SCHOOL OF ARCHITECTURE

BBDU,LUCKNOW

Declaration

I, **ABHISHEK KUMAR** Roll Number, **1150101005** hereby declare that the thesis titled **500 BEDDED SUPER-SPECIALITY HOSPITAL, HYDERBAD,** submitted by me, in partial fulfillment of the requirement for the award of Degree in Bachelor of Architecture, to School of Architecture, as a record of my original research work.

_____

Signature of Student

Date:

THESIS REPORT ON

“500 BEDDED SUPER-SPECIALITY HOSPITAL, HYDERABAD”

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF:

BACHELOR OF ARCHITECTURE

BY

ABHISHEK KUMAR

1150101005

THESIS GUIDE

PROF. SANGEETA SHARMA

AR . NAVEEN SINGH

SESSION 2019-20

TO THE

SCHOOL OF ARCHITECTURE AND PLANNING

BABU BANARASI DAS UNIVERSITY

LUCKNOW.

SCHOOL OF ARCHITECTURE AND PLANNING

BABU BANARASI DAS UNIVERSITY, LUCKNOW (U.P.).

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I hereby recommend that the thesis entitled "500 BEDDED SUPER-SPECIALITY HOSPITAL, HYDERABAD" under the supervision, is the bonafide work of the students and can be accepted as partial fulfillment of the requirement for the degree of Bachelor's degree in architecture, school of Architecture and Planning, BBDU, Lucknow.

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Recommendation Accepted

Not Accepted

External Examiner	External Examiner

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Certificate of thesis submission for evaluation

1. Name **ABHISHEK KUMAR**

2. Roll No. **1150101005**

3. Thesis Title : 500 BEDDED SUPER-SPECIALITY HOSPITAL, HYDERABAD

4. Degree for which the thesis is submitted: Bachelor Of Architecture

5.	**Faculty of University to which the thesis is submitted:**	**Yes / No**
6.	**Thesis preparation guide was referred to for preparing the thesis.**	**Yes / No**
7.	**Specification regarding thesis format have been closely followed.**	**Yes / No**
8.	**The content of the thesis have been organized based on the guidelines.**	**Yes / No**
9.	**The thesis has been prepared without resorting to plagiarism**	**Yes / No**
10.	**All the sources used have been cited appropriately**	**Yes / No**
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Roll No.:

ACKNOWLEDGEMENT

I take this as an opportunity to extend my gratitude to all those who have contributed to the completion of this thesis in any manner large or small.

To begin with, I would like to thank my thesis guide PROF. SANGEETA SHARMA and AR . NAVEEN SINGH who has guided me throughout the whole thesis. My sincere regards t for helping me with regular discussions leading to a better design proposal.

Also I would like to thank **Dean Ar. Mohit Kumar Agarwal** and **H.O.D. Ar.Sangeeta Sharma**, for their valuable suggestions and motivation during the thesis.

I would like to express my gratitude to my family for their endless encouragement as well as financial and emotional support. They were with me in moments when I felt low and let down and helped me in any way they could.

I am grateful to our thesis Coordinator **Ar. URWASHI TIWARI** and **Ar. SHAILESH YADAV**, for providing their useful comments at the stage submissions.

My all Teachers, your support, encouragement and guidance have given us the strength to embark on this rigorous journey.

I would also like to express my gratitude to various persons without whose help this Thesis would not have been possible

My senior– ESSHU BHARDWAJ ,AASIM ,YASH , HIMANSHU

My friends – ABHISHEK BANERJEE, AAYUSH KHARE , MAZHER HUSSAIN

Special Mention to- ROOPAL GOEL

Last but definitely not the least, I owe to my talented and loving juniors **SHUBHAM RAJAK , DIVYAM SHARMA ,SURAJ SAHU ,ABHINAV AGARWAL , MIENAL AGARWAL** who helped me enormously during the thesis.

ABHISHEK KUMAR (CHAUHAN)

Date

ABSTRACT

This report unfolds up all the twists and turns regarding Health care and Hospitals as an institution. The entire project is based on it. This sums up the history and the growth of healthcare and healthcare system in our country briefly explaining its needs and requirements. This also helps in understanding and visualizing the inter-relationship between the two main art forms – **HEALTHCARE AND ARCHITECTURE.**

The entire project provides a detailed analysis of studies over Hospitals with the help of various case studies and literature studies undertaken. Also the standards and design considerations for such campuses.

Finally, the project wraps up, in detail, the integration of modern healthcare in hospitals under one roof.

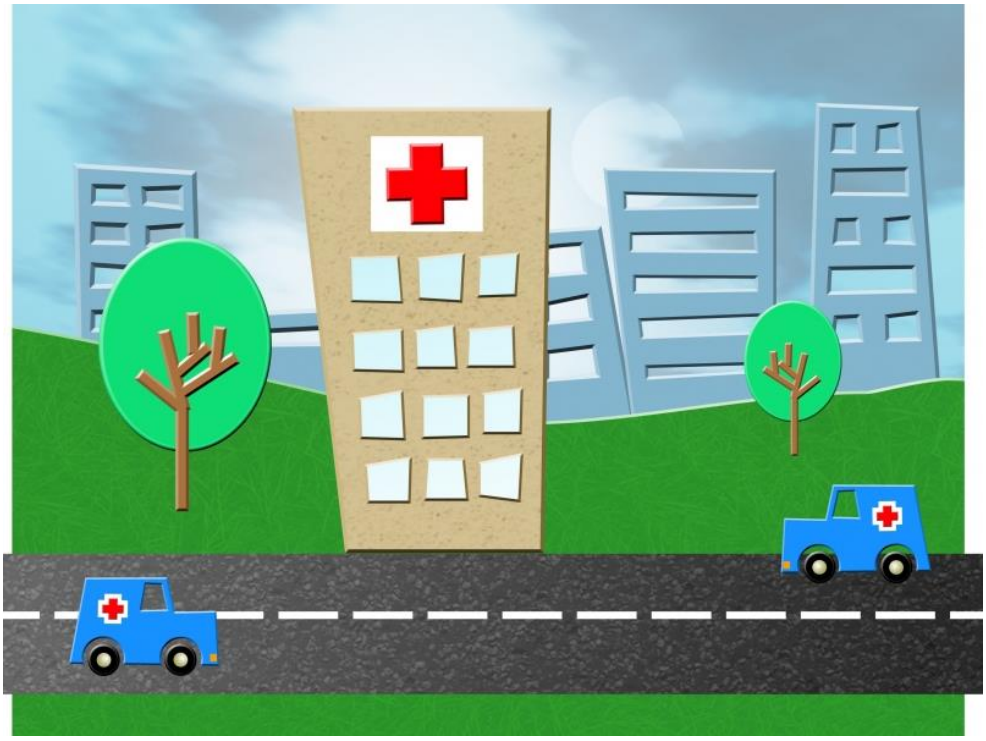
CONTENTS

CONTENTS

1. INTRODUCTION

1.1 THE PROJECT

PROJECT NAME	500 Bedded Super-speciality Hospital
CLIENT	Hyderabad Government
TYPE	Government Sector
LOCATION	Kukatpally ,Hyderabad
SITE AREA	40,468 sq.m. (10 Acres)



1.2 HEALTH CARE

Healthcare is the repairing, maintenance, fixing or improvement of health through diagnosis, therapy, treatment and prevention of disease, illness or injury by trained and specialized professionals. It is the act of taking preventive or necessary medical procedures and services to improve person's well being. Health care is delivered by health care practitioners. These include physicians, dentists pharmacists, surgeons, nurses, dietitians, therapists, clinical officers ,social workers, psychologist and pathologists etc. Health care are different across countries , groups, and individuals. It largely affect by the health care policies of that particular place as well as their social and economic conditions.

1.3 HOSPITALS

A hospital is a health care institution providing medical, diagnostic, surgical, nursing treatment to sick or injured with specialized staff and equipment. It provides medical services to the whole community . It is a place where most of the people born and die . It is created for the purpose of serving the health care needs of people when they are mentally or physically ill . Their mission is to help patients to get well and to stay well by getting treatment from qualified physicians, surgeons, nurses and staff. Some patients go to a hospital just for diagnosis, treatment, or therapy and then leave as outpatients without staying overnight; while others are admitted and stay overnight or for several days or weeks or months as inpatients.

SUPERSPECIALITY HOSPITAL - These hospitals provide wide range of specialties under one roof with better facilities and staff related to certain disease like neuro , cardio , pediatric ,ortho , gynecology , ENT , dental , ophthalmology etc.

1.4. VALIDITY OF THE PROJECT

Need for the community as there is only one hospital in kukatpally and they still have to look up to another place for them . It is on nh65 mumbai highway .So a hospital has been proposed in the zonal plan of HYDERABAD development authority to cater the health care needs of population of HYDERABAD and adjoining districts of HYDERABAD .

The existing hospital near to the site is primarily not able to cater whole population , serious health diseases and accidents . The proposed hospital is emphasized as a solution to these requirements. To fulfil the health care demands of patients with modern technology and improvised infrastructure as now a days patients demand on health care services keep on increasing .

1.5 REASONS FOR SELECTING THE PROJECT

•To give a new identity to the already existing health care image in India .

•To explore the complexities of designing a hospital building.

•Ideal combination for using modern architecture with appropriate medical technology to suit the health care needs of the population .

•Want to do specialization in hospital design .

•Opportunity to provide better space planning , circulation and healthier environment .

1.6 AIMS AND OBJECTIVES

•Aim to provide better space planning , circulation and healthy environment .

•Healthy environment with proper day light and ventilation which helps the patients to recover soon .

•Separation of all departments yet keep them close so that they can easily accessible.

•Shortest traffic routes .

•Segregation of public traffic i.e. OPD , IPD ,emergency .

1.7 SITE SELECTION

The site for construction of hospital is 10 Acres allotted by HMDA(Hyderabad Metropolitan Development Authority)

1.7.1 SITE SURROUNDINGS

- Commercial, Residential, Industrial

2. LANDMARK:

- KPHB Metro Station, Hyderabad

3. LOCATION :

NH 65 Mumbai Highway , Hyderabad

1.8 REASONS FOR SELECTING THE SITE

•Site has adequate area of 10 acres for designing the required superspecialty hospital.

•Shape of the site and topography is suitable for the project .

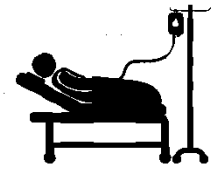
•Site is accessible from two roads And offering opportunity to separate vehicular movement for patients and services .

•Connectivity with bus stand and railway station , metro station ..

•The site has less exposure to the noise which is suitable for hospital .

•The site has provision of all the basic amenities such as

electricity, water drainage system and sewage system which are required to operate the building.



1.9 PROPOSED METHODOLOGY

STAGE	WHAT	HOW	AIM
1.	Identification of project requirements .	Newspaper, internet , Delhi Development authority .	Collection of client's brief and all necessary documents.
2.	Analysis of site and study of local building laws	Regular site visits, surroundings and collection of documents from local authorities	To provide an efficient environment by S.W.O.T. analysis , sun path and climatic analysis
3.	Proto-type case studies :- A. Library study B. Books C. Previous thesis	Studying similar prototypes from standard books, magazines and internet	To understand , strength and flaws of already constructed building's
4.	Live case studies	Photographs , sketches , drawings and plans	TO analysis the basic planning , usage and view point of users
5.	Formulation of requirements acc. To client brief and case studies	Visual survey and analysis of inferences from literature study	To derive quantitative and qualitative criteria for design process
6.	Conceptual design	Bubble diagram, adjacency matrix and sketches	To have a reference point for developing the plan and form of the building
7.	Design development	Developing a building plan based on the diagrams generated in the concept	To sequentially progress towards establishing a functional building
8.	Final design process	. Plans, 3d, model	To make the graphic representation of the final design

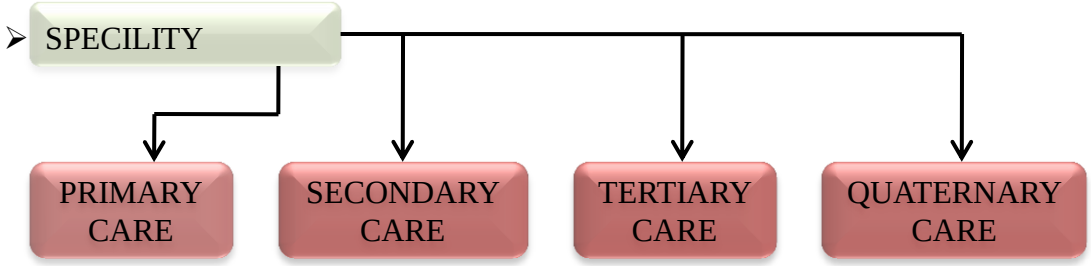
THE ENVISAGED USER PROFILE

THE ENVISAGED USER PROFILE

2.1 ROLE OF HEALTH CARE

Health care plays an important role in the overall development of the society. As we know the rapid growth of cities provides opportunities for transmission of infections, unsafe factories increased injuries, death rates rose rapidly, and social supports break with increasing population as a result people are suffering from various healthcare problems so health care plays a significant role to make people to get well and stay well . To ensure that people are free and safe from various health related problems , sickness and injuries , there should be provision of best health care services. . The growth and future of our country highly depends upon the health of the citizens .

LEVELS OF HEALTH CARE



•PRIMARY HEALTH CARE – Primary care is the initial or urgent care given to the patients at their first point of consultation based on the factors of ease of communication , easily accessible , family relations or cost

Issues. Primary Health care includes care for mother and

child which included family planning, immunization,

treatment of common diseases or injuries. Primary health care professionals are general practitioner , family physician , a licensed independent practitioner or nurse practitioner. Primary health care services are provide by dispensaries and nursing centre .

•SECONDARY HEALTH CARE - Secondary Healthcare is the second level of health system, in which patients from primary care are referred to specialists in higher hospitals for treatment. Secondary health care services are provided by medical specialists, and other health professionals like cardiologists, urologists and surgeons who generally do not have first contact with the patients. It includes necessary treatment for a short period of time to recover from serious illness or injury by specialized skill or equipment rather than primary care centre . Secondary health care is provided by district hospitals and community health centers.

•TERTIARY HEALTH CARE - Tertiary Health care refers to a third level of health system, the patient from primary and secondary medical care are referred specialized consultative care as once a patient is hospitalized he needs a higher level of specialty care within the hospital. Tertiary care services includes cancer management, neurosurgery, cardiac surgery, plastic surgery, treatment for severe injury or burns, advanced neonatology services, and other complex medical, surgical interventions. Advanced diagnostic support services and specialized intensive care which can not be provided by primary and secondary health centers are available at the tertiary health centers. Tertiary care service is provided by medical colleges and advanced medical research institutes , research hospitals and specialized hospitals .

•QUATERNARY HEALTH CARE - It is the extension of tertiary care in reference to advanced levels of medicine which are highly specialized . As it is so specialized, not every hospital or medical center even offers quaternary care.

Some types of uncommon diagnostic or surgical procedures

are considered in quaternary care.

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2.2 .HISTORY OF HEALTH CARE

During the ancient times diseases were mostly caused due to the supernatural forces and medicine was considered as magical and mythological. Priests/doctors were part of the ruling class with great political influences and the hospital/ temple was also a meeting place . In the earliest prehistoric days, a different kind of medicine was practiced in countries such as Egypt, Greece, Rome, Mesopotamia, India, Tibet, China, and others.

•GREEKS (460-136 B.C.) – Begin modern medical science by observing the human body and effects of disease An early leader in Greek medicine has two daughters- one was worshipped as the goddess of health and second as the goddess of medicine. The temples of Greek god of medicine all served as both medical schools for practitioners and resting places for patients under observation or treatment.

•HIPPOCRATES (460-370 B.C) - The father of medicine, practiced, taught medicine , perform surgical operations and provide historians with detailed records of his patients and descriptions of diseases ranging from tuberculosis to ulcers. Hippocrates used the concept of massage, art therapy and herbal medicines for the treatment .

•ROMANS (130-205 A.D) - A medical teacher, observed the disease is due to factors- predisposing i.e. the tendency to suffer from a particular condition and environmental factors. They made military and slave hospitals and provide health care to the soldiers .

•CHINESE MEDICINE - Chinese medicine developed as a concept of yin and yang, acupuncture and acupressure, and it has even been used in the modern medicine.

•DARK AGES – Emphasis was given on saving the soul and developed the Unani system of medicine i.e. medicines were made from natural herbs.

•MIDDLE AGES – Return to the medical practices of Greeks and Romans . During the middle ages public hospitals were also opened, financed by city authorities, the church and private sources .

2.3 HISTORY OF INDIAN HEALTH CARE

The Indian medicine system development are Ayurveda and Siddha system . Dhanvantari was considered as the Hindu god of medicine. Ayurveda is the science of natural healing. The celebrated authorities in Ayurvedic medicine were Atreya, charaka, Susruta and Vaghbhatt. Atreya is the first Indian physician and teacher lived in ancient university of Takshashila. Charaka compiled his famous thesis on medicine the Charaka samhita in which he described completely about Indian traditional medicine and theories on human body. Susruta known as father of surgery and compiled the surgical knowledge of his classic susruta samhita which contains ancient Sanskrit text on medicine and surgery. Vaghbhatt is also famous classical writer of ayurveda. Like Ayurveda, Siddha is also a traditional medical system of India and has its entire literature in Tamil language. The aim of siddha medicine is to make the body perfect and the medicines were made from herbal products, metals , mineral products and animal products.

2.4 MODERN HEALTH CARE

With rapid development and advancement in technological ,medical and administrative sciences , innovative techniques and therapies changed the concept of traditional healthcare. Modern health care equipments include are diagnostic x-ray machine for checking the breaking of bones , diagnostic ultrasound for viewing a developing fetus during pregnancy and to see problems with blood vessels , tissues and organs , Magnetic resonance imaging system (MRI) allows the radiologist to see soft tissues like muscles , fat and internal organs without the use of x-ray , Mammography machine is a simple and safe radiographic examination of internal structure of the breast which can detect breast cancer years before the doctor or patient can feel it , Computerized axial tomography (CAT scan) used to detect serious head injuries and to detect abnormalities in the body such as tumors and abnormal blood vessels , Patient bedside monitoring system used for monitoring the health status of patients .Pneumatic tube system is used to transport urgent blood samples in labs for testing ,Operating room control panel is used to monitor pipeline pressure, indicate estimate time in operation, day clock, temperature and humidity value and also control several systems such as Operation Theatre lights. Cardiac catheterization lab with diagnostic imaging equipment used to visualize the arteries of the heart and the chambers of the heart and for treatment of any abnormality found.

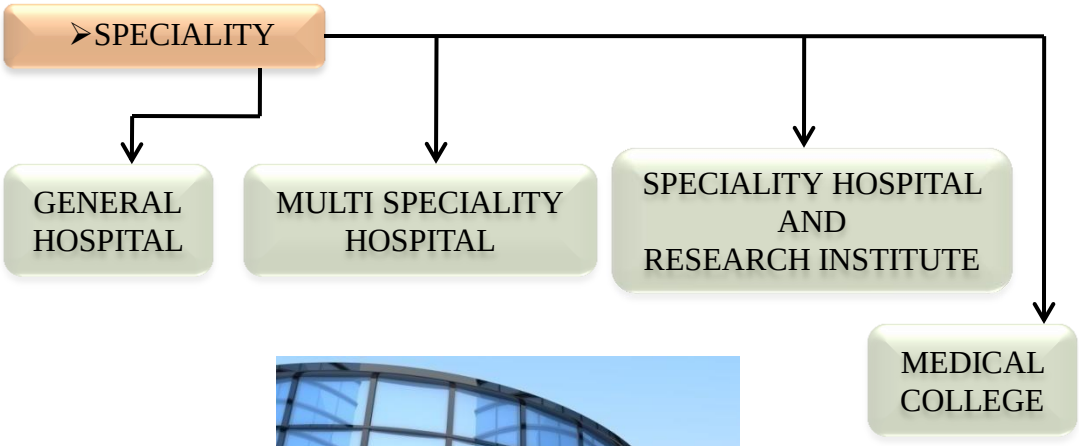
2.5 CLASSIFICATIONS OF HOSPITALS

1.According to Speciality

2.According to Ownership

3.According to Medical System

4.According to Size

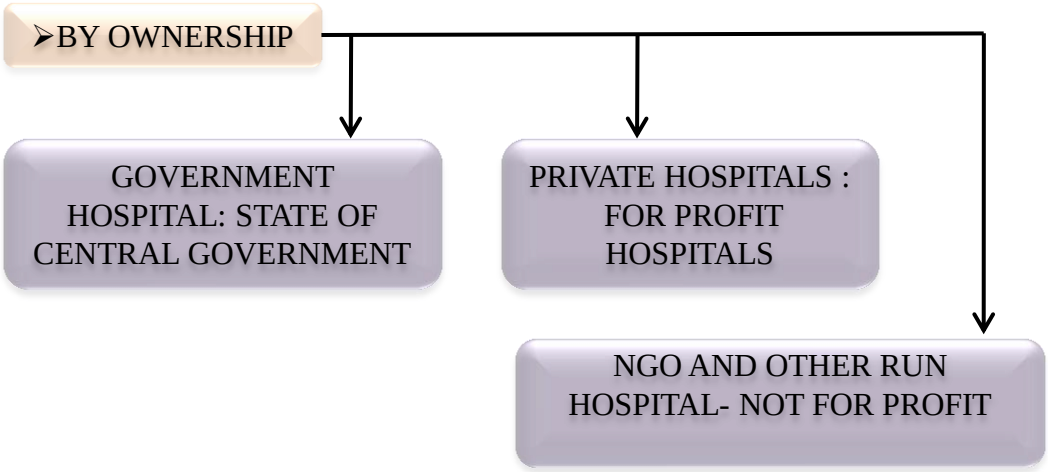


•GENERAL HOSPITAL - A hospital which is not specialized in the treatment of any particular illness, injury or patient of particular age or sex .

SPECIALIZED - Specialized hospitals provide specialized care to the patients. These include rehabilitation hospitals, children's hospitals and hospitals which deals with specific disease such as oncology, orthopedic .

▪MULTISPECILITY HOSPITAL - These hospitals provide wide range of specialties under one roof with better facilities and staff related to certain disease like neuro , cardio , pediatric ,ortho , gynecology , ophthalmology etc.

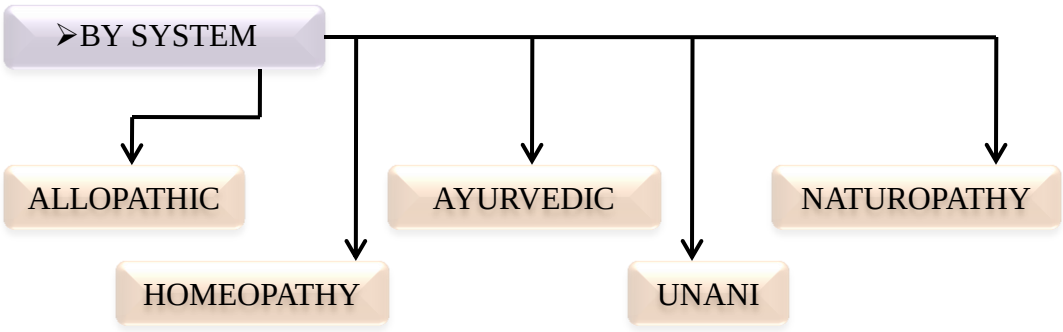
▪MEDICAL COLLEGE - It is one which provides treatment to the patients with teaching to medical students and nurses and often is linked to a medical school, nursing school or university.



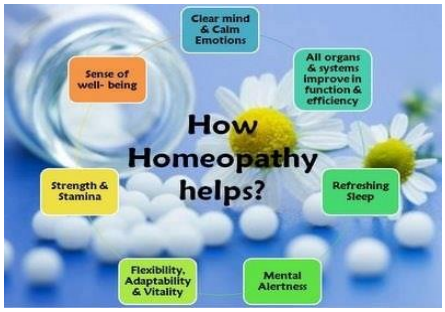
▪GOVERNMENT HOSPITAL - These are hospitals that are owned and operated by a city, country and state government .these are usually charitable hospital as they are not for profit. These hospitals offers treatment , diagnosis and medicines with qualified and best doctors. They are known in India to be overcrowded due to lack of beds and funds.

▪PRIVATE HOSPITALS - These are owned by private companies or multinational companies specializing in hospitals. They are for profit and known for their over charge. These private hospitals provides best facilities and services for patients and well as their attendants. They are mostly unaffordable by common people.

▪NGO OR CHARITABLE TRUST RUN HOSPITALS -These hospitals are mostly run by donations and government subsidy to provide treatment to the poor by supporting them financially. Mostly these hospitals can not provide appropriate technology for treatment due to lack of funds.



•ALLOPATHIC SYSTEM - Allopathic is commonly called as drug therapy and is based on that diseases which can be treated with the help of drugs. It is the medical practice that is use in modern hospitals and is also termed as western medicine or modern medicine . It involves chemical treatment for diseases and weaknesses. The drugs which are used in allopathic medicine are only made for partial cure as they cure the reaction and not the cause. Allopathy has some side effects as prescribed on medicine.



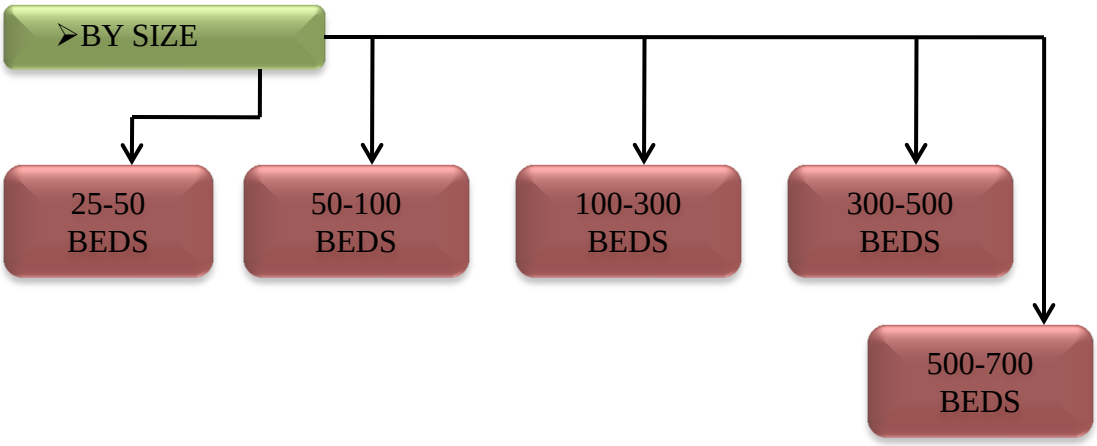
HOMEOPATHY SYSTEM - Homeopathy is another field of medicine which deals with the root of the problem by taking into account mental and social factors rather than the symptoms of

the disease. Homeopathy medicine is not common for everyone as every individual is different from others in some way in terms of his nature , taking , choices , behavior and body's abilities to recover . Homeopathic medicines have no side effects if taken under proper guidance .

AYURVEDA SYSTEM- Ayurveda is the science of natural healing. Ayurveda stresses a balance of three elemental energies air , fire and water . According to ayurvedic medical theory, these three substances are important for health, because when they exist in equal quantities, the body will be healthy, and when they are not in equal amounts, the body will be unhealthy in various ways . The medicines used for this purpose are made from herbs, minerals, and metals. The treatment also includes massages, special diets and cleansing techniques.

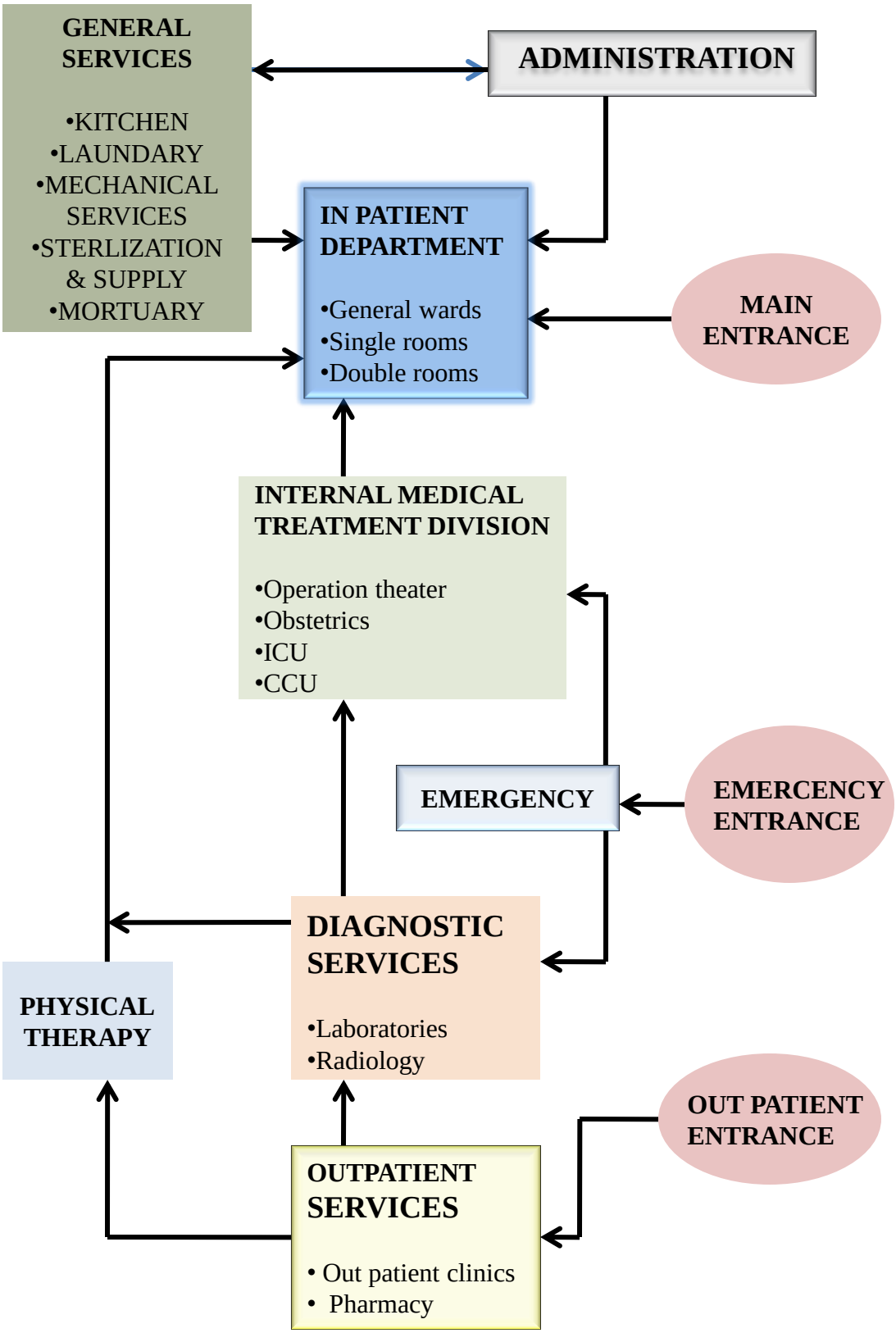
NATUROPATHY SYSTEM - Naturopathy is a system of therapy based on preventive care by the use of heat, water, light, air, and massage as main therapies for curing the disease. Naturopathy is also a way of life, with drugless treatment of diseases. The system is based on the ancient practice of application of simple laws of nature. The advocates of naturopathy focus on eating and living habits, adoption of purification measures, use of hydrotherapy, baths, massage etc. Unani medicine also gives Great importance to special diets .

•UNANI SYSTEM - Unani System of medicine is based on established knowledge and practices relating to promotion of positive health and prevention of diseases. Although Unani system originated in Greece, passed through many countries, and the system was brought to India during Medieval period. Unani System emphasize the use of naturally occurring, most herbal medicines, though it uses ingredients of animal. Unani medicines are made from natural substances like plant products. This system of medicine believed to eliminate toxic agents and cleansing the system through sweating, Turkish bath, massage, exercise.



There are variations in the size of hospitals . Primary health centers generally have 6 beds that can be raised up to 10 beds. Private nursing homes generally have 25-50 beds. The tehsil / sub-divisional hospitals generally have 50 beds that can be raised to 100 depending upon population . The district hospitals generally have 200 beds , which can be raised to 300 depending upon population . Teaching hospitals generally have 500 beds which can be increased
according to the number of students.

CONNECTIVITY OF VARIOUS DEPARTMENTS IN HOSPITAL



2.6 HISTORY OF HOSPITALS IN INDIA

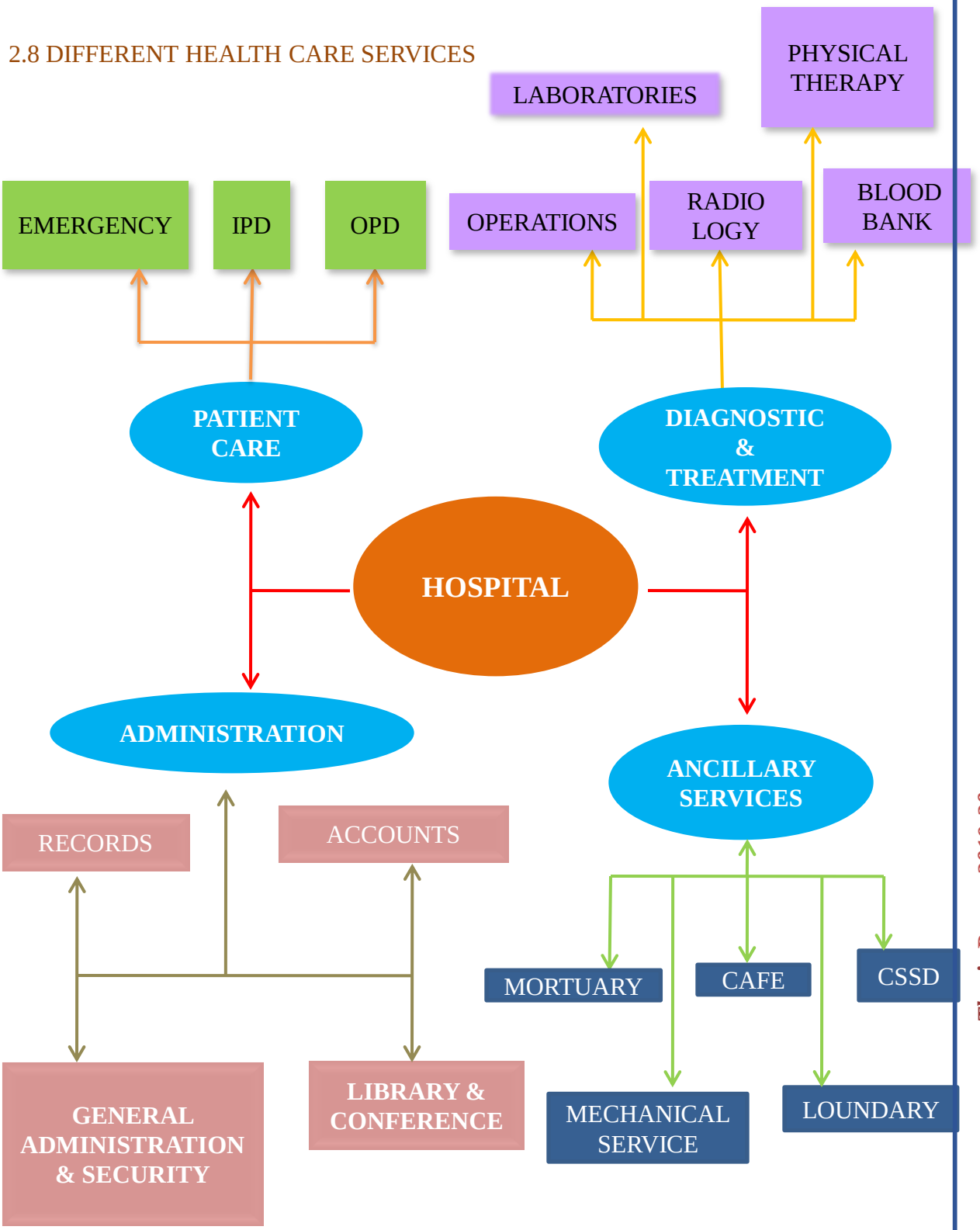
The word "hospital" is derived from the latin word 'hospitium'- Establishment where guest is received. Historical records show that efficient hospitals were constructed in India by 600 BC . During the reign of King Asoka (273-232 BC), Indian hospitals started to look like modern hospitals. They followed principles of sanitation and surgical delivery operations were performed with close attention to technique in order to save both mother and child. The writings of Susruta and Charaka the famous surgeon and physician respectively were considered standards works for creation of hospitals, for provisions of children rooms, maintenance sterilization of bed linen with steam and use of syringes and other medical appliances . The decline of Indian medicine started with the invasion of foreigners in the 10^{th} century A.D. , which was the period of unrest. They brought with their own physicians called hakims . The modern system of medicine in India i.e. allopathic system of medicine was introduced in the 17th centaury with the arrival of Christian missionaries in South India. In the 17th centaury, British empire established first hospital at Chennai in 1664. The planning and design of hospitals did not experience a systematic development but reflected with suitable adaptations of changes that occurs in the past..Organized medical training was started with the first medical college opening in Calcutta in 1835, two in Delhi in 1835 and 1836, followed by Mumbai in 1845 and Chennai in 1850. . During the 18^{th} and 19^{th} centuries there was a there was slow practice in the modern system of medical practice in India. The priority given to health , hygiene and welfare resulted in establishment of large no. of hospitals , health centers and medical colleges. Organized medical training was started in the 19^{th} century as the first medical college of Asia was established in Calcutta in 1835 followed by Madras Medical College .AIIMS is established in 1956 which is leading hospital in India in 21st centaury .

2.7 NEED OF HOSPITALS

According to the latest WHO (World Health Organization) Statistics there is recommendation of 1.9 beds per 1,000 population and India ranks among the lowest with only 0.9 beds per 1,000 population .On the other hand Sri Lanka has 3.1 beds per 1,000 population, China 3 beds, Thailand 2.2, Brazil 2.4, USA 3.1 and UK 3.9 beds per 1,000 population. Shakti Gupta, HOD of hospital administration at AIIMS said that it was recommended in 1948 by Bhore Committee that there should be one bed per 1,000 population. However it's been 68 years since and we still haven't been able to reach that target . If a patient needs to be admitted in the general bed for the surgery, the waiting time is more than a year because of India has huge shortage of hospital beds. Thus there is need of hospitals in India . The hospital which are the major part of social organization, offers considerable advantages to both the patient and the society. Certain health problems which requires intensive medical treatment and personal care which normally cannot be made available at home or in the clinic of a doctor, this is possible only in a hospital where a large number of professionally and technically skilled people apply their knowledge and skill with the help of world class advanced equipment. Hospitals provides proper care to the sick and injured without any social, economic or racial discrimination.

(Source: Times of India)

2.8 DIFFERENT HEALTH CARE SERVICES



2.9 HEALTH SPACES CHARECTERISTICS AND ARCHITECTURE

•Allowing maximum light and breeze to all parts of the building .

•There should be four separate entries to a hospital i.e. main hospital entrance, out patient entrance , emergency entrance and service entrance .Smaller hospital may have less that that also.

•The service entry should be adjacent to the kitchen and storage areas which receives bulk of the supplies.

•Removal of dead bodies should be patient and visitors' view for psychological reasons.

•The main entrance and the lobby should be attractive.

•The emergency department should be located on the ground floor with easy access for patients and ambulances . The entrance to the emergency should be sheltered to protect ambulance patients from the weather while unloading.

•Separating public corridors from patient and staff corridors as far as possible reduces the congestion . Movement of supplies and materials and removal of garbage should not interfere with the movement of people.

•Outpatients may be routed from registration and medical records to sub – waiting areas. . There should be direct link between diagnostic departments like radiology , physiotherapy , blood bank and laboratories.

•The wards must be spacious so that the patient feels comfortable. Their should be adequate entertainment facilities and privacy. At the same time all wards must be in sight of a nurses station to detect an emergency situation .

•If possible there should be separate reserved parking area for doctors.

•Visitors should be carefully controlled . There should not be allowed to wander in the patient areas.

•Staff should be pass from the entrance to the lockers room .

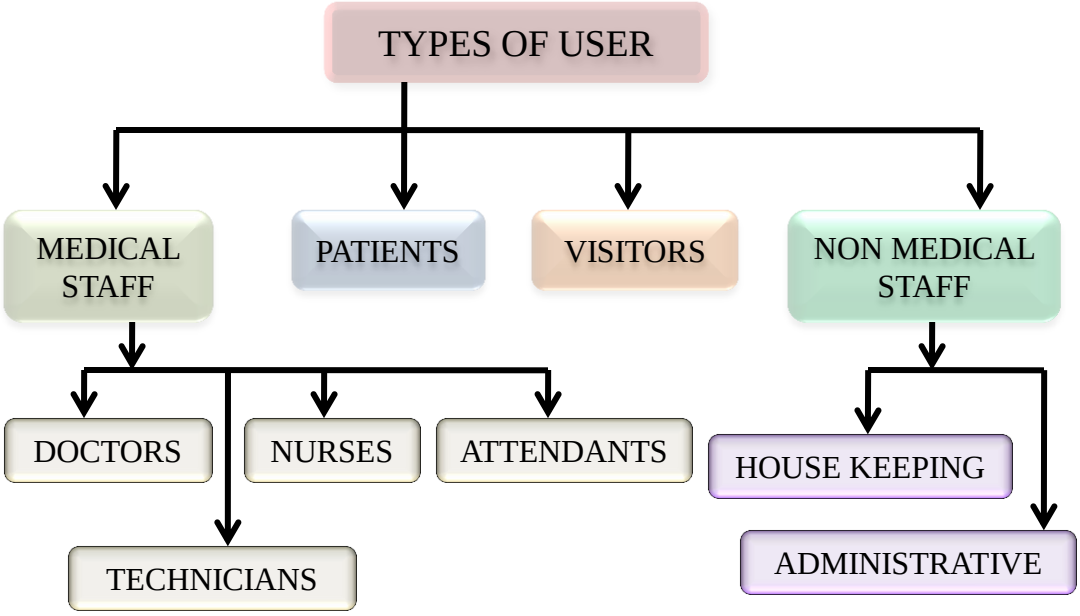
•Elevators should be located where there is maximum concentration of traffic . Elevators doors should not be open directly to the main lobby . Passenger elevators and visitor elevators should be separate .

THE ENVISAGED USER PROFILE

THE ENVISAGED USER PROFILE

3.1 IDENTIFY THE USER GROUP

- Patients
- Visitors
- Medical staff
  1. Doctors
  2. Nurses
  3. Technicians
  4. Attendants
- Non medical staff
  1. House keeping
  2. Administrative



3.2 ECONOMIC STATUS – The hospital is made to the cater the population of middle and higher income group by providing advanced technology , facilities , equipments as compared to the government hospital nearby .

3.3 SOCIAL ASPECTS

The visitors to a hospital consists of patient's relatives , friends and family members . They usually come to meet the patient as well as doctors . The atmosphere of the hospital should provide a sense of comfort to the visitors.The hospital environment should be healing . In hospital people meet with doctors and other patients , share their problems and get proper treatment. In hospital when some ones health becomes serious the concered family becomes worried and in same time when some one gets new life or a new baby gets born people celebrates a lot .The atmosphere of hospital should be user friendly and where ever there is need provision of waiting area should be provided with attacthed toilets.

3.4 PHYCHOLOGICAL ASPECTS

•When a patient stays in a hospital, his or her behavior is quite different from that at home . They wants a space which can provide them comfort as well as privacy so that stress can be reduced . Too much traffic will disturb the patient's as well as create infection. A stress free environment can be provided through the distribution and composition of spaces, the presence of views to outside, green and worship spaces, furnishings, materials, finishes, colors, signage, light both natural and artificial, ceilings .

•Well designed and architecturally pleasing drop off zones, parking areas ,entrance hall, corridors, waiting areas, common areas , cafeterias conveys the message to the visitors about patient well being and safety and similarly it also reduce the stress of the visitors . The use of good lighting , flooring , use of colors on walls , outside landscape creates pleasing effect for the visitors.

•Allowing of natural light and interaction with the outside environment reduce the stress of doctors. Shortest possible traffic routes increase the efficiency of work of doctors .

THE STANDARDS

THE STANDARDS

4.1 STANDARD CONFIGURATIONS

IS 10905(Part – 1) – 1984 Administrative and Hospital Services Department Buildings
IS 10905(Part – 2) – 1984 Medical Services Department Buildings
IS 10905(Part – 3) – 1984 Engineering Services Department Buildings

4.1.1.ENGINEERING SERVICES DEPARTMENT

Various departments which an engineering services building should have for comfort and well being of patients, shall be as follows.

CIVIL ENGINEERING DEPARTMENT

a)Building maintenance ,b) Water supply and plumbing ,c) Drainage and sanitation

MECHANICAL ENGINEERING DEPARTMENT

a) Air-conditioning ,b) Refrigeration.

ELECTRICAL ENGINEERING DEPARTMENT

a) Illumination , b) Ventilation

MISCELLANEOUS SERVICES DEPARTMENT

a) Gas supply ,b) Transport and communication ,C) Waste disposal

•IS 10905(Part – 3) – 1984 Engineering Services Department Buildings

PROVISION FOR VARIOUS FLOOR AREAS IN ENGINEERING DEPARTMENT

S.N0.	FACILITY	ROOM (NO)	AREA (SQ.)
1.	Civil building maintenance	2	42
2.	Pump house	1	28
3.	Air conditioning plant	1	17.5
4.	Stand by generator	2	10.5
5.	Electrical sub station office	1	10.5
6.	Medicinal gas supply: Manifold room with toilet	1	7

WATER SUPLLY

Normal water - Arrangement shall be made to supply the following quantities of potable water per bed per day to meet all requirements (including laundry), except fire-fighting, in all categories of hospital:

REQUIREMENT OF WATER CATEGORY OF HOSPITAL - 350 liters

Storage capacity for 2 days requirement should be made on the basis of above consumptions. Round the clock water supply shall be made available to all wards and departments of the hospital. Separate reserve emergency overhead tank shall be provided for operation theatre. Necessary water storage overhead tanks with pumping/ boosting arrangement shall be made. Cold and hot water supply piping should be run in concealed form embedded into wall with full precautions to avoid any seepage.

•HOT WATER - Hot water supply to wards and departments of the general hospital shall be provided by means of electric storage type water heaters or centralized hot water system of capacity depending upon the need of hot water consumption.

•FILTERED AND SOFT WATER - Filtered and soft water supply is required in pathology laboratories and shall be supplied as required.

•COLD WATER - Cold water supply is needed for processing tanks in film developing room and shall be supplied as required.

REQUIREMENTS FOR SANITARY FITMENTS IN HOSPITALS FOR PATIENTS (Outpatients and other departments)

S.N0.	FITMENTS	REQUIREMENTS
1.	Water closets	For males – 1 for every 40 persons For females - 2 for every 50 persons
2.	Ablution taps	1 in each water-closet plus 1 water tap with draining arrangements shall be provided in the vicinity of water-closet and urinals per lavatory block
3.	Urinals	1 for every 25 persons (only males)
4.	Wash basins	For male – 1 for every 50 persons For females – 1 for every 50 persons

•REQUIREMENTS FOR SANITARY FITMENTS IN HOSPITALS FOR PATIENTS (In Patient Wards or Nursing Unit)

S.N0.	FITMENTS	REQUIREMENTS
1.	Water closets	For males – 1 for every 8 beds For females – 1 for every 6 beds
2.	Ablution taps	1 in each water-closet plus 1 water tap with the vicinity of water-closet
3.	Urinals	1 for every 12 beds (only males)
4.	Wash basins	1 for every 12 beds
5.	Baths	1 bath with shower for every 12 beds
6.	Bed pan washing sinks	1 for each ward
7.	Cleaner's sinks and sink/slab for cleaning mackintosh	1 for each ward
8.	Kitchen sinks and dish washers	1 for each ward in ward pantry

•REQUIREMENTS FOR SANITARY FITMENTS IN HOSPITALS (Administrative and Hospital Service Buildings)

S.N0.	FITMENTS	FOR MALES	FOR FEMALES
1.	Water closets	1 for every 25 persons	1 for every 15 persons
2.	Ablution taps	1 in each water closet	1 in each water closet
3.	Urinals	1 for every 25 persons	-
4.	Wash basins	1 for every 25 persons	1 for every 25 persons
5.	Drinking water fountains	Minimum 1 per floor	Minimum 1 per floor
7.	Cleaner's sinks	Minimum 1 per floor	Minimum 1 per floor

•REQUIREMENTS FOR SANITARY FITMENTS IN HOSPITALS

(Medical staff)

S.N0.	FITMENTS	FOR MALES	FOR FEMALES
1.	Water closets	1 for every 4 persons	1 for every 4 persons
2.	Ablution taps	1 in each water closet	1 in each water closet
3.	Wash basins	1 for every 8 persons	1 for every 8 persons
4.	Drinking water fountains	Minimum 1 per floor	Minimum 1 per floor
5.	Cleaner's sinks	Minimum 1 per floor	Minimum 1 per floor

AIR-CONDITIONING - Air-conditioning and environmental control in hospitals is essential to ensure the comfort of patients, sterile and comfortable conditions in operation theatres, maintenance of essential sophisticated instruments and equipment and to help in the speedy recovery and treatment of seriously ill patients. Whereas it is advisable that the entire hospital be air-conditioned, this may not be possible due to economic considerations. The following department/ wards are considered essential and recommended for air-conditioning:

•Blood laboratory in blood bank of out-patient department
•Operation theatre complex in emergency and casualty department
•Certain laboratories in pathology department
•Radiography and radio therapy rooms in radiology department
•Fracture-cum-casualty theatre, recovery, frozen section of clear zone and all rooms in sterile zone of operation theatre department;
•Certain number of beds in ward units of particular specialities
•Al1 rooms in sterile zone of delivery suite
•Intensive care unit
•Autopsy room in mortuary

REFRIGERATION - Hospitals shall be provided with water cooler and refrigerators in wards and departments, freezers in pathology, and cold storage plants for pathology, mortuary, medical stores and dietary department. All these, power consuming units shall be provided with voltage stabilizers.

ILLUMINATION

GENERAL - General lighting of all hospital areas except stores and lavatory block shall be fluorescent. In other areas it is recommended to be of incandescent lamps.

SHADOWLESS LIGHT - Shadow less light (mountable type) shall be provided in operation theatres and operating delivery rooms whereas in other areas, where operations of minor nature are carried out shadow less lamps (portable type) shall be provided.

CALL BELLS - Call bells switches should be provided for all beds in all types of wards with indicator lights and location indicator situated in the nurses duty room of the wards.

EMERGENCY LIGHTING - Emergency portable light units should also be provided in the wards and departments to serve as alternative source of light in case of power failure.

STANDBY GENERATORS - Standby generators should be provided to generate electric and power supply to water supply, air-conditioning units, and plants, cold storage units, and radiography units.

VENTILATION - Ventilation of hospital buildings may be achieved by either natural supply and natural exhaust of air, or natural supply and mechanical exhaust of air, or mechanical supply and natural exhaust of air, or mechanical supply and mechanical exhaust of air. The following standards of general ventilation are recommended for various area of the hospital

building based on maintenance of required oxygen, carbon dioxide and other air quality levels and for the control of body odours when no products of combustion or other contaminants are present in the air .

S.N0.	SPACE TO BE VENTILATED	AIR CHANGES PER HOUR
1.	Bathrooms/toilets	6 - 12
2.	Wards	8 - 12
3.	Kitchen	6 - 9
4.	Operation theaters	15 - 20
5.	Other air conditioned space below	8 - 10

GAS SUPPLY

MEDICAL GAS - Medical gases comprise of oxygen and nitrous oxide. Necessary pipe line network should be laid in departments and wards to connect them to the manifold room (where gas cylinder of bulk supply will be mounted on wall). A compressor should also be provided in separate room adjoining to the manifold room to provide suction along with medical gas supply pipe. All these three pipes should be of different color conforming to a laid down standard and mounted

on wall or ceiling surface.

COOKING GAS - For better hygienic conditions use of cooking gas LPG (liquefied petroleum gas) is recommended. These should also be kept in a room from where necessary pipe line with gas outlets as required may be provided to hospital kitchen and ward pantries.

LABORATORY GAS - Pipe line network should be laid in pathology laboratories and other laboratories of sub-speciality clinics where extensive laboratory benches are provided. This network should be connected to gas plant room or gas storage room wherein either LPG (liquefied petroleum gas) cylinders are stored or gas plant is instaIIed to manufacture lab-gas from kerosene oil

medium.

TRANSPORT AND COMMUNICATION

Lifts - electrically operated automatic control lifts shall be provided in all category of hospitals having more than one storey. The recommended car speed for hospital bed lifts are given below:

S.N0.	OCCUPANCY	NO. OF STOREYS	CAR SPEED M/S
1	Short travel lifts	2 or 3	0.25
2	Medium travel lifts	4 or 5	0.50
3	Long travel lifts	6 and above	1.00

The passenger lifts should be so arranged that they are easily accessible from all entrances of the hospital. It is convenient to place the lifts near the staircases. Hospital lifts should be situated conveniently near the ward and operation theatre department entrances. There shall be sufficient space near the landing door for easy movement of Stretcher .

•RAMP - A ramp 1eading to the topmost floor of hospital of two or more storey may be provided in addition to the stairs needed at places.

CONSTRUCTIONAL REQUIREMENTS

•CIRCULATION AREAS - Circulation areas such as corridors, entrance halls, staircases, etc, in the hospital buildings should not be less than 30 percent of the total floor area of the building .

•FLOOR HEIGHT - The height of all the rooms in the hospital should not be less than 3.00 m and not more than 3.65 m, measured at any point from the surface of the floor to the lowest point of the ceiling. The minimum head-room such as under the bottom of beams, fans and lights shall be 2.5 m measured vertical under such beam, fan or light.

•Room shall have for the admission of light and air, one or more apertures, such as windows and fan lights, opening directly to the external air or into an open verandah. The minimum aggregate areas of such opening, excluding doors but inclusive of frames, shall

be not less than 20 percent of the floor area in case such apertures are located in one wall and not less than 15 percent of the floor area in case such apertures are located in two opposite walls at the same sill level.

•The architectural finishes in hospitals shall be of high quality in view of maintenance of better hygienic conditions specially in sanitary blocks. Flooring in sanitary blocks should be done with marble or polished stone; and dado or glazed/ceramic tile finish given on wall.

•The design of building shall ensure control of noise due to walking, movement of trollies and banging of doors, etc. Expansion joint should have a non-metallic beading finish.

IS 10905(Part – 1) – 1984 Administrative and Hospital Services Department Buildings

4.1.2.SECTIONS OF ADMINISTRATIVE AND HOSPITAL SERVICES BUILDINGS

Various departments which administrative and hospital services buildings should have for comfort and well being of patients shall be as follows:

a) Administrative Department:

• General, and

• Medical records.

b) Hospital Services Department:

•Central Sterilization and Supply Department,

•Dietary,

•Laundry,

•Hospital stores,

•Workshops,

•Transport services,

•Community services, and

•Mortuary

ADMINISTRATIVE DEPARTMENT

The administration department of any hospital shall essentially look after an organized group of people, patients and resources in order to accomplish the task of providing best patient care. It shall have two main sections, namely, general and medical records. General section shall deal with all matters relating to overall upkeep of the hospital as well as welfare of its staff and patients. Medical records section shall function for professional work in diagnosis, treatment and care of patients. Medical record section is only required for hospitals of category C, D and E.

The administrative department shall preferably be located close to the main entrance of the hospital.

•PROVISION OF VARIOUS FLOOR AREAS IN ADMINISTRATIVE UNIT

S.N0.	FACILITY	ROOM (NO)	AREA (SQM.)
1	Medical Supdt (M.S.)room with toilet	1	35
2	Dy/ Asstt. Medical Supdt. room with toilet	1	21
3	Admin Officer	1	21
4	Waiting room	1	21
5	Library cum Conference room	1	56
6	Nursing Officer's room with toilet	1	31.5
7	Accounts Officer	1	14
8	Cashier	1	14
9	Purchase Officer	1	14
10	Clerical Staff	1	5.25/ staff
11	Reception cum Enquiries	1	28
12	Welfare/ Labour Officer	1	14
13	Stationery/Record	1	42
14	Security Officer	1	14
15	Lavatory for staff(Separate for maIe and female)	3	21

•PROVISION OF VARIOUS FLOOR AREAS AS HOSPITAL STORE

S.N0.	FACILITY	ROOM (NO)	AREA (SQM.)
1	Receipt of stores (weighing, inspection)	1	28
2	Medical store	1	70
3	General store	1	56
4	Linen store	1	42
5	Furniture store	1	70

6	Surgical store	1	21
7	Equipment store	2	42
8	Areas for storage of mechanical transport spares	1	28
9	Area for storage of articles awaiting condemnation	1	17.5
10	Store office room with toilet	2	21
11	Office	1	10.5
12	Stationery store	1	10.5

- PROVISION OF VARIOUS FLOOR AREAS IN BLOOD BANK

S.N0.	FACILITY	ROOM (NO)	AREA (SQM.)
1	Reception and waiting	1	30
2	Bleeding area	2	42
3	Donor's rest room with kitchenette	2	42
4	Laboratory & blood storage area	1	21
5	Office	1	10.5
6	Stores	1	21
7	Bottle washing area	1	10.5
8	Lavatory	1	10.5
9	Doctor's room with toilet	1	17.5

•PROVISION OF VARIOUS FLOOR AREAS IN DIETARY UNIT

S.N0.	FACILITY	ROOM (NO)	AREA (SQM.)
1	Reception and admission with waiting area	1	35
2	Examination and preparation room with toilet	1	17.5
3	Doctor's change room	1	17.5
4	Nurses change room	1	10.5
5	Sterile storage	1	21
6	Instrument linen store	1	10.5
7	Trolley bay	1	10.5
8	Switch room	1	10.5
9	Recovery room	2	42
10	Anaesthesia room	1	14
11	Labour room (A)Private Room: 4 (B)Semi- Private: 2	6	120
12	Delivery room	2	28
13	Operating delivery room	2	42
14	Instrument sterilizing	1	14
15	Scrub up	2	14
16	Children birth	2	21
17	Dirty utility	1	10.5
18	Janitors closet	1	3.5

•PROVISION OF VARIOUS FLOOR AREAS IN LAUNDARY UNIT

S.NO.	FACILITY	ROOM (NO)	AREA (SQM.)
1	Dirty clothes receiving and sorting area (with weighing facility)	2	42
2	Sluice and autoclaving machine area	2	56
3	Washing area	2	56
4	Hydro extractor area	2	56
5	Drying tumbler area	2	56
6	Calendaring machine Area	1	17.5
7	Tailor desk	2	21
8	Steam pressing	2	28
9	Manual press area	2	28
10	Clean clothes storage area	2	42
11	Issue area	1	17.5
12	Trolley bay	1	10.5
13	Store	2	21
14	Laundry supervisor office with toilet	1	14
15	Laundry staff room with toilet	1	21

•PROVISION OF VARIOUS FLOOR AREAS FOR TRANSPORT SERVICES

S.NO.	FACILITY	ROOM (NO)	AREA (SQM.)
1	Ambulance	6	42
2	Mortuary van	2	21
3	Tempo	4	42
4	Staff car	10	120

•PROVISION OF VARIOUS FLOOR AREAS FOR MORTUARY

S.N0.	FACILITY	ROOM (NO)	AREA (SQM.)
1	Walk in cooler(to store)	1	21 (8 Bodies)
2	Post mortem area	1	17.5
3	Autopsy stores	1	14
4	Body wash and prayer room	1	14
5	Relative waiting area with toilet and drinking water facilities	1	35
6	Doctor's office wit toilet	1	17.5
7	Staff room with toilet	1	17.5
8	Office	1	10.5
9	Stores	1	10.5
10	Janitors closet	1	3.5
11	Trolley bay	1	10.5

IS 10905(Part – 2) – 1984 Medical Services Department Buildings

4.1.3.SECTIONS OF A MEDICAL SERVICES BUILDING

Various departments which a medical services buildings should have for comfort and well being of patients shall be as follows:

➢OUT- PATIENTS DEPARTMENT:

•General facilities

•Clinics for various medical disciplines

•Supporting facilities like laboratory, injection room, etc .

•Pharmacy

•Blood bank.

➢EMERGENCY AND CASUALTY DEPARTMENT

➢DIAGNOSTIC AND TREATMENT DEPARTMENTS

•Pathology

•Radiology

•PROVISION OF VARIOUS FLOOR AREAS FOR OPD CLINIC

S.N0.	FACILITY	ROOM (NO)	AREA (SQM.)
1	**PAEDIATRIC CLINIC**		
	1. Consultation and Examination	2	17.5
	2. Dressing treatment and dispensing	1	17.5
	3. Immunization Room		
	4. Waiting	1	17.5
		1	21
2	SURGICAL CLINIC		
	1. Consultation and examination	3	17.5
	2. Treatment dressing room /minor Surgery	1	14
	3. Waiting room	1	49
3	ORTHOGAEDIC CLINIC		
	1. Consultation and examination	1	17.5
	2. P1aster and spit storage room	1	14
	3. Fracture and treatment	1	17.5
	4. Plaster cutting room	1	14
	5. Recover Room	1	21
	6. Waiting Room	1	35
5	EYE CLINIC		
	1. Consu1tation examination and refraction	1	28
	2. Minor surgery and treatment room	1	17.5
	3. Dark room		
	4. Waiting	1	14
		1	21
6	ENT CLINIC		
	1. Consultation and Examination	1	17.5
	2. Treatment	1	14
	3. Audiometric room	1	14
	4. waiting	1	21
7	DENTAL CLINIC		
	1. Consultation and Examination	1	17.5
	2. Dental hygienist Room	1	14
	3. Recovery	1	14
	4. Dental workshop		17.5
	5. Waiting		21

•PROVISION OF VARIOUS FLOOR AREAS FOR OPD CLINIC

8	**OBSTETRIC AND GYNAECOLOGICAL CLINIC**		
	1. Reception and Registration	1	17.5
	2. Consultation and Examination	2	17.5
	Treatment	1	17.5
	3. Clinical laboratory	1	14
	4. Toilet-cum – changing	1	10.5
	5. Waiting	1	38
9	FAMILY PLANNING CLINIC		
	1. Consultant and examination	1	17.5
	2. Treatment	1	17.5
	3. Health educator and social worker	1	14
	4. Recovery	1	21
	5. Waiting	1	21

10	**SKIN & STD CLINIC**		
	1. Consultation and Examination	1	17.5
	2. Treatment rooms	2	17.5
	3. Superficial therapy	1	14
	4. Skin laboratory	1	21
	5. Waiting	1	21
11	PSYCHIATRIC CLINIC		
	1. Consultation and examination	1	17.5
	2. ECT room	1	21
	3. Recovery room	1	21
	4. Psychologist room	1	17.5
	5. Social worker room	1	17.5
	6. Waiting	1	21
12	SUPPORTING FACILITIES		
	1. Central injection room	1	14
	2. Specimen collection room	1	17.5
	3. Clinical laboratory	1	17.5
	4. Social worker room	1	14
	5. Waiting	1	21

•PROVISION OF FLOOR AREAS IN THE EMERGENCY DEPARTMENT

S.NO.	FACILITY	ROOM (NO.)	AREA (SQM.)
1	Drive-in Ambulance unit(Reception,waiting,Trolley bay, PA System,police control, Special Woker room	1	150
2	Doctor's Duity with Toilet	5	72
3	Doctor's Lounge with Toilet	1	21
4	Medico legal Specimen And Record room	1	10.5
5	Brought in Dead Room	1	14
6	Retiring Room for Ambulance -drivers and support staff	1	17.5
7	ECG Room	1	14
8	Treatment Room	5	35
9	Operation Theatre Unit:-		
A	Operation Theatre	2	48
B	Instrument Sterilization	1	7
C	Scrub Up	1	21
D	Dirty Utility	1	7
E	Anesthesia Room	1	10.5
10	Resusciation Room	4	120
11	X-Ray Room with Dark Room	1	28
12	Clinical Laboratory	1	17.5
14	Blood Storage Area	1	10.5
15	Drug Dispensing Facility	1	10.5
16	Stores	1	14
17	Sluice Room & Janitor Closet	1	14
18	Nurses Station with Toilet	1	17.5
19	Observation room	3	42
20	Emergency Ward (A) 6 Bedded@1 (B) 4 Bedded@2 (C) 2 Bedded@2	3	335
21	Pantry	2	21

•PROVISION OF FLOOR AREAS IN THE PATHOLOGY DEPARTMENT

S.N0.	FACILITY	ROOM (NO)	AREA (SQM.)
1	Reception and specimen collection/ distribution	1	42
2	Patients waiting area with toilet	1	42
3	Pathologist laboratory with toilet	5	51
4	Office and record	1	14
5	Technician's room with toilet	1	14
6	Stores	3	42
7	Biochemistry	1	35
8	Microbiology with incubator	1	35
9	Media room	1	14
10	Clinical pathology and heamoto1ogy	1	28
11	Histology and cytology	1	14
12	Washing and sterilizing area	1	14
13	Janitors closet	1	3.5
14	Specimen disposal and sluice room	1	7.0

•PROVISION OF VARIOUS FLOOR AREAS IN OT . DEPARTMENT

S.N0.	FACILITY	ROOM (NO)	AREA (SQM.)
	ZONE A		
1	OT reception bay	1	14
2	Relatives waiting room (including 2 toilets of 6sqm. each)	1	24
3	Officer-in-charge of OT with toilet	1	15
4	Doctor's room change	1	17.5
5	Nurses room change	2	42
6	Technician change room	1	17.5
7	Class IV staff change room	1	14
8	Sterile storage area	2	14
9	Instrument and linen room	1	10.5
10	Trolley bay	1	10.5
11	Gas cylinder storage	1	10.5
12	Switch room	1	10.5
	ZONE B		
1	Fracture-cum Casualty theatre	1	28
2	Instrument sterilization	1	10.5
3	Scrub up	2	24
4	Dirty wash up	2	21
5	Plaster Preparation	1	10.5
6	Splint store	1	35
7	Pre-operative room with toilet	6	84
8	Recovery room	6	63
9	Nurses duty room	1	10.5
10	Theatre pack preparation room	1	17.5
11	Frozen section	1	21
12	X-ray with dark room	1	17.5
13	Pantry	1	14

•PROVISION OF VARIOUS FLOOR AREAS IN OT . DEPARTMENT

	ZONE C		
1	Operation theatres (Major)	6	126
2	Operation theatres (Minor)	4	70
3	Instrument sterilization	3	10.5
4	Scrub up	3	10.5
5	Anaesthetist room	1	14
6	Anaesthetic storage	1	10.5
7	Anesthesia room	2	21
8	Doctor's work room	1	21
9	Nurses work room	1	10.5
	ZONE D		
1	Dirty utility	3	10.5
2	Janitor's closet	2	14

•PROVISION OF VARIOUS FLOOR AREAS IN RADIOLOGY DEPARTMENT

S.N0.	FACILITY	ROOM (NO)	AREA (SQM.)
1	Reception registration with waiting area and toilet	1	65
2	Radiologist office + Toilet	1	17.5
3	Technicians room with toilet	2	28
4	Digital X-ray + change	2	42
5	X- ray console room	2	14
6	CT scan + change	2	70
7	CT scan console room	2	21
8	MRI room + change	2	84
9	MRI console room	2	12
10	Equipment room	1	21
12	Mammography room + Change	1	21
11	Ultrasound room + change + toilet	1	21
12	Reporting room	1	14
13	Trolley bay	1	10.5

•PROVISION OF VARIOUS FLOOR AREAS IN DELIVERY SUITE

S.N0.	FACILITY	ROOM (NO)	AREA (SQM.)
1	Reception and admission with waiting area	1	35
2	Examination and preparation room with toilet	1	17.5
3	Doctor's change room	1	17.5
4	Nurses change room	1	10.5
5	Sterile storage	1	21
6	Instrument linen store	1	10.5
7	Trolley bay	1	10.5
8	Switch room	1	10.5
9	Recovery room	2	42
10	Anaesthesia room	1	14
11	Labour room (A)Private Room: 4 (B)Semi- Private: 2	6	120
12	Delivery room	2	28
13	Operating delivery room	2	42
14	Instrument sterilizing	1	14
15	Scrub up	2	14
16	Children birth	2	21
17	Dirty utility	1	10.5
18	Janitors closet	1	3.5

•PROVISION OF VARIOUS FLOOR AREAS IN WARD UNIT

S.N0.	FACILITY	ROOM (NO)	AREA (SQM.)
A.	General Ward		
1.	Nursing station with work area and toilet	5	105
2.	Doctor's duty room with toilet	5	87.5
3.	Treatment room	2	42
4.	Laboratory	2	14
5.	Ward pantry	5	52.5
6.	Ward store	4	42
7.	Sluice room	4	42
8.	Janitor's closet	4	14
9.	Day space	2	35
10	Patient's relatives waiting area with toilets	2	70
B.	Additional for Pediatric Ward		
1.	Formula room	3	42
2.	Clothes room	3	42
3.	Play room		14
C.	Neonatal Unit		
1.	Nursery i) Premature ii) Septic iii) Normal	 1 1 1	 10.5 10.5 10.5
2.	Nurses station with toilet		14
3.	Formula cum breast feeding room	1	14
4.	Store	1	7
5.	Phototherapy room	1	7
6.	Sluice room	1	7

4.3 OTHER STANDARD CONFIGURATIONS

IN – PATIENT DEPARTMENT

• GENERAL WARDS - These include wards for medical, surgical ENT and eye disciplines.

•WARD FOR SPECIALTIES - Wards for specialties like post operation, orthopedic, pediatric, psychiatry, infection, skin, obstetrics and gynecology, etc.

•PEDIATRIC WARDS – As many as 12 to 15 percent of beds in a hospital may be required for pediatric patients. A pediatric ward should not be as large as an adult unit as children need more care and attention.

•GYNECOLOGICAL WARDS - The proportion of gynecological beds should be 40 percent of the maternity beds.

•PRIVATE& SEMI-PRIVATE WARDS – In hospitals of category C, D and E few single and two bedded units may be provided for patients on the basis of hotel type accommodation with independent toilet facility. Area recommended for these rooms is 14 and 21 m2 respectively.

•Intensive care unit – as a thumb rule, about 2 to 5 percent of total medical and surgical patients in a hospital should constitute icu's. However it is recommended a minimum of 10 percent of the total beds be designed to icu's, especially for specialty and super-specialty hospitals. A unit shall not have less than 4 beds nor more than 12 beds.

•ISOLATION UNIT - Isolation unit shall have at least 25 percent of patients in isolated cubicles in single and two bedded rooms per nursing unit to cater for certain cases requiring isolation from other patients. An area of 14 m2 for such rooms to contain a bed, bedside locker, easy chair for patient, a chair for the visitor and a built in cupboard for storing clothes is recommended.

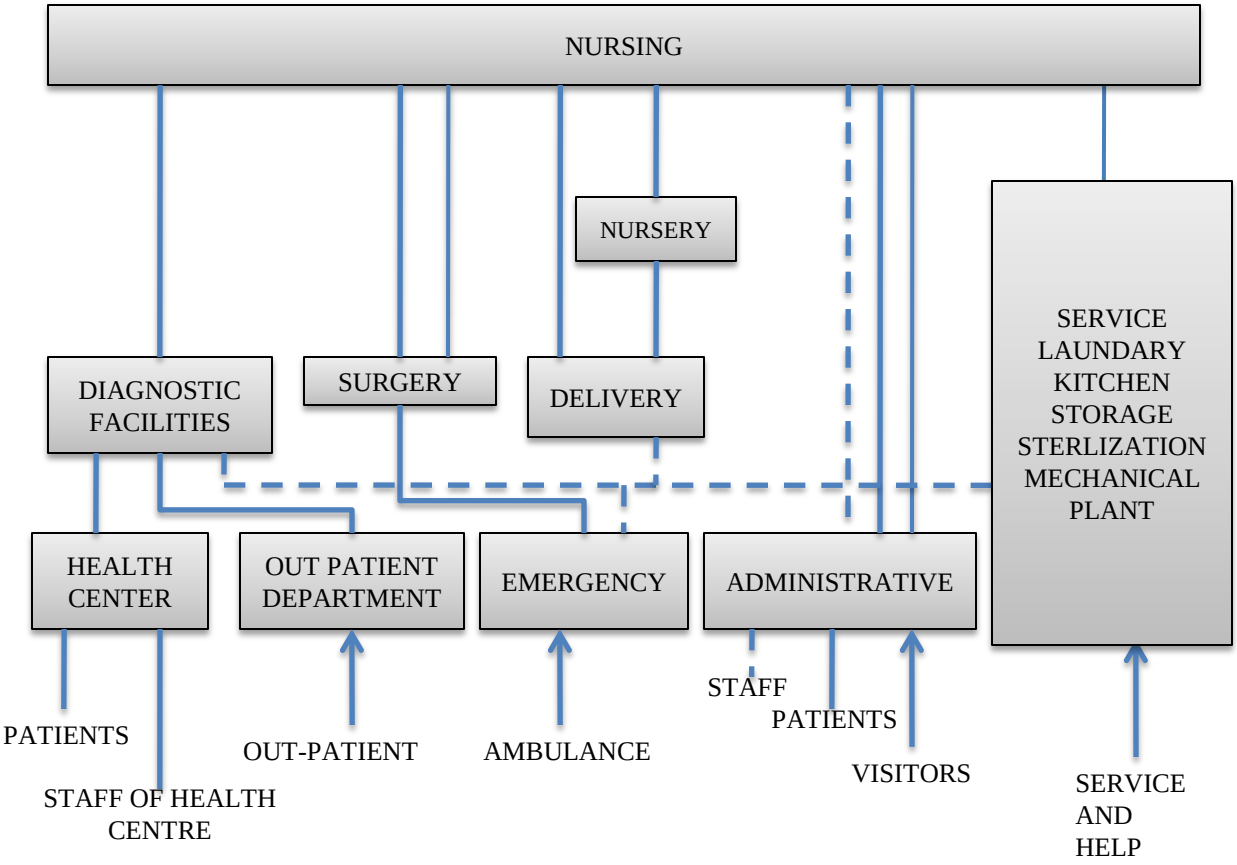
•PLANNING OF WARD UNIT – Normally, a ward unit shall comprise 24 to 36 beds, unless small strength wards are needed for specific reasons in multiple beds and isolation unit. An area of 7 m2 per bed is recommended, and should be arranged with a minimum distance of 2.25 m between centers of two beds and a clearance of minimum 200 mm between the bed and wall.

(Source – GD kundres)

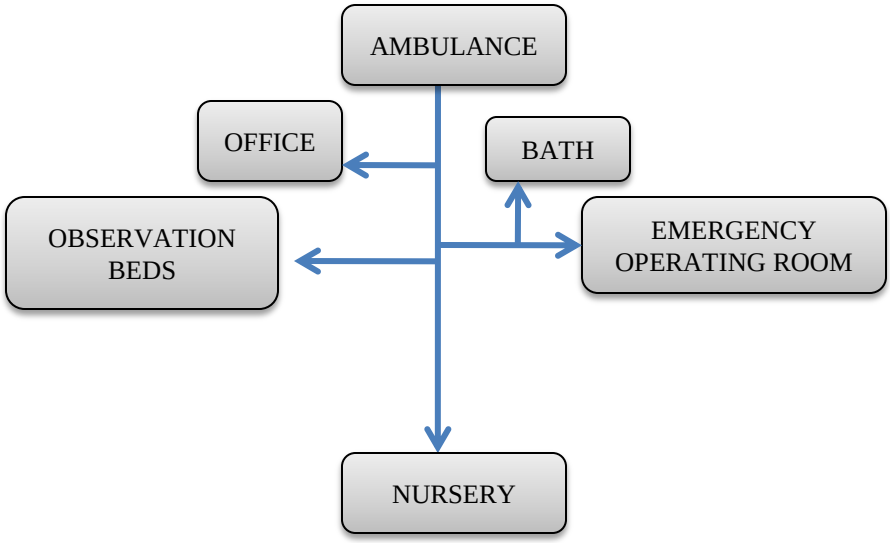
4.2 FLOW DIAGRAMS OF VARIOUS HOSPITAL DEPARTMENTS

FLOW CHART SHOWING VARIOUS FUNCTIONS OF HOSPITAL

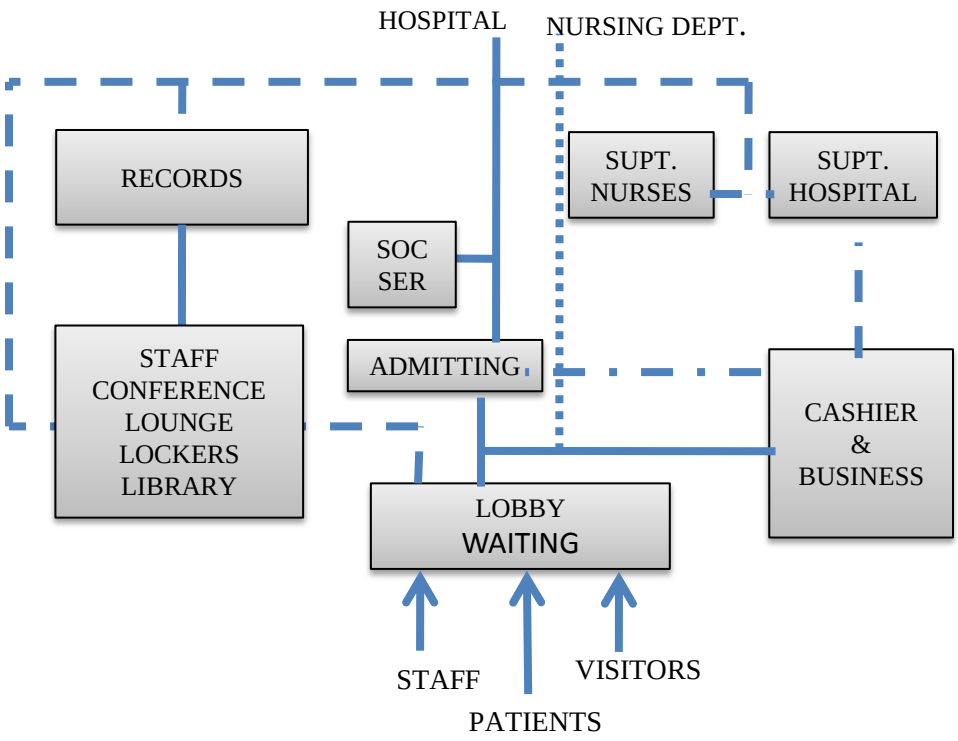
(TIME SAVERS)



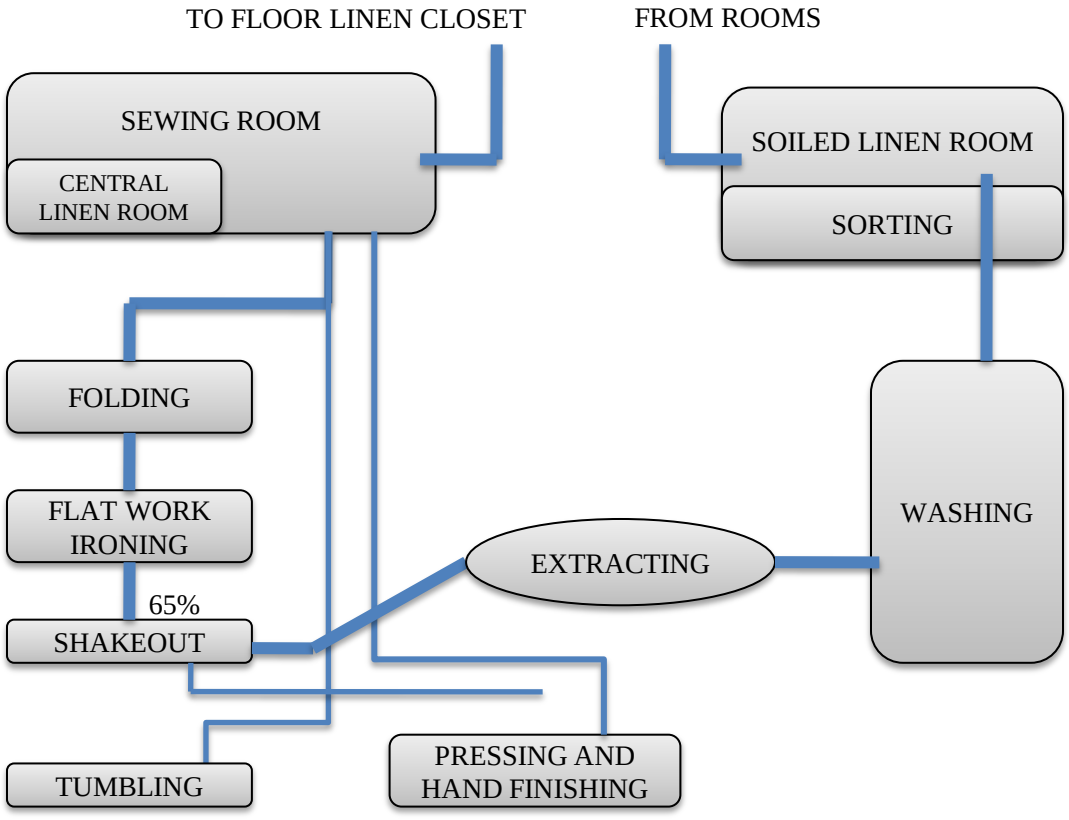
FLOW CHART OF EMERGENCY DEPARTMENT



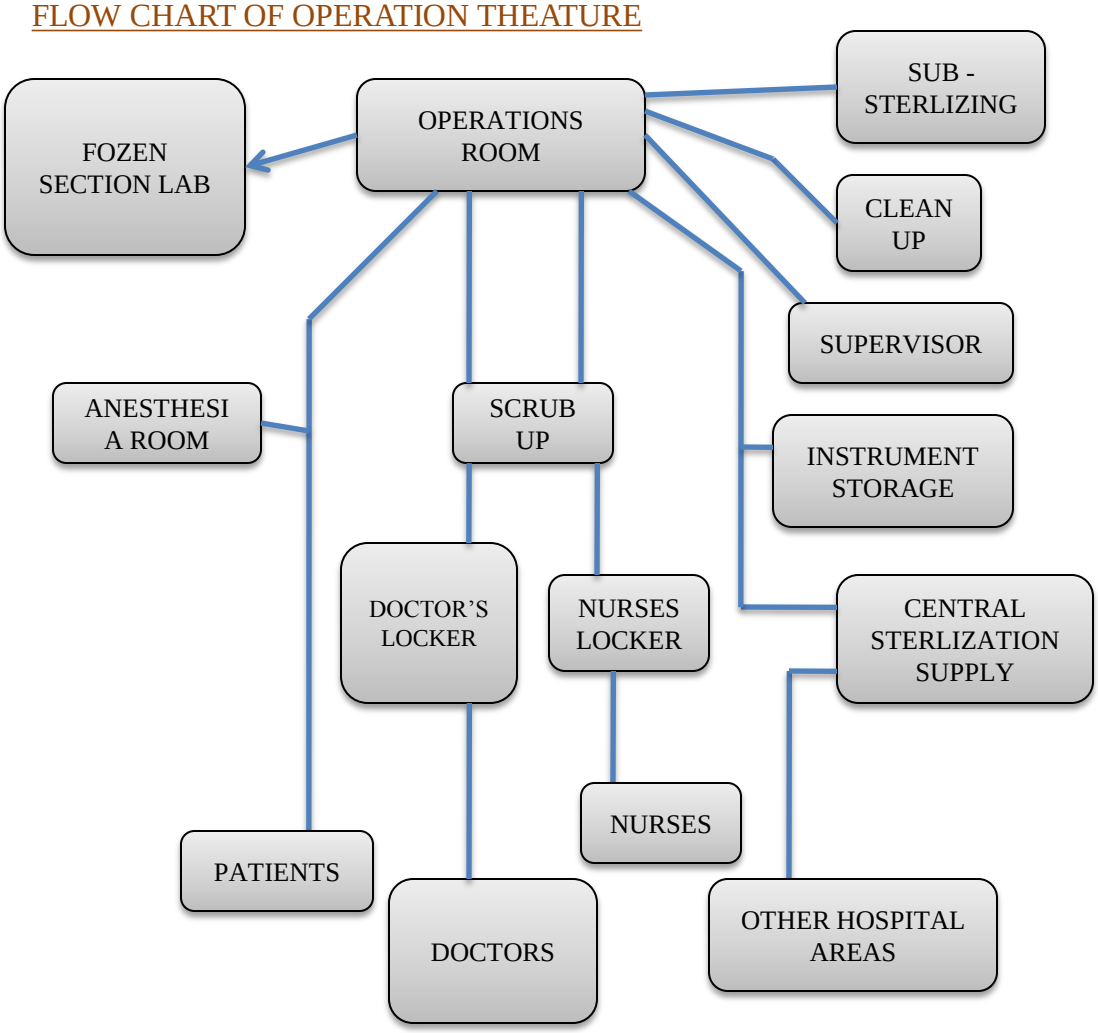
FLOW CHART OF ADMINISTRATIVE DEPARTMENT



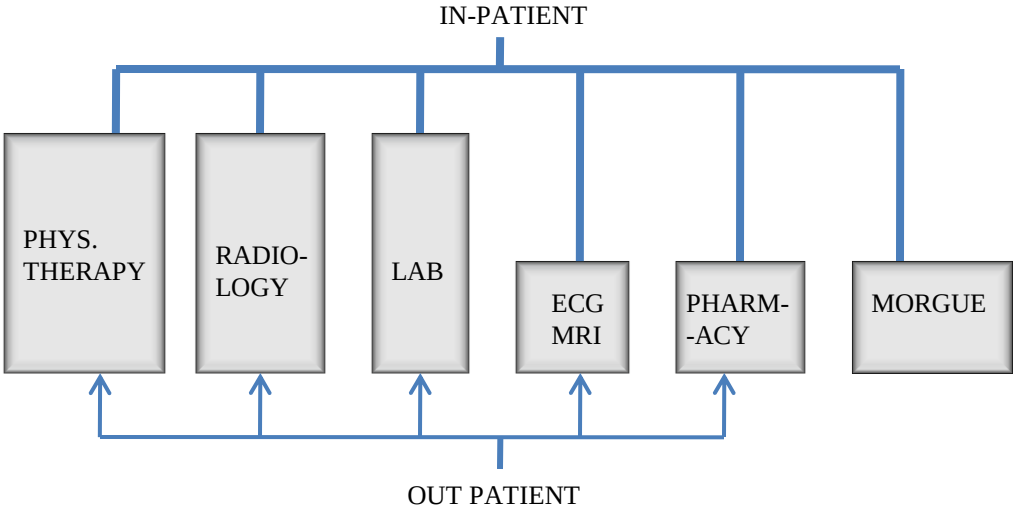
FLOW CHART OF LAUNDARY DEPARTMENT



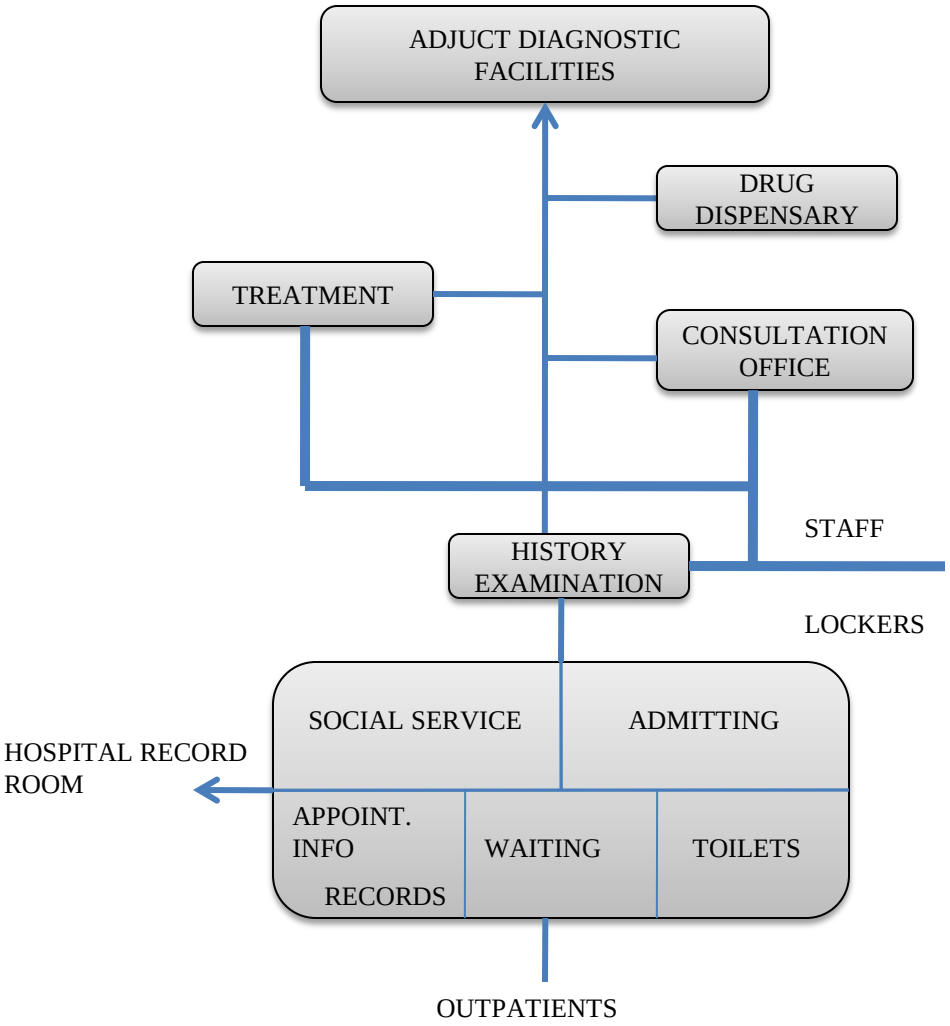
FLOW CHART OF OPERATION THEATURE



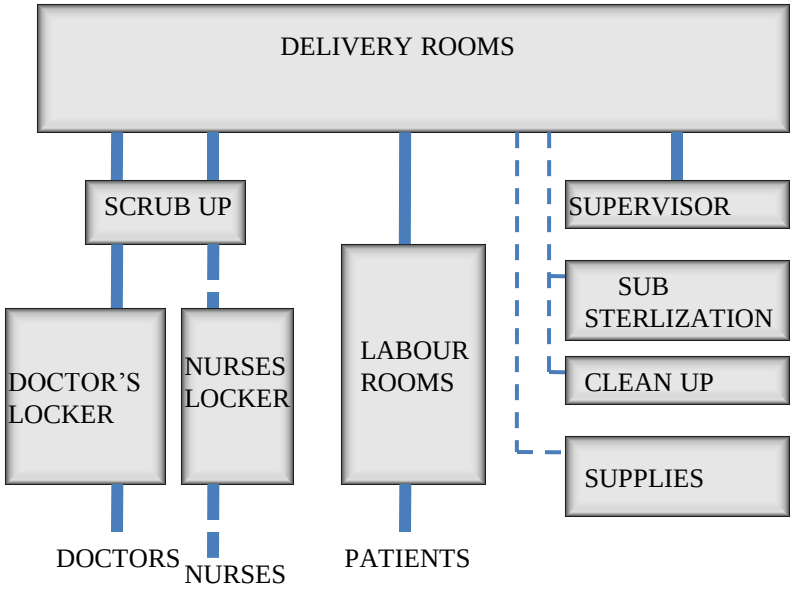
FLOW CHART OF DIAGNOSTICS DEPARTMENT



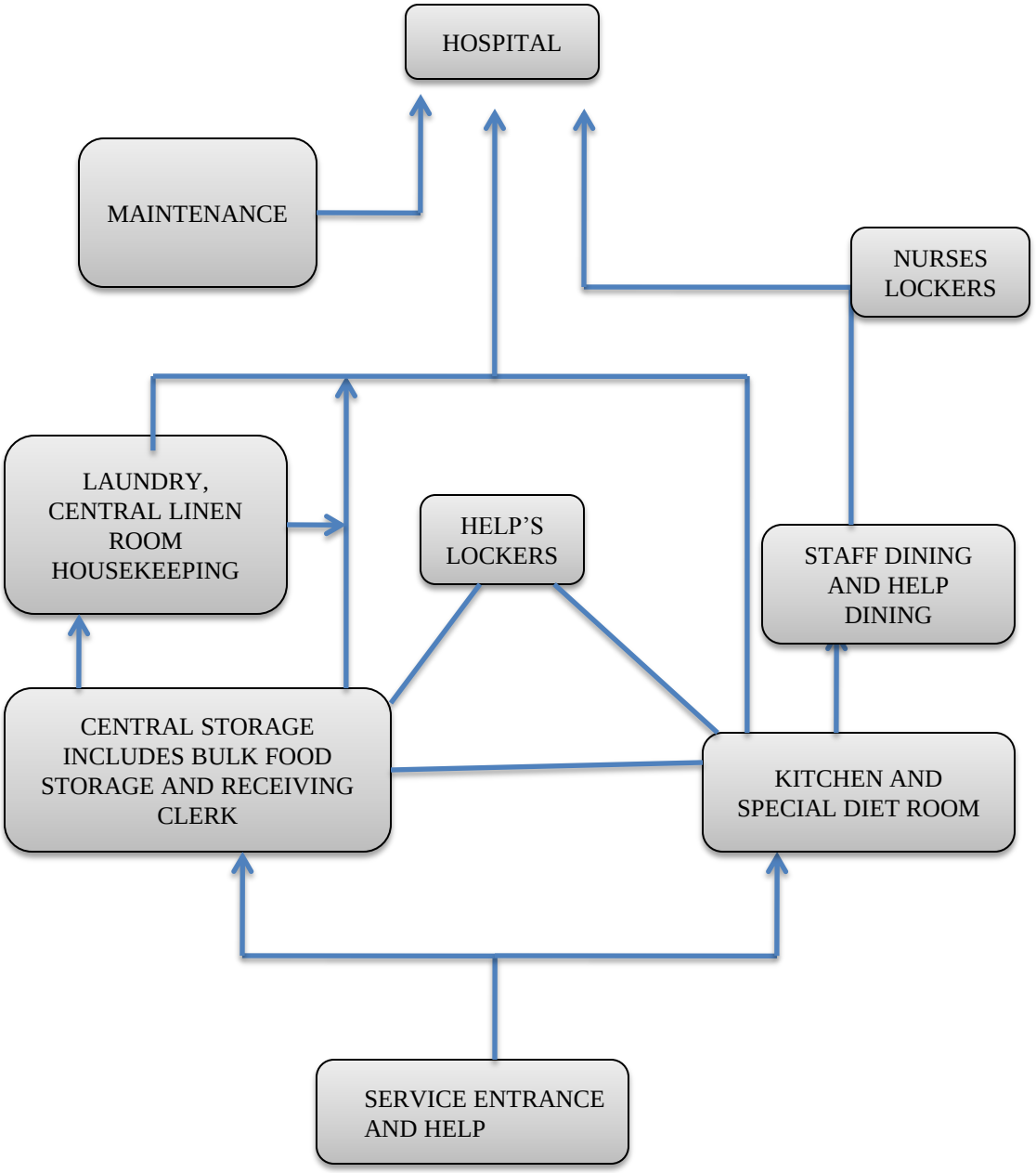
FLOW CHART OF OUT PATIENT DEPARTMENT



FLOW CHART OF OBSTETRICAL DEPARTMENT



FLOW CHART OF SERVICE FACILITIES



4.3 ANTHROPOMETRICS

ANTHRO OF WARDS

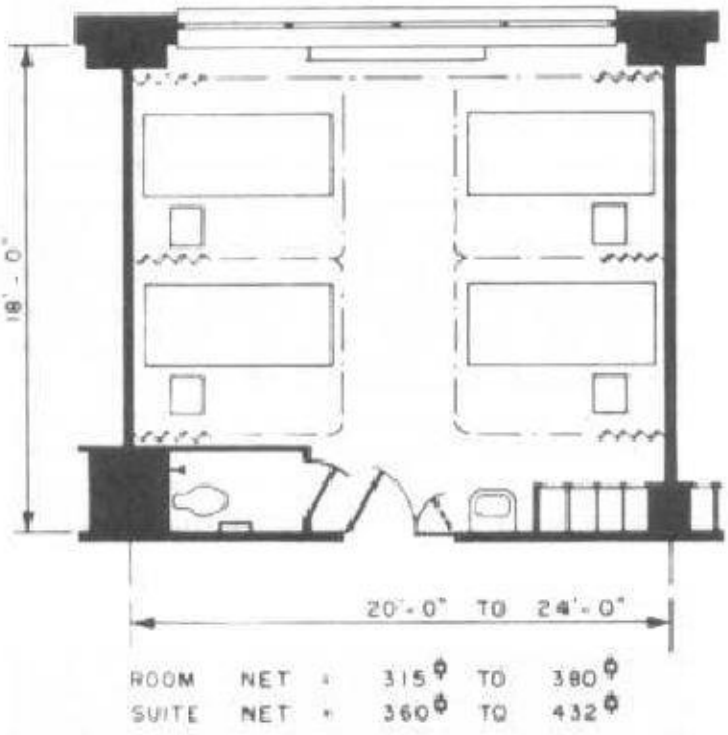


Fig. 2 Four-bed room

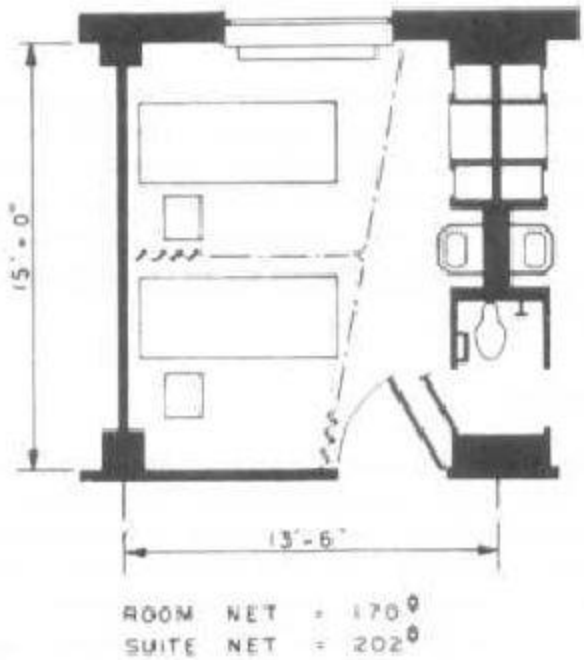
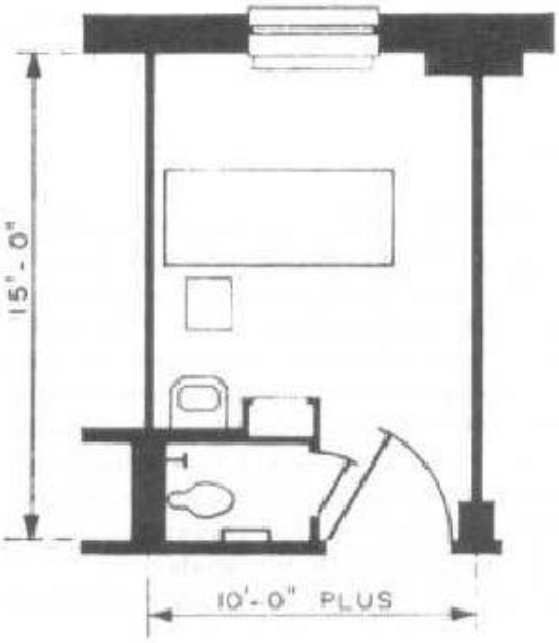
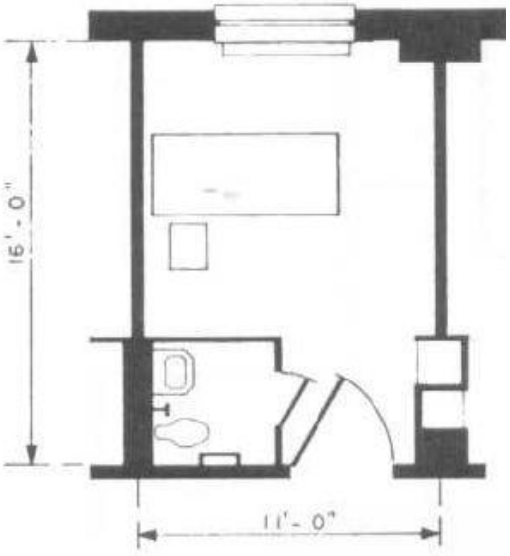


Fig. 3. Double bedroom, small, shared toilet



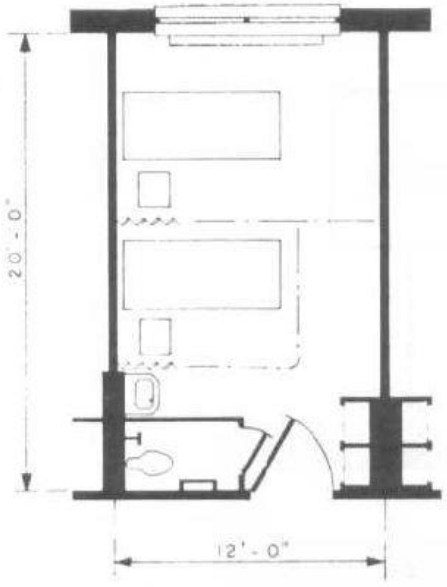
ROOM NET = 120 ☼ PLUS
SUITE NET = 150 ☼ PLUS

Fig. 4. Single room, small



ROOM NET = 136 ☼
SUITE NET = 176 ☼

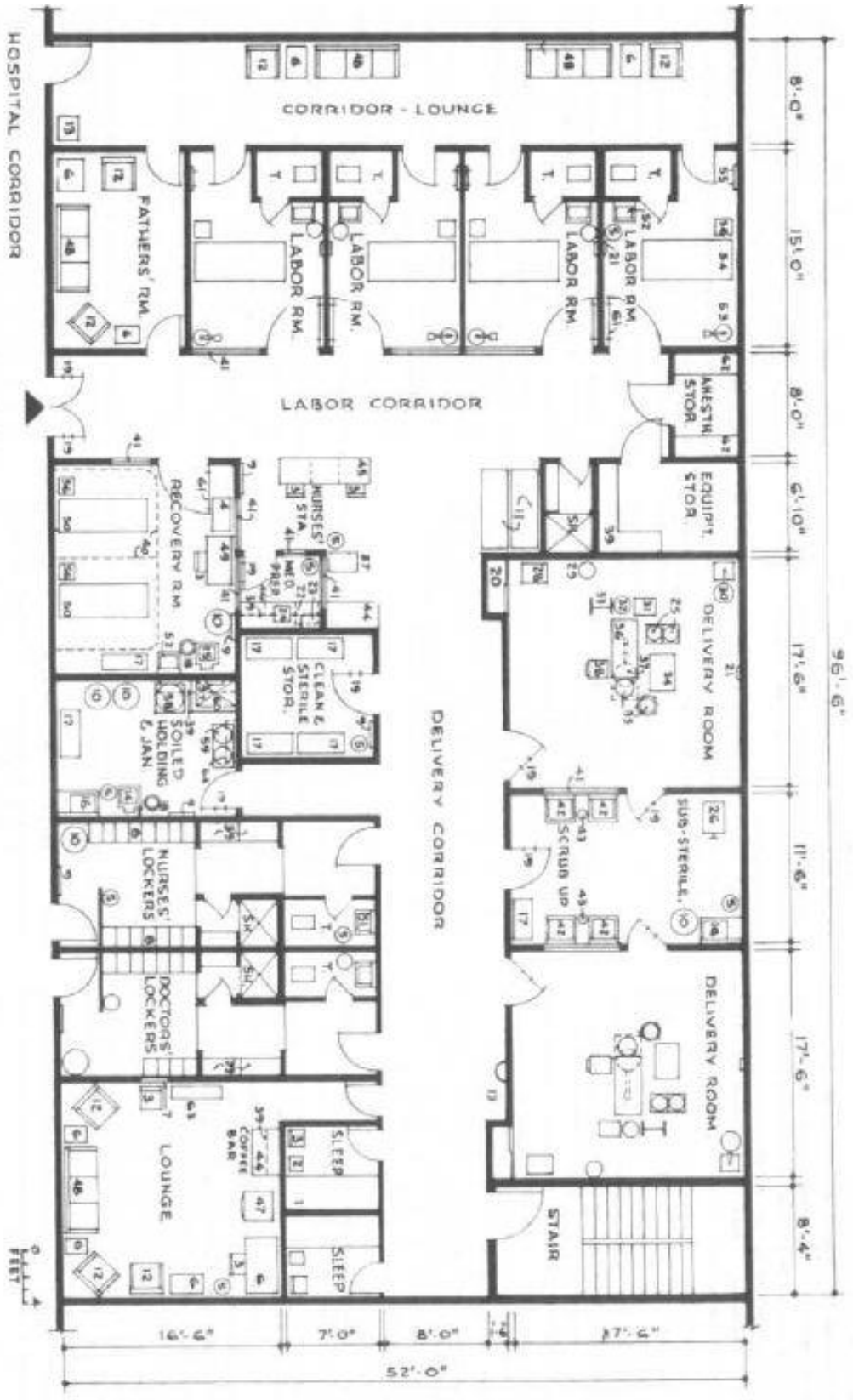
Fig. 6. Single room, medium size



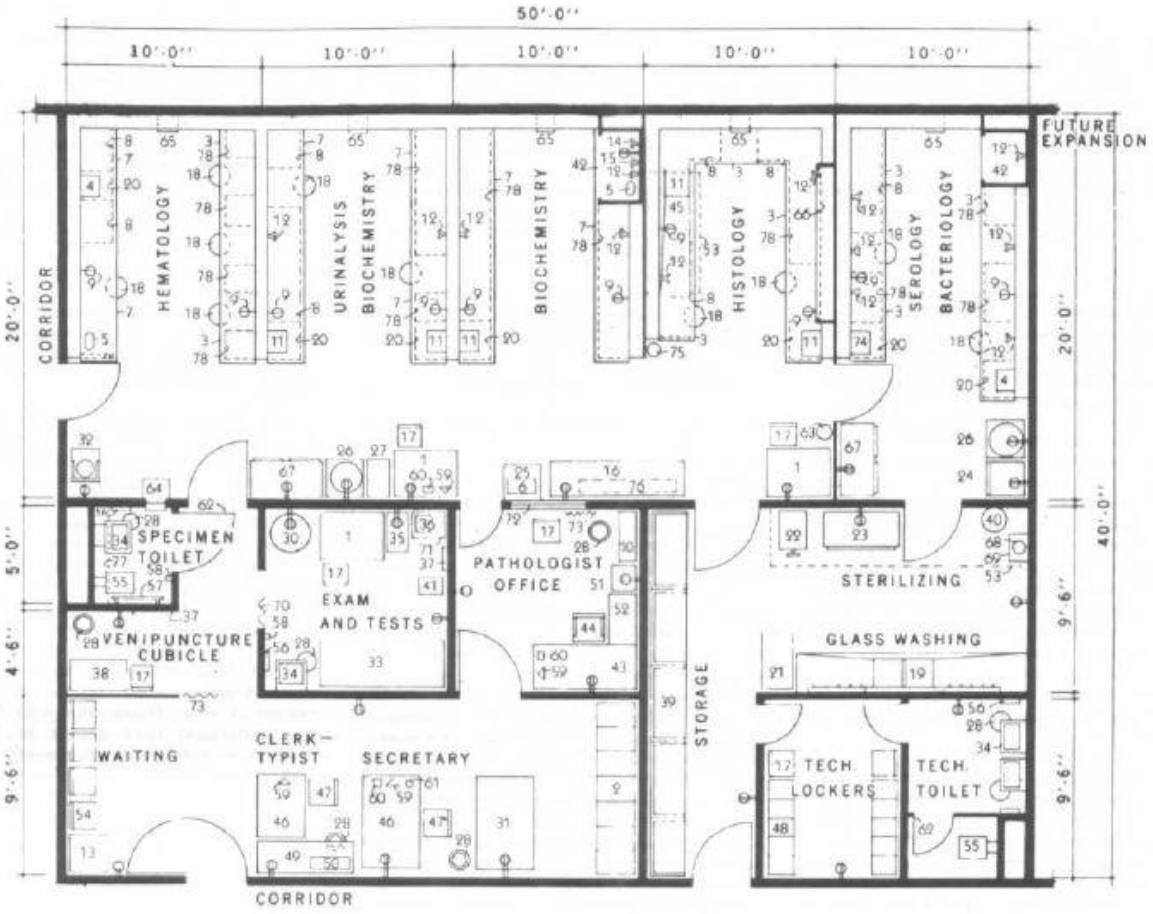
ROOM NET = 202 ☼
SUITE NET = 240 ☼

Fig. 5. Double room, medium size

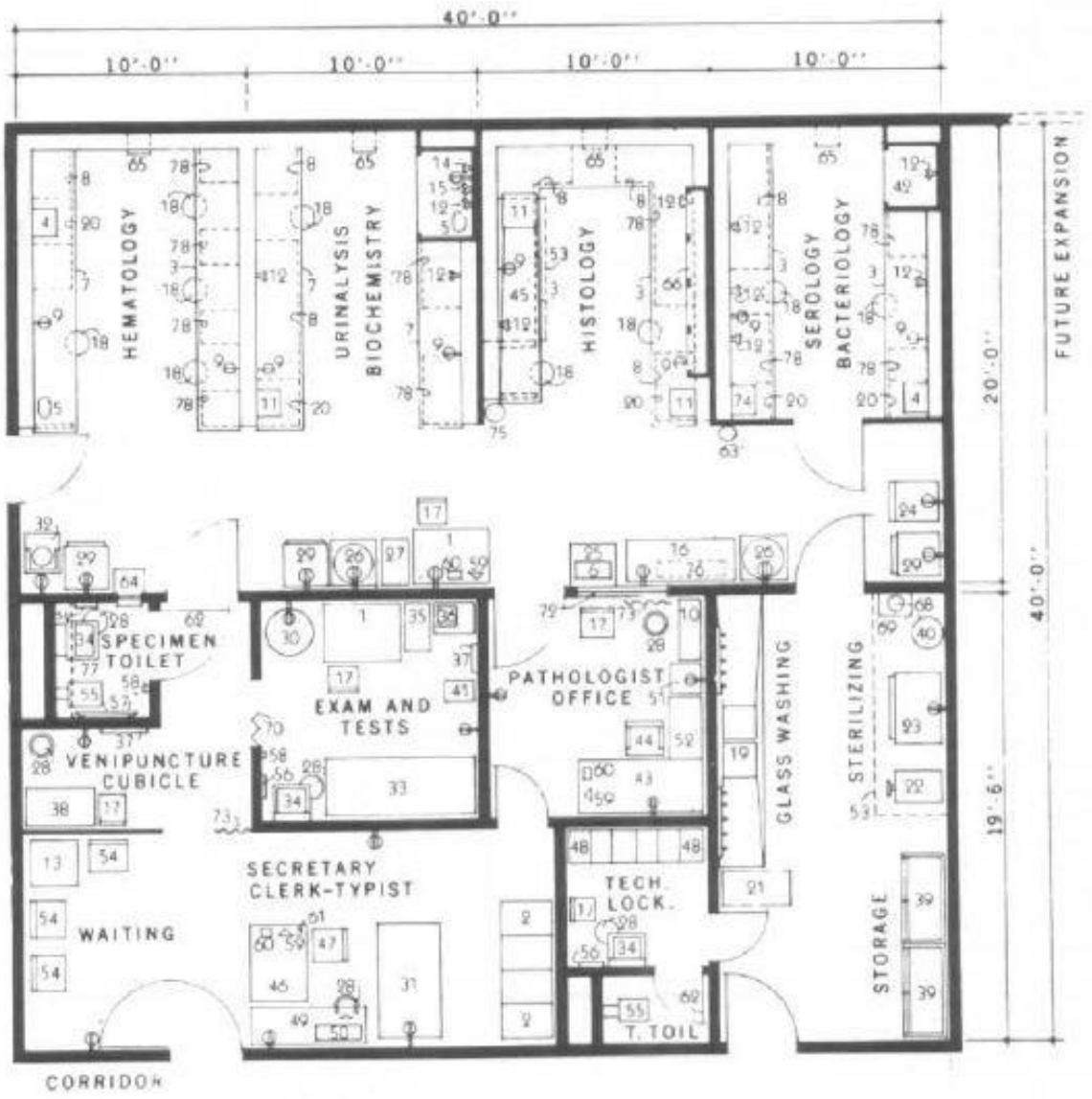
STANDARDS OF DELIVERY SUITE



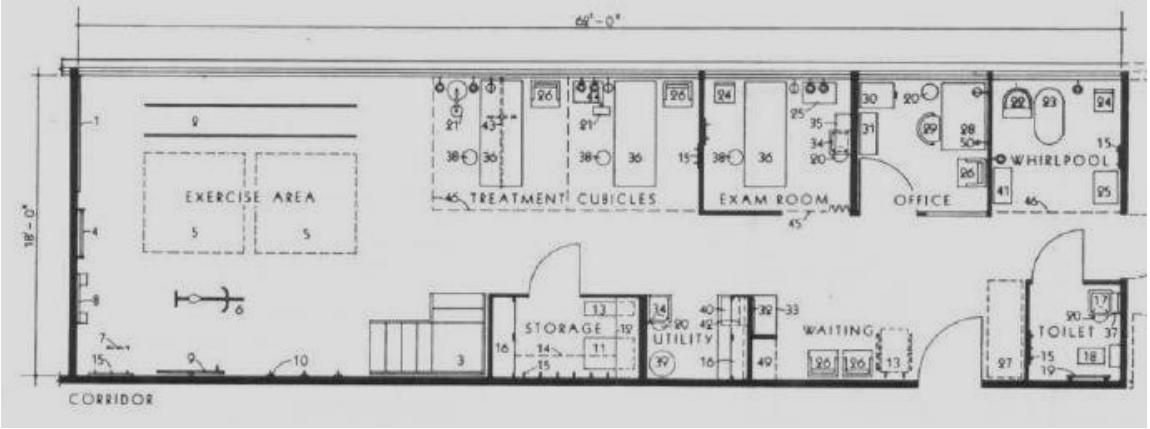
STANDARDS OF LABORATORY DEPARTMENT

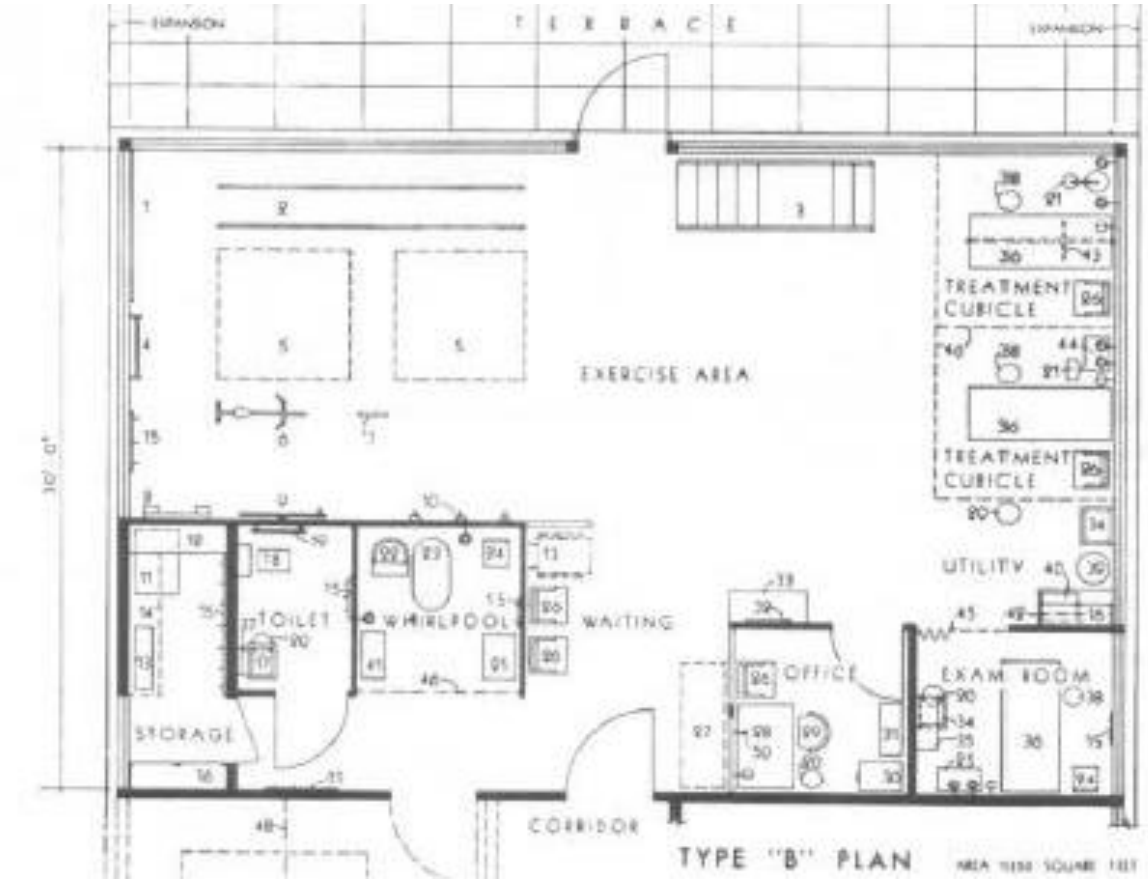


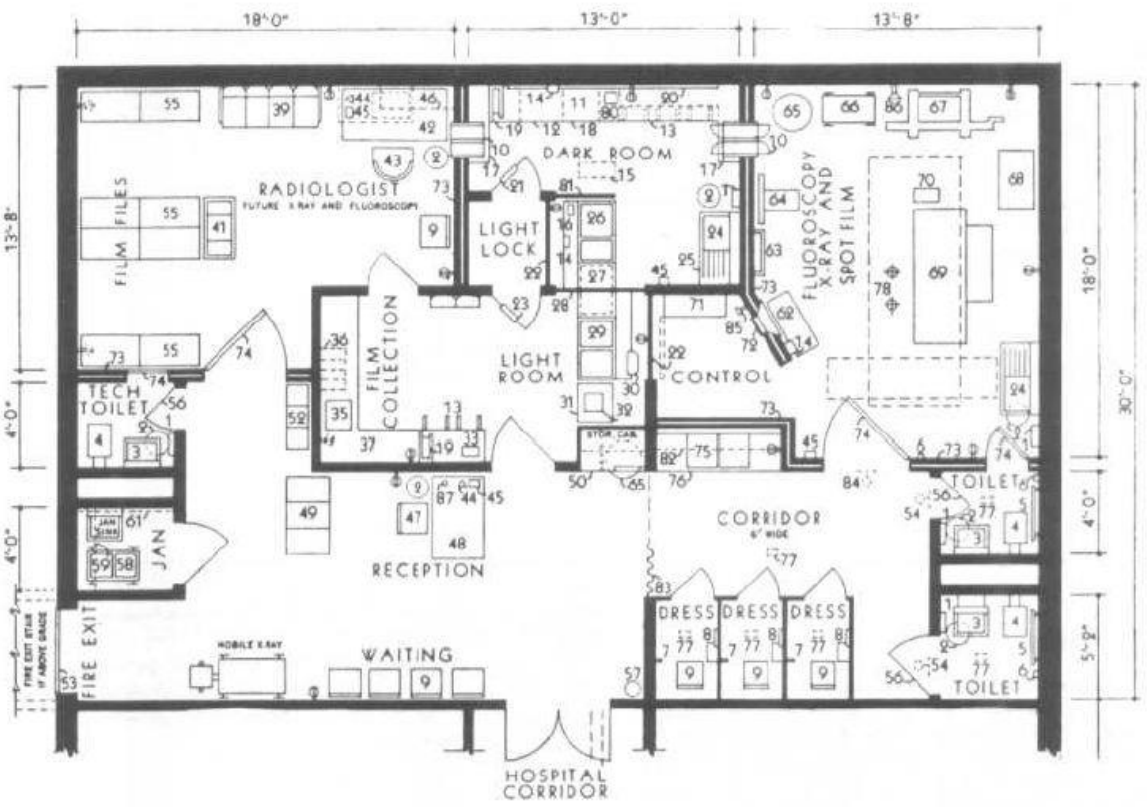
STANDARDS OF LABORATORY DEPARTMENT



STANDARDS OF PHYSICAL THERAPY DEPARTMENT

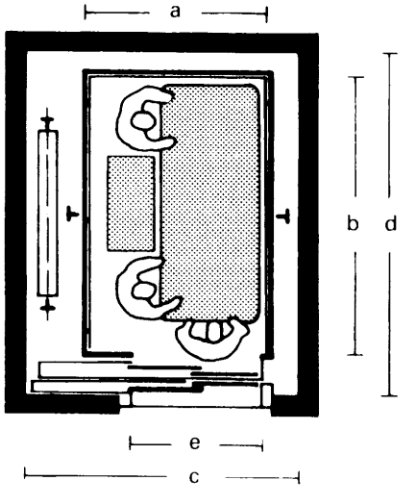






STANDARDS OF LIFT SIZE

6 Ward corridor, intensive care

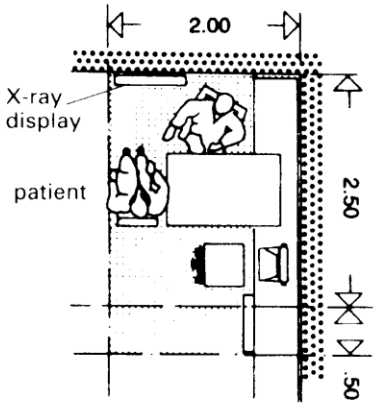


8 Bed lift

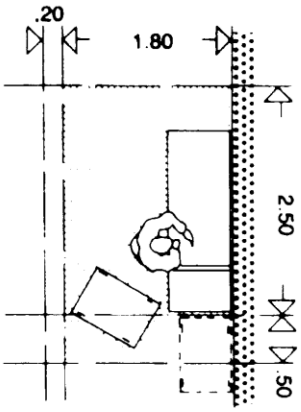
7 Lift lobby

capacity (kg)	1600	2000	2500
shaft width c	2400	2400	2700
shaft depth d	3000	3000	3300
car width a	1400	1500	1800
car depth b	2400	2700	2700
car door e	1300	1300	1300
car height	2300	2300	2300
car door height	2100	2100	2100
capacity (passengers)	21	26	33

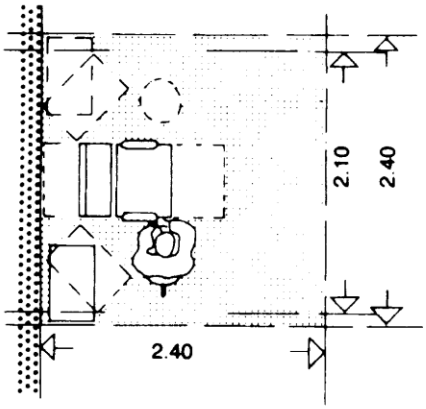
9 Dimensions of bed lifts → 8



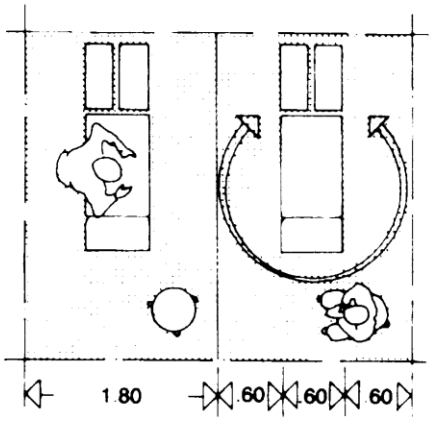
(2) **Minimum area: doctor's consultation**



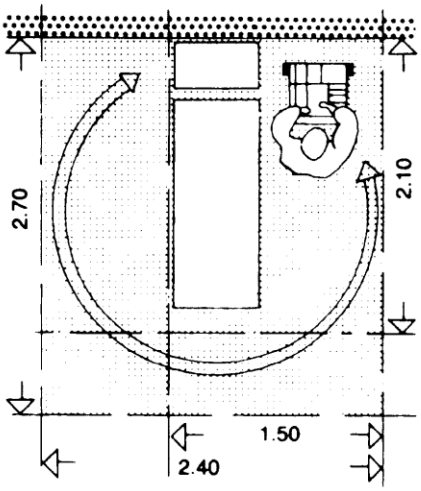
(3) **Minimum area: examination of reclining patient**



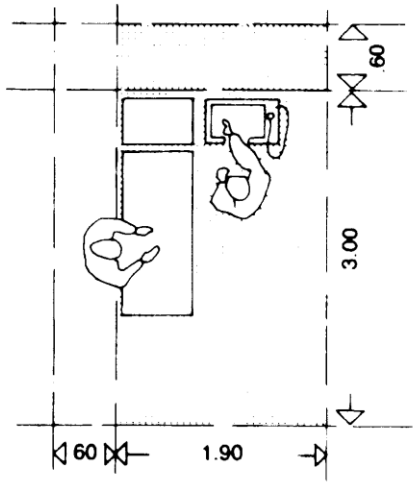
(4) **Minimum area: taking blood samples**



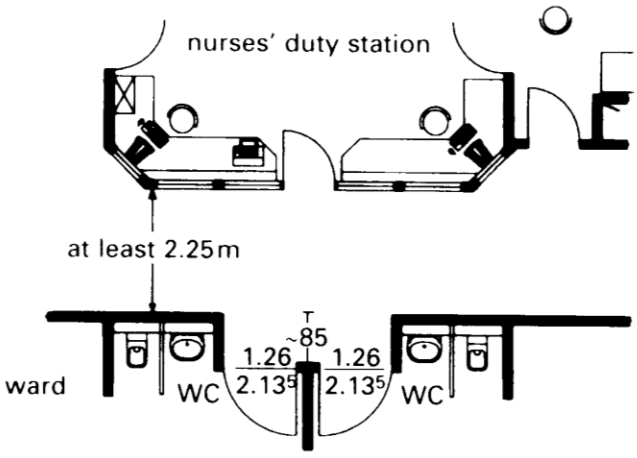
(5) **Area for physiotherapy couches**

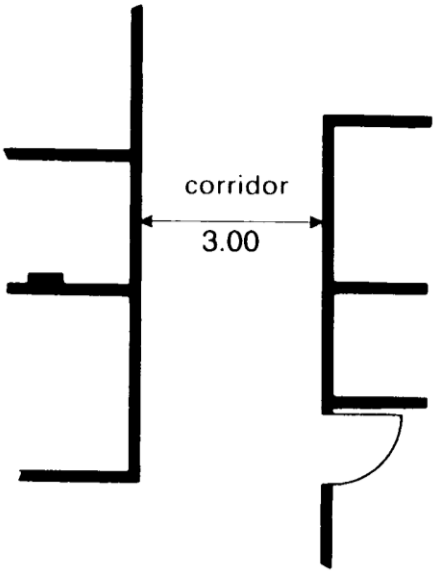


(6) **Minimum area: electrocardiogram (ECG)**

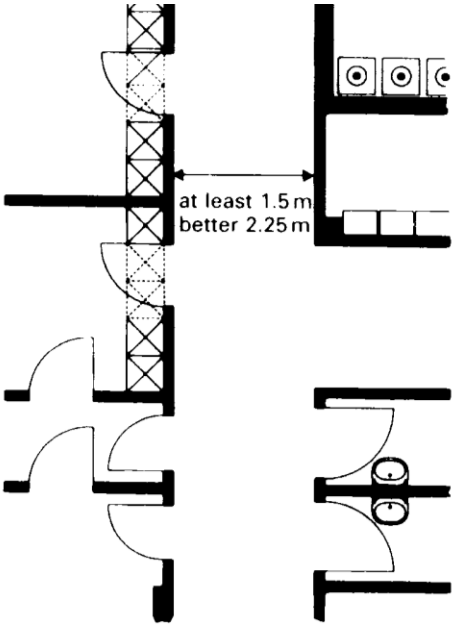


(7) **Area requirements: ultrasound examination**



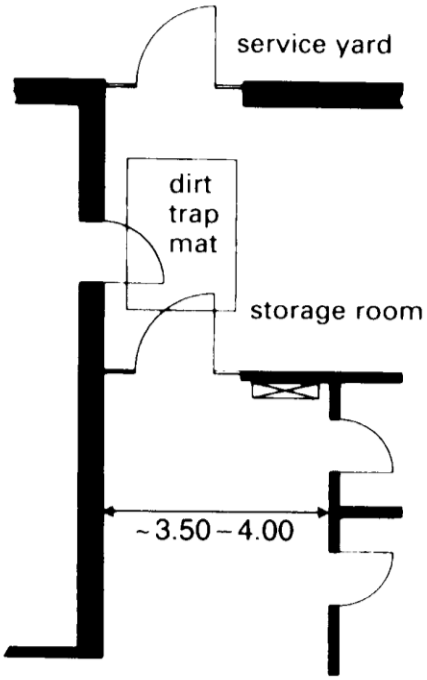


2 **Main corridor (spine)**

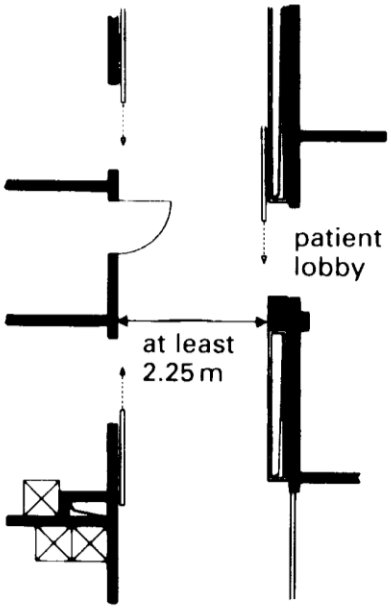


3 **Medical services corridor**

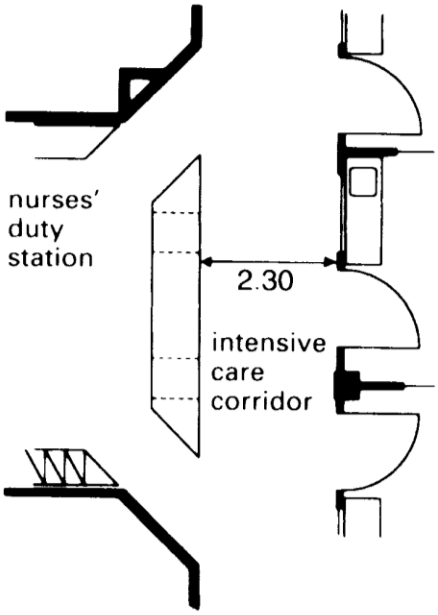
STANDARDS OF CORRIDOR WIDTH



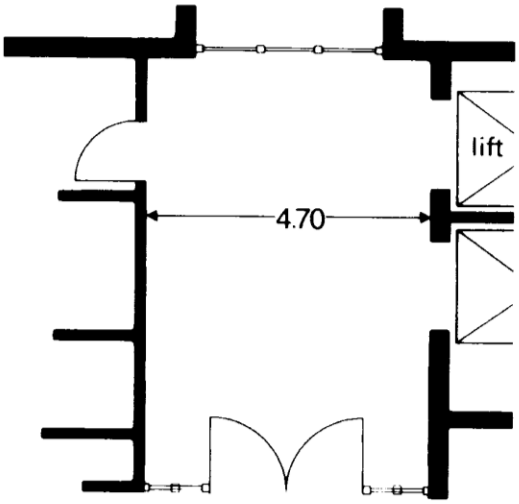
4 **Service corridor, deliveries, storage areas**



5 **Working corridor, surgical area**



6 **Ward corridor, intensive care**

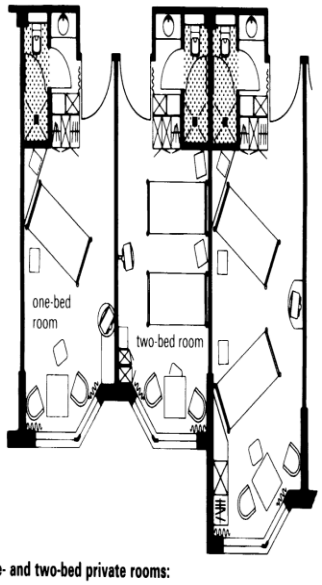


7 **Lift lobby**

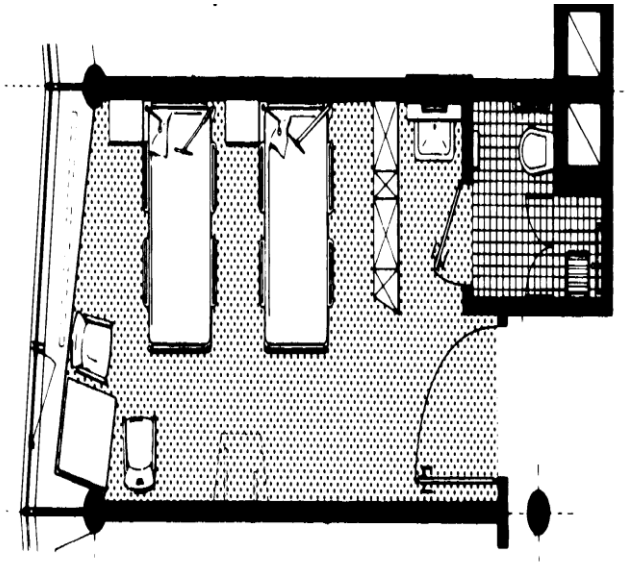
STANDARDS OF ROOMS

The following nursing areas should be distinguished:

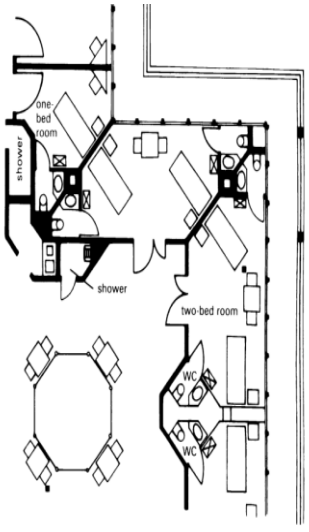
- **Normal Care Units-** are for general in-patient care (acute illness but short length of stay). Can be single or double bedded.
- **Each nurse station** should not supervise more than **16-24 beds**
- **The smallest size of one bed room is 10sqm**;
- for **2-3 bed room** a minimum of **8sqm per bed** should be given.



1) One- and two-bed private rooms:

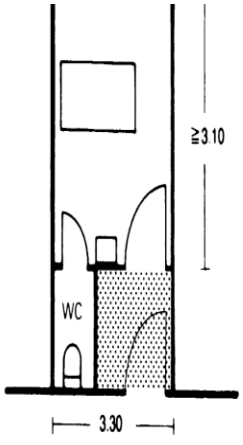


2) Two-bed room with shower Architects: Nickl + Partner

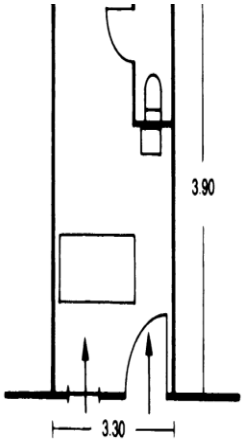


Architects: Joedicke and Partner

3) One- and two-bed room; shower on the corridor: Clinic II, Munich



4) Single-bed room with lobby



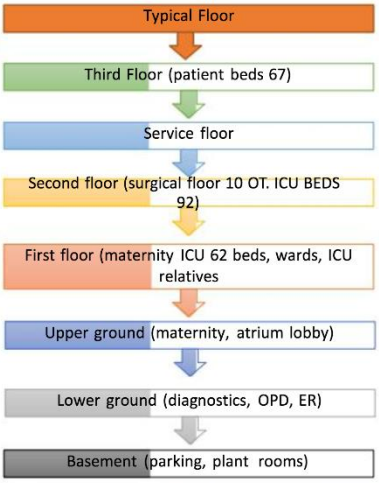
5) Single-bed room, no lobby; observation possible from corridor

LITERATURE STUDY

FORTIS HOSPITAL,GURUGRAM

Fortis Memorial Research Institute

- Location: Sector 44, Gurugram
- Site Area: 43,303sqm
- Built up Area:- 65,961sqm.
- F.A.R-1.52
- Principal Architect: Ar Rajinder Kumar,Rajendra Kumar Associates, New Delhi
- Fortis Memorial Research Institute,Gurugram,(FMR)
- FMR is a a Multi- Speciality Hospital
- FMRI is a set in 11 Acre campus
- It has 430 Functional Beds, with a Further planned increase in beds to 1000
- FMRI is accessible easily by road, It can also be reached using Delhi Metro as the Hospital is opposite to Huda City Centre



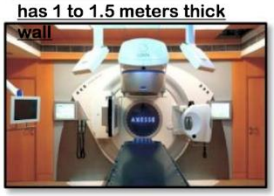
- TERI GRIHARATING

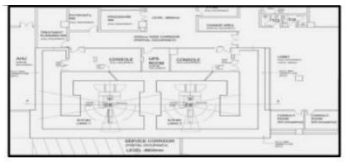
Air Conditioned Area: 44,612sqm
Energy Consumption reduction:33% reduction in comapred to TERI GRIHA Bench mark
Epi: 154kwh/sqm/year
Renewable energy installation on site : 25KWp rated capacity of solar PV installed
4 Stars rating by TERI GRIHARATING

AIM OF THIS HOSPITAL IS TO CREATING BETTER ENVIRONMENT NOT TO BORE IN HOSPITAL

BASEMENT PLAN

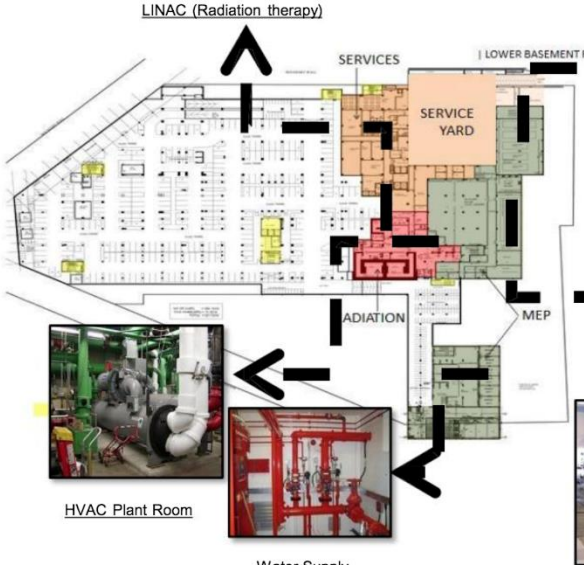
LINAC (Radiation therapy) used for treatment of oncology has 1 to 1.5 meters thick wall





LINAC (Radiation therapy)

D.G.Room



- Admin area
- Service yard
- Mechanical therapy
- Radiation therapy
- Lifts and services

Total parking in the basement-

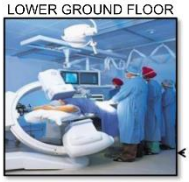
- 280 cars parking
- 51 two wheeler parking

BASEMENT IS USED FOR-

- The basement is used for engineering services plant room like HVAC, LT panel room, DG room, Pump rooms etc.
- And it is also used for radiation therapy used in oncology treatment.
- And for parking and HR department and staff areas.

HVAC Plant Room

LOWER GROUND FLOOR



Radiology

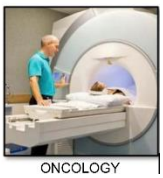
- OPD
- Oncology OPD
- Laundry
- CSSD
- Radiology
- Emergency
- Physiotherapy department

Total area of lower ground floor – 7864.890 SQ.M.

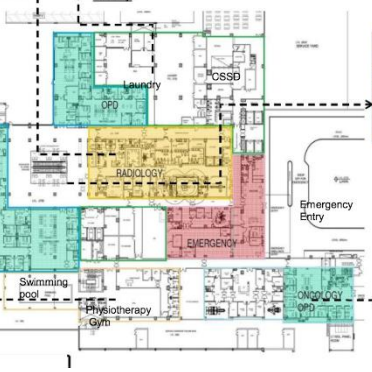
OPD

Lower G.F.

Physiotherapy



ONCOLOGY



OUT PATIENT SERVICES - The Out Patient Department of a hospital mainly is about diagnosis and where people come for procedures that do not require admission to the hospital .

➢OPD should locate close to main entrance . There should be direct link between diagnostic departments like radiology , physiotherapy , blood bank and laboratories.

➢Lobby and lounge should be large enough to provide sittings to the patients of outpatients. Sub waiting areas should be provide near to various clinics. Public areas with provision for reception and enquiry desk or counter, public telephones , public toilets , water coolers , cashier booth , coffee shop or snack bar.

➢Elevators should be easily accessible from the lobby and should not open directly into the lobby. Registration counter designed to afford some privacy. If the laboratory is located at a distance or on another floor , it is recommended to provide laboratory substation be located in the outpatient clinic areas.

EMERGENGY SERVICES - The emergency department should be located on the ground floor with easy access for patients and ambulances. There should be separate entrance to the department which is away from the main hospital and out patient entrance. The entrance to the emergency should be sheltered to protect ambulance patients from the weather while unloading.

➢There should be reserved parking space for ambulance and cars of patients. If there is any raised platform ramps should be provided for visitors and patients access.

➢With injured patients , accident victims and their relatives around , emotions run high in emergency department . So traffic control within the department is critical. Unsatisfactory arrangements , congestions , delays and inefficient operation due to faulty design will present a poor image of the hospital.

The design of emergency department should facilitate quick access to the patients by staff and supplies. There should be well equipped emergency operating room with supplies ready for use .

IN PATIENT SERVICES - In-Patient Department (IPD) is also known as indoors or wards. The patients who need continuous nursing care, monitoring or medical/ surgical interventions are admitted to IPD in a hospital . Nursing units have close relationship with the operating rooms , laboratory and dietary .

- The wards should be spacious so that the patient feels comfortable. Their should be adequate entertainment facilities and privacy. At the same time all wards must be in sight of a nurses station to detect an emergency situation
- The nurse station/ nursing station should be located in such a way that the distance of patient beds from nursing station are minimum possible.
- Patients beds should be placed parallel to the exterior wall so that the outside glare does not effect the eyes of patient . The height of the window sill should not exceed above 3 meters .
- Each patient bed must be supplied with built in wardrobe . The furniture in each private room includes a bed , lounge chair , a visitor's chair , a bed site locker and over bed table .

BLOOD BANK SERVICES - The function of blood bank is donor selection , collection of blood , grouping and cross matching , testing for transmittable diseases , blood component separation , storage of blood components .

- In blood bank there should be two laboratories , one for blood group serology and another for screening the blood for HIV antibodies. The two laboratories and blood collection room should be air conditioned .
- There should be refrigerators maintaining temperature between 4 to 6 degree C with recording thermometer and alarm device , one for the blood collection room and another for the laboratory.

LABORATORY SERVICES – The main function of laboratories is to perform tests in the six main fields of bacteriology , histology , serology , haematology and cytology to assist medical staff in making or confirming diagnoses and in the treatment and prevention of diseases. The specimens are received from wards , OPD , operation theatres and emergency department . So lab should be closely accessible from all these . The laboratory needs cold , hot , distilled water in certain sections .

➢Work stations should be equipped with vacuum gas , electrical services , sinks and water .Work counters with space for equipments , incubators, microscopes , etc. Under the counters and overhead cabinets may be provided.

➢For the urine and faeces collection area , there should be toilets with a washbasin .

RADIOLOGY SERVICES - The main function of radiology department is to diagnose the patients through the use of radiography machines i.e. X-ray , CAT scan , mammography , MRI and ultrasound . Patients may arrive on foot , wheel chairs or trolleys . The department should be located close to outpatients , inpatients , ICU and emergency department.

PHYSICAL THERAPY – Physical therapy is given to the patients in order to correct or prevent the disability by the use of physical measures like heat , cold , light , water , electricity and therapeutic exercises . Since the department provides therapy for outpatients and inpatients , it should be conveniently located to serve both categories .

OPERATION THEATURES - A high degree of asepsis is necessary in all areas connected with surgical operation . this cannot be achieved if the patient and equipment have to pass through long corridors and other unprotected areas. zoning is therefore necessary to keep the theatre free from micro organisms as far as possible.

5.2 BUILDING TYPOLOGY STUDY

LITERATURE STUDY-2

ROCK LAND HOSPITAL



LOCATION: Qutub Institutional area,B-33-34,Katwaria Sarai,New Delhi 110016

CAPACITY: 150 patients

ARCHITECT: Mr. Anil Yadav

The hospital is one of the prestigious hospitals in Delhi and can be said to beautifully dovetailing modern treatment with holistic healthcare.

TOTAL BUILT UP AREA : 4360 sqm.



LOCATION

•Location of the hospital should be convenient in relation to the people it serves.

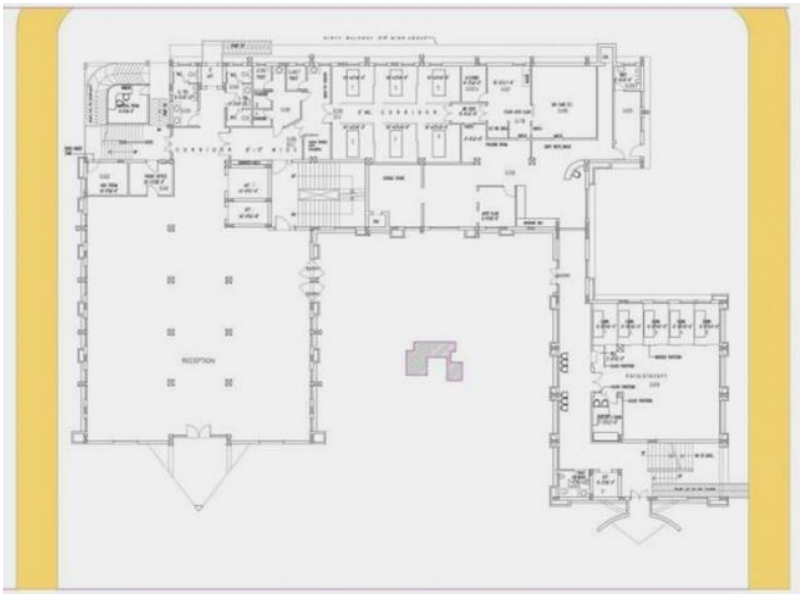
• The site offer sufficient space for hospital departments.

•It is a quiet location with no possibility of future intrusive development not excluded by regulations on adjacent sites.

•The land must not be contaminated and adequate open areas for later expansion must also be planned.

(Source - www.archinomy.com)

DRIVEWAY



CAR PARKING

Parking being provided with in the setbacks of the hospital area mostly at the back.

Some cars were parked in front of the hospital.

Location of the hospital should be convenient in relation to the people it serves.

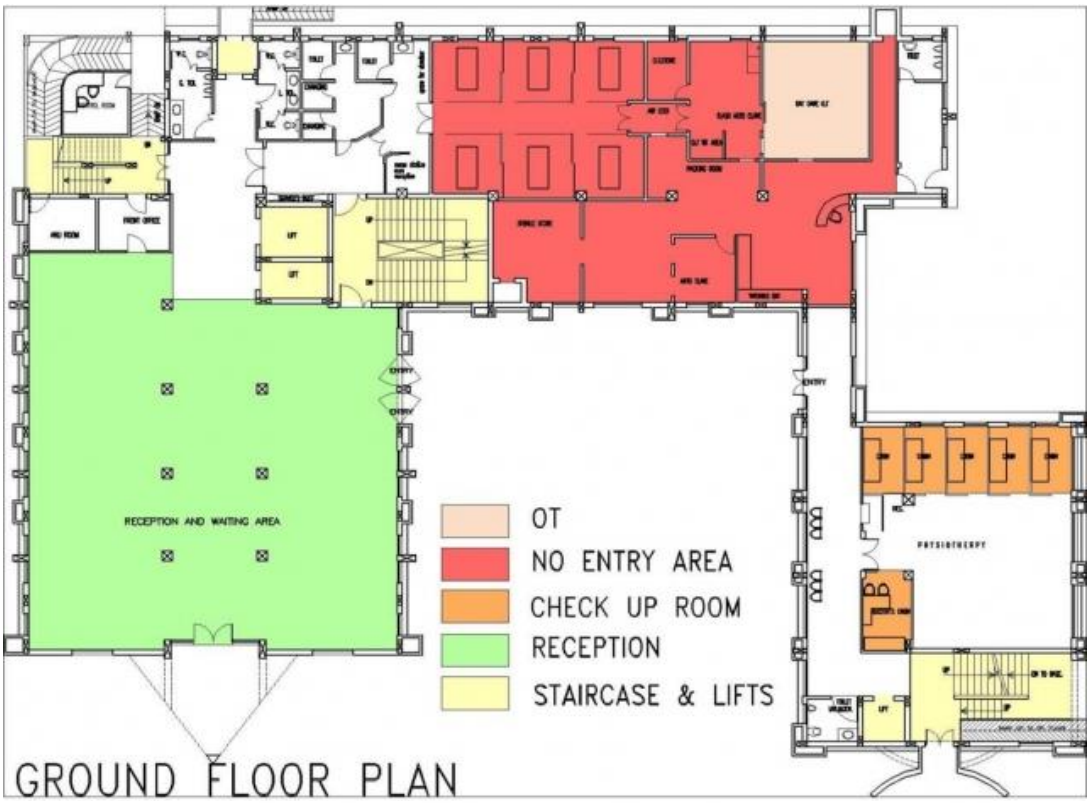
Effective zoning is required.

Privacy and confidentiality are important , especially at the reception desk and clinical rooms during consultations and treatments.

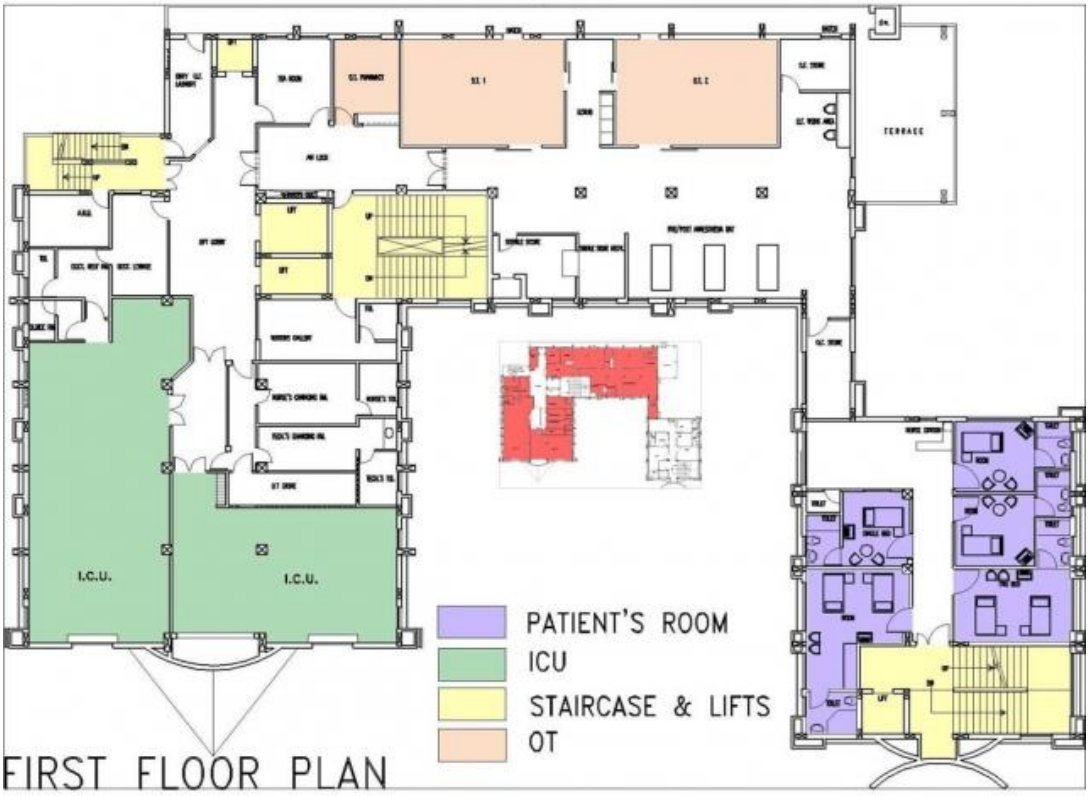
Security and supervision in the premises will be necessary including staff protection against personal assault and equipment safeguarded against theft and vandalism.

For running costs, efficient staffing , energy efficiency, long life and low maintenance approaches should be adopted.

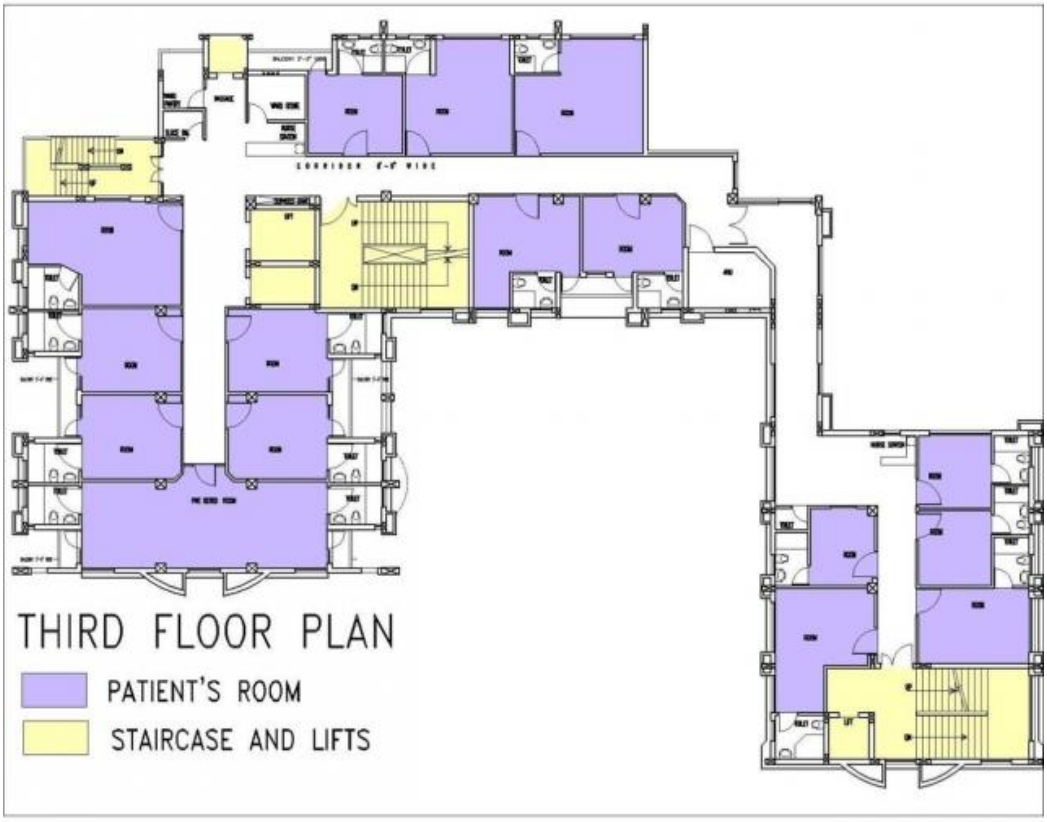
Flexibility and growth should be catered for flexibility in the use of some spaces, and potential for future extension of the building

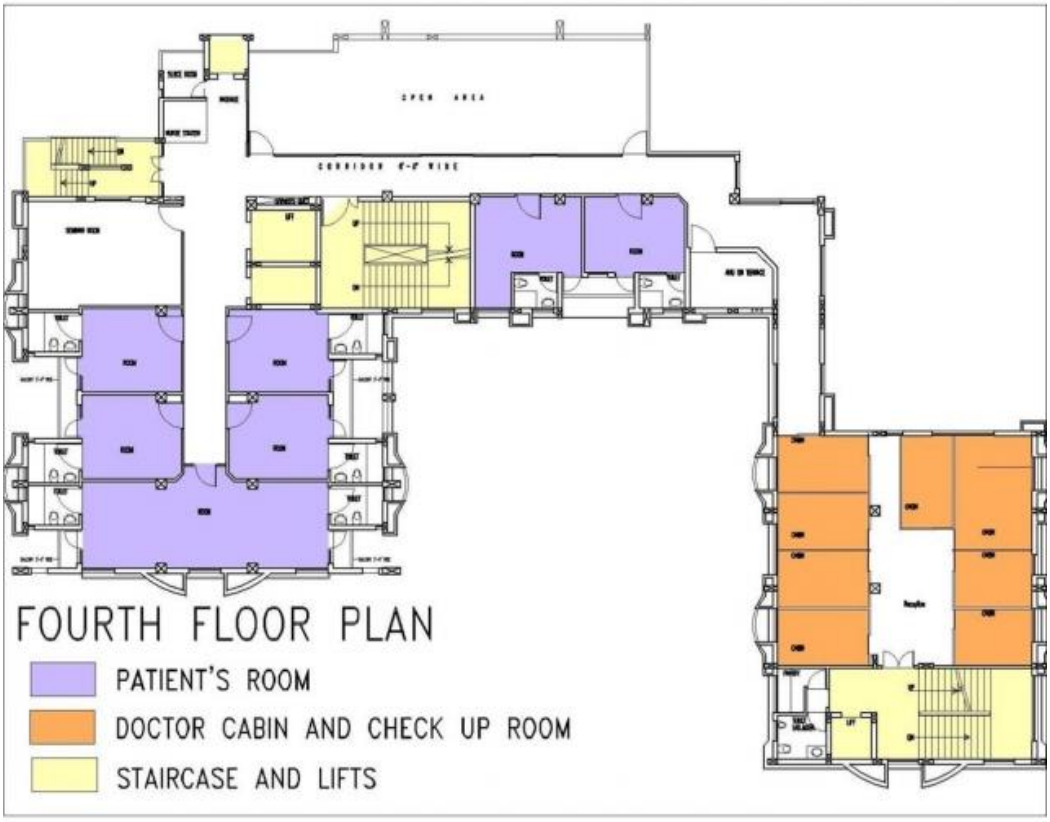


GROUND FLOOR PLAN



FIRST FLOOR PLAN


THIRD FLOOR PLAN
PATIENT'S ROOM
STAIRCASE AND LIFTS


FOURTH FLOOR PLAN
PATIENT'S ROOM
DOCTOR CABIN AND CHECK UP ROOM
STAIRCASE AND LIFTS

ZONING

BASEMENT: OPD services , radiology , laboratory , OPD Pharmacy office

GROUND FLOOR: Reception cum waiting area , Physiotherapy day care unit (Operation Theatre)

FIRST FLOOR: Operation Theatre, ICU, Post-Operative wards

SECOND FLOOR: IPD

THIRD FLOOR: IPD

FOURTH FLOOR: IPD

LANDSCAPING

The glory of the magnificent infrastructure and the warmth of the ambience distinguish Rockland Hospital from the rest. The hospital atrium surrounded with fountains and greenery adds a soothing and healing touch of its own.

5.2 BUILDING TYPOLOGY STUDY

STRUCTURAL

CONSIDERATIONS SUBSOIL LEVEL - Determines how heavy a structure can be erected on site.

FOUNDATION - Items as rock, water, sand, swamp, gravel, and artificial fill will determine what type of foundation is possible and appropriate. Eg. Whether basement would be risky because of water conditions or whether elevator pits would have to be blasted out because of rock presence.

PRONENESS TO EARTHQUAKES FIRE RESISTANT CLASSIFICATION - Fire and building codes specify what fire resistive type of structure like wood framed, steel , concrete structures and any combination thereof is required to meet.

OCCUPANCY CLASSIFICATION - Fire and building codes also placed restrictions on the type of structure that can be built, based on the expected occupancy of the structure.

FIRE PROOFING REQUIREMENTS - The kind of structure will also dictate the amount of water proofing to be done. Eg: what type of walls are allowed, and how many smoke barriers are necessary for each floor.

STRUCTURAL LOADING REQUIREMENTS - Structural configuration will vary considerably between an auditorium, a library, a hydrotherapy room and a row of patients.

TYPES OF STRUCTURES

The three structural materials used today are concrete, steel, and wood. each has advantages and disadvantages. each can be used alone and in conjunction with each other.

CONCRETE - (poured in place) In most cases, concrete poured in place will be reinforced concrete of either slab, columns or beams. For 1-2 storey structures, a wall bearing condition with concrete slabs and beams might be considered. Concrete has proved to be the most versatile material for health care facilities since it gives good fire proofing without additional messy material.

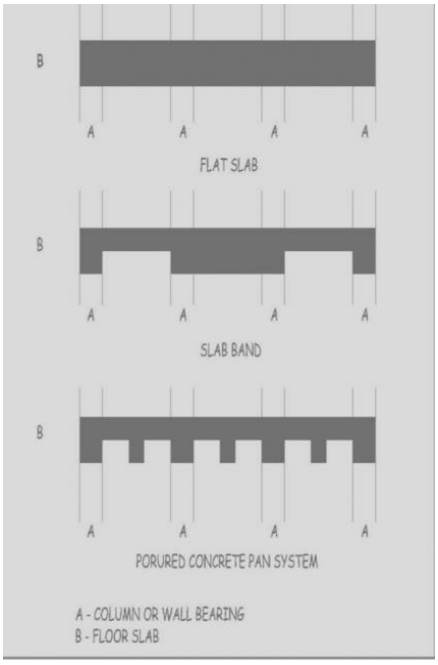
STEEL - A steel skeleton is the next best solution for health care facilities since it can be erected relatively fast, and it allows work to proceed quickly for other trades. However fire proofing requirements can be messy. Steel structures can be combined with concrete floor slabs of both precast and poured types.

CONCRETE (PRECAST) - The precast columns and beams with either precast slabs or poured concrete slabs can be used. Precast and pre stressed floor and roof slabs can also be used but they cannot be cut for utilities to pass through. The holes for utilities must be designed into this system.

WOOD - The wood structure is very easy to build. However, in most instances, fire safety restrictions limit the height of such a structure to a one storey, isolated building. Other fire resistive considerations are necessary such as treated wood, ceiling and partition construction. Wood is quite restricted when used for structural purposes in health care facilities because of its combustibility.

MASONARY STRUCTURE (CONCRETE BLOCK OR BRICK)

A wall bearing masonry structure might be considered for 1,2 or 3 storey structures. It can be combined with concrete slabs or precast slabs. Bothe exterior walls and interior partitions can be wall bearing. (i.e., the walls carry the load in place of beams and columns). This method is best for such buildings as nursing homes, dormitories and some utility type structures because of its cost and ease of construction.



COMBINATIONS

One or more of the preceding types of structures can be combined Figure shows some of the more common combinations used.

MAIN ENTRANCE

General traffic goes only to the main entrance; for hygiene reasons (e.g. risk of infection), special entrances are to be shown separately. The entrance hall, on the basis of the open-door principle, should be designed as a waiting room for visitors. Today's layouts are more like that of a modern hotel foyer, having moved away from the typical hospital character. The size of the hall depends on bed capacity and the expected number of visitors. Circulation routes for visitors, patients and staff are separated from the hall onwards. The reception and telephone switchboard (12m2) are formed using counters, allowing staff to supervise more effectively. However, it must be possible to prevent public access from reception to inner areas and main staff circulation routes.

MAIN ENTRANCE

WAITING AREA

CIRCULATION

Entrance and circulation within the building must consider wheelchair users, parents with small children and people with disabilities.

RECEPTION

.

CORRIDORS

•Corridors must be designed for the maximum expected circulation flow.

•Generally, access corridors must be at least 1.50m wide. corridors in which patients will be transported on trolleys should have a minimum effective width of 2.25m.

•The suspended ceiling in corridors may be installed up to 2.40 m.

Widows for lighting and ventilation should not be further than 25m a part.

•Smoke doors must be installed in ward corridors in accordance with local regulations

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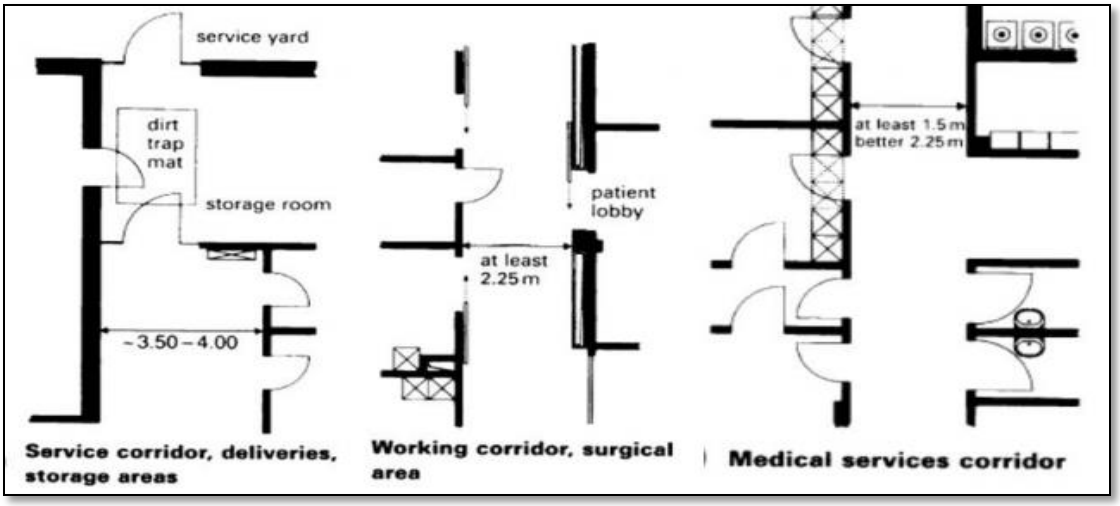
BASEMENT CORRIDORS

Extensive use of artificial light in the basement because of unavailability of natural light in the basement.



UPPER FLOOR CORRIDORS

•Artificial light not required during day time.

•Large non open able windows providing good natural light and external view .

Width of access corridors 2m and 2.5 m .

DOORS

•When designing doors the hygiene requirements should be considered.

•Doors must meet the same standard of noise insulation as the walls surrounding them.

•The clear height of doors depends on their type and function: Normal doors 2.10-2.20m vehicle entrances, oversized doors 2.50m transport entrances 2.70-2.80m Minimum height on approach roads 3.50m .

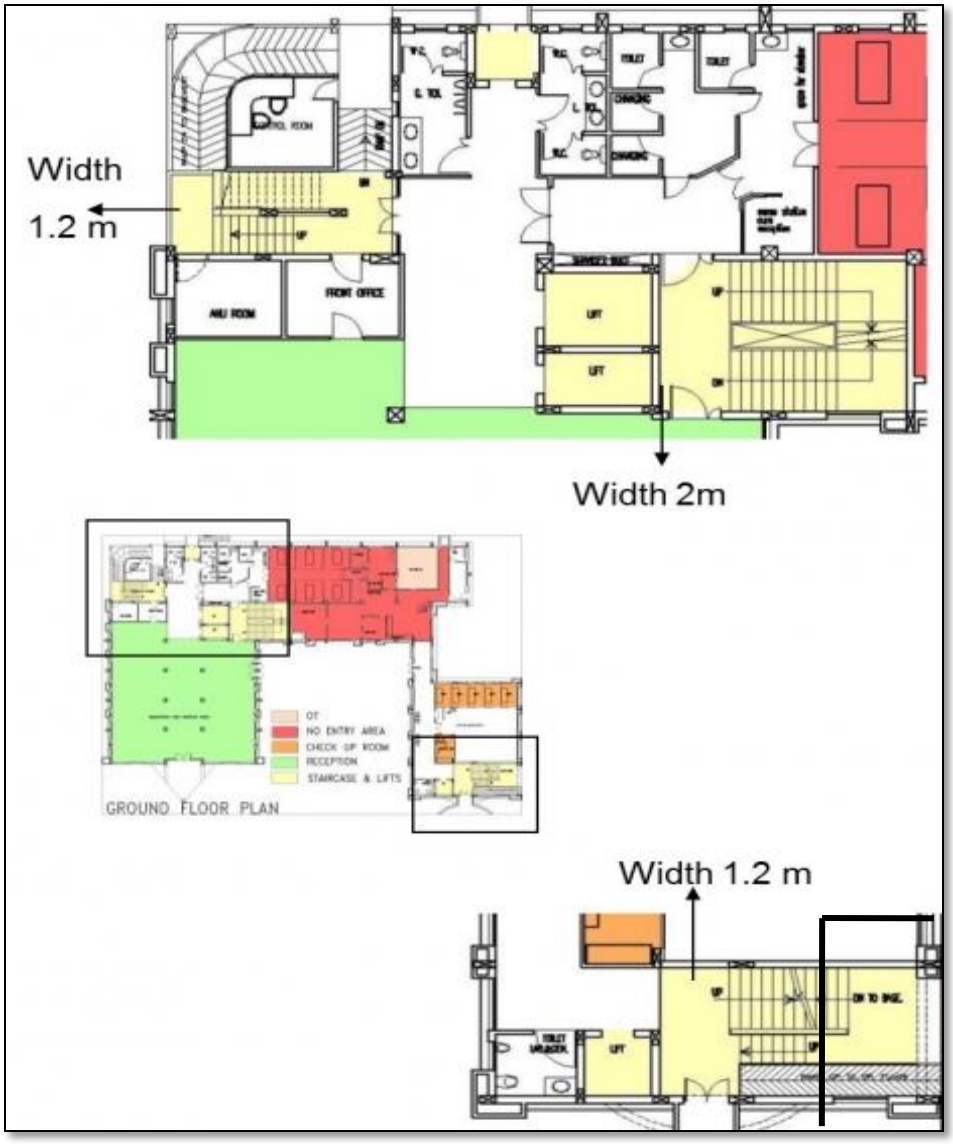
STAIRS

•For safety reasons stairs must be designed in such a way that if necessary they can accommodate all of the vertical circulation.

•The effective width of the stairs and landings in essential staircases must be a minimum of 1.50 m and should not exceed 2.50 m.

•Doors must not constrict the useful width of the landings and, in accordance with hospital regulations, doors to the staircases must open in the direction of escape. Step heights of 170 mm are permissible and the minimum required tread depth is 280 mm.

•Riser / Tread ratio of 150:300 mm.



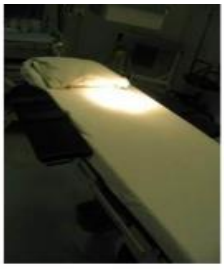
The large internal courtyards allow natural lighting into most of the rooms on all floors. The design grid, on which all subsequent divisions are based, measures about 7.2 x 2.2m. Both the examination rooms and wards {with centers at 3.6m) are designed to comply.

MAIN SURGICAL ROOMS

•A number of necessary supply and workrooms adjoin the operating theatre directly.

•The operating theatre should be designed to be as square as possible to allow working whatever direction the operating table is turned in.

A suitable size would be 6.50 X 6.50m, with a clear height of 3.00m and an extra height allowance of roughly 0.70m for air conditioning and other services. Operating theatres should be fitted out as uniformly as possible, in order to offer maximum flexibility, and centre on a transportable operating table system which is mounted on a fixed base in the middle of the room. The operating theatre should be connected to the anaesthetics room, discharge room, a wash room and sterile materials room via electric sliding doors, fitted on the outer side of the theatre so as not to constrict the space within. The opening mechanisms must be operated by foot switches for hygiene reasons. In the rooms for auxiliary functions, swing doors with a clear width of 1.00-1 -25 m are sufficient.



ANAESTHETICS ROOM

The anaesthetics room should be approximately 3.80 X 3.80m in size and have electric sliding doors into the operating theatre (clear width l.40m). These doors must have windows to give a

visual link with the operating theatre. The room should be equipped with a refrigerator .

ANAESTHETIC DISCHARGE ROOM

•This is set out identically to the anaesthetics room. The door to the working corridor should be designed as a swing door with a clear width of 1.25m .

•Wards must have windows to give natural lighting whereas the service rooms (treatment areas, nurses' rooms, pharmacy etc.) can be located in the artificially lit inner area .

•There is a window for each bed. Size of nursing unit can vary from 20-75 beds. The nursing unit is the most important element of the many comprising the hospital. It is the space where the patient actually lives during his sojourn in the hospital .

X RAY ROOM

Ceiling height for x ray room is 11 feet location. The most important factor that will vary the laboratory program from one hospital to another . One North orientation so as to escape the possible annoyance of direct sunlight Resilient floors acid and grease resistant.

STERILE GOODS ROOM

The size of this room is more flexible but there must be sufficient shelf and cupboard space and it must be accessed directly from the operating theatre.

EQUIPMENT ROOM

Although direct access to the operating theatre is preferable, it is not always feasible; where direct access cannot be provided, the equipment room must be located as close as possible to the theatre in order to reduce waiting times. A room size of approximately 20m should be allowed.

PLASTER ROOM

For hygiene reasons this is not located in the surgical zone but in the outpatient area. In emergencies the patient must be channeled through lobbies in order to get to the operating theatre.

Beds must not be too close together in the recovery room and allow enough space for the anaesthetist and his equipment to reach at least three sides. Awkward additional equipment, such as sublimation stands, also requires adequate space for ease of movement. The patient is supplied via mobile service bridges with connections for a vacuum line, nitrous oxide, oxygen, power and lighting. All the necessary equipment can be accommodated in a suspended equipment trolley.

•The route between the recovery room, the operating theatre and the ward should contain several doors and be as short as possible so the anaesthetist can get to the patients quickly in case of emergency.

RECOVERY ROOM REQUIREMENTS

•The recovery room must accommodate the post-operative patients from more than one operating theatre. The number of beds required is calculated as 1.5 times the number of operating theatres. Adjoining is a small sluice room with drainage sinks. A nurse's monitoring position must be provided from which all the beds can be seen. Designs should allow in daylight to help the patients to orientate themselves.

•Arrangement: The intensive care department must be a separate area, and only accessible through lobbies (for hygiene reasons). Note that according to hospital regulations, each intensive care unit must be a separate fire compartment. Apart from the patient and staff lobbies, visitors should only access the unit through a visitors' lobby (waiting room). The central point of an intensive care unit must be an open nurses'

•workstation from which it is possible to oversee every room. The recovery room of the operating department is often located in the intensive care unit so the patients can economically be cared for by the same staff.

•The number of patients per unit should be between six and ten in order to avoid overloading the medical and nursing personnel and to provide the patient with the best possible care. One nurse's duty station, a sterile workstation (medication), one materials

room and one equipment room per unit (six to ten beds) should be included in the plan.

SERVICE YARD

Hospital logistics should be centered in one place. A service yard, conveniently situated in a low-level supplies and disposal area, makes this possible. The supply and disposal of all hospital goods and materials is conducted via a separate road connection, segregated from the main and emergency entrances. During planning, consideration must be given not just to the parking and but also to the wide variety of waste to be managed (kitchen, septic, metal, glass, paper, chemicals etc.) and the necessary storage requirements. In addition, service yard auxiliary rooms house emergency electricity generators, the sprinkler control room, the oxygen distribution system, and other services.

6. CASE STUDY

A Centre for Tertiary Care
Location : Gomti Nagar, Lucknow
In technical Collaboration with
Apollo Hospitals

Client : **Sahara India Parivar**, in **Technical collaboration with Apollo Hospitals**
Design Team :**M/s Architect Hafeez Contractor**(Design and Concept), M/s Archimedes Consultants (Present)

Total Site : **27 Acres**
Built Up Area : **74,000 sq m** (approx)
Cost : **Rs 400 Crores** (approx.)
F.A.R:2
E.C.S:100
Year of Completion : **2008**

LOCATION:-

• Situated in Gomti Nagar, a newly developed area in Lucknow.
• 31 acres of prime land, corner plot in which 27 acres is used in hospital.
• On back side is railway line.
• Other side is occupied by traditional built form of institute.
• Situated on walking distance from Hanneyman chauraha.

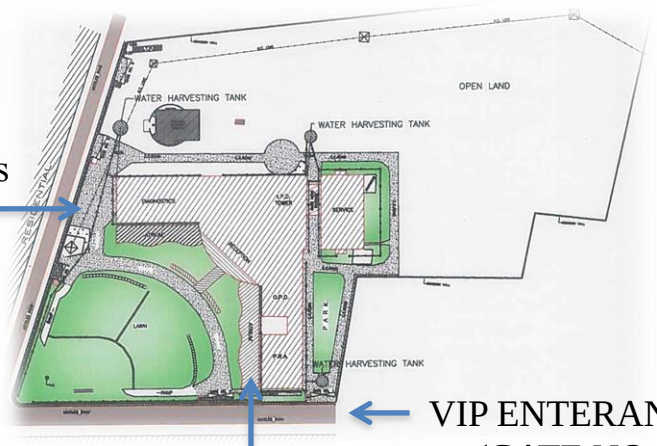
GENERAL FEATURES OF BUILDING:

• A Hospital with **350 beds expandable to 500 beds.** State-of-the-art, multi-specialty, tertiary care.
• hospital providing **7-star facilities Hospital** is broken into two blocks of different heights connected by an atrium.
• Estimated to care for the needs of almost **3 lakh** people with its **outpatient department and 50,000 patients** through its inpatient facility annually.

DESIGN CONSIDERATIONS:-

• The "L' shaped 4-floor high block houses the diagnostics zone in one arm and an outpatient section in another.
• The 13-storey high in patient tower rises from the centre and is fronted by a double volume entrance lobby, which functions as a common foyer to all the zones.

Sahara Hospital



Common Entry's (Gate no. 3)

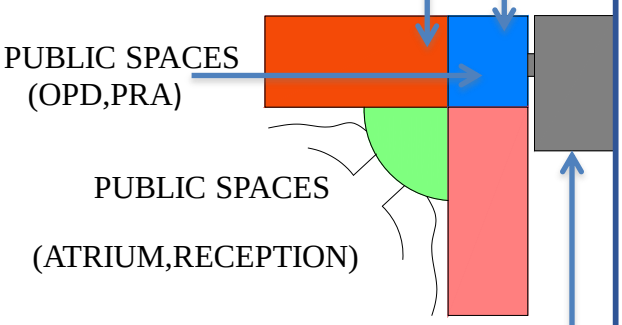
SEMI PUBLIC SPACES (IPD)

PRIVATE SPACES (O.T,ICU,EMERGENCY)

VIP ENTERANCE (GATE NO.1)

Exit (Gate no.2)

ZONING



SEMI PRIVATE SPACES (SERVICE BLOCK)

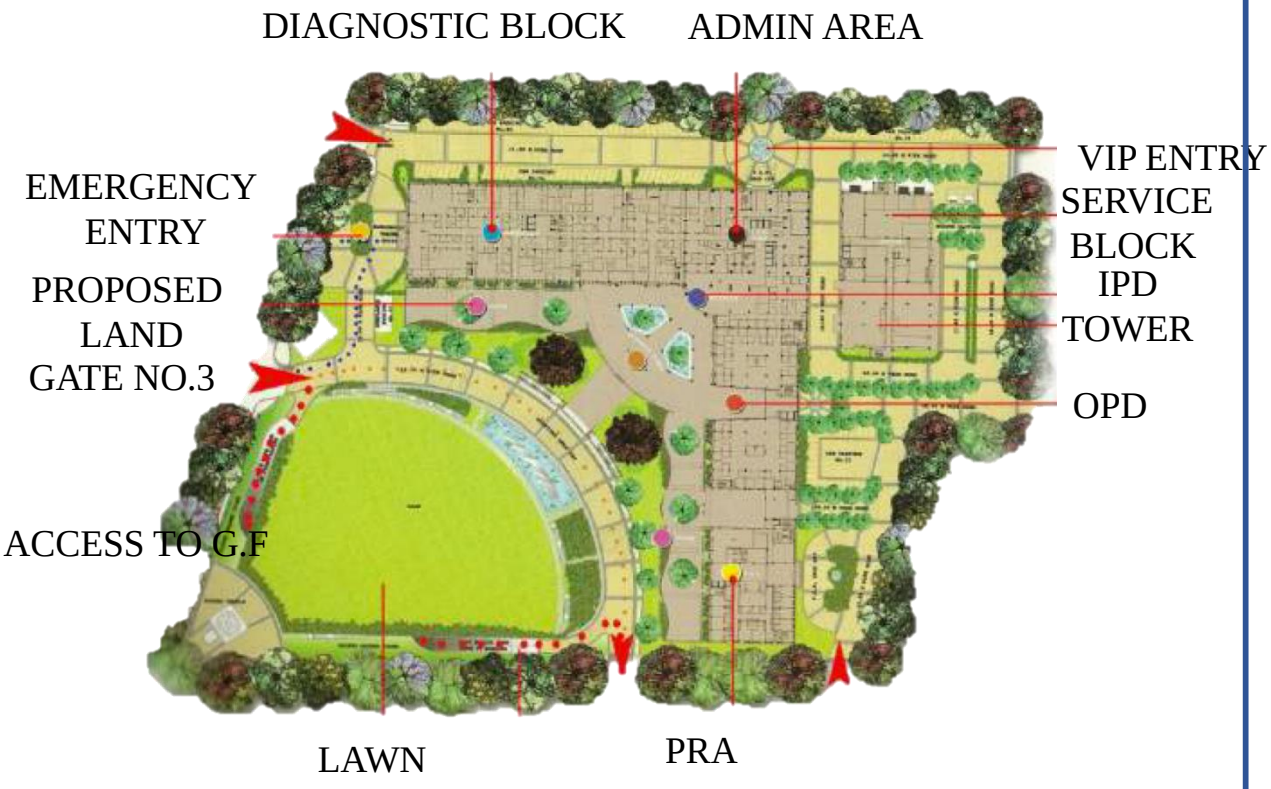
• Main Access is from **24 mts wide roads from two sides.**

• Across the road is the Gomti Nagar commercial area. Embarked with number of small malls in the area. Other vicinity is flooded by residential sector.

• **Two entry from main road** which serves The **Service block and OPD**, will serve general public and Doctors.

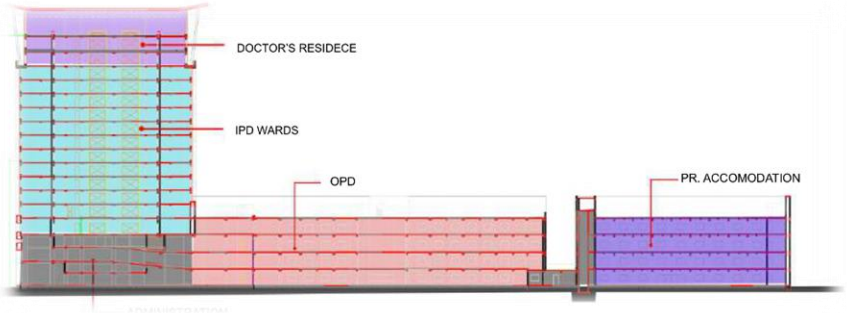
• Other **separate entry for Emergency area.**

LOCATION : **Gomti Nagar, Lucknow**
SURROUNDING :Commercial,Residential
ROAD: **24mts. Wide Road** From **Two Sides**
BUS STOP : Heinemann Chauraha 850 Mts.
CHARBAGH BUS STATION: **12.6 km** takes **40 minutes**,buses available every 15 minutes
AIRPORT :**23.7km** takes **1hour 39minutes** from Heinemann
RAILWAY STATION **: 12.5 km** away from heinemann takes **55 minutes** from **bus via route no. 45** and it takes **25 minutes from car**

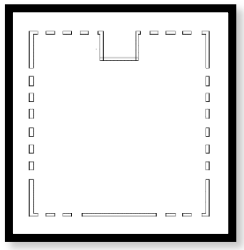


UNIQUE FEATURES OF THE HOSPITAL:-

- A **Hyperbaric Oxygen therapy** centre which is a specialised
- Centre to treat diseases caused by **ischemia** (**Oxygen depletion in tissues).**
- Sahara Hospital will have the most modern delivery system –
- **"Pneumatic Tube"** to achieve efficient & safe transportation of drugs, pathological samples.



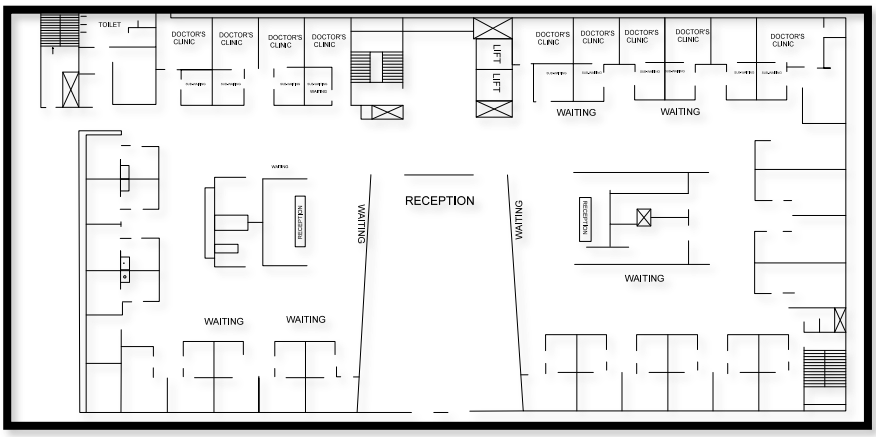
SECTION



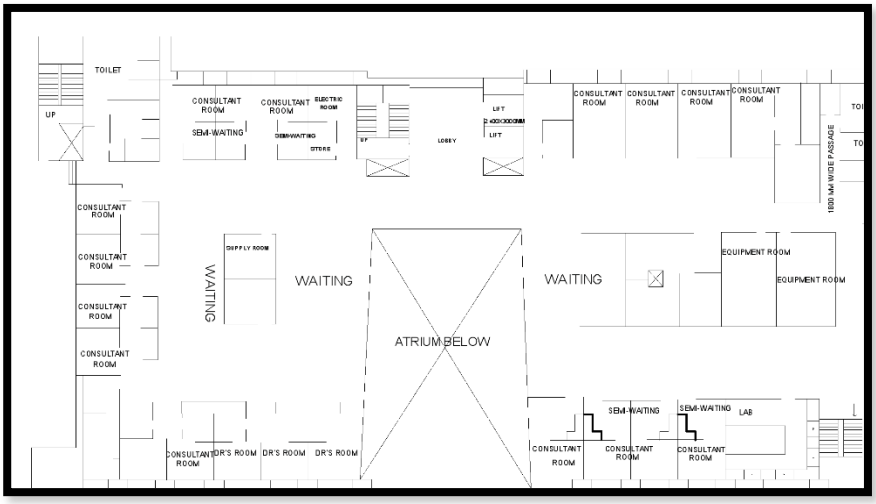
IPD STUCTURE LAYOUT

PRA

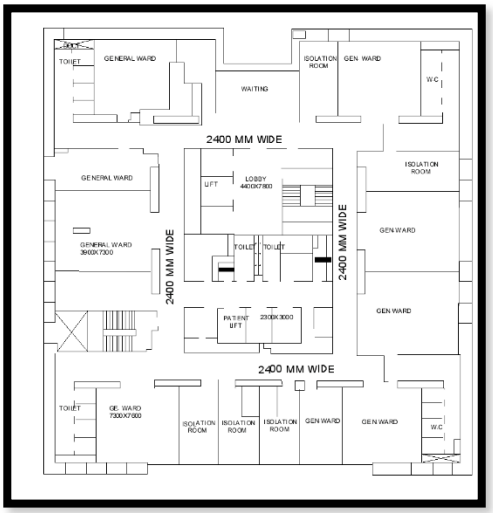
O
P
D



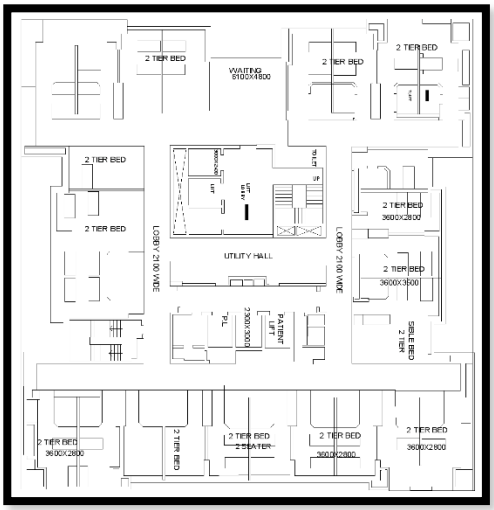
GROUND FLOOR PLAN



FIRST FLOOR PLAN

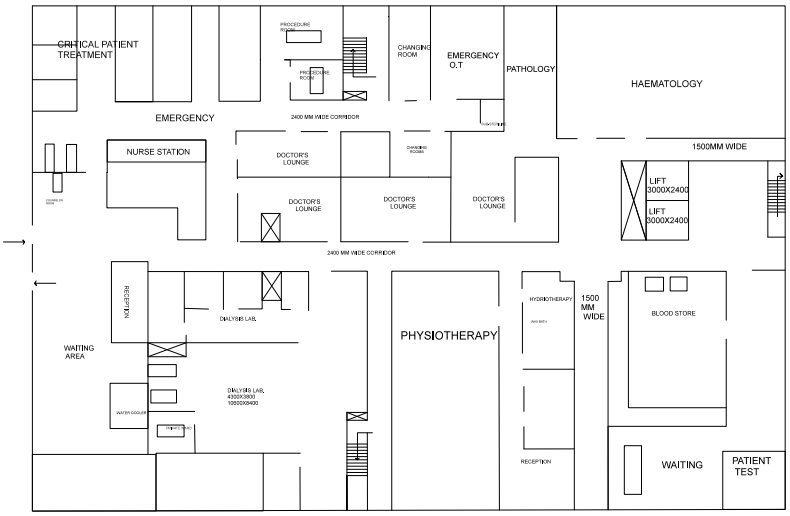


LEV.01 IPD

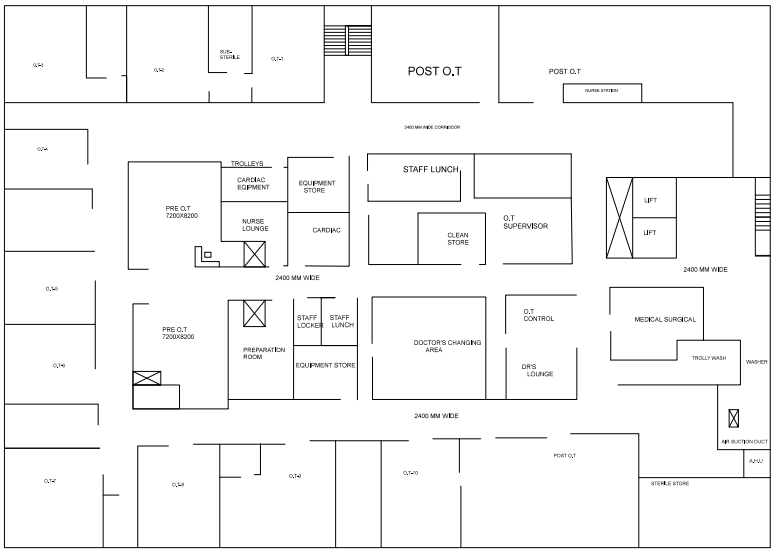


LEVEL 03 IPD

• DIAGNOSTIC BLOCK



GROUND FLOOR PLAN



FIRST FLOOR PLAN

- Multiple entrances of all diagnostics areas.
- Linear block consists of three major zones on Ground floor-

A) Emergency- O.T., triage room, plaster and consultant's room.

B) Diagnosis- radiology, C.T. scan, pathology labs, etc. And administration area

C) IPD tower .

D) Services Block

- Minor OT is provided in this area.
- All three are approachable by different entries.
- Lifts are provided at the middle and end of the corridor.
- 10 O.T.'s and I.C.U.'s are placed on First floor.

• SERVICE BLOCK

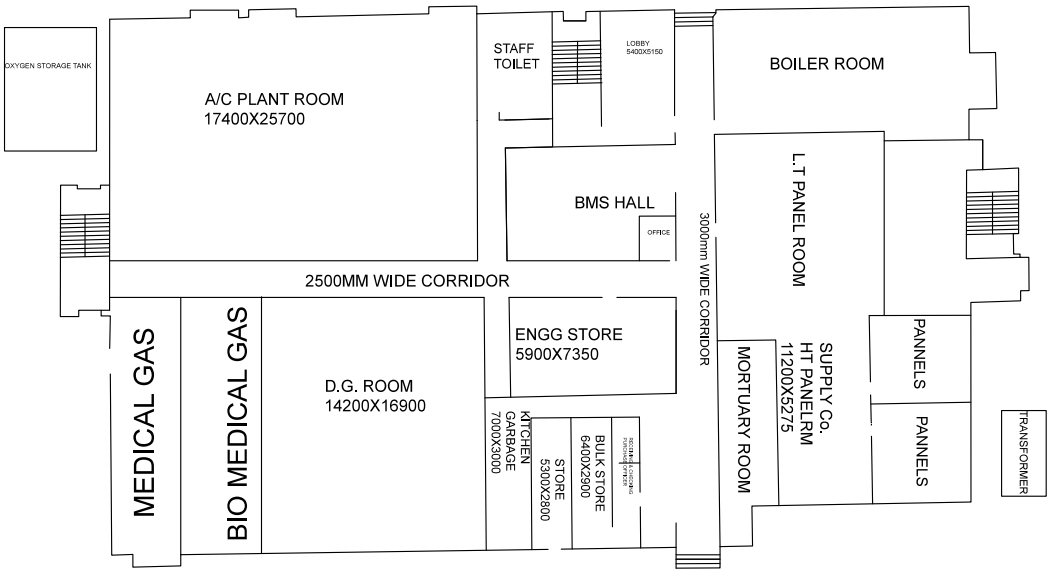
- Service Block in the rear of the main hospital building.
- Separate service entry through one separate gate
- Almost whole of the block is double height (6m).
- Block abutting the service court accommodates

1. L.T. and H.T.,
2. Food receiving areas,
3. water treatment plant,
4. Telephone exchange,
5. Store
6. gas manifold room
7. L.P.G. stores,
8. D.G. set, workshop,
9. change rooms,
10. A.C. plant room,
11. Linen store,
12. Laundry, Boiler,
13. Mortuary.

• These services travel the vertical distance by ducts and then span the horizontal distance running through ducts underground and covered by concrete slab.

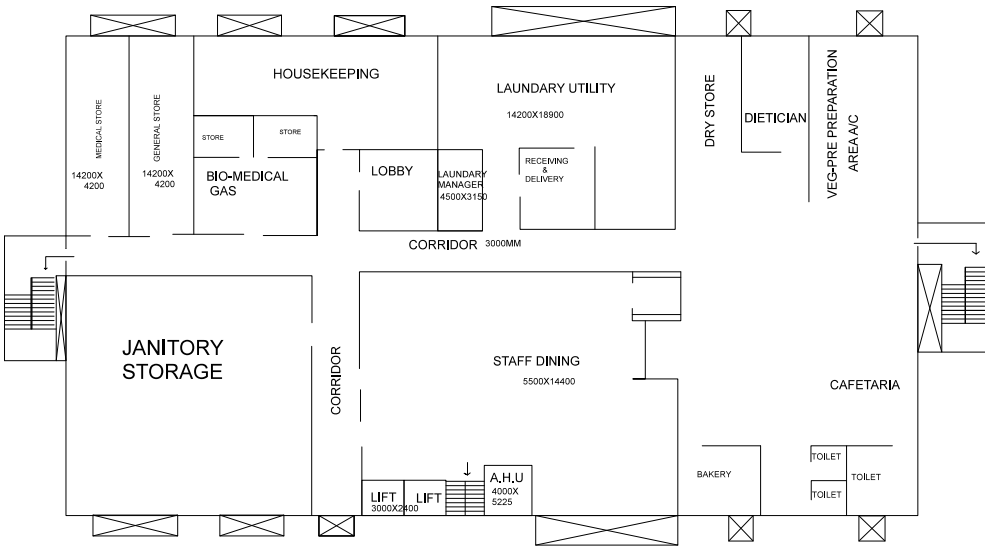
- Basements are largely for the parking and security control room.

- SERVICE BLOCK FLOOR PLAN



GROUND FLOOR PLAN

KITCHEN CYLINDER



FIRST FLOOR PLAN

- CASE STUDY 2-

DURGABAI DESHMUK HOSPITAL

- Veteran freedom **Durgabai Deshmuk** started it as a nursing home with **15 beds in 1962**
- **Objective** to serve the poor people.
- It has grown into a full-fledged hospital with more than 350 beds.
- It is working under the umbrella of **Andhra Mahila Sabha**

- **Durgabai Deshmukh Hospital** Andhra Mahila Sabha
- **Location:-** Vidyanagar Hyderabad India
- **Organisation**

Affiliated university:- National Board of Examinations

Services

1. Emergency department
2. 350 BEDDED Hospital

- **History Founded in** 1962

Facilities:-

- **Family Planning Unit**
- **Immunization programme**
- **24 hours Pharmacy**
- **Spacious Library and Hostel Facility**
- **Blood Bank**

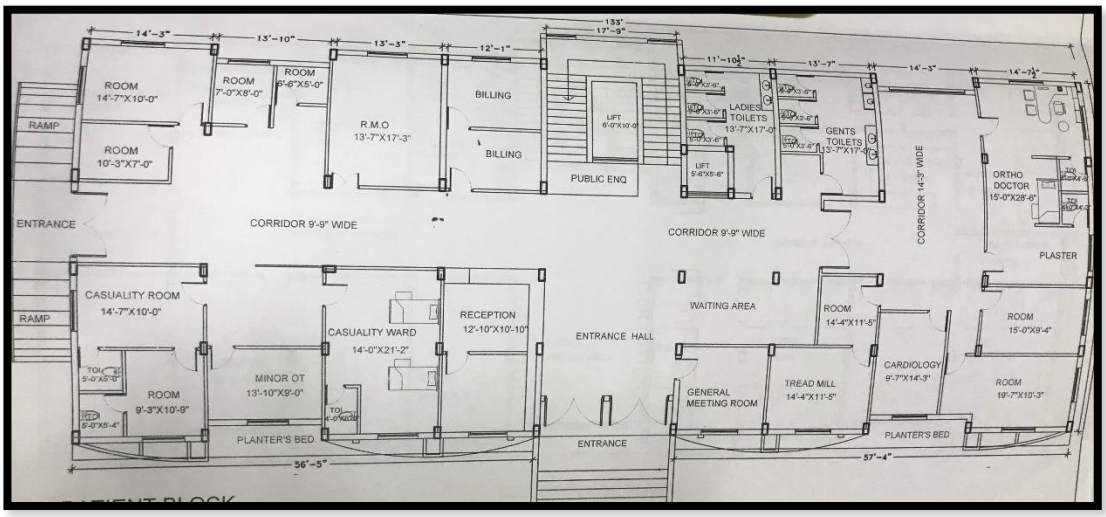
- SITE ANALYSIS

- 30M ROAD WIDTH , 1 ENTRANCE AND 1 EXIT
- AT THE NORTH SIDE MEDICAL STORES RESTAURANTS AND MIX USE BUILDINGS
- FLOOR PARKING IN FRONT OF OPD BLOCK
- SERVICE BLOCK AT BACK SIDE
- BRIDGE CONECTIVITY BETWEEN THE BLOCK
- 2 GENERATORS ,1 FOR REGULAR USE 300 KVA AND 1 FOR STAND BY 260 KVA
- LIGHT DISTRIBUTED THROUGH L.T PANNELS
- DIESEL STORAGE -2 TANKS;1000EACH

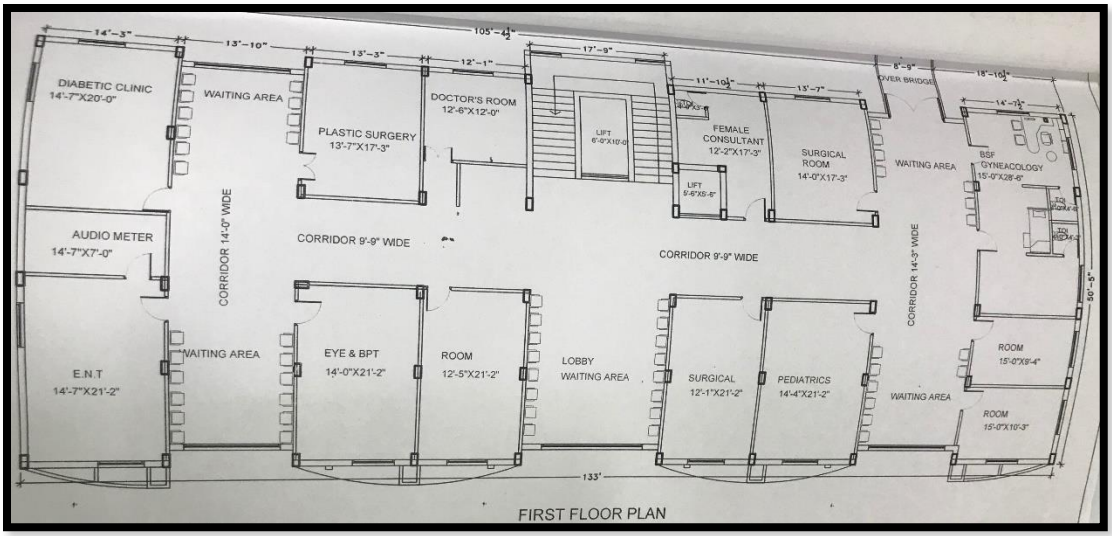
- ACCESS TO SITE

- SITE AREA:
  8 ACRES

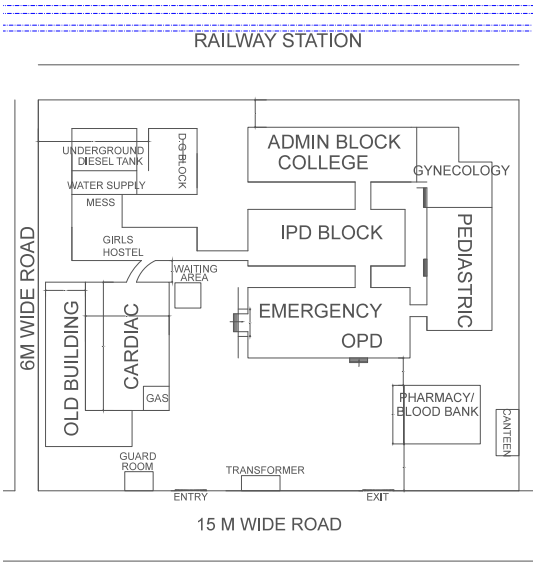
O.P.D BLOCK



GROUND FLOOR PLAN

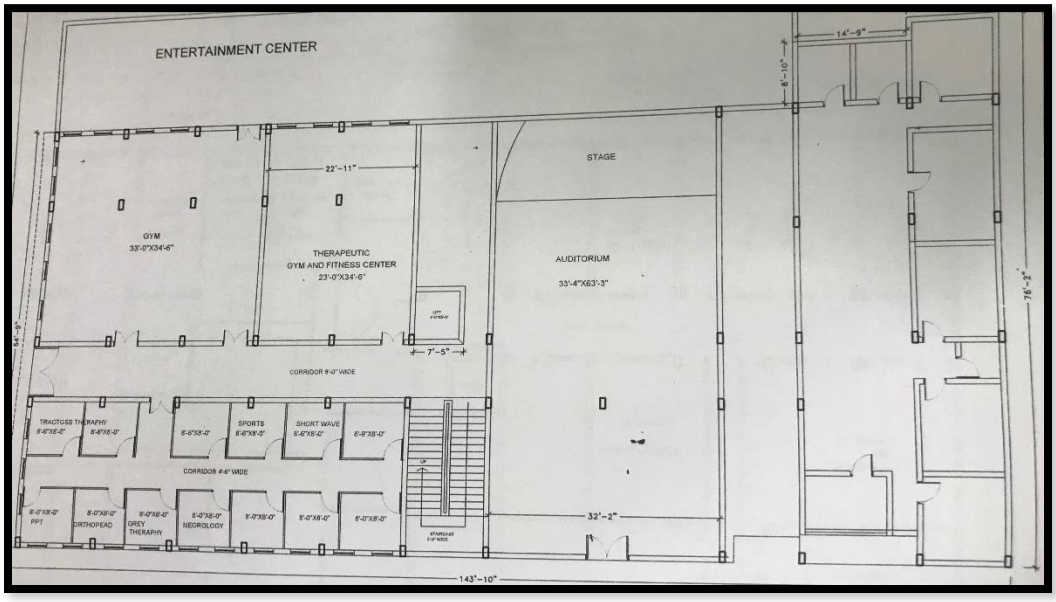


FIRST FLOOR PLAN



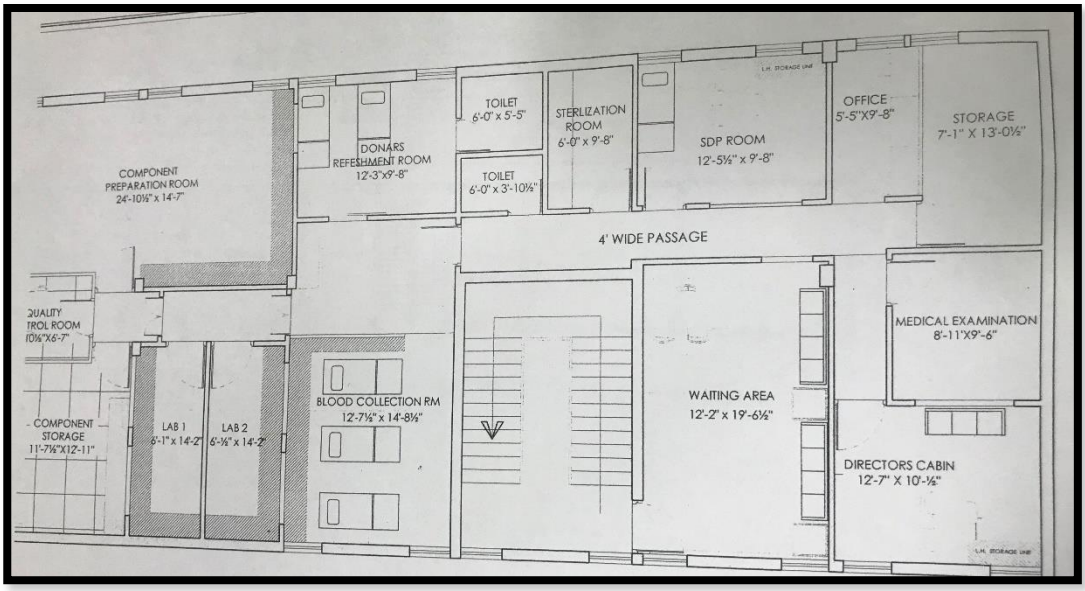
SITE ANALYSIS

- PHYSIOTHERAPY DEPARTMENT & COLLEGE



GROUND FLOOR PLAN

- BLOOD BANK


COMPONENT PREPARATION ROOM 24-10½" x 14'-7"
DONARS REFRESHMENT ROOM 12'-3"X9'-8"
TOILET 6'-0" x 5'-5"
TOILET 6'-0" x 3'-10½"
STERLIZATION ROOM 6'-0" x 9'-8"
SDP ROOM 12'-5½" x 9'-8"
OFFICE 5'-5"X9'-8"
STORAGE 7'-1" X 13'-0½"
4' WIDE PASSAGE
QUALITY TROL ROOM 10'½"X6'-7"
COMPONENT STORAGE 11'-7½"X12'-11"
LAB 1 6'-1" x 14'-2"
LAB 2 6'-½" x 14'-2"
BLOOD COLLECTION RM 12'-7½" x 14'-8½"
WAITING AREA 12'-2" x 19'-6½"
MEDICAL EXAMINATION 8'-11"X9'-6"
DIRECTORS CABIN 12'-7" X 10'-½"

CONCEPT STAGE

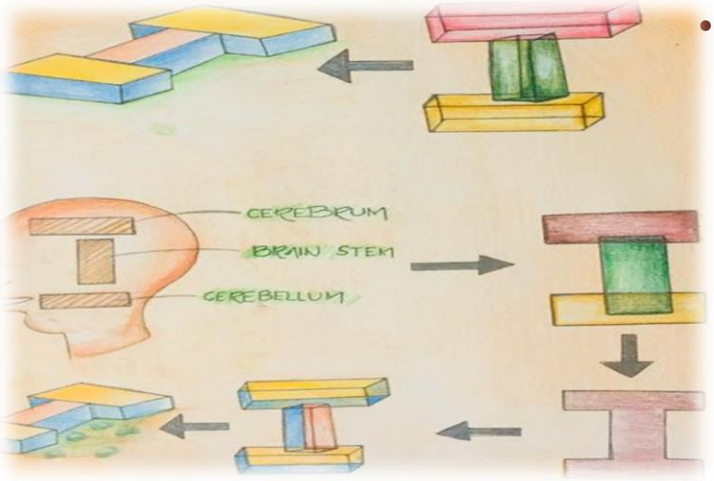
CONCEPT:

- **Story Line Of Concept:-**

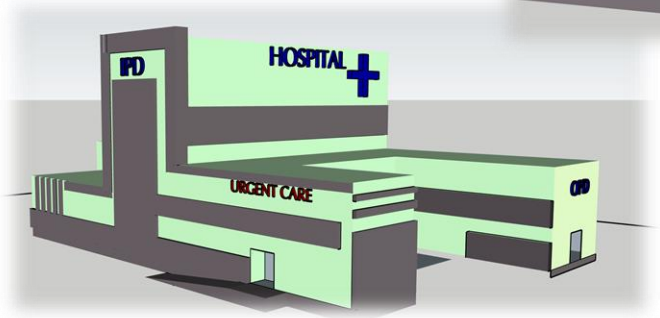
As per my topic hospital is of Neuro Super Speciality Hospital So taking 3 major parts of brain Named as :-

1. CEREBRUM
2. CEREBELLUM
3. BRAIN STEM

- I will be Designing Super-Speciality Hospital. It will be holding Super Speciality in Neurology
- Neurology is a term which defines disease,disorder related to the brain .Hence I am taking the Concept from the Brain puzzle .
- This Puzzle belongs to the Care Unit for Neurology

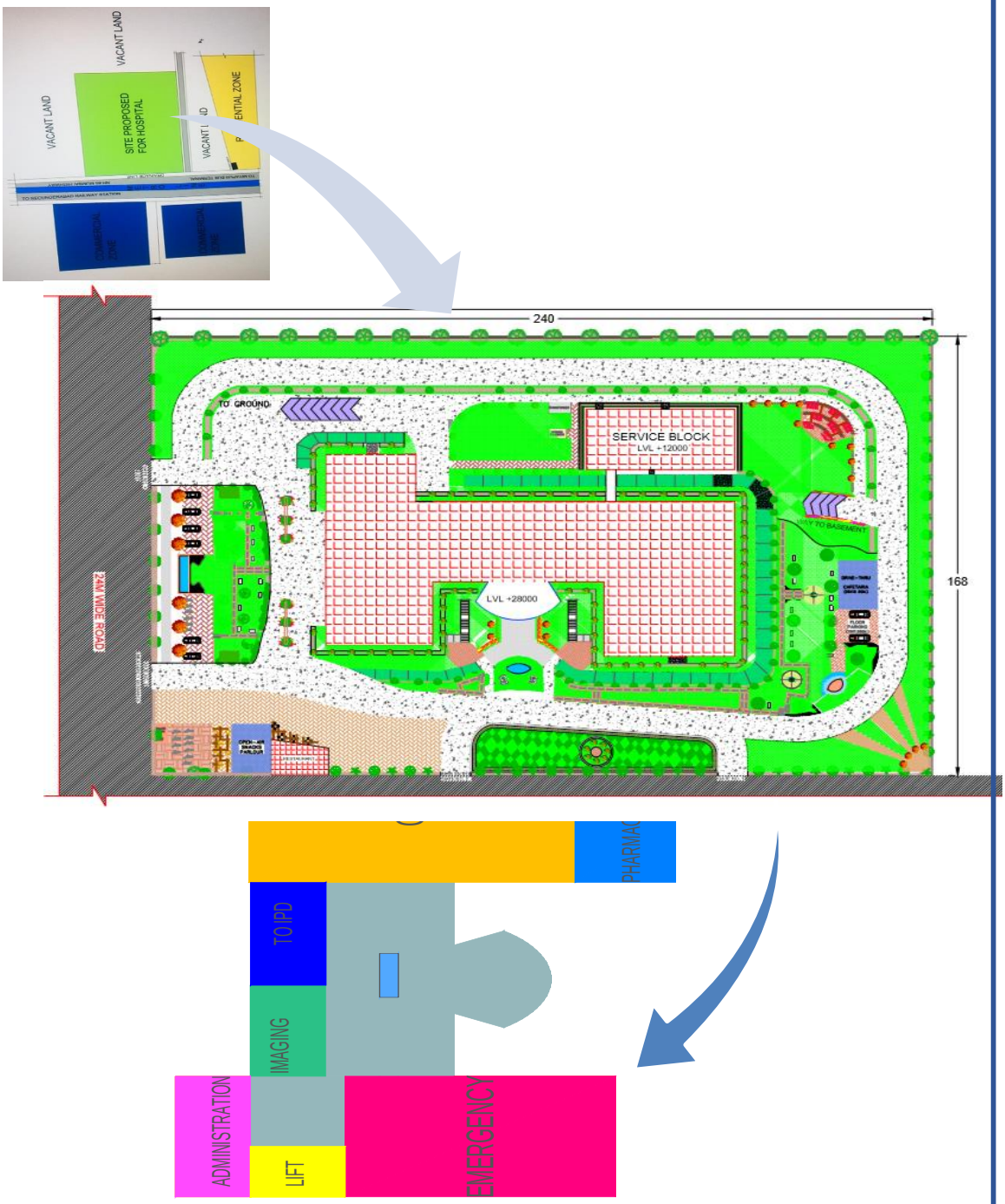


- FORM EVOLUTION



- SITE ZONING

- Area of the hospital: An area of **65-85 m2** per bed has been considered to be reasonable. The area will include the service areas such as waiting space, entrance hall, registration counter.
- In addition, Hospital Service buildings like Generators, HVAC plant, Manifold Rooms, Boilers, Laundry, Kitchen and essential staff residences.

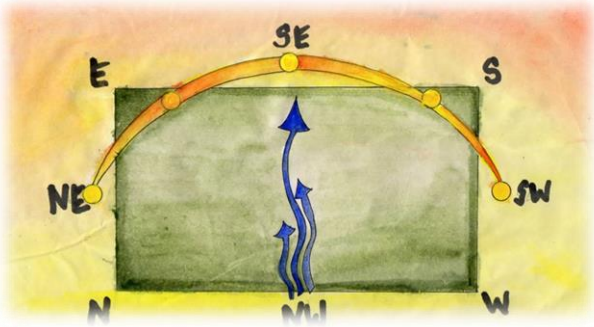


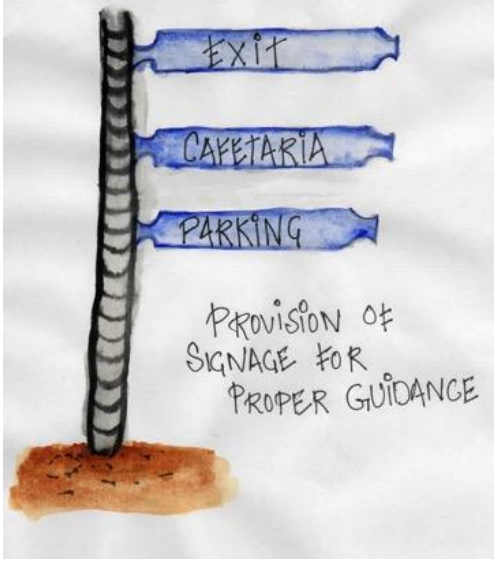
- CLIMATIC IMPLICATIONS

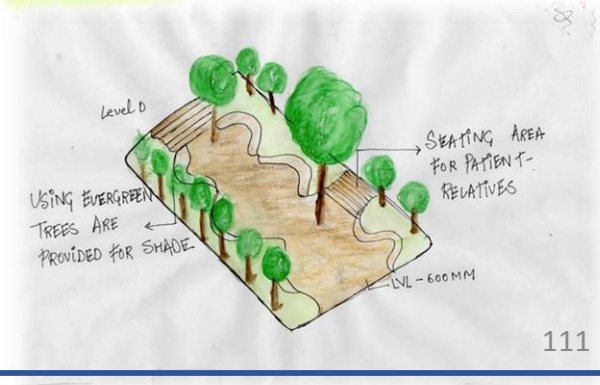
•Tropical Wet And Dry Climate

Building Components are placed according to the Climate Consideration
The facing of site is Northwest and the wind Direction is from Northwest to SouthEast
Main Features used for Climatic Implicatiosn are:-

1. Water Body infront of main Enterance to avoid Hot wing passing throughout the Building
2. Dense trees are provided for natural Shades
3. Glass Enterance for low absorption of heat by the building
4. For better exchange of heat and transfer of wind , planning has been adopted
5. Low Heat Absorbing Bricks
6. Heat and Water Resistant Paints are used
7. Good Landscaping with natural Flora and Fauna is used
8. Large evergreen trees along pedestrian paths and parking.
9. Noise, dust blocking & nitrogen fixing trees along periphery.







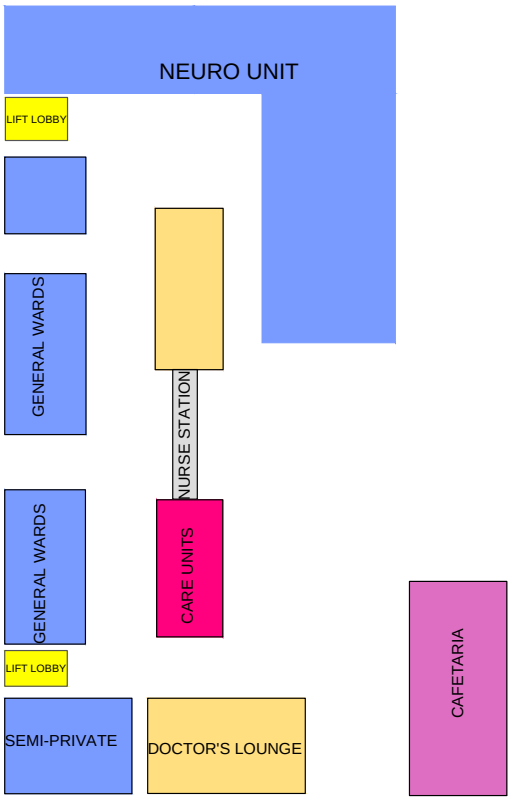
- CLIMATIC CONDITIONS

MONTH
RECORD HIGH ℃
AVERAGE HIGH ℃
DAILY MEAN ℃
AVERAGE LOW ℃
RECORD LOW ℃
AVERAGE RAINFALL MM
AVERAGE RAINY DAYS>1 MM
AVER. RLATVE HUMIDITY(%)
MEAN MONTH. SUNS. HOURS

JAN	FEB	MR.	APR	MA.	JUN	JUL.	AU.	SEP	OC.	NO.	DE.	YR.
35.6	39.1	42.2	43.3	44.5	44.5	37.4	36.1	36.1	36.7	34.0	33.8	45.5
28.8	31.9	35.4	37.9	39.0	34.5	30.8	29.8	30.5	30.6	29.0	28.0	32.2
22.2	25.1	28.4	31.5	33.0	29.3	27.0	26.2	26.6	25.7	23.2	21.6	26.7
15.2	17.6	20.8	24.3	26.2	24.0	22.6	22.1	22.0	20.3	16.9	14.5	20.5
6.1	8.9	13.2	16	16.7	17.8	18.6	18.7	17.8	11.7	7.4	7.1	6.1
13.2	7.9	15.3	20.2	35.7	103.8	169.9	178.8	158.3	97.2	22.4	5.9	828.5
0.6	0.8	1.0	2.1	3.4	10.0	12.4	14.1	9.7	6.3	2.9	0.7	64.0
56	49	39	37	39	61	71	74	72	63	58	57	56
278.6	269.3	263.4	273.4	281.5	179.8	141.1	137.3	167.2	227.3	247.1	263.2	2729

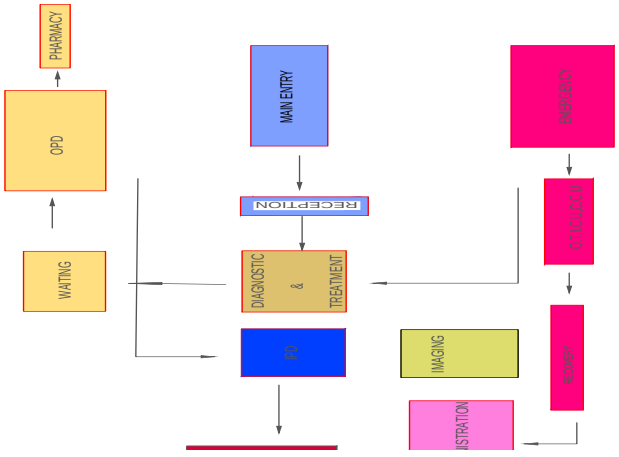
- VERTICAL STACKING

Doctor's Residence	Doctor's Residence
IPD	IPD
IPD	IPD
IPD	IPD
O.T	IPD
CARE UNITS	BLOOD BANK,OPD
O.T'S,CARE UNITS	LABORATORY,OPD
EMERGENCY	IMAGINARY,OPD, PHARMACY

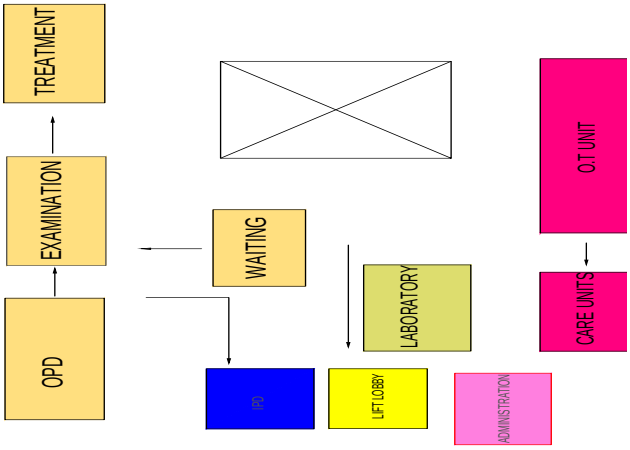


IPD FLOOR

- HORIZONTAL STACKING



GROUND FLOOR

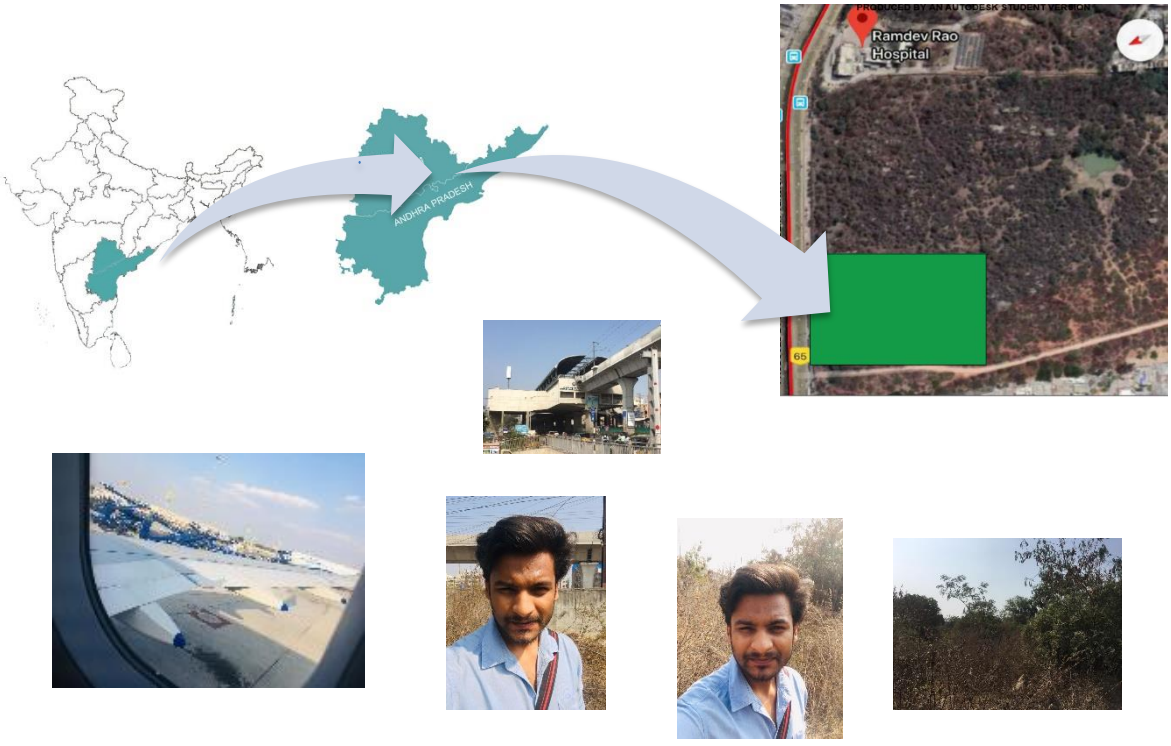


FIRST FLOOR

7.SITE ANALYSIS

7.SITE ANALYSIS

The site for construction of hospital is 10 ACRES allotted by HMDA (Hyderabad Metropolitan Development Authority)



- Hyderabad is located in central Telangana and is spread over an area of **260 km^2**.
- This Site comes in under **Hyderabad Metropolitan Development Authority**
- The city lies in the Deccan Plateau and rises to an average **height of 536 m above the sea level.**
- The city lies at 17.366° N latitude and 78.476° E longitude.

- **Soil bearing capacity** and the it is ranged from **41 kg/cm2 to 53 kg/cm2**
- Top layer: Silty clay of intermediate to high plasticity,Sand-30%,Silt-60%,Clay-10%
- Climate: **Tropically Wet and Dry Climate**

• ON SITE CONSIDERATION

- IMPACT ON EXISTING FACILITIES:-

1. There is no Hospital in the Existing Surrounding ,Hence the Health Facilities will provide better approachment to the Society
2. Accidents on near by roads like Highways or Regular road network will be cured
3. It will increase near by Economy
4. It will enhance on the socio Economic status

- IMPACT ON LAND USE:-

1. The Site is located in an Urban Landscape
2. The Development of project will lead to a possitive change

- IMPACT ON ECOLOGY:-

1. Site Area is Flat Land with Limited Vegetation
2. The Project will include the removal of vegetation but vegetation will be controlled by Landscaping

• ACCESS TO SITE:-

1. Takes **55 Minutes** from Site To **Secunderabad Railway Station**
2. Takes **5 Minutes** from site to **Metro station**
3. Takes **50 minutes** from site **to Airport**
4. Takes **50 minutes** to **Main Bust Stand**

- AREA STATEMENT:

SITE AREA- 10 ACRES

=40,468 Sqm.

Ground Coverage- 35% Of Plot Area = 14,163 Sqm.

F.A.R- 2

(According to Norms can Raise upto 35%)

=2+35% (of F.A.R)

=2.7

So, Built-up Area is F.A.R X SITE AREA

=2.7X 40,468

=1,09,263 Sqm.

Number Of Floors = Builtup/Ground Coverage

= 1,09263/14,163

= 7.7

No. Of Floor is 8

The number of beds required for a district having a population of 20 lakhs will be as follows:

The total number of admissions per year = 20,00,000 x 1/50 = 40,000

Bed days per year = 40,000 x 5 = 2,00,000

Total number of beds required when occupancy is 100% = 200000/365=**547 beds**

Total number of beds required when occupancy is 80% = 100000/365 x 80/100 = **440 beds**

- DISTRIBUTION OF BEDS
- Neuro 10%-15%
- ICU- 5% Of Total Bedded Strength

  =25 bedded for ICU
- Laundry Unit 1.2/bed sqm
- Dietician Unit 0.5/bed sqm
- Private Wards- 10% of the total bed strength =50 Bedded

- Medical 20%-30%
- Surgical 15%-20%

  (includes Orthopedics – 5%)
- Obs & Gynae 2%-5%
- Peadiatrics 5%-8%
- ENT & Eye etc 7%-10%

8. CLIENT BRIEF

8.1 CLIENT BRIEF ABOUT PROJECT

Superspecialty hospital will be a 500 bedded hospital with different superspecialties like neuro , pediatric ,ortho , gynecology , ENT ,dental , ophthalmology , dermatology and with cardiology as super speciality . The hospital will be provided with modern technology , equipments like MRI , CAT scan , mammography , ultrasound , multipurpose x ray , modern operation theaters and cath lab for primary cardiac surgery .

8.2 CLIENT

Hyderabad Metropolitan Development Authority

8.3. TANGIBLE -

• Superspeciality facilities including –

1.Cardiology

2.Neurology (superspeciality)

3.Pediatrics & Neonatology

4.Gynecology

5.Dermatology

6.Orthopedics

7.Dietetics

8.Ophthalmology

9.Gastroenterology

10.ENT

11.Physiotherapy

12.Radiology

13.Pathology

•Gynecology and maternity suite

•Mortuary department

•Physiotherapy department

•Radiology department

•Administrative unit

•Central sterilization and supply department

•Dietary department

•Central stores department

•Laundry department

•Engineering services

•Major OT's including OT for gynae and maternity

•Laboratory services

8.4.2. INTANGIBLE

A well functional hospital building in terms of circulation and spatial arrangements. Proper provision of light and ventilation to the wards . Provision of healing environment for the patient so that they can recover easily.

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