Technical

Assignments

1. Design layout of a toilet, Public and Private.
2. Represent structure, sanitary wares, fixtures, tile layout, dimensions and annotations with plan, section and isometric view.

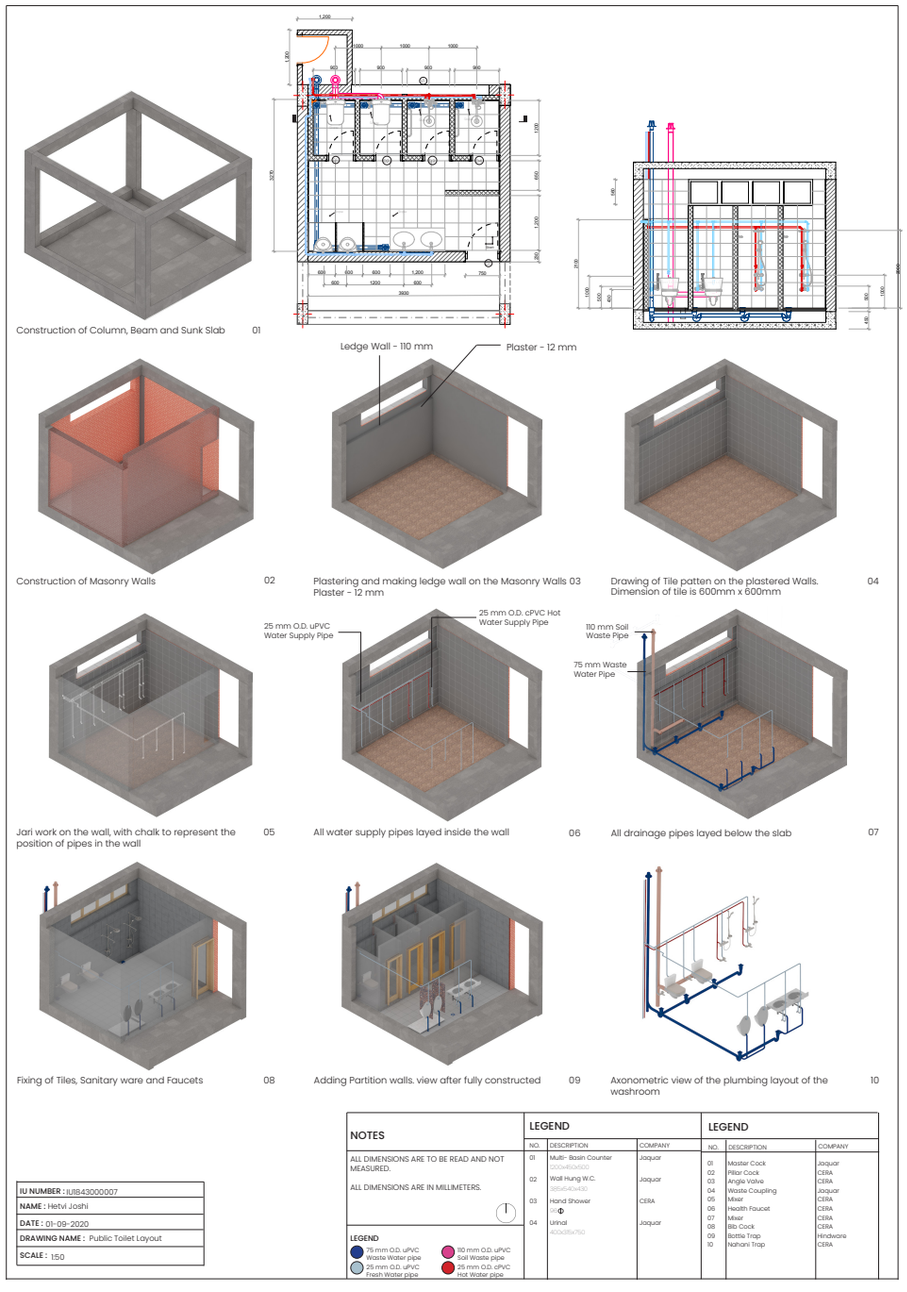
Note: maintain the sequence as mentioned below,
sheet 1 – Private Toilet Plan
Sheet 2 – Isometric views
Sheet 3 – Public Toilet Plan
Sheet 2 – Isometric views

3. Micro Level – Show water supply system and drainage system in the Toilet, both in public and private.

4. Macro Level – Understand the Water supply system and Drainage system – Case study.

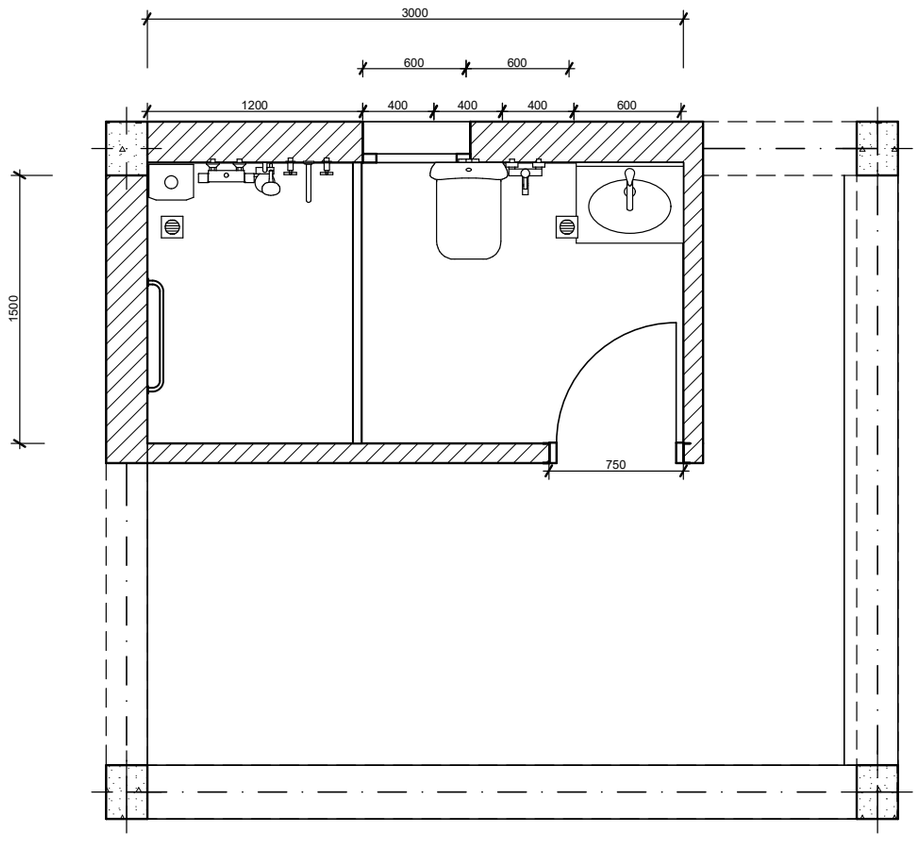
5. Macro level – Schematic representation of the water supply and drainage system of the case study.

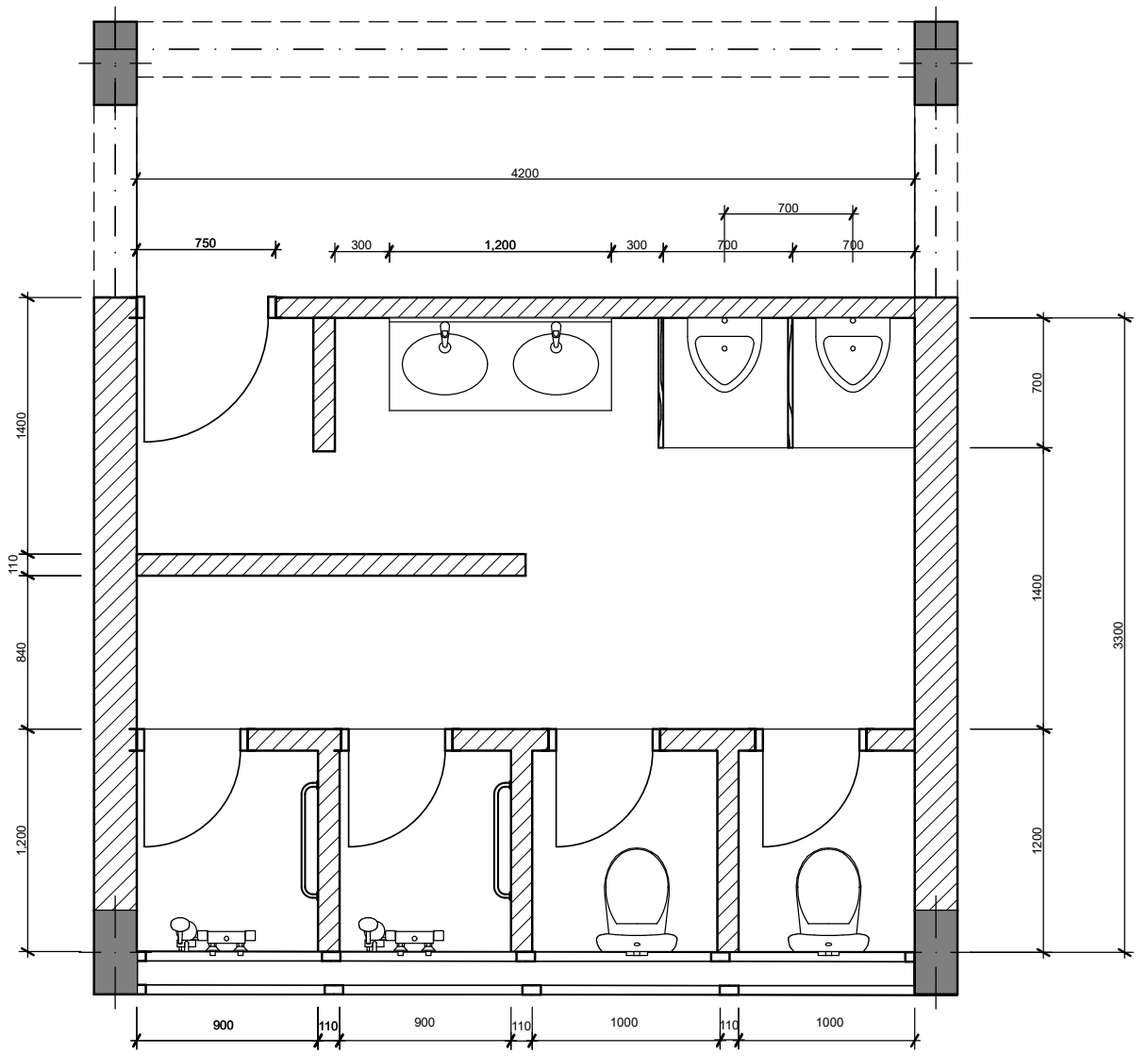
Building Construction & Services



Assignment 1.

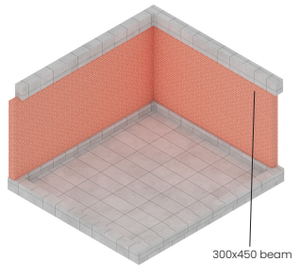
1. Design layout of a toilet, Public and Private.



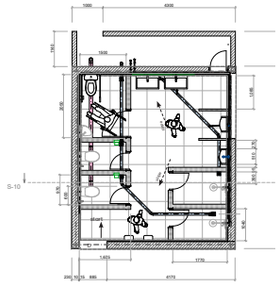


Assignment 2.

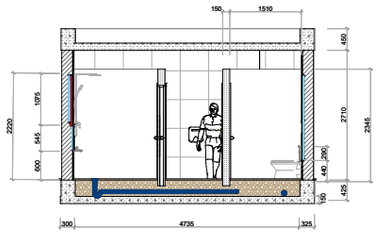
2. Represent structure, sanitary wares, fixtures, tile layout, dimensions and annotations with plan, section and isometric view.



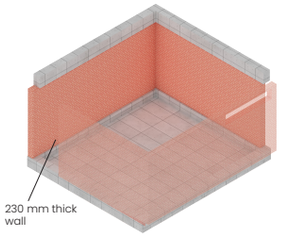
Construction of Sunk slab, Beam and Walls



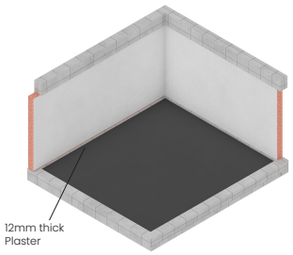
PLAN OF WASHROOM



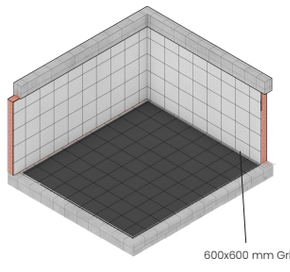
SECTION OF WASHROOM



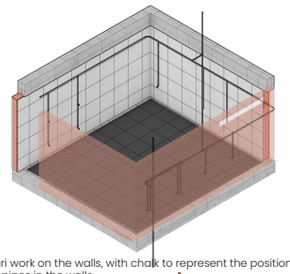
Construction of Masonry walls



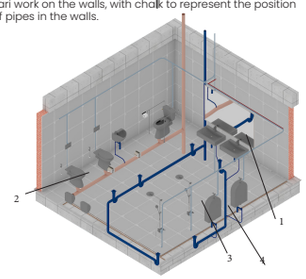
Plastering on the load bearing walls



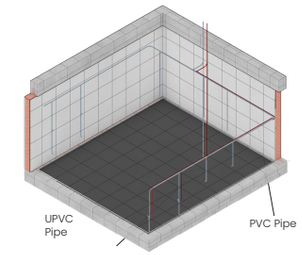
Drawing of Tile pattern on the plaster walls.



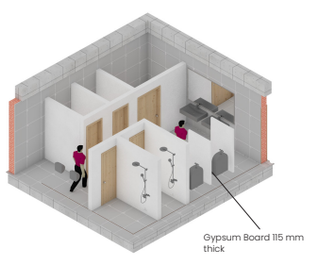
Jari work on the walls, with chalk to represent the position of pipes in the walls.



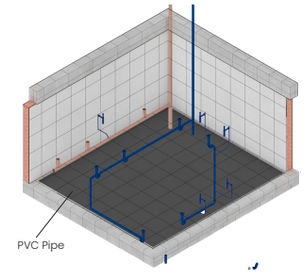
Fixing of Tiles, Sanitary ware and Faucets



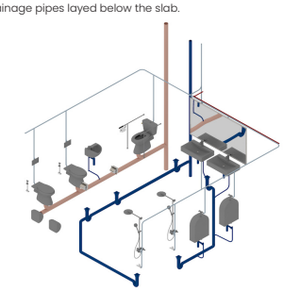
All water supply pipes layed inside the walls.



Constructing Partiton walls .



All drainage pipes layed below the slab.



Axonometric view of the plumbing layout of the Washroom.

IU NUMBER : IU1843000003	
NAME : Shaily B	
DATE : 22-08-2020	
DRAWING NAME : PUBLIC TOILET	
SCALE : 1:50	

NOTES

ALL DIMENSIONS ARE TO BE READ AND NOT MEASURED.

ALL DIMENSIONS ARE IN MILLIMETERS.

LEGEND

Waste water
Soil waste
Fresh water
Hot water

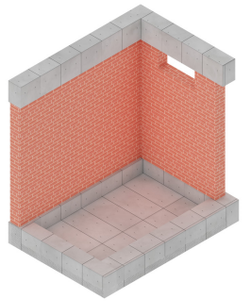
LEGEND

NO.	DESCRIPTION	COMPANY
01	Basin 750 *440*115	Jaquar
02	Floor mountedW.C. 350 *330*560	Jaquar
03	Hand Shower set	CERA
04	Urinal 406 *406*737	Jaquar

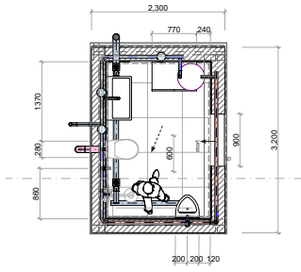
LEGEND

NO.	DESCRIPTION	COMPANY
01	Master Cock	Jaquar
02	Pillar Cock	CERA
03	Angle Valve	CERA
04	Waste Coupling	Jaquar
05	Mixer	CERA
06	Health Faucet	CERA
07	Mixer	CERA
08	Bib Cock	CERA
09	Bottle Trap	Hindware
10	Nahani Trap	CERA

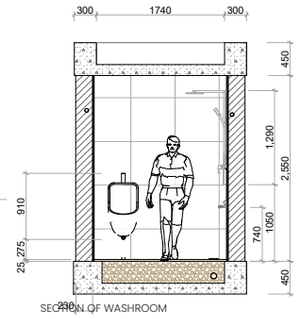
3. Micro Level – Show water supply system and drainage system in the Toilet, both in public and private.



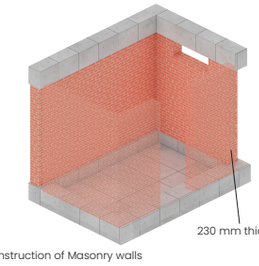
Construction of Sunk slab, Beam and Walls



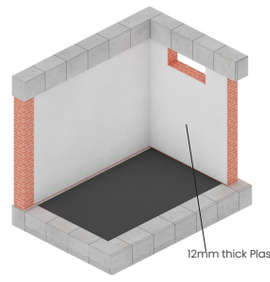
PLAN OF WASHROOM



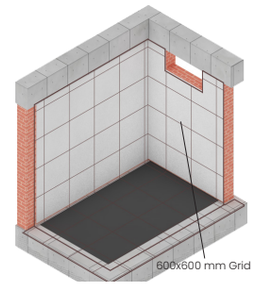
SECTION OF WASHROOM



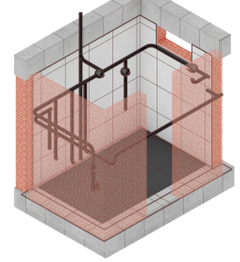
Construction of Masonry walls



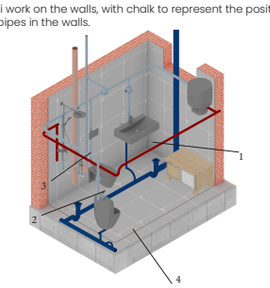
Plastering and making ledge wall on the load bearing walls



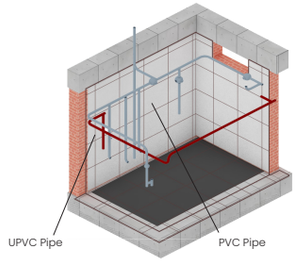
Drawing of Tile pattern on the plaster walls.



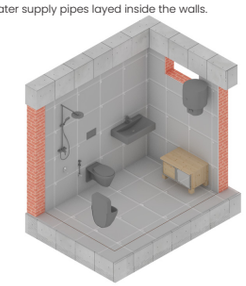
Jari work on the walls, with chalk to represent the position of pipes in the walls.



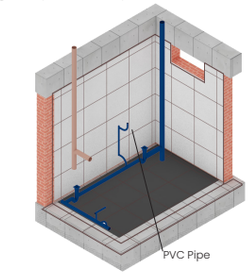
Fixing of Tiles, Sanitary ware and Faucets



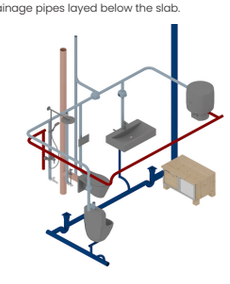
All water supply pipes layed inside the walls.



Constructing Partiton walls .



All drainage pipes layed below the slab.



Axonometric view of the plumbing layout of the Washroom.

IU NUMBER : IU1843000003	
NAME : Shaily B	
DATE : 22-08-2020	
DRAWING NAME : PRIVATE TOILET	
SCALE : 1:50	

NOTES

ALL DIMENSIONS ARE TO BE READ AND NOT MEASURED.

ALL DIMENSIONS ARE IN MILLIMETERS.

LEGEND

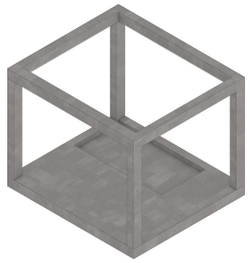
Waste water
Soil waste
Fresh water
Hot water

LEGEND

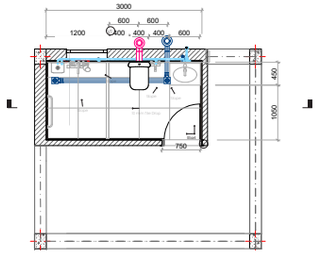
NO.	DESCRIPTION	COMPANY
01	Basin 750 *440*115	Jaquar
02	Floor mounted 350 *330*560	Jaquar
03	Hand Shower set	CERA
04	Urinal 406 *406*737	Jaquar

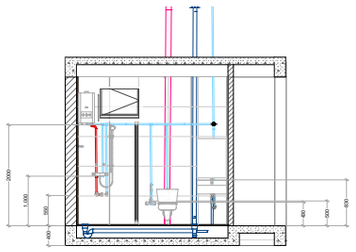
LEGEND

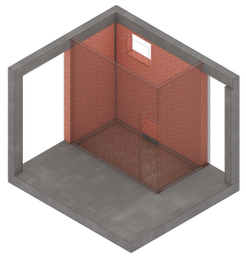
NO.	DESCRIPTION	COMPANY
01	Master Cock	Jaquar
02	Pillar Cock	CERA
03	Angle Valve	CERA
04	Waste Coupling	Jaquar
05	Mixer	CERA
06	Health Faucet	CERA
07	Mixer	CERA
08	Bib Cock	CERA
09	Bottle Trap	Hindware
10	Nahani Trap	CERA
11	Jet Spray	Roca



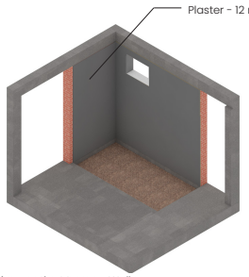
Construction of Column, Beam and Sunk Slab 01



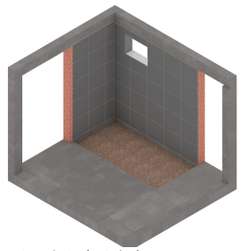




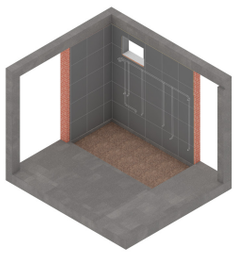
Construction of Masonry Walls 02



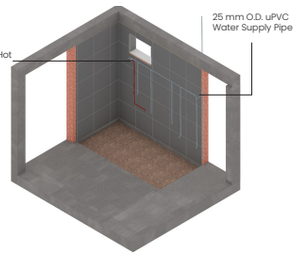
Plastering on the Masonry Walls
Plaster- 12 mm 03



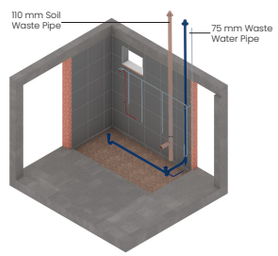
Tile line out on plaster for Jari reference
Dimension of tile - 600 x 600 mm 04



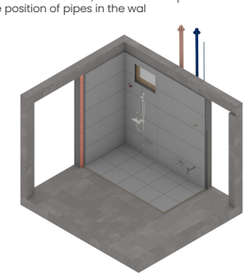
Jari work on the wall, with chalk to represent the position of pipes in the wal 05



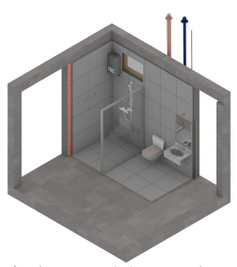
Laying of water supply pipes inside the wall 06



Laying of drainage pipe in sunk slab 07



Fixing of Tiles, and Faucets 08



Fixing of Sanitary ware and other accessories 09

Axonometric view of the plumbing layout in the washroom 10

IU NUMBER : IU1843000007	
NAME : Hetvi Joshi	
DATE : 01-09-2020	
DRAWING NAME : Private Toilet Layout	
SCALE : 1:50	

NOTES

ALL DIMENSIONS ARE TO BE READ AND NOT MEASURED.

ALL DIMENSIONS ARE IN MILLIMETERS.

LEGEND

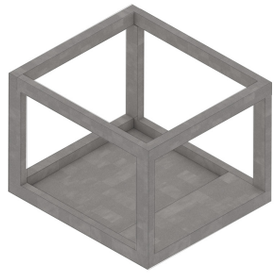
- 75 mm O.D. uPVC Waste Water pipe
- 110 mm O.D. uPVC Soil Waste pipe
- 25 mm O.D. uPVC Fresh Water pipe
- 25 mm O.D. cPVC Hot Water pipe

LEGEND

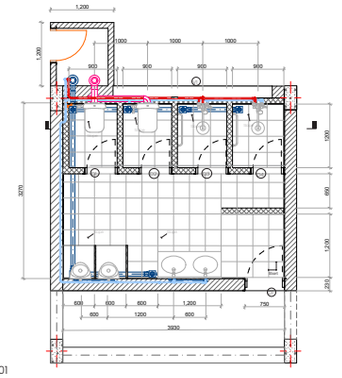
NO.	DESCRIPTION	COMPANY
01	Basin Counter 600x450x500	Jaquar
02	Wall Hung W.C. 585x540x430	Jaquar
03	Hand Shower 90Φ	CERA

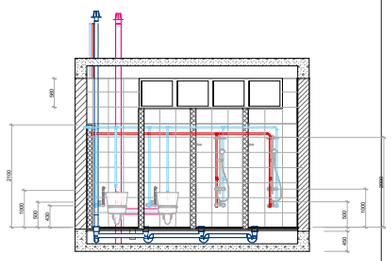
LEGEND

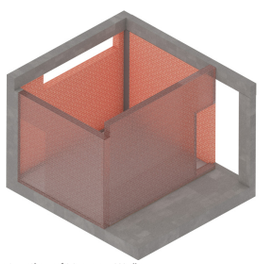
NO.	DESCRIPTION	COMPANY
01	Master Cock	Jaquar
02	Pillar Cock	CERA
03	Angle Valve	CERA
04	Waste Coupling	Jaquar
05	Mixer	CERA
06	Health Faucet	CERA
07	Mixer	CERA
08	Bib Cock	CERA
09	Bottle Trap	Hindware
10	Nahani Trap	CERA



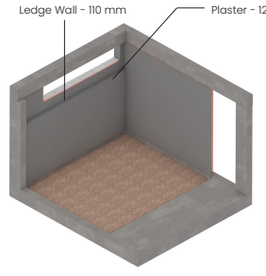
Construction of Column, Beam and Sunk Slab 01



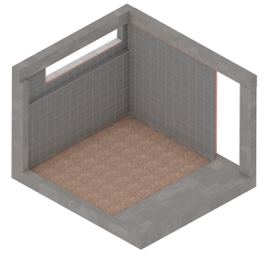




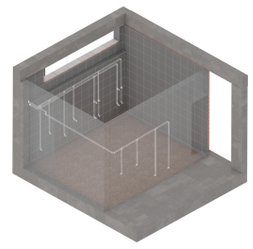
Construction of Masonry Walls 02



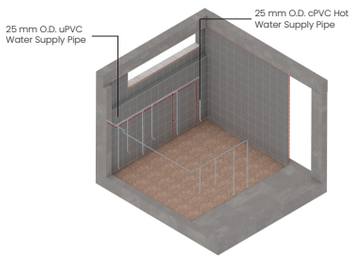
Plastering and making ledge wall on the Masonry Walls 03
Plaster - 12 mm



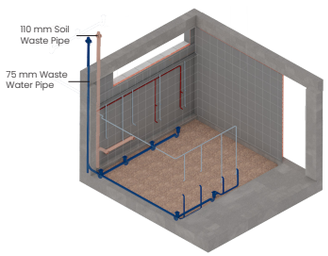
Drawing of Tile patten on the plastered Walls.
Dimension of tile is 600mm x 600mm 04



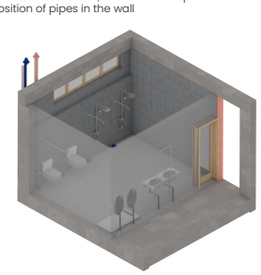
Jari work on the wall, with chalk to represent the position of pipes in the wall 05



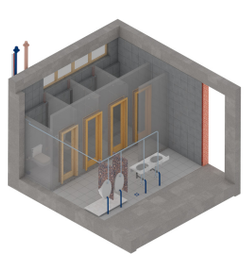
All water supply pipes layed inside the wall 06



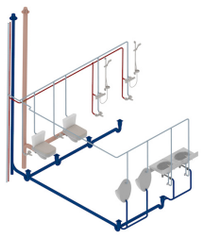
All drainage pipes layed below the slab 07



Fixing of Tiles, Sanitary ware and Faucets 08



Adding Partition walls. view after fully constructed 09



Axonometric view of the plumbing layout of the washroom 10

IU NUMBER : IU1843000007	
NAME : Hetvi Joshi	
DATE : 01-09-2020	
DRAWING NAME : Public Toilet Layout	
SCALE : 1:50	

NOTES

ALL DIMENSIONS ARE TO BE READ AND NOT MEASURED.

ALL DIMENSIONS ARE IN MILLIMETERS.

LEGEND

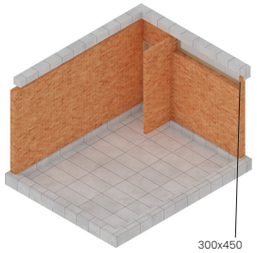
- 75 mm O.D. uPVC Waste Water pipe
- 110 mm O.D. uPVC Soil Waste pipe
- 25 mm O.D. uPVC Fresh Water pipe
- 25 mm O.D. cPVC Hot Water pipe

LEGEND

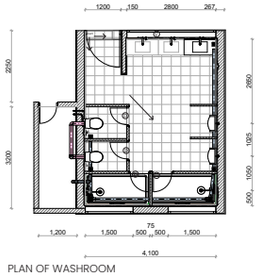
NO.	DESCRIPTION	COMPANY
01	Multi- Basin Counter 1200x450x500	Jaquar
02	Wall Hung W.C. 585x540x430	Jaquar
03	Hand Shower 90Φ	CERA
04	Urinal 400x385x750	Jaquar

LEGEND

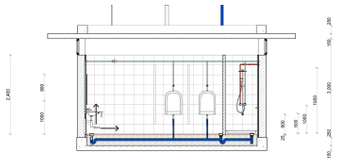
NO.	DESCRIPTION	COMPANY
01	Master Cock	Jaquar
02	Pillar Cock	CERA
03	Angle Valve	CERA
04	Waste Coupling	Jaquar
05	Mixer	CERA
06	Health Faucet	CERA
07	Mixer	CERA
08	Bib Cock	CERA
09	Bottle Trap	Hindware
10	Nahani Trap	CERA



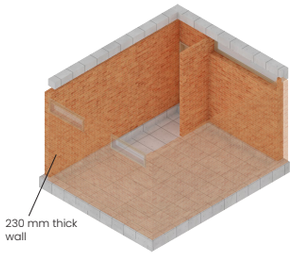
Construction of Sunk slab, Beam and Walls



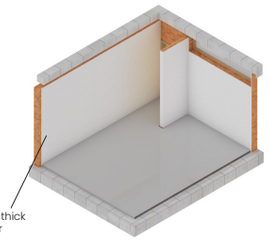
PLAN OF WASHROOM



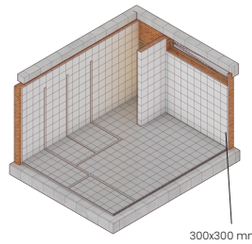
SECTION OF WASHROOM



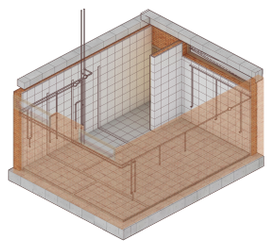
Construction of Masonry walls



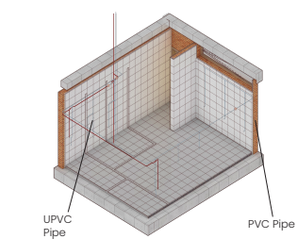
Plastering and making ledge wall on the load bearing walls



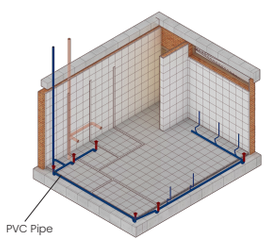
Drawing of Tile pattern on the plaster walls.



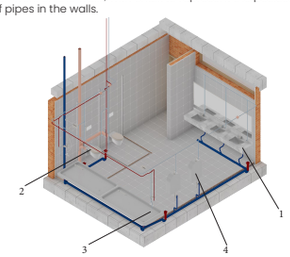
Jari work on the walls, with chalk to represent the position of pipes in the walls.



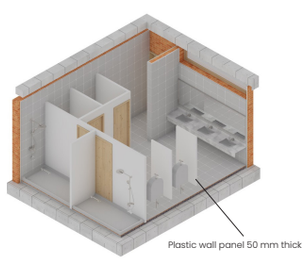
All water supply pipes layed inside the walls.



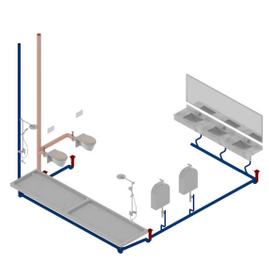
All drainage pipes layed below the slab.



Fixing of Tiles, Sanitary ware and Faucets



Constructing Partiton walls .



Axonometric view of the plumbing layout of the Washroom.

IU NUMBER : IUI84300017
NAME : Gagan Prajapati
DATE : 32-08-2020
DRAWING NAME : PUBLIC TOILET
SCALE : 1:50

NOTES

ALL DIMENSIONS ARE TO BE READ AND NOT MEASURED.

ALL DIMENSIONS ARE IN MILLIMETERS.

LEGEND

Waste water 80 Φ
Soil waste 110 Φ
Fresh water 25 Φ
Hot water 25 Φ

LEGEND

NO.	DESCRIPTION	COMPANY
01	Multi- Basin Counter 1200x460x650	Jaquar
02	Wall Hung W.C. 385x540x430	Jaquar
03	Hand Shower 90 Φ	CERA
04	Urinal 400x385x750	Jaquar

LEGEND

NO.	DESCRIPTION	COMPANY
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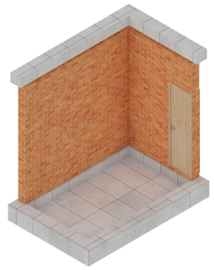
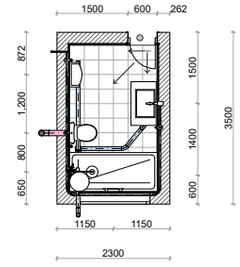
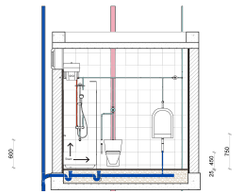
02	Pillar Cock	CERA
03	Angle Valve	CERA
04	Waste Coupling	Jaquar
05	Mixer	CERA
06	Health Faucet	CERA
07	Mixer	CERA
08	Bib Cock	CERA
09	Bottle Trap	Hindware
10	Nahani Trap	CERA



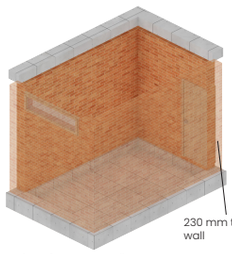
Construction of Sunk slab, Beam and Walls



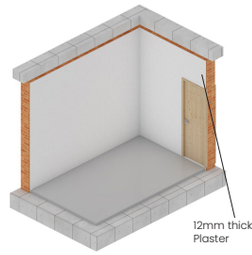
PLAN OF WASHROOM



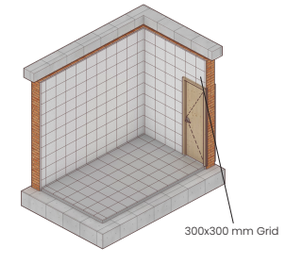
SECTION OF WASHROOM



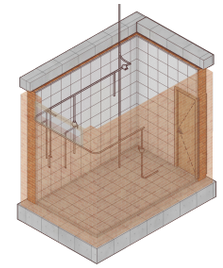
Construction of Masonry walls



Plastering and making ledge wall on the load bearing walls



Drawing of Tile pattern on the plaster walls.



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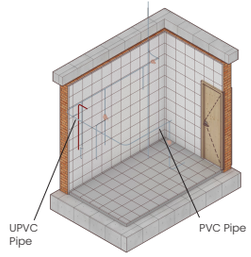
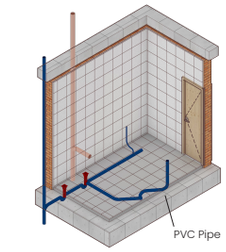
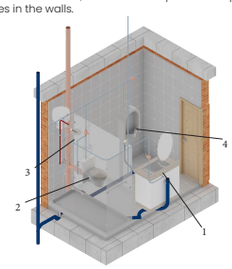


All water supply pipes layed inside the walls.

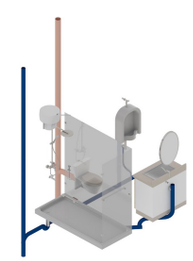


All drainage pipes layed below the slab.



Fixing of Tiles, Sanitary ware and Faucets

Constructing Partiton walls .



Axonometric view of the plumbing layout of the Washroom.

IU NUMBER : IUI84300017
NAME : Gagan Prajapati
DATE : 32-08-2020
DRAWING NAME : PRIVATE TOILET
SCALE : 1:50

NOTES

ALL DIMENSIONS ARE TO BE READ AND NOT MEASURED.

ALL DIMENSIONS ARE IN MILLIMETERS.

LEGEND

Waste water 80 Φ
Soil waste 110 Φ
Fresh water 25 Φ
Hot water 25 Φ

LEGEND

NO.	DESCRIPTION	COMPANY
01	Multi- Basin Counter 1200x460x650	Jaquar
02	Wall Hung W.C. 385x540x430	Jaquar
03	Hand Shower 90 Φ	CERA
04	Urinal 400x385x750	Jaquar

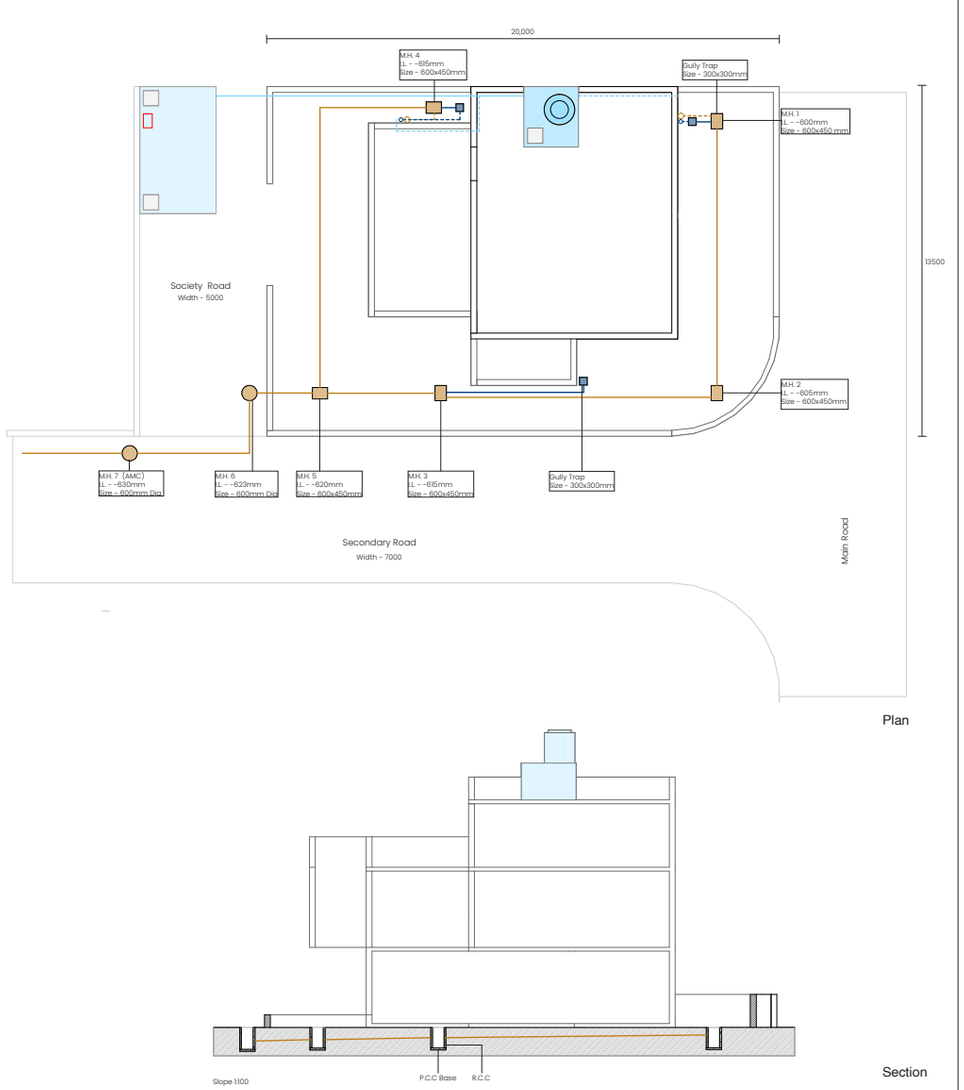
LEGEND

NO.	DESCRIPTION	COMPANY
01	Master Cock	Jaquar
02	Pillar Cock	CERA
03	Angle Valve	CERA
04	Waste Coupling	Jaquar
05	Mixer	CERA
06	Health Faucet	CERA
07	Mixer	CERA
08	Bib Cock	CERA
09	Bottle Trap	Hindware
10	Nahani Trap	CERA
11	Jet Spray	Roca

Assignment 3.

Understanding the properties and behaviour of the material.

Hands on work – Making Physical models with various materials like,

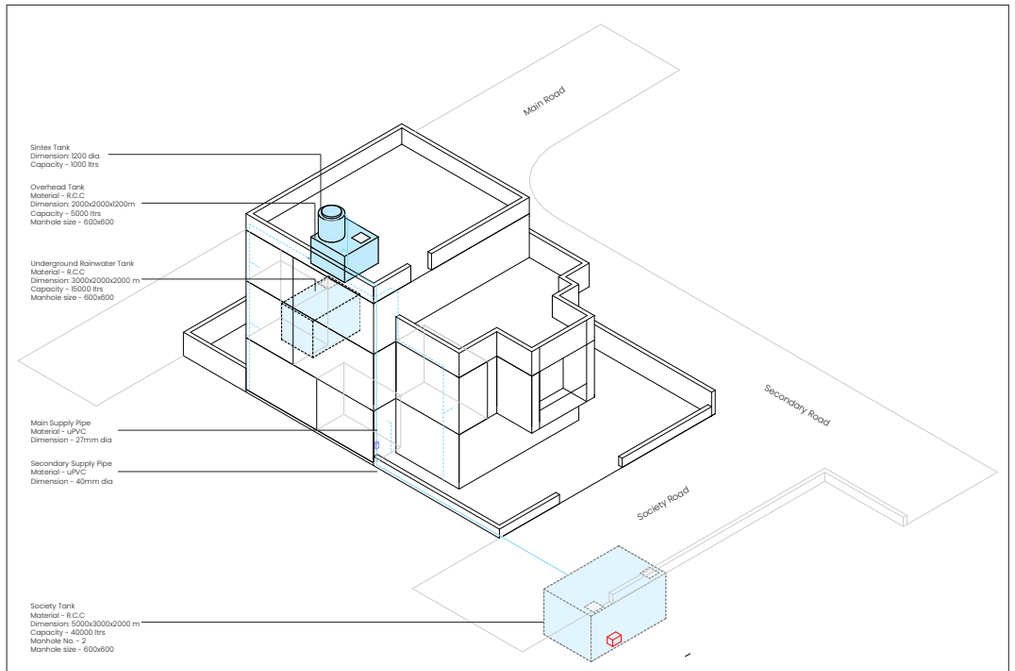


Plan

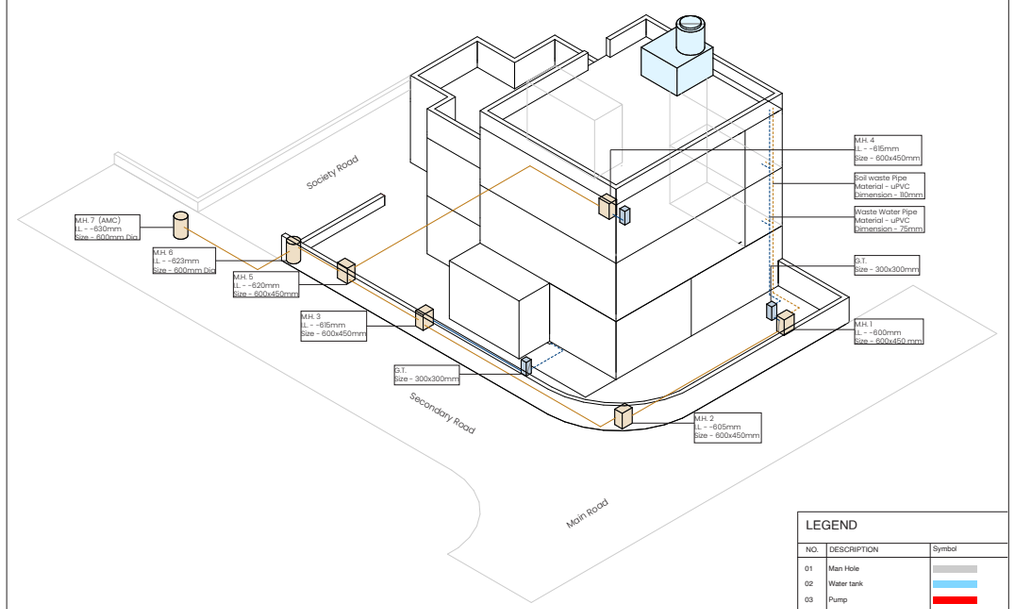
Section

LEGEND		
NO.	DESCRIPTION	Symbol
01	Man Hole	
02	Water tank	
03	Pump	
04	Primary drainage pipe	
05	Secondary drainage pipe	
06	Primary water inlet pipe	
07	Secondary water inlet pipe	

Scale : 1:100	IU number: IU1843000008	Drawing name: Plan/Section	Technical module (macro level plumbing)	Date: 8/9/2020	Indus Universiy (IDEA) Sem-5



Water-supply System

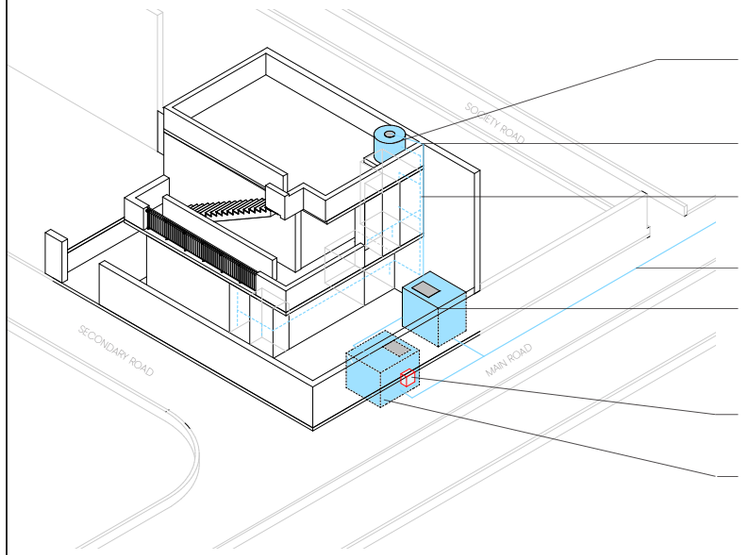


Drainage System

LEGEND		
NO.	DESCRIPTION	Symbol
01	Man Hole	
02	Water tank	
03	Pump	
04	Primary drainage pipe	
05	Secondary drainage pipe	
06	Primary water inlet pipe	
07	Secondary water inlet pipe	
08	Softner	

Scale : 1:100	IU number: IU1843000008	Drawing name: Axonometric	Technical module (Macro level plumbing)	Date: 8/9/2020	Indus Universiy (IDEA) Sem-5

Schematic Water Supply System (Row House)



Overhead Water Tank (Sintex)
Dimensions: 1200 mm dia
Capacity: 1000 litres
Man hole : 400 mm dia

Main Intake (Water Supply Pipe)
60 mm O.D

Secondary Water Supply Pipe
25 mm O.D

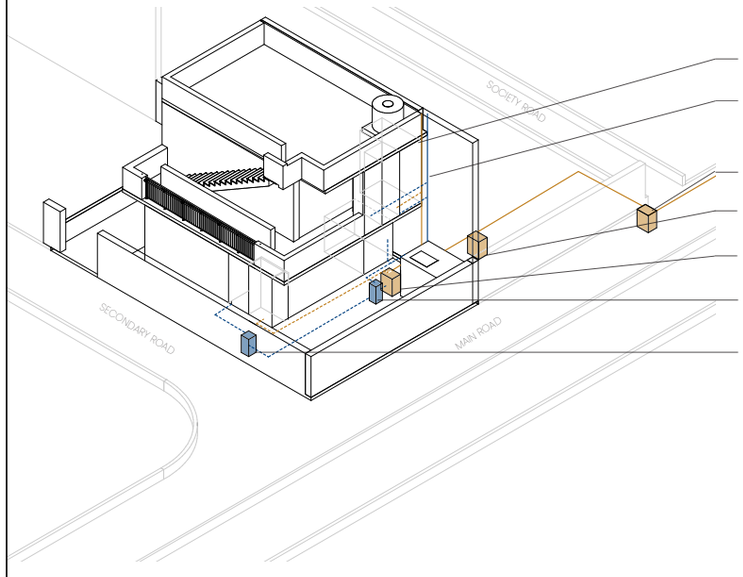
Municipality Water Supply Pipe

R.C.CTank
(Water used for washing purpose)
Dimensions: 1500 X 1200 X 1800
Capacity: 4000 litres
Man hole : 600 X 900 mm

Submersible Motor Pump
Power : 0.5 HP

Underground Water Tank (R.C.C)
Dimensions: 1500 X 1500 X 1800
Capacity: 4500 litres
Man hole : 600 X 900 mm

Schematic Sewage System (Row House)



SOIL WASTE PIPE
110 mm O.D

WASTE WATER PIPE
80 mm O.D

M.H. 3
Dimensions : 600 X 450 mm
I.L -625 mm

M.H.2
Dimensions : 600 X 450 mm
I.L -610 mm

M.H. 1
Dimensions : 600 X 450 mm
I.L -600 mm

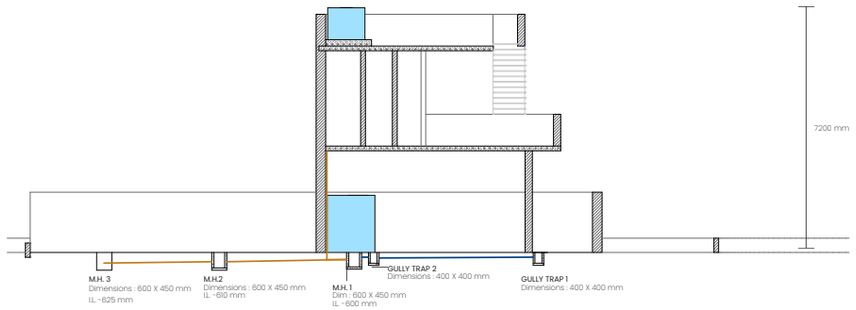
GULLY TRAP 2
Dimensions : 400 X 400 mm

GULLY TRAP 1
Dimensions : 400 X 400 mm

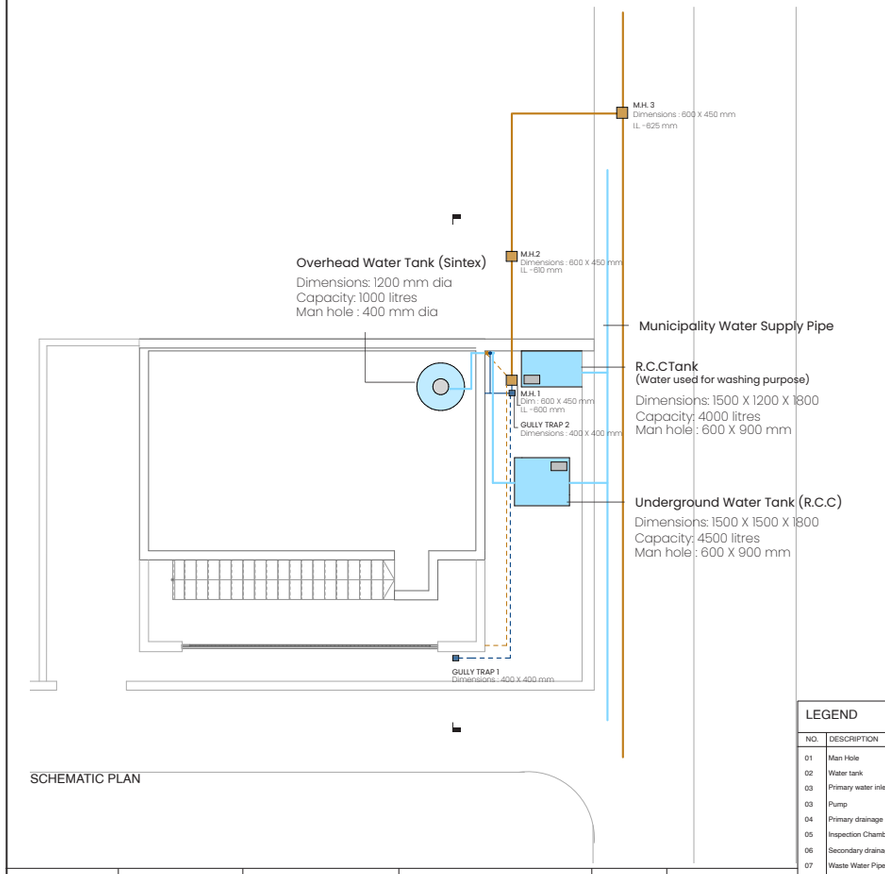
LEGEND

NO.	DESCRIPTION	Symbol
01	Man Hole	
02	Water tank	
03	Primary water inlet pipe	
03	Pump	
04	Primary drainage pipe	
05	Inspection Chamber	
06	Secondary drainage pipe	
07	Waste Water Pipe	
08	Gully Trap	

Name : Hetvi Joshi	IU number: IU184300007	Drawing name: Schematic Isometric	Technical module (Macro level plumbing)	Date: 08/09/2020	Indus Universiy (IDEA) Sem-5



SCHEMATIC SECTION



SCHEMATIC PLAN

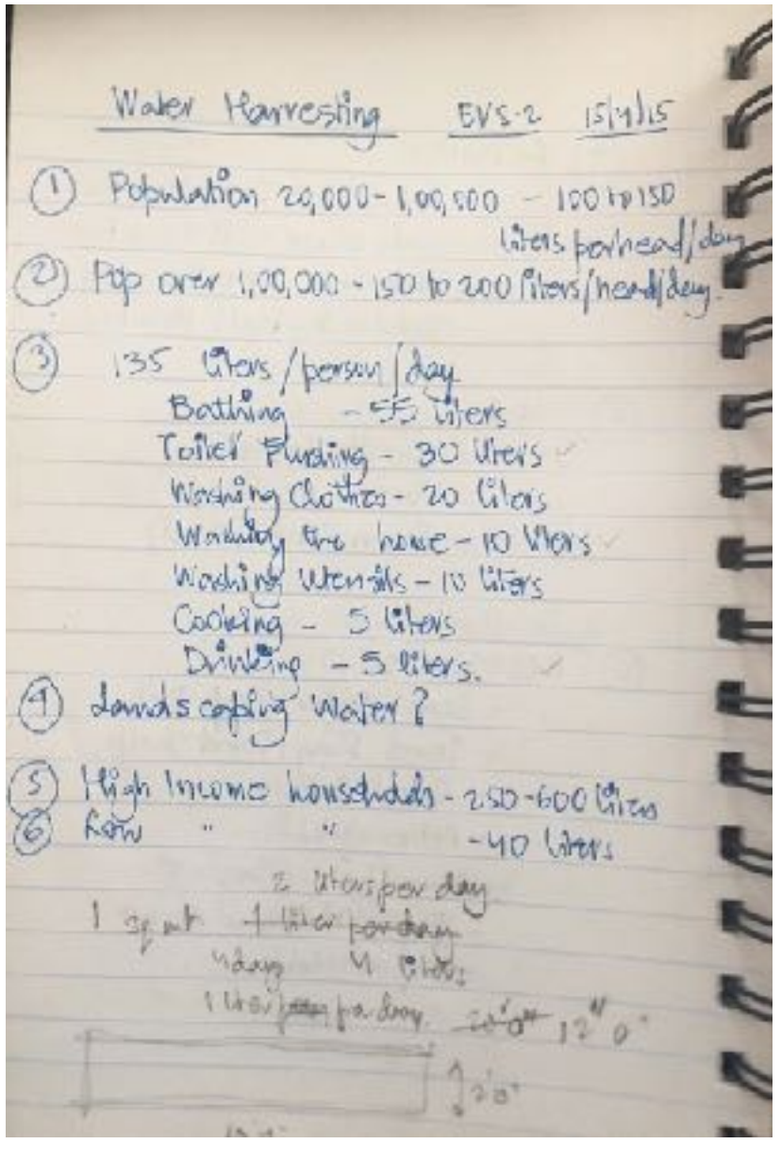
LEGEND

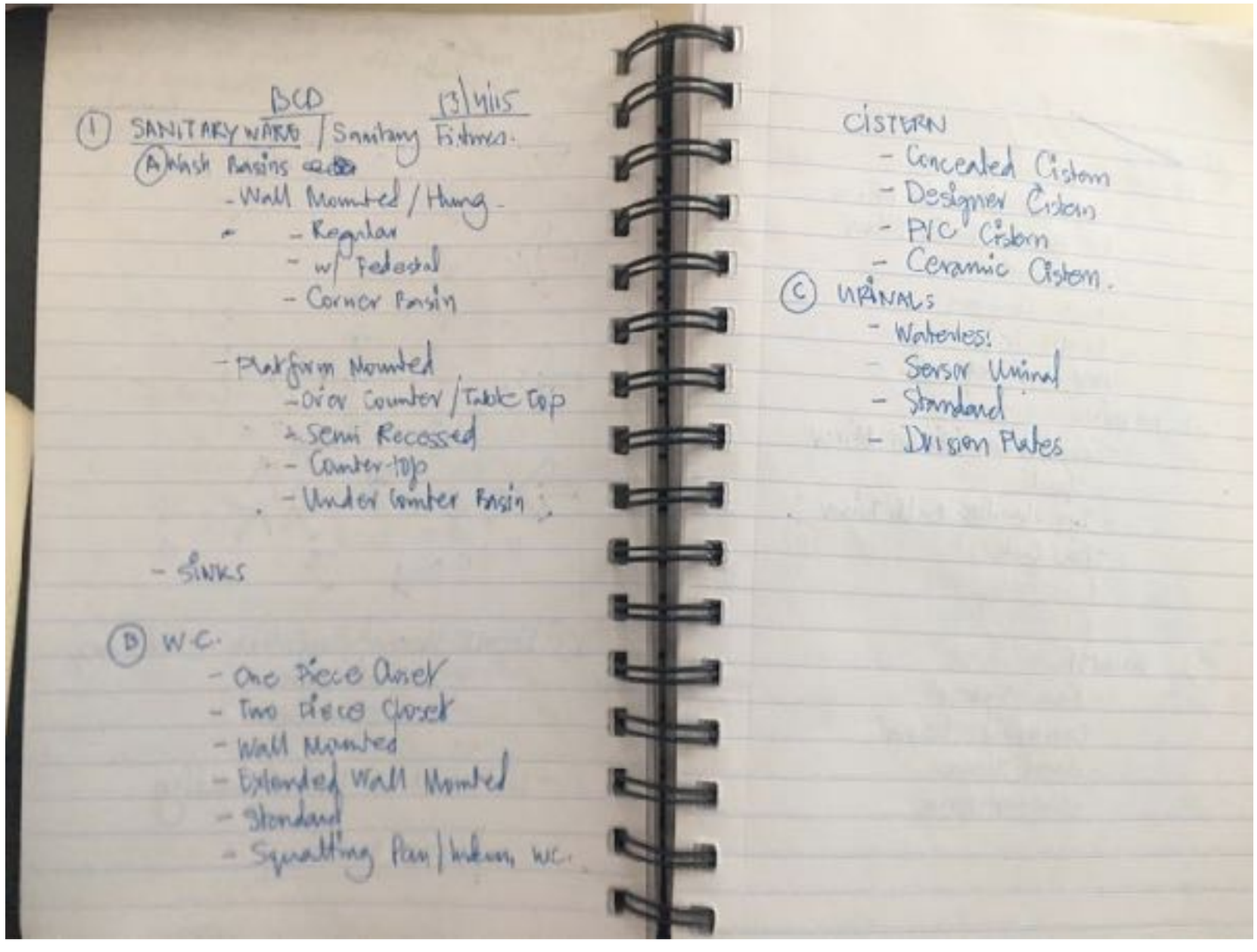
NO.	DESCRIPTION	Symbol
01	Man Hole	
02	Water tank	
03	Primary water inlet pipe	
03	Pump	
04	Primary drainage pipe	
05	Inspection Chamber	
06	Secondary drainage pipe	
07	Waste Water Pipe	
08	Gully Trap	

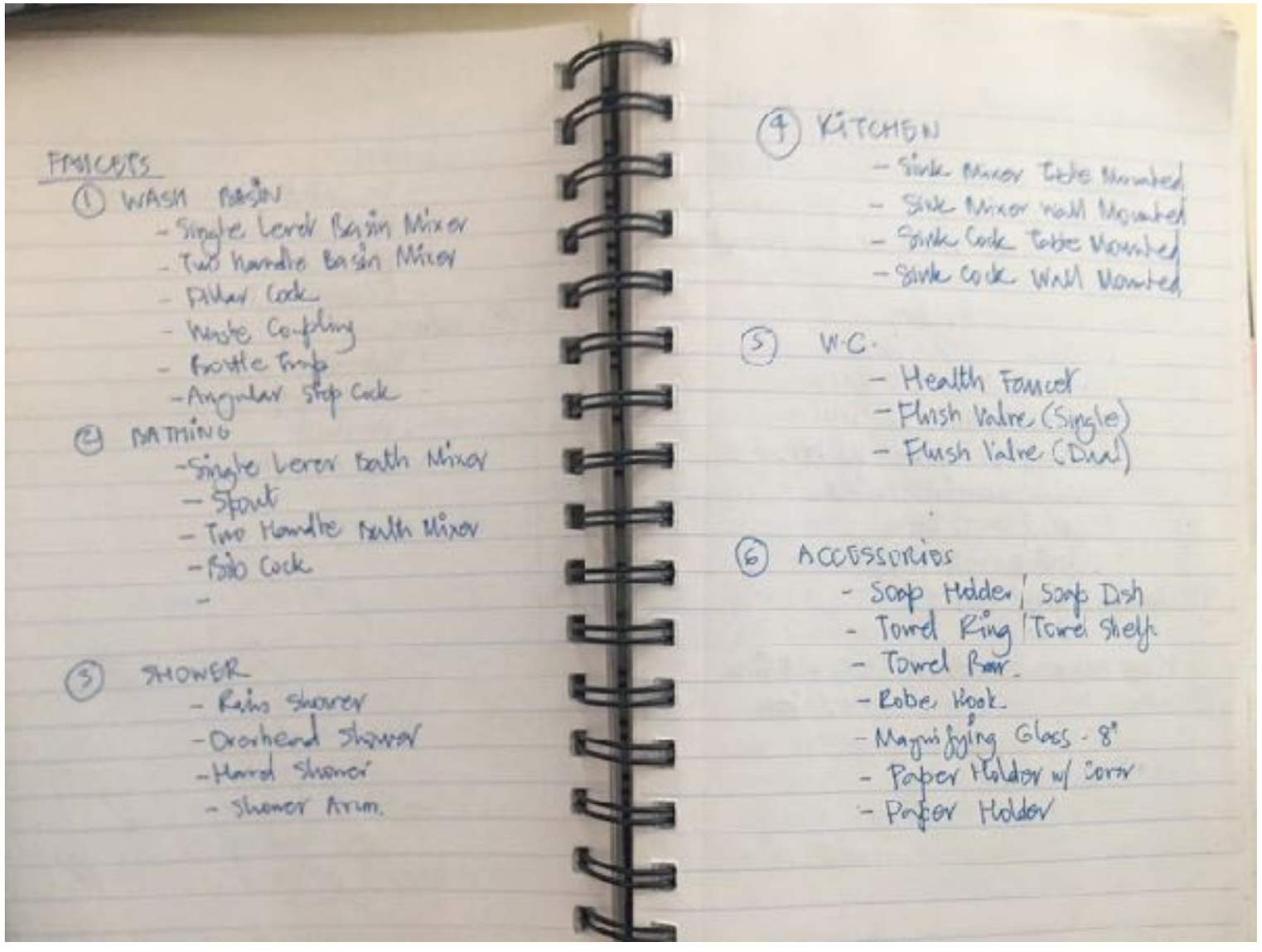
Name : Hetvi Joshi	IU number: IU184300007	Drawing name: Schematic Drawings	Technical module (Macro level plumbing)	Date: 08/09/2020	Indus Universiy (IDEA) Sem-5

Note:

Building Construction & Services







PROCESS

① WASH BASIN
- Single Lever Basin Mixer
- Two Handle Basin Mixer
- Pillar Cock
- Waste Coupling
- Bottle Trap
- Angular Stop Cock

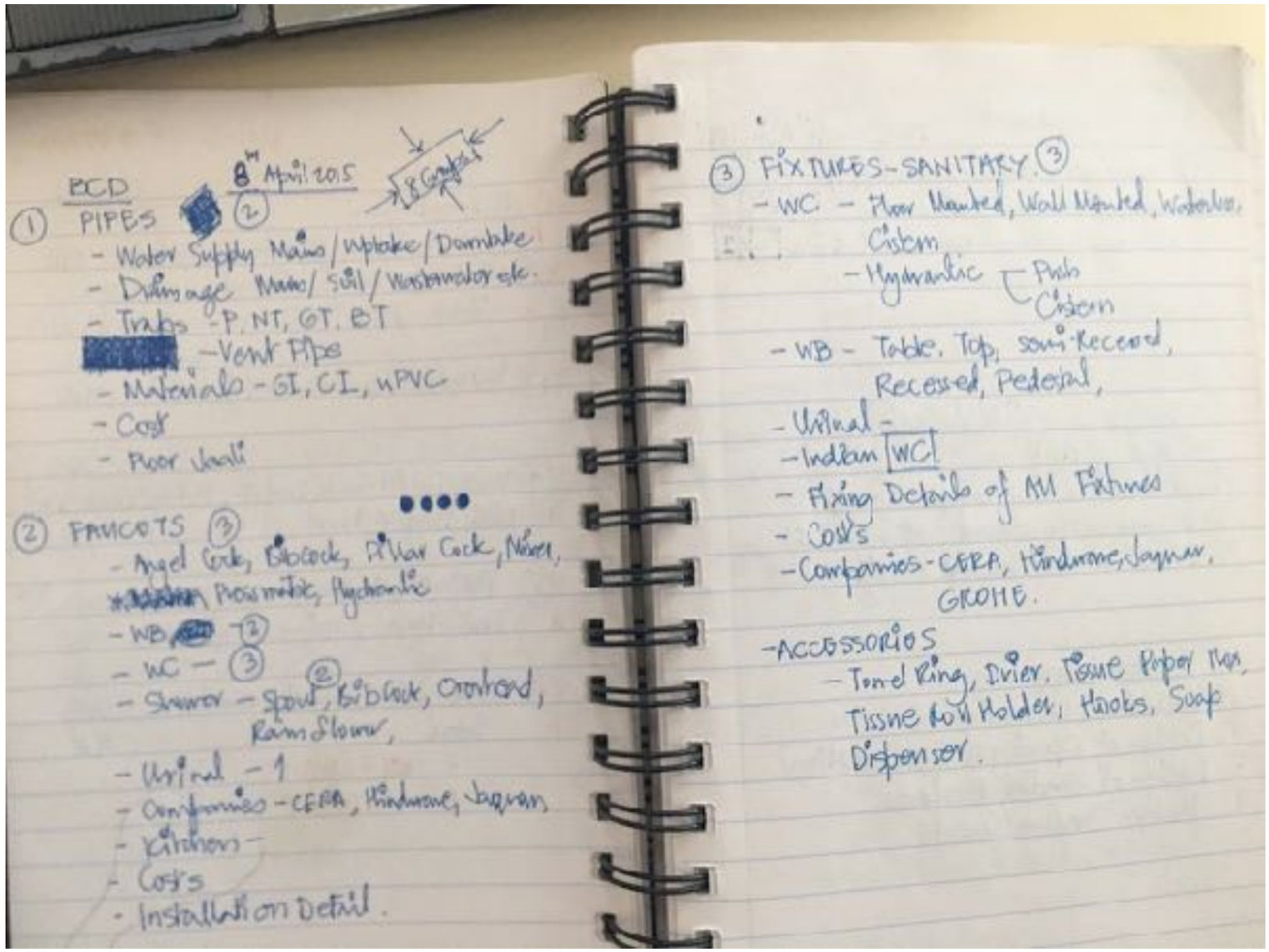
② BATHING
- Single Lever Bath Mixer
- Spout
- Two Handle Bath Mixer
- Pillo Cock
-

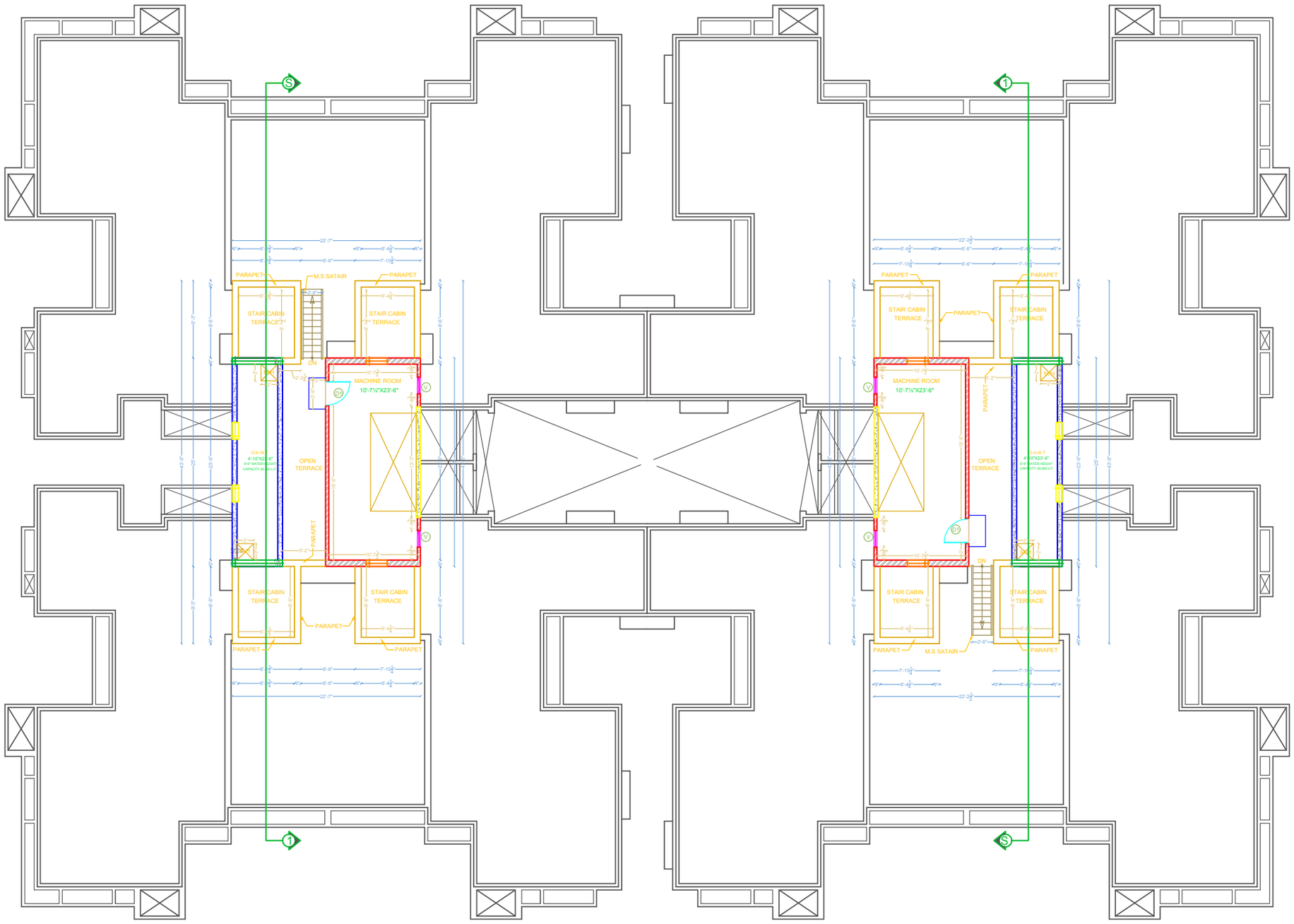
③ SHOWER
- Rain Shower
- Overhead Shower
- Hand Shower
- Shower Arm.

④ KITCHEN
- Sink Mixer Table Mounted
- Sink Mixer Wall Mounted
- Sink Cock Table Mounted
- Sink Cock Wall Mounted

⑤ W.C.
- Health Faucet
- Flush Valve (Single)
- Flush Valve (Dual)

⑥ ACCESSORIES
- Soap Holder / Soap Dish
- Towel Ring / Towel Shelf
- Towel Bar
- Robe Hook
- Magnifying Glass - 8"
- Paper Holder w/ Cover
- Paper Holder


BCD
8th April 2015
(1) PIPES (2)
- Water Supply Mains / Uptake / Dontake
- Drainage Mains / Soil / Wastewater etc.
- Traps - P, NT, GT, BT
- Vent Pipe
- Materials - GI, CI, uPVC
- Cost
- Poor Vault
(2) FAUCETS (3)
- Angel Cock, Bibcock, Pillar Cock, Mixer,
Pneumatic, Hydraulic
- WB (2)
- WC - (3)
- Shower - Spout, Bibcock, Overhead,
Rain Shower,
- Urinal - 1
- Companies - CERA, Hindware, Jaquar,
- Kitchen -
- Cost's
- Installation Detail.
(3) FIXTURES - SANITARY (3)
- WC. - Flow Mounted, Wall Mounted, Waterless,
Cistern
- Hydraulic - Push
Cistern
- WB - Table. Top, semi-Recessed,
Recessed, Pedestal,
- Urinal -
- Indian WC
- Fixing Details of All Fixtures
- Cost's
- Companies - CERA, Hindware, Jaquar,
GROHE.
-ACCESSORIES
- Towel Ring, Drier. Tissue Paper Roll,
Tissue Roll Holder, Hooks, Soap
Dispensor.



O.H.W.T & MACHINE ROOM PLAN (E,F,M & N BLOCK)

3-BHK-BIG

S C H E D U L E (STAIR CABIN &TERRAE PLAN)

DOOR

CODE	SIZE	SILL	LINTEL	LOCATION
D1	3'-0"X-----	-----	BEAM - BOTTOM	MACHINE ROOM
V	2'-0"X1'-6"	-----	BEAM - BOTTOM	MACHINE ROOM

NOTE :

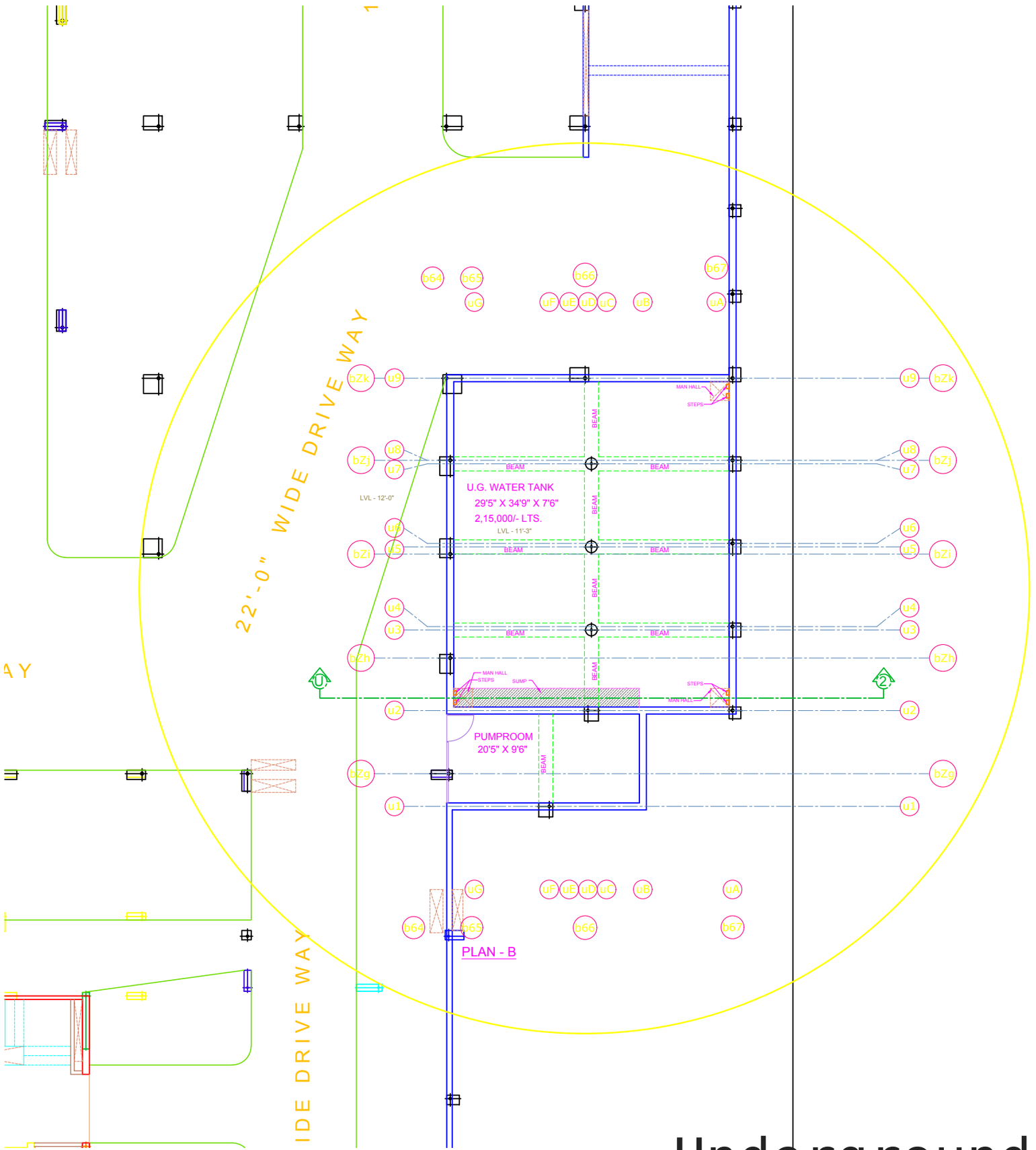
[1] RAILING DETAIL (REFER OUR Br_T1Cd_209SaHp DWG.)

[2] STAIR CASE DETAIL (REFER OUR Ss_T1w_209SaHp DWG.)

[3] DOOR & WINDOW DETAIL (REFER OUR Dw_T1Cd_209SaHp DWG.)

[4] WALL SECTION DETAIL (REFER OUR Dw_T1Ws_209_SaHp DWG.)

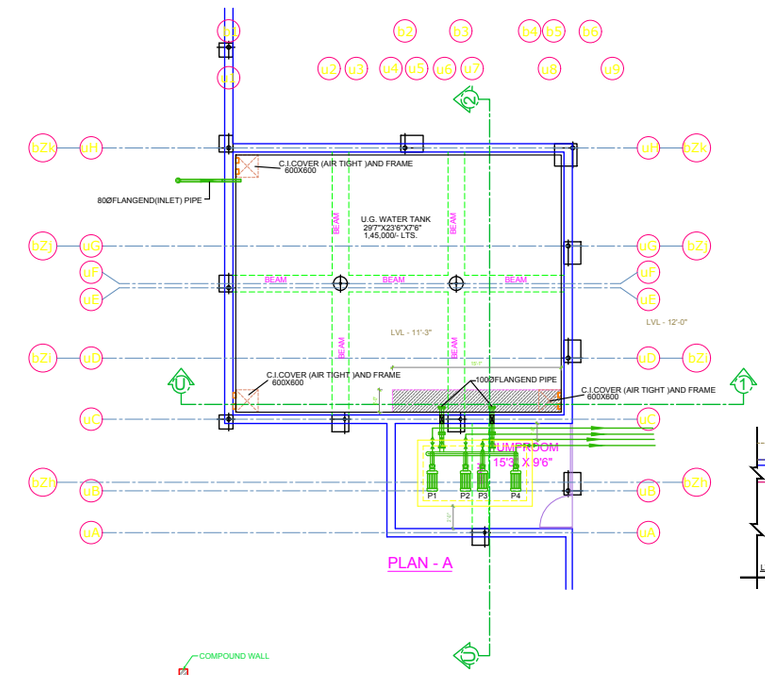
Overhead Water Tank

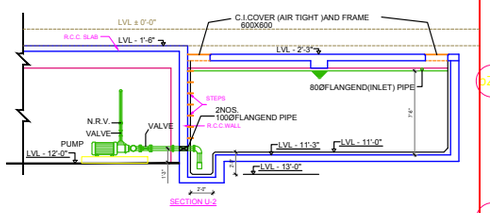


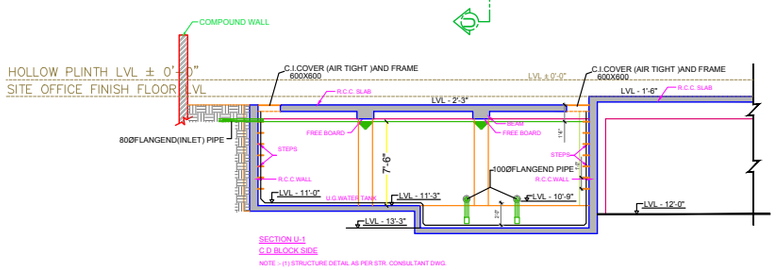
Underground Water Tank

NOTES

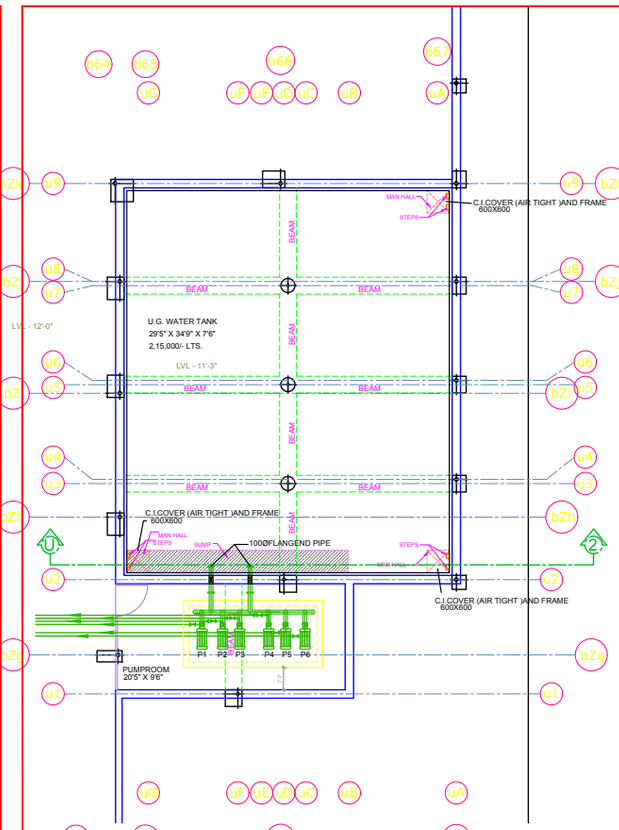
IN CASE THERE IS ANY DISCREPANCY BETWEEN ARCHITECTURAL DRAWINGS AND OTHER DRAWINGS, ARCHITECTURAL DRAWINGS TO BE FOLLOWED. THE DISCREPANCY TO BE BROUGHT TO THE NOTICE OF THE ARCHITECT BEFORE COMMENCEMENT OF THE WORK.
ALL DIMENSIONS ARE TO BE READ AND NOT MEASURED
REFER TO DETAIL DRAWINGS WHEREVER RELEVANT, e.g. STAIRCASE, TOILETS ETC.
ALL WATER SUPPLY PIPE DEPTH ARE MIN.600MM FROM GROUND LVL.
ALL FIXTURES AND DIMENSIONS ARE AS / ARCHITECT DRAWING.
THIS DRG READ WITH CONJUNCTION OF ARCHITECT DRG.
ALL CONCEALED U.P.V.C.R.W.P. 6kg/cm2

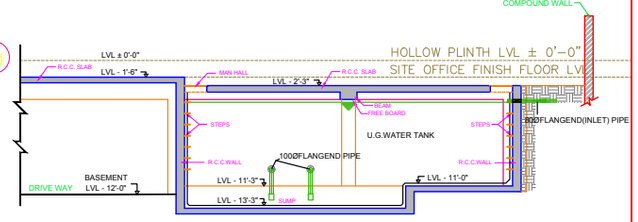


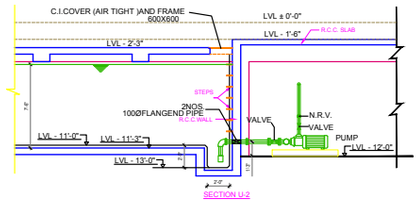




NOTE:-THICKNESS OF R.C.C.SLAB AND WALL AS PER SRUCTURE DWG.







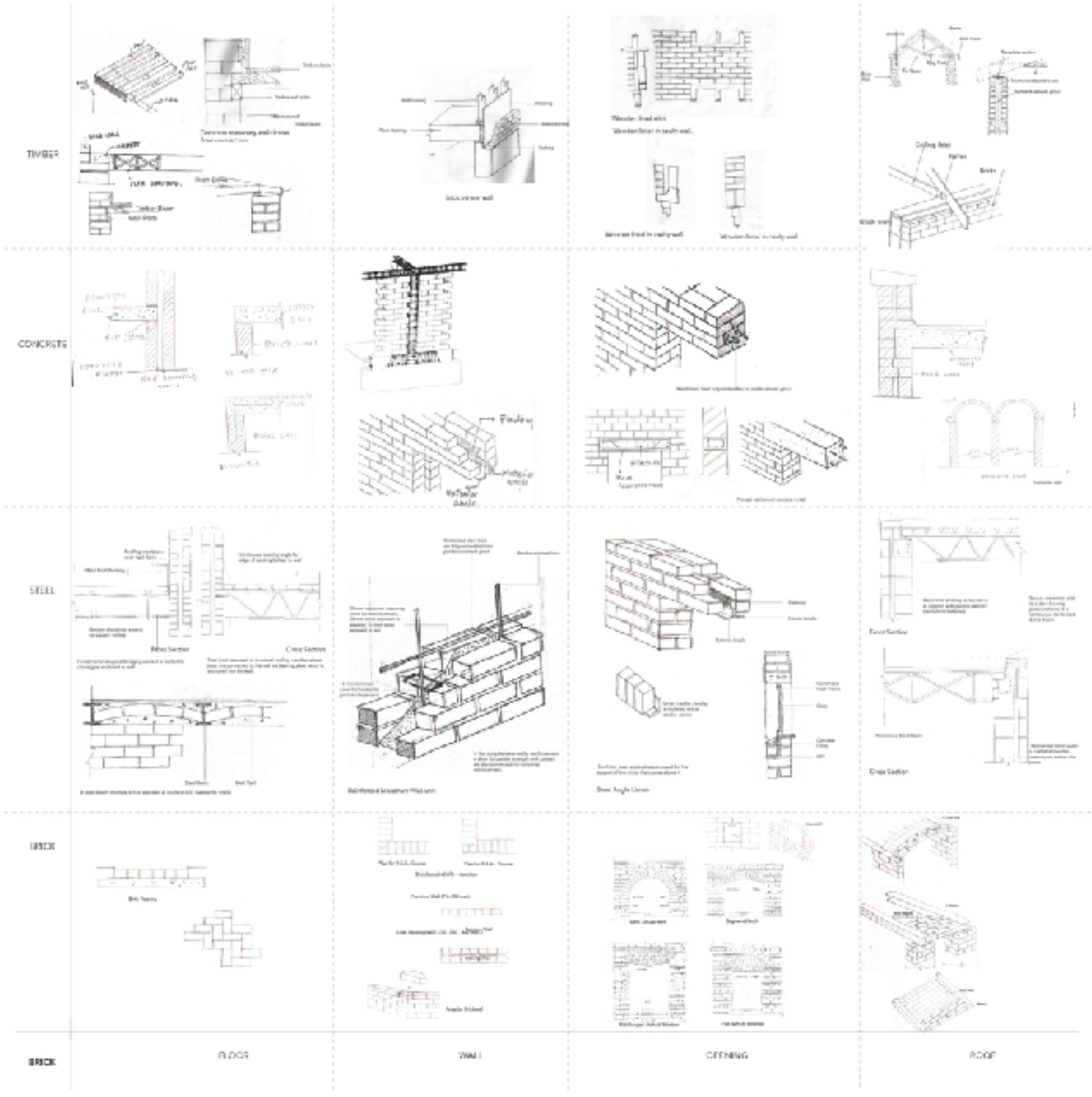
NOTE:-THICKNESS OF R.C.C.SLAB AND WALL AS PER SRUCTURE DWG.

Structure
Exercise 1 Joinery Matrix

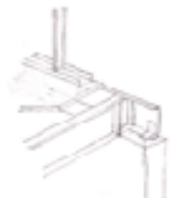
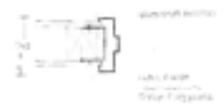
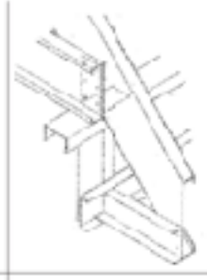
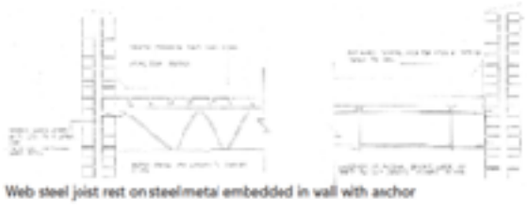
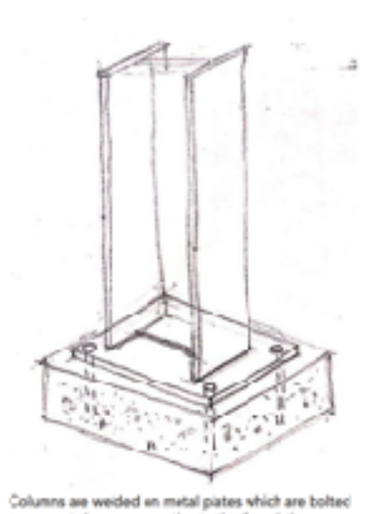
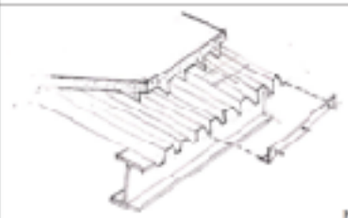
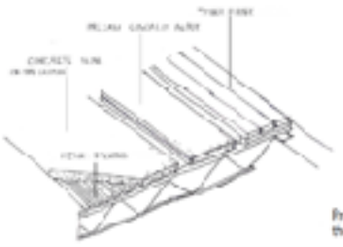
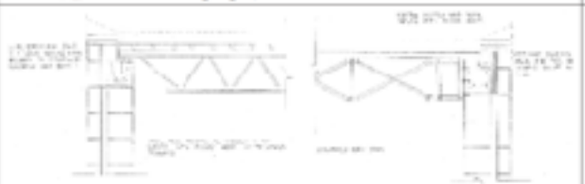
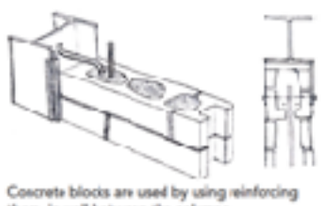
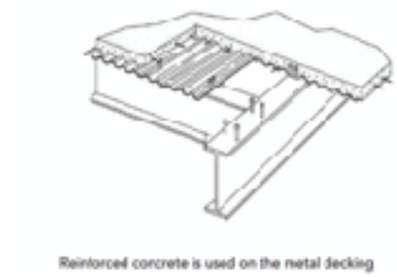
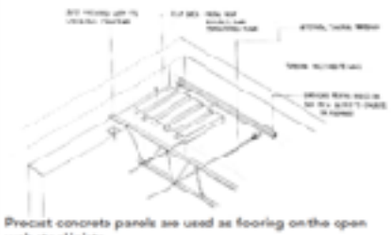
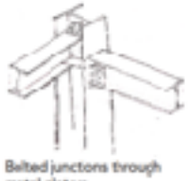
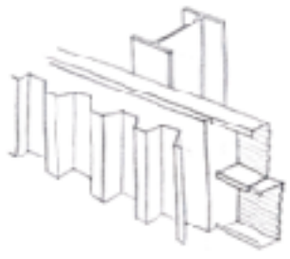
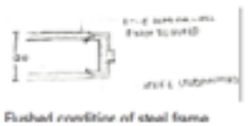
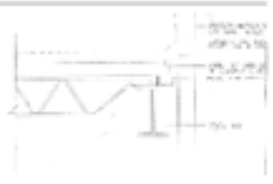
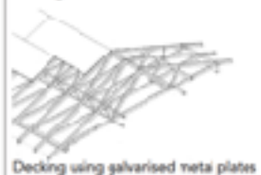
To classify all the possible connections or joining techniques in the following materials(Brick, Concrete, Steel)

Intent
•Was to explain what are the different combinations possible
•Also how two materials come together to define a junction in away complimenting each others properties(Concrete good in compression used with steel bars which are good in tension
•To understand the structural strength and possibilities of using a material using its maximum strength

Output
•Introduction to types of Structures
•Compression is the only force that can work independently
•Discussion on the difference between shallow dome(shell) and filler slab and how they work



Brick Matrix

TIMBER		 Wooden decking is placed on structural steel frame  Wooden decking is done on steel beams which are bolted on concrete walls	 Wood stud framing  Wooden planks are used for cladding and insulting material is used for infilling the space between the columns	 Steel C - sections are used in sloping roof and wooden decking is done on it
BRICK			 Web steel joist rest on steel/metal embedded in wall with anchor Steel beams resting on brick wall and bolted using angle plate	
CONCRETE	 Columns are welded on metal plates which are bolted to concrete beams connecting to the foundation	 PCC is used in flooring on metal decking  Precast concrete panels are used as flooring on the open web steel joists	 Concrete blocks are used as wall between the two columns and the joists are bolted through a metal plate  Concrete blocks are used by using reinforcing them in wall between the columns	 Reintorced concrete is used on the metal decking
STEEL		 Precast concrete panels are used as flooring on the open web steel joists  Welded stiffener plates and bolted to certain junctions  Bolted junctions through metal plates  Welded beams then bolted to column  Welded column and beam junction	 External profile sheeting  Flushed condition of steel frame  Steel frame wrapped around the glass of the opening	  Open web steel joists used for spanning and concrete flooring is done on metal decking  Decking using galvanised metal plates  Different trusses of steel members are used and decking is done of corrugated sheet
STEEL	FOUNDATION	FLOOR	WALL	ROOF

Jaiwal, Kawisha, Mohit, Ria, Shishir, Sweta, Vimarsh Yaal

Steel Matrix

Exercise 2 Material Matrix

To prepare a flow chart explaining the factors affecting choice of materials

Intent –
•To first understand factors affecting the evolution of structural system and material
For e.g.. Strength, Form, Weight, Availability of raw material, Making process etc

Output
•Explaining cause and effect of change caused during the evolution of material.
•Circular matrix branching to explain the sub topics and their importance in choice of materials and evolution of systems

BRICK SHELL

CAUSES

TO DECREASE USE OF MATERIAL FOR LARGE SPANS

EFFECTS

SHELL STRUCTURES

FORM HELPS IN TRANSFERING THE LOAD

Reinforcements (Steel rebars)

Use of brick as shell by etodo daide

Fiz dome made out of bricks

METHODS OF USE

CAUSES

DUE TO IT'S COMPRESSIVE STRENGTH AND AVAILABILITY, MANY DIFFERENT METHOD OF USE WERE FOUND WITH BRICK

EFFECTS

CHANGE IN THE ARCHITECTURE AND AESTHETICS OF A STRUCTURE

Hollow bricks used in filler slab

Brick semi-circular arch

Flat arch

DIFFERENT TYPES OF BRICKS

CAUSES

FOR STACKING OF A MODULE AND MAKING A WALL, MANY DIFFERENT THOUGH SIMILAR SUBSTITUTES COULD BE USED

EFFECTS

LIGHT WEIGHT AND ENVIRONMENTAL FRIENDLY OPTIONS
SUSTAINABLE CHOICES

Hollow clay brick

Compressed stabilized earth blocks (C.S.I.B)

Wire cutbrick

Fly ash bricks

Automatic machine for fly ash bricks

AERATED CONCRETE BLOCKS

CAUSES

TO INCREASE THE PRODUCTION TIME AND MAKE THE STRUCTURE LESS HEAVY

EFFECTS

STRAIGHTER WALLS WITHLESS USE OF MORTAR AND PLASTER

Brick wall volume

Concrete aerated block

Uneven mortar

High tolerance of brick size therefore uneven mortar gaps

Even mortar

NAME : RITIK SHARMA
M NUMBER : M00XXXXXX
DATE : 30/08/2000
TECHNICAL MODULE 2/2

BRICK EVOLUTION

EARLY FORM OF BRICK

CAUSES

AVAILABILITY OF STONE

RIGOROUS PROCESS OF ROCK CUTTING

EFFECTS

EASIER PROCESS OF MAKING A SHELTER WITH EASILY AVAILABLE MATERIALS

"Loaf of bread" Shaped

Uneven sizes

Straws used to bind the mud together

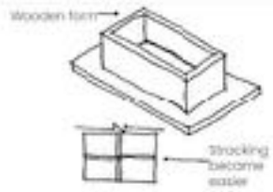
INTRODUCTION TO TIMBER MOULDS

CAUSES

UNEVEN FORM OF THE BRICKS THEREFORE MORE USE OF MORTAR AND LESS STABILITY

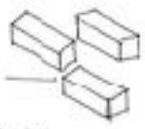
EFFECTS

DUE TO TIMBER MOULDS, SIMILAR SIZED BRICK COULD BE PRODUCED AND TALLER STABLE WALLS COULD BE BUILT WITH LESS MORTAR



Wooden form

Stracking become easier



Similar size of bricks

Uniform mortar

Taller walls were possible due to uniform stacking

FIRED BRICK

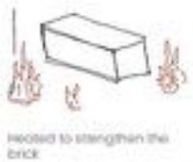
CAUSES

COLDER AND HUMID REGIONS WERE UNABLE TO SUN DRY THE BRICKS

LACK OF FAST PROCESS

EFFECTS

FIRED BRICKS HAD INCREASED THE STRENGTH AND SKINS WERE USED TO MASS PRODUCE



Heated to strengthen the brick

Brick Kiln
Mass production of fired brias

Standardization of size with respect to measurements of hand

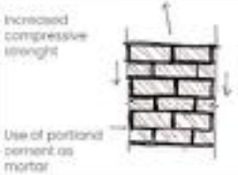
CONVENTIONAL METHOD OF CONSTRUCTION

CAUSES

AVAILABILITY OF CLAY AND CEMENT IS MORTAR
EASY ASSEMBLY OF A WALL

EFFECTS

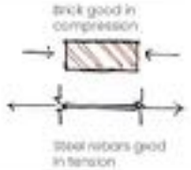
STANDARDIZED CONSTRUCTION METHOD



Increased compressive strenght

Use of portland cement as mortar

Steel rebars used for binding and reinforcing the wall



Brick good in compression

Steel rebars good in tension

NAME : RITIK SHARMA
M NUMBER : M00XXXXXX
DATE : 30/08/2000
TECHNICAL MODULE 2/2

BRICK EVOLUTION

METHODS OF USE

CAUSES

TO AVOID CAST IN-SITU AND HAVE MODULAR UNITS WHICH COULD BE ASSEMBLED ON SITE

EFFECTS

DECREASE IN COST DUE TO MASS PRODUCTION OFF SITE

LESSER TIME TAKEN DURING THE CONSTRUCTION ON SITE

Aerated concrete block

Pre-cast hollow slab

Shotcrete method of spray concrete

PRE-STRESSING

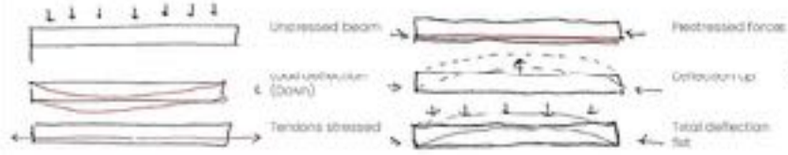
CAUSES

BEAMS OF GREAT SPANS GOT UNDER HEAVY DEFLECTION AND BENDING

EFFECTS

LESS DEFLECTION IN THE BEAM AND DECREAMENT IN BEAM DEPTH

TENSION IN STEEL TENDONS



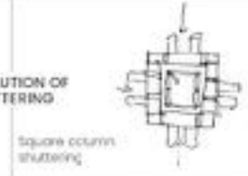
EVOLUTION OF SHUTTERING

CAUSES

DUE TO THE TIMBER SHUTTERING ORTHOGONAL SHAPES COULD BE CASTED FROM CONCRETE

EFFECTS

ORGANIC FORMS AND CURVILINEAR FORMS COULD BE CASTED BY CONCRETE



Square column shuttering

Flexible ply used as shuttering

Fabric formed concrete shuttering

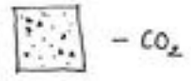
FURTHER DEVELOPMENT IN CONCRETE

CAUSES

WITH THE DEVELOPMENT AND MANY RESEARCH DONE ON CONCRETE WHICH IS STILL IN PROGRESS, THE PATH TO SUSTAINABLE HIGH STRENGTH FLEXIBLE CONCRETE IS IN PROGRESS

Transparent concrete

Flexible concrete



Concrete with less carbon emission

NAME : RITIK SHARMA
M NUMBER : M00XXXXXX
DATE : 30/08/2000
TECHNICAL MODULE 2/2

CONCRETE EVOLUTION

EARLY USE OF CONCRETE

CAUSES

SUBSTITUTE OF MORTAR AND STONE MASONARY FOR EASE OF CONSTRUCTION

EFFECTS

DEVELOPMENT IN THE BINDING AGENT AND THE METHOD OF CONSTRUCTION WITH IT

First usec as a binding substance for stones

Gaps filled by hands

DISCOVERY OF PORTLAND CIMENT

CAUSES

MULTIPLE BINDERS WERE USED, AND PORTLAND CEMENT ALSO HAD SO FORMULAS OF IT

EFFECTS

STANDARDIZING THE RATIO OF SUBSTANCES FOR EQUAL STRENGTH THROUGHOUT THE USE OF IT

USE OF R.C.C

CAUSES

CONCRETE WAS ONLY GOOD IN COMPRESSION THUS STEEL WAS ADDED AS AN REINFORCEMENT

EFFECTS

FRAME STRUCTURE WITH FREE AND ELEGANT FACADE THUS GAINING THE EXCEPTANCE OF R.C.C

Use of steel rebae to reinforce and enhance its tensile strenght

R.C.C column and beam structure

Free facades can be given

Beam with reinforcement where tension is the most

R.C.C pad foundation

SHELL / FOLDED PLATE STRUCTURES

CAUSES

TO DECREASE USE OF MATERIAL FOR LARGE SPANS

EFFECTS

SHELL AND FOLDED PLATE STRUCTURES

FORM HELPS IN TRANSFERING THE LOAD

Parabolic arched airship hanger

Folded plate

Shell structure by felix candela


Structural System
Material Properties
Sustainability
Details
Climate
Scale of the Building

Matrix

Exercise 2 Ferro cement as a Construction Technique

•Make a model with 30 x 30 cm base with 70% cut-out 1/3rd or ½ size height
•To tie cotton threads from equidistant holes connecting opposite sides of the cut-out to form a square grid of 1.5 x 1.5 cm taking height 1/3rd or ½ of the diagonal
•To dip the model in pop solution
•To invert the model and check the stability by loading it with 100gsm a4 papers
•To repeat the exercise 3 times
1.Model 1 – Cotton Treads
2.Model 2 – Cotton Thread and Copper wire
3.Model 3 – Cotton thread, copper wire and POP Bandages

Intent

Explaining the strength to thickness ratio of surface active structures and how it is possible to achieve strength in those structures

Output

•Understanding how denser grid can transfer load to diagonally and give strength

Base with 70% cut out

Half height of the diagonal

Model 1 - Cotton Treads

Model 2 - Cotton Thread and Copper wire

Model 3 - Cotton thread, copper wire and POP Bandages

Survey and Levelling

Surveying Volume - 1

by Dr. K.R. ARORA (Author)

Fundamental Definition & Concept

Surveying

Surveying is the art of determining the relative positions of points on, above or beneath the surface of the earth by means of direct and indirect measurements of distance, direction and elevation.

the technique, profession, art and science of determining the terrestrial or three-dimensional positions of points and the distances and angles between them.

Why it is conducted ?

to establish maps and boundaries for ownership, locations, such as building corners or the surface location of subsurface features, or other purposes required by government or civil law, such as property sales.

Levelling

Levelling is a method of surveying used for determination of the difference of elevation or levels of various points on the surface of the earth.
The elevation of a point is its vertical distance above or below a reference level, called datum.
The most commonly used datum is the mean sea level (M.S.L))

Levelling is required to determine the undulation of the earths surface for topographic mapping.

Why it is conducted ?

1. Design of highways, railways, canals, sewers.
2. Layout of the construction projects,
    a. for locating the excavation level
    b. for the control of various elevation in buildings, bridges, dams

Surveying

A land surveying professional is called a land surveyor

Elements

Geometry
Trigonometry
Regression analysis
Physics
Engineering
Metrology
Programming languages
Law

Equipments

Total Station
Robotic total station
Theodolites
GNSS receiver
(Global Navigation Satellite System receivers)
Retroreflectors
3D scanners
Radio
Inclinometer
Handheld tablets
Digital levels
Subsurface locators
Drones
GIS
Surveying Software

Total Station

Robotic Total Station

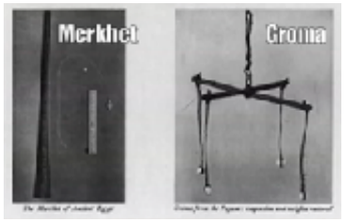
Theodolite

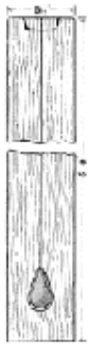
GNSS Receiver

History of Surveying

Distinguishing one man's land

In Ancient Egypt after flood-waters would recede, Egyptian surveyors would with relative accuracy resection the Nile delta implementing plumb-bobs and pre-measured sections of rope





A plumb rule
from the book Cassells' Carpentry and Joinery
https://en.wikipedia.org/wiki/Surveying

Roman Surveying Instrument
https://www.muelaner.com/measurement/make-a-simple-groma/

https://holmansnv.com/2012/03/surveyings-new-dawn/

Ancient Egypt
A rope being used to measure fields. Taken from the Tomb of Menna, TT69.
Re-establishing boundaries after the annual floods of the Nile River.
https://en.wikipedia.org/wiki/Rope_stretcher

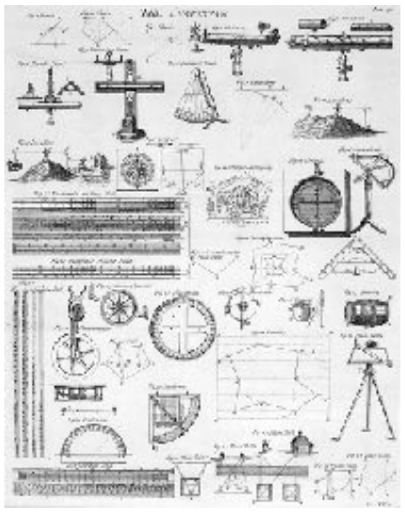


Table of Surveying, 1728 Cyclopaedia
https://en.wikipedia.org/wiki/Surveying

A map of India showing the Great Trigonometrical Survey, produced in 1870

Documentary recommendation

The Great Trigonometrical Survey I RSTV Life and Culture

https://www.youtube.com/watch?v=S6v8PGd0CSc&t=177s

Survey of India celebrates 250 years of its Glorious history

https://www.youtube.com/watch?v=B8Q7tj1tGZo

Genius of Ancient Technology: Surveyors & Water. SGD Sacred Geometry Decoded

https://www.youtube.com/watch?v=iBR526HDX8g

Surveyor's Tool I A History of Kentucky in 25 Objects I KET

https://www.youtube.com/watch?v=Dvh_b19QcXE

History of GSI

https://www.youtube.com/watch?v=VFakz8MmCwg

Primary Division of Surveying

Whether the curvature of the earth is considered

Or

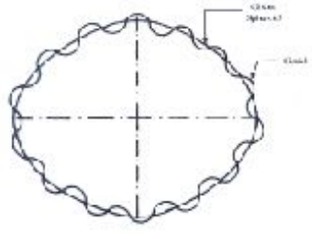
Whether the earth is assumed to be flat plane.

Plane Surveying

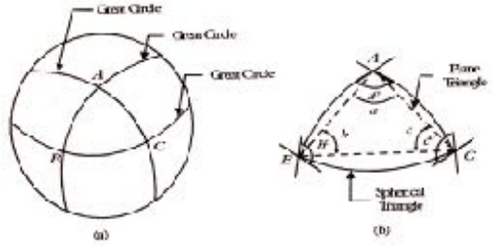
The **curvature of the earth is neglected and it is assumed to be a flat surface.**
How it is conducted ?
All Distance and horizontal angles are assumed to be projected on to a horizontal plane.
A horizontal plane at a point is the plane which is perpendicular to the vertical plane of reference is selected for the entire survey of the small area.
Less than 250 sq.km or so.

Geodetic Surveying

The **curvature of the earth is taken in to consideration, and a very high standard of accuracy is maintained.**
How it is conducted ?
The earth's major and minor axes are computed accurately and spheroid of reference is visualised.
The earths mean sea level surface which is perpendicular to the direction of gravity at every point is represented by geoid.
Large area.



The imaginary surface representing mean sea level extending over the entire surface of the earth is represented by spheroid.



The Figure a, shows three point,
A, B and C on the mean surface of the earth.
The line AB, BC and CA are the arch of great circle passing through the centre of the earth.
The great circle is formed by the intersection of a plane passing through the centre of the earth.
Spherical Trigonometry - In geodetic surveying AB, BC and CA are determined from the spherical triangle using spherical trigonometry.
Plane Trigonometry - these distances are obtained from the plane triangle using lan trigonometry.

Summery

Plane Surveying

1. It is used for relatively small areas. < 250 sq. km2
2. A curved line on the surface of the earth is considered as mathematically straight.
3. The direction of the plumb lines at various points are assumed to be parallel to one another.
4. The spherical angles are considered as plane angles.
5. The standard of accuracy is lower than that in geodetic surveying.

Geodetic Surveying

1. It is used for large areas. > 250 sq. km2
2. It is used for establishing precise points of reference or control points.
3. The surface of the earth is considered as plane angles.
4. The direction of the plumb lines at various points are different. The earth's mean level is perpendicular to the direction of gravity indicated by plumb bobs.
5. The standard of accuracy is very high. Very precise interments are used.

Classification of Surveying

Functional Based

1. Control Surveying
2. Land Surveying
3. City Surveys
4. Topographical Surveys
5. Route Surveying
6. Mine Surveys
7. Hydrographic Surveys
8. Engineering Surveys
9. Astronomic Surveys
10. Satellite Surveys
11. Geological Surveys
12. Construction Surveys
13. Miscellaneous Surveys

Archeological Surveys
Military Surveys
Gravity Surveys
General Surveys

Instrument Used Based

1. Chain Surveying
2. Compass surveying
3. Levelling
4. Plane Table surveys
5. Theodolite Surveys
6. Tachometric Surveys
7. Photogrammetric Surveys
8. EDM Surveys

Survey and Levelling - Research & Presentation, as discussed yesterday in the survey and levelling class,

1. Example of Functional Based Survey

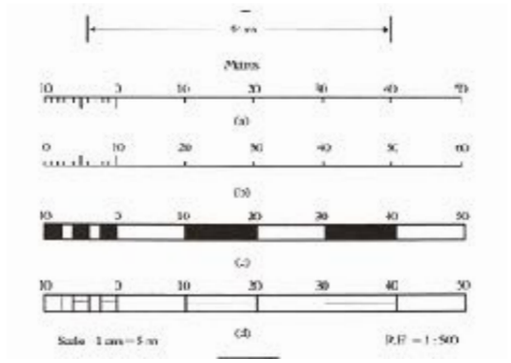
2. Instrument based survey

1. Chain Surveying
2. Compass surveying
3. Levelling
4. Plane Table surveys
5. Theodolite Surveys

Explain method of instrument based survey in detail.
Study can be shown through photographs, sketch, diagram, video.

Representation of Scale

1. **Engineer's Scale** — Indicated by a statement
2. **Representative fraction** — Indicated by a ratio
3. **Graphical Scale** — Line drawn on the map marking the ground distance

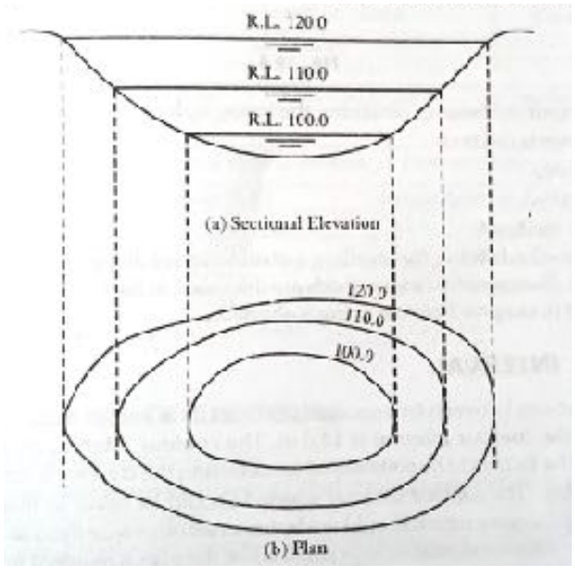


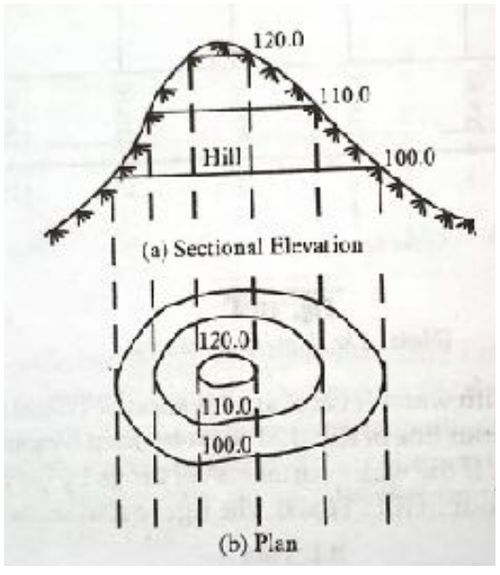
S. No.	Purpose of Survey	Scale	R.F.
1	Building site	1 cm = 10 m	1 : 1000
2	Town planning, reservoir planning, etc.	1 cm = 100 m	1 : 10,000
3	Route surveys	1 cm = 100 m	1 : 10,000
4	Longitudinal sections (a) Horizontal scale (b) Vertical scale	 1 cm = 10 m 1 cm = 1m	 1 : 1000 1 : 100
5	Cross-sections	1 cm = 1m	1 : 100
6	Land surveys	1 cm = 5 m to 50 m	1 : 500 to 1 : 5000
7	Topographical maps	1 cm = 0.25 km to 2.5 km	1 : 25,000 to 1 : 250,000
8	Geographical maps	1 cm = 5 km to 150 km	1 : 5,00,000 to 1 : 150,00,000

The graphical scale has the advantage over the numerical scales that the distances on the maps can be determined by actual scaling even when the map has shrunk or has been reproduced to some other scale.

Basic Measurement In Surveying

Horizontal distance	Vertical distance	Horizontal Angle	Vertical Angle
1. Chains	1. Levelling Instruments	1. Magnetic Compasses	1. Theodolite
2. Tapes	2. Techeometers	2. Theodolites	2. Clinometer
3. Techeometers		3. Sextants	3. Chapters
4. E.D.M.			





Level Line: **The level line is a line in a level surface. As the level surface, the level line is also curved. Every element of the level line is perpendicular to the direction of gravity. All Points in elevation line are the same elevation.**

Datum Surface or Datum: **It is a level surface which is taken as a reference surface for the determination of elevation of various points.**

Elevation: **It is a vertical distance of the point above or below the datum surface.**

Altitude: **It is the vertical distance of the point above mean sea level. Therefore, if the datum surface is the mean sea level, the elevation is the same as the altitude.**

Difference of elevation: **It is the vertical distance of the point between the level surfaces passing through the two pints.**

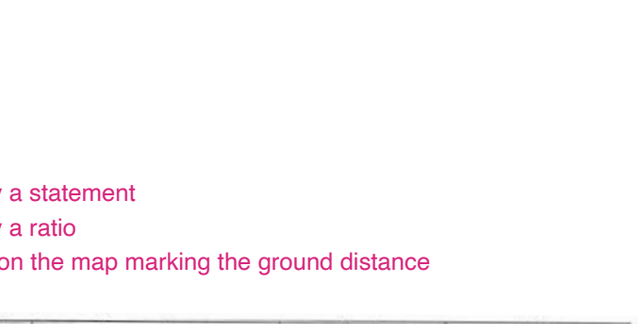
Reduce Level (R.L.): **The reduced level of a point is its height relative to the datum.It is the calculated (reduced) height of the point above or below the datum.**

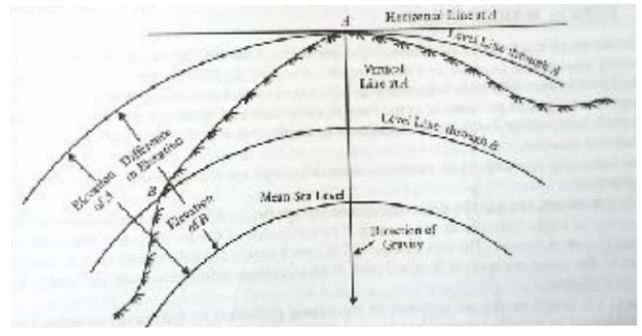
Horizontal Plane: **It is a plane which is perpendicular to the direction of the gravity.**

Horizontal Line: **It is a line in a horizontal plane. The horizontal line is, therefore, perpendicular to the vertical line at the plane.**

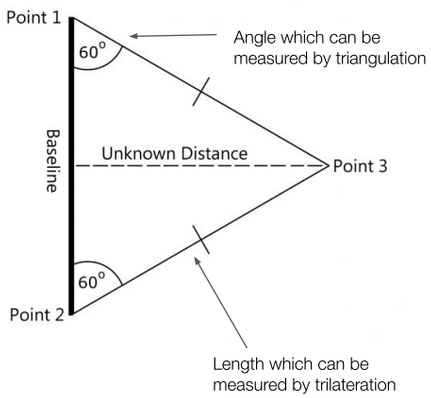
Vertical Plane: **It is plane which contains a vertical line at the point.**

Vertical Angle: **It is the angle measured in a vertical plane. The vertical angle is usually measured with respect to the horizontal line at the point.**

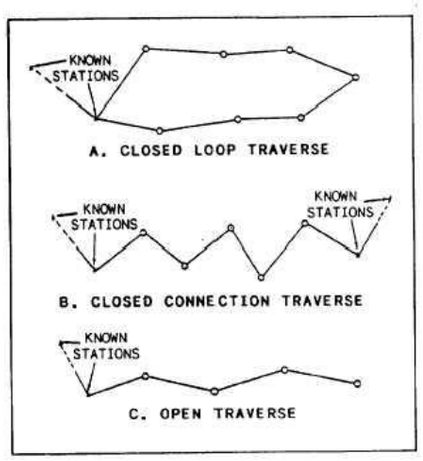




Land Surveying



Triangulation and trilateration



Traverse

Control Surveying

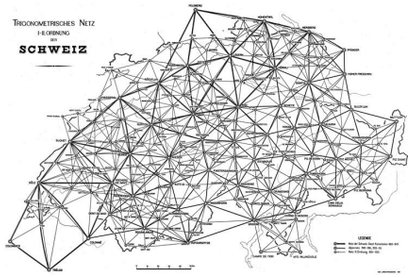
- Establishing a network of **Horizontal** and **Vertical** monuments that serve as a reference for other survey projects.

Control Points

- A system of Control stations, must be established to locate the positions of various points, objects or detail on surface of the ea
- Points can be of two types :

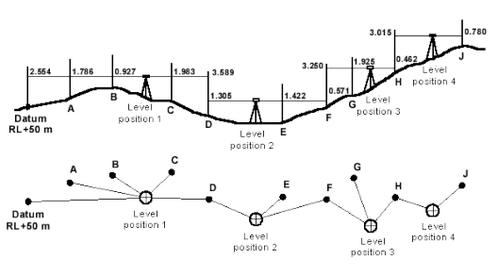
1) Horizontal Control Points

Using the horizontal coordinates to determine positions



2) Vertical Control Points

Use of vertical elevation to determine the positions



Control Surveying

Horizontal Control Surveys

- This control network can provide a reference framework of points for -

  1) Topographic mapping and large-scale plan production

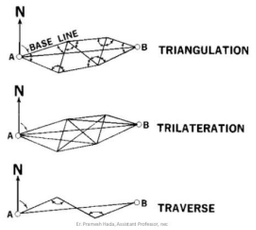
  2) Dimensional control of construction work

  3) Deformation surveys for all manner of structures

Techniques Used in Horizontal Control Surveys

Classical Methods

- Traversing
- Triangulation
- Trilateration



Vertical Control Surveys

- To determine elevation of primary control station
- Primary stations are located by triangulation and trigonometric leveling
- Secondary vertical control points are done by Ordinary spirit levelling

Techniques Used in Vertical Control Surveys

Classical Methods

- Direct Leveling
- Trigonometric Levelling
- Trilateration

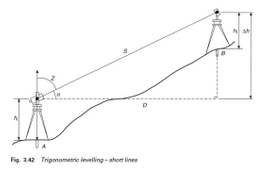
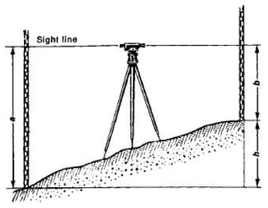


Fig. 3.42 *Trigonometric levelling – short lines*

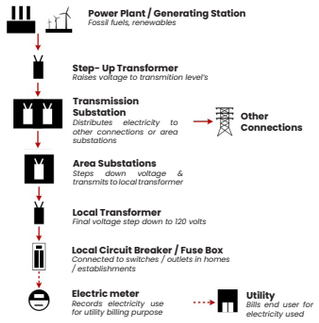


EVS

Research & design – Poster

ENERGY

Supply and demand in Bhuj



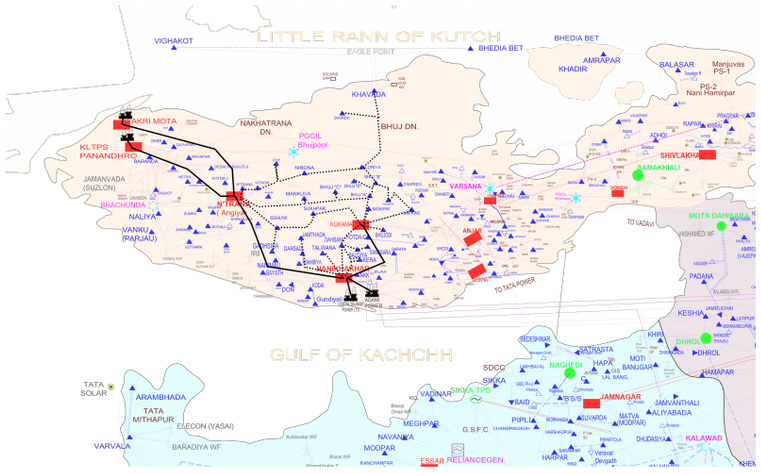
125 MW Thermal Power Project are located at village Nani Chher, Taluka Lakhapat, Dist. Kutch in Gujarat State.

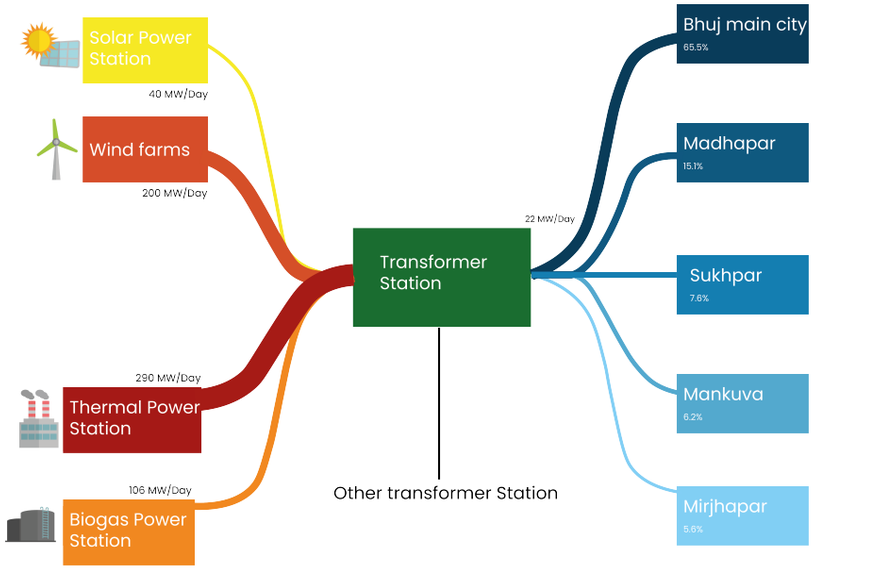
It is getting Lignite from its own mines located at Panandhro, Mata no Madh and Umarsar. The water requirement for the power plant is taken from the nearest Kori Creek through a 1.4 KM long sea water intake channel

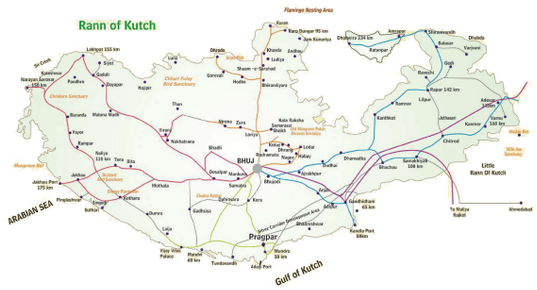
There are two units of 70 MW each (Unit no. 1 & 2) and two units of 75 MW (Unit no. 3 & 4) with a total installed capacity of 290 MW. 70 MW units are of BHEL make and 75 MW unit no. 3 is of Elecktrim Poland make & unit no. 4 is of BHEL .

200 megawatt of wind farms commissioned are at Bhuj and are connected to the interstate transmission system and the power generated is supplied to multiple states

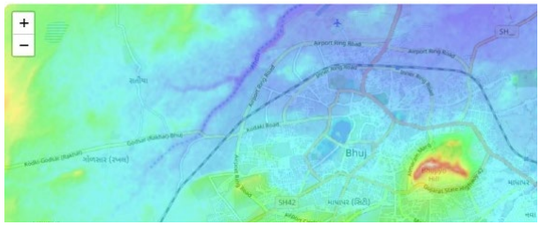
A 5 MW solar photovoltaic (PV) power plant is located around Bhuj , built by Apar Corporation Pvt. Ltd. which can produce up to 40 MW

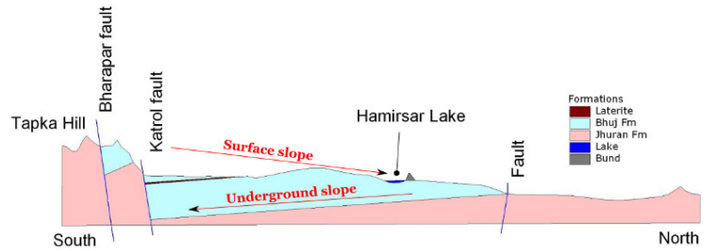






Bhuj has an average elevation of 110 metres (360 feet). On the eastern side of the city is a hill known as Bhujia Hill, on which there is a Bhujia Fort, that separates Bhuj city and Madhapar town .It has two lakes namely Hamirsar and eshadsar.





The general slope of the terrain is toward the north (from the hills towards Bhuj) whereas underground slopes the other way around.

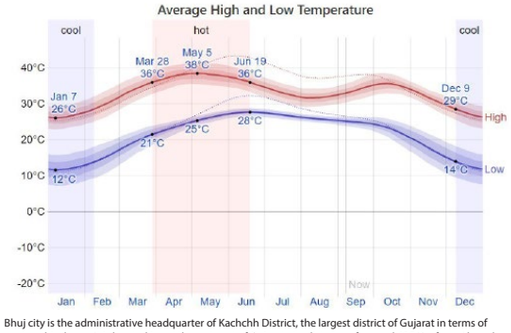
Bhuj is located on a "porous" sandstone which acts like a "sponge". The surface rain waters flows towards Hamirsar and the other city lakes. It can then penetrate the ground and get "stored" in this enormous natural underground "tank". The underground water could then be tapped through one of the 60 wells in the city.

The shale layer, below the sandstone, is water proof and makes sure that the water doesn't flow out of Bhuj Area underground.

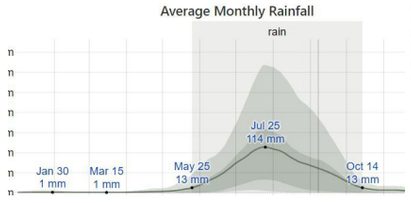
All the "feeder dams", in the upper part of the catchment, are directly in contact with the shale layer. The water doesn't go underground and is therefore a great surface water storage which can be used to "refill" Bhuj lakes when required.

Bhuj is of strategic importance for development of the region. On 21 July 1956 as well on 26 January 2001, the city was struck by a major earthquake , which caused a great deal of damage and loss of life and property. Many parts of Bhuj were demolished due to the extensive damage whilst others were repaired. There has been a great deal of progress in the city since 2001 earthquake

The earthquake was caused at the convergent plate boundary between the Indian plate and the Eurasian plate boundary. These pushed together and caused the earthquake. However as Bhuj is in an intraplate zone, the earthquake was not expected, this is one of the reasons so many buildings were destroyed – because people did not build to earthquake resistant standards in an area earthquakes were not thought to occur. In addition the Gujarat earthquake is an excellent example of liquefaction, causing buildings to 'sink' into the ground which gains a consistency of a liquid due to the frequency of the earthquake.



Bhuj city is the administrative headquarter of Kachchh District, the largest district of Gujarat in terms of geographical area. It is located in north-west part of Gujarat at a distance of around 400 Km from Ahmeda



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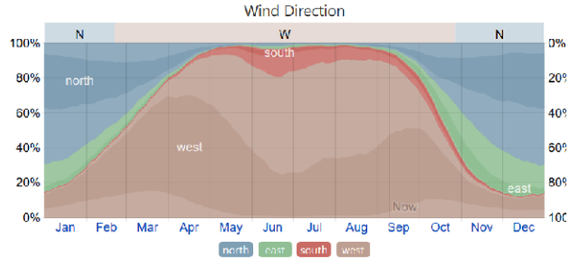

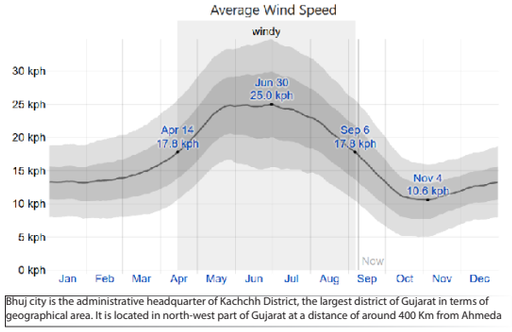

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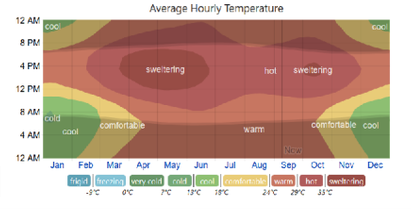

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TOPOGRAPHY AND CLIMATE

Research & design – Poster