THESIS REPORT ON

“PARENTERAL PRODUCTION FACILITY, BARABANKI, U.P.”

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

BACHELOR OF ARCHITECTURE

BY

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THESIS GUIDE

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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.).

CERTIFICATE

I hereby recommend that the thesis entitled“PARENTERAL PRODUCTION FACILITY, BARABANKI“ under the supervision of Prof. MOHIT Kr. AGARWAL, is the bonafide work of the
student 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
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3. Thesis Title: PARENTERAL PRODUCTION FACILITY, BARABANKI, U.P.

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ACKNOWLEDGEMENT

I would like to take this opportunity to thank my beloved thesis guide **Prof. MOHIT KUMAR AGARWAL**, who have always helped me and have give me brilliant ideas. I highly appreciate all the help they have given to me. Their concerns about the many problems involved in acquiring land for **PARENTERAL PRODUCTION FACILTY** or for the expansion of existing ones have encouraged me to conduct this study as a means of presenting more explicitly the difficulties of **PARENTERAL PRODUCTION FACILTY** in new areas.

I would like to thank the Dean **Prof. Mohit Kumar Aggarwal** and thesis coordinator **Ar. Ramakant** without whose help and co-ordination this thesis may not have been possible. I also want to thank all my faculty members for the guidance that helped successfully integrating the research aspects of the project throughout this thesis.

I am grateful to my family for standing with me throughout and finally my heartiest thanks to my friends**: Pushpika Mishra, Alok Singh, Randhir Singh, Suyash Pratap Singh, Sayem Amjad (MSB Engineer's)** and all my classmates who have been helpful throughout the five years of my graduation stage.

Deepak Singh

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10.2-Floor Plans
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10.4-Sections
10.5-3D Views
10.5-Model Views

INTRODUCTION . .

INTRODUCTION TO THE TOPIC....

PARENTERAL PRODUCTION FACILITY Produces Intravenous infusion formulations including nutritional products, in Glass & form-filled seals bottles. Parenteral preparations are pyrogen-free preparations intended to be administered other than oral routes. The Term Parenteral is Derived from two Greek words.(**PARA – outside, ENTERON – intestine**).

PURPOSE OF PARENTERAL: This project covers the aspects of industrial designing which will help me not only to learn about industrial development but also help me to better my skills in Industrial Designing.

TYPES OF PARENTERAL: Pareteral are four types ar as follows :

- INTRAVENOUS
- INTRAMUSCULAR
- SUBCUTANEOUS
- INTRADERMAL

ROLE OF ENTERTAINMENT: Parenteral Neutrition bypasses the normal digestion in the gastrointestinal (G.I.) Tract. It is a sterile liquid chemical formula given directly into the bloodstream thorugh an **Intravenous** (**IV**) catheter (needle in the vein) which manufactured in **Parenteral Production Facilty**.

PARENTERAL INTRAVENOUS FLUIDS….

- The dosage form for conveying a drug by means of injection through the skin or mucous membranes.
- Parenteral drugs are administered directly into the veins, muscles or under the skin, or more specialized tissues such as the spinal cord.
- Circumvented the highly efficient first line bodydefense that is skin and mucus membrane.
- Thus they should be free from microbial contamination and should have high purity.

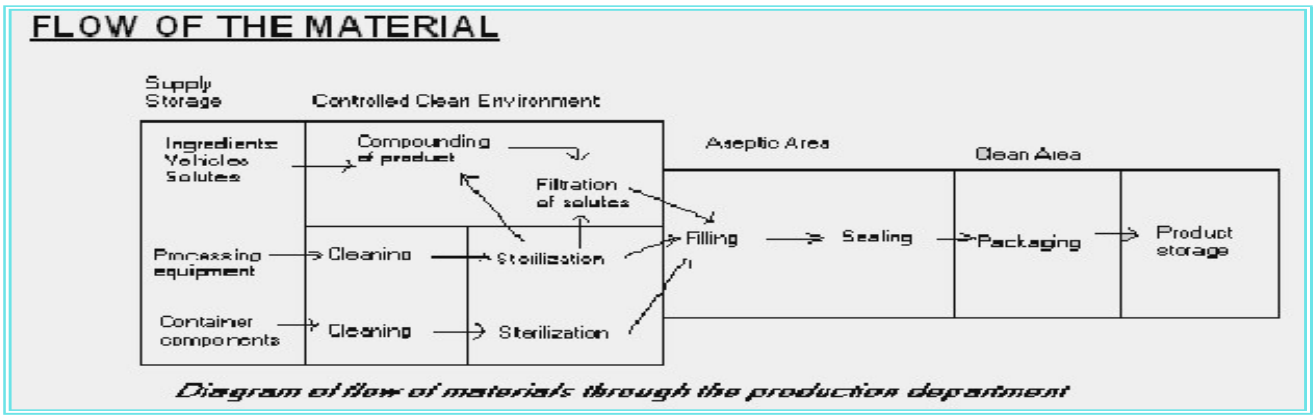
PARAMETERS to be taken into consideration in the Design of The Parenteral Production Facility:

Enviromental factors such as Site Selection, Area Planning, Space Planning, Design and Construction Features, Traffic flow of Personnel and Supplies, and Service Features.

Site Selection: Criteria and Two Major Factors for Site Selection.

1. **Basic Factors** : Land Availability, Land Cost, Construction Cost, Taxes, Utility Costs, Labour Availability, Labour Cost and so on.
2. **Pharmaceutically Important Factors** : Requires Special Consideration because of unique Pharmaceutical Needs.

- Basic plant requirement includes an adequate supply of raw materials, transportation availability, market proximity, adequate utilities, and labor supply.
- Minimizing shipping may aid in minimizing potential contamination, material degradation due to ageing or lack of environmental control (e.g. temp. & humidity).



OBJECTIVE OF THE PROJECT

- This Project covers the aspects of industrial designing which will help me not only to learn about industrial development but also help me to better my skills in Industrial Designing.
- Which is a very Developing and Promition Field in Our Country Due to the Govt. Policies, like – Make in India.

AIM:

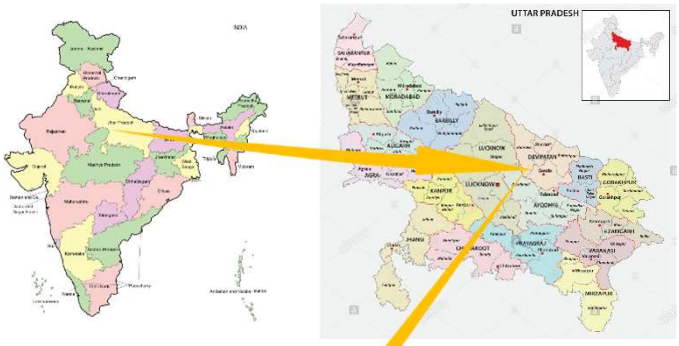
To Provide better healthcare solutions and a economical medical products into the nearby local market.

Due to insufficient quantity of supply into the market, through the setup of this factory we'll counter at this lower supply.

SITE ANALYSIS

PROJECT PROFILE. . .

- ❑ Location – Satrikh, Barabanki, Uttar Pradesh
- ❑ Total project area -5.06 acres(20,500 sq.m)
- ❑ Building type – Industrial Project
- ❑ Soil Type : Alluvial
- ❑ Site Shape - Irregular
- ❑ Orientation- South _East facing



PROJECT BRIEF :

ASPIA PARENTERAL PVT. LTD. Have decided to set a Production plant if IV Fluids Large Volume on Large Scale on this Region for Complete the shorting of Supply.

CLIMATIC CONDITION :

Satrikh, Barabanki overlap between monsoon influenced humid subtropical with high variation between summer and winter tempratures and precipitations. It is observes relatively dry short winters and has a prolonged spell of vert hot weather due to its semi-arid climate.

MICRO CLIMATIC CONDITION :

Most Important wind pattern influencing Barabanki's climate are the western disturbance (summer) and the south-east winds carries humidity and comforts to users. Thus the positioning of site is naturally favourable for the building to be built.

ACCESSIBILITY :

- Nearest Airport : Amausi Airport 54kms.
- Nearest Railway Station : Barabanki Junction 26kms.
- Nearest Bus Station : Barabanki 28kms.
- Nearest Bus Stop : Satrikh Chauraha 1kms.

ABOUT THE SITE :

- Location : Satrikh, Barabanki
- Latitude :
- Longitute :
- District : Barabanki
- Site Area : 20500.0 sqm (5.06 acres)
- Land : Flat Land
- Soil Type : Alluvial

REQUIREMENTS :

- **PRODUCTION**
    1. GLASS FILLING
    2. FFS FILLING
    3. AUTOCLAVE
    4. QUARANTINE
    5. PACKAGING
    6. PRODUCTION MANAGER
    7. TANK ROOM
    8. CHEMIST ROOM
    9. STERLIZE CORRIDOR
    10. SEILING
    11. COLLECTION
    12. RM DAY CARE
    13. WASH ROOM
    14. CHANGING ROOM WITH TOILET
    15. DISPENSING AREA
    16. CUTTING ROOM
    17. ANCILLIARY
    18. AIR LOCK ROOMS
    19. GRA NUEL STORE
    20. UNIFORM ROOM

- **WAREHOUSE**
    1. HRA STORAGE
    2. GS STORE
    3. RM STORE
    4. RM RECEIVING
    5. UNAPPROVED RM
    6. REJECTED RM
    7. APPROVED RM
    8. LABEL STORE
    9. EMPTY BOX STORE
    10. FINISH GOODS STORGAE

- **ADMINISTRATION & QUALITY**
    1. MD OFFICE
    2. HR OFFICE
    3. ACCOUNTS OFFICE
    4. MARKETING OFFICE
    5. GM OFFICE
    6. LABORATORY
    7. R&D LAB
    8. IPQC LAB
    9. CONFERENCE ROOM

- **UTILITY**
    1. CANTEEN

- **MAINTAINANCE**
    1. WATER SYSTEM
    2. ELECTRICAL
    3. HVAC

- **SECURITY**
    1. RECORD ROOM
    2. SURVEILLANCE ROOM
    3. AIR CHANGE ALARM SYSTEM

ZONES AS PER cGMP & G.O.I.

- **ZONES AS PER cGMP**
    1. EXTERIOR
    2. WAREHOUSE
    3. GENERAL PRODUCTION
    4. CLEAN AREA
    5. WEIGHING, MIXING & TRANSFER AREA
    6. FILLING AREA
    7. FILLING LINE

- **ZONES AS PER GAZZETTE OF INDIA**
    1. White Zone : Final Step (filling of parenteral).
    2. Grey Zone : Weighing, Dissolution & Filteration.
    3. Black Zone : Storage, worst Area from Contamination view point.

AREA CALCULATION & ANALYSIS

FUNCTION	Area After Deduction of Circulation Area (25%)	
	Square meter	Percentage
Production	5800	45.0
Warehouse	4000	30.0
Administration	650	5
Utility	550	4.0
Quality control	950	7.0
Maintenance	550	4.0
Employee services	500	4.0
Security	150	1.0
	13700	100.0

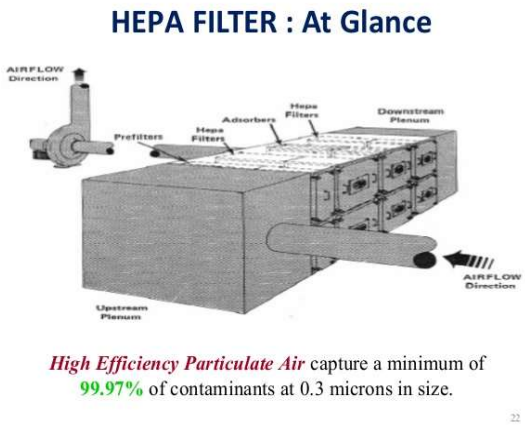
- Site Area - 5.06 acres (20500 sqm.)
- Permissible F.A.R. - 0.6
- Ground Coverage - 40% of site area
- Total Built-up Area - F.A.R. X Site Area (0.6 x 20500 = 12300 sqm.)
- Circulation - 25% of built up area (4586 sqm.)
- Landscape - 15% of Total Area (3075 sqm.)
- Site Area - 2 hactare
- Tree Requires at Site - 50 Trees per Hectare (50 x 2 = 100 trees)

UPSIDC BYE-LAWS

- PGC – 50%
- F.A.R. – 0.6
- SETBACKS – 9M (FRONT)
- SETBACKS – 9M (REAR)
- SETBACKS – 4.5M (SIDE)
- SETBACKS – 4.5M (SIDE)

SERVICES (FILTERS)

- The product & sterilized components are exposed to room environment. Therefore these areas are specially constructed, filtered, and maintain to prevent environmental contamination.
- Clean room must meet several requirements:
    1. The room should undergo 15-20 air changes per hour.
    2. HEPA filters are to clean the air entering the room.
    3. HEPA filters remove all airborne particles of size 0.3 or larger with an efficiency of 99.97%.
    4. Maintaining Higher Air Pressure (+ve pressure) within the critical area to minimize infiltration of airborne contaminants from outside.
    5. Adjacent rooms of different grades should have a pressure differential of 10-15 pascals.
    6. Care should be taken to ensure that air flows do not distribute particles from a particle-generating person, operation or equipment to a zone of higher product risk. A warning system should be provided to indicate failure in the air supply.



SERVICES (PRODUCTION)

1. Counters in the clean room should be made of stainless steel or other non-porous, easily cleaned material.
2. Walls and floors should be free from cracks or crevices and have rounded corners. If the walls or floors are to be painted, epoxy paint is used.
3. Clean Room Door Used in Filling Area with Air-Lock Feature.
4. The air flow should move with uniform velocity along parallel lines. The velocity of the air flow is 90 20 ft/m^3.
5. Providing temp. & humidity controls appropriate to the product being manufactured

HVAC AND AHU

- HVAC System is a Basic Requirement of pharmaceutical manufacturing facility. It has different parts those help to maintain

the required temperature and humidity in the manufacturing area.

- Air Handling Units for sterile product manufacturing areas shall be different from those for other areas. Critical areas, such as the aseptic filling area, sterilized components unloading area and change rooms conforming to Grades B, C and D respectively shall have separate Air Handling Units. The filter configuration in the air handling system shall be suitably designed to achieve the Grade of air.

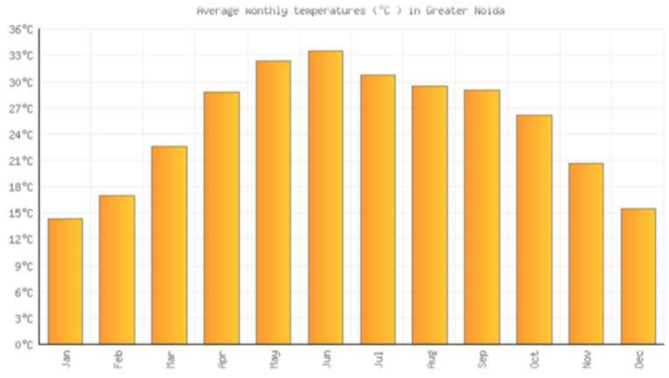
CLIMATE. . .

CLIMATIC CONDITION:

Satrikh , Barabanki overlap between monsoon influenced humid subtropical with high variation between summer and winter temperatures and precipitations. It is observes relatively dry short winters and has a prolonged spell of very hot weather due to its semi-arid climate.

MICRO CLIMATIC CONDITION:

Most important wind pattern influencing Barabanki's climate are the western disturbance (summer) and the south-east winds (monsoon). As the wind blowing in summer is hot and dry. South-West winds carries humidity and comforts to users. Thus the positioning of site is naturally favorable for the building to be built.



AVERAGE MONTHLY TEMPERATURE

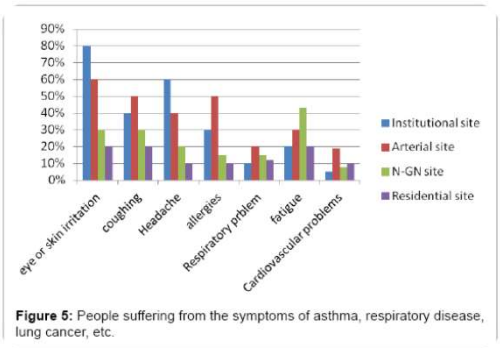
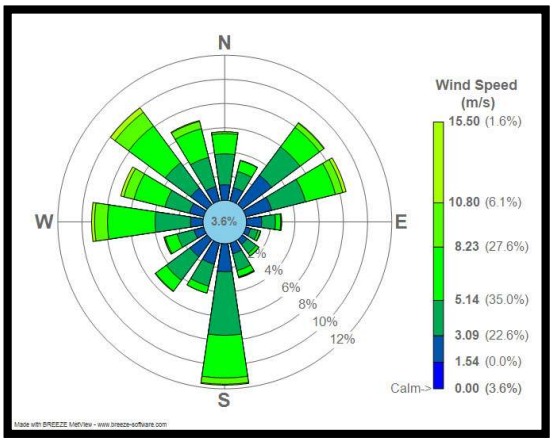
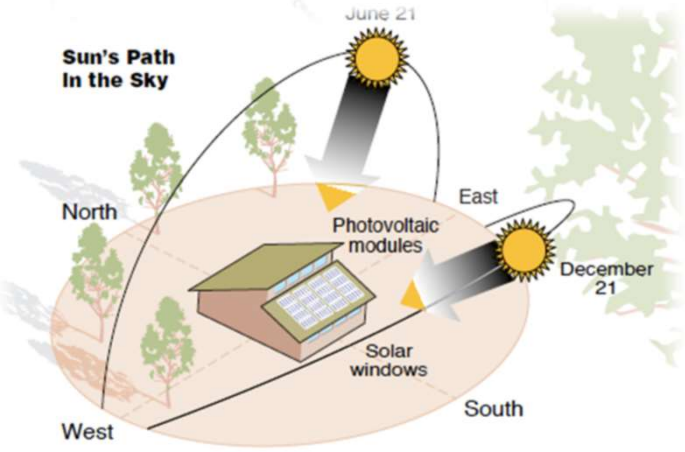


Figure 5: People suffering from the symptoms of asthma, respiratory disease, lung cancer, etc.



WIND DIAGRAM



Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °C (°F)	30.0 (86.0)	34.1 (93.4)	40.6 (105.1)	45.6 (114.1)	47.2 (117.0)	46.7 (116.1)	45.0 (113.0)	42.0 (107.6)	40.6 (105.1)	39.4 (102.9)	36.1 (97.0)	29.3 (84.7)	47.2 (117.0)
Average high °C (°F)	21.0 (69.8)	23.5 (74.3)	29.2 (84.6)	36.0 (96.8)	39.2 (102.6)	38.8 (101.8)	34.7 (94.5)	33.6 (92.5)	34.2 (93.6)	33.0 (91.4)	28.3 (82.9)	22.9 (73.2)	31.2 (88.2)
Daily mean °C (°F)	14.3 (57.7)	16.8 (62.2)	22.3 (72.1)	28.8 (83.8)	32.5 (90.5)	33.4 (92.1)	30.8 (87.4)	30.0 (86.0)	29.5 (85.1)	26.3 (79.3)	20.8 (69.4)	15.7 (60.3)	25.1 (77.2)
Average low °C (°F)	7.6 (45.7)	10.1 (50.2)	15.3 (59.5)	21.6 (70.9)	25.9 (78.6)	27.8 (82.0)	26.8 (80.2)	26.3 (79.3)	24.7 (76.5)	19.6 (67.3)	13.2 (55.8)	8.5 (47.3)	19.0 (66.2)
Record low °C (°F)	−0.6 (30.9)	1.6 (34.9)	4.4 (39.9)	10.7 (51.3)	15.2 (59.4)	18.9 (66.0)	20.3 (68.5)	20.7 (69.3)	17.3 (63.1)	9.4 (48.9)	3.9 (39.0)	1.1 (34.0)	−0.6 (30.9)
Average precipitation mm (inches)	19 (0.7)	20 (0.8)	15 (0.6)	21 (0.8)	25 (1.0)	70 (2.8)	237 (9.3)	235 (9.3)	113 (4.4)	17 (0.7)	9 (0.4)	9 (0.4)	790 (31.1)
Average precipitation days (≥ 1.0 mm)	1.7	2.5	2.5	2.0	2.8	5.5	13.0	12.1	5.7	1.7	0.6	1.6	51.7
Average relative humidity (%)	63	55	47	34	33	46	70	73	62	52	55	62	54
Mean monthly sunshine hours	214.6	216.1	239.1	261.0	263.1	196.5	165.9	177.0	219.0	269.3	247.2	215.8	2,684.6

Source #1: NOAA[83]

MONTHLY TEMPERATURE DATA

WIND DIRECTION

C S 1

INTRODUCTION

TYPE OF PROJECT : PARENTERAL PRODUCTION PLANT
CLIENT NAME :
ZEDUX PARENTERAL PVT. LTD.
LOCATION :
CHHATENA GARHI, KISHAN PATH,LUCKNOW,UTTAR PRADESH
AREA : 16540 sqm
FLOOR : G+1
STORAGE :
8 LAKH BOTTLES
PARKING :
20 CAR, 50 BIKES, 8 TRUCKS

- THIS FACTORY PRODUCED PER DAY 1.5 LACS. BOTTLE PER DAY WITH ALL QUALITY CHECK AND READY FOR DELIVERY.
- THIS FACTOY IS WELL CONNECTED WITH NH 24 & DEWA ROAD. 24 HOURS TRANSPORT AVAILABLE. NO RESTRICTIONS FOR NO ENTRY ON THIS AREA.EASY SUPPLY DONE BY SAME DAY OF MANUFACTURING.

SITE SURROUNDINGS

- THIS PLANT IS PLACED BETWEEN FAIZABAD ROAD & DEVA ROAD, SURROUNDED BY OTHER INDUSTRIES, GREEN FIELDS, RESORTS..

SITE CONNECTIVITY

- 15 kms FROM GOMTI NAGAR STATION.
- 35 kms FROM CCS AIRPORT AMAUSI, LUCKNOW.
- 15.5 kms FROM INDIRA NAGAR METRO STATION.
- ACCESS DIRECTLY BY OWN VEHICLE VIA KISAAN PATH FROM DEVA ROAD & FAIZABAD ROAD.

PLANNING ANALYSIS & SERVICES

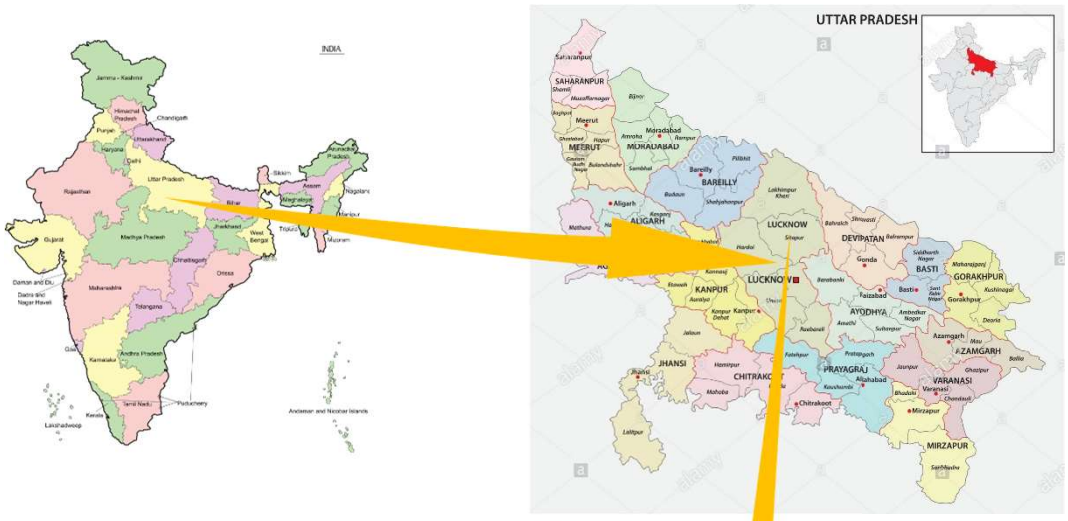
- THE BUILDINIG IS PLANNED IN PROPER BUILDING CONCEPT WITH FULLY HVAC EQUIPPED WITH HEPA FILTER FOR BACTERIA FREE PRODUCTION AREA.

- **CIRCULATION :** ALL COMMON CORRIDORS ARE 2400MM WD & PRODUCTION AREA HAVE 1200MM WD CORRRIDOR, 2 CARGO LIFT & 1 PASSENGER LIFT, 3 STAIRCASES ARE PROVIDE IN PLANT.

- **MATERIAL :** EPOXY FLOORING, CLEAN ROOM DOOR, FALSE CEILING, ANTI-BACTERIAL PAINT, KOTA STONE & PAVERS.

CLIMATIC CONDITION:

LUCKNOW overlap between monsoon influenced humid subtropical with high variation between summer and winter temperatures and precipitations. It is observes relatively dry short winters and has a prolonged spell of very hot weather due to its semi-arid climate.

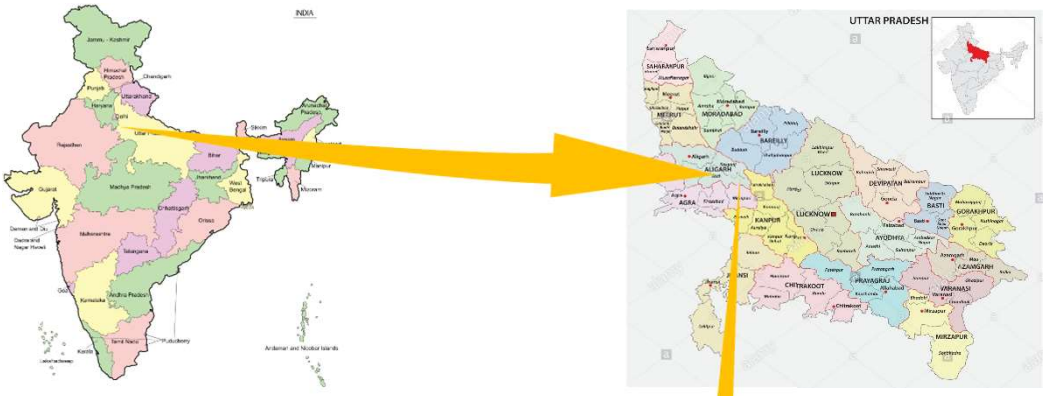


CASE STUDY-2

INTRODUCTION

TYPE OF PROJECT : PARENTERAL PRODUCTION PLANT
CLIENT NAME :
SWAROOP PHARMACEUTICAL PVT. LTD.
LOCATION :
A-10, Tala Nagari Industrial Area ALIGARH
AREA : 32374sqm.
FLOOR : G+1
STORAGE :
18 LAKH BOTTLES
PARKING :
40 CAR, 90 BIKES, 9 TRUCKS

- This factory produced per day 5 lacs. Bottle per day with all quality check and ready for delivery.
- This factory is well connected with aligarh bypass which is easy access to yamuna expressway by khair tappal road and G.T. Road.



PLANNING ANALYSIS & SERVICES

- The buildinig is planned in proper building concept with fully hvac equipped with hepa filter for bacteria free production area.
- **CIRCULATION :** All common corridors are 2400mm wd & production area have 1200mm wd corrridor, 4 cargo lift & 2 passenger lift, 5 staircases are provide in plant.
- **MATERIAL :** Epoxy flooring, clean room door, false ceiling, anti-bacterial paint, kota stone & pavers.

SITE SURROUNDINGS

- This plant is placed between UPSIDC industrial area Surrounding Many Industries and Production Plants & Institutional Buildings.



SITE CONNECTIVITY

- 8.7 kms FROM ALIGARH JN. STATION.
- NEARBY BUS STAND IS DPS CIVIL LINES.
- 8.8 kms FROM ALIGARH BUS STATION STATION.
- ACCESS DIRECTLY BY OWN VEHICLE VIA RAMGHAT ROAD.

CLIMATIC CONDITION:

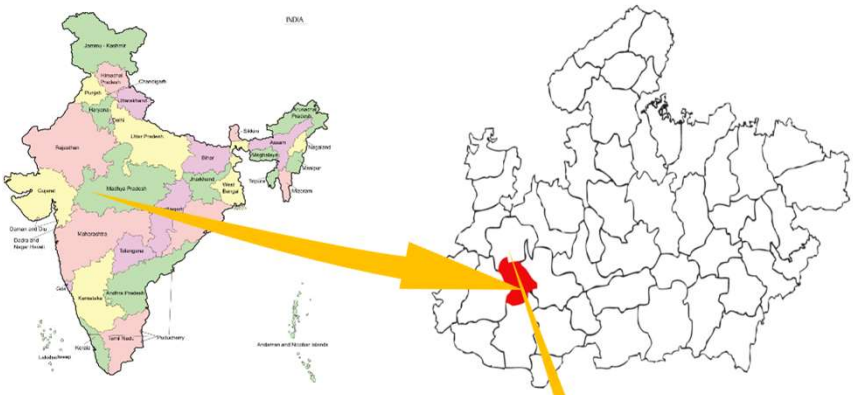
Aligarh has a monsoon-influenced humid subtropical climate, typical of north-central India. Summers start in April and are hot with temperatures peaking in May. The average temperature range is 28–38 °C. The monsoon season starts in late June, continuing till early October, bringing high humidity. Aligarh gets most of its annual rainfall of 800 mm during these months. Temperatures then decrease, and winter sets in December, and continues till February. Temperatures range between 5–11 °. Winters in Aligarh are generally mild, but 2011–12 experienced the lowest temperature of 1 °C. The fog and cold snaps are extreme.

LITRATURE STUDY

INTRODUCTION

TYPE OF PROJECT : PARENTERAL PRODUCTION PLANT
CLIENT NAME :
PARENTERAL DRUG (INDIA) LTD.
LOCATION :
KASRAWAD, MADHYA PRADESH
AREA : 42 ACRES
FLOOR : G+1
STORAGE :
12.5 LAKH BOTTLES

- THIS FACTORY PRODUCED PER DAY 3 LACS. BOTTLE PER DAY WITH ALL QUALITY CHECK AND READY FOR DELIVERY.
- THIS FACTOY IS WELL CONNECTED WITH KHARGONE - INDORE HIGHWAY. 24 HOURS TRANSPORT AVAILABLE..ONE OF THE TOP SUPPLIER IN INDIA.



CLIMATIC CONDITION:

- Parenteral Drugs (India) Ltd has its manufacturing unit located at Kasrawad, Madhya Pradesh, was set up in 2015. Parenteral Drugs (India) Ltd, Baddi was set up in 2006.These facilities are at par with global standards highlighting PDIL's dedication towards quality and safety.
- We have established State-of-Art FFS technology & Glass bottle LVP products with a motto to provide quality products to the consumers. PDIL believes that quality has to exist inherently and thus it is the people who make that difference as each & every person working tries to add value in their functional area.

PLANNING ANALYSIS & SERVICES

- The buildinig is planned in proper building concept with fully hvac equipped with hepa filter for bacteria free production area.

- **CIRCULATION :** All common corridors are 2400mm wd & production area have 1200mm wd corrridor, 7 cargo lift & 2 passenger lift, 6 staircases are provide in plant.

- **MATERIAL :** Epoxy flooring, clean room door, false ceiling, anti-bacterial paint,Granite , kota stone & pavers.

CLIMATIC CONDITION:

Kasrawad lies on a borderline between a humid subtropical climate (Köppen climate classification *Cwa*) and a tropical savanna climate (*Aw*). Because of its high elevation and inland location even during the hottest months the nights are relatively cool, which is known as *Shab-e-Malwa*. Three distinct seasons are observed: summer, monsoon and winter. the coldest temperature was 1.1 °C (34.0 °F) in January 1936.
Indore gets moderate rainfall of 700 to 800 millimetres (28 to 31 in) during July–September due to the southwest monsoon.

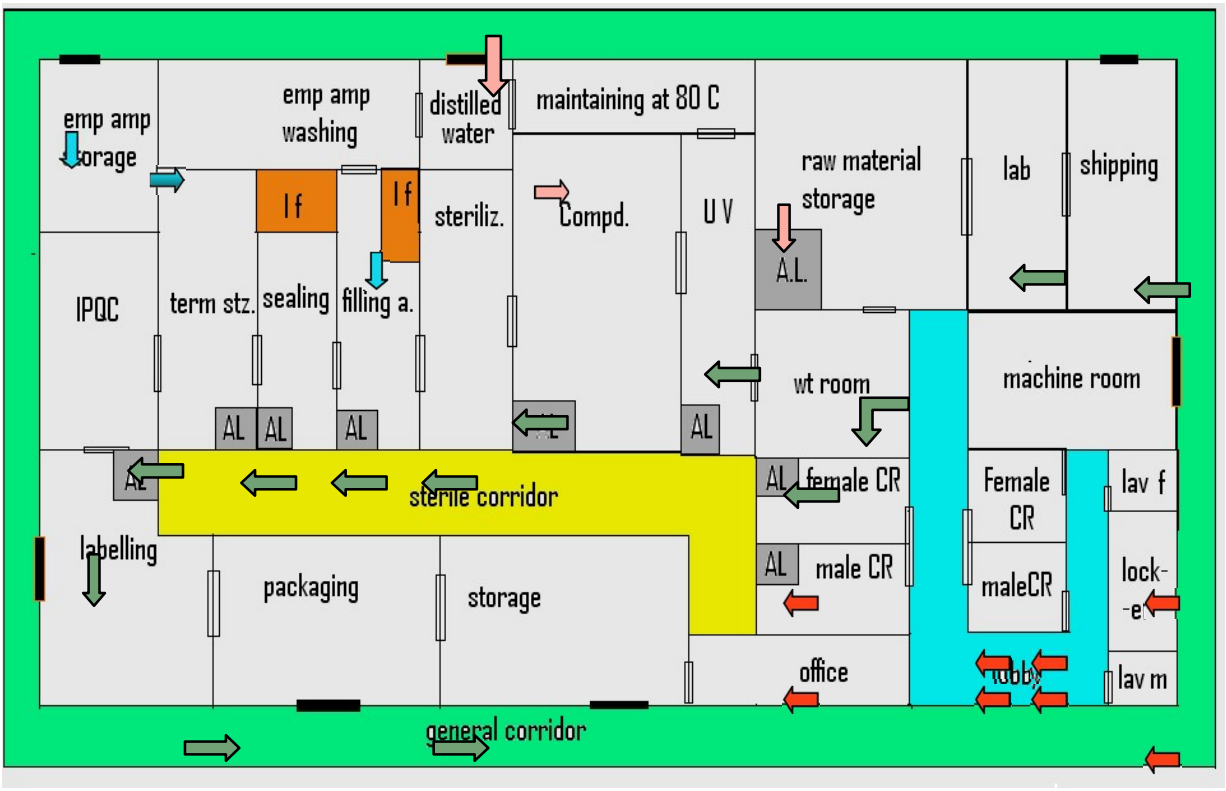
SITE CONNECTIVITY

- 71 kms From Indore Railway Station.
- 69 kms From Indore Airport.
- Kasrawad Local Bus Station.
- Access directly by own vehicle via khargone – Indore Highway.

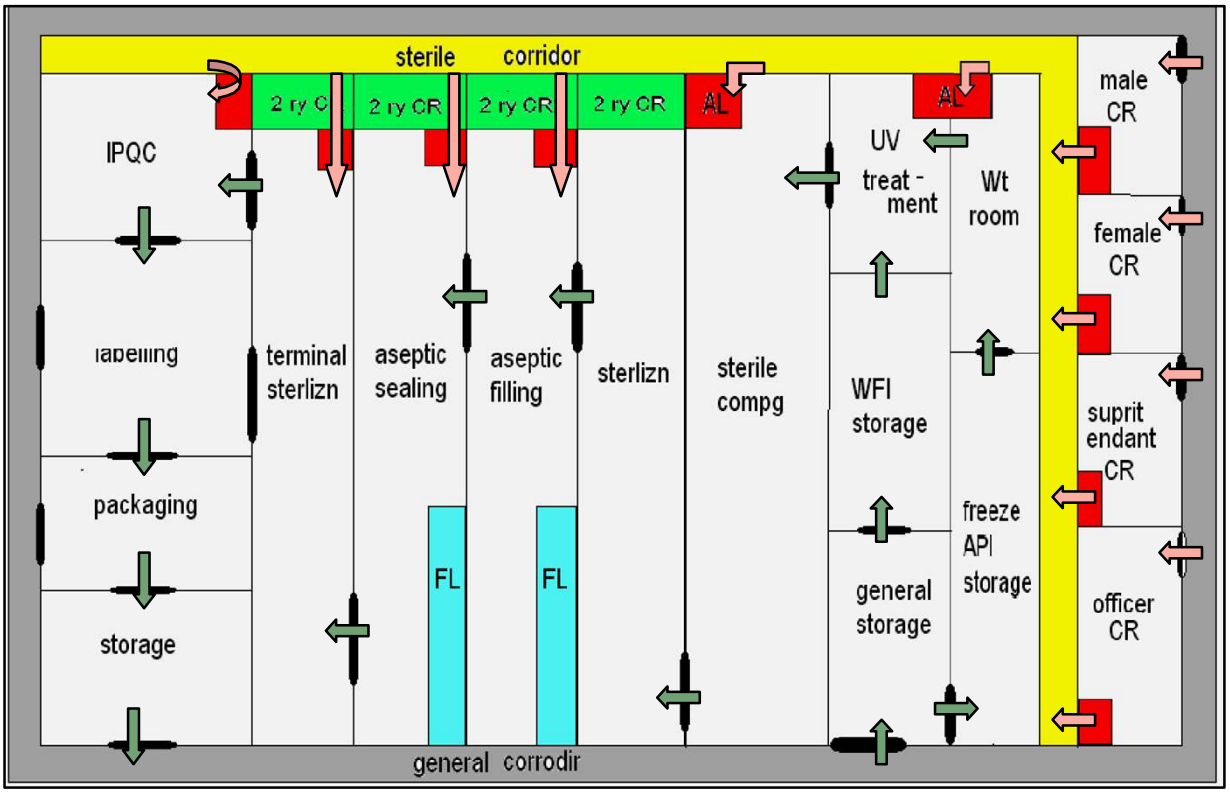
SERVICES

- Counters in the clean room should be made of stainles steel or other non-porous, easily cleaned material.
- Walls and floors should be free from cracks or crevices and have rounded corners. If the walls or floors are to be painted, epoxy paint is used.
- Clean Room Door Used in Filling Area with Air-Lock Feature.
- The air flow should move with uniform velocity along parallel lines. The velocity of the air flow is 90 20 ft/m^3.
- Providing temp. & humidity controls appropriate to the product being manufactured.

CIRCULATION & PLANNING



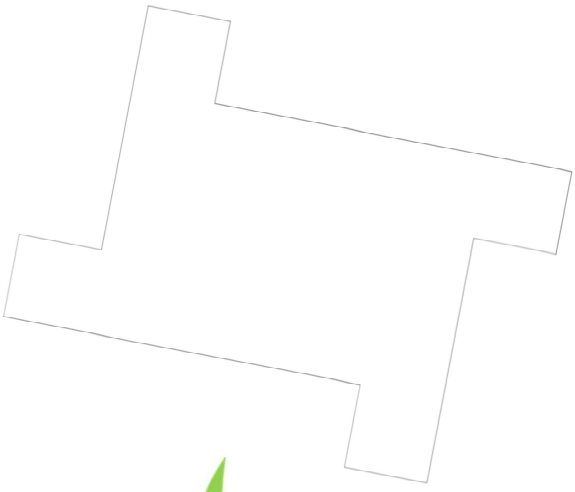
CIRCULAR FLOW IN FFS FILLING

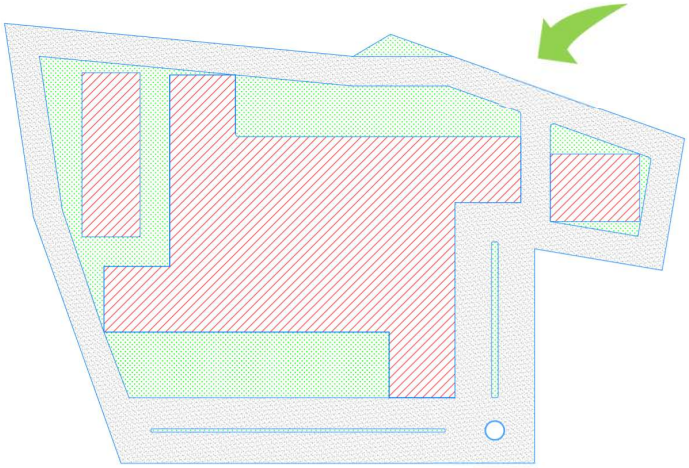


PARELLEL FLOW IN G.BOTTLE FILLING

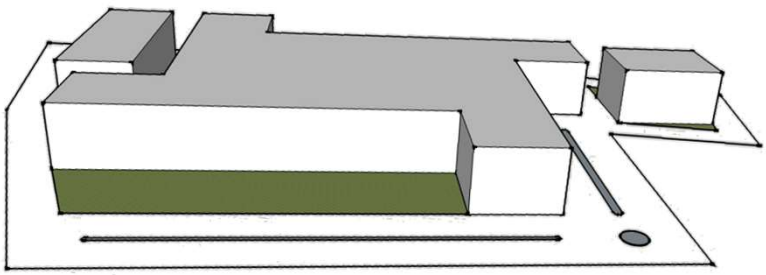
CONCEPT

UNITY





SITE PLAN



CONCEPTUAL VIEW

UNITY

- THE IDEA BEHIND THE DESIGN COMPONENT UNITY IS TO CREATE ELEMENT THAT SUPPORT EACH OTHER AND ALL WORK TOGETHER TOWARD A COMMON GOAL. IT'S ABOUT AVOIDING MIXED MESSAGE.
- VISUAL UNITY:

  A GROUP OF ELEMENTS ALL ALIGNED TO A COMMON AXIS.
- CONCEPTUAL UNITY:

  EACH WORK OF ART THAT IS SUCCESSFUL IN CONVEYING AN IDEA OR THEME TO YOU, IS AM EXAMPLE OF CONCEPT IN ART.

- MY DESIGN WILL INPART A SENSE OF BEING ABOUT A SINGLE IDEA. UNITY HOLDS MY DESIGN TOGETHER BOTH VISUALLY AND CONCEPTUALLY.
- UNITY IS MEASURE OF HOW WELL THE ELEMENTS ON THE BUILDING BELONG TOGETHER.

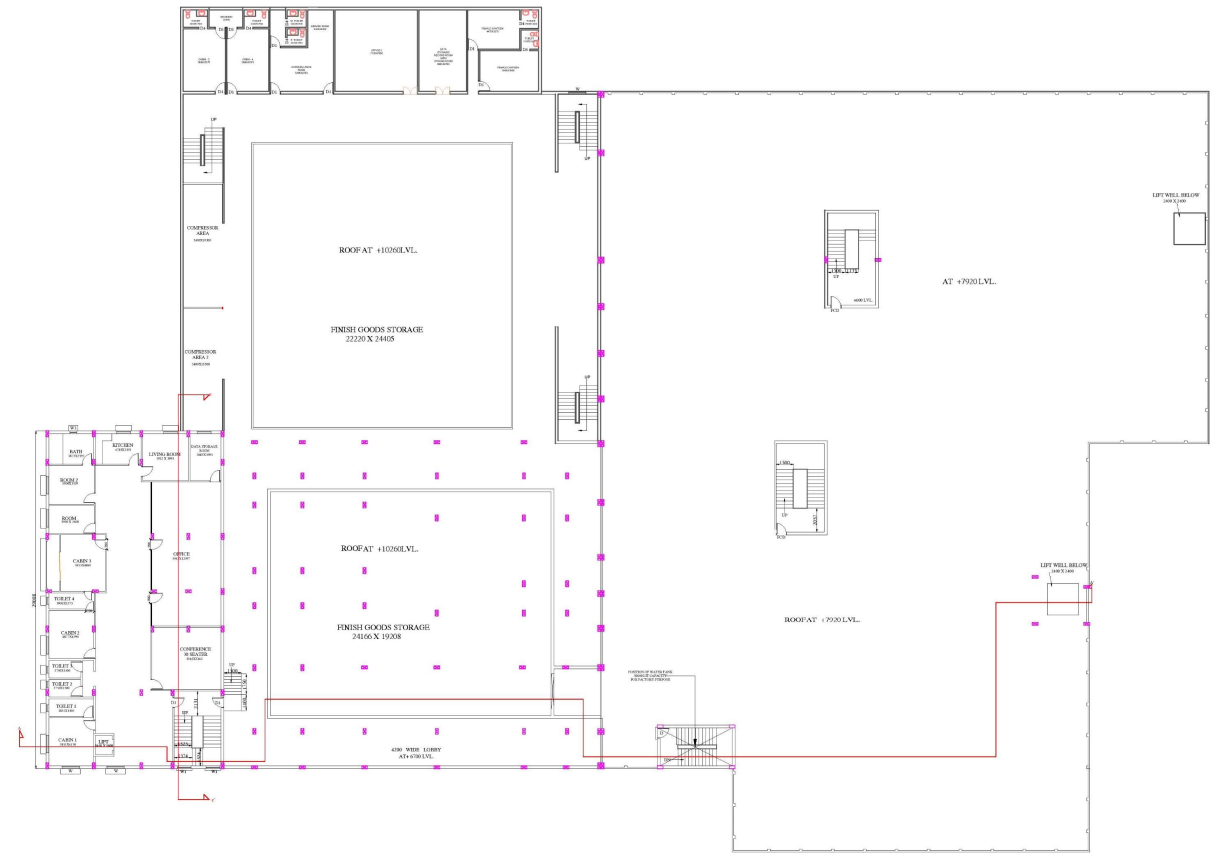
SITE PLAN

SCALE:-1:100

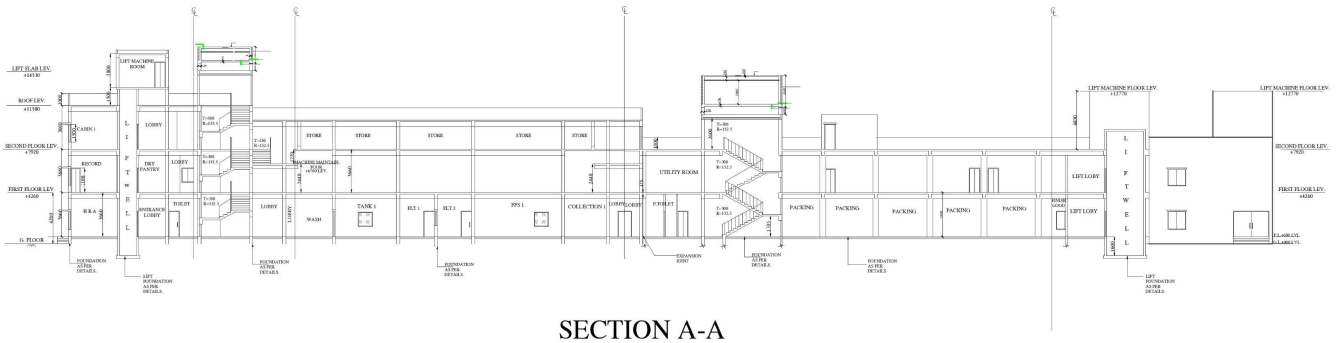
GROUND FLOOR PLAN

SCALE:-1:100

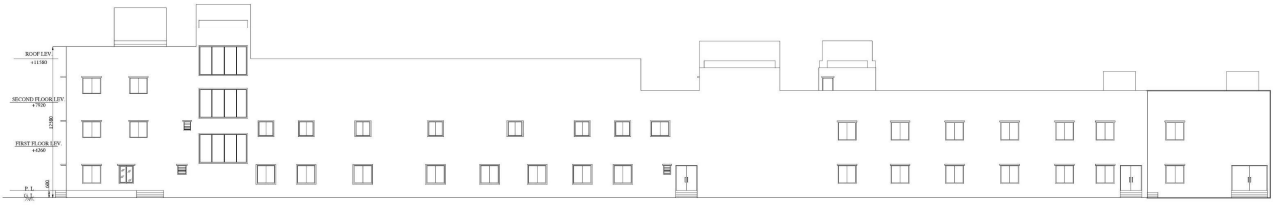
FIRST FLOOR PLAN
SCALE:-1:100



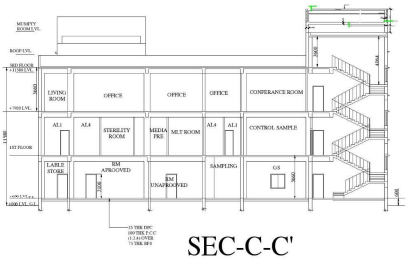
SECOND FLOOR PLAN
SCALE:-1:100



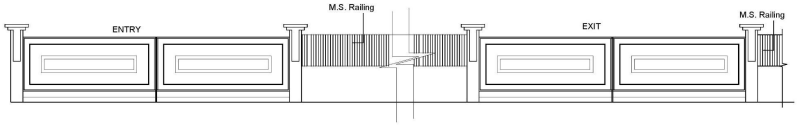
SECTION A-A
SCALE:-1 :100



ELEVATION
SCALE:-1 :100



SEC-C-C'
SCALE:- 1:100



ELEVATION OF FRONT SIDE BOUNDARY WALL

HVAC & ELECTRICAL HOUSING PLAN
SCALE:-1:100