

**NEW GOVT. POLYTECHNIC,  
PATNA-13  
DEPTT. OF CIVIL ENGG  
PPT ON BUILDING DRAWING**

# CONTENTS:

- Introduction
- Concept of plan
- Principles of Building Planning
- Building drawing
- Plan
- Elevation
- Section
- Line plan

# INTRODUCTION

## BUILDING PLANNING :-

- In a residential building two factors are of great importance, the site and the planning of the building before it is constructed.
- After selecting a suitable site ,the next step of building in the planning.
- The functional planning is a pre-requisite of any type of building.

θ The following considerations are kept in mind for making the design more useful.

I. People and their requirement

II. Climate and its effects

III. Building bye laws of the locality

IV. Materials and method of construction

**Plan** : The arrangement of various rooms in the building is known as plan or design of building.

**Concept of plan:** while attempting to plan of a building , the main criteria to be constantly kept in mind by the engineer is the general scope or purpose of the building .

- Each type of building has its own requirements to suit its purpose in the best possible manner.
- To develop the plan of the building sizes of rooms, their location, position of passages and other amenities ,etc are considered.
- A building used for dwelling purpose is known as residential building.

The different rooms in a residential building are

I. Living /Drawing room

II. Dining room

III. Kitchen

IV. Store

V. Study room

VI. Bed room

VII. Bath and w.c

VIII. Verandah, etc.

**Principles of Building Planning** :There are certain general principle or factors which an engineer should bear in mind while planning a building.

Following are general principles of planning :

- I. Aspect
- II. Prospect
- III. Privacy
- IV. Grouping
- V. Roominess
- VI. Circulation
- VII. Elegance
- VIII. Flexibility
- IX. Sanitation
- X. Economy and Practical Considerations
- XI. Furniture requirement

## BASIC REQUIREMENTS FOR BUILDING PLANNING :

- I. Selection of site
- II. Building bye – laws
- III. Orientation of building
- IV. Requirements of a building
- V. Functional requirement of a residential building

# WAYS TO SAVE MONEY – THROUGH DESIGN

1. Smaller sq. footage
2. Two-story homes
3. Back-to-back plumbing
4. Stacked fireplaces
5. Reduce number of dormer windows
6. Use simpler foundations (less jogs, simple rectangle)
7. Use standard sizes and finishes
8. Plan long-term and easy maintenance
9. Reduce cubic feet (lower ceilings for heating/cooling)

## BUILDING DRAWING :-

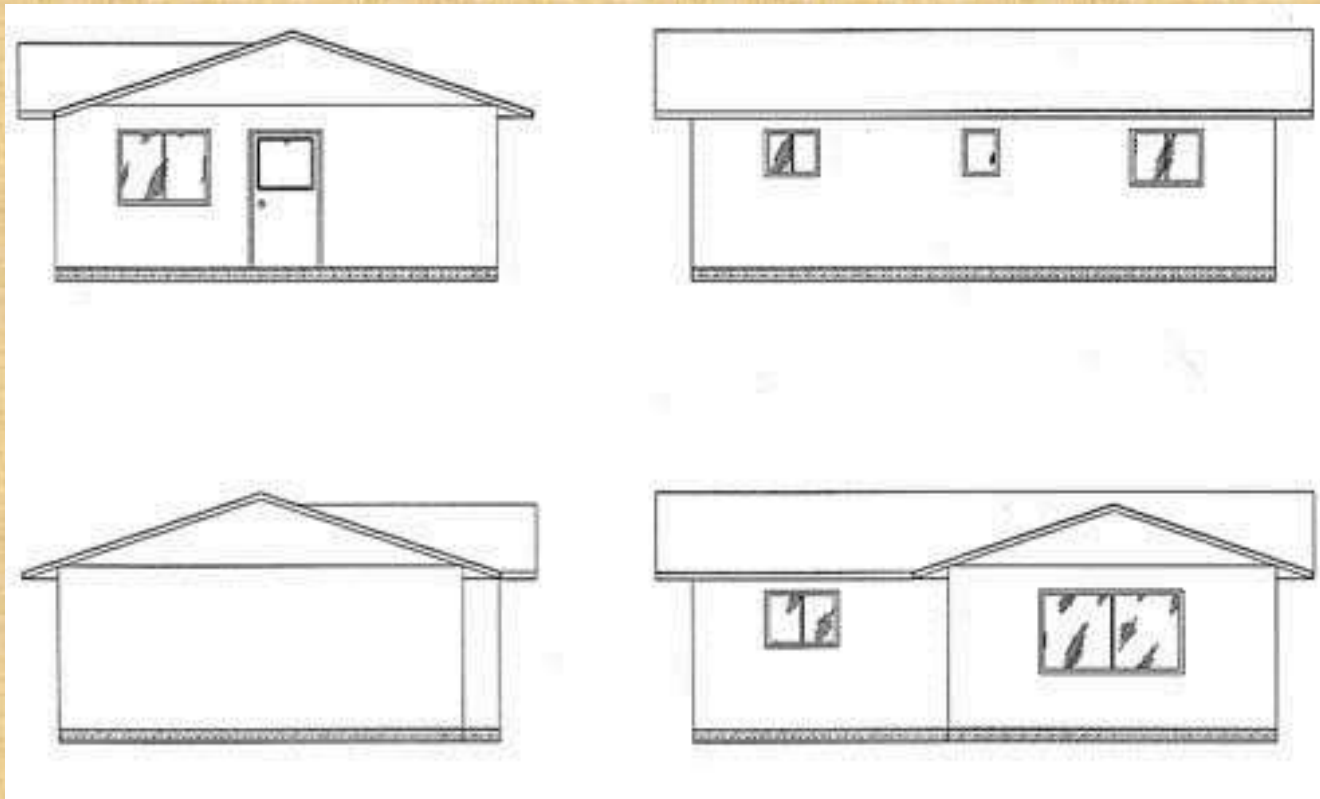
- The drawing is the language of the engineers. This language is expressed not in words but in the shape of lines and figures. The shape of lines and figures every where in the world have got the same meaning.
- The main aim of building drawing is to give sufficient information by the designer to the construction engineer.

→ **Plan :-** The plan of the building gives the general alignment or location of different rooms of the building. Plan draw in building drawing is not simply the top seen from the top of the building. The building is imagined to be cut by a horizontal plane at the sill of the window. Upper portion is removed on a horizontal plane below the building will be known as plan.



# Elevation

- Elevations are orthographic projections of a building produced by its architect or designer.



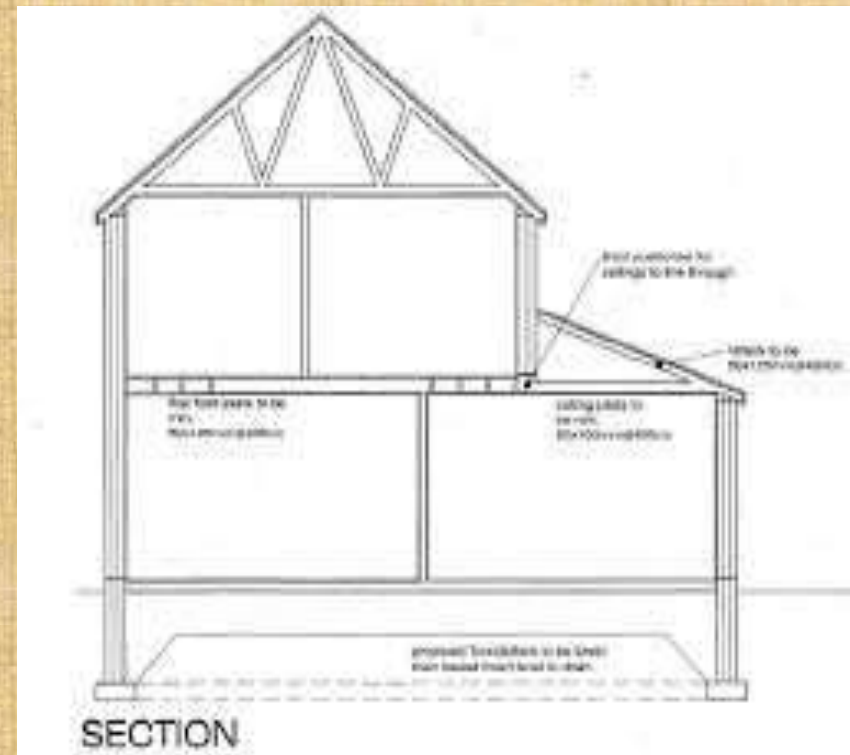
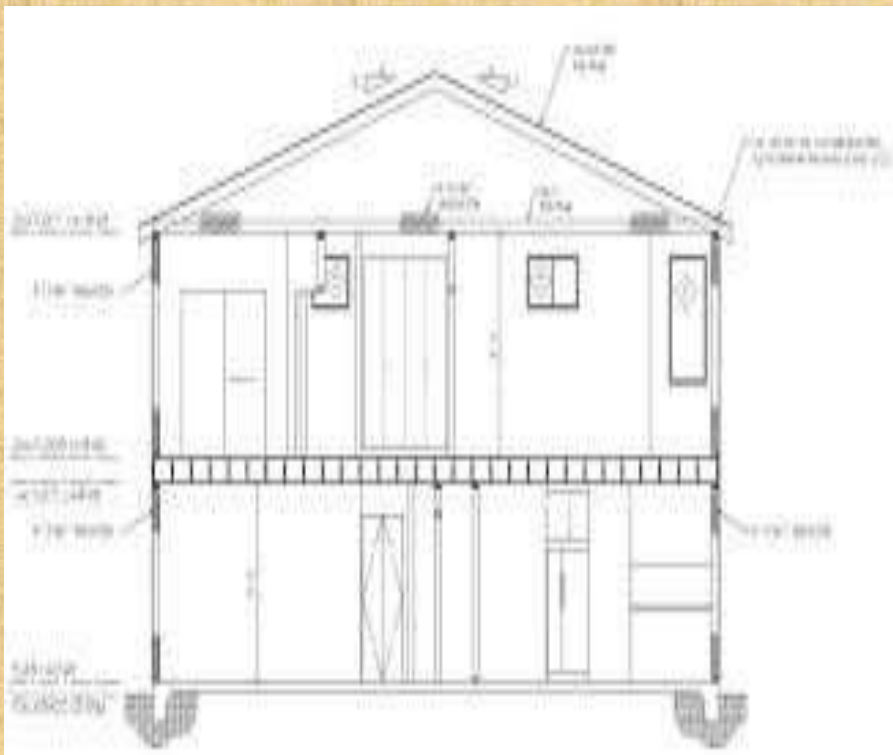
# ELEVATION PICTURE



- Elevations are required by the local planning department to assess whether the style and proportions of the proposed building are appropriate for the location.
- Builders also need a picture of what the house will look like from the outside.

## Section :-

- A cross-section showing a slice through the wall gives builders, joiners and roofers a great deal of information about how the house should be built,

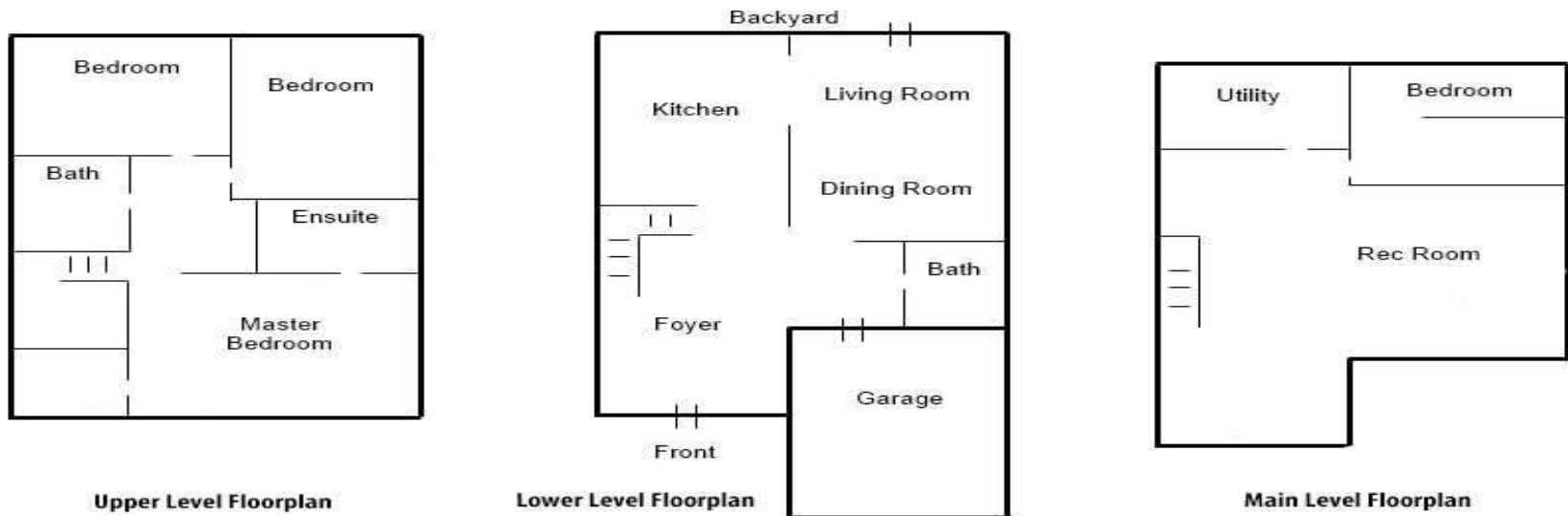


- Sections can be shown through any part of the building and normally a scale of 1:20 is used. The local building control department needs sectional views and floor plans to assess the quality of construction design.

# Line plan (Single line plan)

- An owner's requirement changes with his needs. Therefore, before preparing the plan, preparing a line plan is important. Alternative line plans would

Give scope for comparing by changes in the size



THANK YOU



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# IMPOTANCE OF CIVIL ENGINEERING DRWING

- ' Designing the components of the proposed product
- ' Size and shape of product
- ' Final dimensions.
- ' Estimate material
- ' Prepare alternative design
- ' Supervision
- ' Checking and approving parts
- ' Valuation purpose
- ' Etc.....



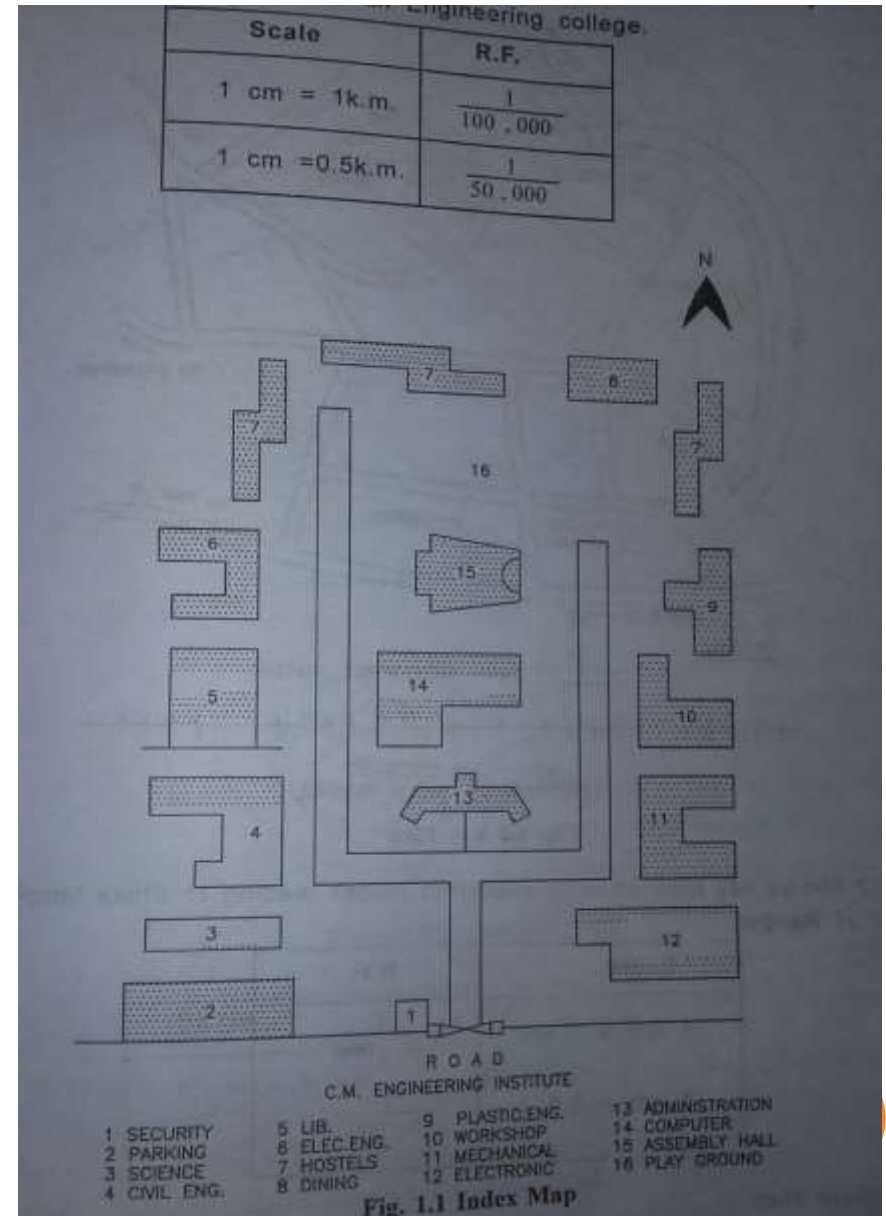
## 1.2 TYPES OF CIVIL ENGINEERING DRAWING

- ' Index map
- ' Key map
- ' Topographical map
- ' Village map
- ' Site plan
- ' Layout plan
- ' Preliminary drawing
- ' Working drawing
- ' Large scale drawing
- ' Enlarge scale drawing



# INDEX MAP

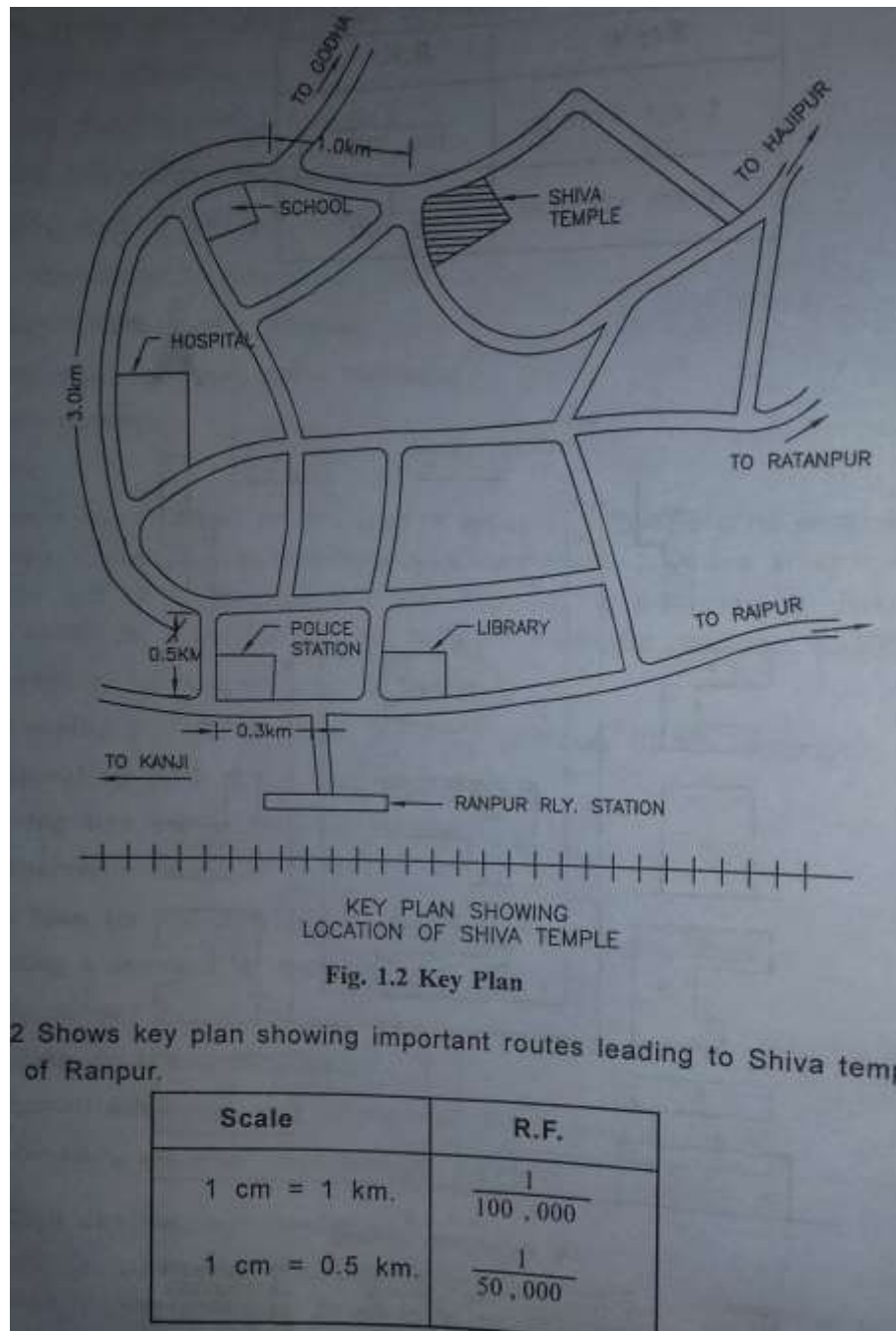
Location of building  
Important details  
Numbered area  
Located at entrance



# KEY PLAN

## They have:

- To know the location
- To connecting routes
- To use selecting most approximate routes
- Sometime distance shown
- sometime high lighted by color



# TOPOGRAPHICAL MAP

Information about project like..

- Contours, hill, valley, ponds, important places, bridges etc...
- Prepared by department of survey of india.
- Useful for army so easily not available
- Provide important preliminary information for project

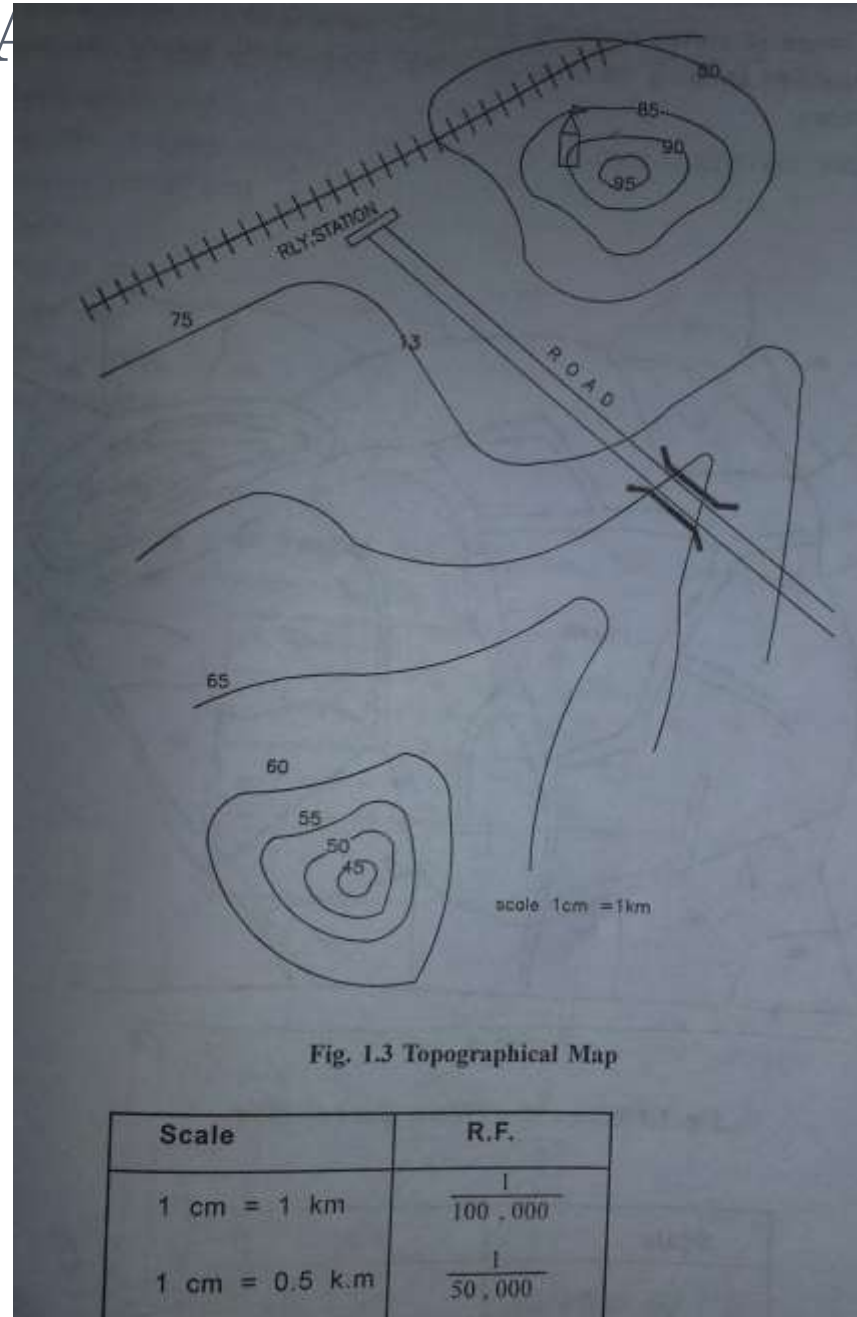


Fig. 1.3 Topographical Map

# VILLAGE MAP(TOWN SURVEY MAP)



Fig. 1.4 Village Map (Town Survey Map)

Scale	R.F.
1 cm = 0.5 km	$\frac{1}{50,000}$
1 cm = 0.25 km	$\frac{1}{25,000}$
1 cm = 0.1 km	$\frac{1}{1000}$
1 cm = 50 m	$\frac{1}{5000}$

Information about project like..

- ' Road,street light,telphone lines,water supply & drainage lines,gas lines...

Prepared map showing

- ' Main road
- ' Village area
- ' Pond
- ' Survey nos
- ' Rivers
- ' Hills
- ' Well known places

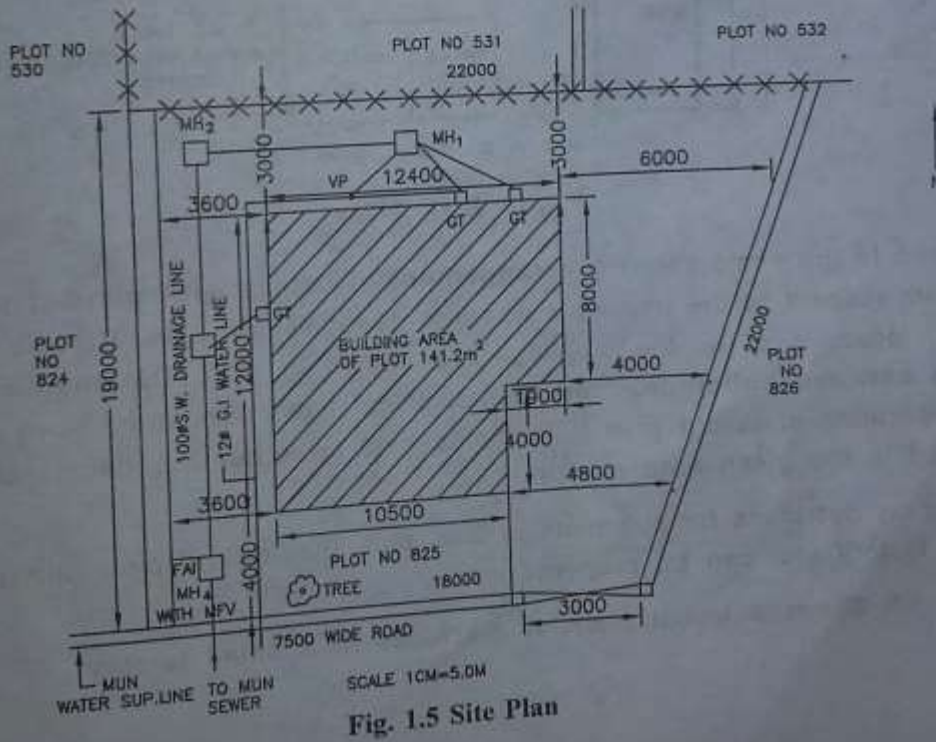


# SITE PLAN

Showing following details of plot

- ' Shape and size of building
- ' Building in plot
- ' Lengths of sides of plot
- ' Survey no of plot
- ' Margins
- ' Area of plot
- ' Northline
- ' Trees in plot
- ' Drainageline
- ' Water supplyline
- ' Compound wall

Scale	R.F.
1 cm = 20 m	$\frac{1}{2000}$
1 cm = 10 m	$\frac{1}{1000}$
1 cm = 5 m	$\frac{1}{500}$





# PRELIMINARY DRAWING MAP

Scale	R.F.
1 cm = 5 m	$\frac{1}{500}$
1 cm = 2 m	$\frac{1}{200}$
1 cm = 1 m	$\frac{1}{100}$

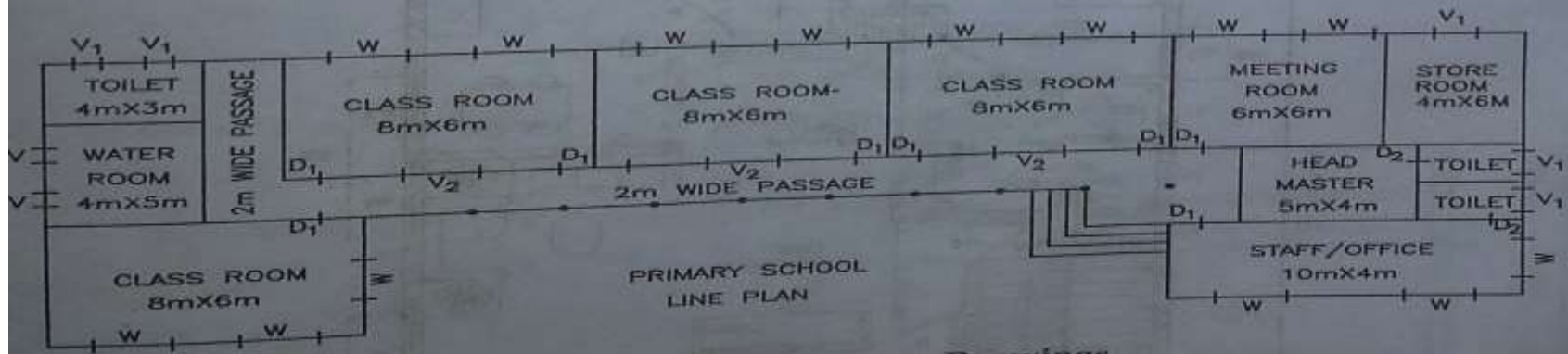


Fig. 1.7 Preliminary Drawings

It is not desirable to prepare detailed drawing till the proposed designs is final.

- Saves time & labour
- Hence line diagrams are shown to the owner till he is satisfied with design.
- For initial stage of work

# WORKING DRAWINGS(G.F.,F.F.,SECTION,ETC..)

It is prepared from the preliminary drawings approved by owner for purpose of execution work.

Included details.

- ' All details
- ' Dimensions
- ' Brief specifications
- ' Notes
- ' Terrace plan
- ' Drainage & water supply lines
- ' Site plan
- ' Area table
- ' Signatures of owner, engineer & authority

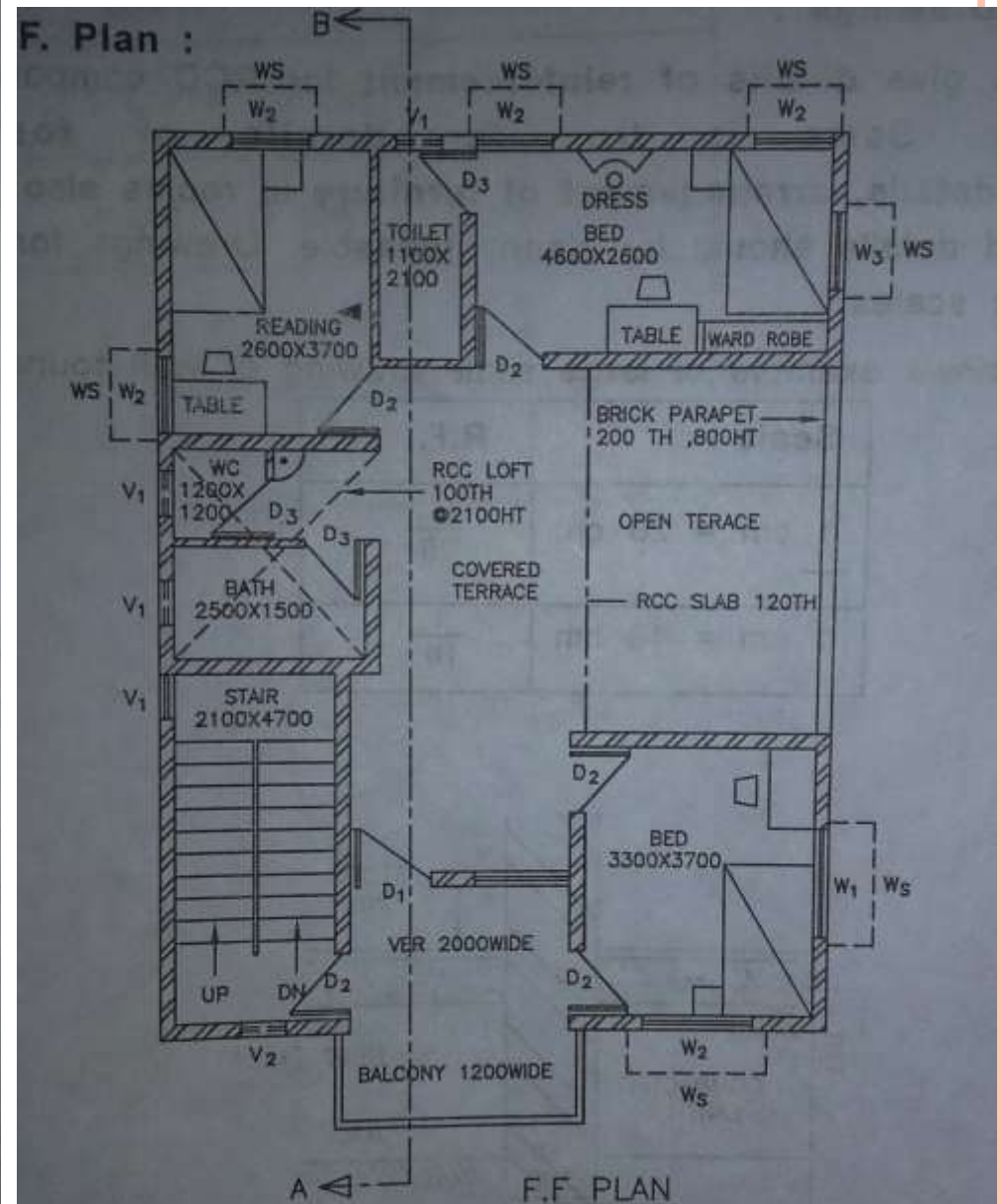
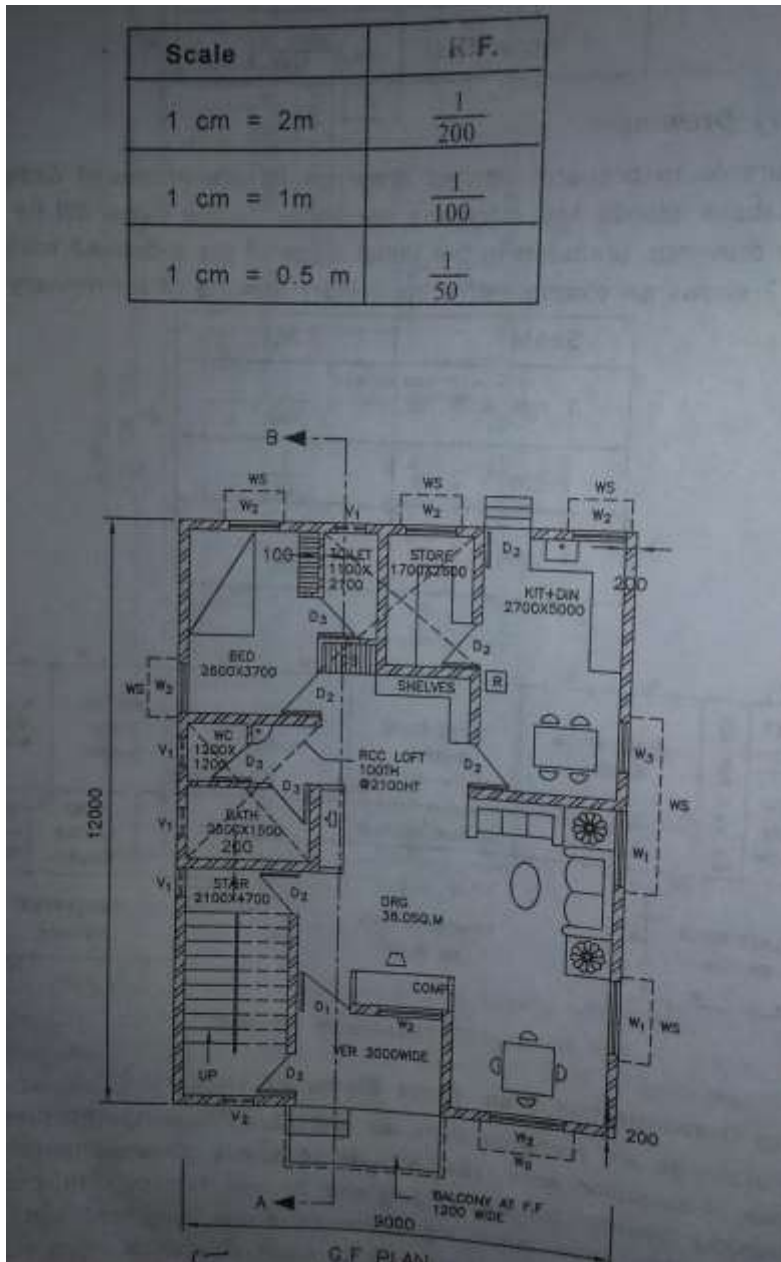
Useful for

- ' Loans
- ' Insurance
- ' Make document for court
- ' Fixing rate...

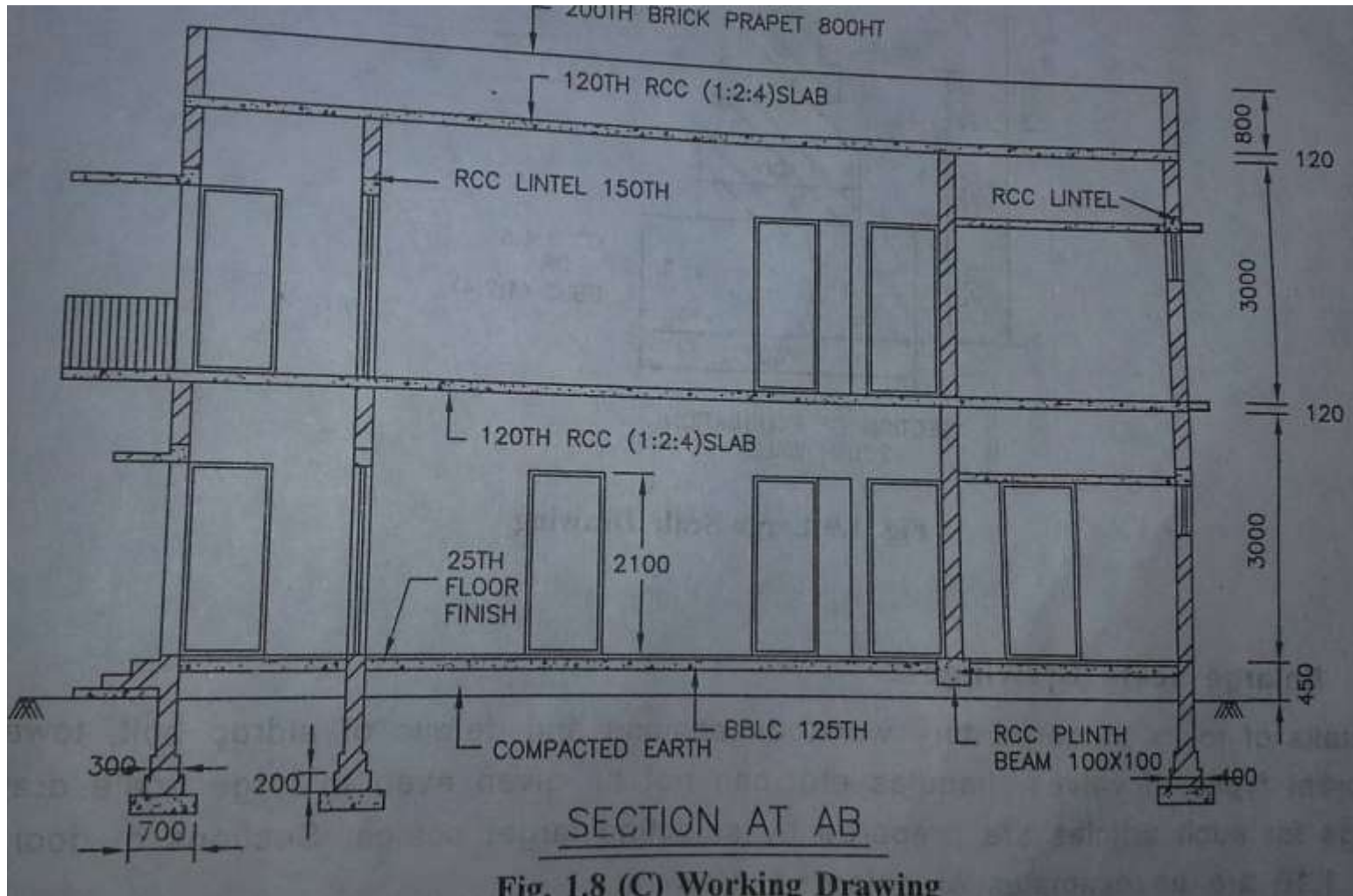


# WORKING DRAWING(G.F. & F.F. PLAN)

Scale	R.F.
1 cm = 2m	$\frac{1}{200}$
1 cm = 1m	$\frac{1}{100}$
1 cm = 0.5 m	$\frac{1}{50}$



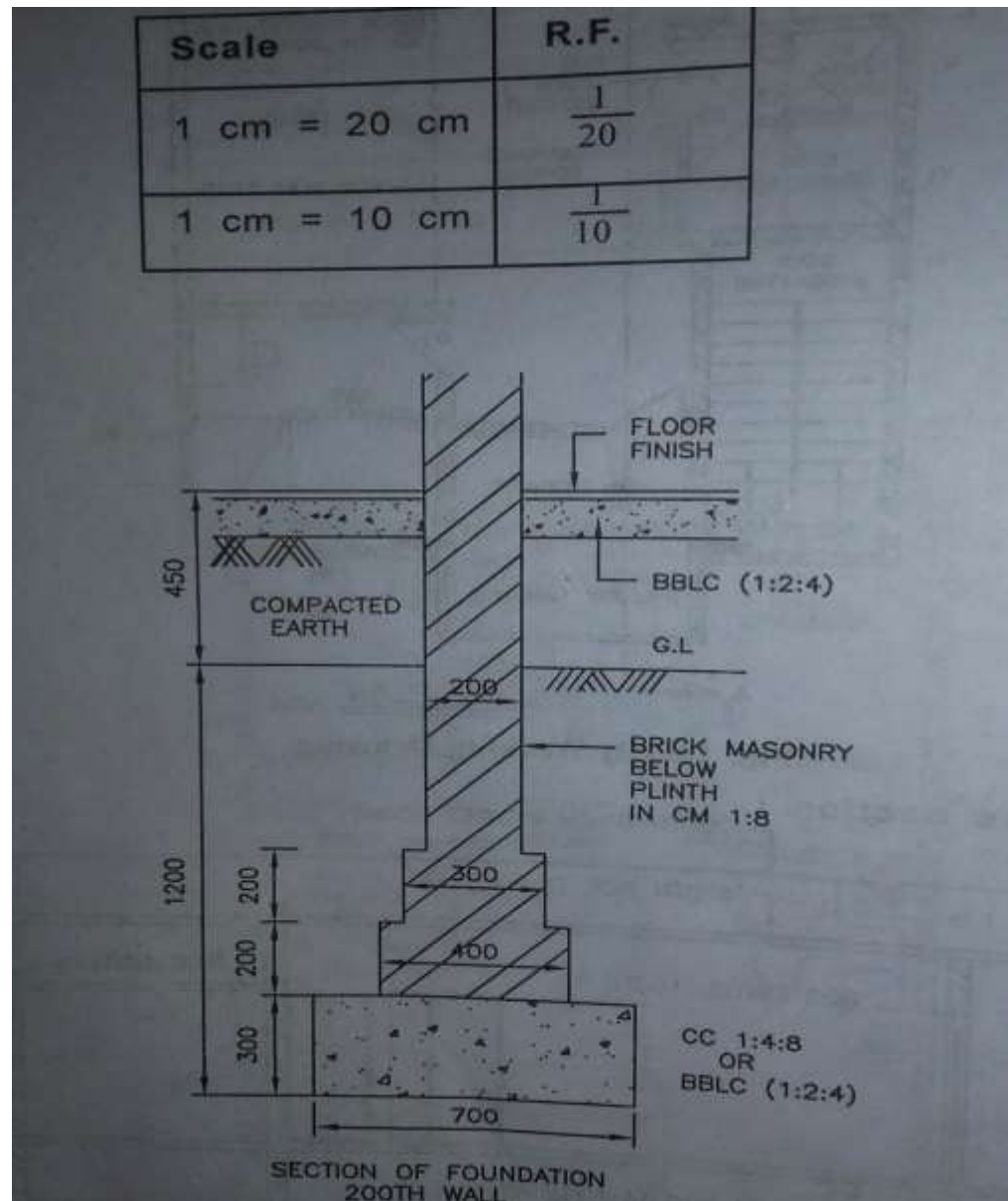
# WORKING DRAWING(C/S)



# LARGE SCALE DRAWINGS

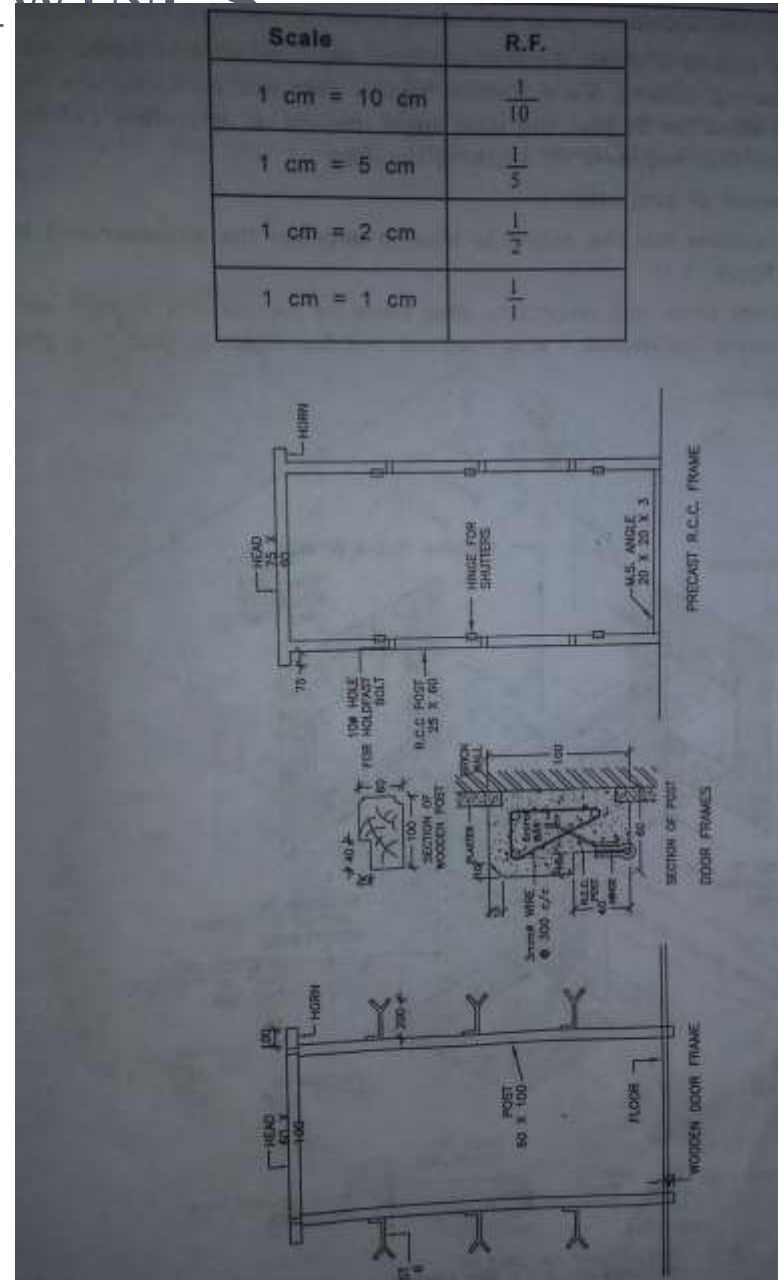
Details give...

- ' Details of foundation
- ' Doors
- ' Windows
- ' Kitchen details
- ' Arrangement of furniture
- ' Rcc components


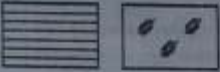








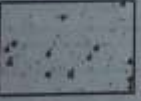
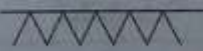



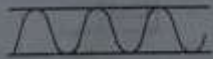


# ENLARGE SCALE DRAWINGS


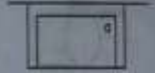











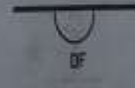


Details of joints in carpentry work, dimensions & details of aldrop bolt, tower bolt or different types of valves, handles etc. can not be given even in large scales.



# SYMBOLS

	BRICK		GLASS
	STONE		WOOD
	PARTITION BLOCK		SLAB REINFORCED ONE WAY
	PLASTER		SLAB REINFORCED TWO WAY
	CONCRETE		METAL SECTION
	REINFORCED CONCRETE		HARD CORE
	PARTITION EXISTING WORK		TOR STEEL
	SPECIAL BRICKS		INSULATION BOARD

THE SYMBOLS FOR SANITARY AND WATER SUPPLY INSTALLATIONS

	SLOP SINK		SLAB URINAL
	COMBINATION SINK		PEDESTAL TYPE URINAL
	WC LOW DOWN		INDIAN TYPE WC
	WC		WC LOW TANK
	URINAL WALL HUNG		WC NO TANK FLUSH TYPE
	URINAL CORNER HUNG		PEDESTAL DRINKING FOUNTAIN
	URINAL FLOOR		DRINKING FOUNTAIN WALL TYPE
	URINAL STALL		HOT OR COLD WATER DRAIN OFF

	FIRE ALARM PUSH		MICROPHONE OUTLET
	BELL CONNECTED TO FIRE ALARM		SIREN
	FIRE ALARM INDICATOR		ARIAL
	AMPLIFIER		CEILING FAN
	CONTROL BOARD		BRACKET FAN
	HORN OR HOOTER		EXHAUST FAN
	PILOT OR CORRIDOR LAMP		FAN REGULATOR
	RECEIVER OUTLET		EARTH POINT

	BH	BATTEN LAMP HOLDER		PULL SWITCH
	WT	WATER TIGHT LIGHT FITTING		SOCKET OUTLET 2 PIN 5 AMP.
		POWER FACTOR CAPACITOR		SOCKET OUTLET 3 PIN 5 AMP.
		CHOCK		SOCKET OUTLET AND SWITCH COMBINED 2 PIN 5 AMP
		ONE-WAY SWITCH		SOCKET OUTLET AND SWITCH COMBINED 3 PIN 5 AMP
		TWO-WAY SWITCH		SOCKET OUTLET 2 PIN, 15 AMP
		INTERMEDIATE SWITCH		SOCKET OUTLET 3 PIN, 15 AMP
		PENDANT SWITCH		SOCKET OUTLET AND SWITCH COMBINED 3 PIN, 15 AMP

# LAYOUT OF VIEWS AND DETAILS ON DRAWING PAPER

1cm=0.5m	Is suitable for building	Less than 10m
1cm=1m	Having max outward dimension	Between 10&20 m
1cm=2m		More than 20m

## Size of letters

Suggested of height of letters in mm	details
6,8,10,12	Main title & drawing num
3,4,5,6	Sub titles & heading
2,3,4,5	Meas.,schedules materials etc..



# SIZE OF DRAWING PAPERS

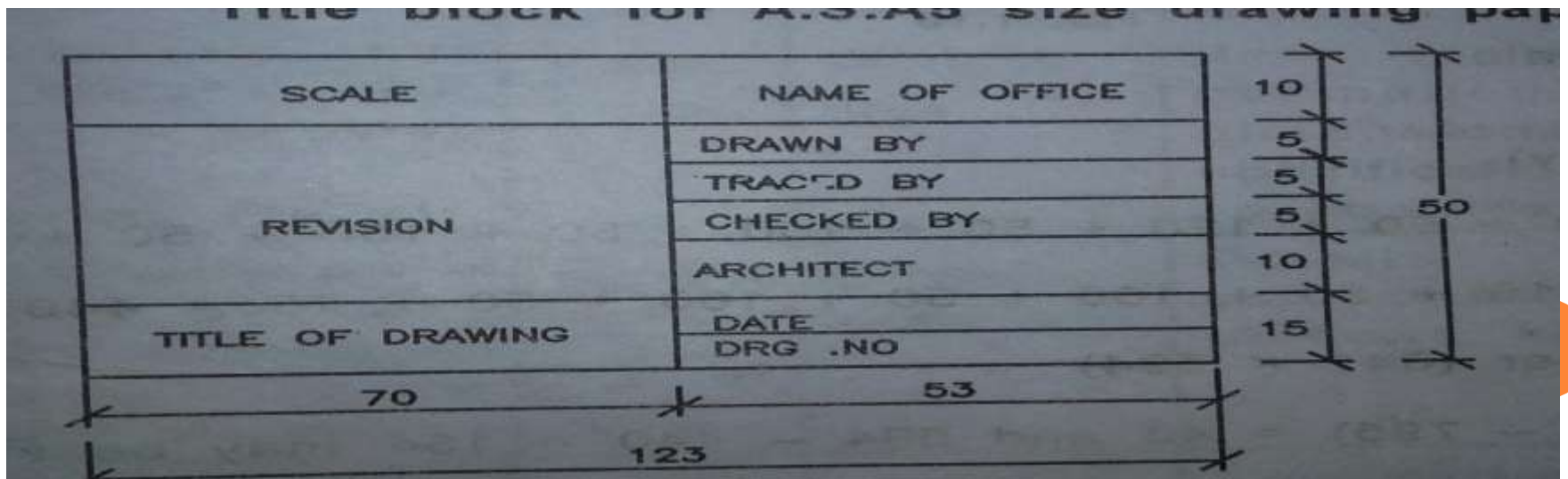
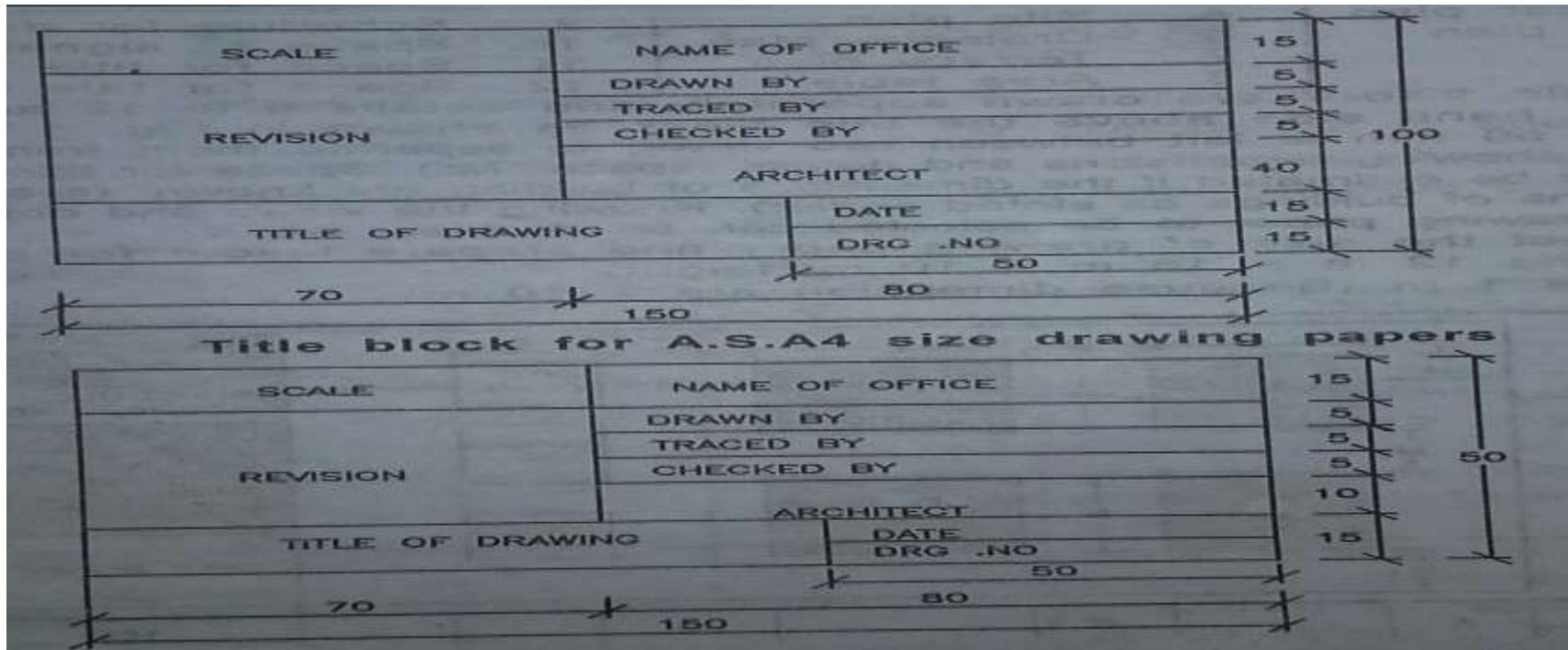
Types of paper	Length(mm)	Breadth(mm)
A0	1189	841
A1	841	594
A2	594	420
A3	420	297
A4	297	210
A5	210	148

## Margins

Size of paper	Left side (mm)	Other sides (mm)
A0 to A3	30 to 50	15
A4 to A5	20	10



# TITLE BLOCKS



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# Perspective Drawing



# Perspective

- During the **Renaissance** artists became interested in making **two-dimensional** artwork look **three-dimensional**.
- **Renaissance- (1450-1600):** The Renaissance began in Italy and spread through Northern Europe. Art, Science, and Literature grew during this time.

# Perspective

- **Many of the earlier works artists created showed little depth.**
  - **Does this picture reflect depth? Why or why not?**
  - **How could this picture be changed to increase its' depth?**



Kaufmann Haggadah. Spain, late 14th C.

# Perspective

- Artists used mathematics and close observation to invent linear perspective.
- Linear perspective allows artists to trick the eye into seeing depth on a flat surface.



# Perspective

## Influential People during the Renaissance



Raphael, *School of Athens*,  
*One-point linear perspective*

- **Art:**
  - Michelangelo
  - Leonardo da Vinci
- **Science**
  - Galileo
- **Literature**
  - Shakespeare

# Perspective

- **Many artists have used a variety of different techniques to show depth. However it was not until the Renaissance that artists developed a system to show depth logically and consistently.**

# Perspective

## ➤ Linear Perspective:

- Based on the way the human eye sees the world.
- Objects that are closer appear larger, more distant objects appear smaller.
- To create the illusion of space the artists creates a vanishing point on the horizon line.
- Objects are drawn using orthogonal lines, which lead to the vanishing points.

# Perspective

## ➤ **Vanishing Point**

- **The single point on the horizon where all the lines on the ground level seem to come together**

## ➤ **Horizon Line**

- **The place where the land and the sky meet.**

## ➤ **Orthogonal Line**

# Perspective



- Can you locate the Horizon Line?
- How did you determine this?
- Can you find the vanishing point in this picture?

# Perspective

**The red line is the Horizon Line.**



# Perspective

Can you locate the vanishing point?



# Perspective

- Artists use one-point perspective to show objects face-on.
- Most lines are vertical, horizontal, or orthogonal drawn to a single vanishing point.



# Perspective

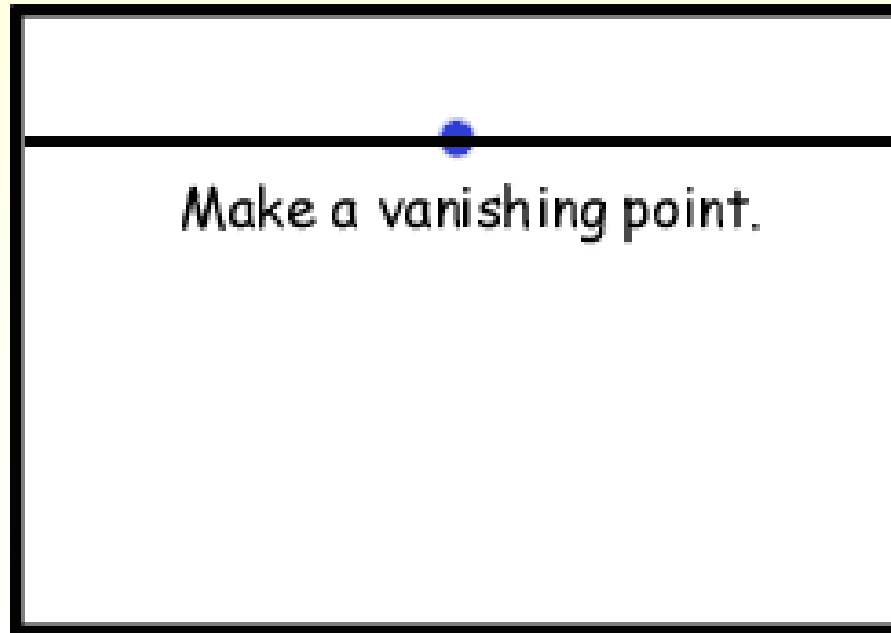
- The **Horizon Line** is **horizontal**, it goes from left to right and is parallel to the bottom edge of the picture.
  - Represents the viewer's eye level.
  - It is the place where the ground and the sky seem to meet
  - You can see the top of an object if it is below eye level, below the Horizon Line.
  - If an object is above eye level, above the Horizon Line, you can not see it's top.



Draw a horizon line.

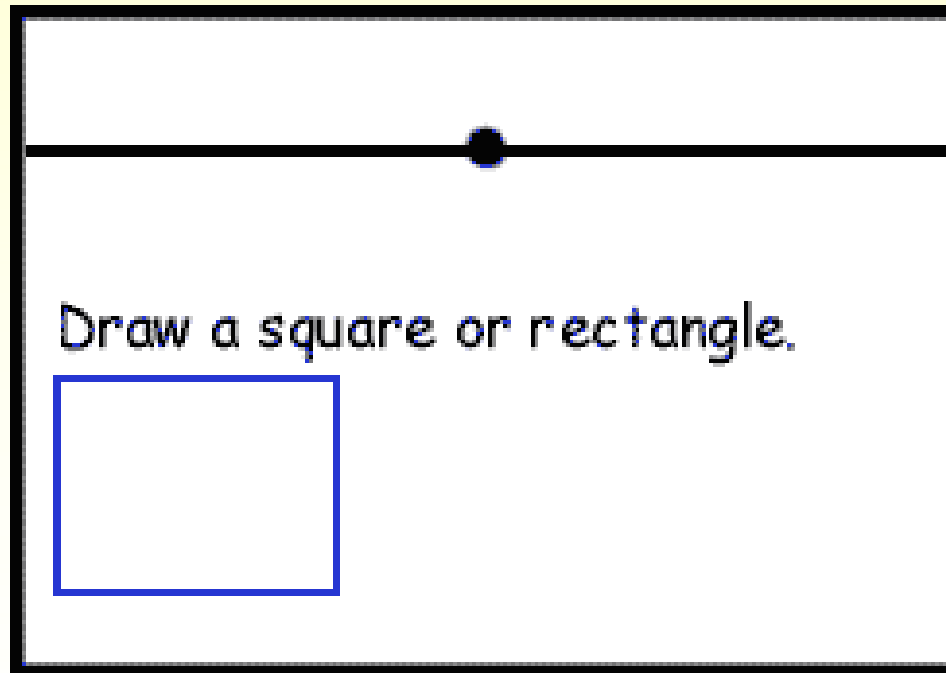
# Perspective

Place a dot in the middle of the Horizon Line. This is your vanishing point. In one-point perspective the Vanishing Point, represented is always on the Horizon Line. As things get closer to the Vanishing Point they get smaller and smaller until they appear to vanish.



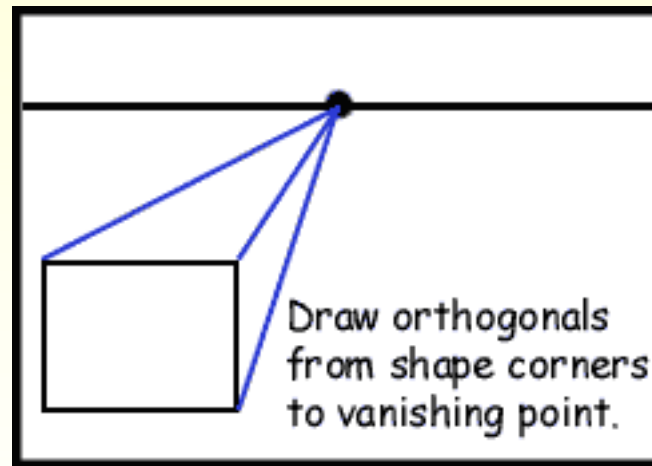
# Perspective

**Draw a square or rectangle In your picture plane.**



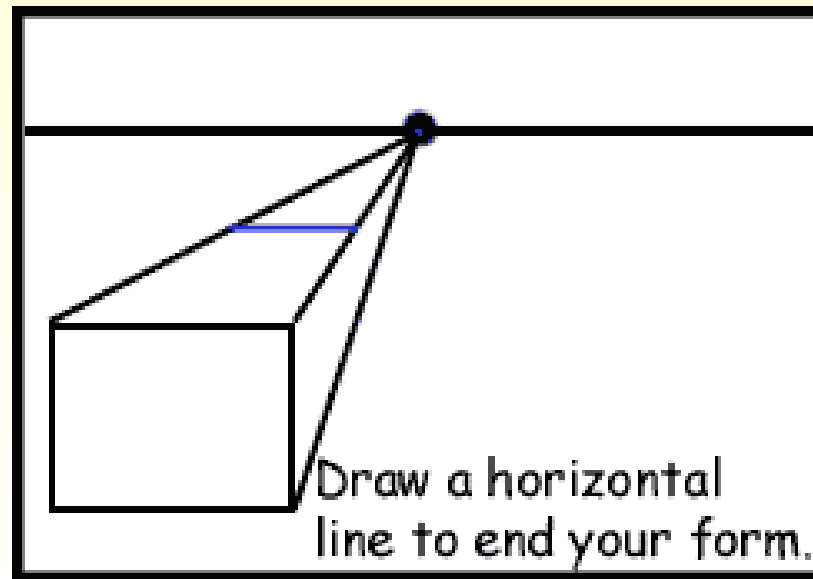
# Perspective

**Now connect three corners of your rectangle or square to the vanishing point. These are orthogonals.**



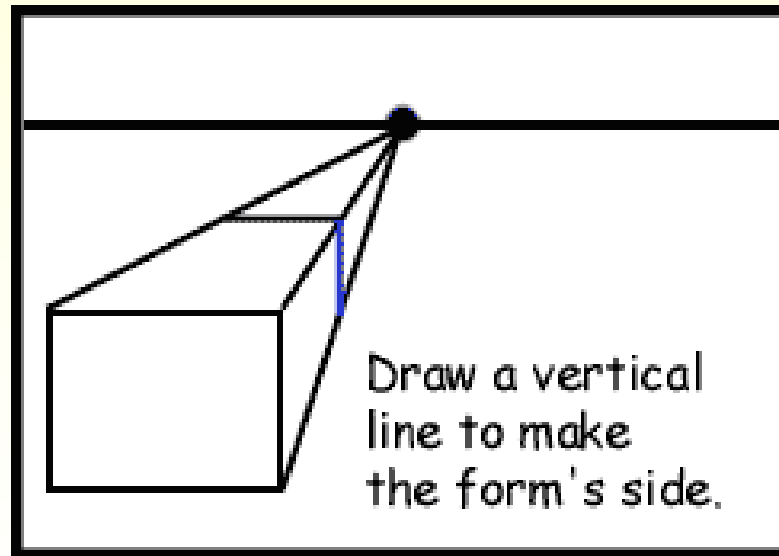
# Perspective

**Draw a horizontal line between the two orthogonals where you want your forms to end.**



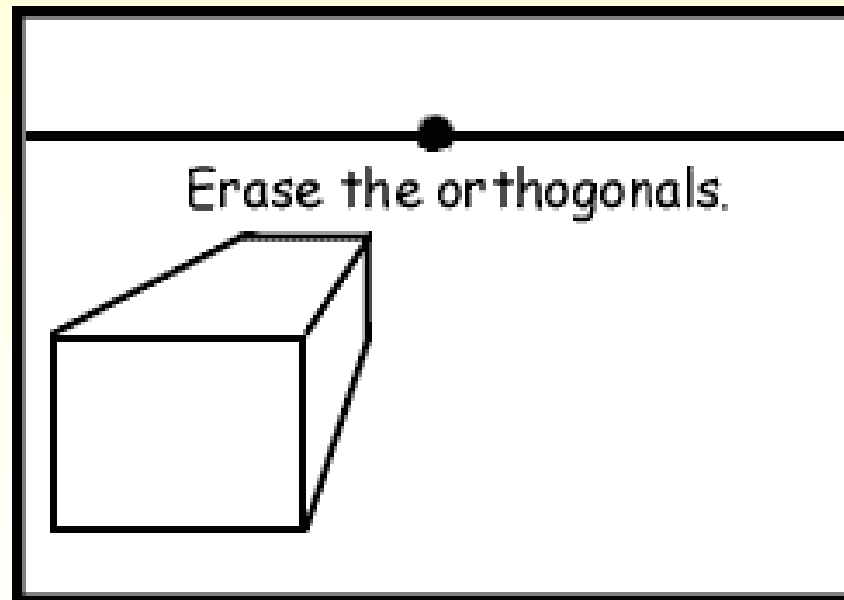
# Perspective

**Vertical lines** go from the top of the page to bottom of the page and are perpendicular to the bottom edge of the picture. Along with orthogonal and horizontal lines they make up a one-point perspective drawing.

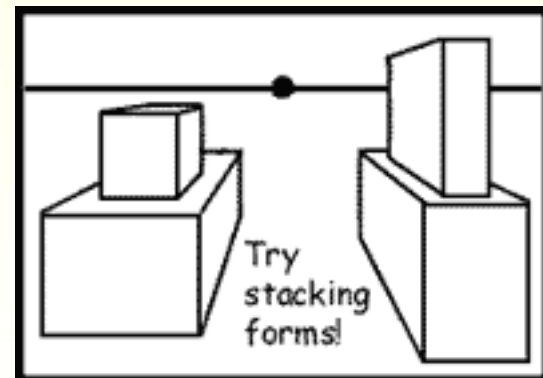
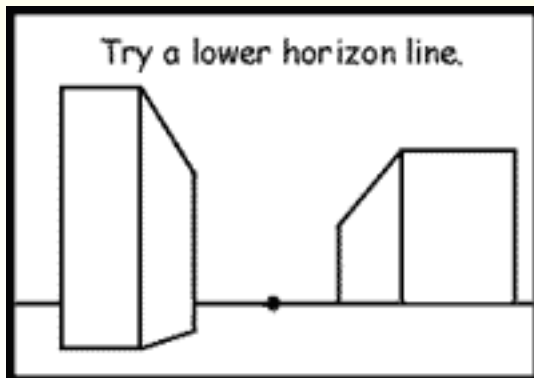
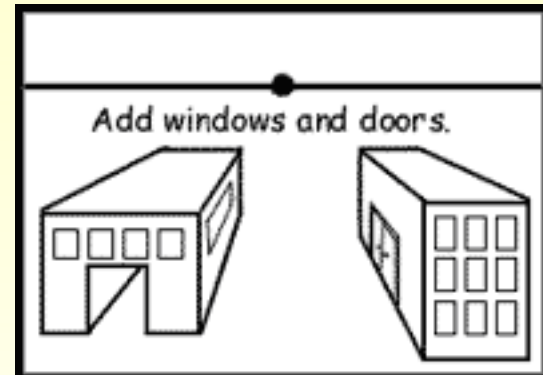
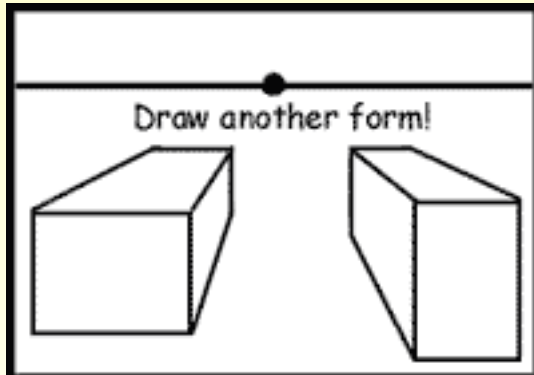


# Perspective

**Erase the orthogonals to complete your form. You now have a 3-D form in one-point perspective.**

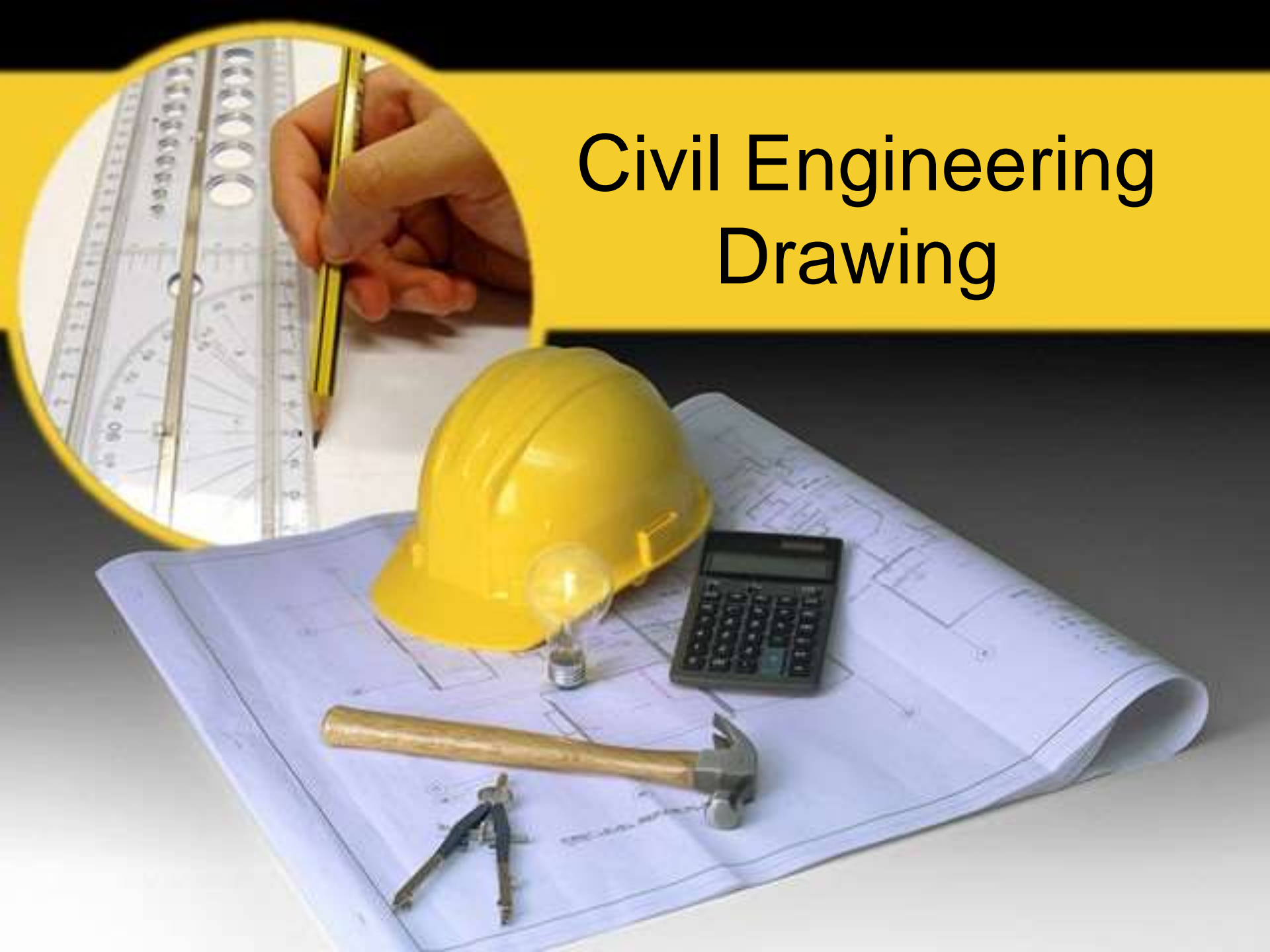


# Perspective



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# Civil Engineering Drawing



# Different Drawings



Line sketch



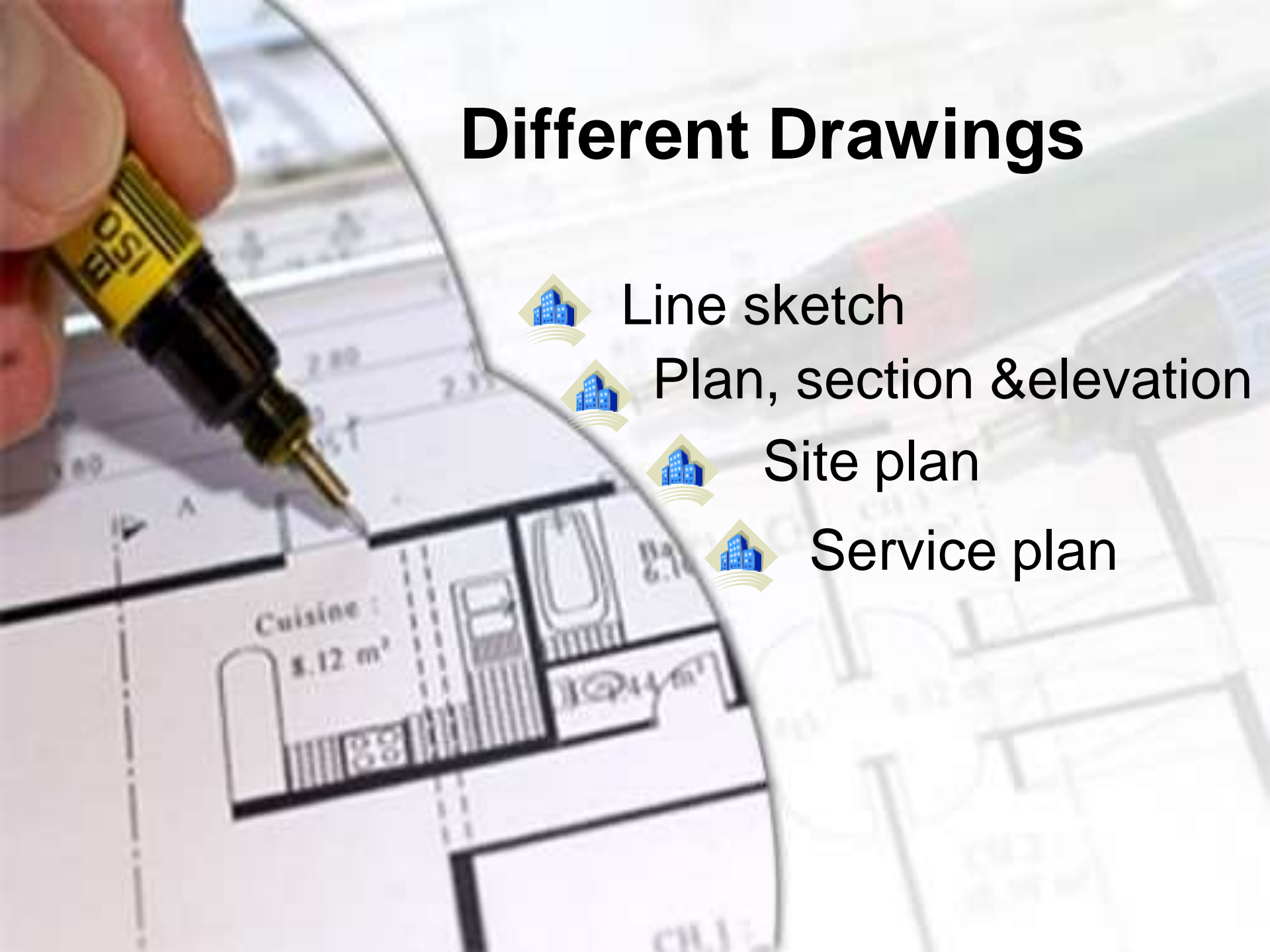
Plan, section & elevation



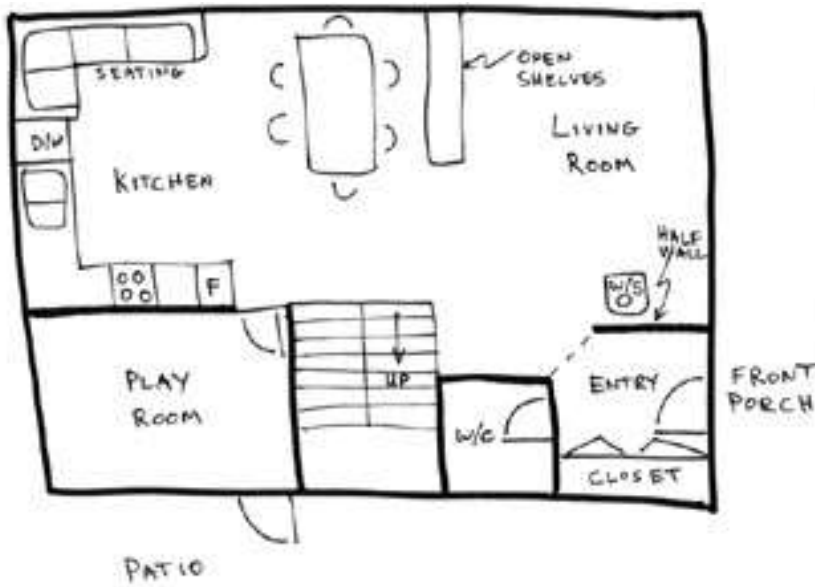
Site plan



Service plan

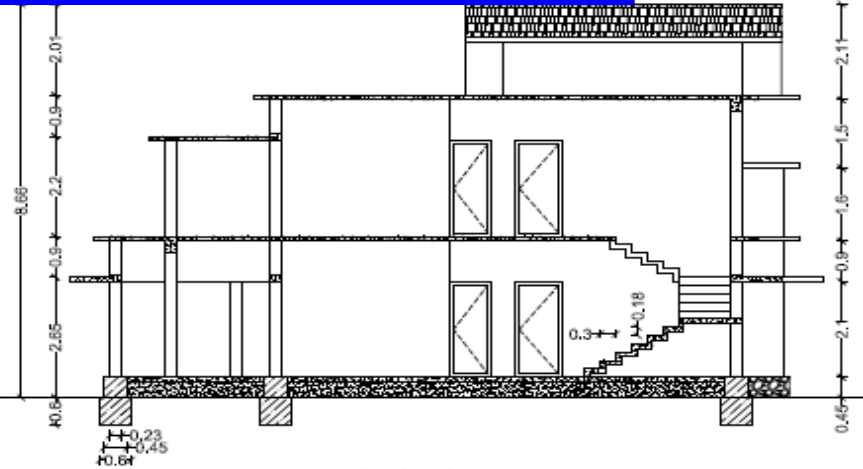


# Line Sketch



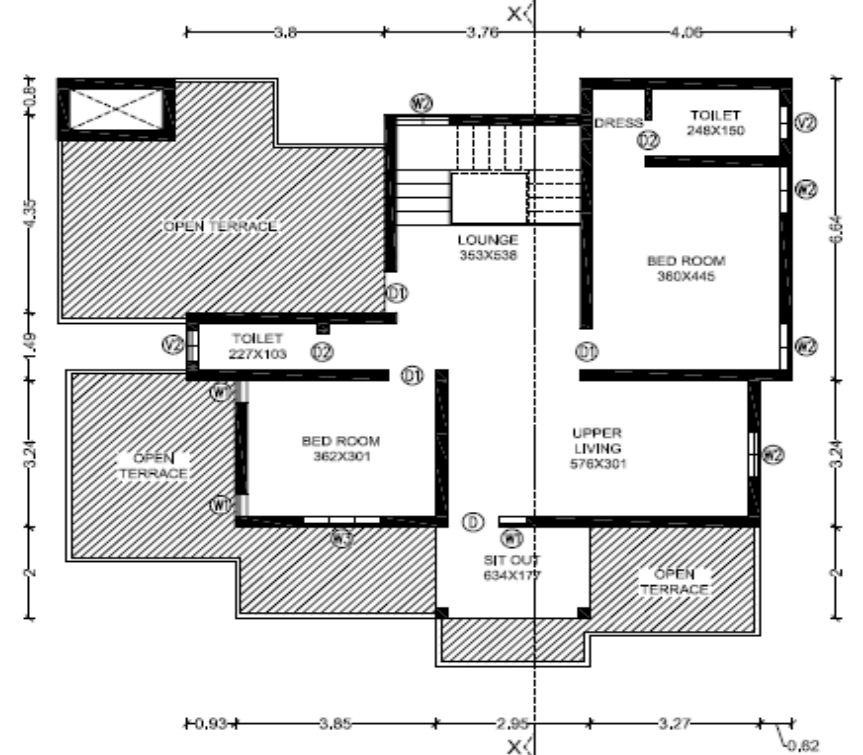
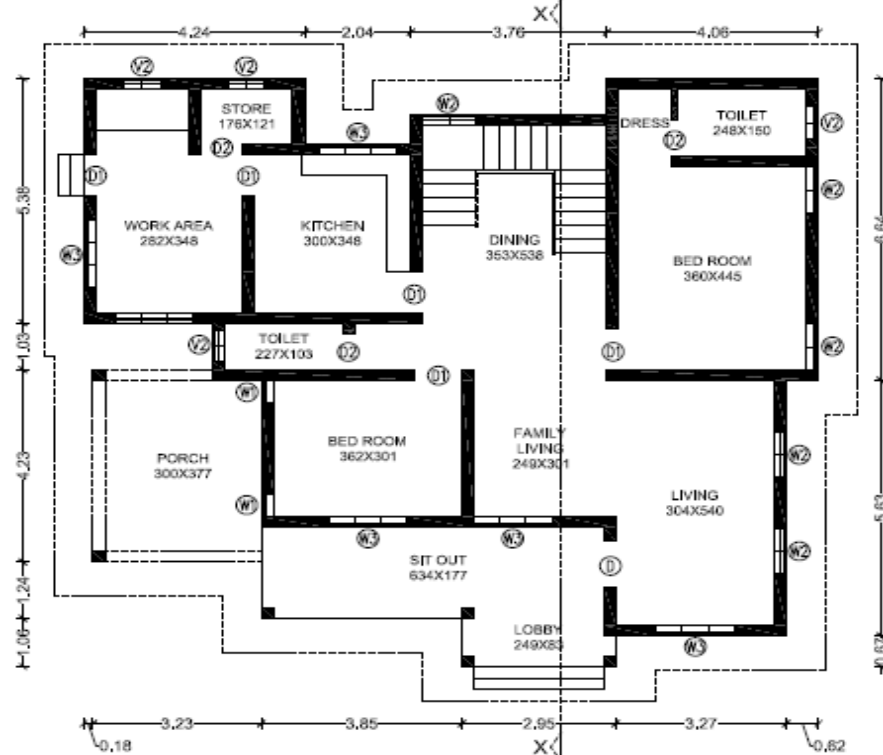
- The first sketch drawn
- Line representation of building
- Free hand drawing
- Drawn in presence of clients

# Plan, Section & Elevation



ELEVATION

SECTION AT XX



GROUND FLOOR PLAN

FIRST FLOOR PLAN

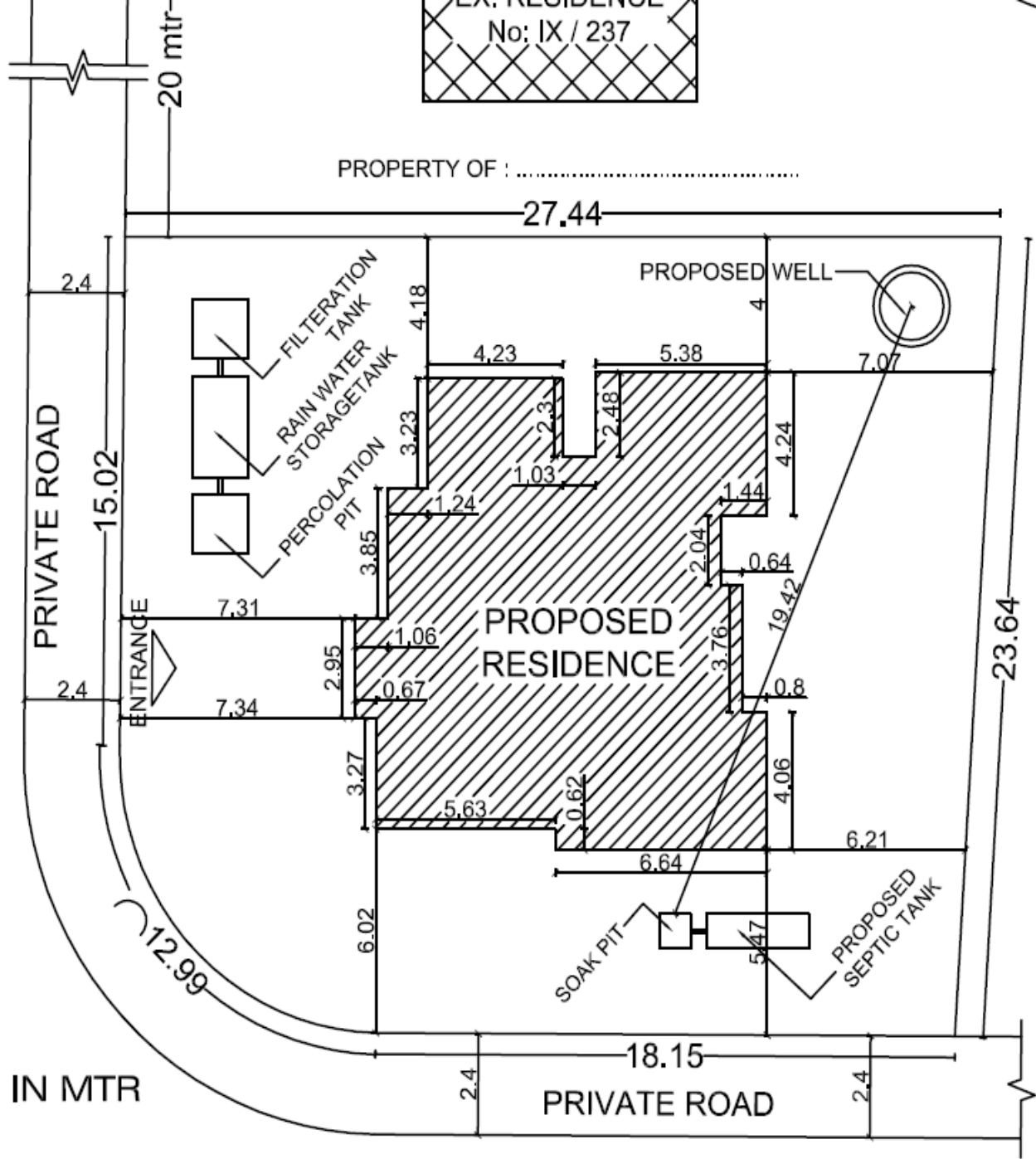
# Site plan

A site plan is a top view, bird's eye view of a property that is drawn to scale.

## A site plan can show

- Property lines
- Outline of existing and proposed buildings and structures
- Distance between buildings
- Distance between buildings and property lines (setbacks)
- Parking lots, indicating parking spaces
- Driveways & acces
- Surrounding streets & widths
- Landscaped areas
- Easements
- Ground sign location
- Utilities

EX. RESIDENCE  
No: IX / 237



PROPERTY OF : .....

PROPERTY OF : .....

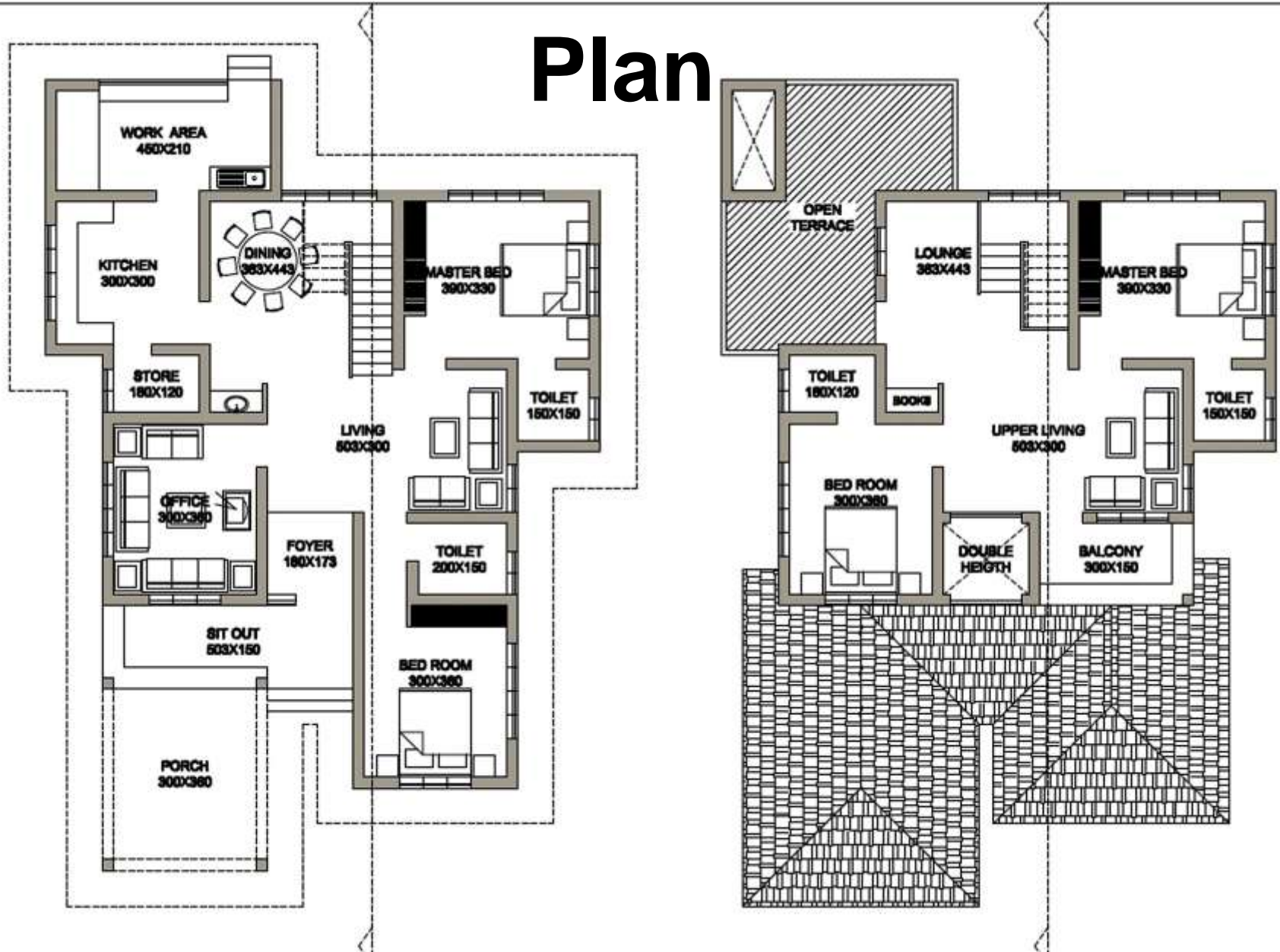
# SITE PLAN

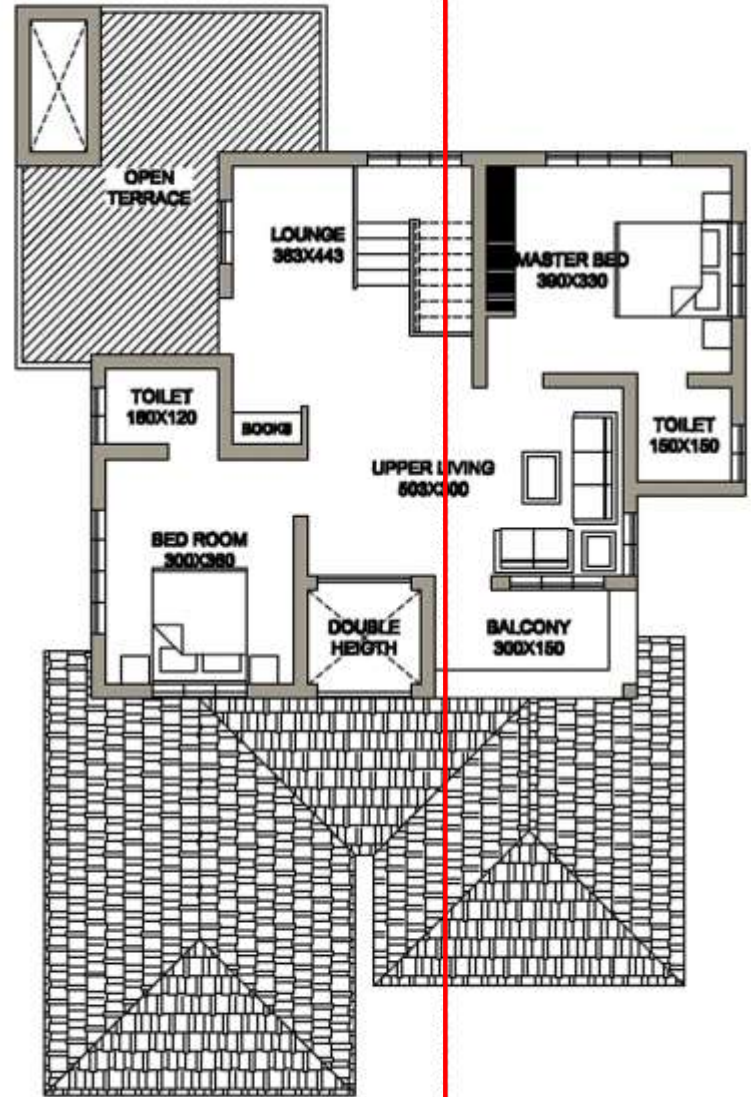
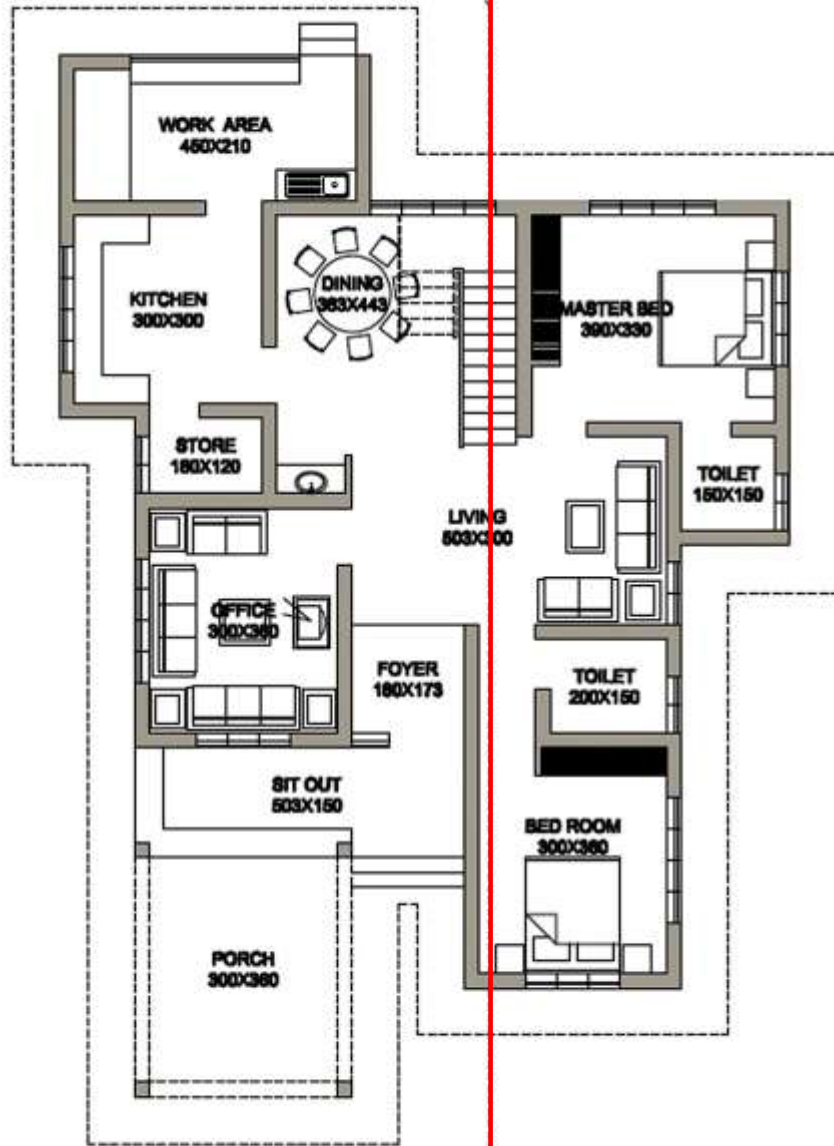
ALL DIMENSIONS ARE IN MTR  
SCALE - 1 : 300



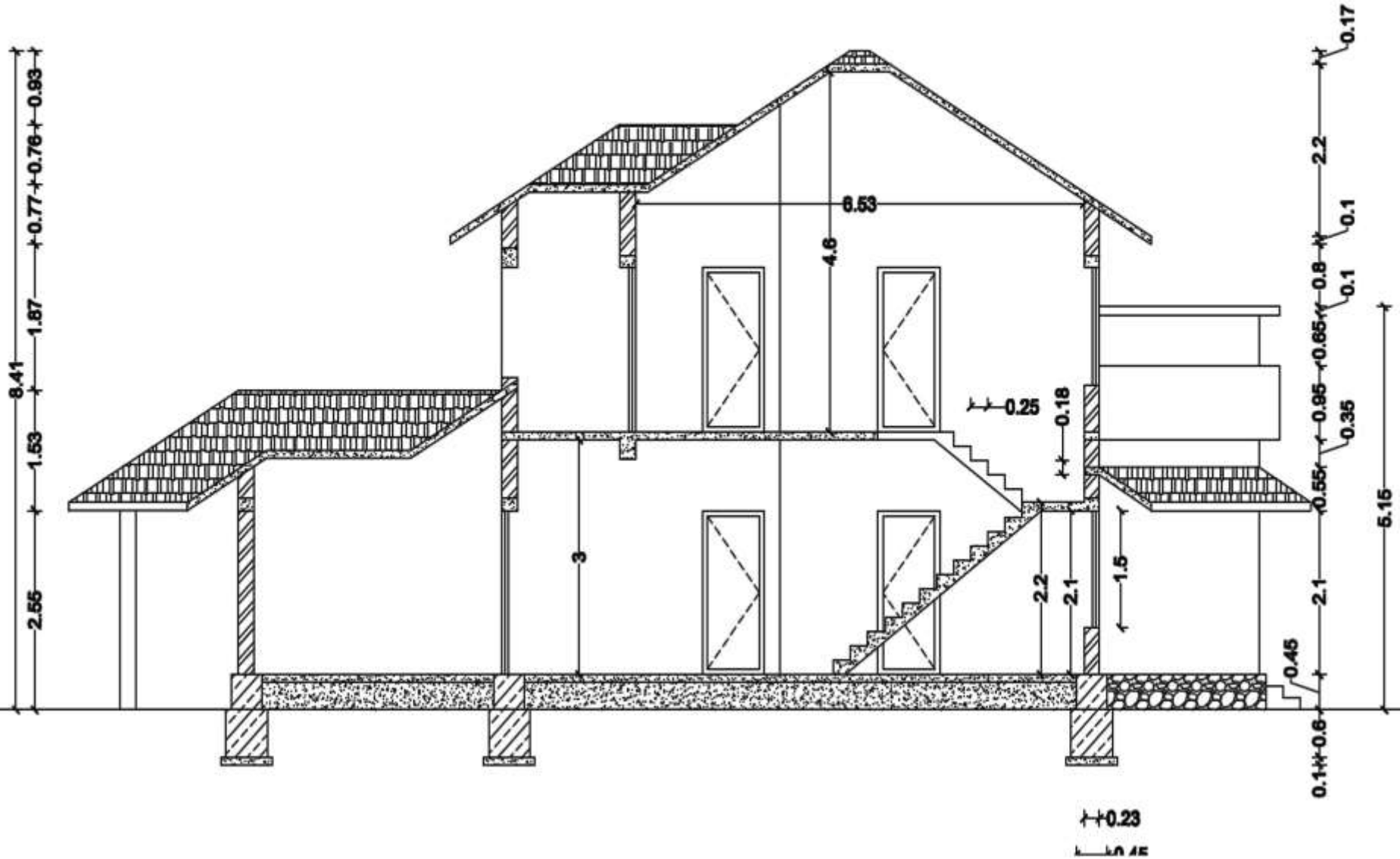
**Plan, Section & Elevation**

# Plan

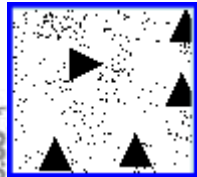




# Sectional View



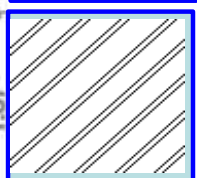
# HATCHINGS



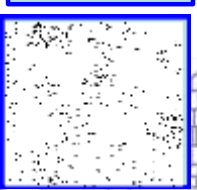
*Reinforced Cement Concrete*



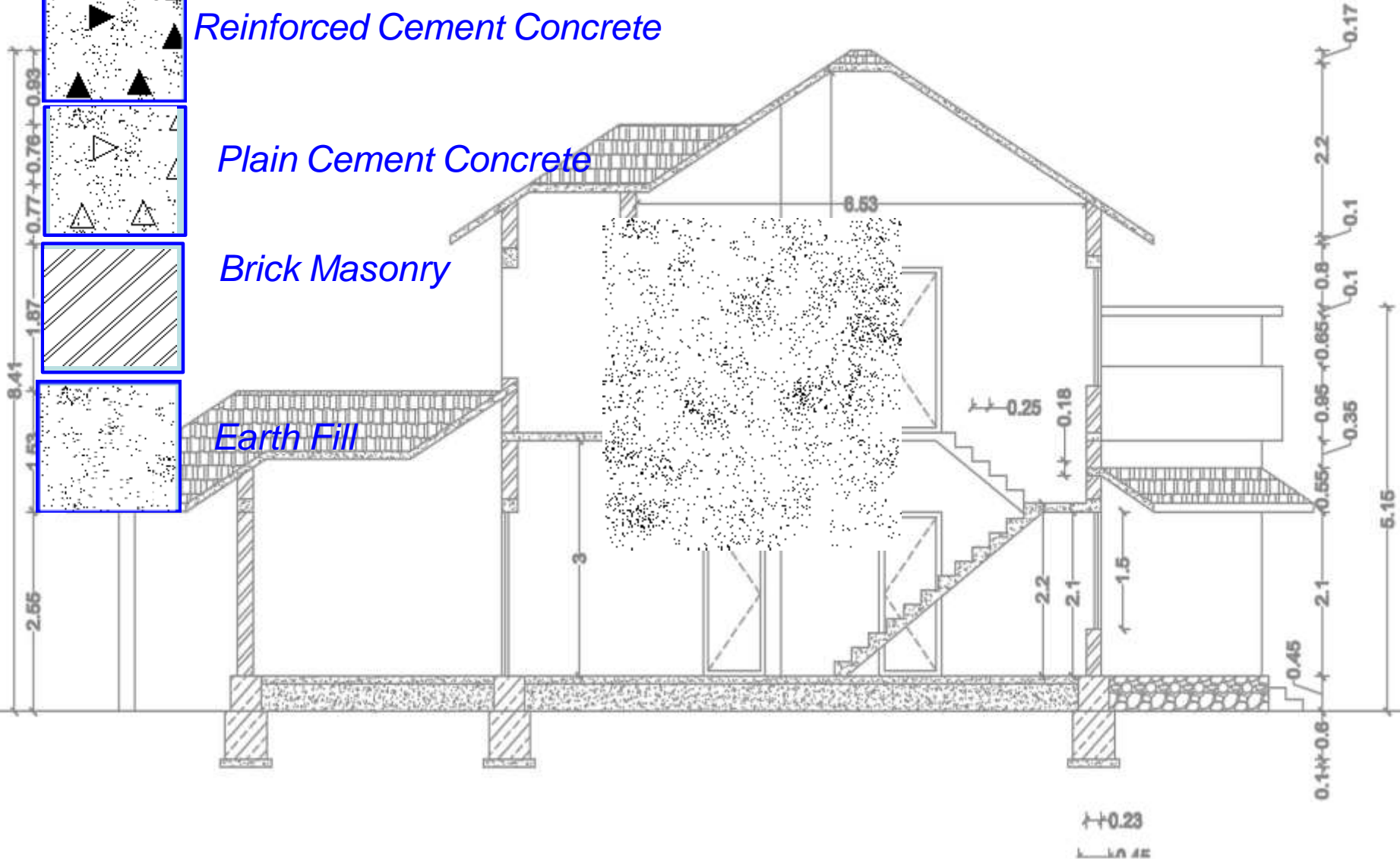
*Plain Cement Concrete*



*Brick Masonry*



*Earth Fill*



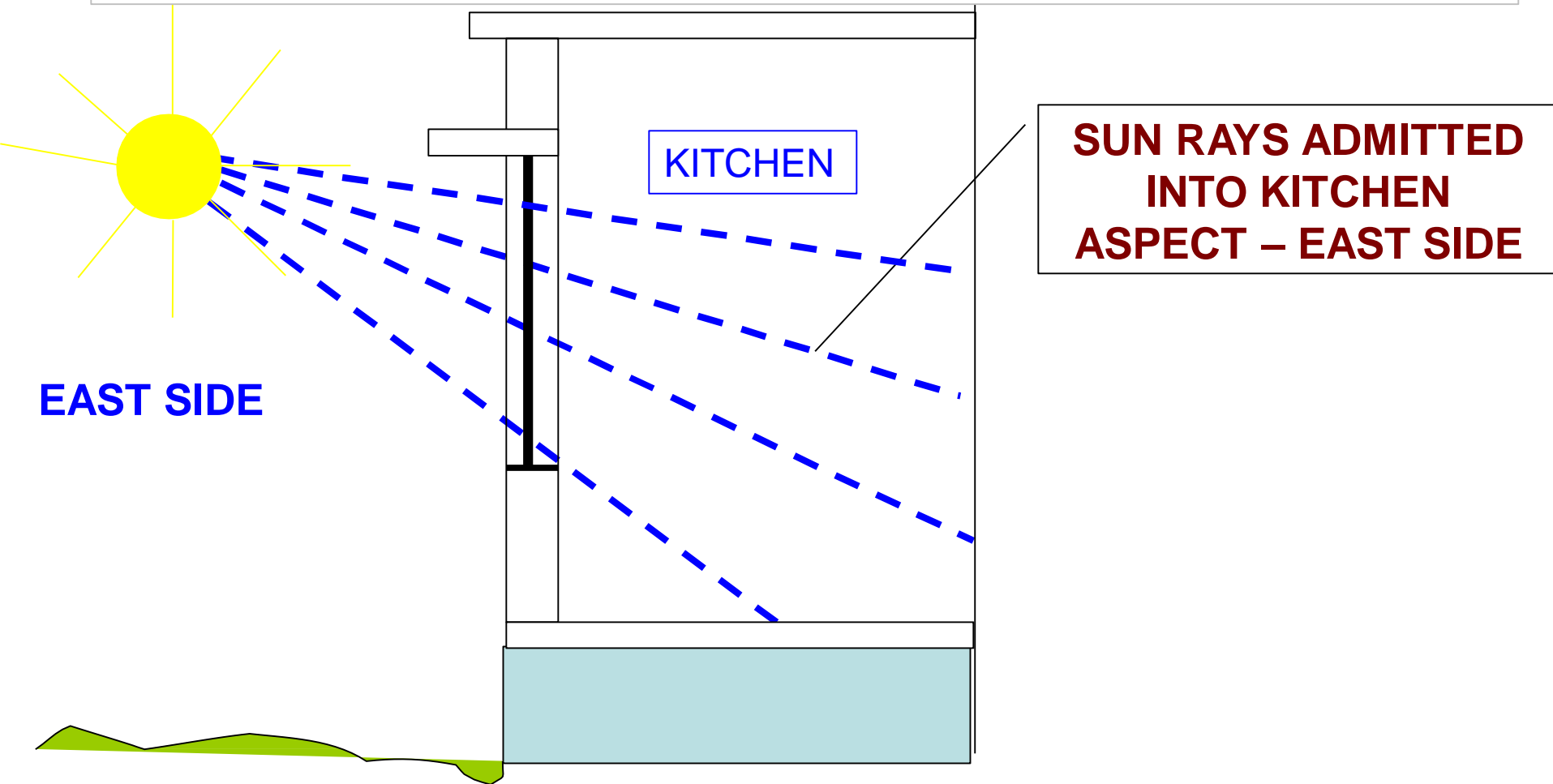


# PRINCIPLES OF BUILDING PLANNING

- **Architect prepares design of a building with the help of the following principles of planning.**
  - **Aspect**
  - **Prospect**
  - **Privacy**
  - **Roominess**
  - **Grouping**
  - **Circulation**
  - **Furniture requirement**
  - **Flexibility**
  - **Sanitation**
  - **Elegance**
  - **Economy**

# 1. ASPECT

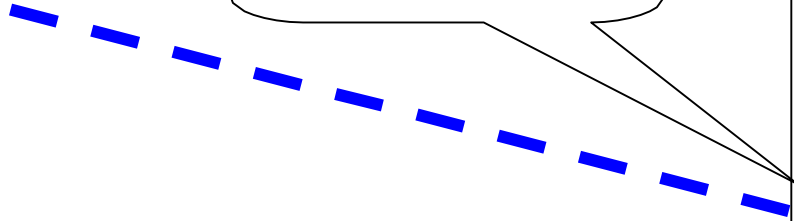
Disposition of doors and windows in the external walls – occupants can enjoy the gifts of the nature viz; sun-shine, breeze, view of landscape etc.



## 2. PROSPECT

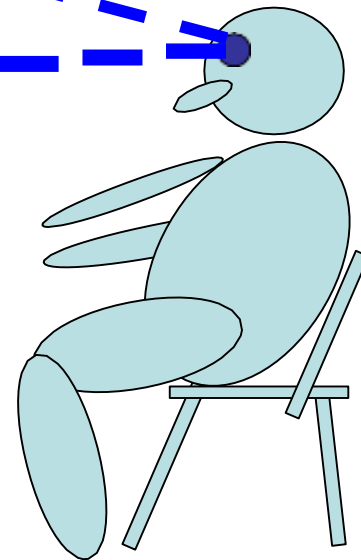
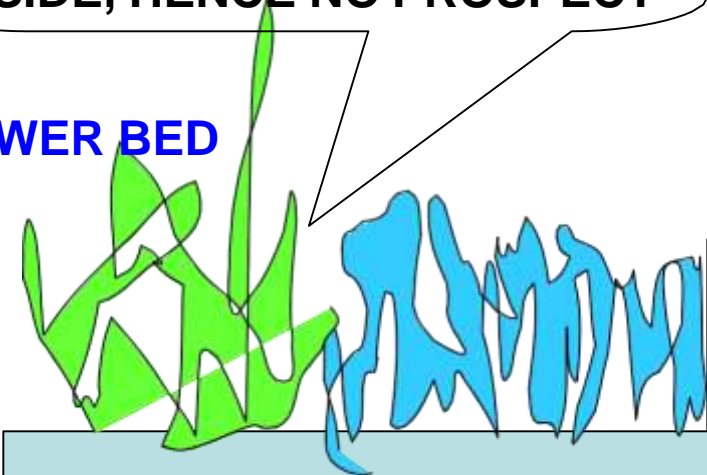
OUTSIDE VIEW SEEN FROM  
INSIDE OF THE ROOM

WINDOW AT  
HIGHER LEVEL

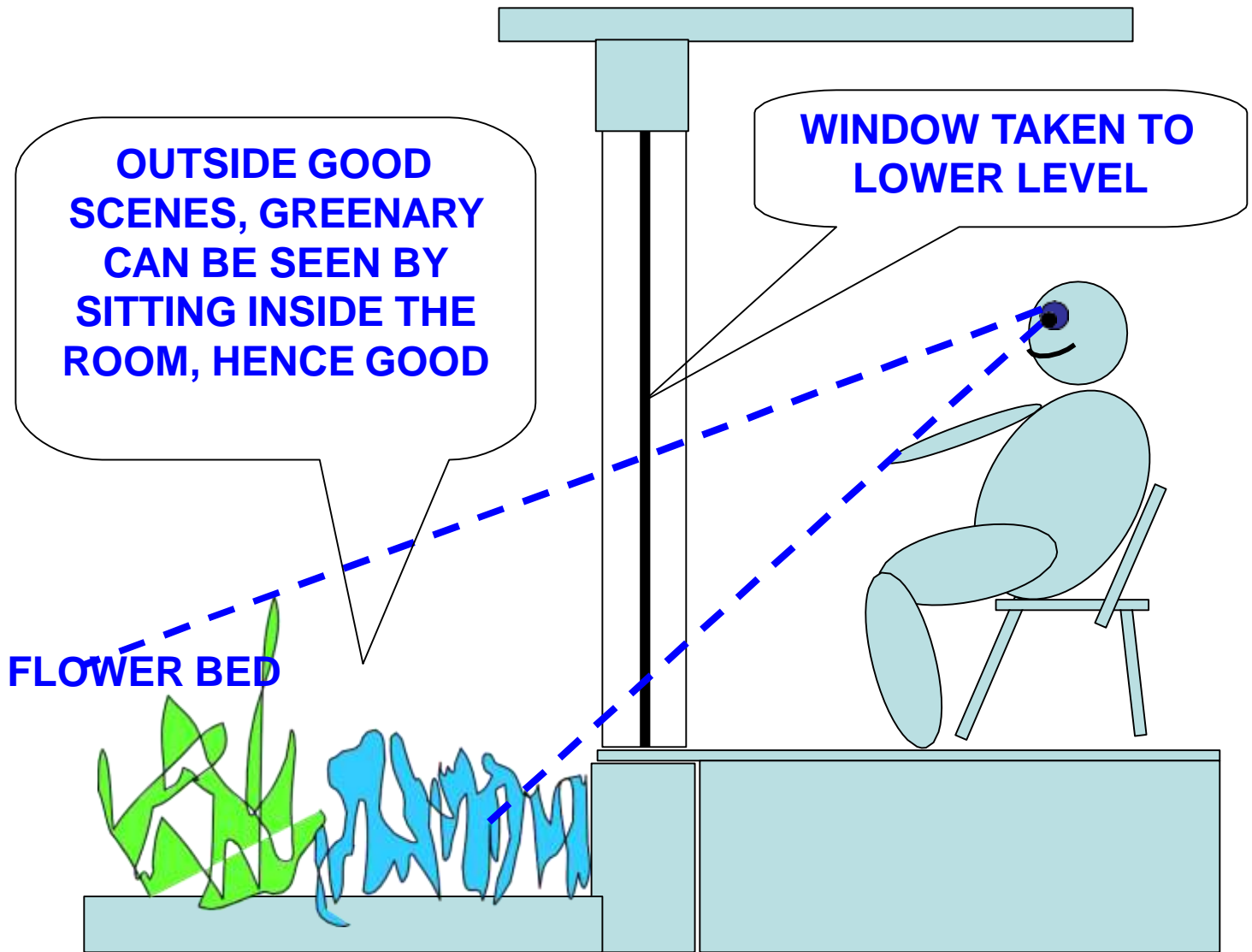


OUTSIDE GREENEARY  
CANNOT BE SEEN FROM  
INSIDE, HENCE NO PROSPECT

FLOWER BED



# PROSPECT CONTD...



# 3. PRIVACY

**Exposure of the interior space / room to the visitors vision**

**Types of privacy:**

**(1) Privacy of all parts of building with reference to surrounding buildings, roads etc.**

**This type of privacy can be achieved by--**

- **Growing plants, trees etc**
- **Providing high windows with respect to roads, grounds etc.**

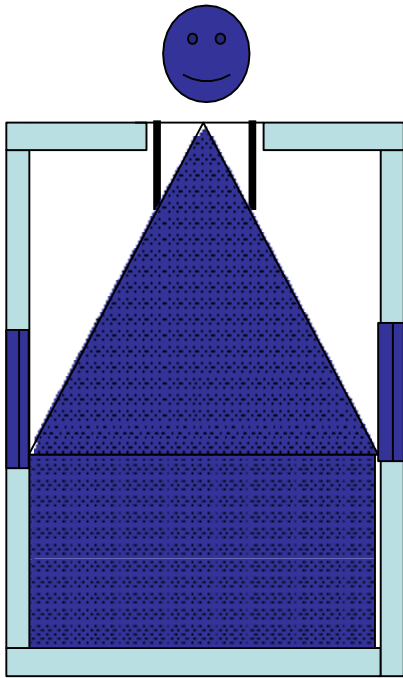
**(2) privacy of one room from another room:**

**This type of privacy can be achieved by—**

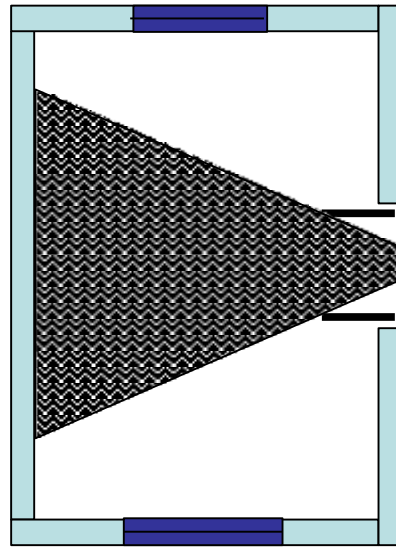
- **Carefully positioning of doors & windows**

# Privacy depends on placement of doors /window openings

OBSERVER

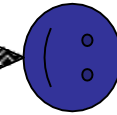


NO PRIVACY

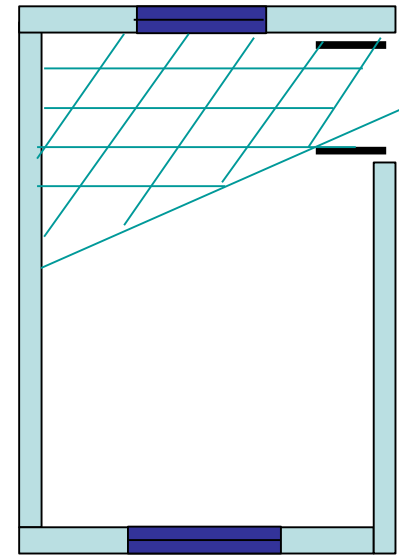


MODERATE  
PRIVACY

OBSERVER



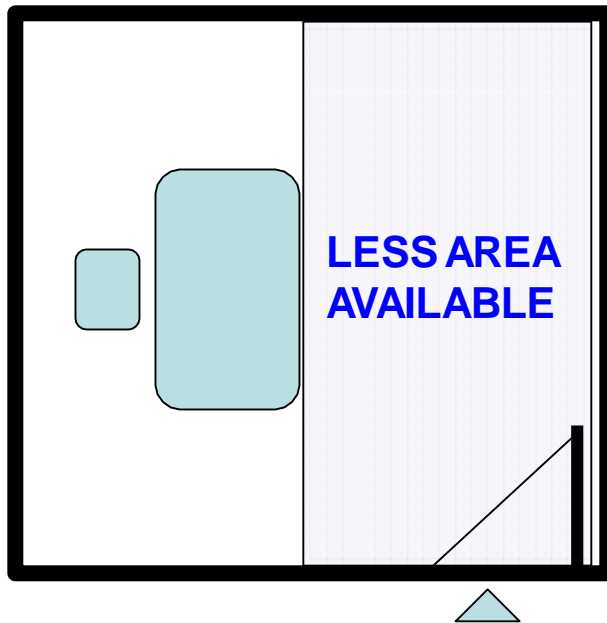
OBSERVER



MAX PRIVACY

# 4. ROOMINESS

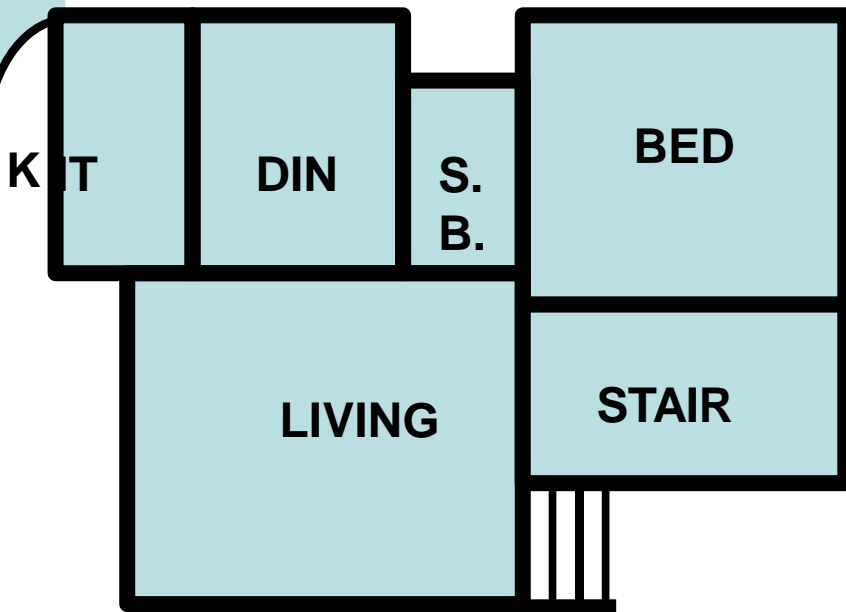
1. Getting maximum benefit from minimum dimensions or space of room
2. Rectangular shaped room gives feeling of more space than square shaped room for the same area



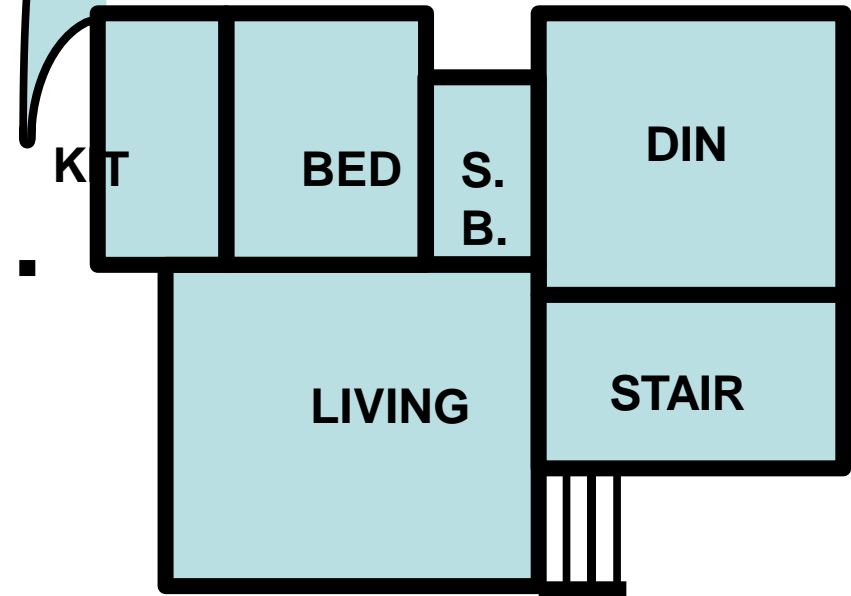
# 5. GROUPING

Arrangement of various rooms in relation with their functions

**GOOD GROUPING**

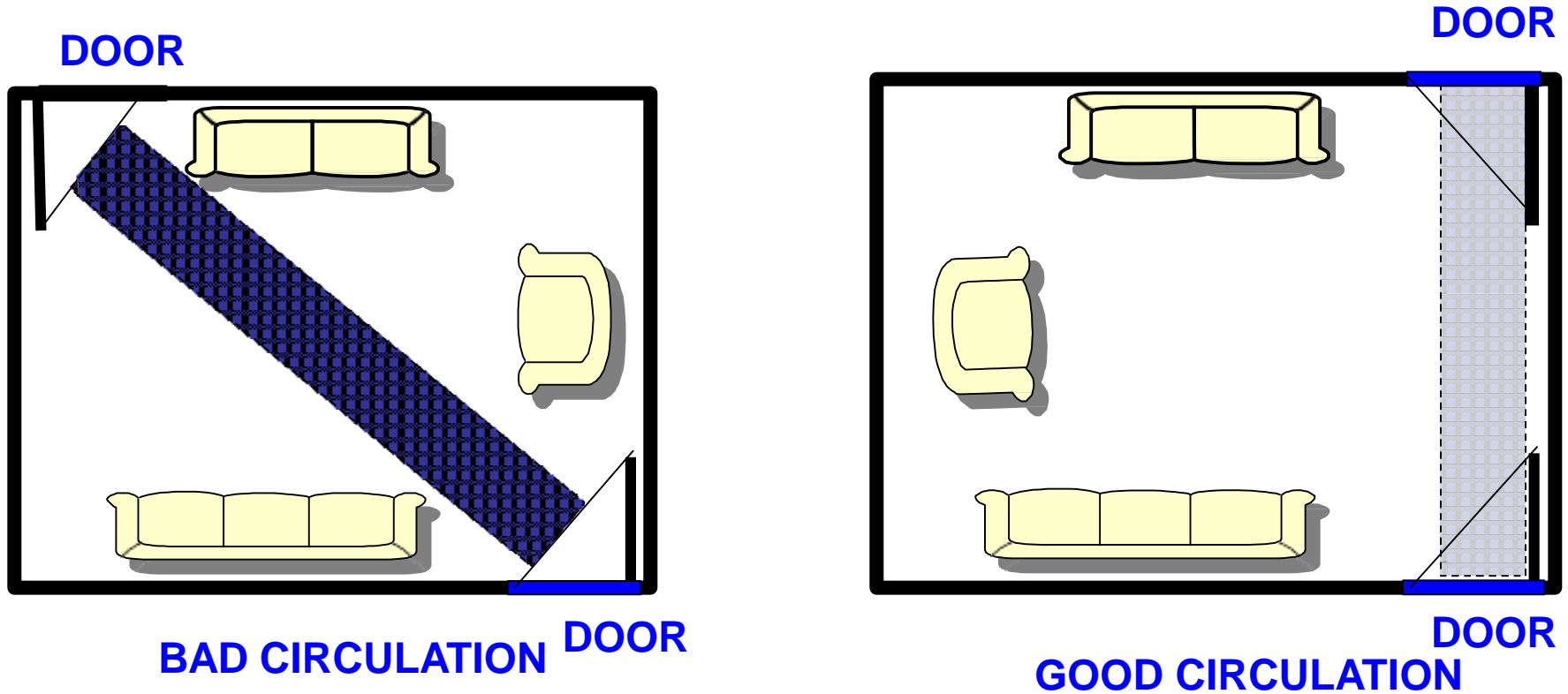


**IMPROPER GROUPING**

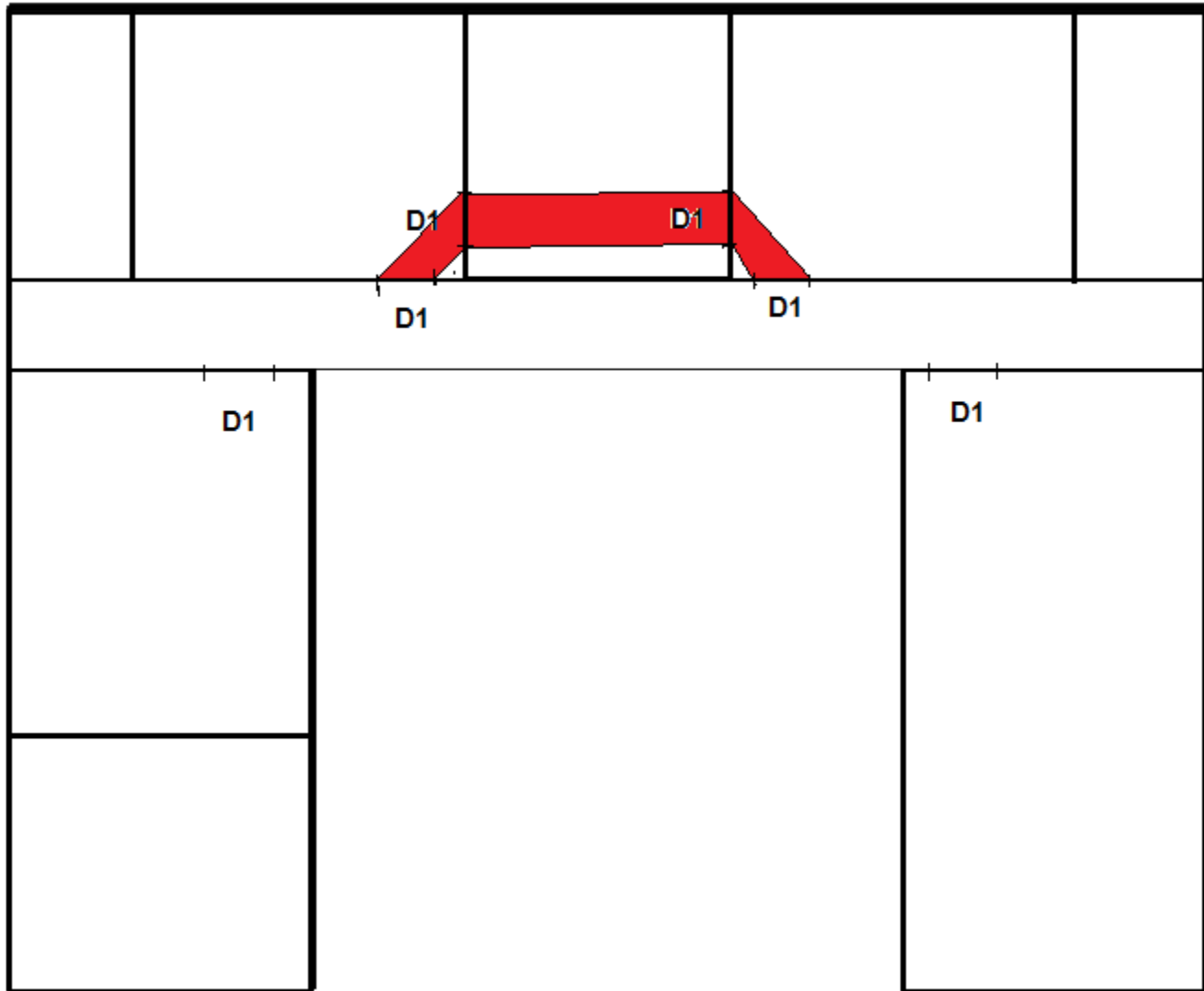


# 6. CIRCULATION

1. Horizontal circulation – passages, corridors, verandahs etc.
2. Vertical circulation – stairs, lifts, escalators etc.

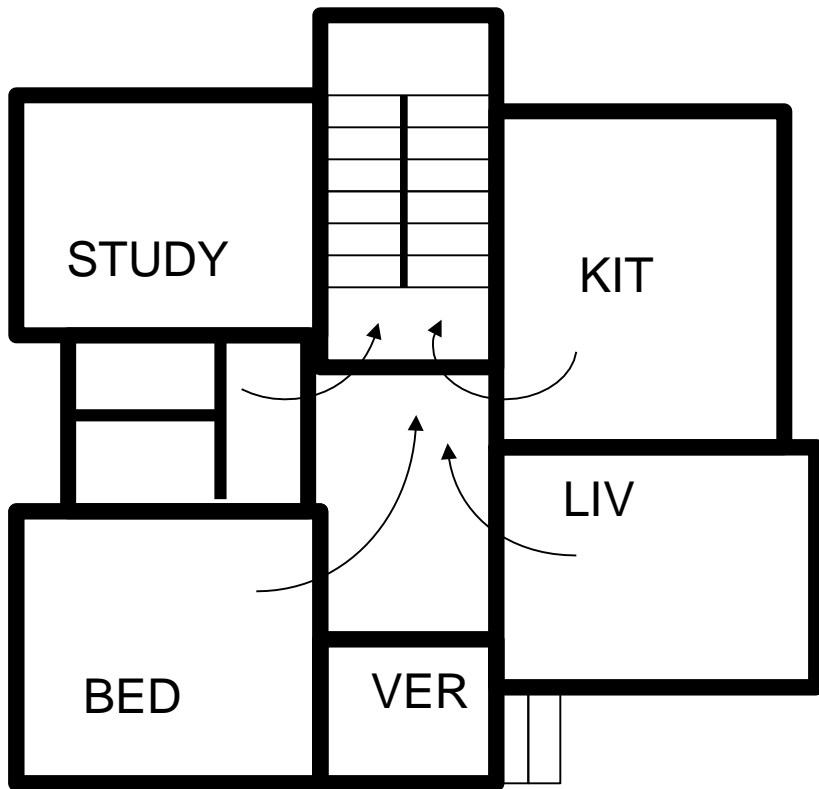


**HORIZONTAL CIRCULATION**

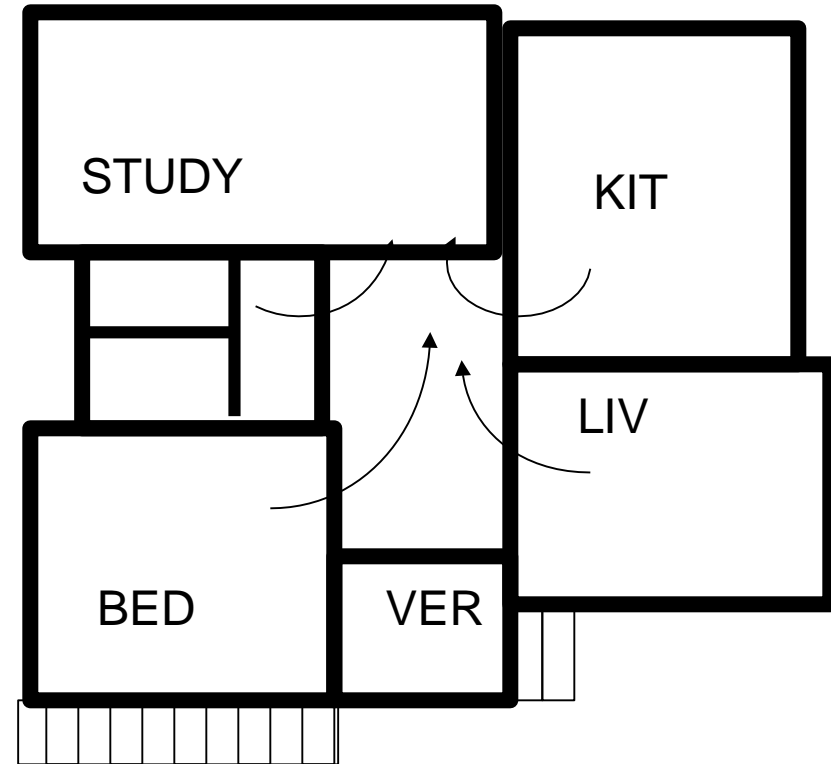
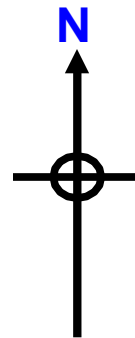


# 6. CIRCULATION CONTD...

## VERTICAL CIRCULATION



**GOOD CIRCULATION WITH  
STAIR INSIDE**



**BAD CIRCULATION WITH  
OUTSIDE STAIR**

# 7. FURNITURE REQUIREMENT

- **Function of the Room decides the Furniture requirement of that room**
  - Living hall – sofa set, teapoy, tv case, showcase, etc.
  - Bed – single, double beds, dressing table, almirah etc.
  - Dining – dinning table, chairs, cupboards etc.
- **Knowing type of furniture the dimensions of the room can be arrived at.**







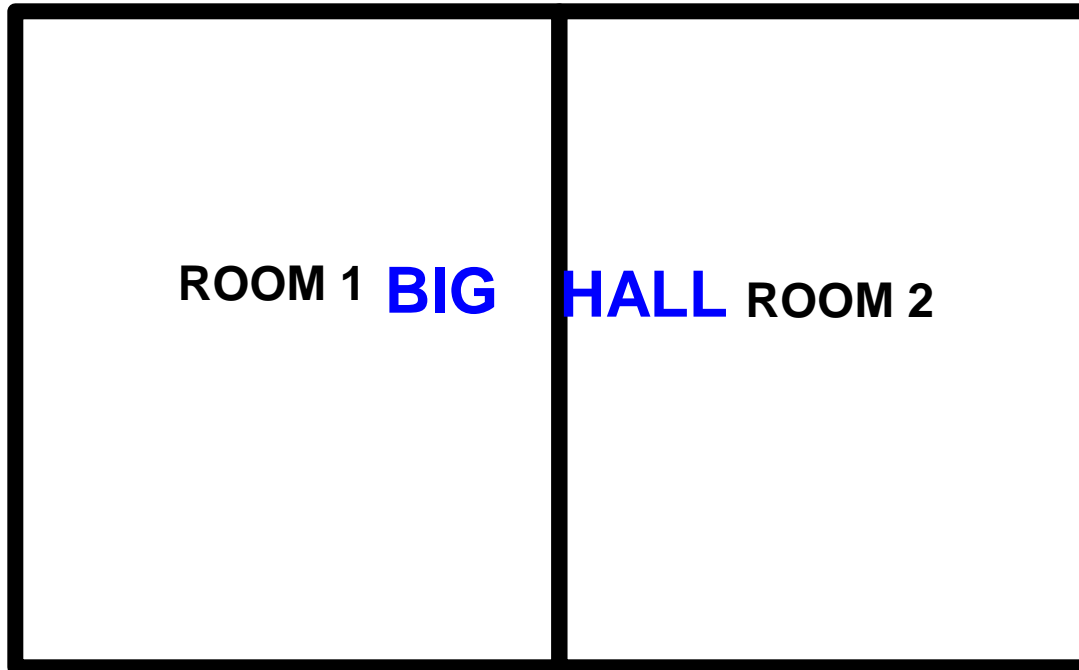
A photograph of a red-tiled sloped roof. The roof is covered in reddish-brown tiles. A brick chimney is visible on the right side. A white gutter runs along the edge of the roof. The sky is blue with some clouds. Two text boxes are overlaid on the image.

# Sloped Roof

How to draw roofline of sloped roof in plan

# 8. FLEXIBILITY

To facilitate accommodation of changes in the plan of the building in future if necessary



# 9. SANITATION

- **LIGHTING**
  - NATURAL LIGHTING
  - ARTIFICIAL LIGHTING
- **VENTILATION**
  - NATURAL VENTILATION
  - ARTIFICIAL VENTILATION
- **CLEANLINESS**
- **SANITARY PROVISIONS**
  - BATHS-ROOMS
  - WATER CLOSETS
  - LATRINES

# 10. ELEGANCE

- **ELEGANCE MEANS THE AESTHETIC VIEW OF THE BUILDING OR THE BEAUTY OF THE BUILDING**
- **ELEGANCE OF THE BUILDING CAN BE ACHIEVED BY**
  - **INCREASING THE PLINTH HEIGHT OF BUILDINGS**
  - **TREATMENT OF EXTERIOR OF BUILDING – SLOPING ROOF, PROJECTIONS ETC.**

# 11. ECONOMY

- **MINIMUM DIMENSIONS OF THE ROOM, DOORS, WINDOWS,**
- **SIMPLE DESIGN OF WINDOWS,**
- **PROVIDING MINIMUM HEIGHT OF BUILDING**
- **AVOIDING PORCHES, LOBBIES ETC**

*Thank You*

