



SALU-SALO: CREATING SUSTAINABLE FILIPINO COMMUNITIES THROUGH MIXED COMMUNITY LIVING

CONTEMPORARY PHILIPPINE HOUSING ISSUES

Housing has been one of the Philippines' major concerns for decades. It affects many aspects of the lives of the people in the country. Some of the most significant issues encompassed by this industry are the increasing backlog for affordable housing, and proliferation of large areas of informal settlements all over the country. These issues have been present since the 1970s, yet currently new problems have been identified, which have a direct relation to these:



UNLIVABLE SOCIAL HOUSING DEVELOPMENTS

An increasing number of socialized housing projects outside Metro Manila are being abandoned, because the residents have deemed them as uninhabitable.

❶ **INACCESSIBLE**
Many are located in the outskirts of the cities, so people need to pay more and travel greater distances to go to work.

❷ **POOR QUALITY**
Some units that are turned over to the residents are unfinished, and lack utilities, such as electricity and running water.



INCREASINGLY UNAFFORDABLE HOUSING

With the construction of more vertical developments to address the lack of available land in cities, there is a corresponding increase in the prices of the housing units as the cost of building these is greater than low-rise structures. This affects the lower and middle classes as housing is starting to become more expensive. The discrepancy between people's affordability level and what is being supplied by the housing market greatly contributes to the country's housing backlog.



SOcially UNSUSTAINABLE NEIGHBORHOODS

❸ **"ONE SIZE FITS ALL"**
Units in social housing are small as a "one-size fits all" solution is used. Thus, overcrowding occurs as there is a lack of consideration for the various types of families in the Philippines, which results to no room for growth.

❹ **EXCLUSIVE COMMUNITIES**
Private gated communities also suffer from this issue as privacy is given higher prioritization than social relations, so the neighborhood aspect of communities is limited.

❺ **SOCIAL ISOLATION**
City dwellers experience loneliness as interactions and chance encounters are lessened in condominiums. Inhabitants are distanced from the "street-life" and public spaces.

DESIGN VISION



ADAPTABLE

Housing that allows for growth and flexibility for the various needs of the users.



ACCESSIBLE

Housing that is accessible to public transportation and infrastructure.



AFFORDABLE

Housing that matches the affordability levels of different classes.



SENSE OF COMMUNITY

Housing that provides a genuine sense of community for the wellbeing of the users.

Most of the existing housing issues in the Philippines arise because the needs of the people are not addressed. The following design goals aim to provide the aspects which are most sought after in housing to create **better quality housing**, which will **improve the quality of the lives of the users**.

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AY 2018-2019

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CO-LIVING AS A STRATEGY FOR BETTER COMMUNITIES

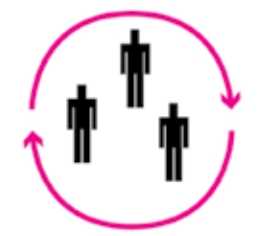
Co-living is one of the new housing trends in the world today. It is a new way of living, which focuses on community, accessibility, and flexibility. It is characterized by communal spaces and services. With the global phenomenon of increasing housing prices, many accept that the idea of ownership of real-estate is unattainable, which is why the rise of co-living is appealing to the market. Access is becoming more important than ownership, because of its flexibility. This concept can be utilized in Philippine housing to alleviate issues that are brought about by deficiencies in the accessibility and quality of housing. Communal spaces play vital roles in establishing the concepts of housing equity, social sustainability, and Philippine neighborhoods.

COMMUNAL SPACES



HOUSING EQUITY

The shared areas in co-living projects can bring about better housing equity, as it allows for the re-distribution of financial resources into improving the quality of the private units.



SOCIAL SUSTAINABILITY

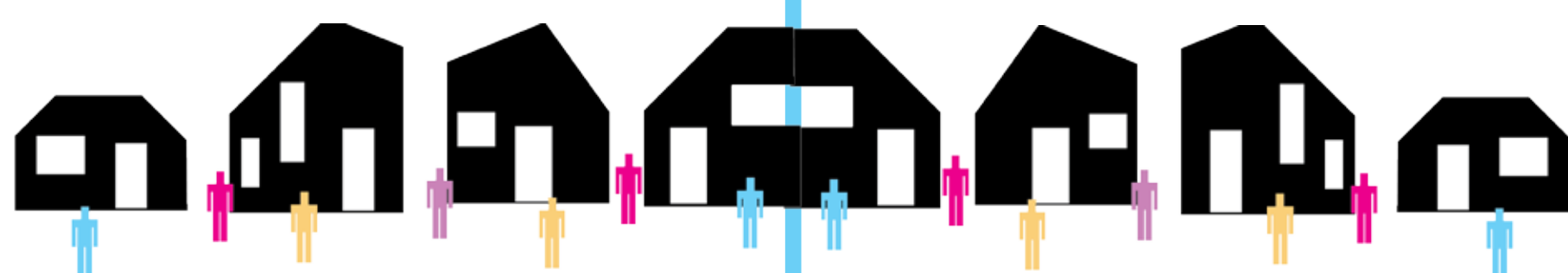
The social dimension is greatly dependent on common spaces, as these are the main actors in fostering interaction and strengthening bonds between people.



PHILIPPINE NEIGHBORHOODS

Philippine neighborhoods also thrive on communal spaces, such as streets, as these are the "heart" of the area. Communities need these spaces to develop a sense of identity and pride within the residents.

ACCESSIBLE & QUALITY HOUSING



HUMAN-CENTRIC FILIPINO CO-LIVING

SUSTAINABLE & INCLUSIVE FILIPINO COMMUNITIES

CO-LIVING DESIGN STRATEGIES



flexible design



modular prefabricated system



variety of flexible leasing schemes



sustainable technology & design



renewable energy



rainwater harvesting



communal/shared spaces

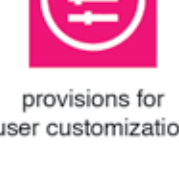


variety of unit typologies

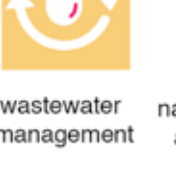
KEY FEATURES



incremental growth design



provisions for user customization



wastewater management



natural ventilation and daylighting



mixed-income community



culturally appropriate & universal design

SITE INFORMATION

SITE LOCATION: San Mateo-Batasan Bypass Link Road, San Mateo, Rizal, Philippines

The site was chosen based on its relatively low vulnerability to hazards and disasters, as compared to other sites in San Mateo, and its high accessibility. This makes it ideal as it is a safe and convenient location for a housing development.



PHILIPPINES
30,000,000 ha.

LUZON, PH
10,468,800 ha.

REGION IV-A
1,657,626 ha.

RIZAL PROVINCE
130,892 ha.

SAN MATEO
5,509 ha.

THE SITE
26,156sqm.



The site is in a residential area that is accessible to the urban center, which is connected to Quezon City and Marikina City.

context & accessibility
 - commercial
 - residential
 - institutional
 - vehicular
 - pedestrian
 - jeepney terminal
 - bus terminal
 - major traffic junction

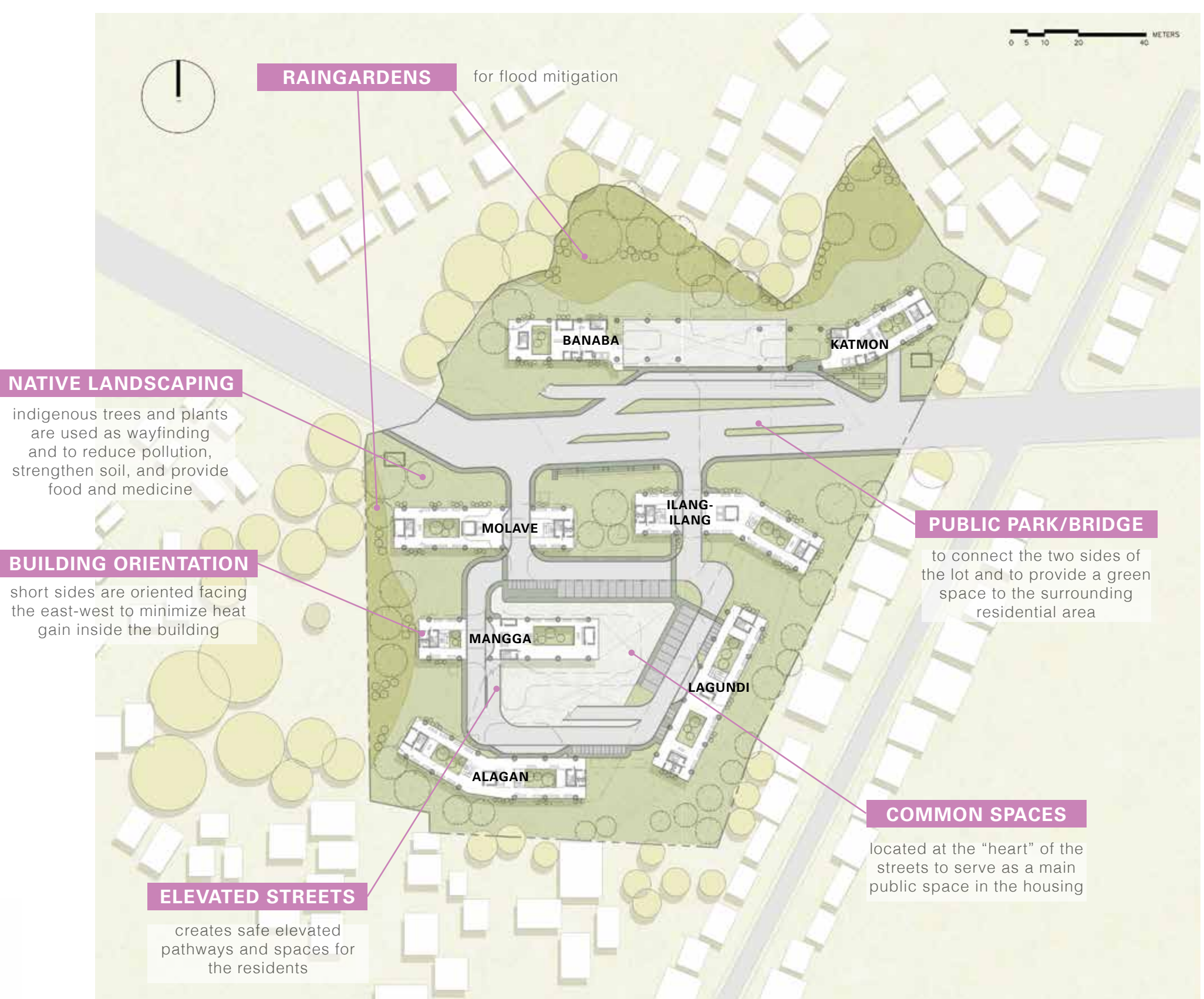


climate
 31.5< degrees Celsius
 30.80
 30.10
 29.40
 28.70
 28.00
 27.30
 26.60
 25.90
 25.20
 <24.50

The West is the hottest side, so the design must limit the radiation that enters through this side, while still allowing for wind to enter during Habagat.



topography
 18m
 19m
 20m
 drainage
 natural disasters
 - moderate flood susceptibility
 - prone to subsidence due to ground settlement
 - liquefaction possible due to earthquake



RAINGARDENS for flood mitigation

NATIVE LANDSCAPING
indigenous trees and plants are used as wayfinding and to reduce pollution, strengthen soil, and provide food and medicine.

BUILDING ORIENTATION
short sides are oriented facing the east-west to minimize heat gain inside the building

ELEVATED STREETS
creates safe elevated pathways and spaces for the residents

COMMON SPACES
located at the "heart" of the streets to serve as a main public space in the housing



ALAGAU
cooling and fever/cough relief

BANABA
erosion control and medicine

ILANG-ILANG
fragrant shade and essential oil

KATMON
fruit jelly, shampoo and cough syrup

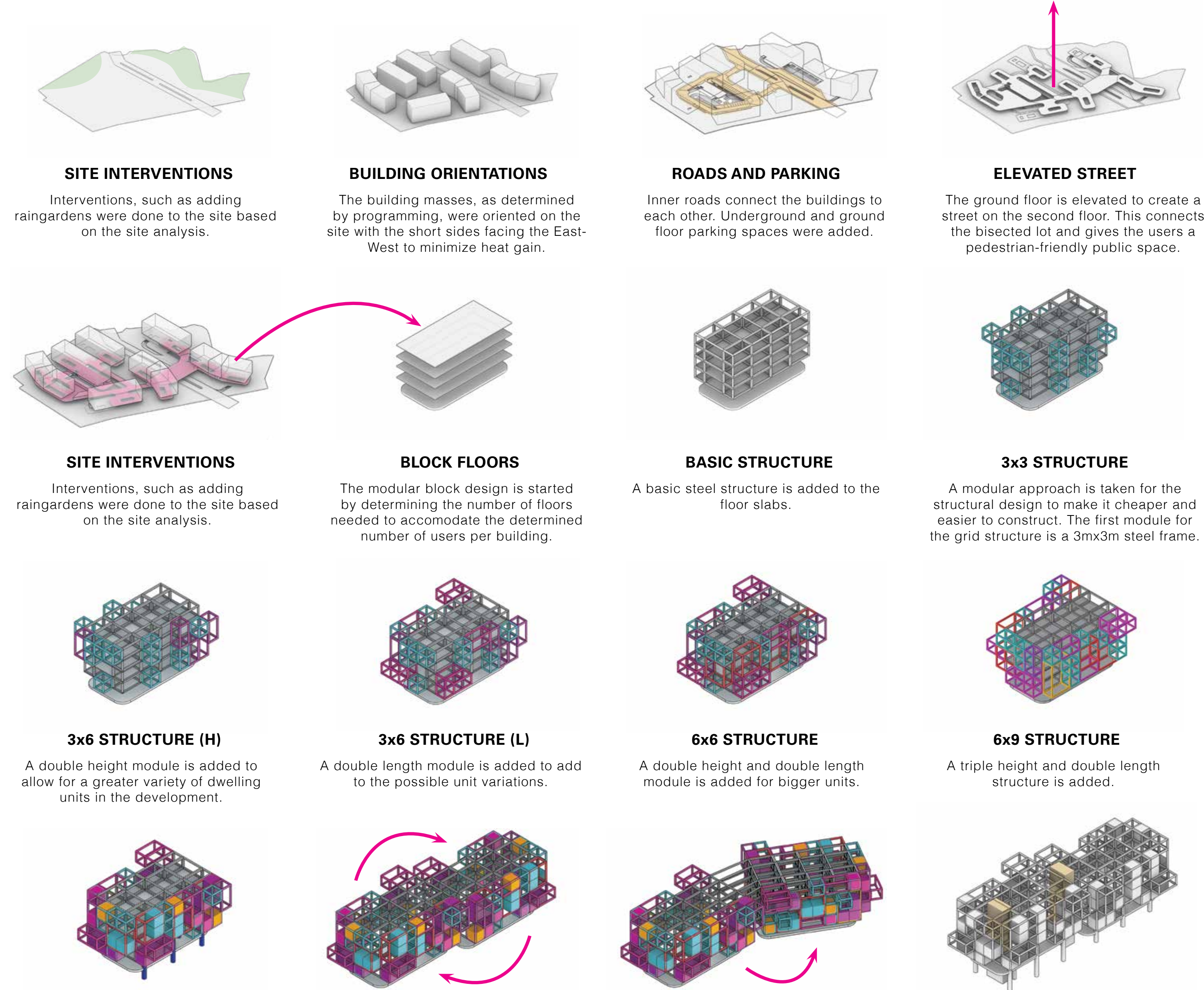
LAGUNDI
herbal medicine

MANGGA
shade tree, edible fruit and medicine

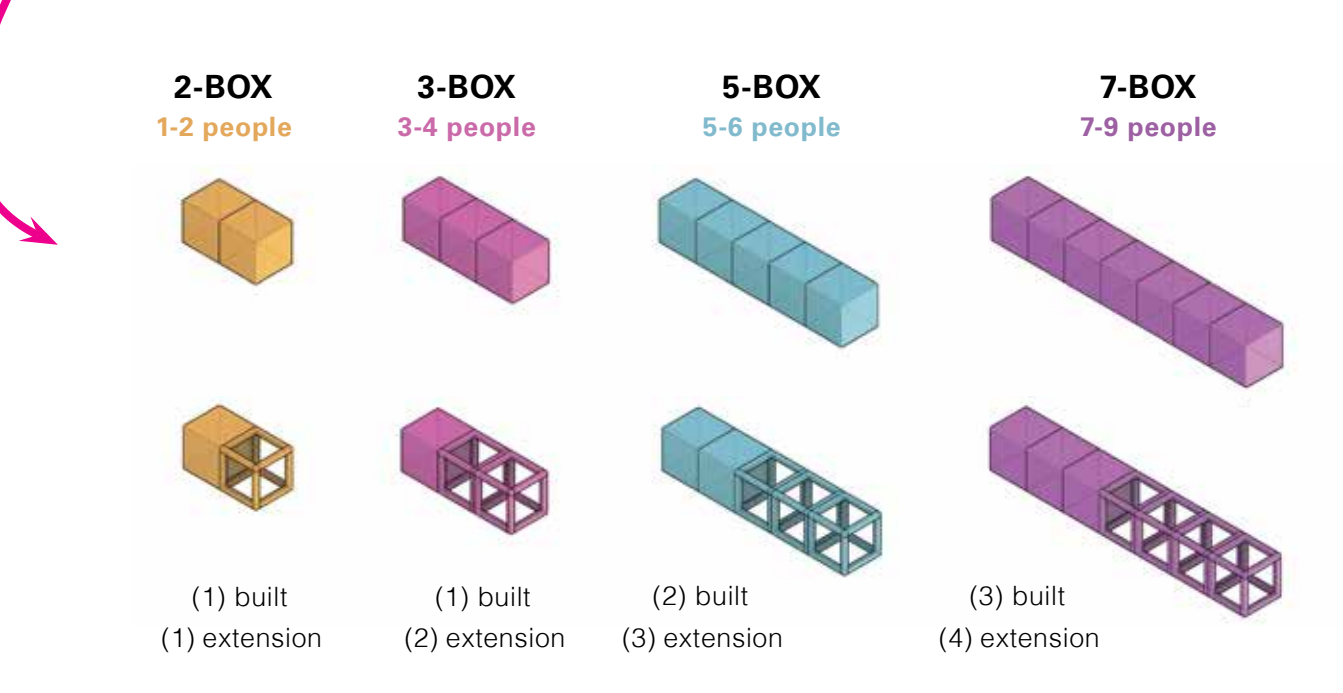
MOLAVE
pollution abatement and shade

Proper flood mitigation techniques must be used on the northern and western sides of the site. Soil strengthening must also be used for the lot.

DESIGN APPROACH



UNITS AND EXTENSIONS
"Units" are composed of 3m x 3m boxes and extension spaces, which allows for the future growth of the space. The number of these varies depending on the number of users.



BUILDING TYPE 01
Buildings are composed of two blocks that are mirrored. There are 20 units per block, and 40 units per building.

BUILDING TYPE 02
The second building type includes a slight tilt in the mirrored block to adjust to the irregular site form.

CIRCULATION
The main circulation spaces are found in the center of the mirrored blocks. Emergency circulation spaces are found at opposite ends or in the center and an opposite end of the block.



THE FINAL DESIGN
The units are planned and a facade is added to these to protect it from the climate.

ZONING AND CIRCULATION

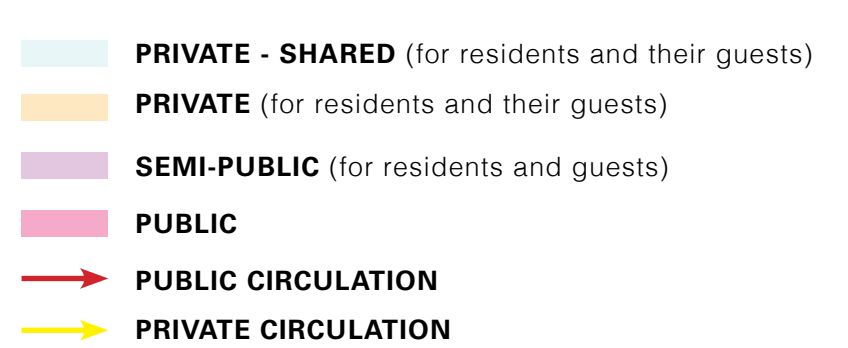
For the buildings, there are three types of zoning; public, semi-public, and private. The basement, which connects to the underground parking is semi-public as it is for the residents and their guests. The lower floors are public spaces, as these include the lobby on the ground floor and the commercial shops on the second floor. Third floor to the sixth or seventh floor, depending on the building type, are private as these are residential floors. Consequently, the circulation to these zones vary.

Floor slabs inside the shared spaces of the building are color coded by activity for wayfinding.

Access is limited for the upper floors through an enclosed staircase that requires a key, which only residents will have.

Zoning is easily identified by looking at the color of the columns. This also serves as a wayfinding tool for guests as public floors are color coded.

The common spaces on the lower floors can be utilized by people from the neighboring residential zones, so these can be considered as public spaces.



DWELLING UNITS
The residential spaces surround the living corridor as access to the shared spaces is enhanced in this layout.

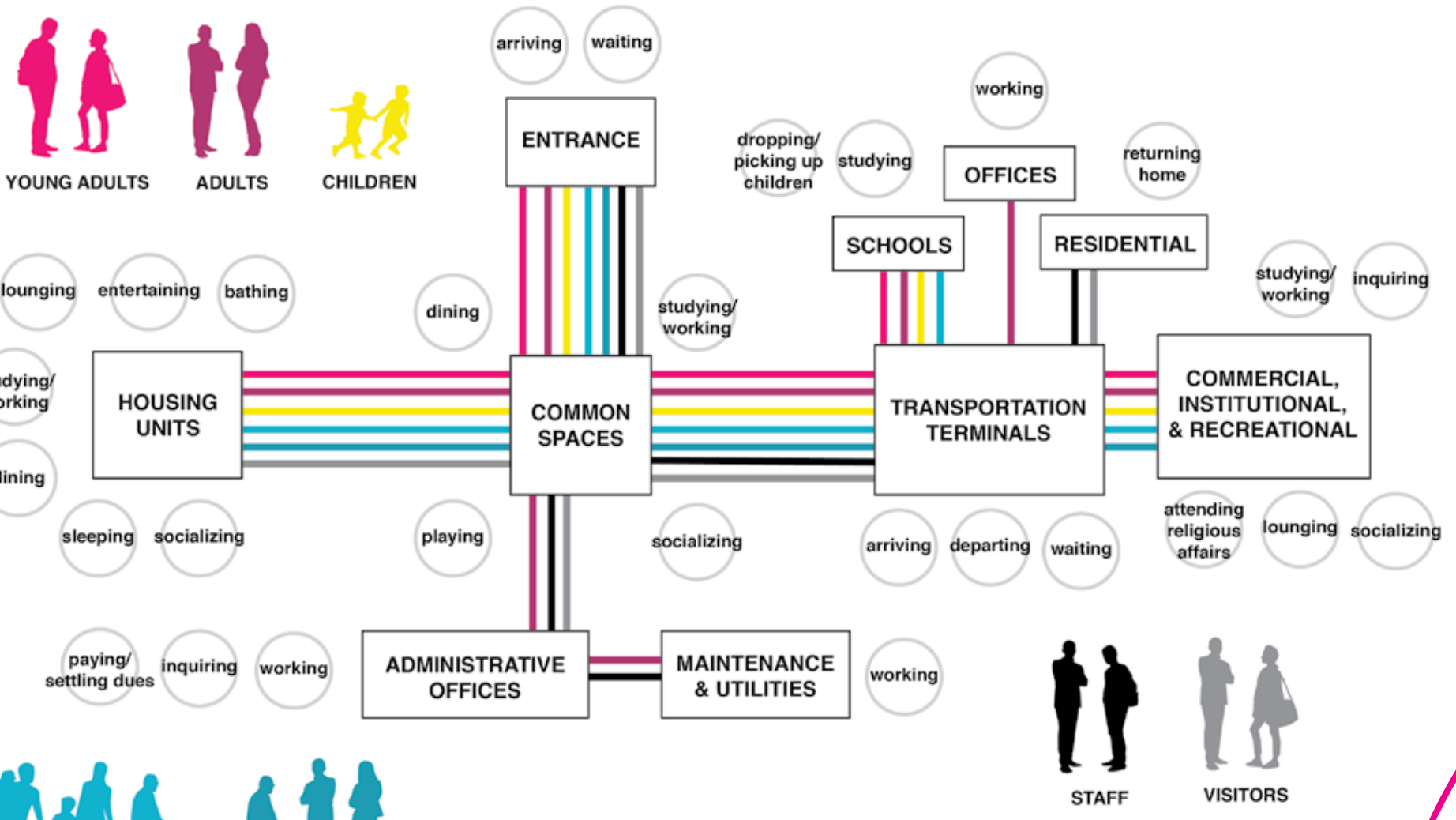
PODIUM
The commercial shops are found on this floor, and this acts as an income generating space for the development as rent can reduce certain fees and association dues for the users.

LOBBY AND SUPPORT FACILITIES
This space acts as the main receiving area of the building. Support spaces, such as the mail room, security room, waste disposal room and a small community garden are found here.

In the buildings, the private dwelling units are directly connected to the various shared spaces. It can be observed that many of the conventional private spaces in traditional homes are shared in the co-living scheme. This affects the accessibility of the spaces, as some are classified as private - shared zone since a communal approach is being taken.

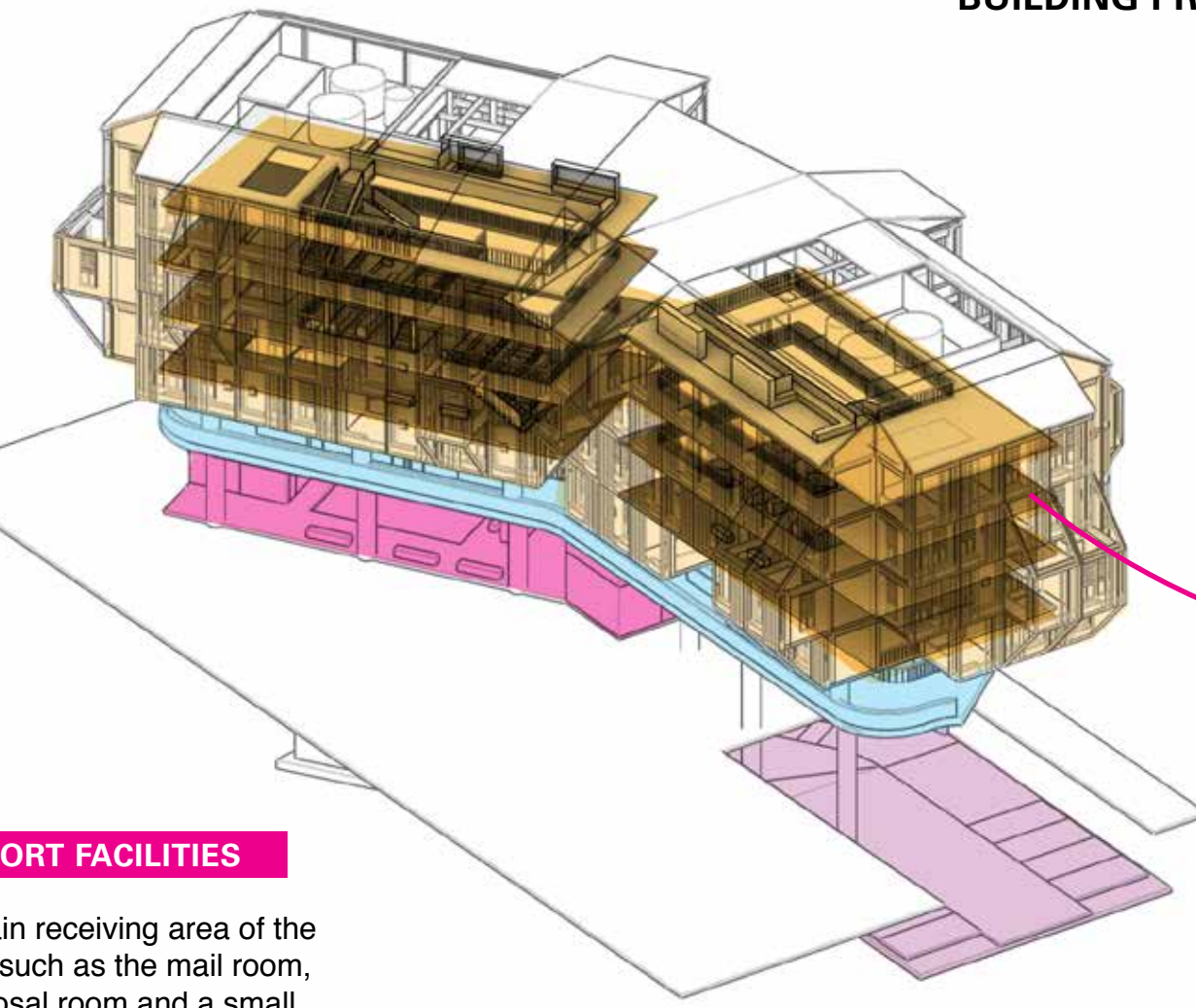
THE SHARED PROGRAM

In this co-living housing development, the shared spaces connect the private and public spaces. Buildings are connected to each other through common open spaces that can be accessed by all residents. Within these buildings, a "living corridor" or the central shared space connect all the residential units to each other. Consequently, in the dwelling unit, private and shared spaces can be created as dictated by the user. Some Filipinos perceive the "sala", or a space that combines the receiving area, living room and dining area, as public as the neighbors they know are free to come in unannounced. Generally, the shared spaces act as links and intersection spaces where interaction can occur between residents to create a sustainable community.



"LIVING CORRIDOR"
This contains the main shared spaces that support the co-living concept. These act as the "inner streets" where relationships can be formed and reinforced among the residents.

BUILDING PROGRAM



BASEMENT
The parking and utilities are located here. Locating these underground reduces noise and air pollution on the ground plane.

COMMUNITY FACILITIES

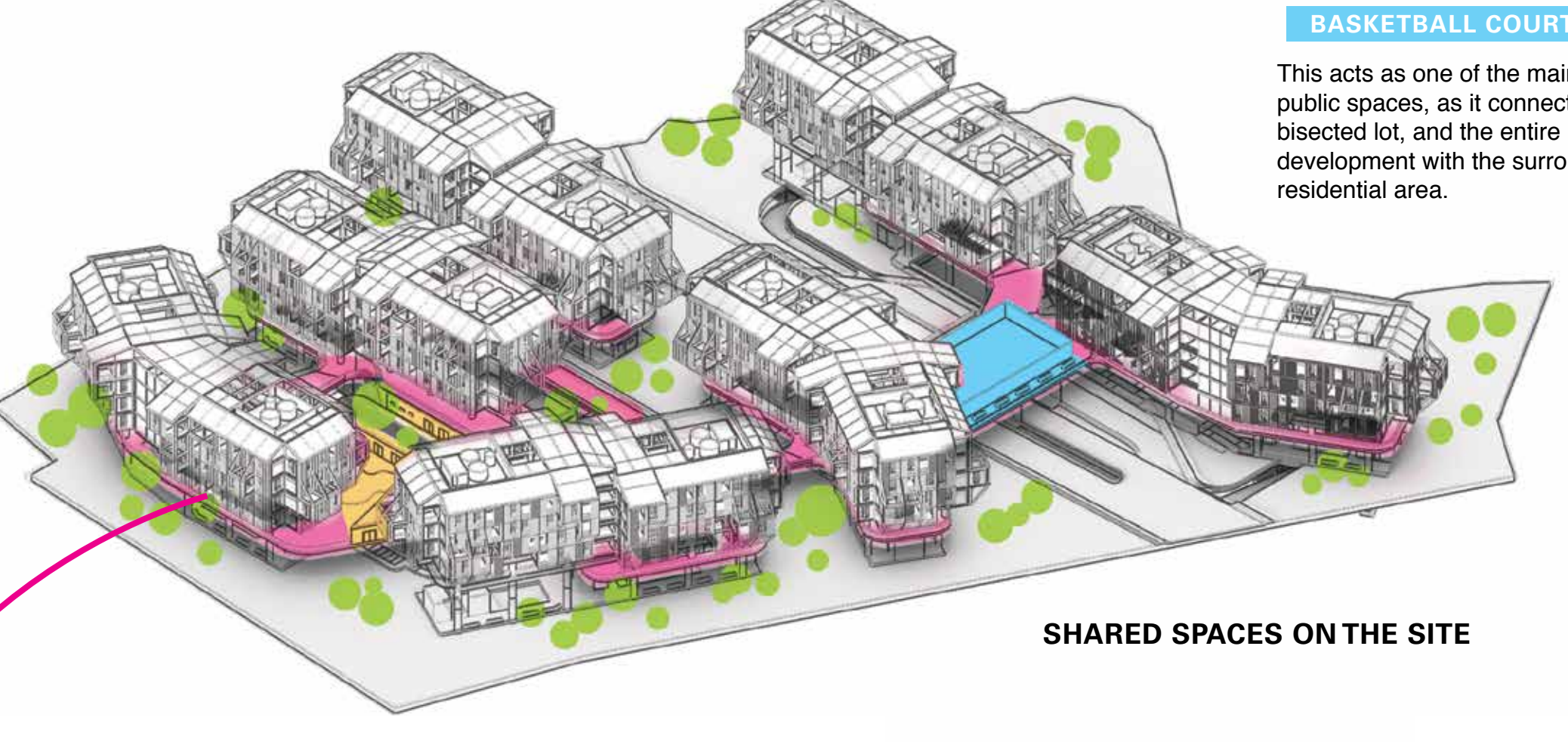
These include the administration office, multipurpose hall, study and livelihood center, and the playground. These spaces are located in the center of the development for ease of access, and to serve as a main interaction space for the residents.

PUBLIC PARK/BRIDGE

As a major pathway, this shared space would act as a possible "first contact" space wherein users can make initial connections. The various benches and support spaces on the bridge would also serve as "third places", or where these relationships can be cemented.

BASKETBALL COURT

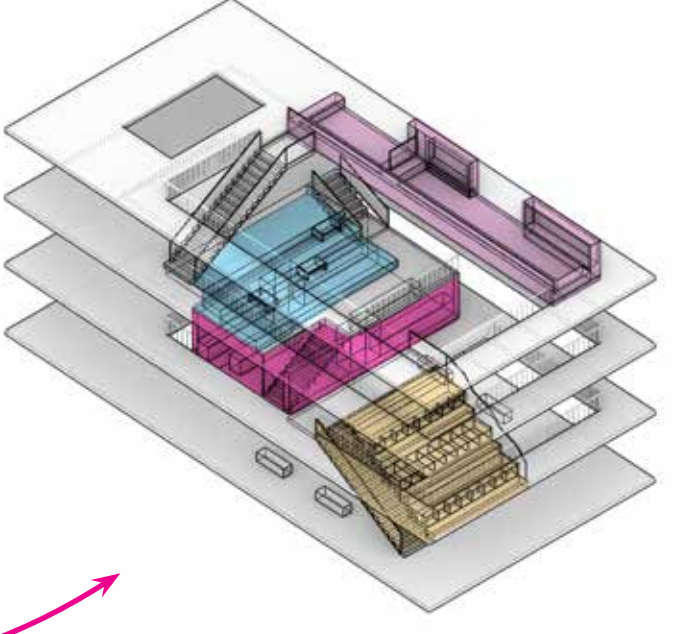
This acts as one of the main public spaces, as it connects the bisected lot, and the entire housing development with the surrounding residential area.



SHARED SPACES ON THE SITE

"LIVING CORRIDOR"

Instead of delineating specific activities to the spaces, a flexible design is applied to each part of the "living corridor". Various activities can be accommodated in each, so as to not limit what residents can do with the space. The main circulation also runs through these spaces to increase the likelihood of interaction.



SHARED SPACES IN THE BUILDING

UPPER LOUNGE

READING, WATCHING, PLAYING, RELAXING, LOUNGING, SOCIALIZING

MIDDLE LOUNGE

DINING, LOUNGING, SOCIALIZING, WATCHING, HOSTING

COMMON KITCHEN

COOKING, SOCIALIZING, TEACHING

OPEN SPACE + LOWER LOUNGE

DINING, LOUNGING, SOCIALIZING, READING, PLAYING, HOSTING, DANCING, SINGING

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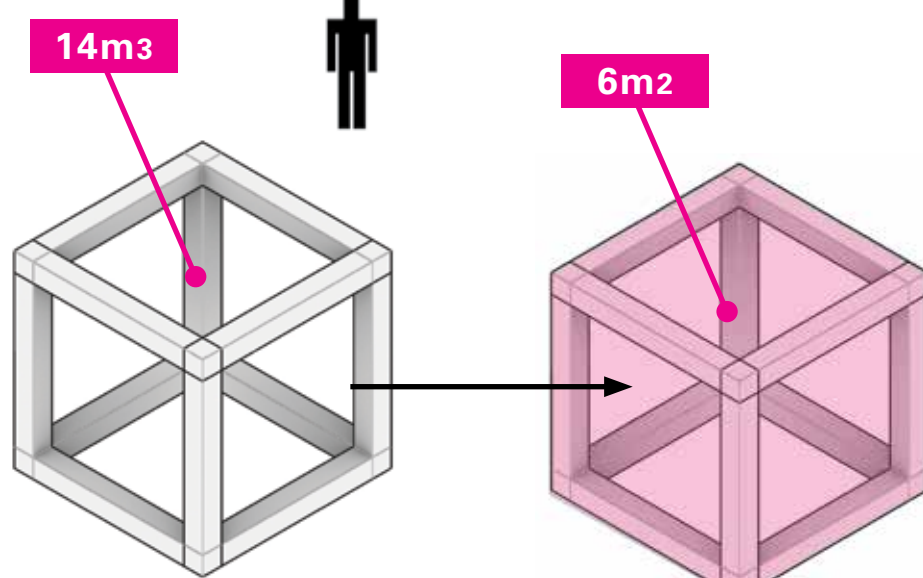
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THE 3X3 MODULE

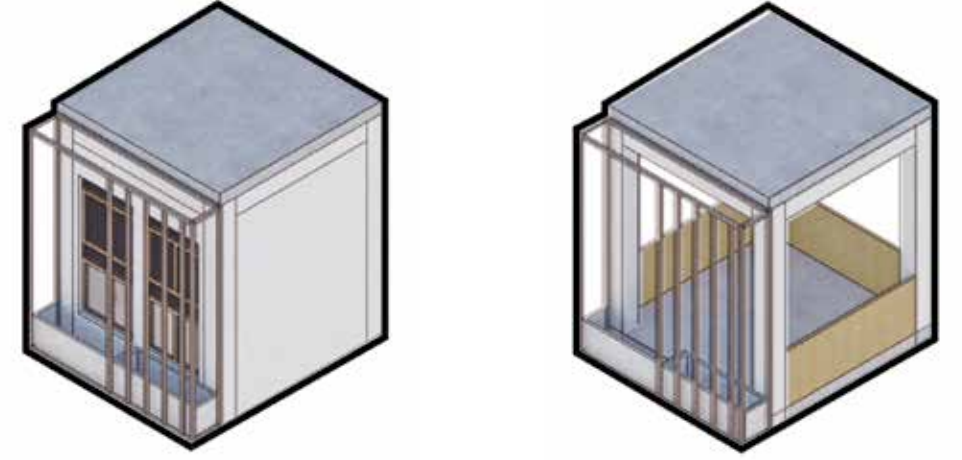
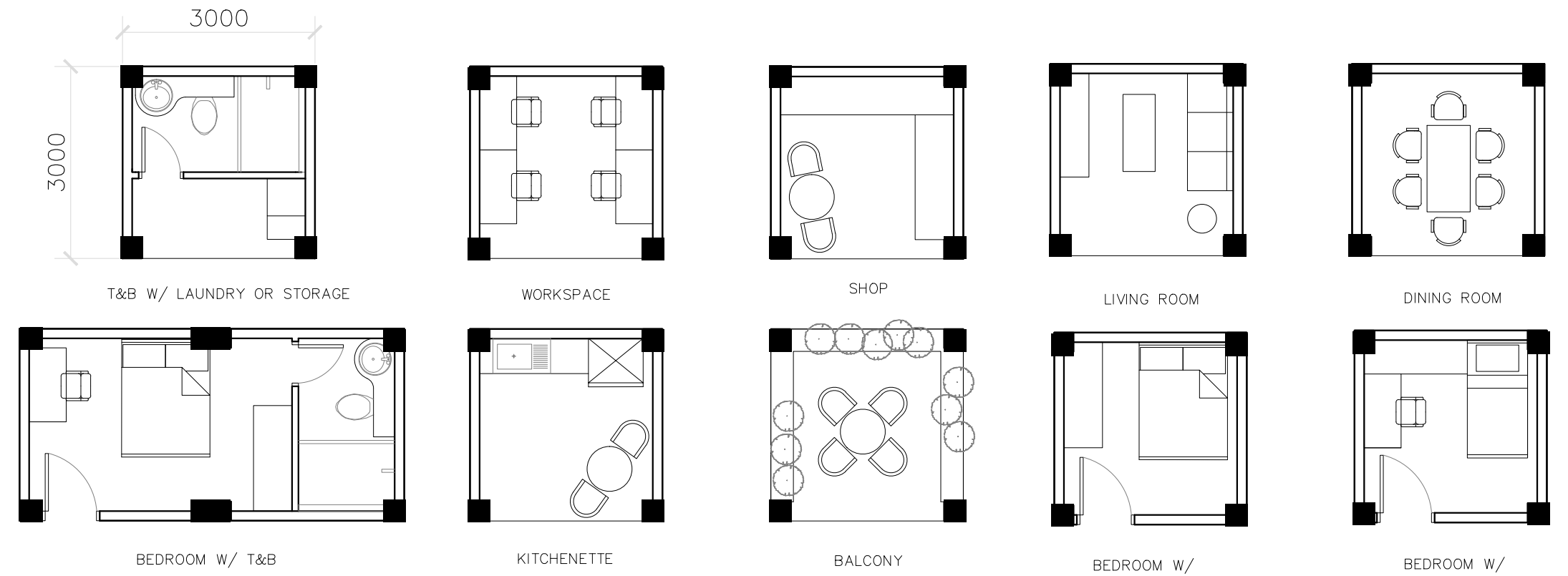
Instead of having typical units that are based off how many bedrooms fit into the space, the dwelling units are composed of a certain number of 3m x 3m modules that can accommodate a number of various spaces. The number of modules in a specific unit type depends on how many people will occupy it. This strategy prevents overcrowding, which is one of the major factors that leads to the deterioration of quality of the residential space. The user is free to decide the function of the space, as the module is easily adaptable to various needs. Two or more of these can also be combined to fit bigger spaces.



WHY 3m x 3m?
 This module was chosen because of its flexibility and compliance with the building code standards in the Philippines. After testing different areas, it was determined that the 9 square meter module was able to accommodate the greatest number of functions; thus it was the most adaptable. It is also reminiscent of the indigenous "bahay kubo" (a one room house), which was around the same size.

According to the National Building Code of the Philippines, a habitable room must have at least 14 cubic meters of air space per person.
 Rooms for human habitation must also have an area of at least 6 square meters.

VARIOUS FUNCTIONS IN THE MODULE



UNIT AND EXPANSION

The 3x3 module is translated as either a built space or an extension. Units are given at least one of both. The built space contains the toilet & bath, as this is a necessary space and would be difficult for some to build on their own. The extension allows the user to expand their unit, which also instills a sense of responsibility as they are given the ability to grow their space.

HOW CAN YOU USE YOUR 3X3 MODULE?

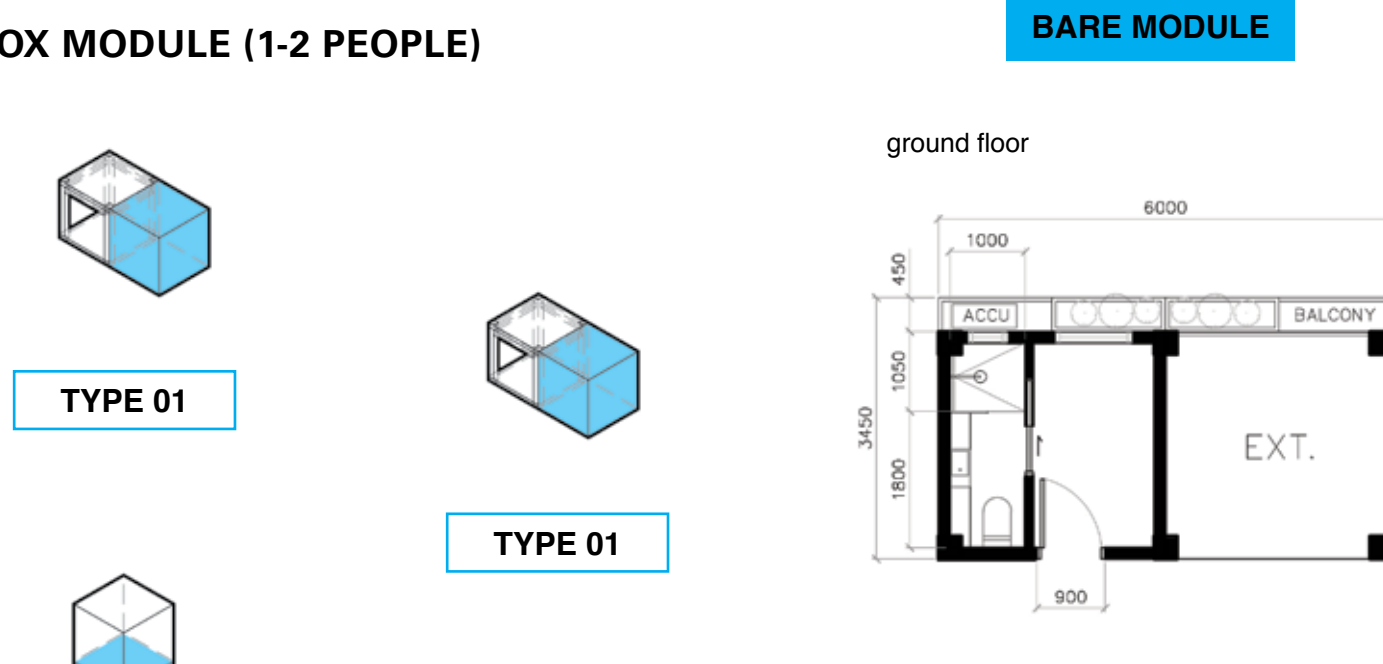


UNIT MODULES

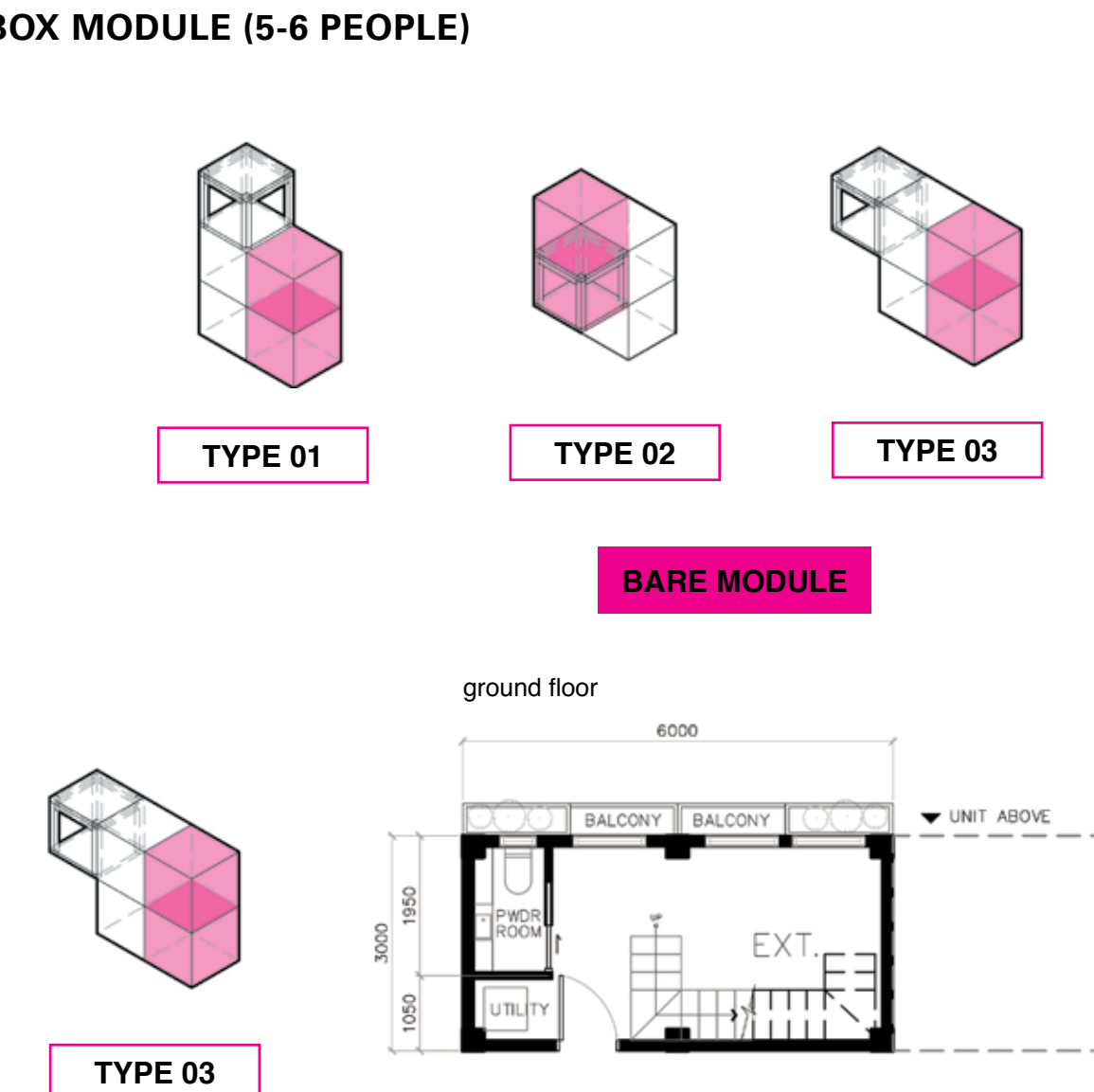
The 3x3 module can be arranged in different ways to fit into the regular structural grid. The number of floors and width of the unit can alter as modules are added. This variety allows for people to customize their unit to suit their needs.



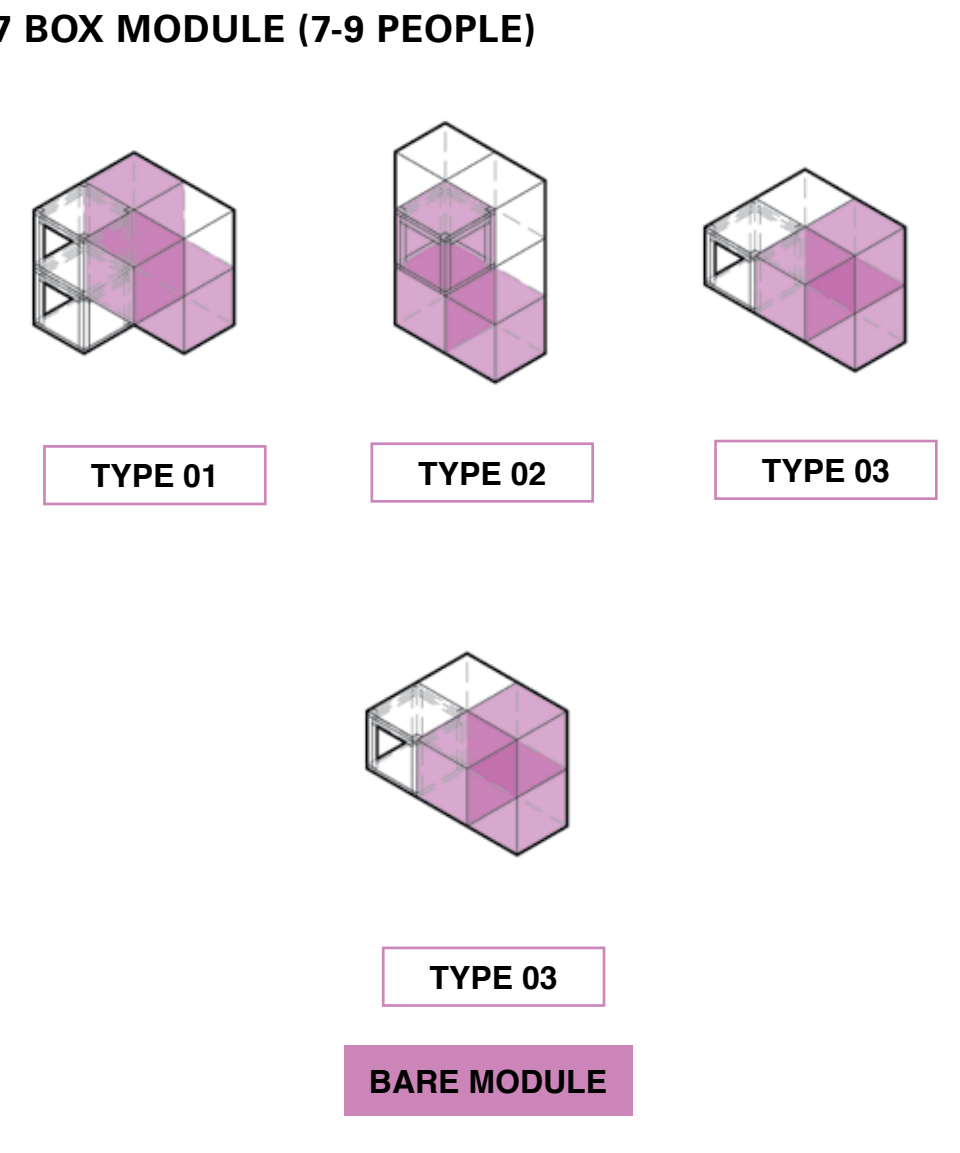
2 BOX MODULE (1-2 PEOPLE)



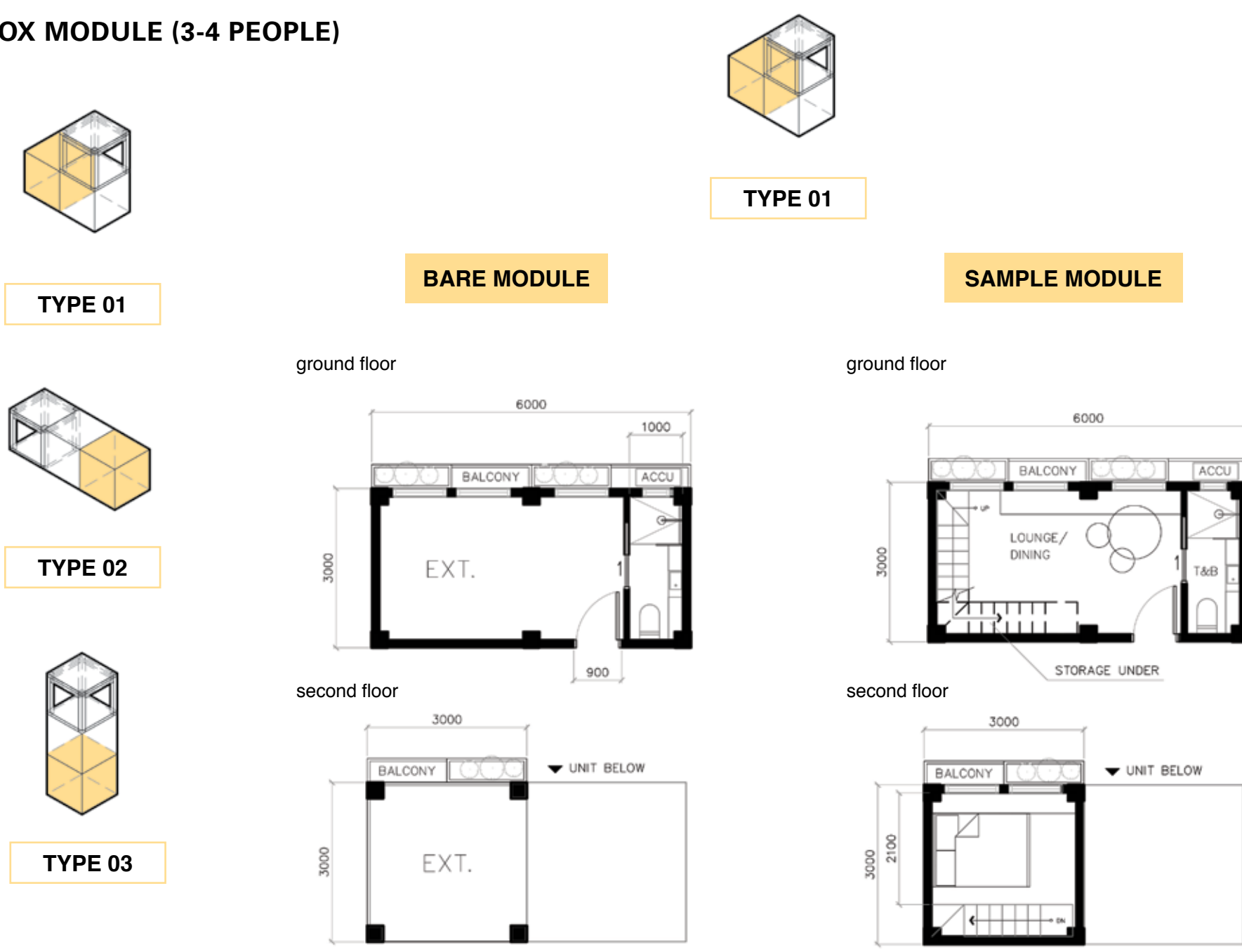
5 BOX MODULE (5-6 PEOPLE)



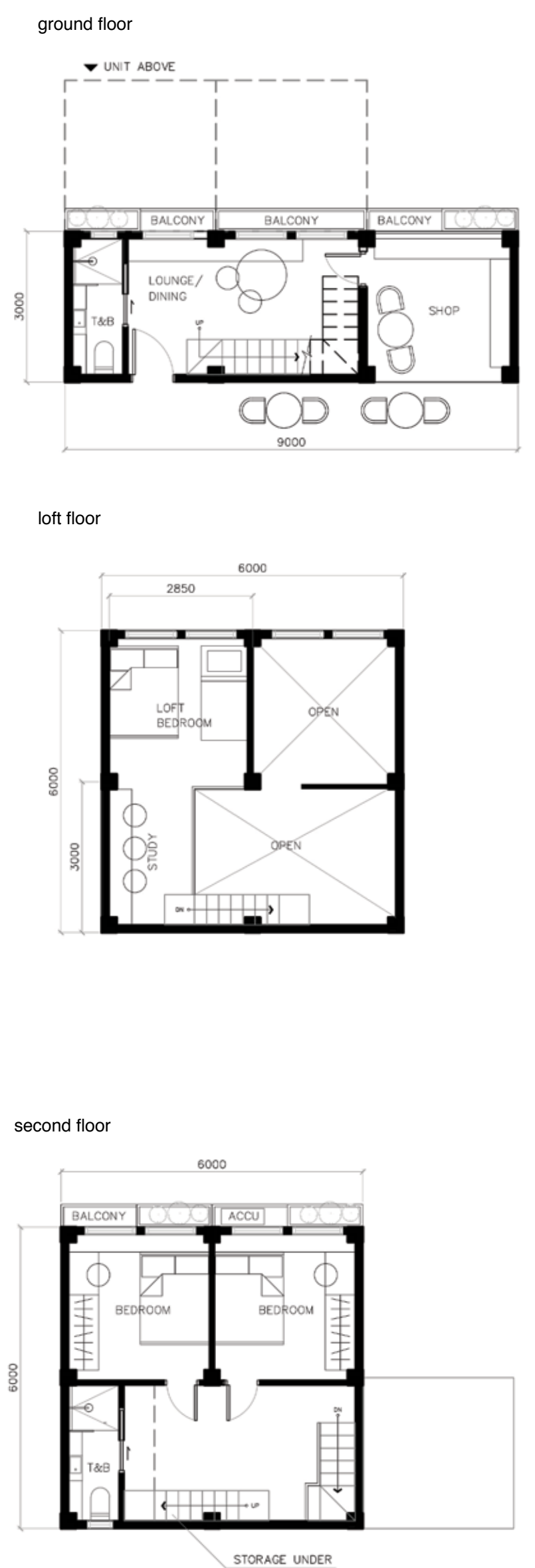
7 BOX MODULE (7-9 PEOPLE)



3 BOX MODULE (3-4 PEOPLE)



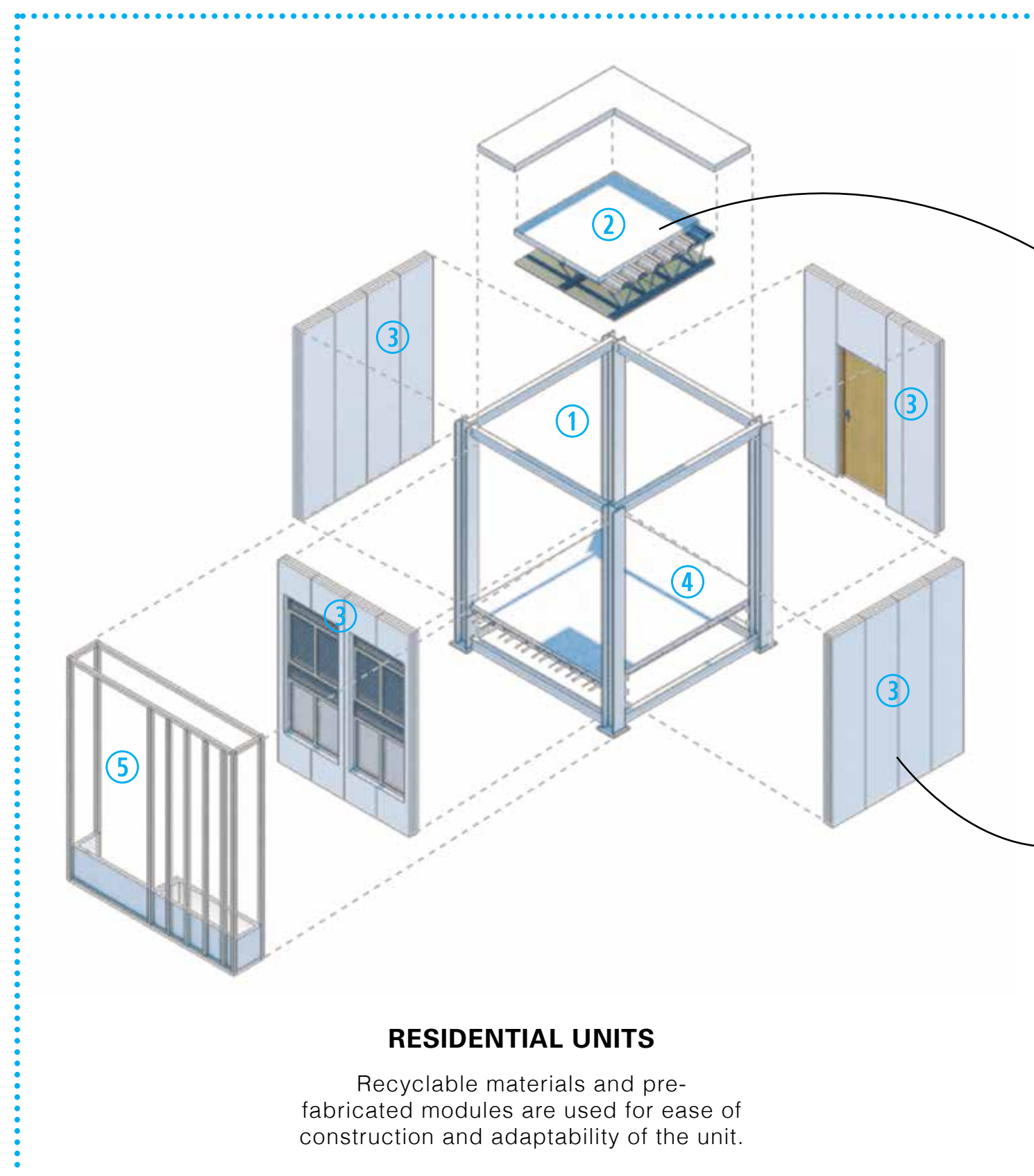
SAMPLE MODULE



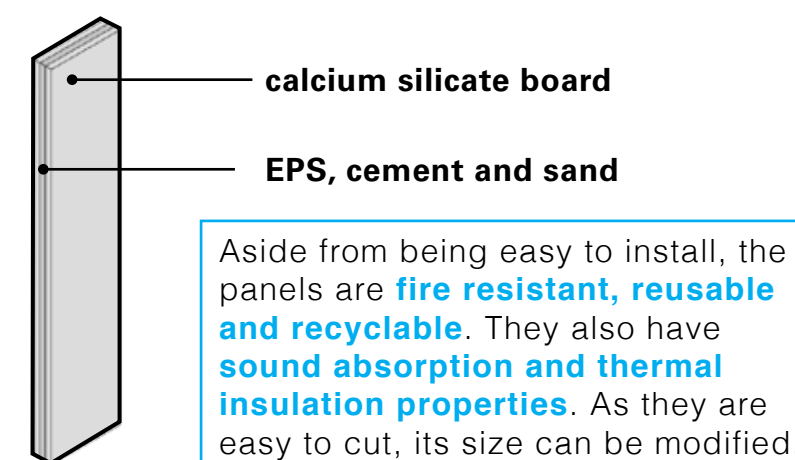
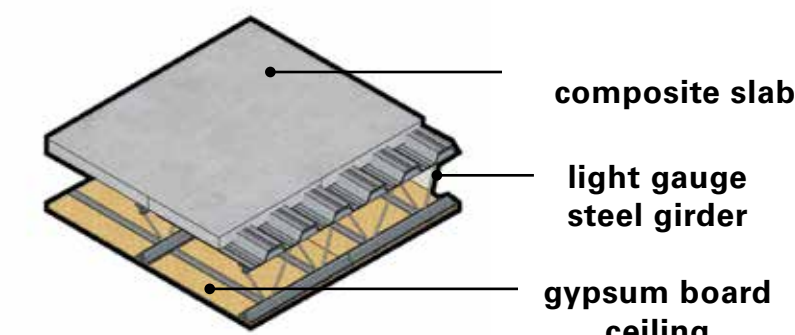
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FEASIBILITY THROUGH CONSTRUCTION

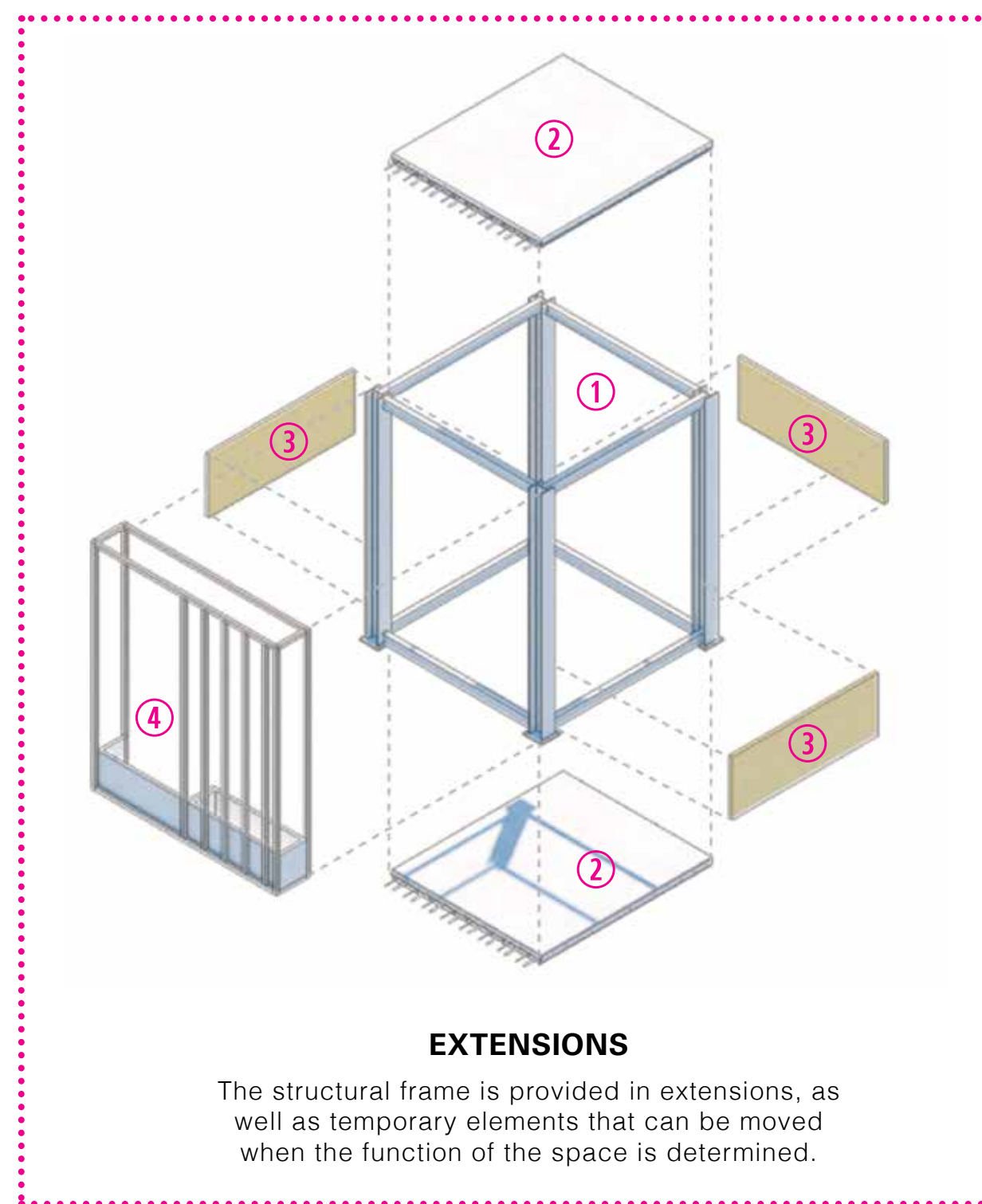
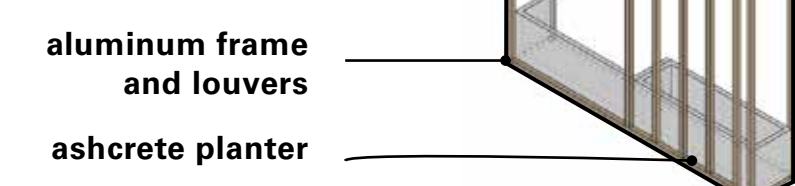
The construction of the units and extension spaces use modular and pre-fabricated construction methods to increase efficiency and reduce any wastage of material. As the process becomes faster and easier, financial resources are saved. Aside from this, environmental considerations are also given in the selection of materials that would have the least impact on the natural surroundings. The chosen materials are reusable, recyclable, and readily available to reduce their embodied energies (CO2/kg).



- STEEL STRUCTURAL FRAME**
Steel was used for its efficiency and speed of construction. As the grid is regular, it would be much faster to construct than reinforced concrete.
- INTEGRATED SLAB-CEILING SYSTEM**
As steel decking is used for the slabs, a light gauge steel girder can easily be attached to this to create a ceiling by installing gypsum boards. This ceiling system is optional, as users may opt to not have this for budget or aesthetic reasons.
- PRE-FABRICATED SANDWICH PANELS**
Expanded Polystyrene (EPS) Cement Sandwich Panels are used for the walls to allow users to change the interior configuration of their unit. These lightweight composite panels are non-load bearing, so it would not affect the structural integrity of the building.

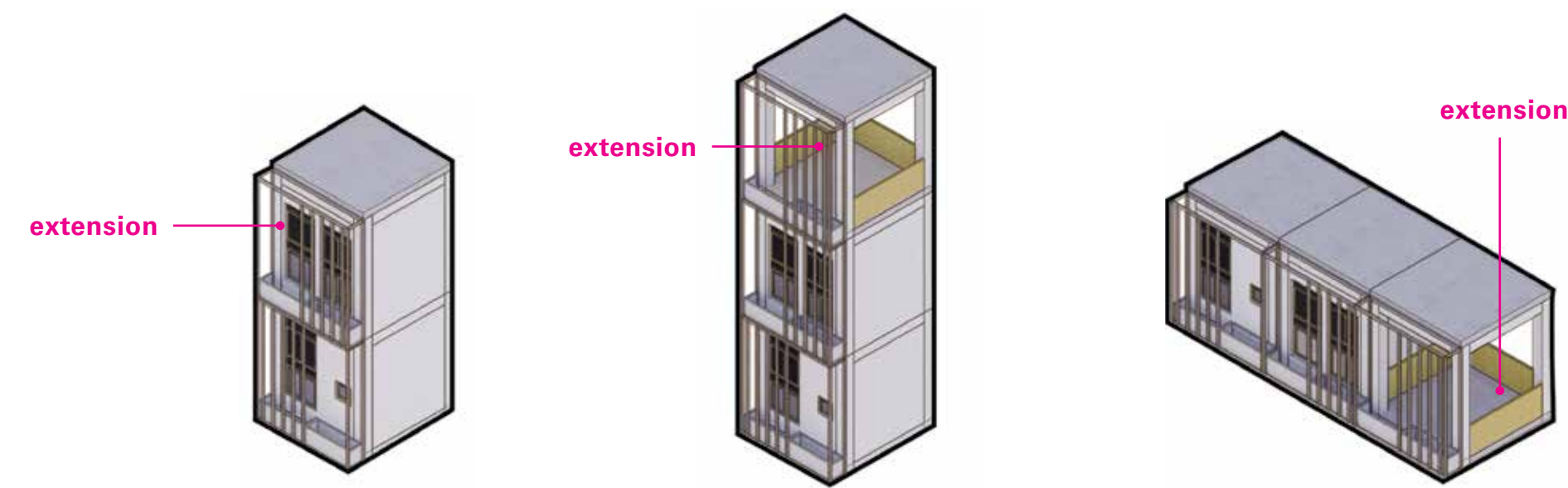


- COMPOSITE SLAB**
Composite slabs are used for the residential floors of the structure. Profiled steel decks are filled with in-situ reinforced concrete topping for better structural stability. A welded wire reinforcement mesh is also placed inside the slab to increase its structural properties. The slab is fixed to the steel beams or girders with shear studs.
- RECLAIMED ALUMINUM FACADE**
Reclaimed aluminum is used for the facade and louvers. Ashcrete is also used for the planters as it is a recycled alternative to concrete.



- STEEL STRUCTURAL FRAME**
The structural frame is provided and fixed in the extensions.
- COMPOSITE SLAB**
Composite slabs are also provided in extensions that are not continuations of a lower floor. Ceilings are not provided in these spaces to prevent limiting the space's flexibility.
- TEMPORARY PLYWOOD RAILINGS**
Temporary railings are included instead of walls, as the extension can be used as an outdoor space. Plywood is used as it can be easily reused or recycled.
- RECLAIMED ALUMINUM FACADE**
The facade with the planters are provided as well in extensions, as they still act as sunshading for any space.

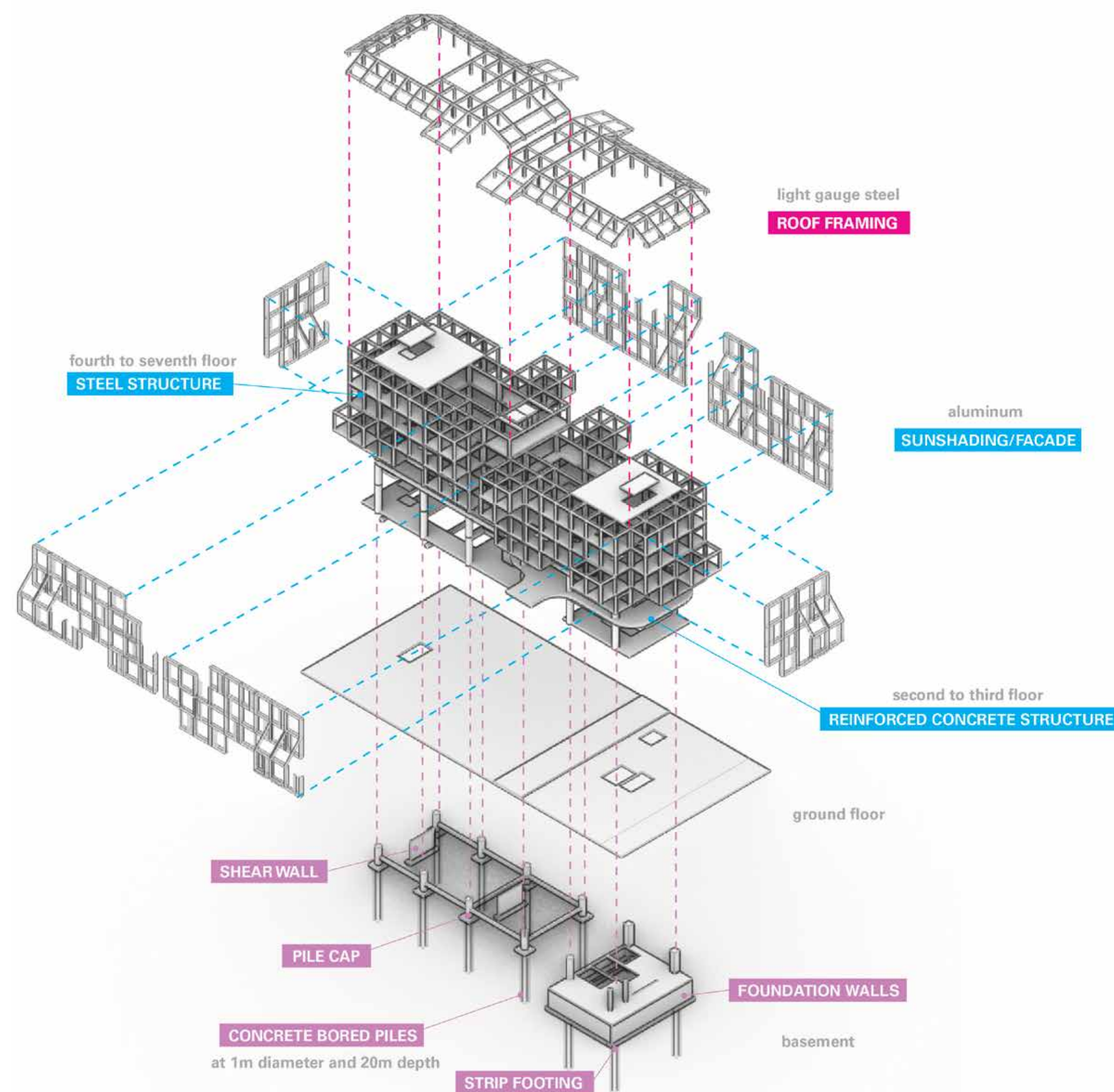
EXTENSION TYPES



- SECOND FLOOR**
This vertical extension would require for an enclosed extension space. This would have the walls and windows, but no composite slab. The user can decide to add this with the approval of structural engineers for safety.
- THIRD FLOOR**
Unlike the second floor extension, the third floor is left open. A temporary slab is placed instead of the composite slab, as this can be easily removed. Temporary plywood railings are provided instead of walls.
- HORIZONTAL**
The horizontal extension is left open as well, but it is built with a composite slab as the lower unit is owned by another resident. It is not enclosed to allow for a greater variety of functions to be accommodated.

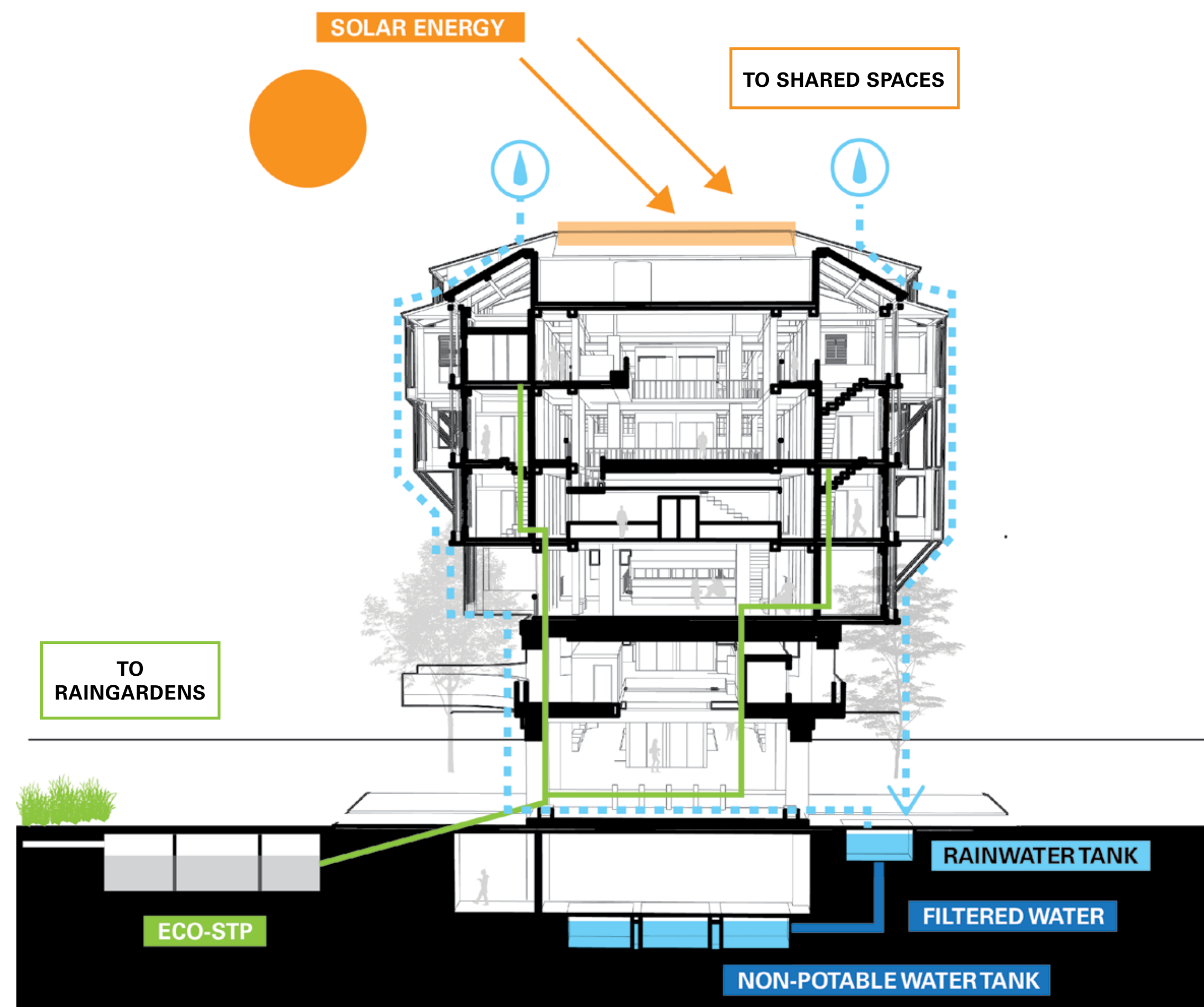
BUILDING STRUCTURAL SYSTEM

A hybrid structural system is used for the buildings; the foundation and basement to the second floor uses a reinforced concrete structural system, while the third to seventh floor uses a steel structure. The residential areas utilize steel as it is a regular grid, so assembling this will take a significantly shorter time than using reinforced concrete. As for the foundations and substructure, reinforced concrete is used as the buildings have basements and this would provide greater stability. As the site is in an area that is prone to liquefaction and settlement, deep foundations are used. Concrete bored piles are used in order to secure the structure, and to protect it from any possible natural disaster.



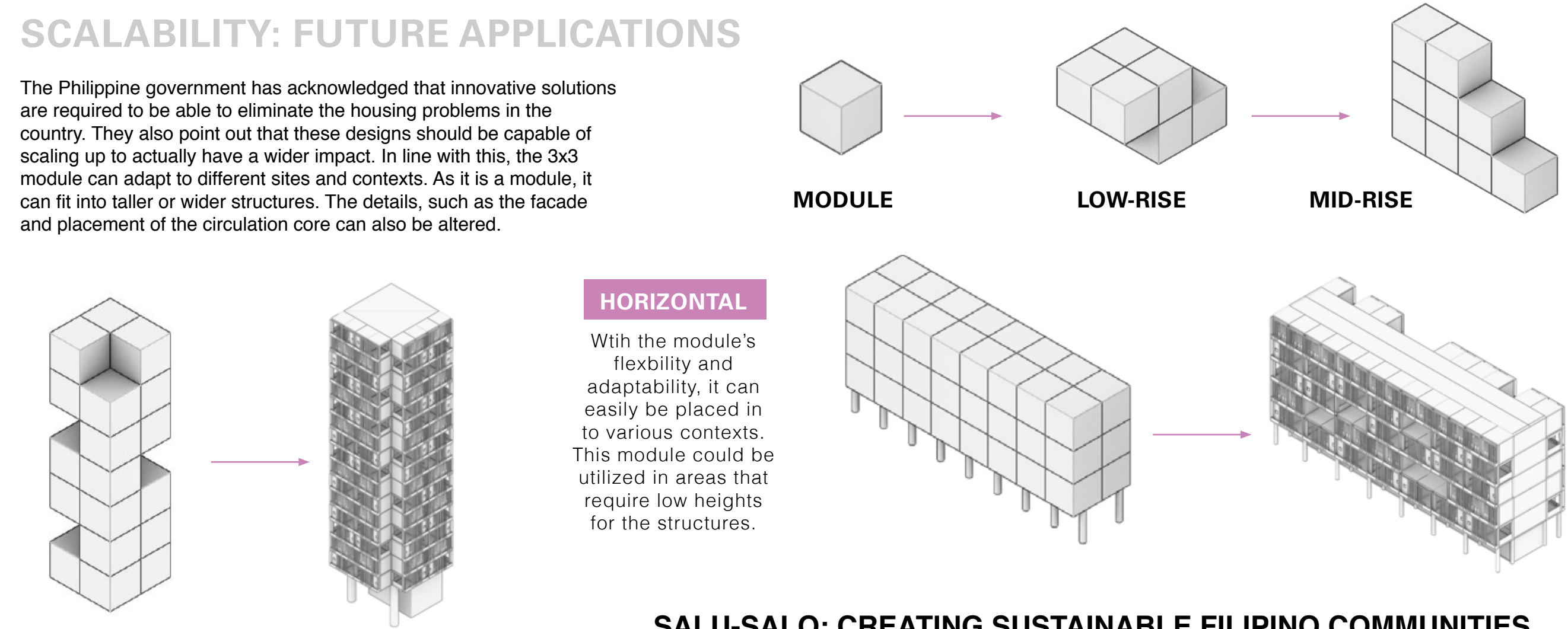
ENVIRONMENTAL SUSTAINABILITY

Sustainable technology is integrated into the building design to reduce its environmental impact. Photovoltaic panels are found on the roof to harvest solar energy which powers the shared spaces. The rainwater that is harvested from the roof is filtered then brought to the non-potable water tank to reduce the water used from the main tap. As for the solid waste management, an Eco-STP is utilized as it uses natural processes, requires no energy, and does not release any carbon dioxide emissions.



SCALABILITY: FUTURE APPLICATIONS

The Philippine government has acknowledged that innovative solutions are required to be able to eliminate the housing problems in the country. They also point out that these designs should be capable of scaling up to actually have a wider impact. In line with this, the 3x3 module can adapt to different sites and contexts. As it is a module, it can fit into taller or wider structures. The details, such as the facade and placement of the circulation core can also be altered.



The module can be used in areas with smaller lots and less height restrictions. Modifications in the structural frame will have to be made to be able to safely accommodate more units.

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