hospital design

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Theory

history

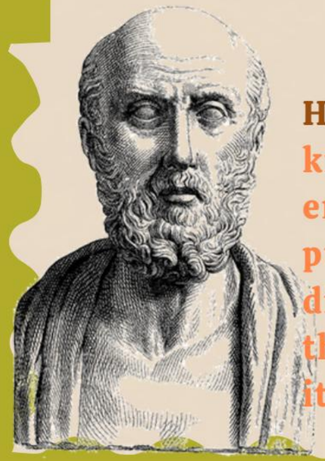
Before there were hospitals, patients used to resort to the doctor to bring him to their homes, or vice versa, they would go to his house.

The first physician to emerge is Imhotep, chief minister to King Djoser in the 3rd millennium BCE, who designed one of the earliest pyramids, the Step Pyramid at Saqqara, and who was later regarded as the Egyptian god of medicine and identified with the Greek god Asclepius

first doctor in the world

The medicine of Islamic civilization

Islamic civilization reached the first rank medically with the contribution of its doctors in anatomy, ophthalmology, pharmacology, pharmacology, physiology and surgery. Islam expanded in West Asia and passed its golden period and its most famous physicians, Al-Razi and Ibn Sina, wrote more than 40 books on health and medicine



Hippocrates, a Greek physician, philosopher, and writer, known as the father of modern medicine, for his use of an empirical method. He opened a medical school in Kos, and put forward his theory of medicine, which was radically different from what was prevalent at that time; He linked the patient's health status with the environment through its influence on what happens inside the human body.

the Definition difference between old and modern system

Old known

- an institution that is built, staffed, and equipped for the diagnosis of disease; for the treatment, both medical and surgical, of the sick and the injured; and for their housing during this process.

modern

The modern hospital also often serves as a center for investigation and for teaching. he modern hospital has often developed outpatient facilities, as well as emergency, psychiatric, and rehabilitation services. In addition, “bed less hospitals” provide strictly ambulatory (outpatient) care and day surgery. Patients arrive at the facility for short appointments. They may also stay for treatment in surgical or medical units for part of a day or for a full day, after which they are discharged for follow-up by a primary care health provider.

General hospitals :

- are meant to provide wide –range of various type of healthcare , but with limited capacity . They care of patients of both sex to all ages , medical ,surgical pediatrics ....etc..

CLASSIFICATION OF HOSPITALS

BASING ON OBJECTIVE

- GENERAL HOSPITALS
- SPECIAL HOSPITALS
- Teaching hospitals

TYPE OF MEDICAL STUFF

- Closed – staff
- Open-staff

BASING ON ONER SHIP

- Public
- Privet
- Voluntary agency

BED CAPACITY

- Small (up to 100 beds)
- Medium (more than 100 less than 300
- Large (300 and more)

BASIN ON LENGTH OF STAY

- 1.Short term (less than 30 days)
- Long term (more than 30 days)

TYPE OF CARE

- Primary care
- Secondary care
- Tertiary care

Things To Consider Before Designing Hospitals

Flexibility and Expandability

should follow the modular concepts of space planning and layout, like using generic room sizes and plans as much as possible.

Therapeutic Environment

The architect of the hospital should be convenient for the patients and visitors and provide an unthreatening comfortable and stress-free environment

Sustainability

they need high energy and water and produce a sizeable amount of waste.

Cost-Effectiveness and Efficiency

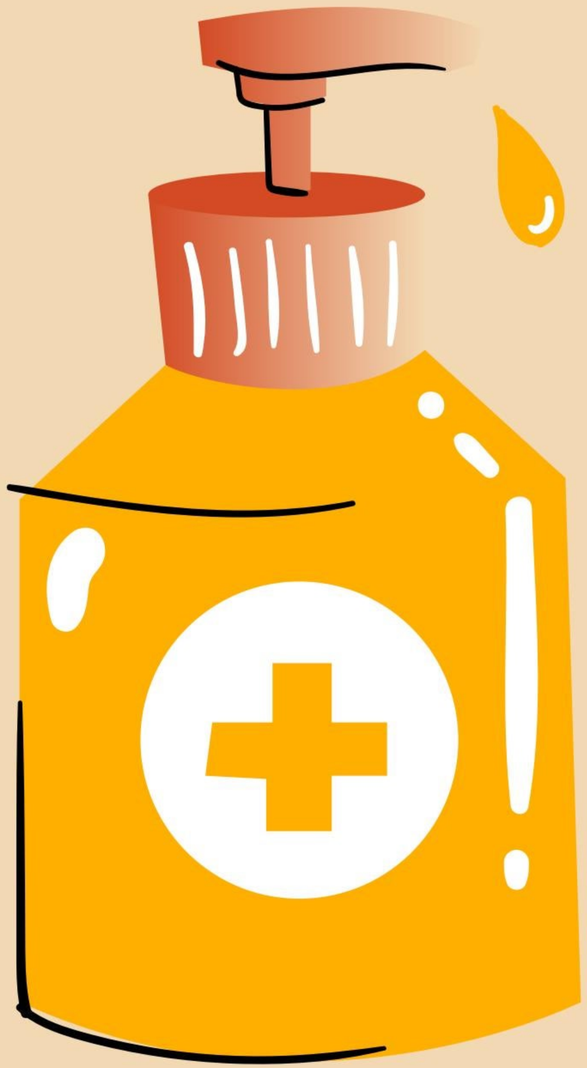
An efficient design layout promotes staff efficiency by minimizing the travel distance between frequently used spaces

Cleanliness and Sanitation

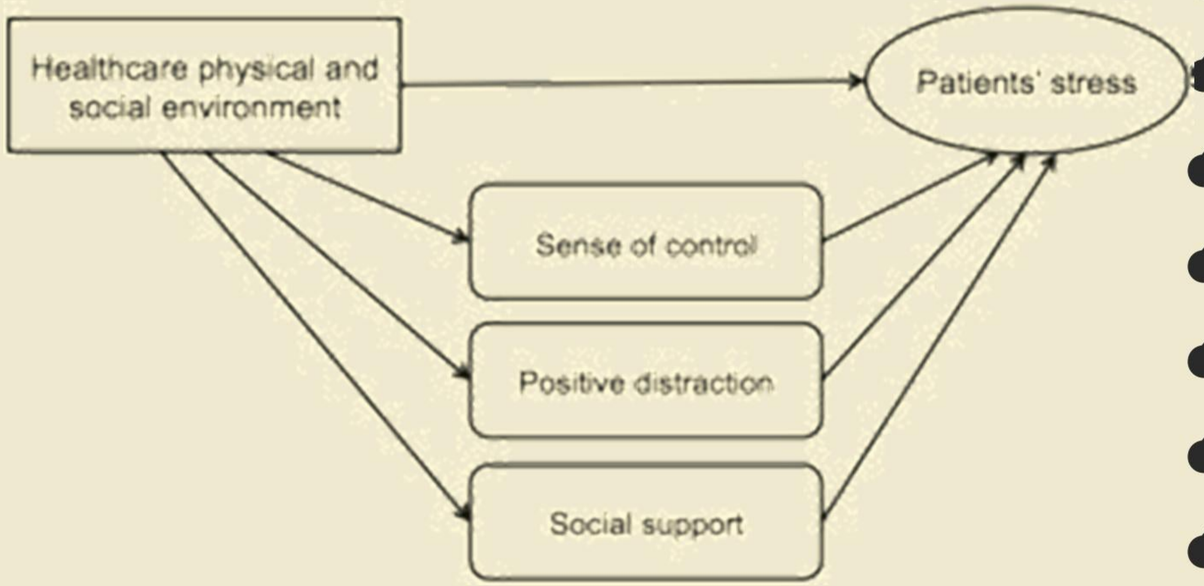
he design of the hospital must be easy to maintain and clean. Therefore, the design should be facilitated by appropriate and durable finishes for each functional space.

Safety and Security

The hospitals have several security concerns like the safety of patients and staff, hospital assets like including drugs, property and vulnerability to terrorism because of high visibility.



- Part of support design theory which includes how design considerations effect the patients stress



Standards

Planning standards

site requirements

- There are mang factors that effect on choosing the site , first of then there should be 2 streets at least to enter the site . the chose sit should have 3 entrance for patient , ambulance and staff .
- natural environment is a must for recovering psychological health in healthy way
- the building should be far form the site out lines 80 meters
- site minimumratio is 1:1:5 with 25 meters minimum width , building ratio is 40-505
- green area = 10 m2 for each bed
- total building area = 150 m2 x num of beds
- parking for 0.12m2

hospital main components

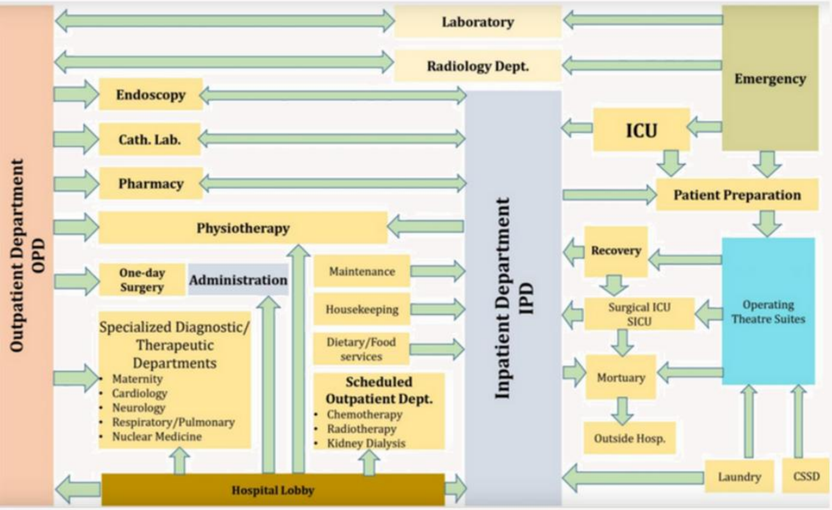
- support departments 10-15% of total gross area
- inpatient departments 40 % of total gross area
- diagnostic therpeutic departments 40% of total gross area
- administration departments 4-5% of total gross area
- ancillary services 2-3% of total gross area

main zoning of the hospital

hospital department

Diagnostic Department	Inpatient Department	Ancillary Department	Support Department	Admin. Department
Outpatient	Intensive care	Pharmacy	Mortuary	Administrtion
Physiotherapy	Inpatient unit	Central Sterilization	Linen	Medical director
Emergency	Nursing units		Housekeeping	Medical media
Radiology			Central stores	Staff education
Operation theatre			Food services	Public area
Endoscopy			Maintenance	Medical records
Labs				Social services

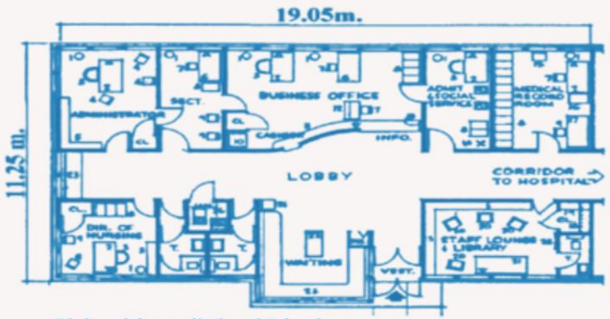
connectivity between areas



	nursing	operating	intensive care	sterilisation	maternity	emergency	laboratory	radiology	examination	X ray	out patients
nursing			□		□			□		◇	
operating			○	○	○	◇	◇				○
intensive care				◇		◇	◇			◇	
sterilisation											○
maternity						◇			□		
emergency							◇			○	○
laboratory									□		□
radiology											
examination										◇	◇
X ray											◇
out patients											

○ very good connection required ◇ good connection sensible □ connection desirable

Admin department

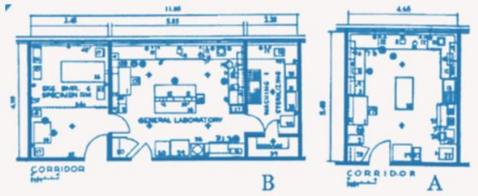


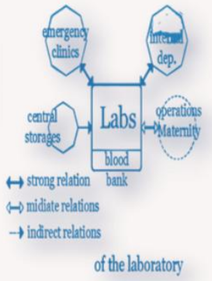
50 bed hospital = 214m2
100 bed hospital= 364 m2

The Functional relations b/w Admin.

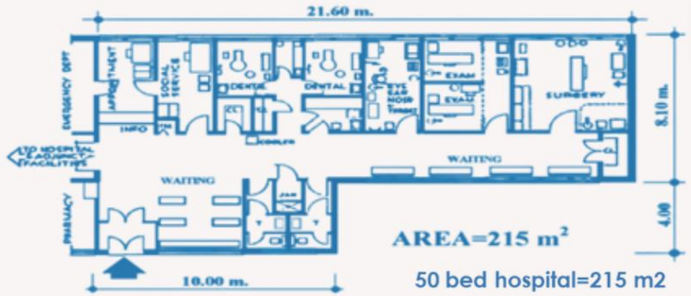
Laboratories

A- 50 hospital =25m2
B- 100hospital =60m2



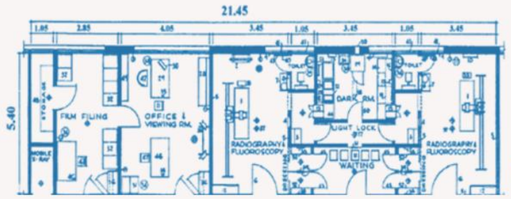


Out patients division



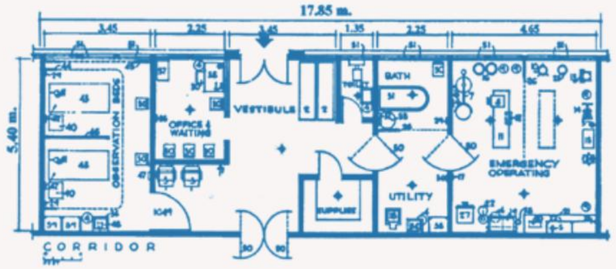
50 bed hospital=215 m2
100 bed hospital =305 m2

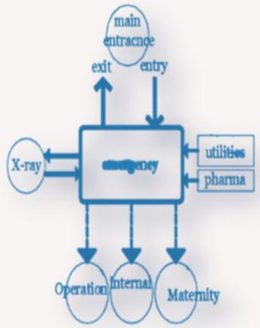
Radiology division



50 – 100 bed hospital = 65 – 104 m2

Emergency reception





Emergency relanship

Intensive care unit

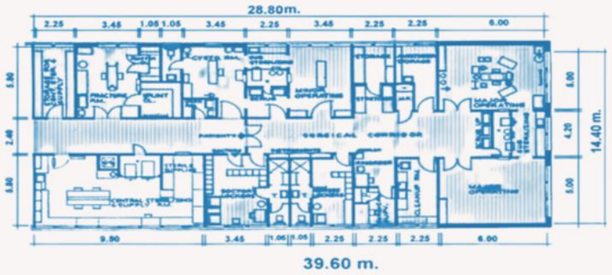
❖Location:

- Very close to the recovery room in the operation theatre.
- Can be easily accessible from the emergency division by elevator.

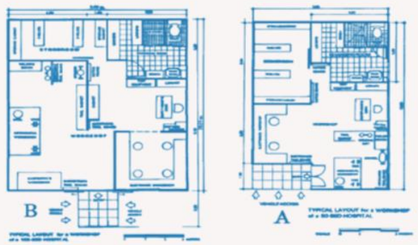
❖Area of the department:

Must be designed 1-2 % of hospital beds.

Operation theater



Maintenance workshop



A.50 bed hospital
B.100 bed hospital

Circulation:(Horizontal circulation):

#Corridor

at least 2.40 m.

Should fillet corners in cross corridor or design lobby at least 3*3 m.

Services corridor 1.20 m, kitchen & laundry & stores 1.80 m.

 # Ramps:

Handrail 0.9 m height for pedestrian and another 0.5 m height for disabled.

Max height 0.75 max horizontal distance 9 m at least 1.50 width (1:12).

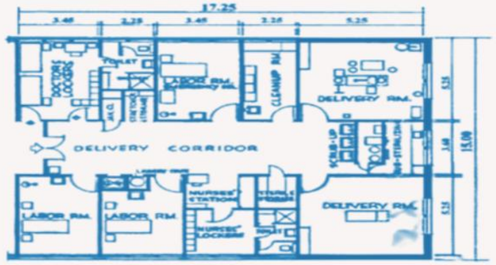
Max height 0.75 max horizontal distance 12 m at least 1.50 width (1:16).

Max height 0.75 max horizontal distance 15 m at least 1.50 width (1:20).

Landing at least 1.50 m width * 1.55 m length.

At least 9 m * Radius of handrail 0.045 - 0.075 m far from wall 0.040 m.

Maternity division



Open room 20-40m2
-Operation 26m2
-WCs
-Utilities 8m2
-Office 15m2
-Unclean room 8m2
-Cleanup room 5m2
-Storeg 10m2
-Waiting area 10m2
-Corridors 2.2m

#Stairs:

1. Main stairs

At least width 1.30 with dim for step (0.15-0.17 riser, 0.27-0.30 tread).

2. Escape stairs 35 m max between two stairs. At least 1.10 m width with landing 2.80m * 1.95m. If 1.30 m width possible landing 2.80m* 1.85m.

 # Lifts:

1. Patient lifts At least 1.40 width* 2.40 length Lobby above lifts at least 2.75 width * 3.40 length At least 1 lift for 2 floor and 2 lifts for more than 2 floor 2. Visitor and staff lifts At least 1.30 *1.30 with door width 0.85 m for disabled

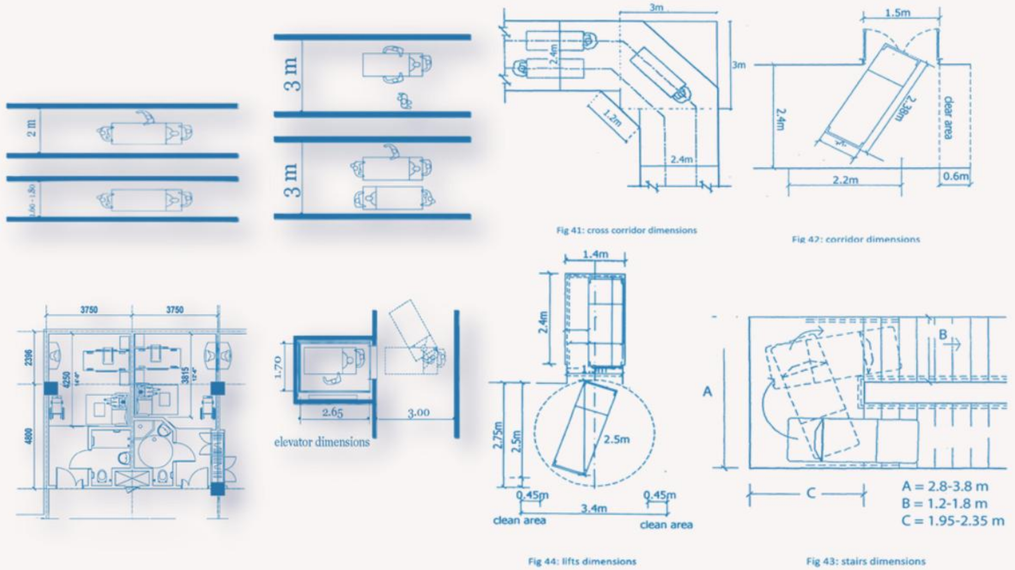


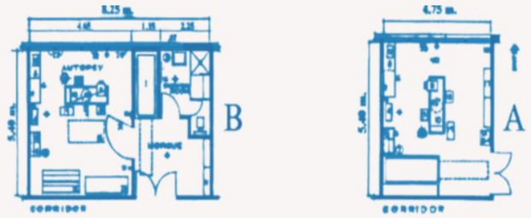
Fig 41: cross corridor dimensions

Fig 42: corridor dimensions

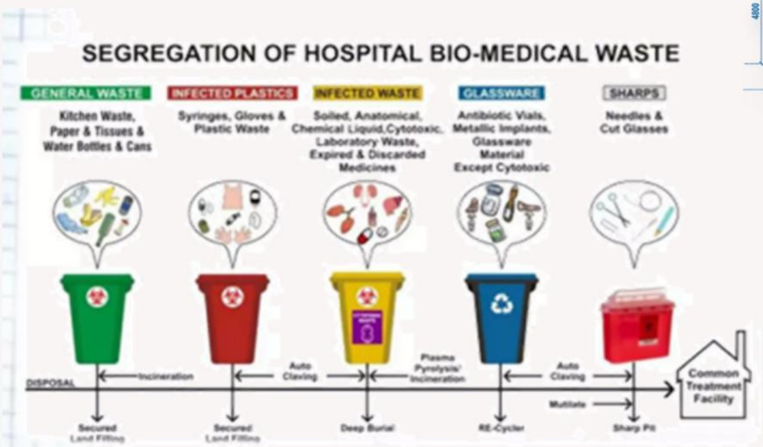
Fig 44: lifts dimensions

Fig 43: stairs dimensions

Mortuary room



50 bed hospital = 25m2
100 bed hospital = 45 m2



case study

King Juan Carlos Hospital

Project brief

Architects: Rafael de La-Hoz
LOCATION : Madrid, SPAIN
Year : 2012
Type : public health service
Capacity : 160 beds

Justification " why this case "?

conceptually, the new hospital is arranged on base that gives structure to the health care units, outpatient diagnosis and treatment. Structured in three modules or parallel buildings that reflect the best hospital main structures: flexibility, expansion, functional clarity and horizontal circulations.

Design objective

they propose to transform the citizen into a customer, for a new type of hospital, which in addition to assist with the proven effectiveness of our healthcare system, can feel at all times the center of all care, giving them all attention

Context

This new hospital model is configured in three basic elements: efficiency, light and silence. The best about hospital architecture and the best in residential architecture.

location

SPAIN

a country on Europe's Iberian Peninsula, includes 17 autonomous regions with diverse geography and cultures. Capital city Madrid.
Population: 47.35 million
Area of 505,990 km2
Spain is the second-largest country in the European Union

Madrid

Spain's central capital, is a city of elegant boulevards and expansivity's renowned for its rich repositories of European art
Area: 604.3 km^2
Population: 3.223 million

Móstoles

is a municipality of Spain located in the Community of Madrid. With over 200,000 inhabitants, it is the region's second most populated municipality after Madrid. Móstoles was a small town for a long time, but expanded rapidly in the second half of the 20th century
Area: 45.28 km^2
Population: 207,095

Móstole is the first city in the region, besides the Madrid capital, to have two public hospitals.

land marks

Bullring of Mostoles

. 15 minutes by car from the center of Madrid and accessible by bus and metro
600 m\2 min via car\5 min via bus\7 min via foot away from the hospital

The Rey Juan Carlos Hospital is located north of the municipality of Móstoles, Madrid, bordered by the Extremadura highway, a university campus and the rear street of a low-density residential area.

Rey Juan Carlos University

Founded: July 8, 1996 is a Spanish public research university
850 m\2 min via car\4 min via bus\4 min via foot

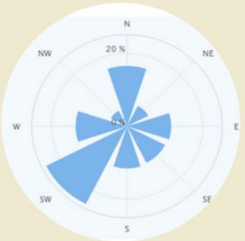
Site forces

One of the main points in the building is the sustainability; considering the conditions of solar orientation, topography, built environment and the greenery nearby, without forgetting the urban conditions of application.

they dealed with noise using the structure of the building Incorporate in the system green materials and renewable energy technology, with the objective to save resources and optimize operating costs, providing trough the green roof the natural light and ventilation to the inside of the building.

The climate of Madrid is moderately continental, with quite cold, relatively rainy winters and hot, sunny summers.

The sun was best used to illuminate all rooms throughout the building



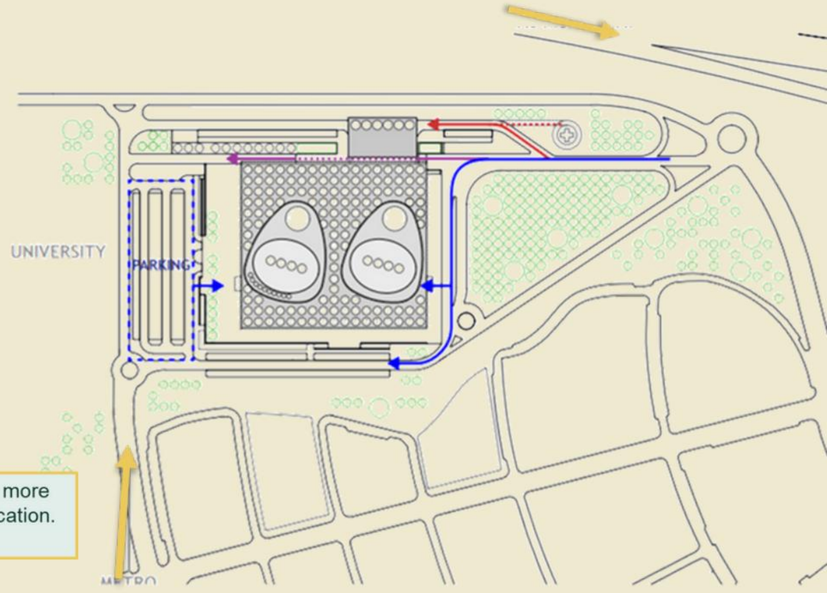
Surrounded by a highway and several structures, the hospital reveals to the exterior only the two ovoid silkscreen printed glass crowns, turning them into a point of reference and concealing the remaining facilities.

accessibility

A special road for ambulances and employees and includes a special entrance for emergencies

A special road for reviewers and hospital visitors to the parking as well

Public transportation is secured for the hospital from more than one direction of the metro due to its strategic location.



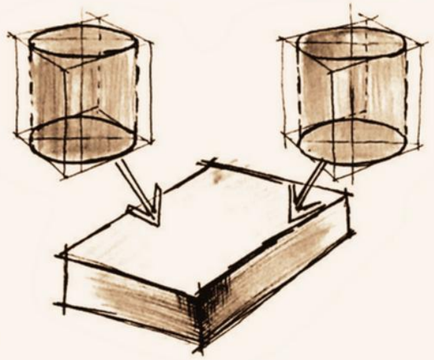
concept

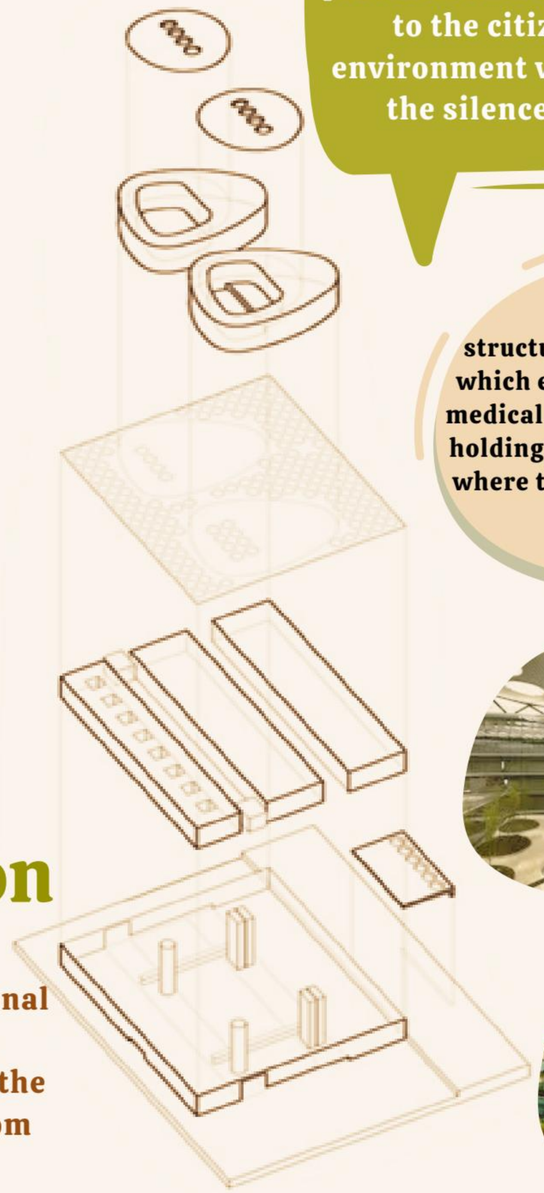
The concept purpose is also give therapeutics spaces, provide and architecture that serves to he rest and recovery of the patient. “To use the architecture as a medical treatment”

This new hospital model is configured in three basic elements: efficiency, light and silence. The best about hospital architecture and the best in residential architecture.

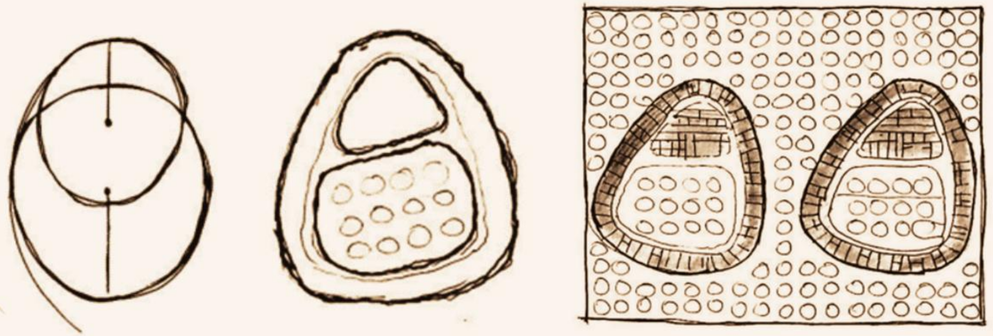
Two functional concepts space: base and crown, which are linked to form a new architecture, a model that offers to the professionals the opportunity to treat and to the citizens to be treated in an environment where the natural light and the silence resulting therapeutics

three prisms that make up the base, geared to each other as if it were a machine, a "healing machine"





structured on a large base, which encompasses various medical areas of the hospital, holding two volumes of glass where the ward is developed



Two oval crowns drawn with pleasant curves which move away in sensory terms from the depressive residential forms of the rationalist “pill block” and are inspired by the best of recent residential architecture: the removal of corridors and hence of noise, concentric circulation, light and silence around a common atrium.

form follow function

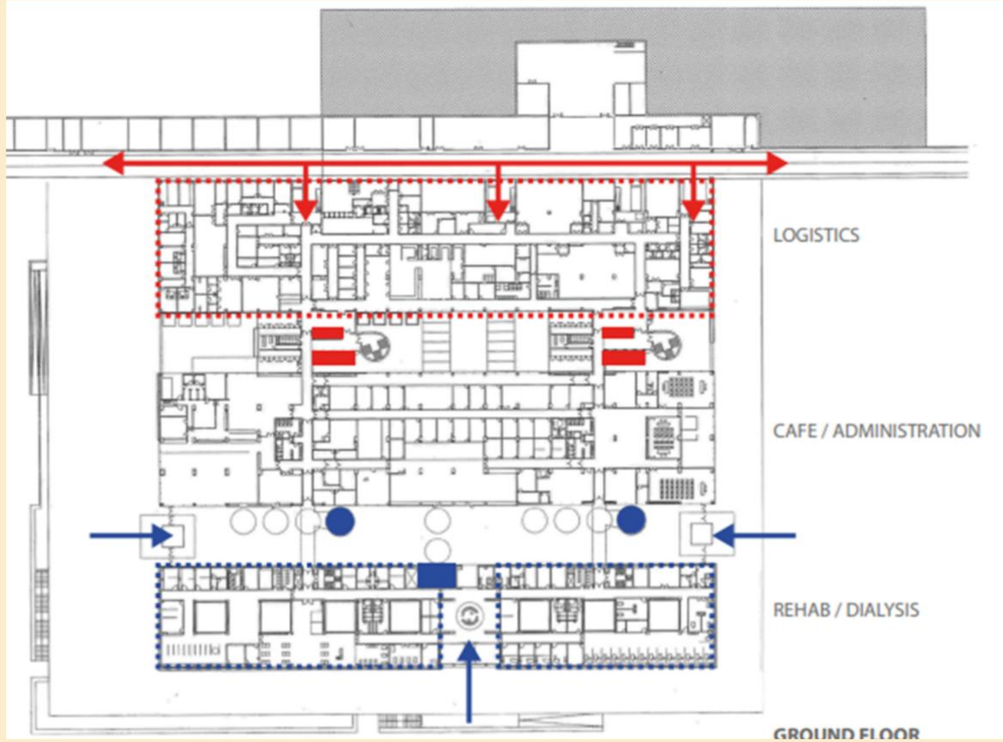
form the very outset it has been sought to separate this patient space from the functional activity areas, raising them on a vegetation covering which takes on its full meaning in the shape of a garden which can be observed from the rooms.

function

ground floor

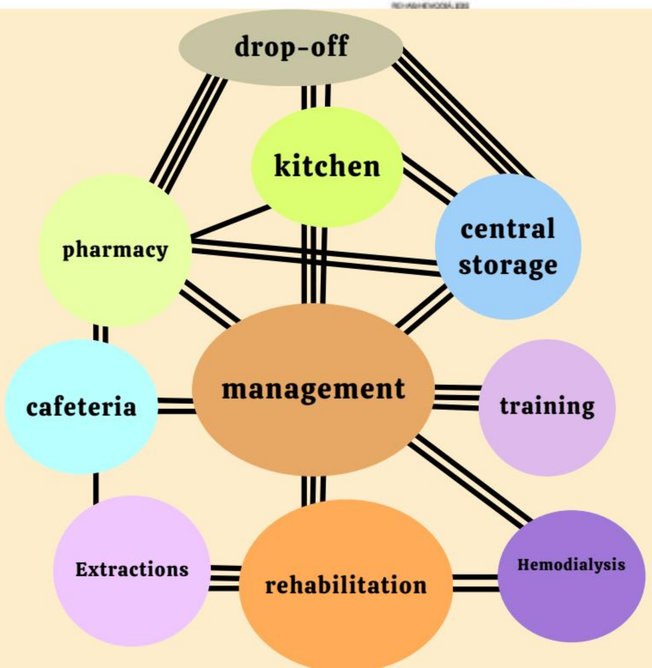
- Sum
- Pharmacy
- Loading area
- cashier
- Sterilization
- Kitchen
- Laundry
- Central storage
- Screening area
- Central storage
- Cleaning center
- Morgue
- Service elevator
- Elevators
- Private cafeteria
- Public cafeteria
- Cashier
- Continuing professional development (CPD)
- Management
- Social work
- Admission
- Security
- Training
- Extractions
- Extractions
- Hemodialysis
- Stairs

circulation



Public circulation

Private circulation



Dialysis Unit
Easy access with the main entrance

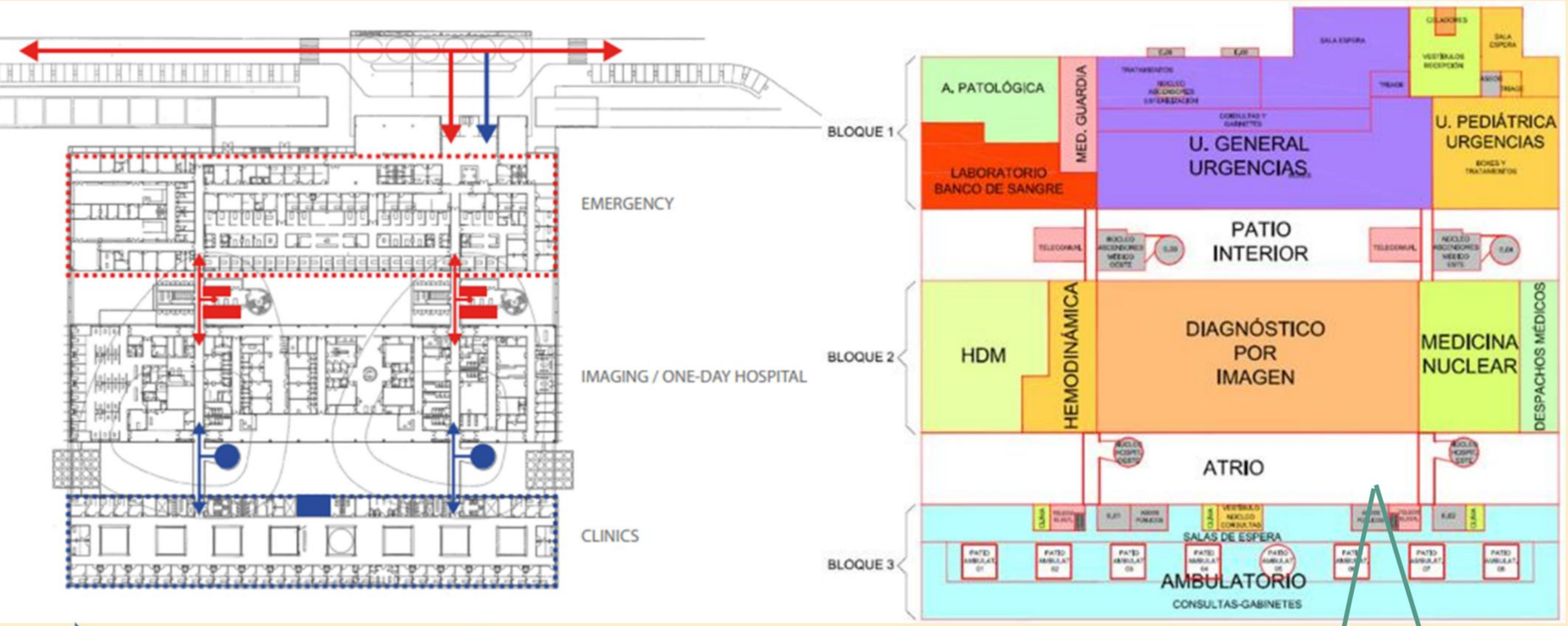
Services entrance with three drop off Kitchen near services entrance Central Storage Two central storage with main access to drop off zone

direct relationship between logistics services and drop-off area

12 operating theatres, 54 outpatients' units, 33 exploration rooms, 7 RPTU (Radiological Protection Technical Units), 84 emergency stations, 17 dialysis stations, 20 medical day hospital stations, 20 surgical day hospital stations and 17 radiology stations, inter alia.

first floor

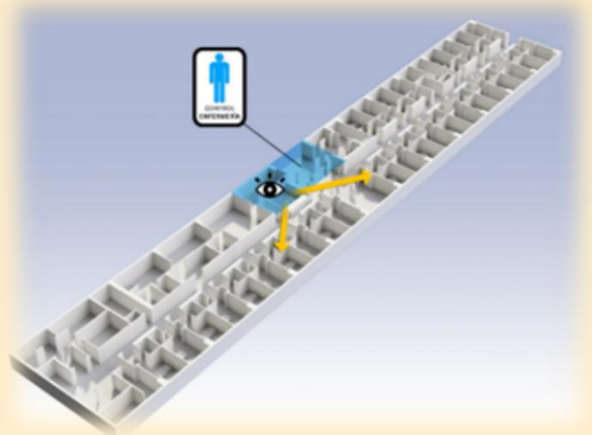
direct realationship between examination rooms and outpationt rppms and emergency area



- Courtyard
- Pathological
- Blood bank laboratory
- **Security**
- General Emergency
- **Emergency Pediatric**
- **Hemodynamics**
- **Health Surveillance and Disease Management**
- Diagnostic Imaging
- **Nuclear Medicine**
- Out-Patient Clinics
- **Medical Offices**
- Atrium

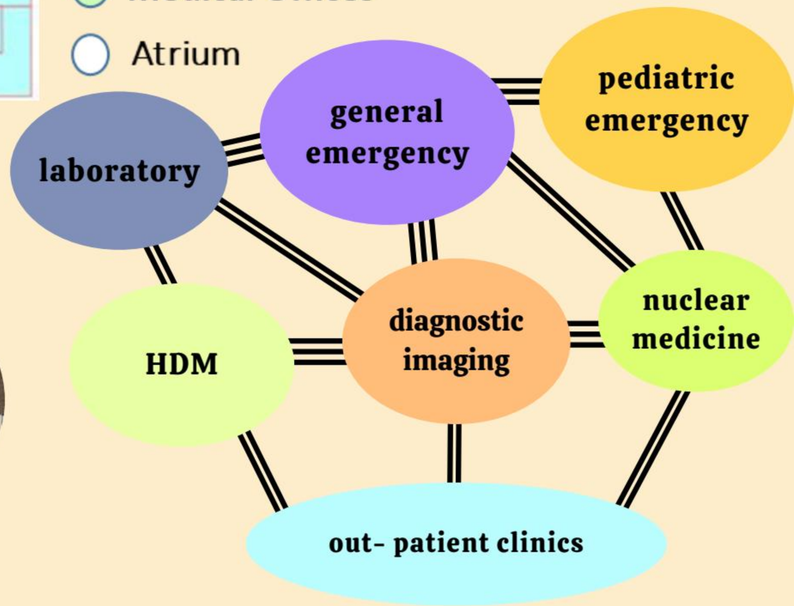
Public circulation

Private circulation

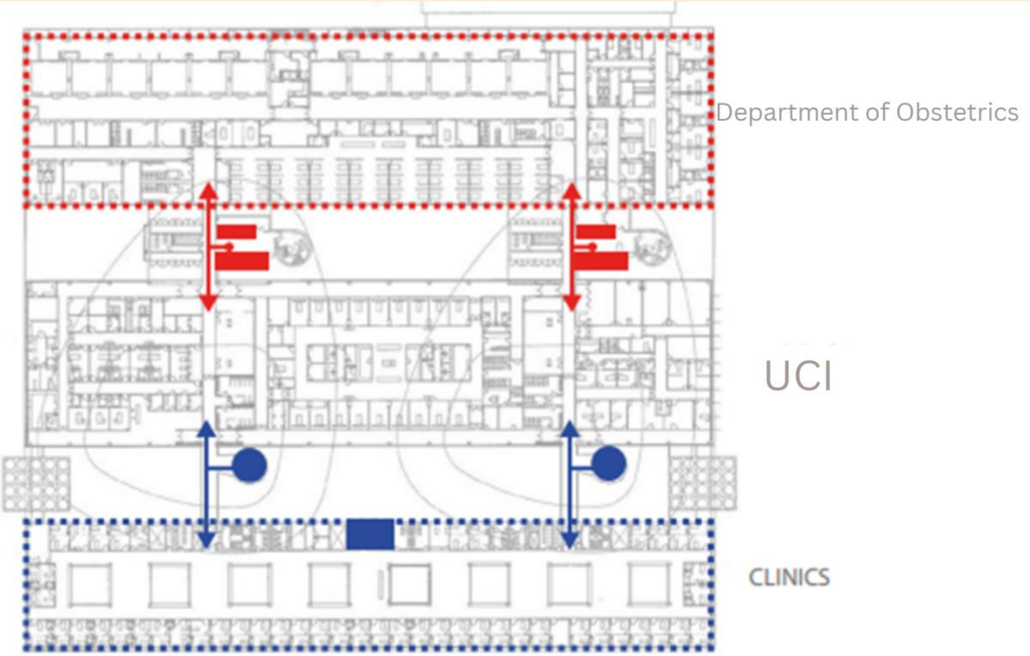


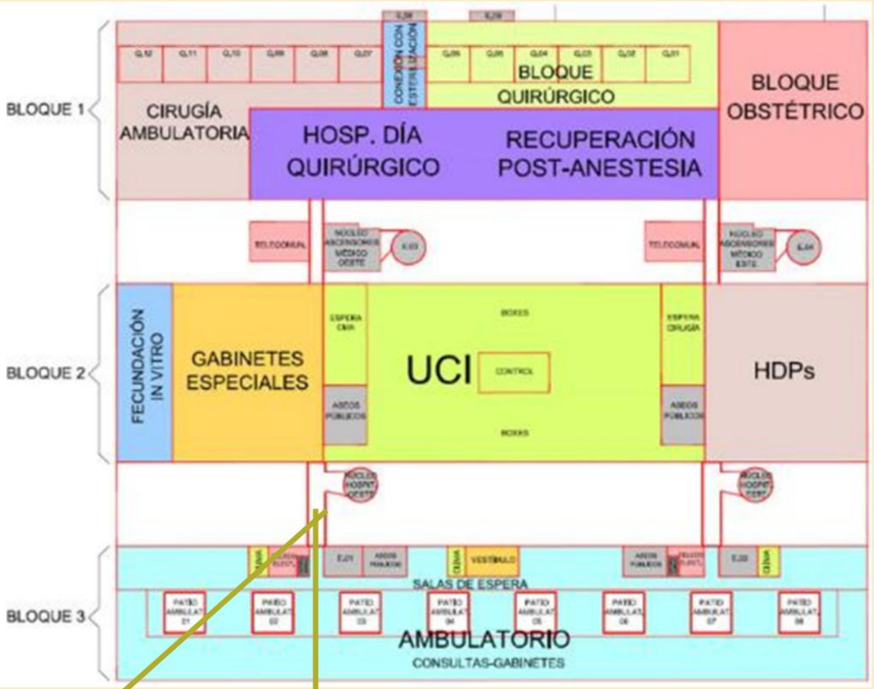
Atrium separates zones with 132 x 14 m dimension

Spatial organization is Linear but the architect avoided using long corridor



second floor





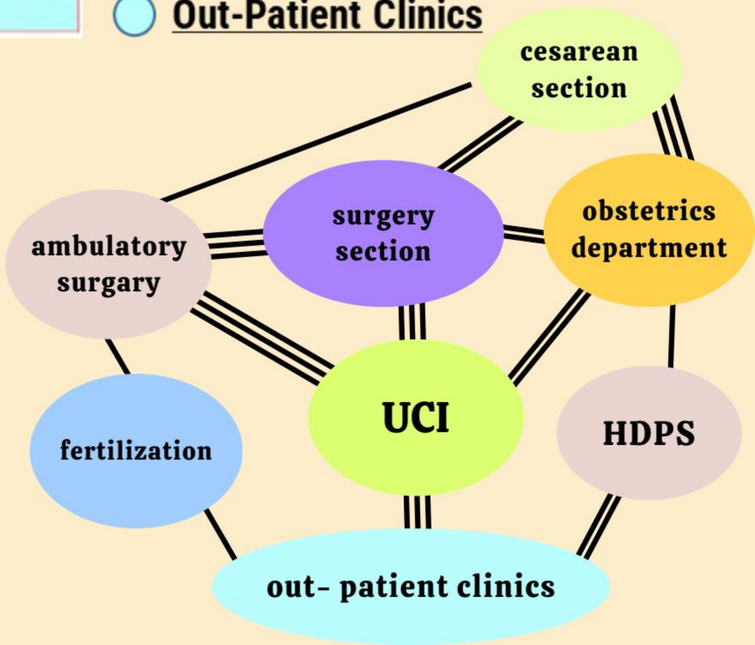
- Ambulatory Surgery
- Surgery Section
- Sterilization
- Cesarean Section
- Recovery Section
- Obstetrics Department
- Special Cabinet
- In Vitro Fertilization
- **UCI — Ultrasonic Contact Impeda**
- HDPs therapeutic potential of hdps immunomodulatory agents
- **Out-Patient Clinics**

Public circulation

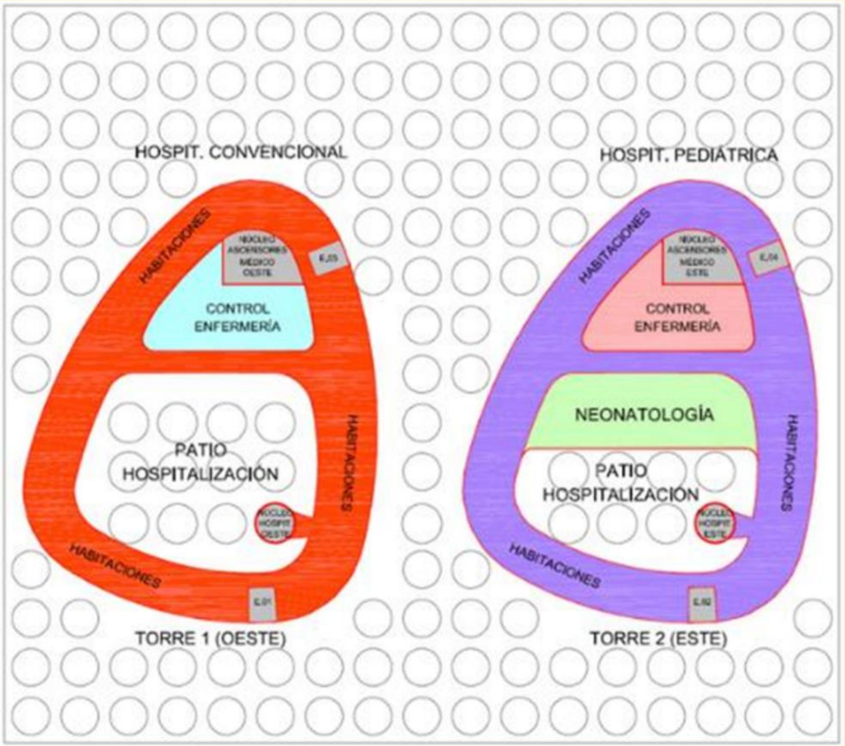
Private circulation

he central prism has shared uses in which the internal and external circulations are necessary, but always not interfering with each other. Having separate internal and external circulations keeps journeys to a minimum and makes communications simpler.

Drum within elevators each one 2 x 2.5 m



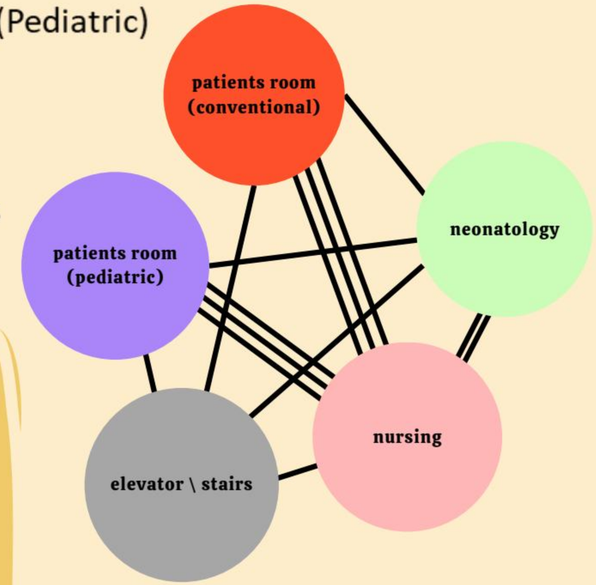
third floor

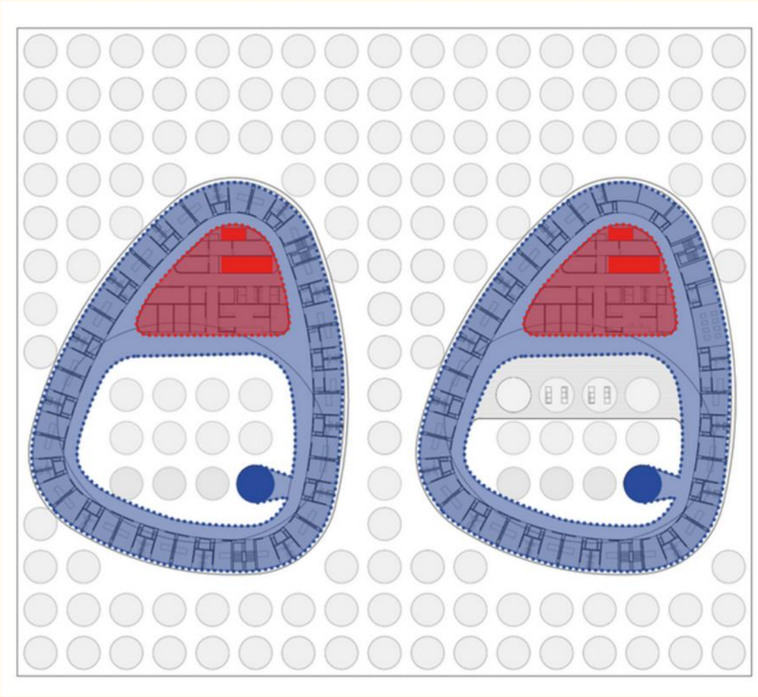


The position of the inpatient areas in the two oval towers addresses the functional need of placing them in an area with immediate access from the hospital premises, and making them accessible for visitors. The rooms are organized around a large atrium, separated from the rest of the facilities and rising over the landscaped roof of the plinth,

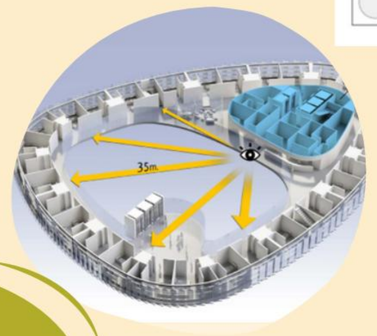
fourth and fifth floor

- patient's room (conventional)
- patient's room (Pediatric)
- Neonatology
- Nursing
- Elevator / Stairs

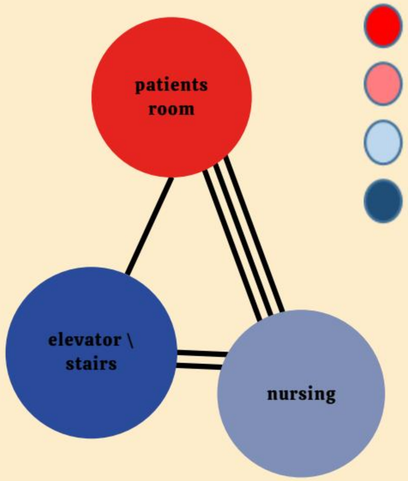




The position of the two towers, responds to the functional need to have an immediate access to the operating rooms, delivery rooms, emergency and diagnostic.



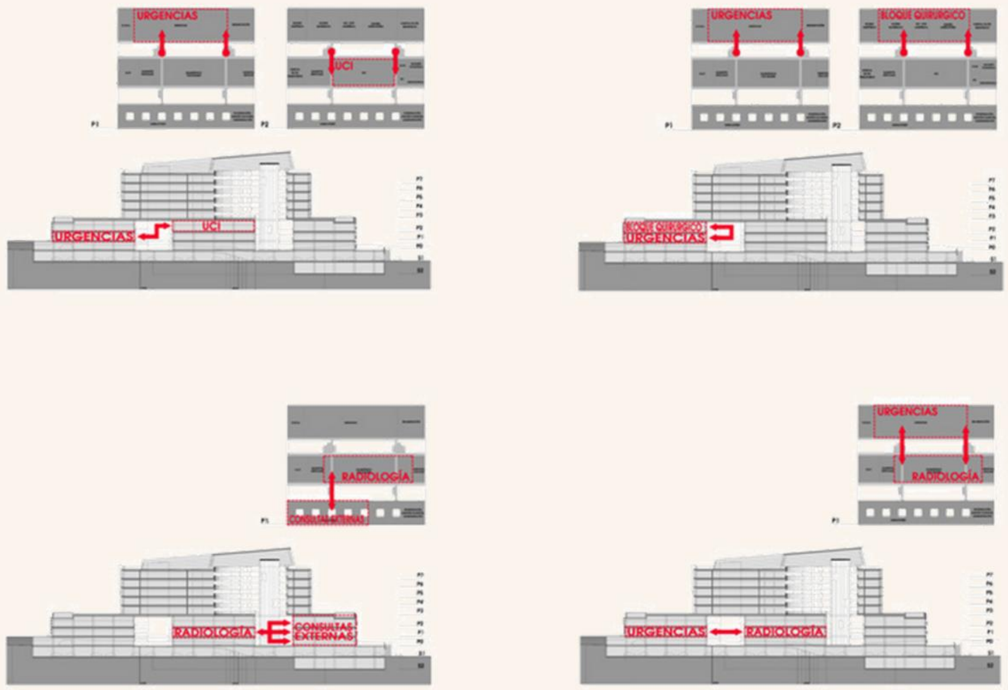
The centralized location for nursing section :
More control.
Easy to reach all patients.
Can see all the patient's rooms .

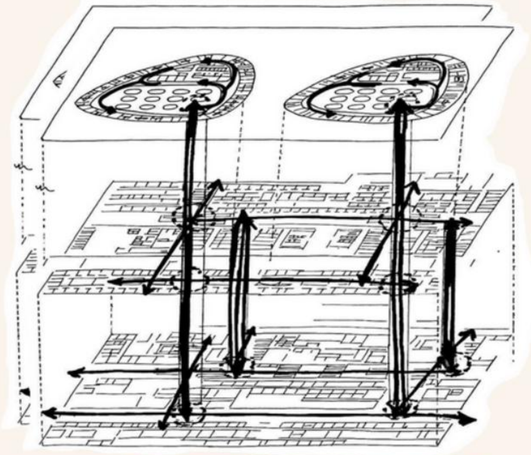


- Nursing
- Elevator / Stairs
- patient's room
- Elevators

vertical function and circulation

As regards the circulatory structure of the hospital, the architects set out to distinguish the internal and external circulations, thereby minimising the length of the routes. In the two prisms of the ends there are clearly internal uses on one and external on the other. The central prism has shared uses in which the internal and external circulations are necessary, but always not interfering with each other. Having separate internal and external circulations keeps journeys to a minimum and makes communications simpler.

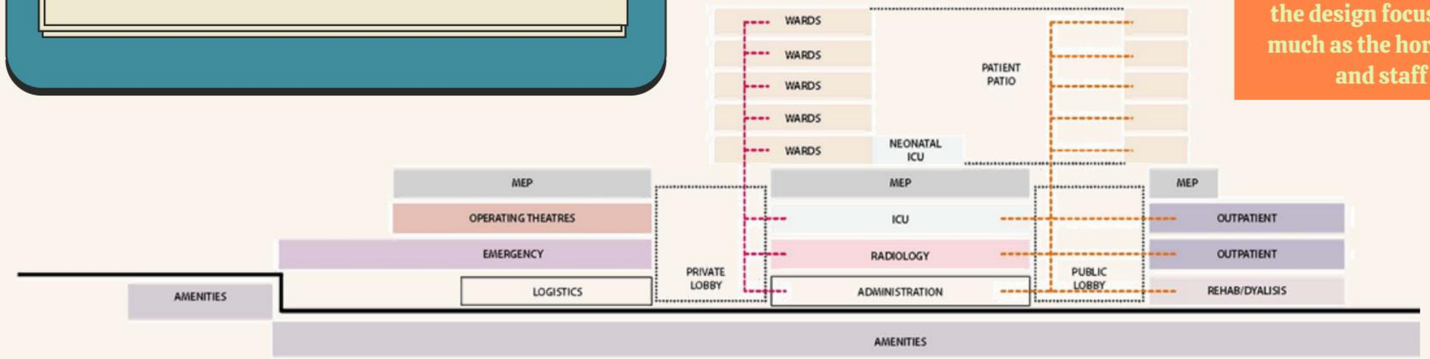




Shortest distance between tow vertical circulation = 24 m

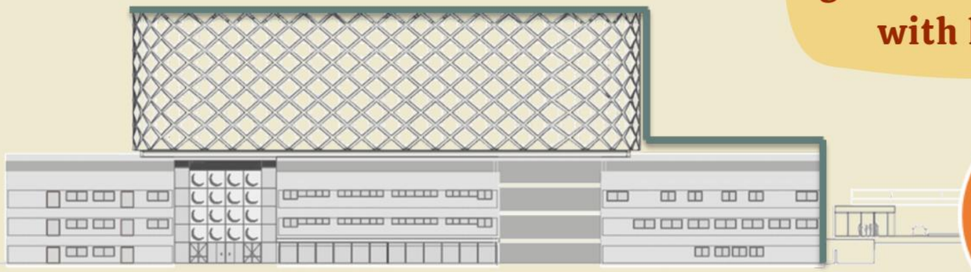
Longest distance between tow vertical circulation = 64 m

the design focused over the circulation in a virtical way as much as the horzintal and mae a sepration between public and staff to make it easier to move and faster



formative

The ratio of solid and void is equal in all facades, where glass was used and covered with light retractors



50% solid
50% void

natural light

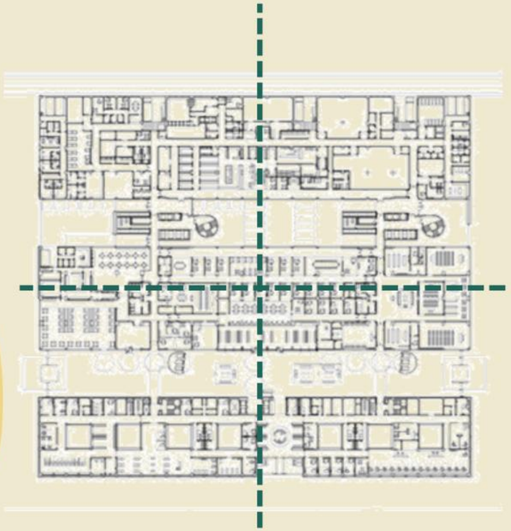
the design though the glass and the green roof allows sunlight to enter the space well , the design is working well with the sun path its a sustainable design

ventilated facade is textured with a diamond pattern that enable views

plan to elevation

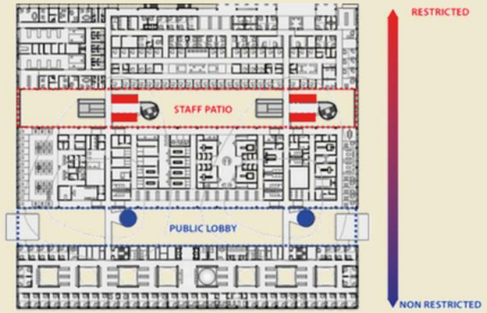
- analogos

symmetrical



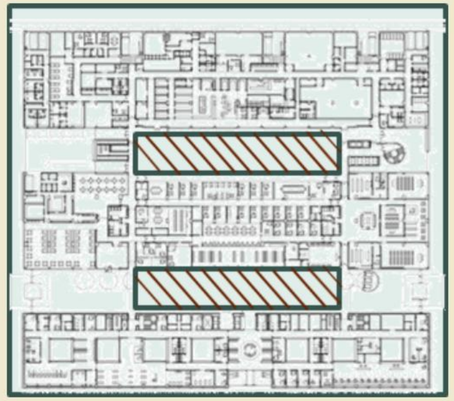
axis of balance

The axis separates the public areas and the employees' areas, and shows the division of entrances to both sides and limits the circulation of each



subtraction

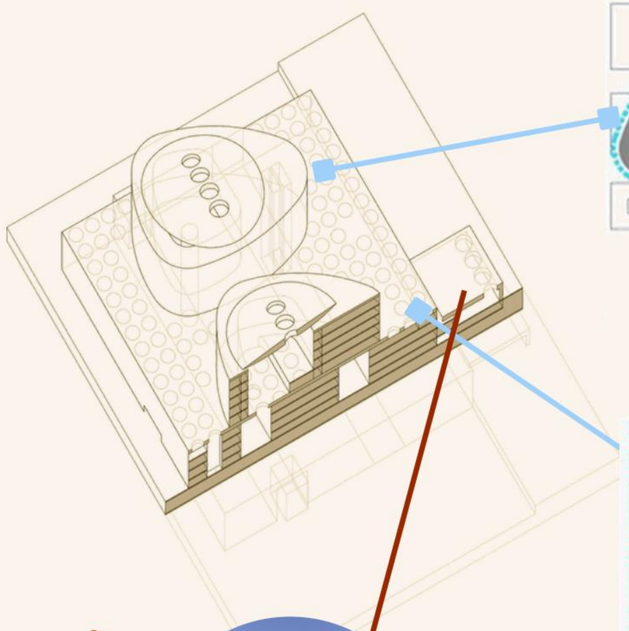
Two rectangles of the basic shape were cut to connect the floors vertically and to allow sunlight to reach

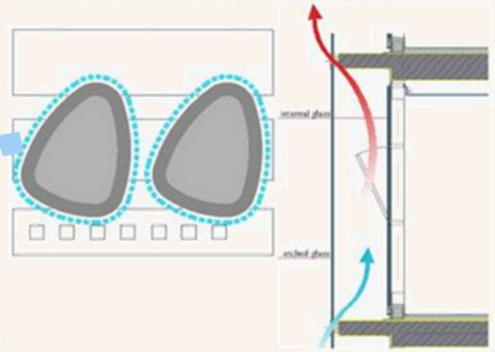


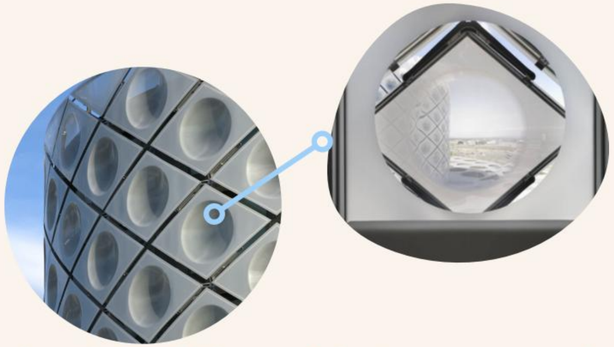
constraction

Systematize the building by structural modulation with the subsequent pre-industrialization process linked with a technological innovation in the materials and systems used; give a unique result with the last technology making the difference with the traditional hospital buildings.

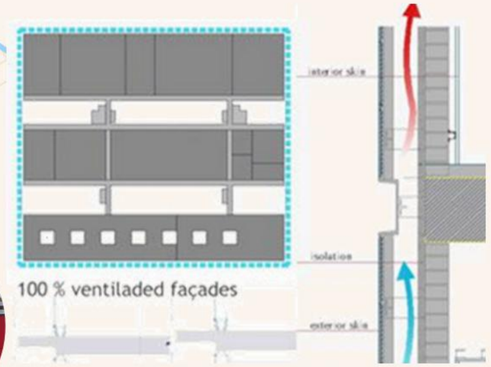
Incorporate in the system green materials and renewable energy technology, with the objective to save resources and optimize operating costs, providing trough the green roof the natural light and ventilation to the inside of the building.







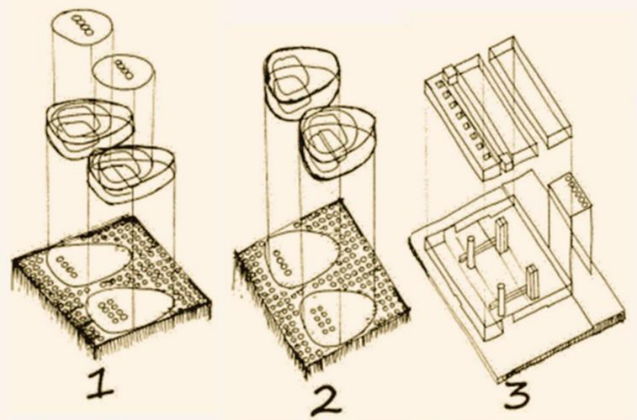
The suitable thickness of the glass to support the loads caused by the wind is 35cm
Nature curves. organic with more natural light



ventilated facade, supported by stainless-steel arms, is textured with a diamond pattern of dimpled glass panels

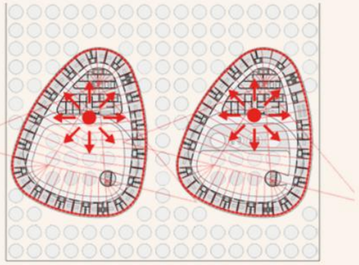
exterior structure of steel framing assuring efficiency light and silence

Alcobond material was used in the emergency entrance to add aesthetics to the facade and to isolate heat and cold



consists of a large prismatic base with strict structural modulation, in which care units, outpatients, diagnosis and treatment, are included and structured into three modules – internal, shared and external uses -, and which supports two glass ovoid towers housing the hospitalisation units.

has different spaces between the area of the patients and the other functional areas of the hospital, allowing in this area the relation between the green roof garden and the views from each room



colour scheme

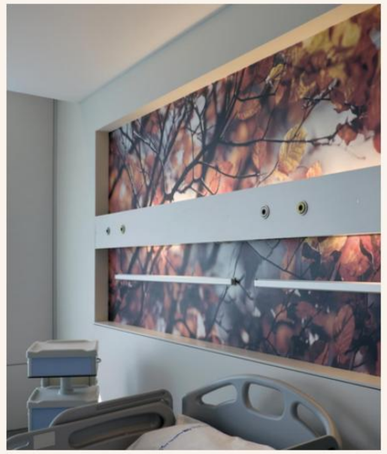
alcobond glass steel silkscreen

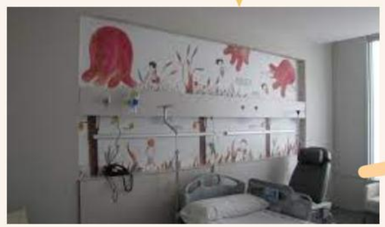
details

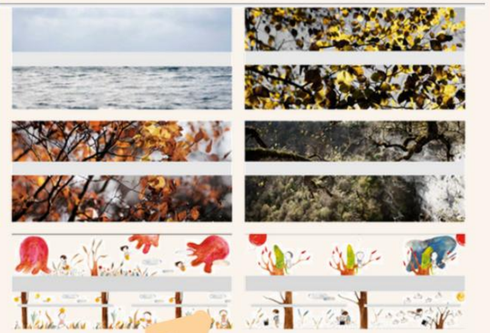
• lighting

Ventilated facade / Solar protection system for facade / Roof garden / Soundproof forged / 75%-90% natural light / Light filters according to uses / Reduce light pollution outside / Effective landscaping: use of non-potable water for irrigation / Technologies Innovative waste water

For every different kind of room, from hospitalisation rooms to the prenatal units, the architects have gone for a personalization of the CLINIC GAS head with the technical specifications required for the correct undertaking of each activity



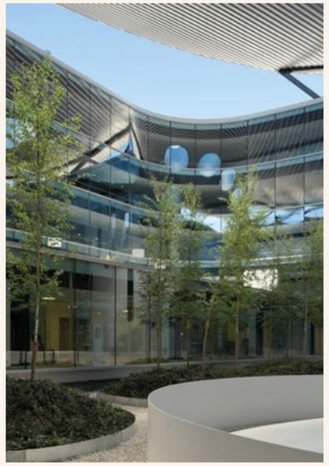




custom-made CLINIC GAS bed head unit by the LAMP brand.

Clinic Gas are luminaires that can be customized according to the needs of each project, with the possibility of direct and indirect lighting, with a wide range of mechanisms which are always integrated in the top or bottom of the profile in such a way as to be concealed. The Clinic Gas model, also allows the housing of the medical gas outlets in an independent channel, giving great accessibility and usability

• landscape

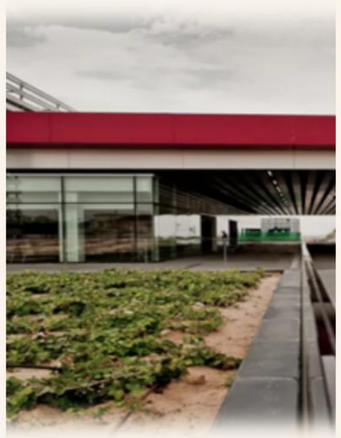


interior

From the very outset it has been sought to separate this patient space from the functional activity areas, raising them on a vegetation covering which takes on its full meaning in the shape of a garden which can be observed from the rooms.

exterior

- Exterior landscape next to the hospital continuing the same module shapes as the building
- Open space for emergency entry to be accessible from every point to ambulance cars and drop off



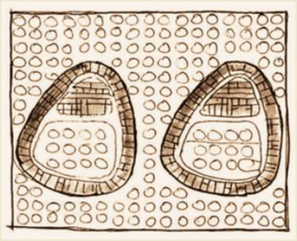
Some remarks concerning sustainability. considered the conditions of solar orientation, topography, built environment and the green areas nearby, without forgetting the urban conditions worked in. Roof gardens and water efficient Landscaping, using brown water for irrigation help to reduce water consumption and lower the temperature in the vicinity of the hospital.

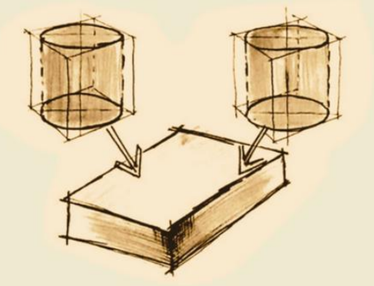
conclusion

site plan

One of the main points in the building is the sustainability; considering the conditions of solar orientation, topography, built environment and the greenery nearby, without forgetting the urban conditions of application.

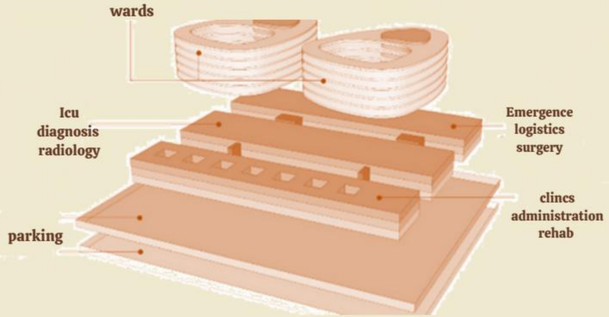
concept





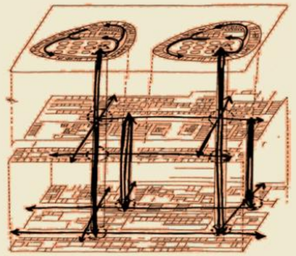
The concept purpose is also give therapeutics spaces, provide and architecture that serves to he rest and recovery of the patient. “To use the architecture as a medical treatment”

function zoning



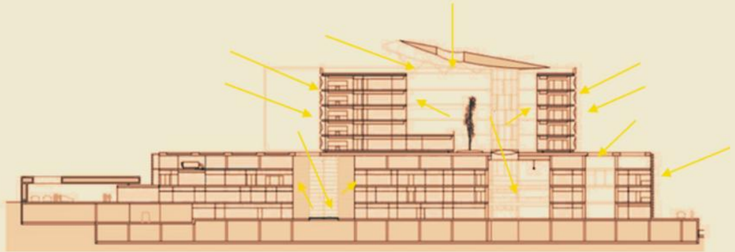
zones are separated on whos using the zone if its staff or its for public use and connected using bridges

circulation



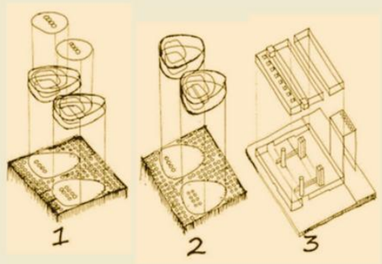
The central prism has shared uses in which the internal and external circulations are necessary, but always not interfering with each other. Having separate internal and external circulations keeps journeys to a minimum and makes communications simpler.

formative (natural light)



the design though the glass and the green roof allows sunlight to enter the space well , the design is working well with the sun path its a sustainable design

constraction



consists of a large prismatic base with strict structural modulation, in which care units, outpatients, diagnosis and treatment, are included and structured into three modules – internal, shared and external uses -, and which supports two glass ovoid towers housing the hospitalisation units.

color scheme and material

alcobond glass steel silkscreen

site analysis

location

jordan

is a country in Western Asia.
Area: 89,342 km^2
Population: 10.27 million

Jordan prides itself on its health services, some of the best in the region. Qualified medics, a favourable investment climate and Jordan's stability has contributed to the success of this sector. The country's health care system is divided between public and private institutions

Amman

s the capital and largest city of Jordan, and the country's economic, political, and cultural center. With a population of 4,061,150
Area: 1,680 km^2

shafa badran

One of Amman's new northern regions. It is located north of the Jordanian capital, Amman. It is about 20 km away from its center, and it is located within the university district. The population of the area is about 35,000 people. The area of the area is about 45,000 acres and its height above sea level is from 700 m to approximately 1000 m. Shafa Badran is a rocky mountainous area

land marks

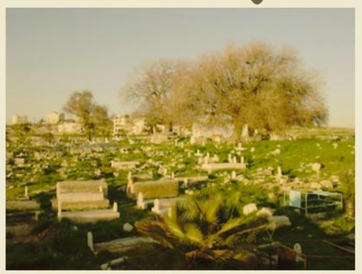
Applied science private university

t was established in 1991 as the largest private university in Jordan in terms of campus area and number of students' enrollment

100m away from site,1min by car ,5min walking

Lijam Hotel

100m away from site,1min by car ,5min walking



Shafa cemetry

200m away from site,3min by car ,10 min walking

neighborhood context

Accessibility

from irbid 81.1km ,71 min . The north complex to the site 6.8 Km 7min

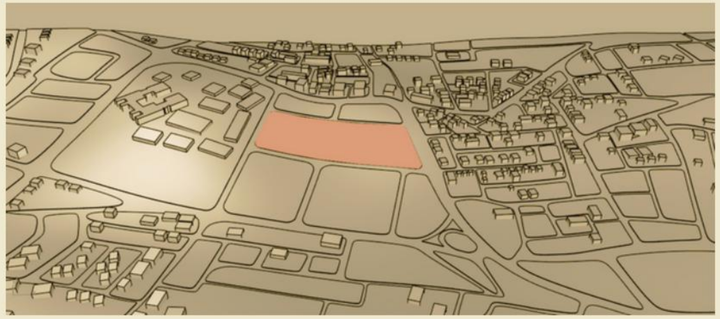
from zarqa to site 28km 31 min

from mafraq to site 66.7 km 70 min

solid and void

45% solid
55% void

high building



The maximum height we can reach is 20 m compared to the buildings in Applied Science Private university
As for the nearby building , the maximum height is 15m

land use

- educational
- graveyary
- residential
- commercial
- park

the site development by time

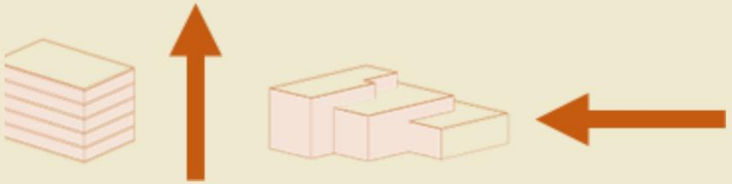
2004

2012

2022

Shafa Badran is one of the areas that has witnessed rapid development over the years, so it needs services such as a hospital

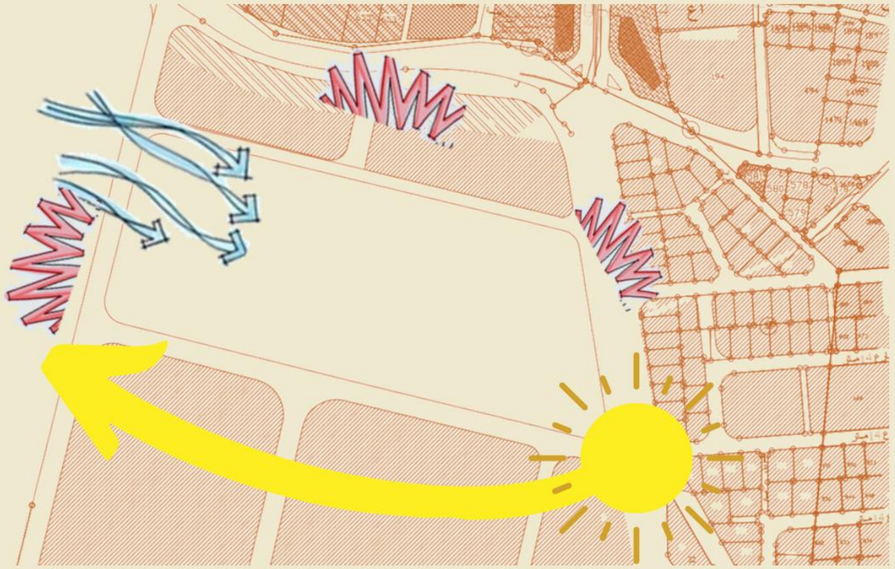
Architectural style



- The classicist style
- the Islamicist style
- The cottage style
- The modern style

The design of the university adopted the cubism School a pattern that easy to fallow in the design of all it's facilities with the occurrence of voids and additions. The main shape is a rectangle that has been divided into many rectangle one rectangle has been deleted and added

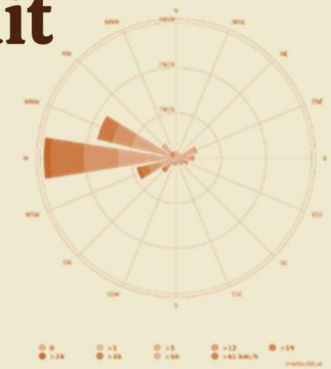
site force



we can take advantge of the sun path for natural lighting or solar panles

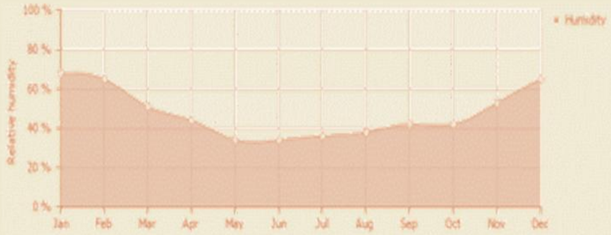
We can plant trees as windbreaks and nuisances

climit

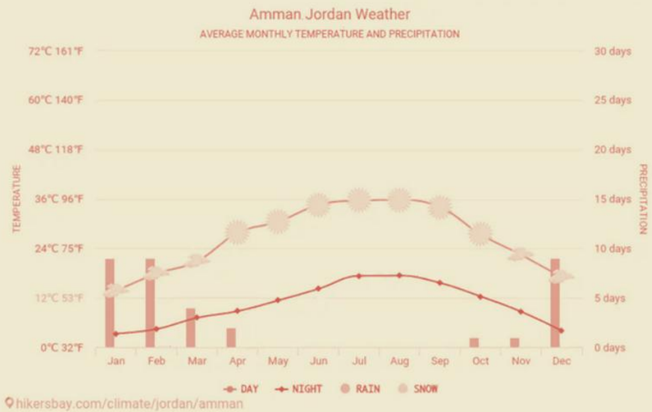


The region exposed to semi-strong wind come from WEST and normal wind from other sides.

Humidity



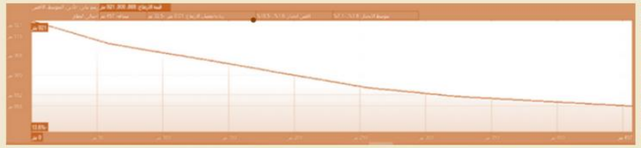
Amman have normal humidity range.



rain fall is Precipitation is moderate and suitable for the growth of most plant species
Amman have a moderate climate

Topography

We have a slope witch is about 42m, highest point is 921m , and minimum is 888m



Because of the sharp topography, we will take advantage of it by designing a basement for service needs or an underground garage

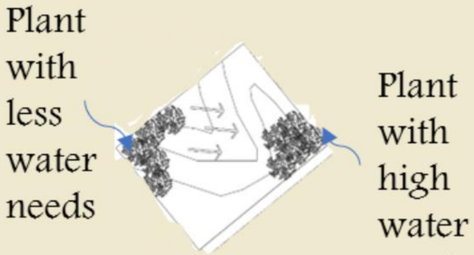
soil

The land is divided into two types of soil:
rocky soil located in the high region
Red soil suitable for cultivation located on flat ground

Vegetation

Plants used for arranging around the site, such as the palm tree, can be used as a sign
Thorny plants and weeds must be removed as they have grown as empty land

Water harvesting can be used to provide the hospital's needs of water and watering plants



APPROACH

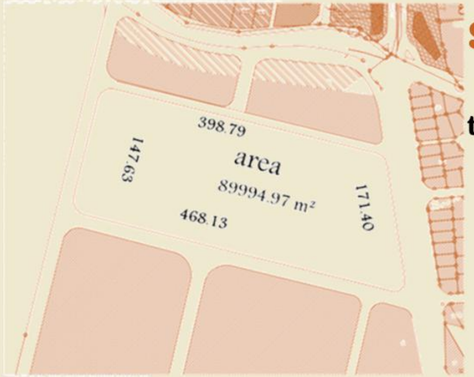
alarab street 40m

shafabadran street 50m

Main street

side street

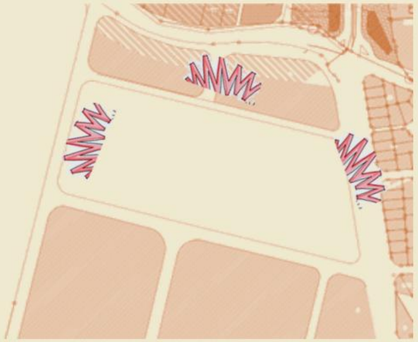
size and area



setbacks

80 meters from each side
total area is almost 90000

noise



Noise from Applied Science Private university
Noise from main street

Man made features

off site feature

lighting buildings signs

In site feature

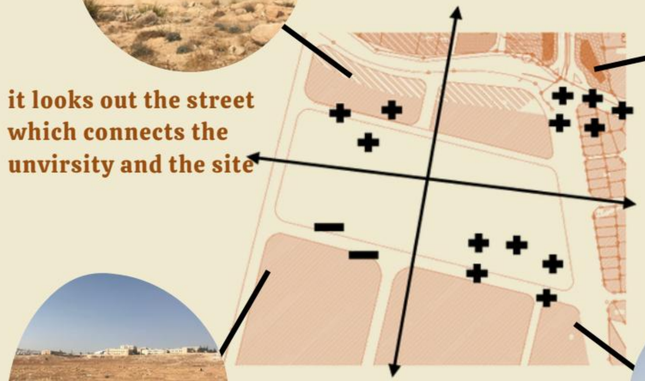
workers house for market use infrastructure ducts

On Eid al-Adha the site is used as an altar

View from siteand into site

it looks out the street which connects the unvirsity and the site

It looks out the main street through the roundabout and some stores



it looks out the rocky height in the plot which is going to be gone during the construction

It looks our the cemetery, and the main street but it is covered with trees

circulation

The land contains three entrances, two entrances from two main streets and an entrance from the back between the university and the ground There is the possibility of opening an additional street according to the plans

There is no footpath in the area to the main streets and there is no sidewalk

conclusion

designing decisions

- Building blacks in the form Cubes. So The proposal is to change the building to be distinet from the surrounding buildings or we can let it take the place style and do harmony and unity
- Stats in the form of unexplored squares So the openings must be made according to architectural studies.
- Make a symmetric segment to reflect the strength of the divider So symmetry reflect strength

plant trees around noise sources and use Water harvesting can be used to provide the hospital's needs of water and watering plants specaliy that shafa is a rainy place in winter

Internal zoning

Emergency placement in the front of the building for quick access
Placing patient rooms overlooking green areas
Placing services and departments in the center of the building
Make two entrances, one near the departments and the other near the clinics.

External zoning

Putting green places and places for pedestrians in to build a threptic environment

Glass facade design for patient rooms with a view and to take the best advantage out of sun path

Putting parking at the entrance out of main streets for quick access

program

Main entrance

No	Department	Name of Space	Area (m2)	No.	Total Area (m²)
1	main lobby	reception	30	1	30
		waiting	60	1	60
		Prams	10	1	10
		wheel chairs	10	1	10
		W.C	10	2	20
		telephone	10	1	10
		small cafeteria	20	1	20
		shops	10	1	10
2	Admission	clerks	10	2	20
		records	15	1	15
		changing	25	2	50
		admission office	10	1	10
3	staff area	cleaners	10	2	20
		changing	10	1	10
		W.C	10	2	20
4	Store		10	2	20
		Net area			355
		Circulation Ratio	20%		71
		Gross Area			426

administration

No	Department	Name of Space	Area (m2)	No.	Total Area (m²)
1	Reception	Reception	8	1	8
2	Offices	Waiting	12	1	12
		Clerks	20	1	20
		Accounts	20	1	20
		Archive	15	1	15
		records	10	1	10
3	Management	Manager	36	1	36
		Secretary	10	1	10
		assistant	18	1	18
		conference	50	1	50
		Meeting Room	250	1	250
4	Staff Area	Dining	20	1	20
		Lounge	20	1	20
		W.C & locker	10	2	20
5	Cleaning		12	1	12
6	Stores		20	1	20
		Net Area			533
		Circulation Ratio	25%		133.25
		Gross Area			666.25

emergency department

No	Department	Name of Space	Area (m²)	No.	Total Area (m²)
1	Reception	police	10	1	10
		trolley	12	1	12
		control.& radio	12	1	12
		reception & info.	15	1	15
		waiting	30	1	30
		W.C	5	2	10
		chief	12	1	12
		staff lounge &	24	1	24
		staff lounge & W.C	20	1	20
2	Operation	treatment	32	1	32
		exam	20	1	20
		critical care	36	1	36
		x ray & machine	35	1	35
		patient observation	35	1	35
		nursing station	15	1	15
		waste accumulation	12	1	12
		cleaning	15	1	15
		cleaner	10	1	10
		Stores	12	1	12
		Net Area			367
		Circulation Area	50%		183.5
		Gross Area			551

Intensive care unite department

No	Department	Name of Space	Area (m²)	No.	Total Area (m²)
1	patient	isolation	24	2	48
		Ante room	10	2	20
		respiratory	13	1	13
		patient`s bed	50	2	100
		patient`s W.C	12	2	24
		changing + W.C	10	2	20
2	Staff	nurse station	24	1	24
		dirty utility	13	1	13
		clean utility	13	1	13
		W. C + bath (staff)	13	2	26
		doctor`s room	13	1	13
		changing room	13	2	26
		store	10	1	10
		kitchen	13	1	13
		eqp. Store	13	1	13
		conference	24	1	24
	Net Area				400
	Circulation Ratio		30%		120
					520

Maternity department

No	Department	Name of Space	Area (m²)	No.	Total Area (m²)
1	Entrance	reception	8	1	8
		record	5	1	5
		waiting	15	1	15
2	Treatment & examination	nurses lounge	18	1	18
		doctor lounge	18	1	18
		changing + W.C	10	2	20
		preparation	10	1	10
			10	4	40
		delivery	24	3	72
		recovery room	9	3	27
		new born child	20	2	40
3	surgery	hall	56	1	56
		preparation	12	1	12
		recovery room	28	1	28
4	Service	clean utility	10	1	10
		dirty utility	10	1	10
		store	10	1	10
		feeding	10	1	10
	Net Area				409
	circulation Ratio		30%		123
	Gross Area				532

Pharmacy department

No	Department	Name of Space	Area (m2)	No.	Total Area (m2)
1	Reception	control	20	1	10
		waiting	30	1	15
		dispensary	12	1	10
2	Staff Area	rest	30	1	12
		changing	20	2	20
		cleaners	12	1	4
		pharmacist charge	12	1	8
		assisted pharmacies	12	1	10
3	working Area		100	1	100
4	Store		150	1	70
	Net Area				418
	Circulation Ratio		15%		62.7
	Gross Area				480.7

laundry

No	Department	Name of Space	Area (m²)	No.	Total Area (m²)
1	washing Action	soiled Area	36	1	36
		classification	18	1	18
		clean area	12	1	12
		classification	18	1	18
		washing	54	1	54
		drying	18	1	18
		sterilizing	18	1	18
		ironing	36	1	36
		pressing	18	1	18
		repairs	18	1	18
2	Staff	staff room	12	1	12
		supervisor	12	1	12
		changing + W.C	12	2	24
3	Service	store for linen	12	1	12
		store for washing m.	12	1	12
		cleaner room	10	1	10
		Garbage	12	1	12
	Net Area				340
	Circulation Ratio		30%		102
	Gross Area				442

mortuary

No	Department	Name of Space	Area (m²)	No.	Total Area (m²)
1	Body receiving	manager	12	1	12
		Receiving	18	1	18
		washing	36	1	36
		pray	36	1	36
2	Inspection	hall	48	1	48
		cold store	48	1	48
3	relatives	waiting	36	1	36
4	cleaning and store	chemical room	13	1	13
		cleaning	8	1	8
	Net Area				255
	circulation Ratio		25%		64
					319

mechanic department

No	Department	Name of Space	Area (m^2)	No.	Total Area (m^2)
1	Mechanical Service	mechanical plant	180	1	180
		Transformer room	60	1	60
		emergency generators	120	1	120
		meter room	12	1	12
		fire pumps	24	1	24
		electrical switchboards	52	1	52
		elevators machine room	26	1	26
		telephone equipment room	26	1	26
	Net Area				500
	Circulation Ratio		30%		150
	Gross Area				650

kitchen

No	Department	Name of Space	Area (m^2)	No.	Total Area (m^2)
1	Storing	main store	36	1	36
		vegetable store	12	1	12
		red meat store	12	1	12
		white meat store	12	1	12
		bread store	12	1	12
		fruit store	12	1	12
		canned store	12	1	12
		store for daily share	6	2	12
2	Preparation & cooking	cooking	36	1	36
		preparation & serve	36	1	36
		washing	36	1	36
		trolley washing	18	1	18
		trolley churching	18	1	18
3	Dining	staff dining & café	200	1	200
		control room	6	1	6
4	Service	main store	10	1	10
		cleaner	6	1	6
		Garbage	8	1	8
	Net Area				494
	Circulation Ratio		35%		172.9
	Gross Area				667

General ward department

No	Department	Name of Space	Area (m^2)	No.	Total Area (m^2)
1	Treatment	doctor(special & control)	20	2	40
		sister	18	1	18
		nurse station	24	1	24
		preparation	15	1	15
		treatment	15	2	30
2	patient	1 bed with W.C &	22	30	660
		2 bed with W. C &	30	20	600
		4 bed with W.C &	42	8	336
3	Staff & Service	staff W C	9	2	18
		staff shower	9	2	18
		staff changing	18	2	36
		sluice	10	1	10
		disposal	6	1	6
		linen	10	1	10
		store	9	1	9
		cleaner room	9	1	9
4	Rest	day room	25	1	25
		kitchen \ dining	20	1	20
5	inpatient	waiting \ visitor	35	1	35
		reception	15	1	15
	Net Area				2438
	circulation Ratio		40%		975.2
	Gross Area				2909

Operation department

No	Department	Name of Space	Area (m^2)	No.	Total Area (m^2)
1	main	operation theatre	36	6	216
		anesthetic room	10	4	40
		scrap up	10	4	40
		exit by	10	4	40
		sterilize store	13	3	26
2	entry-exit	recovery	100	1	100
		reception	52	1	52
		sister room	18	1	18
3	Staff	changing room	24	2	48
		surgeon`s rest room	18	1	18
		nurse`s rest room	18	1	18
		orderlies rest room	13	1	13
		kitchen	6	1	6
4	Service	eqp. Store	18	1	18
		cleaner room	13	1	13
		clean utility	10	1	10
		dirty utility	18	1	18
		conference	13	1	13
		generator room	18	1	18
		mobile x-ray	6	1	6
		refrigeration	24	1	24
	Net Area				755
	circulation Ratio		30%		226.5
	Gross Area				981.5

Outpatient department

No	Department	Name of Space	Area (m2)	No.	Total Area (m^2)
1	Administration	Reception	15	1	15
		waiting	70	1	70
		staff W.C	5	2	10
		patient W.C	10	2	20
		Chief nurse	10	1	10
2	Consultant offices	consultant	8	10	80
		exam	8	10	120
		treatment	20	1	20
		preparation	10	2	20
		cleaning	6	2	12
		disposal	12	1	12
		consultant	48	2	96
3	Ophthalmology	store	24	1	24
4	Dentistry	consultant	48	2	96
5	Cardio-vascular	store	36	1	36
		consultant	12	2	24
		tests	24	1	24
		waiting	10	1	10
6	ENT	Audiometry	12	2	24
7	Supporting facilities	hearing aids	10	1	10
		disposal	8	1	8
		treatment	10	2	20
		watinig	20	1	20
		medicine dispensery	40	1	40
8	Cleaning		16	1	16
9	Stores		16	1	16
		Net Area			803
		Circulation Area	25%		201
					1004

radiology department

No	Department	Name of Space	Area (m2)	No.	Total Area (m2)
1	Entrance	entrance & registration	52	1	52
		bed waiting	24	1	24
		W C	6	2	12
		W C (handicapped)	6	2	12
2	X-Ray	x-ray hall	30	2	60
		dark room	10	2	20
		control room	6	2	12
		changing	3	5	15
		film collection	18	1	18
		dr. viewing	10	2	20
		recovery	10	1	10
		barium preparation	10	1	10
		chemical store	10	1	10
		clean equipment	16	1	16
3	C . T Scan	hall	36	1	36
		control room	6	1	6
4	M . R . I .		36	1	36
		changing	3	3	9
		equipment	20	1	20
		control room	10	1	10
5	Sonography	hall	30	1	30
6	staff	manager	10	1	10
		assistance	10	1	10
		chief Dr.	10	1	10
		rest	15	1	15
		nursing station	15	1	15
		duty room	10	1	10
		secretary & writing	15	1	15
		W.C	6	2	12
7	Service	main store	10	1	10
8	Cleaner	cleaner	6	1	6
		Gaerbage	8	1	8
		Net area			559
		circulation Ratio	35%		195.65
		Gross Area			754.65

laboratory department

Department	Name of Space	Area (m2)	No.	Total Area (m2)
Hematology	lab	35	1	35
	blood draw	10	1	10
	blood bank	20	1	20
General lab	micro biology	20	1	20
	ante room	8	1	8
	bacteriology & serology	20	1	20
	soiled utility	9	1	9
	clean utility	12	1	12
	processing	12	1	12
	chemical pathology	18	2	36
	pathologist	9	1	9
	histology	20	1	20
	virology	9	1	9
	cytology	20	1	20
	cold room	6	1	6
	hot room	6	1	6
	sterilize & wash	12	1	12
3 Administration	waiting	20	1	20
	reception	12	1	12
	records	9	1	9
	W.C	6	2	12
	lab manager	9	2	9
	patient examination	9	1	9
	staff lounge	9	1	9
	patient W.C	6	2	12
4 Cleaning		9	1	9
5 Stores		9	1	9
	Net Area			394
	Circulation Area	25%		98.5
	Gross Area			493.5

The entire program area for a 100-bed hospital with circulation in all departments is 11 thousand m2