AMPHIBIAN ARCHIPELAGO – A SUSTAINABLE NEIGHBOURHOOD, Mumbai

A Thesis Submitted
in Partial Fulfillment for the Requirements
for the Degree of

BACHELOR OF ARCHITECTURE

in

Field of specialization(ARCHITECTURE)

by

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Under the guidance of

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to the

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BABU BANARASI DAS UNIVERSITY,

LUCKNOW

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BABU BANARASI DAS UNIVERSITY

B. Arch Thesis 2019-2020

Certificate

Name of Student: VINEET VINAY Roll no. 1150101085

Department: …Architecture……..……

Thesis Title (in capital): **AMPHIBIAN ARCHIPELAGO – A SUSTAINABLE NEIGHBOURHOOD, Mumbai**

Thesis guide: …**AR. ANSHU RASTOGI**

Remarks: Satisfactory / not Satisfactory (in case of not Satisfactory give comments):

……
……
……

Sign of Thesis Guide	**Sign of External Examiner 1**
Thesis coordinator	**Sign of External Examiner 2**
Sign of Head of Department	**Sign of Dean of School**

ACKNOWLEDGEMENT

The journey which started 5 years ago has culminated….as I step into the world a series of people flash in my memory without whose support and good will this journey wouldn't have been easy and free flowing…..

To start with. First and foremost gratitude towards almighty GOD for his blessings. Then I would like to thank all my faculty members who have supported and guided me all these memorable 5 years.

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Last but not the least all friends and love one who give their all kind of support and **Concern,Collegues**- Kaushlendra, Sandeep , Diksha

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I have put in my best of efforts and worked day and night to make this project a success .hope u too will appreciate my endeavour……

I wish to dedicate this work to my love ones…..Who are always their in my heart.

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CERTIFICATE OF THESIS SUBMISSION FOR EVALUATION

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3. Thesis title:…….**AMBHIBIAN ARCHIPELAGO – A SUSTAINABLE NEIGHBOURHOOD**

……..…
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4. Degree for which the thesis is submitted:…BACHELOR OF ARCHITECTURE……

5. Faculty of the University to which the thesis is submitted
……

6. Thesis Preparation Guide was referred to for preparing the thesis. YES ☐ NO ☐

7. Specifications regarding thesis format have been closely followed. YES ☐ NO ☐

8. The contents of the thesis have been organized based on the guidelines. YES ☐ NO ☐

9. The thesis has been prepared without resorting to plagiarism. YES ☐ NO ☐

10. All sources used have been cited appropriately. YES ☐ NO ☐

11. The thesis has not been submitted elsewhere for a degree. YES ☐ NO ☐

12. Submitted 4 spiral bound copies plus one CD. YES ☐ NO ☐

……..
Signature(s) of the Guide
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(Signature of the Candidate)
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Roll No. 1150101085

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INTRODUCTION

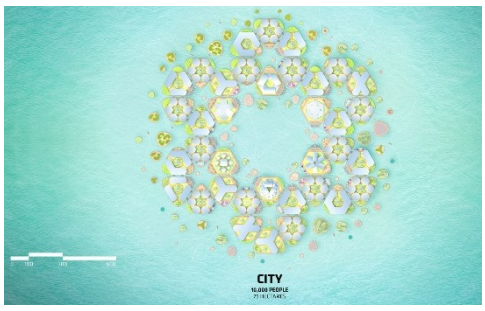
INTRODUCTION

Water – an element in nature that life is constantly surrounded by; an element that has given birth to life on Earth and continues to support it. Although we made our shift to land, our bond with water still remains significant as ever; it is an element that is a basic necessity for our survival.

The Project entitled **AMPHIBIAN ARCHIPELAGO** can be introduced as the solution to the basic requirement of today's construction related problems i.e. the availability of land on which the construction is to be started. Amphibious Architecture is cost effective and safe alternative for permanent static elevation and it is achieved by buoyant foundations. This solution will also include waterproof material and protection of vital utilities, design of buoyant foundation, vertical guidance pole attached to the foundation, which provides resistance from lateral force caused by wind and water. For centuries, the coastline has been the focus for variety of activities including industries, agriculture, recreation and fisheries. All the major cities in India have developed along the coastline.

Over the past centuries, the sea level increased nearly eight inches in the coastal area and the scientists suggest a constant increase in sea level due to climatic change. There are two major factors for sea level rise, melting of ice sheets and thermal expansion of ocean. Due to global warming, the sea water level starts rising by two to five times, as with the increase in temperature ice caps located in Antarctica and comprise about 99 percent of the world's land ice. If the Antarctic ice sheet were to completely melt, it would be roughly equivalent to a 180-foot increase.

It is predicted that by the end of 2100 the water level will rise by 22 inches worldwide. An increase of this magnitude could inundate coastal areas, erode beaches and increase coastal flooding and storm surge.



OCEANIX CITY (**BY BJARKE INGLES GROUP)**

In India, there is around 53 Km of coastal stretch that will be at the verge of being engulfed by water.
Today, the discourse of 'smart cities' has overtaken every conversation discussing the future of architecture. It is a glaring question as to how are we going to address the equation between the contrasting aspects of ecological crises and technological advancement for building our futures. This idea can be introduced as the first step to change or prepare ourselves regarding to the future aspects of the water level rise.

HISTORY & BACKGROUND

India being a peninsular country and surrounded by Arabian Sea, Bay of Bengal and Indian Ocean is quite prone to flood. As per Geological Survey of India (GSI) the major flood prone areas covers 12.5% of total country area. Idea of amphibian structure is not new but it's basically the same idea as an oil rig or large dock, only with a city built on top of it. This type of dwelling can also be used in the area comes under flood prone zone as better response to flood.

This concept is being conceptualized in Netherlands, Venice etc. and several studios are working on it like **Koen olthuis (Waterstudio), Bjarke Ingels(BIG)** are some of the world renowned architects working on the floating cities as responsive to flood.

The idea of this topic comes in my mind, when a competition called **Aquatecture** floated in 2018 in which the competition challenges the participants to create futuristic, water-based habitat for humans to prosper and thrive on this aquatic/ amphibian Home that is flood resilient. The participants are to design an aquatic/amphibian Home that can house 20 individuals with spaces to live in (sleep, rest, sanitize, work and interact).
The spaces in the program can -:
Relaxation
Interaction
Food Generation
Food Storage
Water and Energy Generation

FLOATING APARTMENT **(BY WATER STUDIO)**

Floating Urban Development Marina Oude Tonge

A 150.000 sq.mt. Water development with 170 houses and boathouses. The houses are located on island or around a small harbor. At the side are special boathouses are situated. All plots have space for mooring boats, from your house you sail directly to open water.







BY WATERSTUDIO

PROJECT BRIEF

PROJECT BRIEF

The Project entitled **AMPHIBIAN ARCHIPELAGO** is the vision of a neighborhood that will float on water and keep at rest with help of mooring technique, which is kind of basic principle of any structure that rests on water with the help of buoyancy.

PROJECT DETAILS –

1. ***Administration wing*** – designed to maintain the harmony between services and occupants with the administrative control of maintenance wing.
2. ***Amenity tower*** (mix – used building) – consist of various amenities, commercial areas and studio apartments at the top.
3. ***Low cost housing complex*** – housing with the use of cargo containers.
4. ***Luxury housing complex*** – housing designed for H.I.G.
5. ***Smart vehicle parking complex*** – parking of smart vehicles.
6. ***Normal vehicle parking complex*** – parking for normal two and four wheelers.
7. ***Primary health care facility*** – for primary medical treatment.
8. ***Primary education facility*** – for primary education.
9. ***Tourist villas*** – for visitors to stay.
10. ***Open air theatre with restaurant*** – designed fpor cultural ceremonies with multi-posture spaces.
11. ***Town plaza*** – plaza for public gathering and service market.
12. ***Office buildings*** – I.T. offices for generating the

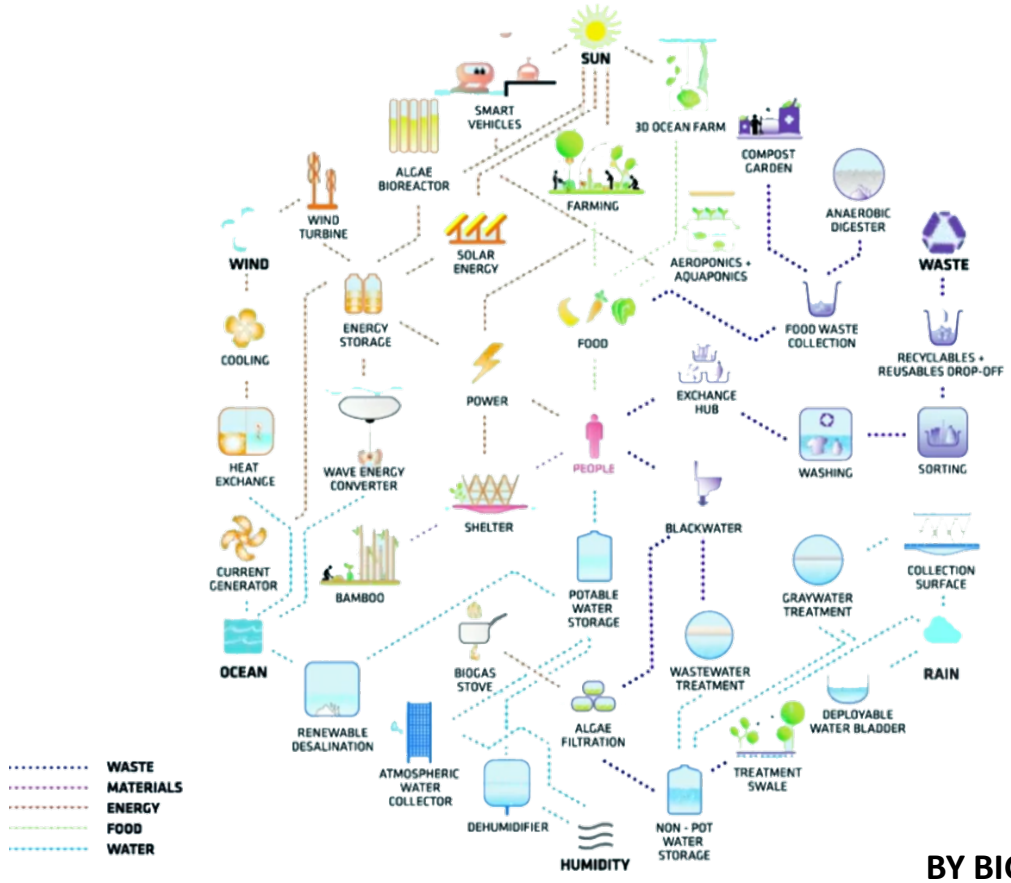
SUSTAINABLE FACTORS –

- ***Soil biotech plant***
- ***Use of recycled steel as in reinforcement and in low cost housing as cargo container units and in plaza as multifunctional sitting spaces.***
- ***Aquaponics and hydroponics.***
- ***Use of green concrete.***
- ***Use of fly ash bricks.***
- ***Water desalination plant***
- ***Mode of transport is only smart vehicles (electric vehicles) with restriction of normal vehicles in the precinct of neighborhood.***
- ***generation of electricity with the "Seagen" turbine.***
- ***Solar water heating for housing.***

BY WATERSTUDIO

SUSTAINABLE DEVELOPMENT FACTORS

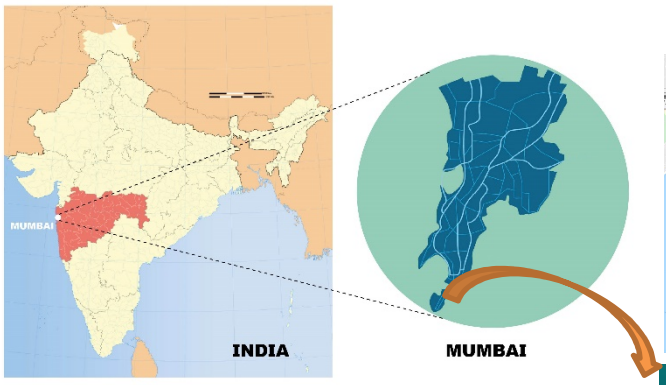
SUSTAINABLE DEVELOPMENT GOALS

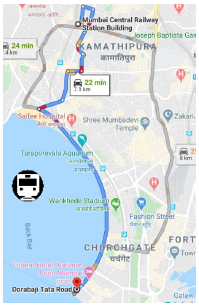


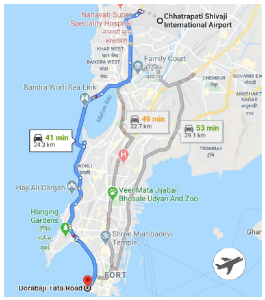
BY BIG GROUP

SITE STUDY

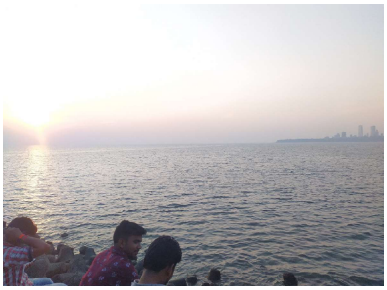
SITE APPROACH

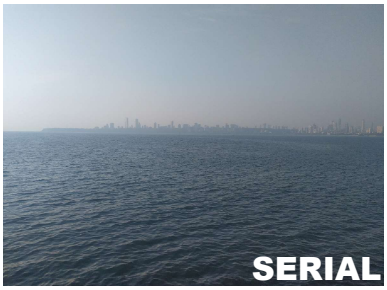


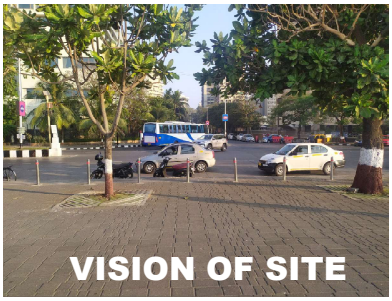


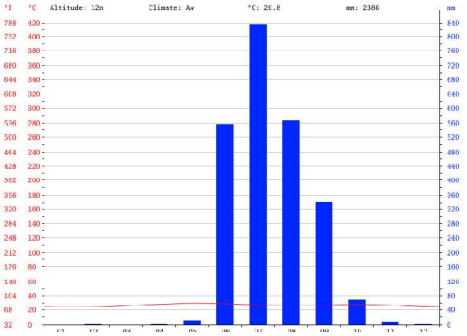


ELEVATION / ALTITUDE - 3 meters, Above Seal level.
POPULATION DENSITY - South Mumbai- 46,000/ km2
DIMENSIONS - 300 X 400 Meters.
AREA - 29.65 Acre.
SHAPE- Rectangular.
ORIENTATION - Minor side is facing north and in front of marine drive.
EXISTING AND NEARBY SERVICES -
NEAREST FIRE STATION –
Nareman point Fire Station - 5.4 Km
NEAREST SHOPPING MALL - CR2 - 4.8 Km
NEAREST LOCAL RAILWAY STATION - Bombay Church Gate Station - 1.4 Km
NEAREST ELECTRICAL SUBSTATION - 2 Km away

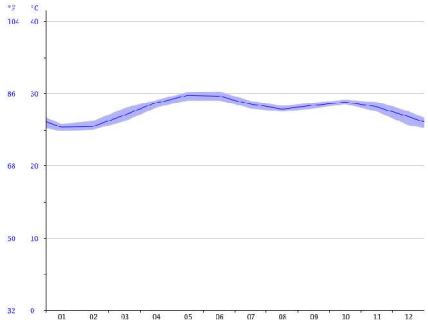




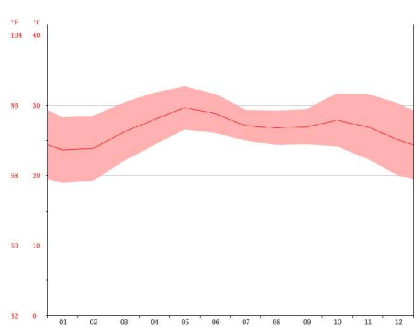




MUMBAI AVERAGE TEMP.



MUMBAI CLIMATE GRAPH



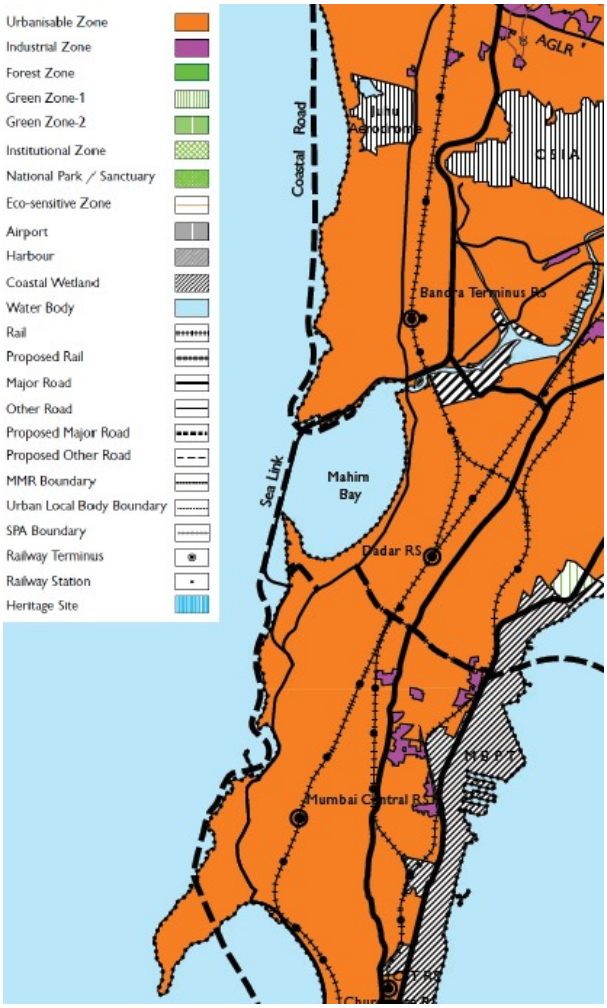
MUMBAI WATER TEMP (Arabian Sea)

The Mumbai lies on 12m above sea level Mumbai has a tropical climate. When compared with winter, the summers have much more rainfall. According to Köppen and Geiger, this climate is classified as Aw. The average annual temperature is 26.8 °C | 80.2 °F in Mumbai. In a year, the rainfall is 2386 mm

The difference in precipitation between the driest month and the wettest month is 835 mm | 33 inch. The variation in annual temperature is around 6.0 °C

LOCAL BUILDING MATERIAL AND TECHNOLOGY -

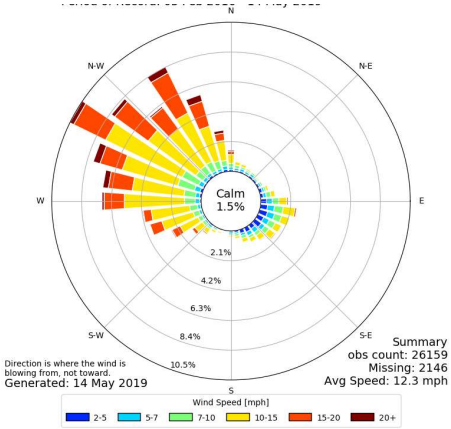
R.C.C. Construction
Fly Ash Bricks / ACC Blocks
Prefabricated structures
Steel Sections



WHY THIS SITE ?

This site is chosen because the population density is increasing with continuous growth and due to which the scarcity of land takes place. hence, we need to look forward for other dimension to live in so that we can acclimatize with the change in environment. This site is located near to marine drive

WIND MOVEMENT



STRENGTH	WEAKNESS	OPPORTUNITY	THREAT
Exploring new dimension to work on.	Primary cost is high.	To design vertical green tower.	High tides
Less carbon emission.	Quality product should be used In construction.	To design max. Pedestrian and bicycle or green ways that connect public spaces	Symmetrical loading is necessary.
scar less development because of mobile islands.	Proper sealant should be used.	To use sea water after desalination process.	Natural calamities
Wind and tidal energy generation.	Subjected to heavy wind natural load.	Design modular structures to confront the problem.	Maintaining min required weight at the floating platform to float.
Can adjust with the change in water level.	Anti rusting material should e used	Building self sustain neighborhood that eventually make cities.	To maintain the biodiversity across the islands.

LIVE STUDY - I

APPROACH PLAN

OVERVIEW

CLIENT - Magarpatta Township Development & Construction Co. Ltd.
CONSTRUCTION - Magarpatta Township Development & Construction Co. Ltd.
PRINCIPAL ARCHITECT - Prakash Deshmukh
LANDSCAPE ARCHITECT - Ravi & Varsha Gavandi
TOTAL LAND AREA - 430 acre
POPULATION - 8,000 units residents
DENSITY - 100-115 ppa
LOCATION - It is situated on national highway pune-solapur.

Pune station	7	kms
Airport	9	kms

Spread over 430 acres, Magarpatta City is an award winning and internationally acclaimed model of integrated development and self-sustainability.
A city within a city, Magarpatta City is home to a commercial zone, residential neighbourhoods, two schools, a multi speciality hospital, a shopping mall, multiple restaurants, a gymkhana and a large 25 acre serene park called Aditi Garden. All this is complemented by a verdant environment and a pollution free ambience - a supreme setting for life and business.
Through its sustainable development model, Magarpatta City has introduced eco-friendly development and has green spaces that make up for 30 per cent of the area.
The implementation of comprehensive waste management and sustainable systems ensures further preservation of the environment.
It has won accolades at the Sydney World Congress of Metropolis, 2008, and the Maharashtra EconomicDevelopment Council lists Magarpatta City among the 'Top 10 success stories of the State'.
Today, the name Magarpatta City stands for quality in construction, innovation in design and impeccable planning. It is the only fully functional and privately managed township in the country and is regarded as a remarkable reality; a reality born through immaculate vision and brilliant execution.

OBJECTIVE AND VALIDITY

The main objective behind the case study was the **SUSTAINABLE NEIGHBORHOOD DESIGN CONCEPT** of the city.
To understand the relationship between the harmony of open and built space designed for a community.
To understand the techniques for making a community sustainable.
To understand the functional connection between the personal, communal and working space.
To understand the role of recreational spaces in urban community.

The designed city is on **WALK TO WORK** concept and was adopted as the key to the design of Magarpatta city. A research on the traditional community housing typology was also carried out, and the courtyard concept was translated to the need of a large central open space for the community.
This case provides the study details of areas, services and sustainable process involved and exist in the design of the city.

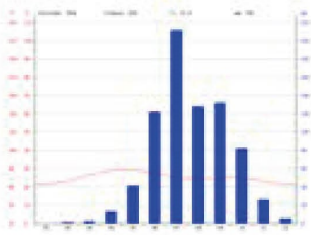
ARCHITECT'S OBJECTIVE

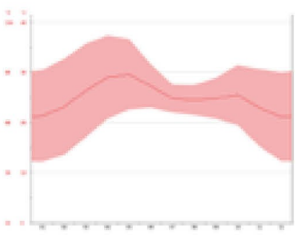
Designed by : Ar. Prakash Deshmukh
Firm name : Space Designers Pvt. Ltd.

PROJECT CONCEPT : Fast urbanization of pune city and Haphazard spread of city pune in 90's was major issue. So a group 120 families of Farmers came together with an Idea to convert agricultural land into an Innovative Township.
The objective was to design the 430 acre township like an integrated community space which is created as a green environment to conserve the nature and water, and also have a self sustainable environment.

CASE STUDY I

CLIMATE ANALYSIS





The Pune lies on 562m above sea level Pune, there is little rainfall throughout the year. . The average annual temperature in Pune is 25.0 °C.The annual rainfall is 763 mm. The difference in precipitation between the driest month and the wettest month is 211 mm. During the year, the average temp. vary by 8.5 °C.

TROPICAL CLIMATE

The driest month is January, with 0 mm of rainfall. With an avg. of 211 mm, the most precipitation falls in July.
The warmest month of the year is May, with an average temperature of 29.6 °C
December has the lowest avg. temperature of the year. It is 21.1°C

FREQUENTLY VISITING AREAS (residents)

Roads/ footpaths private/public transport+ office/ commercial spaces+ recreational / walkways in evening .

FREQUENTLY VISITING AREAS (floating population)

Roads/ footpaths by public transport/ private transport /
Office areas + shopping area+ utility areas/ cleaning area, + recreational / relative place ie. Over all. Respectively.

AREA DISTRIBUTION

Total Area : 430 acre.
Built up Area : 55% i.e 240 acre.
Total open Area : 45% i.e 190 acre.
Four entries to the site from all four direction makes a good connectivity with locality, main entry from east direction.Axis is taken radial cum grid pattern whole project divided in 4 phases
Residential at peripherry , middle ring for cyber city around the green core area to balance the mass building around.

POPULATION

Residential units : 8,000 units, 40,000 person avg.
Commercial : 12 companies+ offices and shops, 10,000 persons avg.
Major Public amenities given at phase 1 & 2 near to existing market.

NEARBY LANDMARKS

Race course	3.5 kms
Koregaon park	4.5 kms
M.G.roads	5 kms

SITE STUDY (TOPOGRAPHY, SOIL, SITE PROFILE)

The entire land is agricultural land it is a fertile virgin land with 32 bore wells.Land is gently sloping from southwest to northeast with a level difference of 12 m.
Black cotton soil- good for plantation and landscaping.
Land is gently slopping from southwest to northeast.
Almost rectangular site, site was enclosed by, further extended city road of about 24 mt.

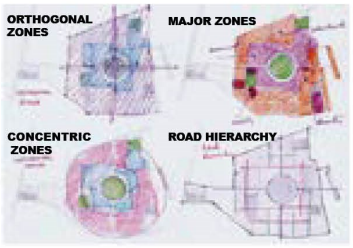
DESIGN CONCEPT

Design on concept of garden city.
The concept for Magarpatta City is a gated community i.e. Integration of work place and living place.
based on 'walk to work, school, play and entertainment' showing quite many prominent features of social,
environmental and economic sustainability.
Climate responsive : Rutu chakra concept taken for the landscaping for plants to bloom all the years.

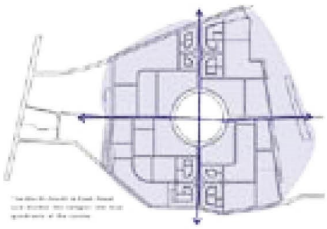
These five pillars, in the context of Magarpatta City, play a vital role in the creation and preservation of the city.Integration of these elements vis-à-vis addressing the economic, environmental and social fators has not only led to a sustainable living model but they also bringindirect benefits through revenues, social-upliftment, creating harmony with nature, etc.

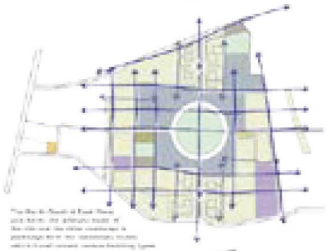
USER'S OCCUPATION

Teacher
Doctors/ medical Proffessionals
Engineers/ technical group
Management group/ Business group
Other Service Provider Group



FORM EVOLUTION FACTORS





ZONAL PLAN

LANDUSE PLAN


CYBER CITY


ROYSTONEA


DAFFODILS


COSMOS


COORPORATE OFFICE

SITE VIEW

MEGA CENTER


NOBAL HOSPITAL


GYMKHANA


PENTAGON OFFICE


MAGARPATTA CITY SCHOOL

LANDSCAPE ELEMENTS

Magarpatta city has a good water table there being 32 bore wells which is used by all the building in magarpatta and
reused for landscape.Black cotton soil is good for vegetation.existing trees retained or re-planted, artificial lake covers ½ acre out of 25 acre. Trees and plantations also for security sound and visual barrier and ide shade and as a boundry. Benches for Sittings at corners or side ways of roads paved wide footpaths to encourage pedestrian movement.Ramps are provided to reach various spaces.To define parking zone using landscape elements – bays are marked using colored sheet. Landscape elements trees or plants used for creating canopy don't shed leaves.For recreational areas restaurant- medium plantation water bodies ground covers and trees bordering the court.For exercise Zone a combination of hard (paved path) and soft (buses , trees) landscape is used to make the environment fresh and lively. Water bodies keep the atmosphere fresh.

PLANTING SCHEME

Trees

Arzadirachta indicai - neem used for shade for parking,
medicinal tree.
Butea monosperma - flame of forset- used for shade for
parking.
Cipharexylop quadranguralae
Jacaranda mimosifolia - neel gulmohor - used for shade,
colour of flora
Michelia champaca - golden yellow champa - son chafa used because fragrance of the flower.
Spathodia companulata - Tulip tree- to create road side
avenue colour of flower
Tabebuia Argentia

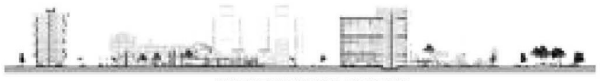
Shrubs

Eranthemum Nigrum - ebony black magic used in planting bed
Hamelia Pattensscarlet bush - fire bush used at the edge of the building.
Ixora duffii pink - ixora along the compound wall
Tabermaemontana variegated - edge of the building

Grass

Paspalum lawn – used under the big tree and bigger lawn areas.


LANDSCAPE ELEMENTS


SITE SECTION THROUGH CYBER CITY


SITE SECTION OF ERICA

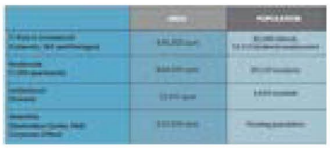
USE OF FLY-ASH BRICKS IN CONSTRUCTION

Usage of fly ash bricks helps in reduction of greenhouse gases, which are depleting the ozone layer. These bricks are better than traditional bricks, like controlling of pollution, cost, breakage, wastages, evenness, finish while manufacturing and more compressive strength. As fly ash bricks are produced mechanically they are economical, good for any type of masonry and absorb very less water.For every tonne of fly ash used in construction, approximately 1 tonne of CO2 emission in environment is reduced. Magarpatta City is set to consume 1,30,000 tonne of fly ash by the time construction is completed here, translating into a huge saving of over the same, i.e. 1,30,000 tonne of carbon emission.

BUILT AREA DISTRIBUTION	OF Total	OF built up
Residential blocks (including individual's open space) : 148 acre	37%	61.25%
Cyber city area : 44 acre	11%	18%
Public area : 24 acre Include: Gymkhana sport complex, Public school building, Primary school, Destination center, hospital building,	6%	10%
Recreational area : 24 acre,	6%	10%
Services : 1 acre	0.25%	0.75%

PRUTHVI (EARTH)

An abode for about 29,159 people.
Over 1 lakh people are provided employment (direct and indirect)
The net imperviousness of the site is restricted to 55% which is much lower than the maximum benchmark prescribed by the National Building Code.



LANDSCAPE STUDY OF MAGARPATTA CITY

In Magarpatta City, lawns are extended over 17 lakh square feet with 25,000 trees and bushes occupying 12.39 lakh square feet of area.During the design and planning stage, despite the Pune Municipal Corporation mandatory requirement for planting one tree in every 100 square meter, Magarpatta City planted one tree for every 80 square meter area.This resulted in the well-designed Aditi Garden, recreating the experience of a mini forest within the city.
Magarpatta city aims to provide a lush green pollution free environment along with technologies education recreation and better living condition.The environment has been given the utmost priority in magarpatta city with 3200 trees, 20 lakh sqft lawn over 10,000 shrubs and bushes and punes largest mist foundation.
Used landscape elements require less water and grow well without requiring excessive care and maintenance. Many of these species such are as : **Azadirachta indica (Neem), Ficus religosa (Peepal), Alstonia scholaris (Saptaparni), Syzigium cuminii (Jamun) and Eucalyptus globulus (Nilgiri)** are known for their air purification properties.
Some of these species are also known for carbon capture and storage, Species such as **Tectona grandis (Saagwan), Eucalyptus globulus (Nilgiri), Prosopis juliflora (Shami) and Azadirachta indica (Neem)** are known to have a high carbon absorption potential (~1.5 to 2.5 lakh tonnes of carbon dioxide in their lifetime), therefore they have been planted in large numbers. 78% of the open spaces is pervious using soft-scape such as lawns and natural ground cover, soft pavements or
open pavements.

Flowering trees such as **Cassia, Canon Ball Tree, Crape Myrtle, Coral Tree and Golden Champa** having different flowering seasons mark the "**Rutu Chakra**" or the seasonal cycle breaking the monotony of the landscape and further strengthening the bond between mankind and
nature.

VAYU (AIR)

A total of 25,000 trees comprising of more than 173 species were planted in Magarpatta City.
$PM_{2.5}$ levels within Magarpatta City vary from 20 to 40 micrograms/m^3
well below the permissible limit of 60 micrograms/m^3.
18,000 people using Magarpatta City zip (shared bus service) reducing traffic and parking issues along with reducing 16 metric tonnes of CO_2 emissions in a year.
NOx levels vary from 27 to 42 micrograms/m^3as against the limits of 80 micrograms/m^3 .Average noise level reduction of 7.5 dB due to thick vegetation cover.
Today there are 17,898 people using City Zip. Together, these 80 buses are able to substitute 2,400 cars from the road of Pune, thereby reducing 16 metric tonnes of CO_2 emissions in a year.

JAL (WATER)

Rain water harvesting system is operational with a capacity of 11375 m^3. 6 lakh/day litres of water savings due to drip irrigation. 2/3rd of the total treated water is being reused for irrigation and other purposes. OUT OF THE TOTAL MUNICIPAL SUPPLY:
70 % is utilized in residential while the rest 30% is for commercial purposes.70% of the total water used is being fed into the STP for the treatment. 90% of the above water gets treated.
Out of which, 66% is used for irrigation and the rest for other purposes.

CENTRALISED WATER DISTRIBUTION SYSTEM

The centralised water distribution system comprises of one
Ground Storage Reservoir (GSR) & two **Elevated Storage Reservoir tanks (ESR)**.Water is pumped from GSR into ESR Tank
No. 2 & from ESR Tank No. 2, it goes to overhead tanks of each buildings by gravity. The ESR Tank No. 1 is for storing the treated sewage water which is utilised for irrigation and other purposes by gravity.
This helps to reduce the pumping cost for irrigation
also.

SITE PLAN

SOLAR POWER GENERATION

More than 7,000 solar water heater system in Magarpatta City supply hot water to the residents. Magarpatta City's
solar water heating system is Asia's largest solar system run by a singleorganisation. The solar system is installed on the terrace of all apartments, buildings, row houses and bungalows. The system is designed in such a way so as to blend it with gardens and landscapes of the project and personify the complex projected as Oxygen Zone by Magarpatta City.

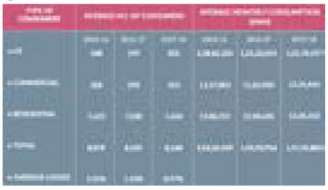
SEWAGE TREATMENT PLANT

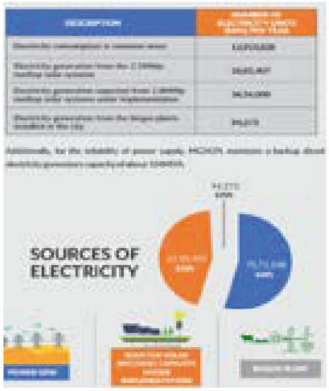
There are four sewage treatment plants which treat 4.5 million litres waste water. Treated water is recycled for gardening and cooling towers within Magarpatta City. before the township was established, Magarpatta City had 8 wells to irrigate the land. The rain water harvesting systems are designed to recharge these wells. Some part of the collected rain water is stored in artificial lake at Aditi Garden, with themajor quantity of collected rain water is injected into the 375 recharging bore wells.
Solar water system in Magarpatta City has the potential to save 48,000 units of electricity per day and 12,000 tonnes of carbon dioxide emission a year. Affirmative response by the Pune Municipal Corporation (PMC) gives total 10% rebate on property tax to the residents of the Magarpatta City. This includes 5% for solar waterheating and remaining 5% for solid waste management.

AGNI(FIRE)

POWER CONSUMPTION IN MAGARPATTA CITY

The internal power distribution network for Magarpatta City is managed at 11 kV through a network of four sub-stations.
The complete internal power distribution is through underground XLPE insulated, round wired armoured cables.
The 11kV power is stepped down to 415V level using the number of 630 kVA distribution transformers at various neighbourhoods.





LEGENDS

1. **ADITI GARDEN -** 25 acre
2. **CYBERCITY 4** - Floor plate/ Tower - 40,000 sqft.
3. **LABURNUM PARK** - 56250 sq. m
4. **RYSTONEA** - 45,000 sq.m approx
5. **DAFODILS**
6. **COSMOS**
7. **ERICA**
8. **MEGACENTRE**
9. **SCHOOL** - Plot Area = 27,000 sq.mt
   Built up = 9 ,000 sq.mt
10. **GREVILLA**
11. **IRIS** - 37625 sq. m
12. **PENTAGON**
13. **JASMINIUM** - 89, 800 sq.m approx
14. **CYBERCITY 2** - Floor plate/ Tower - 40,000 sqft.
15. **CYBERCITY 1** - Floor plate/ Tower - 40,000 sqft.
16. **SEZ**
17. **TRILLIUM**
18. **SYLVANIA**
19. **MALL** - Site Area : 50,189 square metres

Total Retail Gross Floor Area : 60,900 square metres
Total builtup : 207,000m²

(Plot Area = 1,86,000 sq.m 46 acres approx for total cyber city [12 towers].)


24 MT . WIDE ROAD


SOUTH ENTRY


ENTRANCE LANDSCAPE


JOGGING TRACK


INTERNAL ROAD WITH PLANTATIONS


SIGNAGES


MIST FOUNTAIN


CENTRAL RECREATION SPACE

GARBAGE DISPIOSAL

Eco-friendly practice of segregation of over 400 tonnes of household and commercial garbage, trash and waste per month is done at source of which 280 tonnes of biodegradable waste is used for vermi-culture and bio-compost. Over 120 tonnes non-biodegradable waste is recycled in a way not hazardous to nature, disposed off safely and the re-usable scrap is sold.

BIOGAS PLANT

Magarpatta City has a 8-ton capacity bio-gas plant, where bio-degradable waste goes through a process to generate biogas. The biogas is used to generate power to operate a major percentage of street lights. Presently, this biogas per day generates 400-450 cubic meter gas, which is converted into over 270 units of electricity. The amount of biogas generated is equivalent to 20 LPG cylinders of 14 kilograms capacity per day.

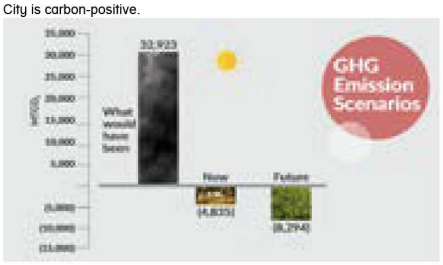
AKASH (SKY)

SOLAR WATER HEATING

The current installed capacity of the solar water heaters is more than 10 lakh liter per day of hot water with a collector area of more than 16,000 square meters spread over 273 buildings in the township.These systems help replace electricity consumption to the tune of 16 million kWh annually thereby reducing more than 13,500 tonnes per year carbon emissions equivalent.

CARBON FOOTPRINT

As compared to 32,923 MTCOe in the business as usual scenario, in the reporting period, Magarpatta 2City's carbon footprint reveals that the City is carbon-positive.



RESIDENTIAL ZONE

Total area: 148 acre
11 Type Residential blocks
There are 28 neighborhoods planned in the different phases of the city. And the 11 options of residential buildings, with different specification.

MEGACENTER

Plot area : 4 acre
floors : 11
The internal Amenity Center of Magarpatta City consist of block land scape,Facility offers space, Shops,food courts and leisure activities..
Well spread out space 5.25 lakh sq.ft.
Parking space for 800 cars and 1000, 2-wheelers.
A total of 5 floors of modern Office space, Banking and 24-hr ATM facilities.
8 lifts, 10 no. capacity.
4 - Theme cafeterias and restaurants,Food courts and Other entertainment spots.
Facilities like Full power back up with ample parking ensure that your business never takes on the back seat.
Frames, fenestration and building massing gives, modern look.

RECREATIONAL SPACES

Aditi Gardens
deccan Harvest reastaurent + three small platform forming informal open activity areas + open air theater at west- south of the site.For appx.8000 ppl.
Individual blocks have own recreational spaces like,Play areas, court/ lawns, pools. Common gym includes health care activities and sports etc.

Shopping areas
food plazas reastaurents in destination point and in mega center theam reastaurents and other activities are the good means of entertainment .

GYMKHANA COMPLEX

It includes : swimming pool giving beautiful look from entrance and even the upper floors .
1st floor : Pantry and snacks counter in waiting lounge + offices +gym + changing rooms with separate way to the court of pool / shower area, store room and
tennis court , Vollyball, basket ball court entance seperately,
2nd floor : Meditation+ parlours, childrens section.


MAGARPATTA CITY PUBLIC SCHOOL

Area : 4 acre
'The Magarpatta City Public School' - an English medium ICSE Board School managed by the well-known Vidya Pratisthan Trust.Play area with swings, sculptures lawn and open central court and classes placed around.School is given exterior of exposed plaster and brick work the massive building seen to merge with the nature.

NOBAL HOSPITAL

Nobal Hospital is at main road pune solapur, It is for 250 beds.

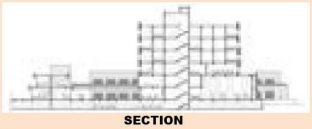
COMMERCIAL SECTOR

All the IT tower- commercial Zone is planned around the central Open ADITI Garden. It is away from the residential and school buildings hence does not cause a disturbanceModern technology has been used – glass cladding, post tensioned slabs thus giving it a competitive look. There are 12 buildings with 7 floors each.Separate smoking zone are created and smoking is not allowed on the footpaths.


BASEMENT FLOOR PLAN


GROUND FLOOR PLAN


SECOND FLOOR PLAN


SECTION

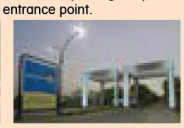

ELEVATION


INTERNAL VIEWS

PARKING & TRANSPORTATION

Public transportation like taxies or buses are not having any separate track. Each building block are given separate parking area , Most of the parking is in the basements. Separated in – out basement parking ramps with slope1: 10 taken from the entrance point.


9 MT. WIDE INTERNAL ROAD

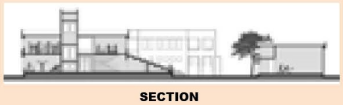

18 MT. WIDE INTERNAL ROAD


INTERNAL ROADS WITH PLANTATIONS


MIST FOUNTAIN AT THE MAIN ENTRANCE


FIRST FLOOR PLAN


GROUND FLOOR PLAN


SECTION

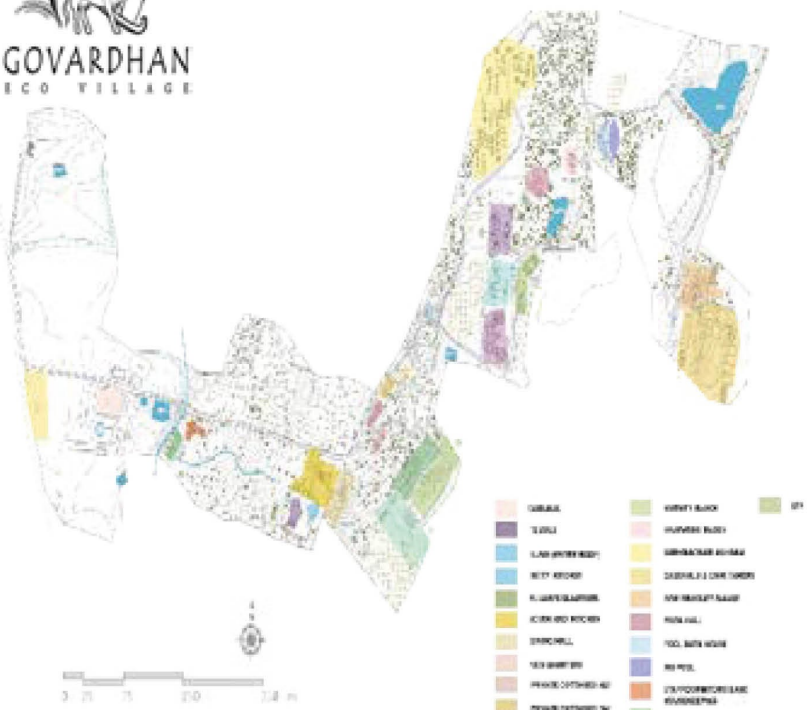
SECURITY

Round the clock cenetralized security systems entry by security clearance. Magarpatta is walled city with fortified gates & guarded entrances. The city is intensively patrolled day & night by security persons. Town level ZED security with walkie-talkie & computer surveilance. Individual watchmen for each complex, Intercom facility in each house.

LIVE STUDY - II

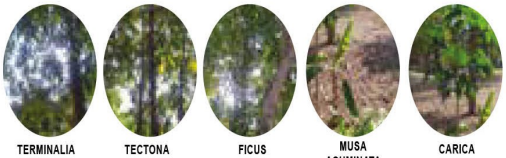
MASTER PLAN OF GOVARDHAN ECO VILLAGE

GOVARDHAN
ECO VILLAGE



OVERVIEW

Location : Galtre, wada Thane, Maharashtra
Land : 100 acres
Total built up area : 2400.65 sq. mt.
Climate : Wet and dry climate
Energy consumption reduction :57% reduction in energy consumption compared to Griha benchmark.
Energy performance index (EPI): 37.5 KWH/m²/year
Renewable energy rated capacity of solar PV installed on site is 39 kw.
GRIHA provisional rating: 5 star
Year of completion : 2012
Architect team : Biome environmental solution , Bangalore.
Footfall : 500 avg. (Peak 6000-10000)



TERMINALIA CRENULATA | TECTONA GRANDIS | FICUS RACEMOSA | MUSA ACUMINATA | CARICA PAPAYA

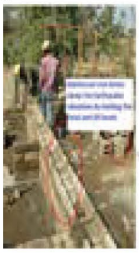
TREES TYPOLOGY

OBJECTIVE AND VALIDITY

Preserve existing Vegetation or plant new tree as per GRIHA Norms.
Proper timing of Construction with respect to rains, Start after Monsoon and finish before next Monsoon.
Confine Construction Activity to only few select parts of the Campus.
Erosion and sedimentation control.
Preserve topsoil and use it for Raised Bed Agriculture Waste segregation, recycle and reuse.

ARCHITECT'S OBJECTIVE

Designed by : Ar. Chitra Vishwanath, Sharath Nayak, Anshu Ahuja, Surabhi Pandurangi
Structural Designer : Professor Yogananda / Pramod A.V / Ravindranath Bontadka
Firm name : Biome environmental solution , Bangalore.
PROJECT CONCEPT : Govardhan Eco Village (GEV) is a humble attempt to highlight the importance of living in harmony with nature and using he gifts that Nature and God have bestowed upon us to serve the society by setting up a model farm community. Our aim is to create aesthetical and comfortable structures for the residents and guests, while not breaking the harmony with nature and our immediate surroundings.
Farming is the central activity of GEV. All other activities are planned around organicfarming. Every activity has an output which directly contributes towards this farming.



DESIGN CONCEPT

It is based on the Vedic principle of living.
In the ancient past, in Vedic times, life was focused on service to the world and its inhabitants - both human and animal – not their exploitation.
This was the essence to leading a healthy and sustainable lifestyle.
With this positive attitude of nurture and Service, GEV showcases this profound principle of 'simple living high thinking', and its relevance in today's world.
Sriela Prabhupada, the Founder-Acharya of the International society for Krishna Consciousness (ISKCON), frequently encouraged his disciples to adhere to this principle by developing farm communities for healthful and ecological living.

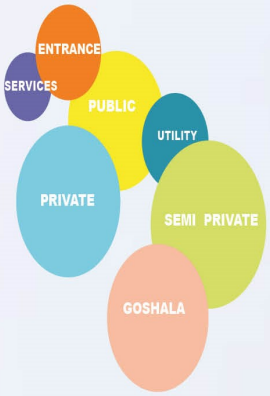
CONFORMANCE TO GRIHA CERTIFICATION:

To comply with the GRIHA norms the following considerationshave to be fulfilled:
Preserve and protect the landscape during construction.
Proper topsoil laying, stabilization of the soil, and maintenance of adequate fertility of the soil.
Reduce air pollution during construction.
Reduce landscape water requirement.
Reduce building water use by applying low-flow fixtures.
Optimize building design to reduce the conventional energy demand.
Optimize the energy performance of the building within specified comfort limits.
Renewable energy utilization.
Renewable-energy-based water heating system.
Waste-water treatment using SBT.
Water recycle and reuse.
Reduction in waste during construction.
Resource recovery from waste.
Minimize ozone-depleting substances.
Minimize the disruption of the natural ecosystem.
Meet minimum allowable luminous efficiancy.
Minimize road and pedestrian length by appropriate planning.
To protect the health of construction workers and prevent pollution.
Reduce volume, weight, and time of construction by adopting an efficient technology.
Use low-energy material in the interiors.

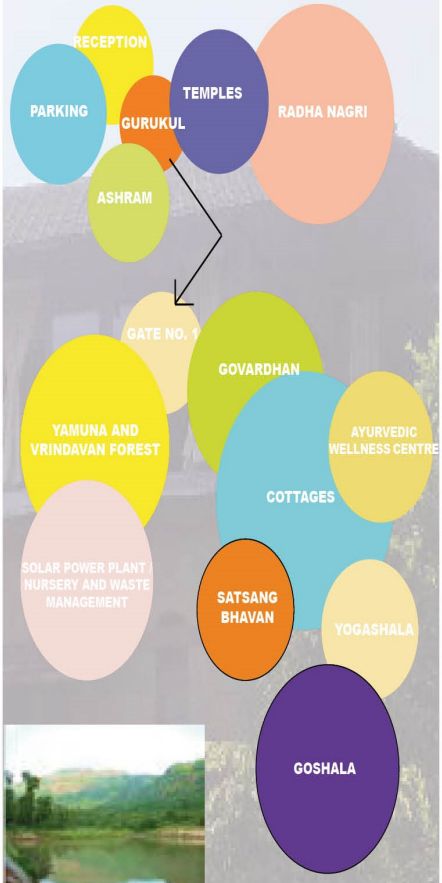
SIGNAGES

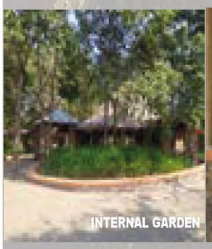
COTTAGES

ZONAL DISTRIBUTION



AREAS DISTRIBUTION



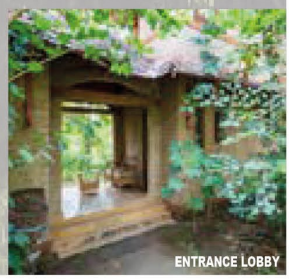


INTERNAL GARDEN

SATSANG BHAVAN

PYROLYSIS PLANT

COTTAGE



ENTRANCE LOBBY

SERVICES

WATER SUPPLY

Need
the average water requirement for the Govardhan eco-village is projected to about 1 Lakh litres per day.Previously, the water requirement for the eco-village was met by extracting water from the Vaitarna river and supplemented by groundwater. However, this is not viable in the long run.

Future
A 1 Crore ltr pond was recently excavated at the location suggested by the survey, at present the capacity is gradually being utilised with an aim to reach full capacity during the monsoons.
With the 1 Crore litre pond the greenery around it has increased very much. Biodiversity of the region has been observed to be increasing.

ALTERNATIVE ENERGY RESOURCES

SOLAR ENERGY

GEV has exposure to sunlight for most part of the year and management identified certain unusable open areas to install panels to harness solar energy.

Feature	Value
Capacity of our Solar Plant during daytime (Rem 6pm)	20 KW during Day. All the energy requirements of the farm are met through Solar Power
Battery Backup	1.2KAH
Capacity of our Solar Plant at night	3KW, 8 hours
Output of Solar Water Heaters	100 ltr at 60-70C

WASTE MANAGEMENT

Ample availability of Food Waste: They have a potential of providing about **1.5 tons/ day** of vegetable waste and left over food.
Organic Manure: The left over slurry, after the removal of biogas, acts as excellent organic manure in a very easily dispensable form. Since in GEV we have a "zero chemical" agricultural policy, this slurry is fulfilling the role of other expensiveorganic manures.

BIO GAS ENERGY

Biomass is a renewable energy resource derived from the carbonaceous waste of various human and natural activities. Biomass does not add carbon dioxide to the atmosphere as it absorbs the same amount of carbon in growing as it releases when consumed as a fuel.
During this process, some organic compounds are converted to methane (CH4) and carbon dioxide (CO2) gases. This mixture of gases is known as **biogas**. The composition of biogas is 50 to 75 per cent CH4 and 25 to 45 per cent CO2. Like natural gas, biogas can also be used as a fuel in power generators, engines, boilers and burners.
We made necessary modifications to the existing biogas plant so that it could generate about **60-70 cu.m** of biogas with the existing set up. The following innovative changes were made in the existing setup to attain the goal:
1. A 5 HP pulverizer to crush the food waste before feeding.
2. A **30 cu.m** biogas balloon to store the additional gas.
3. A 2 HP biogas blower to supply gas to kitchen at a high pressure.
4. A ramp was constructed for the vehicle to climb and dispose the waste.

Plant	Source of biomass	Capacity
Floating dome type	cow dung from Cow Shed	30 cu.m
Fixed dome	Food waste from HFL	9 cu.m

Output	Values
Irrigation water generated/ day	20,000-30,000 ltr/day. This also saves Rs.35000 Approx. per annum.
Bio-fertilizer produced in SBT	2 Metric Tons/annum

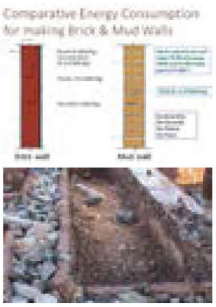
chemical additives and biological cultures are also included in the process in order to renovate the wastewater to the desired quality.
The process by design integrates with the natural bio-geochemical cycles of nature. Purification takes place by **adsorption, filtration and biological reaction**. The process operates in aerobic mode; thus eliminating possibility of foul odour. The processed water can be reused in gardening, agriculture and support marine life.
The capacity of the SBT system is 30 KLD and operates in an 8hr/day cycle.

Zoned Construction: Construction activity was not allowed to spread all throughout the campus. It was restricted to only some areas with all the brick production units strategically placed near those areas to minimize transportation.

FOUNDATION
Pcc with stabilized mud.
Stone masonry with stabilized mud mortar
Concrete short pole.

WALL: stabilized mud block
MUD - 45%
Quarry dust - 45%
Lime - 3%
Cement - 7%

FOUNDATION
Stone masonry with stabilized mud Mortar and Concrete short pole (as bond stone). Smart Sourcing : To reduce the overall Carbonfootprint, 90% of the materials were sourced from within 100 Kms radius of our facaility.



	CONVENTIONAL BRICK	CSEB
Fundamental process	Made by burning clay in kilns. Consumes a lot of wood and causes pollution.	Made by Compressing a combination of mud, stone dust and lime.
Stabilization	Stabilization is achieved by burning the brick.	Stabilizing is achieved by adding 5-10% cement
Mortar	1 cement : 6 sand	1 cement : 1 sand : 4 stone dust
Wall finishing	Needs plastering & painting.	Plastering painting are not required. Pointing is done to fill in the cavities b/w the brick layers.
Energy Consumption	22.3 mj/kg	0.275 mj/kg
Strength	40 kg/cm2	85 kg/cm2
Cost (Finished Wall)	Rs.647/m3	Rs.568/m3
Size Variation	10-25 mm	0-2 mm
Variation in shape	Only 1 Shape	8 possible shapes.

SOIL BIO TECHNOLOGY

The SBT system consists of an impervious containment and incorporates soil, formulated granular filter media, select culture of macro organisms such as earthworms and plants. Combined grey and black water from GEV cottages are collected and transported via underground sewage network to a central collection point.**Primary treatment unit:** The physical separation is accomplished in primary treatment unit consisting of **Equalization tank**, perforated screen and **gravity settling tank**. The Secondary treatment: is combination of physio-chemical and biological processes in an engineered ecosystem. In this unit waste water is processed in an ecosystem consisting of soil, **bacterial culture** and **geophagus earthworm**, mineral additives and select plants. Formulated natural mineral additives and biological cultures are also included in the process in order to renovate the wastewater to the desired quality.
The process by design integrates with the natural bio-geochemical cycles of nature. Purification takes place by **adsorption, filtration and biological reaction**. The process operates in aerobic mode; thus eliminating possibility of foul odour. The processed water can be reused in gardening, agriculture and support marine life.
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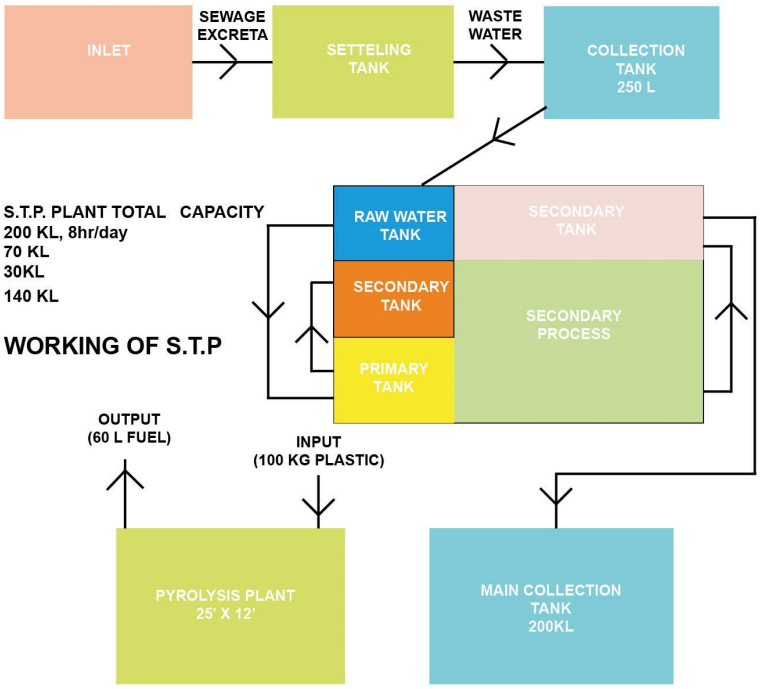


O.H.T. Capacity - 2,00,000 l
100 % of treated water is being reused in horticulture. The revenue from horticulture comes to Rs. 1.5 Lakh p.a.
Electricity requirement - 750 KW BY PMC
Solar Panels - 100 KW
No. of rooms available in village = 150
No. of people living in the village = 280
Water distribution by O.H.T. of capacity 2,00,000 l to all over the village and cottages having seperate individual tanks according to the users. while the O.H.T. is being filled by the water body present at the precinct.
For Air Conditioning, each and every cottage is provided with a seperate slit or window a.c. ranging from 1.5 to 2.5 tonn.


INLET TANK


SETTELING TANK


COLLECTION TANK


RAW WATER TANK / FILTERATION TANK


MAIN COLLECTION TANK

DEAD STUDY - I

GoodEarth
building sustainable communities

MALHAR FOOTPRINTS

PROJECT OVERVIEW

Good Earth Malhar Footprints is a 7.5 acres Residential community development as partof the 50 acres Eco village located 1.5km off Mysore road, near Kengeri town. Thecoordinate of the place is 12.88 N, 77.46 E with an altitude of 931m above sea level. It is located 27km from Bangalore and
experiences moderate climate as per NBC 2005 definitions.

Project name : Good Earth Malhar Footprints
Year of construction : Sep 2011 – Sep 2014
Location & Address : Kengeri, Bangalore
Climate (as per NBC) : Moderate
Site area : 7.5 acres
Architect : Good Earth
Contractor : Good Earth
Developer : Good Earth
MEP Consultant : Good Earth
Energy consultant : Good Earth

Total Cost of Construction : Rs. 2000/sq.ft (2014)
Construction Cost of units : Between 25.6 to 51.3 lakhs (Excludes
land cost and profit of developer
Total Built up Area (Sq. mts) : 17966.17 sq.m (193316 sq.ft)
Total site area (sq. mts.) : 30351 sq.m (7.5 acres)
No of dwelling units : 96 units
Typology of development : Cluster homes- G+1 homes
Dwelling density : 12.9 units/acre

Green technologies/features incorporated : Rain water harvesting, Ground water recharge, Waste Water Treatment and reuse, Solid waste management, Green Construction practices, integrating craft into the design, Use of local materials, Biodiversity and use of indigenous species in landscape, preserving top soil and ecology.

LITERATURE STUDY I

SITE PLANNING & LANDSCAPE

The 96 homes at Footprints are divided into 8 groups of 9-16 plots, each arranged around acluster park. 3 central parking courts are tucked away beneath neighborhood parks andservice 2-3 such cluster groups each. At the entrance of each group of clusters is a drop-off point with some surface parking for visitors or residents with special needs, beyond which a ramp continues down into the central parking area. Since the layout follows the natural slope of the land, with clusters being at various levels, these parking courts do not resemble typical basements. They are well lit and ventilated, and connected to the clusters throughlandscaped courts, sometimes even at the same level.

FUNDAMENTAL QUANTITY	DATA
Site Area (Sq.m)	7.5 acres, 30351 sq.m
Built up Area (Sqm)	17966.17
Floor Area Ratio (FAR)	0.75

The natural drainage pattern of the site was preserved which was embedded withgravels/aggregates/stones as a feature to enhence percolation of rainwater and helps storm water management. It's a cost effective feature as the infrastructure for storm water management required will be lesser in size and capacity as against a site in conventionalpractice.

SERVICE CORRIDOR PLANNING

Building services like water supply, electricity etc. is placed in aggregate utility corridors. Itis a sustainable feature which helps in protection of pavements and from unnecessarytrenching. In conventional cases, services are not planned systematically and multipletrenches damages roads and pavements.

LANDSCAPE PAVING MATERIALS:

Landscape soft paving includes mud concrete road and pervious pavement for pedestrian movement to maximize percolation of rainwater in the ground and reduce heat island effect. Materials like chappadi, hollow clay block, Cuddapah, Brick, Grass, mulching using wooden scraps as a waste from the sawing process, are used in the landscape pavement and
softscaping.
In pavement areas for circulation, pedestrian and automobiles, impervious paving in the form of mud concrete (sand replaced by mud in PCC) and vacuum dewatered flooring (VDF) has been respectively used. Mud concrete is sustainable as it avoids sand and uses soil from site in comparison to conventional PCC. VFD pavement, although uses sand, still it is sustainable because it has high SRI (solar reflective index) which reduces heat island effect Green Building Initiatives for Affordable Housing
on site and avoids flooring like tiles/paver tiles as against plain cement concrete pavement.

Brief details on Landscape areas and materials at Malhar Footprints:

SOFT PAVING	
Soft scape Area	19651 sq.m (including Lawn, bushes, shrubsand trees (Sqm))
Names of Native species	Terminalia, Arjuna, Ficus Religiosa
Total site area	30351 sq.m
Total ground coverage	8000 Sq.m
% pervious pavement	87.9 %
% impervious pavement	12.1 %
HARD PAVING	
Pervious Paved Area	500 sq.m
Construction/ Material	Cuddapah, Chappadi, sadaralli
Impervious Area (sq.m)	2700 sq.m
Construction/ Material	Mud concrete, VDF
Details of any local materials used	Stone, mud blocks

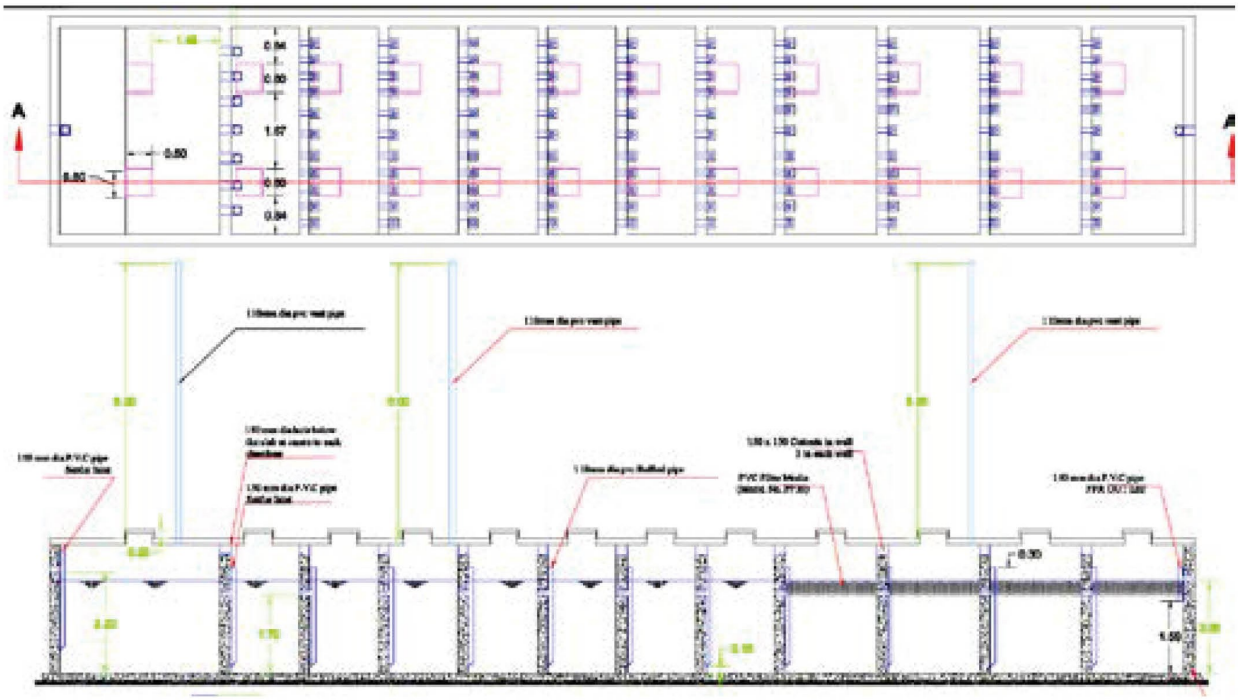
Building Envelope and civil works:
Building plan is rectangular in form with surface to volume ratio as 0.43 for corner plots,0.26 for the rest. The Window to Wall ratio is 18% for corner plots and additional 25% forothers.

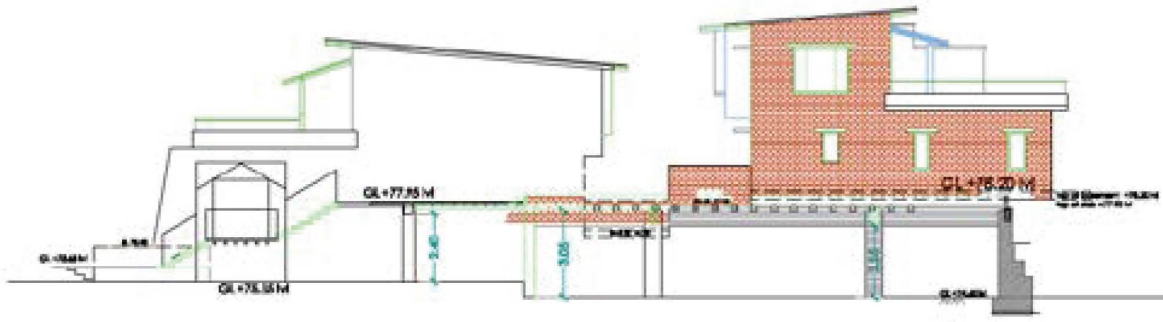
Roof

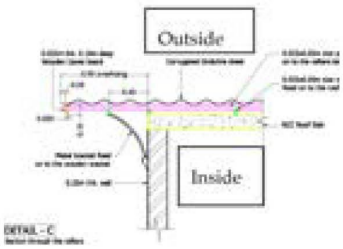
Roof is constructed of RCC roof slab with treatment in the form of shading has beenprovided using composite sheet made of GI and Onduline sheet fixed over the steel rafters.It helps to ventilate and shade the RCC roof, lower heat transmission from sun, supports solar hot water system and has gutter for roof top rain water harvesting.
Walls

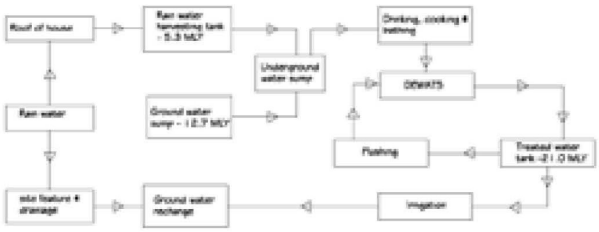
Exterior wall is made of CSEB (compressed stabilized earth block) and random rubblemasonry which helps in lower heat transmission and maintains lower temperature in the interior space than outside. CSEB is more environmentally sustainable in comparison to conventionally used concreteblock as it has less embodied energy with 631 MJ/cu.m (source: Auroville Earth Institute) as against 1880 MJ/cu.m for concrete block.

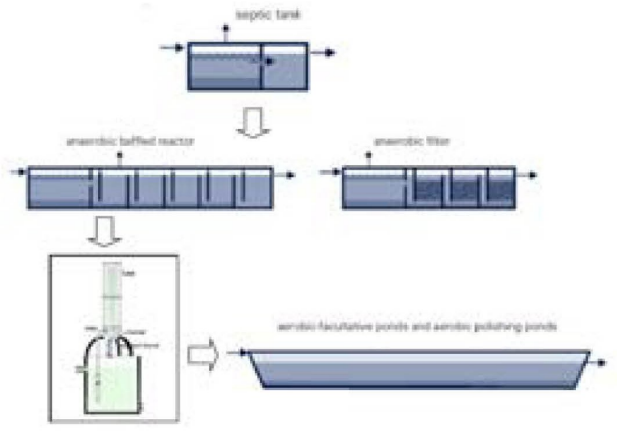
Material	Application
Stabilized Earth Blocks	Walls (Exterior & interior)
Rammed earth	Compound Wall (Upper level)
Ashlar Masonry	Lower wall (ext.) for most residents. Some residents have all ground level.
Stabilized Mud Blocks (twice the size of normal bricks)	On all upper level of homes (above sill)(Some above GF)(Exposed bricks)
Finished walls (with stabilized mud blocks, plastered)	Purpose of aesthetics – mud plaster and distemper
Hollow clay blocks	Landscaping, hedging around plant &landscapes.
Cuddapah stone	Landscaping for hard surface integrated with soil
Wood	Recycled teak – sill for windows (interior) - column at balcony - balcony/shading structure - window frames - indoor staircase
Terracotta floor tiles	Indoor outdoor flooring (some houses)
Bangalore stone (Sadaralli)	Landscaping, hard surface, compound wall
Mud Concrete	Paving (soil + cement + *aggregate*)
Athangudi tiles, Clay tiles, Ceramic tiles	Interior flooring materials
Mud concrete, dhappadi, hollow clay block, Cuddapah, Brick, Grass, Mulching	Landscape paving











Shade

Windows are shaded with RCC and Mangalore tile roof overhangs. Verandahs are also shaded with Mangalore tile roof overhangs. Both the features help in reducing solar radiation inside the house.

Day lighting

Daylight has been integrated through windows, courtyards and skylights in stairwell. It helps to harvests natural daylight to the interiors and avoids artificial light usage. In conventional practice, day lighting is provided with limitation, thus interiors are more dependent on artificial lighting and consume energy during day time.

Natural Ventilation:

Natural ventilation has been integrated through window, courtyards and high wallventilators. No provision for air conditioning has been provided by the developer. Thisstrategy helps in achieving thermal comfort and reduces dependency on air conditioning and fan.

Construction technologies

Vaulted roof with CSEB has been used for underground parking. In this technology, being sustainable, no centring is needed thereby reducing cost.

Water demand and source:

Total project water demand of the community is 31.75MLYwith total building waterdemand @ 27 MLY (excluding drinking water). The required water is procured from groundwater @12.7 MLY, Filtered Rainwater @ 5.3 MLY and recycled Water @ 21 MLY (million liters per year) of availability from the respective sources.

Irrigation:

Irrigation system such as micro sprinkler & drip irrigation has been used in the landscape as depicted below in the photograph. In conventional cases, flooding method is used for irrigation. Micro irrigation and drip irrigation are highly efficient (0.85) with 41% less water demand and cost compared to less efficient (0.5) flooding system, preserving water resource. Water efficient low flow rate plumbing and sanitary fixtures has been used such as shower dual flush Water Closet with 3/6 - litres/flush as against 9 litres/flush used in conventional cases. The low flow water closet consumes 75% water less than conventional system. The cost of low flow fixture is approximately 23% costlier than a conventional water closet.

Rain water harvesting system

The total roof area of 8000 sq.m harvests 5.9 Million liters of water annually from rainwater out of which 5.3 MLY is useful. Each house has the potential to harvest rainwater and re use. The size of rain water harvesting tank is 175000 liters for the community. Percolation pits along with soft drainage channels (gravel embedded) has been integrated in the ground for-efficient recharge of rainwater. Rain water from landscape surfaces is used for recharging through percolation pits. Rain water from roof tops is used for drinking & cooking by storing in the rain water harvesting tank.

Sewage Treatment plant:

DEWATS (Decentralized Waste Water Treatment System) sewage treatment plant with dualplumbing for recycled water has been designed for the community. It has the capacity to treat waste water of 10,000 liters/day. The treated water is used for flushing and irrigation.

Renewable Energy Technologies

Renewable energy, as a source, is available at Malhar, in the form of solar hot water. As a sustainable feature, hot water from solar hot water system is available without electricity, thereby saving energy and conserve fossil fuels
200 liters solar hot water system comparing with 3 units of 25L capacity electric geyser for a single residence at Malhar.
The 7.5 acres campus has a Total Connected Load (kW) of 739 kVA with source of power from grid only. Energy efficient lamps such as 15W CFL, 15W FTL, 6W LED in internal and 150W Metal halide for external lighting have been used. No artificial cooling or air conditioning has been used or provision been made. 8 numbers of 24 HP motors have been used for all utilities. A DG of 125 kVA capacities has been installed in the campus.

Solid Waste Management

Solid waste management at Malhar has been systematically achieved through segregation of dry and wet waste. Dry waste is sent to the dump yard for systematic recycling by BBMP (Bangalore Municipality). Wet waste is managed at unit level by using potable composter that converts waste into manure/compost for garden use. The above process reduces environmental pollution arising from waste. The portable composter used, is a product from Daily Dump, called Kambha 3 Tiered Small, costing approximately Rs.990/unit and ideal for afamily of two. The additional cost of buying manure and its transportation is also avoided,making it affordable to replicate.

DEAD STUDY - II

BedZED
Beddington Zero Energy Development

PROJECT OVERVIEW

LOCATION: WALLINGTON, SOUTH LONDON
DATES: planning began 1999, completed 2002
TYPE: new construction on former brown field site
USE: residential, office/workshop, open spaces.
SIZE: 3.5 acres, 1.42 hectares
PEOPLE: 240 residents (100 units). 100 workers
ACTORS: Peabody trust, bio regional
ARCHITECT: BILL DUNSTER
ENERGY & ENGINEERING CONSULTANT: over Arup and partners
QUANTITY SURVEYORS: Gardiner and the obold

The Beddington Zero Energy Development (BEDZED) is the UK's largest carbon- neutral eco-
community. The first of its kind in the country Completed in 2002, BEDZED was developed by the Peabody trust in partnershipwill bill duster architects and bio regional development group (environment consultants).
BEDZED is mixed-used, mixed-tenure development that incorporates innovative to approaches to energy Conservation and environmental sustainibility.

URBAN CONTEXT

The site is situated in a dense residential. Suburb of wellington in South London activity is mainly residential. The site edge is the main road connecting city to wellington town.
The proposal was n end product of the decision by UK to go CARBON NEUTRAL by a 2036.
The proposal was a live demonstration of the possibilities of zero carbon neighbourhoods

BEDZED - CONCEPT AND FORM

FORM

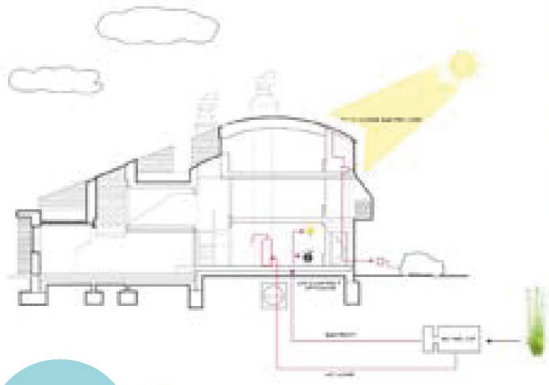
Four different typologies have been designed at BEDZED, loosely based on traditional English urban forms, each with different subdivisions creating variety of flat types.

South- facing terraces with front gardens,
terraces with workspace and vehicle mews
pedestrian-only mews with gable-end entry
workspace and cafe/shop, hosing with space for community activities such as childcare, health and arts.

almost every flat has a small land- or sky-garden and a double-glazed conservatory, integrating the two features most desired by many suburban households

BEDZED AIM - TO REDUCED THERMAL DEMAND.

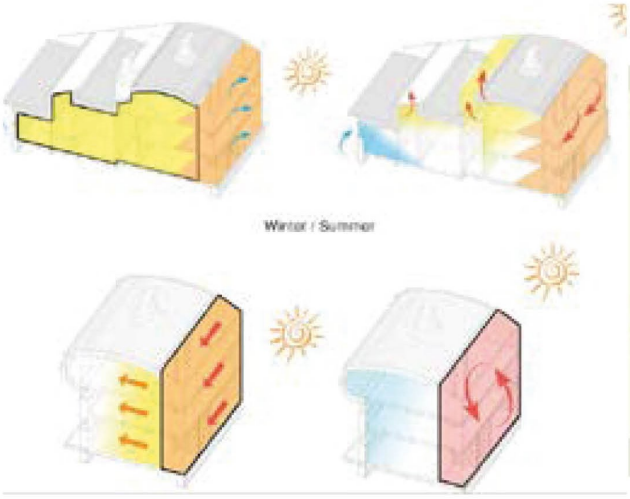
Passive gain; dwellings face south with Triple -storey conservatories (sun spaces)
Super Insulation : 300 mm insulation jacket around each terrace.
2 skins of doble glazing to south elevation and triple glazing for all other elevations.
Thermal mass provided by dense concrete block work and concrete floor slabs and exposed radiant surfaces to aid heat absorption.
Passive ventillation with heat recovery
Reduced flow taps and shower
Visible hot water meter.
A combined heat and power plant was designed to burn BEDZED waste to produce hot water and electricty. Effluent from the buildings is treated on site and the water is used for flusing toilets.



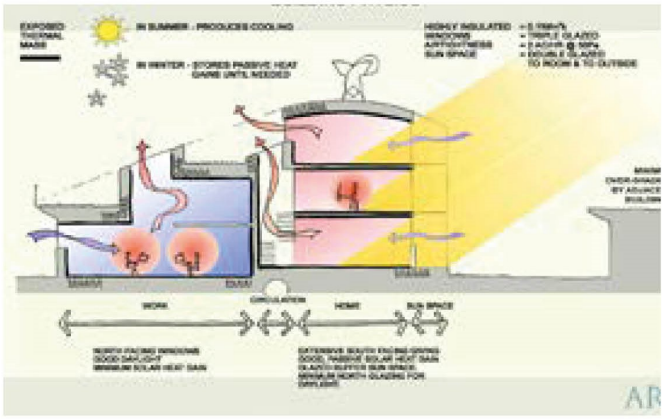
SITE PLAN

SITE SECTIONAL VIEW

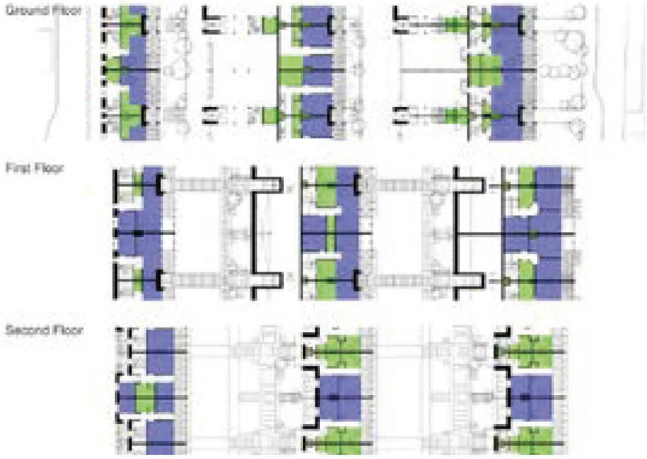
LITERATURE STUDY II



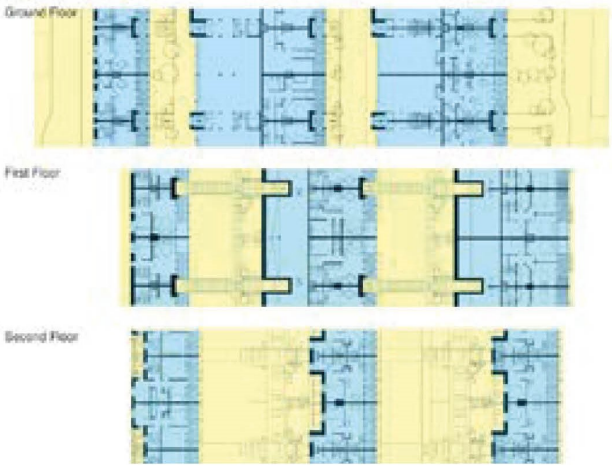
THERMAL DISTRIBUTION



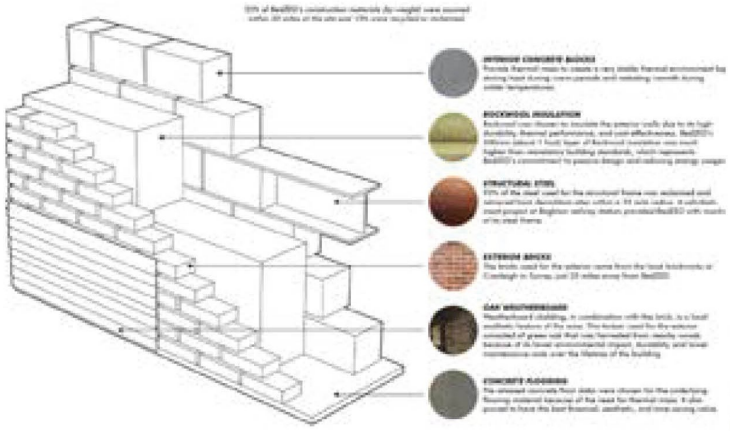
BUILDING PHYSICS



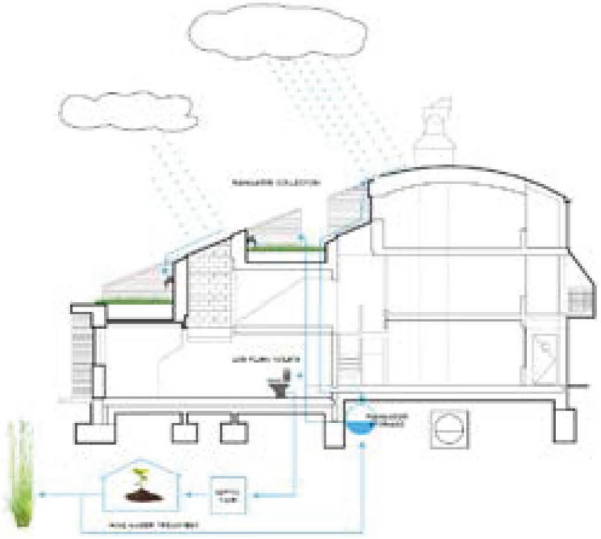
INDOOR / OUTDOOR SPACE



SERVED / SERVANT ROOM



MATERIAL USED



WATER FLOW DIAGRAM

SPACE HEATING

Through the innovative design construction heat from the sun and heat generated by oocupants and every day activies such as cooking, is sufficient to heat BEDZED homes to comfortable temperature. The need for space heating, which accounts for a significant part of the energy and demand in conventional building, is therefore reduced or completely eliminated.
People seperate their waste in their kitchens to make recycling and compositing easier. 60% of waste is recycled, three times the UK average. Residents encourage each other to recycle.

SERVICES

Green Water Treatment Plant (GWTP) An effluent treatmet facility used to effluent to standard wherby it can used for toilet flusing and irrigation. The BEDZED system comprises two underground septic tank followed by a series of treatment tanks that the water biologically.

BEDZED WASTEWATER RECLAMATION PLANT

Bedezd is again using recycled water and now hosts the un's first bio-reactor (mbh) for recycling waste water for Non-potable domestic use toilet flushing & irrigation
The water conservation measure includes:
Low flow tabs in household and commercial spaces
Dual-flush toilets in developments
Bio membrane reactor for on-site recycled-water.
Wind cowls bed zed's wind cowls.

The part of the passive ventilation system they are the colourful cowls Ten. Located on the roof. They bring in fresh air through one duct and expel it Through the another.

A distinctive feature of the buildings is the wind cowls at the roofs. These New kinds of weathercock venntilate the houses and recover heat from The air coming out7. The roofs are covered by solar panels (to generate Electricity) and plants (for insulation and a habitat for wildlife)

Bed zed walls are thicker than average, with insulation between the bricks to prevent energy loss.
The building materials are, where and have used less possible, locally produced5 energy to make.

COMBINED HEAT AND POWER PLANT

Bed zed receives power from a smallscale combined heat and power plant (chp).In conventional energy generation, the heat that is produced as
A by-product of generating electricity is lost. With chp technology, this heat can be harnessed and used. At bed zed the heat from the chp provides hot water, which is distributed around the site via a district heating system or super-insulated pipes. If residents of workers require a heating boost, each home or office has a domestic hot water tank that double as a radiator. The chp plant at bedzed is power by off-cuts from tree surgery waste that would otherwise go to landfill. Wood is a carbon neutral fuel because the greenhouse gases released when it's burned equal to that absorbed by the tree as it grew.

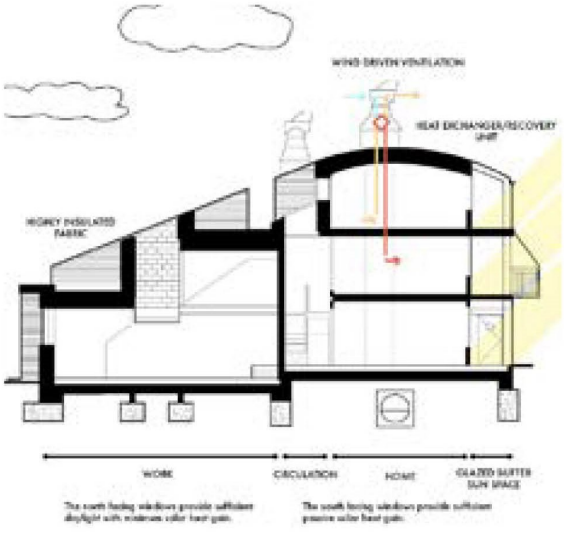
TARGET ACHIEVED AT THE END OF FIVE YEARS

ENERGY: 81% REDUCTION IN ENERGY USE FOR HEATING,
45% REDUCTION IN ELECTRICITY USE (COMPARED TO LOCAL AV.)

TRANSPORT: 64% REDUCTION IN A CAR MILEAGE 2,318 KM/YEAR (COMPARED TO NATIONAL AV.).

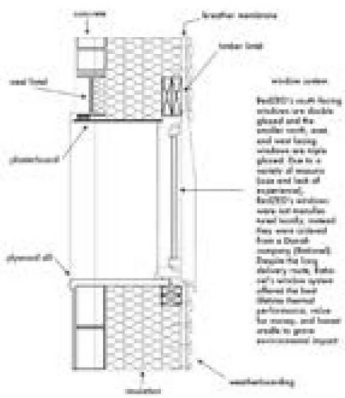
WATER: 60% WASTE RECYCLED
FOOD: 86 % OF RESIDENTS BUY ORGANIC FOOD
COMMUNITY: RESIDENTS KNOW 20 NEIGHBOUR BY

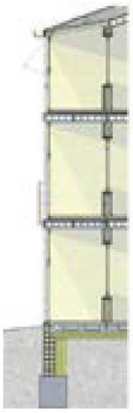
POSITIVES
NAME ON AVERAGE
*BED ZED COMMUNITY
*ARCHITECTURE / DESIGN
*SUSTAINABILITY
*WELLBEING (FEELING OF SPACES, LIGHT, QUIET, HEALTH GARDEN AND SUNSPACES)
*COST
*LOCATION
*OTHER (UNIQUENESS, MODERNITY ...)
*FACILITIES (COMMUNITY CENTRE, CAR, CLUB, SHOWER, SIZE)



ENERY REDUCTION

SITE SECTION





STRUCTURE USED

DEAD STUDY - III

BURJ - AL - ARAB : CONSTRUCTION REFERENCE STUDY

The Burj Al Arab - Tower of the Arabs , also known as “Arab Sail“.A luxury hotel located in Dubai, United Arab Emirates.
At 321 m (1,050 ft), it is the third tallest building in the world used exclusively as a hotel.Stands on an artificial island 280 m (920 ft) .
Connected to the mainland by a private curving bridge.It is an iconic structure, designed to symbolize Dubai’s urban transformation and to mimic the sail of a boat.

CONCEPT

The instruction from the client (the Crown Prince of Dubai) was to design, not just a hotel, but also a signature building; one that would announce, “Welcome to Dubai”.The client wanted a dramatic statement with imagery that would immediately conjure up images of the city.
The building is built on sand, which is unusual as most tall building are founded on rock. The Burj al Arab is supported on 250, 1.5M diameter columns that go 45 meters under the sea. As there is only sand to hold the building up the columns rely on friction.

CONCEPT – ORIENTATION AND CIRCULATION

The orientation of the building minimizes the heat gain during the summer seasons. The south elevation has the most exposed surface area. As a result, it has the maximum capacity for heat absorption. For people, there is access to the hotel through the roof via a helicopter. At the main entrance there is a grand stairway, an escalator and elevators. For air, the revolving door located at the main entrance acts as a locking mechanism to prevent a phenomenon known as the stack effect, which occurs when the hot air rises and the cool air falls in a tall building.

ENVIRONMENTAL APPROACH

Wind Effects Dubai’sGeographic location subjects the hotel to severe weather conditions including strong winds and occasional violent thunderstorms.Due to the structure’s proximity to its adjacent hotel resort, wind tunnel testing was considered to ensure a safe design.
wind speed of 45 meters per second, under the recommendations of Dubai Municipality, was adopted for the design.

SEISMIC IMPACT DUBAI

Itself is not located in an earthquake intensive zone. However, southern Iran which is only 100 miles away to the north is subjected to moderate earthquake risk and in turn which could create tremors in Dubai if a seismic event were to occur in Iran.
To reinforce the structure from any potential swaying, two tuned mass dampers, weighing about 2 tonnes each, limit vibrations in the tubular steel mast that projects 60 m above the building.

VORTEX SHEDDING

Analysis were done with respect to Building response under wind loads. Wind tunnel could threaten the entire skeleton. Wind blowing away sharp edges can cause destruction. Vibration may cause due to vortex shedding

RESPONSE

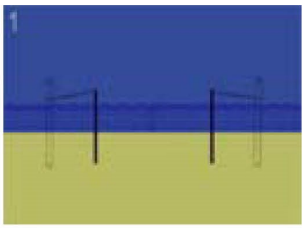
First option was to change the shape but Architect was against and forced the engineer to re-think.
Ingenious hanging weight were installed at variable places - when wind blows, 5 ton weight will swing and damp down the vibrations to safety limits.
Building is a hybrid “V” shape structure constructed in concrete and blended with structural steel.The “V” shape steel frame wraps around the reinforced concrete tower inhabiting hotel rooms and lobbies. The two wings enclose space in center to form largest atrium in the world standing about 180m height.
Burj al Arab is made up of 28 storeys of split levels (56 storeys) with 10,000 Sqmt floor area, 60,000 Sqmt of concrete and 9,000 ton of reinforced steel.The roofs and walls of the building are made of prefabricated concrete
There is a concrete core at the back of the building which forms the base of the V-shape and the trusses are connected to it.
Burj al Arab has the structural expressionism.Structural Expressionism basically means that the structural components of the building are visible on the inside as well as outside. This includes features such as exposed truss work and complex shapes.

THE CHALLENGE

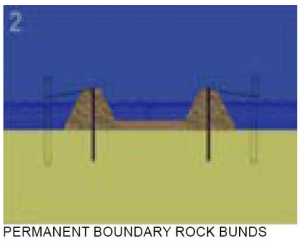
It was very challenging to design foundations to Support the mega structure-270 miles off coast, 320 mtr in height on man-made island (6mts from Arabian Sea) resistant to earthquake (falling under range of major fault line) and wind that blows 90 miles per hour.
Structure was designed to amaze-one never built before. Location on a reclaimed land was added challenge.

TESTS AND RESULTS

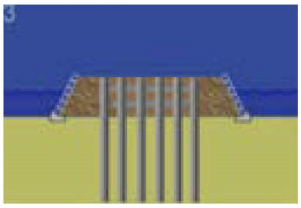
Initial core test-Drilling done 180mts down and no solid rock was formed but architect was defiant about the design and construction.
Then, reinforced concrete foundation piles deep into sand with concept of skin –friction were designed.
Skin friction: resistance that stops the slipping between sand and surface of piles. When friction between them is equal to impact, situation is handled.
The building is built on sand.Sand was compacted around the building to create friction against pile. This stopped the building from sinking.
It is supported on 250 numbers of 1.5 meter diameter columns that drilled deep into the sea
Each column is a steel reinforced concrete foundation pile with 45 meter in length.
Piles -20 percent longer than planned were executed with combined length of six and a half miles-35 times as long as tiring hotel to support.
Longer the pile the greater the effect of skin friction is.



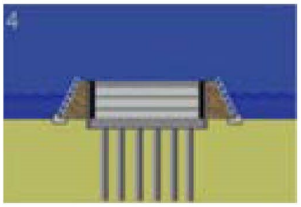
TEMPORARY TUBE PILES DRIVEN INTO SEA BED
TEMPORARY SHEET PILES AND TIE RODS DRIVEN INTO SEABED TO SUPPORT BOUNDARY ROCKS



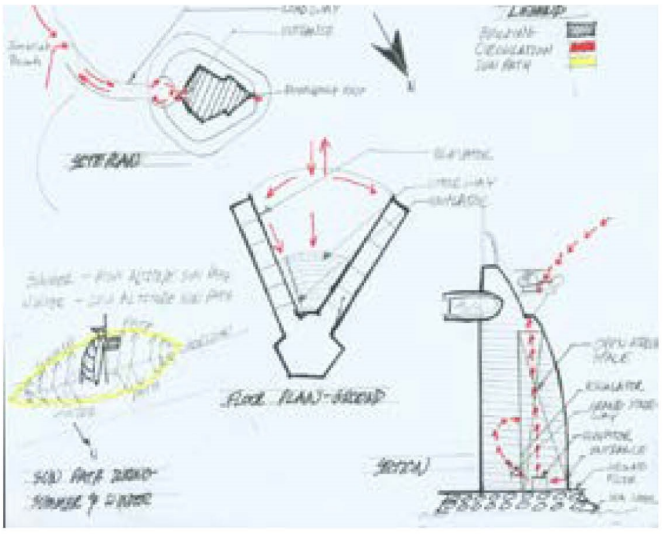
PERMANENT BOUNDARY ROCK BUNDS DEPOSITED EITHER SIDE OF SHEET PILES HYDRAULIC FILL LAYERS DEPOSITED BETWEEN BUNDS TO DISPLACE SEAWATER AND FORM ISLAND



PERMANENT CONCRETE ARMOR UNITS PLACED AROUND ISLAND TO PROTECT IT FROM THE WAVES
1.5 M DIAMETER 45M DEEP PILES DRIVEN THROUGH ISLAND AND SEA BEDBELOW TO



ISLAND INTERIOR EXCAVATED AND TEMPORARY SHEET PILE COFFER DAM INSERTED, 2M THICK CONCRETE PLUG SLAB LAID AT BASE OF ISLAND, REINFORCED CONCRETE RETAINING WALL BUILT BASE-



CONCEPT

SITE LOCATION

WHY THIS PROJECT?
TO EXPLORE ANOTHER DIMENSION IN WHICH WE CAN CONTINUE TO LIVE AND PROSPER WITH ALL OUR BASIC RESOURCES, REQUIRED TO FULFILL OUR DAILY NEEDS AND DEMANDS.

MAHARASHTRA

INDIA

APPROACH

MUMBAI CENTRAL RAILWAY STATION - 7.1 km.

N.C.P.A. BUS-STOP - 600 m

CHHATRAPATI SHIVAJI INTERNATIONAL AIRPORT - 24.3 km.

MUMBAI

N

SITE AREA - 30 ACRE
PROPOSED POPULATION
N DENSITY - 3000
SCALE - 1:2000

NARIMAN POINT TIP
N.C.P.A.
TATA THEATRE
THE OBEROI

CONCEPT

- THE IDEA IS TO DESIGN AN ENVIRONMENT THAT WILL GIVE THE OCCUPANTS A SENSE OF CALM FROM THE HUSTLING ENVIRONMENT OF THE CITY.
- JUST LIKE MATTER IS MADE UP OF ATOMS, HUMAN BODY IS MADE OF CELLS, SIMILARLY; A CITY IS MADE UP OF NEIGHBORHOOD
- THE CHARACTERISTICS OF A ATOM IS BEEN USED TO DEVELOP THE CHARACTERISTICS OF NEIGHBORHOOD.
- EQUIVALENT RELATIONSHIP :
  1) e^- ⟶ USERS
  2) nucleous (+ve & 0 CHARGE) ⟶ AMENITY / MIXDUSE TOWER
  3) Orbits ⟶ TRANSPORTATION MEANS (ROADS, BRIDGES, PATHWAYS)
  4) shell ⟶ RESIDENTIAL HOUSES.

THE ATTRACTION BETWEEN THE ATOM'S NUCLEOUS & ELECTRON DUE TO +ve CHARGE, HERE THE FORCE OF ATTRACTION BETWEEN THE AMENITIES AND USERS RESEMBLES THE SAME.

MASTER PLAN DEVELOPMENT

ABOUT THE PROJECT

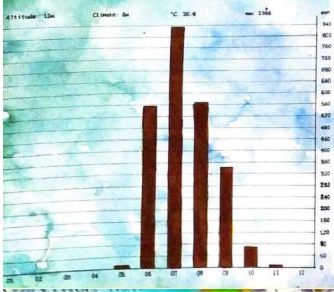
- THE TERM ARCHIPELAGO REFERS TO AN AREA THAT CONTAINS A CHAIN OR GROUP OF ISLANDS SCATTERED IN LAKES, RIVERS AND THE OCEANS.
- THE IDEA OF THE PROJECT IS TO DESIGN THE ARCHIPELAGO AS A NEIGHBOURHOOD THAT CAN BE SERVED AS A ALTERNATIVE SOLUTION TO THE RISING WATER LEVEL DUE TO GLOBAL WARMING.
- AMPHIBIOUS ARCHITECTURE IS COST EFFECTIVE AND SAFE ALTERNATIVE SOLUTION TO THE PERMANENT STATIC ELEVATION AND IT IS ACHIEVED BY BUOYANT FOUNDATIONS.

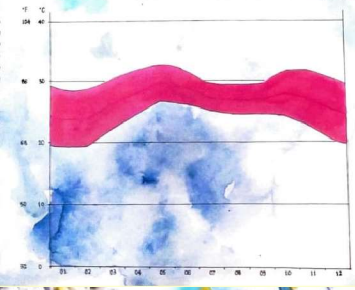
ISLAND

NEIGHBORHOOD

CITY

INSPIRATION : OCEANIX CITY -(BJARKE INGLES)





ABOUT THE CITY

THE MUMBAI CULTURE IS A BLEND OF TRADITIONAL FESTIVALS, FOOD, MUSIC AND THEATERS. IT IS BUSIEST COMPOSITION CITY OF INDIA HOLDING ITS OLD AGE CULTURE. THE OFFICIAL LANGUAGE IS MARATHI BUT THE BAMBAIYA HINDI IS ALSO POPULAR IN MUMBAI. IN THE COASTAL AREAS, THE PEOPLE LOVE TO SING THE MARATHI KOLI SONGS, WHICH ARE INTEGRAL PART OF THE CULTURE OF MUMBAI.

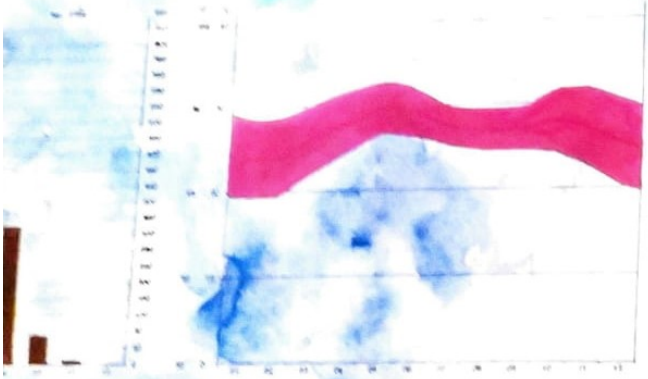
- AVERAGE ANNUAL TEMPERATURE - 26.8°C / 80.2°F
- AVERAGE ANNUAL RAINFALL - 2386 mm
- AVERAGE WATER TEMPERATURE - 27.90°C / 82.22°F

ISLAND

NEIGHBORHOOD

CITY

INSPIRATION : OCEANIX CITY -(BJARKE INGLES)



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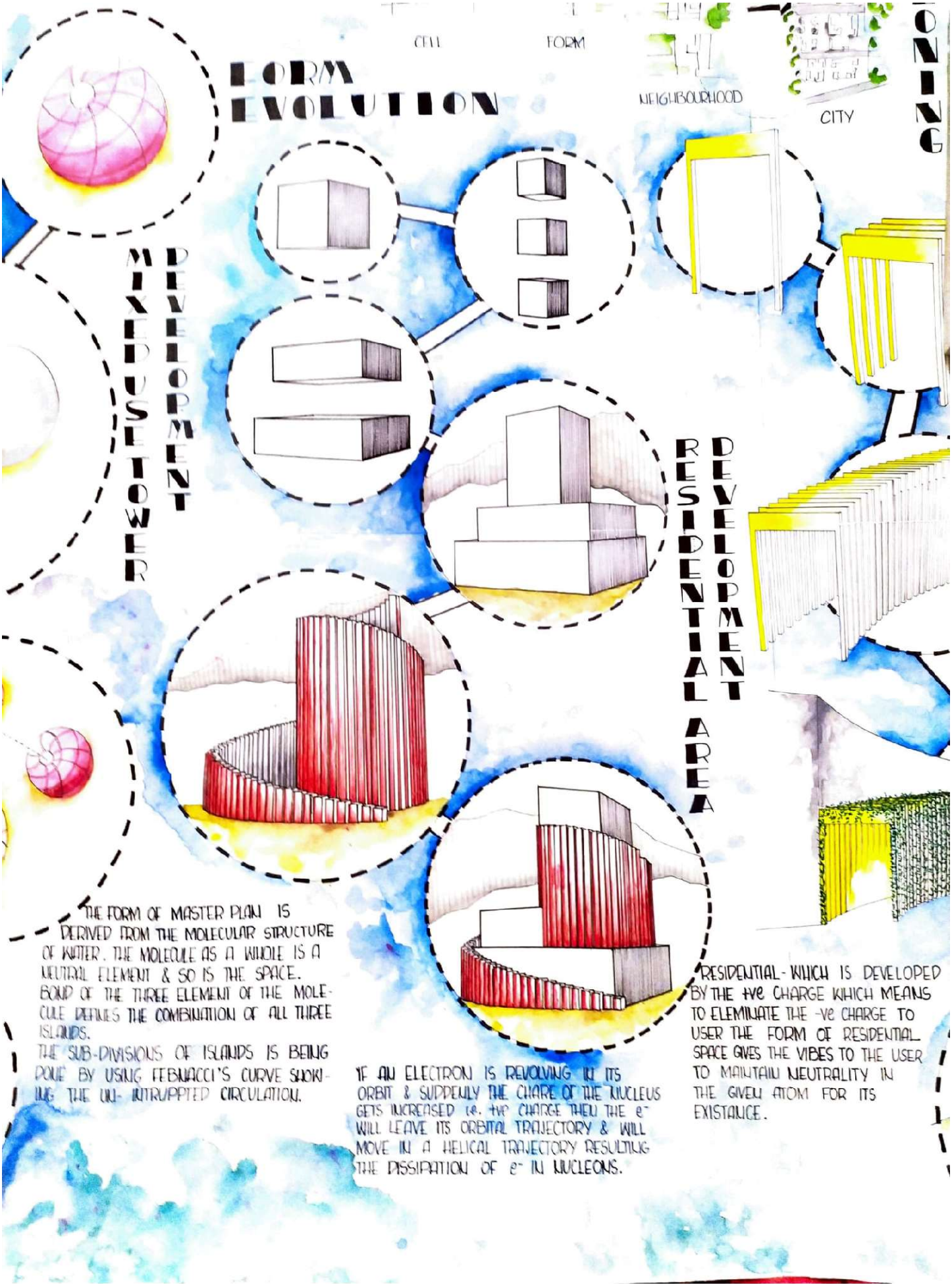
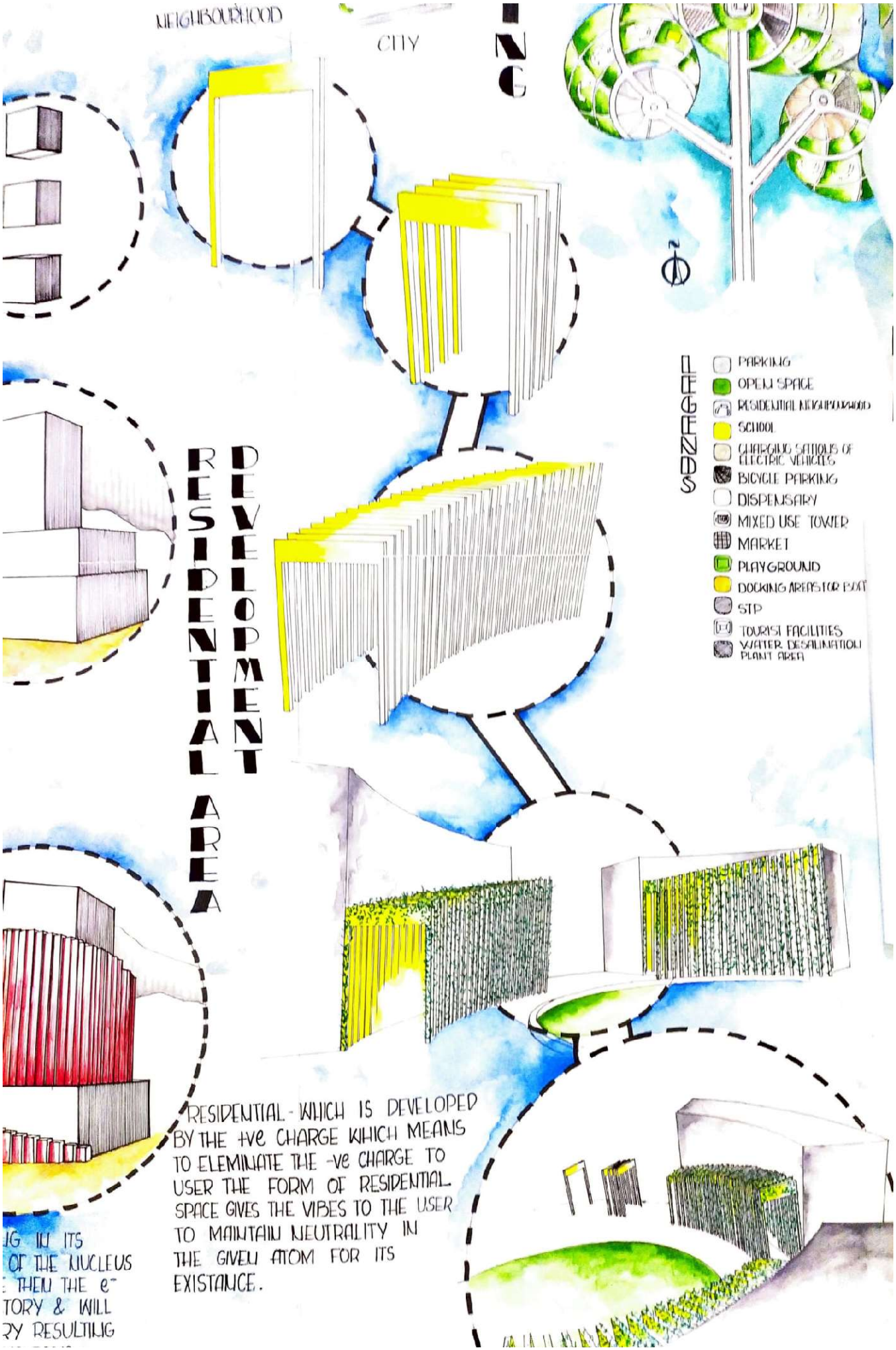
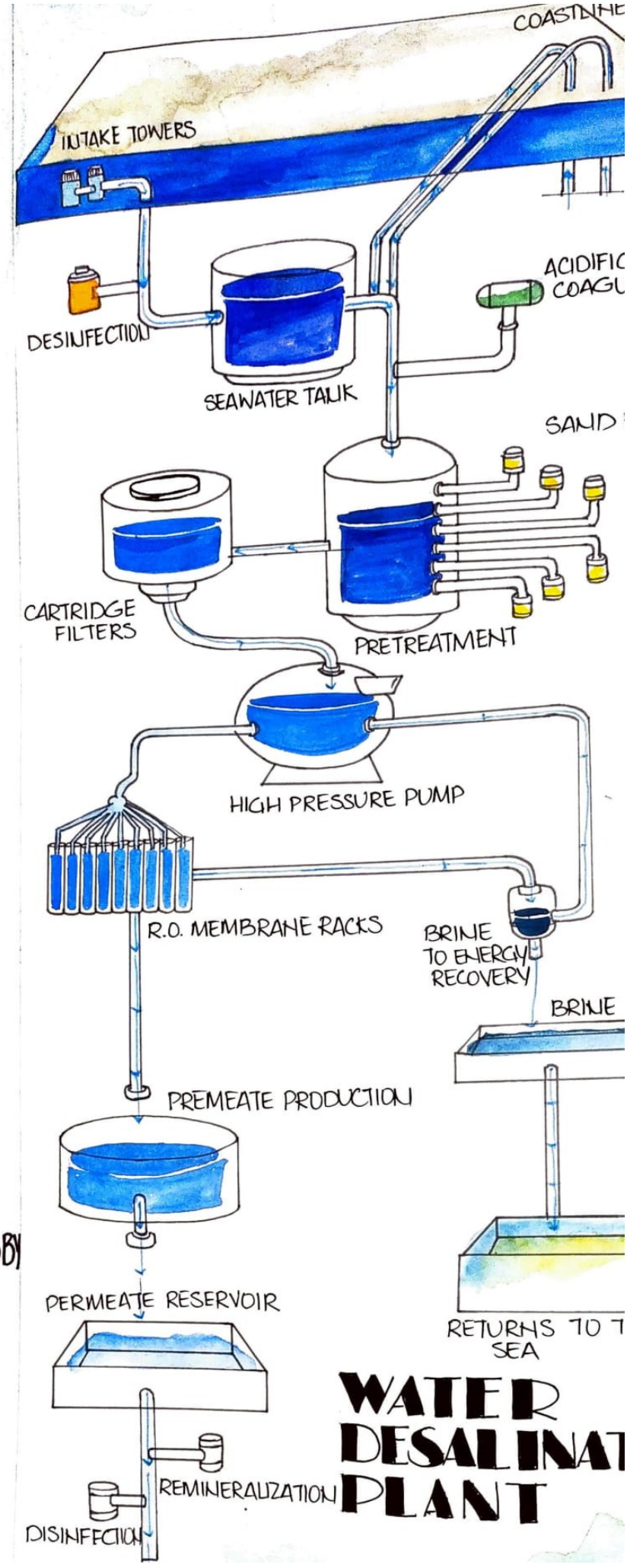

CELL
FORM
NEIGHBOURHOOD
CITY
ONING
FORM EVOLUTION
MIXED USE TOWER DEVELOPMENT
RESIDENTIAL AREA DEVELOPMENT
THE FORM OF MASTER PLAN IS DERIVED FROM THE MOLECULAR STRUCTURE OF MATTER. THE MOLECULE AS A WHOLE IS A NEUTRAL ELEMENT & SO IS THE SPACE. EACH OF THE THREE ELEMENT OF THE MOLECULE DEFINES THE COMBINATION OF ALL THREE ISLANDS.
THE SUB-DIVISIONS OF ISLANDS IS BEING DONE BY USING FIBONACCI'S CURVE SHOWING THE UN- INTRUPPTED CIRCULATION.
IF AN ELECTRON IS REVOLVING IN ITS ORBIT & SUDDENLY THE CHARGE OF THE NUCLEUS GETS INCREASED (i.e. +VE CHARGE) THEN THE e⁻ WILL LEAVE ITS ORBITAL TRAJECTORY & WILL MOVE IN A HELICAL TRAJECTORY RESULTING THE DISSIPATION OF e⁻ IN NUCLEONS.
RESIDENTIAL - WHICH IS DEVELOPED BY THE +ve CHARGE WHICH MEANS TO ELEMINATE THE -ve CHARGE TO USER THE FORM OF RESIDENTIAL SPACE GIVES THE VIBES TO THE USER TO MAINTAIN NEUTRALITY IN THE GIVEN ATOM FOR ITS EXISTANCE.

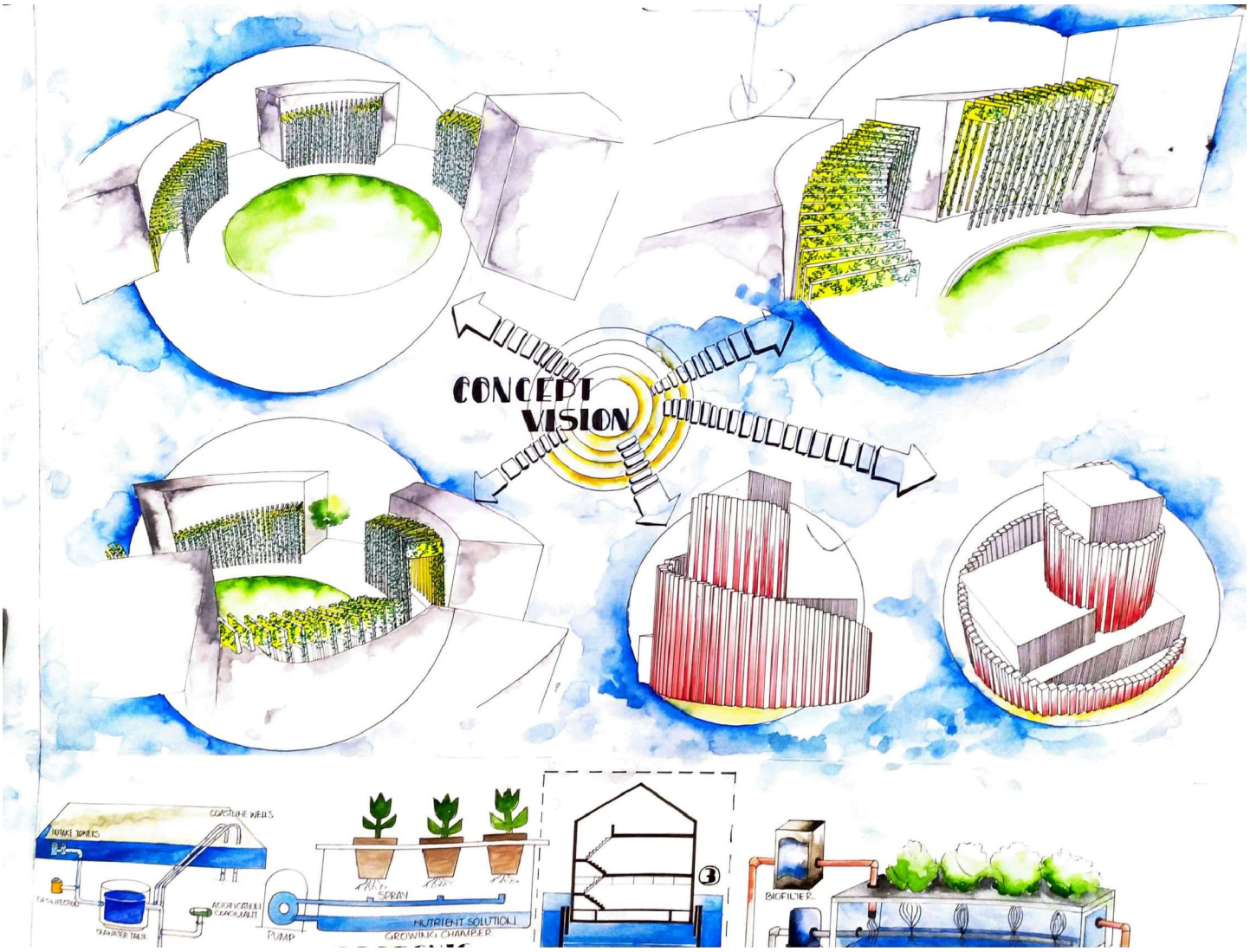

NEIGHBOURHOOD
CITY
N
G
DEVELOPMENT
RESIDENTIAL AREA
DIAGRAM
PARKING
OPEN SPACE
RESIDENTIAL NEIGHBOURHOOD
SCHOOL
CHARGING STATIONS OF ELECTRIC VEHICLES
BICYCLE PARKING
DISPENSARY
MIXED USE TOWER
MARKET
PLAYGROUND
DOCKING AREAS FOR BOAT
STP
TOURIST FACILITIES
WATER DESALINATION PLANT AREA
RESIDENTIAL - WHICH IS DEVELOPED BY THE +ve CHARGE WHICH MEANS TO ELEMINATE THE -ve CHARGE TO USER THE FORM OF RESIDENTIAL SPACE GIVES THE VIBES TO THE USER TO MAINTAIN NEUTRALITY IN THE GIVEN ATOM FOR ITS EXISTANCE.
IG IN ITS
OF THE NUCLEUS
THEN THE e⁻
TORY & WILL
RY RESULTING

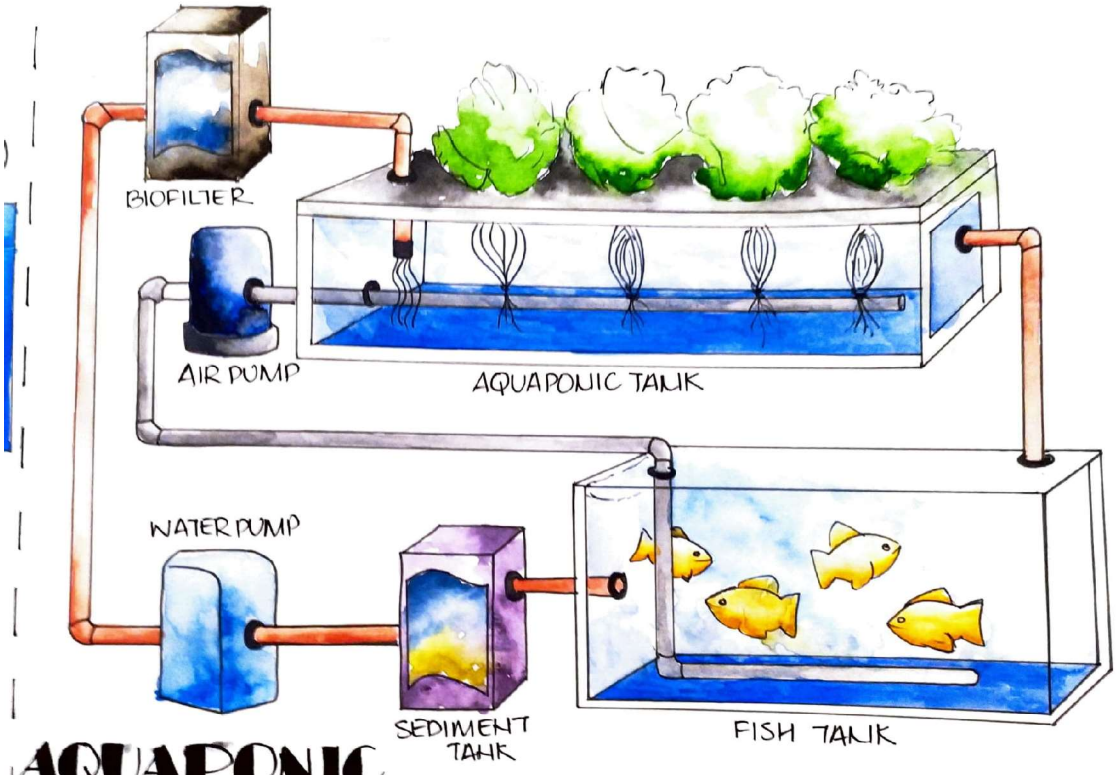

COASTLINE
INTAKE TOWERS
DESINFECTION
SEAWATER TANK
ACIDIFIC
COAGU
SAND
CARTRIDGE FILTERS
PRETREATMENT
HIGH PRESSURE PUMP
R.O. MEMBRANE RACKS
BRINE TO ENERGY RECOVERY
BRINE
PREMEATE PRODUCTION
PERMEATE RESERVOIR
RETURNS TO T
SEA
REMINERALIZATION
DISINFECTION
WATER
DESALINAT
PLANT

1

LOBBY

1

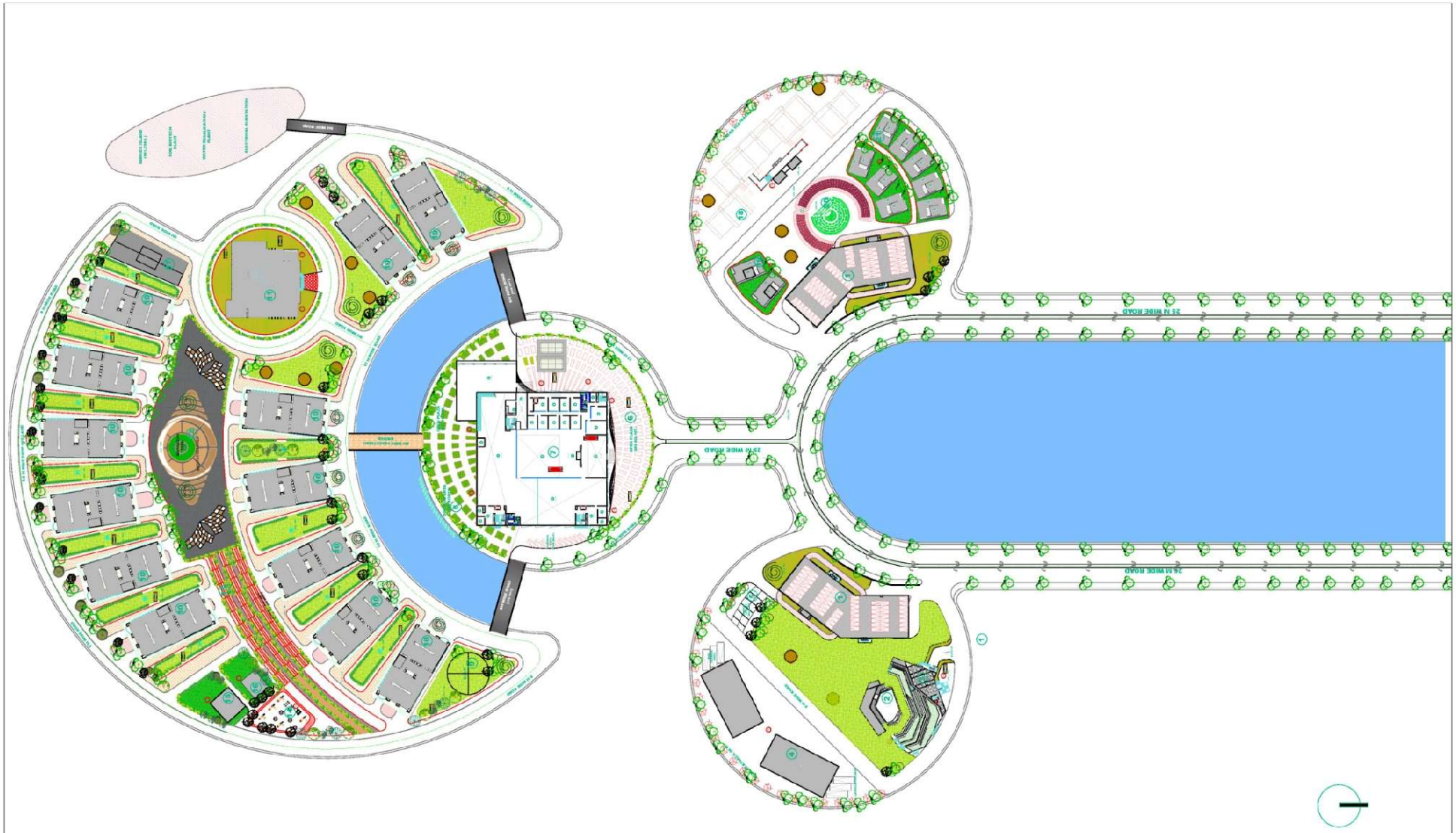




AQUAPONIC FARMING

DRAWINGS

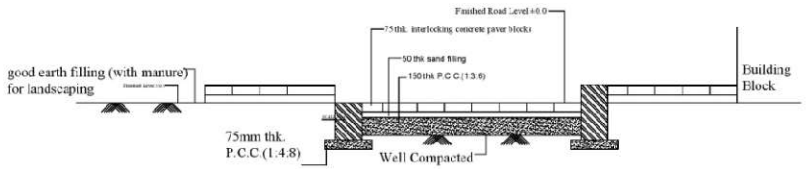
SITE PLAN



AMPHIBIAN ARCHIPELAGO : A SUSTAINABLE NEIGHBORHOOD

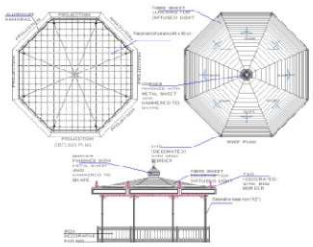
VINEET VINAY	SHEET TITLE
UNI. ROLL NO. : 115101085	**ELECTIVE 1**
THESIS YEAR - 2019/20	SCALE
B.B.D.U , L.K.O	**1:1000**

S. NO.	NOMENCLATURE
1.	MULTI LEVEL PARKING
2.	OPEN AIR THEATRE
3.	OPEN AIR RESTAURANT
4.	OFFICE BUILDING
5.	SERVICE MARKET
6.	OPEN PLAZA
7.	AMENITY TOWER
8.	DOCKYARD FOR BOATS
9.	C.H.T.
10.	LOW COST HOUSING CLUSTER
11.	ADMINISTRATIVE BUILDING
12.	MEDITATION AREA
13.	STEPPED LANDSCAPE
14.	KIDS PARK
15.	PR MARY SCHOOL
16.	DISPENSARY
17.	AQUAPONICS AND HYDROPONICS FARM
18.	LAVISH HOUSING CLUSTER
19.	CENTRAL PLAZA
20.	VILLAS - TYPE 'A'
21.	VILLAS - TYPE 'B'

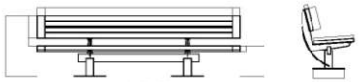


Pathway Sectional Detail

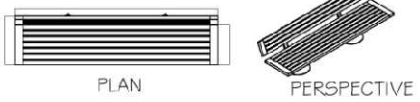
SCALE 1:20



DETAIL AT GAZEBO



ELEVATION

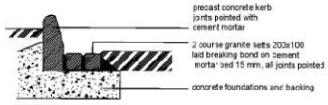


PLAN

PERSPECTIVE

DETAIL OF SEAT

Section - Shrub Plantation



kerb detail

SCALE 1:20

LEGENDS FOR FINISHES

S.NO.	KEY	NAME	NATURE	SYMBOL	AREA	REMARK
1	GP	GREEN PAVED FOOTPATH	GREEN/BROWN			40% CONCRETE 60% GRASS
2	IT	INTERLOCKING TILES FOOTPATH	BROWN			CONCRETE
3	LV	LIGHT VEHICULAR PATH	YELLOW-BROWN			CONCRETE
4	GG	GREEN GRASS	GREEN			BERMUDA GRASS
5	GT	GREEN TRUFF	GREEN			ARTIFICIAL TRUFF
6	GC	HEXAGONAL INTERLOCKING TILES	BROWN			STRONG GRIP

HEDGES

S.NO.	KEY	BOTANICAL NAME	COMMON NAME	NATURE	SYMBOL	HEIGHT	FOLIAGE	REMARK
1	MU	MURRAYA EXOTICA	MAKKI	EVERGREEN SHRUB		DWARF	-	
2	DJ	DURANTA VERBENACEAE	GOLDEN DURANTA	GOLDEN LEAVES		DWARF	-	

SITE FURNITURE

S.NO.	KEY	NAME	DISTANCE	SYMBOL
FURNITURES:				
1	DB	DUSTBINS	200 M	
2	BN	BENCHES	200-250 M	
3	WF	WATER FOUNTAIN	200-300 M	
4	SG	SIGNAGES	AS REQ.	
5		CONTOUR	AS GIVEN	
6		GAZEBO	AS GIVEN	

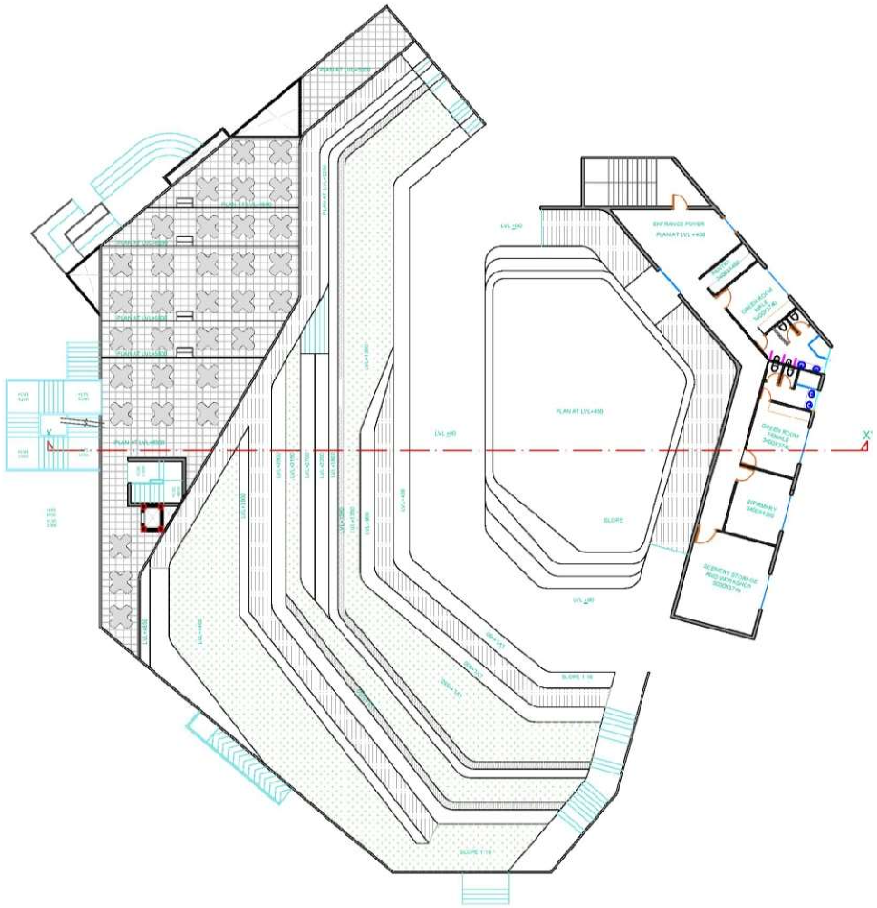
LEGENDS FOR LANDSCAPE

S.NO.	KEY	BOTANICAL NAME	COMMON NAME	NATURE	SYMBOL	HEIGHT	FOLIAGE	REMARK
TREES								
1	AZ	AZADIRACHTA INDICA	NEEM	EVERGREEN		TALL	15 M	
2	MK	MESUACRIA KASAMBA	KADAM	EVERGREEN		TALL	15 M	
3	CF	CASSIA FISTOLA	AMALTUS	DECIDUOUS	CF	MEDIUM	8 M	
4	PO	POLYALTHIA LONGIFOLA	ASHOKA TREE	EVERGREEN	PO	MEDIUM	(10-15) M	
5	SF	SACRED FIG	PEEPAL	DECIDUOUS		LARGE	(10-30) M	
6	HY	HYDNOCRBE LAGINEAULIS	BOTTLE PALM	EVERGREEN	HY	MEDIUM	(3-6) M	
7	CA	CASSIA NODOSA	SHOWER TREE	DECID. & SHADY	CA	MEDIUM	8 M	
8	BV	BAUHIVIA VARIEGATA	KACHNAR	DECIDUOUS		DWARF	4M	

AMPHIBIAN ARCHIPELAGO : A SUSTAINABLE NEIGHBORHOOD

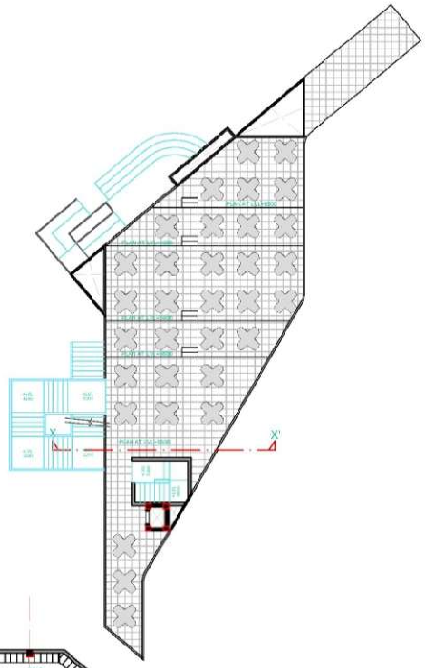
VINEET VINAY	SHEET TITLE
UNI. ROLL NO. : 115101085	**ELECTIVE 1**
THESIS YEAR - 2019/20	SCALE
B.B.D.U , L.K.O	**1:1000**

O.A.T/RESTAURANT



PLAN OF O.A.T.

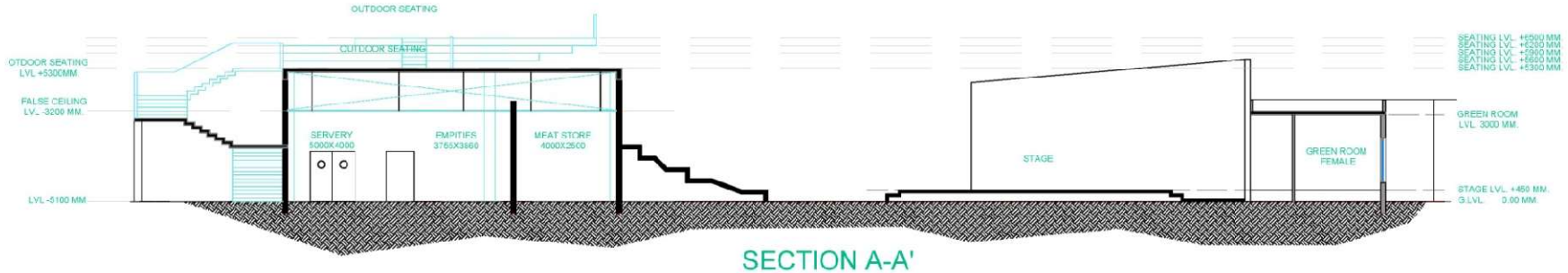
PLAN OF RESTAURANT
UNDER O.A.T



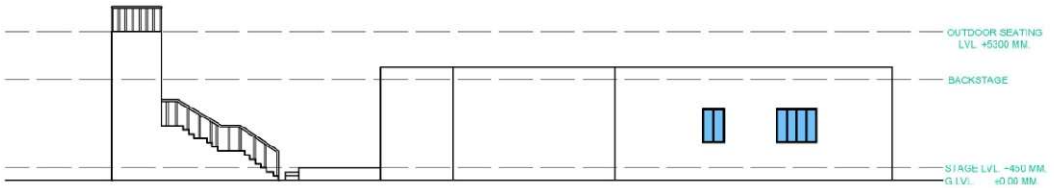
PLAN OF O.A.T.

AMPHIBIAN ARCHIPELAGO : A SUSTAINABLE NEIGHBORHOOD

VINEET VINAY	SHEET TITLE
UNI. ROLL NO. : 115101085	**RESTAURANT**
THESIS YEAR - 2019/20	SCALE
B.B.D.U , L.K.O	**1:100**



SECTION A-A'



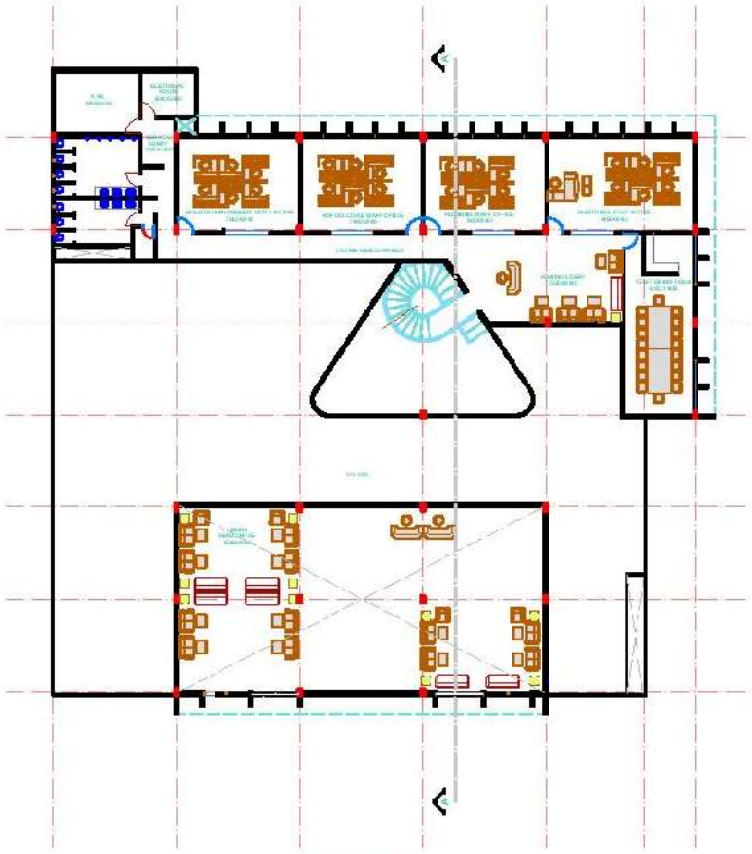
ELEVATION

AMPHIBIAN ARCHIPELAGO : A SUSTAINABLE NEIGHBORHOOD

VINEET VINAY	SHEET TITLE
UNI. ROLL NO. : 115101085	RESTAURANT
THESIS YEAR - 2019/20	SCALE
B.B.D.U , L.K.O	1:100

ADMIN WING

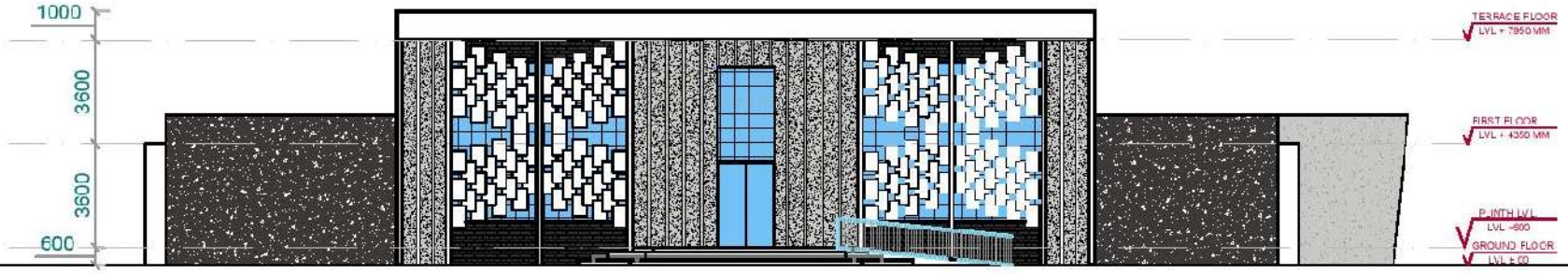
GROUND FLOOR PLAN



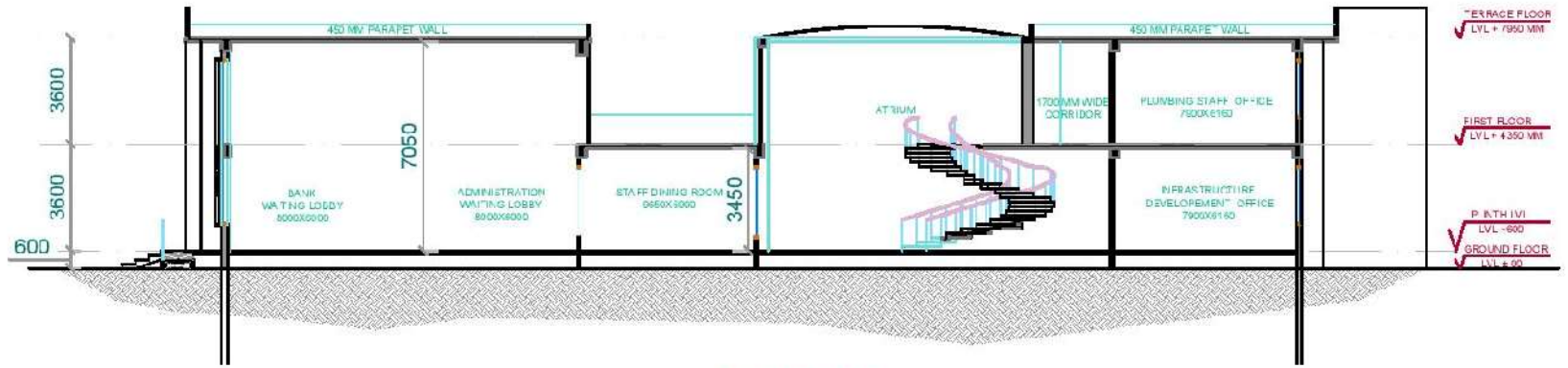
FIRST FLOOR PLAN

AMPHIBIAN ARCHIPELAGO : A SUSTAINABLE NEIGHBORHOOD

VINEET VINAY	SHEET TITLE
UNI. ROLL NO. : 115101085	**ADMIN WING**
THESIS YEAR - 2019/20	SCALE
B.B.D.U , L.K.O	**1:200**



FRONT ELEVATION



SECTION A-A'

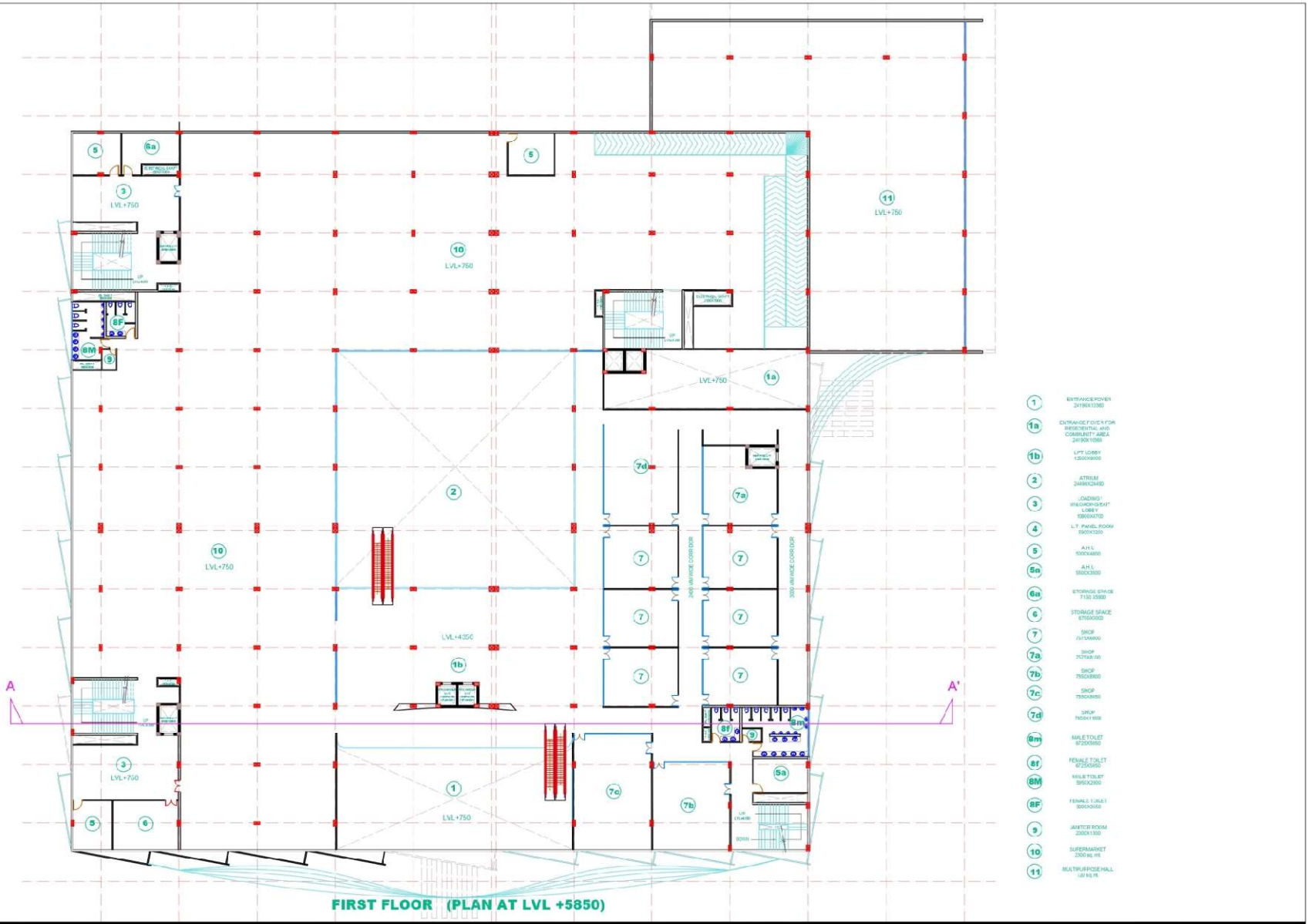
AMPHIBIAN ARCHIPELAGO : A SUSTAINABLE NEIGHBORHOOD

VINEET VINAY	SHEET TITLE
UNI. ROLL NO. : 115101085	**ADMIN WING**
THESIS YEAR - 2019/20	SCALE
B.B.D.U , L.K.O	**1:100**

AMENITY TOWER

AMPHIBIAN ARCHIPELAGO : A SUSTAINABLE NEIGHBORHOOD

VINEET VINAY	SHEET TITLE
UNI. ROLL NO. : 115101085	**AMENITY TOWER**
THESIS YEAR - 2019/20	SCALE
B.B.D.U , L.K.O	**1:250**



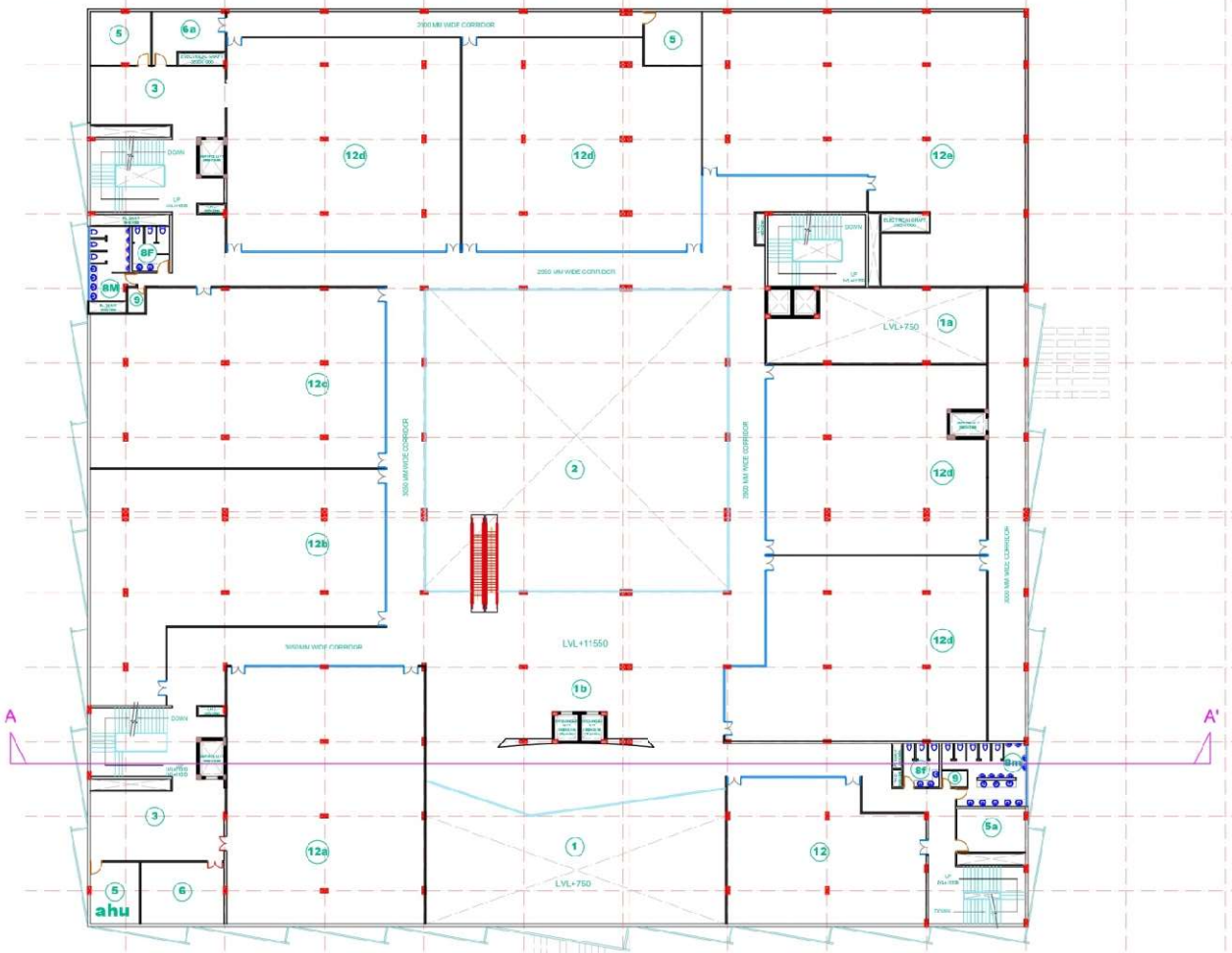
FIRST FLOOR (PLAN AT LVL +5850)

AMPHIBIAN ARCHIPELAGO : A SUSTAINABLE NEIGHBORHOOD

VINEET VINAY	SHEET TITLE
UNI. ROLL NO. : 115101085	**AMENITY TOWER**
THESIS YEAR - 2019/20	SCALE
B.B.D.U , L.K.O	**1:250**

AMPHIBIAN ARCHIPELAGO : A SUSTAINABLE NEIGHBORHOOD

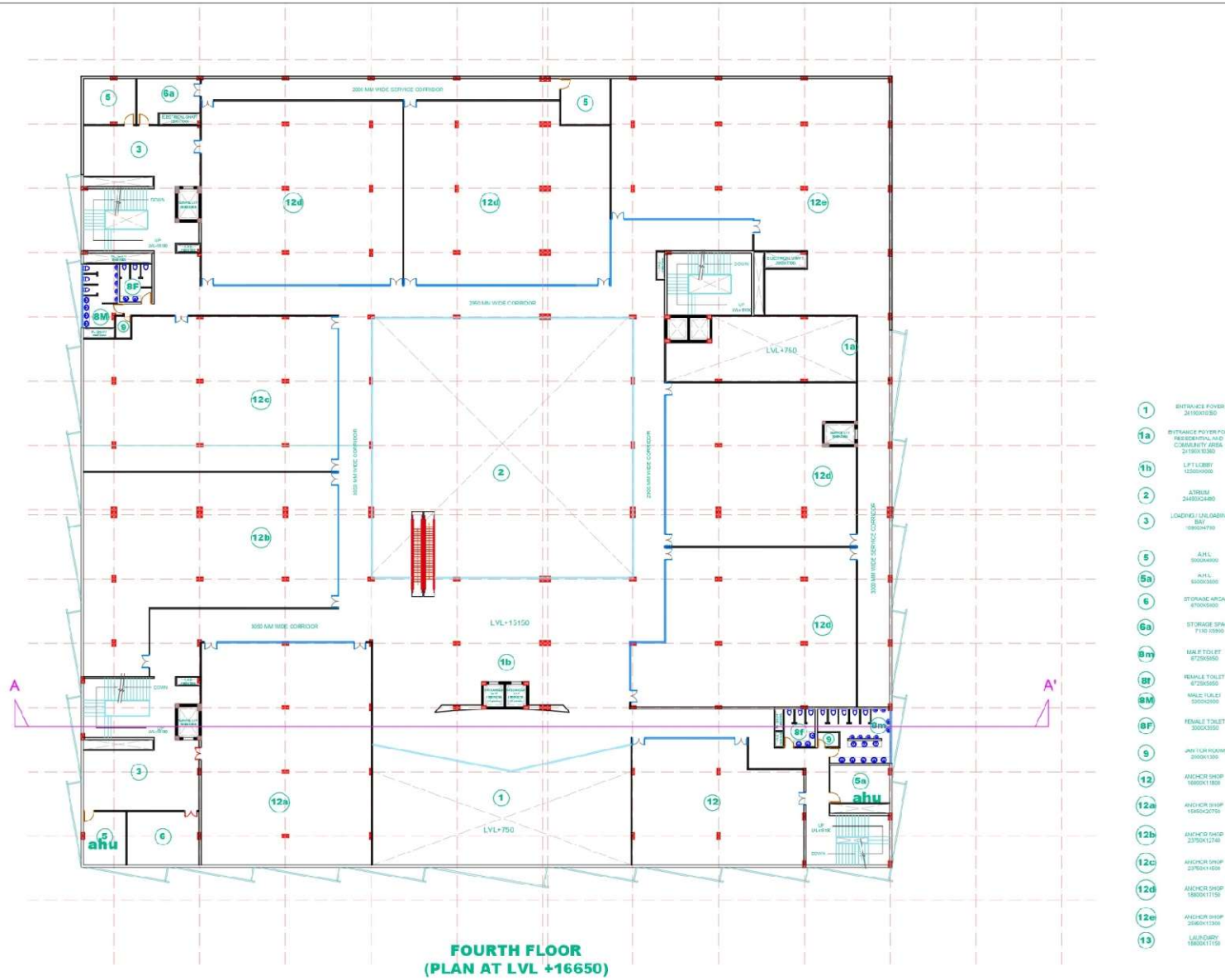
VINEET VINAY	SHEET TITLE
UNI. ROLL NO. : 115101085	**AMENITY TOWER**
THESIS YEAR - 2019/20	SCALE
B.B.D.U , L.K.O	**1:250**



THIRD FLOOR
(PLAN AT LVL +13050)

AMPHIBIAN ARCHIPELAGO : A SUSTAINABLE NEIGHBORHOOD

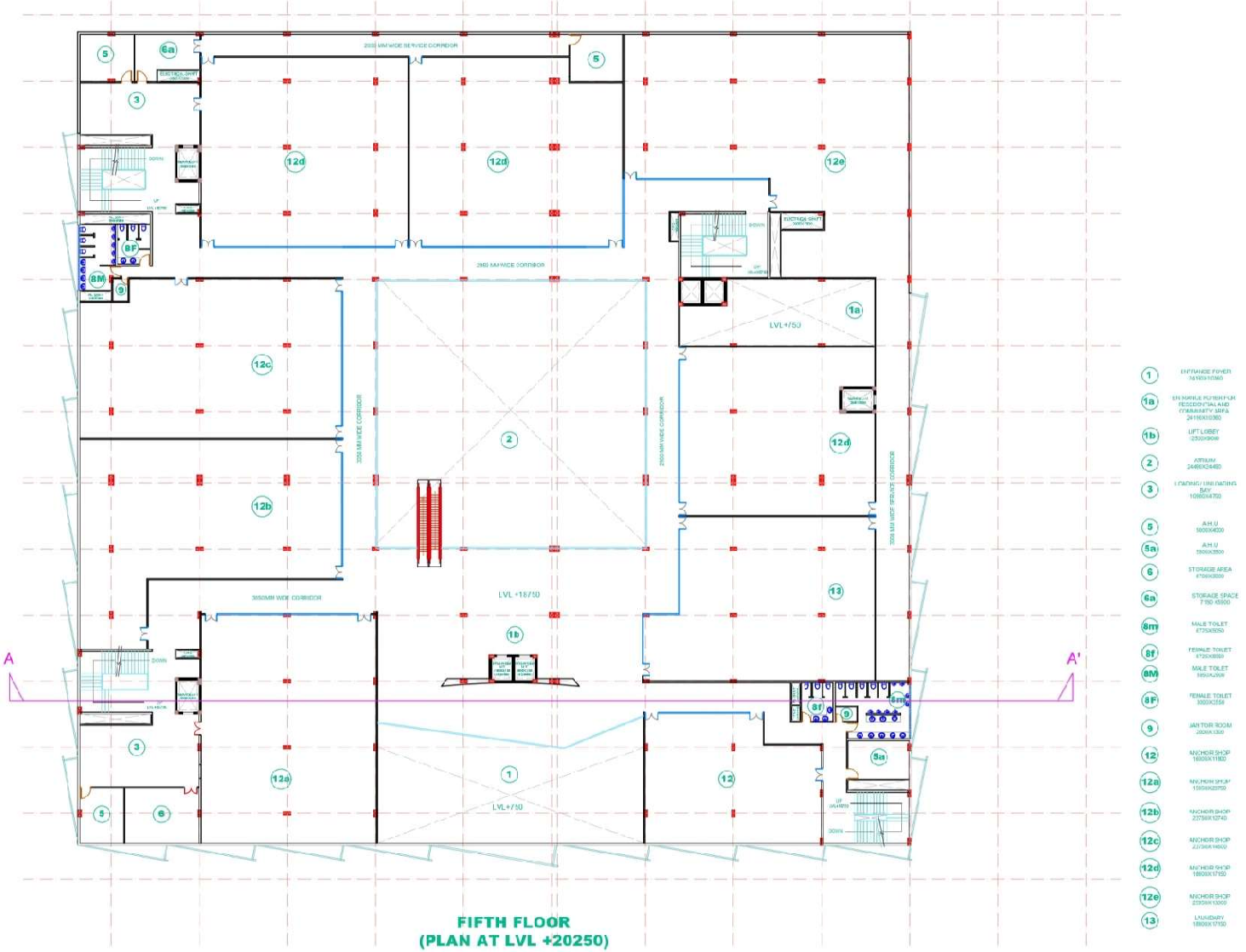
VINEET VINAY	SHEET TITLE
UNI. ROLL NO. : 115101085	**AMENITY TOWER**
THESIS YEAR - 2019/20	SCALE
B.B.D.U , L.K.O	**1:250**



FOURTH FLOOR
(PLAN AT LVL +16650)

AMPHIBIAN ARCHIPELAGO : A SUSTAINABLE NEIGHBORHOOD

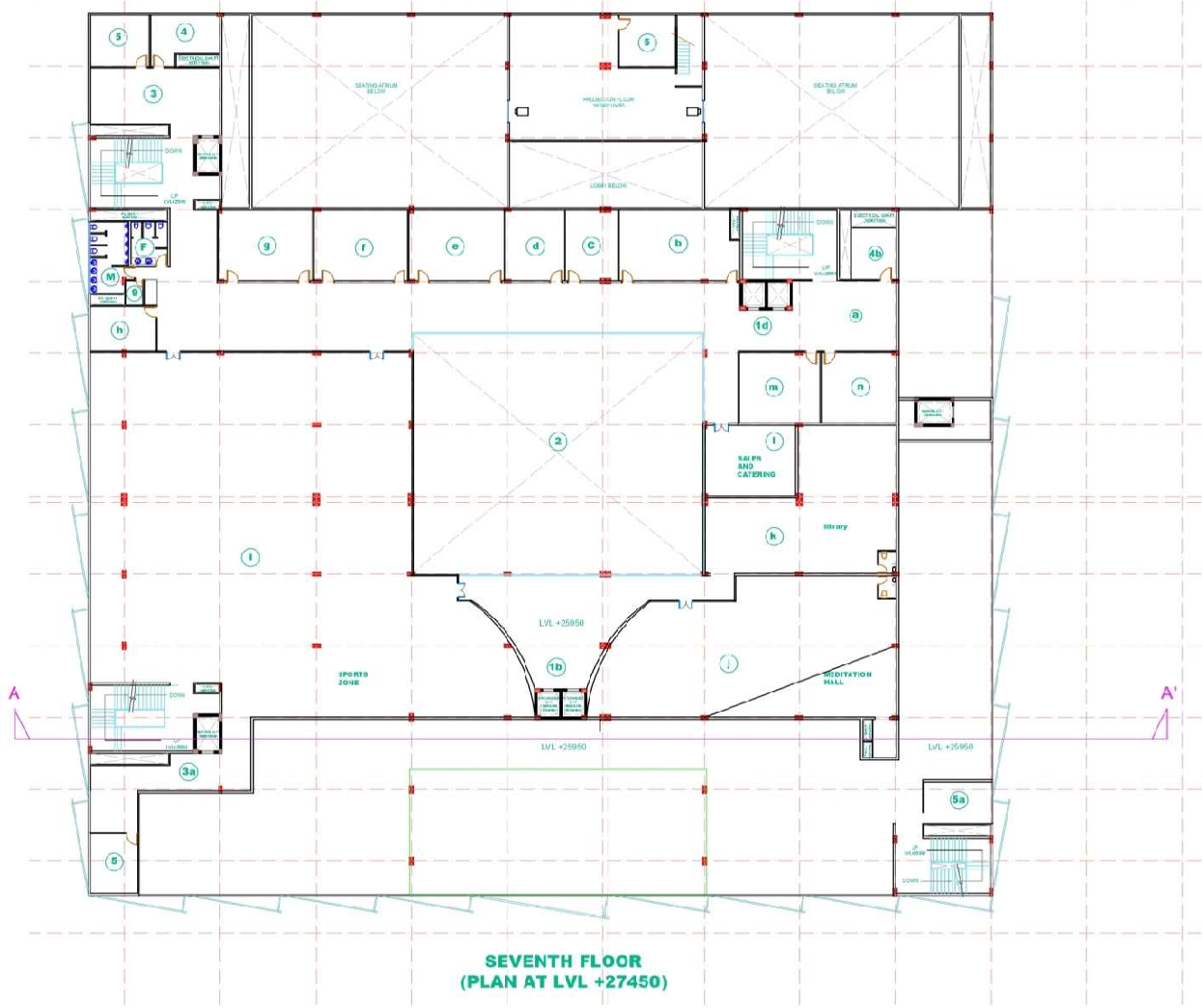
VINEET VINAY	SHEET TITLE
UNI. ROLL NO. : 115101085	**AMENITY TOWER**
THESIS YEAR - 2019/20	SCALE
B.B.D.U , L.K.O	**1:250**



FIFTH FLOOR
(PLAN AT LVL +20250)

AMPHIBIAN ARCHIPELAGO : A SUSTAINABLE NEIGHBORHOOD

VINEET VINAY	SHEET TITLE
UNI. ROLL NO. : 115101085	**AMENITY TOWER**
THESIS YEAR - 2019/20	SCALE
B.B.D.U , L.K.O	**1:250**

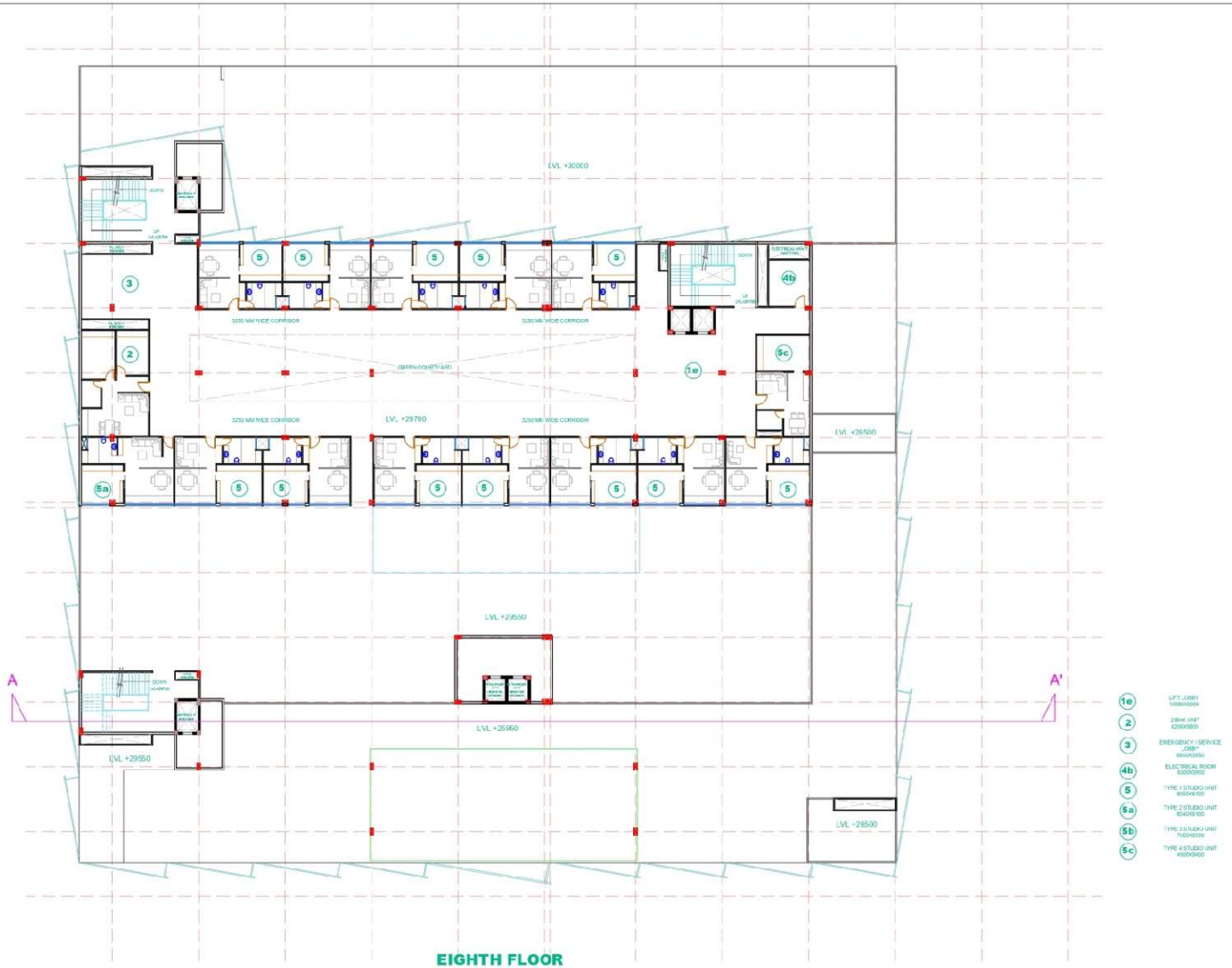


SEVENTH FLOOR
(PLAN AT LVL +27450)

1d	LIFT LOBBY 6000X3450
3	LOADING- UNLOADING BAY 10900X4700
3a	LOADING- UNLOADING BAY 10850X2200
4	LT. PANEL ROOM 5800X3200
4b	ELECTRICAL ROOM 6300X3600
5	AHU 5000X4000
5a	AHU 3500X3500
g	JANITOR ROOM 2000X1300
a	RECEPTION 8100X3900
b	LOUNGE 10100X5900
c	T.T.R ROOM 4400X3900
d	MANAGER ROOM 4950X3900
e	MEETING ROOM 7900X3900
f	STAFF ROOM 7900X3900
g	STAFF DINING ROOM 7900X3900
h	RECORE ROOM 5400X4770
i	GAME ZONE 36900X30480
j	MEDITATION HALL & 2385 211880
k	LIBRARY 16050X12390
l	SALES AND CATERING 7650X5850
m	ACCOUNTS ROOM 6750X3900
n	SECURITY OFFICE 6300X3900
M	MALE TOILET 5200X3900
F	FEMALE TOILET 5200X3900

AMPHIBIAN ARCHIPELAGO : A SUSTAINABLE NEIGHBORHOOD

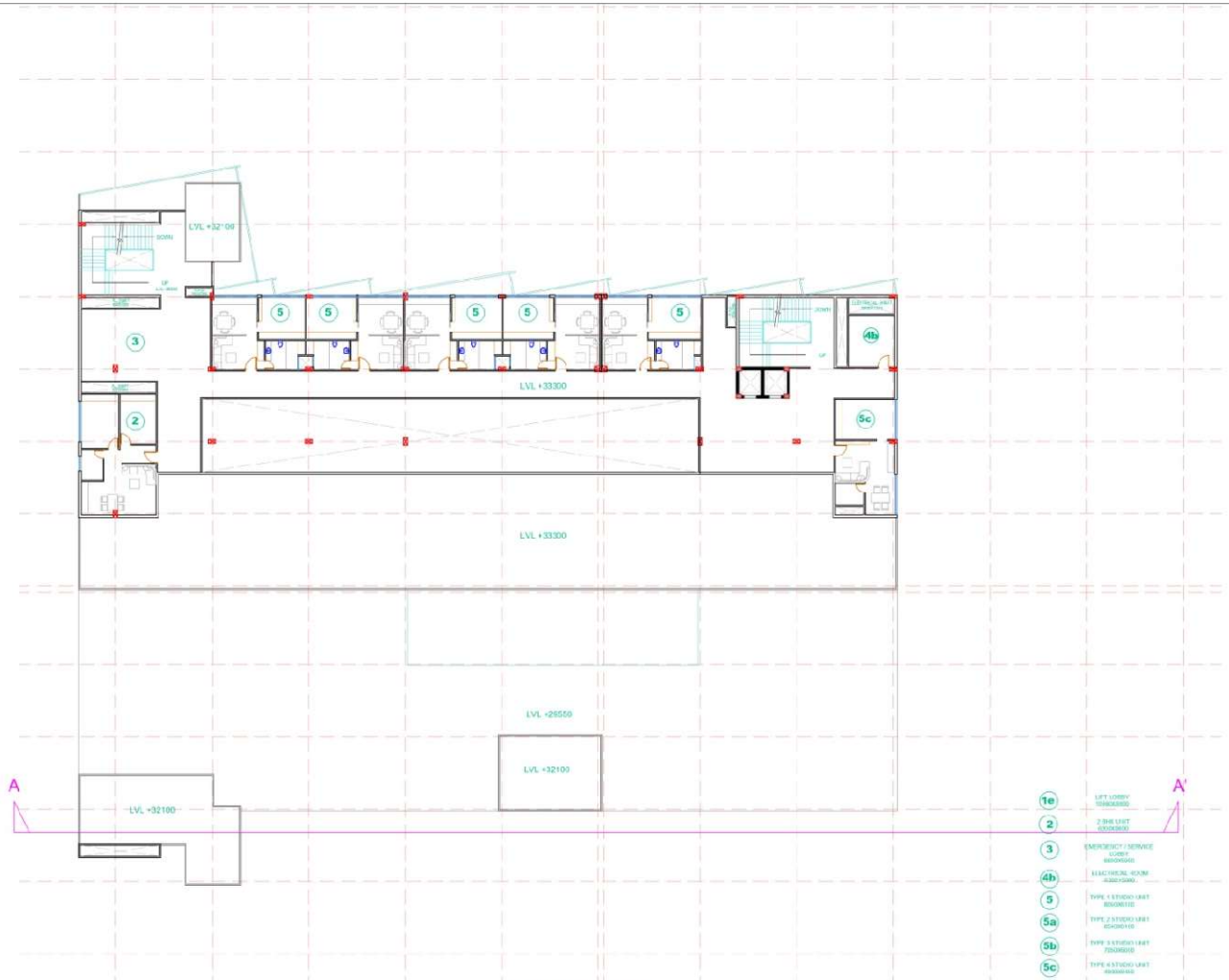
VINEET VINAY	SHEET TITLE
UNI. ROLL NO. : 115101085	**AMENITY TOWER**
THESIS YEAR - 2019/20	SCALE
B.B.D.U , L.K.O	**1:250**



EIGHTH FLOOR
(PLAN AT LVL +31050)

AMPHIBIAN ARCHIPELAGO : A SUSTAINABLE NEIGHBORHOOD

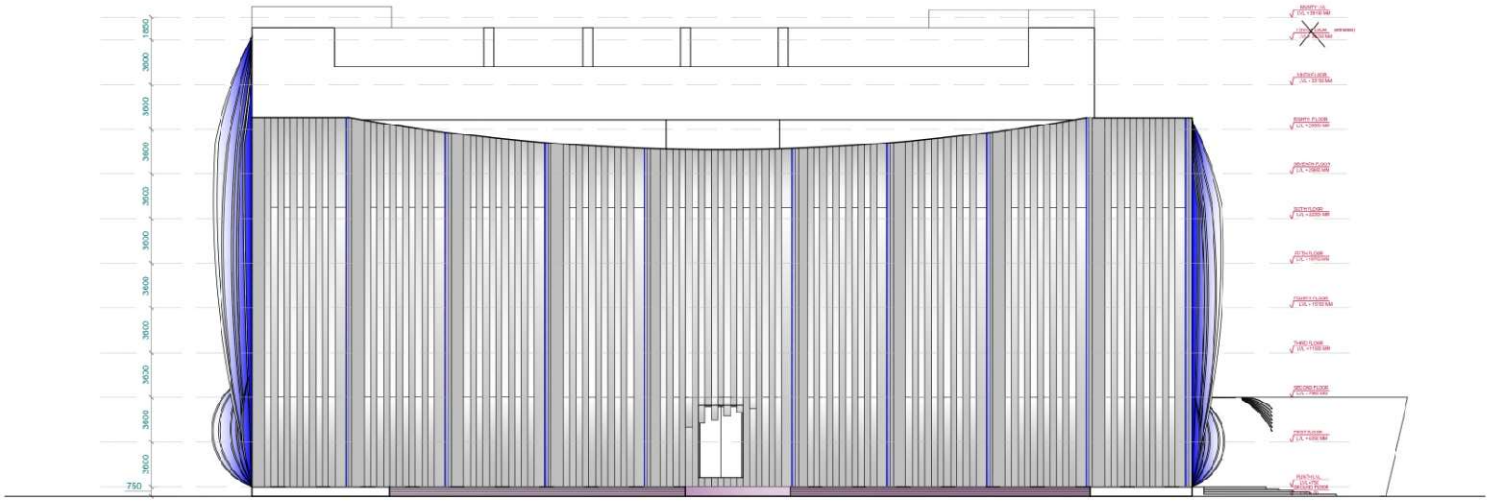
VINEET VINAY	SHEET TITLE
UNI. ROLL NO. : 115101085	**AMENITY TOWER**
THESIS YEAR - 2019/20	SCALE
B.B.D.U , L.K.O	**1:250**



NINTH FLOOR
(PLAN AT LVL +34650)

AMPHIBIAN ARCHIPELAGO : A SUSTAINABLE NEIGHBORHOOD

VINEET VINAY	SHEET TITLE
UNI. ROLL NO. : 115101085	**AMENITY TOWER**
THESIS YEAR - 2019/20	SCALE
B.B.D.U , L.K.O	**1:250**



FRONT ELEVATION

APPLIED SKIN

AMPHIBIAN ARCHIPELAGO : A SUSTAINABLE NEIGHBORHOOD

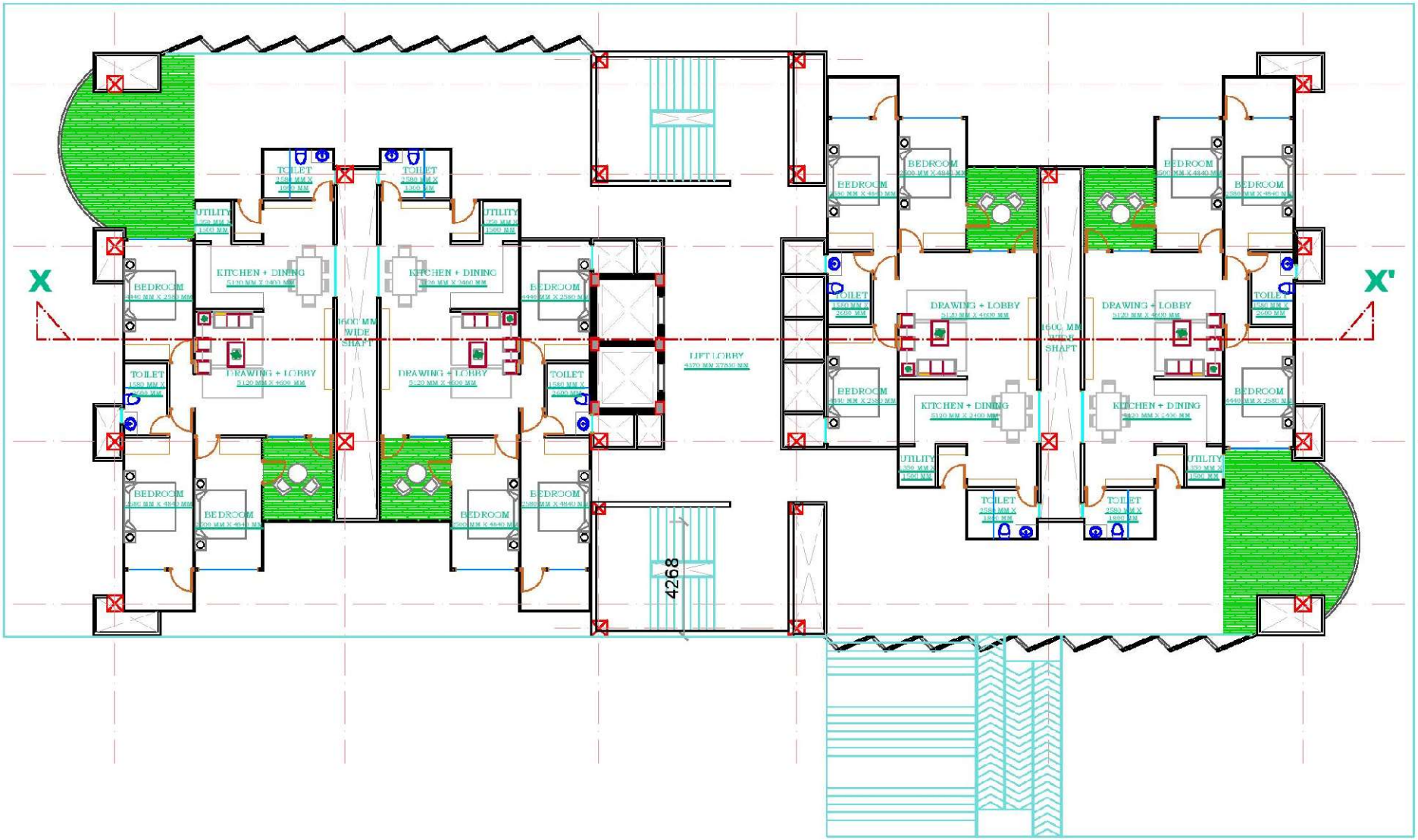
VINEET VINAY	SHEET TITLE
UNI. ROLL NO. : 115101085	**AMENITY TOWER**
THESIS YEAR - 2019/20	SCALE
B.B.D.U , L.K.O	**1:250**

SECTION AA'

AMPHIBIAN ARCHIPELAGO : A SUSTAINABLE NEIGHBORHOOD

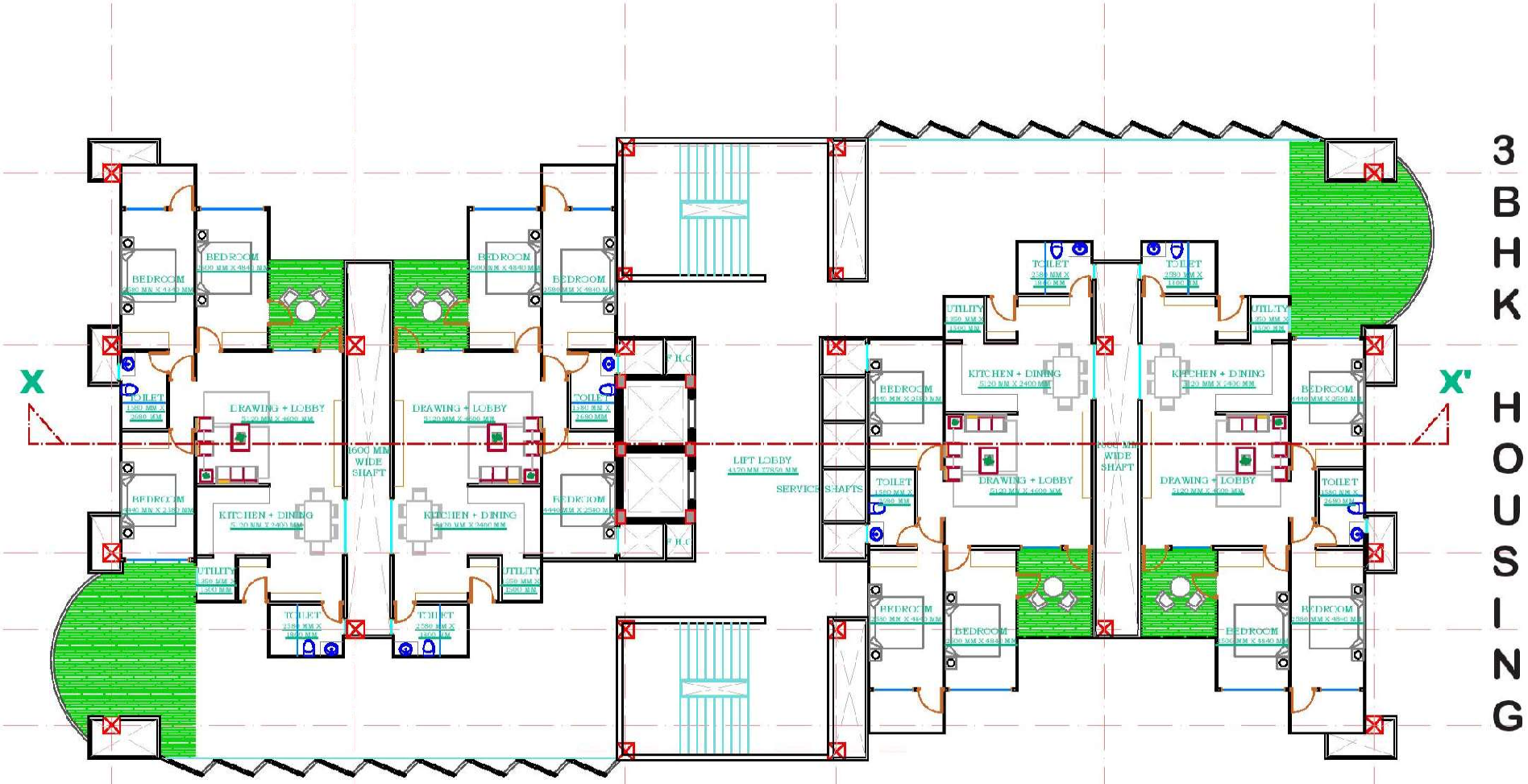
VINEET VINAY	SHEET TITLE
UNI. ROLL NO. : 115101085	**AMENITY TOWER**
THESIS YEAR - 2019/20	SCALE
B.B.D.U , L.K.O	**1:200**

4 BHK TOWER



FIRST FLOOR PLAN

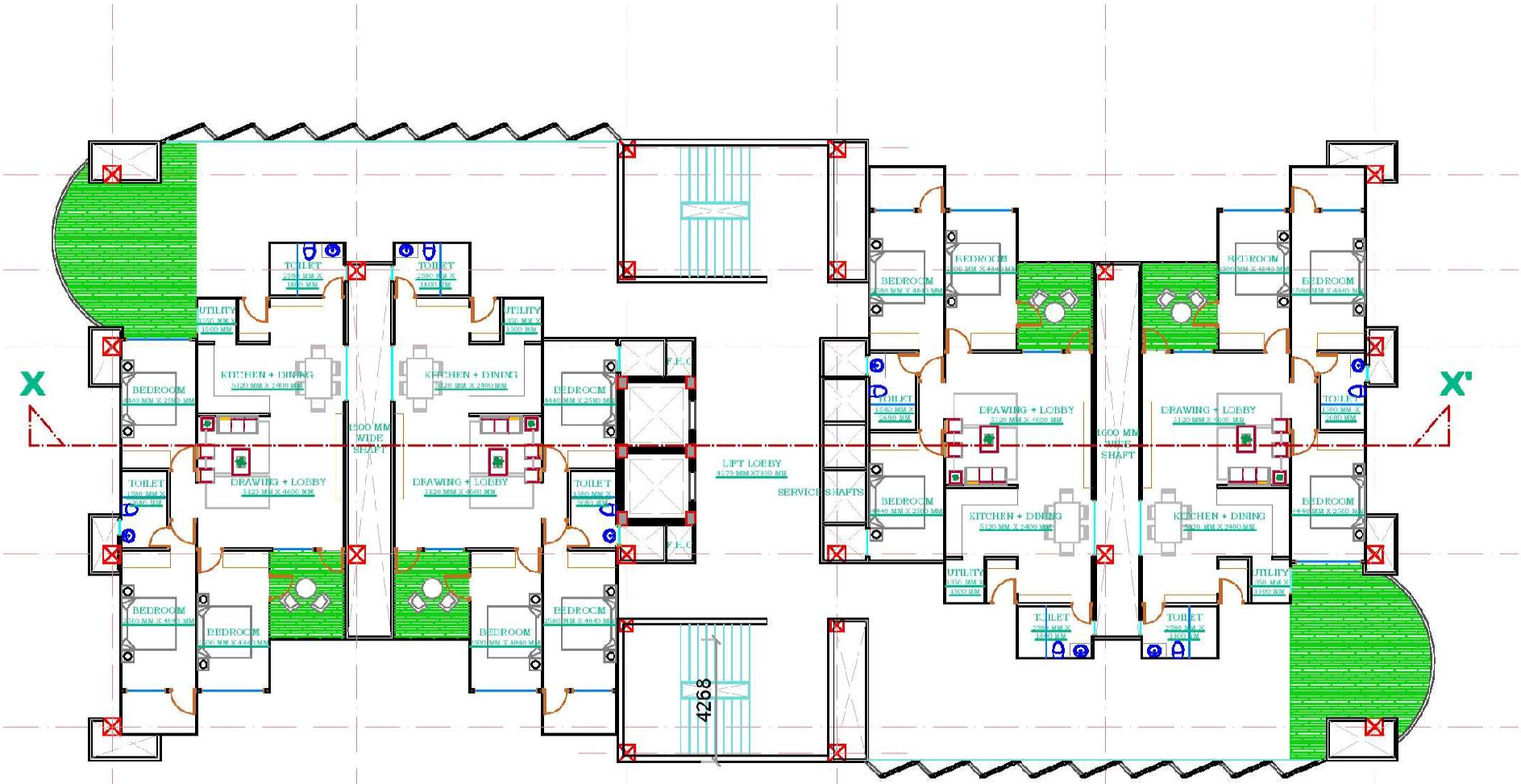
3 BHK HOUSING



SECOND/FIFTH/EIGHTH FLOOR PLAN

3 BHK HOUSING

SCALE :1 :200



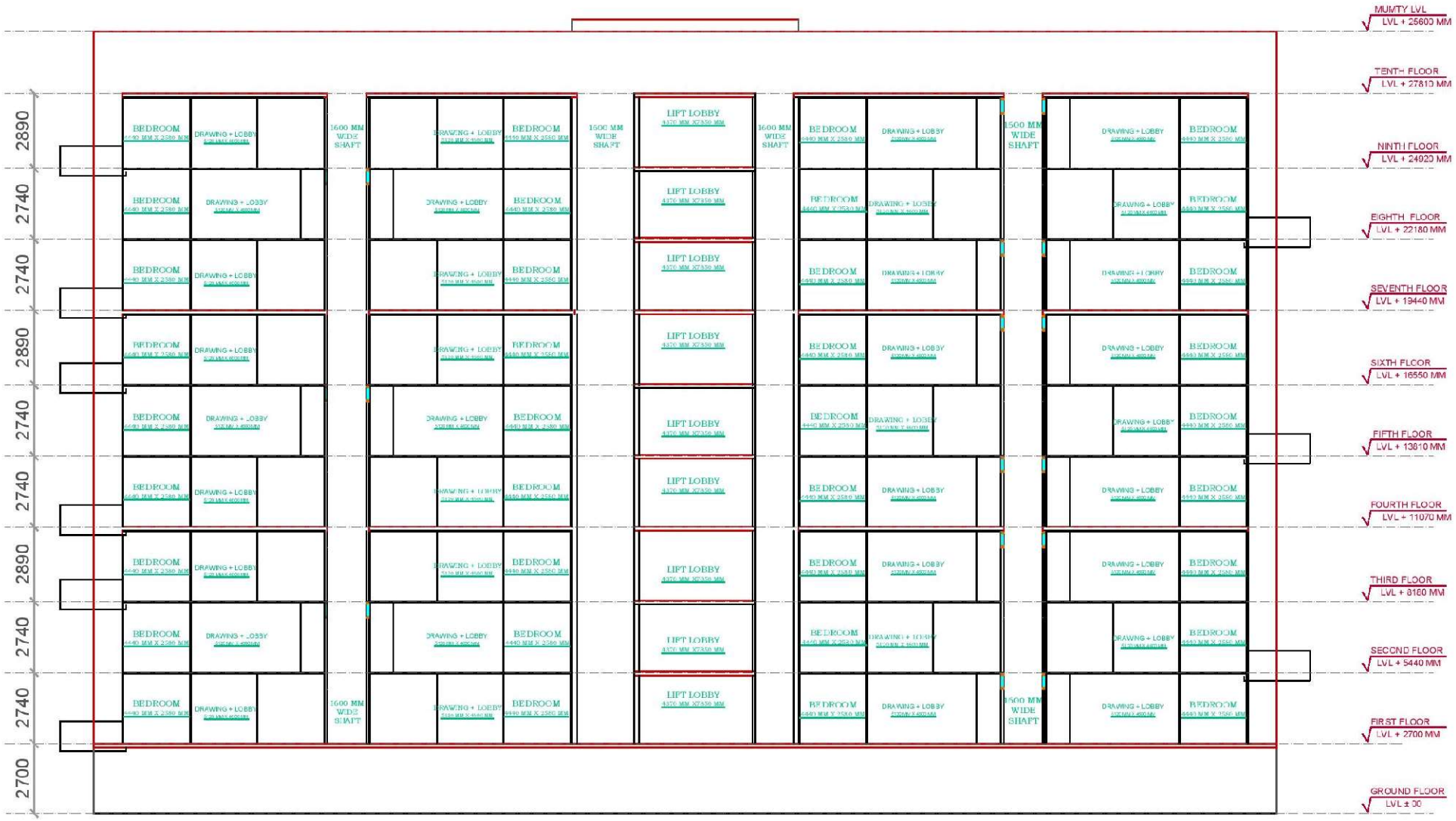
THIRD/FOURTH/SIXTH/SEVENTH/NINTH FLOOR PLAN

3 BHK HOUSING

FRONT ELEVATION

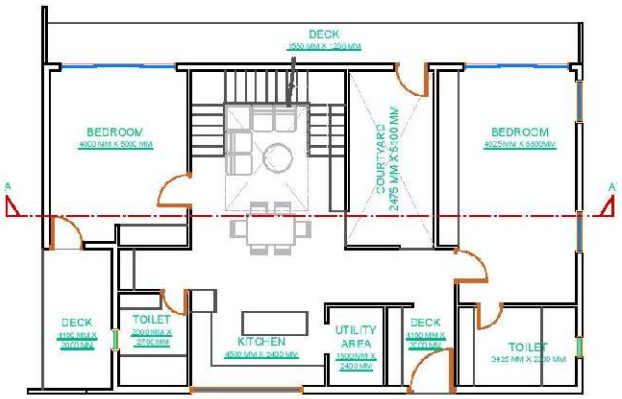
3 BHK HOUSING

SCALE : 1 :200

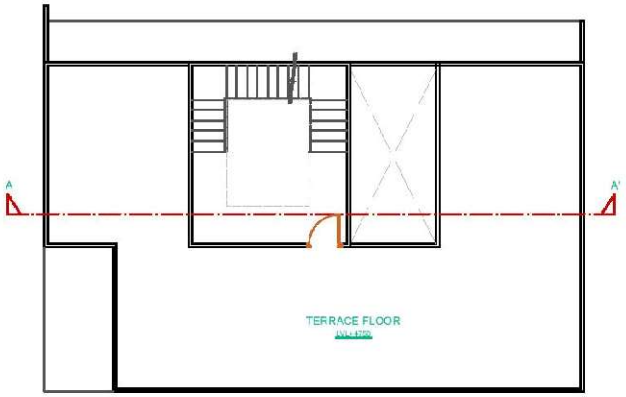


SECTION X-X'

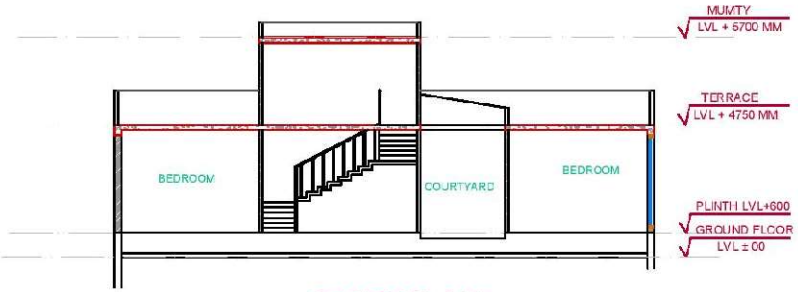
3 BHK HOUSING



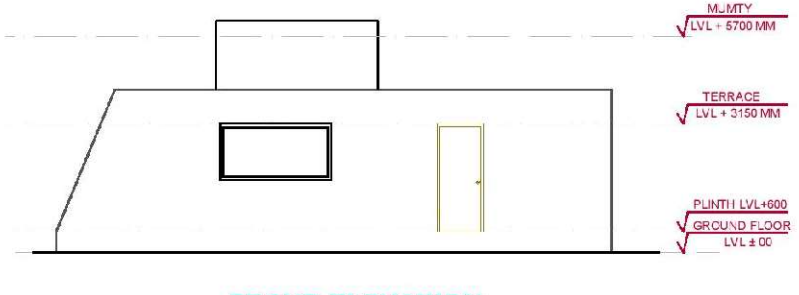
GROUND FLOOR PLAN



TERRACE FLOOR PLAN

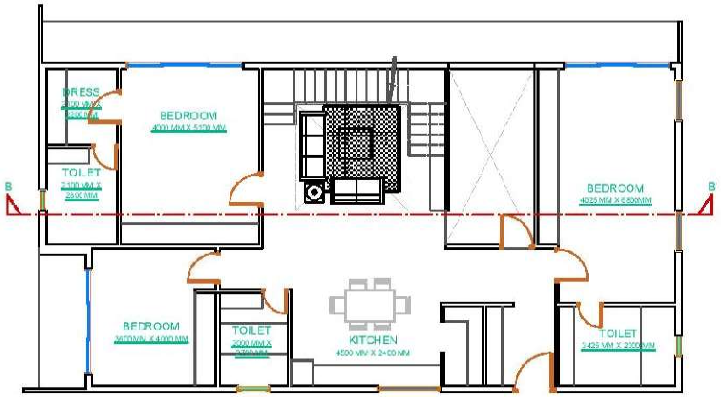


SECTION AA'

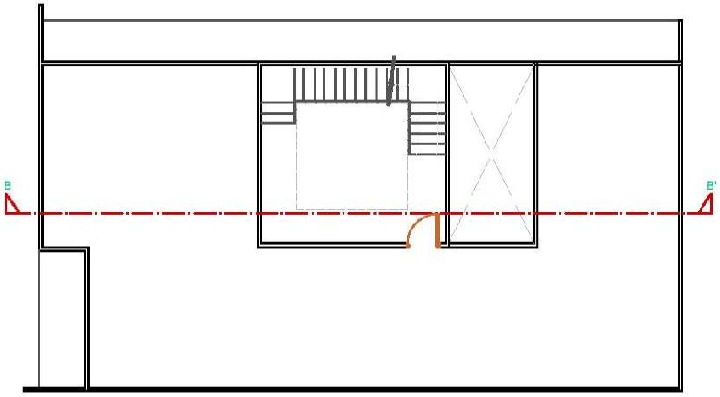


FRONT ELEVATION

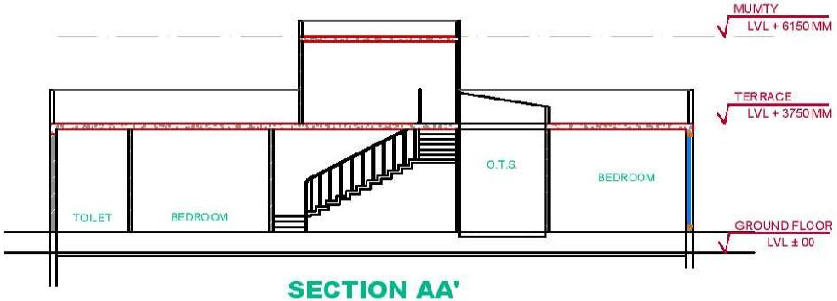
TOURIST VILA TYPE A



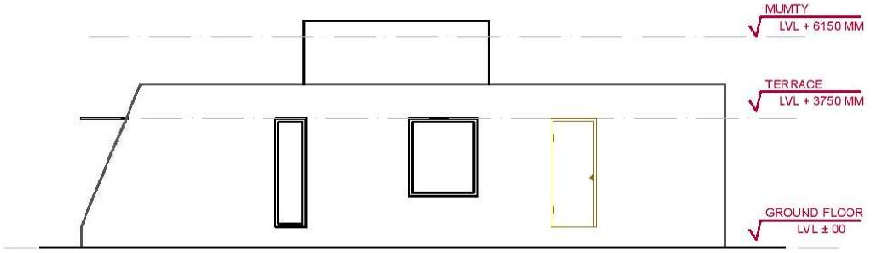
GROUND FLOOR PLAN



TERRACE FLOOR PLAN



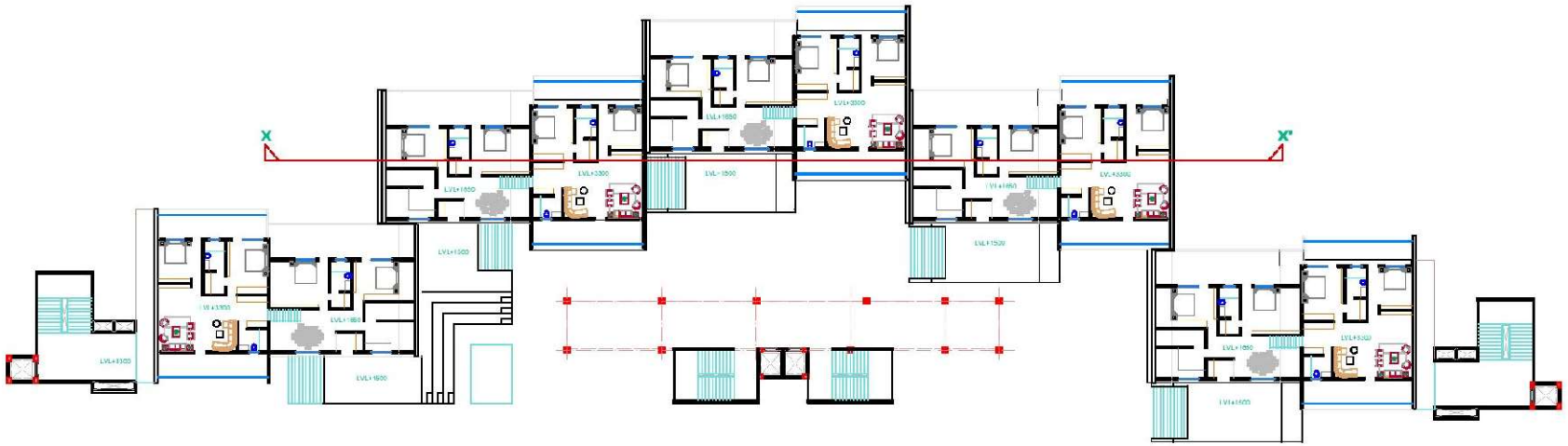
SECTION AA'



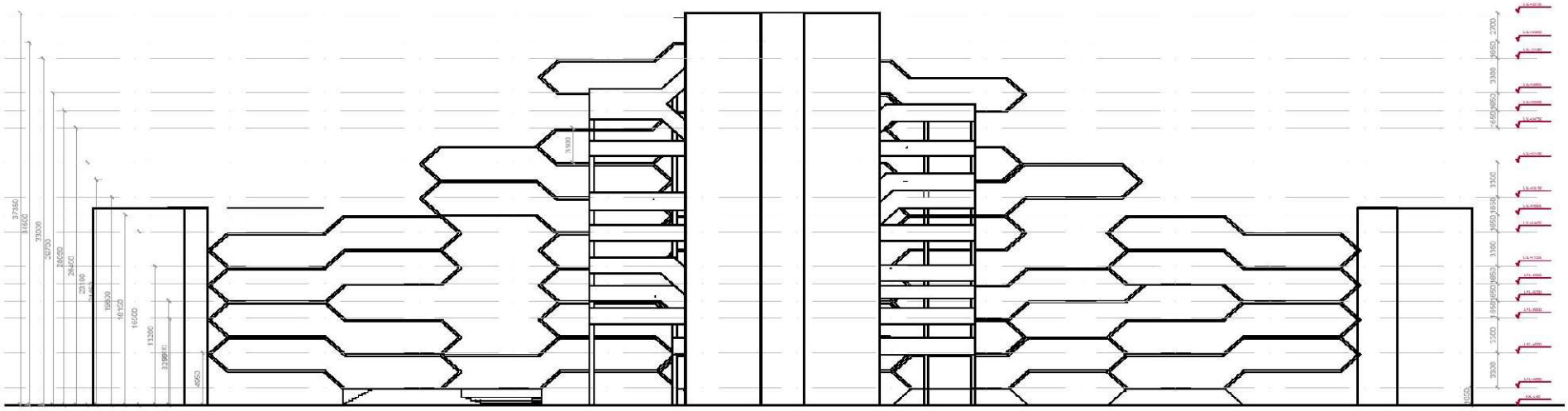
FRONT ELEVATION

TOURIST VILA TYPE B

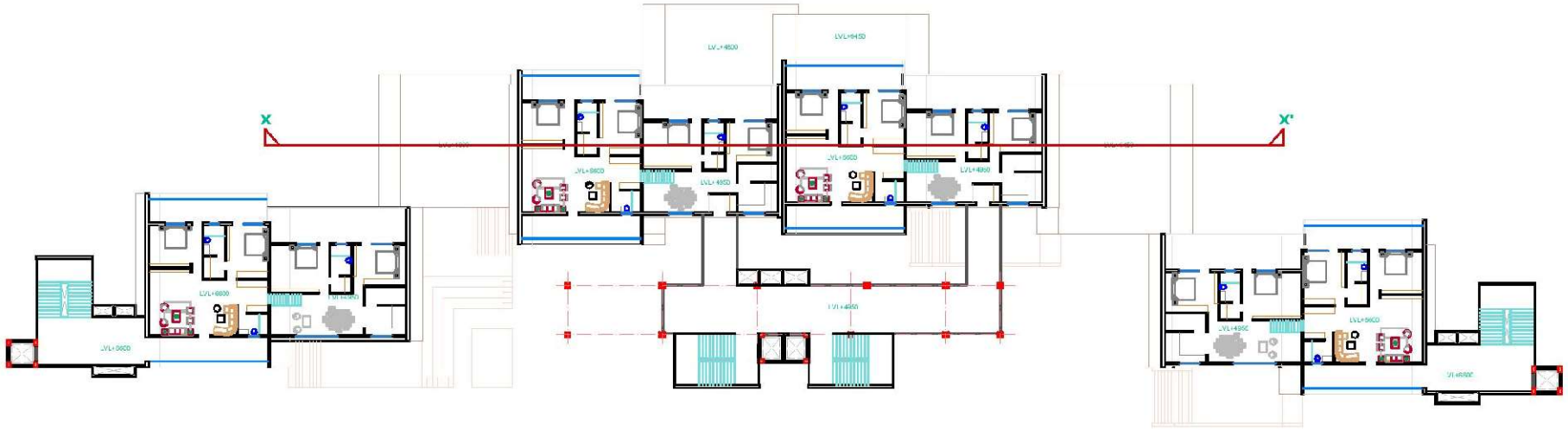
4 BHK TOWER



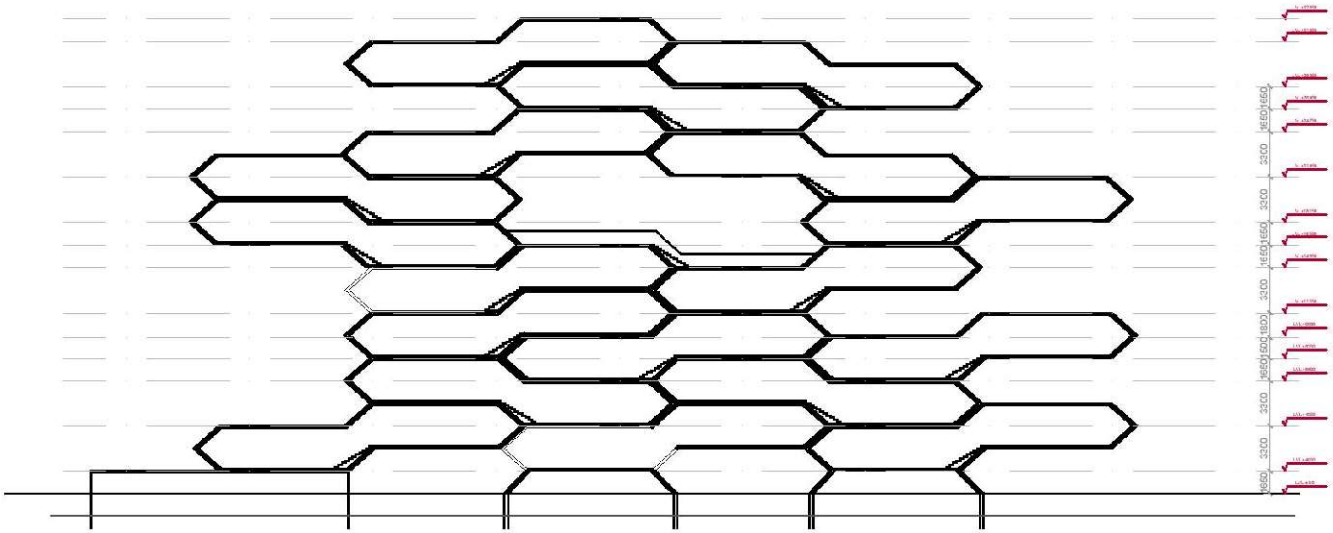
PLAN AT LVL+3900



SCALE :1 :250



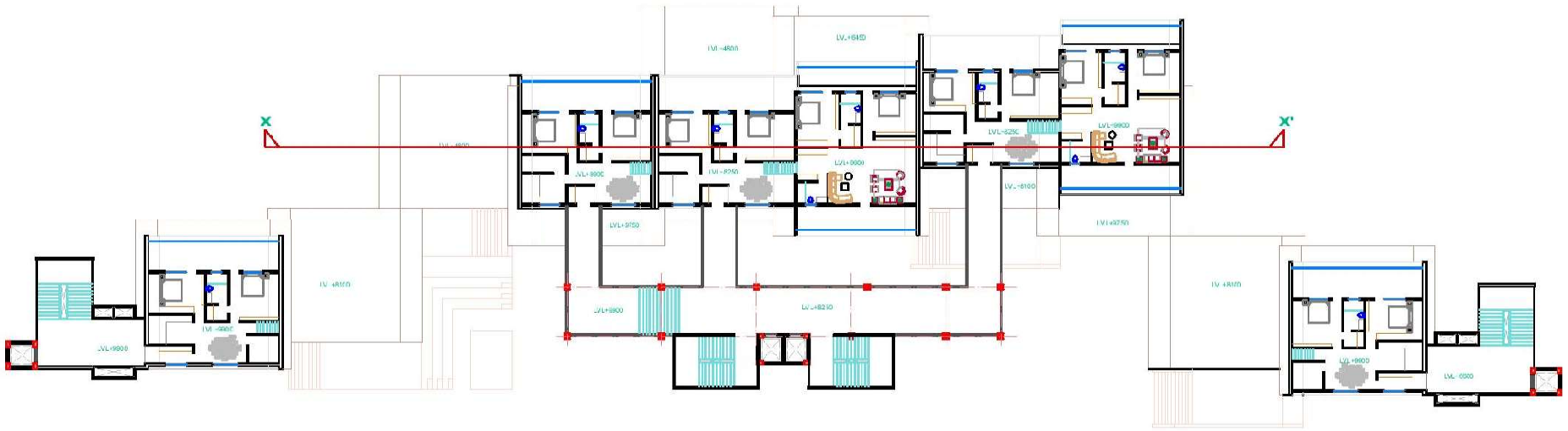
PLAN AT LVL+7200



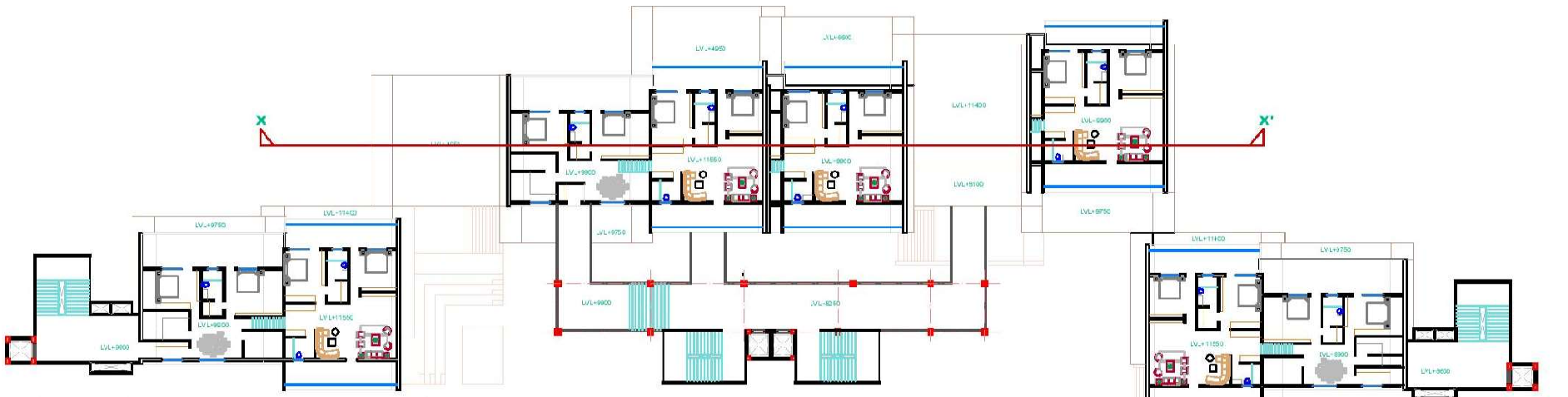
4 BHK HOUSING CLUSTER

SECTION A-A'

SCALE :1 :250



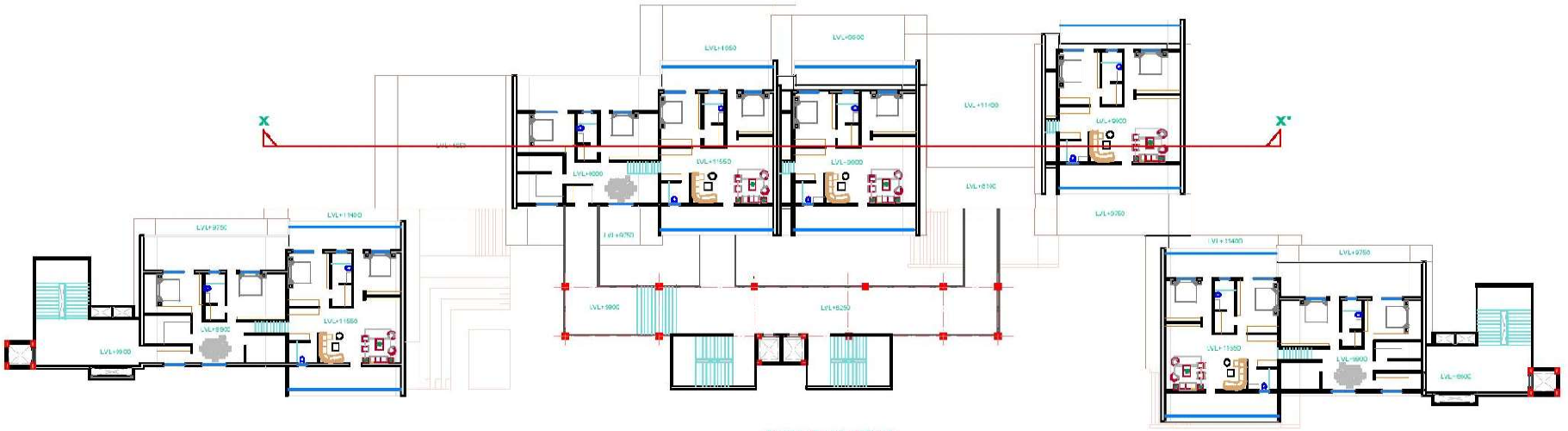
PLAN AT LVL+10500



PLAN AT LVL+12300

4 BHK HOUSING CLUSTER

SCALE : 1 :250

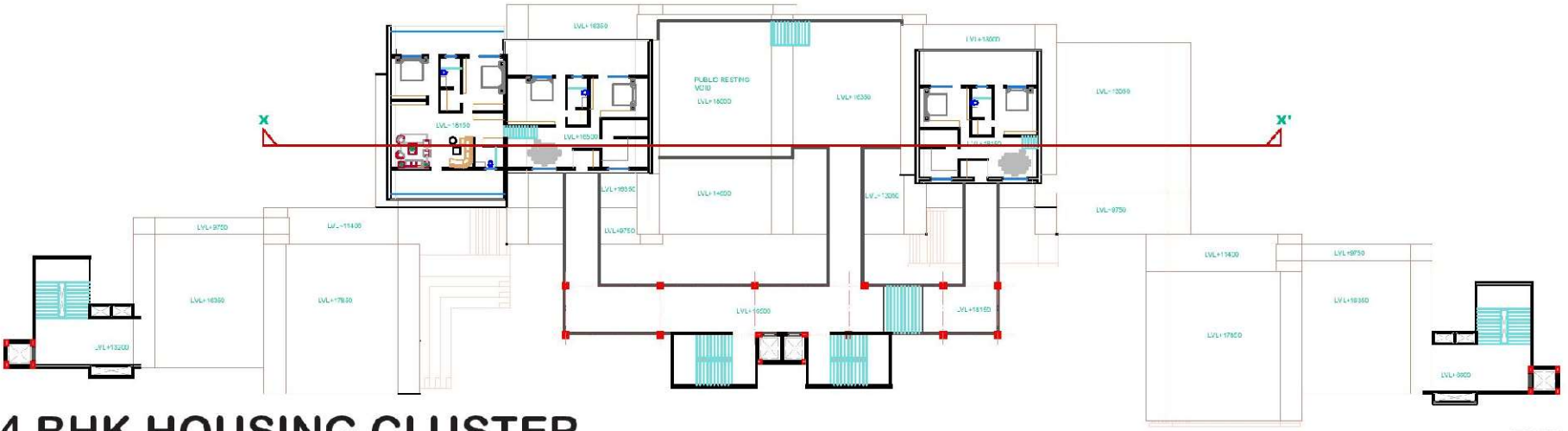


PLAN AT LVL+12300

SCALE :1 :250

PLAN AT LVL+15600

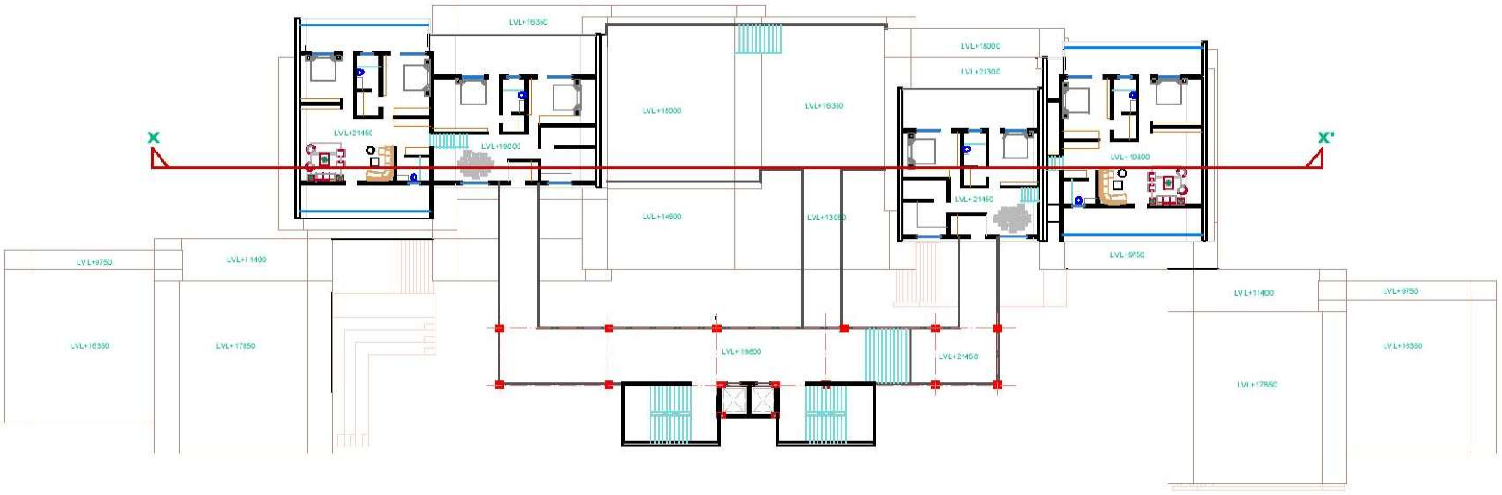
PLAN AT LVL+15600



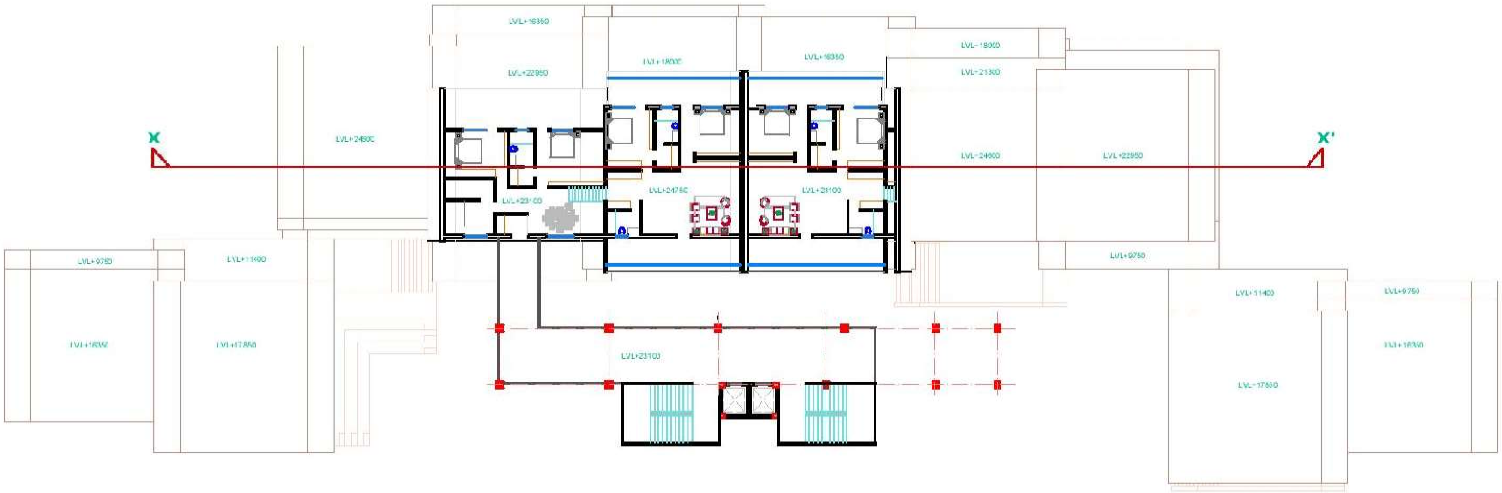
4 BHK HOUSING CLUSTER

PLAN AT LVL+18900

SCALE :1 :250



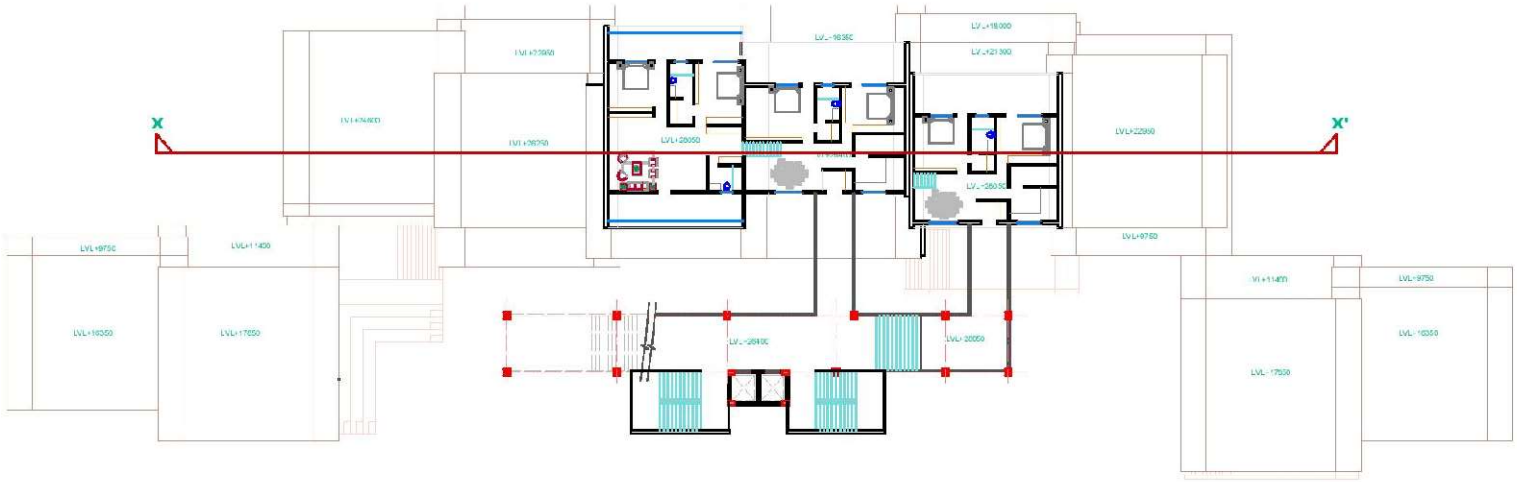
PLAN AT LVL+22100



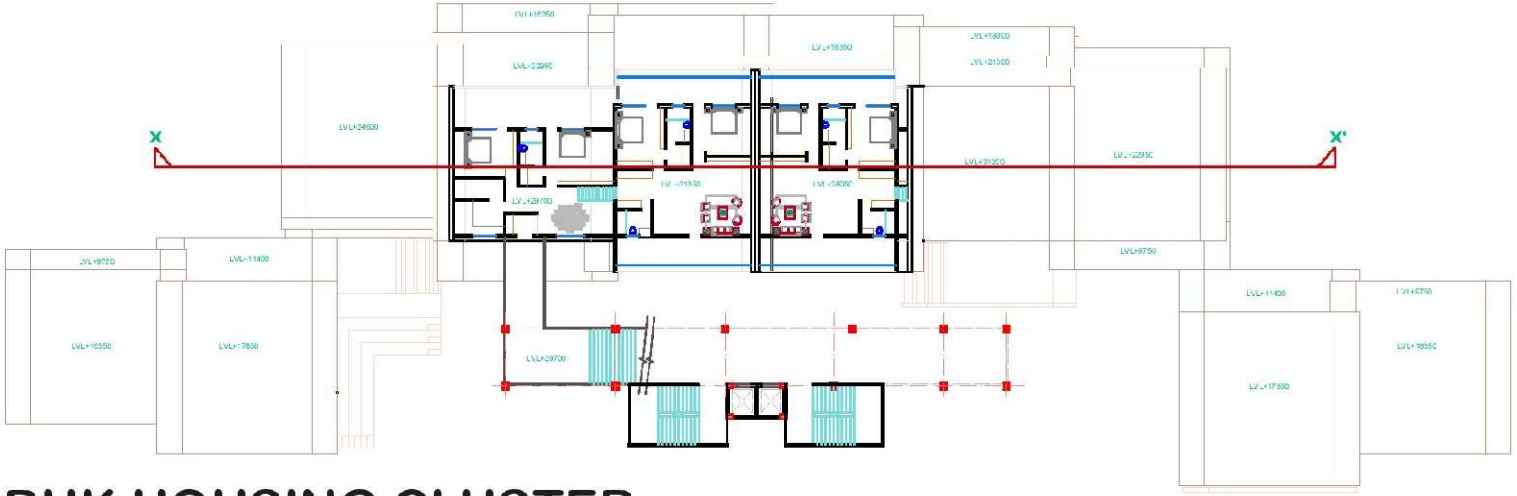
4 BHK HOUSING CLUSTER

SCALE :1 :250

PLAN AT LVL+25400



PLAN AT LVL+28700



SCALE :1 :250

4 BHK HOUSING CLUSTER

PLAN AT LVL+32000