SYSTEMIC DIVERSITY

Open International Competition For Alternative Layout Design In Standard Housing

DCOOP

HISTORY

1920
COMMUNAL SETTLEMENTS

- Russian Revolution (1917).
- 80 percent of people lived in rural areas.

1930
WORKER SETTLEMENTS

- Density of people in urban Russia rapidly increased due to the world wars and industrialization.
- Housing for workers were largely communal and cramped.

1950
STALIN ERA

- Personal space not encouraged.
- Apartments owned by aristocrats confiscated and divided into family communal apartments.
- Common bathrooms and kitchens.

1970
KHRUSHCHEV ERA

- Large scale housing projects.
- The Khrushchyovka gets established.
- Prefabricated construction is widespread.
- No elevators for 5 storied buildings.
- Function over superfluous.
- Monotonous facades.

1980
BREZHNEV ERA

- Taller prefabricated structures with advancement in technology.

2018
CONTEMPORARY

- Privatisation.
- New types of housing emerge.
- Statistics change- now 75% of people live in Urban areas.

CONTENTS

CONCEPT NOTE

Housing has historically been influenced by the political philosophy of the country. Several political leaders and movements have left a strong impact on housing in Russia. The Soviet era Housing has been described through terms like Kommunalki - COMMUNAL HOUSING, Khrushchevki or Khrushchovkas. This mass housing made during the 1950's and 1960's is devoid of identity and expression. People lived in cramped housing which decayed quickly over the next couple of decades. In cities like Moscow and Saint Petersburg, large areas have this kind of housing which has a crucial impact on the urban character. Saint Petersburg itself has about 1500 or so Khrushchovkas! The urbanity of a city can shape the way people think, behave and feel. This design proposal is an attempt to create a more distinct, contemporary identity for mass housing keeping systemic processes and design principles as the central idea.

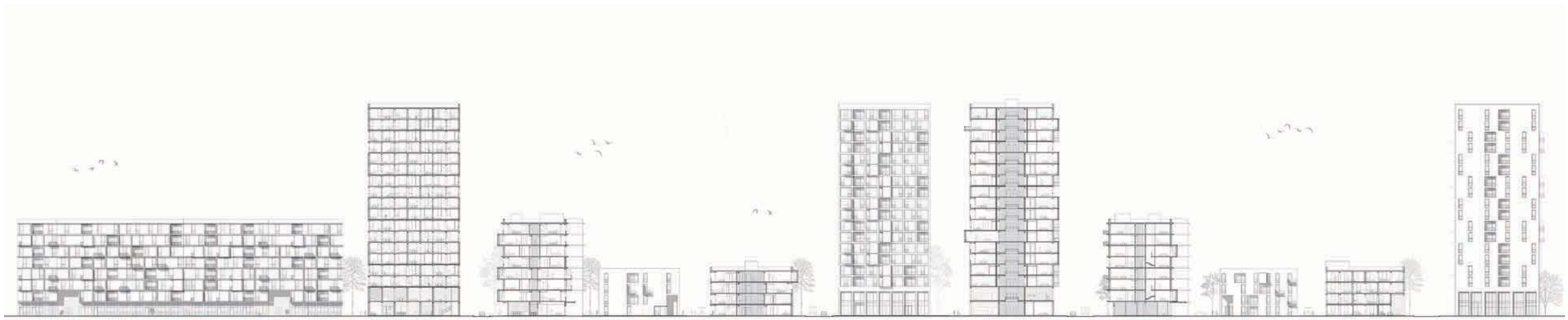
The plan of an apartment is the critical defining factor for its spatial quality. A set of layouts have been worked out based on a MODULAR GRID as an ordering principle. Compact layouts with minimal space for corridors and streamlined arrangement of service areas have been stressed on. The apartments are efficient not just in their floor area but are designed to be flexible such that they adapt to the needs of the residents as well as the changing building typologies.

The layouts form the basic modules for conjuring the various building types. This MODULAR nature of the layout is used in various configurations resulting in VARIED FORMAL OUTCOMES. The Urban villa, Tower and Section building are all designed using the same layouts. The Medium (25) series and Large (30) series have a change in the grid sizes and also variations in their layouts. This results in some unique characteristics for the spaces.

A set of COMPONENTS have been created for making the "Sun Rooms" and facade modulation. Every apartment has a sunroom which can be modulated as per climate. The components come together in various permutations to create the facades. This helps to create distinct facades for each building type.

The CONSTRUCTION system chosen is Prefabrication method for couple of reasons. It is a time tested system and will be ECONOMICAL and fast to execute. The design uses a standard structural system so that the costs remain optimum.

The MATERIAL palette chosen consists of brick and plastered finishes. Various brick finishes can be used to create subtle variety to the housing as it is used in a larger, urban scale. The warm colors for the plastered surfaces are chosen so that the buildings become particularly appealing during the harsh winter months.

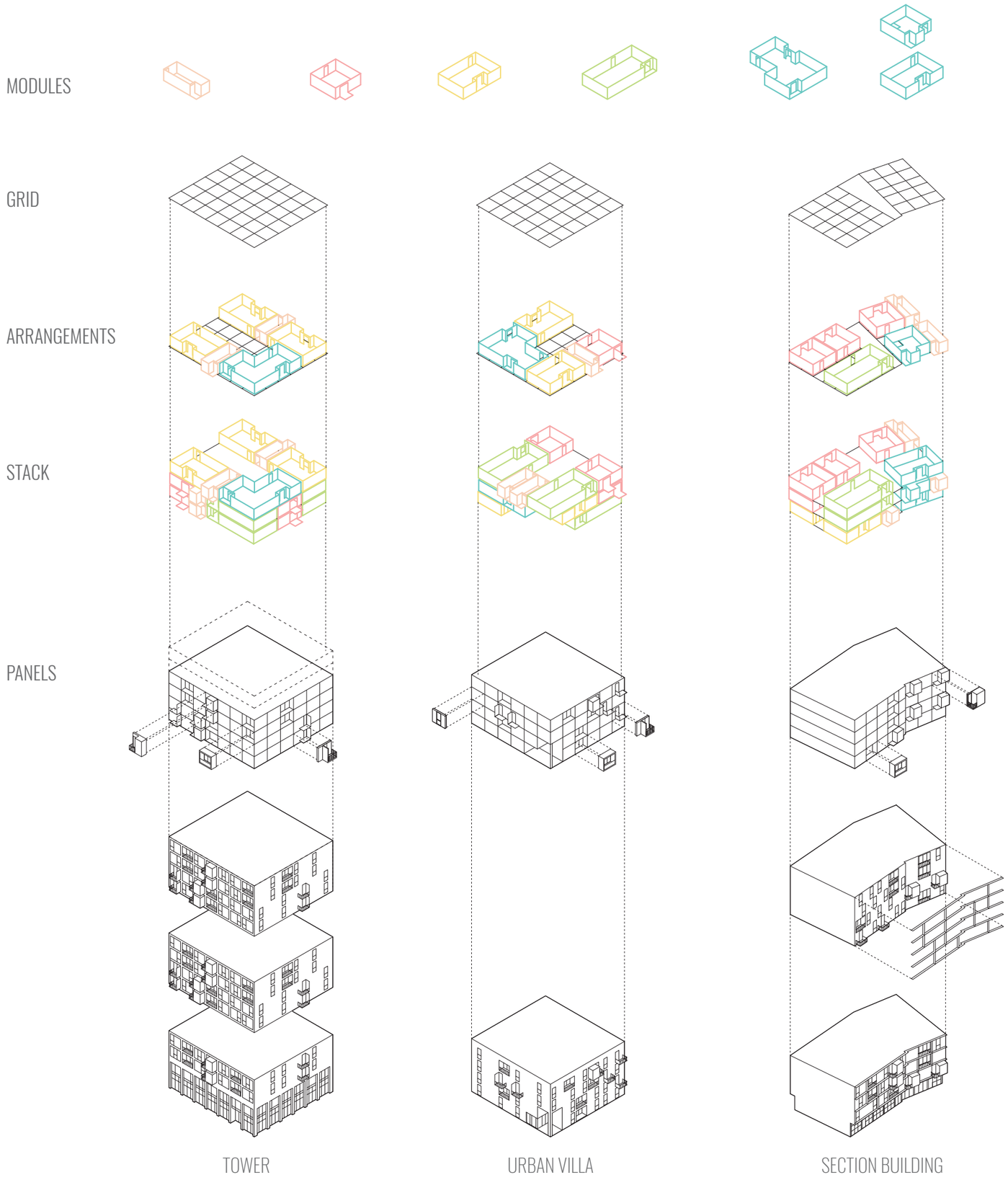


MODULAR LAYOUTS

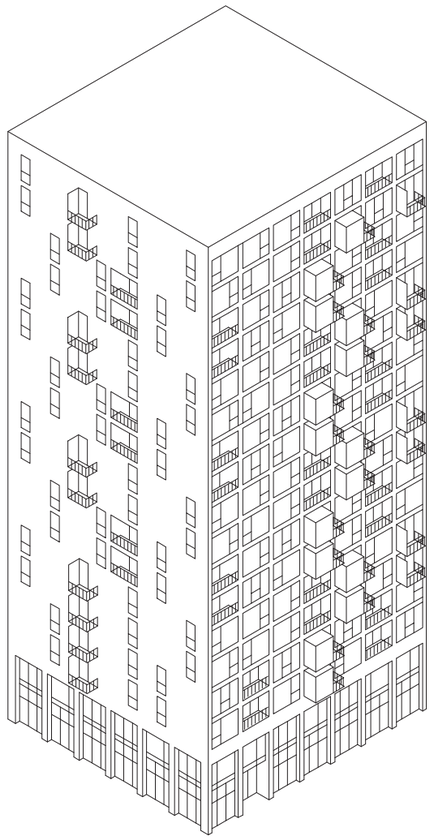
The apartments are designed based on a SYSTEM. The five standard APARTMENT types are designed in a GRID of 3.45 meters for the medium series and 3.6 meters for the large series. This modularity helps ARRANGE them within a grid in different configurations to give varied formal outcomes. The same layout is used in vertical STACKS of varied layout arrangements to result in the tower, urban villa and section building. A range of internal spaces have been achieved though the formal outcomes are similar in both the series.

COMPONENTS

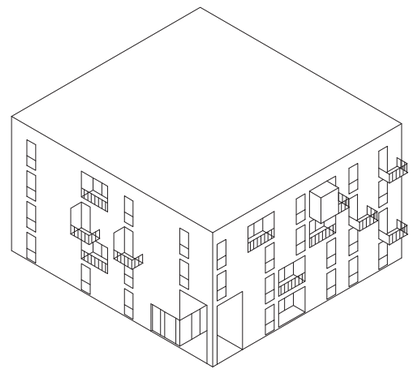
The façade is modulated using three basic PANEL gestures - projection, recess and surface fenestration. These gestures in tectonic expressions for "components" consist of a balcony, loggia, window and a hybrid combination. These four components have variants depending on factors such as climate, privacy and functional usage. These are then arranged and distributed through the vertical surfaces such that they are in sync with the functional requirement of each type of apartment in plan. Conceptually, with a set of fixed components a micro rayon or city district can have a lot of variation. The idea is to create a new vision which avoids monotony and yet has a cohesive feeling.



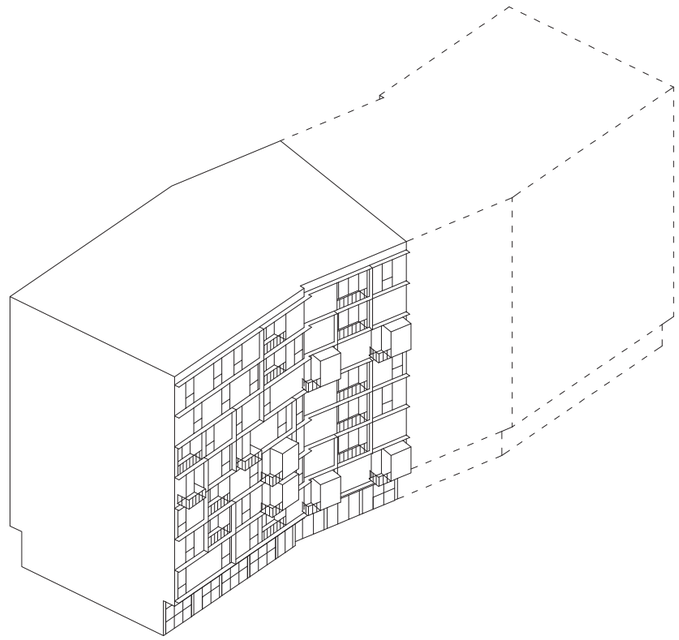
FORMAL OUTCOME



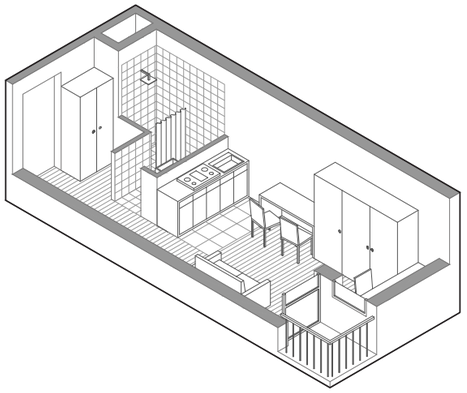
TOWER



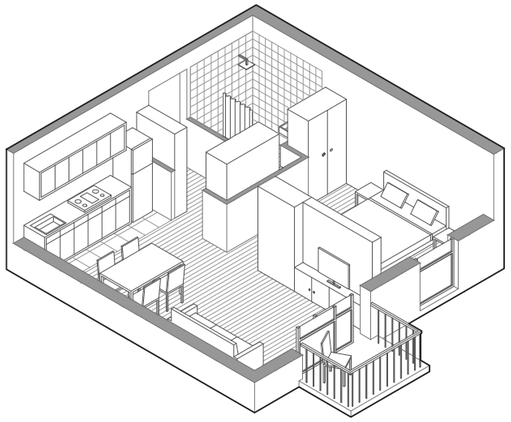
URBAN VILLA



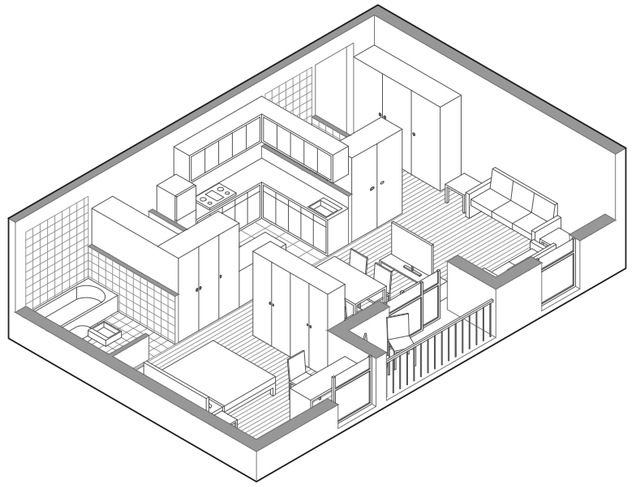
SECTION BUILDING



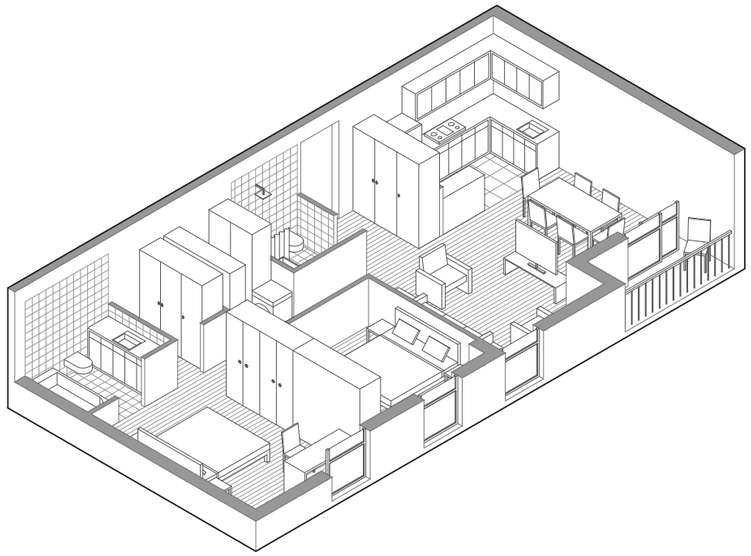
STUDIO (1R)



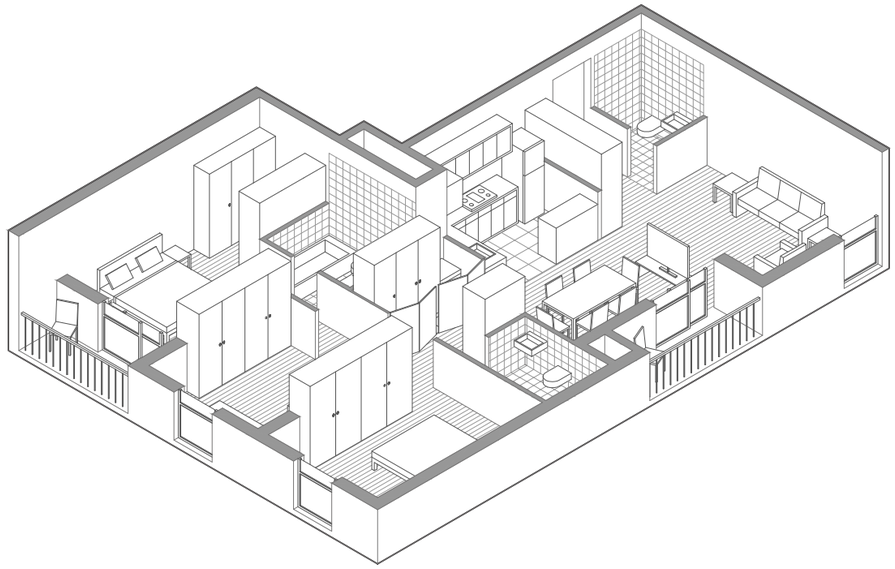
1-BEDROOM (1BR)



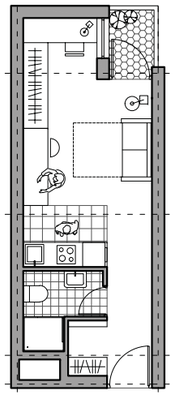
1-BEDROOM+ (1BR+)



2-BEDROOM (2BR)

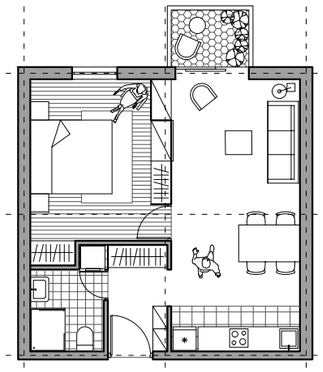


3-BEDROOM (3BR)



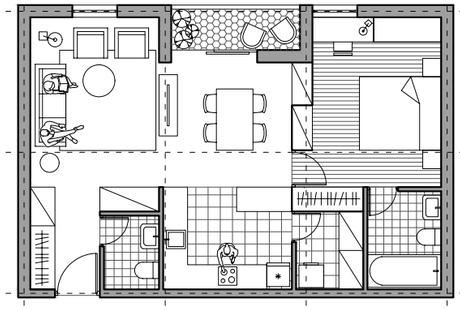
25.3 m²

STUDIO (1R)



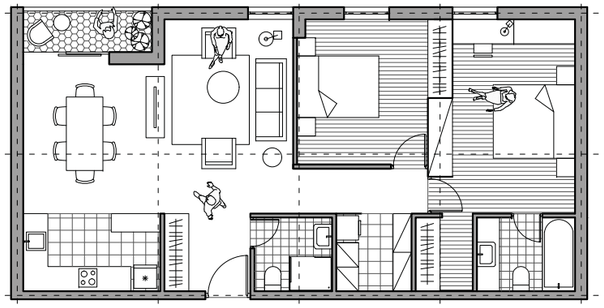
44.7 m²

1-BEDROOM (1BR)



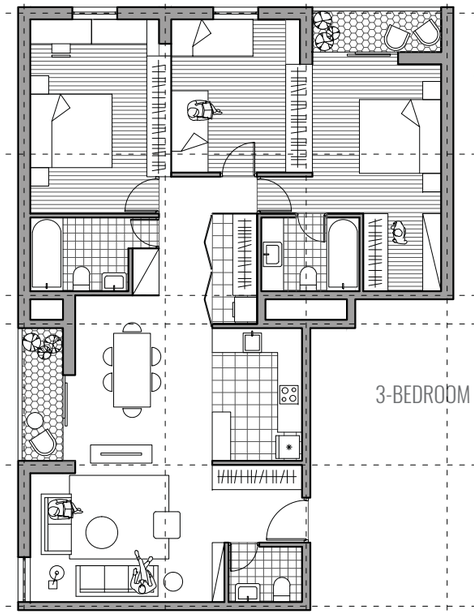
64.3 m²

1-BEDROOM+ (1BR+)



85.0 m²

2-BEDROOM (2BR)

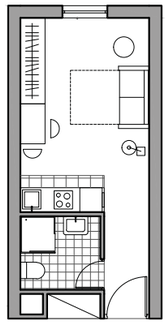


105.9 m²

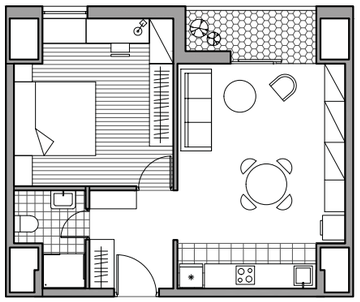
3-BEDROOM (3BR)


3600
3450
700
29.9 m²
STUDIO (1R)
49.2 m²
1-BEDROOM (1BR)
70.6 m²
1-BEDROOM+ (1BR+)
90.1 m²
2-BEDROOM (2BR)
Level 1
3-BEDROOM (3BR)
Level 2
109.5 m²

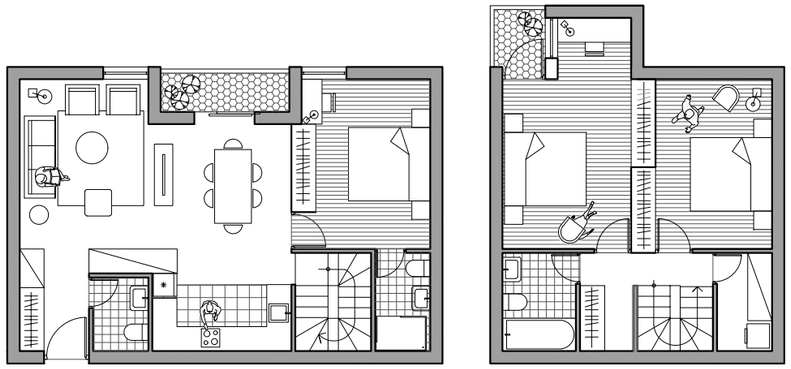
MEDIUM



CONCIERGE (1R)

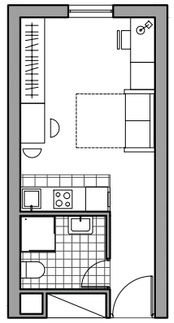


STAIRCASE BAY (1BR)

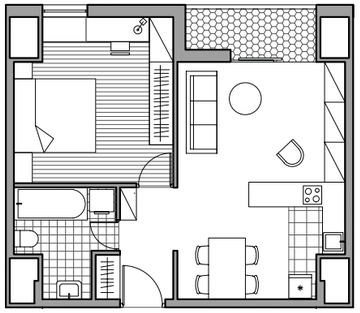


3-BEDROOM IN TOWER (3BR)

LARGE



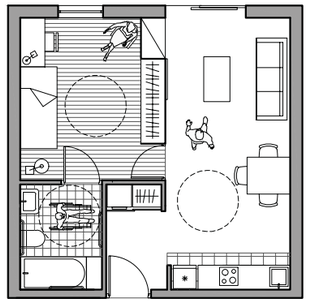
CONCIERGE (1R)



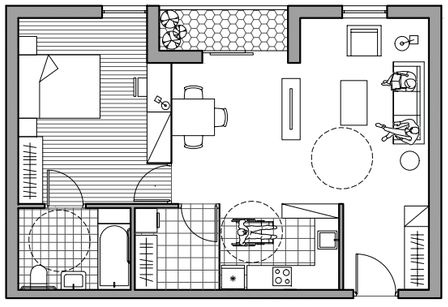
STAIRCASE BAY (1BR)

2-BEDROOM IN VILLA (2BR)

UNIVERSALLY ACCESSIBLE LAYOUT- MEDIUM

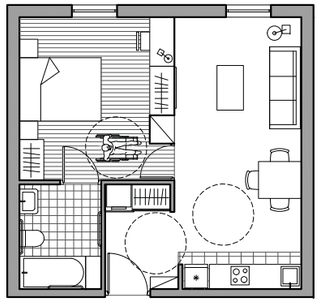


1-BEDROOM (1BR)

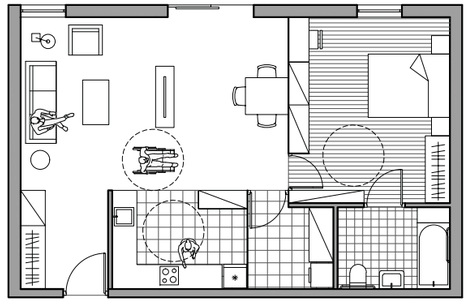


1-BEDROOM+ (1BR+)

UNIVERSALLY ACCESSIBLE LAYOUT - LARGE

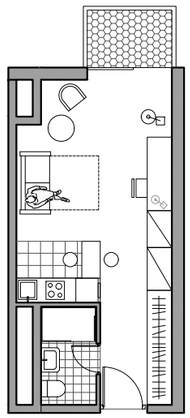


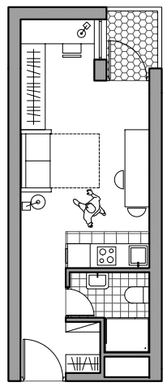
1-BEDROOM (1BR)



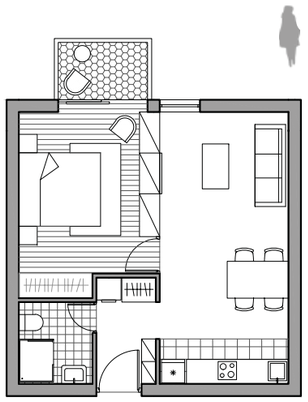
1-BEDROOM+ (1BR+)

The layouts have the possibility of easy adaptability. This allows for inhabitants to make changes in the apartments over a period of time as per changing needs. Also allows new owners to adapt apartments as per their requirement. The flexibility in the apartments facilitates multiple configurations of people to occupy same typology of apartment.

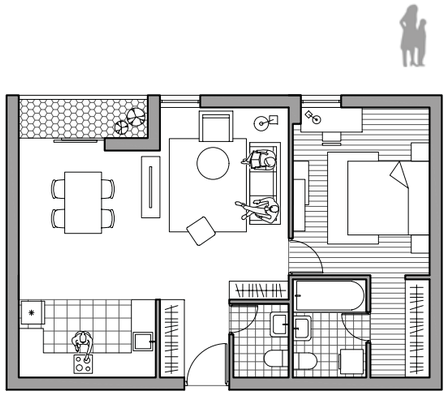


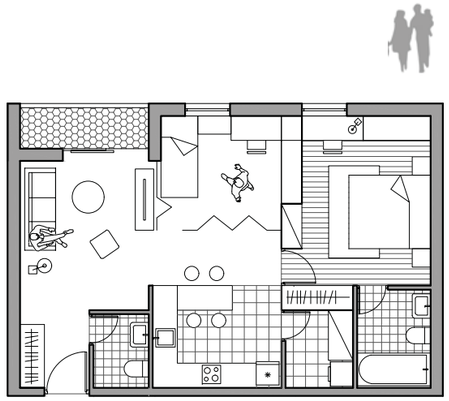


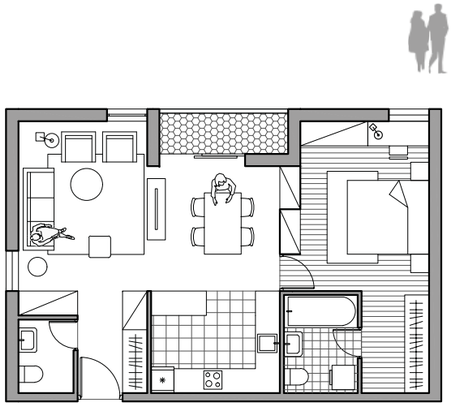
STUDIO (1R)



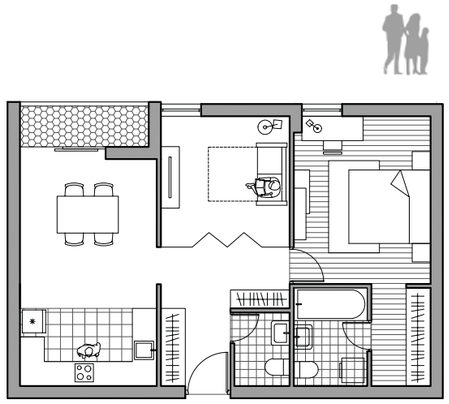
1-BEDROOM (1BR)



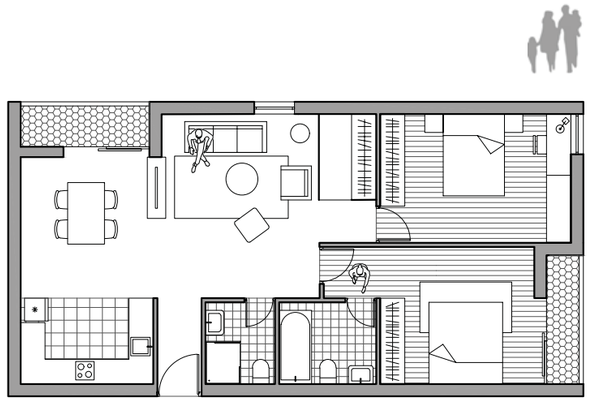




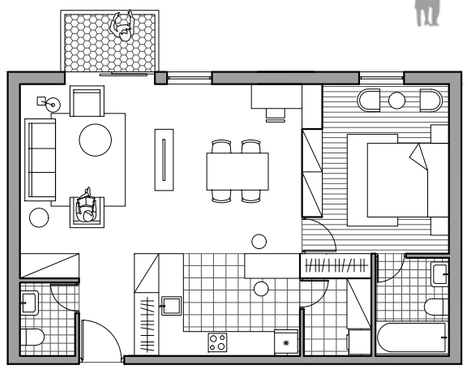
CORNER CONDITION

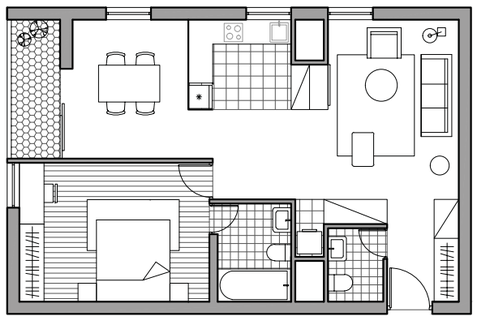


1-BEDROOM+ (1BR+)



2-BEDROOM (2BR)





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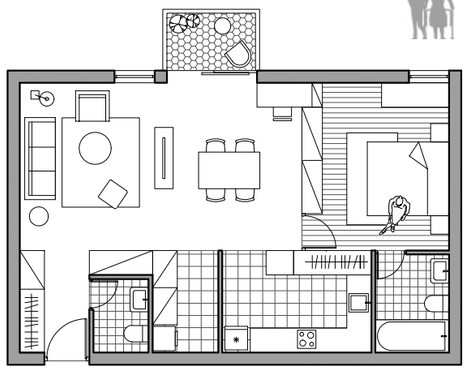
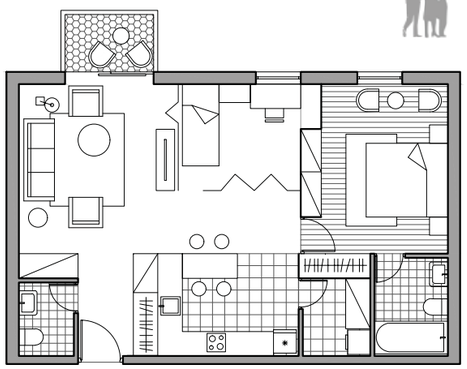
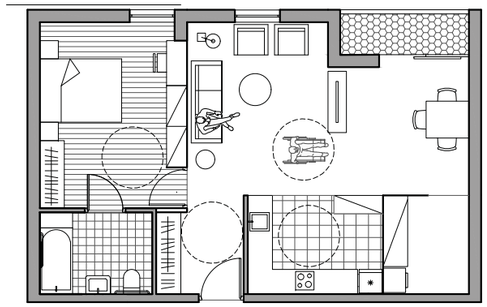
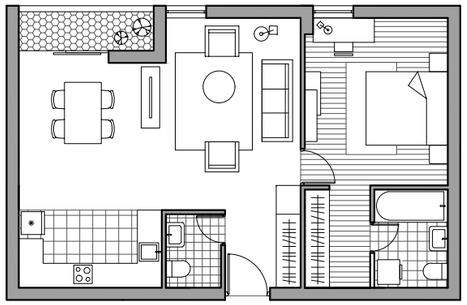
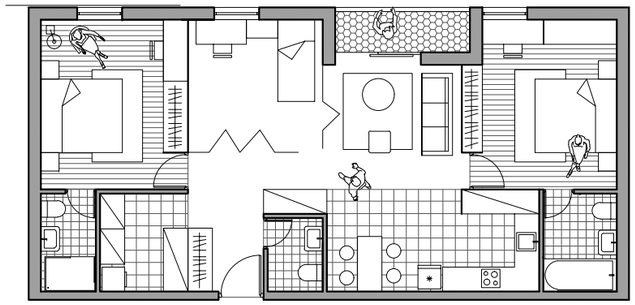




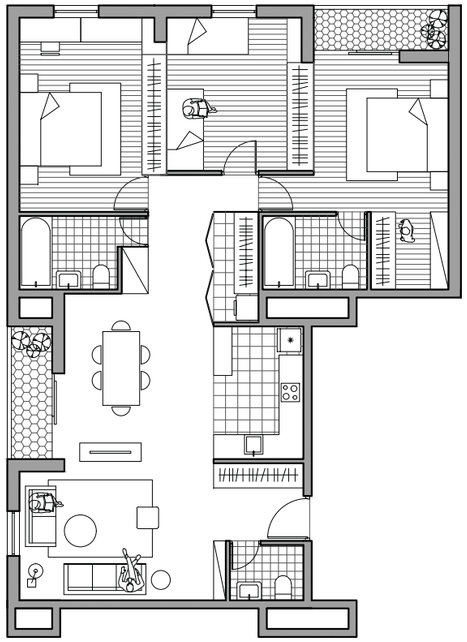




1-BEDROOM+ (1BR+)



2-BEDROOM (2BR)

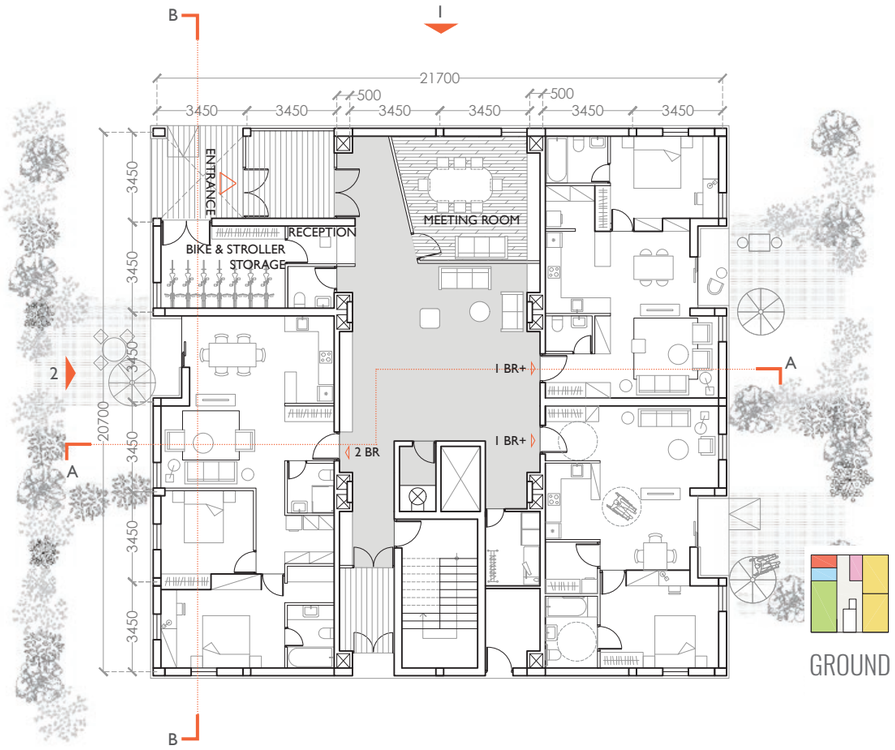


3-BEDROOM (3BR)

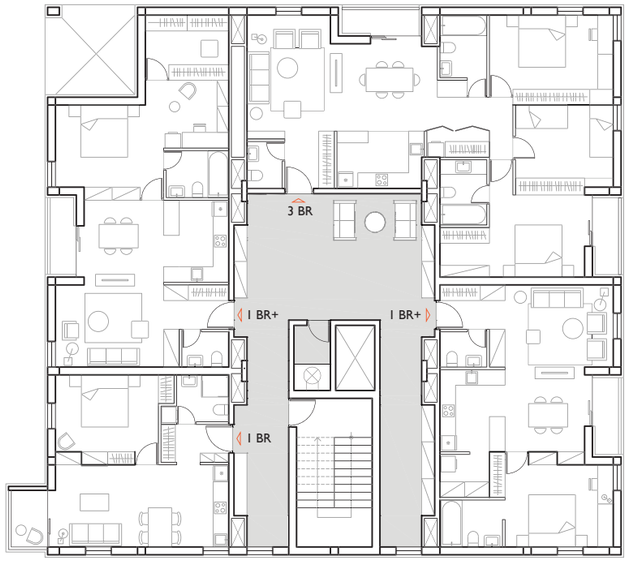
Urban Villa

The Urban Villa is low-rise building with a corner entry through a well-designed lobby space. The two entrances allow access from the road side and the backyard/courtyard. The ground floor has a collective space where residents can gather for a meeting or leisure. Each floor also has a well designed lobby. The building is clad in brick tiles which are earthy in color and texture.

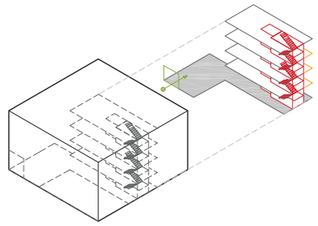
Medium		Large	
4 Storeys	17% Studio	**4** Storeys	17% Studio
	22% 1BR		22% 1BR
3-6 Apartments/Floor		**3-5** Apartments/Floor	
	33% 1BR+		33% 1BR+
18 Total Apartments		**18** Total Apartments	
	17% 2BR		17% 2BR
471 Footprint (m^2)	11% 3BR	**491** Footprint (m^2)	11% 3BR



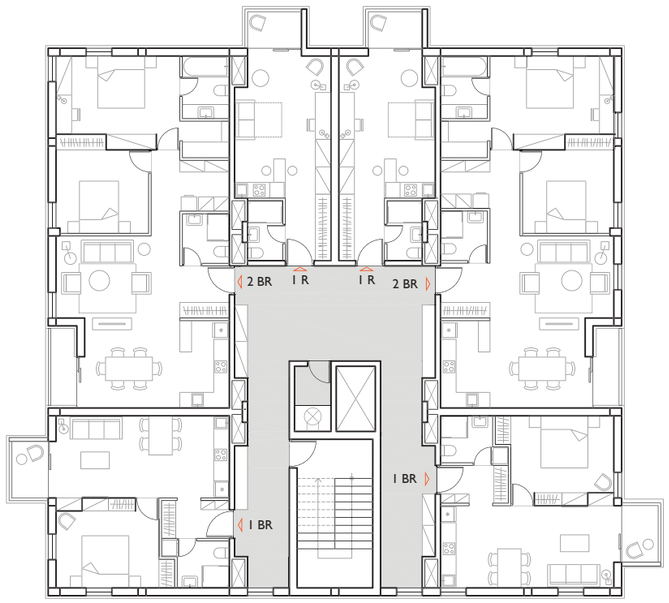
GROUND FLOOR PLAN



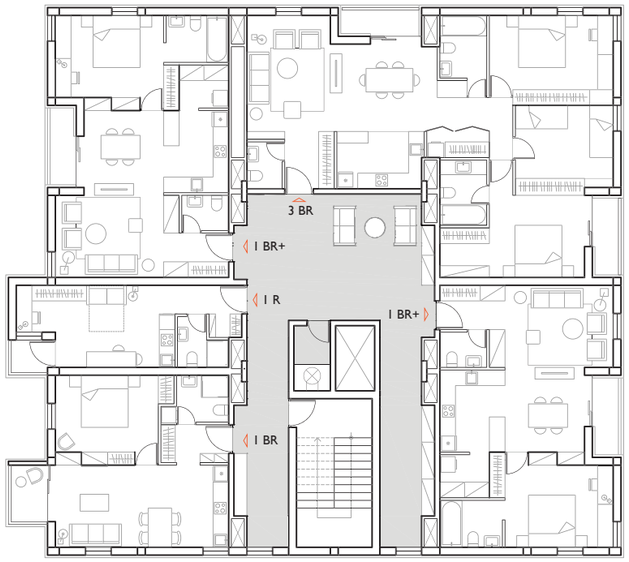
FIRST FLOOR PLAN



Entrance
Vertical Communication Elements
Horizontal Communication Elements



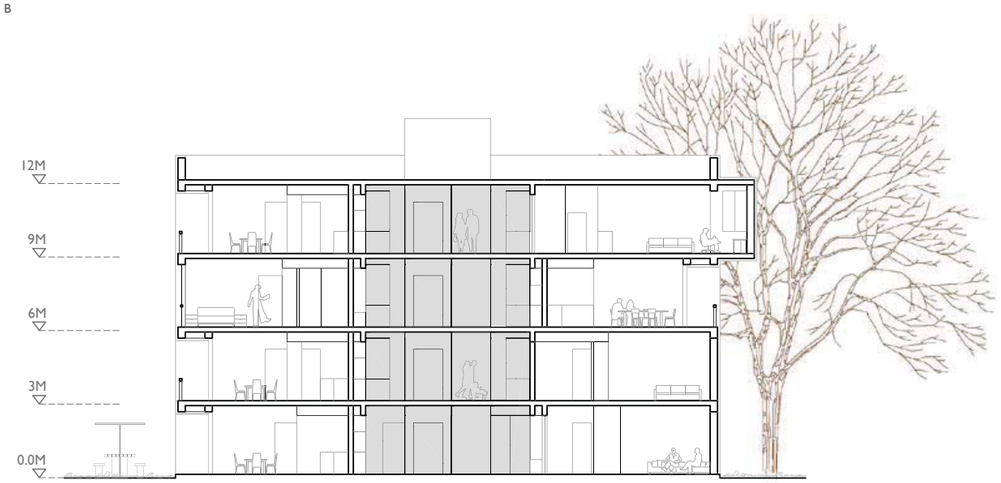
SECOND FLOOR PLAN



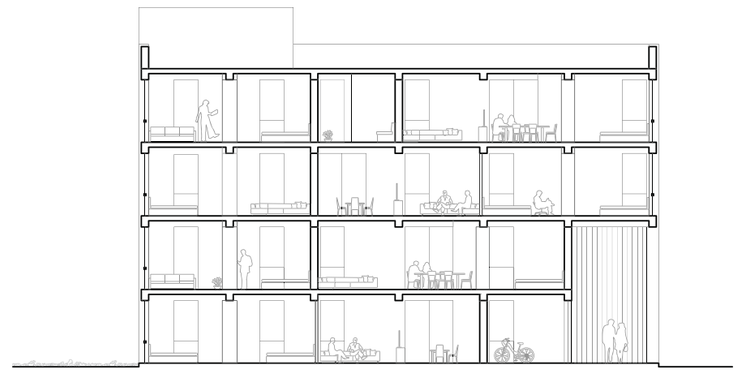
THIRD FLOOR PLAN

Studio (1R)
1-Bedroom
1-Bedroom+
2-Bedroom (2 BR)
3-bedroom (3 BR)
Services
Commercial
Collective spaces
Storage spaces
Vertical communication
Entrance group
Toilet

0 1 3 5 7M



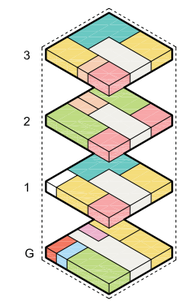
SECTION AA



SECTION BB

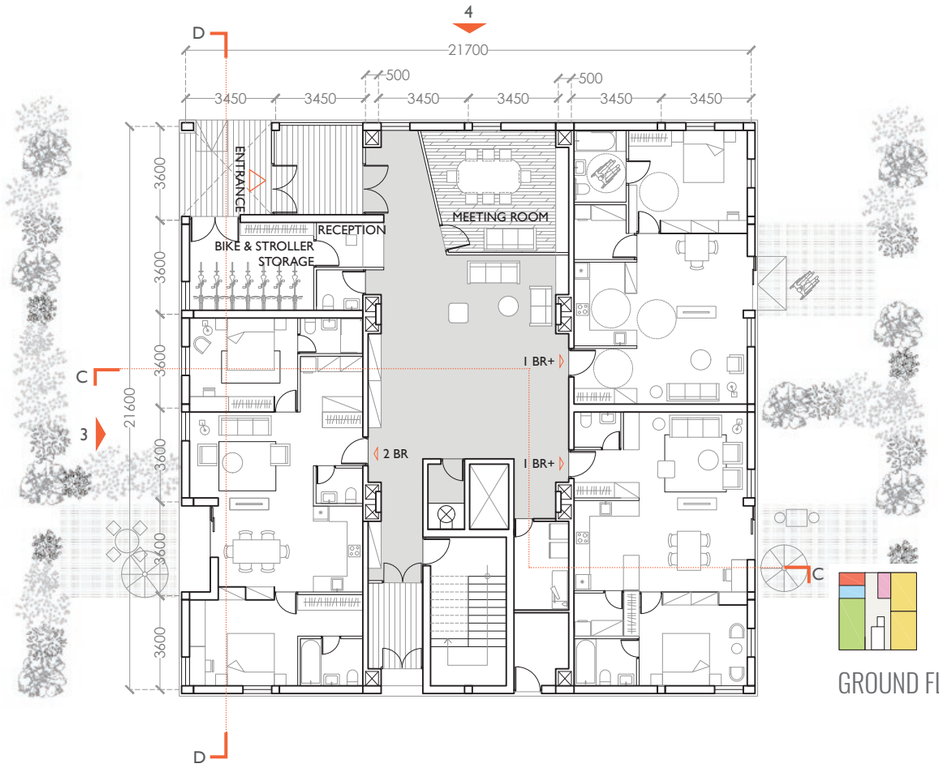
ELEVATION 1

ELEVATION 2

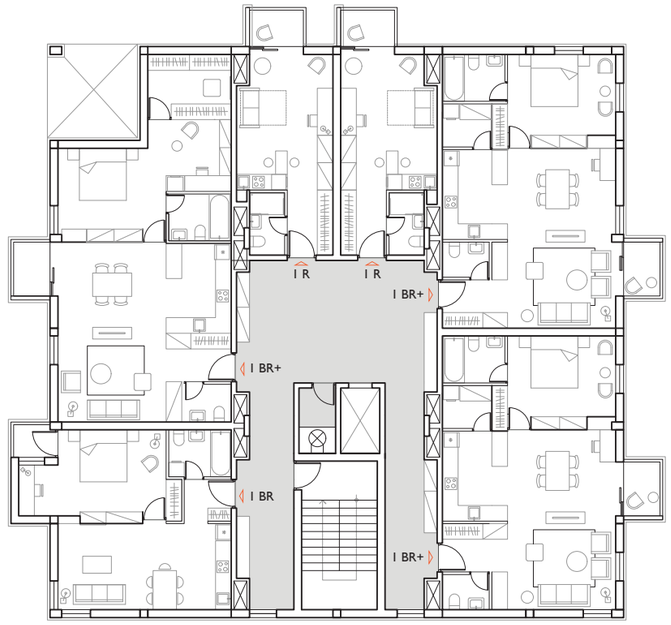


- Studio (1R)
- 1-Bedroom
- 1-Bedroom+
- 2-Bedroom (2 BR)
- 3-bedroom (3 BR)
- Services
- Commercial
- Collective spaces
- Storage spaces
- Vertical communication
- Entrance group
- Toilet

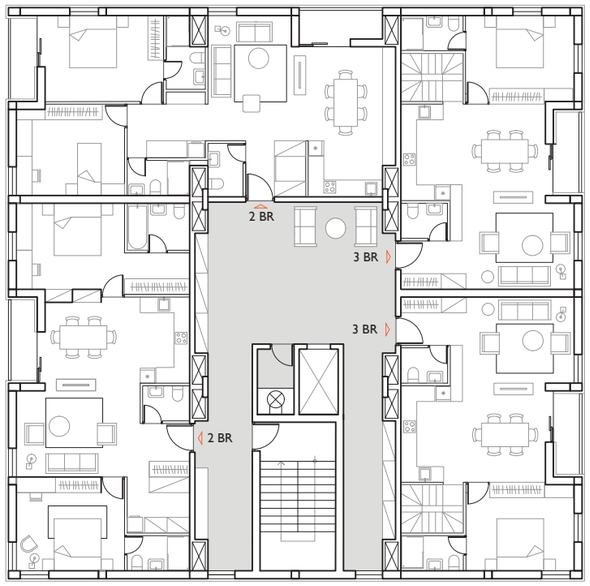
0 1 3 5 7M



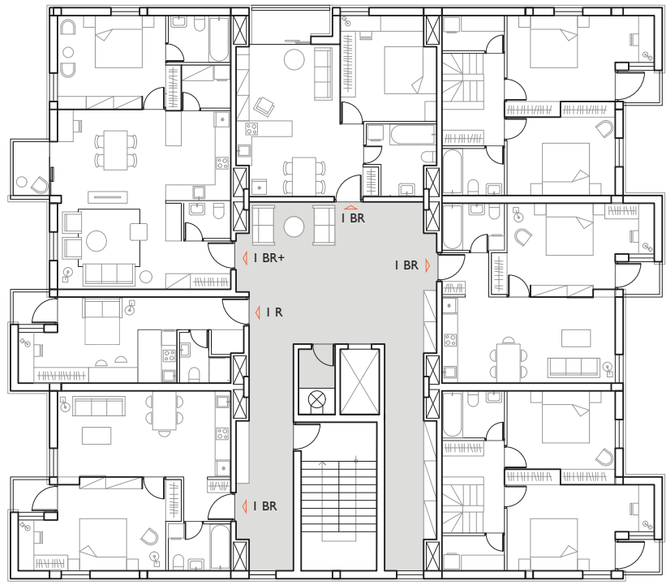
GROUND FLOOR PLAN



FIRST FLOOR PLAN



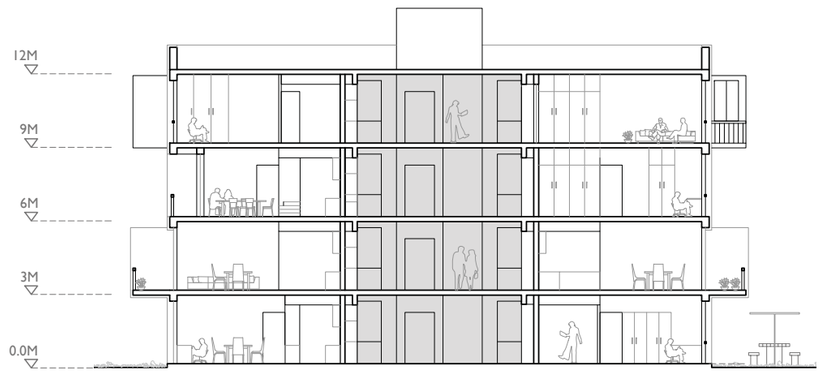
SECOND FLOOR PLAN



THIRD FLOOR PLAN

- Studio (1R)
- 1-Bedroom
- 1-Bedroom+
- 2-Bedroom (2 BR)
- 3-bedroom (3 BR)
- Services
- Commercial
- Collective spaces
- Storage spaces
- Vertical communication
- Entrance group
- Toilet

0 1 3 5 7M

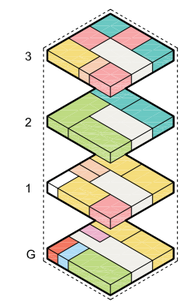


SECTION CC

SECTION DD

ELEVATION 3

ELEVATION 4



- Studio (1R)
- 1-Bedroom
- 1-Bedroom+
- 2-Bedroom (2 BR)
- 3-bedroom (3 BR)
- Services
- Commercial
- Collective spaces
- Storage spaces
- Vertical communication
- Entrance group
- Toilet

0 1 3 5 7M

Section Building

The Section building is a mid-rise building. It is a longer block compared to the urban villa. The most important aspect of this block is the angular form that it is designed with the same set of plans as the tower or villa. This is achieved through creating an angular lobby space. Multiple angular blocks come together to form an oscillating façade. The angle helps to reduce the monotony of a typical linear façade, which in turn, adds to its rich urban presence. Though the apartment plans used are same as the villa and tower, when multiplied, the section buildings come together to create a very interesting interface with the street.

Medium

8
Storeys

2-7
Apartments/Floor

41
Total Apartments

453
Footprint (m^2)

27% Studio
24% 1BR
29% 1BR+
15% 2BR
5% 3BR

Large

8
Storeys

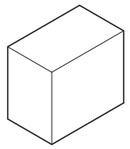
2-7
Apartments/Floor

41
Total Apartments

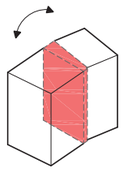
461
Footprint (m^2)

27% Studio
24% 1BR
29% 1BR+
15% 2BR
5% 3BR

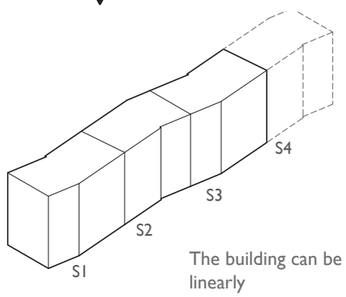
FORM DEVELOPMENT



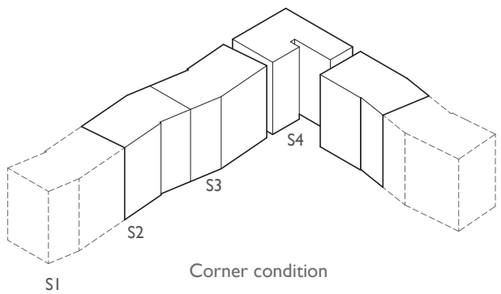
Base Form



The cuboid is split to create a wedge for the entrance & vertical communication

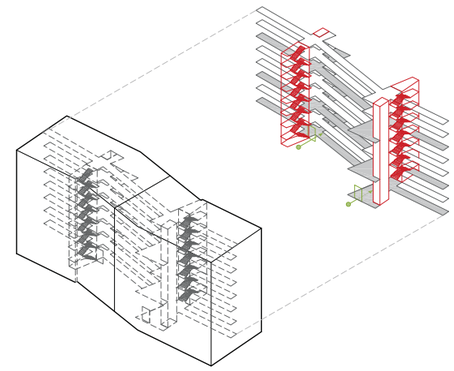


The building can be joined linearly

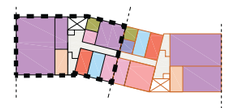


Corner condition

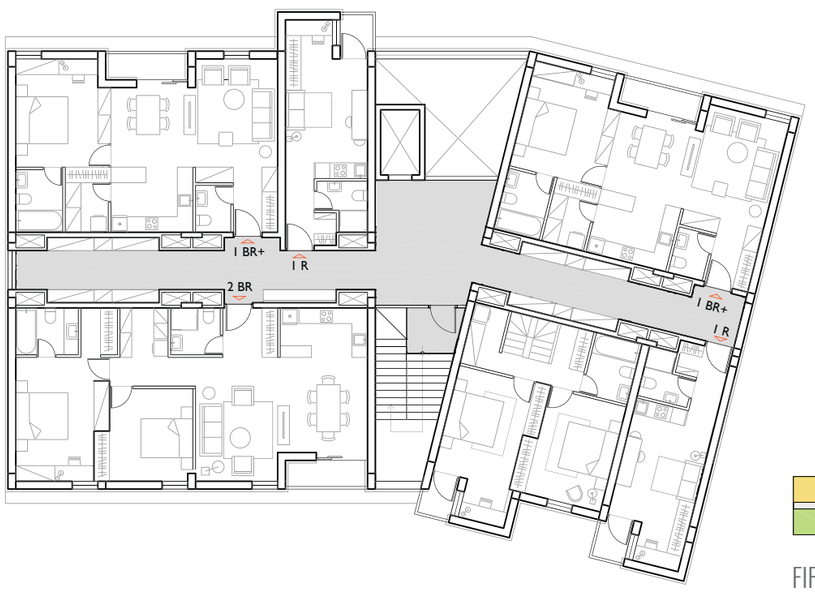
LOBBY INTERIOR VIEW

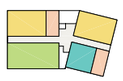


Entrance
Vertical Communication Elements
Horizontal Communication Elements



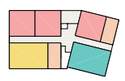
GROUND FLOOR PLAN





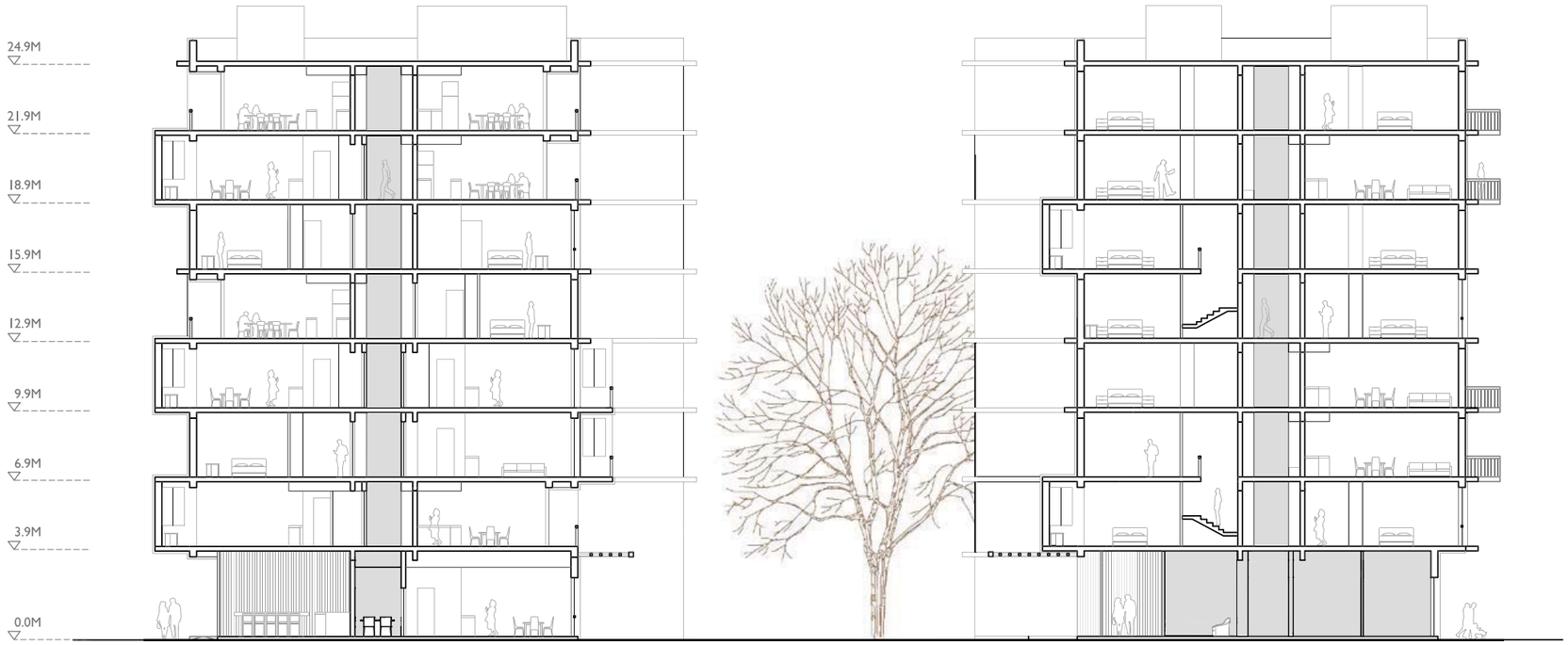
FIRST FLOOR PLAN

Studio (1R)
1-Bedroom
1-Bedroom+
2-Bedroom (2 BR)
3-bedroom (3 BR)
Services
Commercial
Collective spaces
Storage spaces
Vertical communication
Entrance group
Toilet



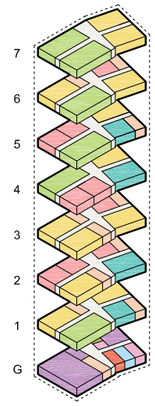
SECOND FLOOR PLAN

0 1 3 5 7M



SECTION EE

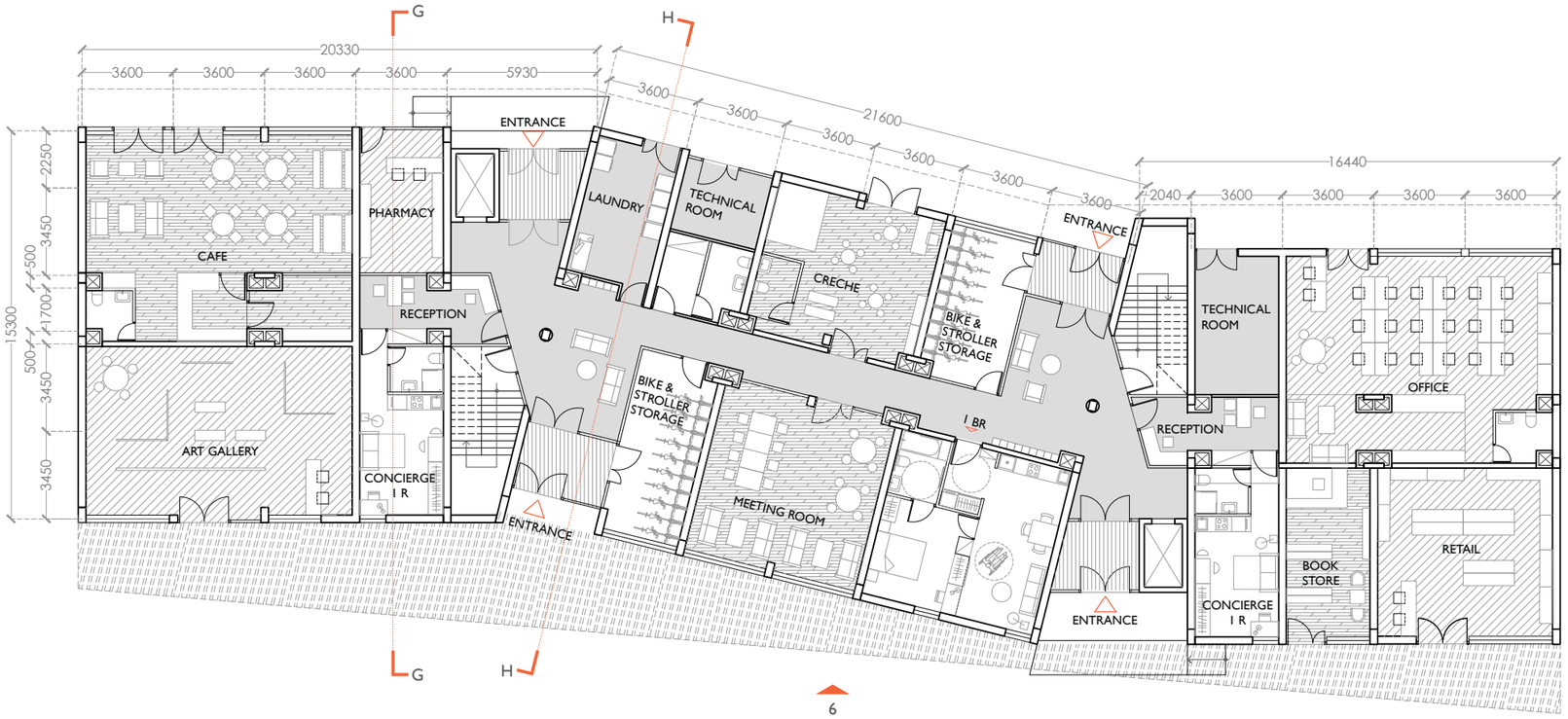
SECTION FF

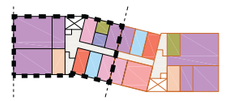


- Studio (1R)
- 1-Bedroom
- 1-Bedroom+
- 2-Bedroom (2 BR)
- 3-bedroom (3 BR)
- Services
- Commercial
- Collective spaces
- Storage spaces
- Vertical communication
- Entrance group
- Toilet

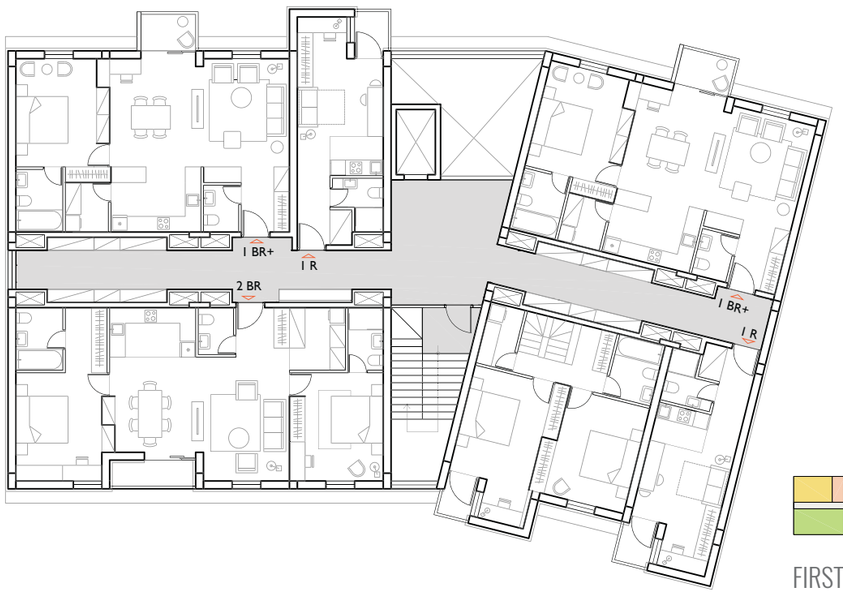
ELEVATION 5

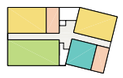
0 1 3 5 7M





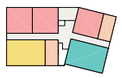
GROUND FLOOR PLAN





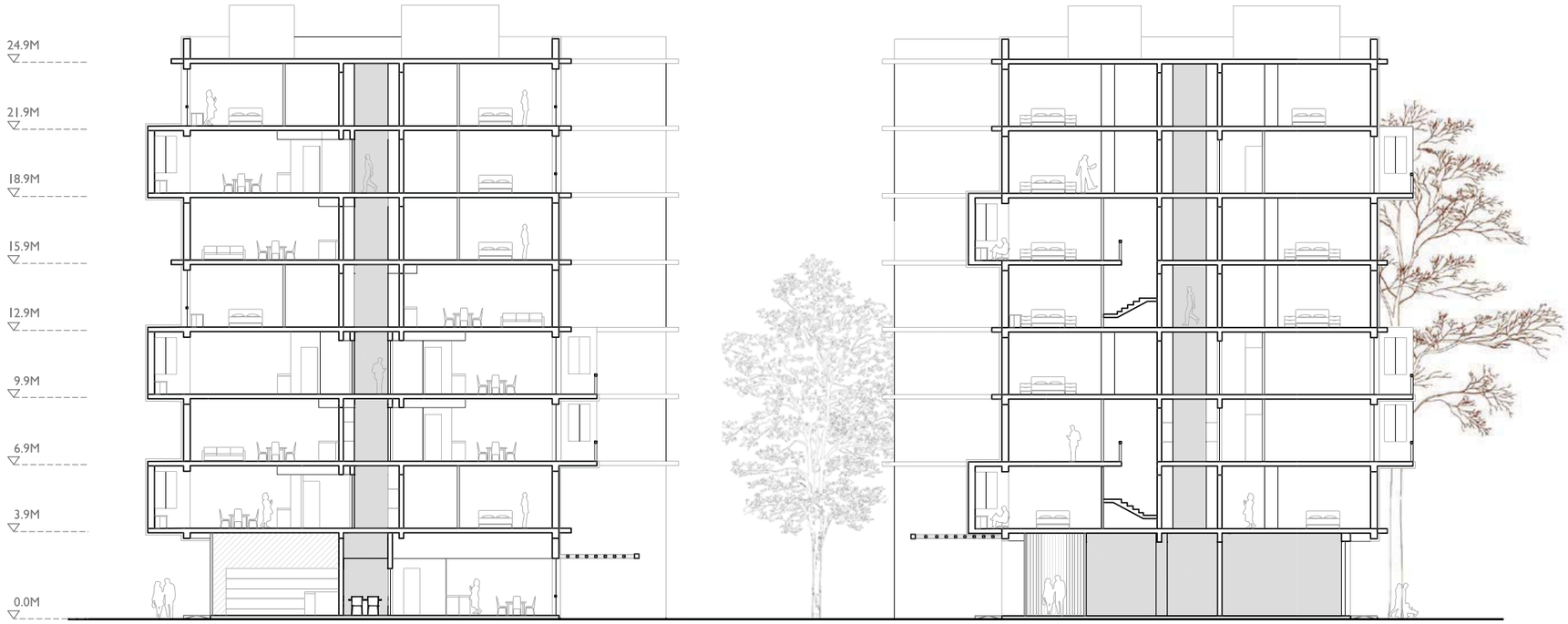
FIRST FLOOR PLAN

- Studio (1R)
- 1-Bedroom
- 1-Bedroom+
- 2-Bedroom (2 BR)
- 3-bedroom (3 BR)
- Services
- Commercial
- Collective spaces
- Storage spaces
- Vertical communication
- Entrance group
- Toilet



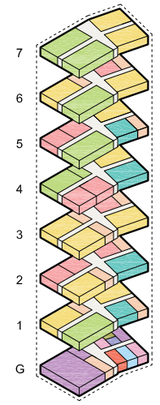
SECOND FLOOR PLAN

0 1 3 5 7M



SECTION GG

SECTION HH



- Studio (1R)
- 1-Bedroom
- 1-Bedroom+
- 2-Bedroom (2 BR)
- 3-bedroom (3 BR)
- Services
- Commercial
- Collective spaces
- Storage spaces
- Vertical communication
- Entrance group
- Toilet

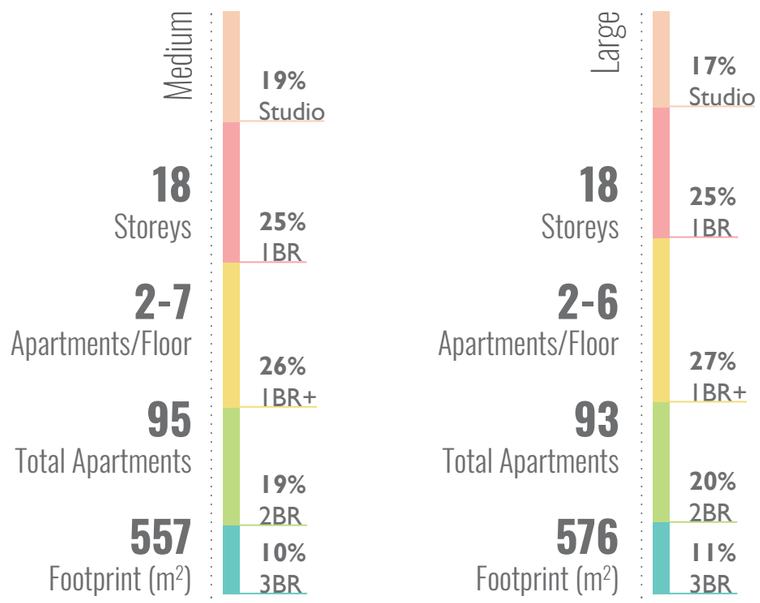
ELEVATION 6

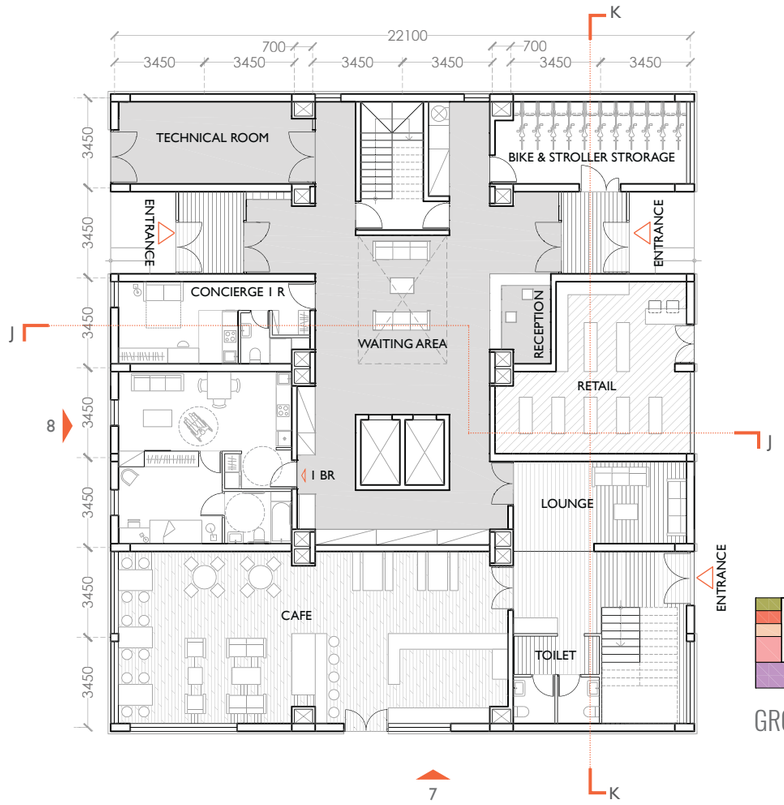
0 1 3 5 7M

Tower

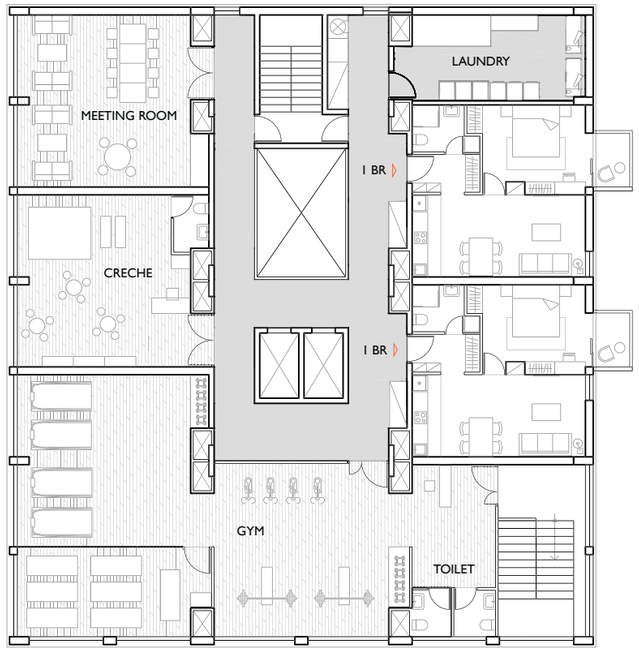
The Tower is an eighteen storey high-rise building. The ground and first floors are designed for commercial activities such as shops, grocery stores, office spaces and also collective spaces for the apartment such as meeting rooms, laundry facilities etc. There are two entries for the residents of the tower and an independent entry with staircase for the commercial activities spread across lower two floors.

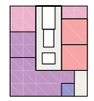
Furthermore, the tower essentially has stacks of four floors which are piled thrice. This stack of four floors have arrangements of multiple types of apartments on each floor. This is an important strategy because it breaks the scale of the tower, bringing it to a more humane scale like that of the villa. This also helps to create a systemic yet interesting variation in the facade. Each stack is visually connected by a triple-height collective space, thus creating a better community life.



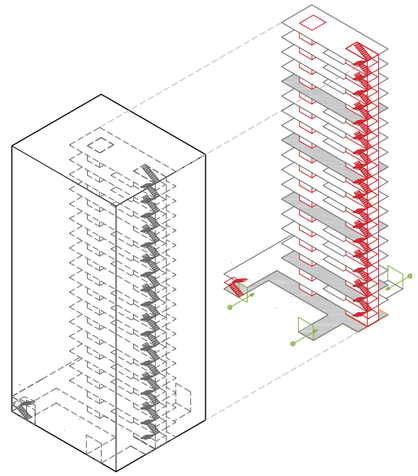


GROUND FLOOR PLAN

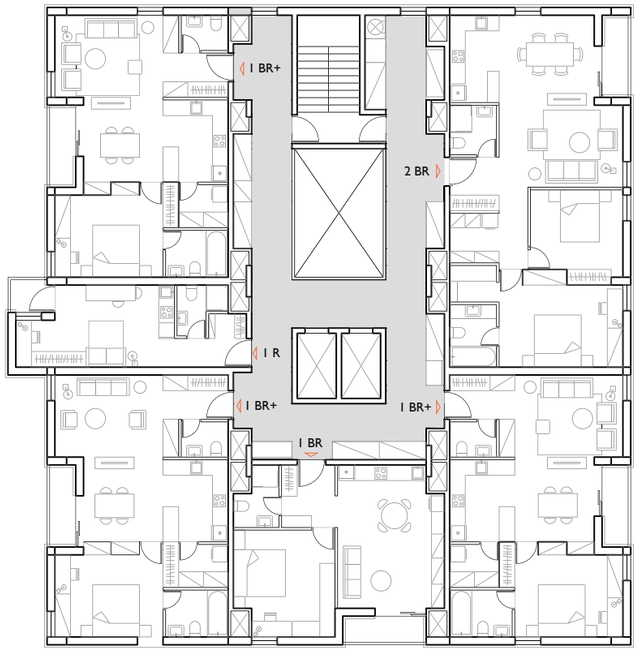


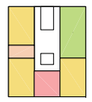


FIRST FLOOR PLAN

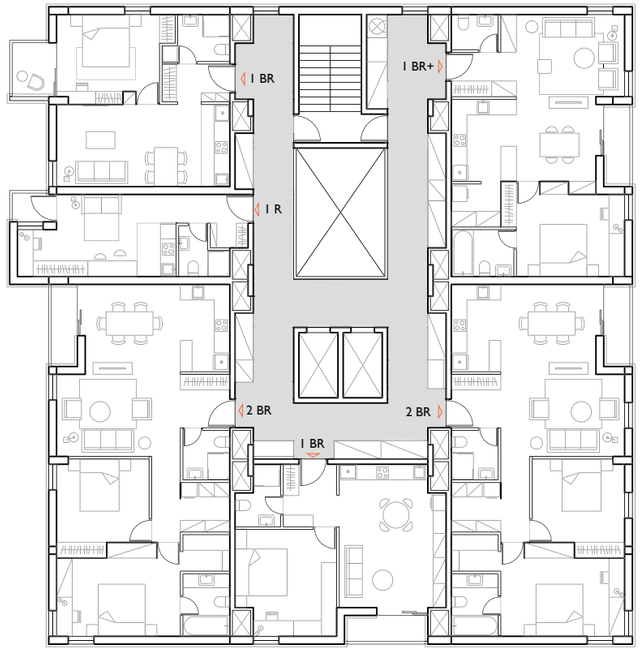


Entrance
Vertical Communication Elements
Horizontal Communication Elements





THIRD FLOOR PLAN

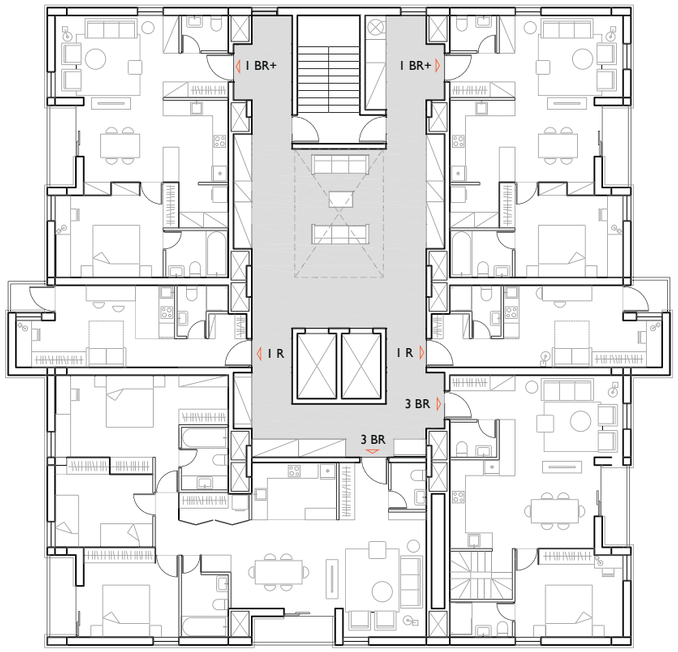


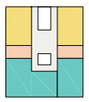
FIFTH FLOOR PLAN

Standard Floor Plan - A

Studio (1R)
1-Bedroom
1-Bedroom+
2-Bedroom (2 BR)
3-bedroom (3 BR)
Services
Commercial
Collective spaces
Storage spaces
Vertical communication
Entrance group
Toilet

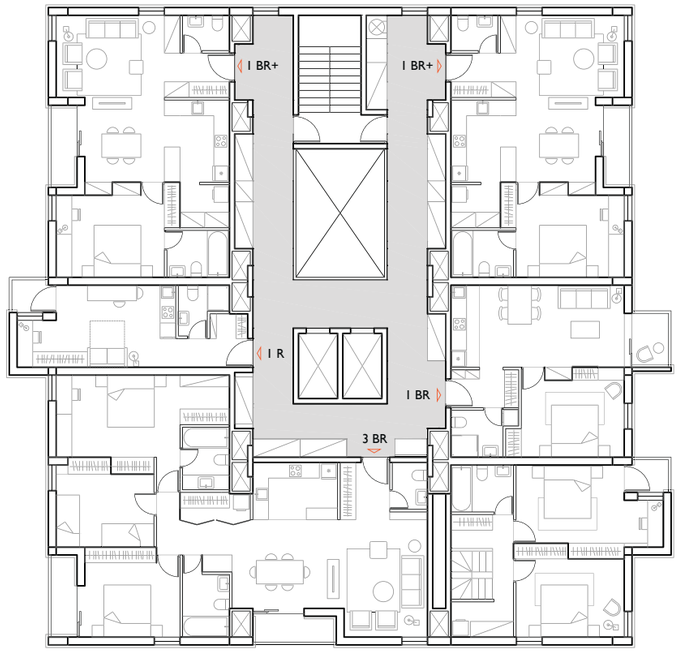
0 1 3 5 7M

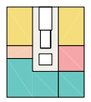




SIXTH FLOOR PLAN

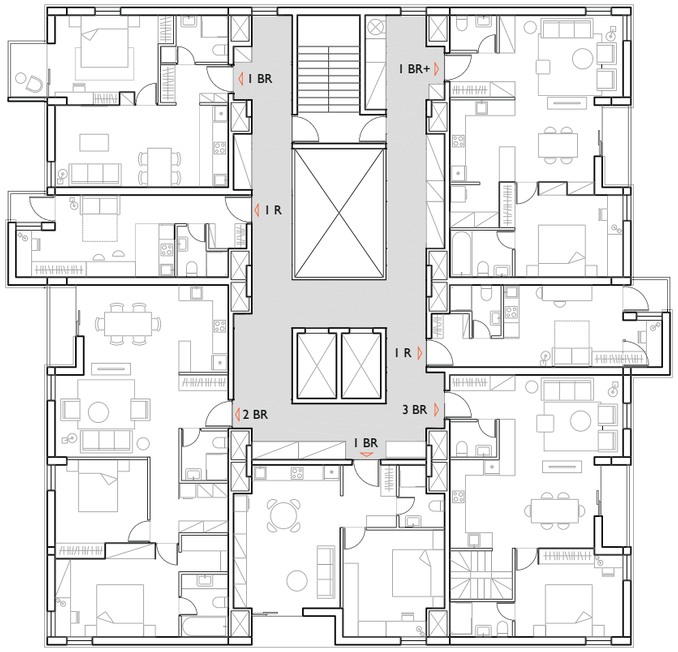
Standard Floor Plan - B



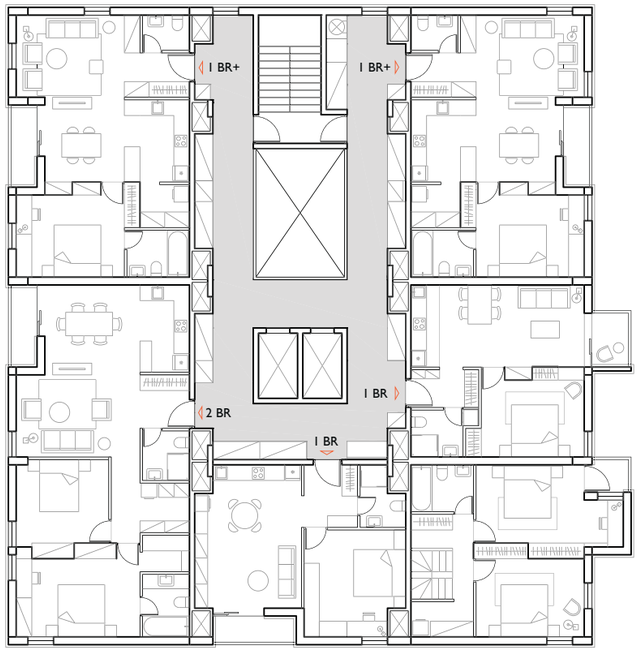


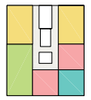
SEVENTH FLOOR PLAN

Standard Floor Plan - C



SIXTEENTH FLOOR PLAN





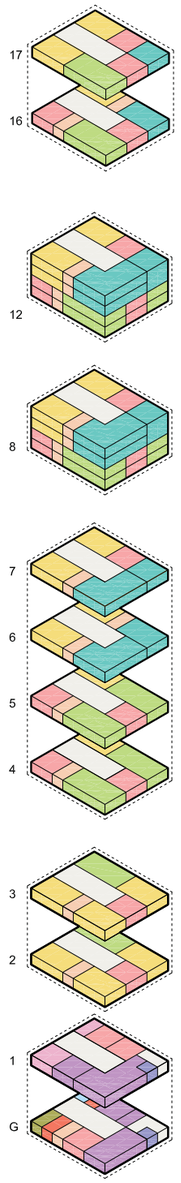
SEVENTEENTH FLOOR PLAN

- Studio (1R)
- 1-Bedroom
- 1-Bedroom+
- 2-Bedroom (2 BR)
- 3-bedroom (3 BR)
- Services
- Commercial
- Collective spaces
- Storage spaces
- Vertical communication
- Entrance group
- Toilet

0 1 3 5 7M

SECTION JJ

SECTION KK

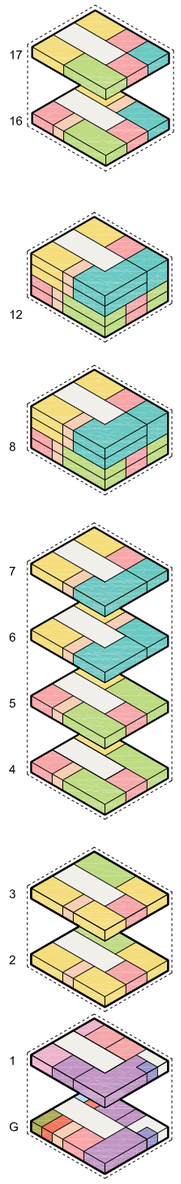


- Studio (1R)
- 1-Bedroom
- 1-Bedroom+
- 2-Bedroom (2 BR)
- 3-bedroom (3 BR)
- Services
- Commercial
- Collective spaces
- Storage spaces
- Vertical communication
- Entrance group
- Toilet

0 1 3 5 7M

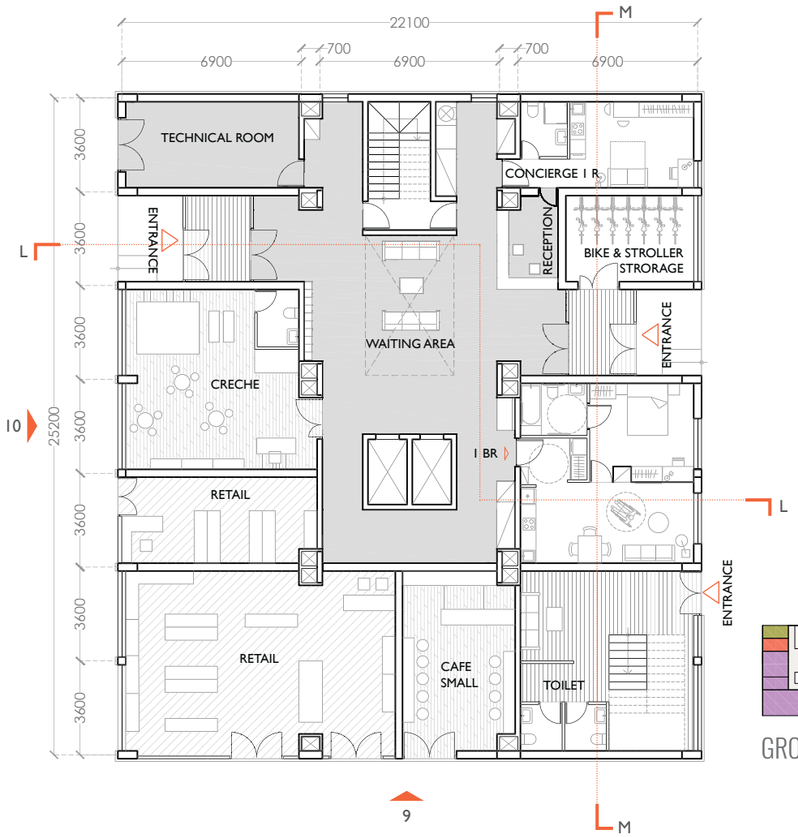
ELEVATION 7

ELEVATION 8

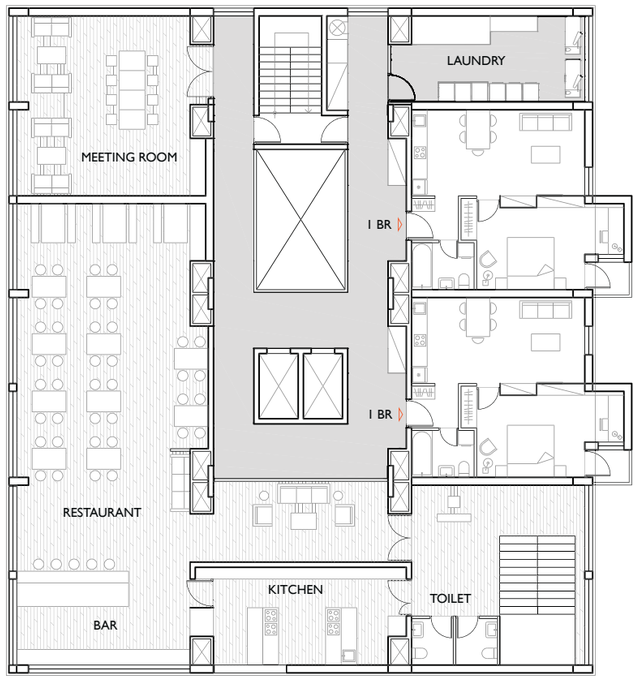


- Studio (1R)
- 1-Bedroom
- 1-Bedroom+
- 2-Bedroom (2 BR)
- 3-bedroom (3 BR)
- Services
- Commercial
- Collective spaces
- Storage spaces
- Vertical communication
- Entrance group
- Toilet

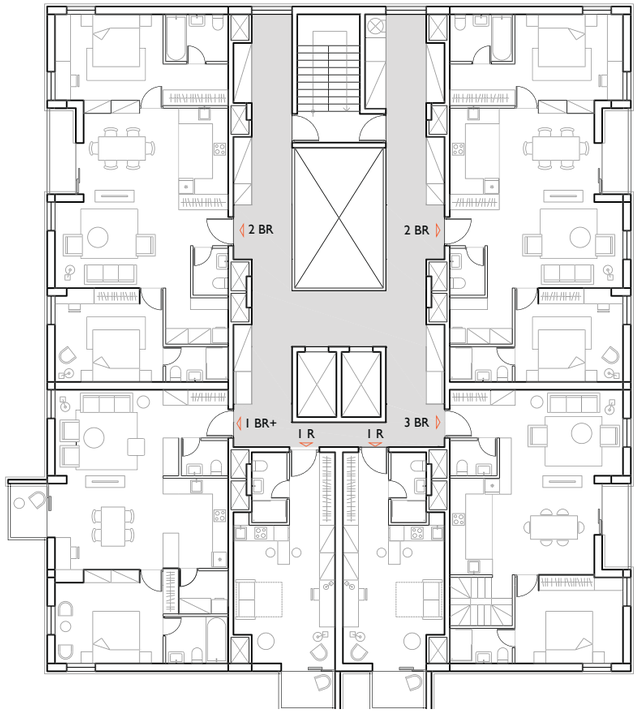
0 1 3 5 7M



GROUND FLOOR PLAN

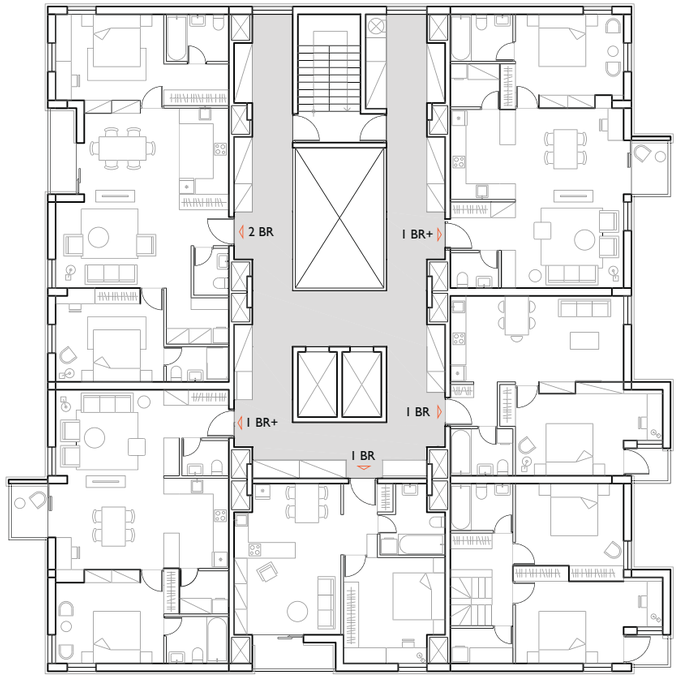


FIRST FLOOR PLAN



FOURTH FLOOR PLAN

Standard Floor Plan - A

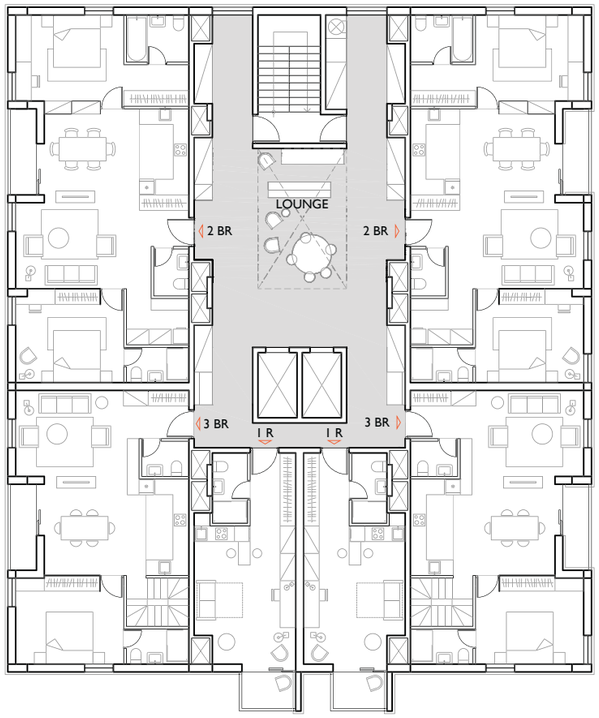


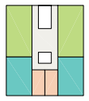
FIFTH FLOOR PLAN

Standard Floor Plan - B

- Studio (1R)
- 1-Bedroom
- 1-Bedroom+
- 2-Bedroom (2 BR)
- 3-bedroom (3 BR)
- Services
- Commercial
- Collective spaces
- Storage spaces
- Vertical communication
- Entrance group
- Toilet

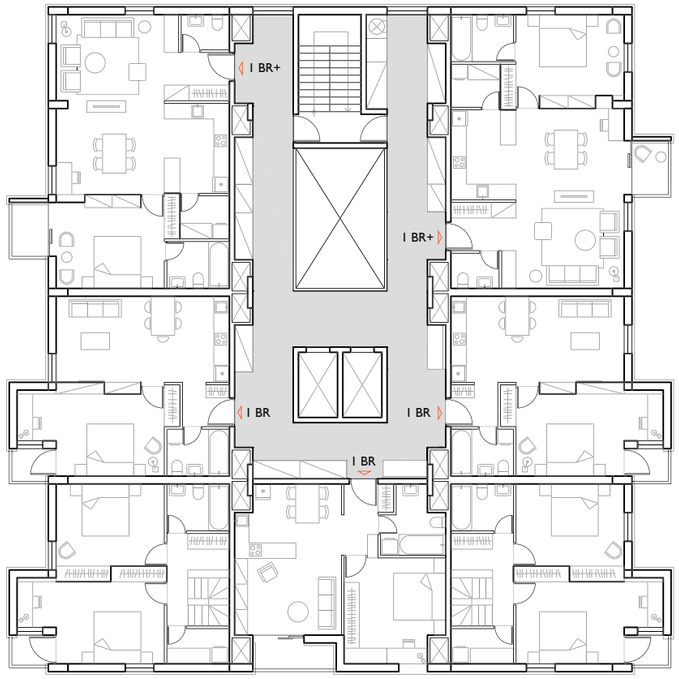
0 1 3 5 7M

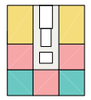




SIXTH FLOOR PLAN

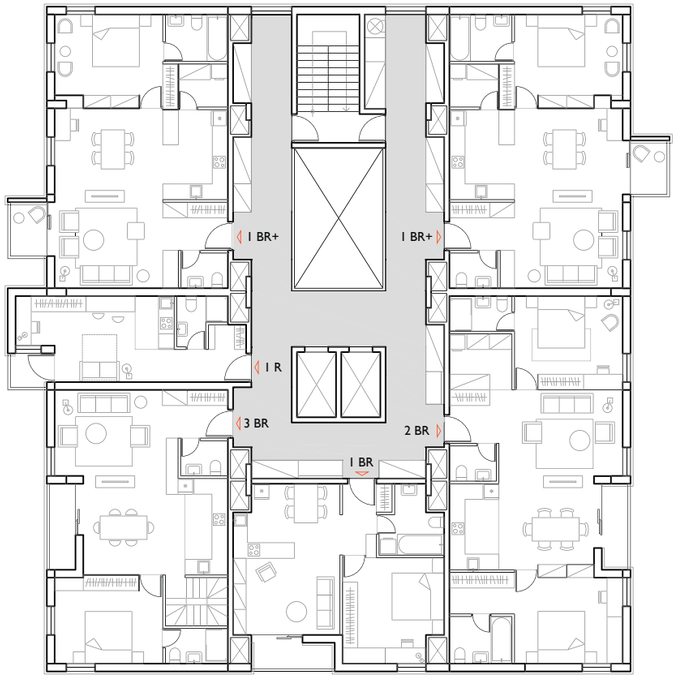
Standard Floor Plan - C

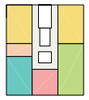




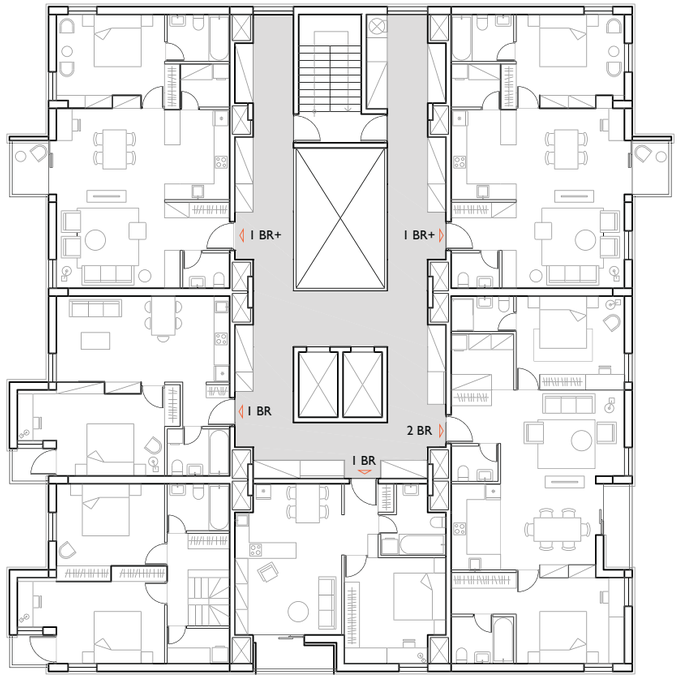
SEVENTH FLOOR PLAN

Standard Floor Plan - D





SIXTEENTH FLOOR PLAN

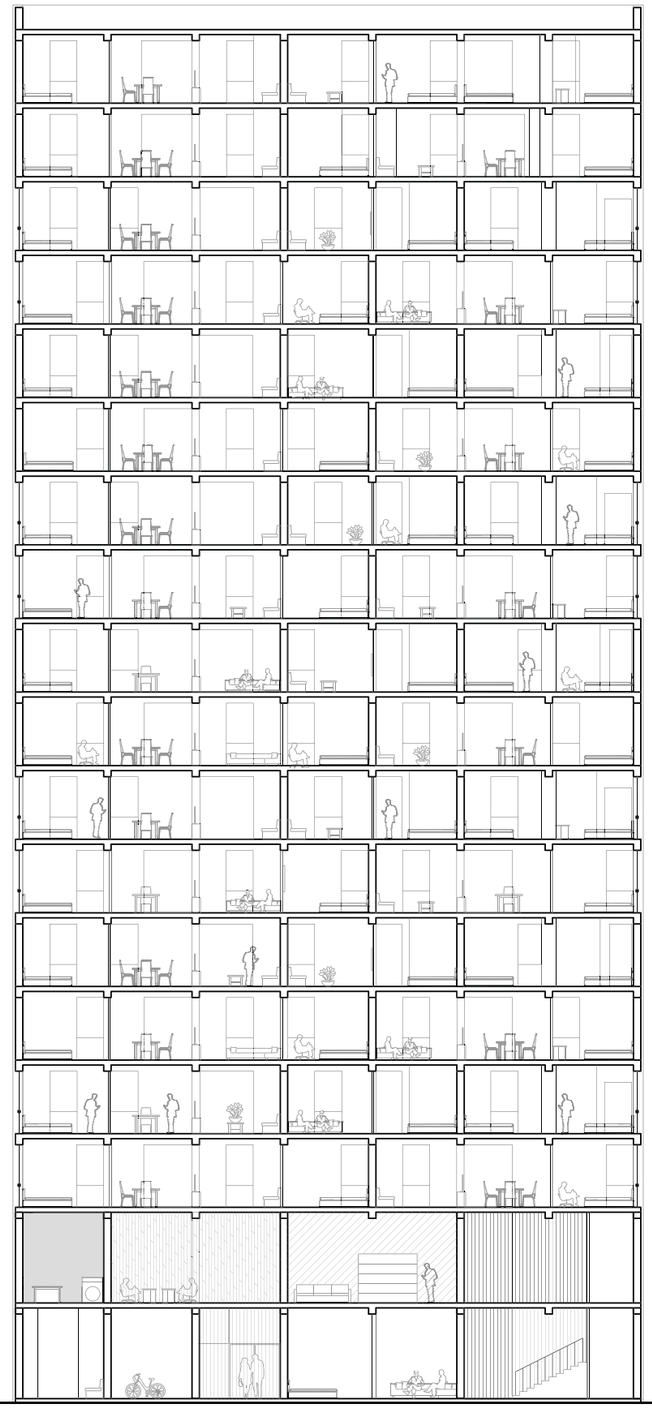


SEVENTEENTH FLOOR PLAN

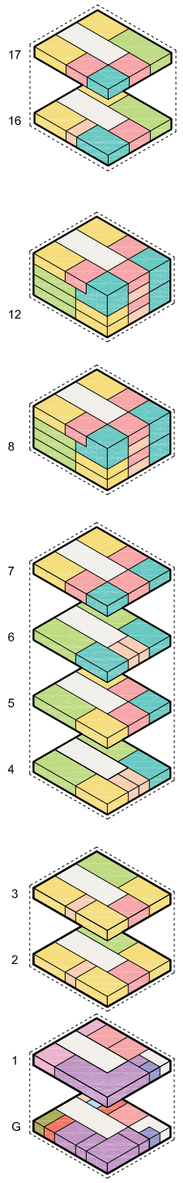
- Studio (1R)
- 1-Bedroom
- 1-Bedroom+
- 2-Bedroom (2 BR)
- 3-bedroom (3 BR)
- Services
- Commercial
- Collective spaces
- Storage spaces
- Vertical communication
- Entrance group
- Toilet

0 1 3 5 7M

SECTION LL

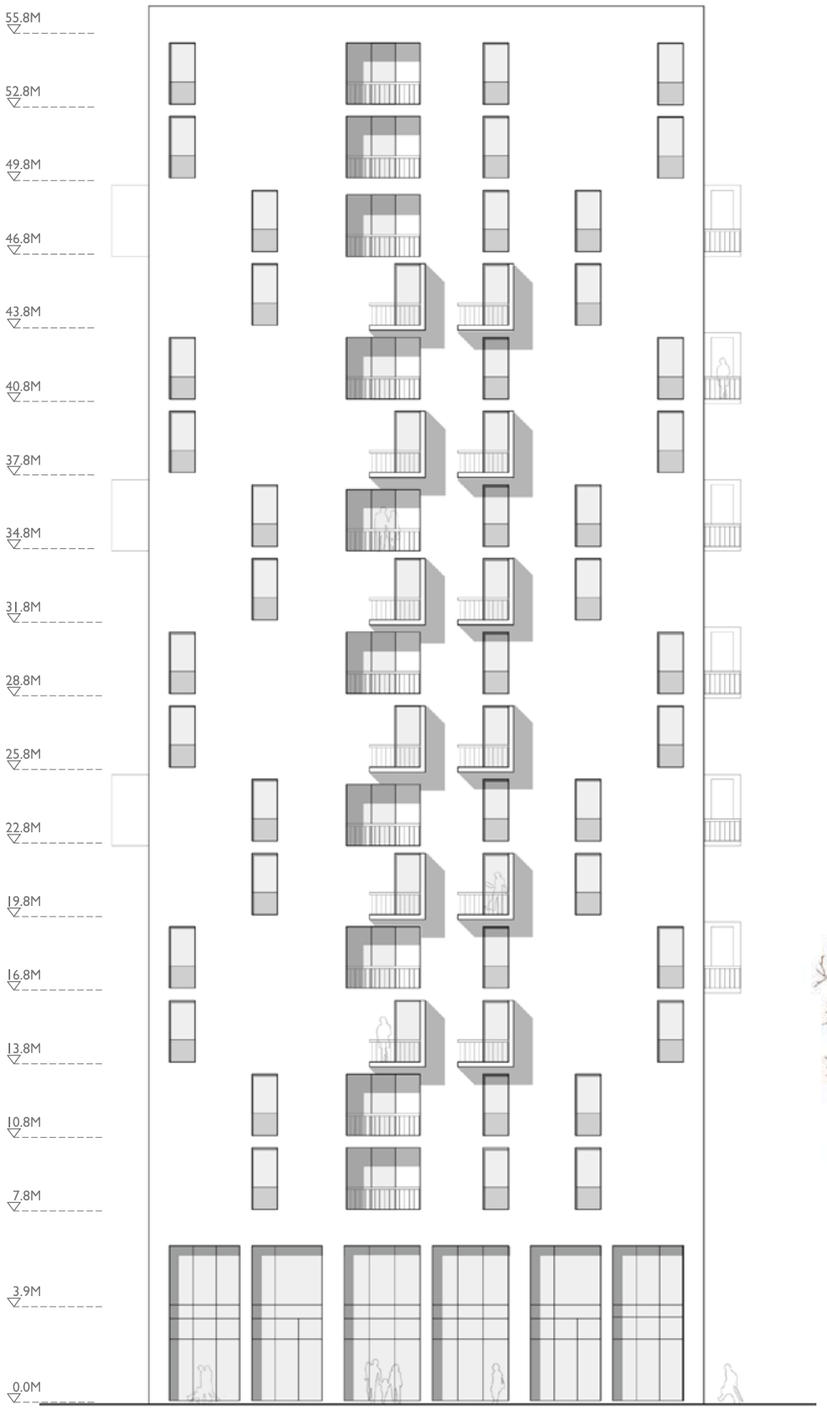


SECTION MM



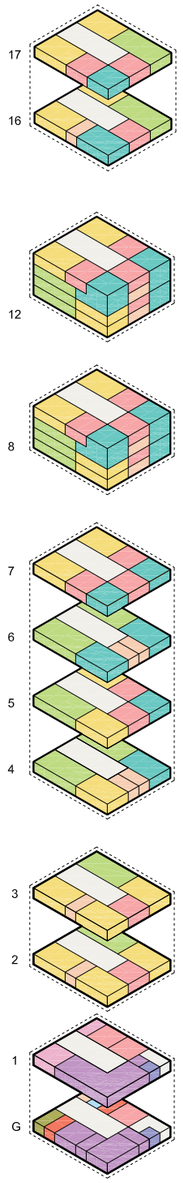
- Studio (1R)
- 1-Bedroom
- 1-Bedroom+
- 2-Bedroom (2 BR)
- 3-bedroom (3 BR)
- Services
- Commercial
- Collective spaces
- Storage spaces
- Vertical communication
- Entrance group
- Toilet

0 1 3 5 7M



ELEVATION 9

ELEVATION 10



- Studio (1R)
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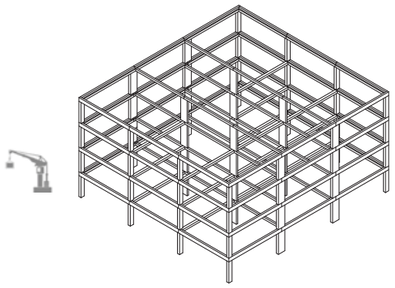
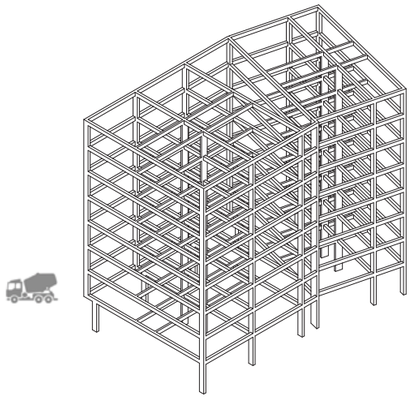
0 1 3 5 7M

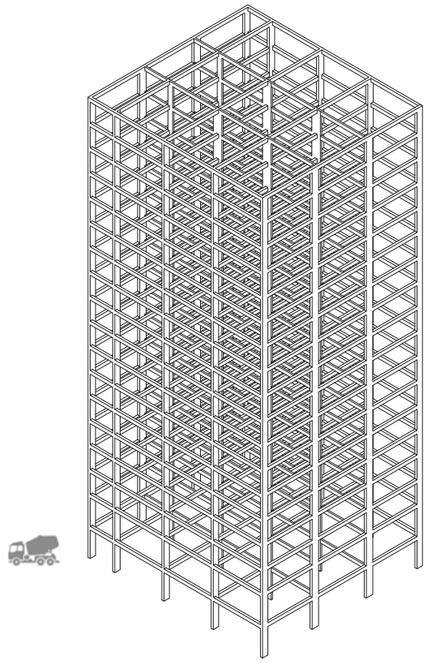
STRUCTURE



URBAN VILLA



SECTION BUILDING

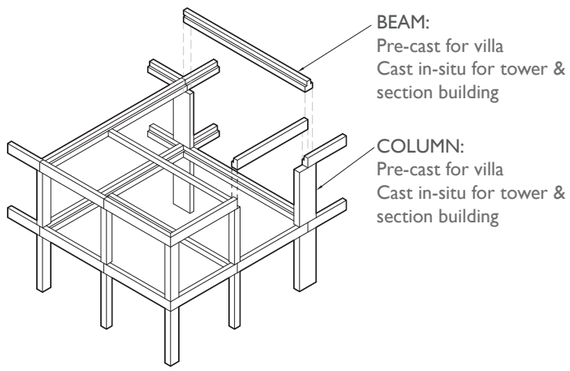


TOWER

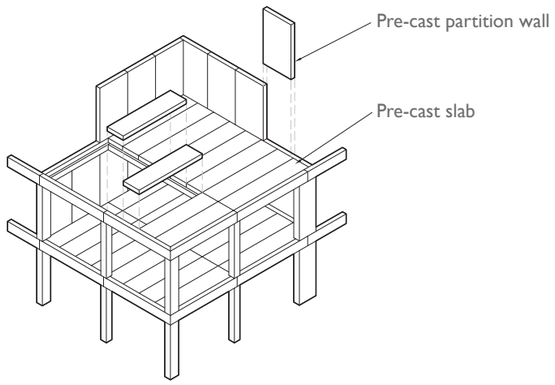
The intent is to use an efficient system in terms of time and cost for the structure and the construction. Russia has a long history in Prefabrication construction and it would be best to make use of this. The Villa is afully prefabricated structure with precast beams and columns which are then assembled on site. Whereas, the tower and section building because of their size and intensity are designed such that the beams and columns are going to be cast on site. The slabs for all three buildings are designed as prefabricated hollow core slabs. The internal divisions between the various spaces can be a choice of flexible options such as wood-based materials and concrete panels.

The construction system for the external SKIN of the building comprises of precast concrete panels, a set of glazing possibilities and a set of components comprising of windows, balconies, loggias and sunrooms. All these ELEMENTS which create the façade are clad in materials such as clinker bricks and other warm colored finishes. The external façade is also designed as a system so that the panel and glazing can be streamlined to come together as a coherent visual output.

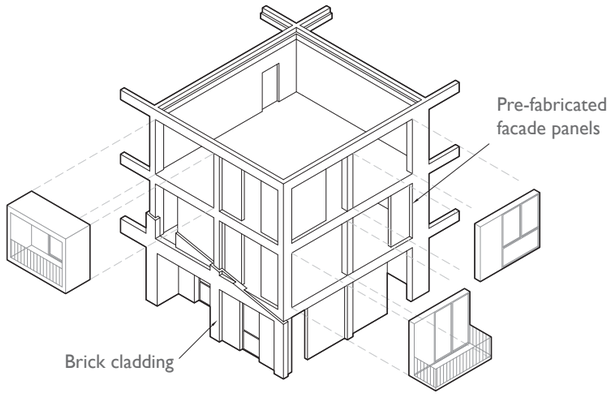
SYSTEM OF ASSEMBLY



STRUCTURAL FRAME

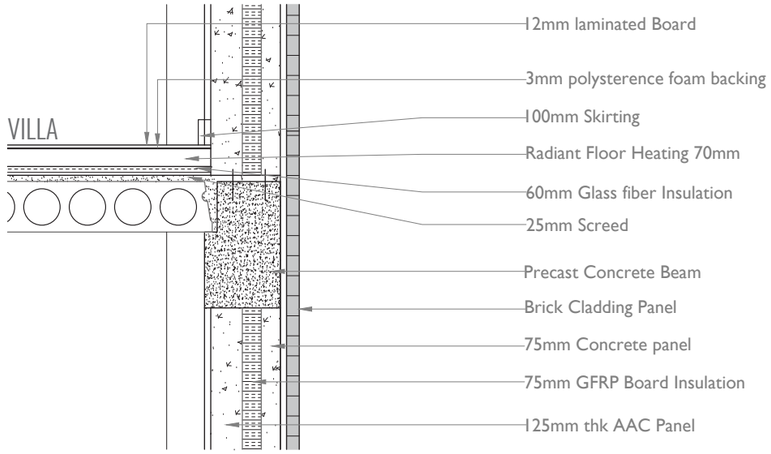


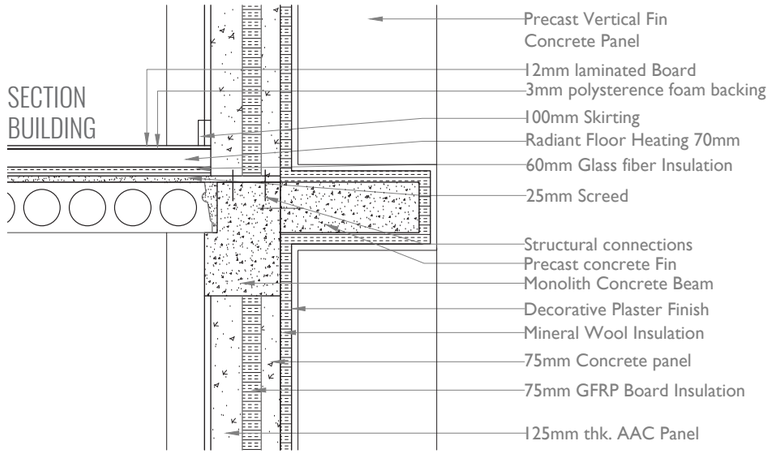
SLABS & WALLS

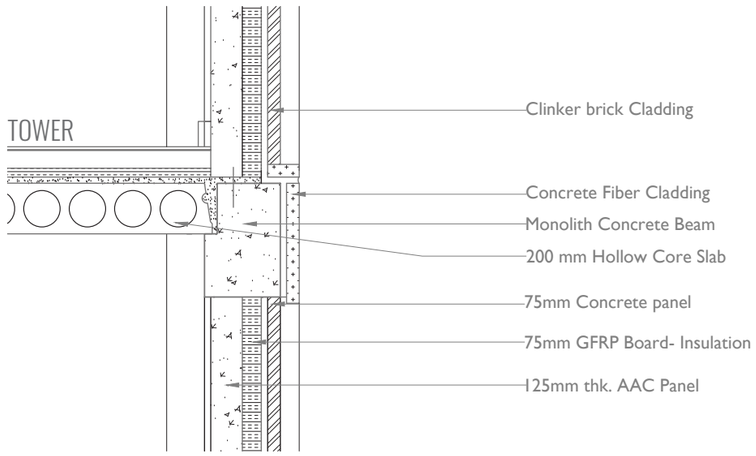


FACADE & COMPONENTS

WALL SECTIONS







MATERIALITY

The design intent has been to create a warm yet varied environment in terms of materials and textures. Hence the three buildings are each treated differently. Brick cladding in various colours and textures form the basis of finishes for the Villa and Tower blocks. On the other hand, the Section block is finished with lighter tones of grey and white. In a larger urban scenario, the section building with its oscillating form and light colours helps to break the monotony of the tower and villa.

TOWER CLADDING

TOWER PLASTER

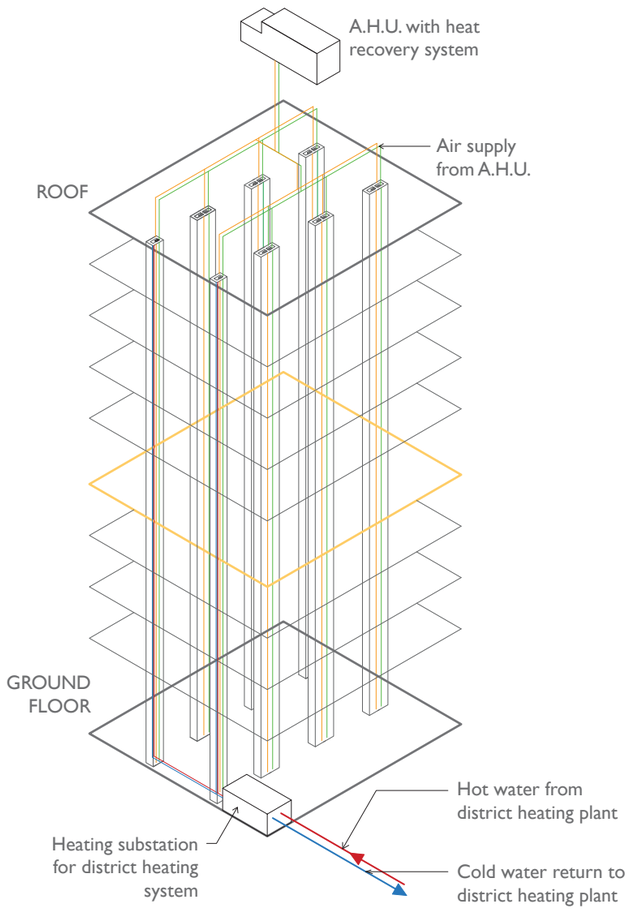
VILLA CLADDING

SECTION BUILDIG PLASTER

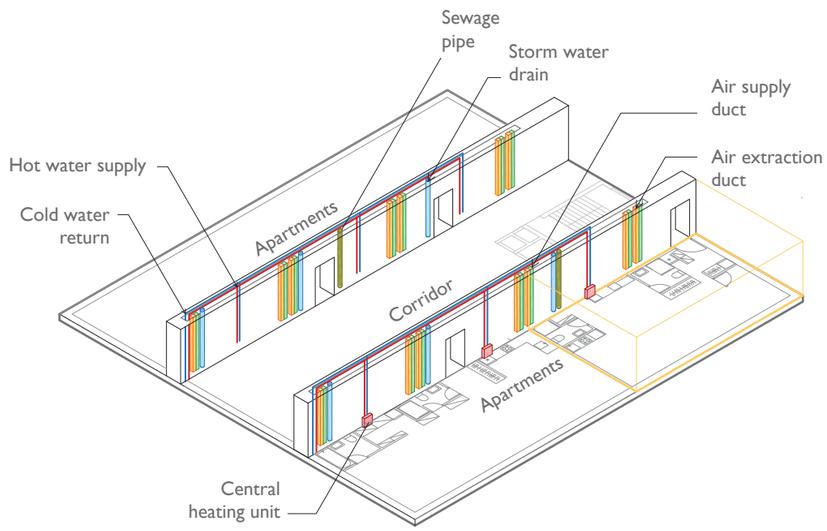
WOOD CLADDING

FLOORING

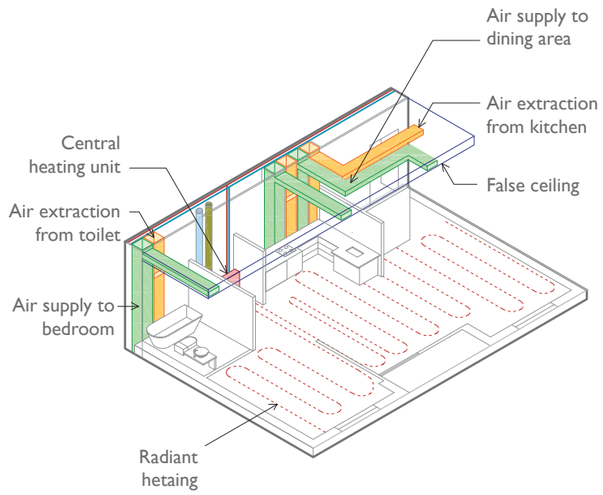
The services for the buildings move vertically through the ducts which are located towards the central lobby of the building. The heating system has a technical room at the ground level. The heating pipes move through the ducts vertically and is then distributed into each apartment through the floor. The same concrete ducts are used for air extract and supply ducts, sewage and fresh water pipes. The apartments are designed such that all toilets, kitchen and wet areas are located adjacent to the ducts. The horizontal distribution in the apartments is done through a slightly lowered false ceiling over the part where toilets, kitchen etc are located.



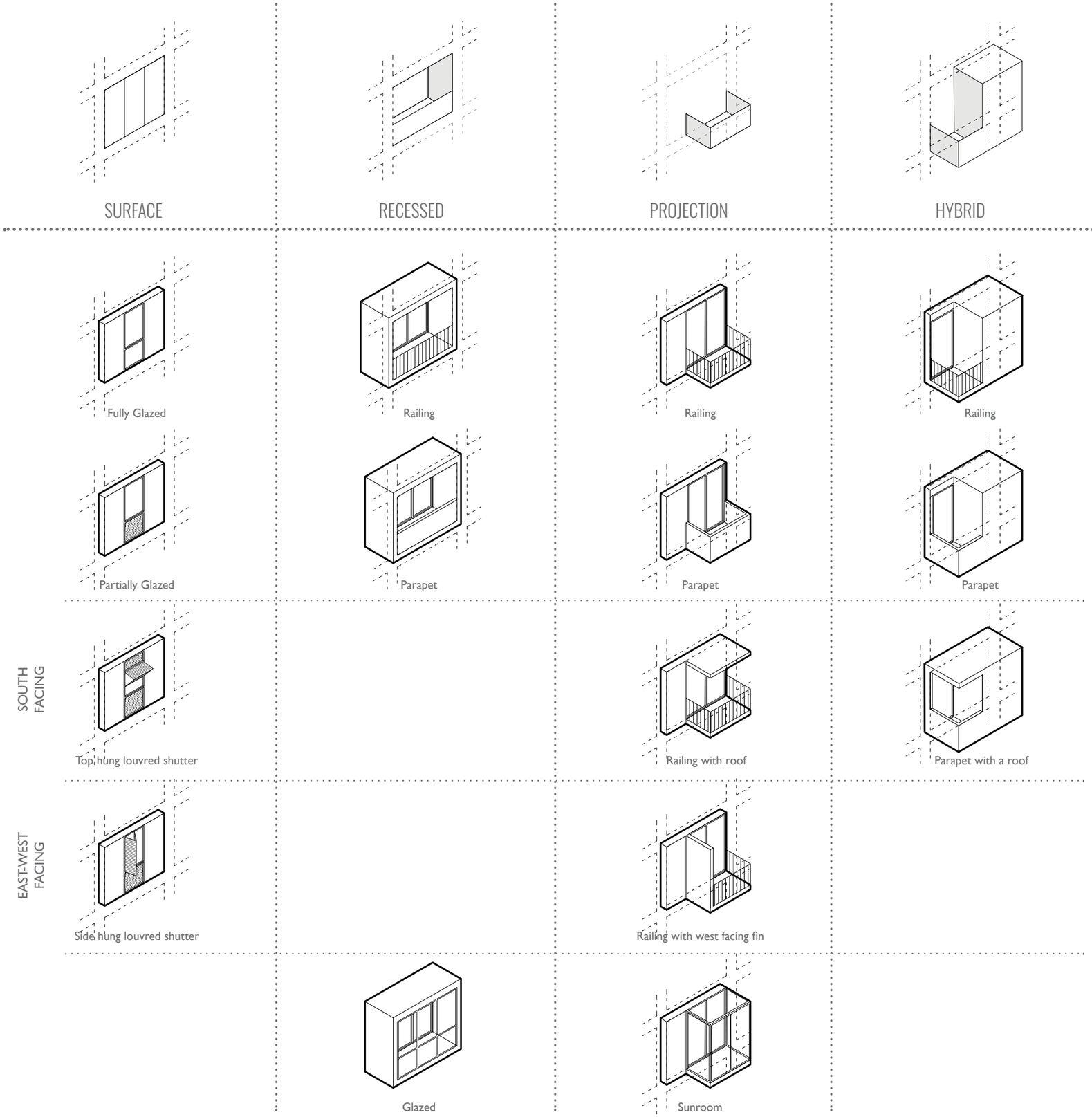
BUILDING



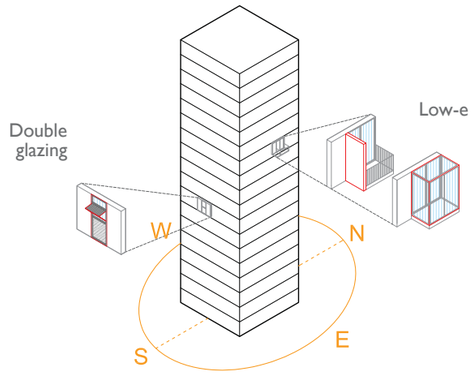
FLOOR



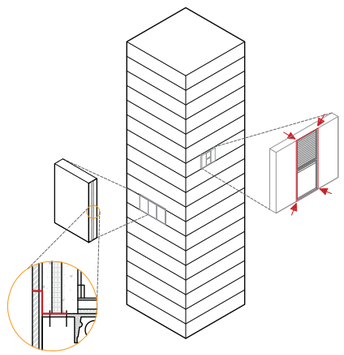
APARTMENT



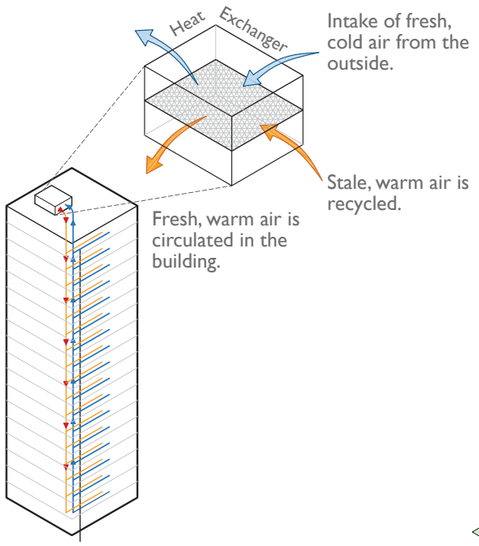
The energy efficiency of a building is closely dependent on its climatic response. The buildings are designed such that they are able to negotiate climatic changes successfully. Since Russia is predominantly a cold climate the façade has controlled openings in terms of glazing size and other factors. The façade is modulated using four basic gestures- Projection, recess, surface fenestration and a hybrid gesture. These consist of a balcony, loggia , windows and a hybrid combination. These components are arranged and distributed through the vertical surfaces such that they are in sync with the functional requirement of each type of apartment in plan. The components also vary as per climatic requirements. The base component is adapted to East and west facing facades and they are different for the South facades.

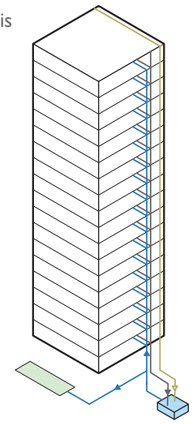


Components are flexible and adapt to climate by varied orientation and glazing ratios

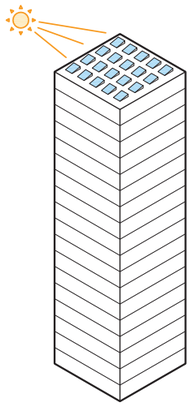


Thermal bridging is mitigated by staggering the joints of the cladding and the floor





Rainwater and waste water from bathrooms are recycled & used in toilet flushing & for gardening.



Use of solar energy using photovoltaic cells on the roof

The attempt is to make an energy efficient building. The key strategies in reducing use of energy are:

1.Heat recovery system where the warmth of stale air from the houses is reused for temperature control.

2.Glazing and other façade components such as louvers and sun room designed such that it helps to mitigate climatic variations.

3.Recycling grey water and using it to maintain surround landscape and for other facilities in the building.

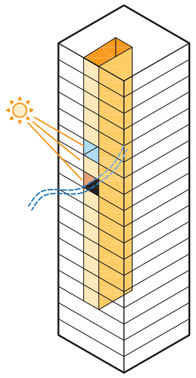
4.Solar energy tapping through photo voltaic panels.

The definition of efficiency is not limited to the building energy efficiency but also of the sustainable life of the inhabitants. Thusthe following strategies help in creating a better life of its residents:

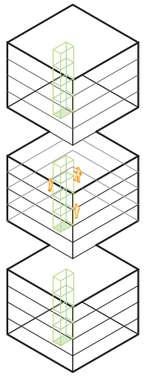
1.Modular layouts with framed structure allow for flexible and adaptable floor plans, thus reducing modification costs in the future.

2.The joints in the building are well tackled by staggering them to eliminate thermal bridging.

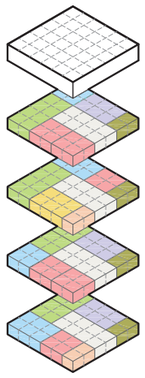
3.In case of the tower, the scale of the building is reduced by stacking four floors thrice with a central triple height common area. This connects the floors visually and creates a better community life. Also each stack has a refuge area on the lower floor which is naturally lit and ventilated, making it safe in case of fires.



Shared spaces are naturally lit and have the possibility to be opened out for natural ventilation

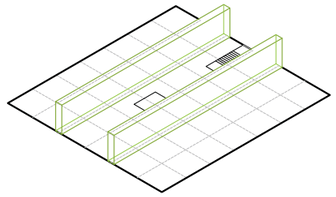


The tower has a 4-floor stack module with a triple height space which creates a humane scale and brings together a sense of community though visual connections.

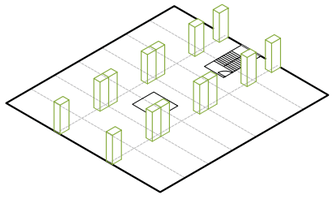


Modular layout provides a free floor plan allowing adaptability and flexibility

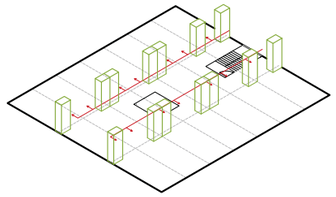
Variations Encoded In System



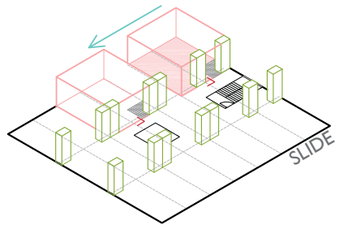
The service ducts are restricted to the edge of the common space or lobby.



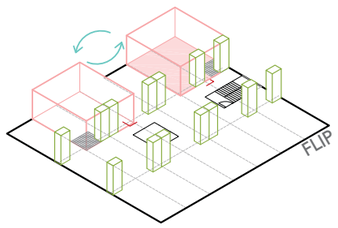
The frequency of gaps are reduced for more efficient planning



This allows for flexibility in the entrances of the apartments

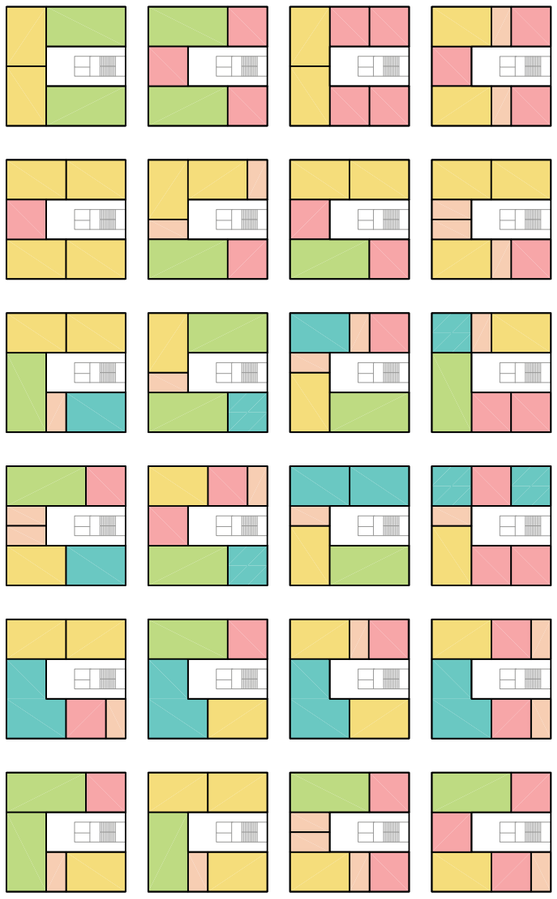


Apartments can be slid across the grid

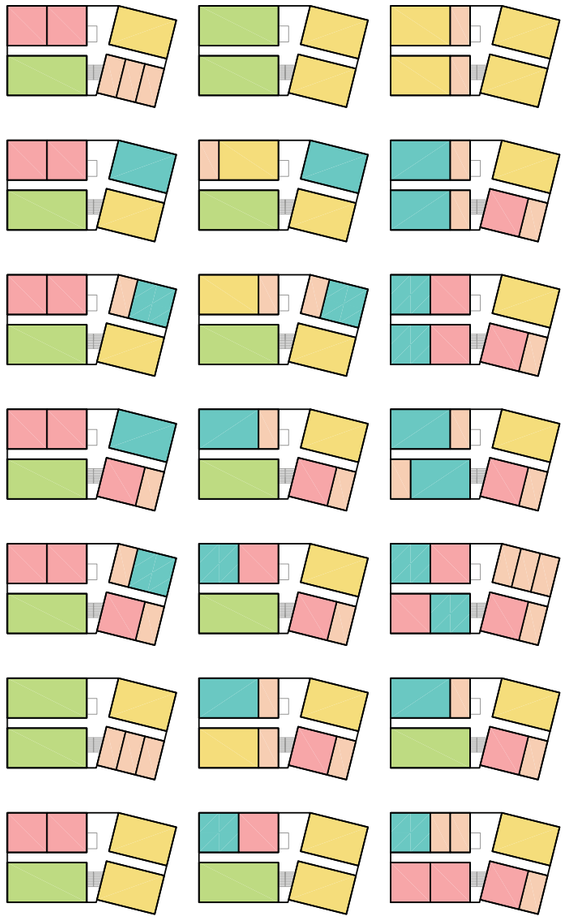


Apartments can be flipped internally

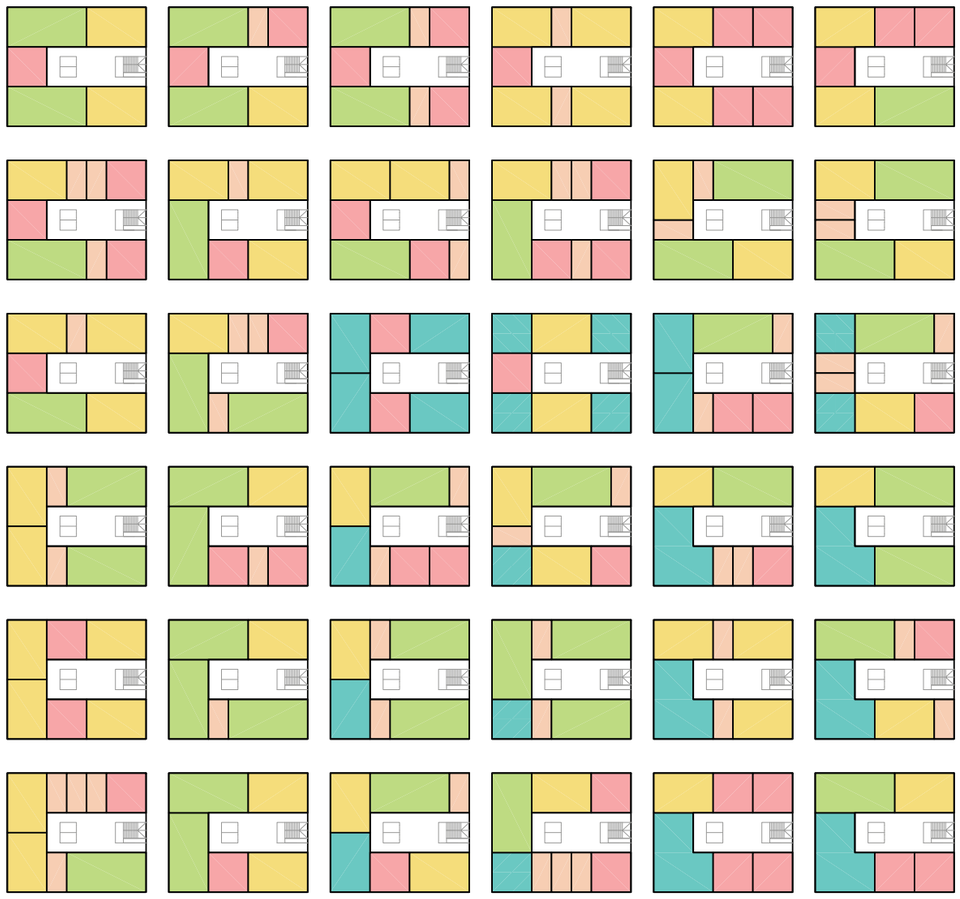
- Studio (1R)
- 1-Bedroom
- 1-Bedroom+
- 2-Bedroom (2 BR)
- 3-bedroom (3 BR)



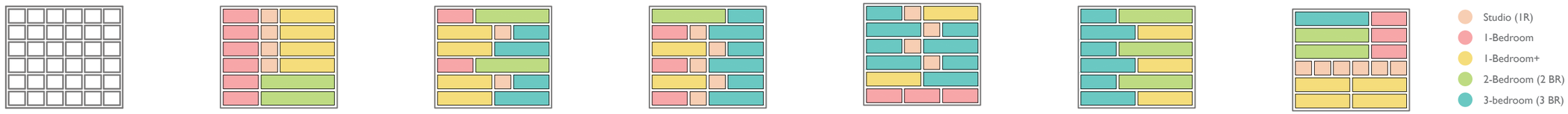
Urban Villa



Section Building

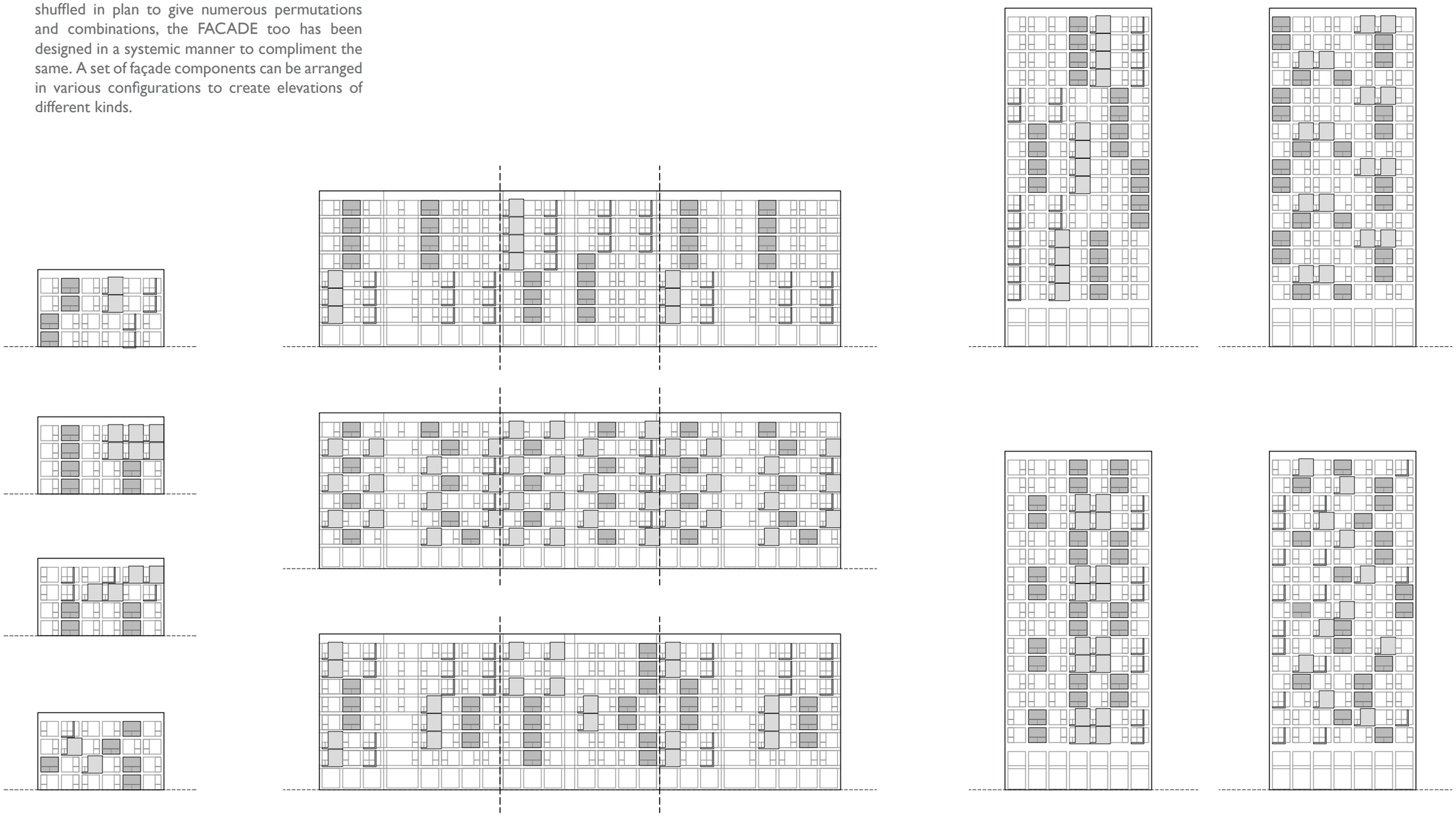


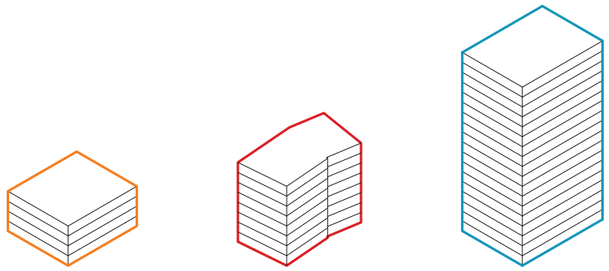
Tower



GRID IN ELEVATION

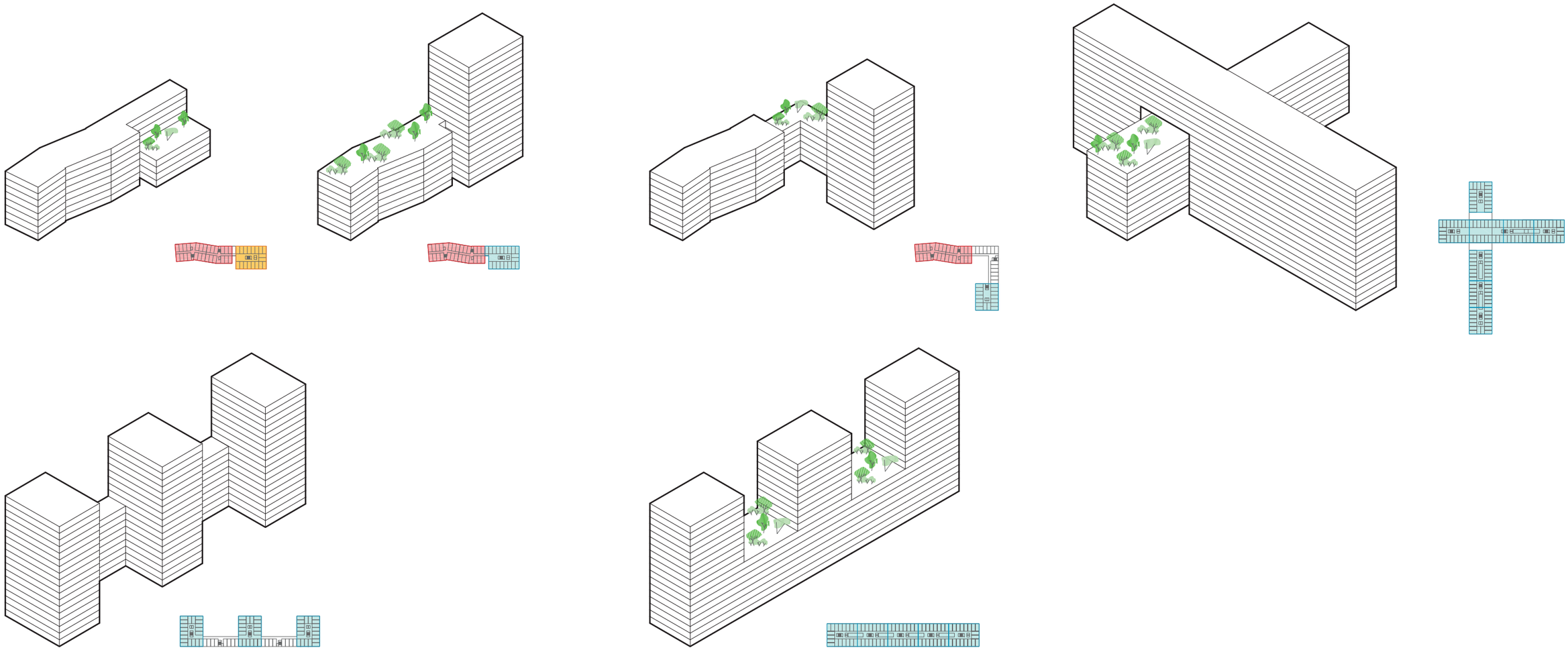
The apartments not only have a possibility to be shuffled in plan to give numerous permutations and combinations, the FACADE too has been designed in a systemic manner to compliment the same. A set of façade components can be arranged in various configurations to create elevations of different kinds.





The buildings have a possibility of connecting with each other to form Hybrid buildings. Because of the systemic nature of the buildings they can come together in multiple configurations. The formal outcomes of such combinations can result in interesting forms and can also be useful in varied urban scenarios as needed.

We have demonstrated how the Villa, Section and Tower building can be combined to result in Hybrid outcomes. A gallery building could also be included in such scenarios.



SYSTEMIC DIVERSITY

Open International Competition For Alternative Layout Design In Standard Housing

DCOOP