

Sukumvit 101 / 1 Shophouse Research

PREFACE

As the Bangkok's population grows, both public and private sectors must provide the proper amenities for its people - from buildings to transportation networks to civil infrastructure. In terms of architecture, conventional wisdom leads us to believe that an increased population demands the construction of more and more buildings. We see the results of this archaic logic in Bangkok, as construction sites abound in most every city block. Developers scramble to supply a seemingly endless market demand for housing, commercial space, and retail. However, development comes at a price. Construction of new roads, houses, condominiums, and office blocks, inevitably brings about a host of adverse environmental impacts – dust, waste, noise, heat, and land/water/air pollution. This includes the CO2 emissions from on-site constructions and off-site fabrications, resulting transport traffic and pollution, and solid/liquid waste created during demolition of (often times) re-useable existing buildings to make way for new construction.

This begs the question: Isn't the very act of CONstruction pushing us down the path towards the DEstruction of the environment? In the face of this urban catch 22, must we consider other alternatives to providing accommodations for living and commerce that do not rely solely on building entirely NEW structures?

The shophouse is one of the most commonly found building types in Bangkok. Once recognized as the main building block for Thai urbanism, this historic building typology still has an widespread urban presence, lining most major roads and avenues in the city. It's architectural programming was once aimed at supporting a life of living and working by delineating the bottom floor family business and the upper levels to domestic life. However, as conditions for 'living' in Bangkok worsened with congestion, overcrowdedness, and pollution, shophouse families opted to only 'work' in their shophouse. Commuting to work in downtown from more spacious detached homes in the periphery suburbs has become more attractive over the years. Many times, families rented out for short and long term leases. Other times they would abandon the shophouse altogether, boarding up doors and windows to await the day a large developer to purchase their property for the right price. Thus, began the physical decline, emotional detachment, and urban abandonment of the Bangkok shophouse...

But has the shophouse truly lost its usefulness? Have we forgotten its incredible flexibility, functionality, and utility as an urban building type? Least of all let's not forget its sheer volume as EXISTING building stock that can be found on virtually every street corner?

Can we look to resuscitating, recycling, and re-programming the incredible stock of existing Bangkok shophouses in order to accommodate a new generation of city dwellers who value small businesses, flexible commerce, mixed-use, and community-based living ... and in the process, alleviate the pressures that new construction has put on our natural environment?

The 101/1 Shophouse Design Research

The 101/1 Shophouse Design Research aims to uncover the hidden potentials of Bangkok's extensive stock of under-utilized shophouses in order to satisfy the ever-increasing demands for retail, office, and community-enriching mixed-used spaces. Shophouse 'recycling' will provide a stockpile of ready-to-use, flexible, and easily accessible spaces for rent, creating new economic opportunities for the city's emerging start-up culture, as well as preserving a sense of community by stitching new commercial programs to existing local businesses. Furthermore, re-developing the city's existing building stock will inevitably reduce the need for NEW construction, minimizing air, water, and waste pollution in Bangkok.

ECONOMIC OPPORTUNITY...Who is the new shop house for?

Large and medium scale commercial and residential development in large part cater towards more established buyers and tenants who guarantee financial return and success. Prime office space near in financial hubs and accessible locations usually demands high rent that again can only be afforded by larger companies. Locations with more reasonable rent demands are usually in less removed, less accessible, remote locations, demanding more expensive commuting expenses, from gas to multiple fares of multiple modes of public transportation.

As it stands however, very little attention is ever given to the provision of those small and emerging businesses -- the rising entrepreneurs, promising start ups, and small industries that are proving to be forgotten presence but powerful base for the Thai economy.

The New Start-up

The start-up sector is one of the fastest growing flakdfjasdf groups in Bangkok. By its very nature, a start up is an entrepreneurial venture seeking financial backing to support its newly conceptualized product or services. Despite its hidden potentials, start ups are always risky propositions because of their unproven performance. As such, it is always natural these new entrepreneurs support their initial business out of their own pocketbooks. Therefore, everything mustlsdfksf, including rent or investment into workspace. It is no surprise that start up operations have become the new urban nomads...working from their homes, in cafes, and pop-up co-working spaces. This way of working also isn't certainly by chance as many in this group embrace the bohemian element, shunning typical 9-5 office culture, preferring a freer, more well rounded lifestyle that balances work, leisure, and travel.

However, once a start up gains traction and sees the fruits of its success, the larger operation can longer float freely from cafe to cafe. Co-working spaces are catered towards freelancing individuals, but are inadequate for larger groups that need privacy and greater workplace accommodations. The startup culutre will demand a highly flexible work environment that keeps pace with the multiple speeds with which its dynamic business evolves. Despite its strong presence in the financial landscape, the start up still operates like a unrooted nomad, roaming the city's coffe shops from meeting to meeting. There has yet to be a workspace solution that caters both to the startup's need for reliable office infrastructure, yet flexible enough to adapt to the groups' ever-changing needs and dynamic activities that are constantly-evolving at break-neck speed.

The startup culture, specifically the young and creative minds which make its core, are also extremely globally conscious and socially aware, seek places of business thanbtt have local character and are a part of the community in which they operate. They new entrepreneur isn't all about business. and their need for a well-rounded life is reflected in their workplace selection. Their new office prototype needs to accommodate this new worldly view.

In essence, the start up will require a work environment that is inexpensive, flexible, adaptable, accessible, and connected to daily life and community in an authentic way.

The Neighborhood Retail and Services

Far too often in imagining Bangkok as the Modern Asian Metropolis it is difficult to shut out external and internal forces that push us to adapt international business practices, to embrace global tourism, and to even adopt American, European, Japanese, and Korean social norms. In the midst of chasing the global trend to improve its status as a world-class city, Bangkok must not forget its valuable homegrown cultural and economic asset.... The Thai local business. They are the backbone of Thai society and way of life. These may include the neighborhood noodle shop, hair salons, small markets, rahn cham (mom and pop convenient store), and countless other local institutions that are the foundations of Thai communal life. These institutions allow us to enjoy local products, to support local businesses, which in turn support the local economy. And just as importantly, local businesses preserve the history, culture, and community of Thai life.

In contrast to franchises and international chains, many local business are able to offer services, food, and products to the neighborhood at lower prices. This In a favorable and sustainable situation, the businesses operate in a mixed use community of high and low income, are able to afford their rent, and make a sustainable financial living. However, as big developments invade the neighborhood, buy up real estate, in turn, driving up property prices and rent, these local businesses can no longer afford to survive. Inevitably, these local operators are driven out, and replaced by corporate chains and global franchises. The unique local community becomes simply another a homogenized and gentrified global city.

This begs the question... How can we provide an affordable, functional, flexible place of business for a new generation of entrepreneurs without squeezing out long established family/ local businesses in Bangkok, and still do so in minimizing the environmental impact of growth and development in our city?

Recycling the BANGKOK SHOPHOUSE

The 101/1 Shophouse Design Research aims to find the answer to these critical questions through researching the hidden potentials of recycling, renovation, and reprogramming of the incredibly stock of existing shop houses in Bangkok. This will lay the foundation for the development of a new urban infill typology, cone that stitches young emerging businesses with local Bangkok establishments.



Sukumvit 101/1 Shophouse Research





BANGKOK'S URBAN DISTRIBUTION BELT

Bangkok is a densely populated metropolitan city that is bursting at the seams. Its population demands a high volume of supplies in terms of food, clothing, appliances and other essential products. Most of these items are produced in farms and factories that lay outside the city boundaries or in other provinces throughout the country. Every day truck loads of items arrive by the metric ton to fulfill the demand of these products. However, many of these products are still in their 'raw' state, still un-cleaned, unsorted, and unpackaged.

The Bangkok urban distribution belt (diagram 1) has become a vital area in serving as the transitional zone in which products from the countryside can be sorted, cleaned, and packaged, before being distributed to stores and direct suppliers in the city center. Location-wise, the location of this peripheral 'ring' is ideal in terms of its proximity to Bangkok proper. The area also contains moderately-priced real estate that is affordable to these "middleman" distribution businesses.

THE SITE: 101/1 SHOPHOUSE CLUSTER

Our intended area of research, a series of shophouses located at the corner of Sukumvit 101/1 (diagram 2), is located in this urban distribution belt. We will see that many of the shophouses selected for the research have been 'hacked', or hybridized, from its intended traditional use of house and retail, to serve as storage/packing/distribution centers for essential food and products to be supplied to Inner Bangkok.

The research area includes XXX 'kooah', or bays, of street-facing line of shop houses on Sukumvit Road, and XXX kooah or of street-facing shophouses that turn the corner into Sukumvit 101/1. Both lines of shophouses are located at the northwest corner of the 101/1 intersection and have immediate adjacencies the True Digital Park Complex, which abut their rear elevations.

Also included the area of research is the large cluster of shophouses occupying the northeast corner of Sukumvit 101/1. This cluster includes shophouses that open up to Sukumvit Road Proper as well as Sukumvit 101/1, but also those that align the internal sois, or alleys, within this cluster.





EXISTING SHOPHOUSE PROGRAMS

Programming of the existing shophouses located at the northeast/northwest corner of the Sukumvit 101/1 reveals that auto accessibility is an important determinant.

The shophouses located at the northwest corner facing Sukumvit Road, a major traffic artery, do not have parking accommodations. Its street frontage has no curbside parking while its rear abut True Digital Park ring roads, which also doesn't allow free parking. Therefore this street-facing shophouses have only programs that can only be accessed by foot, taxi, or other public transportation, limiting their programs to restaurants, beauty salons, small offices, condominium sales offices, and retail. The little residential spaces detected on the upper floors contain low-income tenants who access the building by foot or public transportation.

The shophouses on the northeast corner of the intersection comprise a large cluster that not only line Sukumvit and Sukumvit 101/1 Road, but extend into a network of alleys, or *sois*, inside the block. It is a shophouse micro-neighborhood, occupied by with a variety of tenants with unexpected programs. The street facing shophouses on the northeast corner of the Sukumvit 101/1 intersection share similar programs to those at the northwest corner, including barbers, beauty salons, food & beverage, hardware stores, and other small retail- again, all accessed by foot or public transportation. However, auto accessibility afforded by the minor streets allows a greater variety of programs to exist. The less heavily trafficked alleys allows for residents and shophouse guests to have both permanent and private



Site Plan Showing Existing Shophouse Programs

parking. Larger vehicles such as delivery trucks can also enter these alley ways to make temporary stops for loading and unloading, activities that could not happen on the congested main streets of Sukumvit and Sukumvit 101/1. This auto accessibility for larger vehicles allows for light industry programs such as an egg factory, auto parts distributor ship, and other warehouse or factory type programs to take place. Many of the internal shophouses also accommodate residential living as the the overall atmosphere in the minor sois is much calmer and less polluted and less congested than the major streets. Street side parking in the alleys is also another major factor that allows residential programs to exist.

Case Studies



“THE EGG FACTORY”

Every day, truckloads of chicken eggs from outlying farms throughout Bangkok arrive at the ‘egg factory’ with thousands of uncleaned eggs. Five koohah, or bays, in this shophouse cluster at the northeast corner of Sukumvit 1010/1, have been transformed into an egg cleaning, sorting, and packaging facility. The trucks unload the eggs at the east facades of the complex, which are then cleaned and sorted in the two shophouse bays. The third bay at the northeast corner is used to clean and stack empty egg crates. The two west-facing koohahs at the are also utilized as cleaning and sorting distribution lines. Once cleaned, the eggs are then packed into crates and stored in the middle of the complex, awaiting to be loaded onto trucks at the central opening on the north façade. These packaged eggs will be then transported to markets and suppliers in the city center for sale.

The accessibility afforded by the internal sois, or alleys, surrounding three sides of the egg factory allow for this smooth operation. Constant parking and unloading of large egg delivery trucks could never be allowed on major traffic filled roads, but can happen here as the internal shophouse alleys are rarely congested.



Groud Floor Plan

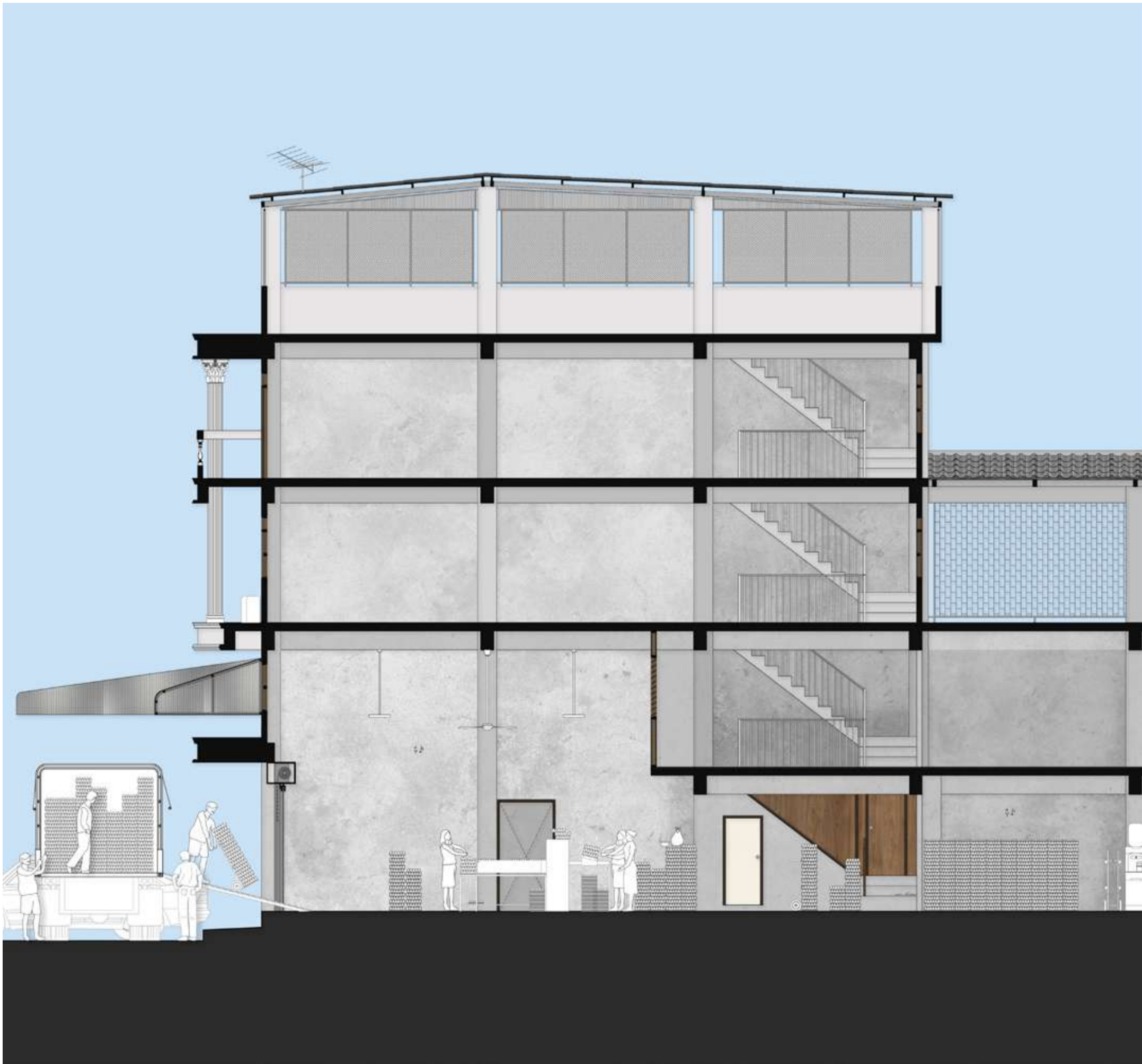


1.) Egg-cleaning factory line inside the shophouse



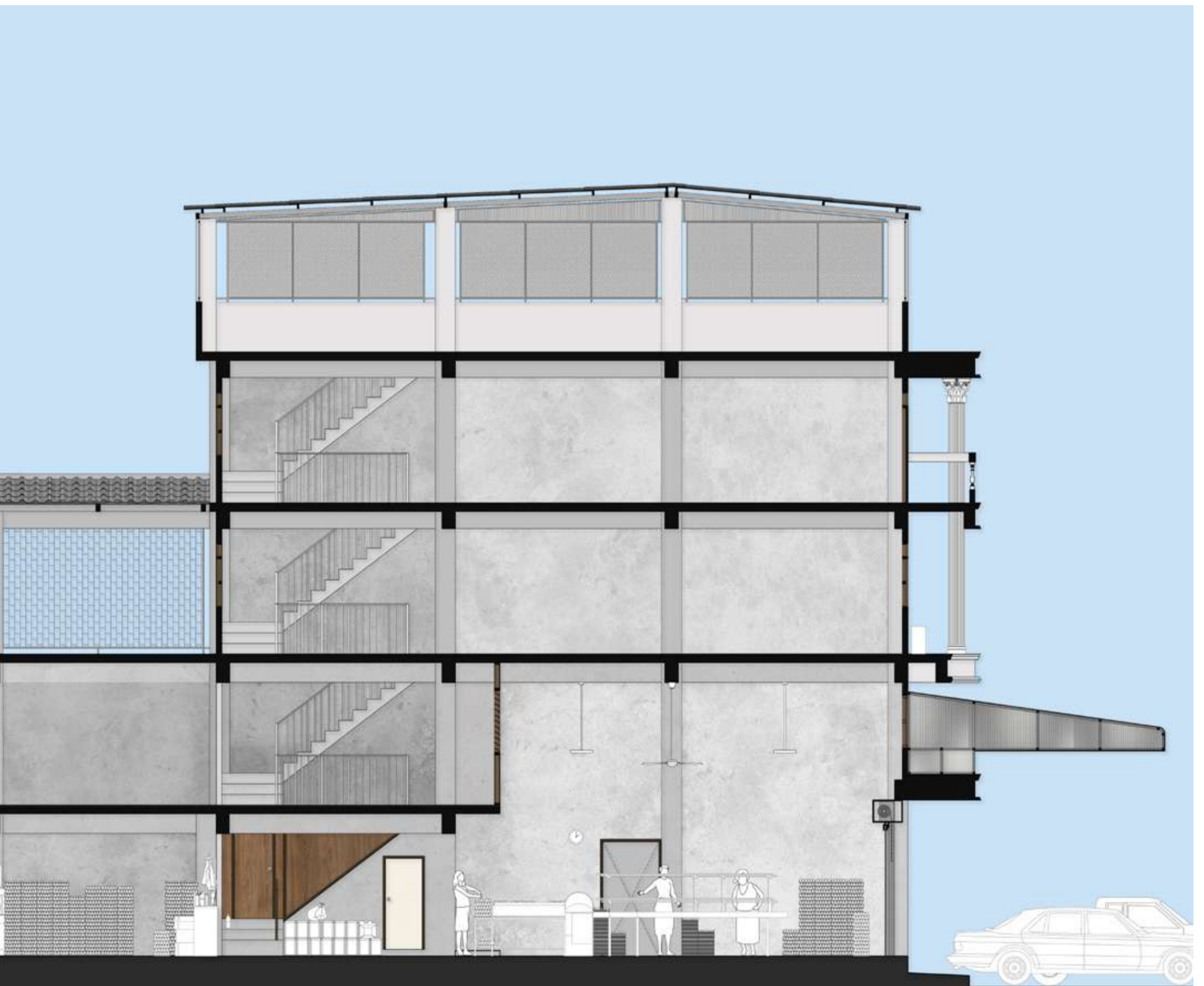


- 1.) Storage area for cleaned and crated eggs, awaiting pick-up
- 2.) Delivery of uncleaned eggs from farms at east façade .
- 3.) Egg-cleaning factory line inside the shophouse
- 4.) Pick-up of cleaned and crated eggs at north façade, to be delivered to markets in inner Bangkok.



On the ground floor, delivery trucks unload fresh eggs from outlying farms at the east façade (left in the section drawing). They are then immediately cleaned by hand and machine in the main shophouse interiors at either end of the factory. Once cleaned the eggs are then sorted and packed into plastic egg crates in the middle zone of the factory, awaiting pickup (This packing zone is located in a new construction addition that occupies the old 'backyard' area shared between the two rows of shophouses).

The mezzanine area of the shophouse has been converted into storage area for the factory, while the 2nd, 3rd, and 4th floors are used as private residential living spaces for the egg factory owners' families.



Section



“RAHN KAO GAENG SHOPHOUSE”

“Rahn kao gaeng” is a staple for the traditional Thai street food vendor. It means a small restaurant that sells a variety of savory dishes that is served in combination with rice. You simply point and choose 1,2, or 3 “gahp”(savory side dish), “gahng”(curry), or even “tom jeud”(non-spicy soup) to be served with the complimentary rice. If the customer does not want one of the premade dishes, or gahp, he/she can also order standard noodle and rice dishes to be made on the spot.

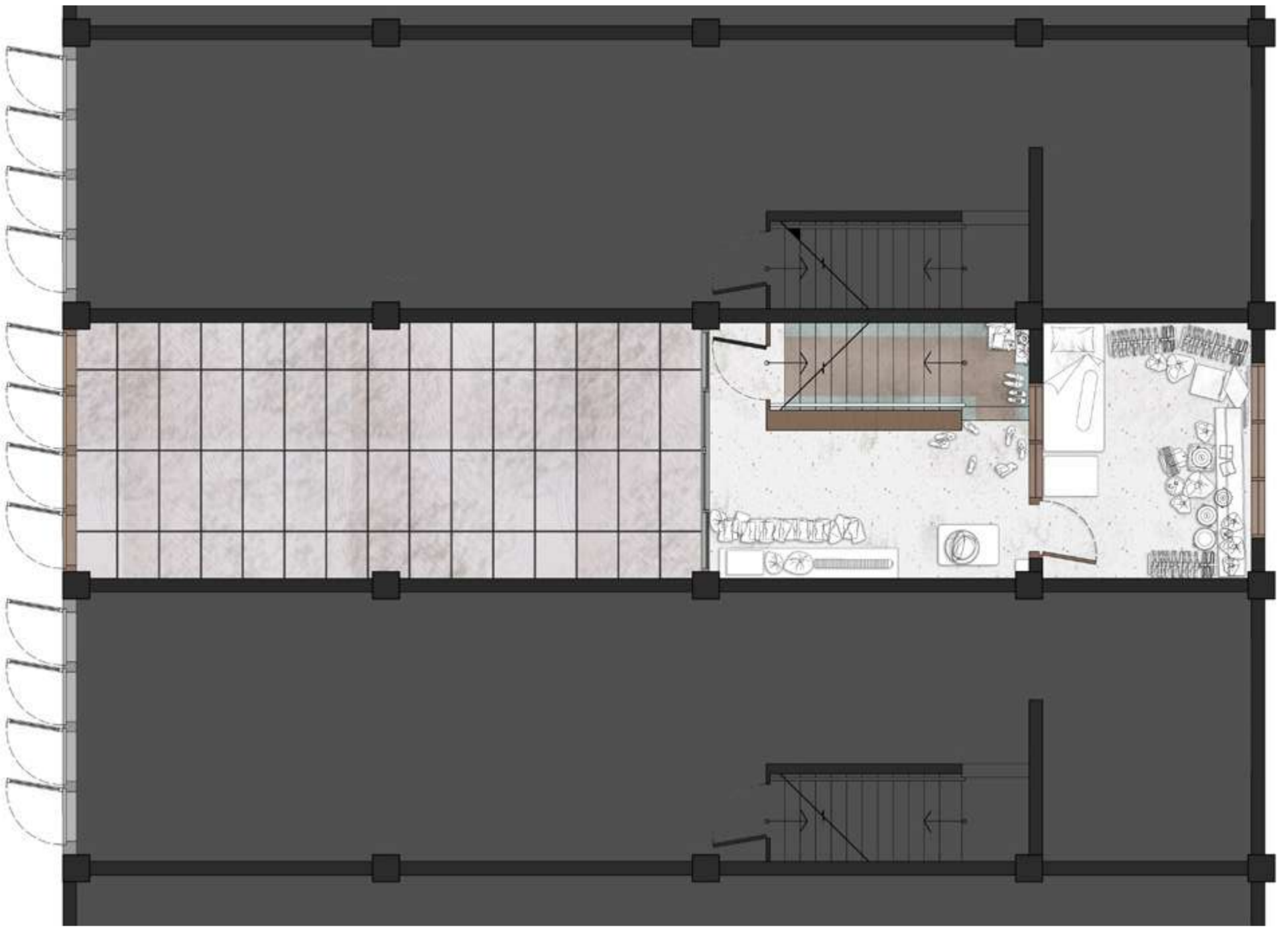
This shophouse ground level has been rented out to a ‘rahn kao gaeng’ vendor, with serving, cooking, eating, and cleaning areas on the ground level, and storage and day-time resting areas on the mezzanine. The owner has not occupied the 2nd and 3rd levels as she believes it is excess space she does not need nor want to spend extra funds on to refurbish. The rahn kao gaeng is one of the neighborhood essential small businesses that has been a vital part of Bangkok street life for the past century. Its tasty and inexpensive dishes feed people from all walks of life, but are especially important sources of food for office workers and everyday wage earners, who may not have time (or maids) to cook and need to be frugal on eating expenses.



Groud Floor Plan



1.) View of front façade of the rahn kao gaeng, with food displays/prepping station spilling out onto sidewalk. What is usually hidden, or 'back-of-house', in Western restaurants are promoted in Bangkok street food. Here the rahn kao gaeng places cooking station and food display counters right on the sidewalk, allowing the aroma from her work to lure in hungry pedestrians. The beautifully arranged food display a real-life menu from which customers can easily choose.



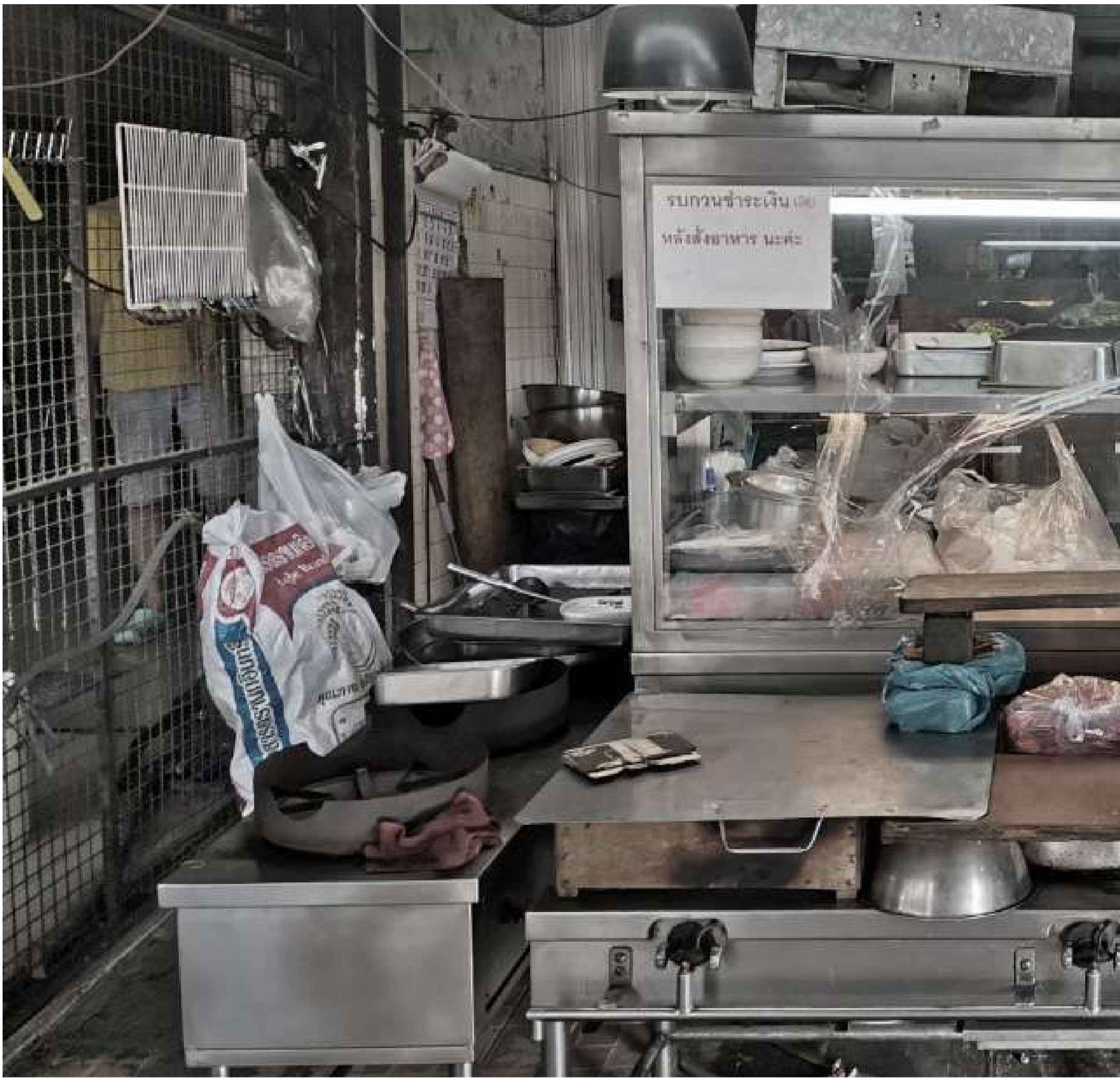
Mezzanine Floor Plan



2nd Floor Plan



- 1.) Kitchen equipment and food storage in the rear, mezzanine floor.
- 2.) Storage shelves at stair hall, mezzanine floor
- 3.) View of stair hall, looking back to rear storage room, mezzanine floor.





- 1.) *The food display/prepping station is rolled out onto the sidewalk to beckon in passing pedestrian. In exposing the cooking area to public view, it guarantees that the customers can see the hygienic (or non-hygienic) conditions in which the food is cooked. Cooking on the sidewalk is also a Bangkok street food technique that shows off the live visuals and aroma that draw in customers.*
- 2.) *Front storage zone of shophouse immediately adjacent to sidewalk, where vendor rolls in the cooking counter that 'invades' the sidewalk during operating hours. This 2-meter deep 'back-of-house' storage is interestingly located at front-of-shop.*
- 3.) *Eating area for customers, ground floor*
- 4.) *Washing area in rear, ground floor*

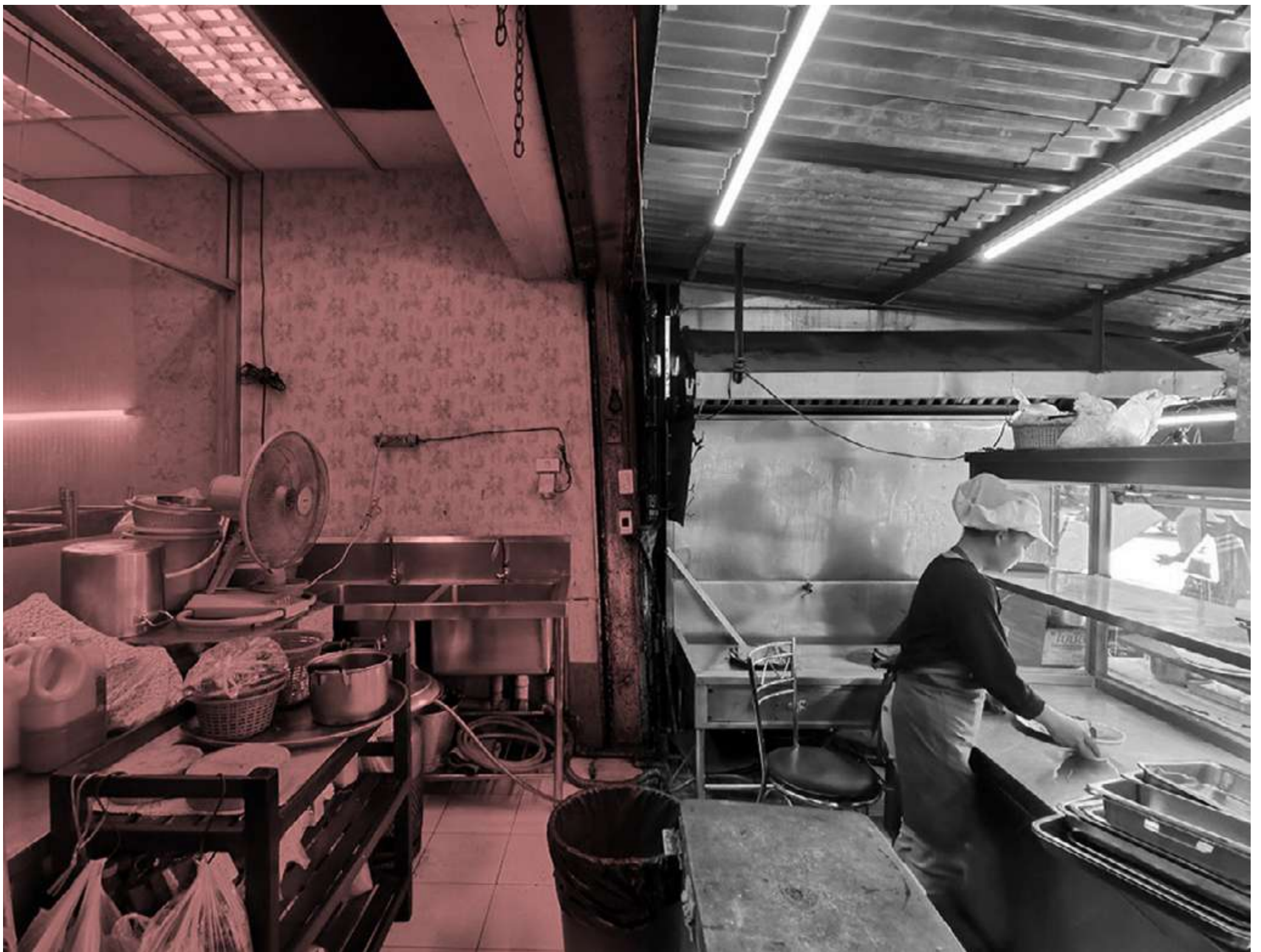




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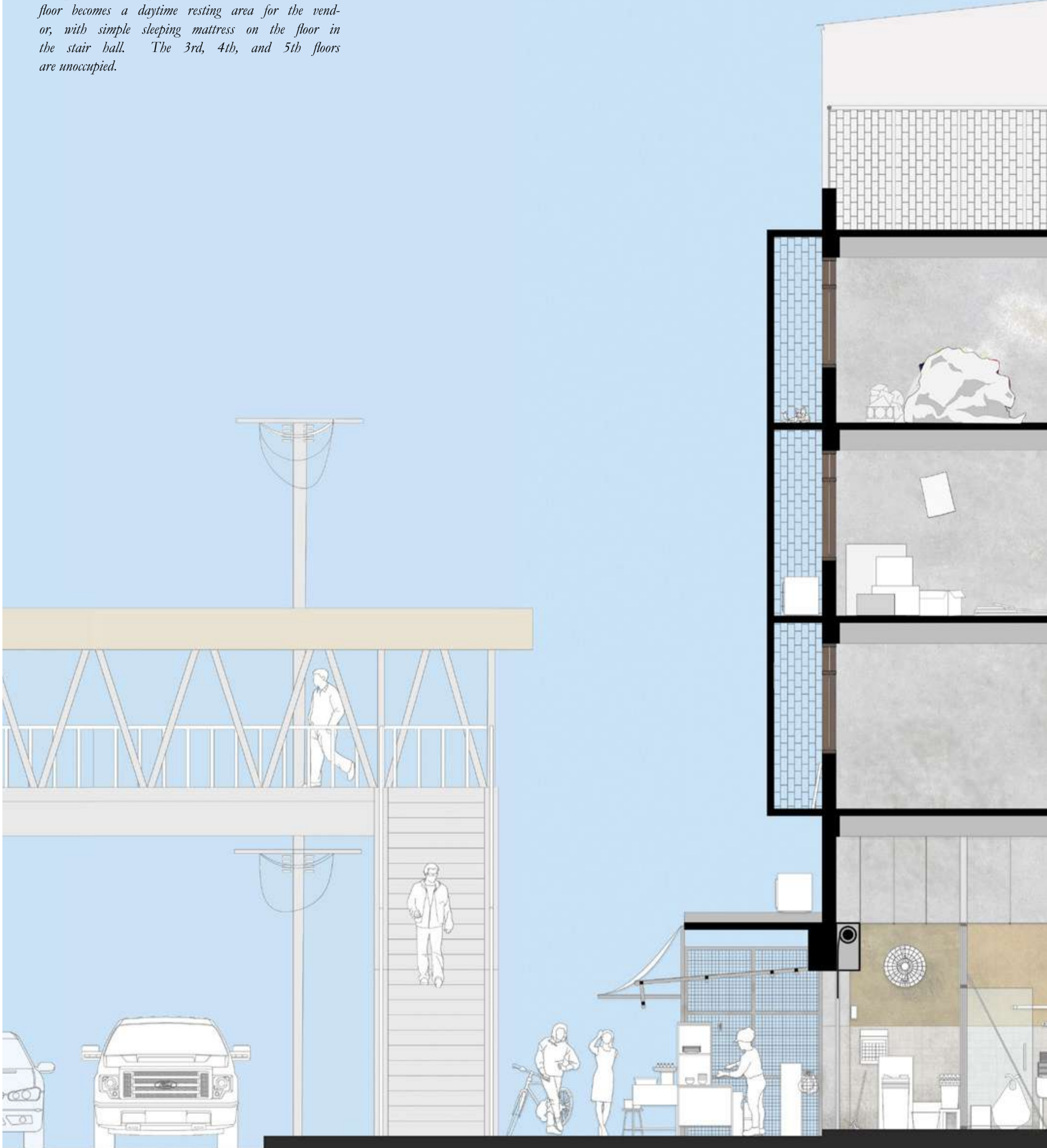
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"PACKING UP" THE SIDEWALK

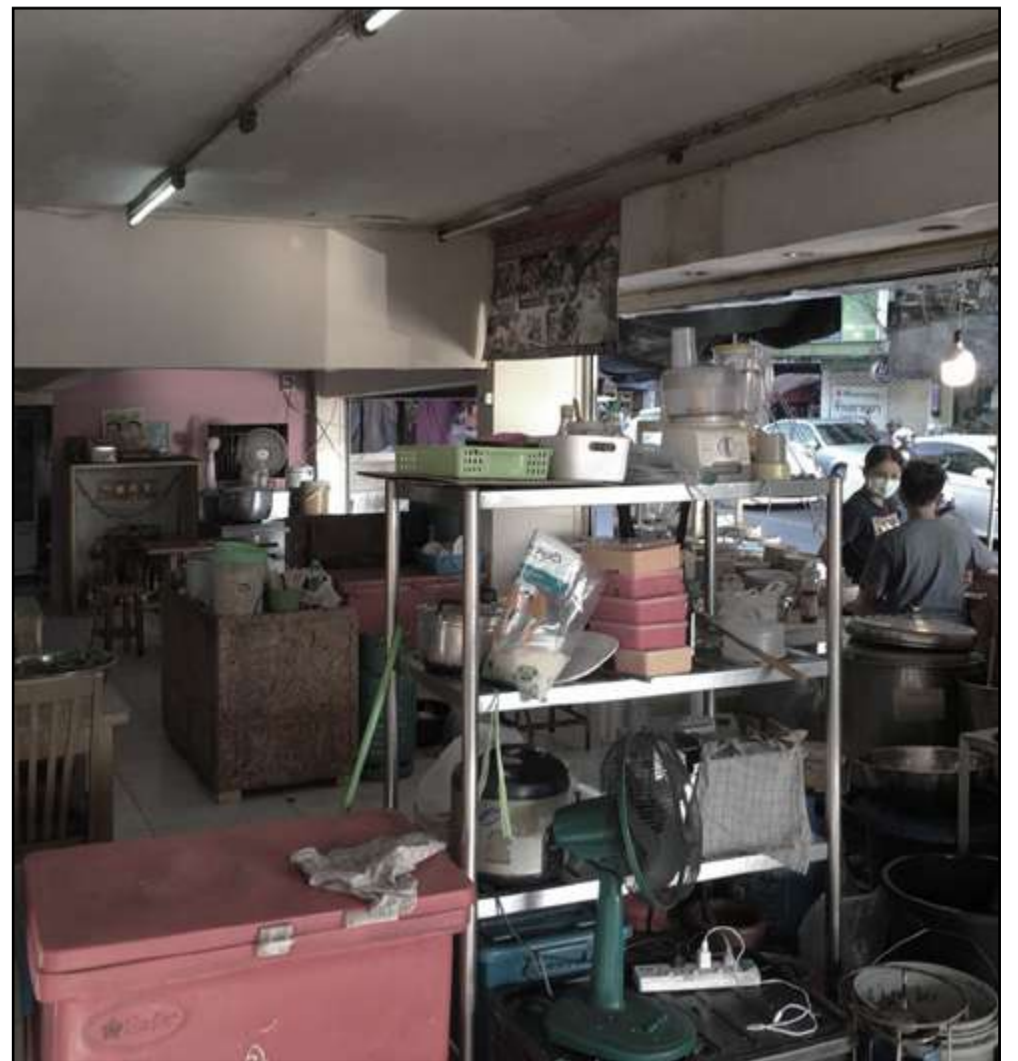
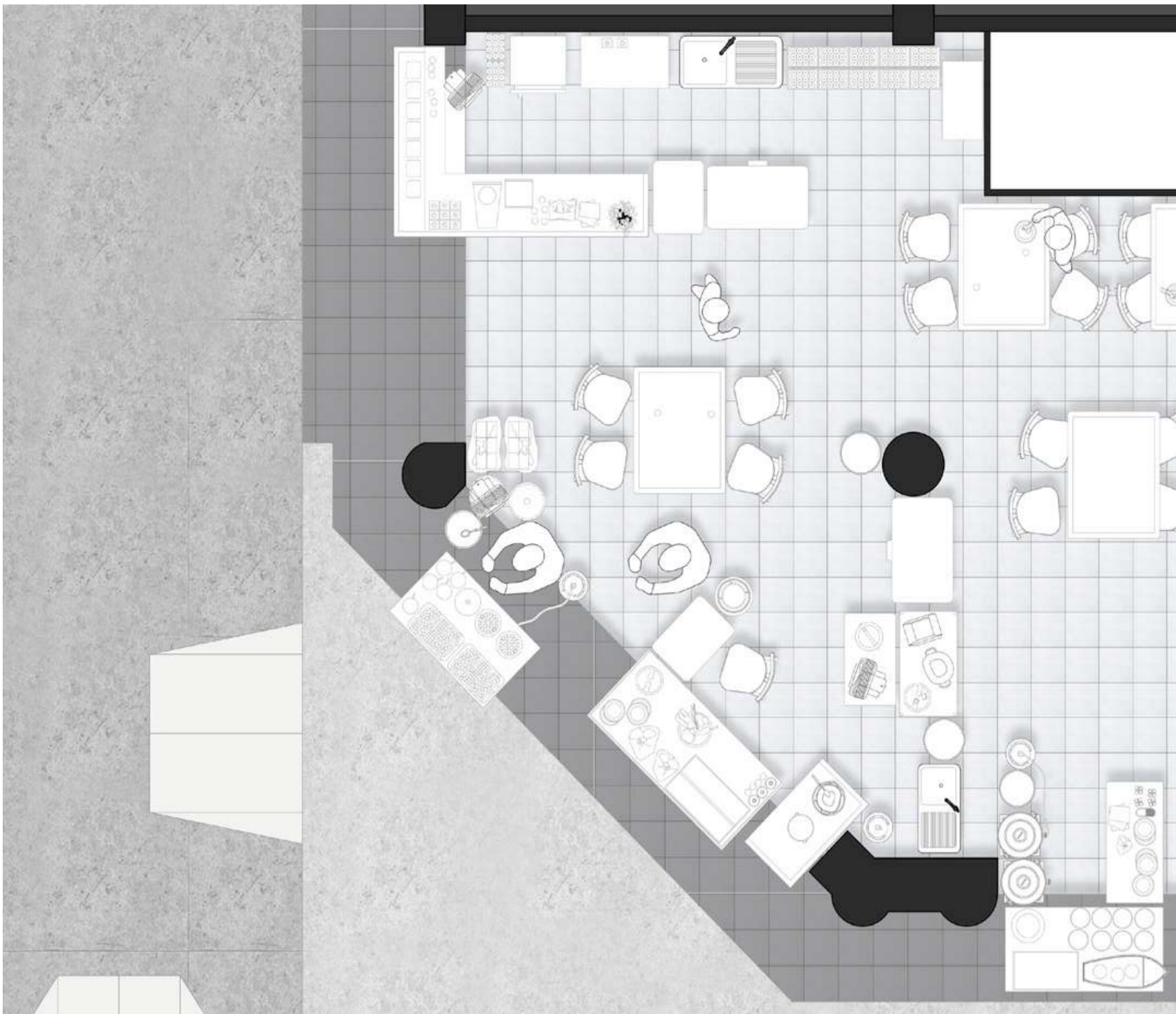
The rahn kao gaeng food preparation/food display counter occupies that hazy zone of public & private in Bangkok urbanism. Vendors often take liberties in letting their interior activities 'spill out' onto the sidewalk just outside the shophouse. As the sidewalk-intruding furniture/counter is underneath the allowable shophouse rain canopy, the space can be seen as occupying a hazy private/public zone. (shown in gray in drawings to the left and photograph above). The frying wok and washing areas are located just behind the food display, and situated legally inside the shophouse interior (shown in red in drawings to the left and photograph above). This extra food prep area becomes a storage zone where equipment and utensils used on the counter 'invading' the sidewalk can be securely stored and locked up after operating hours. This useful 2-meter 'back-of-house' storage zone is interestingly located at front-of-shop.

On ground floor, (from left to right) this section cuts through street, sidewalk with spill-out kitchen counter and cooking station, eating area, and storage and washing area in the rear. The second floor becomes a daytime resting area for the vendor, with simple sleeping mattress on the floor in the stair hall. The 3rd, 4th, and 5th floors are unoccupied.





Section





1st Floor Plan

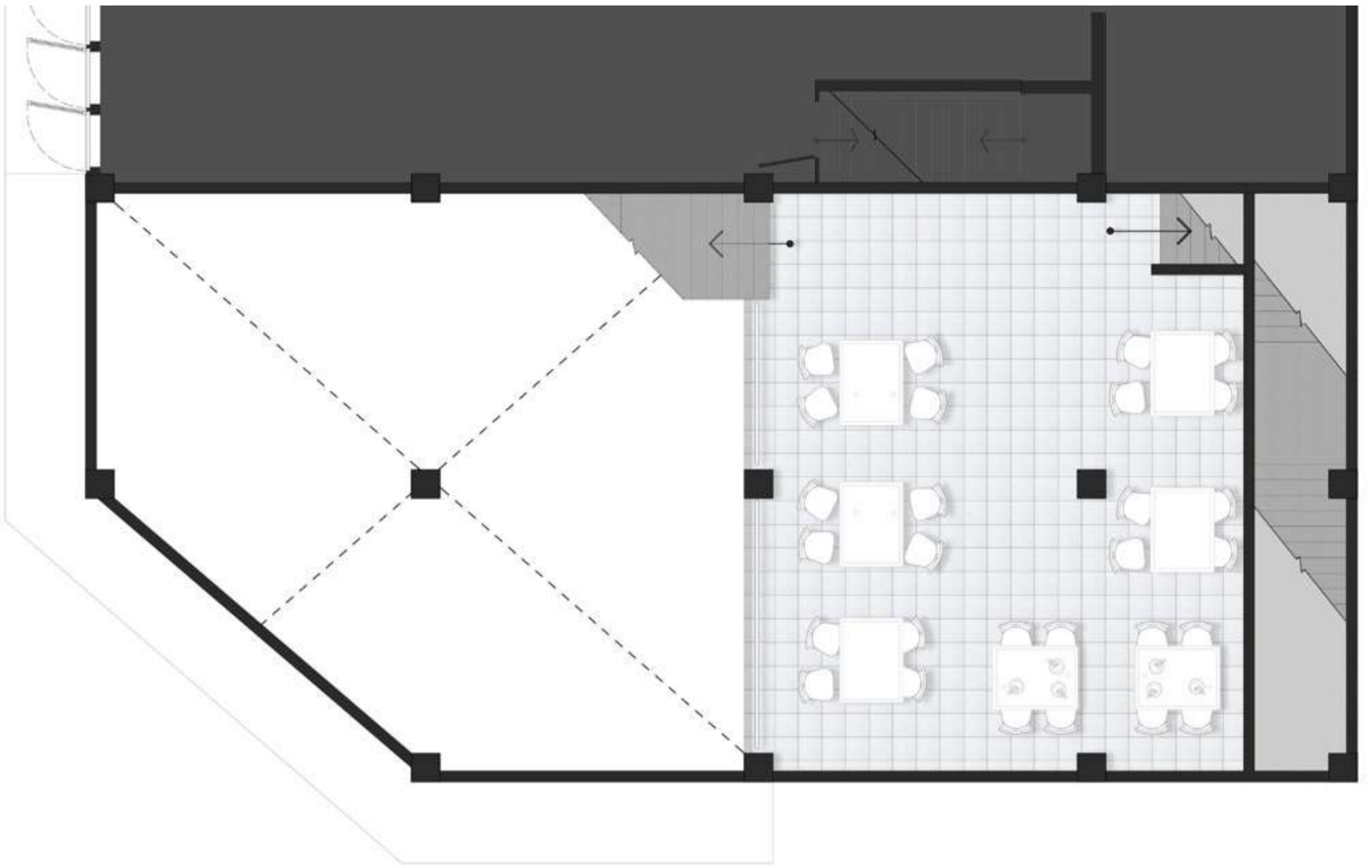
“FOOD COURT SHOPHOUSE”

This unique twist on the rahn kao gaeng combines many food vendors into one shared ‘food court’ area on the ground floor of two shophouse ‘kooah’, or bays. Here customers can come in and choose from a variety of Bangkok street food selections as there is a drink vendor, 2 noodle vendors, a deserts vendor, and a ‘kao kah moo’ (pork knuckle and rice) vendor. Again, the cooking areas of each vendor is pushed to the sidewalk edge to attract pedestrians with the sight and smell of their dishes. An additional ‘quick’ stair has been added to take customers straight up to extra seating on the mezzanine level.

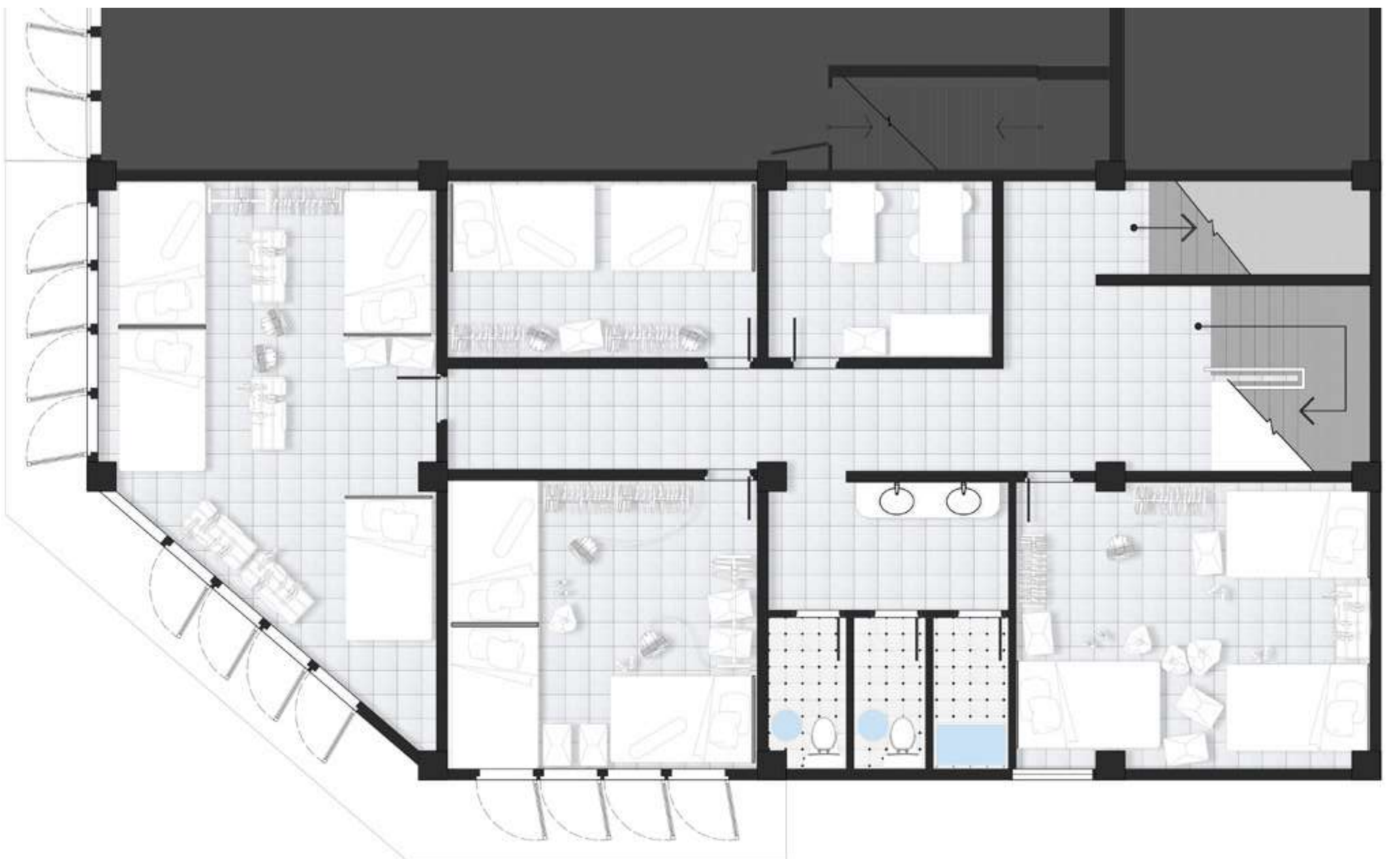
A second extra stair has also been added, allowing the building owner to rent out inexpensive compact dormitory units to construction workers on floors 2-5. This stair is accessed directly from the sidewalk on Sukumvit 101/1, allowing the living tenants to completely bypass the food court areas on the ground floor.

- 1.) View of customer eating area, looking out onto street.
- 2.) Vendor areas straddling the sidewalks.
- 3.) Overall view of food court shophouse from the street

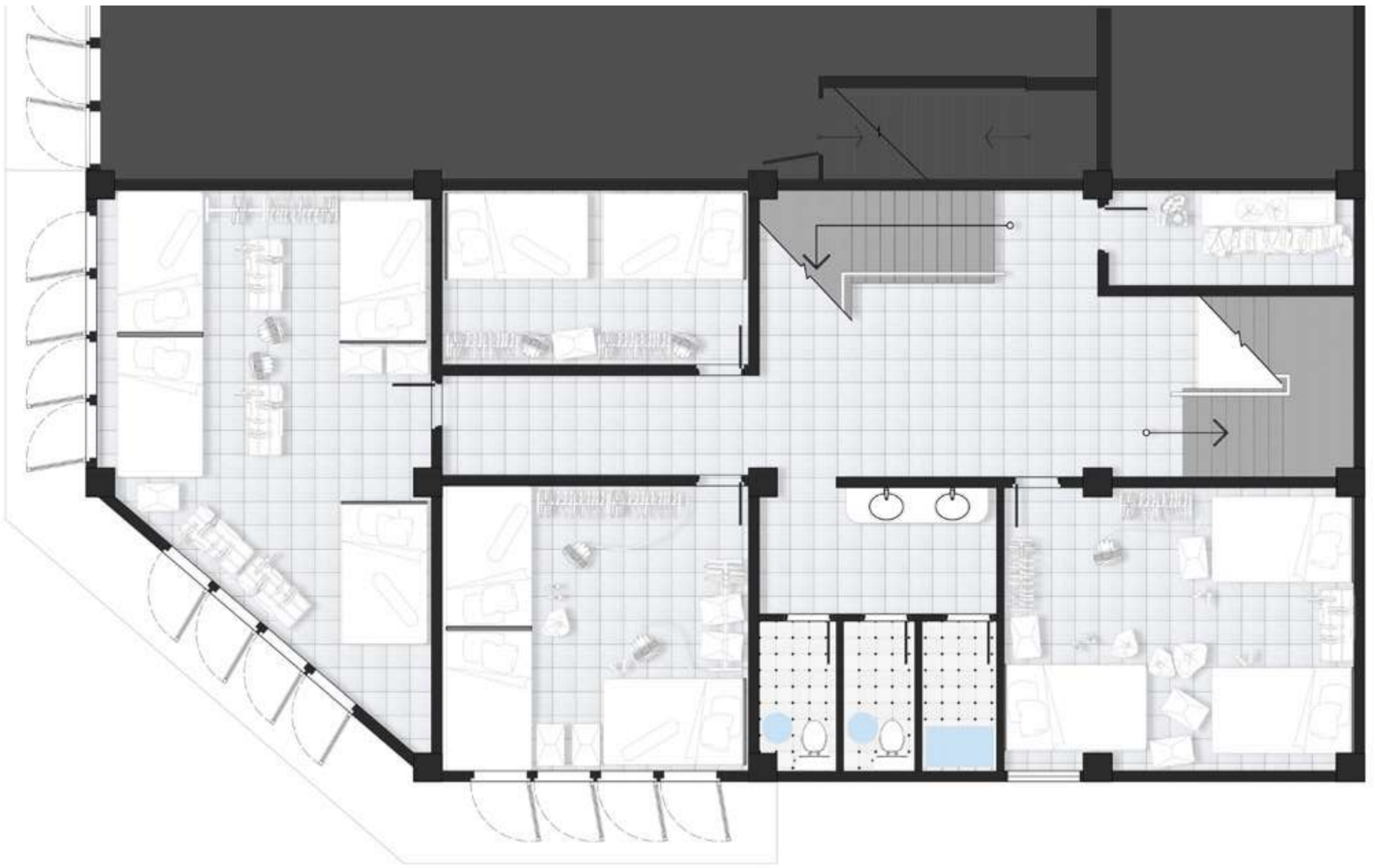




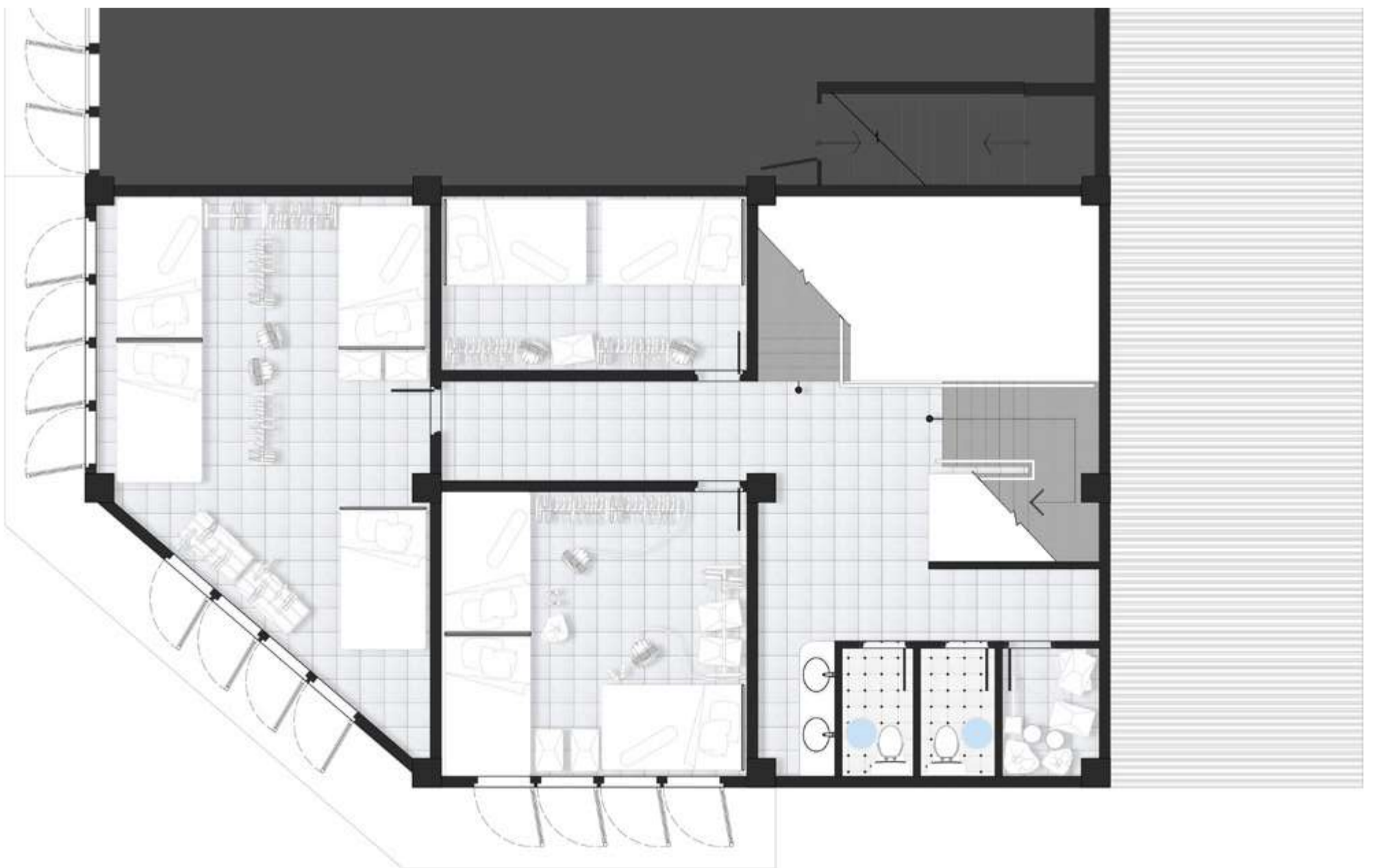
Mezzanine Floor Plan



2nd Floor Plan



3rd Floor Plan

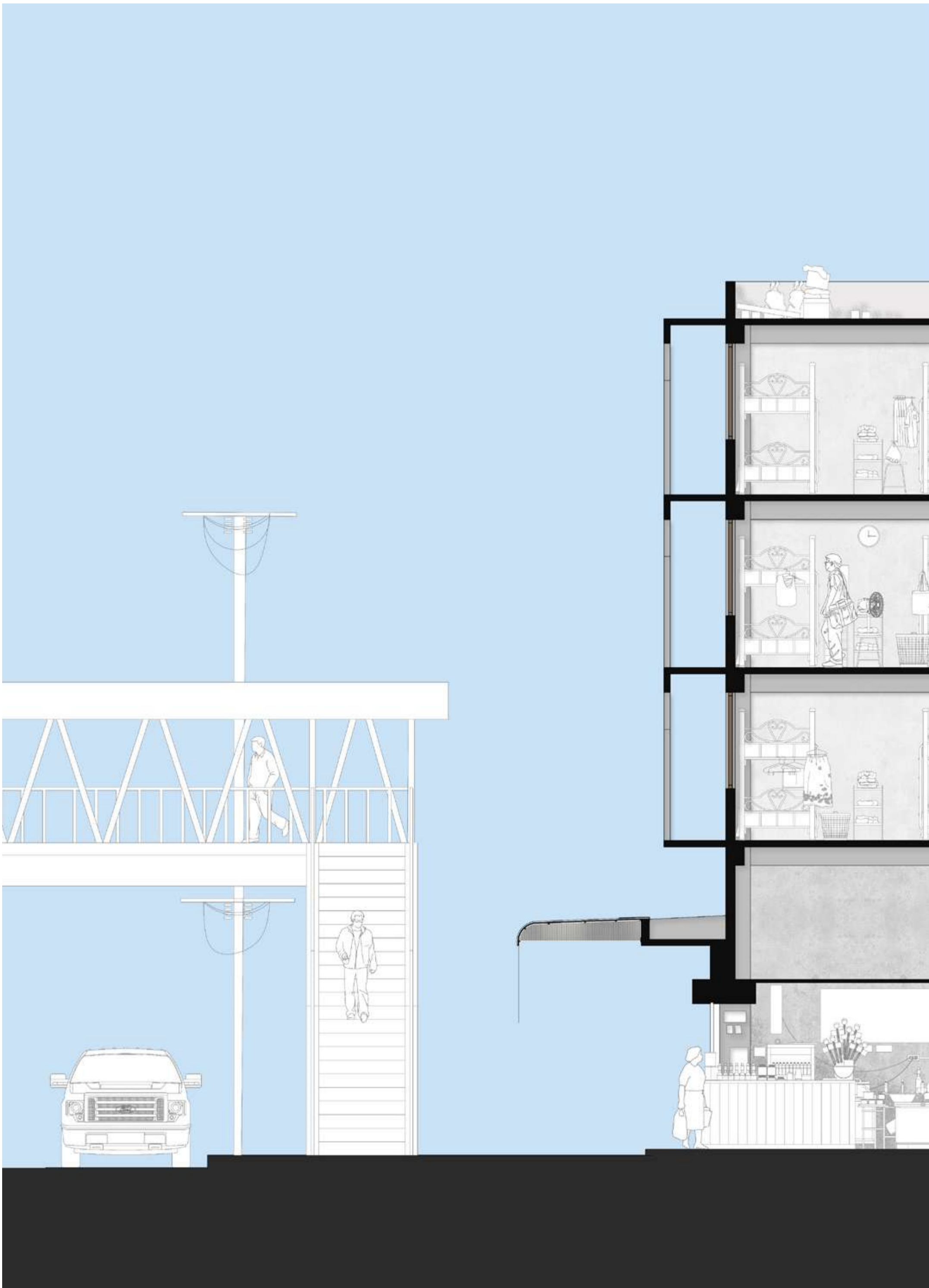


4th Floor Plan

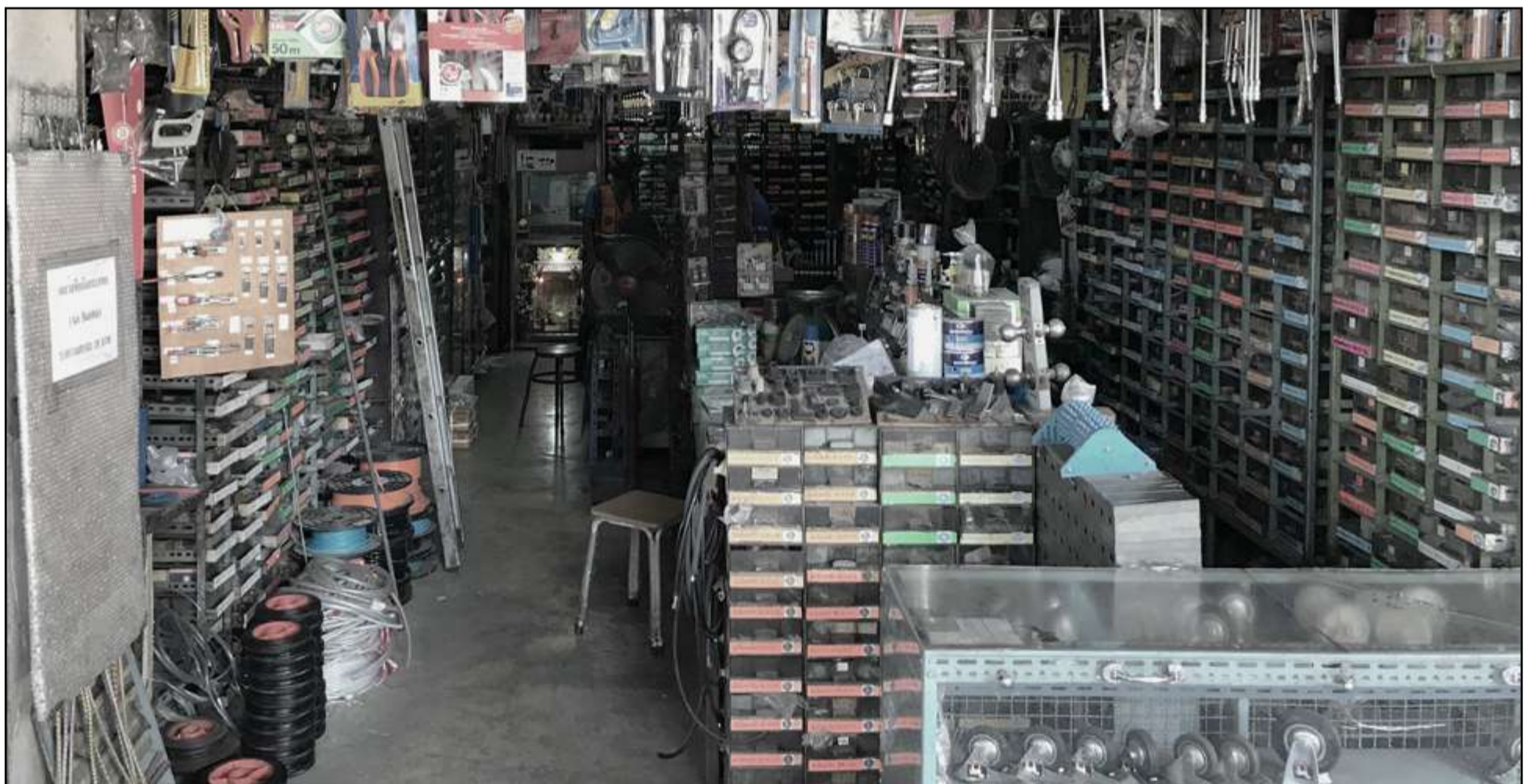
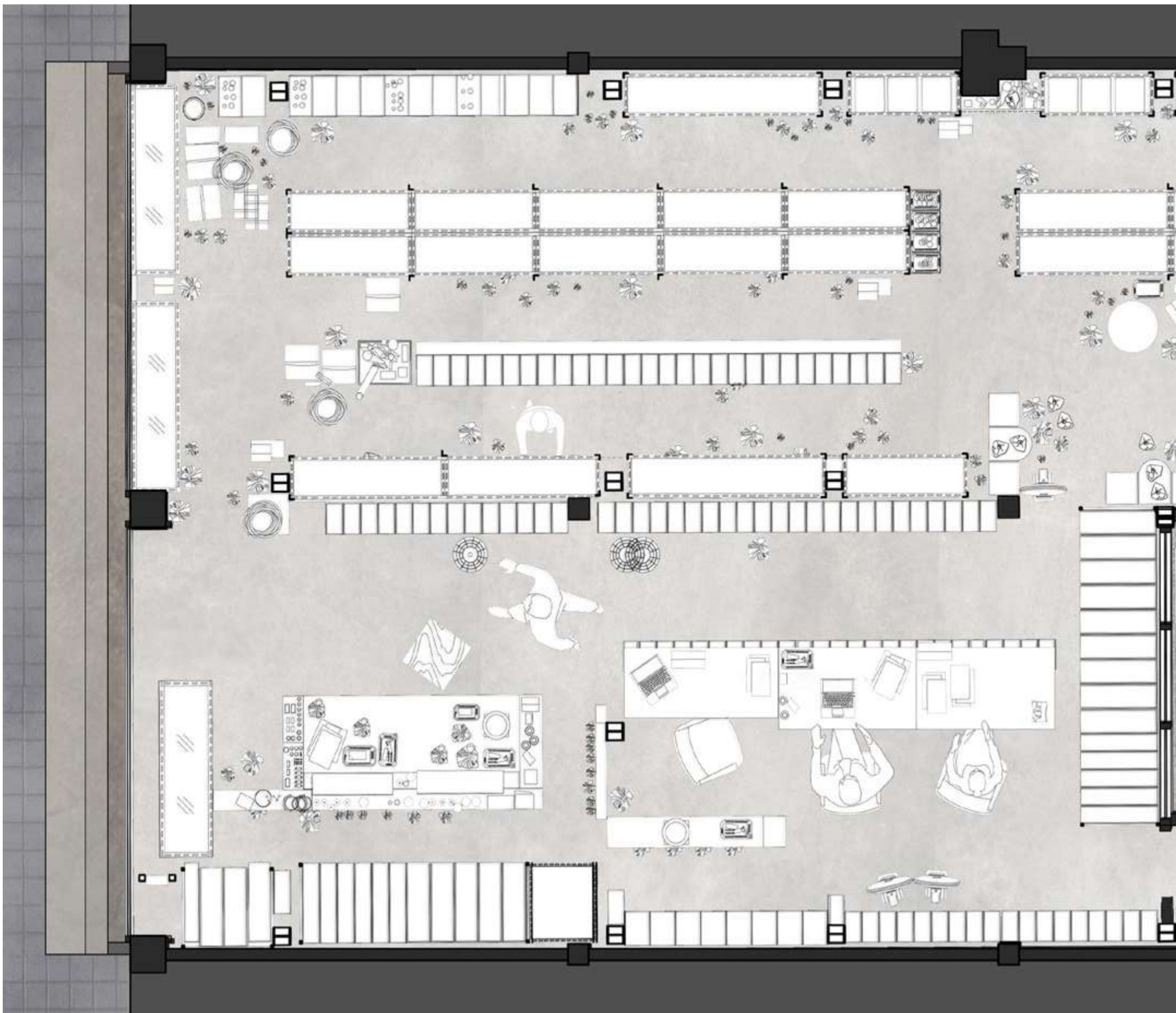




Section 1





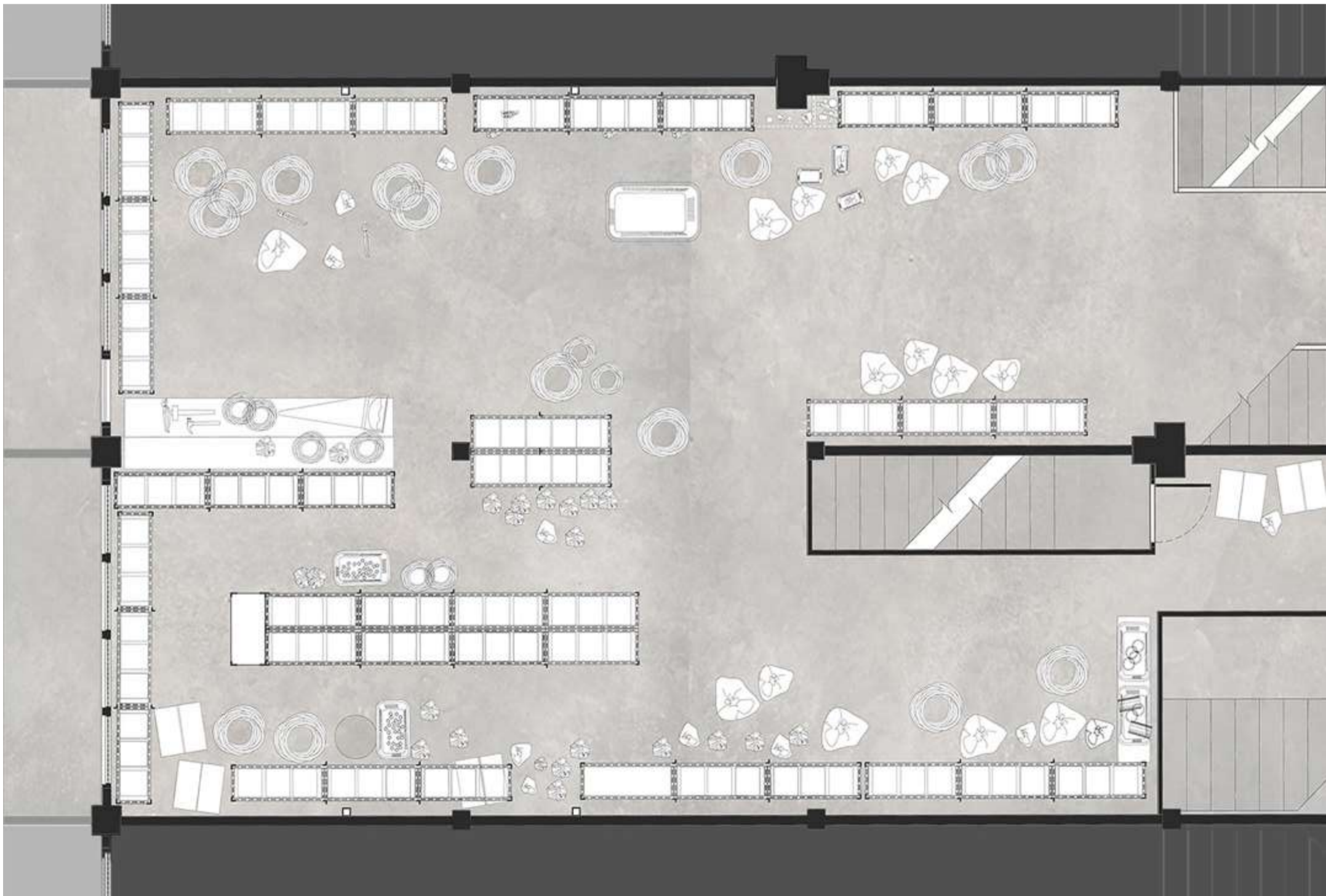
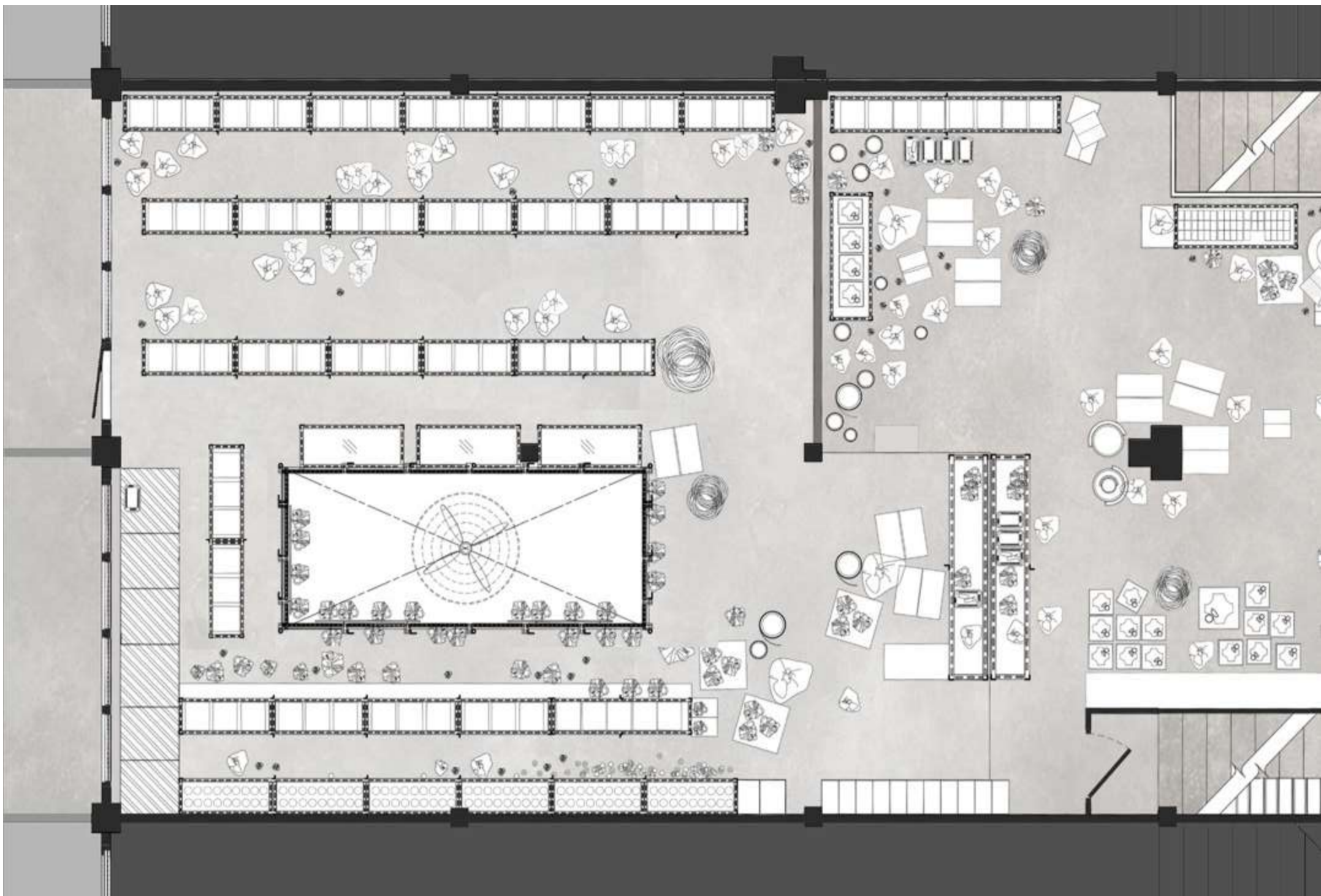


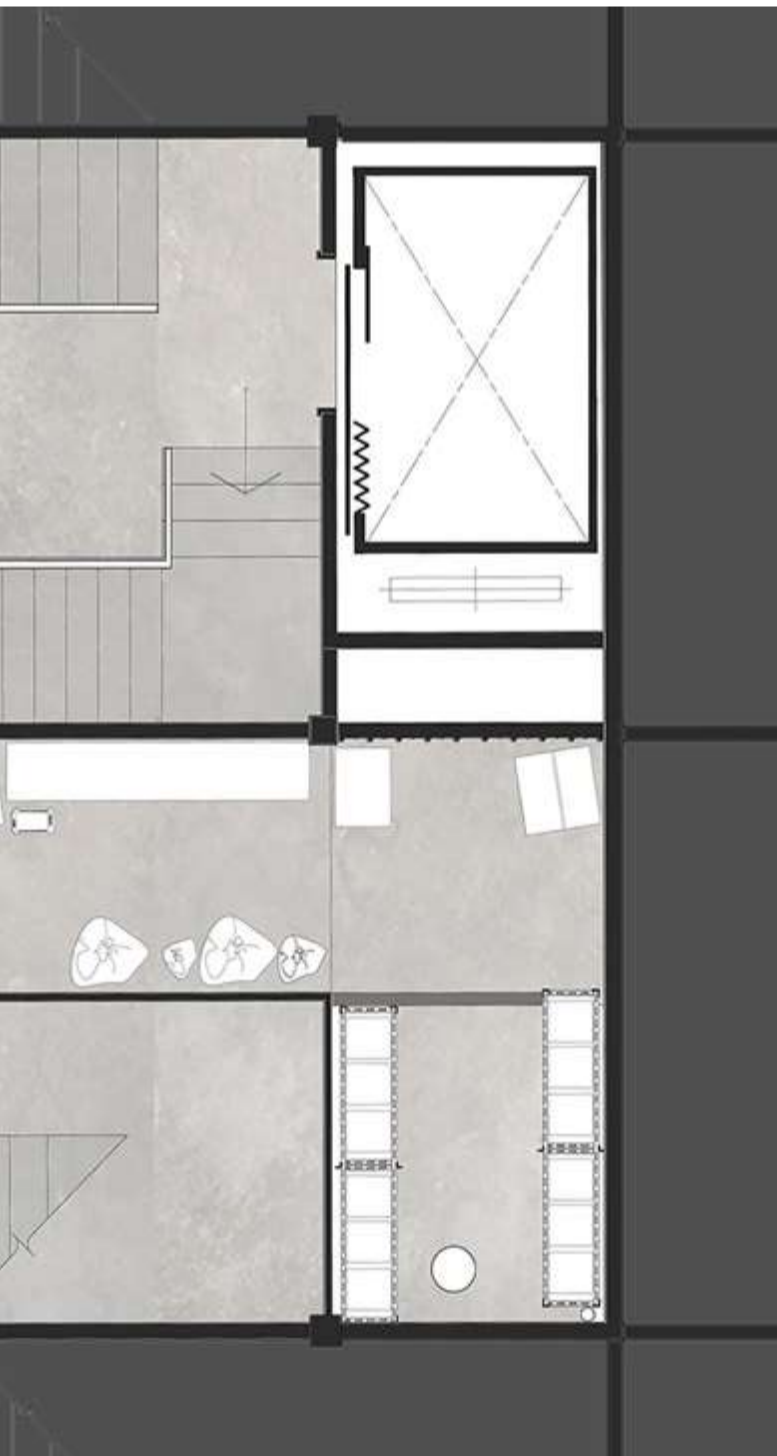


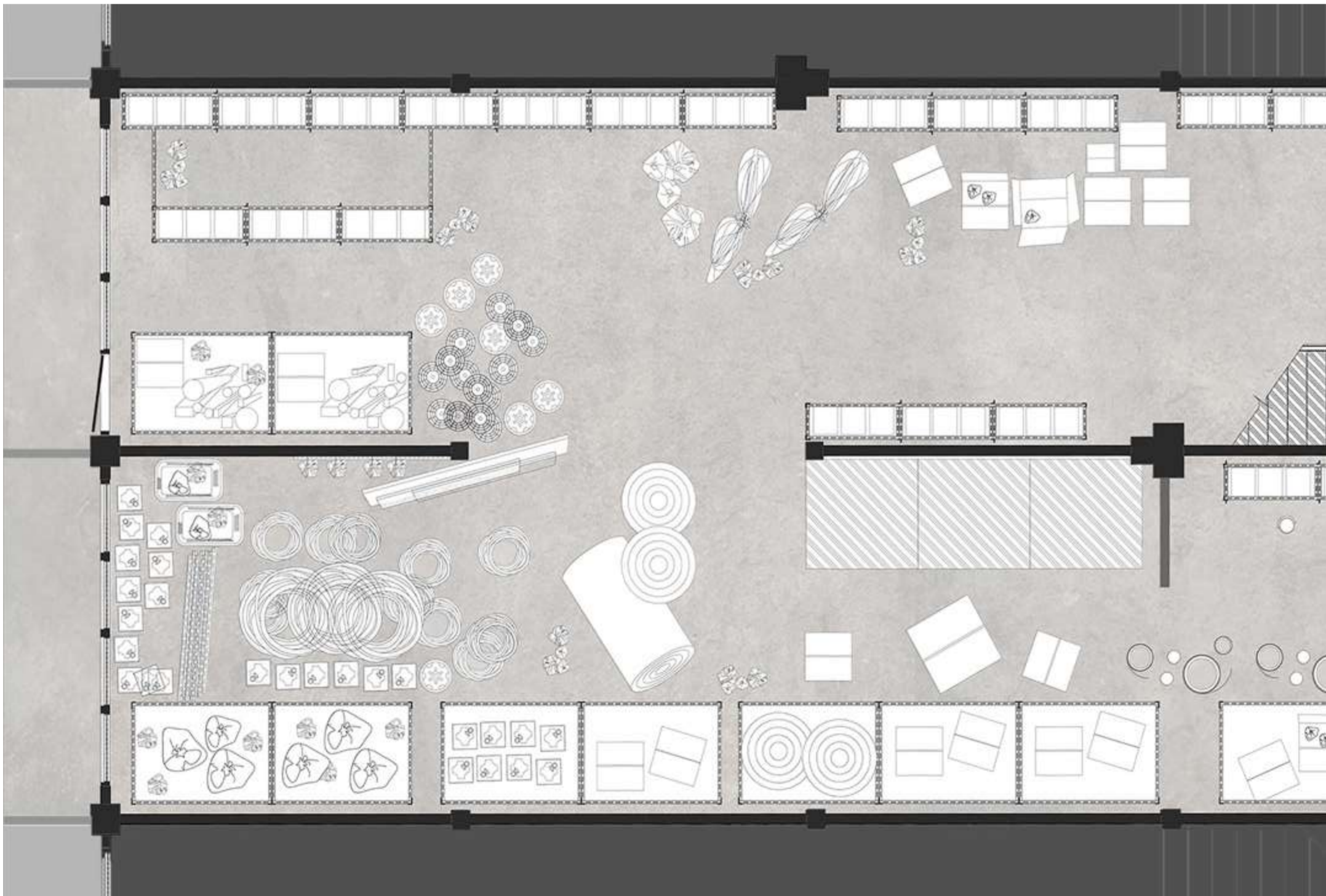
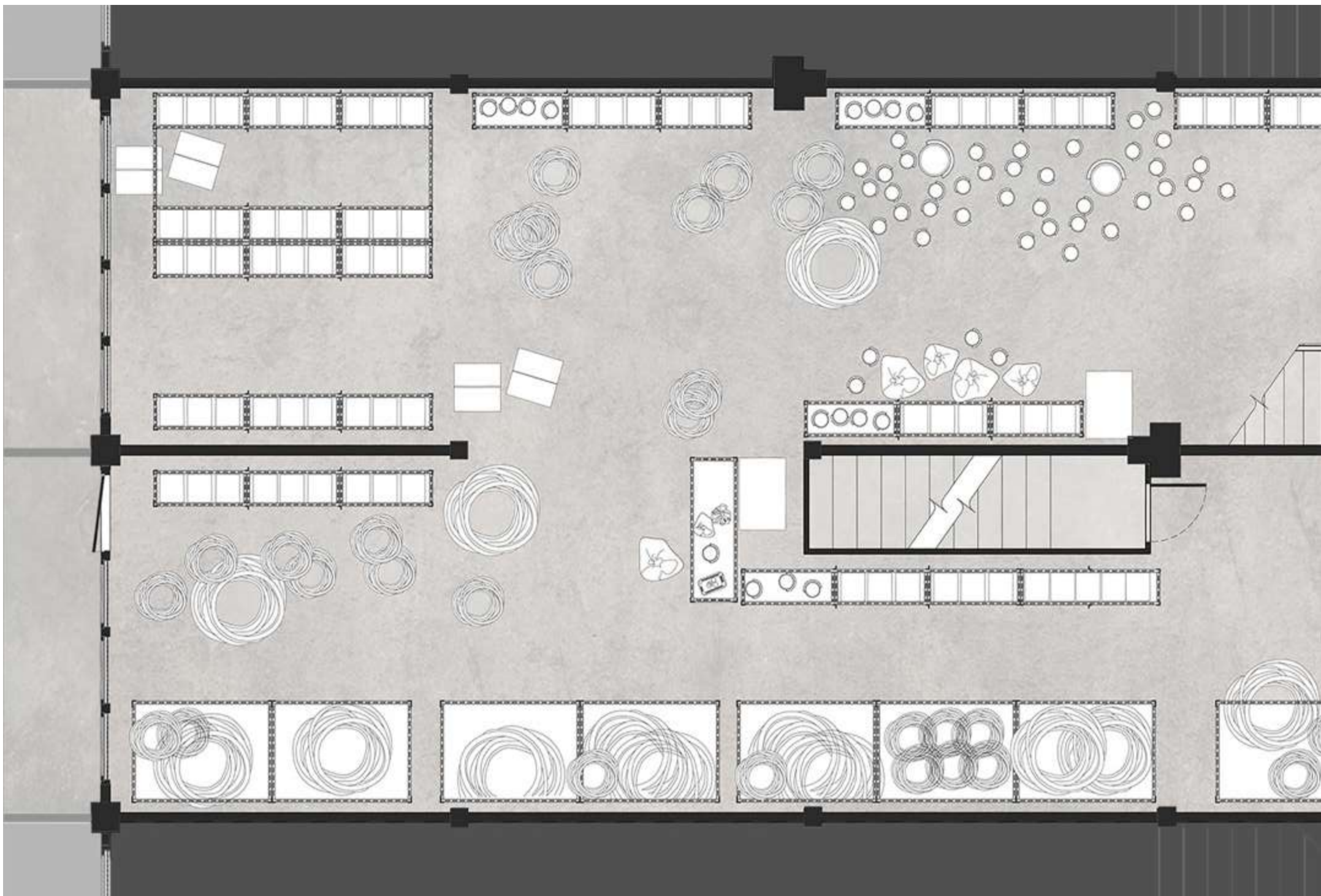
“HARDWARE SHOP/HOUSE”

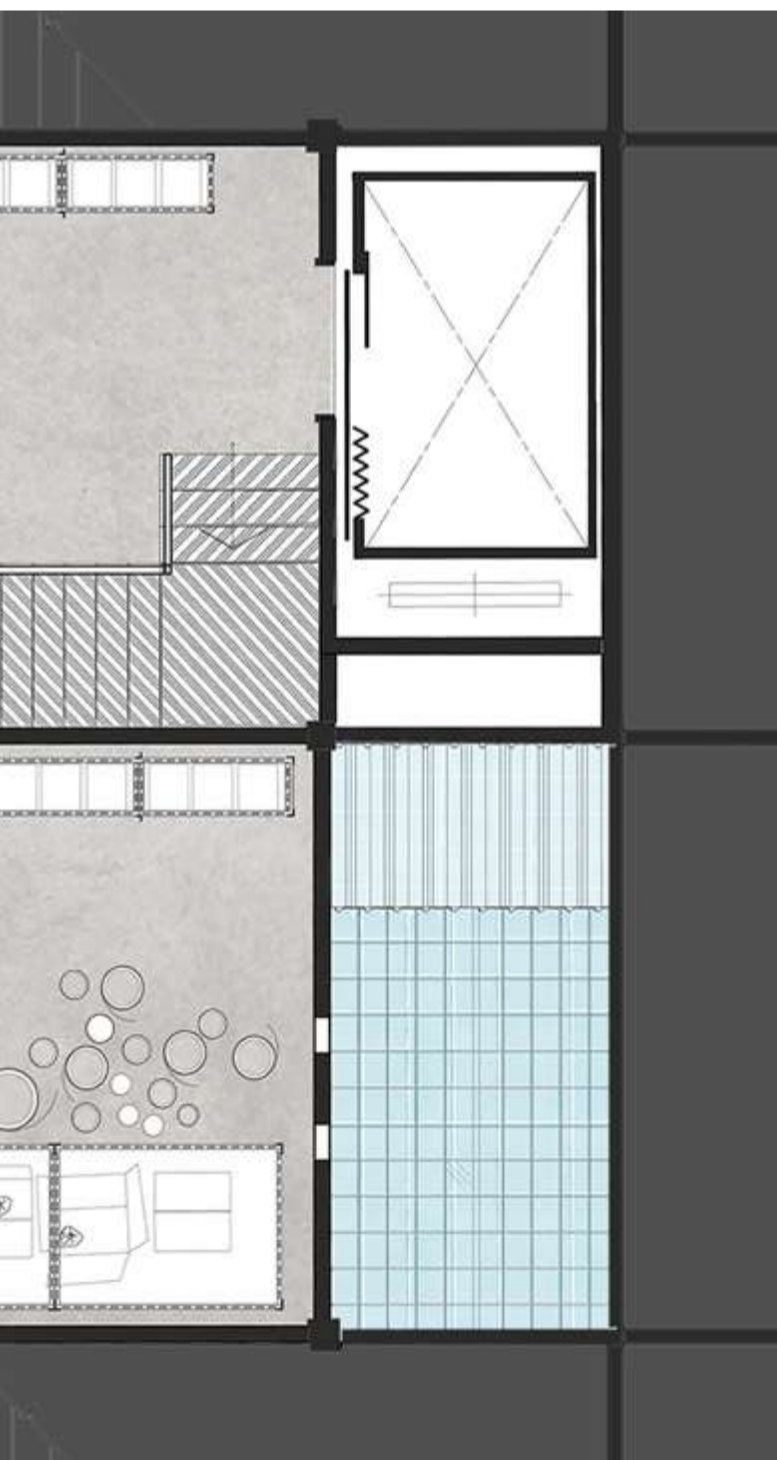
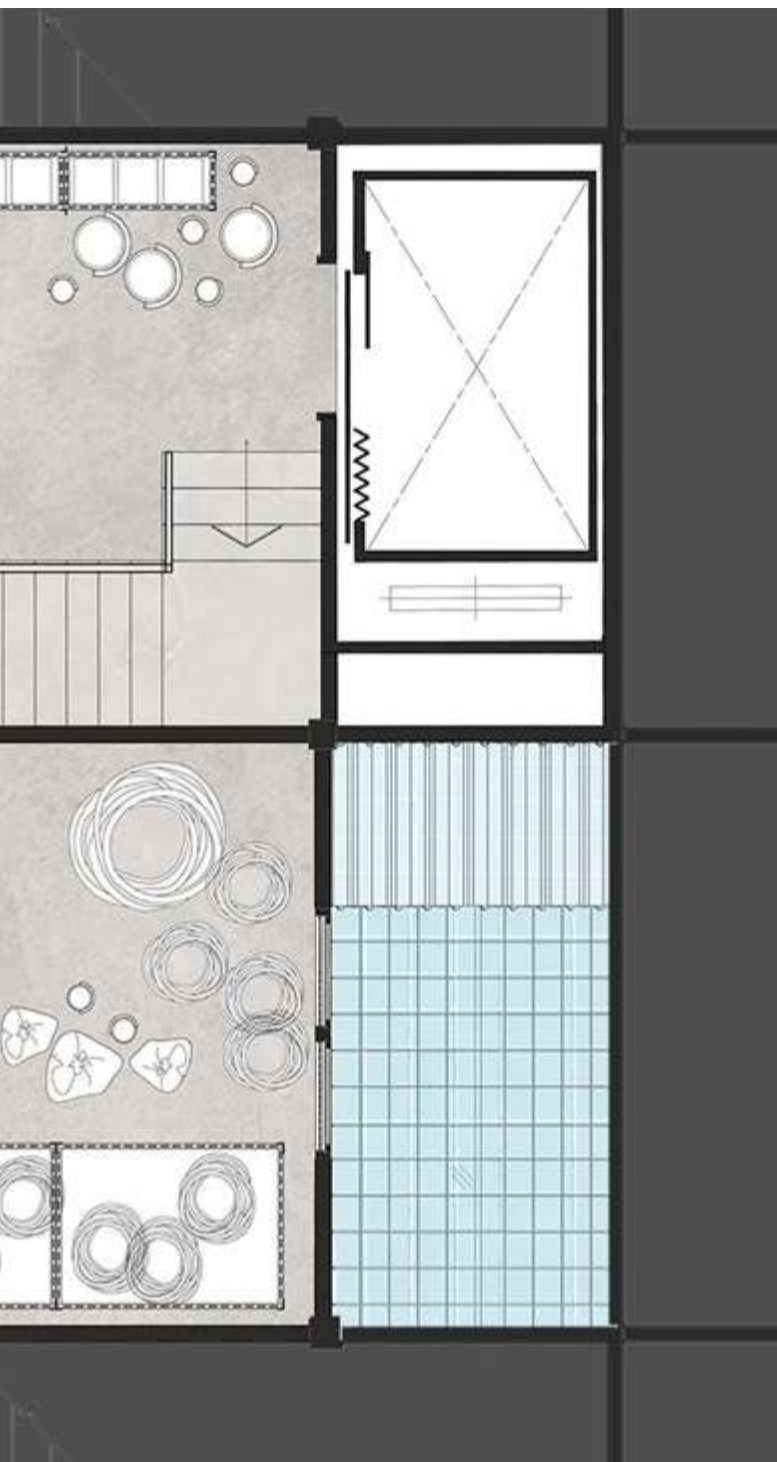
This shophouse has been transformed, from bottom to top, into a hardware supplies shop and distribution/storage facility by the mother and son owner. As construction throughout Bangkok runs rampant in the area, necessary construction components, from hand tools, to replacement saw blades, to drill bits, to nuts & bolts in constant and high demand. As there is no room for large construction hardware superstores, these invaluable construction supplies are sold in hardware retail shophouses like this one. The defining trademark of this particular store is the ingenious home-made storage system invented by the owner. Floor-to-ceiling shelving units constructed out of off-the-shelf standard steel angles organize the 2-kooah building into a library of hardware components. Customers can easily navigate through each corridor of tools and building components, logically sorted according to size, function, and type. The smaller elements, like screws, nuts, and bolts are located on the ground floor. Medium size handtools are located on the middle floors while larger supplies like industrial hoses are stored on the top floor. The owners have also added in an elevator in the back to assist in moving larger hardware equipment to the upper levels.

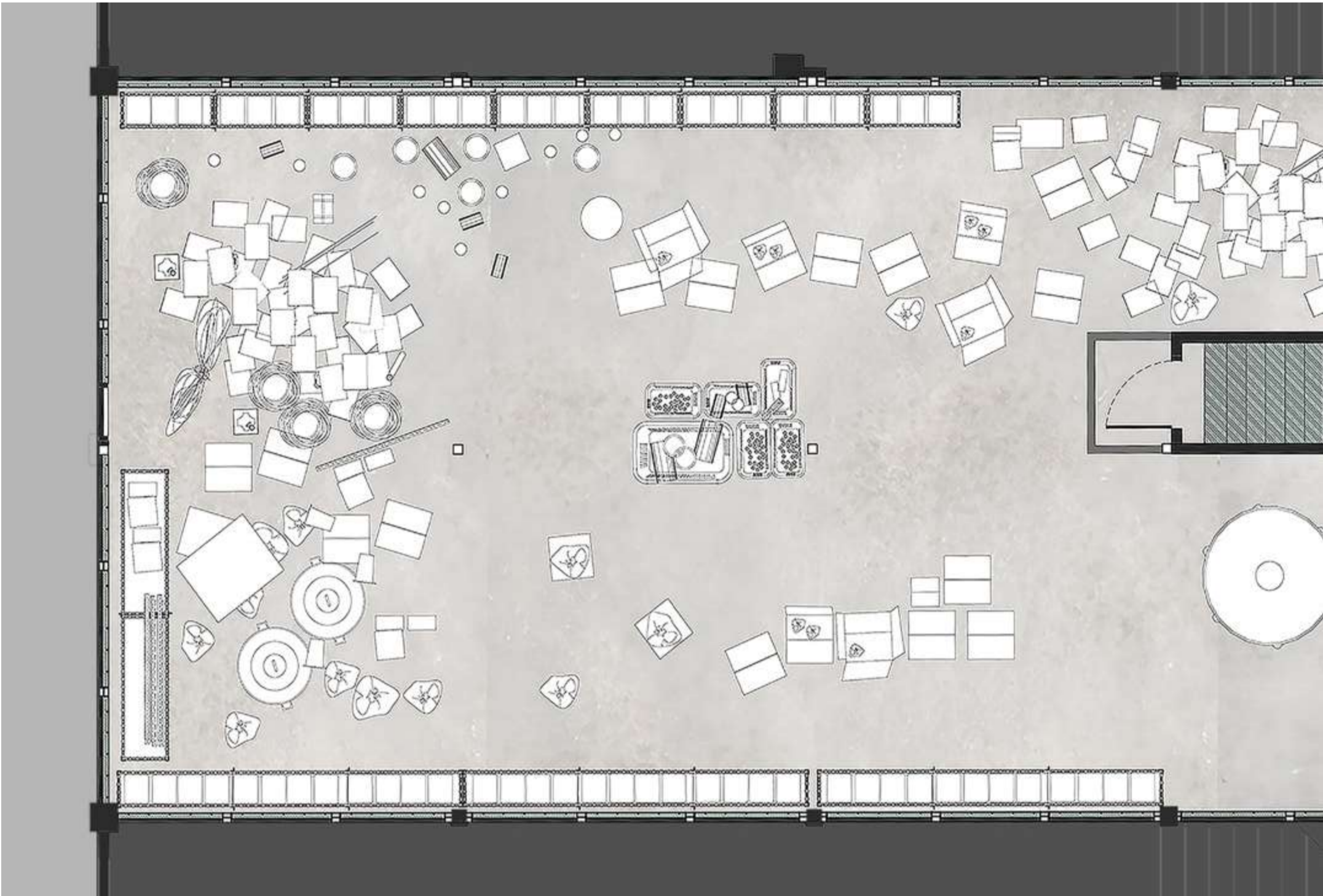


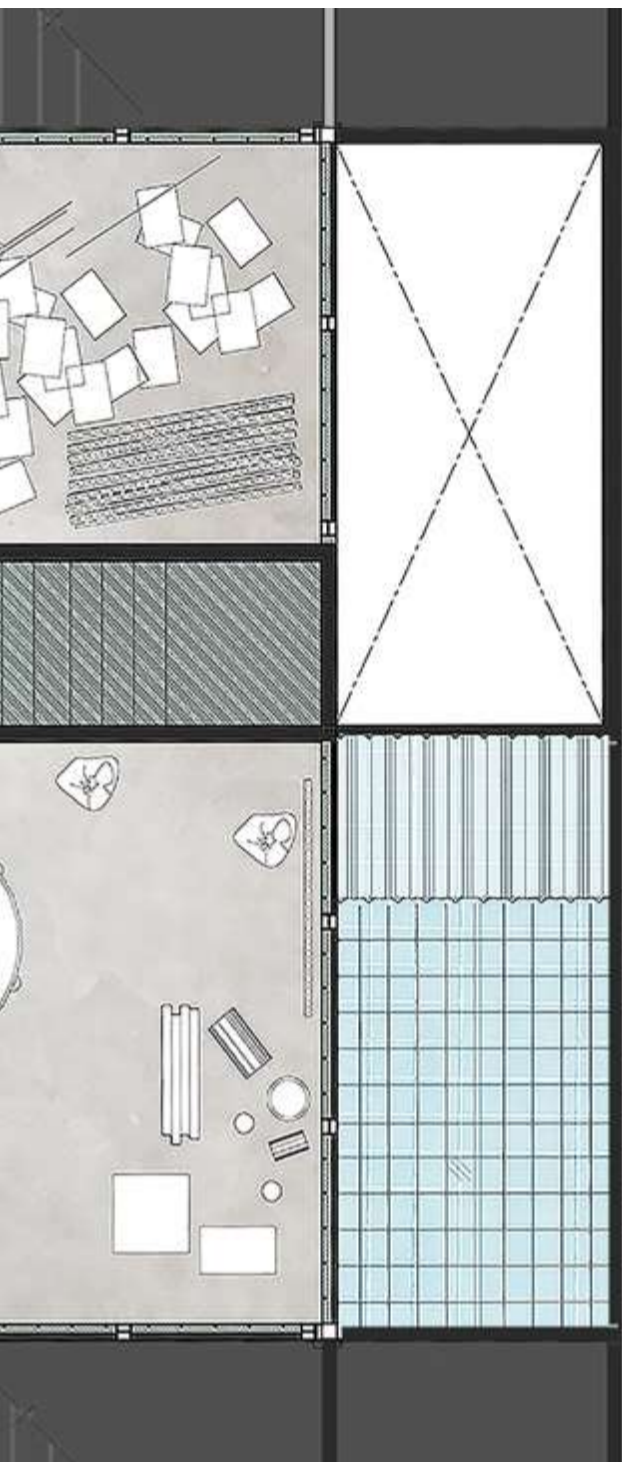


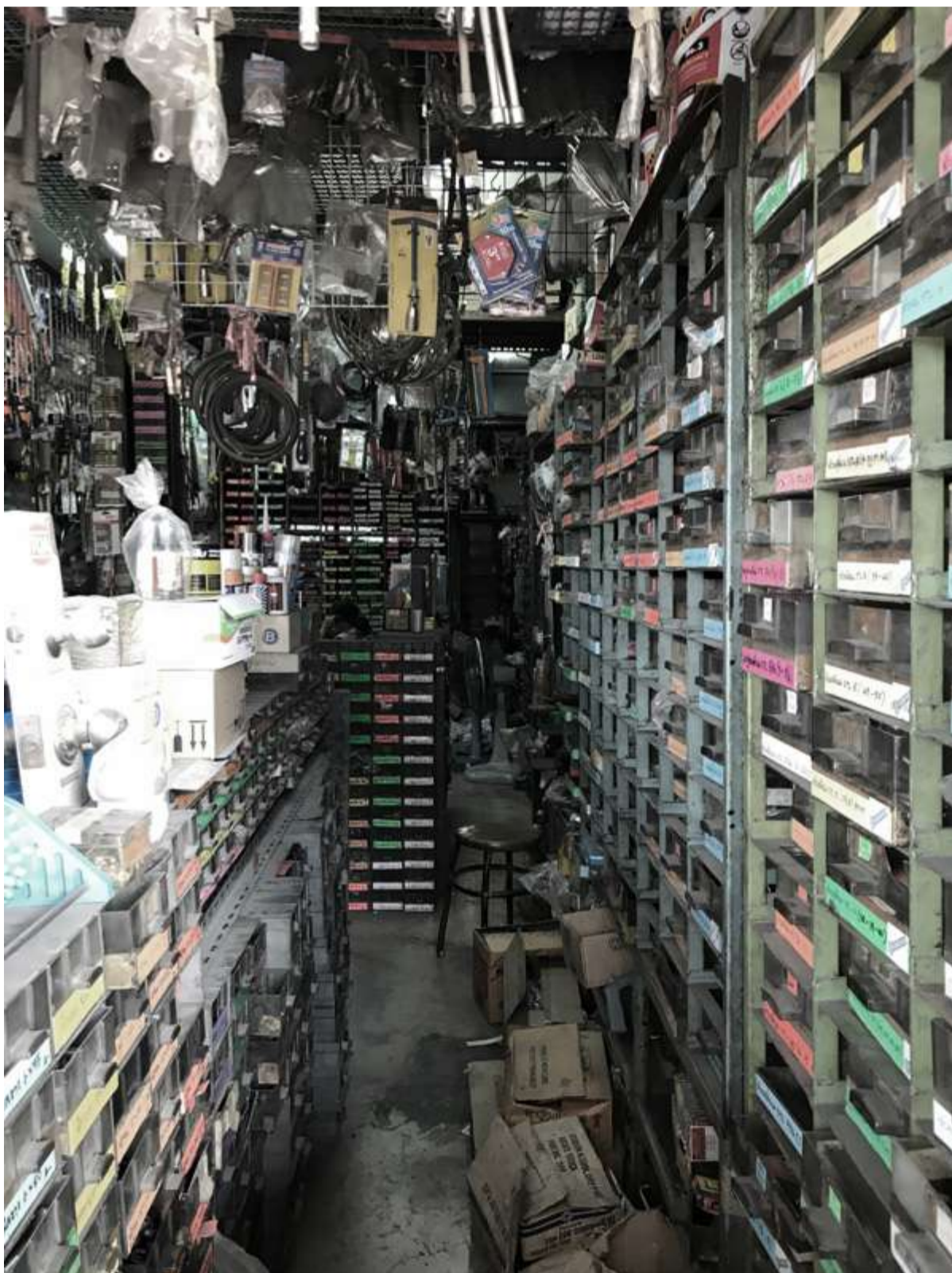




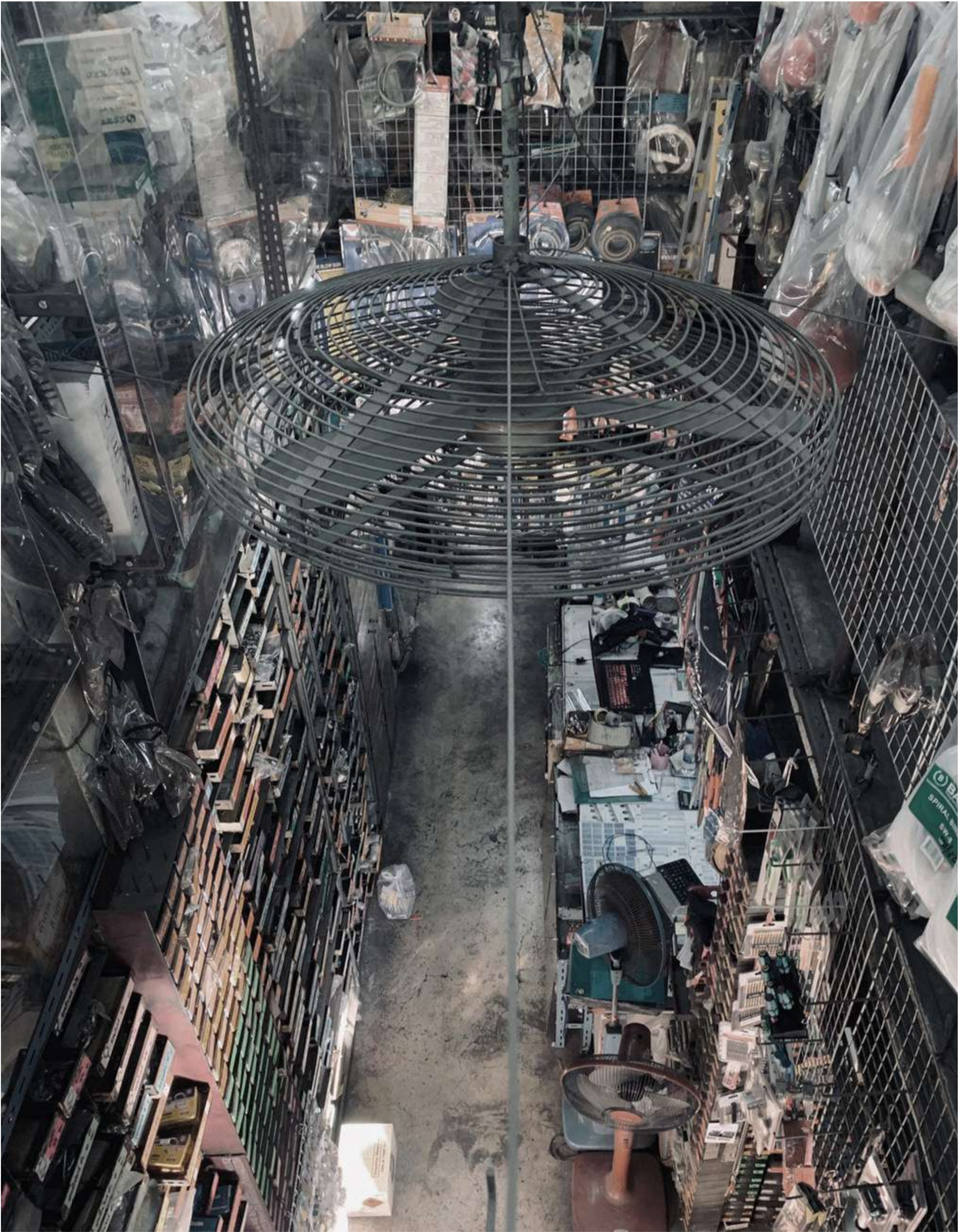






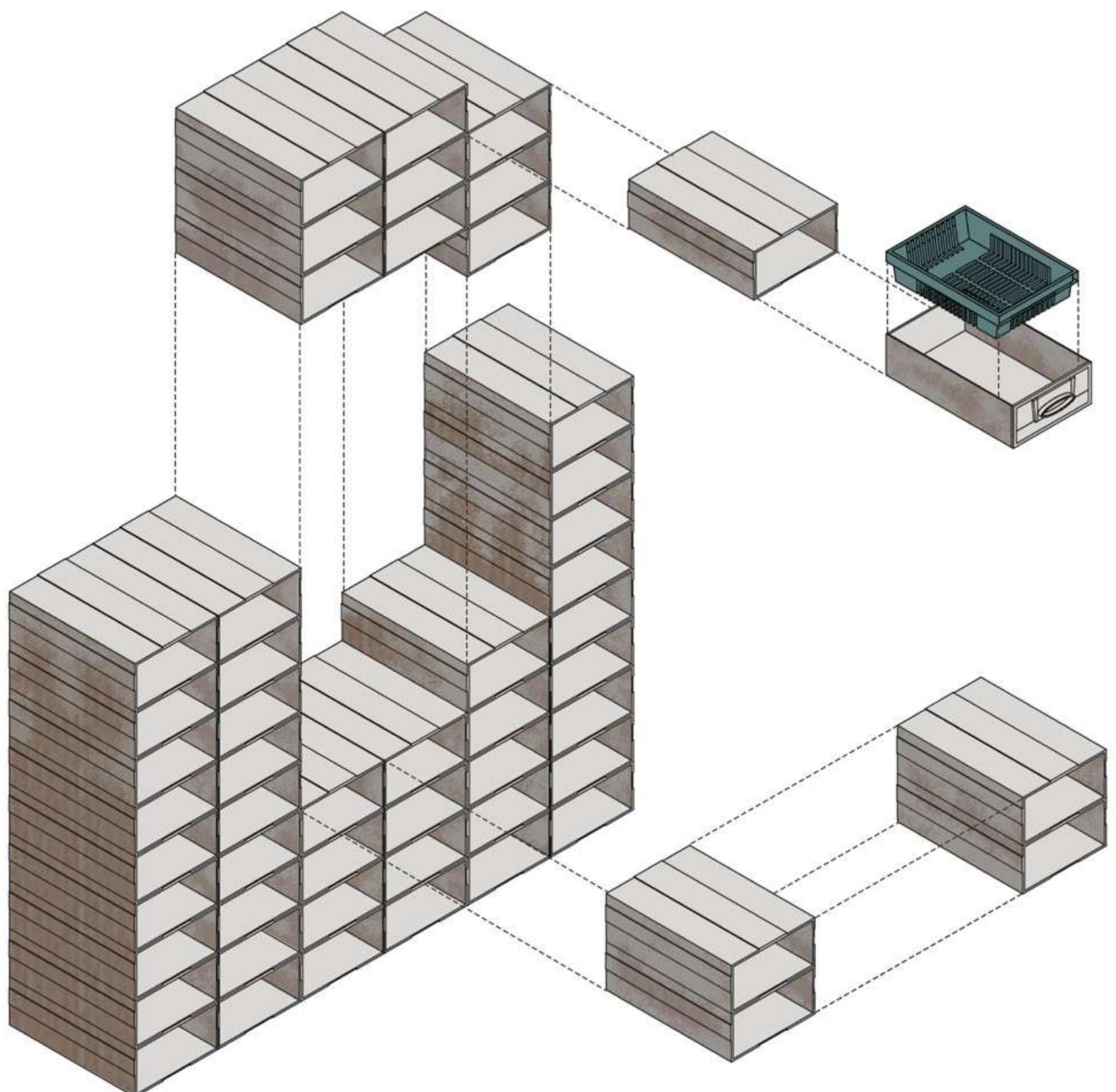


- 1.) The storefront window has double function: The front displays hardware component to attract contractors while also acting as storage shelves that are accessed from the back inside the store. In essence, hardware internal storage becomes hardware exterior sidewalk display.
- 2.) Floor-to-ceiling storage shelves to the right, low counter with visible glass top on the left, and hanging supplies above.
- 3.) The taller ground floor/ mezzanine space has been turned into a "tower" of shelves that occupies the double height space. All manners of tools cover the entire vertical space, even hung from the ceiling like ornaments. A moveable ladder is used to access all of the supplies that are out of reach.





The shelf housing units are stackable prefab casings that are made from folded steel sheets. The individual shelving units are plastic trays that are bought off the shelf in common retail stores.

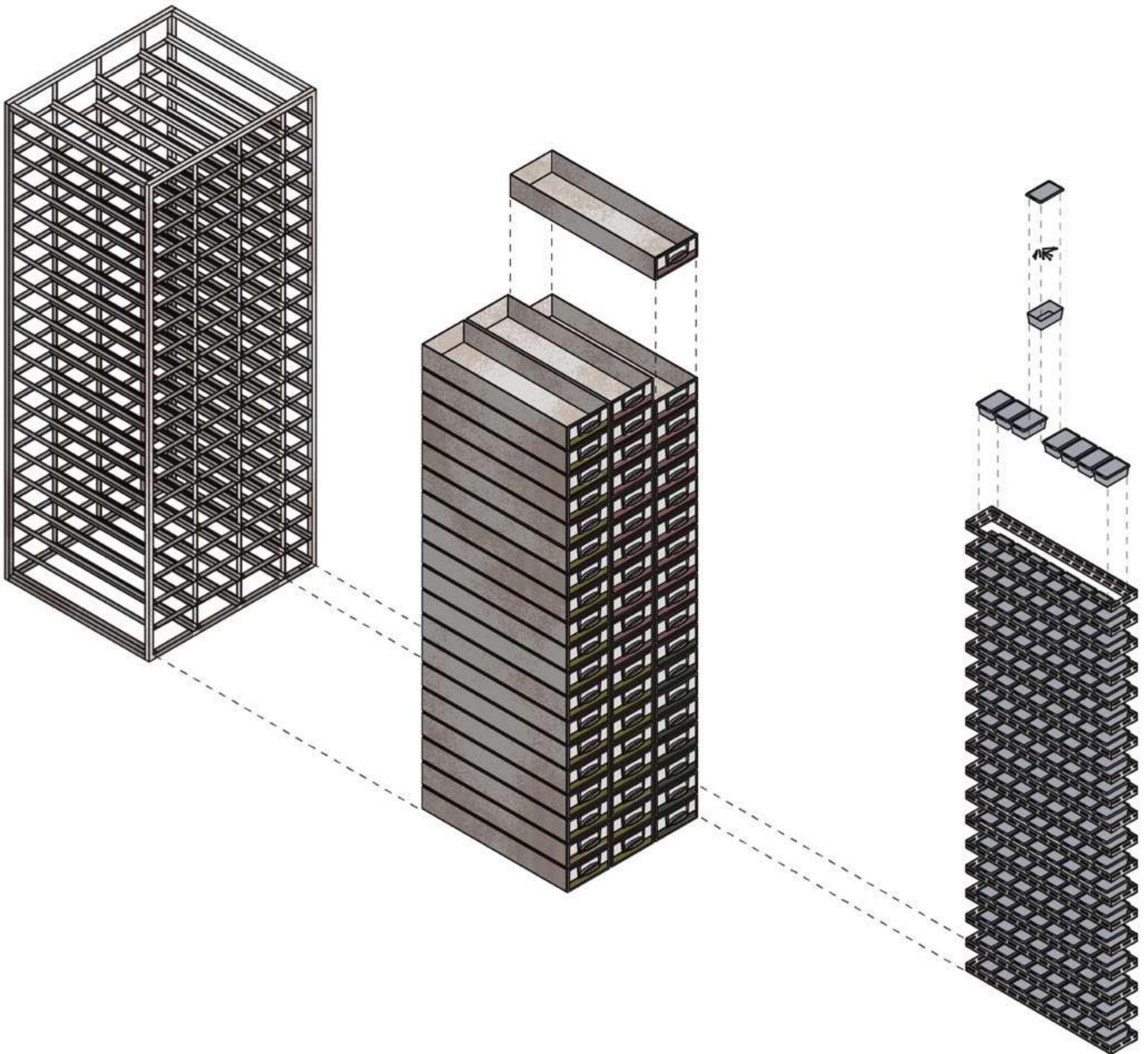


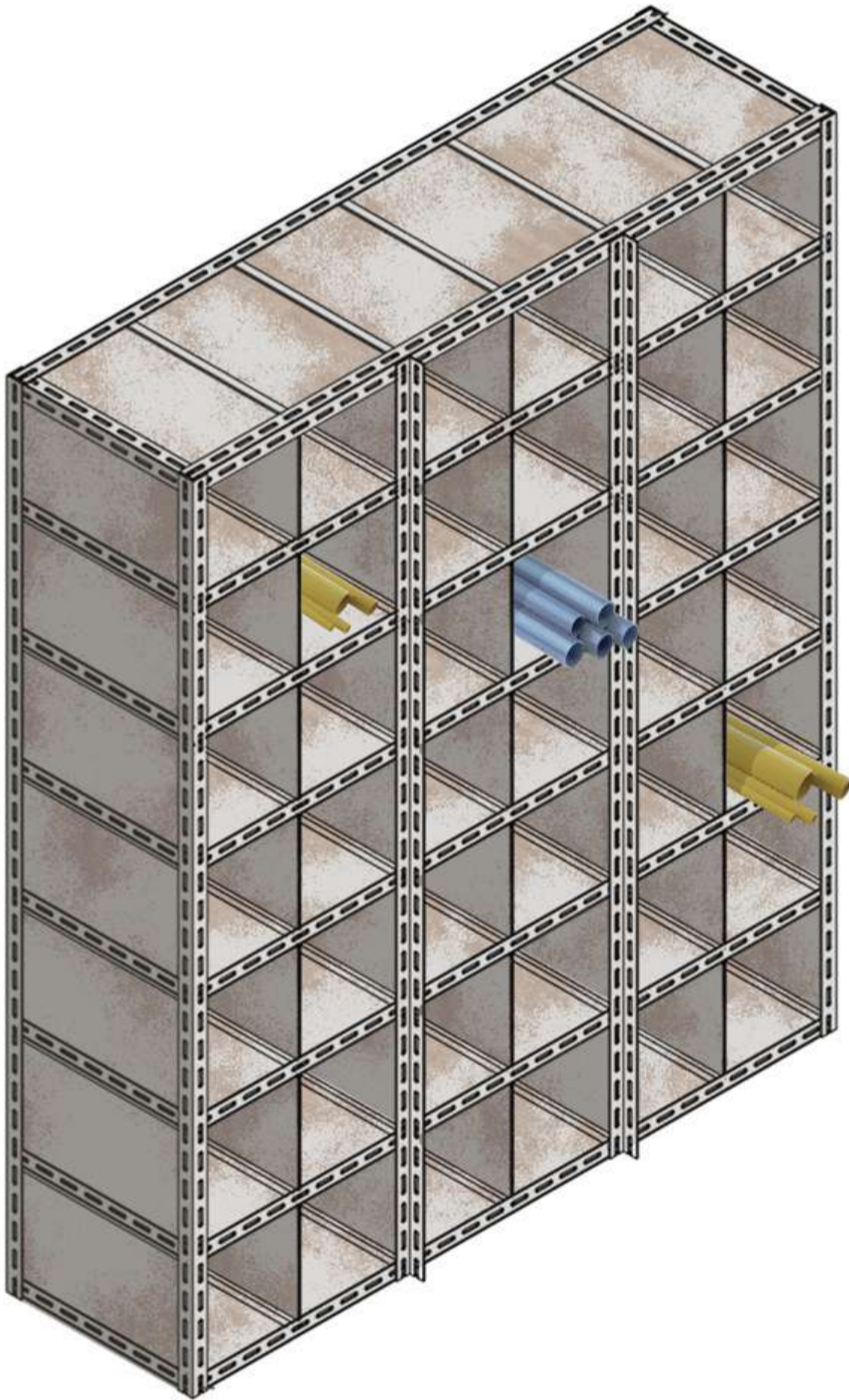




Shelf structure made out of 15mm x 15mm steel tubes. The trays are deep plastic shelves bought from local retail stores.

The many drawers organize the many different types of nuts, screws, and bolts that are used in construction. Within each drawer, the compartment can be further separated into smaller slots to accommodate different sizes of the same type of screws/nuts/bolts.

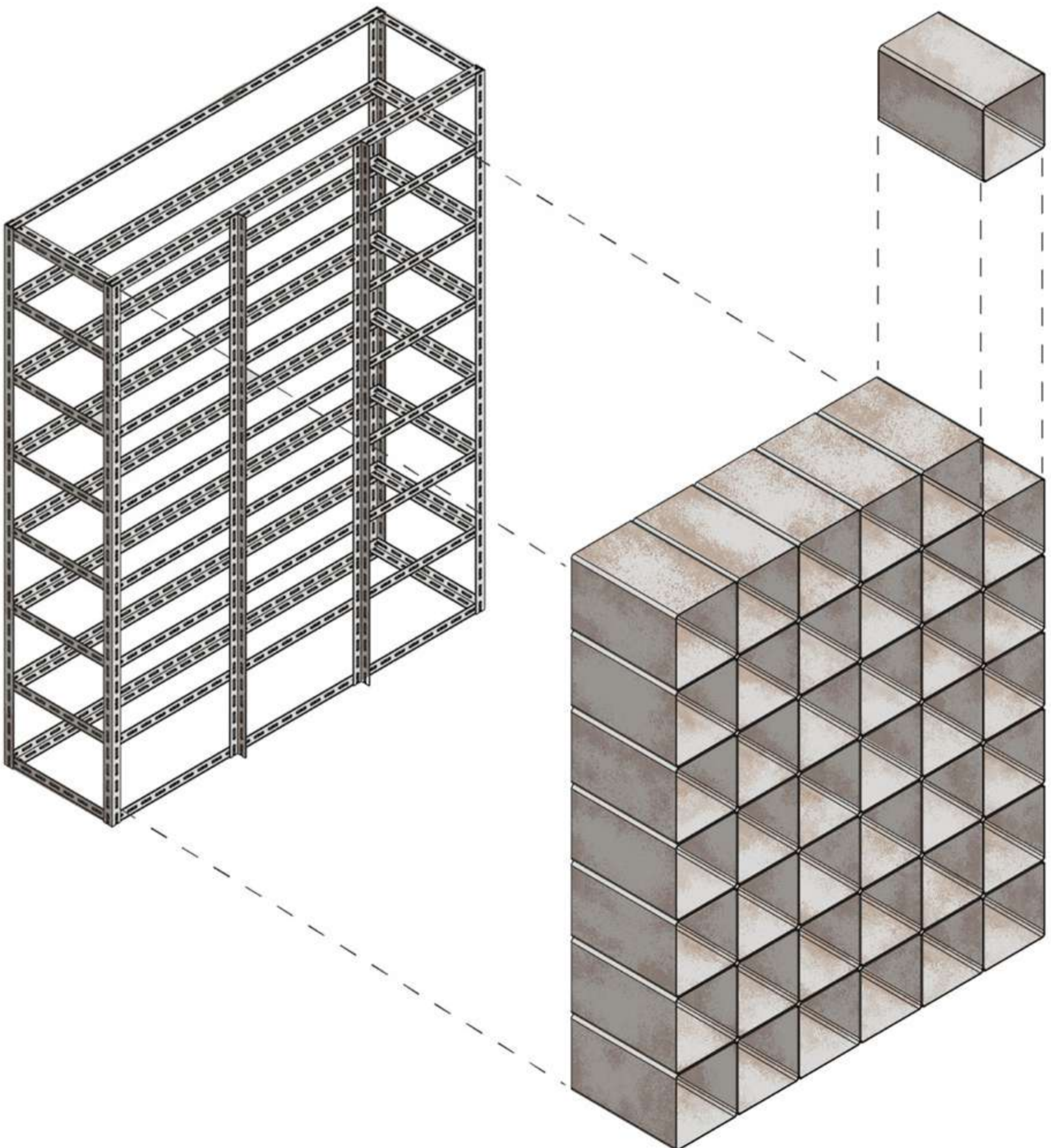


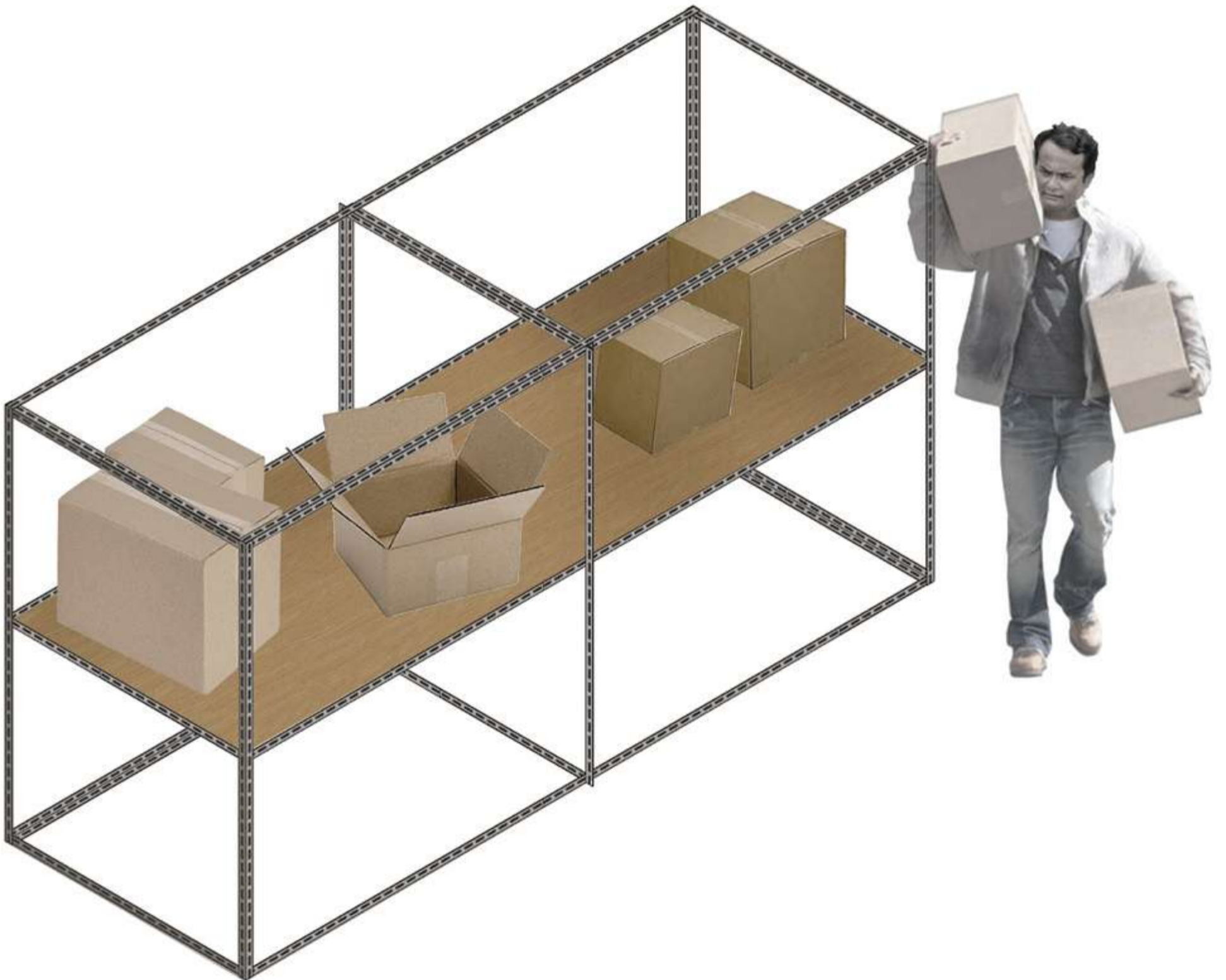




The structure of the storage unit is made out of 1-1/2" x 1" steel angles with predrilled holes. "Peep" containers, or recycled 5 gallon old snack tins, with tops and (sometimes bottoms) removed become dividing cubicles that separate the stored items into clear categories.

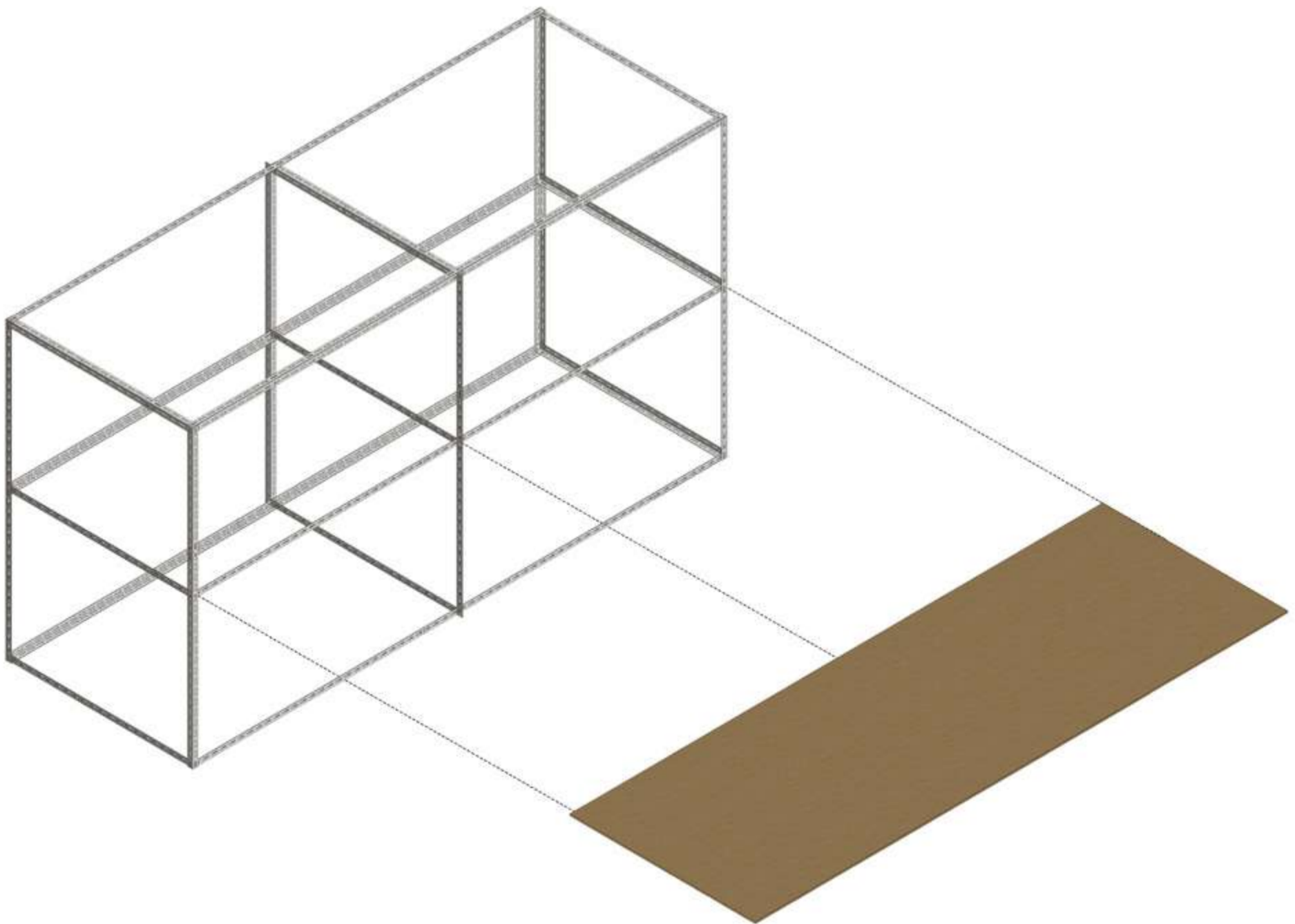
These deep shelf cubicles hold long PVC sanitary and electrical pipes, easily identifiable with their light blue (sanitary) and yellow (electrical) colors. Each slot organizes the types of pipes according to their diameter size.



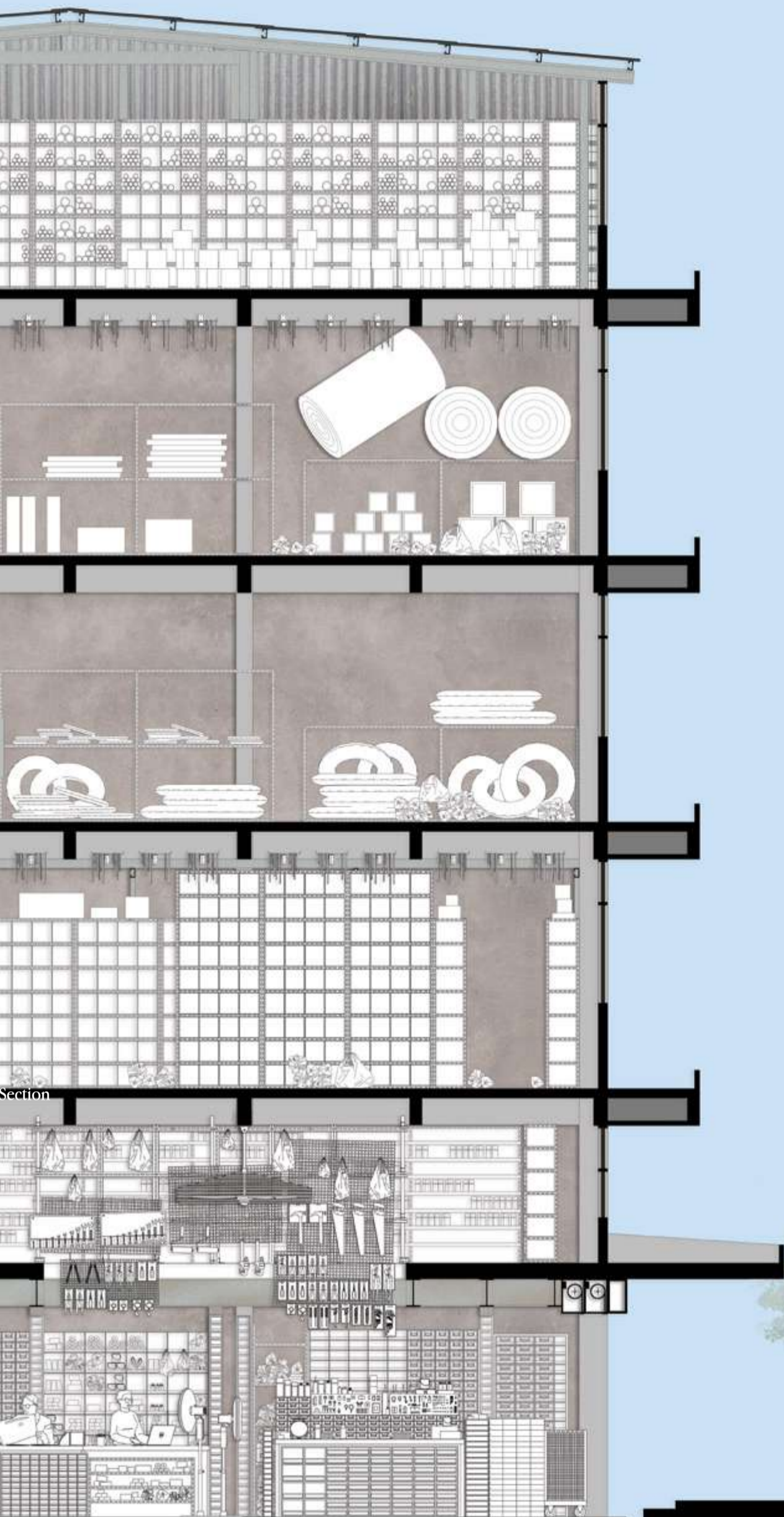


Shelf structure is made out of 1" x 1" steel angles with predrilled holes. Twenty millimeter thick plywood sheets are inserted as shelf surfaces.

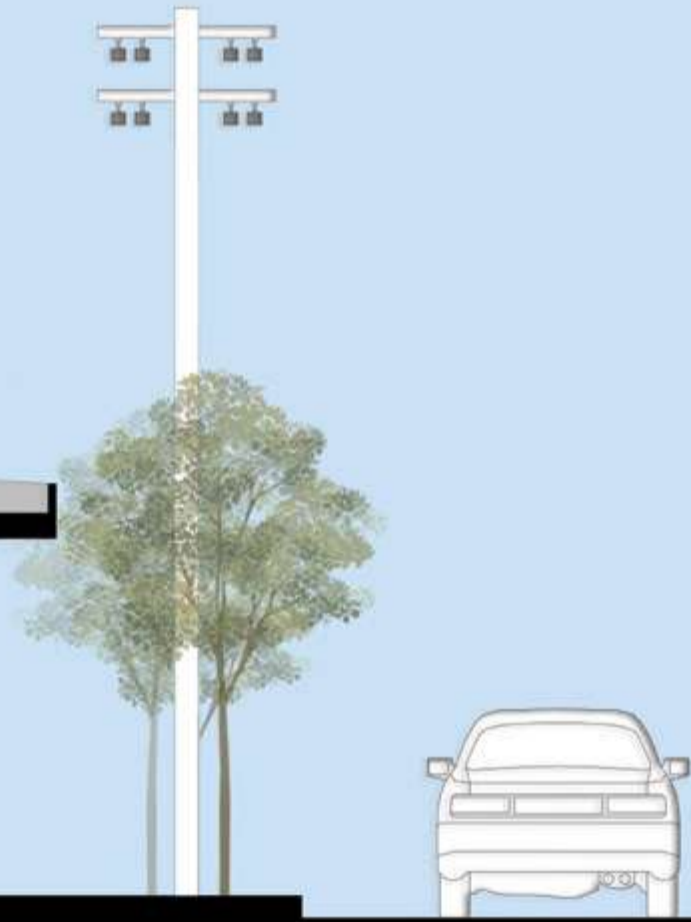
Contents on the shelves are usually large cardboard boxes or plastic containers that hold smaller items and appliances.



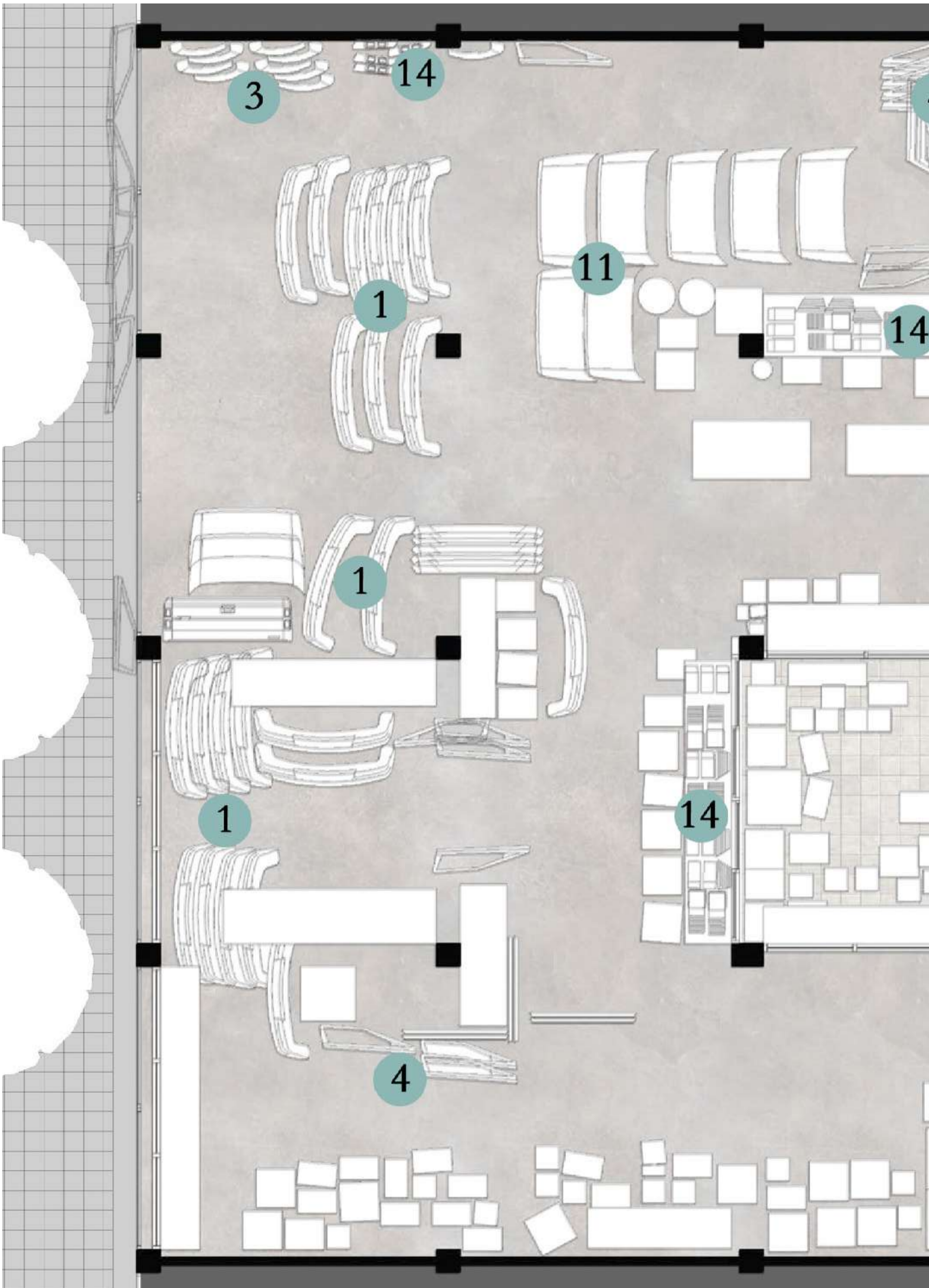




Section



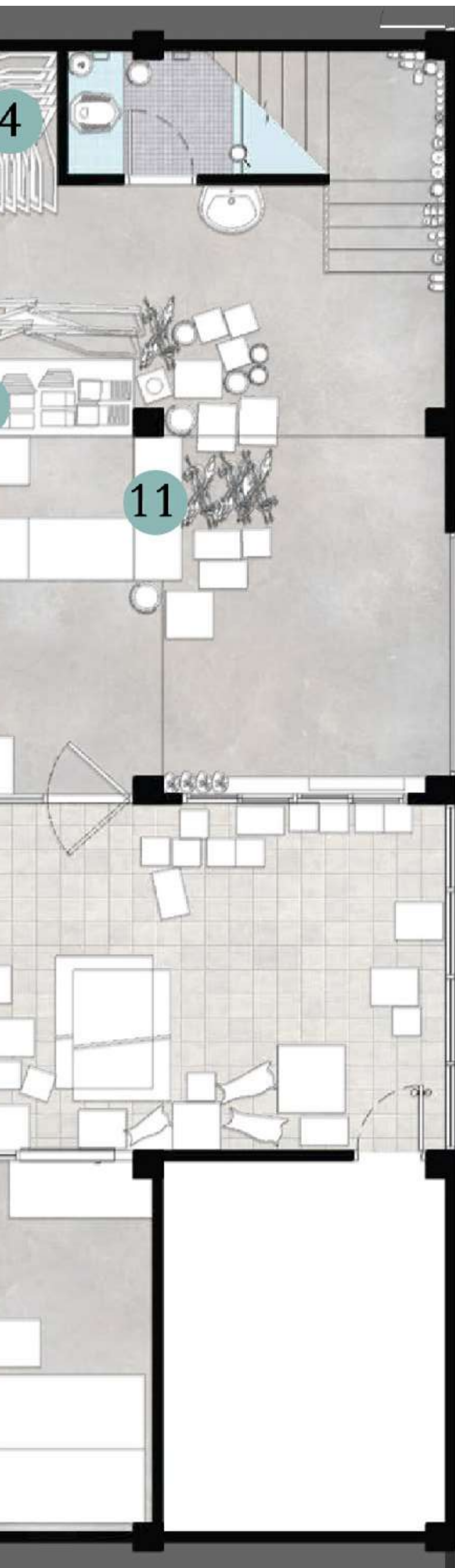
Section



“AUTOPARTS SHOP(WARE)HOUSE:

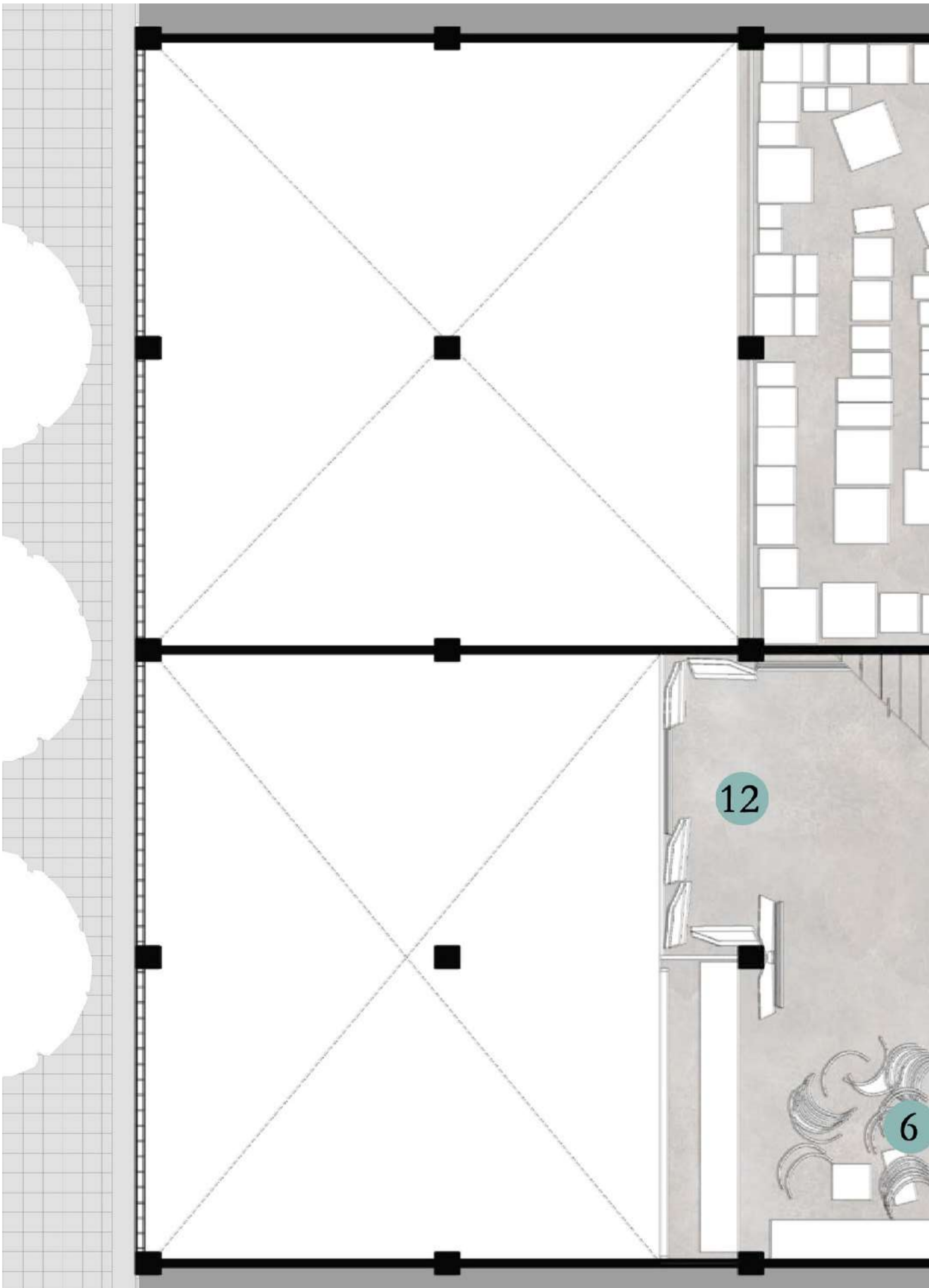
This family-run auto parts showroom/warehouse occupies a large cluster of shophouses that have been expanded over time to accommodate the growing business and their expanding collection of autoparts. The operation enjoys both frontage on the heavily-trafficked main street (Sukumvit Road) but can also be accessed by an internal sub-soi (sub alley), where deliveries can be made more conveniently compared to busy front road. These hybrid shophouse(s)-turned-warehouse essentially serves as a more compact, urban substitute for the suburban auto showroom with its auto parts garage. As it also buys and sells used auto parts, the business can also be viewed as a car recycling center, thus reducing the industrial waste for the city in a productive and profitable way.

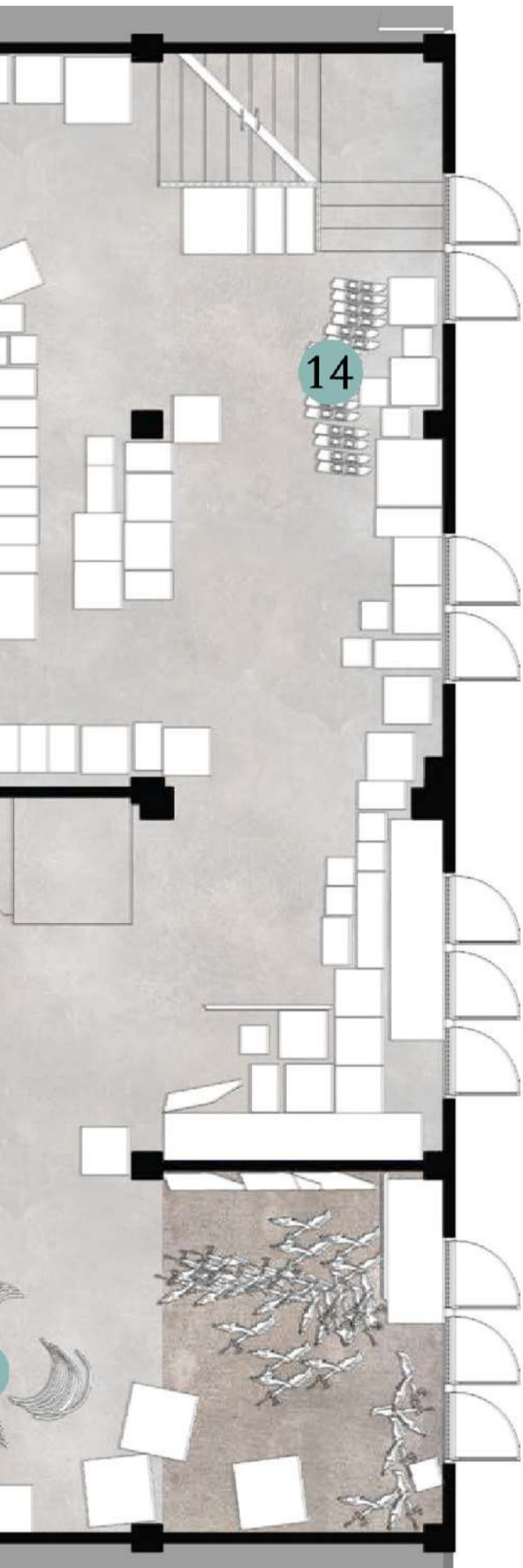
The actual auto parts components are distributed throughout 4 shophouse kooah's facing the main street, and are sorted according to their size, shape, and function. (The lack of elevator in the shophouse makes moving the large parts through the narrow existing stairs quite difficult.) Occupying another 4 kooah that also face the main street is the front office where customers place their orders. All eight of the main street -acing shophouse kooah's have access to the rear alley.



1st Floor Plan

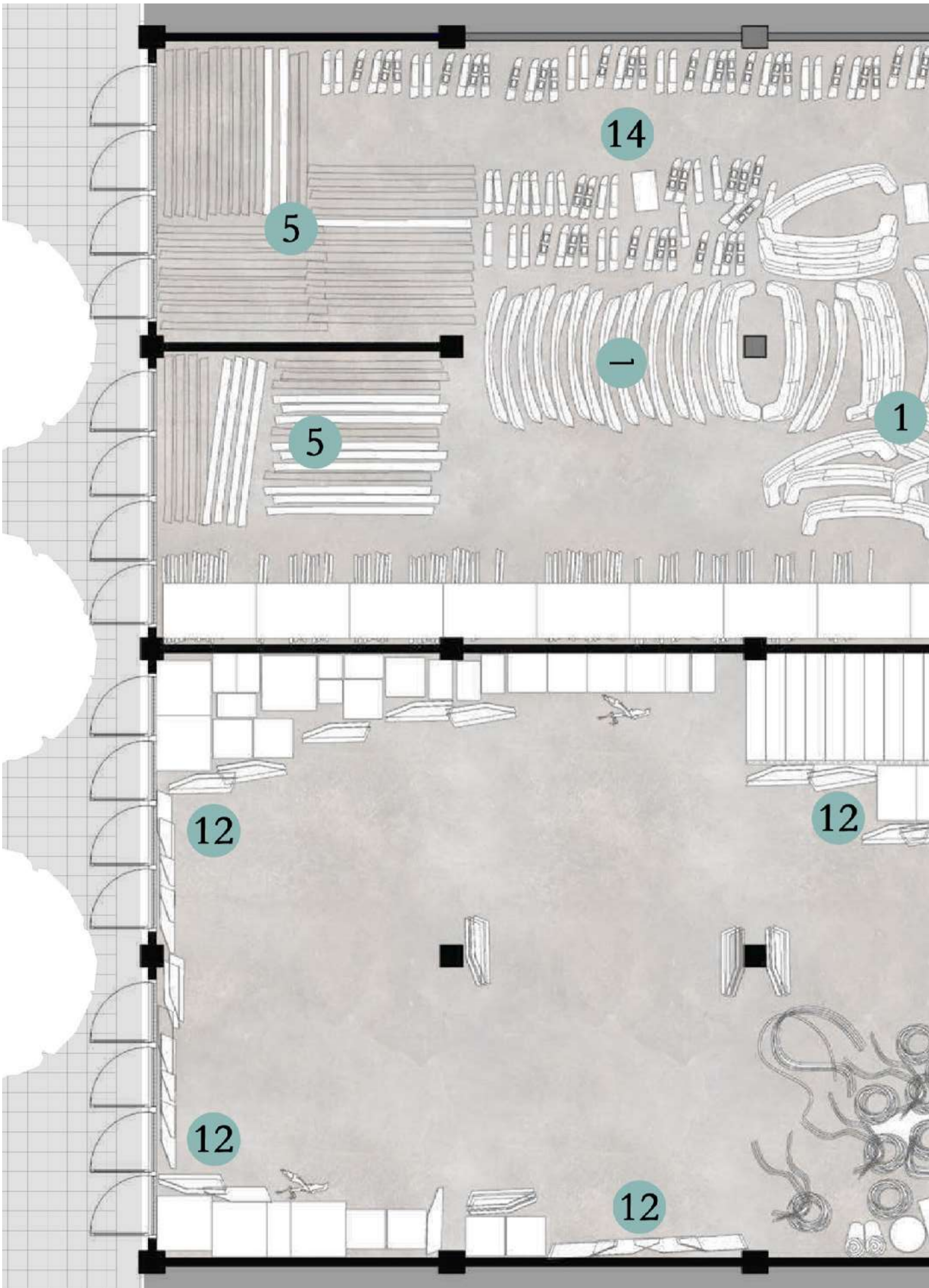
- | | |
|---------------------|------------------|
| 1. Car Bumper | 8. Header Panel |
| 2. Head lamp | 9. Hood |
| 3. Fender(Guard) | 10. Mirror |
| 4. Door | 11. Trunk |
| 5. Rocker Panel | 12. Mirror Panel |
| 6. Wheel Arch Panel | 13. Grill |
| 7. Quarter Panel | 14. Back Light |

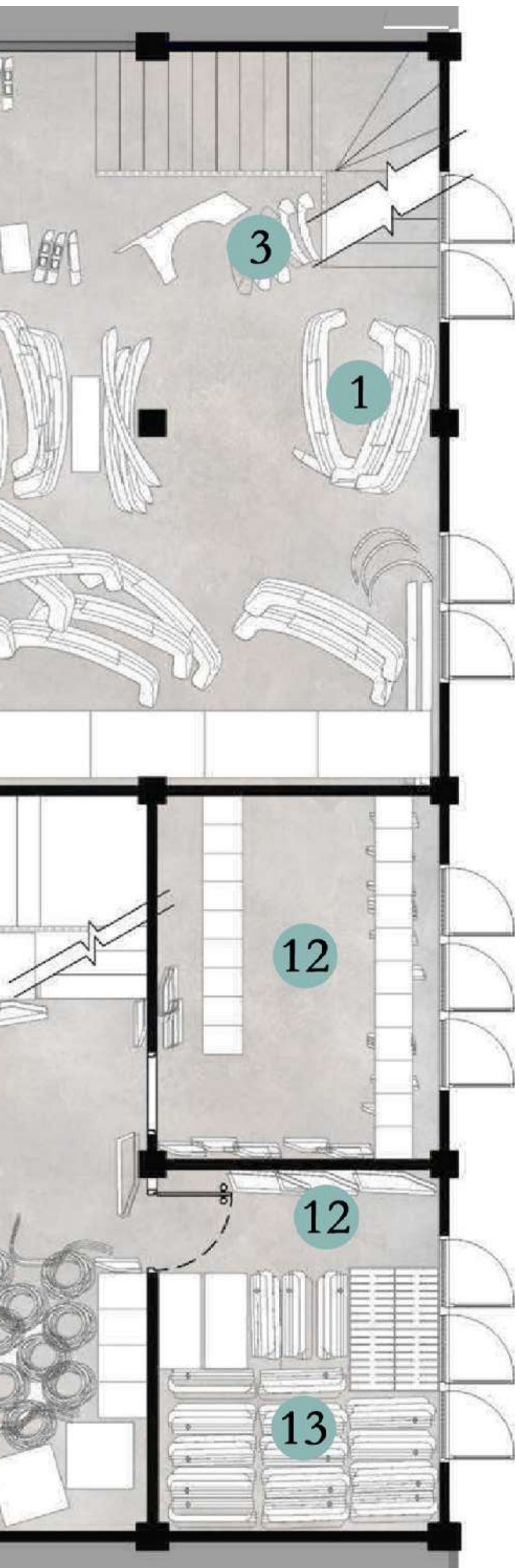




Mezzanine Floor Plan

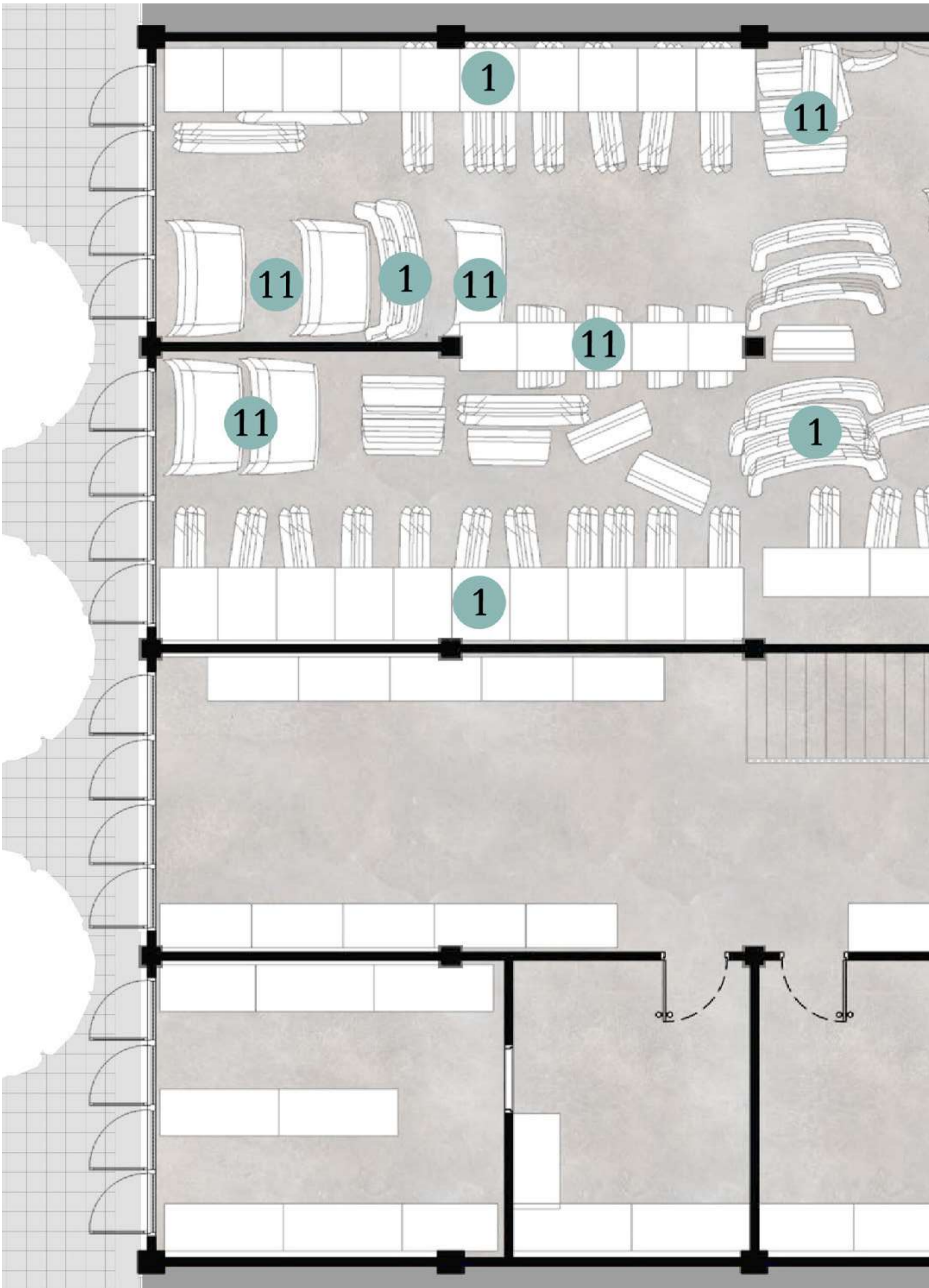
- | | |
|---------------------|------------------|
| 1. Car Bumper | 8. Header Panel |
| 2. Head Lamp | 9. Hood |
| 3. Fender(Guard) | 10. Mirror |
| 4. Door | 11. Trunk |
| 5. Rocker Panel | 12. Mirror Panel |
| 6. Wheel Arch Panel | 13. Grill |
| 7. Quarter Panel | 14. Back Light |

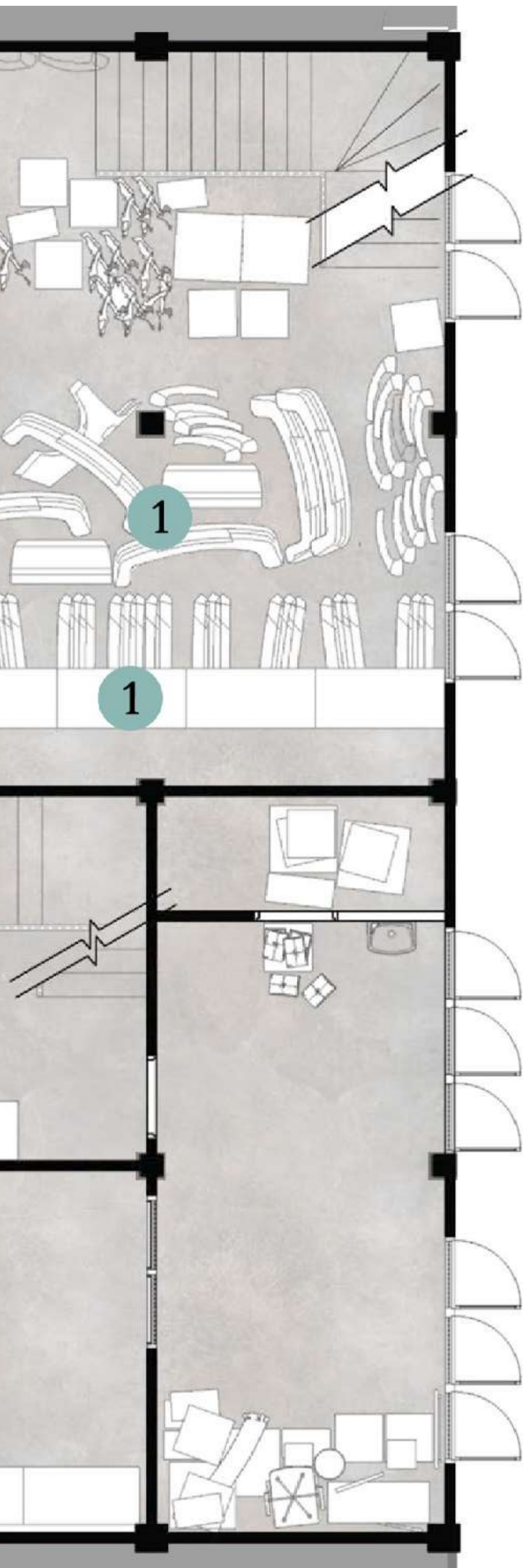




2nd Floor Plan

- | | |
|---------------------|------------------|
| 1. Car Bumper | 8. Header Panel |
| 2. Head Lamp | 9. Hood |
| 3. Fender(Guard) | 10. Mirror |
| 4. Door | 11. Trunk |
| 5. Rocker Panel | 12. Mirror Panel |
| 6. Wheel Arch Panel | 13. Grill |
| 7. Quarter Panel | 14. Back Light |





3rd Floor Plan

1. Car Bumper
2. Head Lamp
3. Fender(Guard)
4. Door
5. Rocker Panel
6. Wheel Arch Panel
7. Quarter Panel

8. Header Panel
9. Hood
10. Mirror
11. Trunk
12. Mirror Panel
13. Grill
14. Back Light





4th Floor Plan

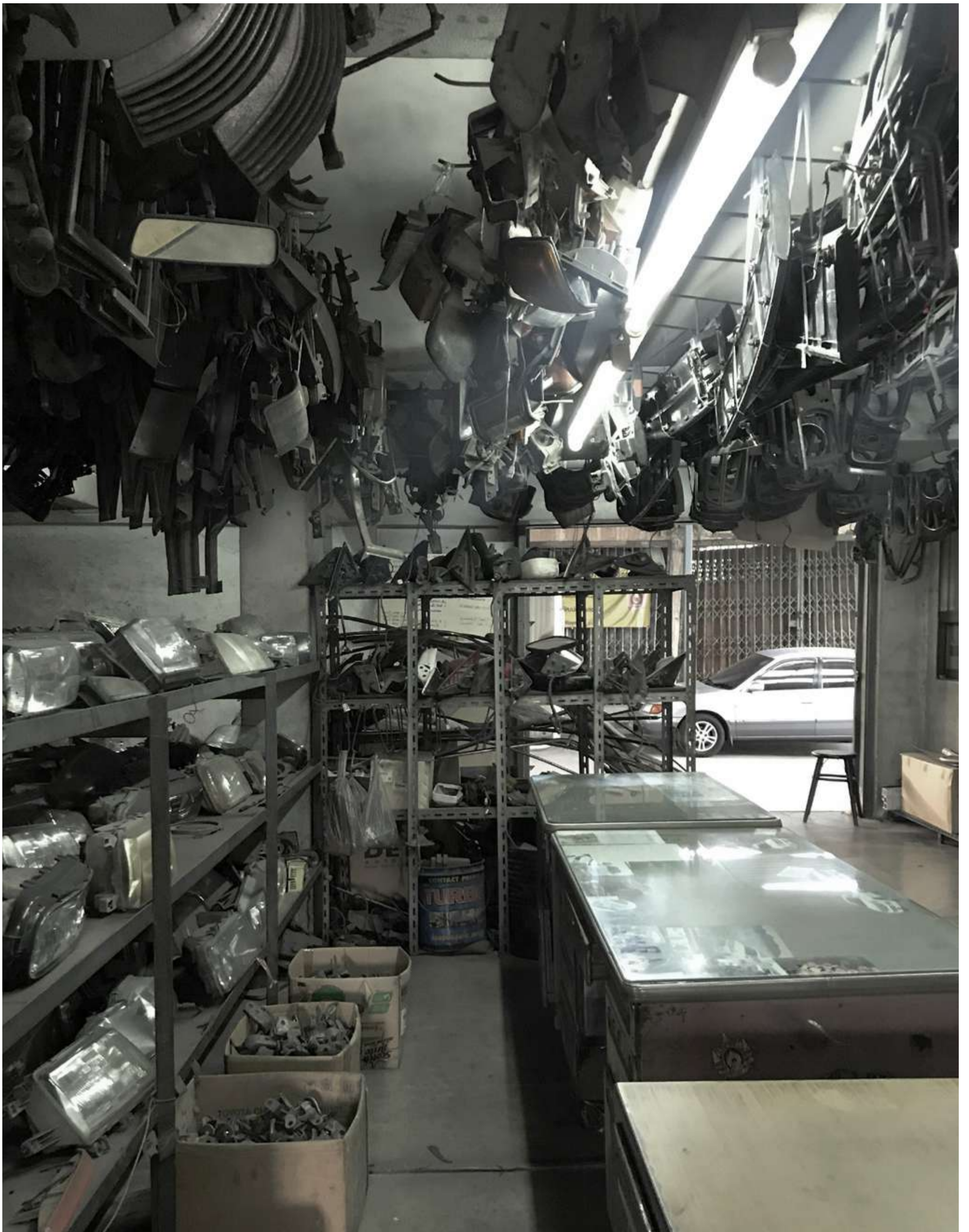
1. Car Bumper
2. Head Lamp
3. Fender(Guard)
4. Door
5. Rocker Panel
6. Wheel Arch Panel
7. Quarter Panel

8. Header Panel
9. Hood
10. Mirror
11. Trunk
12. Mirror Panel
13. Grill
14. Back Light



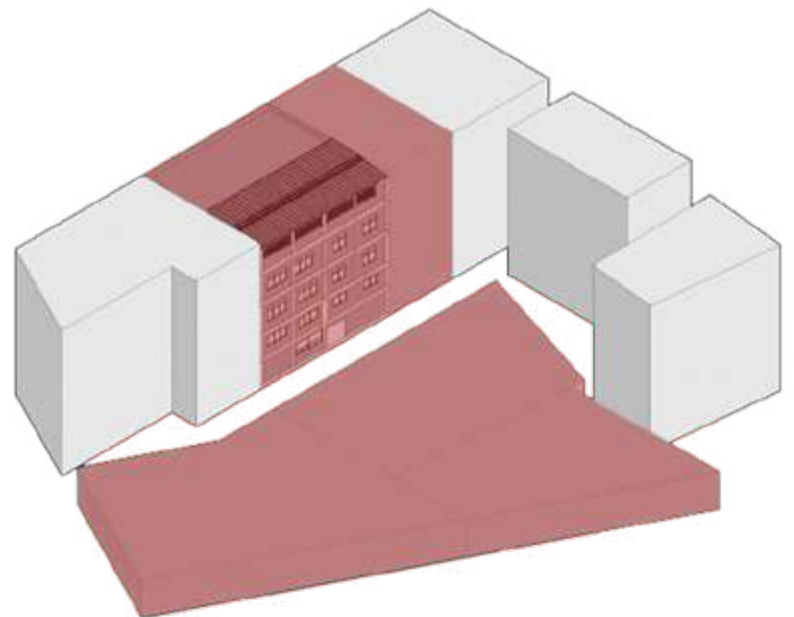
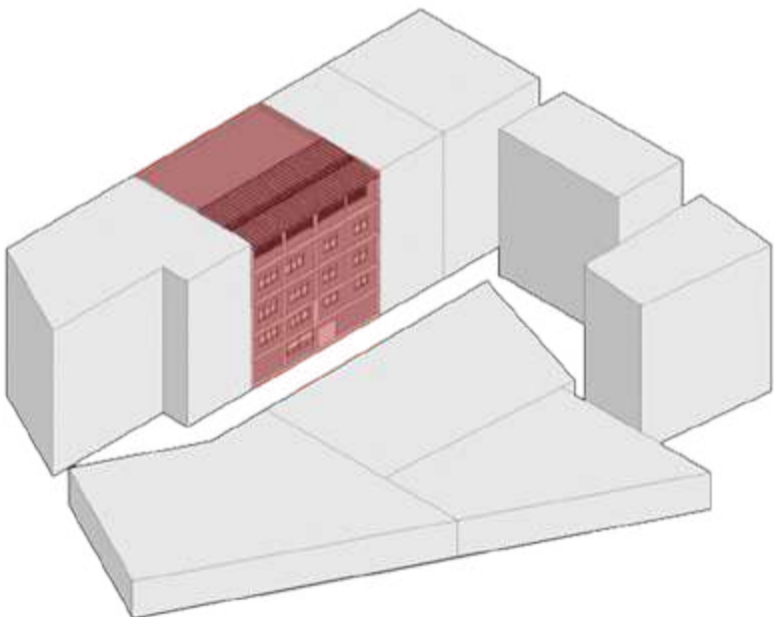
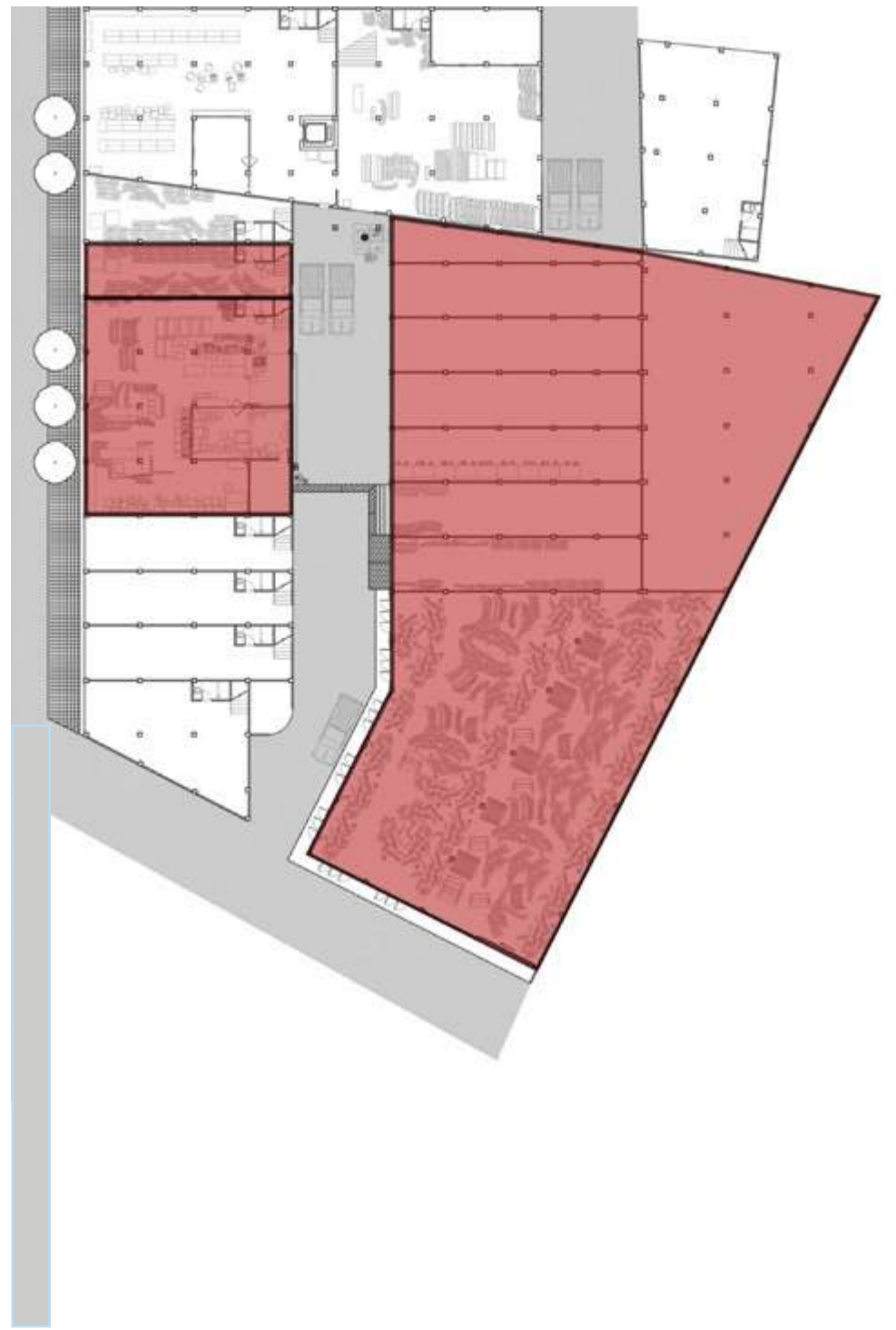
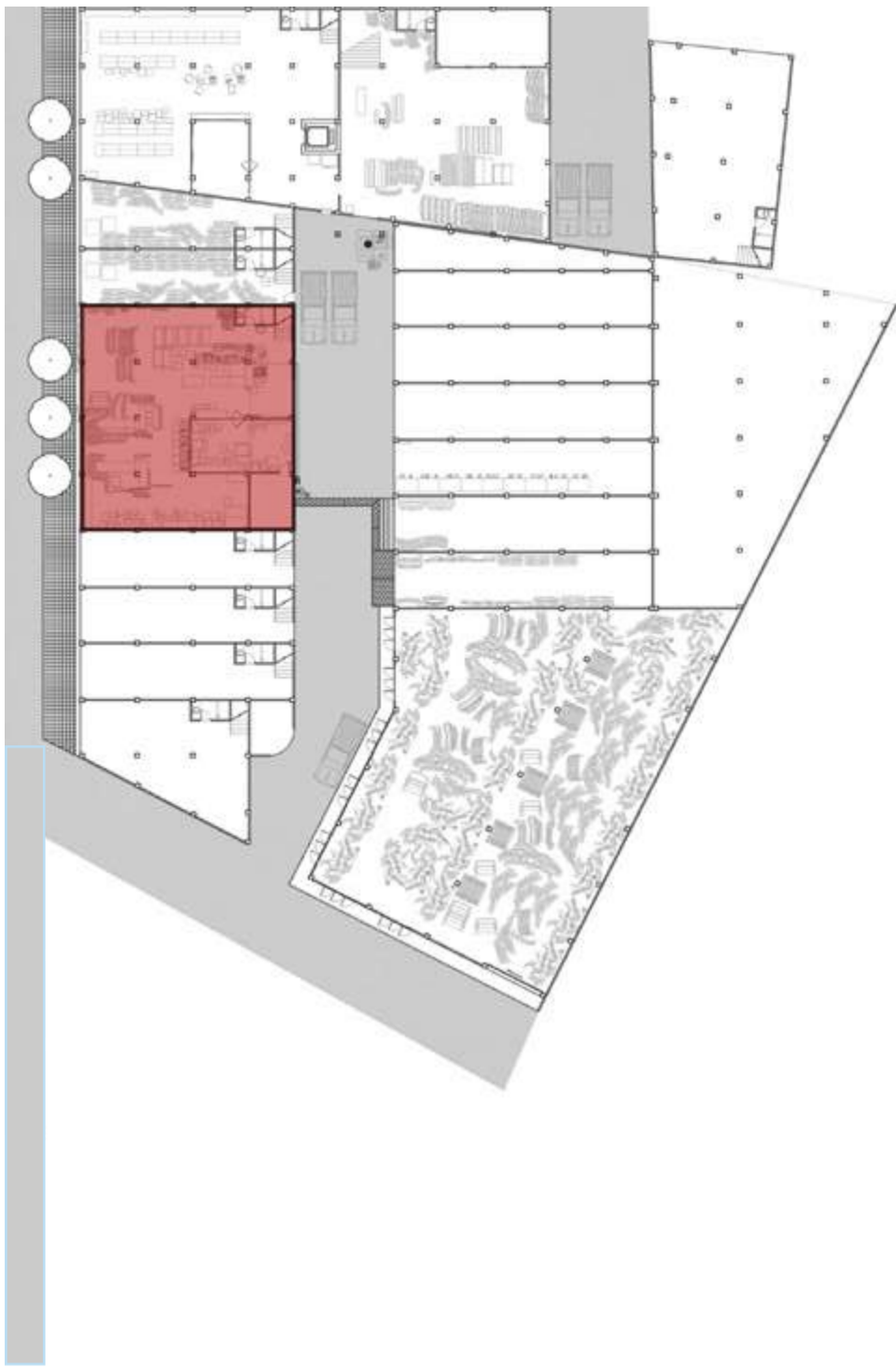


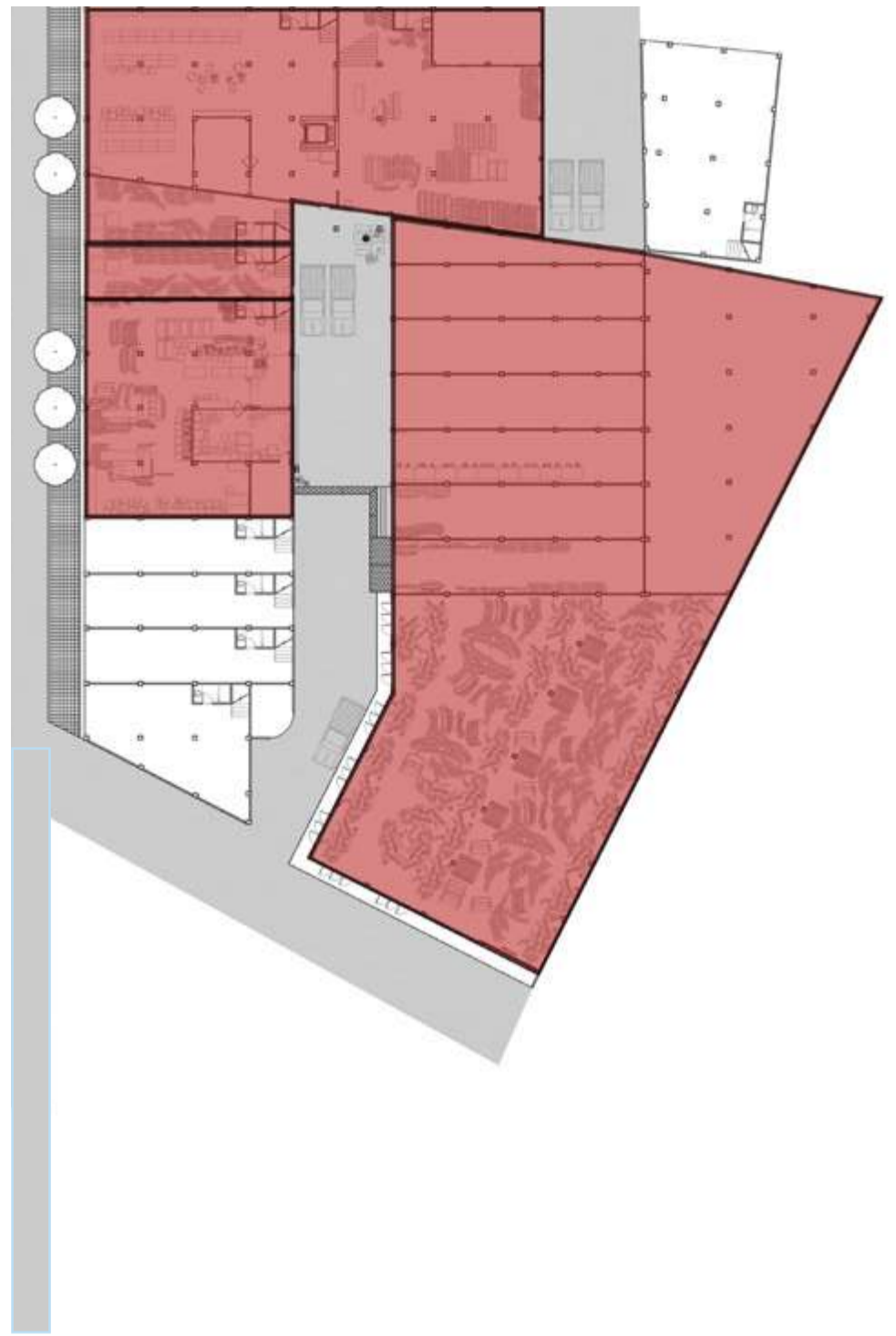
1.) The ground level of the auto parts shophouse. This 'storefront' is completely open to both the Sukumvit Road sidewalk and the small alley in the rear. Large and small auto parts are displayed on the ground, in shelving units, and stacked up against the wall. The double height volume allows fenders to be hung from the tall ceilings as well. Customers from the street or from the rear alley can freely walk in the display to select their desired replacement parts. The largest items, like windshields and fenders, are arranged on the sidewalk, allowing the gallery program to spill out onto the street.





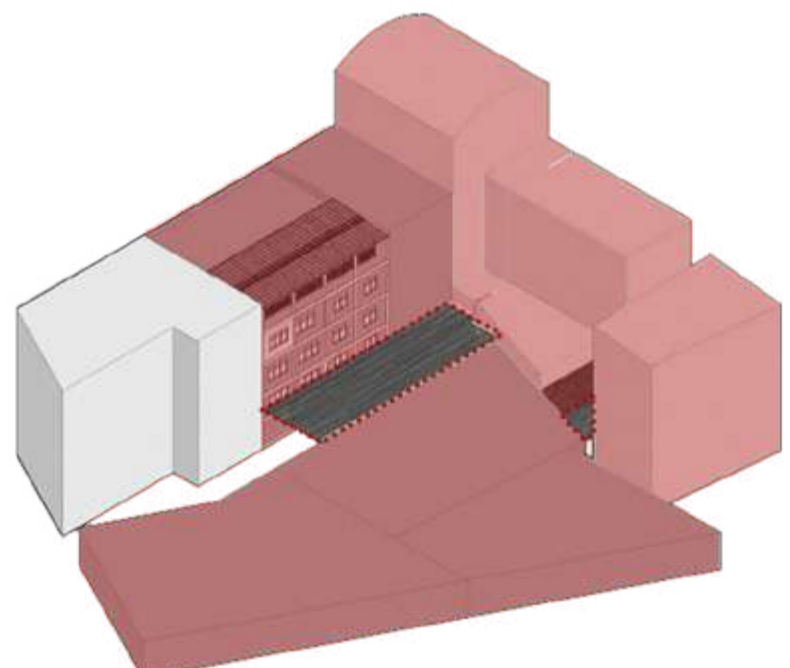
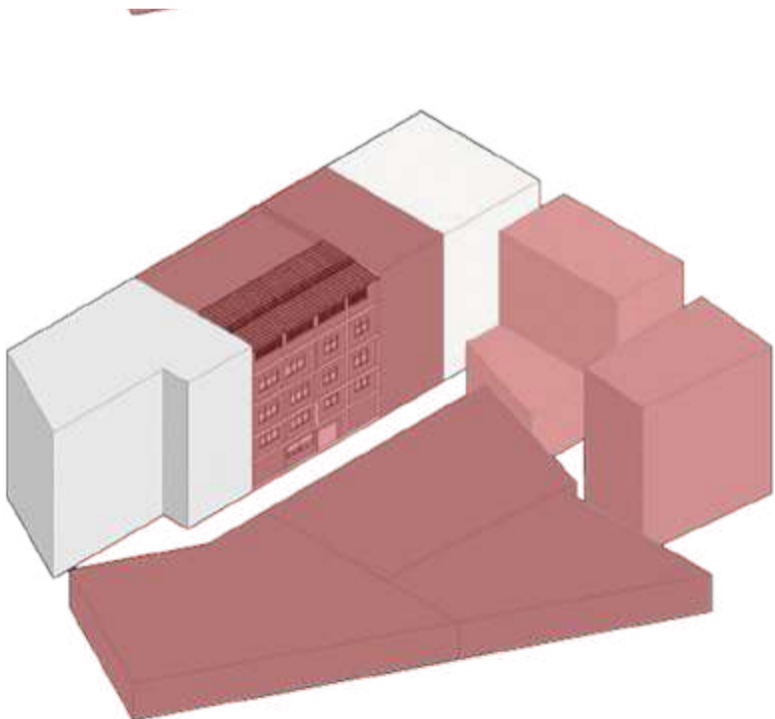
- 1.) *The underside of the mezzanine level, where every surface is utilized to display auto parts, even the ceilings - from which items are hung on hooks.*
- 2.) *Second floor - homemade shelving units line the wall to organize and separate each type of large auto part.*

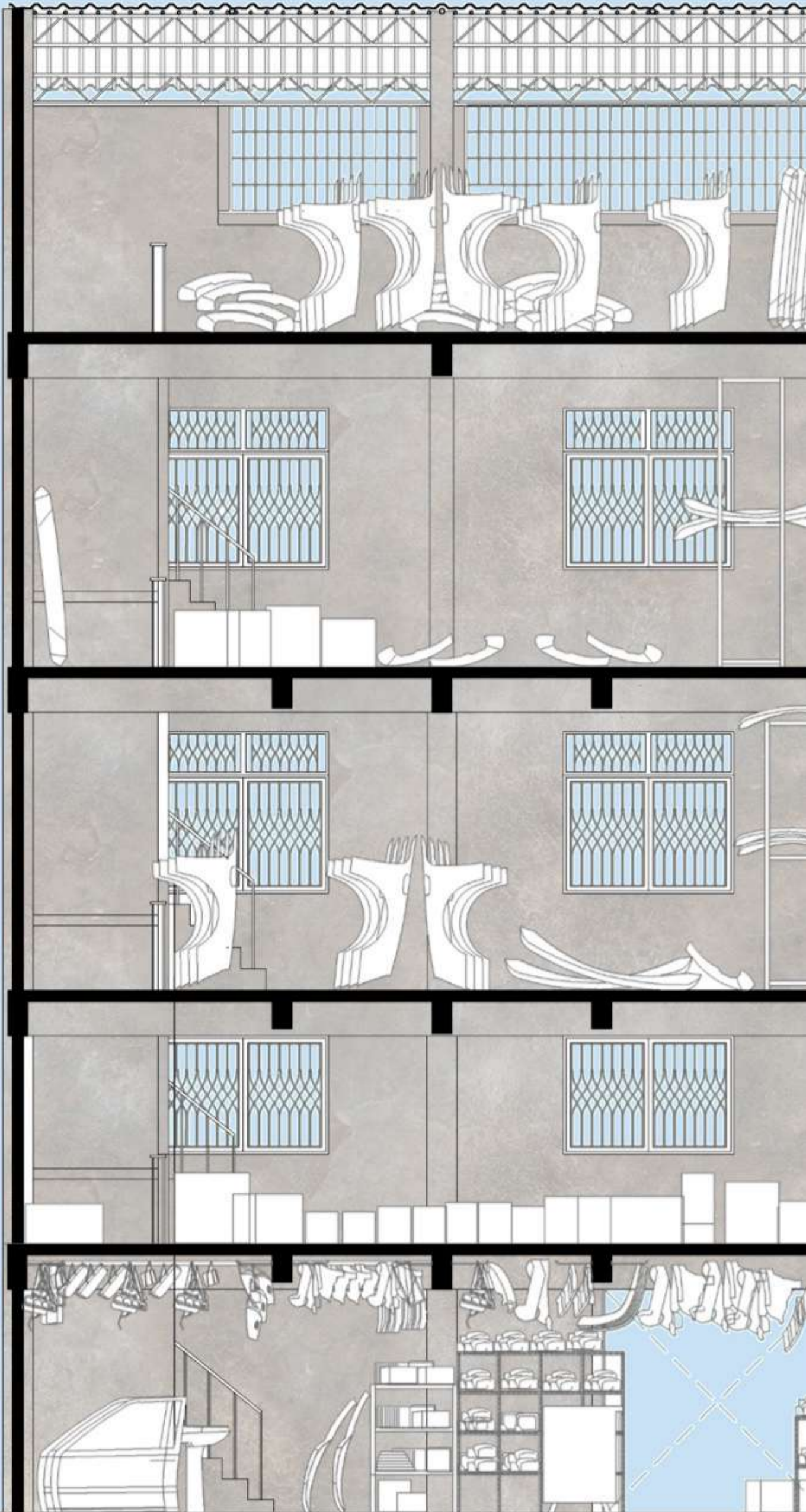




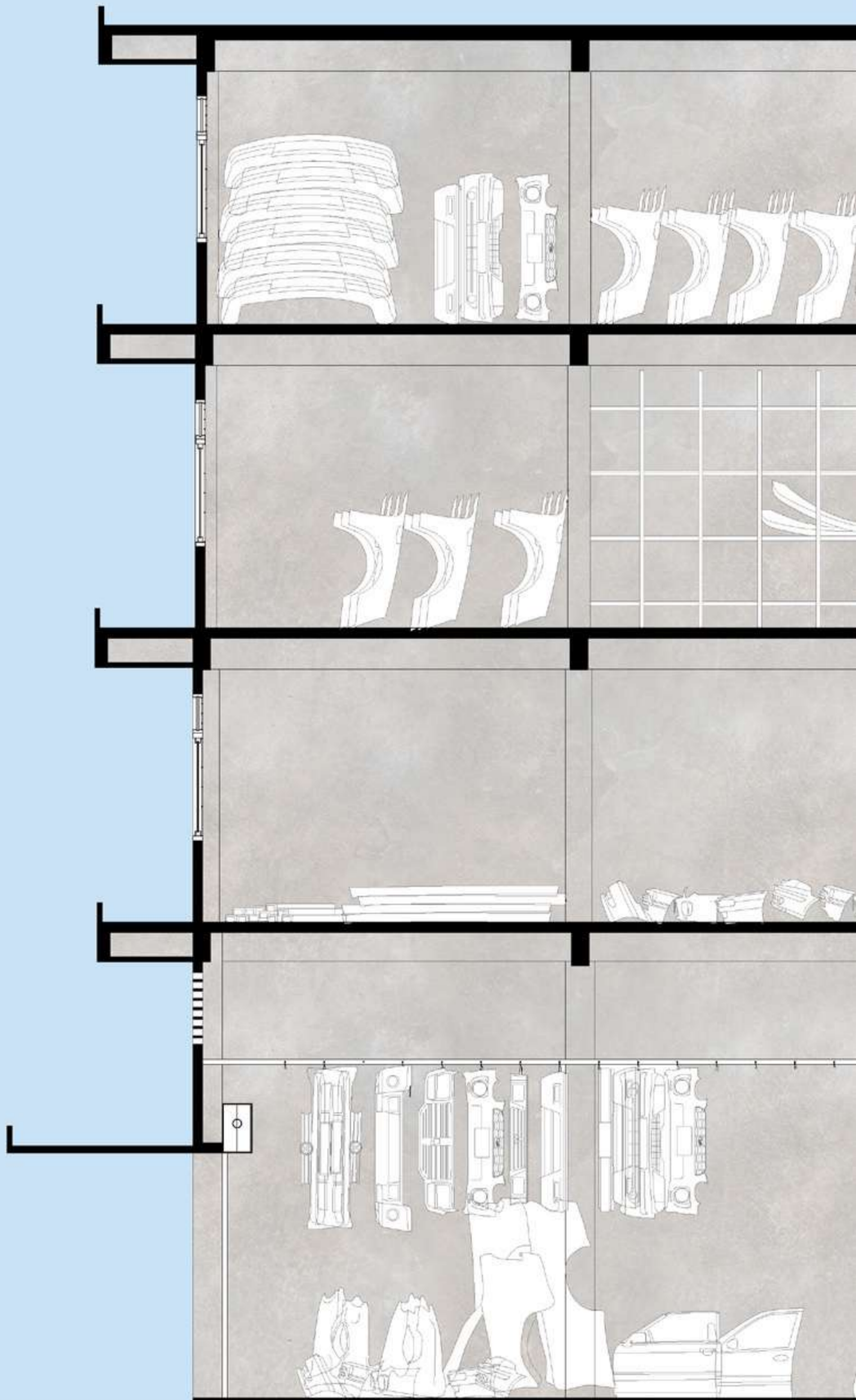
EXPANSION OVER TIME:

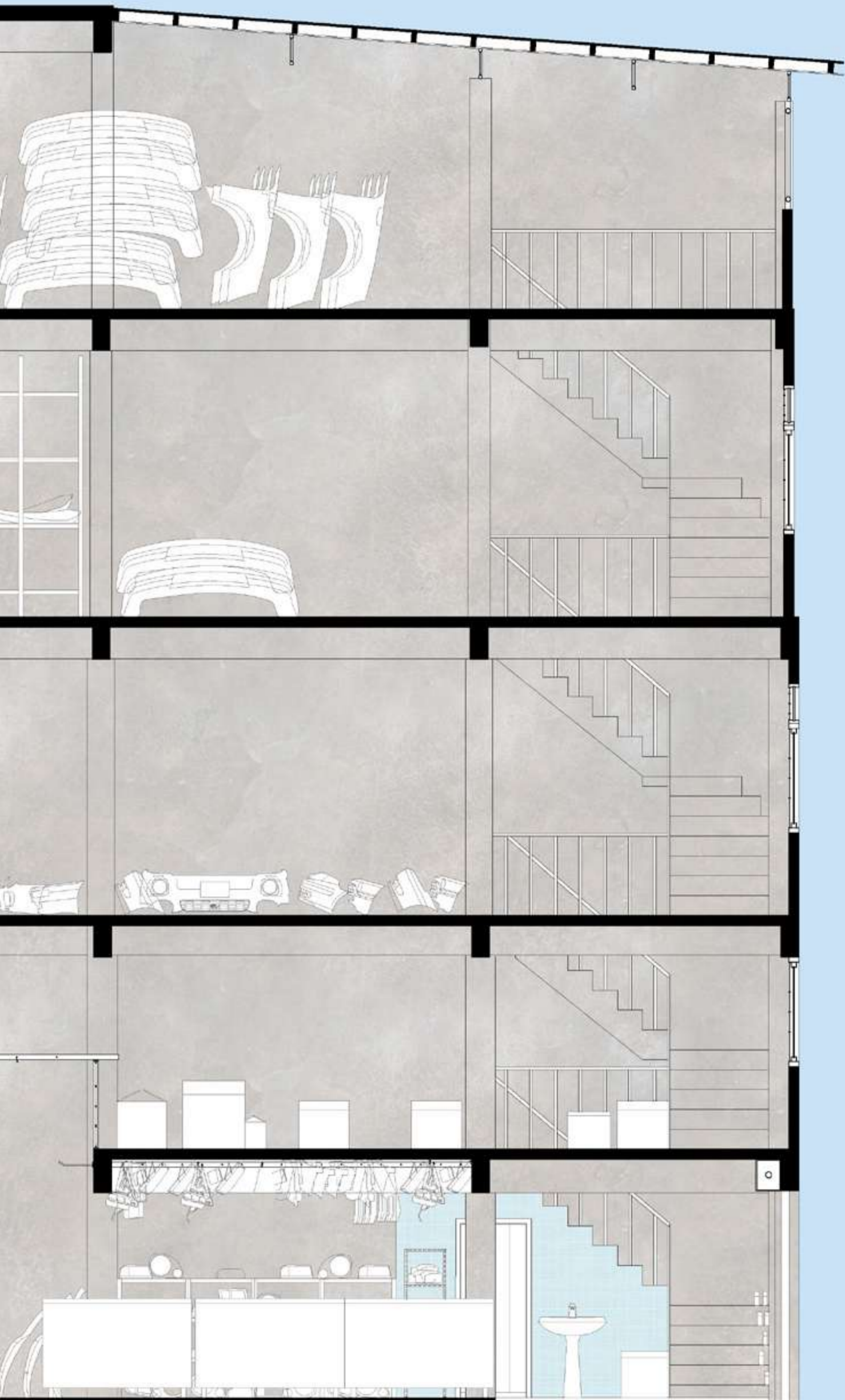
The autoparts shophouse was a small operation, occupying only 4 street-facing shophouse koohah's (bays). Recognizing that its business needed a dropoff area where large delivery trucks can make pick-ups and drop-offs that wouldn't impede traffic, the owner bought the entire rear block as much needed extra storage for their growing inventory. Owning the rear volume also allowed them to have part ownership of the rear alley and thus freely park their delivery trucks as without problem. The shop eventually then added a canopy to cover half of the service alley to protect from sun and rain. The last acquisition was additional shophouse on the streetfront in order to accommodate a more formal street entry and administrative office spaces.











Roofscapes





Roofscape - Aerial Photograph



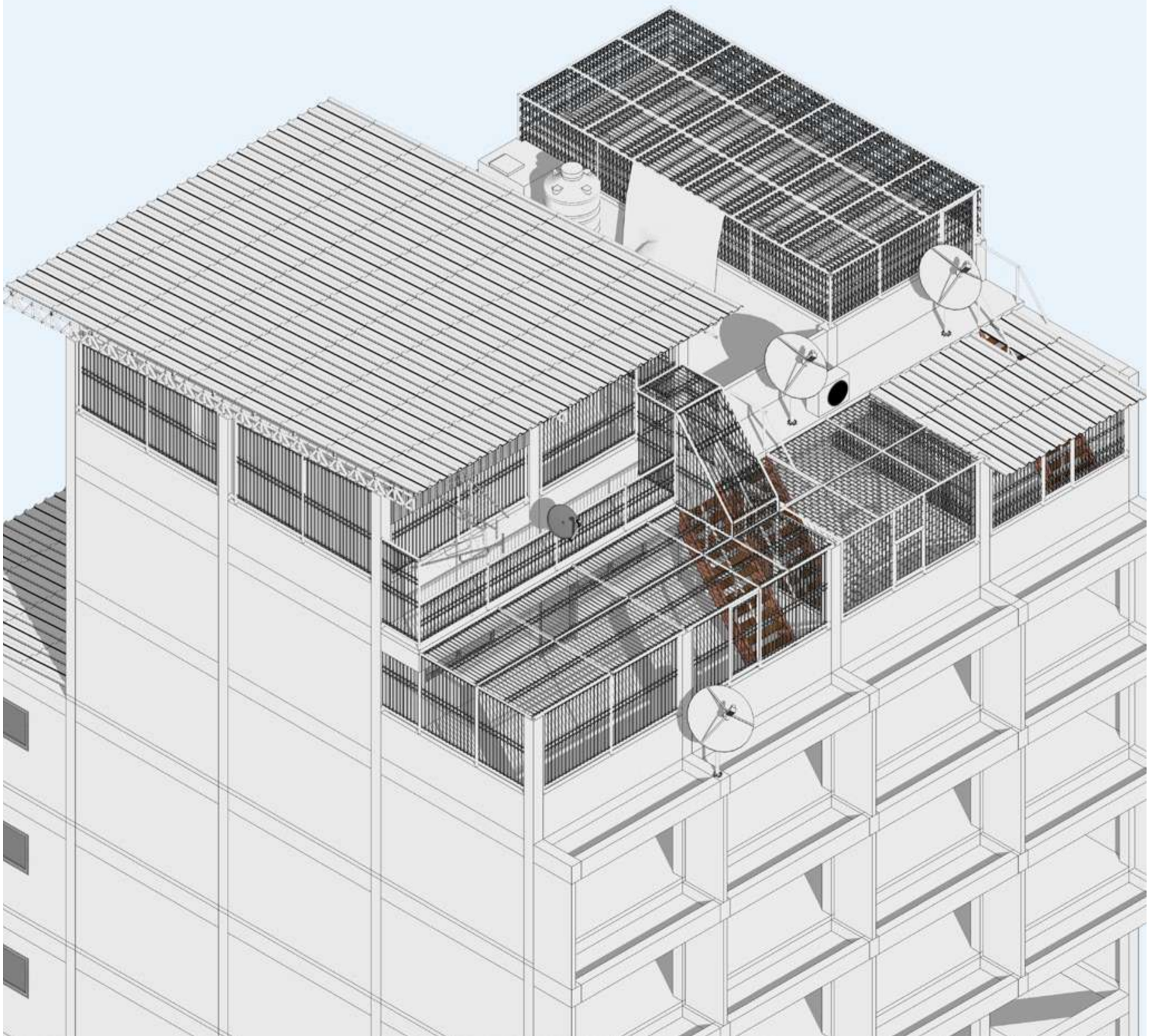


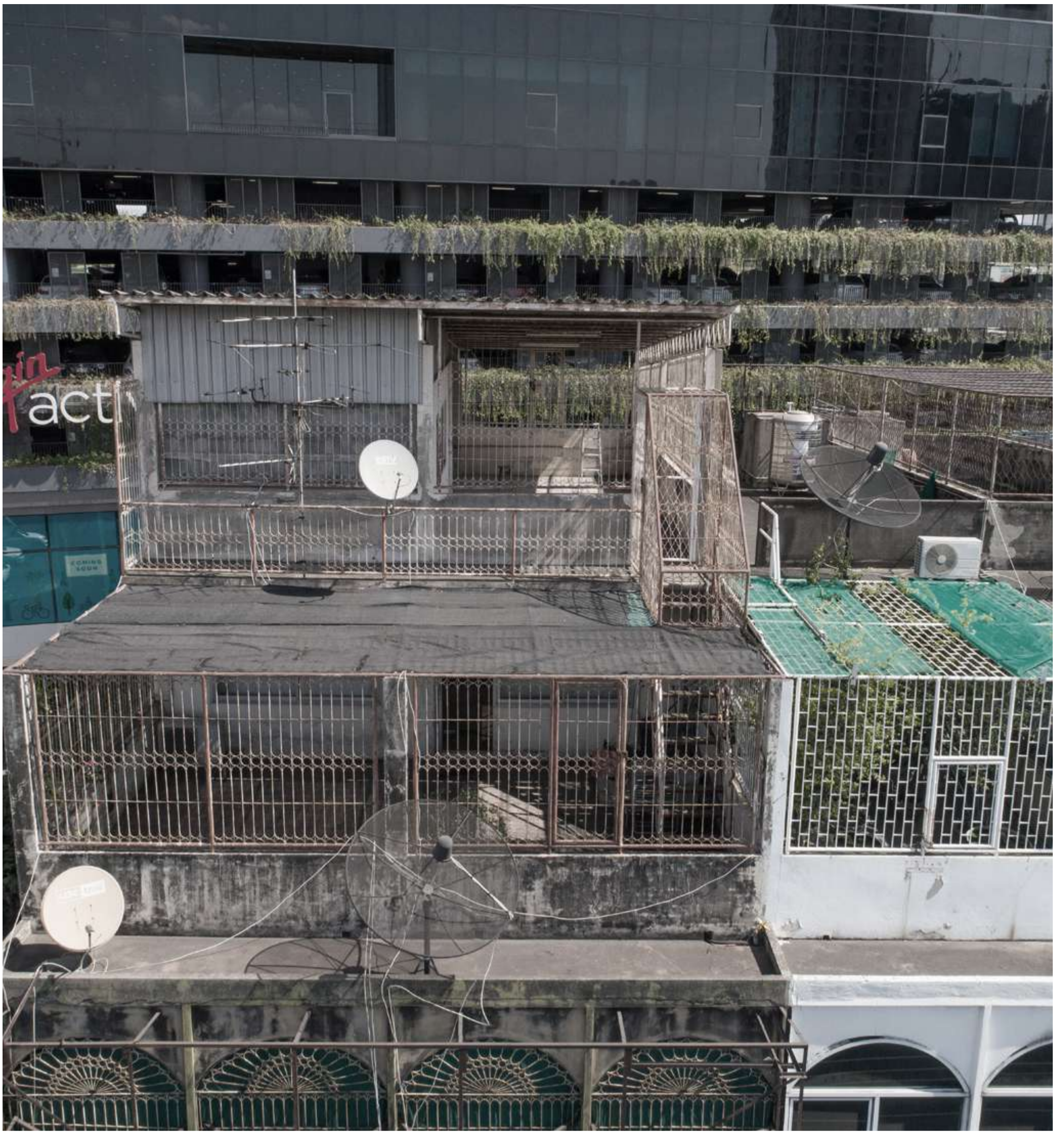
Roof Plan

Roof Addition #1:

The existing shophouse is a 5 storey structure, with the top level containing a penthouse interior that occupies the rear half of the footprint, leaving the front portion uncovered as a *dahd fah*, or open roof deck. This roof case study is located in the large cluster of shophouses occupying the northeast corner of Sukumvit 101/1.

The owner has constructed another interior room on top of the existing 5th floor penthouse volume, making it into a six-story structure. The new penthouse is accessed by an exterior stair (shown in red below) that arises from the 5th floor open terrace, or *dahd fah*. Security bar screens are built to completely cover the horizontal and vertical planes of the 5th floor terrace, sloping upwards to enclose the exterior stair that leads to the 6th floor penthouse, whose exterior perimeter is also covered in the same steel bar grill.



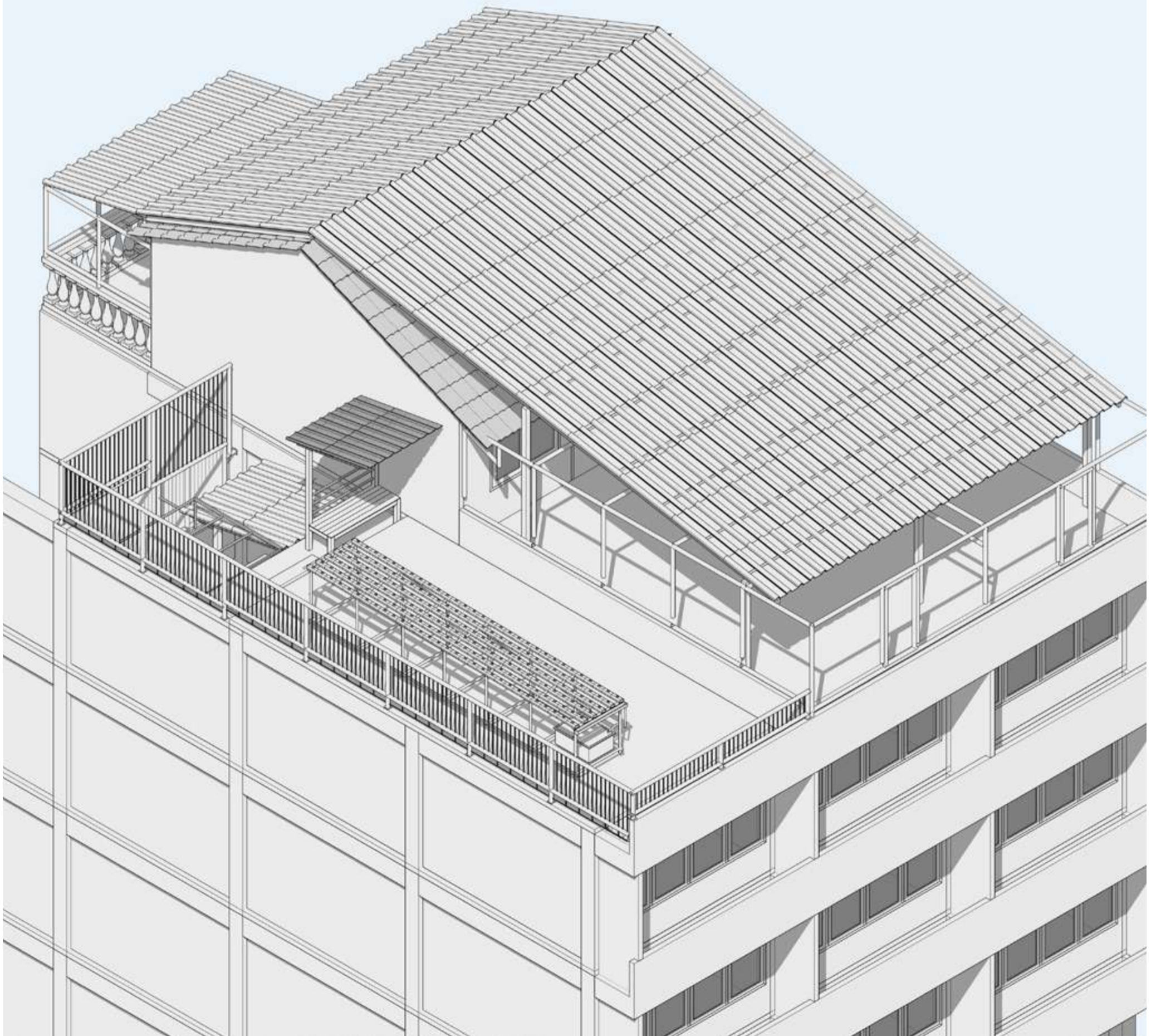


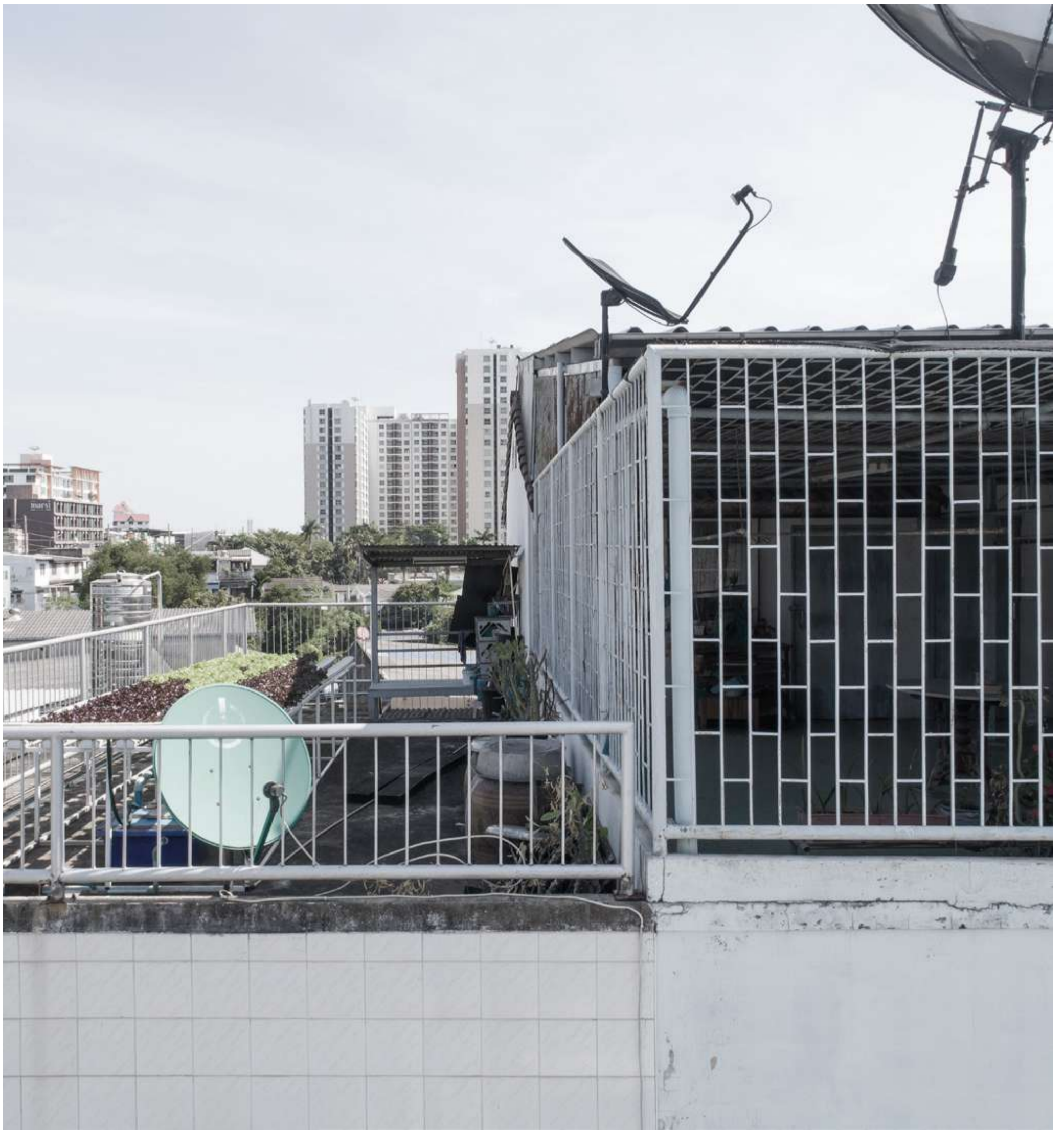
Roof Addition #2:

This owner of this residence occupies 3 koohah's (bays) of a 5-story shophouse block. There is an existing penthouse interior space occupying the rear half of 2 of the 3 koohah's on the 5th floor. This roof case study is located in the large cluster of shophouses occupying the northeast corner of Sukumvit 101/1.

The owner has constructed a unique second 'super' roof that covers the existing gabled roof of the existing 5th floor penthouse roof. The new super roof also extends forward to cover the entire front roof deck, and extends to cover the building's illegal addition in the rear. This new superstructure provides complete shade and protection from rain to the entire 5th floor. The 'double-roof' construction creates an insulating air gap between the new and old roofs, thereby helping to cool the interior of the existing penthouse interior. The new covered roof decks in the front and rear can be used more fully as it is now sheltered from the sun and rain. The exterior spaces are completely wrapped in a security cage composed of 2" diameter steel pipe structural frame with steel flatbar infill screens of traditional Thai *fab pakon* pattern.

The roof of the third koohah is left uncovered, allowing space for an rooftop garden and satellite dish.





Roof Addition #3:

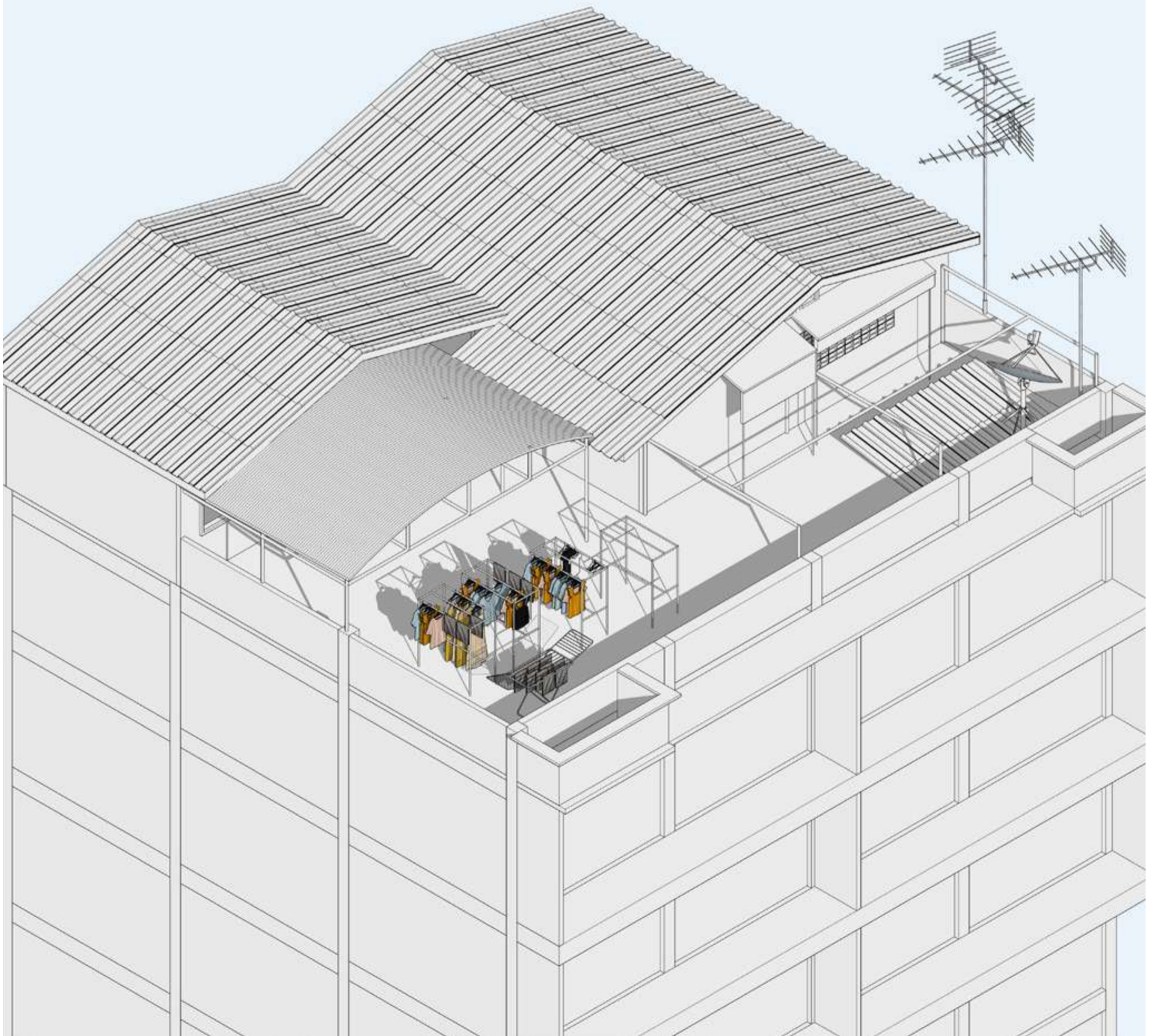
This roof case study is located at the northwest corner of the 101/1 intersection and have immediate adjacencies the True Digital Park Complex

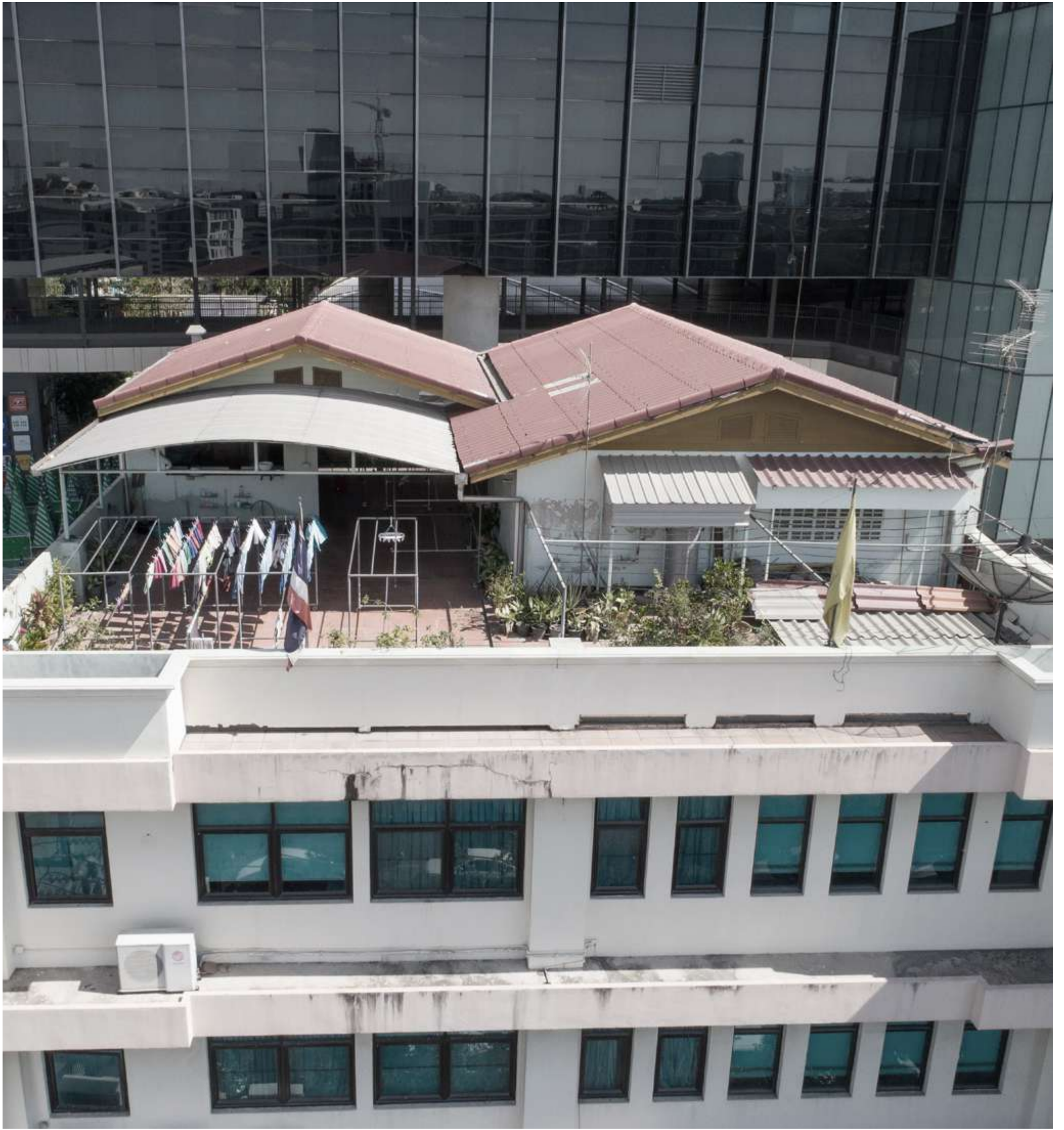
The original condition of this shophouse roof space is a clean exposed floor slab. This 5-story shophouse block contains unusually wide koo-hah's (bays). Each koo-hah is approximately 8 meters wide compared to the standard 4-5 meter width of a typical Bangkok shophouse.

The new addition to the rooftop is new double-gabled interior space that covers 2/3 of the existing roof footprint. The front portion is left open as an exposed terrace for hanging/drying laundry, potted plant garden, and storage space for construction material like additional roof tiles.

A second round of additions were later added in the form of a large curved corrugated roof and smaller canopies to existing window openings. These served to increase overhang area to guard against heavy rains which can become even stronger at the rooftop level of the city.

Out of the four case studies, this is the only roofscape that has no security grills. This may be due to the fact that it is an isolated detached shop house block with no other buildings within close proximity. Its highly exposed location, located between the very busy BTS skytrain platform and True Digital Park, may alleviate the owners' fears for burglary.

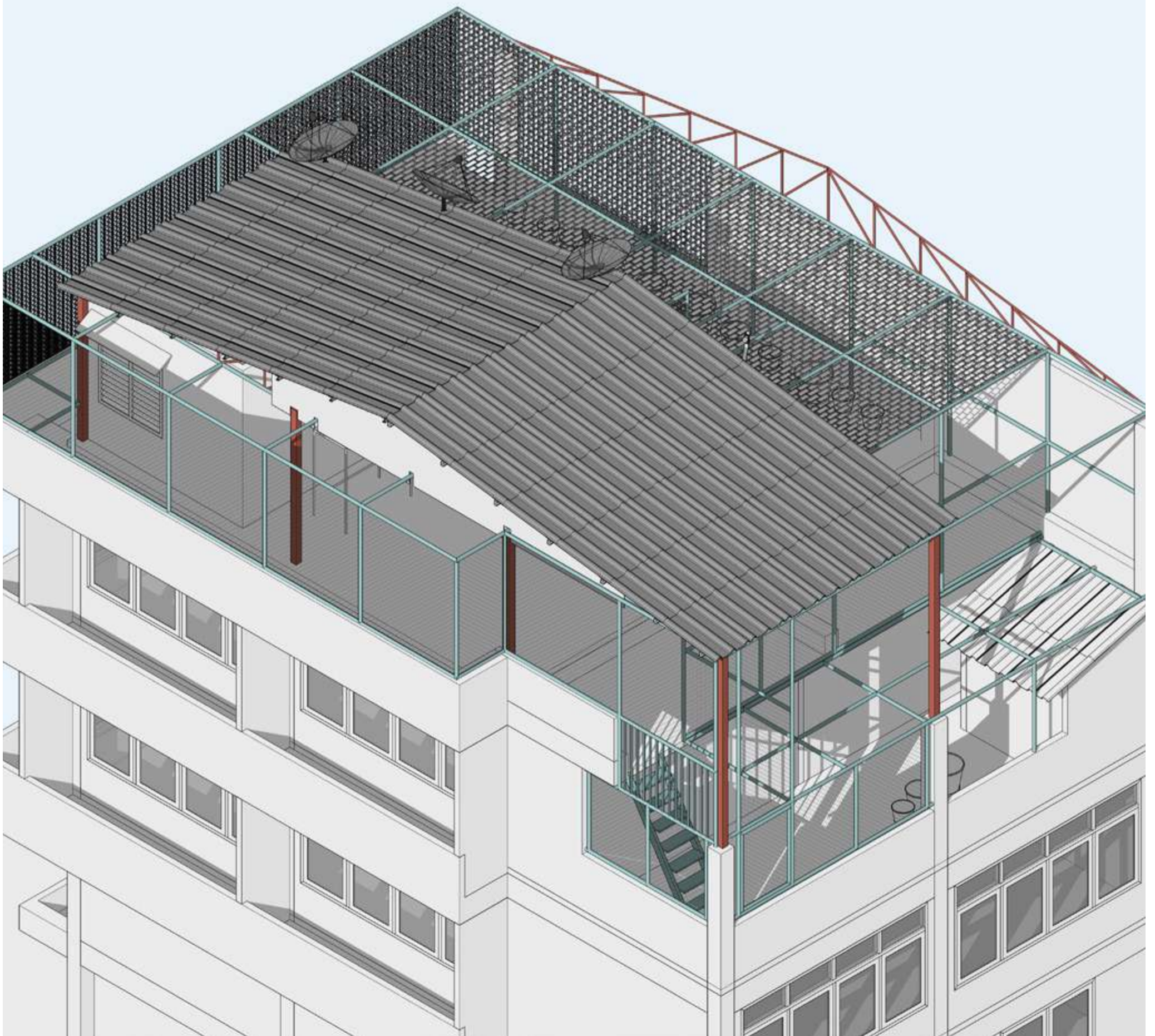




Roof Addition #4:

The existing shophouse is a 5-storey structure, with the top level containing a penthouse interior that occupies the rear half of the footprint, leaving the front portion uncovered as a *dabd jab*, or open roof deck. This roof case study is located in the large cluster of shophouses occupying the northeast corner of Sukumvit 101/1.

Similar to case study #1, a new steep stair (in green) leads up to the new pent house interior space constructed on top of the existing interior space on the 5th floor. The new interior addition takes up only half of the roof plane, leaving the rest as a 6th story terrace. A corrugated cement fiber roof covers the new interior space. A chainlink cage protects the old roof deck, the new 6th story terrace, and the stair that connect the two levels. A lush garden is flourishes inside the 5th storey terrace, under the protection of the cage. This terraced steel framework effectively protects all exposed rooftop spaces from burglars, as well as creating a beautiful ghostly chainlink profile against the skyline.





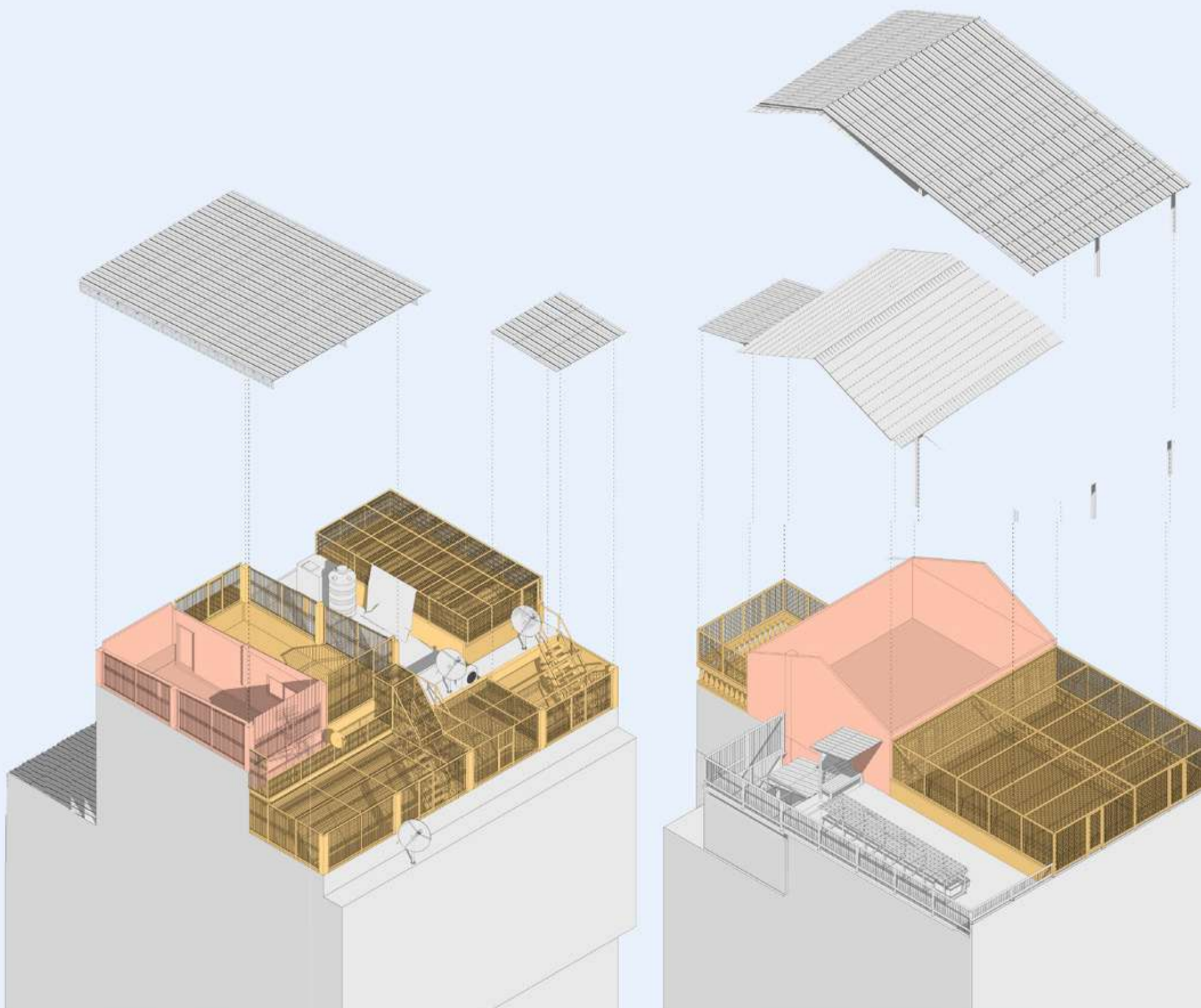
Roof Addition Programs and Strategies:

All of the new rooftop additions on the shophouses include extra interior spaces, creating a new 'penthouse' conditions for the newly colonized roof landscape. In some cases, a new penthouse space is stacked ontop of an old, existing penthouse volume) The roof structure of the added spaces are light steel-frame pitched or gabled roofs, minimizing the added weight for the existing structure.

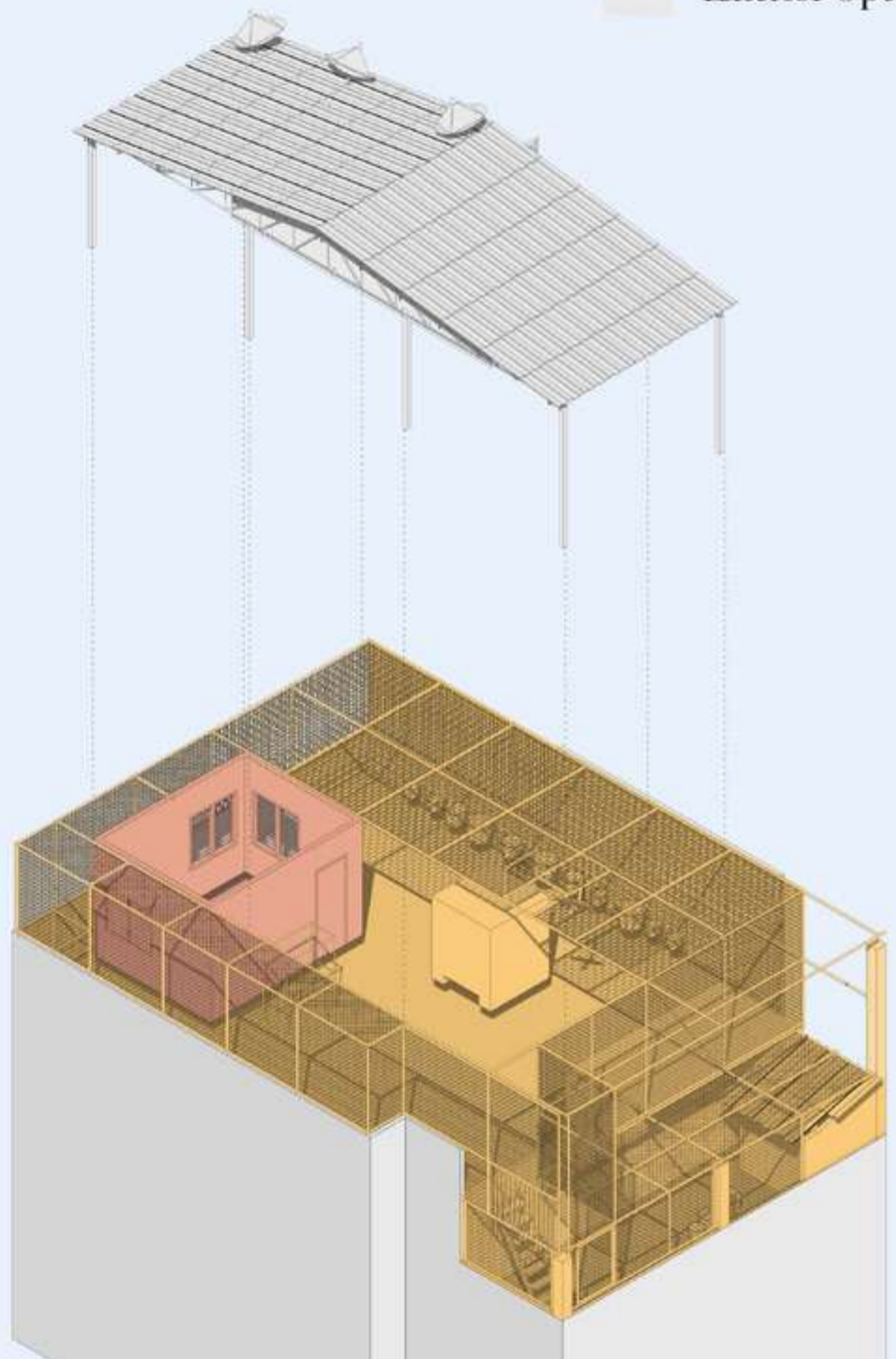
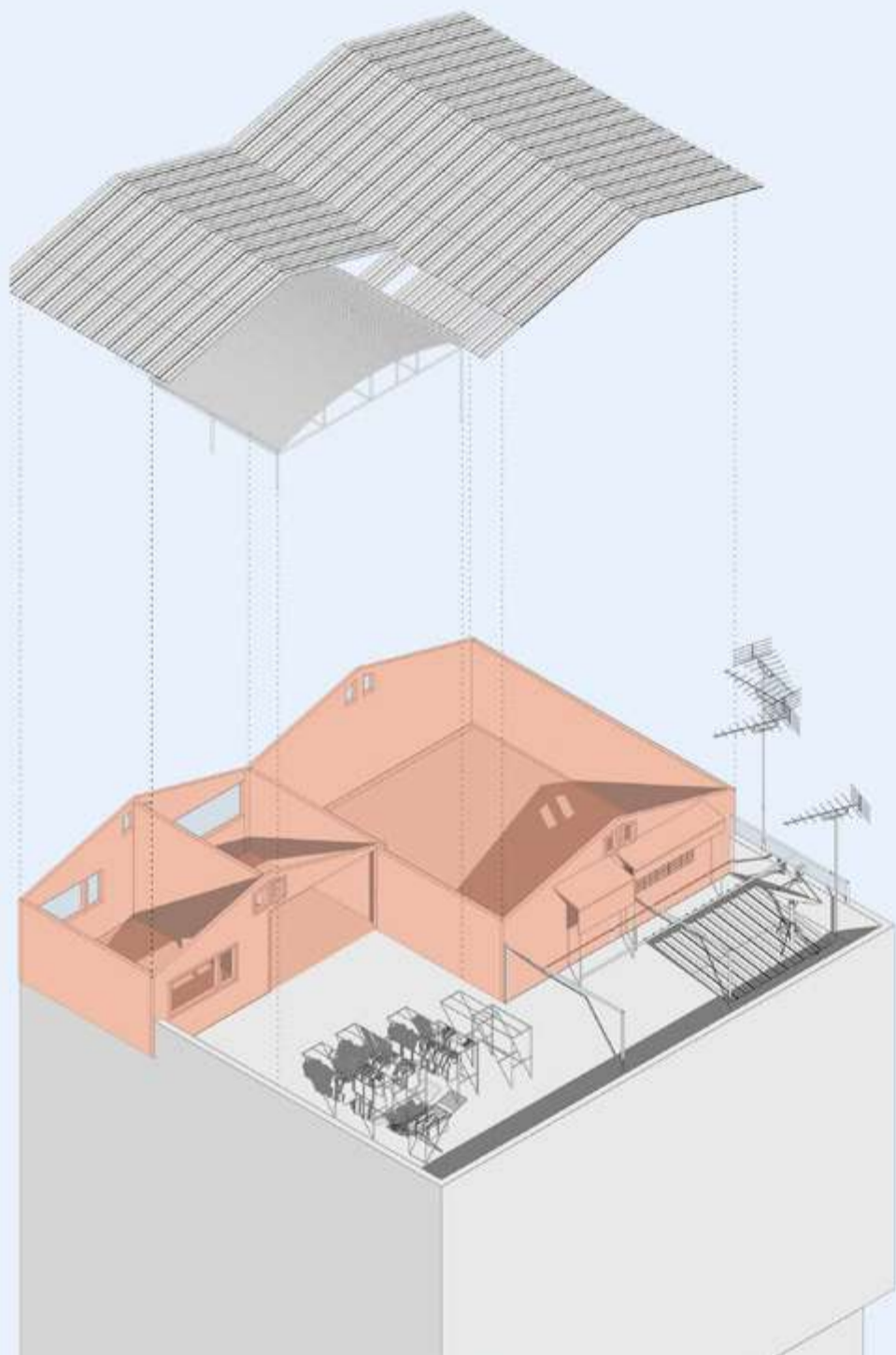
All rooftops surveyed contain additional MEP equipment that was added on after original construction. Mechanical equipment include air conditioning condensers. Electrical equipment include extra telecommunications hardware like TV antenaes and satellite dishes. Plumbing amenities include water tanks, water pumps, and added pipes for extra rooftops faucets and garden hoses.

Three out of the 4 roofscapes surveyed have burglar security fences in both the vertical and horizontal planes, thereby enclosing all useable exterior spaces from the threat of home invasion. These protective second skins allow tenants to colonize the roof plane with patio furniture and potted plants without fear of burglar intrusion. The security grills are of light, perforated or penetrable materials that permit air flow and sun/rain penetration.

The exposed rooftop level experiences harsher local weather conditions than the lower levels. This is reflected in the extra added roof additions: Case study #2 added a second super roof to cover the existing penthouse roof and front terrace. Case study #3 added a second round of additions in the form of another free standing curved canopy and additional overhangs on the penthouse widow openings. All cases studies have some form of canopy protecting select parts of the roof terrace that were originally uncovered, showing that completely exposed outdoor living in Bangkok's roofscape is undesirable due to the harsh sun and monsoon rains in Thailand.



- Interior
- Exterior Envelope
- Exterior Open



Block Elevations



Elevation along Sukumvit Road

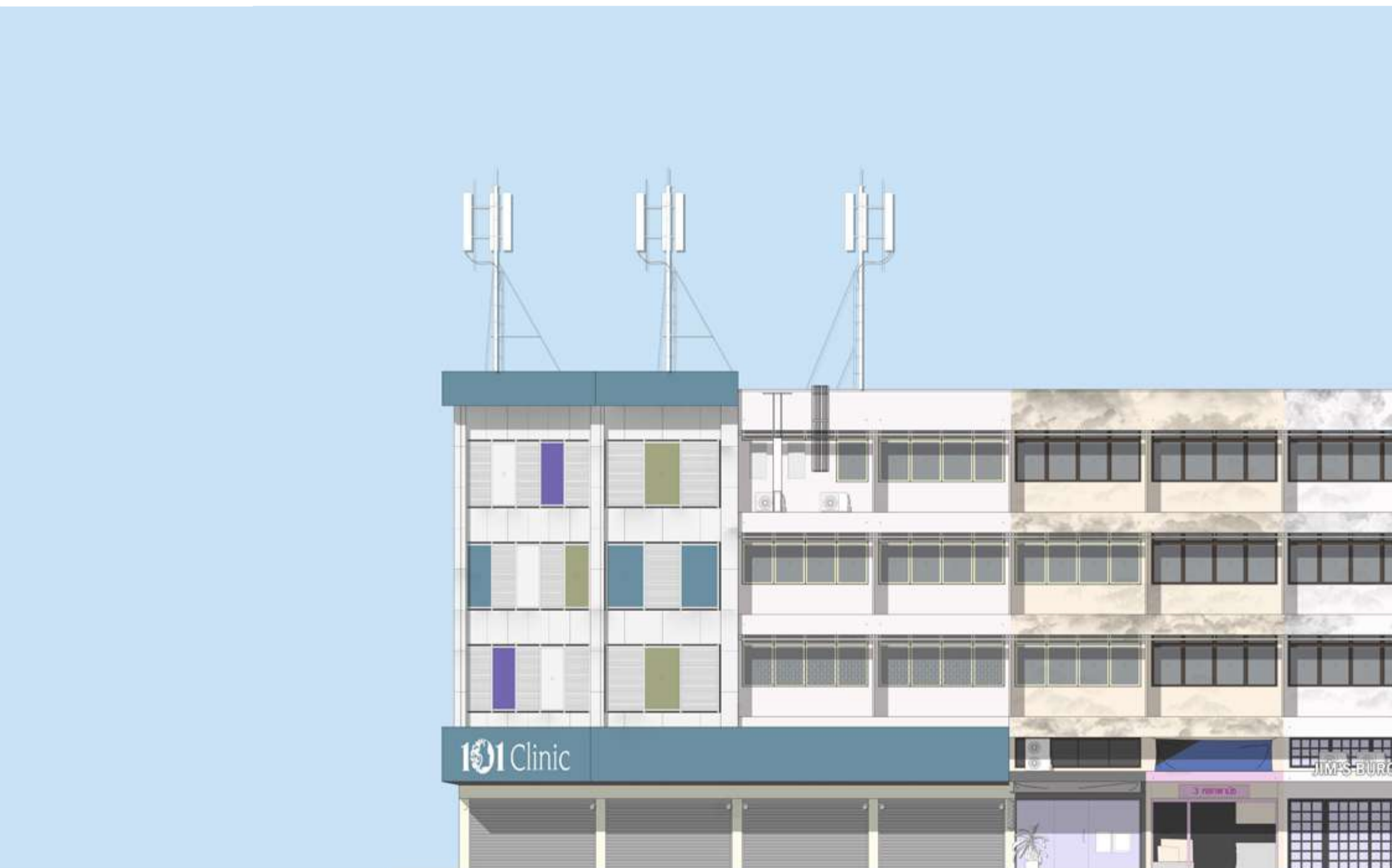


Elevation along Sukumvit Road





Elevation along Sukumvit Road



Elevation along Sukumvit Road





Elevation along Sukumvit 101/1 Road (Northwest Corner)



Elevation along Wachirathamsatit 4 Alley

Elevation along



g Sukumvit 101/1 Road (Northeast Corner)



Elevation along Wachirathamsatit 2 Alley



Elevation along Sukumvi1 101/1 Road (Northeast Corner)



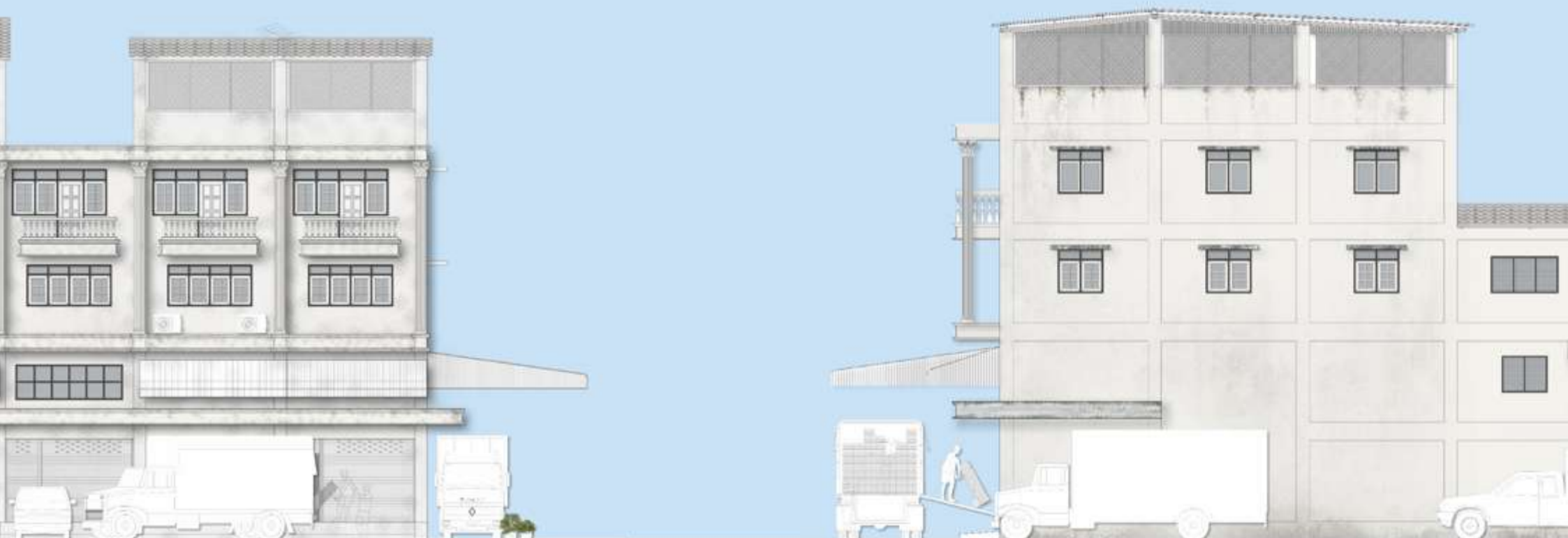
Elevation along Wachirathamsatit 4 Alley



Elevation along Wachirathamsatit 4 Alley



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Elevation along Wachirathamsatit 4 Alley



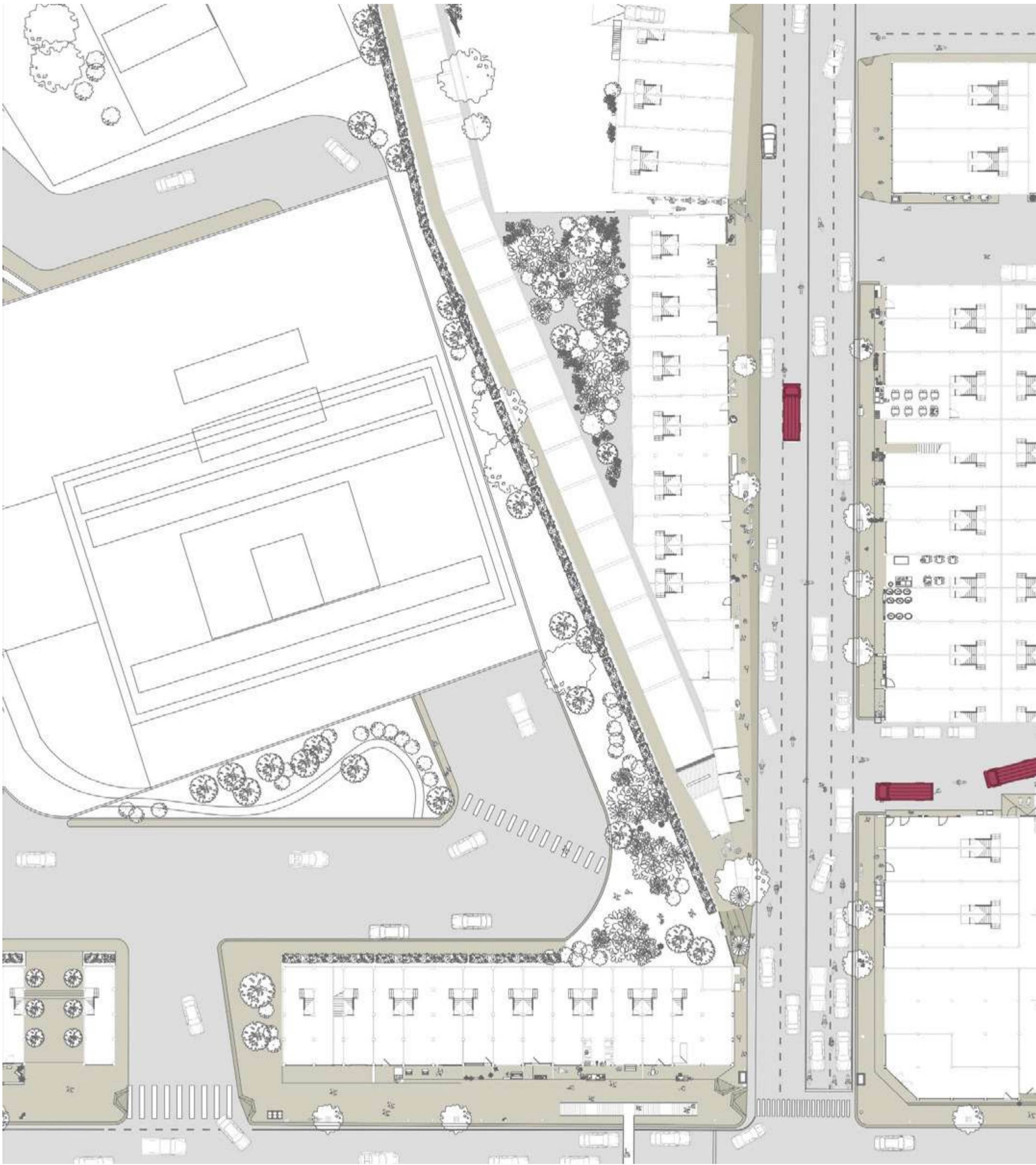
Elevation along Wachirathams



Elevation along Wachirathamsatit 4 Alle




Transportation



 BUS

 KA-POH

 MOTORCYCLE TAXI (WIN)





Sukumvit 101/1 Intersection as Hub for Formal and Informal Transportation Networks:

The site of the shophouse research happens to be at an important node of transportation for the Punnavithi Neighborhood. As Sukumvit Road is one of the major avenues in Bangkok, many lines of transportation converge along its length. This is especially true in the case at the Sukumvit 101/1 intersection. Tuk tuks (Thailand's rickshaw style taxis), 'win' motorcycles (motorcycle taxi's), and mini red busses which travel short routes all have pickup and drop off stations at the intersection of Sukumvit 101/1, immediately adjacent to our shophouse subjects. These informal, and uniquely Thai, delivery systems serve to transport passengers who live along Sukumvit 101/1 to the major bus stops and the Punnavithi BTS station at the main Sukumvit Road. The proximity of the shophouses to this transportation hub serves as a great advantage to its inhabitants, granting accessibility to both city-scale transports as well as the neighborhood-scale delivery systems. The tuk tuks and red busses utilize the alley system in the shophouse cluster at the northeast intersection as 'u-turn' stations. The win motorcycle taxi's have two pickup stations, hidden between and behind the shophouse blocks on the northwest corner of the intersection.



The Red Mini Bus

Bangkok's iconic red mini busses travel short circular routes, picking up and delivering passengers at the mouth of a soi (alley) at a major intersection to the ends of the soi. They are inexpensive delivery systems that serve to carry passengers deep into neighborhoods, where big city buses cannot.

At the Sukumvit 101/1 intersection, The red mini buses utilize the alley system in the shophouse cluster at the northeast intersection as 'u-turn' stations and passenger drop-off/pick-up stations. They make their u-turns at the second internal alley nearest to Soi Sukumvit 101/1, so that their route does not overlap with that of the 'tuk tuks' drivers, who use the first alley to make their u-turn.



'Tuk Tuks'

'Tuk tuks' are open-air, short-route, rickshaw style taxis that transport passengers from the interior of a soi (alley) to intersection at the nearest major avenue(s). They may serve as collective transport where many passengers share the ride like a public bus, or they may operate as independent taxi's, servicing only one group of passengers at a time. In the case of the latter, the passenger can request personal routes and destination and collectively decide on a price with the driver.

At the Sukumvit 101/1 intersection, The tuk tuks utilize the alley system in the shophouse cluster at the northeast intersection as 'u-turn' stations and passenger drop-off/pick-up stations. They make their u-turns at the first alley nearest to Soi Sukumvit 101/1, so that their route does not overlap with that of the mini red buses, that uses the second alley to make their u-turn.

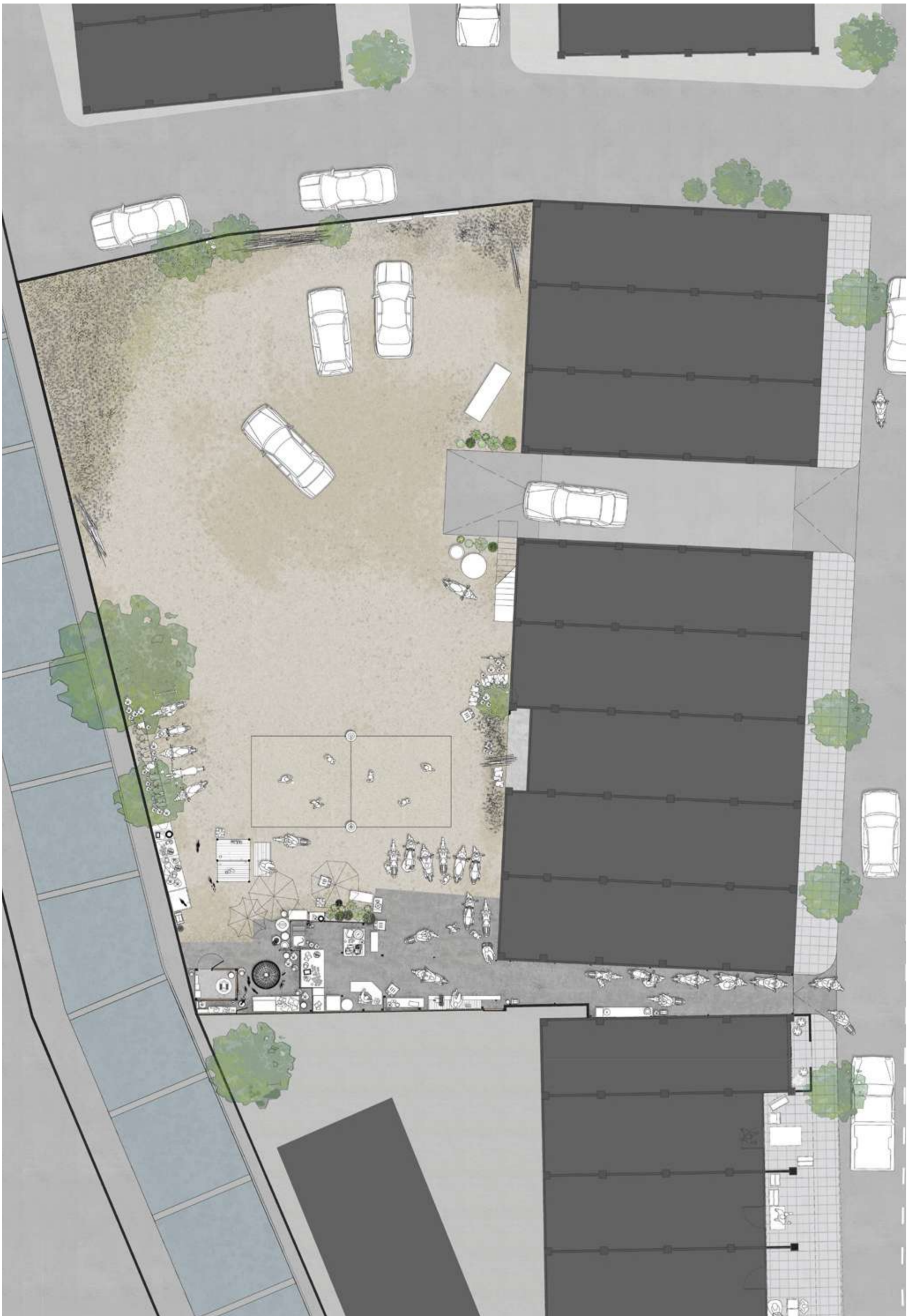


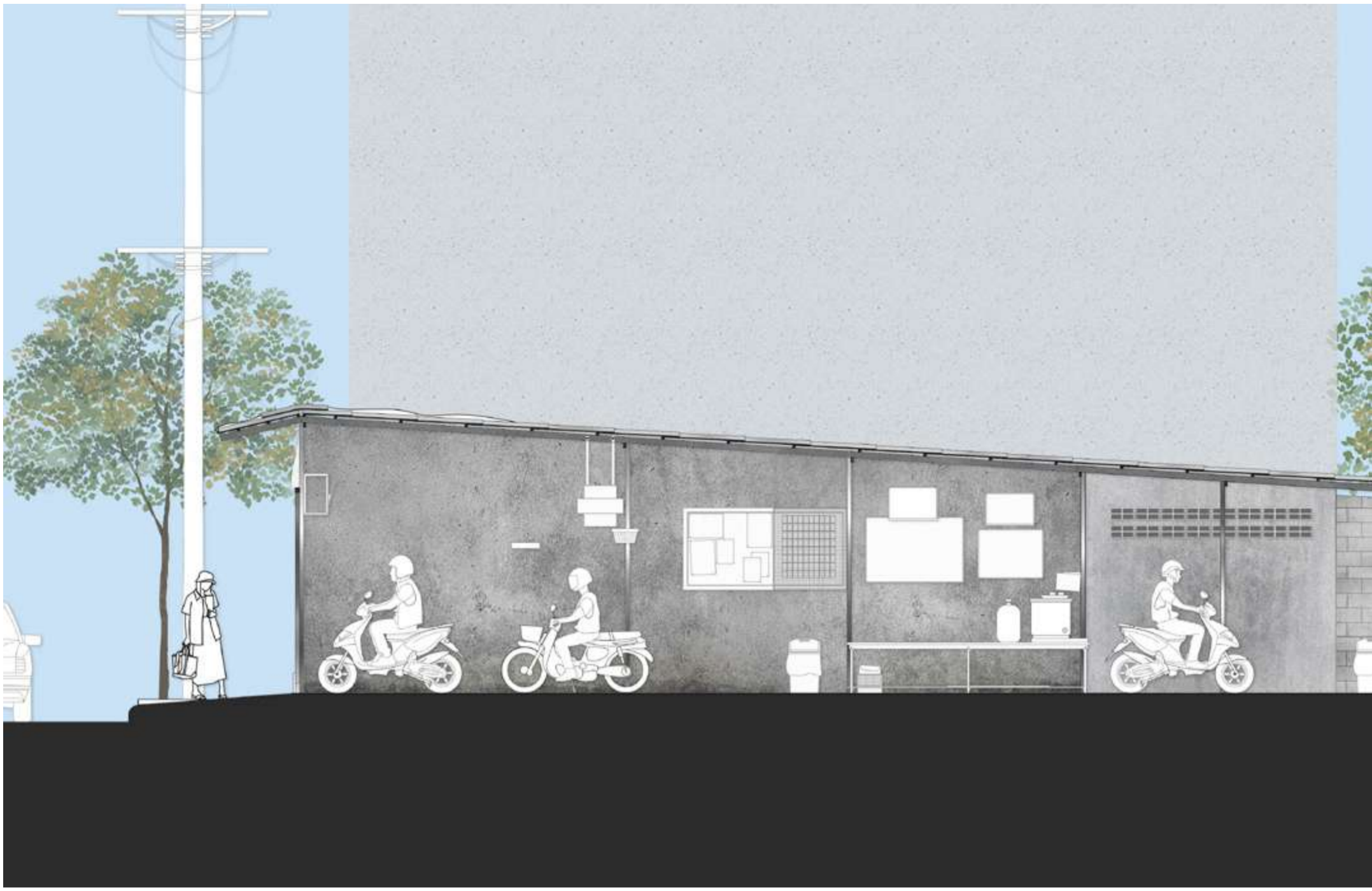


'Win' Motorcycle Taxi's

'Win' motorcycles are motorcycle taxi's that are flexible and fast in delivering passengers to their destinations. As the vehicles are small and mobile, they can skirt through and by-pass traffic more effectively than the tuk tuks and red mini buses. Win motorcycle stations are common sites at major intersections in Bangkok.

The win motorcycle taxi's in our site have two pickup stations at the northwest corner of the intersection. The first station is located curbside as one rounds the corner into Soi Sukumvit 101/1. The second station is located in a gap between two shophouses, allowing for the taxi's to line up in greater number as not to create traffic congestion along the main road. This alley station leads into a clearing at the back of the shophouse block, which has been colonized as an informal motorcycle taxi pocket community. Within this open area the cyclists have created a covered seating area, motorcycle service station, additional cycle parking, outdoor kitchen, and chicken coop area. Scavenged materials are used to create light canopy structures attached to the perimeter walls, granting cover from sun and rain. The central open area is utilized as a taw-graw court.



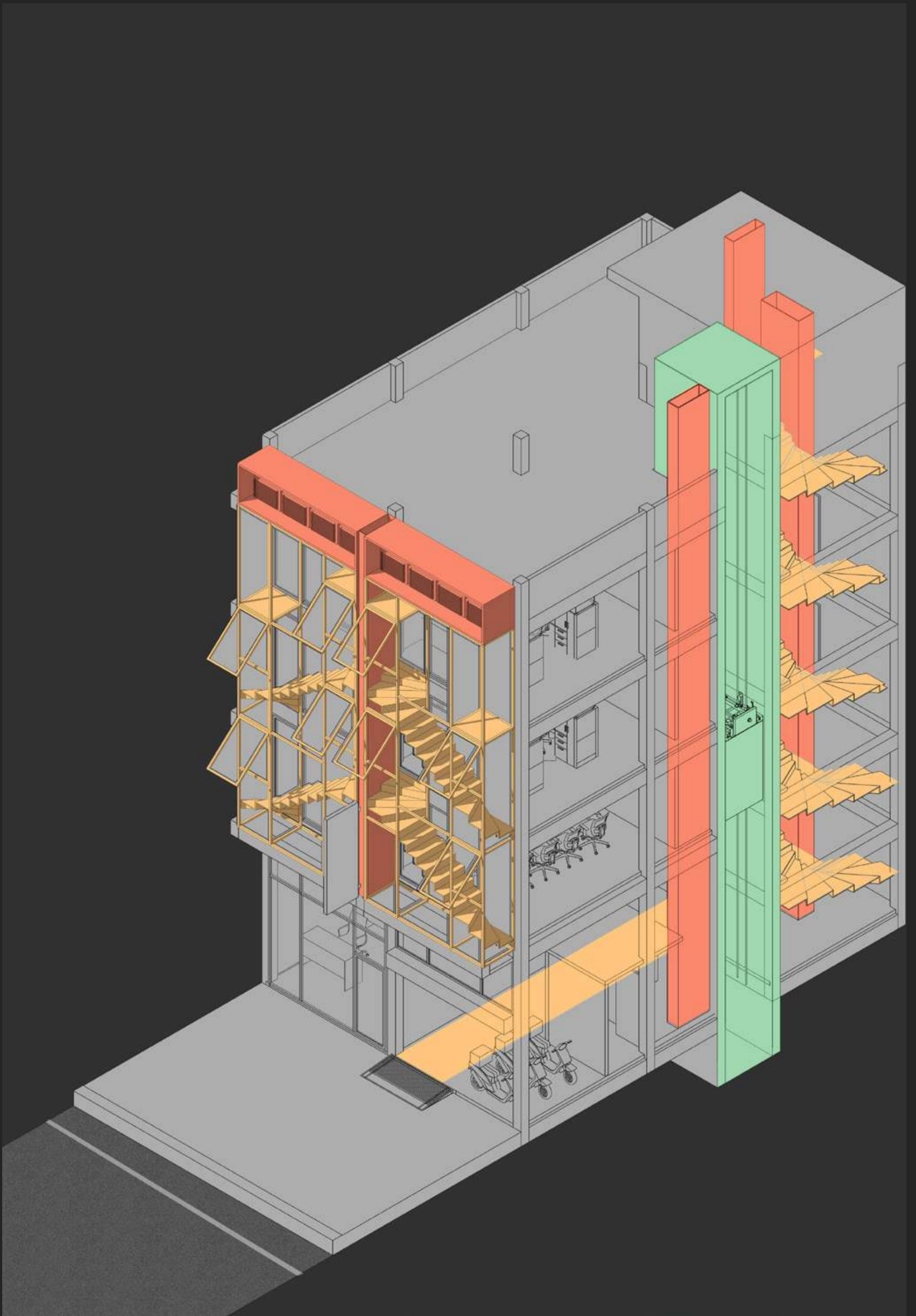


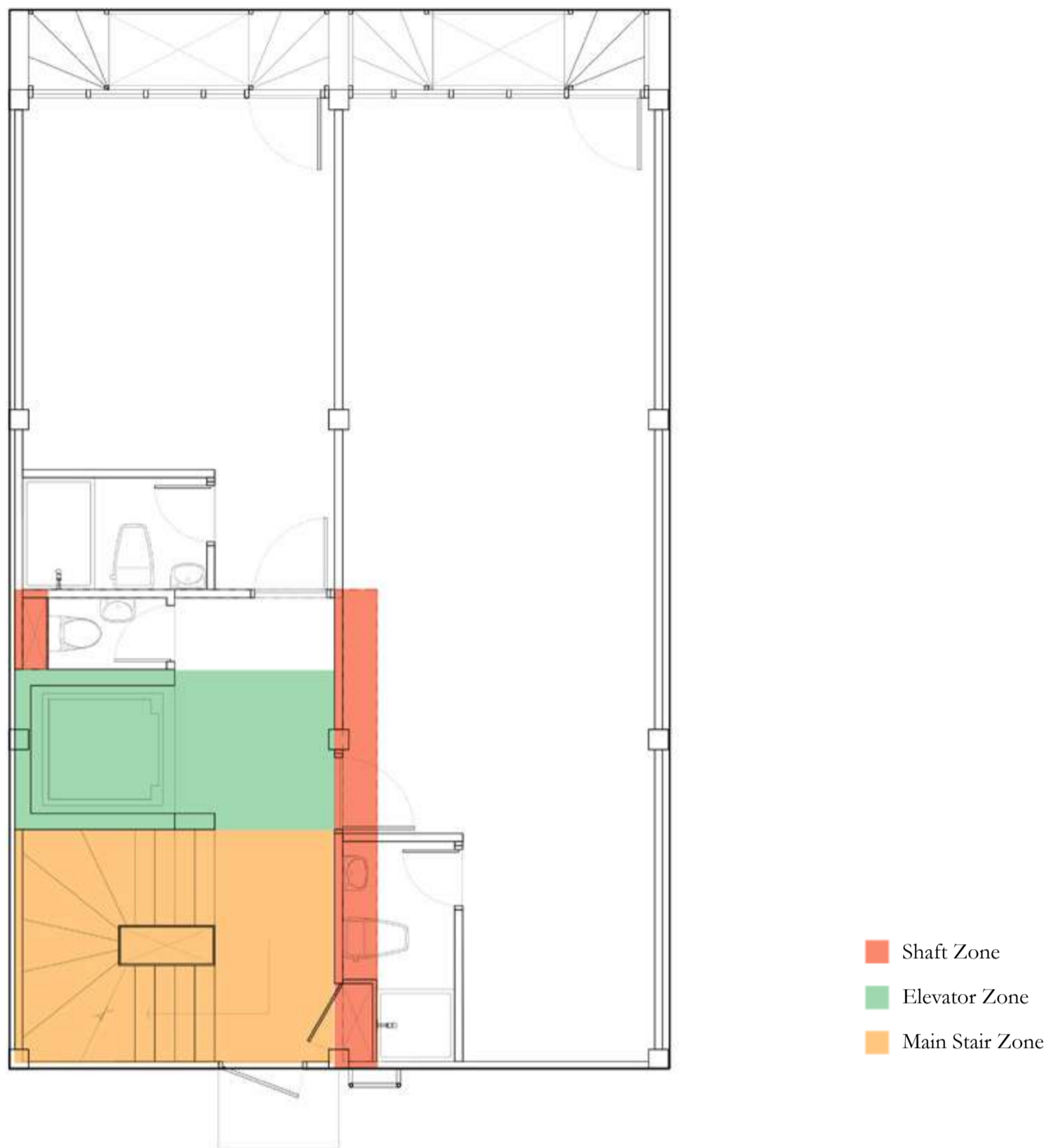






Shophouse Prototype Design Templates





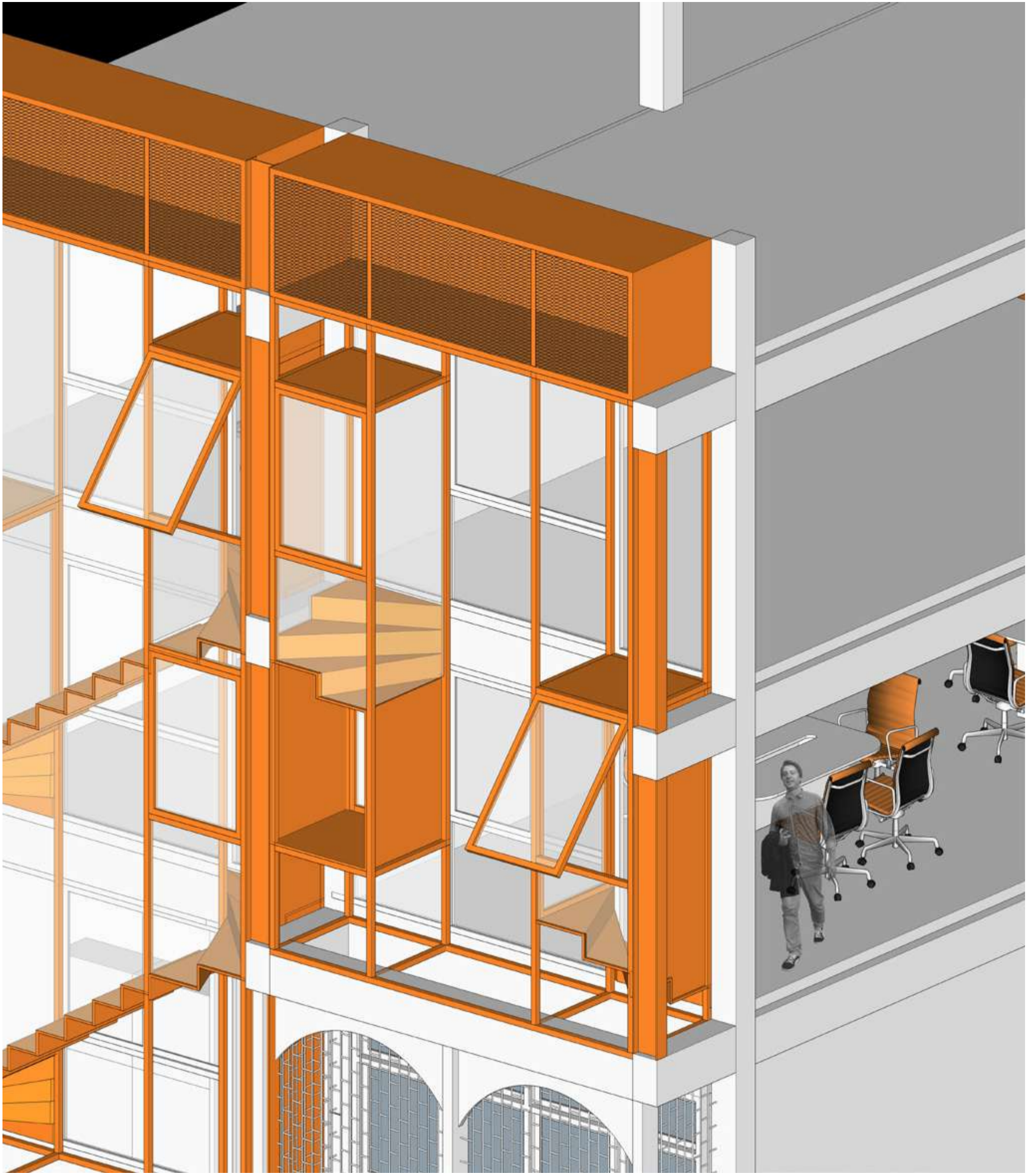
2-Bay Shophouse Prototype:

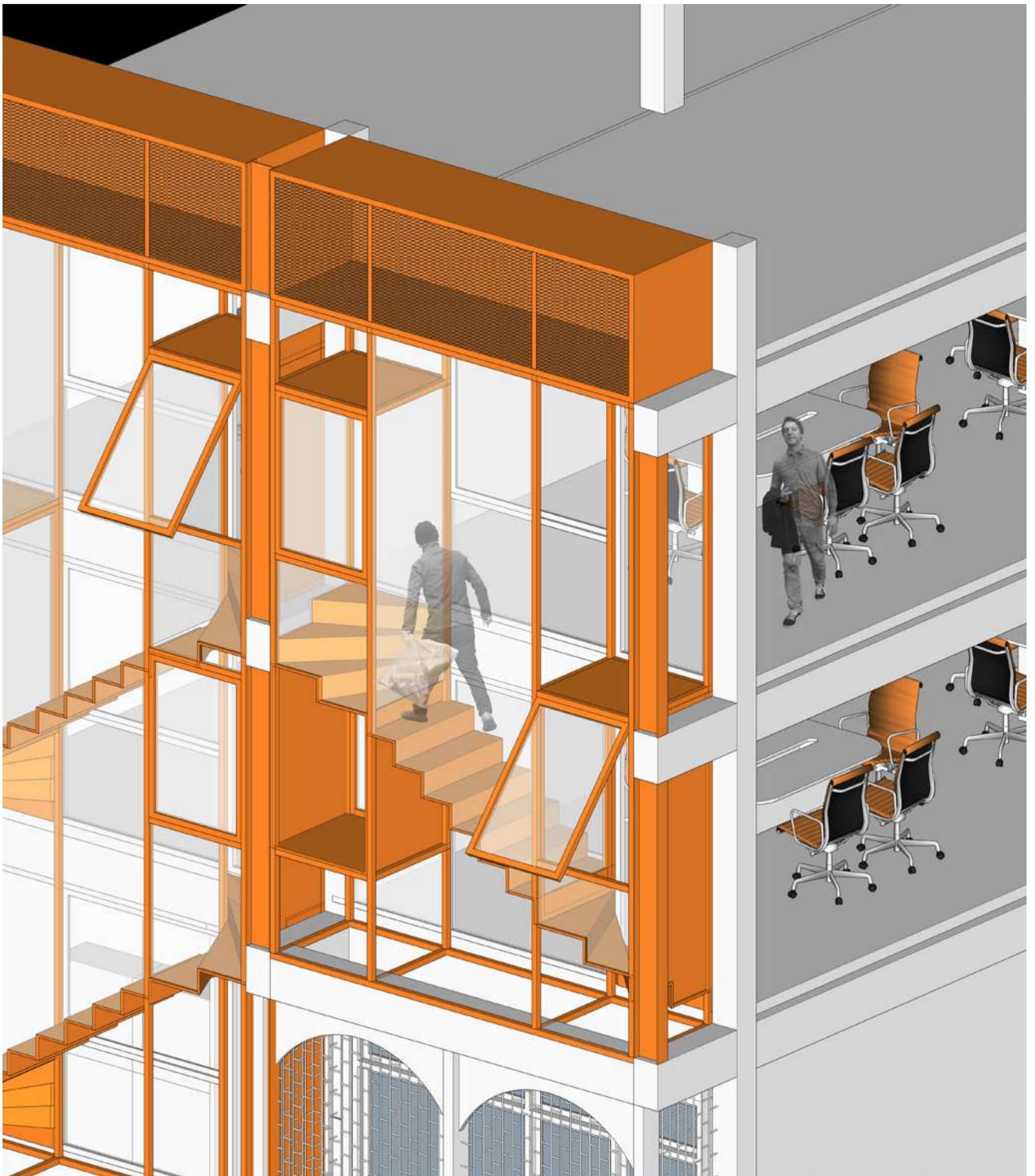
The 2-bay shophouse prototype allows for the flexibility of multiple programs and users to customize the interior spaces to meet their needs. The stair of the existing shophouse will be removed and replaced with a new circulation and utilities core that contains a new stair, new MEP shafts, and a compact elevator (if desired). This new core will occupy one and a half structural bays at the rear of each shophouse module.

As the new shophouse prototype is designed to accommodate multiple tenants, the new circulation core will effectively service users on every floor. At the street level, a new public entry and compact corridor will be created, allowing tenants and their visitors to access the main stair and elevator without having to bypass existing ground floor programs, as was the case in previous shophouse conditions. The new ground floor essentially becomes a public lobby to be shared by all. The area immediately adjacent to the sidewalk corridor can be utilized as a small lobby for guests and delivery people who are awaiting tenants on the upper floor to come down. It can also potentially serve as motorcycle parking, to alleviate the problems of traffic-impeding motorcycle curbside/sidewalk parking.

New MEP shafts will be located in the perimeter of the new core, allowing for vertical distribution of mechanical components (A/C pipes and ventilation shafts), electrical components (electrical wiring and wireways), and plumbing components (clean water and soil pipes). Bathrooms on each level can be directly attached to this MEP shaft zone, thereby facilitating connections to necessary sanitary pipework.

The shophouse prototype also contains a new 'occupiable' facade. This component accommodates a second stair that can be customized to create vertical linkages for tenants on the upper floors. The facade component will also contain another MEP shaft zone for the front of the shophouse. The top of the facade has compartments for air conditioning condensers, that can be serviced from the roofscape.

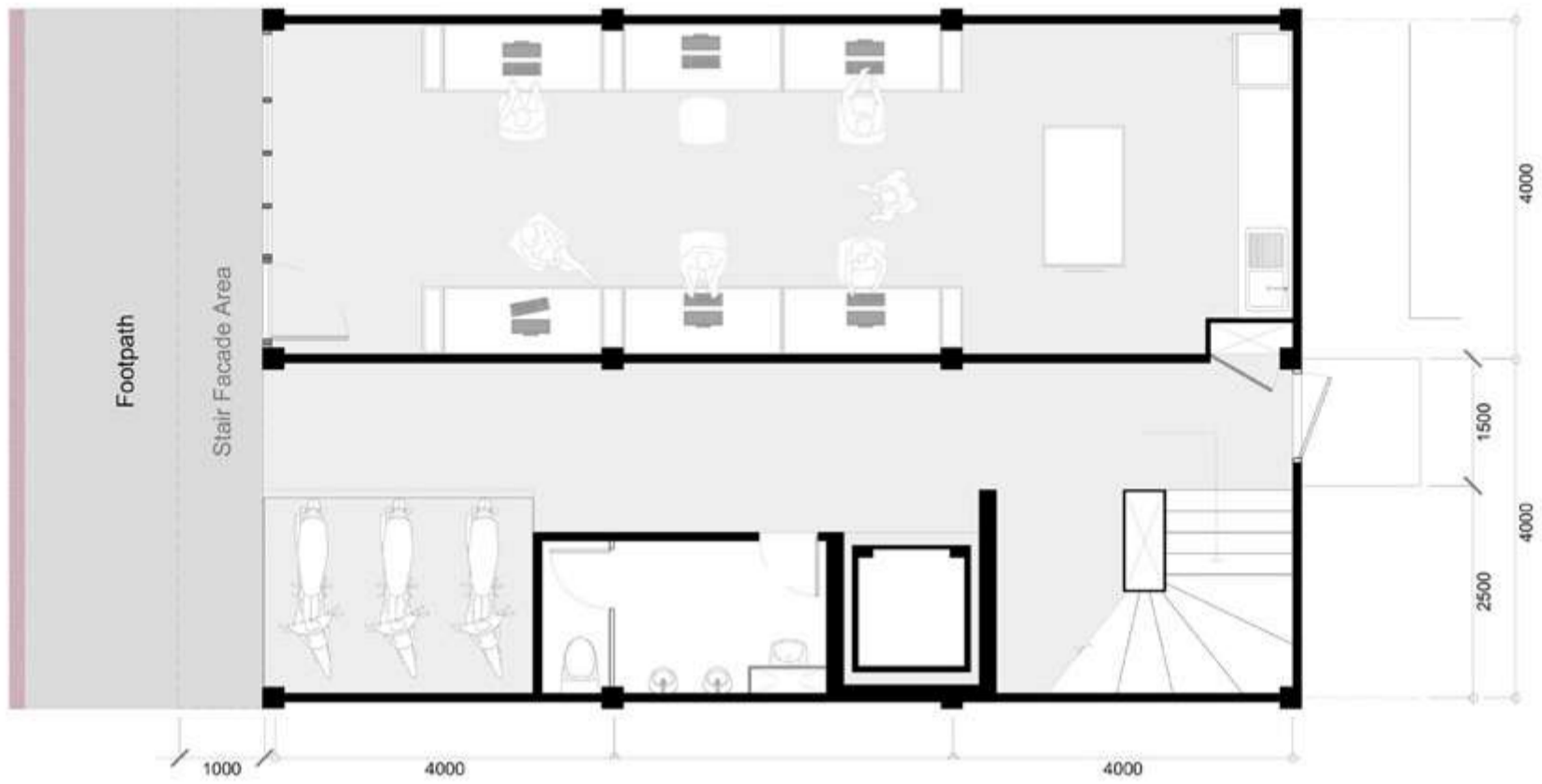




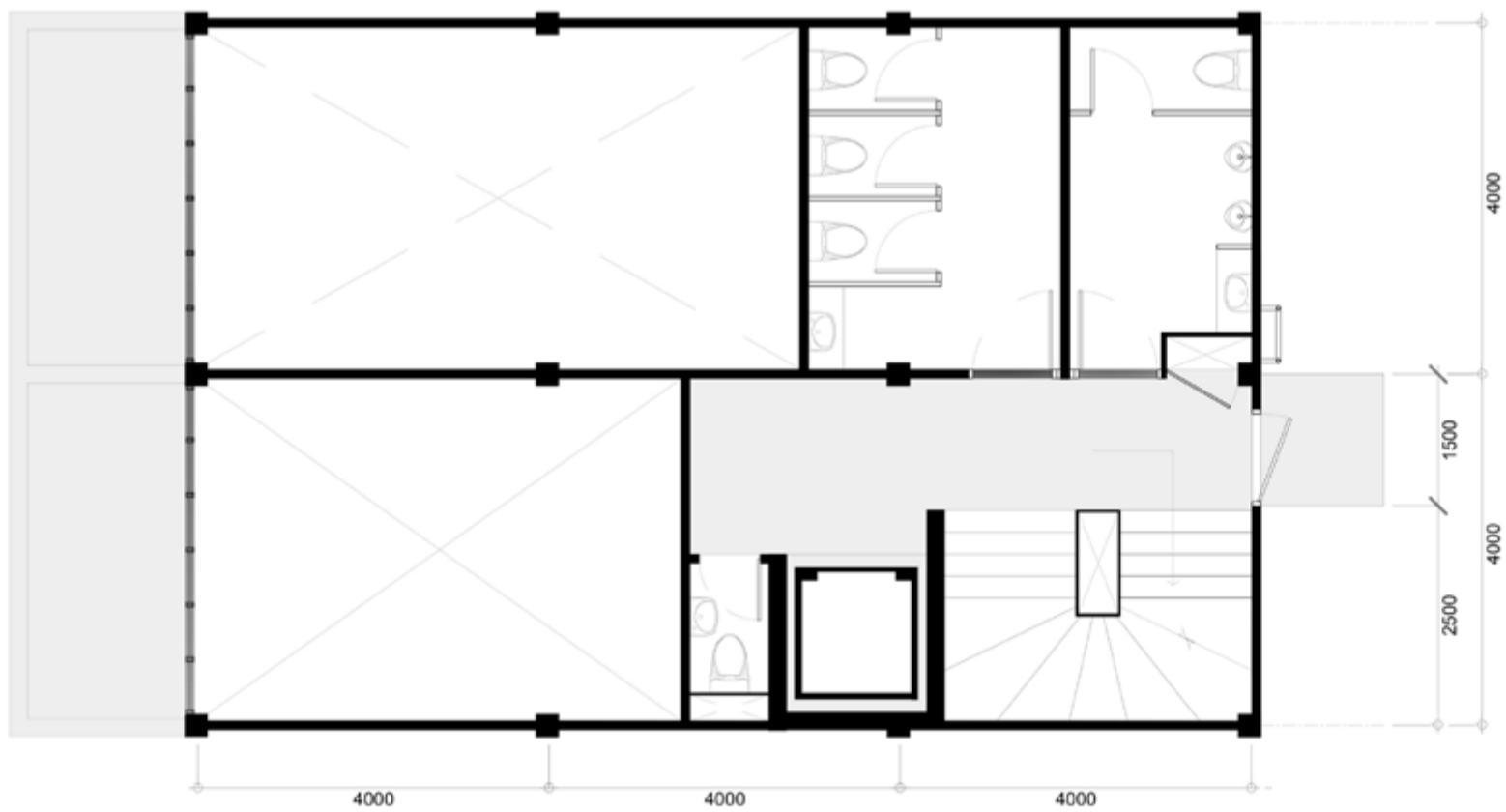
The Occupiable Street Facade

The new occupiable facade component accommodates a single flight second stair that can be customized to create vertical linkages for tenants on the upper levels. Two operable windows and fixed glass panes will allow light and air into the interior space. In the levels where the stair isn't required the six middle steps can be removed. The 4 remaining steps on either side become stepped platforms used to access the operable windows and can also serve as shelving for potted plants. The facade component also serves as a second skin and insulating zone to direct sun. At the top of this facade are ventilation panels allowing hot air to escape, thereby creating a 'stack effect' and moves air throughout the stair case. The occupiable facade also contains additional MEP shaft zones for the front zones of the shophouse. The top of the facade has compartments for air conditioning condensers, that can be serviced from the roof scape. Bringing an active circulation element to the streetfront also visually activates the life on the street and sidewalk below, replacing previous neglected exterior balcony and overhang conditions which were common Bangkok eye-sores (laundry-hanging space or air condensor chambers).

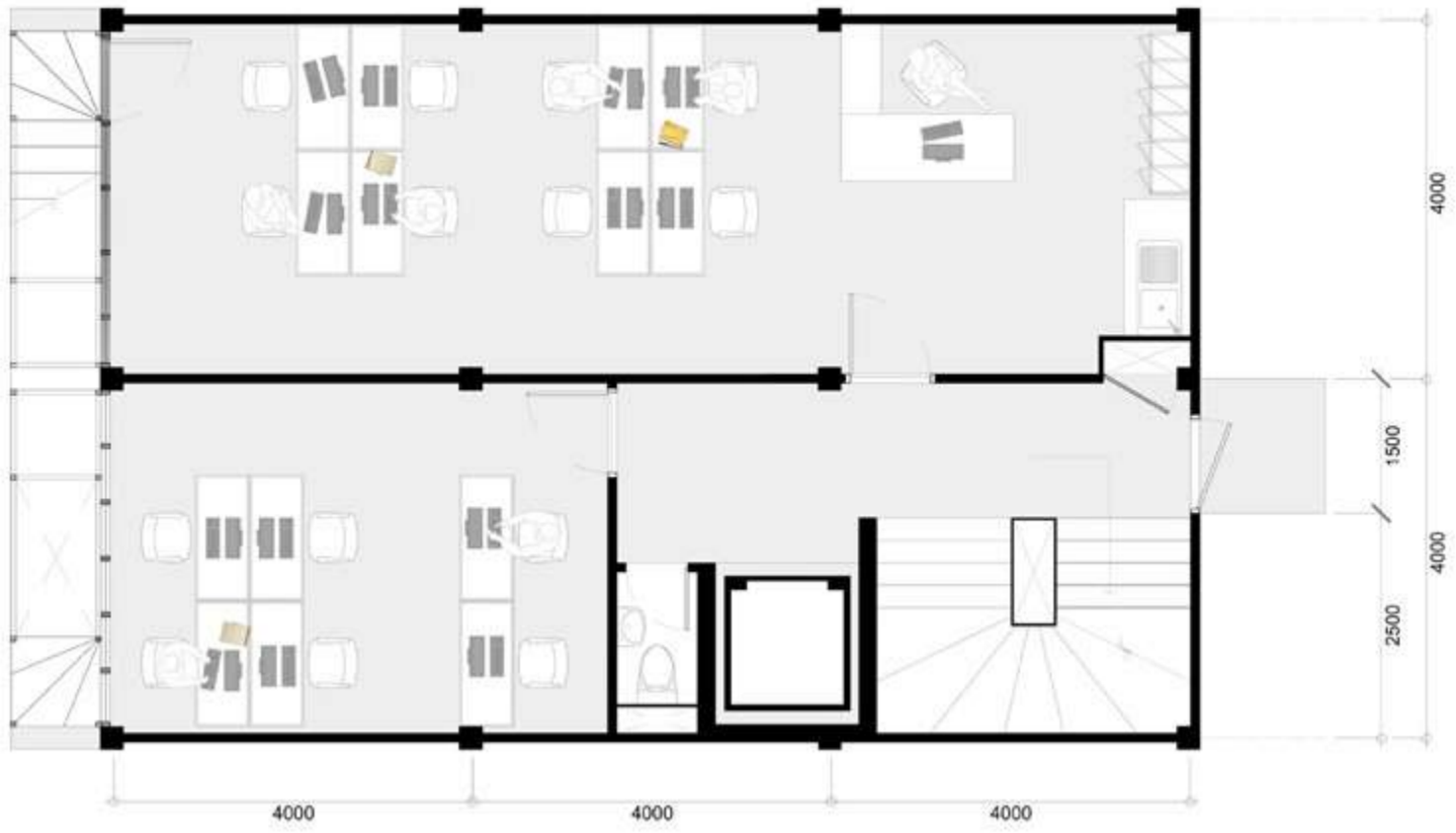
OFFICE LAYOUT



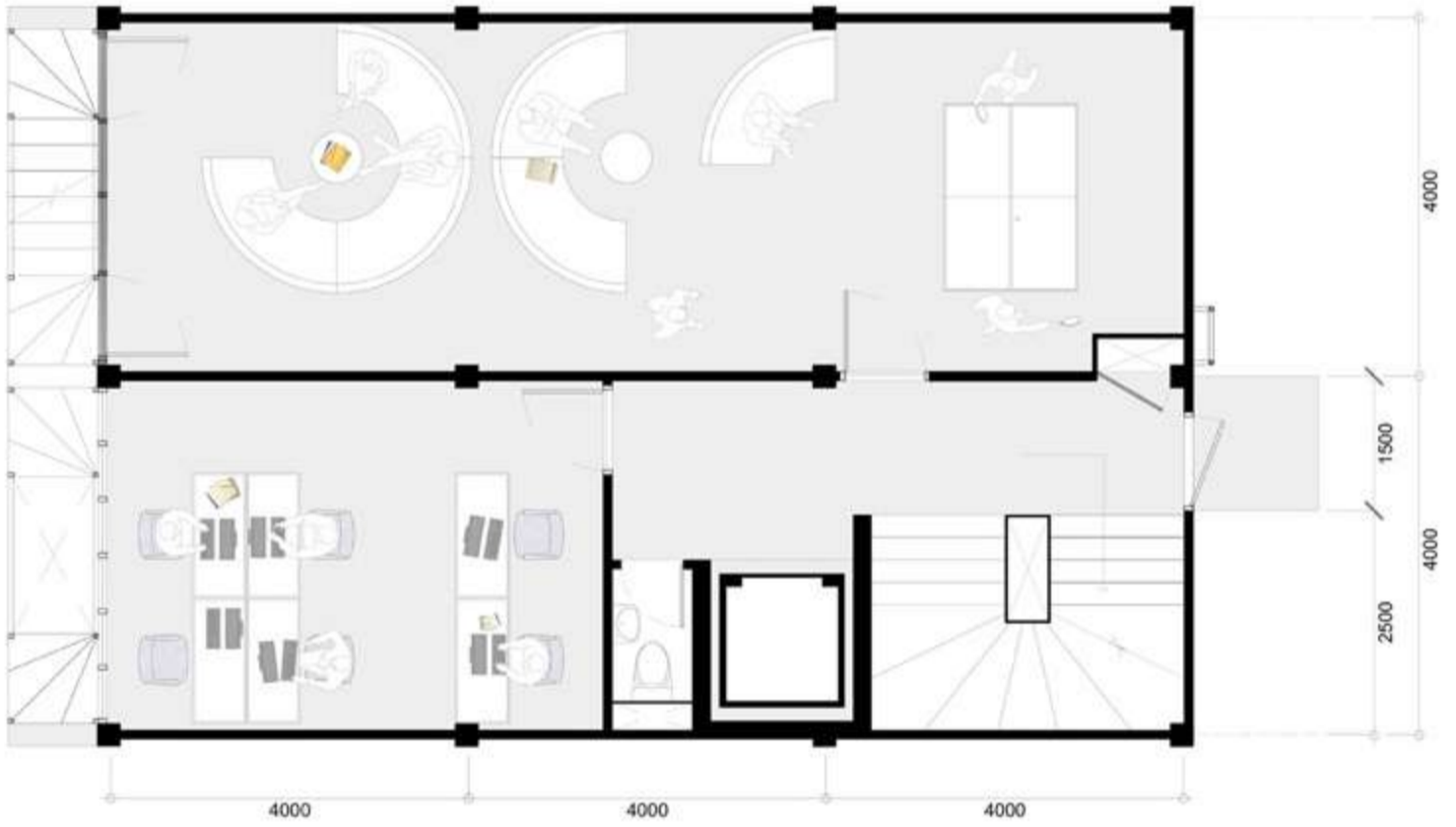
1st Floor Plan



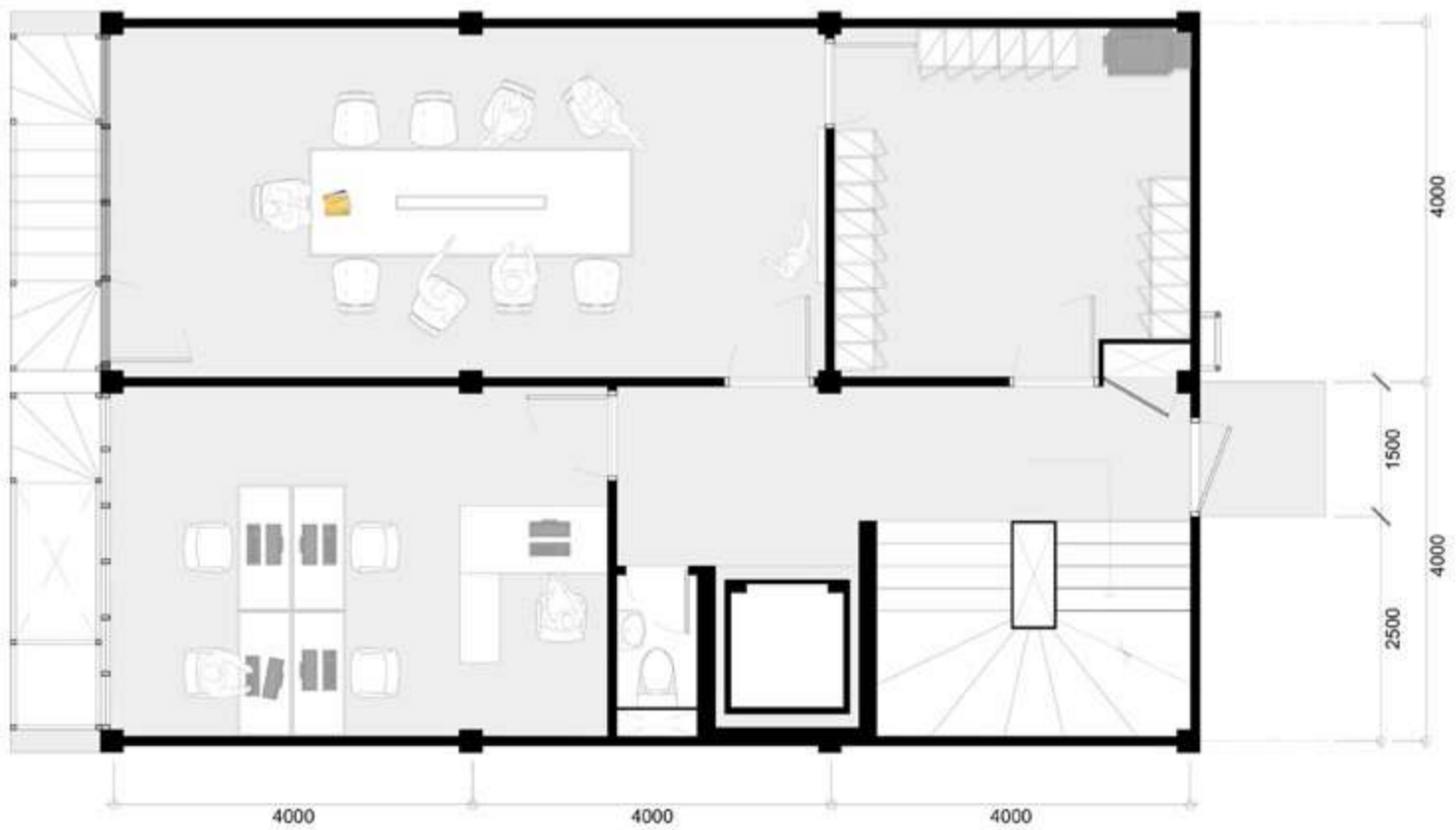
Mezzanine Floor Plan



2nd Floor Plan

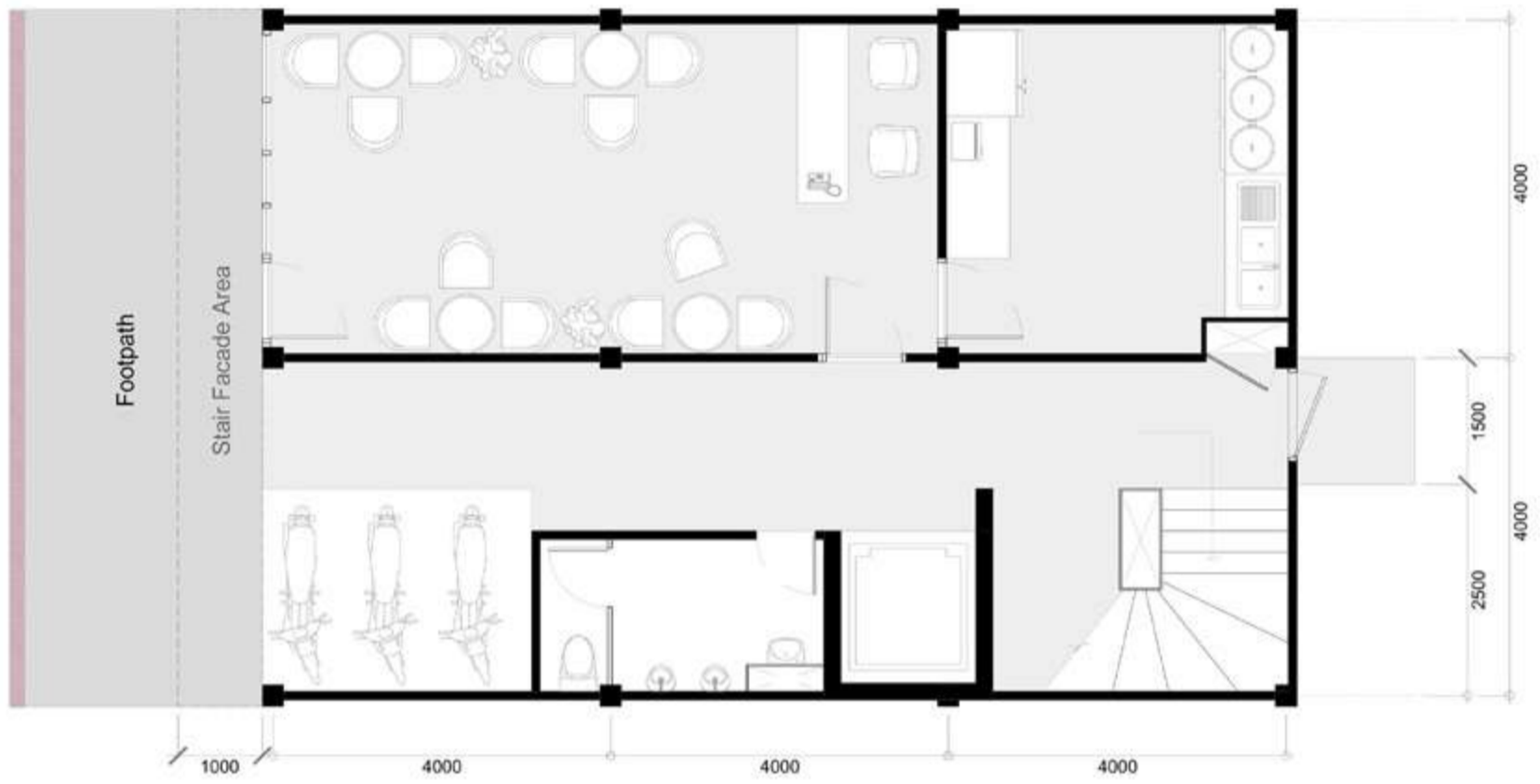


3rd Floor Plan

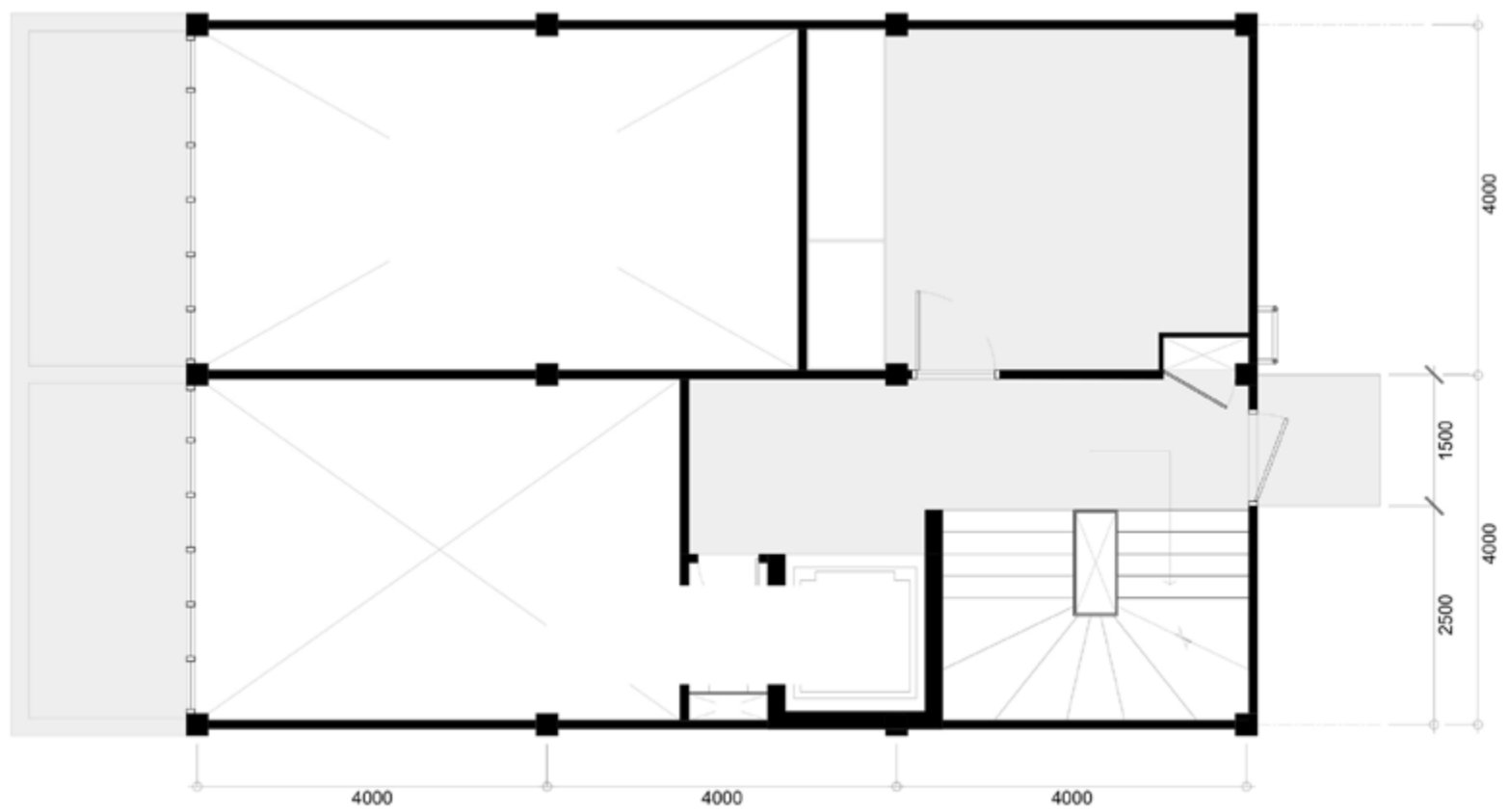


4th Floor Plan

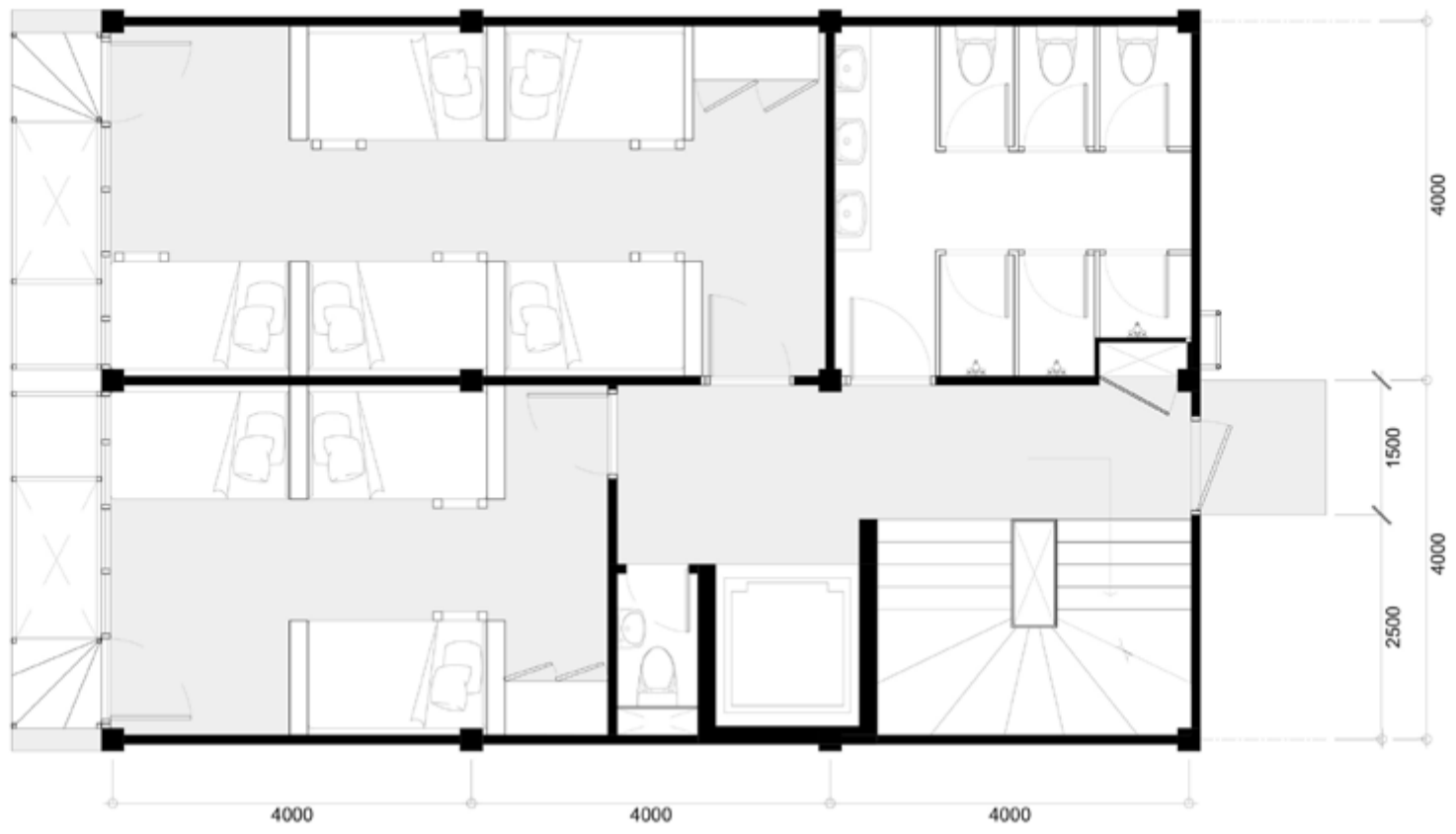
HOSTEL LAYOUT



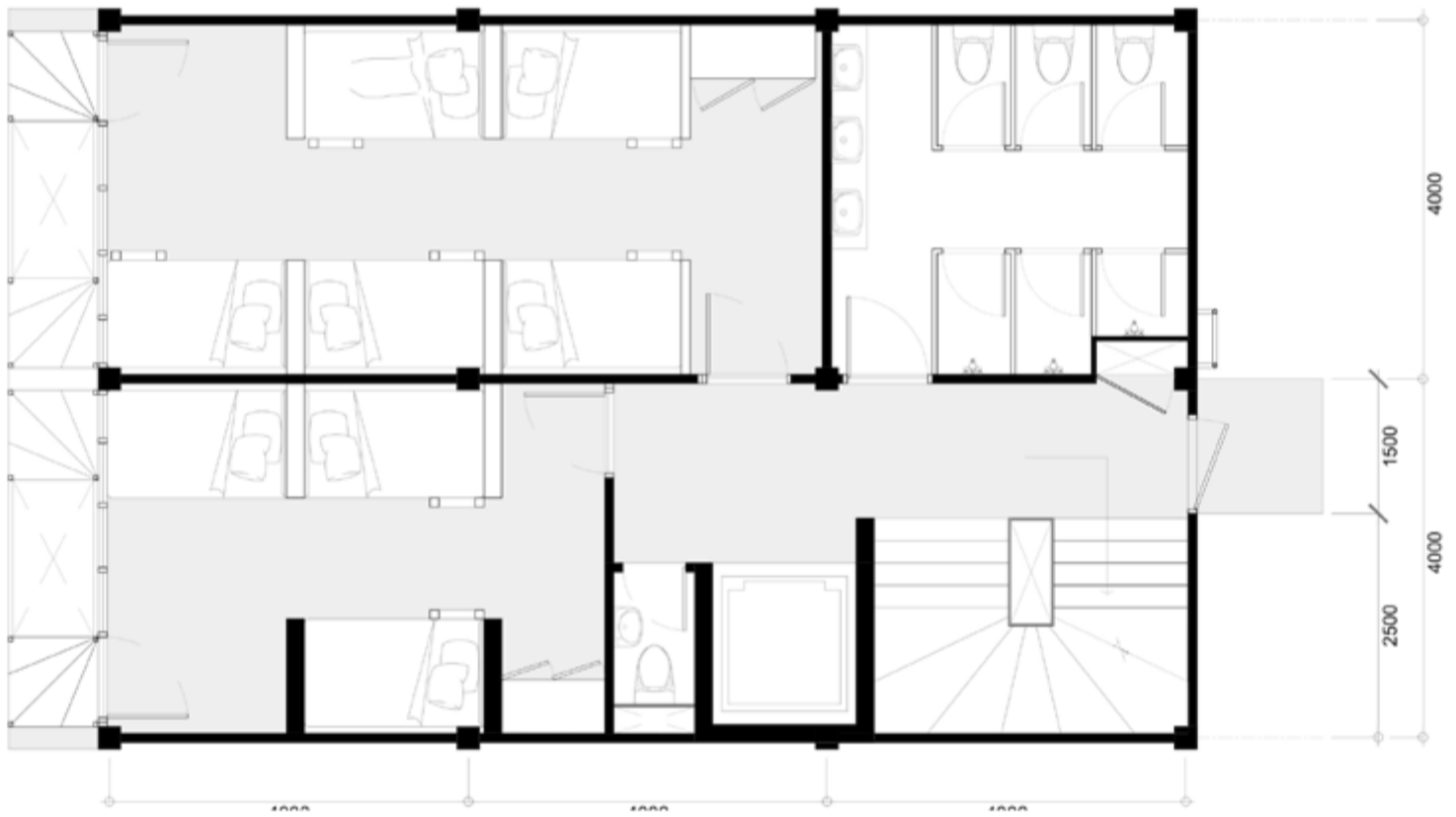
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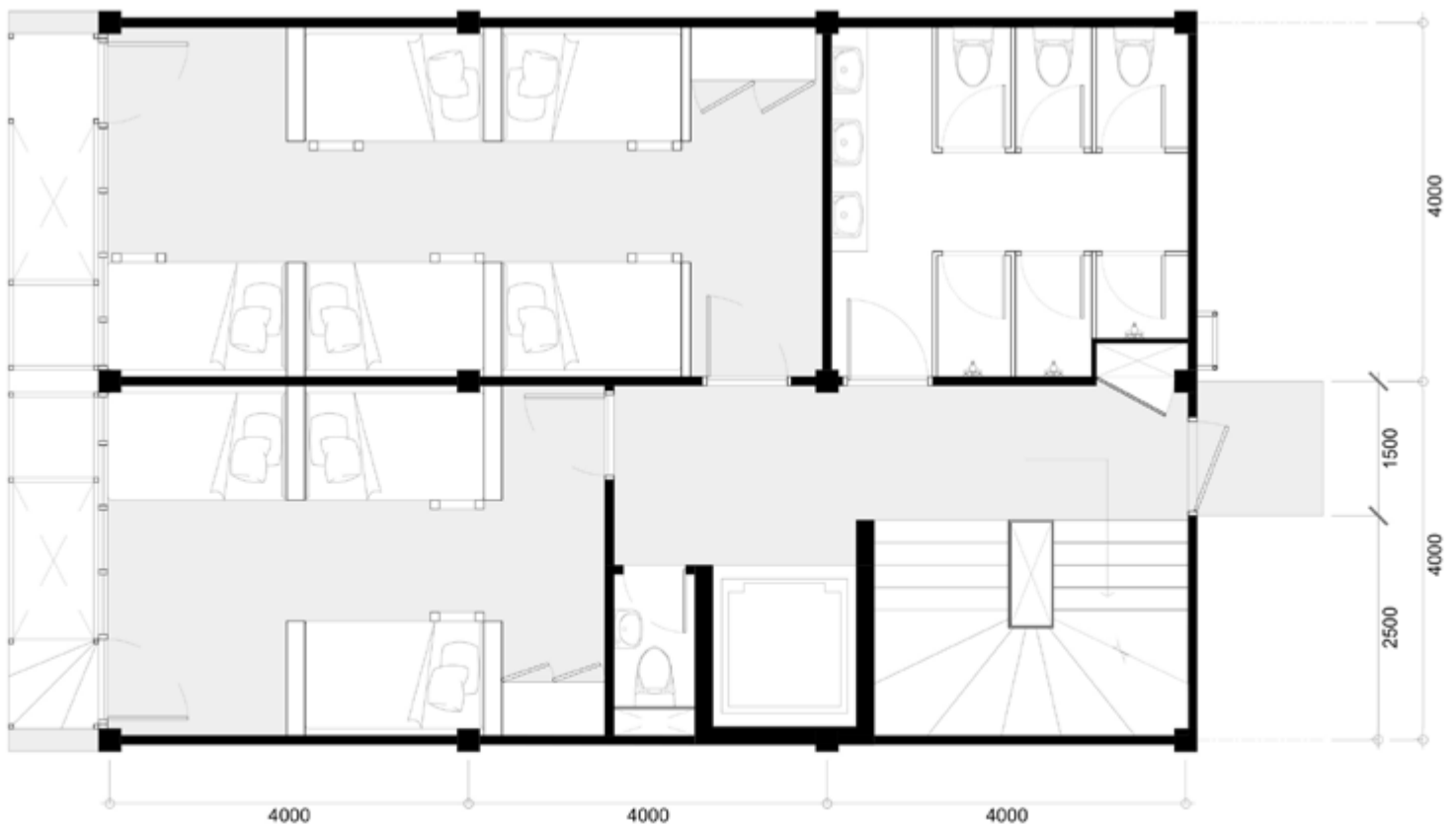
Mezzanine Floor Plan



2nd Floor Plan

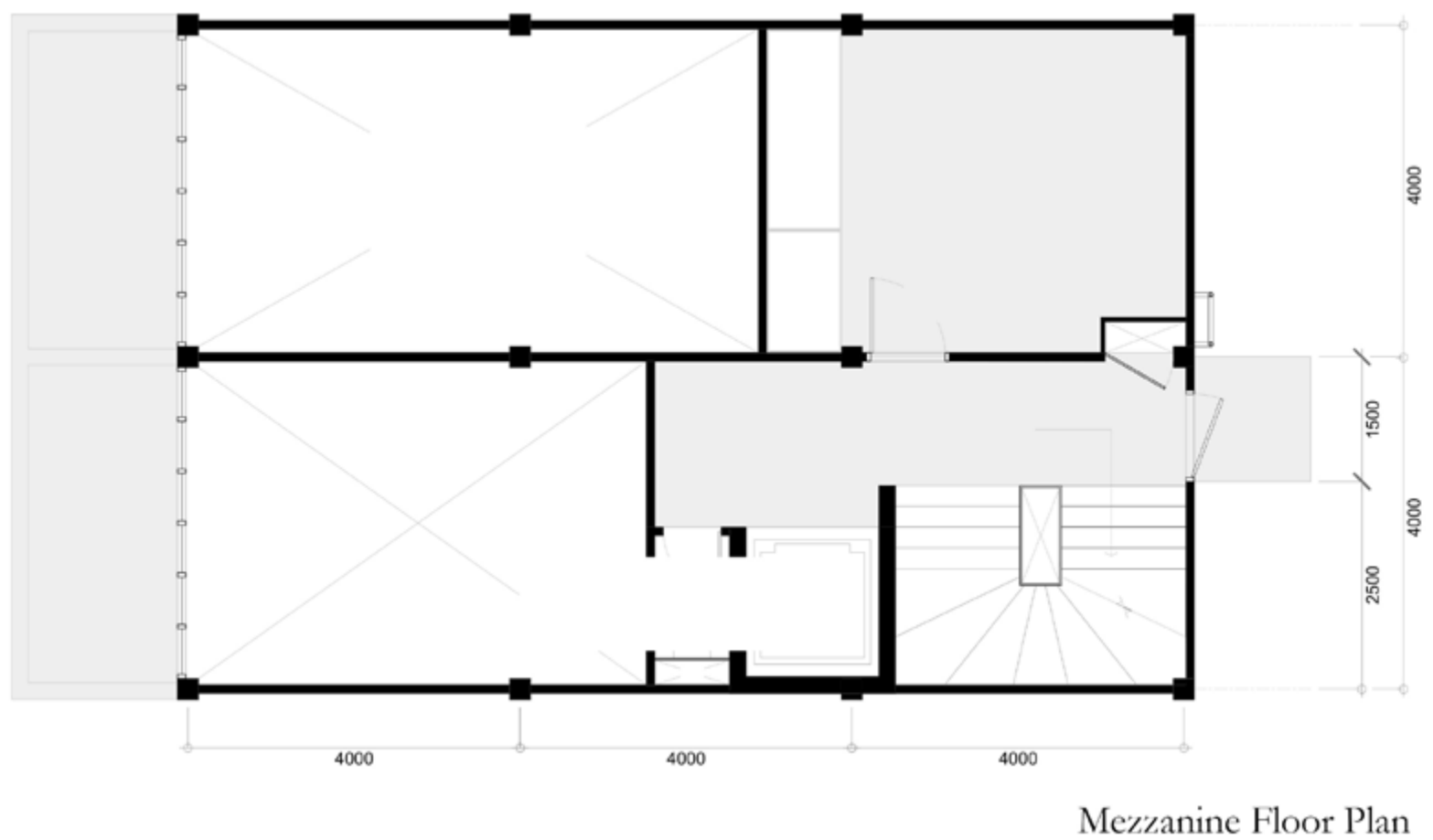
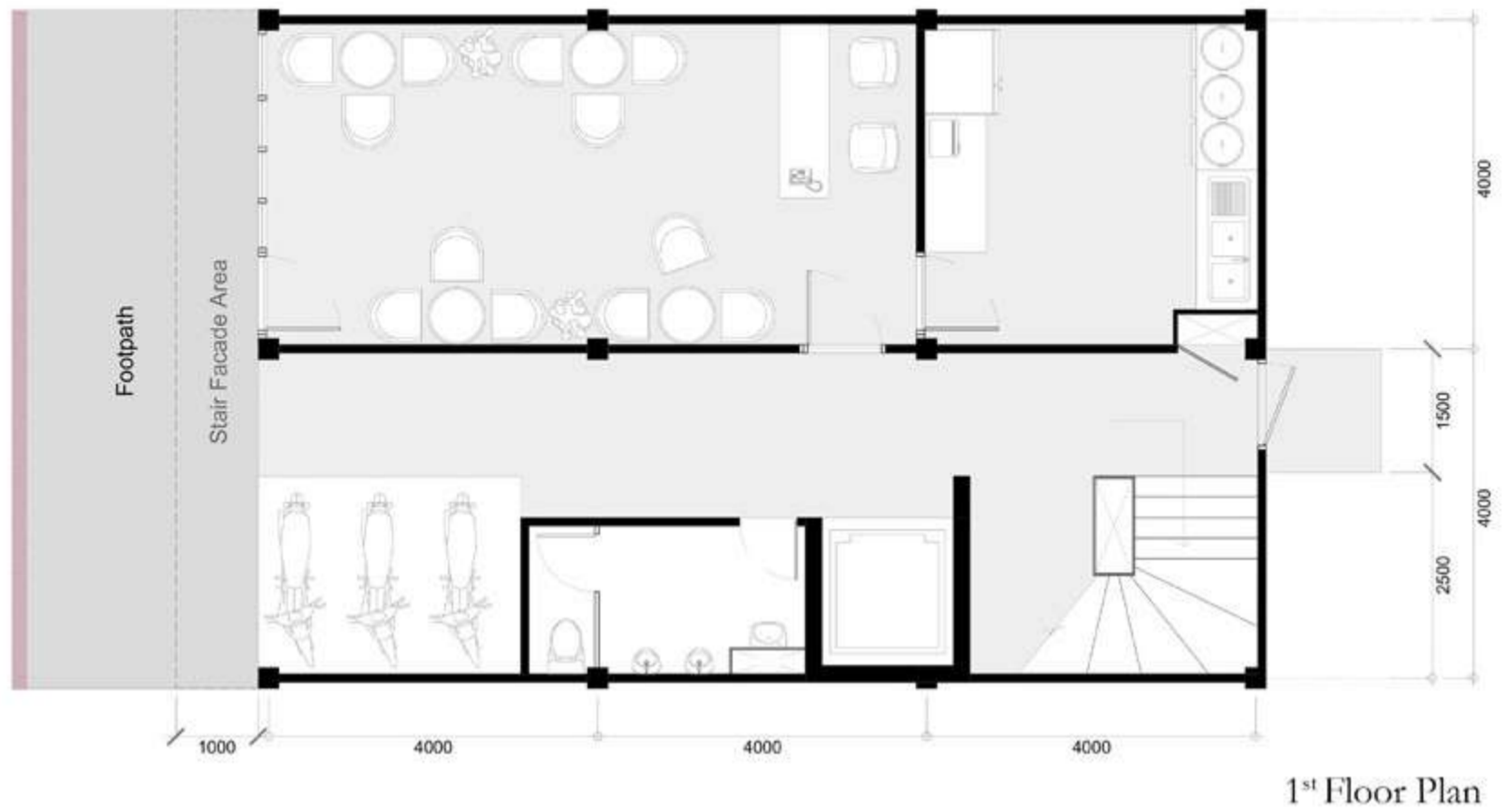


3rd Floor Plan



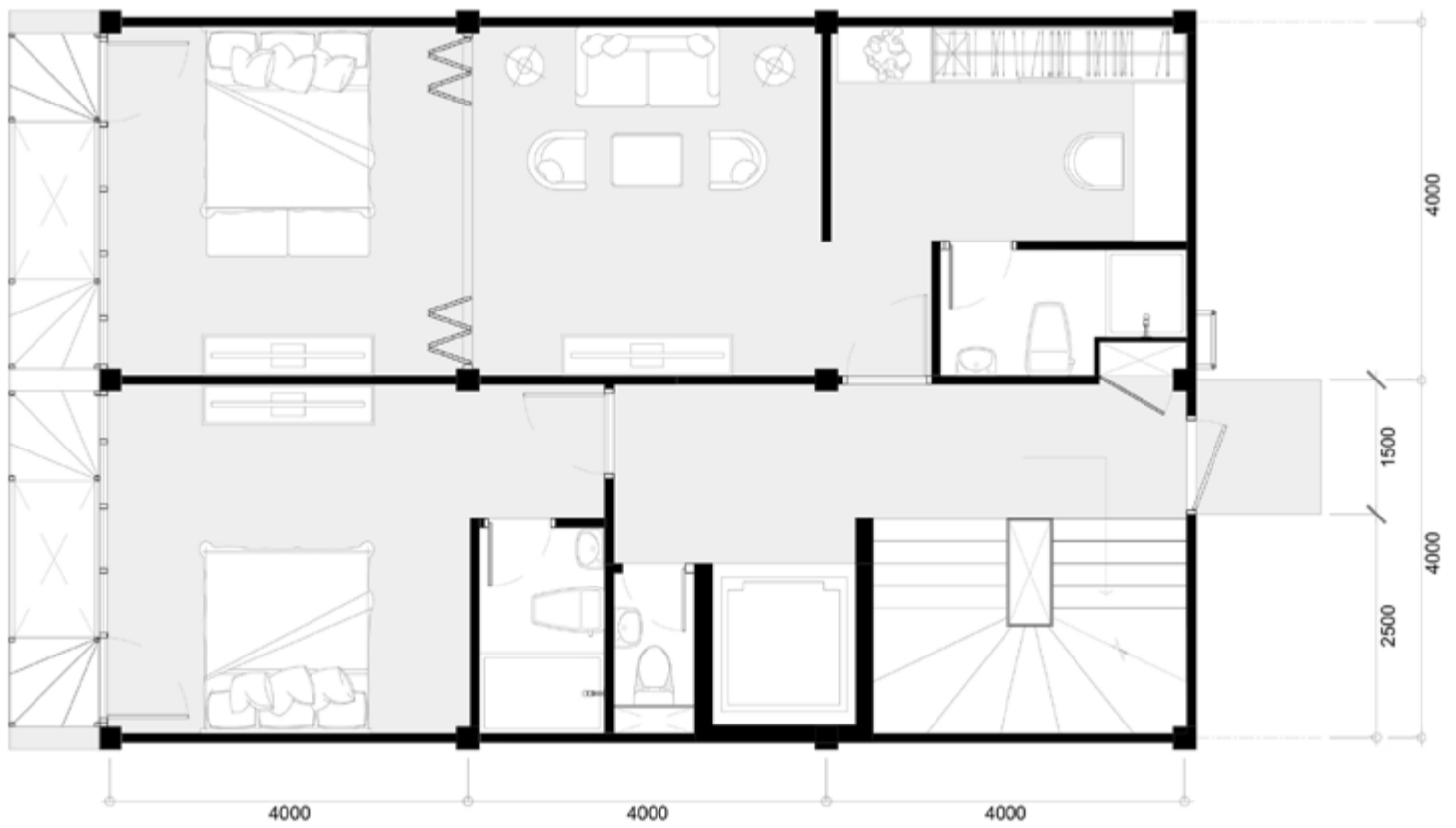
4th Floor Plan

AIR BNB LAYOUT





2nd Floor Plan



3rd Floor Plan



4th Floor Plan



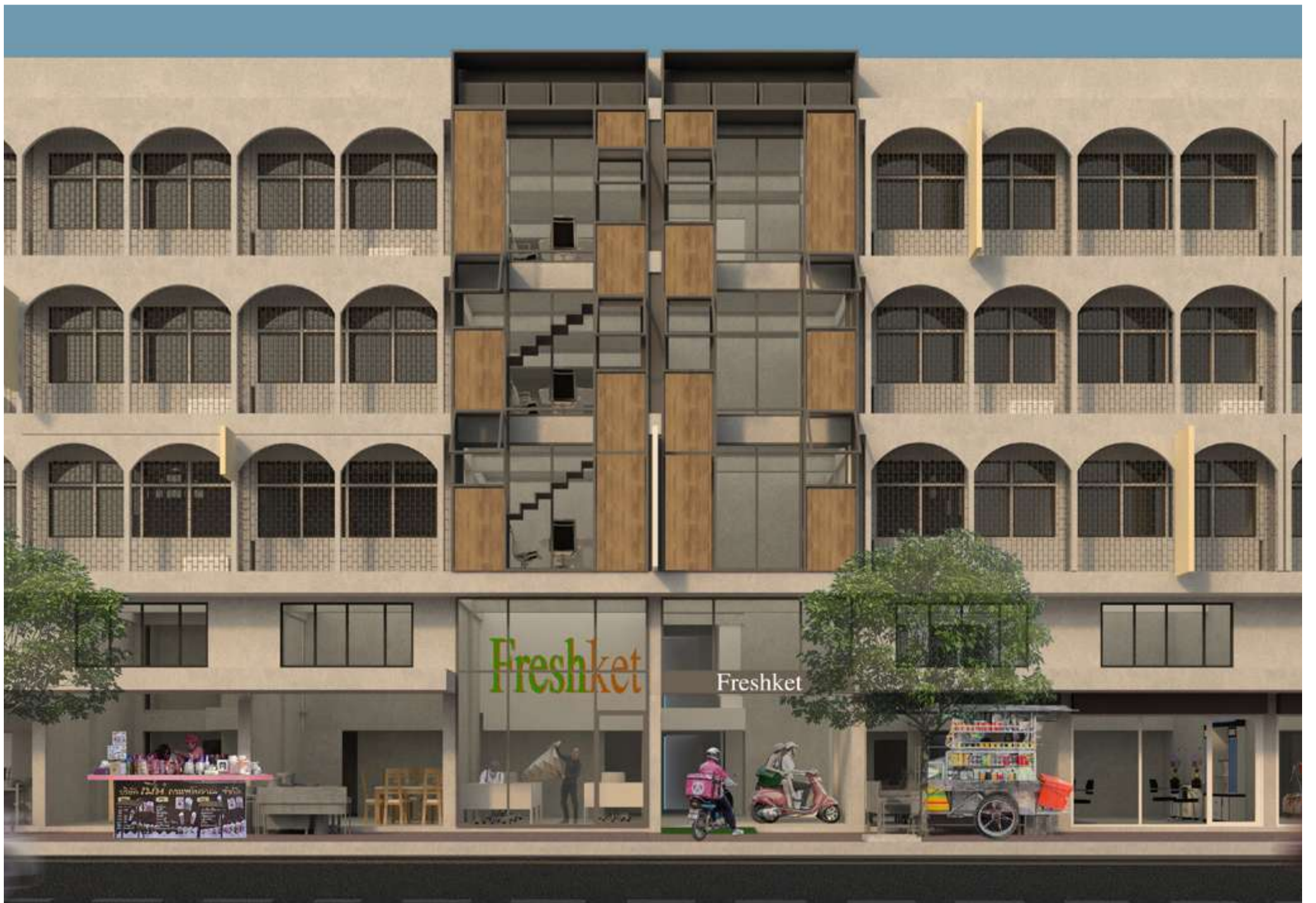






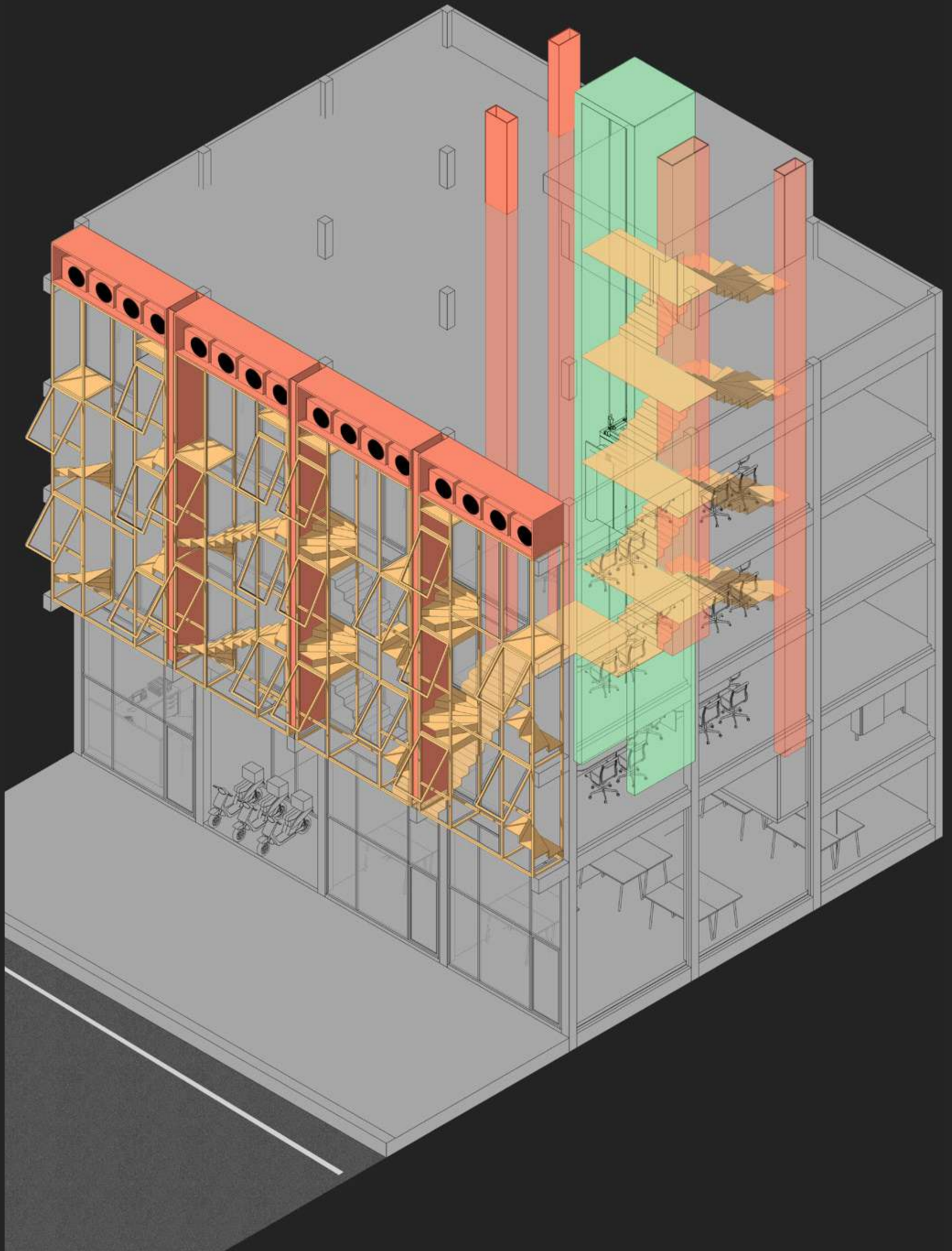
Street Elevation in City Context

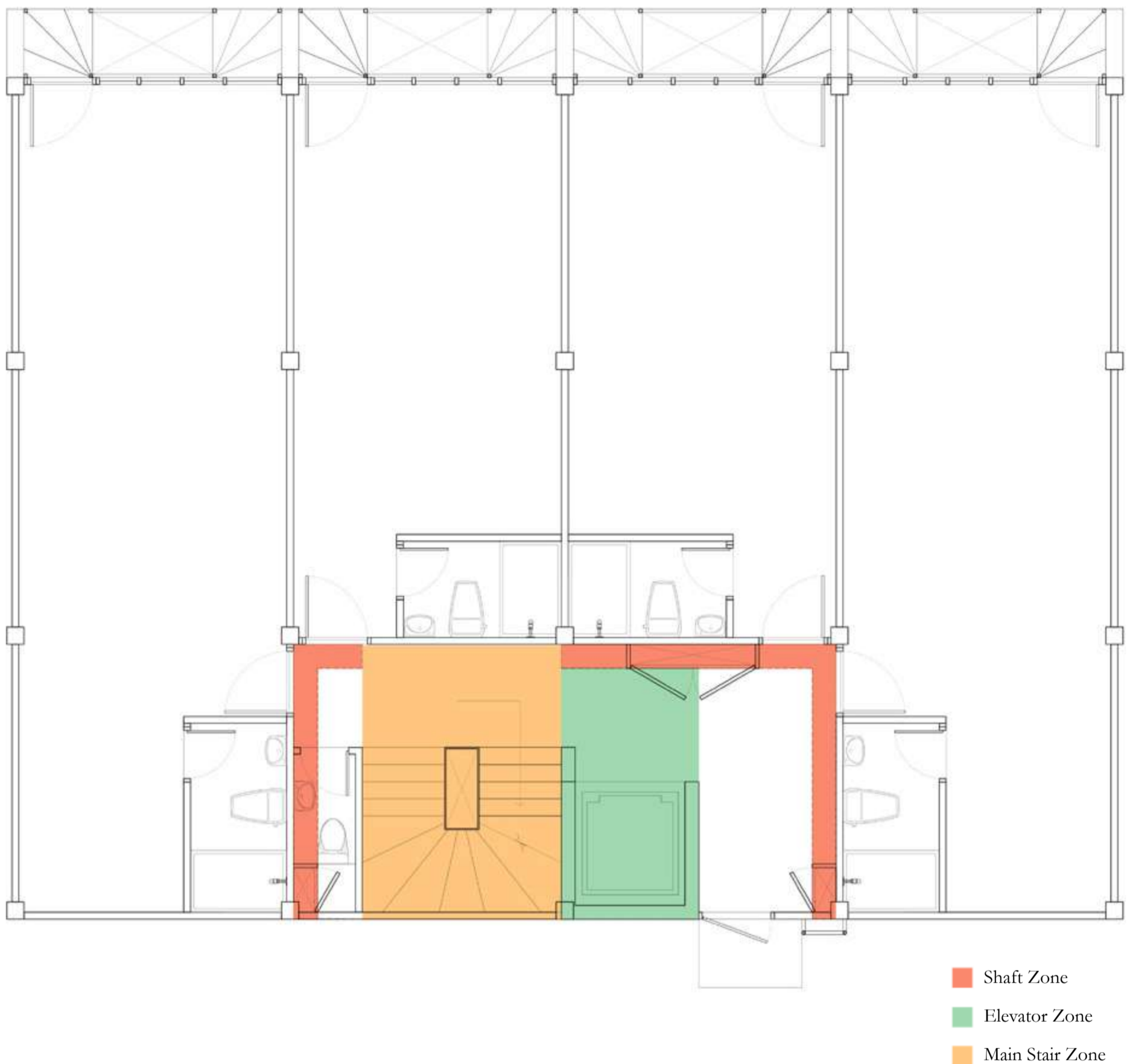












4-Bay Shophouse Prototype:

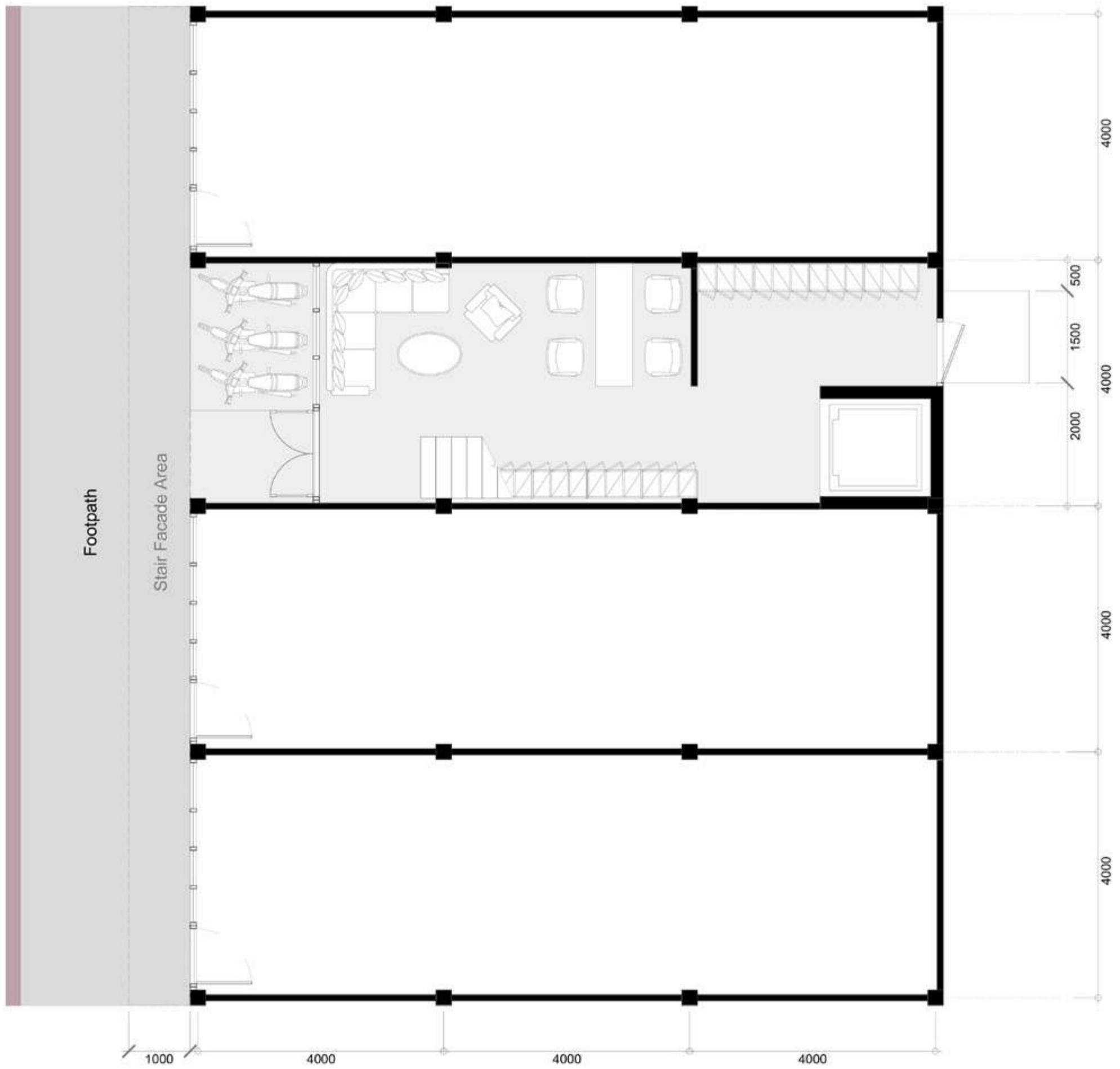
The 4-bay shophouse prototype allows for the flexibility of multiple programs and users to customize the interior spaces to meet their needs. The stairs of all 4 existing shophouse will be removed and replaced with 1 new circulation and utilities core that contain a new stair, new MEP shafts, and a compact elevator (if desired). This core will occupy two structural bays at the rear of the middle 2 shophouse modules. The removal of the existing stairs in the other modules will increase useable floor area.

The new circulation core will be effectively service users on every floor. Similar to the 2-bay prototype, a new public entry and compact corridor will be created in one of the middle bays, allowing tenants and visitors to access the main stair and elevator without having to pass existing groundfloor tenant space. Likewise, the area immediately adjacent to the sidewalk corridor can be utilized as a small lobby for guests and delivery people who are awaiting tenants on the upper floor to come down. It can also potentially serve as motorcycle parking. Retail, offices, and other commercial programs can occupy the other 3 streetlevel bays.

New MEP shafts will be located in the perimeter of the new core, allowing for vertical distribution of mechanical, electrical, plumbing components. Bathrooms on each level can be directly attached to this MEP shaft zone, thereby facilitating connections to necessary sanitary pipework.

Like the 2-bay version, the 4-bay shophouse prototype also contains a new occupiable facade component that will accommodate second stairs that can be customized to create vertical linkages for tenants on the upper levels. The facade component will also contain additional MEP shaft zones for the front zones of the shophouse. The top of the facade has compartments for air conditioning condensers, that can be serviced from the roof scape.

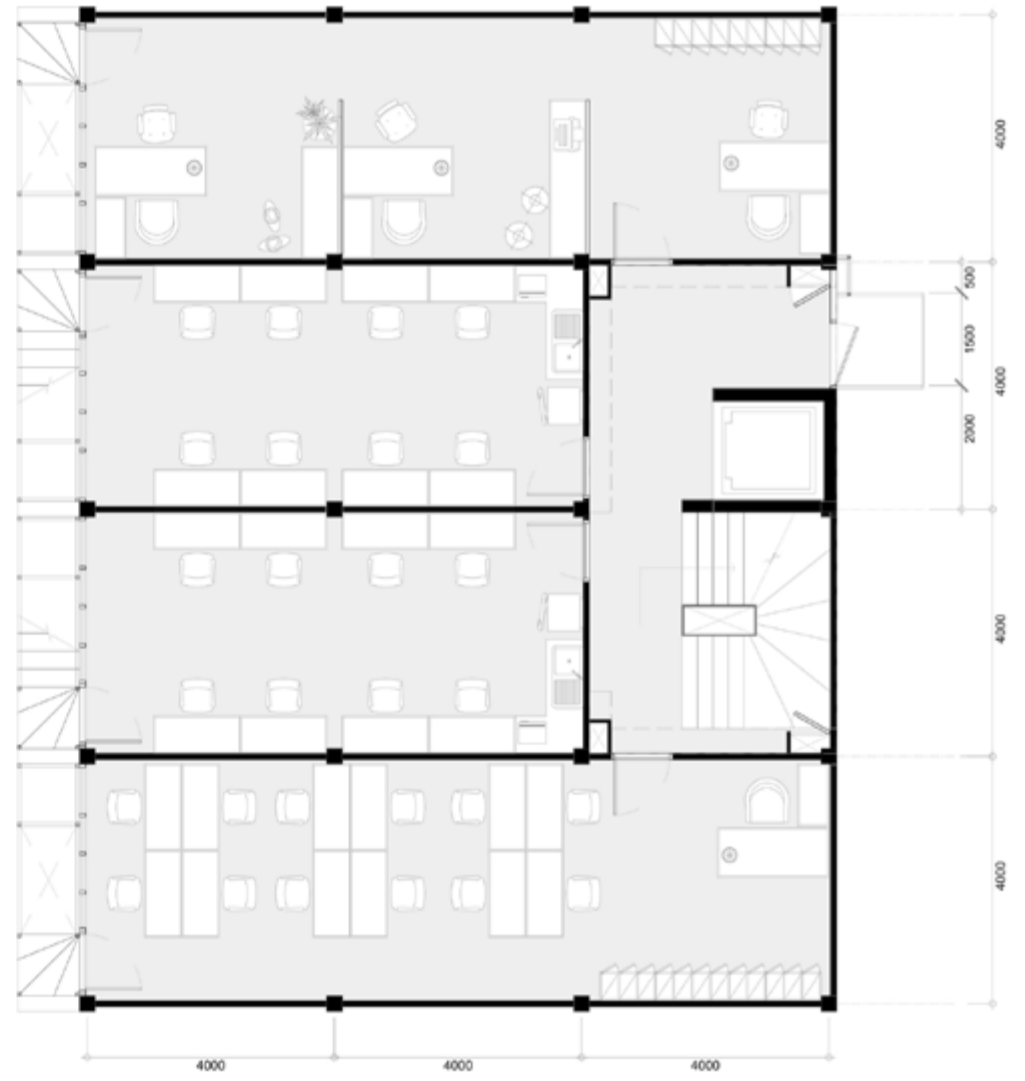
OFFICE LAYOUT



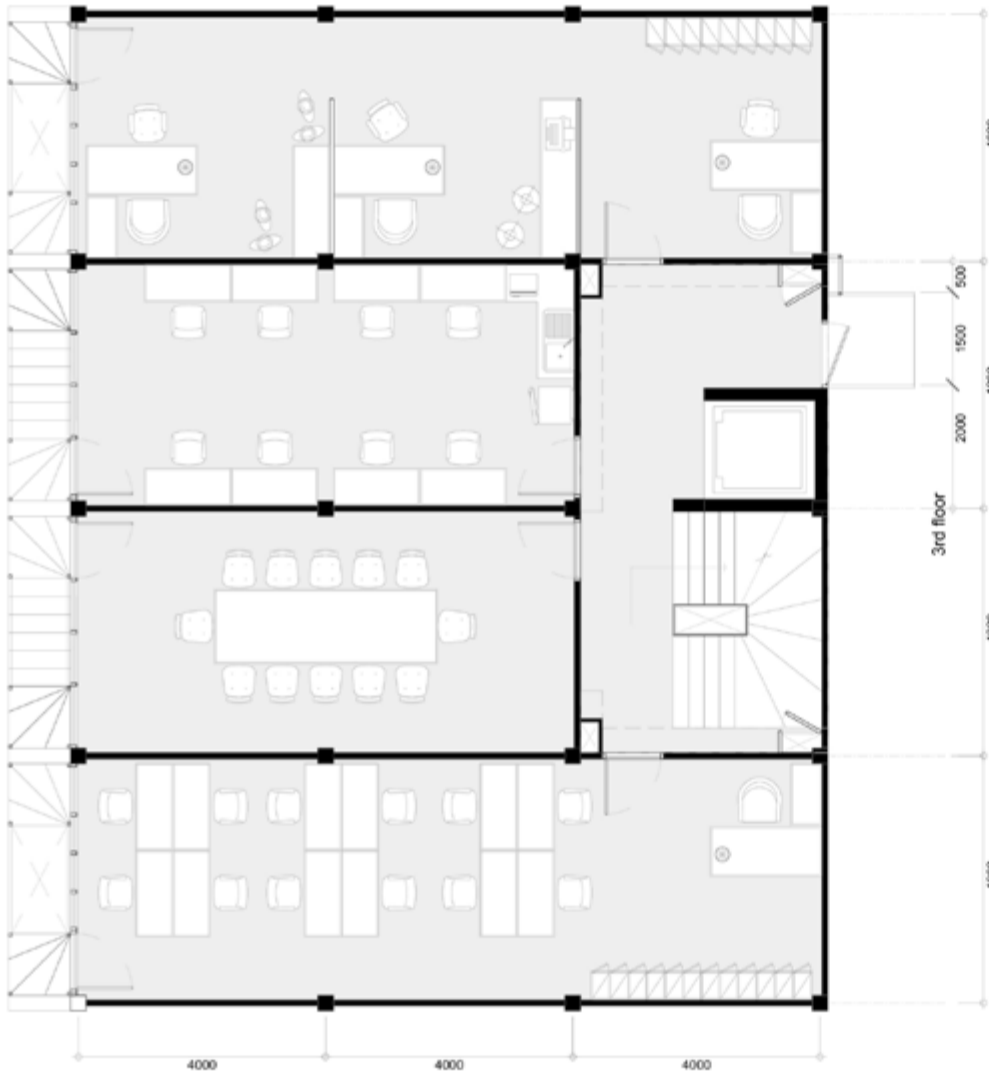
1st Floor Plan



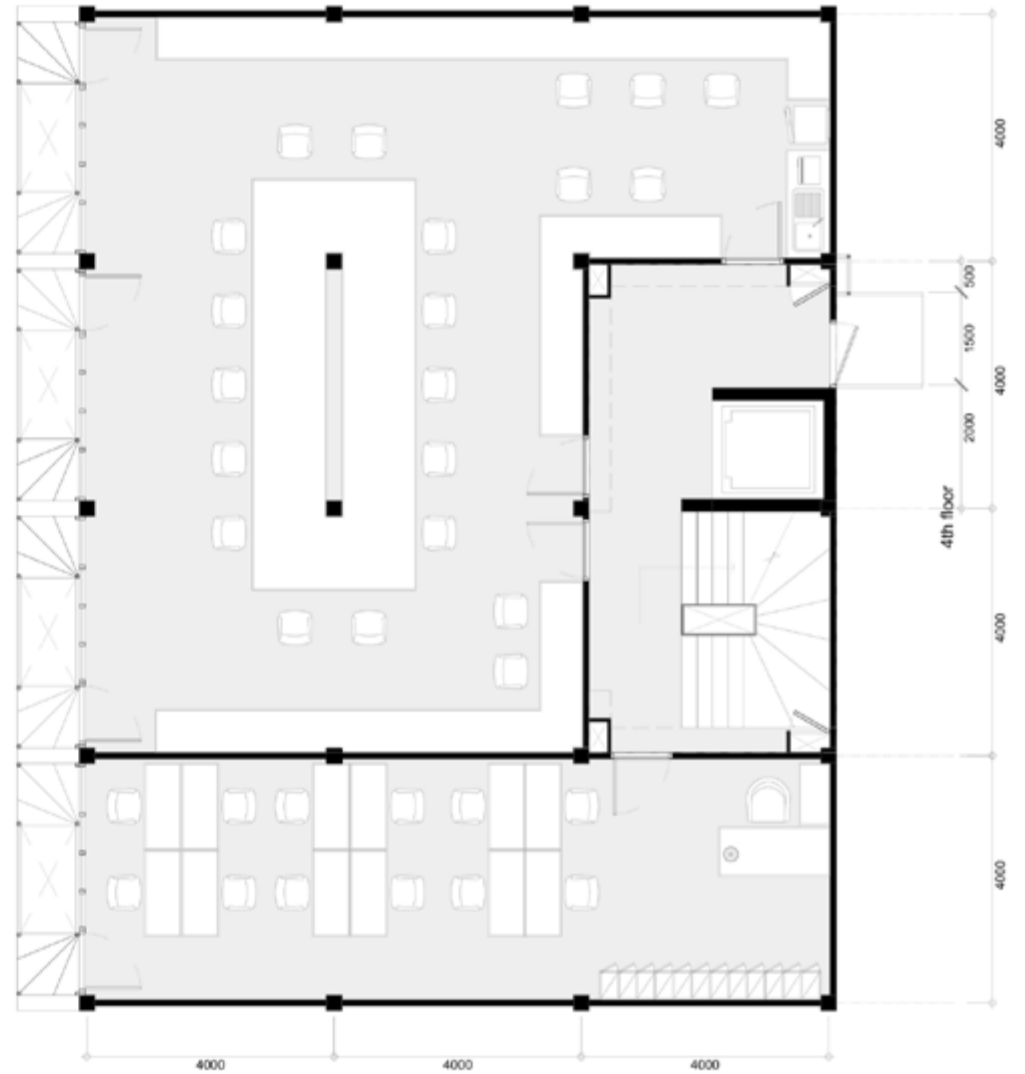
Mezzanine Floor Plan



2nd Floor Plan

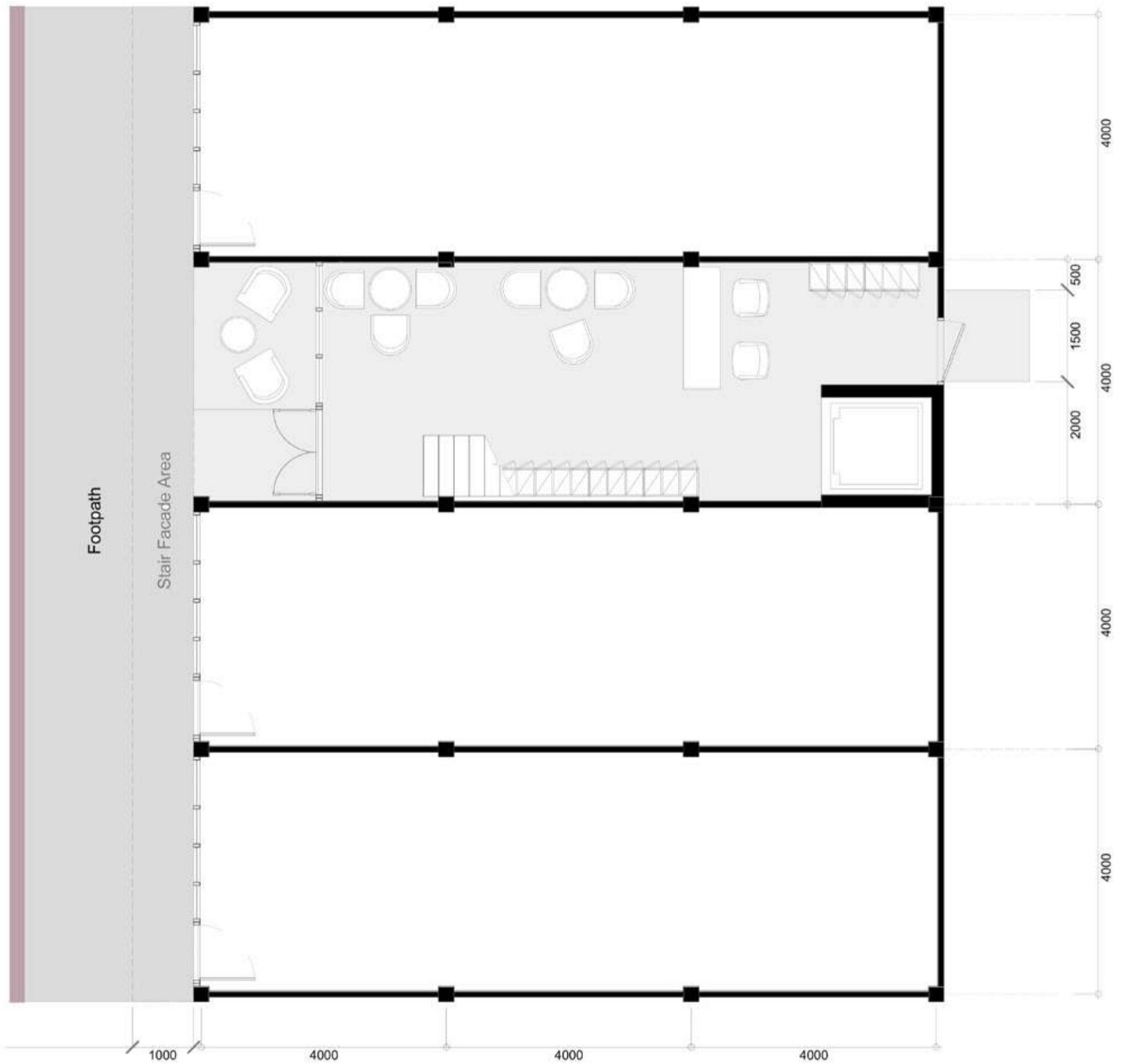


3rd Floor Plan

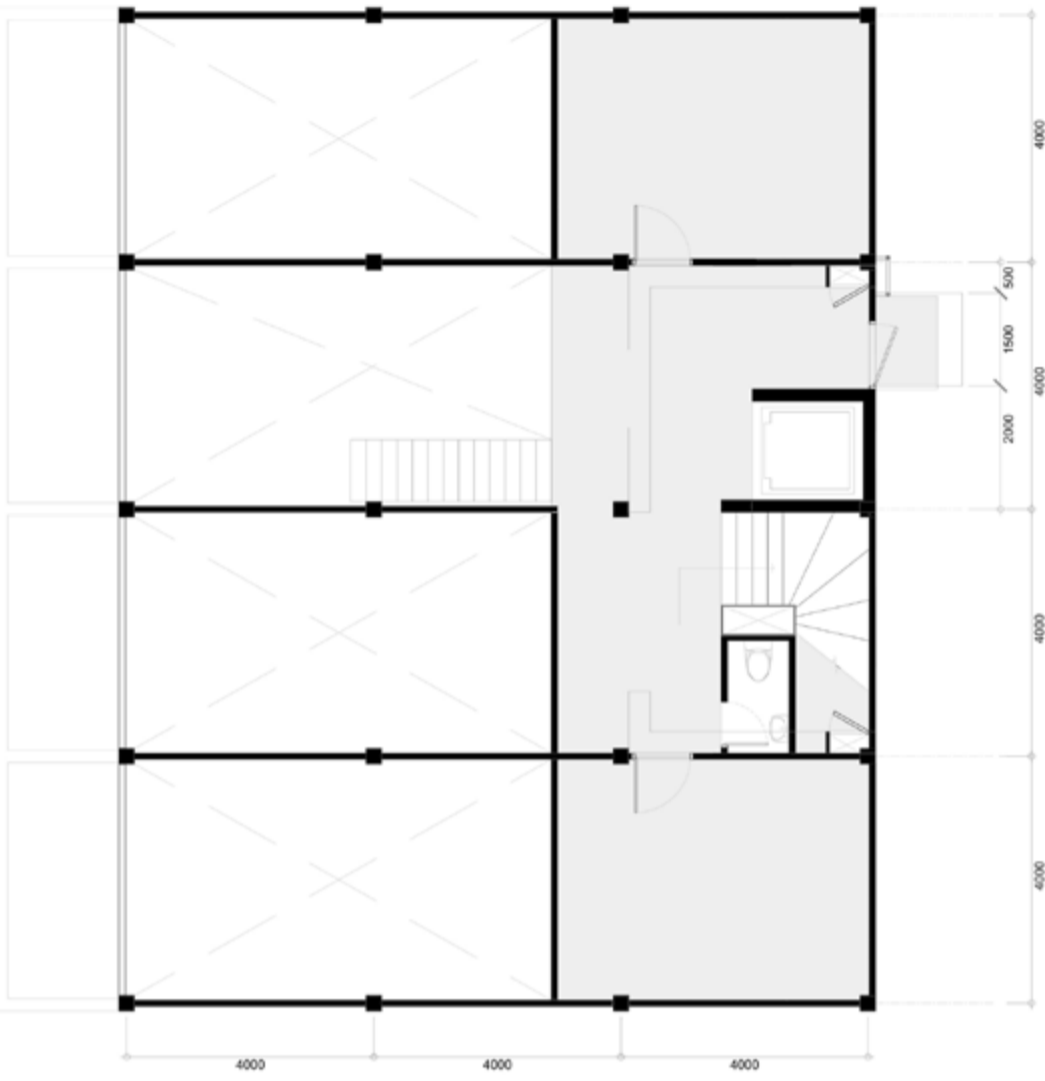


4th Floor Plan

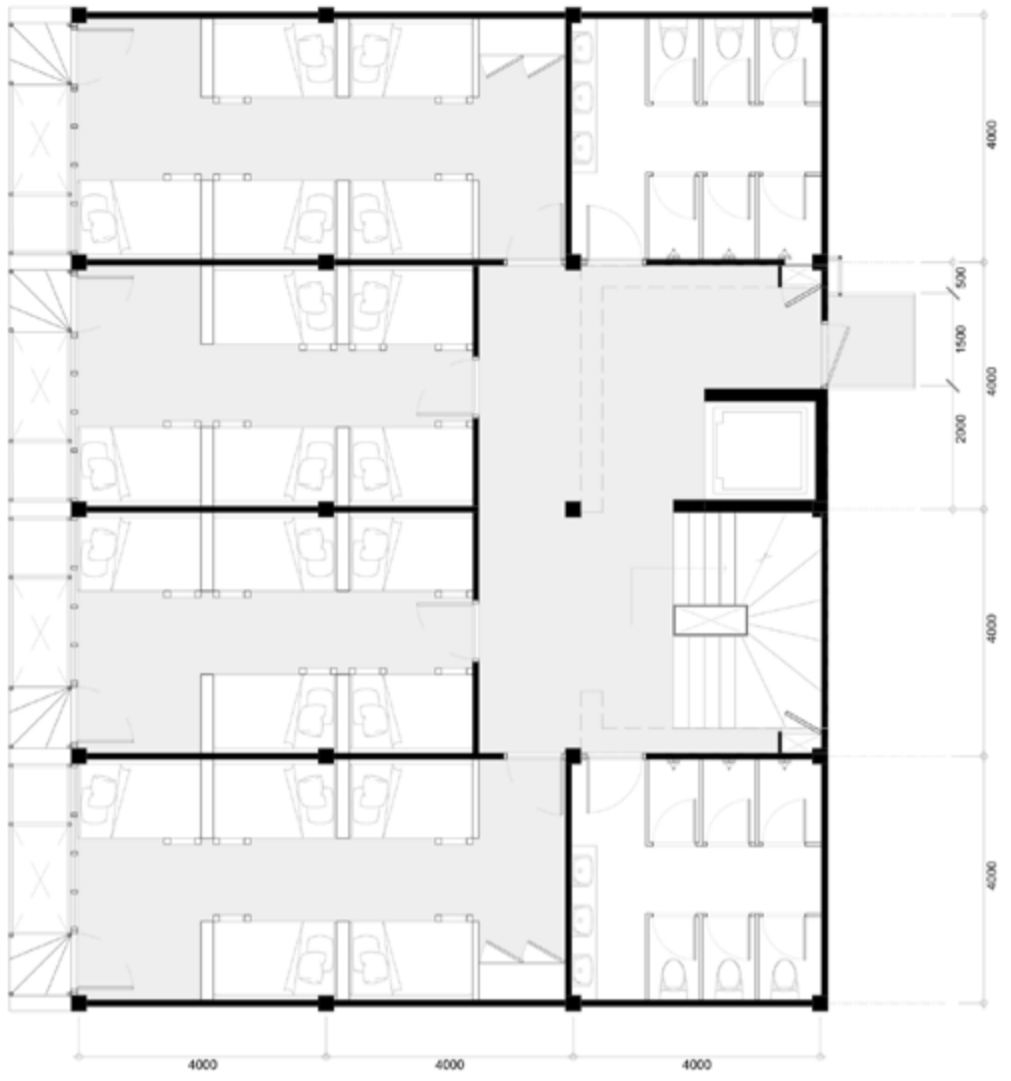
HOSTEL LAYOUT



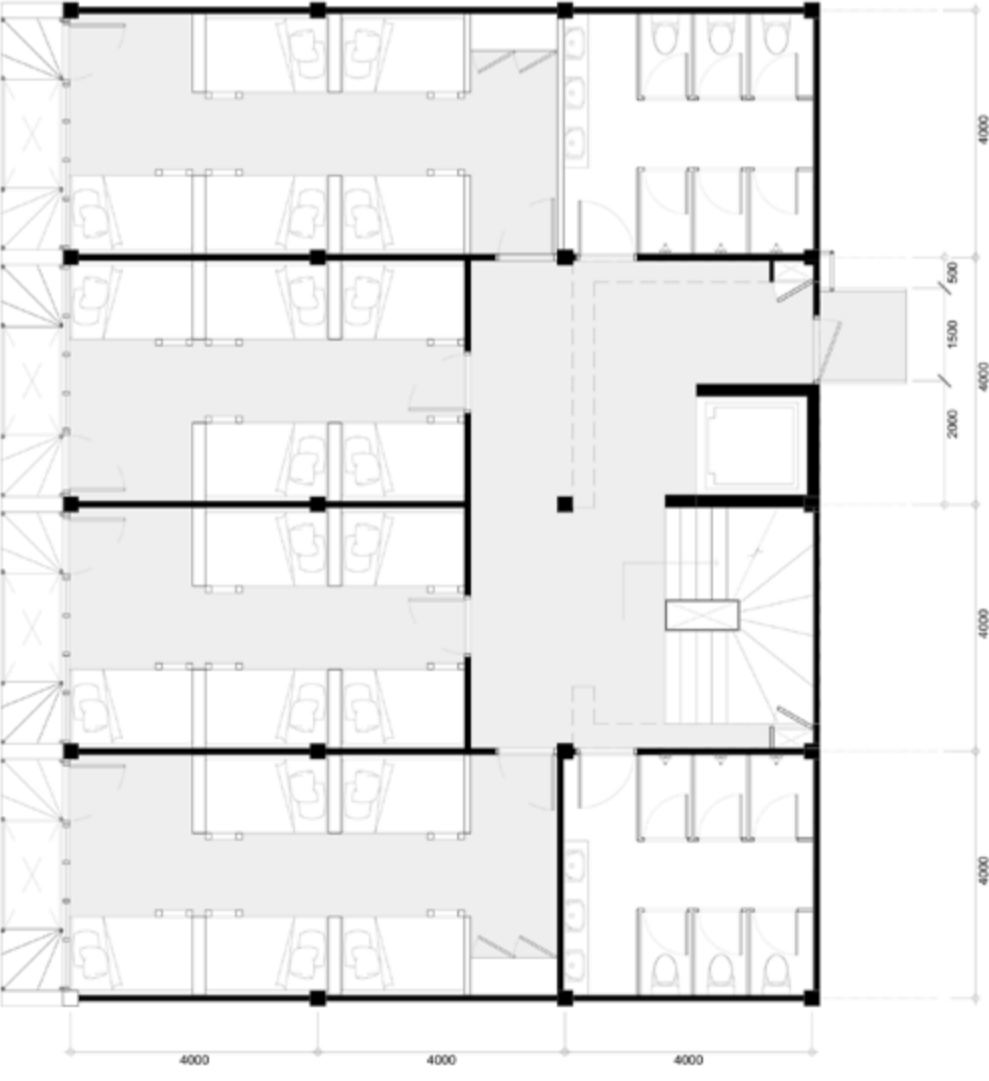
1st Floor Plan



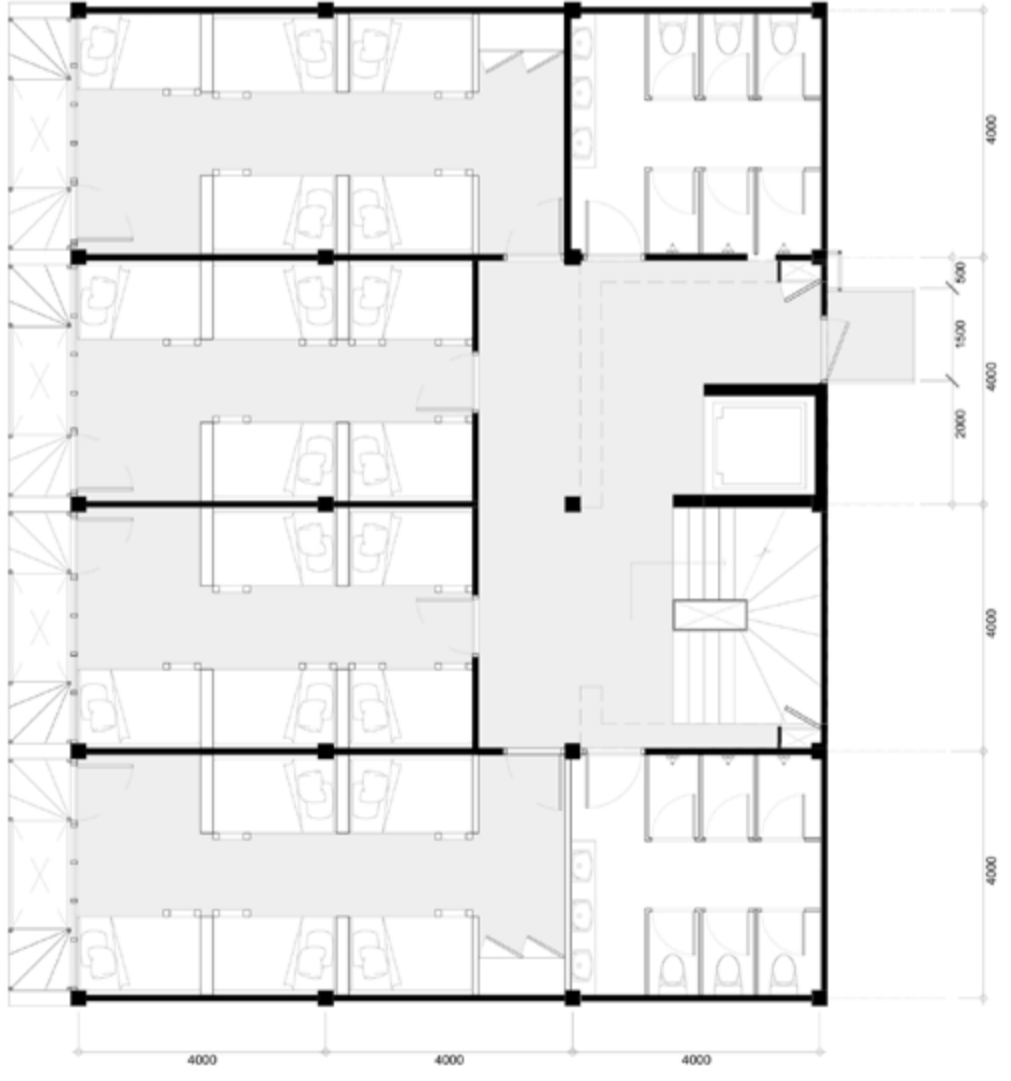
Mezzanine Floor Plan



2nd Floor Plan

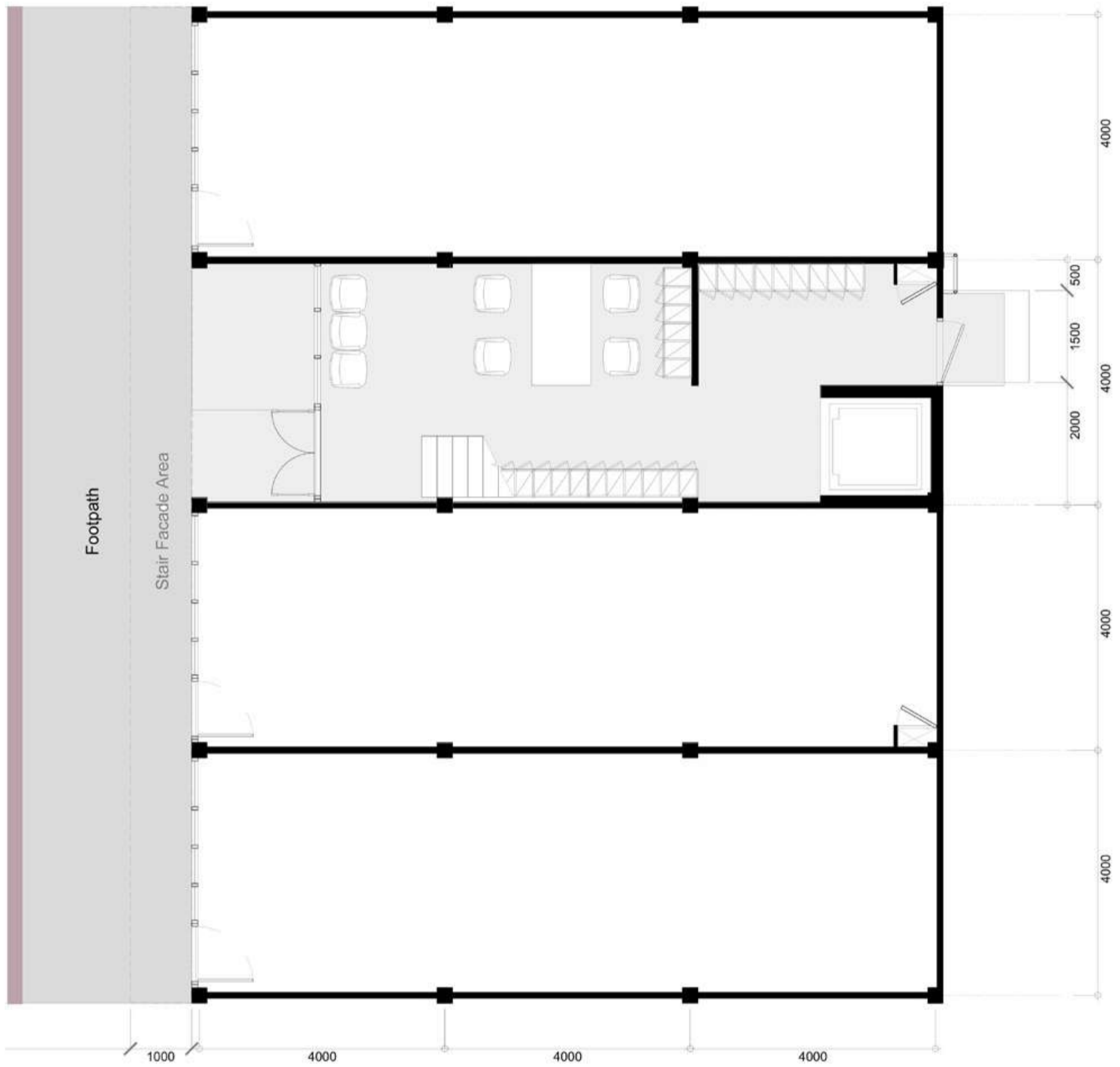


3rd Floor Plan

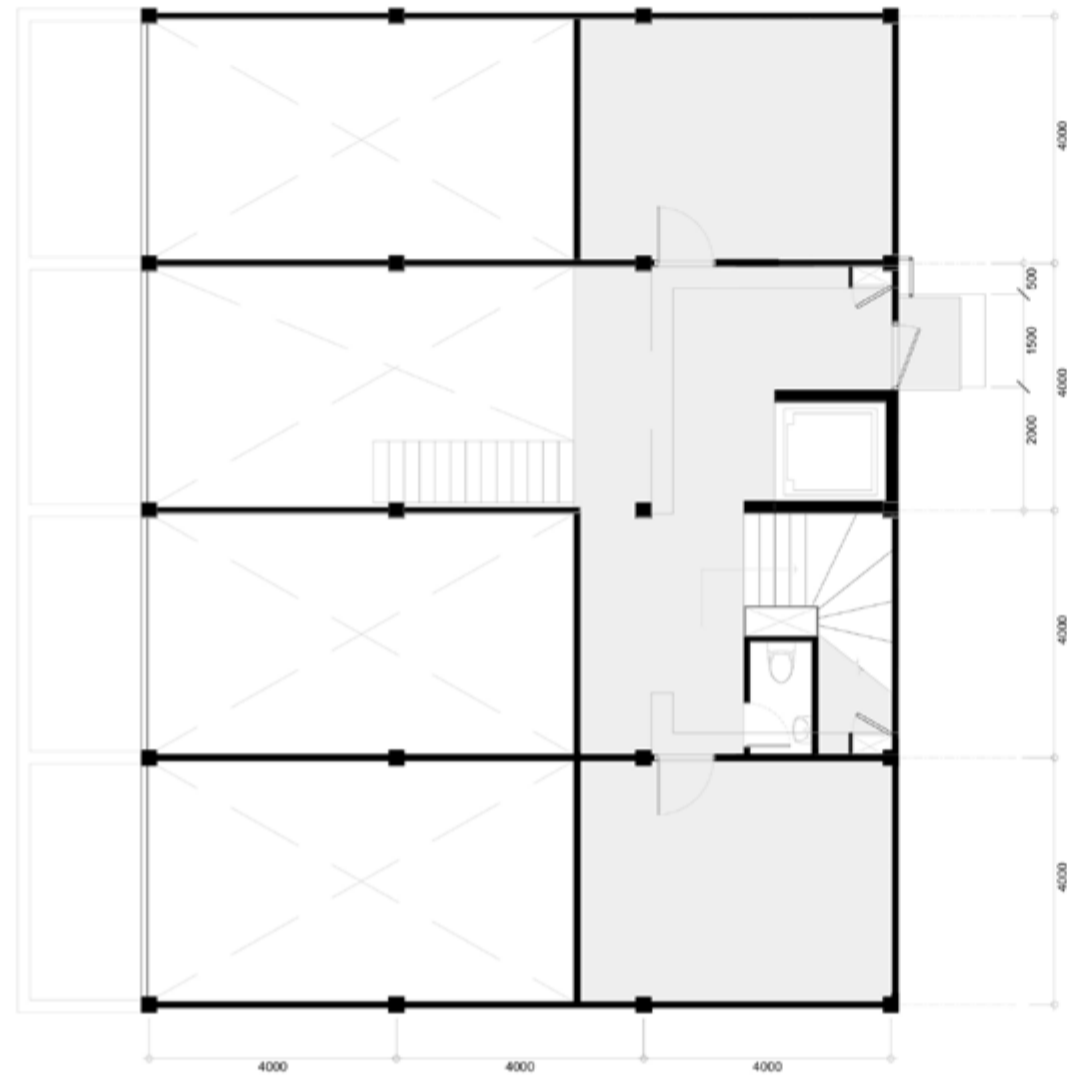


4th Floor Plan

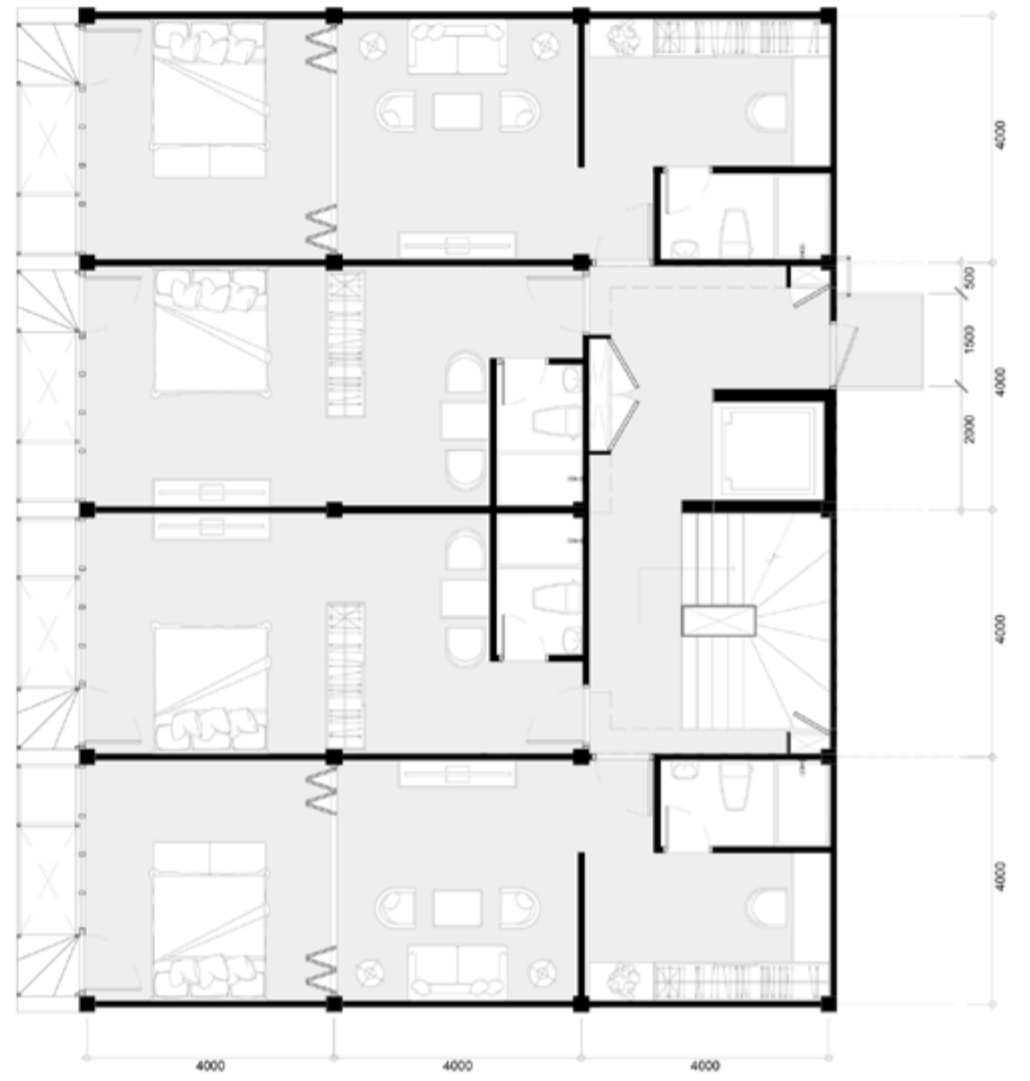
AIR BNB LAYOUT



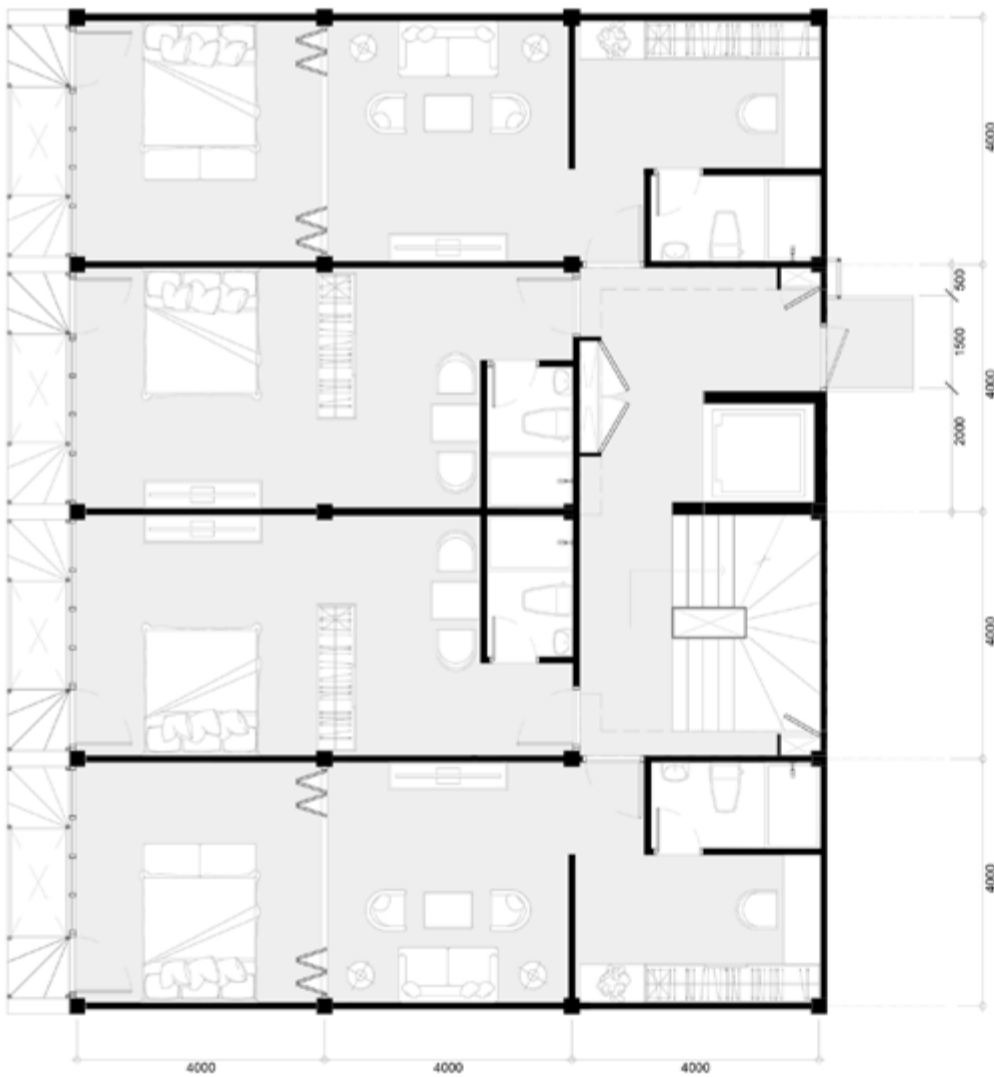
1st Floor Plan



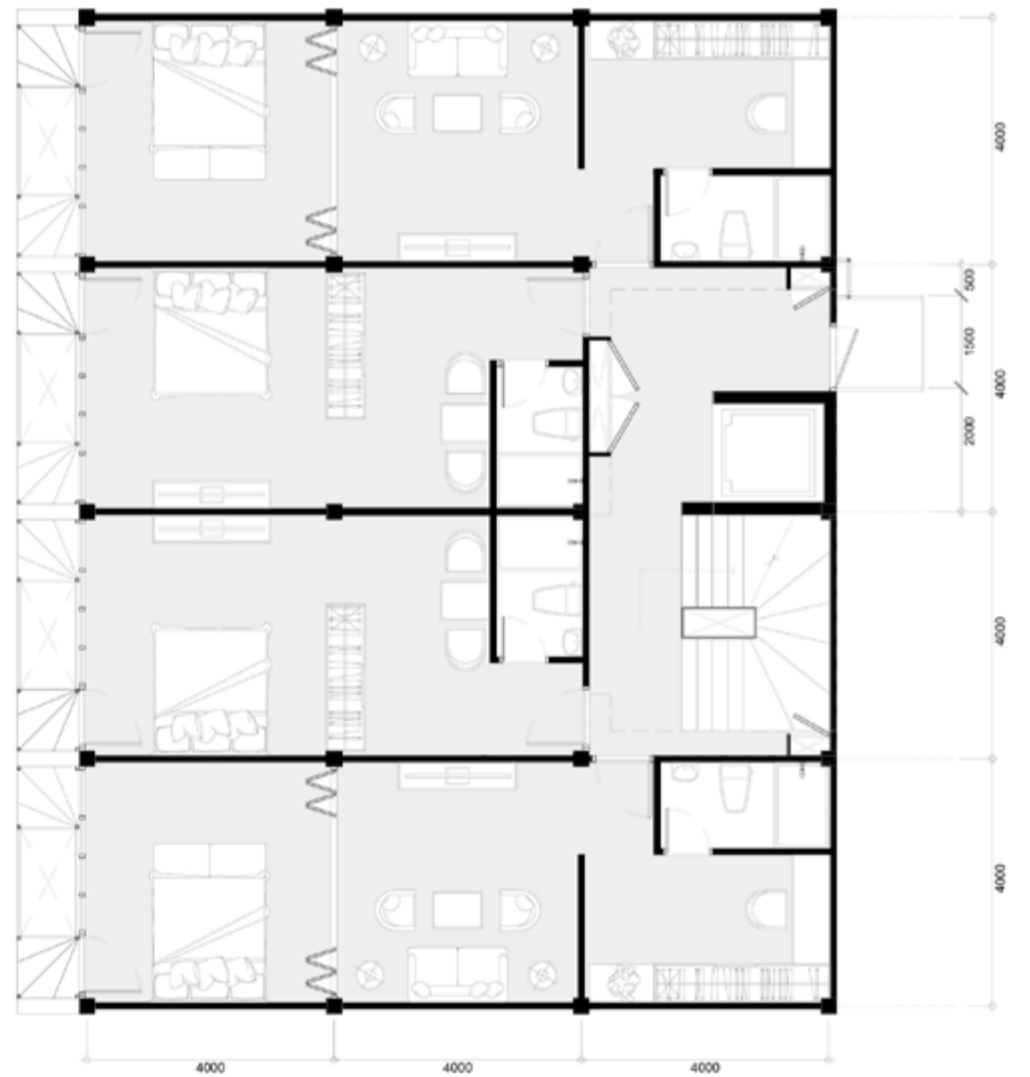
Mezzanine Floor Plan



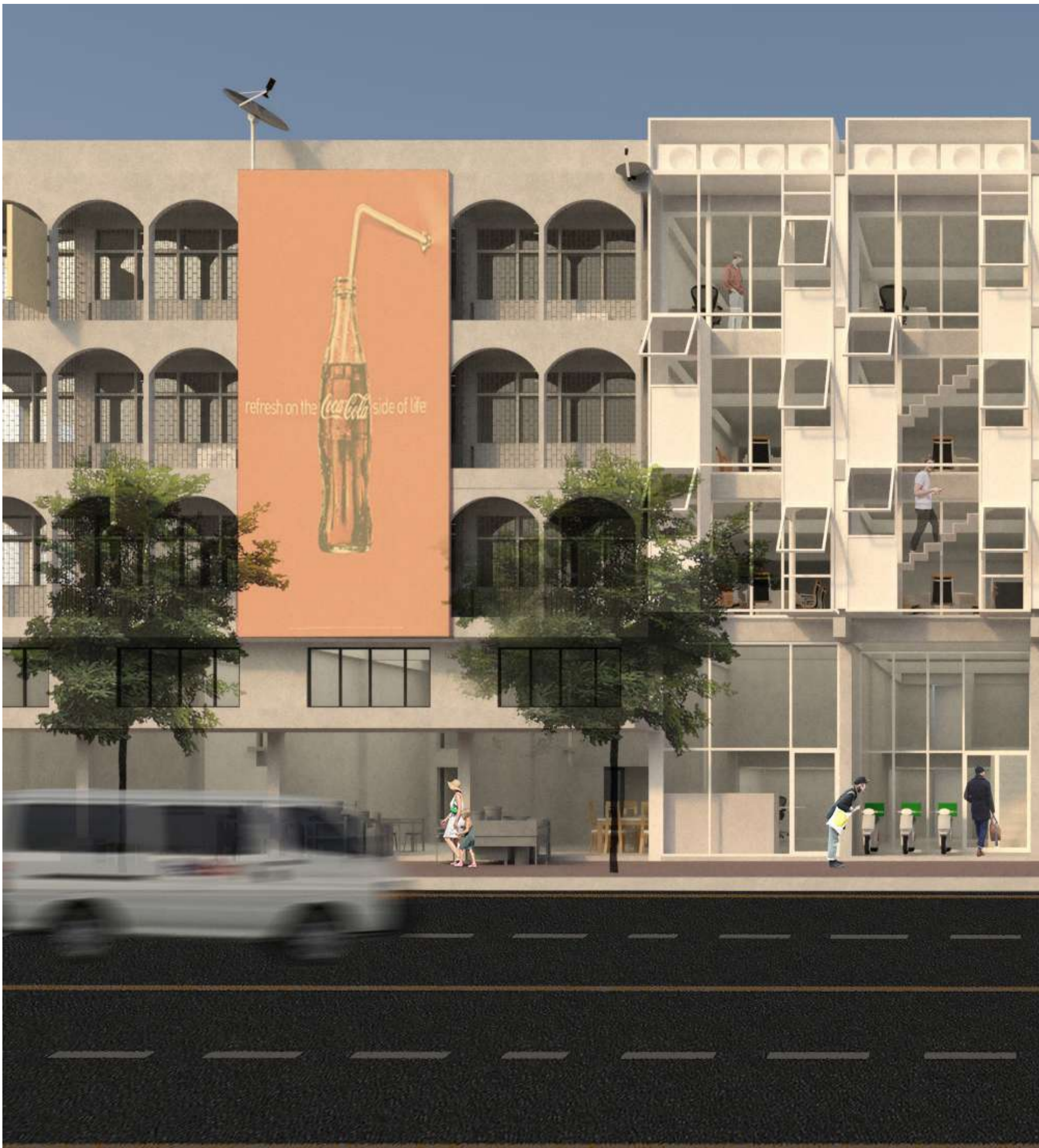
2nd Floor Plan



3rd Floor Plan



4th Floor Plan





Street Elevation in City Context

Shophouse Prototype Design Applications













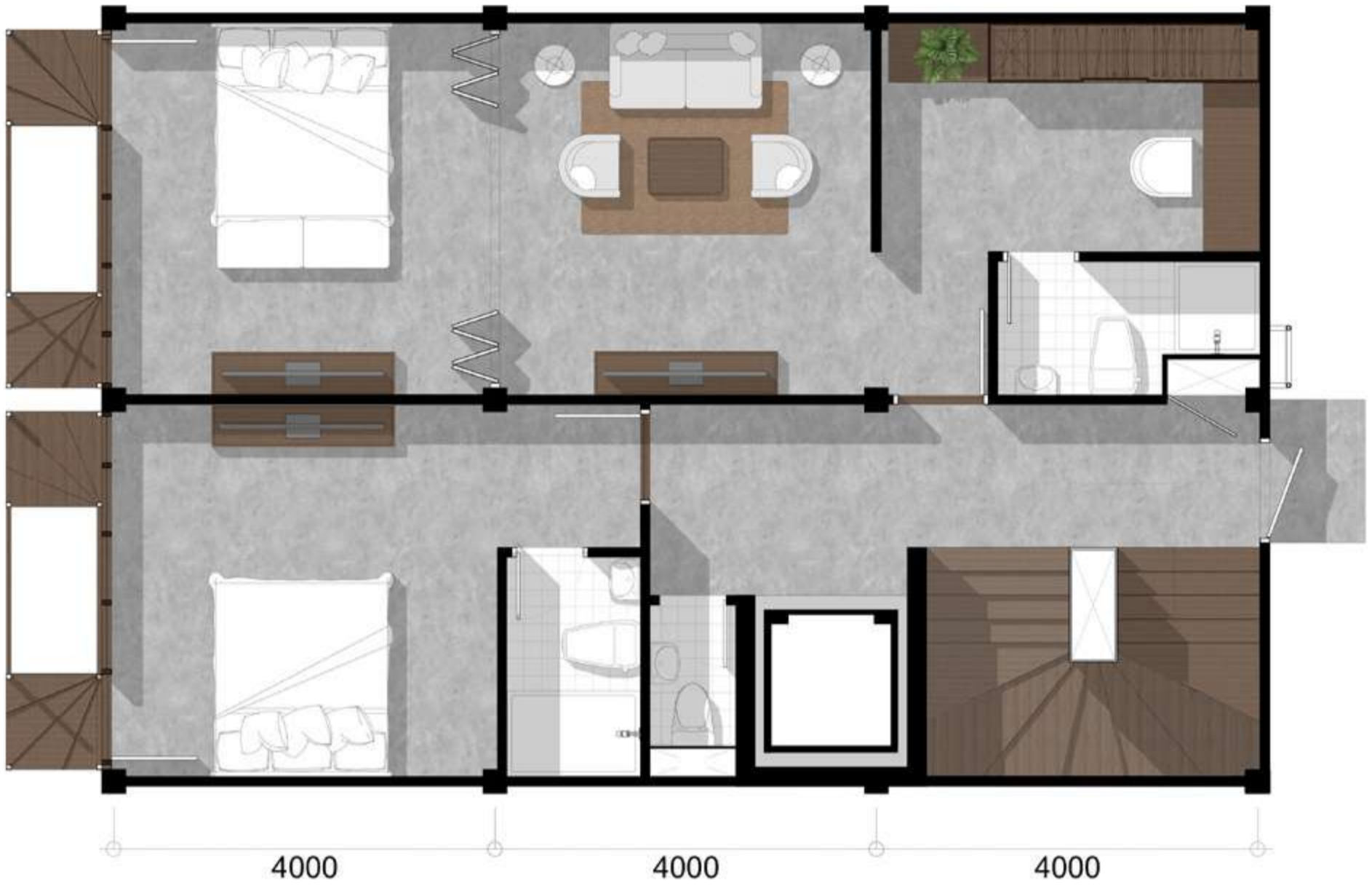
1st Floor Plan



Mezzanine Floor Plan



2nd Floor Plan



3rd Floor Plan



4th Floor Plan



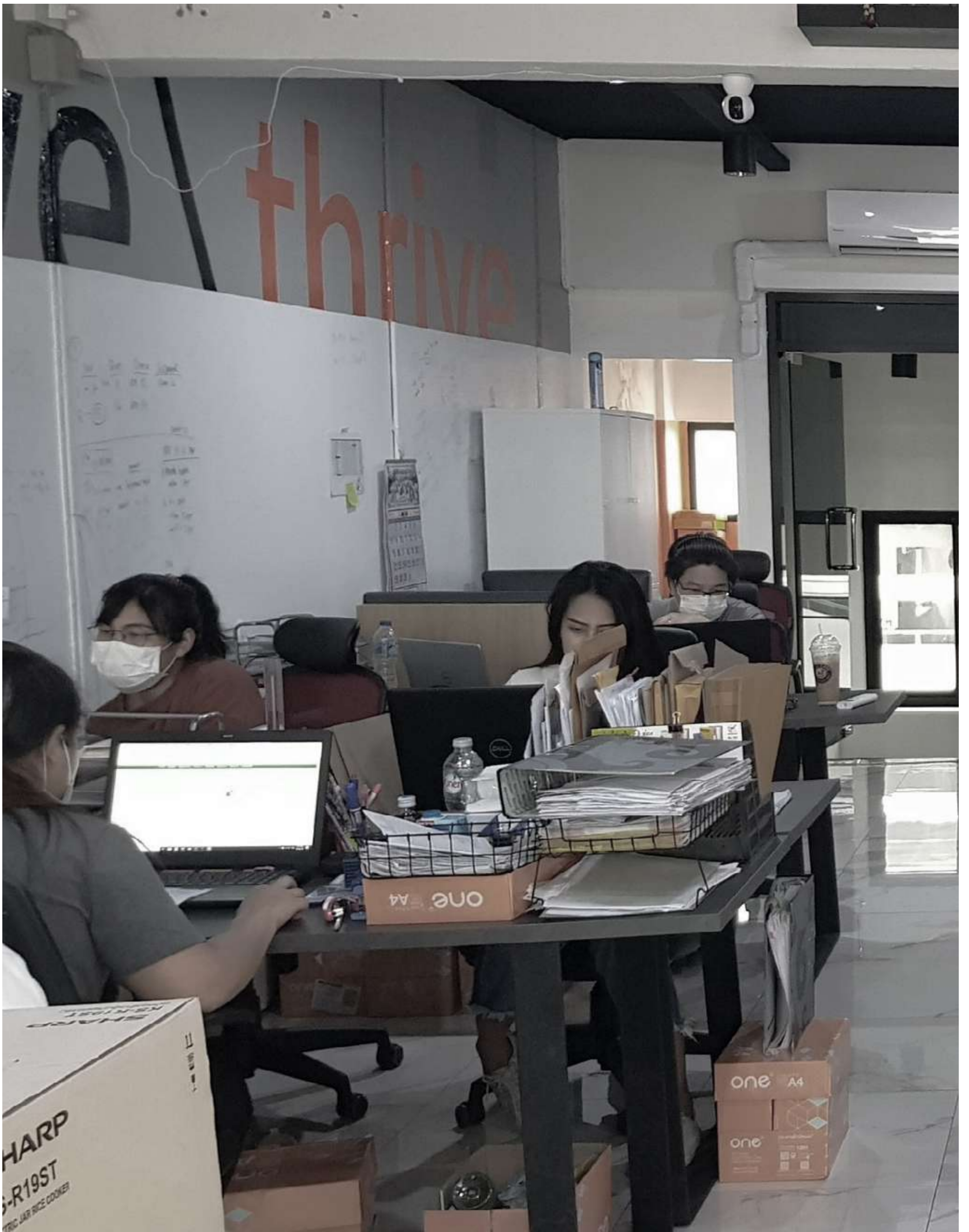




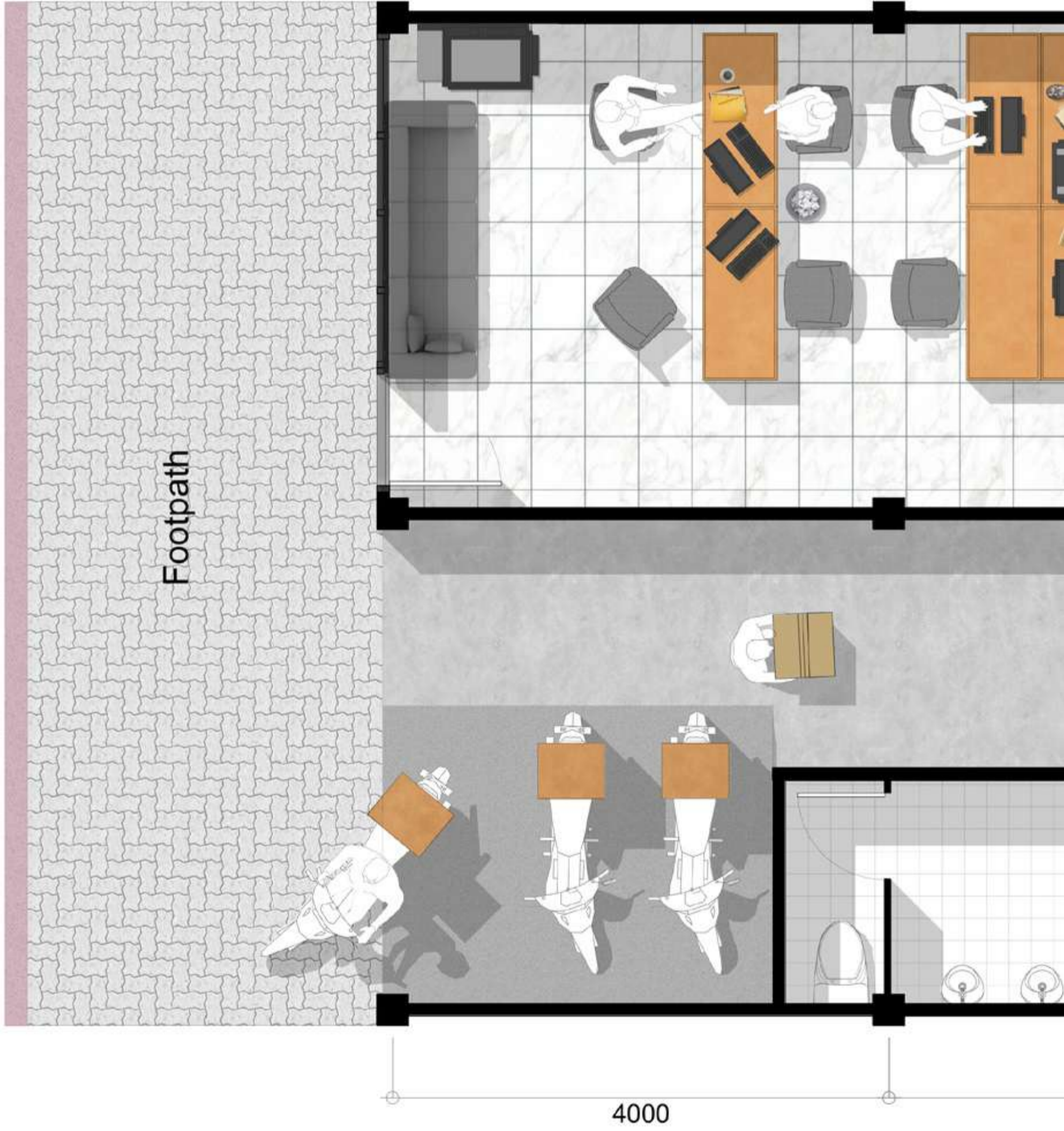






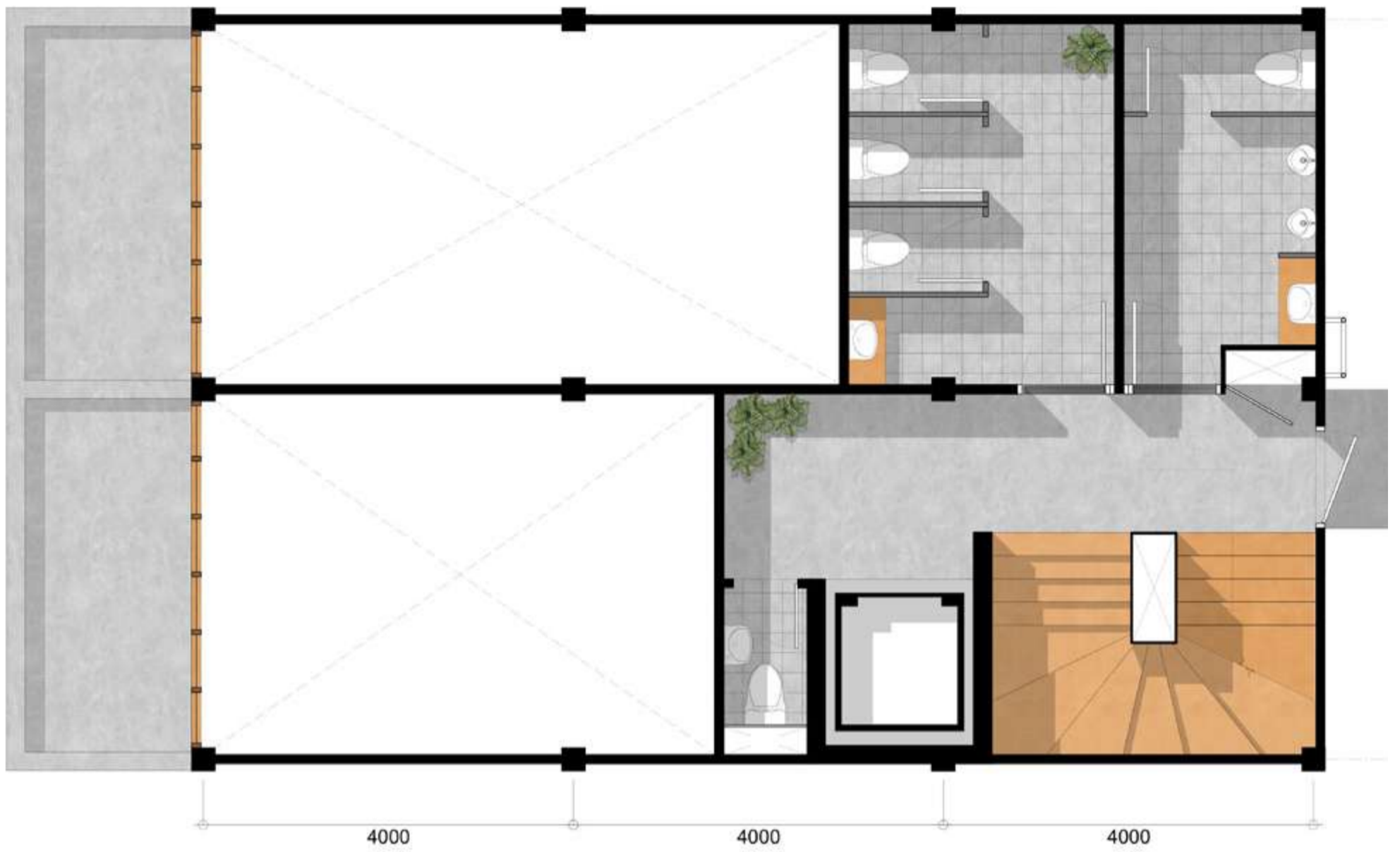




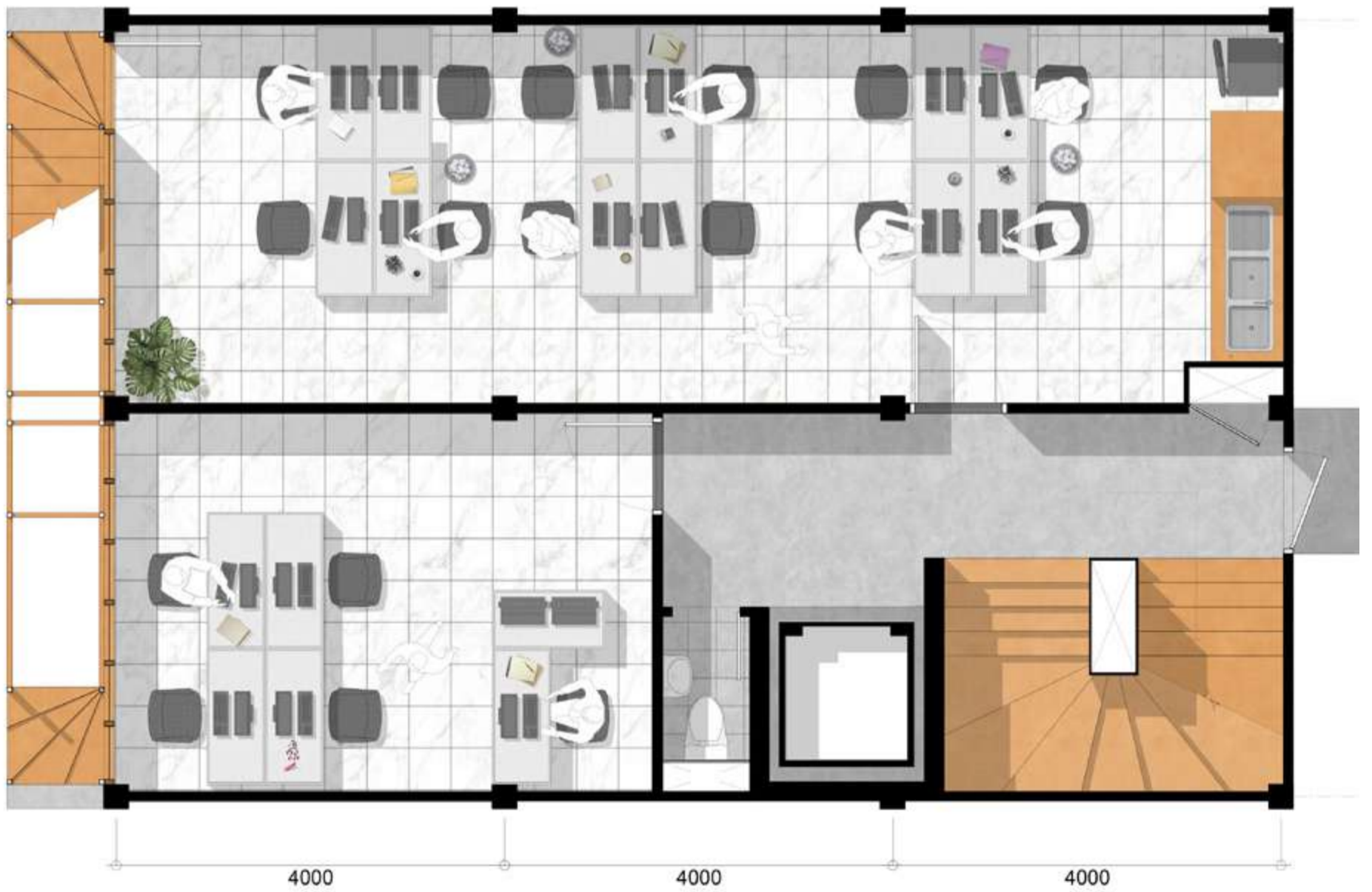




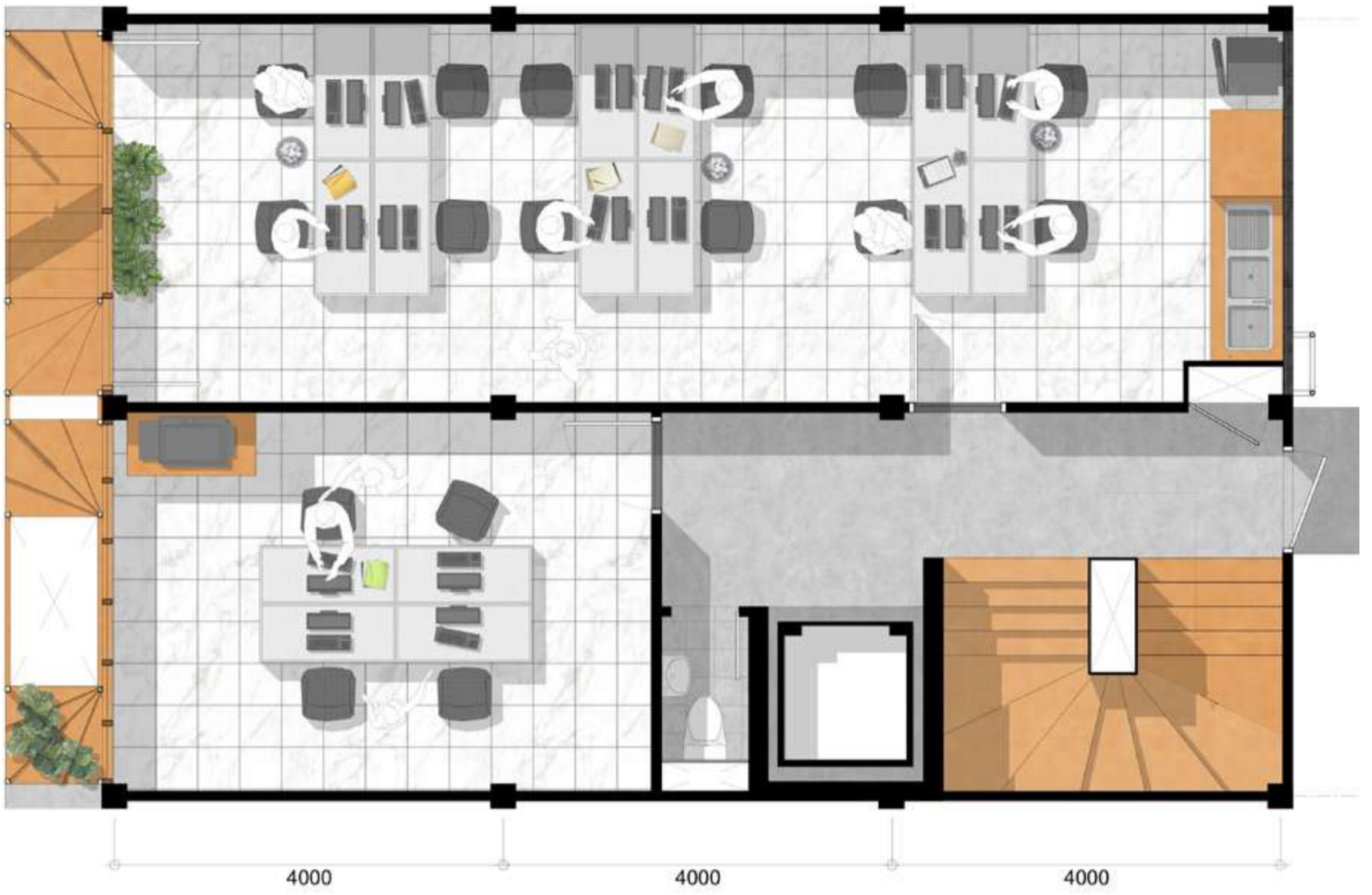
1st Floor Plan



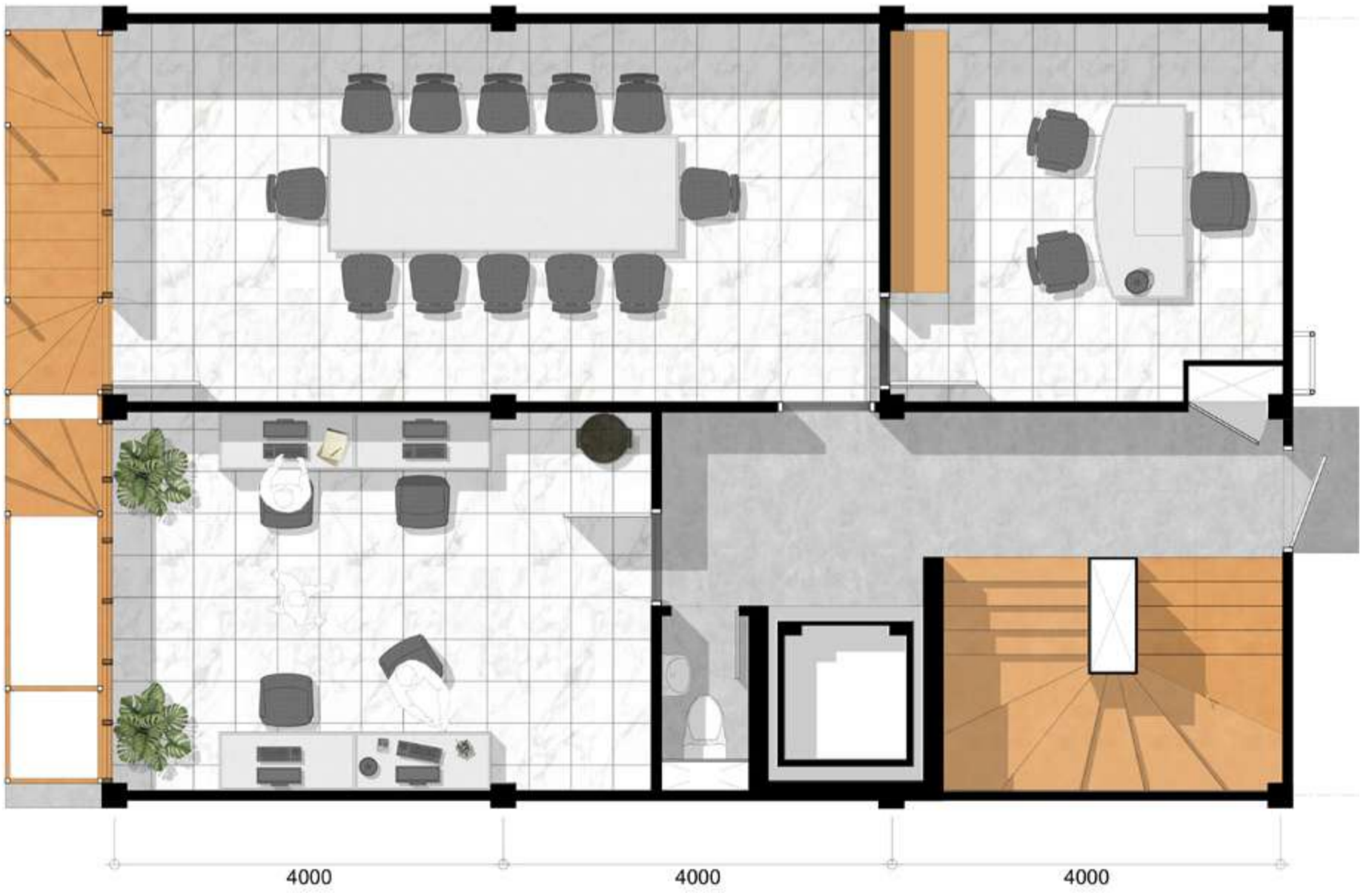
Mezzanine Floor Plan



2nd Floor Plan



3rd Floor Plan



4th Floor Plan





Lessons Learned and Recommendations

CITY SCALE:

Lesson Learned 1: Although it may seem obvious, we learned that shophouses are used and programmed differently according not only the users that occupy them, but according to the character of its zone in the Bangkok metropolis. The site of 101/1 Sukumvit is located in Bangkok's Urban Distribution Belt. It is a vital area in serving as the transitional zone in which products from the countryside can be sorted, cleaned, and packaged, before being distributed to stores and direct suppliers in the city center. Therefore, many of the existing shophouses researched have adopted the program of warehouse/factory/and distribution center due to its location as the 'pit stop' or intermediate 'rest area' between the rural productive landscapes/factories and the city center.

Recommendation 1: We may consider the program of factory/warehouse/distribution center for food, household, and light industry products in reimagining the new Bangkok shophouse prototype in the Punnawithi area. This should lead us to further scrutinize the specific character of the city when developing a shophouse prototype for other parts of Bangkok. By no means should we be developing a completely 'universal' program for the entirety of Bangkok... as each district will have its own uniqueness which will result in different types of programming of the shophouse. Ones that respond to that particular area's character, economy, and demographic in a unique way.

NEIGHBORHOOD SCALE:

Lesson Learned 2: Transportation accessibility (or inaccessibility) to potential shophouse subjects is of major importance. This is especially true for shophouse programs that require auto drop off for its commercial activities. Two of our subjects, the egg factory and auto parts warehouse, could not survive if they were located on the main street as long term parking for deliveries would not be permitted. The hardware shophouse encountered problems as it can only be accessed through Sukumvit Road. Customers arriving in vehicles in front of the store to pick-up hardware supplies need to temporarily park on the street (that doesn't have curbside parking), thereby creating traffic congestion.

Recommendation 2: Therefore, the site selection of shophouse prototypes is quite important as many businesses in the Punnawithi area require drop-off and pick-up points for their customers. The shophouse need access to minor alleys that allow for deliveries and temporary parking of larger delivery vehicles.

Lesson Learned 3: Bangkok's unique motorcycle delivery system (of food and products) are an important part of the shophouse network. Many commercial businesses that occupy shophouses, restaurant in particular, accept many food-by-phone delivery orders. Grab, Lineman, and Good Panda motorcycle delivery men frequently need to cue up to pick up food either on the curbside of the street, or even the sidewalk. This in turn, creates traffic obstruction and congestion, not to mention traffic safety concerns.

Recommendation 3: The new shophouse prototype design needs to address the problem of motorcycle delivery men that crowd the curb or sidewalk when they are picking up food and other products. The new shophouse prototype could potentially provide some design solutions to help alleviate this problem for the city. A question to ponder: Do the shophouse owners need to assume partial responsibility for the traffic impediments (through motorcycle delivery) that their business incurs?

Lesson Learned 4: Many traditional local businesses in Bangkok have activities that spill onto the sidewalk. They could be restaurants that serve street food, with food counters and cooking stations that 'colonize' the public sidewalk temporarily or permanently. This 'invasion' can be looked at positively as the blurring of public and private zones on sidewalks creates street liveliness that Bangkok is known for. On the other hand, these invasions could become serious obstruction to traffic flow and safety in some instances.

Recommendation 4: A middle-of-the-road, design strategy that simultaneously allow both 1.) the colonization of sidewalks for temporary shophouse activity as well as 2.) the avoidance of public safety and disturbance problems that is the result of this colonization.

Lesson Learned 5: The selected shophouse research site at the corner of 101/1 Sukumvit happens to fall on an important public transportation hub, where skytrain, meets mini red soi busses, tuk tuk's, and motorcycle taxis stations. The tenants of the shophouse therefore both enjoy and suffer from the heightened transportation activity. Commercially, the high traffic of 'outside' commuters arriving by BTS skytrain, and locals who travel from the interior of Soi Sukumvit 101/1 are a sources of customers and profitability. At the same time, this high activity may cause air and noise pollution, along with traffic congestion for local residents.

Recommendation 5: When choosing the shophouse development site, we must carefully consider access and availability to local transportation as tenants in shophouses have no parking spaces (if not connected to internal soi) and therefore cannot travel by car.

BUILDING SCALE:

Lesson Learned 5: The traditional program of the shophouse – family-run business with commercial on the bottom and living on top – are rarely found in existing shophouses.

Many times, the original owners no longer desire to live where they work. As the city environment has become more polluted and congested, shophouse owners have opted to live in townhomes or detached suburban houses in outlying suburbs, and simply commute to work day and night. This is the case with the hardware shophouse.

Many owners have left city life altogether, choosing to rent out their shophouse to another tenant who occupy the shophouse for purely commercial purposes. This is the case with the auto parts warehouse and the rabn kao gaeng shophouse.

However, secondary tenants some times still utilize the shophouse as a live/work environment, conducting business on the ground floor and living in the levels above. This is the case with the egg warehouse.

Lastly, original building owners have become creative in transforming their shophouse to accommodate multiple tenants with different programs. This is the case with the food court shophouse, with its food and beverage program on the bottom, and residential dorm rental on top. Here the owner has ingeniously created secondary stairs and side entrances to separate circulation and street access for multiple tenant groups.

Recommendation 5a: The new prototype should provide for these new transformations in commercial and residential shophouse programming (as recorded in the case studies): new all-commercial programs...new live/work tenant models...new configurations of multiple tenant with multiple programs.

Recommendation 5b: The MEP (mechanical, electrical, and plumbing) engineering system should be designed to accommodate multiple users who may need to separate their meters.

Recommendation 5c: A more flexible and efficient system of stairs should be designed to accommodate the multiple tenants/multiple programs in the new shophouse design. Perhaps a secondary stair may be needed to separate multiple users within the shophouse.

Recommendation 5d: Elevators may be necessary (or at least desirable) for some commercial programs that may need to transport heavy or bulky supplies up multiple levels.

Recommendation 5e: Secondary street access may be necessary for tenants of upper floors to access their space without having to go through the ground floor tenant's space. A provision for a lift/stair lobby may be needed in some cases for upper tenants.

Recommendation 5f: All changes in architecture, structural engineering, and MEP must still adhere to existing building codes.

Lessons Learned 6: The elevations of shophouses have been transformed in many ways to accommodate the functional, safety, commercial, and aesthetic requirements of the tenants.

At the ground floor, canvas or light metal canopies are frequently added to protect the sidewalk elevation from harsh sunlight and rain from entering the interior. At the city level, a series of interconnected canopies provide for shaded walkways that benefit sidewalk pedestrians.

Security grills have been added to enclose street-facing windows and balconies to protect from potential burglaries and unwelcome invaders.

Air conditioning condensers are common additions to the front facades of all shophouses. They are either installed (after-the-fact) on balconies, overhangs, or on new add-on shelves attached to any available vertical surfaces.

Building signage billboards are common additions to shophouse building facades. For the commercial tenants, business recognition and advertisement to the passing pedestrian or car are of crucial importance in the survival of their business. Therefore, space and accommodation for building signage should be considered in façade design.

Recommendation 6: All of the aforementioned 'ad-hoc' additions to the façade to fulfill functional, safety, and advertisement requirement should be considered when designing the façade of the new shophouse prototype.

Lessons learned 7: Rooftop additions have been made (legally and illegally) to express the need of existing tenants for additional rooftop "penthouse" living space...with visual and physical access to the sky and rooftop views of the city.

Recommendation 7: The roof plane should be considered accessible and potentially programmable in the new shophouse prototype design.

Lessons learned 8: Rooftop /roofdecks in existing shophouses are the only place where tenants can create greenspace and gardens, usually in the form of potted plants.

Recommendation 8: Potential program for previously unauthorized roof access – roof garden.

Lessons learned 9: All roof top additions surveyed have security screens in the form of chain link fence, "lek dad"(security steel bars of intricate patterns), or many other construction types, to protect from burglars and thieves.

Recommendation 9: The concern for safety is a key consideration when designing rooftop spaces and gardens in the new shophouse prototype.

Lessons learned 10: The existing restaurant for "Hia Hai Crab Fried Rice Restaurant" case study has a high powered ventilation hood that disposes of oily fumes resulting from the wok cooking on the ground floor. The issues concerning heavy kitchen cooking and its smells/oil residue that may effect neighbors is a big concern in restaurant operations.

Recommendation 10: In the case of restaurant/cooking programs and tenants, seriously consider and provide for a well thought out ventilation system and its associated equipment (large pump, separate vertical ventilation ducts in shafts, and tall exhaust chimney on roof deck)

Lessons learned 11: Bangkok municipality outlines specific building code requirements that need to be followed in renovating existing building.

Recommendation 11: New programs being introduced to the shophouse that are different from its original use of retail and single family residential occupation, need to be strictly adhered to. For example the introduction of an office program will require increased fire stair provisions to ensure the safety of increased volume of tenants that come with the new program.

Lessons learned 12: Bangkok municipality requires that any renovation of more than 2 shophouse kookba's (bays) with a combined upper floor area of more than 300 sq. m. must have a main stair that has a minimum 1.50 meter width (not including the handrail).

Recommendation 12: Many old shophouses have existing stairs that have widths that are less than the required 1.50 meter. Therefore, a new stair must be designed to accommodate the new requirements for the renovation.

Lessons learned 13: Older shophouses are designed to accommodate private residential living and therefore have lower minimum requirements for bathroom accommodations. Bangkok municipality requires more expansive bathroom accommodations in new shophouse renovations.

Recommendation 13: Shophouse renovations with new public programs must provide bathroom requirements as specified by Bangkok municipal building codes. One area that can accommodate more bathrooms without taking up valuable occupiable and rentable space is the shophouse mezzanine level. As the mezzanine floor plate only occupies approximately 40% of the plan footprint, its compact area can accommodate little else and can be sacrificed for storage, building utilities, and extra bathrooms.