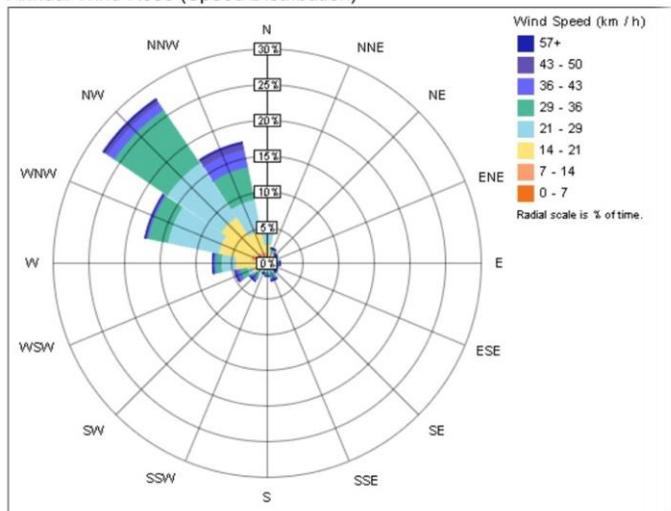
Temperature Diagram

- The maximum temperature is 43 degree Celsius .
- The average temperature ranges from 18 to 30 degree Celsius .
- The minimum temperature ranges from 10 to 24 degree Celsius .

## (2) Site Analysis

### (2-10-5) Wind Roses:

Annual Wind Rose (Speed Distribution)



Annual Wind Rose (Frequency Distribution)

Fig. ( 2-24 )  
Annual Wind Rose

Monthly Wind Roses

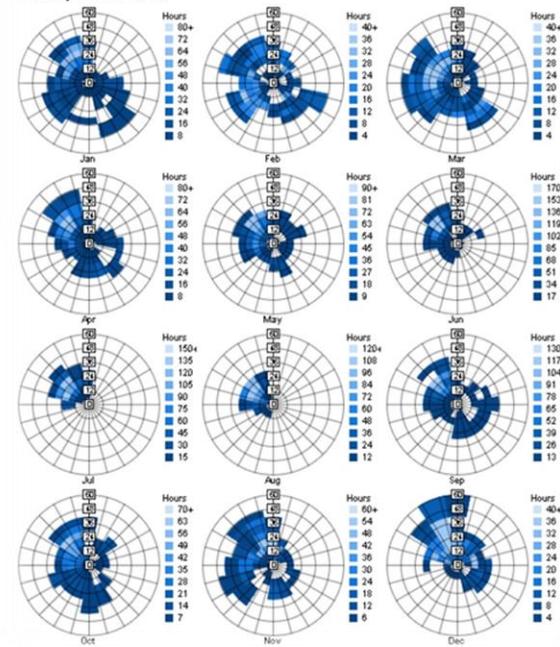


Fig. ( 2-25 )  
Monthly Wind Rose

### (2-10-6) Clouds , Percip. Probability , Percip. Amount & Percip. Rate :

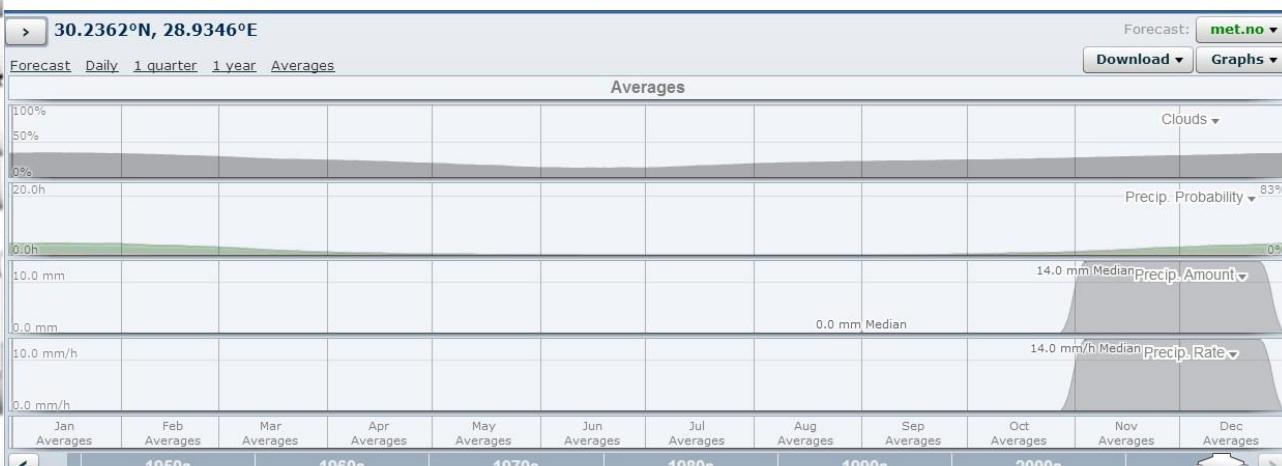


Fig. ( 2-26 )  
Clouds , Percip. Probability , Percip. Amount & Percip. Rate

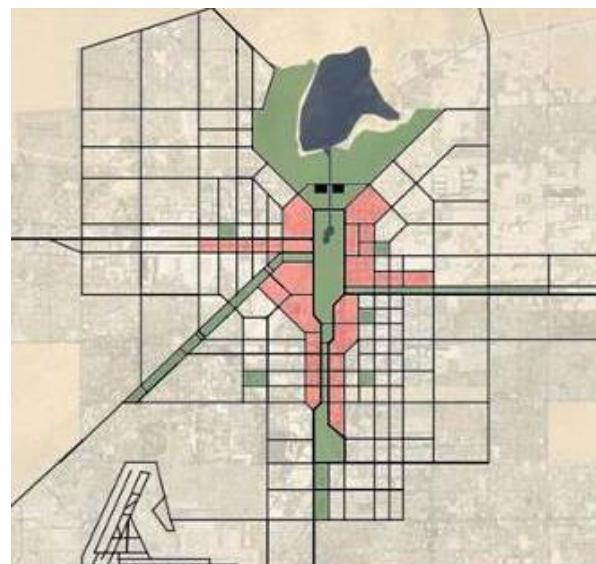
## (2) Site Analysis

### (2-11 ) SOWAT Analysis :

#### (2-11-1) Strengths :

- The Strategic Importance of the Site Comes from its (Near the Central Park ), It is Near from the Lake.
- Also Western Desert is Characterized by Bright Sun Most of The Year.

Fig. (2-27)  
Strengths



#### (2-11-2) Weakness:

- The soil type is limestone .
- There is no contours .
- The existence of groundwater.

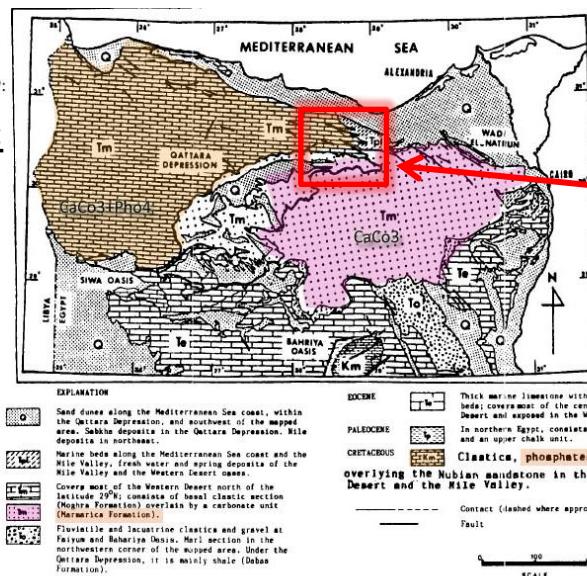


Fig. (2-28)  
Weakness

#### (2-11-3) Opportunity

- Nefertari has natural sources like sun so we can generate electricity .
- The low level of Nefertari so we can generate electricity from the water fall to the lake .

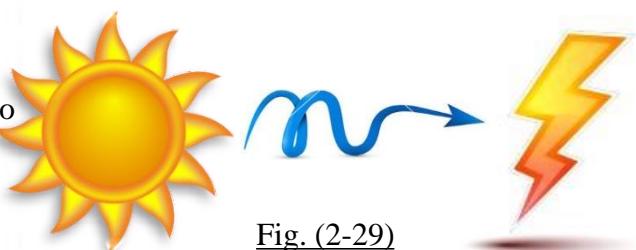


Fig. (2-29)  
Opportunity

#### (2-11-4) Threats

- The site is far from the main cities .
- The high temperature in summer that reach 43 degree Celsius .

# (3)Similar Projects

## (3)Similar Projects:

### (3-1) Shanghai International Medical City

- Master plan creates a unique urban landmark and innovative healthcare system.



Fig.( 3-1).

Shanghai International Medical City

### (3-1-1)Project Analysis :

- Central to the master plan is the core support facility, which will enable the site's private and public medical groups to share state-of-the-art diagnostic equipment, and eliminate the expense of each hospital and clinic providing its own. With strategies to deliver a garden-like setting and design breakthroughs that will provide a carbon neutral site, the campus establishes an oasis of healing and a civic amenity in an intensely urban environment



Fig.( 3-2).  
Master Plan

- The master plan calls for the development of approximately five million square feet of healthcare space to accommodate 3,000 beds and support space dispersed among five hospitals, multiple specialty clinics and a core support facility

- The Shanghai International Medical City will serve as a landmark project for the city of Shanghai. The new campus seeks to dispel the idea that a hospital is a place for the sick by creating a serene garden-like environment that instead creates an oasis for healing

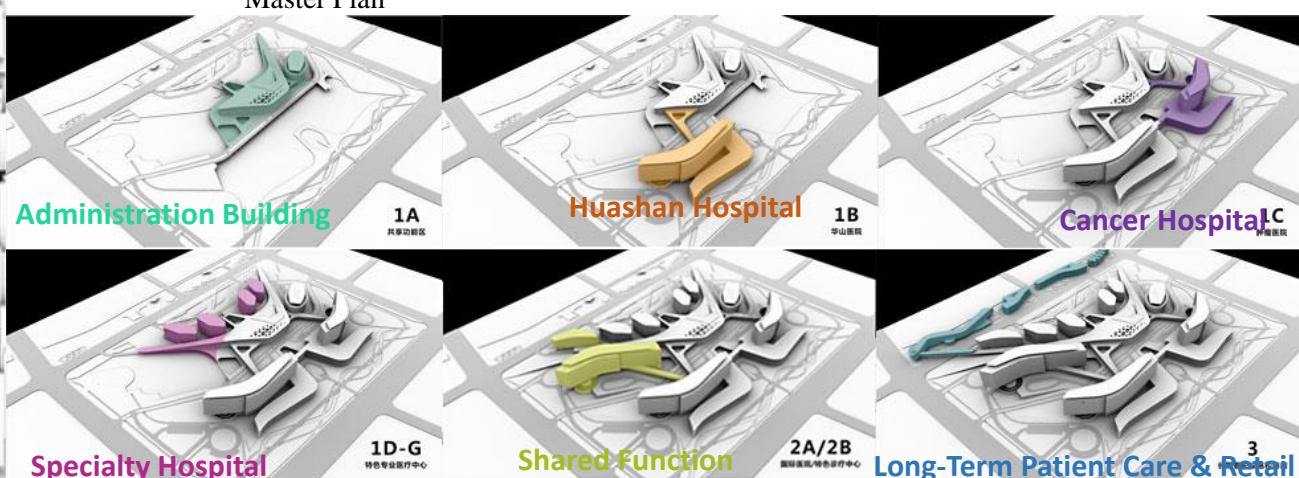
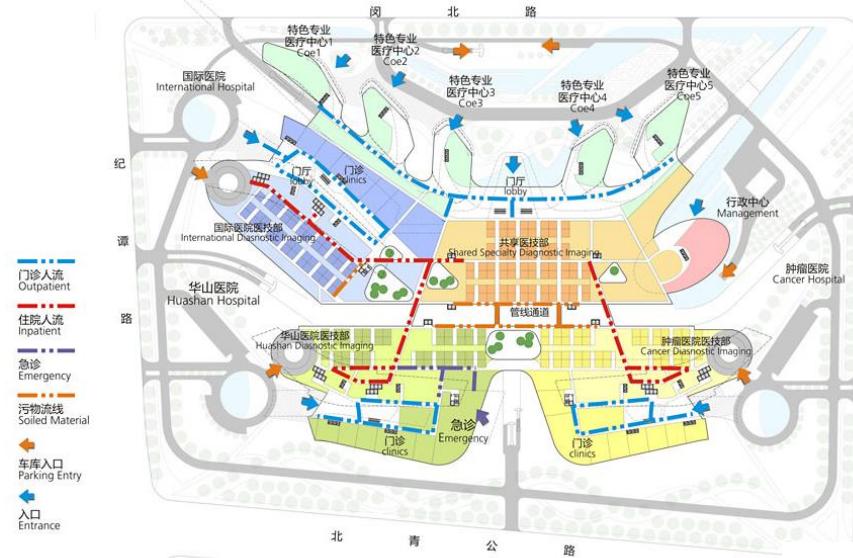


Fig.( 3-3)

Main zones of project

-The master plan is organized to allow for phased design and construction over a ten-year span. (1A - Shared Facility; 1B - Huashan Hospital; 1C - Cancer Hospital; 1D-G - Specialty Hospitals; 2 - International Hospital; 3 - Long-Term Patient Care and Retail

### (3) Similar Projects



- The campus shares boundaries with multiple transportation hubs. Studies of traffic and circulation patterns have been addressed through facility placement and interior roadway design

Fig.( 3-4)  
Detailed Zoning

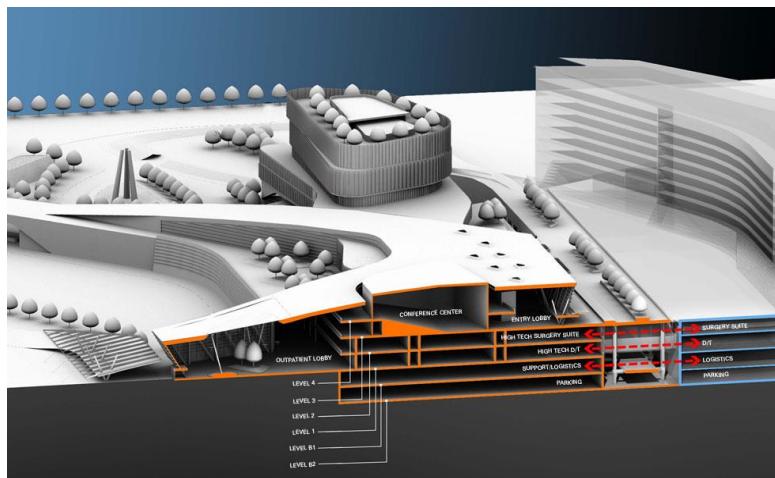


Fig.( 3-5)  
Section

-The platform or public plaza is essentially a roof garden that slopes up from the edge to three stories above street level, with two functioning stories and parking beneath

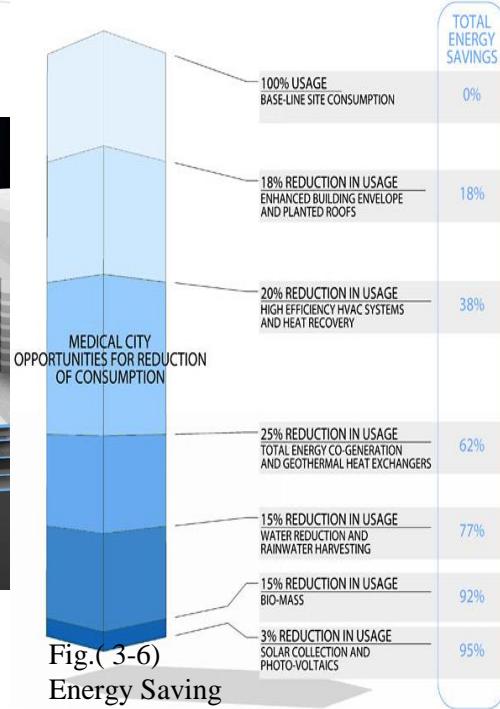


Fig.( 3-6)  
Energy Saving

- Of all building types, hospitals are among the highest in terms of energy consumption. Shanghai International Medical City strives to be the world's most energy efficient healthcare campus by generating, conserving and recycling energy



Fig.( 3-7)  
Main Entrance

- Road entrance shows ramping to the entry platform and sky bridges.



Fig.( 3-8)  
Main Entrance

### (3)Similar Projects



Fig.( 3-9)  
Main Plaza



Fig.( 3-10)  
Interior Shots

-The shared facility lobby connects diverse public spaces like education and convention functions. RIGHT: Road entrance shows ramping to the entry platform and sky bridges.



Fig.( 3-11)  
Interior Shots

- Outpatient lobbies are highlighted by skylights and a curtain wall that provide an abundance of natural light and a strong connection to the campus' park-like setting



Fig.( 3-12)  
Interior Shots

-Luxurious VIP suites include private nurses, a concierge, special food service and suite space for families

### (3-2) Huashan Hospital in Shanghai International Medical City:

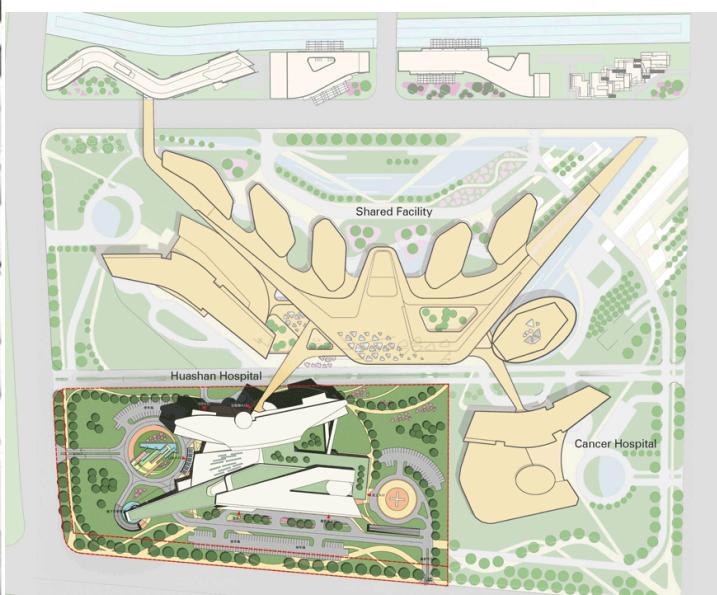


Fig.( 3-13)  
Layout

-Huashan is the first facility to be constructed in Shanghai International Medical City campus, which will also include a Shared Facility, two additional hospitals and four specialized centers of excellence



Fig.( 3-14)  
Zoning

- Ample green spaces create a park-like setting

### (3)Similar Projects

#### (3-2-1)Project Analysis:



Fig.( 3-15)

##### Environmental Studies

-To honor the Chinese custom of providing as much sunlight as possible, the team studied the hours of sunlight and shadows a room will receive throughout the year. Most patient rooms were aligned to have a southern exposure



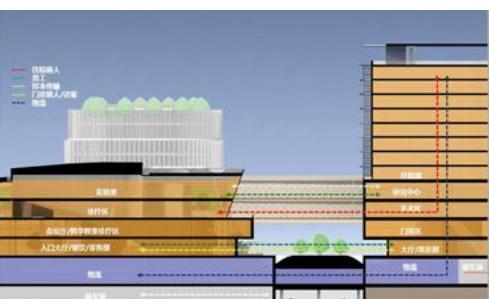
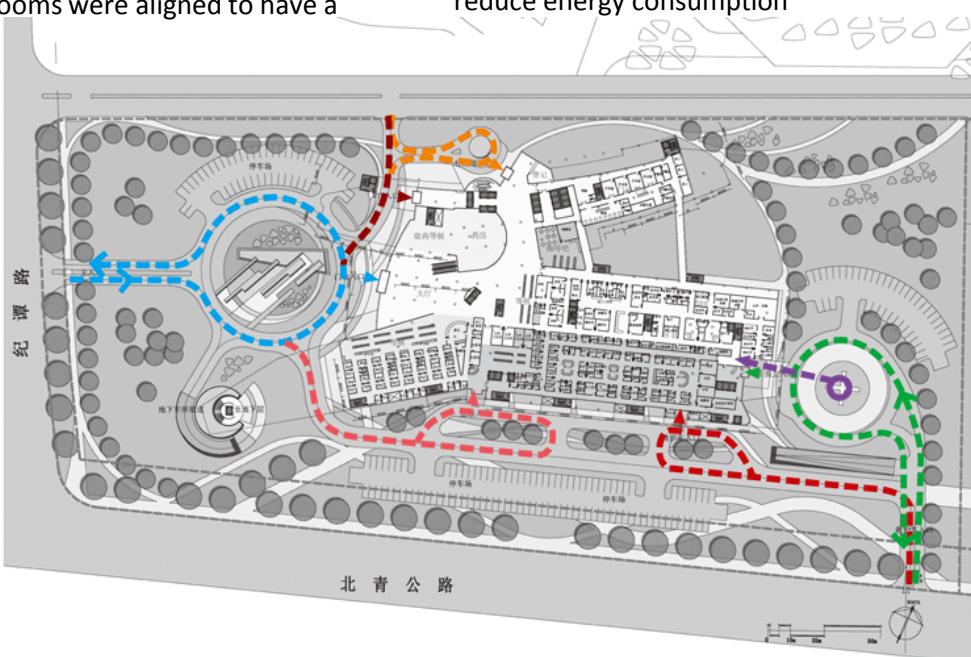
Fig.( 3-16)

##### Main Entrance & Roof Garden

- Roof gardens were incorporated in to the design as a way to integrate nature and reduce energy consumption

Fig.( 3-17)  
Master Plan

- First Floor Plan highlighting vehicular/pedestrian circulation and Main Lobby



Basement

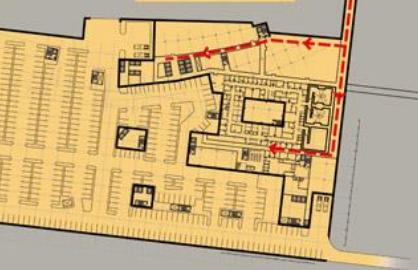


Fig.( 3-18)  
Links Between Basement

-Materials will be moved through the basement tunnel. The general public will use the ground level and patients/staff will use sky bridges to transfer to other campus buildings

### (3)Similar Projects

#### (3-2-2)Interior:

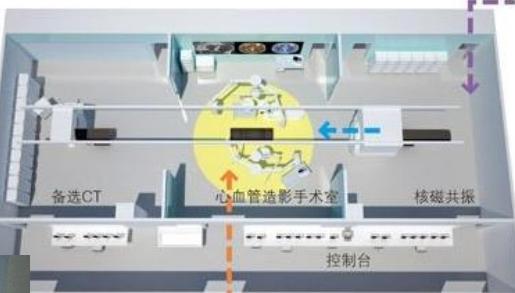
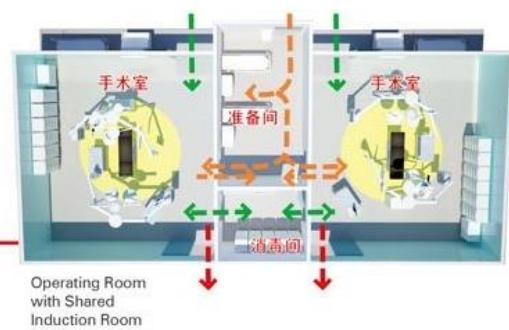


Fig.( 3-19)  
Plan Studies

-The cutting edge inter operative suite combines MRI, OR, and DSA (digital subtraction angiography). This layout provides immediate feedback during a surgery without transferring patients, which significantly reduces the time for each surgery case.

Fig.( 3-20)

Interior Patient Room

- Patient rooms feature angled headwalls to accommodate three patient beds, while providing privacy and a view to the outdoors

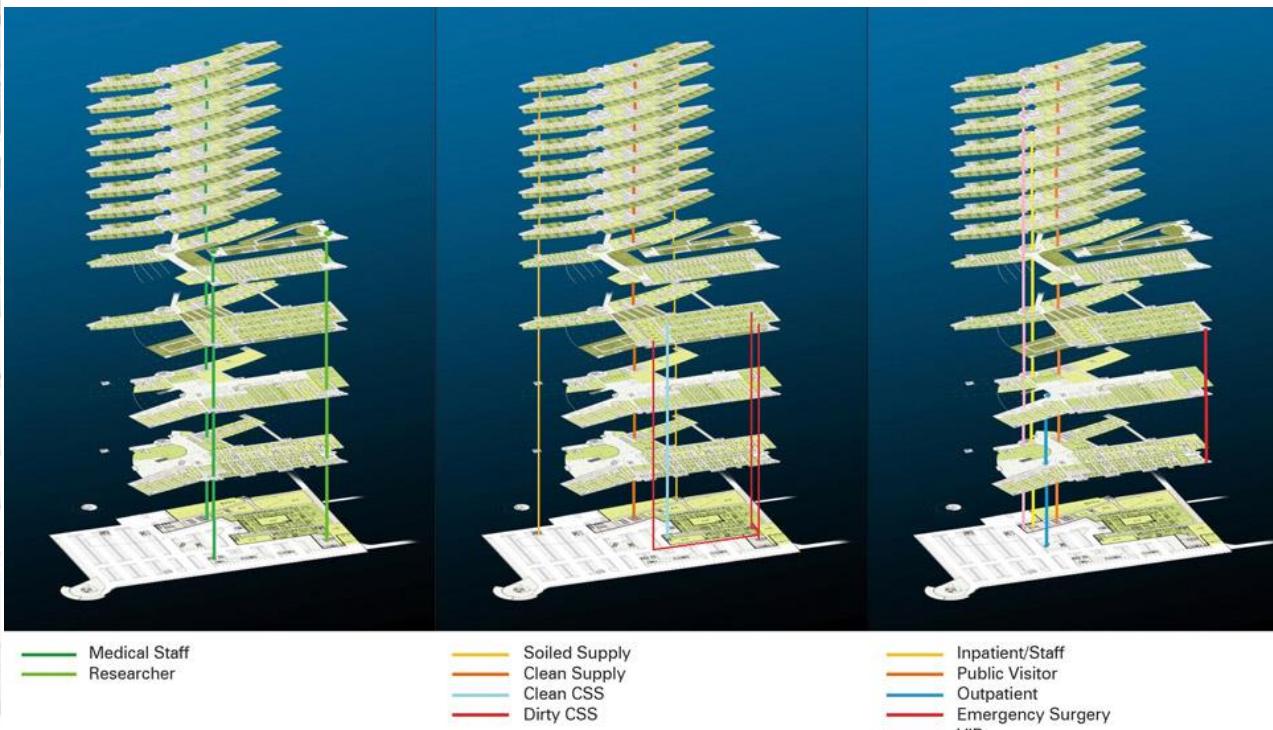


Fig.( 3-21) 3D Zoning

- Vertical circulation diagrams show separation of patient, staff, public, and materials

### (3)Similar Projects

#### (3-2-3)Elevations:



Fig.( 3-22)  
Elevation



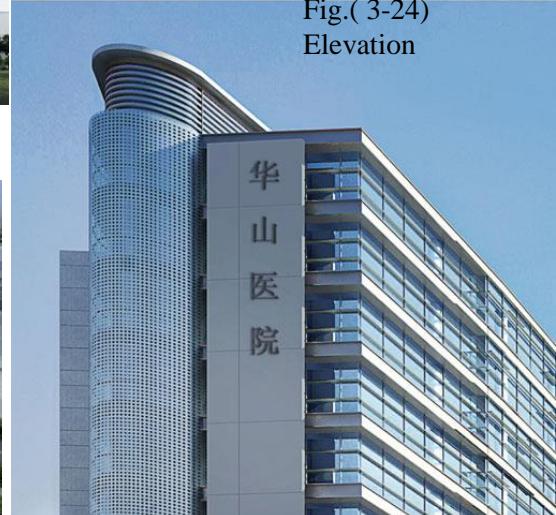
Fig.( 3-23)  
Elevation



Fig.( 3-24)  
Elevation



Fig.( 3-25)  
Main Shot



-The design features gentle, organic curvatures expressed in modern materials that signify the dual roles that nature and technology play in healing

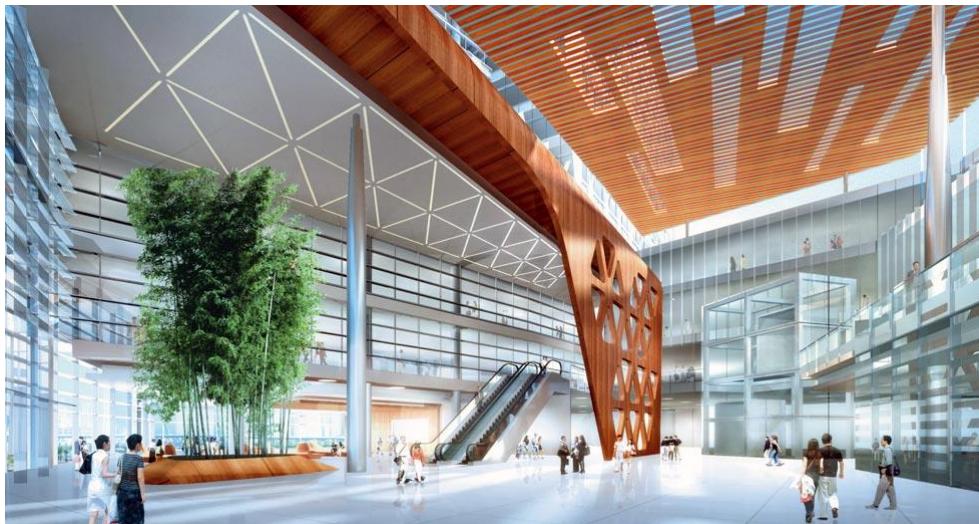


Fig.( 3-26)

#### Interior

- Natural lighting and intuitive way finding in the entrance lobby reduce anxiety among inpatients, outpatients and visitors

### (3)Similar Projects

#### (3-3) Suzhou Children's Hospital Competition in China.

-The program includes a 94,800 sqm children's hospital with 600 beds in the initial phase including over 7,000 sqm for outpatient clinics, 14 OR's, a full service emergency department, imaging, and required support.



- Other major program elements include a teaching/research and administration facility, staff housing, a separate infectious disease facility, and initial parking for 800 cars

Fig.( 3-27)  
Suzhou Children's Hospital

-Parking is minimal for a project of this size and all the parking is below grade, decreasing the heat island effect. Bus stops are located on the adjacent streets. It is anticipated a majority of the visitors will arrive by mass transit. Staff housing is provided on site to minimize transportation to work

#### (3-3-1)Project Analysis:

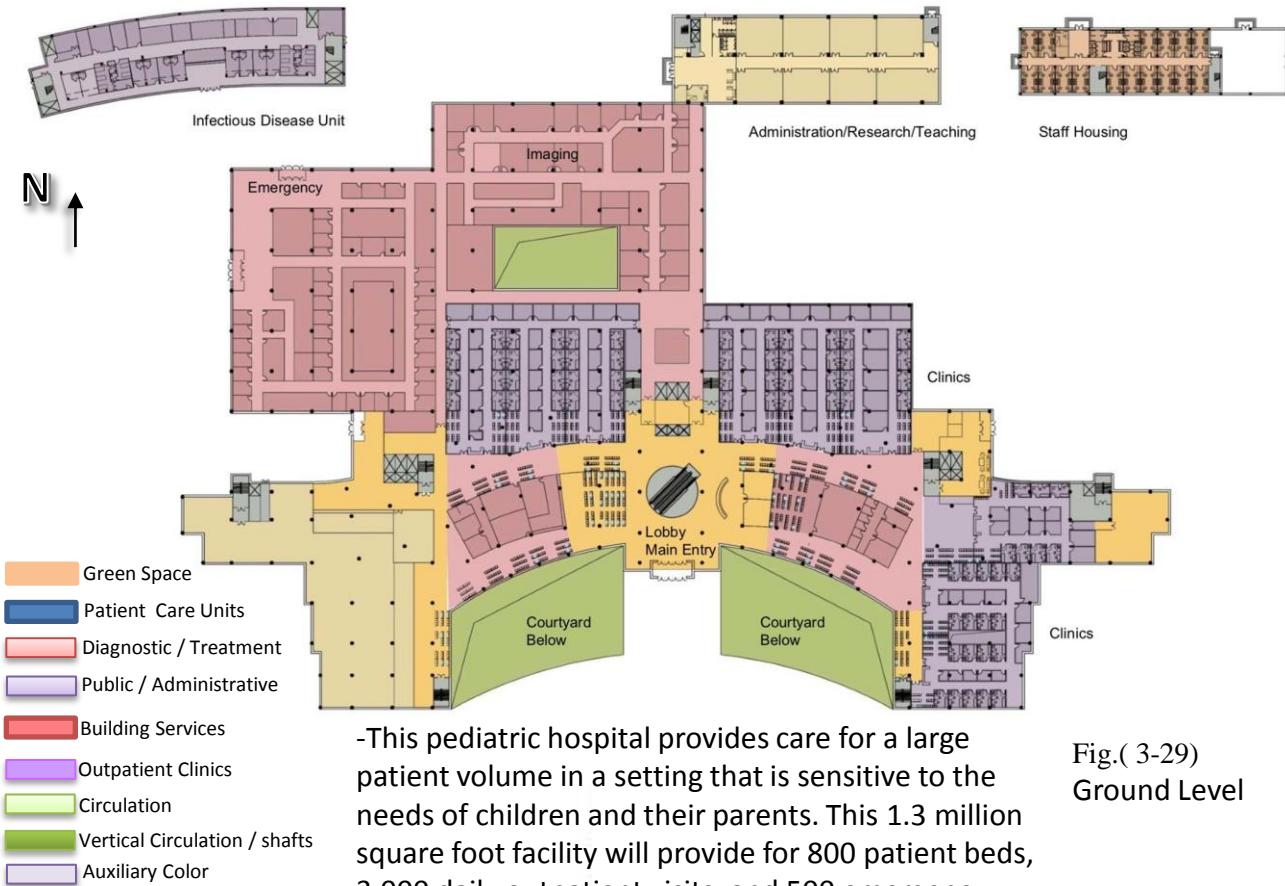


Fig.( 3-28)  
Layout

-The site is in a rapidly developing urban area of Suzhou. The project will utilize the adjacent canal water for landscaping, water gardens, and supplementing the HVAC systems. The Chinese culture believes in natural light and air as a major component of healthcare delivery. All the patient rooms face south with the ability for natural ventilation. Garden courtyards will provide natural light and air to the diagnostic and clinical functions of the hospital. The project will incorporate cool roof technology and green roofs. The client is requesting the equivalent rating of LEED silver for the project.

### (3)Similar Projects

#### (3-3-2)Plans :



-This pediatric hospital provides care for a large patient volume in a setting that is sensitive to the needs of children and their parents. This 1.3 million square foot facility will provide for 800 patient beds, 3,000 daily outpatient visits, and 500 emergency room visits.

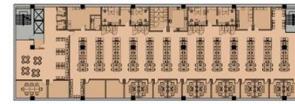
Fig.( 3-29)  
Ground Level



-Patients will arrive on foot, by bus, by bicycle, and automobile across a bridge that spans a below grade healing garden specifically designed for children and their parents arriving in a spacious multilevel space that provides easy way-finding and access into all areas of the hospital. The use of escalators will speed the patients to the clinical areas. Each floor of the facility will have patient registration, cashier and pharmacy thus reducing congestion and unnecessary traffic patterns

Fig.( 3-30)  
First Level

### (3)Similar Projects



Administration/Research/Teaching

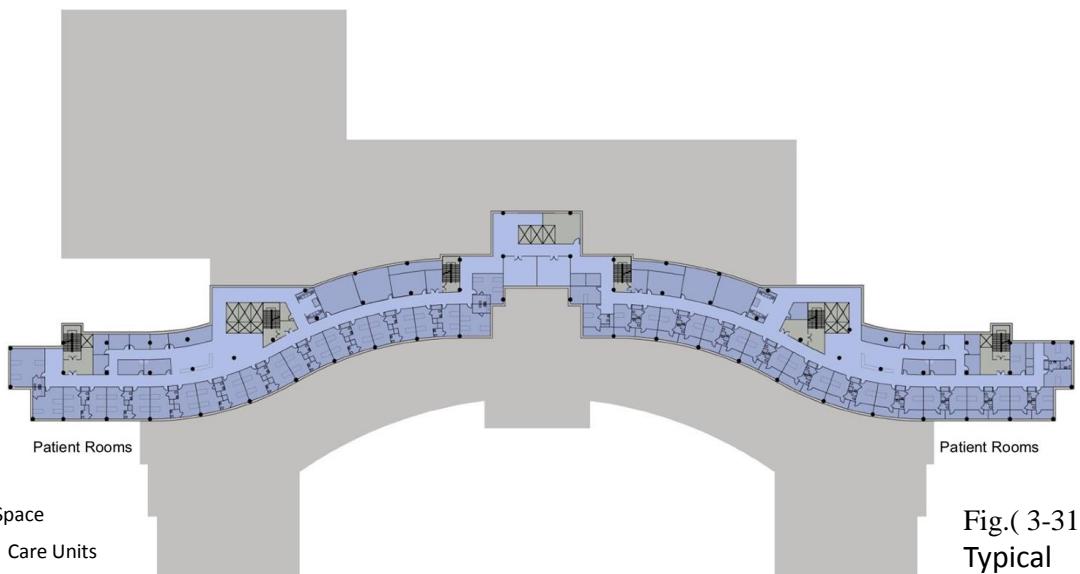


Fig.( 3-31)  
Typical  
Inpatient  
Level

-Patient care areas were designed so that all patient rooms face south, in a mixture of single and 4 bed wards. The south facing rooms provide for the best balance of the healing benefits of the sun

Fig.( 3-32)  
Suzhou Children's Hospital

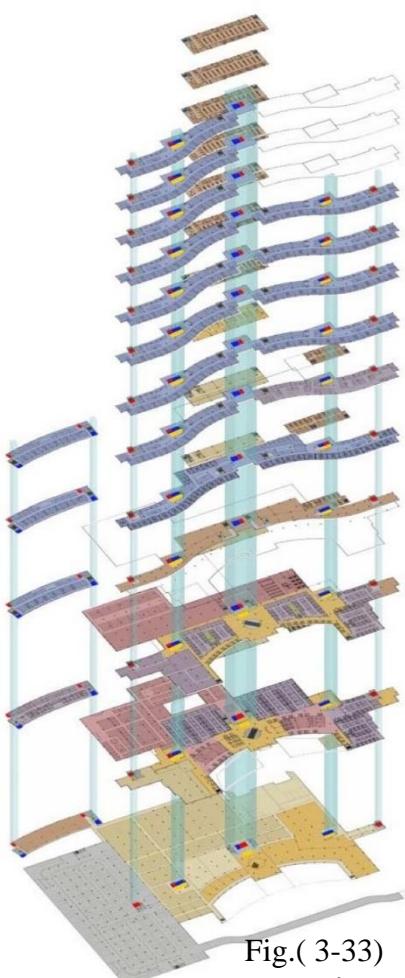
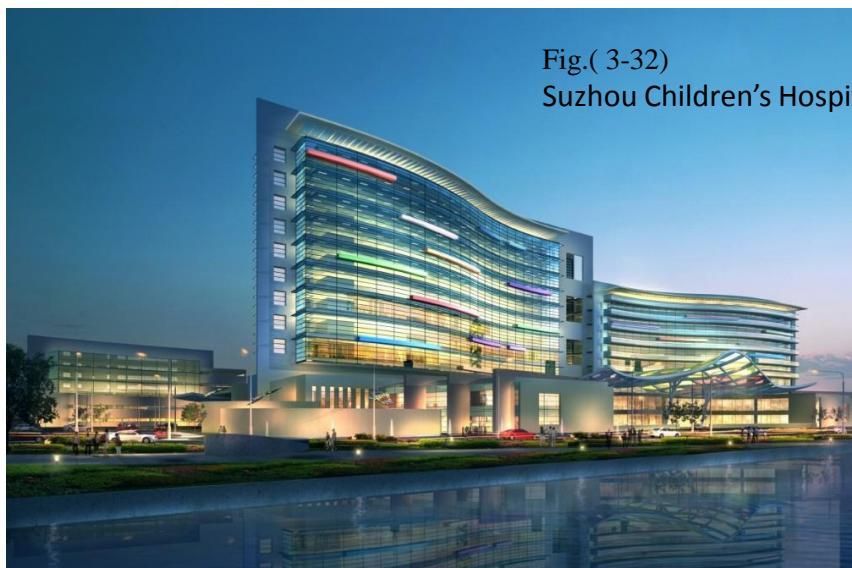


Fig.( 3-33)  
Vertical Circulation and Stacking

-Kites have always delighted children for centuries. It is believed that kites originated in China over 2800 years ago. Their bright colors and shapes soaring through the sky bring wonder and joy to children of all ages. Suzhou Children's Hospital has its own very large kite that soars over the garden and play areas. This kite provides cover and protection from the sun and rain, adding color and delight to the children and their families.

-The water garden at Suzhou Children's Hospital recalls a long tradition of the water gardens in Suzhou, known for their beauty and tranquility. The water features also provide a visual connection to the canals of Suzhou, the Venice of the East. The project abuts canals on the south and east sides

### (3)Similar Projects

#### (3-3-3)Entrance



Fig.( 3-34)  
Main  
Entrance

-The architecture of the hospital reinforces this tie to the fluidity of the water in the gardens and canals, and the fluidity of a kite soaring. The curves are visually appealing, like waves of water or currents of air. Bands of color will be interspersed on the building's façade to further designate the hospital as a place for children and their families.



Fig.( 3-35)  
Main  
Entrance

-The existing Suzhou Children's hospital is located in a building that is 80 years old with little improvement since its original construction. This new replacement hospital has been designed with all the latest concepts in pediatric healthcare delivery. The design's imagery puts at ease the stress and fears of patients and their parents. Spaces are designed with the emotional and physical needs of this unique population. Infusion of natural light, well-planned clinical areas and access to multiple outside areas offer relief from anxiety and stimulates patient health

### (3)Similar Projects

#### (3-3-4)Section & Elevations:

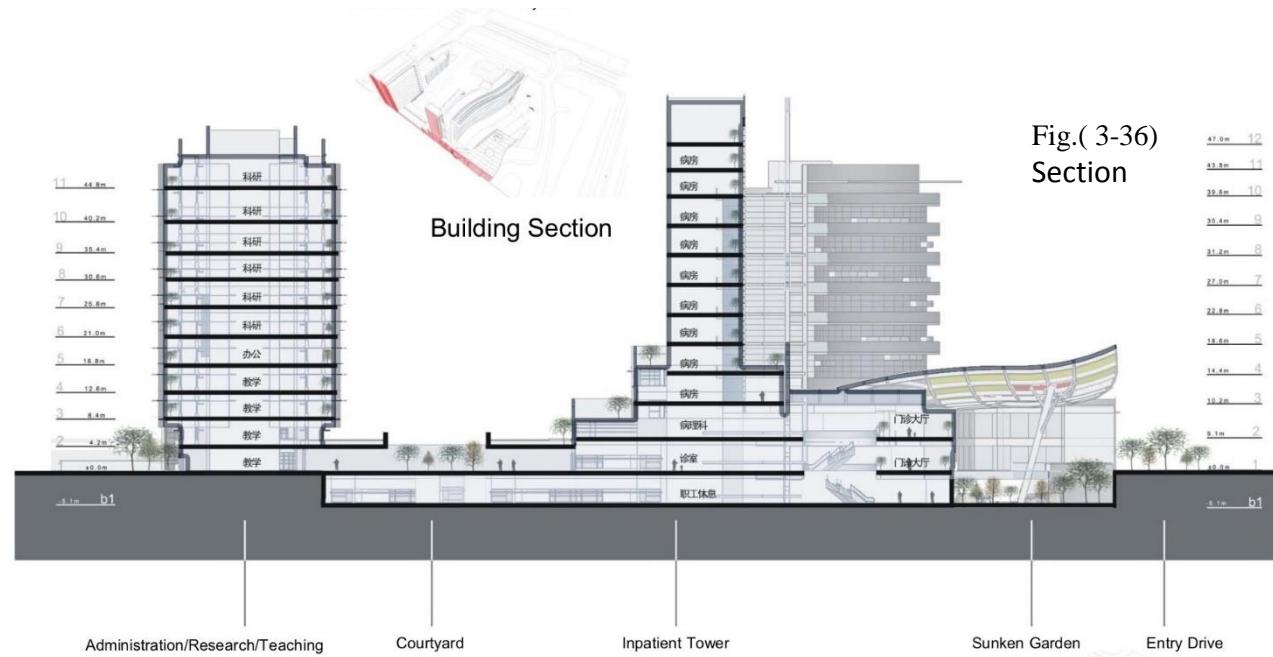


Fig.( 3-36)  
Section



Fig.( 3-37)  
North Elevation



Fig.( 3-38)  
East Elevation



Fig.( 3-39)  
West Elevation

### (3)Similar Projects

#### (3-4) Children's Hospital of Saskatchewan

##### (3-4-1)Before Design Adaptations



Fig.( 3-40).  
Children's Hospital  
of Saskatchewan



Fig.( 3-41).  
Children's Hospital  
of Saskatchewan

##### Vision

-Healthiest People, Healthiest Communities, Exceptional Service

##### Mission

-Improve health through excellence and innovation in service, education and research, building on the strengths of our people and partnerships.

##### (3-4-2)After Design Adaptations



Fig.( 3-42).  
Children's Hospital  
of Saskatchewan



Fig.( 3-43).  
Children's Hospital  
of Saskatchewan



##### (3-4-3)Project Analysis :

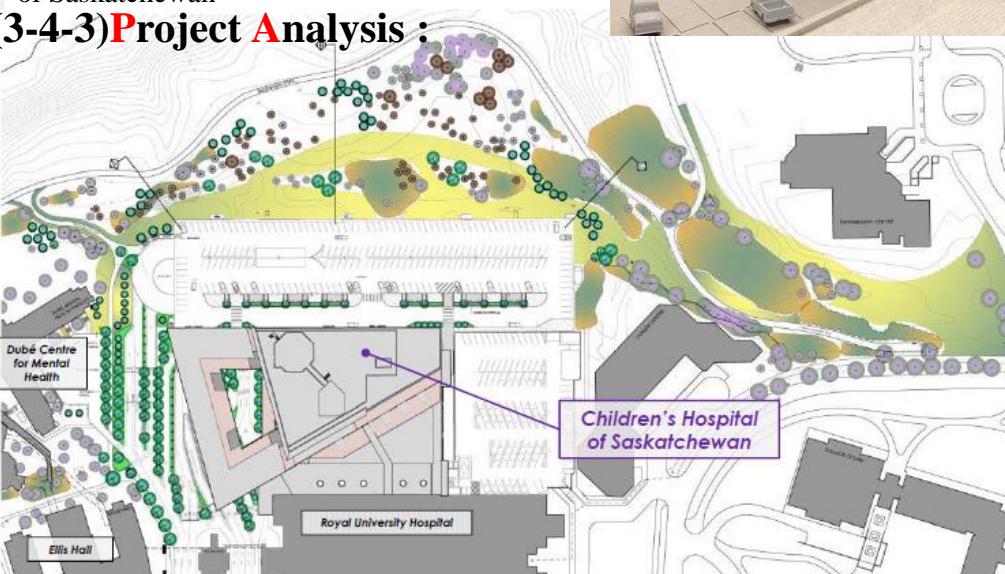


Fig.( 3-44).  
Children's Hospital  
of Saskatchewan

Fig.( 3-45).  
Master Plan

### (3)Similar Projects

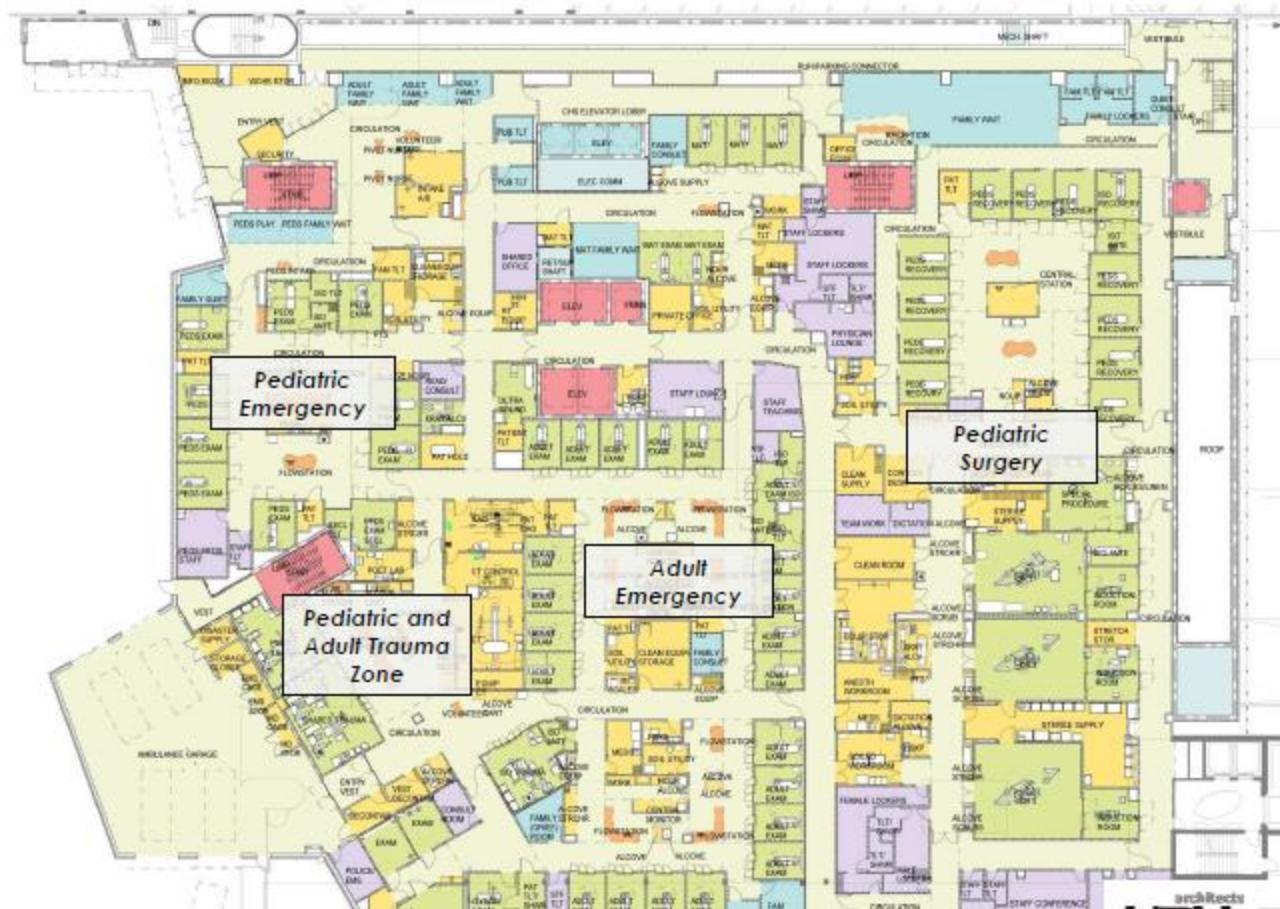
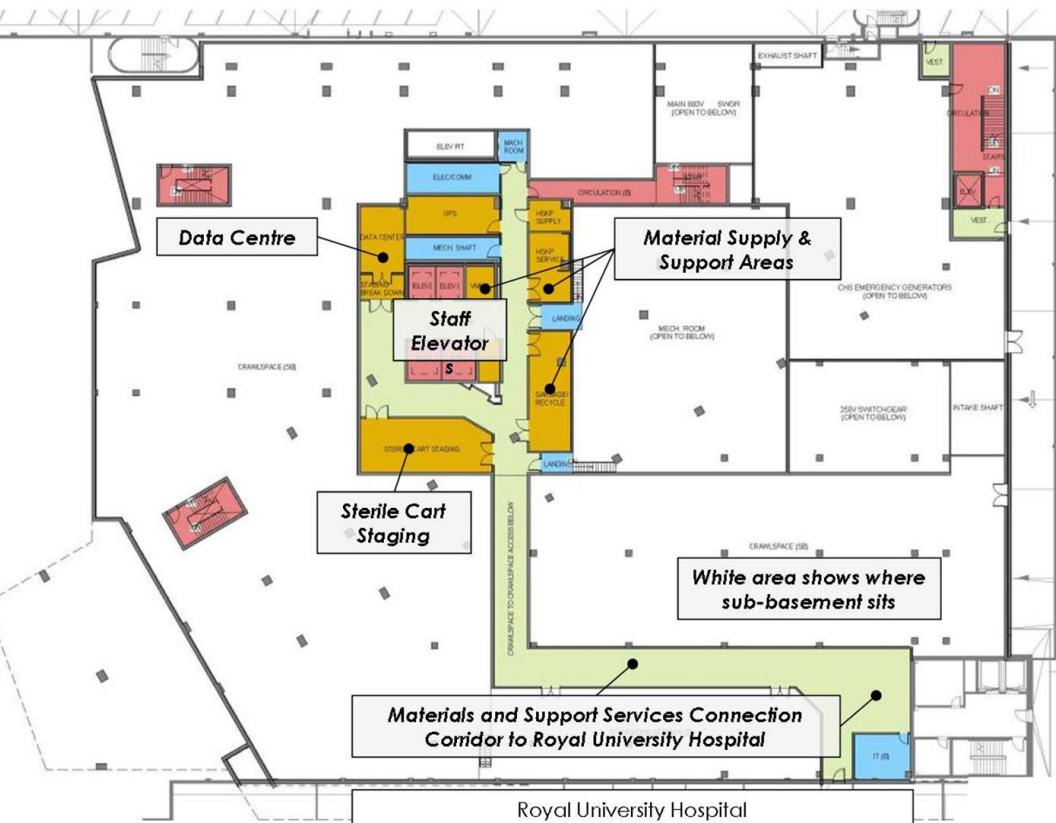


Fig.( 3-47).  
Ground Floor

-Ground Floor - Pediatric Emergency, Adult Emergency and Pediatric Surgery

### (3)Similar Projects



Fig.( 3-48).  
Ground Floor

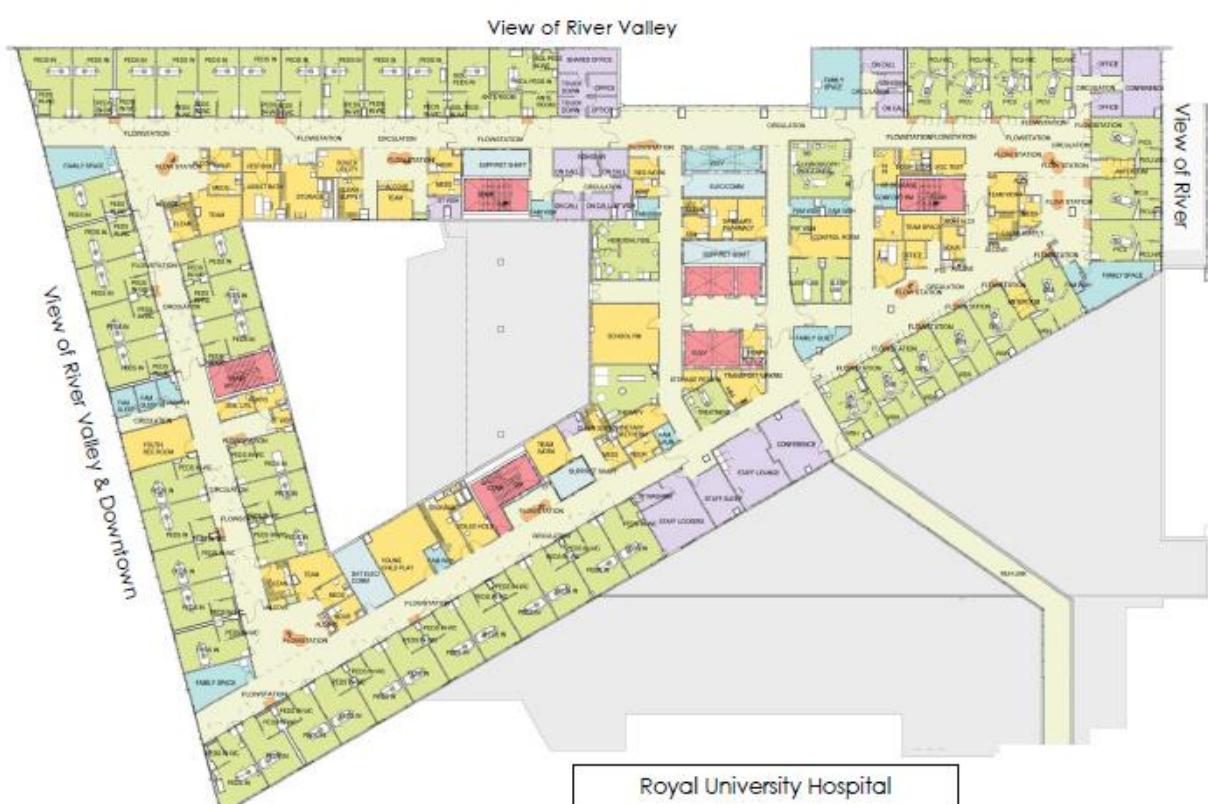
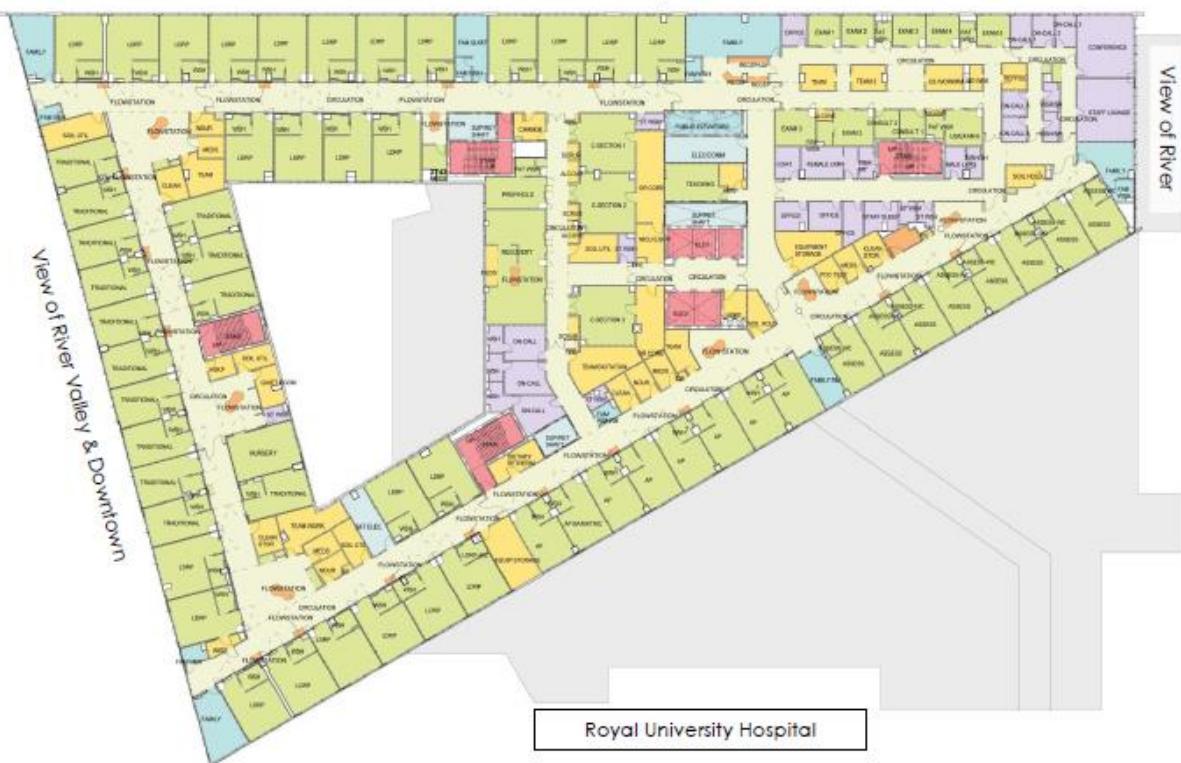


Fig.( 3-49).  
2nd Floor

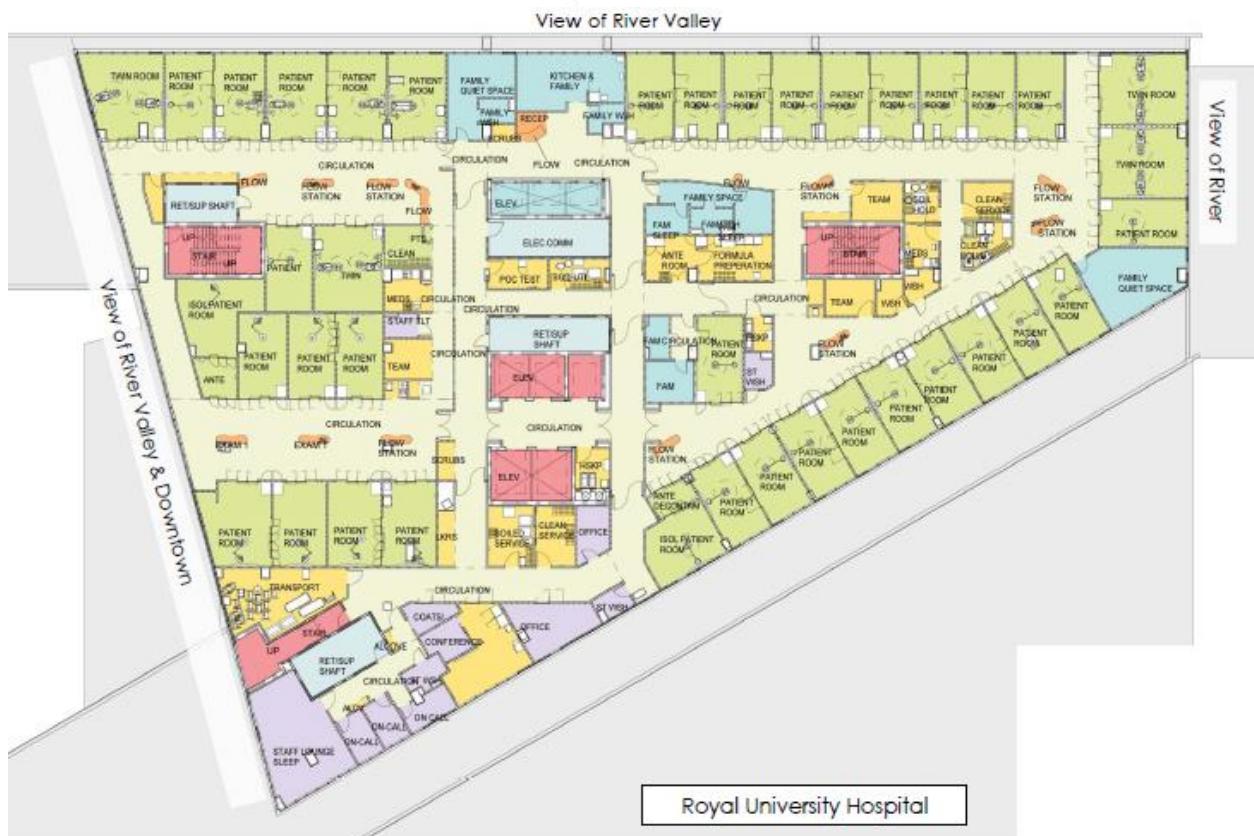
-2nd Floor - Inpatient Pediatric Unit & Pediatric Intensive Care/Observation Unit

# (3) Similar Projects



-3rd Floor – Maternal Services

Fig.( 3-50).  
3rd Floor



-4th Floor – Neonatal Intensive Care Unit (NICU)

Fig.( 3-51).  
4th Floor

### (3)Similar Projects

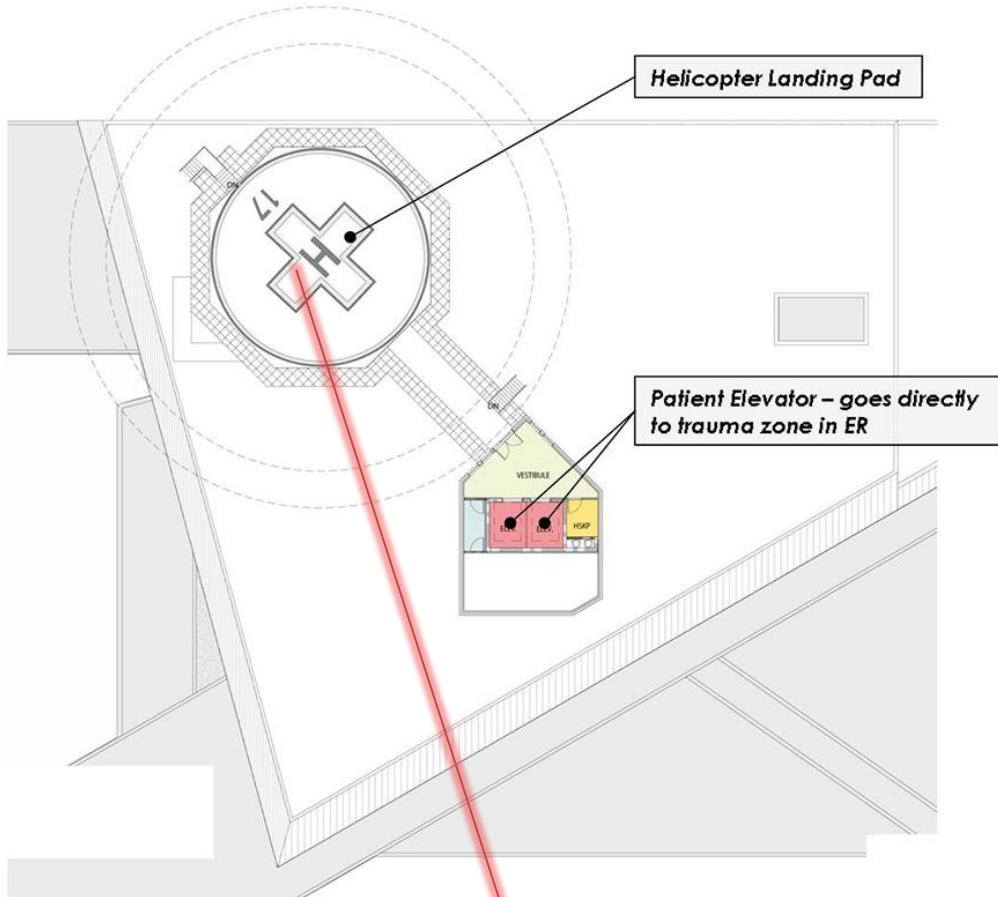


Fig.(3-52).  
Roof Plan



Fig.( 3-53).  
3D Model

# (3) Similar Projects

## (3-4-5) Plan Details

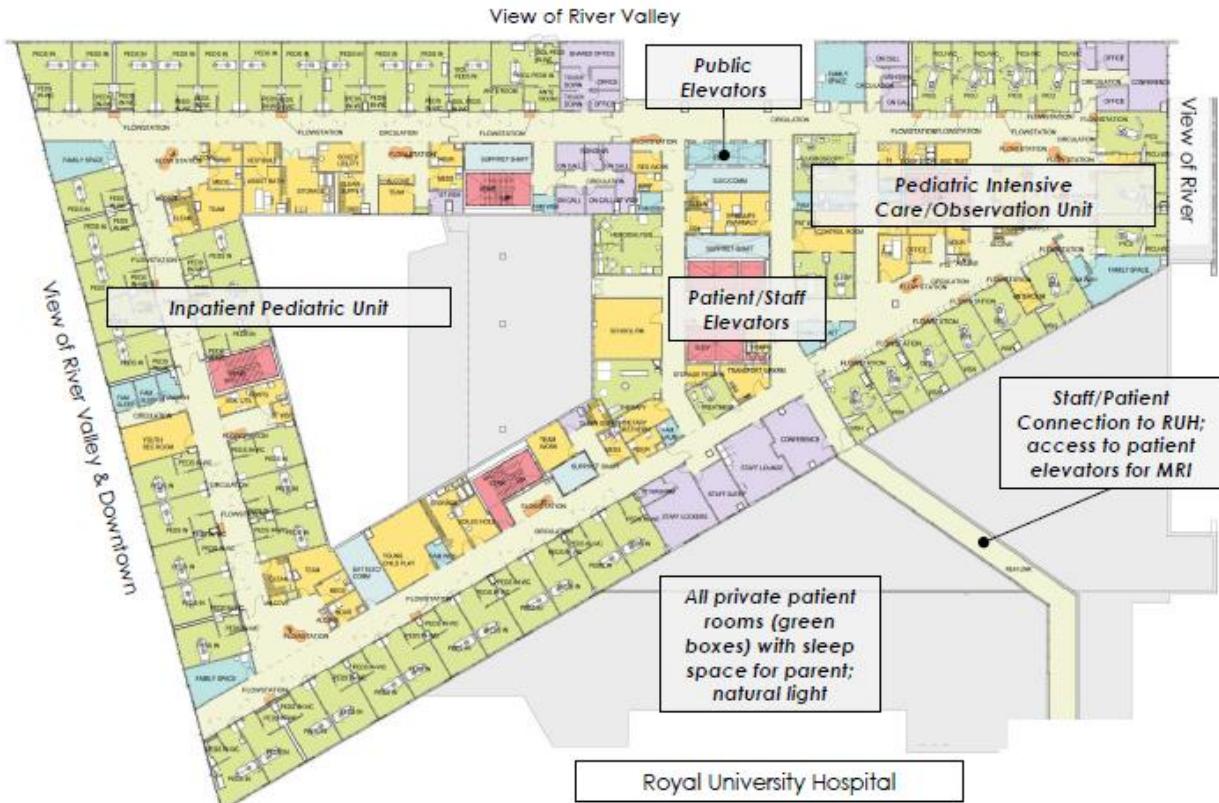


Fig.( 3-54).  
2nd Floor Zoning

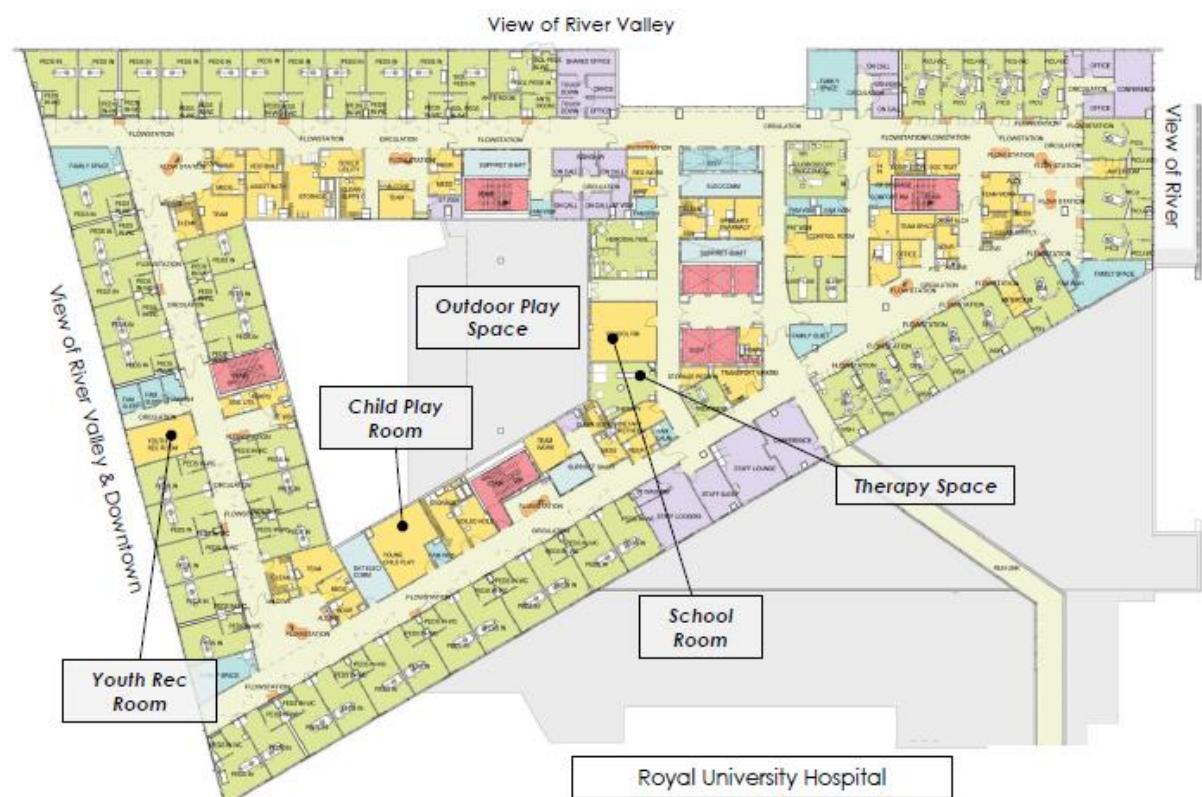


Fig.( 3-55).  
2nd Floor Zoning

### (3) Similar Projects

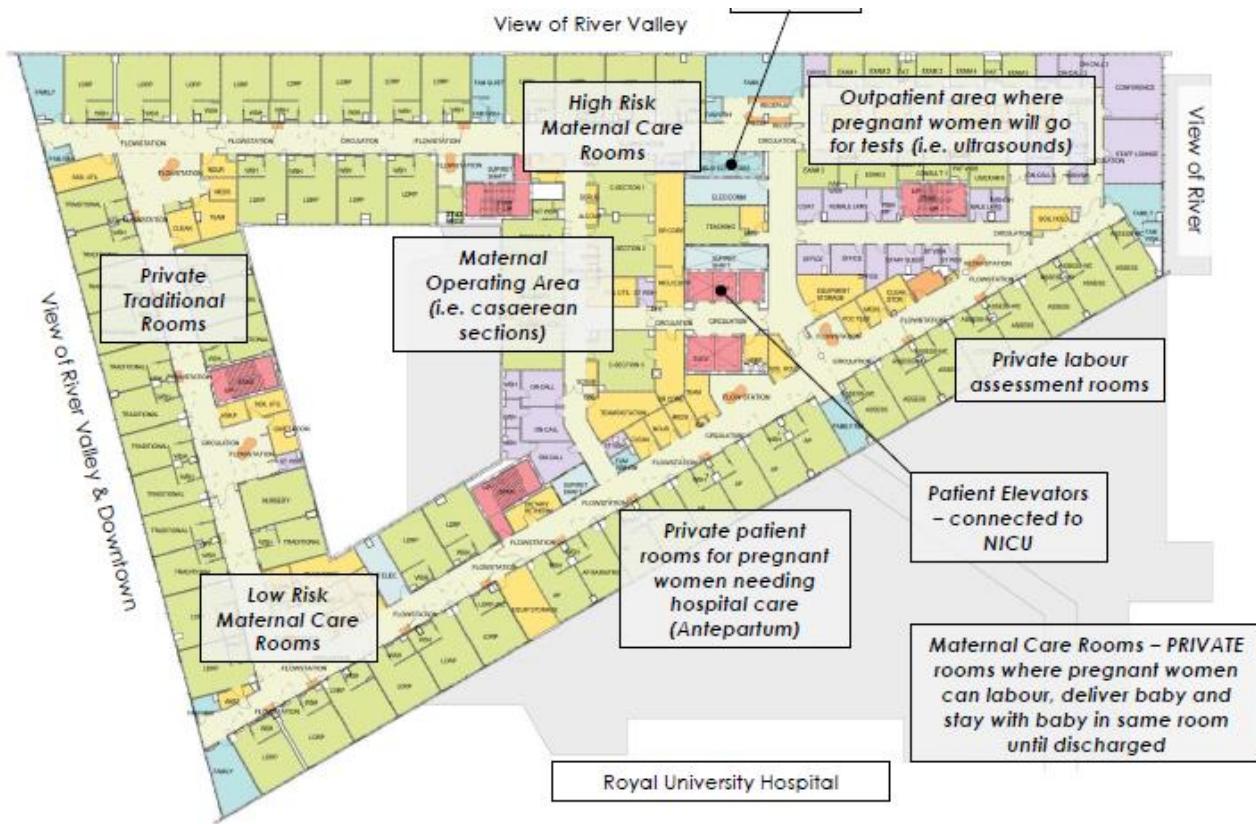


Fig.( 3-56).  
3rd Floor Zoning

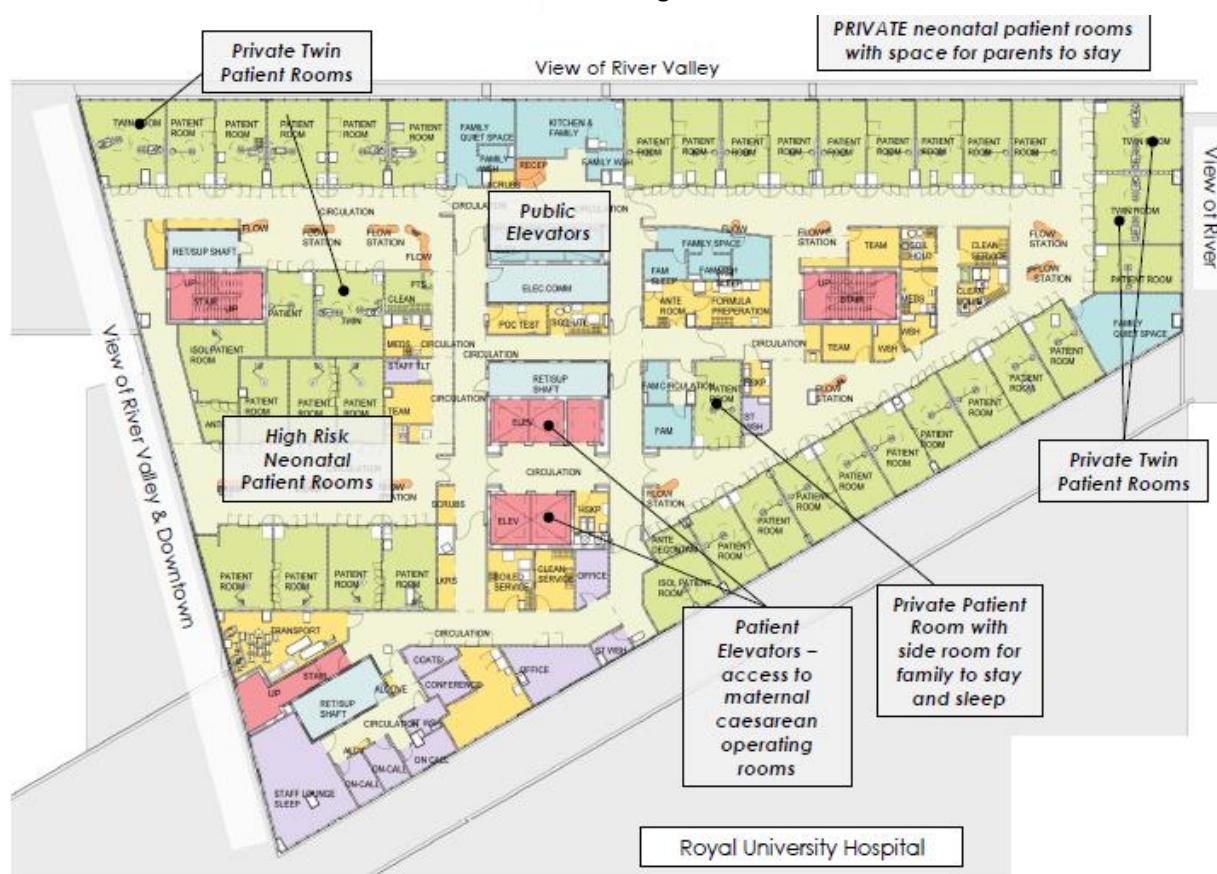


Fig.( 3-57).  
4th Floor Zoning

# (3) Similar Projects

## -Emergency

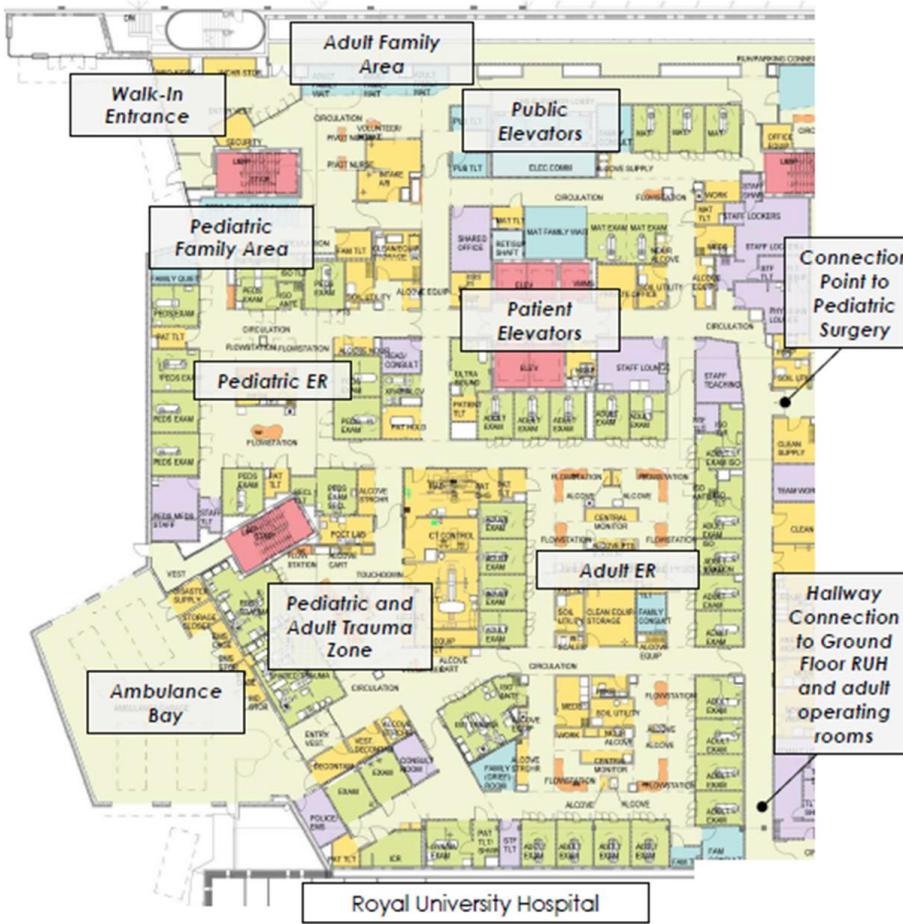


Fig.( 3-58).  
Ground Floor

## -Pediatric Surgery

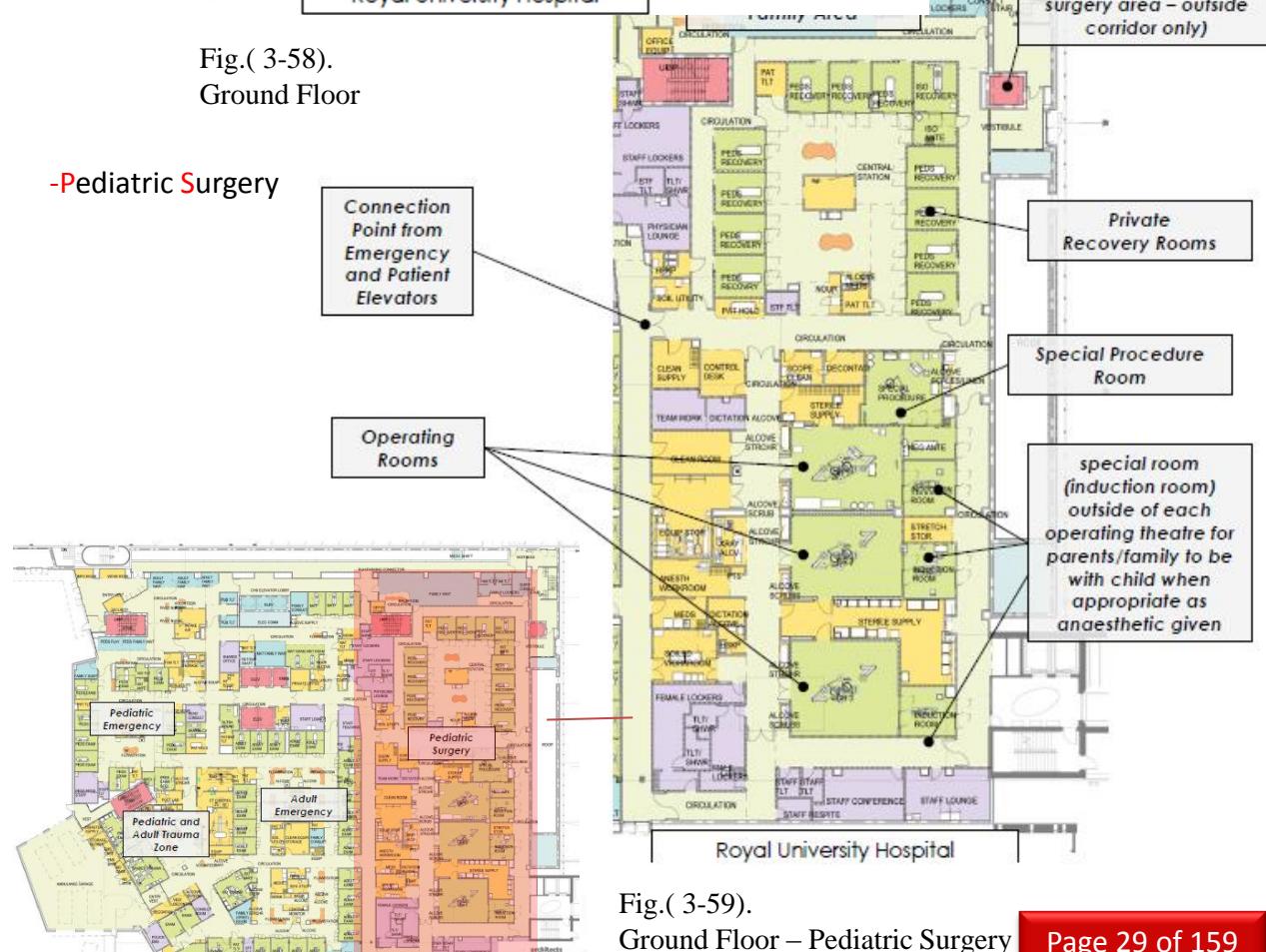


Fig.( 3-59).  
Ground Floor – Pediatric Surgery

### (3)Similar Projects

-Main Entrance

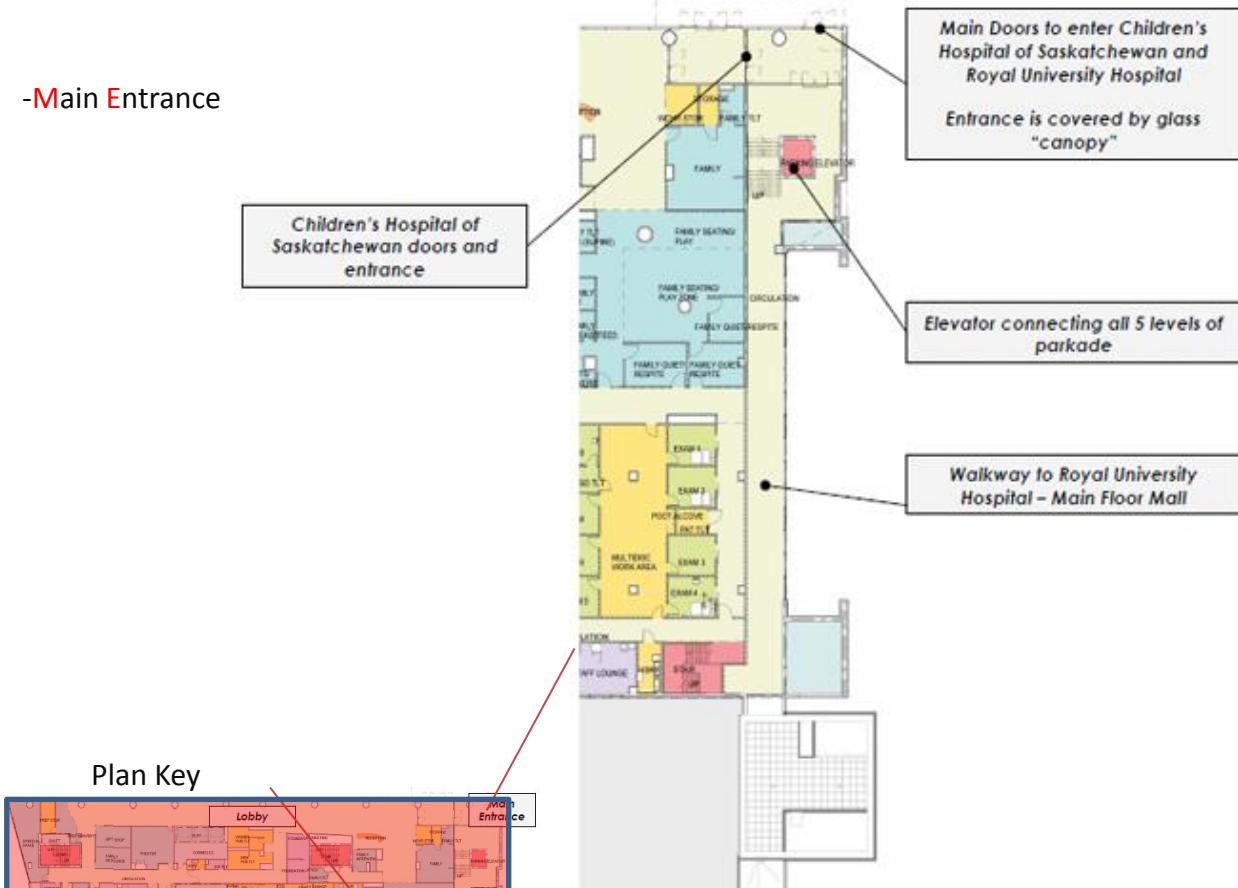


Fig.( 3-60).  
Ground Floor – Main Entrance

-Lobby

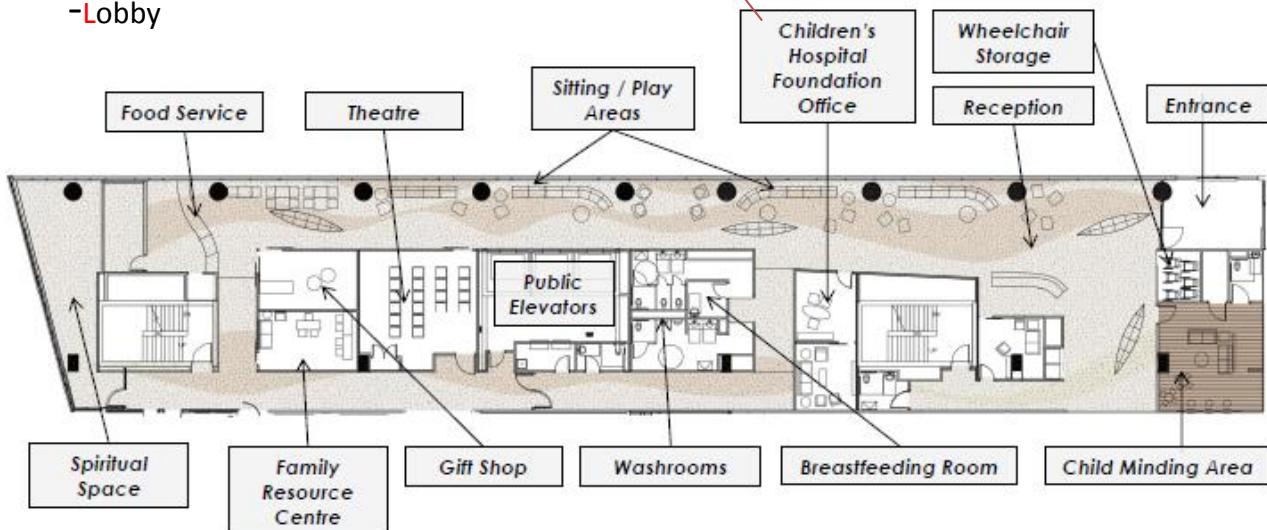


Fig.( 3-61).  
Ground Floor- Lobby

### (3)Similar Projects



Fig (3-62)  
Interior Design  
Concept  
after walking  
through the door



Fig (3-63)  
after walking through  
the door and looking  
left



Fig (3-64)  
Pediatric Outpatient  
Clinic – Family Area

### (3)Similar Projects

#### -Ground Floor



Fig (3-65)  
Interior Design Concept  
Pediatric Surgery – Family Area

Fig (3-66)  
Pediatric Surgery –  
Operating Theatre



Fig (3-67)  
Emergency  
Walking through doors  
and towards pediatric  
emergency



Fig (3-68)  
Adult Emergency Family Area

### (3)Similar Projects

#### -Ground Floor



Fig (3-69)  
Pediatric Emergency Family Area

Fig (3-70)  
Pediatric Emergency Exam Room – view from door

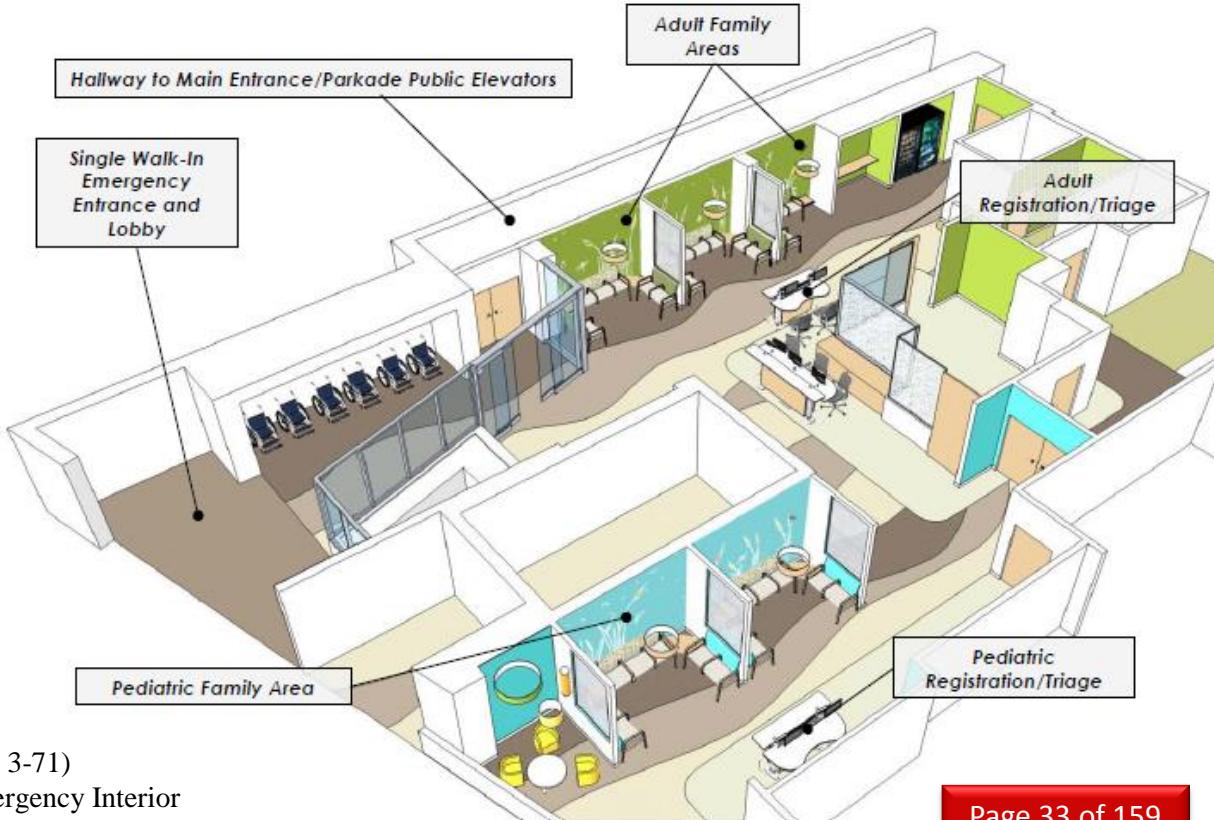


Fig.( 3-71)  
Emergency Interior

### (3)Similar Projects

Fig.( 3-72)  
2nd Floor Interior



Fig.( 3-73)  
the public elevators  
from 2nd floor



Fig.( 3-74)  
2nd Floor Interior



Fig.( 3-75)  
2nd Floor Interior

### (3) Similar Projects

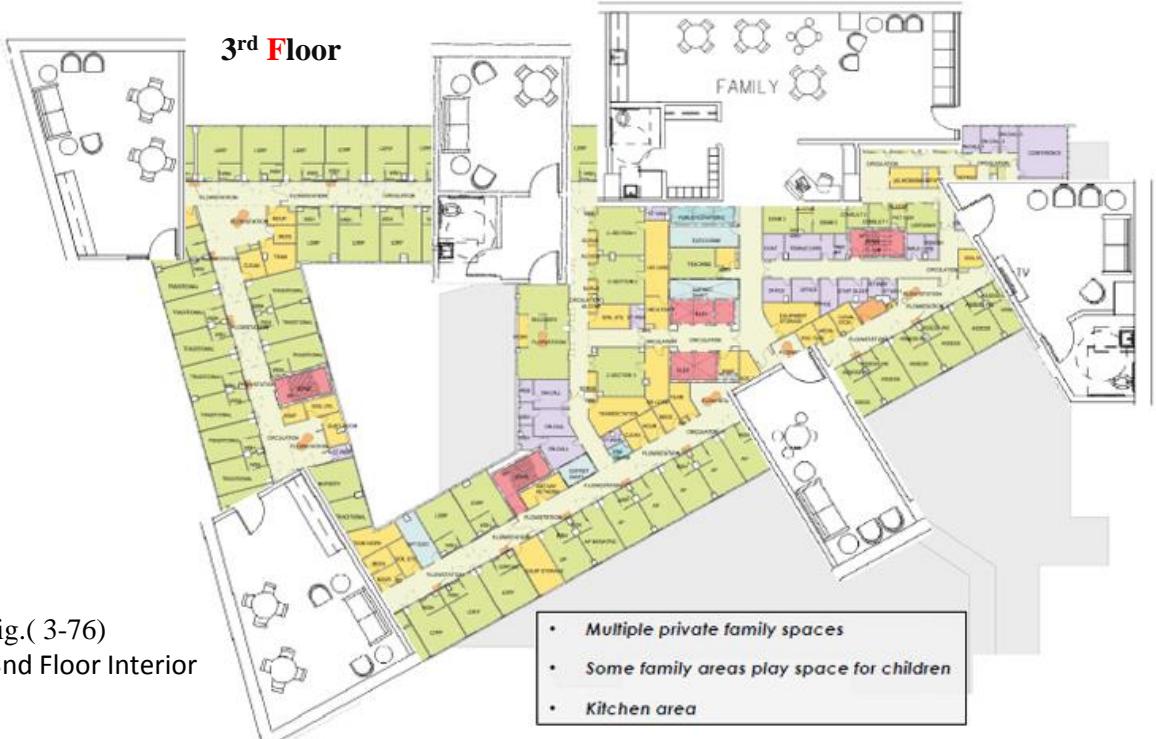
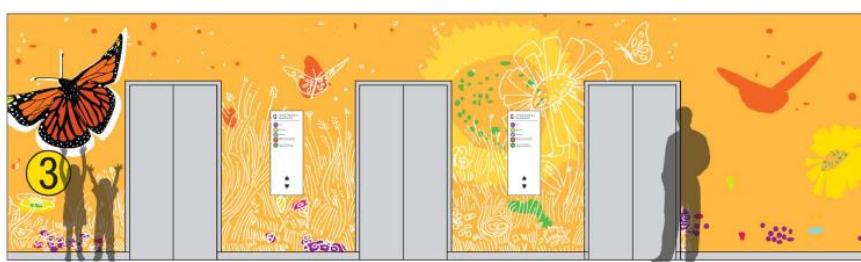


Fig.( 3-76)  
3nd Floor Interior

- *Multiple private family spaces*
  - *Some family areas play space for children*
  - *Kitchen area*

*Taking the public elevators from 3<sup>rd</sup> floor*

Fig.( 3-77)  
the public elevators  
from 3rd floor



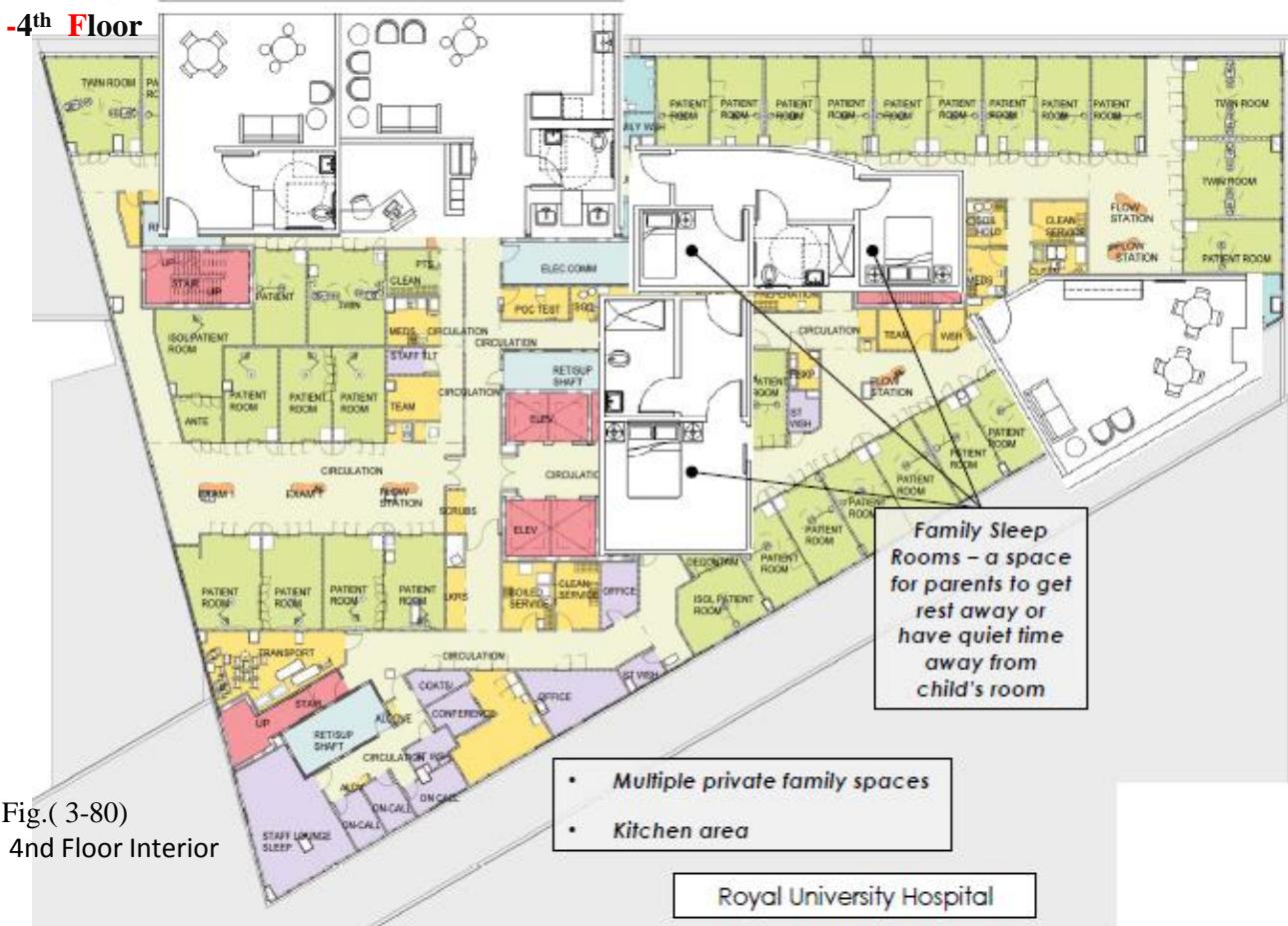
An architectural rendering of a modern hospital room. The room features light blue walls with large, stylized yellow flower murals. A wooden cabinet with a flat-screen monitor on top is positioned against one wall. In the center, there is a mobile medical cart with a computer monitor and keyboard. To the right, a patient bed is positioned next to a wooden cabinet with a small vase of flowers on top. A person is standing near the bed, and another person is walking away from the camera towards a doorway. The floor is made of light-colored wood planks.

Fig.( 3-78)  
Maternal Patient Room



## Fig.( 3-79) Maternal Family Area

### (3)Similar Projects



**Fig.( 3-81)**  
the public elevators  
From 4rd floor



**Fig.( 3-82)**  
Neonatal Intensive Care Patient Room

### (3)Similar Projects

#### (3-5) Shriners Hospitals for Children



Fig.( 3-83)  
Main Building

- The Shriners Hospitals for Children - St. Louis provides orthopedic care at no cost to the families through the volunteer efforts of local medical staff. When facing the prospect of moving to a more visible, urban location, GS&P worked to develop a facility that would not only enhance Shriners' presence in St. Louis and the region but also contribute to the nearby medical community and Washington University. The result is a regionally themed, welcoming environment that furthers the mission of the Shriners organization to improve the lives of children around the world.

#### (3-5-1)Project Analysis :



Fig.( 3-85)  
3D Shots

- The eight-story, 36-bed urban hospital will be located on the Washington University campus in St. Louis. Playful architecture and iconic graphics leave a lasting impression on I-64 motorists



Fig.( 3-88)  
Interior Nurses' Stations

- Stress reduction opportunities were created, such as the teen play area with Wii stations and TV lounge to toddler play areas with light boxes at nurses' stations to encourage interaction between staff and child



Fig.( 3-84)  
Entrance



Fig.(3-86)  
Reception

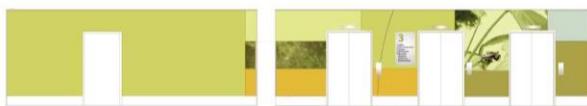


Fig.( 3-87)  
Interior Elevation



- Stress reduction opportunities were created, such as the teen play area with Wii stations and TV lounge to toddler play areas with light boxes at nurses' stations to encourage interaction between staff and child



Fig.( 3-89)  
Interior Shots

### (3)Similar Projects

#### **(3-6) Obstetrics & Gynecology Hospital - GAZA**



Fig.( 3-90)  
Main Building

#### **Project Description-**

The project is going to be in Dayr al- Balah / Gaza on lot No. 128 at the Middle Region Municipality.

The Hospital will have Delivery Department, Neonatal Department , Operating Theater and Out Patient clinics.

In addition to every needed medical and non medical services.

#### **(3-6-1)Project Analysis :**

##### **-Site Analysis**



Fig.( 3-91)  
Site Location



Fig.( 3-92)  
Project Site



Fig.( 3-93)  
Existing Site Layout

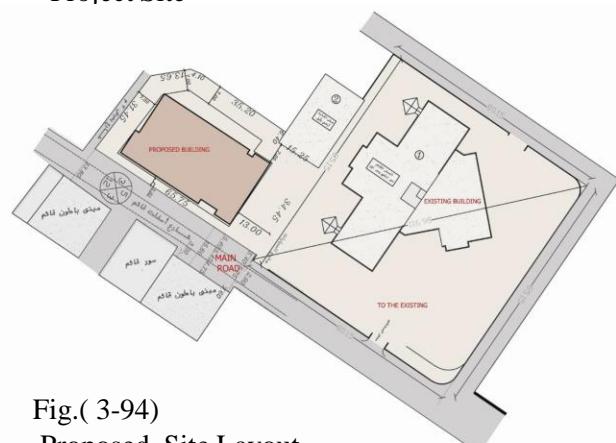
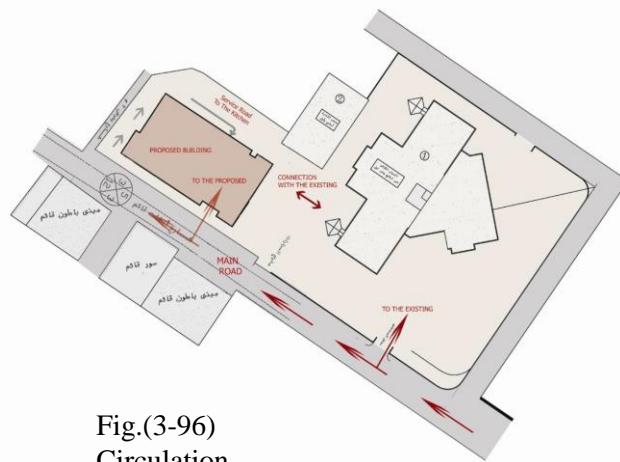
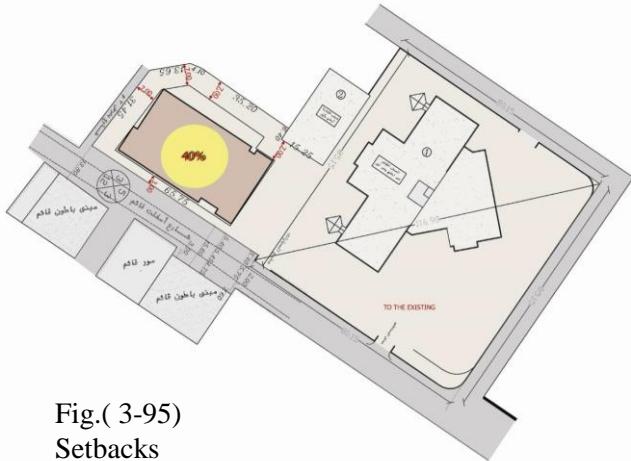


Fig.( 3-94)  
Proposed Site Layout

### (3)Similar Projects

#### -Site Analysis



#### (3-6-2)Plans



# (3)Similar Projects



**(3-6-3)Plan Study**

Fig.( 3-99)  
First Floor Plan



Fig.( 3-100)  
Ground Floor Circulation

## (3-6-4)Areas and Cost Estimation

The suggested number of floors was 2 floors + Basement floor with an approximate area (1100m<sup>2</sup>)/ floor. Accordingly, the project total area is : Floor Area \* No. of floors = 1100\* 3 = 3300m<sup>2</sup> The project cost has been estimated by the General Directorate of Engineering and Maintenance in the Ministry of Health as follows :-

- The cost of the Basement Floor is estimated as 550000 USD.
- The cost of the Ground Floor is estimated as 880000 USD.
- The cost of the First Floor is estimated as 880000 USD. So the estimated project cost with all the required facilities is 2310000 USD.

# (3)Similar Projects

## (3-7) Royal Derby Medical City

### (3-7-1)Vision

The Trust's Vision is 'Taking Pride in Caring'.

To be a national beacon for all that is best in the NHS delivering 21st century healthcare. We will be part of a flourishing network of health and social care partners to integrate care for our patients, deliver clinically excellent results and be financially sustainable.



We will:

- Deliver quality in everything we do; safety, effectiveness and patient experience
- Transform services to maximise productivity and efficiency
- Create networks for acute and complex care
- Develop integrated care for people with long term conditions to help them stay as healthy as they can be

### (3-7-2)Values

CARE principles of Compassion, a positive Attitude, Respect and Equality are at the very heart of care at Derby Hospitals. These values motivate us to provide for the individual needs of our patients in a compassionate and professional manner, encourage us to create a positive workplace for our employees, and push us to strive to continue to deliver high quality healthcare.



### (3-7-3) Objectives

Trust strategies and plans are based on our shared objectives:

- .Putting patients first
- .Right first time
- .Investing our resources wisely
- .Developing our people
- .Ensuring value from partnerships

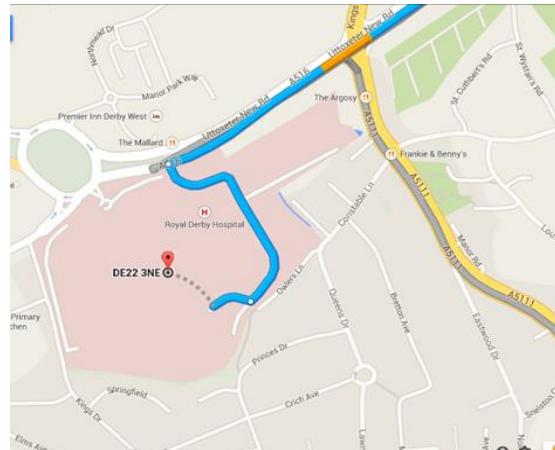
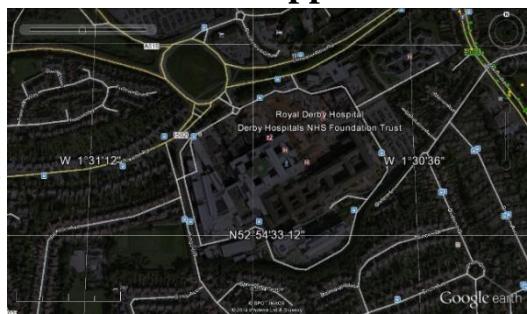


Fig.( 3-101)  
Location



(3-7-4) Layout Fig.(3-102).  
Approaches

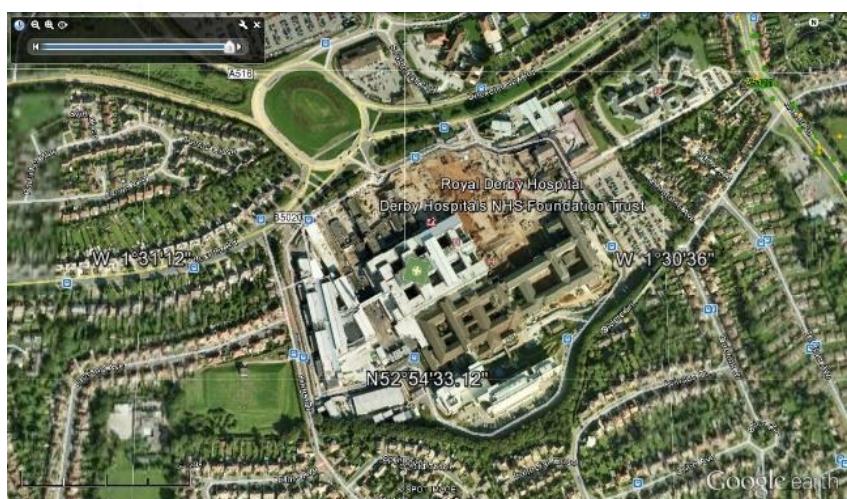


Fig.( 3-103)  
Bus Stop

Fig.( 3-104)  
Layout

### (3)Similar Projects



Fig.( 3-105)  
Zoning Layout

### (3.7.5)Zoning

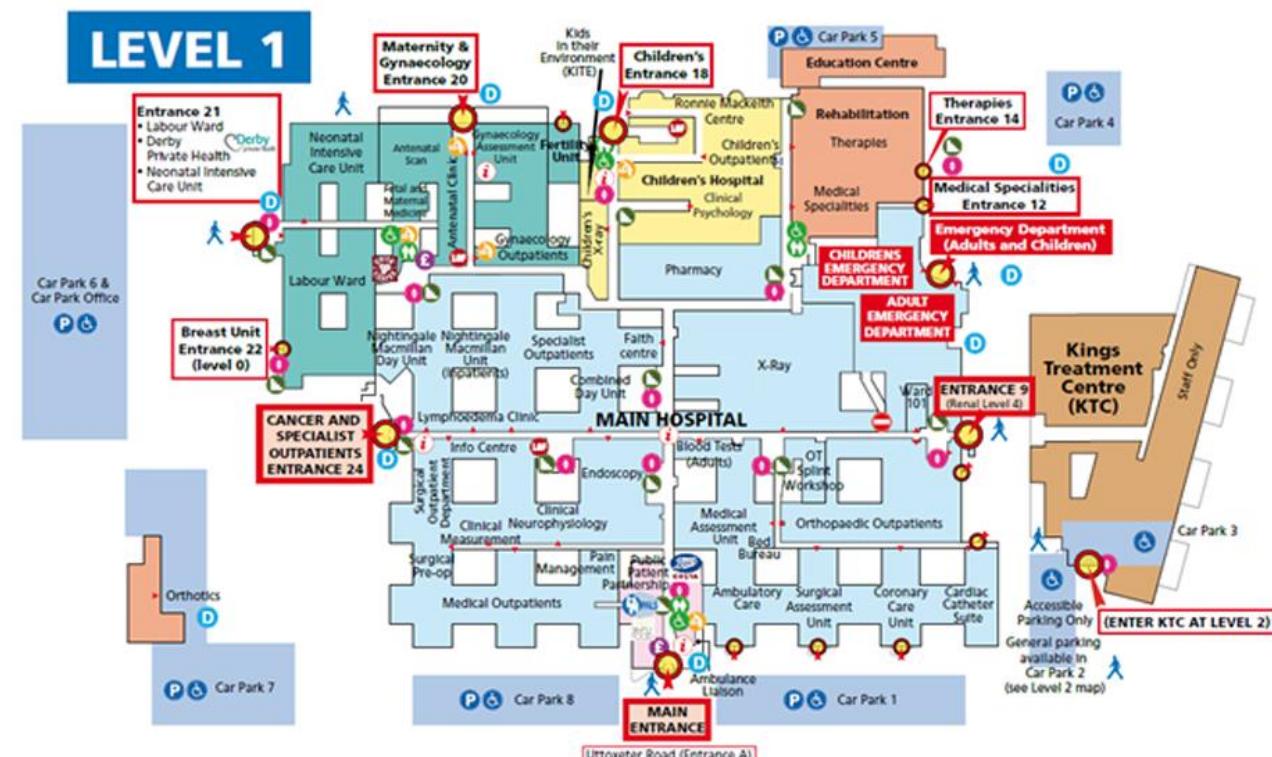


Fig.( 3-106)  
First Floor Zoning

### (3)Similar Projects

(3-7-5)Zoning

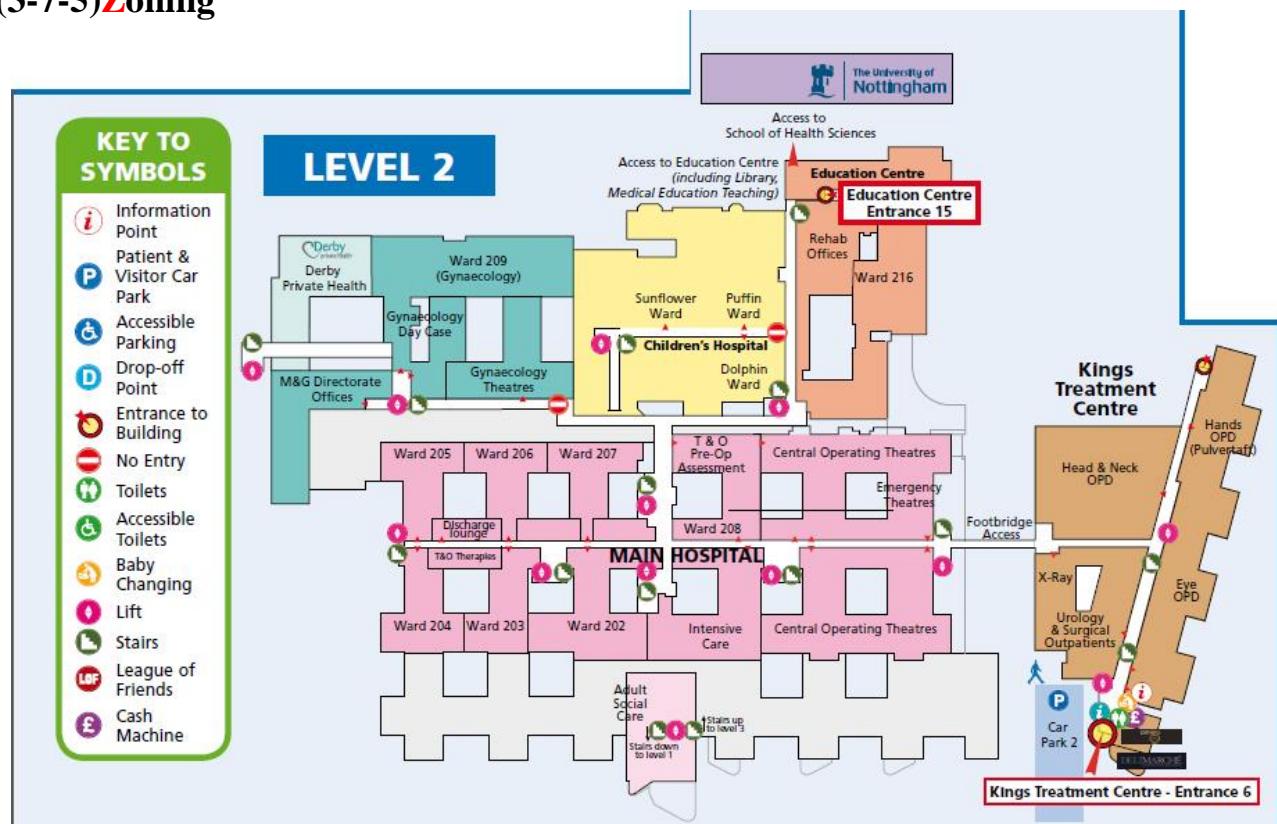


Fig.( 3-107)  
Second Floor Zoning

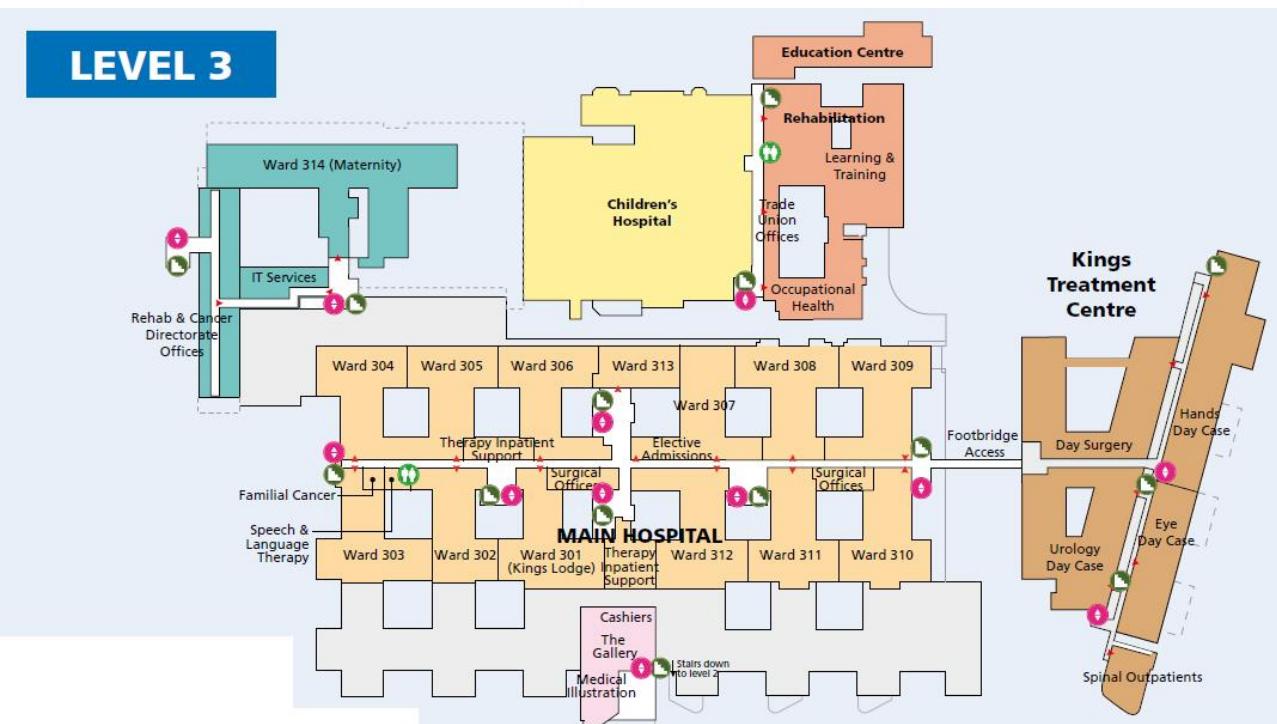


Fig.( 3-108)  
Third Floor Zoning

### (3)Similar Projects

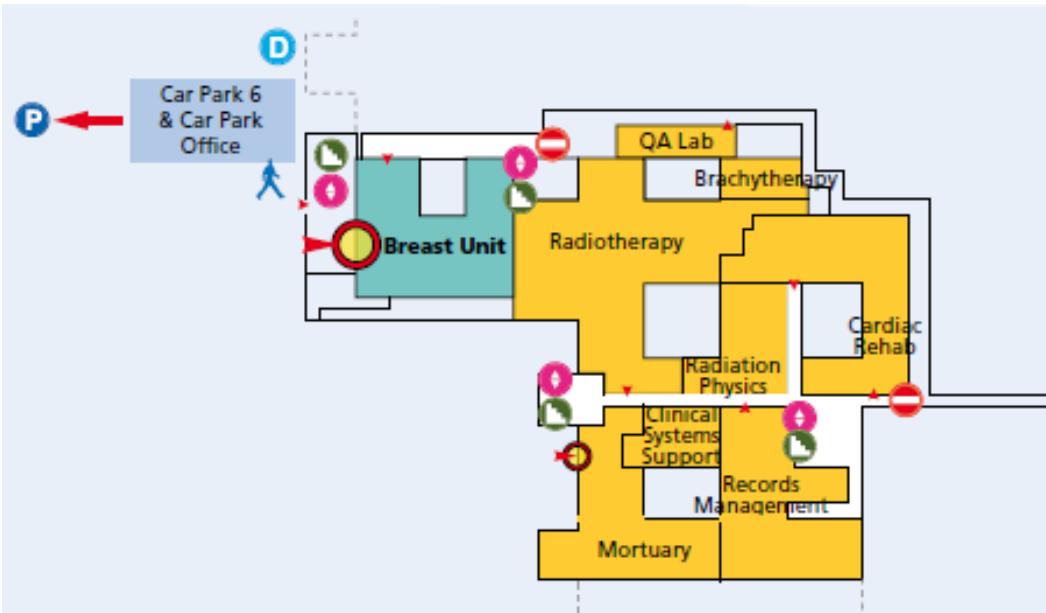
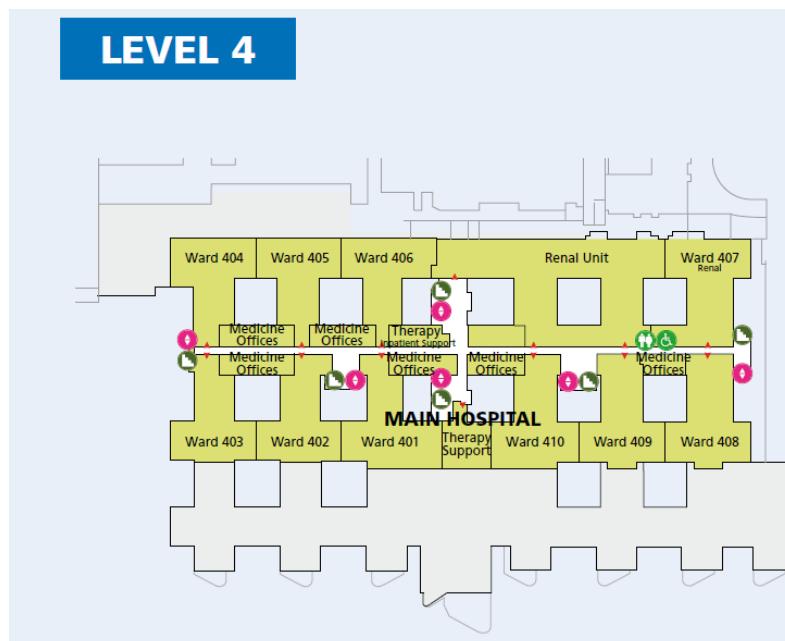


Fig.(3-109)  
Ground Floor  
Zoning

Fig.(3-110)  
Fourth Floor Zoning



LEVEL 5

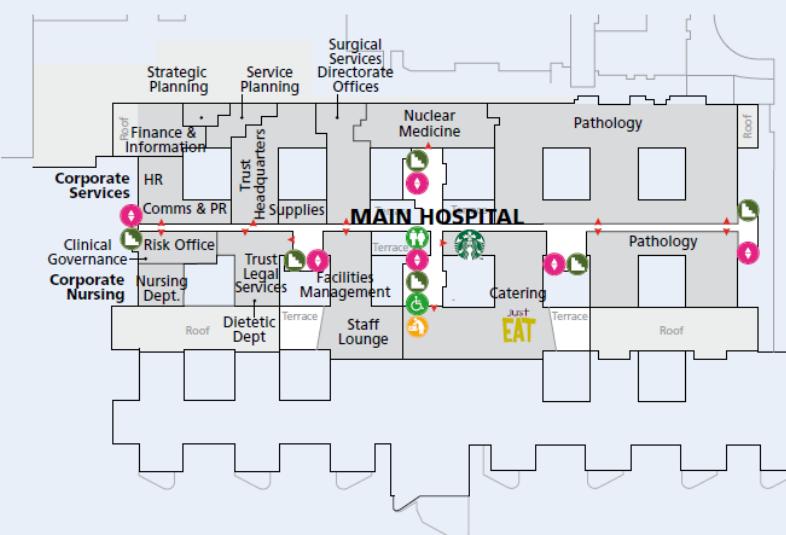


Fig.( 3-111)  
Fifth Floor Zoning

### (3)Similar Projects

#### (3-8 )Fred Hutchinson Cancer Research Center

(Seattle, Washington, USA)



Fig.( 3-112)  
Main Building

- Dense and green campus was to be built. The original urban plan envisaged parallel volumes leading down from the hilltop to the waterside like steps of a giant stair. This in terms of urban planning plausible idea turned out to be too expensive. Consequently, the buildings were lined up along the existing roads to enable a partial use of the existing infrastructure.

Base area :6,100 m<sup>2</sup>



Fig.( 3-113)  
North  
Elevation

#### (3-8-1)Project Analysis :

##### -Site Analysis

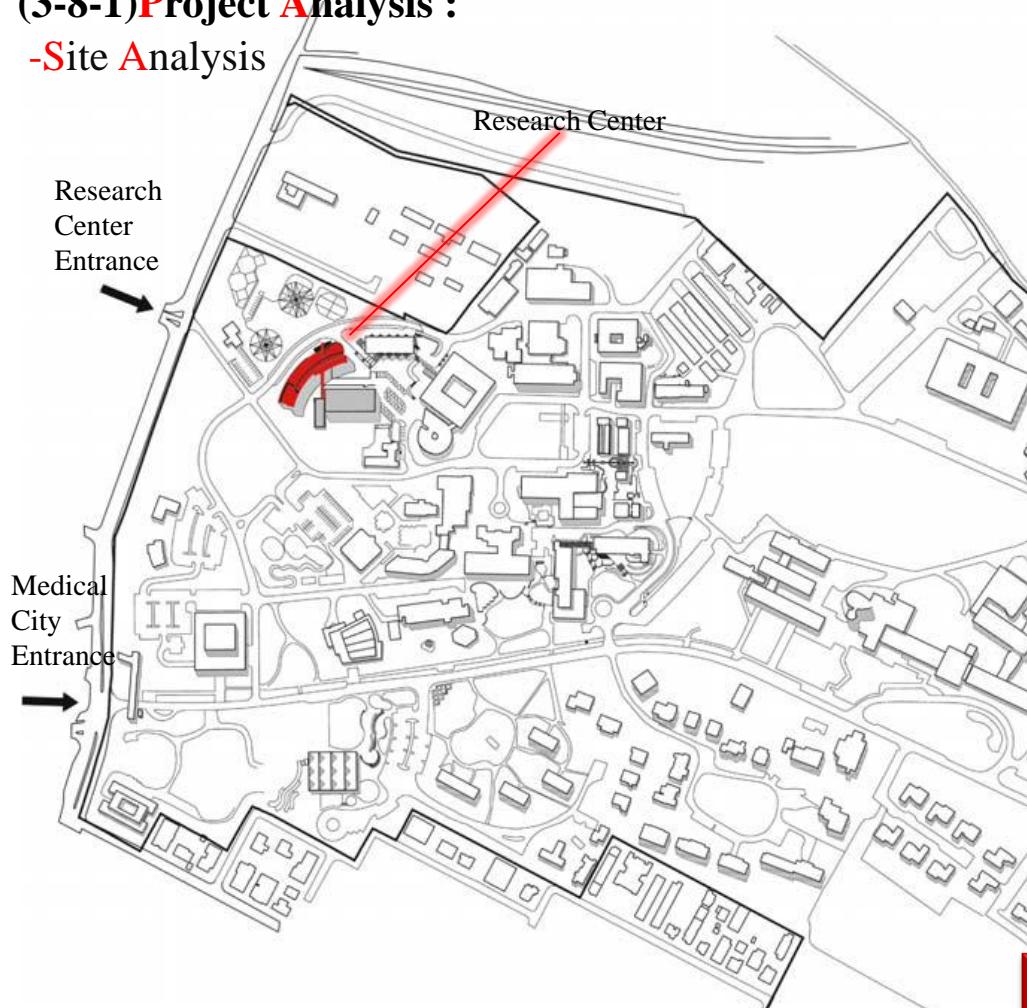


Fig.( 3-114)  
Site Plan

### (3)Similar Projects

#### (3-8-2)Plans

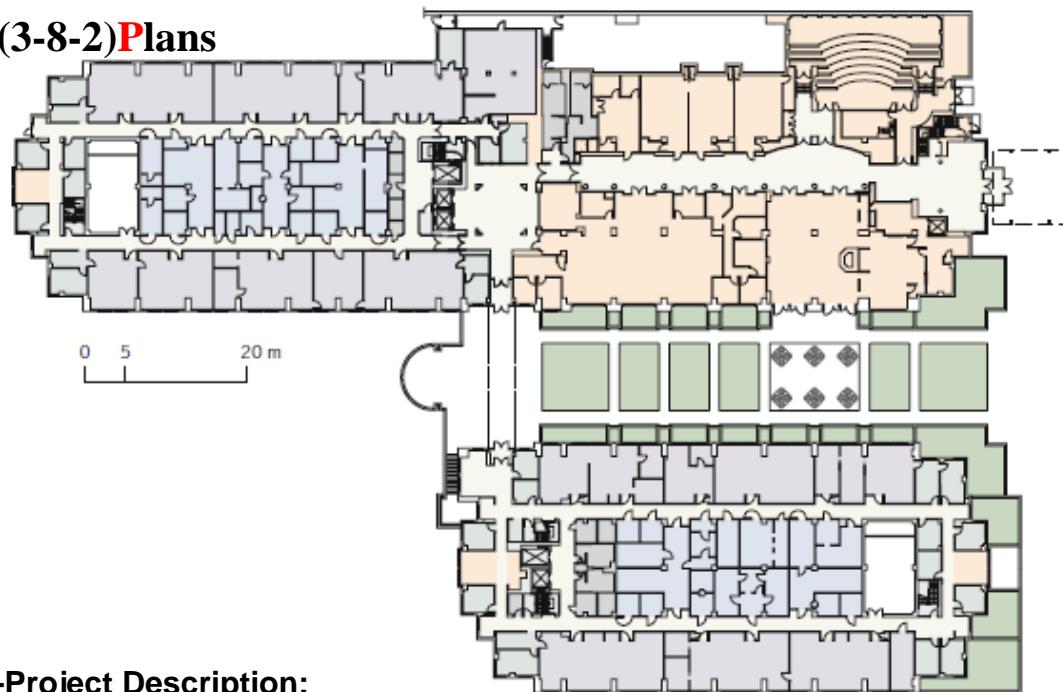


Fig.( 3-115)  
Ground Floor  
Plan

#### -Project Description:

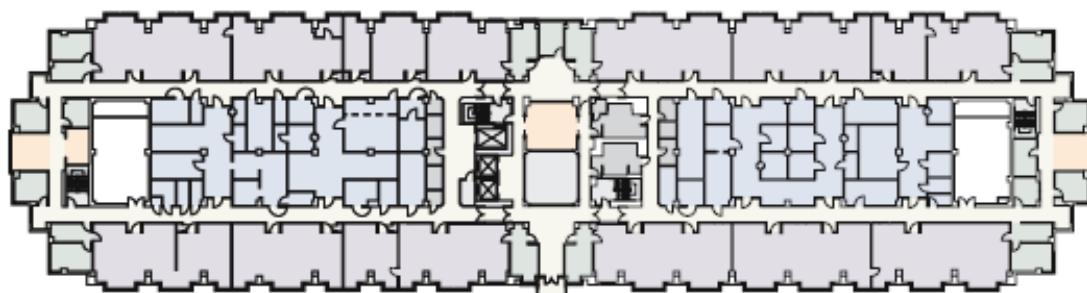
-The three departments of the Cancer Research Center were to be realized in four building phases with the option of further extensions. A clearly arranged, from left to right

Along the jutting-out reinforced concrete wall runs the main circulation artery connecting all parts of the building | The western part of the building follows the curved ring road and closes the gap towards the Meyer Building | Curved horizontal lines and a white coloring characterize the design | The galleries in the atrium are to serve as informal meeting points supporting communication

from left to right

The new research center is located at the foot of Capitol Hill in Seattle adjacent to the waterfront | View from the port to the Cancer Research Center | Windows in the laboratories and meeting

rooms afford views of the port and the sea | Landscape architect Peter Walker, San Francisco, designed the strictly geometrical interior courtyard



-Typical floor plan: laboratories, offices, and the central dark zone are accessed with two corridors

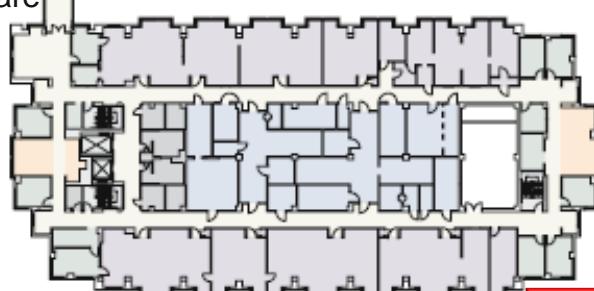


Fig.( 3-116)  
Typical floor  
plan

# (4)Architectural Program

## Pediatric Hospital

### **4-Architectural Program:**

#### **(4-1) Detailed Architectural Program:**

##### **(4-1-1) Pediatric Hospital:**

Space	area / unit	Unit	No.	Total	pproximate	Notes
<b><u>Main Entrance</u></b>						
Information & Reception	0.65	/ Person	300	195	200	
Security & social services	20	/ Room	10	200	200	
Waiting Areas	1.4	/ Person	300	420	475	
Air lock zone					95	
Entrance Lobby	0.5	/ Person	300	150	150	
Main Toilets						
	1.5	/ Men			50	T= 4 , S= 6 , U=4
	1.5	/ Women			50	T=8 , S=6
gift shop					60	
flower shop					70	
<b>Main Entrance Total Area=1,350m2</b>						
<b><u>Mosque</u></b>						
praying area -men	0.65	/ Person	125	81.25	80	
praying area -women	0.65	/person	80	52	50	
services	0.3	/ Person	205	61.5	70	
<b>Mosque Total Area=210m2</b>						
<b><u>Pharmacy</u></b>						
Main store	0.4	/ bed	300	120	120	
Cold cure store	0.1	/ bed	300	30	30	
Drugs store	0.08	/ bed	300	24	25	
Supervisor office	0.1	/ bed	300	30	30	
Medicines Exchange	0.1	/ bed	300	30	30	
<b>Pharmacy Total Area/300 bed=235m2</b>						
<b><u>Theatre</u></b>						
Hall	1.2	/ Person	600	720	720	
Services	0.6	/ Person	600	360	360	
Toilets						
	1.5	/ Men	100	54		T= 3 , S= 4 , U=3
	1.5	/ Women	100	46	100	T=5 , S=4
foyer	0.5	/hall area	1	360	310	
<b>Theatre Total Area =1,750m2</b>						
<b><u>Cafeteria</u></b>						
Doctors area	1.6	/ Person	200	320	350	
Visitors	1.6	/ Person	250	400	430	
services	0.3	/ Person	450	135	200	
Toilets						
	1.5	/ Men			50	T= 4 , S= 6 , U=4
	1.5	/ Women			50	T=6 , S=8
Foyer	0.35	/person	450	160	160	
<b>Cafeteria Total Area=1,400m2</b>						

# (4) Architectural Program

## Pediatric Hospital

<b>Kids Skills Development Center</b>					
culture development				100	
nature development				135	
artistic talent development				110	
science technologies				70	
marin exploration				140	
music room				60	
develope manual talent				100	
science development				70	
buffet				40	
toilets					
	1.5	/ Men		50	T= 4 , S= 6 , U=4
	1.5	/ Women		50	T=6 , S=8
Inner park				490	
<b>Kids Skills Development Center Total Area=1,960m2</b>					
atrium				6000	
<b>Atrium Total Area =6,000m2</b>					
<b>Elevators</b>					
Main Elevator	9	/ elevator	5	45	45 W=3m , L= 3m
Secondary Elevator	12	/ elevator	5	60	60 W=3m , L= 4m
sterilization	9	/elevator	2	18	18 W=3m , L= 3m
services elevator	12	/elevator	2	24	24
Corridor between them	12	/ elevator	3	36	40 W=3m , L= 4m
Corridors front of them	36	/ elevator	2	72	75
<b>stairs</b>					
Exit stairs	70	/stair	7	490	490
theatre exit stair	35	/stair	2	70	70
surgery exit stair	30	/stair	1	30	30
employee stairs	30	/stair	1	30	30
<b>vertical circulations Total Area=620m2</b>					
<b>Mortuary</b>					
Laying Hall	7.5	/ bed	6	45	50
Waiting Areas	0.65	/ Person	200	130	135
Cold Room	7.5	/ bed	5	37.5	40
Dissection Room	10	/ Person	4	40	40
Record & Writing	10	/ Person	6	60	70
casket room					20
preparation room					20
<b>Mortuary Total Area =485m2</b>					
<b>Outpatient Clinics</b>					
Internal diseases	20	/Clinic	4	80	80
Cardiology	20	/Clinic	1	20	20
Oncology	20	/Clinic	1	20	20
Thoracic	20	/Clinic	2	40	40
Psychiatry	20	/Clinic	1	20	20
Dermatology	20	/Clinic	1	20	20

# (4) Architectural Program

## Pediatric Hospital

Ear, Nose and Throat	25	/Clinic	1	25	25	
Ophthalmology	20	/Clinic	1	20	20	
Physiotherapy	25	/Clinic	2	50	50	besides Neurosurgery
Neurosurgery	25	/Clinic	2	50	75	
Dental	25	/Clinic	2	50	50	Min W=3.5m
Speech Therapy Unit	20	/Clinic	1	20	20	
Orthopaedic	25	/Clinic	1	25	25	
Splinting Room	12	/Clinic	1	12	12	
Services	6	/Clinic	1	6	12	
Clinics Waiting areas						
	1.4	/ Person	400	560	640	each clinic need 20 seat
Toilets						
	1.5	/ Men			27	T= 5 , S= 10 , U=5
	1.5	/ Women			27	T=8 , S=10
Nurse Station						
	5	/ Person	40	200	200	2 nurse for each clinic
Lounge	0.1	/ Person	400	40	40	
Services					20	50% of lounge
Reception desk	0.1	/ Person	400	40	40	

### Outpatient Clinics Total Area=1,620m<sup>2</sup>

<u>administration</u>						
total area	4.65	/bed	300	1368	1500	
Toilets						
	1.5	/ Men			27	T= 5 , S= 10 , U=5
	1.5	/ Women			27	T=8 , S=10
lounge					565	
services					105	

### Administration Total Area =2,225m<sup>2</sup>

<u>Radiology</u>						
X-Ray room	45	/ room	1	45	45	40+20 dressing & toilet <w:
Fluoroscopy	54	/ room	1	54	54	
CT scan	54	/ room	1	54	54	
Mammography	60	/ room	1	60	60	
Ultra sound room	30	/ room	1	30	30	
MRI Magnetic Resonance	60	/ room	1	60	60	
nuclear medicine	40	/room	1	40	40	
Waiting area						
	1.4	/ Person	60	84	100	each room need 10 seat
Toilets						
	1.5	/ Men				T= 1 , S= 2 , U=1
	1.5	/ Women				T=2 , S=2
service offices	25	/office	6	150	150	

### Radiology Total Area =924m<sup>2</sup>

<u>Laboratories</u>						
laboratories	100	/ lab.	4	400	400	labs.with sink
Waiting area					200	
Sterilization					50	

# (4) Architectural Program

## Pediatric Hospital

Medical record					40	
Sampling , Testing & Toilet					60	
2 Toilets					10	
Pathologist room					40	
Storage					50	
staff lockers& toilets					100	
toilets	1.5	/men			30	T= 3 , S= 4 , U=3
	1.5	/women			30	T=5 , S=4

**Laboratory Total Area =1,495m<sup>2</sup>**

<u><b>Emergency</b></u>						
reception					250	
Area of emergency rooms	0.65	/ Person	300	195	215	10 rooms
Wheeled stretcher area	1	/ stretcher	20	20	20	
Nurse station	5	/ Person	20	100	100	2 nurse for each room
Waiting Areas	1.4	/ Person	300	420	400	
Equipments & Supply storage	0.3	/ Person	300	90	100	
clinics	20	/clinic	6	120	120	
staff lounge	3	/doctor	20	60	64	
head of department	30	/room	1	30	30	
storage					40	
Examination & Treatment rooms	7.5	/ bed	20	150	150	
Observation area	5	/ bed	15	75	75	
Toilets	1.5	/ Men	150			T= 4 , S= 6 , U=4
	1.5	/ Women	150			T=6 , S=8
staff lockers& toilets					100	
buffet					64	
operation room	50	/room	1	50	50	min W=5m , A=30m <sup>2</sup>

**Emergency Total Area =2,850m<sup>2</sup>**

**Ground Floor Total Area =24,322m<sup>2</sup>**

<u><b>Intensive care</b></u>						
air lock					45	
unit	20	/ bed	6	120	172	min W=4m
private room	33	/ Room	6	198	203	
isolation room	20	/ Room	1	20	20	
nurse station	5	/ Person	7	35	50	
Drugs store	0.08	/bed	13	1.04	15	
dr/station	5	/ Person	12	60	60	
staff lockers& toilets	5	/person	12	60	60	
waiting Areas "visitors"	1.4	/ person	200	280	280	
toilets						
	1.5	/woman	1		27	T=4 , S=3
	1.5	/man	1		27	T=3 , S=3 , U=3
storage	50	/ Room	2	50	50	
Solid utilites storage	20	/ Room	2	40	40	
movable radiology	25	/ Room	1	25	25	
lobby					60	

# (4) Architectural Program

## Pediatric Hospital

Examination room	17	/room	2	34	35	
Babies food preparation	18	/room	1	17	17	
Staff lounge	30	/room	1	30	30	
laboratory	4	/room	7	28	35	
Medical reports	30	/room	1	30	30	
<b>Pediatrics ICU</b>						
unit	9	/bed	6	54	54	
nurse station	5	/person	3	15	15	
Drugs store	0.08	/ bed	24	1.92	5	
sterilization					30	
<b>Intensive Care Total Area=2,000m<sup>2</sup></b>						
<b>Specialized Clinics</b>						
clinics	20	/Clinic	22	440	440	
Clinics Waiting areas						
	1.4	/ Person	440	616	700	each clinic need 20 seat
Toilets						
	1.5	/ Men			27	T= 3 , S= 3 , U=3
	1.5	/ Women			27	T=4 , S=3
Nurse Station	5	/ Person	20	100	100	
Lounge	0.1	/ Person	400	40	40	
Services					20	50% of lounge
Reception desk	0.1	/ Person	400	40	40	
<b>Specailized Clinics Total Area=1,350m<sup>2</sup></b>						
<b>Surgical department</b>						
specialized operation room	60	/room	9	540	540	min W=6m , A=50m <sup>2</sup>
preparation room	18	/bed	8	144	145	
toilets & shower					60	T=4 , S=4 , U=2 shower 4
anesthesia room	15	/room	8	120	160	
Storage					35	
non- sterilization room					45	
sterilization & storage					35	
recovery room	18	/patient	12	216	260	min.A=17m <sup>2</sup>
nurse station					20	
handwash	6	/ o.room	6	36	40	
change room	2	/person	12	24	24	
head department	25	/person	2	50	55	
medical report	5	/person	10	50	50	
sub-sterillizing	4.65	/o.room	15	69.75	75	
Drugs store	0.08	/bed	15	1.2	5	
equipments storage	4	/o.room	8	32	25	
janitor room	3.9	/ closet	2	7.8	10	
toilets						
	1.5	/woman			15	T=3 , S=3
	1.5	/man			15	T=3 , S=3 , U=2
rest room					90	
anesthesia staff room					25	

# (4) Architectural Program

## Pediatric Hospital

clean storage					85	
waiting Areas "visitors"	1.4	/ person	200	280	280	
dirty storage					25	
Air lock	40	/ unit	2	80	80	
Nurse Station	5	/ Person	6	30	30	
blood store					40	
<b>Surgical Department Total Area=3,500m2</b>						
<b>One day Care</b>						
anesthesia room	15	/room	10	150	200	
medical report	5	/person	4	20	20	
waiting area	1.4	/person	65	91	95	
examination room	20	/room	1	20	20	
recovery	12	/patient	15	180	200	min.A=8m2
buffet	0.3	/ Person	25	7.5	10	
patient rest room					35	
kids playing room					25	
toilets						
	1.5	/woman			15	T=3 , S=3
	1.5	/man			15	T=3 , S=3, U=2
air lock zone					18	
archive	5	/person	4	20	20	
<b>One Day Care Total Area=1,400m2</b>						
Double height					3936	
<b>Double Height Total Area=3,936m2</b>						
<b>Elevators</b>						
Main Elevator	9	/ elevator	5	45	45	W=3m , L= 3m
Secondary Elevator	12	/ elevator	5	60	60	W=3m , L= 4m
services elevator	12	/elevator	2	24	24	
Corridor between them	12	/ elevator	3	36	40	W=3m , L= 4m
Corridors front of them	36	/ elevator	2	72	75	
<b>stairs</b>						
Exit stairs	70	/stair	7	490	490	
<b>Vertical Circulations Total Area= 6,143.5m2</b>						
Green roof						
<b>Green Roof Total Area1,330m2</b>						
<b>Sevices for doctors</b>						
Department Manager	88	/ Floor	1	88		
Toilet	3.5	/ Floor	1	3.5		
Multi Purpose Room	46	/ Floor	1	46		
dr/ rest room	57	/ Floor	1	57		
<b>Doctors Total Area= 194.5m2</b>						
<b>Main nurse station</b>						
supervisor room	40	/ Floor	1	40	40	
Storage for drugs	17	/ Floor	1	17	17	
Archive	35	/ Floor	1	35	35	
medical report	35	/ Floor	1	35	35	

# (4) Architectural Program

## Pediatric Hospital

toilets						
	1.5	/ Men			27	T= 3 , S= 3 , U=3
	1.5	/ Women			27	T=4, S=3
Changing Clothes	30	/ Floor	1	30	30	
examination room	18	/ Floor	1	18	18	min. 12m2
Staff lounge	23	/ Floor	1	23	23	
babies feeding room	20	/ Floor	1	20	20	
nurse station	20	/ Floor	1	20	20	
<b>Main Nurse Station Total Area= 292m2</b>						
<b>Secondary Services</b>						
Food preparing and deliver	54	/ Floor	1	54	54	
Storage for clothes	30	/ Floor	1	30	30	
Clean room for Steriled stu	15	/ Floor	1	15	15	
House Keeping	20	/ Floor	1	20	20	
Solid utility room	20	/ Floor	1	20	20	
Storage for vehicles	25	/ Floor	1	25	25	
medical equip. Storage	25	/ Floor	1	25	25	
General Storage	45	/ Floor	1	45	45	
fire fighting room	30	/ Floor	1	30	30	
gases room	20	/ Floor	1	20	20	
electric room	35	/ Floor	1	35	35	
Inner court					240	
electro mechanical room	90	/ Floor	1	90	90	
<b>Secondary Services Total Area= 292m2</b>						
<b>Service Zone Total Area= 1,555m2</b>						
<b>Cancer unit</b>						
Stomach &						
Oesophageal Cancer	20	/Clinic	1	20	20	
Pancreatic cancer	20	/Clinic	1	20	20	
Oncology	20	/Clinic	1	20	20	
kidney cancer	20	/Clinic	1	20	20	
Psychiatry	20	/Clinic	1	20	20	
Mouth, Nose and Throat						
Cancers	20	/Clinic	1	20	20	
skin cancer	20	/Clinic	1	20	20	
digestive cancer	20	/Clinic	1	20	20	
blood cancer	20	/Clinic	1	20	20	
Bowel Cancer	20	/Clinic	1	20	20	
Brain and Spinal Cancer	20	/Clinic	1	20	20	
Gynecological Cancers	20	/Clinic	1	20	20	
Clinics Waiting areas	1.4	/ Person	200	280	280	each clinic need 20 seat
Toilets						
	1.5	/ Men			27	T= 5 , S= 10 , U=5

# (4) Architectural Program

## Pediatric Hospital

	1.5	/ Women			27	T=8 , S=10
Nurse Station	5	/ Person	5	25	25	
Lounge Services	0.1	/ Person	400	40	40	
Reception desk	0.1	/ Person	400	40	40	
Treatment radiology	50	/room	4	200	200	
Examination radiology	100	/room	1	100	100	
Department office	30	/room	1	30	30	
Clean storage	30	/room	1	30	30	
Radiology reading	30	/room	1	30	30	
Reast station	30	/room	1	30	30	
Archive room	30	/room	2	60	60	
Laboratory	5	/person	10	50	53	
Clinics Waiting areas	1.4	/ Person	50	70	80	
<b>Cancer Unit Total Area= 1,850m<sup>2</sup></b>						
<b>First Floor Total Area =16,113m<sup>2</sup></b>						
<b><u>Private room</u></b>						
Room	40	/ Room	46	1840	1840	
Bath room	10	/ Room	46	460	460	
<b><u>Isolated room</u></b>						
Isolated room	52	/ Room	10	520	520	
Bath room	10	/ Room	10	100	100	
<b><u>secondary Nursing Station</u></b>						2/Station
Nurse station	12	/ Nurse	12	144	160	
services room	17	/room	4	68	68	
storage	17	/ Nurse	4	68	68	
air lock	17	/nurse stat.	4	68	68	
<b><u>Sevices for patients&amp;Visitors</u></b>						
Lounge	140	/ lounge	4	560	560	
toilets	54	/ Floor	4	216	216	
	1.5	/ Men			27	T= 3 , S= 3 , U=3
	1.5	/ Women			27	T=4, S=3
playing room					128	
inner courts					1173	
<b>Wards Total Area=7,052m<sup>2</sup></b>						
<b><u>Elevators</u></b>						
Main Elevator	9	/ elevator	5	45	45	W=3m , L= 3m
Secondary Elevator	12	/ elevator	5	60	60	W=3m , L= 4m
services elevator	12	/elevator	2	24	24	
Corridor between them	12	/ elevator	3	36	40	W=3m , L= 4m
Corridors front of them	36	/ elevator	2	72	75	
<b><u>stairs</u></b>						
Exit stairs	70	/stair	7	490	490	
<b>Vertical Circulations Total Area=734m<sup>2</sup></b>						
<b><u>Sevices for doctors</u></b>						
Department Manager	88	/ Floor	1	88		

# (4) Architectural Program

## Pediatric Hospital

Toilet	3.5	/ Floor	1	3.5		
Multi Purpose Room	46	/ Floor	1	46		
dr/ rest room	57	/ Floor	1	57		
<b>Doctors Services Total Area=734m2</b>						
<b>Main nurse station</b>						
supervisor room	40	/ Floor	1	40	40	
Storage for drugs	17	/ Floor	1	17	17	
Archive	35	/ Floor	1	35	35	
medical report	35	/ Floor	1	35	35	
toilets						
	1.5	/ Men			27	T= 3 , S= 3 , U=3
	1.5	/ Women			27	T=4, S=3
Changing Clothes	30	/ Floor	1	30	30	
examination room	18	/ Floor	1	18	18	min. 12m2
Staff lounge	23	/ Floor	1	23	23	
babies feeding room	20	/ Floor	1	20	20	
nurse station	20	/ Floor	1	20	20	
<b>Main Nursa Station Total Area= 292m2</b>						
<b>Secondary Services</b>						
Food preparing and deliver	54	/ Floor	1	54	54	
Storage for clothes	30	/ Floor	1	30	30	
Clean room for Steriled stu	15	/ Floor	1	15	15	
House Keeping	20	/ Floor	1	20	20	
Solid utility room	20	/ Floor	1	20	20	
Storage for vehicles	25	/ Floor	1	25	25	
medical equip. Storage	25	/ Floor	1	25	25	
General Storage	45	/ Floor	1	45	45	
fire fighting room	30	/ Floor	1	30	30	
gases room	20	/ Floor	1	20	20	
electric room	35	/ Floor	1	35	35	
Inner court					240	
electro mechanical room	90	/ Floor	1	90	90	
<b>Secondary Services Total Area= 704m2</b>						
<b>Services Zone Total Area= 1,555m2</b>						
<b>Second Floor Total Area =13,692m2</b>						
<b>Private room</b>						
Room	40	/ Room	15	600	600	
Bath room	10	/ Room	15	150	150	
<b>Double room</b>						
Room	35	/ room	24	840	840	
Bath room	8	/ Room	24	192	192	
<b>Environmental room</b>						
Room	45	/ room	8	360	360	
Bath room	8	/ Room	8	64	64	
<b>Isolated room</b>						
Isolated room	52	/ Room	3	156	156	
Bath room	10	/ Room	3	30	30	

# (4) Architectural Program

## Pediatric Hospital

Isolated room	52	/ Room	6	312	312	
Bath room	10	/ Room	6	60	60	
<b><u>secondary Nursing Station</u></b>						2/Station
Nurse station	12	/ Nurse	15	180	180	
services room	17	/room	5	85	85	
storage	17	/ Nurse	5	85	85	
air lock	17	/nurse stat.	5	85	85	
<b><u>Sevices for patients &amp; Visitors</u></b>						
Lounge	140	/ lounge	5	700	700	
toilets	54	/ Floor	5	270	270	
	1.5	/ Men			27	T= 3 , S= 3 , U=3
	1.5	/ Women			27	T=4, S=3
playing room					128	
<b>Wards Total Area= 6,1435m2</b>						
<b><u>Elevators</u></b>						
Main Elevator	9	/ elevator	5	45	45	W=3m , L= 3m
Secondary Elevator	12	/ elevator	5	60	60	W=3m , L= 4m
services elevator	12	/elevator	2	24	24	
Corridor between them	12	/ elevator	3	36	40	W=3m , L= 4m
Corridors front of them	36	/ elevator	2	72	75	
<b><u>stairs</u></b>						
Exit stairs	70	/stair	7	490	490	
<b>Vertical Circulations Total Area= 6,143.5m2</b>						
<b><u>Sevices for doctors</u></b>						
Department Manager	88	/ Floor	1	88		
Toilet	3.5	/ Floor	1	3.5		
Multi Purpose Room	46	/ Floor	1	46		
dr/ rest room	57	/ Floor	1	57		
<b>Doctors Total Area= 194.5m2</b>						
<b><u>Main nurse station</u></b>						
supervisor room	40	/ Floor	1	40	40	
Storage for drugs	17	/ Floor	1	17	17	
Archive	35	/ Floor	1	35	35	
medical report	35	/ Floor	1	35	35	
toilets						
	1.5	/ Men			27	T= 3 , S= 3 , U=3
	1.5	/ Women			27	T=4, S=3
Changing Clothes	30	/ Floor	1	30	30	
examination room	18	/ Floor	1	18	18	min. 12m2
Staff lounge	23	/ Floor	1	23	23	
babies feeding room	20	/ Floor	1	20	20	
nurse station	20	/ Floor	1	20	20	
<b>Main Nurse StationTotal Area= 292m2</b>						
<b><u>Secondary Services</u></b>						
Food preparing and deliver	54	/ Floor	1	54	54	
Storage for clothes	30	/ Floor	1	30	30	
Clean room for Steriled stu	15	/ Floor	1	15	15	

# (4) Architectural Program

## Pediatric Hospital

House Keeping	20	/ Floor	1	20	20	
Solid utility room	20	/ Floor	1	20	20	
Storage for vehicles	25	/ Floor	1	25	25	
medical equip. Storage	25	/ Floor	1	25	25	
General Storage	45	/ Floor	1	45	45	
fire fighting room	30	/ Floor	1	30	30	
gases room	20	/ Floor	1	20	20	
electric room	35	/ Floor	1	35	35	
Inner court					240	
electro mechanical room	90	/ Floor	1	90	90	
<b>Secondary Services Total Area= 704m2</b>						
<b>Service Zone Total Area= 1,555m2</b>						
<b>Third Floor Total Area =12,782.5m2</b>						
<b><u>Double room</u></b>						
Room	35	/ room	39	1365	1365	
Bath room	8	/ Room	39	312	312	
<b><u>Isolation room</u></b>						
Isolation room	52	/ Room	9	468	468	
Bath room	10	/ Room	9	90	90	
<b><u>secondary Nursing Station</u></b>						2/Station
Nurse station	12	/ Nurse	12	144	144	
services room	17	/room	4	68	68	
storage	17	/ Nurse	4	68	68	
air lock	17	/nurse stat.	4	68	68	
<b><u>Sevices for patients &amp;Visitors</u></b>						
Lounge	140	/ lounge	4	560	560	
toilets	54	/ Floor	4	216	216	
	1.5	/ Men			27	T= 3 , S= 3 , U=3
	1.5	/ Women			27	T=4, S=3
<b>Wards Total Area= 5,306m2</b>						
<b><u>Elevators</u></b>						
Main Elevator	9	/ elevator	5	45	45	W=3m , L= 3m
Secondary Elevator	12	/ elevator	5	60	60	W=3m , L= 4m
services elevator	12	/elevator	2	24	24	
Corridor between them	12	/ elevator	3	36	40	W=3m , L= 4m
Corridors front of them	36	/ elevator	2	72	75	
<b><u>stairs</u></b>						
Exit stairs	70	/stair	7	490	490	
<b>Vertical Circulations Total Area= 734m2</b>						
<b><u>Sevices for doctors</u></b>						
Department Manager	88	/ Floor	1	88		
Toilet	3.5	/ Floor	1	3.5		
Multi Purpose Room	46	/ Floor	1	46		
dr/ rest room	57	/ Floor	1	57		
<b>Doctors Services Total Area= 195m2</b>						
<b><u>Main nurse station</u></b>						
supervisor room	40	/ Floor	1	40	40	

# (4) Architectural Program

## Pediatric Hospital

Storage for drugs	17	/ Floor	1	17	17	
Archive	35	/ Floor	1	35	35	
medical report	35	/ Floor	1	35	35	
toilets						
	1.5	/ Men			27	T= 3 , S= 3 , U=3
	1.5	/ Women			27	T=4, S=3
Changing Clothes	30	/ Floor	1	30	30	
examination room	18	/ Floor	1	18	18	min. 12m2
Staff lounge	23	/ Floor	1	23	23	
babies feeding room	20	/ Floor	1	20	20	
nurse station	20	/ Floor	1	20	20	
<b>Main Nurse Station Total Area= 292m2</b>						
<b>Secondary Services</b>						
Food preparing and deliver	54	/ Floor	1	54	54	
Storage for clothes	30	/ Floor	1	30	30	
Clean room for Steriled stu	15	/ Floor	1	15	15	
House Keeping	20	/ Floor	1	20	20	
Solid utility room	20	/ Floor	1	20	20	
Storage for vehicles	25	/ Floor	1	25	25	
medical equip. Storage	25	/ Floor	1	25	25	
General Storage	45	/ Floor	1	45	45	
fire fighting room	30	/ Floor	1	30	30	
gases room	20	/ Floor	1	20	20	
electric room	35	/ Floor	1	35	35	
Inner court					240	
electro mechanical room	90	/ Floor	1	90	90	
<b>Secondary Services Total Area= 704m2</b>						
<b>Services Zone Total Area= 1,555m2</b>						
<b>Fourth Floor Total Area =8,082m2</b>						
<b>Double room</b>						
Room	35	/ room	39	1365	1365	
Bath room	8	/ Room	39	312	312	
<b>Isolation room</b>						
Isolation room	52	/ Room	9	468	468	
Bath room	10	/ Room	9	90	90	
<b>secondary Nursing Station</b>						
Nurse station	12	/ Nurse	12	144	144	
services room	17	/room	4	68	68	
storage	17	/ Nurse	4	68	68	
air lock	17	/nurse stat.	4	68	68	
2/Station						
<b>Sevices for patients&amp;Visitors</b>						
Lounge	140	/ lounge	4	560	560	
toilets	54	/ Floor	4	216	216	
	1.5	/ Men			27	T= 3 , S= 3 , U=3
	1.5	/ Women			27	T=4, S=3
playing room					35	
<b>Wards Total Area= 5,330m2</b>						

# (4) Architectural Program

## Pediatric Hospital

<b>Elevators</b>						
Main Elevator	9	/ elevator	5	45	45	W=3m , L= 3m
Secondary Elevator	12	/ elevator	5	60	60	W=3m , L= 4m
services elevator	12	/elevator	2	24	24	
Corridor between them	12	/ elevator	3	36	40	W=3m , L= 4m
Corridors front of them	36	/ elevator	2	72	75	
<b>stairs</b>						
Exit stairs	70	/stair	7	490	490	
<b>Vertical Circulations Total Area= 734m2</b>						
<b>Sevices for doctors</b>						
Department Manager	88	/ Floor	1	88		
Toilet	3.5	/ Floor	1	3.5		
Multi Purpose Room	46	/ Floor	1	46		
dr/ rest room	57	/ Floor	1	57		
<b>Doctors Services Total Area= 194.5m2</b>						
<b>Main nurse station</b>						
supervisor room	40	/ Floor	1	40	40	
Storage for drugs	17	/ Floor	1	17	17	
Archive	35	/ Floor	1	35	35	
medical report	35	/ Floor	1	35	35	
toilets						
	1.5	/ Men			27	T= 3 , S= 3 , U=3
	1.5	/ Women			27	T=4, S=3
Changing Clothes	30	/ Floor	1	30	30	
examination room	18	/ Floor	1	18	18	min. 12m2
Staff lounge	23	/ Floor	1	23	23	
babies feeding room	20	/ Floor	1	20	20	
nurse station	20	/ Floor	1	20	20	
<b>Main Nurse Station Total Area= 292m2</b>						
<b>Secondary Services</b>						
Food preparing and deliver	54	/ Floor	1	54	54	
Storage for clothes	30	/ Floor	1	30	30	
Clean room for Steriled stu	15	/ Floor	1	15	15	
House Keeping	20	/ Floor	1	20	20	
Solid utility room	20	/ Floor	1	20	20	
Storage for vehicles	25	/ Floor	1	25	25	
medical equip. Storage	25	/ Floor	1	25	25	
General Storage	45	/ Floor	1	45	45	
fire fighting room	30	/ Floor	1	30	30	
gases room	20	/ Floor	1	20	20	
electric room	35	/ Floor	1	35	35	
Inner court					240	
electro mechanical room	90	/ Floor	1	90	90	
<b>Secondary Services Total Area= 704m2</b>						
<b>Services Zone Total Area= 1,555m2</b>						
<b>Fifth Floor Total Area =8,123m2</b>						

# (4)Architectural Program

## Gynecological & Obstetrics Hospital

### (4-1-2) Gynecological & Obstetrics Hospital:

Space	area / unit	Unit	No.	Total	pproximatio	Notes
<b>Main Entrance</b>						
Information & Reception	0.65	/ Person	100	65	65	
Security & social services	20	/ Room	7	140	140	
Waiting Areas	1.4	/ Person	100	140	140	
Air lock zone					40	
Entrance Lobby	0.5	/ Person	100	50	60	
Main Toilets						
	1.5	/ Men			50	T= 4 , S= 6 , U=4
	1.5	/ Women			50	T=8 , S=6
Gift shop					105	
Flower shop					45	
<b>Main Entrance Total Area=715m<sup>2</sup></b>						
<b>Mosque</b>						
praying area -men	0.65	/ Person	80	52	50	
praying area -women	0.65	/person	50	32	35	
Toilets						
	1.5	/ Men			27	T= 3 , S= 3 , U=3
	1.5	/ Women			27	T=5 , S=3
lobby	0.15	/ Person	130	19.5	20	
<b>Mosque Total Area=160m<sup>2</sup></b>						
<b>Pharmacy</b>						
Main store	0.4	/ bed	100	40	40	
Cold cure store	0.1	/ bed	100	10	20	
Drugs store	0.08	/ bed	100	8	25	
Supervisor office	0.1	/ bed	100	10	15	
laboratoy	3.5	/person	7	24.5	25	
office	15	/room	3	45	45	
Medicines Exchange	0.1	/ bed	100	10	30	
<b>Pharmacy Total Area=212m<sup>2</sup></b>						
<b>Cafeteria</b>						
Doctors area	1.6	/ Person	150	240	240	
Visitors	1.6	/ Person	225	360	360	
services	0.3	/ Person	375	112.5	190	
Toilets						
	1.5	/ Men			50	T=5 , S=4 , U=4
	1.5	/ Women			50	T=6 , S=4
Foyer	0.35	/person	375	160	150	
<b>Cafeteria Total Area=1,012m<sup>2</sup></b>						
<b>Atrium</b>						
<b>Atruim Total Area=3.075m<sup>2</sup></b>						
<b>Elevators</b>						
Main Elevator	9	/ elevator	4	36	36	W=3m , L= 3m
Secondary Elevator	12	/ elevator	4	48	48	W=3m , L= 4m
surgery elevator	9	/ elevator	2	18	18	W=3m , L= 3m
services elevator	12	/elevator	2	24	24	

# (4) Architectural Program

## Gynecological & Obstetrics Hospital

Corridor between them	12	/ elevator	3	36	40	W=3m , L= 4m
Corridors front of them	36	/ elevator	2	72	75	
<b><u>Stairs</u></b>						
Exit stairs	40	/stair	4	160	160	
surgery exit stair	40	/stair	1	40	40	
employee stairs	30	/stair	1	30	30	
<b>Vertical Circulations Total Area=471m<sup>2</sup></b>						
<b><u>Mortuary</u></b>						
Laying Hall	7.5	/ bed	6	45	50	
Waiting Areas	1.4	/ Person	100	140	120	
Cold Room	7.5	/ bed	9	67.5	70	
Dissection Room	10	/ Person	7	70	70	
Entrance Lobby	0.5	/ Person	140	70	70	
storage					85	
preparation room					22	
Record & Writing	10	/ Person	4	40	40	
casket room					28	
preparation room					20	
<b>Mortuary Clinics Total Area=670m<sup>2</sup></b>						
<b><u>Clinics</u></b>						
Breast Clinic	20	/Clinic	1	20	20	
Clinic diabetes	20	/Clinic	1	20	20	
Urodynamic clinic	20	/Clinic	1	20	20	
Family planning clinic	20	/Clinic	1	20	20	
Gynecologic oncology	20	/Clinic	1	20	20	
Pregnancy Clinic	20	/Clinic	1	20	20	
Gynecology Clinic	20	/Clinic	1	20	20	
Sterility clinic	20	/Clinic	1	20	20	
<b>Clinics Waiting areas</b>						
	1.4	/ Person	320	448	520	each clinic need 20 seat
<b>Toilets</b>						
	1.5	/ Men				T= 3 , S=3 , U=4
	1.5	/ Women				T=4 , S=3
service offices	20	/office	6	120	120	
<b>Nurse Station</b>	5	/ Person	16	80	100	2 nurse for each clinic
<b>Lounge</b>	0.1	/ Person	160	16	20	
Services					20	50% of lounge
<b>Reception desk</b>	0.1	/ Person	160	16	20	
seurity room					35	
wheeled stretcher area					20	
babies feeding room	17	/room	2	34	34	
<b>Outpatient Clinics Total Area=1,083m<sup>2</sup></b>						
<b><u>Radiology</u></b>						
X-Ray room	45	/ room	1	45	45	40+20 dressing & toilet <w:
Fluoroscopy	54	/ room	1	54	54	
CT scan	54	/ room	1	54	54	
Mammography	60	/ room	1	60	60	

# (4) Architectural Program

## Gynecological & Obstetrics Hospital

Ultra sound room	30	/ room	1	30	30	
MRI Magnetic Resonance	60	/ room	1	60	60	
mamography	9	/room	1	9	15	
nuclear medicine	40	/room	1	40	40	
Waiting area	1.4	/ Person	60	84	100	each room need 10 seat
Toilets						
	1.5	/ Men				T= 3 , S=3 , U=4
	1.5	/ Women				T=4 , S=3
service offices	25	/office	6	150	150	

**Radiology Total Area=853m2**

### Laboratories

laboratories	75	/ lab.	5	375	375	labs.with sink
Waiting area	1.4	/person	60	84	88	
Sterilization	50	/room		50	50	
Medical record	40	/room		40	40	
Sampling , Testing & Toilet	40	/room		40	40	
2 Toilets	10			10	10	
Pathologist room	40	/room		40	40	
Storage	50	/room		50	50	
staff lockers& toilets	80	/room		80	80	
toilets						
	1.5	/men			40	T= 5 , S= 4 , U=4
	1.5	/women			40	T=6 , S=4

**Clinics Total Area=853m2**

### Emergency

reception					125	
Area of emergency rooms	0.65	/ Person	100	65	100	10 rooms
Wheeled stretcher area	1	/ stretcher	20	20	20	
Nurse station	5	/ Person	20	100	100	2 nurse for each room
Waiting Areas	1.4	/ Person	150	210	218	
Equipments & Supply stor	0.3	/ Person	100	30	30	
clinics	20	/clinic	3	60	60	
staff lounge	3	/doctor	20	60	64	
head of department	30	/room	1	30	30	
storage					40	
movable radiology	15	/room	1	15	15	
Examination & Treatment v	7.5	/ bed	20	150	150	
Observation area	5	/ bed	15	75	75	
Toilets						
	1.5	/ Men	150			T= 4 , S= 6 , U=4
	1.5	/ Women	150			T=6 , S=8
staff lockers& toilets					100	
buffet					64	
revive room	15	/bed	3	45	45	
operation room	50	/room	1	50	50	min W=5m , A=30m2

**Emergency Total Area=1,286m2**

### Services

# (4) Architectural Program

## Gynecological & Obstetrics Hospital

electric room	25	/unit	2	50	50	
gases room	20	/unit	2	50	40	
solid utilities	64	/unit	1	64	64	
electromechanical	64	/unit	1	64	64	
house keeping & janitor	35	/unit	1	35	35	
medical storage	30	/unit	1	30	30	
<b>Services Spaces Total Area=283m<sup>2</sup></b>						
<b>Ground Floor Total Area=12,550m<sup>2</sup></b>						
<b><u>Intensive care</u></b>						
air lock					45	
unit	18	/ bed	4	72	83	min W=4m
private room	33	/ Room	4	132	132	
isolation room	20	/ Room	2	40	40	
nurse station	5	/ Person	10	50	50	
Drugs store	0.08	/bed	24	1.92	5	
dr/station	5	/ Person	4	20	20	
staff lockers& toilets	5	/person	12	60	70	
waiting Areas "visitors"	1.4	/person	100	140	140	
toilets						
	1.5	/woman	21		15	T=2, S=3
	1.5	/man	1		15	T=2 , S=3, U=2
storage	50	/ Room	1	50	50	
dirty storage	25	/ Room	1	25	25	
movable radiology	20	/ Room	1	20	20	
lobby					60	
laboratory	4	/room	7	28	35	
<b><u>Pediatrics ICU</u></b>						
unit	9	/bed	5	45	100	
nurse station	5	/person	2	10	10	
Drugs store	0.08	/ bed	24	1.92	5	
sterilization					30	
<b>Intensive Care Total Area=1,000m<sup>2</sup></b>						
<b><u>Surgical department</u></b>						
operation room	30	/room	4	120	120	min W=5m , A=30m <sup>2</sup>
specialized operation room	60	/room	4	240	280	min W=6m , A=50m <sup>2</sup>
preparation room	8	/bed	6	48	120	
toilets & shower					40	T=4 , S=4 , shower 4
anesthesia room	15	/room	6	90	100	
non- sterilization room					45	
sterilization & storage					35	
recovery room	17	/patient	7	119	150	min.A=17m <sup>2</sup>
nurse station					20	
handwash	6	/ o.room	6	36	40	
change room	2	/person	12	24	24	
head department	25	/person	2	50	55	
medical report	5	/person	5	25	25	

# (4) Architectural Program

## Gynecological & Obstetrics Hospital

sub-sterilizing	4.65	/o.room	15	69.75	75	
Drugs store	0.08	/bed	15	1.2	5	
equipments storage	4	/o.room	8	32	25	
janitor room	3.9	/ closet	2	7.8	10	
toilets						
	1.5	/woman			15	T=3 , S=3
	1.5	/man			15	T=3 , S=3, U=2
rest room					50	
anesthesia staff room					25	
clean storage					25	
dirty storage					25	
blood store					25	
<b>Surgical Department Total Area=1,930m2</b>						
<b><u>One day care</u></b>						
archive	5	/person	4	20	20	
medical report	5	/person	4	20	20	
waiting area	1.4	/person	65	91	95	
examination room	20	/room	1	20	20	
anesthesia room	15	/room	10	150	200	
recovery	12	/patient	15	180	200	min.A=8m2
buffet	0.3	/ Person	25	7.5	10	
patient rest room					35	
kids playing room					25	
toilets						
	1.5	/woman			15	T=3 , S=3
	1.5	/man			15	T=3 , S=3, U=2
air lock zone					18	
<b>One Day Care Total Area=798m2</b>						
<b><u>service zone</u></b>						
general storage					64	
food prepration room					40	
house keeping room					35	
clothes storage					30	
solid utilities room					30	
electromechanical room					64	
lobby					50	
<b>Services Zone Total Area=350m2</b>						
<b><u>Administration</u></b>						
total area	4.65	/bed	100	465	500	
inner court					175	
Toilets						
	1.5	/ Men			30	T=3 , S=3
	1.5	/ Women			30	T=3 , S=3, U=2
lounge					50	
office					20	
<b>Administration Total Area=805m2</b>						
<b><u>Specialized clinics</u></b>						

# (4) Architectural Program

## Gynecological & Obstetrics Hospital

clinic area	20	/Clinic	11	220	220	
Clinics Waiting areas						
	1.4	/ Person	220	308	337	each clinic need 20 seat
Toilets						
	1.5	/ Men			27	T= 3 , S= 3 , U=3
	1.5	/ Women			27	T=4, S=3
Nurse Station						
	5	/ Person	20	100	100	2 nurse for each clinic
storage					20	

**Specialized Clinics Total Area=711m2**

**First Floor Total Area=7,125m2**

<b><u>Private room</u></b>						
Room	40	/ Room	21	840	840	
Bath room	10	/ Room	21	210	210	
<b><u>Double room</u></b>						
Room	35	/ room	7	245	245	
Bath room	8	/ Room	7	56	56	
<b><u>Isolated room</u></b>						
Isolated room	52	/ Room	4	208	208	
Bath room	10	/ Room	4	40	40	
Isolated room	47	/ Room	1	47	47	
Bath room	8	/ Room	1	8	8	
<b><u>secondary Nursing Station</u></b>						2/Station
Nurse station	12	/ Nurse	6	72	80	
services room	17	/room	2	34	34	
storage	17	/ Nurse	2	34	34	
air lock	17	/nurse stat.	2	34	34	
<b><u>Sevices for patients&amp;Visitors</u></b>						
Lounge	100	/ lounge	2	200	212	
toilets	54	/ Floor	2	108		
	1.5	/ Men			27	T= 3 , S= 3 , U=3
	1.5	/ Women			27	T=4, S=3
inner courts					648	

**Wards Total Area=3,950m2**

**Vertical Circulations Total Area=863m2**

<b><u>Sevices for doctors</u></b>						
Department Manager	46.5	/ Floor	1	46.5		
Toilet	3.5	/ Floor	1	3.5		
Multi Purpose Room	40	/ Floor	1	40		
dr/ rest room	25	/ Floor	1	25		

**Doctors Services Zone Total Area=144m2**

<b><u>Main nurse station</u></b>						
supervisor room	20	/ Floor	1	20	20	
Storage for drugs	12	/ Floor	1	12	12	
Archive	18	/ Floor	1	18	18`	
medical report	17	/ Floor	1	17	17	
toilets						

# (4) Architectural Program

## Gynecological & Obstetrics Hospital

toilets	1.5	/ Men			27	T= 3 , S= 3 , U=3
	1.5	/ Women			27	T=4, S=3
Changing Clothes	50	/ Floor	1	50	50	
examination room	18	/ Floor	1	18	18	min. 12m2
lounge	18	/ Floor	1	18	18	
babies feeding room	18	/ Floor	1	18	18	
nurse station	20	/ Floor	1	20	20	
<b>Main Nurse Station Total Area=245m2</b>						
<b>Secondary Services</b>						
Food preparing and deliver	40	/ Floor	1	40	40	
Storage for clothes	25	/ Floor	1	25	25	
Clean room for Steriled stu	15	/ Floor	1	15	15	
House Keeping	20	/ Floor	1	20	20	
Solid utility room	20	/ Floor	1	20	20	
Storage for vehicles	20	/ Floor	1	20	20	
medical equip. Storage	20	/ Floor	1	20	20	
General Storage	50	/ Floor	1	50	50	
electro mechanical room	80	/ Floor	1	80	80	
<b>Secondary Services Total Area=290m2</b>						
<b>Service Zone TotalArea=863m2</b>						
<b>Second Floor Total Area=5,190m2</b>						
<b>Double room</b>						
Room	35	/ room	27	945	945	
Bath room	8	/ Room	27	216	216	
<b>Isolation room</b>						
Isolated room	47	/ Room	5	235	235	
Bath room	8	/ Room	5	40	40	
<b>secondary Nursing Station</b>						
Nurse station	12	/ Nurse	6	72	80	
services room	17	/room	2	34	34	
storage	17	/ Nurse	2	34	34	
air lock	17	/nurse stat.	2	34	34	
<b>Sevices for patients&amp;Visitors</b>						
Lounge	100	/ lounge	2	200	212	
toilets	54	/ Floor	2	108		
	1.5	/ Men			27	T= 3 , S= 3 , U=3
	1.5	/ Women			27	T=4, S=3
newborn nursery					218	
<b>Wards total area=3.293m2</b>						
<b>vertical circulations total area=863m2</b>						
<b>Sevices for doctors</b>						
Department Manager	46.5	/ Floor	1	46.5		
Toilet	3.5	/ Floor	1	3.5		
Multi Purpose Room	40	/ Floor	1	40		
dr/ rest room	25	/ Floor	1	25		
<b>Doctors services zone total area=144m2</b>						

# (4) Architectural Program

<b>Gynecological &amp; Obstetrics Hospital</b>						
<b>Main nurse station</b>						
supervisor room	20	/ Floor	1	20	20	
Storage for drugs	12	/ Floor	1	12	12	
Archive	18	/ Floor	1	18	18	
medical report	17	/ Floor	1	17	17	
toilets						
	1.5	/ Men			27	T= 3 , S= 3 , U=3
	1.5	/ Women			27	T=4, S=3
Changing Clothes	50	/ Floor	1	50	50	
examination room	18	/ Floor	1	18	18	min. 12m2
lounge	18	/ Floor	1	18	18	
babies feeding room	18	/ Floor	1	18	18	
nurse station	20	/ Floor	1	20	20	
<b>main nurse station total area=245m2</b>						
<b>Secondary Services</b>						
Food preparing and deliver	40	/ Floor	1	40	40	
Storage for clothes	25	/ Floor	1	25	25	
Clean room for Steriled stu	15	/ Floor	1	15	15	
House Keeping	20	/ Floor	1	20	20	
Solid utility room	20	/ Floor	1	20	20	
Storage for vehicles	20	/ Floor	1	20	20	
medical equip. Storage	20	/ Floor	1	20	20	
General Storage	50	/ Floor	1	50	50	
electro mechanical room	80	/ Floor	1	80	80	
<b>Services Zone Total Area=290m2</b>						
<b>Services Zone Total Area=863m2</b>						
<b>Third Floor Total Area=4.533m2</b>						

## (4-1-3) Cancer Research Center:

Space	area / unit	Unit	No.	Total	pproximatio	Notes
<b>Main Entrance</b>						
Information & Reception	0.65	/ Person	300	195	200	
Security & social services	20	/ Room	7	140	140	
Waiting Areas	1.4	/ Person	100	140	140	
Entrance Lobby	0.5	/ Person	100	50	60	
Main Toilets						
	1.5	/ Men			50	T= 4 , S= 6 , U=4
	1.5	/ Women			50	T=8 , S=6
Back offices	25	/room	2	50	50	
<b>Main Entrance Total Area=695m2</b>						
<b>Cafeteria</b>						
Doctors area	1.6	/ Person	160	256	270	
services	0.3	/ Person	160	48	40	
Toilets						
	1.5	/ Men			50	T=5 , S=4 , U=4
	1.5	/ Women			50	T=6 , S=4

# (4) Architectural Program

## Cancer Research Center

Foyer	0.35	/person	160	56	70	
<b>Cafeteria Total Area=480m2</b>						
<u>Inner garden</u>					700	
<b>Inner Garden Total Area=700m2</b>						
<u>Elevators</u>						
Panoramic elevator	6	/ elevator	4	24	24	W=3m , L= 2m
services elevator	12	/elevator	2	24	24	W=3m , L= 4m
Corridor between them	12	/ elevator	3	36	40	
<u>stairs</u>						
main stairs	50	/stair	1	50	50	
Exit stairs	40	/stair	4	160	160	
<b>Vertical Circulations Total Area=298m2</b>						
<u>Radiology</u>						
X-Ray room	45	/ room	1	45	45	40+20 dressing & toilet <w:
Fluoroscopy	54	/ room	1	54	54	
CT scan	54	/ room	1	54	54	
Mammography	60	/ room	1	60	60	
Ultra sound room	30	/ room	1	30	30	
MRI Magnetic Resonance	60	/ room	1	60	60	
mamography	9	/room	1	9	15	
nuclear medicine	40	/room	1	40	40	each room need 10 seat
Waiting area	1.4	/ Person	100	140	140	
Toilets						
	1.5	/ Men			27	T= 3 , S=3 , U=4
	1.5	/ Women			27	T=4 , S=3
service offices	30	/office	2	60	60	
medical reports	20	/office	1	20	20	
<b>Radiology Total Area=548m2</b>						
<u>Services</u>						
electric room	25	/unit	2	50	50	
gases room	20	/unit	1	20	20	
Solid utilities	20	/floor	1	20	20	
Electromechanical	64	/floor	1	64	64	
House keeping	25	/floor	1	25	25	
Janitor room	10	/floor	1	10	10	
lobby					70	
<b>Services Total Area=210m2</b>						
<u>Administration</u>						
Employees entrance	0.5	/ Person	100	50	45	
Reception & Waiting Area	1.4	/ Person	140	200	200	
Back Offices	15	/office	2	30	30	
Total area	12	/employee	18	216	216	
Manager Office	78	/room	1	78	78	
Toilets						
	1.5	/ Men			20	T=2 , S=2 , U=3
	1.5	/ Women			13.5	T=2 , S=3
Storage					35	

# (4)Architectural Program

## Cancer Research Center

office					20	
<b>Administration Total Area=733m2</b>						
<b>library</b>						
Library Area	2.7	/ Person	190	513	523	
Book Storage					70	
Digital Library	1.6	/ Person	53	84.8	95	
Supervisor storage	30	/room	1	30	30	
					20	
<b>Library Total Area=733m2</b>						
<b>Multi-Purpose Hall</b>						
M.P.H	1.5	/ Person	250	375	430	
Foyer	0.5	/hall area	430	215	220	
Buffet					100	
Toilets	1.5	/ Men			40	T=5 , S=4, U=4
	1.5	/ Women			30	T=6 , S=4
<b>M.P.H Total Area=820m2</b>						
<b>Ground FloorTotal Area=6077m2</b>						
<b>Private room</b>						
Room	35	/ Room	6	210	210	
Bath room	8	/ Room	6	48	48	
<b>Double room</b>						
Room	35	/ room	6	210	210	
Bath room	8	/ Room	6	48	48	
<b>secondary Nursing Station</b>						2/Station
Nurse station	12	/ Nurse	3	36	36	
services room	17	/room	1	17	17	
storage	17	/ Nurse	1	17	17	
air lock	17	/nurse stat.	1	17	17	
<b>Sevices for patients &amp; Visitors</b>						
Lounge	30	/ lounge	1	30	30	
toilets	54	/ Floor	1	54		
	1.5	/ Men			27	T= 2 , S= 3 , U=2
	1.5	/ Women			27	T=2, S=3
<b>Wards Total Area=820m2</b>						
<b>Elevators</b>						
Panoramic elevator	6	/ elevator	4	24	24	W=3m , L= 2m
services elevator	12	/elevator	2	24	24	W=3m , L= 4m
Corridor between them	12	/ elevator	3	36	40	
<b>stairs</b>						
main stairs	50	/stair	1	50	50	
Exit stairs	40	/stair	4	160	160	
<b>Vertical Circulations Total Area=298m2</b>						
<b>Sevices for doctors</b>						
Department Manager	46.5	/ Floor	1	46.5	46.5	
Toilet	3.5	/ Floor	1	3.5	3.5	
Multi Purpose Room	40	/ Floor	1	40	40	

# (4) Architectural Program

## Cancer Research Center

dr/ rest room	25	/ Floor	1	25	25	
<b>Doctors Services Total Area=144m<sup>2</sup></b>						
<b>Main nurse station</b>						
supervisor room	20	/ Floor	1	20	20	
Storage for drugs	12	/ Floor	1	12	12	
Archive	18	/ Floor	1	18	18	
medical report	17	/ Floor	1	17	17	
toilets						
	1.5	/ Men			27	T= 3 , S= 3 , U=3
	1.5	/ Women			27	T=4, S=3
Changing Clothes	50	/ Floor	1	50	50	
examination room	18	/ Floor	1	18	18	min. 12m <sup>2</sup>
lounge	18	/ Floor	1	18	18	
babies feeding room	18	/ Floor	1	18	18	
nurse station	20	/ Floor	1	20	20	
<b>Main nurse station Total Area=245m<sup>2</sup></b>						
<b>Secondary Services</b>						
Food preparing and deliver	40	/ Floor	1	40	40	
Storage for clothes	25	/ Floor	1	25	25	
Clean room for Steriled stu	15	/ Floor	1	15	15	
House Keeping	20	/ Floor	1	20	20	
Solid utility room	20	/ Floor	1	20	20	
Storage for vehicles	20	/ Floor	1	20	20	
medical equip. Storage	20	/ Floor	1	20	20	
General Storage	50	/ Floor	1	50	50	
electro mechanical room	80	/ Floor	1	80	80	
<b>Secondry Services Total Area=290m<sup>2</sup></b>						
<b>Main nurse station Total Area=727m<sup>2</sup></b>						
<b>Clinics</b>						
Clinic	20	/Clinic	9	180	180	
<b>Clinics Waiting areas</b>	1.4	/ Person	18	25.2	35	each clinic need 20 seat
<b>Toilets</b>						
	1.5	/ Men			27	T= 3 , S=3 , U=4
	1.5	/ Women			27	T=4 , S=3
<b>Nurse Station</b>	5	/ Person	3	15	17	
service offices	20	/office	2	40	40	
<b>Clinics Total Area=370m<sup>2</sup></b>						
<b>Laboratories</b>						
laboratories	5	/ doctor	140	700	700	labs.with sink
Waiting area						88
Sterilzation	25	/room	1	25	25	
Medical record	26	/room	1	25	25	
Sampling	27	/room	1	25	25	
Testing	28	/room	1	25	25	
Blood bank	29	/room	1	25	25	
Blood storage	30	/room	1	25	25	
Pathologist room	35	/room	2	70	70	

# (4) Architectural Program

Cancer Research Center	Storage				80	
	toilets					
	1.5	/men		30	T= 3 , S= 3 , U=3	
	1.5	/women		30	T=4 , S=3	
	<b>Laboratory Total Area=1,390m<sup>2</sup></b>					
	<b>Researchers offices</b>					
	Office area	35	/office	30	1050	1050
	Toilets					
	1.5	/ Men		30	T=3 , S=3	
	1.5	/ Women		30	T=3 , S=3, U=2	
	Head of department	40	/room	1	40	40
	Meeting room	24	/room	1	25	25
	Secrtery	25	/room	1	25	25
	<b>Offices Total Area=1,2503m<sup>2</sup></b>					
	<b>Elevators</b>					
	Panoramic elevator	6	/ elevator	4	24	24 W=3m , L= 2m
	services elevator	12	/elevator	2	24	24 W=3m , L= 4m
	Corridor between them	12	/ elevator	3	36	40
	<b>stairs</b>					
	main stairs	50	/stair	1	50	50
	Exit stairs	40	/stair	4	160	160
	<b>Vertical Circulations Total Area=298m<sup>2</sup></b>					
	<b>First Floor Total Area=7.918m<sup>2</sup></b>					
	<b>Researchers offices</b>					
	Office area	35	/office	24	840	840
	Toilets					
	1.5	/ Men		30	T=3 , S=3	
	1.5	/ Women		30	T=3 , S=3, U=2	
	Head of department	40	/room	1	40	40
	Meeting room	24	/room	1	25	25
	Secrtery	25	/room	1	25	25
	<b>Offices Total Area=1,165m<sup>2</sup></b>					
	<b>Elevators</b>					
	Panoramic elevator	6	/ elevator	2	12	12 W=3m , L= 2m
	<b>stairs</b>					
	main stairs	50	/stair	1	50	50
	Exit stairs	40	/stair	1	40	40
	<b>Vertical Circulations Total Area=102m<sup>2</sup></b>					
	<b>Second Floor Total Area=1.267m<sup>2</sup></b>					

## (4-2) Conclusion of Architectural Program:

Project	NO. of Floors	Foot print Area	Total Plot Area
Pediatric Hospital	6	24,322	68,788
Gynecological & Obstetrics Hospital	4	12,550	26,711
Research Center	3	6,077	11,539

# (4)Architectural Program

## (4-3) Pie Chart:

### (4-3-1) Pediatric Hospital:

#### a. Pediatric Hospital Ground Floor Plan

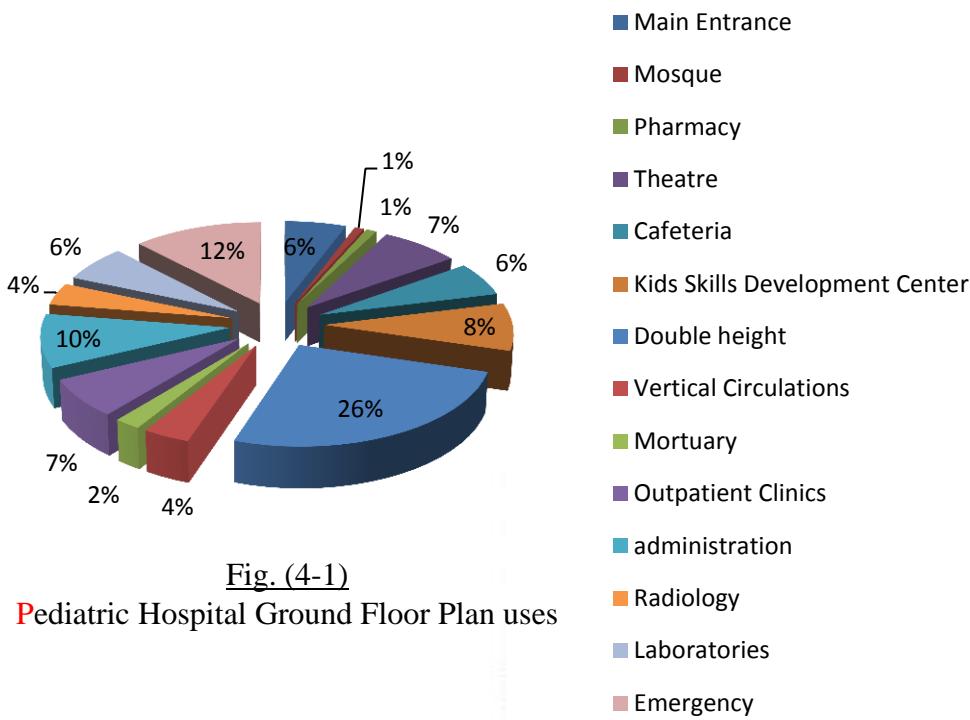


Fig. (4-1)  
Pediatric Hospital Ground Floor Plan uses

#### b. Pediatric Hospital First Floor Plan

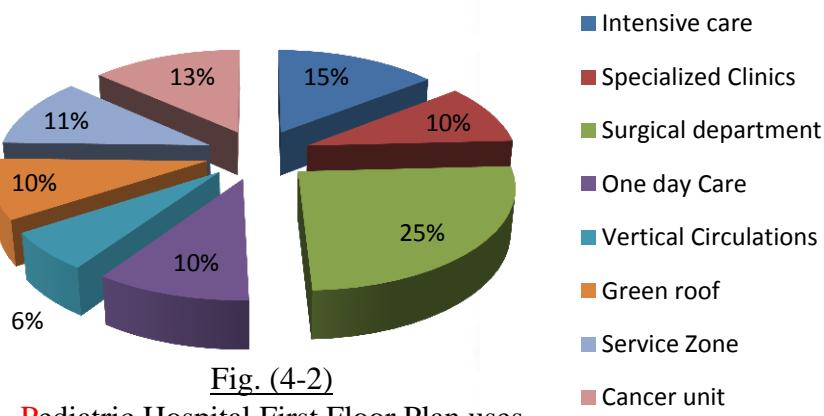


Fig. (4-2)  
Pediatric Hospital First Floor Plan uses

#### c. Pediatric Hospital Second Floor Plan

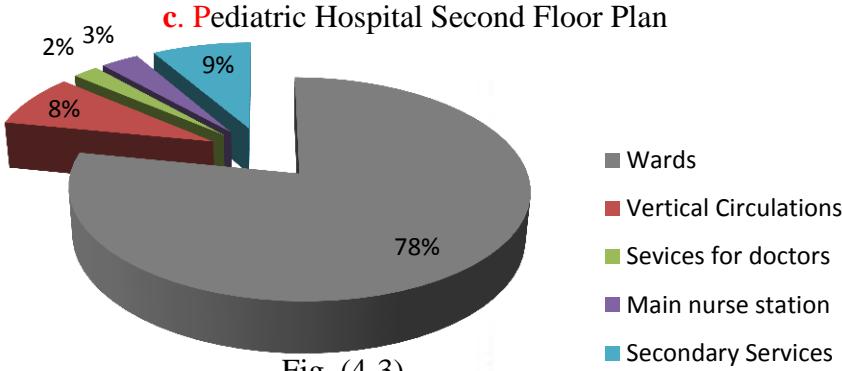


Fig. (4-3)  
Pediatric Hospital Second Floor Plan uses

# (4)Architectural Program

d. Pediatric Hospital Third Floor Plan

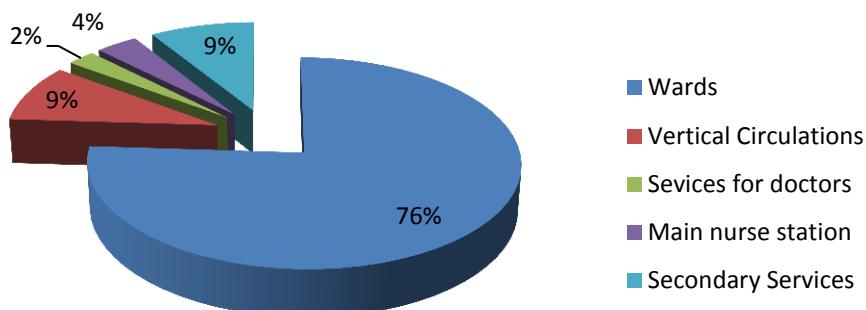


Fig. (4-4)

Pediatric Hospital Third Floor Plan uses

e. Pediatric Hospital Fourth Floor Plan

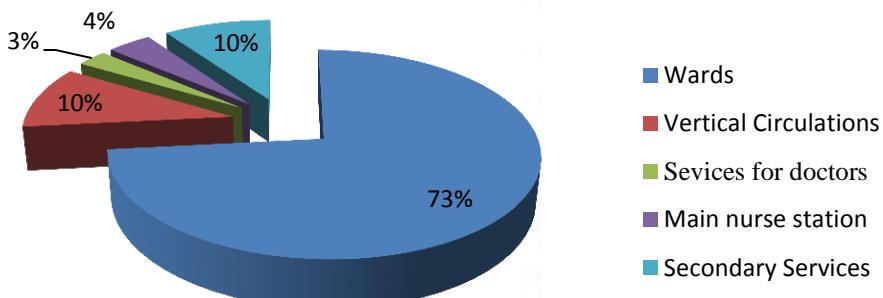


Fig. (4-5)

Pediatric Hospital Fourth Floor Plan uses

f. Pediatric Hospital Fifth Floor Plan

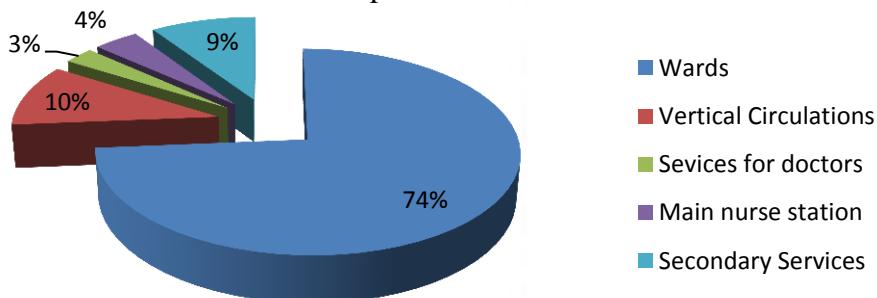


Fig. (4-6)

Pediatric Hospital Fifth Floor Plan uses

# (4) Architectural Program

## (4-3-2) Gynecological & Obstetrics Hospital :

### a. Gynecological & Obstetrics Hospital Ground Floor Plan

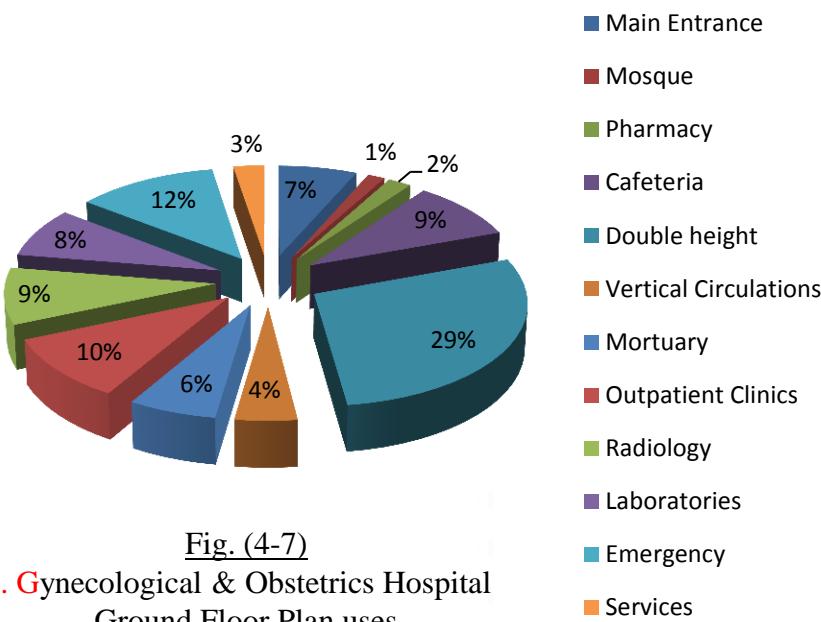


Fig. (4-7)

. Gynecological & Obstetrics Hospital  
Ground Floor Plan uses

Main Entrance

Mosque

Pharmacy

Cafeteria

Double height

Vertical Circulations

Mortuary

Outpatient Clinics

Radiology

Laboratories

Emergency

Services

### b. Gynecological & Obstetrics Hospital First Floor Plan

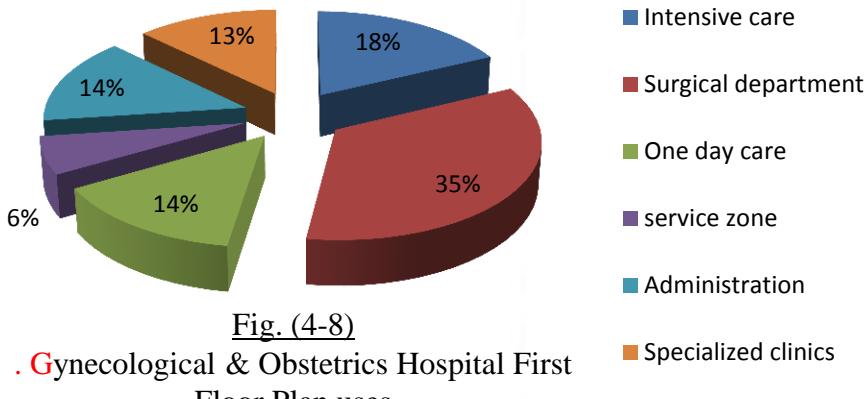


Fig. (4-8)

. Gynecological & Obstetrics Hospital First  
Floor Plan uses

Intensive care

Surgical department

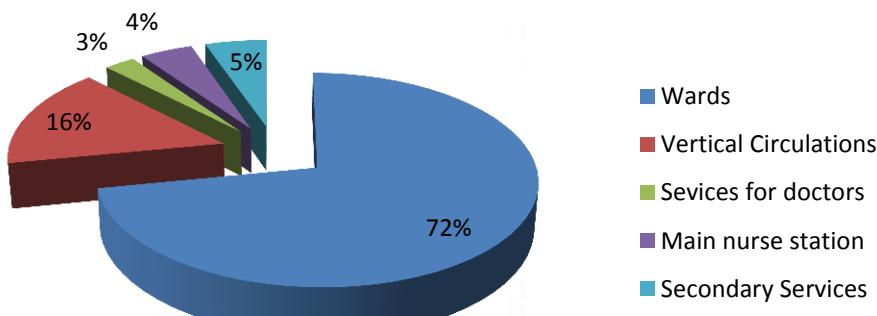
One day care

service zone

Administration

Specialized clinics

### c. Gynecological & Obstetrics Hospital Second Floor Plan



Wards

Vertical Circulations

Services for doctors

Main nurse station

Secondary Services

Fig. (4-9)

. Gynecological & Obstetrics Hospital  
Second Floor Plan uses

# (4)Architectural Program

d. Gynecological & Obstetrics Hospital Third Floor Plan

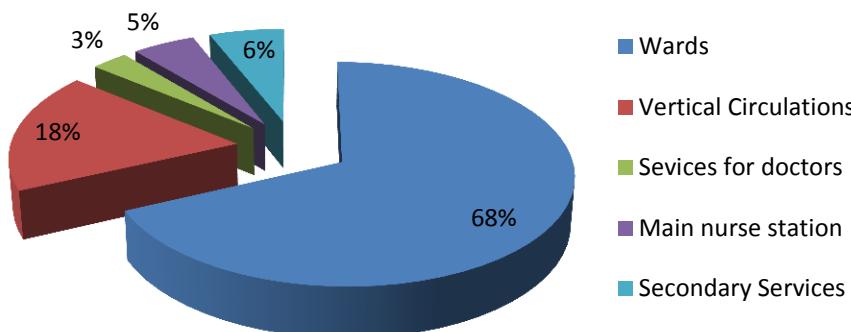


Fig. (4-10)

. Gynecological & Obstetrics Hospital Third Floor Plan uses

(4-3-3) Research Center:

a. Research Center Ground Floor Plan

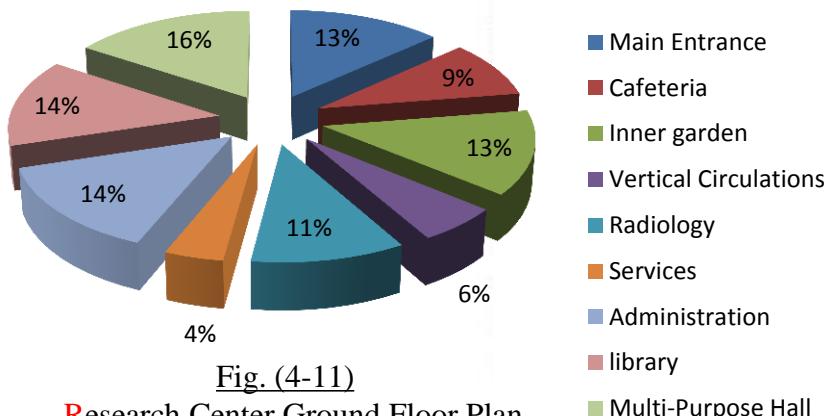


Fig. (4-11)

. Research Center Ground Floor Plan uses

b. Research Center First Floor Plan

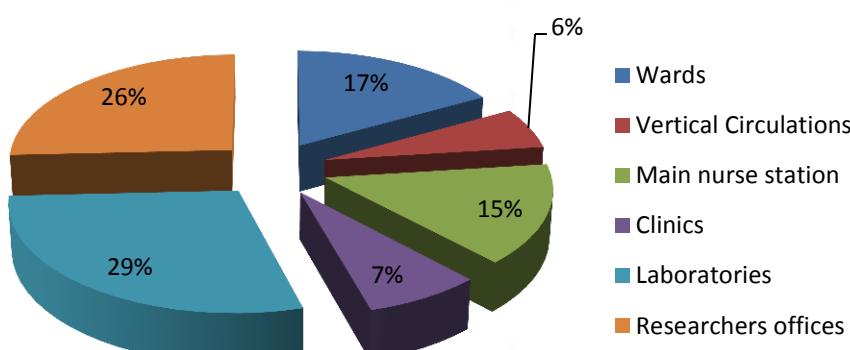


Fig. (4-12)

. Research Center First Floor Plan uses

# (4) Architectural Program

c. Research Center Second Floor Plan

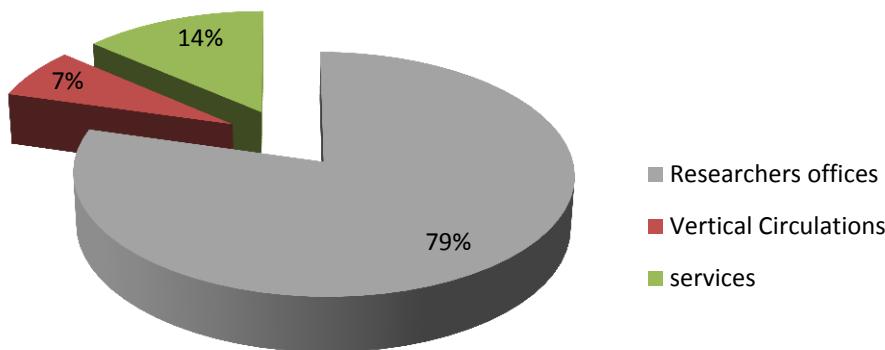


Fig. (4-13)  
Research Center Second Floor Plan  
uses

(4-3-4) Comparison between Three Projects Plot Area:

a. Total Plot Area of Each Project

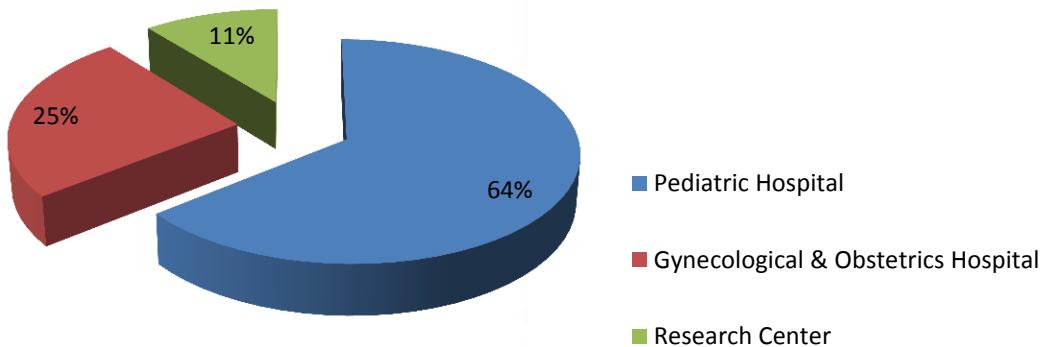


Fig. (4-14)  
Three Projects Plot Area

# (5)Programmatic Concepts

## (5) Programmatic Concepts

### (5-1) Priority

The site has many buildings which differ in its function for example:

- Resort
- commercial Tower
- Mall
- Medical Zone

The main activity is for the medical zone, so the priority goes for the healthcare city. That's why each hospital has its Main-Emergency entrance and Exit.

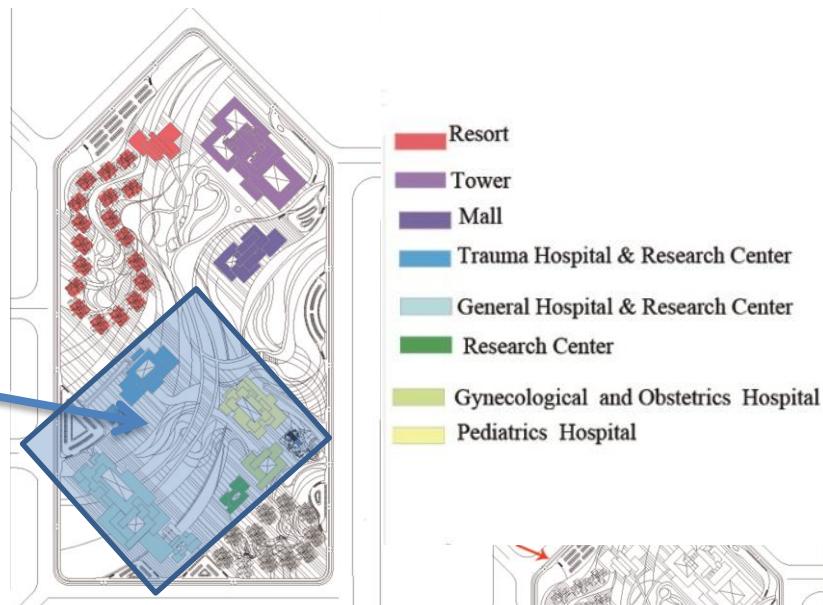


Fig. (5-1)  
Zoning



Fig. (5-2)  
Entrances

### (5-2) Hierarchy

The project consists of commercial zoning (commercial tower -mall )and the medical zoning (Trauma-General-Pediatrics- Gynecological and Obstetrics hospitals).

The hierarchy of the buildings appear in the sky line, which is very high in the tower and reduces gradually then start to high again in the general hospital.



Fig. (5-3)  
Skyline

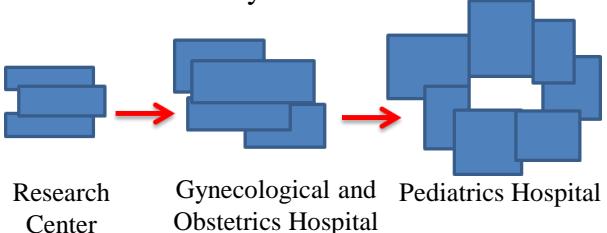


Fig. (5-4)  
Different Scale Buildings

### (5-2-2)Buildings

There is Hierarchy in the scale of the squares & rectangles to serve the design concept of the activity levels to age of human levels which is much more hyper for children when they become older.

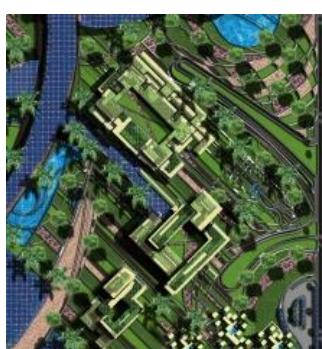


Figure (5-5)  
Buildings

# (5)Programmatic Concepts

## (5-3) Character

### **(5-3-1)Layout**

The organic lines of the landscape that combines with the nature around.

The enclosure of the buildings which refers to the safety and security



### **(5-3-2)Pediatrics Hospital**

Feeling of the meccano of the small objects not bulk buildings.

Fig. (5-6)  
Layout

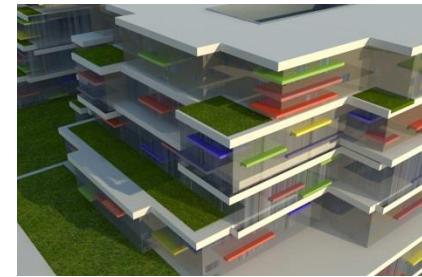
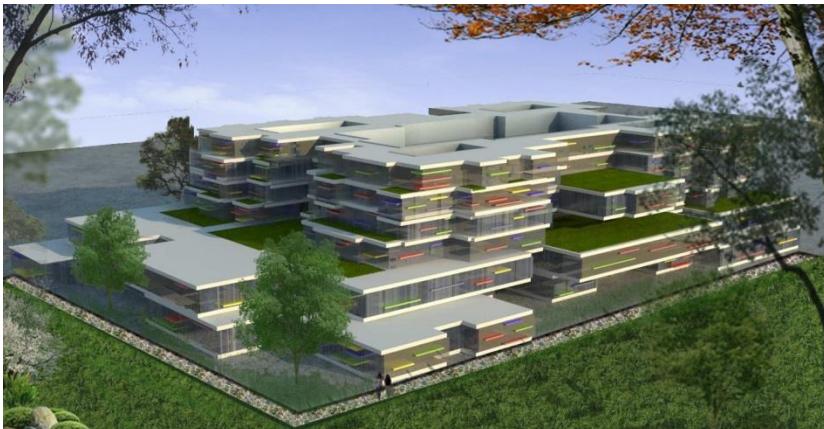


Fig. (5-8)  
3D Shot(2)

Fig. (5-7)  
3D Shot(1)

## (5-4) Service Grouping

Main services of the building are located in the basement floor like (Laundry-Kitchen-Storages-...).

The service zone in the floors is located in South to exploit north orientation for other spaces.

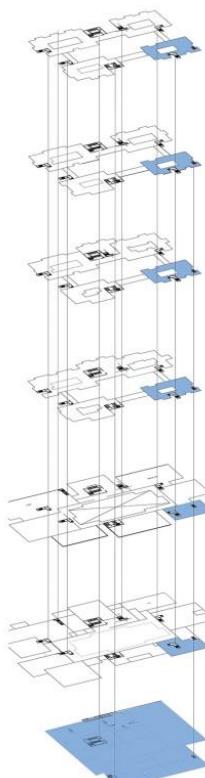


Fig. (5-9)  
Services

# (5)Programmatic Concepts

## (5-5) Activity Grouping

### (5-5-1) Layout

Each activity has its zone and plaza.  
(Commercial-Medical) zones.

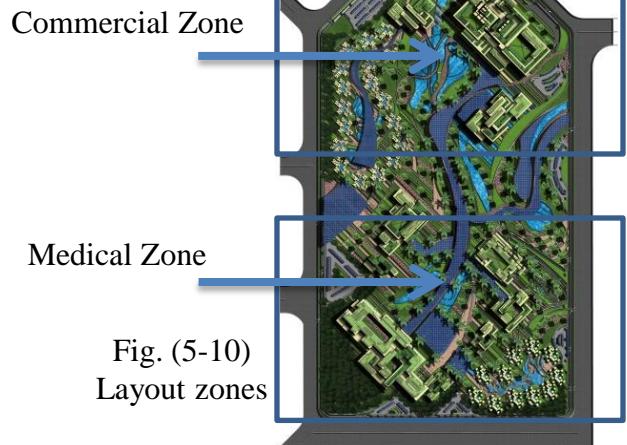


Fig. (5-10)  
Layout zones

### (5-5-2) Pediatrics Hospital

Grouping is generally done according to similarity of duties.



INSIDE

OUTSIDE

Fig. (5-11)  
Hospital departments

## (5-6) People Grouping

### (5-6-1) Layout

There are two main plazas where people can gather.

The medical zone has its own plaza as a node point where people enter and gather first, then they separate to each hospital.



Fig. (5-12)  
Medical Plaza

Commercial Plaza

Medical Plaza

Fig. (5-13)  
Layout

### (5-6-2) Pediatrics Hospital

Employees, Doctors, patients and visitors, each group has its own circulation which doesn't interfere with another.

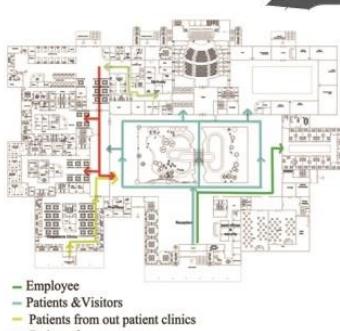


Figure (5-14)  
People grouping

# (5)Programmatic Concepts

## (5-7) Relationships

### (5-7-1) Layout

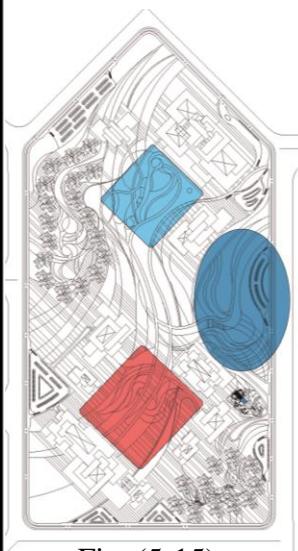


Fig. (5-15)  
Plazas



Fig. (5-16)  
Solid & Void

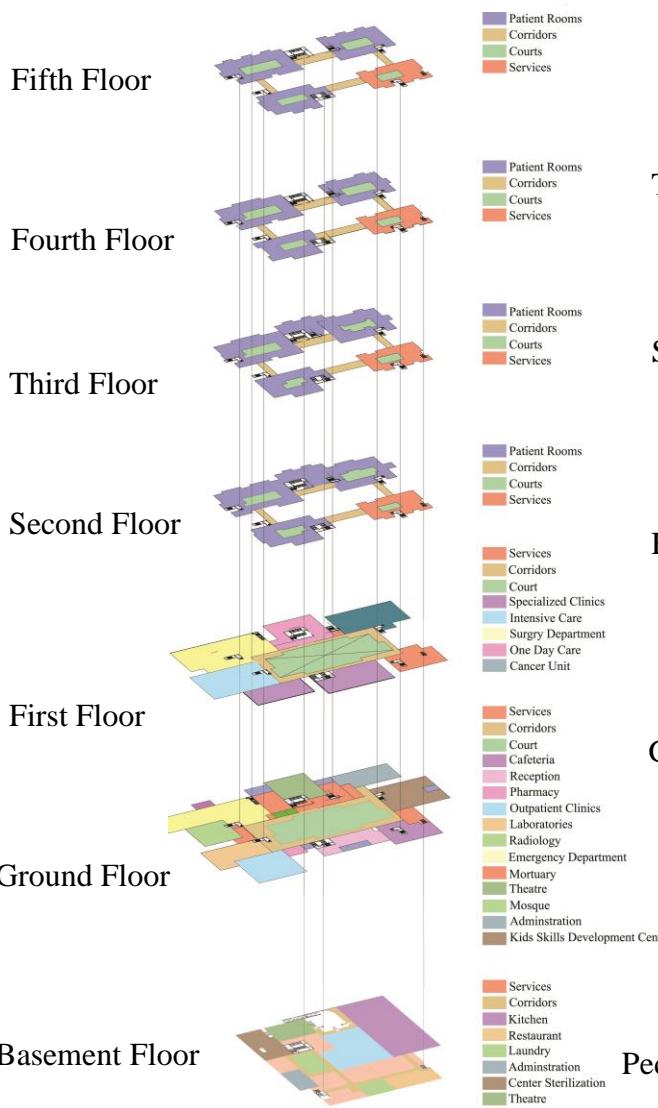


Fig. (5-17)  
Solid & Void

- Resort
- Tower
- Mall
- Trauma Hospital & Research Center
- General Hospital & Research Center
- Research Center
- Gynecological and Obstetrics Hospital
- Pediatrics Hospital

### (5-7-2) Hospitals

#### a-Pediatrics Hospital



#### b-Gynecological and Obstetrics Hospital

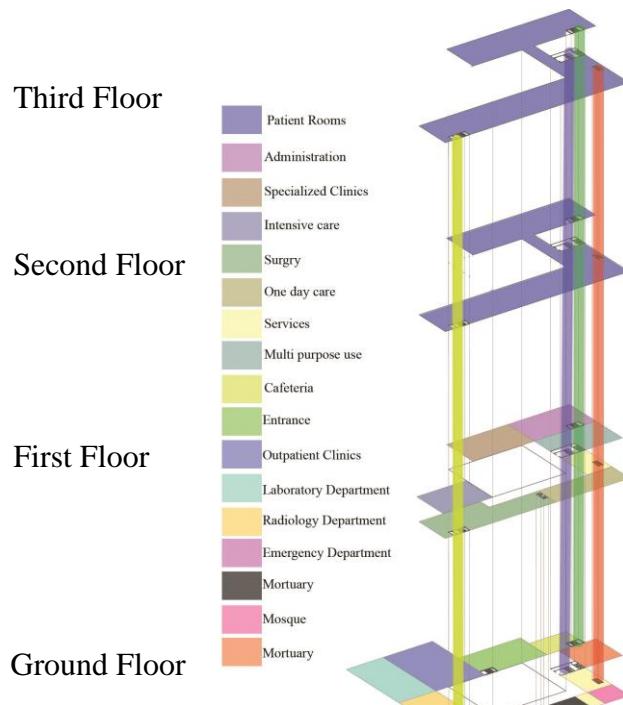


Figure (5-18)  
Gynecological and Obstetrics hospital  
3d zoning

Figure (5-19)  
Pediatrics hospital 3d zoning

# (5) Programmatic Concepts

## (5-8) Communications

### (5-8-1) Pediatrics Hospital

There are zones that must be connected to each other, for example :

- Radiology and laboratory department must be in a mutual place between outpatient clinics and emergency department.

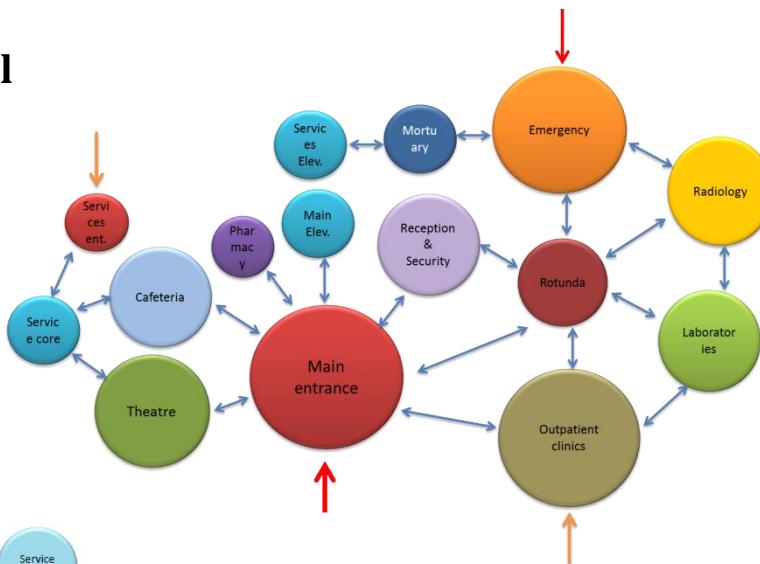


Fig. (5-20)  
Ground Floor

- Intensive care must be connected to the surgical zone.

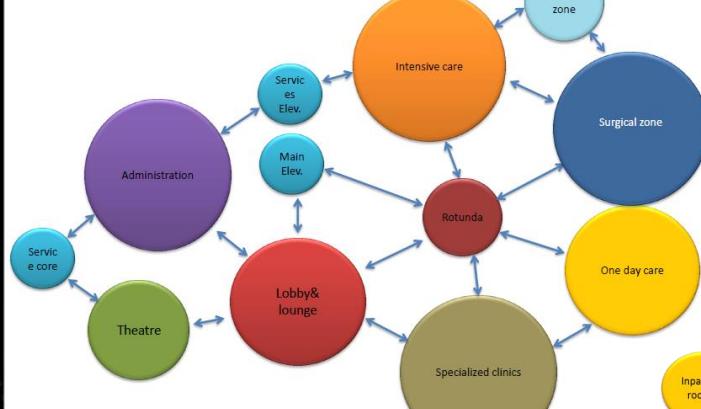


Fig. (5-21)  
First Floor

- Nurse station must be centralized and connected to all of the inpatient rooms.

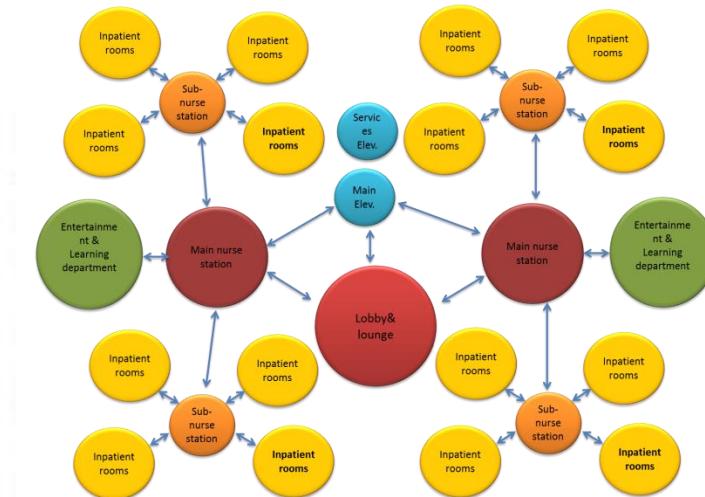


Fig. (5-22)  
Typical Floor

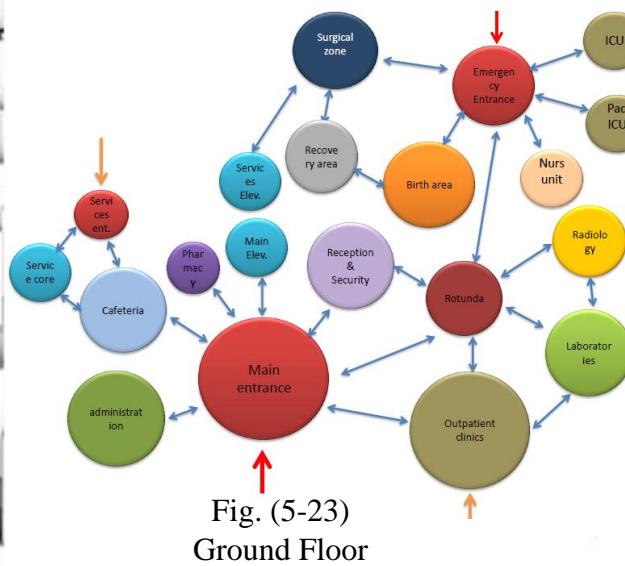


Fig. (5-23)  
Ground Floor

### (5-8-2) Gynecological and Obstetrics Hospital

# (5)Programmatic Concepts

## (5-9)Neighbors

### **(5-9-1)Surrounding Services :**

Our location is near to the educational & entertainment services at which there is many children



Fig. (5-24)  
Surrounding services

### **(5-9-2)Surrounding Views :**

Our location looks at natural lake from side & the park from the other side

As the need mitigate stress is magnified when the patient are children as that is a must to make a link between the children & the surrounding environment.



Fig. (5-25)  
Surrounding views

## (5-10)Accessibility

### **(5-10-1)The City:**

- The site is Located in the center of western desert ,200km Cairo from the east ,70 km from El-Alameen from north and 100 km from Alexandria from east .
- The city is located at main roads Including the way to Cairo , faoum and El-Alameen



Fig. (5-26)  
Surroundings



Fig. (5-28)  
Entrances and exits

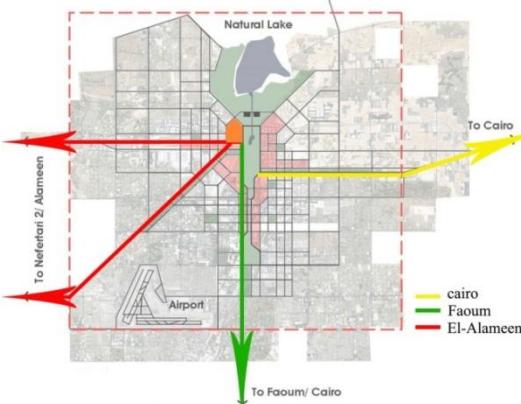


Fig. (5-27)  
Main roads

Fig. (5-29)  
Parking

# (5)Programmatic Concepts

## (5-11)Separated / Mixed Flow

### (5-11-1)Layout

- Car Roads are separated to avoid accidents.
- There are roads only for emergency that connect to hospitals.
- Pedestrian road is separated and people can reach to the hospital either by walk or by electric cars.
- Parking was placed to be below the streets level to avoid car exhausts.



Fig. (5-31)  
Layout

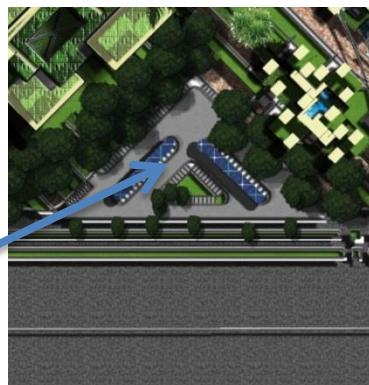


Fig. (5-32)  
Parking



Fig. (5-30)  
Paths



Fig. (5-33)  
Parking 3D



Fig. (5-34)  
Layout section

### (5-11-2)Pediatrics Hospital

Employees, Doctors, patients and visitors, each group has its own circulation which doesn't interfere with another.

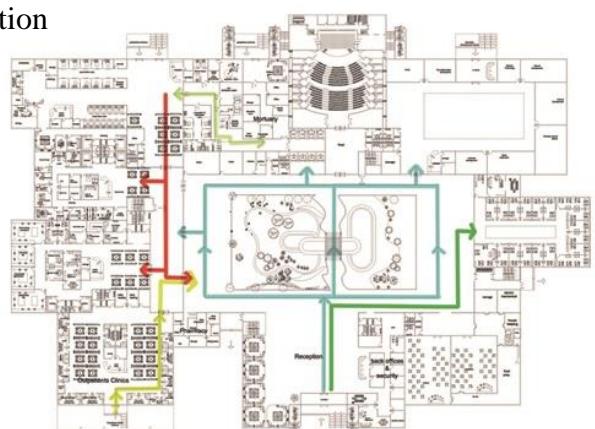


Fig. (5-35)  
People circulation

Employee  
Patients & Visitors  
Patients from out patient clinics  
Patients from emergency

# (5)Programmatic Concepts

## (5-12) Circulation Path

### (5-12-1)Layout

Fig. (5-36)  
Paths



### (5-12-2)Pediatrics Hospital

Vertical Circulation:

■ Escape  
■ Main  
■ Services

Horizontal Circulation:

■ Main  
■ Secondary

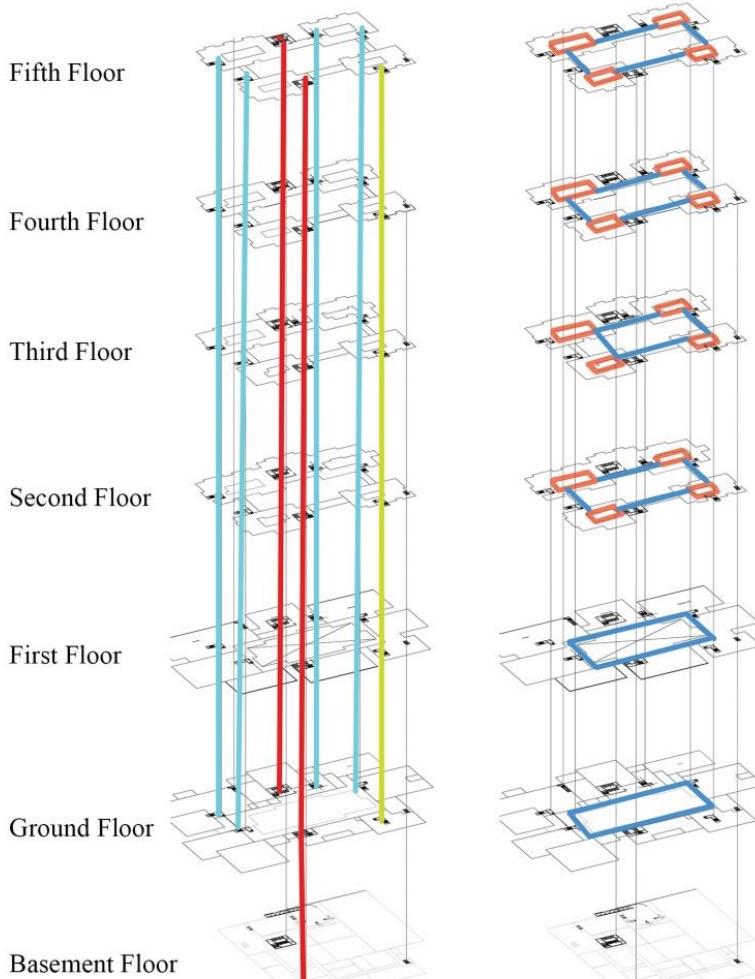


Fig. (5-37)  
Vertical and horizontal circulation

# (5)Programmatic Concepts

## (5-13)Orientation

### (5-13-1)Layout

The orientation is mainly designated to follow the grid of the context ,streets around and the internal view.

The grids were also decided to be in the main axis of the wind.



Fig. (5-38)  
Grids

Fig. (5-39)  
Climatic studies

Fig. (5-40)  
View studies

### (5-13-2)Hospital Buildings

According to the Egyptian Code for the main principles of hospitals design, The best orientation for patient rooms is North west or North east .

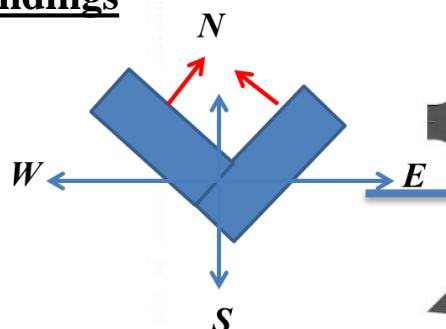


Fig. (5-41)  
Building orientation

Fig. (5-42)  
Layout

## (5-14) Tolerance

By using Dry wall constructive system between patient rooms which is better than using ducts to solve the problem of shifting between levels.

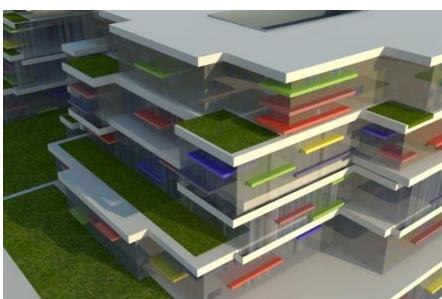


Fig. (5-43)  
Pediatrics hospital 3D

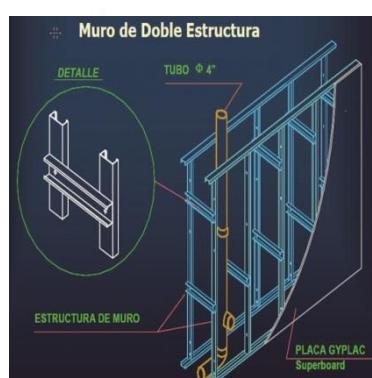


Fig. (5-44)  
Dry wall constructive system

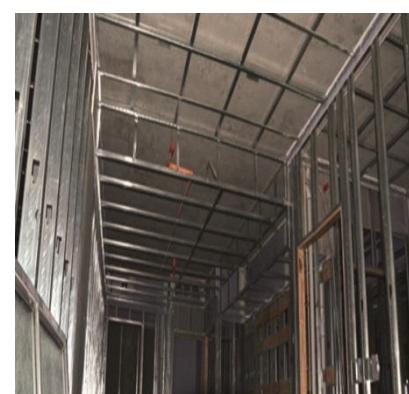


Fig. (5-45)  
Dry wall frame

# (5)Programmatic Concepts

## (5-15)Security Control :

### **(5-15-1)Air Barriers**

Air barriers to avoid air transfer from zone to another.

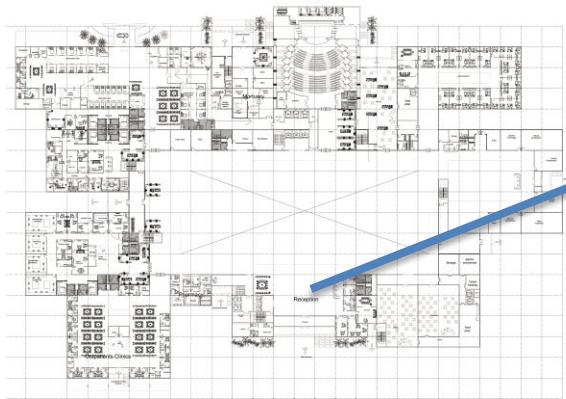


Fig. (5-46)  
Pediatrics hospital  
Ground floor

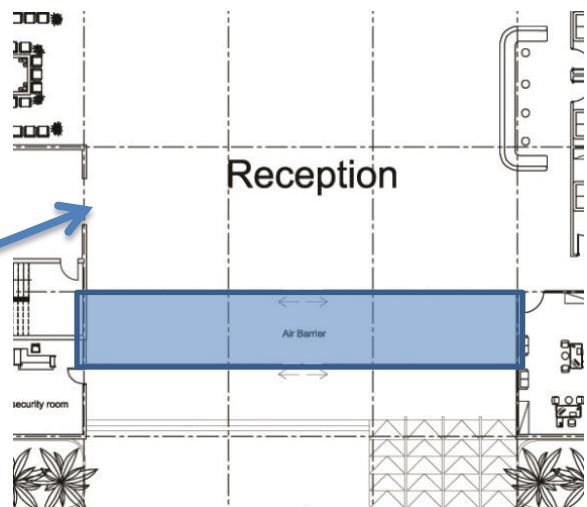


Fig. (5-47)  
Air barrier in main  
entrance

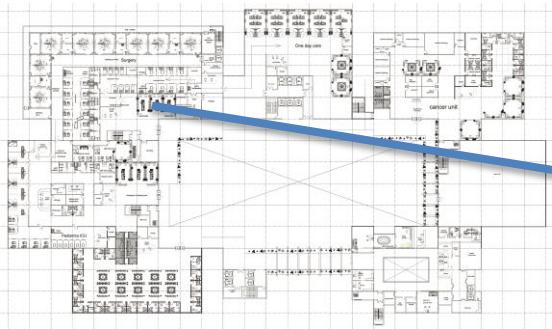


Fig. (5-48)  
Pediatrics hospital first  
floor

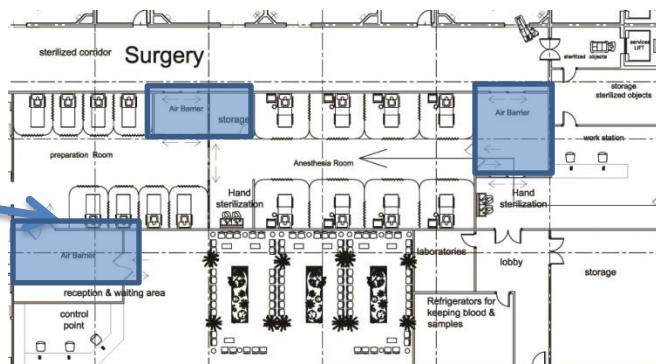


Fig. (5-49)  
Air barrier in surgery  
department

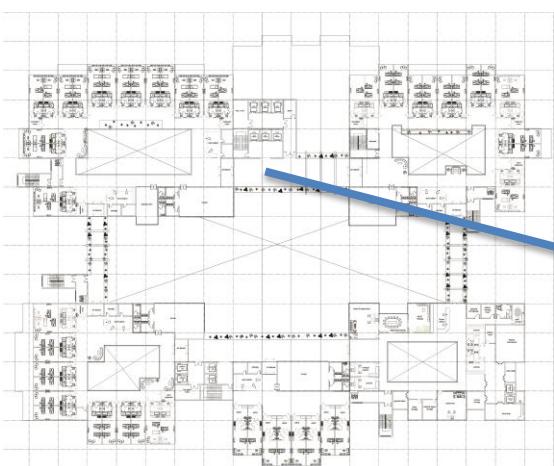


Fig. (5-50)  
Pediatrics hospital  
typical floor

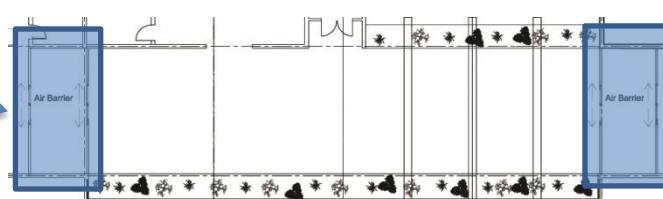


Fig. (5-51)  
Air barriers between patients wards

# (5)Programmatic Concepts

## (5-15-2) Clean & Dirty Zones:

Fig. (5-52)  
Dirty & Clean zones

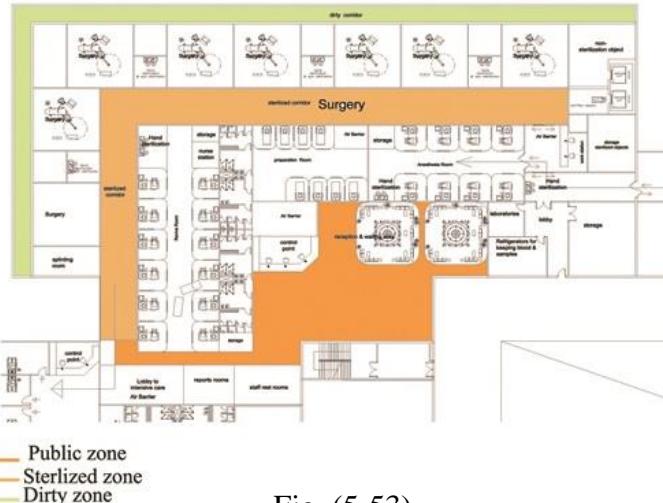
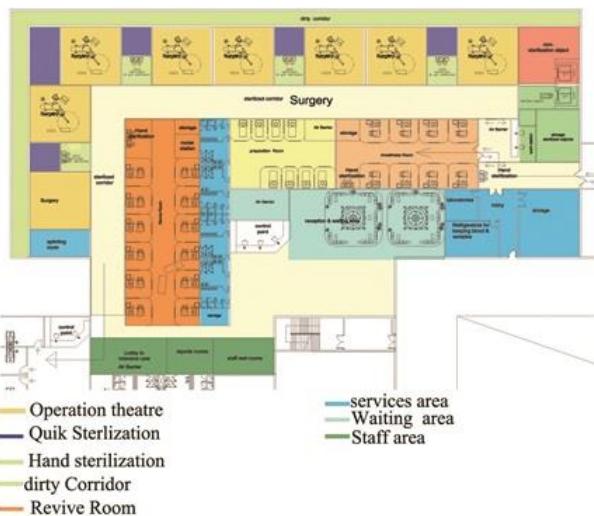


Fig. (5-53)  
Zones inside the surgery  
department

## (5-15-3)Green Wall Systems: Active Phytoremediation Wall System

Because of the courts in the hospital, so it was decided to put the green wall system as a smart method for air purification.



Fig. (5-54)  
Green wall

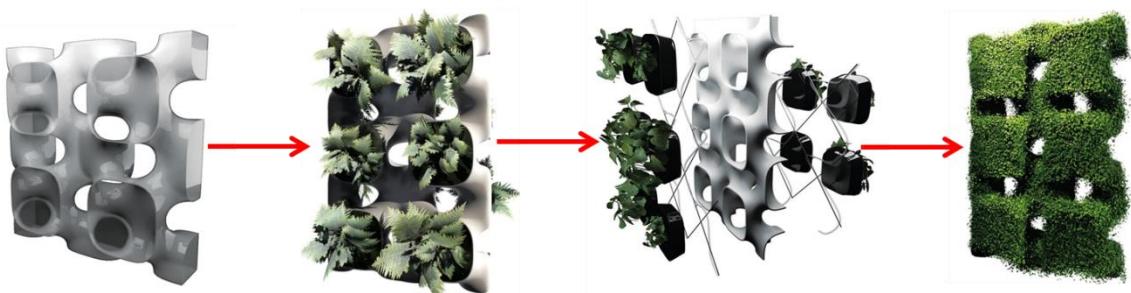


Fig. (5-55)  
Green wall structure

## (5-16) Safety:

Escape stairs are distributed according to the Egyptian code for fire fighting.

Vertical Circulation:

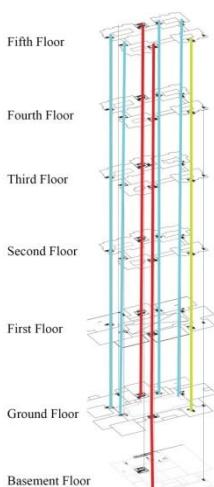


Fig. (5-56)  
Vertical circulation

# (5)Programmatic Concepts

## **(5-17) Energy Conservation:**

Healthcare facilities are the second most energy-intensive buildings, using more energy per square foot than any other type of building except food services.

There are many energy saving measures that hospitals can implement without affecting patient comfort or well being.

*Energy consumption in a typical hospital, by end use*

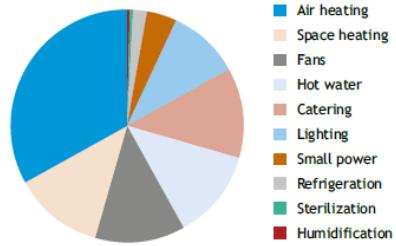


Fig. (5-57)  
Energy consumption

### **(5-17-1)Photovoltaic: a-Main Paths Shade**

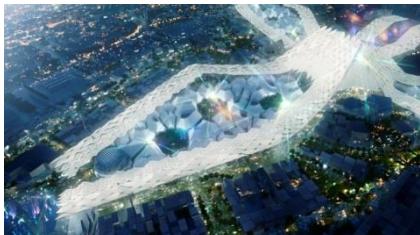


Fig. (5-58)  
Expo 2020, Dubai(1)



Fig. (5-59)  
Expo 2020, Dubai(2)



Fig. (5-61)  
Layout

### **(5-17-2)Solar Panels: Parking**

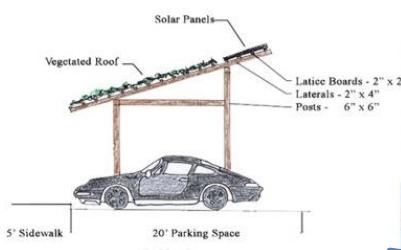


Fig. (5-62)  
Solar panels(1)



Fig. (5-63)  
Solar panels(2)



Fig. (5-64)  
Layout section



Fig. (5-66)  
Solar panels(3)



Fig. (5-65)  
Parking

# (5)Programmatic Concepts

## (5-17-3)Water Reduction:

35% reduction water use than is used in a similar sized building

Water conservation include:  
the installation of low flow fixtures,  
waterless urinals, dual flush toilets, and  
sinks and water fountains with motion  
sensors.

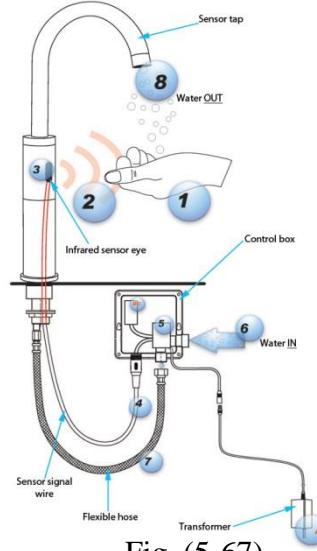


Fig. (5-67)  
Sinks motion sensors



Fig. (5-68)  
Waterless urinals

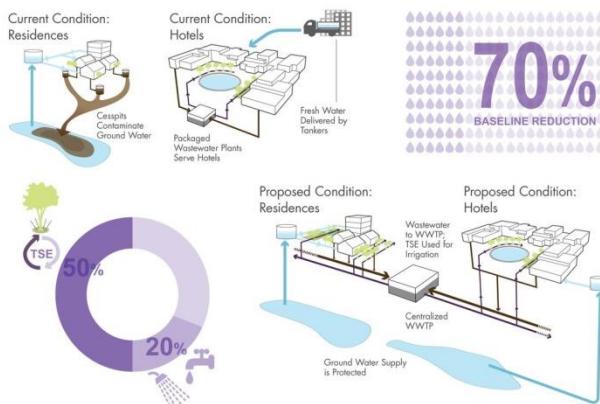


Fig. (5-69)  
Water reduction



Fig. (5-70)  
Dual flush toilets

## (5-17-4)Smart Windows:



Fig. (5-71)  
Example for smart window

### Heat Transfer Through Windows

1. **CONDUCTION** is the direct transfer of heat through the window to the outdoors.
2. **RADIATION** is the movement of heat as infrared energy throughout the glass.
3. **AIR LEAKAGE** is the passage of heated air through cracks and around weather stripping.
4. **CONVECTION** occurs when air gives up its heat to the cooler glass and sinks toward the floor. This movement sucks new, warmer air through the glass that is in turn cooled, creating a draft.

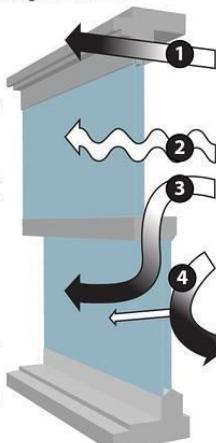


Fig. (5-72)  
Heat transfer

## (5-17-5)Eco Elevator:

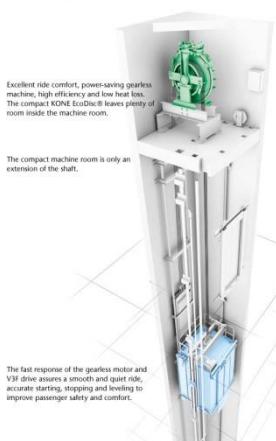


Fig. (5-73)  
Eco Elevator

# (5)Programmatic Concepts

## (5-18) Environmental Control

### (5-18-1)Climatic Studies

All the buildings and it's main spaces are oriented to north and the wind direction to avoid the heat of the sun and reduce convection.



Fig. (5-74)  
Climatic study

### (5-18-2)Roof Garden

Roof garden was used to reduce heat gain and also as a good view for patients.

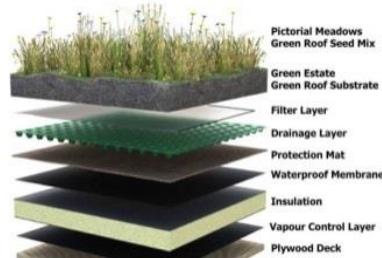


Fig. (5-75)  
Roof garden detail



Fig. (5-76)  
Roof garden installation

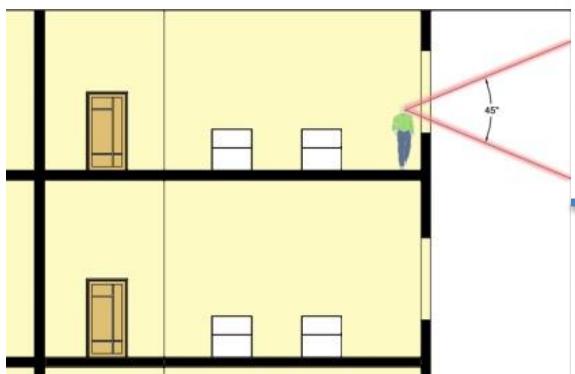


Fig. (5-77)  
Building without roof garden

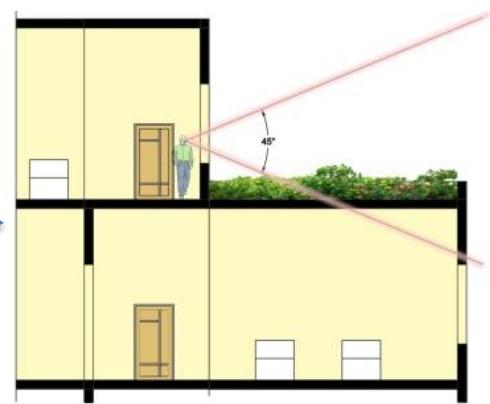


Fig. (5-78)  
Building with roof garden

### (5-18-3)Interlocking Masses

The masses are overlapped and interlocked to make shades and reduce heat gain.



Fig. (5-79)  
3D shot(1)

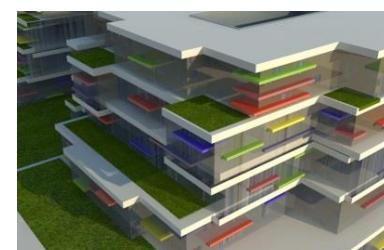


Fig. (5-80)  
3D shot(2)

# (5)Programmatic Concepts

## (5-18-4)Courts:

using court to allow natural ventilation & to make Containment.



Fig. (5-81)  
Court



Fig. (5-82)  
Pediatrics hospital section

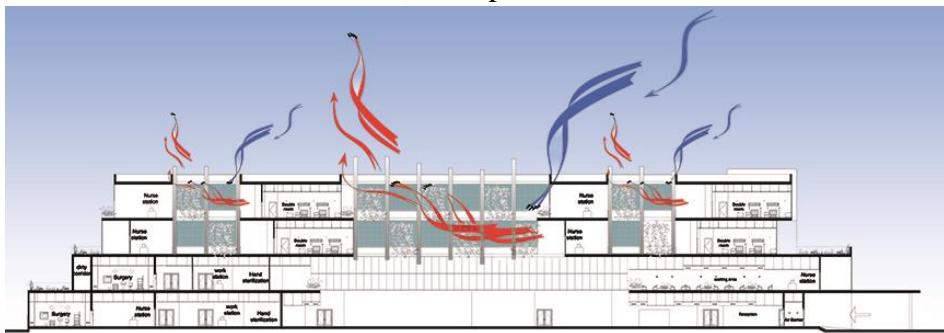


Fig. (5-83)  
Gynecological and obstetrics hospital section

## (5-18-5)Green Wall Systems:

### Active Phytoremediation Wall System

The air purification process works as follows: Ventilated outside air is brought into a building by the HVAC system. Oxygen is used up and toxins are added as the air is affected by people, finishes, and other contributors to poor indoor air quality. As the polluted air moves through the phytoremediation wall--largely by natural air circulation flows--the root rhizomes digest the toxins and replenish the oxygen. Clean air is then returned to the interior environment.



Fig. (5-84)  
Green wall

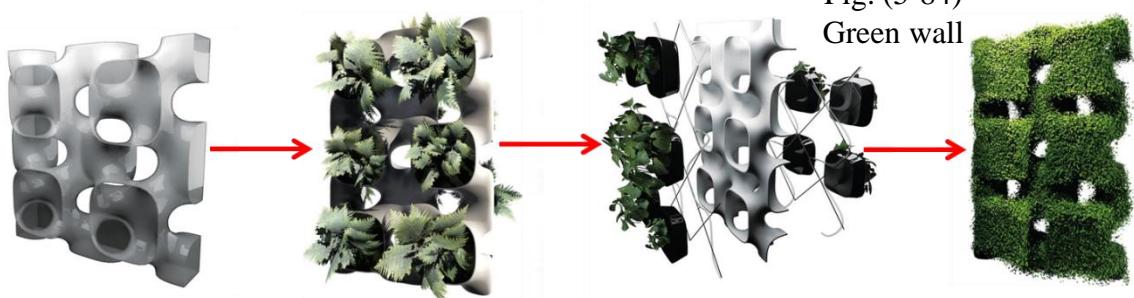


Fig. (5-85)  
Green wall structure

# (5)Programmatic Concepts

## (5-19)Phasing:

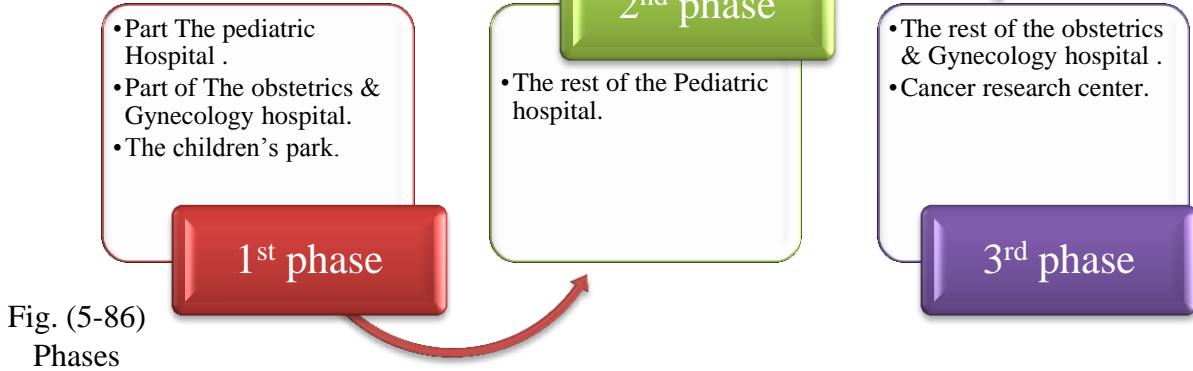
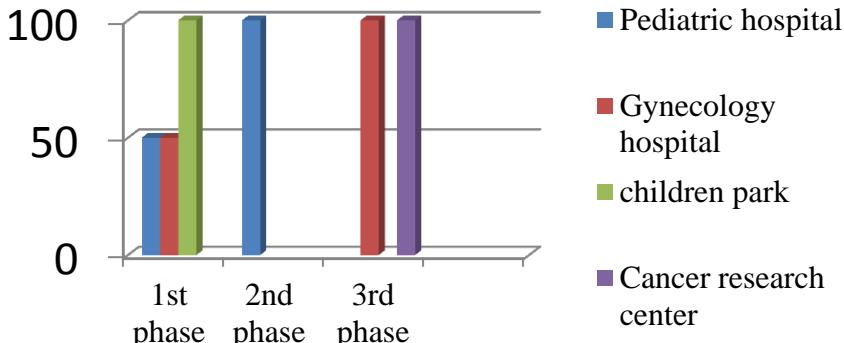


Fig. (5-87) Phases chart



## (5-20) Cost Control

### (5-20-1)Feasibility Study:



Fig. (5-88) Site

3,000,000 person

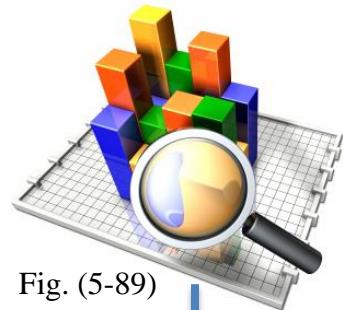


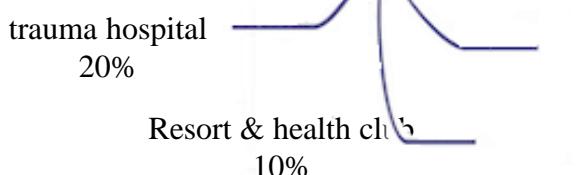
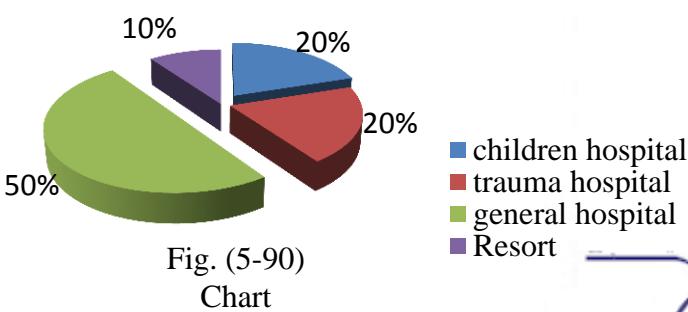
Fig. (5-89) Studies

3 beds / 1,000 person

Bed capacity for the proposed city = 9,000

22%

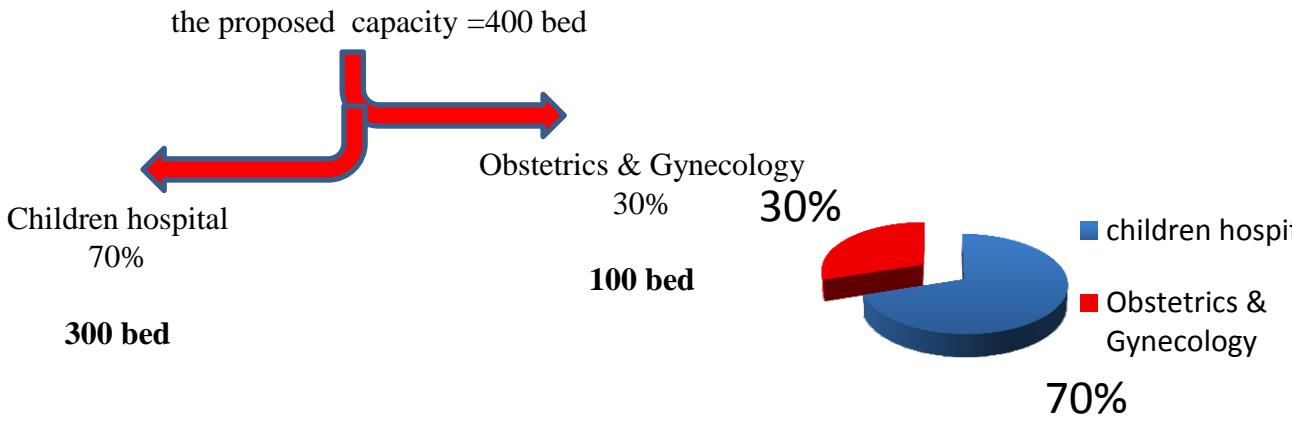
Bed capacity for the down town = 2,000



Children hospital  
Obstetrics & Gynecology  
20%

General hospital  
50%

# (5)Programmatic Concepts



- Construction cost per unit area 1,400 \$ - 2,100 \$
- Construction cost per unit area include equipment cost 3,000 \$



Fig. (5-92)  
Operation expenses

✿ Capital expenses → Children hospital / Obstetrics & Gynecology

	Children hospital	/	Obstetrics & Gynecology
180,000,000 \$	/	60,000,000 \$	

- Operational expenses 30-40% capital cost = 54,000,000 \$ / 18,000,000 \$
- Operational expenses /day = 150,000 \$ / 50,000 \$
- Energy cost 6% of running cost = 3,240,000 \$ / 1,080,000 \$
- Recover cost 10% capital cost = 5,400,000 \$ / 1,800,000 \$
- Annual cost = recover + operational = 59,400,000 \$ / 19,800,000 \$



→ bed cost / day = 600 \$

Fig. (5-93)  
Money

- 
- | Category            | Value               | Notes               |
|---------------------|---------------------|---------------------|
| 25% free            | 100 bed             | 25% investment      |
| 100 bed             | cost/ / bed = 0     | 100 bed             |
| 50% at cost         | 200 bed             | 50% at cost         |
| cost/ / bed = 600\$ | cost/ / bed = 600\$ | cost/ / bed = 600\$ |

## (5)Programmatic Concepts

→ 2 doctors / 1,000 person → 260 doctor



Fig. (5-94)  
Doctor



Fig. (5-95)  
Nurse

→ 4 nurse / 1,000 person → 520 nurse



### (5-20-2)Soil Analysis:

How to Deal with the limestone soil

Fig. (5-96)  
Piles

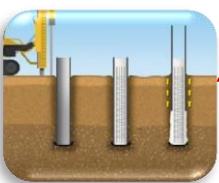


Fig. (5-97)  
Soil replacement

Piles  
↓  
High Cost



Fig. (5-98)  
High cost

Soil Replacement  
↓  
Low Cost



Fig. (5-99)  
Low cost

# (6)Design Concepts

## (6-1)Layout Concept

### (6-1-1)What Causes People to Get Sick

there are two major kinds of diseases: infectious and non-infectious. Infectious diseases are caused by pathogens such as bacteria, viruses, fungi and parasites. These pathogens can enter the body through the air we breathe, the food and drink we consume or through openings in the skin, such as cuts.

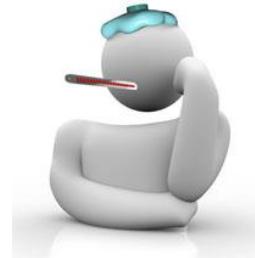


Figure (6-1)  
Sick Person

### (6-1-2)Barriers to Infection (Innate Immunity)

- The skin
- The mucous membrane
- Immune System

The skin and the mucous membrane are the first line of defense against invasion by microbes or parasites and provide physical and chemical barriers to infection

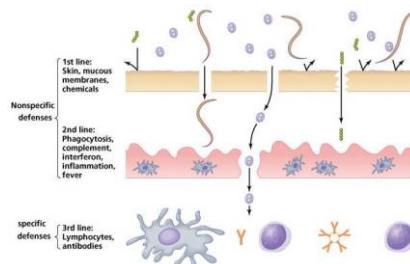


Figure (6-2)  
barriers to infection

### (6-1-3)Immune System

Not every pathogen that enters the body results in illness -- our bodies come equipped with immune systems to fight off foreign agents. However, pathogens have the ability to adapt and evolve much more quickly than the immune system can, which means that pathogens sometimes have the upper hand when it comes to fooling the body's defenses. One way that pathogens evade the immune system is by hiding within the body's healthy cells. Additionally, some people have weakened immune systems that make it harder for them to resist the effects of an invading pathogen.

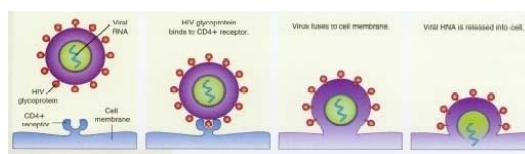


Figure (6-3)  
infection invades body

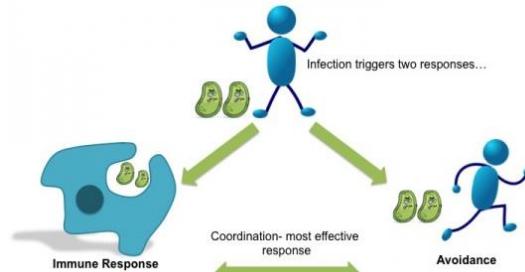


Figure (6-4)  
Immune system response

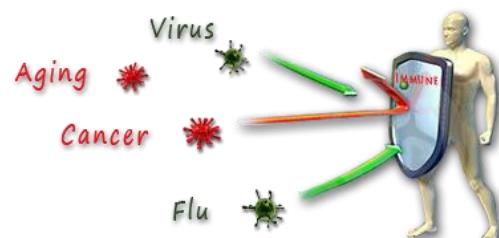


Figure (6-5)  
Immune system fight infection

# (6)Design Concepts

The first part of the immune system that meets invaders such as bacteria is a group of proteins called the complement system. These proteins flow freely in the blood and can quickly reach the site of an invasion where they can react directly with antigens - molecules that the body recognizes as foreign substances.

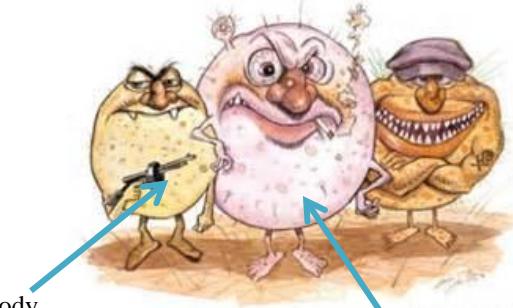


Figure (6-6)  
Fight the bacteria(1)

## (6-1-4)C5a Molecule (Part of The Immune Complement System)

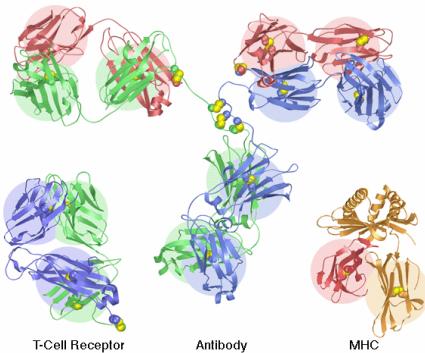


Figure (6-7)  
C5a Molecule(1)



Figure (6-8)  
C5a Molecule(2)

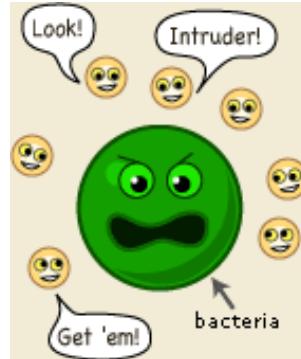


Figure (6-9)  
Fight the bacteria(2)

## (6-1-5) The Lymphatic System

The lymphatic system aids the immune system in removing and destroying waste, debris, dead blood cells, pathogens, toxins, and cancer cells.

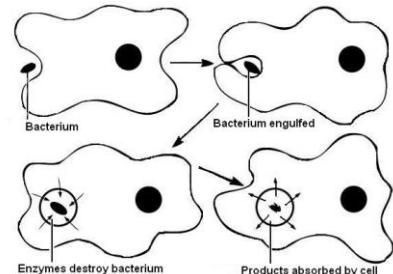


Figure (6-10)  
Bacteria Destruction

- The concept is inspired from the Model of the C5a molecule (part of the immune complement system), The Lymphatic System structure and the cells from the human body to get the enclosure of the antibodies to fight the foreign cells.

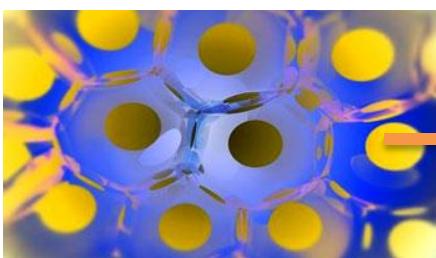


Figure (6-11)  
Body cells

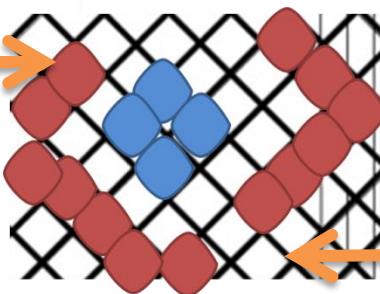


Figure (6-12)  
Cells Grid

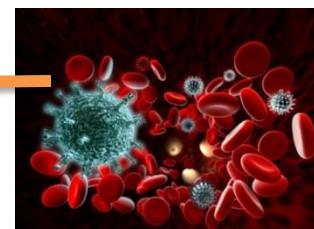
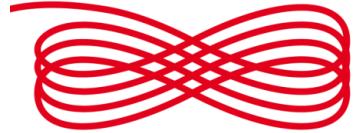
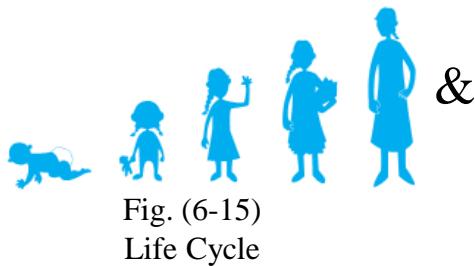
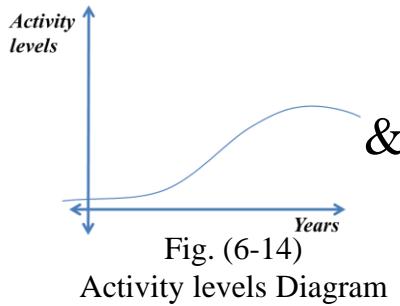


Figure (6-13)  
Immune System

- Each cell in the grid is refer to a cell of the immune system .
- That make Enclosure , continuity & differences of heights of layout lines

# (6)Design Concepts

## (6-2)Buildings Concept



By using activity levels to age of human levels

By using the life cycle of the human

By using continuity & complexity of life

Using Different scales of the squares & rectangles

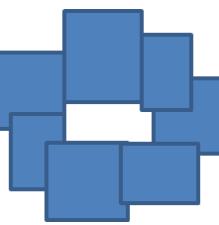


Fig. (6-17)  
Different Scale Buildings

## (6-3)Pediatrics Hospital Building Concept

### **(6-3-1) Meccano:**

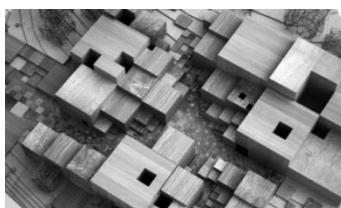
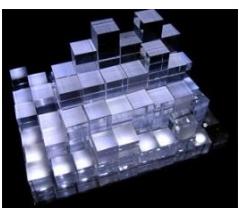
Children can't recognize bulk models, so it was decided that the children hospital will be divided into small objects so that it could be understood and be inspiring source for children.



### **(6-3-2)The Benefits of Meccano:**

- Meccano can be a source of comfort to those convalescing from a long illness, or housebound
- Meccano as a home hobby provides endless interest and challenge which not only stimulates, but encourages creativity and a sense of pride and achievement and maintains personal interest and occupation. It has both mental and therapeutic properties, and facilitates friendships on a local and international basis.

### **(6-3-3)Inspiration Images:**

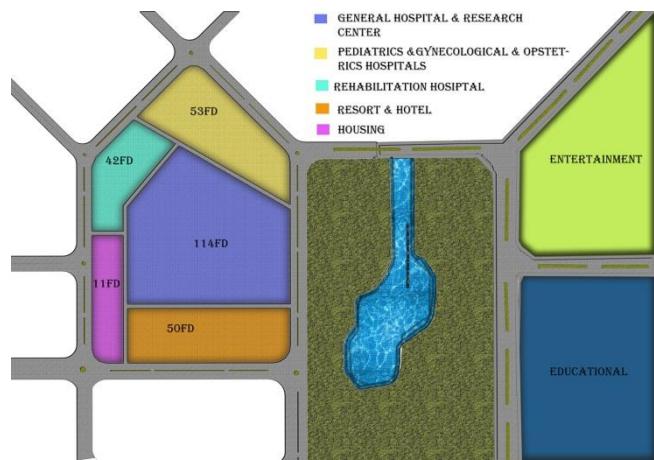


# (7) Design Development

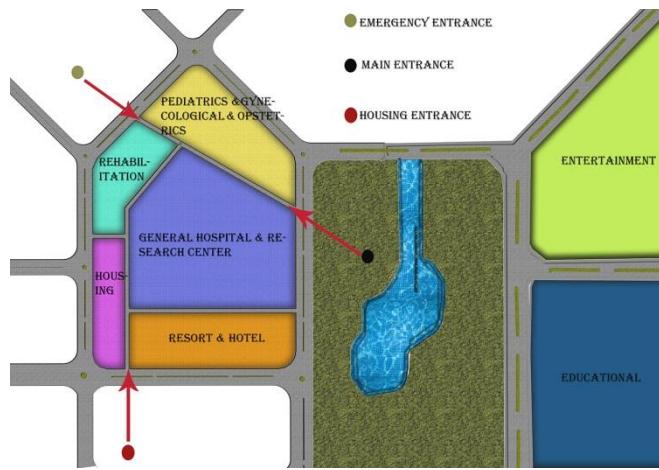
## (7 ) Design Development :

### (7-1) 1<sup>st</sup> Assignment :

#### (7-1-1) Master Plan Zoning :



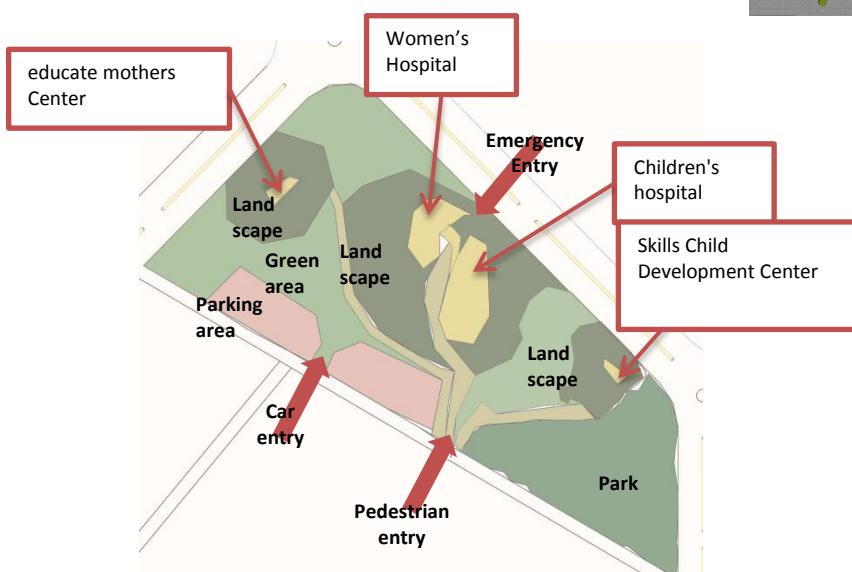
#### (7-1-2) Entrances:



#### (7-1-3) Buildings:

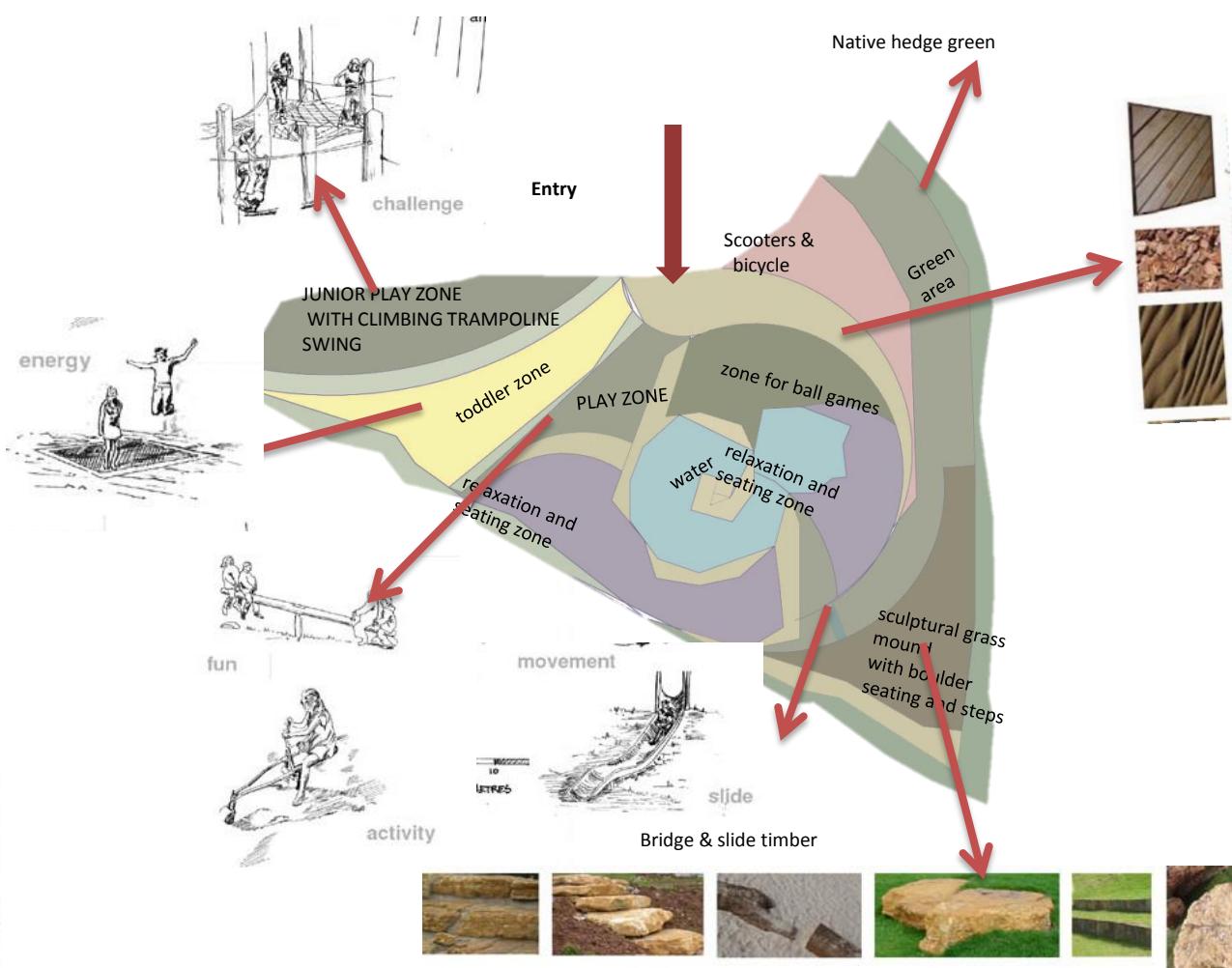


#### (7-1-4) Our Plot Zoning :

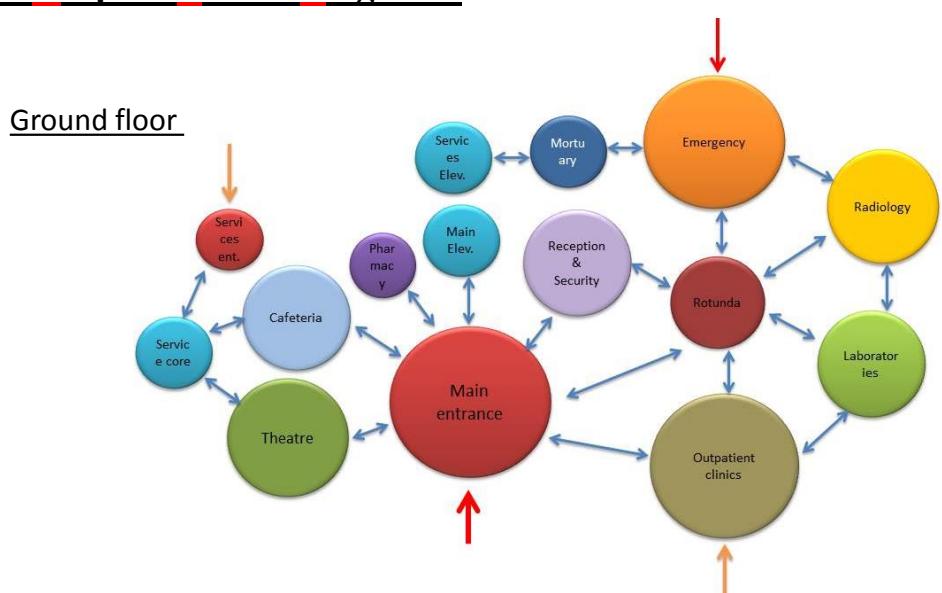


# (7) Design Development

## (7-1-5) Park Zoning :

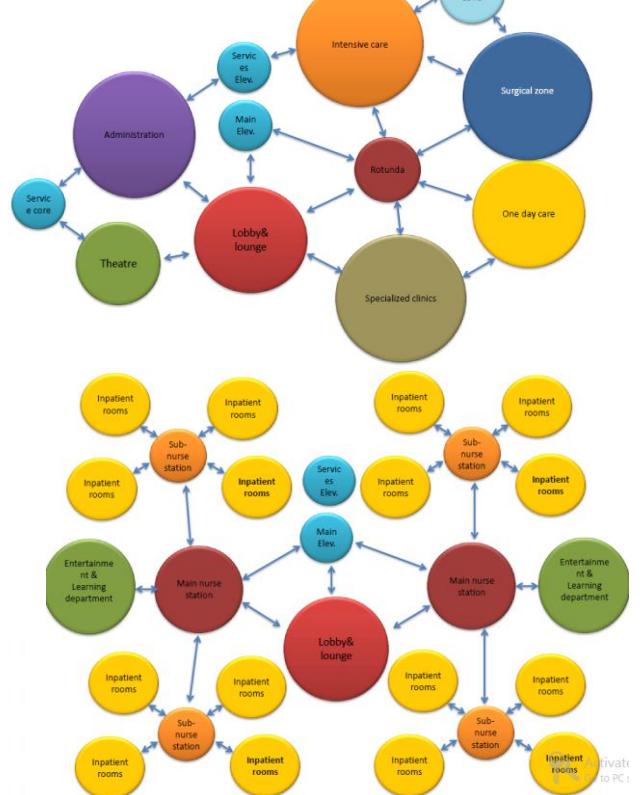


## (7-1-6) Pediatric Hospital Bubble Diagram :

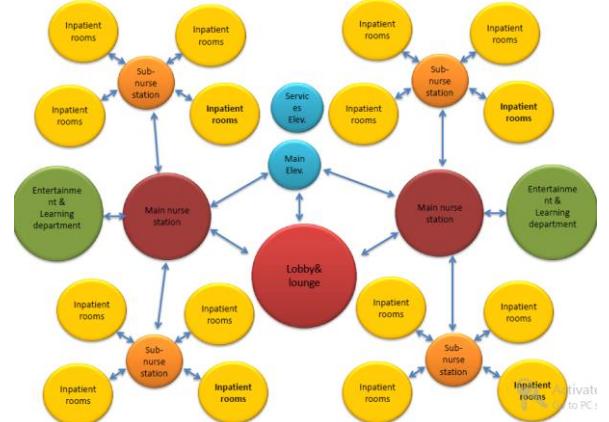


# (7) Design Development

First Floor

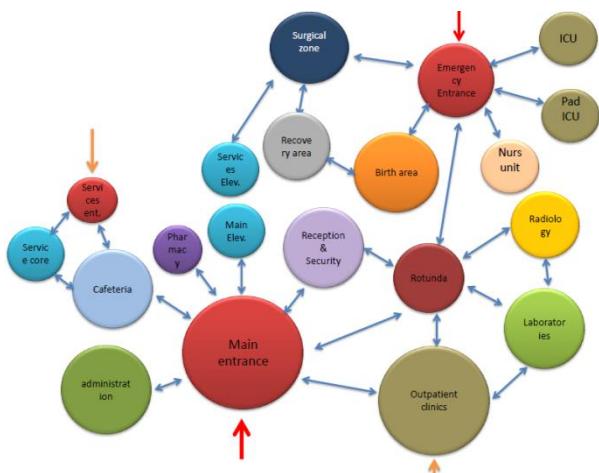


Typical Floor



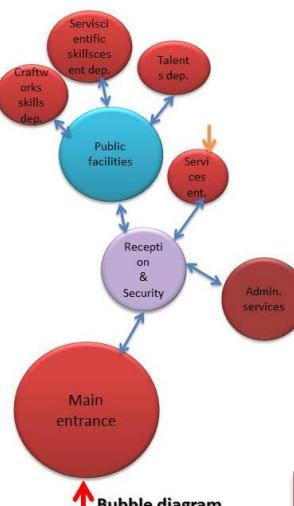
## (7-1-7) Obstetrics & Gynecological Hospital Bubble Diagram :

Ground Floor



## (7-1-8) Park Bubble Diagram :

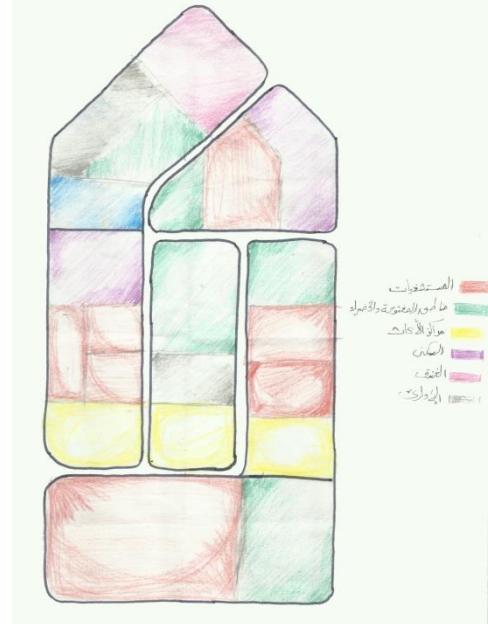
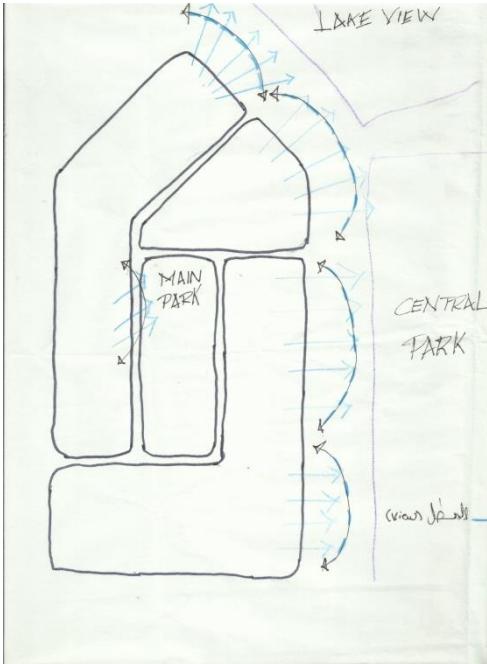
Bubble diagram



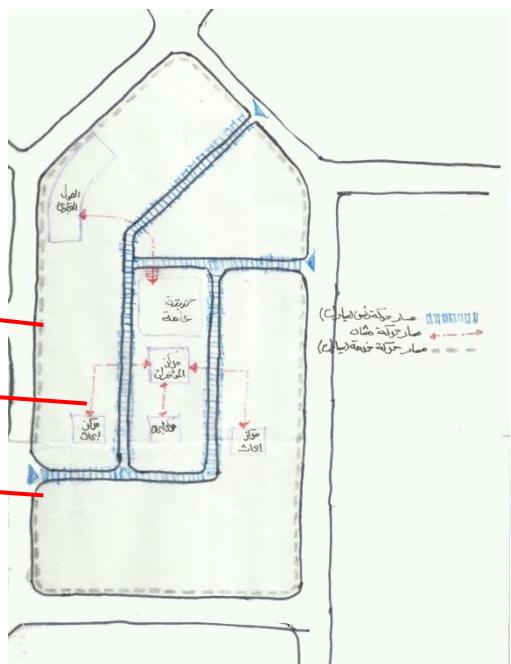
# (7) Design Development

## (7-2) 2<sup>nd</sup> Assignment :

### (7-2-1) Land Uses



### (7-2-2) View Studies



### (7-2-3) Circulation Studies

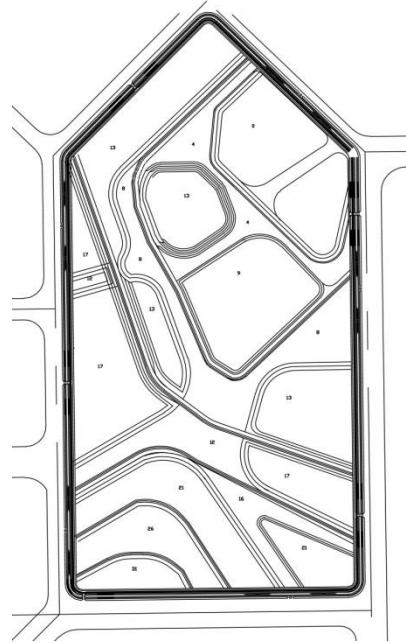


### (7-2-4) Entrances Studies

- Main entrances
- Services entrances
- Emergency entrances
- Public parking

## (7) Design Development

**(7-2-5) Contour**



**(7-2-6) Layout**

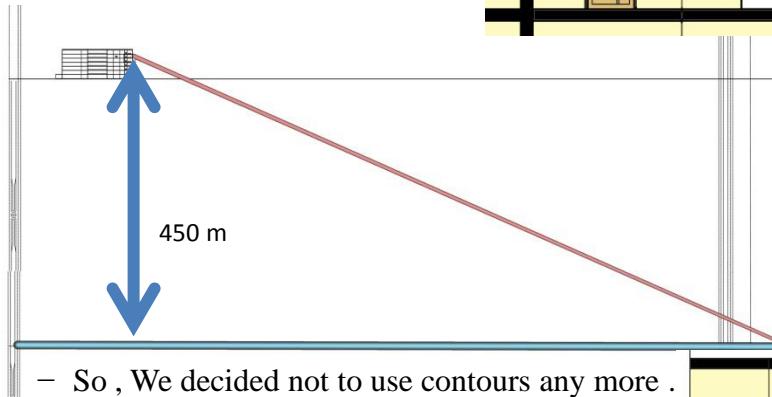
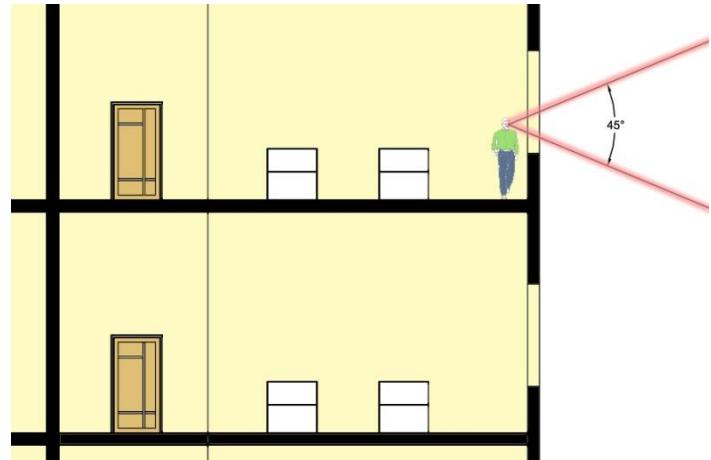


# (7) Design Development

## (7-3) 3<sup>rd</sup> Assignment :

### (7-3-1) Cone of Vision

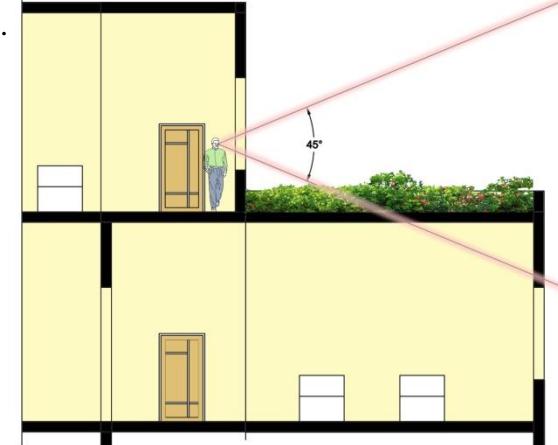
- We study the cone of vision of the users



- We need to make contours on 450m height to see the end of the site not the central park

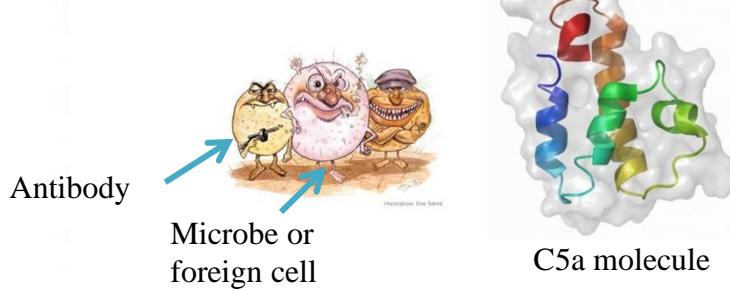
- So , We decided not to use contours any more .

- we also decide to deal with the site as it is & make near view .

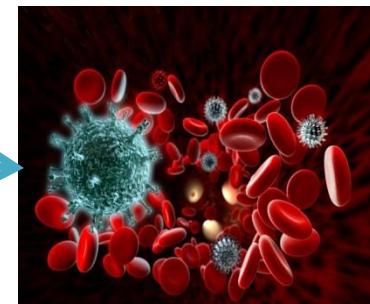
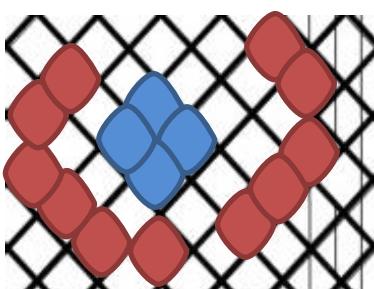


### (7-3-2) Concept

- The concept is inspired from the Model of the C5a molecule , part of the immune complement system.



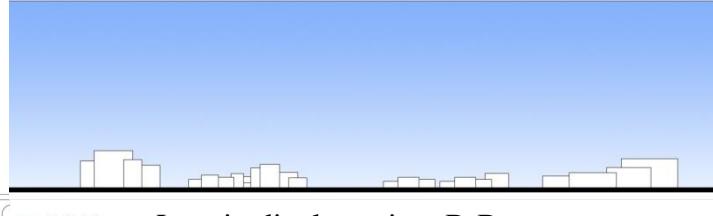
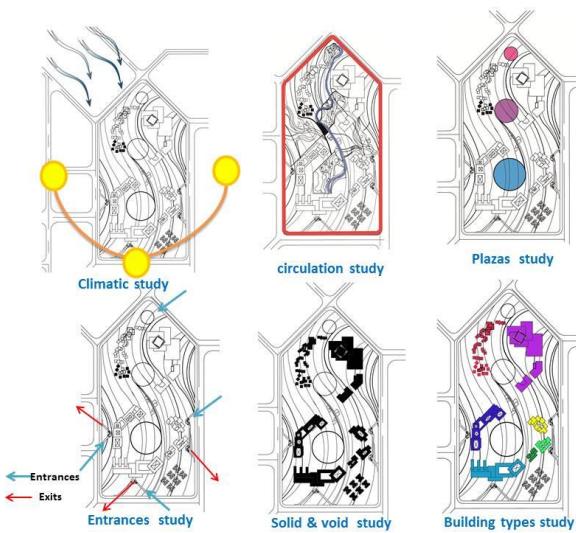
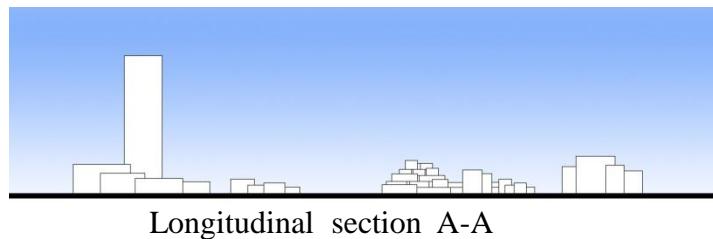
- Each cell in the grid is refer to a cell of the immune system .
- That make Enclosure , continuity & differences of heights of layout lines



# (7) Design Development

## (7-3-3) Sky Line

- Differences of heights & continuity of lines



## (7-3-4) Layout

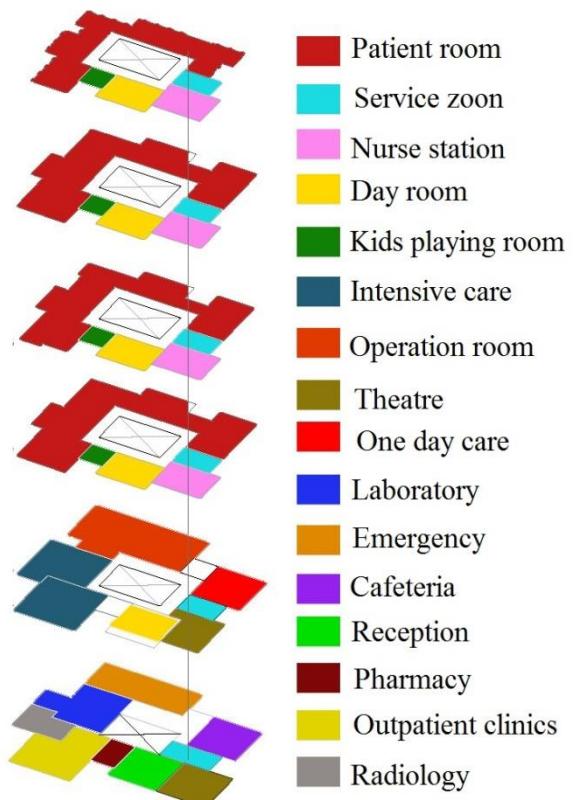
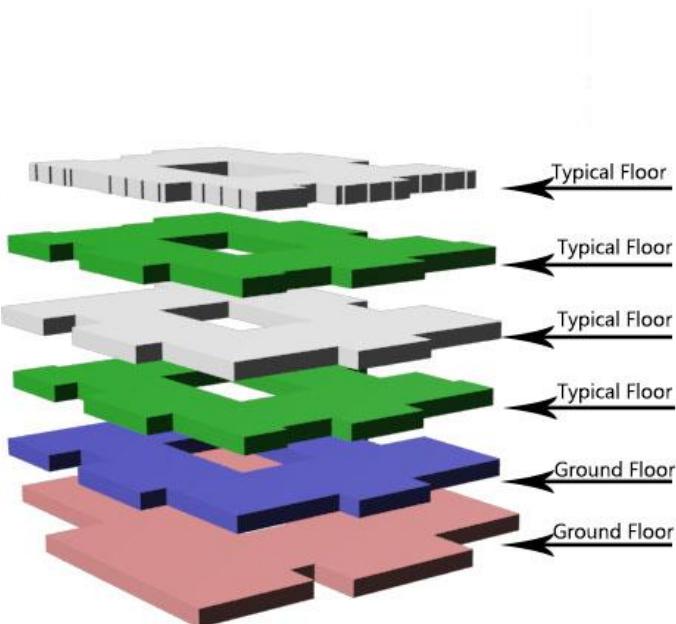


# (7) Design Development

## (7-3-5) 3D Shots



## (7-3-6) Pediatric Hospital 3d Zoning

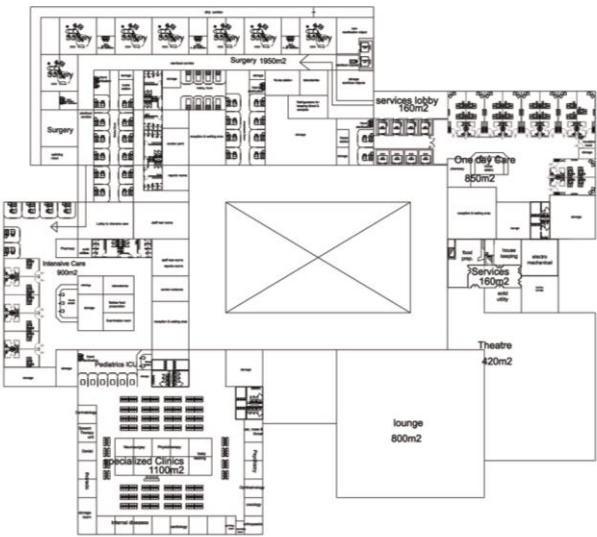


# (7) Design Development

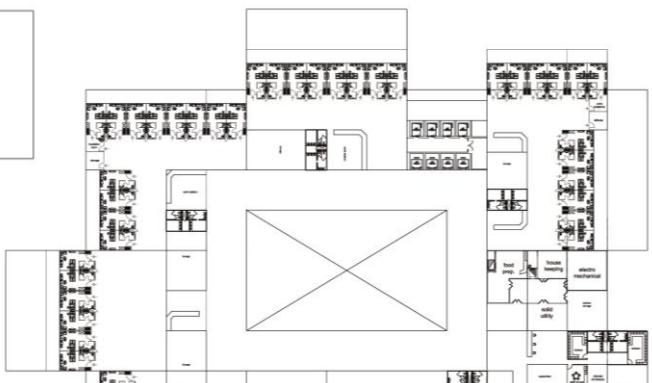
## (7-3-7) Pediatric Hospital Plans

N

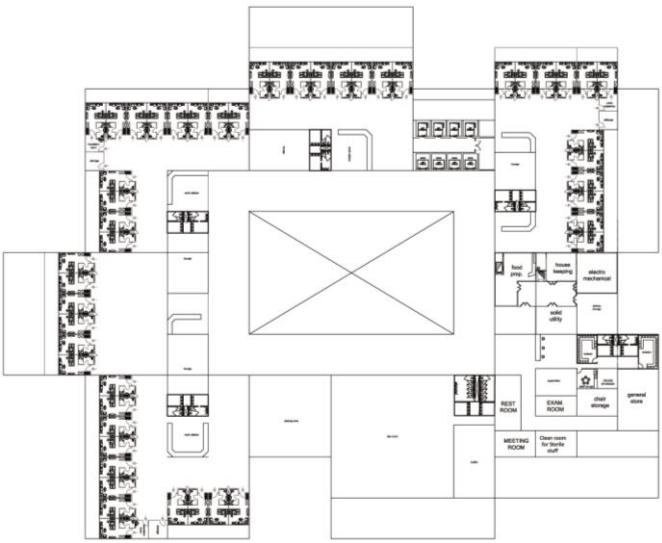
Ground Floor



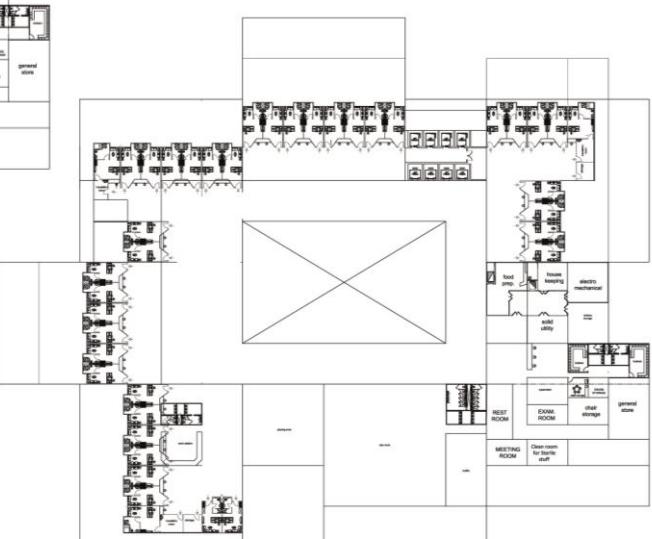
1<sup>st</sup> Floor



2<sup>nd</sup> & 4<sup>th</sup> Floor



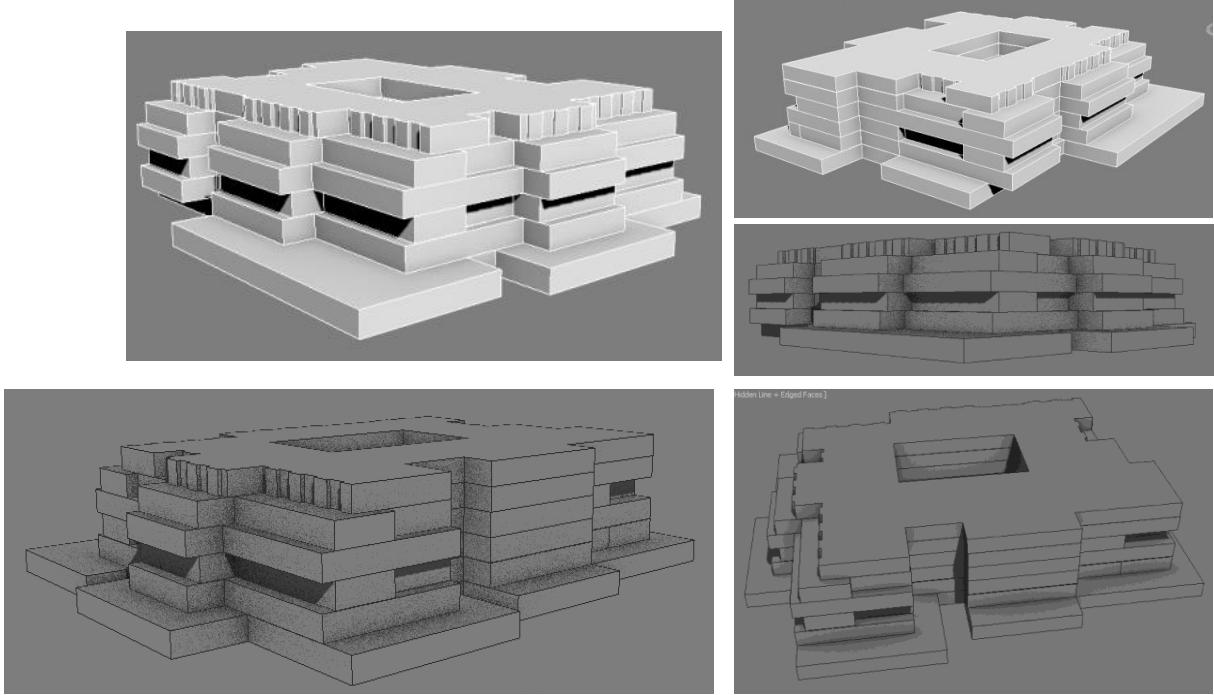
3<sup>rd</sup> Floor



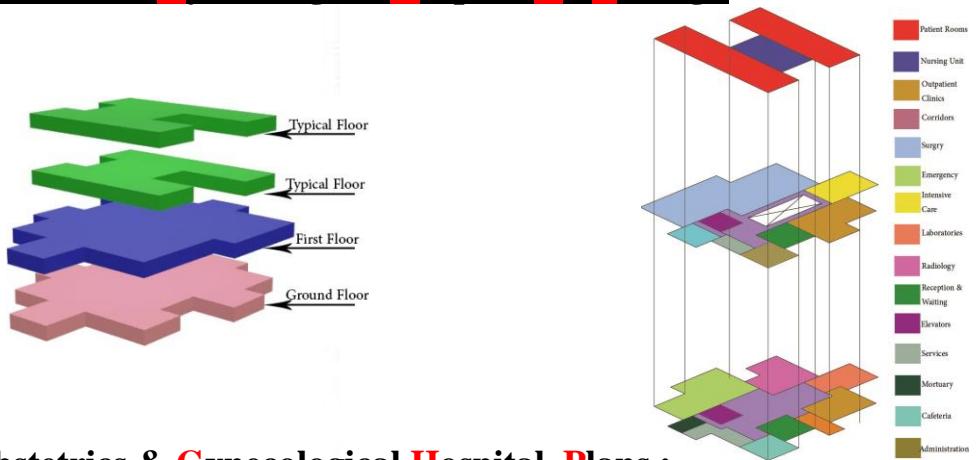
5<sup>th</sup> Floor

# (7) Design Development

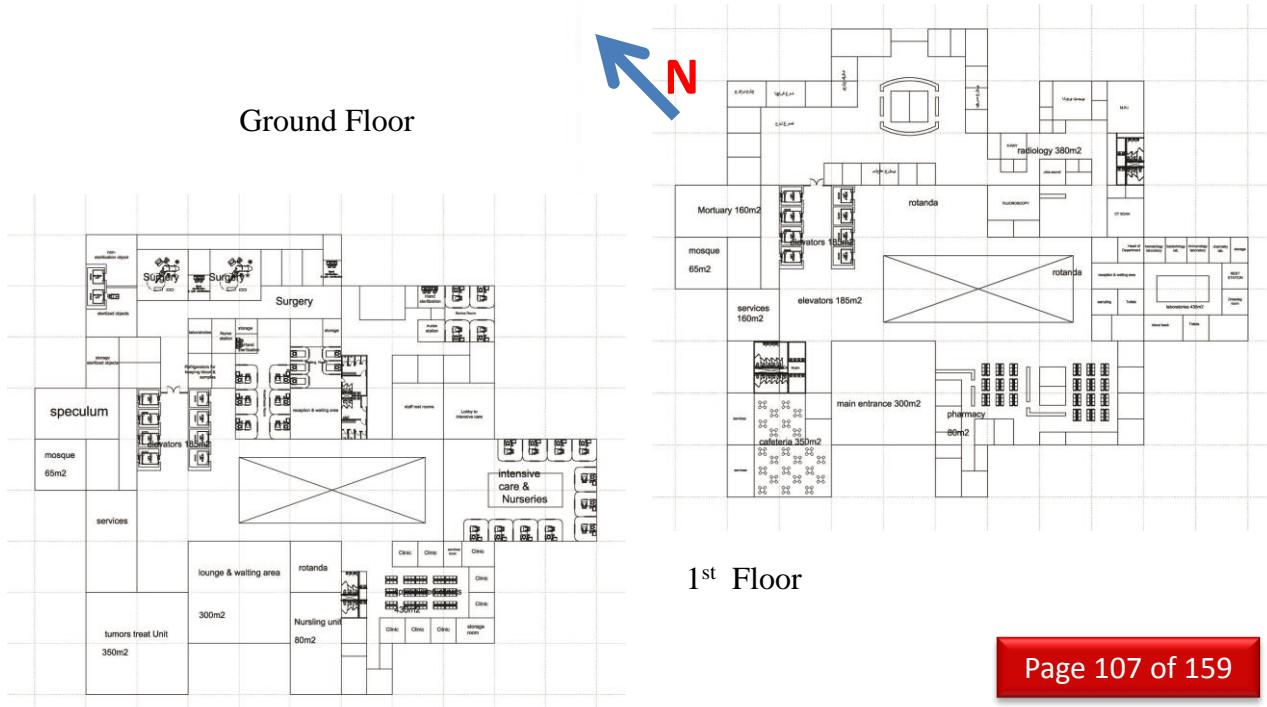
## (7-3-8) Pediatric Hospital 3d shots



## (7-3-9) Obstetrics & Gynecological Hospital 3d Zoning :

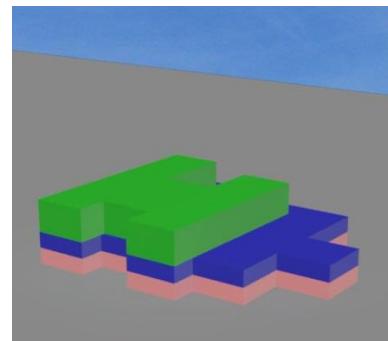
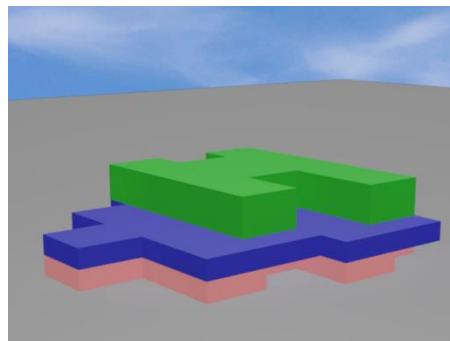


## (7-3-10) Obstetrics & Gynecological Hospital Plans :

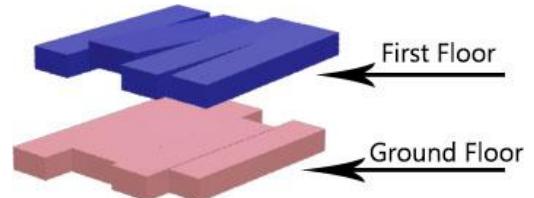


# (7) Design Development

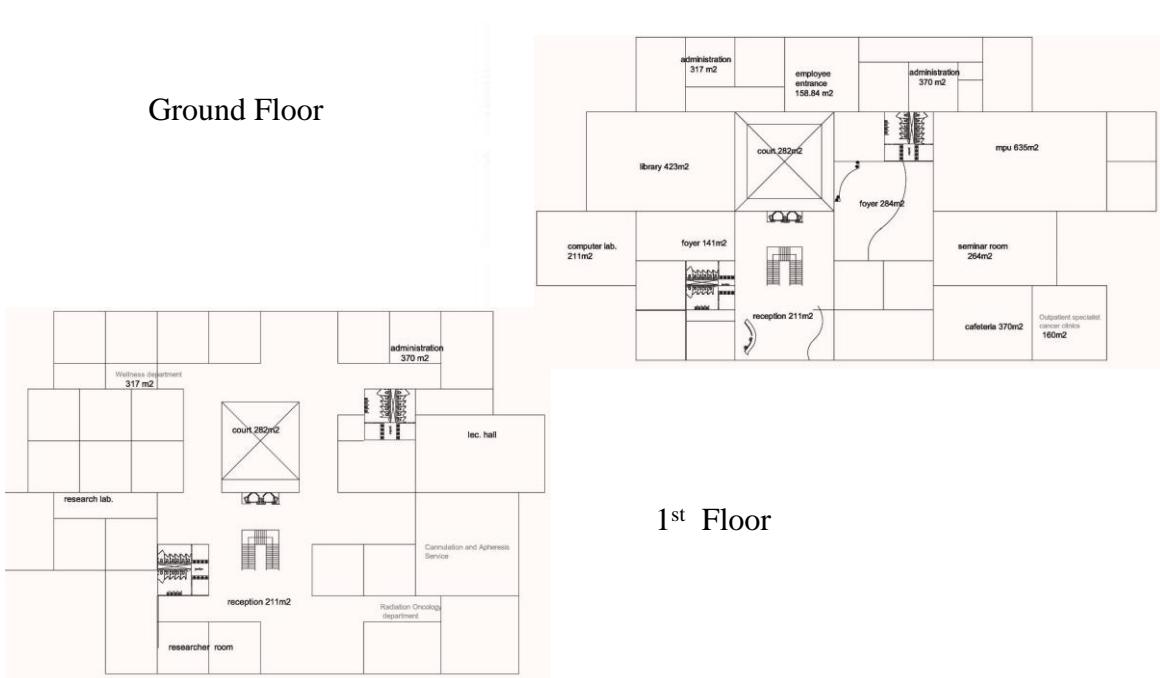
## (7-3-11) Obstetrics & Gynecological Hospital 3d Shots:



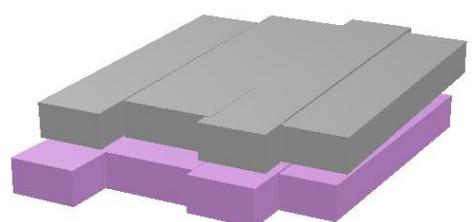
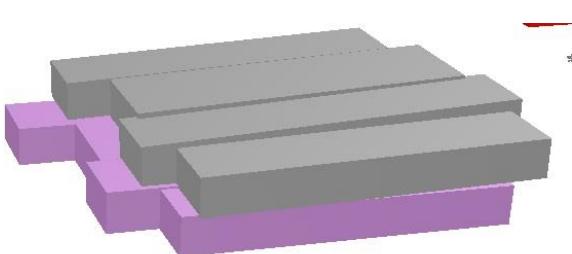
## (7-3-12) Cancer Research Center 3d Zoning:



## (7-3-13) Cancer Research Center 3d Plans :



## (7-3-14) Cancer Research Center 3d Shots:



# (7) Design Development

## (7-4) 4<sup>th</sup> Assignment :

### (7-4-1) Vision , Design Concept , Programmatic Concept & Design Performance

## NEFIERTARI MEDICAL CITY

### Pediatrics , Gynecological and Obstetrics Hospitals

#### Vision

- To Decrease the % of children death
- To make Excellent medical services for the mammals & their babies
- To Increase the women knowledge .
- To give the mammals & their children the advices .
- Make Nefertari children's & women's hospital as the first all over Egypt .

Nefertari is going to be the destination of health care in Egypt.



Rise the healthcare level Egypt is going to be one of the top 7 countries in the world in providing healthcare



#### Design Concept :

##### What causes people to get sick

Our bodies come equipped with immune systems to fight off foreign agents. However, pathogens have the ability to adapt and evolve much more quickly than the immune system can. One way that pathogens evade the immune system is by hiding within the body's healthy cells. Additionally, some people have weakened immune systems that make it harder for them to resist the effects of an invading pathogen.

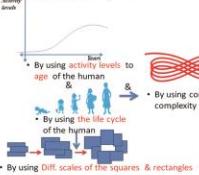


The first part of the immune system that meets invaders such as bacteria is a group of proteins called the complement system. These proteins flow freely in the blood and can quickly reach the site of an invasion where they can react directly with antigens - molecules that the body recognizes as foreign substances.

The concept is inspired from the Model of the C5a molecule, part of the immune complement system

Each cell in the grid is refer to a cell of the immune system .

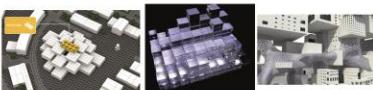
That make Enclosure , continuity & differences of heights of layout lines



##### INSPIRATION IMAGES :



As Children can't recognize bulk Models,so it was decided that the hospital will be deviated into small objects so that it could be understood and an inspiring source for Children.



#### Programmatic Concept

##### MISSION:

##### \* DESIGN APPROACH :

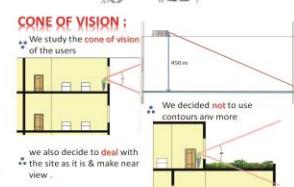
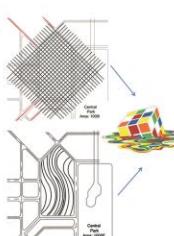
##### AXIS :

##### 1 BUILDING AXIS ::

- The grid is inspired from the surrounding context .
- It is in the same direction of the prevailing wind .

##### 2 LANDSCAPE AXIS :

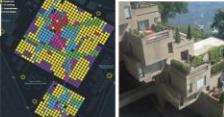
- The grid is inspired from the site nature & its Sand dunes movement . The grid is to make contrast with the straight grid



**BUILDINGS:**  
The Rooms orientation is North west or North east  
The best site view is on the central park & the children's park



##### INSPIRATION IMAGES :



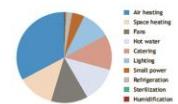
#### Design Performance

##### Problem:



##### Energy efficiency in a hospital

Energy consumption in a typical hospital, by end use



→ Healthcare facilities are the second most energy-intensive buildings, using more energy per square foot than any other type of building except food services



##### Solution:

There are many energy saving measures that hospitals can implement without affecting patient comfort or well being.

##### MAIN PATH SHAPE WITH PHOTOVOLTAIC



##### GREEN WALL SYSTEMS: ACTIVE PHYTOREMEDIATION WALL SYSTEM



##### FACADES TREATMENT



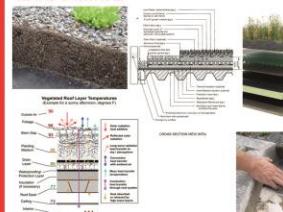
##### AIR PURIFICATION BY USING : TITANIUM DIOXIDE

Attribute	Application
Opaque, white and bright	High reflectance index (reflects white light)
UV protection	absorb UV light energy (transforms to heat) - prevent damage to skin, eyes, plants, cosmetics, pharmaceuticals
Non toxic / inert	safe for environment, cosmetics, pharmaceuticals
High strength-to-weight ratio	strong at least 40 times lighter, twice the density of glass, 10 times stronger than steel
Corrosion resistance	most impervious to acids, bases, chemicals, oxygen, water, moisture, damage
Slag formation	important constituent of welding to shape, hold and protect the weld from atmospheric conditions
Nanoparticles	superfine particles into nanotechnology shows promising new applications for titanium dioxide
Welding flux agent	stop burning, fabrication
Nanomaterials	active organic, inorganic, metallic, chemical, biological, desalination, deodorant

##### PARKING RETAILS:



##### ROOF GARDEN



##### SOIL ANALYSIS : Who to Deal with the limestone soil



#### Group 2H

#### Healthcare Design Studio

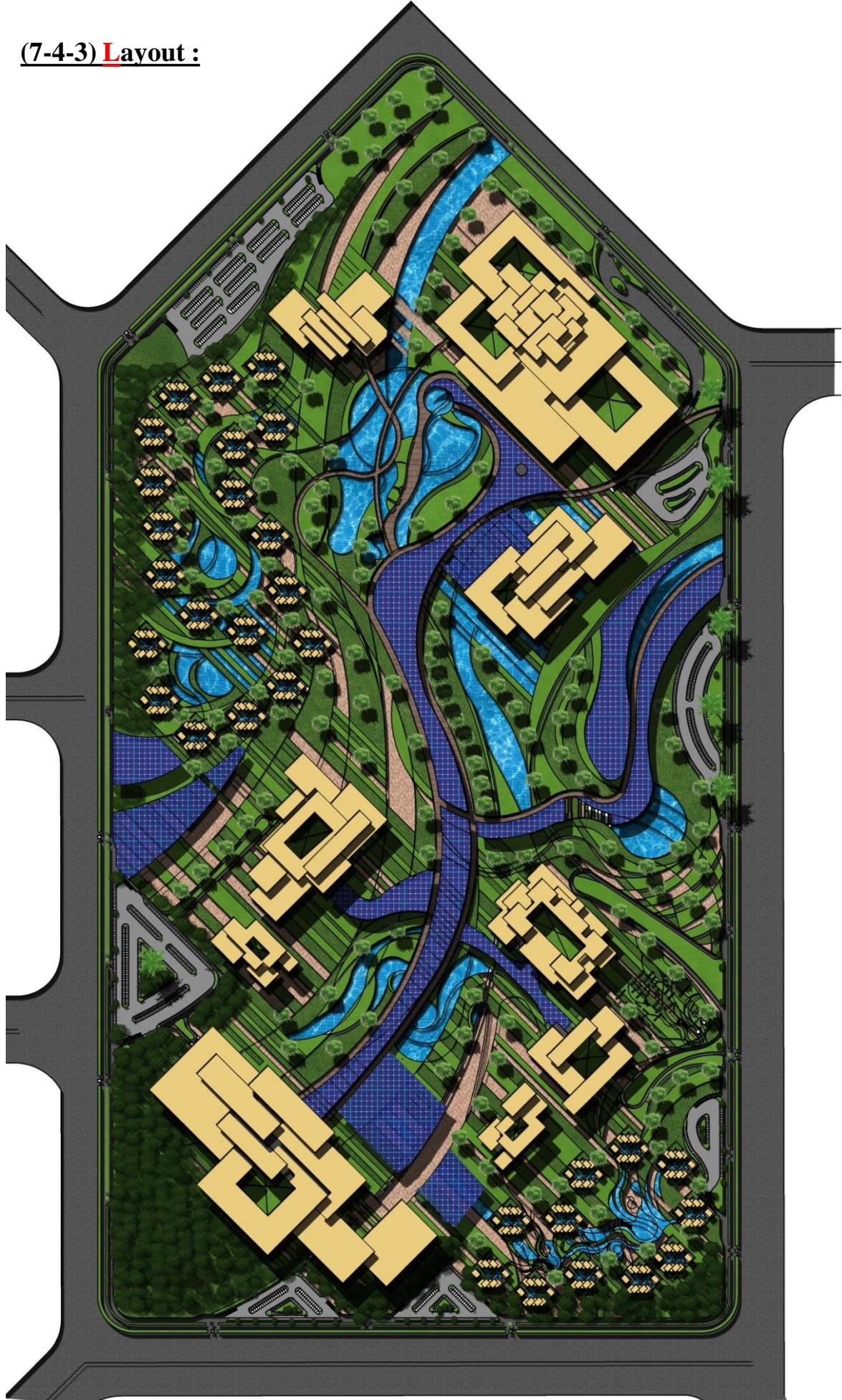
# (7) Design Development

## (7-4-2) Layout Studies :



## (7) Design Development

(7-4-3) Layout :



## (7) Design Development

### (7-4-4) Layout Development:



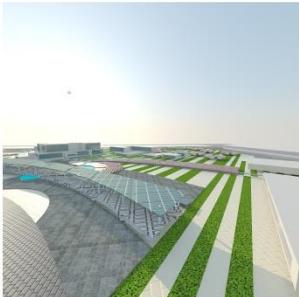
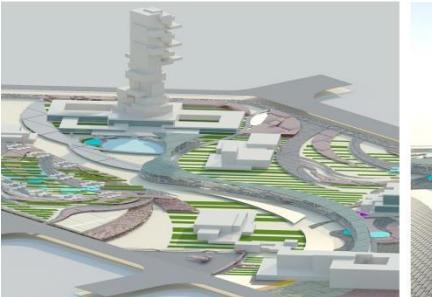
# (7) Design Development

## (7-4-5) Physical Model & 3d Shots :

Physical Model :



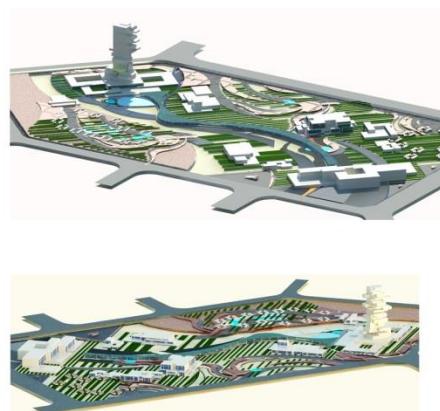
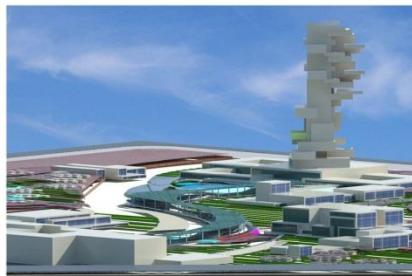
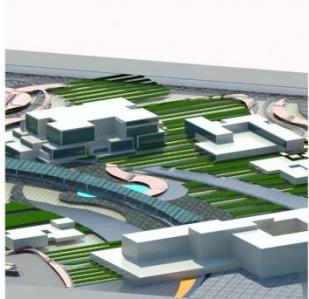
3D Shots :



# (7) Design Development

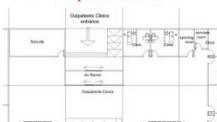
## (7-4-6) 3d Model , Interior Details & Sustainable Solutions :

### 3D Model Shots:



### Interior Details:

#### • Outpatient clinics:



Floors : anti-slip - anti-friction  
Floors, ceiling & walls : sound isolation anti-bacterial  
Skirting: curved skirting  
Buffer Handrail & Low Level Crash Rail



#### • Radiology:



Floors : anti-slip - easy to clean  
Walls- lead backed dry wall, easy to clean & sterilized  
Floors, ceiling & walls : fire rated,  
Skirting: curved skirting, water leak proof  
Buffer Handrail & Low Level Crash Rail  
Doors : lead lined doors



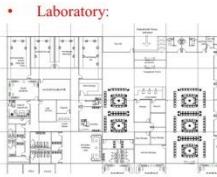
- Nuclear medicine:

X-Ray

- MRI (magnetic resonance imaging):



#### • Laboratory:



Floors : anti-slip - anti-acids, easy to wash & clean  
Mortar: anti-bacterial & fungi  
Walls- epoxy paint anti-fungi or ceramic or porcelain easy to clean & sterilized  
Ceiling: aluminum / galvanized steel  
Skirting: curved skirting, water leak proof  
Hand wash : anti-acids  
Negative pressure air-condition



#### • Patient room:



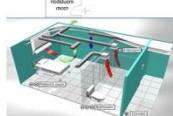
Floors : easy to clean & sterilize  
Floors, ceiling & walls : sound isolation  
Bed head unit for gases supplying  
Providing natural light in all rooms.



#### • Isolation room:



Floors : anti-slip - anti-friction ,  
easy to clean & sterilize " ceramic,  
epoxy"  
Positive pressure air-condition  
Hand wash : with sensor  
Self closing door



#### • Neonatal Intensive care:



Floors : anti-slip - easy to clean &  
sterilized  
Floors, ceiling & walls : sound  
isolation - easy to clean & sterilized  
Skirting: curved skirting

#### • C.S.S.D Central sterile supply department:



Floors: anti-slip - anti-friction , easy to  
clean & sterilize "ceramic, epoxy"  
Walls: anti-bacterial & fungi "ceramic"  
Ceiling: anti-bacterial & fungi, easy to  
clean , anti-corrosion  
Skirting: curved skirting

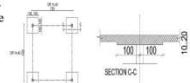
### Structural System:

#### STRUCTURE GRID :



Column grid spacing = 7.2m , 8.4m .  
As smaller construction grids are  
problematic because large rooms ( e.g.  
operating theaters ) which must be free  
from internal columns

#### Flat Slab With Drop Panel:



### Sustainable Solutions:

#### WATER REDUCTION:

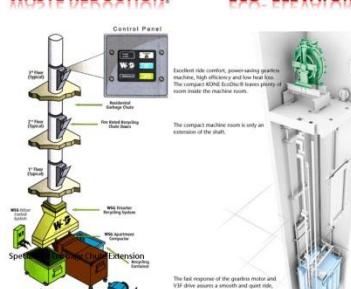
**WATER REDUCTION :**  
35% reduction water  
use than is used in a  
similar sized building

#### WATER CONSERVATION INCLUDE:

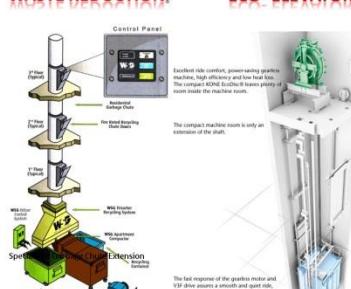
the installation of low  
flow fixtures, waterless  
urinals, dual flush toilets,  
and sinks and water  
fountains with motion  
sensors.



#### WASTE REDUCTION:

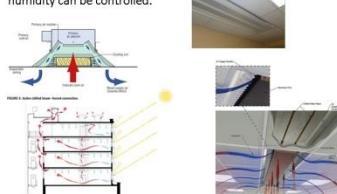


#### ECO- ELEVATOR:



#### CHILLED BEAM

Chilled beams are predominantly used for cooling and  
ventilating spaces, where a good indoor environment and  
individual space control is valued. Chilled beams use water to  
remove heat energy from a room and are located in the room  
space. Chilled beams are primarily used in locations where the  
humidity can be controlled.



## (7) Design Development

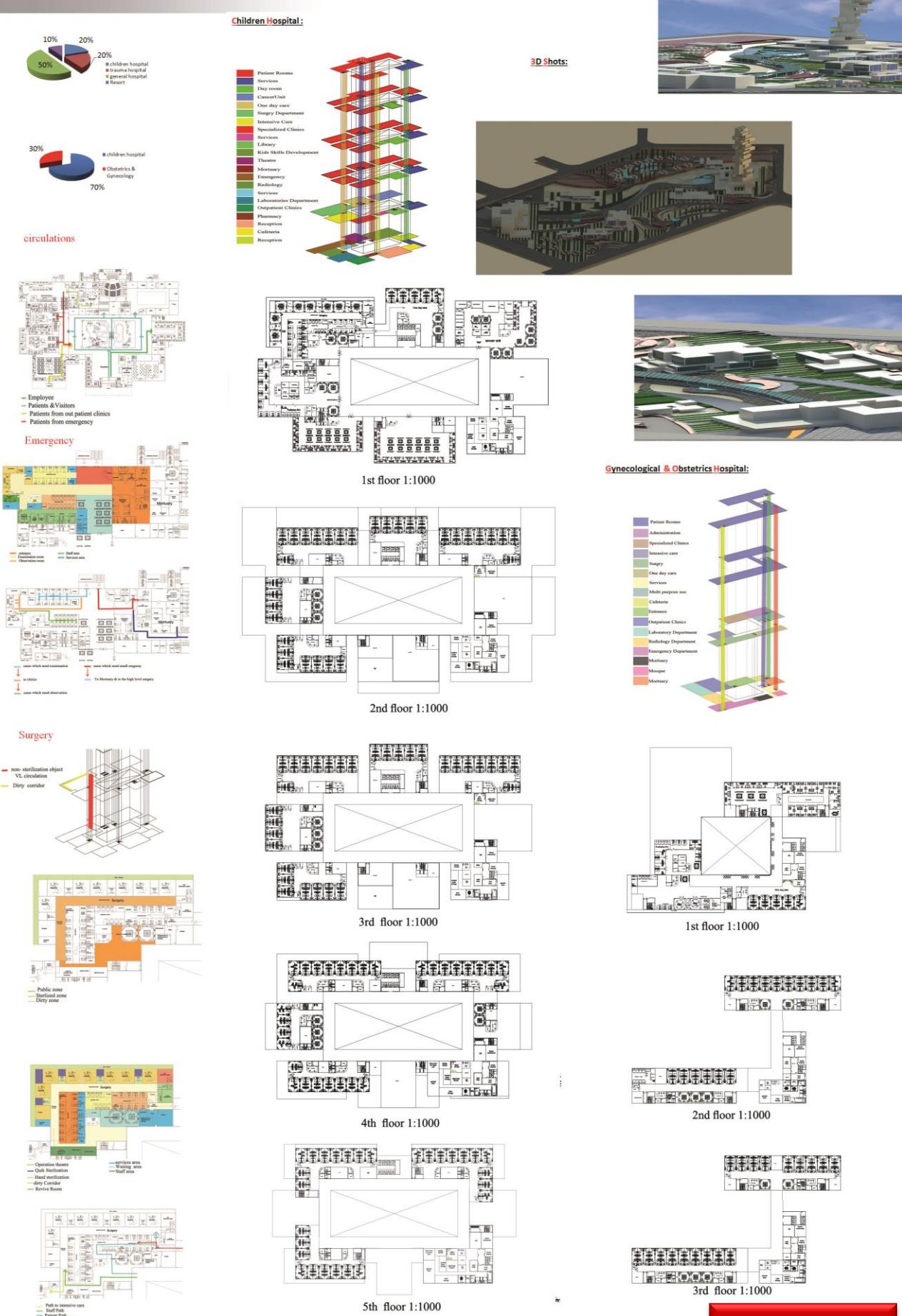
### **(7-4-7) Site Plan:**



# (7) Design Development

## (7-4-8) Hospitals Studies & Plans:

### Hospital Studies :



# (7) Design Development

## (7-5-2) Design Performance :

# Design Performance

## Problem:

→ Healthcare facilities are the second most energy-intensive buildings, using more energy per square foot than any other type of building except food services

## Solution:

There are many energy saving measures that hospitals can implement without affecting patient comfort or well being.

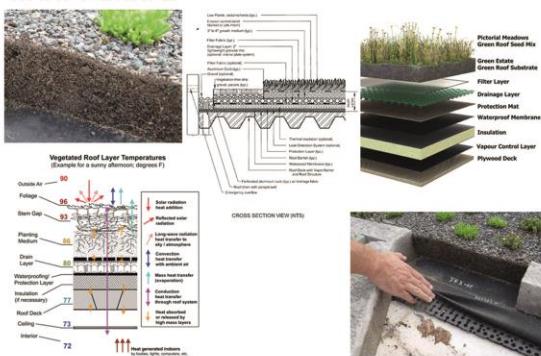
## MAIN PATH SHAPE WITH PHOTOVOLTAIC



## AIR PURIFICATION BY USING : TITANIUM DIOXIDE

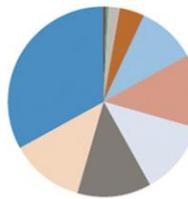
Attribute	Application
Opaque, white and bright; High refractive index (reflects white light)	
UV protection absorbs UV light energy (transfers to heat) – prevents fading, peeling, cracking	Pigment paints & coatings, plastics, paper
Non toxic / inert safe for use in foods, cosmetics, pharmaceuticals	Titanium metal aircraft engines, airframes, military, chemical processing, desalination plants, medical , sporting equipment
High strength-to-weight ratio Stronger than steel 45 per cent lighter, twice the strength of aluminium: important fuel efficiency benefit in aerospace applications	Corrosion resistant self repairs when mechanically damaged
Slag formation Important constituent of welding to shape, hold and protect the weld pool from atmospheric conditions	Welding flux agent ship building, fabrication
Nanoparticles significant research into nanotechnology shows promising new applications for titanium dioxide	Nanomaterials dye-sensitized solar cells, arsenic removal in water treatment, cancer treatments, noise absorption

## ROOF GARDEN



## Energy efficiency in a hospital

Energy consumption in a typical hospital, by end use



## GREEN WALL SYSTEMS: ACTIVE PHYTOREMEDIATION WALL SYSTEM

The air purification process works as follows: Ventilated outside air is brought into a building by the HVAC system. Oxygen is used up and toxins are added to the air as it is affected by paints, finishes, and other contributors to poor indoor air quality. As the polluted air moves through the phytoremediation wall—largely by natural air circulation flows—the root rhizomes digest the toxins and replenish the oxygen. Clean air is then returned to the interior environment.



## PARKING RETAILS:



## SOIL ANALYSIS :

Who to Deal with the limestone soil



Group 2H

Healthcare Design Studio

# (7) Design Development

## (7-5) 5<sup>th</sup> Assignment :

### (7-5-1) Vision , Design Concept & Programmatic Concept :

# NEFERTARI MEDICAL CITY

PEDIATRICS , GYNECOLOGICAL AND OBSTETRICS HOSPITALS



Nefertari is going to be the destination of health care in Egypt.

Rise the healthcare level Egypt is going to be one of the top 7 countries in the world in providing healthcare



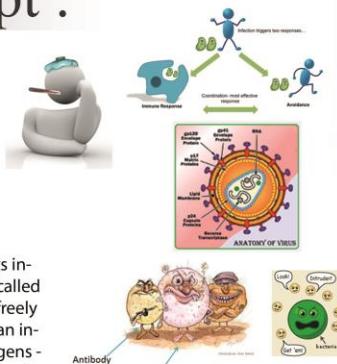
- To Decrease the % of children death
- To make Excellent medical services for the mamies & their babies
- To Increase the women knowledge .
- To give the mamies & their children the advices .
- Make Nefertari children's & women's hospital as the first all over Egypt .

## Design Concept :

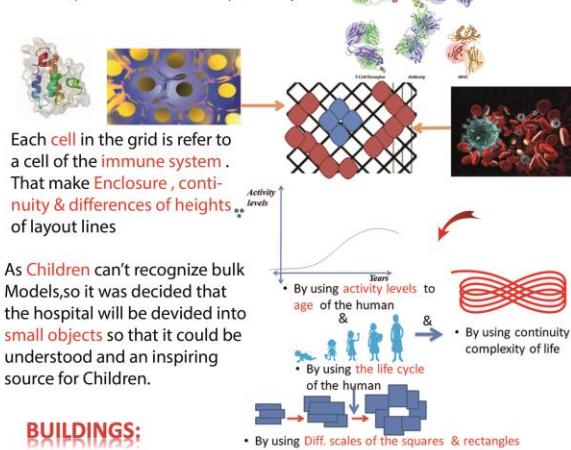
### What causes people to get sick

Our bodies come equipped with immune systems to fight off foreign agents. However, pathogens have the ability to adapt and evolve much more quickly than the immune system can. One way that pathogens evade the immune system is by hiding within the body's healthy cells.

The first part of the immune system that meets invaders such as bacteria is a group of proteins called the complement system. These proteins flow freely in the blood and can quickly reach the site of an invasion where they can react directly with antigens - molecules that the body recognizes as foreign substances.



The concept is inspired from the Model of the C5a molecule , part of the immune complement system



## Programmatic Concept :

### **MISSION:**

#### **• DESIGN APPROACH :**

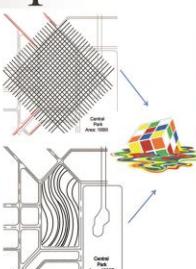
#### **AXIS :**

#### **1 BUILDING AXIS :**

- The grid is inspired from the surrounding context .
- It is in the same direction of the prevailing wind .

#### **2 LANDSCAPE AXIS :**

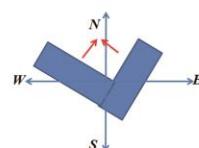
- The grid is inspired from the site nature & its sand dunes movement . The grid is to make contrast with the straight grid



### **BUILDINGS:**

The Rooms orientation is North west or North east .

The best site view is on the central park & the children's park

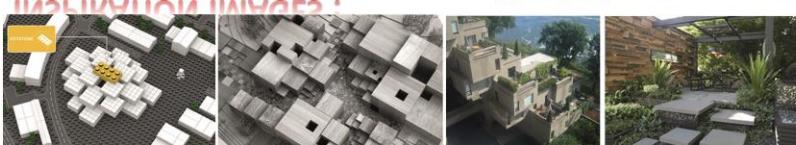


### **CONE OF VISION :**

- We study the cone of vision of the users



## INSPIRATION IMAGES :



## (7) Design Development

### (7-5-3) Layout Development:



## (7) Design Development

### (7-5-4) Layout :



# (7) Design Development

## (7-5-5) Plaza Details:

Plaza



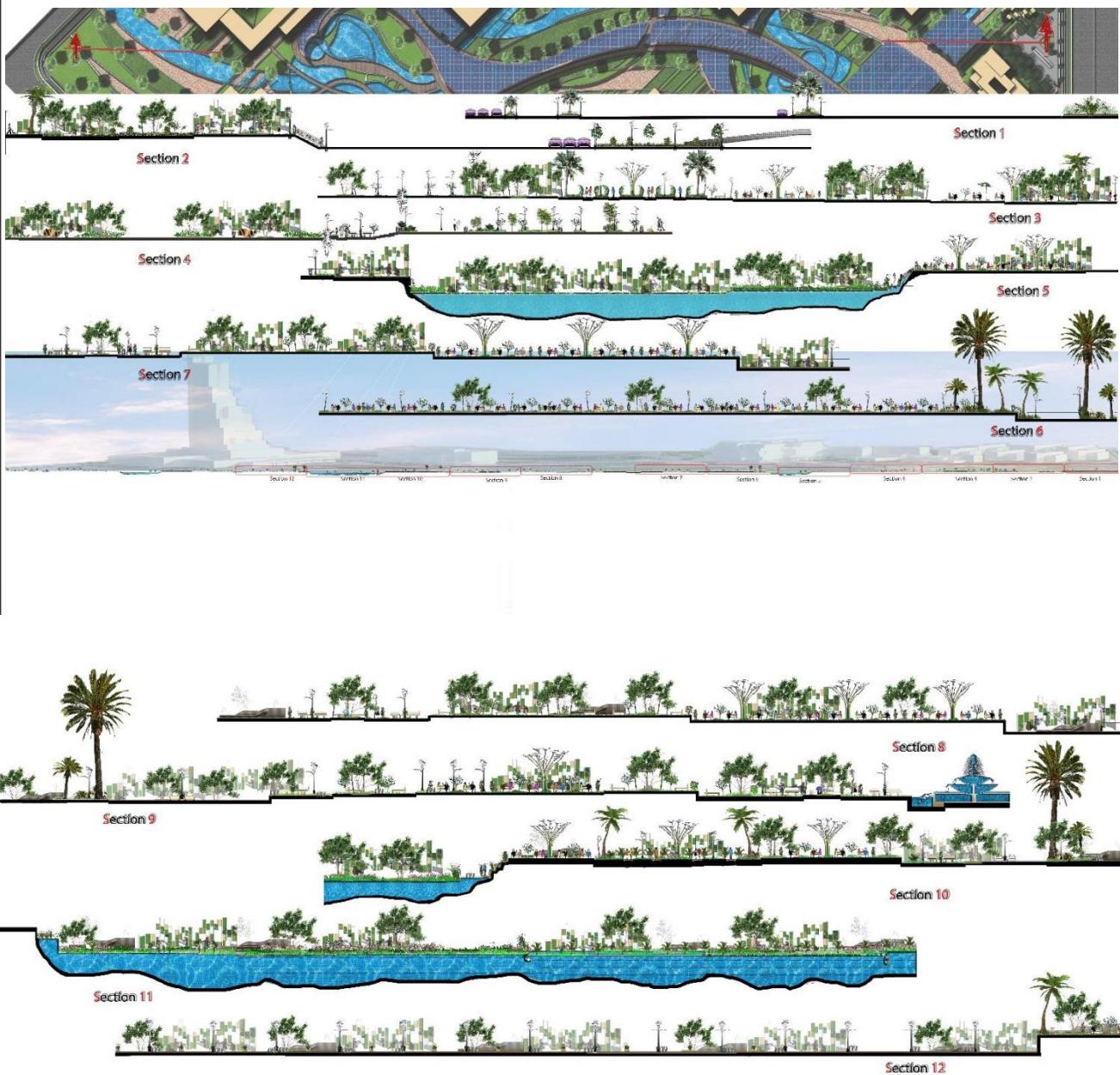
layout



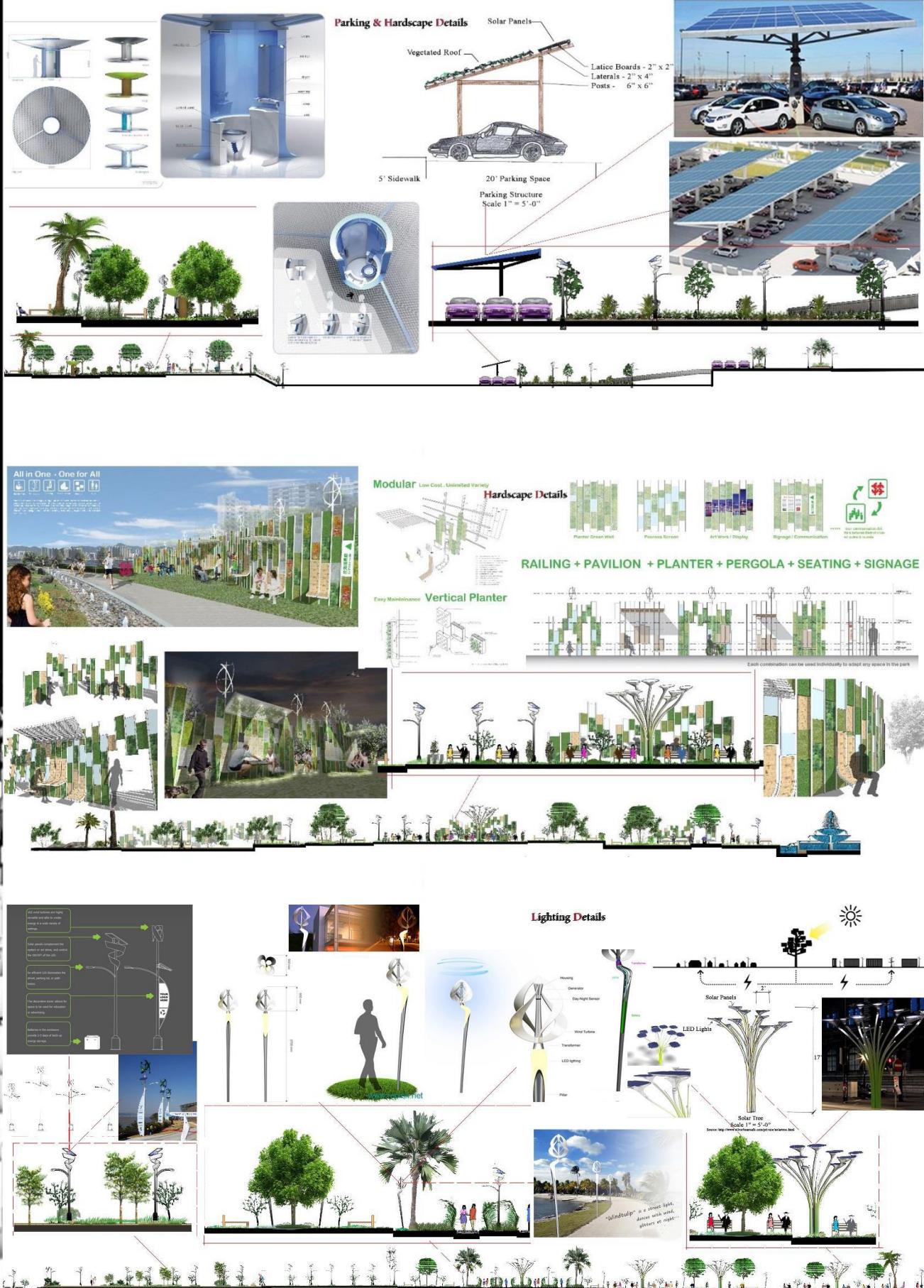
section

# (7) Design Development

## (7-5-6) Layout Sections & Details :



# (7) Design Development



## (7) Design Development

### (7-5-7) Site plan :



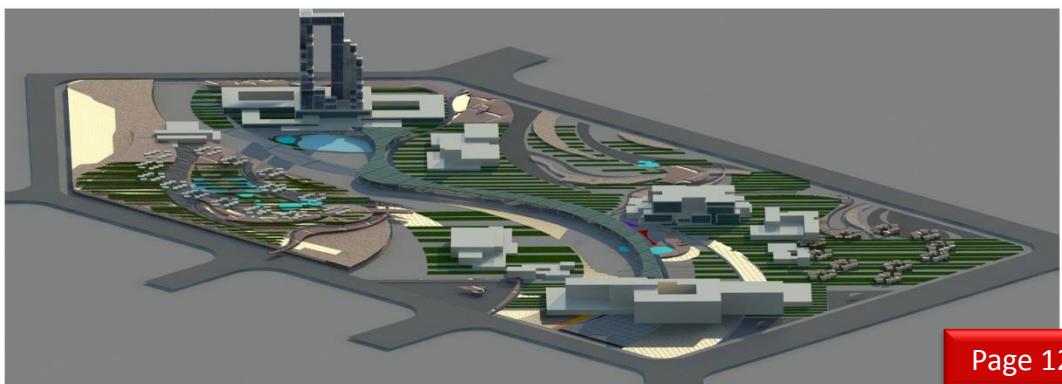
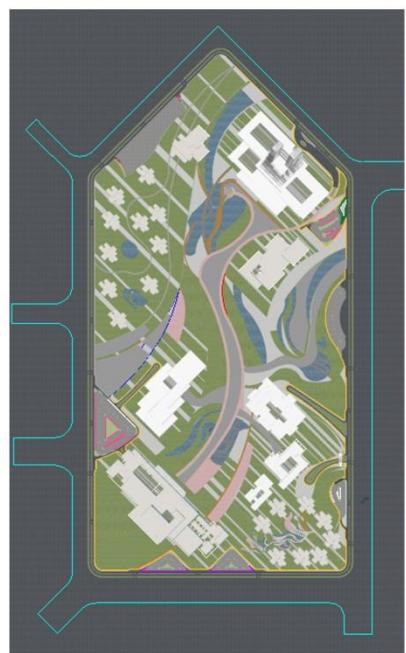
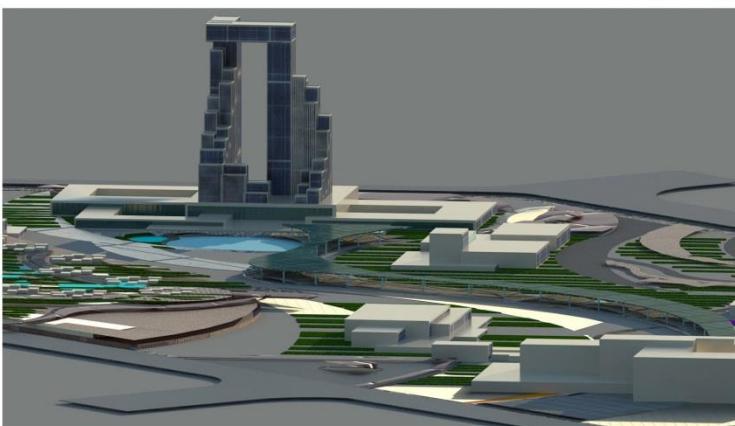
# (7) Design Development

Physical Model:

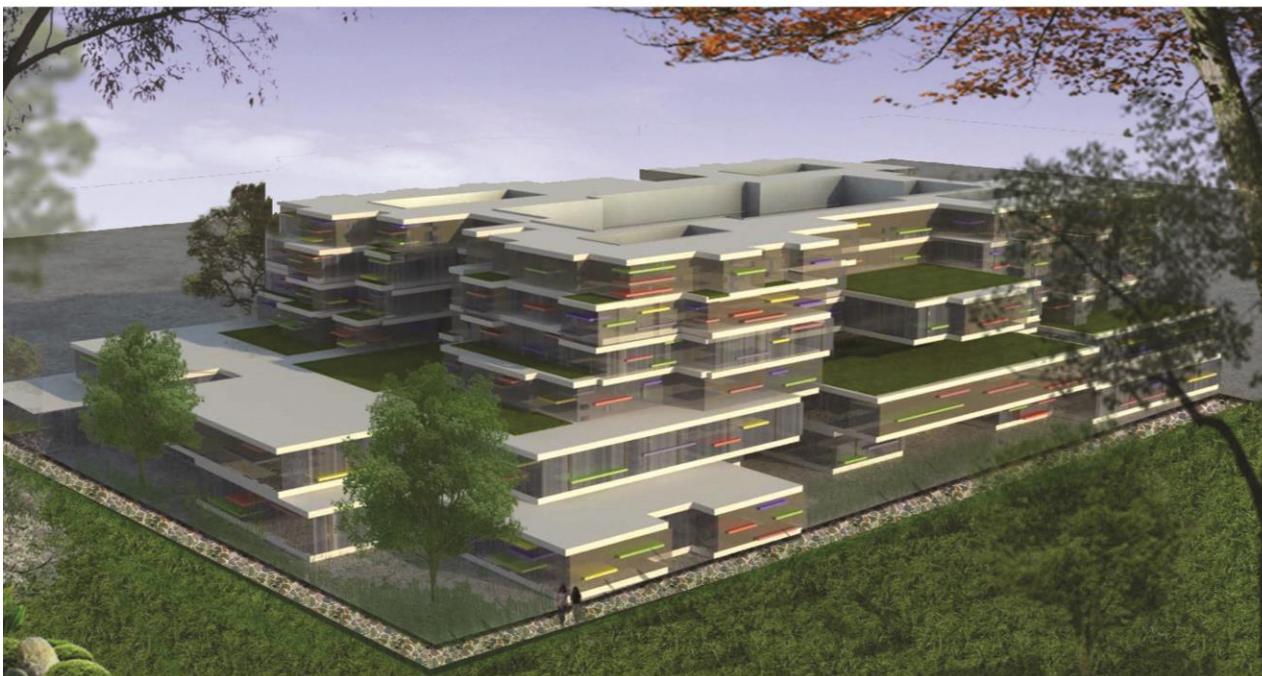
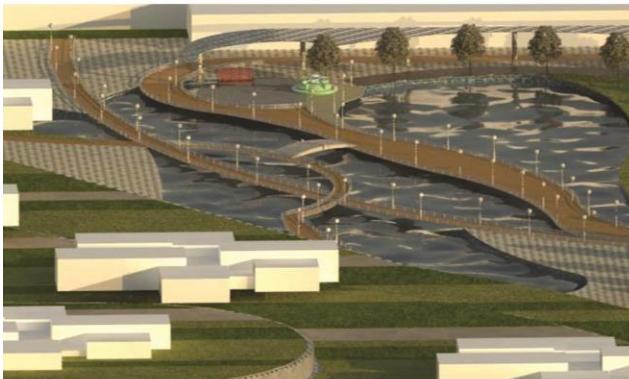
(7-5-8) Physical model & 3d shots :



3D Shots:

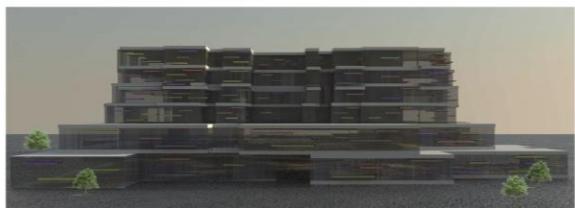
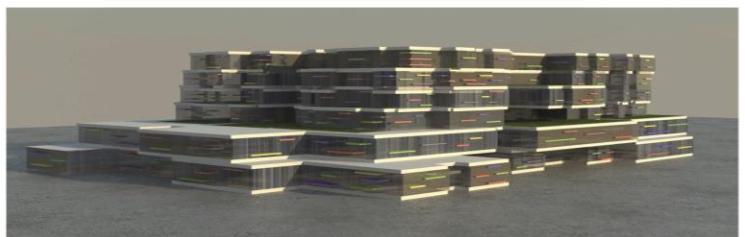
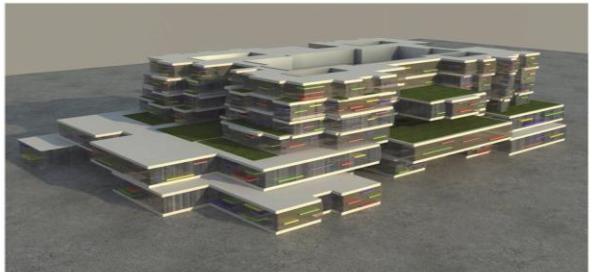
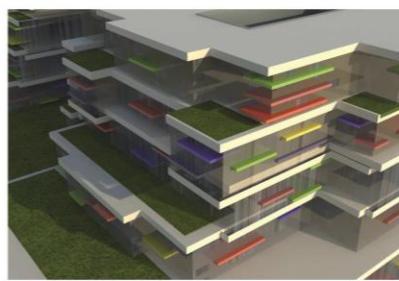
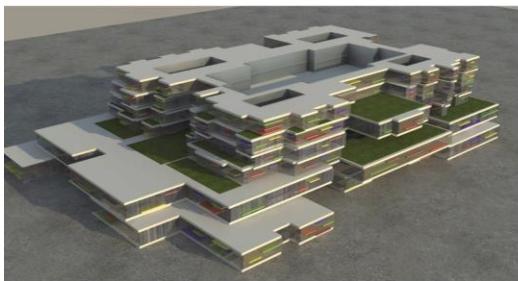


## (7) Design Development



# (7) Design Development

## PEDIATRICS HOSPITAL

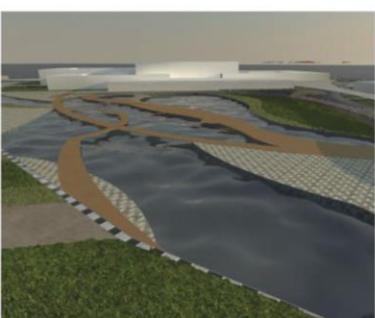


NORTH EAST ELEVATION



SOUTH WEST ELEVATION

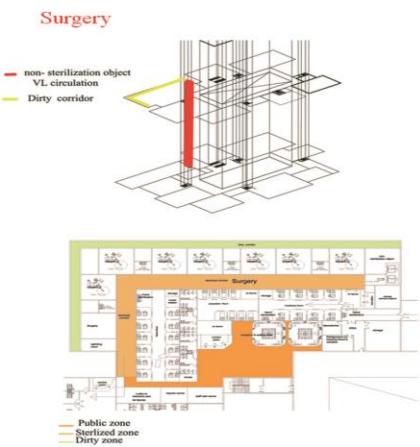
3D SHOTS:



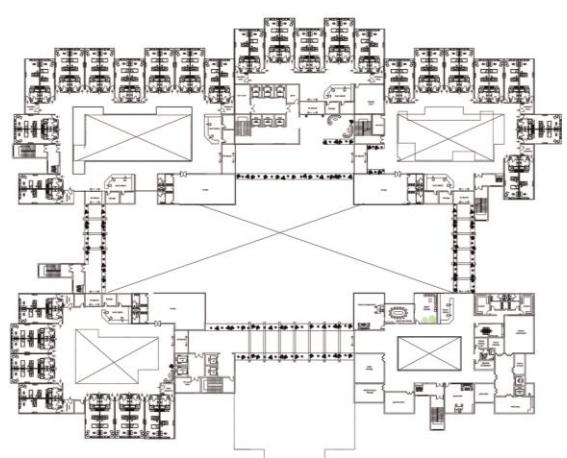
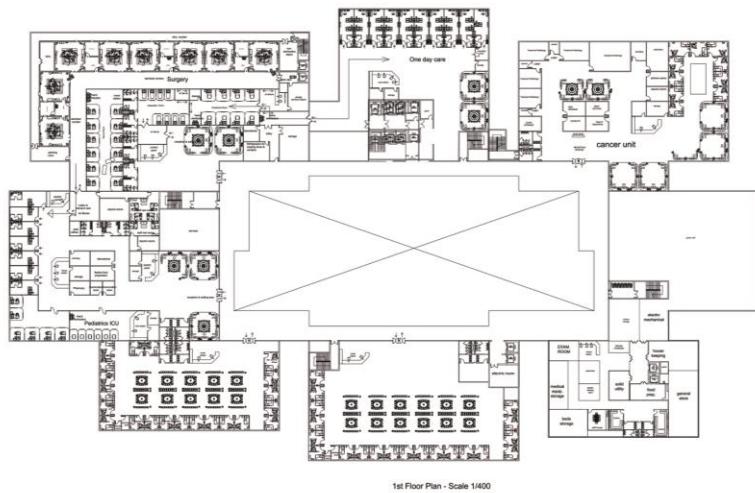
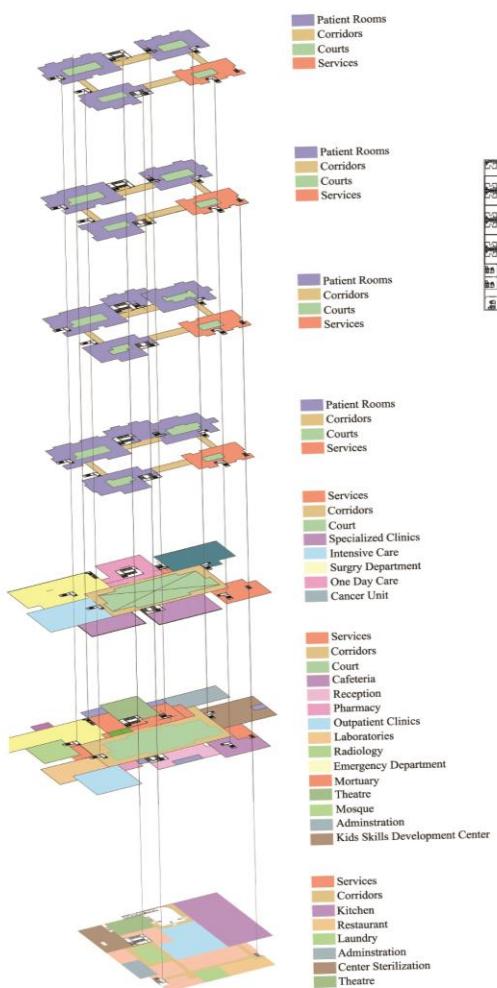
# (7) Design Development

## (7-5-9) Pediatrics Hospitals Plans & 3d Zoning :

### Children Hospital:



### 3D Zoning :

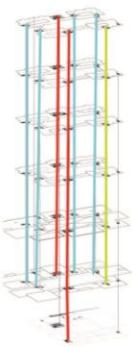


# (7) Design Development

## Plan Studies :

### Vertical Circulation:

- Escape
- Main
- Services



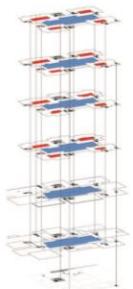
### Horizontal Circulation:

- Main
- Secondary

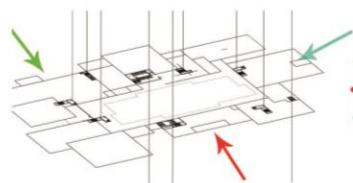


### Courts:

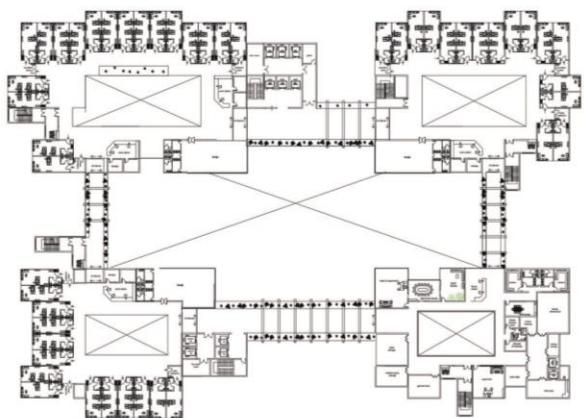
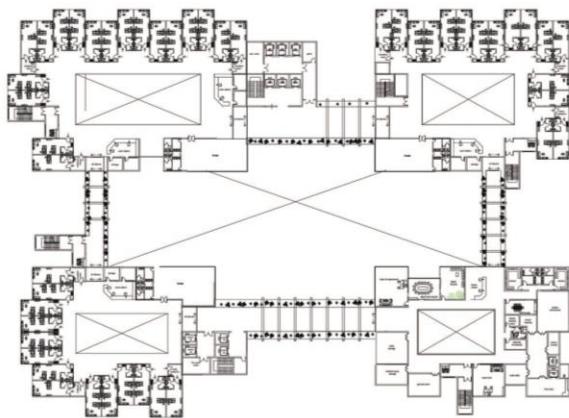
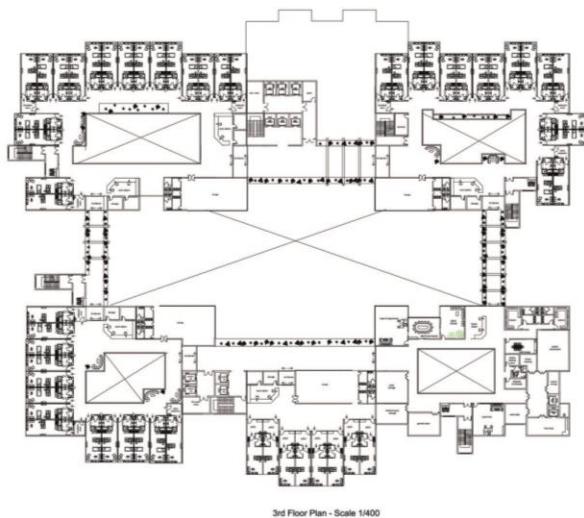
- Main
- 



### Services



- EMERGENCY ENTRANCE
- MAIN ENTRANCE
- DEVELOPMENT CENTER ENTRANCE



# (7) Design Development

## (7-5-10) Pediatrics Hospital Section:

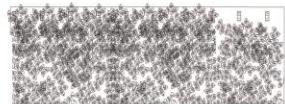
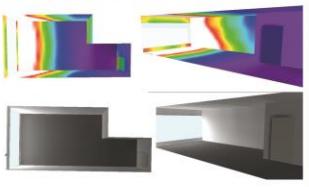
Part 1

Part 2



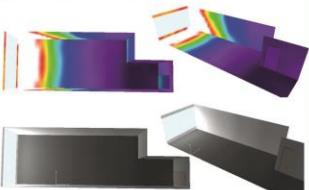
### DAYLIGHTING STUDIES : CHILDREN HOSPITAL SECTION :

SINGLE PATIENT ROOM :



GREEN WALL

DOUBLE PATIENT ROOM :

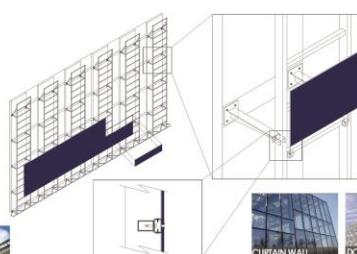
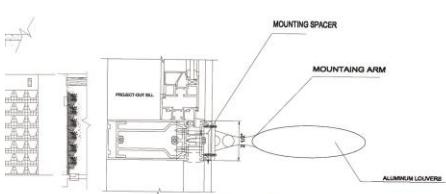
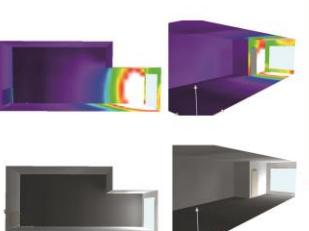


atrium interior :



Part 1

INTENSIVE CARE :



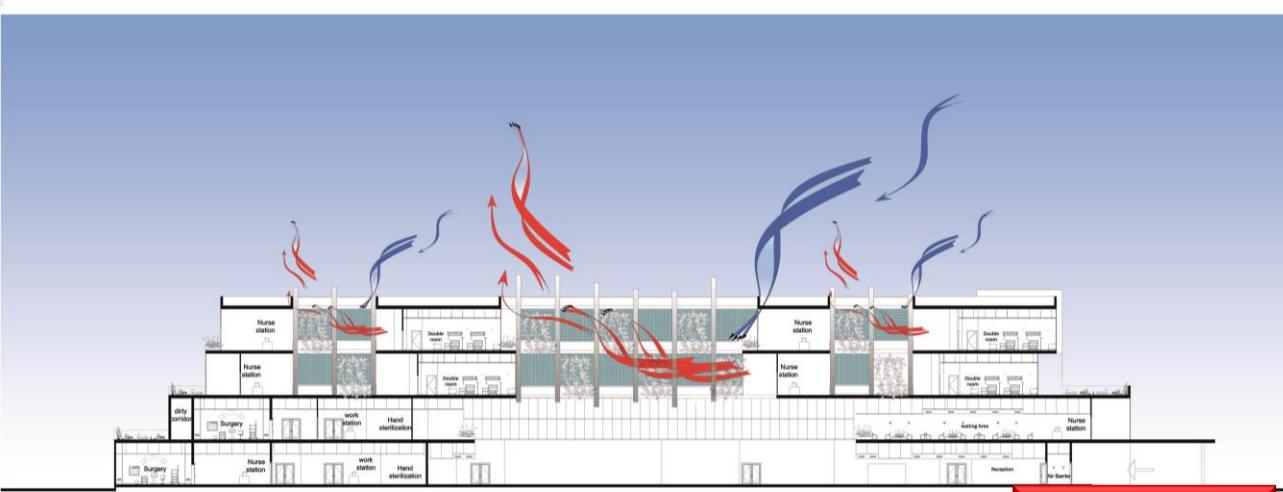
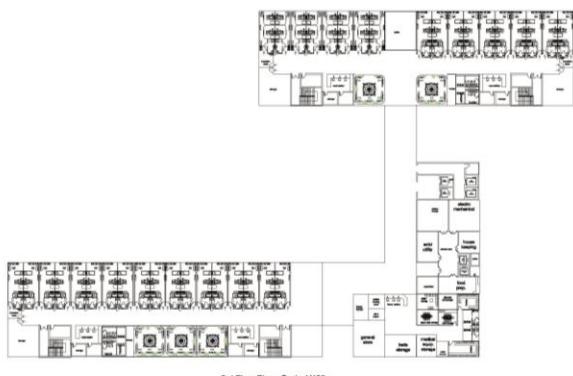
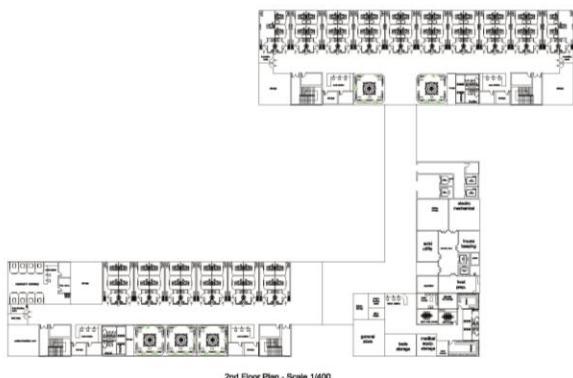
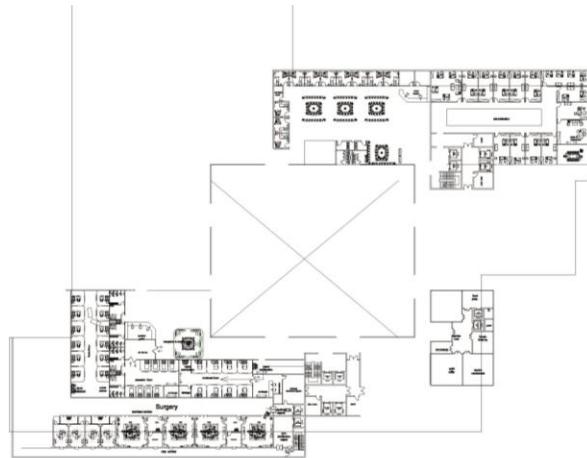
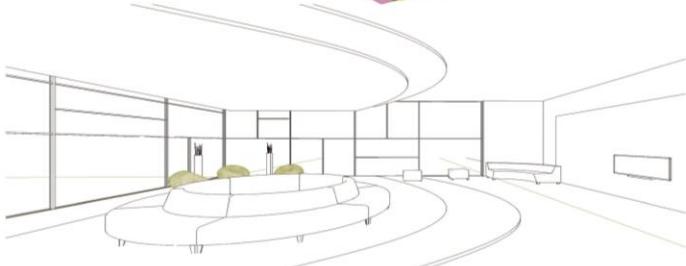
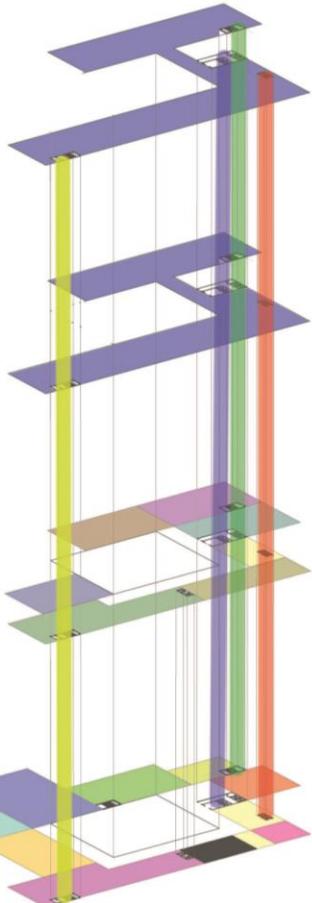
Part 2



# (7) Design Development

## (7-5-11) Gynecological & Obstetrics Hospital Plans , 3d Zoning & Section:

- Patient Rooms
- Administration
- Specialized Clinics
- Intensive care
- Surgery
- One day care
- Services
- Multi purpose use
- Cafeteria
- Entrance
- Outpatient Clinics
- Laboratory Department
- Radiology Department
- Emergency Department
- Mortuary
- Mosque
- Mortuary

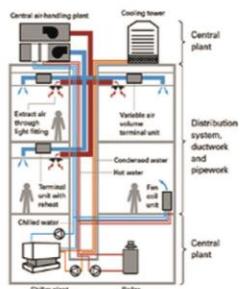
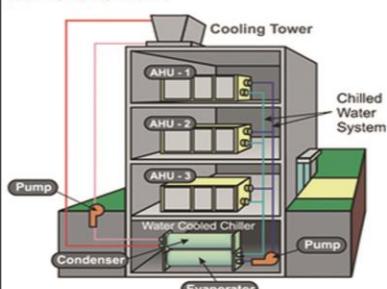


# (7) Design Development

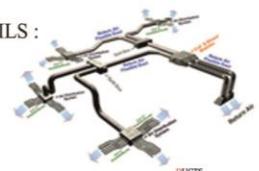
## (7-5-12) HVAC System & Interior shots :

### HVAC SYSTEM :

HVAC SYSTEM :

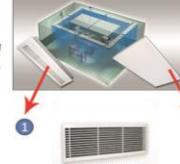
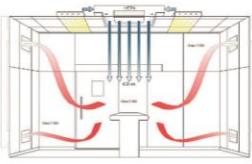
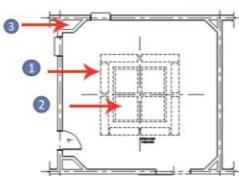


HVAC SYSTEM DETAILS :

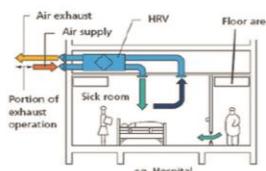
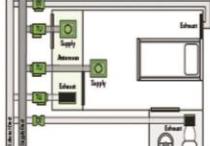
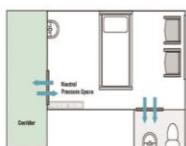


HVAC IN OPERATION THEATRE :

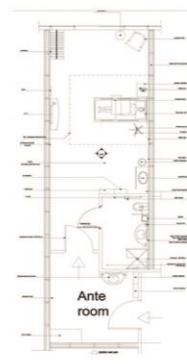
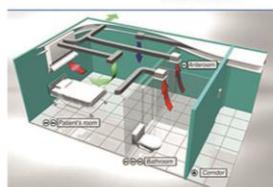
AIR CURTAIN SYSTEM :



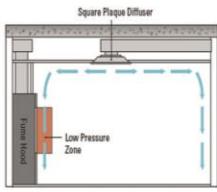
HVAC IN PATIENT ROOM :



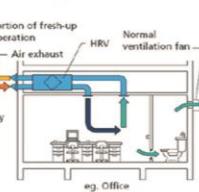
HVAC IN ISOLATION ROOM :



HVAC IN LABORATORIES :

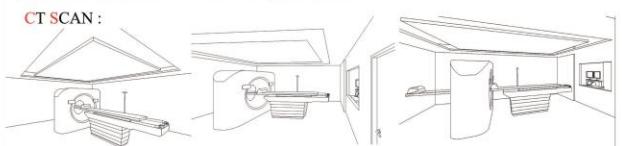


HVAC IN LABORATORIES :



INTERIOR SHOTS :

CT SCAN :



DOUBLE ROOM :



INTENSIVE CARE :



INVESTMENT ROOM :



ISOLATION ROOM :



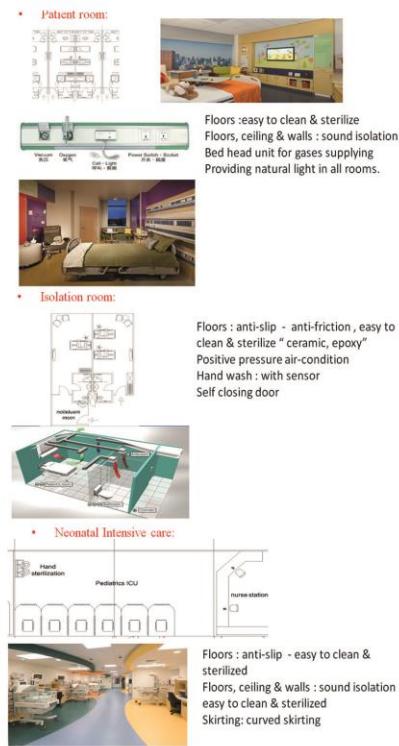
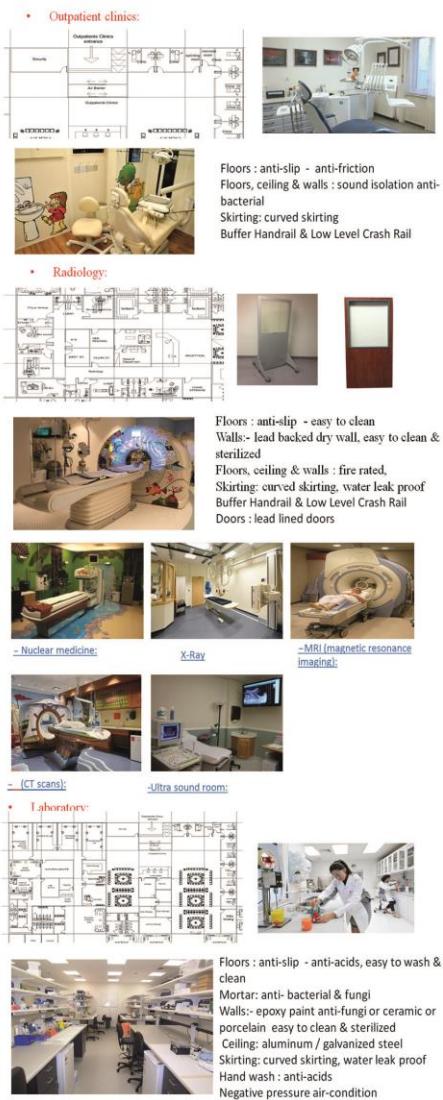
HEAD OF DEPARTMENT OFFICE :



# (7) Design Development

## (7-5-13) Interior Details , Structure systems , Sustainable solutions & Water efficiency :

### INTERIOR DETAILS :



### Structural System:

#### STRUCTURE GRID :



#### Sustainable Solutions

##### WASTE REDUCTION:



##### ECO- ELEVATOR:



#### Water Efficiency in Landscaping:

- Smart Watering
- labeled irrigation controllers



### Water Efficiency:

#### Water Efficiency Indoor:

##### dual flush toilet

- toilets can effectively save up to 16,500 gallons of water annually.



#### Faucet Aerators

- Compared to the standard faucet aerator with a flow rate of 2.2 gallons per minute the flow rate reduction will be 0.5 gpm = up to 77%



#### Innovative waste water technologies:

- Grey water reuse after treatment .
- As grey water represents as 50-80% from waste water



#### Waterless Urinal Systems:

- no-flush urinals use no water, one to five gallons of water is saved with each use.
- use of waterless urinals could result in an overall reduction in energy use

# (7) Design Development

## (7-5-14) Materials & Space finishing schedule :

### Materials:

#### Floors:

Rosa Portogallo  
Marble Tiles



Anti acid Ceramic

Epoxy Paint

Ceramic Tiles  
30\*30Cm

Vinyl rolls anti  
bacterial

Terrazzo  
Tiles 30\*30 \*2cm

Acrylic Painting  
Anti Bacterial

Ceramic Tiles  
30\*20 Cm

Gypsum Board  
Dry Wall

Acrylic Painting

Rosa Portogallo  
Marble Cladding  
60X60Cm

Lead Plywood  
Wall

#### Walls:



Rosa Portogallo  
Marble

Epoxy

Rubber Base

Curved Vinyl

#### Skirting:



#### Ceiling:

Plastic Painting

(False Ceiling) Gypsum  
Board anti moisture

(False Ceiling) Gypsum  
Tiles anti moisture  
600X600mm



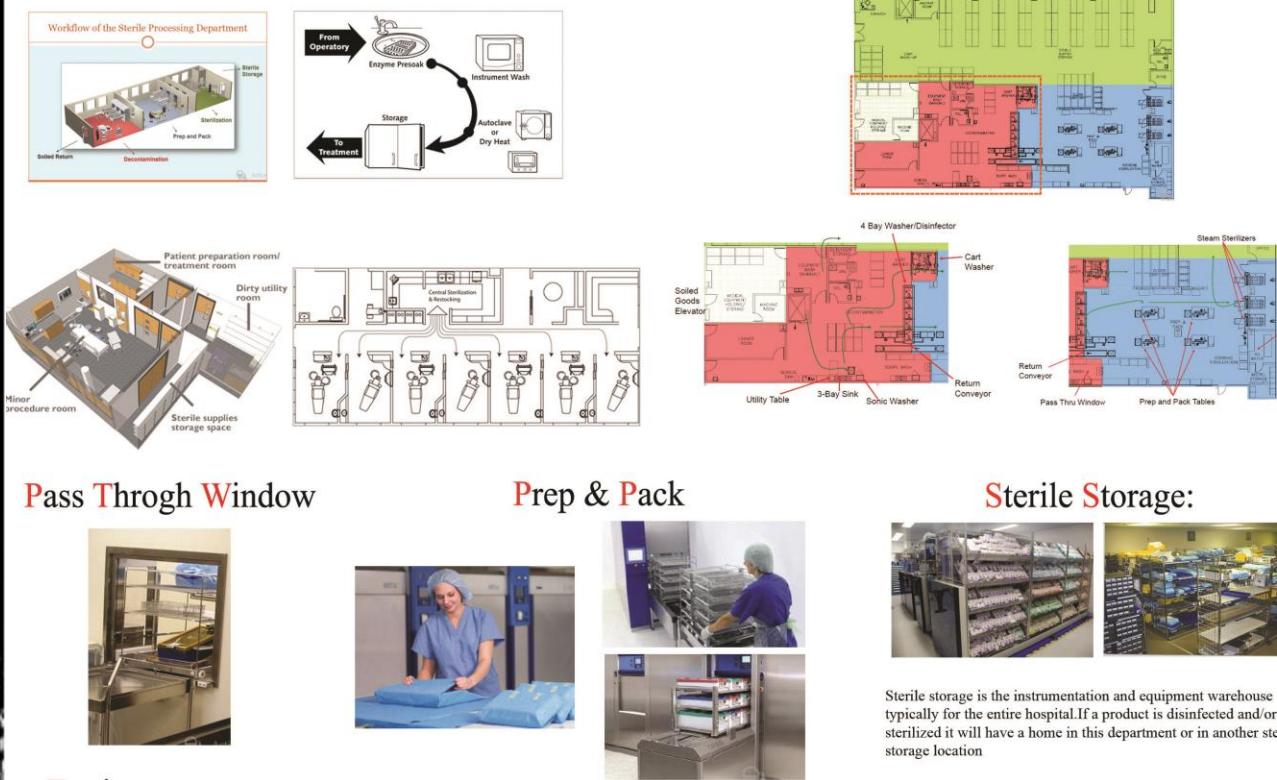
### SPACES FINISHING SCHEDULE :

ROOM/SPACE NAME AND CATEGORY	FLOOR FINISHES						WALL FINISHES				SKIRTING FINISHES				CEILING FINISHES			
	Rosa Portogallo Marble TILES 30*30cm	Anti acid Ceramic	Epoxy	Gypsum Board Dry wall	Metal rate anti moisture 30*30cm	Terrazzo Tiles 30*30 *2cm	Acrylic Painting Anti Bacterial	Open Panel Rosa Portogallo Marble	Rubber Base	Curved Vinyl	Lead Plywood Wall	Plastic Painting	(False Ceiling) Gypsum Board anti moisture	(False Ceiling) Gypsum Tiles anti moisture 600X600mm	Coat of Epoxy	Coat of Gloss Epoxy	CEI	CE2
GROUND FLOOR PLAN	FL1	FL2	FL3	FL4	FL5	FL6	WL1	WL2	WL3	WL4	WL5	SK1	SK2	SK3	SK4	CE1	CE2	CE3
Reception	●											●		●				●
Pharmacy	●											●		●				●
Outpatient Clinic			●									●					●	
Laboratory	●						●											●
Radiology			●															●
Emergency Department						●	●	●					●				●	
Mortuary	●											●		●				●
Theatre			●									●		●			●	
Mosque	●											●		●			●	
Administration	●											●		●			●	
Kids Skills Development Center			●									●						●
Service area							●					●					●	
Toilet					●				●			●						●
Corridor						●				●		●					●	
<b>FIRST FLOOR PLAN</b>																		
Specialized Clinics							●					●		●		●	●	●
Intensive Care			●									●		●			●	●
Surgery			●					●				●						●
One Day Care			●									●		●				●
Cancer Unit			●									●						●
Service area									●			●		●			●	
Toilet						●			●			●						●
Corridor							●			●		●					●	
<b>SECOND FLOOR PLAN</b>																		
Patient room							●					●				●		●
Service area								●				●		●		●	●	●
Toilet								●				●		●				●
Corridor									●			●					●	
<b>THIRD FLOOR PLAN</b>																		
Patient room							●					●				●		●
Service area								●				●		●		●	●	●
Toilet								●				●		●				●
Corridor									●			●					●	
<b>FOURTH FLOOR PLAN</b>																		
Patient room							●					●				●		●
Service area								●				●		●		●	●	●
Toilet								●				●		●				●
Corridor									●			●					●	
<b>FIFTH FLOOR PLAN</b>																		
Patient room							●					●				●		●
Service area								●				●		●		●	●	●
Toilet								●				●		●				●
Corridor									●			●					●	

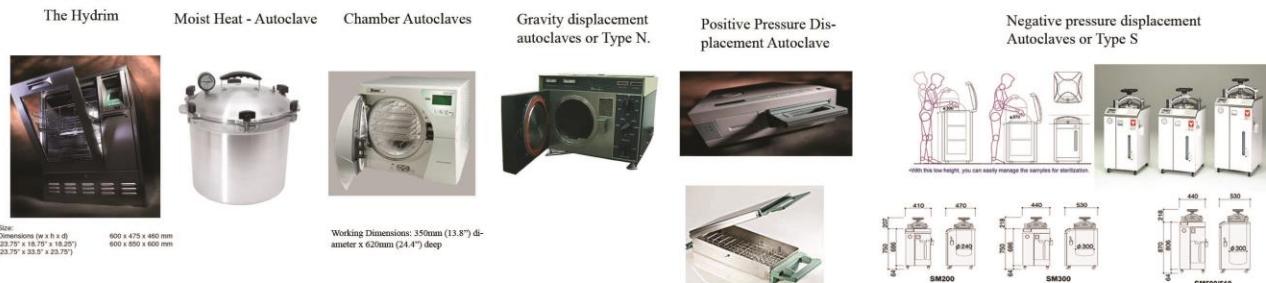
# (7) Design Development

## (7-5-15) Central Sterilization & Medical Waste Incinerator Details :

### Central Sterilization Details :



### Equipments:



### Medical Waste Incinerator Details :



# (7) Design Development

## (7-5-16) Radiology Details :

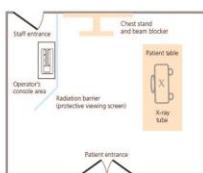
### Radiology Details :



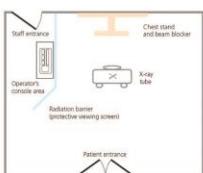
Fixed operator's screen



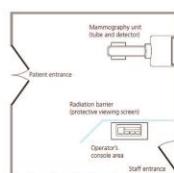
Interventional X-ray room with partial body shielding devices



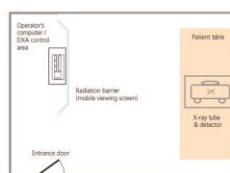
General X-ray room with chest stand



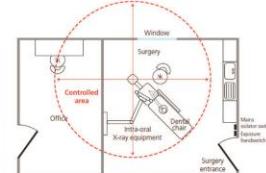
Dedicated chest room



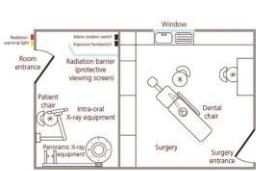
Mammography X-ray room



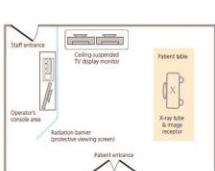
DXA room



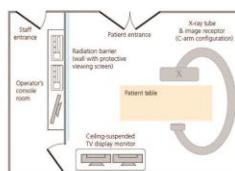
An intra-oral dental unit installed in a surgery



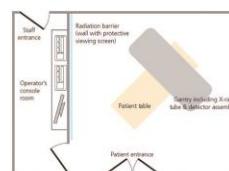
A dental radiography suite with several items of equipment



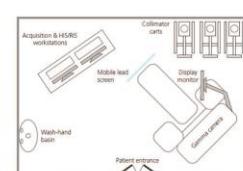
Fluoroscopy room



Computed Tomography (CT) room



Computed Tomography (CT) room

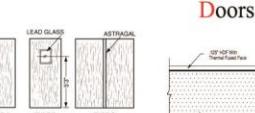
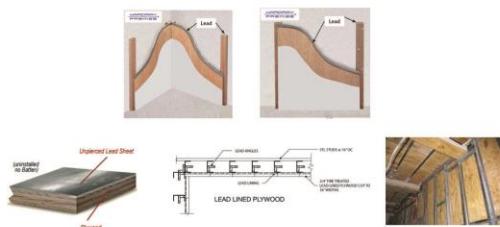


Gamma camera room

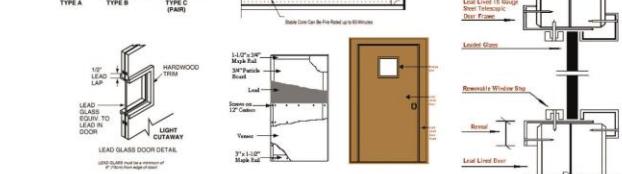
### Precautions:

#### Walls

Lead plywood on lead lined batons



#### Doors



Doors should be of solid construction with the lead bonded on both sides by wood or a suitable alternate protective material. The shielding must run the entire length and width of the door down to a few mm from the floor, and continue on the underside. Doors may include lead glass windows.

#### Ceiling

Waffle type ceiling



conventional floor and ceiling construction generally provides adequate protection in mammography.



#### Window

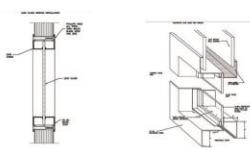
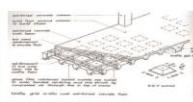
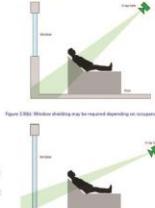


Figure 3.7(a) Window shielding not required, as primary X-ray beam does not impact on window

Figure 3.7(b) Window shielding may be required depending on occupancy outside window

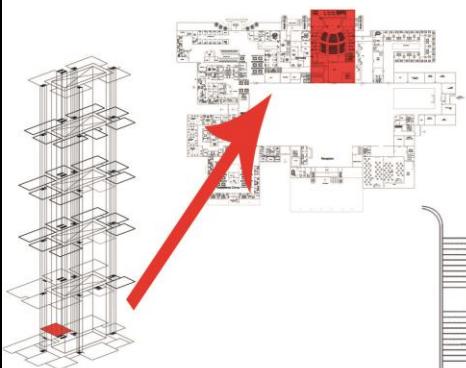
If windows are required in X-ray rooms, they may be shielded by lead glass or lead acrylic. These should be provided in the form of double-glazing, with plate glass on the outside as lead glass and lead acrylic may be easily damaged and lead glass must be kept dry



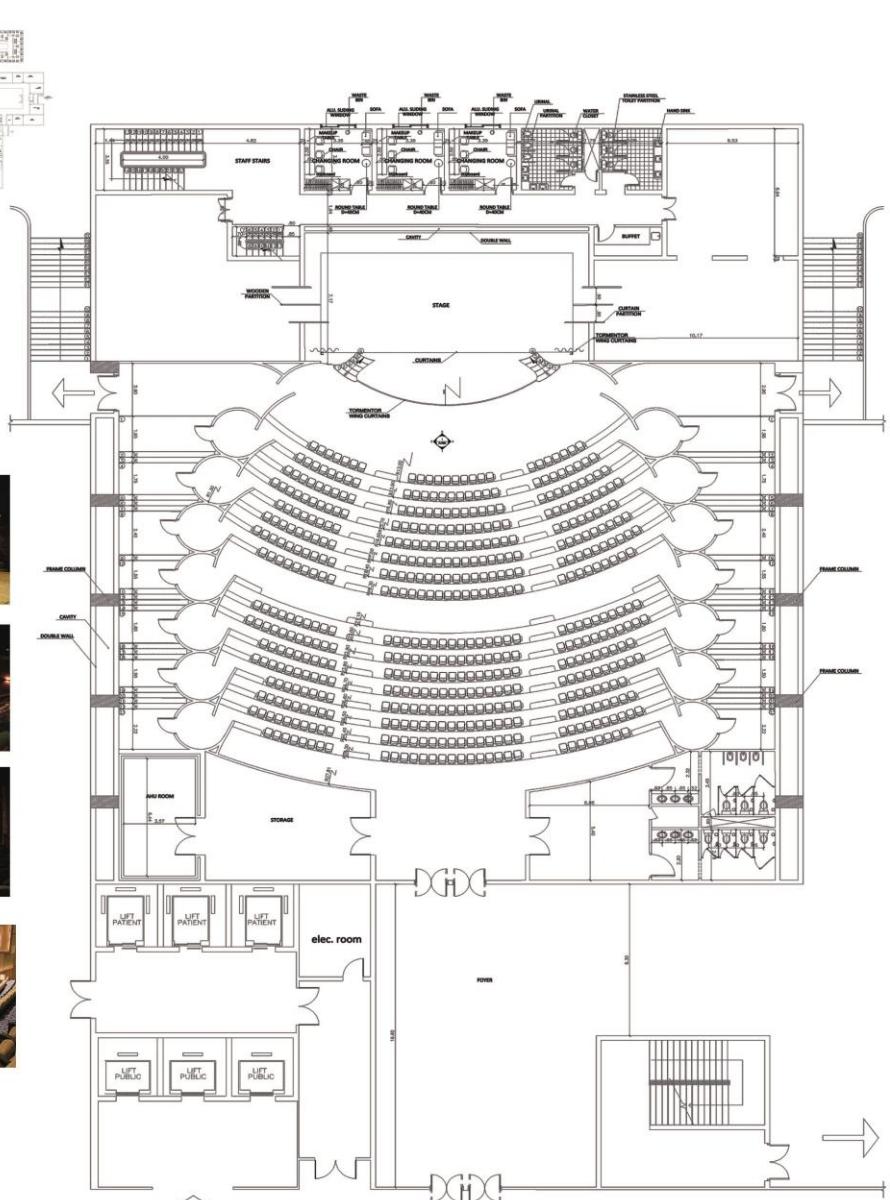
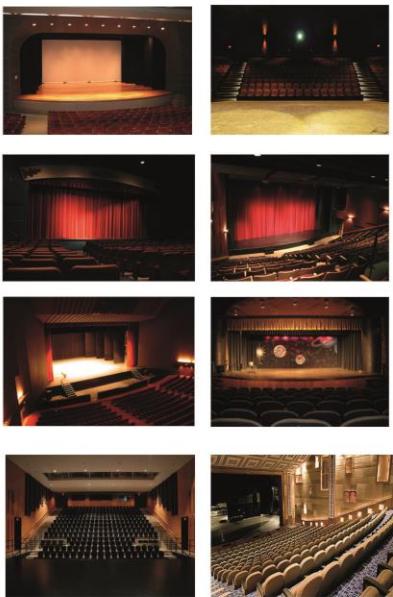
## (7) Design Development

## (7-5-17) Project Blow Ups:

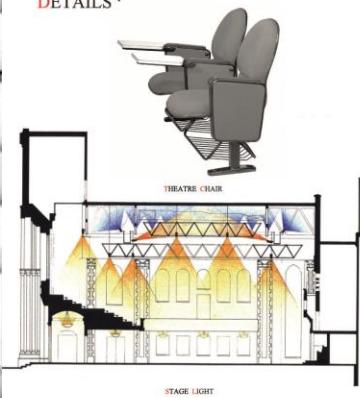
## THEATRE :



## **THEATRE EXAMPLES:**



## DETAILS ·

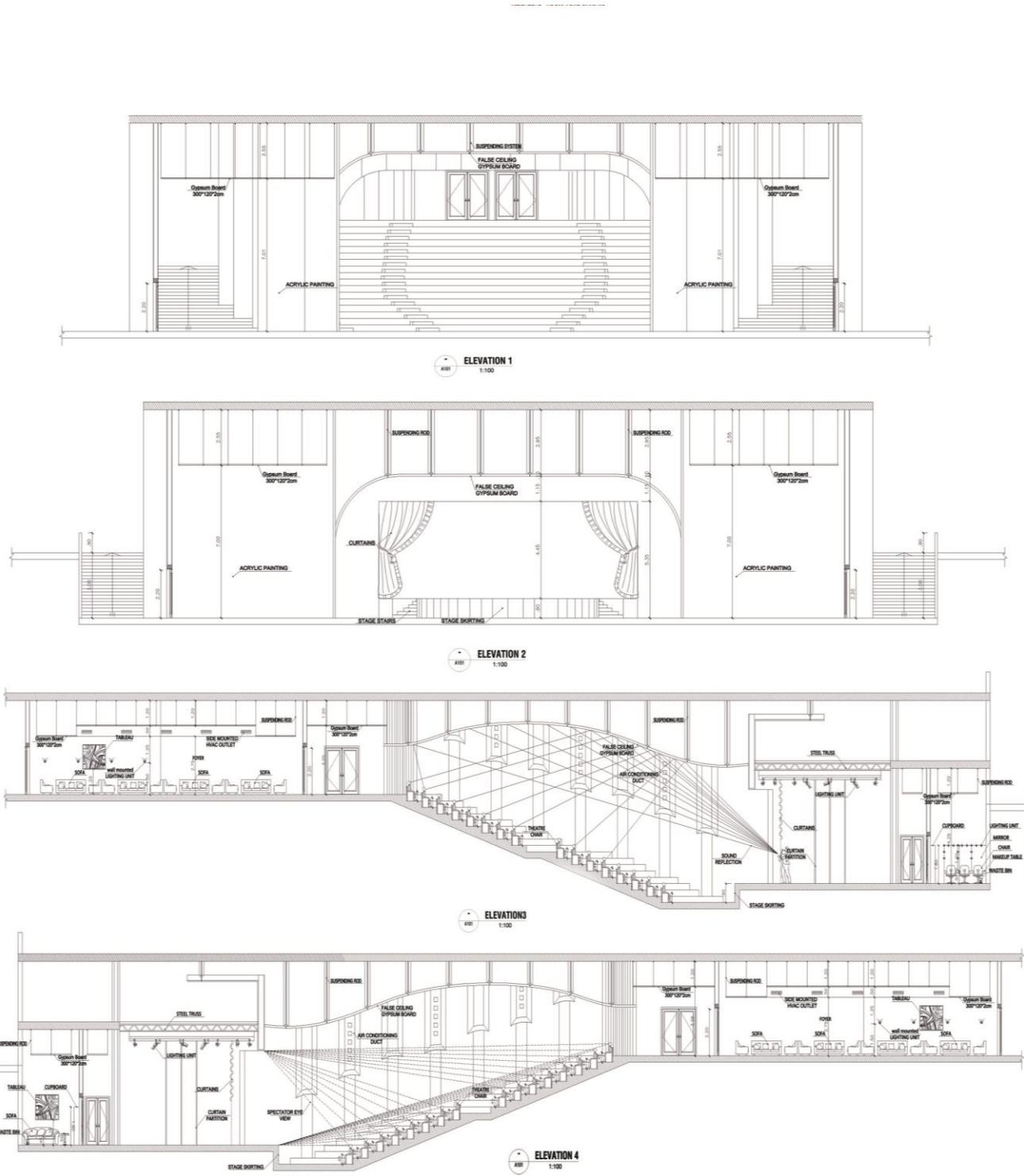


• 200 •



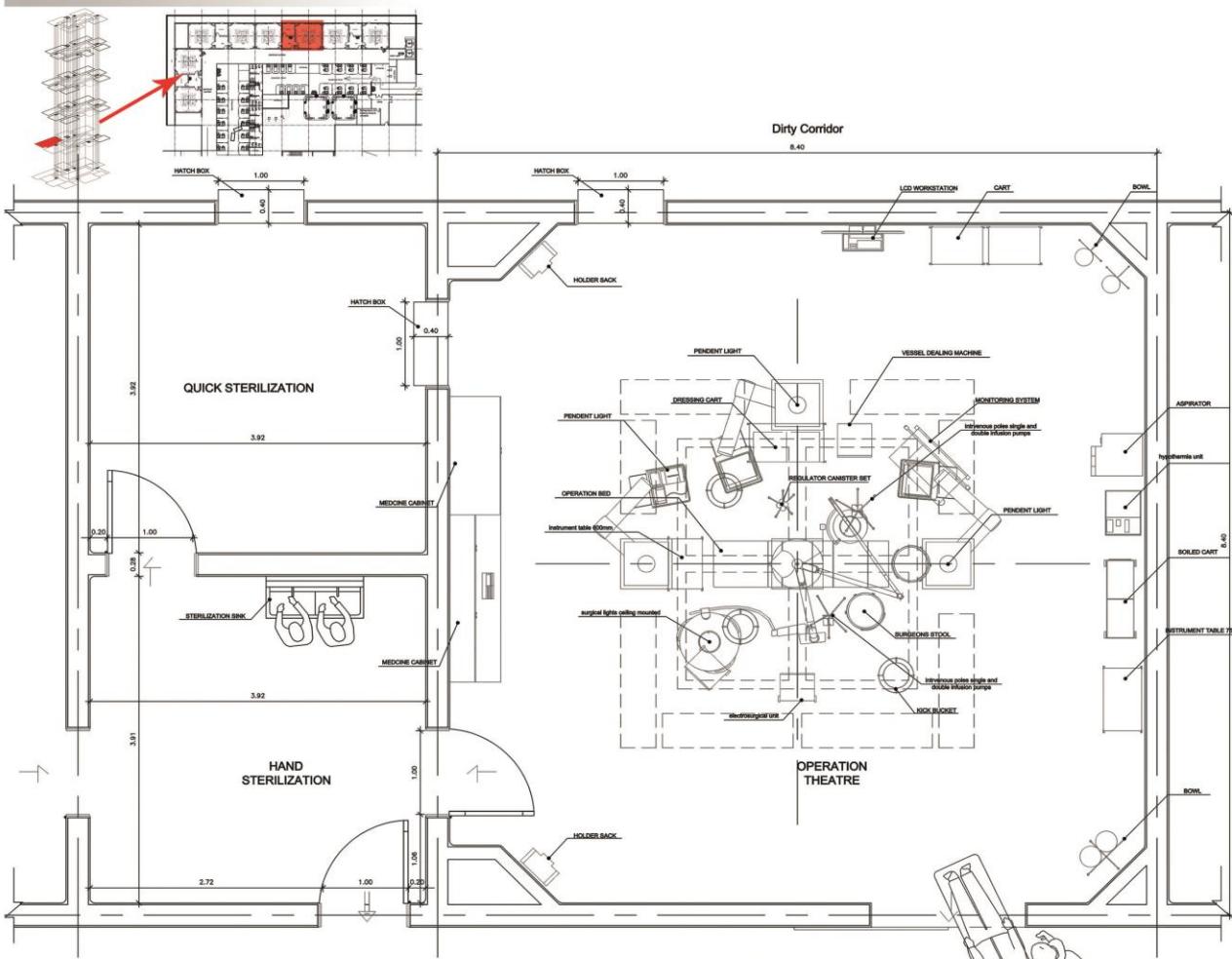
## THEATRE CEILING

# (7) Design Development



# (7) Design Development

## OPERATION THEATRE :



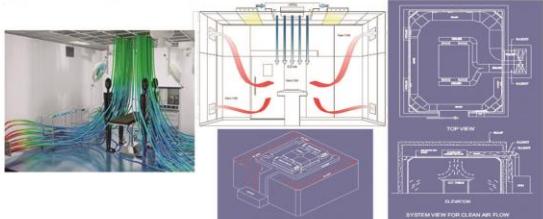
## OPERATION THEATRE EXAMPLES:



## DETAILS:

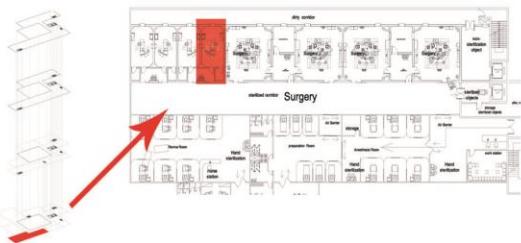


## OPERATION THEATRE HVAC & AIR FLOW :



# (7) Design Development

## DELIVERY OPERATION THEATER :



EXAMPLES:



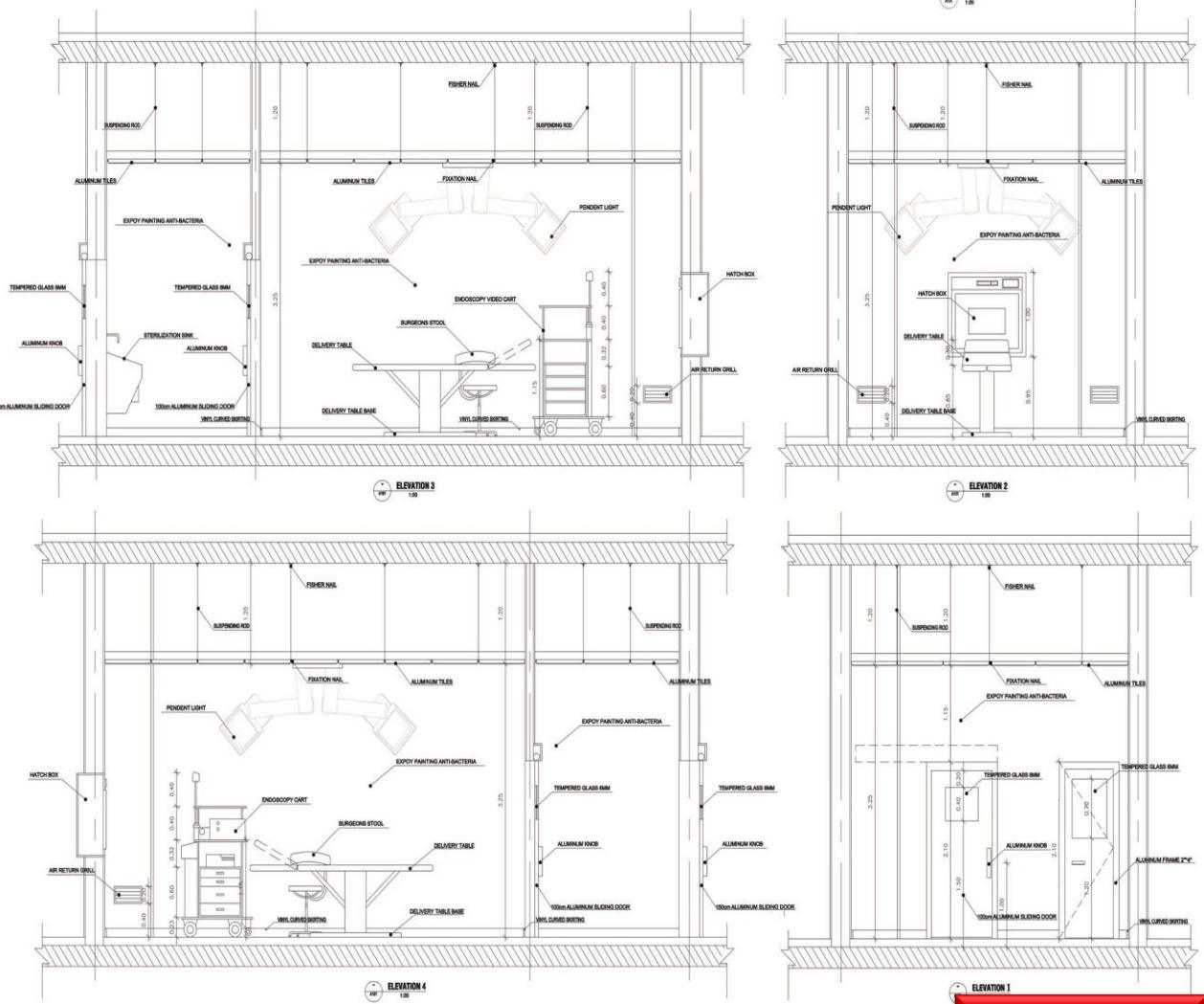
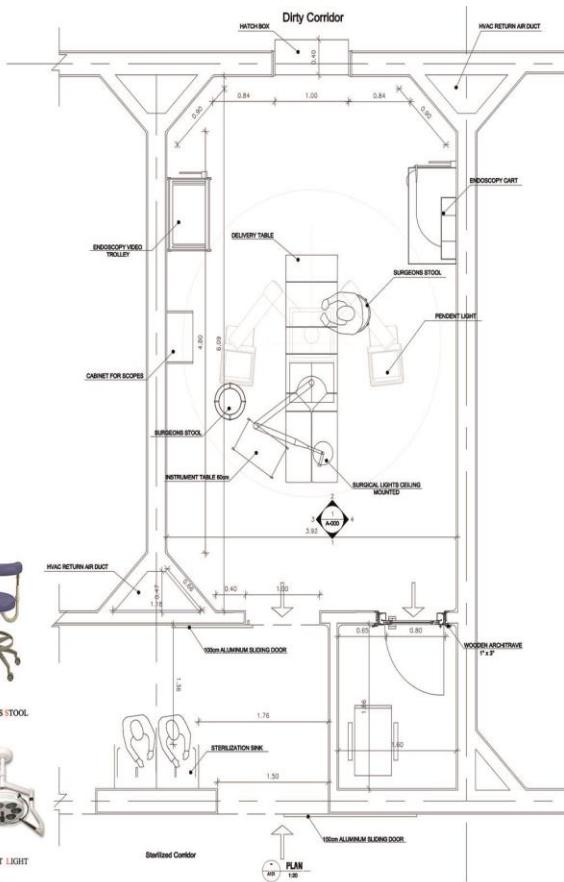
DETAILS :



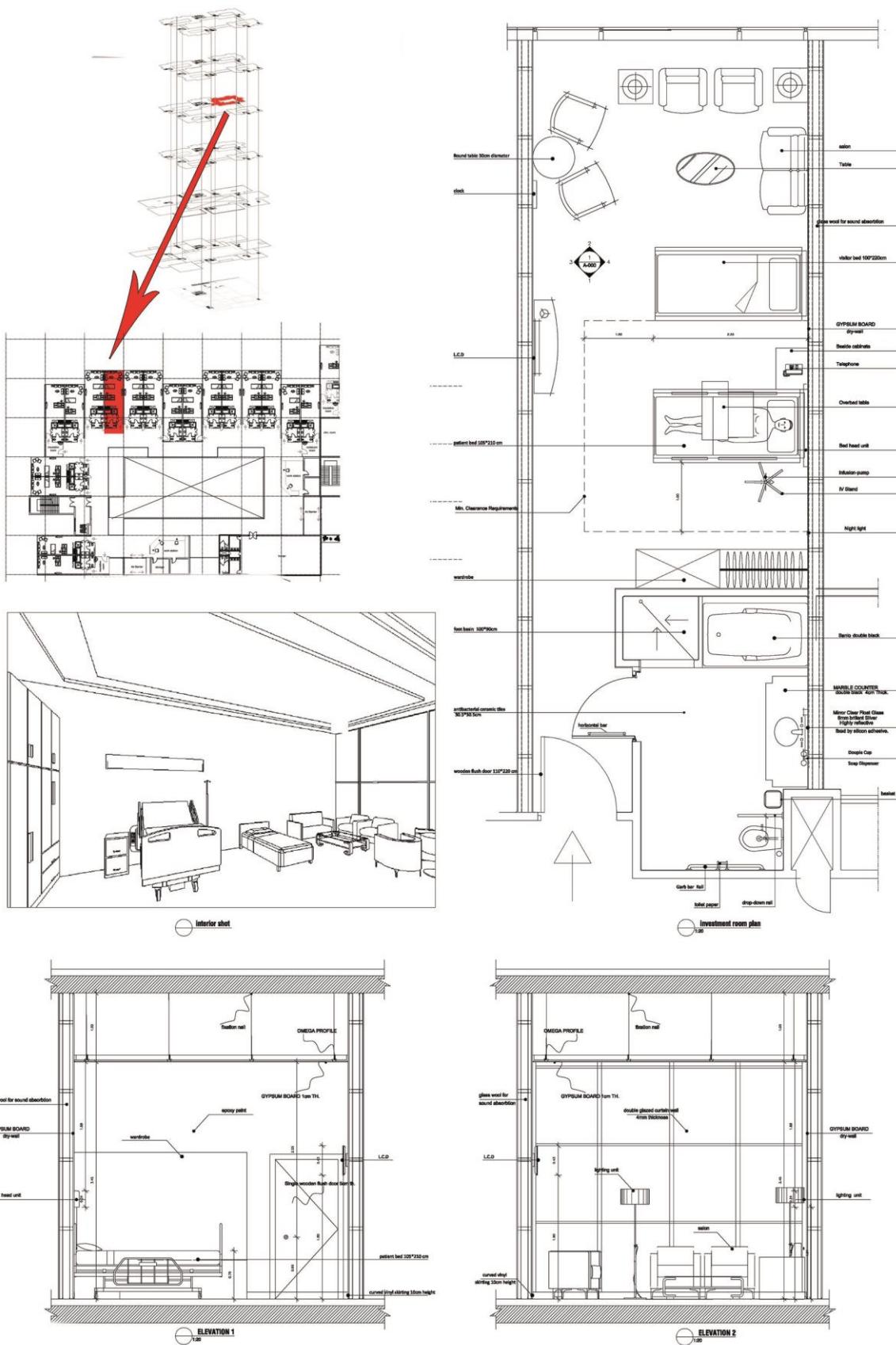
INSTRUMENT TABLE



PENDENT LIGHT

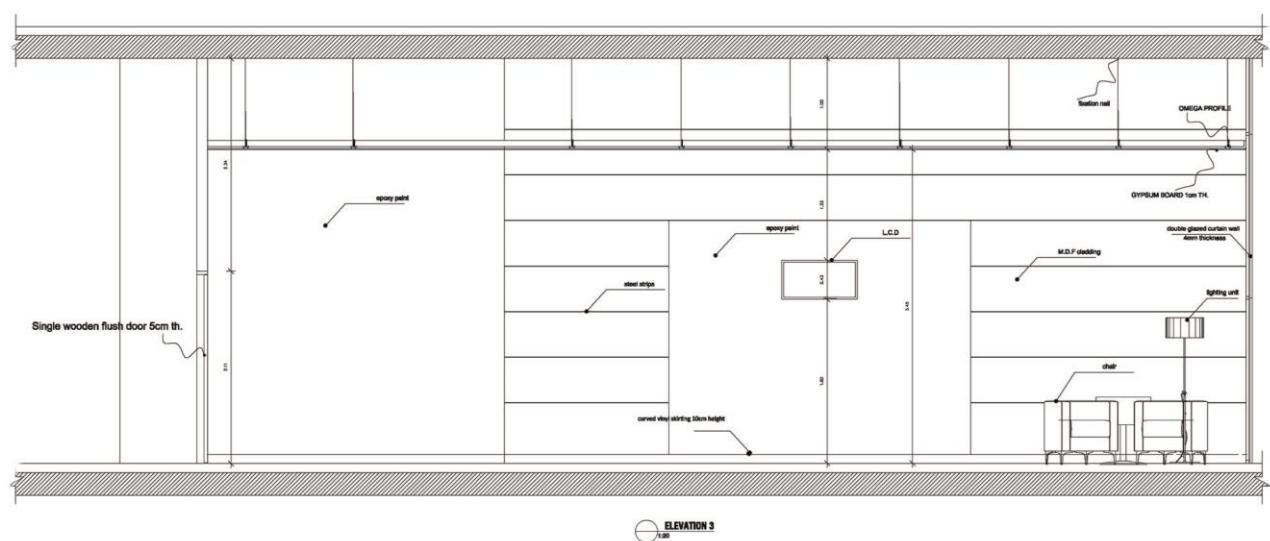
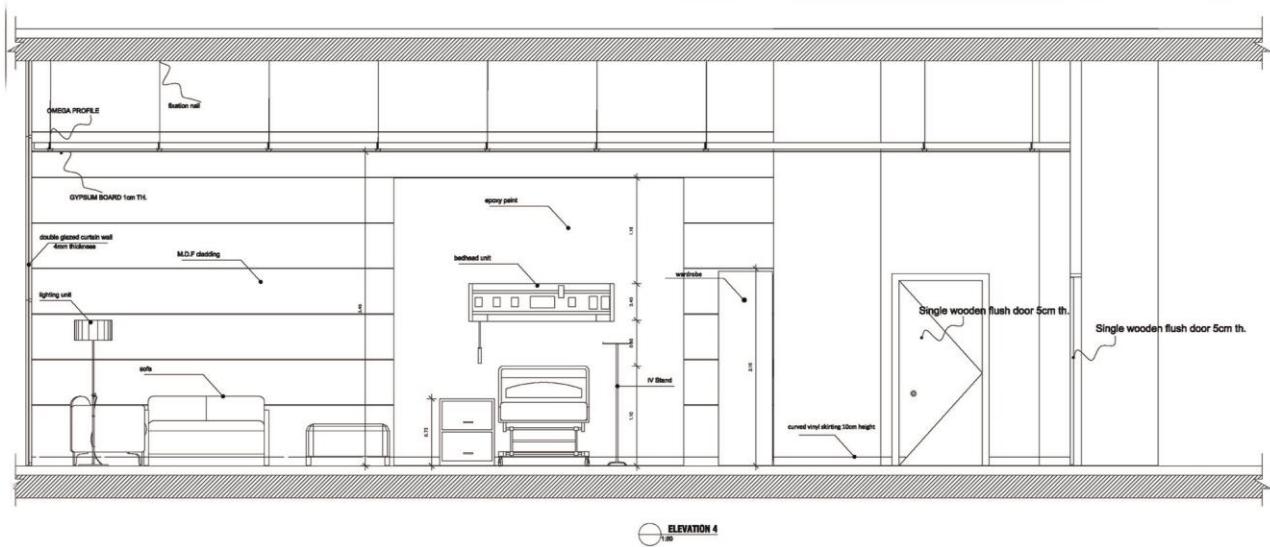


## SINGLE ROOM:



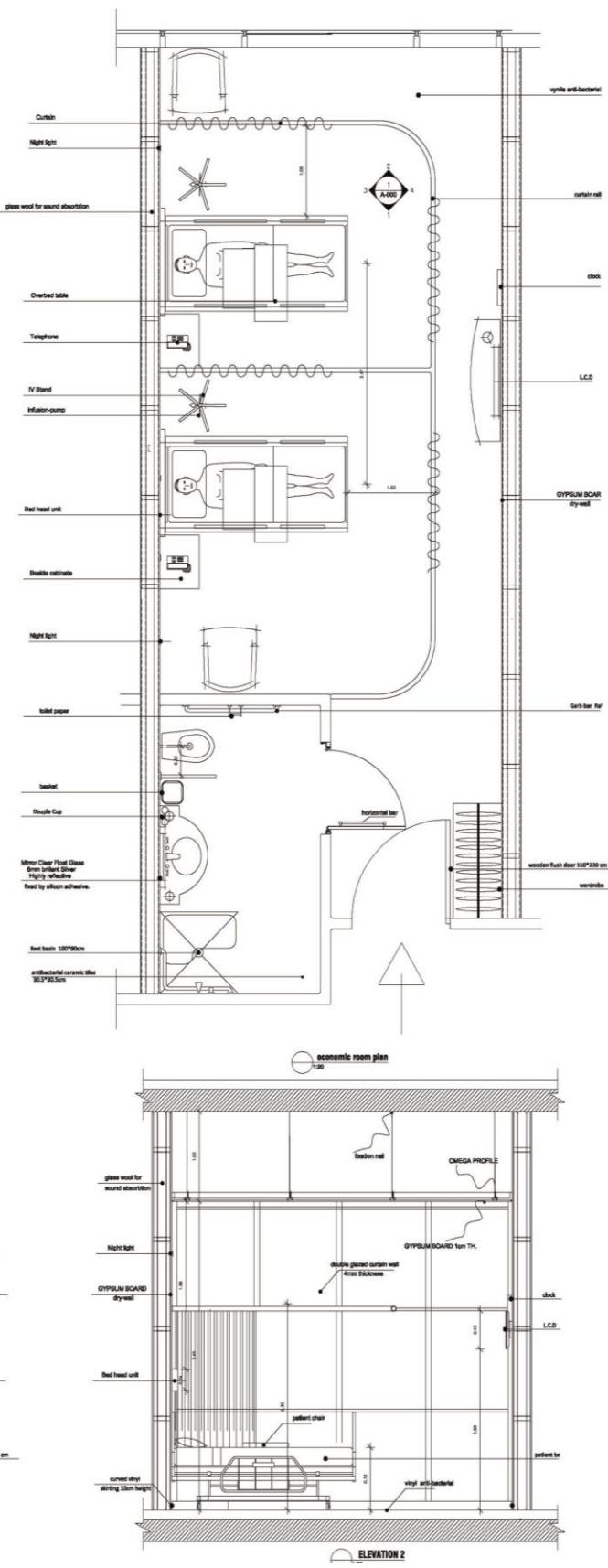
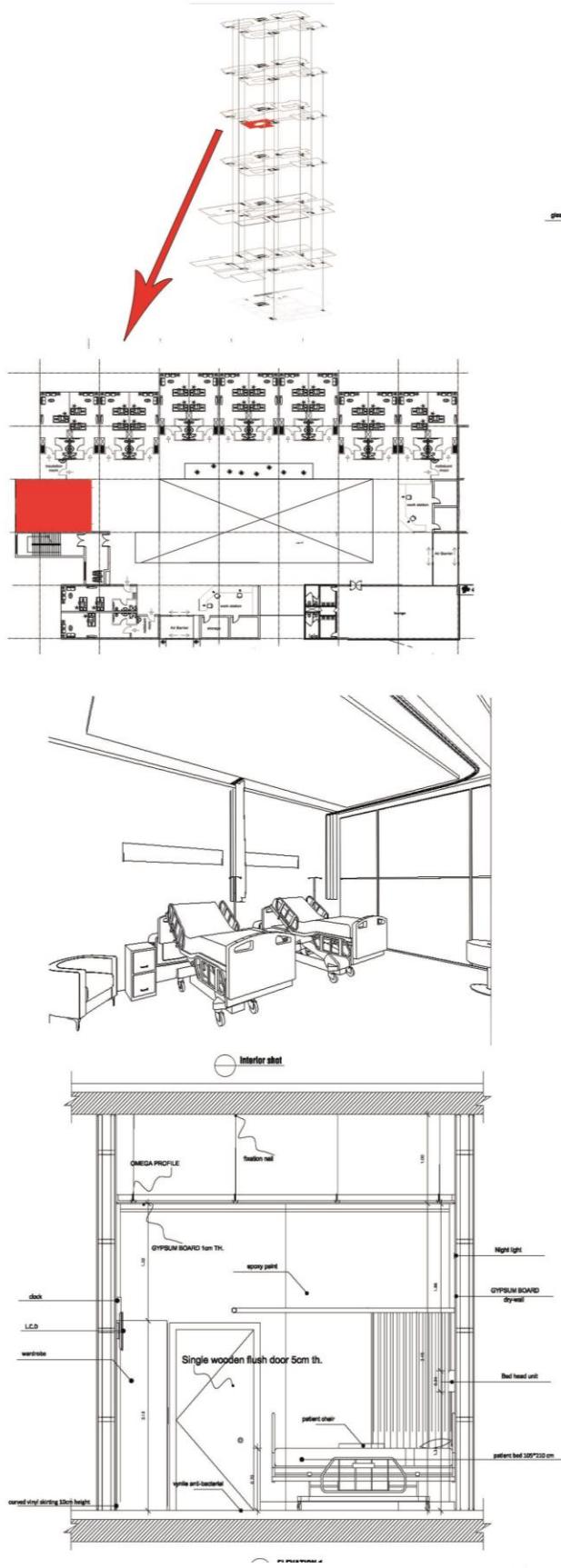
# (7) Design Development

## SINGLE ROOM EXAMPLES:



# (7) Design Development

## DOUBLE ROOM:

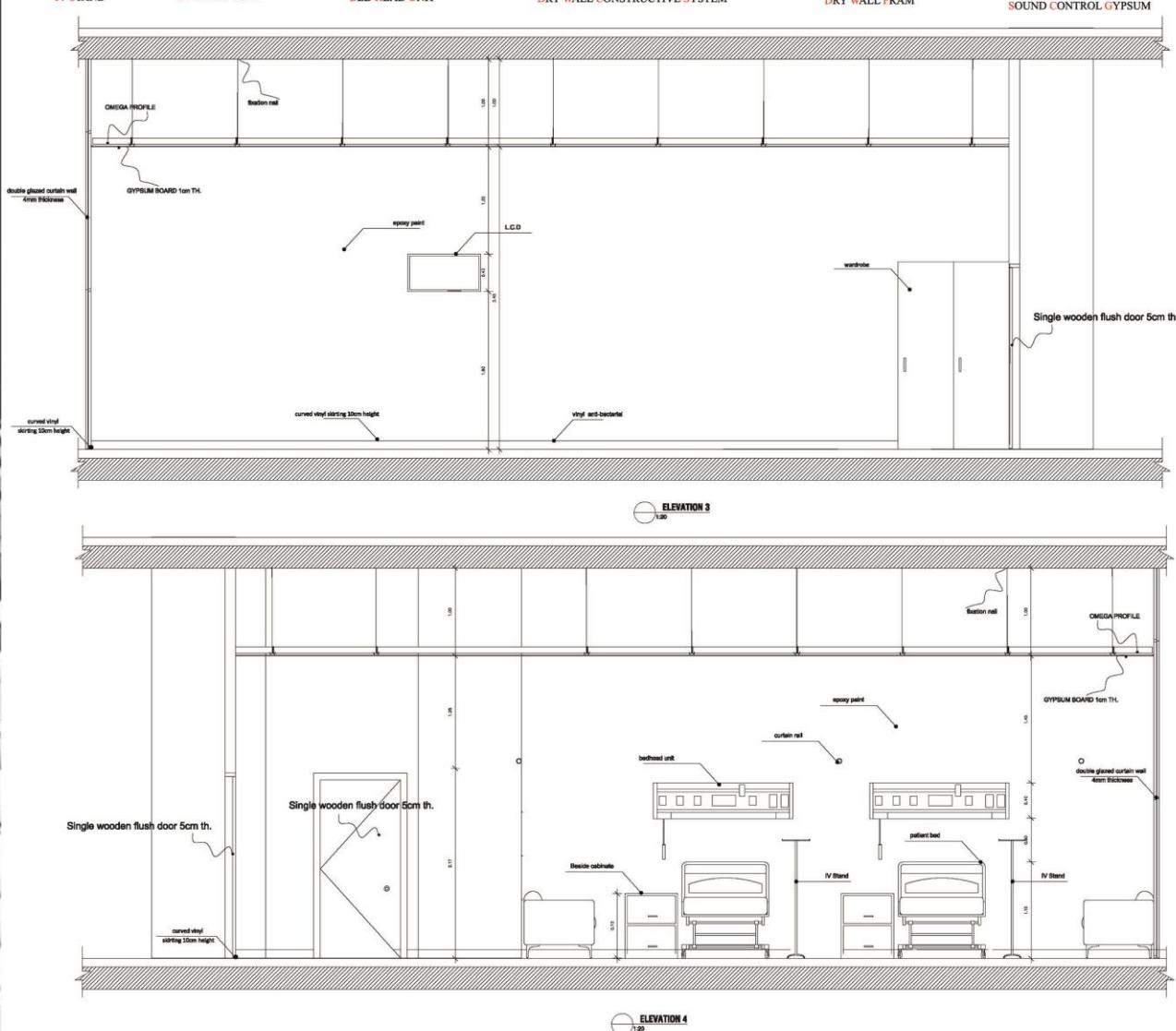
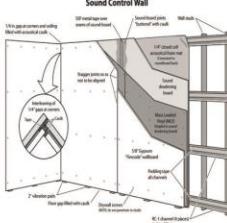
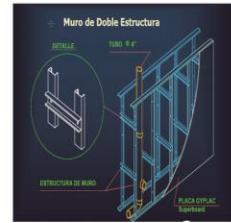
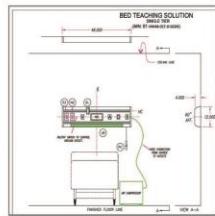


# (7) Design Development

## DOUBLE ROOM EXAMPLES:

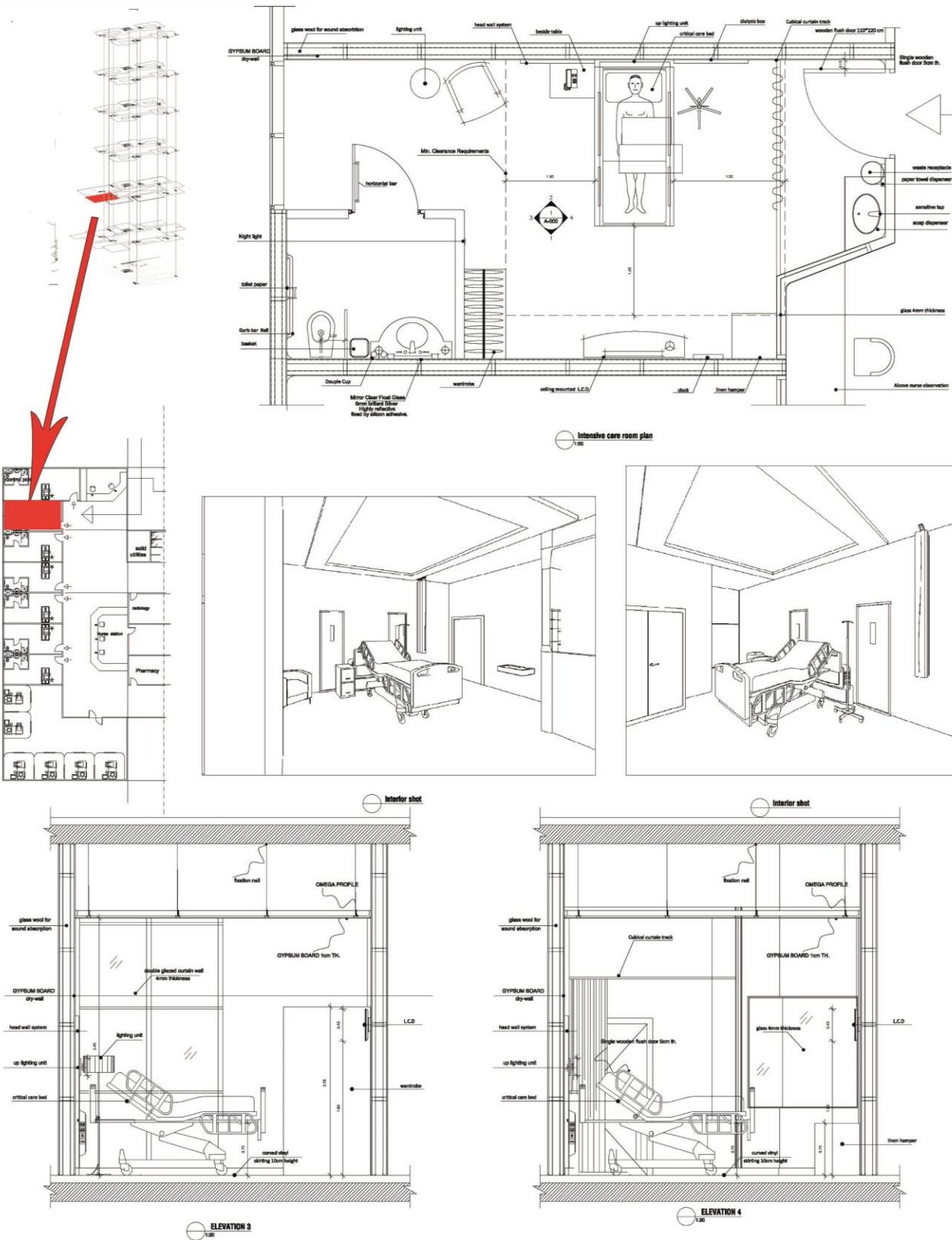


### DETAILS :



# (7) Design Development

## INTENSIVE CARE ROOM:



# (7) Design Development

## INTENSIVE CARE ROOM EXAMPLES:



### DETAILS:



WASTE RECEPTACLE



SHARPS DISPOSAL-



GLUCOSE ANALYSER



DIALYSIS BOX



LINEN HAMPER



VENTILATOR

Dimensions : 650\*560\*980mm



DEFIBRILLATOR

Dimensions : 650\*560\*980mm



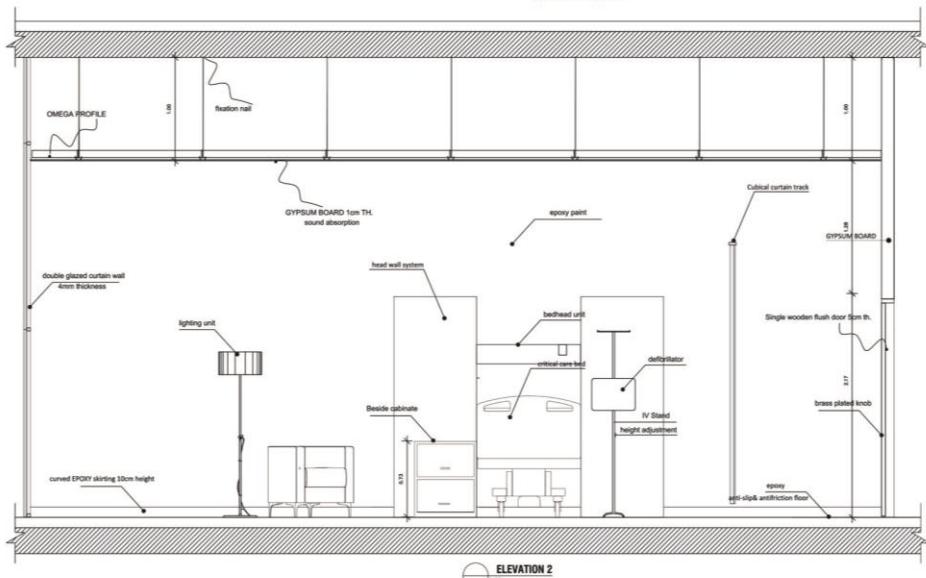
ONATAL INTENSIVE CARE UNIT (NICU)

Size: Main body: 109 cm x 65.5 cm x 76 cm  
Cabinet: 138 cm x 61 cm x 40 cm

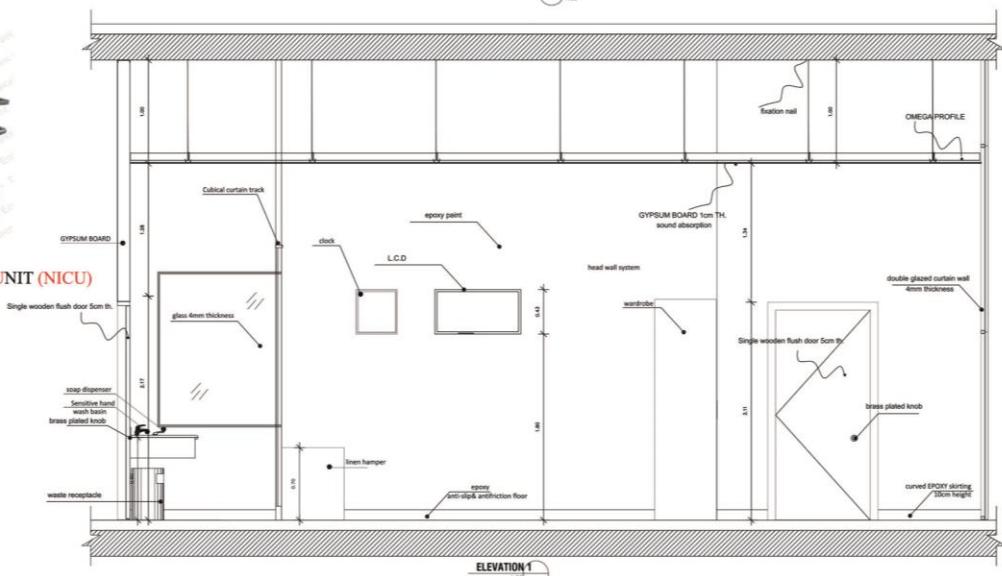


ECG MONITOR

47.5 cmsx31.7 cm



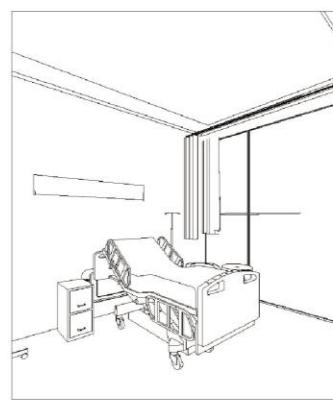
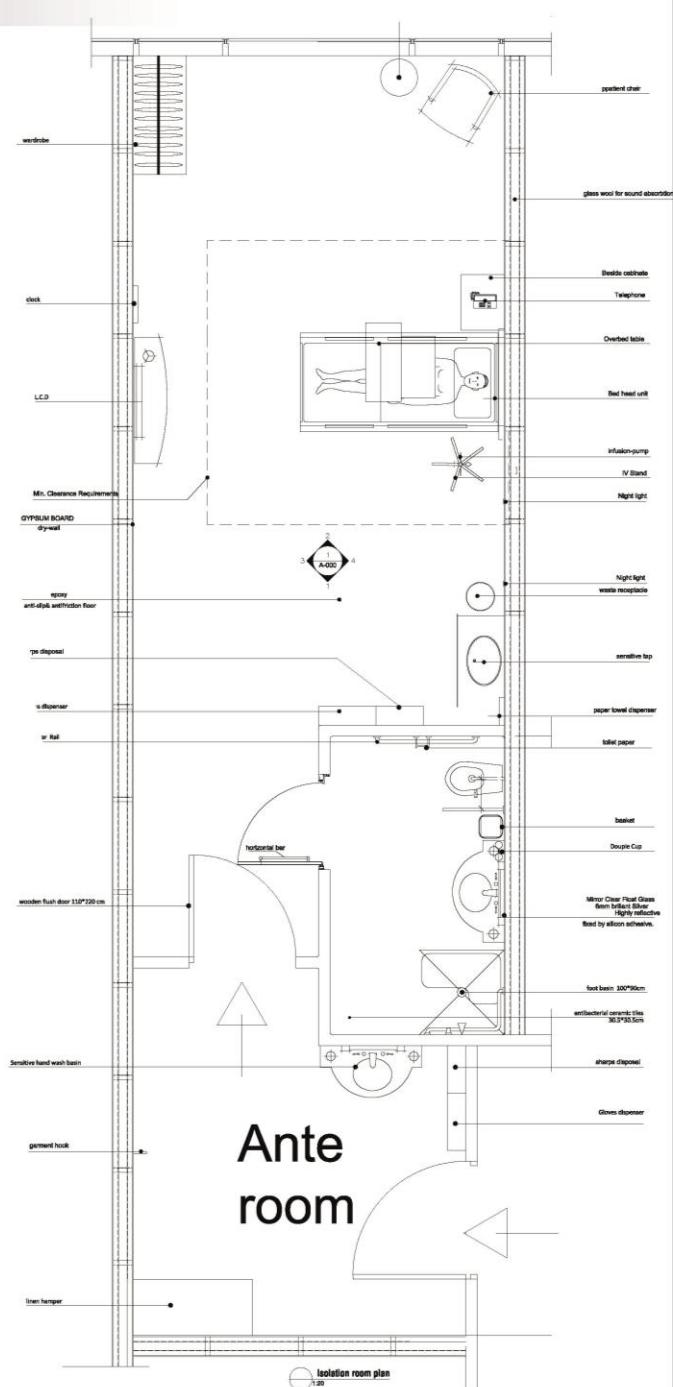
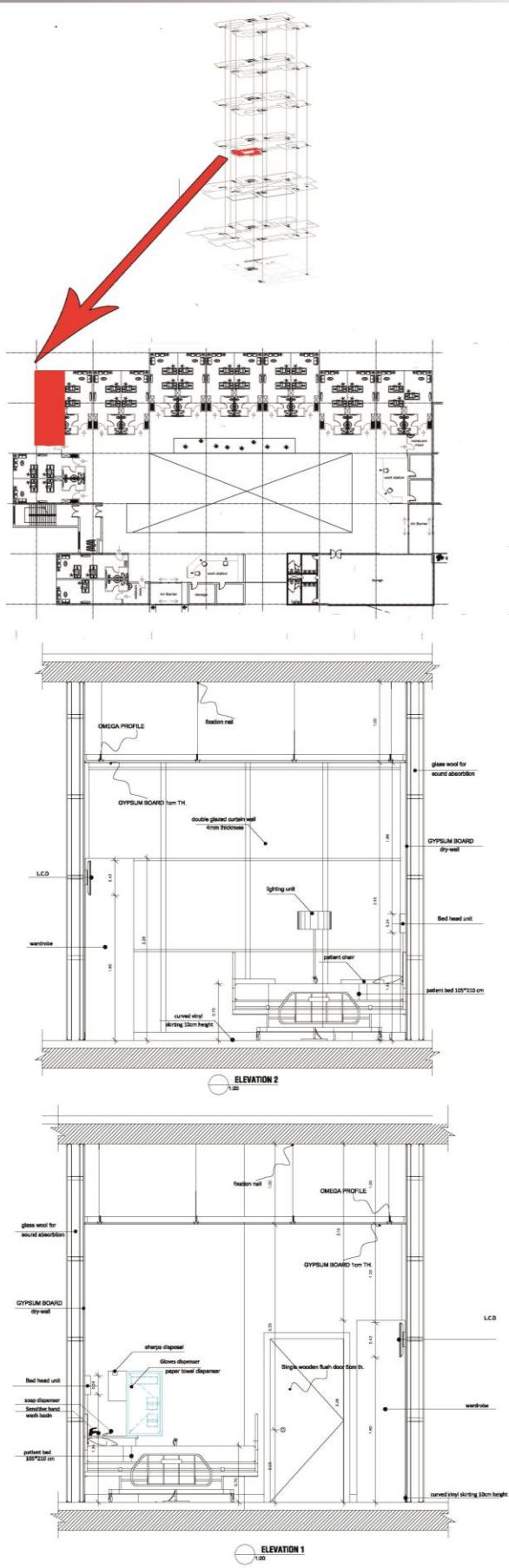
ELEVATION 2



ELEVATION 1

# (7) Design Development

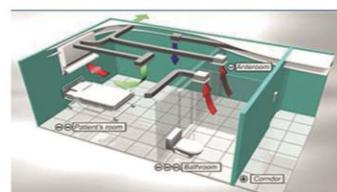
## ISOLATION ROOM:



**Interior shot**

# (7) Design Development

## ISOLATION ROOM EXAMPLES:



## DETAILS:



PAPER TOWEL DISPENSER

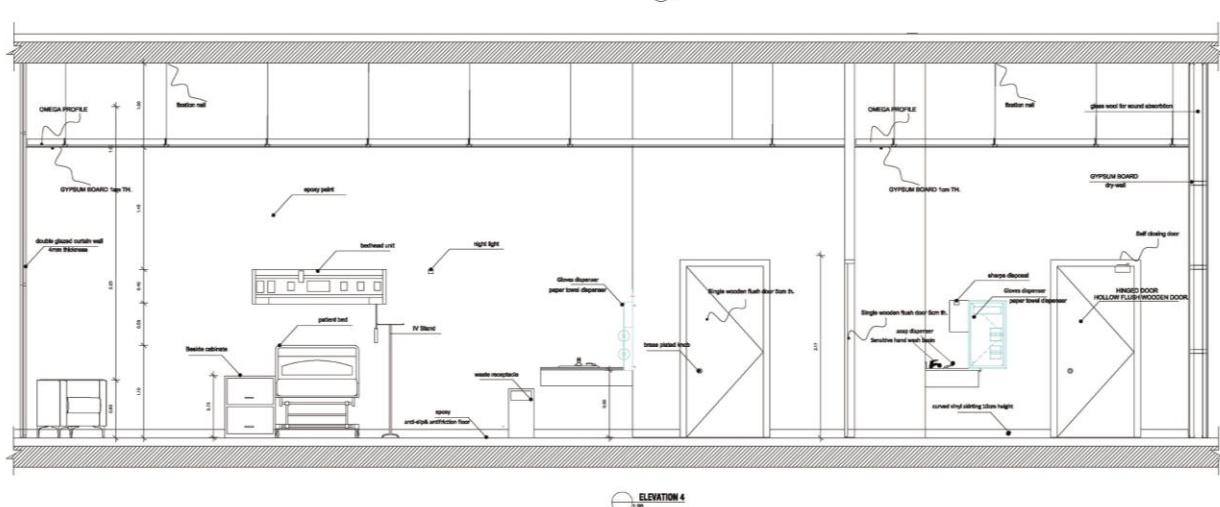
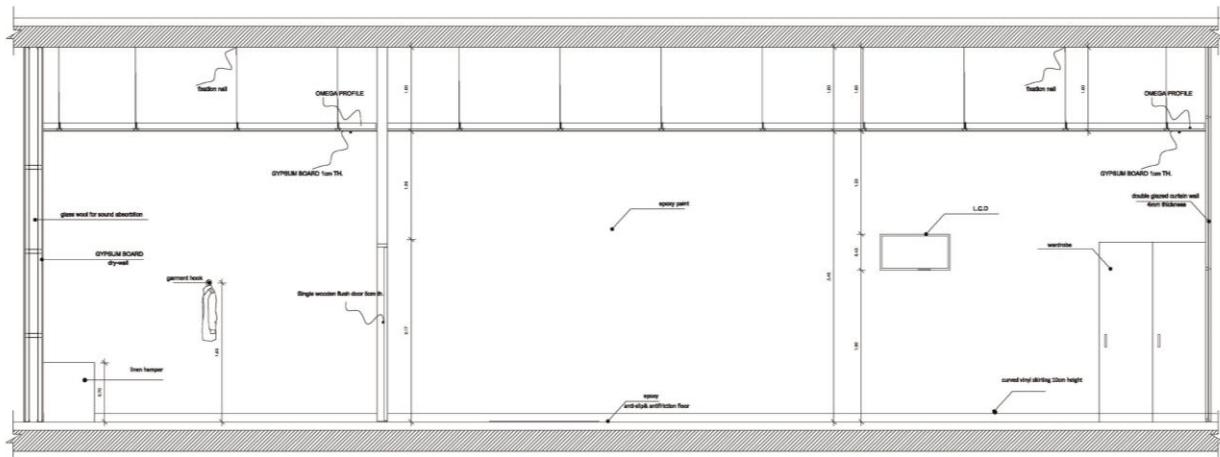
OVER BED TABLE

NIGHT LIGHT

GARMENT HOOK

SHARPS DISPOSAL

LINEN HAMPER

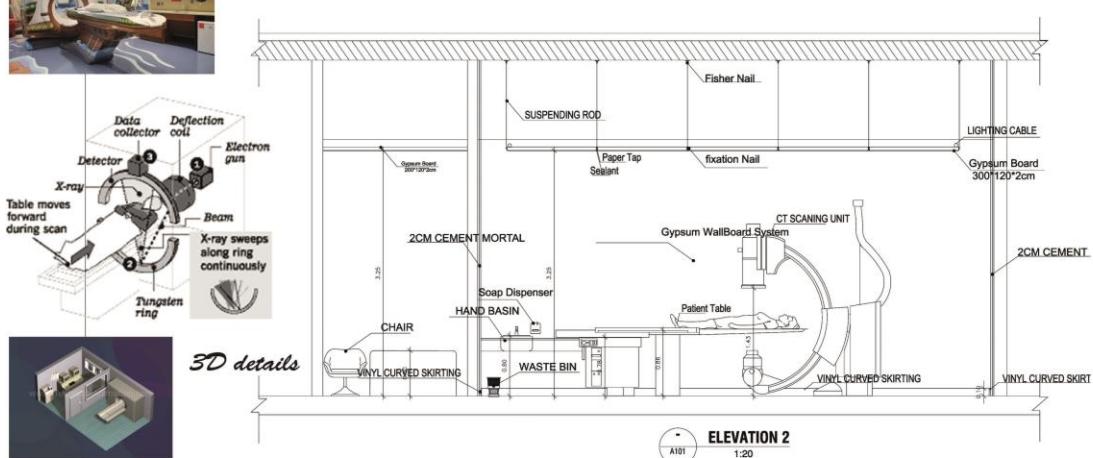
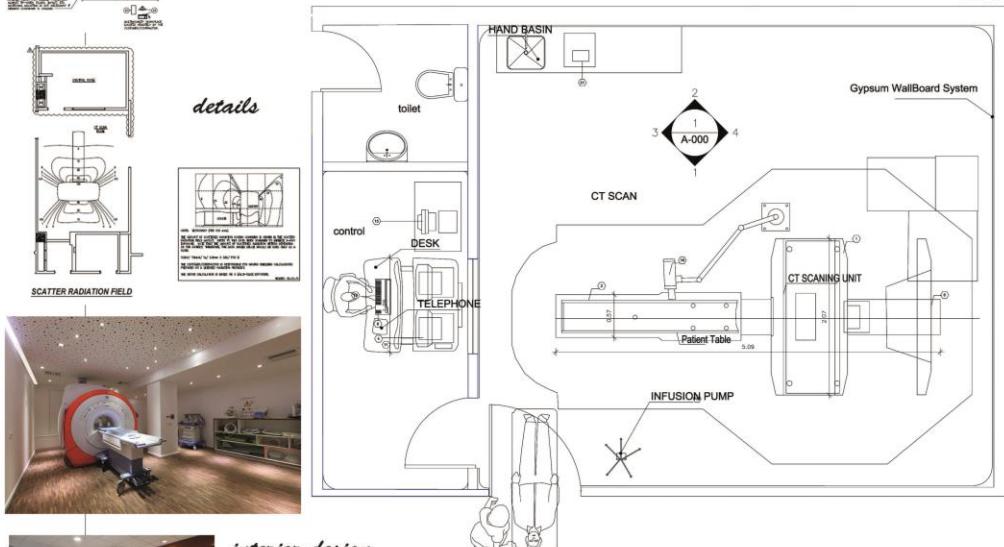
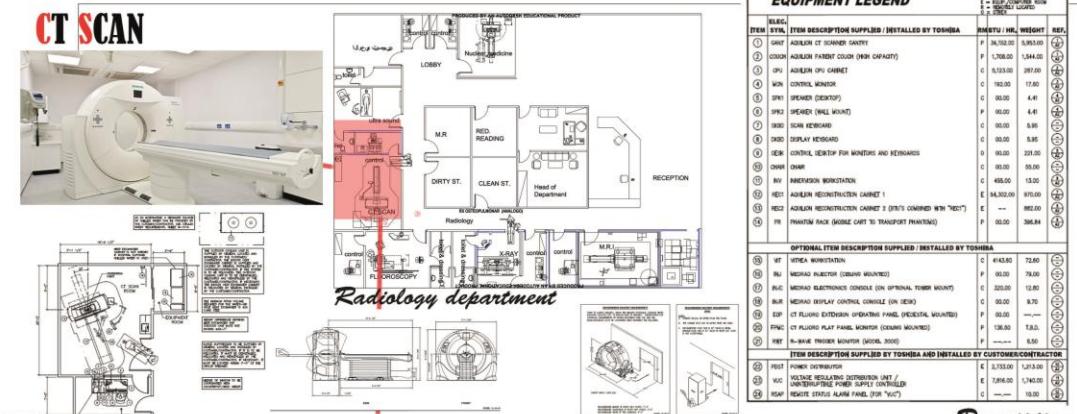
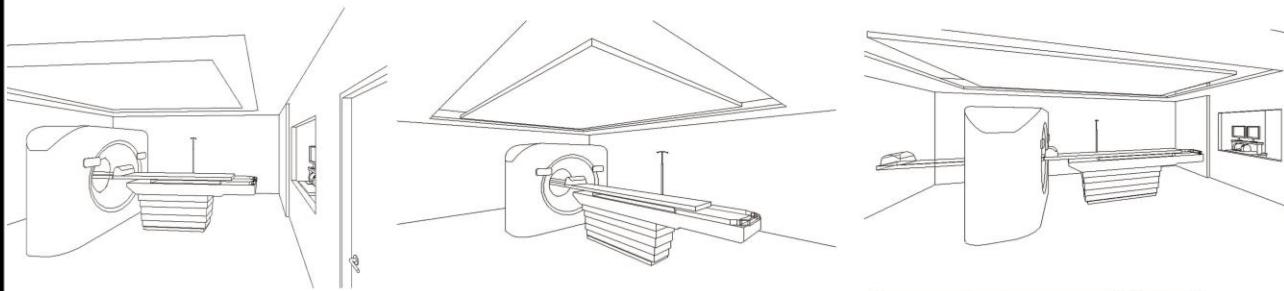


# (7) Design Development

## CT Scan:



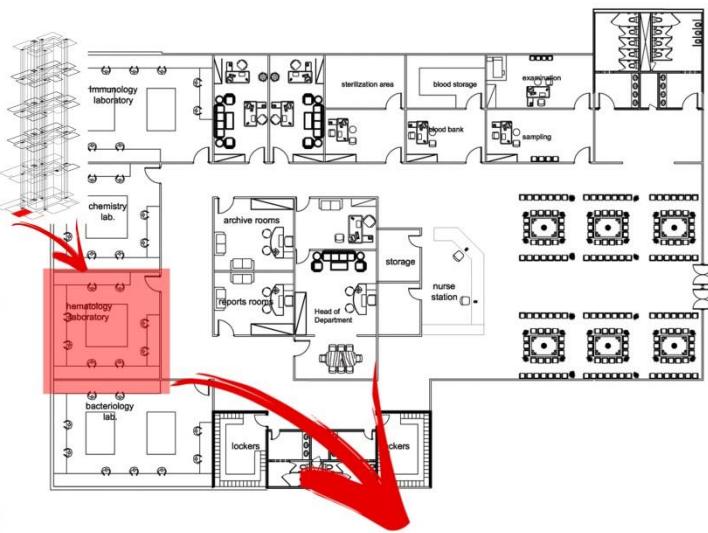
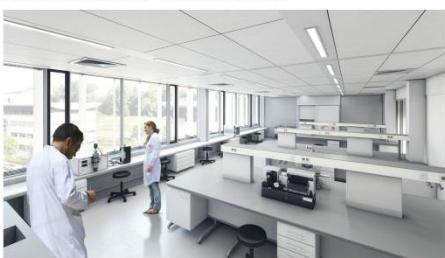
3rd Floor Plan - Scale 1/400



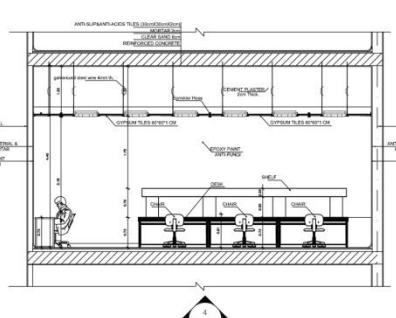
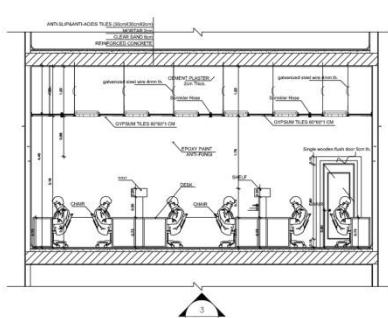
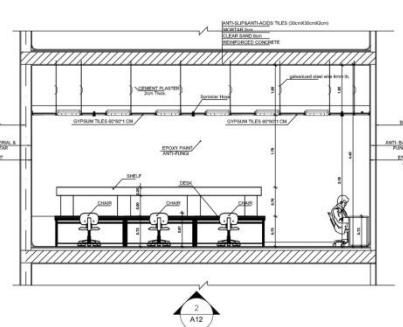
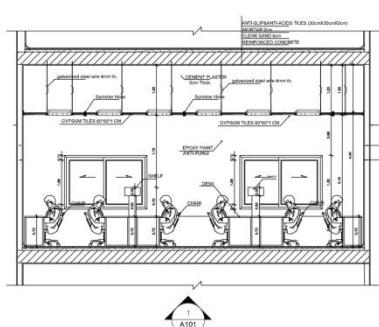
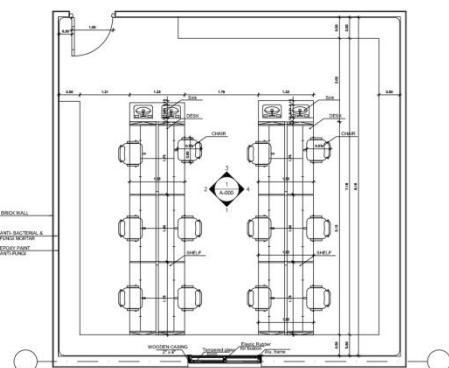
# (7) Design Development

## Laboratories Department :

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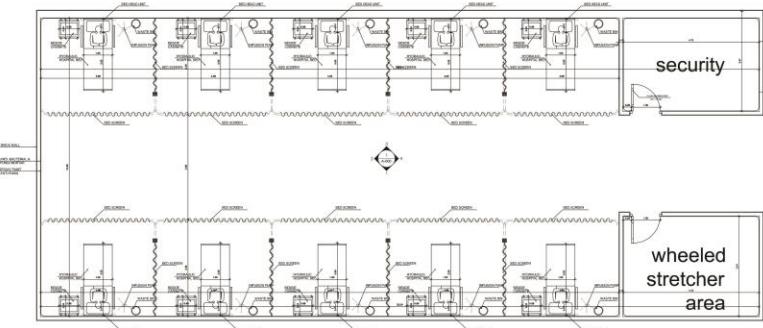
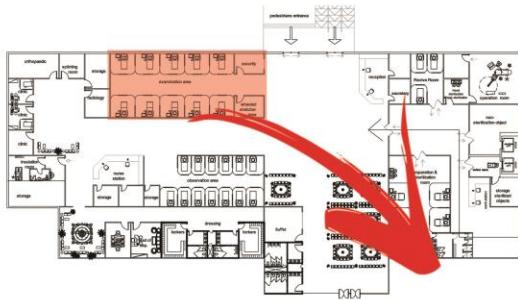
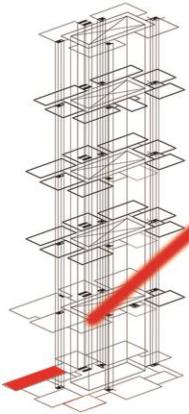


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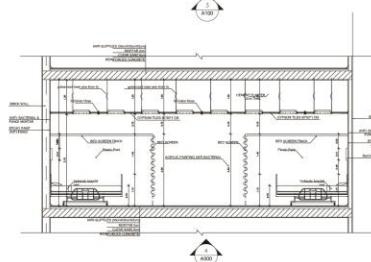
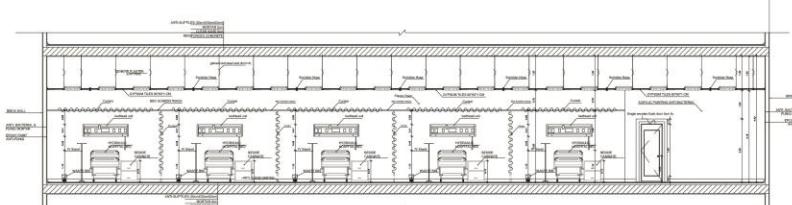
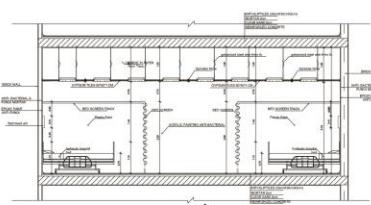
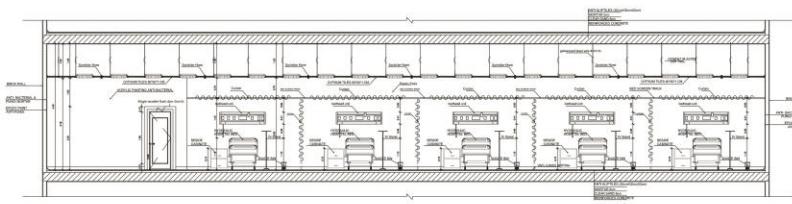


# (7) Design Development

## Emergency Department



## EMERGENCY DEPARTMENT EXAMPLES:

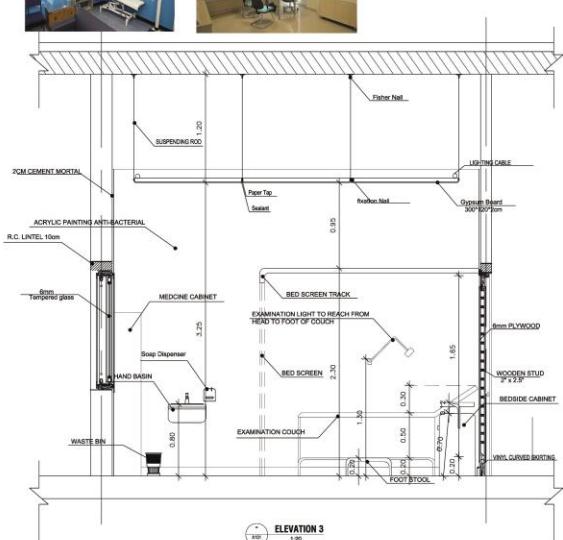
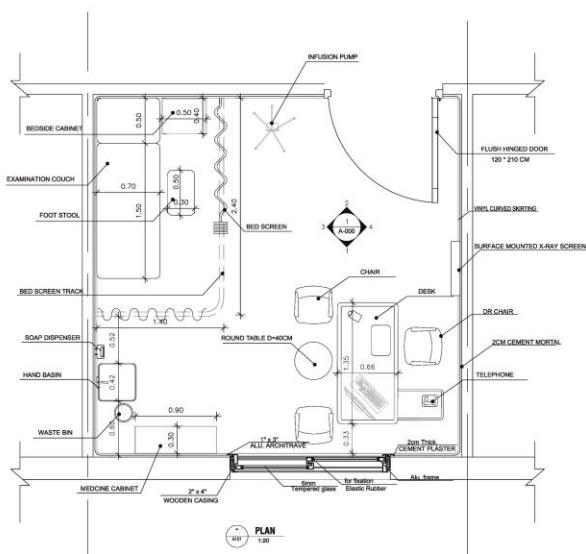


# (7) Design Development

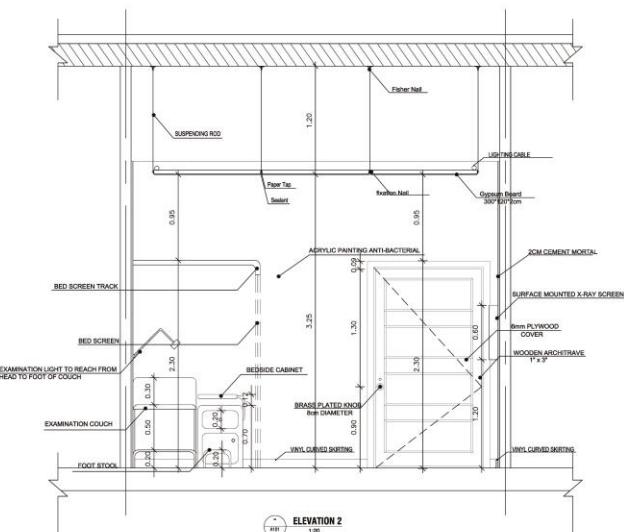
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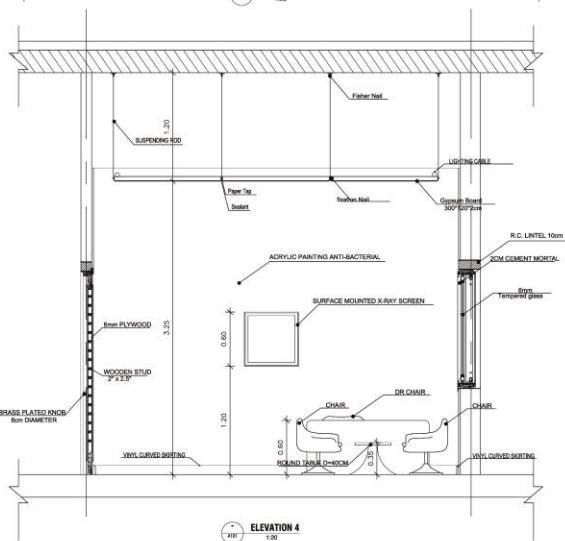
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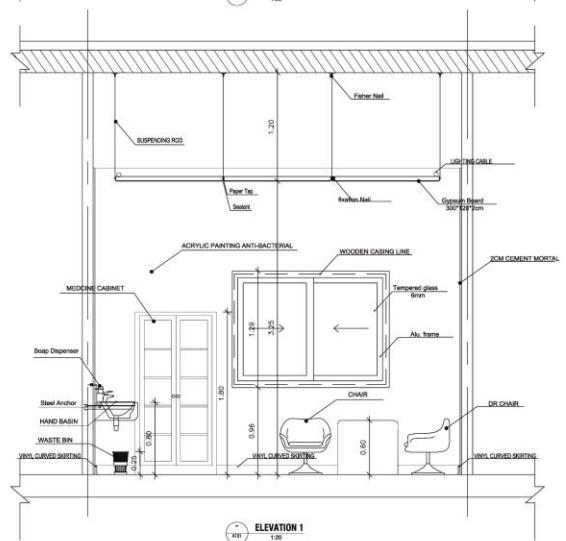
ELEVATION 3



ELEVATION 2



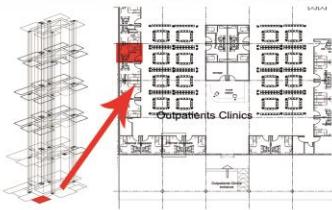
ELEVATION 4



ELEVATION 1

# (7) Design Development

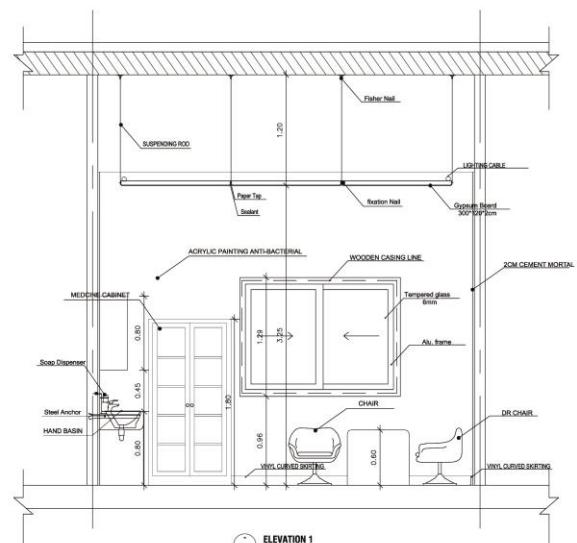
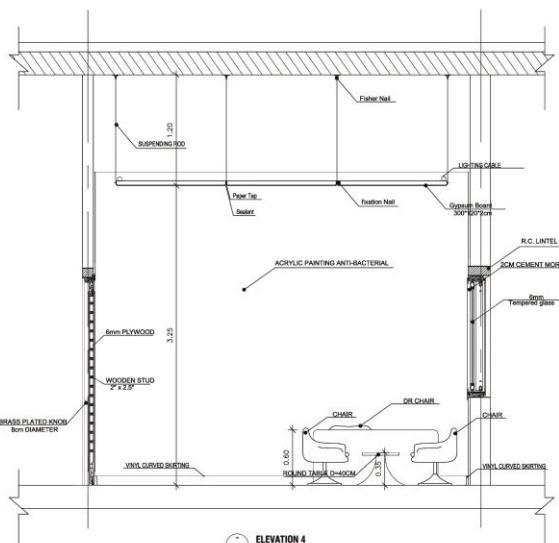
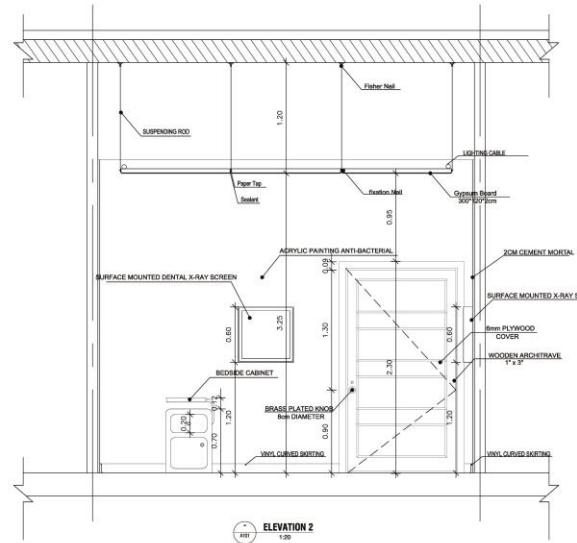
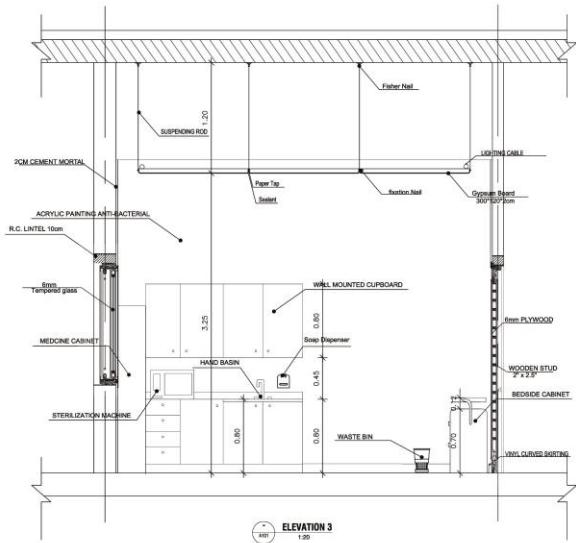
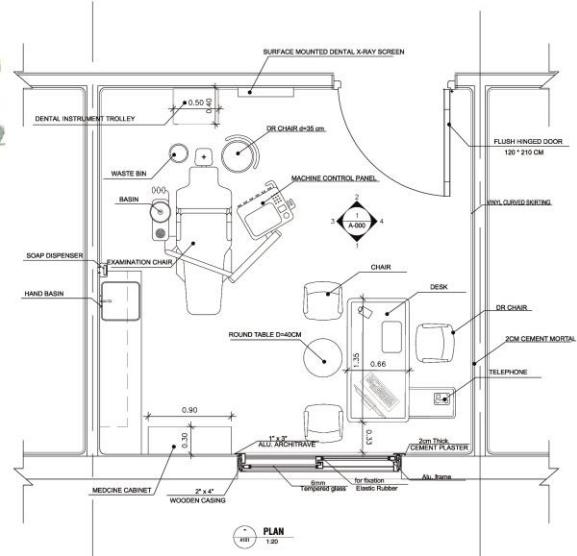
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DETAILS :

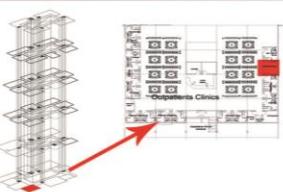


CLINIC EXAMPLES:



# (7) Design Development

## OPHTHALMOLOGY CLINICS :



DETAILS :

CLINIC EXAMPLES:



EXAMINATION COUCH



REFLECTING SCREEN



REFRACTION DESK



EXAMINATION LIGHT



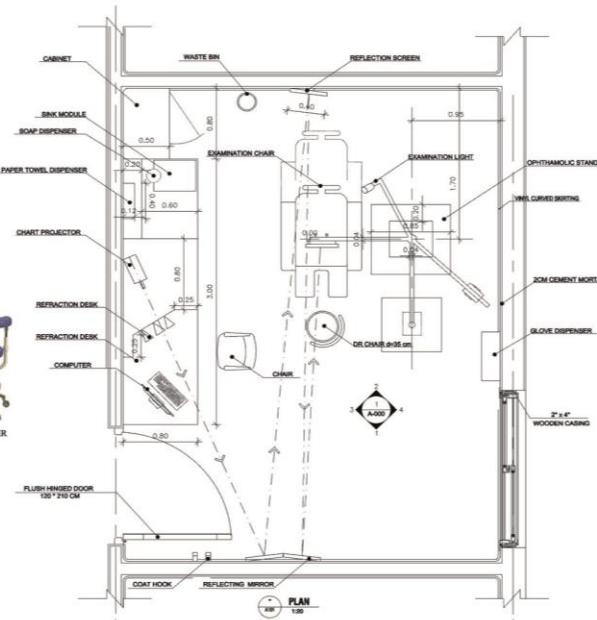
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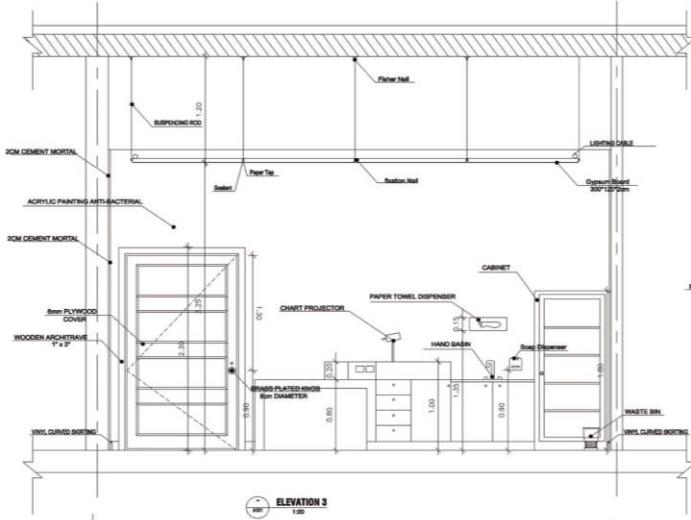
DR. CHAIR



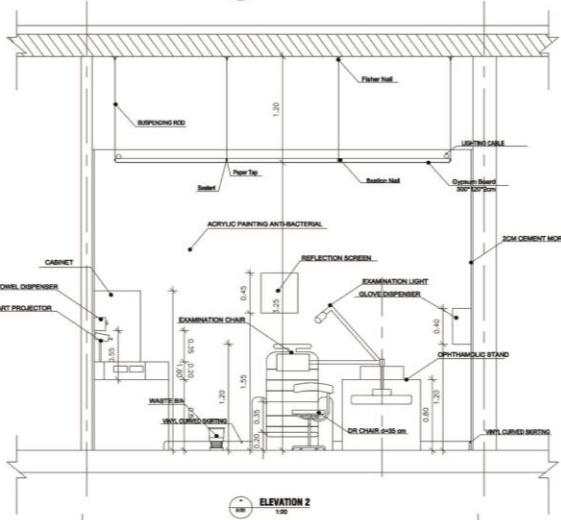
PAPER TOWEL DISPENSER



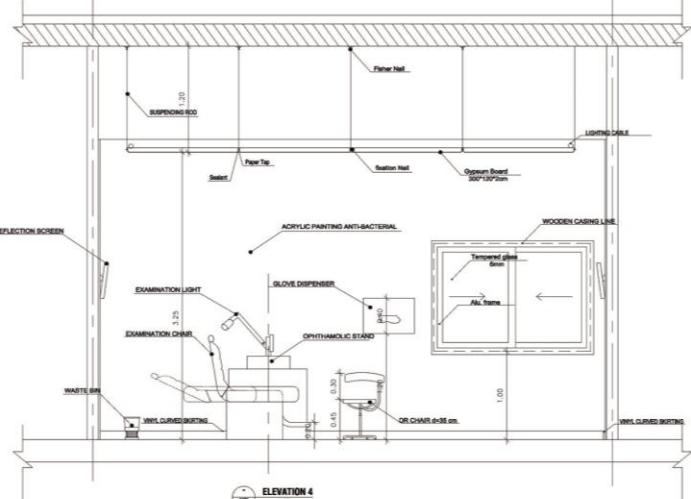
PLAN



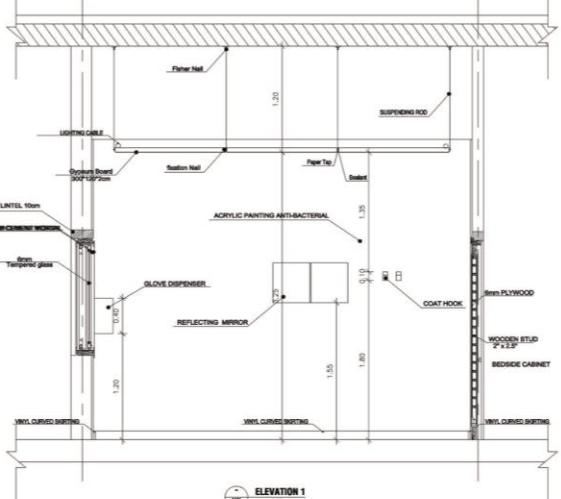
ELEVATION 3



ELEVATION 2



ELEVATION 4



ELEVATION 1

## **(8) Lessons learned and Recommendations :**

### **( 8-1 ) Lessons Learned**

#### **(8-1-1) Lessons Learned Related to the Site**

-One of the learned lessons that Site analysis is more than just collecting information about the site. The site analysis should identify issues that will influence the design of a development in order to make a considered response to both site opportunities and constraints, to provide a good quality living environment, and respect, acknowledge and improve the character of the area.

##### - Studying Orientation, direction and angle of slope :

- How does the sun move across the site?
- Does the site slope represent any design challenges?  
E.g. structurally and/or maintenance of views from adjoining buildings.

##### - Studying Trees and other significant vegetation which Adapt to Site Climate (Desert)

##### - Studying Surrounding Zones:

Ex: Children's Hospital located beside Educational Zone

##### - Studying Roads :

- The impact of the roads surrounding the site on the function of the buildings and its sites  
Ex: General Hospital in the main road to reach easily to it.
- Extension the existing roads to serve the project , making a ring of roads around it .to provide the required accessibility

##### - Consultation:

Collecting site information provides a good Opportunity to contact site neighbours and gain Appreciation of how they use sites and what matters .They might like considered in the design process

For example, locating windows, maintaining a view or screening open space. Making the effort to inform and involve neighbors of the proposal at the pre-planning stage may well assist the progress of application.

#### **(8-1-2) Lessons Learned Related to the project :**

##### - Principles:

- 1-Nurture an Emerging Health and Life Sciences Sector
- 2-Forge Strategic Partnerships
- 3>Create High Quality Design and an Attractive Public Realm
- 4-Establish a Resource for the Austin Community
- 5-Enhance Connectivity and Access
- 6-Improve Learning, Research, and Clinical Opportunities
- 7-Accommodate Growth

-Sustainability is a core principle for the planning and development of the medical district, building on the precedent set in earlier planning efforts. Sustainability is embedded within every aspect of the main master plan and follows clear goals established in the medical city Natural Resource

Management and Conservation Strategic Plan.

# **(8)Recommendations**

## - Layout :

- Studying Entrances ,Emergency roads ,parking ,  
Plazas and urban spaces
- Studying methods and techniques use in layout to  
energy saving

## - Buildings :

- The importance of functional studies which are  
essential in putting project program.
- Public buildings need well defined approaches and entrances in  
order to make it easier for project's visitors to reach their  
destinations.

## **(8 -2 ) Recommendations:**

### -Design

- Ability to engage imagination, think creatively, innovate and provide design leadership.
- Ability to gather information, define problems, apply analyses and critical judgment and formulate strategies for action.
- Ability to think three dimensionally in the exploration of design.
- Ability to reconcile divergent factors, integrate knowledge and apply skills in the creation of a design solution.

### - Knowledge

- Cultural and Artistic Studies
- Ability to act with knowledge of historical and cultural precedents in local and world architecture.
- Ability to act with knowledge of the fine arts as an influence on the quality of architectural design.
- Understanding of heritage issues in the built environment.
- Awareness of the links between architecture and other creative discipline

### -Environmental Studies

- Ability to act with knowledge of natural systems and built environments.
- Understanding of conservation and waste management issues.
- Understanding of the life cycle of materials, issues of ecological sustainability, environmental impact, design for reduced use of energy, as well as passive systems and their management.
- Awareness of the history and practice of landscape architecture, urban design, as well as territorial and national planning and their relationship to local and global demography and resources.
- Awareness of the management of natural systems taking into account natural disaster risks.

### -Social Studies

- Ability to act with knowledge of society, and to work with clients and users that represent society's needs.
- Ability to develop a project brief through definition of the needs of society. users and clients, and to research and define contextual and functional requirements for different types of built environments.
- Understanding of the social context in which built environments are procured, of ergonomic and space requirements and issues of equity and access.
- Awareness of the relevant codes, regulations and standards for planning, design, construction, health, safety and use of built environments.
- Awareness of philosophy, politics, and ethics as related to architecture

## (8) Recommendations

### -Technical Studies

- Technical knowledge of structure, materials, and construction.
- Ability to act with innovative technical competence in the use of building techniques and the understanding of their evolution.
- Understanding of the processes of technical design and the integration of structure, construction technologies and services systems into a functionally effective whole.
- Understanding of services systems as well as systems of transportation, communication, maintenance and safety.
- Awareness of the role of technical documentation and specifications in design realization, and of the processes of construction cost planning and control.

### - Design Studies

- Knowledge of design theory and methods.
- Understanding of design procedures and processes.
- Knowledge of design precedents and architectural criticism.

### -Professional Studies

- Ability to understand different forms of procurement of architectural services.
- Understanding of the fundamental workings of the construction and development industries, such as finance, real estate investment and facilities management.
- Understanding of the potential roles of architects in conventional and new areas of activity and in an international context.
- Understanding of business principles and their application to the development of built environments, project management and the functioning of a professional consultancy.
- Understanding of professional ethics and codes of conduct as they apply to the practice of architecture and of the architects' legal responsibilities where registration, practice and building contracts are concerned.

### -Skill

- Ability to work in collaboration with other architects and members of interdisciplinary teams.
- Ability to act and to communicate ideas through collaboration, speaking, numeric, writing, drawing, modeling and evaluation.
- Ability to utilize manual, electronic, graphic and model making capabilities to explore, develop, define and communicate a design proposal.
- Understanding of systems of evaluation, that use manual and/or electronic means for performance assessments of built environments.

# (9) References

## (9 ) **References :**

### (9-1) Books:

Code	Author - title	Published
1	<b>Alder, David</b> , “ Metric Handbook Planning and Design Data”, second edition.	<b>1999</b>
2	<b>Ernst and Neufert, Peter</b> , “Neufert Architects` Data”, Black well publishing, third edition.	<b>2000</b>
3	<b>Hancock, john and De Chiara, Joseph</b> , “Time Saver Standards for Building Types”, McGraw-Hill Book Company, seventh edition.	<b>1990</b>
4	الكود المصرى لأسس التصميم و اشتراطات التنفيذ لحماية المنشآت من الحرائق, الجزء الأول, المركز القومى لبحوث الأسكان	<b>2012</b>
5	المعايير التصميمية للمستشفيات و المنشآت الصحية-360,الجزء الاول 1/603, وزارة الإسكان و المرافق و التنمية العمرانية المركز القومى للبحوث و الأسكان.	<b>2010</b>
6	المعايير التصميمية للمستشفيات و المنشآت الصحية المتخصصة,الجزء الثاني, وزارة الإسكان و المرافق و التنمية العمرانية المركز القومى للبحوث و الأسكان.	<b>2010</b>

### (9-2) Websites:

Code	Name - URL
1	Pinterest, Pinterest <a href="http://www.pinterest.com/pin/346425396306241176">http://www.pinterest.com/pin/346425396306241176</a>
2	Gspnet, Shanghai International Medical City <a href="http://www.gspnet.com/Projects/Shanghai-International-Medical-City">http://www.gspnet.com/Projects/Shanghai-International-Medical-City</a>
3	Forneywellness, Forney Wellness Medical Dental Massage Chiropractic <a href="http://www.forneywellness.com/2013/12/30/has-your-immune-system-gone-on-strike/">http://www.forneywellness.com/2013/12/30/has-your-immune-system-gone-on-strike/</a>
4	Greshamsmith, Gresham Smith and Partners <a href="http://www.greshamsmith.com&gt;Showcase/Projects&gt;Showcase-5/Huashan-Hospital">http://www.greshamsmith.com&gt;Showcase/Projects&gt;Showcase-5/Huashan-Hospital</a>
5	Saskatoonhealthregion, Saskatoon Health Region <a href="https://www.saskatoonhealthregion.ca/locations_services/locations/CHS/Pages/Pictures-and-Plans%20-%20Interior%20Design.aspx">https://www.saskatoonhealthregion.ca/locations_services/locations/CHS/Pages/Pictures-and-Plans%20-%20Interior%20Design.aspx</a>
6	Regionreporter, Saskatoon Health Region <a href="http://regionreporter.wordpress.com/2013/04/25/2276/">http://regionreporter.wordpress.com/2013/04/25/2276/</a>

# (9) References

Code	Name - URL
7	Nottingham, UK Campus <a href="http://www.nottingham.ac.uk/about/visitorinformation/mapsanddirections/medicalschoolsnursingcentres.aspx">http://www.nottingham.ac.uk/about/visitorinformation/mapsanddirections/medicalschoolsnursingcentres.aspx</a>
8	Shrinershospitalsforchildren, Shriners Hospitals for Children <a href="http://www.shrinershospitalsforchildren.org/">http://www.shrinershospitalsforchildren.org/</a>
9	Thepatientfactor, Health rank <a href="http://thepatientfactor.com/canadian-health-care-information/world-health-organizations-ranking-of-the-worlds-health-systems/">http://thepatientfactor.com/canadian-health-care-information/world-health-organizations-ranking-of-the-worlds-health-systems/</a>
10	Worldlifeexpectancy, HEALTH PROFILE : Egypt <a href="http://www.worldlifeexpectancy.com/country-health-profile/egypt">http://www.worldlifeexpectancy.com/country-health-profile/egypt</a>
11	Nobelprize, The Immune System - in More Detail <a href="http://www.nobelprize.org/educational/medicine/immunity/immune-detail.html">http://www.nobelprize.org/educational/medicine/immunity/immune-detail.html</a>
12	Niaid, Immune system Phagocytes and Their Relatives <a href="http://www.niaid.nih.gov/topics/immunesystem/immunecells/Pages/phagocytes.aspx">http://www.niaid.nih.gov/topics/immunesystem/immunecells/Pages/phagocytes.aspx</a>
13	Imperial, UNDERSTANDING COORDINATED RESPONSES TO INFECTION <a href="http://www.imperial.ac.uk/AP/faces/pages/read/Research.jsp?person=r.mcmullan&amp;_adf.ctrl-state=1cq0rbmfco_3&amp;_afrRedirect=5572225014845788">http://www.imperial.ac.uk/AP/faces/pages/read/Research.jsp?person=r.mcmullan&amp;_adf.ctrl-state=1cq0rbmfco_3&amp;_afrRedirect=5572225014845788</a>
14	Meccanotec, Benefits of meccano. <a href="http://www.meccanotec.com/benefits.html">http://www.meccanotec.com/benefits.html</a>

## (9-3) Site Visits:

Code	Name of The Hospital
1	Ain Shams Specialized Hospital
2	Children's Cancer Hospital Foundation 57357
3	El Demerdash Hospital