OLD BUS DEPOT

BUS - REPAIR SHOP

NTUA 9TH SEMESTER PROJECT

INSPIRELI

GREECE

ELEONAS

ALEXANDROS ELENI SEMELI

AGRO-URBAN

FLOODING

TERRITORIAL CONTEXT

The Plot is situated in an industrial Area in the middle of the Athens Metropolis in Greece.

This area is currently a socioeconomical Black hole, as shown in the Activity Heatmap that can be seen bellow:



However, the "Double Regeneration" Plan to Revive it includes a series of new Projects that surround our plot and create a passage that connects two sides of the City as shown in the diagram.

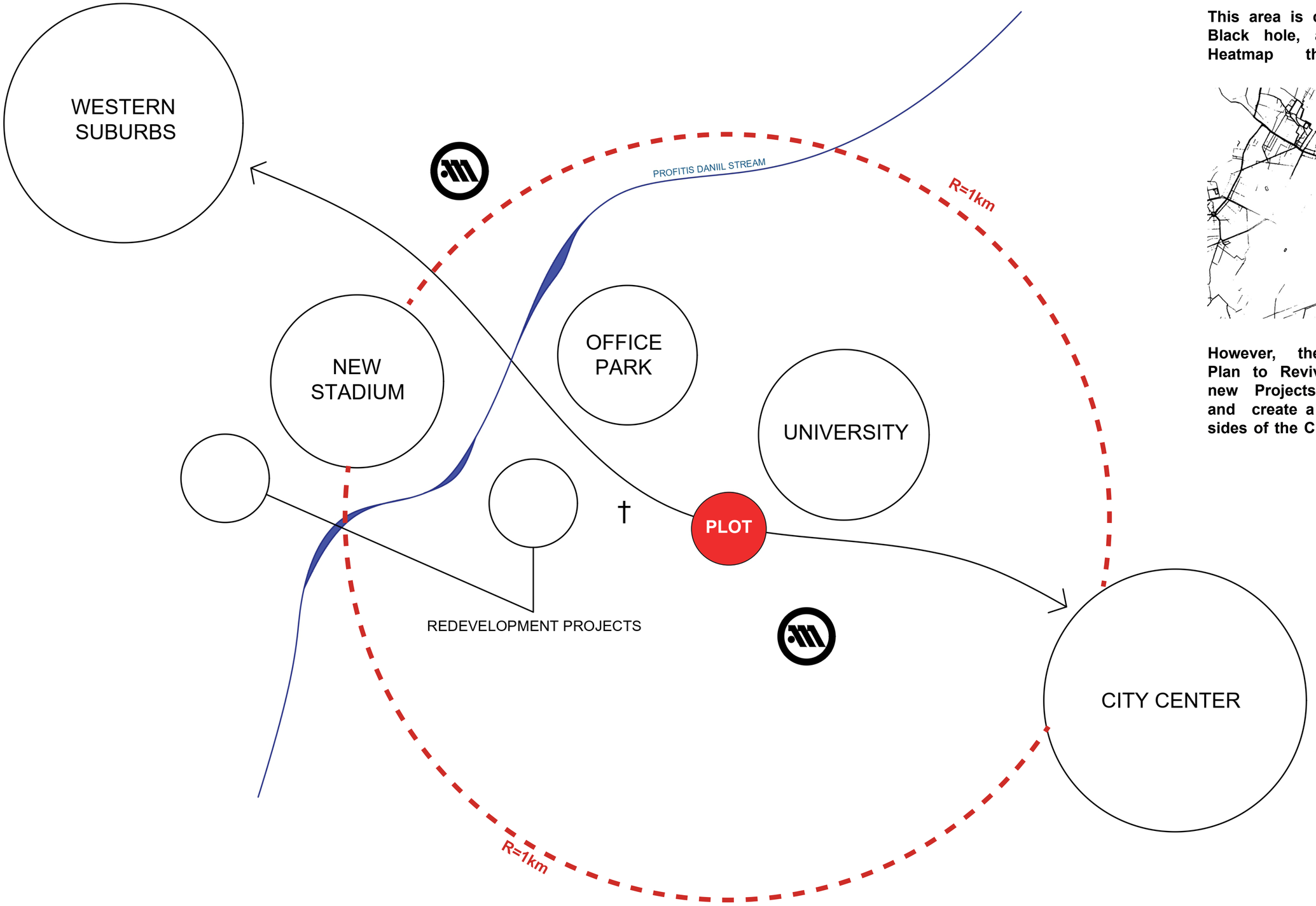


Photo Source: Public Domain



Vineyard

Photo Source: Agricultural University of Athens (permission acquired)



University Facilities

Photo Source: Agricultural University of Athens (permission acquired)



Incidental Landscape

Photo Source: Agricultural University of Athens (permission acquired)



Greenhouses

Photo Source: Agricultural University of Athens (permission acquired)



Greenhouse Agriculture

Photo Source: Public Domain



Arboretum

The **Water Runof:**

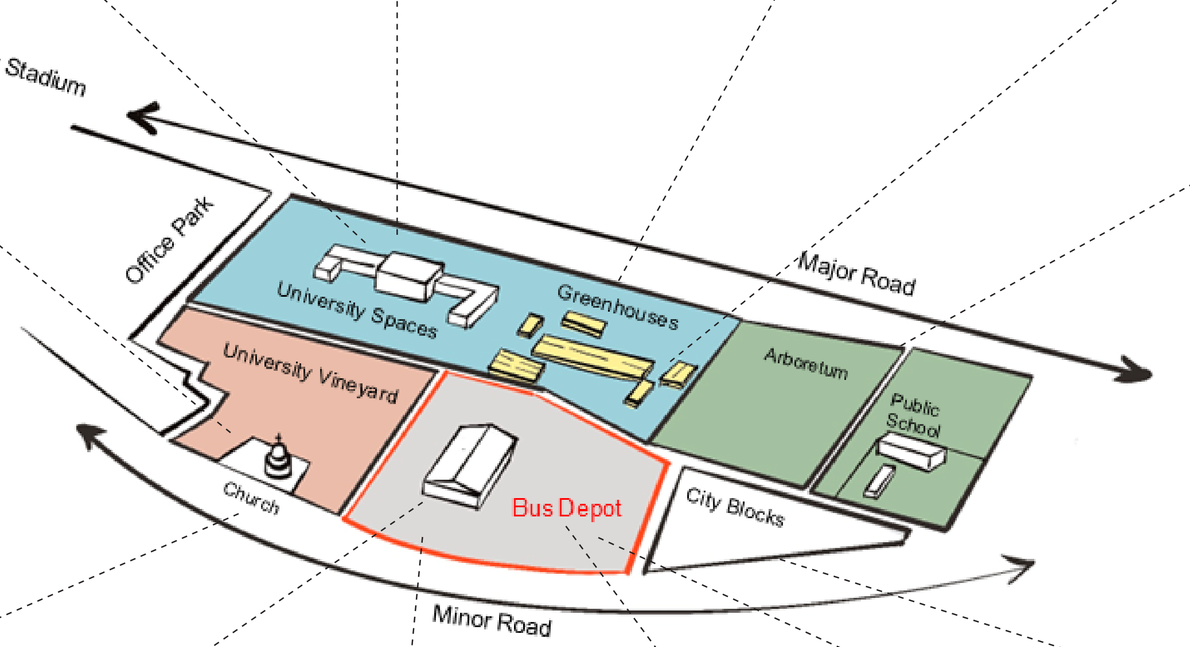
While the Arboretum and the Incidental Landscape doesn't create toxic water, The **greenhouses and agricultural production** creates Irrigation and drainage runoff that contain

Salts
Fertilizers
Pesticides

that would require a multiple filter treatment process to clean

Adding to that, the Depot Facilities contain batteries, vehices and Tires that contain:

Heavy Metals (Pb, Zn, Ni, Cd)
Hydrocarbons (TPH, PAHs)



The Context:

The Plot is situated between the

City
Agricultural Lands

The Peaceful connection of the two different Land uses will be a major challenge.



Being in a flood prone Area, Water need to be in mind when designing the connection



Saint Polykarpos Church

Photo Source: Public Domain



Bus Depot Repairshop

Photos Source: © O.Σ.Υ. ΜΟΝ. Α.Ε. (permission acquired)



Bus Parking

Photos Source: © O.Σ.Υ. ΜΟΝ. Α.Ε. (permission acquired)



Batteries

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Tires

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City Blocks

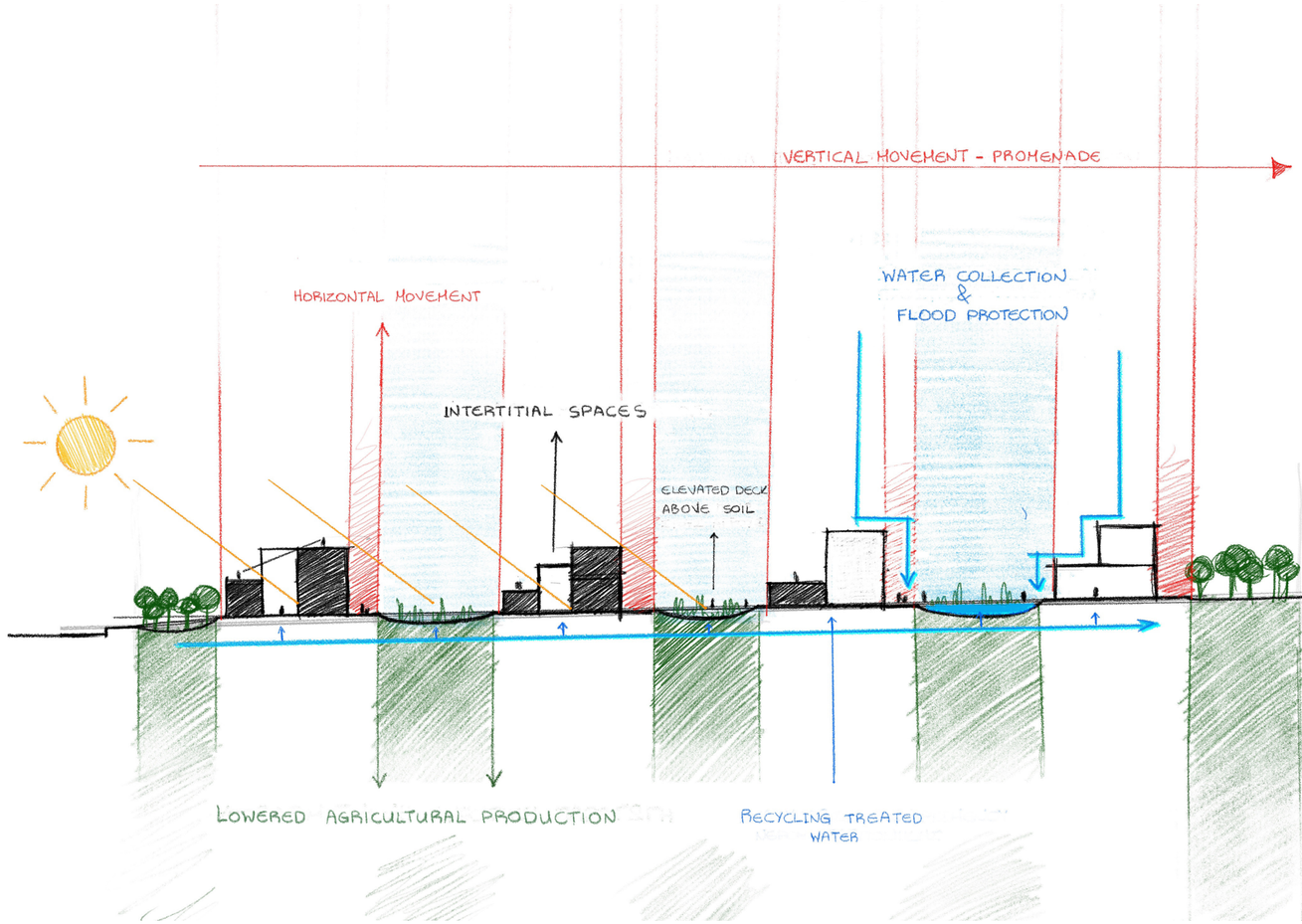
Photo Source: Public Domain

SPATIAL COMPOSITION

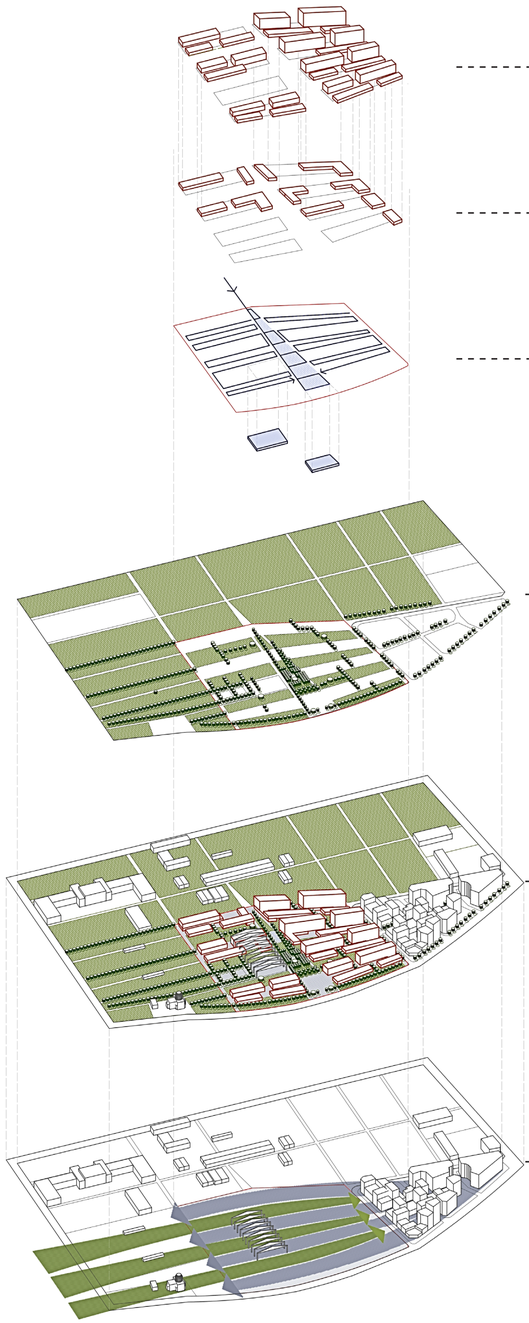
The Lowered Productive Softscape
The agricultural lands are physically lowered to form a highly permeable landscape that integrate decentralized Sustainable Drainage System (SUDs) and retention wetlands to capture, hold, and filter severe stormwater and industrial runoff.

The Elevated Infrastructure Core
Suspended above the flood-prone agricultural layer is a dedicated structural deck system. This car-free promenade permits the vertical movement through the plot and the horizontal building and soil zones

The Stepped Morphological Profile
The residential massing uses a stepped layout maximizes sun exposure across the site, naturally encourages dual-aspect cross-ventilation, and transforms low flat roofs into accessible community green space.



COMPOSITIONAL LAYERS



Building Massing:
The buildings are placed in blocks that ensure urban fabric continuity and are parametrically adjusted to the shape of the plot

Ground Floor:
The ground floors are following a different pattern that prioritises a commercial city frontage and other public uses throughout the plot and offers walkable terraces for the residents .

Blue infrastructure:
The water management is the centre-point and the dividing line between the plots. It starts at the top of the plot where the agricultural waters are gathered and through a series of water cleanup zones that double as a park for the residents, it reaches a floodable theatre plaza and storage tanks to be reused.

Green Infrastructure:
The green system is purposefully dispersed throughout the plot and connected to the existing green infrastructure. This way, we can deploy phytoremediation strategies in all necessary areas. The tree system cuts through the building blocks as well helping in this proccess.

Final Product:
All the systems work with each other to create a lively green community, part of an urban structure. A Pergola Plaza utilising the depot station is a gathering point and a stop for people moving between the city centre and the votanikos redevelopment.

City-Fields Connection:
The agricultural & green zones are mirroring the building- block masses in creating urban continuity and softening the city border. A series of green corridors are created to facilitate the sustainable movement of people and the connection of the plot with the city.

0 5 10 50m



MASTERPLAN



Greenhouses

Photo Source: Agricultural University of Athens (permission acquired)



Swales

Photo Source: Public Domain



Vineyards

Photo Source: Public Domain

Photo Source: Public Domain



Green Roofs

Photo Source: Public Domain



Urban Roof Farms

Photo Source: Public Domain



Ground Farms

Flood Plaza

Water Storage

0 5 10 50m

PHASING - THE AUTONOMOUS BLOCK

PHASING

Each City Block Includes the Agricultural zones, a water management system, Ground Floor Commercial Spaces and Co-housing Spaces Above. This enables phased development while remaining fully operational at every stage, making the project economically viable.



Public Pavilion:

Each City block has a social space to be used by the residents as wanted. Access to this pavilion is assured through architectural walks, independently of the circulation cores



Social Facade:

A series of stairs connect single and double height balconies, protected by a kinetic turning panel facade, creating a layer of privacy and sun protection. This creates a community-strengthening architectural walk

Urban Farming:

The goal of farming isn't only food production. It's an economically viable way to preserve greenery and a community-building Activity



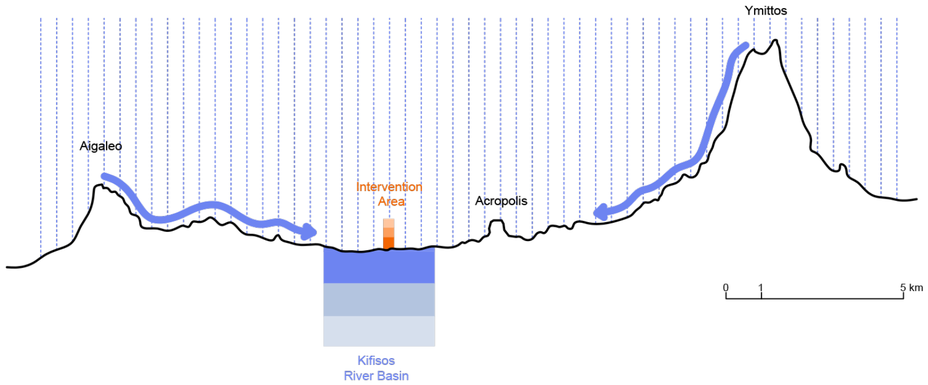
Activating the Street Level:

Being a mixed use Complex, The ground level integrates localized commercial, logistics and social spaces, like cafes, libraries and supermarkets.

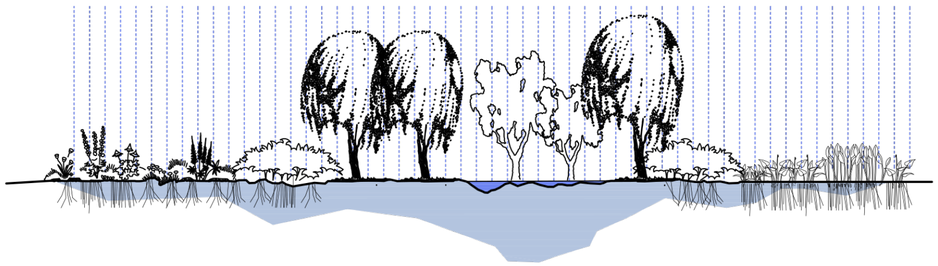


THE FLOOD CRISIS

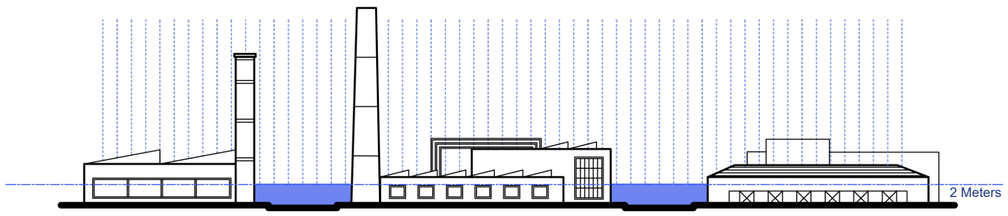
The **Natural Basin** of Eleonas, result of the Kifisos river basin and its tributaries, sits at the lowest point of the Athenian plain, meaning that water from surrounding mountains usually finds its way there.



Eleonas was historically used for agricultural purposes which worked as **Nature's Sponge,** absorbing floods and protecting residential areas.



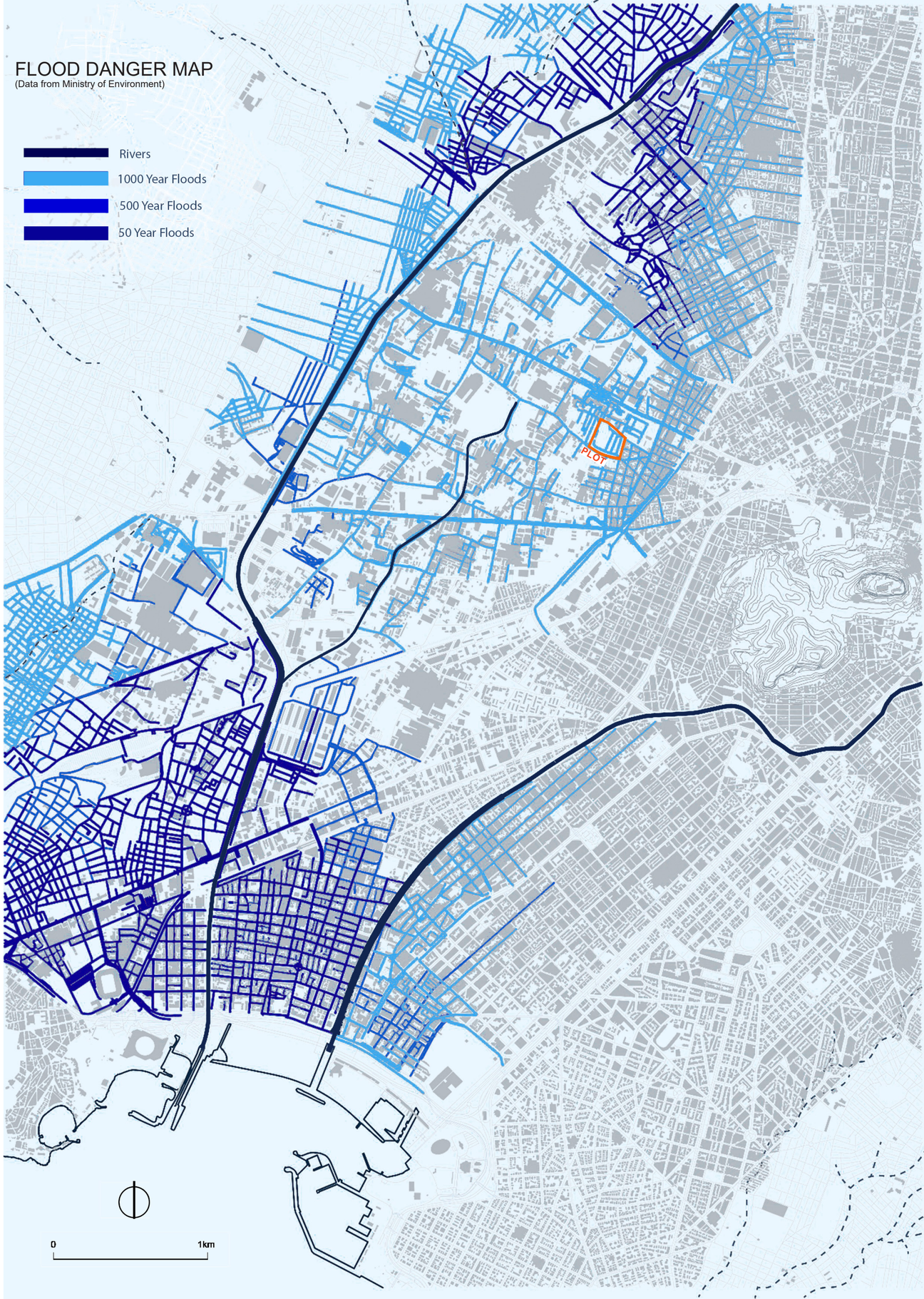
After WW2, during Athens' unplanned construction boom, Eleonas transformed into an Industrial Area. Its **impermeable ground** intensified Flash Floods in the area and neighbourhoods downstream.



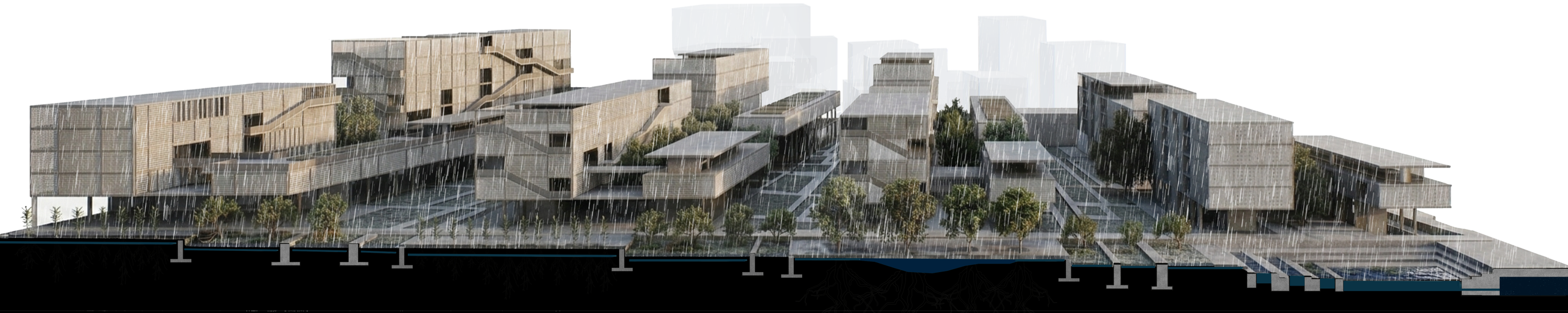
Today, Athens faces significant Flood Risk, with 200.000 people potentially being affected, making the need for permeable infrastructure an urgent matter.

Our Solution:

A multi-level solution integrating flood zones, swales and water storage while utilising the water for agricultural production

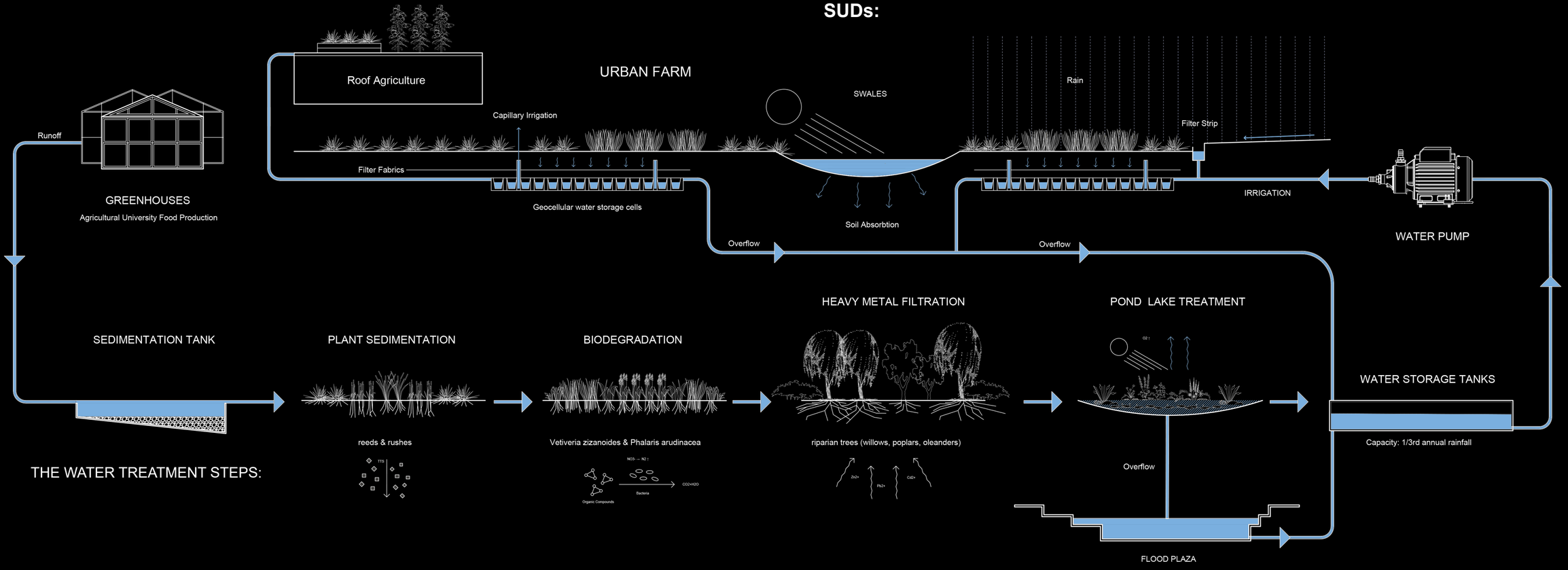


THE FLOOD CRISIS



THE SUSTAINABLE WATER CYCLE:

SUDs:



THE HOUSING CRISIS

The Problem:

Housing is a major problem in Greece.

According to ELSTAT 34% of Greeks spend more than 40% or more of their disposable income in housing.



Students are mostly tenants which is the most vulnerable group, with 70% of them spending 40% or more of their income on housing.



Citizens aged 65 and over currently make up over 22% of the total population rising to 40% by 2040



In traditional modern cities, seniors are often isolated in single-occupancy apartments or eldercare facilities. According to the World Health Organization (WHO) chronic loneliness is detrimental to their health.

Our Solution:

A **public co-housing** model based on flexible Apartment types that create an **Intergenerational Care Matrix**.

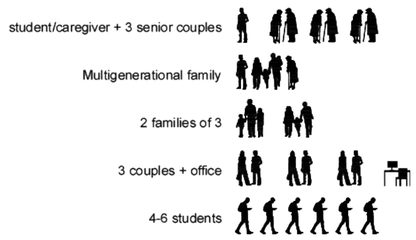
Incentives like lower Rent for Caregivers will be used to keep the community running.

The organization model features compact semi-autonomous private rooms grouped together around public spaces like kitchens and living rooms. The spaces open up to a social façade and connect to a Public Pavilion and Agricultural Roofs. The space organisation creates layers of **Privacy and Community.**

Will it Work?

Plaza de América Intergenerational Housing in Alicante and Generationen Wohnen am Mühlgrund in Vienna are proof of this model.

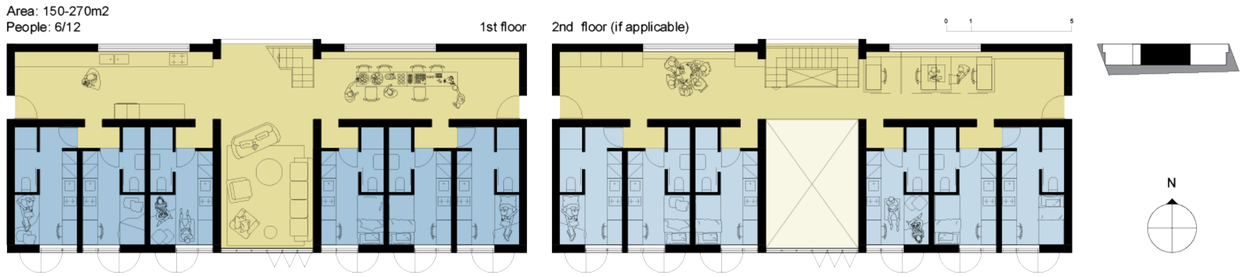
SCENARIOS



APARTMENT TYPES



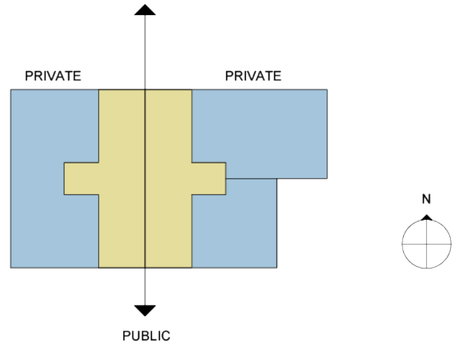








GOAL APARTMENT



PUBLIC SPACES:
central location
double orientation

PRIVATE SPACES:
southern facing
antechamber
en suite
kitchenette

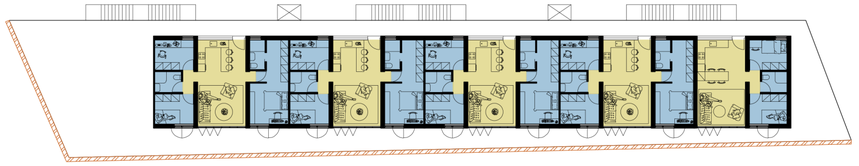
THE HOUSING CRISIS

BUILDING TYPES

Flexible Length Building

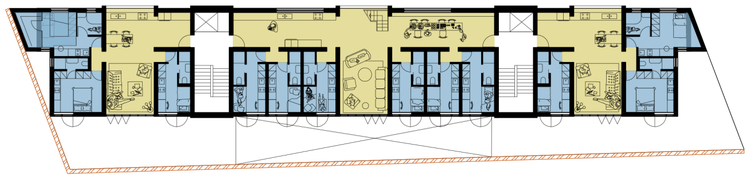
Area: 75 m2 per 10m length
People: 3-4 per 10m length

0 1 5 10

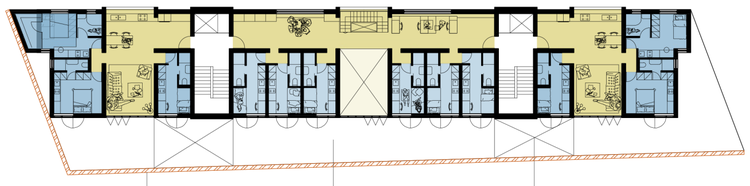


50m Building

1st Floor:
Area: 350 m2
People: 12-15



2nd Floor
Area: 300 m2
People: 12-15



Voids Creating Diagonal Views

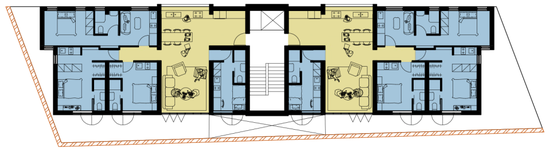
Common Balcony Space

Perforated Metal Facade

0 1 5 10

30m Building

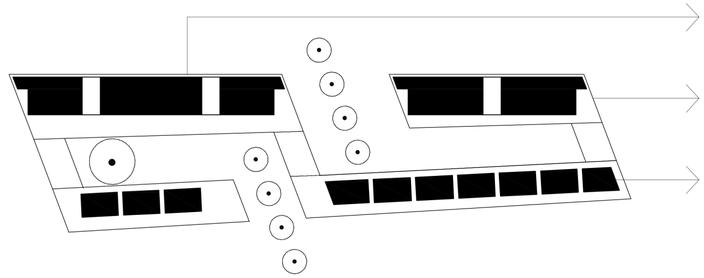
Area: 250 m2
People: 8 -14



0 1 5 10

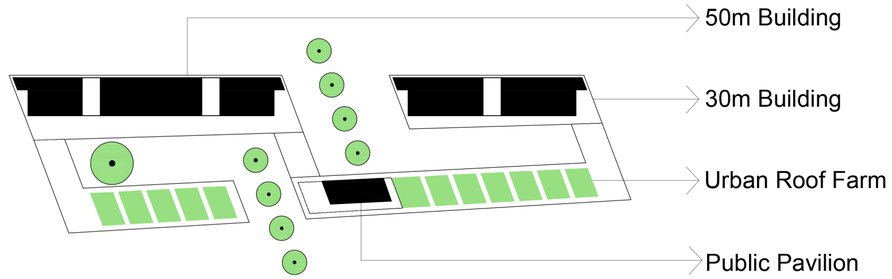
BUILDING BLOCK COMPOSITION

1st Floor



0 10 20

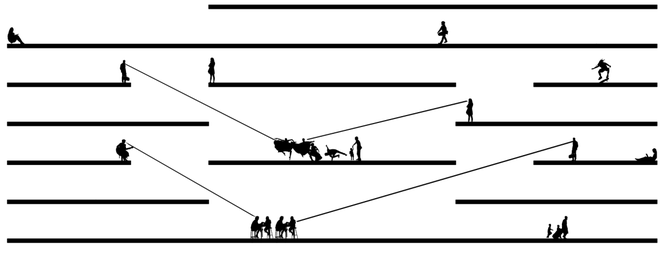
Other Floor



0 10 20

COMMON BALCONY SPACES

Behind the Social Facade



THE FOOD CRISIS

The Problem:

According to ELSTAT, **7% of families** in Greee are food insecure, more than 700.000 people.



According to a study in the PMC, **25% of elderly people** are food insecure.

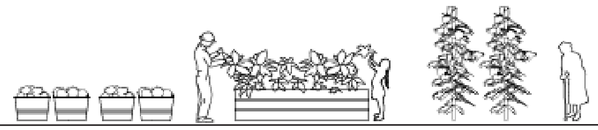


Accoring to ΑΠΘ, **70% of students** are food insecure, the most vulnerable group.



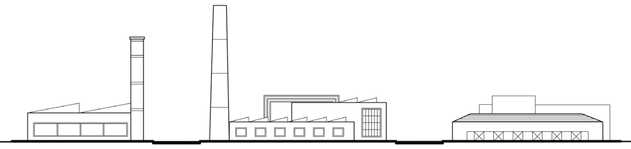
Our Solution:

Introduce **Urban Farming**. We utilise the agricultural strips and Flat Roofs to Cultivate Food. The urban farm becomes a communal activity that connects people and solves food insecurity in a sustainable way. Surplass is sold in the pergola market that functions like a traditional Street Market, known in Greece as “Laiki Agora”



The Obstacle:

Eleonas, which used to be a fertile oasis, but now is a paved toxic unproductive land.

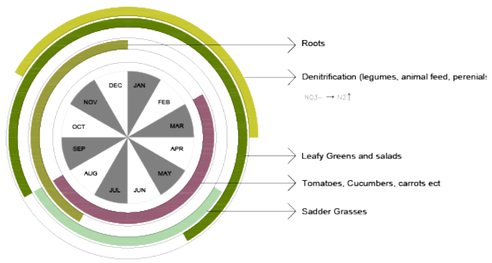


How to overcome it:

The neighbouring Agricultural University is using the land for food production that is highly desirable in the market. They used the following solution:



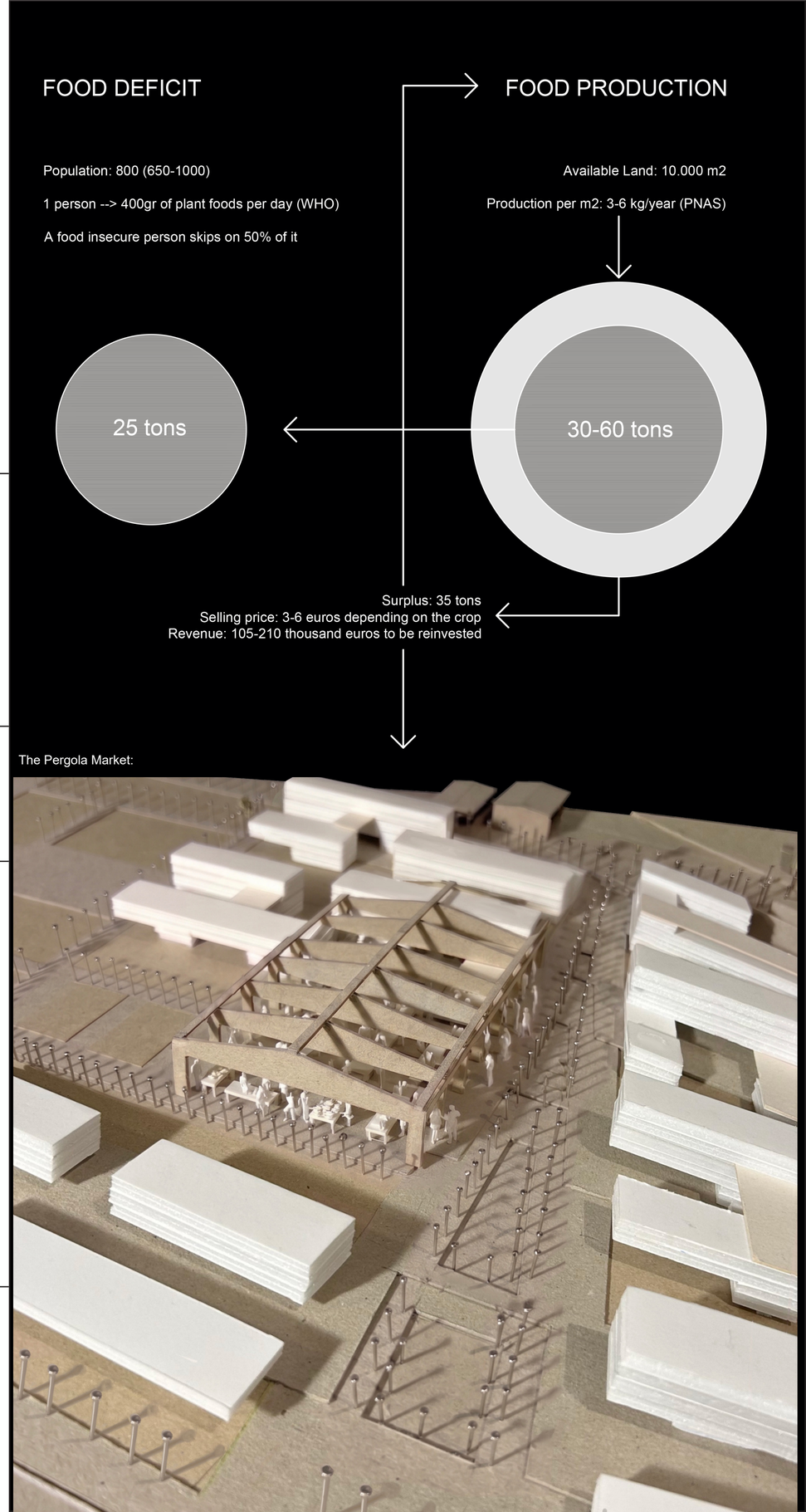
Ground-level cultivation begins with phytoremediation to restore contaminated soil, with early biomass used for energy and animal feed, while human grade food production is ensured through rooftop agriculture before transitioning to edible crops in the ground.



After, a crop calendar is used to ensure optimal food production and allow for the nitrification of the soil, ensuring the quality of the products.

Will it work?

Agrotopia in Belgium, Gardens4Goodin Paris, The Self-Managed Field of Elliniko, Dio Pigadia Ecovillage & Permaculture Farm in Peloponnese and Skala Ecovillage in Thessaloniki are all examples that prove that urban farming isn’t only possible and economically viable but also create communities and tackle elderly loneliness.



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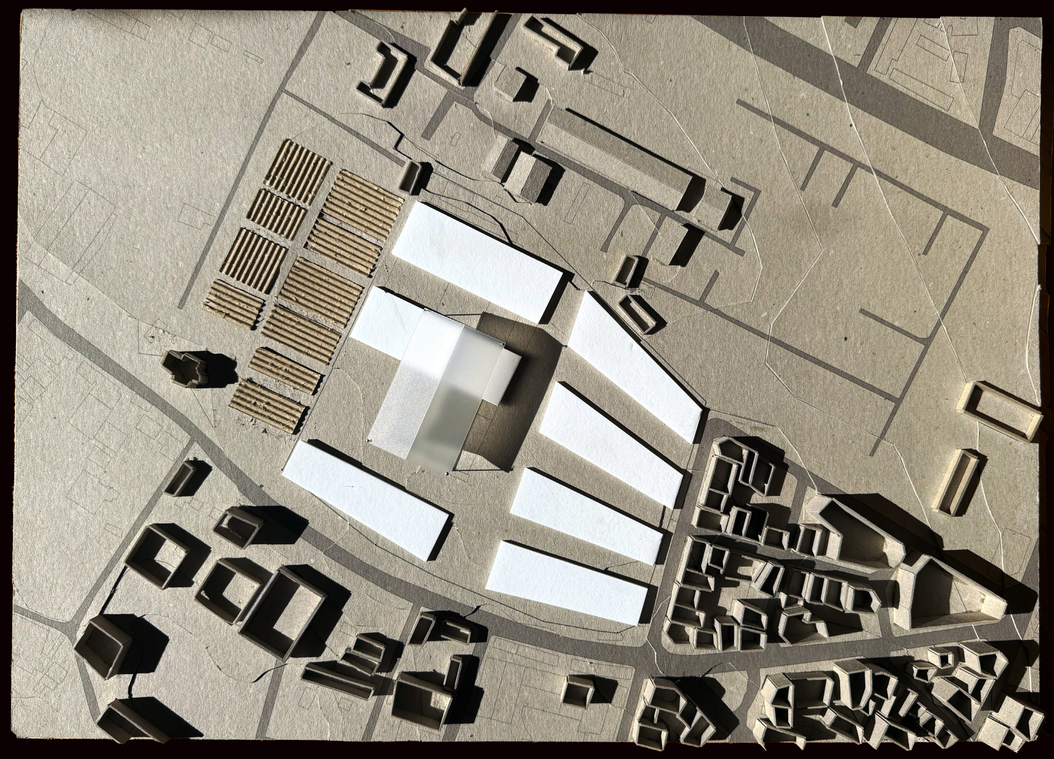
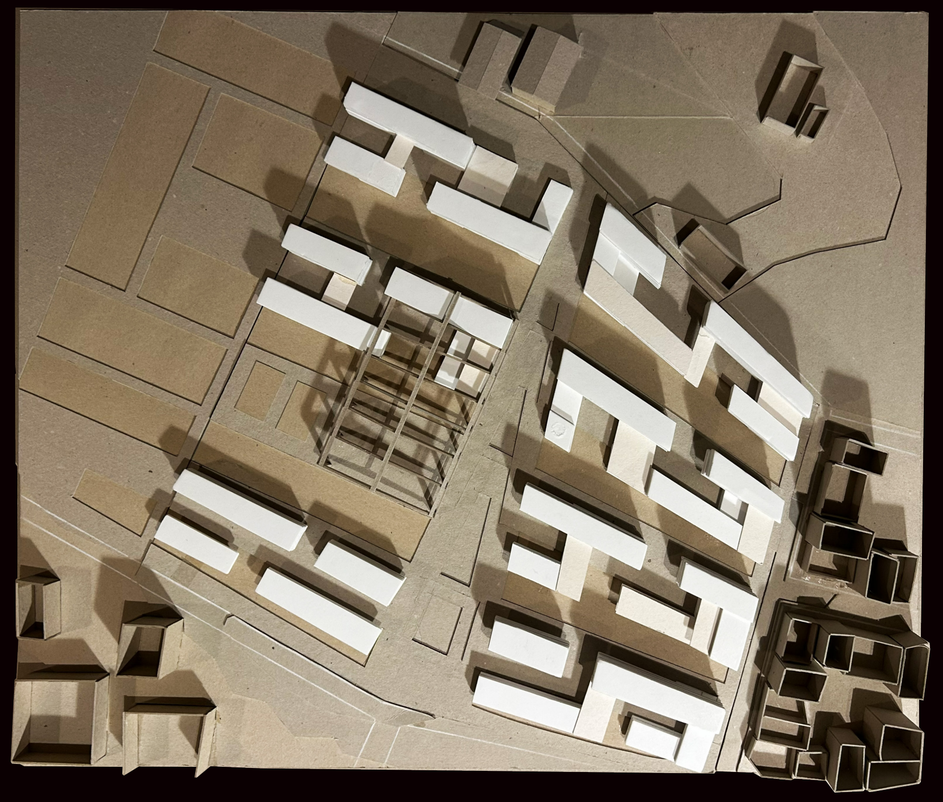
MODEL INDEX - SPATIAL COMPOSITION



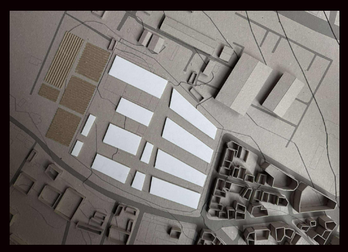
Model 1:1000



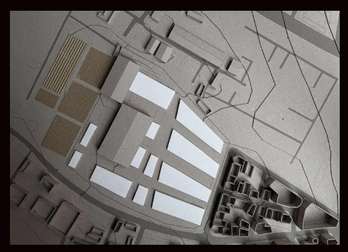
Model 1:500

MODEL INDEX - SPATIAL EXPERIMENTATION

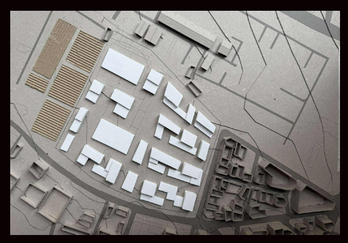
Model 1:1000



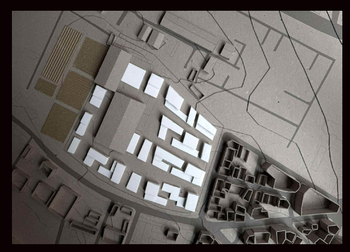
New City blocks



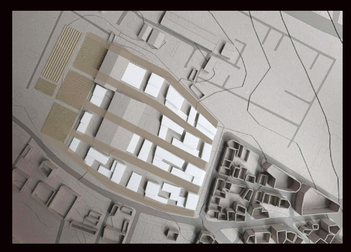
City blocks+Existing Structures



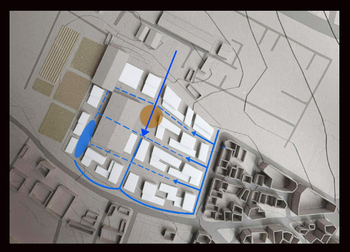
New buildings



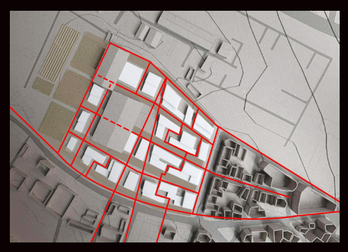
New buildings+Existing Structures



Agricultural Strips

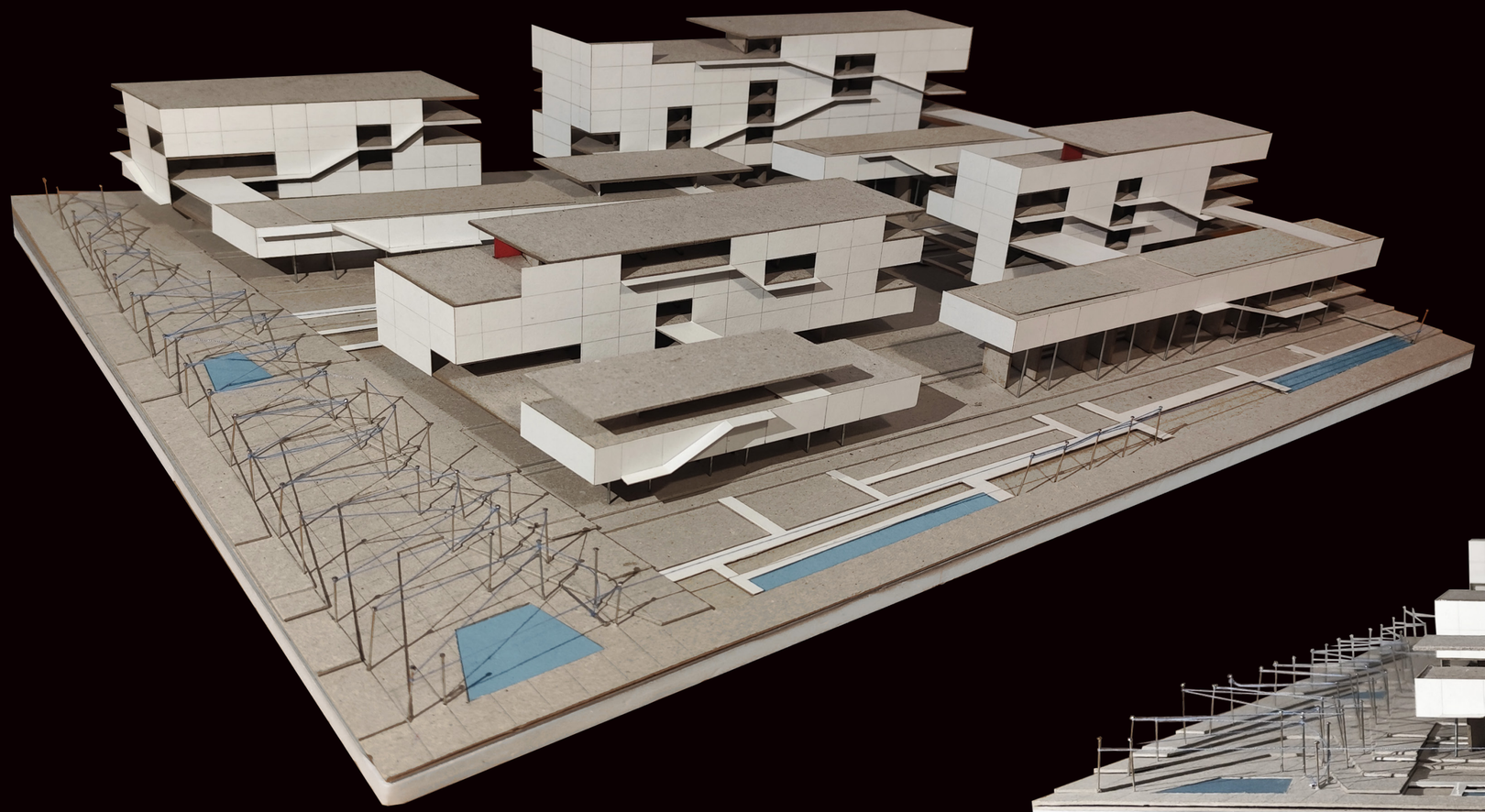


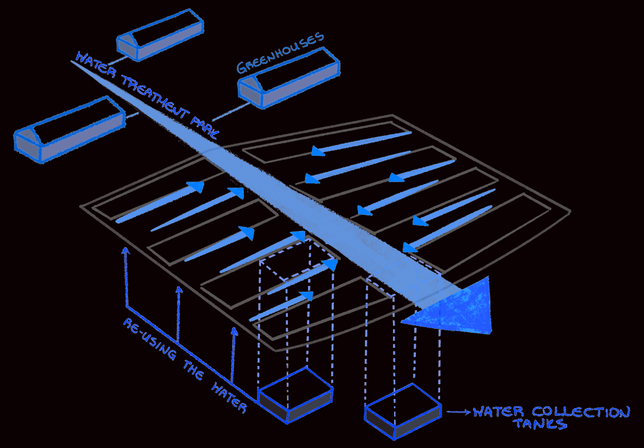
Water Management



Circulation

MODEL INDEX - THE WATER SYSTEM

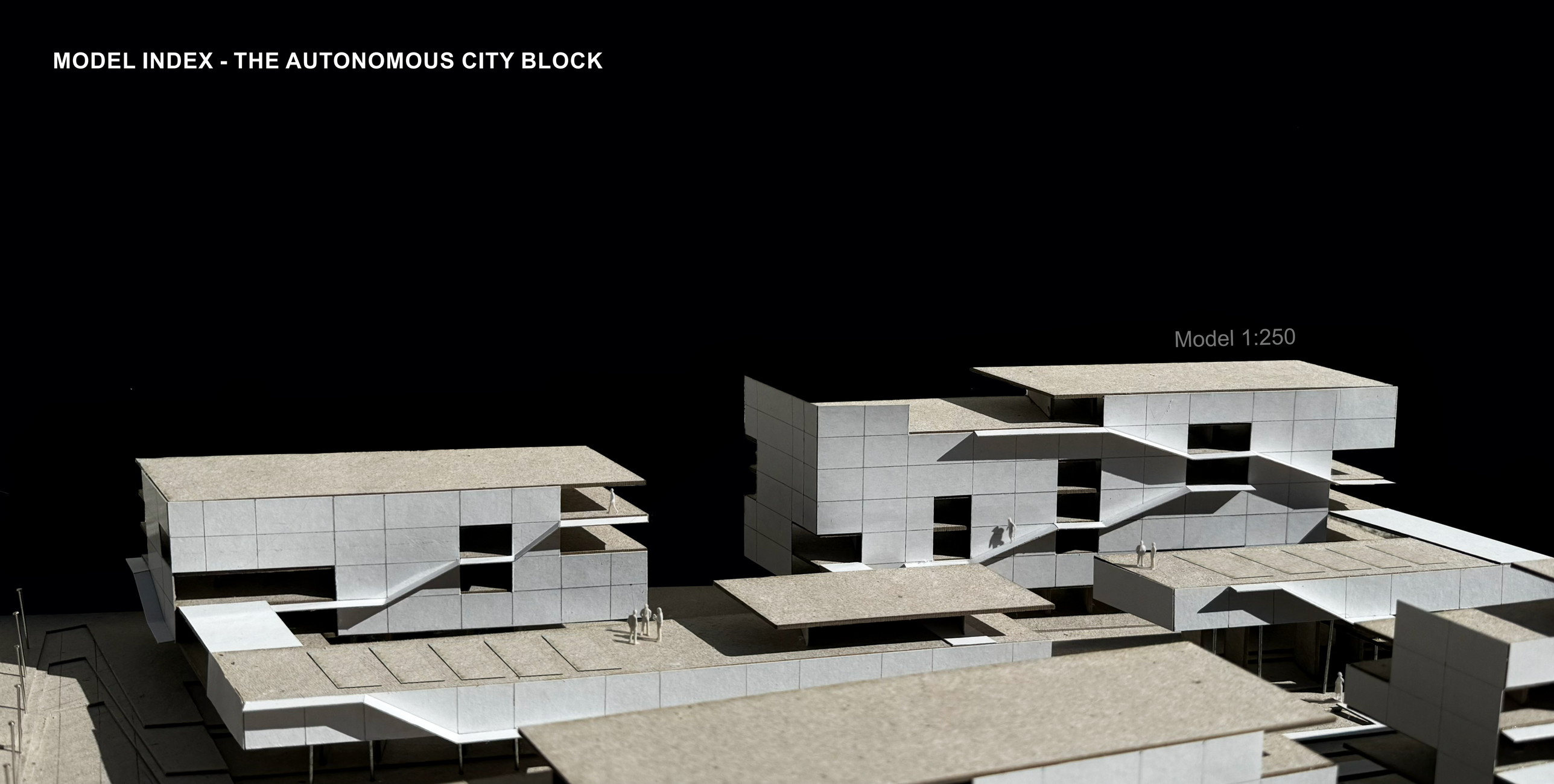




Model 1:250

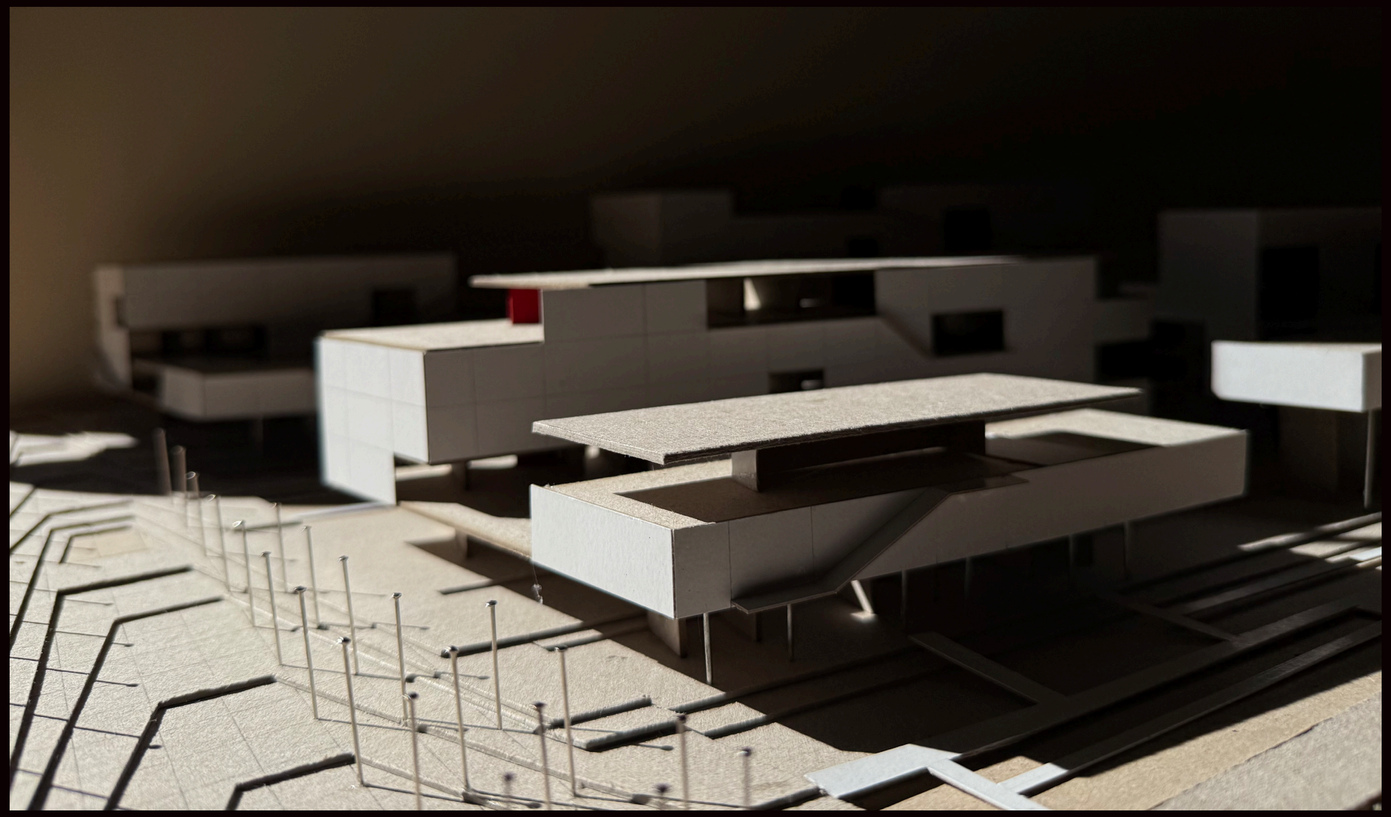


MODEL INDEX - THE AUTONOMOUS CITY BLOCK

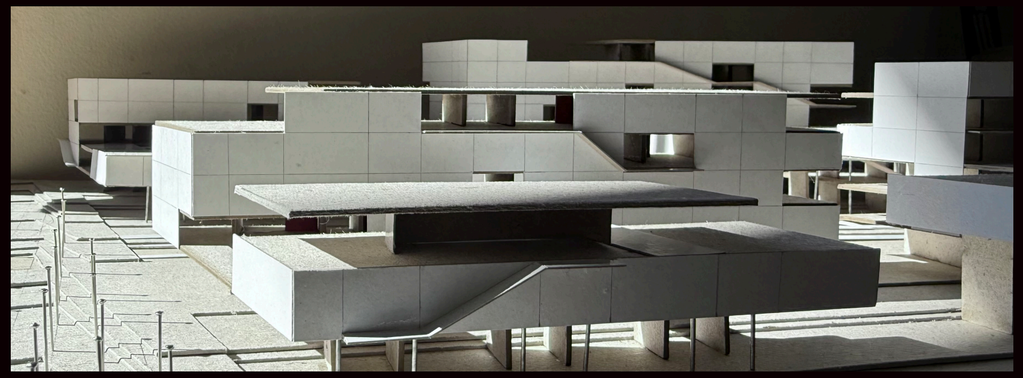


MODEL INDEX - BUILDING FORM

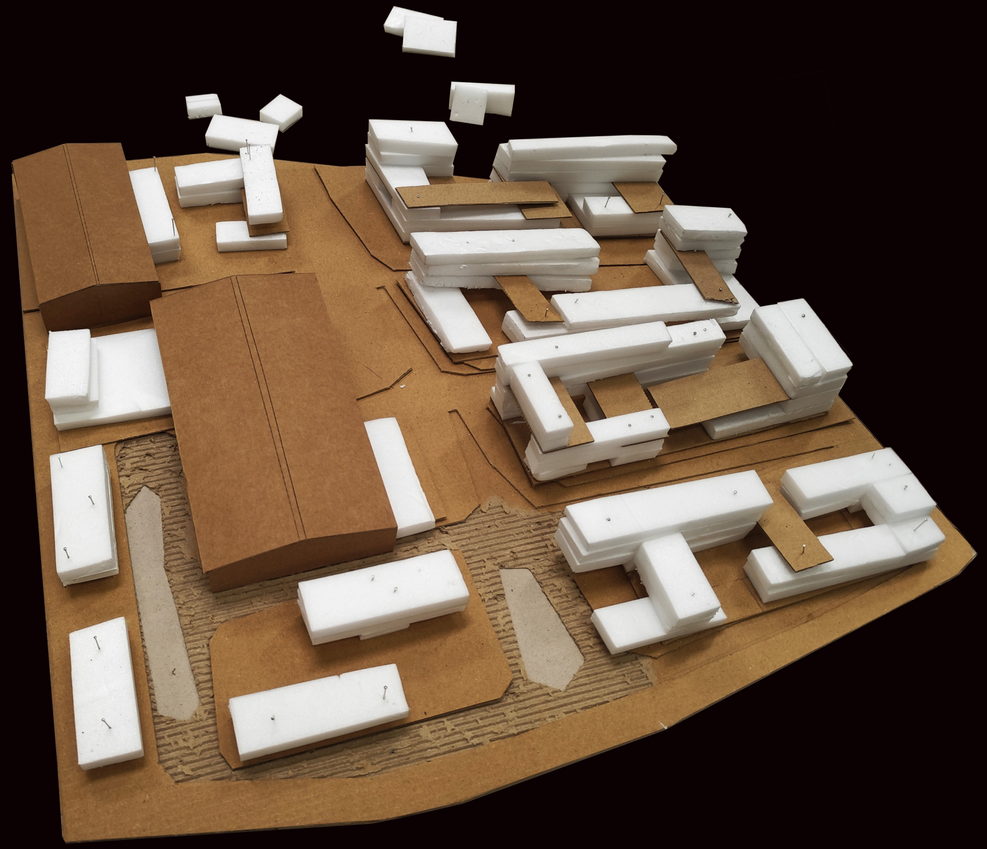
Model 1:250



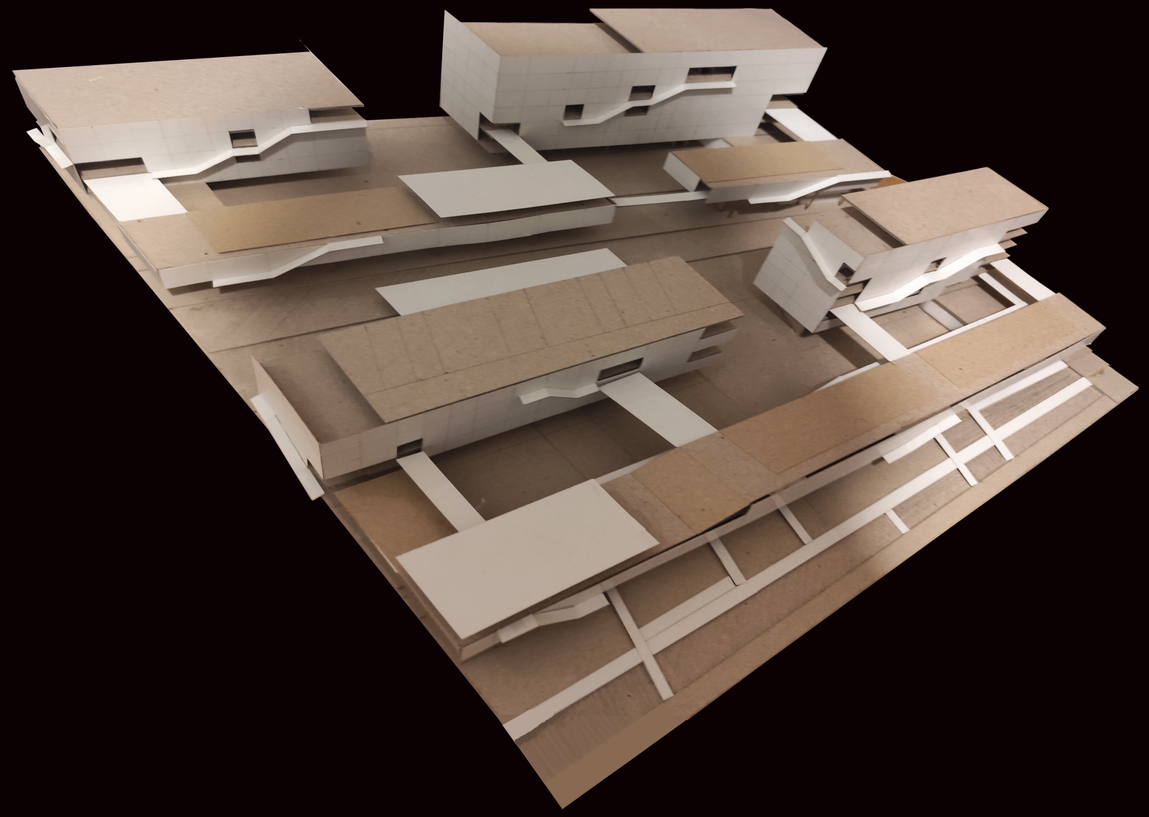




MODEL INDEX - FORM EXPERIMENTATION



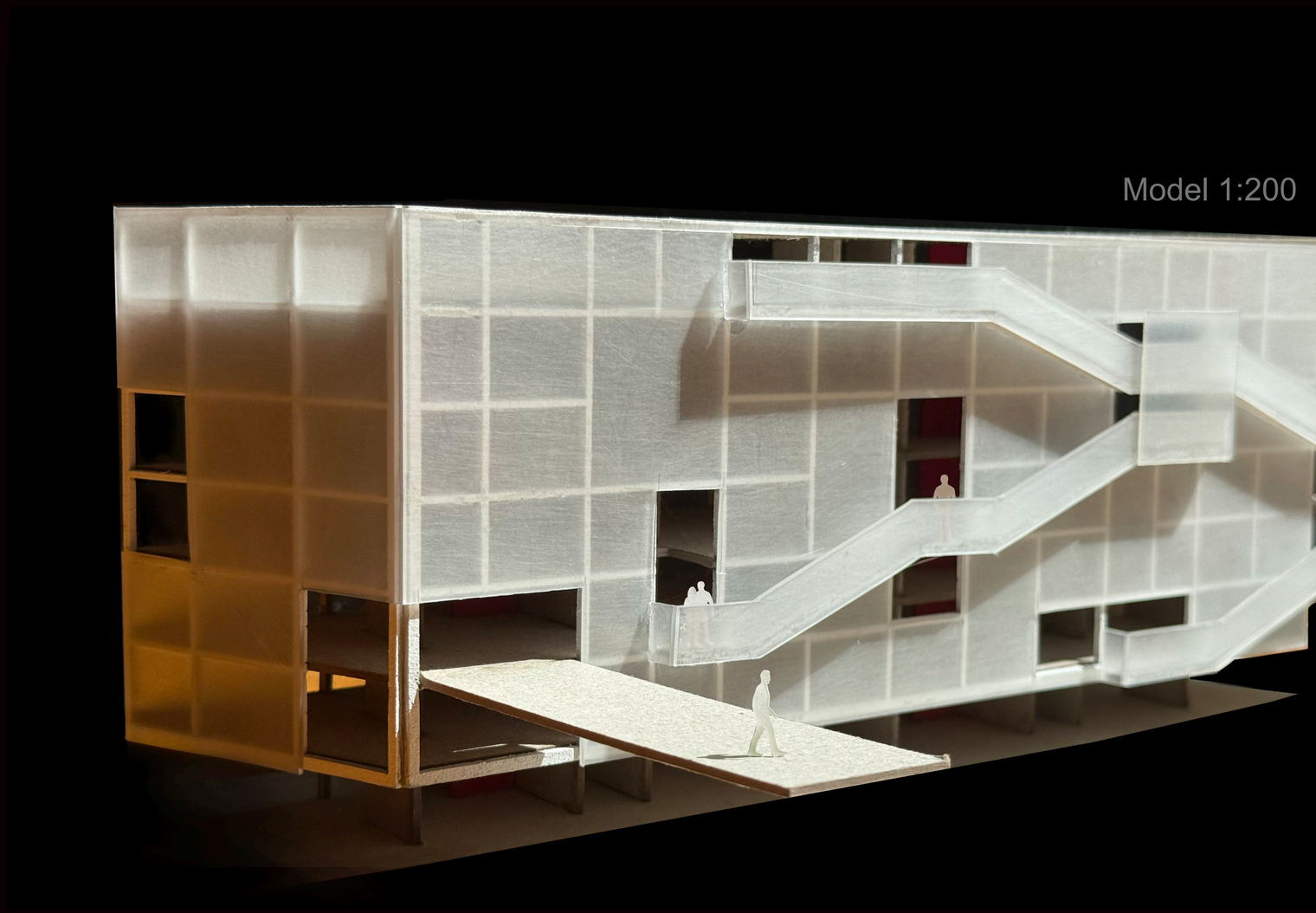
Model 1:500



Model 1:250

MODEL INDEX - THE SOCIAL FACADE





Model 1:200

MODEL INDEX - FACADE EXPERIMENTATION



AGRO-URBAN NETWORKS DIAGRAM

AGRICULTURE

BUILDING

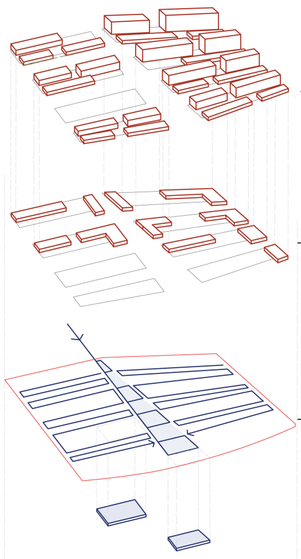
WATER

MOVEMENT

ROOF ACTIVITY

ARHITECTURAL FORM & SPATIAL COMPOSITION

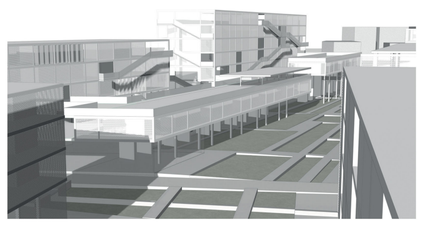
CONCEPTUAL DIAGRAM



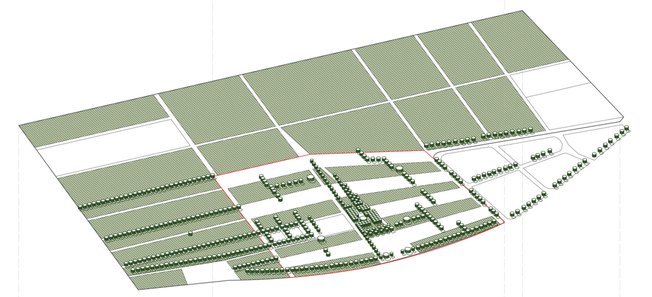
BUILDING MASSING:
THE BUILDINGS ARE PLACED IN BLOCKS THAT ENSURE URBAN FABRIC CONTINUITY AND ARE PARAMETRICALLY ADJUSTED TO THE SHAPE OF THE PLOT

GROUND FLOOR:
THE GROUND FLOORS ARE FOLLOWING A DIFFERENT PATTERN THAT PRIORITISES A COMMERCIAL CITY FRONTAGE AND OTHER PUBLIC USES THROUGHOUT THE PLOT AND OFFERS WALKABLE TERRACES FOR THE RESIDENTS .

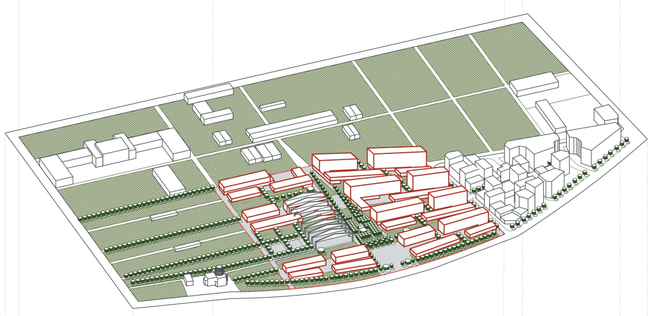
BLUE INFRASTRUCTURE:
THE WATER MANAGEMENT PLAYS A MAJOR ROLE IN THE DESIGN, BEING THE CENTRE-POINT AND THE DIVIDING LINE BETWEEN THE PLOTS. IT STARTS AT THE TOP OF THE PLOT WHERE THE AGRICULTURAL WATERS ARE GATHERED AND THROUGH A SERIES OF WATER CLEANUP ZONES THAT DOUBLE AS A PARK FOR THE RESIDENTS, IT REACHES A FLOODABLE THEATRE PLAZA AND STORAGE TANKS TO BE REUSED.

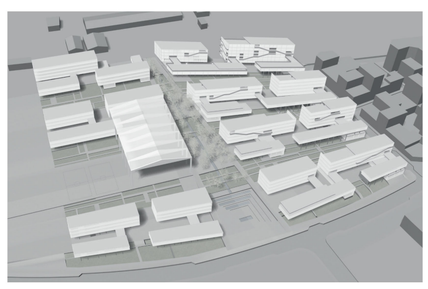


GREEN INFRASTRUCTURE:
THE GREEN SYSTEM IS PURPOSEFULLY DISPERSED THROUGHOUT THE PLOT AND CONNECTED TO THE EXISTING GREEN INFRASTRUCTURE. THIS WAY, WE CAN DEPLOY PHYTOREMEDIATION STRATEGIES IN ALL NECESSARY AREAS. THE TREE SYSTEM CUTS THROUGH THE BUILDING BLOCKS AS WELL HELPING IN THIS PROCCESS.

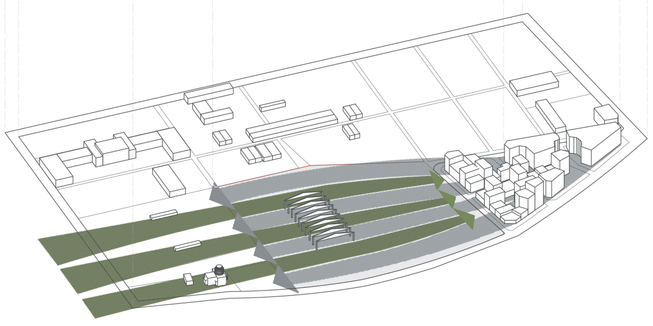


FINAL PRODUCT:
ALL THE SYSTEMS WORK WITH EACH OTHER TO CRRATE A LIVELY GREEN COMMUNITY, PART OF AN URBAN STRUCTURE. A PLAZA UNDER THE SCELETON OF THE DEPO STATION WORKS AS A GATHERING POINT AND A STOP FOR PEOPLE MOVING BETWEEN THE CITY CENTRE AND THE VOTANIKOS REDEVELOPMENT





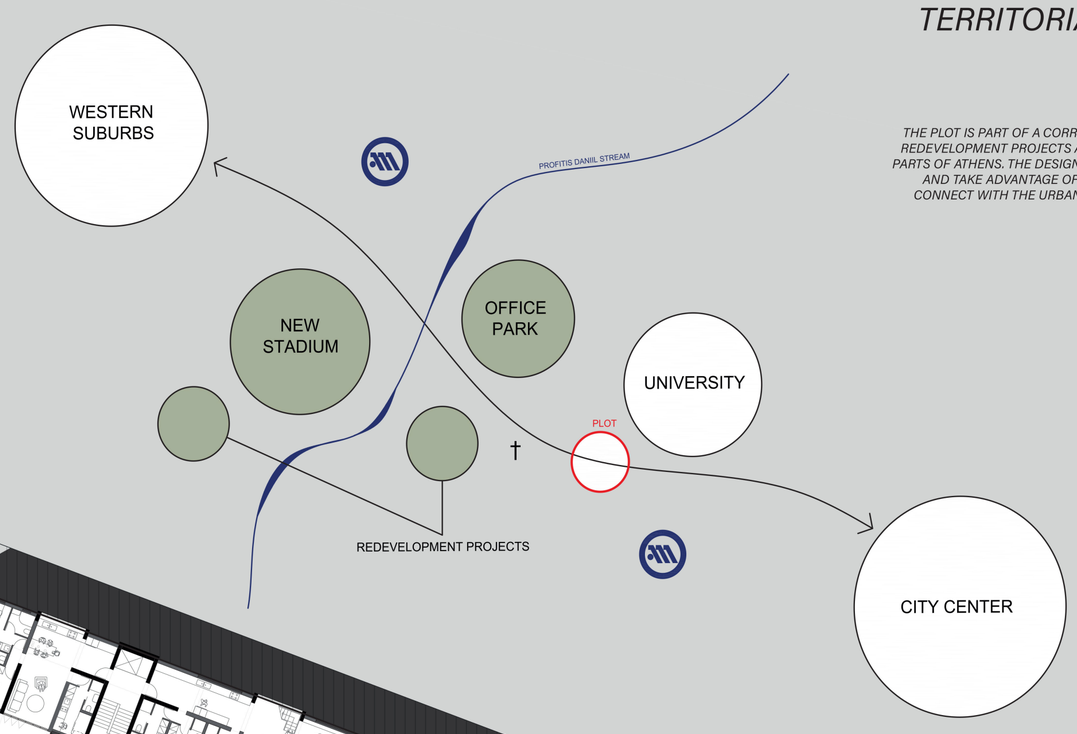
THE AGRICULTURAL & GREEN ELEMENT IS MIRRORING THE BUILDING-BLOCK MASSES IN CREATING URBAN CONTINUITY AND SOFTENING THE CITY BORDER. A SERIES OF GREEN CORRIDORS ARE CREATED TO FACILITATE THE SUSTAINABLE MOVEMENT OF PEOPLE AND THE CONNECTION OF THE PLOT WITH THE CITY, THE UNIVERSITY, THE CHURCH AND THE REST OF THE REDEVELOPMENT PROJECTS IN VOTANIKOS.



A FLEXIBLE FACADE WITH MOVING PANELS PERMITS THE RESIDENTS CONTROL SHADE AND PRIVACY. IT IS ALSO A SOCIAL FACADE AS IT FACILITATES INTERRACTION BETWEEN THEM THROUGH A SECONDARY ARCHITECTURAL WALK THROUGH STAIRS BRIDGES AND WALKABLE ROOFS.

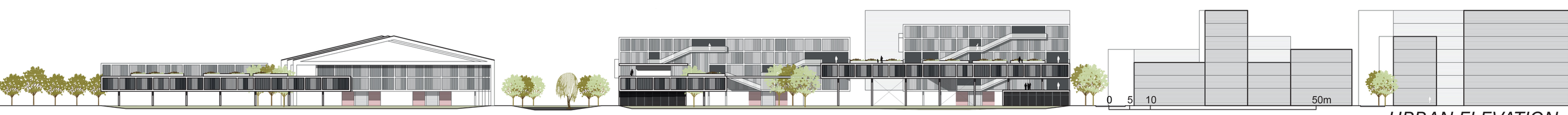
TERRITORIAL CONTEXT

THE PLOT IS PART OF A CORRIDOR CREATED BY A SERIES OF REDEVELOPMENT PROJECTS AND CONNECTING TWO LIVELY PARTS OF ATHENS. THE DESIGN FACILITATES THIS MOVEMENT AND TAKE ADVANTAGE OF THE FAVORABLE POSITION TO CONNECT WITH THE URBAN FABRIC AND CREATE A LIVELY COMMUNITY.



BUILDING BLOCK DETAIL





MASTERPLAN

URBAN ELEVATION



LANDSCAPE & HABITATION STRATEGIES

COLIVING

WHILE THE APRATMENT TYPES ARE STANDARDISED, THEY ARE HIGHLY FELXIBLE, ALLOWING A SERIES OF COMBINATIONS ANF LIVING SCENARIOS AS TO CREATE A LIVELY AND ACCESSIBLE COMMUNITY

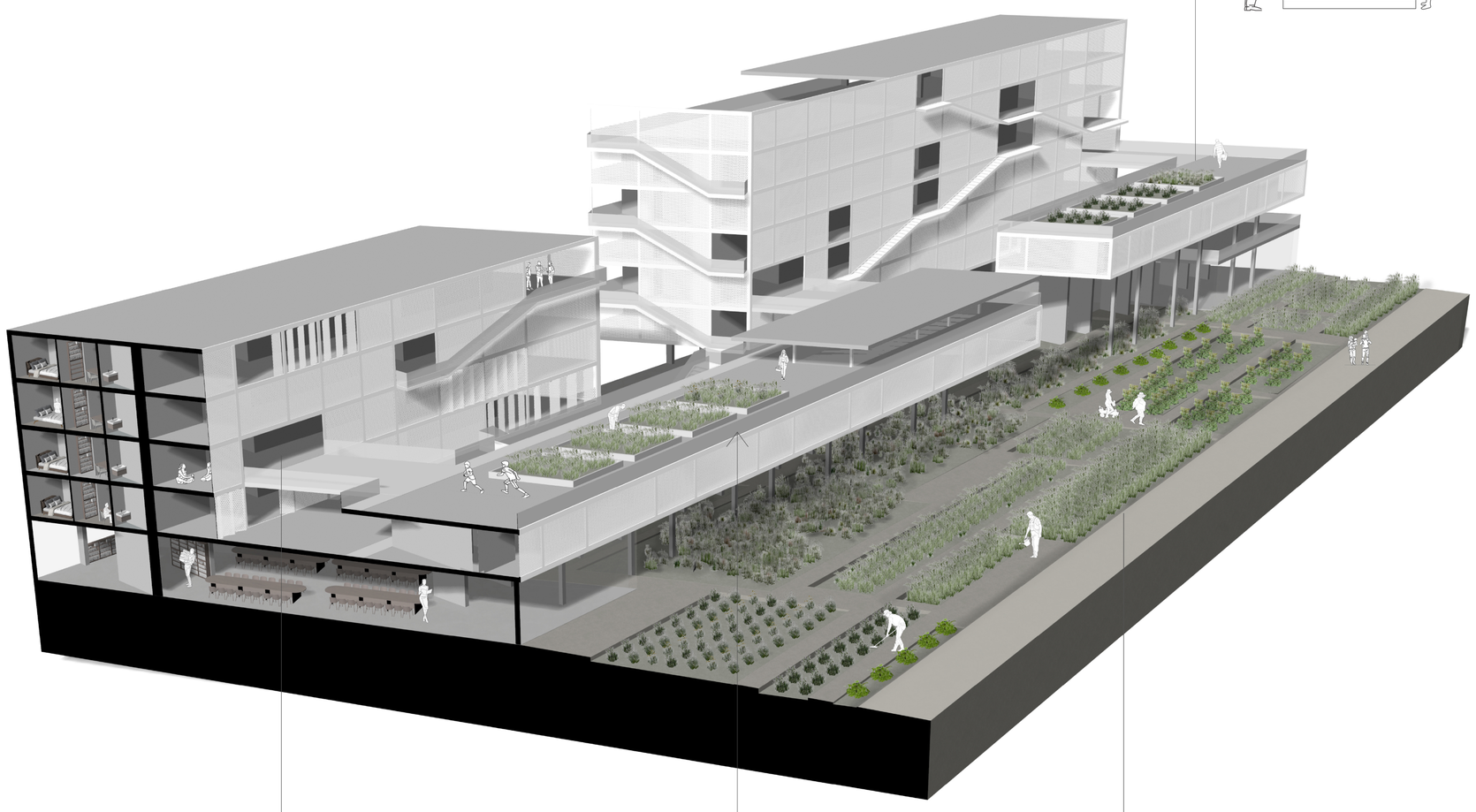
PHASING

EACH URBAN BLOCK FUNCTIONS AS AN AUTONOMOUS MIXED-USE UNIT, WITH AGRICULTURAL PRODUCTION, ENABLING PHASED DEVELOPMENT WHILE REMAINING FULLY OPERATIONAL AT EVERY STAGE.

AXONOMETRIC OF AN AUTONOMOUS BUILDING BLOCK

THE ROOFS ARE USED FOR AGRICULTURAL PRODUCTION AND ARE CONNECTED TO THE MAJOR HOUSING UNITS BY BRIDGES OR WALKABLE TERRACES. THEY SUPPORT MICROCLIMATIC REGULATION, WATER RETENTION, AND COMMUNITY-BASED FOOD PRODUCTION.





SOCIAL FACADE

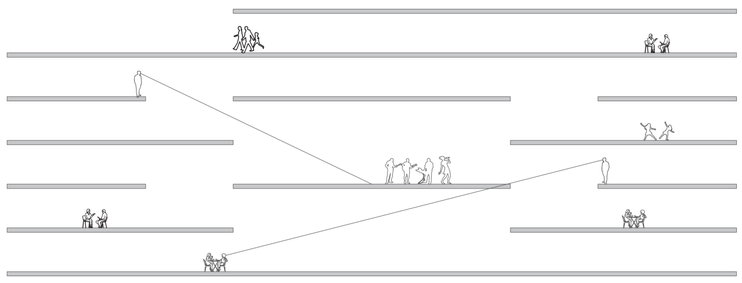
EXTERNAL STAIRCASES OPERATE AS SOCIAL FAÇADES, ENHANCING VISUAL PERMEABILITY AND COLLECTIVE INTERACTION. TERRACES ARE PUBLIC SPACES WITH AGRICULTURAL USE AND A SOCIAL PAVILION

PROTECTIVE FACADE

SOUTHERN FAÇADES INCORPORATE ROTATING PERFORATED PANELS FOR PASSIVE SOLAR CONTROL AND NATURAL VENTILATION, AS WELL AS PRIVACY

BEHIND THE FACADE

CUTTING THE BALCONY SLAB CREATES DIAGONAL VIEWS AND FACILITATES SOCIAL INTERACTION WITHING A PROTECTED BY THE FACADE COMMUNITY.

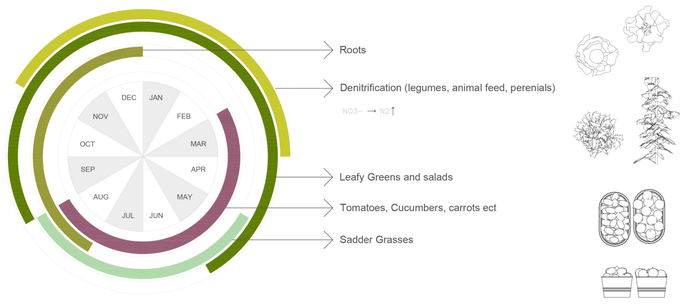


AGRICULTURAL STRATEGY

GROUND-LEVEL CULTIVATION BEGINS WITH PHYTOREMEDIATION TO RESTORE CONTAMINATED SOIL, WITH EARLY BIOMASS USED FOR ENERGY AND ANIMAL FEED, WHILE FOOD PRODUCTION IS ENSURED THROUGH ROOFTOP AGRICULTURE BEFORE TRANSITIONING TO EDIBLE CROPS.

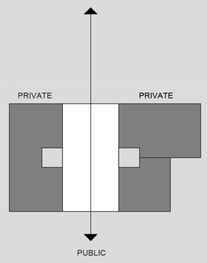


A CROP CALENDAR IS USED TO ENSURE OPTIMAL FOOD PRODUCTION AND ALLOW FOR THE NITRIFICATION OF THE SOIL, ENSRURING THE QUALITY OF THE PRODUCTS



THE PRODUCTION IS MORE THAN SUFICIENT TO FIGHT FOOD INSECURITY IN THE COMMUNITY. THE REST IS SOLD IN THE LOCAL MARKET SITUATED IN THE SQUARE TO COVER THE COST OF PRODUCTION

GOAL APARTMENT

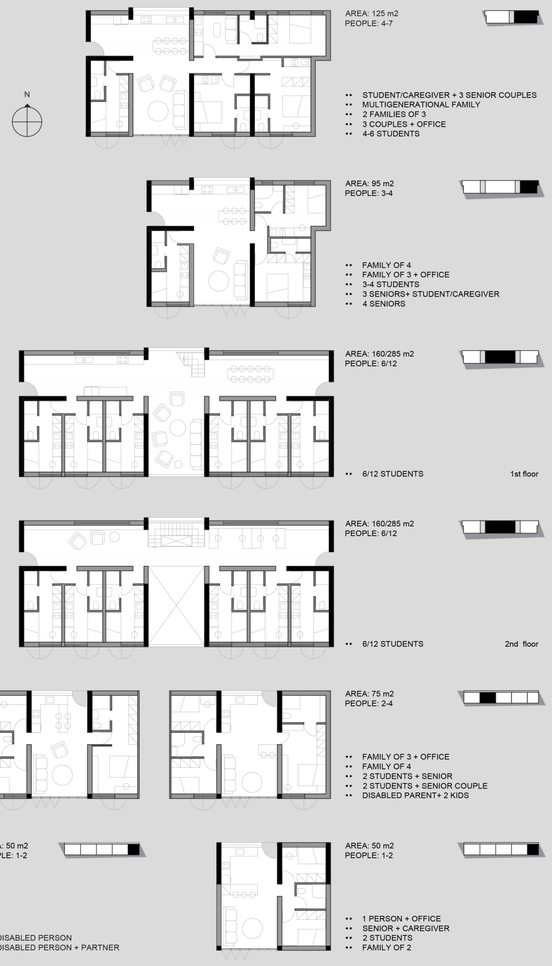


PUBLIC SPACES:
CENTRAL LOCATION
DOUBLE ORIENTATION

PRIVATE SPACES:
SOUTHERN FACING
ANTECHAMBER
EN SUITE
KITCHENETTE

USERS:
FLEXIBLE AND ADAPTABLE

APARTMENT TYPES



FOOD INSECURITY IN GREECE

FAMILIES: 7% source: ΕΛΣΤΑΤ

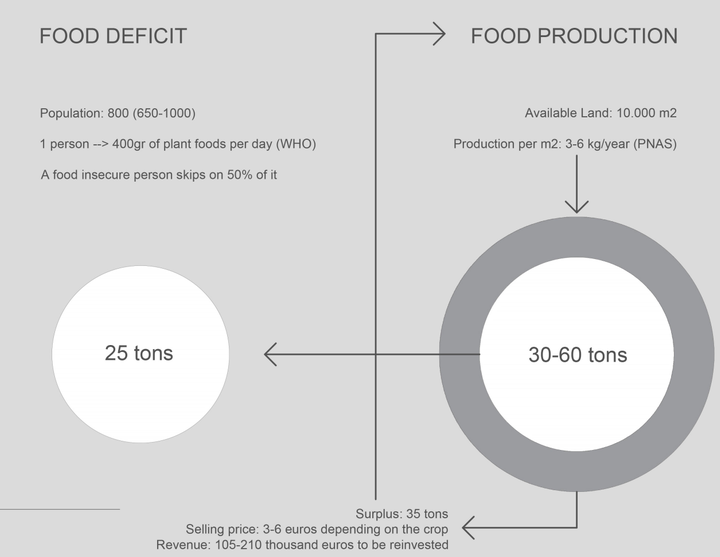


SENIORS: 25% source: PMC

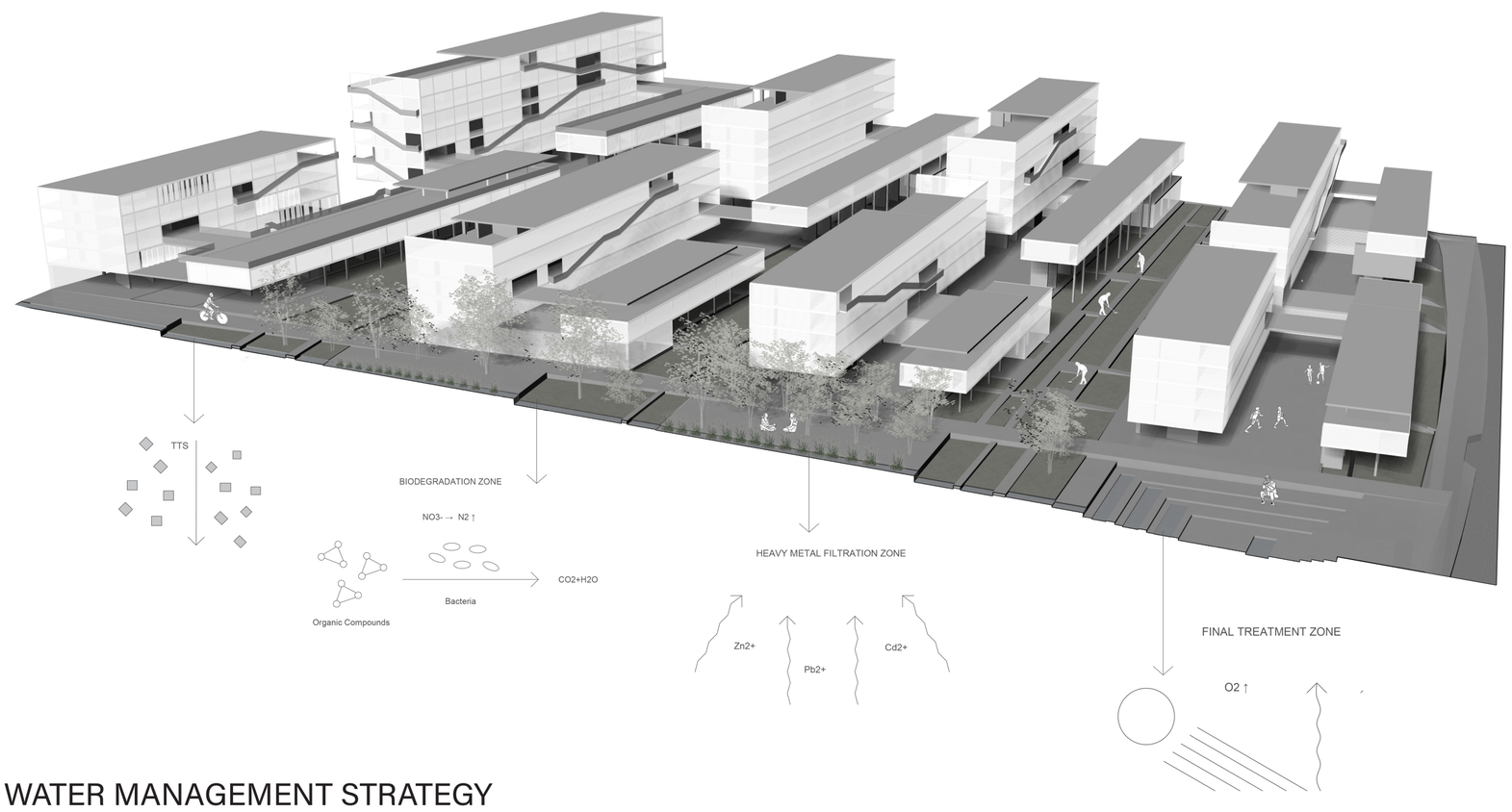


STUDENTS: 70% source: ΑΠΘ





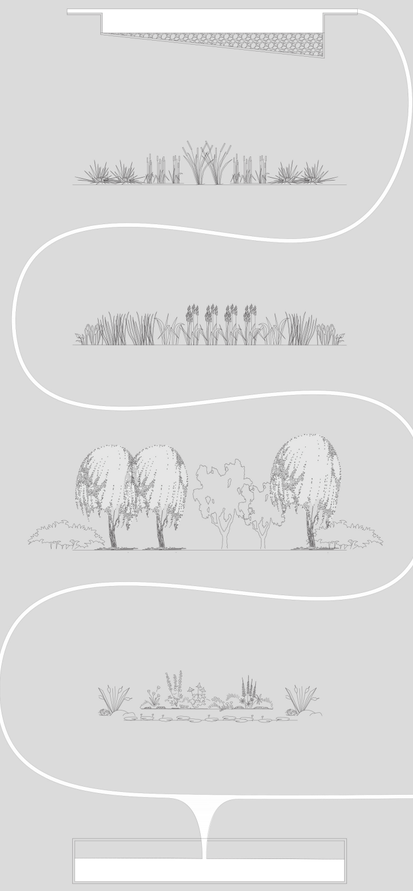
AXONOMETRIC SECTION OF WATER TREATMENT PARK



WATER MANAGEMENT STRATEGY

THE WATER FILTRATION SYSTEM IS A MAJOR PART OF THE DESIGN. THE WATER IS COLLECTED FROM THE AGRICULTURAL PLOTS OF THE UNIVERCITY AS WELL AS THE COMMUNITY AND IT IS CLEANED IN A LINEAR PARK TO BE REUSED.
EACH PHASE WORKS AS A GREEN SPACE FOR THE RESIDENTS, CREATING A PARK NEXT TO THE SQUARE AND A FLOODABLE THEATER PLAZA THAT CAN BE USED FOR RESEARCH AND COMMUNITY EVENTS

WATER FILTRATION SYSTEM



SEDIMENTATION ZONE

- Sedimentation tank
- Plant Sedimentation (reeds, rushes ect.)

BIODEGRADATION ZONE

- Biodegradation through roots (vetiveria zizanoides,Phalaris arudinacea ect.)

HEAVY METAL FILTRATION ZONE

- Park Zone
- Riparian Trees (Willows, Poplars, Oleanders ect.)

FINAL TREATMENT ZONE

- Pond lake ecosystem (irises,water lilies ect.)
- Flooding Plaza

RECYCLING

- Water Storage Tanks (Capacity: 1/3rd annual rain)
- Reuse for Irrigation and grey water uses