



PORTFOLIO

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MS. Advanced Architectural Design
Columbia University GSAPP

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HEADQUARTERS GOING UP!

Columbia GSAPP | Advanced Design Studio

Summer 2019

Instructor: Dan Wood, Maurizio Mattioli / Individual Work

Location: New York, NY

Program: Office, Housing

Used Software & Tools

Modeling: Rhinoceros, Grasshopper

Rendering: Vray, Photoshop

Physical Modeling: Laser Cutting, 3D Printing

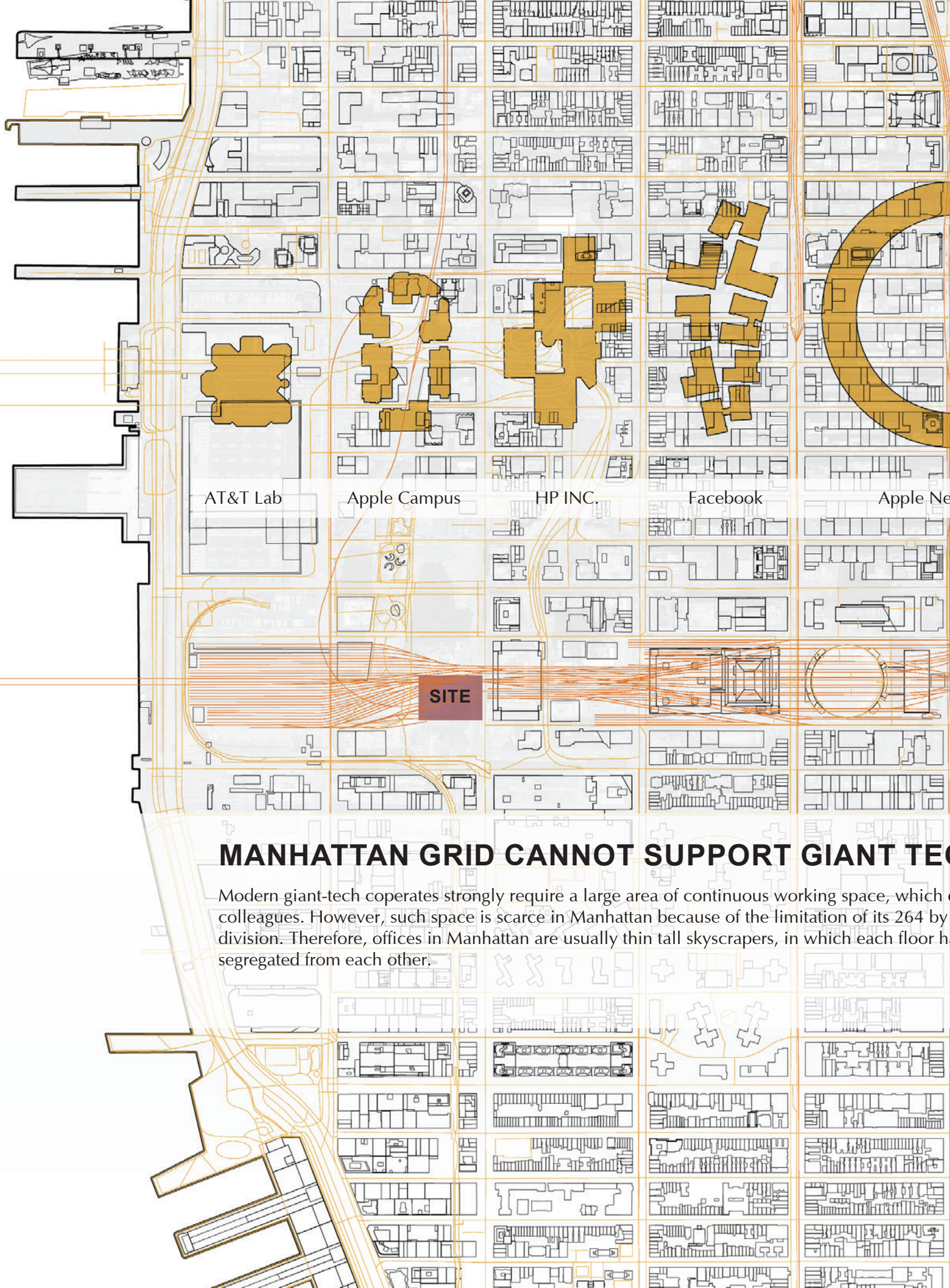
The idea of this project is to reinvent working space, meeting the needs of continuous working space strongly requested by modern cooperative large companies, such as Apple, Amazon, Google, etc. However, such space is scarce in Manhattan because of the limitation of its 264 by 900 feet urban planning block division. Therefore I attempt to achieve this vertically in a comparatively limited site plot.

In order to provide a continuous large floor plate required by modern giant tech corporates, which enhances connection and cooperation among their employees, this project creates an open space that connects different floors and there is convenient pedestrian circulation in the space. The open space can be easily accessed on each floor of the office, and it becomes a place for employees to refresh themselves and have casual meetings with people from different floors, which is essential to encourage communication, cooperation and creativity inside a corporate. A second curtain-wall skin is added to cover the office so as to provide a more stable and controlled environment for the open space, especially during winter and harsh weather days. There are trees and plants in the open space to create a vertical garden shared by the whole office on different floors.

In addition, urban plaza and public space are redefined in this project. Publicity is expressed not only as a level of transparency, but also a sense of inclusiveness, in which sharing cultures such as co-working, co-living and co-studying are encouraged.







AT&T Lab

Apple Campus

HP INC.

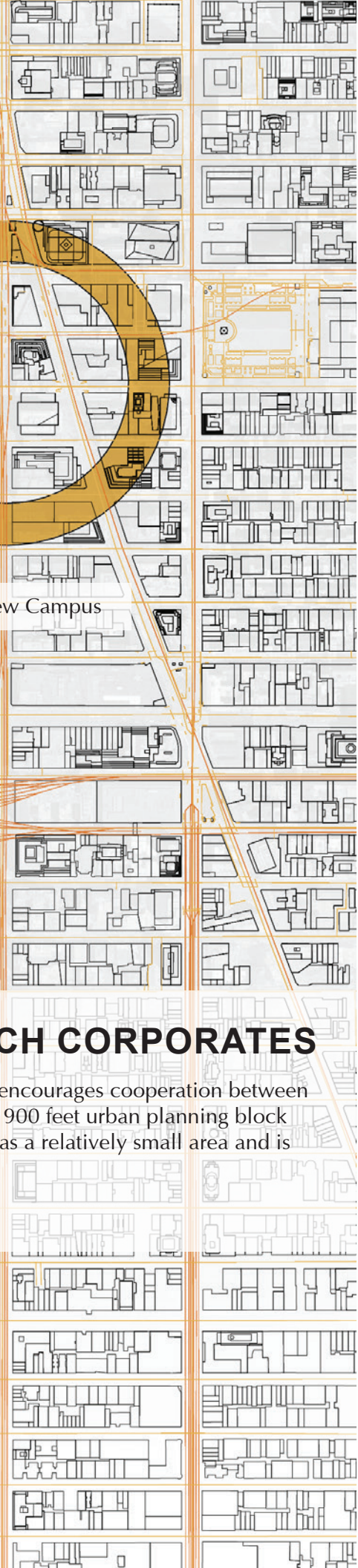
Facebook

Apple Ne

SITE

MANHATTAN GRID CANNOT SUPPORT GIANT TECH

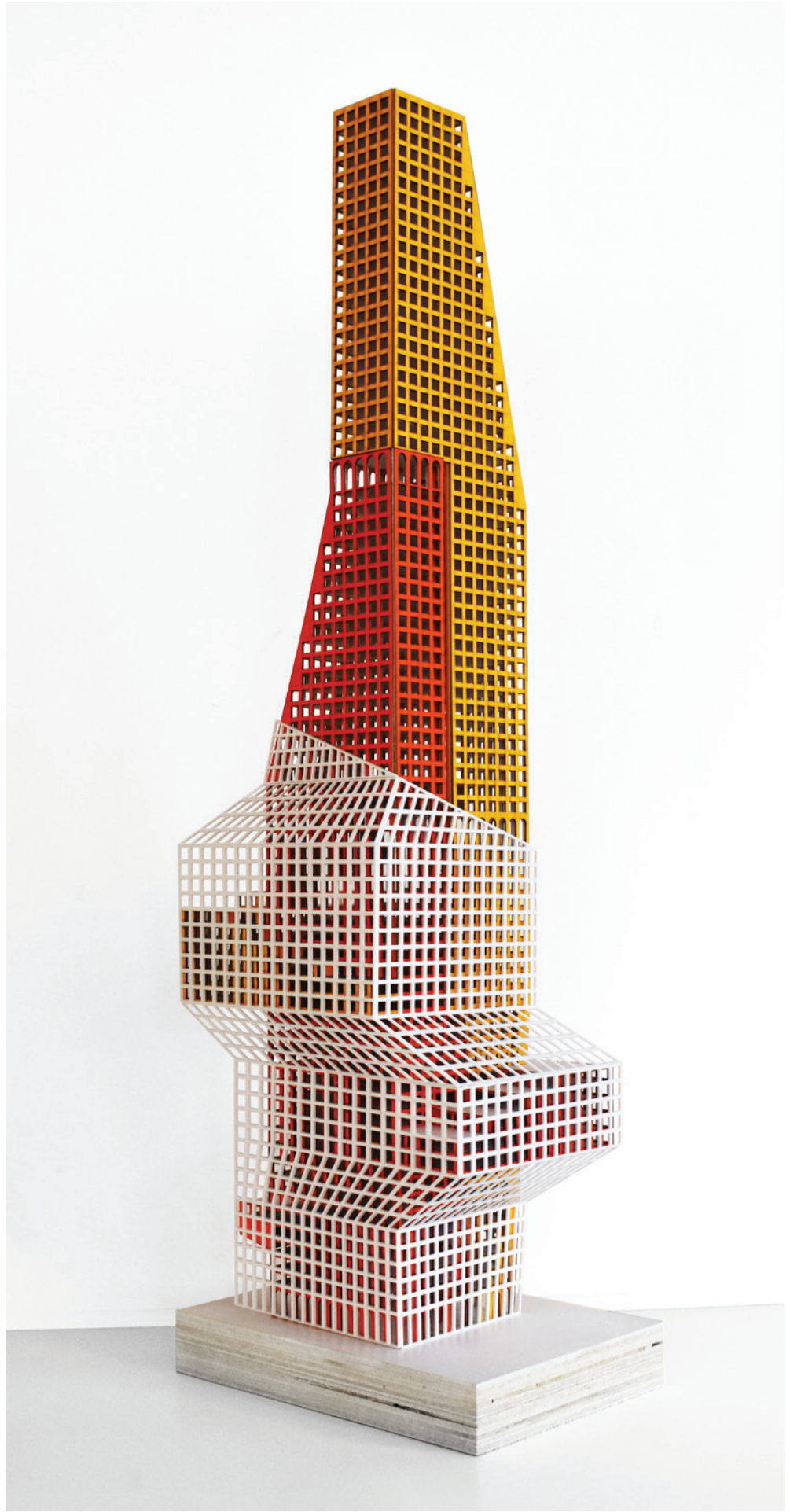
Modern giant-tech cooperates strongly require a large area of continuous working space, which colleagues. However, such space is scarce in Manhattan because of the limitation of its 264 by division. Therefore, offices in Manhattan are usually thin tall skyscrapers, in which each floor h segregated from each other.



ew Campus

CH CORPORATES

encourages cooperation between
900 feet urban planning block
as a relatively small area and is





A vertical creative working space should not be just the repetition of floors with increased area. It should encourage informal communication with people working in different teams, which links people together in a giant corporate where employees spread out in a lot of departments; it should allow people to easily see each other's work so that they can be mutually inspired; it should provide recreational space for people to relax themselves from time to time to maintain their creativity; it should provide personal autonomy for people who need to highly concentrate on their work without distraction; it should provide an atmosphere to encourage interaction and collaboration; and finally it should allow a more flexible living-working mode for people who prefer independent creative work.



Informal Communication



Mutual Inspiration



Recreational Space



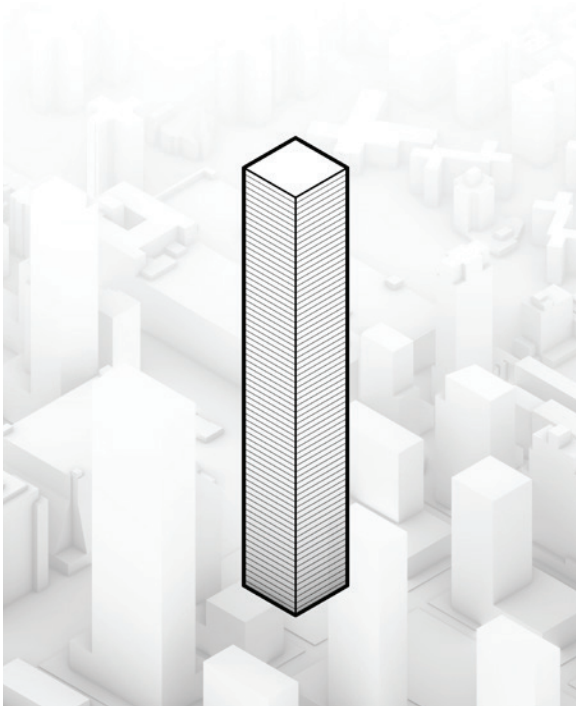
Personal Autonomy



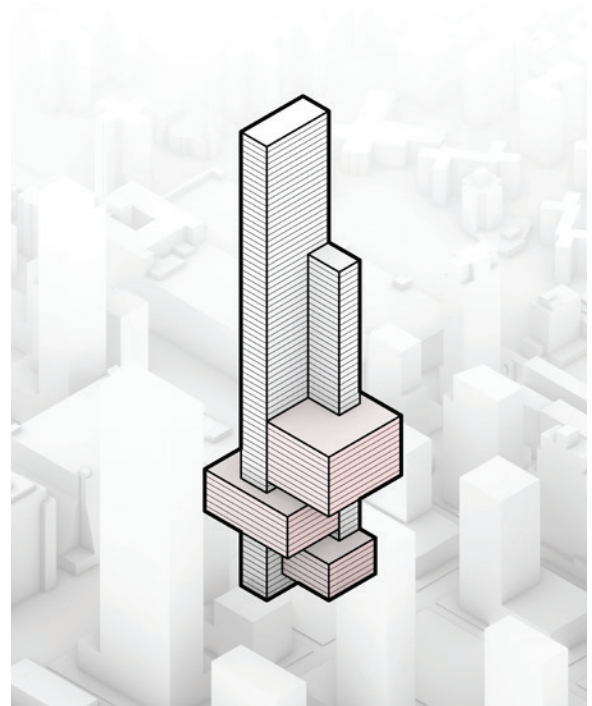
Interaction & Collaboration



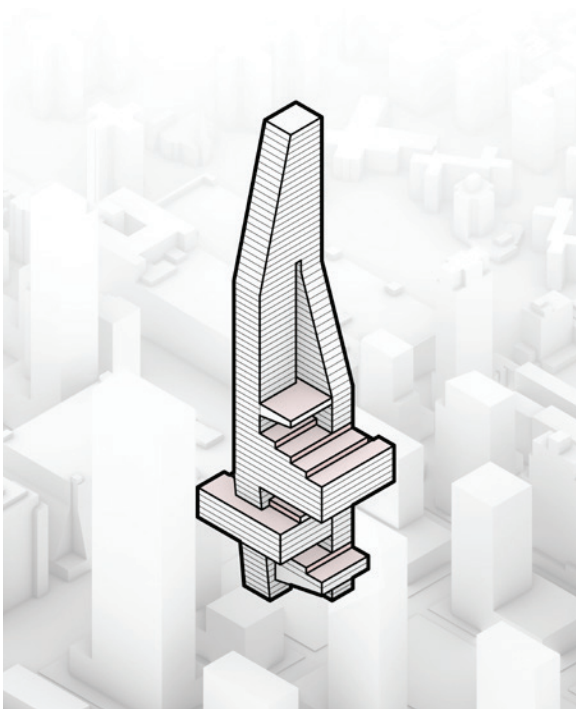
Living-Working



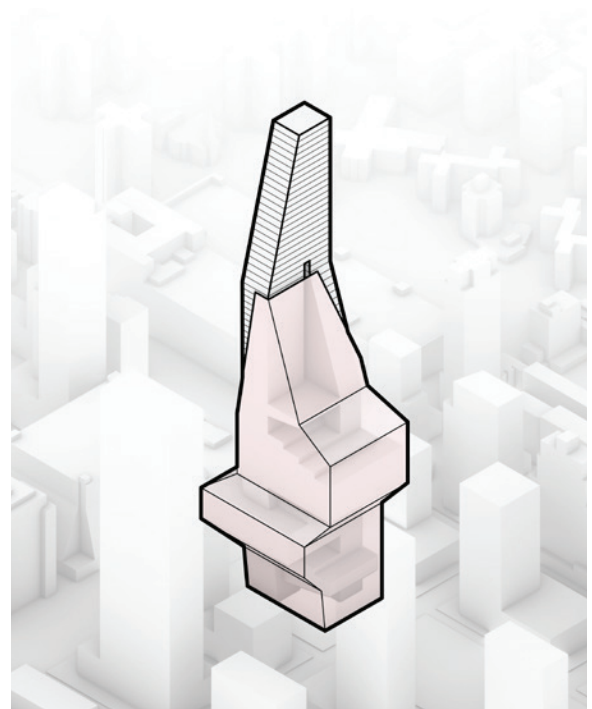
A typical mixed-use office-residential highrise tower in Manhattan with a rectangular floor plan is 320m high with 70 floors. It comprises 10,000m² of office space and 6,000m² of residential space.



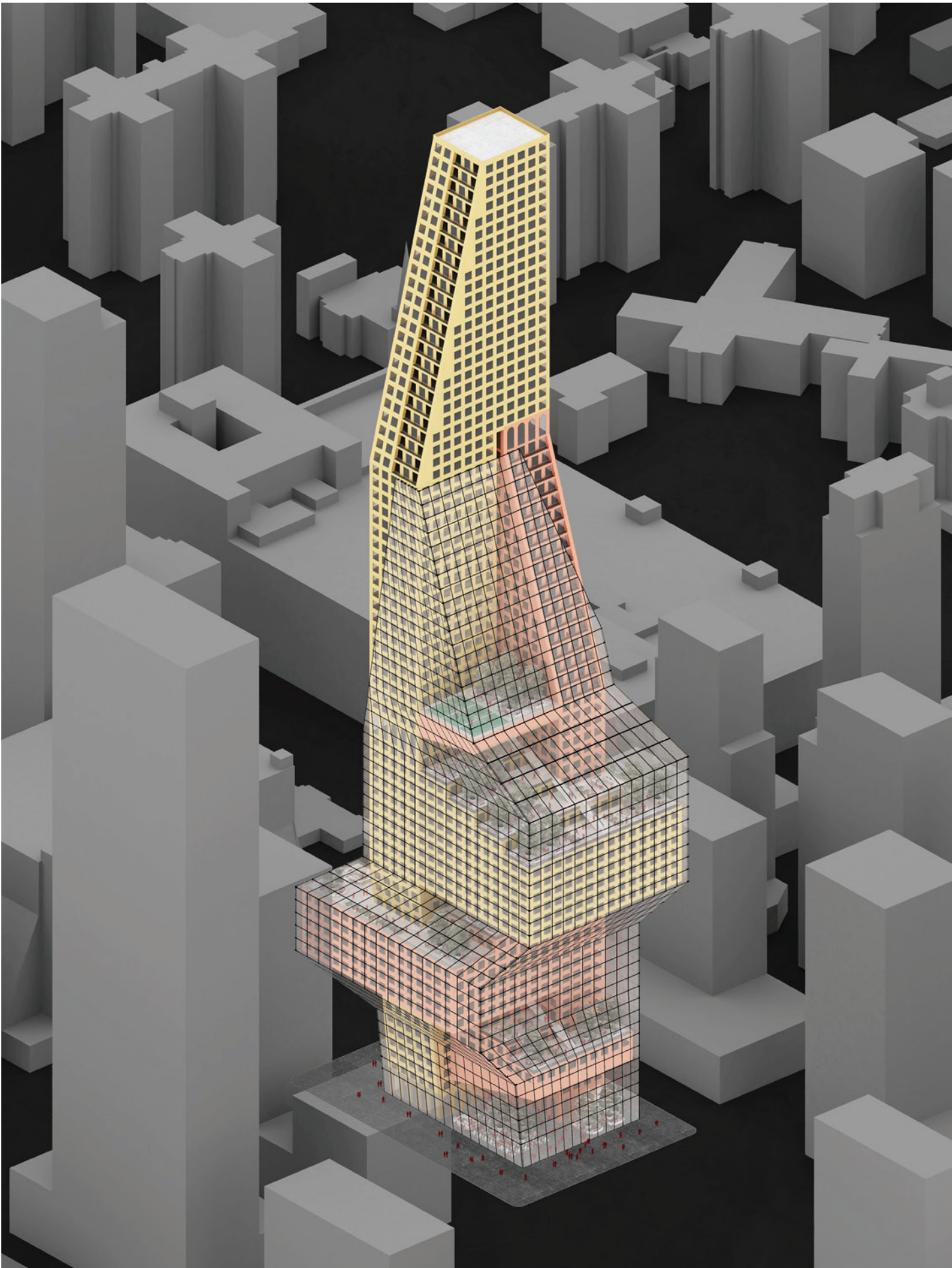
Office blocks with a larger floor plate are inserted vertically into the tower, and each of them could be taken by one corporate firm. Each block functions independently and does not interfere with each other.

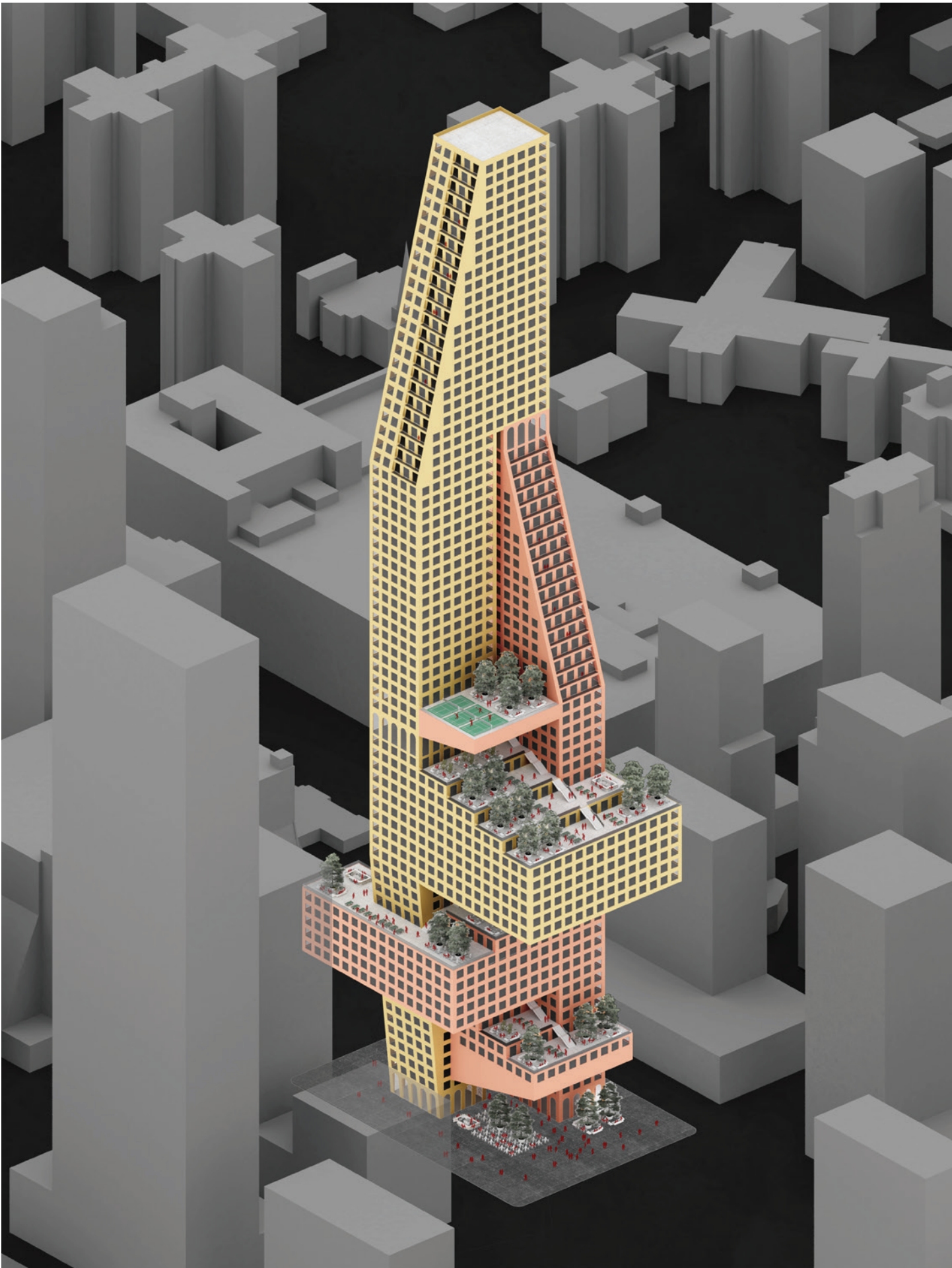


Stepped-floor plates connect each floor together within each office block, creating a large continuous working space. In addition, a shared platform is created for the upper living-working part of the building.



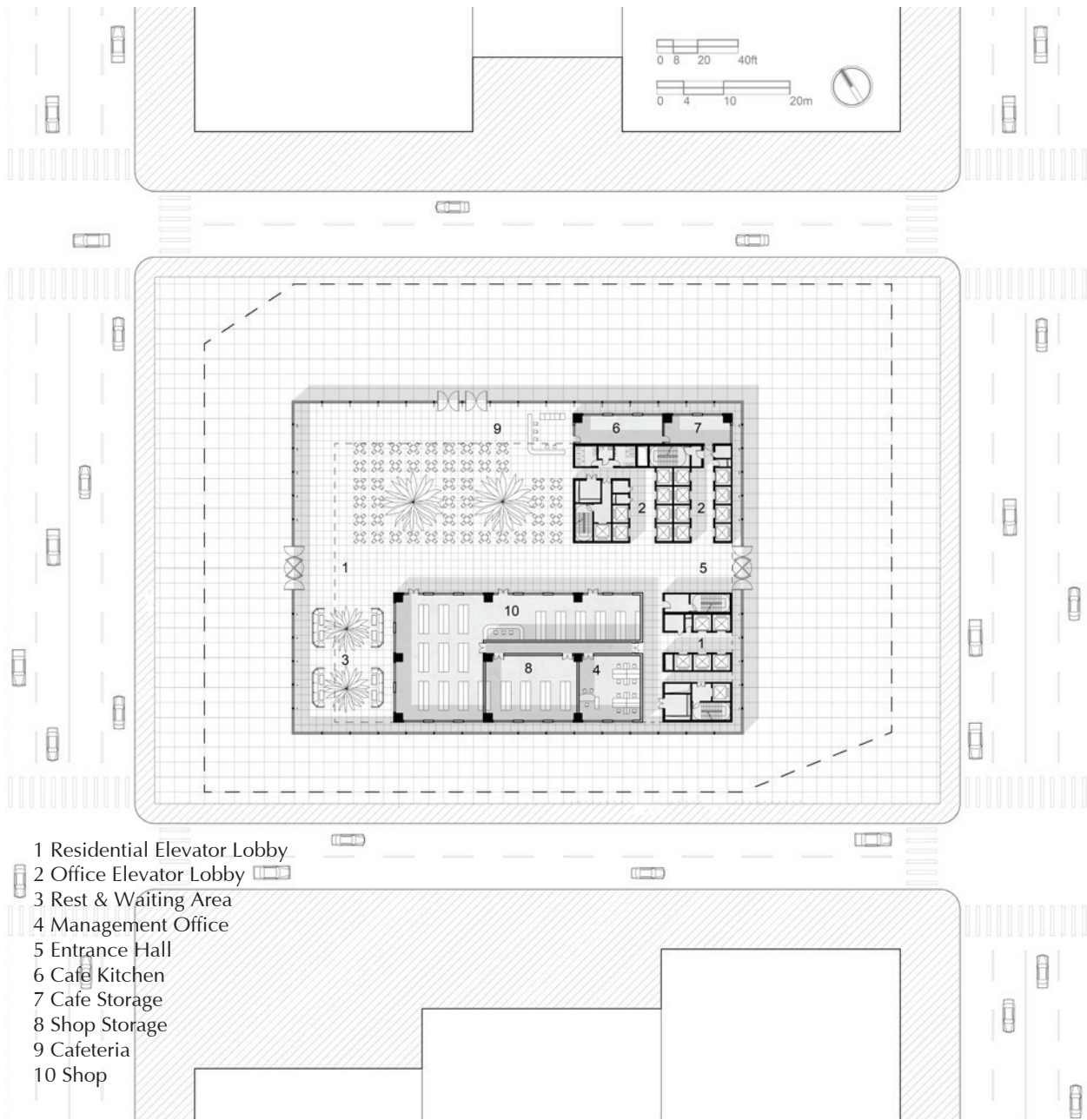
A skin of curtain wall is placed in the exterior of the building, creating a controlled climate-moderate space in between. The stepped-floor plates then become indoor greenery gardens that are multi-functional.









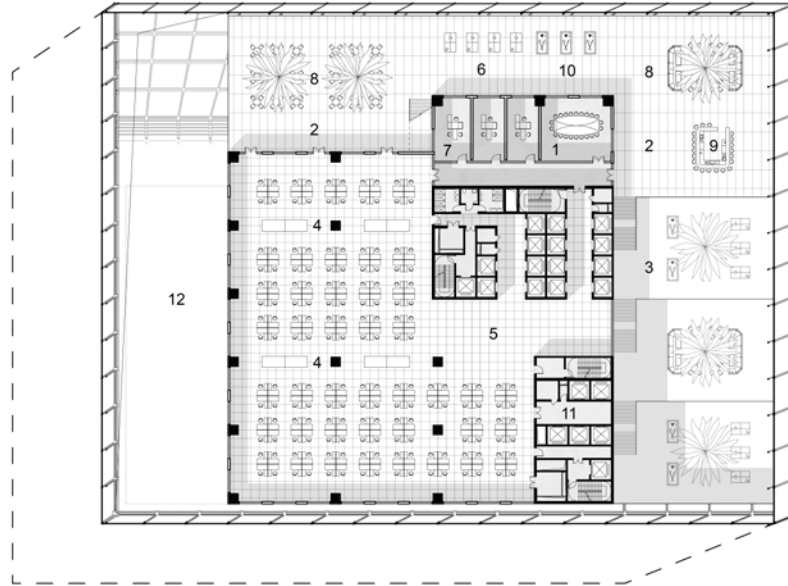


Ground Floor Plan

The two cores of the tower function separately. The south core serves the living-working residential apartments on the upper floors, while the north core serves the headquarter offices on the lower floors. Each headquarter would occupy one block, and floors within a block connect with each other with stepped semi-outdoor terraces covered by a curtain wall exterior skin. Rest facilities, recreational activities including billiards and table tennis as well as drink bars are organized on the terraces, which provide an environment that not only connect the whole headquarter together but also inspires cooperation and creativity.

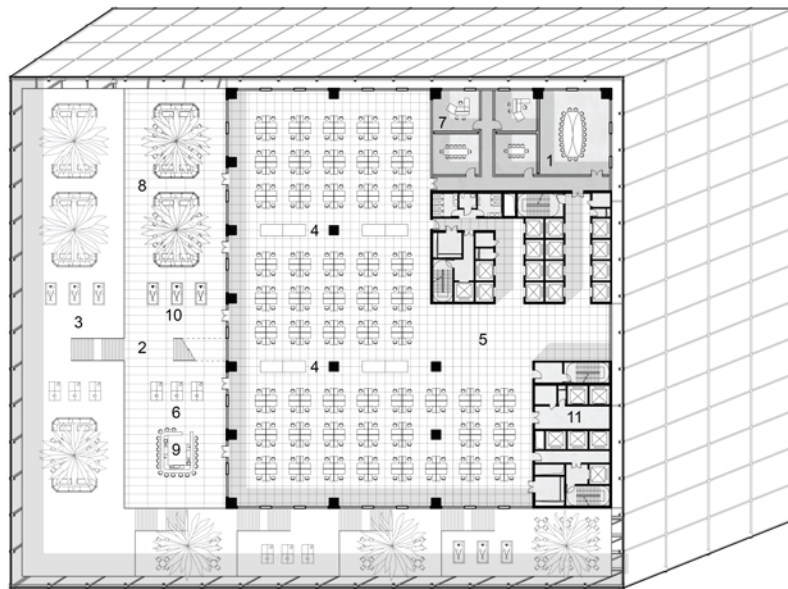
16th Floor Office

- 1 Group Meeting Room
- 2 Semi-Outdoor Terrace
- 3 Lower Floor Terrace
- 4 Open Hive Office
- 5 Office Lobby
- 6 Table Tennis
- 7 Cell Office
- 8 Rest Area
- 9 Drink Bar
- 10 Billiards
- 11 Storage
- 12 Atrium



27th Floor Office

- 1 Group Meeting Room
- 2 Semi-Outdoor Terrace
- 3 Lower Floor Terrace
- 4 Open Hive Office
- 5 Office Lobby
- 6 Table Tennis
- 7 Cell Office
- 8 Rest Area
- 9 Drink Bar
- 10 Billiards
- 11 Storage

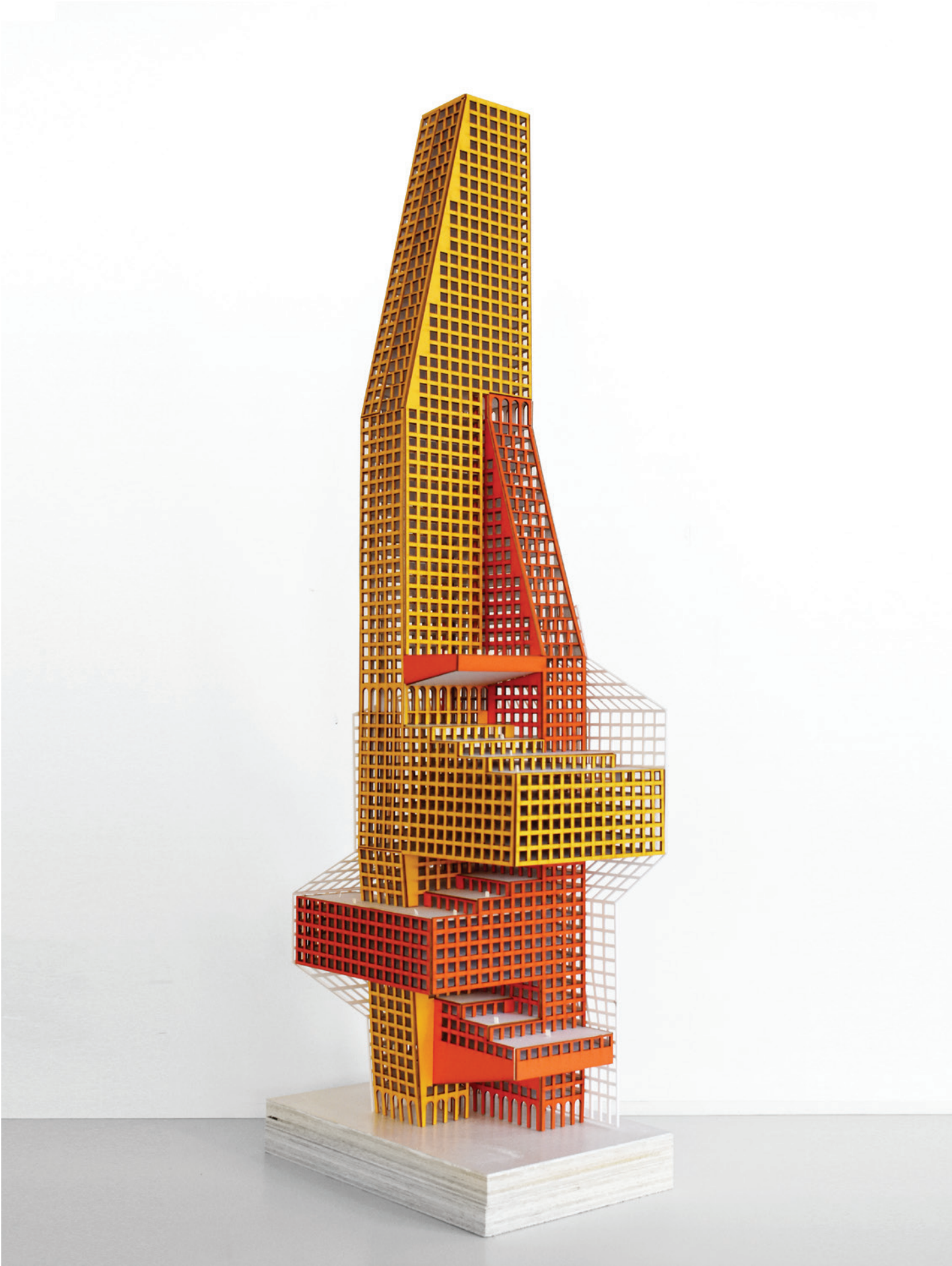




Higher-Level Office Open Space



Lower-Level Office Open Space





SELF-EFFICIENT ARCHITECTURAL DESIGN

Columbia GSAPP | Advanced Design Studio
Fall 2019

Instructor: David Benjamin / Individual Work
Location: New York, NY
Program: Housing, Office, Farming, Recycling

Used Software & Tools

Modeling: Rhinoceros, Grasshopper, Maya
Rendering: Vray, Photoshop
Physical Modeling: Laser Cutting, 3D Printing

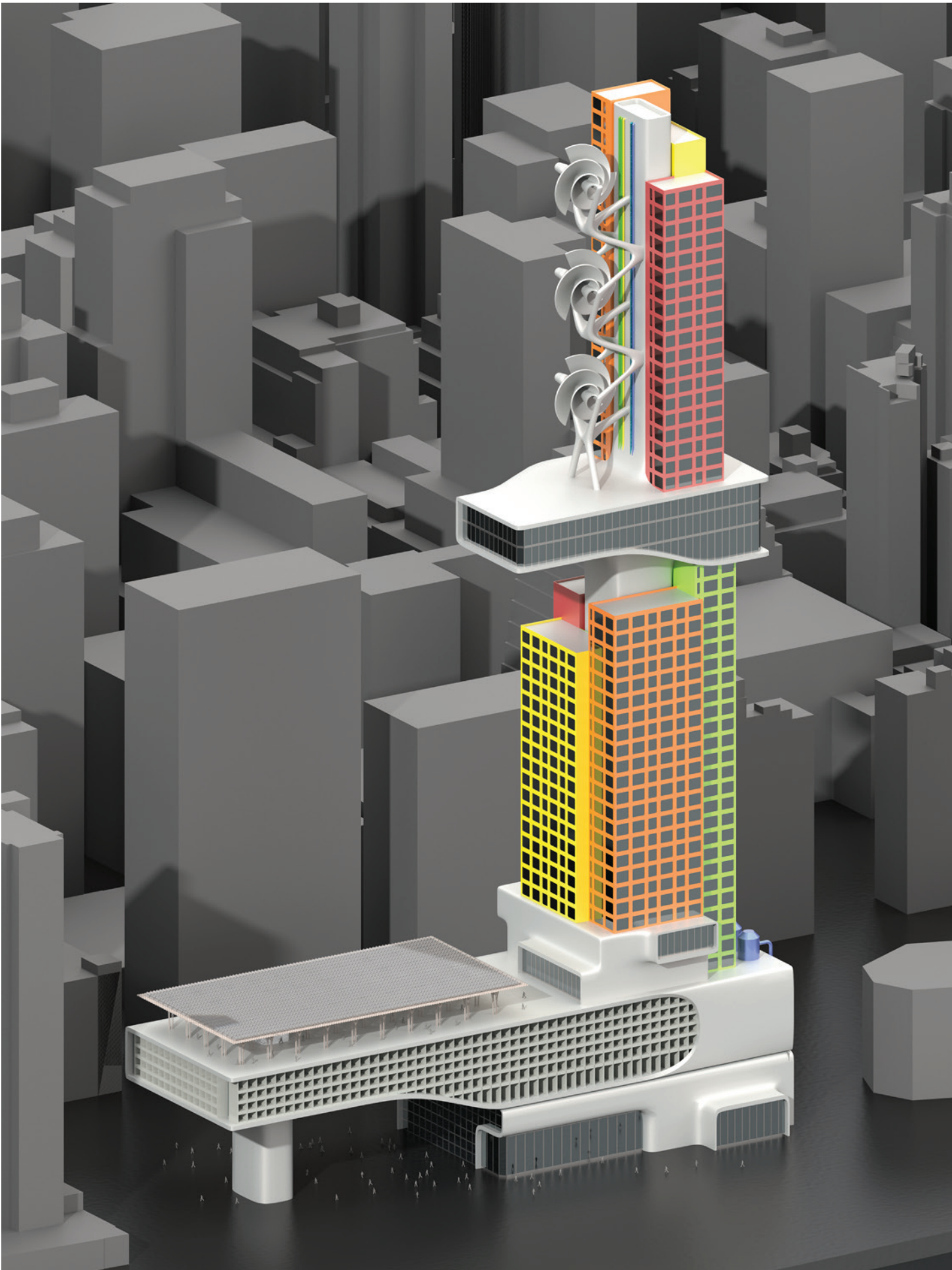
Buildings are responsible for approximately 40% of energy consumption and 36% of CO₂ emissions in the world, making them the single largest energy consumer globally.

The Energy Committee in European Union requires that all new buildings must be nearly zero-energy buildings (NZEB) as of 31 December 2020. The low amount of energy that NZEB require comes mostly from renewable energy sources or energy produced on site by the building.

Currently in the US there is no legislation on building energy performance except the LEED standard, which is not a compulsory building code. In order to achieve the goal of the Green New Deal, I suggest that every building should be nearly self-efficient in terms of the consumption and production of energy, water, food and waste.

Jobs are created in the building on the industry of energy production, food production and waste recycle. The goal is that most residents can work within the building and approximately 600 jobs will be provided.

This project includes mixed uses of housing, water recycle & water treatment, electricity production, food production, education center, community center and a farmers' market. The idea of the architectural design of this project is to invite public spaces into the building. So I designed this large horizontal plate to create a public plaza underneath and a roof platform. Also a public education center is placed on the upper level with a good view towards the city and the East River.



New York City Consumption Statistics:

Housing:

866 square feet per household (lowest in US)

Water Consumption:

120 Gallons per person per day (lowest in US)

Electricity Consumption:

19 kWh per month per household (2nd lowest in US)

Food Consumption:

5.5 pounds per person per day

Persons per Household:

2.67

Project Program Statistics:

Housing: 250 units, 807,500 ft²

Water Recycle & Waste Treatment: 1850 ft²

Electricity Production: 52,000 ft²

Food Production: 64,500 ft²

Education Center: 37,650 ft²

Community Center: 17,500 ft²

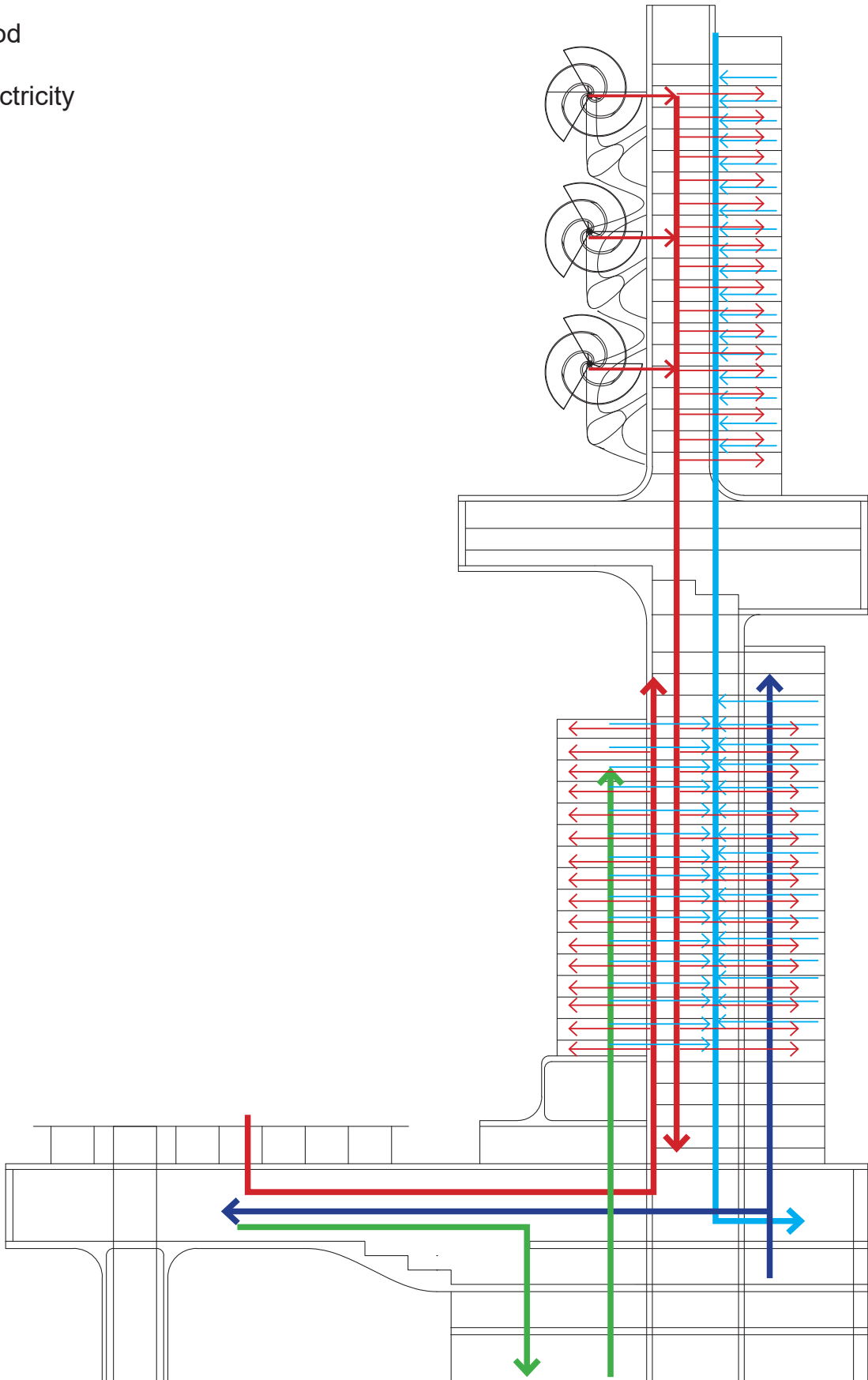
Farmers' Market: 52,750 ft²

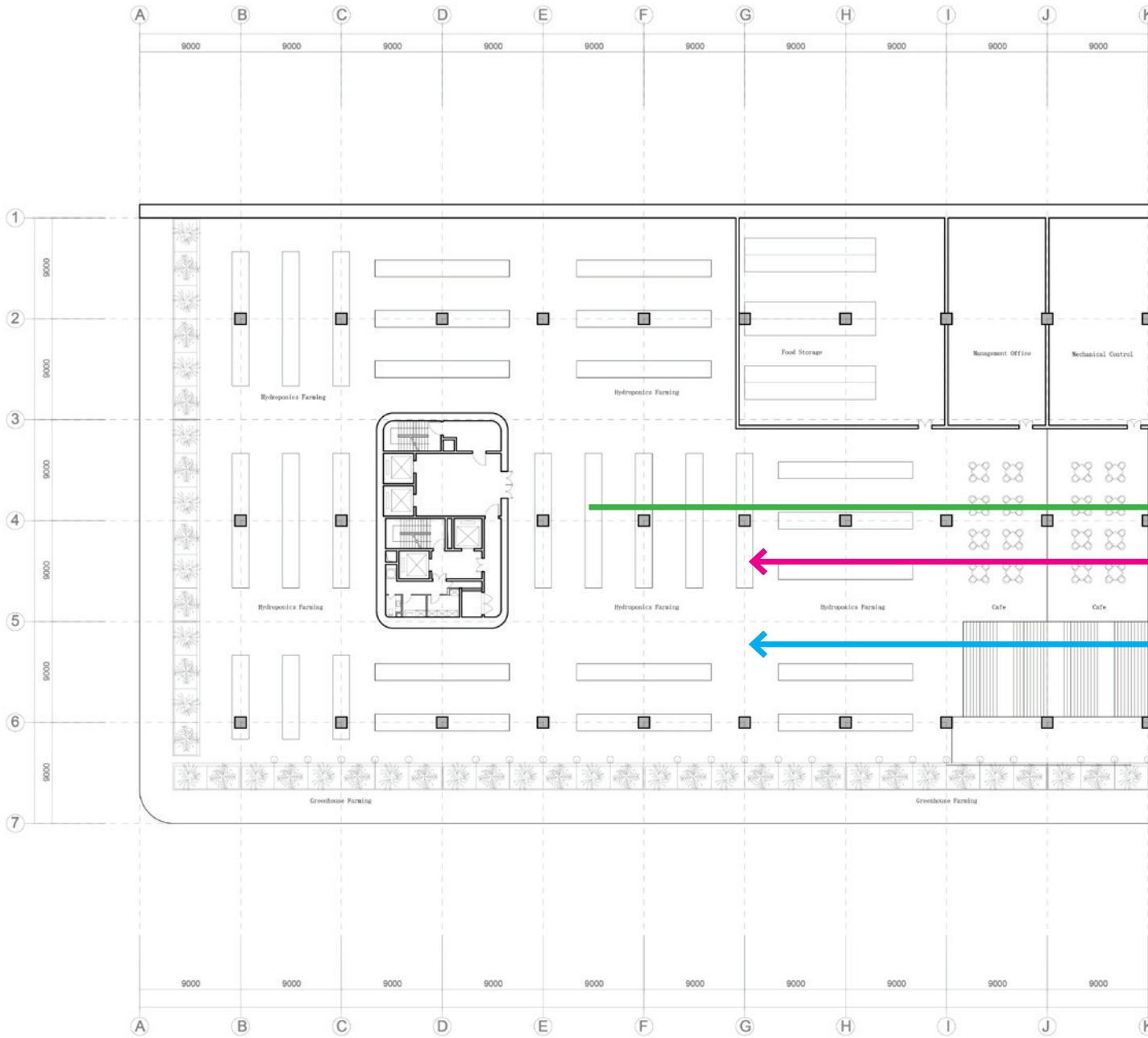


The site of this project is located in east Manhattan on 1st Avenue, between East 38th Street and East 41st Street with an area of 270,000 ft², which was a former Con Edison power plant site next to the United Nations head-quarter.

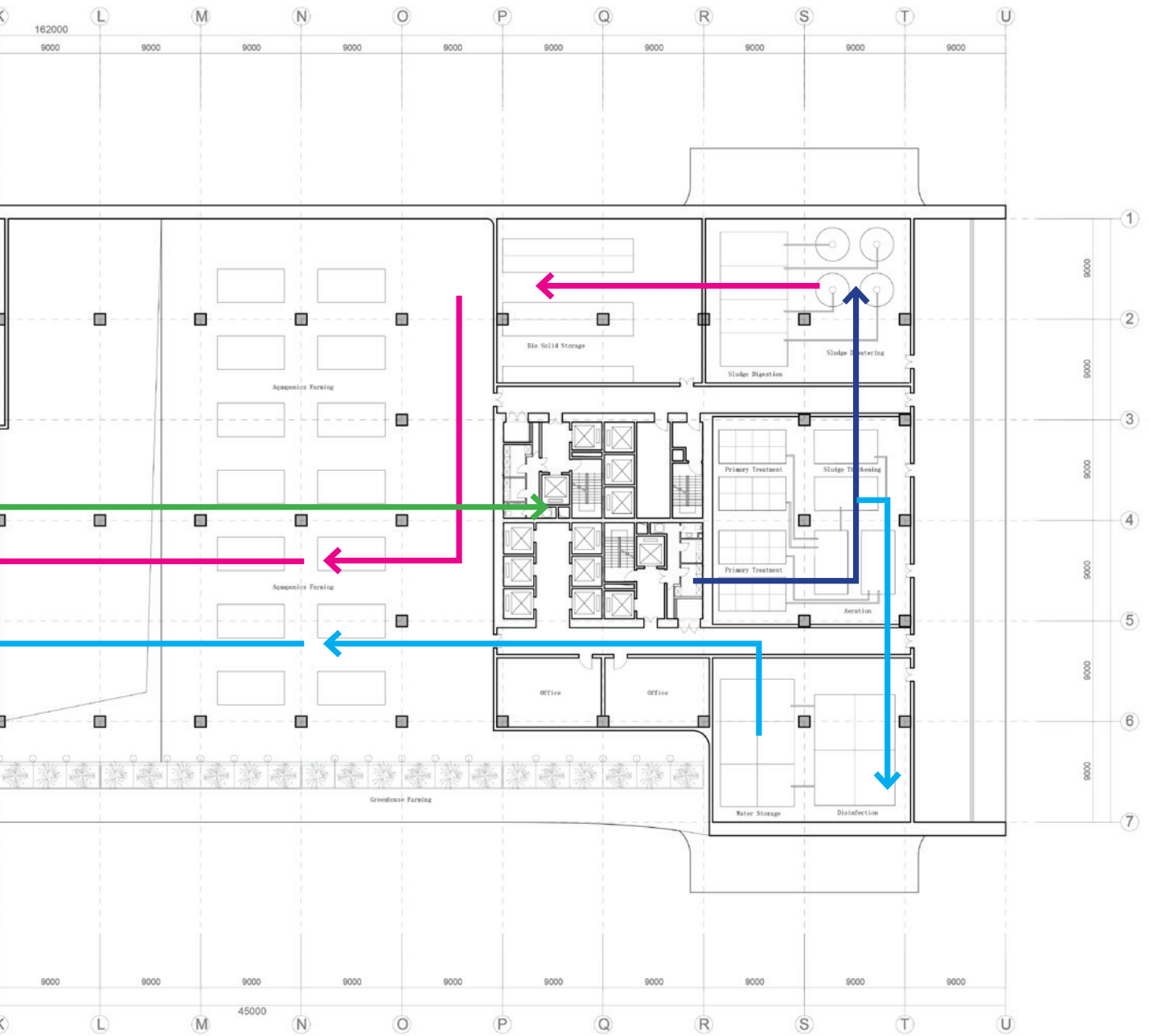
This site was chosen as a pioneering experimental place for a new way of sustainable architectural design and construction responding the Green New Deal, aiming activate and broadcast the idea to the whole city and then globally.

- Sewage Water
- Recycled Water
- Food
- Electricity



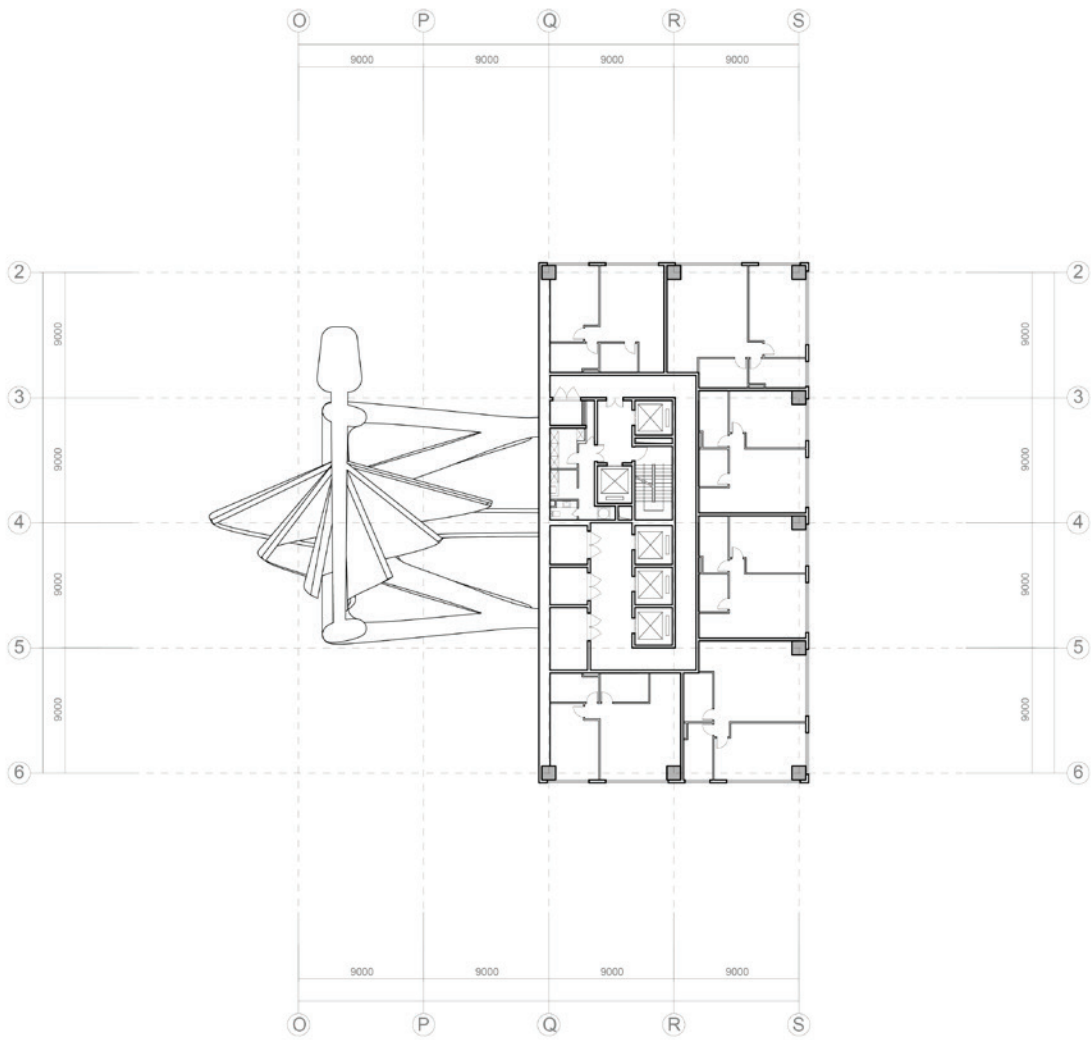


B



Wastewater  Recycled Water  Bio Solid  Food 

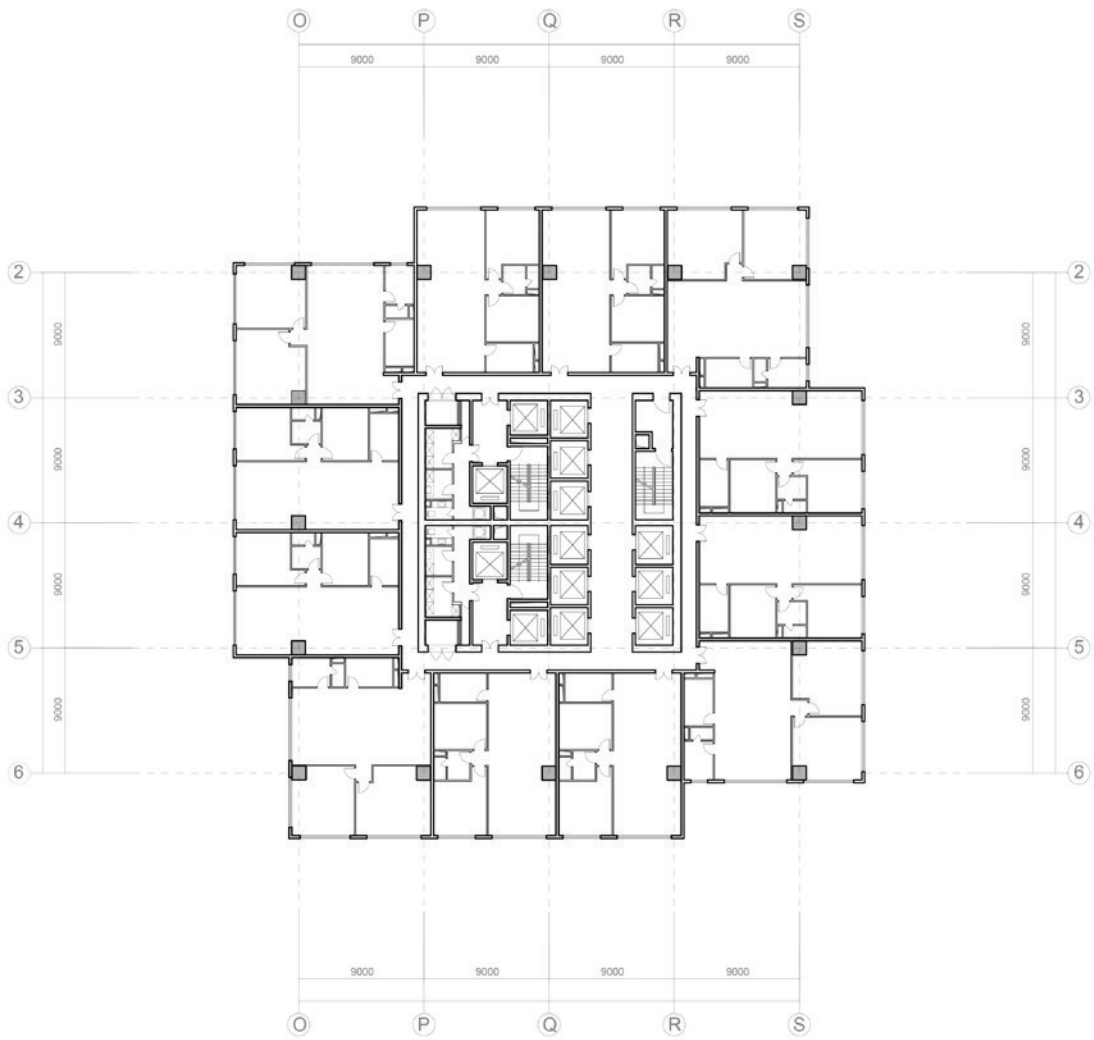
Manufacturing Plinth Plan



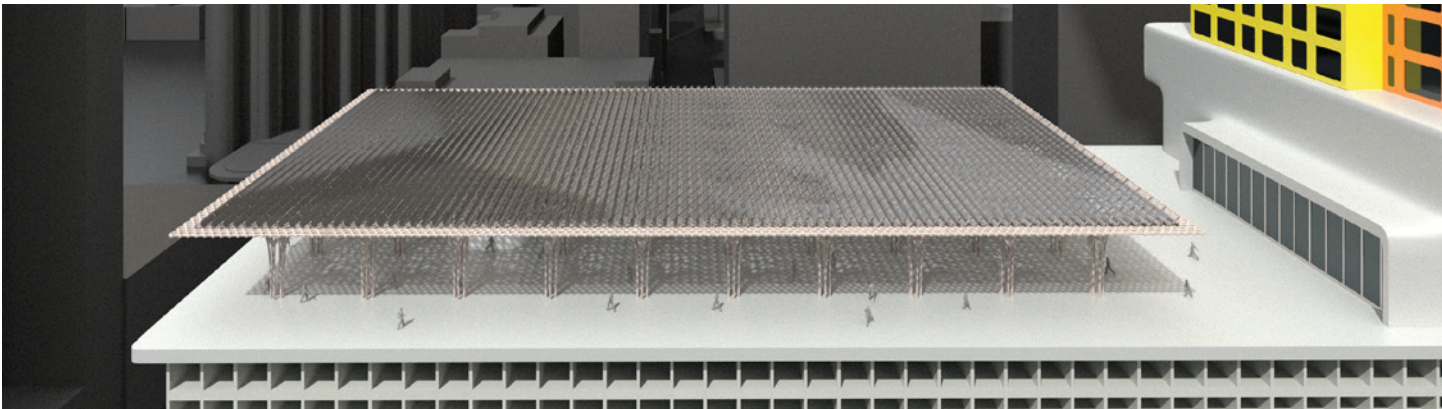
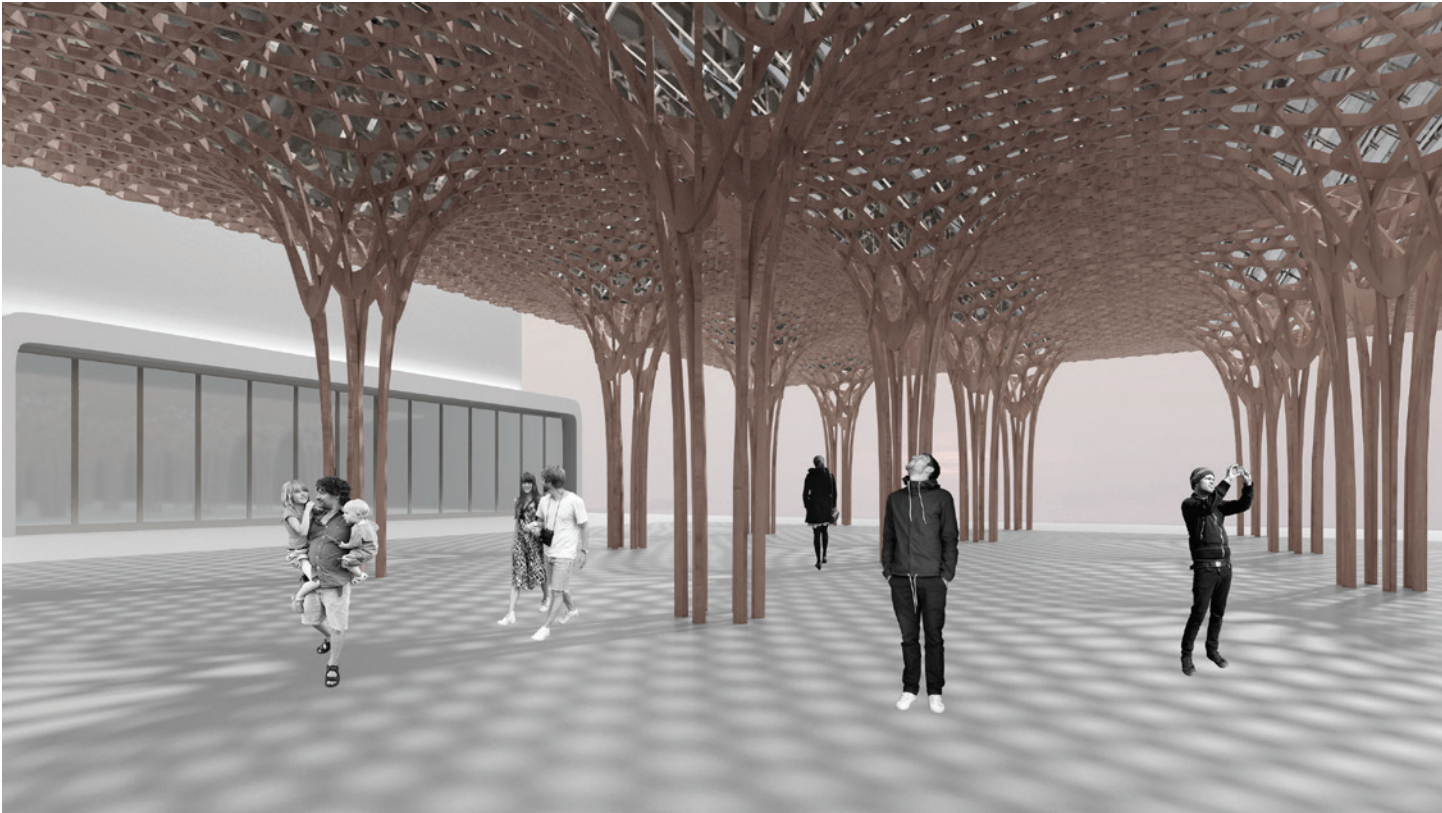
Upper Level Residential Plan



Upper Level Arial View



Lower Level Residential Plan



Solar Energy Platform Views

Overall Energy and Food Production and Consumption

Residential Consumptions:

Electricity Consumption:
4,750 kWh/d
Water Consumption:
80,100 Gallons/d
Food Consumption:
3671 pounds/d

Farming Consumptions:

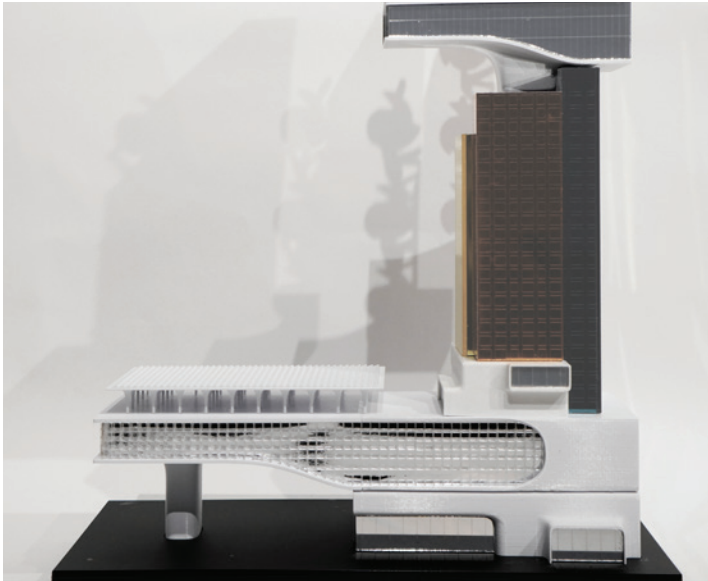
Electricity Consumption:
44,175 kWh/d
Water Consumption:
9,100 Gallons/d

Food Production:

Greenhouse:
371.5 pounds/d
Vertical Farming:
2718 pounds/d
Total: 3090 pounds/d

Electricity Production:

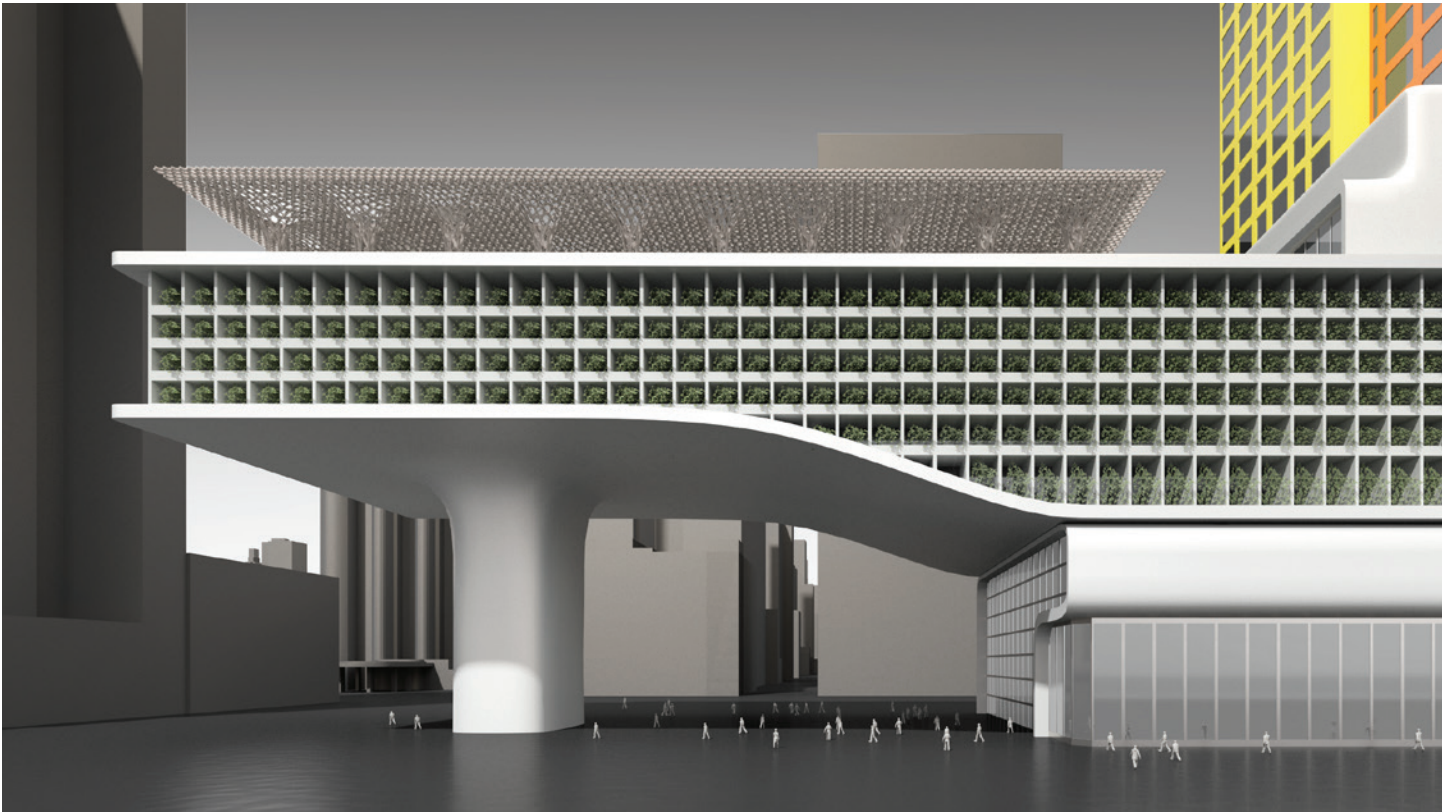
Wind Turbines:
960 kWh/d
Solar Panels:
3,780 kWh/d
Total:
4740 kWh/d



Physical Model Photos



Vertical Planting Shop View



Urban Plaza View

FOODBELT COLLECTIVE

Columbia GSAPP | Advanced Design Studio
Spring 2020

Instructor: Mimi Hoang
Collaborator: Joyce Chen
Location: New York, NY
Program: Food Factory

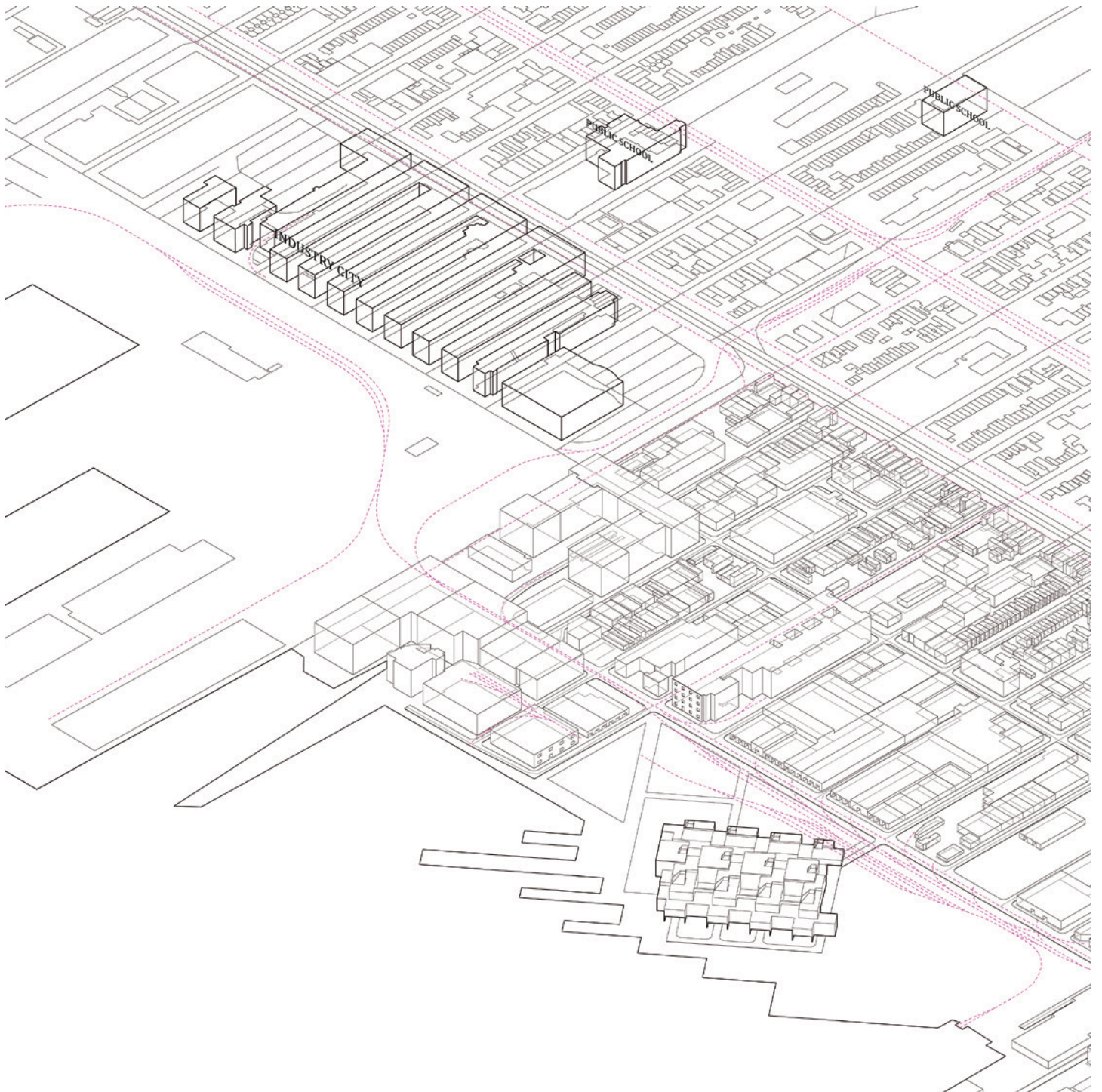
Used Software & Tools
Modeling: Rhinoceros
Drawing: Illustrator, Vray, Photoshop

The factory addresses food waste and consumption in New York City by educating consumers about healthy sustainable eating practices through facilitating transparent relationships that connect local food producers to the Brooklyn community and the upcycling of discarded food products. A new system that synergizes the existing typologies of market and production, the factory is a modular and flexible proposal capable of expanding throughout New York City, the beginning prototype currently situated in Bush Terminal at Sunset Park.

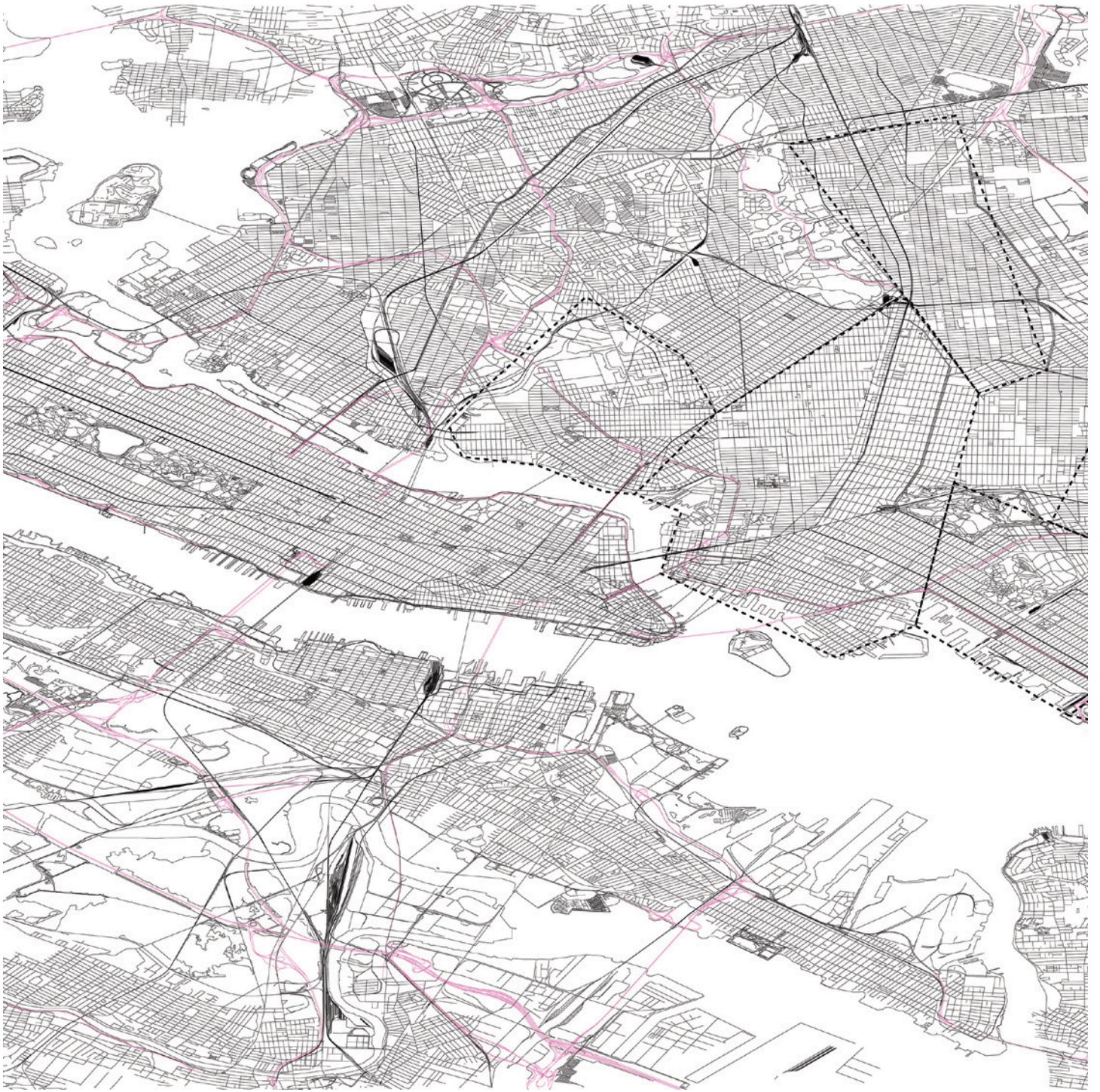
The factory will circumvent food waste from both large scale industries, such as restaurants and grocery stores, as well as domestic households in the city. This waste will be collected on the first tier, with barges entering along the waterfront entrance into the factory while trucks enter from the city side. The salvageable food waste is collected and upcycled into new products as they are channeled upwards into the factory, while inedible items are either discarded or composted.

The factory consists of three modular systems of varying scales, each maintaining different microclimates throughout in order to accommodate the varying temperature requirements in food production. The second tier has the largest module, intended to house large scale food producers. This module accepts the majority of the food waste, and also possesses the largest ventilation chambers in order to effectively collect cold air and filter out hot air released by industrial processing machines.

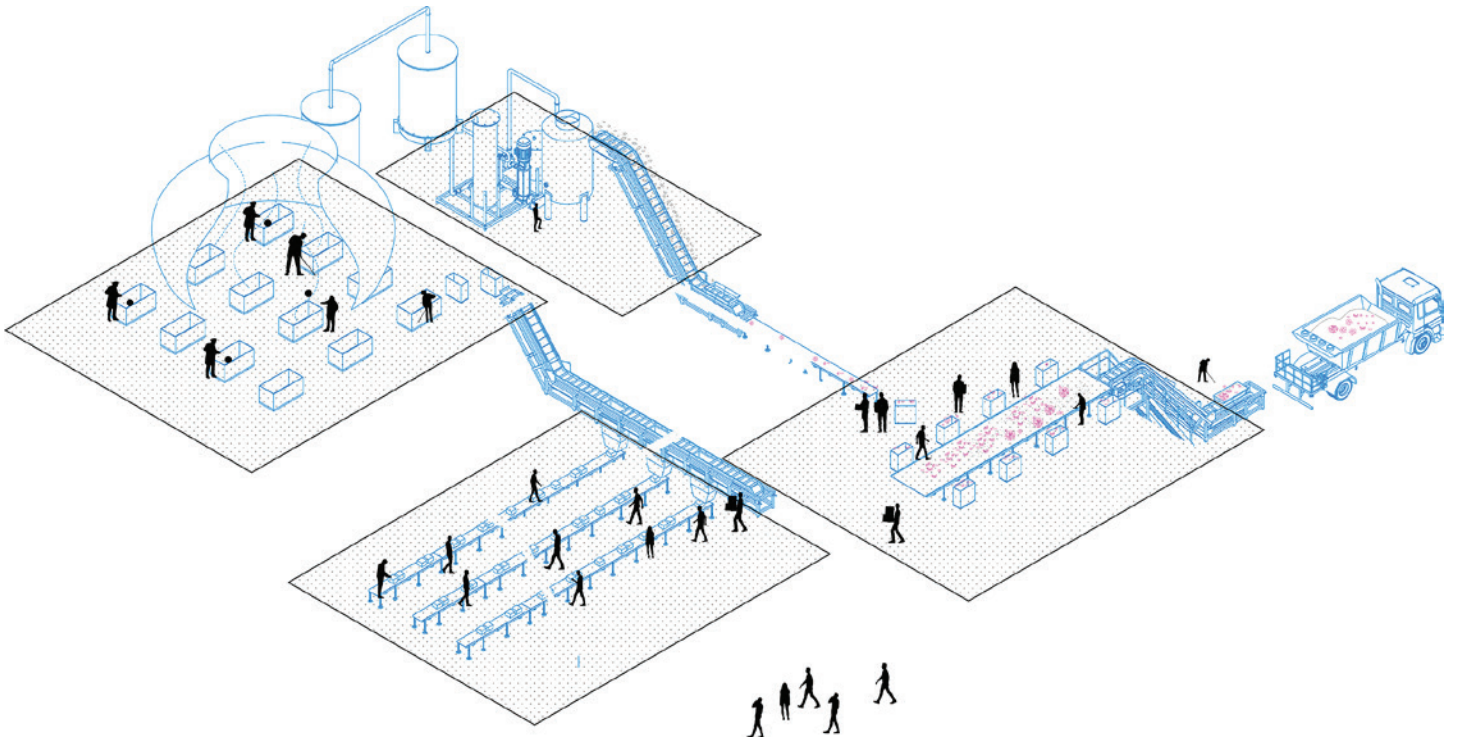




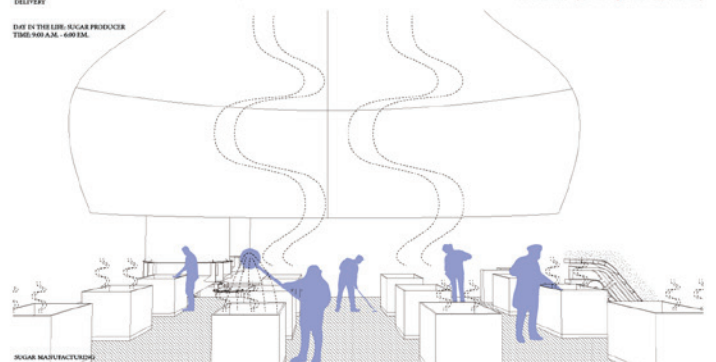
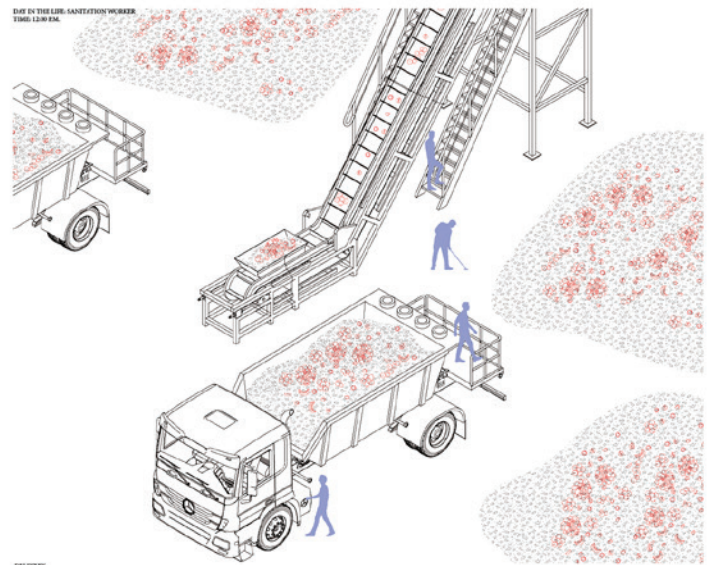
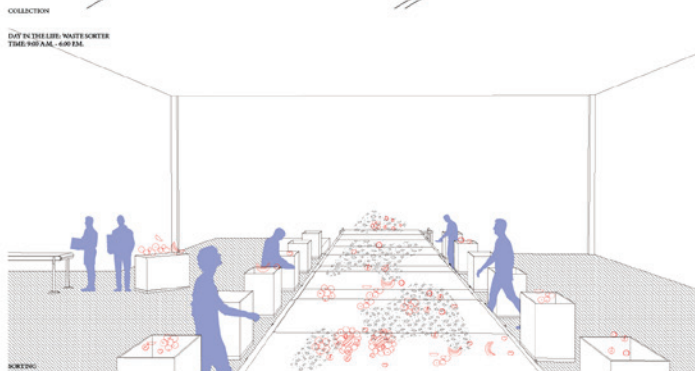
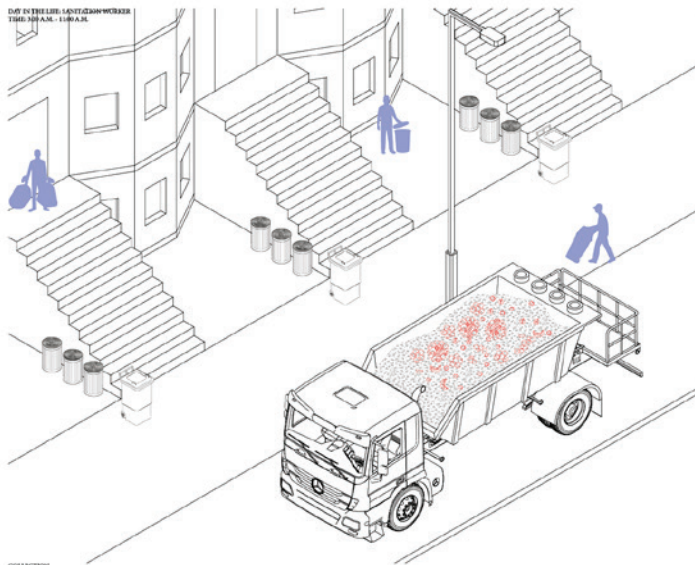
Community Context



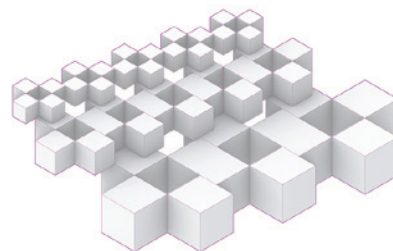
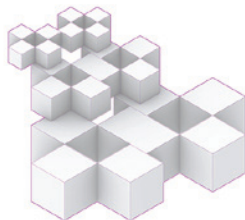
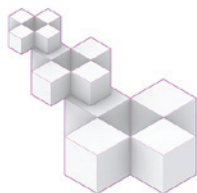
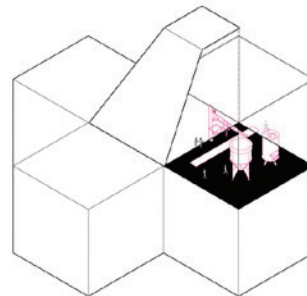
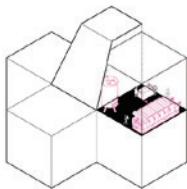
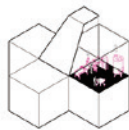
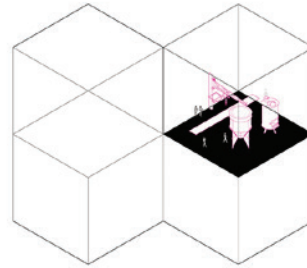
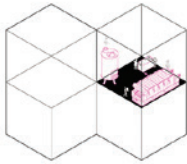
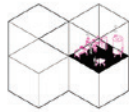
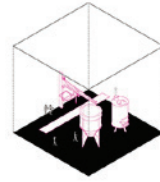
City Context

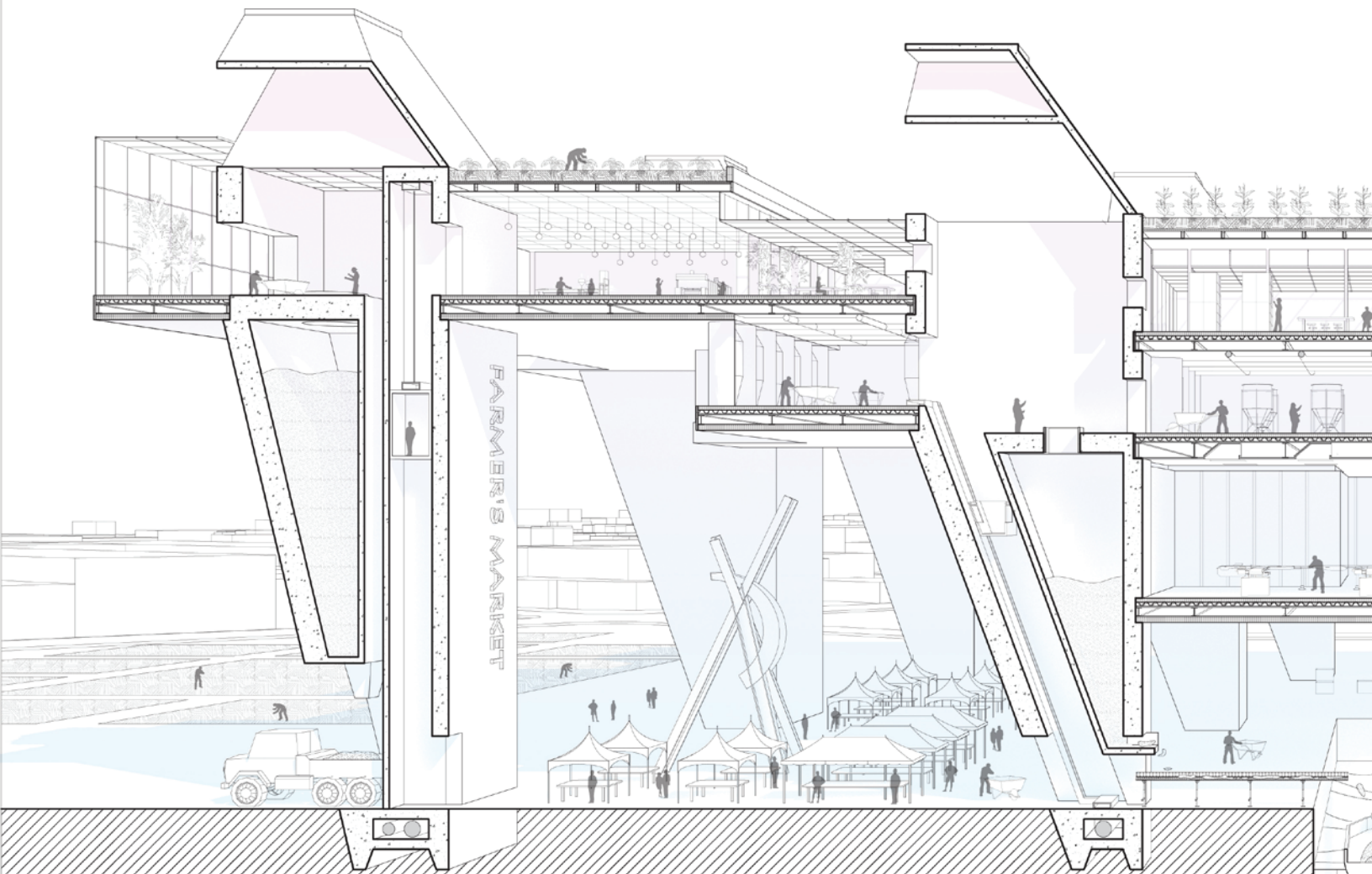


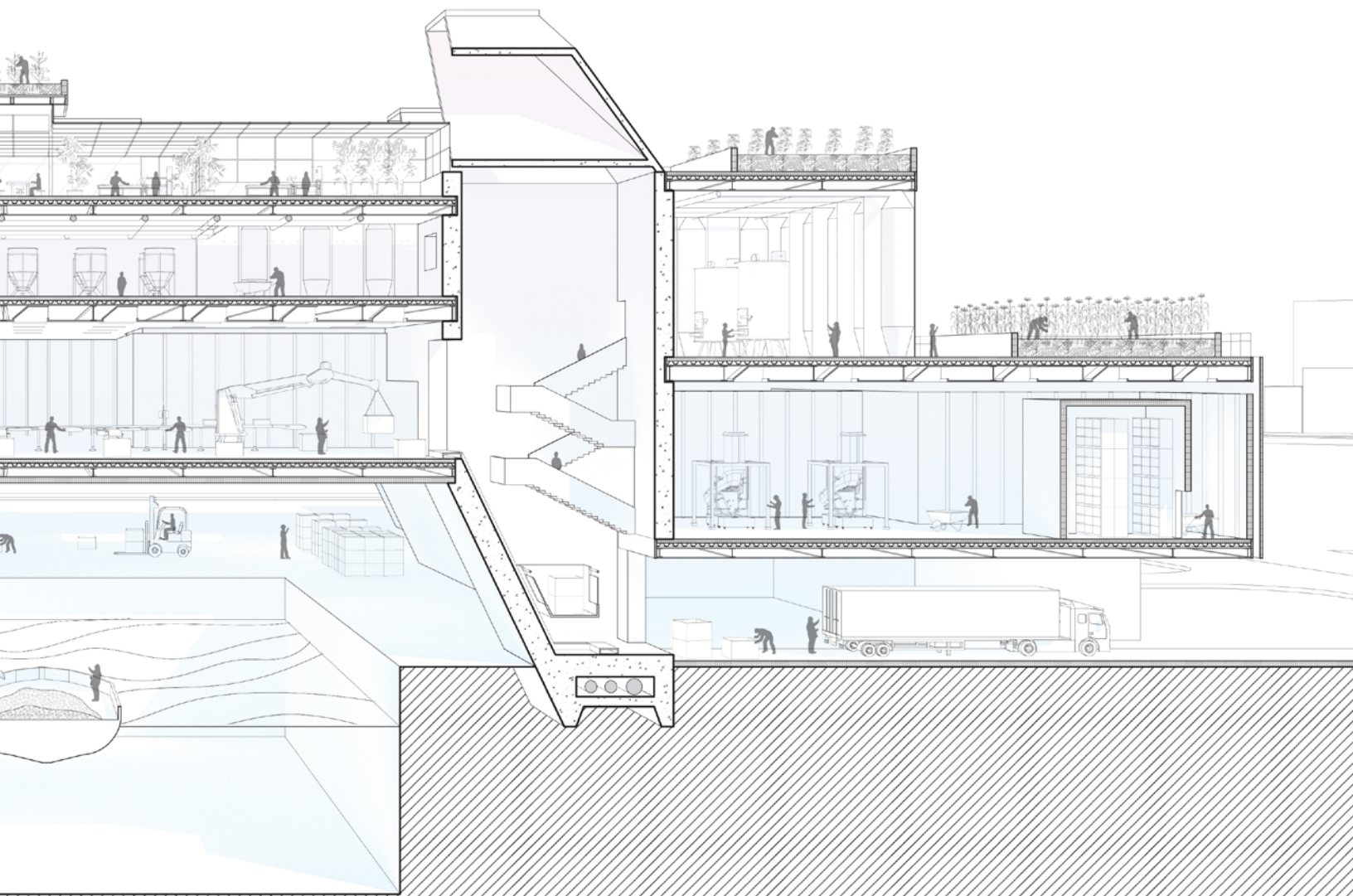
Manufacturing Process

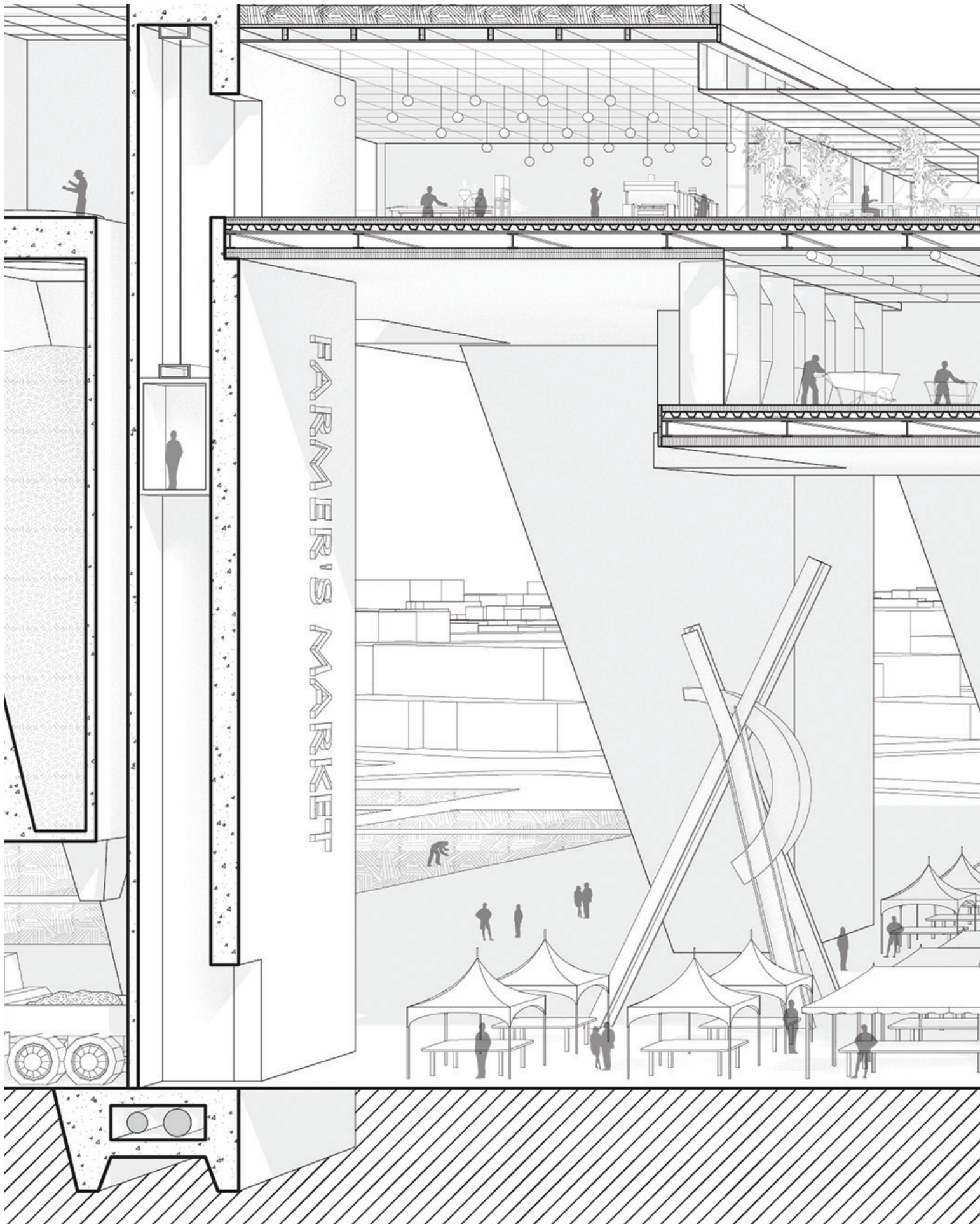


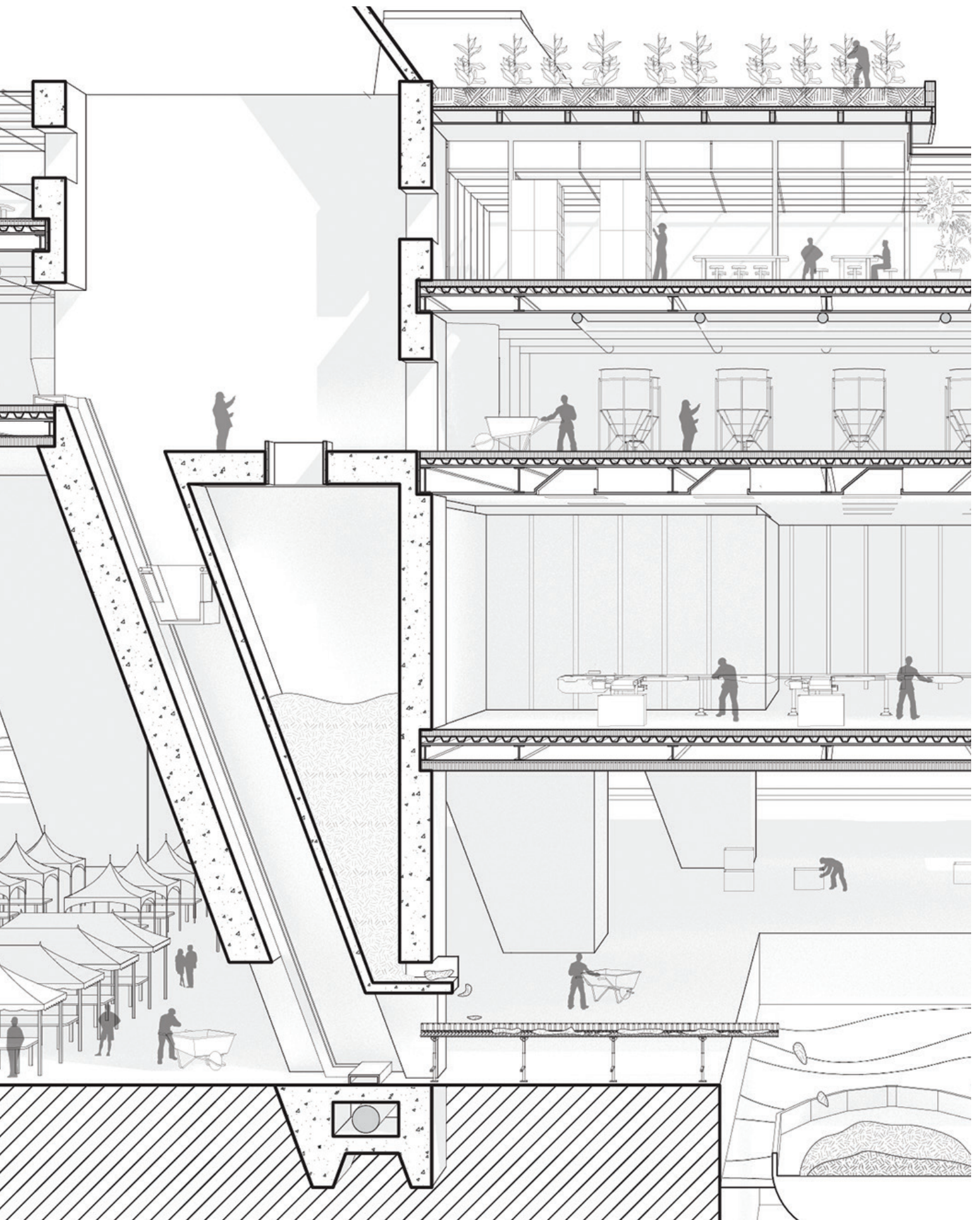
Manufacturing Scenarios

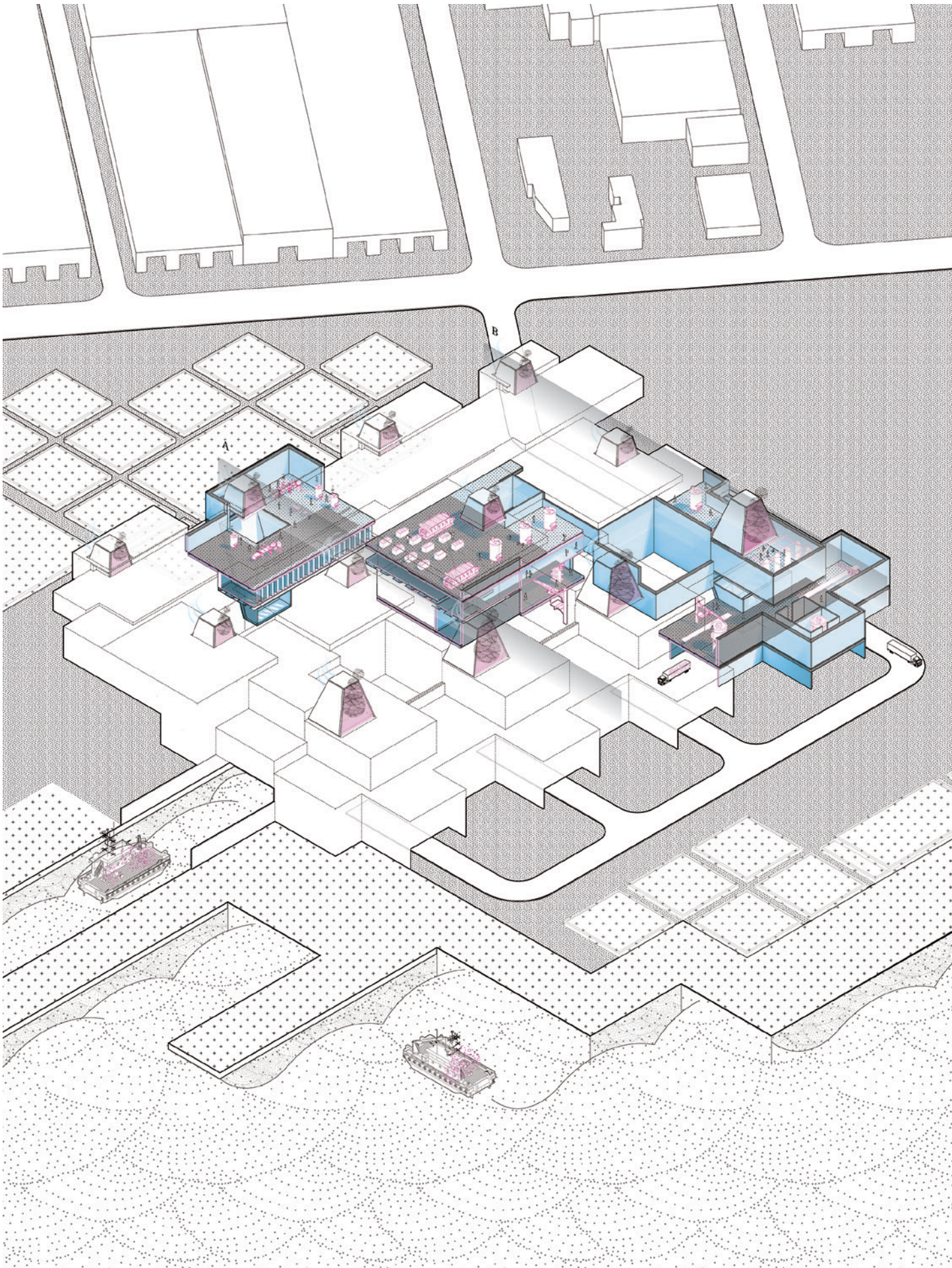


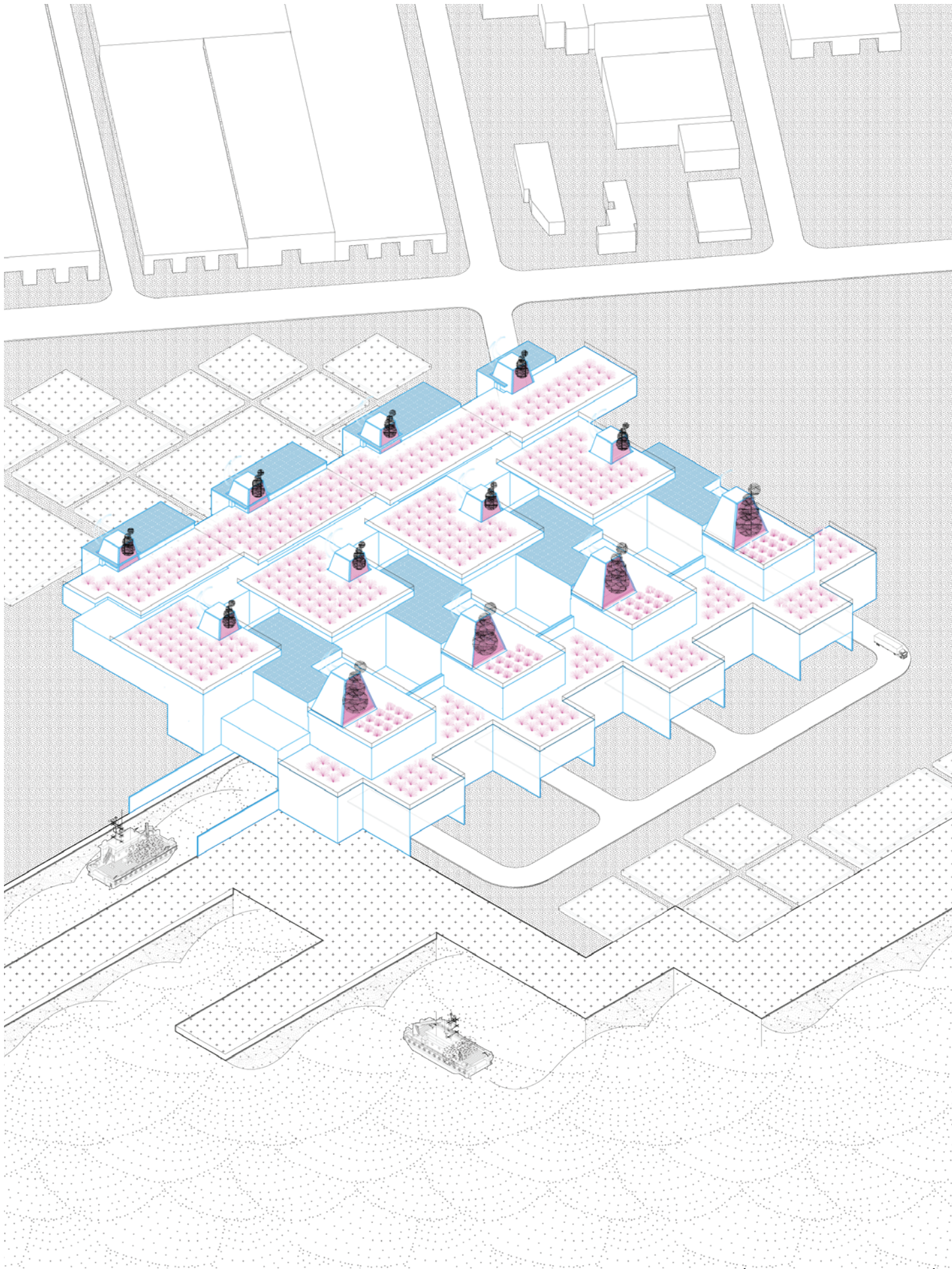


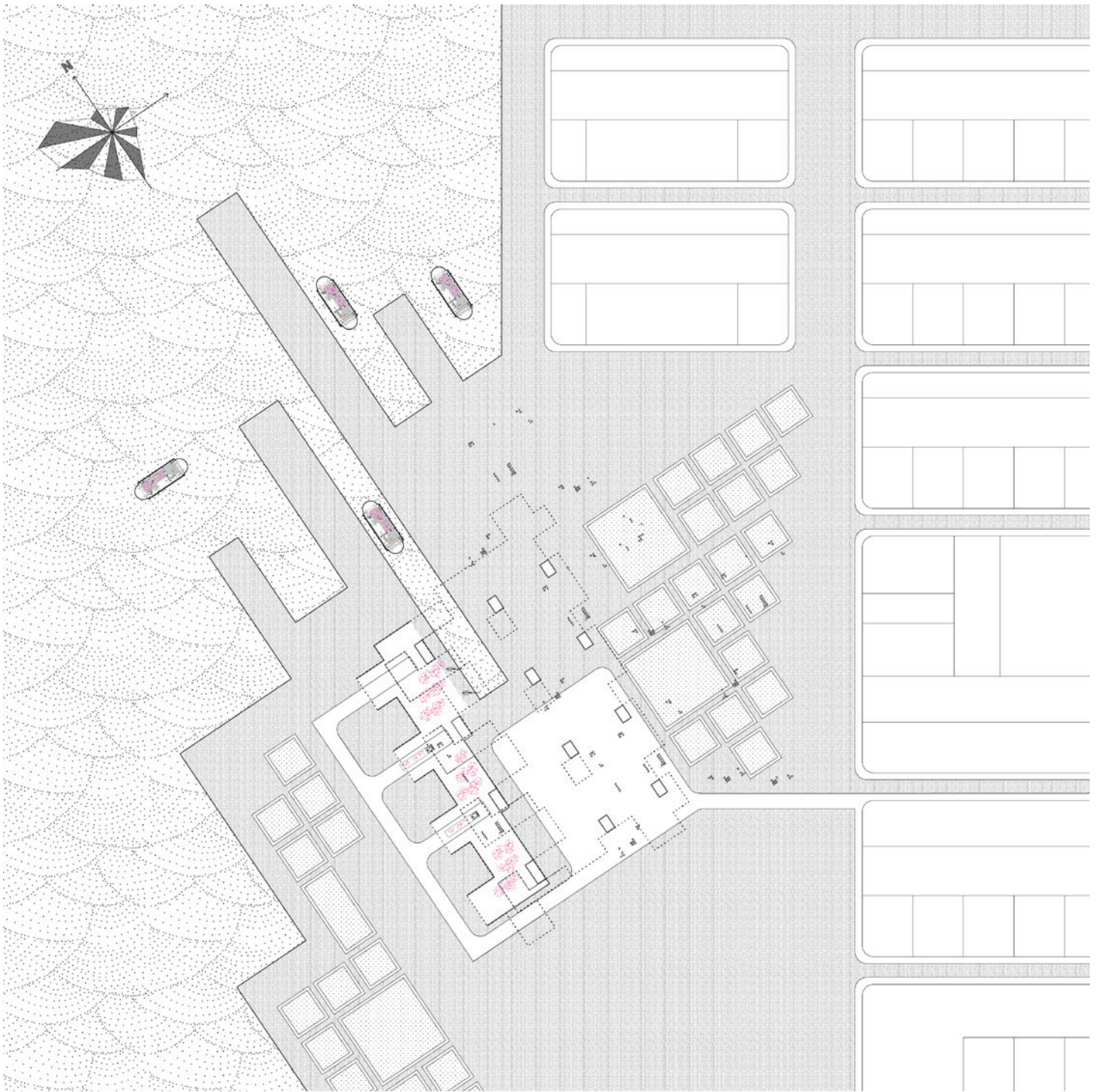




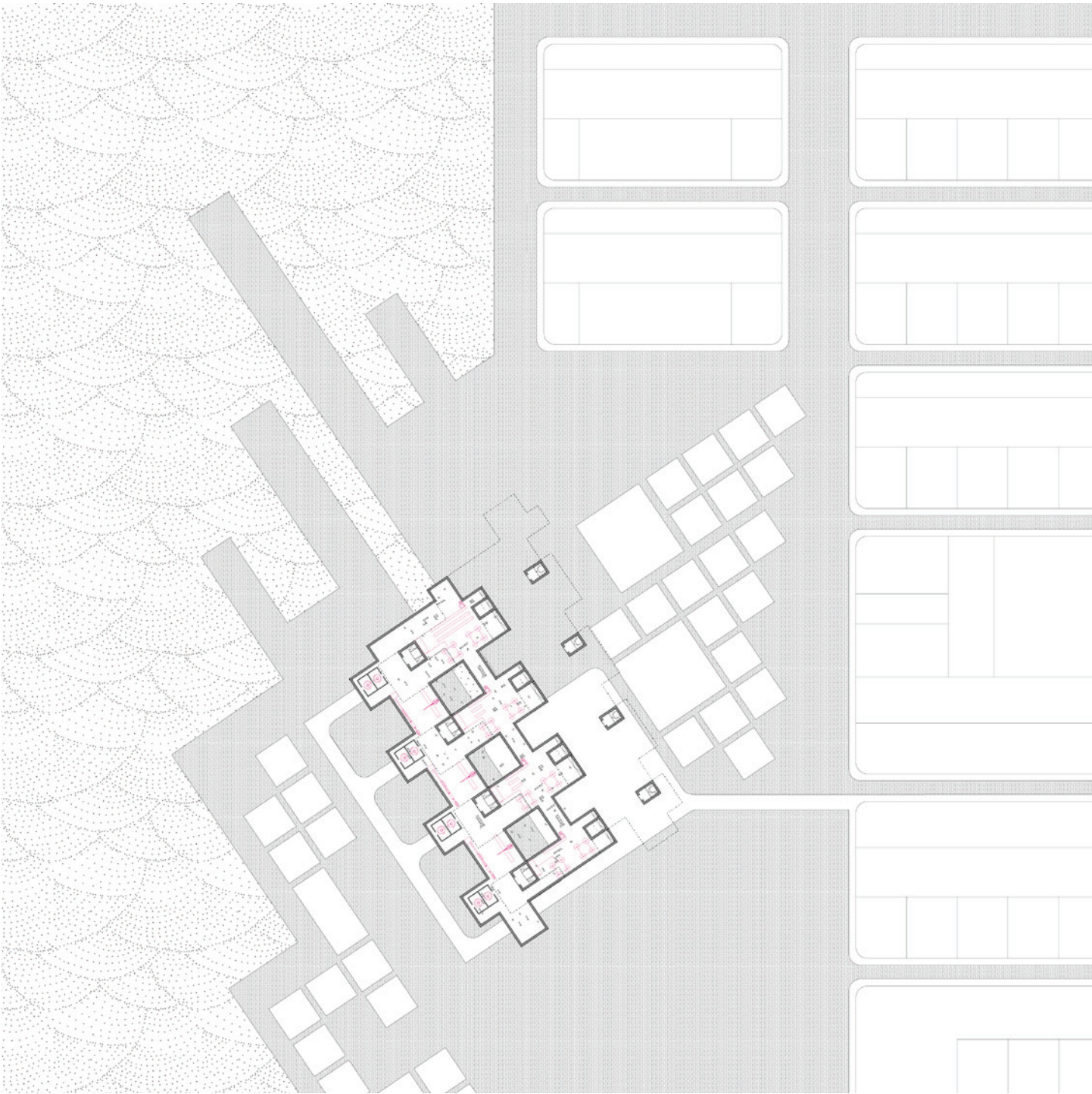




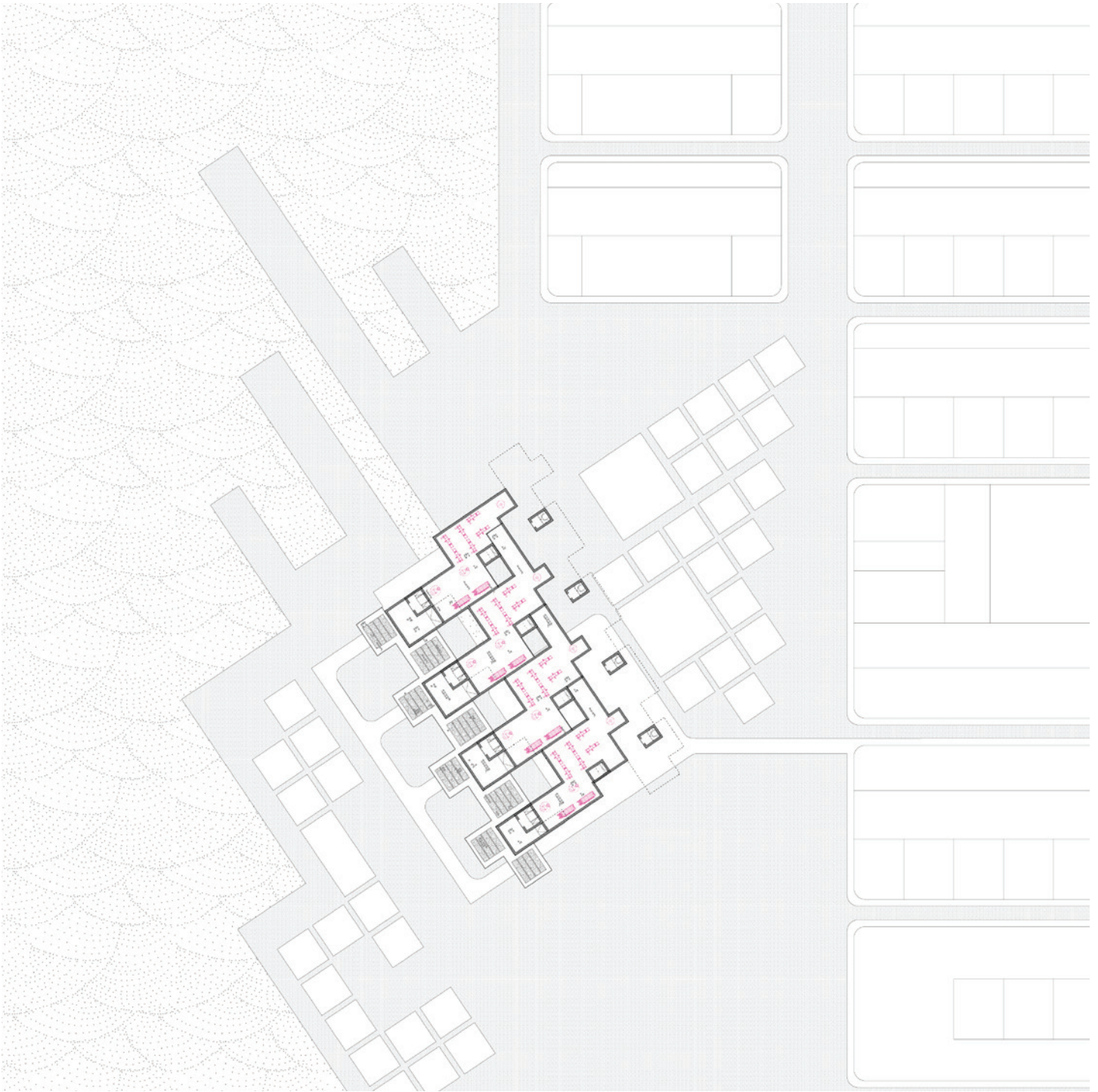




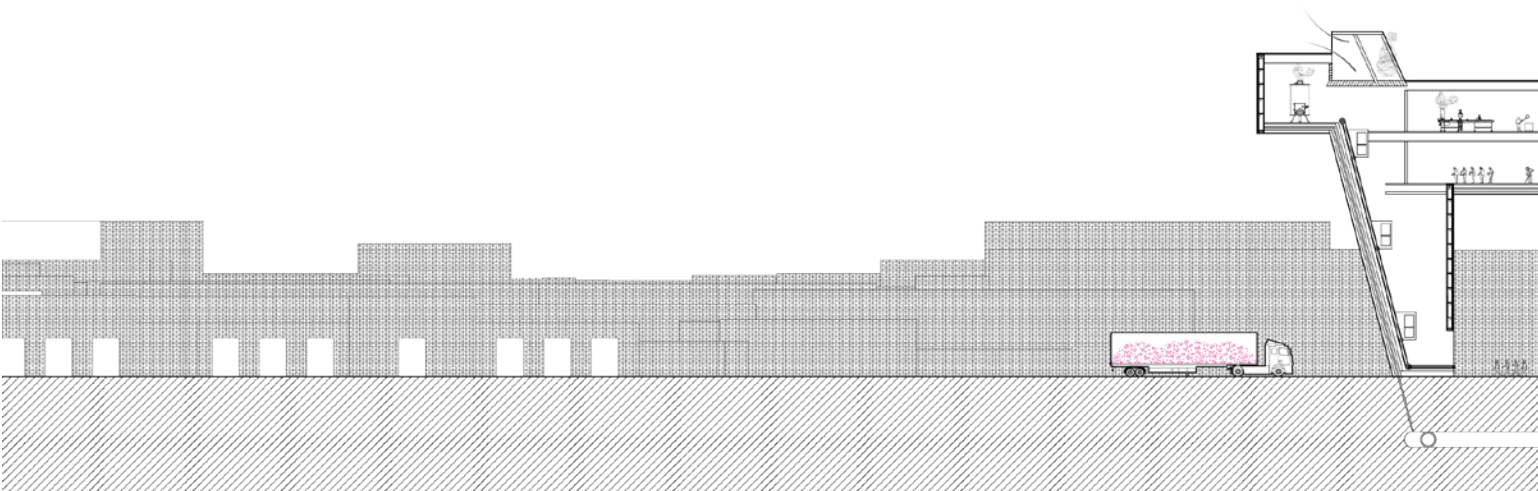
Ground Level Plan

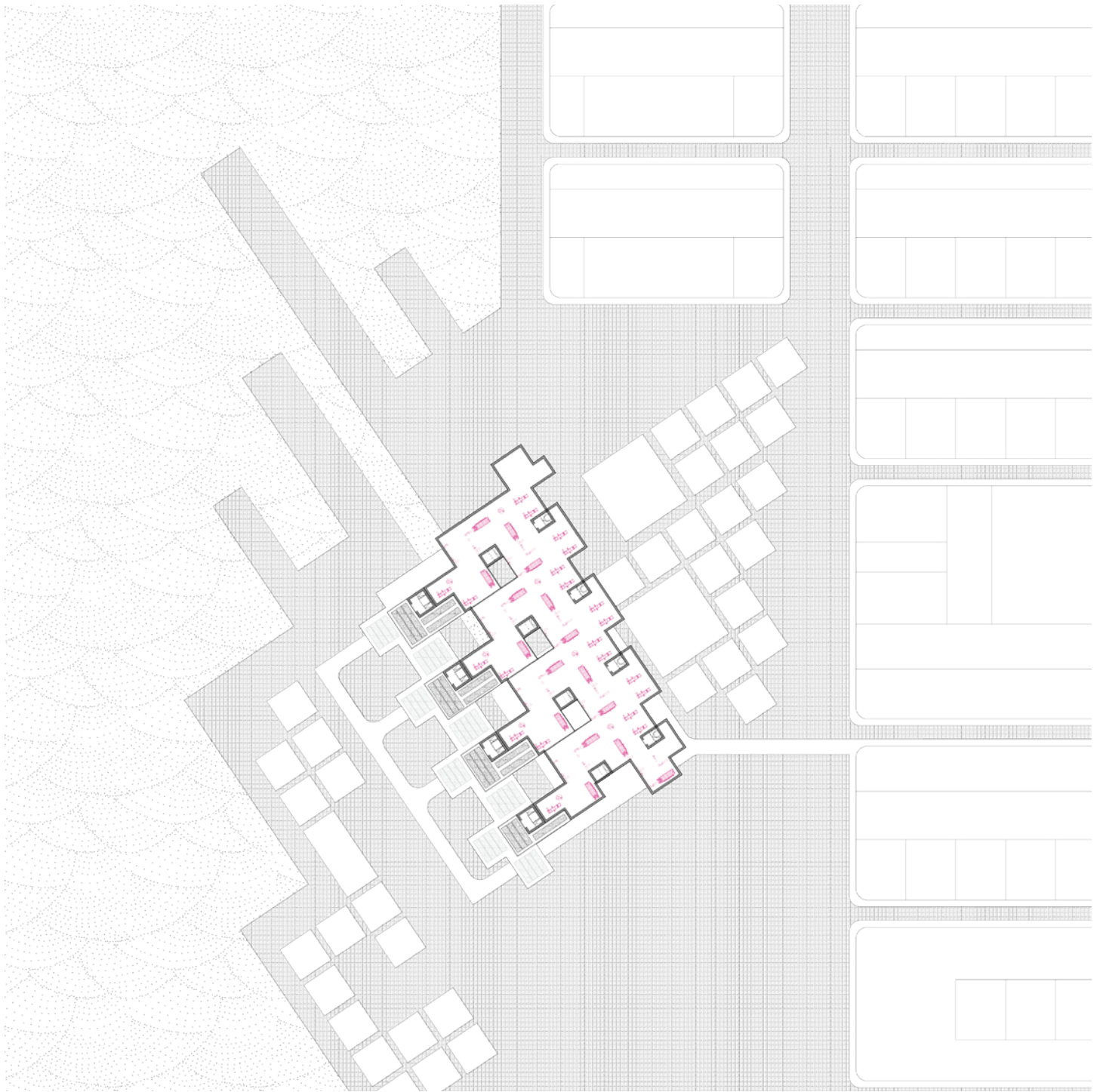


Level 2 Plan

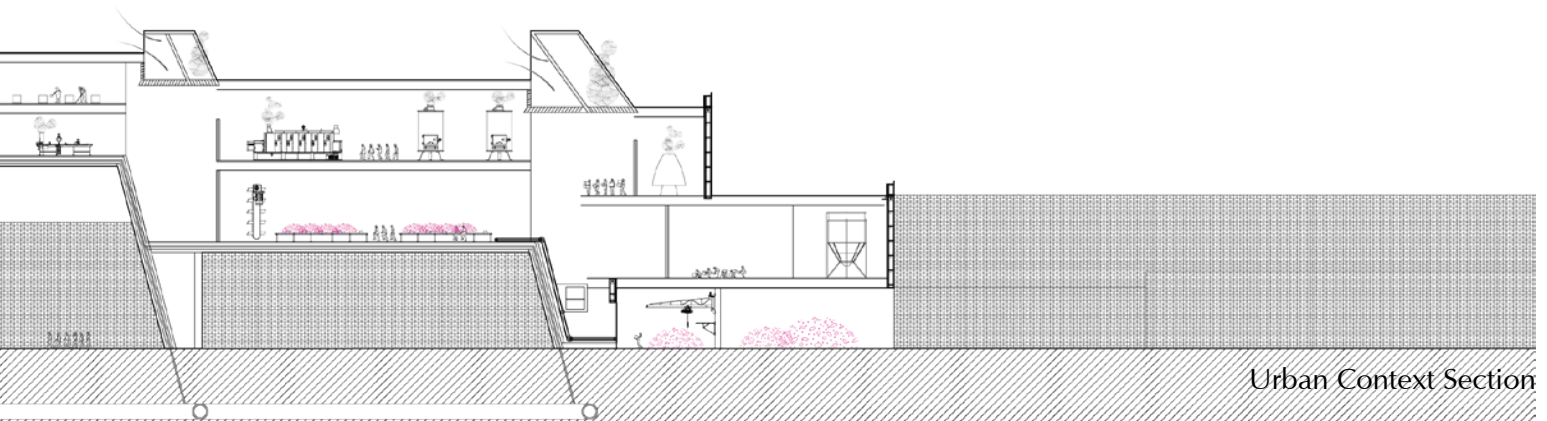


Level 3 Plan





Level 4 Plan



Urban Context Section



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