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GSAPP PORTFOLIO

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Cruz Garcia / GSAPP
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I URBAN NOMADS

A new lifestyle for the migrantworkers

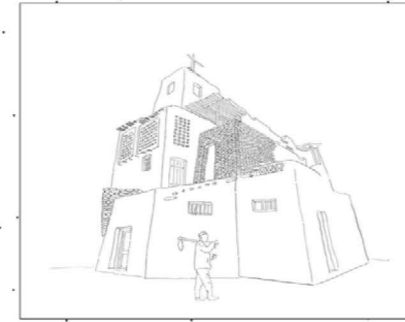
Site: Shanghai, China

Date: 2022 Summer

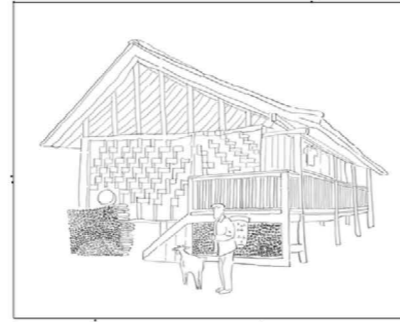
Instructor: Elias Anastas, Yousef Anastas
group work

Collaborator: Joo

In the past 40 years, China has developed rapidly. Many big cities have risen overnight, and behind the prosperity are countless neglected builders, most of them come from remote areas, most of them struggle to break through poverty, they are called migrant workers. Some of the migrant workers have a special status, they are ethnic minorities. While struggling for a living, they have to endure the torment of being away from their own culture. In Notes On Architectural Practice Studio, we start from studying the lifestyle and architectural culture of ethnic minorities and summarize some interesting architectural methods and techniques as well as special shared seemingly traditional lifestyles, and try to propose the concept of urban nomads as a solution to the lack of housing and quality of migrant workers through transcription.

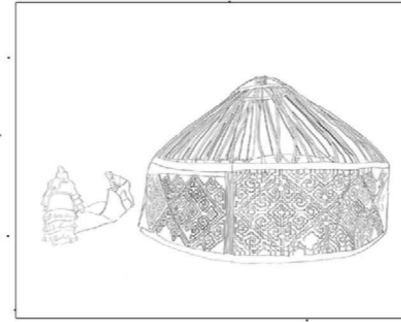


Raw Soil.
Rammed earth has good properties such as cold insulation, heat insulation, fire prevention and sound insulation, and at the same time, it has many advantages such as making use of local materials, making use of local materials, and making low cost.



CARPET
Felt as an enclosure material is lightweight, easy to handle, easy to assemble, etc.

WOOD, BAMBOO
Bamboo and wood are common, and the materials are easily accessible and lightweight and environmentally friendly.



ROCK



BEARING STRUCTURE

MAINTENANCE STRUCTURE

COVERING STRUCTURE

AUXILIARY STRUCTURE

MINORITY ARCHITECTURE

In addition to the mainstream Han culture, the architectural culture of ethnic minorities is also colorful. After a long period of development in remote areas, they are to some extent more adaptable to the changing natural environment. The convenience of grassland architecture, the adaptability of mountainous areas to the natural climate, and the clever use of natural and environmentally friendly materials are all worth learning from.

SLATE
Scaled roof panels, each piece of stone thickness of about 2 cm, high and low superimposed, staggered, like fish scales.



THATCH
It is easy to obtain for farming civilization. By increasing thickness, it can achieve a good waterproof and thermal insulation effect.

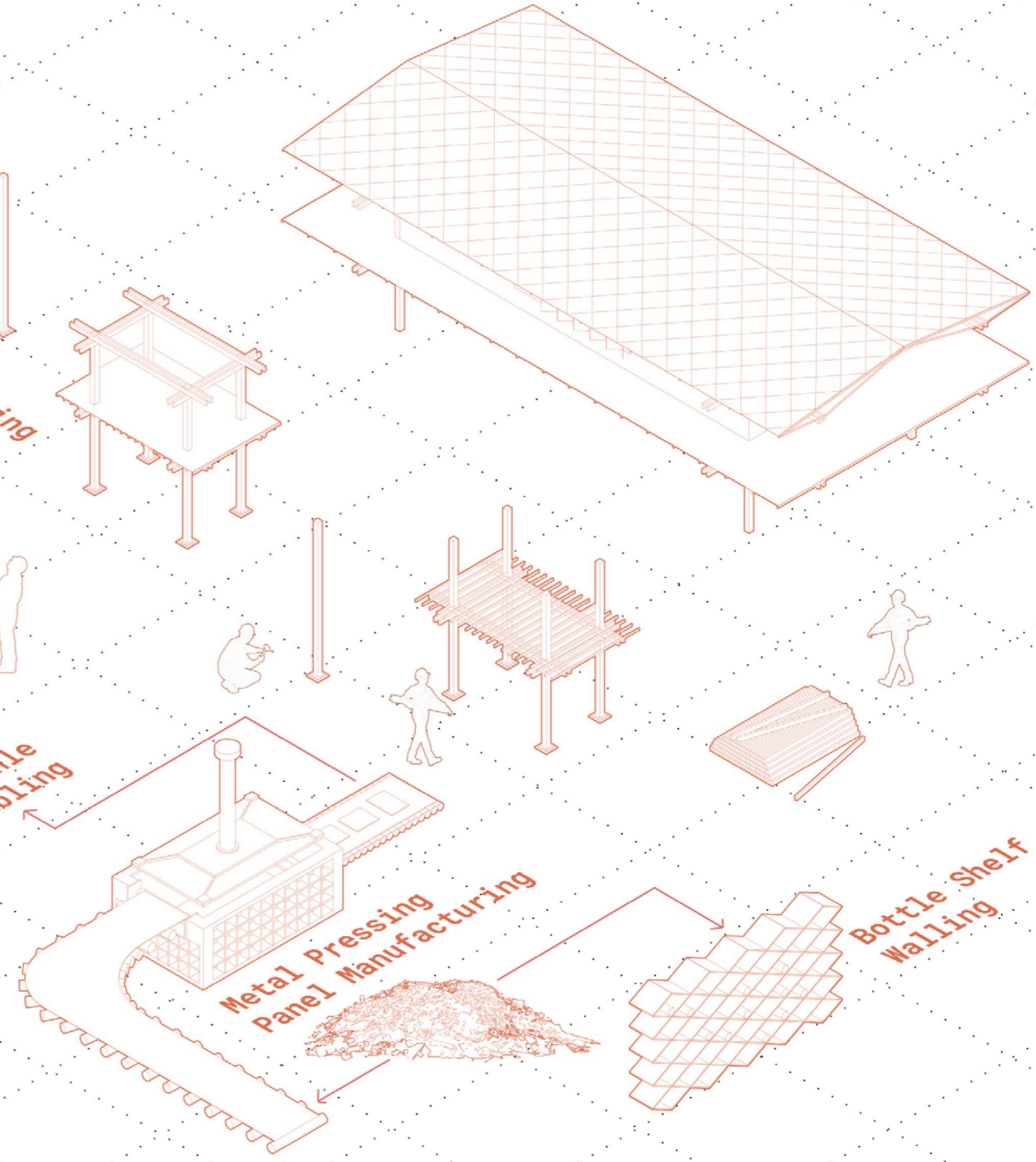


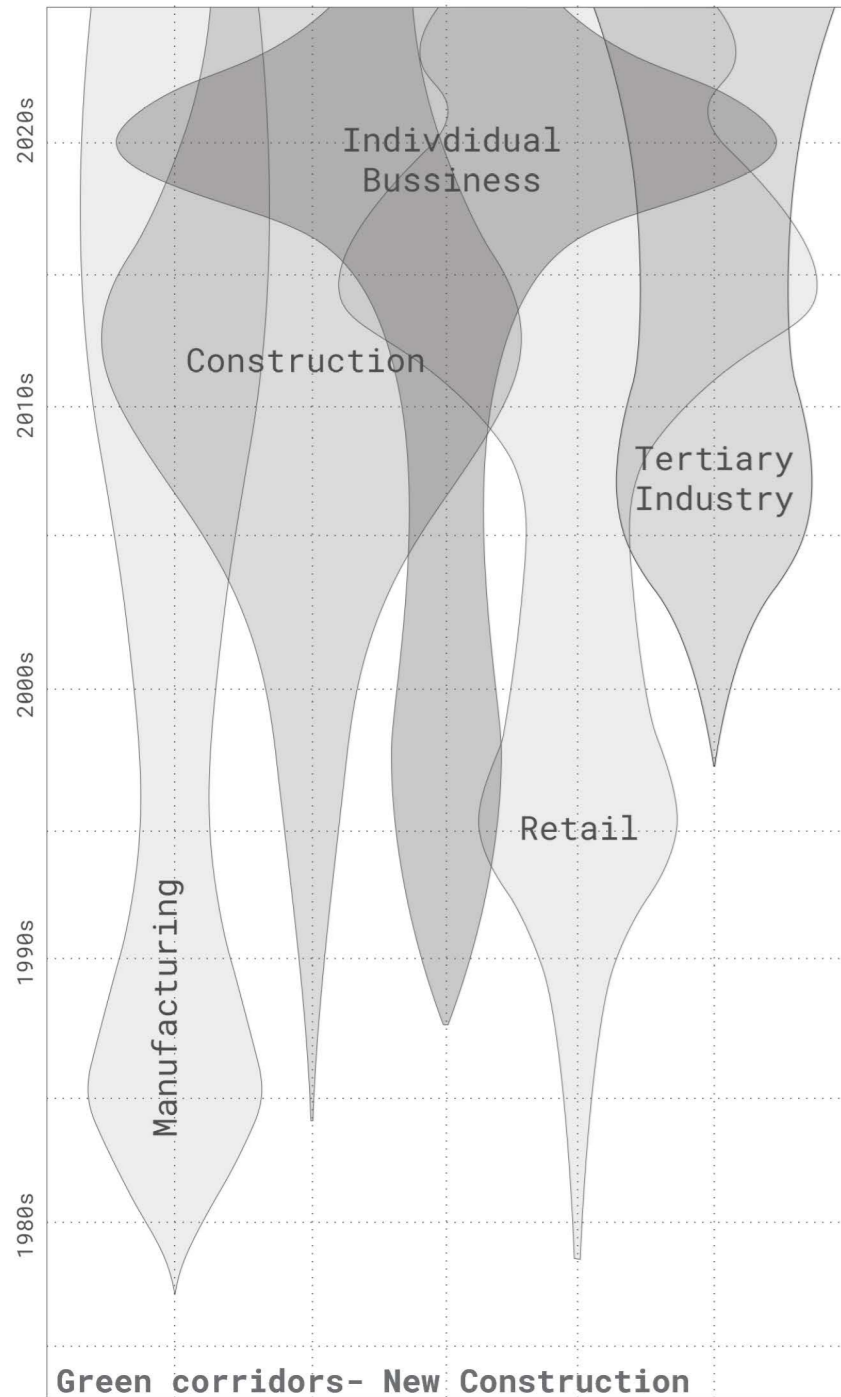
Base Anchoring

Roof Panel Assembling

Metal Pressing Panel Manufacturing

Bottle Shelf Walling





Migrant Workers Living Conditions

Although Shanghai is a developed city, the situation of migrant workers, as the builders of the city, seems to be in contrast with the prosperous scenery. Due to the problem of economic income, the living places chosen by migrant workers are usually simple houses in construction sites, urban villages, or even bridge caves. Although the government is making efforts to solve the housing problem of migrant workers, such as encouraging labor-using units and industrial development zones to collaborate in building collective dormitories, and providing living places for migrant workers by providing free and cheap rentals, these only account for 11% of the total demand.

minority ingenuity
assimilation of in the form of minorities
unique house due to the fun

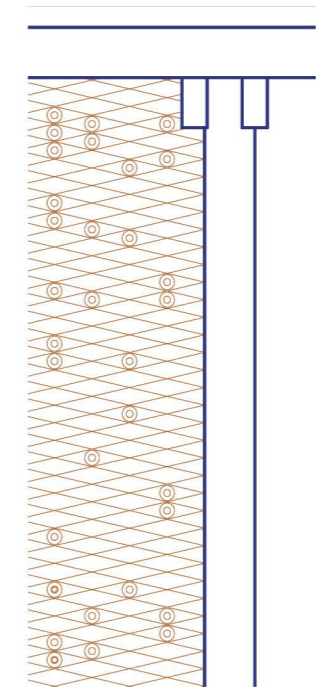
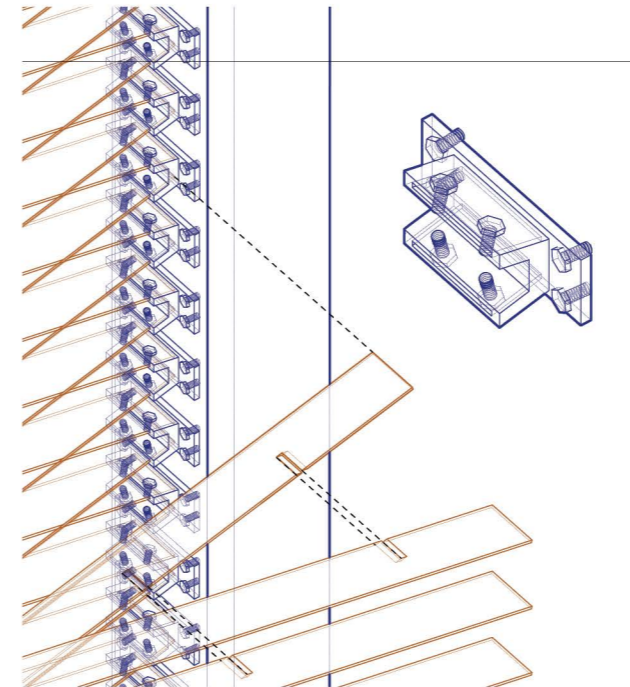
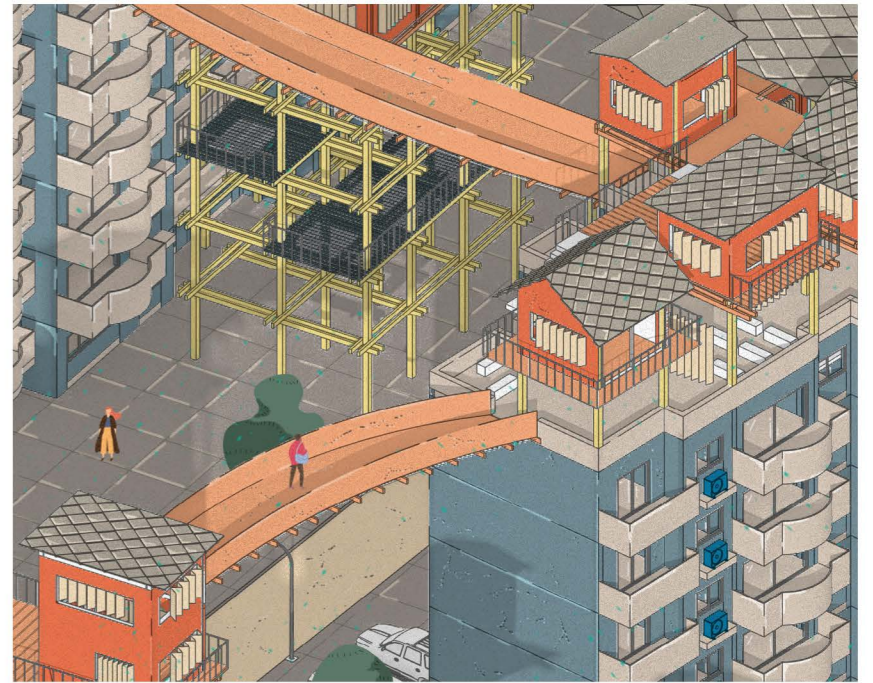
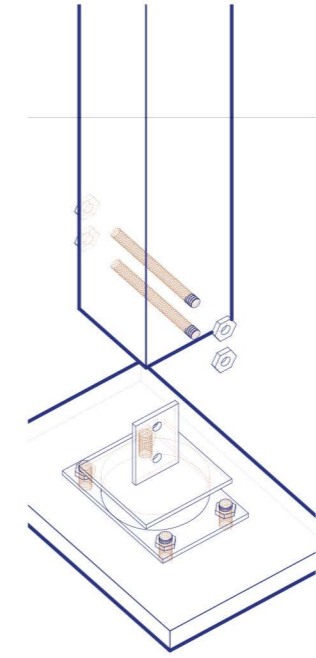
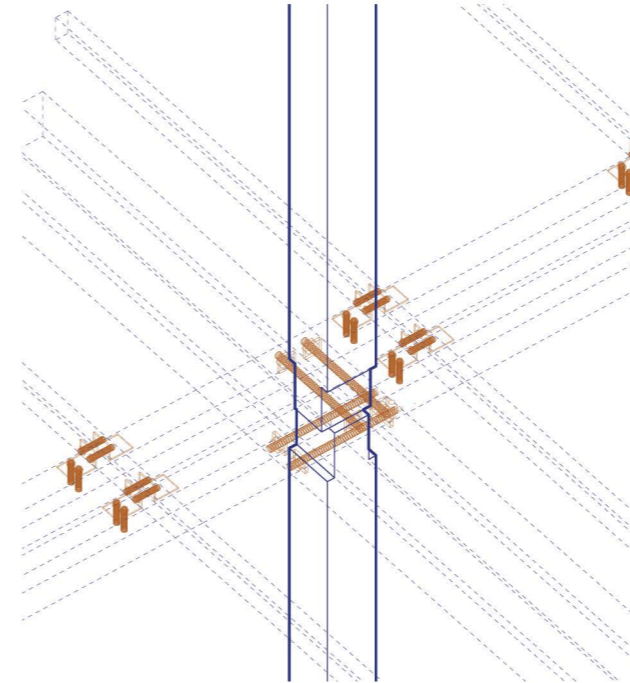
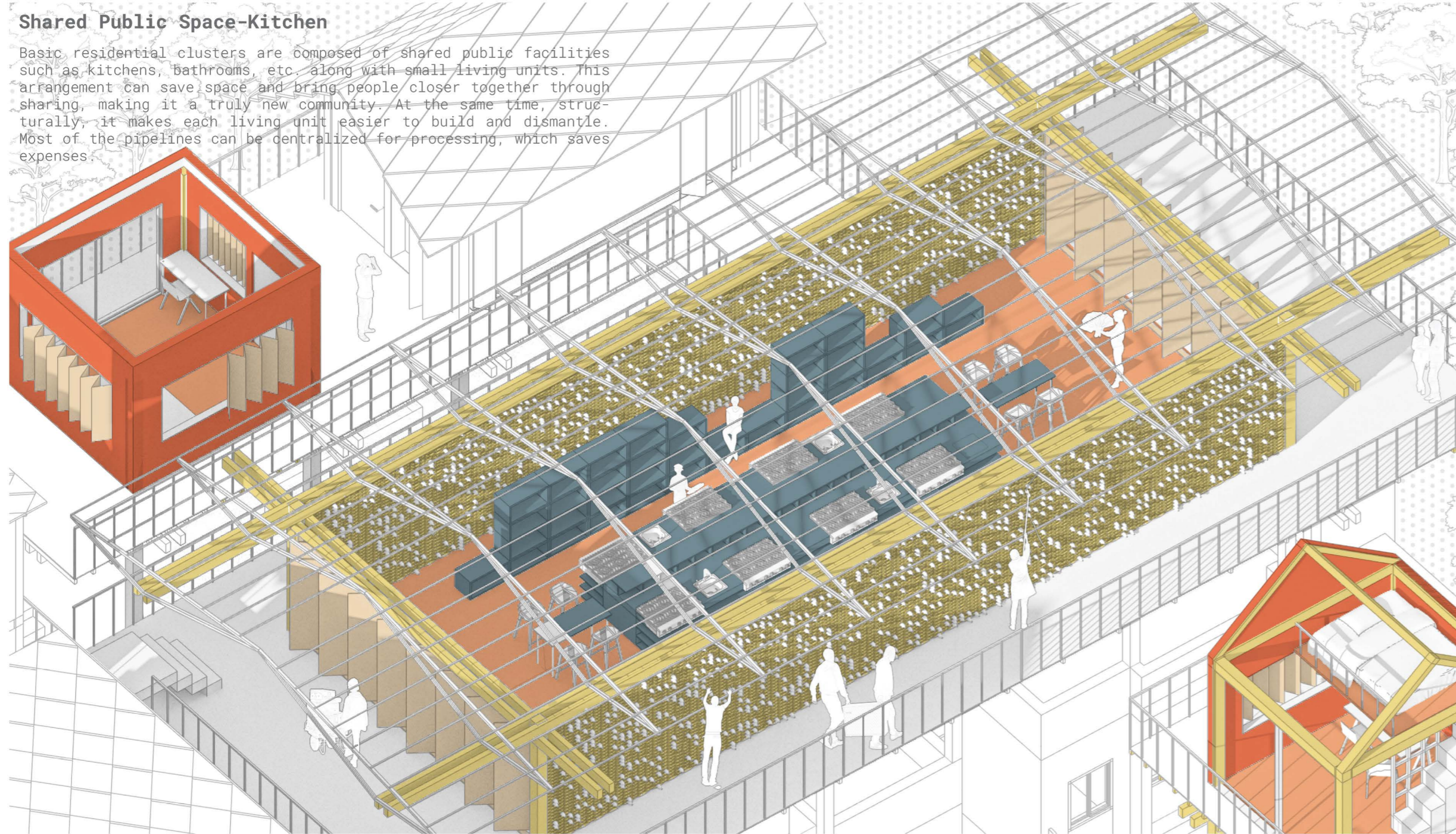
exchange of labor
exchanges labor with each other
to help a large amount of harvesting crops

housing crisis of migrant workers
in the city

In addition to the individual buildings, the way ethnic groups live together can also inspire our design, especially the concept of shared common spaces, such as shared living rooms and kitchens.

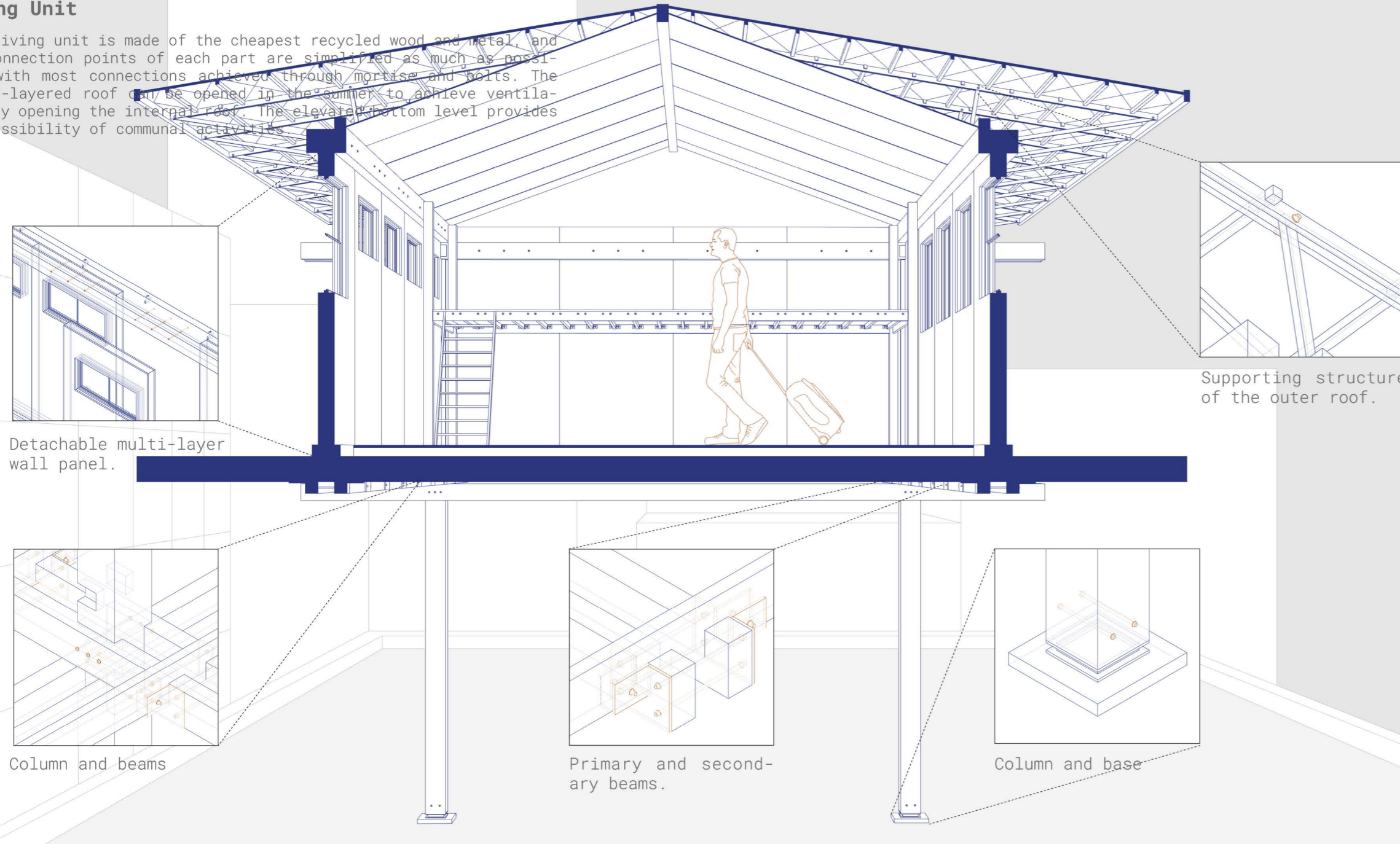
Shared Public Space-Kitchen

Basic residential clusters are composed of shared public facilities such as kitchens, bathrooms, etc. along with small living units. This arrangement can save space and bring people closer together through sharing, making it a truly new community. At the same time, structurally, it makes each living unit easier to build and dismantle. Most of the pipelines can be centralized for processing, which saves expenses.



Living Unit

Each living unit is made of the cheapest recycled wood and metal, and the connection points of each part are simplified as much as possible, with most connections achieved through mortise and bolts. The double-layered roof can be opened in the summer to achieve ventilation by opening the internal roof. The elevated bottom level provides the possibility of communal activities.



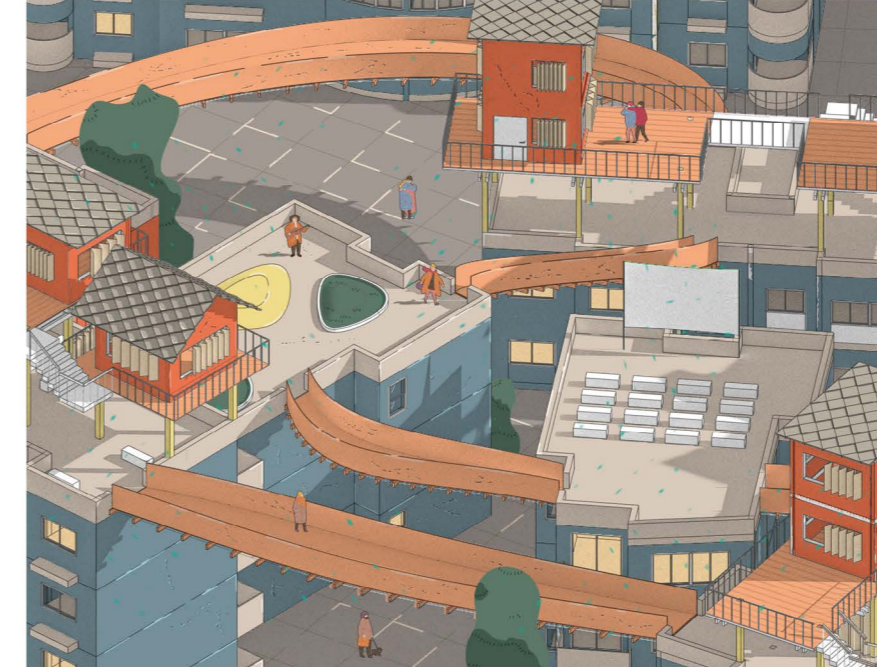
Supporting structure of the outer roof.

Detachable multi-layer wall panel.

Column and beams

Primary and secondary beams.

Column and base



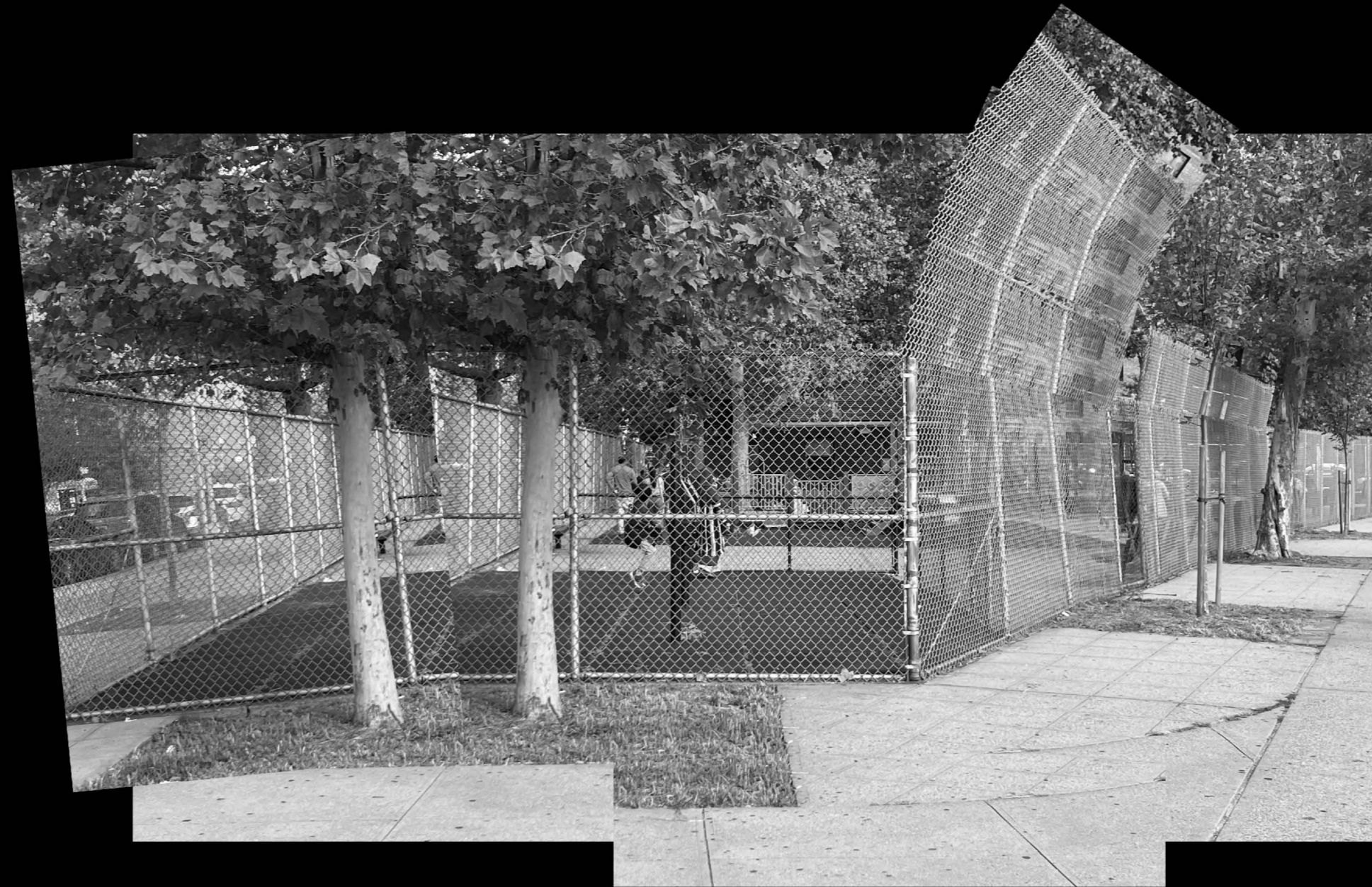
II

FARM IN MID AIR

A way to cap the CBE while solve issues

Site: New York City, UNITED STATES
Date: 2022 Fall
Instructor: Michael Bell
indivisual work

As a representative of the authority, the Cross Bronx Expressway has had many negative impacts on the local community, such as dividing the north and south sides, air pollution, noise pollution, etc. There are also many other public facilities near the CBE that have negative effects on the Bronx. In this project, I want to design a Bronx-friendly public facility that partially alleviates the negative impacts of the CBE. It will create employment opportunities, reduce noise pollution, and reconnect the north and south. It is a miles-long urban farms above the Cross Bronx Expressway.



CBE

The playground gets its name for the extensive views of the East River that can be seen from the southern part of Prospect Avenue. The playground includes basketball and handball courts.

It is built above the CBE, covering a part of it. This park provides us a perspective of what can be brought up by capping. For instance, connecting the neighborhood, providing public space, and reducing the vehicle noise.

Prospect Playground



Parkchester is a planned community and neighborhood originally developed by the Metropolitan Life Insurance Company and located in the central Bronx, New York City. The immediate surrounding area also takes its name from the complex. Its boundaries, starting from the north and moving clockwise, are East Tremont Avenue to the north, Castle Hill Avenue to the east, Westchester Avenue to the south, East 177th Street/Cross Bronx Expressway to the southwest, and the Bronx River Parkway to the west. Metropolitan Avenue, Unionport Road, and White Plains Road are the primary thoroughfares through Parkchester.

The concentration of fine particulate matter, the deadliest type of air pollutant, in Parkchester and Clason Point is 0.0076 milligrams per cubic metre (7.6x10⁻⁹ oz/cu ft), more than the city average. In 2018, 72% of residents described their health as "good," "very good," or "excellent," lower than the city's average of 78%.

Parker Chester

- Commercial
- Residence
- Manufacture
- Easily Capping Area

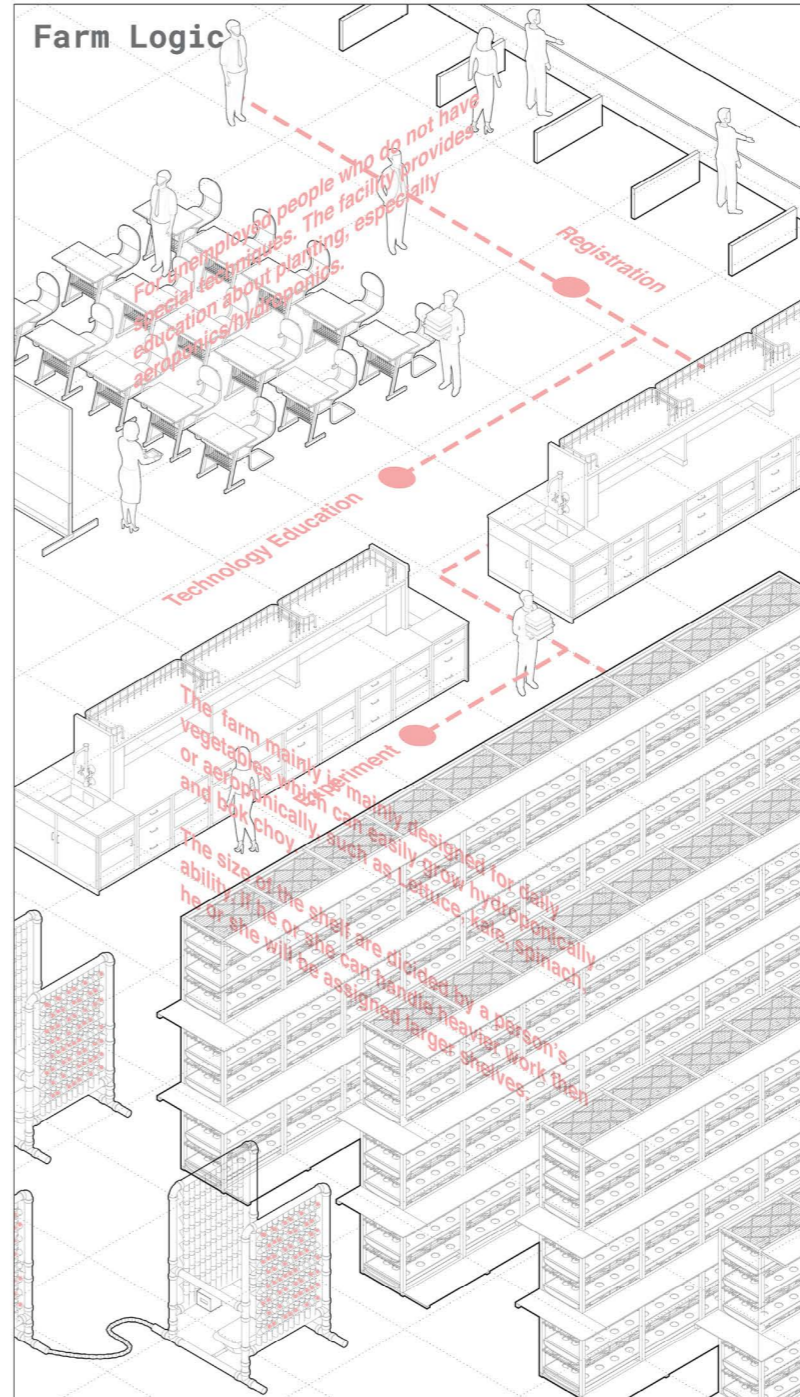
The Grand Concourse

The Grand Concourse (also known as the Grand Boulevard and Concourse) is a 5.2-mile-long (8.4 km) thoroughfare in the borough of the Bronx in New York City. Grand Concourse runs through several neighborhoods, including Bedford Park, Concourse, Highbridge, Fordham, Mott Haven, Norwood and Tremont. For most of its length, the Concourse is 180 feet (55 m) wide, though portions of the Concourse are narrower.

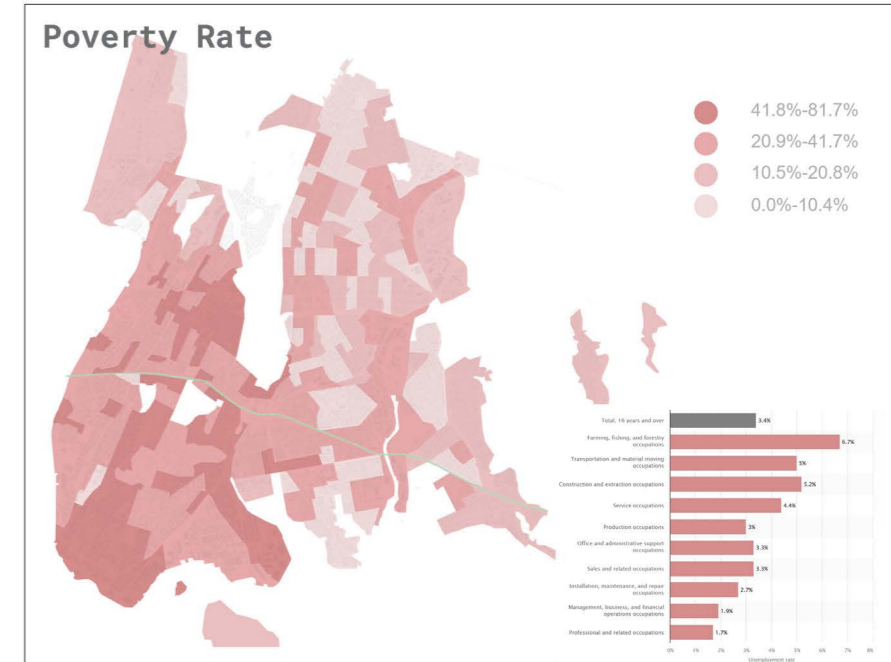
The Cross Bronx Expressway is a major freeway in the New York City borough of the Bronx. It is mainly designated as part of Interstate 95 (I-95), but also includes portions of I-295 and U.S. Route 1 (US 1). The Cross Bronx begins at the Alexander Hamilton Bridge over the Harlem River, where the Trans-Manhattan Expressway continues west across Upper Manhattan to the George Washington Bridge. While I-95 leaves at the Bruckner Interchange in Throgs Neck, following the Bruckner Expressway and New England Thruway to Connecticut, the Cross Bronx Expressway continues east, carrying I-295 to the merge with the Throgs Neck Expressway near the Throgs Neck Bridge. Though the road goes primarily northwest-to-southeast, the nominal directions of all route numbers west of the Bruckner Interchange are aligned with the northbound route number going southeast, and the southbound route number going northwest.

The Cross Bronx Expressway was conceived by Robert Moses and built between 1948 and 1972. It was the first highway built through a crowded urban environment in the United States; the most expensive mile of road ever built to that point is part of the Cross Bronx, costing \$40 million (equivalent to \$404,621,118 in 2021). At one point during construction, Moses' crews had to support the Grand Concourse (a major surface thoroughfare), a subway line and several elevated train lines while the expressway was laboriously pushed through. The highway experiences severe traffic problems, and its construction has been blamed for negatively affecting a number of low-income neighborhoods in the South Bronx.

Farm Logic

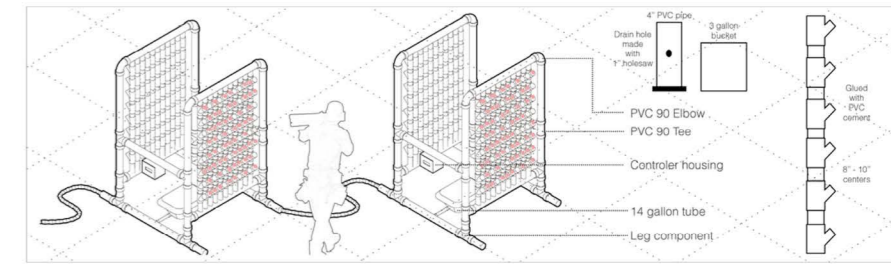


Poverty Rate



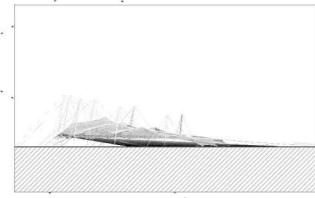
What relates closely to poverty is unemployment. This shows the unemployment rate in the United States in 2022, by occupation. From the top to bottom, it is not hard to see that the most unstable jobs are lesser-professional and lesser-technique-required ones.

This chart indicates that the unemployment rate is relatively high among those who work in agriculture. Therefore, a self-sufficient farm model is proposed, where people can receive vocational training on the farm, claim their own soilless cultivation frame, and then plant, harvest and sell in the market.

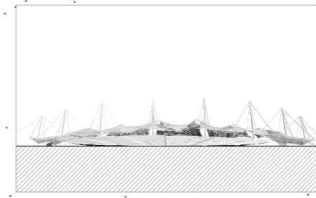


Munich Stadium

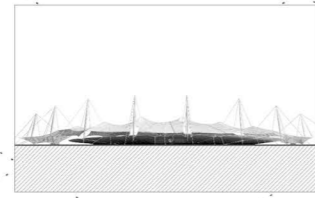
With peaks and valleys echoing the nearby Alps, the vast canopy of the Munich Olympic Stadium has been a local landmark since the opening of the 1972 Olympics for which it was designed. Intended to present a new face for post-war Germany, the stadium strikingly Modernist in character was meant to stand in harmony with its surroundings. Despite these modest intentions, however, controversy surrounded the project from its outset, which centered on skyrocketing costs, the erosion of local heritage, and the grim specter of the country's own recent past.



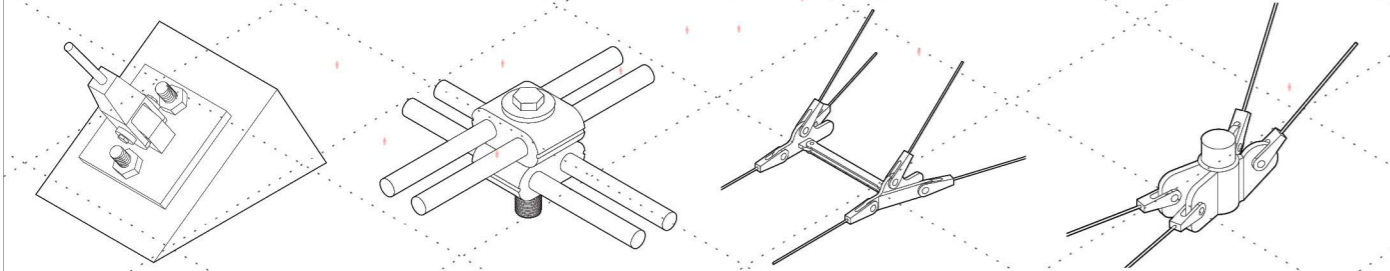
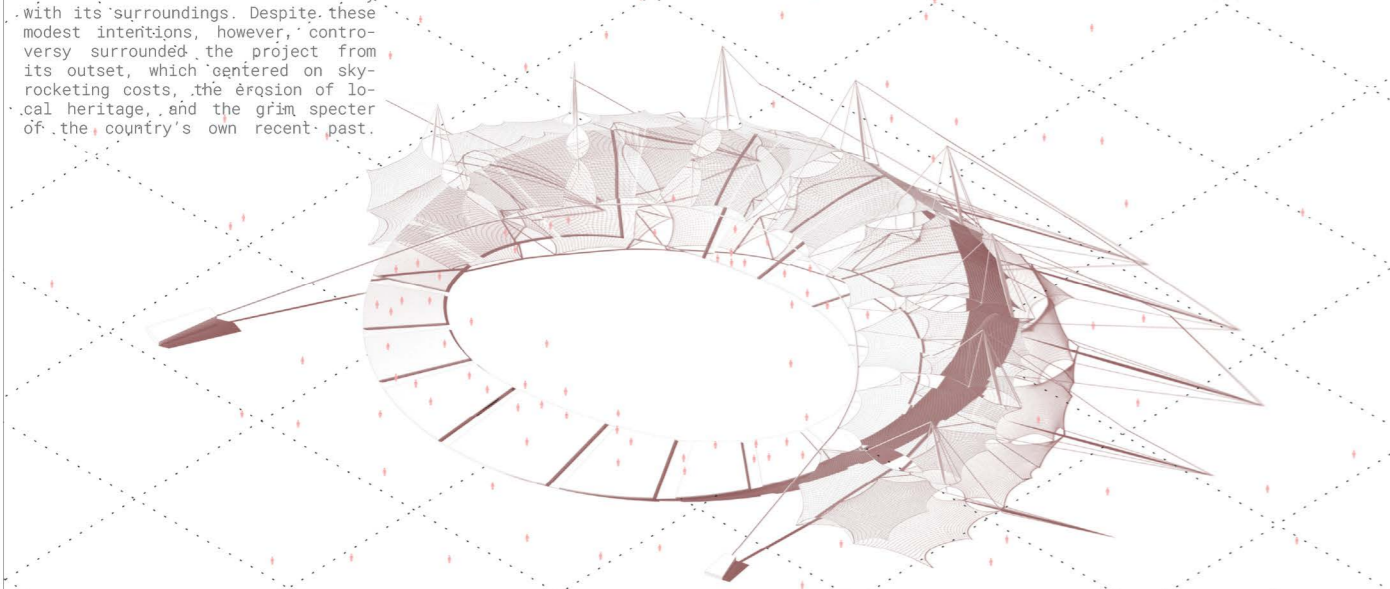
Left View



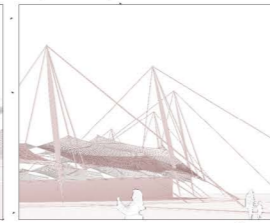
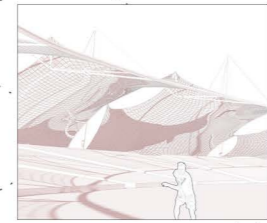
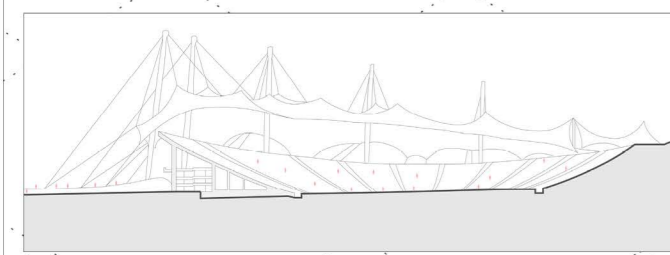
Front View



Back View



Section

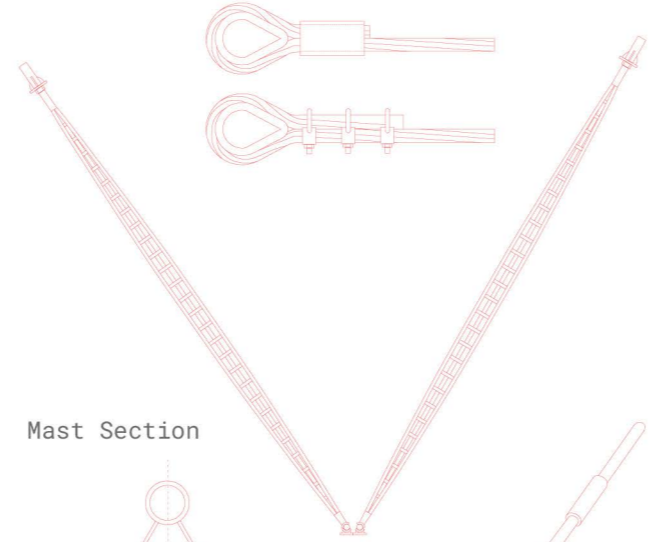


The tensile surface created more than just one major space which is for the athletes, it also created a peripheral space due to its structural character.

Structure Design

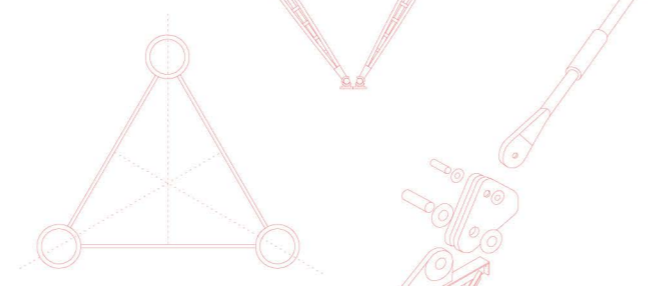
The Munich Olympic Stadium, as a case study for our studio, has shown us the advantages of tension structures: a lightweight structure with a larger coverage space. However, it also has its limitations as the stadium's structure is currently only used as a roof and cannot be used as a building envelope. Therefore, after fully utilizing our imagination, a structure similar to a cable-stayed bridge was proposed, with the tension rods located in the center of the CBE, and the entire building suspended above the highway.

Mast

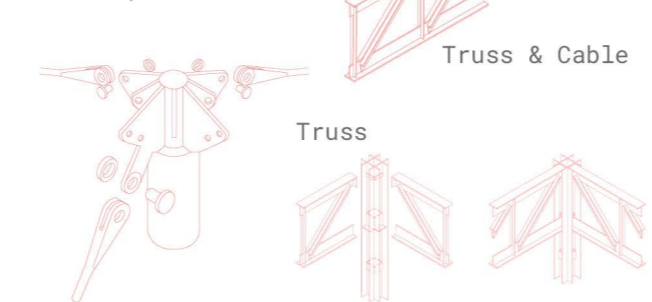


Cable

Mast Section

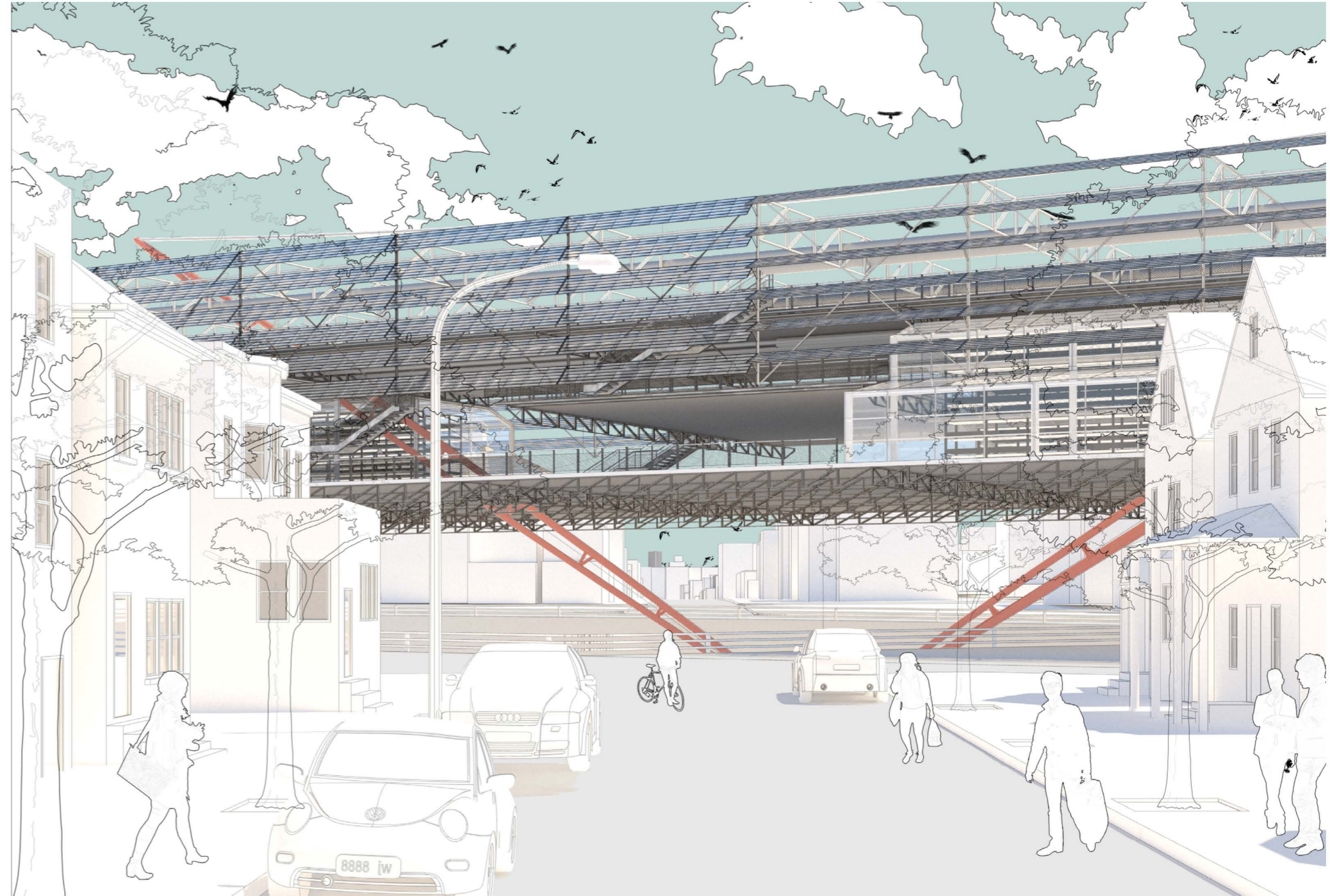


Mast Top Connection



Truss & Cable

Truss



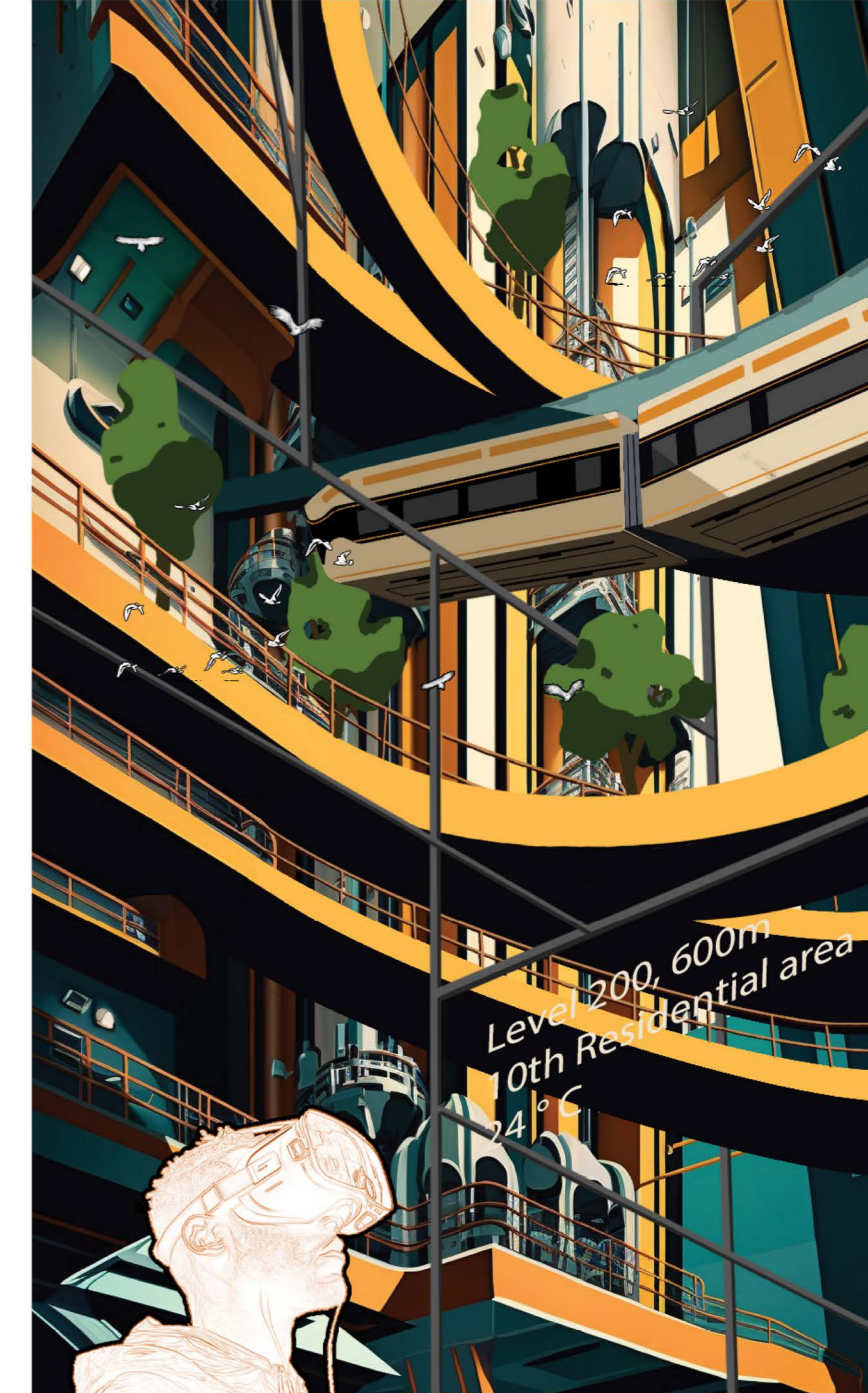
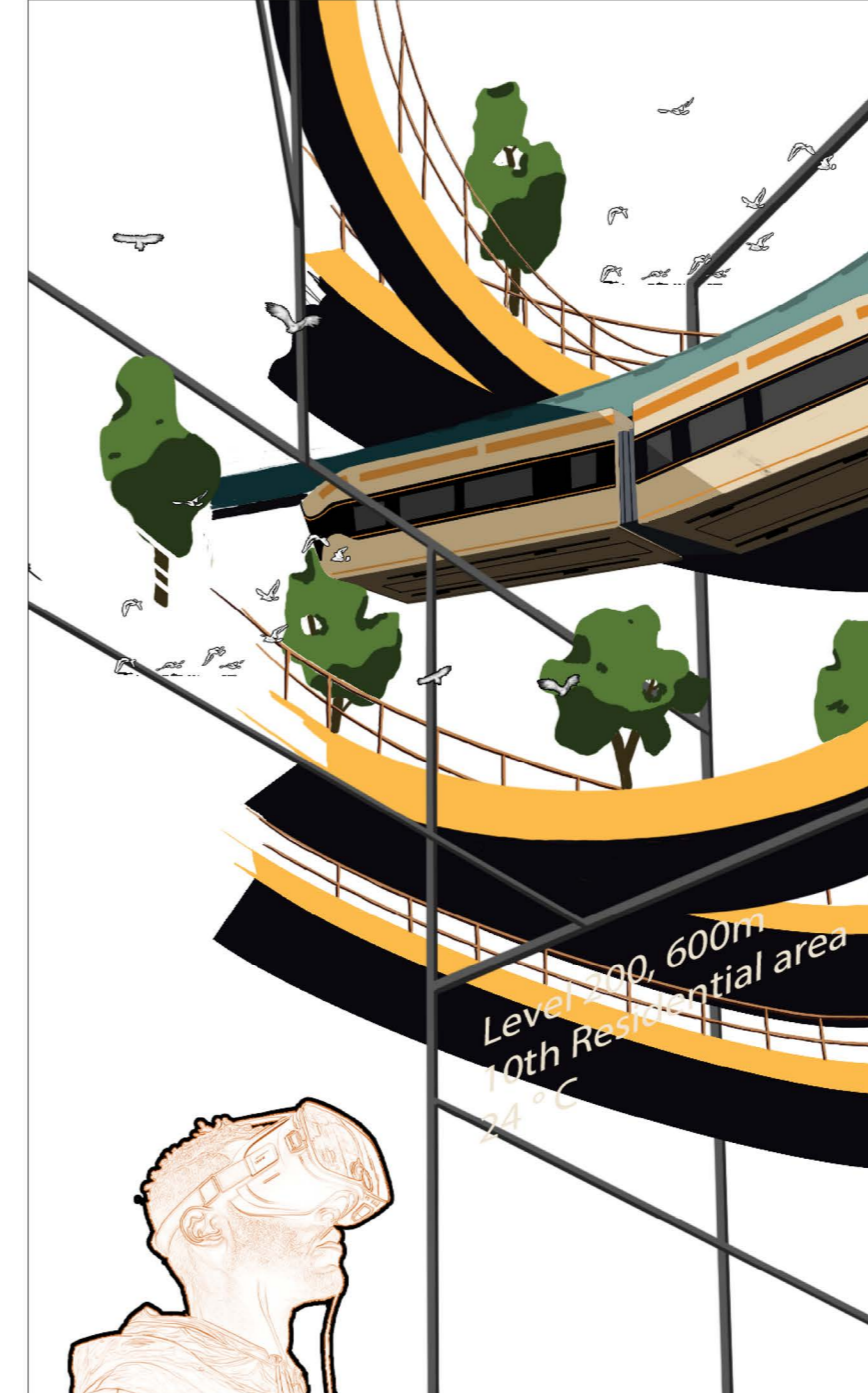


III effi-CITY

A new lifestyle for the migrantworkers

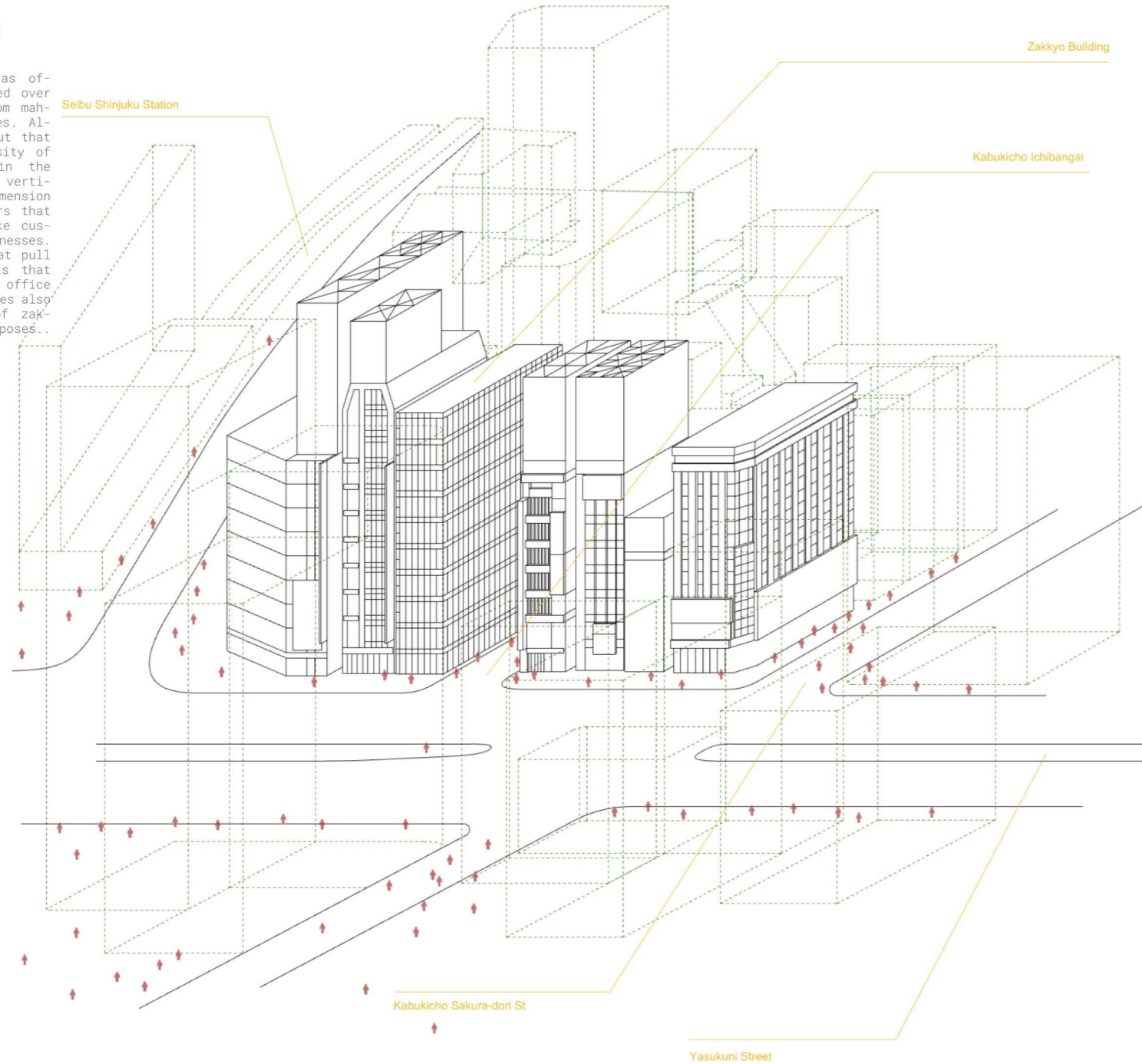
Site: Kusatsu, Japan
Date: 2023 Spring
Instructor: David Benjamin
group work

This semester Our studio is focused on reducing carbon emissions through design methods in the future so that the global temperature rise is less than 1.5 degrees Celsius. As urban areas are the largest source of global carbon emissions, there is an urgent need for change. The current global urbanization rate is 56% and is expected to reach 68% in 2050. Especially in developing countries, the rate of urbanization is more rapid. All our measures will be in vain if cities still develop according to the current crude development model for the most part. In order to achieve carbon neutrality, it is necessary for cities to shift to intensive development, especially for emerging cities. Effi-city proposes a new urban developing model that combines the efficiency of Tokyo's approach with the use of AI.



Zakkyo Building

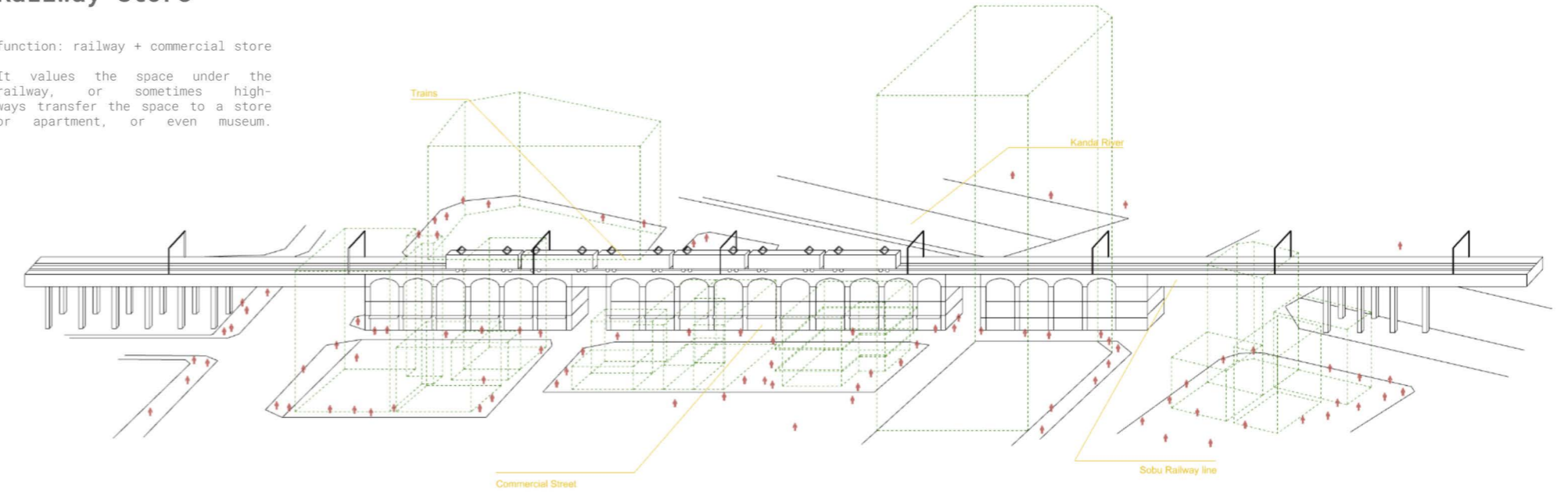
Zakkyo largely started out as office buildings and transformed over time to house everything from mah-jong parlors to karaoke boxes. Almazán and McReynolds point out that these buildings offer a density of destinations rarely found in the West because they offer a vertical—not just a horizontal—dimension to walkability, with elevators that open onto the street and take customers directly up to businesses. Zakkyo are on narrow lots that pull pedestrians along the streets that they line. Unlike larger U.S. office buildings, their small lot sizes also facilitate the easy reuse of zakkyo space for different purposes..



Railway Store

function: railway + commercial store

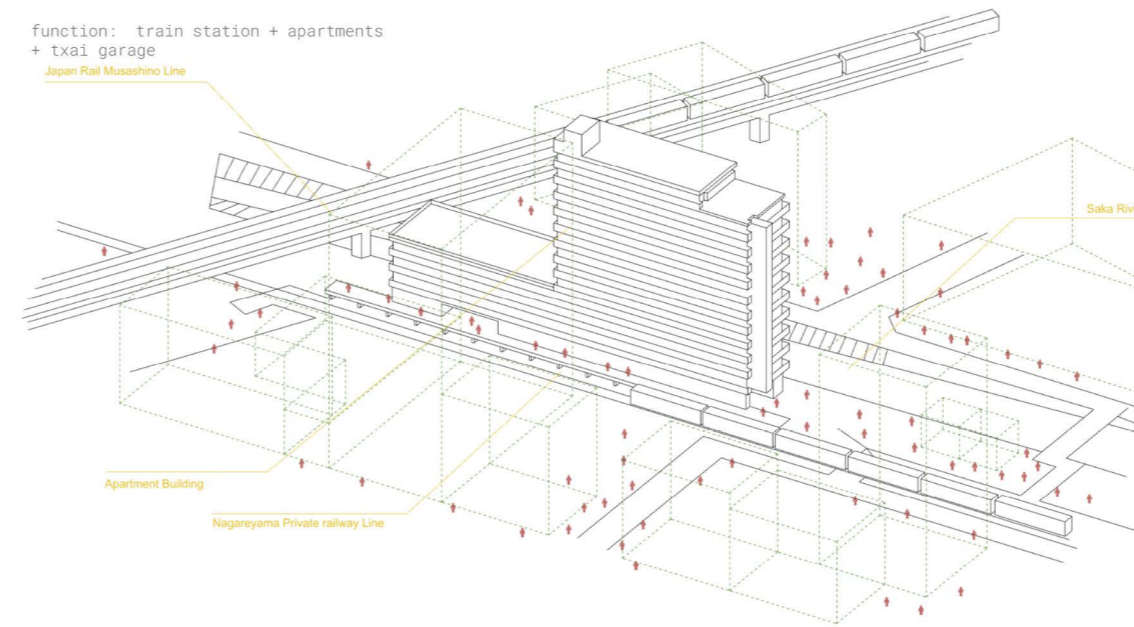
It values the space under the railway, or sometimes highways transfer the space to a store or apartment, or even museum.



Apartment Station

function: train station + apartments + taxi garage

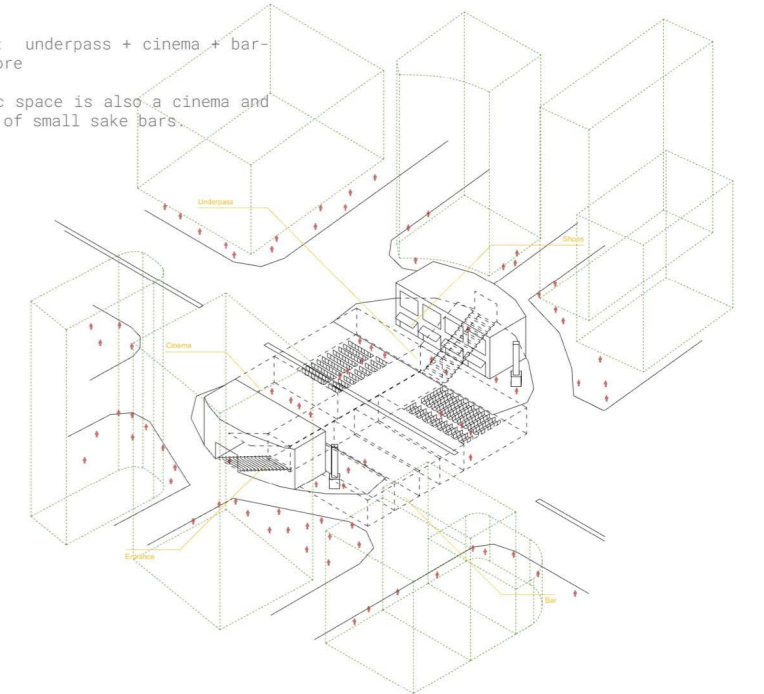
Japan Rail Musashino Line



Cine-bridge

function: underpass + cinema + barber + store

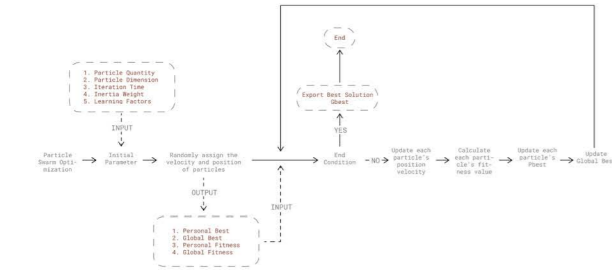
A traffic space is also a cinema and a series of small sake bars.



Particle Swarm optimization

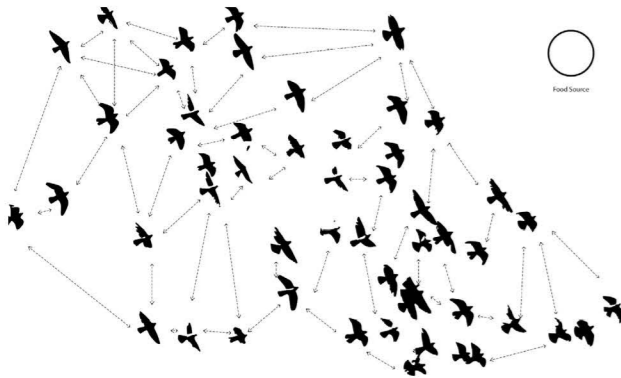
The focus of AI planning is to find the optimal arrangement of various urban functions, which can be achieved through large-scale computation to identify the best solution, an area where AI algorithms excel.

To find the best arrangement, I am adapting the PSO. The idea of particle swarm optimization (PSO) originates from the study of foraging behavior in bird flocks, where collective information sharing enables the group to find the optimal destination.



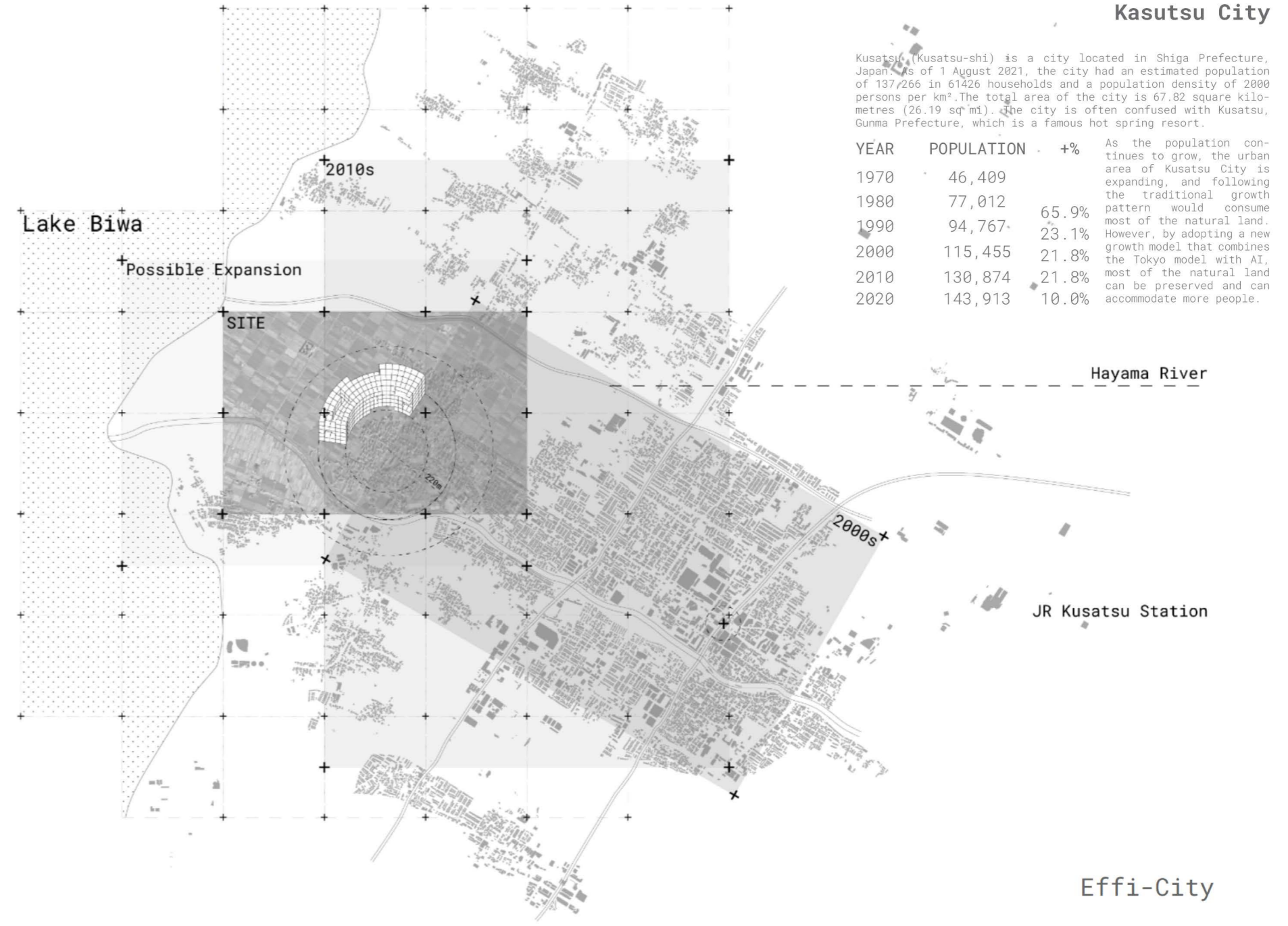
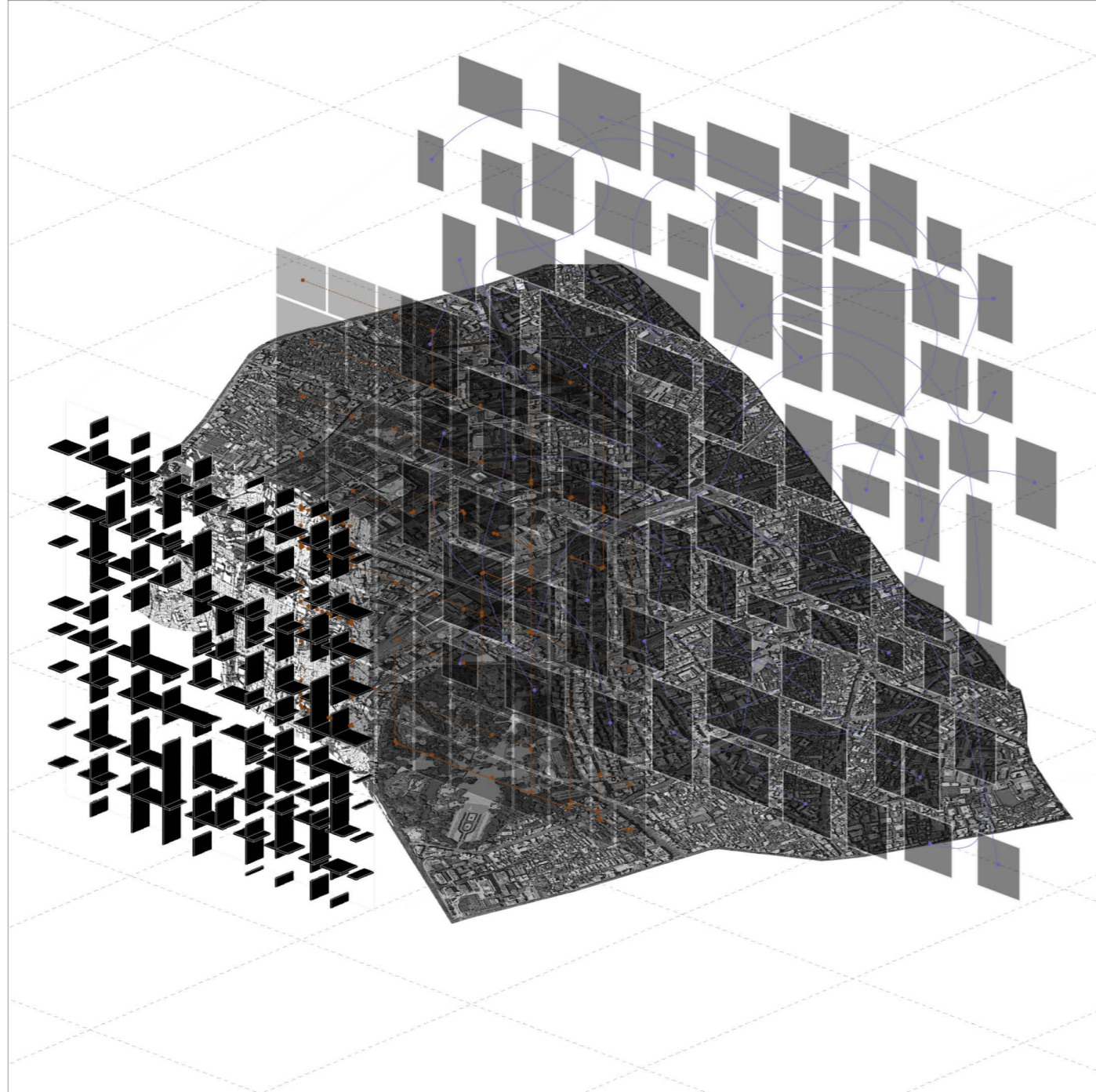
Prototype of PSO

Each bird searches in the direction it judges to be the most promising and records the position where it has found the highest amount of food. Meanwhile, all birds share the positions where they have found the most food and the corresponding amounts. In this way, the flock can determine the location where the food is most abundant.



Application to city

In a city layout optimization project, each building can be seen as a bird, and the aim is to establish an objective function that seeks the optimal arrangement of a specific number and type of buildings with the shortest commute path.

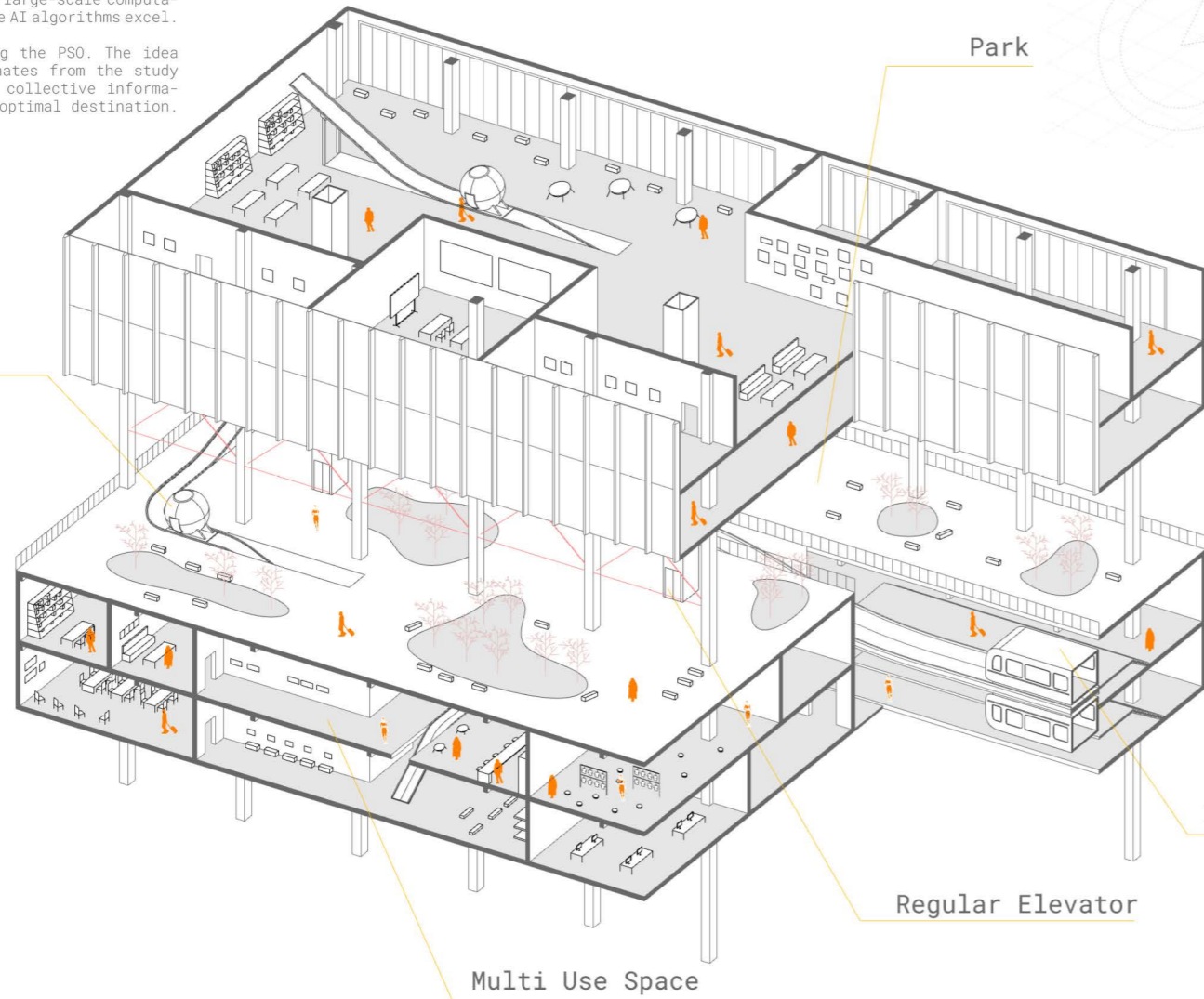
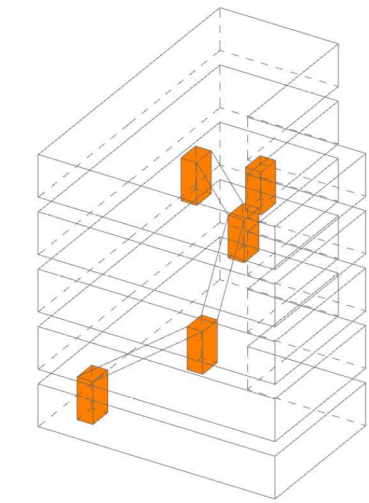


Concept Model of Combining PSO Optimization with TOKYO mode

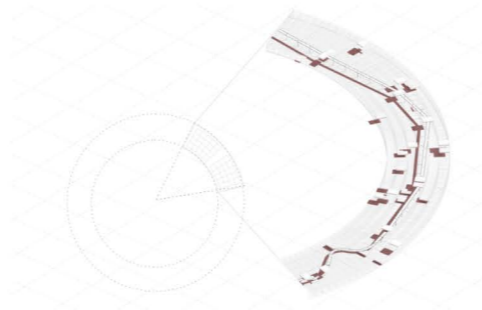
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Inclined Elevator



Park

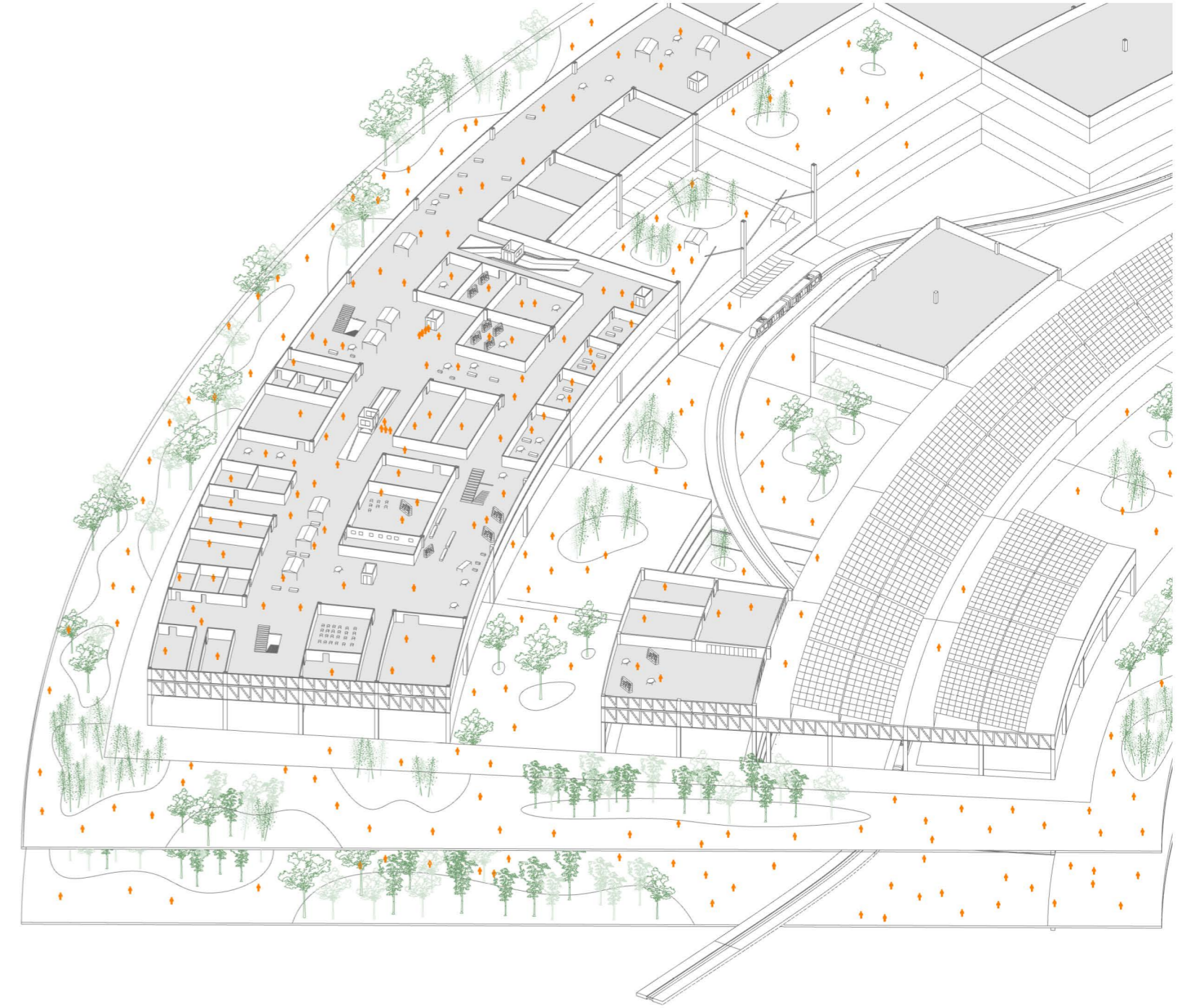
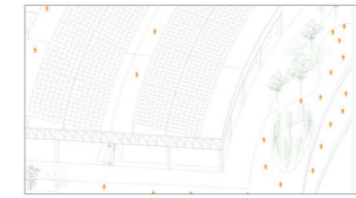
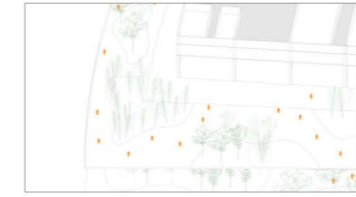


Within a defined sector, the building volume is divided into a predetermined number of small blocks, each representing a specific function, such as commercial or residential. By incorporating a point representing public transportation stations and using PSO algorithm, an optimal layout is obtained. With this layout, people's daily transportation is extremely convenient, and they can easily reach different parts of the city by walking or using public transportation.

Inter block Railway

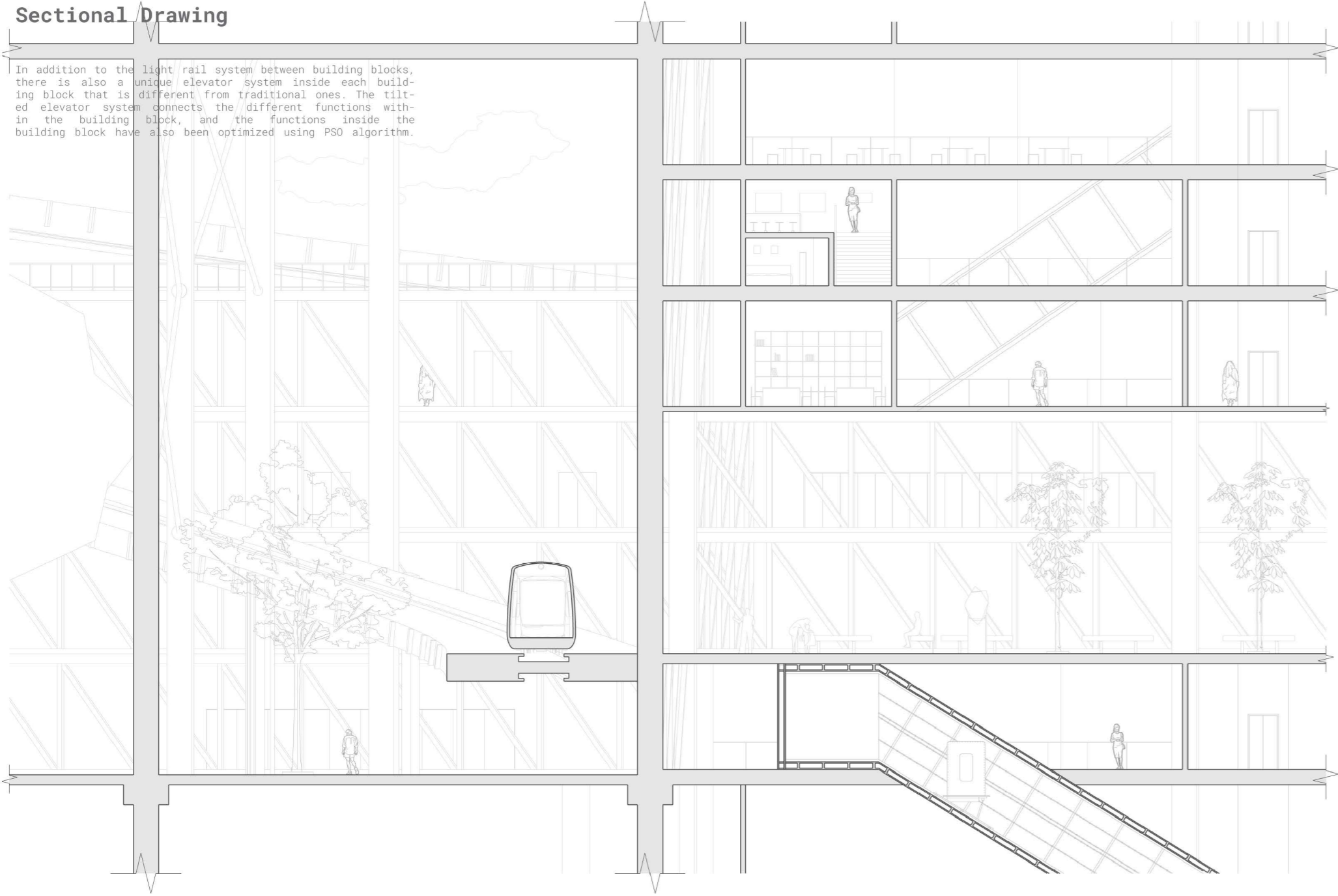
Regular Elevator

Multi Use Space



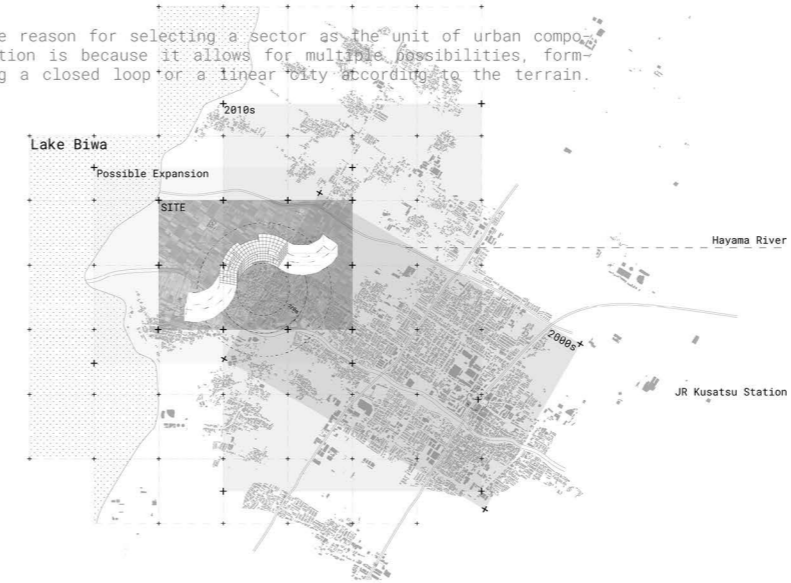
Sectional Drawing

In addition to the light rail system between building blocks, there is also a unique elevator system inside each building block that is different from traditional ones. The tilted elevator system connects the different functions within the building block, and the functions inside the building block have also been optimized using PSO algorithm.



Future Possible Forms

The reason for selecting a sector as the unit of urban composition is because it allows for multiple possibilities, forming a closed loop or a linear city according to the terrain.



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