

MIXED-USE SKYSCRAPER

A THESIS

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Architecture degree

By

KIRTHICK.J

(39210040)



**DEPARTMENT OF ARCHITECTURE
SCHOOL OF BUILDING AND ENVIRONMENT**

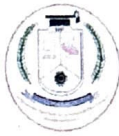
SATHYABAMA

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BONAFIDE CERTIFICATE

This is to certify that Thesis Report is the bonafide work of **KIRTHICK J(39210040)** who carried out the Thesis entitled "**MIXED-USE SKYSCRAPER**" under our supervision from December 2023 to May 2024

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I, **KIRTHICK J** hereby declare that the Thesis Report entitled "Shopping mall" done by me under the guidance of **Ar. Evelyn Jeny** (Internal Guide), **Ar. Esther Kiruba Jebakumar Clifford** (Internal Review Member) and **Ar. Tahaer Zoyab** (External Guide) Sathyabama Institute of Science and Technology is submitted in partial fulfillment of the requirements for the award of Bachelor of Architecture Degree.

DATE: 24/05/2024

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I convey my thanks to **Dr.Devyani Gangopadhyay**, Dean and Head of the Department, School of Building and Environment, Our Design Chair **Ar Sarath c kanth**, Thesis Coordinator **Ar.Mohana Gopiraj** for providing me necessary support and details at the right time during the progressive reviews.

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KIRTHICK J

THESIS SYNOPSIS

Vertical mixed-use community. What is it you might ask? Well, it's exactly what you might think it is. It is a neighbourhood, like any other along a street, only turned vertical into the sky. It is an idea that has been around since the first skyscrapers were built in the late 1880s but have only just now been gaining traction in the building community.

This is in part because of two problems.

One has to do with economics, more diversity means more occupants which translates into more money for the owner. As Architects know, economics drives projects but designing for money yields little reward, because the major, and second issue has to do with the people who occupy these monumental structures.

When a tall building is constructed, floor plate after floor plate is constructed one on top of another, but this creates isolation for the occupants of each floor. Employees of Sears back in the 1970s quickly realized this problem when they were unable to see old colleagues they used to work with regularly.

Modern buildings have only started to investigate mixing program with a single tower, but have only just varied it slightly to keep the economics as high as possible. But the problem with isolation needs a more drastic approach, one where floors are broken and easily reached from one another. With this approach, more creativity with space can be explored and hopefully spark new ideas to improve upon what has already been started.

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CHAPTER 1

INTRODUCTION

Mixed use development is a type of urban development that blends residential, commercial, cultural, or recreational uses where those functions are physically and functionally integrated, and that provides pedestrian connections.

Traditionally human's settlements have developed in mixed use pattern

However, with the industrialization as well as the invention of the skyscraper government zoning regulations were introduced to separate different function such as manufacturing to the residential areas. But since 1990s, mixed zoning has once again become desirable as the benefits are recognized.

Today, it is impossible to imagine major cities without tall buildings. Tall buildings become the famous land marks of the cities, symbol of power, confidence in technology and a mark of the national pride.

The feasibility and desirability of tall buildings have always depended on the available materials, the level of the construction technology and the state of development of the necessary services for the use of the building.

Therefore, advances in analytical techniques, structure design concepts, and high strength materials have made that possible to construct tall buildings.

However, every advantage in height comes with disadvantages, as the increased flexibility makes contemporary tall buildings much more vulnerable to wind loads, which leads to horizontal vibration.

Primarily tall buildings are designed to serve the needs of the users. And in addition to that it is important to satisfy the structure and safety of the users. So that the dynamic nature of the wind is a critical issue, which affects the user's comfort and the services. Therefore, various design methods and modifications are made possible in order to ensure the functional performances of flexible structures and control of the winds in the tall buildings

1.2 AIM

To design a high rise building which will definitely mark a change in the skyline of a metropolitan city in India, which will form a landmark for that particular place and further on create its own identity, that supports a variety of residence, commercial, office and retail space. With the integration of kinetic architecture

1.3 OBJECTIVE

To support the smart growth development rather than urban and sub urban sprawl.

To design spaces which enhances the physical and visual interactions.

To understand the concept of the sustainability and the various issues like climate change, ecological foot print, site amenities, etc...

Priority to the sustainable materials and functional requirements in the design, while integrating services into the design

To familiarise with the passive design considerations, day lighting and natural ventilation in building design and creating sustainable built environment

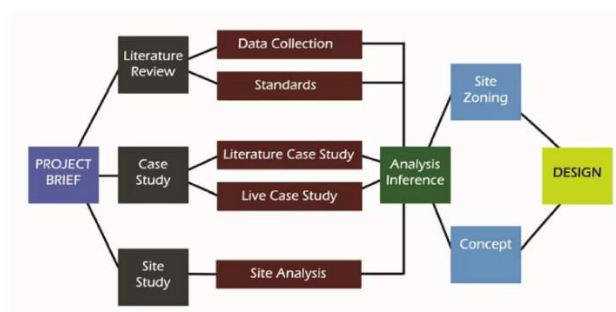
1.4 SCOPE AND LIMITATION

The scope of work in mixed use development is to study and analysis the usage of space, structures, ME services, HVAC, and also implementing the passive design (form and orientation, shading, cool roofs, fenestration, insulation, day lighting, energy and cost saving, etc...) luminaries, efficient appliances, renewable energy like solar PV, wind, etc...

1.5 METHODOLOGY

Literature study - data collections, standards

- Case study - literature case study, live case study
- Site study - site analysis
- From those, analysis inference is taken.
- Analysis inference- site zoning and concept
- Design progress
- And then final design and detailed drawings is given as output



CHAPTER 2

LITERATURE CASE STUDIES

2.1 LIVE CASE STUDY,(UB CITY , BANGALORE):

2.1.1 INTRODUCTION:

UB City is the biggest luxury commercial property project in Bangalore, India. It is built on 13 acres (53,000 m²) of land and hosts 1,000,000 sq ft (93,000 m²) of high- end commercial, retail and service apartment space. UB City has four towers namely, UB Tower (19 Floors), Comet (11 Floors), Canberra (17 Floors) and Concorde (19 Floors).

Architect : Thomas associates,Bangalore

Main contractor : prestige group

Centrally located in the CBD (Central Business District), on the corner of Kasturba road and Vittal Mallya Road, it is just 1.8kms away from M.G. Road - Brigade road junction.

UB city is one of largest mixed use development projects in Bangalore. UB City sprawls over a campus of 7 acres of which a third of it is reserved for landscaped gardens. UB CITY will house the UB Group offices under one roof in the UB Tower. 'Concorde' & 'Canberra' will have retail space on the lower floors and office space in the higher levels, while 'Comet will have service apartments. The campus will house commercial offices, banks, high-end retail stores, serviced apartments, restaurants, food courts, pubs, health clubs and cafe.

Multi-level parking areas will offer virtually unlimited parking spaces. Also on the blueprint is an amphitheatre with food courts and landscaped gardens. UB CITY will provide parking space for over 1,100 cars.

High Performance Products glass were used in the façade to achieve the twin functions of abundant light transmission and lower Relative heat gain. In order to

ensure that traffic within UB CITY'S sprawling seven acres and si properly regulated, a traffic consultant has been specially hired.

2.1.2 CONCORDE BLOCK :

These are the luxury brands which are present in the ground floor.

Chocolate D'Luxe | Bottega | Burberry | Canali | Centarom | Corneliani | Diesel |
Emporio Armani | Floradelie | Hackett | Jimmy Choo | Louis Vuitton | Michael
Kors | Mirrors & Within | Rolex | Salvatore Ferragamo | 3M Car Care



Fig 2.1 VIEW

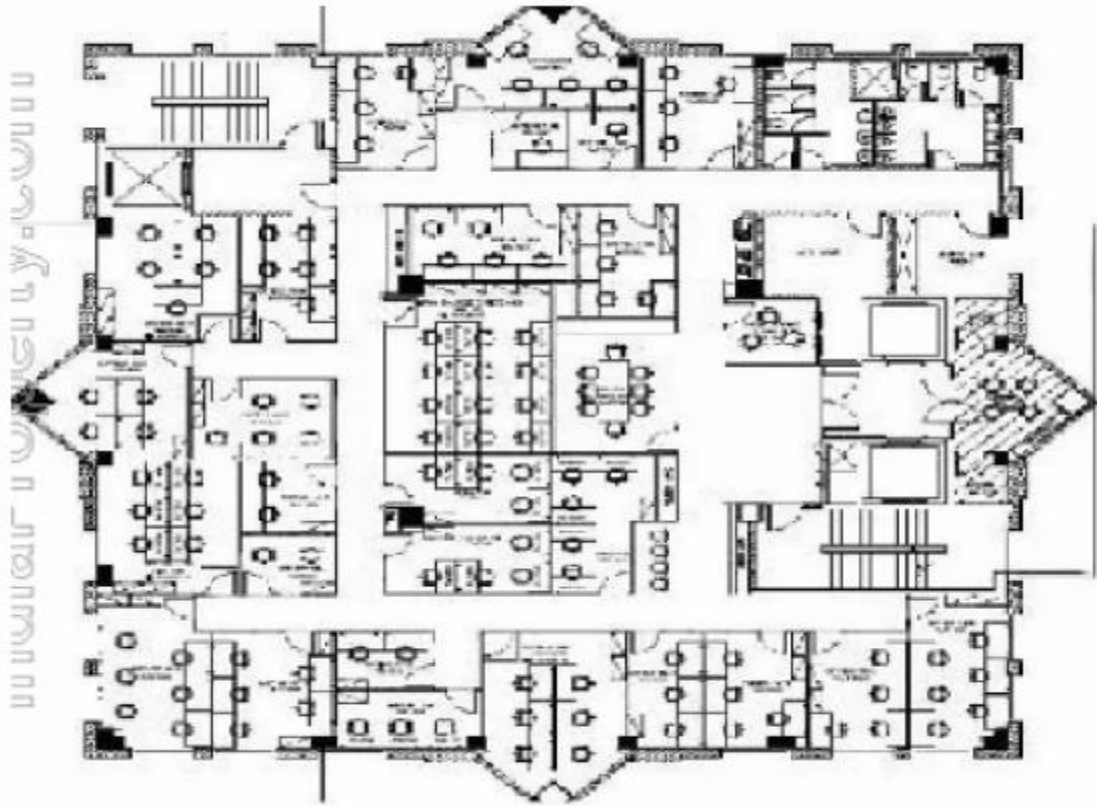


Fig 2.2 PLAN

2.1.3 COMET BLOCK :

Comet will have serviced apartments. It will house commercial offices, banks, high-end retail stores, a five star hotel, serviced apartments, restaurants, food courts, pubs, health clubs and cafes.

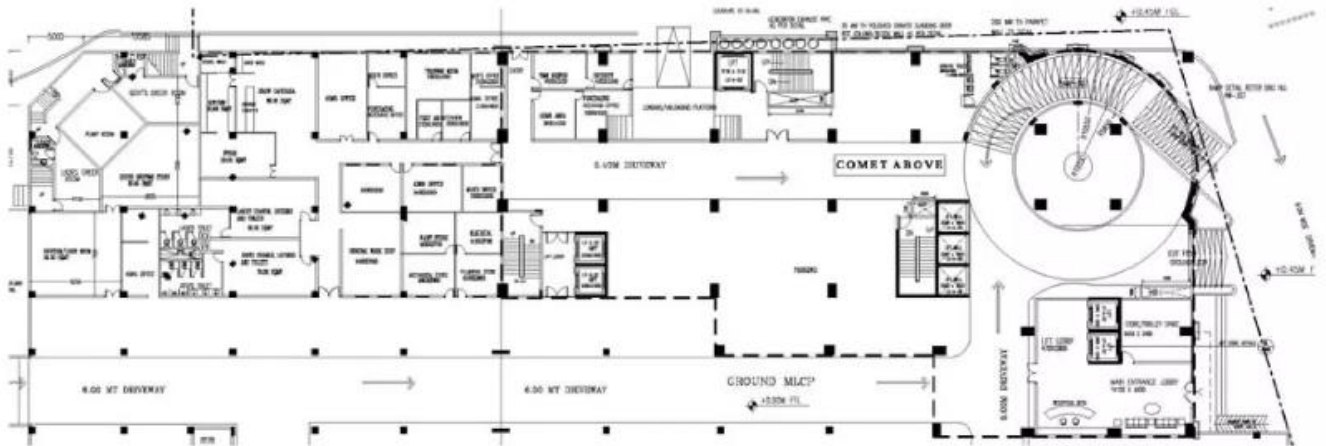


Fig 2.3 PLAN



Fig 2.4 SIDE VIEW

2.1.4: SERVICES

2.1.4.1: AMPHI THEATER:

UB City, India's first luxury mall houses some of Bangalore's finest attractions, the Amphitheatre being one of them. A first of its kind, the Amphitheatre at UB City has been constructed with a seating capacity of 1000 people and a stage dimension of 500sq ft with such an expansive setup, the Amphitheatre has played host to some of Bangalore's most spectacular events.



Fig 2.5 OAT

2.1.4.2 : PARKING SPACE

One common basement for the entire UB City and extensive surface level car parks, will provide UB City the remarkable prospect of offering virtually unlimited car parking space.

UB CITY will provide parking space for over 1100 cars. In order to ensure that traffic within UB CITY's sprawling seven acres and is properly regulated, a traffic consultant has been specially hired.



Fig 2.6 PARKING

2.1.4.3 : WATER SUPPLY SYSTEM:

Water Supply is thro the pressurised booster pump. 100 % generator service for all blocks Building is tohigh risey controlled by BMS system.



Fig 2.7 WATER SUPPLY SYSTEM



Fig 2.7 WATER SUPPLY SYSTEM

2.1.4.4 : ROOFING SYSTEM :

Coffer slab is designed to achieve large span



Fig 2.8 ROOFING VIEW

UB CITY

INTRODUCTION

UB City is the biggest luxury commercial property project in Bangalore, India. It is built on 13 acres (53,000 m²) of land and hosts 1,000,000 sq ft (93,000 m²) of high-end commercial, retail and service apartment space. UB City has four towers namely, UB Tower (19 Floors), Comet (11 Floors), Concorde (17 Floors) and Canberra (19 Floors).

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High Performance Products glass were used in the facade to achieve the twin functions of abundant light transmission and lower Relative heat gain. In order to ensure that traffic within UB CITY's sprawling seven acres and is properly regulated, a traffic consultant has been specially hired.

CONCORDE / CANBERA BLOCK:

These are the luxury brands which are present in the ground floor. Chocolate D'Lux | Bottega | Burberry | Canali | Cartier | Cornelli | Diesel | Emporio Armani | Fioradelle | Hackett | Jimmy Choo | Louis Vuitton | Michael Kors | Mirrors & Within | Rolex | Salvatore Ferragamo | 3M Car Care

GROUND FLOOR PLAN



In first floor the shops which presented are, AMPM | Arvate | Bialli | Buzatti | Ebon | L'Occitane | Longines | Minawala | Omega | Paul Smith | Rado | Rare Rabbit | Samsara | Swarovski | Selko | The Collective | Tumi | Villers & Bock | Zimson

FIRST FLOOR PLAN



In second floor the stores which is presented are, Bang & Olufsen | Citibank ATM | Imagine | Keel Toys | Ladro | Lotus Vibe Ona | One Roze | Samsung | Shimmer Piazza - Amande Patisserie | Cafe Mangli | Cafe Noir | Caperberry | Citibank

SECOND FLOOR PLAN



In second floor the stores which is presented are, Bang & Olufsen | Citibank ATM | Imagine | Keel Toys | Ladro | Lotus Vibe Ona | One Roze | Samsung | Shimmer Piazza - Amande Patisserie | Cafe Mangli | Cafe Noir | Caperberry | Citibank



SITE PLAN:

An elevated roof top helipad will provide a five minute aerial commute to the airport. Four storeys of multi level parking, in addition to one common basement for the entire UB City and extensive surface level car parks, will provide UB City the remarkable prospect of offering virtually unlimited car parking space.

AMPHITHEATRE:

UB City, India's first luxury mall houses some of Bangalore's finest attractions, the Amphitheatre being one of them. A first of its kind, the Amphitheatre at UB City has been constructed with a seating capacity of 1000 people and a stage dimension of 500x ft with such an expansive setup, the Amphitheatre has played host to some of Bangalore's most spectacular events.



COMET :

Comet will have serviced apartments. It will house commercial offices, banks, high-end retail stores, a five star hotel, serviced apartments, restaurants, food courts, pubs, health clubs and cafes.

OAKWOOD PREMIER PRESTIGE BANGLORE :

Comprising 139 fully furnished residences, here is where you will find rest and privacy within an exclusive setting.

Studio - 440-540 SQFT

The studio apartment offers convenient and comfortable living, ideal for individual travelers and couples alike. The apartment comes fully equipped with a kitchen and a state-of-the-art home entertainment system.

One-Bedroom Apartment; 600-840 SQFT

The one-bedroom apartment features a bedroom and separate living area, equipped with a high-end home entertainment system. Additionally, the apartment includes a dining area, with an attached kitchen for food preparation.

Two-Bedroom Apartment: 1140-1450 SQFT

The two-bedroom apartment exemplifies ideal living for couples, or families of up to four members. Luxuriously furnished with elegant marble baths, the master bedroom features a built-in Jacuzzi and an additional LCD television to keep you entertained and relaxed at the end of the day.

PARKING SPACE:

One common basement for the entire UB City and extensive surface level car parks, will provide UB City the remarkable prospect of offering virtually unlimited car parking space.

UB CITY will provide parking space for over 1100 cars. In order to ensure that traffic within UB CITY's sprawling seven acres and is properly regulated, a traffic consultant has been specially hired.

WATER SUPPLY SYSTEM:

Water supply is thro the pressurised booster pump. 100 % generator service for all blocks Building is to high risey controlled by BMS system.

UB TOWER:



CONCORDE BLOCK:



CANBERA BLOCK:



Fig 2.9 CASE STUDY PLATE

CHAPTER 3

LIVE CASE STUDY

3.1 KOHINOOR SQUARE-MUMBAI

The Kohinoor Square, Mumbai's first mixed-use development project. Mixed-use development has emerged as the new trend in global cities. Keeping pace with this new paradigm shift in urban living, the iconic Kohinoor Square has put Mumbai on the world stage.

Sprawled across 2.6 million sq. ft. on 5 acres of land, Kohinoor Square has earned the status of housing one of India's tallest Commercial Towers. The Residential Tower abuts its fraternal twin. Apart from luxury residences, this project will see a heady mix of high-street retail arenas, signature dining spaces and 10 floors of parking at the most strategic location in Mumbai.

It is accessible with ease from both the Eastern and Western Express Highways. Dadar railway station is just a short walk away, offering access to Western & Central Railway. Also, the upcoming Dadar Metro Station is just across the street, ensuring connectivity and convenience.

3.1.1 CENTRAL CORE(OFFICE TOWER):

3 Lobbies of 6 Lifts serving levels 25th to 39th

- Spaces between the lifts where a lift lobby is not provided are used as toilets with dust at either side: 2 lifts from this pack of 6 are assessable to lower floors as well
- 1 lobby of 4 lifts serving levels 1st to 24th There is a lift bank at 24th floor.
- 2 services lifts travelling throughout the building.
- 2 Stair cases are also placed in the core

The Central Core is surrounded by the office spaces.

- There are segregated office space from 6th to 14 floor with toilets to each office and common toilets also provided on all these floor.

VRefuge Floors is provided.



Fig 3.1 LIFT LOBBY



3.1.2 DESIGN PLAN

SITE PLAN



Fig 3.2 SITE PLAN



Fig 3.3 PLAN 1



Fig 3.4 PLAN 2

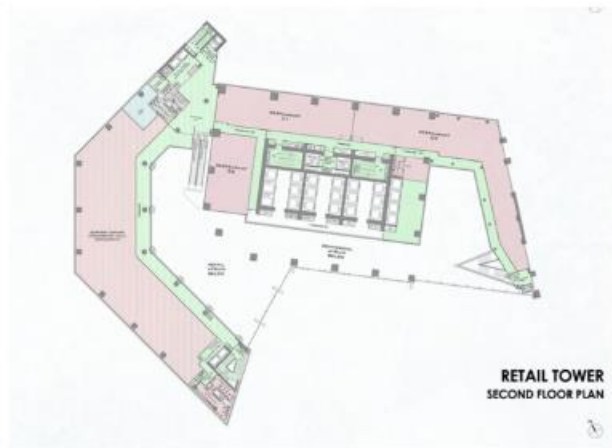


Fig 3.5 PLAN 3

3.1.3 SUSTAINABLE FEATURES:

Low flow faucets, dual flush toilets, grey water systems and storm water & rain water management systems - all the parts of our commitment to the environment.

1. Rain water collection.
2. Sky gardens
3. High performance façade.
4. High efficiency ventilation system.
5. Daylight harvesting & dimming controls.
6. Black & grey water reuse.
7. Environmentally preferable material.
8. Green roof.
9. Energy centre.
10. Native adapted landscape
11. Onsite waste water treatment.

12. Recyclable sorting & collection.

13. Natural ventilation.

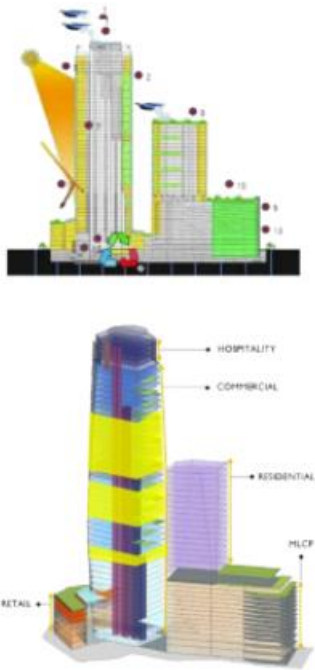


Fig 3.6 SECTION

3.1.4 FOUNDATION:

- The combined pile raft foundation system is used.
- It is a geotechnical composite construction that combines the bearing effect of both foundation elements raft and piles.
- The pile raft foundation system has recently been widely used for many structures, specially in high-rise buildings.

KOHINOOR SQUARE-MUMBAI

INTRODUCTION

The Kohinoor Square, Mumbai's first mixed-use development project. Mixed-use development has emerged as the new trend in global cities. Keeping pace with this new paradigm shift in urban living, the iconic Kohinoor Square has put Mumbai on the world stage.

Sprawled across 2.6 million sq. ft. on 3 acres of land, Kohinoor Square has earned the status of housing one of India's tallest Commercial Towers. The Residential Tower abuts its fraternal twin. Apart from luxury residences, this project will see a heady mix of high-street retail arenas, signature dining spaces and 18 floors of parking at the most strategic location in Mumbai.

It is accessible with ease from both the Eastern and Western Express Highways. Dadar railway station is just a short walk away, offering access to Western & Central Railway. Also, the upcoming Dadar Metro Station is just across the street, ensuring connectivity and convenience.

DESIGN CONCEPT:

The design for the 203-meter Kohinoor Square tower is inspired by one of the largest diamonds in the world. (51+ GROUND FLOOR)

- The Council on Tall Buildings and Urban Habitat (CTBUH) certified it as the tallest commercial tower in India in 2012.
- Designed to achieve LEED Gold certification, the building offers 15 landscaped sky gardens, more than a dozen terraces, vegetated wall systems, low-flow faucets and dual-flush toilets.
- In order to create a luxurious aura of space, the architects have designed the Kohinoor Square in such a way that all RCC pillar structures are situated in the center, leaving office spaces completely unencumbered and pillar less.

DESIGN PLAN

SITE PLAN



CENTRAL CORE(OFFICE TOWER):

- 3 Lobbies of 6 Lifts serving levels 25th to 30th
 - Spaces between the lifts where a lift lobby is not provided are used as toilets with dust at either side; 2 lifts from this pack of 6 are accessible to lower floors as well
 - 1 lobby of 4 lifts serving levels 1st to 24th There is a lift bank at 24th floor.
 - 2 services lifts travelling throughout the building.
 - 2 Stair cases are also placed in the core
- The Central Core is surrounded by the office spaces.
- There are segregated office space from 6th to 14 floor with toilets to each office and common toilets also provided on all these floor.
- VRefuge Floors is provided.

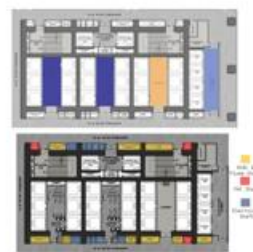
STRUCTURAL SYSTEM:

- The structure comprises a concrete core and post-tensioned concrete slab and spandrel beams.
- The average centre to centre distance between columns is 9.5 m.
- The column is of 1.8 x 1.8m.
- The tube system concept is based on the idea that a building can be designed to resist lateral loads.
- This assembly of columns and beams forms a rigid frame that amounts to a dense and strong structural wall along the exterior of the building.



FOUNDATION:

- The combined pile raft foundation system is used.
- It is a geotechnical composite construction that combines the bearing effect of both foundation elements raft and piles.
- The pile raft foundation system has recently been widely used for many structures, specially in high-rise buildings.



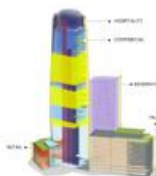
MECHANICAL SYSTEM:

Kohinoor square has a well designed HVAC system for its ventilation purposes. As it is a glass enveloped structure the load of mechanical ventilation is also high.

The cooling towers are situated near water tanks at some level in the buildings.

SUSTAINABLE FEATURES:

- Low flow faucets, dual flush toilets, grey water systems and storm water & rain water management systems – all the parts of our commitment to the environment
- Rain water collection.
 - Sky gardens
 - High performance facade.
 - High efficiency ventilation system.
 - Daylight harvesting & dimming controls.
 - Black & grey water reuse.
 - Environmentally preferable material.
 - Green roof.
 - Energy centre.
 - Native adapted landscape
 - Onsite waste water treatment.
 - Recyclable sorting & collection.
 - Natural ventilation.



MAINTOWER:

- The first five floors of the main building is used for a high-end shopping mall and the remaining 47 floors of the main building is utilized for a commercial offices and five star hotel.
- The main building is crowned by five star hotel on top 5 floor.
- The first 13 floors of the residential building is used as a parking garage for both the buildings and the remaining 18 floors in residences. Parking provided for about 2000 cars

RESIDENTIAL TOWER:

- 13 stories of parking in below floors.
- 132 residential units, 8 units on each floor.
- At top few floors 4 units on each floor.

CENTRAL CORE:

- 3 lifts and 1 service lift
- 2 Stairs are also placed in the core

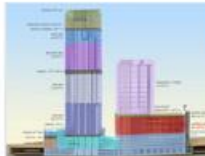


Fig 3.7 CASE STUDY PLATE

3.2 BURJ KHALIFA

3.2.1 INTRODUCTION

Burj Khalifa or "Khalifa Tower" is a very tall skyscraper in Dubai, United Arab Emirates and is the world's tallest building ever built, at 828m (2,717ft).

Before the building opened, it was called Burj Dubai. The building is 162 storey high. Construction of the tower was started in 2004. The building was officially opened on 4 January 2010. It is the tallest structure made by humans in the world. The building is more than 300 metres (980 ft.) taller than Taipei 101. Taipei 101 was the tallest building until 2010 before Burj Khalifa was built.

Adrian Smith designed the tower. He worked with Skidmore, Owings and Merrill (SOM) until 2006. It was built by Samsung Engineering & Construction, Besix, and Arabtec. Its form is derived from symbols from Islamic architecture. It consists of a buttressed core structural system. It has 57 elevators with 12-14 person capacity per cabin and 8 escalators. Total Area : 4.5 sq.ft
Period of construction : 2009
Facilities: Retail, food court, theatre, hotel

3.2.2 DESIGN PLAN

SITE PLAN

SITE PLAN



Fig 3.8 SITE PLAN

Podium concourse



Fig 3.9 PODIUM

Composite Ground Floor Plan

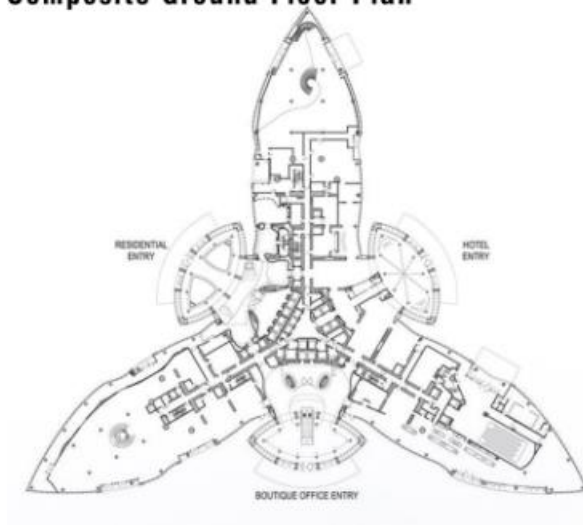


Fig 3.10 GROUND FLOOR PLAN

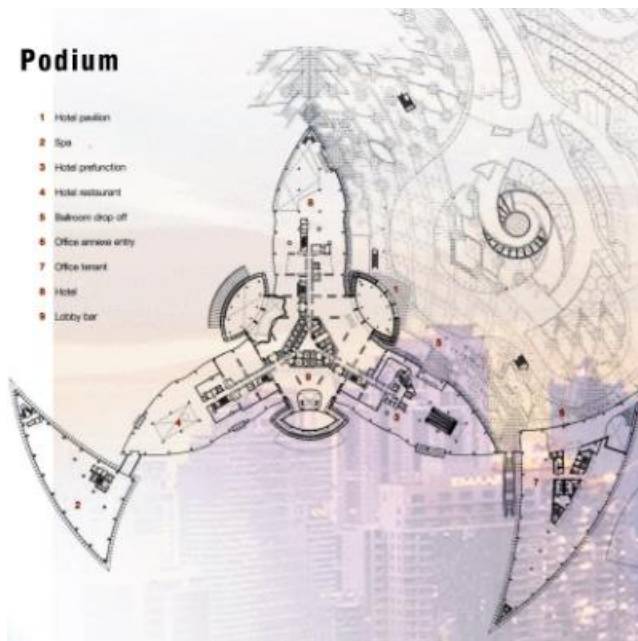


Fig 3.11 PODIUM

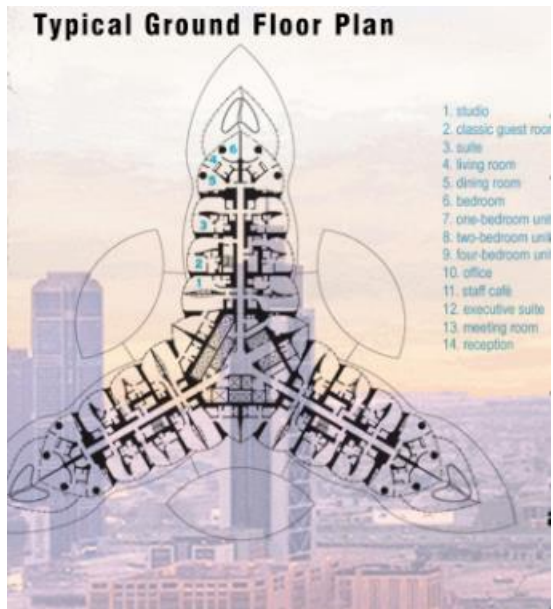


Fig 3.12 GROUND FLOOR PLAN



Fig 3.13 RESIDENCIAL PLAN



Fig 3.14 OFFICE PLAN

3.2.3 Vertical Zoning

The right wing:

spire: over 200m long and house communication equipment

level 156 to 159: broadcast and telecoms companies

level 125 to 135: the corporate suites

level 77 to 108: private residence

level 76: sky lobby (fitness, jacuzzi, swimming pools and recreational room)

level 38 to 39: armani hotel dubai

level 19 to 37: the residence level 9 to 16: armani residence

concourse ground to level 8: armani hotel

the left wing:

level 139 to 154: the corporate suite

level 124: at the top observation deck

level 123: sky lobby (business lounge and library)

level 122: atmosphere restaurant

level 44 to 72 the residence level 43: sky lobby

A : PODIUM :Provides a base (150 m wide, six level)

B: FOUNDATION



Fig 3.14 VERTICAL VIEW

3.2.4 ELEVATOR

- Burj Khalifa will be home to 57 elevators and 8 escalators installed by OTIS; the building service/fireman's elevator will have a capacity of 5,500 kg and will be the world's tallest service elevator. Burj Khalifa is the first mega-high rise in which certain elevators will be programmed to permit controlled evacuation for certain fire or security events. Burj Khalifa's observatory elevators are double deck cabs with a capacity for 12-14 people per cab. Traveling at 10 metres per second, they will have the world's longest travel distance from lowest to highest stop. The building is expected to hold up to 35,000 people at any one time.

- 33 high-rise elevators including 2 double-decks.

- 138 floors served by main service elevator.

- 504 meters - main service elevator rise, the world's highest.

- 10 meters per second-speed of elevators.

- 60 seconds - approximate time from ground to level 124.

- 10.000 kilograms - weight of hoist ropes.

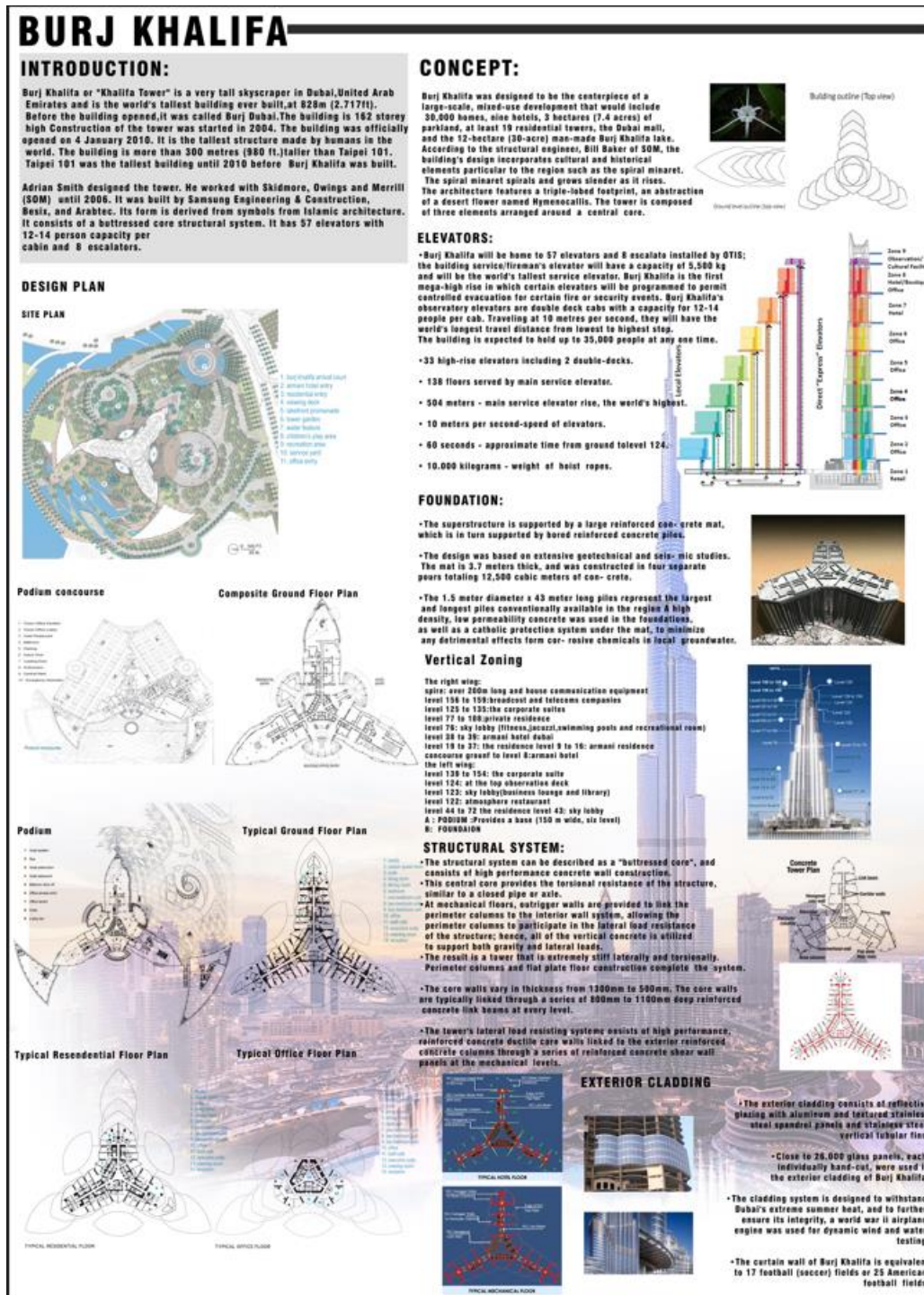


Fig 3.15 CASE STUDY PLATE

3.3 COMPARATIVE ANALYSIS:

COMPARATIVE ANALYSIS

S.NO	Design Feature	BURJ KHALIFA, DUBAI	432 PARK AVENUE, NY	SKYHOOD SQUARE, MUMBAI
1	Architect	Adrian Smith	Kohn Pedersen Fox	Somayya Shikha
2	Location	2 Sheikh Mohammed Bin Rashid Road, down from Dubai - Subur (called Arab Emirates)	432 Park Avenue, New York, NY 10022, United States	MC Kothar Road, Colaba Area, Subur, Mumbai, India -400025
3	Climate	Hot Desert Climate	Humid Subtropical Climate	Tropical wet and Dry Climate
4	Year of construction	January 2004, January 2005	September 2011-December 15, 2012	2009 - 2011
5	Built up area	353,470m ²	36,320m ²	33000m ²
6	Site Area	-	1.93 m ²	1893.5m ²
7	No. of floors	124 floors 49 setbacks	32 floors	33 + Ground Floor (3 Mechanical Floor/Green Building)
8	Typology (semi-enclosed)	Mixed Use - Residential, Office & Hotel	Mixed Use - Residential, Office & Retail	Mixed Use - Residential, Office, Hotel & Retail
9	Architectural Style	Neo-Futurism	Modern	Modern
10	Site Detail	Fast rise surrounded by road network on 4 sides	Fast rise with road network on 2 sides	Fast rise with road network on 2 sides
11	Facility Statement	Armenian hotels, Armenian residences, Corporate suites, Offices	Retail outlets, offices, staff apartments, gym and swimming pool, restaurants, residences	Retail outlets, offices, staff apartments, gym and swimming pool, restaurants, residences
12	Type of Construction	Subsided core consisting of high performance concrete wall construction	Tube in tube (steel wall structural)	the structure comprises a concrete core and post tensioned concrete slab and girders (steel)
13	Entrances	2 entry	2 entry	3 entry
14	Road Width	2.30m wide road	no internal road direct entry from road of width 7.30m wide	9m wide road
15	Number of parking slots	3000 car parking on four	3 Basements	2000 cars with super efficient drive ways and personalized access controls
16	Number of lifts	27 elevators and 8 escalators	12 elevator (and 3 escalators) 2 residential lifts (2 commercial lifts) (3 service lifts) (2 service elevators)	4
17	Core			
18	Sustainability Features	In addition to harnessing the the sun's power to heat water in the building which has been recognized by green spots as having 3 star sustainability, the water comes from the Burj Khalifa's air conditioning units recycled and used to cool the portable water from Dubai Electricity and Water Authority. From there it is collected in an on site storage tank and used for the building's landscaping. This kind of efficiency is essential in the building of the tower, and it is a great way to cut costs dramatically. 	It is a LEED certified building. The atrium is 3 stories high and has a glass facade which increases the daylight being entering inside the building thus reducing the usage of artificial lighting during day time. The windows in the apartments are 20% by 20% thus allowing the maximum daylight into the building, also these glasses are electronically controlled (dimmi-able) glasses which on the intensity of sunlight can be adjusted so as to reduce the cooling load in the building. 	1. Rain water collection 2. No parking 3. High performance facade 4. High efficiency ventilation system 5. Daylight harvesting and dimming controls 6. High quality water use 7. Environmentally preferable material 8. Green roof 9. Energy efficient 10. Native adapted landscape 11. On-site waste water treatment 12. Recyclable wiring and collection 13. Natural ventilation 14. Double height landscaped sky gardens and more than a dozen treepieces as well as tropical and refreshing landscape 15. Low flow flush toilets, low energy water system and storm water & rain water management systems - all the parts of our commitment to the environment 16. One of the tallest mixed-use developments in India. 17. In order to create a luxurious sense of space, the architects have designed the 33-storey square in such a way that all the pillars are situated in the centre, leaving office spaces completely unobstructed and pillar-free. 18. The special quality glass used in the construction reduces the heat gain of the building by 15% - 30 even at the peak of the heat you will feel cooler, even without the air conditioning. 19. Highest vertical elevation, using escalators offered the compact navigation system, where there is a wait time of no more than 20 seconds. 20. The project has 18 floors of parking, which accommodates 1800 cars on spacious ramps which are four lanes wide and also there are 3 elevators. 21. The building's architecture is inspired by the diamond. The entire design actually meant to show at the night the lighting detail in the diamond square changes like a shimmering array of diamonds along side the glass facade. 
19	Unique Features and Records	1. Burj Khalifa has the tallest free standing building in the world, has the highest number stories in the world, has the highest occupied floor in the world, has the highest outdoor observation deck, has the elevator with the longest journey, and has the tallest curved elevator in the world. 2. The building has the top controlled evacuation of security threats, air fire. 3. The design of the tower is inspired by the shape of Hymenocallis flowers. The flower is known for its long petals extending out its centre.	1. Standing 1,396 feet above Manhattan's famed Fifth Avenue, between 10th and 17th streets, 432 Park Avenue is not only the tallest residential building in New York City but also the tallest building in the western hemisphere. 2. The most architect attributes of 432 Park Avenue are geometry and simplicity. The regular 12.5-story by 25.5-foot defined by exposed structural member superlatively realized with the large exposed glass windows. 3. With almost equal width and length of 65.5 feet and a total height of 1296 feet the slender mass into the building is 1:15. 4. The 56 stories high square penthouse is one of the tallest residences in the hemisphere.	

Figure 3.16 comparative analysis

CHAPTER 4

DATA COLLECTION AND STANDARDS

4.1 PLANNING AND DESIGNING OF HIGHRISE BUILDING:

4.1.1 BASIC DESIGN CONSIDERATION:

Basic planning considerations for high rise building design include the following parameters:

- * Planning module
- * Span
- * Ceiling height
- * Floor-to-floor height
- * Depth of structural floor system
- * Elevator system
- * Core planning
- * Parking

Planning module, namely the space one needs for living, changes according to the culture and the economic class.

Span, described as the distance from a fixed interior element such as building core to exterior window wall, is another important criterion for good interior planning. These depths change depending on the function of the space, and acceptable span is determined by office layouts, hotel room standards, and residential code requirements for outside light and air. Usually, the depth of the span should be between 12 and 18 m for office functions, except where very large single tenant groups are to be accommodated. Lease span for hotels and residential units range from 9 to 12 m.

Ceiling height (Fig: 2.1) is also an important factor in building planning.

Commercial functions require a variety of ceiling heights ranging between 2.7 and 3.7 m. While office functions necessitate ceiling heights of approximately 2.5 to 3.0 m, residential and hotel functions require ceiling heights of 2.5 to 3.0 m.

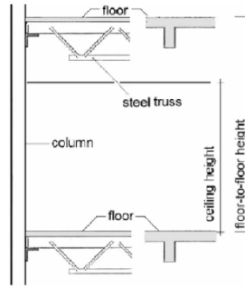


Fig 4.1 PLAN

Floor-to-floor height (Fig: 2.1), which is a function of the necessary ceiling height, the depth of the structural floor system, and the depth of the space required for mechanical distribution, determines the overall height of the building, and affects the overall cost. A small increase or decrease in floor-to-floor height, when multiplied by the number of floors and the area of the perimeter enclosure by the building, can have a great effect on many systems such as the exterior, structural, mechanical system, and the overall cost.

Depth of structural floor system plays an important role for planning considerations in high rise buildings, and varies broadly depending on the floor load requirements, size of the structural bay, and type of floor framing system.

Elevator system is another major component for good interior planning. In the design of an elevator system, waiting interval, elevator size and speed interpretation of program criteria, areas to be served, the population density of the building, and the handling capacity of the system at peak periods, must be considered. This becomes even more complicated for mixed-use projects.

For preliminary planning, one elevator per 1000 m² of gross area is a rule of thumb for estimating the number of elevators needed. Besides this, the net usable area varies from one elevator zone to another and from floor to floor, and should average from 80 to 85% over the entire building. The sky-lobby concept is an important and innovative approach in elevator system design. This concept uses high-speed express shuttle cars to transport passengers from the ground level to a lobby higher up in the building for transfer to local elevator zones so that the area used for elevator shafts and lobbies on the lower floors of the building is reduced.

Core planning is another significant issue for planning considerations. A typical floor in a high rise building contains a perimeter zone, an interior zone, and a core zone. While perimeter zone is described as an approximately 4.5 m wide 5 m deep area from the window wall with access through the interior zone, interior zone is defined as the area between the perimeter and the public corridor. On the other hand, core zone consists of those areas between elevator banks which become rentable on floors at which elevators do not stop. Central core, which is generally used in the buildings with a rectangular plan, and split core, which is generally used in the building with a relatively square plan, is the most typical core arrangements. Cores accommodate elevator shafts, mechanical shafts, stairs, and elevator lobbies. Core elements that pass through or serve every floor should be located, so that they can rise continuously, and thus avoid expensive and space-consuming transfers.

Parking is another planning requirement, which varies according to different functions such as business, residential, and like. When parking facility provided within the footprint of the building, it has a great impact on the plan and the structure. If it is inevitable, the structural bay should be well arranged to obtain efficient space use for parking and functional areas, and the core elements should be effectively located to minimize interference with car parking and circulation.

Mechanical ventilation is one other important concern for the user of parking facility, and pedestrians.

4.1.2 BASIC DESIGN CONSIDERATION:

The basic design considerations for a high-rise building include the following parameters:

- the cultural, political, and social aspects of the city where the building will be located
- a strong relationship with the city
- the master plan and an appropriate site selection
- sustainability
- safety and security issues
- learning about the possibilities and limitations of technology

When a high-rise building is designed, the design team should also be aware of the codes, regulations, zoning requirements, and life safety issues.

The master plan is one of the significant design considerations for high rise buildings, in which well-performed site analysis include, automobile, traffic and pedestrian impact, accessibility, minimal blockage of view, and minimizing the building shadows to neighbouring buildings. Besides this, an appropriate site selection also includes the consideration of reuse or rehabilitation of existing buildings, and physical security. The location of high-rise buildings within an urban area affects the amount of day lighting, and may even create wind tunnels.

4.2 HIGH RISE DESIGN FOR EARTHQUAKE ZONES

4.2.1 NATURE OF EARTHQUAKE:

The earth's outer layer is composed of plates ranging in thickness from 32 to 241 km. The plates are in constant motion, riding on the molten mantle below, and normally traveling at the rate of a millimetre a week, which is equivalent to the growth rate of a fingernail. Hence, this motion causes continental drift and the formation of mountains, volcanoes, and earthquakes

The Richter scale is a logarithmic scale for determining the energy dissipated in an earthquake. This means that an earthquake measuring 7 on the Richter. scale dissipates 32 times the energy of a size-6 quakes, while one measuring 8 dissipates roughly 1,000 times as much energy. The energy dissipated by these earthquakes is expressed in horizontal and vertical acceleration forces acting on the skyscrapers.

The immense forces transmitted from underground must be absorbed by the supporting structures of the buildings. These dynamic loads are replaced by structural equivalent loads in horizontal and vertical direction when a structural analysis of the building is performed.

4.2.2 ACTION OF SEISMIC LOAD ON BUILDING:

The horizontal and vertical acceleration of the subsoil due to an earthquake causes the building to vibrate. In simplified form, these loads can be represented by horizontal and vertical equivalent loads acting on the mass centre of gravity of the building. The magnitude of these equivalent loads depends directly on the mass of the building. This leads to the conclusion that as the height of the building increases, the mass centre of gravity normally wanders upwards and the flexural effect on the building is intensified by the longer lever arm. The potential earthquake damage suffered by high-rise buildings varies. The damage depends more on the rate of motion and magnitude of the displacement than on the acceleration.

4.2.3 ROLE OF SUBSOIL:

Natural rock is the best subsoil from the point of view of its earthquake properties.

Sandy soils saturated with water and artificially backfilled land are considered to be particularly critical. The widely-feared liquefaction effects (plasticization of the soil) can occur if an earthquake coincides with high groundwater levels. The building may subsequently remain at a slant or both the building and the surrounding terrain may subside.

4.2.4 FOUNDATION DESIGN FOR EARTHQUAKE:

Deep foundations generally display better seismic resistance than shallow foundations. Floating foundations can prove advantageous on soft ground, since they may be better able to attenuate resonance action. The risk of subsidence is considerably greater with floating foundations than with deep foundations. "Base isolation" is an anti-seismic construction technique that uses the principle of attenuation to reduce vibrations. The building is isolated from the solid subsoil by damping elements arranged on a foundation ring or foundation plate. The building was retroactively more or less mounted on ball bearings which are intended to gently damp down the impact of a future earthquake.

As in the case of wind loads,
earthquakes can also give rise to resonant vibration.

4.2.5 HEIGHT OF THE BUILDING:

High rise buildings are more susceptible to damage from strong remote earthquakes than from weak earthquakes close at hand. They normally have a lower resonant frequency and a lower attenuation than low buildings. Short-wave oscillation components in earthquakes are rapidly damped, while the long-wave components (frequency $f < 1$ Hz) can still make themselves felt at a distance of several hundred kilometres, particularly in the form of surface waves.

4.2.6 SYMMETRY OF THE HIGHRISE BUILDING:

Symmetric layouts, rigidity and mass distribution lead to a considerably better seismic response than asymmetric layouts, rigidity and mass distribution. This is because asymmetric buildings are subjected to stronger torsion (twisting) around the vertical axis by horizontal seismic loads.

4.2.7 SHAPE OF THE HIGHRISE BUILDING:

When parts of different height are permanently connected to one another as, for example, is often found in high-rise buildings with atriums, then the various structures in the building can be subjected to considerable torsional stresses by the seismic loads. Buildings of different heights can also be subjected to a whole series of effects in an earthquake, higher buildings were literally jammed in between lower buildings, thus extensively damaging the floors at the clamping point. In some cases, the buildings simply buckled over at the edge of the lower adjacent buildings.

Resonance effects can also cause buildings to oscillate so strongly that they hammer against one another. Another effect observed in high-rise buildings is the soft-storey effect: due to lobbies, atriums or glazed shopping passages, some floors - usually near the ground floor - are distinctly "softer" than those above them. These "soft" floors then collapse in an earthquake.

4.3 LATERAL LOADS ON HIGHRISE BUILDING:

From the structural design point of view, due to its height, a high rise building could be described, as one that is more affected by lateral loads created by wind or earthquake actions compared to other building types. Thus, loads acting on high rise buildings are different from those on low rise buildings in terms of accumulation into much larger structural forces, and the increased importance of wind loading. Wind loads on a high rise building act not only over a

very large surface, but also with greater amount at the greater heights, and with a larger moment arm than on a low-rise building.

Even though the wind loads on a low-rise building generally have a minor affect on the design and structural configuration, they can play a vital role for the selection of the structural system in a high rise building. Depending upon the mass and shape of the building, and the region, although, the wind load is very important in the design of high rise buildings, in seismic regions, inertial loads from the shaking of the ground also play an important role. Furthermore, in contrast to vertical loads which can be estimated roughly from previous field observations, lateral loads, namely the wind and earthquake loads, on buildings are fairly unpredictable, and cannot be assessed accurately.

4.3.1 NATURE OF THE WIND:

Wind, which is erected by temperature differences, could be deseribed as an air metien, generally applied to the natural horizontal motion of the atmosphere. The vertical metien, en the other hand, is termed as a current. Air elose to the surface of the earth moves three dimensionality, in which horizontal motion is much greater than the vertical motion. While the vertical air motion is significant particularly in meteorology, the horizontal motion is important in engineering. The surface boundary layer concerning the horizontal motion of wind extends upward to a certain height above which the horizontal airflow is no longer affected by the ground effect.

Mest of the human activity is performed in this boundary layer, and hence how the wind effects are felt within this zone is of great eoneern in engineering.

Wind is a very complex phenomenon owing to the many flow situations resulting from the interaction of wind and structure. In wind engineering, on the other hand, simplifications are made to find meaningful predictions of wind behavior by distinguishing the following features:

- Variation of wind speed with height
- turbulent and dynamic nature of wind vortex-shedding phenomenon
- Cladding pressures

4.3.2 WIND EFFECTS ON HIGH RISE BUILDING:

The wind is the most powerful and unpredictable force affecting high rise buildings.

High rise building can be defined as a mast anchored in the ground, bending and swaying in the wind. This movement, known as wind drift, should be kept within acceptable limits. Moreover, for a well-designed high rise building, the wind drift should not surpass the height of the building divided by 500. Wind loads on buildings increase considerably with the increase in building heights. Furthermore, the speed of wind increases with height, and the wind pressures increase as the square of the wind speed. Thus, wind effects on a high rise building are compounded as its height increases. Besides this, with innovations in architectural treatment, increase in the strengths of materials, and advances in methods of analysis, high rise building have become more efficient and lighter, and so, more vulnerable to deflection, and even to swaying under wind loading.

The swaying at the top of a high rise building induced by wind may not be seen by a passerby, but its effect may be a concern for those occupying the top floors. Unlike dead loads and live loads, wind loads change rapidly and even abruptly, creating effects much larger than when the same loads were applied gradually, and that they limit building accelerations below human perception.

4.3.3 VARIATION OF WIND WITH HEIGHT:

An important characteristic of wind is the variation of its speed with height (Fig: 2.2). The wind speed increase follows a curved line varying from zero at the ground surface to a maximum at some distance above the ground. The height at which the speed stops to increase is called the gradient height, and the corresponding speed, the gradient wind speed. This important characteristic of wind is a well understood phenomenon that higher design pressures are specified at higher elevations in most building codes.

Additionally, at heights of approximately 366 m from the ground, surface friction has an almost negligible effect on the wind speed; as such the wind movement is only dependent on the prevailing seasonal and local wind effects. The height through which the wind speed is affected by the topography is called atmospheric boundary layer.

The wind speed profile within this layer is in the domain of turbulent flow and could be mathematically calculated.

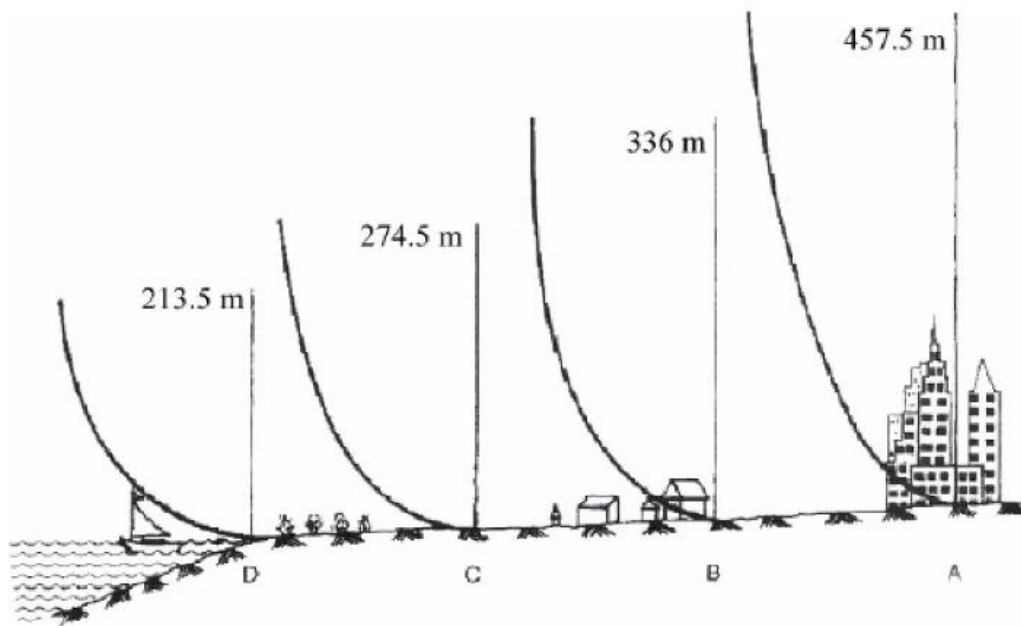


Fig 4.2 HEIGHTS

4.3.4 TURBULENT AND DYNAMIC NATURE OF WIND:

Wind transfers some amount of its energy to the object that it hits on its path. The measure of the amount of energy transferred is called the gust response factor.

Terrain roughness and variety of the height above ground, affect wind turbulence (also known as gustiness). Wind loads related with gustiness or turbulence, change rapidly and even abruptly unlike the mean flow of wind with static characteristic.

Furthermore, the motion of wind is turbulent. Turbulence can be described as, any movement of air at speeds greater than 0.9 to 1.3 m/s, resulting in random movement of air particles in all directions. The scale and intensity of turbulence can be related to the size and rotating speed of eddies (a circular movement of wind) that create the turbulence. Additionally, the flow of a large mass of air has a larger overall turbulence than that of a small mass of air. Consequently, from the structural engineer's point of view, the wind speed can be considered to include two components; a mean speed component increasing with height and a turbulent speed fluctuation.

CHAPTER 5

SITE STUDY AND ANALYSIS

5.1 SITE STUDY:



Figure 5.1 site and its neighbouring

5.2 LOCATION

Latitude : 12°57'10"N

Longitude: 80°09'35"E

200ft Radial road SITE,nemilichery, pal-lavaram,

Chennai, Tamil Nadu 600117

Landmark: nemilichery lake

Site Area: 19.46 Acres (78,763.7sqm)

5.3 SITE JUSTIFICATION AND FEASIBILITY:

The site is adjacent to a few residential communities and surrounded by colleges and IT offices in radial road. The site is exactly in front of VELS Institute of Science and Technology. Accessibility: 200ft Radial road, Nemilich-ery, Pallavaram North and 30ft Earikkari road.

The site can be accessed

About :

The proposed site has sufficient facilities to aid the accessibility and sustain economic activities for the effective functioning of the Mixed Use SKYSCRAPER.

5.4 LAND USE LAW AND NORMS

Road width: 60m wide with two service roads

Adjacent Road width: 6m wide.

Predominant Wind direction: South

East to North West

South East to North West

FSI: Since the road is more than 18 m wide the

FSI is 3.25

Premium FSI: Since the road width is above 18m

the premium FSI is 50% of FSI. Therefore 1.625 is the additional FSI.

Total FSI: 4.875

Ground Coverage: Max 50% coverage.

5.5 Accessibility:

Chennai International Airport: 5.4km

CMBT, Koyambedu: 20 km

Chennai Central, Egmore: 24km

Marina Beach: 23km

Mahabalipuram: 49km

5.6 High Rise Norms

FAR: The maximum permissible FAR of the projects shall be allowed as per the existing licensing policy for integrated commercial complex, however, the permissible FAR for the residential component of the project shall not exceed 1/3rd 33.3% of the maximum permissible FAR of the project and the remaining 2/3rd 66.7% shall be utilized for commercial use.

5.7. Refuge Area

For all building exceeding 24 metres height, refuge area of 15 sqm shall be provided as follows:

1. The refuge area shall be provided on the periphery of the plot or preferably on a cantilever projection and open to air on atleast one side protected with suitable railings.
2. The floors above 24 metres and up to 39 metres- one refuge area on the floor immediately above 24 metres.
3. For floors above 39 metres - one refuge area on the floor immediately above 39 metres and so on after every 15mtrs.
4. Residential flats in multistoried buildings with balconies need not be provided with refuge area.

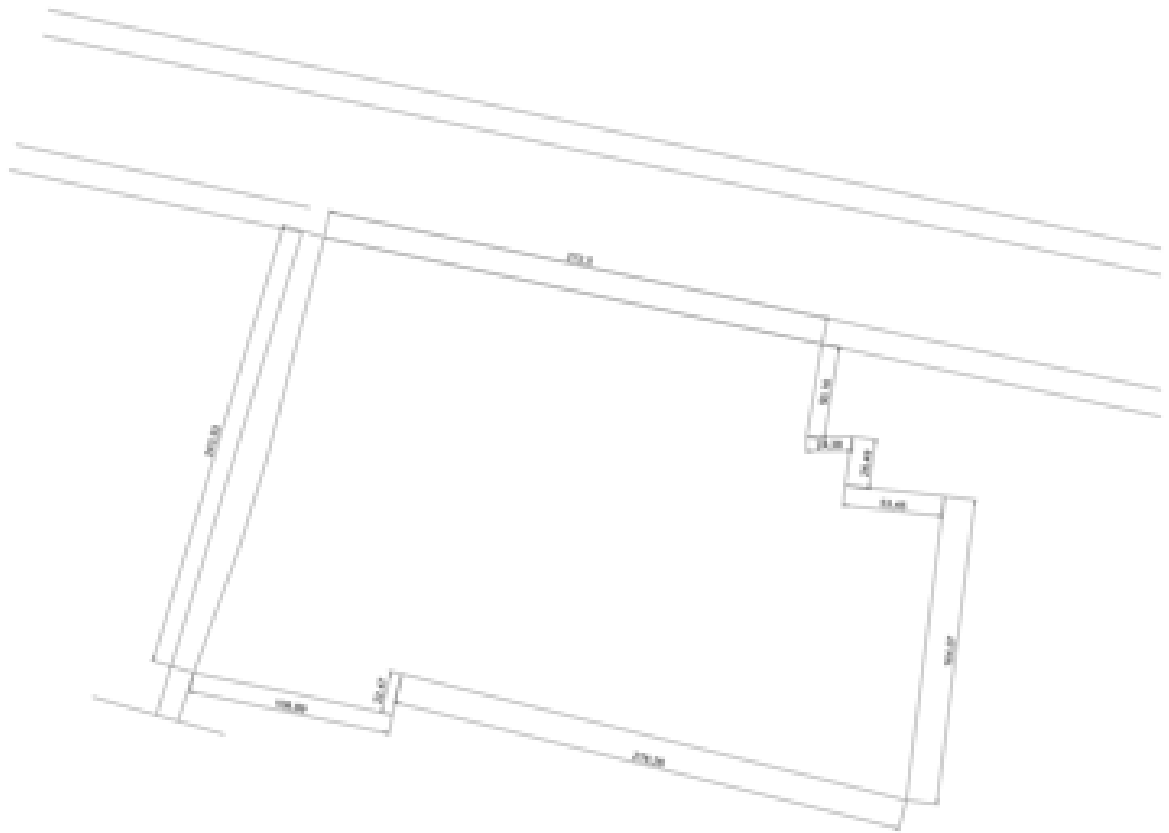


Fig 5.1 SITE DIMENSION

SITE STUDY



SITE LOCATION:

Latitude : 12°57'10"N
Longitude : 80°09'35"E
200ft Radial road , nemilichery, pal-
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Chennai, Tamil Nadu 600117
Landmark: nemilichery lake
Site Area: 19.46 Acres(78,763.7sqm)

LAND USE LAW AND NORMS

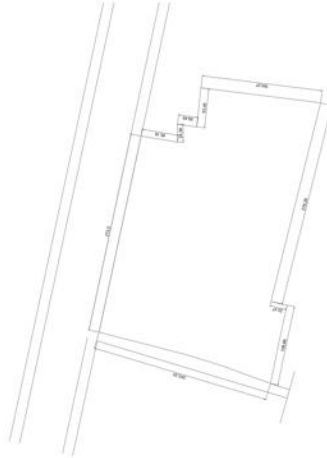
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Adjacent Road width: 6m wide.
Predominant Wind direction: South
East to North West
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FSI: Since the road is more than 18m
wide the
FSI is 3.25
Premium FSI: Since the road width
width is above 18m
the premium FSI is 50% of FSI. There-
fore 1.625 is the additional FSI.
Total FSI: 4.875
Ground Coverage: Max 50% coverage.



Accessibility:

Chennai International Airport: 5.4km
CMBT, Koyambedu: 20km
Chennai Central, Egmore: 24km
Marina Beach: 23km
Mahabalipuram: 49km

Site Dimension



Present Condition:

The site is adjacent to a few residential com-
munities and surrounded by colleges and IT
offices in radial road . The site is exactly in
front of vels institute of science and technolo-
gy.

Accessibility: 200ft Radial road , nemilich-
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FAR for the residential component of the
project shall not exceed 1/3rd 33.3% of
the maximum permissible FAR of the pro-
ject and the remaining 2/3rd 66.7% shall
be utilized for commercial use.

Total buildup area

Site area: 19.46 acres(78,763.8sqm)
Fsi /FAR: 4.875
Ground coverage: 50%
Maximum buildup area : 78,763.8 X 4.875
3,84,803.2sqm
OSR : 10% of the site

SPACE	% OF THE AREA	TOTAL AREA	AREA PER FLOOR	FLOOR
MALL	25%	96,200.80	24,050.20	4
OFFICE	35%	1,34,681.12	6,734.50	20
CO-WORKING	10%	38,480.32	3,848.03	10
RESIDENCE	30%	1,15,440.56	3,298.30	35
			TOTAL NO.OF FLOOR	69

Refuge Area

For all building exceeding 24 metres height,
refuge area of 15 sqm shall be provided as fol-
lows:

1. The refuge area shall be provided on the
periphery of the plot or preferably on a canti-
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one side protected with suitable railings.
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metres- one refuge area on the floor immedi-
ately above 24 metres.
3. For floors above 39 metres - one refuge
area on the floor immediately above 39 metres
and so on after every 15mtrs.4. Residential
flats in multistoried buildings with balconies
need not be provided with refuge area.

Fig 5.9: Concepts used in site

CHAPTER 6

ARCHITECTURAL DESIGN

INTRODUCTION

AIM

An approach to architectural innovation for vertical development in denser cities of India. Architectural concerns can be focus hybrid structure at some point that, Vertical Development can be merge with the Horizontal Development and it can create diagonal interaction on social aspect. Also, the flexible commute can create sustainable linkage inside the project itself which helps to bridge two axes together and create sustainable layers which helps to revamp Vertical Neighbourhood



WHY..?

The concept of a vertical neighbourhood is presented as an important architectural solution to ease the pressure of urban development in the city. There are many reasons for Vertical Neighbourhoods: traffic congestion affecting commuting time, the rapid growth of population density, the rise of rental housing and workplace due to the scarcity of residential and commercial area in high-density cities, and the impact of technology on employment.

It consists of mixing uses of shops, offices, and apartments for the diversity of users of ages, income levels, cultures, and races in the community within neighbourhoods, within blocks and within buildings. This concept can be used to create high-quality comfortable public and private spaces by an emphasis on the beauty and aesthetics of the buildings that creates a sense of place within the community.

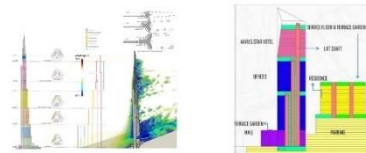


OBJECTIVES

To study pose contributin of architecture to the mixed use development
To study postmodern built forms: structure, services and spaces used in skyscraper building worldwide.
To design spaces which bring closer to nature and harmony.
Priority to sustainable material and functional requirements in design, while integrating services to it

SCOPE

designing a mixed use skyscraper blended with building automation technology



MIXED-USE DEVELOPMENT:

Mixed-use development is a form of urban development, town planning, and / or design that incorporates the use of residential, commercial, cultural, or recreational uses in one place, where these activities are integrated to some degree physically and professionally, and provide pedestrian communication. Mixed-use development can be applied to new building projects in the city or on the outskirts of the city or may apply to a single building, existing or new location, or to a city-wide or other political allotment policy.

FEATURES OF VERTICAL MIXED-USE DEVELOPMENTS

- Combines different functions in one building.
- Provides additional public space on the ground floor such as shopping malls, restaurants, and shopping malls.
- Encourage economic investment.
- Increase revenue.
- Reduce car dependence, road travel, air pollution and reduce carbon emissions.
- Easy-to-reach, cycling areas, increased access to transport, both leading to reduced travel costs.
- Reduction between distances, workplaces, retail business, and other items and facilities.
- More integrated development.
- A strong neighbour's character with a sense of place

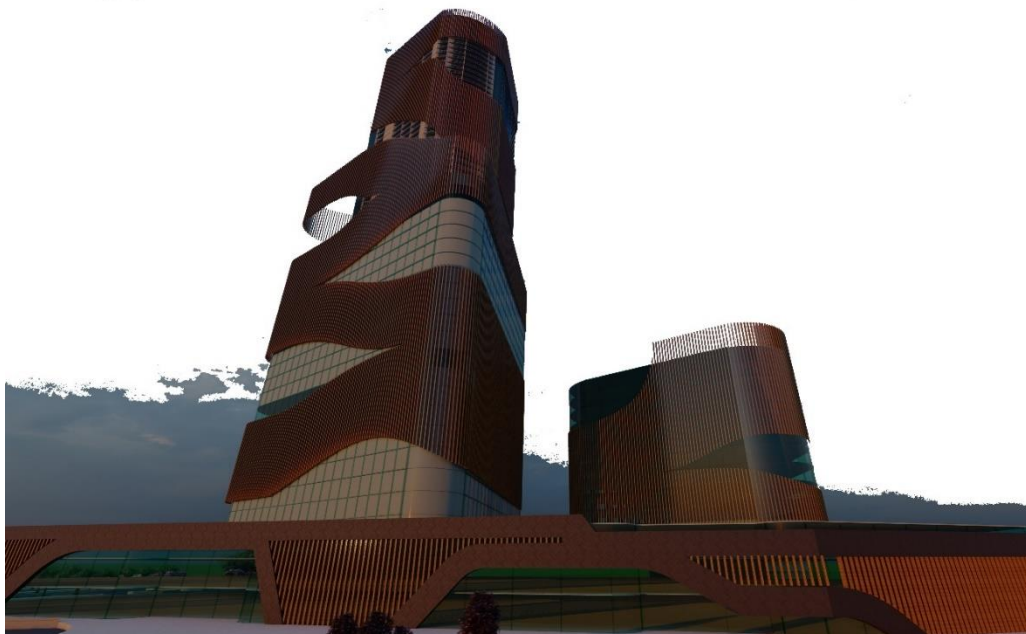
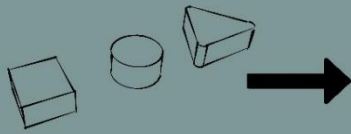


Fig 6.1 INTRODUCTION

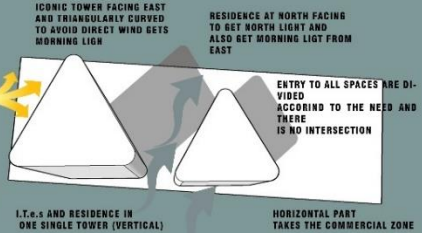
EVOLUTION OF FORM

TRIANGULAR PROFILE ARE WIDELY USED IN HIGHRISE AND SKYSCRAPERS TO CONSIDER THE WIND FLOW AND THE STABILITY. TRIANGULAR FORM IS CHOOSE TO WITH STAND THE WIND FLOW AND LOAD OF THE BUILDING



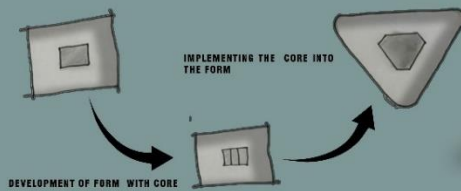
GIVING VOLUME ACCORDING TO THE NEED

TRIANGULAR SHAPE CAN EASILY DIVER THE DIRECTION OF AIR AND HELPS IN THE STABILITY OF THE STRUCTURE



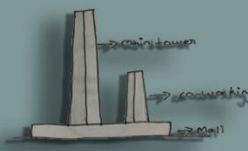
FORM DEVELOPMENT

CHOOSING THE FORM ACCORDING TO AIR FLOW AND PLACING A CENTRAL CORE IN THE FORM (THE CENTER CORE CARRIES ALL THE SERVICES AND HOLD ALL THEE MAIN COMPONENTS OF THE BUILDING



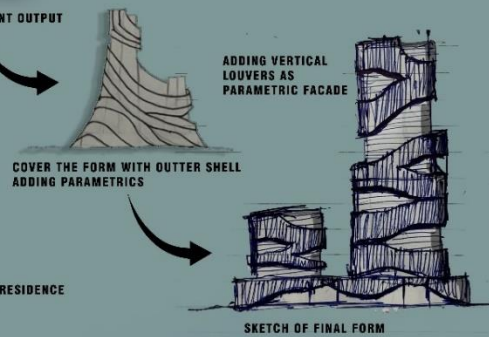
CONCEPTUAL DEVELOPMENT OF BUILDING

EVOLVED OUTCOME OF FORM OF OBLIQUE LINE IN CONTEXT TO RAPID MOVEMENT



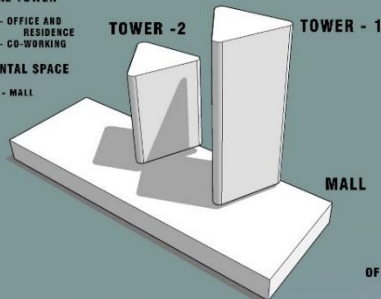
PARAMETRIC FACADE

IMPLEMENTATION OF PARAMETRIC FACADE AS A DOUBLE SKIN FACADE IN BUILDING CAN BE BENEFICIAL TO ITS THERMAL COMFORT AND CONSUMPTION OF ENERGY, WHICH REDUCE BOTH ENERGY DEMAND AND COMFORT

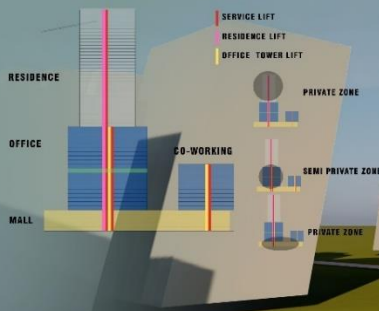


VOLUMETRIC ANALYSIS

VERTICAL TOWER
TOWER 1 - OFFICE AND RESIDENCE
TOWER 2 - CO-WORKING
HORIZONTAL SPACE
BUILDING - MALL



VERTICAL ZONING



EXPLODED AXONOMETRIC VIEW

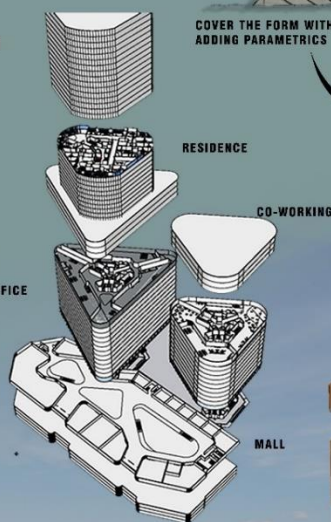


Fig 6.2 EVOLUTION OF FORM

OFFICE FLOOR PLAN

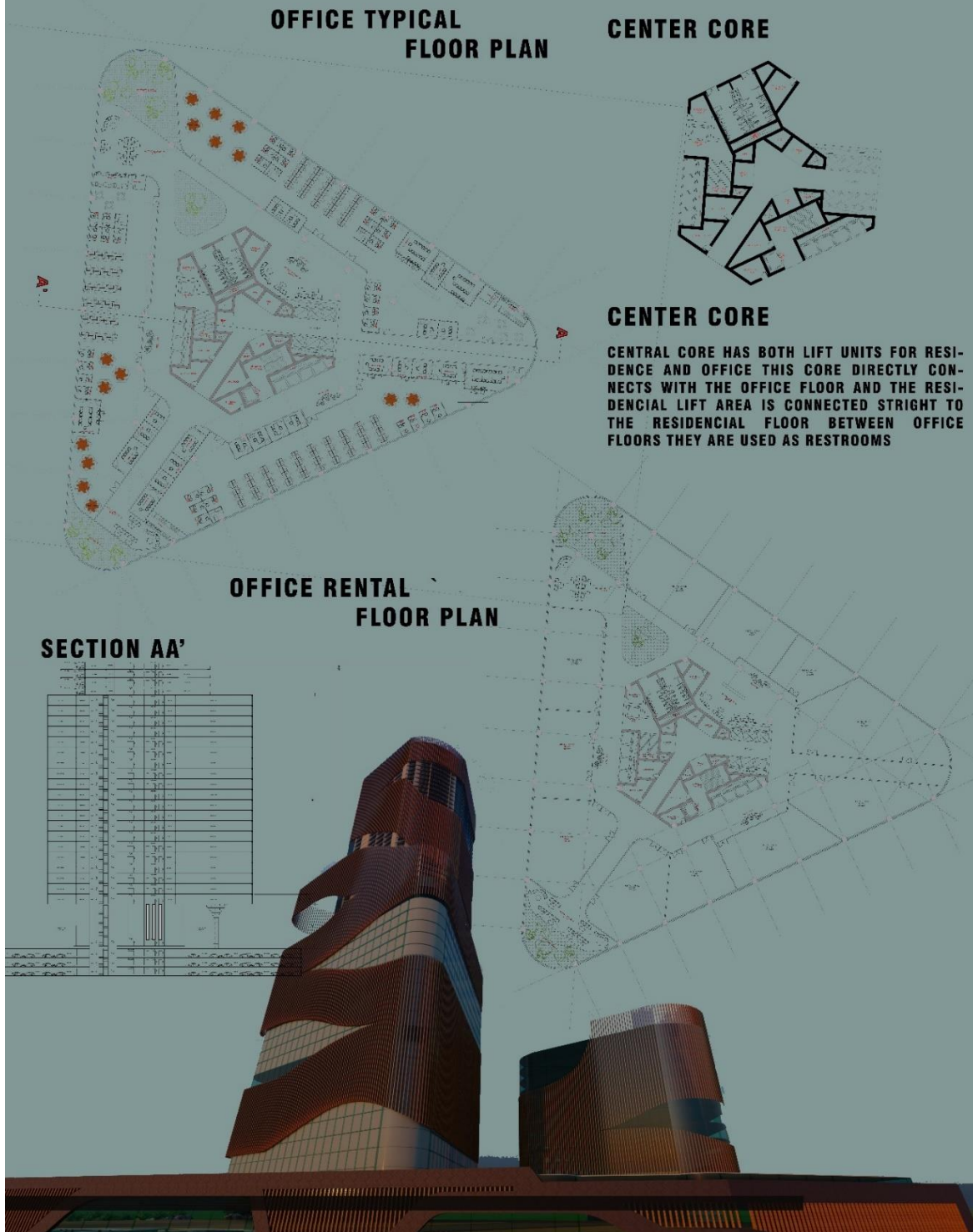


Fig 6.3 OFFICE FLOOR PLAN

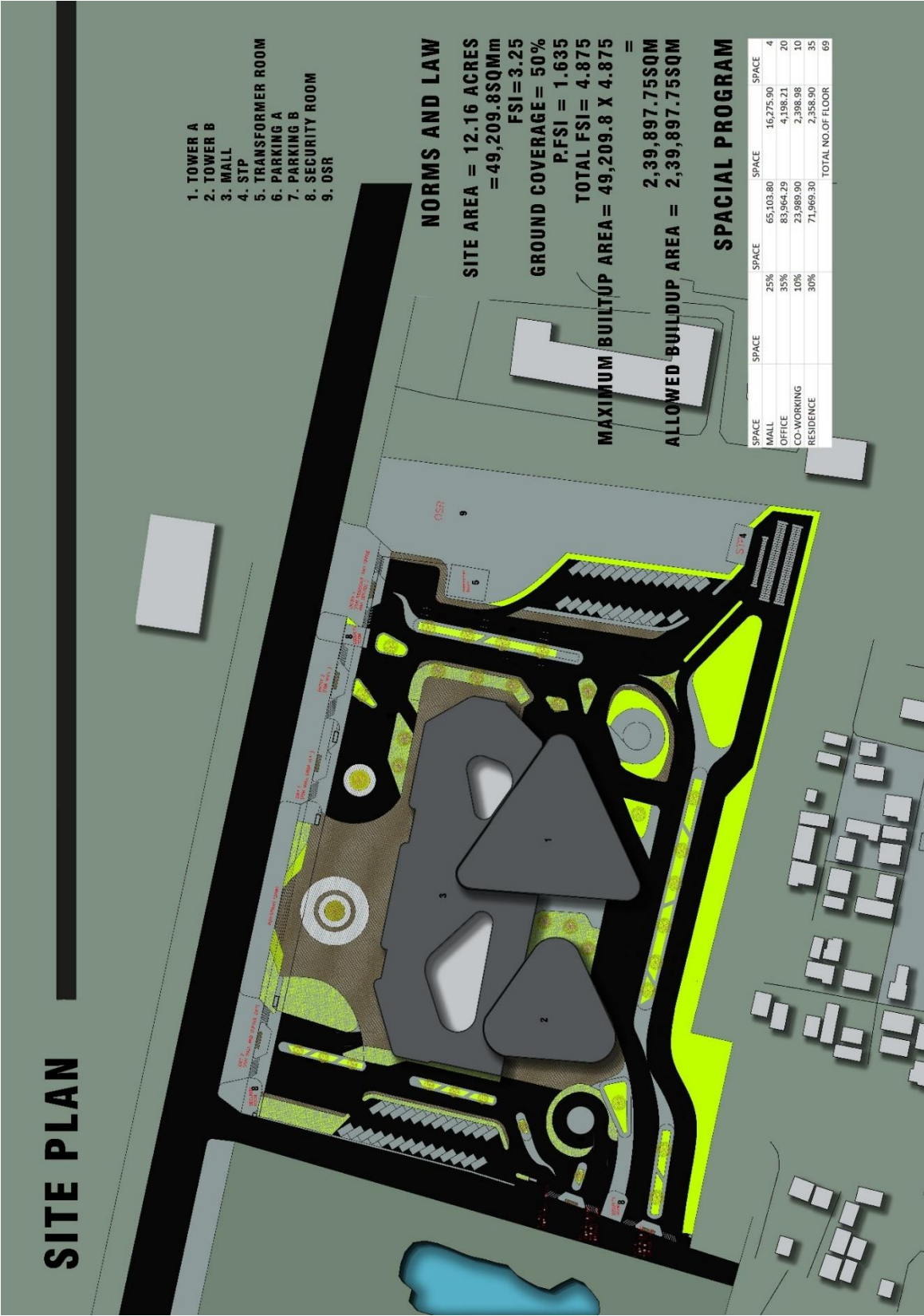


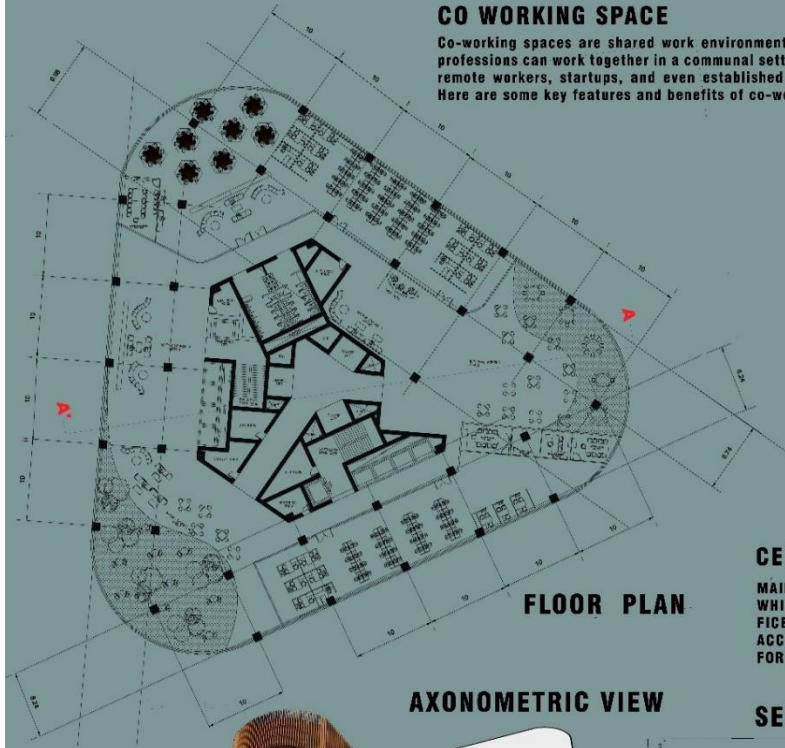
Fig 6.4 SITE PLAN

FLOOR PLAN

CO-WORKING FLOOR PLAN

CO WORKING SPACE

Co-working spaces are shared work environments where individuals from different companies or professions can work together in a communal setting. These spaces are popular among freelancers, remote workers, startups, and even established companies looking for flexible office solutions. Here are some key features and benefits of co-working spaces



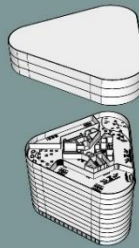
CO-WORKING CORE

CENTER CORE

MAIN CONNECTING POINT FOR THE WHOLE TOWER WHICH HAS SEPERATE LIFT ACCESS FOR MALL, OFFICE, RESIDENCE, CO-WORKING AND THIS HAS DIRECT ACCESS TO SPACES WITH SEPERATE SERVICE LIFT FOR ALL THE 4 UNITS

FLOOR PLAN

AXONOMETRIC VIEW



SECTION VIEW

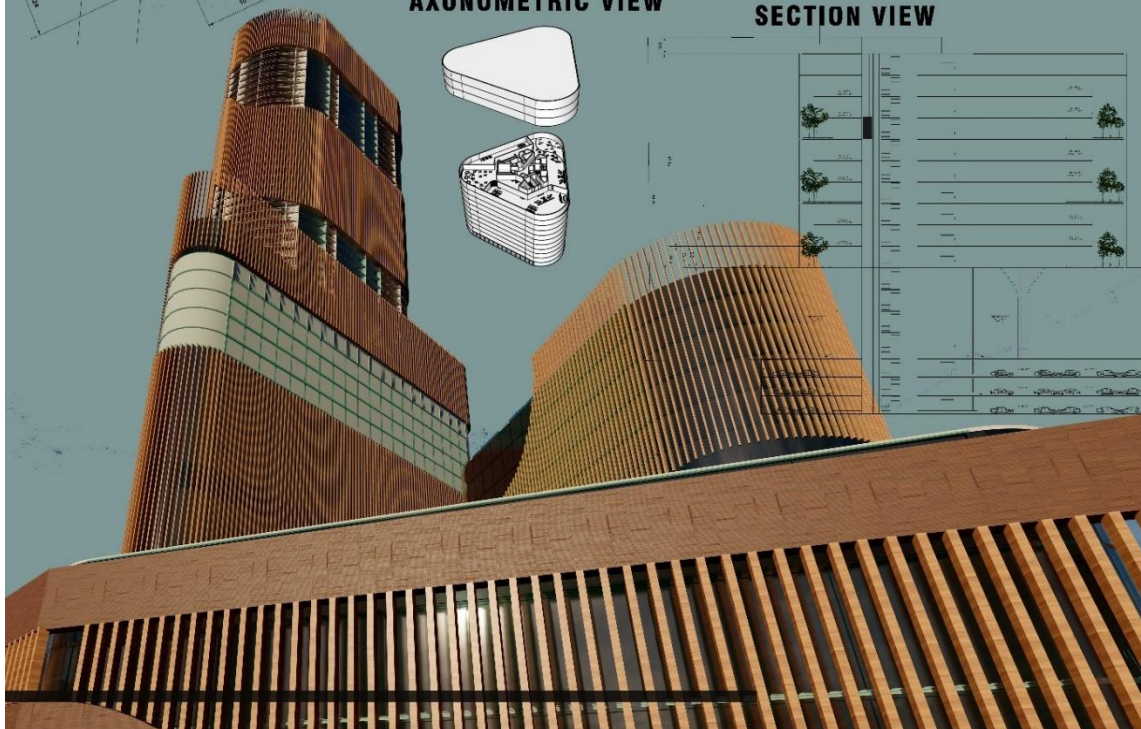
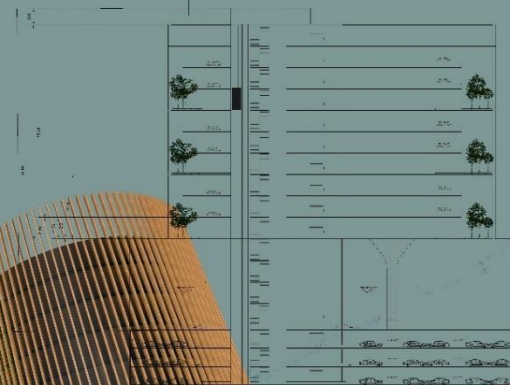
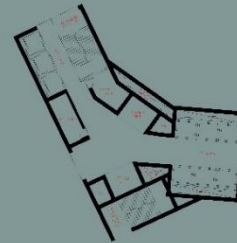
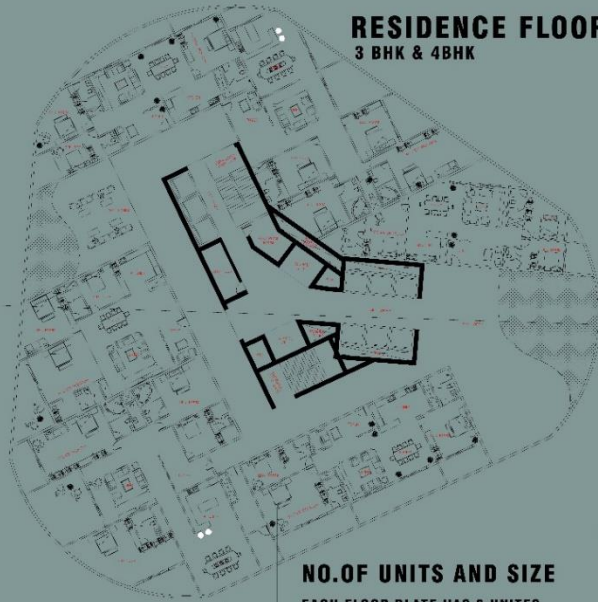


Fig 6.5 FLOOR PLAN

RESIDENCIAL PLAN SECTION

RESIDENCE FLOOR PLAN



CENTER CORE

RESIDENCIAL CORE ONE MAIN LIFT LOBBY AND EMERGENCY STAIRCASE PROVIDED IN IT WHICH HAS DIRECT CONNECTION TO THE RESIDENCIAL ZONE FROM THE GROUND FLOOR, THE PART WHICH IS USED AS A RESTROOM IN OFFICE CORE NOW CONVERTED INTO LIFT LOBBY

SECTION AA'

1980	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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NO.OF UNITS AND SIZE

EACH FLOOR PLATE HAS 6 UNITS
4- 3 BHK AND 2- 4 BHK
UNIT SIZES
3BHK -250SQM
200SQM
4BHK -450SQM
350SQM

INTERIOR VIEWS



BEDROOM



RESTROOM



KITCHEN



RESTROOM



BEDROOM

RESIDENCE ZONE

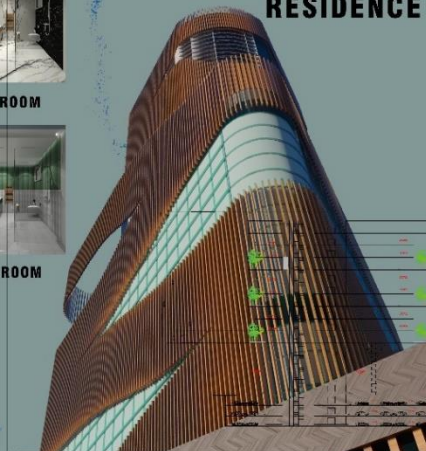


Fig 6.6 RESIDENCE PLAN SECTION

MALL FLOOR PLAN

GROUND FLOOR PLAN

1st AND 2nd FLOOR

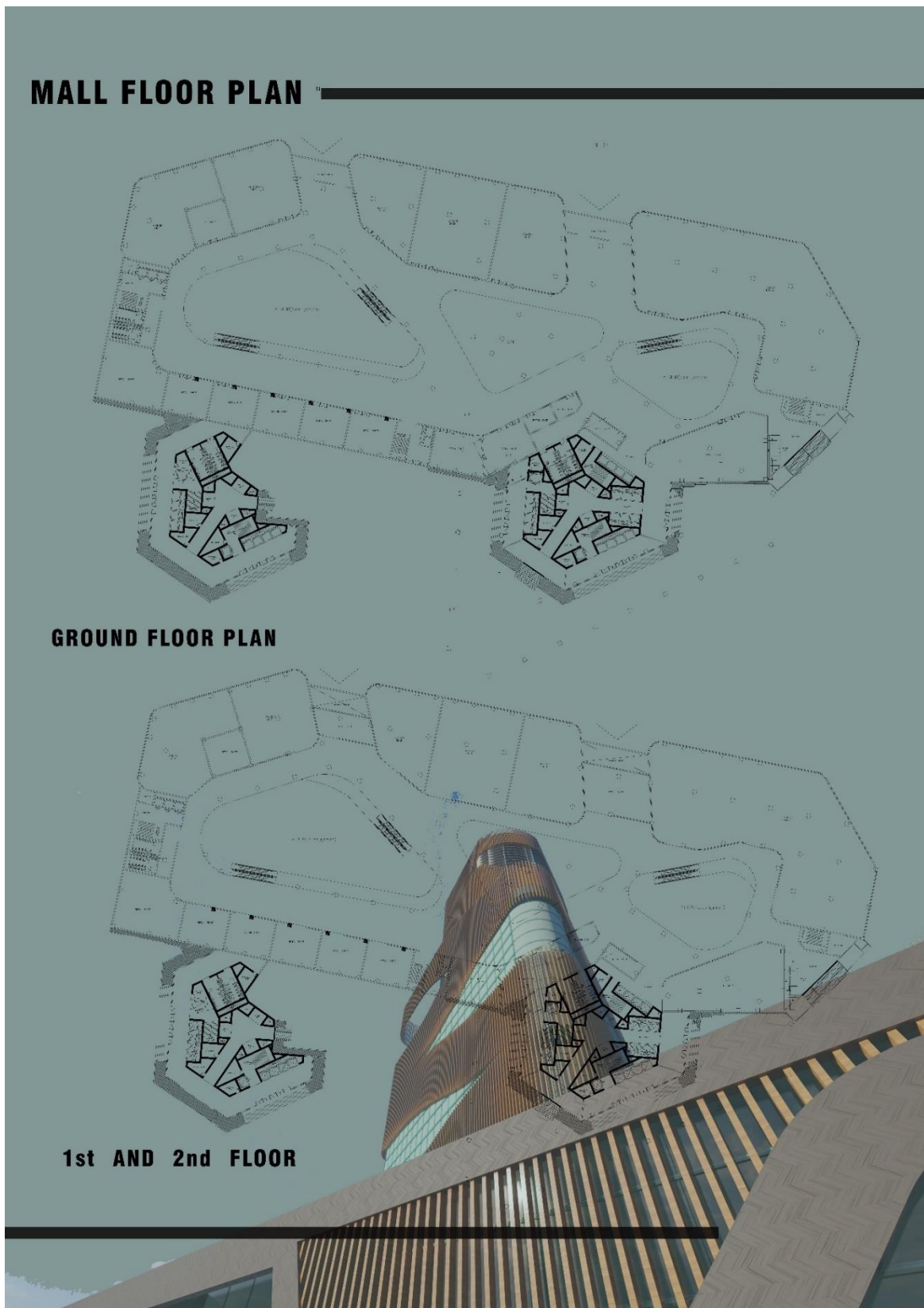


Fig 6.7 MALL FLOOR PLAN

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