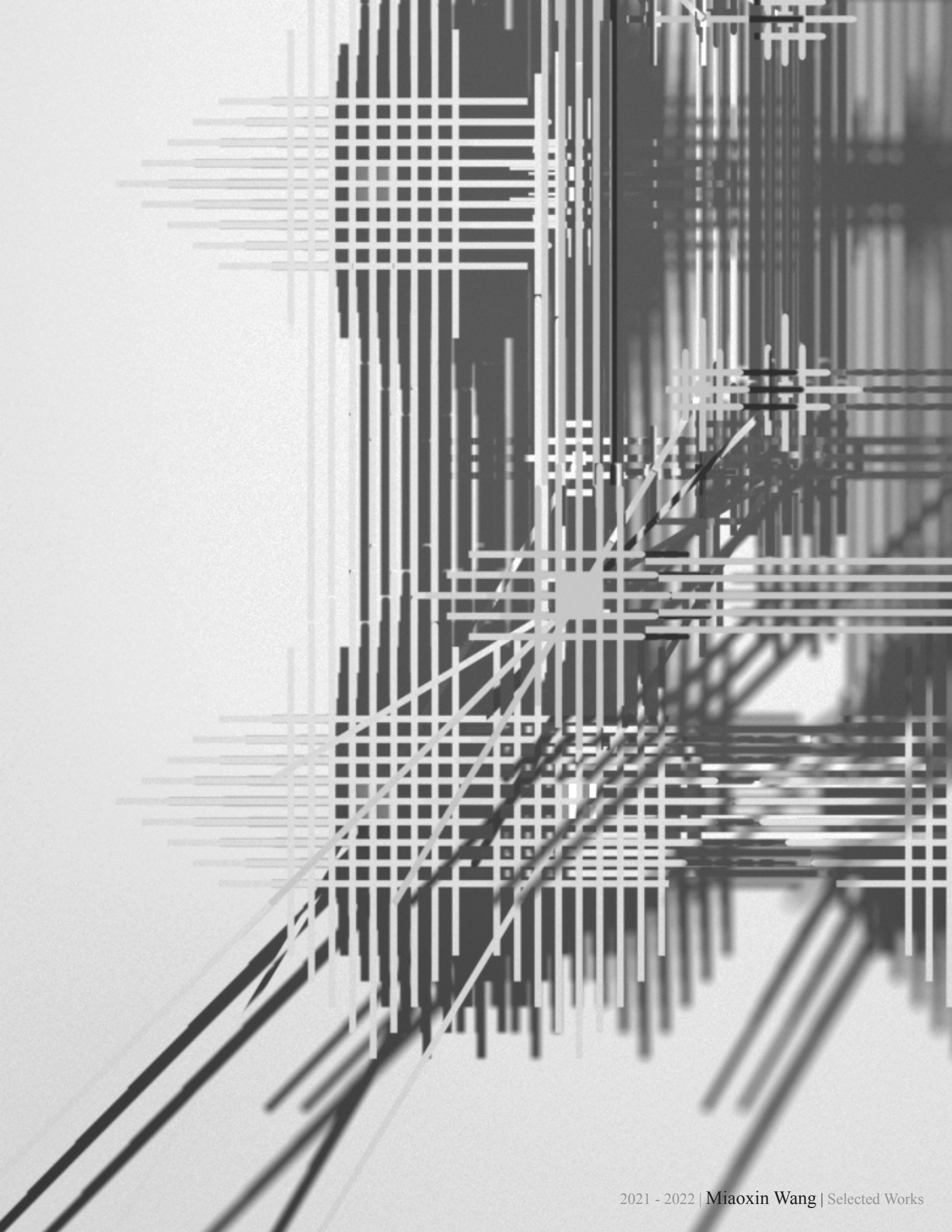
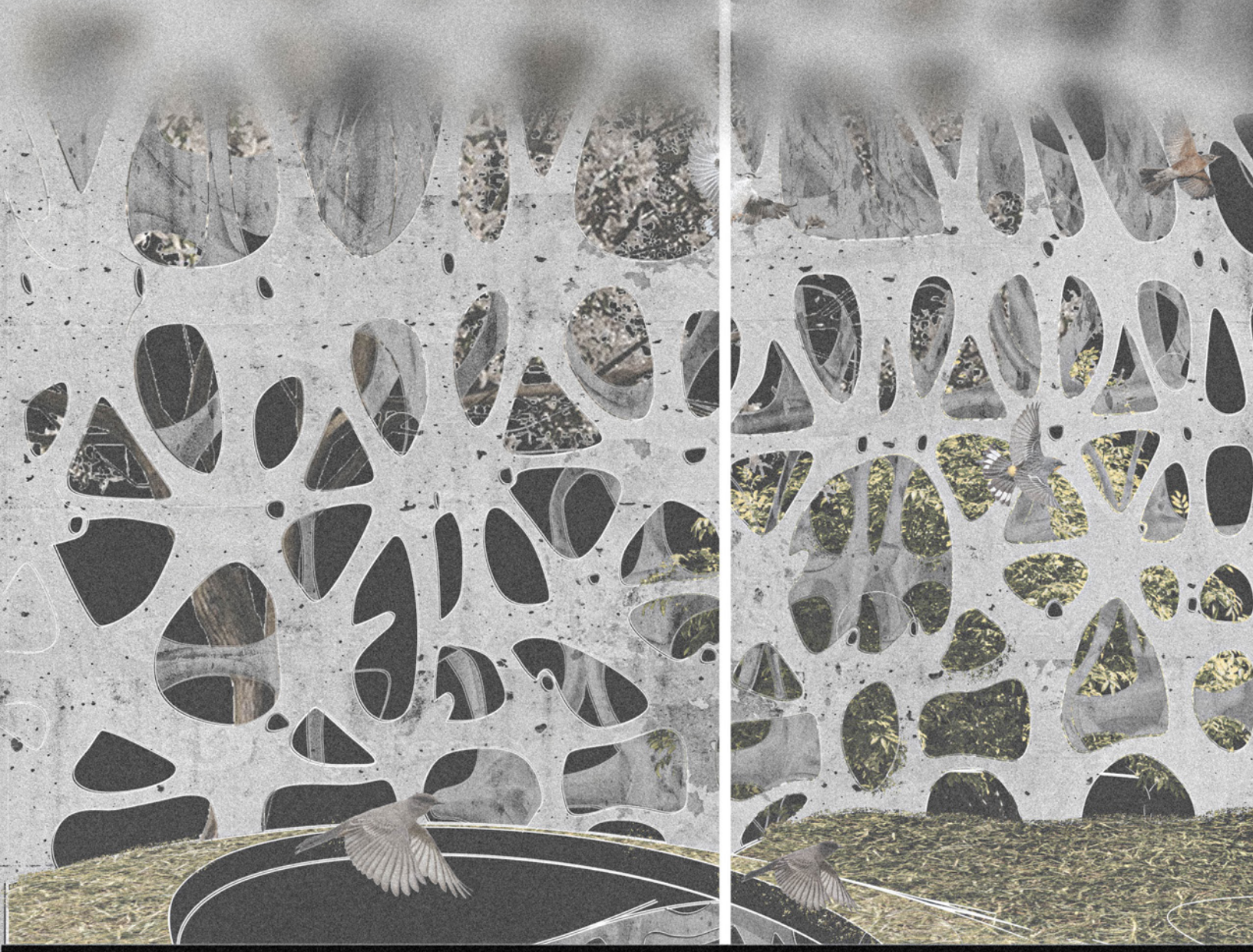
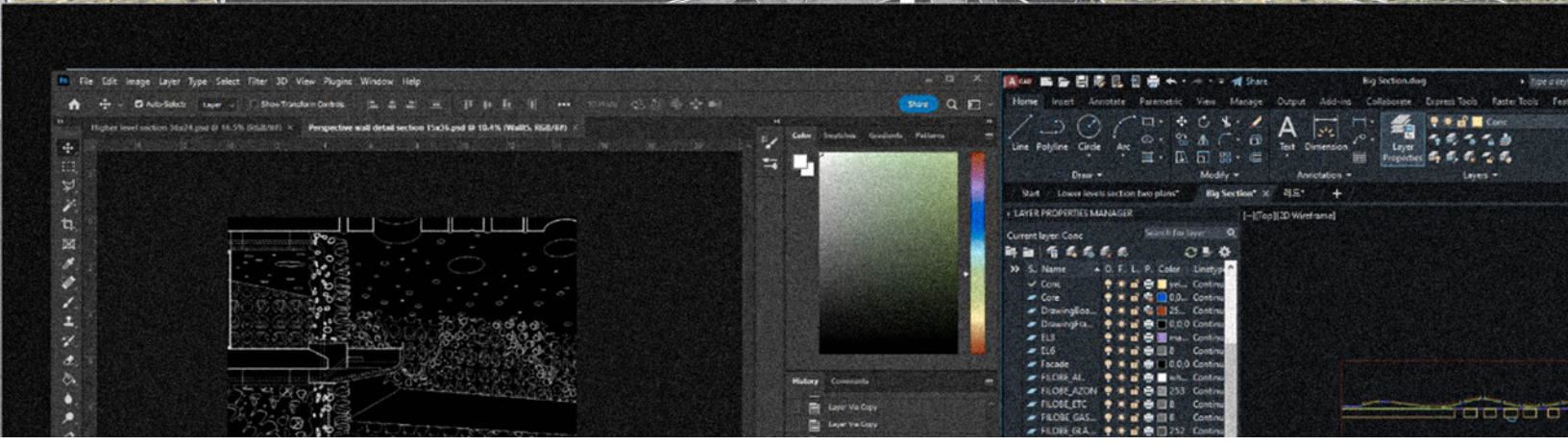
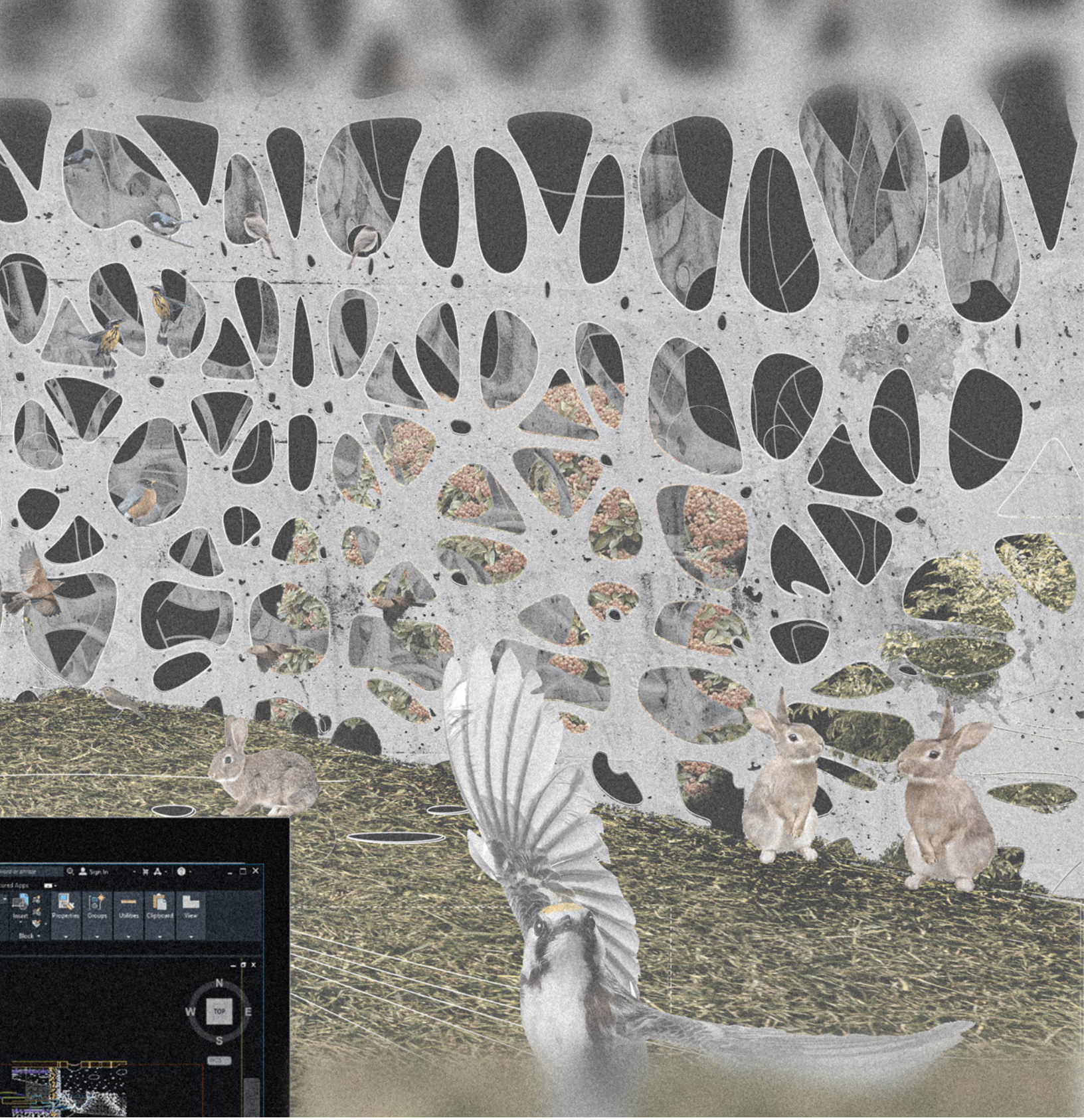






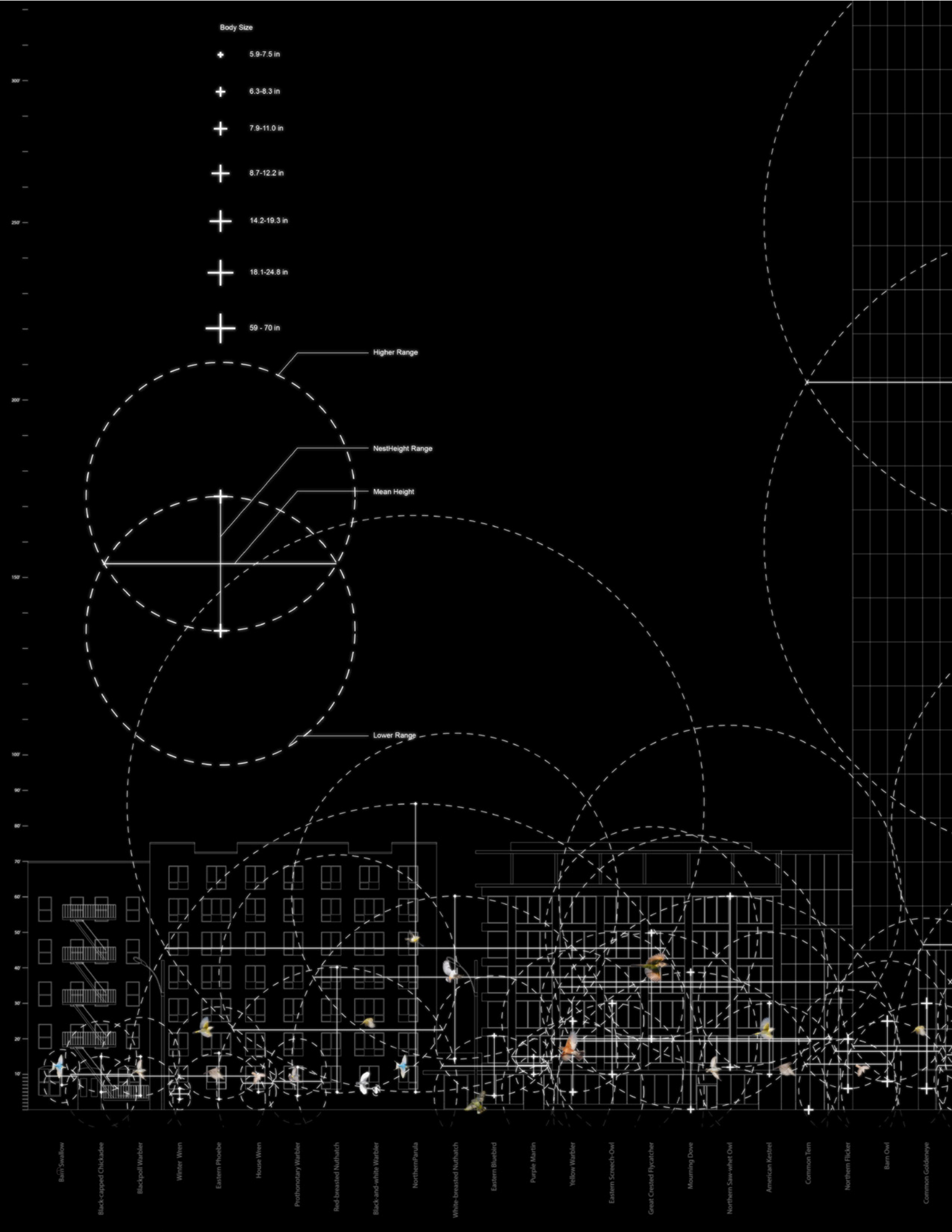
Towards a Bird City

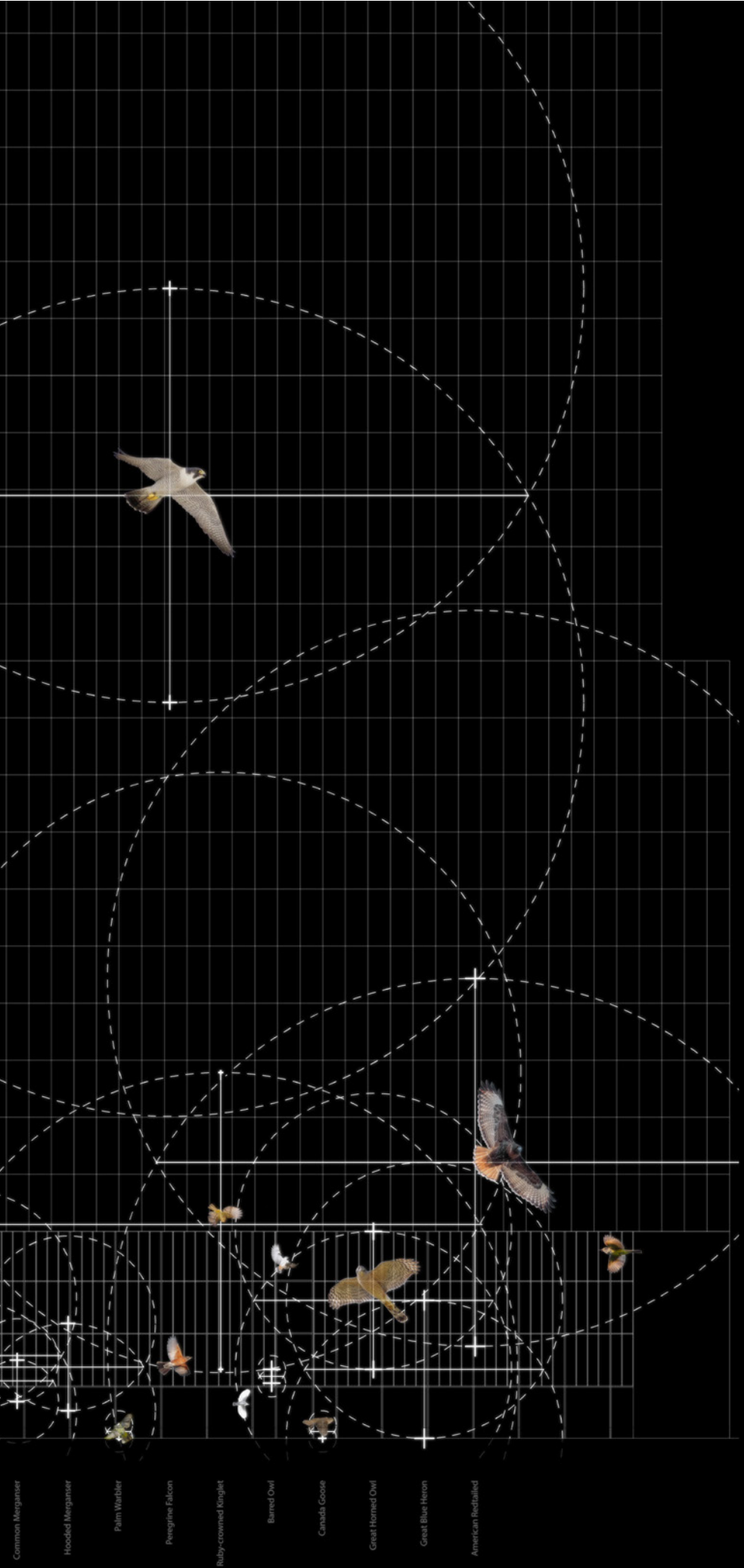
Manhattan, New York
GSAPP Spring 2023
Instructor: Karla Rothstein
Team member: Eunyoung Lee



The entangled environment of birds and cities possesses opportunities for a new collective urban imagination that redresses the negative impacts of anthropocentric urban environments. We challenge the notion that cities are inevitably destructive to the life of birds. Through analytical mapping of found dead birds, 4WTC was chosen as an initial site of intervention. The mapping of different birds' nests reveals a correlation to their food resources under a height of 75'. The project proposes to reintroduce the 75' vertical biome into 4WTC by strategic removal and a lattice system that support biodiversity crucial to the sheltering, foraging, and nesting of non-predatory birds. Through the prototypical intervention of 4WTC, design tactics could be translated to other towers. Most importantly, the design logic derived from a bird's perspective is a forerunner to reconsider a series of human building inventions, ranging from a new skyscraper to regulation of building facades, yielding productive consequences to humans and birds alike, at the urban scale, body scale, and temporal / experiential scale.

Cemetery
Green Space
Reported found dead or injured bird in 2022
Bird hospital/Rehab
Median Income
< 28,750
< 49,281
< 72,258
< 250,000
Spring Migration
Fall Migration
Atlantic Flyway

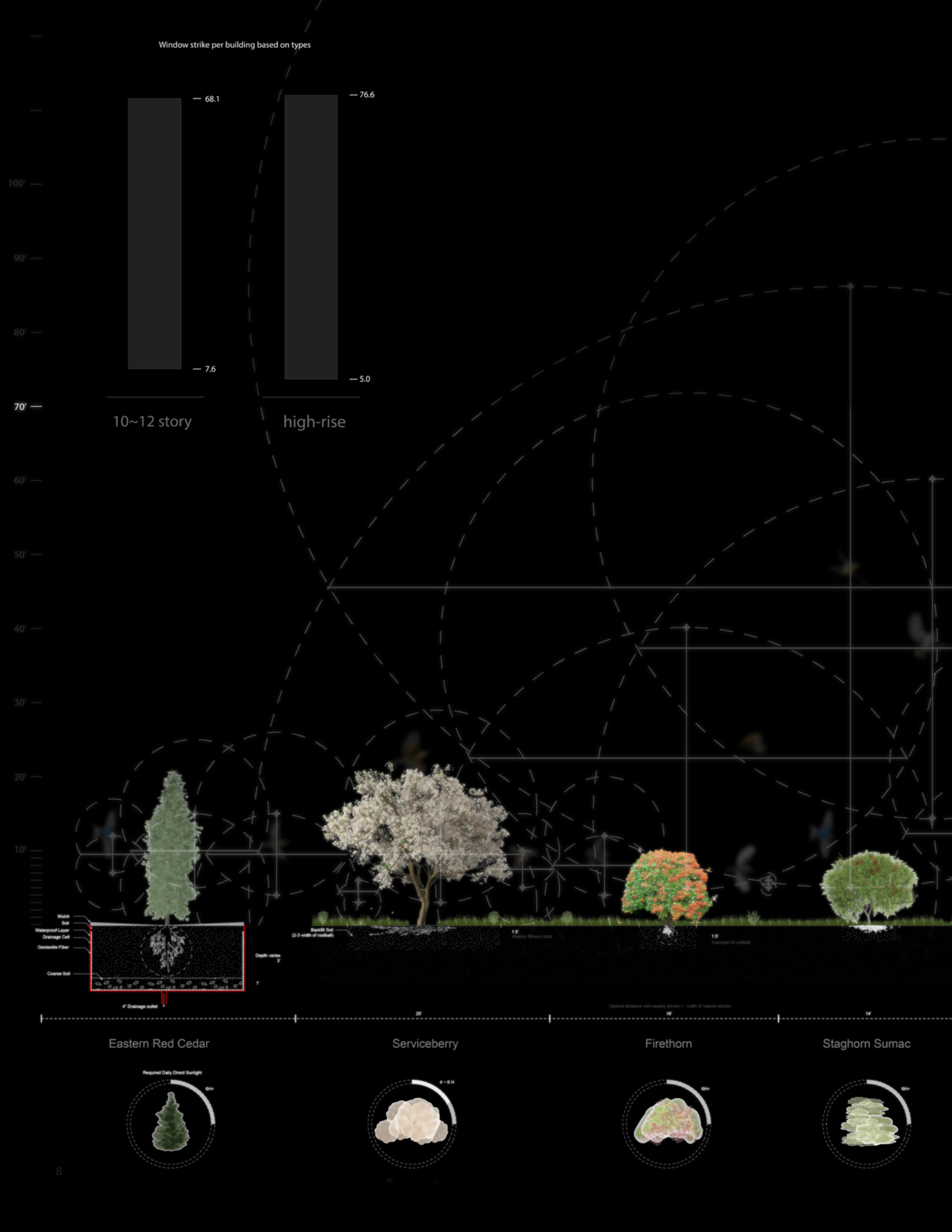

Body Size
5.9-7.5 in
6.3-8.3 in
7.9-11.0 in
8.7-12.2 in
14.2-19.3 in
18.1-24.8 in
59 - 70 in
Higher Range
NestHeight Range
Mean Height
Lower Range
300'
250'
200'
150'
100'
90'
80'
70'
60'
50'
40'
30'
20'
10'
Barn Swallow
Black-capped Chickadee
Blackpoll Warbler
Winter Wren
Eastern Phoebe
House Wren
Prothonotary Warbler
Red-breasted Nuthatch
Black-and-white Warbler
NorthernParula
White-breasted Nuthatch
Eastern Bluebird
Purple Martin
Yellow Warbler
Eastern Screech-Owl
Great Crested Flycatcher
Mourning Dove
Northern Saw-whet Owl
American Kestrel
Common Tern
Northern Flicker
Barn Owl
Common Goldeneye

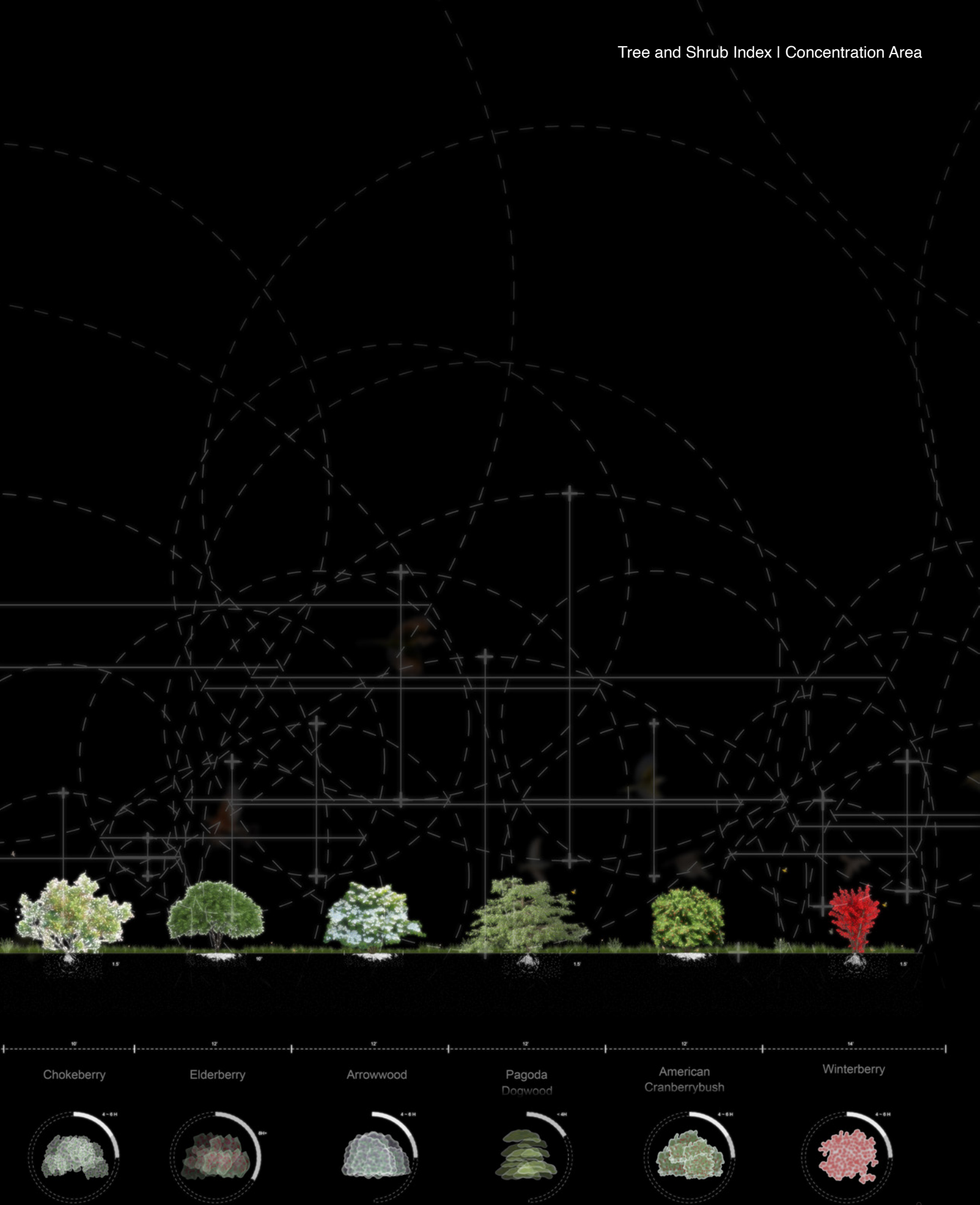


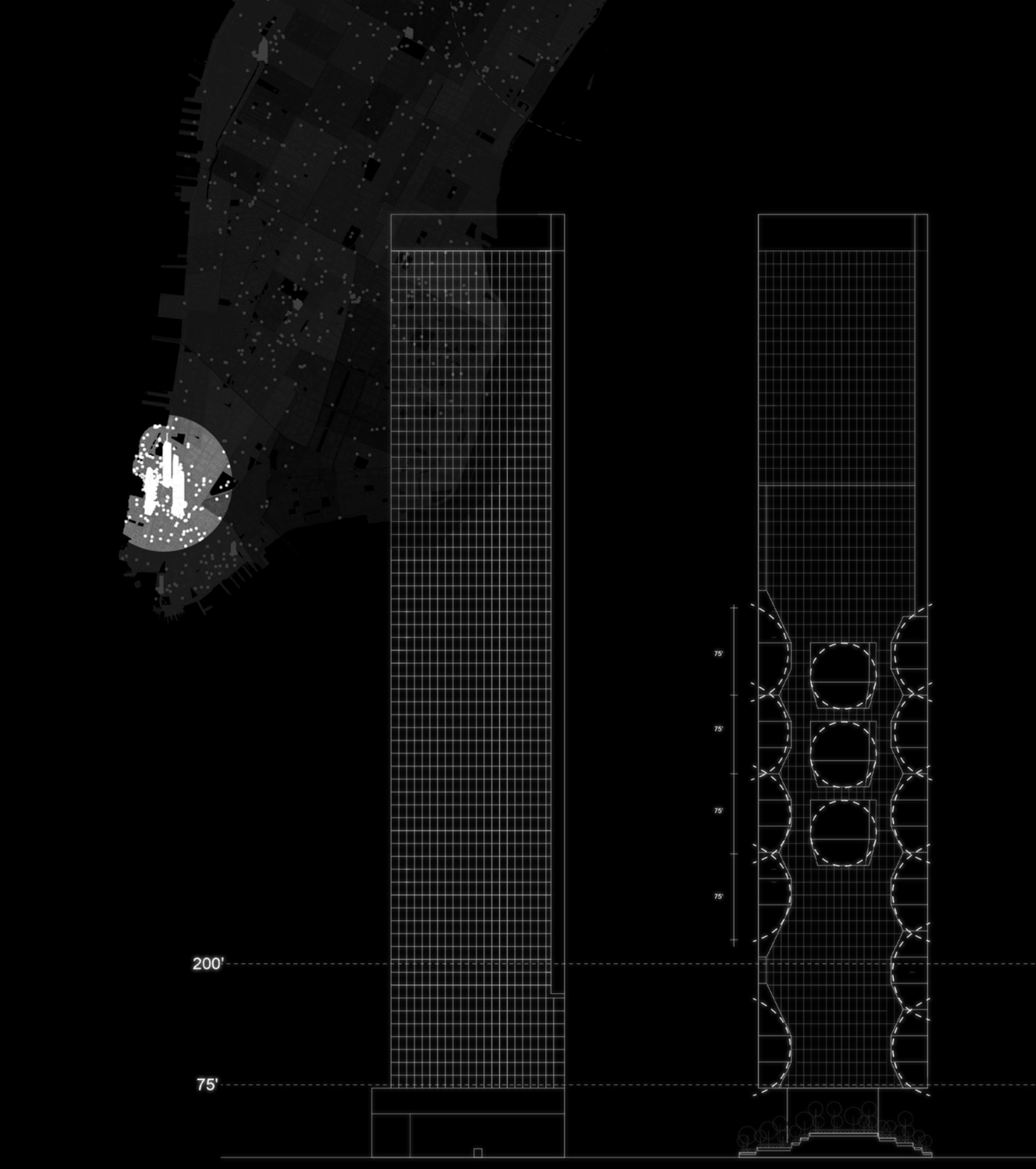
Bird Species

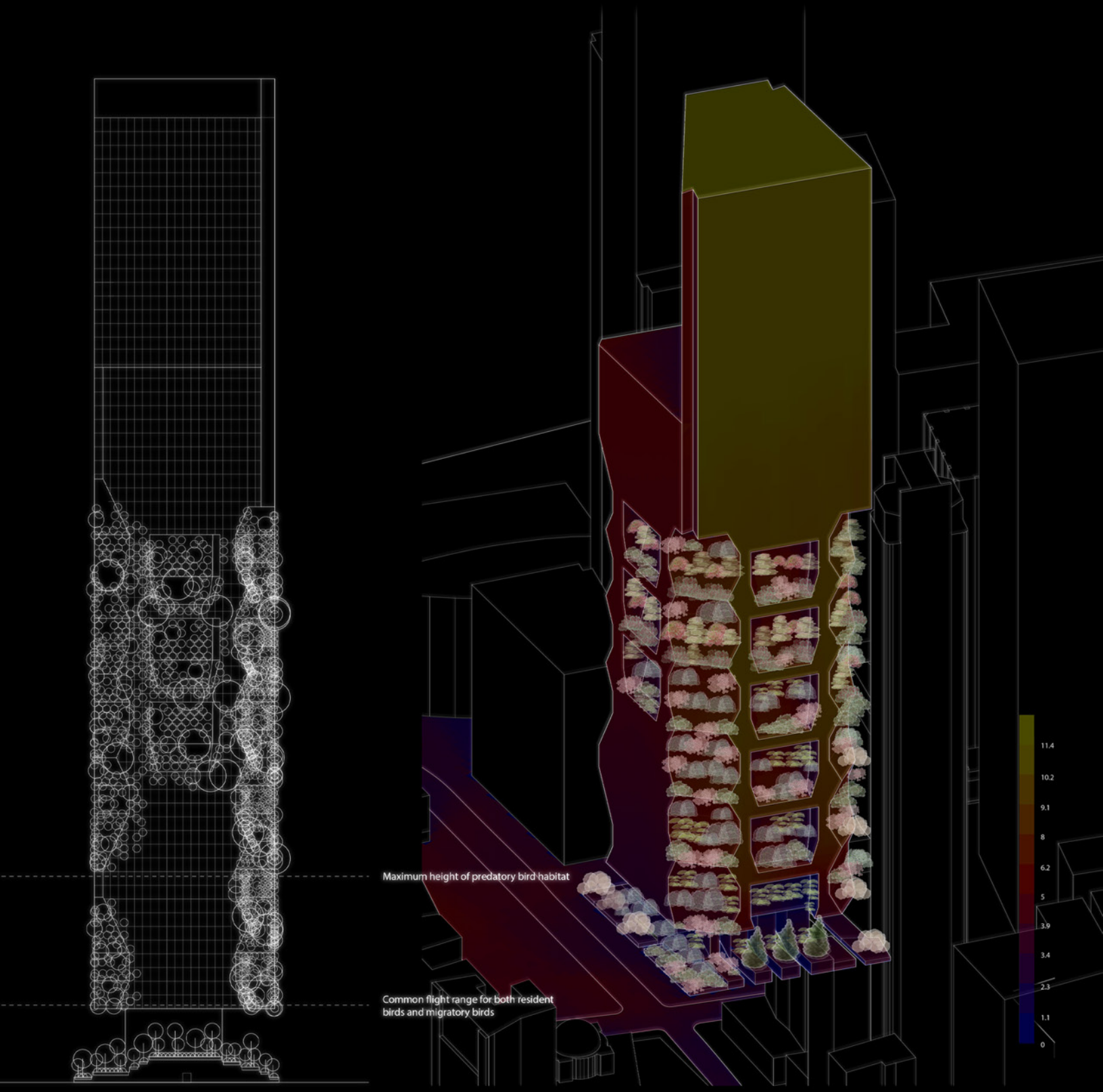
1 Red Tailed Hawk
2 Cooper's Hawk
3 Chimney Swift
4 Eastern Phoebe
5 Great Crested Flycatcher
6 Eastern Kingbird
7 Northern Rough-winged Swallow
8 Barn Swallow
9 White-breasted Nuthatch
10 House Wren
11 Winter Wren
12 Golden-crowned Kinglet
13 Ruby-crowned Kinglet
14 Swainson's Thrush
15 Hermit Thrush
16 American Robin
17 Gray Catbird
18 Northern Parula
19 Yellow Warbler
20 Chestnut-sided Warbler
21 Magnolia Warbler
22 Black-throated Blue Warbler
23 Yellow-rumped (Myrtle) Warbler
24 Black-throated Green Warbler
25 Palm Warbler
26 Blackpoll Warbler
27 Black-and-white Warbler
28 American Redstart
29 Ovenbird
30 Northern Waterthrush

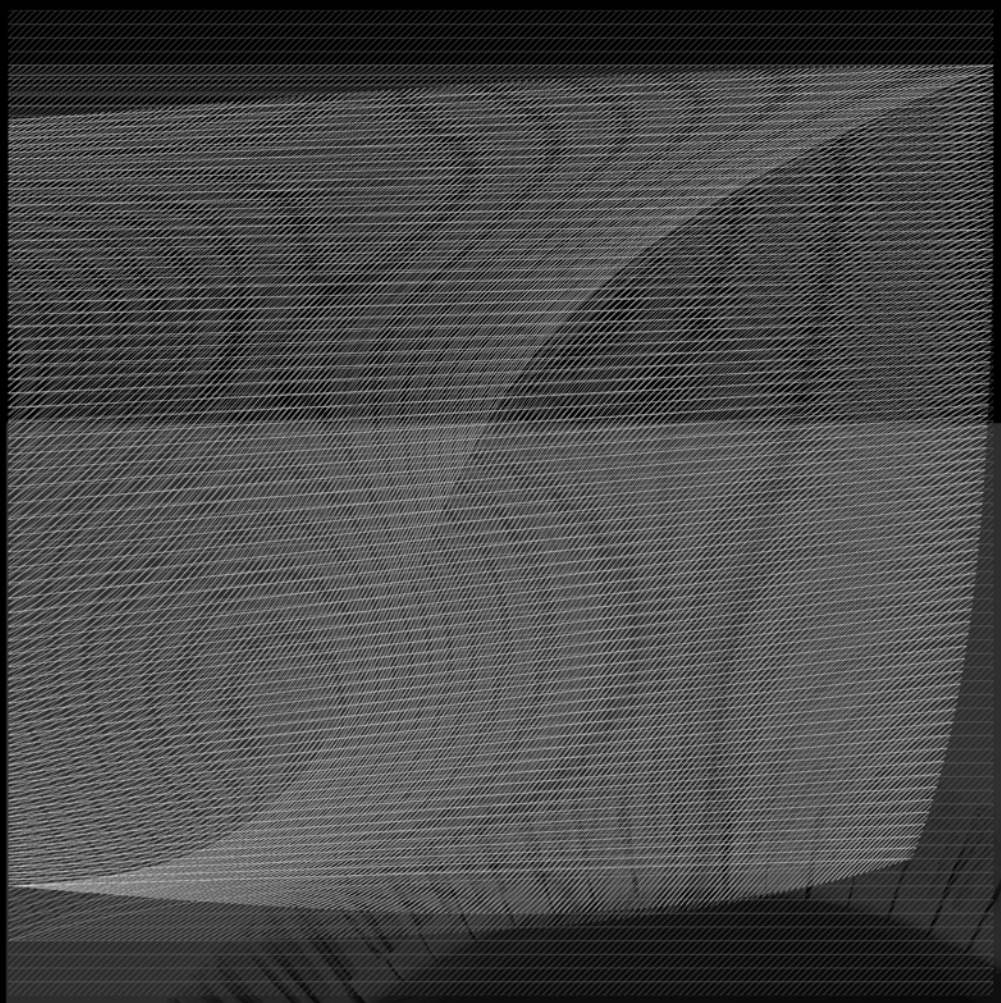
Window strike per building based on types

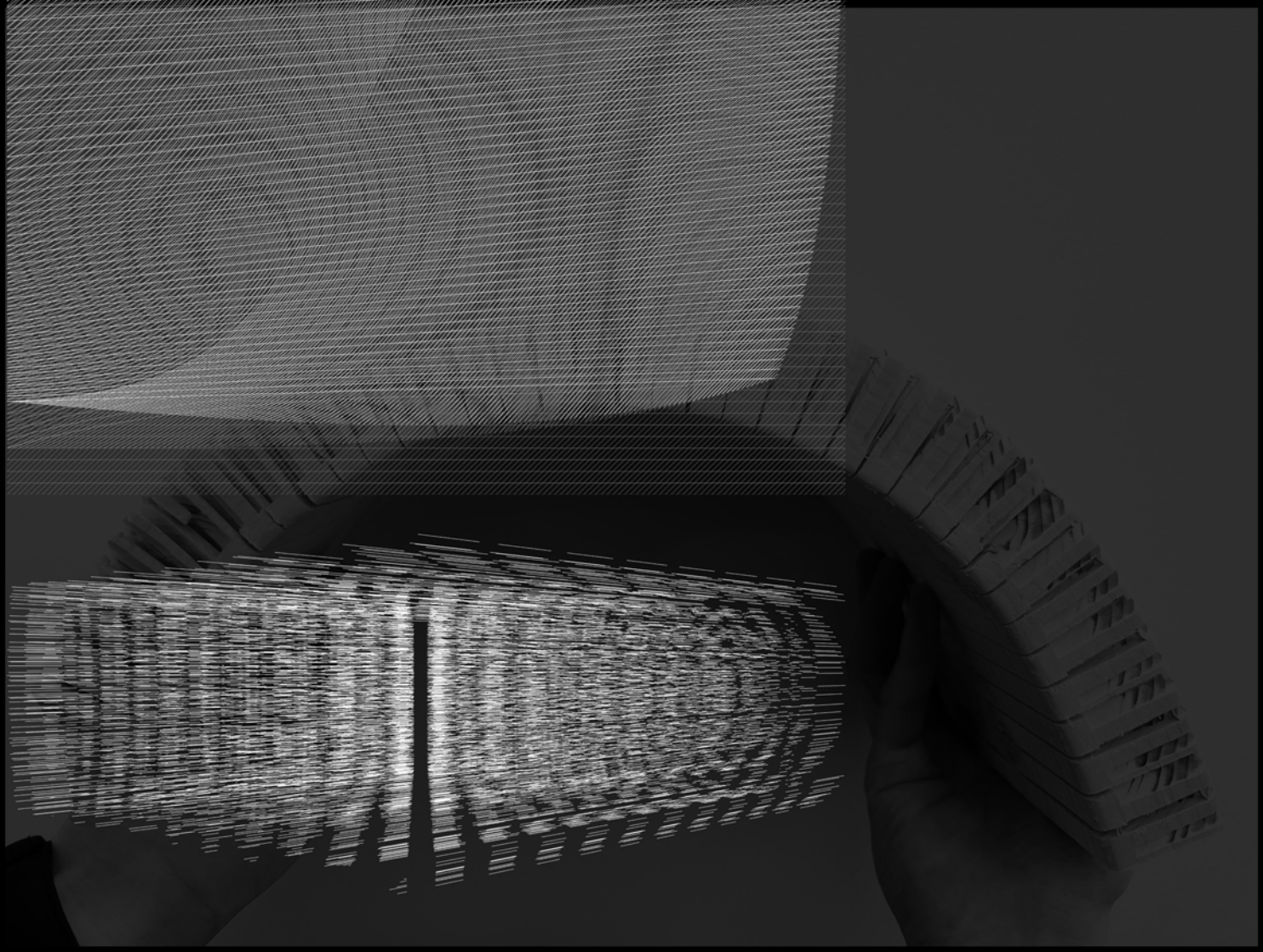


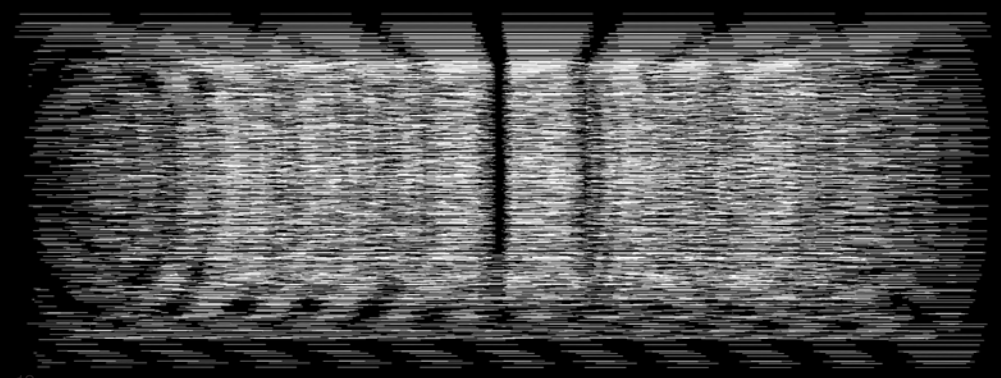

10'
12'
12'
12'
12'
14'
Chokeberry
Elderberry
Arrowwood
Pagoda Dogwood
American Cranberrybush
Winterberry


75'
75'
75'
75'
200'
75'

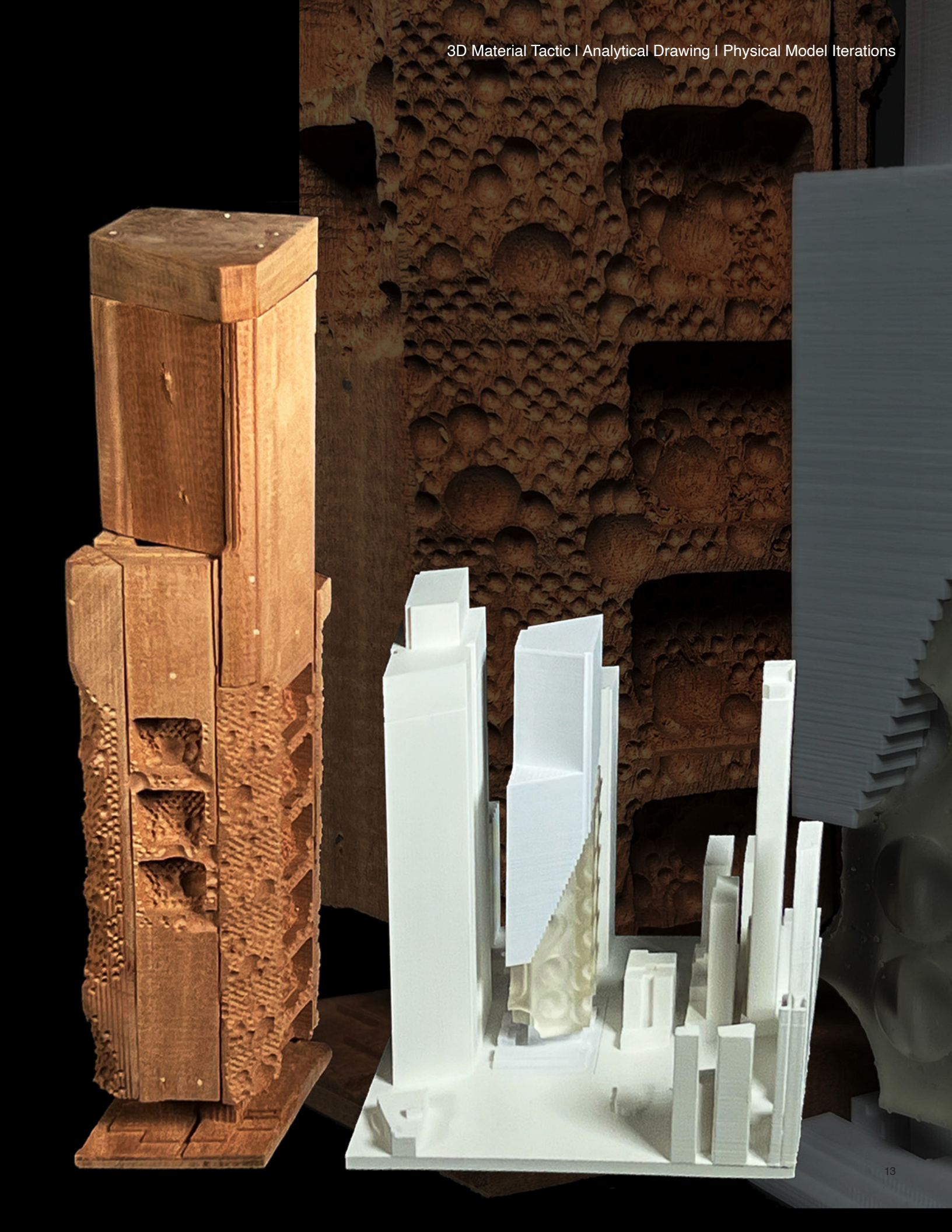

Maximum height of predatory bird habitat
Common flight range for both resident birds and migratory birds
11.4
10.2
9.1
8
6.2
5
3.9
3.4
2.3
1.1
0







3D Material Tactic | Analytical Drawing | Physical Model Iterations

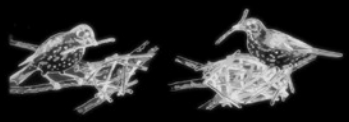


Cup Nest

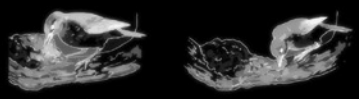
Mud Nest

Hanging Nest

Attachment



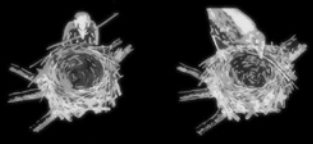
- sticks
- sturdy twigs



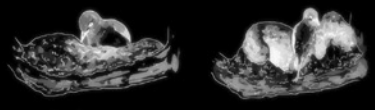
- mud pellets
- straws
- hairs

- moss
- spider silk

Structure



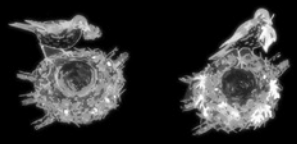
- small sticks
- grass



- mud pellets

- moss
- spider silk

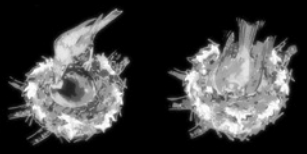
Decoration camouflage



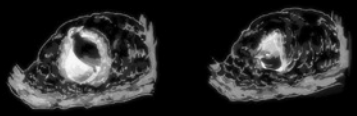
- moss
- leaves

- moss
- lichen

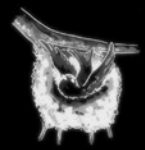
Lining thermal insulation



- moss
- wool
- spider webs
- feather
- shape the inner side with body



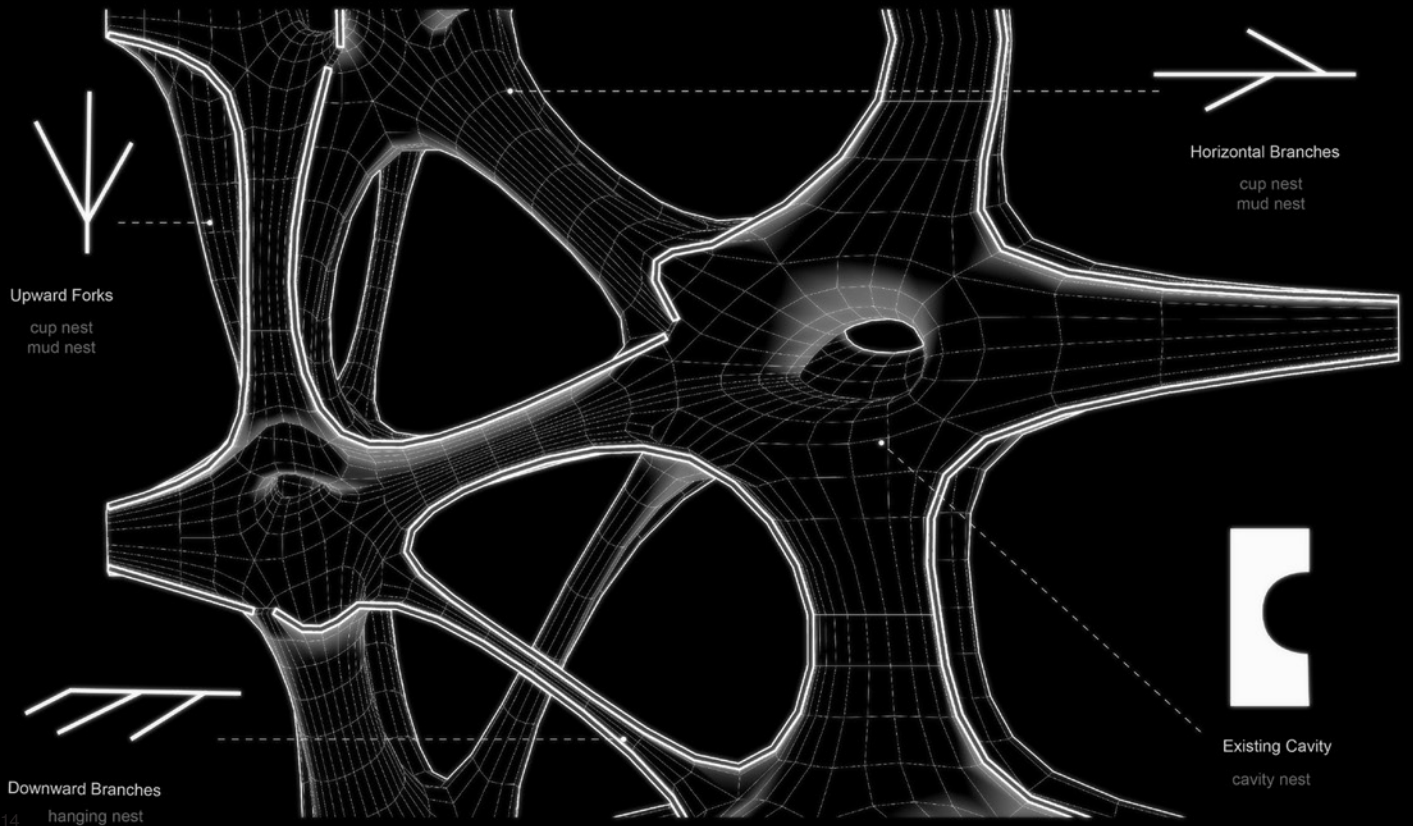
- mud pellets

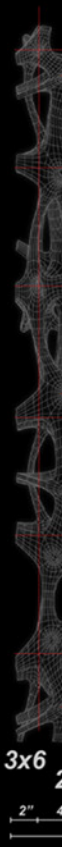


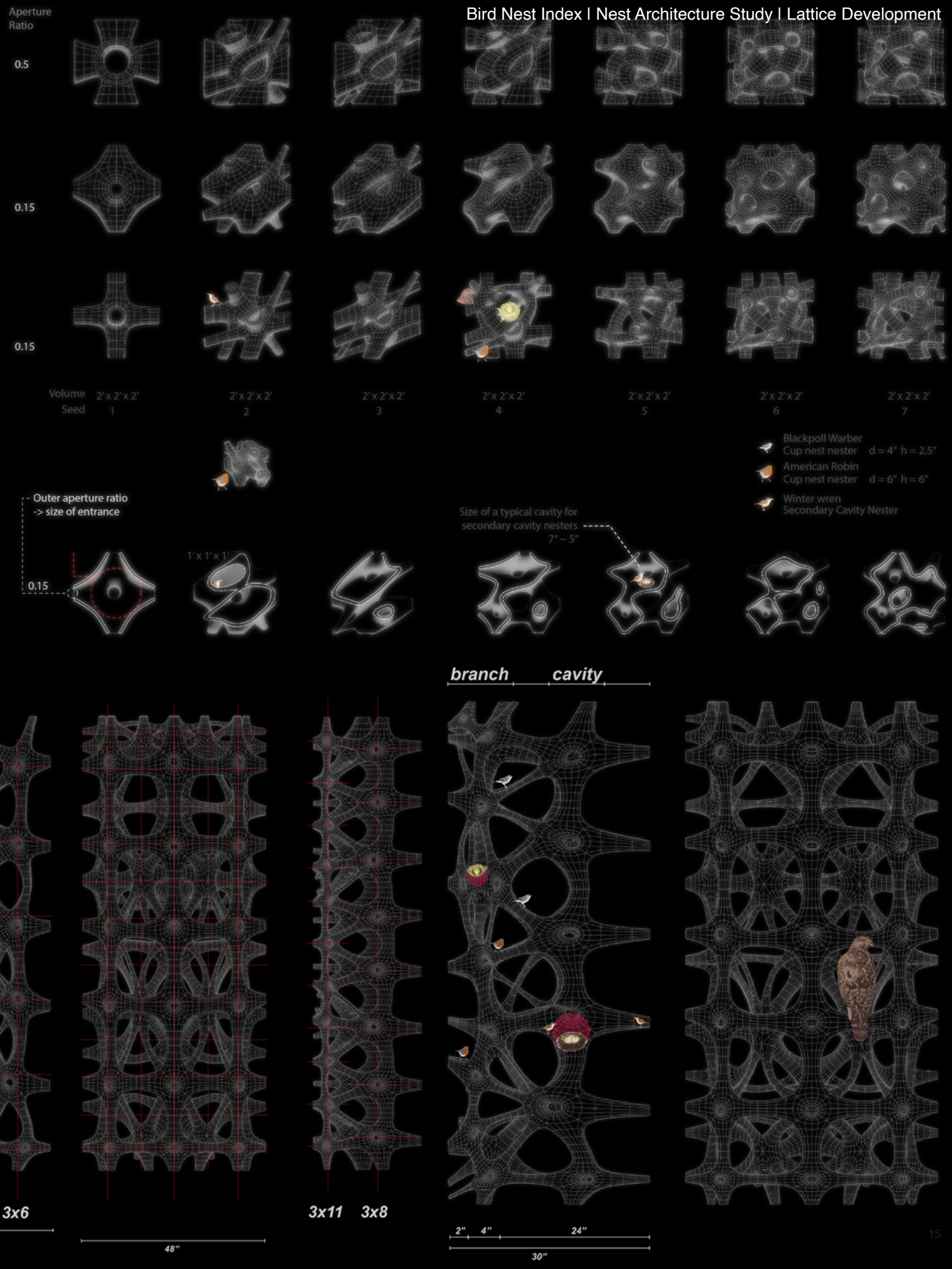
- shape the inner side with

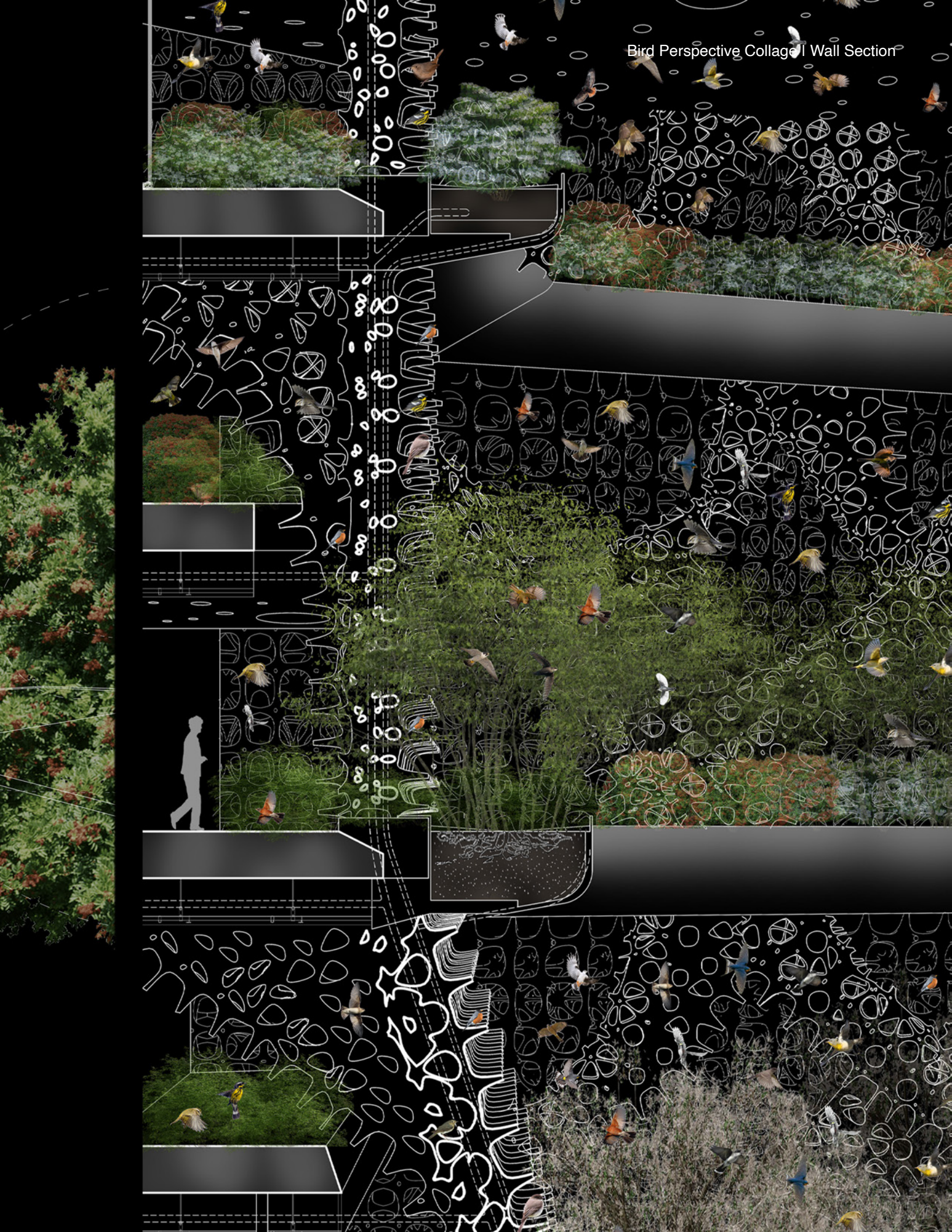
Cavity Nester

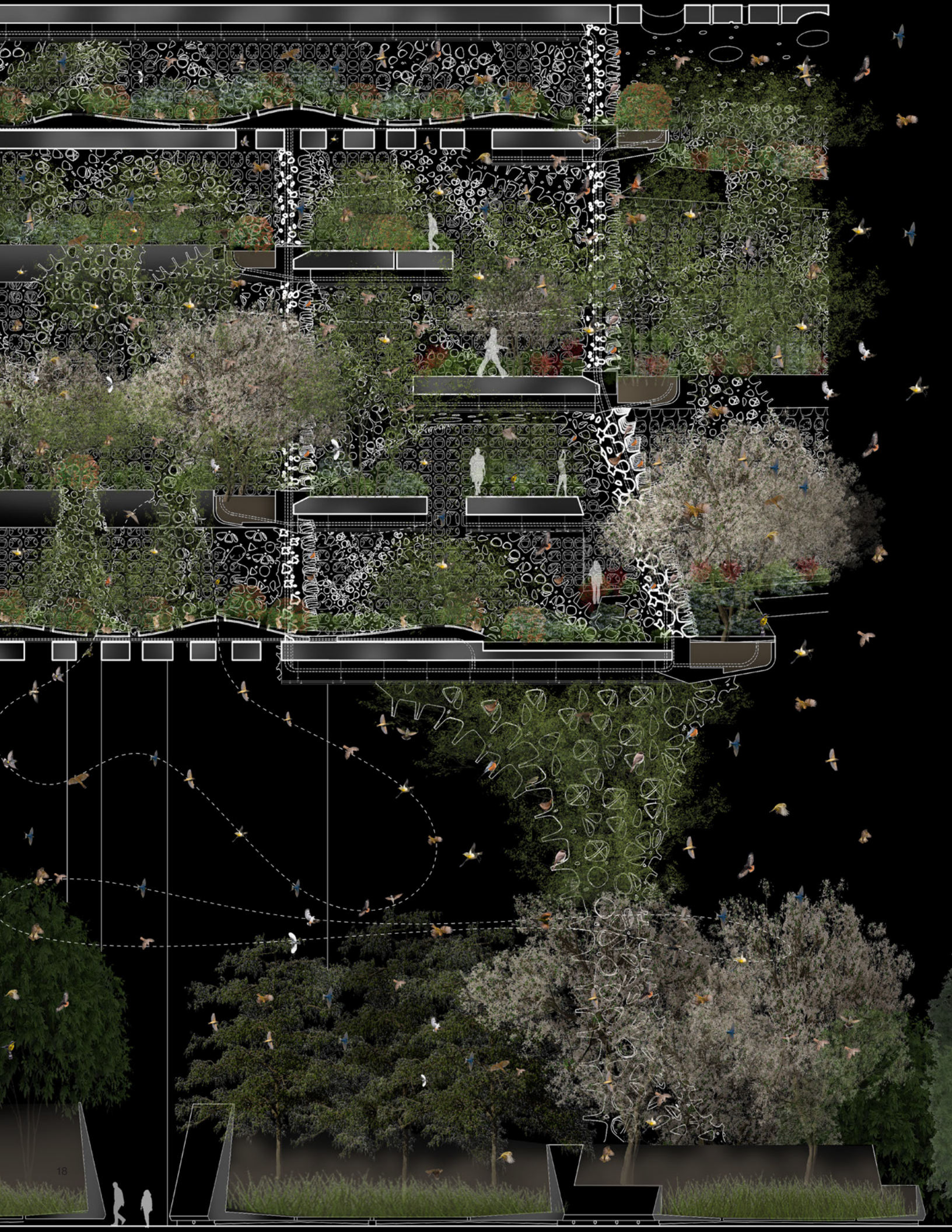
Note: Most of the species concerned in this project are "secondary cavity nesters," who use existing cavity instead of making their own cavities.



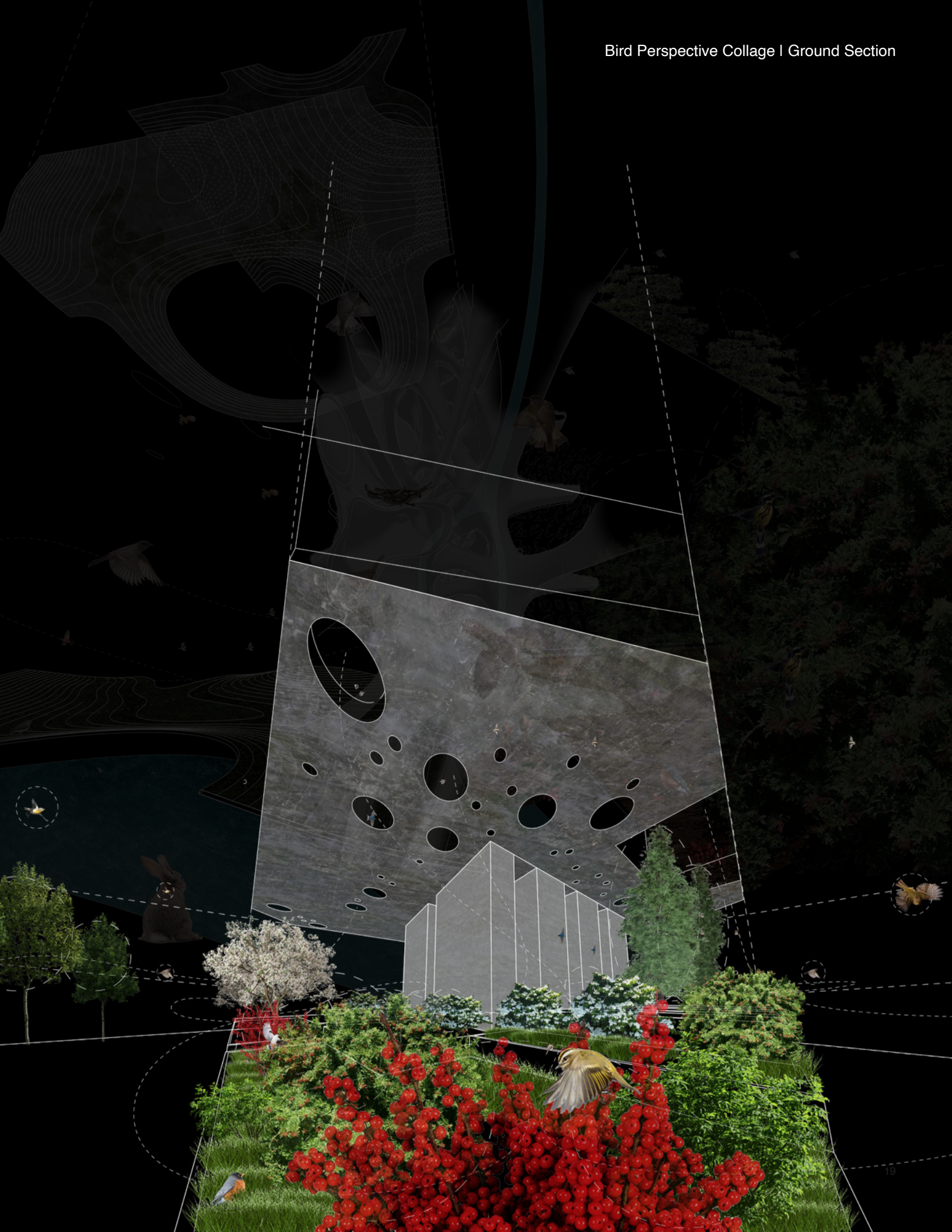


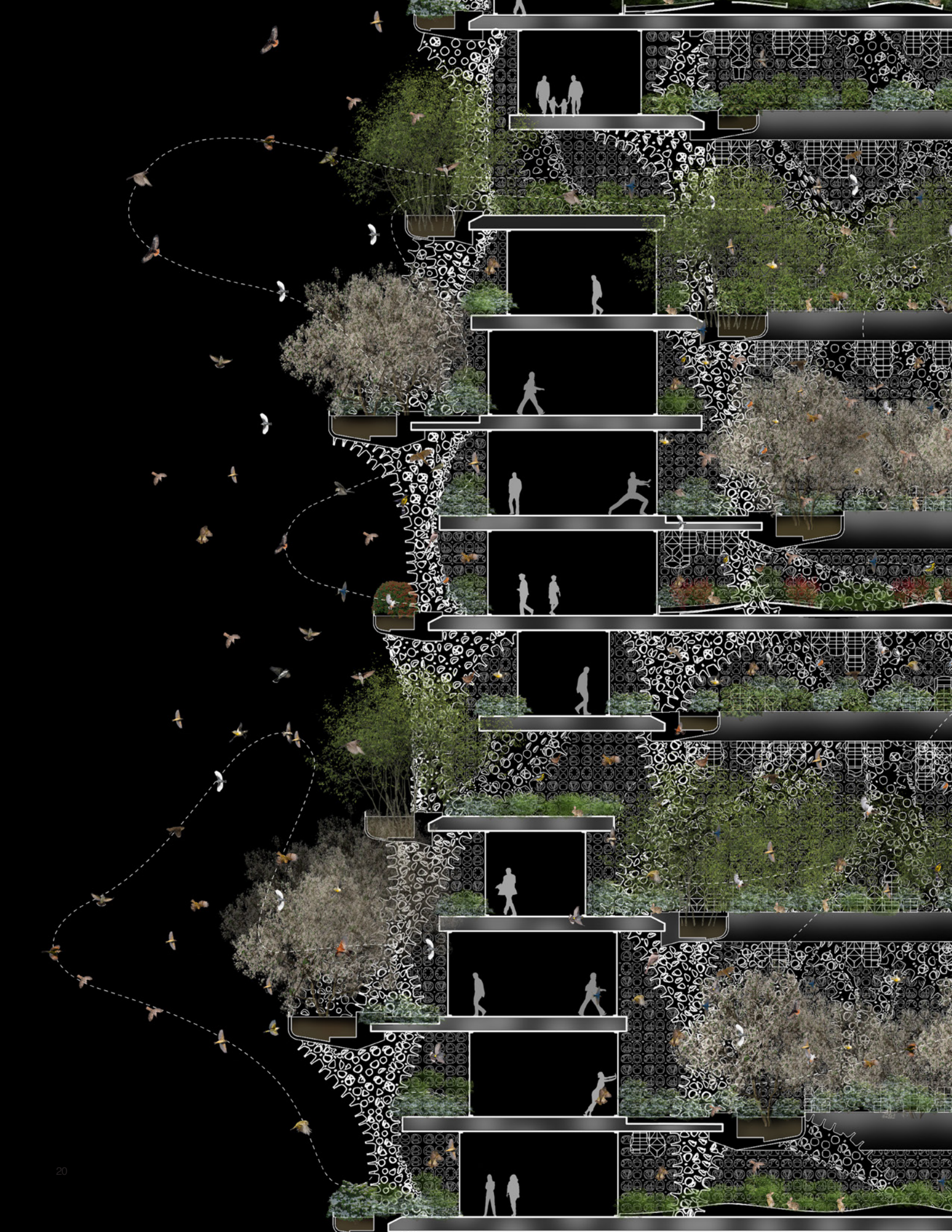

Aperture Ratio
0.5
0.15
0.15
Volume Seed
2'x 2'x 2'
1
2'x 2'x 2'
2
2'x 2'x 2'
3
2'x 2'x 2'
4
2'x 2'x 2'
5
2'x 2'x 2'
6
2'x 2'x 2'
7
Blackpoll Warber
Cup nest nester d = 4" h = 2.5"
American Robin
Cup nest nester d = 6" h = 6"
Winter wren
Secondary Cavity Nester
- Outer aperture ratio
-> size of entrance
0.15
1'x 1'x 1'
Size of a typical cavity for
secondary cavity nesters
7" ~ 5"
branch
cavity
2x3
3x6
24"
48"
3x11
3x8
2"
4"
24"
30"

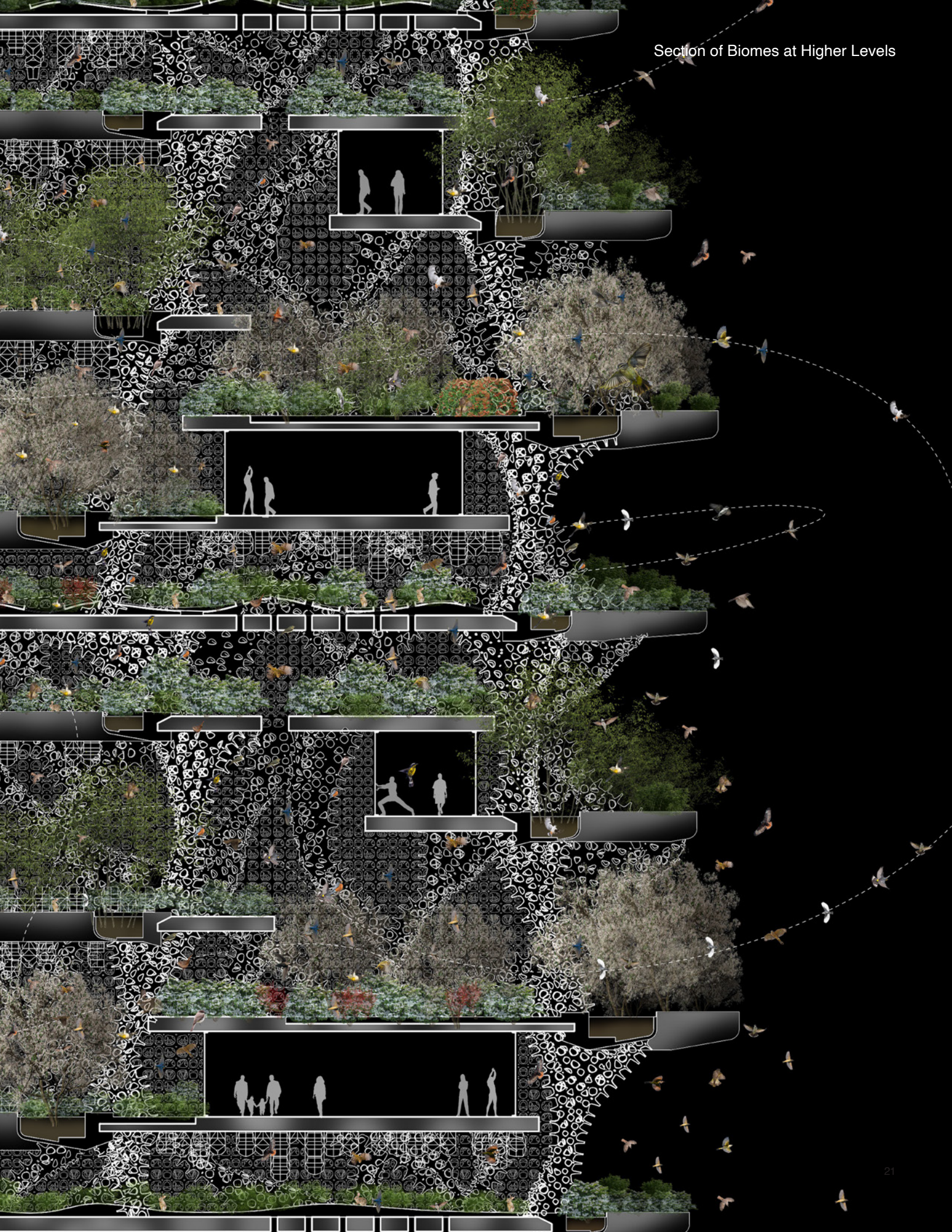

Bird Perspective Collage / Wall Section



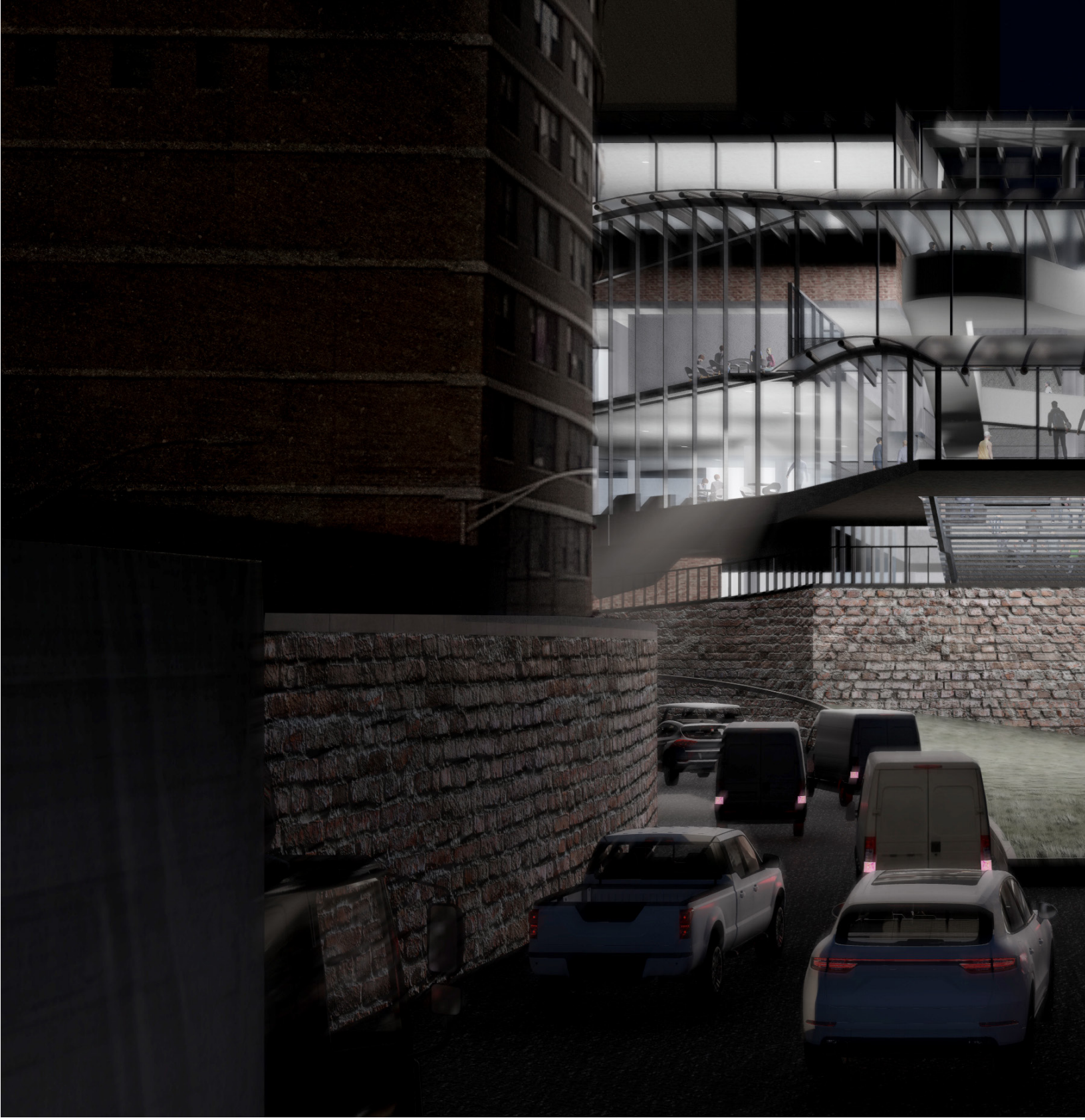
Bird Perspective Collage I Ground Section





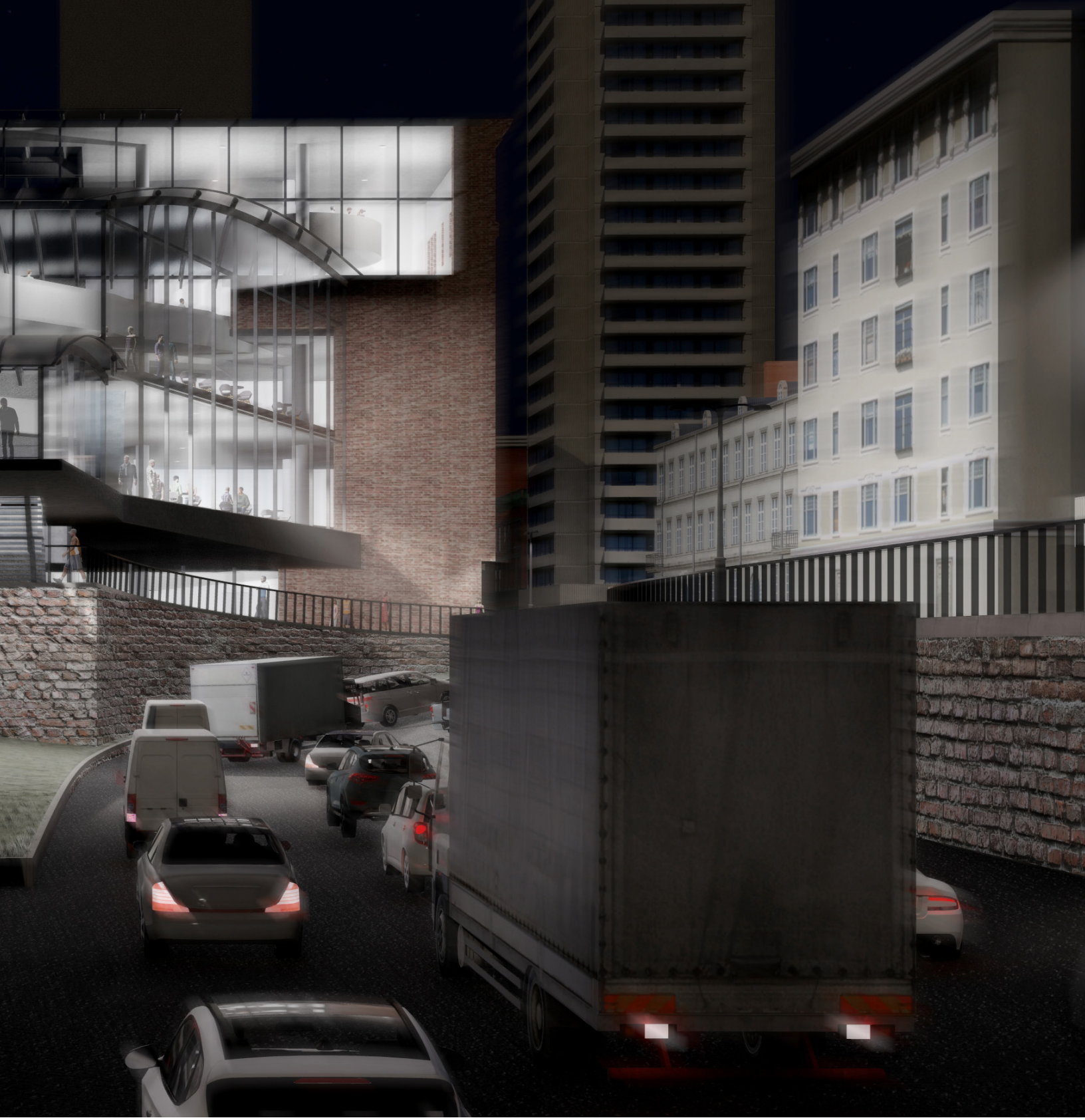


Section of Biomes at Higher Levels



Post Office for the Gig Workers

Manhattan, New York
GSAPP Fall 2022
Instructor: Laurie Hawkinson



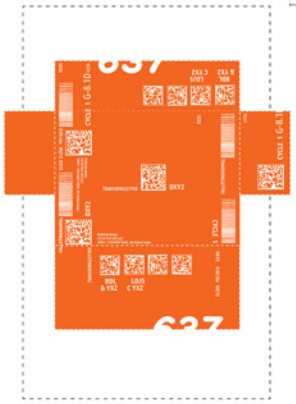
This project speculates the future of USPS in Manhattan, New York. The significance of a post office is more than a service, it protects and ensures the movement of substances that people rely on. From hand written letters to commercial packages, the scope is expanding as the role of USPS strives to be emblematic of its time. Third party food delivery service has become a integral yet problematic part of big cities such as New York. Its hidden environmental costs and socially marginalized gig workers present a urgency for intervention.

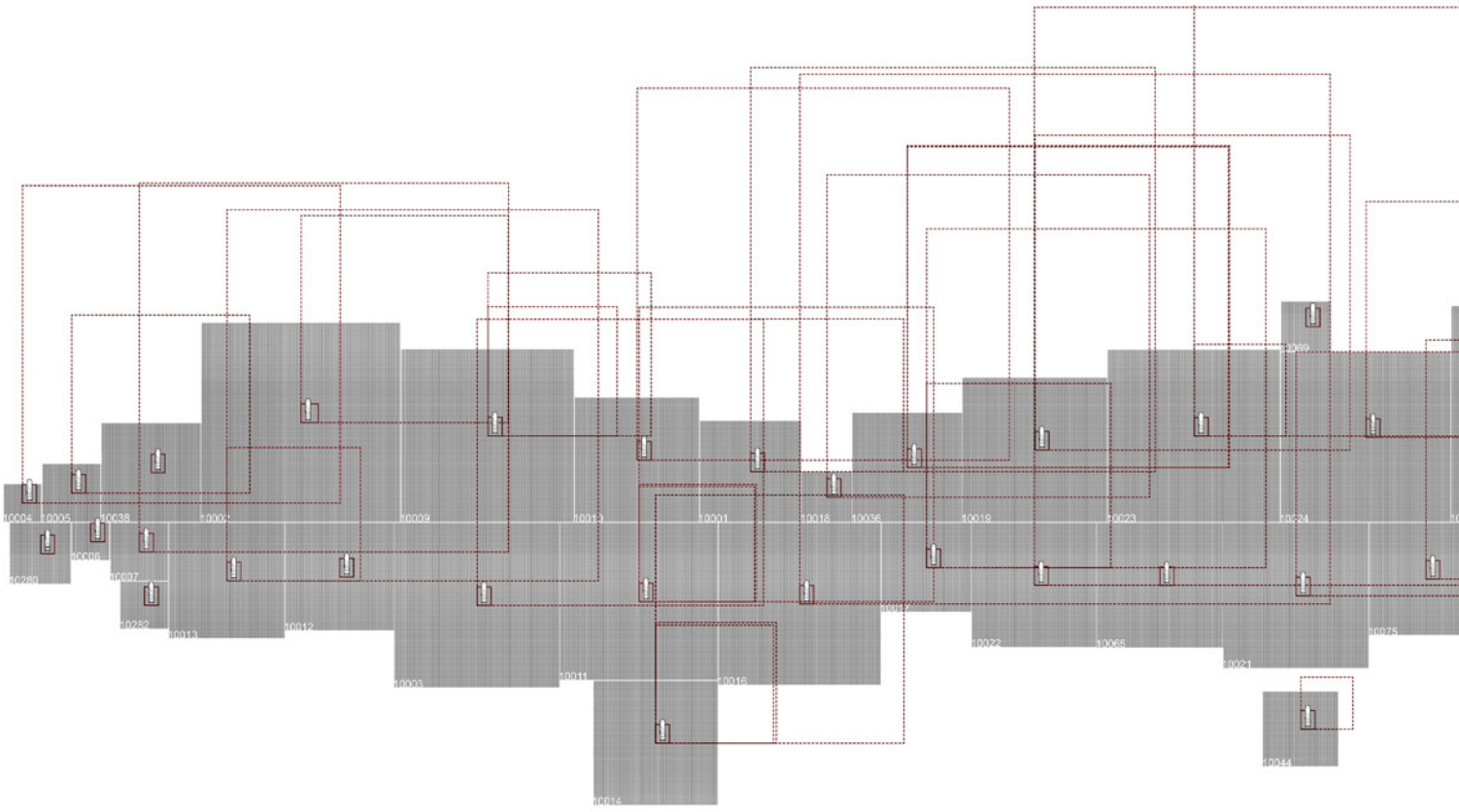
This project proposes that USPS will replace current private companies to provide food delivery services with a reusable food container program. The current gig workers will become a new fleet of E-bike driver for USPS and deliver food as well as small packages. The existing Murray Hill USPS Annex is chosen to demonstrate the potential of USPS to become a social hub for delivery drivers, office staff, and the local community.

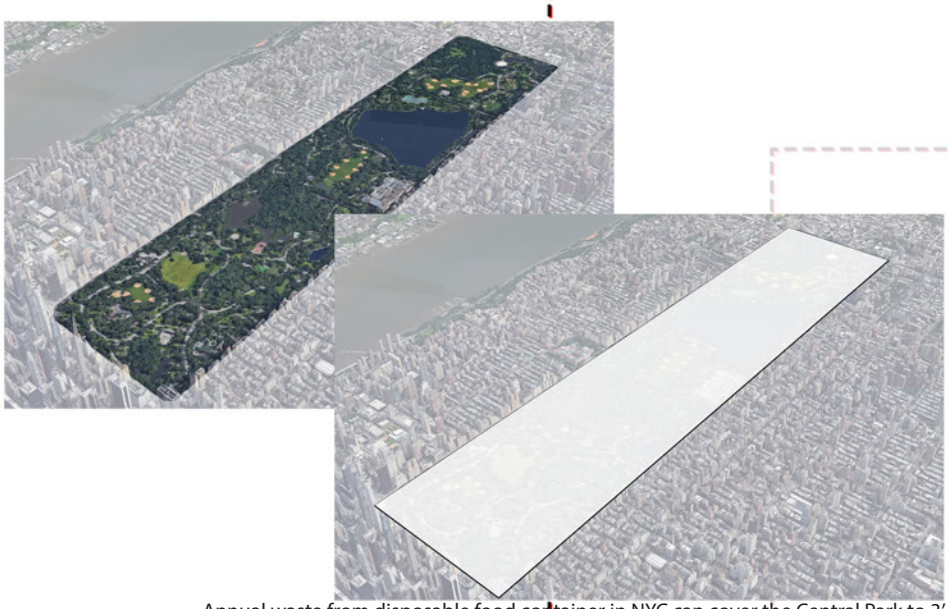
637
WHOOSH!
6 1/2"
3"
15"
8 1/2"
1,000 mile
400 mile
10 mile
THIS PACKAGING IS LIGHTER THAN OUR SMALLEST BOX

637
DAY2
CYCLE 1
G-8.1D

637
DAY2
CYCLE 1
G-8.1D

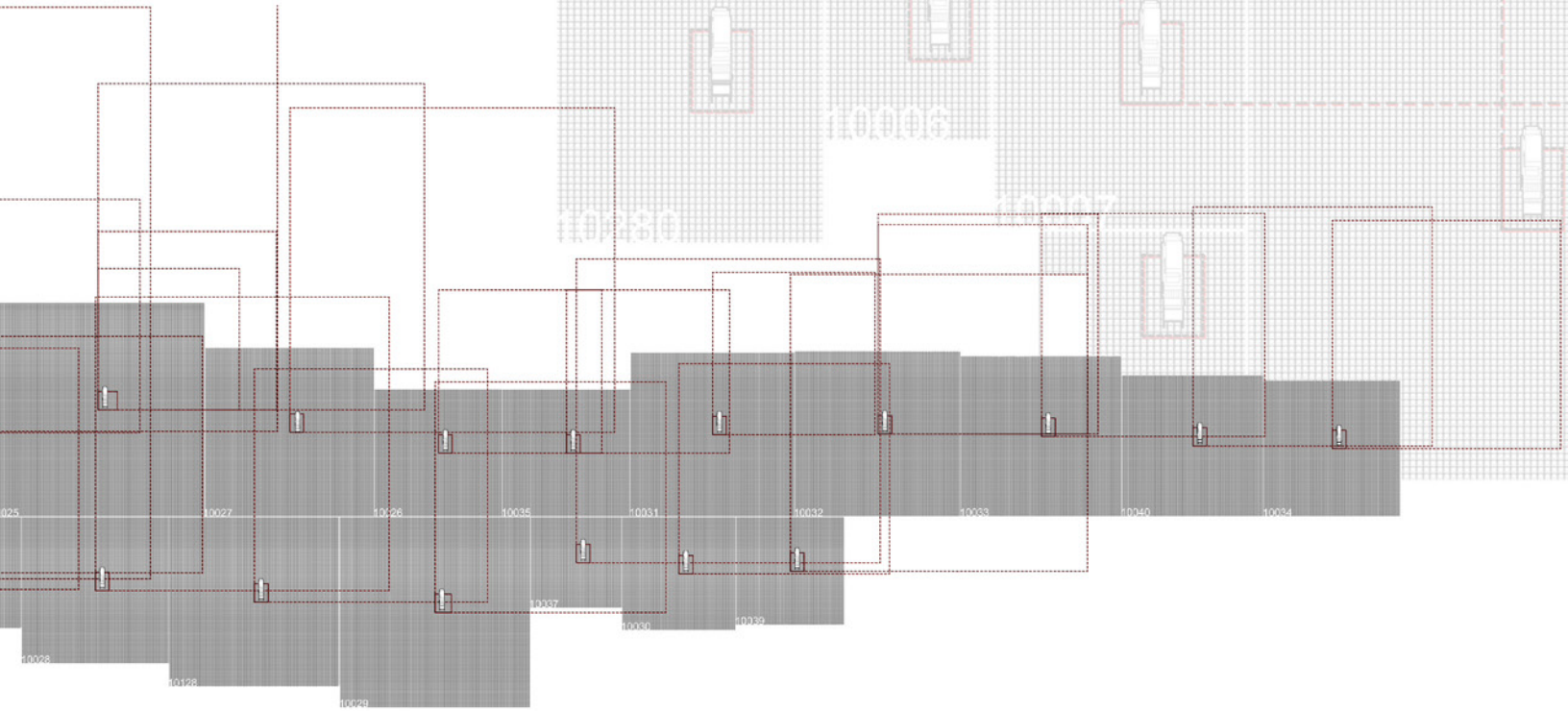

637
DAY2
CYCLE 1
G-8.1D





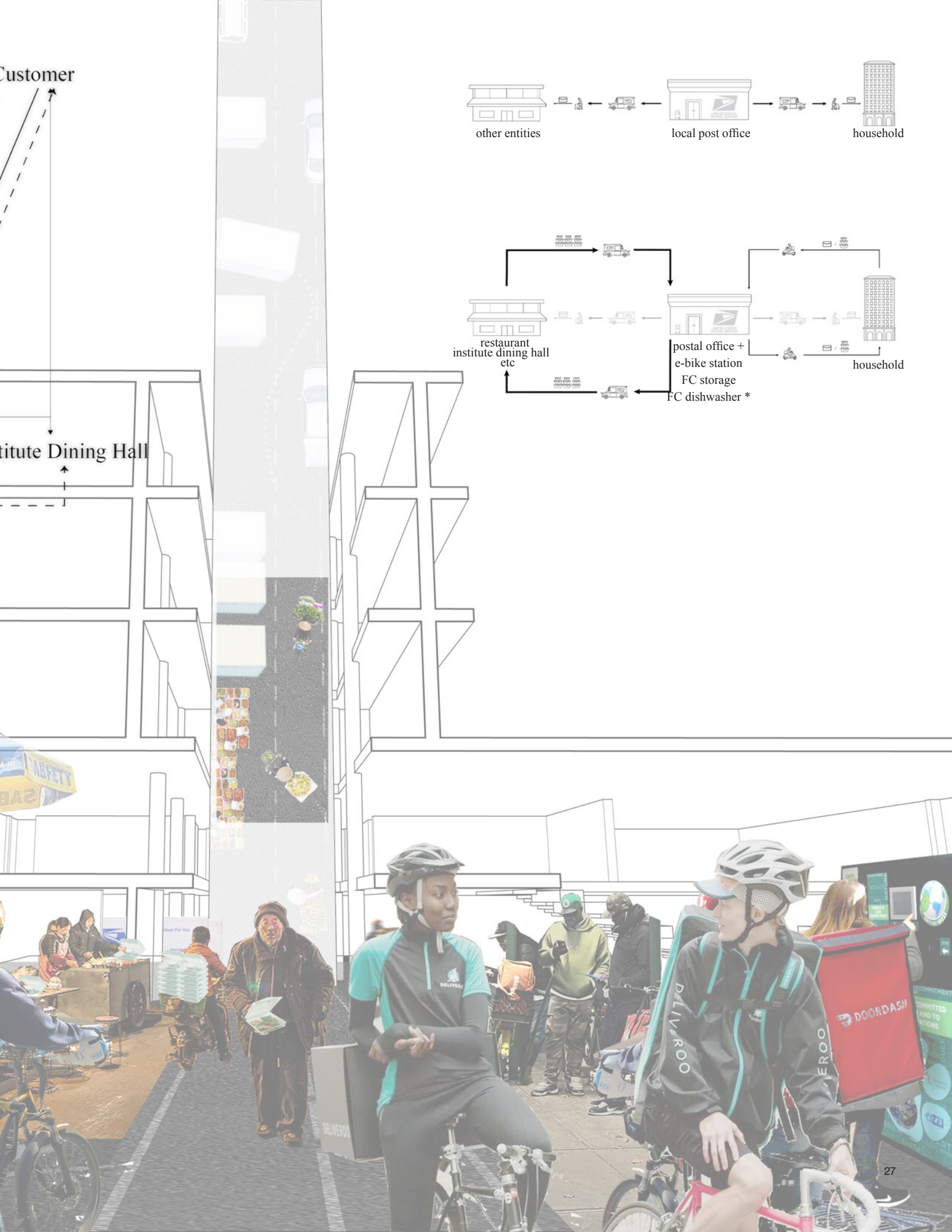
Annual waste from disposable food container in NYC can cover the Central Park to 3’

sqft of USPS in each ZIP
Food containers produced from each ZIP
No. of commercial dish washer needed

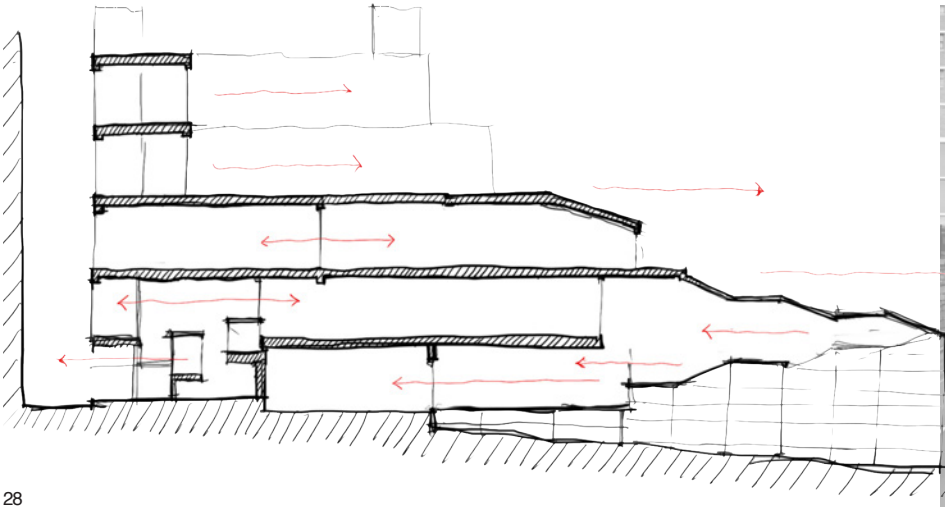


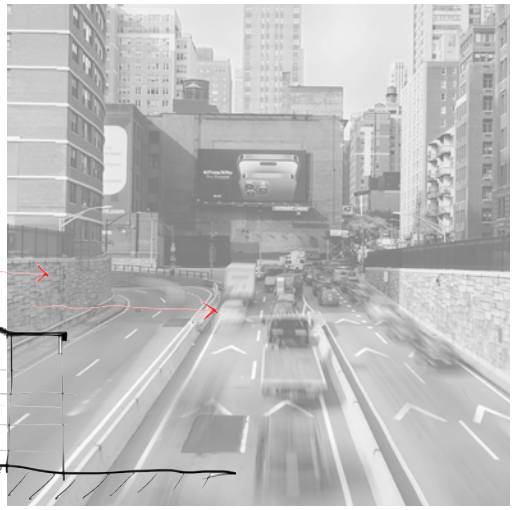
* FC stands for food container. Based on the estimated amount of take-outs and cleaning capacity of a commercial dishwasher, each zipcode would need only one commercial dishwasher to clean all food containers used for takeouts from that zipcode in four hours.

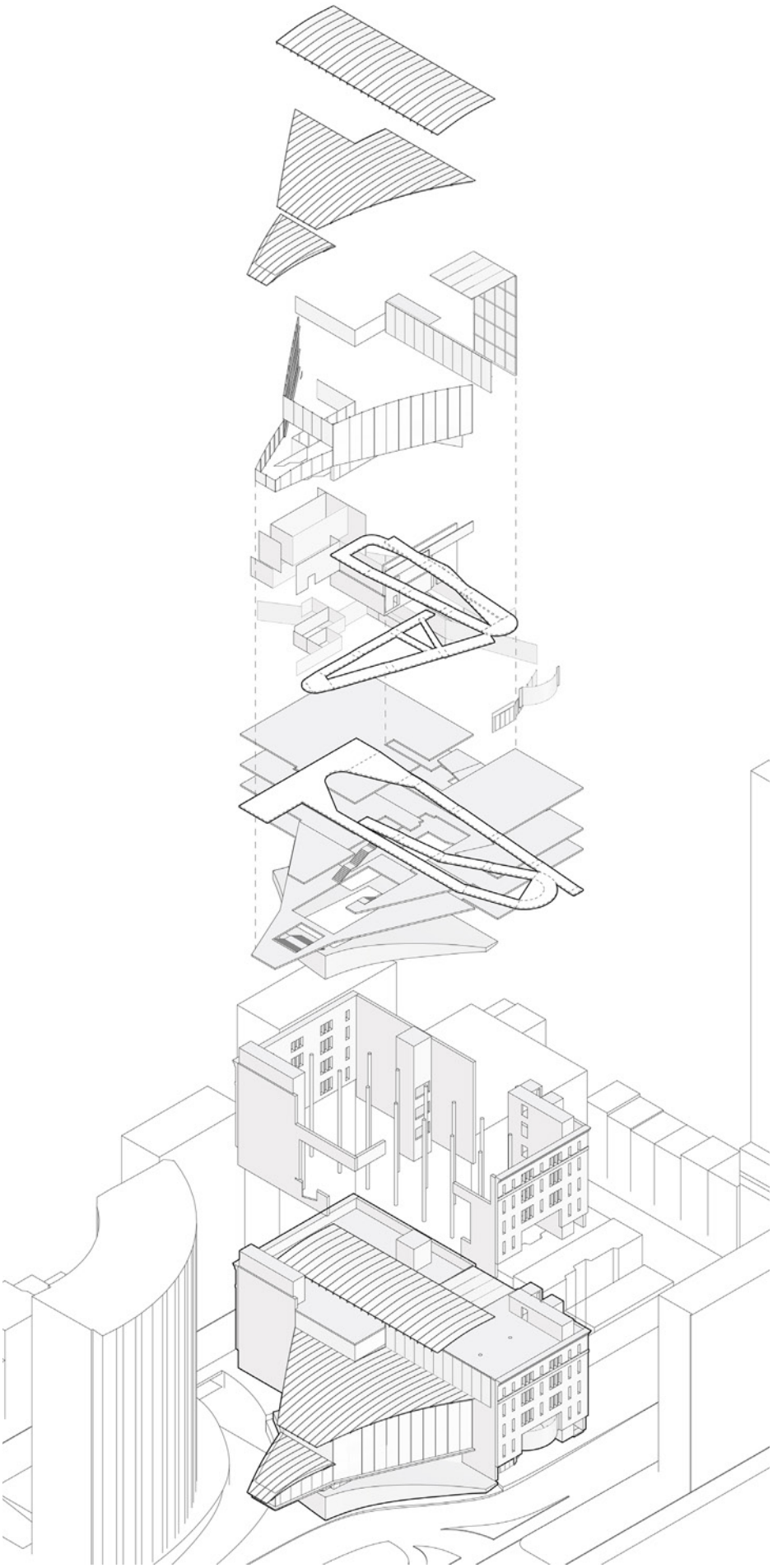
End-of-life Processing Facility
Homeless
Community Garden
Washing Facility
USPS
Food Compost
Delivery Driver
Manufacture Partner
Gym
Co-work
Gallery
Restaurant/Cafe
Government Subsidy
Cleaned Foodware
Dirty Foodware
Incentives
SABRETT
All Beef Hot Dogs
Coca-Cola

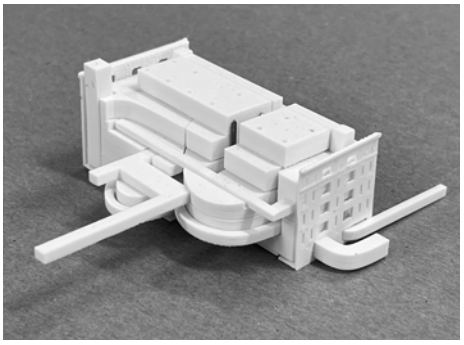

Customer
titute Dining Hall
other entities
local post office
household
restaurant
institute dining hall
etc
postal office +
e-bike station
FC storage
FC dishwasher *
household

42st
41st
40th
39th
38th
37th
36th
35th
34th
33th
32nd
31st
30th
29th
28th
26th
25th
24th
5th Ave
Mad Ave
Park Ave S
Lex Ave
3rd Ave
2nd Ave
1st Ave
FDR DR
Broadway
USPS James Farley Building
1.1 mile 24 min on foot
USPS Madison Square
0.7 mile 14 min on foot

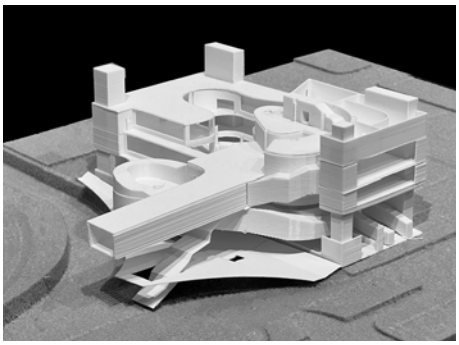




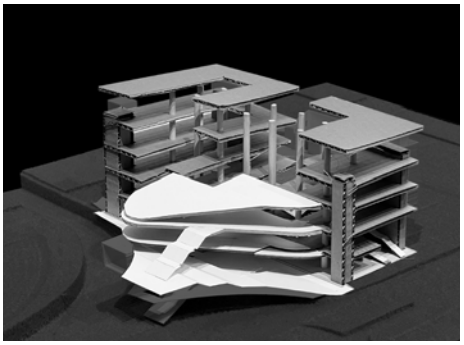




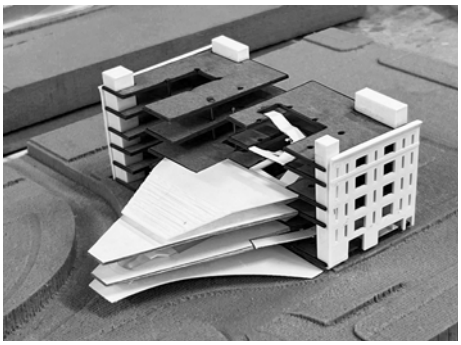
1/64” Model 03: Circulation & structures



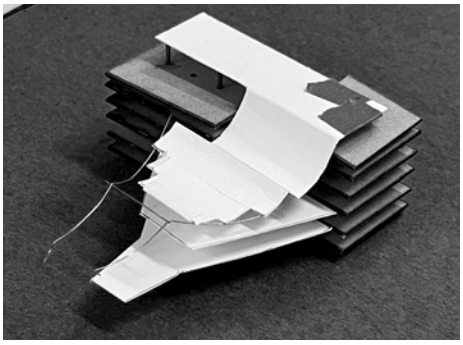
1/32” Model 05: Form follows circulation



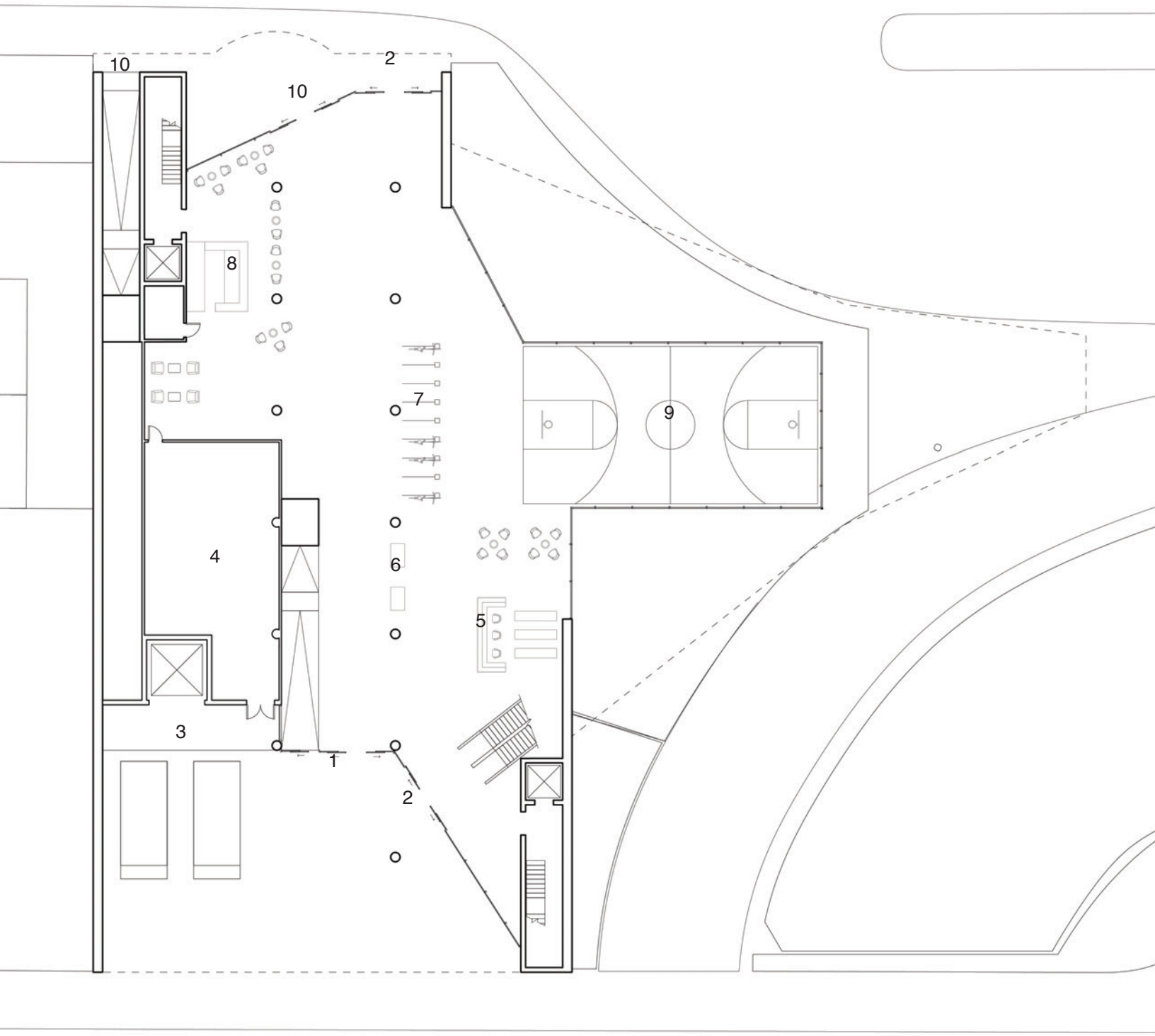
1/16” Model 06: Form reveals circulation



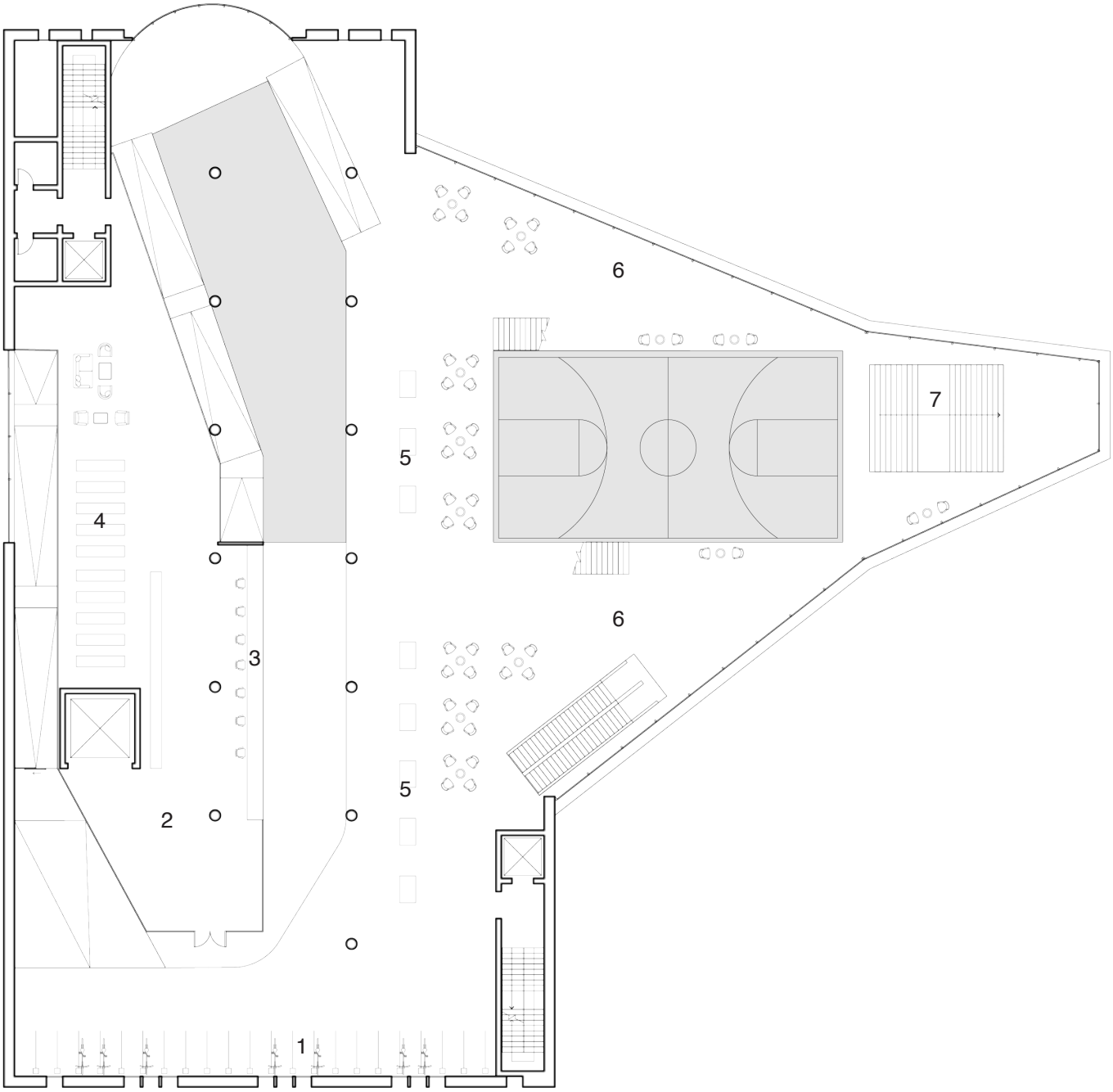
1/32” Model 07: A plug-in



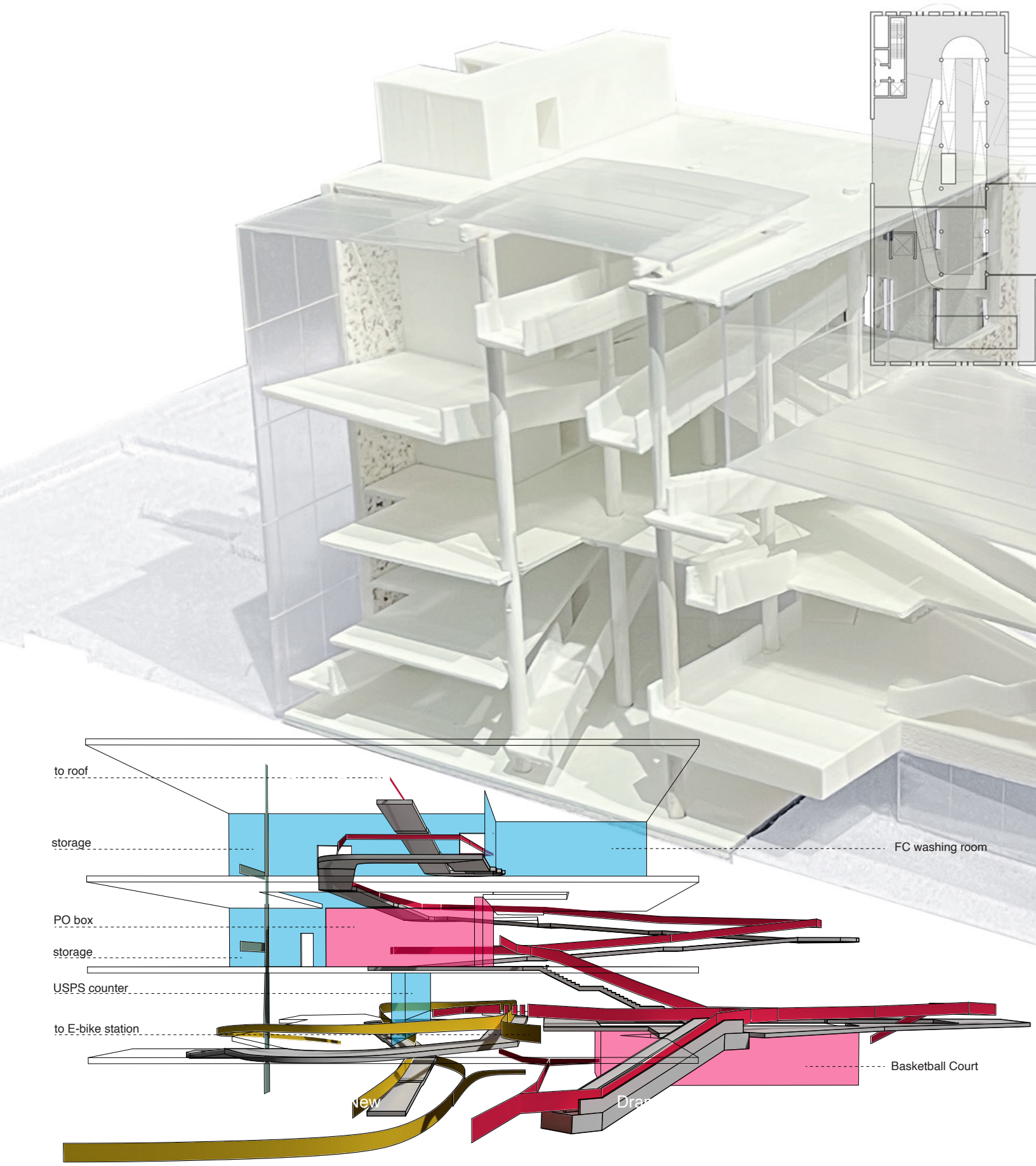
1/64” Model 08: A roof that draps over



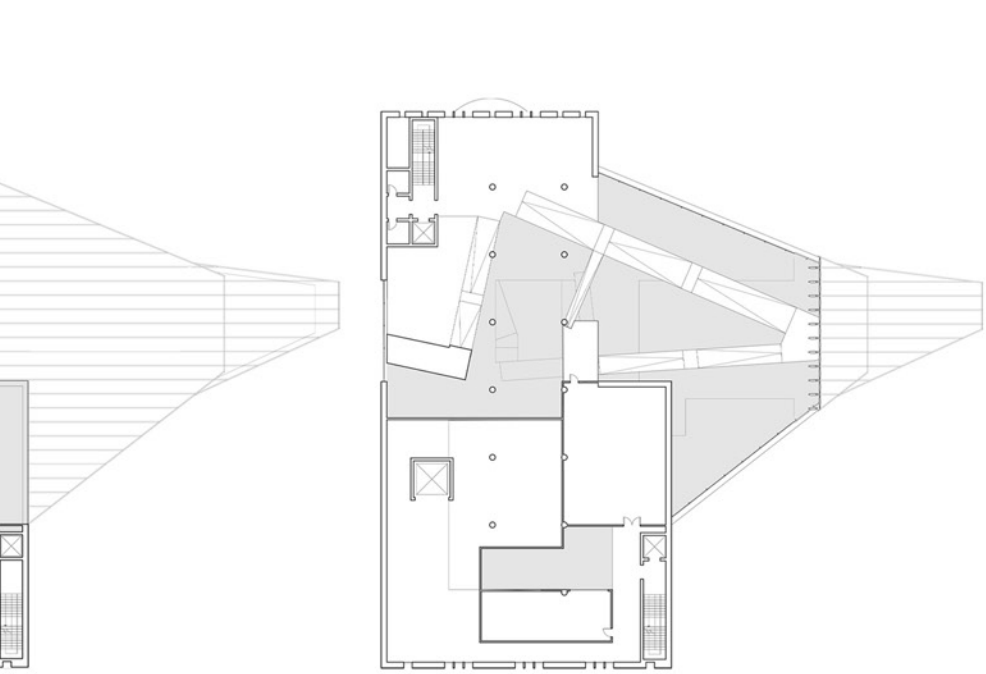
1. Delivery worker entrance
2. Public entrance/exit
3. Loading
4. Sorting
5. Drop-off desk
6. FC kiosk
7. E - bike station
8. Cafe
9. Basketball court
10. Delivery worker exit

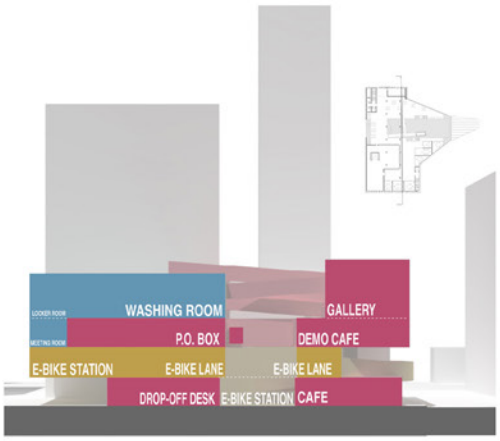


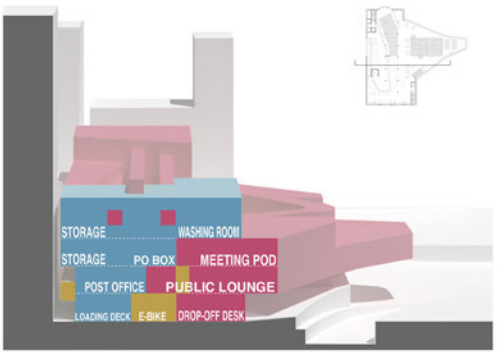
1. Main E-bike station
2. Sorting
3. USPS counter
4. Storage
5. FC kiosk
6. Public lounge
7. Seating towards lower court

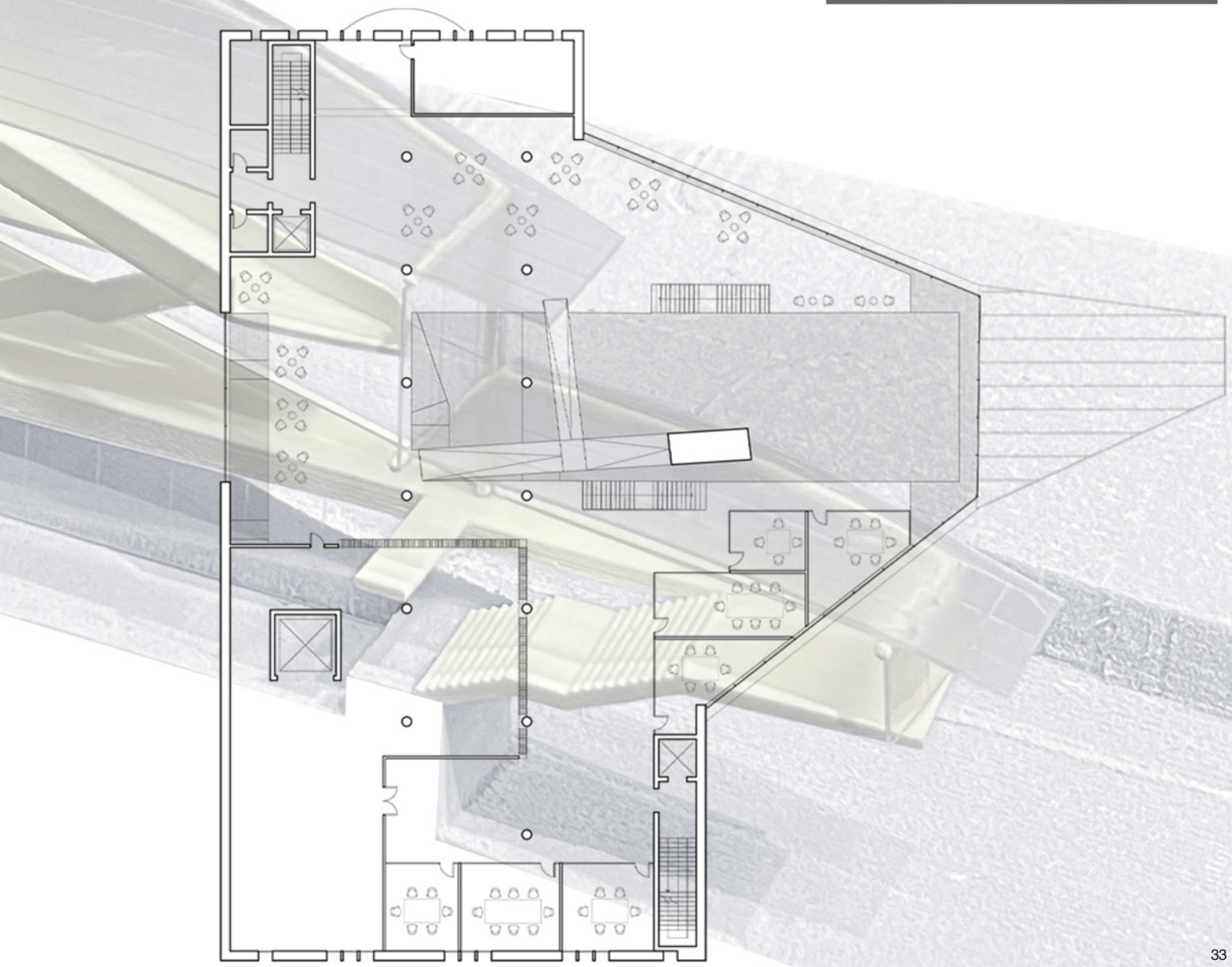


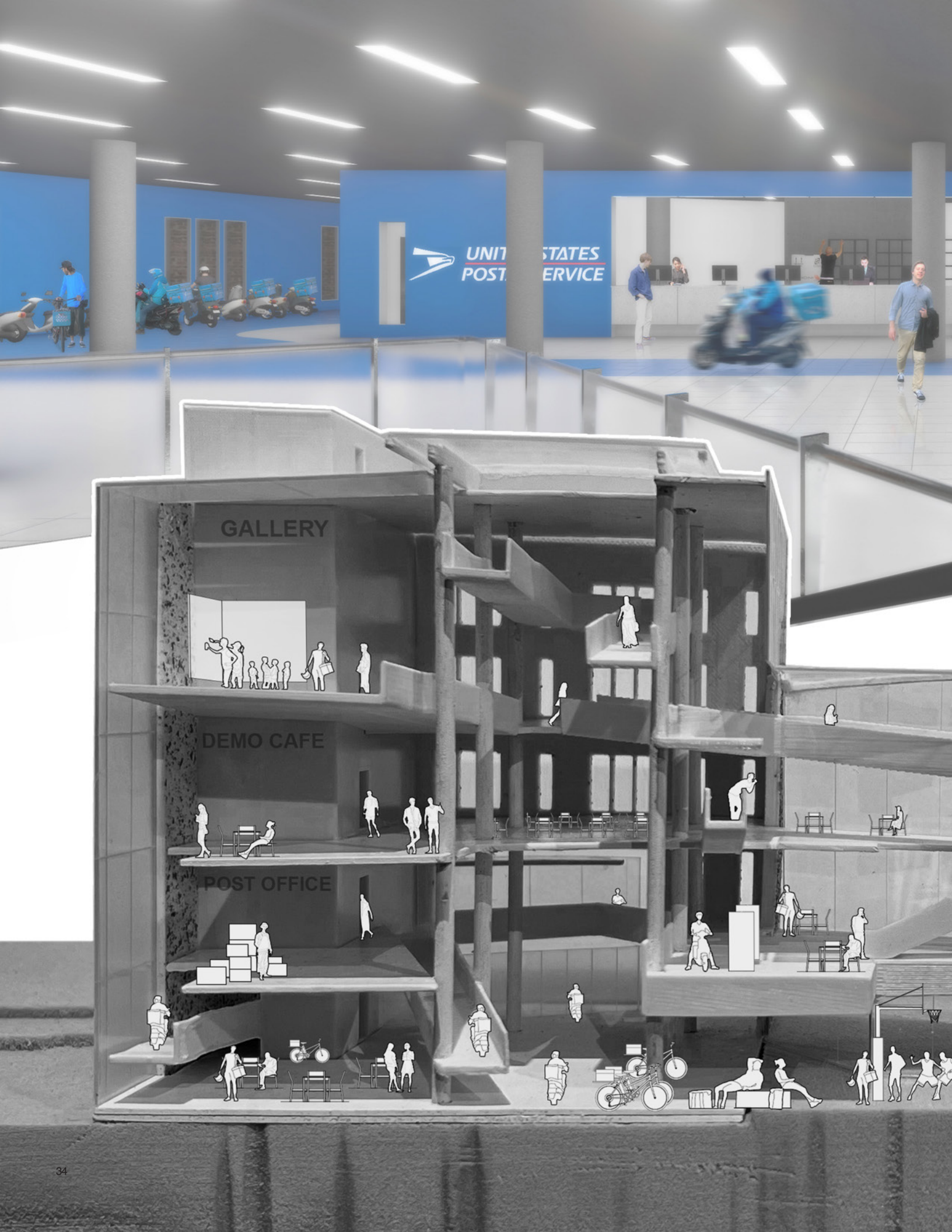
Delivery worker and Public Circulation Diagram

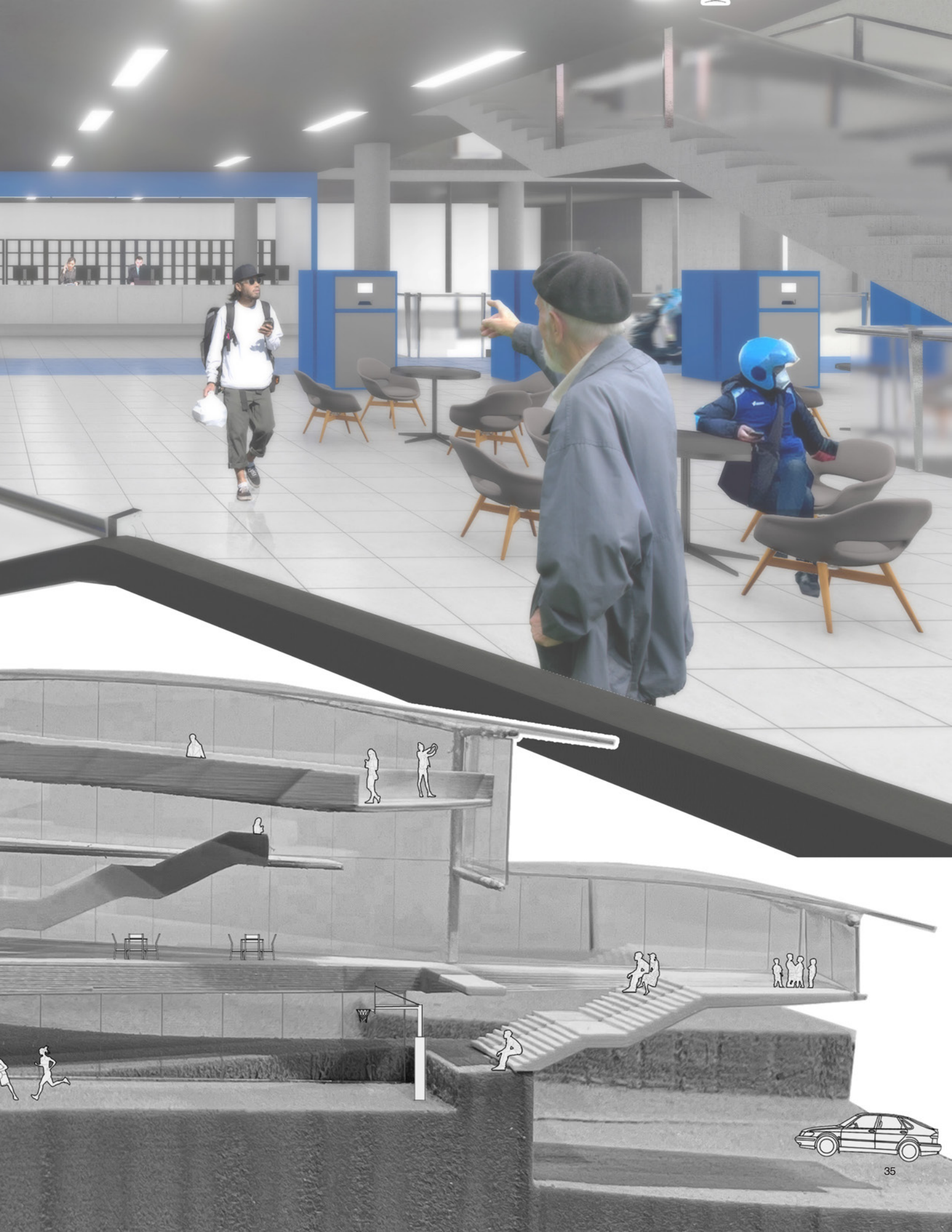



LOCKER ROOM
MEETING ROOM
WASHING ROOM
GALLERY
P.O. BOX
DEMO CAFE
E-BIKE STATION
E-BIKE LANE
E-BIKE LANE
DROP-OFF DESK
E-BIKE STATION
CAFE


STORAGE
WASHING ROOM
STORAGE
P.O. BOX
MEETING POD
POST OFFICE
PUBLIC LOUNGE
LOADING DECK
E-BIKE
DROP-OFF DESK

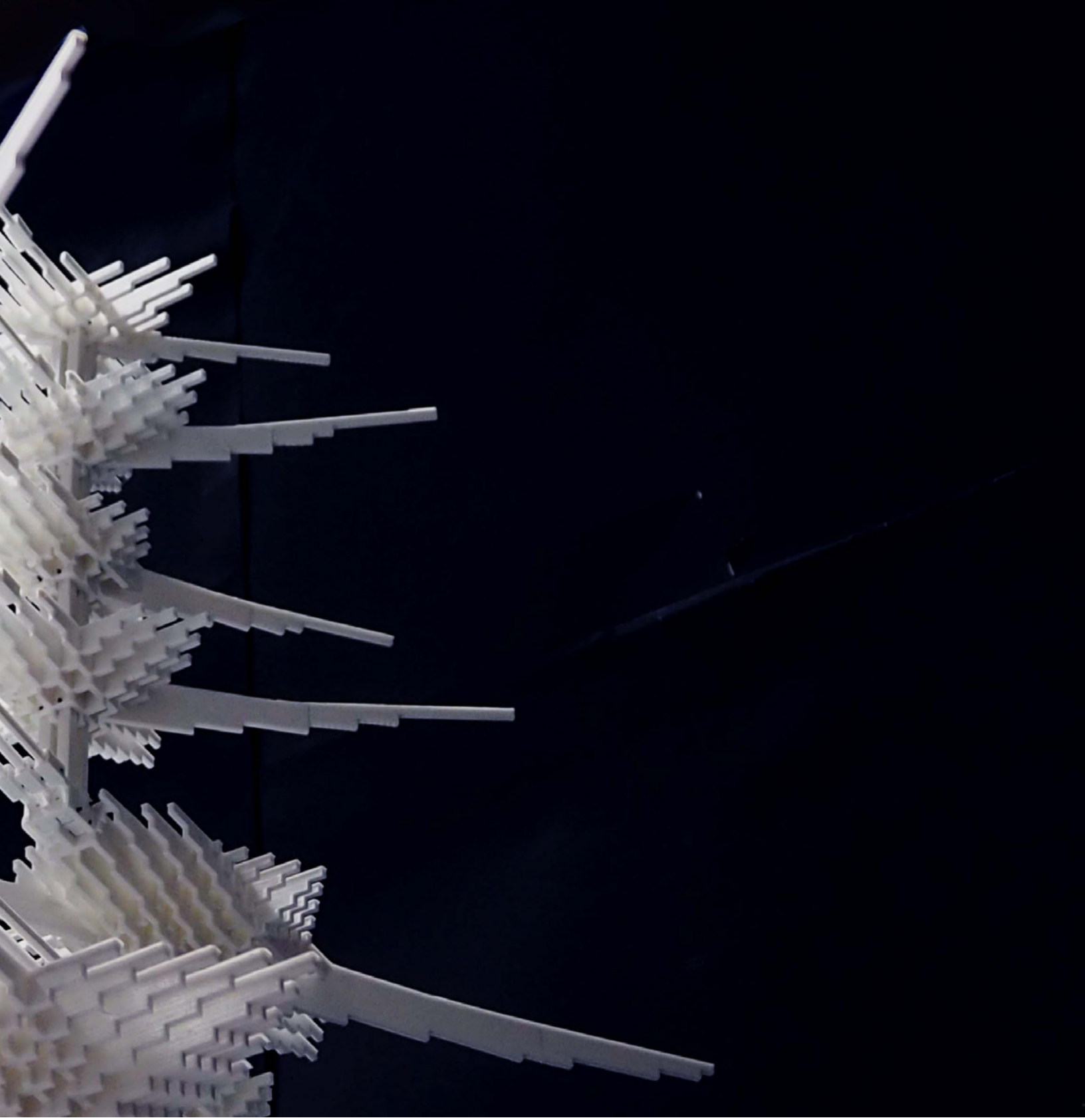



GALLERY
DEMO CAFE
POST OFFICE



The Tale of Dougong

Siteless structural prototype
GSAPP Summer 2022
Instructor: Elias Anastas & Yousef Anastats



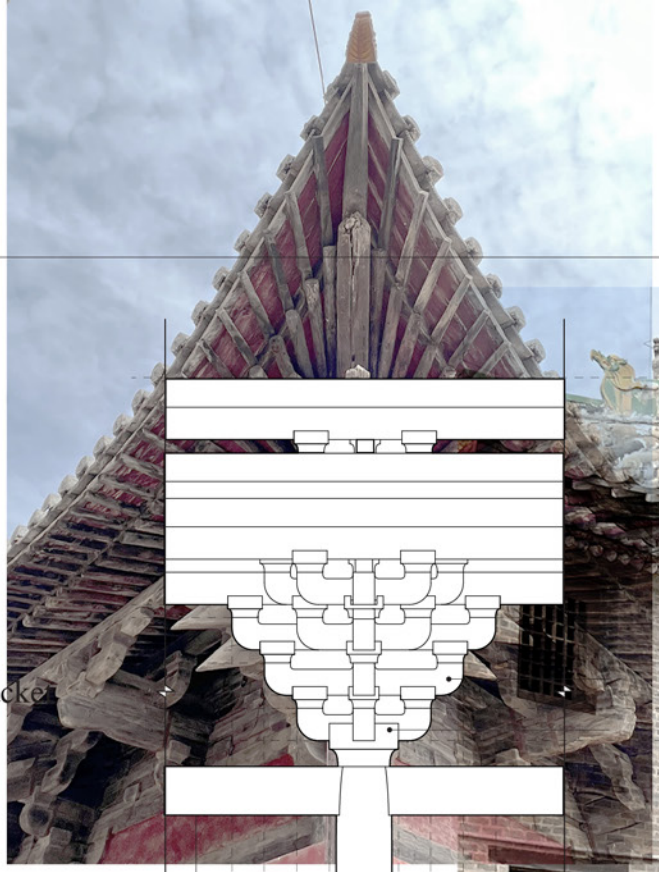
Dou-gong is one of the oldest and most recognizable architectural elements in wooden structures from east Asia. Instead of fetishizing Dou-going as a cultural relic, this project investigates its potential in generating a unique architectural typology based on its flexibilities as a component and structural principles as a system.

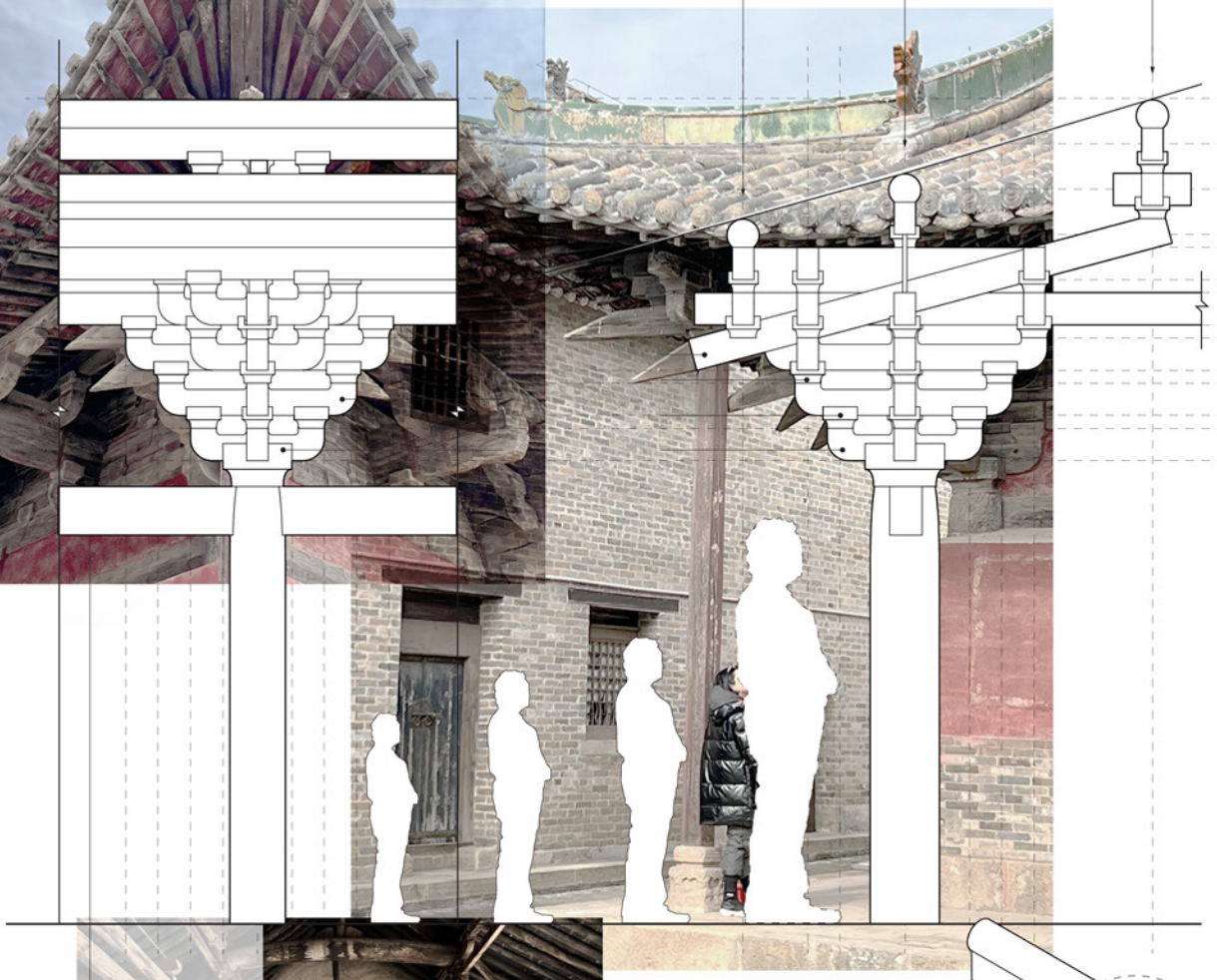
My translation of Dougong utilizes a reverse inclined-arm-leverage system to balance the interior weight with the heavy arms on the exterior, opening up new possibilities for formal expressions. The interior weight transfers to the primary brackets through secondary brackets, making the periphery the primary system for gravity as well as lateral forces. The reasons for choosing a skyscraper as an applicable typology are two folded: exploring Dou-gong's primary function as a lateral system; problematizing capitalist efficiency embeded in the ideology conception of conventional skyscrapers.

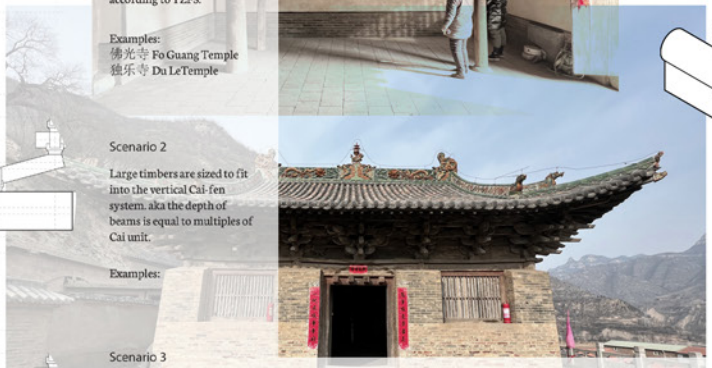
Roof

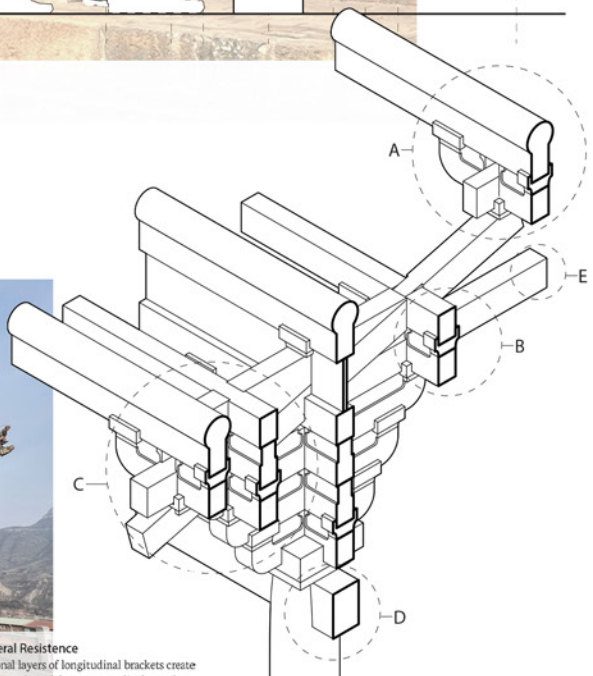
Wooden Bracket

Column
+
Beam / Lintel

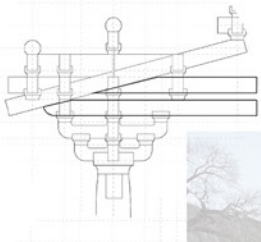








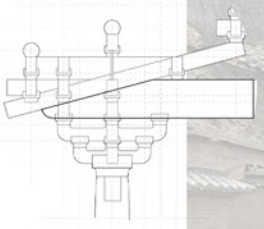
Case Studies:



Scenario 1

Small timbers are sized to fit into the vertical Cai-fen system. This scenario is typical in palace typology of Chinese architecture according to YZFS.

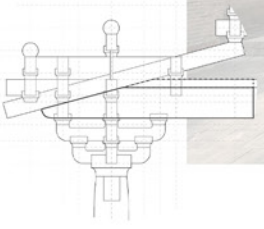
Examples:
佛光寺 Fo Guang Temple
独乐寺 Du LeTemple



Scenario 2

Large timbers are sized to fit into the vertical Cai-fen system. aka the depth of beams is equal to multiples of Cai unit.

Examples:



Scenario 3

Timbers cannot fit into the vertical Cai-fen system, thus breaking the vertical grid. Additional piece is added to maintain the grid. (because other components are standardized.)

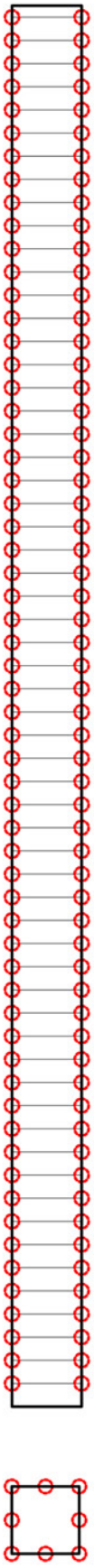
Examples:
奉国寺 Feng Guo Temple
镇国寺 Zhen Guo Temple

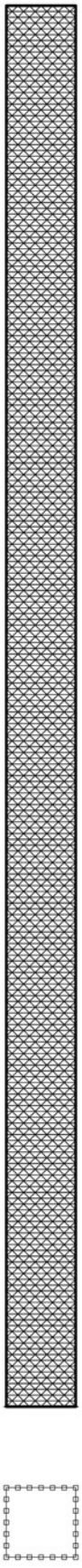
A. Leverage and Cantilever
The use of inclined arms allow the weight of the roof to cancel off the projecting eaves on the outside.

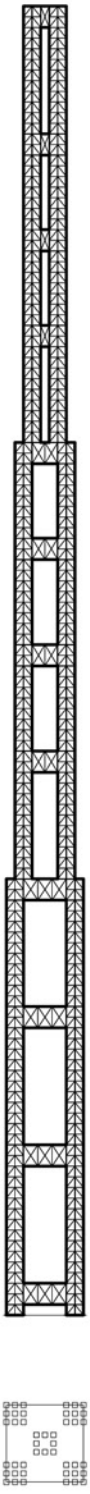
B. Material Properties
Use of blocks minimizes the impacts of material deformation on the structure as a whole.

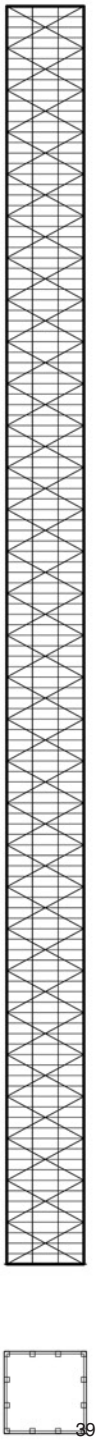
C. Lateral Resistence
Additional layers of longitudinal brackets create resistance to lateral forces perpendicular to the projecting brackets.

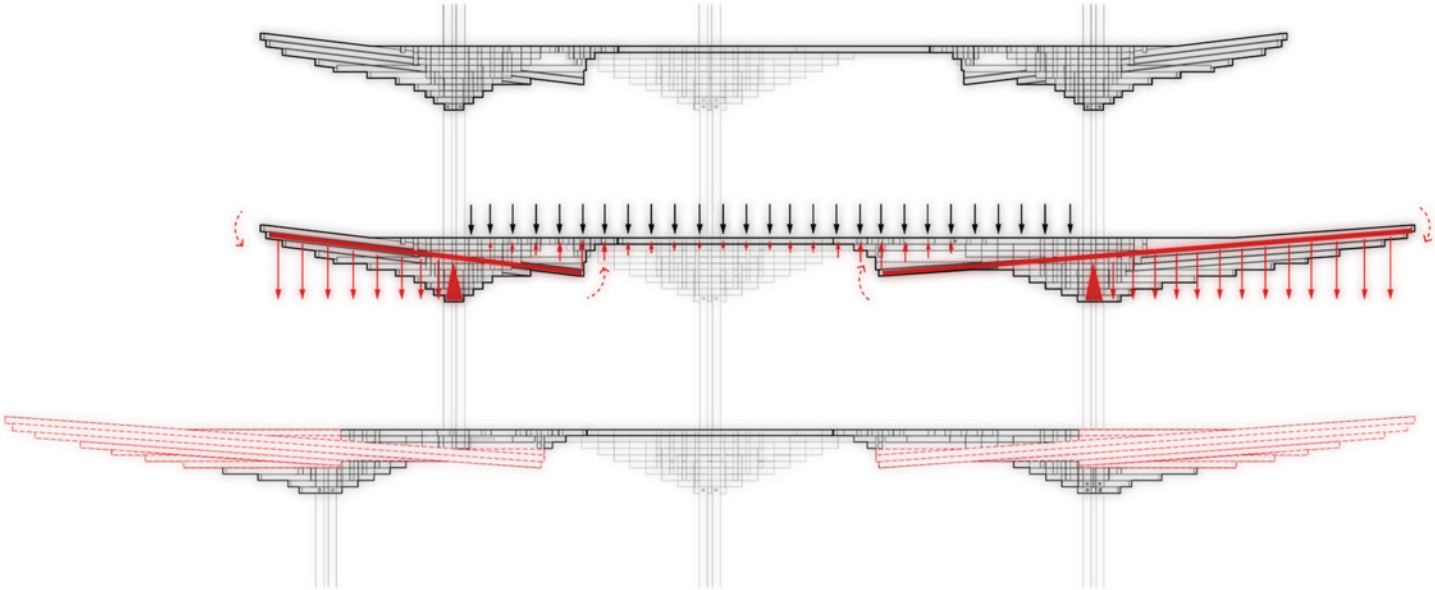
D. Impacts of later techniques
Later techniques were developed to join smaller timbers into bigger timbers, which led to wider use of big columns and beams, thus wooden brackets slowly become more decorative than structural.

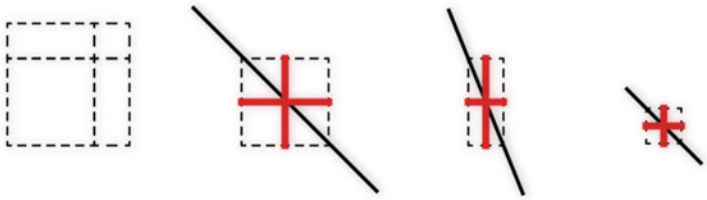


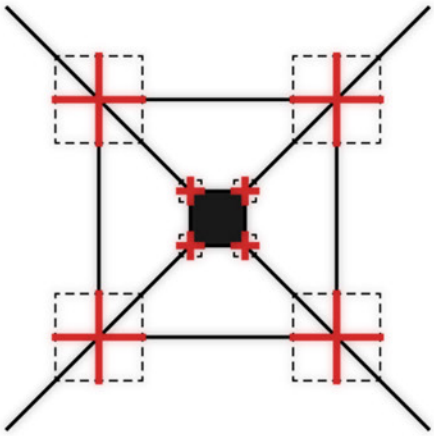


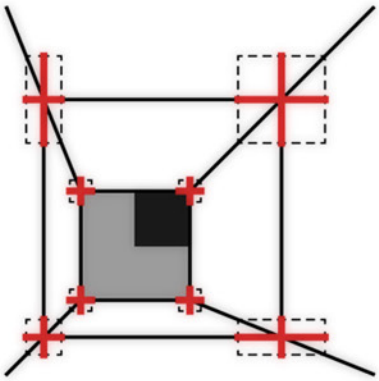


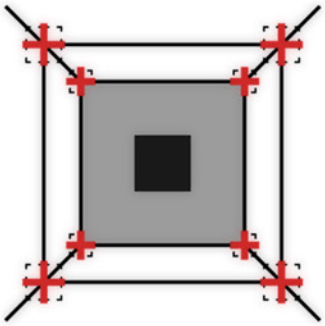


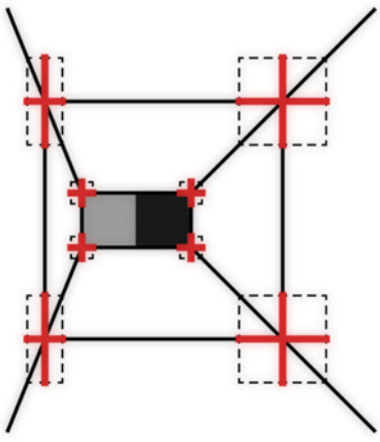


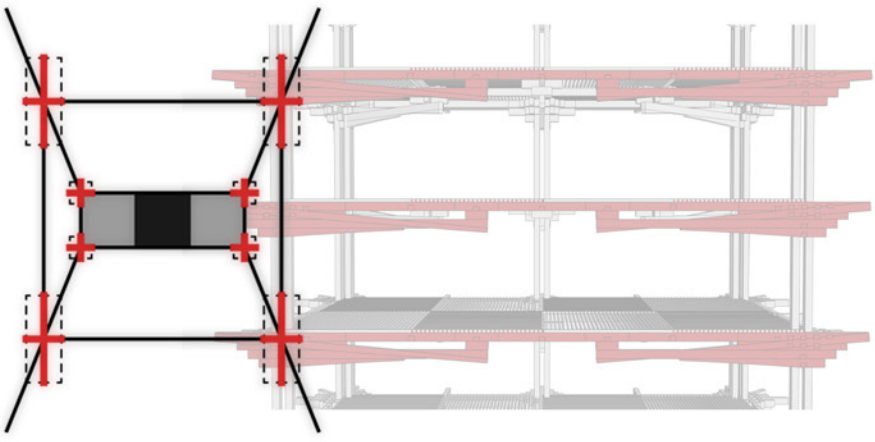


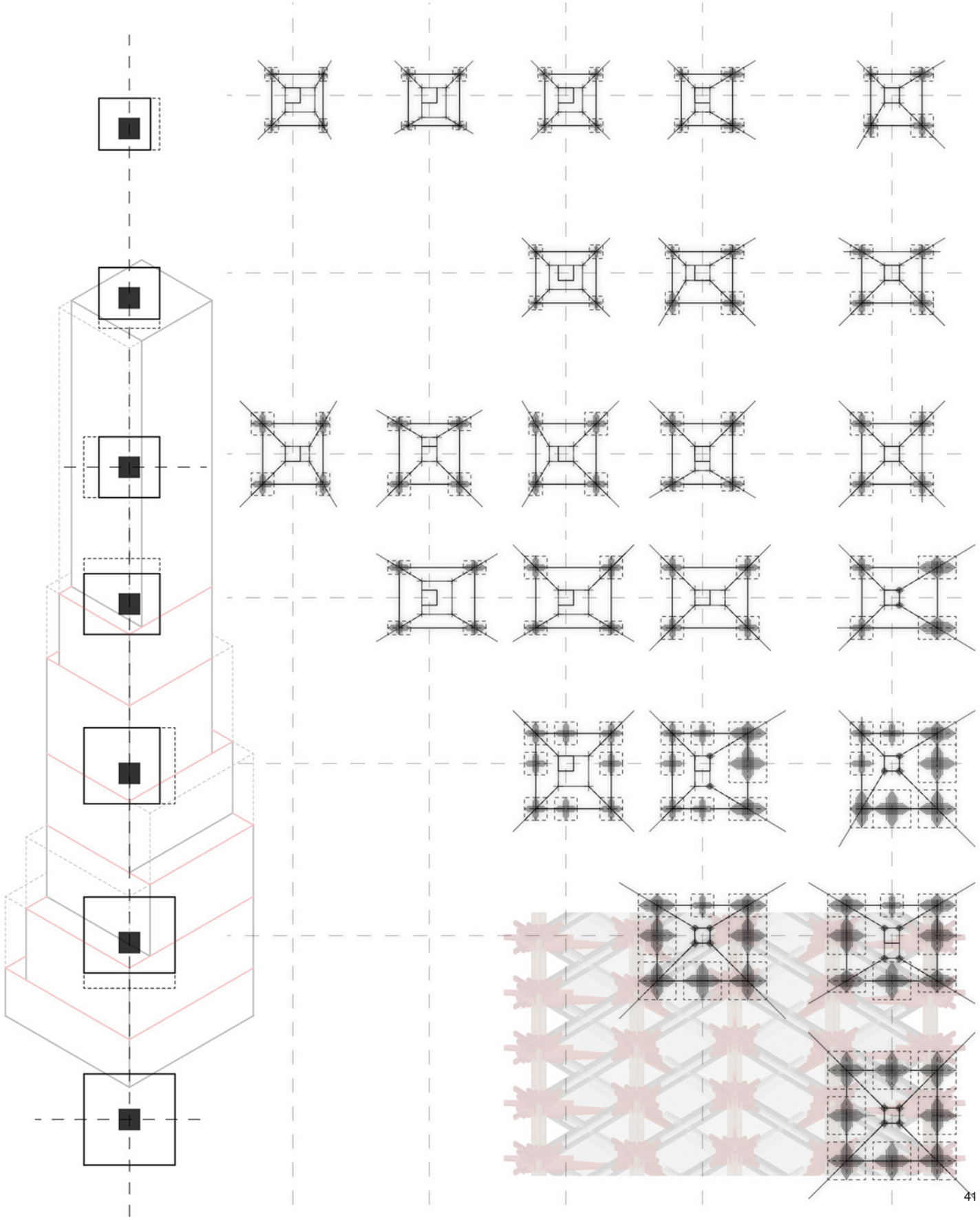


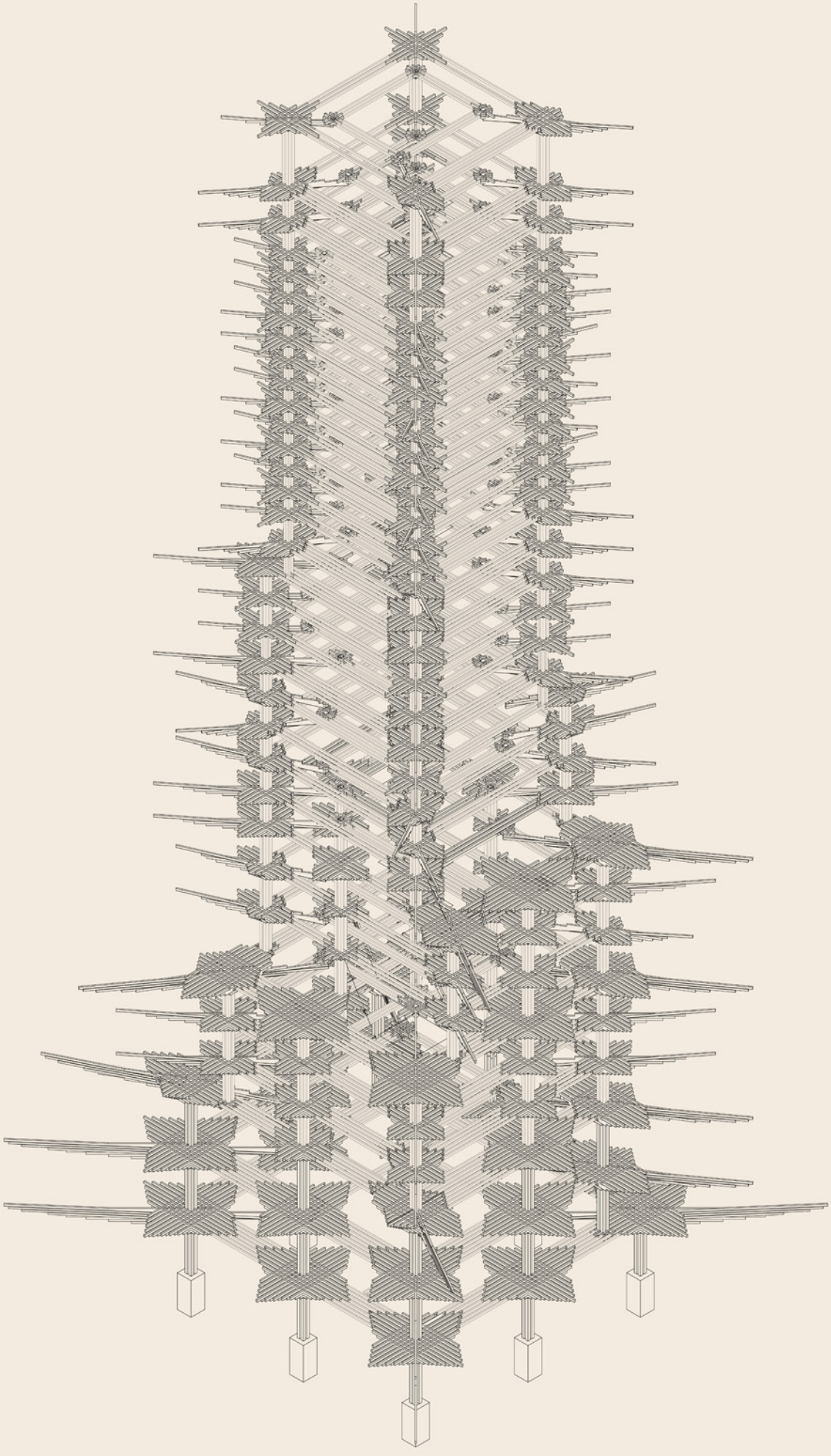


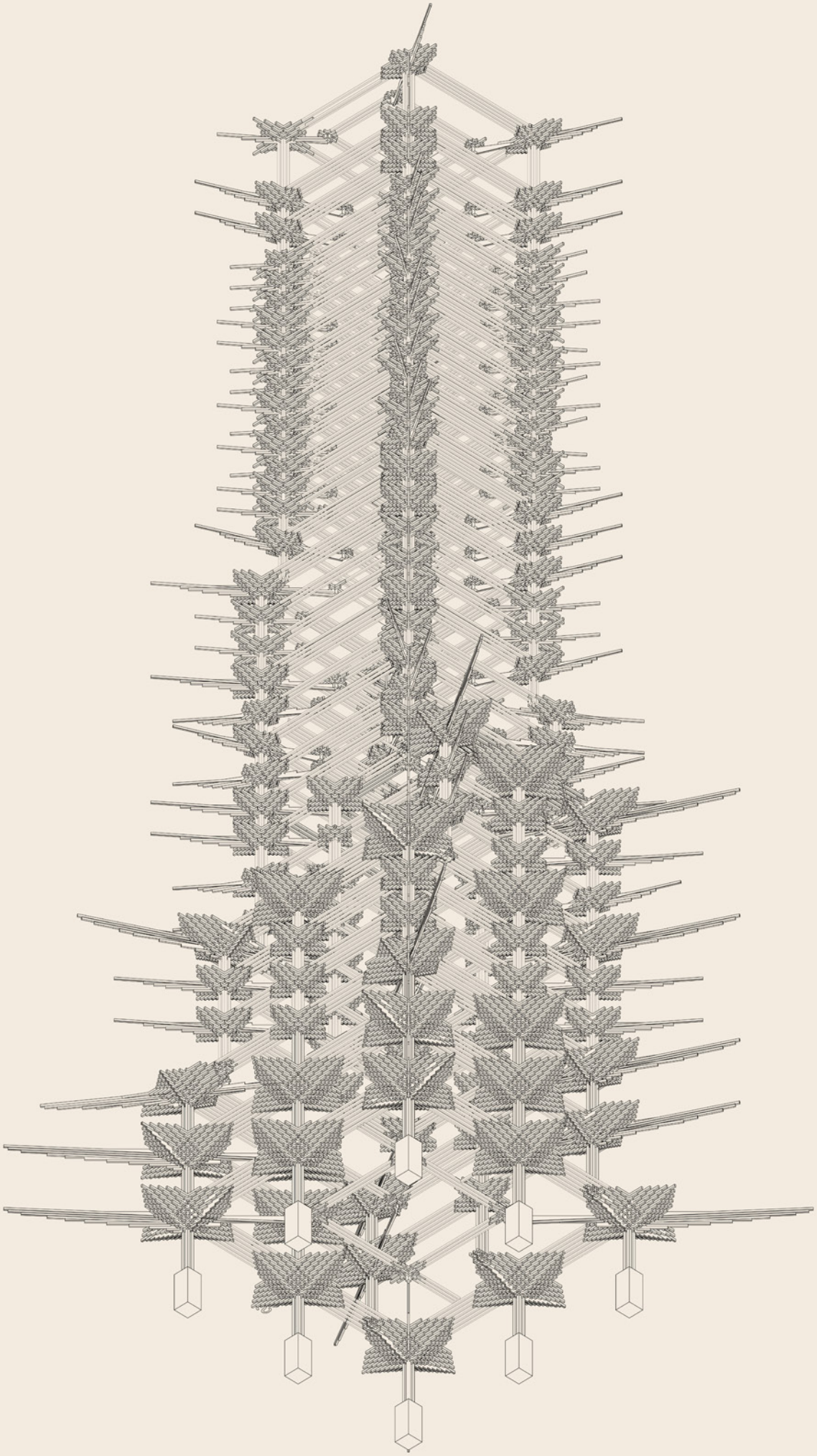


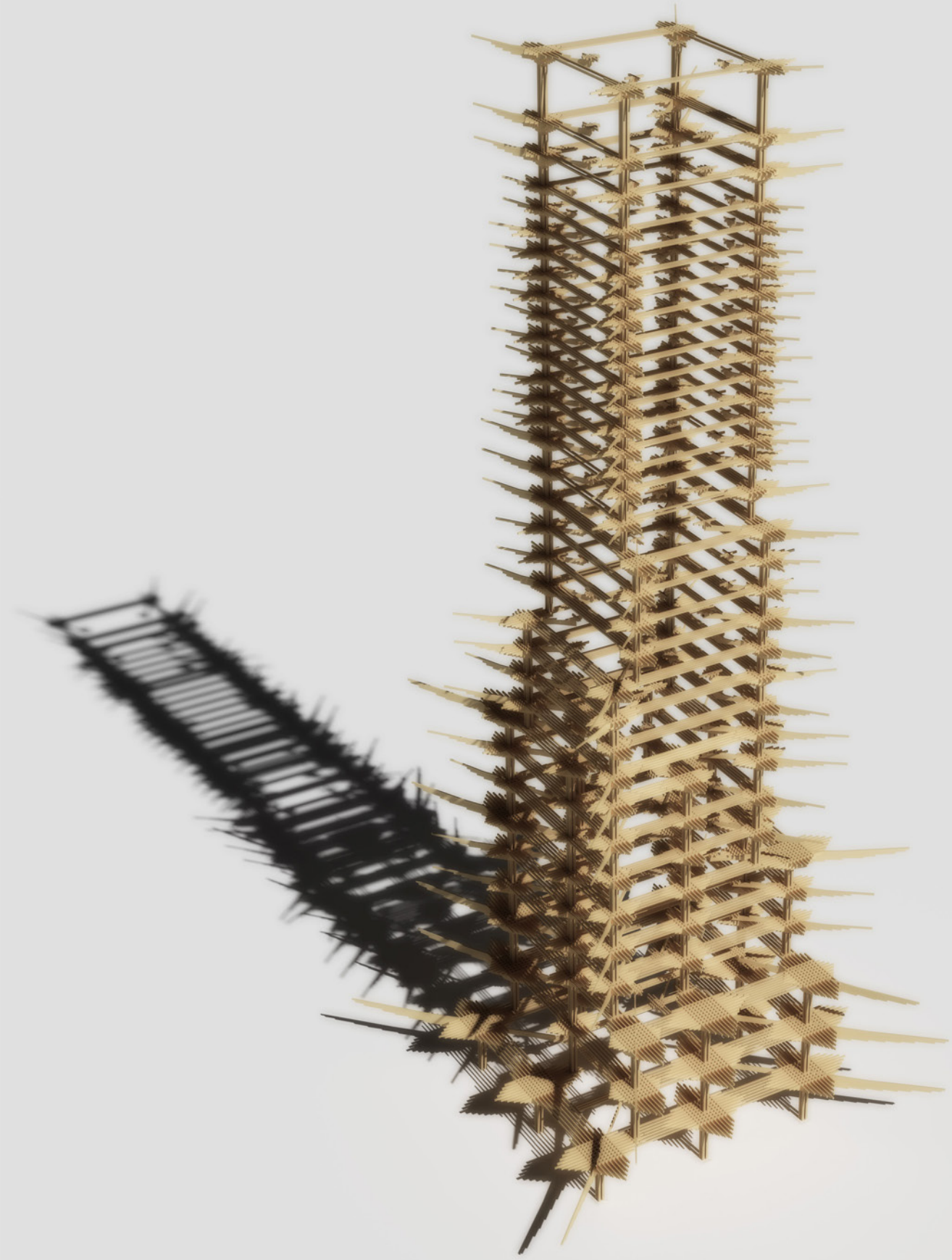


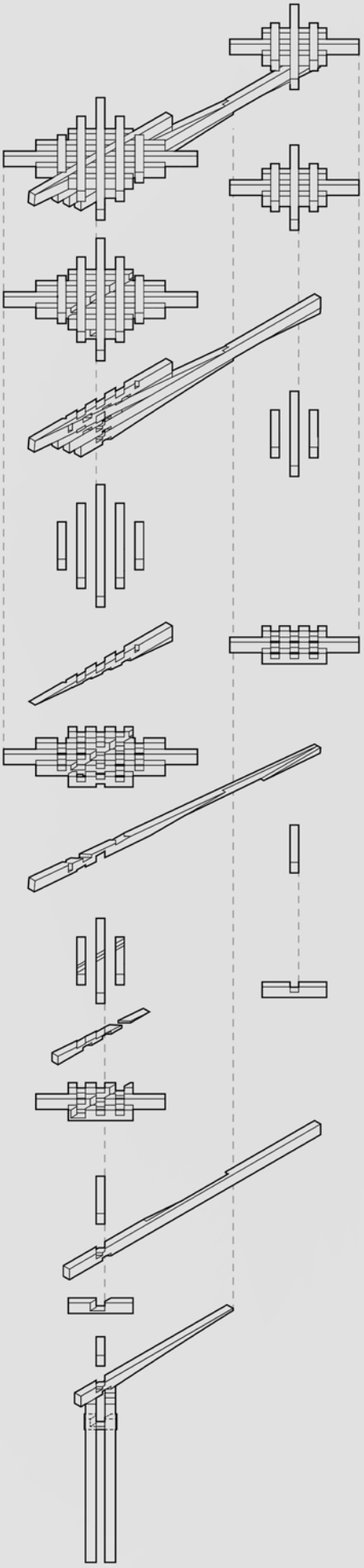


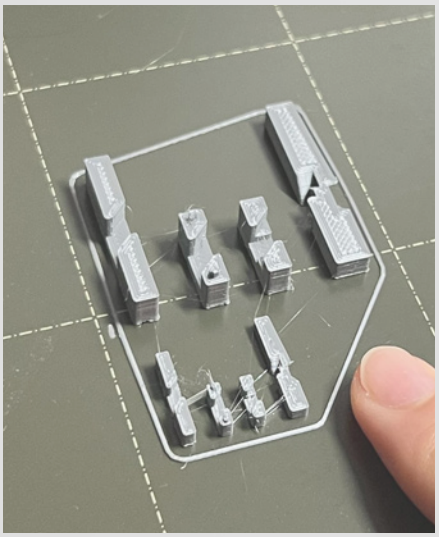






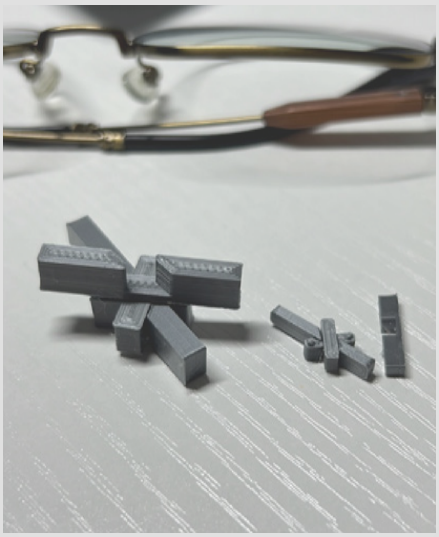




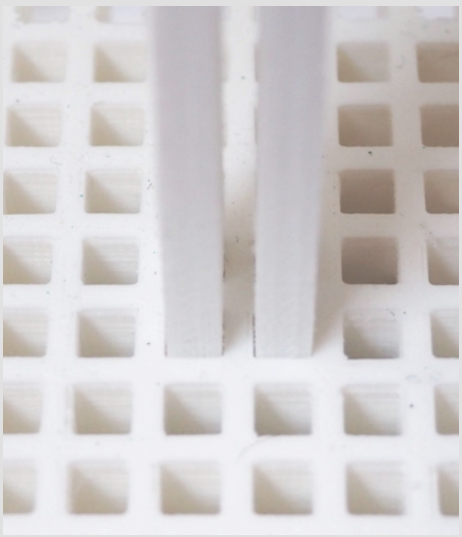


Scale test

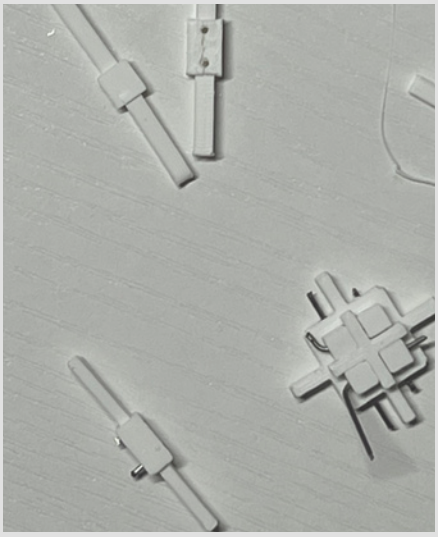
Glueless Dougong-beam detail



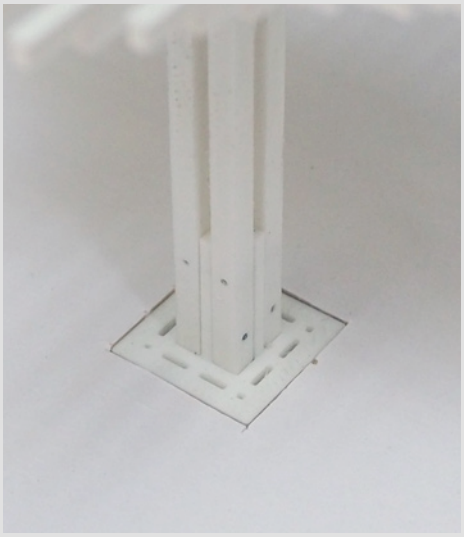
Tolerance test



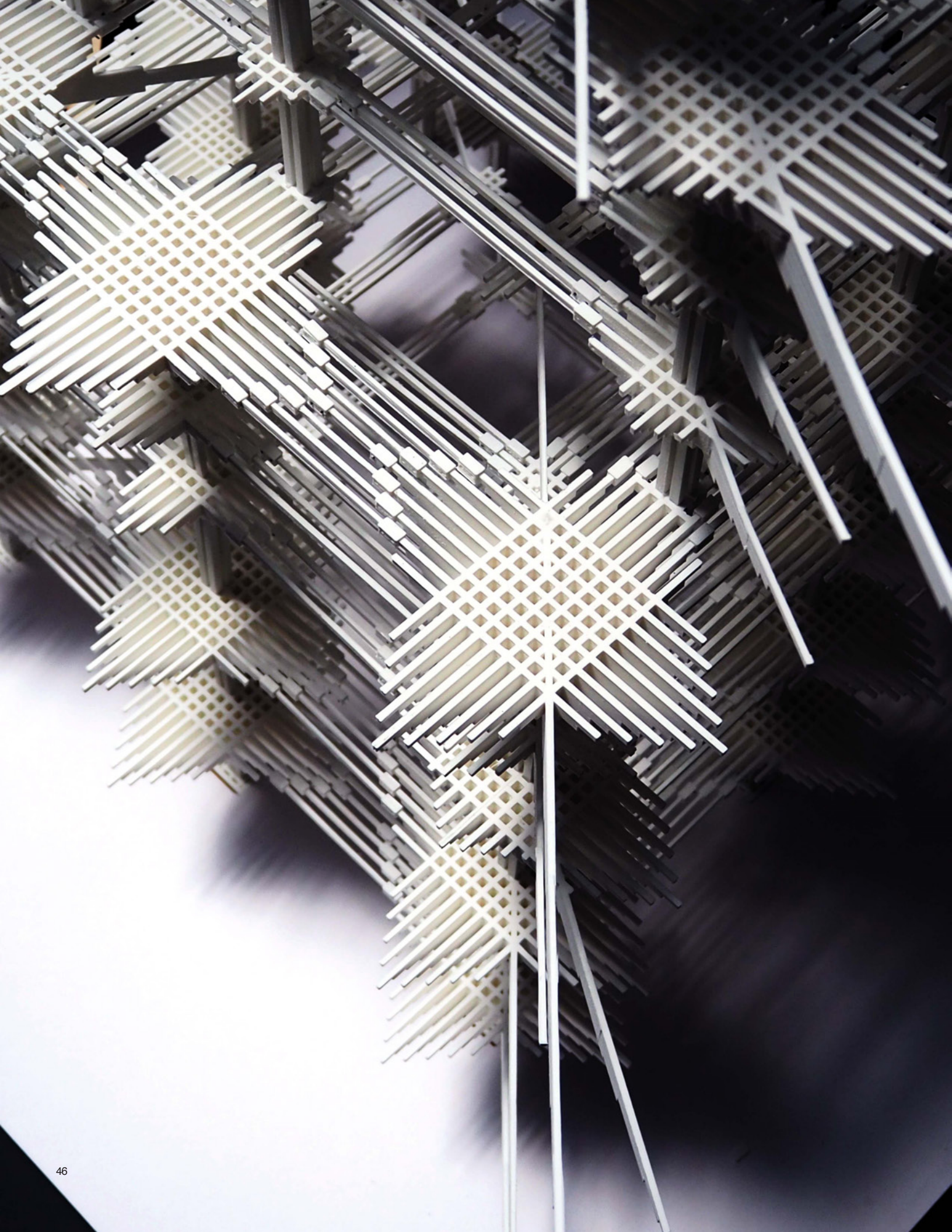
Glueless Dougong-column detail

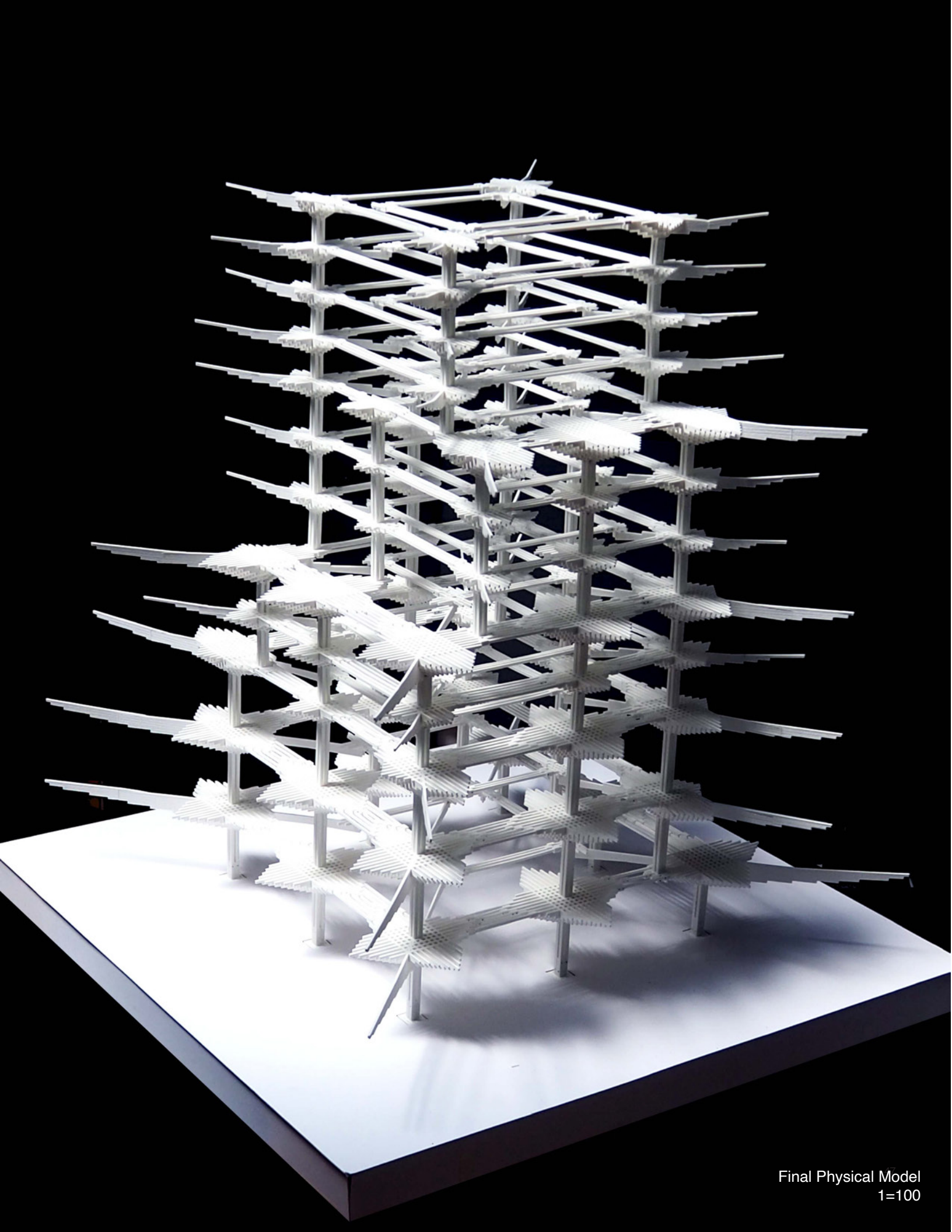


Assembly method test

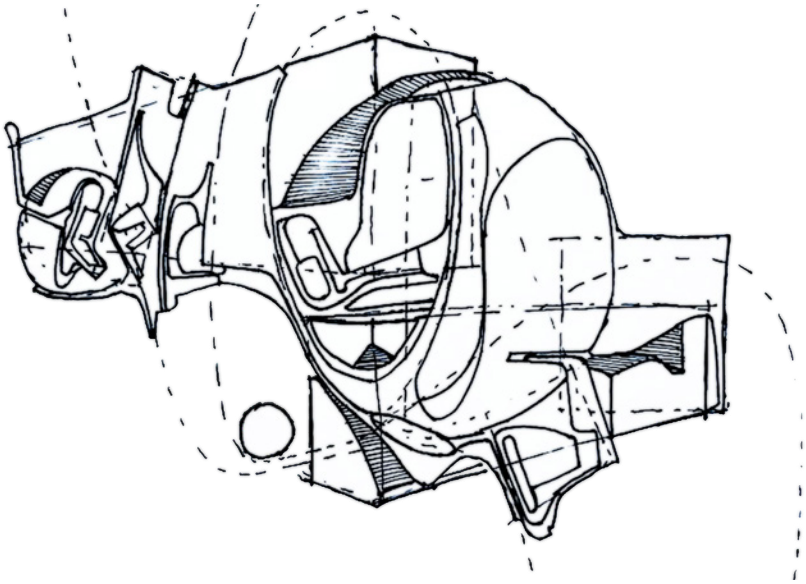


Glueless model foundation detail



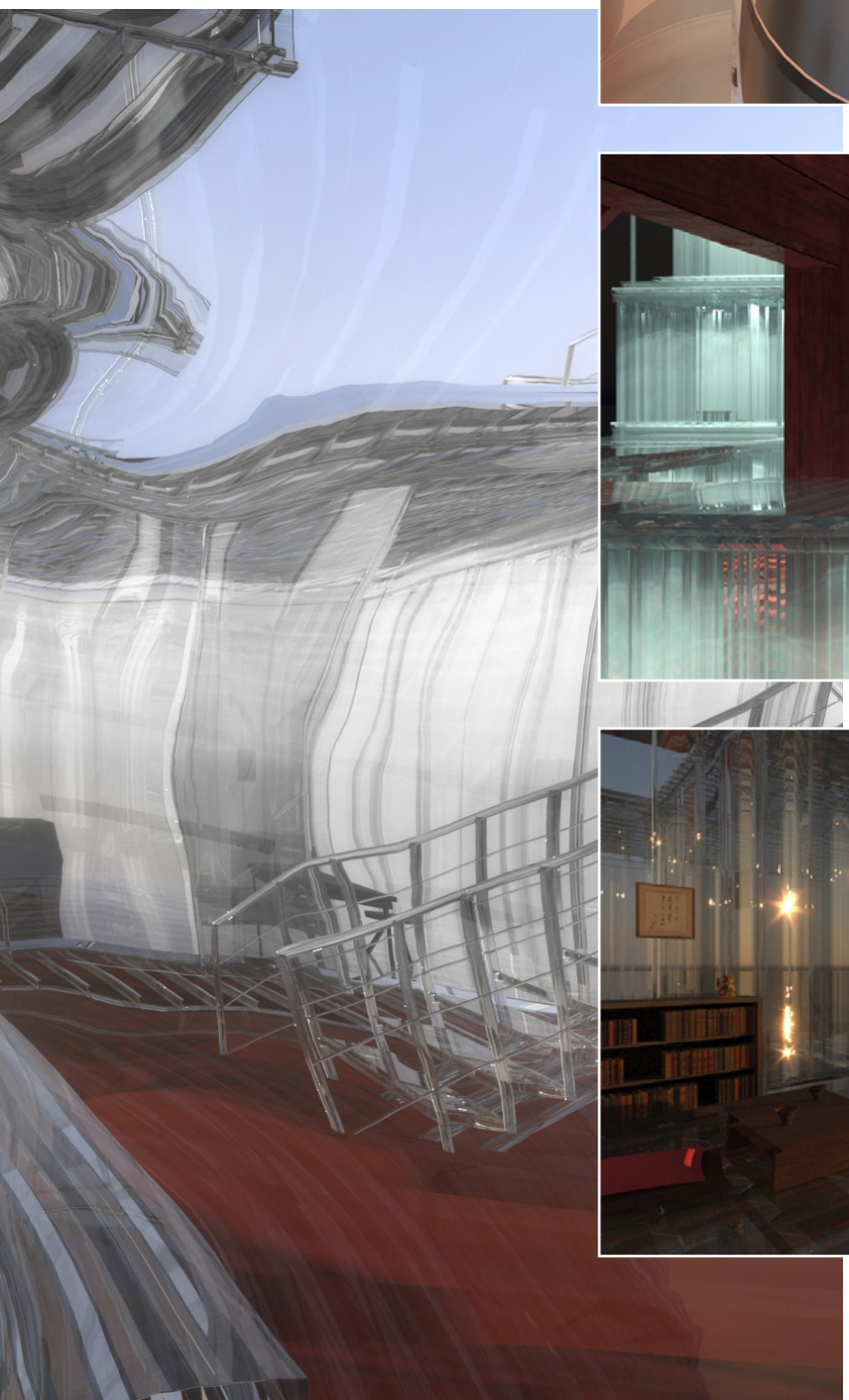


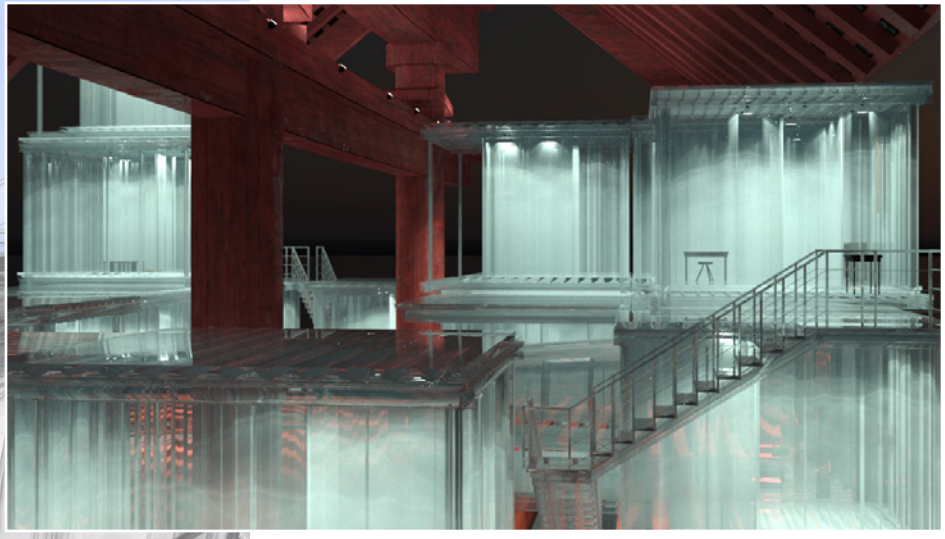
Final Physical Model
1=100

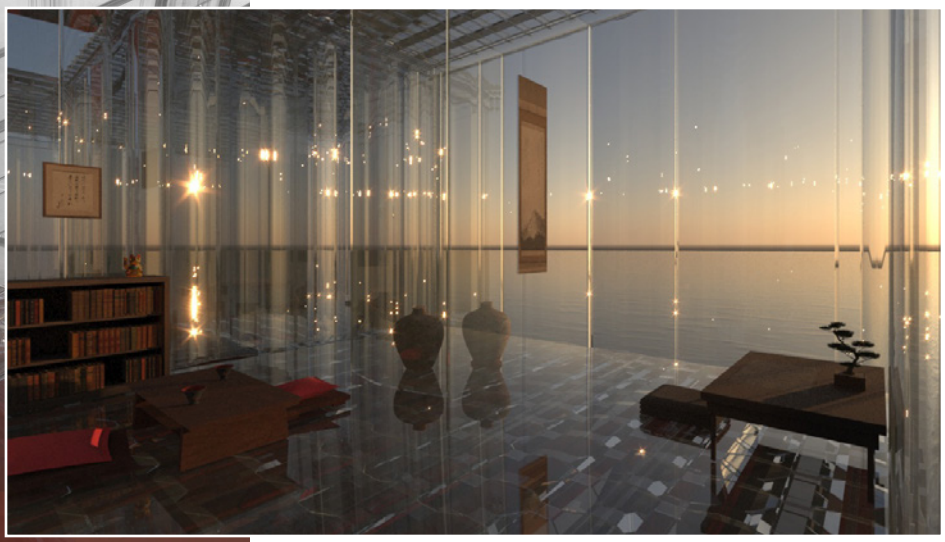


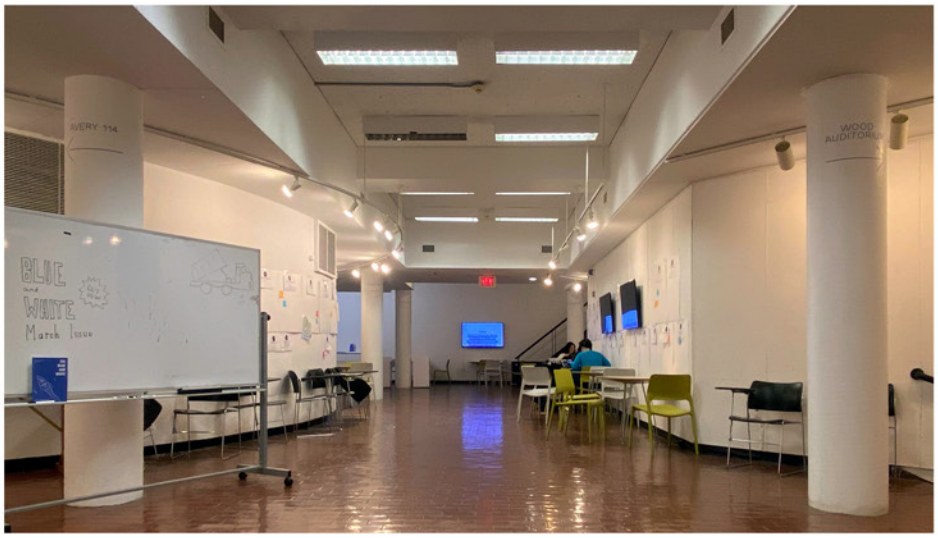
Happy Hour

San Francisco, CA
GSAPP Fall 2022
Techniques for the Ultrareal Elective
Instructor: Phillip Crupi
Team:
Wesley Kinsey
Tim Chen
Harlan Luo



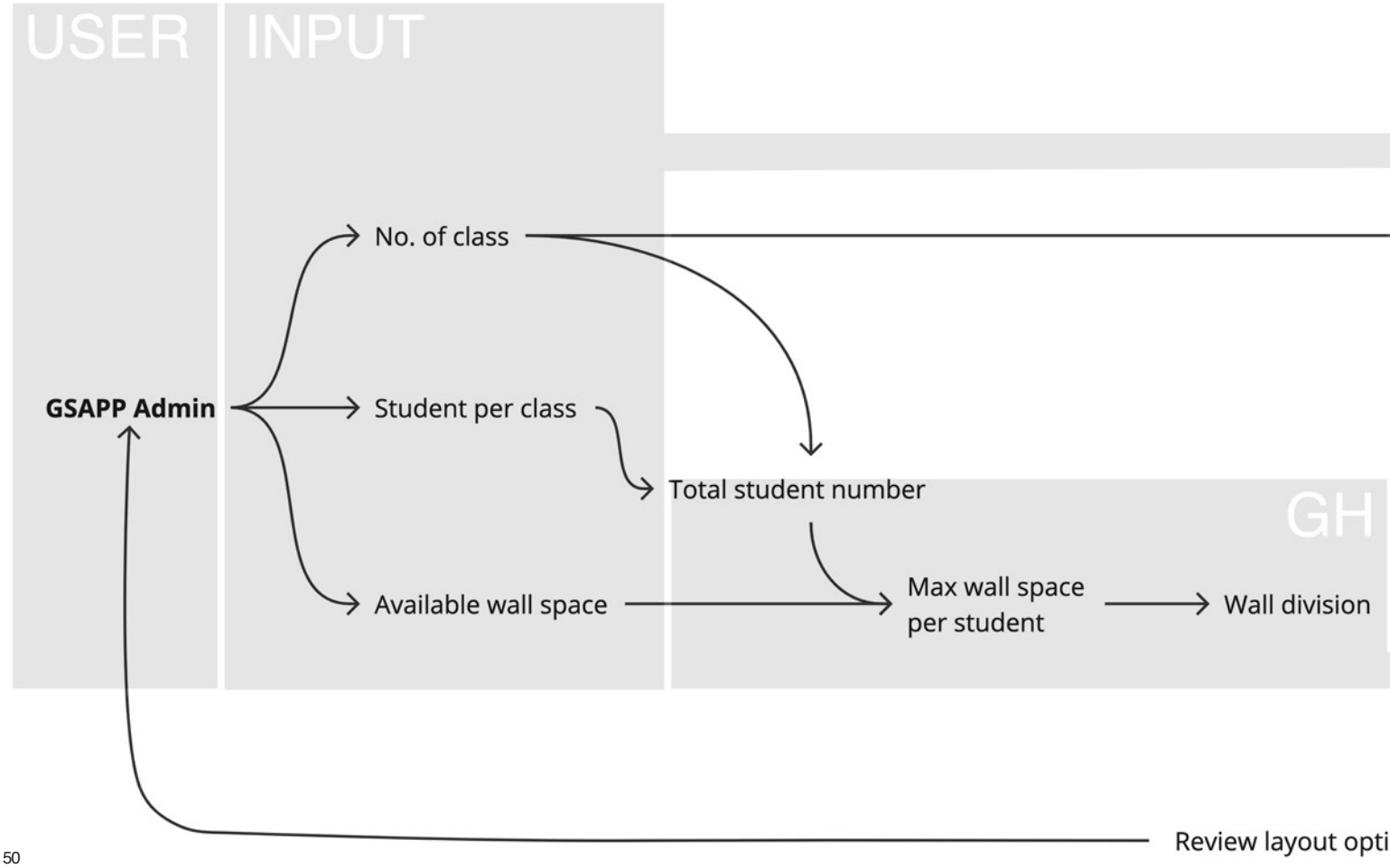


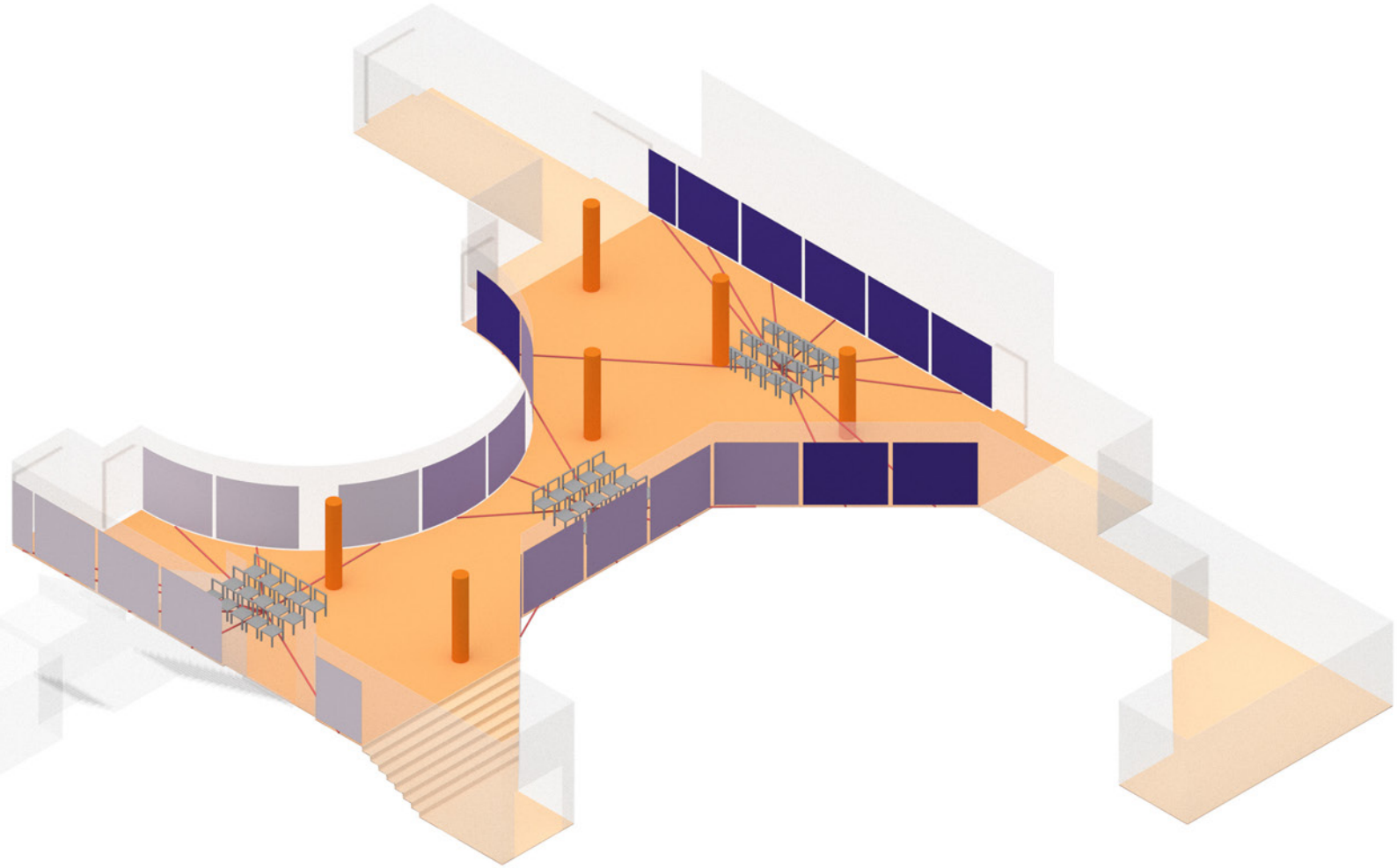


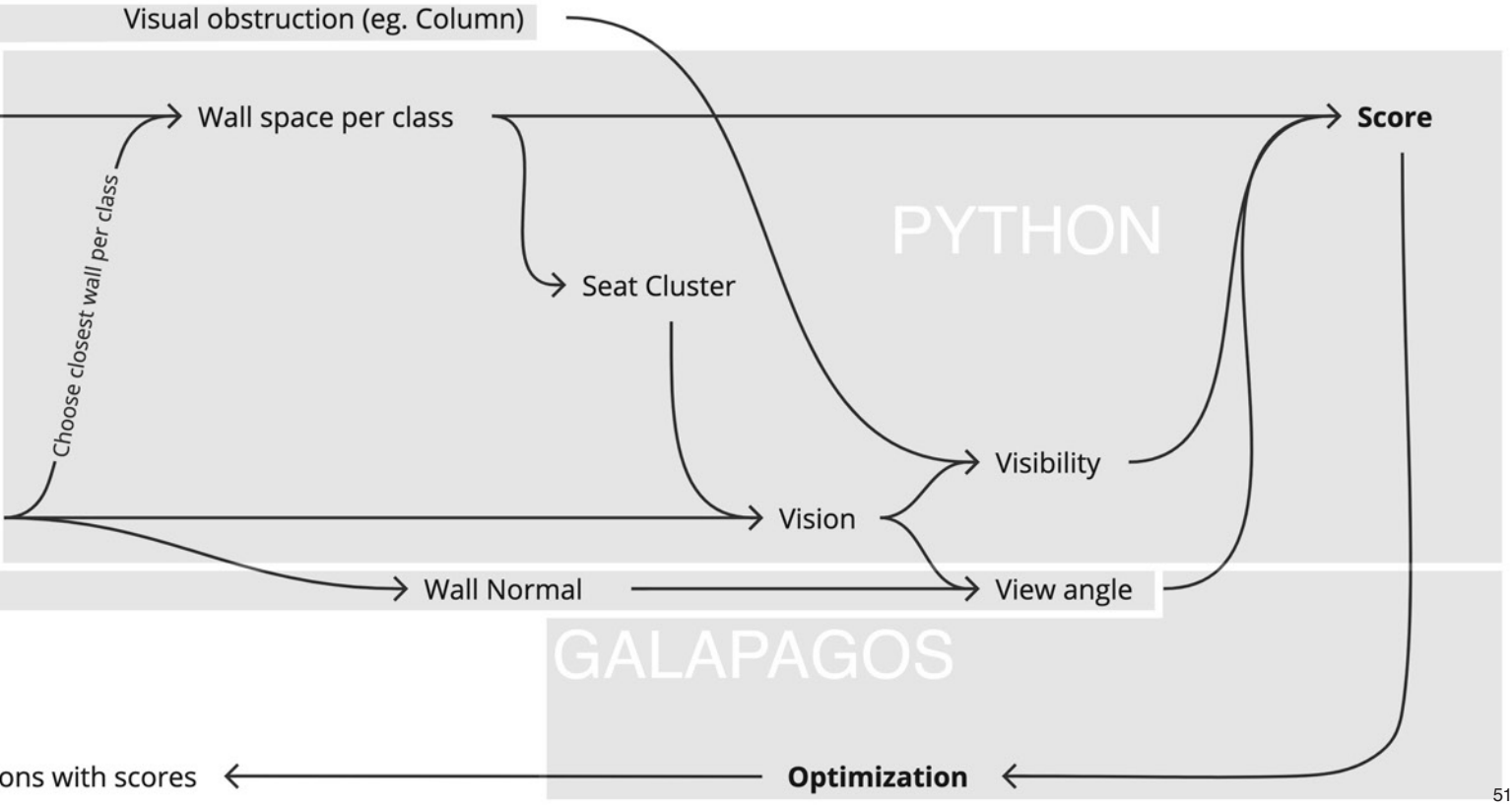


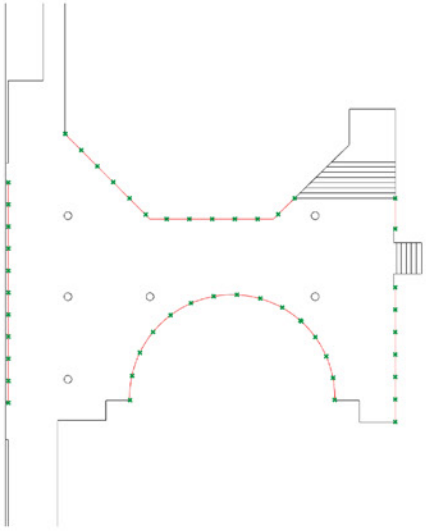
Avery 100

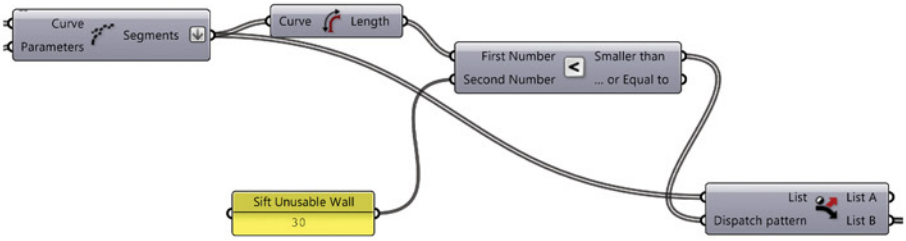
Columbia Univeristy, New York
GSAPP Spring 2023
Generative Design
Instructor: Danil Nagy
Team:
Cohaul Chen
Wenjing Tu
Elena Yu
Zixiao Zhu

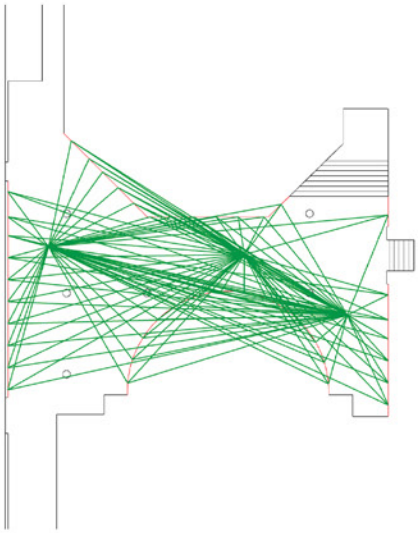


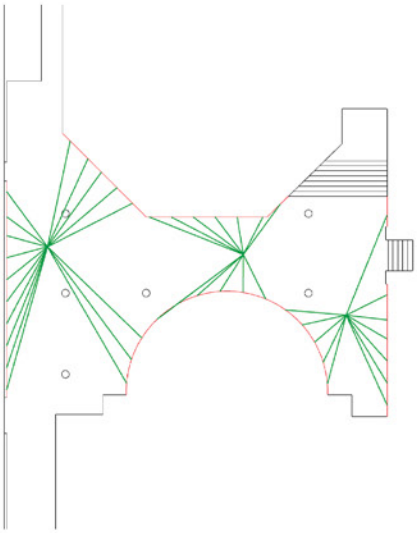



Visual obstruction (eg. Column)
Wall space per class
Score
PYTHON
Choose closest wall per class
Seat Cluster
Visibility
Vision
Wall Normal
View angle
GALAPAGOS
ons with scores
Optimization

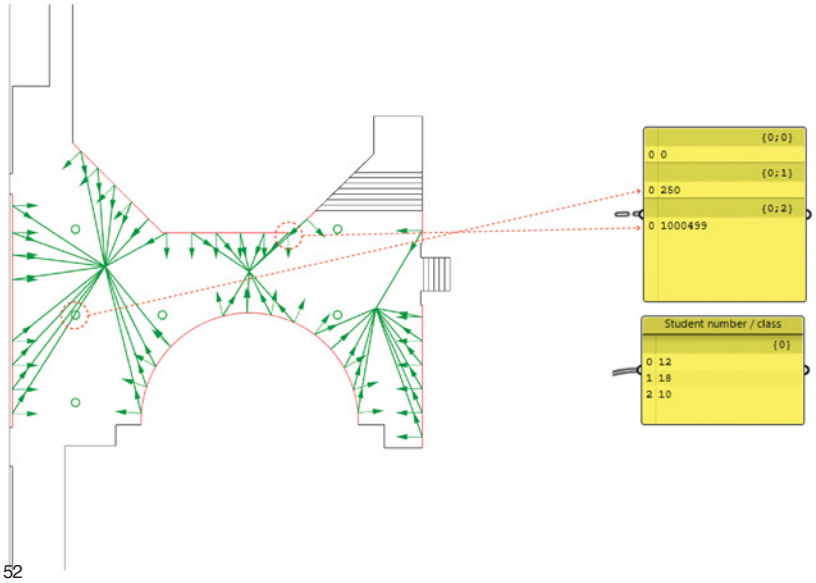




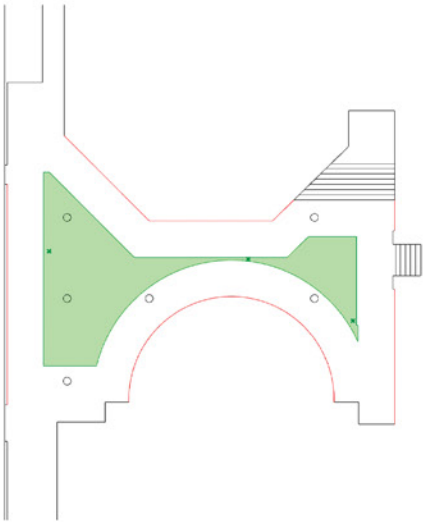


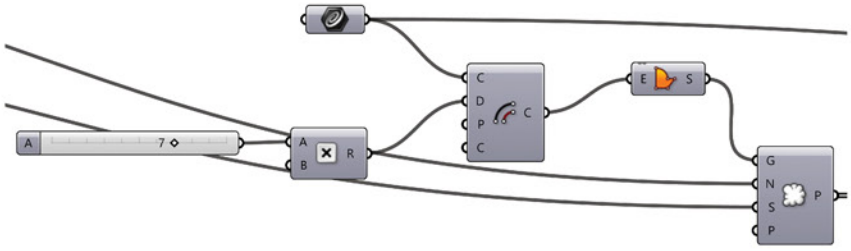


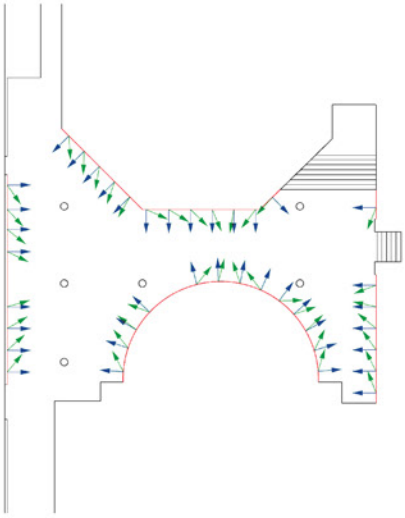
```python
import rhinoscriptsyntax as rs
import ghpythonlib.treehelpers as th
from Grasshopper import DataTree

curve_sublists = []
# iterate over each curve and compare its end point with the end points of other curves
for i in range(len(curves)):
    end_point_i = curves[i].PointAtEnd
    matched = False
    for sublist in curve_sublists:
        # check if any curve in the current sublist has the same end point
        if any([c.PointAtEnd.Equals(end_point_i) for c in sublist]):
            sublist.append(curves[i])
            matched = True
            break
    # if the current curve doesn't match any existing sublists, create a new one
    if not matched:
        curve_sublists.append([curves[i]])

groups = th.list_to_tree(curve_sublists)
```

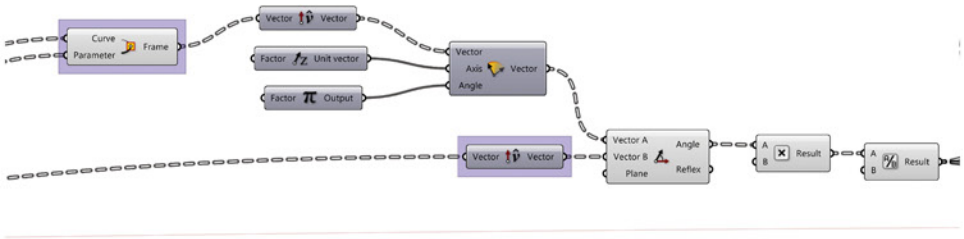


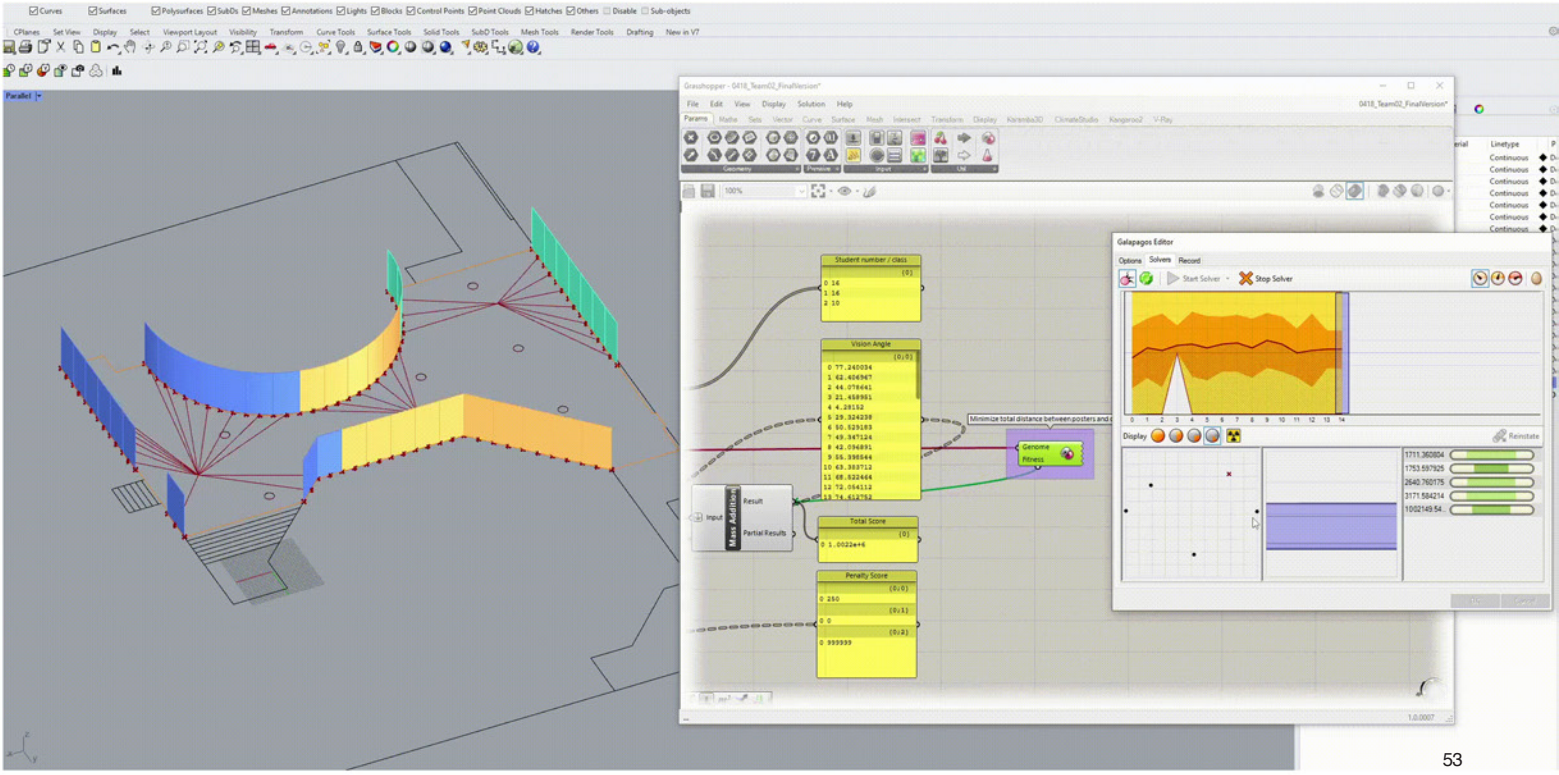

```python

for i, sublist in enumerate(curve_sublists):
    if len(sublist) < student_number:
        output_number.append(999999)
        break
    else:
        output_number.append(0)

intersections = []
score = 0
for circle in circles:
    for curve in curves:
        intersection = rs.CurveCurveIntersection(curve,circle)
        if intersection:
            score = score + 250

collision_score = score

degrees = input_degrees
output = []
view_score_ratios = []

for degree in degrees:
    view_score_ratio = (degree/90)*100
    view_score_ratios.append(view_score_ratio)
    if degree > 90:
        output.append(500)
    view_panalty_score = len(output)*500

view_score = sum(view_score_ratios)/len(view_score_ratios)

print (intersections)
print collision_score
print (output)
print view_score
score = sum(output_number) + collision_score + view_panalty_score

```




A
7
A
B
R
C
D
P
C
E
S
G
N
S
P
P




Curve
Parameter
Frame
Vector
Vector
Factor
Unit vector
Factor
Output
Vector
Axis
Angle
Vector
Vector
Vector
Vector A
Vector B
Plane
Angle
Reflex
A
B
Result
A
B
Result


Curves
Surfaces
Polysurfaces
SubDs
Meshes
Annotations
Lights
Blocks
Control Points
Point Clouds
Hatches
Others
Disable
Sub-objects
Parallel
Grasshopper - 0418_Team02_FinalVersion*
File
Edit
View
Display
Solution
Help
Params
Maths
Sets
Vector
Curve
Surface
Mesh
Intersect
Transform
Display
Karamba3D
ClimateStudio
Kangaroo2
V-Ray
Geometry
Primitive
Input
Util
100%
Student number / class
Vision Angle
Minimize total distance between posters and
Genome
Fitness
Mass Addition
Input
Result
Partial Results
Total Score
Penalty Score
Galapagos Editor
Options
Solvers
Record
Start Solver
Stop Solver
Display
Reinstate
Linetype
Continuous

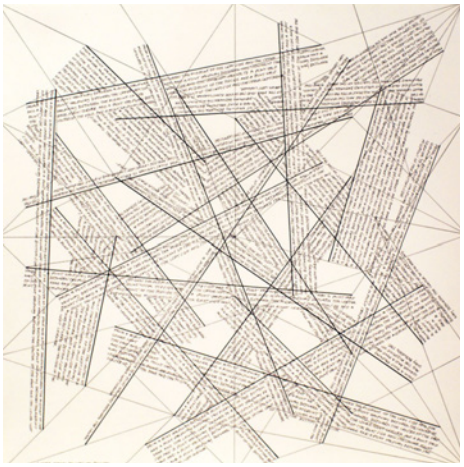
XIT

Lines

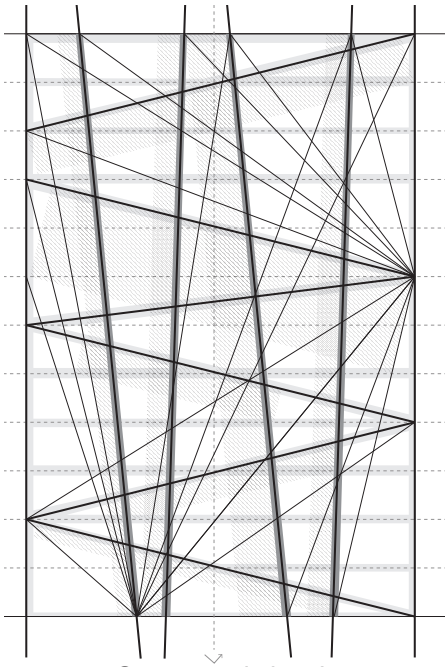
San Francisco, CA
GSAPP Fall 2022
Advanced Curtain Wall Elective
Instructor: Daniel Vos

This technical project describes an airtight and watertight enclosure of a 13-story building occupied by an art gallery in the city of San Francisco.

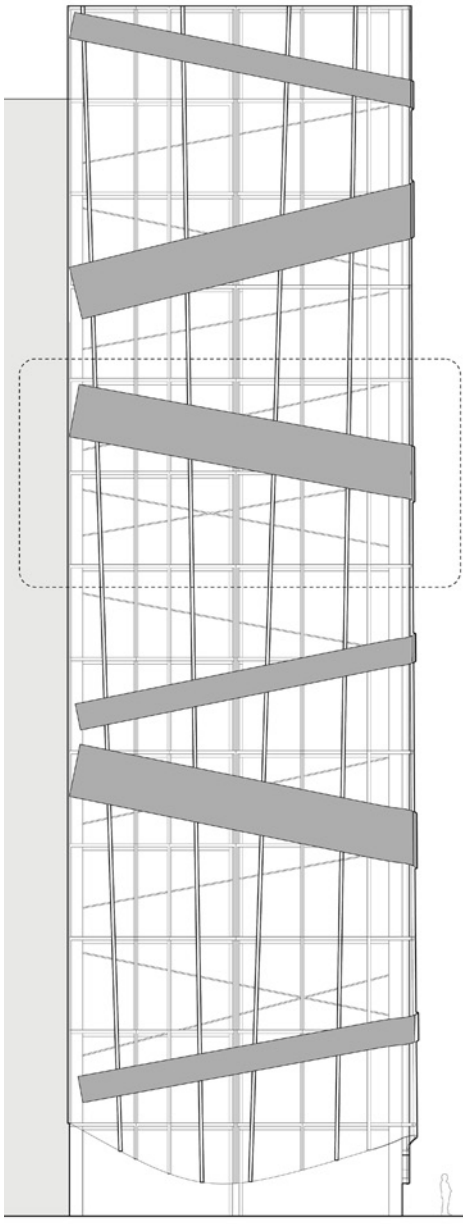
The design of the system takes inspiration from the painting *Lines from Points to Points* by Sol Lewitt and translates the ideas of “wrapping” and “lineweight” into a composite curtain wall system that deploys cables as a secondary system for lateral load on ICUs that are only dead loaded to floor slabs at two points, which helps the system to span a double height space without adding a beam. On the outside, the design accentuates certain “lines” via different exterior conditions on mullions: aluminum mullion caps accentuate certain vertical lines while drop-hook perforated aluminum planels are translated front the diagonal hatches in the original drawing.



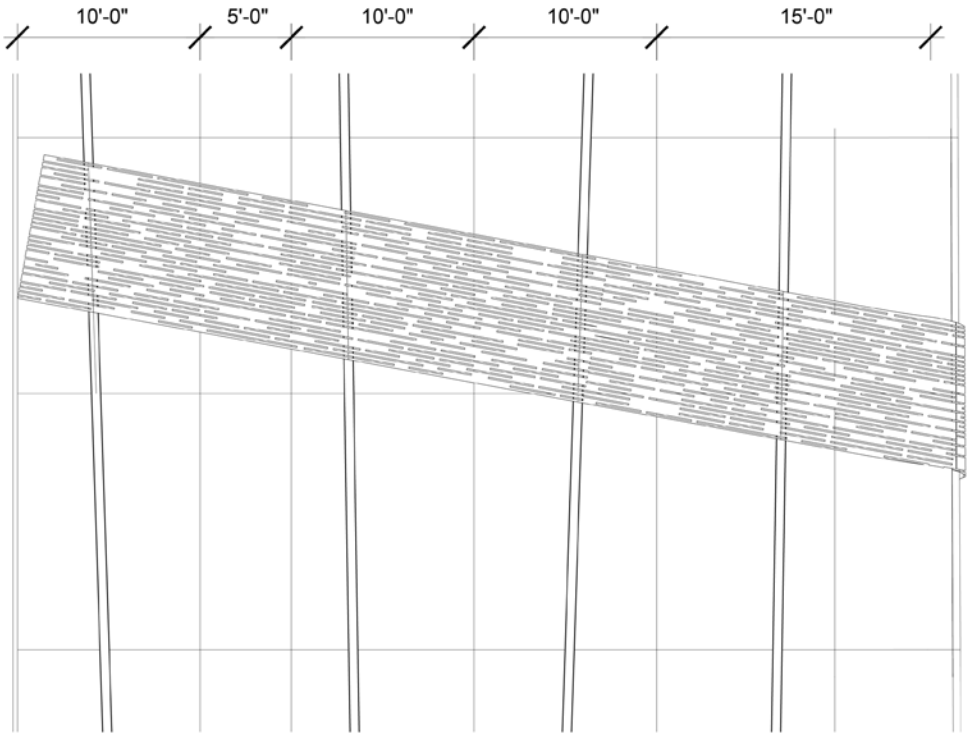
Sol Lewitt,
Lines from Points to Points

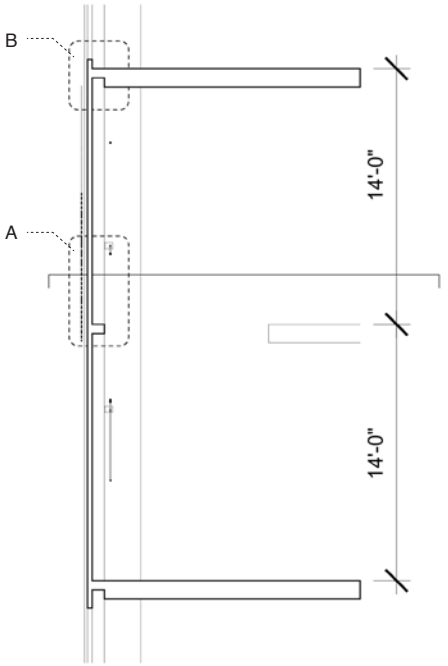


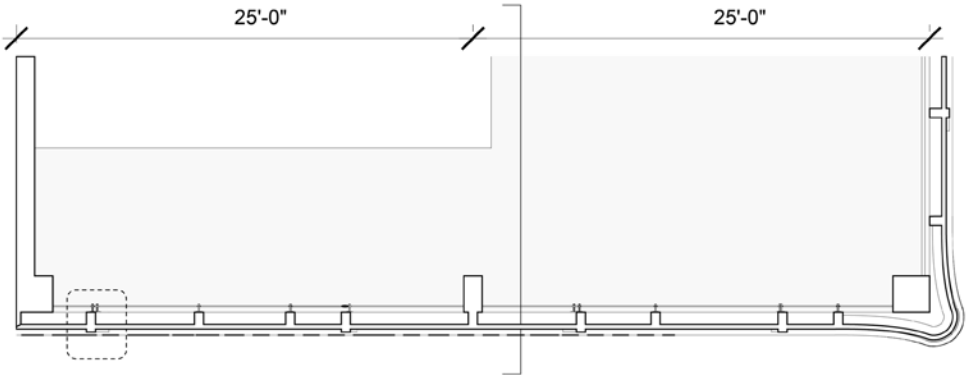
Conceptual sketch

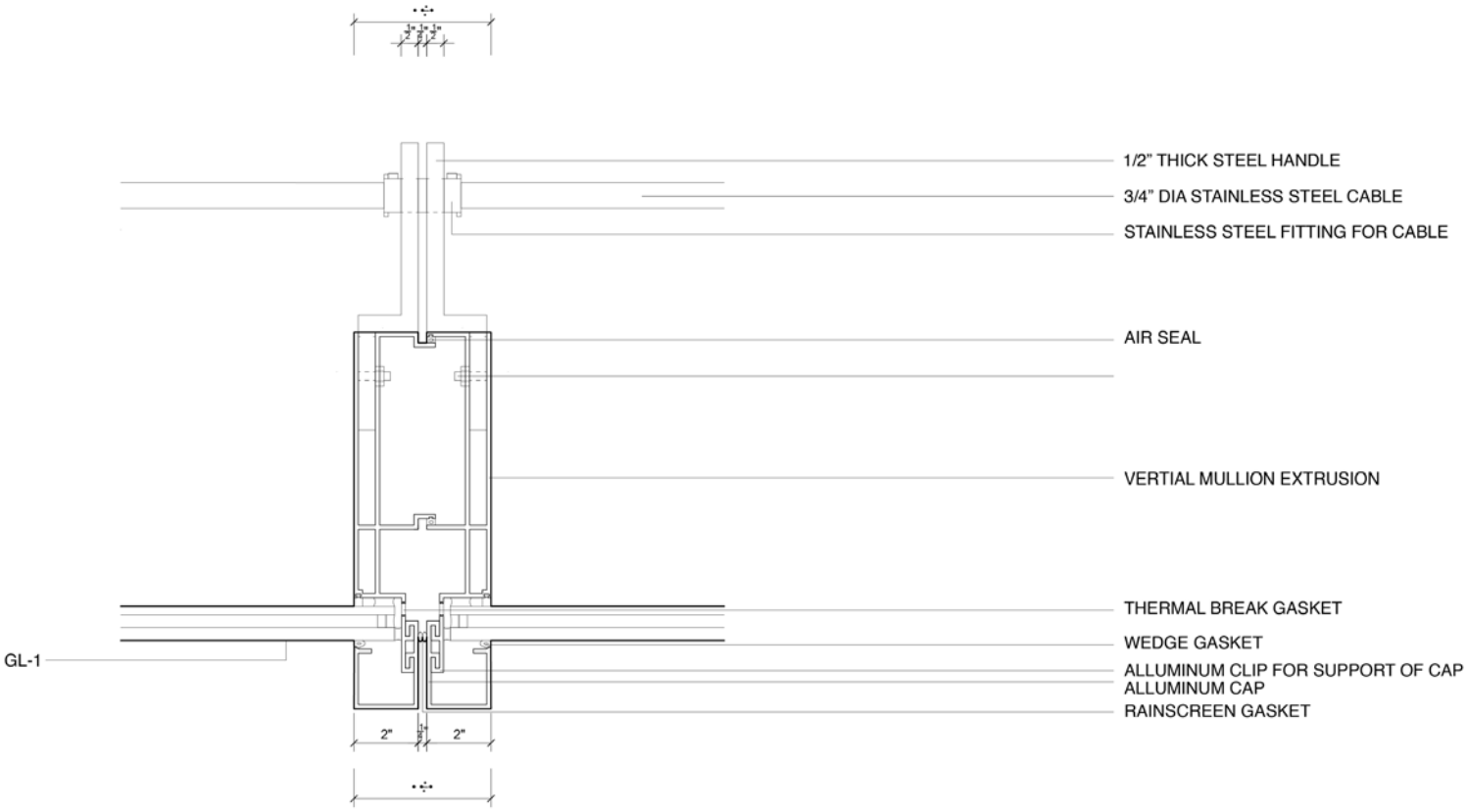


Final Elevation

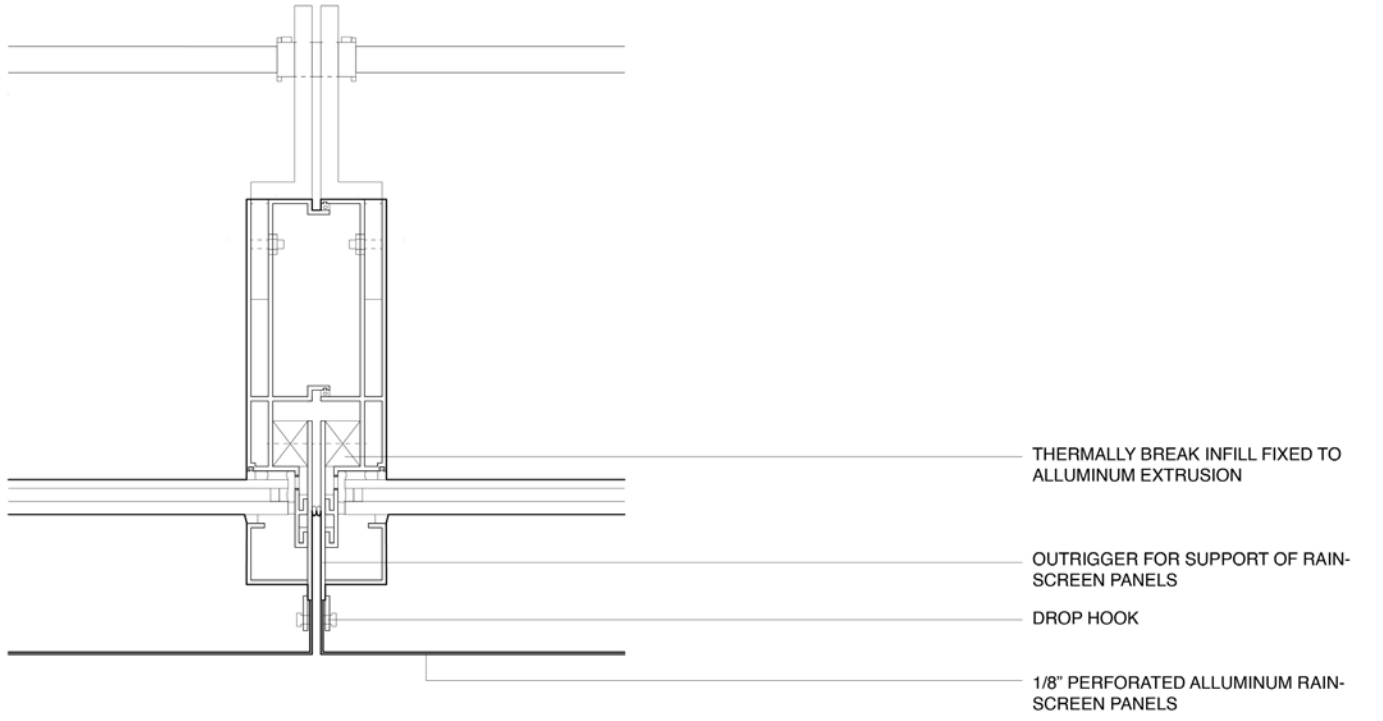

10'-0"
5'-0"
10'-0"
10'-0"
15'-0"


B
A
14'-0"
14'-0"

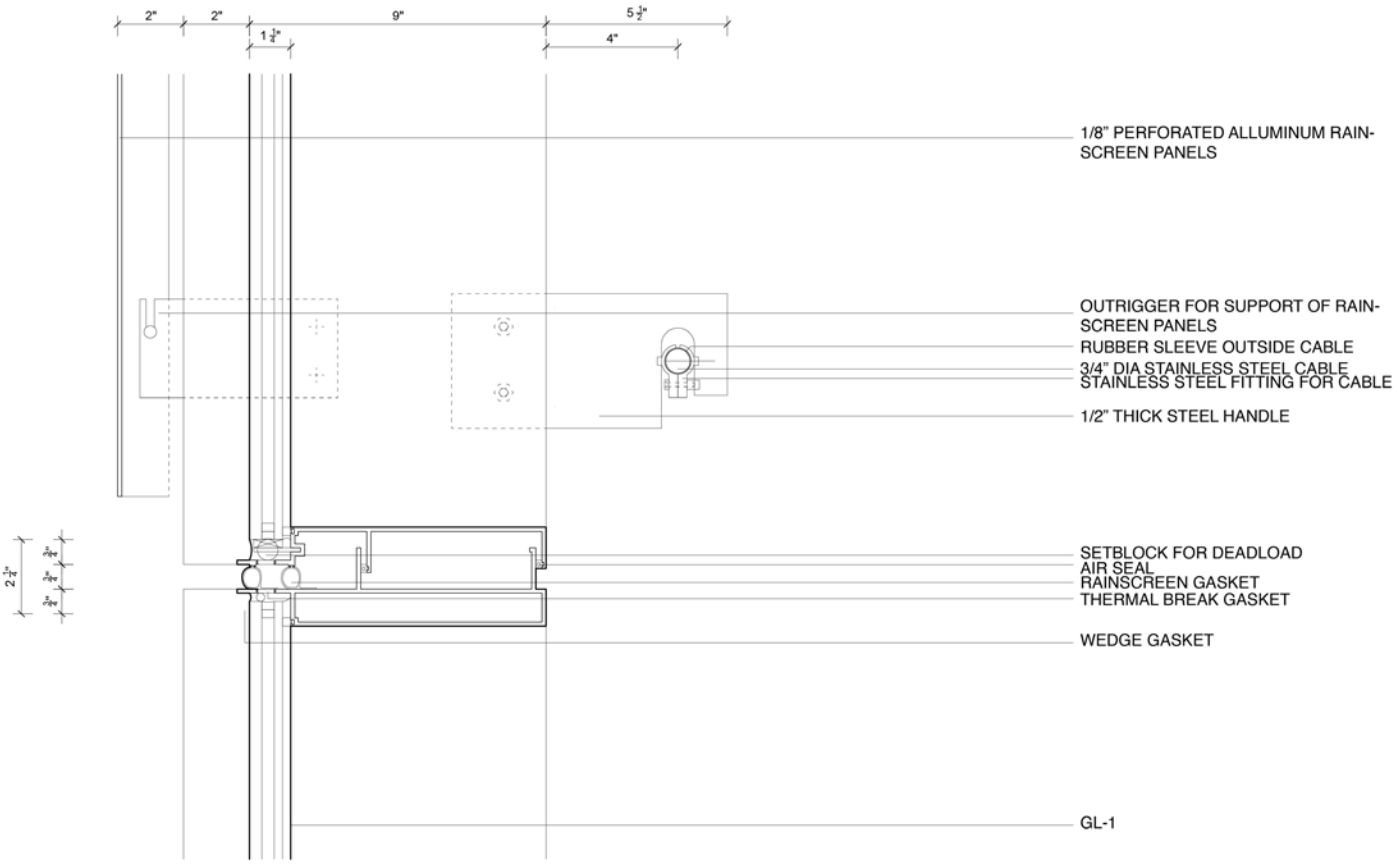

25'-0"
25'-0"



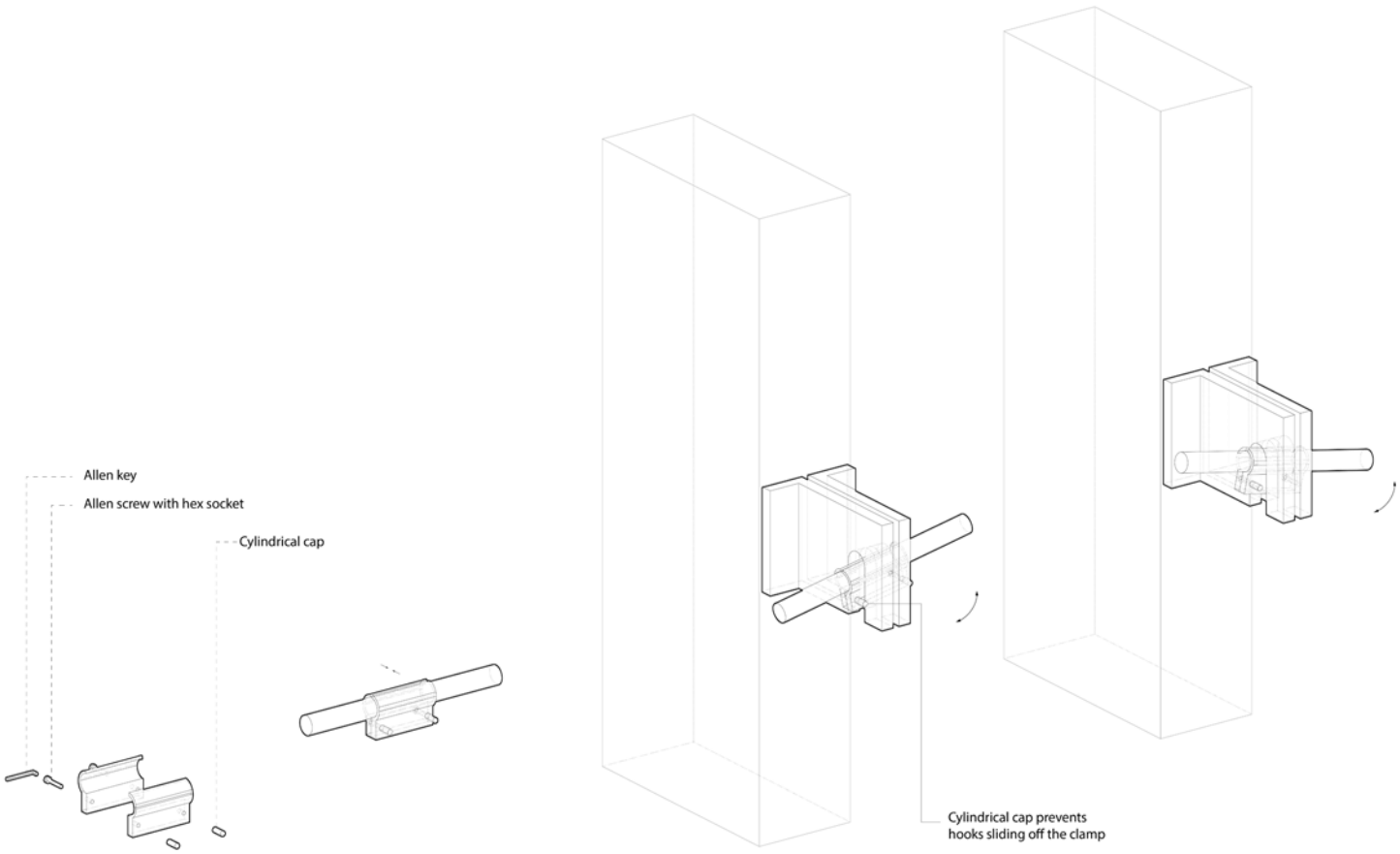
Detail A-1

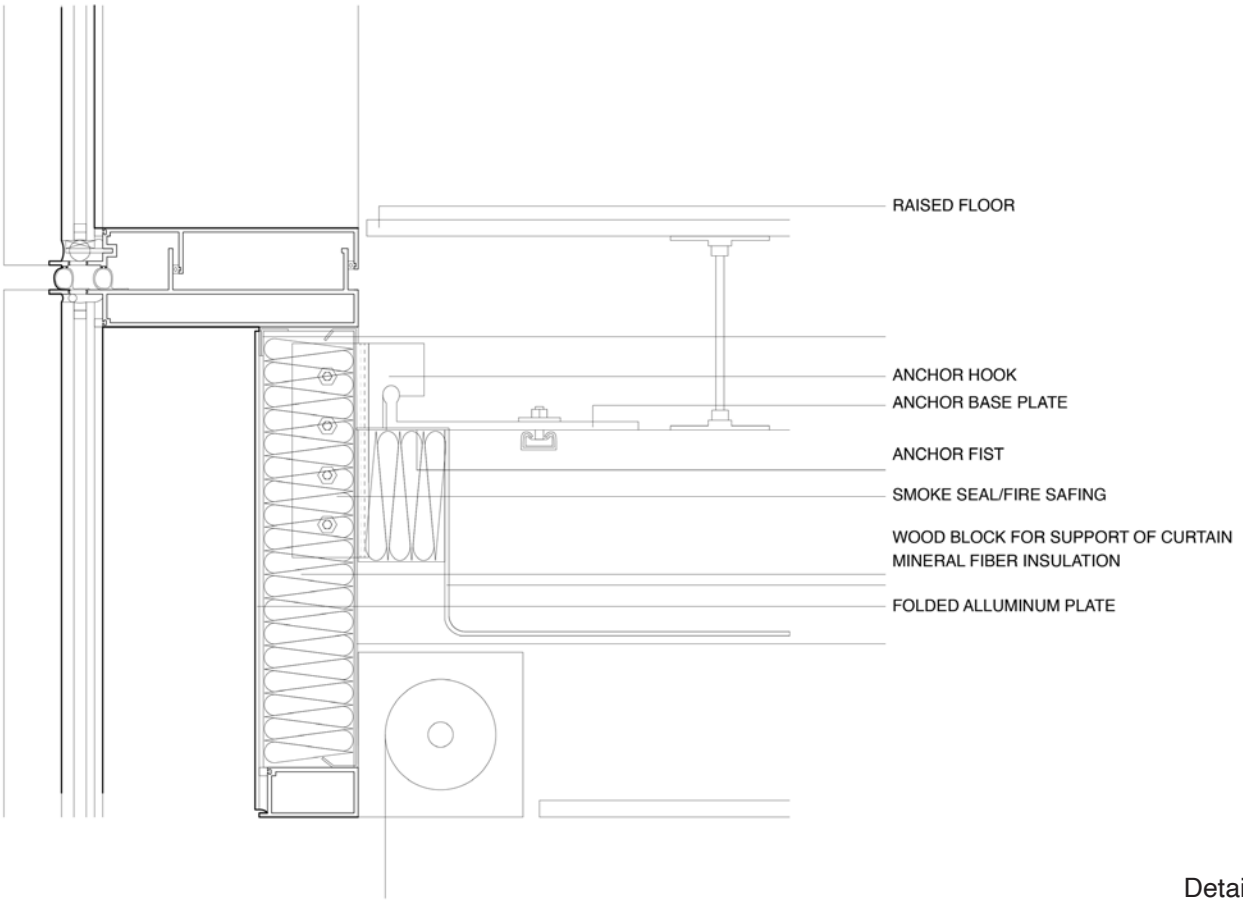


Detail A-2

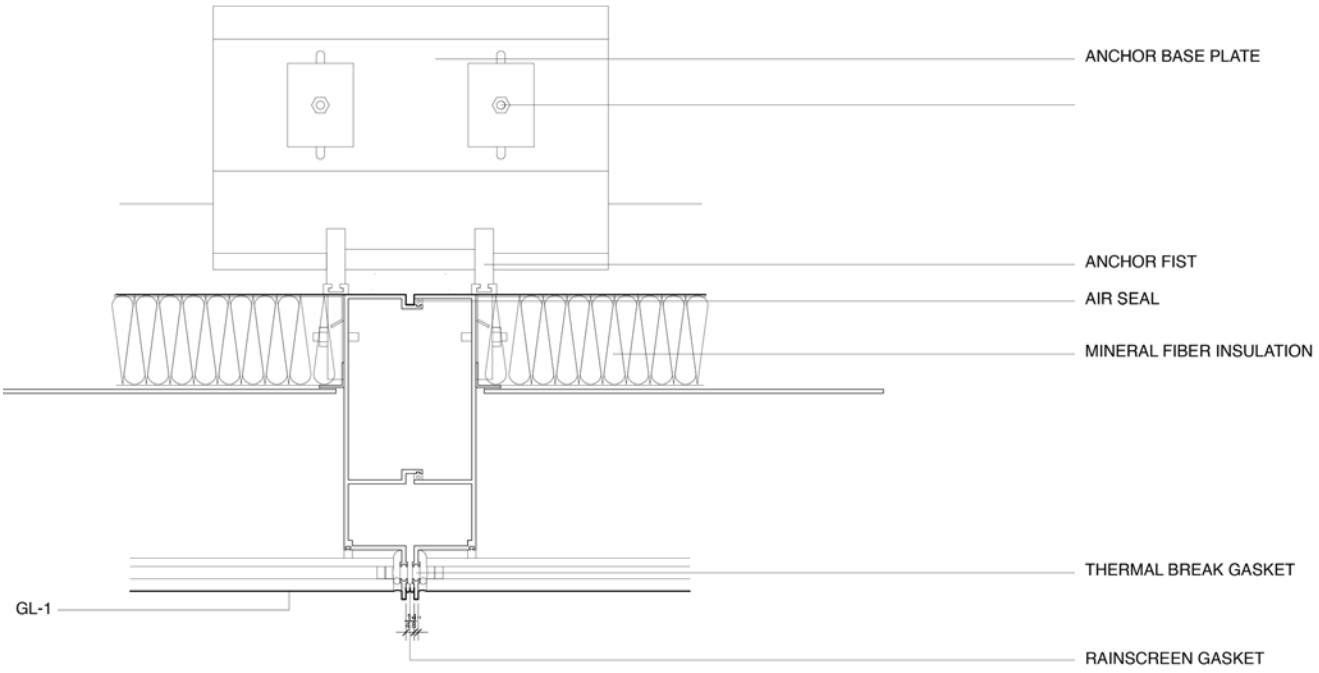
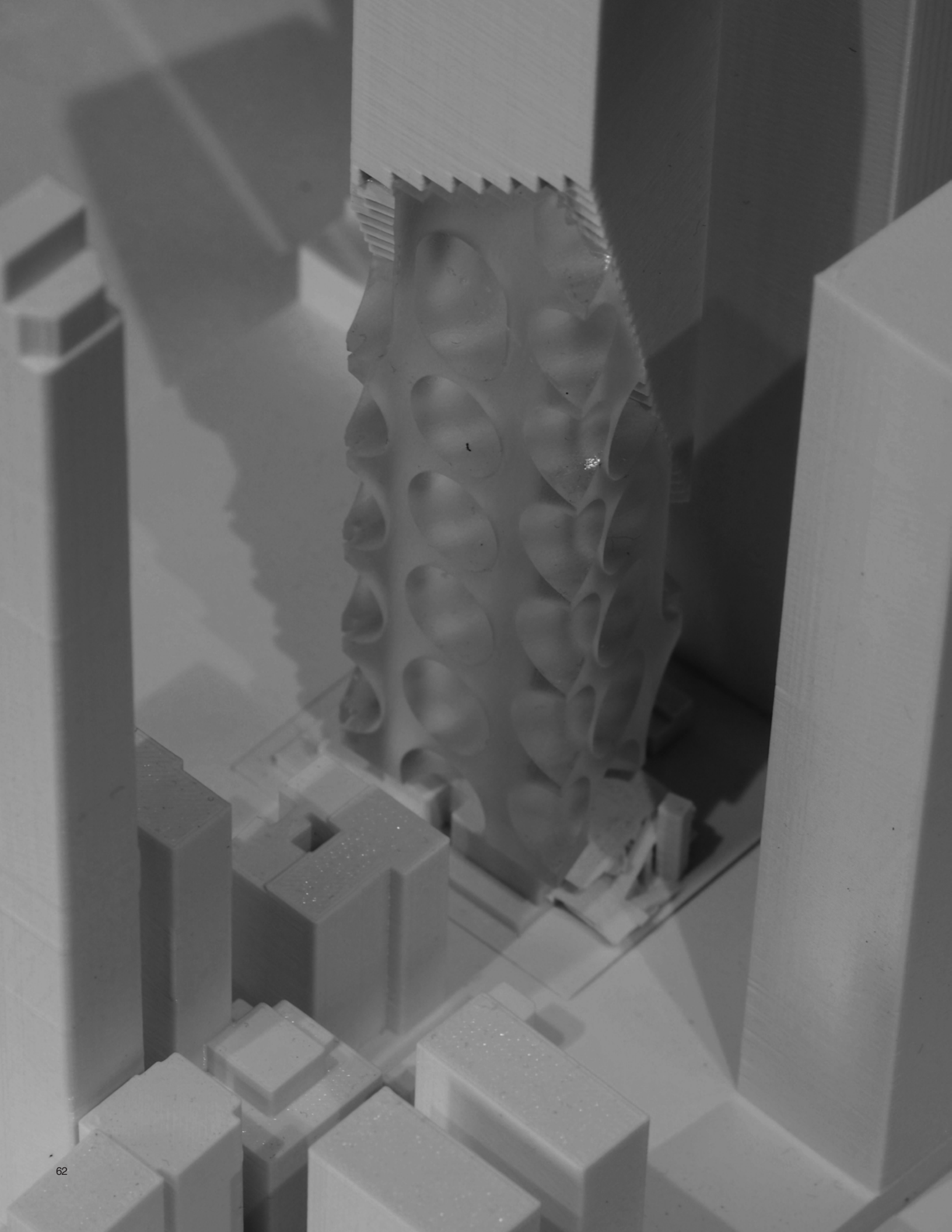

2"
2"
9"
5 1/2"
1 1/4"
4"
1/8" PERFORATED ALLUMINUM RAIN-SCREEN PANELS
OUTRIGGER FOR SUPPORT OF RAIN-SCREEN PANELS
RUBBER SLEEVE OUTSIDE CABLE
3/4" DIA STAINLESS STEEL CABLE
STAINLESS STEEL FITTING FOR CABLE
1/2" THICK STEEL HANDLE
2 1/4"
3/4"
3/4"
3/4"
SETBLOCK FOR DEADLOAD
AIR SEAL
RAINSCREEN GASKET
THERMAL BREAK GASKET
WEDGE GASKET
GL-1

Detail A-3


Allen key
Allen screw with hex socket
Cylindrical cap
Cylindrical cap prevents hooks sliding off the clamp



Detail B-1



Detail B-2