SEMESTER 6 Design Project Module AR0605

COURSE OBJECTIVE

Focuses on materials, building services, construction systems, and their integration in design. We put emphasis on architecture as a system that is consistent in its conception whether in parts or as a whole.

CONTENT FOR THE MODULE

Learn the nuances of making working drawings, detailing of structures and how to integrate materials of different properties together.

LEARNING OUTCOME

Making large size mock-ups and drawings. Getting into the trenches for detailed construction and finishing specifications for an efficient execution of design.

REFERENCES

Books:

1. Studies in tectonic culture, Kenneth Frampton
2. Building construction illustrated, Francis, Ching, D K
3. McKay's Building Construction, William Barr McKay

EXERCISE 1.

To make a physical model from waste material around you.

LEARNING OBJECTIVE:

In this times of COVID-19, everyone faced challenges to work smoothly in regular routine. The students were asked to explore the readily available objects at their home to make them realize how quickly and with limited resources a given task can be achieved.

Methodology :

Students picked up waste material around them and use it creatively to make physical models of their conceptual ideas for design development. The idea was to generate forms and understand their inter-relationships to each other.

STUDENT'S WORK

EXERCISE 2.

Explore the technical details of the alternative materials to be used by the students in their design, and prepare a plate with its construction methodology and techniques.

LEARNING OBJECTIVE:

This exercise intended to get into the depths of the alternative material assemblies, so that when the students proposes to use any of them in their design, they must be aware of the technical specifications in detail.

METHODOLOGY :

The students were asked to explain in form of plates. The sheet should have basic raw material required for procuring a particular material, it's making process. Properties like Strength, water resistance, use in which form in building and in which component, modular or cast in situ, Clear Spans- both horizontal and vertical, kinds of openings that can be created, workability, development of joinery with other subsequent materials in the project.

STUDENT'S WORK: Exercise 2

Ferrocement

Raw Materiial

Design mix :
Cement: Fine Aggregate 1:2 to 1:3 by weight, M25 grade Water: Cement ratio 0.45 to 0.55 Fine Aggregate should be coarse sand confirming to grading Zone II as per IS Code 383-1970

Mesh reinforcement :
200 mm strip of MS weld mesh of 12 gauge, 25 mm square opening along crown of channel GI wire chicken mesh of hexagonal 12 mm opening, 22 gauge, throughout the shell and double layer of 1 m length at both ends of channel.

Nib reinforcement :
Roof application: from 6 mm for 3 m span to (1 no. In both nibs)12 mm for 5.4 m span Floor application: from 8 mm for 3 m span to 16 mm for 5.4 m span.

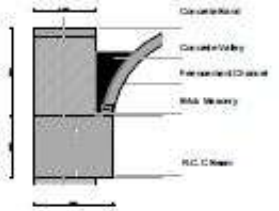
Load carrying capacity of FC Channel roof varies from 650 2kg/m to 1200 kg/m depending on the reinforcement.

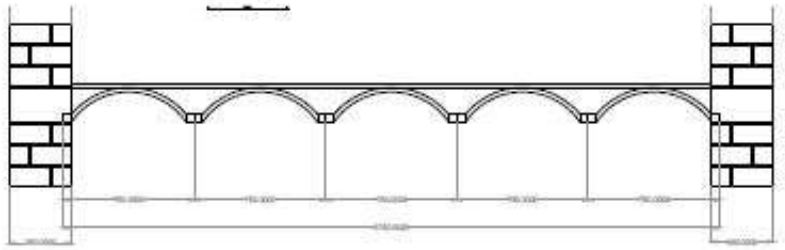
Construction process

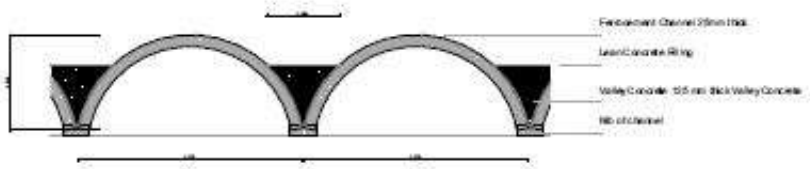
Pre-cast Ferrocement Channels
FC Channels are pre-cast shell units made with rich cement mortar (1:2 to 1:3) and reinforcement consisting of a continuous layer of chicken mesh with steel bars provided at two ends of the channel. These shell units are cast either manually on a masonry mould or mechanically on steel moulds mounted on table vibrator. The channels are supported on ends either on load bearing masonry or on a frame structure (RCC or steel).

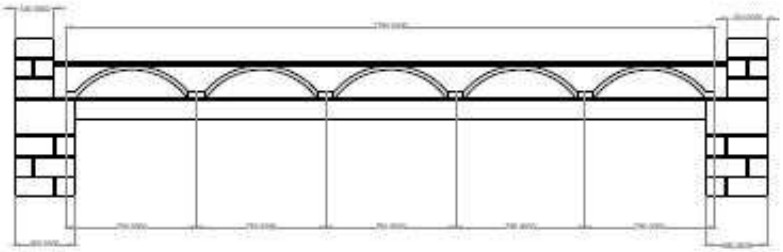
Restraining Beams
Any lateral moment and deflection of FC Channel gets balanced by thrust of adjacent channel. In order to balance the channel movement at ends, restraining beams must be provided to prevent differential movement of FC roof in case of any instability in the support structure. The restraining beam will be a part of RCC bands required for structural strengthening, specially in disaster prone areas.

Concrete Filling
After the Channels have been placed side by side, they are joined together with a concrete infill of at least M15 grade (1:2:4) laid to 150 mm thickness. This concrete completes the T-beam structural action of the FC Channels and creates a basic roof. In case of an intermediate floor, the remaining portion of the valley can be filled the with lean concrete, brick jelly lime concrete or light-weight material and finished with a floor.









EXERCISE 3.

Taking the exercise 2 further ahead, the students were asked to prepare wall sections of their design in the material and technology they are going to use.

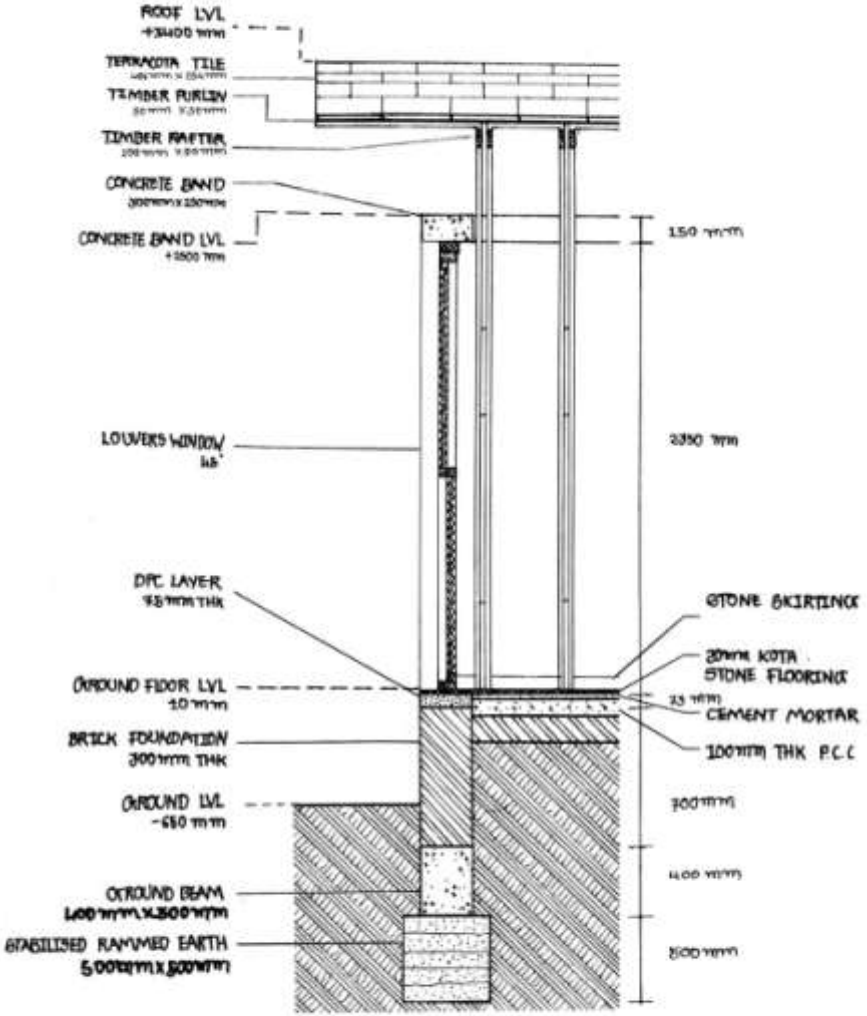
LEARNING OBJECTIVE:

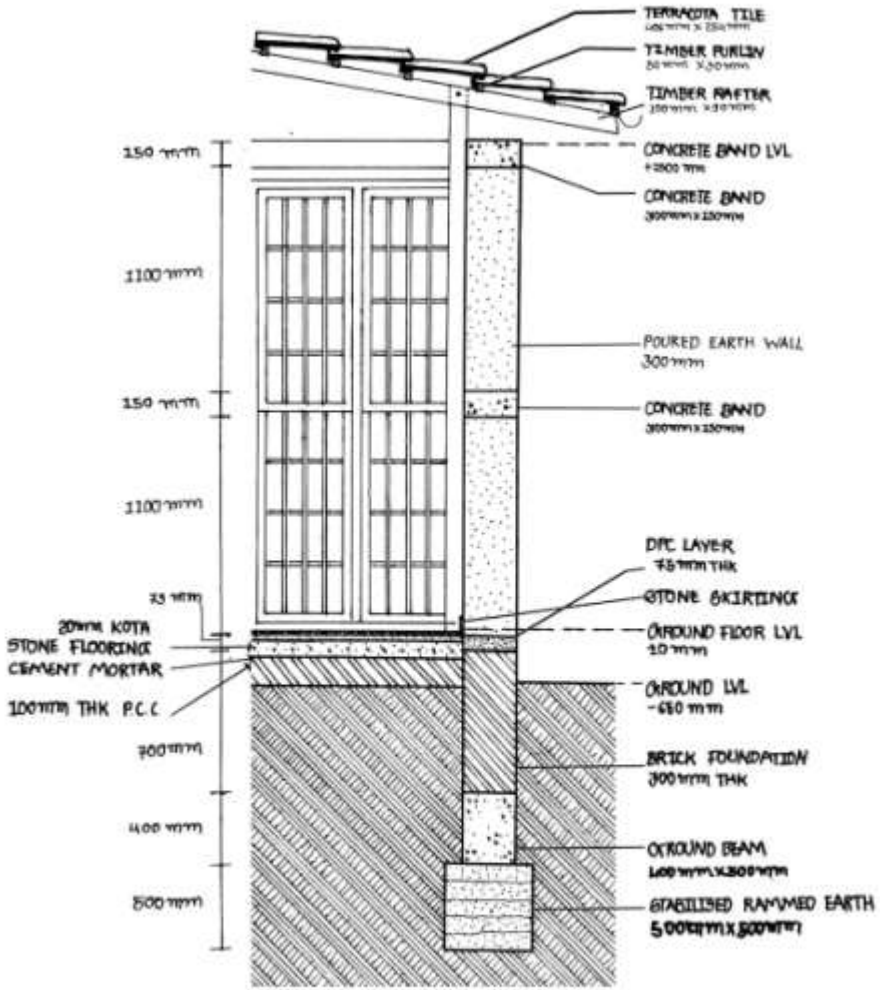
Developing wall section help in understanding the process of vertical built up of a structure. This exercise would help students to clearly understand how different materials behave and how they come together to form a structure.

METHODOLOGY :

The students took one edge of their building and develop wall section through that edge. This would include plinth, openings, lintel, roof etc and the materials used for it.

STUDENT'S WORK: Exercise 3





EXERCISE 4.

Spatial Experience view from ArchiCAD.

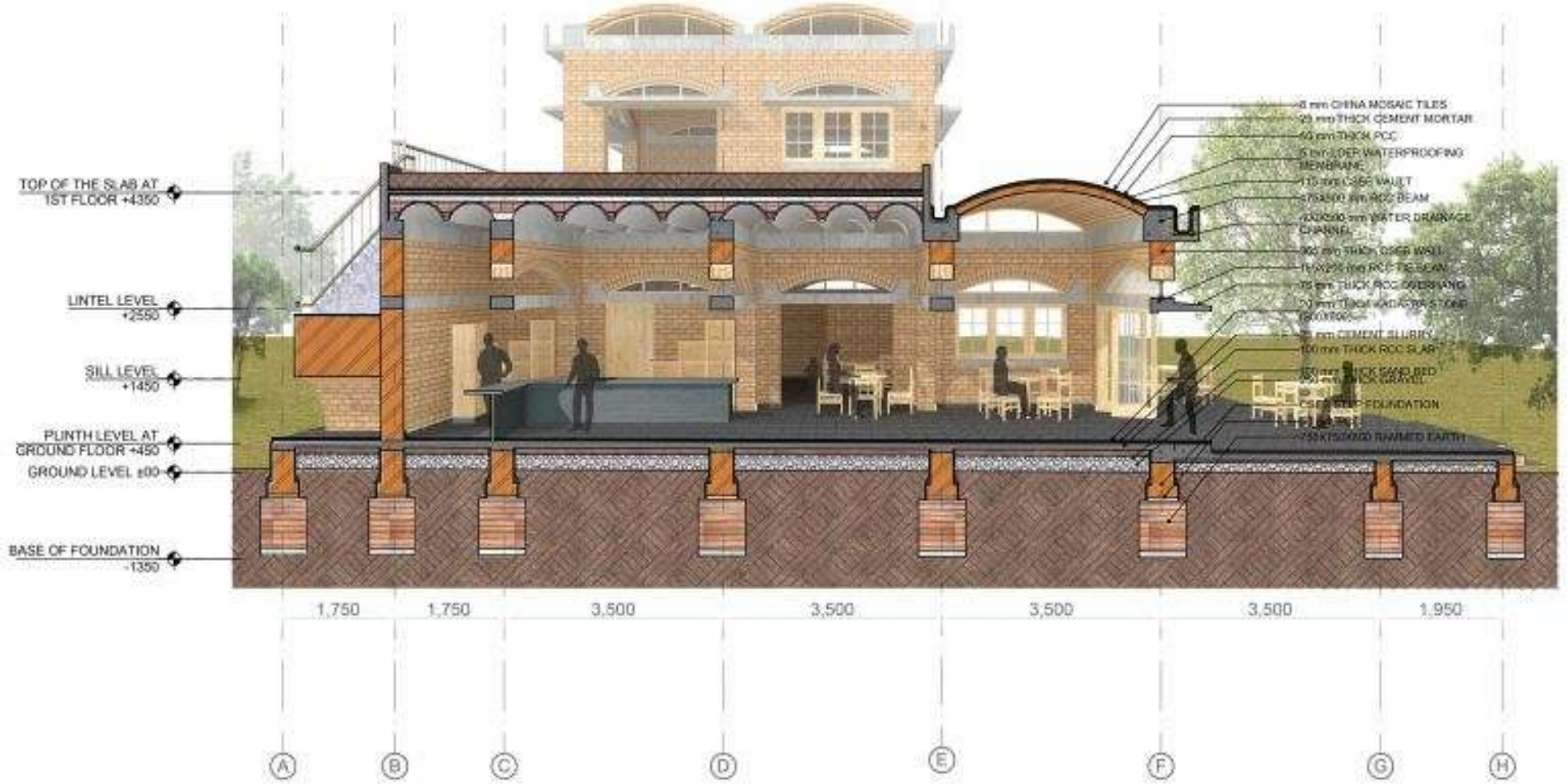
LEARNING OBJECTIVE:

Since this studio was giving equal emphasis on developing detailed drawings and to integrate use of BIM software, this exercise was devised to kind of bring the outcome in the form of a perspective 3-D view, where spatial quality, material exploration and volumetric essence can be showcased all together.

METHODOLOGY :

From the learning of previous exercises, students used their knowledge of BIM software and material and construction technology to give shape to their built form in3-D. Then from the model views were exported and material definition was applied to it.

STUDENT'S WORK: Exercise 4



EXERCISE 5.

Final Set of Working drawings.

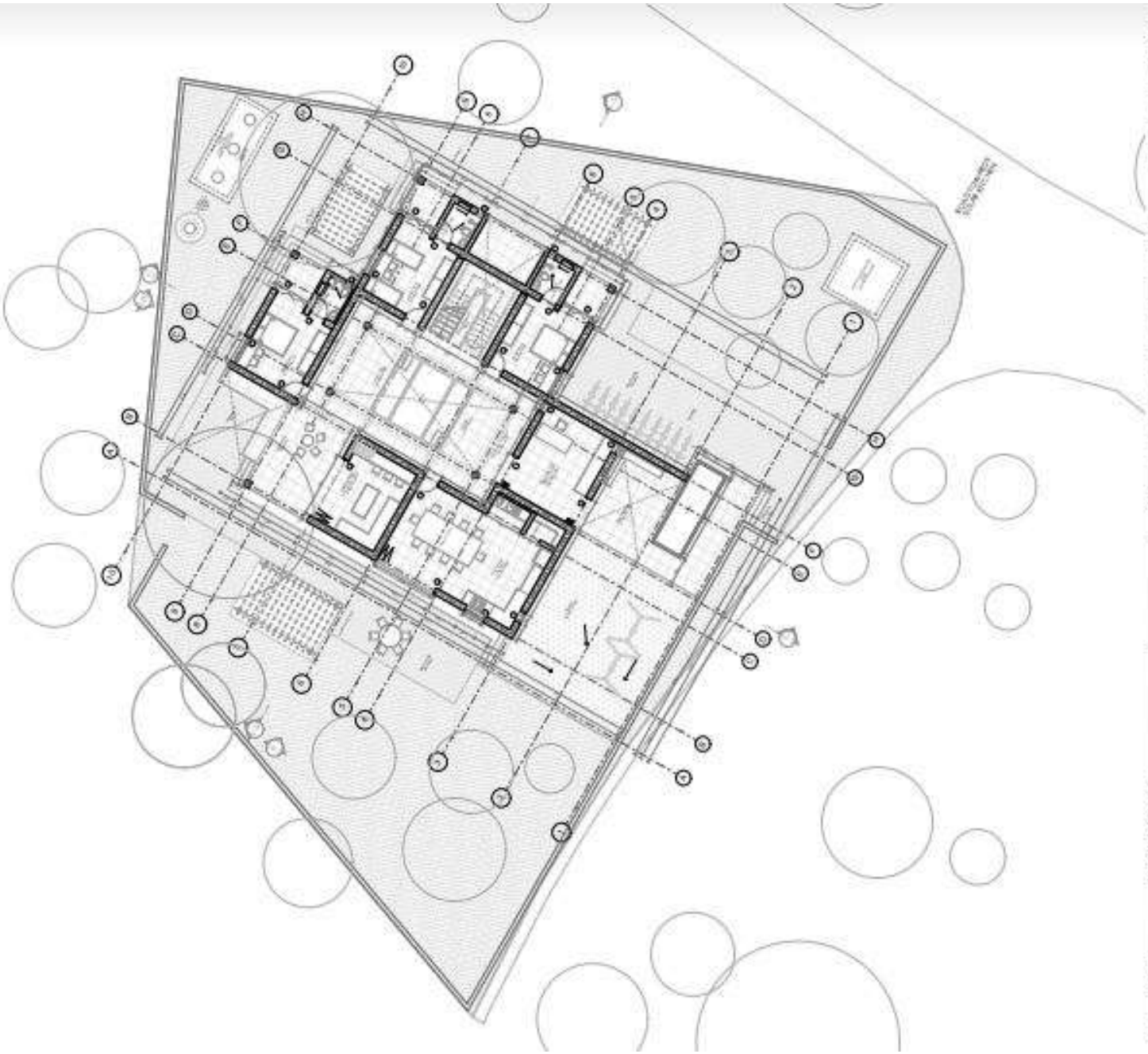
LEARNING OBJECTIVE:

The final set of working drawings include floor plans at all levels, elevations from all four sides, longitudinal and transverse sections, joinery details and everything possible to construct a building. This set enables student to be confident enough to handle the project for execution.

METHODOLOGY :

From the learning of previous exercises, students used their knowledge of BIM software and material and construction technology to give shape to their built form in3-D. The BIM software becomes an important tool to quickly integrate all elements in the model space and export drawings with all the details.

STUDENT'S WORK: Exercise 4



Project Name :
GUEST HOUSE, Auroville

Address -
Auroville, Pondicherry

Contact number -

Key Plan -

Client Name -

Client Address -

General Notes -

- All dimensions are in mm.
- If any discrepancy is found shall brought to the notice of Architect / Engineer.
- Before settings the layout get it approved with the site Engineer, check all diagonals.
- Before execution, please check all dimensions on site.
- Before settings the layout, please check all dimensions on site.
- Details & specification of all R.C.C work shall be considered as per structural drawings.

Electrical consultant -	Plumbing consultant -
Mechanical consultant -	Civil consultant -

Material specifications -

Rammed earth (out)	Sand
Brick (out)	Earth
Tandur stone	
RCC	
Wood	
Glass	

Student Name -

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k.k.Nagar part II, Ghatlodia
Ahmedabad.

Drawing name -	Drawing Number -
GROUND FLOOR PLAN Drawn by - Helee Patel	AD 101
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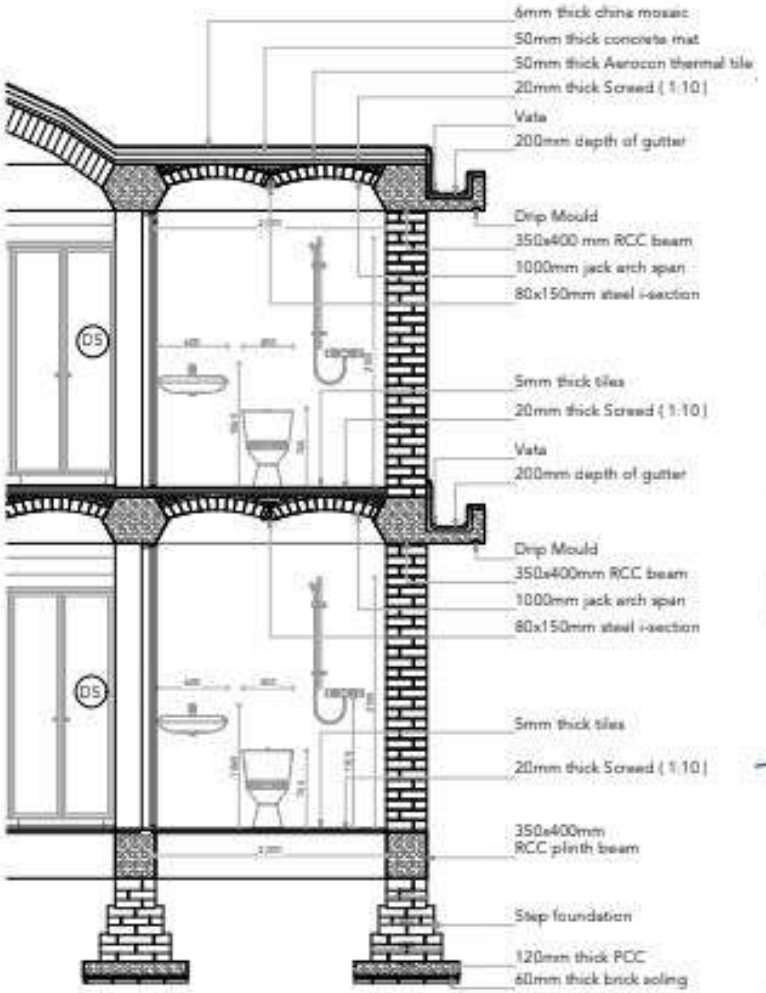
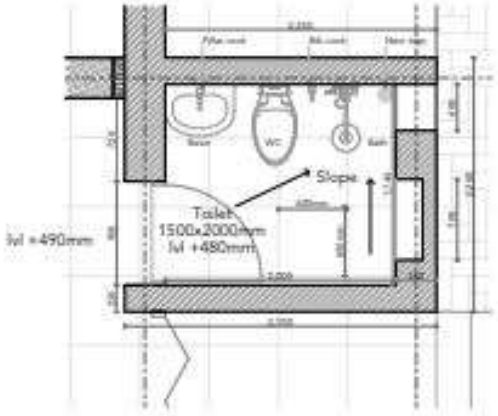
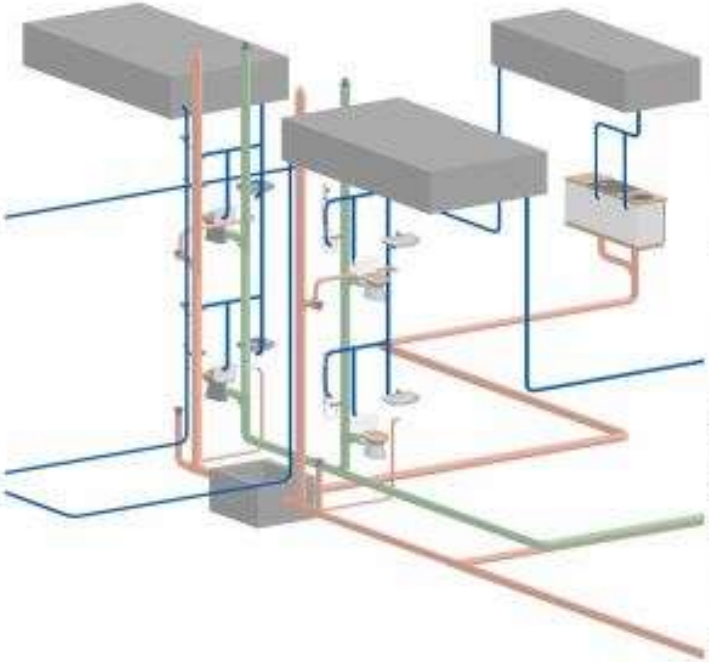
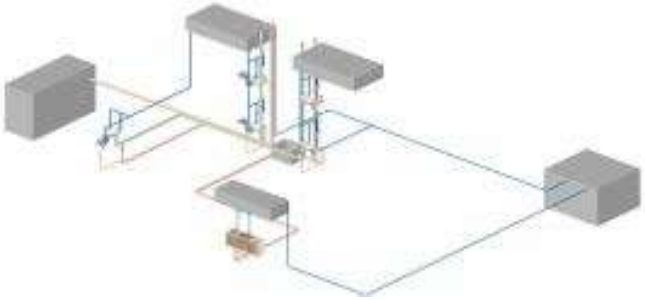
STUDENT'S WORK: Exercise 4









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Mechanical consultant - | Civil consultant -

Material specifications -

Student Name -
Helee Patel
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Drawing name - TOILET

Drawing Number - AD 401

Drawn by - Helee Patel

Scale - 1:20

Stamp -