TU Delft Delft University of Technology
BK Bouwkunde Faculty of Architecture and the Built Environment

Architecture & Dwelling

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MASTER OF ARCHITECTURE, URBANISM & BUILDING SCIENCE

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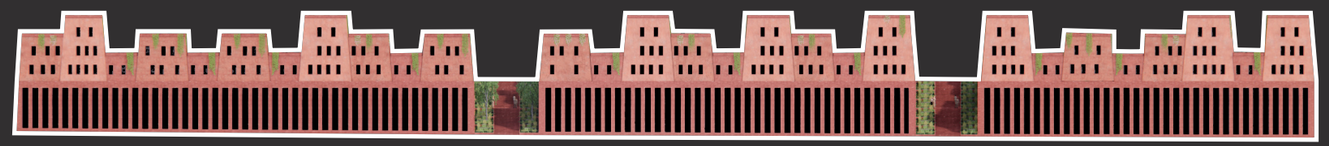
DEVELOPMENT INDUCED EMPOWERMENT: ROOF VILLAGES OF ADDIS ABABA

CITY DEVELOPMENT STRATEGIES IMPROVING ECONOMY AND EMPOWERING URBAN POOR

BARTOSZ KOBYLAKIEWICZ (4917510)



DEVELOPMENT INDUCED EMPOWERMENT: THE ROOF VILLAGES OF ADDIS ABABA

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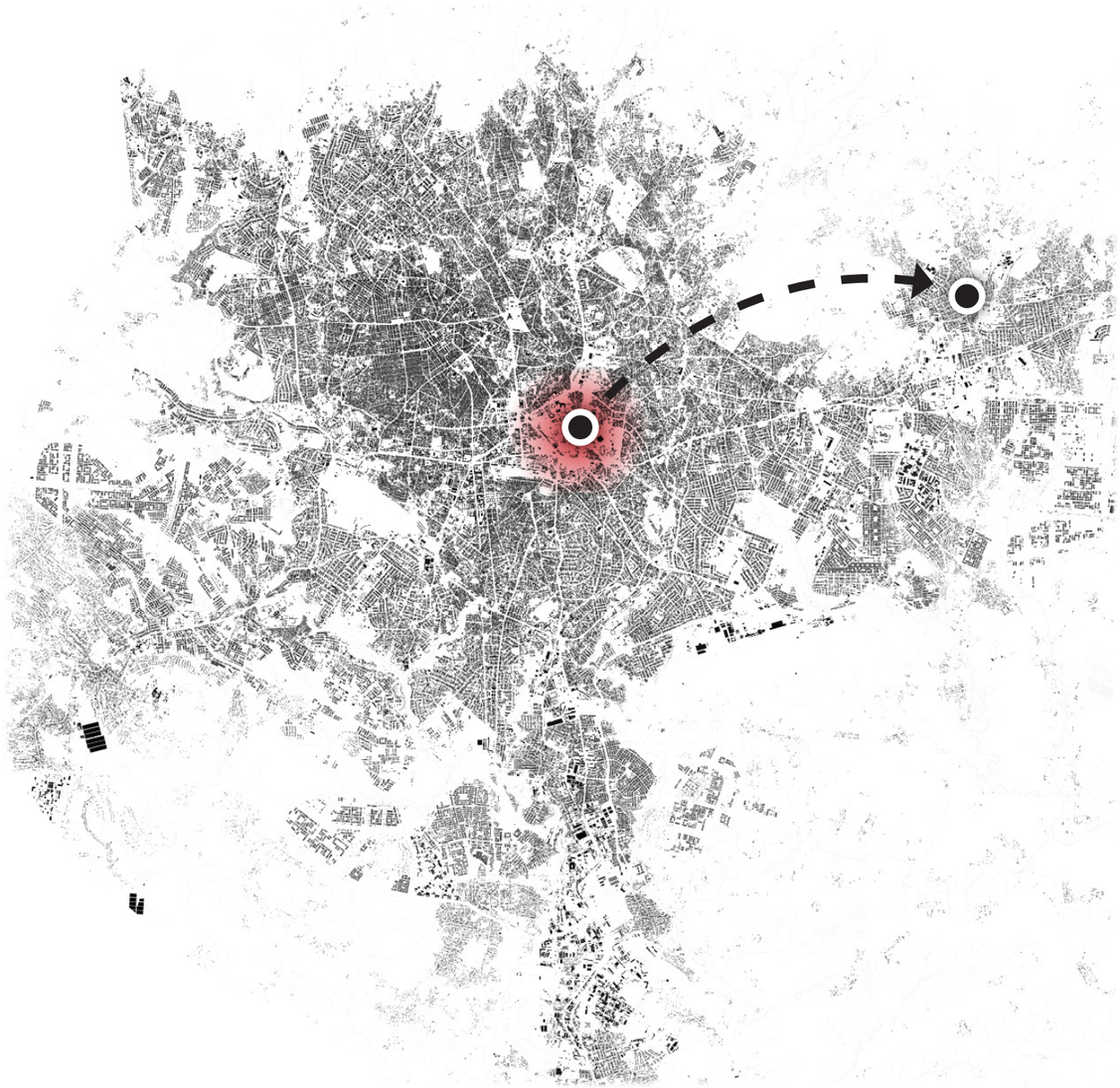
01. RESEARCH VIDEO

02. PROBLEM STATEMENT

CONTEXT ANALYSIS

PROBLEM STATEMENT



DEVELOPMENT INDUCED DISPLACEMENT OF THE INFORMAL SLUM DWELLERS

One of the examples of Local Development Plan and urban development resettlements in Addis is Kazanchis area around United Nations Economic Commission of Africa, which has resettled 730 household to the Gerji and CMC areas (located six and eight kilometers respectively) to make space for expensive multi-story offices and mixed buildings.

PROBLEM STATEMENT

PROBLEM STATEMENT

ECA KAZANCHIS AREA (2003)
BEGINNING OF THE URBAN DEVELOPMENT

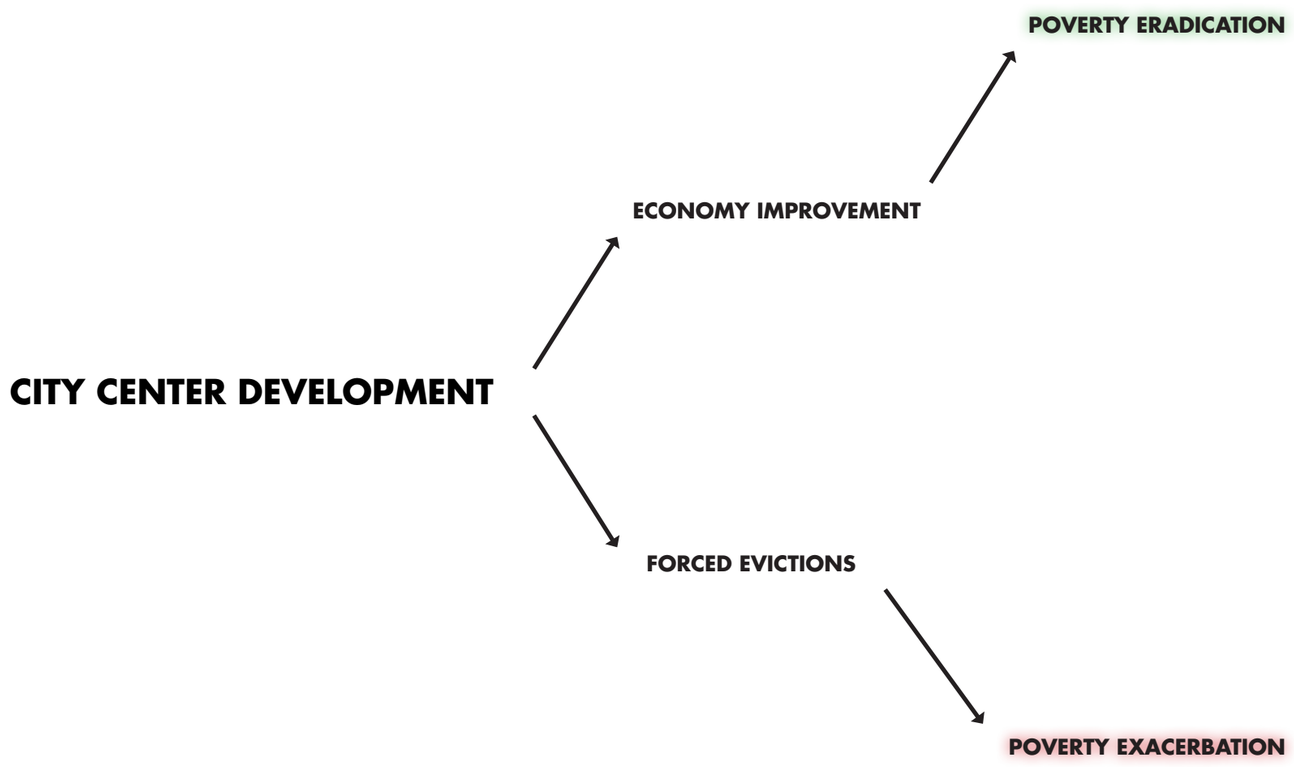
One of the examples of Urban Development Resettlements in Addis is Kazanchis area around United Nations Economic Commission of Africa, The picture reveals the area around Africa Hall and ECA Conference Center used to be surrounded by informal settlements in 2003.

ECA KAZANCHIS AREA (2020)
CURRENT STATE

Over the course of 13 years the area has undergone a major urban development resulting in resettling over 730 household to the Gerji and CMC areas (located six and eight kilometers respectively) to make space for expensive multi-story offices and mixed buildings.

URBAN DEVELOPMENT CONUNDRUM

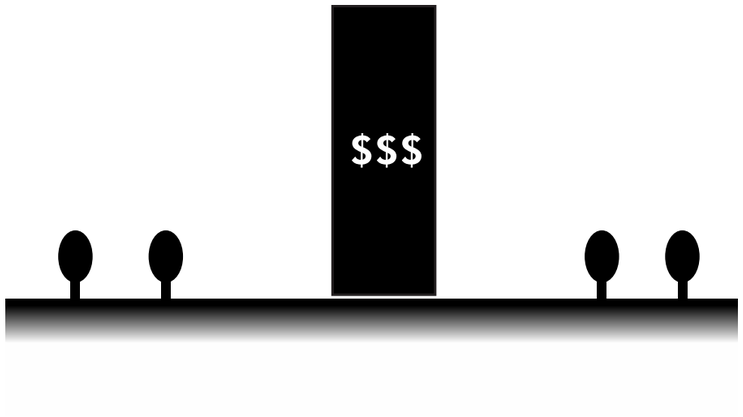
PROBLEM STATEMENT



URBAN DEVELOPMENT CONUNDRUM

While development projects can bring massive benefits to the economy and poverty eradication, they create demand for centrally and well-connected urban lands which stands in stark contrast with current scarcity of land in the city center. Since open spaces for new additional development are unavailable, the inner-city development cannot be possible without demolishing existing structures. As most of the settlements hold no tenure security, the development renders them especially vulnerable to resettlements exacerbating the issue of poverty within evicted households.

05. DESIGN HYPOTHESIS

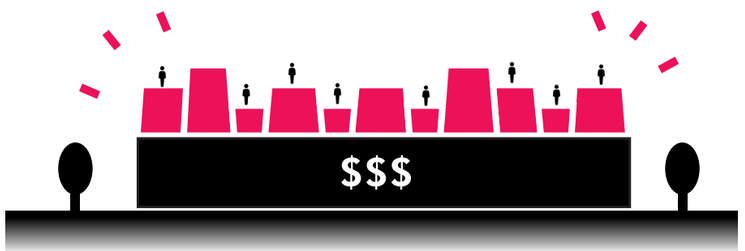


CHALLENGING VERTICAL OFFICE LAYOUT

A choice of horizontal building shape as a polemic with the standard skyscraper volume. Since the vertical orientation was proven to limit social interactions a horizontal distribution is expected to promote them.

MAXIMIZING ROOF AREA

Creating an activated rooftop on top of which a new typology is inserted. Increasing the surface area of the rooftop so more functions can be accommodated.



INTRODUCING SELF BUILT HOUSING

On top of the office rooftop the housing is inserted. Usage of grid module for the bottom and the top part allows for a balanced connection between both typologies, resulting in efficient use of space.

03. PLOT ANALYSIS

KAZANCHIS AREA (KIRKOS)

PLOT ANALYSIS

INFORMAL SETTLEMENTS

INFORMAL SETTLEMENTS

INFORMAL SETTLEMENTS

INFORMAL SETTLEMENTS

MISS FORD ELEMENTARY SCHOOL

SWEDISH COMMUNITY SCHOOL

600M

400M

150M

LEBE FANA KINDERGARTEN

HOTEL HILTON

186M

EMBASSY OF SERBIA

136M

AREA OF INTERVENTION

100M

400M

700M

BIRHAN GUZO SECONDARY SCHOOL

CAR PARKING

BANK OF ETHIOPIA

CITY MALL

ADDIS ABABA PARK

MINISTRY OF TRADE

INTER-CONTINENTAL HOTEL

KAZANCHES BUS STATION

UNICEF ETHIOPIA

UNECA CONFER-ENCE CENTER

MIXED USE DEVELOPMENT

MINISTRY OF LABOUR AND SO-CIAL AFFAIRS

MESKEL SQUARE

NUMBERS

PLOT ANALYSIS

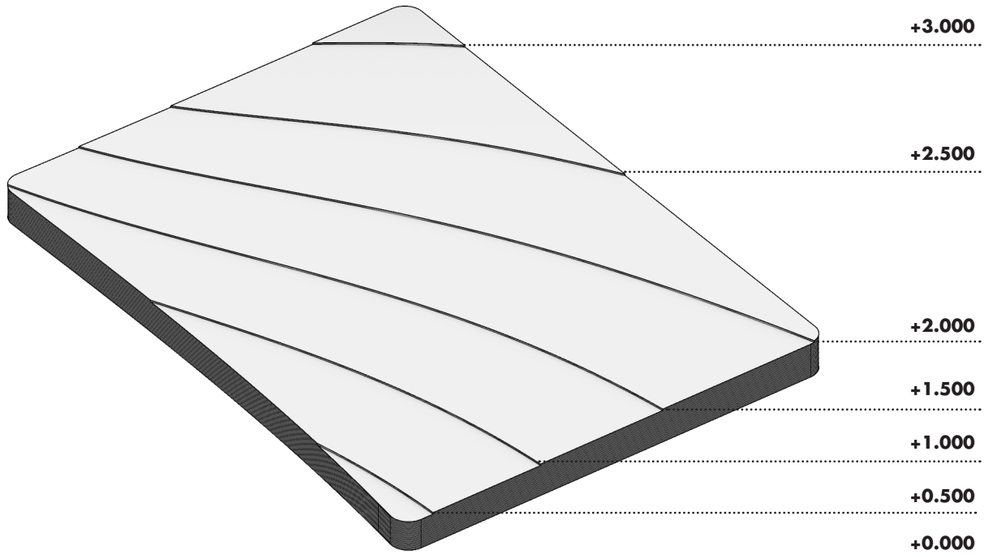
AREA IN NUMBERS

DENSITY IN KIRKOS SUBCITY:

Population: 364.300
Percentage of total population: 11.48%
Area: 1.518Ha
Percentage of total area: 2.81%
Density: 240 persons/ha

PLOT DENSITY:

Plot area: 30350m2
Average household: ~5,2 individuals
Number of people (averaged): 730
Number of units (averaged): 140
Density: 46 units/ha



SOURCE OF INFORMATION

The calculation of the numbers is an approximation as it was carried out remotely. All initial businesses located on the plot are to be incorporated into the new design. Estimations based on data found in 'Situation analysis of slum settlements in Addis Ababa' (UNICEF)

TOPOGRAPHY

The level difference is not extremely large but significant and it had to be taken into account during the design process. The resulting typologies are informed by the location-specific qualities, topography being one of them.

04. RESEARCH QUESTION

CITY DEVELOPMENT

+

EMPOWERMENT OF INHABITANTS

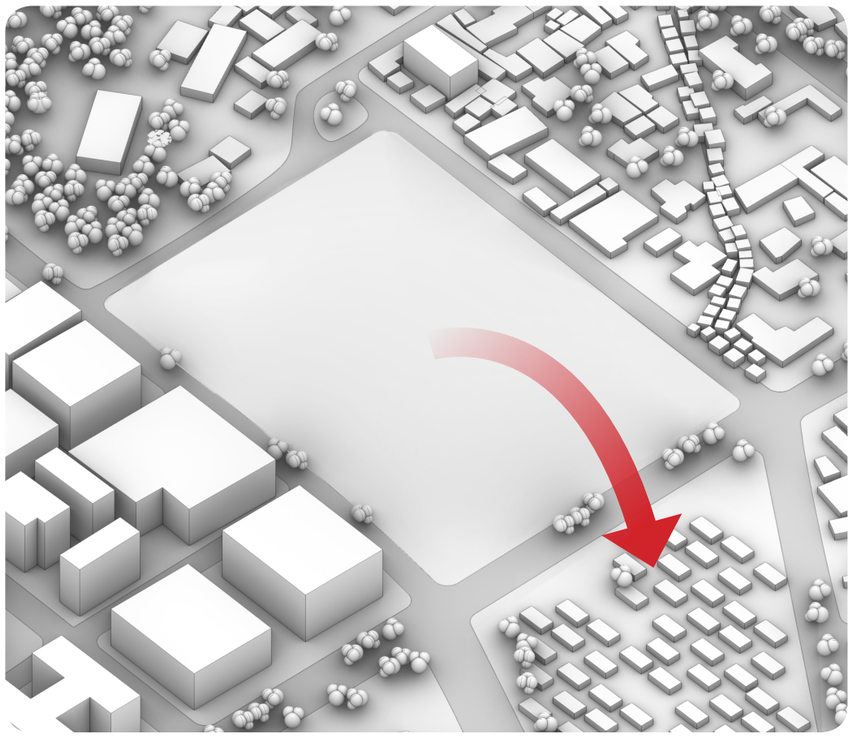
HOW TO REDESIGN ADDIS ABABA'S DEVELOPMENT STRATEGY TO **BOOST ECONOMIC GROWTH**, **MINIMIZE FORCED MIGRATIONS** AND **EMPOWER URBAN POOR**?

WHERE TO LOCATE THE **AFFORDABLE HOUSING IN THE CITY CENTER AND** HOW TO **PRESERVE EXISTING LIVING AND WORKING PATTERNS?**

06. TYPOLOGICAL BUILDUP

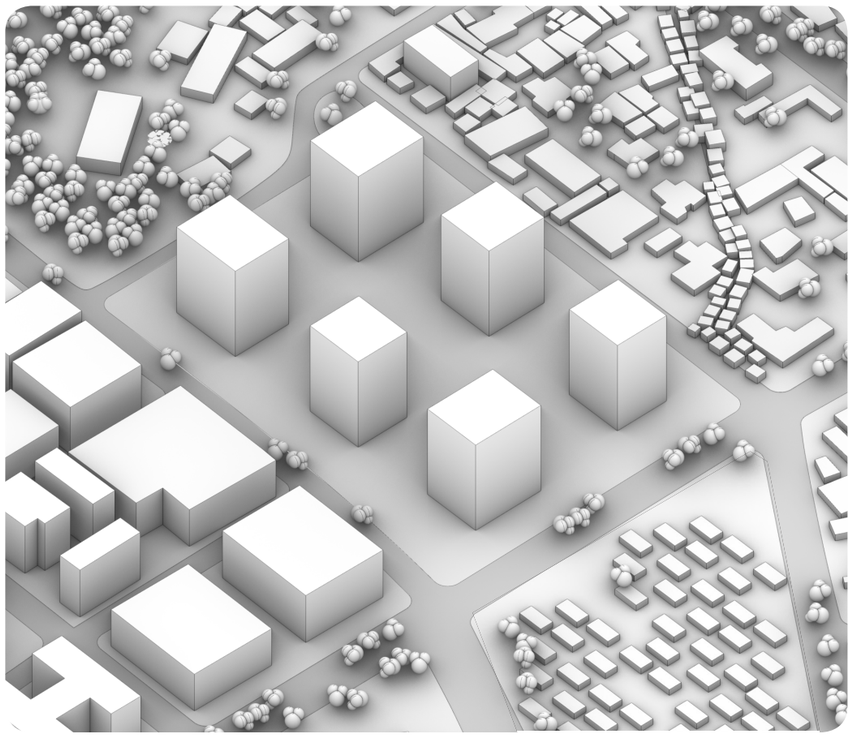
SELECTED PLOT

The selected plot is located at the threshold between urban development zone and the area of informal settlements. Apart from the housing program, there are several businesses located on the plot. The existing paths and streets are informal and serve as outdoor areas for residents.



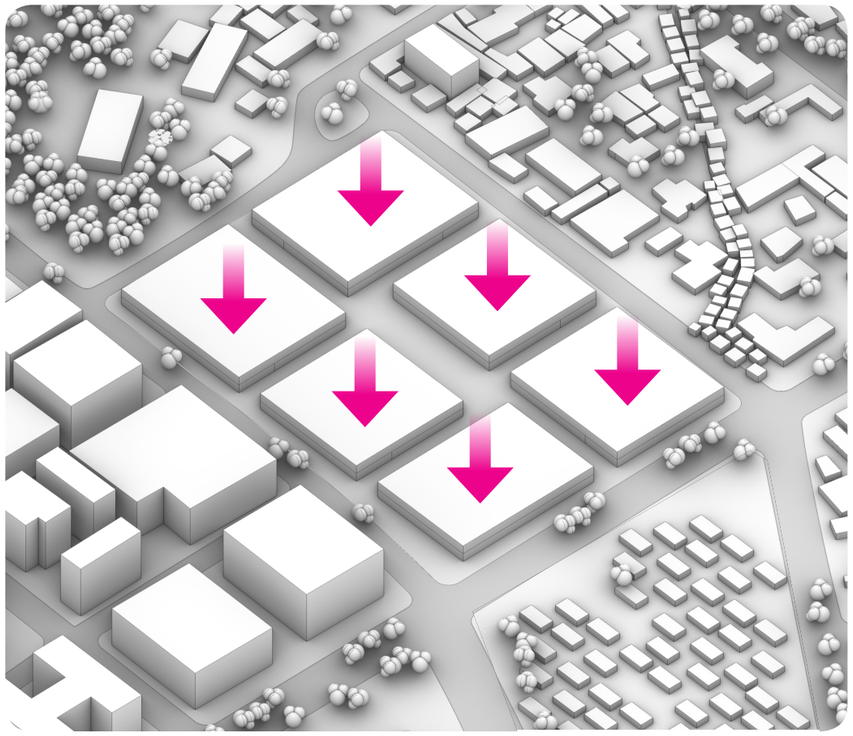
TEMPORARY EVICTION

Over the course of the construction period, the community would be temporarily evicted to the nearby car park, using cargo containers as means of temporary shelter. The project has been subdivided into 6 independent parts minimizing the need of eviction of the whole site.



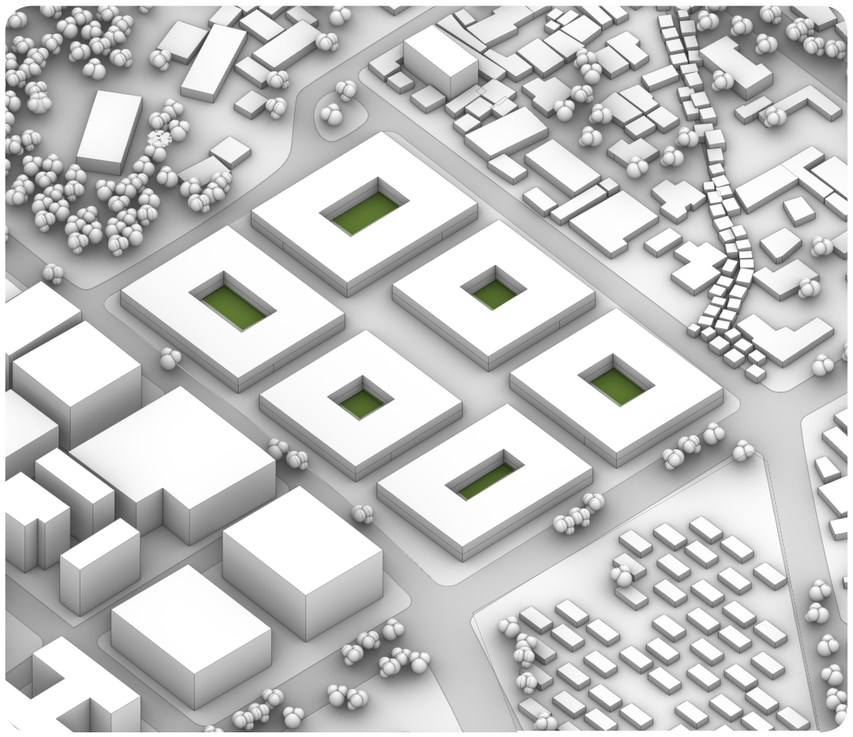
FORESEEN DEVELOPMENT

The diagram reveals the typical in the area development with standard, vertical office layout allowing for maximization of profits. The foreseen development in such form relies on forced eviction of inhabitants outside the city center.



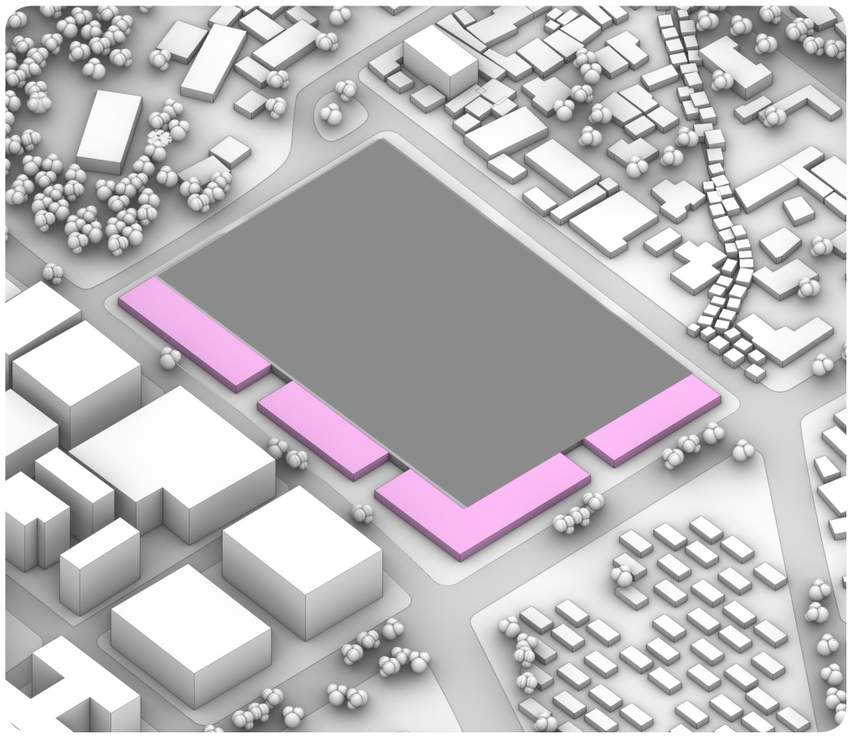
MAXIMIZING FOOTPRINT

The proposed design strategy challenges the existing urban paradigm and relies on typological alteration of the development in order to increase the surface area and alow for more horizontal interactions in the offices.



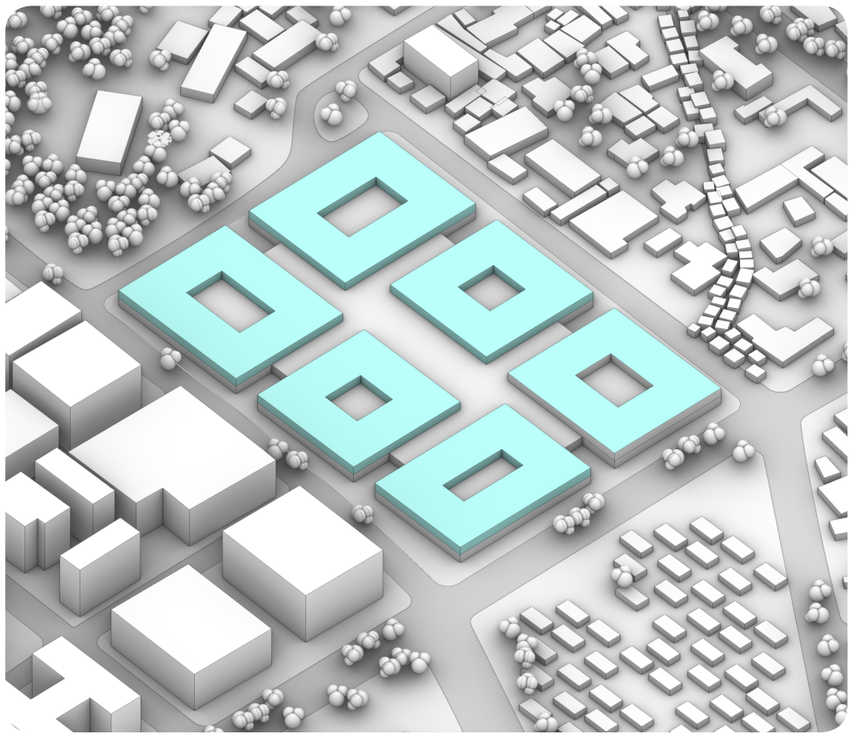
GREEN COURTYARD VOIDS

To allow for light penetration and natural ventilation a series of green courtyard voids is introduced. Additional value of such arrangement is introduction of greenery which increases the quality of working and living both for the offices and to the residential compound.



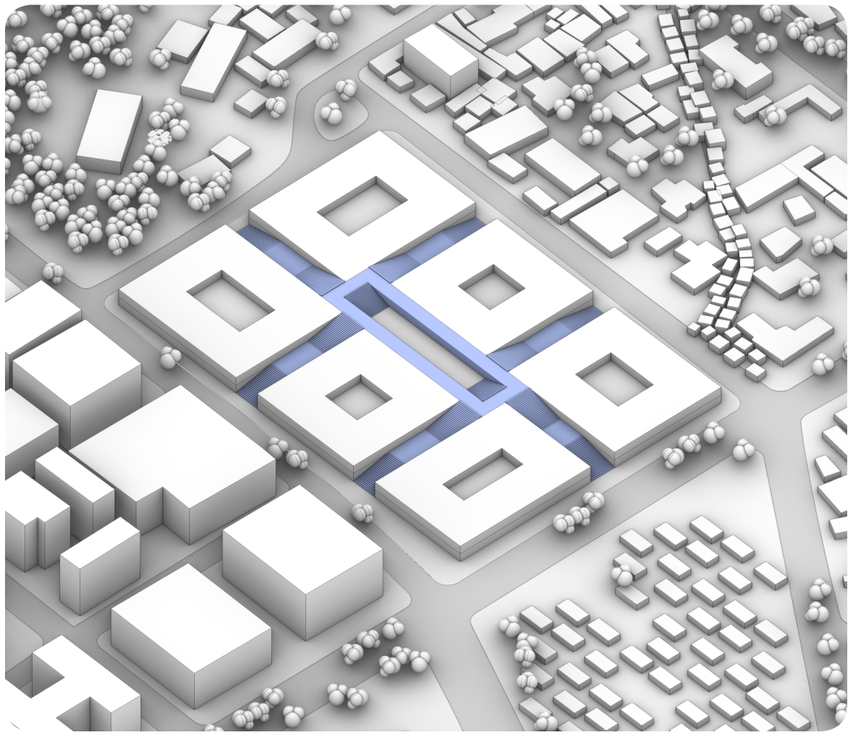
GF: AMENITIES AND PARKING

The ground floor is made of commercial plinth accessed directly from the street level and an integrated underground parking lot. Due to sloping topography the compound is inserted into the plot.



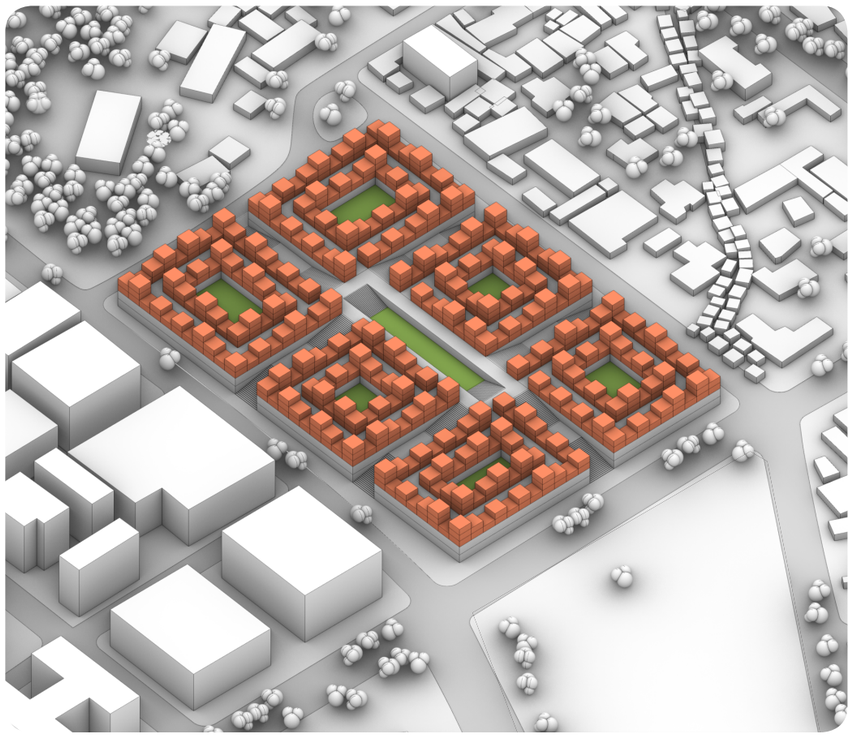
LVL1: OFFICES

On the first floor the offices are located. The space has open floor plan and is accessible directly from the landing or from the lobby on the ground floor. The communal zone in the middle of the offices allows for interaction between different office clusters.



CIRCULATION

The diagram represents the system of pedestrian flow - the ways of accessing spaces and activated rooftops and circulation which is designed to serve as a social space as well. Additionally, each compound has a direct access to the elevators from the street.



SELF BUILT HOUSING

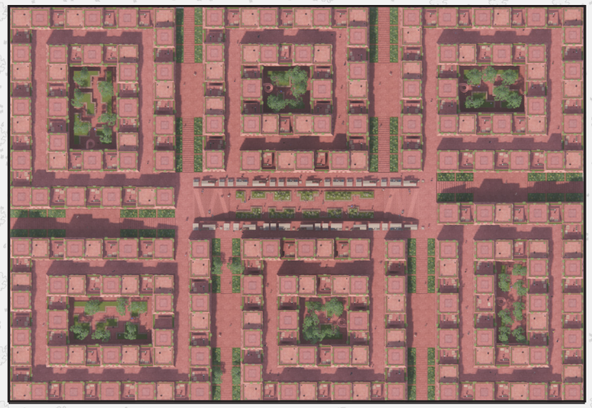
The top layer of the building is a housing layer dedicated for previous occupants of the plot. They have the opportunity to build their dwellings as a part of ‘assisted building’ system, Area dedicated for housing fits more residents than previous settlements on the plot.

URBAN SITUATION

AXONOMETRY

URBAN SITUATION

PLAN 1:500



HOTEL HILTON

EMBASSY OF SERBIA

D.A.R SAHARA STREET

GUINEA CONAGRY STREET

ZEWDITU STREET

CAR PARKING

TITO STREET

TITO STREET

CITY MALL

MINISTRY OF TRADE

UNECA CONFER-ENCE CENTER

UNICEF ETHIOPIA

INTER-CONTINENTAL HOTEL

GUINEA CONAGRY STREET

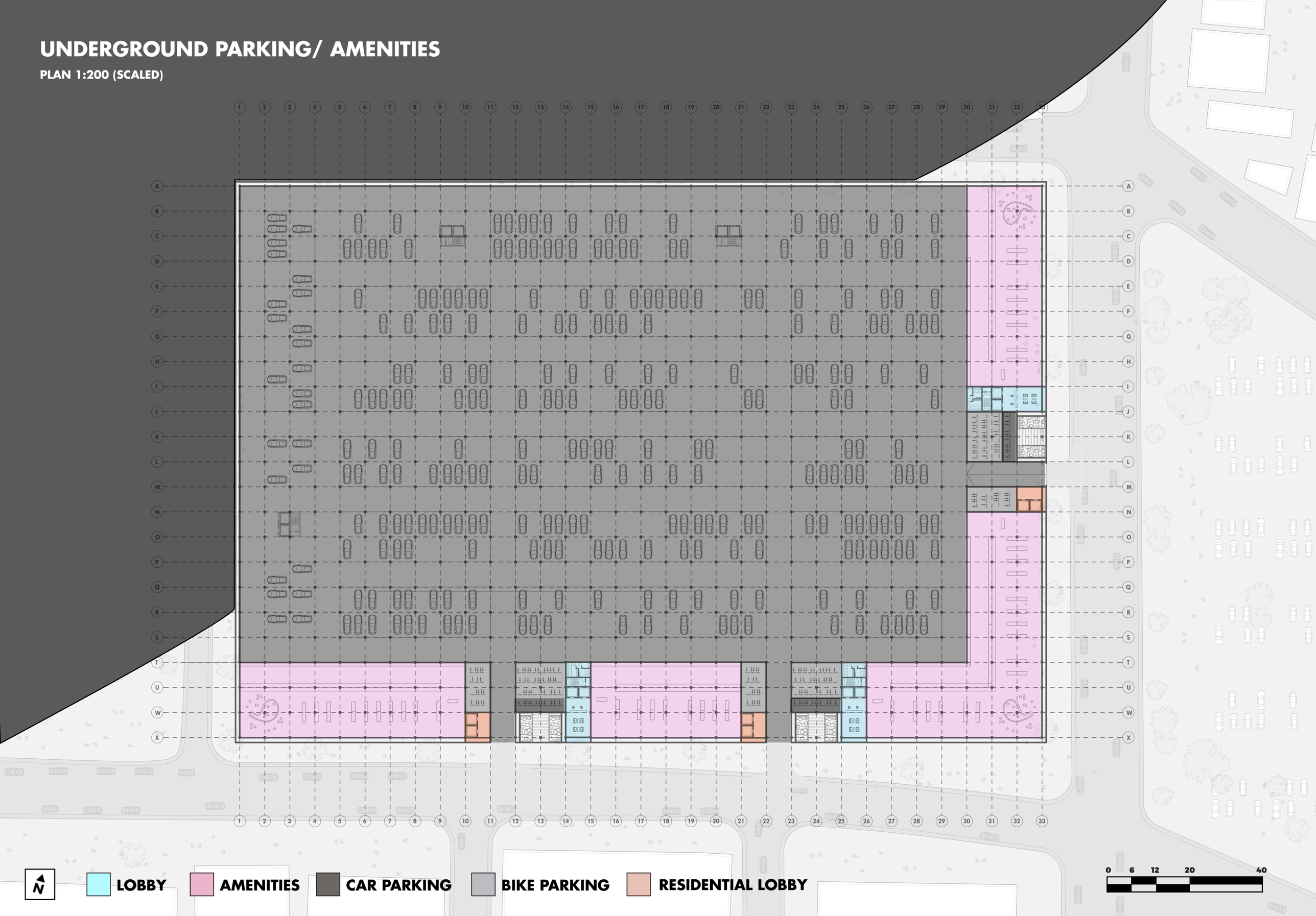
TITO STREET

N

0 10 25 50 100

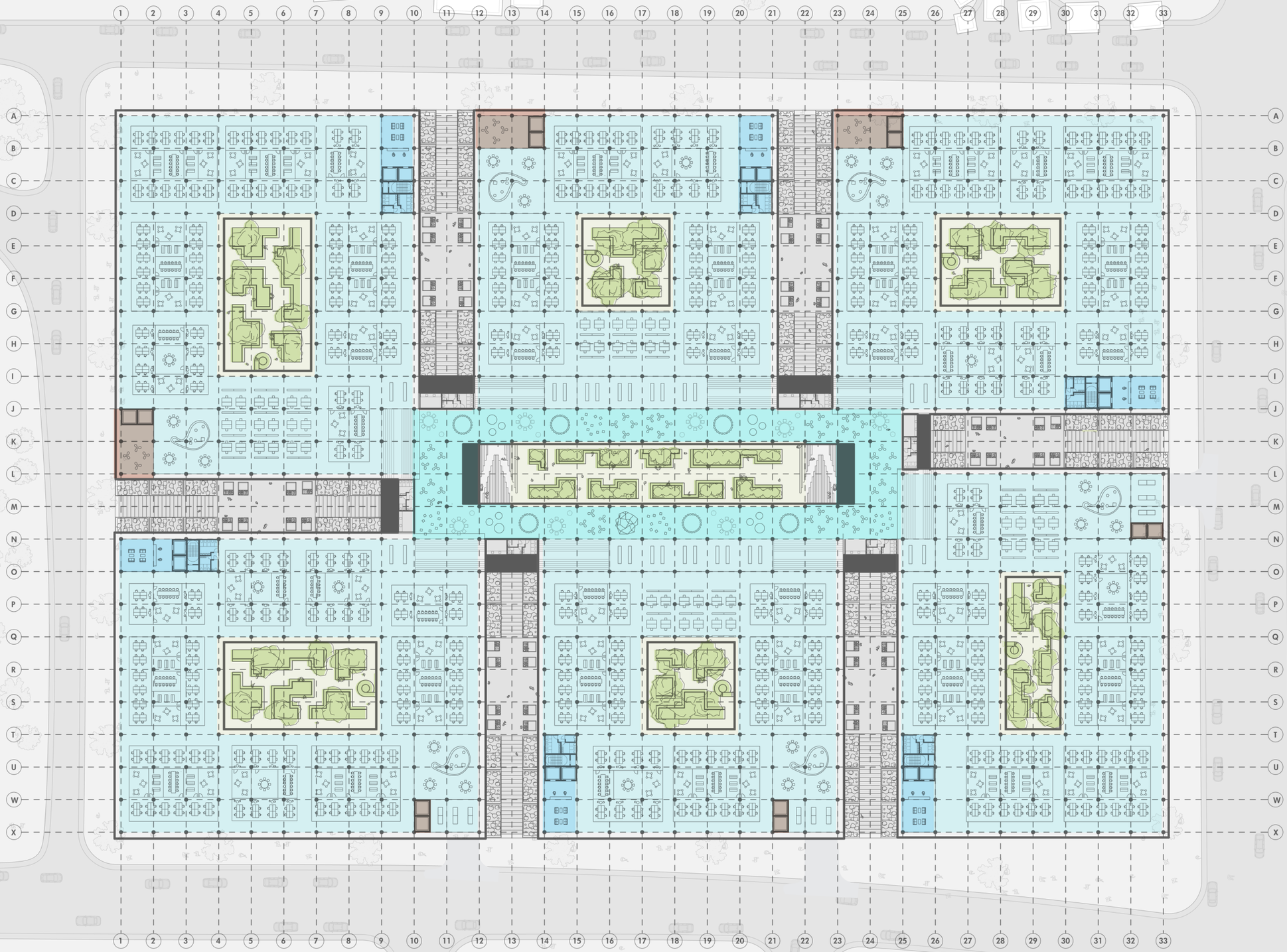
UNDERGROUND PARKING/ AMENITIES

PLAN 1:200 (SCALED)



OFFICE LEVEL

PLAN 1:200 (SCALED)



N

OFFICES

LOBBY

COMMON AREAS

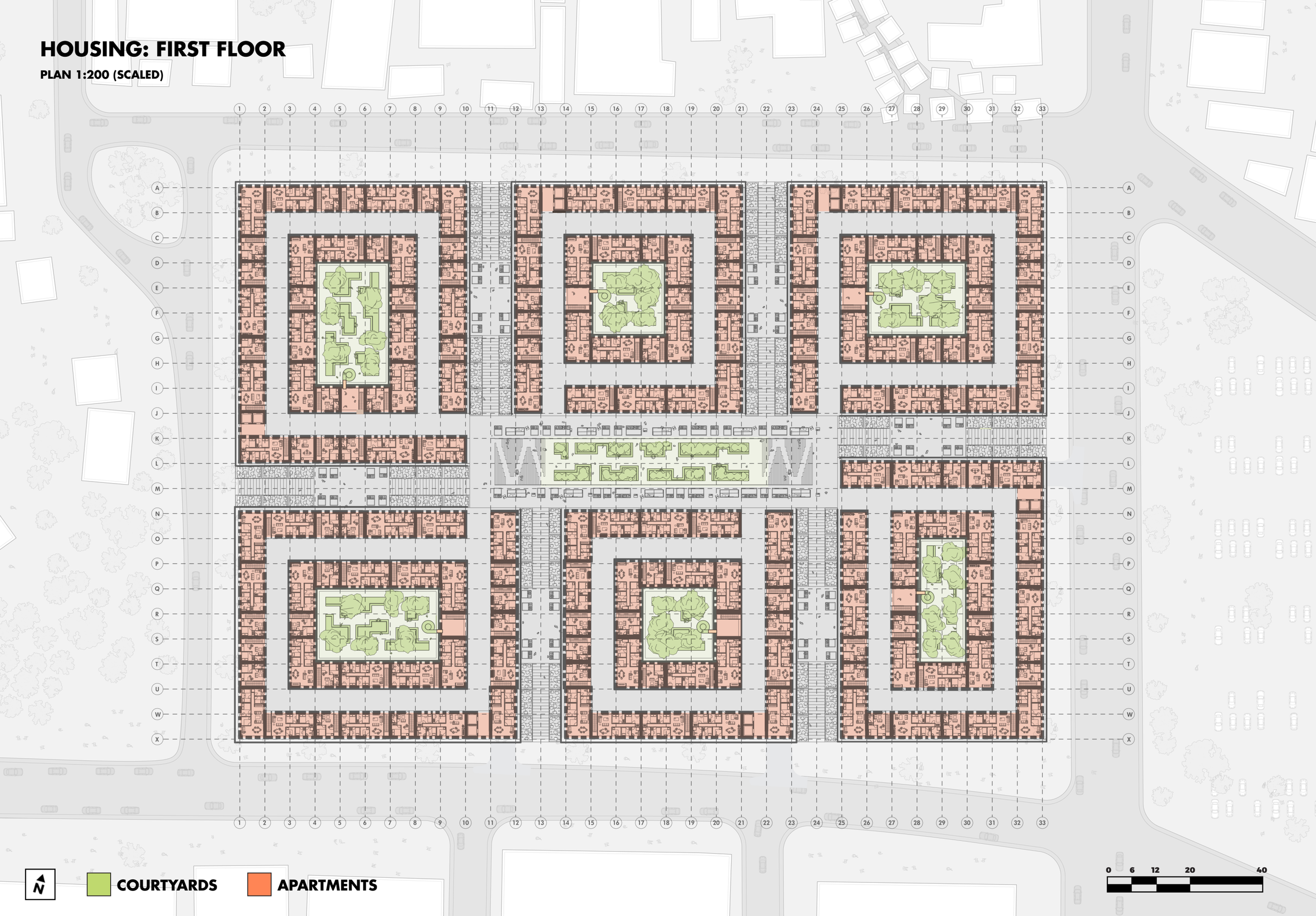
GREEN COURTYARDS

RESIDENTIAL LIFT/ LOBBY

0 6 12 20 40

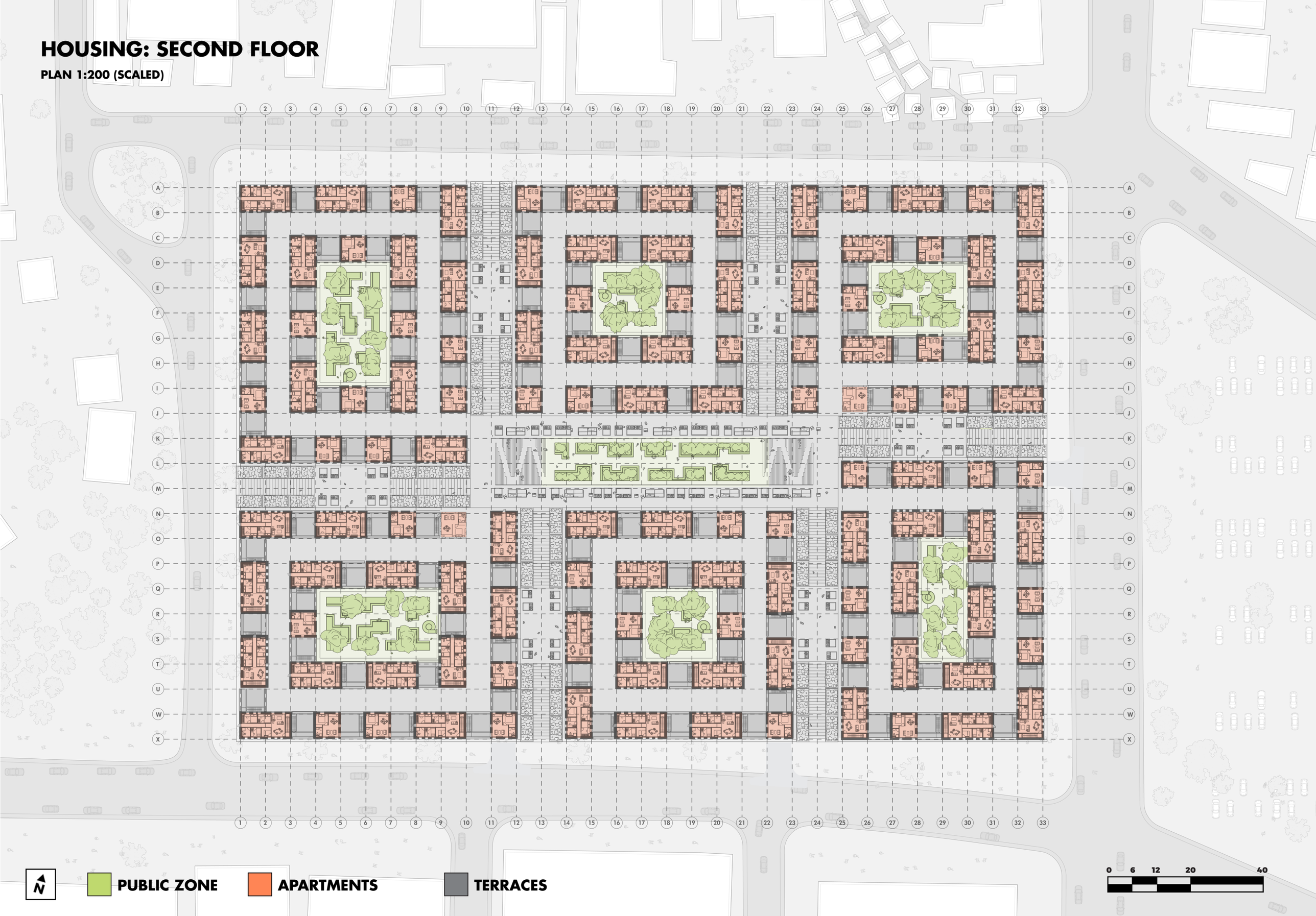
HOUSING: FIRST FLOOR

PLAN 1:200 (SCALED)



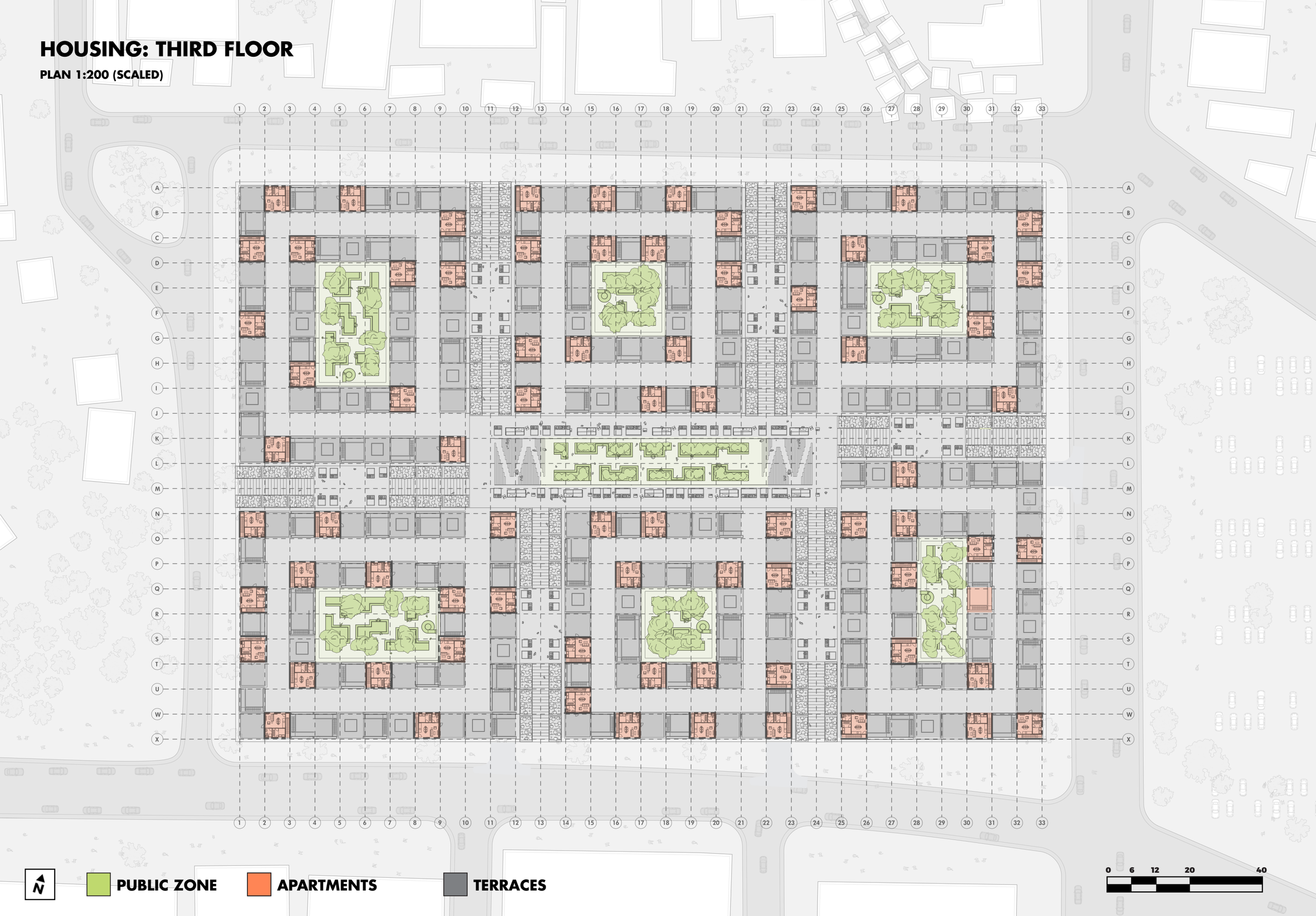
HOUSING: SECOND FLOOR

PLAN 1:200 (SCALED)



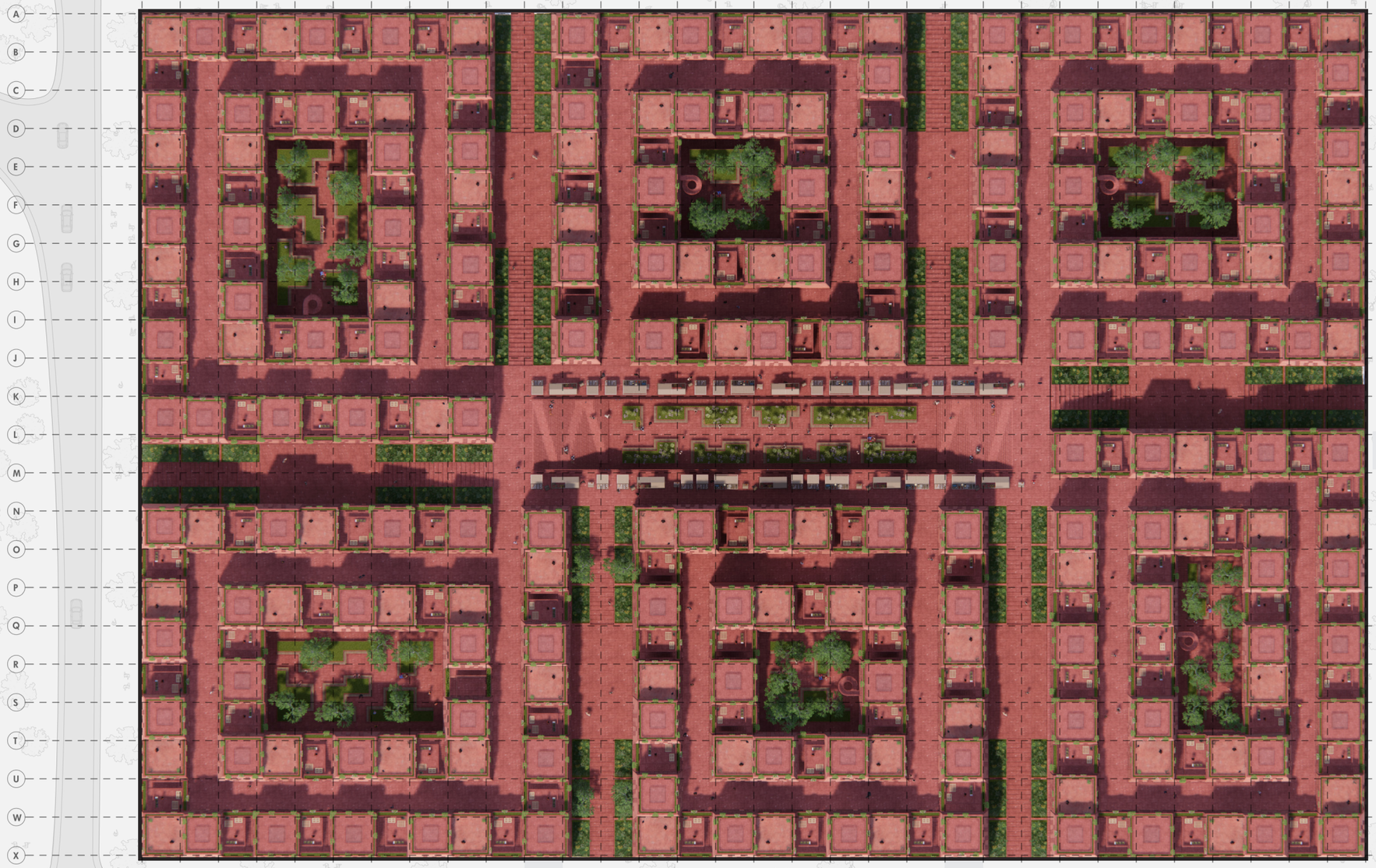
HOUSING: THIRD FLOOR

PLAN 1:200 (SCALED)



ROOFSCAPE

PLAN 1:200 (SCALED)

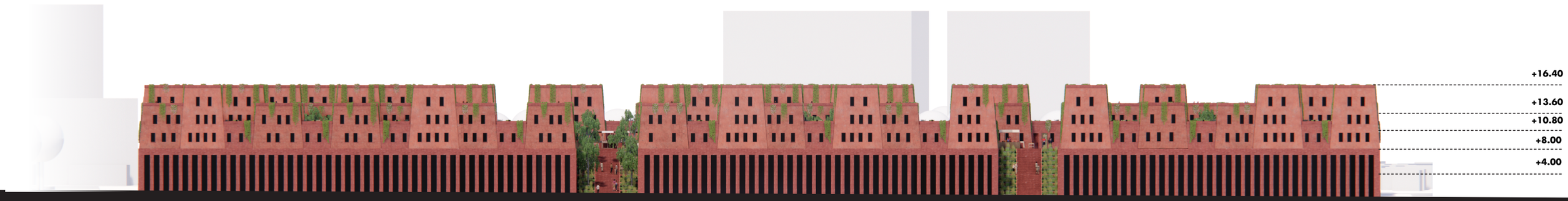


ROOFTOPS AND TERRACES

0 6 12 20 40

ELEVATION - SOUTH

ELEVATION 1:200 (SCALED)



0 6 12 20 40

SECTION - SOUTH

ELEVATION 1:200 (SCALED)

0 6 12 20 40

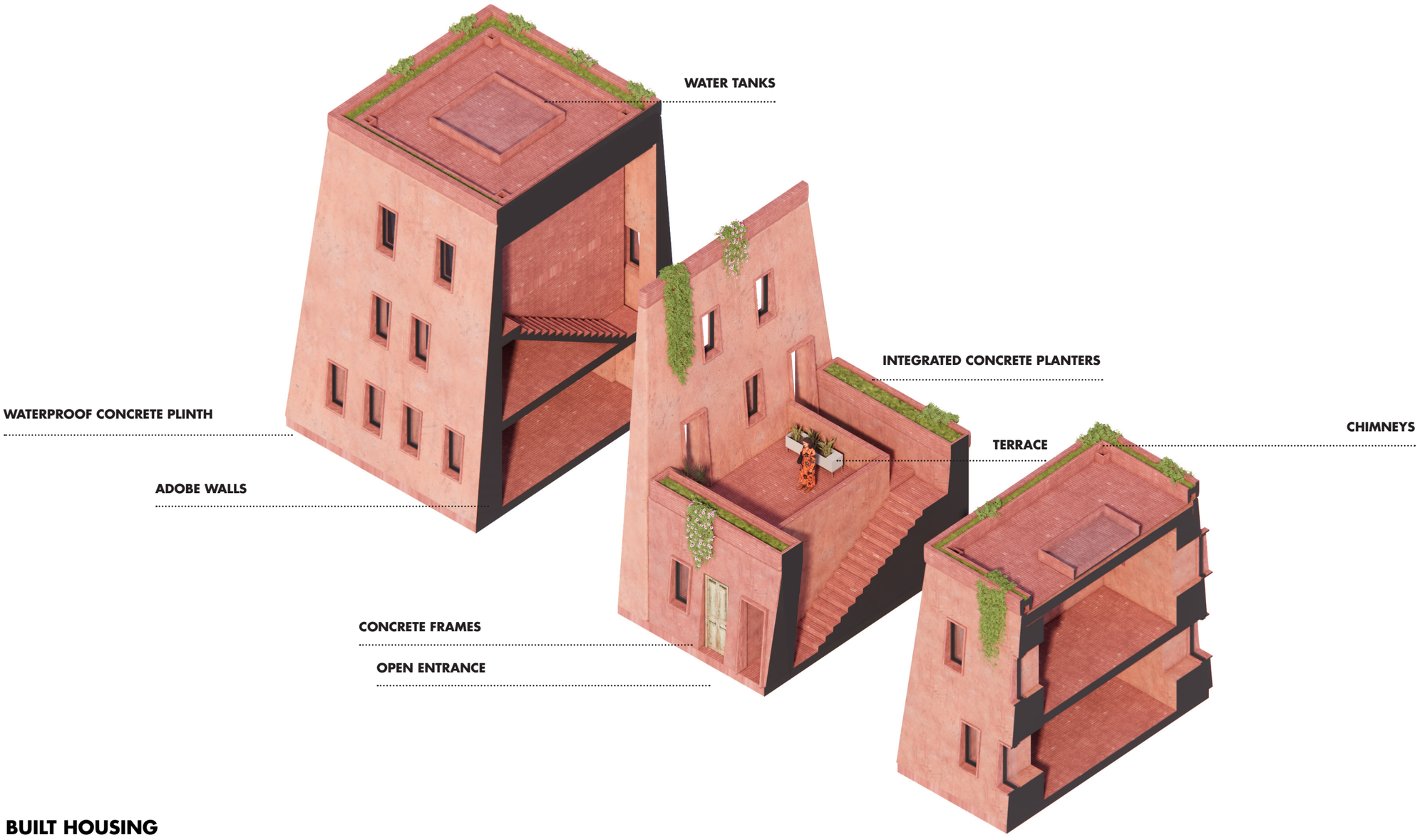
URBAN SITUATION

CONTEXT

07. THE VILLAGE

EXPLODED AXONOMETRY

THE VILLAGE

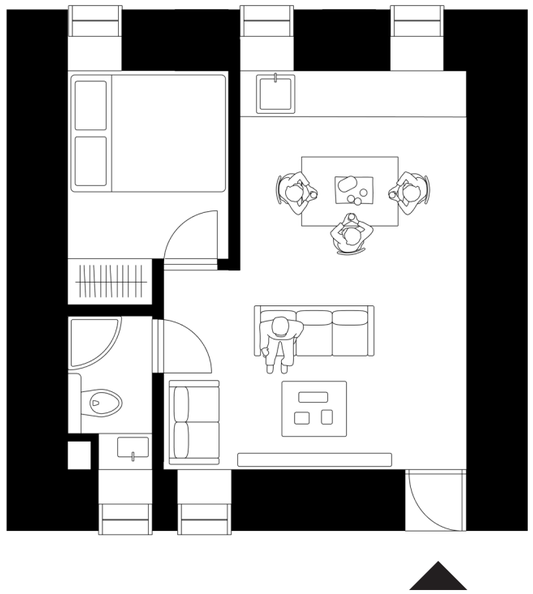


SELF BUILT HOUSING

The system of well fitting connections allowing the singular units to come together. Creation of coherent and well balanced community within the compound.

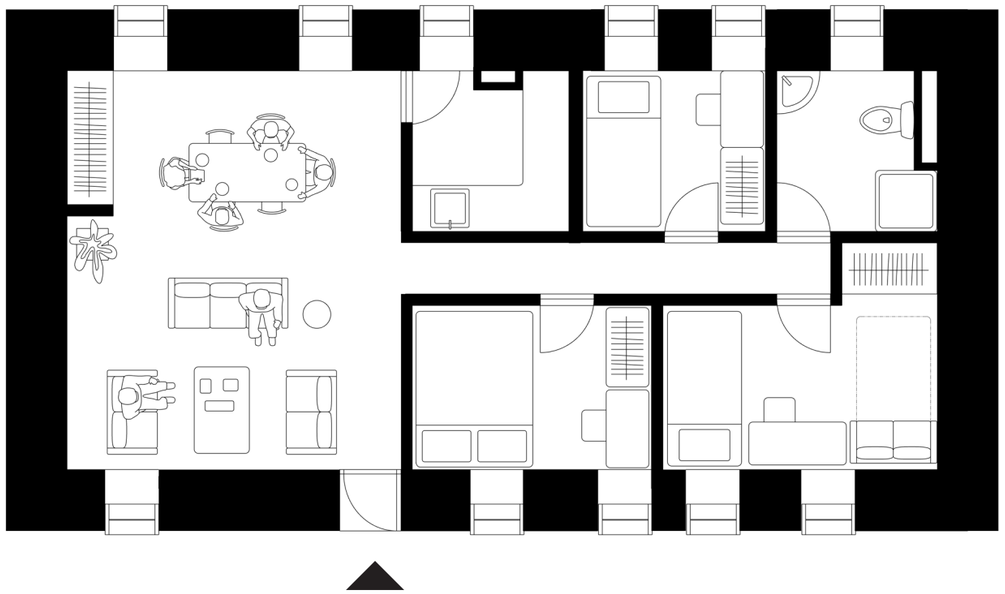
STANDARD UNITS

THE VILLAGE



INDIVIDUAL (36M²)

A small unit is suitable for a couple or a small family, It has cross ventilation, kitchen and bathroom have windows and shaft access for ventilation.

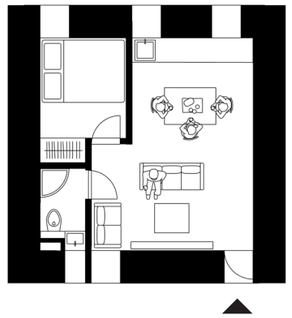


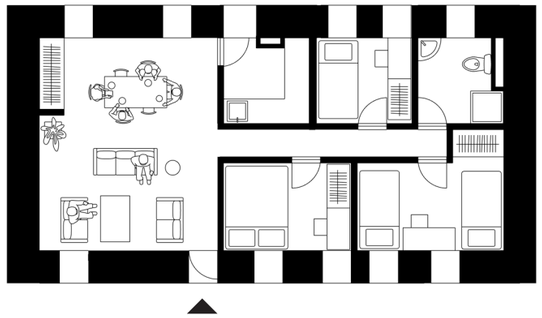
CO-HOUSING (72M²)

The big unit has 4 bedrooms.
It has cross ventilation, and each kitchen and bathroom has operable windows and shaft access for ventilation.

TYPOLOGIES

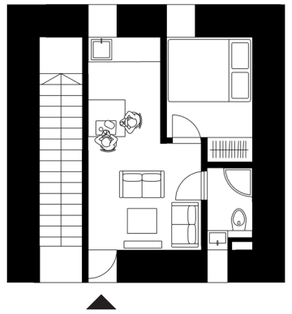
THE VILLAGE

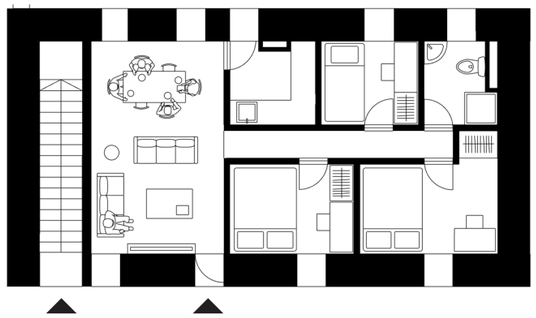




STANDARD UNIT

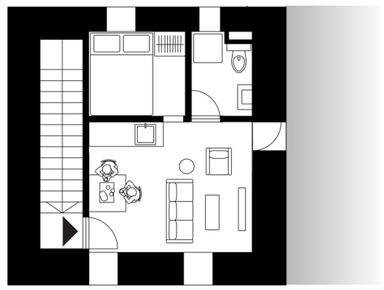
A unit that comes in two sizes: small and large, The unit is suitable for a couple or a small family,

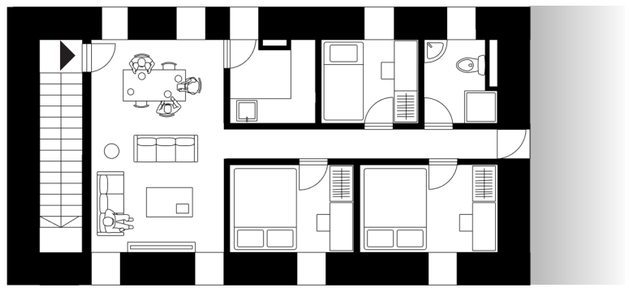




STAIR UNIT

Some typologies have a staircase incorporated on the side, depending on the location within the complex.
In each unit there is a cross ventilation, and each kitchen and bathroom have window and shaft access for ventilation.





TERRACED UNIT

Some units have direct access to the terrace, mainly on upper levels. Terraces serve as space for goods production, social interaction and housework.

INDIVIDUAL UNIT

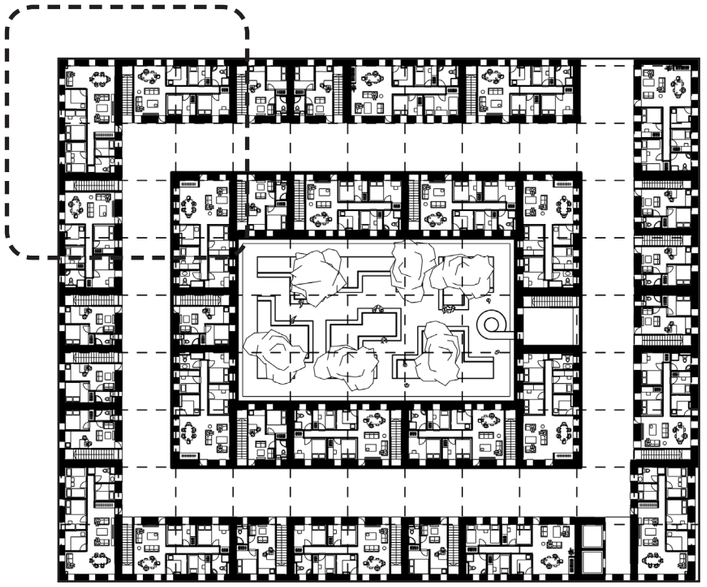
6M

COHABITAT UNIT

12M

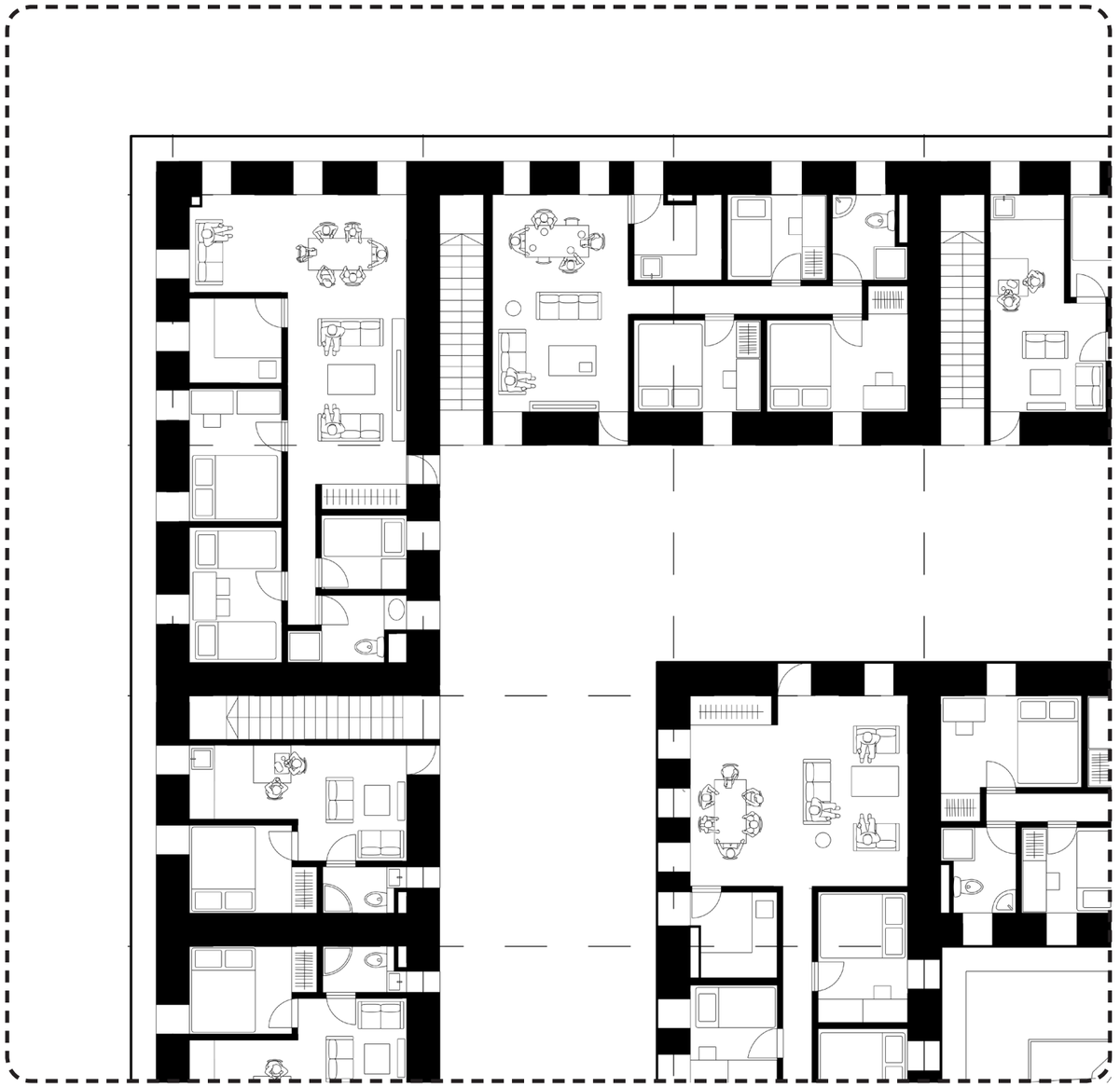
COMPOUND

THE VILLAGE



INTERLOCKING SYSTEM

All units within the compound are interlocking. The system is flexible and allows for personalized adjustments. The drawings show exemplary arrangement of the units - different typologies can be added whenever needed. The arrangement is a suggestion for users, interior design, placement of windows and other elements is up to the desire of the occupants.



VERTICAL CIRCULATION

THE VILLAGE

LEVEL 3

Only single units are located on the top level, All of them have access to the terraces.

LEVEL 2

Distribution of the circulation along private terraces accessible from the units. The location of an extra stair run incorporated into housing unit.

LEVEL 1

The stairs are accessed from the outside (rooftop level of the office/ commercial plinth.

USAGE OF SPACE OVER TIME

THE VILLAGE

ARCHITECTURAL QUALITIES

The architecture of the housing compound is minimal, embracing natural colors and complimenting green hues of the hanging plants. Maintaining aesthetical qualities have been an important aspect of the design process to ensure the residents feel connected and responsible for maintaining the compound.

APPROPRIATION OF SPACES

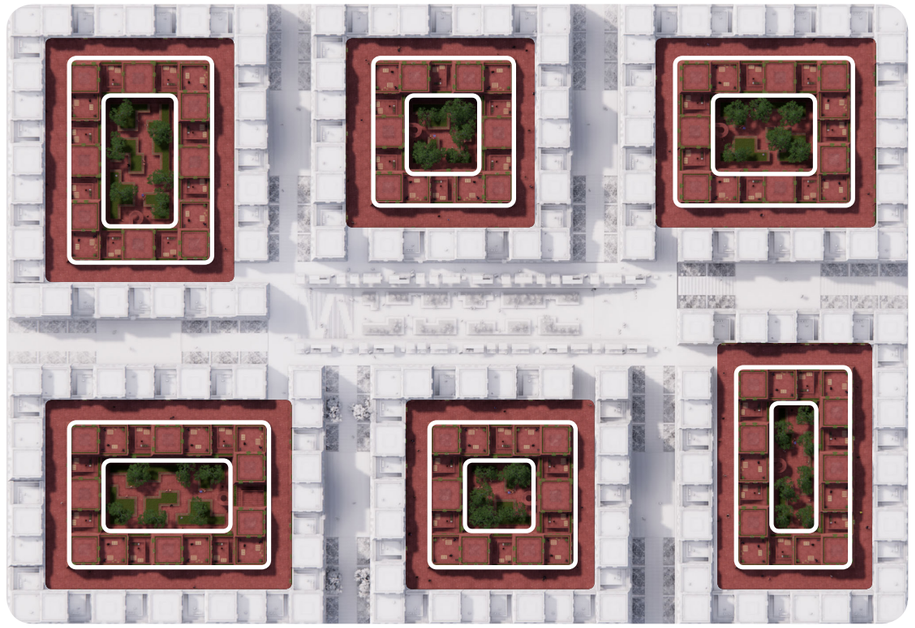
As the in-between spaces have been designed to accommodate everyday life and production of goods, the final look of the design will be determined by the everyday appropriation of space. Over the time, the complex will become a vibrant village reflecting the patterns of everyday life of the inhabitants.

LOCATION OF VILLAGE AMENITIES

FLEXIBILITY

PART OF THE PUBLIC REALM

The 6m grid layout allows for flexibility in the program allowing for modling into different urban conditions. If necessary, some of the housing program can be transformed into amenities. The ones directly connected with the public realm, such as community center, can be located in any of the highlighted units.



PART OF THE ENCLOSURE

Some of the amenities such as nursery and school require more privacy, therefore they require a particular level of surveillance, protection and clear zoning of the space. If more level of privacy is necessary, each of the clusters can be closed off at the entrance gate.

INCREMENTALITY

THE VILLAGE

BASIC UNIT

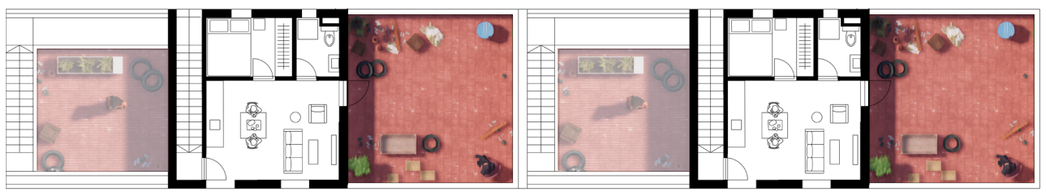
To maximize the open air space, each of the unit above the ground has a direct access to terrace. The owner of the unit has the freedom to expand it in the future, according to his/ hers on-going spatial demands.

SYSTEMATIC EXPANSION

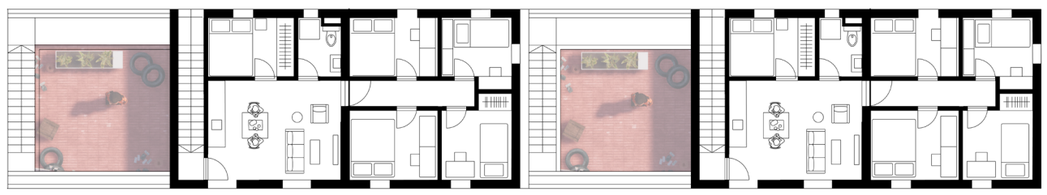
If the household requires expansion of the living space, they can build on top of the terrace using the same technology as the original households to add additional 4 bedrooms.

SELF-MADE EXPANSION

Users are allowed to arrange the expansion themselves with the materials they are able to obtain themselves. After the extension is completed, construction should be professionally inspected.



SINGLE FAMILY UNIT



CO-HABITAT UNIT

CUSTOMIZABILITY

THE VILLAGE

STANDARD UNIT

Diagram depicts standard, basic version of the housing utilizing adobe render as a facade finishing, with matching concrete plinth and planters.

VARIANTS OF HUES

If users would like to make their houses more personal, they can potentially add color to the exterior layer of adobe. The teraccota base of the material will ensure the colors match as an ensamble.

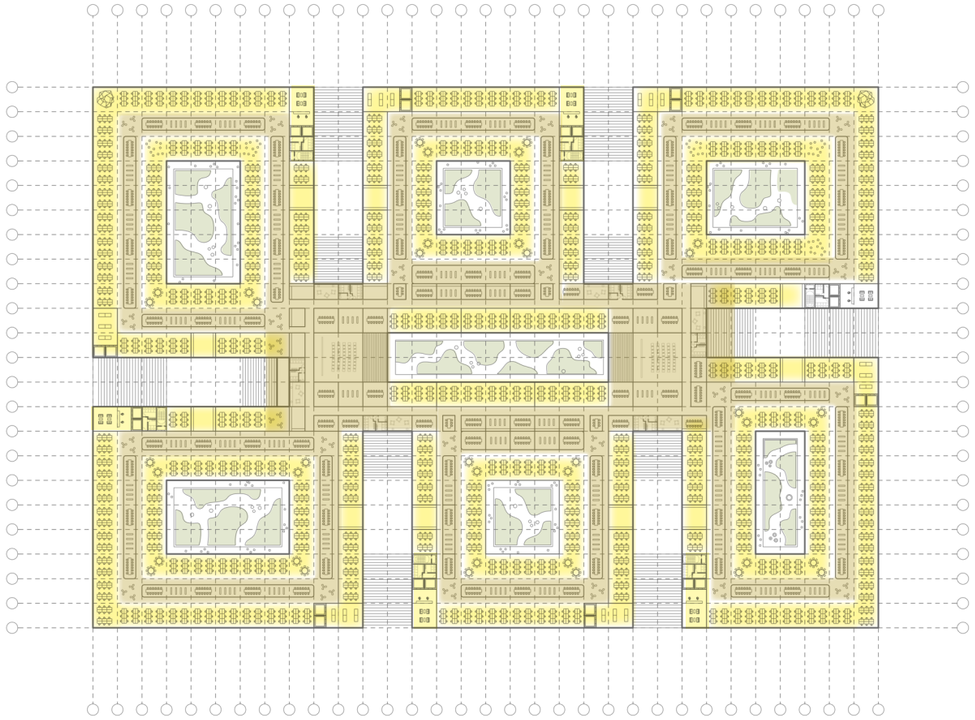
VARIANTS OF TEXTURES

Given the flexibility of the material, it is also possible to add patterns via sculpting or using stencils to the facade. One of the examples of such facade treatment is Addis Ababa's Zoma museum.

08. THE URBAN PLINTH

DAYLIGHT ANALYSIS

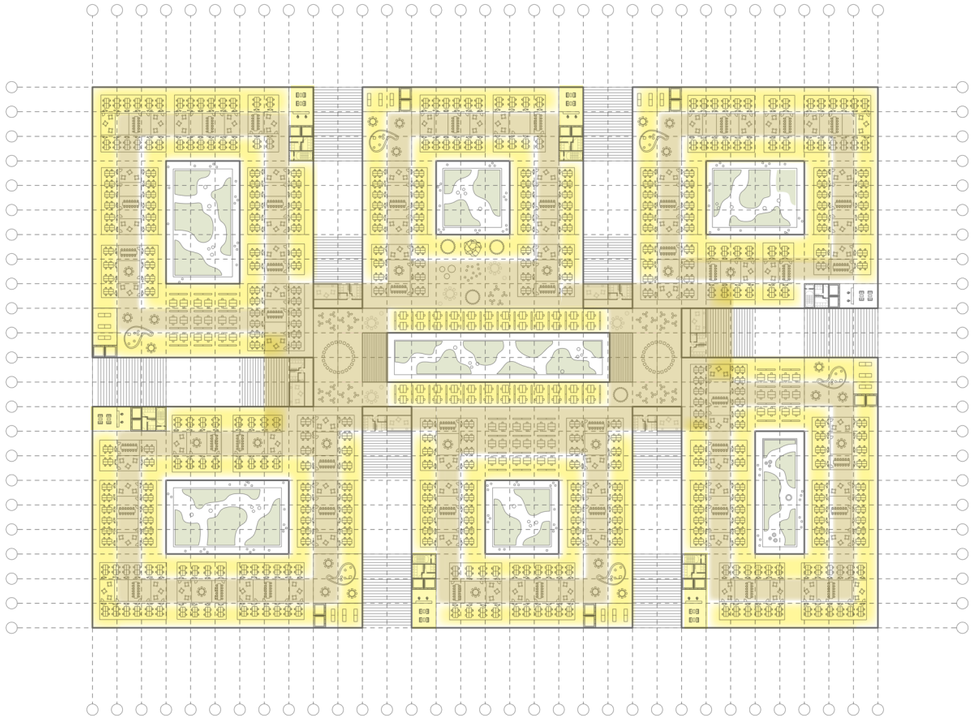
THE URBAN PLINTH



DAYLIGHT ANALYSIS

The office layout in the urban plinth is designed to optimize sunlight access - a 6 m wide stripe is calculated to be directly exposed to natural daylight along the external parameter of the building and from the courtyard side.

DIRECT SUNLIGHT **DIMMED LIGHT**



FLEXIBILITY OF LAYOUT

Thanks to modular grid, the layout is regular and can therefore be filled with specific spaces that are currently required. The only guidance is the exposure to natural light - maintaining accurate access to daylight for specific spaces that need it the most eg. work places.

REFERENCES

THE URBAN PLINTH

MAT TYPOLOGY

Mat typology is defined as a building complex that has access, layout, daylighting and ventilation solved horizontaly for a plan unit that's repeated as often as needed. One of the most known reference project is Free University in Berlin which utilizes courtyards and the horizontal layout to encourage interaction between students and teachers.

COURTYARDS AS MEETING SPACES

The Mat typology buildings are understood as a city in miniature, with open-plan layout, perfectly epitomized for dynamic use. The courtyards are an indispensable part of the system that not only provide access to light and ventilation but also ensure social interaction between the users and contact with nature.

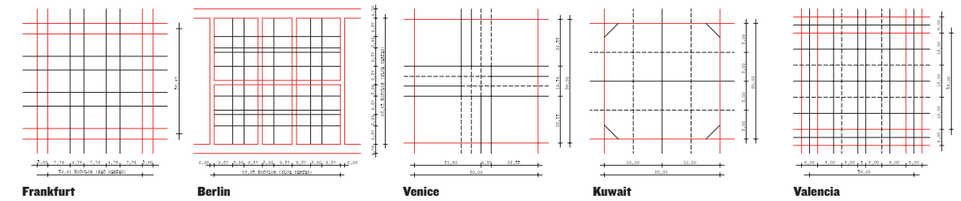
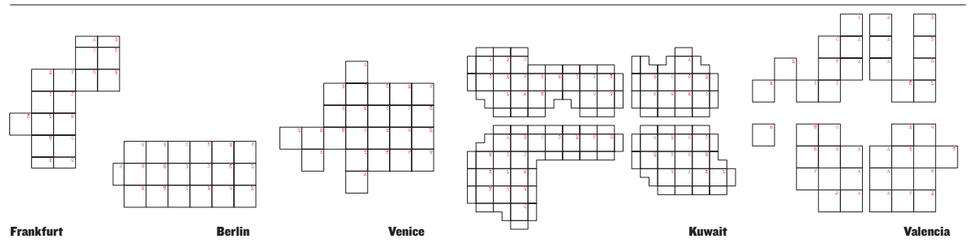


Figure A



FLEXIBILITY OF TYPOLOGY

The original system is built on the grid ranging between 6m and 8m and is fully replicable. The main advantage of the system lays in its modularity allowing for expansion or extraction of elements depending on the size and shape of dedicated plot. The modular system is meant to be multiplied and implement in different parts of the city.

UNIQUE FEATURES

THE URBAN PLINTH

ETHIOPIAN DELIGHTS

Open spaces on the roof can be utilized as areas for market vendors offering goods and services to the people employed in the commercial plinth, offices and the visitors.

COMMON AREAS

Spaces incorporated into the office layout. Those areas enable exchange of ideas, cooperation, can serve as relaxations zones and spaces for socialization. They also have incorporated greenery.

EXCHANGE OF IDEAS

The open plan office layout enables direct contact among employed people, nurturing innovation and creativity. According to the theory of innovation ecosystems, creating an enabling environment for exchange of ideas results in formation of intellectual and social capital.

ACCESS TO NATURE

The complex has incorporated biophilic elements in the courtyards and in the integrated planters. Biophilia has been proven to relieve stress, improve health and increase job satisfaction among the office usesrs.

INTEGRATED AMENITIES

Because a large parking space is included in the basement of the building the efficiency of space use is increased. Cars no longer occupy the space on the streets and large amount of parking spots allow for other people form neighboring buildings to use it as well.

09. URBAN LIVING ROOMS

VERNACULAR WAYS OF LIVING

URBAN LIVING ROOMS

INFORMAL PATHWAYS

Informal pathways are semi private spaces inbetween housing compounds that serve as spaces for interaction, production of good and are background of everyday life.

PRIVATE PATIOS

Private patios are spaces where users feel safe to leave their belongings for longer period of time and use them for production of good. In the complex, the private patios take form of private terraces.

VENDOR STREETS

Vendor streets are inbetween moments in the complex where low income community can sell their goods and offer various services to the office users, fellow inhabitants and visitors .

SOCIAL COURTYARDS

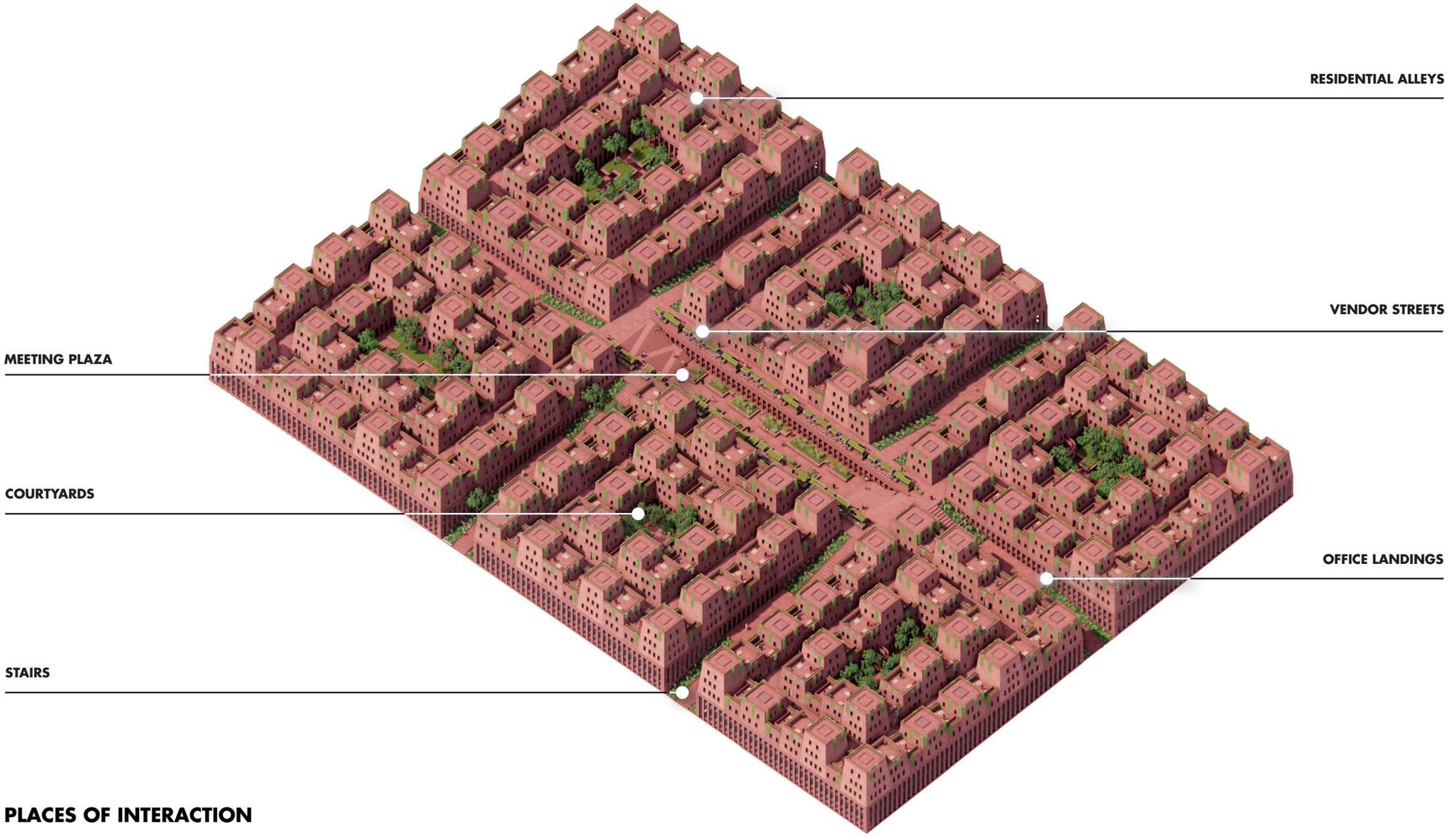
Social courtyards are spaces which encourage social bonding between residents and users of the compound. To ensure inclusivity, the spaces are accessible either through elevators or external ADA ramps.

MERKATO

The complex has two streets of stalls in the center of the complex inviting passers-by and users to exchange goods and interact with each other. The merkato street is visible from the street promoting the complex to wider audience.

PLACES OF INTERACTION

URBAN LIVING ROOMS



PLACES OF INTERACTION

The drawing shows different types of meeting points, places where the two worlds (upper housing units and bottom office spaces) can merge and users can meet and interact with each other.

GOALS

URBAN LIVING ROOMS

BRIDGING TWO WORLD

The project encorporates a set of public and semi public spaces in which different social and income groups and people of different backgrounds can interact and learn bout each other.

PRODUCTION OF GOODS

The project allows for keeping existing patterns of habitation and work which makes it possible to maintain economic activities of inhabitants.

COMMUNITY BONDING

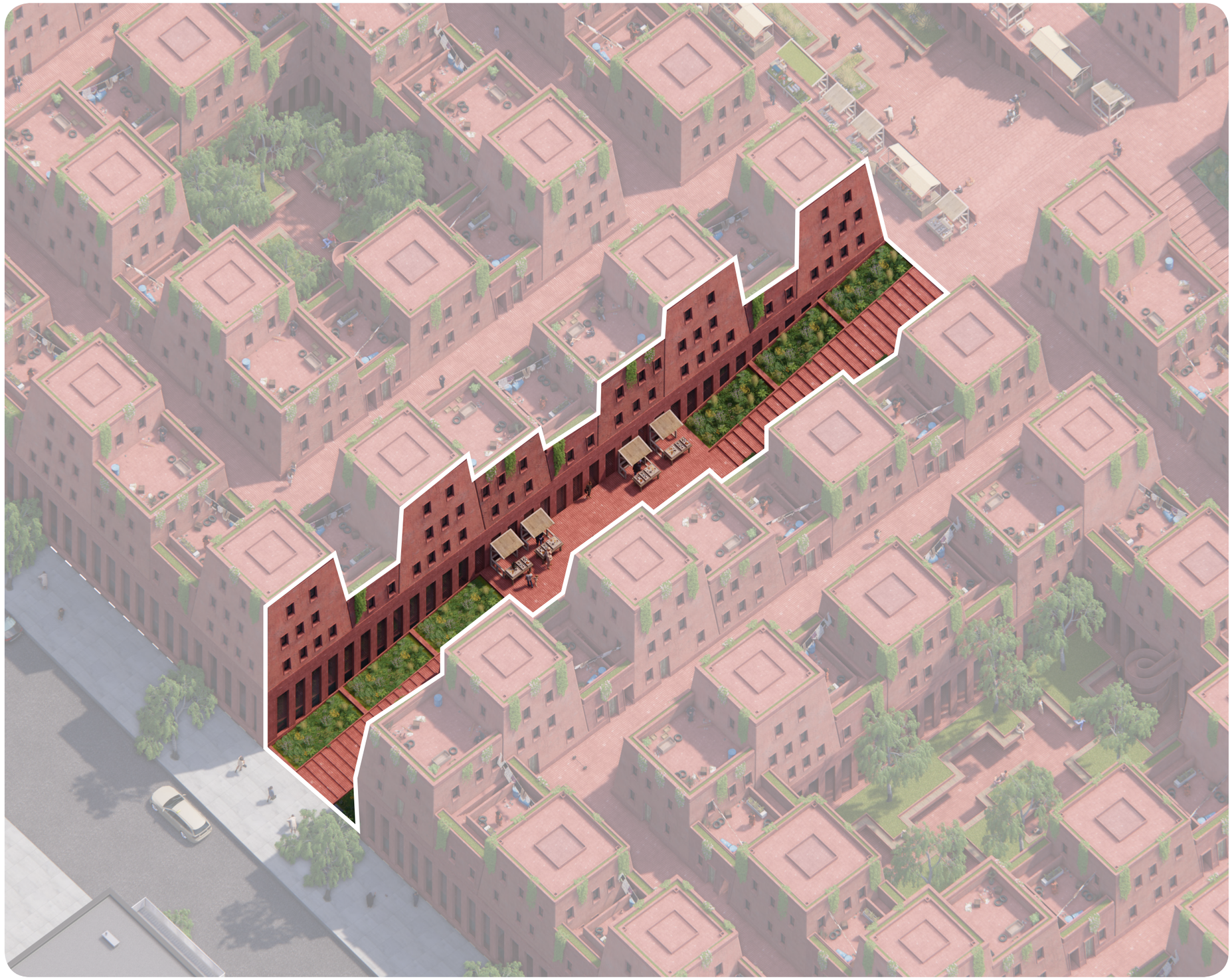
The project has been designed to nurture and encourage social interaction between residents and allow to keep the existing living patterns.

CONTACT WITH NATURE

Large quantities of incorporated greenery improve life and work quality of users.

STAIRS AND LANDINGS

URBAN LIVING ROOMS

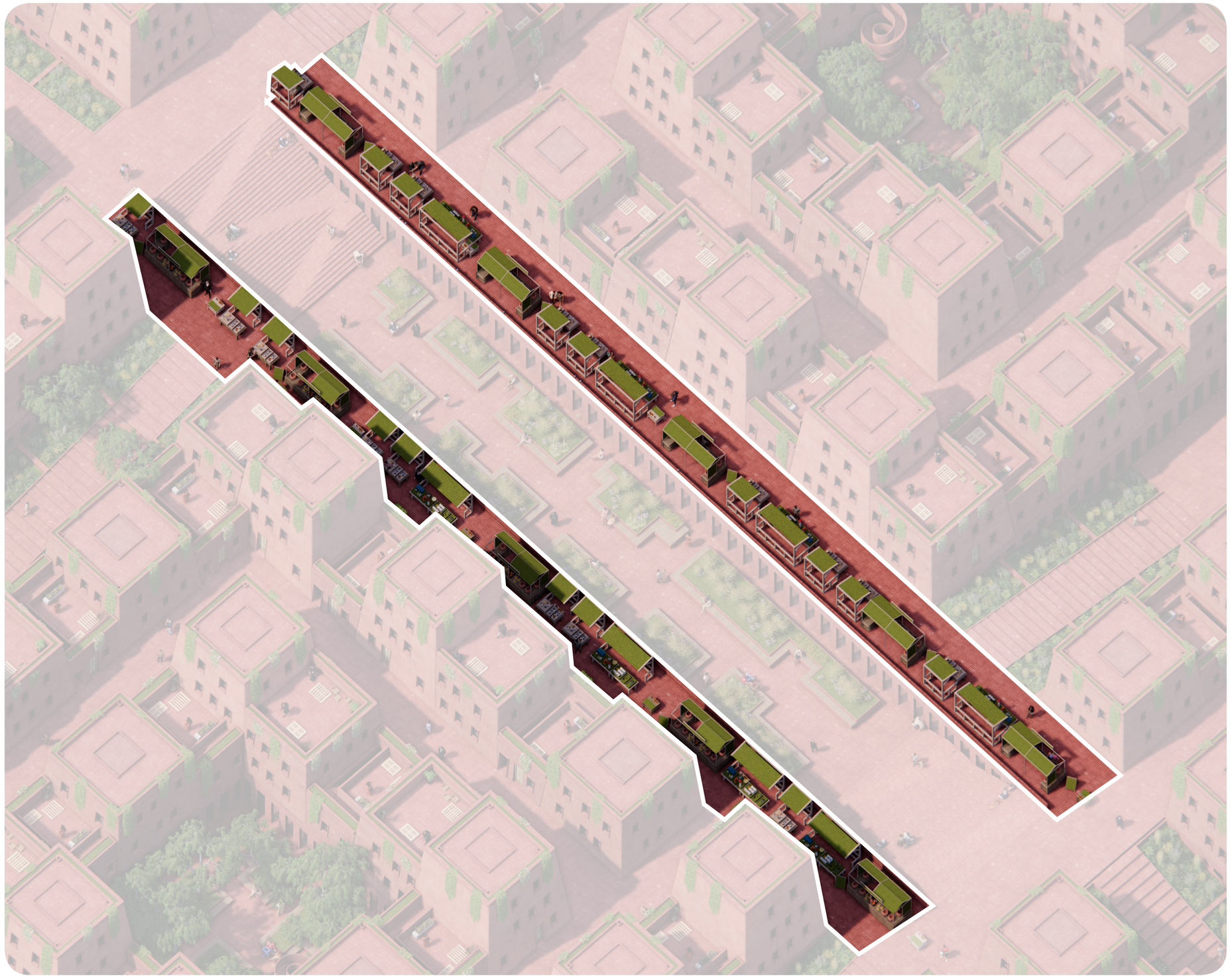


STAIRS AND LANDINGS

One of the most important feature of the complex, bridging two world together and encouraging interaction between different groups of users. Landings are utilized as the main access points to the offices and extra space for street vendors to put their stalls and sell their goods.

VENDOR STREETS

URBAN LIVING ROOMS



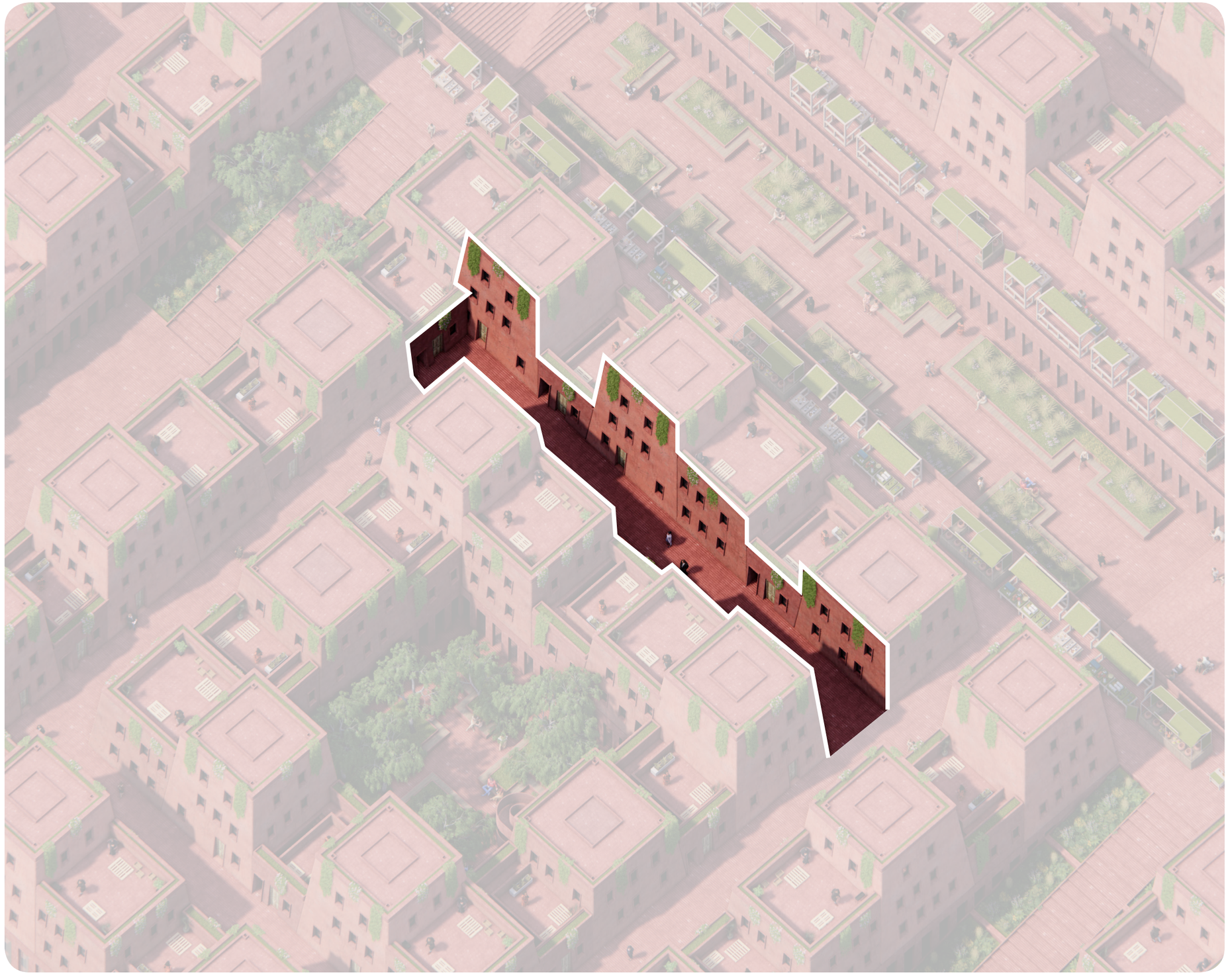
VENDOR STREETS

It's the most open space in the complex, location for selling and trading goods. It can also be used by the whole city, allowing for interactions between different social groups from different parts of the city.

Coca-Cola

INNER STREETS

URBAN LIVING ROOMS



INNER STREETS

Entering the next level towards privacy - spaces leading directly to private houses' entrances. Spaces referencing vernacular ways of living in the previous informal settlement.

PRIVATE TERRACES

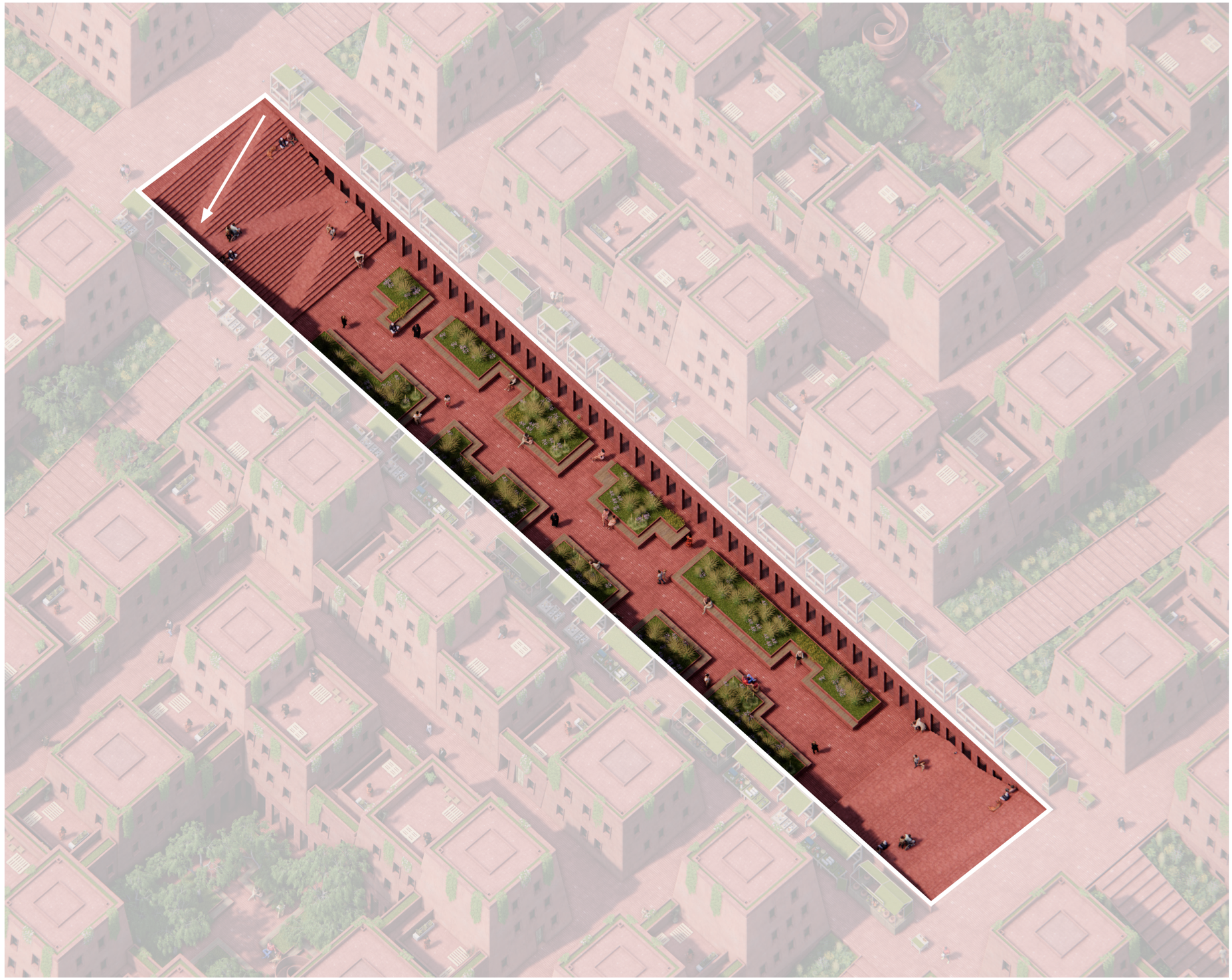
URBAN LIVING ROOMS

TERRACES

Private outdoor spaces, extension of domestic environment. Possibility for the domestic activities to be extended outdoors eg. Cooking, washing, drying clothes etc.

MEETING PLAZA

URBAN LIVING ROOMS



MEETING PLAZA

It's the main courtyard of the whole development, ADA accessible with Piet Oudolf's greenery,
The space is directly accessed form offices and the entire neighborhood. It's also used by people coming to visit Merkato street.

OFFICE COURTARDS

URBAN LIVING ROOMS

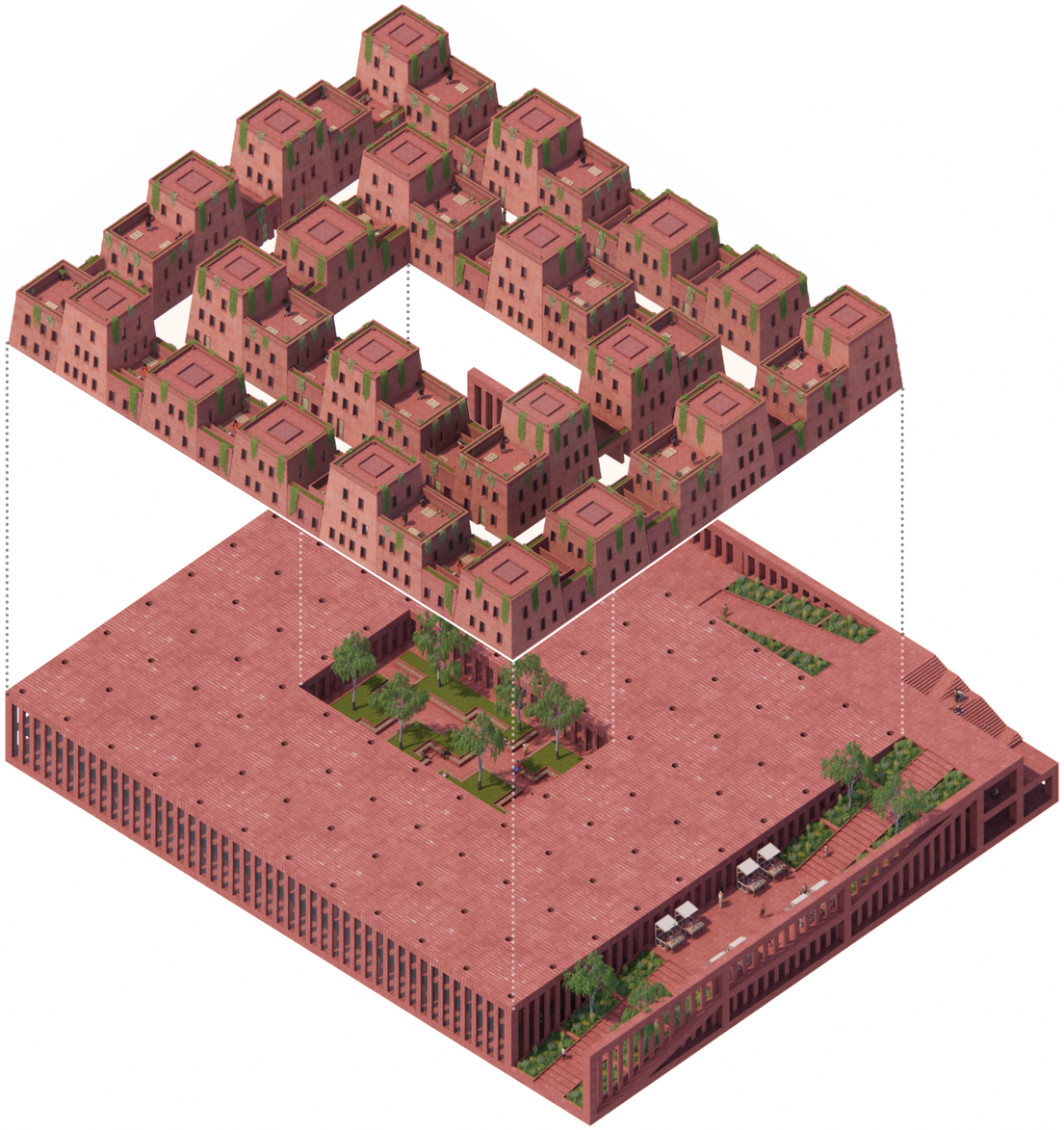
OFFICE COURTYARDS

Important spaces that are designed mainly for office users but are also accessible by community through a spiral staircase, Movable integrated benches and planters allow for pleasant relaxation time. During maintenance those spaces provide access point for the cherry pickers.

10. BUILDING TECHNOLOGY AND CLIMATE

EXPLODED AXONOMETRY

BUILDING TECHNOLOGY



LOW-TECH CONSTRUCTION

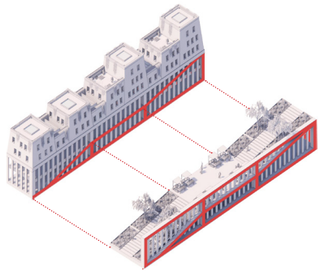
Can be performed by unskilled workers, no expertise is needed. Some supervision is recommender. Opportunity for workers to utilize their newly gained knowledge in different projects - providing future work opportunities.

HI-TECH CONSTRUCTION

Highly controlled process, maintaining high standard and quality. Structure is fully insulated, with finishing according to the on-going needs.

BUILDING TECHNOLOGY STRATEGIES

INNOVATION CAMPUS



HORIZONTAL STABILITY

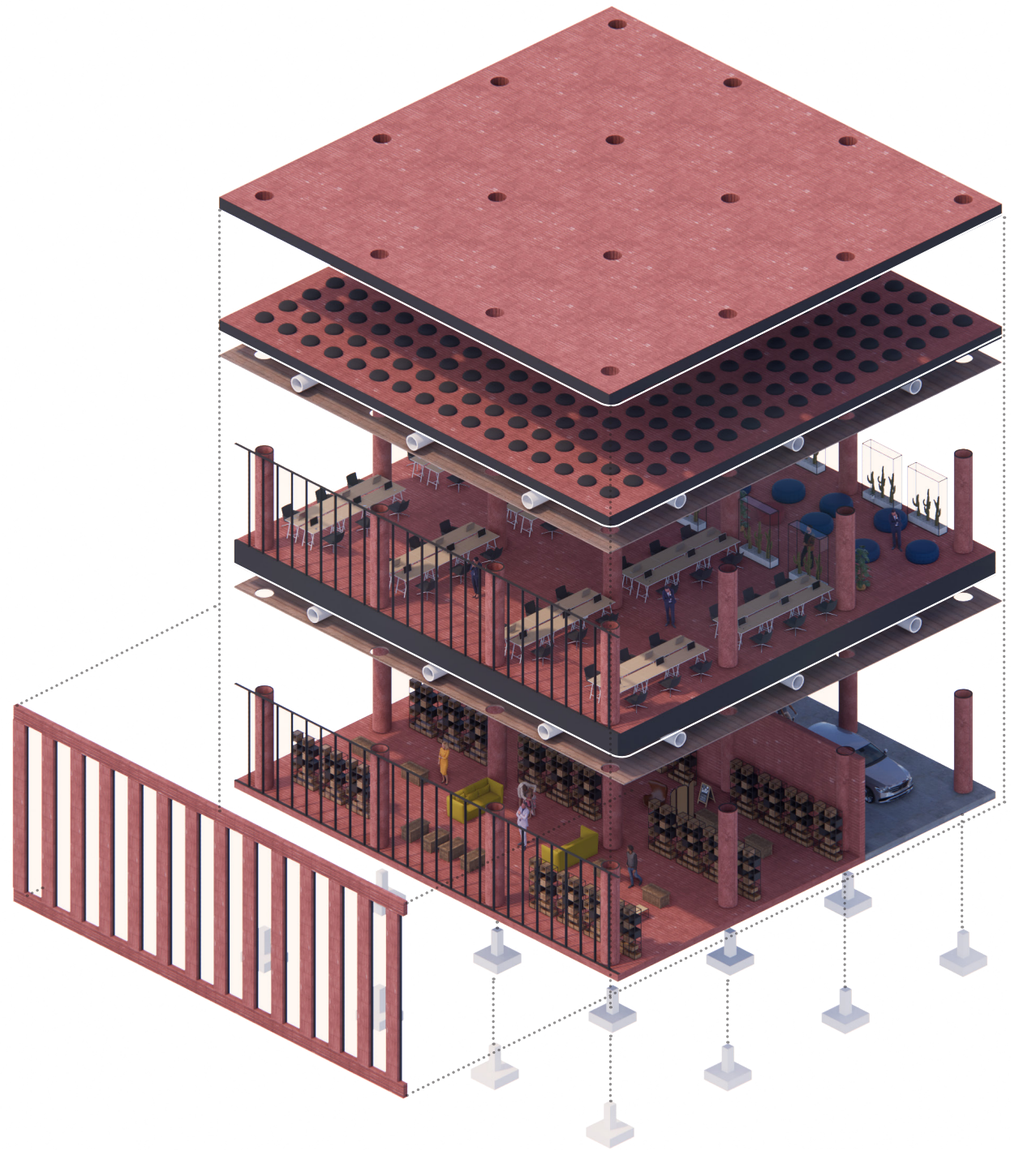
Bracing of each individual compound is located along the stairs acting as a horizontal stabilizer. Each beam is connected diagonally and horizontally with the columns

VOIDED SLAB (COBIAX)

By using the voided slab technology the usage of concrete, transportation and dead load weight of the structure can be reduced by 30 %.

PIGMENTED CONCRETE

Usage of color as a way to unify the project's visual aspects - referencing adobe color, Natural pigments can be utilized to minimize impact on the environment.



BUILDING TECHNOLOGY STRATEGIES

THE VILLAGE

ADOBE TECHNOLOGY

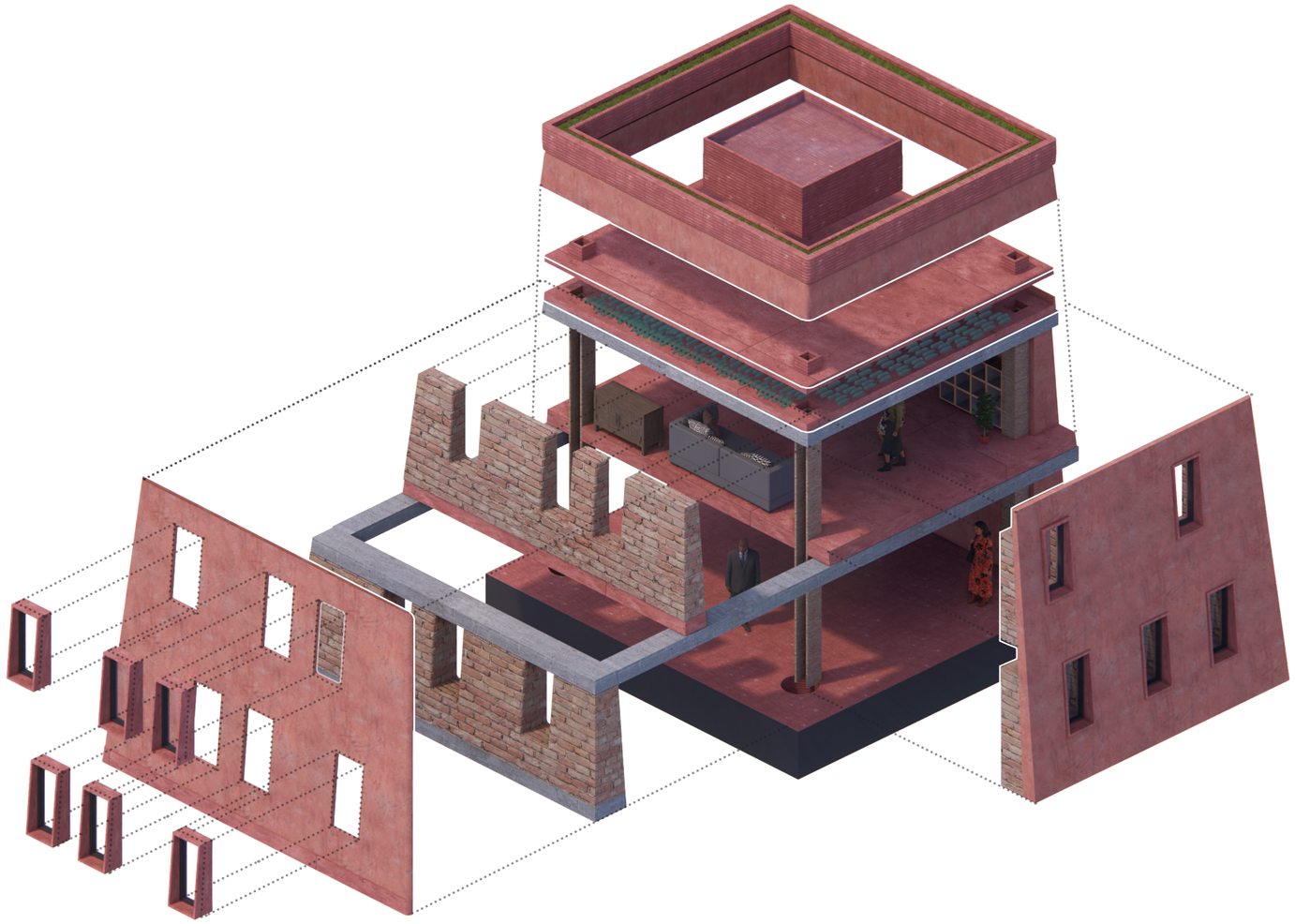
When using adobe the thickness of the wall gets reduced with height. Base has to be 1/10 of the height, hence the resulting shape of the buildings.

PLASTIC BOTTLE VOIDED SLAB

Located in the slabs, referencing Cobiax technology used in the commercial plinth. Bottles used instead of plastic spheres - strategy that reduces the amount of used concrete without sacrificing structural integrity,

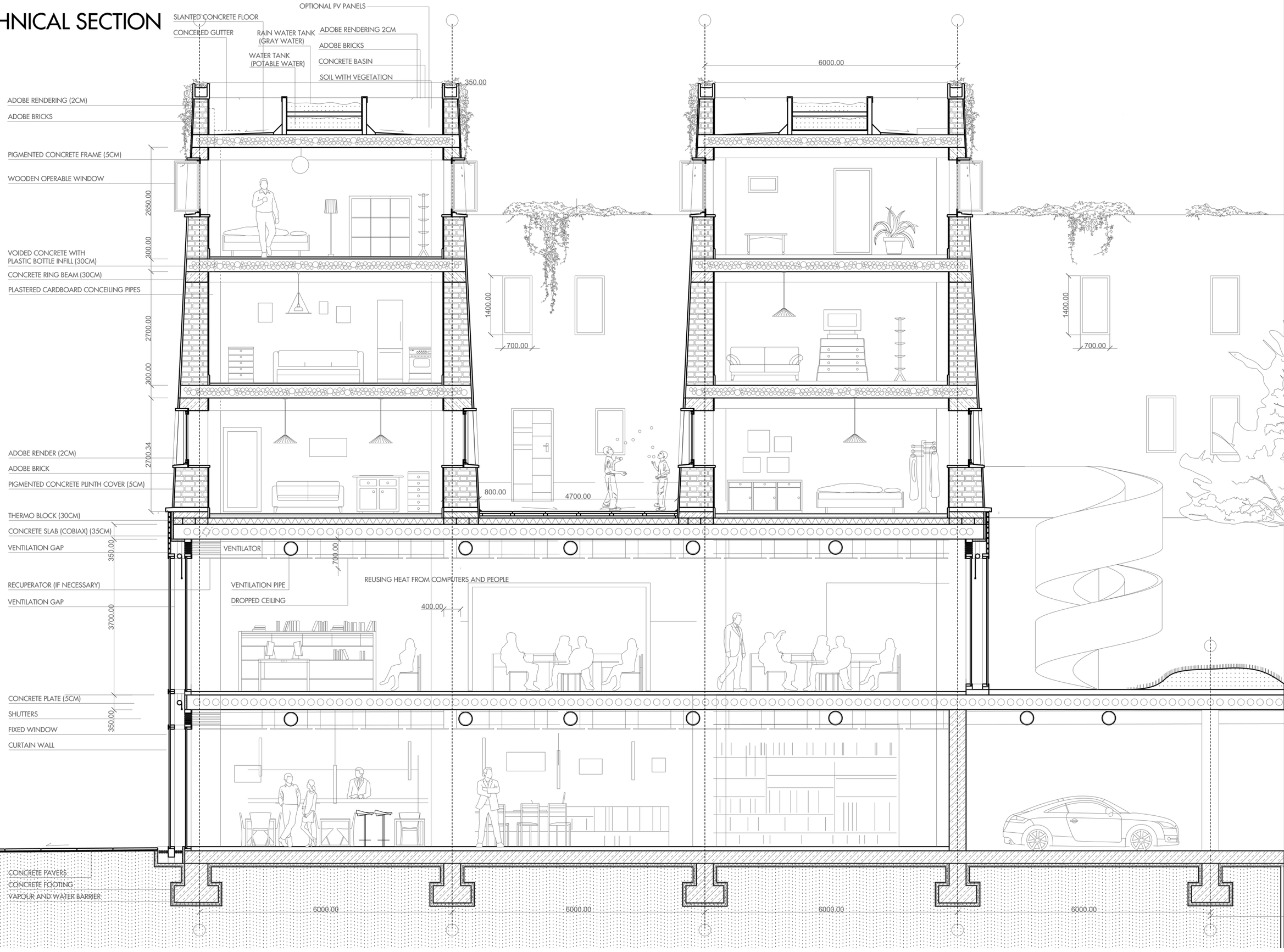
SELF BUILT SYSTEM

Structure can be created by unskilled workers, no expertise is needed. Some supervision is recommender. Opportunity for workers to utilize their newly gained knowledge in different projects - providing future work opportunities.



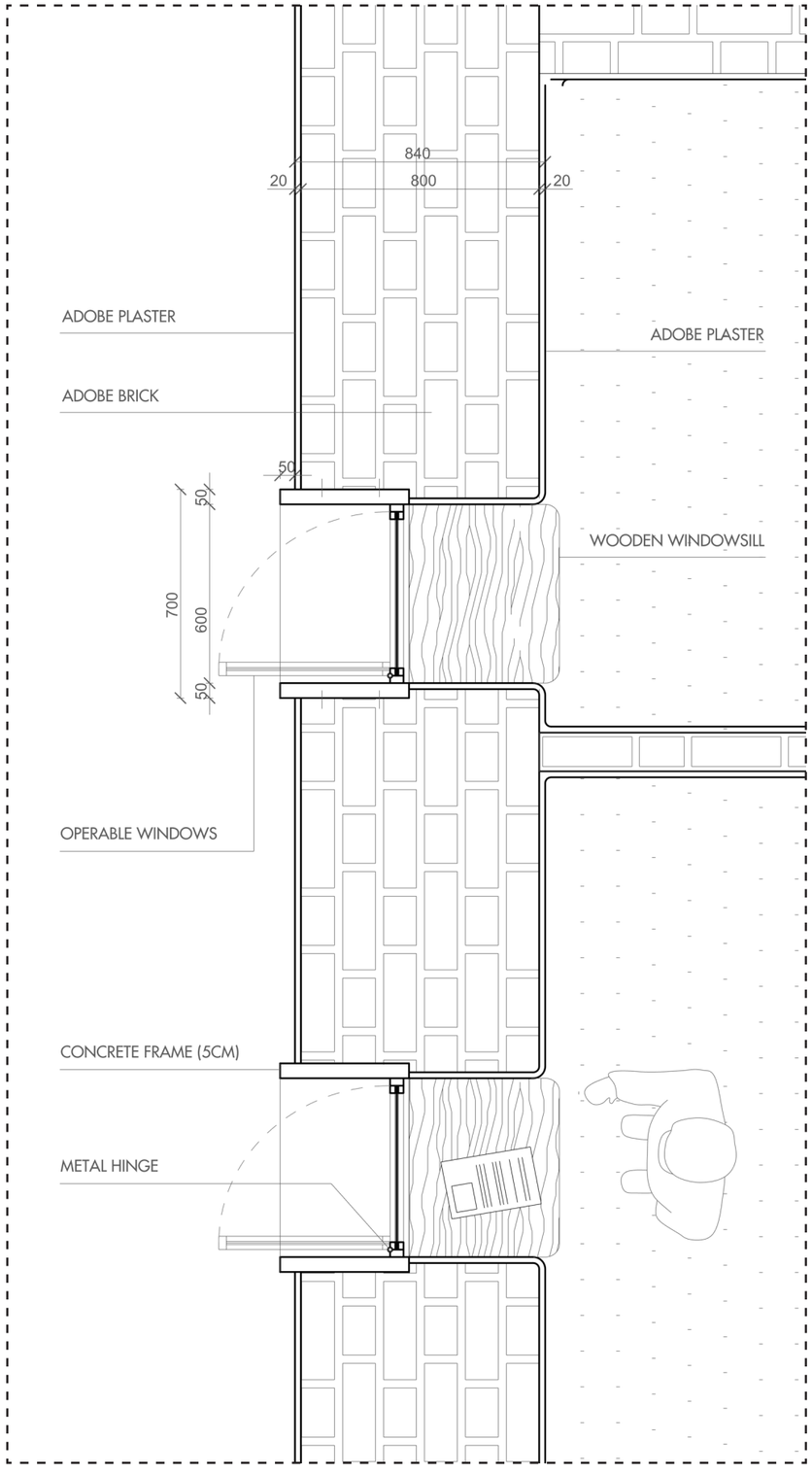
1:20 TECHNICAL SECTION

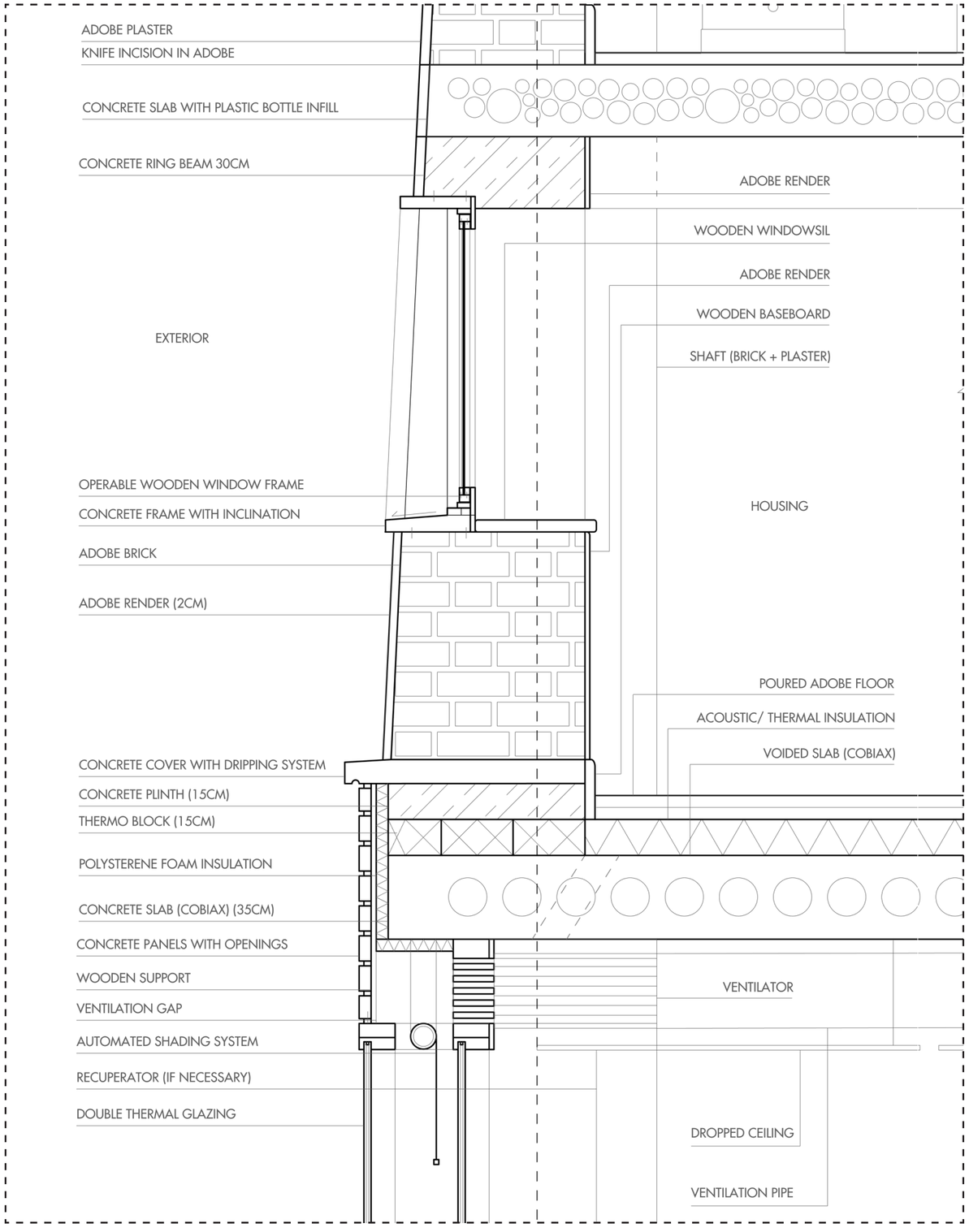
SCALED TO FIT



1:10 DETAILED SECTION

SCALED TO FIT





DETAILED PLAN AND SECTION

Detail shows the connection between low-tech and high-tech elements. A special emphasis is put on the ventilation strategies and protection from weathering.

CLIMATIC STRATEGIES

1 TO 80 SECTION

BIOPHILIA

REDUCING TEMPERATURE AND REGULATING MICRO CLIMATE AND PRECIPITATION

THERMAL MASS

THICK ADOBE BRICK WALLS GAIN HEAT DURING THE DAY AND SLOWLY RELEASE IT IN THE EVENING

CROSS VENTILATION

OPERABLE WINDOWS PROVIDE FRESH AIR CIRCULATION IN THE RESIDENTAIL PART

MECHANICAL VENTILATION

IF NECESSARY THE OFFICE PART IS EQUIPPED WITH VENTILATORS TO SUPPORT THE NATURAL VENTILATION

LIGHT PENETRATION

TALL WINDOWS BRING A LOT OF LIGHT DEEP INTO THE SPACES

BUFFER CAVITY

THE CAVITY BETWEEN TWO SETS OF WINDOWS ALLOWS FOR REGULATING TEMPERATURE BETWEEN SUMMER AND WINTER

FRESH AIR INTAKE

THE DESIGN INTEGRATES FRESH AIR INTAKES TO ALLOW FOR NATURAL VENTILATION TO OCCUR IN THE OFFICE AREA

CHIMNEY STACK EFFECT

VENTILATION SHAFTS USE STACK EFFECT TO EXTRACT STALE AIR FROM KITCHEN / TOILETS AND OFFICES

ACCESS TO SHAFTS

ALL KITCHENS AND TOILETS ARE CONNECTED TO SHAFTS

FLOOR HEATING

AIR DUCTS HIDDEN UNDER THE DROPPED CEILING ALLOW FOR DOUBLE AIR DISTRIBUTION (FRESH AND STALE)

FLOOR HEATING

OPTIONAL WAY TO HEAT THE OFFICES

POTABLE WATER TANK

WATER GETS PUMPED UP TO BE FURTHER USED THROUGHOUT THE WHOLE DEVELOPMENT

GRAY WATER TANK

OPEN TANK PROVIDES AREA FOR THE PRECIPITATION TO BE COLLECTED AND REUSED AS GRAY WATER

REUSING THE HEAT

HUMAN ACTIVITY AND ELECTRONICS ARE ABLE TO NATURALLY INCREASE THE TEMPERATURE

SHADING SYSTEM

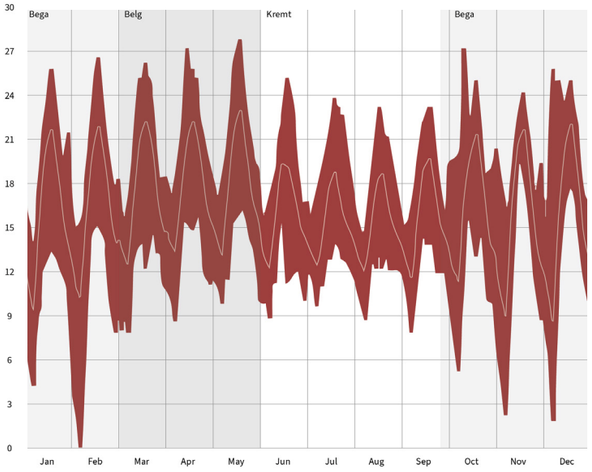
THE GLAZED PARTS OF THE OFFICE HAVE MECHANICAL SHADING SYSTEM MINIMIZING GLARE AND SOLAR GAINS

THERMAL INSULATION

OFFICES ARE FULLY INSULATED TO ALLOW FOR HIGH PERFORMANCE

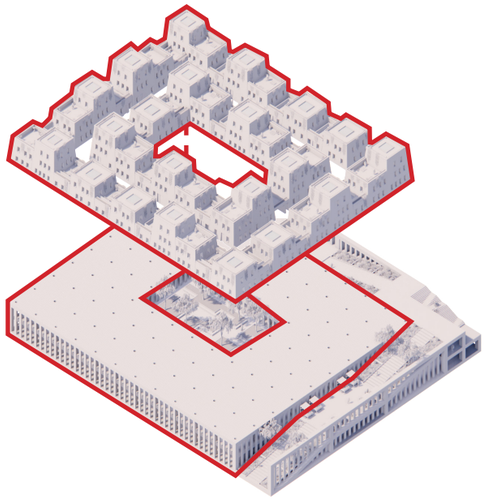
CLIMATIC STRATEGIES

1 TO 80 SECTION



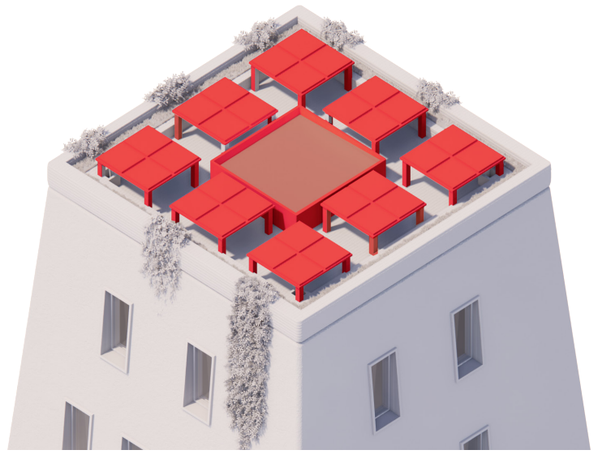
MILD CLIMATE

Addis Ababa has a humid subtropical summer climate that is mild, therefore the requirements for the thermal insulation are reduced bringing the cost of the building and complexity of building technology down. All programs have possibility of utilizing natural ventilation.



TWO STRATEGIES

Two parts of the building use different climatic strategies: First (top housing) uses natural methods of ventilation, the only thermal regulator is the mass of the adobe,
Second (lower offices and commercial plinth) - fully insulated thermally and acoustically. Natural ventilation is integrated in each unit.

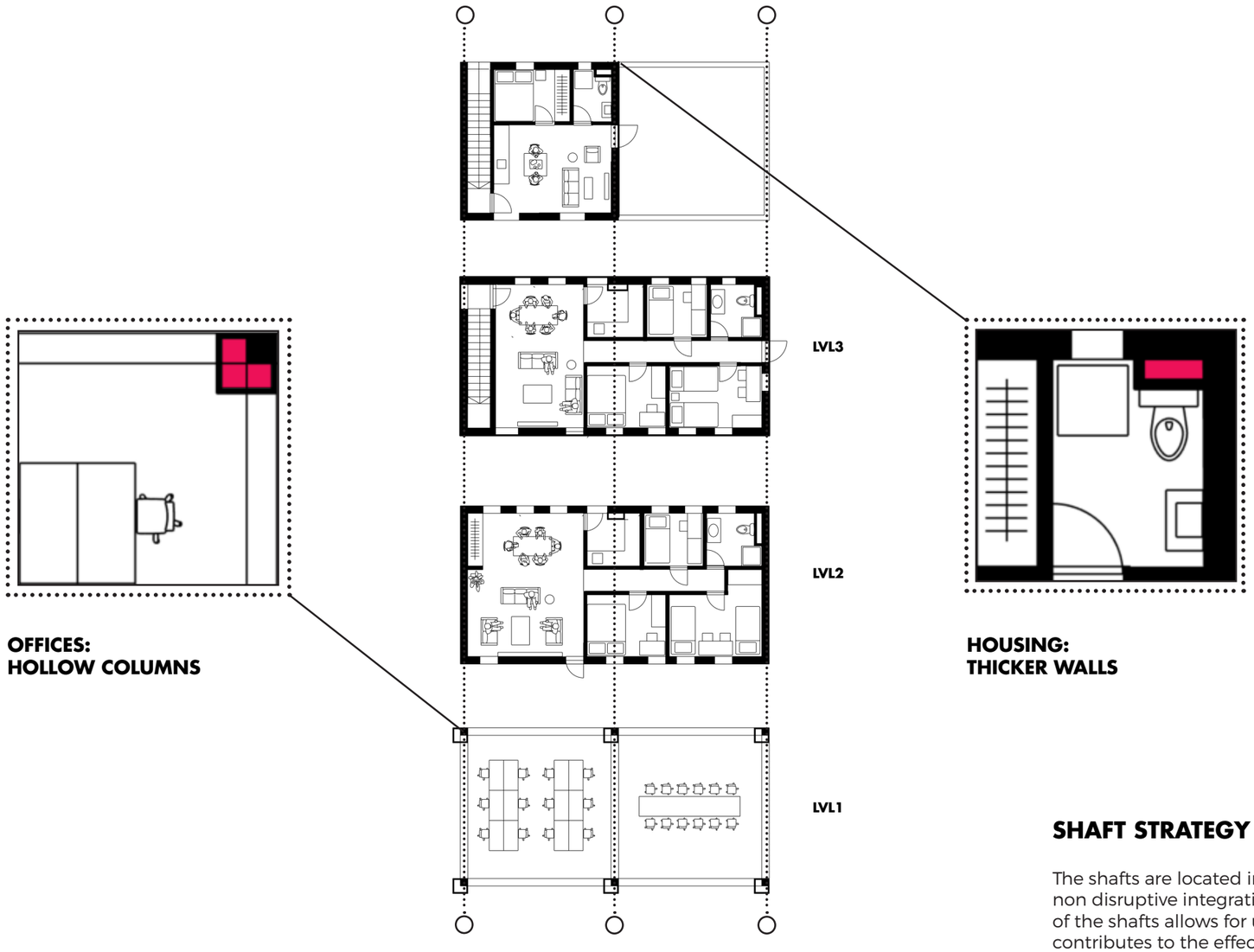


WATER AND ENERGY HARVESTING

The water tanks on top of the roofs are used for collecting and storing the water, which is used in the house for lavatories and irrigation. A filtration system is incorporated in each unit. Optional PV panels that can be used by households or offices,

SHAFT STRATEGY

WATER AND VENTILATION MANAGEMENT



OFFICES:
HOLLOW COLUMNS

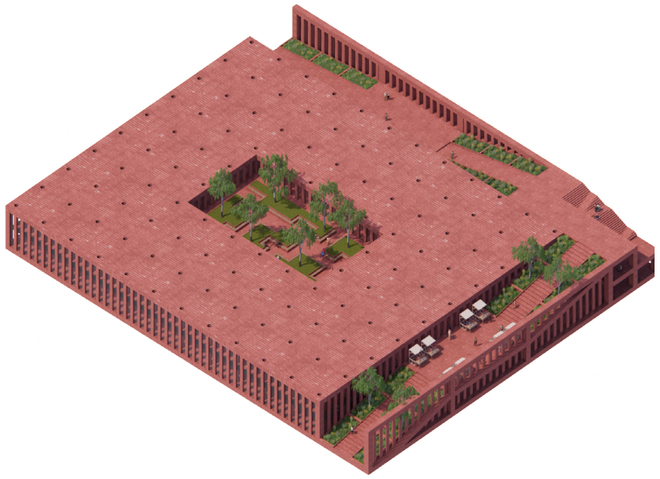
HOUSING:
THICKER WALLS

SHAFT STRATEGY

The shafts are located in the axis of the building, allowing for non disruptive integration of them on both levels. Continuity of the shafts allows for utilizing the chimney effect that contributes to the effect of natural ventilation.

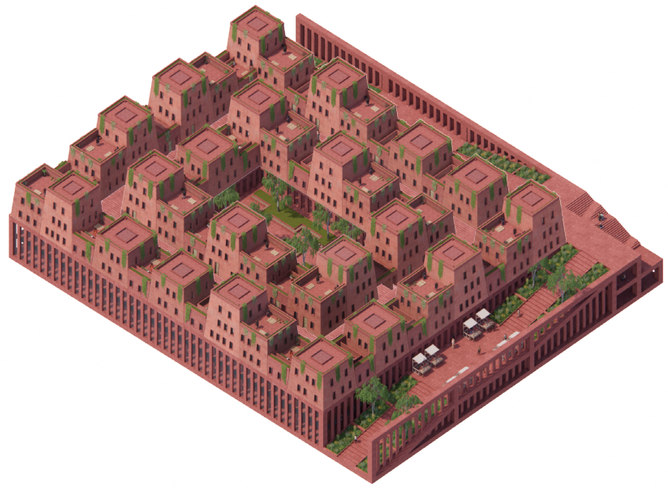
STAGES OF BUILDING

BUILDING TECHNOLOGY



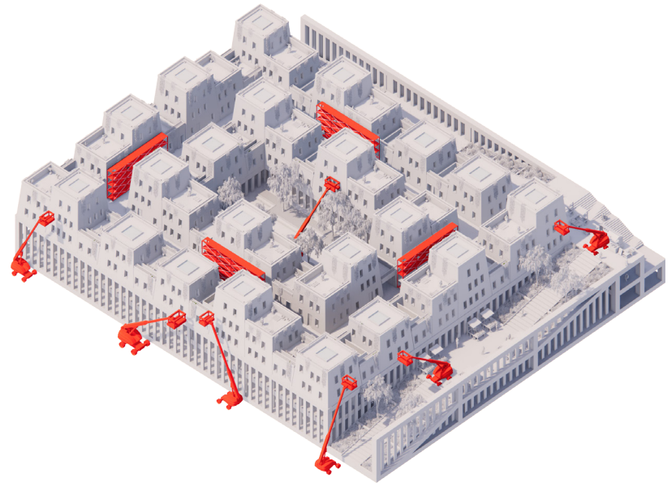
STAGE 1: OFFICES

First to be built are the offices and necessary circulation. The image above reveals first of the compound and reveals the placement of the connections to the necessary housing fixtures for the housing on top.



STAGE 2: HOUSING

After all the adobe bricks have been dried out and tested, local people are invited to participate in the building process. Because of the use of low technology, majority of the work can be performed by non-specialists.

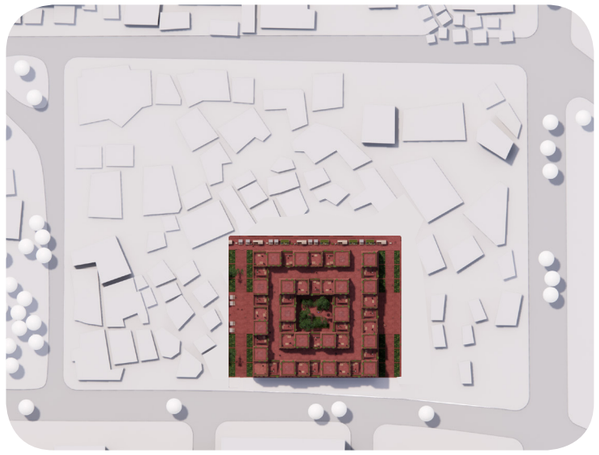


STAGE 3: MAINTENANCE

The system has been envisioned with maintanance in mind. The diagram above reveals the ways the adobe facade would be maintained. The inner facades would have to be maintained with a use of a cherry picker.

PHASING

BUILDING TECHNOLOGY

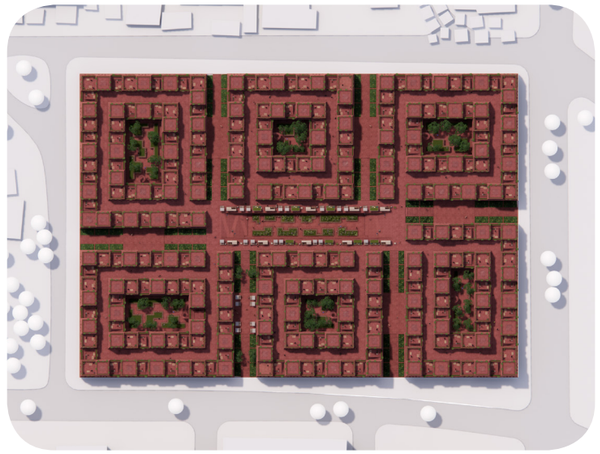


PILOT PROJECT

The project can be built in phases in order to minimize disturbance in lives of the community. The relocated households would be relocated in the nearby car park using containers as temporary shelters.

PHASING

After evaluation of the social and building technology assumptions, the project can proceed to next phases of construction. Each cluster with a set of stairs should be regarded as independent construction regarding fire separation and fire escape routes.



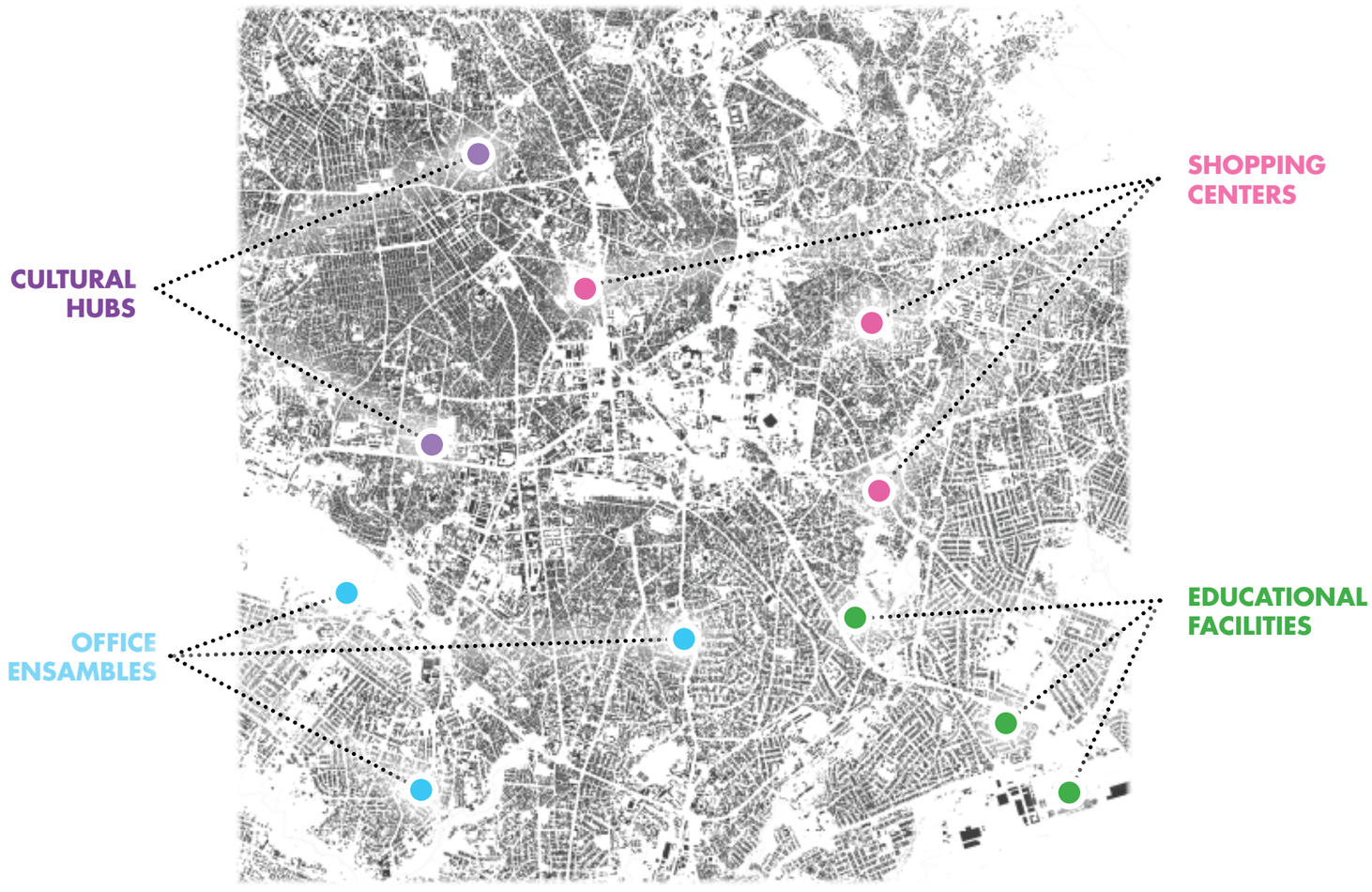
EVALUATION

Once the building is finished, there should be a thorough examination of the technological and social aspects of the project. Any improvements should be discussed with the committee board and if approved, they should be implemented for the future usage.

11. FLEXIBILITY

ACUPUNCTURAL CITY INTERVENTION

NEW URBAN PARADIGM

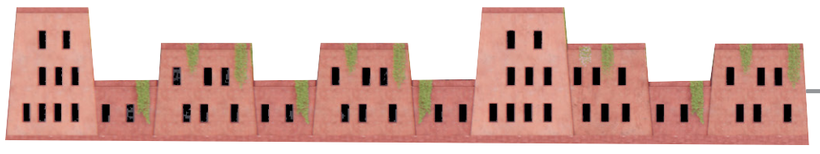


TACKLING DISPLACEMENT AROUND THE CITY

The issue of forced migrations is not only limited to the Business Districts but is present in multiple setups where urban development is currently taking place. Because of its typological flexibility, the design can be adapted to different urban scenarios, allowing to combat the issue of Development Induced Displacement in different part of the city with different desired program at the base of the development.

INCLUSIVE CITY DEVELOPMENT MODEL

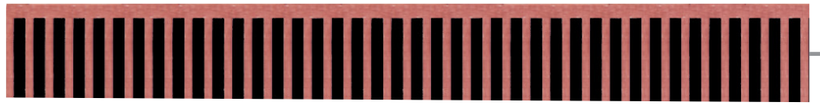
NEW URBAN PARADIGM



EMPOWERMENT OF URBAN POOR

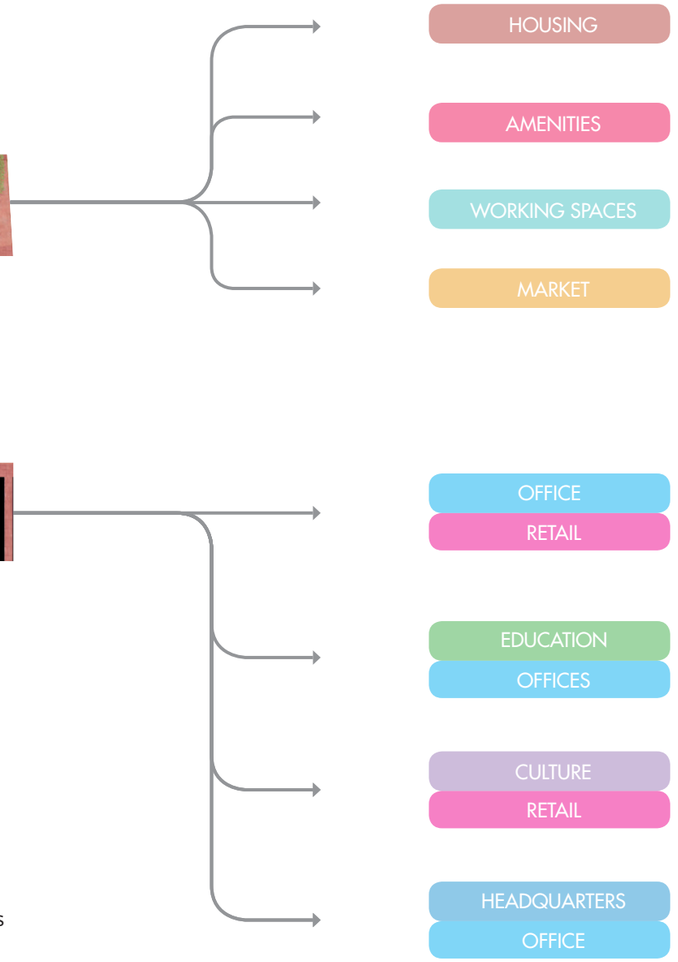
HOUSING/ PRODUCTION OF GOODS/ PLACES OF INTERACTION/ COMMUNAL AMENITIES/ MARKETS

+



SUSTAINABLE CITY DEVELOPMENT

OFFICE ENSAMBLES/ SHOPPING CENTERS/ CULTURAL HUBS/ EDUCATIONAL FACILITIES/ HEADQUARTERS



NEW CITY DEVELOPMENT MODEL

The flexibility of the grid allows for responding to different needs of the city. Both village and urban plinth parts of the building can be modified according to the needs of the users. The 6m span grid ensures longevity of the building as the open plan solutions are easy to change during buildings lifetime.

REPLICABILITY OF THE SCHEME ON DIFFERENT SITES

The design was made in a way that allows for its implementation in various locations around the chosen site. The mat typology used in the project is very flexible, however incorporating a housing function on top of the roof requires consideration of daylight and acccessibility. The diagram above reveals potential ways of solving the courtyards on various plots.

11. MAINTENANCE

OVERVIEW

MAINTANANCE STRATEGIES

UNDERSTANDING THE ISSUES

Adobe buildings share common problems of maintenance and deterioration. However, if constructed and maintaned properly they can withstand the passing of time for hundrets of years.

UNDERSTANDING ADOBE

Adobe bricks are rectangular blocks of adobe small enough to air dry and be manufactured easily. Adobe bricks are made of earth mixed with water and organic material such as dung or straw.

PROTECTION STRATEGIES

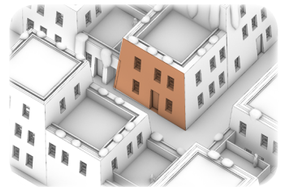
Protection strategies are important to foresee in advance. The technology has to be understood by construction workers as adobe buildings share common problems of maintenance and deterioration.

INVOLVED PARTIES

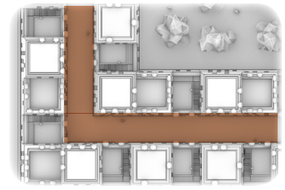
Integral part of the design was to create a framework for maintenance including scheduling, division of work and feasibility of heavy duty equipment usage.

REPAIRS

As adobe buildings share common problems of maintenance and deterioration it was necessary to create a know-how guidelines for future maintenance.



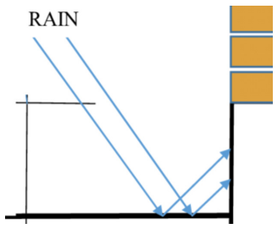
AS OCCURS
REPAIRS



WEEKLY MAINTENANCE
RESIDENTIAL AREAS

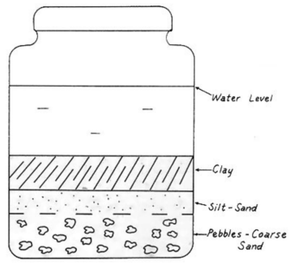
WATERPROOFING OUTER LAYER

As adobe is not waterproof by default it is necessary to make sure that it is well protected against damage caused by rain. One of the ways to prevent water absorption is outer surface treatment



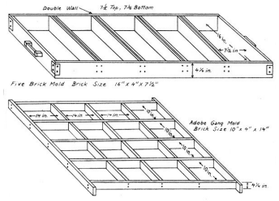
STRENGTHENING VULNERABLE POINTS

The best way to prevent water damage is reinforcing most vulnerable points (plinth and the horizontal surfaces). The design has them both incorporated by usage of concrete plinth and planters.



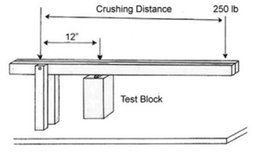
TESTING THE SOIL

One can perform a fairly accurate soil test by filling a jar with 1/3 earth and 2/3 water together and shaking it well. After several minutes the soil will start layering up revealing the mix. The diagram depicts the ideal ratio between substances and can be used as a guideline.



REUSABLE FRAMEWORK

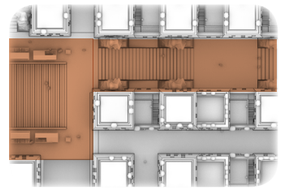
The mold designs for making adobe bricks is simple and can be made using any available material (the simplest ones are usually made of wood). The diagram depicts two possible mold designs. The form can be reused multiple times.



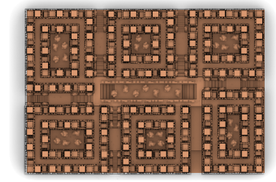
With this apparatus you can conduct a simple compression test.

TESTING THE STRENGTH

Adobe is well known to have good compressive strength, which strength value varies and depends on multiple factors. With this low- tech apparatus one can conduct a simple compression to test the batches of the adobe blocks before using them on site.



EVERYDAY MAINTENANCE
PUBLIC AREAS



BI YEARLY MAINTENANCE
RESIDENTIAL AREAS

12. STAKEHOLDER ANALYSIS

OVERVIEW

STAKEHOLDER ANALYSIS

FINANCING

Since the conducted research was focused on economic viability, the stakeholder analysis and understanding finance models was a vital part of the design strategy.

The diagram on the left reveals potential sources of funding and how the cost recovery could take place. The cost of the housing should be subsidized by both the 'commercial plinth' users and government so that as many households can benefit from the program as possible.

Each cluster is responsible for their own decisions, public zones are managed over democratic agreements.

DEFINITIONS

FEDERAL HOUSING CORPORATION

The FHC grants the leases for the plots and is responsible for obtaining loans from the Commercial Bank and together with Development Committed will manage the development of the project.

DEVELOPMENT COMMITEE

Development Committee manages the project and is a mediator between the different stakeholder groups. the committee is responsible for managing finances, approaching donors, managing leases of future office and residential tenants. It also organizes public masonry courses

INVOLVEMENT OF SPONSORS

Support for innovation development in Africa is a key development objective for the most significant donor countries (the USA, the United Kingdom and Germany) and international organizations (UNECA, UNICEF, The World Bank, EU). T

USER BOARD

Members of the Board represent residential and office users during discussions with the Development Committee. It is responsible for running every day errands and managing maintenance of the build-

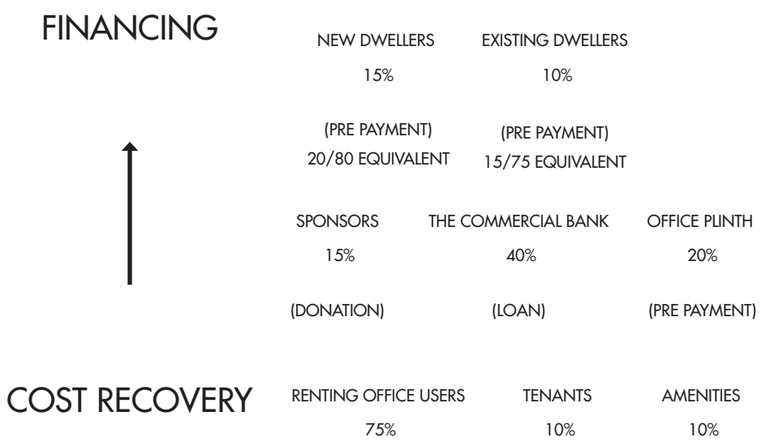
CURRENT TENANT

Current plot tenants get reimbursment for eviction and loss of houses and get priority in the choice of houses and clusters. the cost of the houses for the poorest gets partially subsidized by the development

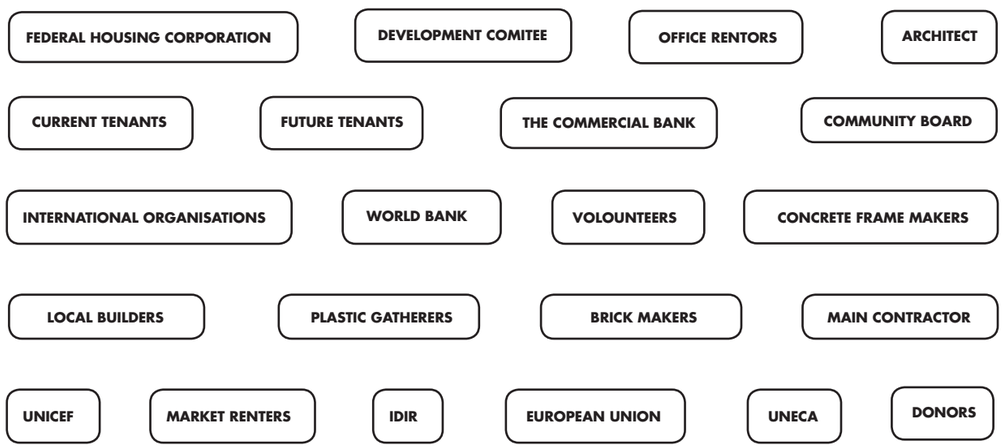
RECOVERY COST SCHEMES

The rent gained from new tenants with medium income will be part of the recovery cost scheme. Development comitee should colaborate with idir and tenants to assess the available contribution.

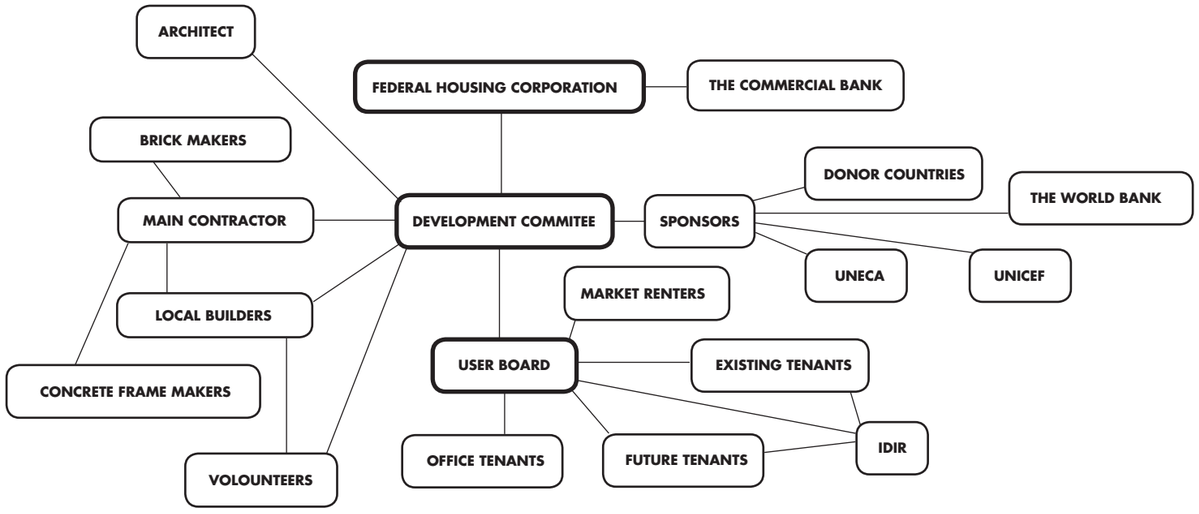
FINANCING MODEL



ACTORS



MAP OF INTERACTIONS



AREA OVERVIEW

PLOT AREA: 30350 M²

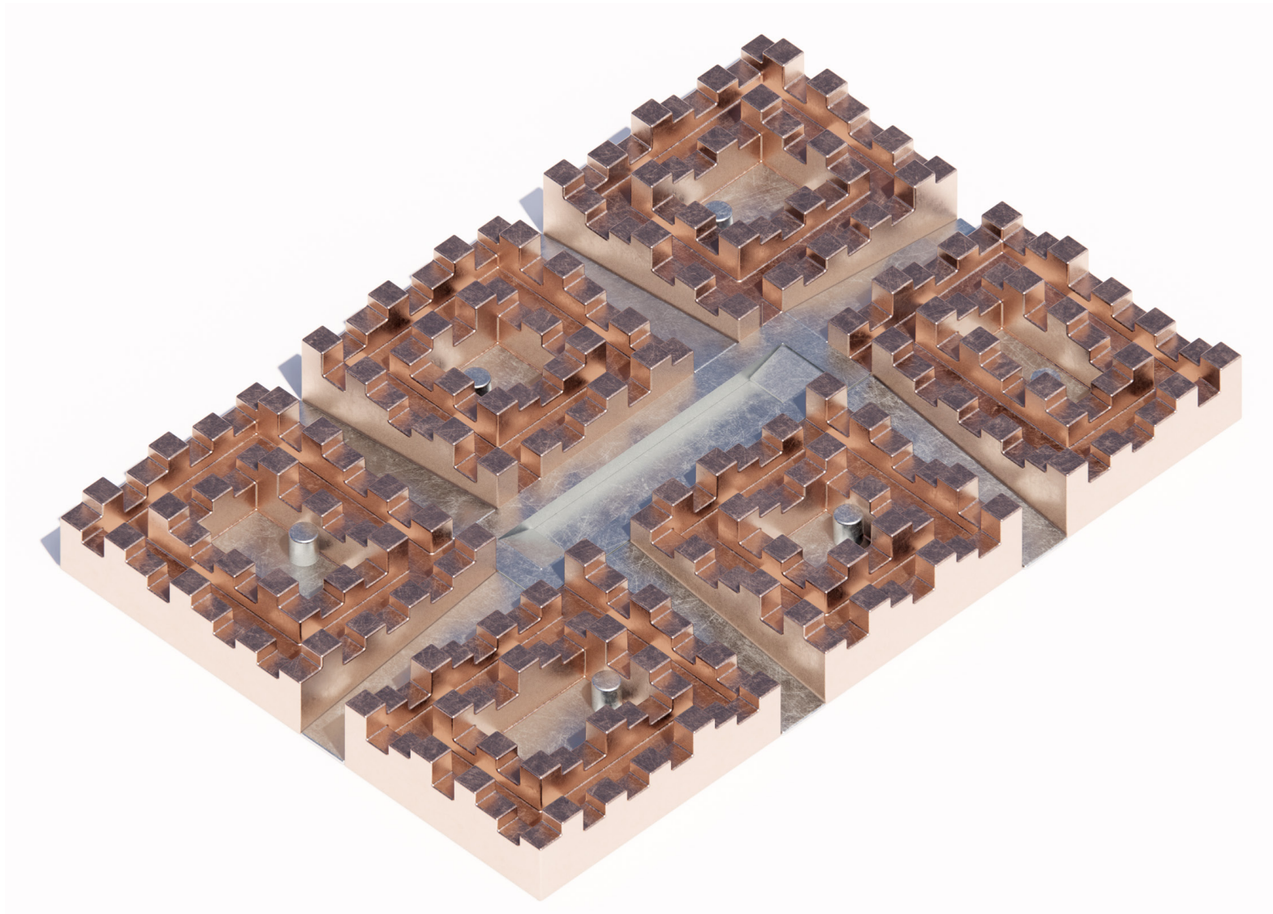
AMENITIES: 8800 M²
PARKING: 15000M²
OFFICE AREA: 18200 M²
RESIDENTIAL AREA: 28980 M²
TOTAL GFA: 70980M²

FSI: 2.33 (MIN)
GSI: 0.83

NUMBER OF UNITS : 383 + 73
INITIAL NUMBER OF UNITS : ~140

DENSITY: 114 DWELLINGS/HECTAR (MIN)
INITIAL DENSITY: 45 DWELLINGS/HECTAR

THANK YOU!



DEVELOPMENT INDUCED EMPOWERMENT: ROOF VILLAGES OF ADDIS ABABA

CITY DEVELOPMENT STRATEGIES IMPROVING ECONOMY AND EMPOWERING URBAN POOR

BARTOSZ KOBYLAKIEWICZ (4917510)