Ground Floor Plan 1:500

THE NEW TRANSITIONAL HOUSING DEVELOPMENT IN SHEUNG SHUI

DIRECTIONALITY ATRIUM CENTRAL CONNECTION COMMUNAL SPACES
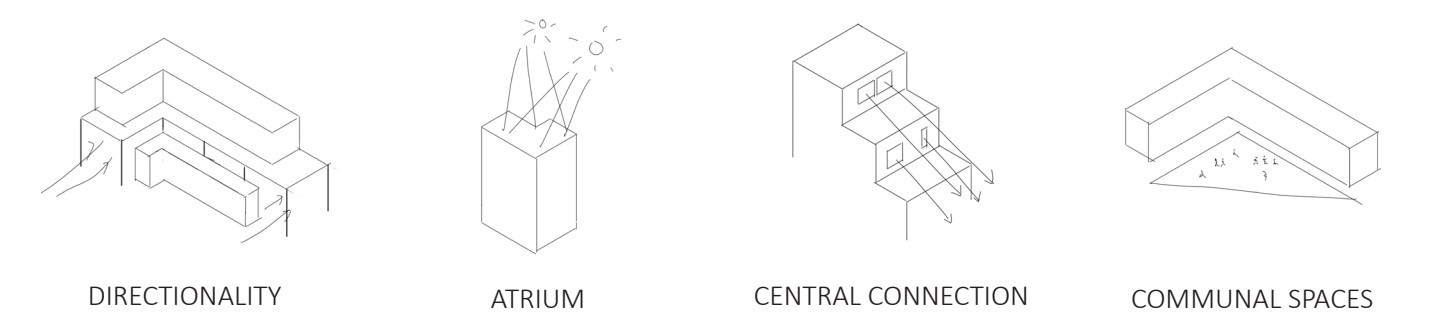
DESIGN CONCEPT:

The temporary housing is designed to foster a sense of community. Under the shade, people of all sizes and ages would be able to live together. Building on a better sense of belonging and the notion that individuals may come together and build strong bonds. The building form plays an important role in the design; all structures are divided into many shapes and iterations to meet the demands of the people, but they all match and fit together like "tetris pieces," then unify and support one another during this transitional stage.

BUILDING FORM:

The emphasis of the building form is to create a community-friendly environment by providing pathways that connects the individual building blocks. To enhance the view of flats and to make effective use of site area, a rising platform were designed to elevate the view of rear row of buildings. It creates sheltered space underneath which are planned for management office and other facilities use.

CONNECTIVITY:

We particularly focus on the mobility of the elderly and the disabled by arranging the barrier-free units at the ground floor and at close approximation to the pedestrian walkway. For vehicles, parking spaces are planned near the entrance of the site. Extensive pathways connecting different blocks provides residents with shorter paths within this site no matter for daily entry and exit or evacuation.

BIM USES IN DESIGN, COLLABORATION, ENGINEERING, ANALYSIS AND OPTIMISATION:

The use of BIM helps speed up the workflow and make data and information transfer between disciplines more efficient and effective. The BIM platform also shortens the time required for analysis as the BIM model could act as common data source for analysis software of different disciplines. This shortens the time required to build analytical models. It could also minimize mistakes like overlapping during the design stage and improve compatibility across disciplines.

BIM COLLABORATION APPROACH:

Revit 2022 was widely used in this project because the software provides an efficient and effective collaboration platform to help bridge the exchange of information across disciplines. By avoiding duplication of modeling work, we reduced the time spent on model reviews and increased efficiency, facilitating collaboration.

QUALITY OF DESIGN:

BIM softwares allow visualizations and simulations of multiple design concepts such that our team could make educated decisions to various parameters and arrangement of the design, this includes site layout, aesthetic designs and estimation of carbon emissions.

SUSTAINABILITY:

The building blocks were arranged in a way to maximize airflow and sun illumination such that the energy usage for lighting and cooling is minimized. The optimal arrangement is determined with the aid of solar analysis BIM softwares. Energy-efficient products are critical to achieving green building goals and balancing integrated systems. With proper planning, a building nearing the end of its useful life can be converted into a material supply for a new project.
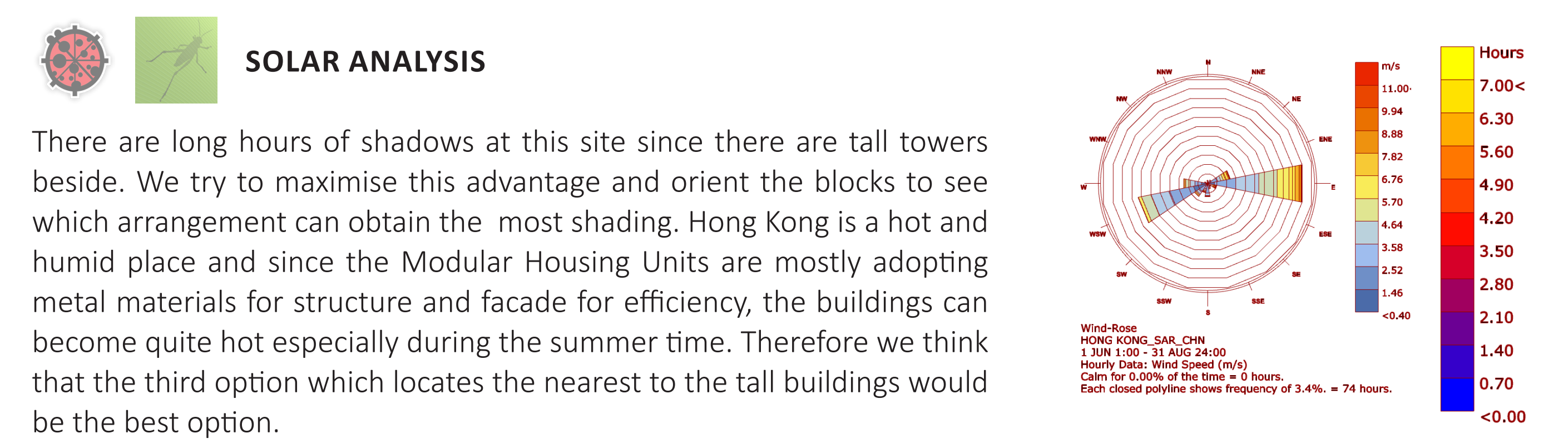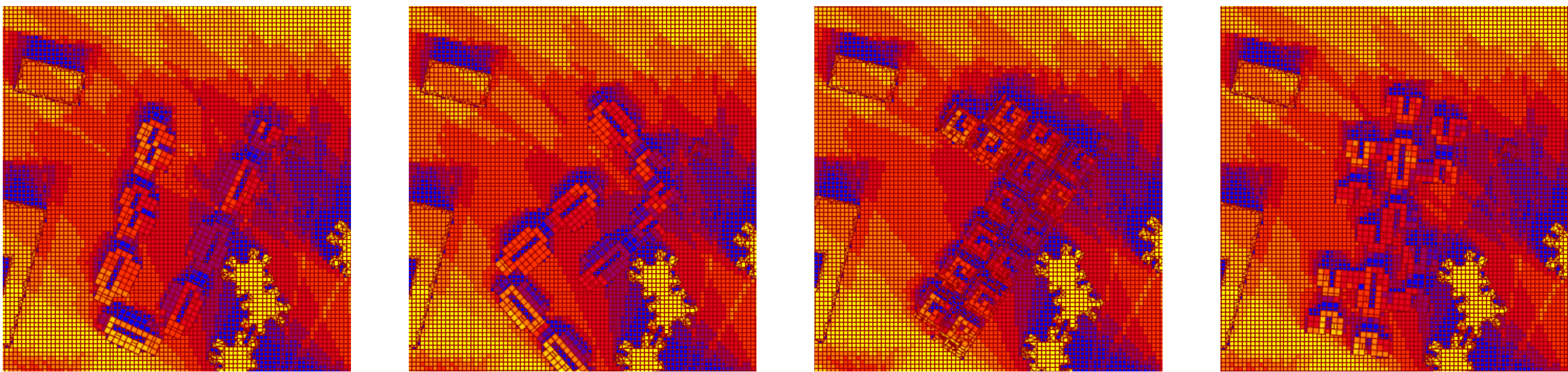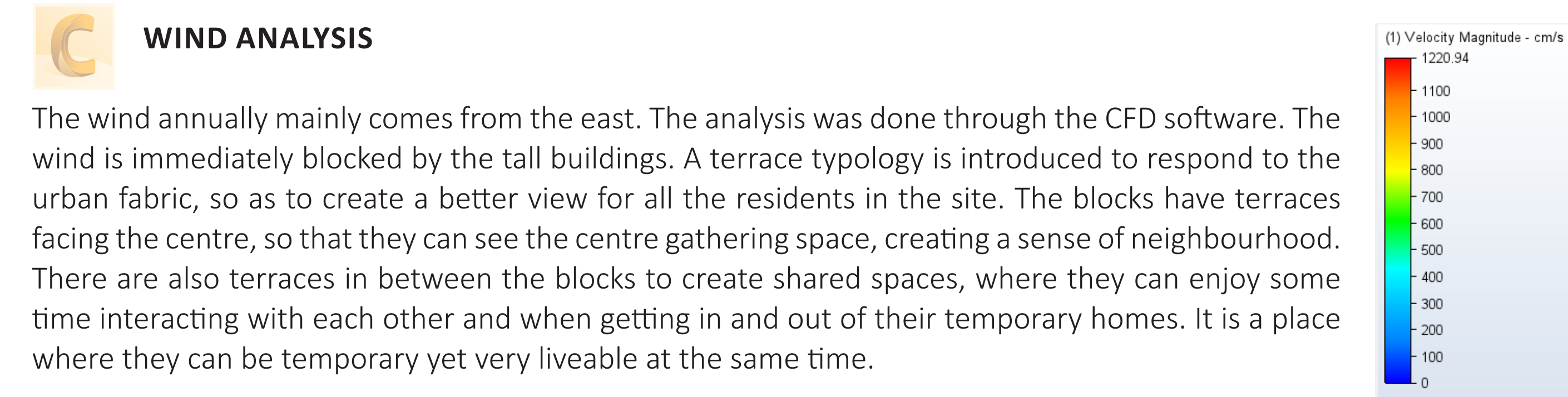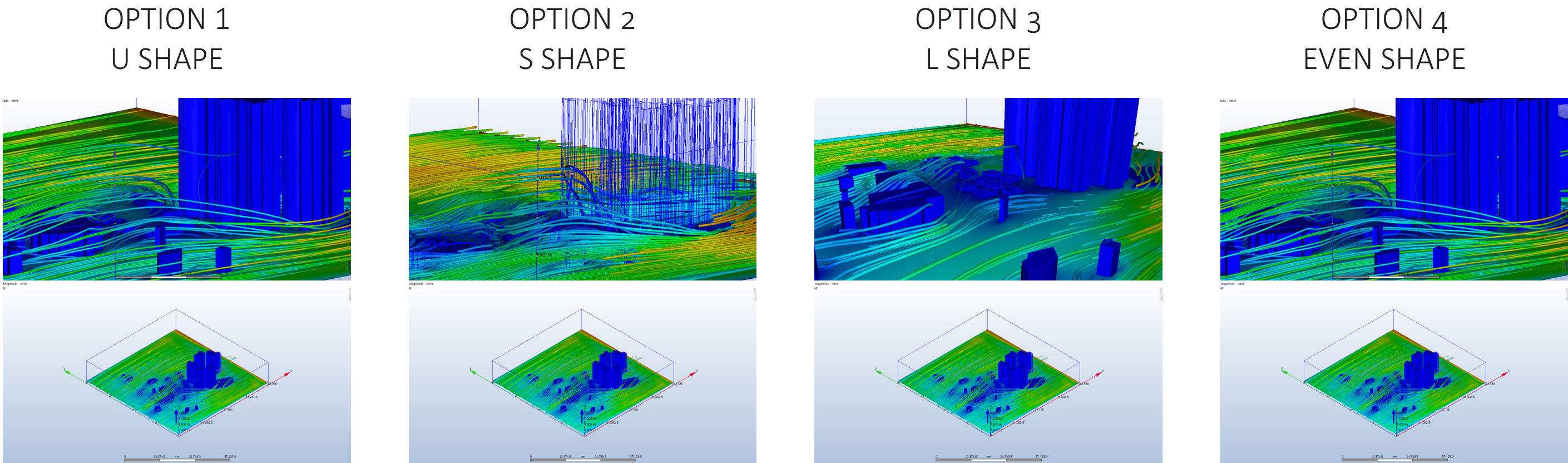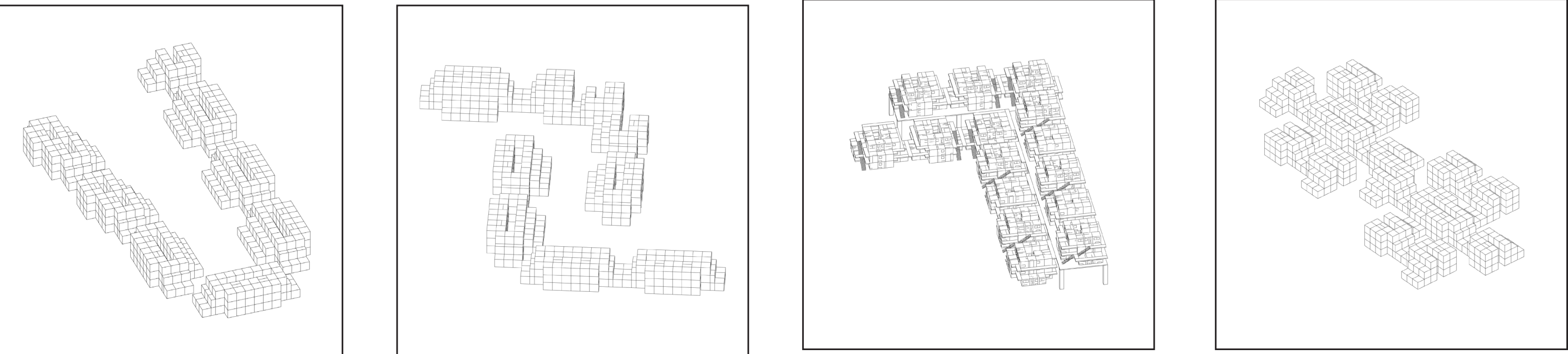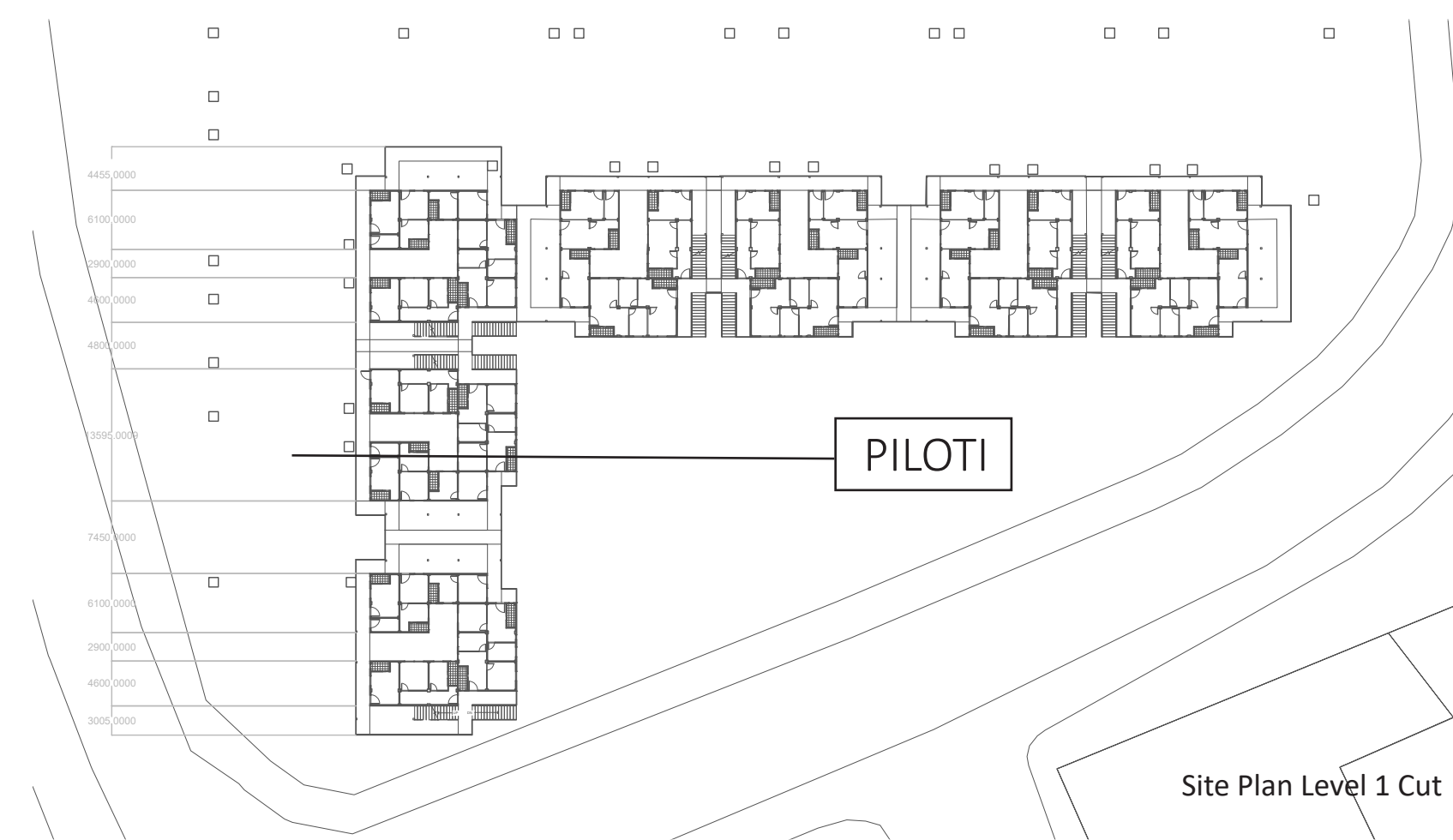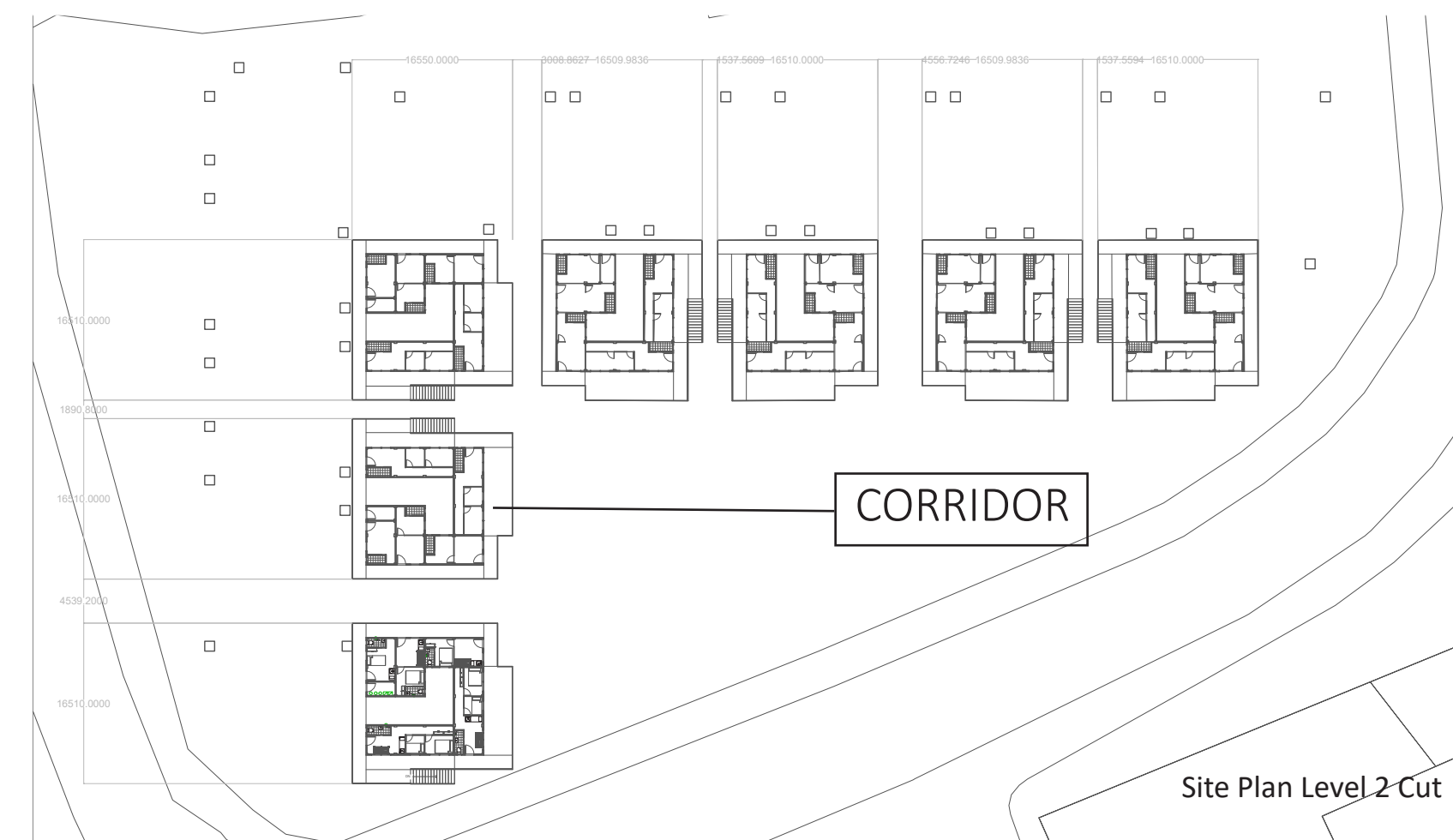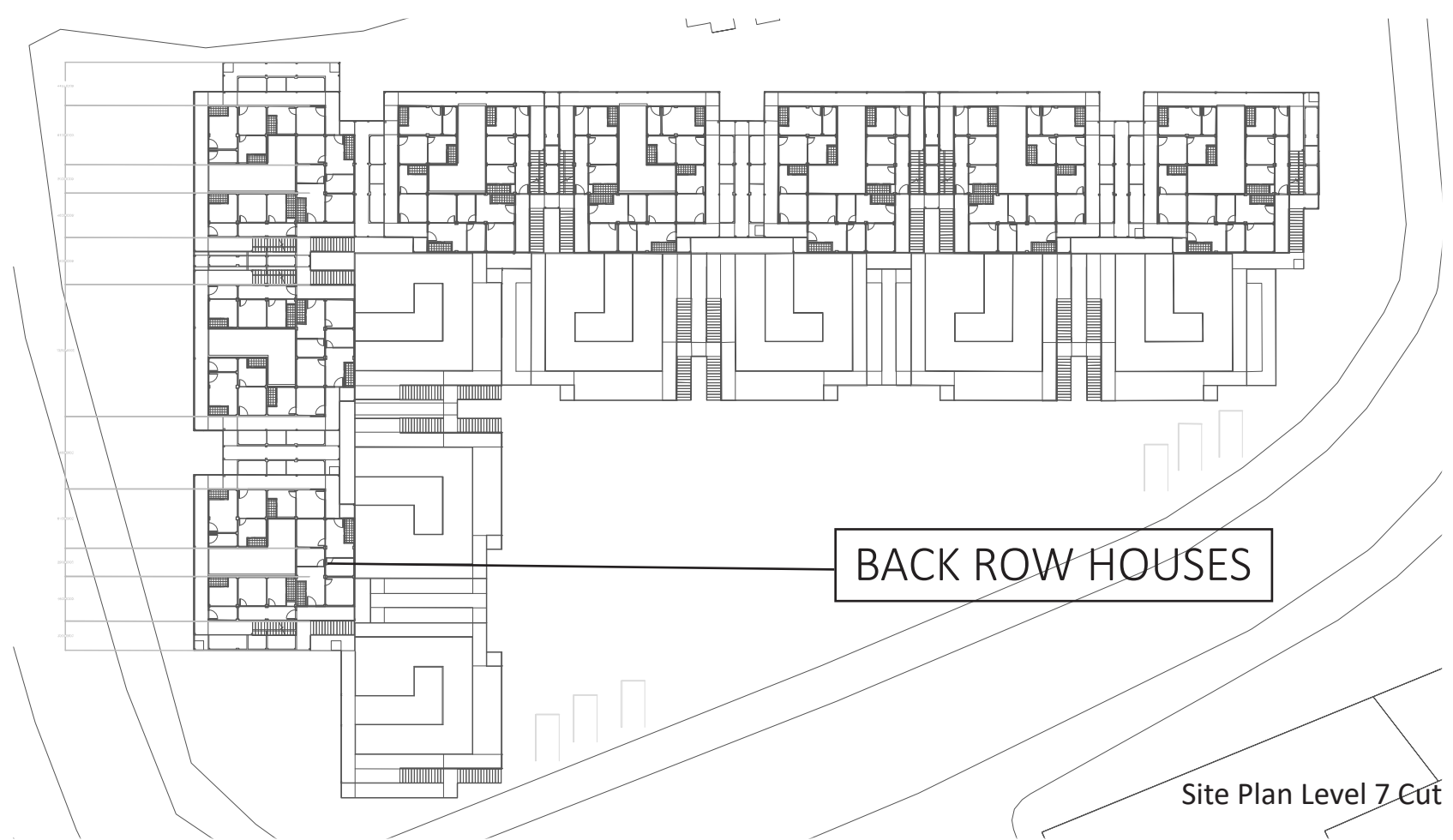
MIC/ DFMA AND CONSTRUCTABILITY:

The flats of blocks are constructed from 2 types of rough machining modules, square and rectangular shaped. Different combinations of these 2 types of module can make up 6 types of flat types to cater for different number of residents. In finish machining stage, 19 types of module are going to be made to form one block. MEP components, corridors, staircases and so on are manufactured with DfMA solution before onsite construction so that more construction time can be saved.

SUMMARY: HOW BIM INFLUENCES THE DESIGN, ENGINEERING AND DESIGN COLLABORATION?

BIM is used to visualize the design process and components of building construction and facilitate productive discussions among team members to better understand others' designs. The end result is a more optimized, constructable and efficient design for the project.

DESIGN ITERATIONS

OPTION 1	OPTION 2	OPTION 3	OPTION 4
U SHAPE	S SHAPE	L SHAPE	EVEN SHAPE

WIND ANALYSIS

The wind annually mainly comes from the east. The analysis was done through the CFD software. The wind is immediately blocked by the tall buildings. A terrace typology is introduced to respond to the urban fabric, so as to create a better view for all the residents in the site. The blocks have terraces facing the centre, so that they can see the centre gathering space, creating a sense of neighbourhood. There are also terraces in between the blocks to create shared spaces, where they can enjoy some time interacting with each other and when getting in and out of their temporary homes. It is a place where they can be temporary yet very liveable at the same time.

(1) Velocity Magnitude - cm/s

SOLAR ANALYSIS

There are long hours of shadows at this site since there are tall towers beside. We try to maximise this advantage and orient the blocks to see which arrangement can obtain the most shading. Hong Kong is a hot and humid place and since the Modular Housing Units are mostly adopting metal materials for structure and facade for efficiency, the buildings can become quite hot especially during the summer time. Therefore we think that the third option which locates the nearest to the tall buildings would be the best option.

Wind-Rose
HONG KONG_SAR_CHN
1 JUN 1:00 - 31 AUG 24:00
Hourly Data: Wind Speed (m/s)
Calm for 0.00% of the time = 0 hours.
Each closed polyline shows frequency of 3.4% = 74 hours.

CIC BIM Competition 2022 - Blocks

BACK ROW HOUSES

Site Plan Level 7 Cut

CORRIDOR

Site Plan Level 2 Cut

PILOTI

Site Plan Level 1 Cut

OFFICE

Site Plan Ground Cut

RENDERINGS

R DRAWINGS

Level 6
18600

Level 5
15500

Level 4
12400

Level 3
9300

Level 2
6200

Level 1
3100

Level Ground
0

Side Elevation 1:200

CIC BIM Comptition 2022 - Units
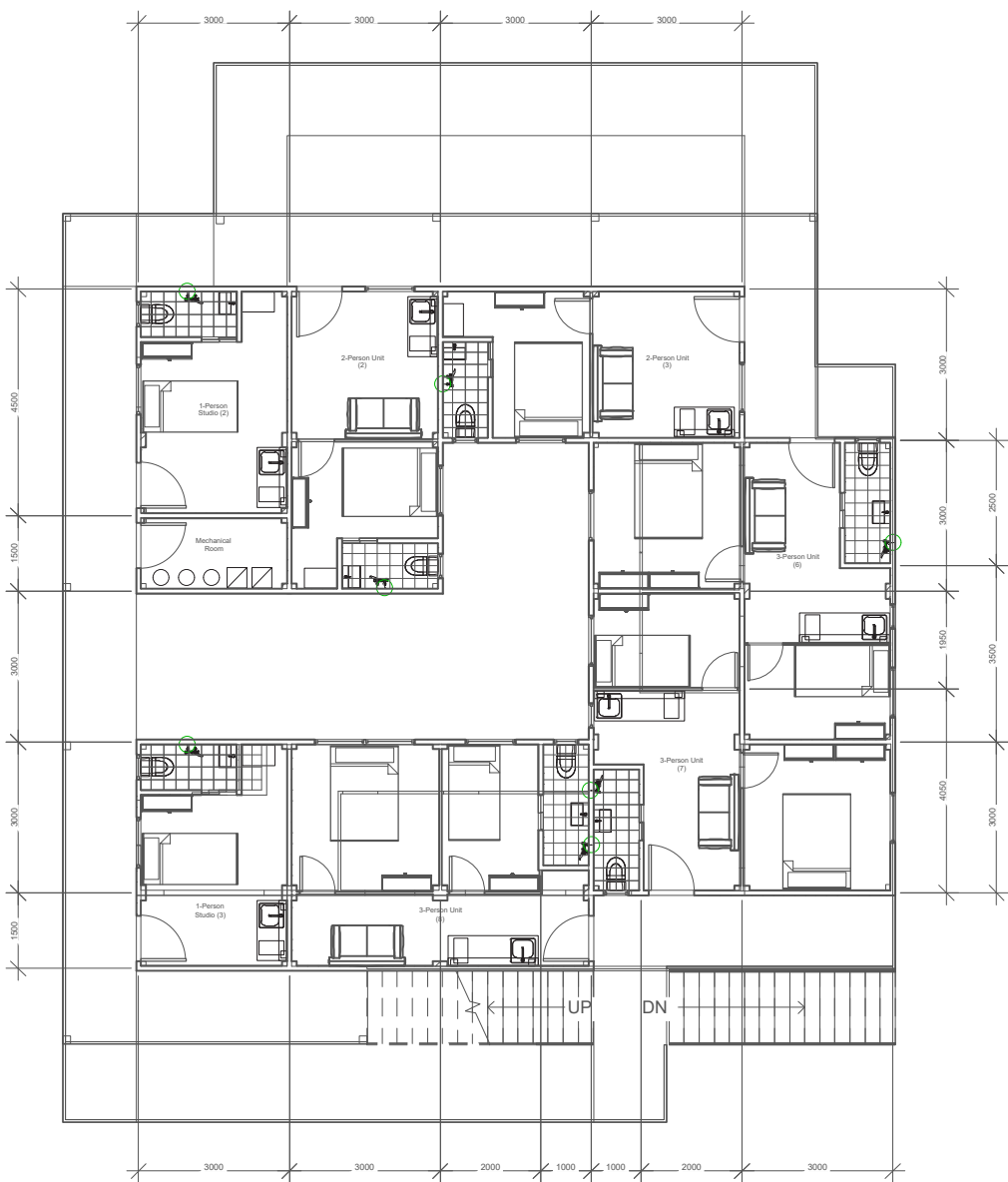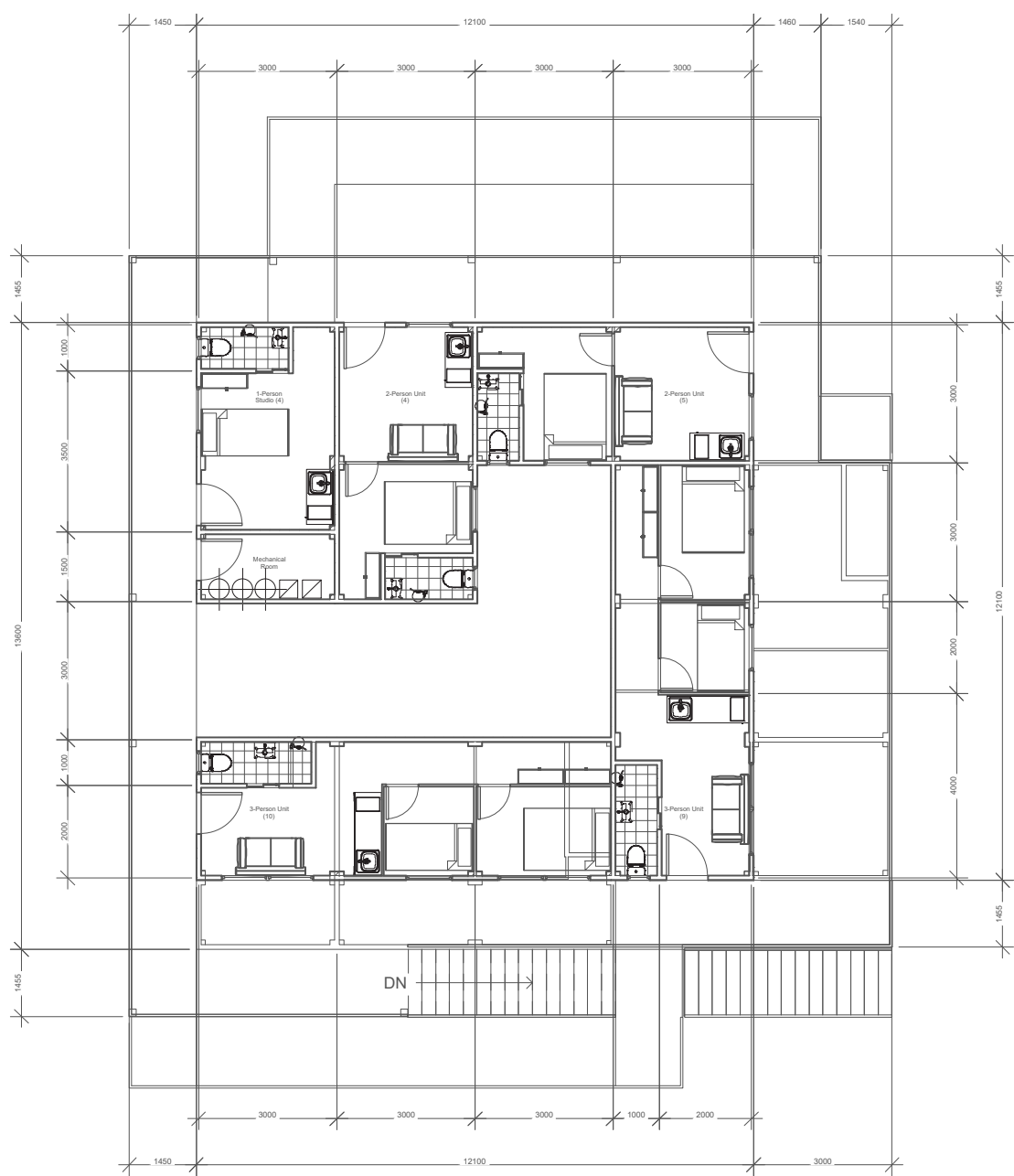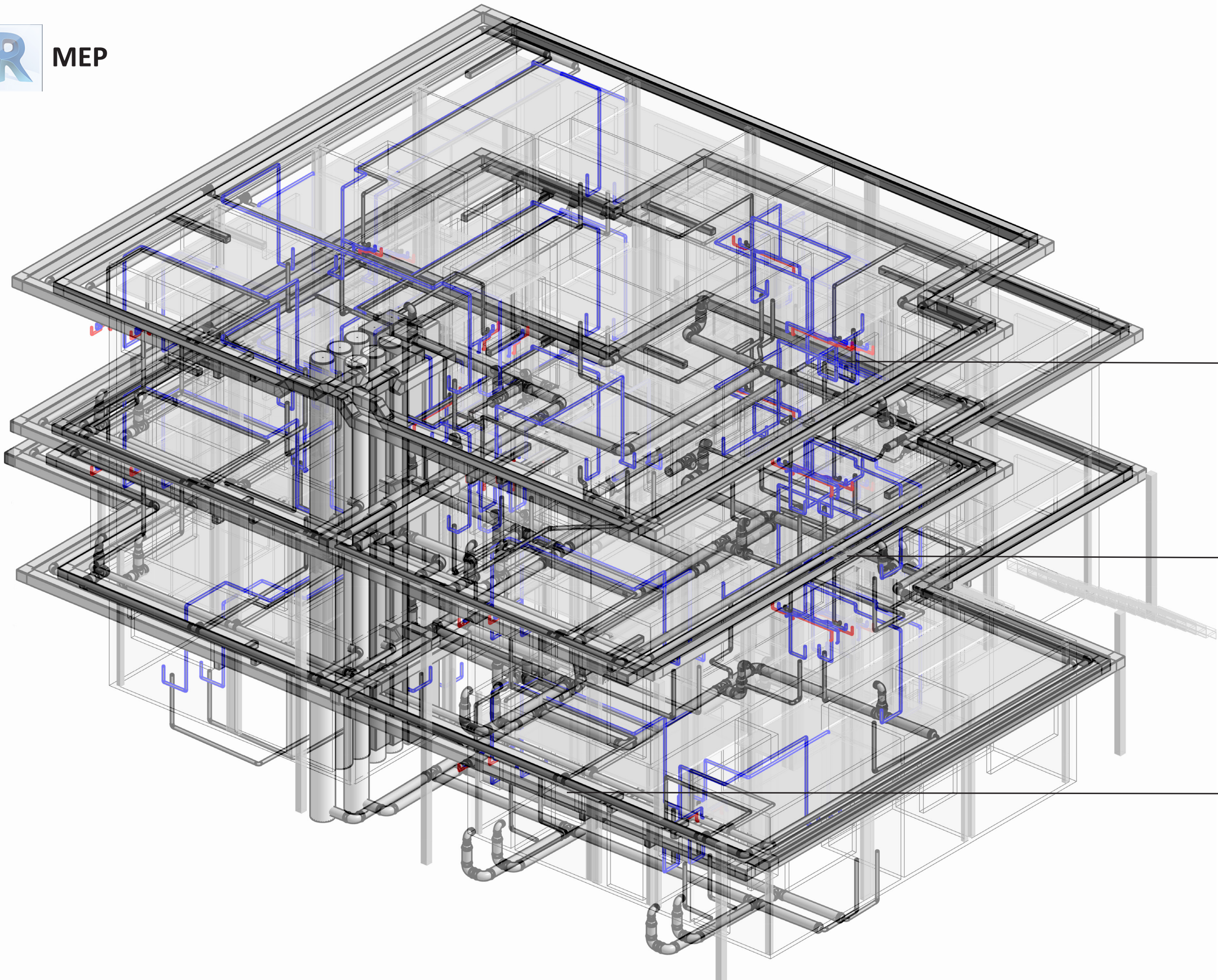

Ground Floor Plan 1:150

1st Floor Plan 1:150

2nd Floor Plan 1:150

R MEP

Various types of mechanical systems are used in transitional housing. The systems are demonstrated through MEP.

- Space heating
- Air conditioning
- Mechanical ventilation

MECHICAL

The basic use of the mechical system is to transfer liquid to the storage. Composes of the heating, cooling and ventilation.

ELECTRICITY

The electricity path for power supply of the daily appliances. Transmitted using insulated copper wire hidden in the flooring, wall cavities, and ceiling cavity of the building.

PLUMBING

Standard home plumbing typically includes mains pressure potable water, hot water (in collaboration with mechanical and/or electrical engineers), sewage, stormwater, natural gas, and rainwater collecting and storage, among other things.
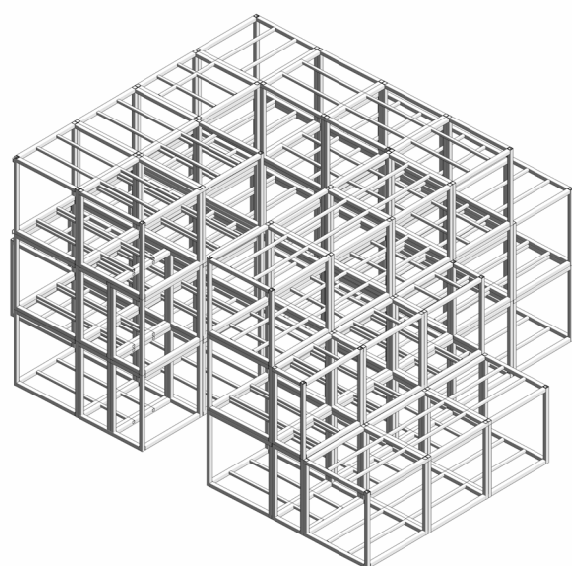
Structural Model
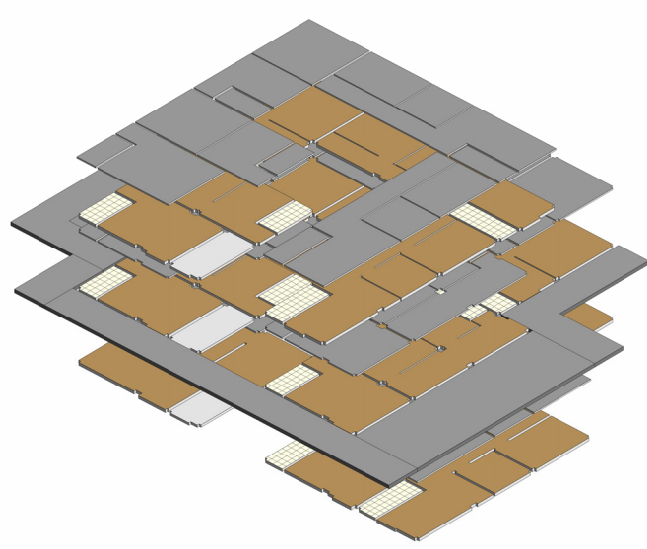
Slab Model
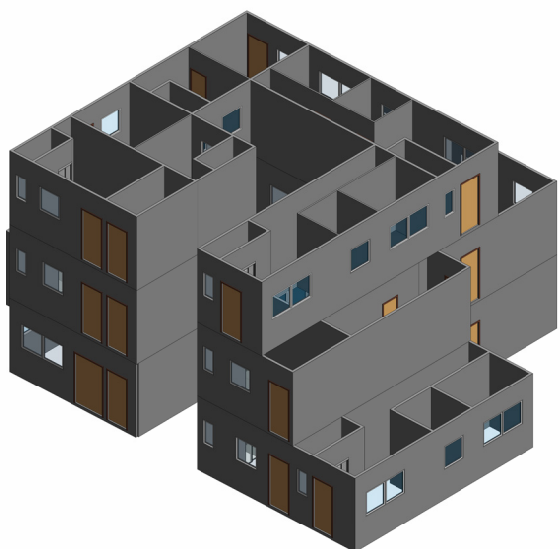
Wall and Partition Model
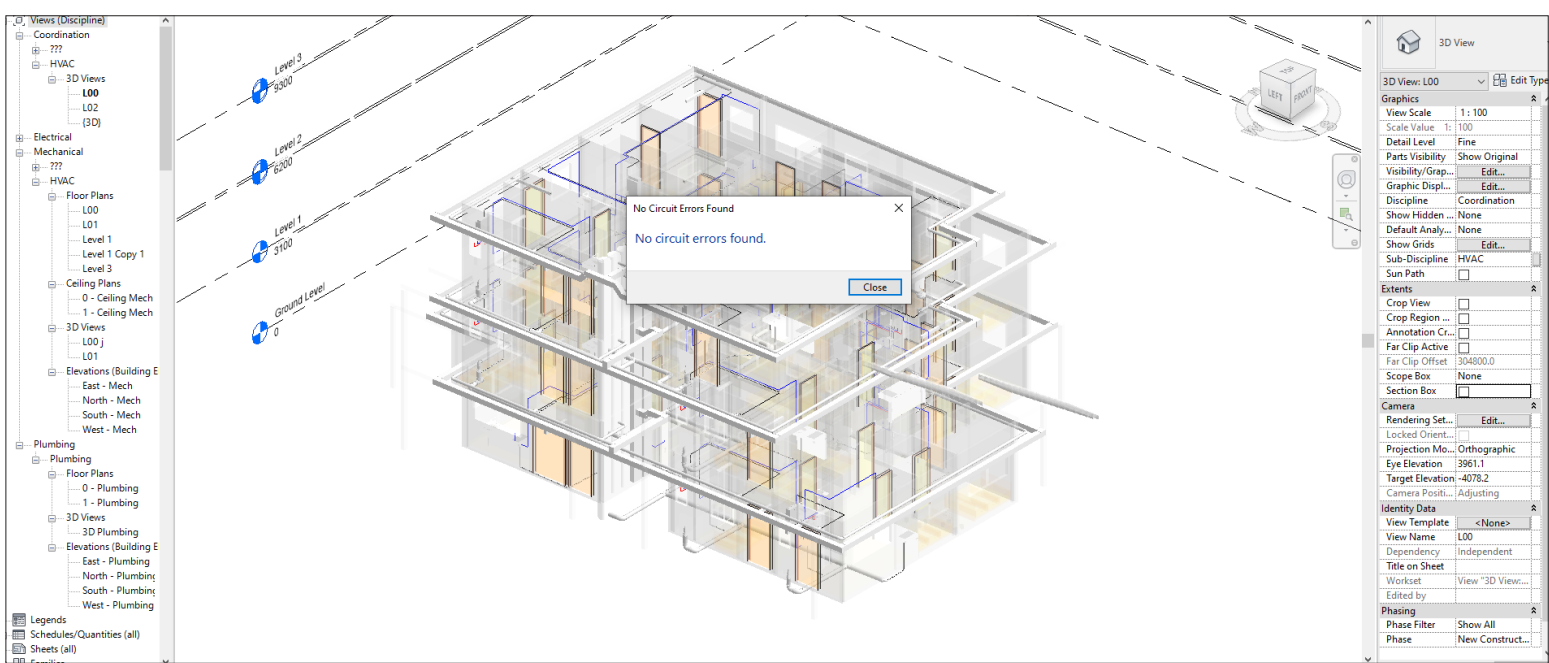
BIM modelling can allow better visualisation of the whole building in MEP. It also can allow checking of the different systems which can prevent mistakes in MEP much more effectively.

Interior Perpective from bedroom

Window from Bathroom

Atrium View from Interior Window

CIC BIM Comptition 2022
Modularity & Adaptability in Transitional Housing Design with Use of BIM

CIC BIM Comptition 2022 - Modular

UNIT FLATS

1 PERSON UNIT (A+B)
60 UNITS
13.5 M^2
-STUDIO
-OPEN KITCHEN
-BATHROOM

2 PERSON UNIT (A+C)
75 UNITS
18 M^2
-ONE BEDROOM
-OPEN KITCHEN
-BATHROOM

3 PERSON UNIT A (G,H,I)
60 UNITS
27 M^2
-2 BEDROOMS
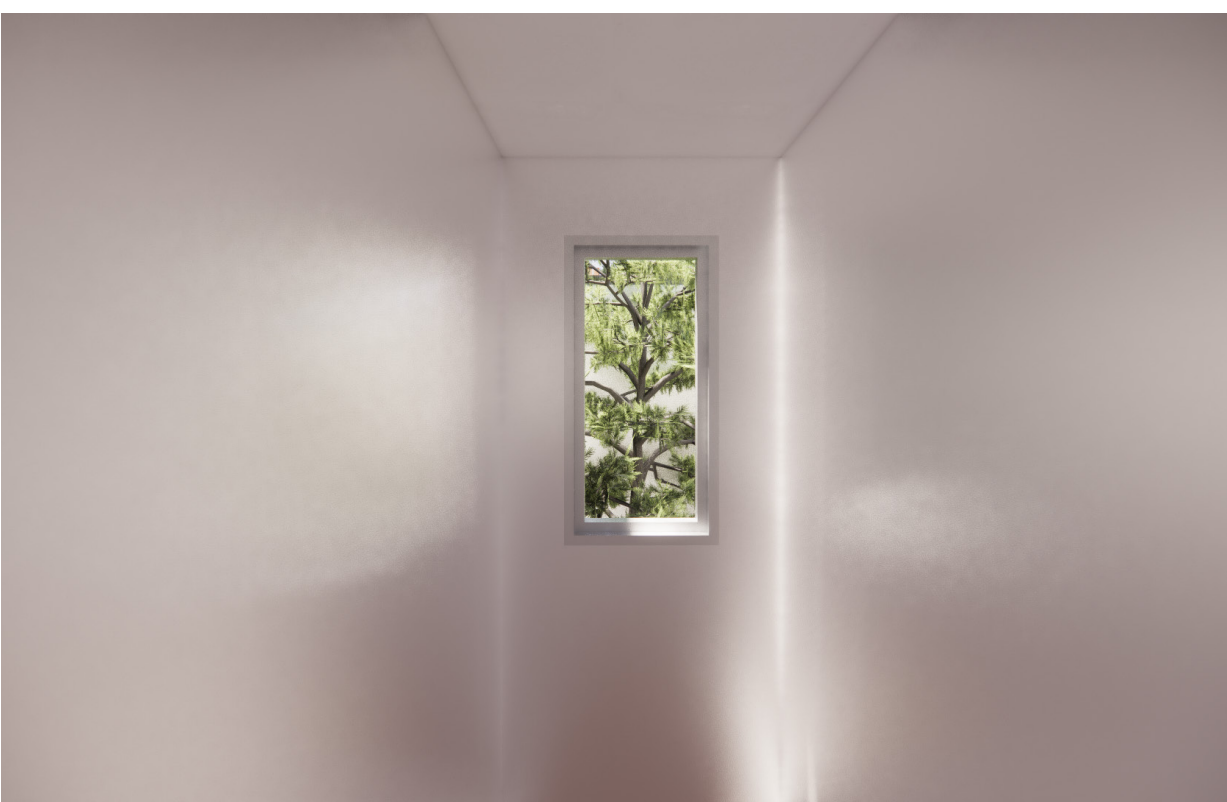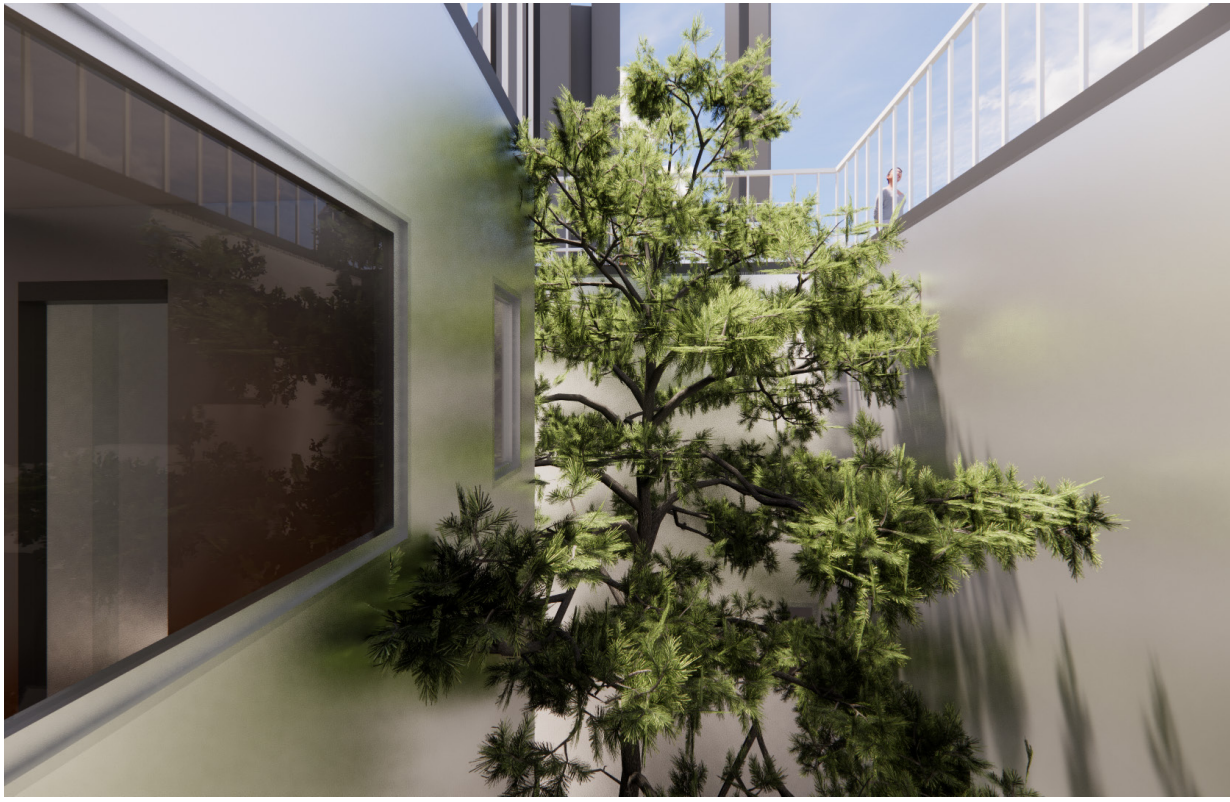-OPEN KITCHEN
-BATHROOM

3 PERSON UNIT B (B,D,E,F)
30 UNITS
27 M^2
-2 BEDROOMS
-OPEN KITCHEN
-BATHROOM

PERSON UNIT C (J,K,L)
60 UNITS
27 M^2
-2 BEDROOMS
OPEN KITCHEN
-BATHROOM

BARRIER - FREE (B,M,N,O)
15 UNITS
31.5 M^2
-BEDROOM
-OPEN KITCHEN
-BARRIER FREE BATHROOM

LOADING ANAYLSIS

FULL CUBE LOADING DISTRIBUTION

HALF CUBE LOADING DISTRIBUTION

Fig. 1 is 3m x 3m x 3m
Fig. 2 is 3m x 1.5m x 3m
s structure is the basic structure of the two types of modules. Here shows the bending moment agram done with Robot Structural.

MODULE

MODULE A

MODULE B

MODULE C

MODULE D

BLOCK E

MODULE F

MODULE G

MODULE H

MODULE I

BLOCK J

MODULE K

MODULE L

MODULE M

MODULE N

BLOCK O

KINDERGARTEN

Kindergarten with 8 classrooms with other supporting rooms

More communal facilities and children playground equipment

Provide at least 20% of site area with greenery

Open up part of the roof for recreational activities

Solar panels to generate electricity for street lighting and planting irrigation

Principal and Staff Room

Washroom

Store Room

Classroom

Music Room

Game Room

Medic and Pantry

BIM WORKFLOW

3D modelling

Real time simulation and rendering

Team collaboration in sharing files and updating the design with one another

Solar Analysis

CFD

Robot Structure
-Load Anaylsis