

DEVELOPMENT INDUCED EMPOWERMENT: THE ROOF VILLAGES OF ADDIS ABABA



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INTRODUCTION

OVERVIEW



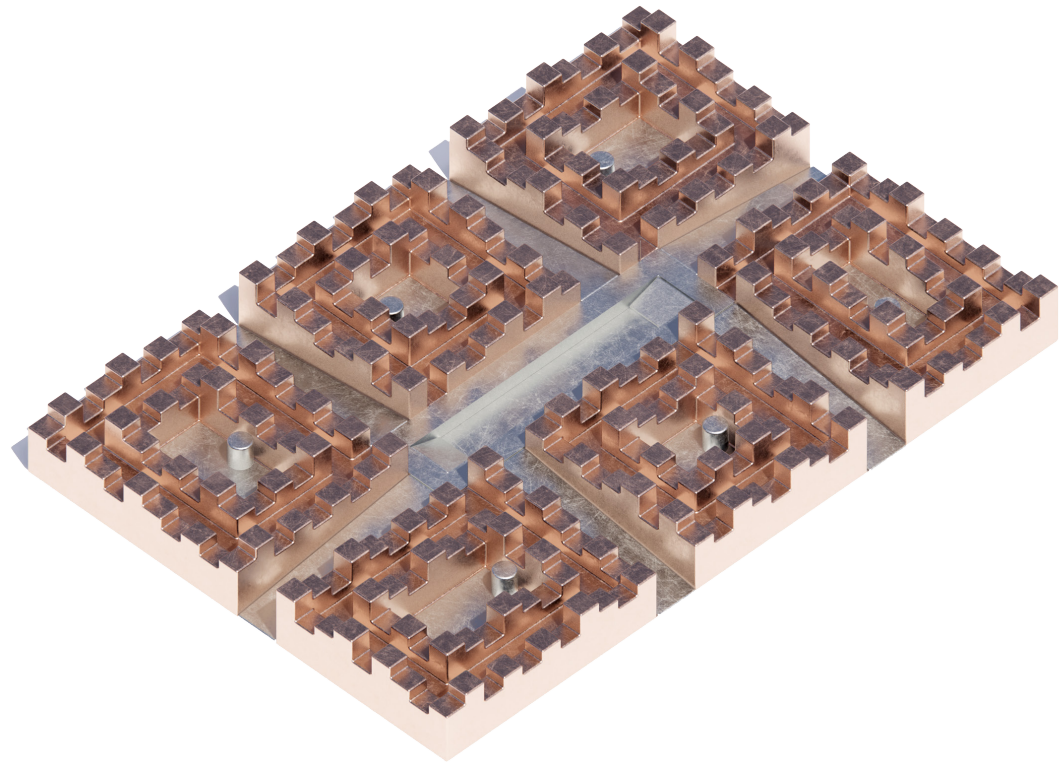
INTRODUCTION

The following design hypothesis addresses spatial dilemma between city development and lack of tenure security dwellers with a special emphasis on improving the economy of both of the individual households as well as creating an optimal condition for nurturing innovation in the city.

The goal of the research and the main goal for design was to create a precedent of framework for policy makers that hopefully proves that resettlement of the dwellers is avoidable and maintaining the bond with the centre is crucial for the livelihood of the slum dwellers.

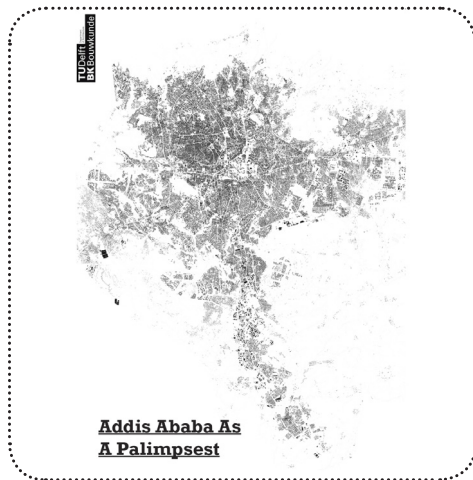
The main challenge was to spatially combine both functions keeping in mind the inherent differences between them and exploring all the social implications, challenges and opportunities of the resulting mix. Important for the project was maintaining current income generating activities (especially the close relation to the ground) and maintaining the social bonds between the slum dwellers.

The area of intervention is located the Kazanchis area around United Nations Economic Commission of Africa, which in recent years has gone through urban development strategies which already resettling 730 household outside the city centre to make space for expensive multi-story offices and mixed building. Because of its prime location and direct proximity to informal settlements, further development is predicted to ensue.



OVERVIEW

RESEARCH SUMMARY



RESEARCH PROCESS

Over the course of graduation period the studio have compiled a booklet containing qualitative and quantitative data on Ethiopia and Addis Ababa using online resources and work of the tutors and students from previous year. The following excerpts of research showcase the data related to the project.



URBAN POVERTY

Almost half of the population lives beyond poverty line. Ethiopia is one of the poorest countries in the world. The problem is that while development projects bring benefits to the economy, the poorest part of the society continues to be overlooked.



INFORMAL SECTOR

Most of the urban population works in the informal sector utilizing households and slum areas as spaces for work or trade. The domestic environment gains an added functional layer of income generation.



INFORMAL SETTLEMENTS

Physical and spatial manifestation of poverty can be seen through proliferation of low quality informal settlements around the city. Self-appointed structures dominate the city center landscape.



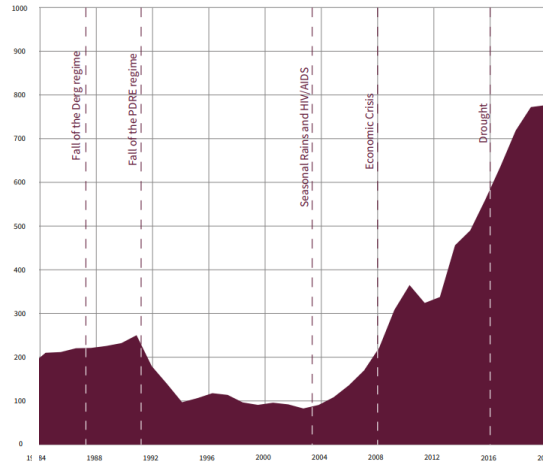
LIVING CONDITIONS

Slum population has to deal with the shortage of the most basic facilities like plumbing or clean water. Living in such conditions leads to direct endangerment of health and life of the most vulnerable.



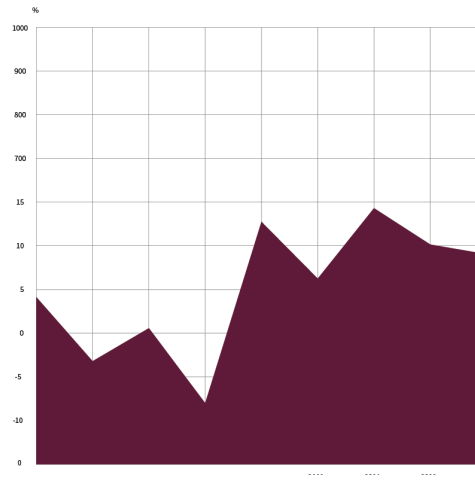
SLUMS AS SOURCE OF INCOME

As most of income of the slum community is informal and self generated the domestic environment becomes a source of income itself.



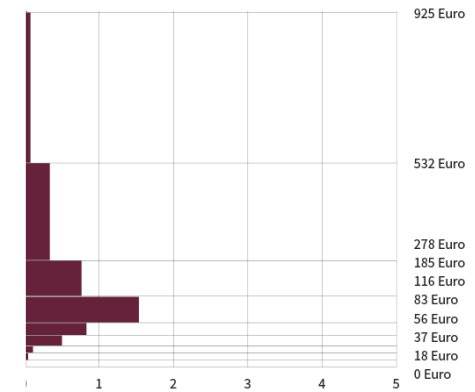
GDP PER CAPITA

The private sector has boosted Ethiopia's GDP to the extent that it is now perceived as the fastest growing economy in the world. The GDP diagram shows a fluctuating GDP which is mainly a result of political changes.



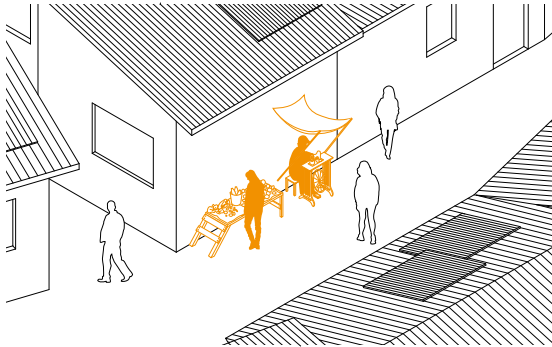
GDP GROWTH

The GDP growth in Ethiopia is steadily increasing and is mainly caused by the growth of the service sector and renewal of the city center, GDP is the total value of all the finished goods and services produced within a country in a specific time frame.

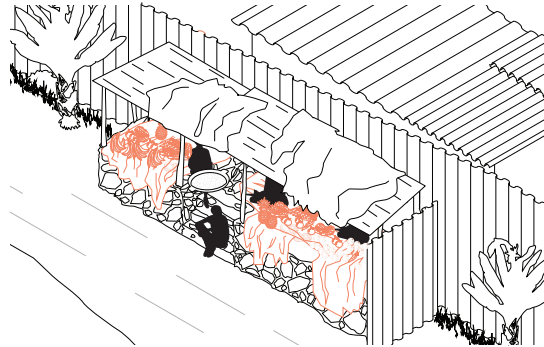


MONTHLY INCOME PER HOUSEHOLD

The majority of Ethiopian households can be classified within the low income group, with a monthly income ranging from 56 to 185 euro. These lower income groups are generally located in the rural areas of Ethiopia.



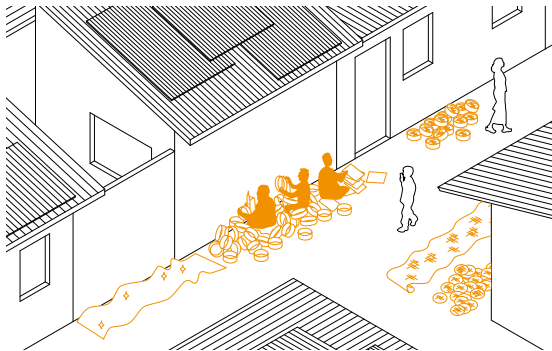
Pop-up vendor



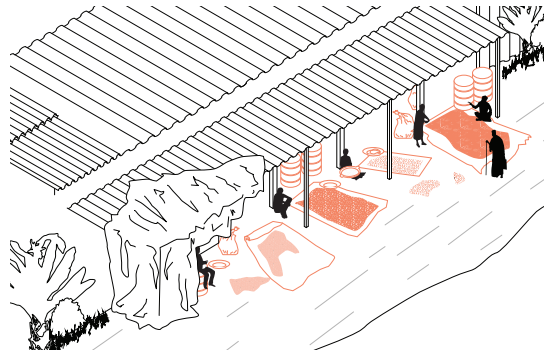
Market stall on the side



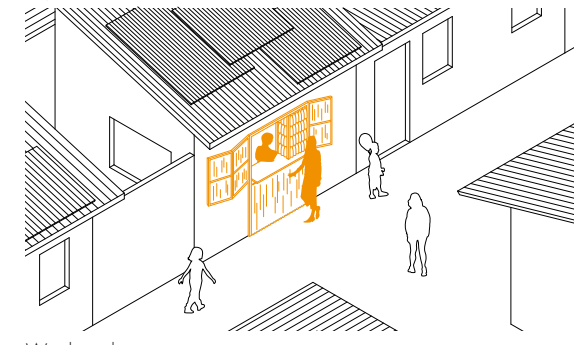
Vegetable stall on the side



Working area



Shop extending on the street



Window shop

CONTACT WITH THE GROUND

Majority of slum dwellers depend on direct connection to the center. For many supporting members of the family, contributing to household income by selling vegetables at local markets or *ingera* pancakes is the only source of income. For low-income groups, houses are used not only as places of residence but also as financial assets, where many informal goods' production and trade activities take place.

CONDOMINIUMS

RESEARCH SUMMARY



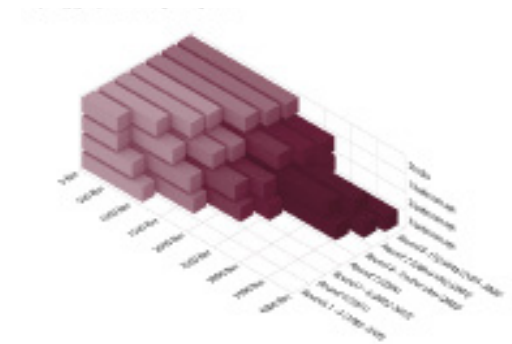
CONDOMINIUM TYPOLOGY

Defined as a building or complex of buildings containing a number of individually owned apartments or houses. Social activities and having living space or cooking large quantities of food for a community is no longer possible or heavily limited in the context of condominiums.



ONE-FITS-ALL APPROACH

Condominium is overused as the omnipresent typology (the so-called cookie cutter approach). Lack of variety limits the housing possibilities and as a result makes the cultivation of traditions and social habits close to impossible.

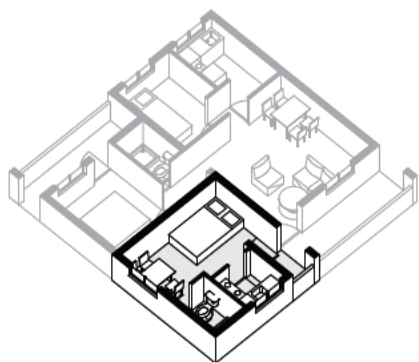


AFFORDABILITY

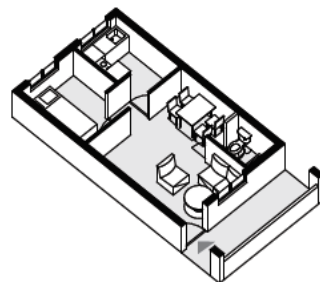
According to the survey conveyed by UNHABITAT in 2017, the condominium schemes are unaffordable to more than 40% of the households as most people spend nearly half of income on food.

CONDOMINIUM TYPOLOGIES

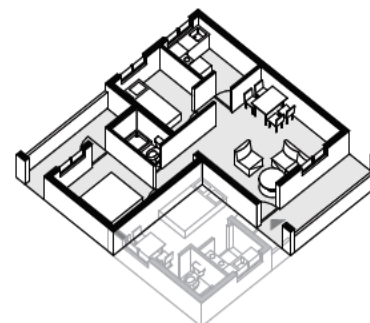
RESEARCH SUMMARY



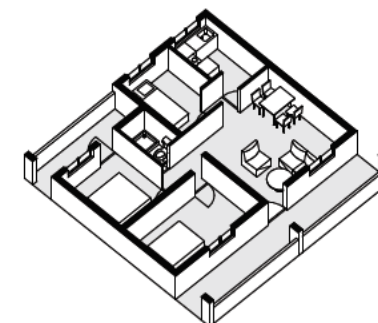
1 room apartment
20m²
built: 2005



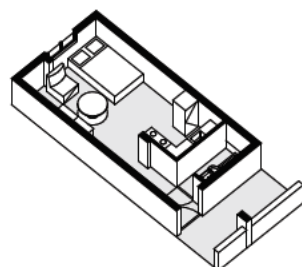
1 bedroom apartment
35m²
built: 2005



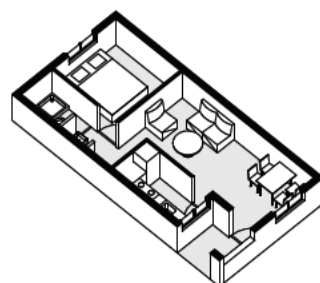
2 bedroom apartment
50m²
built: 2005



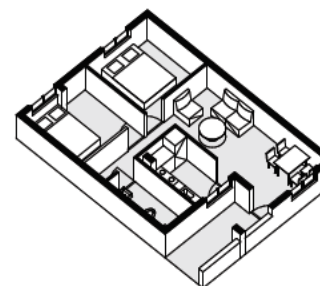
3 bedroom apartment
70m²
built: 2005



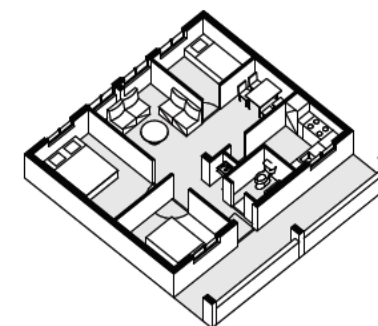
1 room apartment
25m²
built: 2011



1 bedroom apartment
35m²
built: 2011



2 bedroom apartment
50m²
built: 2011



3 bedroom apartment
70m²
built: 2011

URBAN DEVELOPMENT

RESEARCH SUMMARY



IMPROVEMENT OF ECONOMY

Economy improvement through city development has been recognized mostly after 2004 elections, when the government recognized cities as engines of national development.



IMPROVED INFRASTRUCTURE

In recent years China has emerged as a large infrastructure investor in the African continent. A part of the literature on Chinese investments in infrastructure argues that these investments are adverse to the environment, local employment, and the dissemination of technology.



THE CAPITAL CITY

The city is the location of headquarter of African Union and it is often refereed to as the capital of Africa. The building of AU headquarter was funded by Chinese government and serves as a beacon of development trajectory.



FOREIGN INVESTMENT IN ETHIOPIA

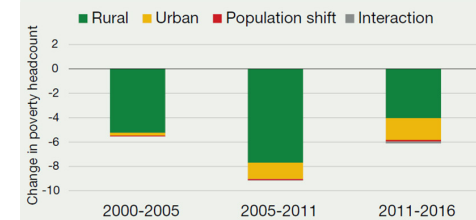
From 2001 onwards, Ethiopia has experienced an enormous economic development, partially due to FDI (foreign direct investments). As in many Asian countries, FDI played a key role in the enhancement of the quality of life of the population.



CITY DEVELOPMENT

The first development plan that recognized urban development as a major driving force of national development was the five-year Growth and Transformation Plan released in 2005.

THE URBAN CONTRIBUTION TO REDUCTION OF POVERTY

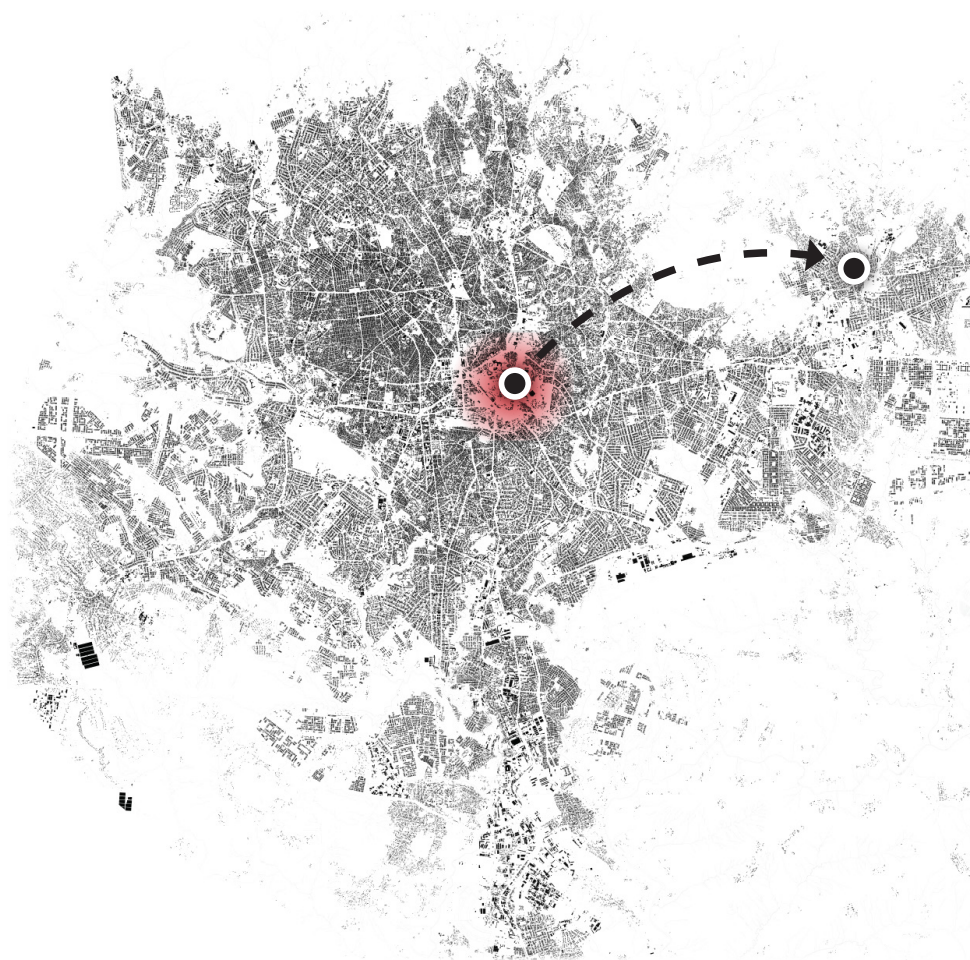


LONG TERM REDUCTION OF POVERTY

Although the main contribution to poverty reduction belongs to rural areas, the role of urban areas is increasing and is expected to contribute to stronger poverty reduction in the long run.

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.



ECA KAZANCHIS AREA (2003)
BEGINNING OF THE URBAN DEVELOPMENT

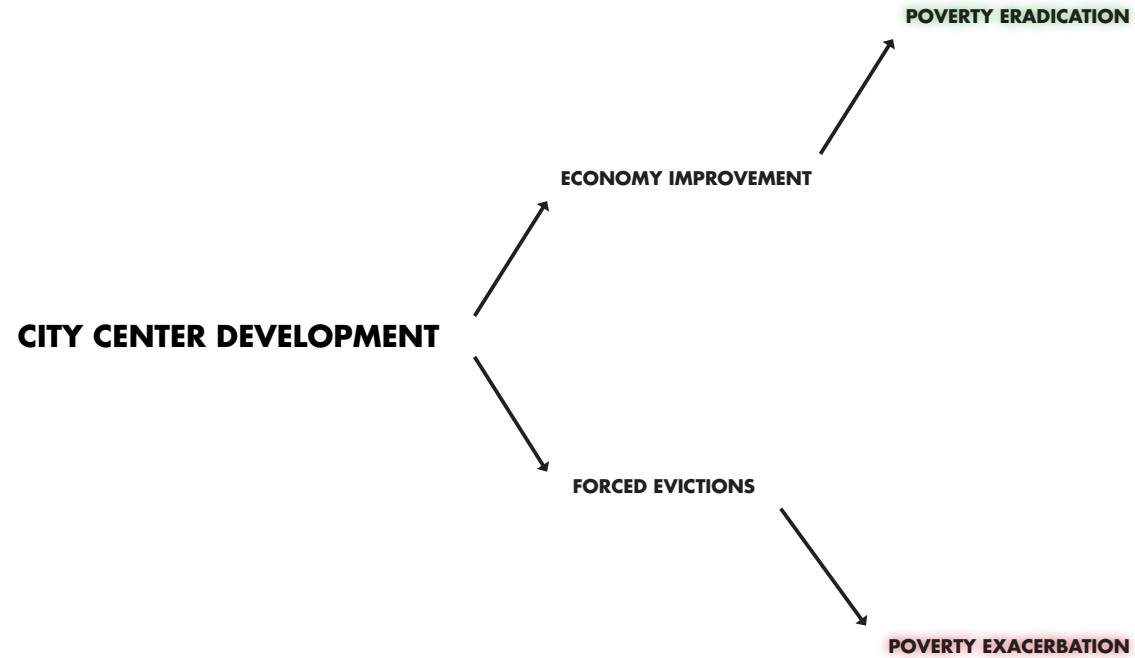
One of the examples of Urban Development Resettlements in Addis is Kazanchis area around United Nations Economic Commission of Africa. The picture reveals the area around Africa Hall and ECA Conference Center used to be surrounded by informal settlements in 2003.

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.

DEVELOPMENT INDUCED DISPLACEMENT

PROBLEM STATEMENT



FORCED MIGRATIONS

Displacement caused by development projects has disrupted lives of millions of people each year not only in Ethiopia but also around the world, making development induced displacement as the most pressing forced migration problem worldwide.



SOCIAL COSTS

One of the related problems is that relocations forcibly break the links with the current income generating schemes and often leaves the slum dwellers without a job.

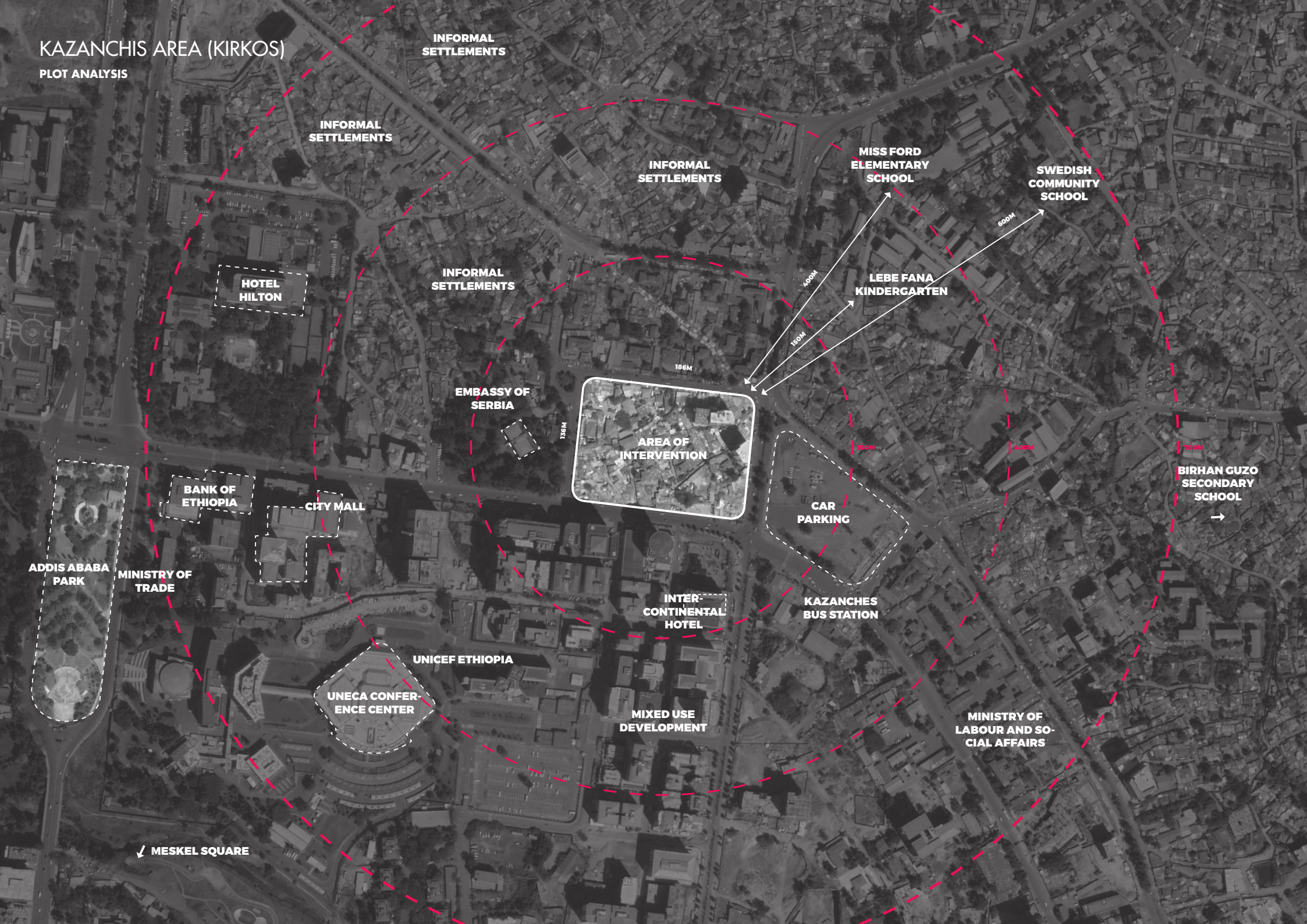


DISRUPTION OF LIVING PATTERNS

Majority of slum dwellers depend on direct connection to the center. Because of the increased distance, many people who worked in the city center are forced to discontinue their work as the transportation costs are too high.

KAZANCHIS AREA (KIRKOS)

PLOT ANALYSIS



INFORMAL
SETTLEMENTS

INFORMAL
SETTLEMENTS

INFORMAL
SETTLEMENTS

INFORMAL
SETTLEMENTS

MISS FORD
ELEMENTARY
SCHOOL

SWEDISH
COMMUNITY
SCHOOL

HOTEL
HILTON

LEBE FANA
KINDERGARTEN

EMBASSY OF
SERBIA

AREA OF
INTERVENTION

BANK OF
ETHIOPIA

CITY MALL

CAR
PARKING

ADDIS ABABA
PARK

MINISTRY OF
TRADE

UNICEF ETHIOPIA

UNECA CONFER-
ENCE CENTER

INTER-
CONTINENTAL
HOTEL

KAZANCHES
BUS STATION

MIXED USE
DEVELOPMENT

MINISTRY OF
LABOUR AND SO-
CIAL AFFAIRS

BIRHAN GUZO
SECONDARY
SCHOOL

MESKEL SQUARE

AREA IN NUMBERS

DENSITY IN KIRKOS SUBCITY:

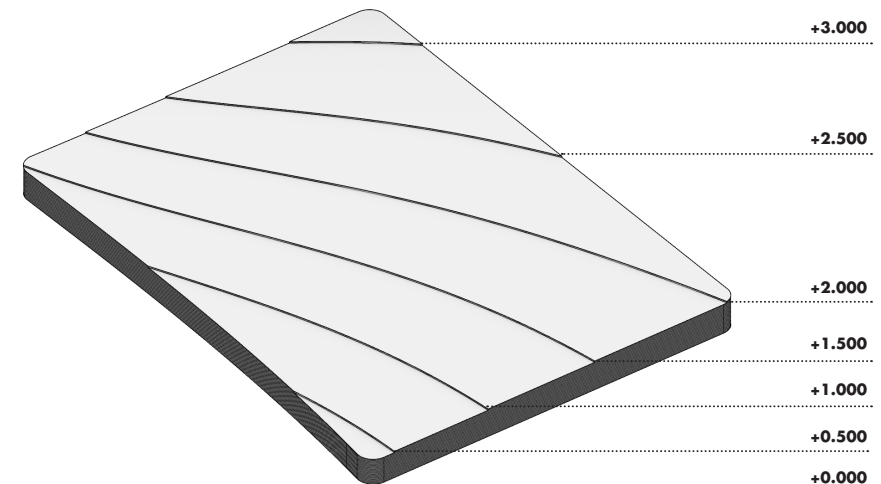
Population: 364.300
Percentage of total population: 11.48%
Area: 1.518Ha
Percentage of total area: 2.81%
Density: 240 persons/ha

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.

RESEARCH QUESTION

PROBLEM STATEMENT

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



CITY
DEVELOPMENT



EMPOWERMENT
OF INHABITANTS

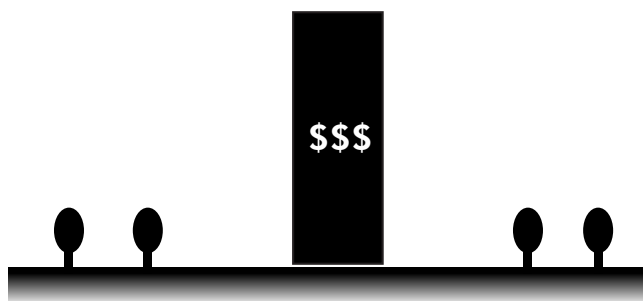


CONCEPT
DESIGN HYPOTHESIS

PARAMETERS

PROBLEM STATEMENT

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



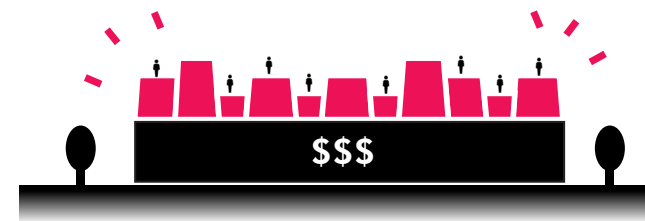
CHALLENGING VERTICAL OFFICE LAYOUT

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.

TPOLOGICAL BUILDUP

DESIGN HYPOTHESIS



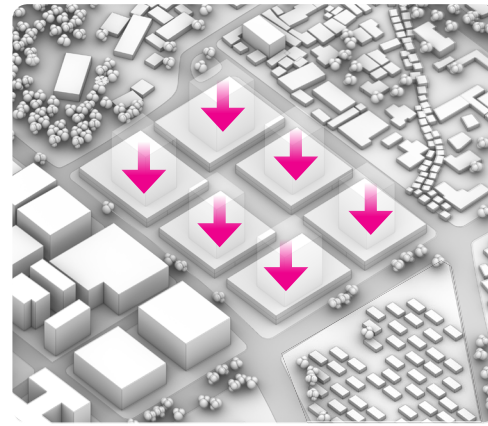
SELECTED PLOT

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.



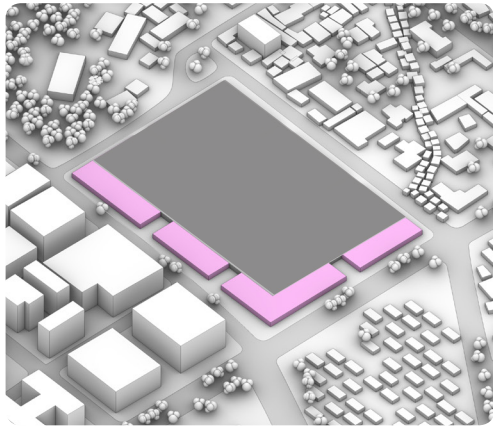
MAXIMIZING FOOTPRINT

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 allow for more horizontal interactions in the offices.



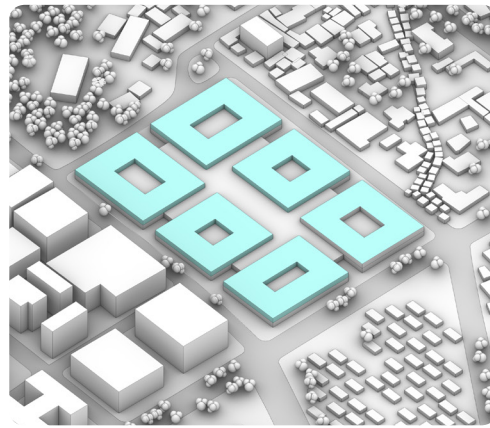
GREEN COURTYARD VOIDS

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.



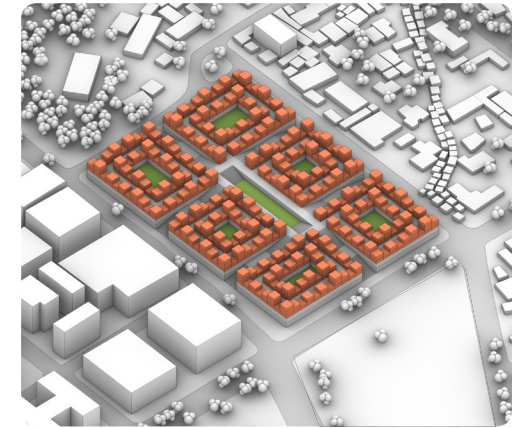
LVL1: OFFICES

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.

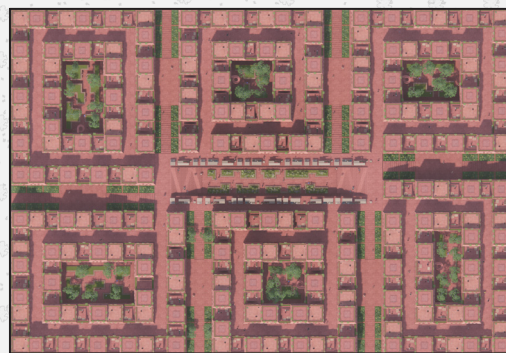
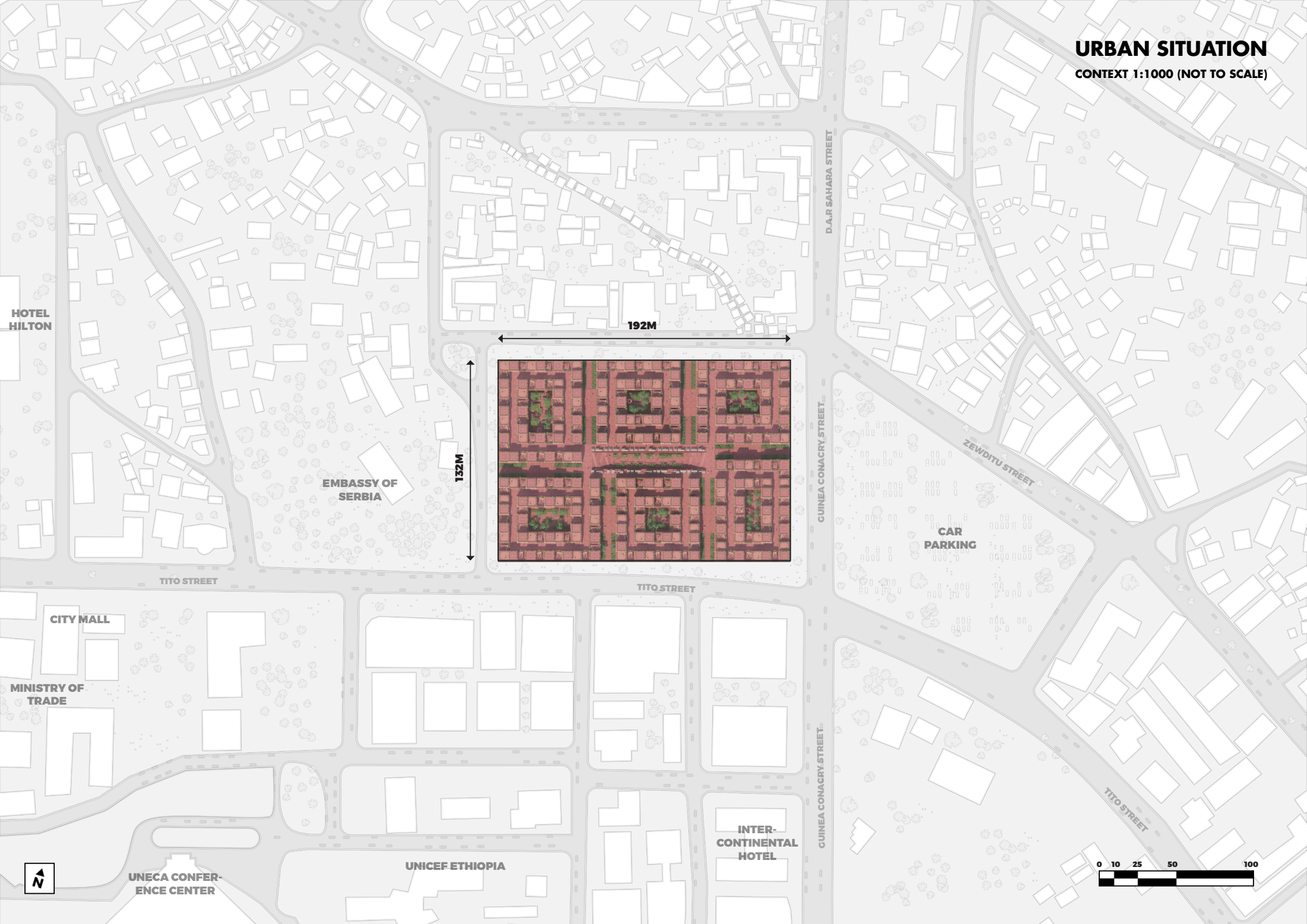
URBAN SITUATION

AXONOMETRY



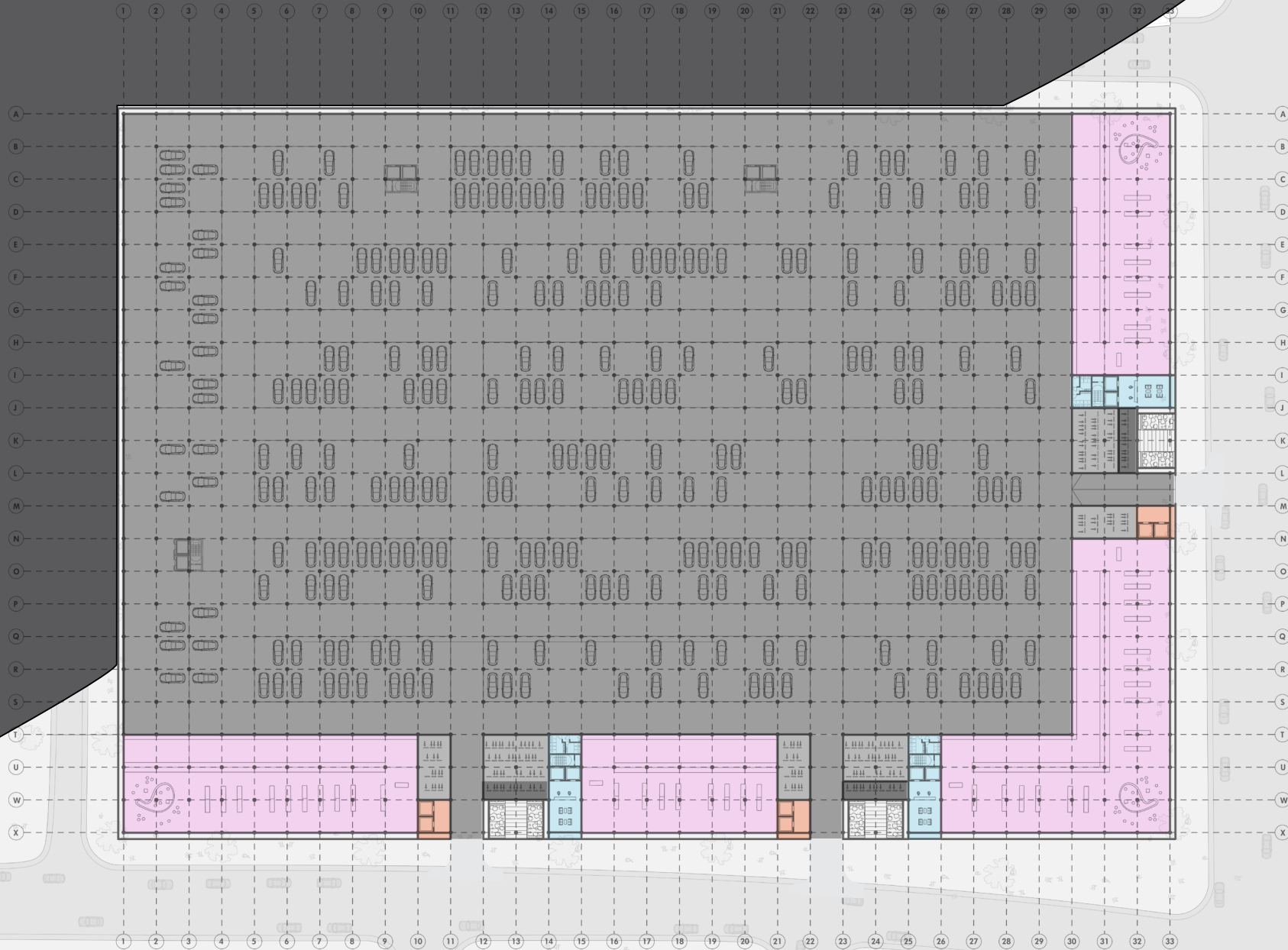
URBAN SITUATION

CONTEXT 1:1000 (NOT TO SCALE)



UNDERGROUND PARKING/ AMENITIES

PLAN 1:200 (NOT TO SCALE)



LOBBY



AMENITIES



CAR PARKING



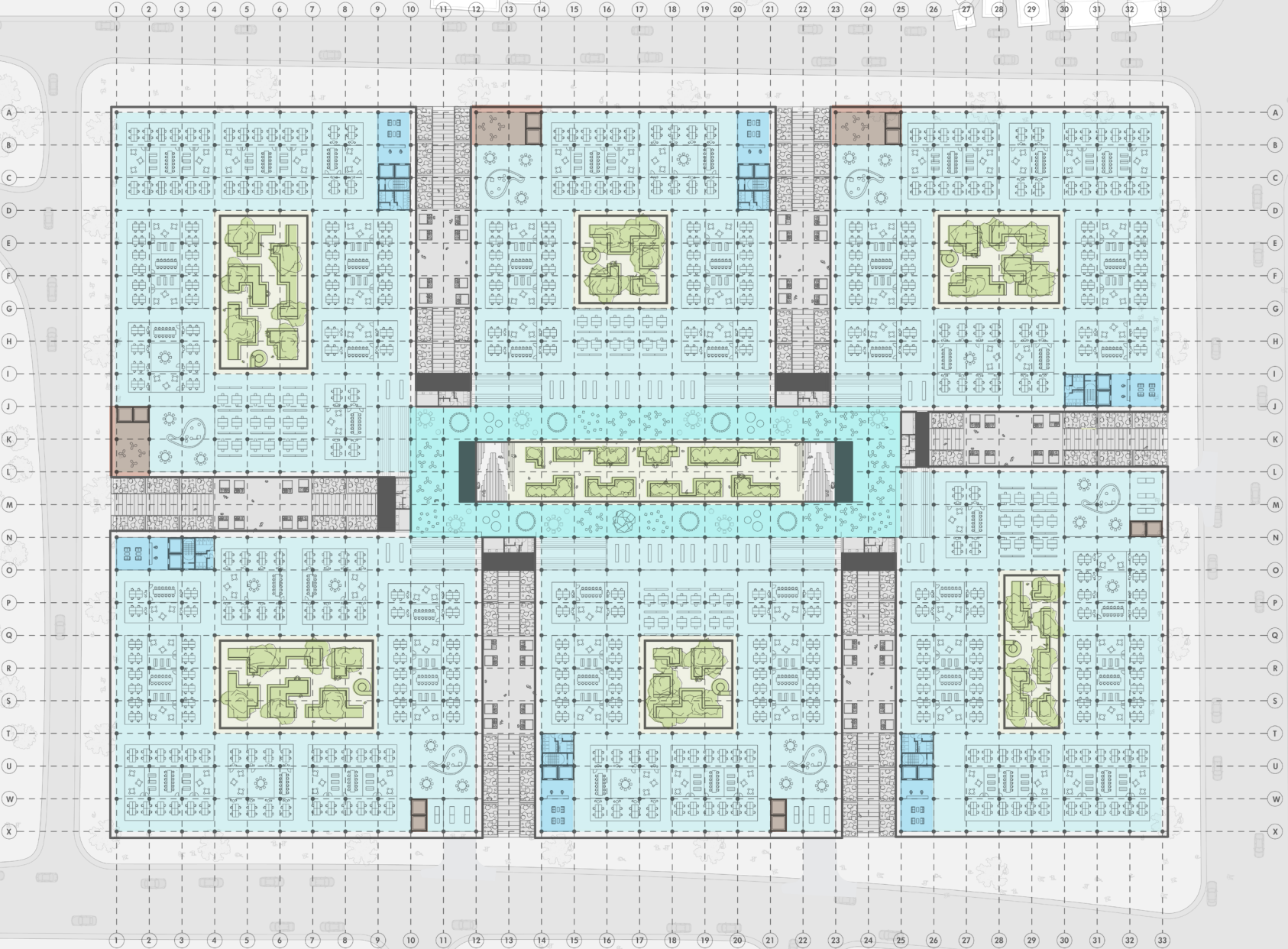
BIKE PARKING



RESIDENTIAL LOBBY



OFFICE LEVEL
PLAN 1:200 (NOT TO SCALE)



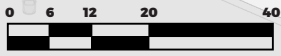
OFFICES

LOBBY

COMMON AREAS

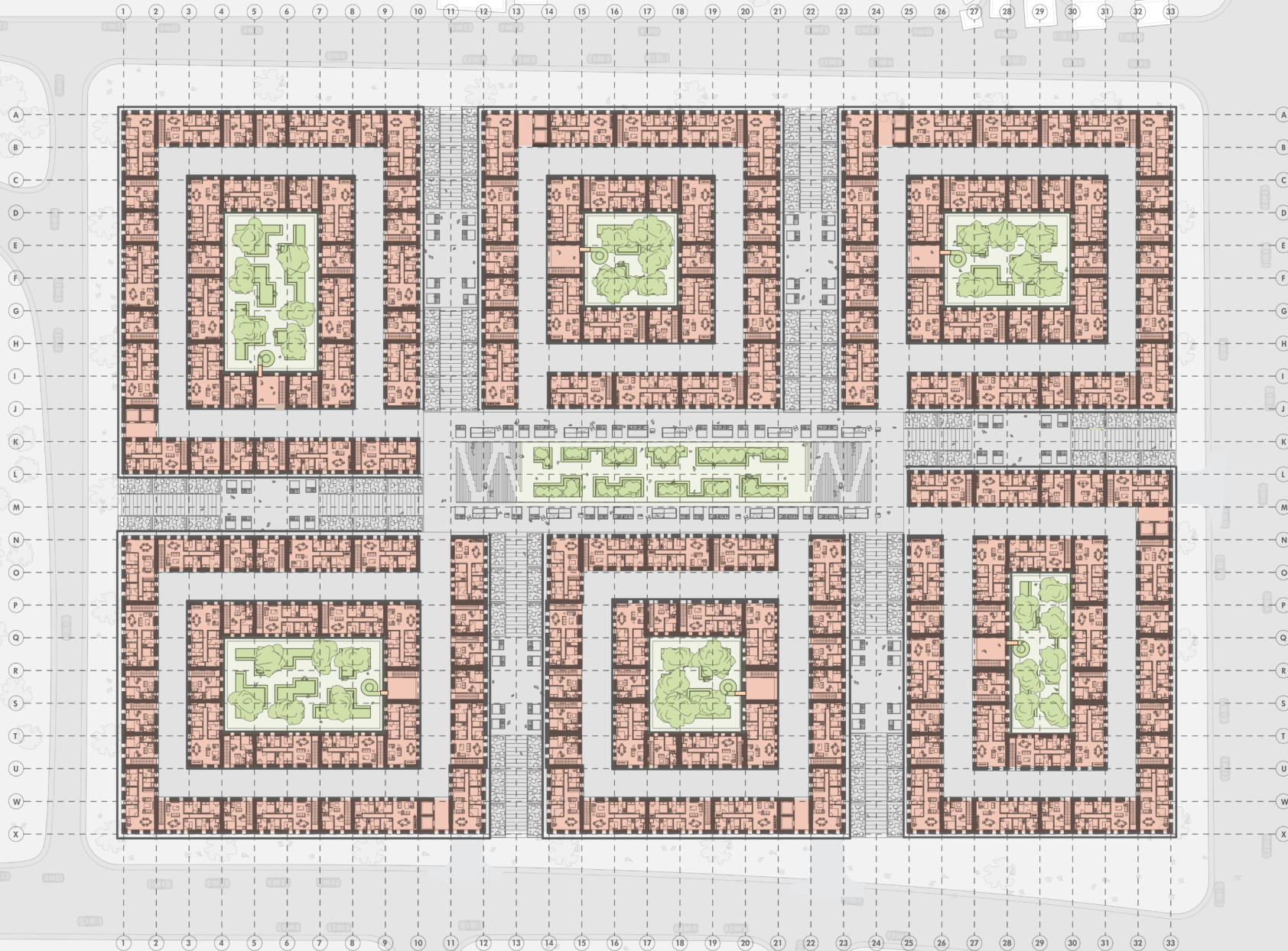
GREEN COURTYARDS

RESIDENTIAL LIFT/ LOBBY



HOUSING: FIRST FLOOR

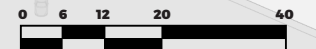
PLAN 1:200 (NOT TO SCALE)



COURTYARDS

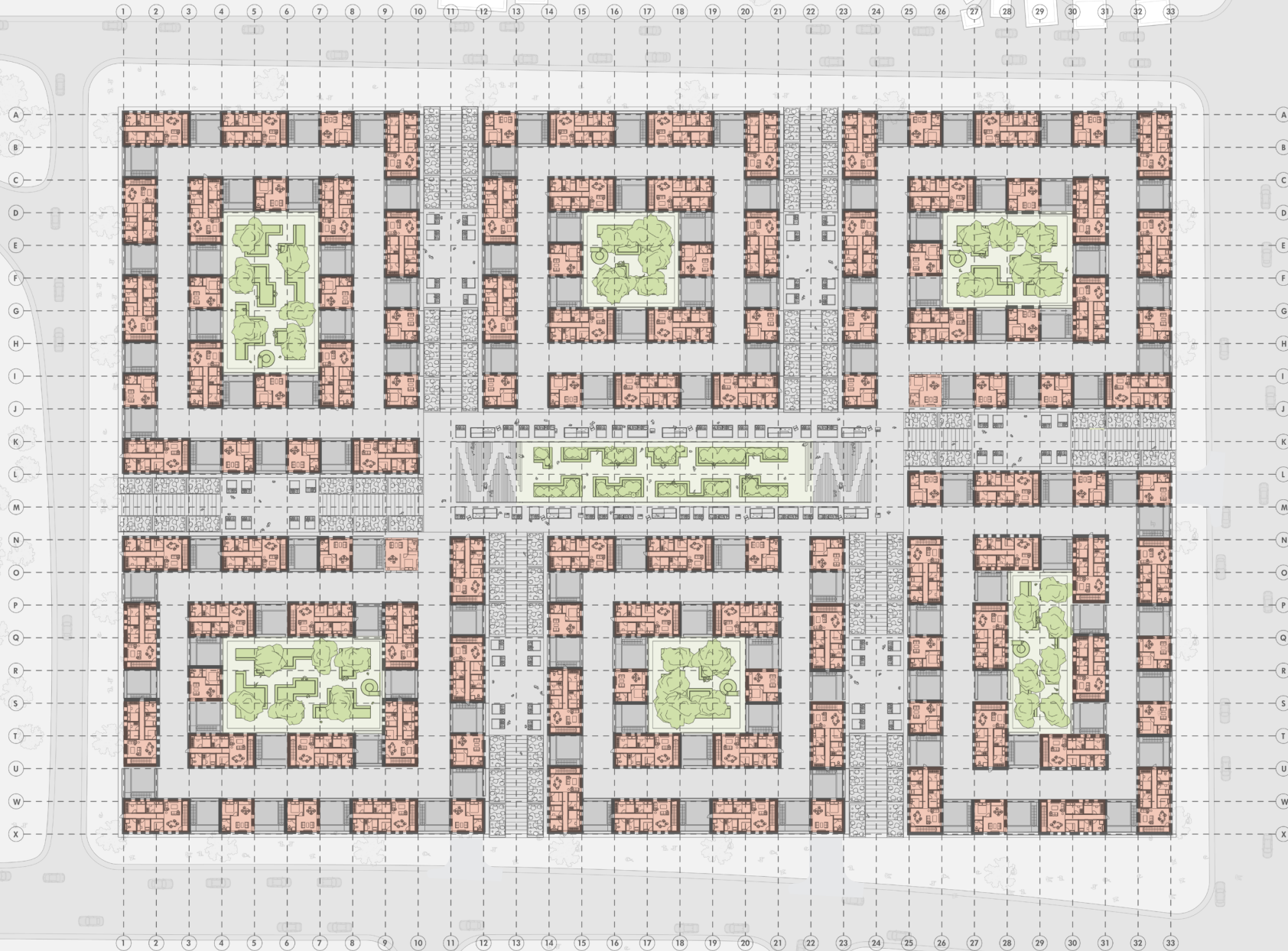


APARTMENTS



HOUSING: SECOND FLOOR

PLAN 1:200 (NOT TO SCALE)



PUBLIC ZONE



APARTMENTS

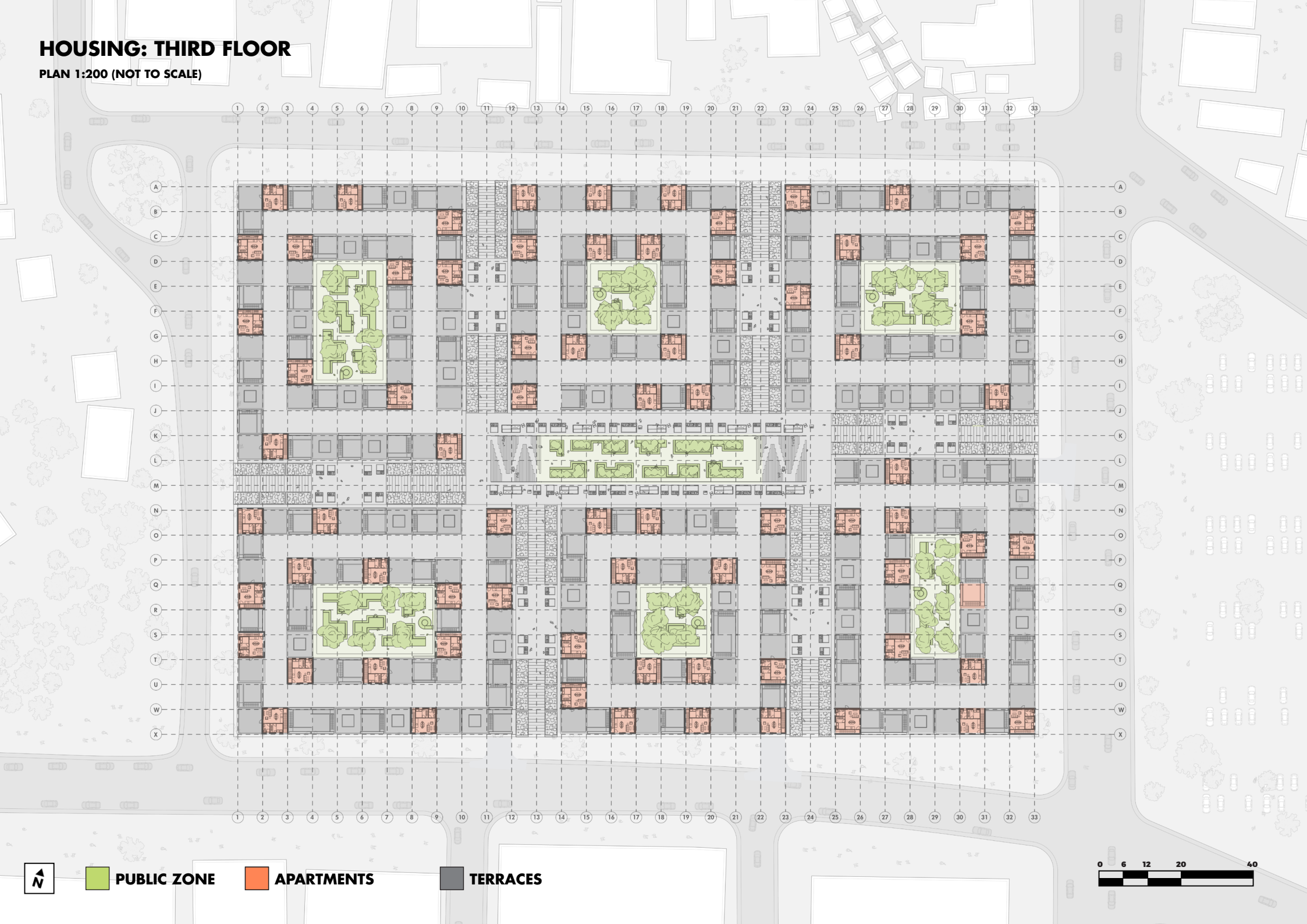


TERRACES



HOUSING: THIRD FLOOR

PLAN 1:200 (NOT TO SCALE)



PUBLIC ZONE



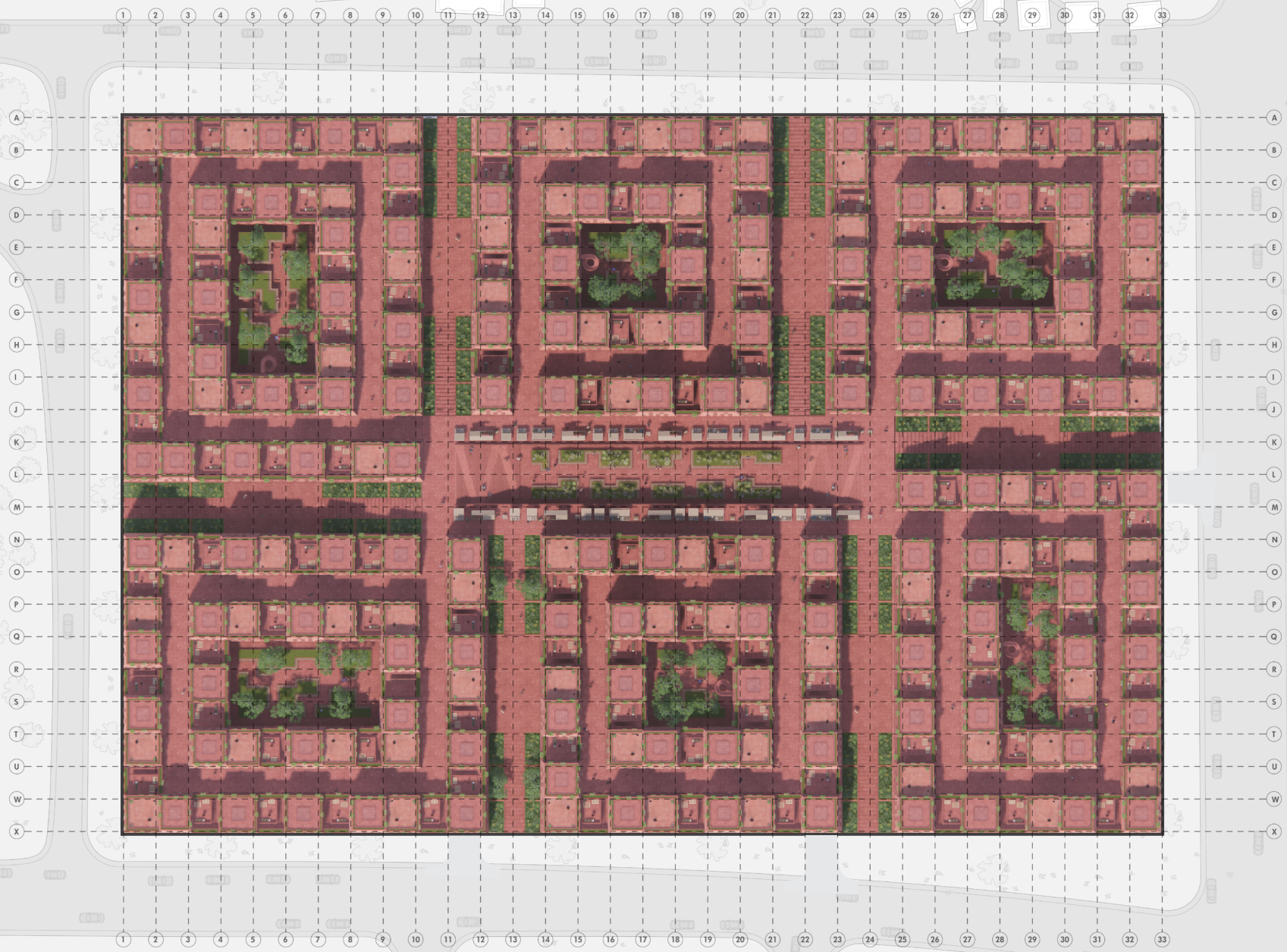
APARTMENTS



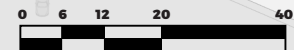
TERRACES



ROOFSCAPE
PLAN 1:200 (NOT TO SCALE)

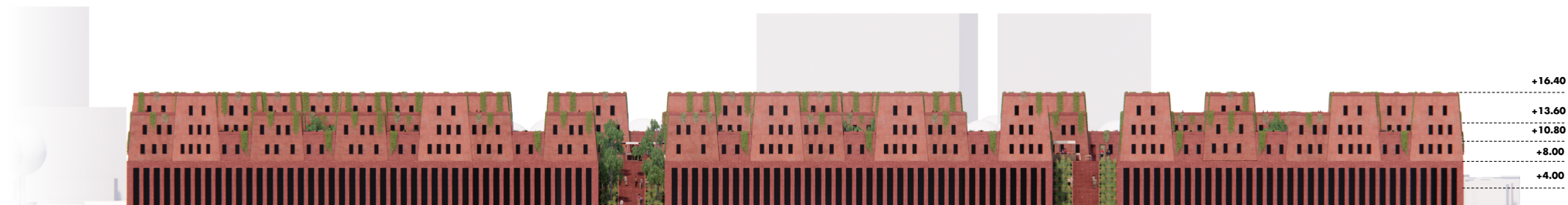


ROOFTOPS AND TERRACES



ELEVATION - SOUTH

ELEVATION 1:200 (SCALED)



SECTION - SOUTH

ELEVATION 1:200 (SCALED)



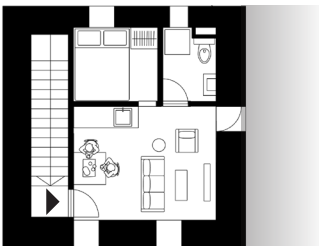
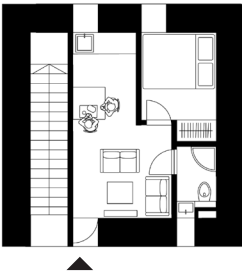
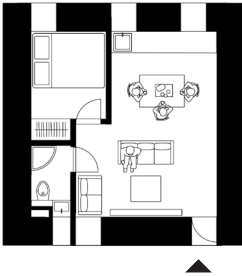
URBAN SITUATION

GOOGLE MAPS MOCKUP



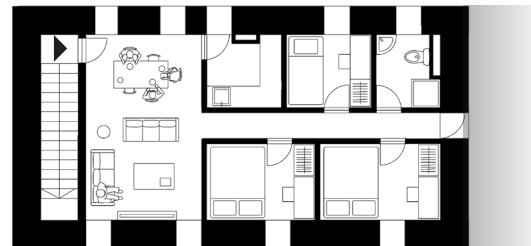
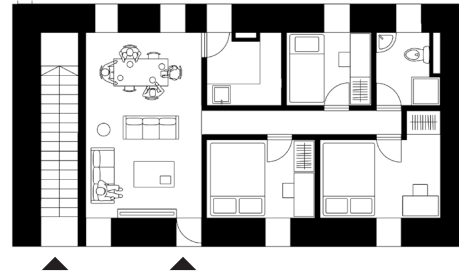
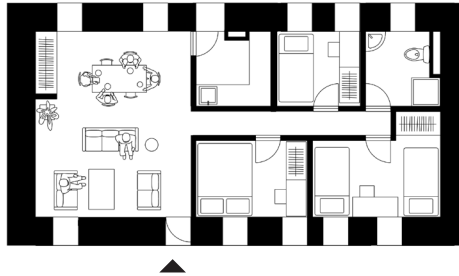






INDIVIDUAL UNIT

6M



COHABITAT UNIT

12M

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

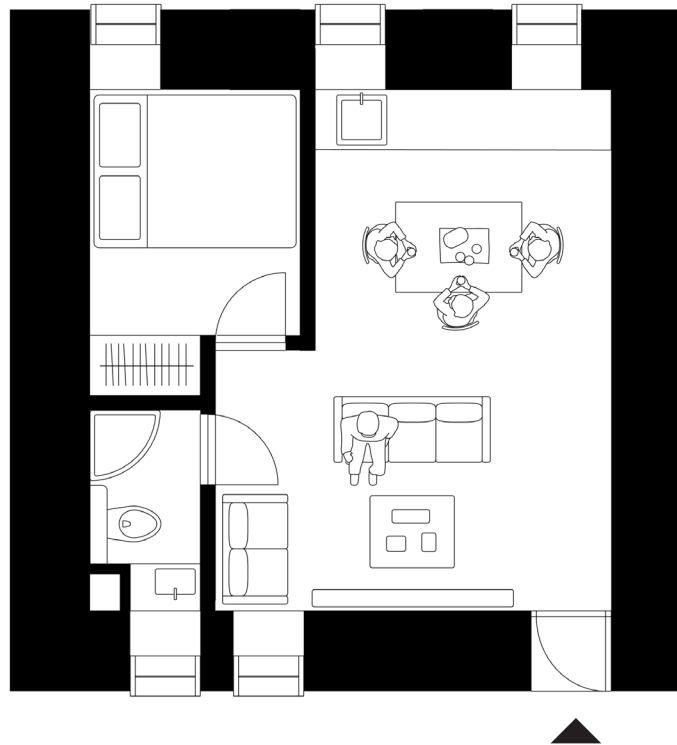
Some units have direct access to the terrace, mainly on upper levels. Terraces serve as space for goods production, social interaction and housework.

SINGLE UNIT

CLOSE-UP

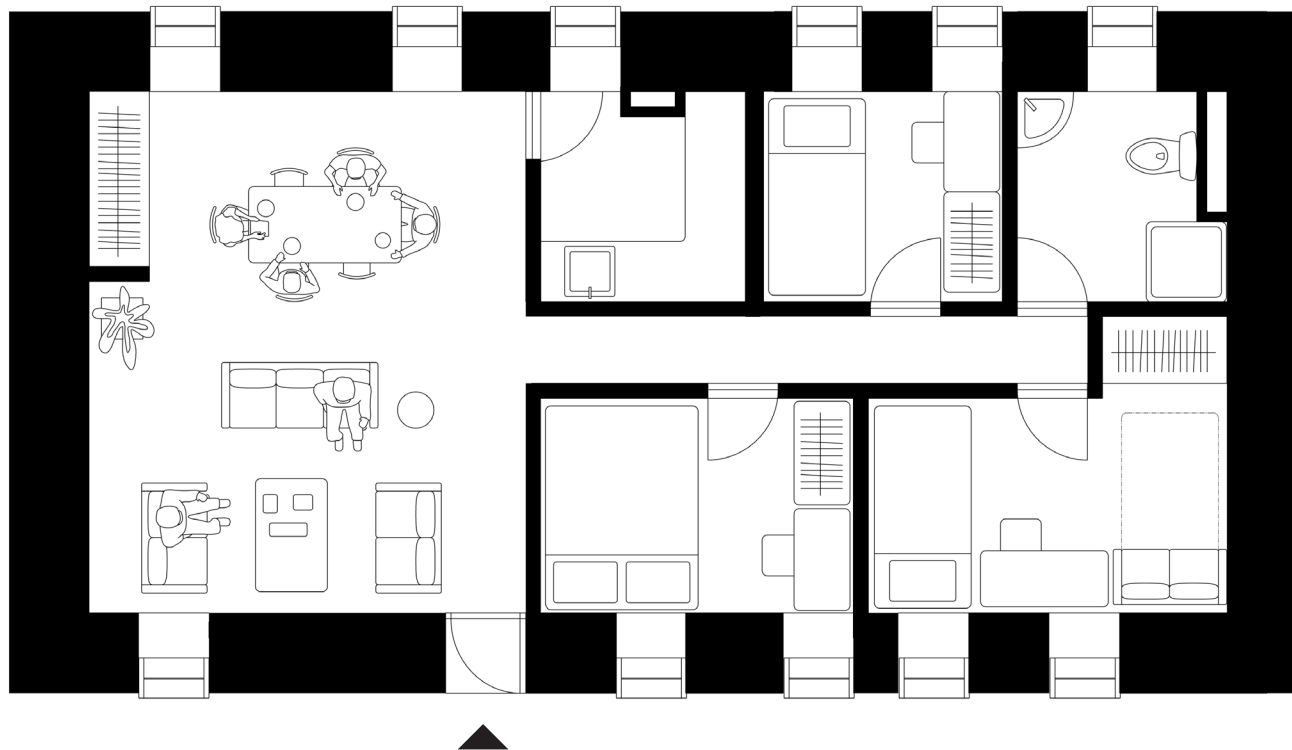
INDIVIDUAL (36M²)

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.

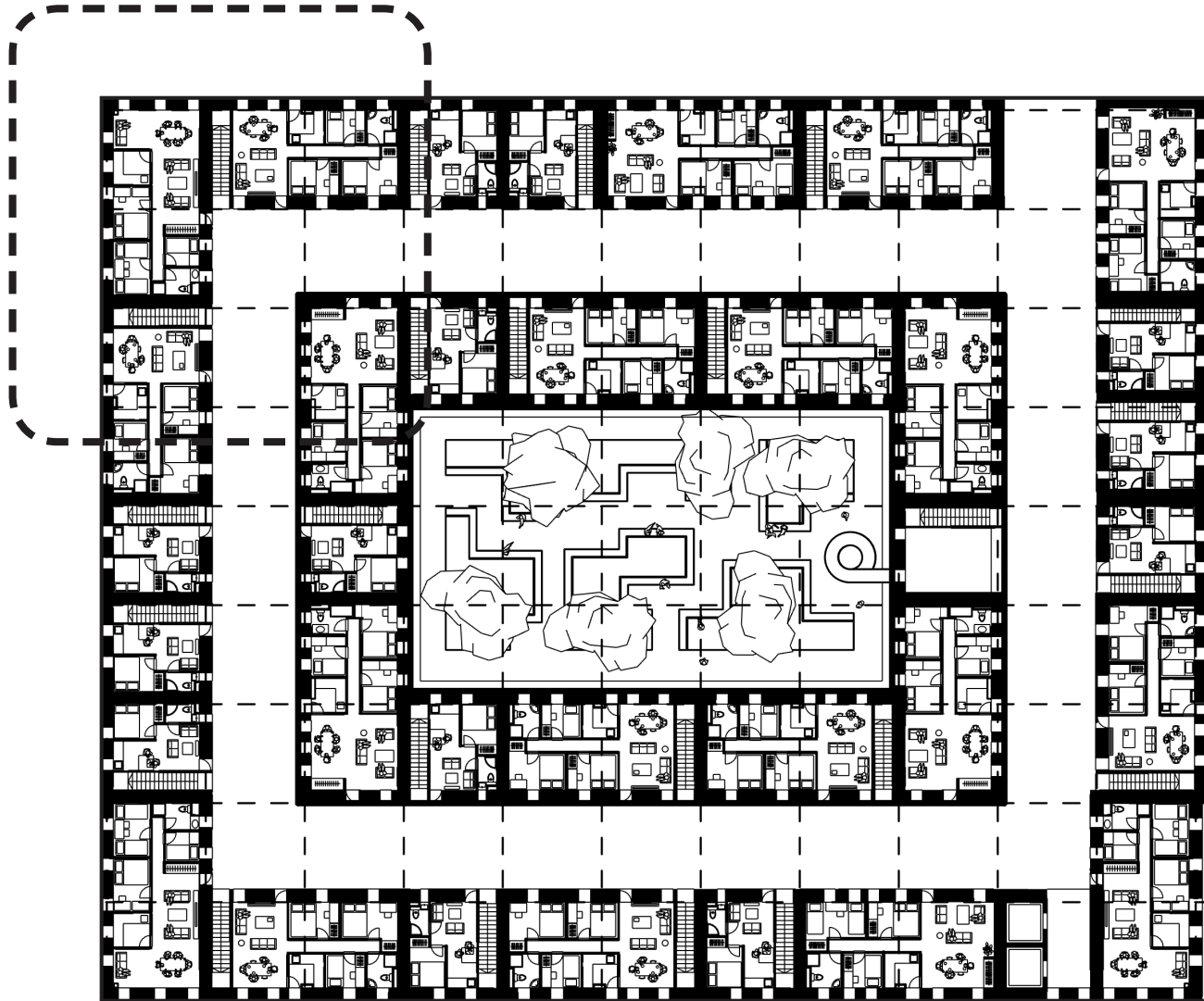


RESIDENTIAL COMPOUND

THE VILLAGE

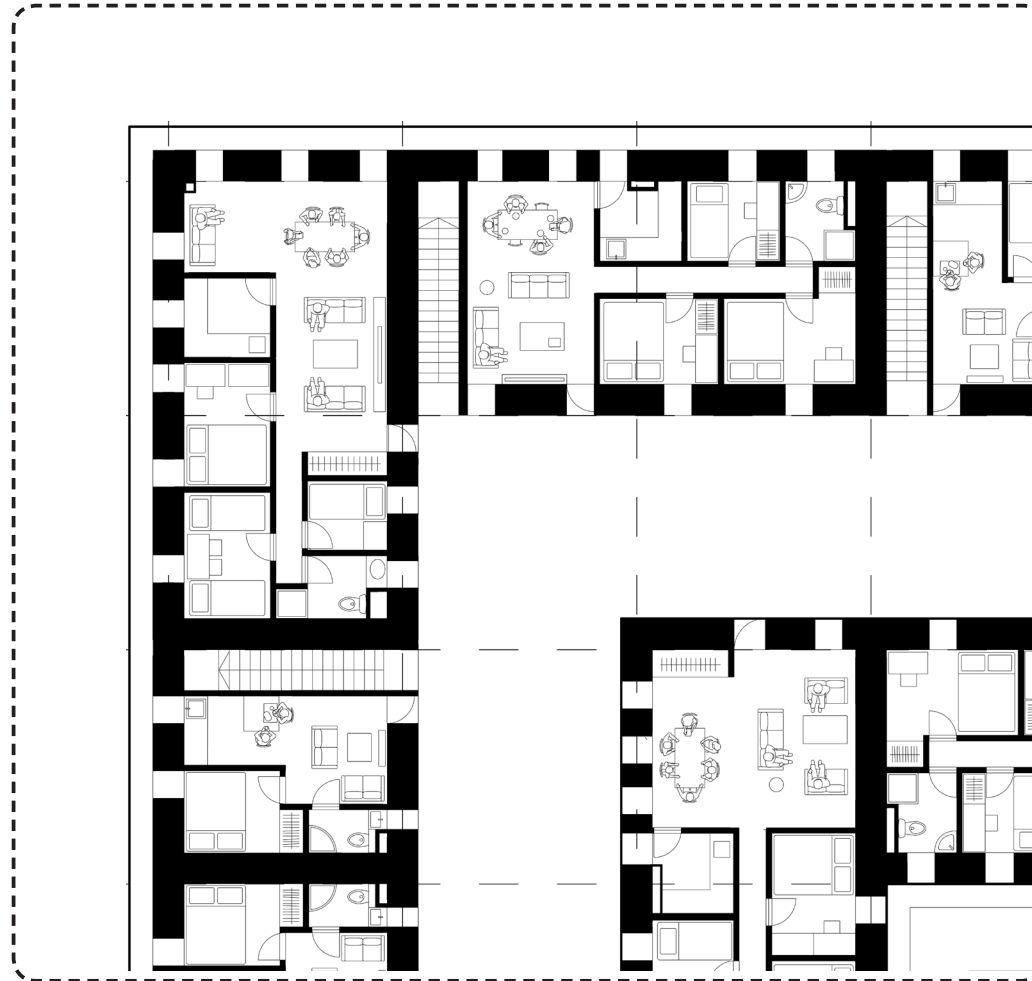
RESIDENTIAL COMPOUND

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.



INTERLOCKING OF MODULES

The drawing reveals some alternative configuration of unit layouts. In this example co-housing unit has been slightly altered to allow for cross ventilation and access



VERTICAL CIRCULATION
THE VILLAGE



LEVEL 3

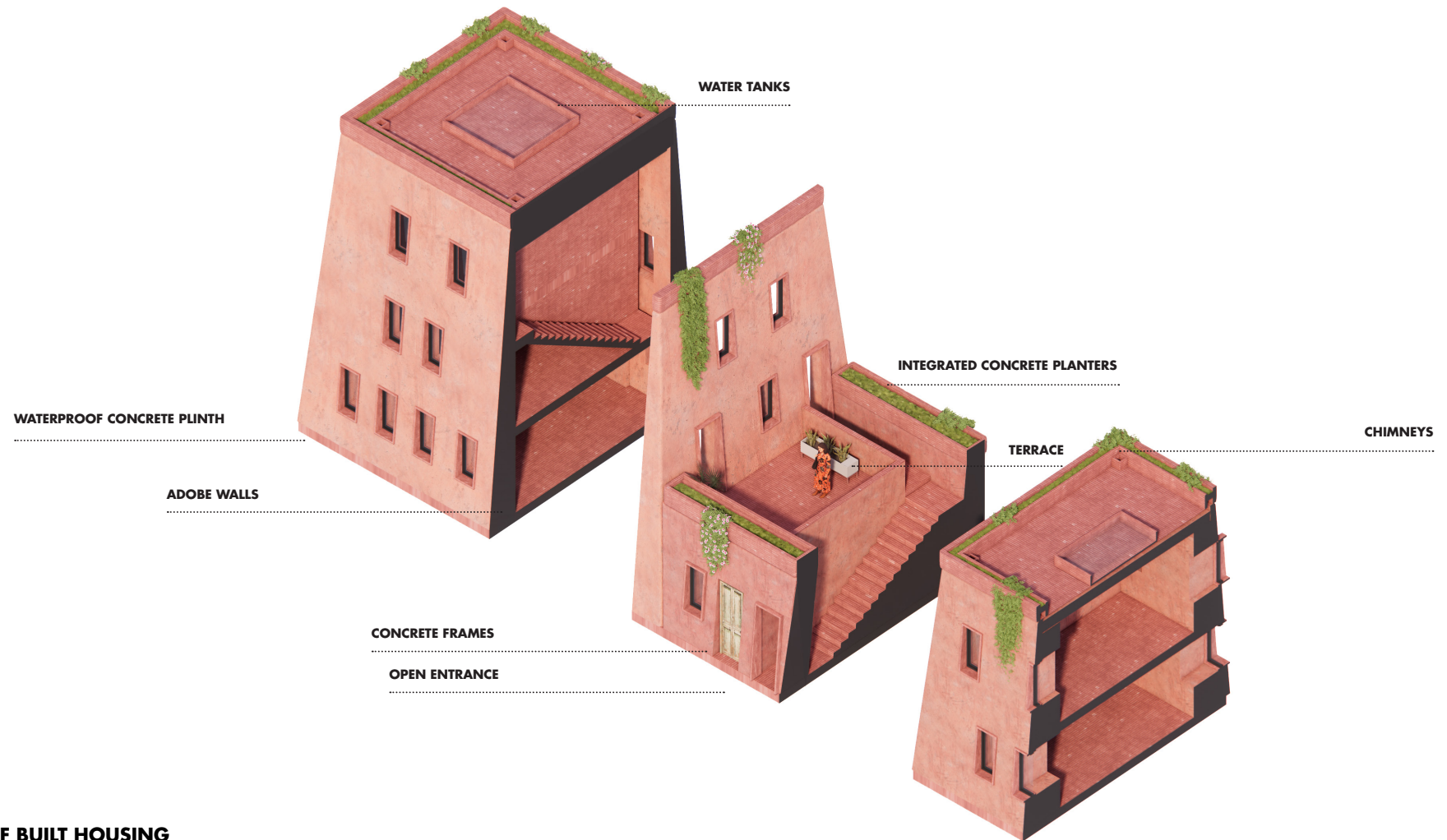
Only single units are located on the top level. All of them have access to the terraces.

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).



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.

APPROPRIATION OF SPACES

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.

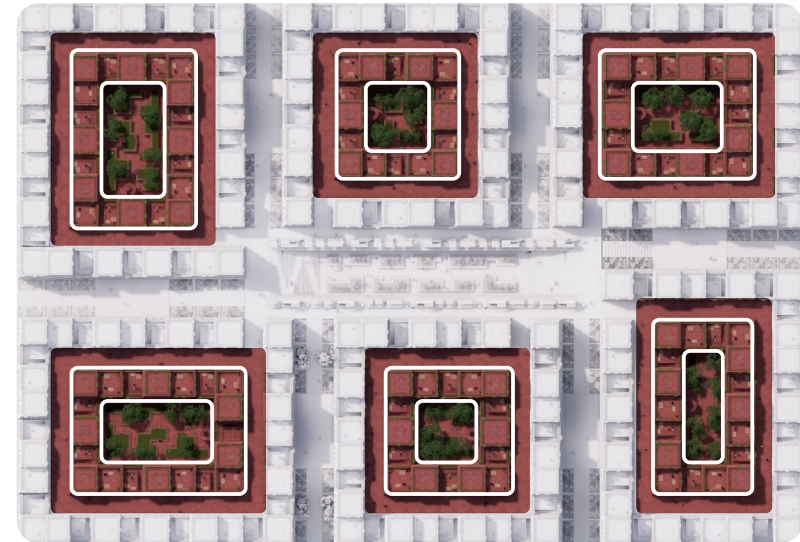
LOCATION OF VILLAGE AMENITIES

THE VILLAGE



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



NATURAL ADOBE

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 terracotta base of the material will ensure the colors match as an ensemble.

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.





MAT TYPOLOGY

Mat typology is defined as a building complex that has access, layout, daylighting and ventilation solved horizontally 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.

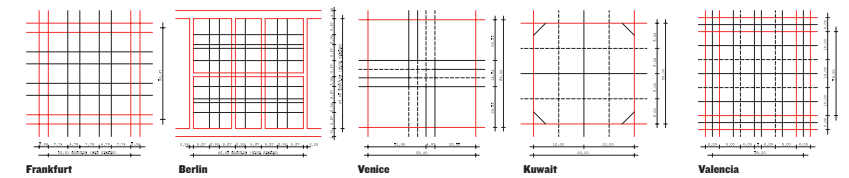
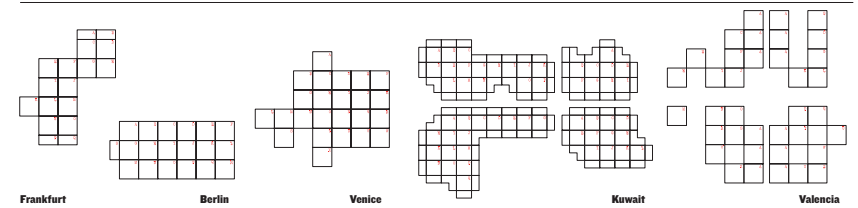


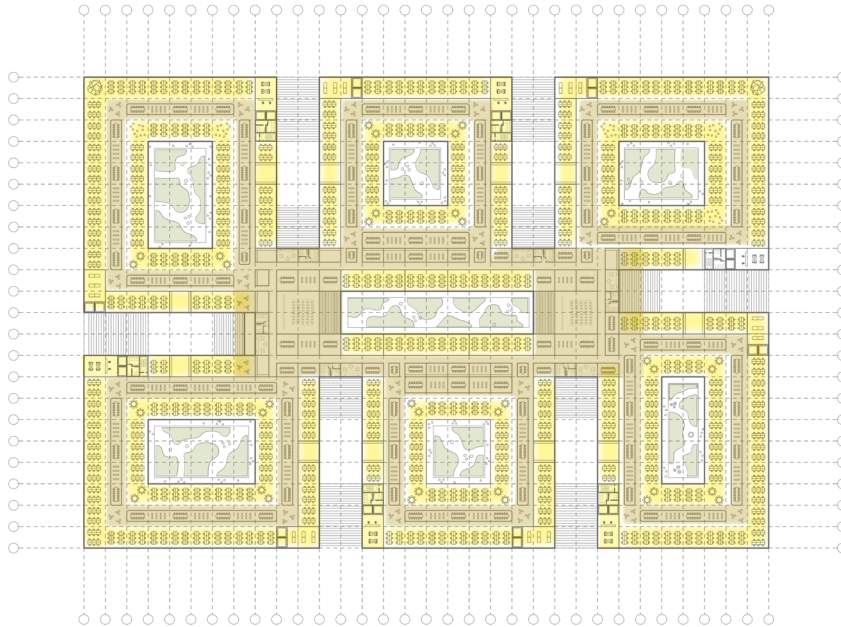
Figure A



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.





DAYLIGHT ANALYSIS

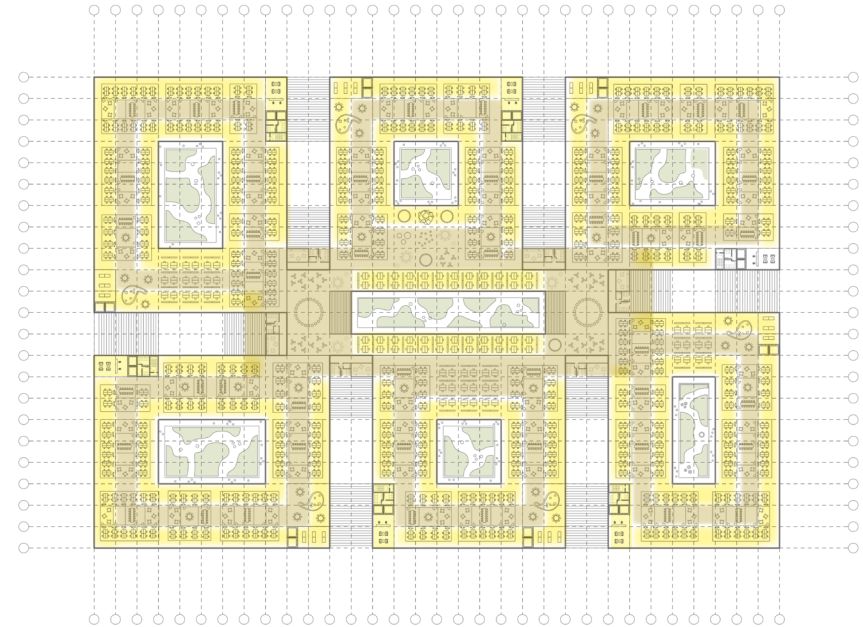
The office layout in the urban plinth is designed to optimize sunlight access - a 6 m wide stripe is calculated to be directly exposed to natural daylight along the external parameter of the building and from the courtyard side.



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.





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 users.



INTEGRATED AMENITIES

Because a large parking space is included in the basement of the building, the efficiency of urban use of space use is increased. Cars no longer occupy the walkways on the streets and large amount of parking spots allow for more urban space to be relieved.

ETHNOGRAPHIC REFERENCES

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.



INFORMALITY ON THE STREETS

Landings and inbetween zones can be used by community members to sell their goods and offer various services to the office users, fellow inhabitants and visitors.



SHARED 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.



OPEN AIR PLAZAS

Open zones allow for flexibility in terms of use of space, ranging from meetings of organized groups (Idir), workshops, spaces of interaction between groups of users and playgrounds.

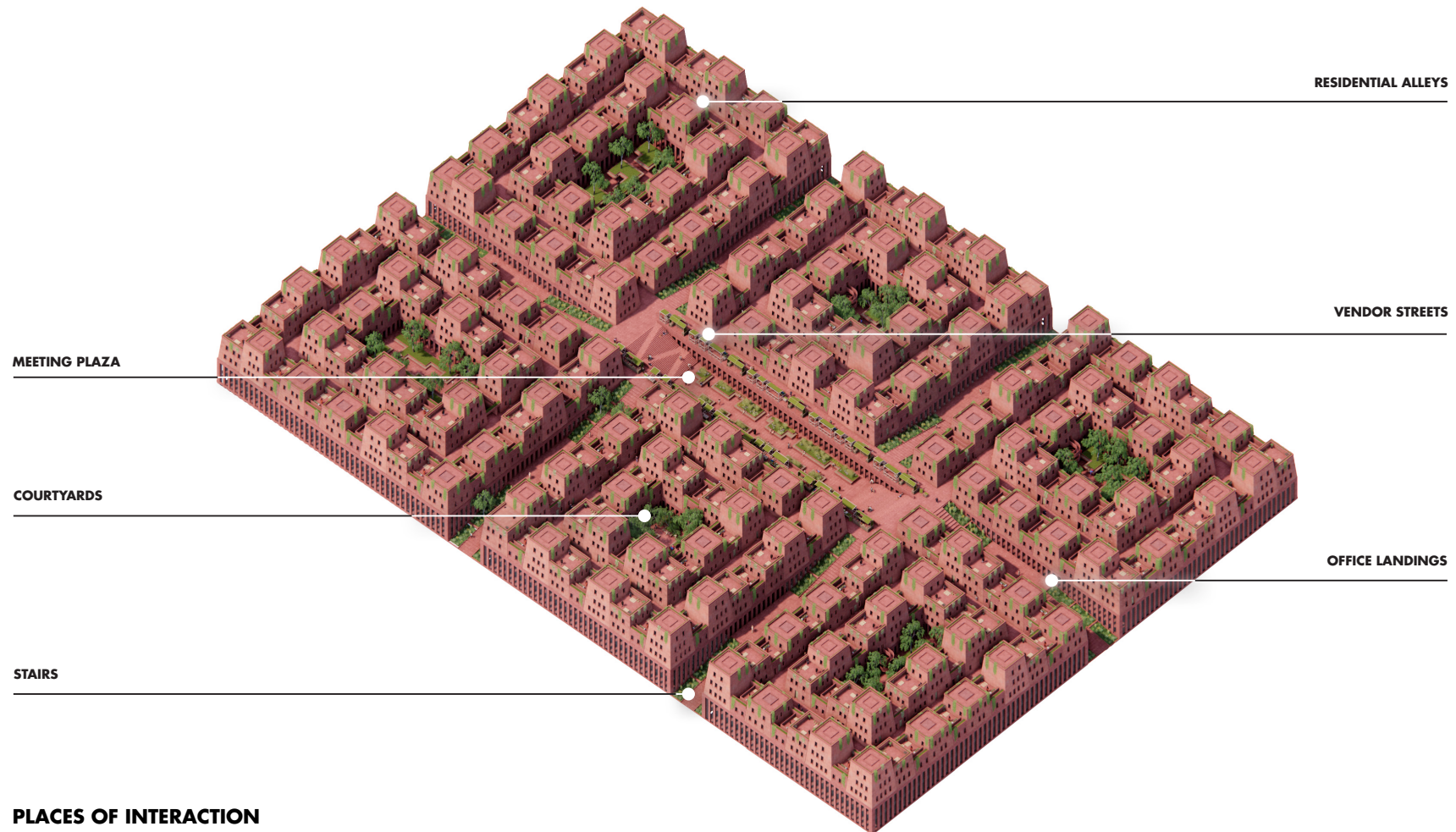


MERKATOS

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.

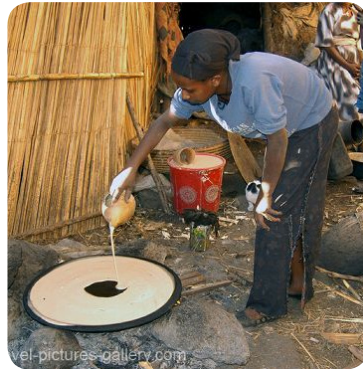
PLACES OF INTERACTION

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.



BRIDGING TWO WORLD

The project incorporates 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.

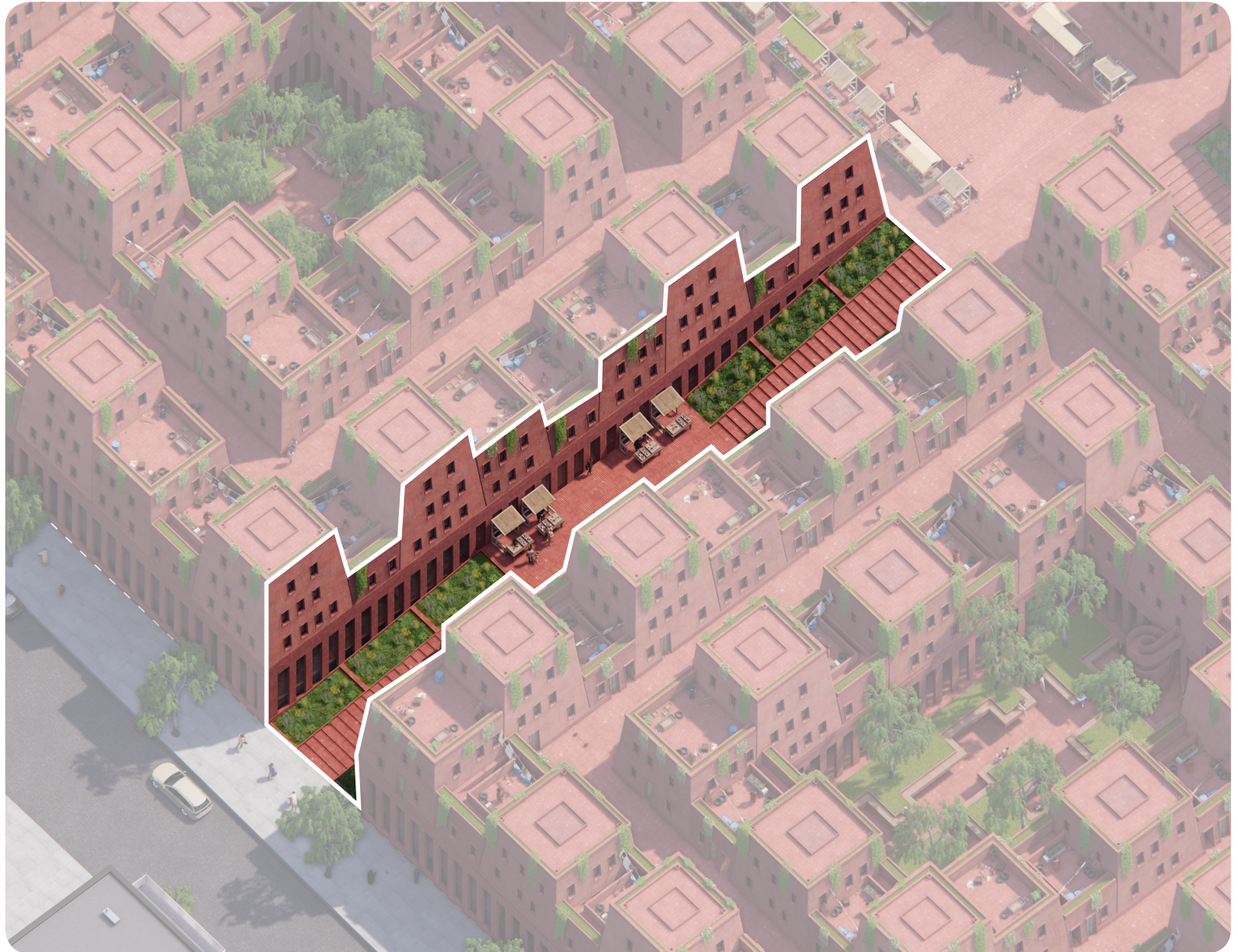
COMMUNITY BONDING

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

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.

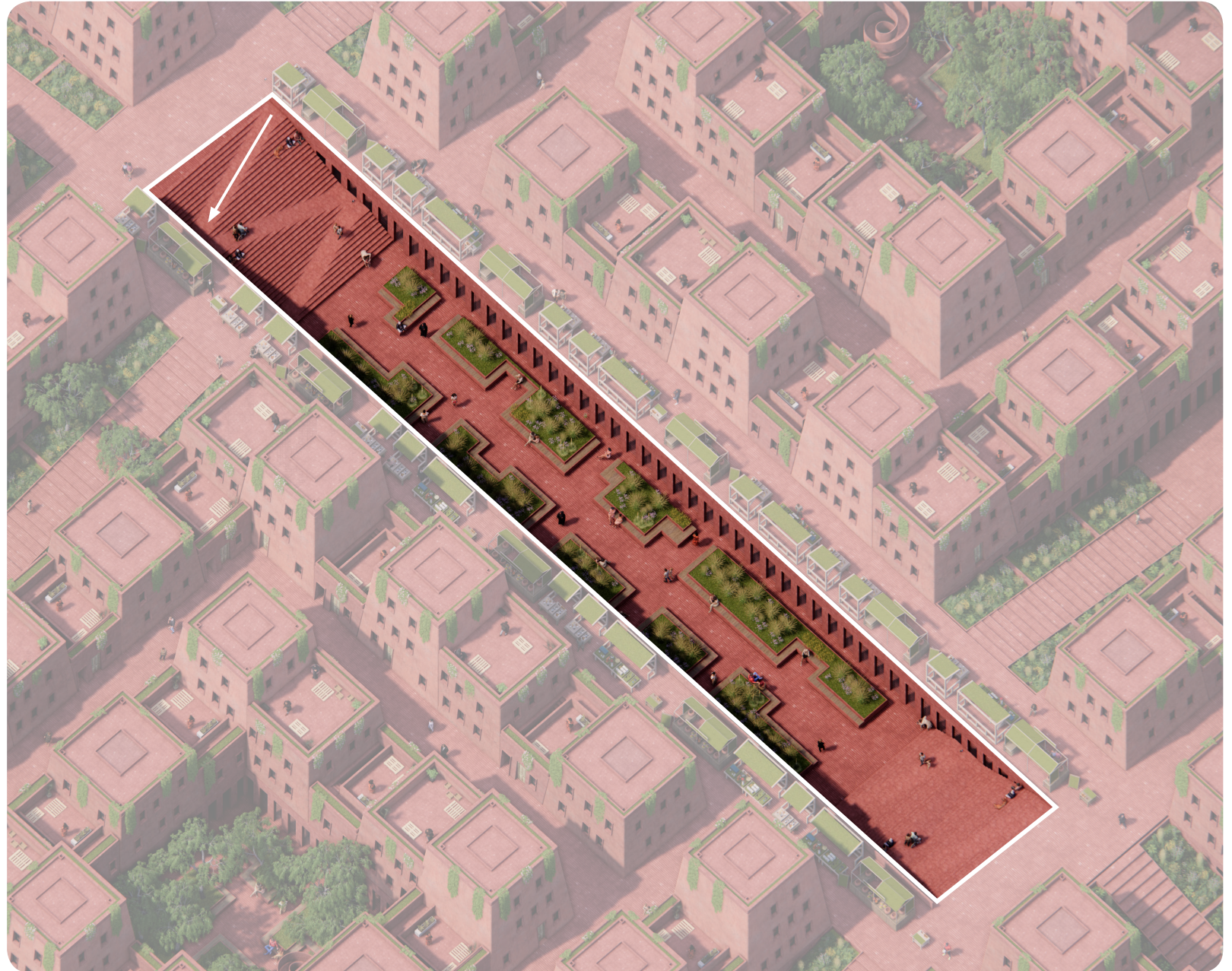




OFFICE COURTYARDS

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.

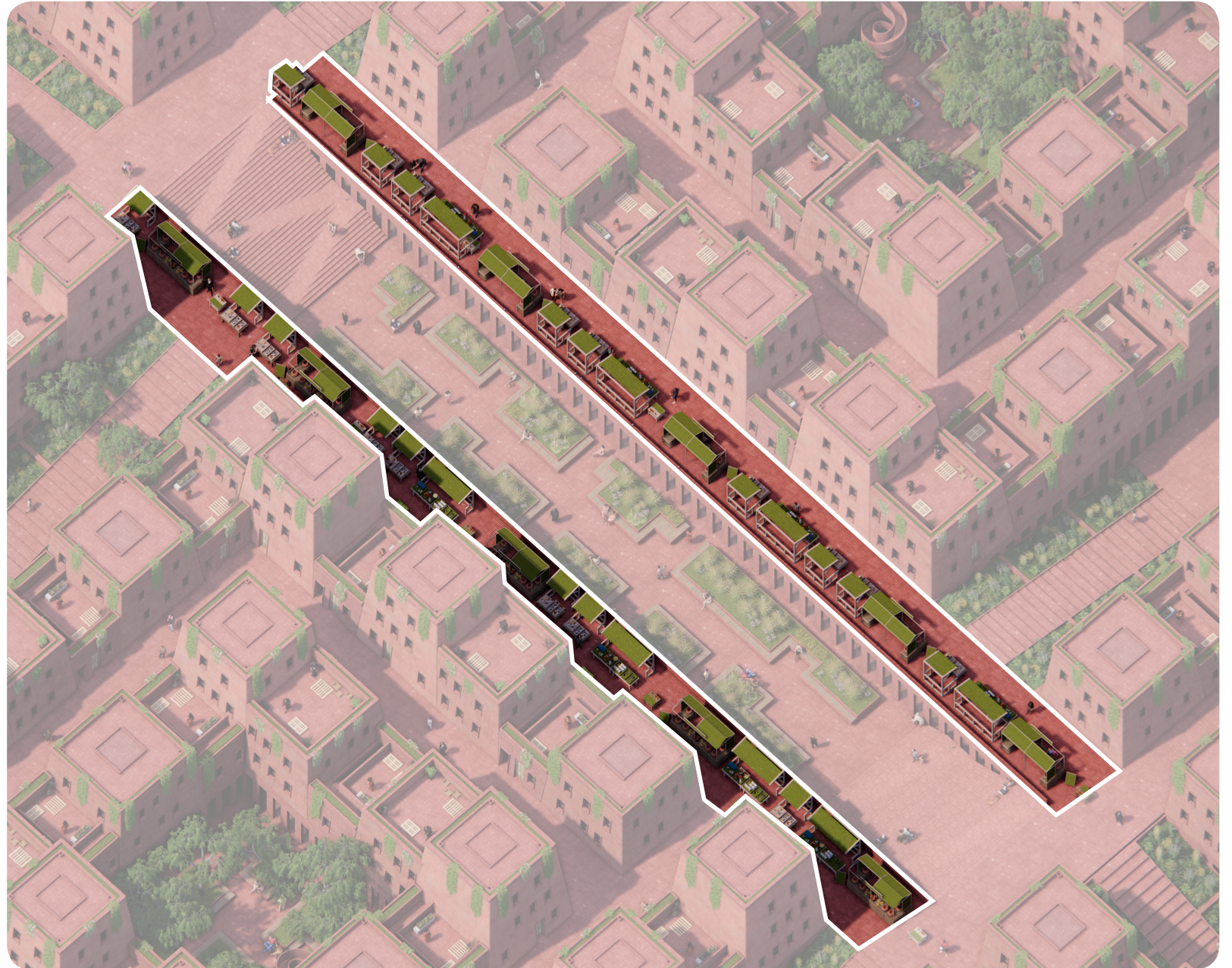




MEETING PLAZA

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

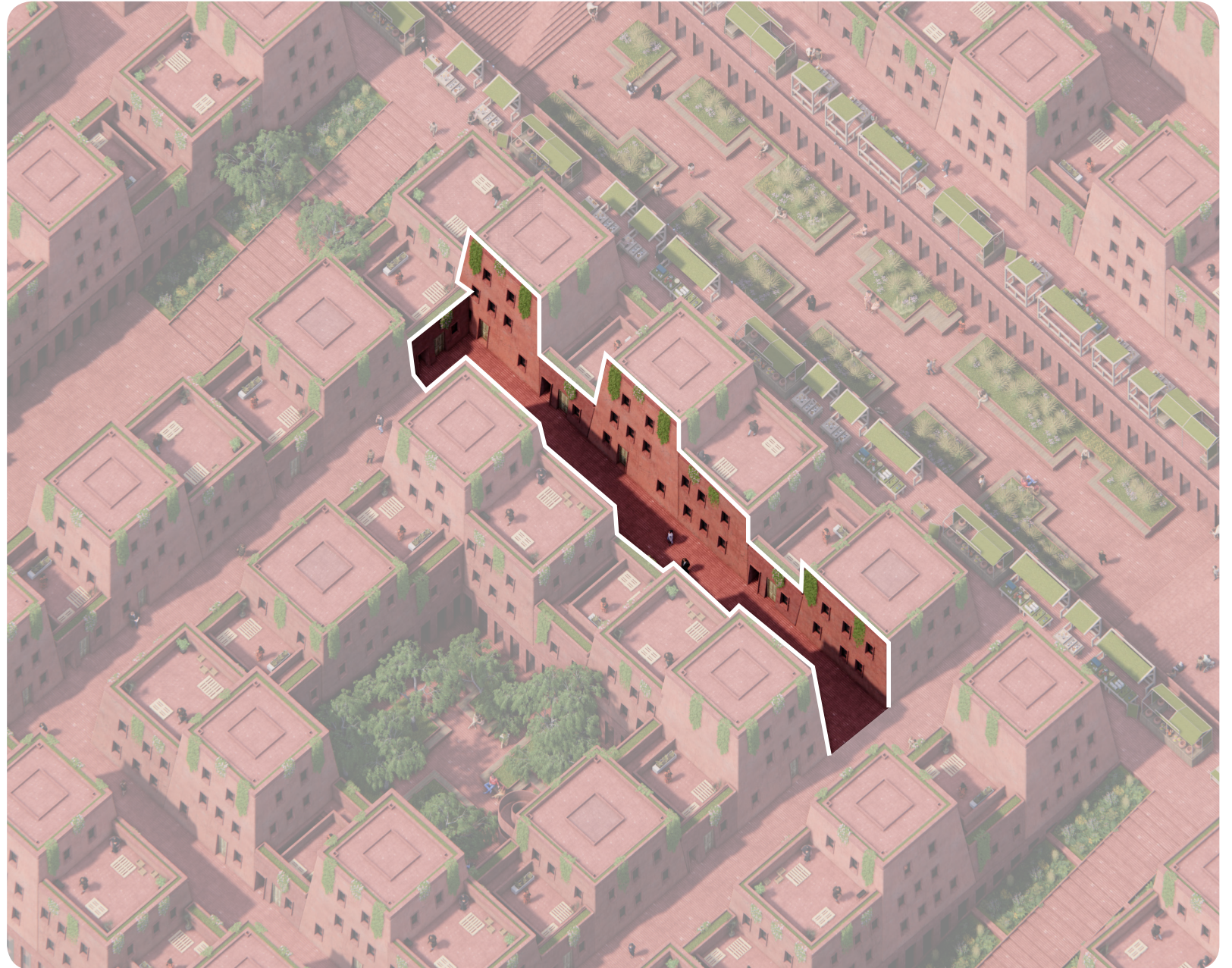




VENDOR STREETS

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.





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.



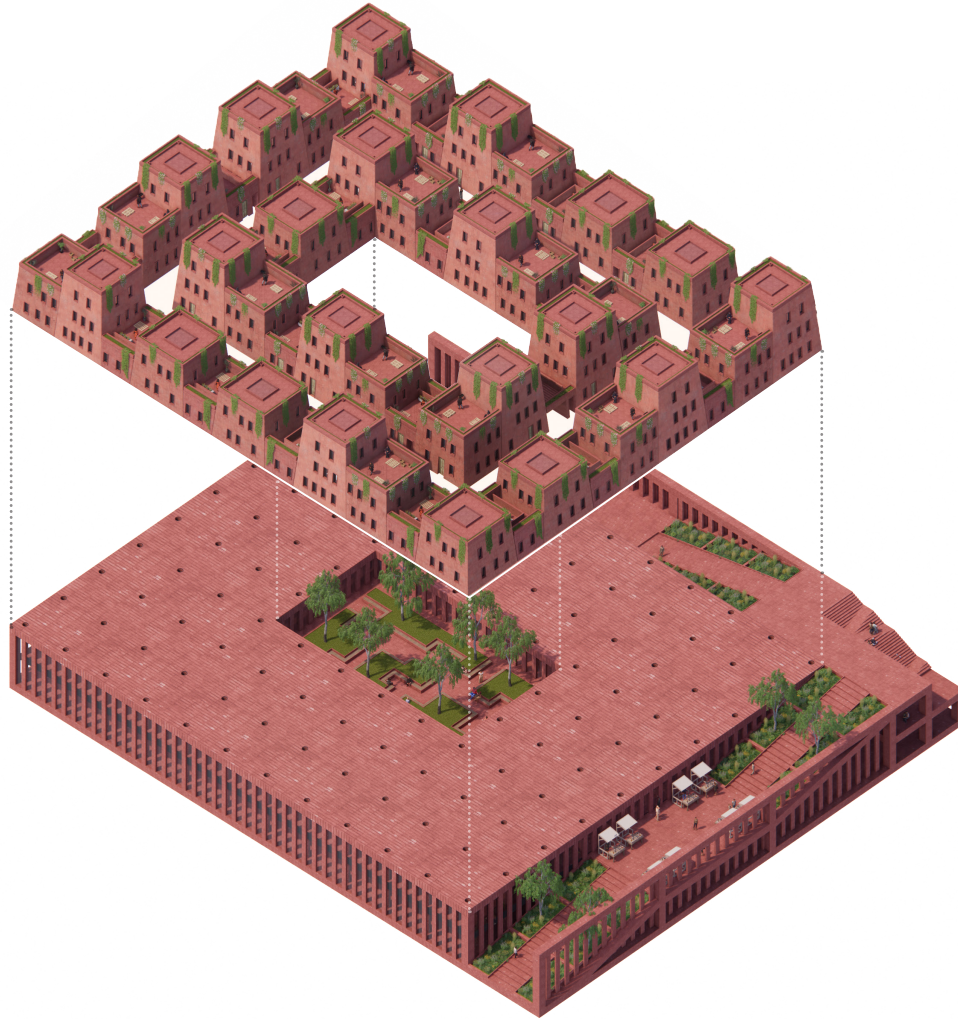


TERRACES

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

EXPLODED AXONOMETRY

BUILDING TECHNOLOGY



LOW-END CONSTRUCTION

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

HI-END CONSTRUCTION

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



EASE OF CONSTRUCTION

Designed to be easily replicated and built. System that doesn't require knowledge or qualified workers.



COST EFFICIENCY

Using adobe as a main material
- extracted locally, what leads to low transportation costs, easy accessibility and almost unlimited quantities.

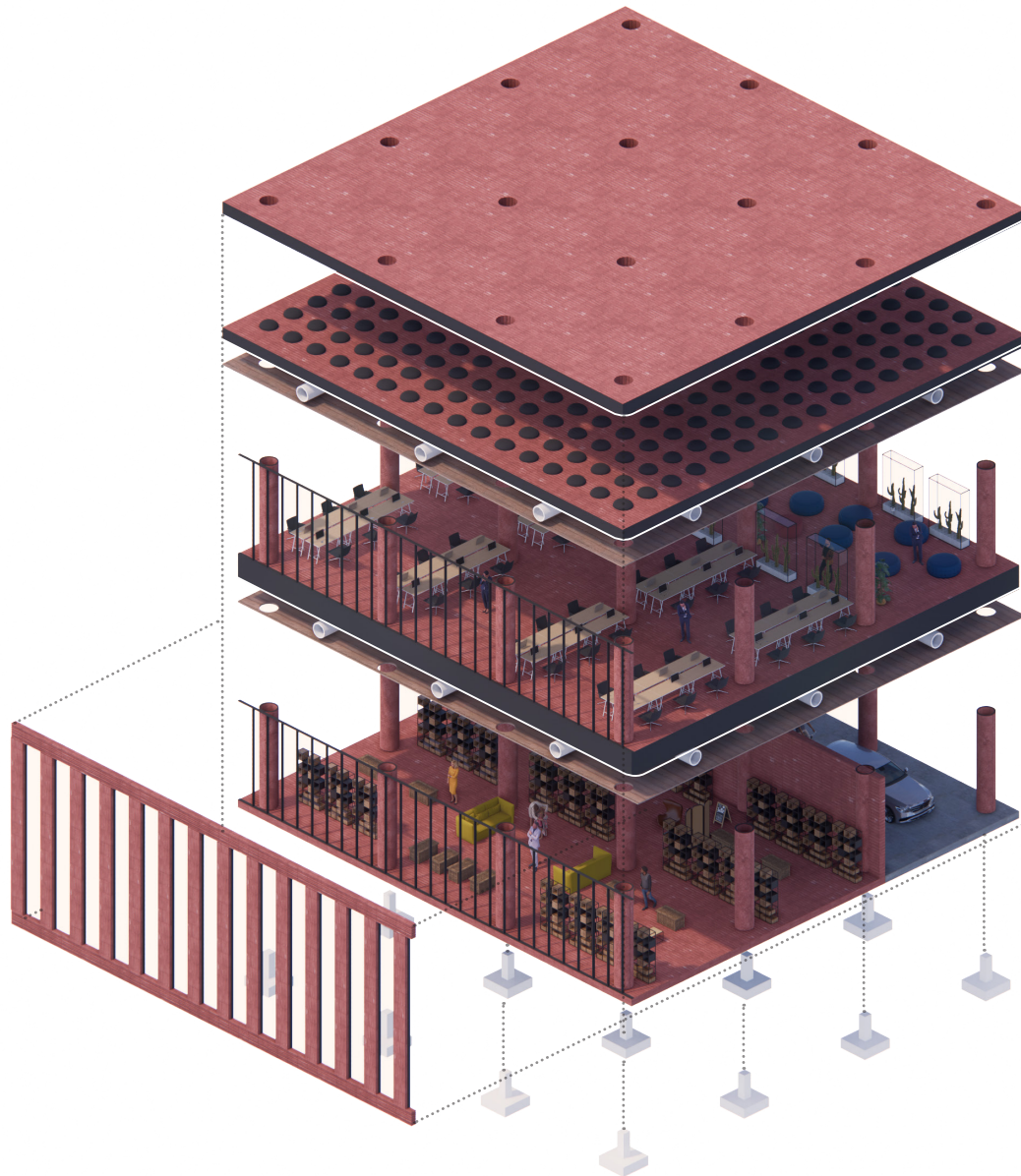


SUSTAINABILITY

Low cost and low petrol usage for material transportation, usage of local resources and low tech solutions.

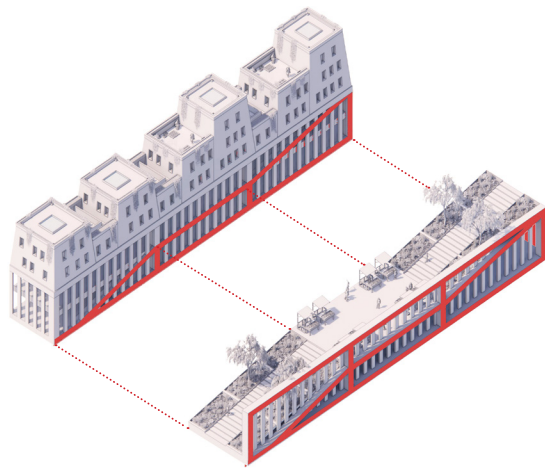
EXPLODED AXONOMETRY

BUILDING TECHNOLOGY



OFFICES AND AMENITIES

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



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.



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.

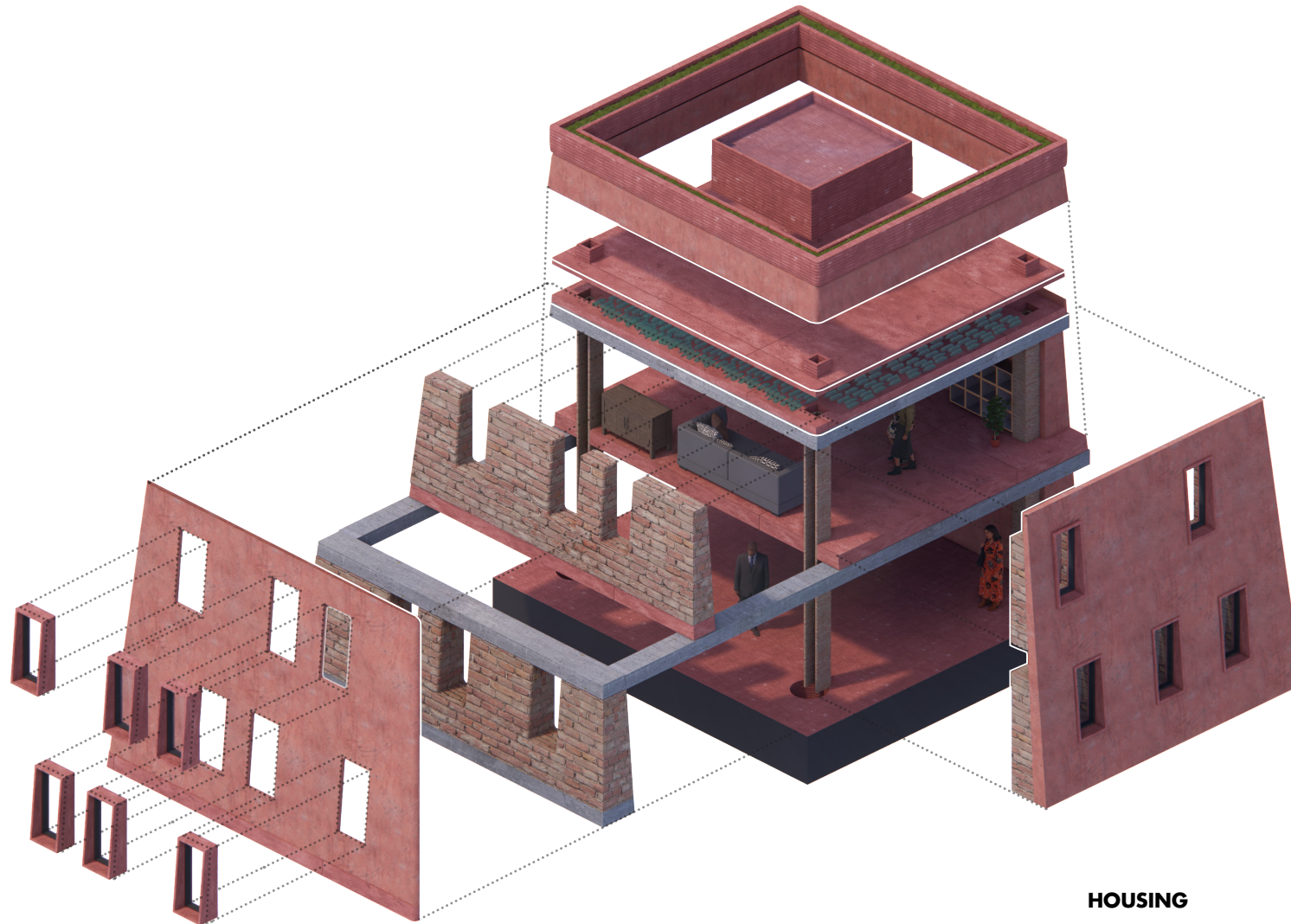


VOIDED SLAB (COBIAX)

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

EXPLODED AXONOMETRY

THE VILLAGE



HOUSING

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



PLASTIC BOTTLE INFILL

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.



THICKNESS TO HEIGHT RATIO

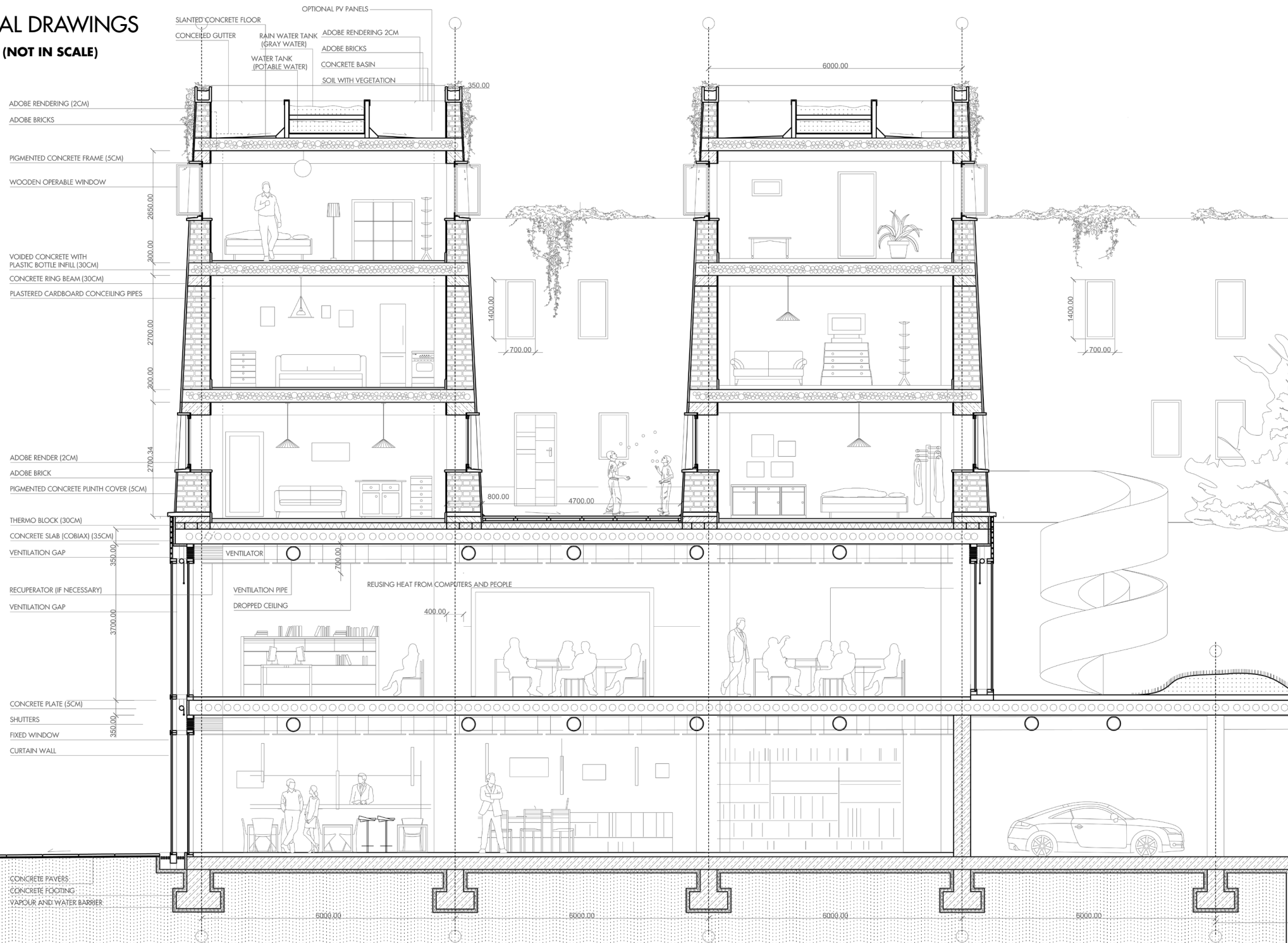
When using adobe the thickness of the wall gets reduced with height. Base has to be 1/10 of the height, hence the resulting shape of the buildings.



PARTICIPATORY METHOD

Using adobe is a low-tech method that can be performed by unskilled workers.

SECTION 1:20 (NOT IN SCALE)

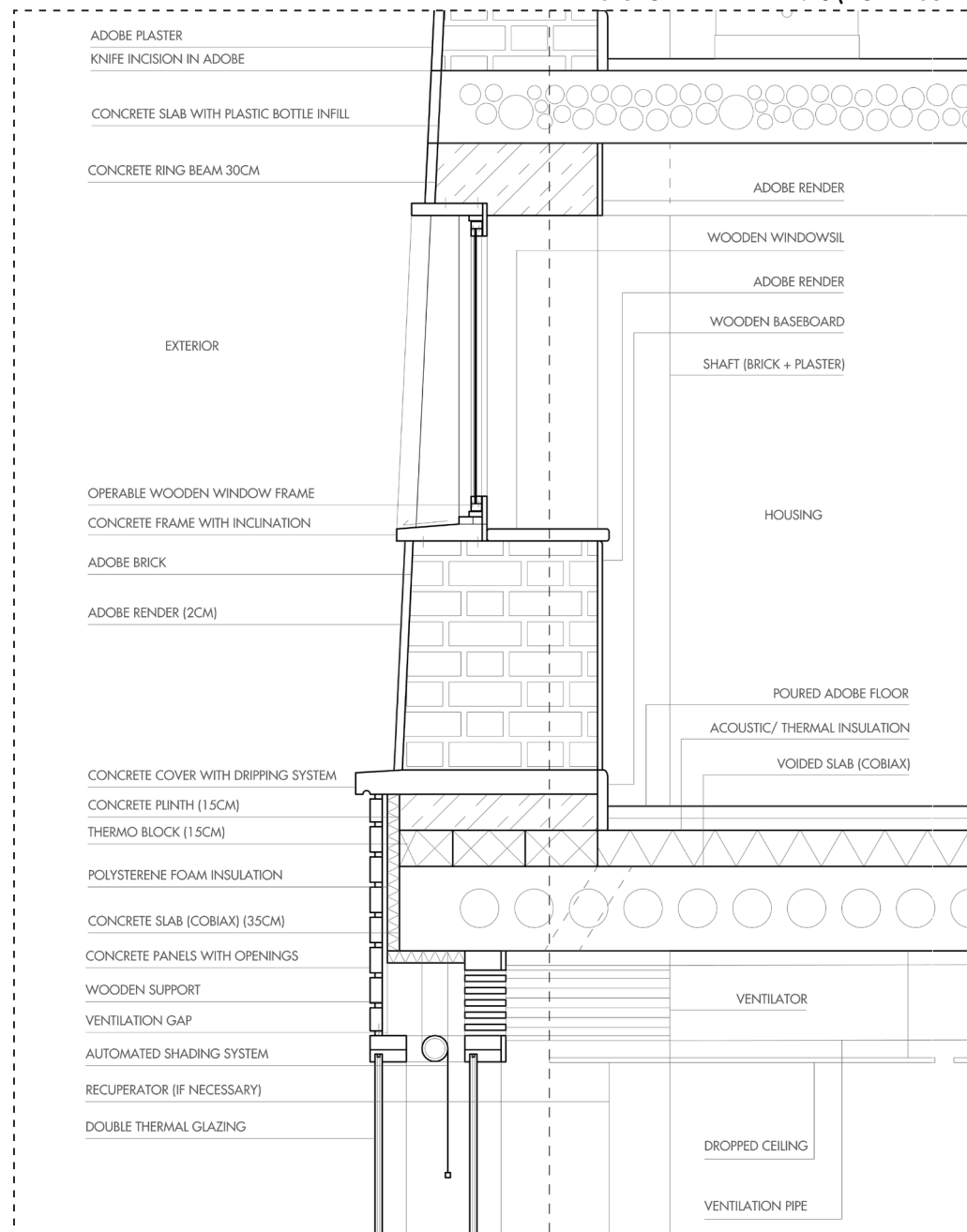
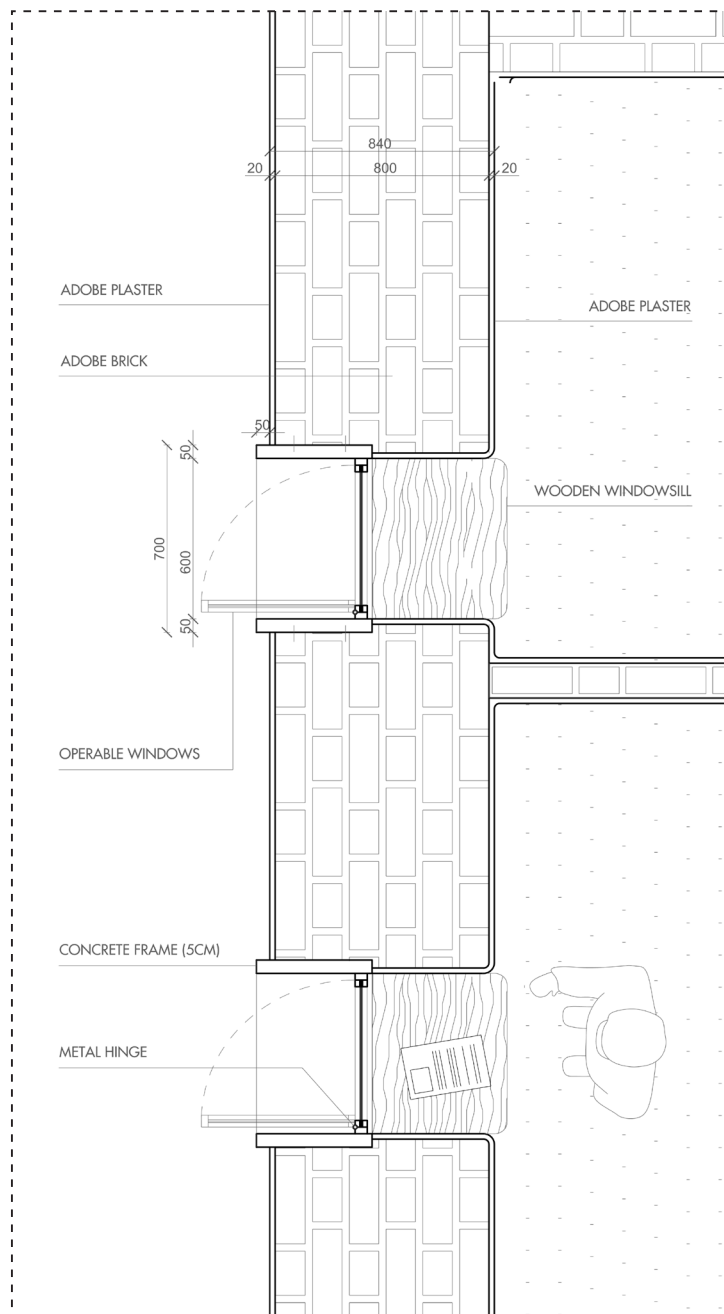


TECHNICAL DRAWINGS

SECTION AND PLAN 1:10 (NOT IN SCALE)

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

SECTION 1:20 (NOT IN SCALE)

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 RESIDENTIAL 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

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

ACCESS TO SHAFTS
ALL KITCHENS AND TOILETS ARE CONNECTED TO SHAFTS

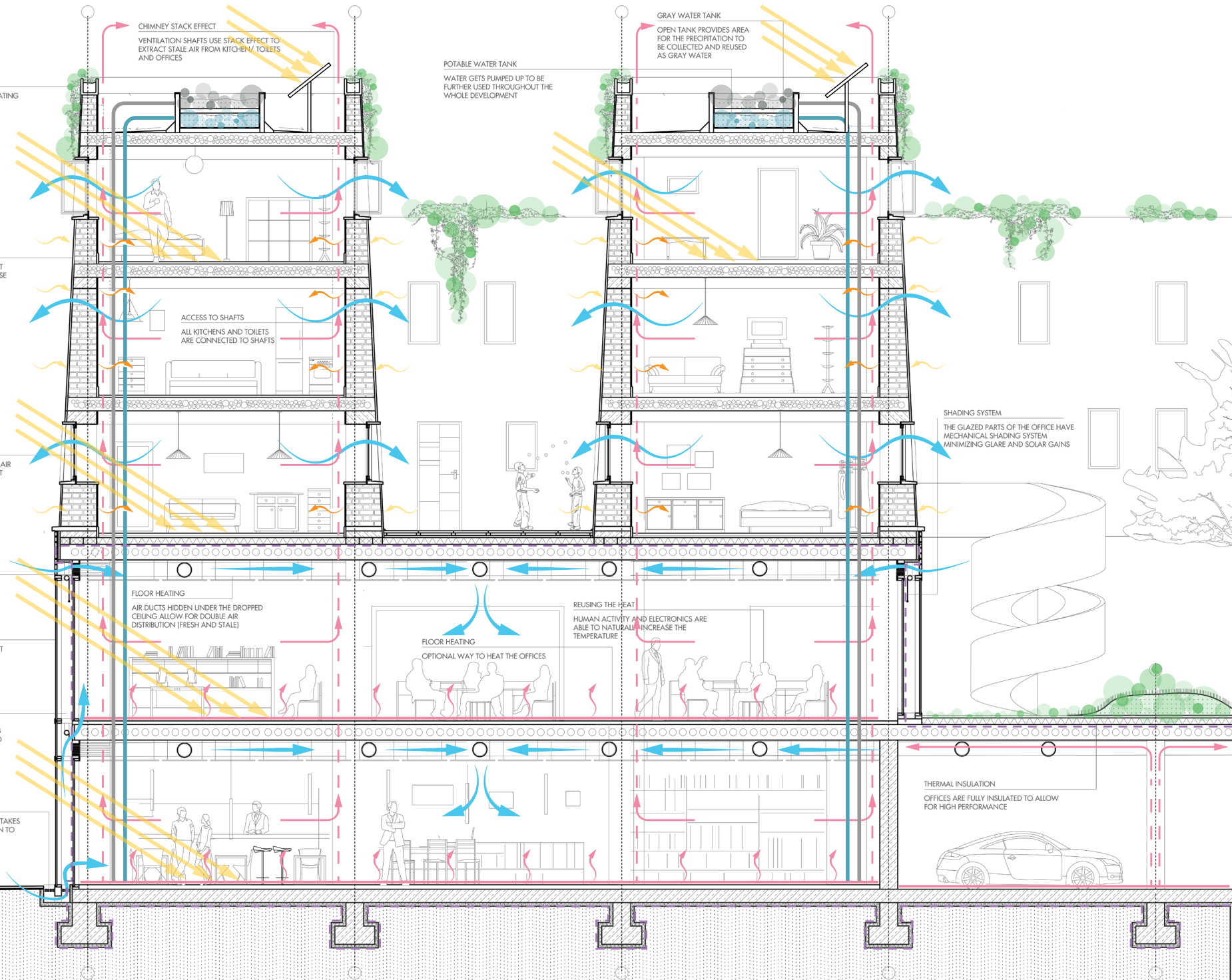
FLOOR HEATING
AIR DUCTS HIDDEN UNDER THE DROPPED CEILING ALLOW FOR DOUBLE AIR DISTRIBUTION (FRESH AND STALE)

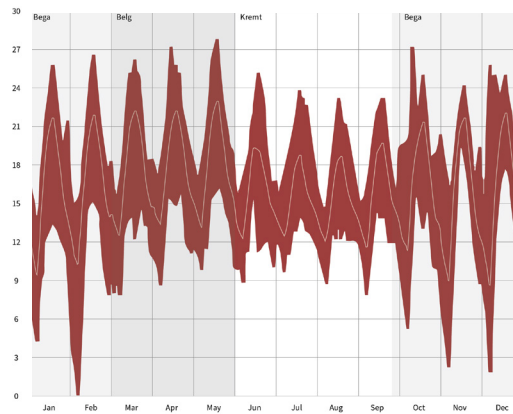
FLOOR HEATING
OPTIONAL WAY TO HEAT THE OFFICES

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

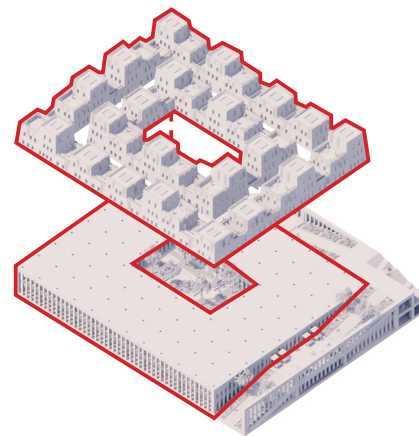
THERMAL INSULATION
OFFICES ARE FULLY INSULATED TO ALLOW FOR HIGH PERFORMANCE





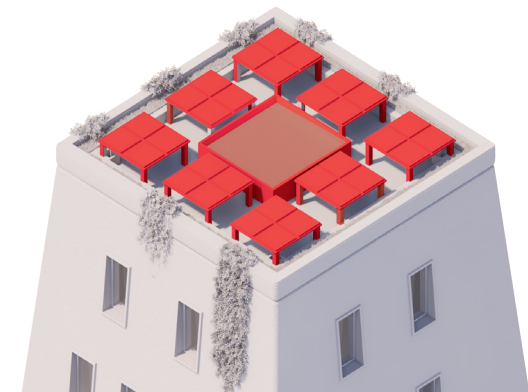
MILD CLIMATE

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.

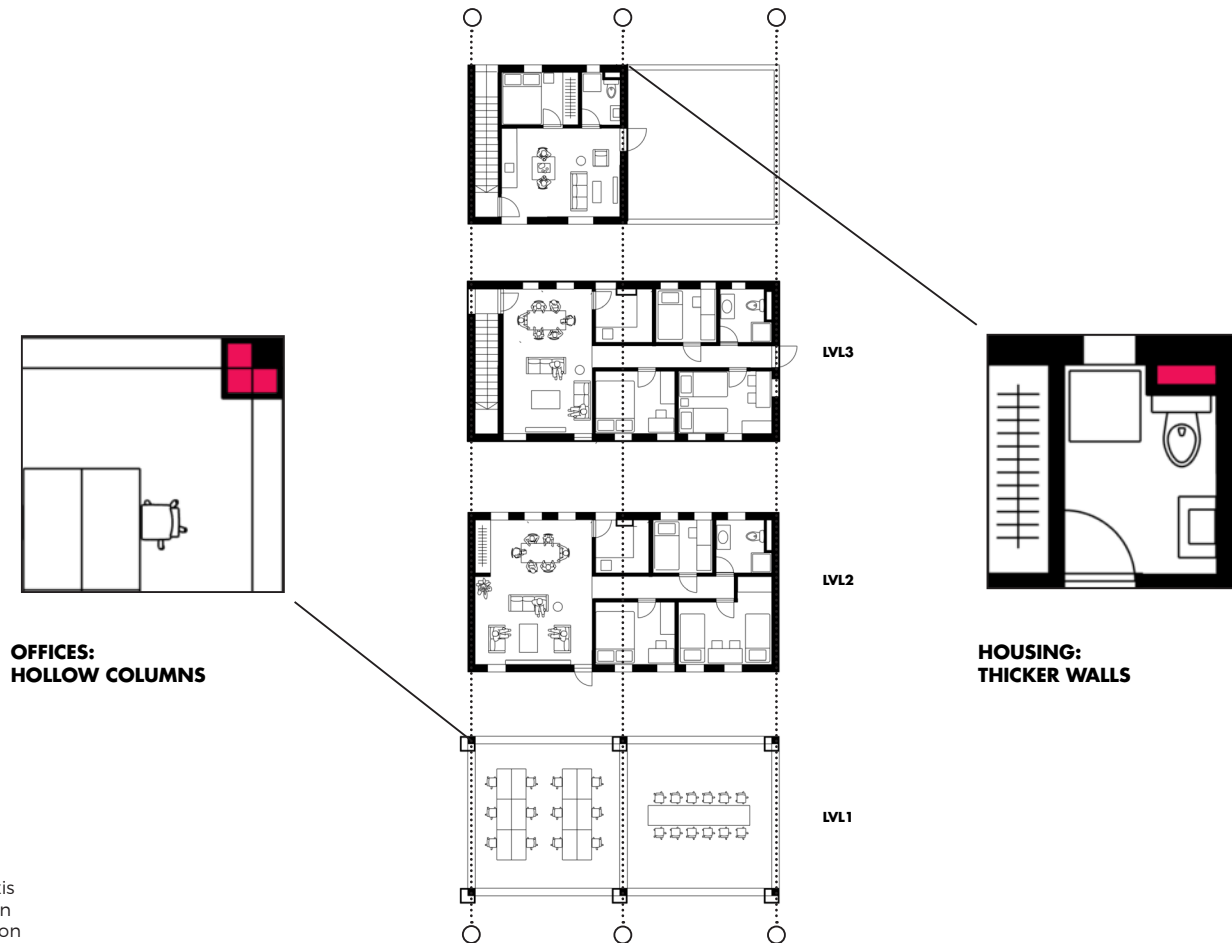


WATER AND ENERGY HARVESTING

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,

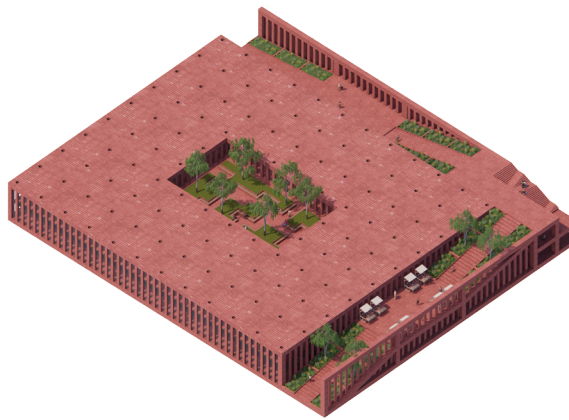
SHAFT STRATEGY

WATER AND VENTILATION MANAGEMENT



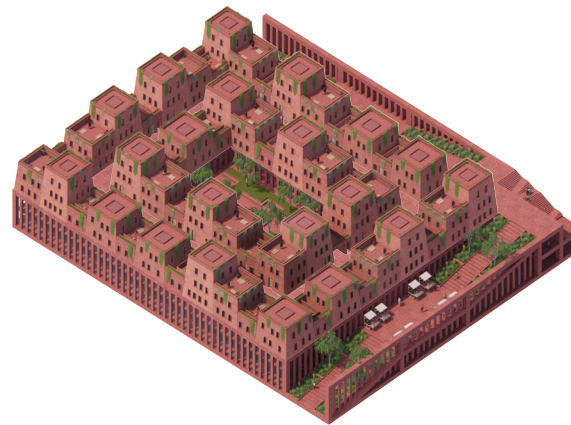
SHAFT STRATEGY

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.



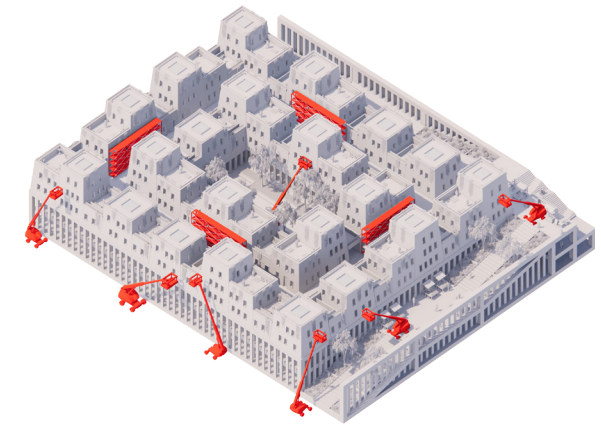
STAGE 1: OFFICES

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.

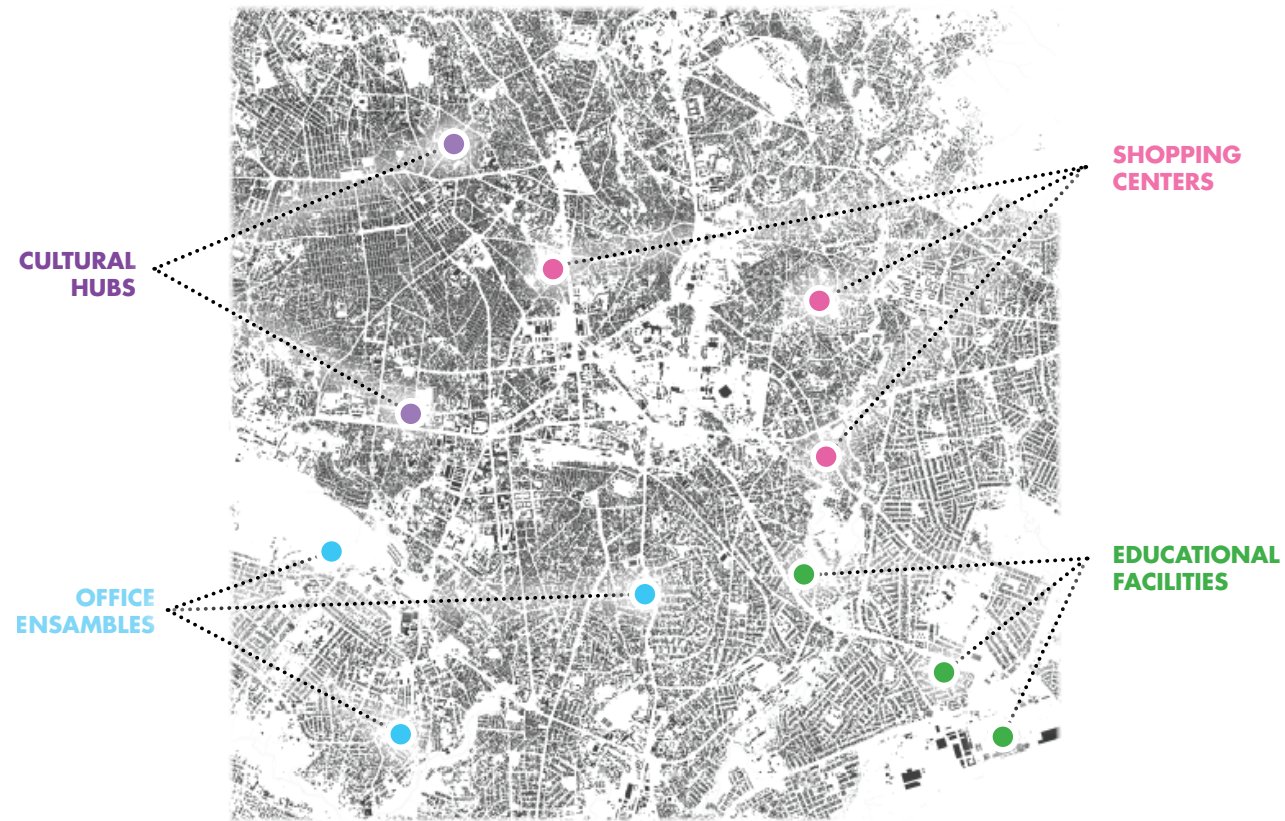


STAGE 3: MAINTENANCE

The system has been envisioned with maintenance 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.

ACUPUNCTURAL CITY INTERVENTION

NEW URBAN PARADIGM

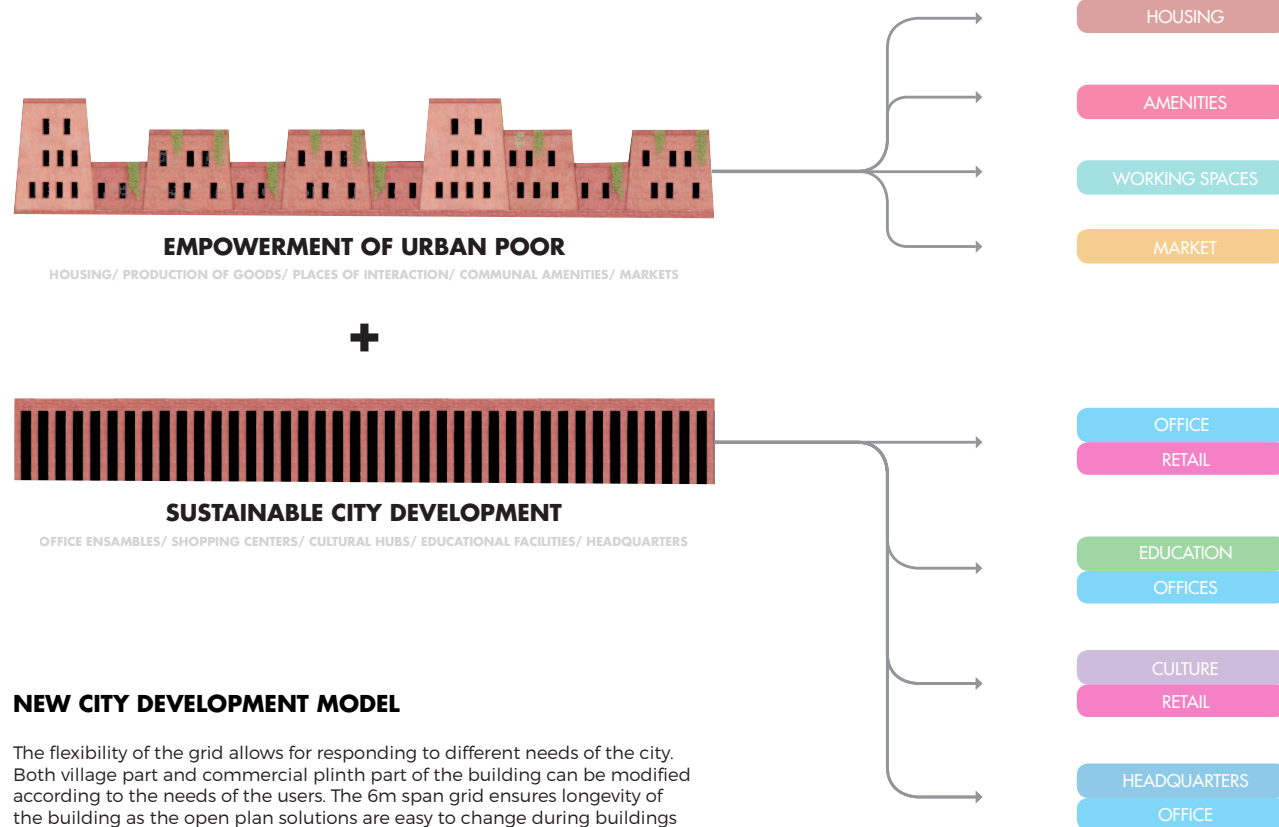


TACKLING DISPLACEMENT AROUND THE CITY

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



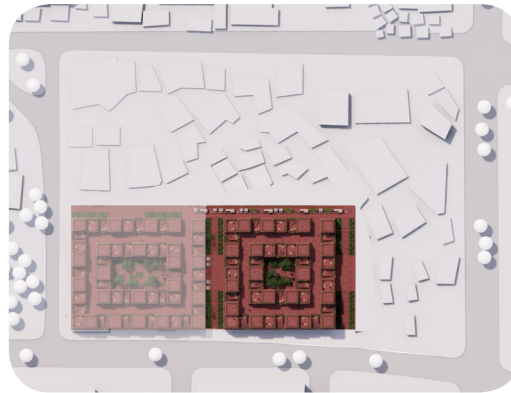
PHASING

BUILDING TECHNOLOGY



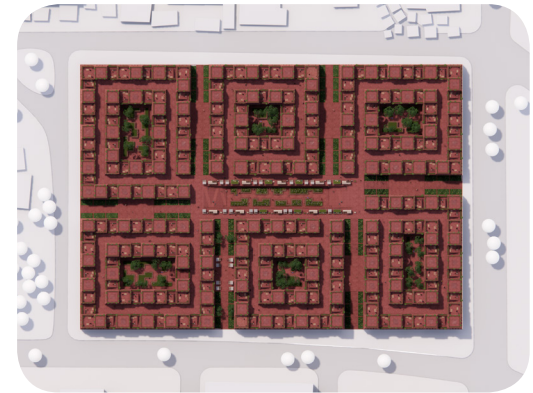
PILOT PROJECT

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.



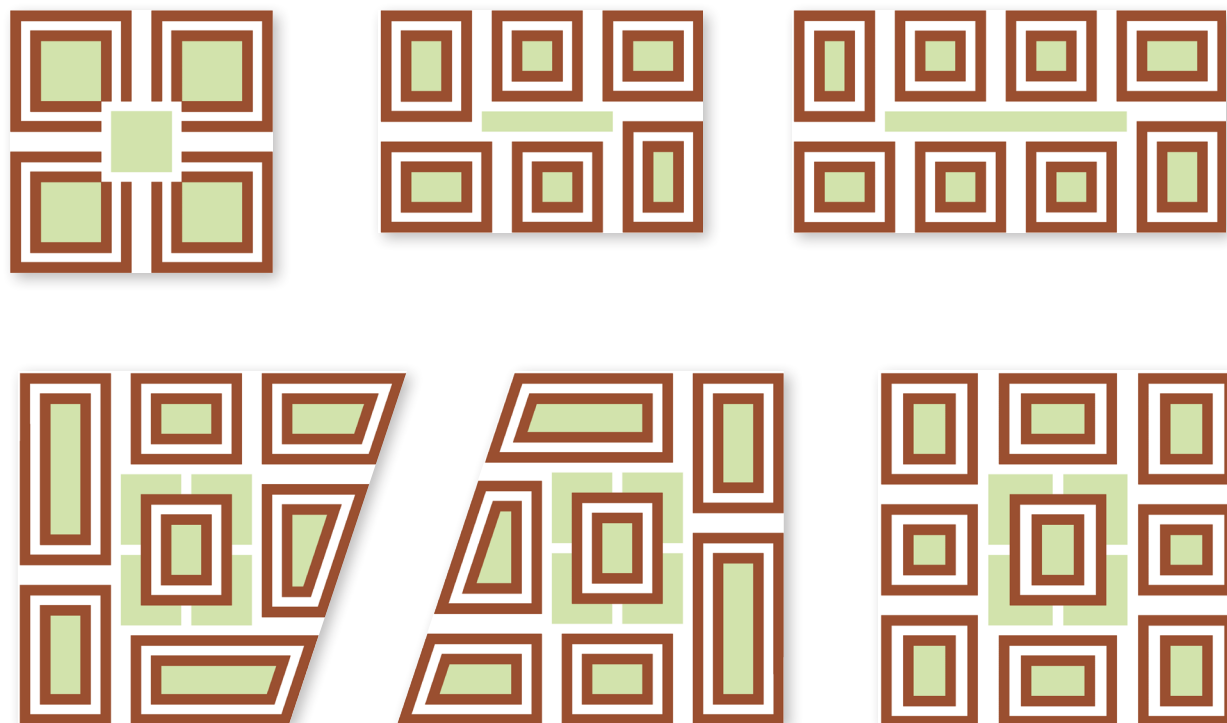
IN BETWEEN PHASES

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.



FINAL 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.



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 accessibility. The diagram above reveals potential ways of solving the courtyards on various plots.

MAINTENANCE OF ADOBE

THE VILLAGE



UNDERSTANDING THE ISSUES

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



PREVENTING WATER DAMAGE

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

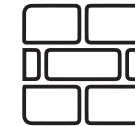
PROTECTION STRATEGIES

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.



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.



REPAIRS

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



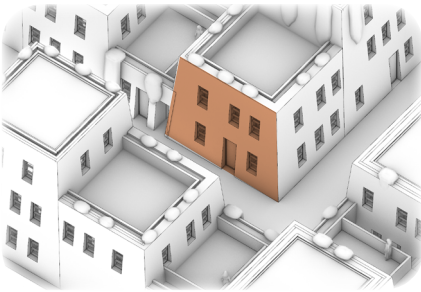
INVOLVED PARTIES

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

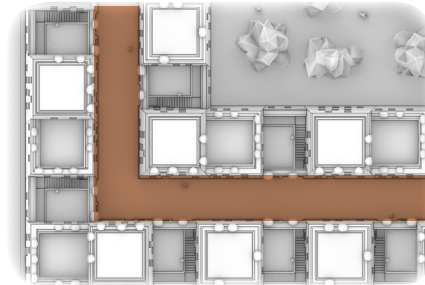


MAINTENANCE OF ADOBE

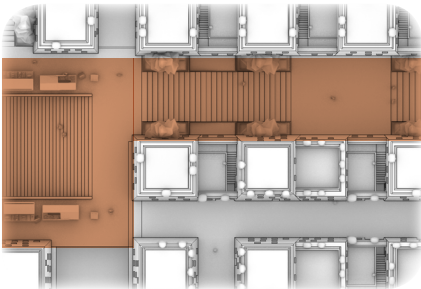
STRATEGY



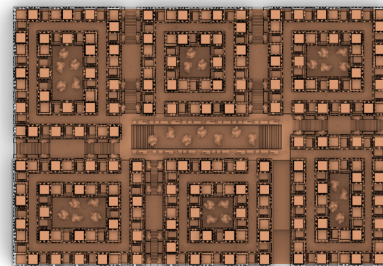
MAINTANANCE: AS OCCURS
LOCATION: VARIES



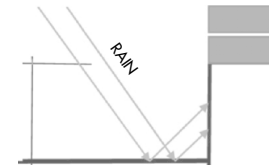
MAINTANANCE: WEEKLY
LOCATION: RESIDENTIAL AREAS



MAINTANANCE: DAILY
LOCATION: PUBLIC AREAS

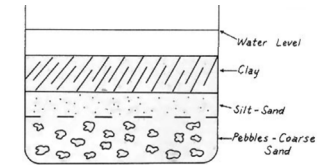


MAINTANANCE: BI-YEARLY
LOCATION: FACADES + PUBLIC AREAS



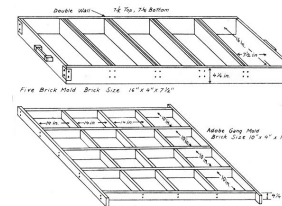
STRENGTHENING VULNERABLE POINTS

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.



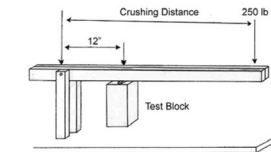
TESTING THE SOIL

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.

FINANCING MODEL

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 right 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.

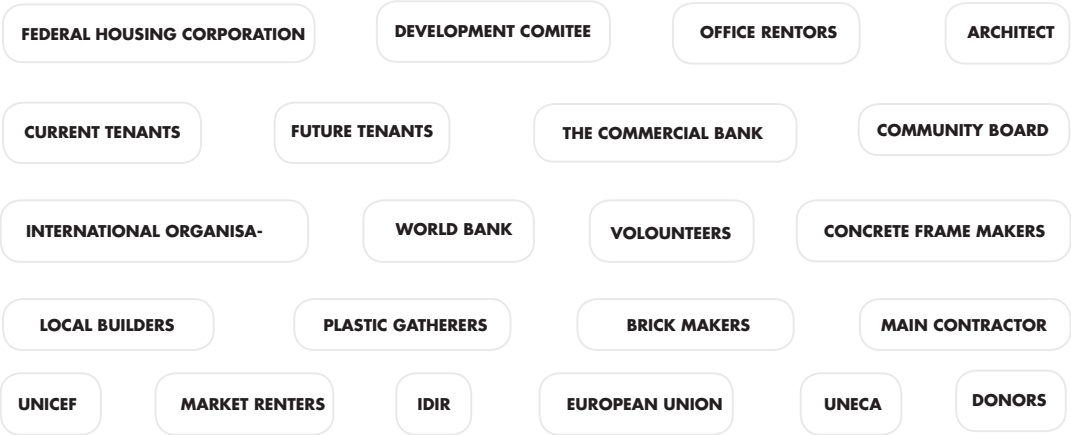
If existing dwellers don't have financial capabilities to pay for the housing they can either help with material making/building and pay over time.

FINANCING	NEW DWELLERS	EXISTING DWELLERS	OFFICE PLINTH
	15%	10%	20%
	(PRE PAYMENT) 20/80 EQUIVALENT	(PRE PAYMENT) 1.5/75 EQUIVALENT	(PRE PAYMENT)
FUNDING	SPONSORS	THE COMMERCIAL BANK	
	15% (DONATION)	40% (LOAN)	
COST RECOVERY	RENTING OFFICE USERS	TENANTS	AMENITIES
	75%	10%	10%

INVOLVED ACTORS

There are numbers of stakeholders from formal to informal and therefore it is paramount that the flow of information and decision making between them is efficient and fast.

Depending on the functions included in the program the map of involved actors will shrink or grow.



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 Committee will manage the development



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 building and its surroundings.



RECOVERY COST SCHEMES

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



DEVELOPMENT COMMITTEE

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



TENANCY COMMITTEE

Current plot tenants get reimbursement 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 committee funds.



INVOLVEMENT OF SPONSORS

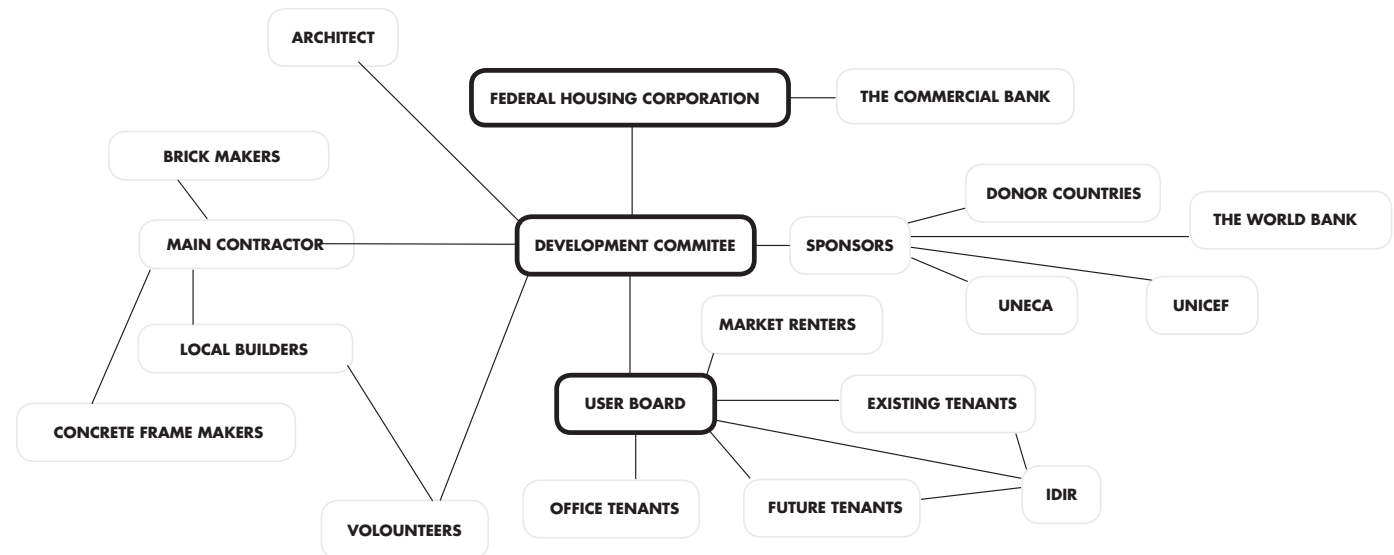
Support for innovation development in Africa is a key development objective for the most significant donor countries (the USA, the United Kingdom and Germany) and international or-



MAP OF INTERACTIONS

There are three main managerial entities which connect the whole network together.

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



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

1. INTRODUCTION

The project is located in Ethiopia - one of the poorest countries in the world and with nearly 115 million inhabitants. It is the second most populated country in Africa. Although it is one of the fastest growing economies of the region, the livelihood of Ethiopian cities is still being challenged by number of issues including overwhelming poverty, shortage of adequate infrastructure and services, deficit of affordable housing and limited access to education. The recent economy growth, mostly triggered by shift of focus from rural to urban development is slowly improving the situation, but at the same time imposes challenges related to development-induced displacement of the urban poor. Those specific problematic aspects and conditions constitute the point of departure for this project and all related research.

The process of gathering information about the context resulted in a reflection on the extent of the poverty of the Ethiopian population. That led to the decision to focus the research on finding a scheme that not only would help alleviate the housing crisis of the most vulnerable part of the society but also boost the economy of the country in the long run. Given the specificity of the context and the habitual patterns of the slum dwellers it became clear that they require not only a physical space in the city center but primarily a space that will respect their living and working habits.

The main goal of my graduation project was therefore to address the spatial dilemma between the city development and a lack of tenure security of the slum dwellers in the city center. Because of the complex nature of the issue, a special emphasis has been put on improving the economy of the individual households as well as creating an optimal spatial environment for nurturing innovation-oriented business in the city.

The main design challenge was to spatially combine business-oriented typology with an affordable housing scheme, keeping in mind the inherent differences between them while being able to explore all the social implications, challenges and opportunities of the resulting mix. Important for the feasibility of the project was maintaining current income generating activities (with a special emphasis on 'close relation to the ground') and maintaining the social bonds between the slum dwellers.

The tutoring sessions and scheduling of the studio were very helpful in making sure all the essential aspects were reflected upon and which later on directly contributed to creating a holistic approach to the project, where all individual aspects informed one another. The feedback from the tutors was encouraging and motivating and it fueled a lot of exploration, especially between different social groups and creation of social spaces.

Given the complexity of the issue at hand and multiple environmental and contextual conditions a further elaboration of certain aspects is still needed. The next step after P4 will be to further develop the typologies of the designed spaces and to relate them to the existing living patterns and vernacular aspects through space animation and choice of the most suitable spatial qualities. The most crucial elements to be considered are landscaping and showcasing the spatial and social aspects of the project, while keeping in mind all the references that have been researched in the previous stages of the project.

2. RELATIONSHIP BETWEEN RESEARCH AND DESIGN

Departing from the issues of poverty among population and current harmful city development strategies in Addis Ababa, the research was focused mainly on the question: How to redesign city's development strategies to mobilize economic growth, minimize forced migrations and empower urban poor. In order to explore the subject further areas of research were established focusing on feasibility, economic growth and income generation expressed through social and spatial conditions.

The outcomes of the theoretical research have been thoroughly analysed and implemented into the design hypothesis. The initial predictions and estimations were further developed as a consequence of 'research through design' strategy allowing to assess the feasibility of the assumptions. All information gathered during the research period have directly informed the design strategies.

In order to illustrate that, we can discuss the results of the contextual research, which revealed that rethinking Addis Ababa's city development is paramount in order to foster sustainable growth of the city. Furthermore the study of condominium scheme revealed that maintaining the bond with the center is crucial for the slum dwellers, therefore it is essential to look for the solutions within the city, rather than pushing the problem outside of its boundaries.

Although the design process itself was not easy and straightforward, the approach turned out to be quite successful in the final outcome. The information gathered during the research phase and case study analysis helped to create a framework in which potential design solutions were tested. The adopted approach revolved around establishing the economic and spatial viability of the issue, which directly informed various aspects of the project such as: funding, form, materiality and creation of urban social spaces.

The research part focusing on the development-induced displacement in Addis Ababa allowed for gaining a better understanding of the scope of the problem and enabled targeting the specific issues that needed to be tackled while developing the proposal. The case studies of precedents located in various locations around the world that were collectively conducted in the studio enabled me to see alternative approaches and made me realize the limitless possibilities of tackling the problem. An especially educational and inspiring example was definitely the detailed case study analysis of Walden 7 by Riccardo Bofill in Barcelona which pushed me to look for spatial beauty amidst lack of resources.

REFLECTION

RELATIONSHIP BETWEEN THE GRADUATION TOPIC AND THE MASTER PROGRAM

3. RELATIONSHIP BETWEEN THE GRADUATION TOPIC AND THE MASTER PROGRAM

Architecture has a great power of shaping people's lives. By choosing the Global Housing studio I wanted to channel this potential into finding ways of improving the situation of the most vulnerable part of the society in the context of developing countries. Ethiopia's rich history and unique multi-cultural values have always been of a particular interest to me and the task of designing affordable housing in a complex economic and urban condition of Addis Ababa seemed like a great way not only to address a global crisis but also to get to know country's legacy in the specificity of the situation. I have always been fascinated with foreign contexts and exotic cultures but up until now I have never had a chance to design outside the Western world framework. The choice of the studio, therefore, seemed like a great way of expanding my perception of architecture in the global context and learning about foreign vernacular methods of building and typologies.

Since the focus of the studio is creation of affordable housing, I dedicated a major share of my time to research, trying to find the answer to the core of the problem: financing the model and finding alternative ways of dealing with the shortage of space in the city center.

As my affordable housing scheme revolves around feasibility, relationship between people, space sharing and inclusivity I believe that the approach that I took aligns well with the vision of the studio. The proposed scheme tackles the above-mentioned issues from multiple vantage points and explores the use of a balanced combination of low-tech and high-tech solutions. The main goal was to bring those two opposites together in such a way that would benefit the future users in the best way possible.

The design strategy I implemented was quite unique in comparison to other students. I believe that my proposal pushed the envelope on how to tackle the issue and proved that combining research and non-standard inventive design strategies, which are directly informed by the conditions of the project, can result in architecture that has the power to solve social, financial and spatial issues all at once.

4. REFLECTION ON THE RESEARCH METHOD

The project has been developed balancing between form, function and socioeconomic sustainability. The main design and research methods that were utilized throughout the process were case study research and form finding, both supported by a thorough ethnographic investigation.

As the physical visit on the site location was not possible, the only way to learn about the patterns of habitation (the crucial aspect of my project) was to explore the material gathered by the students from previous years, research available online and indispensable input from the design tutors.

The project relays strongly on the concept of a "closed system", which turned out to be a significant learning curve. During the process I discovered that this type of solution calls for more time to solve spatially and geometrically as each iteration requires constant remodeling and testing the form of the building as a whole. However, in the end, because of its inherently unique features the building was able to host a system that combines the needs of the city with the needs of the most vulnerable part of the population.

The form finding method that was incorporated into the design process proved that integrated architectural approach is able to solve a spatial and social dichotomy through typological intersections that could not occur while using standard approaches.

5. GRADUATION PROJECT AND THE WIDER SOCIAL, PROFESSIONAL AND SCIENTIFIC FRAMEWORK. TRANSFERABILITY OF THE PROJECT.

Development-induced displacement is an urban phenomenon affecting the lives of millions of households each year around the world, in particular the low-income and vulnerable group of people. As of now, most of available research on urban poverty and spatiality addresses only the outcomes of the poverty rather than deeply engrained causes of it, such as weak economy and lack of income generating possibilities for the slum dwellers. My proposal contributes to understanding of the multi-dimensional effects of development-induced displacement in the context of Addis Ababa by envisioning an alternative scenario to achieve a win-win situation for both city and the dwellers.

From the social standpoint, the aim of the proposal was to increase the quality of life of the slum dwellers by providing them with security of the tenure while upgrading their current living conditions. Special emphasis of the project has been put on social integration between the two worlds (business vs informal housing) as well as keeping the current social links intact. By involving people in creating the housing part, the project aims to create new job opportunities on multiple levels (managerial and directly related to building technologies).

Professionally, the project is an example of how research is able to inform the creation of architecture that tackles very complex socio-economical issues. It raises awareness about concerns of developing countries and tries to showcase ways to combat them. By making architects sensitive to the needs of the poor and showcasing the need of holistic approach to the problems, the project has the potential to become a new typological standard for dealing with such issues. Moreover, the design aims to demonstrate that aesthetics can go hand in hand with low budget and that the low-tech solutions can bring a lot of innovation into a design.

From a scientific standpoint, the project explores and promotes the usage of local low-tech materials and contributes to the research about development-induced displacement. In terms of introduced technological solutions, the goal of the project was to innovate within the existing financial limitations and as a result to contribute to the pool of low-tech solutions that can be replicated in the future.

Since the transferability of the project was also an important concept throughout the process, the design was made in a way that allows for its implementation in various locations around the chosen site. Furthermore the entire concept can be replicated in different locations in any developing country with similar issues. Naturally, each individual case is different and would require additional urban/ contextual analysis as well as engagement with the community in order to find the best and most informed scenario.

6. ETHICAL DILEMMAS

During the process multiple ethical dilemmas had to be considered. Many of them were a resultant of the lack of possibility to visit the site, which made it impossible to interact with people that the project was developed for. Given the limited opportunities for gathering necessary information, an even grater caution had to be maintained while proposing various interventions. The entire process was developed with a very conscious and deliberate effort towards cultivating respect towards local community with simultaneous attempt to improve their life quality.

It is always a great challenge to propose new solutions for a community whose lives are different than ours to such a great extend. Given the complete foreignness and the level of complexity of Ethiopian socio-cultural conditions any project gains a completely new added layer of research aimed at understanding the potential user.

It is important to note that the project was conducted under very exceptional and unexpected conditions (COVID19 pandemic) which enforced a very creative and innovative approach. The lack of direct contact with a potential user would prove difficult under any circumstances, making it especially problematic when designing for a user we have such limited knowledge of.

It is safe to assume that the final result could be dramatically different if the direct contact with the Addis Ababa community was maintained, but conducting a research and developing a design under such untypical conditions was in the end an extremely educational experience allowing for a discovery of new techniques and ways of finding information. I believe that knowledge gained and discoveries made along the process can greatly benefit the discussion on the topic of inclusive development in the context of developing countries.

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05 JULY 2021

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**DEVELOPMENT INDUCED EMPOWERMENT:
THE ROOF VILLAGES OF ADDIS ABABA**

CITY DEVELOPMENT STRATEGIES IMPROVING
ECONOMY AND EMPOWERING URBAN POOR

BARTOSZ KOBYLAKIEWICZ (4917510)