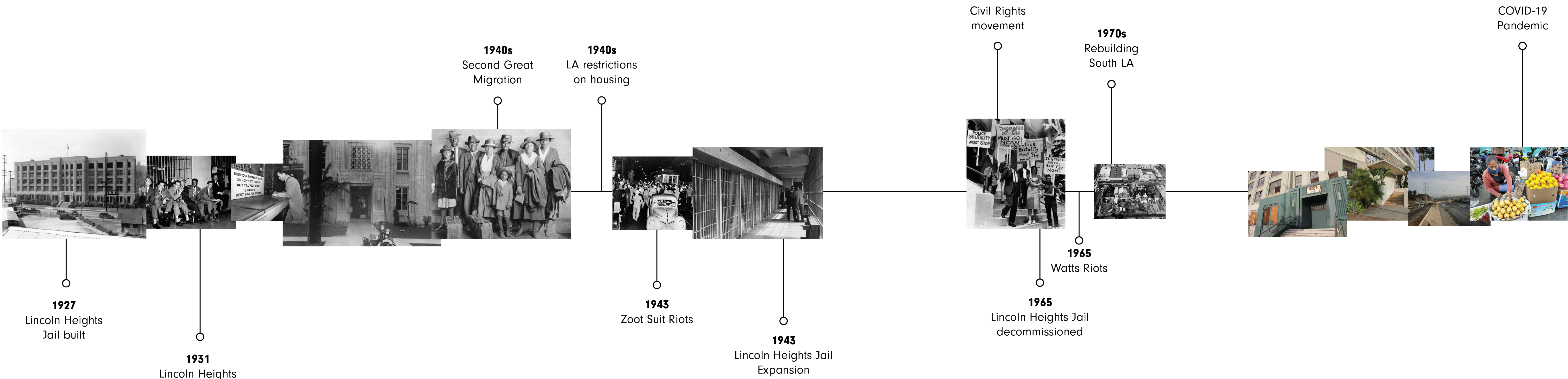


# HOW URBAN FARMING CAN ALLEVIATE FOOD SCARCITY & REBUILD NEIGHBORHOODS IN LOS ANGELES COUNTY

**Abstract |** Good nutrition is fundamental to maintaining good health & wellbeing. Although, healthy foods are limited to those who have access to it. According to the US Department of Agriculture Economic Research Service, about 23.5 million Americans live in a food desert, half of which are considered low income. Because of these statistics it is essential to understand the consequences scarce neighborhoods face due to socioeconomic factors. Historically, Los Angeles has experienced food scarcity based on economic status, ethnic background and geographical location since racial segregation in the mid-1900s. To this day, many communities in LA still experience food shortages and are unjustly living the consequences. The current response to food insecurity in Los Angeles includes small community gardens but doesn't have the ability to reach the supply that is needed. Integrating urban farming practices such as vertical farming would provide opportunities for greater food access and educational initiatives to engage communities and improve food scarcity. The purpose of this design study is to examine the current response to food deserts in LA County by establishing a mixed-use space for mass food production & wellness education for communities experiencing food scarcity. This project is placed in a 5-story abandoned jail near the LA River and Elysian Park. Through space planning, the project scope includes vertical farms along with recreational and educational opportunities in selected spaces.



## LITERATURE REVIEW

### 2.1 FOOD DESERTS & FOOD DESERTS IN LOS ANGELES COUNTY



**Historical review of food deserts in Los Angeles County, Britannica**  
Los Angeles County has had a long history of food insecurity since the mid-1900s. Starting in the 1940s, Los Angeles' population quickly rose after the Second Great Migration as African Americans from the South began to reach the west coast. During this time, Los Angeles put a lot of restrictions on housing, limiting minority groups to about 5% of the available land in LA, as 95% was considered off-limits. Racial segregation forced minority groups to settle in South East Los Angeles (Watts, Compton, Commerce, etc.). These minority groups received little resources and attention from local government, lacking public transportation, proper schools and public funding. In 1965, during the Civil Rights Movement, there was an incident regarding police brutality as a police officer arrested a man for driving under the influence and eventually led to an aggressive conflict. Others joined in which eventually led to large scale rioting. Los Angeles, especially the neighborhoods of South East LA, were outraged by this event along with being fed up with their lack of public efforts which then started the Watts Riots. For multiple days, riots, looting and fires turned Los Angeles into a warzone. This effort was to bring attention to the police incident but also to recognize the lack of support these communities get to live a life that lives up to the surrounding neighborhoods. Following this incident, Los Angeles County set a goal to improve schools, employment, housing, etc. These goals were not met by the time the 92 Riots happened after a similar incident regarding police brutality. Los Angeles, again, had to rebuild a large portion of LA, which was incited by the South East LA neighborhoods they asked for more grocery stores. Again, those needs were not met which is why we still see a lack of access to grocery stores in neighborhoods across LA County and food deserts still exist.

**Statistics on Food Security in Los Angeles County, Feeding America**  
California as a whole has a variety among counties of food insecurity. According to Feeding America, 11.4% of Los Angeles County is food insecure which is about 1.1 million people. California as a whole has over 4 million people facing food insecurity which means Los Angeles makes up about 25% of them. Of those people, 13% live above the SNAP (Supplemental Nutrition Assistance Program) poverty line and 84% below. Los Angeles County spends around \$672,171,000 on their food budget each year in order to fulfill the needs of those facing food insecurity.

**How COVID-19 impacted food deserts + the implications of those factors, Mayo Clinic**  
COVID-19 has had a disadvantaged impact on minorities and has had larger consequences for those who are lacking resources, healthy options and the ability to maintain a healthy lifestyle. Across America, minorities phase racism into everything and undertake the stress levels that follow many incidents. As stress is a leading factor in health & wellbeing, it has the ability to damage it. Along with racism, on average, 25% of service industry jobs are employed by Hispanic, Black or African Americans. Additionally 18% of Hispanics and 10% of non-Hispanic Black people are uninsured. These health barriers have a large impact on the wellbeing of someone and have a huge ability to make many illnesses worse. Aside from minority groups, low income families have consistently lived in multi-generational homes at a higher rate which comes with close living quarters and a lot of shared spaces. Both these health programs and limited access to healthy food makes the risk of COVID much higher. While some families can get Whole Foods delivered to their homes, others are working the front lines having pre-packed meals for dinner.

**Michelle Obama's take on feeding America, Washington Post**  
Michelle Obama, a big advocate for feeding America, publishes a book called "American Grown" where she illustrates the importance of consuming nutritious foods like produce and recipes you can use with such ingredients. As Michelle transitioned from living in South Side Chicago to the White House in DC and years of America's transition to a sedentary and technologically consumed lifestyle, she studies the implications this shift has made on America's health. Portions are larger, soda is the new water, fast food is the easiest meal to get, and PE classes have been cut from school programming. Not to mention, school lunches consist of packaged processed foods that are diminished children's health, memory retention, productivity, and overall academic performance. Michelle established a program as First Lady to help organizations to work with public schools to deliver farm-to-school lunches with healthier options for students. Programs like these have grown across the country to do their part to meet the nutritional needs of children. Although community gardens are only a small step to fixing food insecurity in America, Michelle works to advocate for growing local and understand the importance of eating nutritionally.



**The Value of Urban farming beyond the food you produce, Vox**  
Although urban farming seems like a modern solution to our overly-established world, it is a practice we have used since World War I during a time that homegrown farms could grow 40% of the nation's produce. But, more recently we have used urban farming out of necessity to provide produce to food desert neighborhoods. There is a lot of debate on whether urban farming is practical because food production will never reach a level of putting an end to the issue and even with environmental benefits, there still are many sacrifices. But it isn't exclusively about producing food. Community gardens have the ability to strengthen community, promote health and wellbeing, and give urban neighborhoods a peak into how food production is carried out.

## PRECEDENT STUDIES

### THE YOUTH VILLAGE FARM LAB MILAN, ITALY



Founded from original Italian design concepts, The Village + Farm Lab aims to provide sustainable agriculture methods of urban farming with an emphasis on social accommodations of living, educating, producing, storing and buying all foods all in one place. This conceptual design project, reinvents the traditional Italian Farmhouse, "cascina", into an urban setting. It was awarded in Milan Expo Horizontal Farm competition and was envisioned for the 2015 Milan World Expo.

Milan, Italy is located in the northern part of Italy which is primarily known for its high production of fruits and vegetables. The primary foods to be grown at the farm. In order to accomplish modern urban methods of farming, a designated space for testing and production is required. As previously mentioned, the residential and farming spaces will be integrated in a way that the public is able to view the production process and experience the innovation at the site, all while distancing themselves from the residents.

Through the reconstruction of traditional farms in Italy, The Village + Farm Lab has a goal to imagine a space where you could cultivate your food in one place. Agricultural interventions such as this one have the opportunity to increase efficiency also while keeping sustainability in mind. The task is to accomplish all of this, all while maintaining the vitality of the current urban environment. To achieve this, it is necessary to integrate the functional, educational and recreational spaces methodically to maintain the feeling of innovation and sustainable lifestyle.

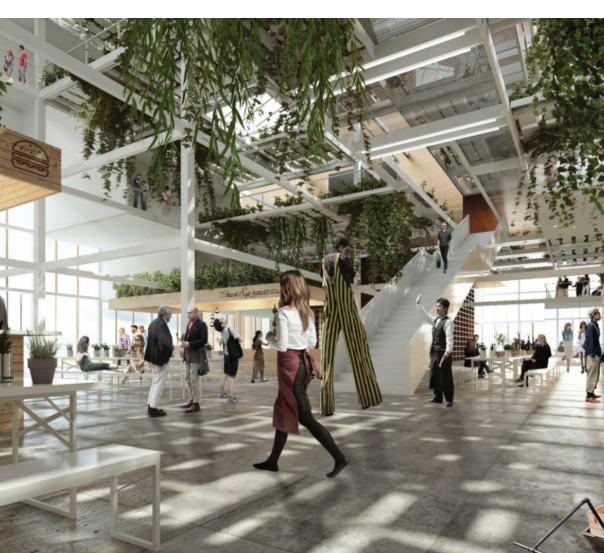
The site is broken up into two main design categories: The Village and The Farm. The Village is designed as a space for campus style living for students that is complemented by the biophilic environment to increase mental health, innovation, health & wellness, and creativity. The design concept of this space is to group small residential units together, surrounding recreational spaces to promote social interaction with nature at the forefront of the design. The units must be private with accommodations such as heat, bathrooms, and water. Traditional Italian homes or apartments are typically built around a "piazza": a square or marketplace in an Italian town or city. The space is typically open with different functionalities such as markets, recreation, gathering and more. For the purpose of this project, The Village + Farm Lab designed different levels of gathering, both public and private to deliver opportunities for food education and comfortable living. Through an interactive process, the designers finalized two options for programming of the space. One where the living spaces such as recreation, culture, and working are designated to the edges of the rectangular space and the farming methods such as labs, markets, and production reside in the middle. Another method integrates the two more as the living areas to primarily take up the perimeter of the site but the farming methods interrupt sections to meet the perimeter. Passageways from the core farming areas of the site lead to the outdoors through the residential spaces. Both options allow for a hybrid between student residents and farmers to cohabit in one central building.



Throughout the building, terraces will be methodically placed in view of light sources in which the food will be distributed. On the eastern and southern sides of the building, openings have been taken out of the building for optimal light use as well as plants that require more light like tomatoes will be placed in higher floors. To complement the sunlight, LED lights are placed in darker regions. Material choices such as a glass roof can ensure the plants thrive in their environment.

Starting from the lobby, the space includes the entrance lobby, recreational activity areas, a market, educational opportunities, and functional services such as loading and packing. The second floor includes student housing at the perimeter with open air farming in the middle, with additional greenhouse rooms to enhance the biophilic design. The third floor is a replication of the second floor, but instead of greenhouse rooms, there is an additional small meeting space/ common rooms in the middle. The core of the building is an open staircase that helps create an easy flow of traffic as well as natural ventilation to all floors. By opening up the middle, the different functions of the space can integrate better into one cohesive space. Additionally, locating the students' residences on the perimeter there is opportunity for the natural spaces to center the social interactions. By placing the farms on the 2nd, 3rd and 4th levels, food can be easily transported down to the market as well as provide biomass waste for the compost on Floor 1.

The farm aims to provide energy, water, food, fresh air and social interaction. Its grid-like formation provides spaces including housing, farming, recreational fields, food markets, food labs and a restaurant. Through the integration of all the spaces, the building can accomplish its goal of bridging the gap between the residential and natural environment.



It is clearly known that urban community farms will never reach the level of production to feed an entire city, let alone an entire neighborhood that faces food insecurity. But, that isn't really the point. Although a high food production would be great to offer nutritious foods, it is primarily the role of socio-ecological factors that have the largest impact on rebuilding food deserts. Community gardens promote health & wellbeing ultimately change the habits of those living in the neighborhood. As they work toward one goal of maintaining the farms, social factors will teach them a greater lesson beyond eating nutritious food. Studies have shown that community gardens have "improved neighborhood aesthetics, reduced crime, and community cohesion." Through educational exercises in young kids, they can learn about agriculture, sustainability, and environmental impact. Their skills are able to be replicated in real-life citations that will carry with them forever.

### 2.2.1 COMMUNITY GARDENS

### 2.2.2 VERTICAL/URBAN FARMING



**Combining agricultural and social protection interventions, FAO UN**  
Across the world, many countries are tackling urban farming and social integration differently. All prove that combining agricultural interventions and social protection have favorable outcomes. Some highlights include self-employment and diversification. Development of programs that promote self care were very successful in avoiding exclusion of certain groups.

**Urban Architecture: Benefits & Limitations, John Hopkins Center for Livable Future**  
Urban farming through architectural design has many benefits as they provide opportunities for farming in areas that need it most. By building farms in urban areas, the accessibility in produce increases, socio-ecological factors are implemented, mental health improvements and opportunity for cultural traditions to be restored. Neighborhoods that phase a lack of resources and attention to their needs, requires restoration that goes beyond the infrastructure itself. Relationships need to be rebuilt and the motivation for community engagement needs to be implemented. There is opportunity for increased bonds as communities are in redevelopment.

Educational practices in young children through farming have a huge potential in personal growth at a young age. As children learn to become "young farmers" then they can learn the production process of foods as well as how to nurture and care for its survival. This can be empowering for many young kids as they feel accomplished in their work. Through determination and hands up learning kids can help end food scarcity while obtaining life-long skills as a young leader.

"The strong socio cultural values surrounding food growing, cooking, and sharing help facilitate the role of gardens as a social bridge, and support communities in maintaining and appreciating cultural traditions associated with food,"  
- The Johns Hopkins Center for a Livable Future

Although community gardens are a great way to provide food options and educational opportunities, it often comes with many setbacks. Community gardens tend to be organized by different leadership structures and have a harder time continuing the responsibilities properly. They are also often founded by people who recognize the needs and have the ability to kick it off but do not live or belong in the community in need. Additionally, getting consistent funding to maintain the space is hard as well as the people running it. By offering services such as educational resources, that often requires a higher knowledge from an outside source. In order to maintain the space, the resources need to be in line to have a consistent flow of leadership.

**The impact urban farming can have on food systems, Agritecture**  
Vertical farming in an urban setting has the potential to provide produce and green spaces in heat islands that statistically damage our earth as well as lack the ability to grow food nearby. Through methods such as rooftop gardens, green facades, community gardens and edible landscape, there is potential to implement more greenery and vegetation into largely established cities. Smaller community gardens can provide the opportunity to reconnect communities and increase biodiversity all while producing 2x the current production rate of farms. Community gardens aim for "creating community empowerment and taking back control of the food system. Instead of looking at urban farms as the solution to all of the problems we have in the food system...we should look at them as part of a larger solution." Although urban farming is a great method for rebuilding neighborhoods and establishing community engagement, they require a large sum of money to maintain and keep in production. of farmers do not make a living from farming and as the cost of real estate in a city is much higher the construction of the space will be extremely expensive. Obtaining the budget to build the space and buying the technology to produce the amount of food needed can only come from donations that do not need investment back.

**Growing Vertically Can Make an Impact, Bowery Farm**  
Horizontal farming, or regular farming as we know it, relies solely on the soil it is grown in as well as the weather conditions it can service in. Farms in rocky areas, have a less likely chance of surviving due to its bad conditions. Vertical farming however does not have these limitations as there are other methods such as hydroponically, aeroponically, and aquaponically which do not require soil. Instead, purified water can filter the water with nutrients to grow the plants. Another limitation to farming is temperature and light. With indoor vertical farming, that can all be controlled by a switch of a button. LED lights can replicate the sunlight to help the plants grow. With these lights, plants can grow faster as they can be "sunny" 24 hours a day.

**Investing in Indoor Farming, Architectural Digest**  
Jeff Bezos, CEO of Amazon, is investing in the future of farming. A startup called Plenty is working towards the issue of quality and quantity to build the new vertical farm in Washington State. The farms are 20 ft tall surrounded by LED lights and microscopes to monitor the production. Plenty is able to produce over 300 varieties of organic foods and decreasing the use of water and energy. Bezos funded \$226 million for the project which proves the high cost in this technologically advanced method of farming.

### GREENBELLY CONCEPTUAL DESIGN



Greenbelly is a project designed by AVL Studio, founded on the idea of bridging the gap between architecture and agriculture. Through their design, cities can become an opportunity for farming methods instead of a prohibitor. Cities around the world have open facades with little to no purpose. Greenbelly is proposing those open facades get used innovatively by designing a green wall with vertical farming methods to enhance the space and sustainably grow foods for the surrounding neighborhood. With limited space in a city it is difficult to find space for agriculture, but through a scaffolding structure, layered farms can be grown.

The foundation of the Greenbelly wall is an existing facade with available space to design an addition to the side. Oftentimes, large urban cities lose touch with nature as they continue to build and by adding greenery to a wall, biophilic design can not only enhance a city but reduce the effect of heat islands. Greenbelly only requires 36 sq m of space to build a fully-functioning 6-level vertical garden made from scaffolding and wood pallets. This amount of space can produce up to 14,000 lbs of vegetables annually. For neighborhoods lacking access to nutritional goods, that is a huge improvement.

The core goals of the architecture of this project are to design a flexible and removable vertical garden, use recycled materials such as scaffolding, achieve community participation and implement permaculture farming methods. A big aspect of community gardening is encouraging social interaction between people of the community to practice healthy eating. These community members play a large role in the cycle of farming to ensure it is kept up to its potential. Benefits of a community garden include biodiversity, lower prices, fresher foods, and improving urban landscape.

Greenbelly is not only an innovative design to provide local opportunities to illuminate food scarcity but also a framework for how it can be implemented in multiple cities. Especially for neighborhoods that have a highly saturated population of homeless people, community gardens can serve as a hobby and necessity for producing nutritious foods. By teaching communities to understand food production, it can benefit the social life cycle of food access and socioeconomic factors. Throughout a city, there are many empty walls with no windows, facing the sun perfectly: parking garages, factories, prisons, etc. These unutilized spaces are the perfect opportunity to add more greenery into a city. Through module calculations different building types can achieve a different level and size of vertical farming. By adding a green space between the world and the inside, a green wall can balance the temperature of the building inside, protect the facade from humidity damage and reduce sound pollution. Additionally, adding nature to a space, can help maintain many natural features.

The vertical facade of the green wall allows for optimal sunlight at different levels. Rainwater collects at the top level and through a drip system, water is irrigated down the farm. Solar panels line the slides of the scaffolding to obtain energy that might be necessary to power the space. Additionally, it can be kept open faced or closed like a greenhouse. Depending on the climate, a plastic or glass enclosure can be added to protect the crops in the winter. Scaffolding also allows for flexibility and easy maintenance through their module system with a low cost budget.

Each module (2m x 3.5m) in the space is designed to fit into the next for the flexibility with the design. These modules can be adjusted, moved and taken out at any point. The entire structure can also be easily taken down and moved to a completely different site at any point. The arrangement of the modules are designed to fit the needs of the local community. The most basic example of a module includes a soil bed, two aeroponic towers and a hydroponic wall. But, options are endless. The upper floors are designated to produce and additionally farming capabilities like beehives but the ground floor of the space remains the same, an entrance marketplace for locals to buy vegetables. Through a farm to table like method, costs of shipping and packaging are eliminated which means the prices of the food decreased.



Modules also have the opportunity to be managed in multiple ways. First the local community can designate distribution within itself. This means all of the food is produced for the purpose of it being sold on the ground floor. Second, modules can be rented out for locals to own as their personal farming space. Spaces can be prioritized for those in higher need. Third, the space can belong to the owner of the building such as a school, prison, hospital etc. They can decide how to manage + consume the goods. Fourth, it can be designated to help the homeless and food production can only be consumed by those affected. Fifth, the wall can be used for commercial food production such as restaurants or food kitchens. Lastly, it can be owned by a private company in which they decide how to create helpful wellness activities centered around the farm to promote health to their employees. The greenbelly wall has huge potential to implement healthy practices into a community and change their society for the better.

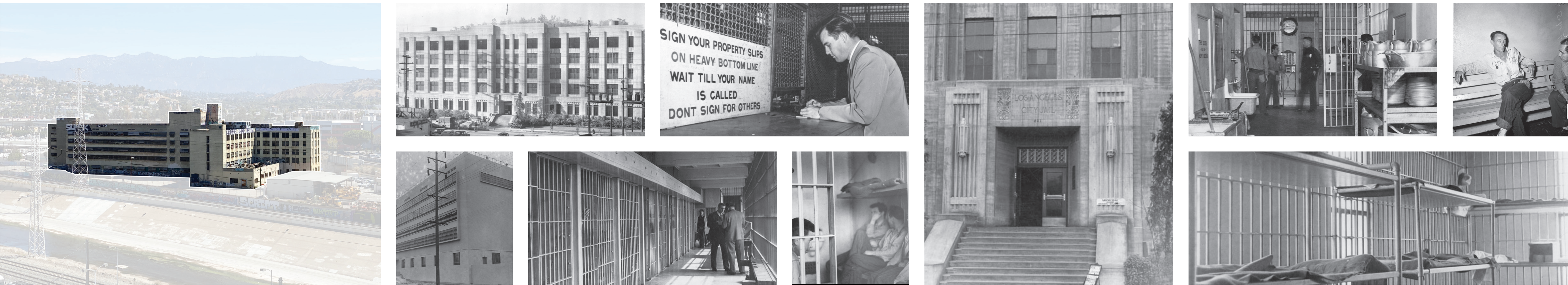
When considering building an urban farm like Greenbelly, there are many challenges it might face. Starting with the scale that each farm has the ability to yield. Large urban cities demand a lot of food production and a small community farm can only grow a fraction of the needed amount. Food desert locations, specifically, require even more production and farms located in those areas likely cannot cover the necessary amount. The second is the risk of pest invasion as it is a public garden and Green Belly grows all of their produce originally. All they can do is control the pests, not get rid of them entirely. Lastly, urban community farms have a difficult time launching due to public agencies can be slow to manage the production process. Local government agencies are not quick to approve these projects as it takes a lot of volunteer management. Bearing this all in mind, the outcome of this project is far more beneficial than if Greenbelly did not exist.



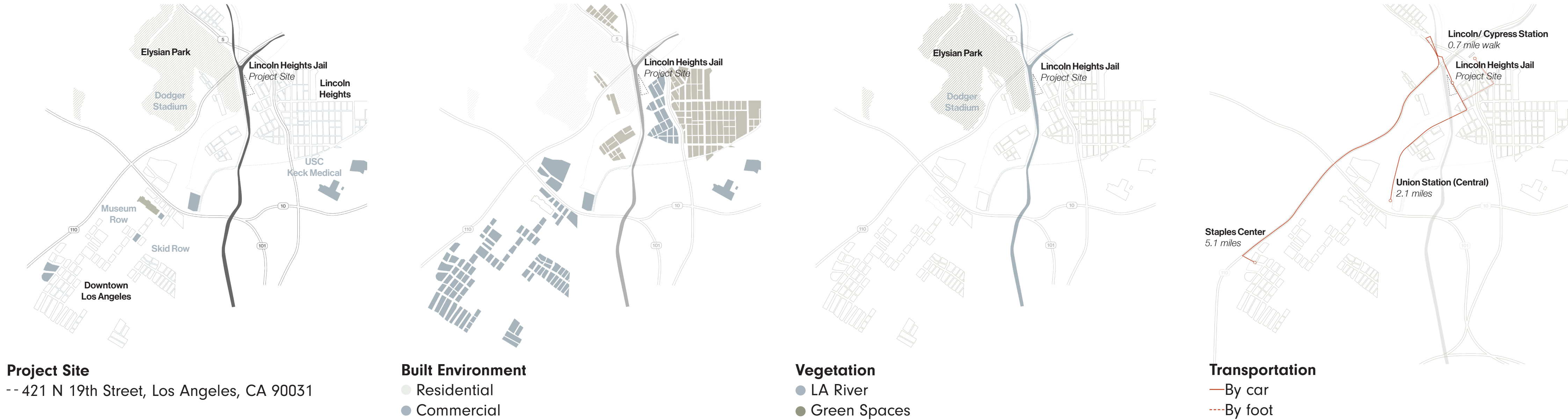
# LINCOLN HEIGHTS JAIL

## 421 N 19TH STREET, LOS ANGELES CA 90031

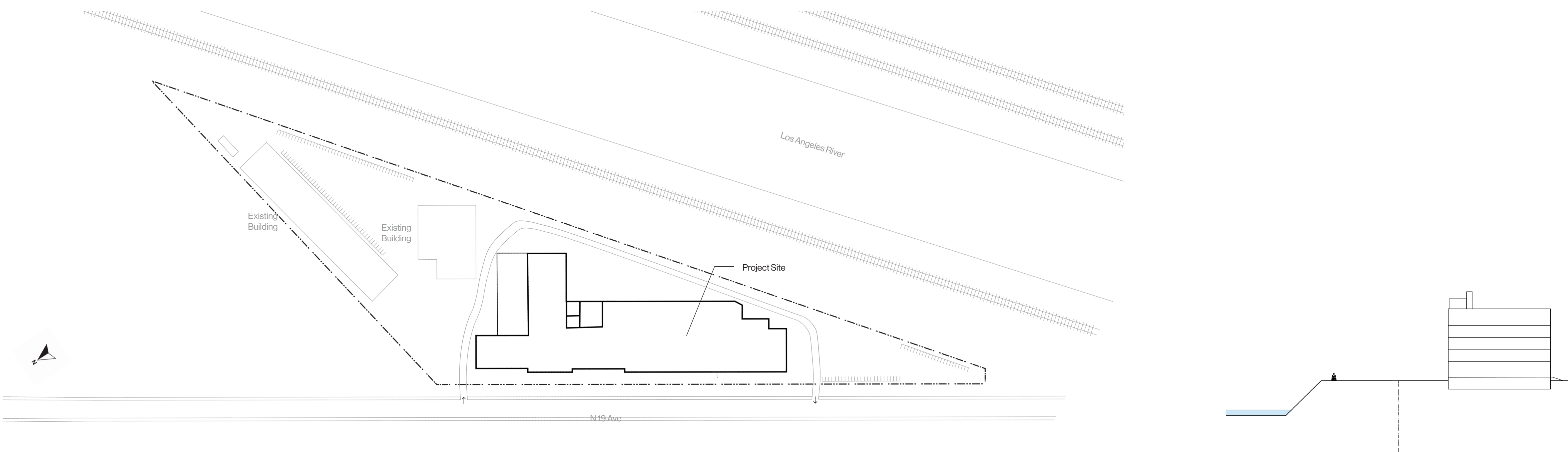
**Scope I** This site was selected to challenge agricultural farming methods into an urban setting. The Lincoln Heights Jail is a five floor, 229,120 sq ft building with a vast amount of space for vertical farming. Located near the LA River and Elysian park, vertical farming methods can compliment this abandoned site with biophilic design elements. The site is also surrounded by a # sqft parking lot, a bike bath and multiple train stations. The scope of this project will include all 5 floors, excluding the basement, of the abandoned jail including the rooftop and the entire parking lot. Through space planning, there is potential for a high yield of farming through vertical farms along with recreational and educational opportunities in selected spaces.



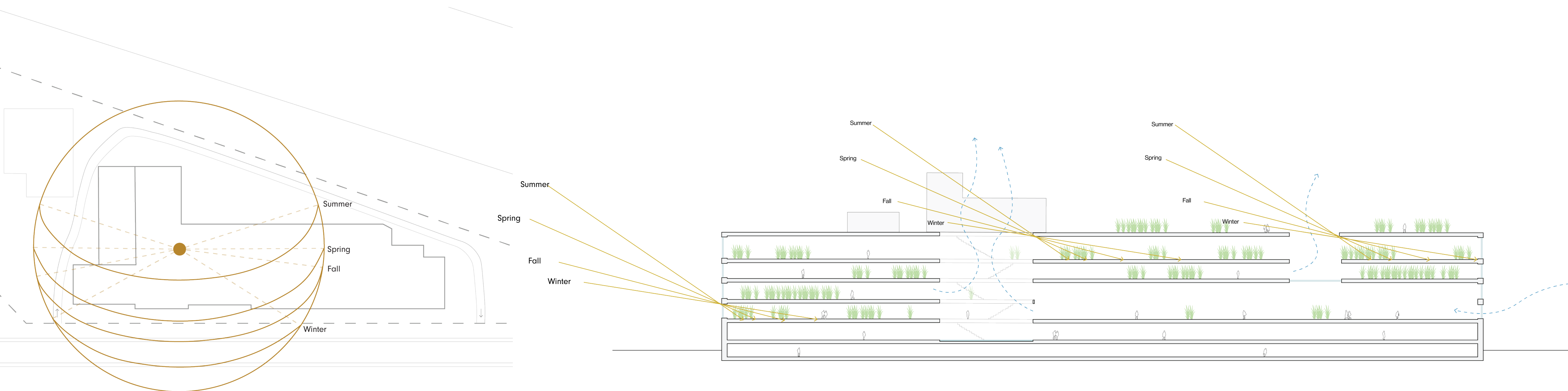
### SITE ANALYSIS



### SITE PLAN



### SUN ANALYSIS

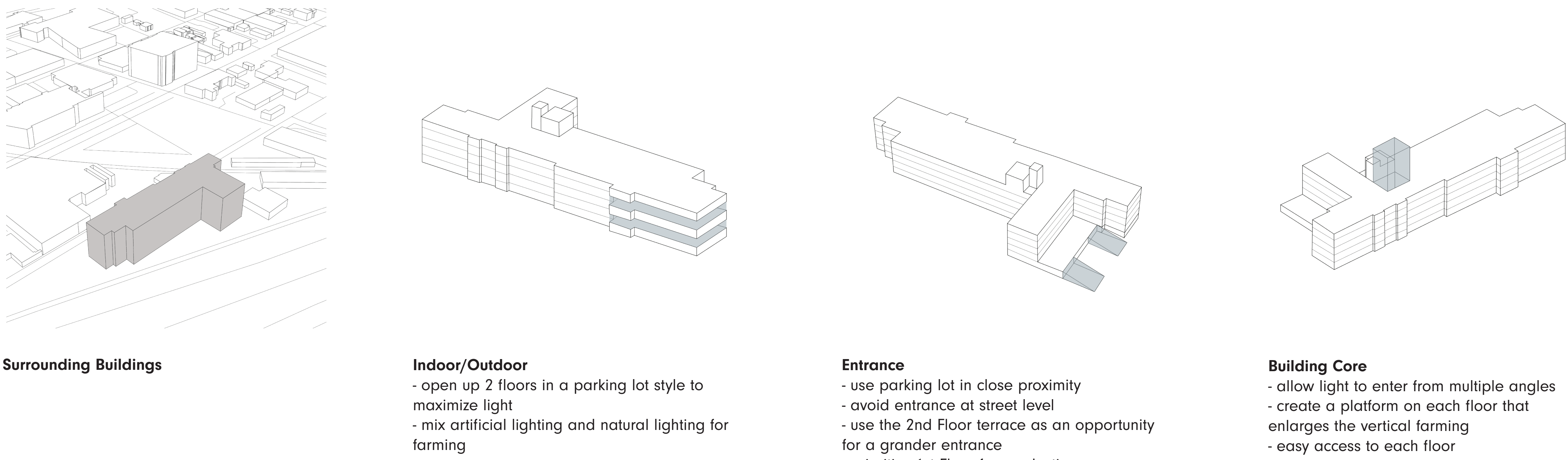


**12:00 PM** | As the sun diagrams illustrate, the shadows cast north into the building on the south side. This creates an opportunity for the vegetation on the south side to obtain more natural light. Also by opening up the core of the building as well as floors 4 & 5, more light can be brought in.

### SITE IMAGES



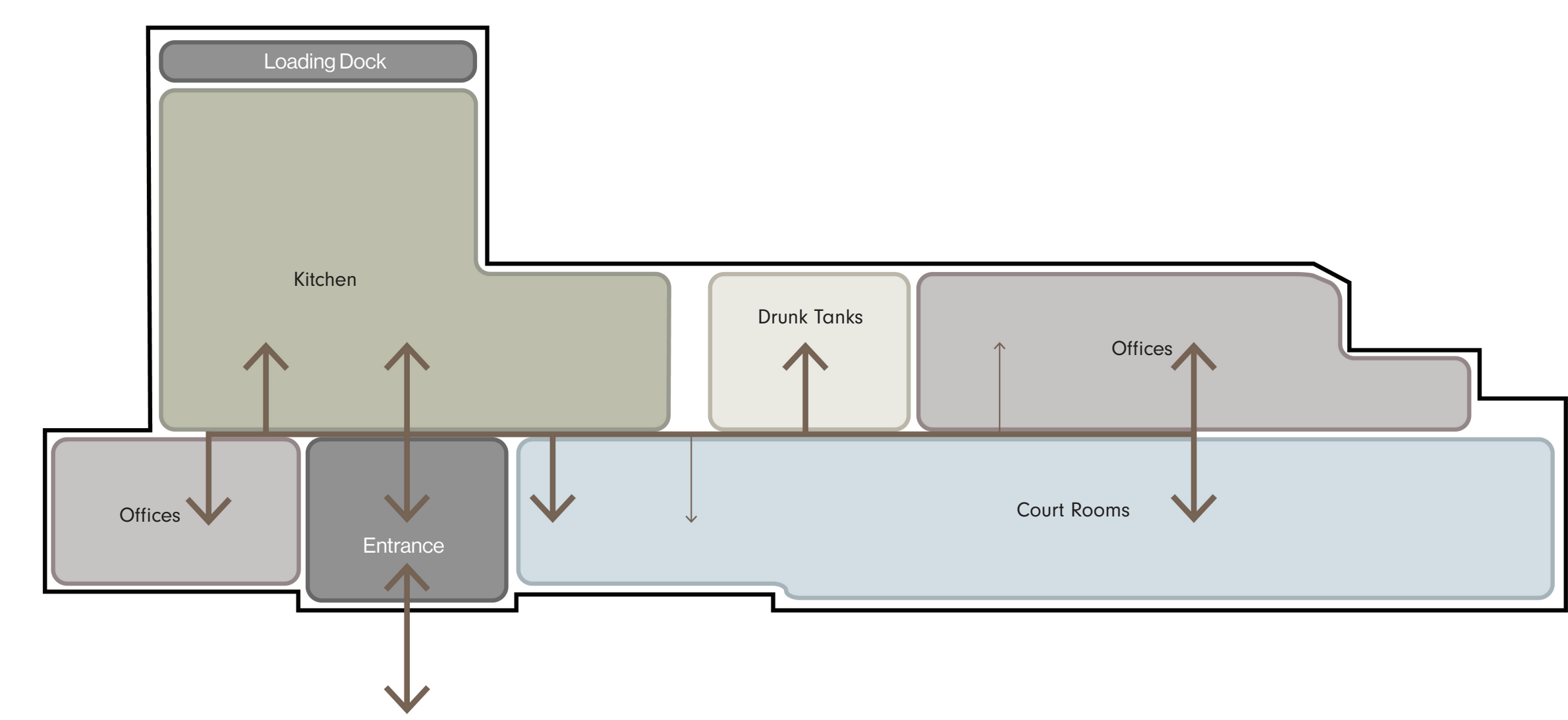
### ARCHITECTUAL PROPOSAL





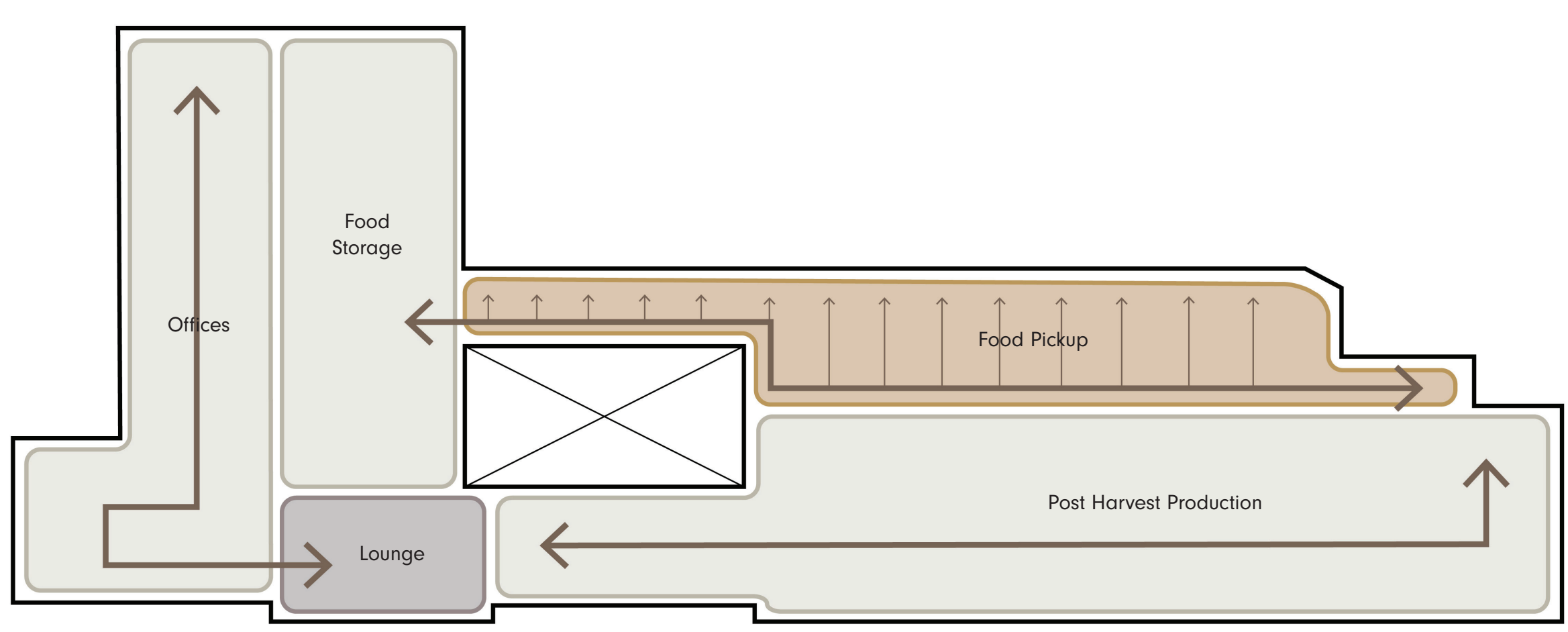
SPACE PLANNING

421 N 19TH STREET, LOS ANGELES CA 90031



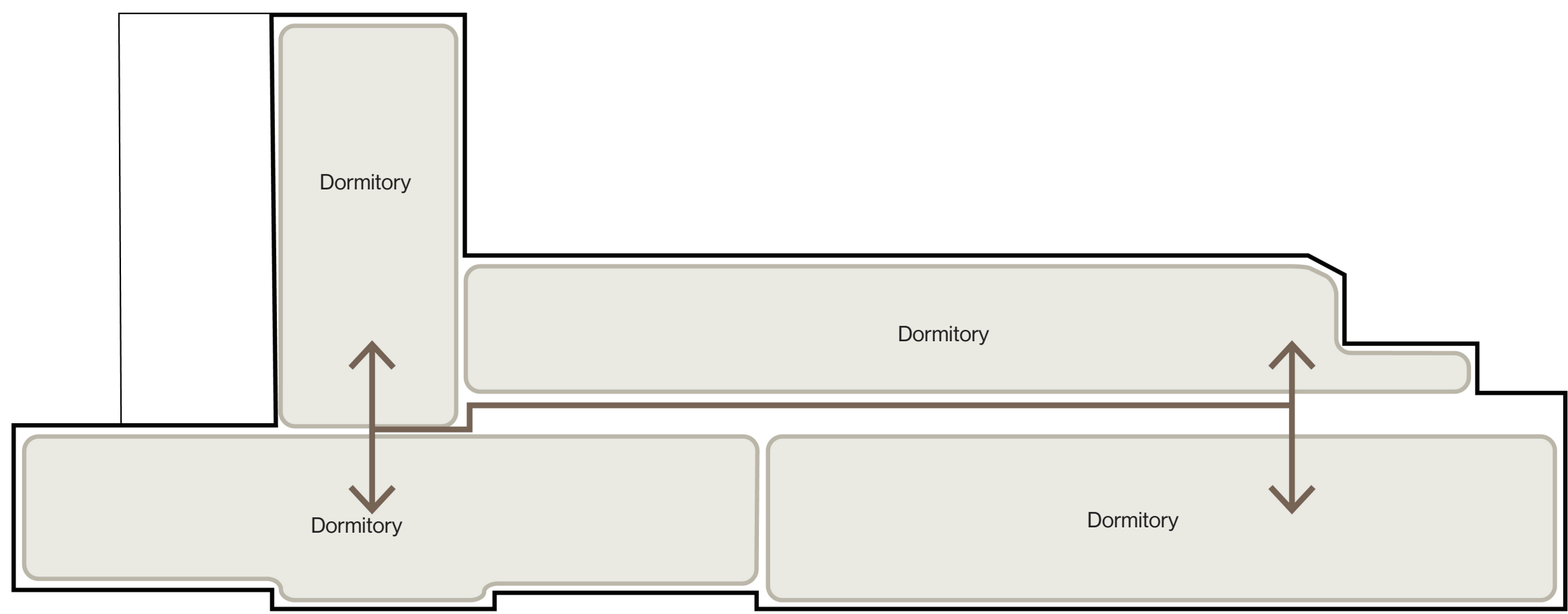
FIRST FLOOR [EXISTING]

- **Offices**  
ward  
bookkeeping room  
fingerprint room  
receiving room
- **Kitchen**  
kitchen annex  
bakery  
pantry
- **Drunk Tanks**  
holding rooms
- **Court Rooms**  
sentenced prisoners  
bail office  
court room  
doctors exam  
records room  
public defender  
parol officer



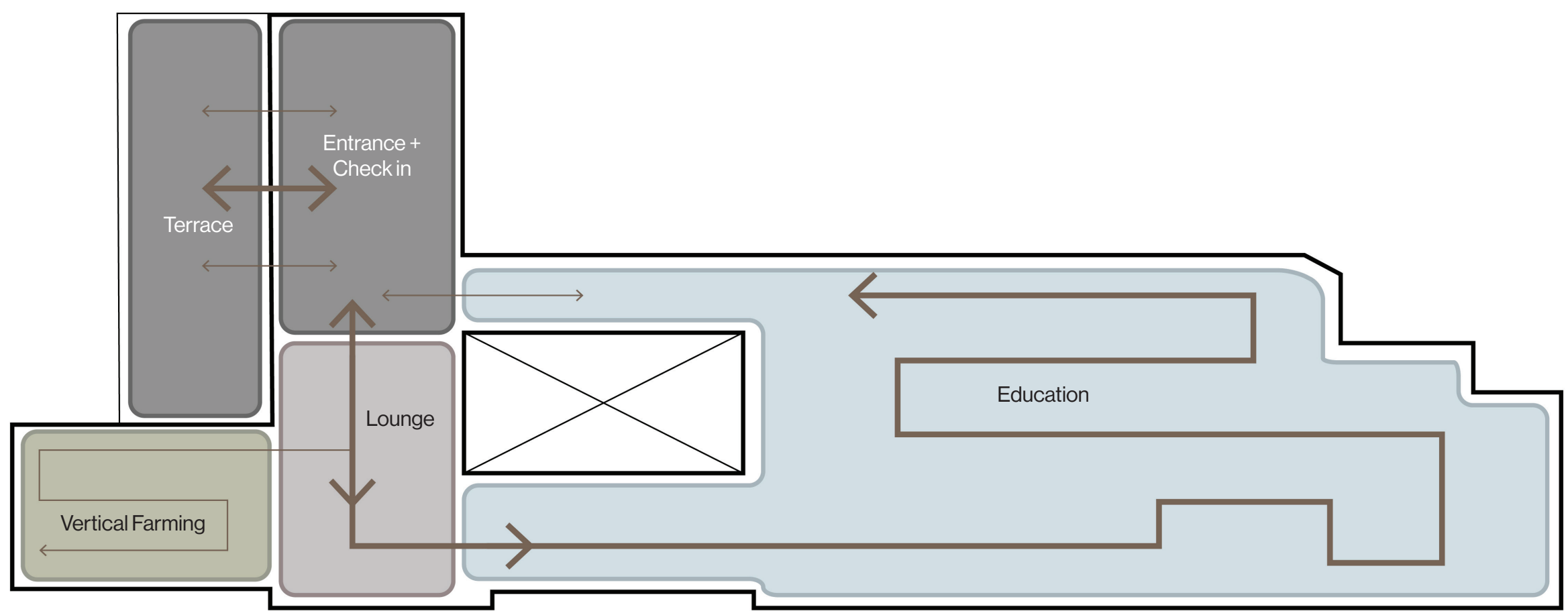
FIRST FLOOR [PROPOSED]

- **Offices + Management**  
conference rooms (2)  
office desks  
private offices
- **Food Pickup**  
distribution sections for  
a variety of produce
- **Lounge Furniture**
- **Post Harvest Production**  
washing stations  
packaging  
organization
- **Food Storage**  
pre-distribution



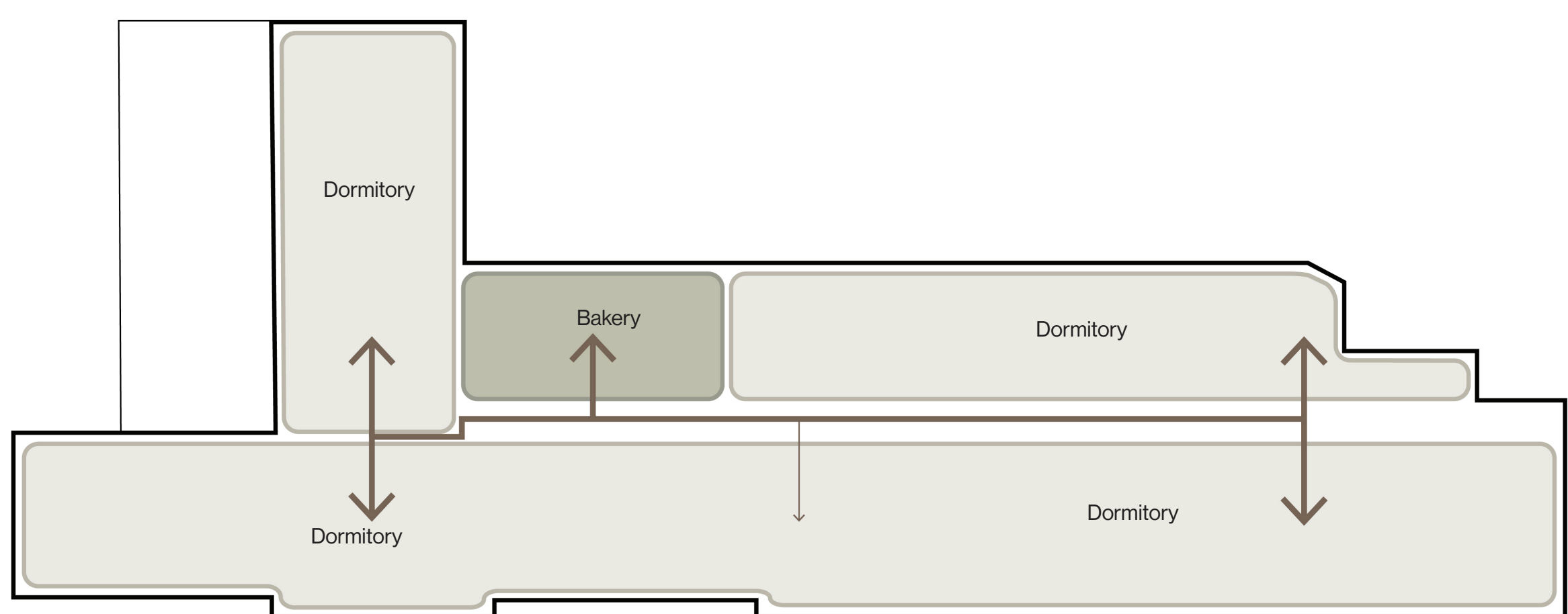
SECOND FLOOR [EXISTING]

- **Dormitory**  
inmate cells (varying in size)



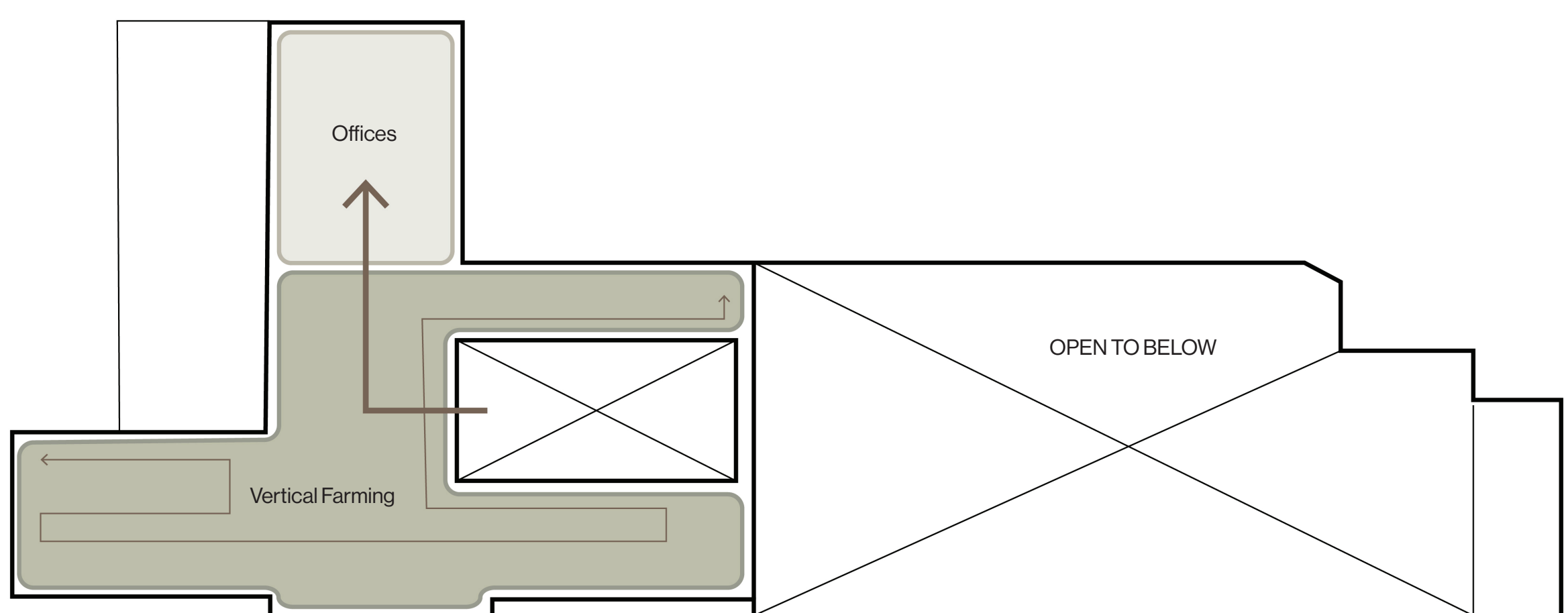
SECOND FLOOR [PROPOSED]

- **Entrance + Check In**  
indoor and outdoor entrance  
check in desk
- **Lounge Furniture**
- **Farming**  
peak into vertical farming
- **Education Space**  
test kitchen  
indoor gardens  
exhibits



THIRD FLOOR [EXISTING]

- **Dormitory**  
inmate cells (varying in size)
- **Bakery**



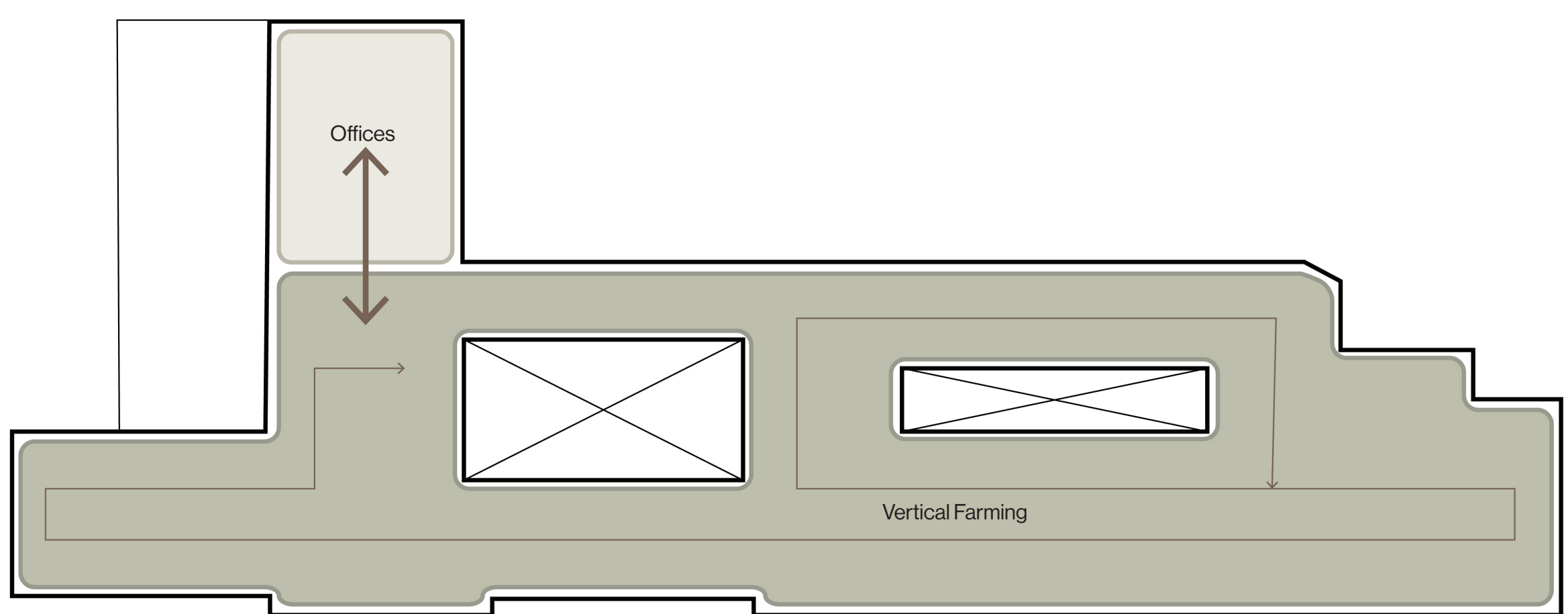
THIRD FLOOR [PROPOSED]

- **Offices + Management**  
break room  
study the progression of the farming process  
prepare food for distribution
- **Farming**  
36 vertical farms



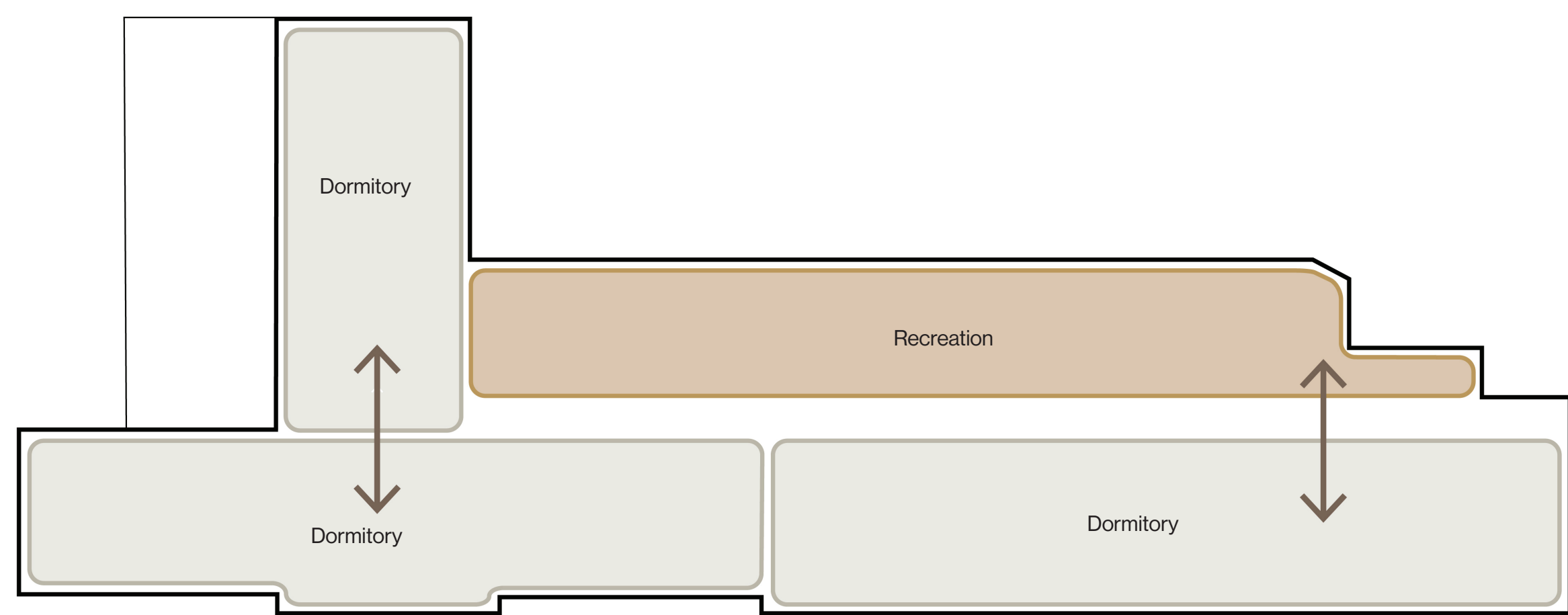
FOURTH FLOOR [EXISTING]

- **Dormitory**  
inmate cells (varying in size)



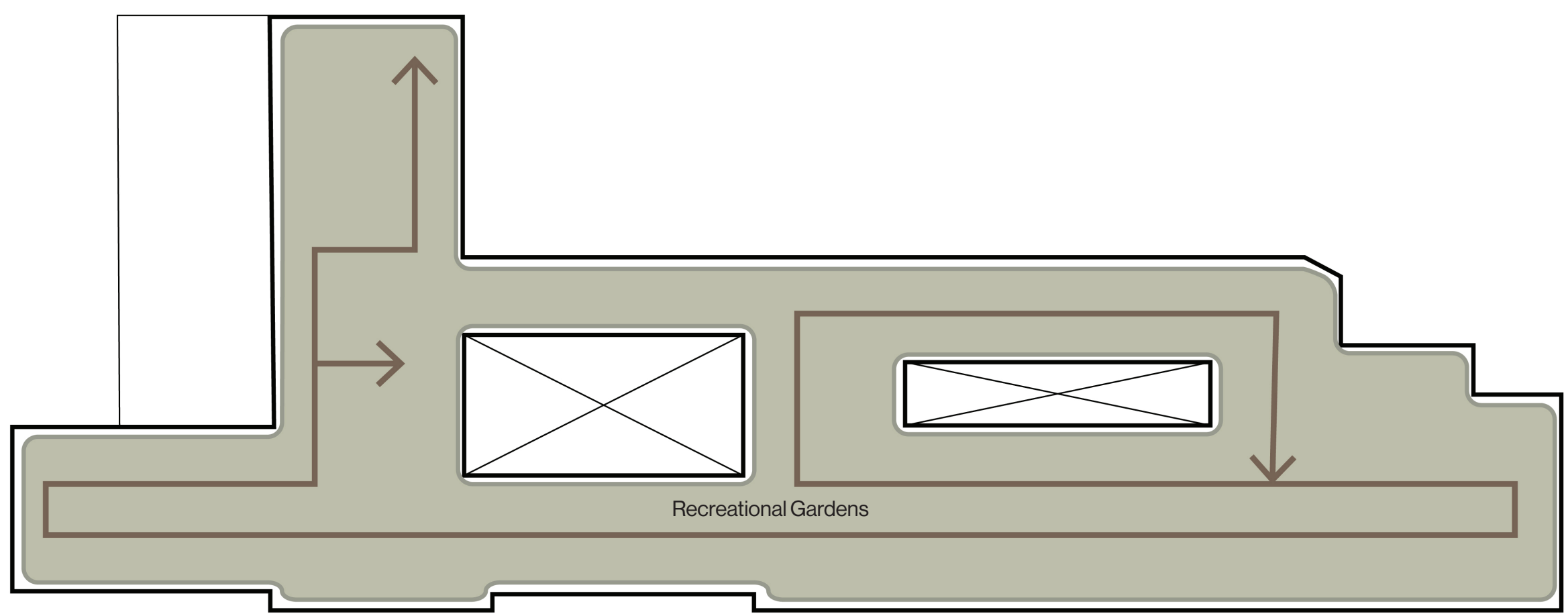
FOURTH & FIFTH FLOOR [PROPOSED]

- **Offices + Management**  
break room  
study the progression of the farming process  
prepare food for distribution
- **Farming**  
55 vertical farms



FIFTH FLOOR [EXISTING]

- **Recreation**  
fighting rings
- **Dormitory**  
inmate cells (varying in size)



ROOF [PROPOSED]

- **Recreation**  
rooftop garden  
seating furniture

- Inmate Cells
- Recreation
- Prosecution
- Egress
- Kitchen
- Offices

- Offices + Management
- Food Pickup
- Education
- Entrance
- Farming
- Lounge





# THE BOUNTY FARM

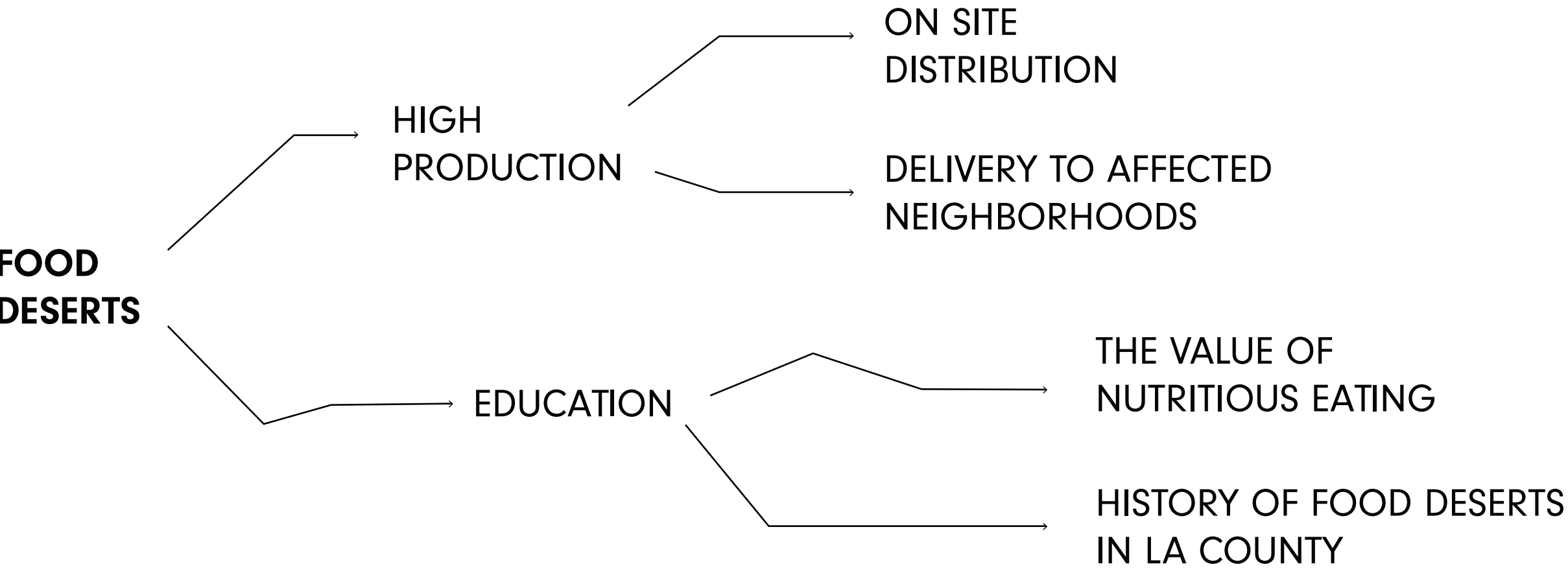
## Welcome to the Farm

Welcome to Bounty Farm — home to over 1000 crops of produce as well as educational and recreational opportunities! Here you'll find something for everyone!

## Alleviating Food Deserts in Los Angeles County, CA

Implementing vertical farming methods in Los Angeles County is a potential solution for those facing food insecurity. Los Angeles lacks land space for open air farming in a city so densely filled with highways, residential homes and commercial buildings. Vertical farming also creates a higher yield of production which brings quantity at the forefront of a solution.

With on site production, Bounty Farms had the ability to feed neighboring cities, public school and those in need. Every Sunday the farm opens a drive thru pickup system where individuals can pick up fresh produce for their week!



## Vertical Farming + Sustainable Practices

Vertical Farming is a sustainable practice used to produce a high volume of foods and plants with less water required. In an area like Los Angeles where land is not abundant, urban farming methods are a grass root to grow locally!



Vertical Farming requires **0.004%** of the water used for open air farming.

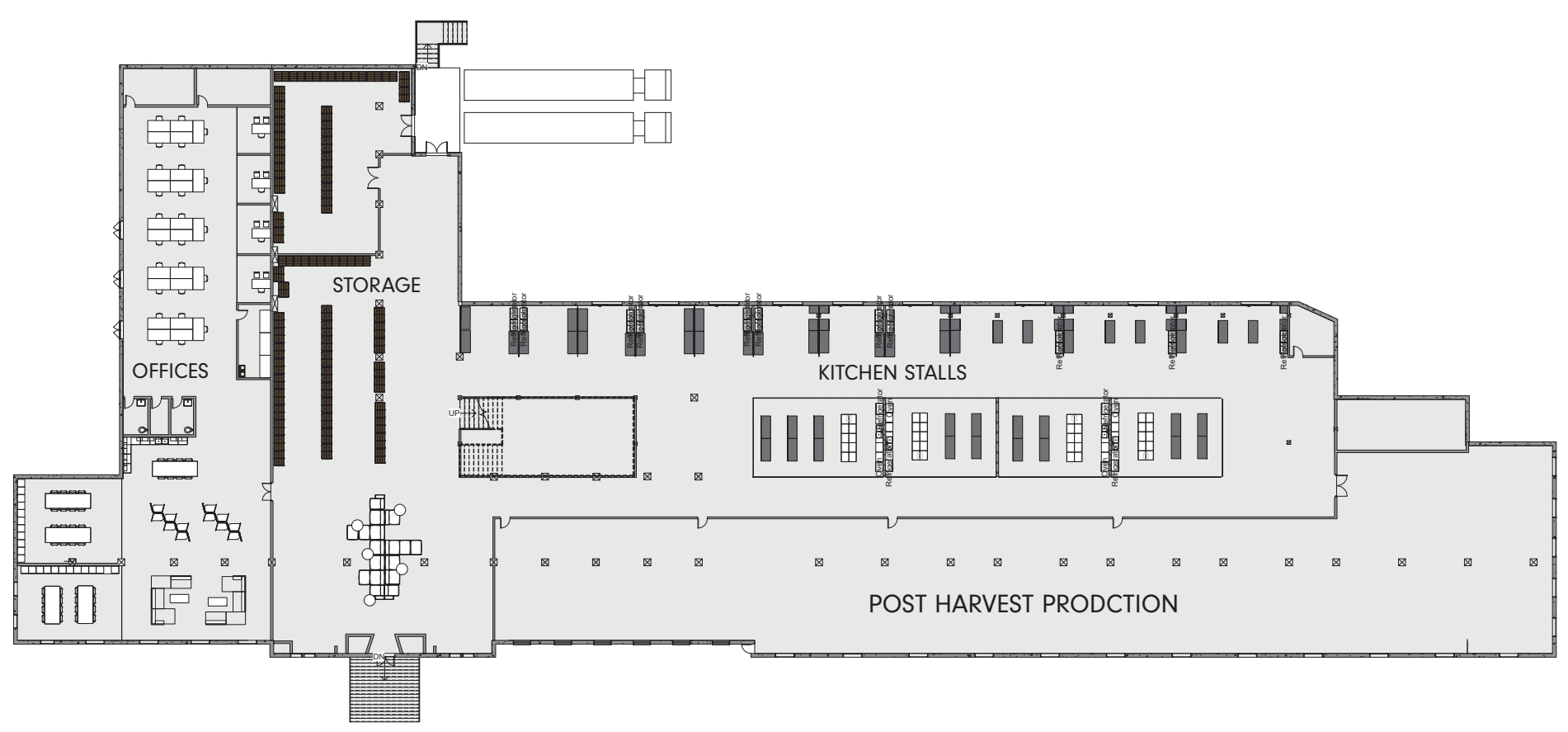


Vertical Farming produces **30x** the yield of open air farming.

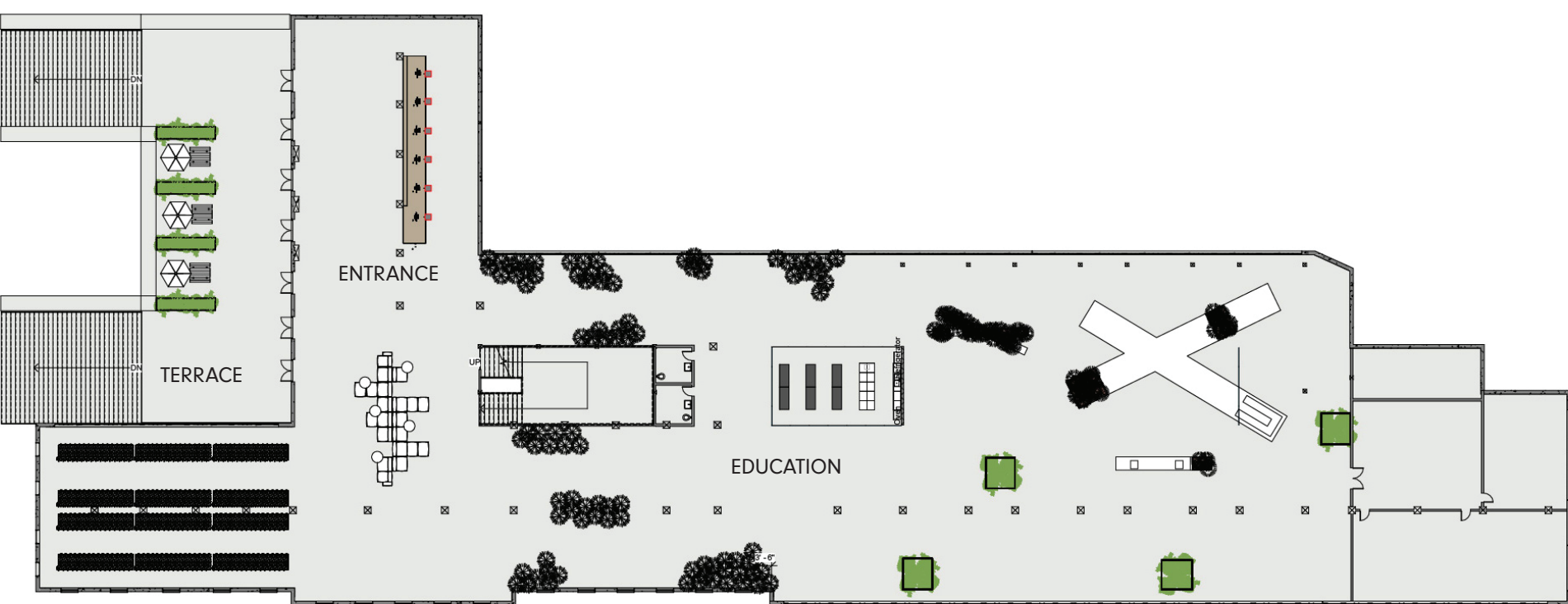
## More than a Farm

Bounty farm not only holds over 6 tiers farming stations, but also provides opportunity such as education and recreation. The main floor of Bounty Farm (Floor 2) is designed to be an education space for school, families and eager to learn individuals to understand the importance of nutrition, healthy eating and the history behind why some people are facing food insecurity. At Bounty Farm, guests are able to learn about how to take care of a food producing plant which develops independence, responsibility and entrepreneurial skills.

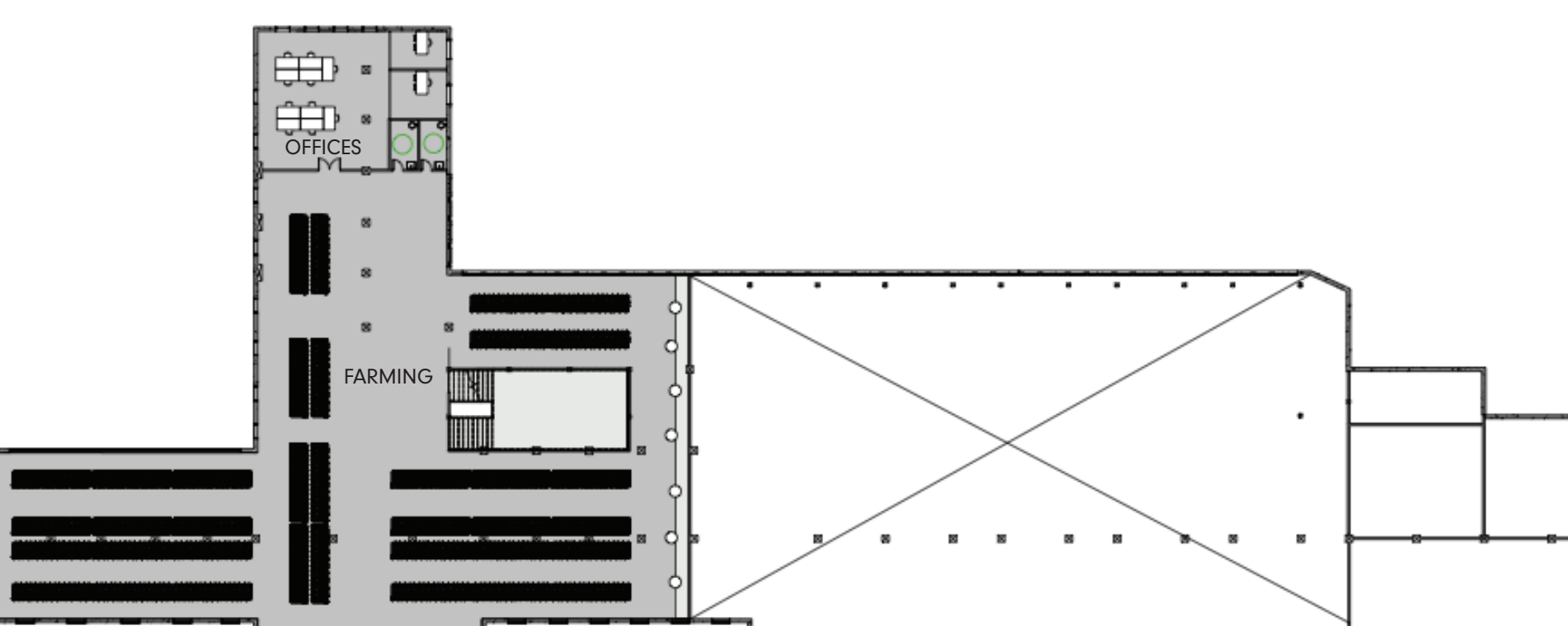
The rooftop of the building is an open public gardens space anyone to utilize. The space spans a beautiful views of the city such as Elysian Park, the Los Angeles River, Dodger Stadium, the San Bernardino mountains and more. Walkways like the roof with smaller spaces with tables and chair for a nice space to relax or enjoy a picnic.



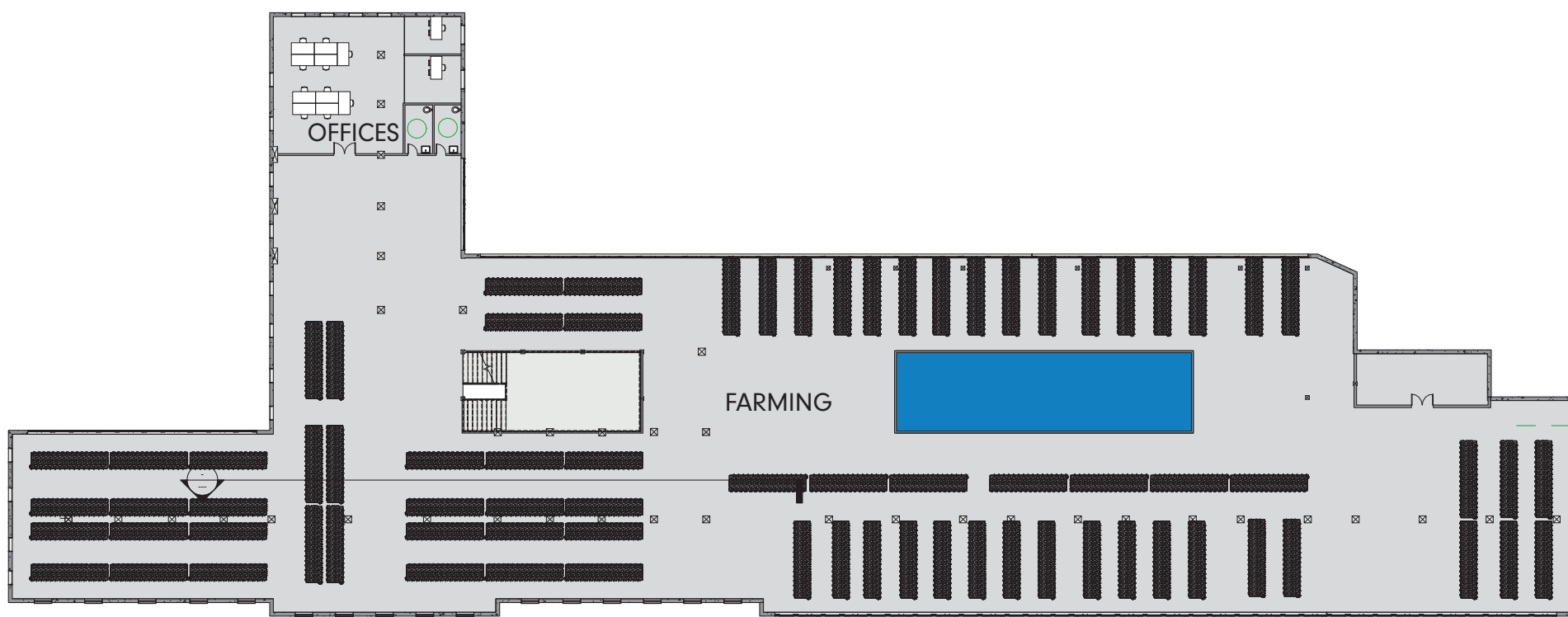
FIRST FLOOR



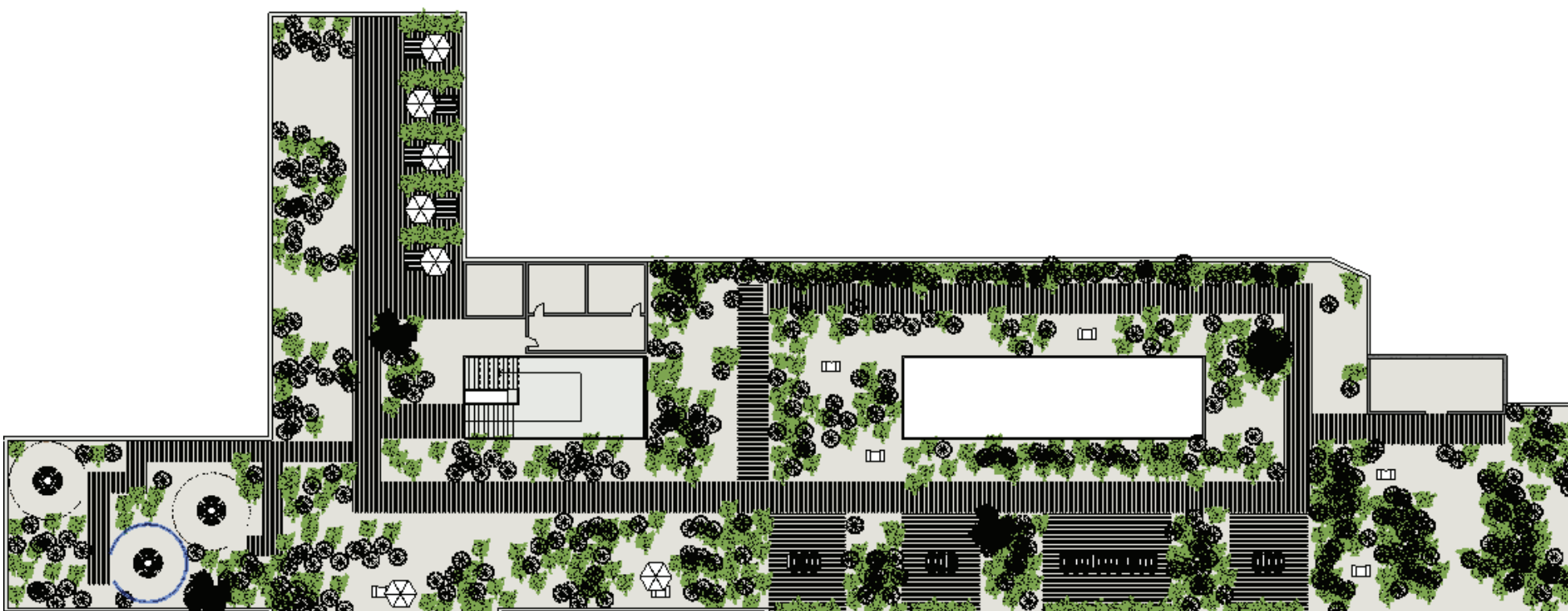
SECOND FLOOR



THIRD FLOOR



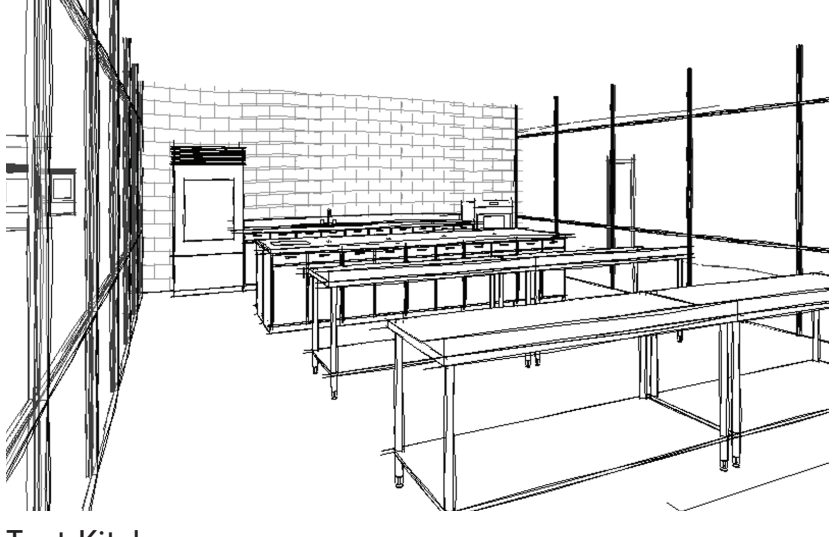
FOURTH + FIFTH FLOOR



ROOF



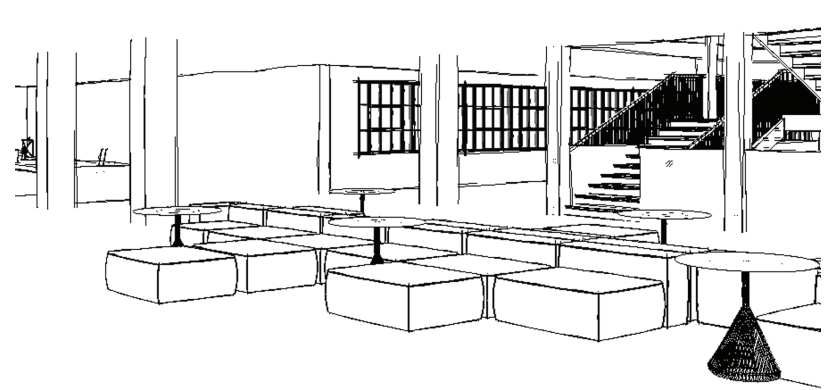
Food Distribution Stalls



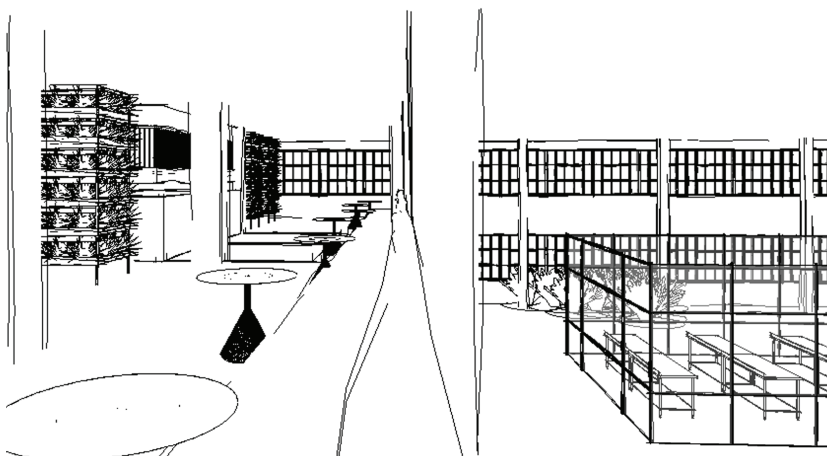
Test Kitchen



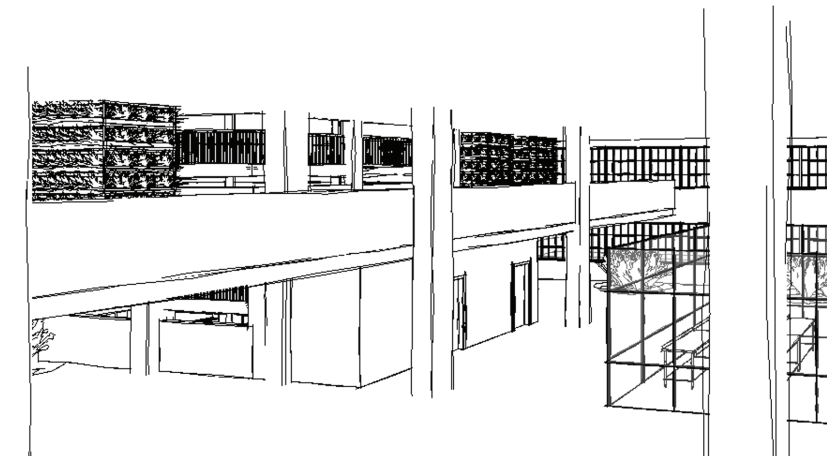
Education Space



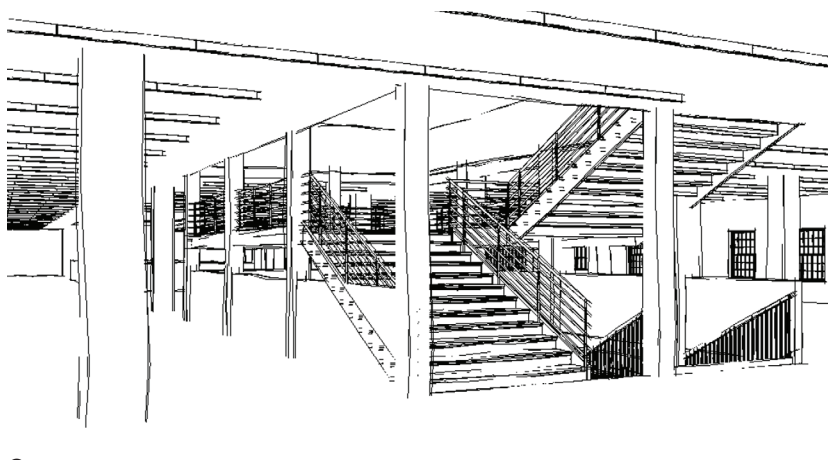
Lounge Furniture



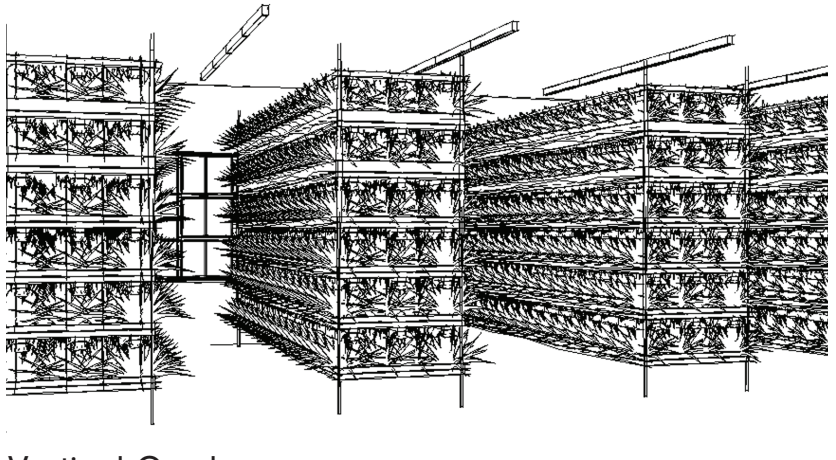
Bench Seating



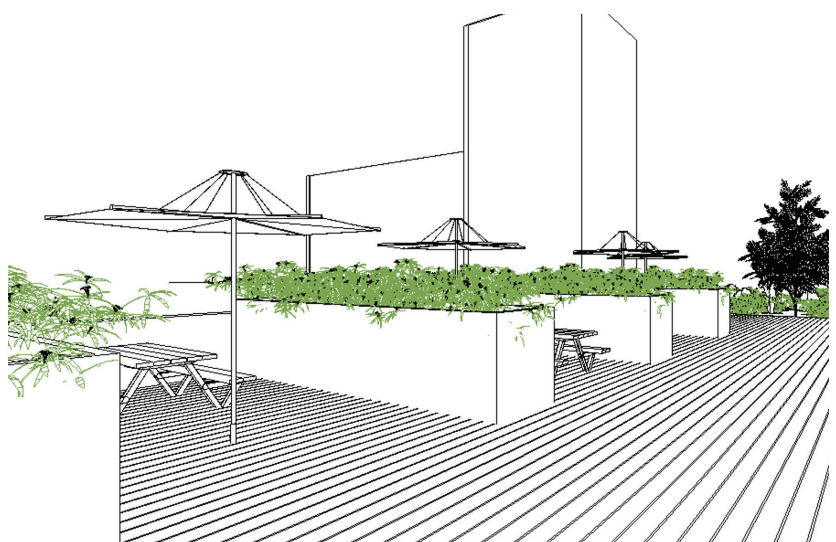
Balcony



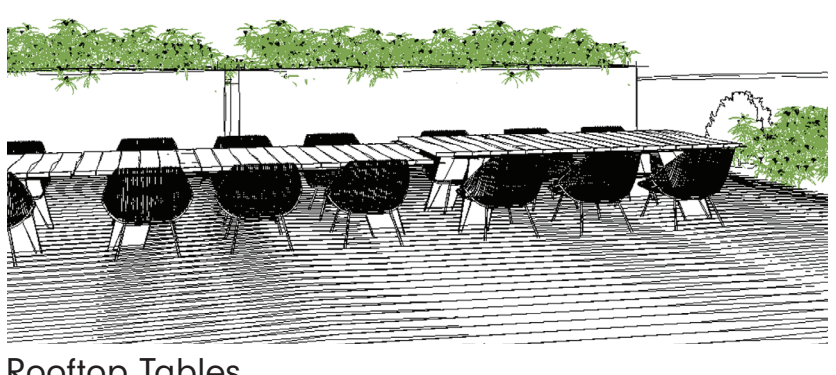
Stairs



Vertical Gardens



Seating Areas



Rooftop Tables

