



# Welcome

## Elderly Living in Green

# Area

## Marconi Torens



- Public transportation
- Shopping strip



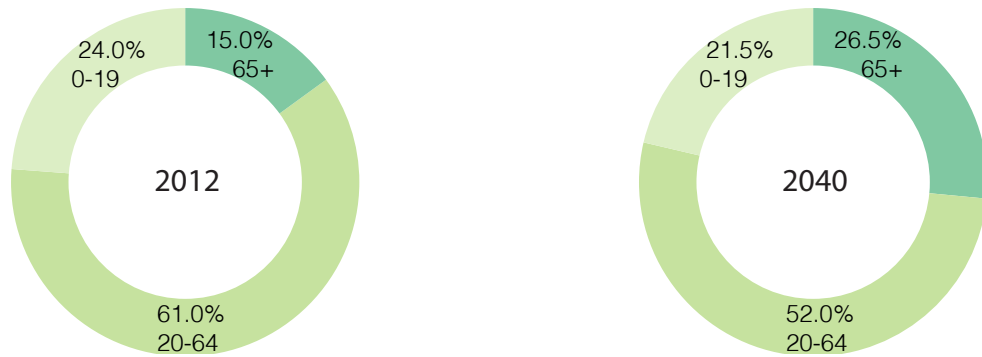


- Large research facility is located in one of the Marconi torens
- Science tower is an important element of the Rotterdam health industry
- Rotterdam wants to become a larger health actor in both the Netherlands and in Europe
- 9 out of 25 largest employers in Rotterdam are related to health



# Demography Population

Demography shift between the years 2012 - 2040



60% of people over 70 are a single household



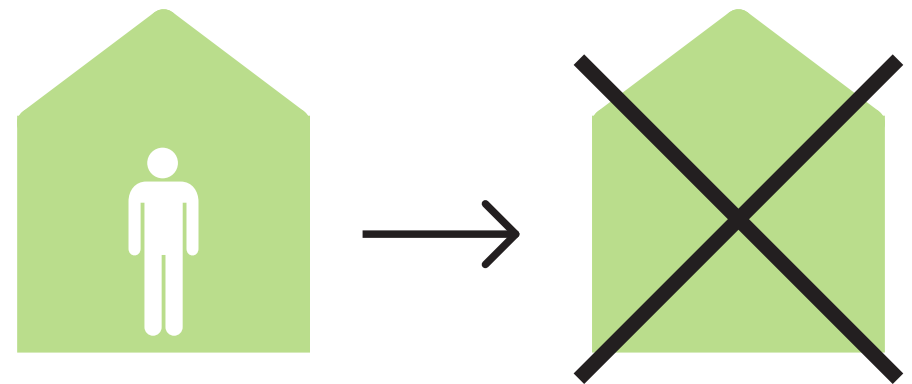
More active, mobile, vital, wealthier and higher educated elderly



Elderly have a lot of free time

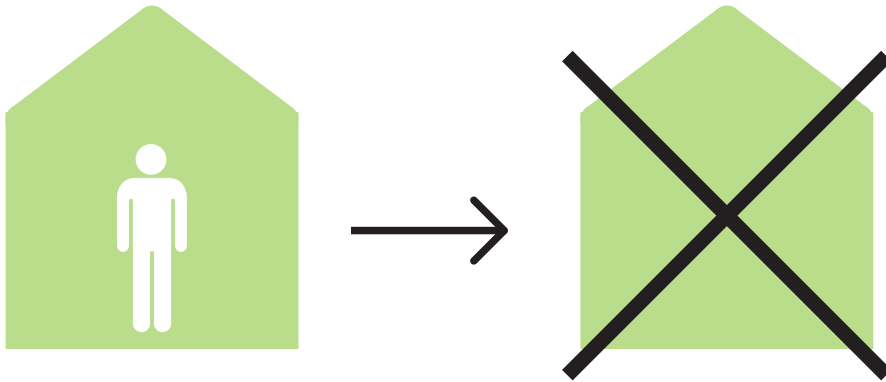


70% of 75+ wants to stay living in their own house

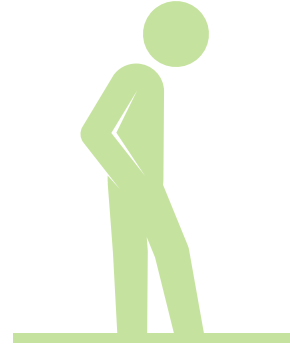


# Housing Elderly

Less than 5% of 65+ people moved in 2011



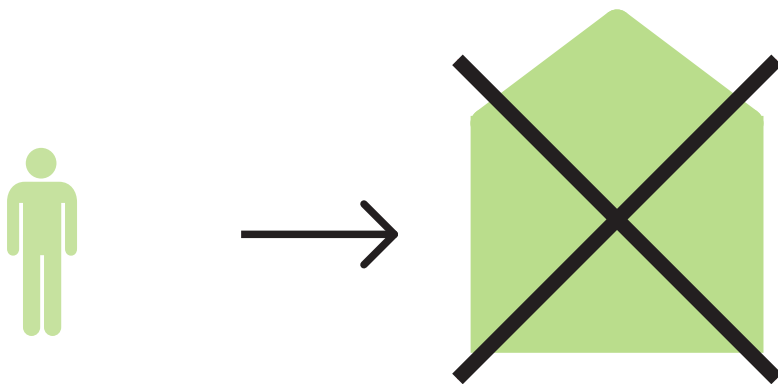
2 reasons to move:  
react and anticipate



Lack of supply



25% of elderly live in dwellings not suited for them



Bigger cities bigger problems



## How to proceed

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- Build and transform houses so they are suited for the elderly
- Create housing with an added value so people want to move
- Organise health care and other required facilities close to apartments

## Healing Environment

- Surroundings which support users in their daily life
- Created by conscious construction for the well-being of the users
- Use the importance of green for health and welfare as a design tool
- Evidence-based design approach



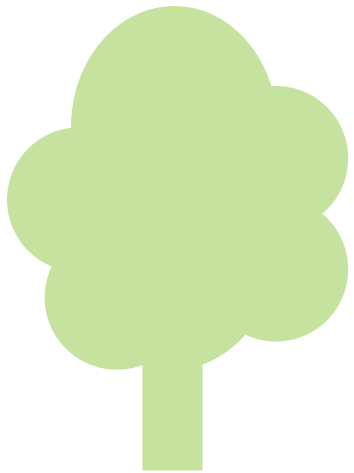
## Green in Neighborhood

16.2% green



An area is seen as green when 50% of the space is green within a radius of 500 meter





Large size plants

Trees  
3/4 floors needed  
Sun



Medium size plants

Bushes  
1 floor needed  
Sun/shade



Small size plants

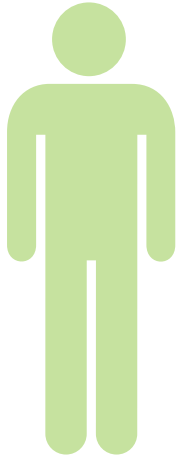
Grass/moss  
1 surface needed  
Sun/shade





## User groups

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### Active Elderly

55 - 75 years  
Working/Pension  
Good condition  
World/Country



### Protected Living

70 +  
Pension  
Small mental and/or physical problems  
Country/City



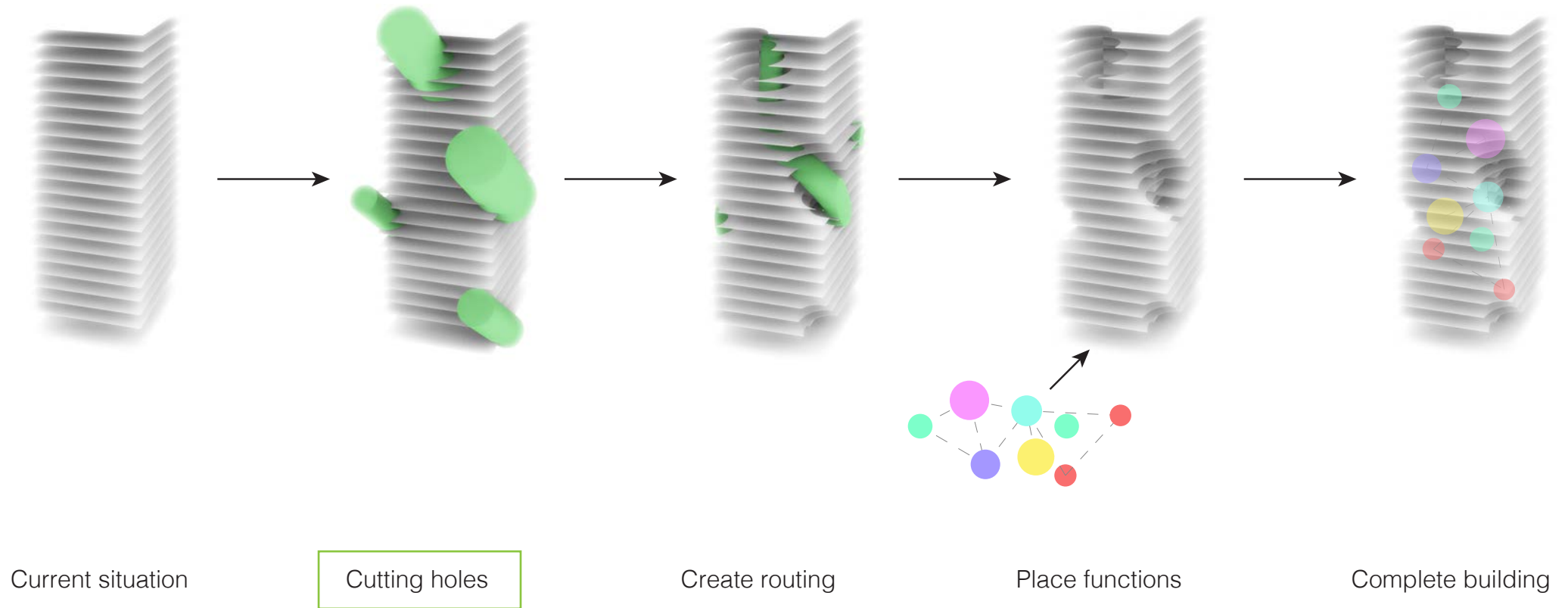
### Complex Care

80 +  
Pension  
Big mental and/or physical problems  
City/Home

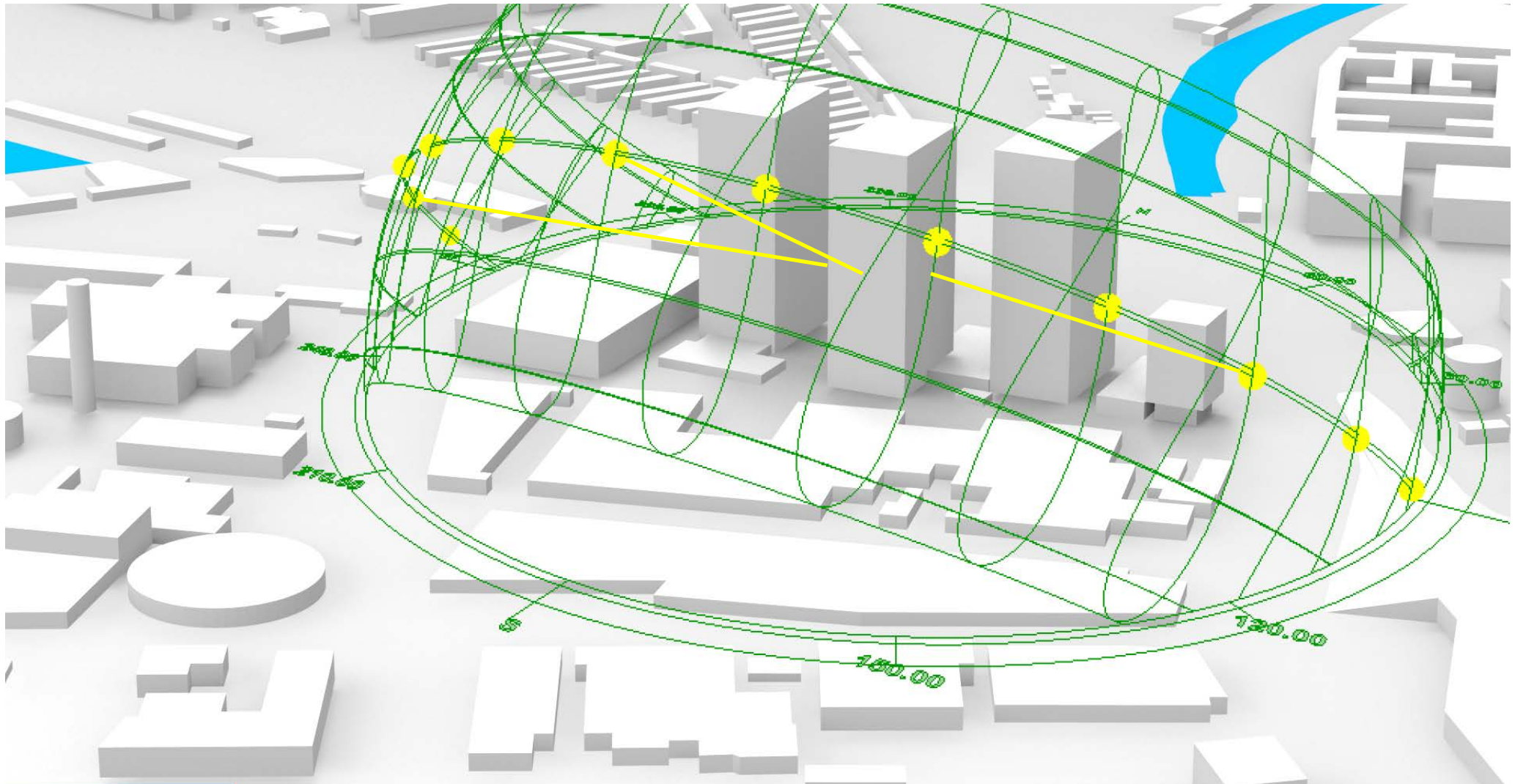
## Extra Functions

Doctors practice (GP)  
Home care service centre  
Pharmacy  
Physiotherapist  
Gym (Outdoor)





# Sun path



Sun path diagram - Latitude: 52.3  
21 March



# Sunlight Penetration

Cone



Flipped cone



Cylinder



Sphere



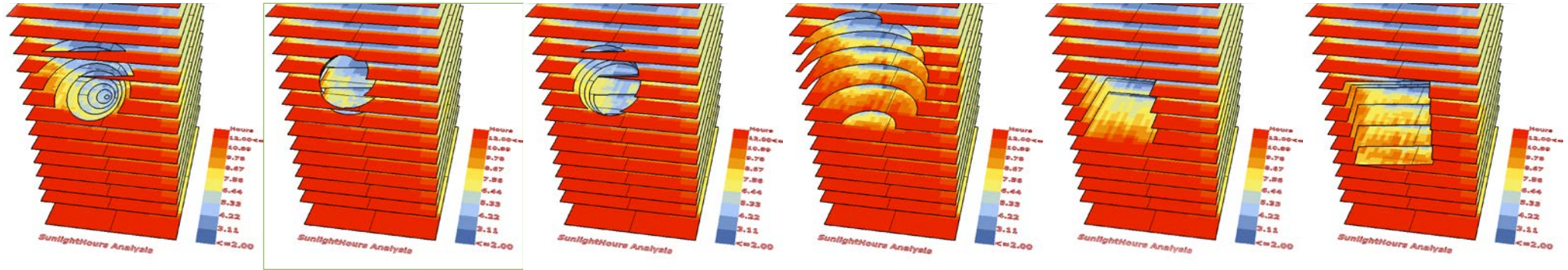
Cube



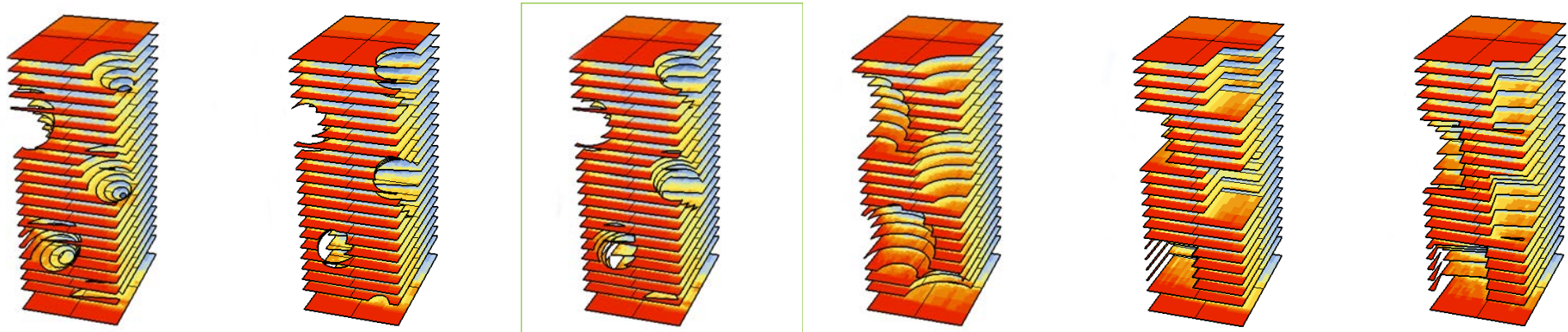
Rotated cube



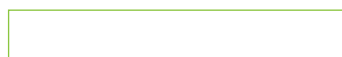
1 subtraction of 1500 sqm



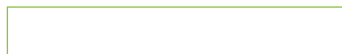
5 subtractions of totally 4000 sqm



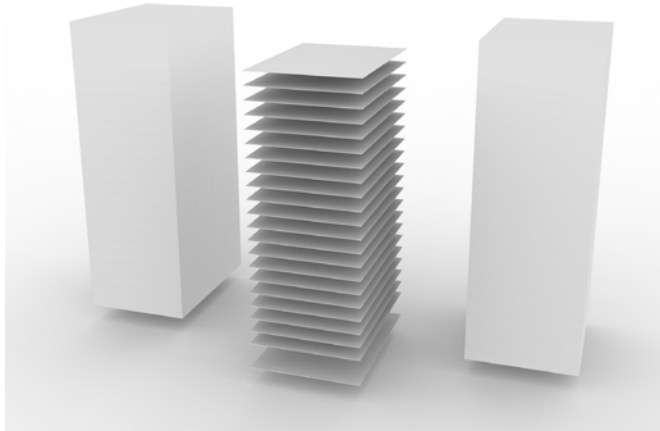
Summer



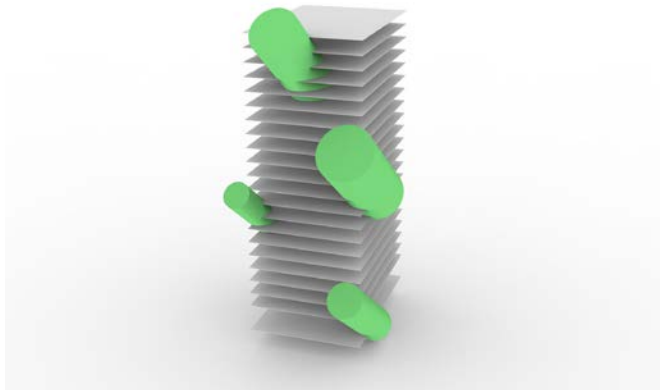
Winter



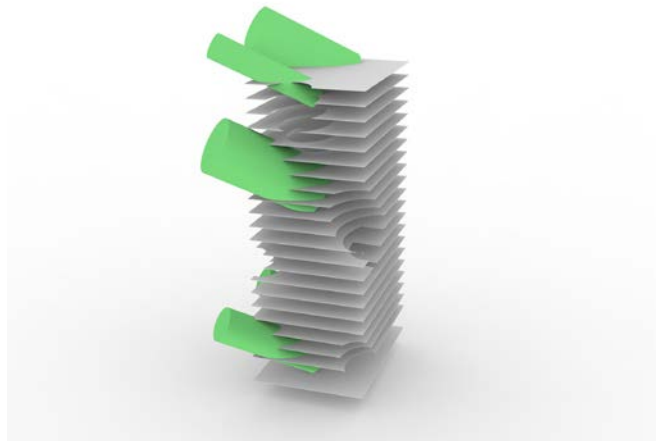
# Cuts



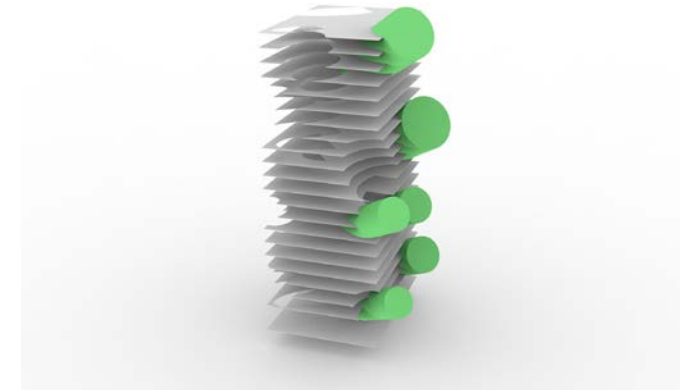
Clean floors



South cuts



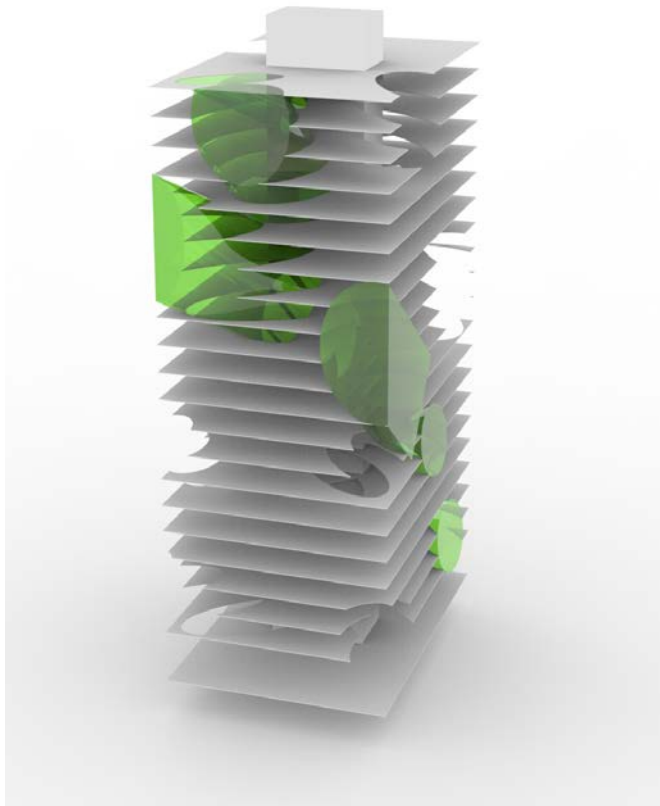
West cuts



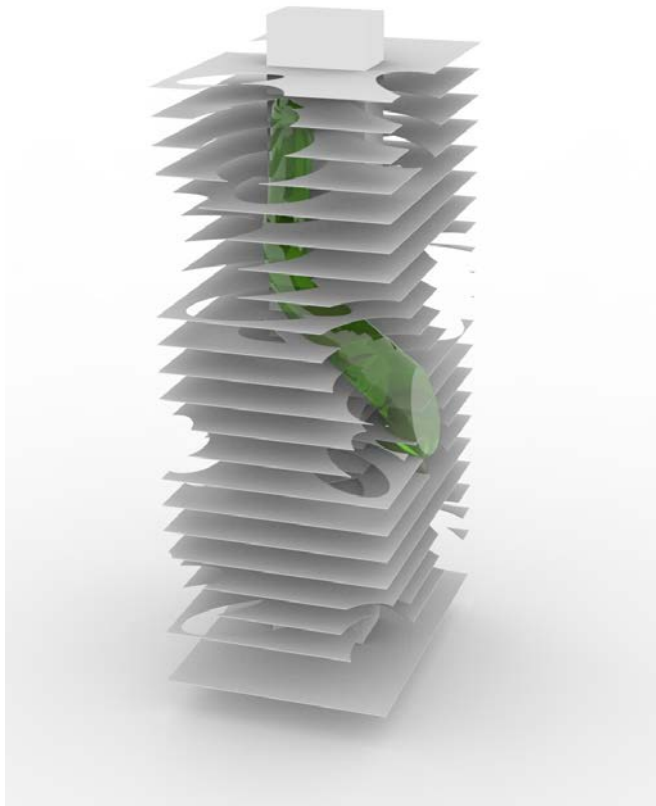
East cuts



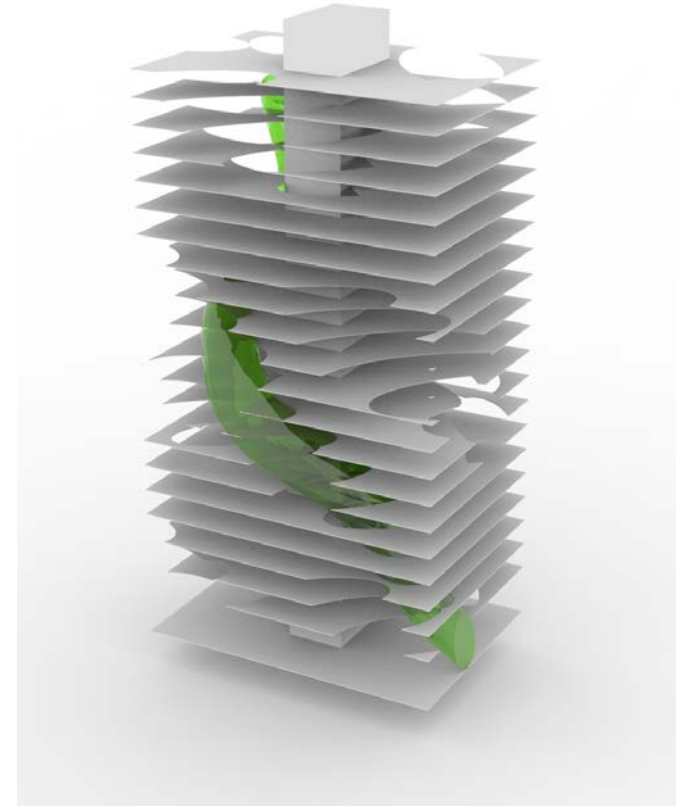
# Route through the building



Public green space

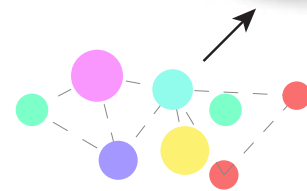
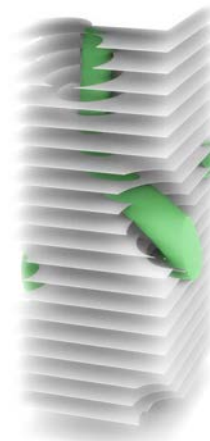
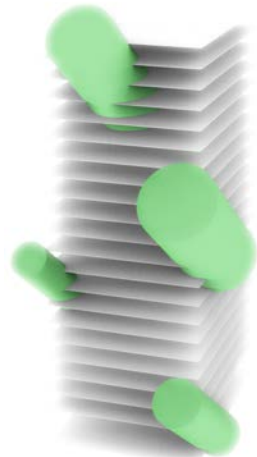


Circulation to top

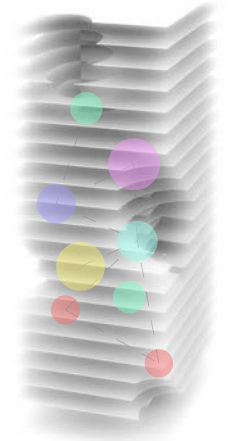


Circulation to top





Place functions



Current floors

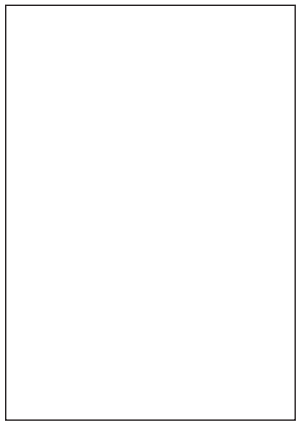
Cutting holes

Create routing

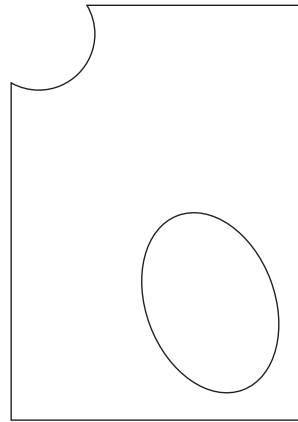
Complete building



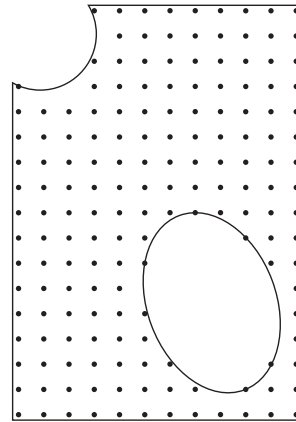
# Creating points



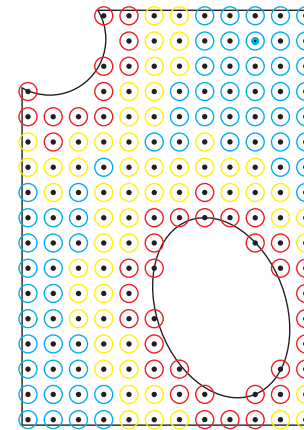
Current floors



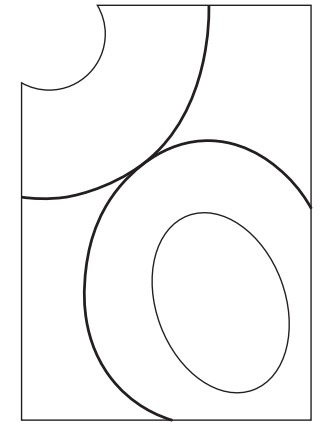
Cutting holes



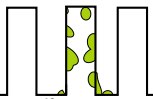
Create grid



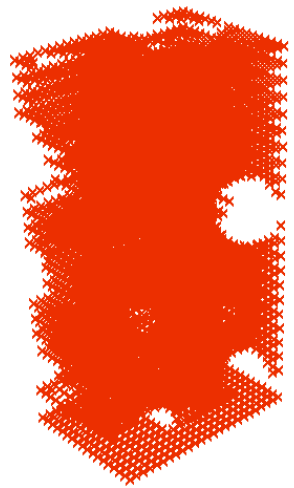
Give points values



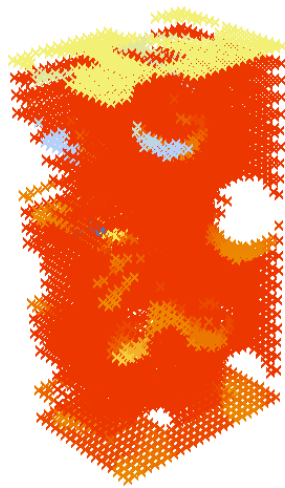
Create space



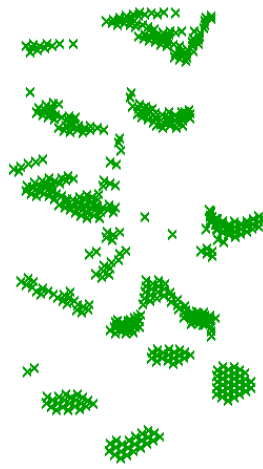




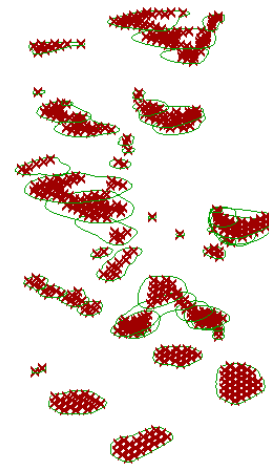
Points



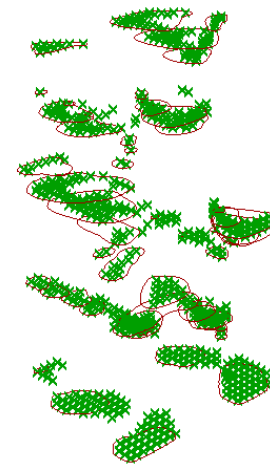
Floor height



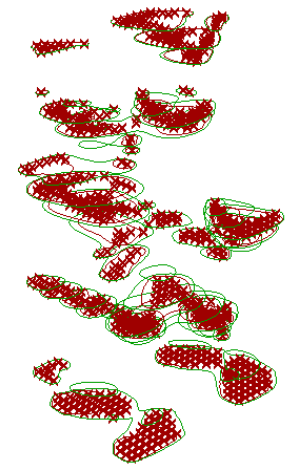
Floor > 12m



Group them

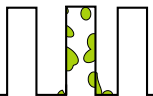


Floor > 8m



Group them

Increase the amount of points until the target of 25% of the floor space is reached



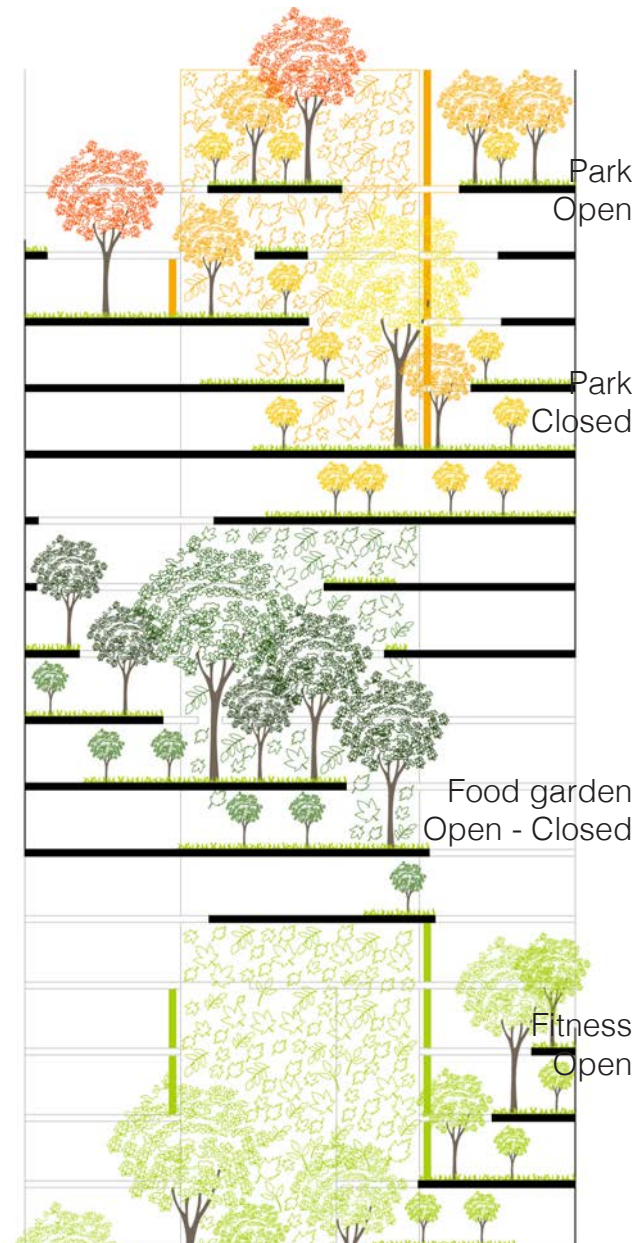
# Green space



Horizontal vegetation



Vertical vegetation

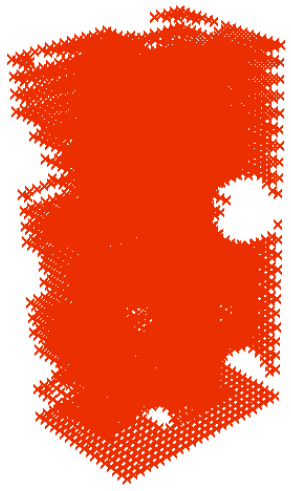


## Function affinity

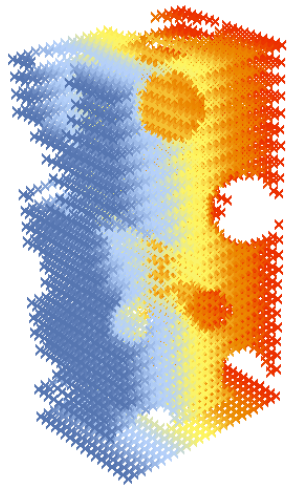
	GP	Nurse	Pharmacy	Fysiotherapist	Fitness	Lobby
Hight of floor	0,00	0,00	0,00	0,00	0,00	0,00
Sunlight holes	0,00	0,00	0,00	0,20	0,25	0,00
Close to core	0,2	0,30	0,00	0,20	0,10	0,20
North side	0,00	0,00	0,00	0,00	0,00	0,00
South side	0,00	0,00	0,00	0,00	0,00	0,00
West side	0,00	0,00	0,00	0,00	0,00	0,00
East side	0,00	0,00	0,00	0,00	0,00	0,00
View from floor	0,00	0,00	0,00	0,00	0,00	0,00
Ground floor	0,10	0,10	0,20	0,10	0,10	0,10
Close to green	0,20	0,00	0,00	0,20	0,35	0,00
Close to main entrance	0,10	0,10	0,20	0,10	0,10	0,50
Close to facade	0,10	0,10	0,10	0,00	0,00	0,20
Close to GP	x	0,10	0,20	0,10	0,00	0,00
Close to Nurse	0,10	x	0,20	0,00	0,00	0,00
Close to Pharmacy	0,10	0,20	x	0,00	0,00	0,00
Close to Physiotherapist	0,00	0,00	0,00	x	0,10	0,00
Close to Fitness	0,00	0,00	0,00	0,10	x	0,00
Close to Lobby	0,10	0,10	0,10	0,00	0,00	x
total	1	1	1	1	1	1



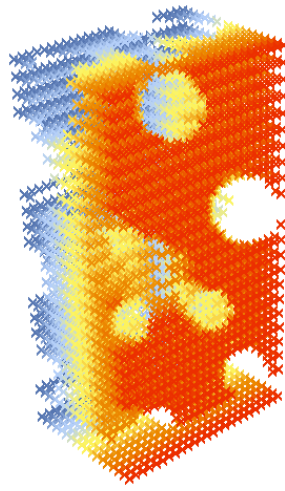
# Point affinity



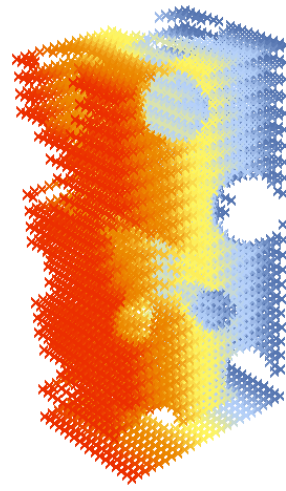
Points



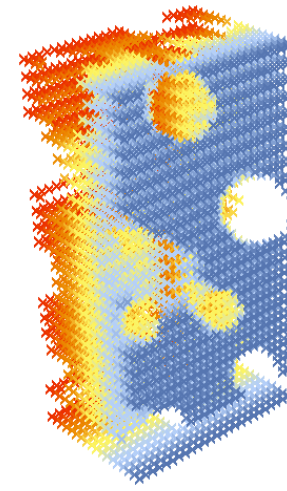
North



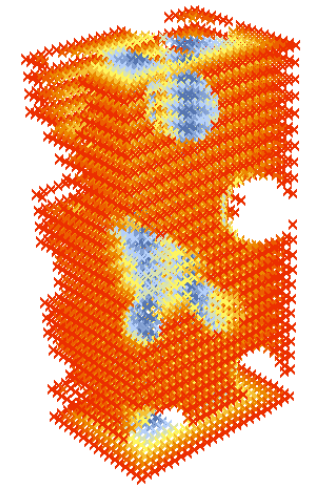
West



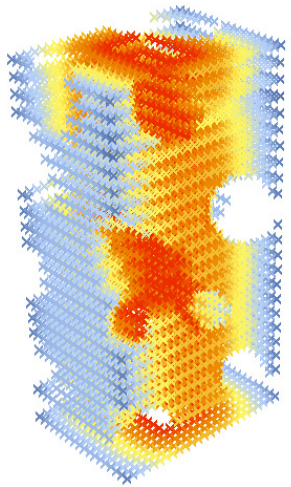
South



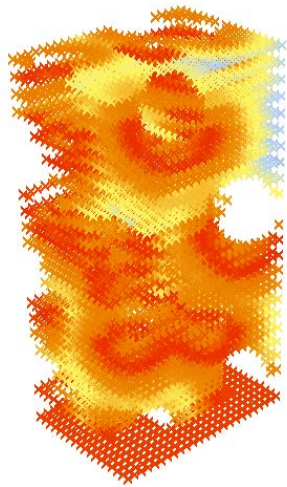
West



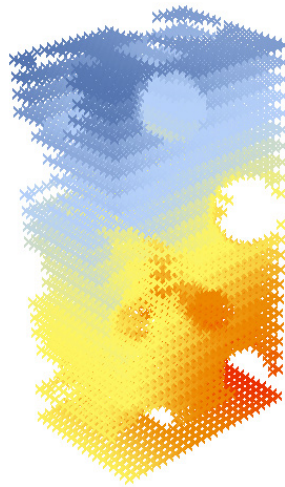
Facade



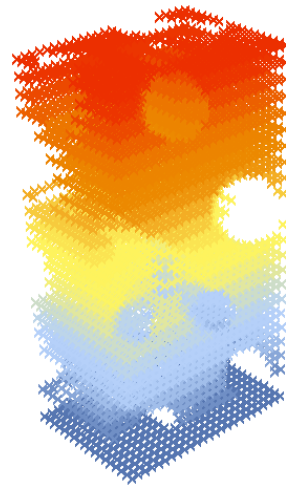
Core



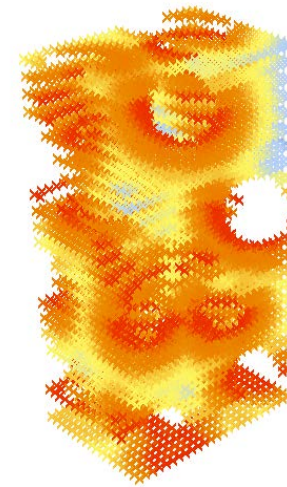
Green



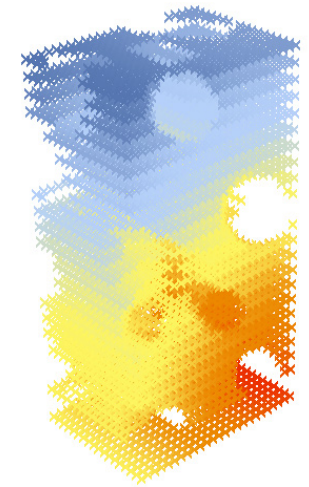
Entrance



Top building



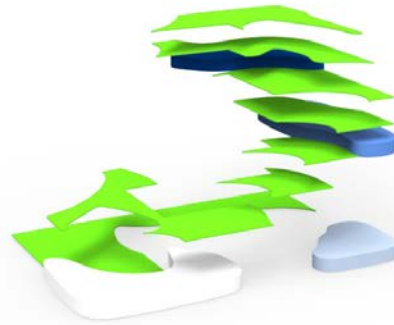
Cuts



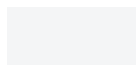
Entrance



# Functions



Green



Lobby



Home care service centre



GP



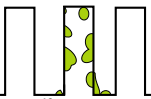
Pharmacist



Fitness



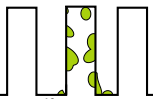
Fysiotherapist

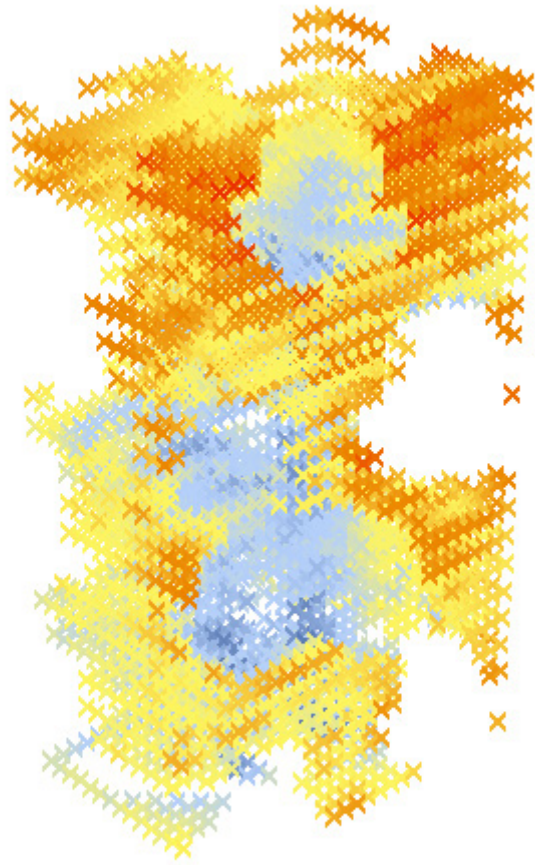


## User group affinity

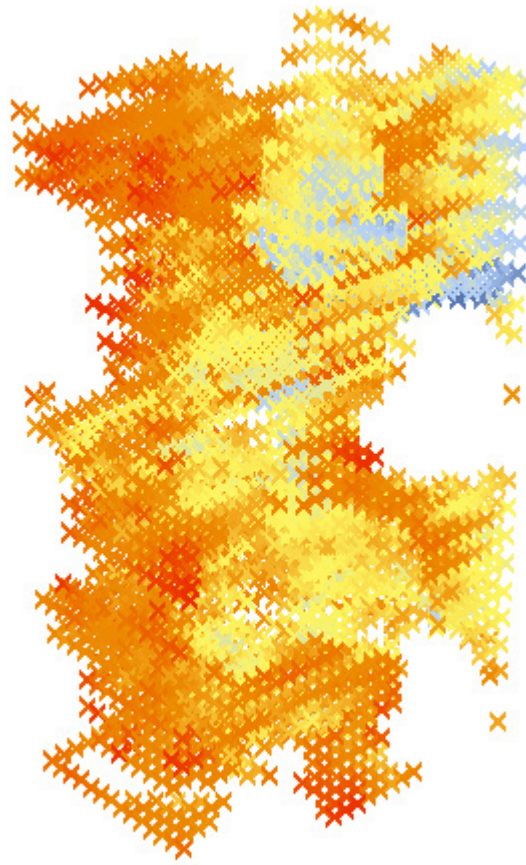
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	Active elderly	Protected living	Complex care
Hight of floor	0,00	0,00	0,00
Sunlight holes	0,20	0,2	0,1
Close to core	0,00	0,1	0,20
North side	0,00	0,00	0,00
South side	0,00	0,05	0,05
West side	0,10	0,05	0,05
East side	0,00	0,05	0,05
View from floor	0,05	0,00	0,00
Ground floor	0,00	0,00	0,05
Close to green	0,30	0,3	0,30
Close to main entrance	0,00	0,00	0,00
Close to facade	0,35	0,25	0,20
total	1	1	1

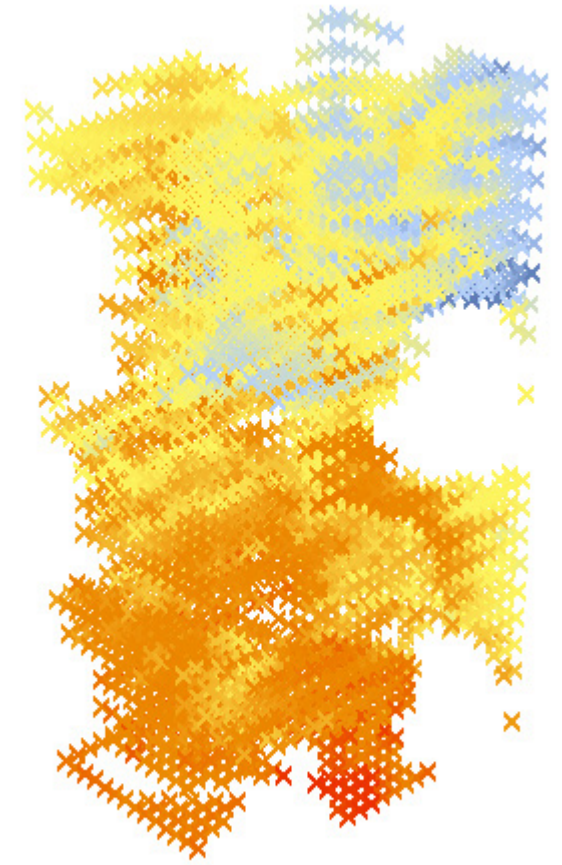




Active elderly



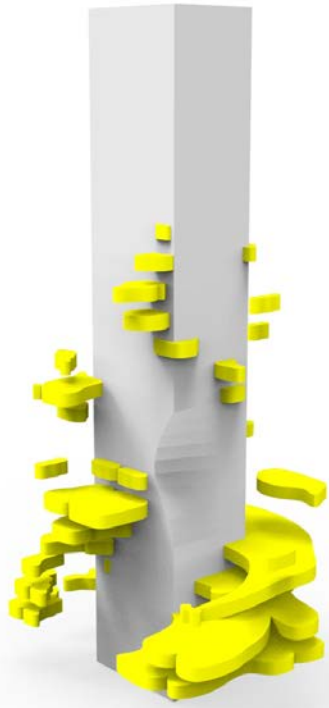
Protected living



Complex care



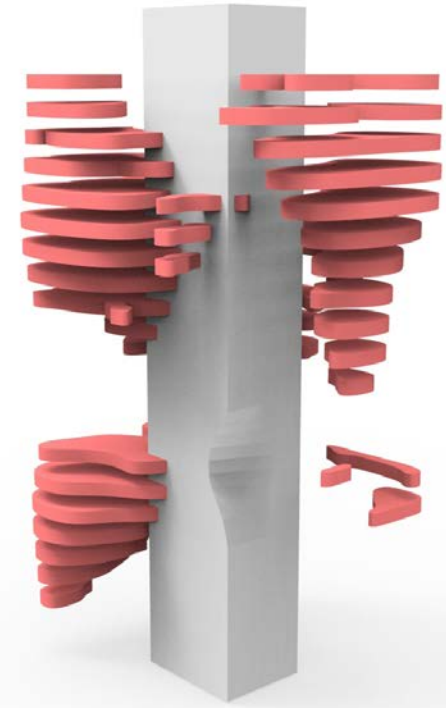
## Placement of apartments



Complex Care



Protected Living

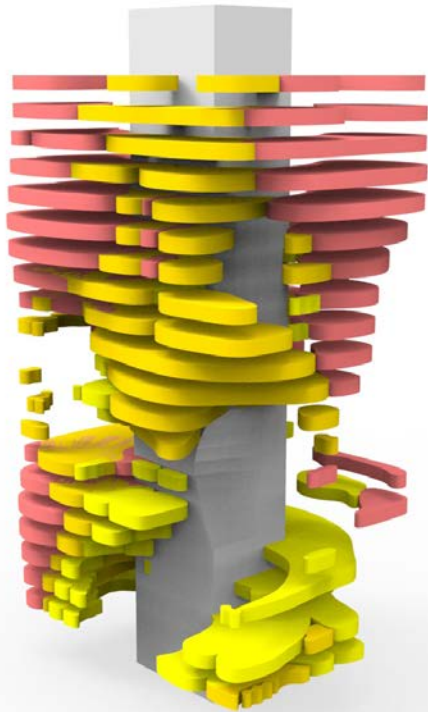


Active Elderly

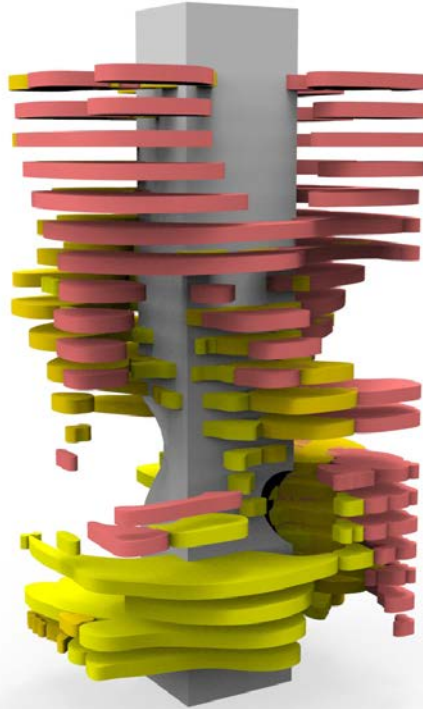




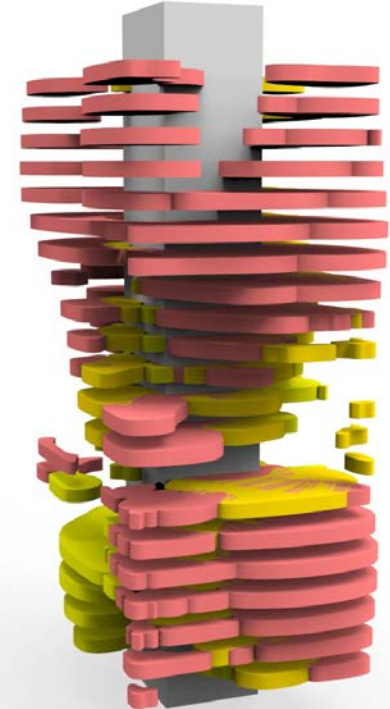
# Placement of apartments



View 1

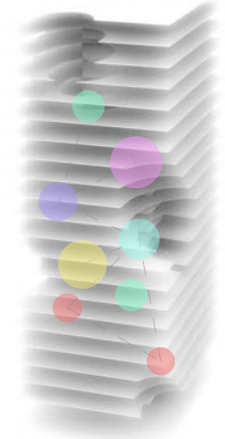
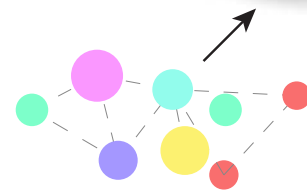
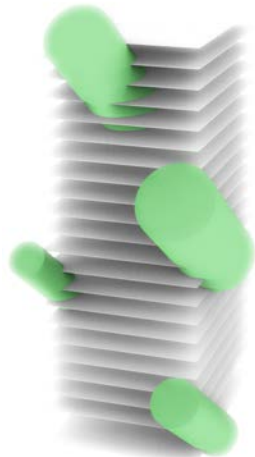


View 2



View 3





Current floors

Cutting holes

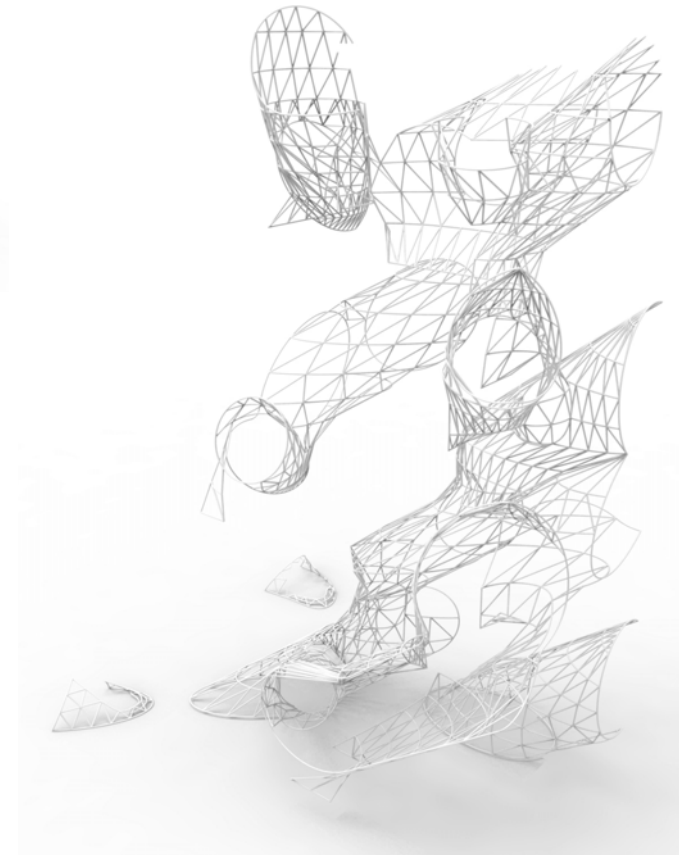
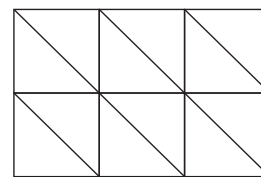
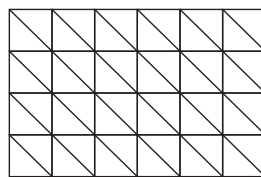
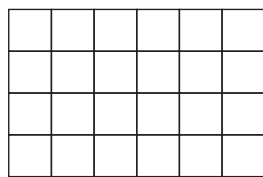
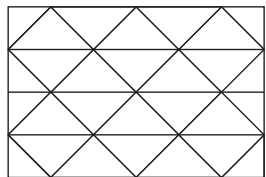
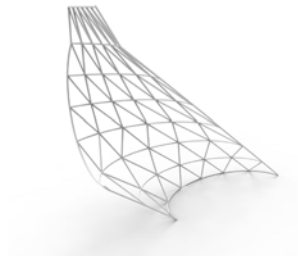
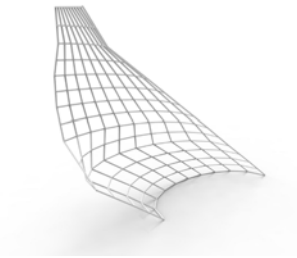
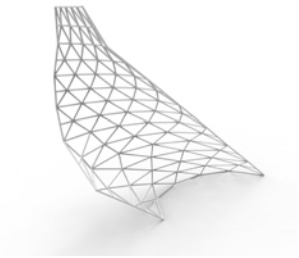
Create routing

Place functions

Complete building



# Grid



Option 1

Option 2

Option 3

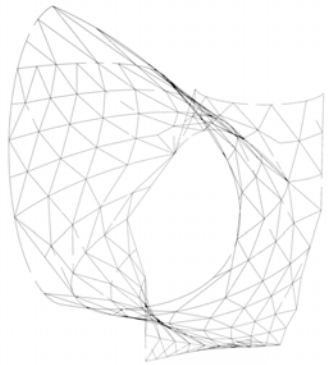
Option 4

Whole structure

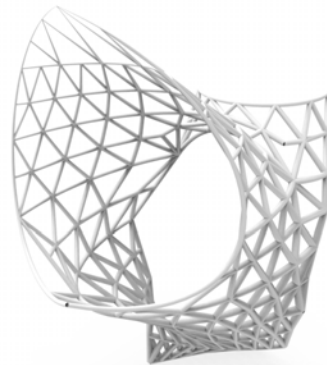


# Grid

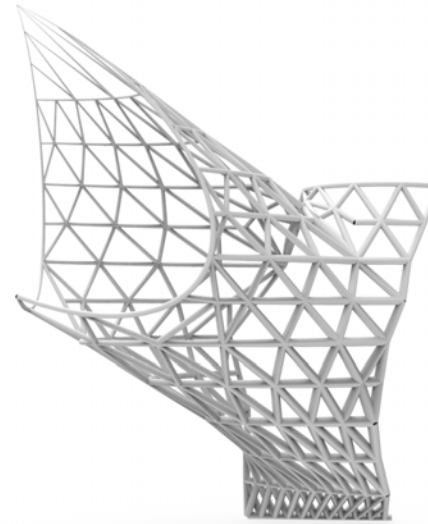
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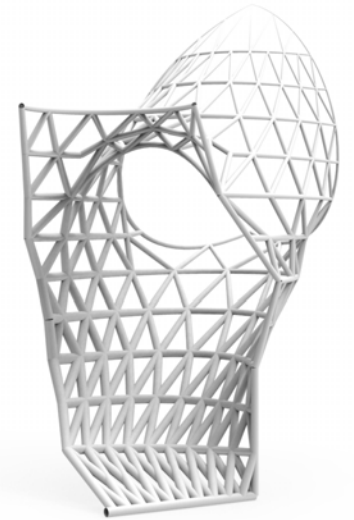
Grid



View 1



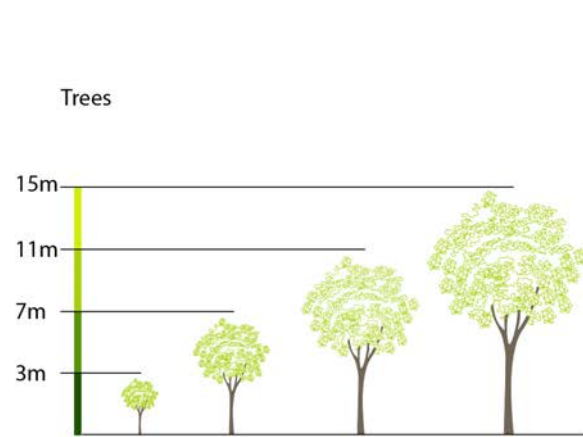
View 2



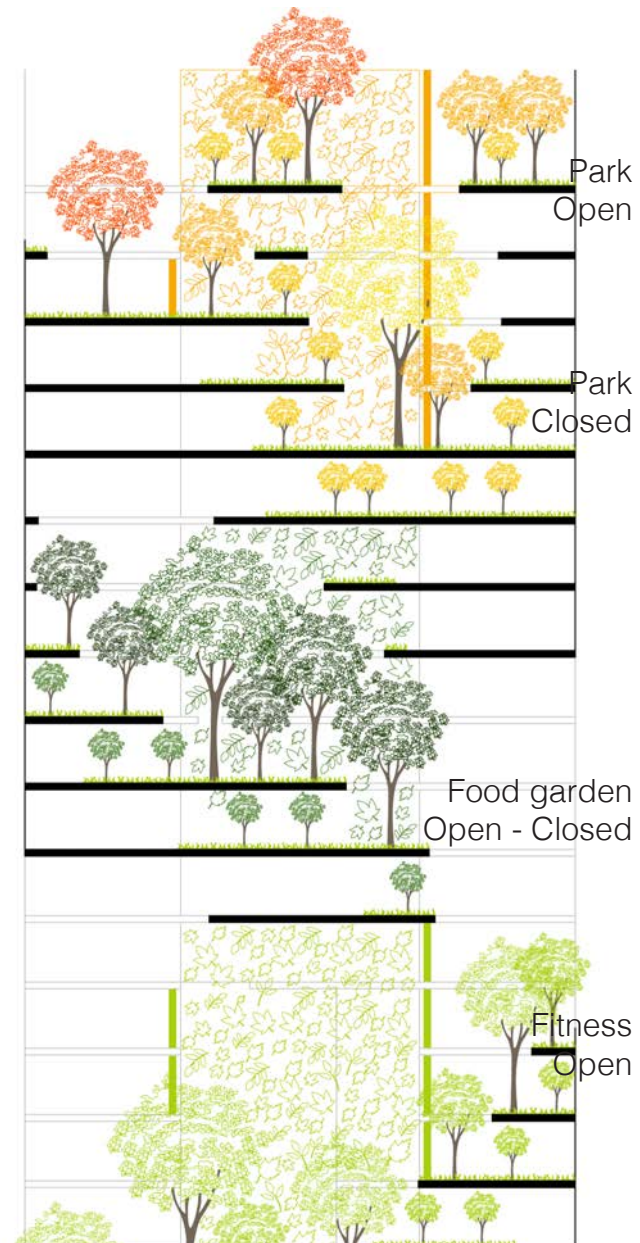
View 3



# Green space



Vertical vegetation



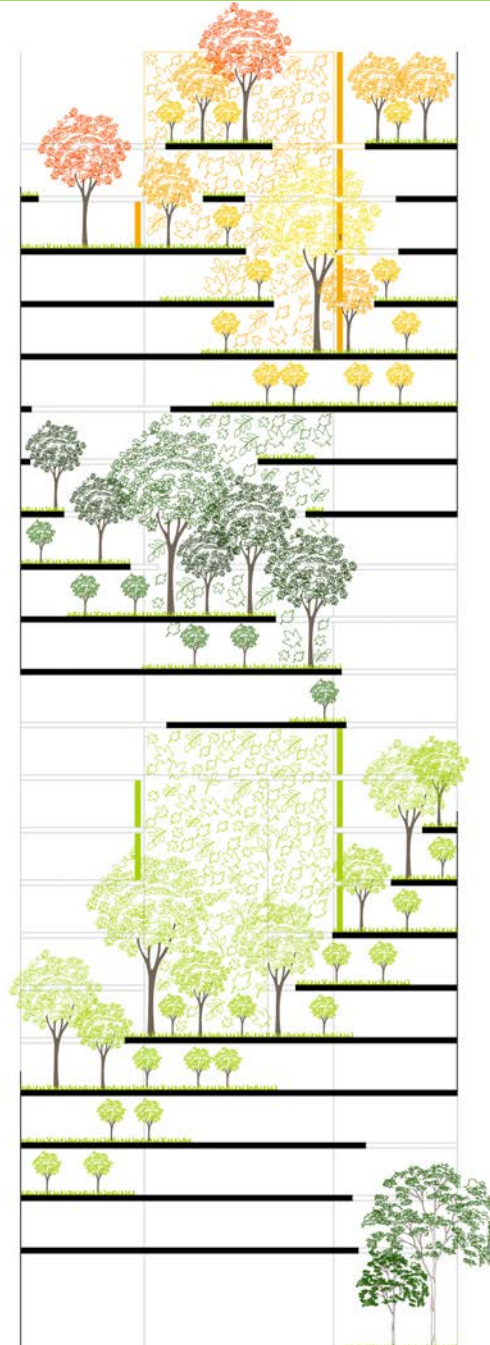
# Different kinds of green



Vertical vegetation



Combined



## Large plants



*Acer platanoides* (Maple)



*Alnus glutinosa* (Alder)



*Pyrus Caucasica* (European pear)

## Medirum plants



*Amelanchier lamarckii* (Snowy mespilus)



*Fraxinus ornus* (Manna ash)

## Small plants



*Stipa tenuissima*



*Erysimum* 'Bowles's Mauve'

# Seasonal division

---

## Spring Season



*Paeonia mlokesevitschii* (Peoni)



Helleborus



*Polystichum setiferum* (Fern)

## Summer Season



*Geranium psilostemon* (Armenian cranesbill)



Halcyon (Hosta)



*Clematis viticella* (Rubra Grandiflora)

---

## Autumn Season



*Echinacea purpurea* (Sunflower)



*Geranium soboliferum* (Geranium)



*Persicaria amplexicaulis* (Knotweed)

## Winter Season



*Verbena hastata* (Vervain)



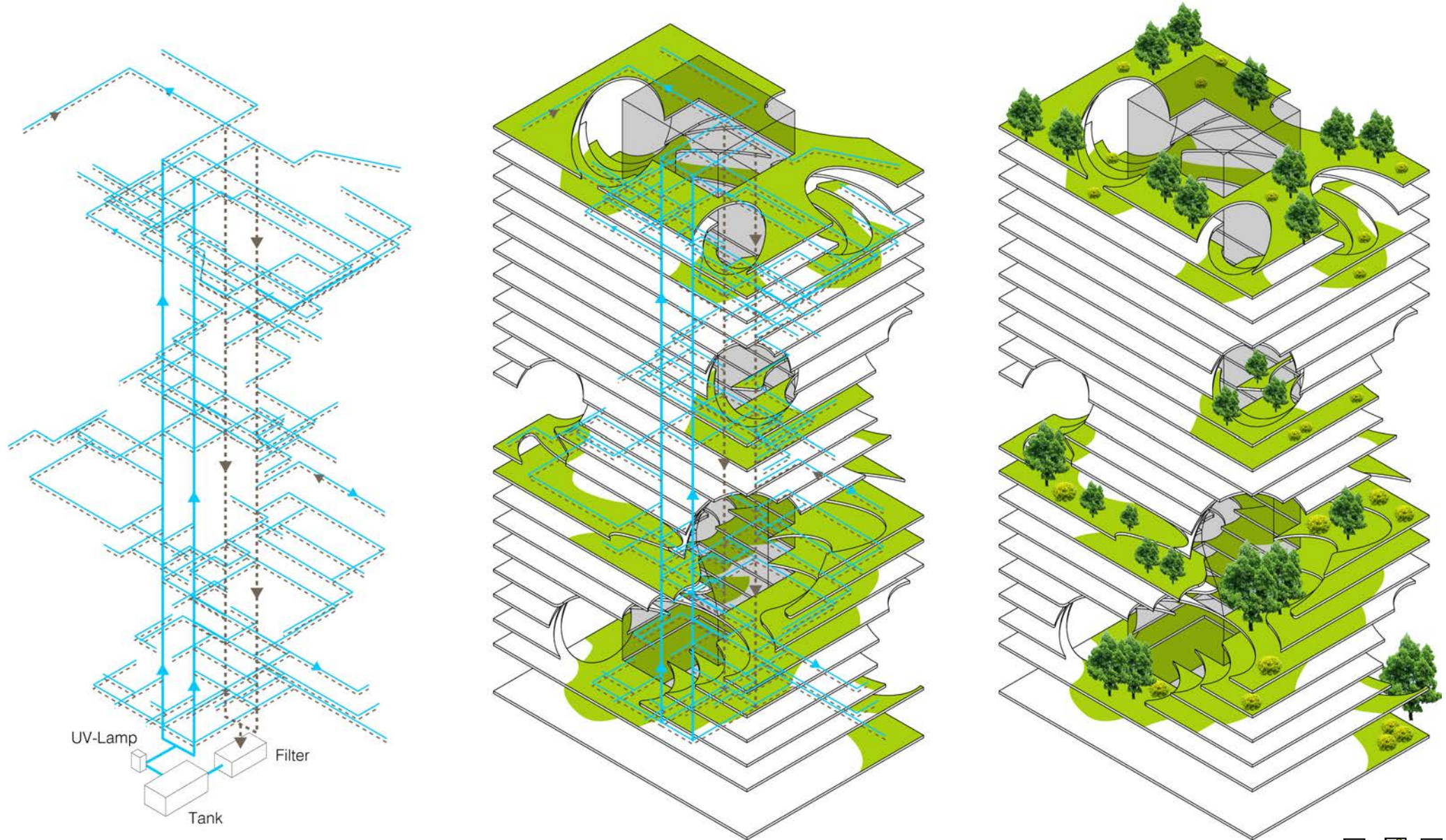
*Eryngium giganteum* (Apiaceae)



*Miscanthus sinensis* (Poaceae)

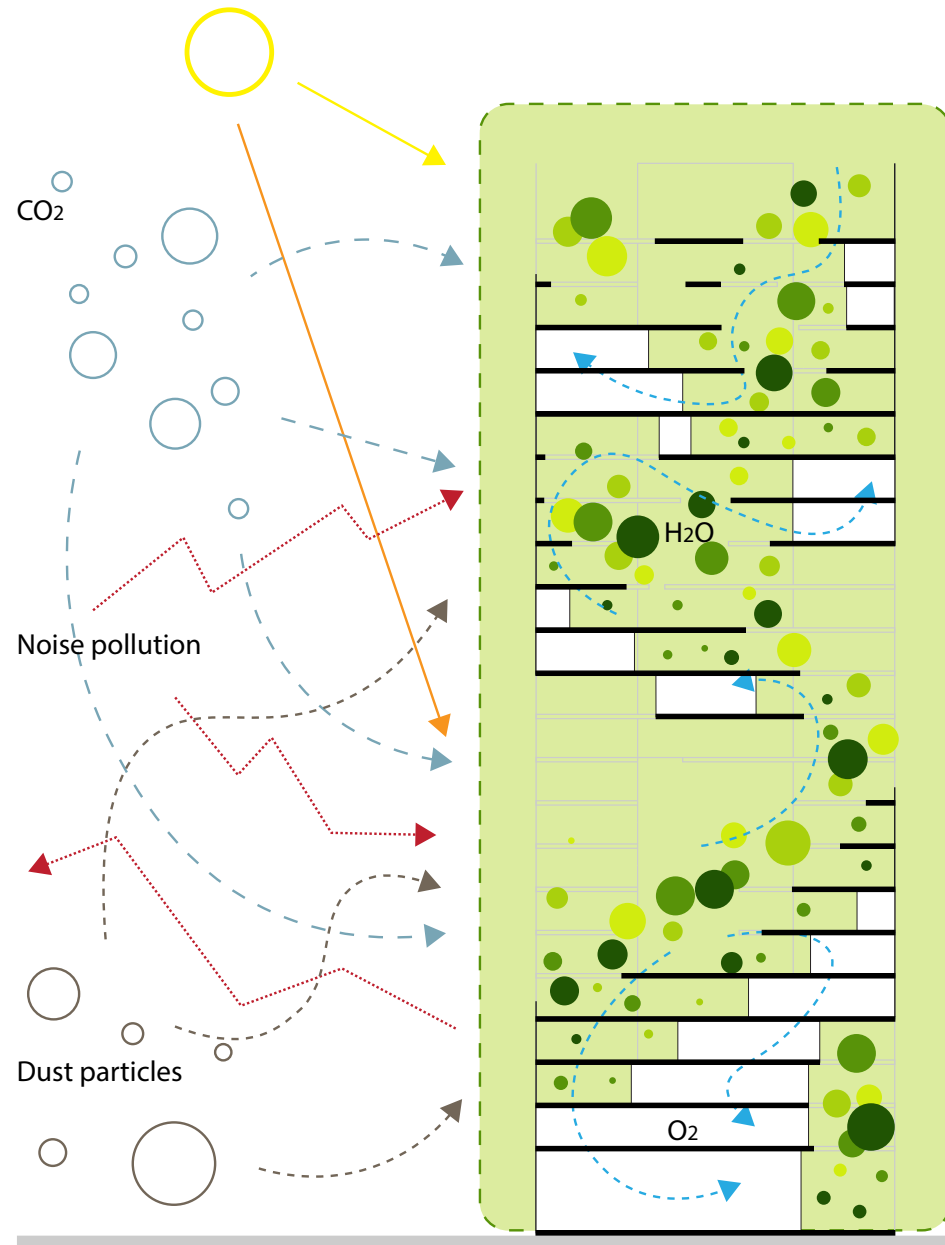
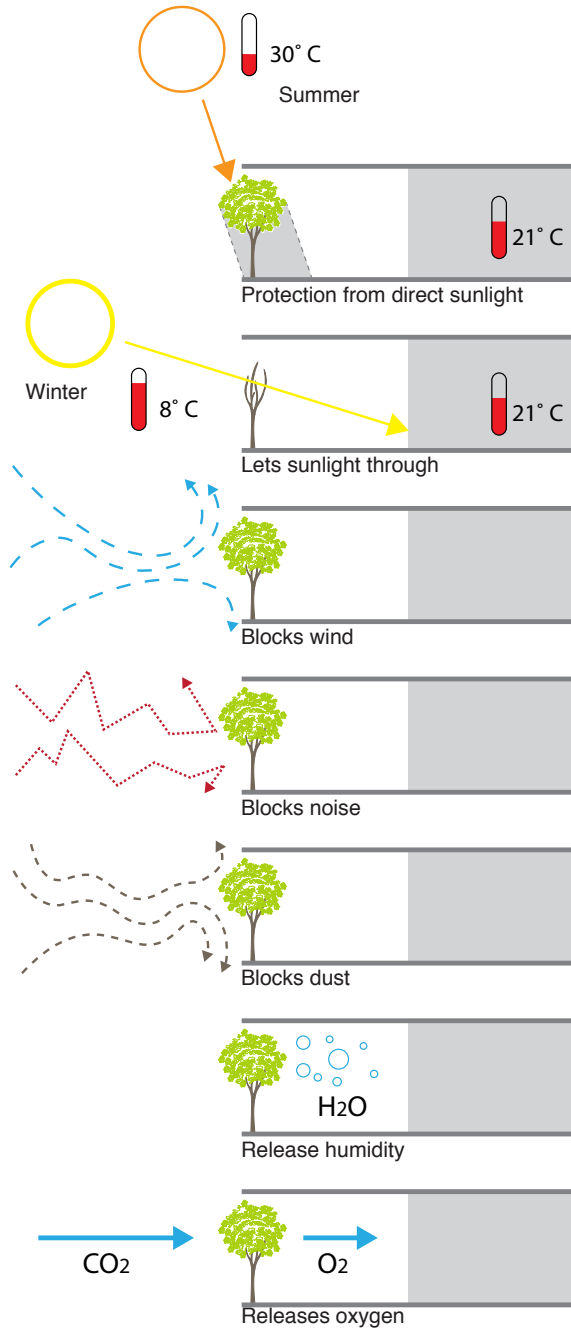


# Water system

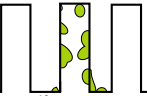
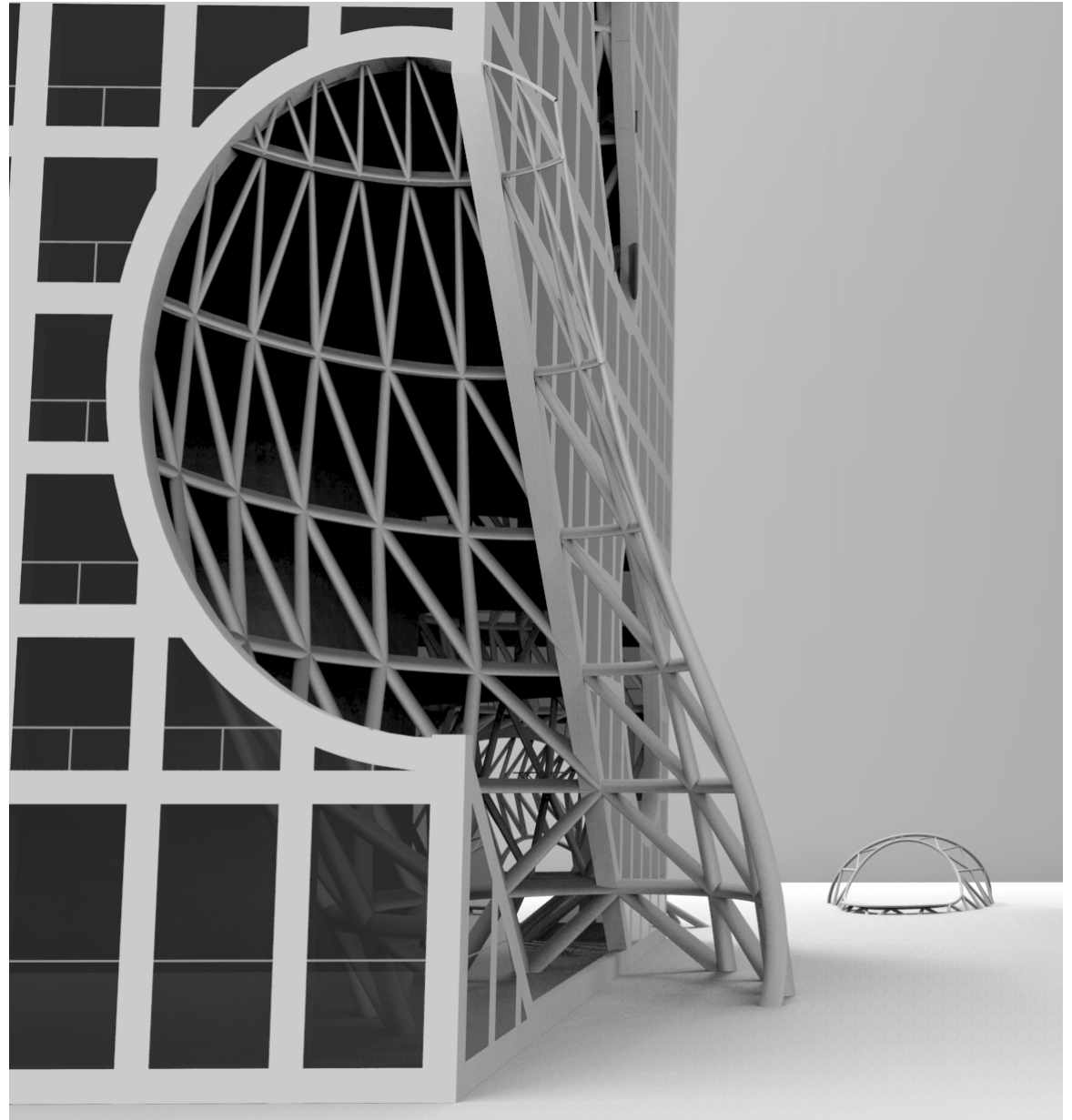
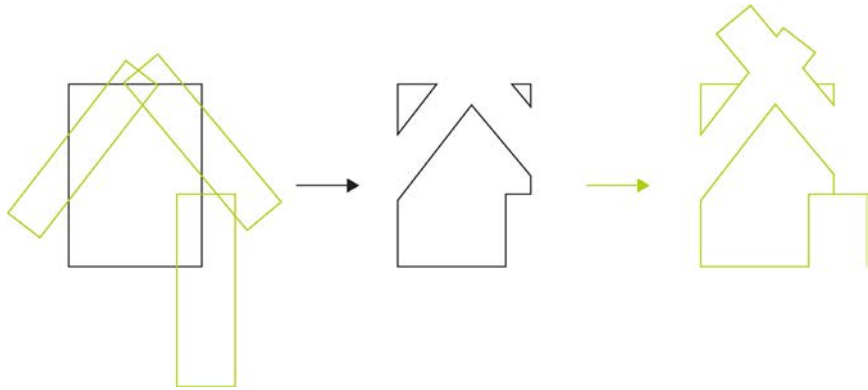




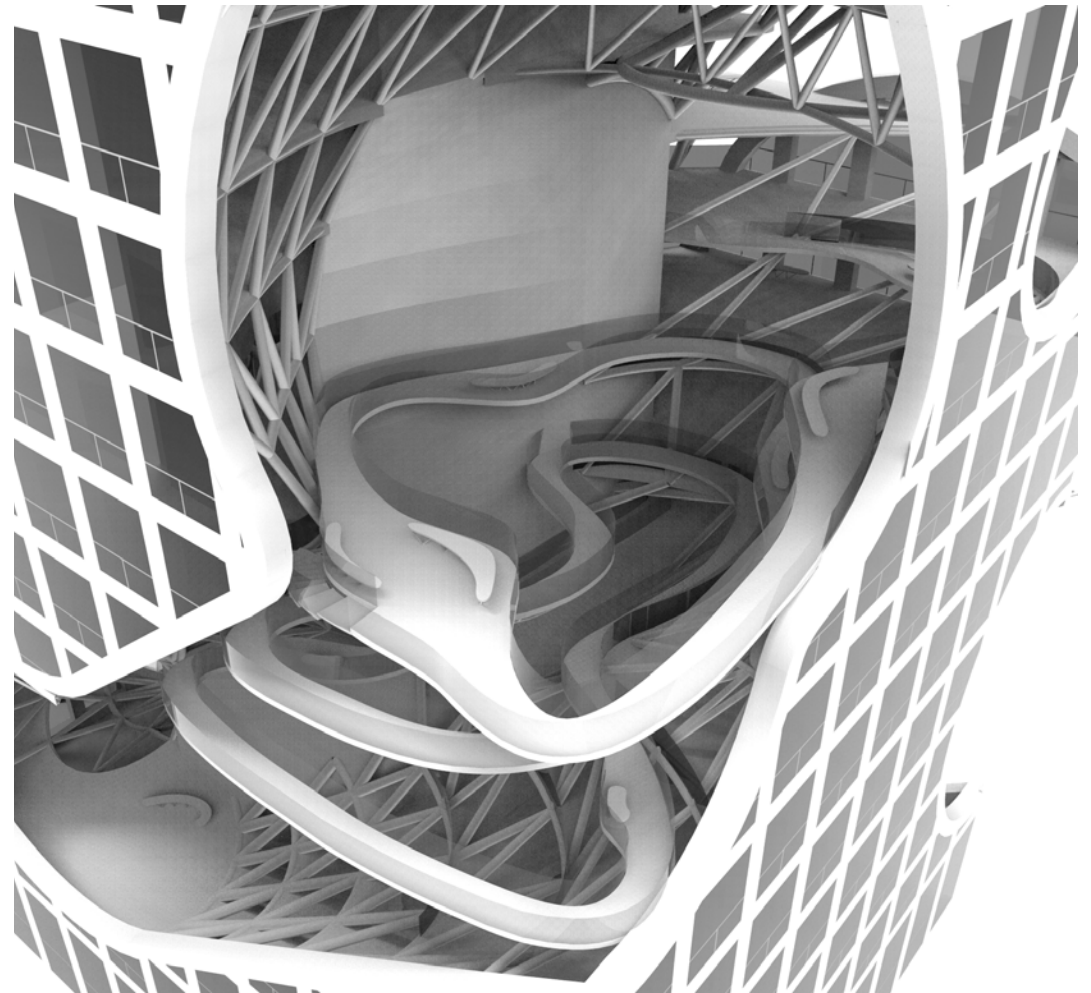
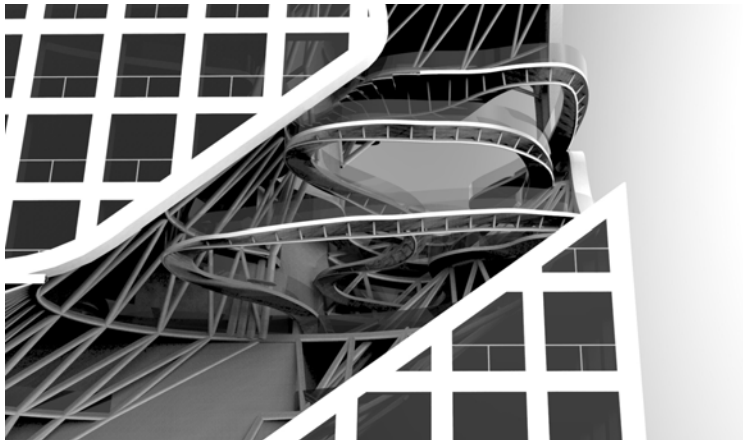
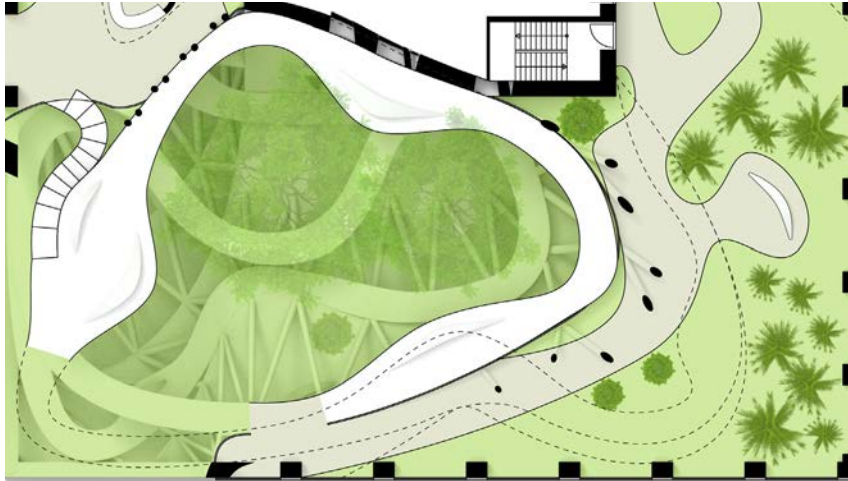
# Green shield

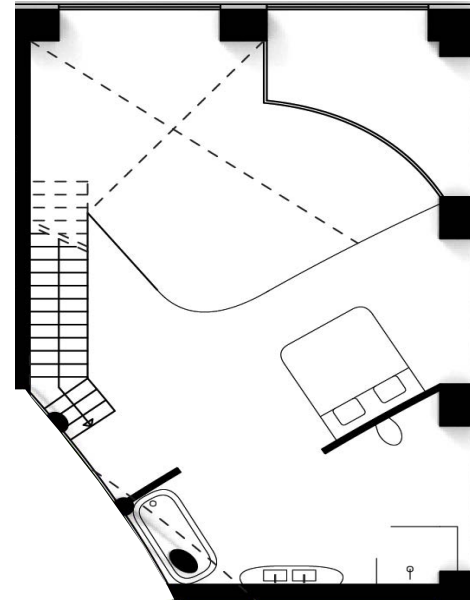
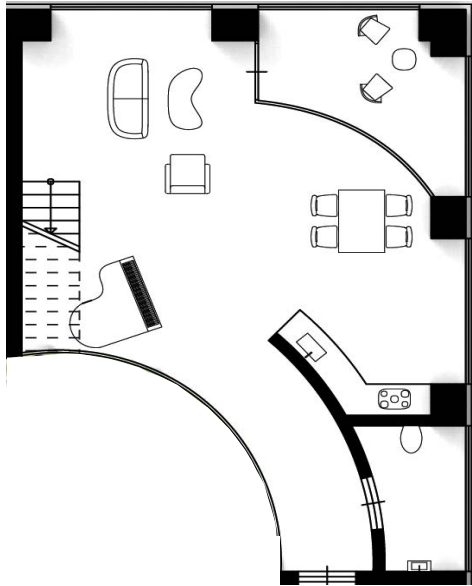


# Positive - Negative



# Routing



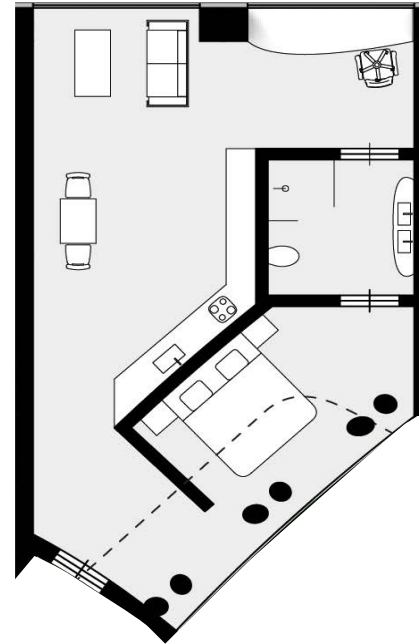
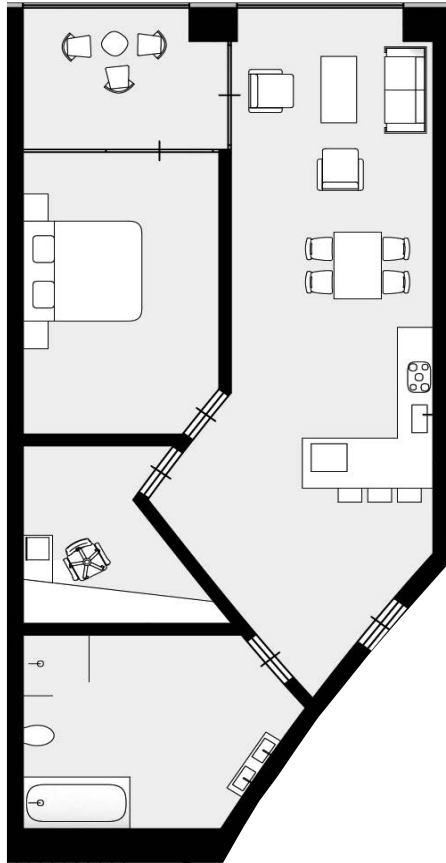


## Duplex apartments

- Different sizes
- With balconies
- Large living space
- Open floorplan



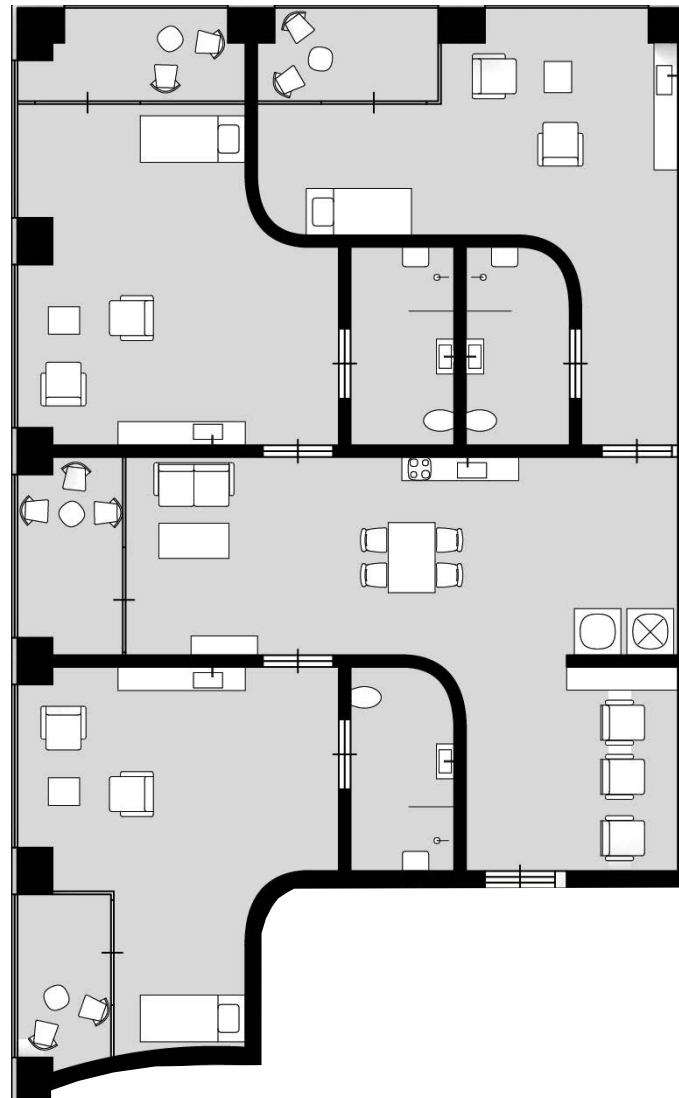
# Protected living



## Private apartments

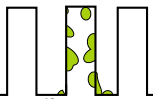
- Different sizes
- With or without balconies
- Open or closed floorplan





## Living groups



- Communal area
- Private rooms
- Private bathrooms
- Curved corners



# Floor plans



Floor 4

-  Active elderly
-  Protected living
-  Complex care

# Floor plans



Floor 5

-  Active elderly
-  Protected living
-  Complex care
-  Green
-  Walk path



# Floor plans



Floor 6

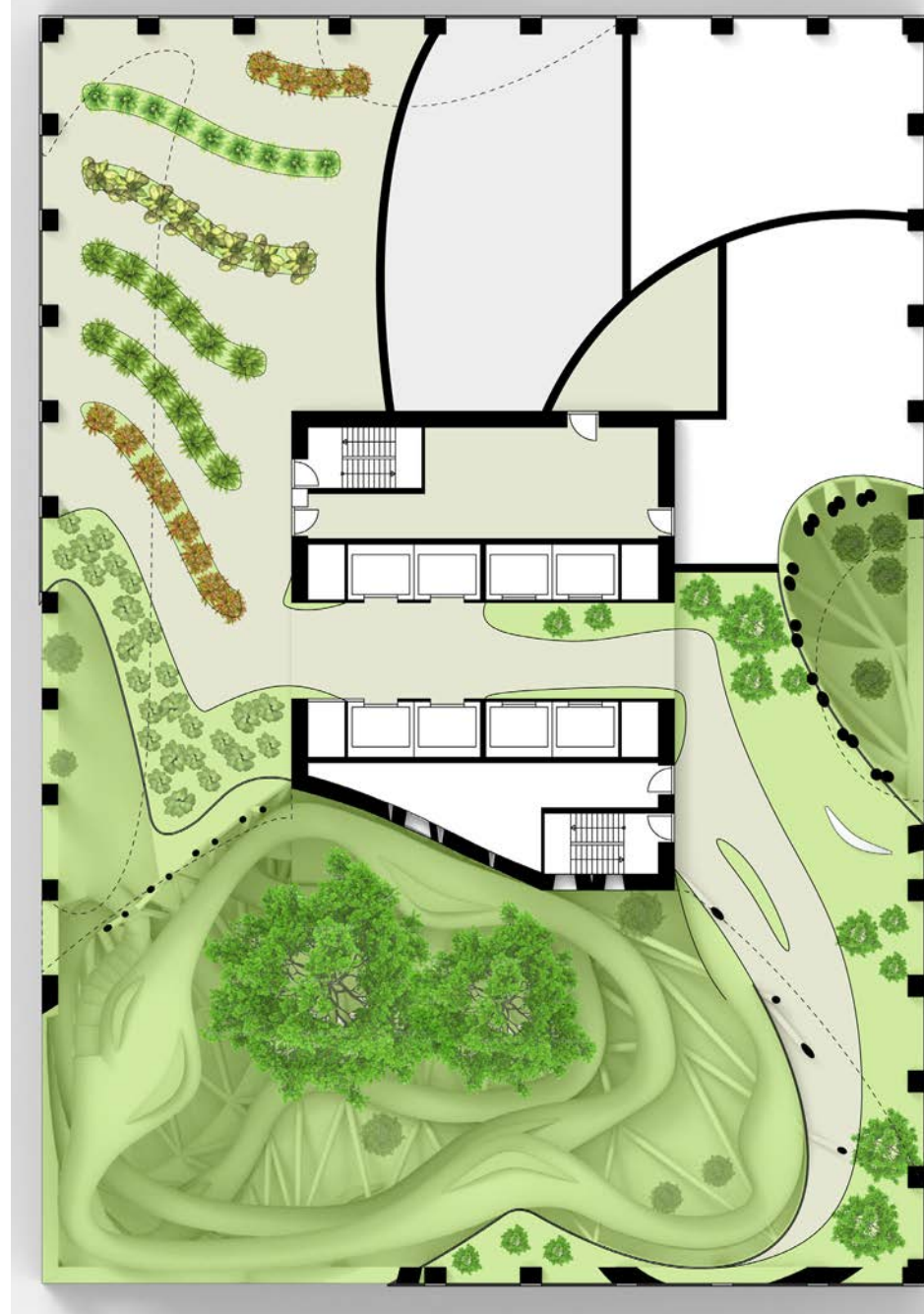
-  Active elderly
-  Protected living
-  Complex care
-  Green
-  Walk path



# Floorplans



# Floor plans

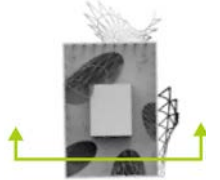
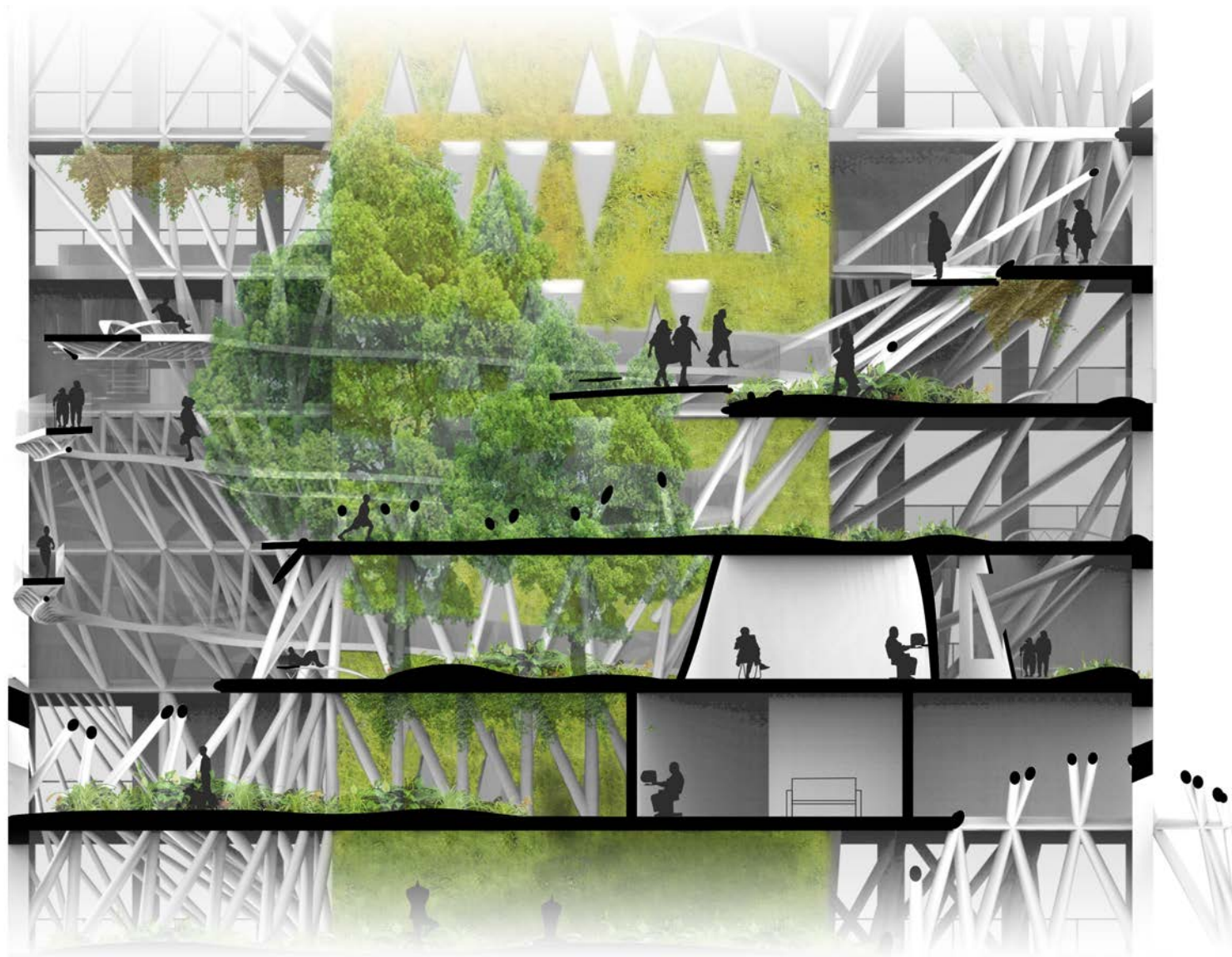


Floor 8

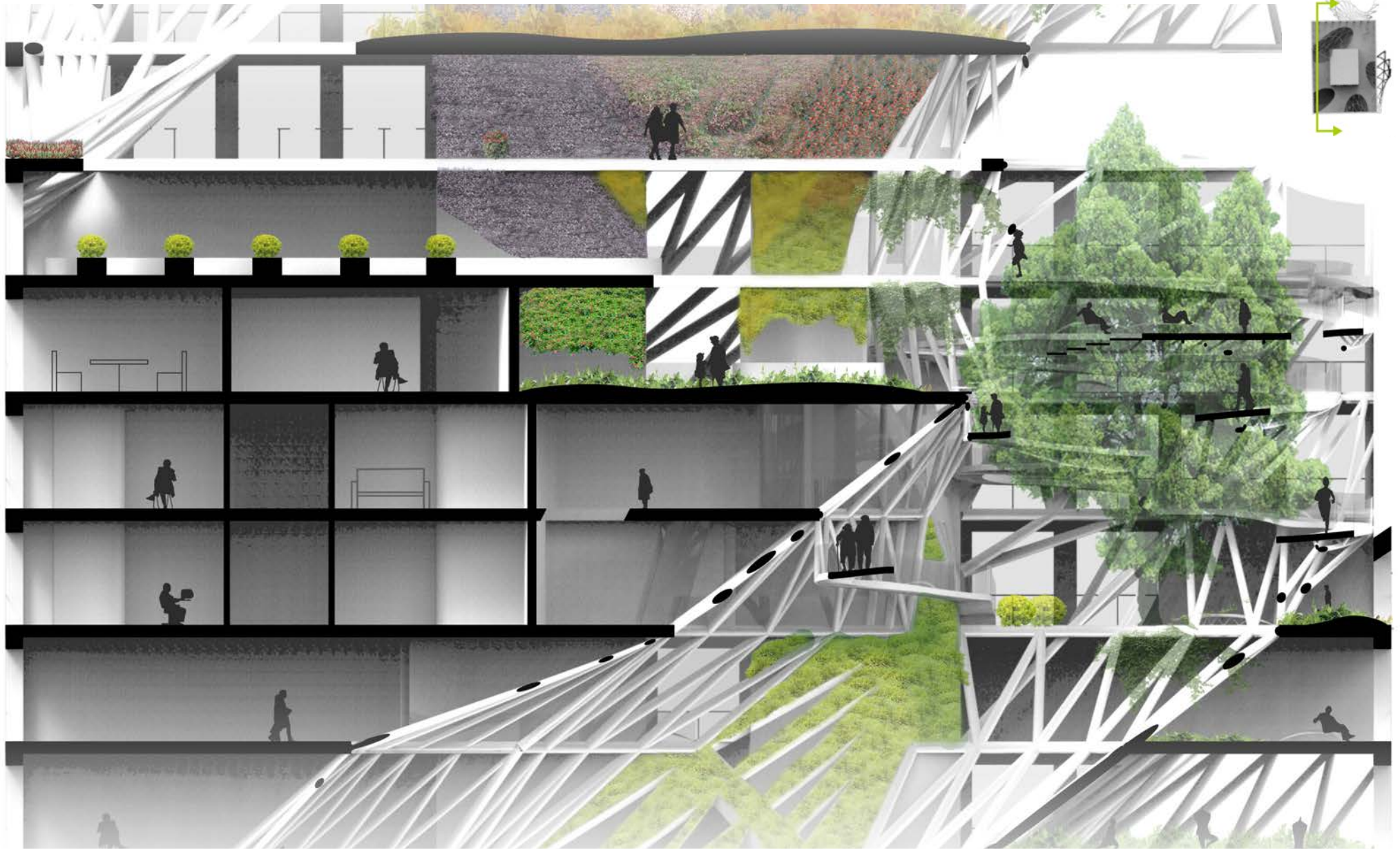
-  Active elderly
-  Protected living
-  Complex care
-  Green
-  Walk path



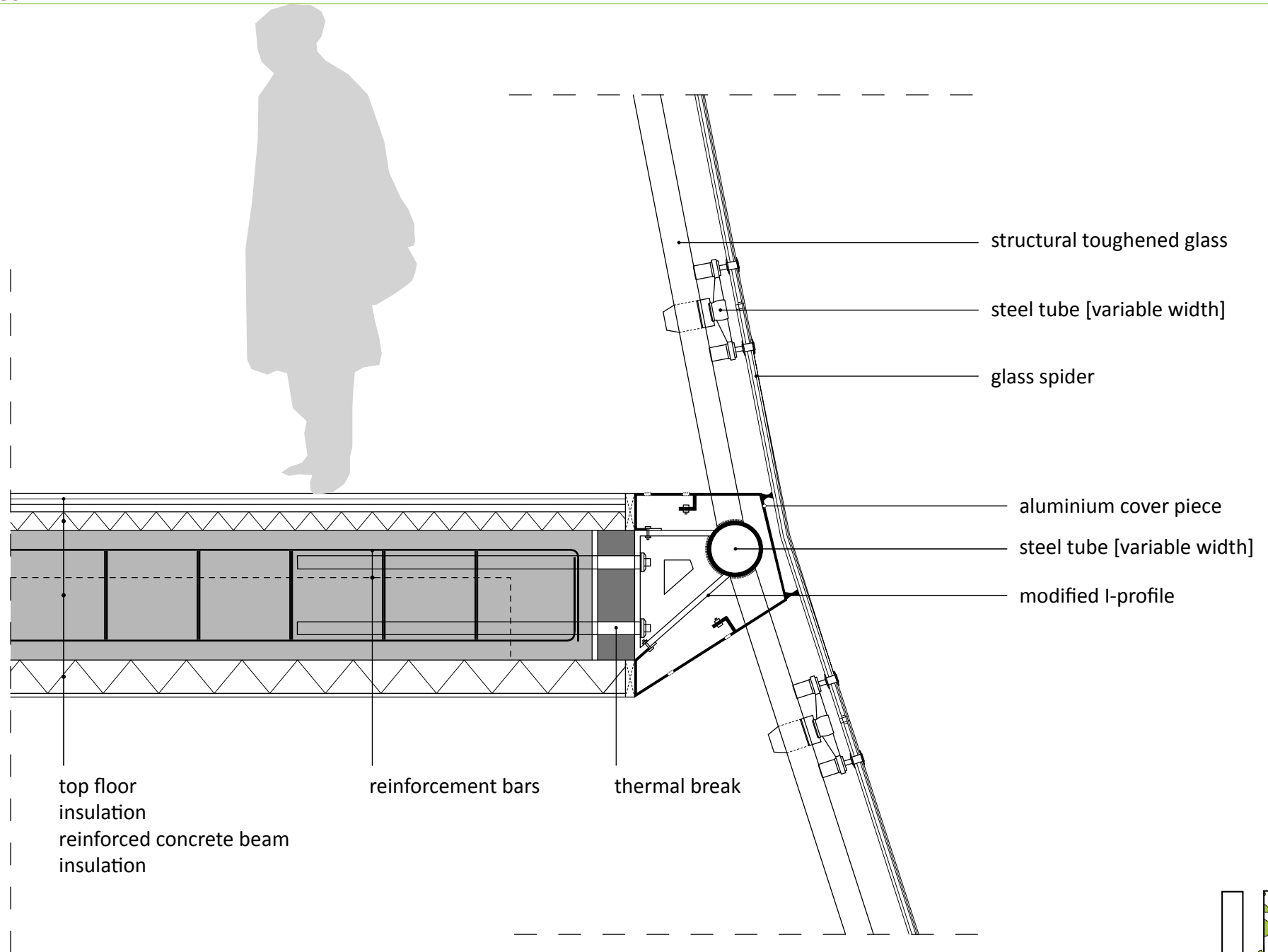
# Section 1



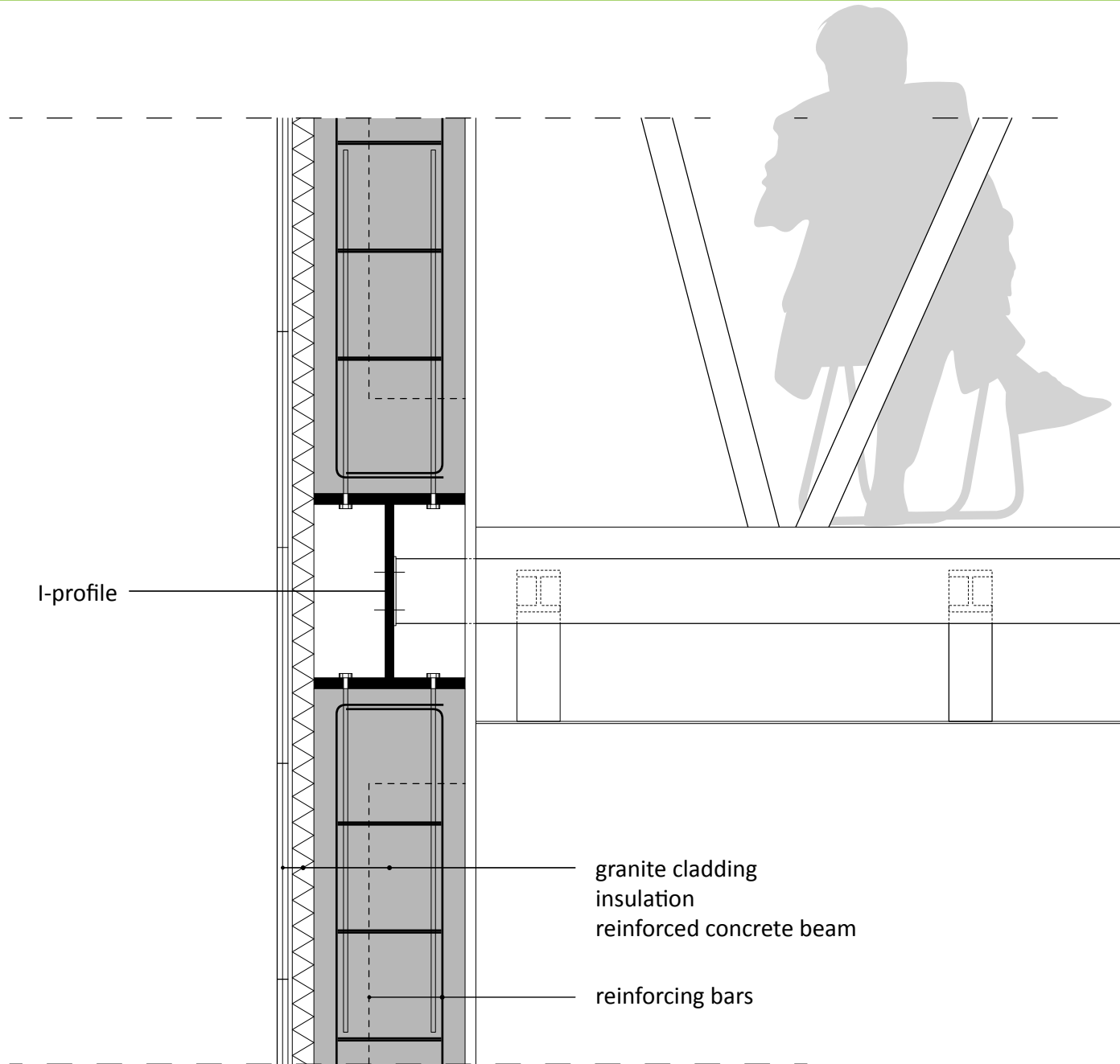
## Section 2



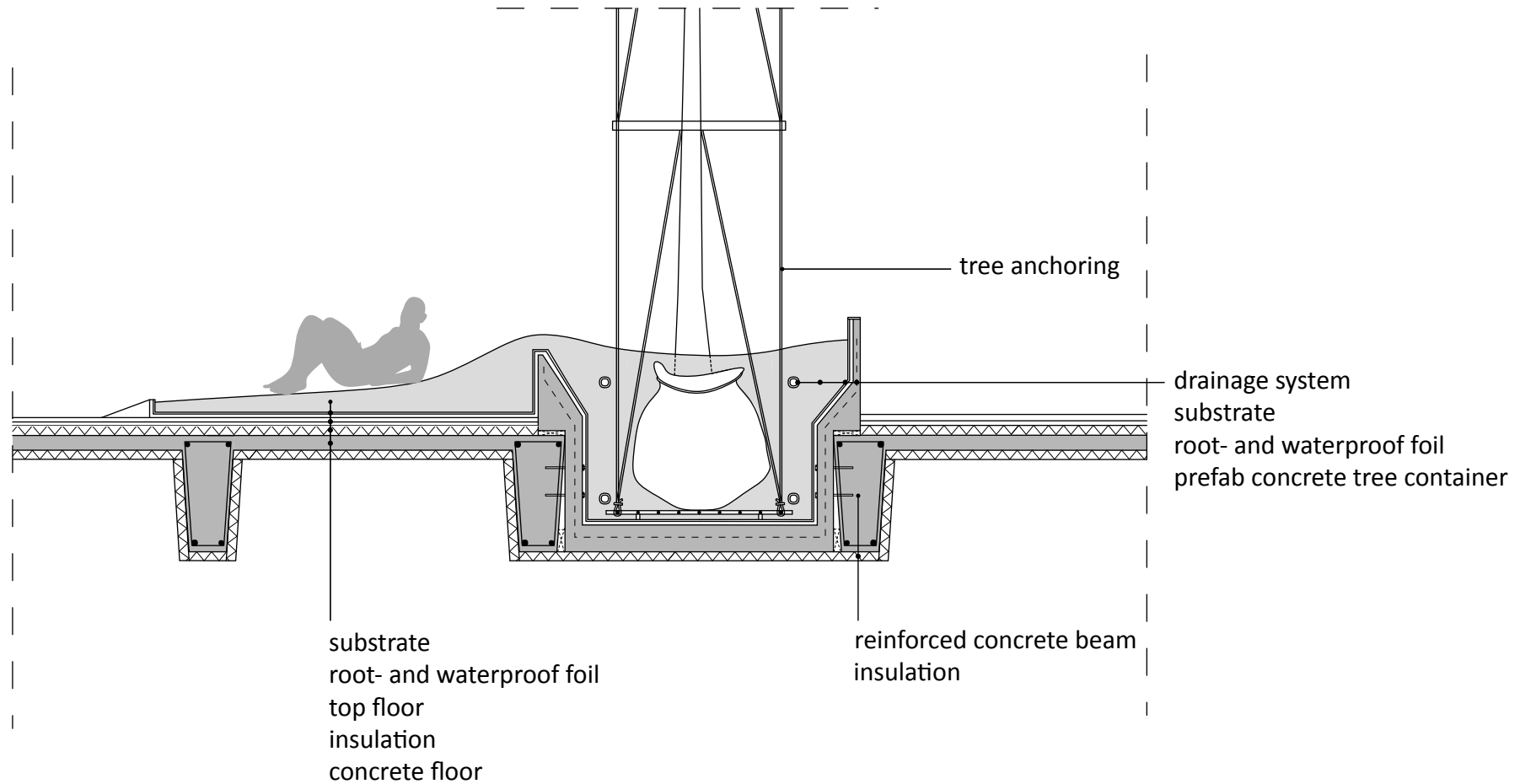
# Detail Tubes



# Detail Facade

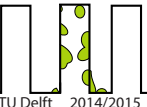
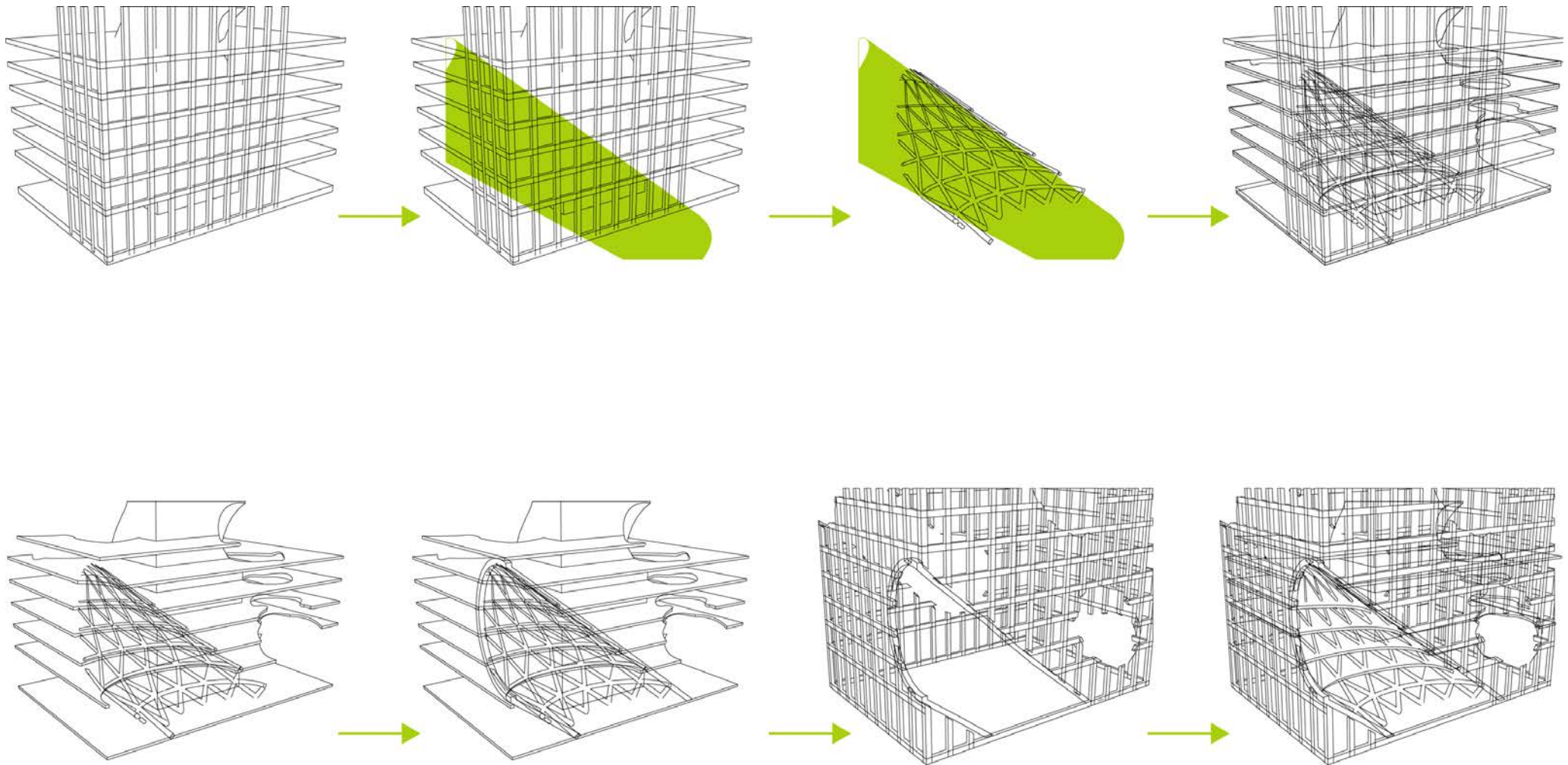


# Detail Plants

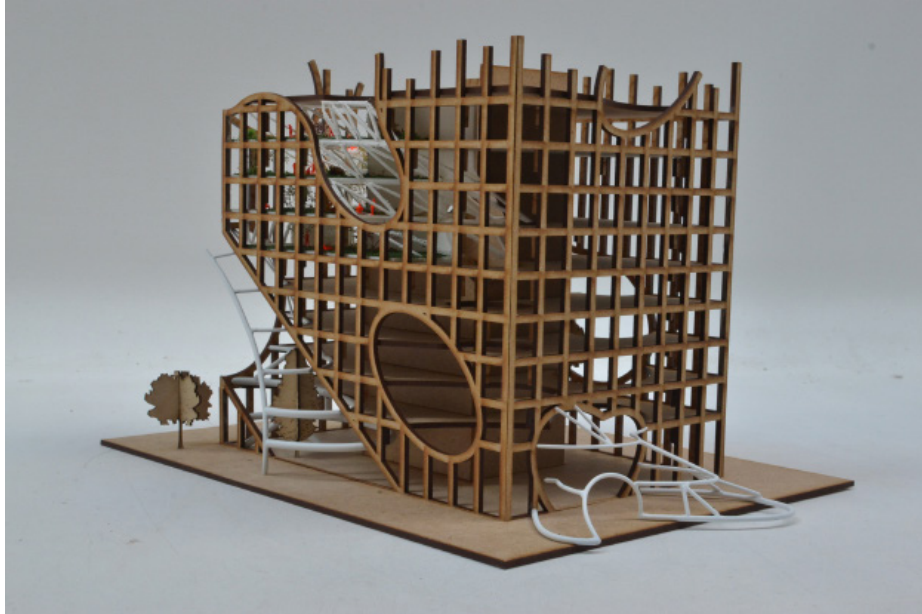




# Building process



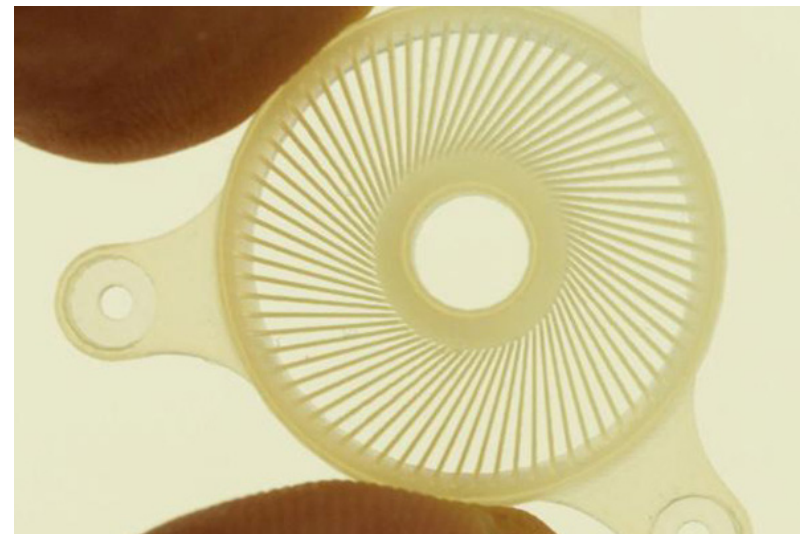
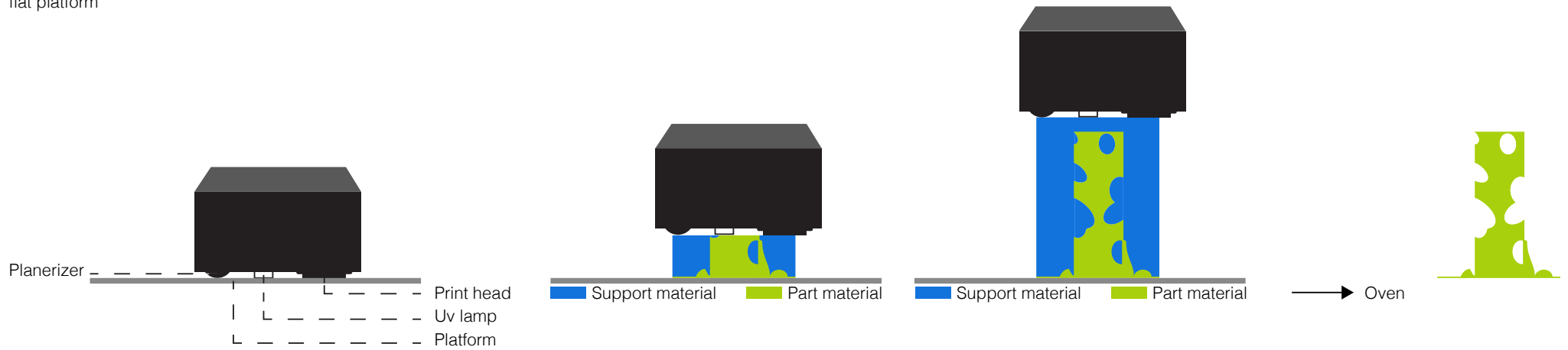
Model 1:200



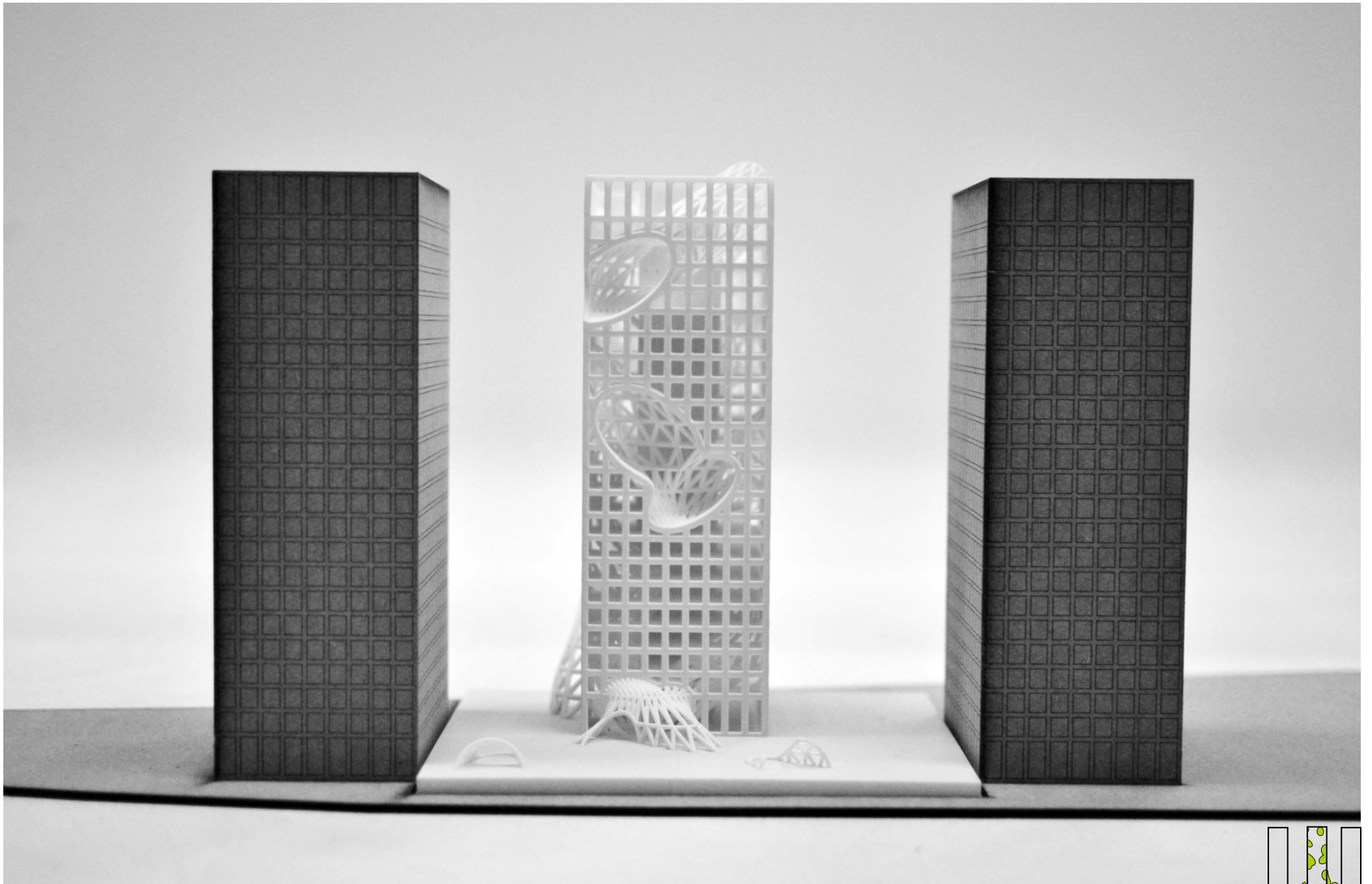
# Model process

## Multi Jet Printing

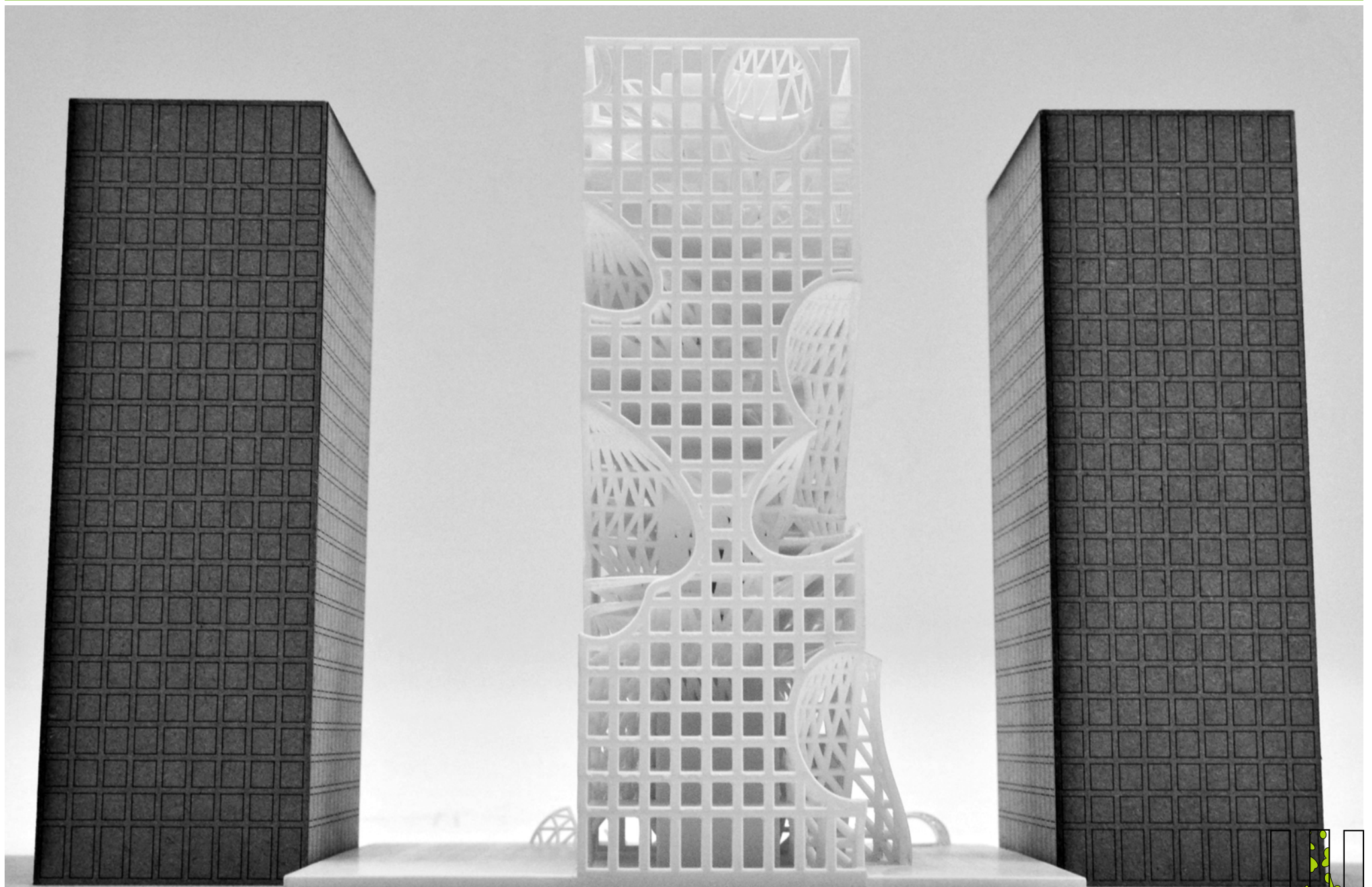
MJP printhead prints layers of UV curable liquid plastic into a flat platform



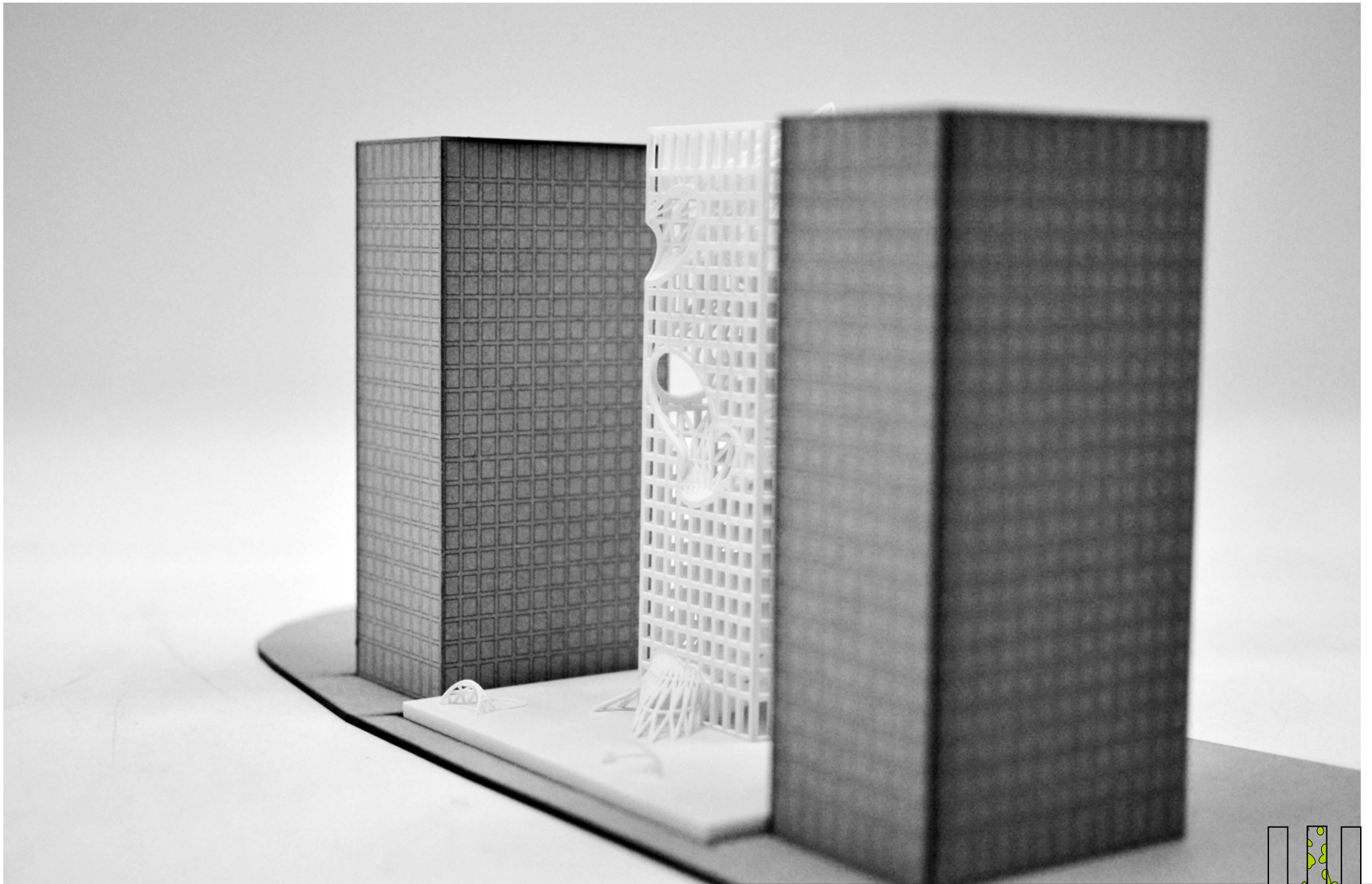
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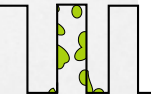
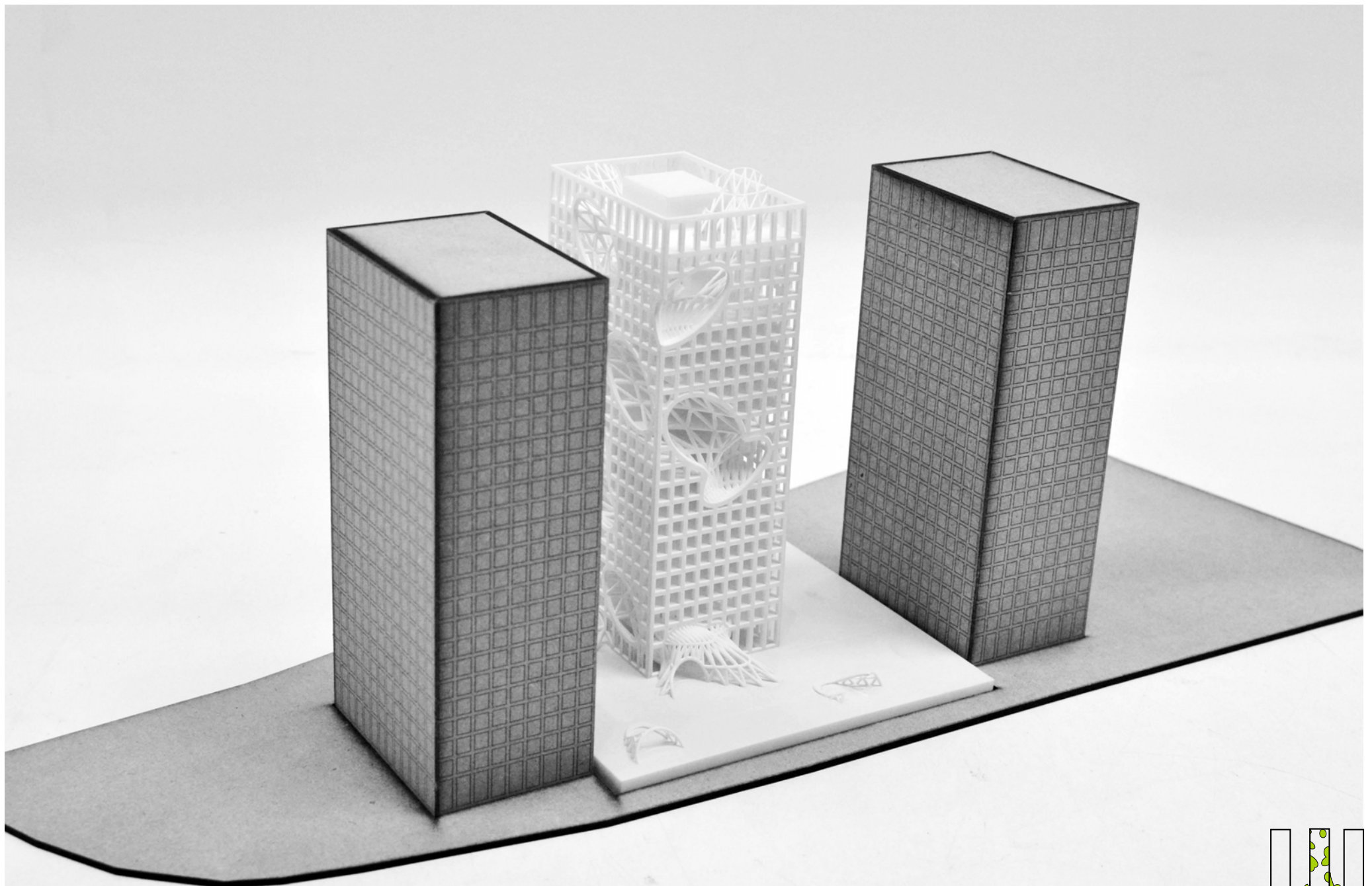
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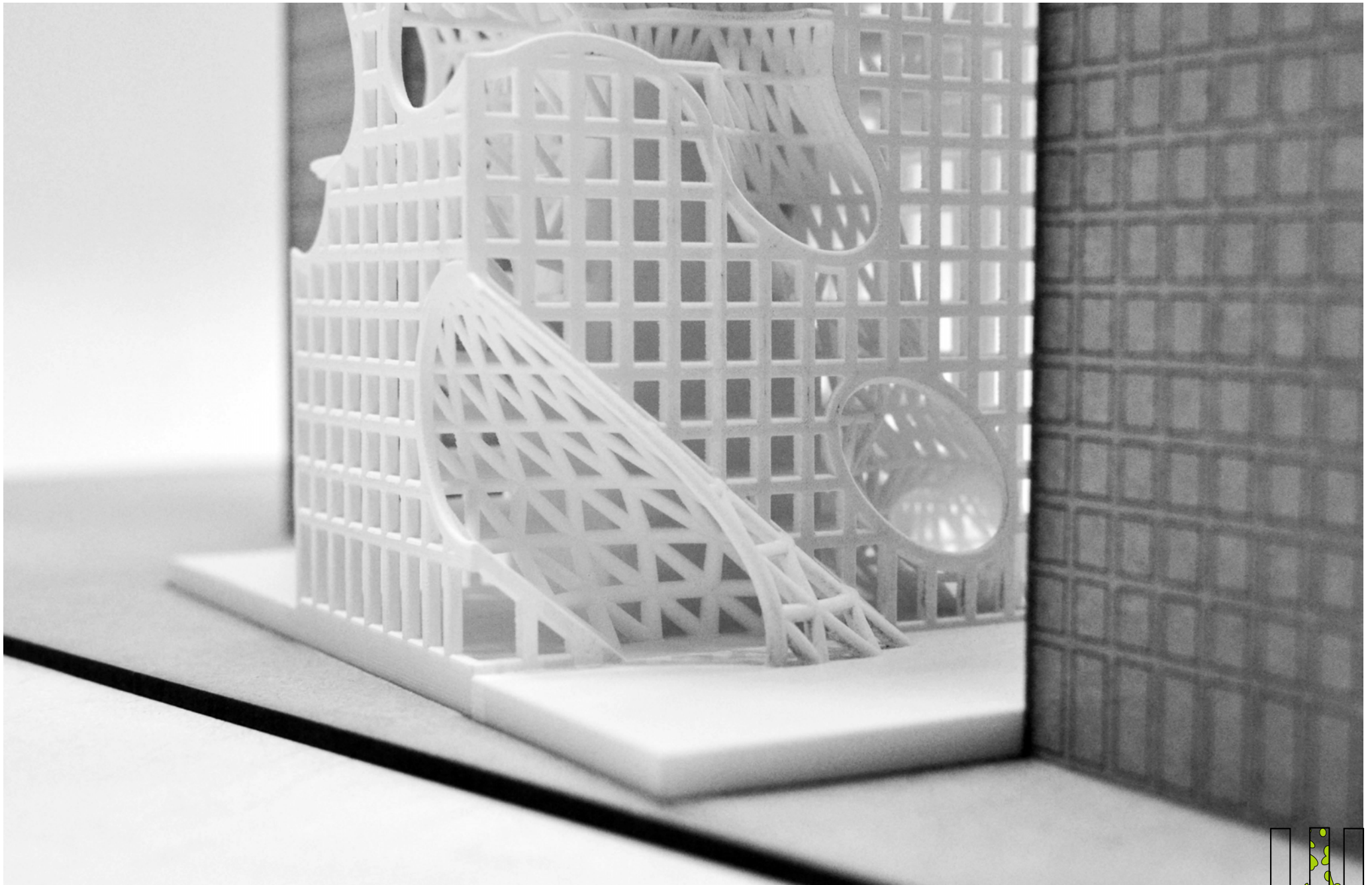
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Model 1:500

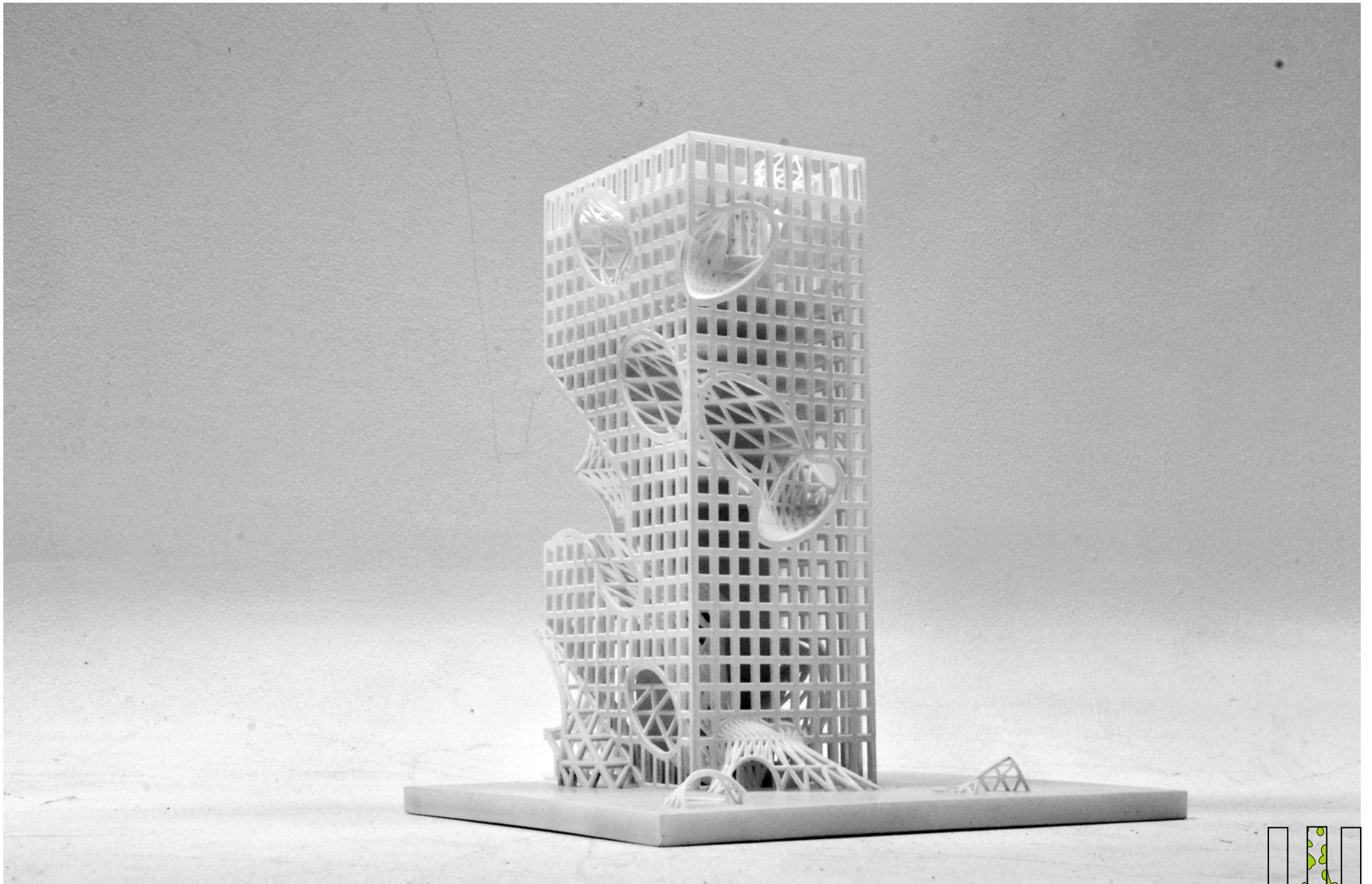


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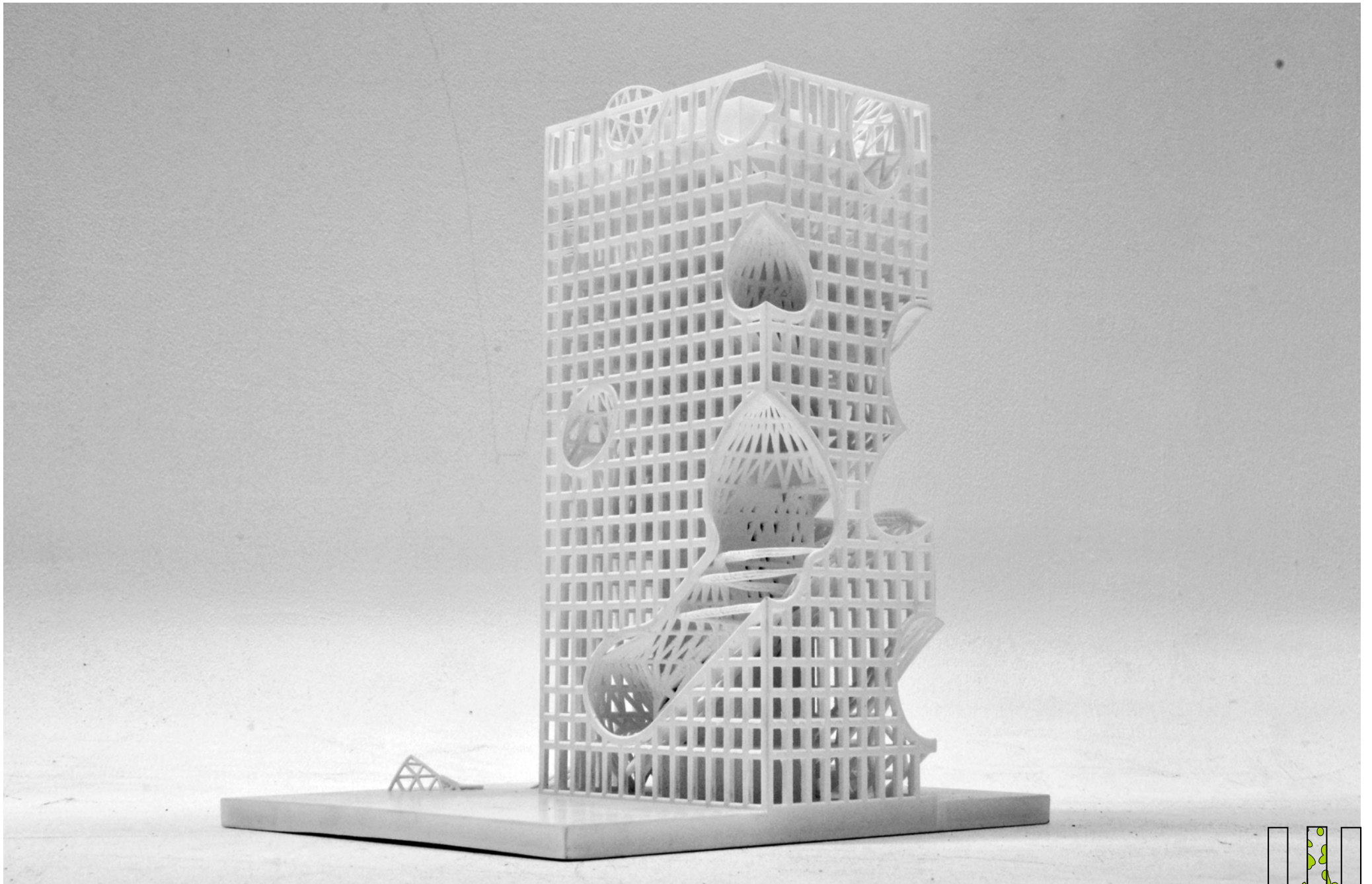




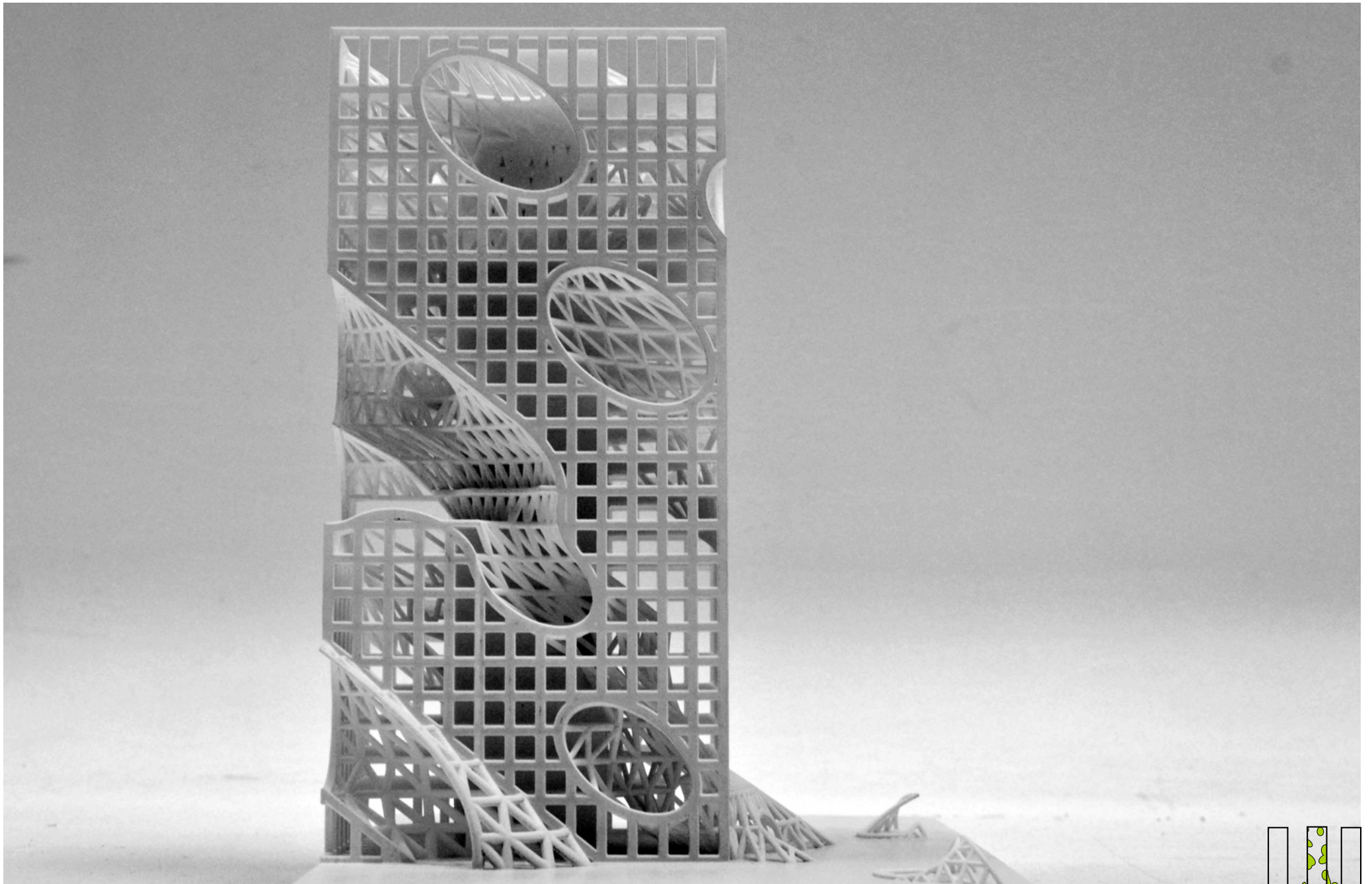
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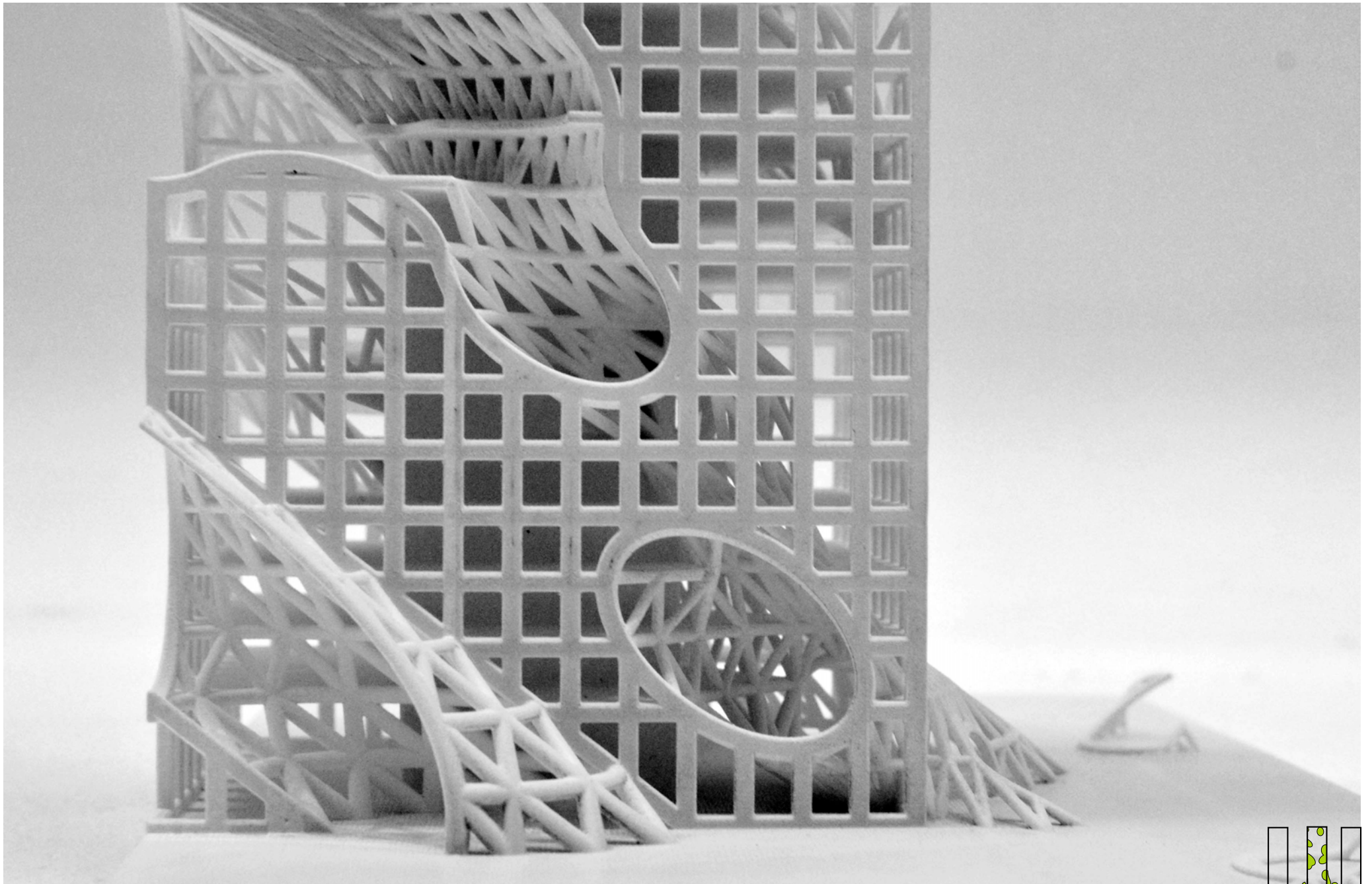
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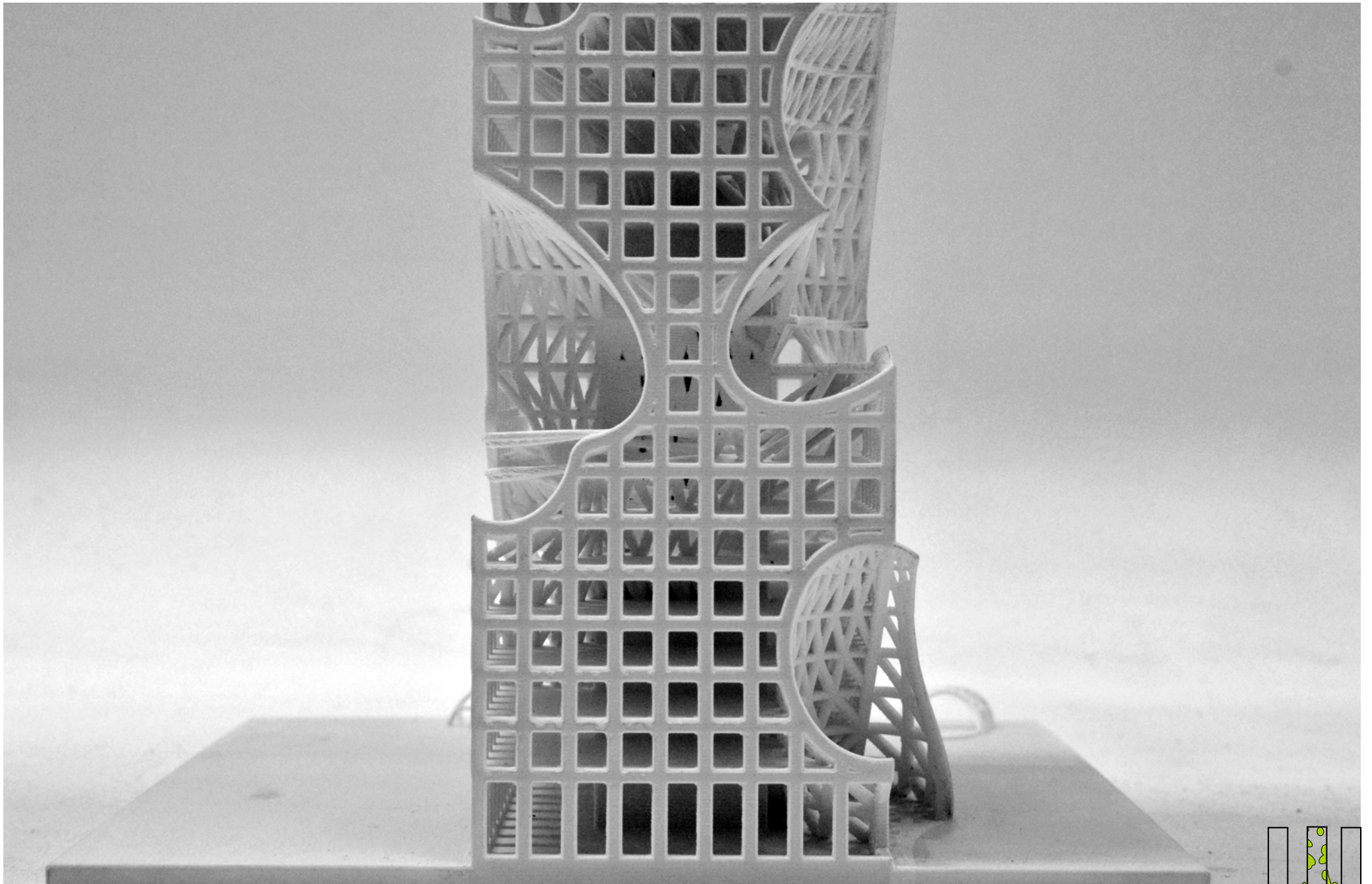
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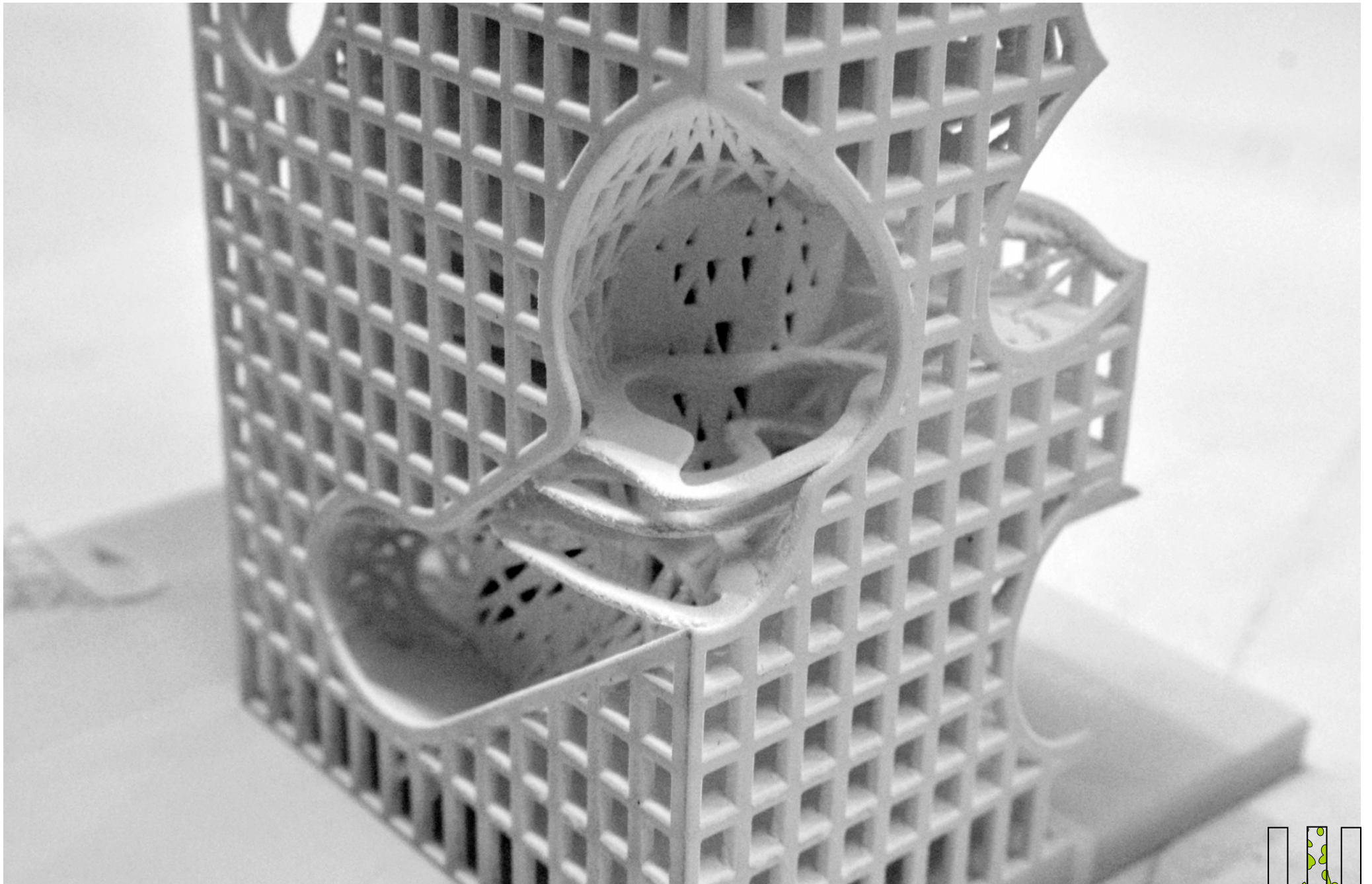
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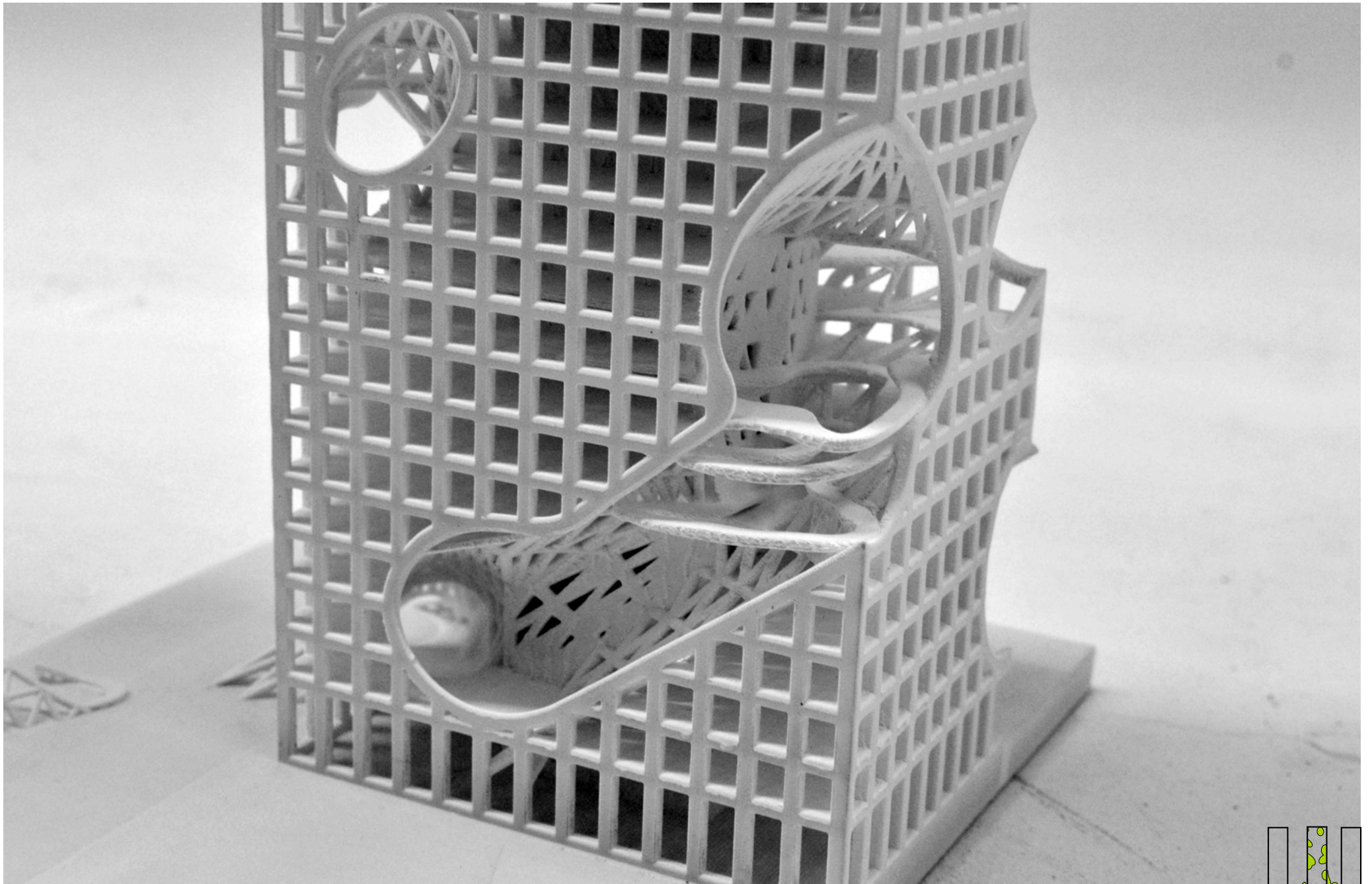
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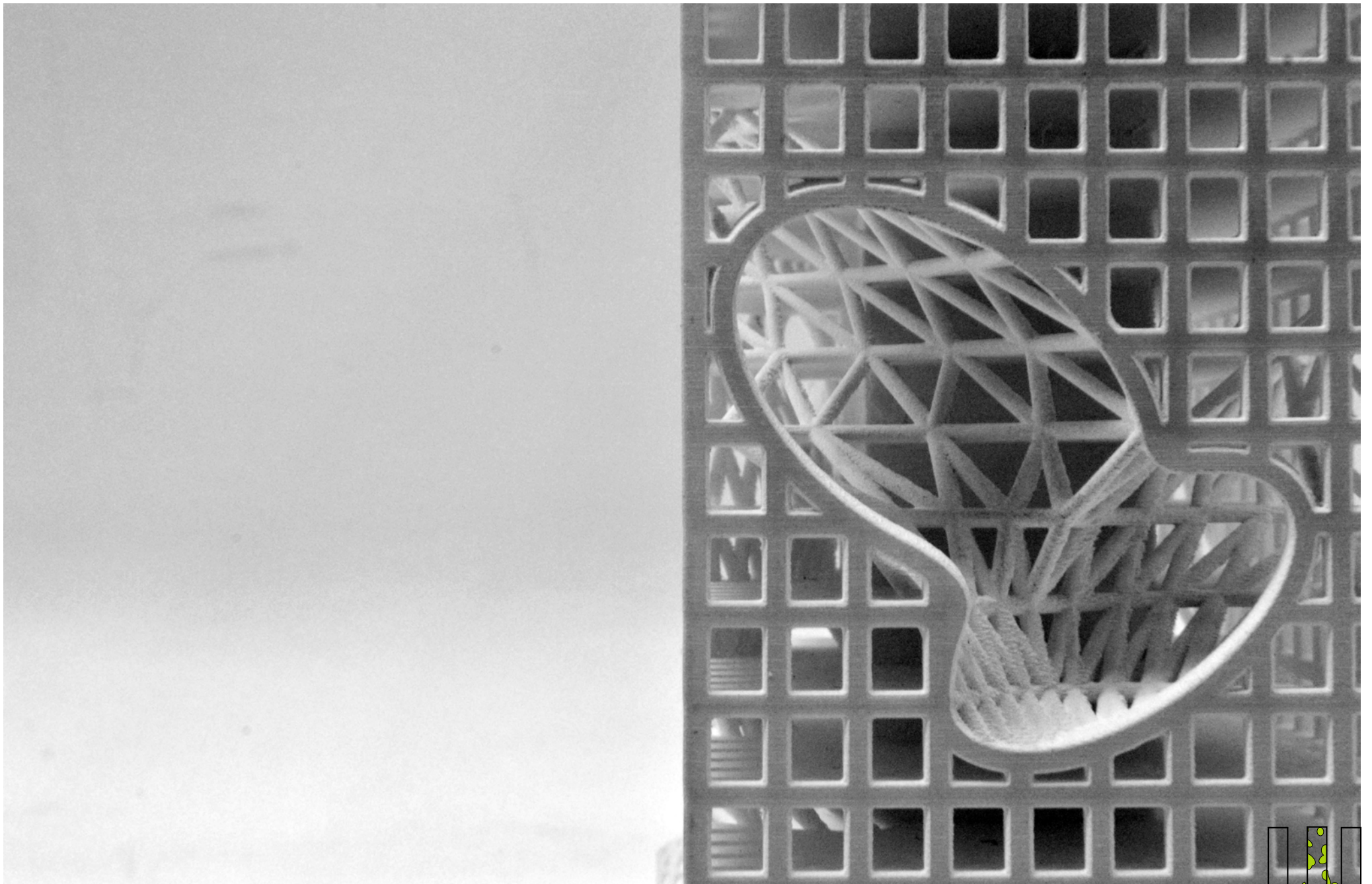
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Model 1:500

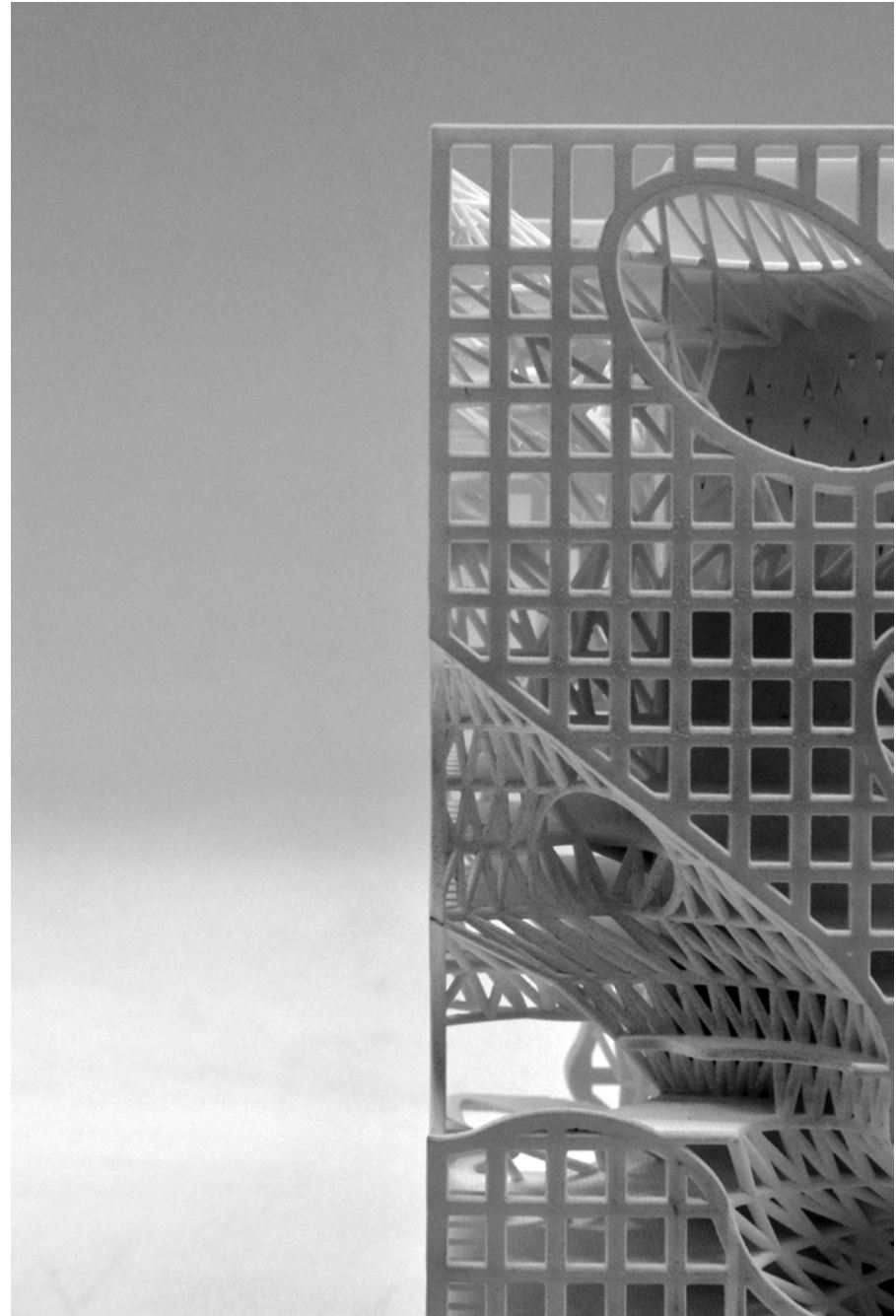
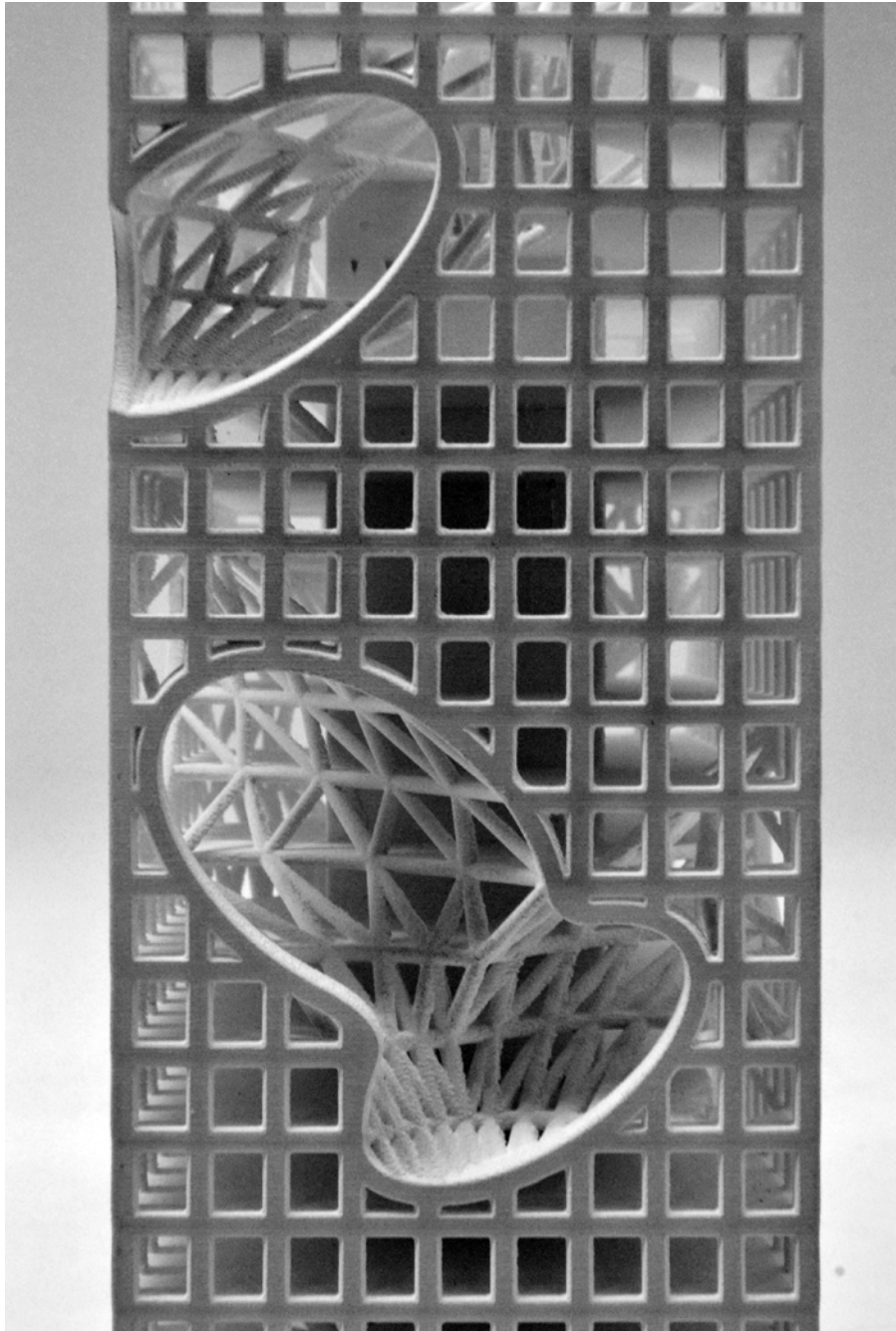


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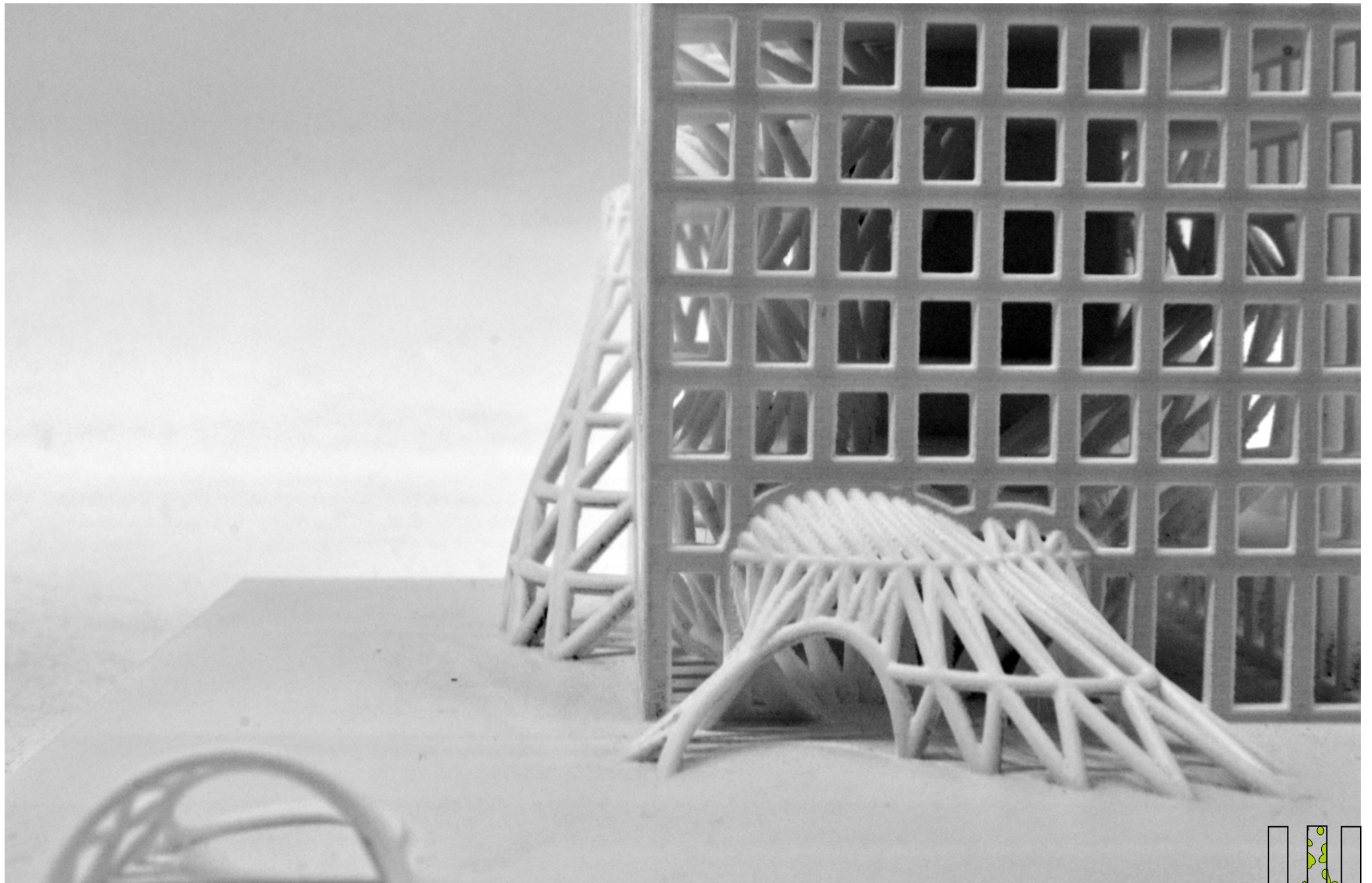




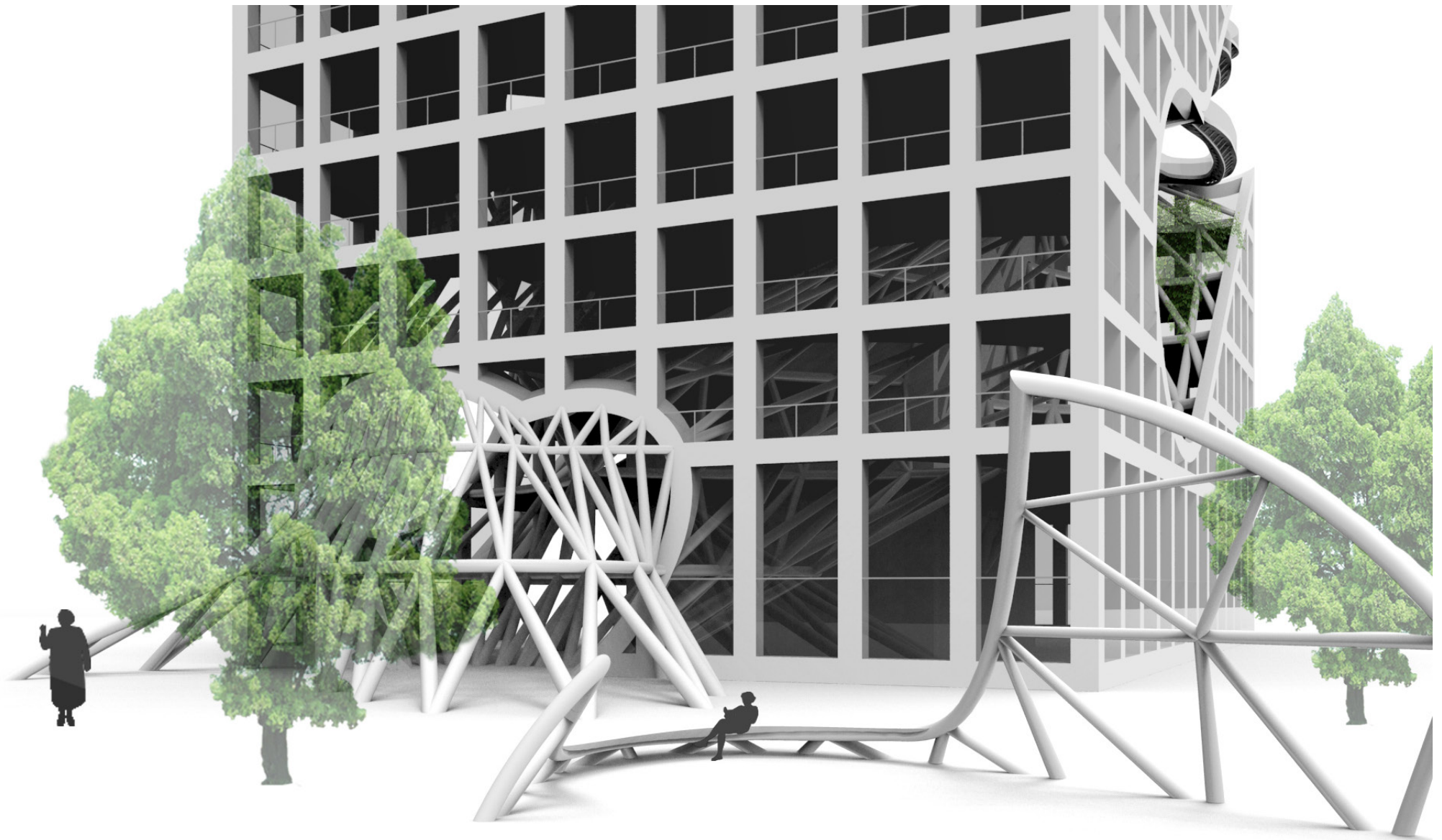
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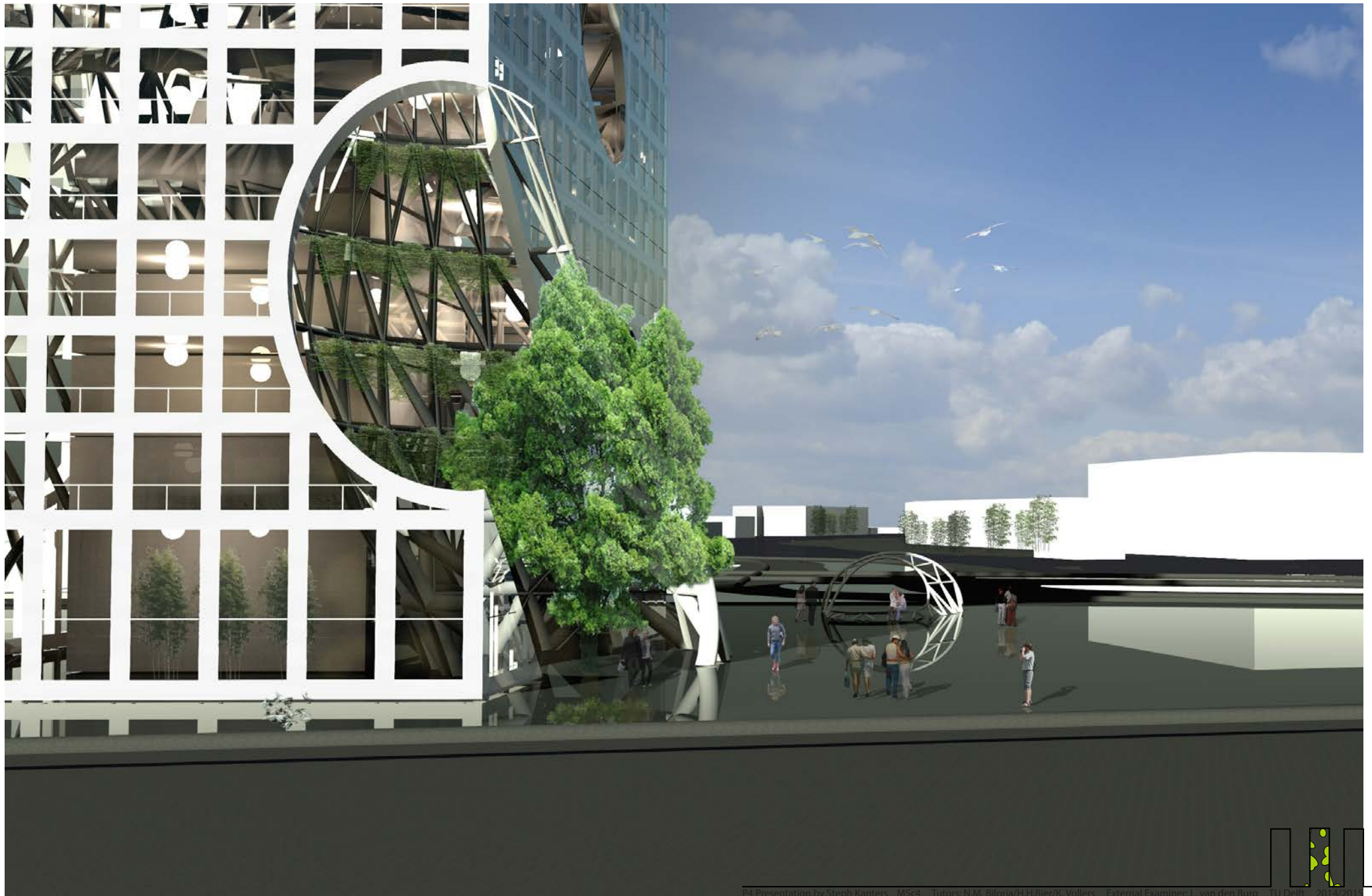
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# Visualisation



# Visualisation



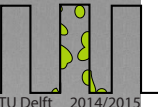
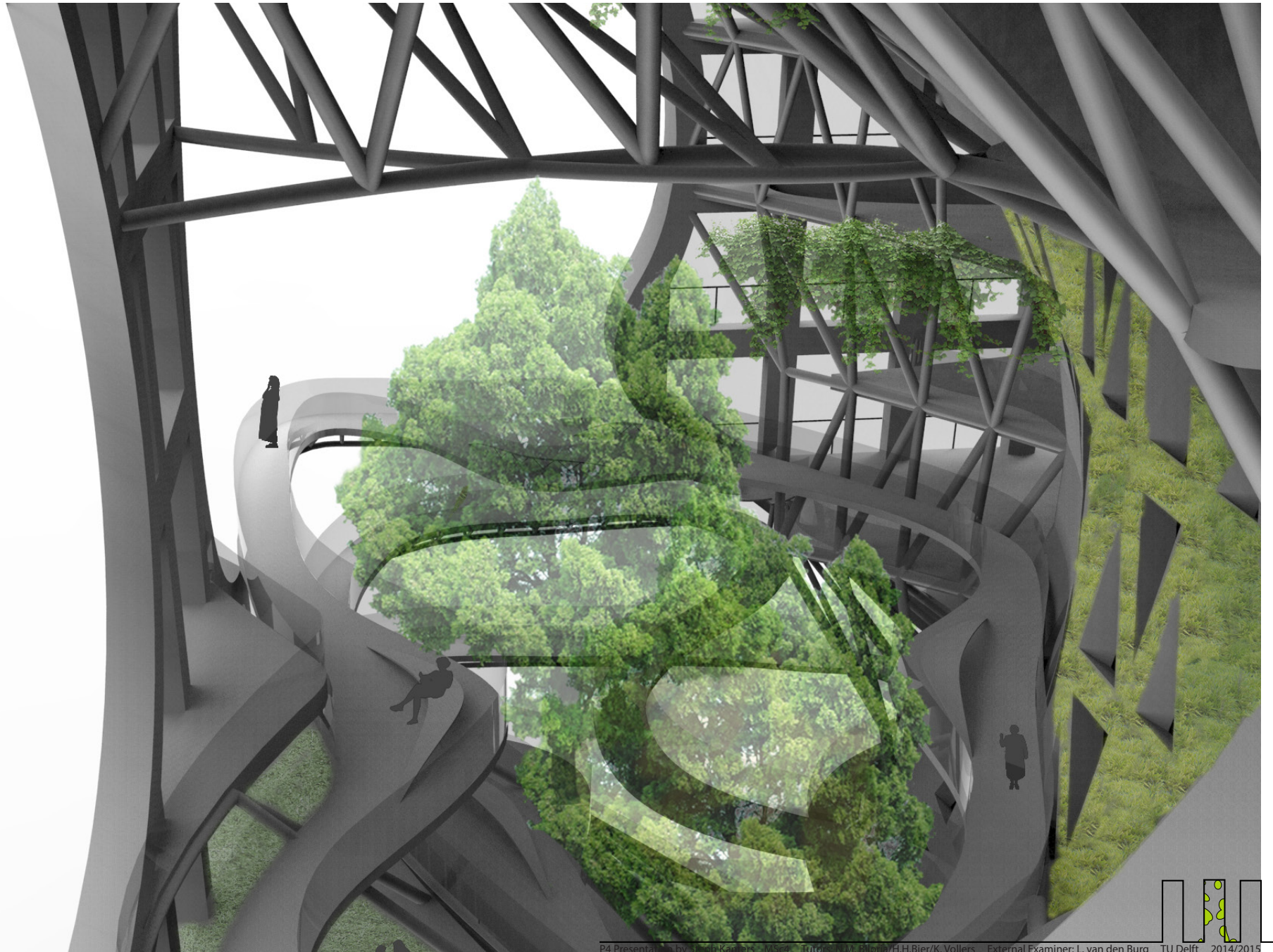
# Visualisation



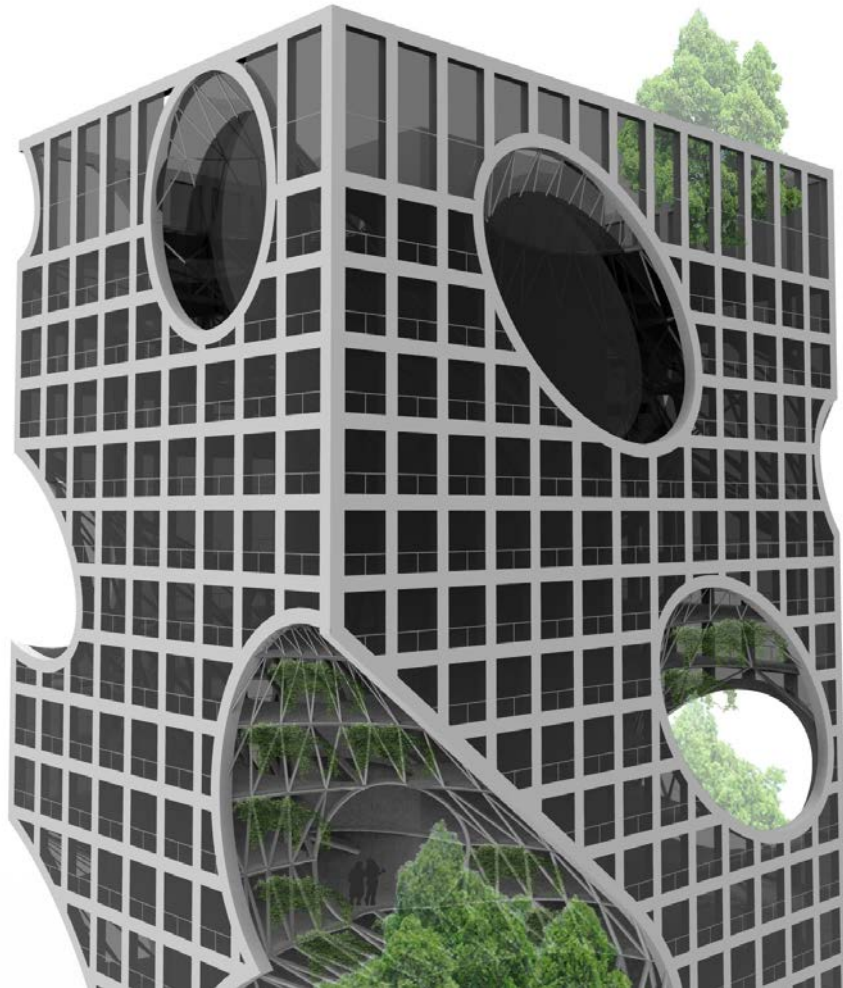
# Visualisation



# Visualisation

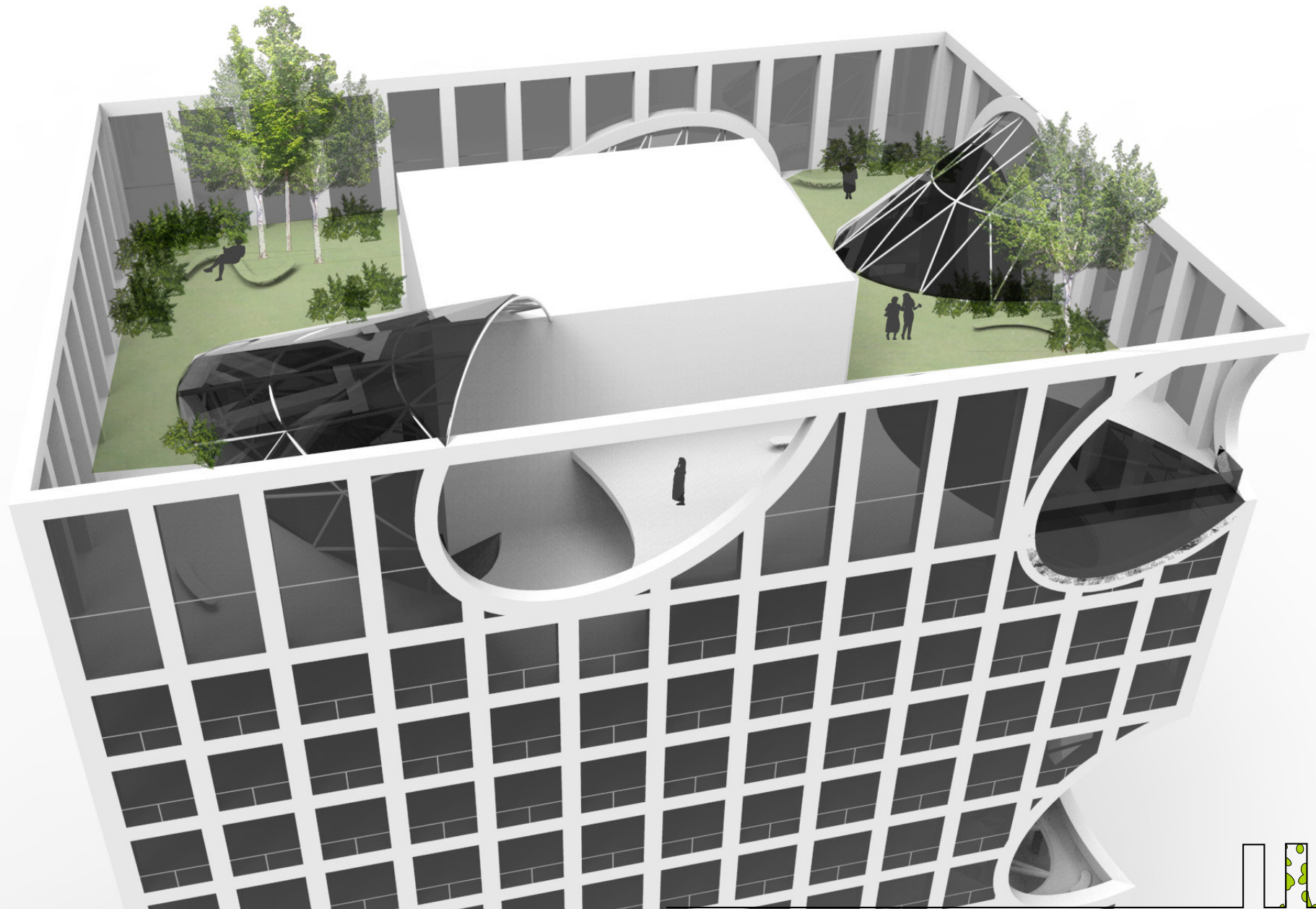


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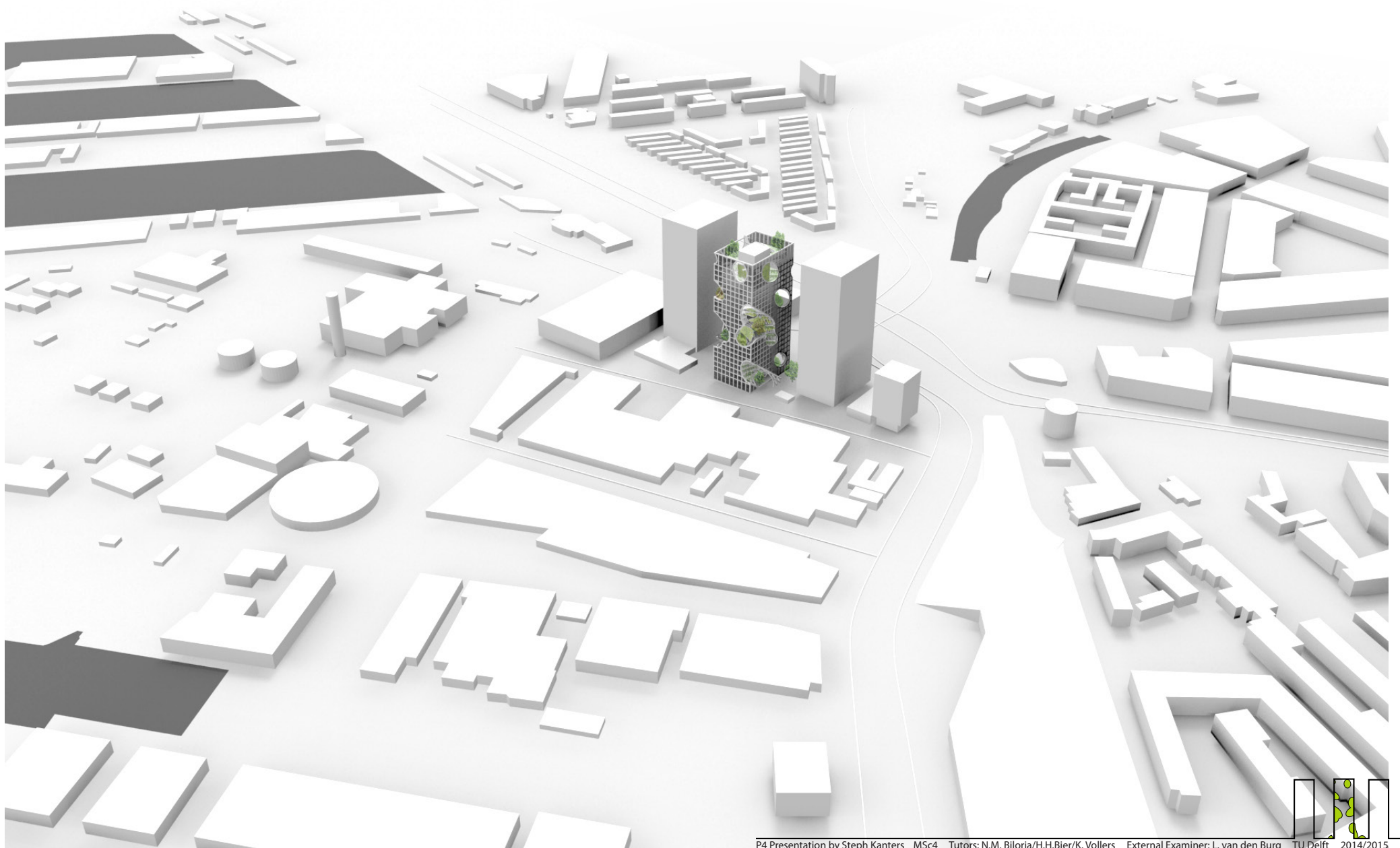




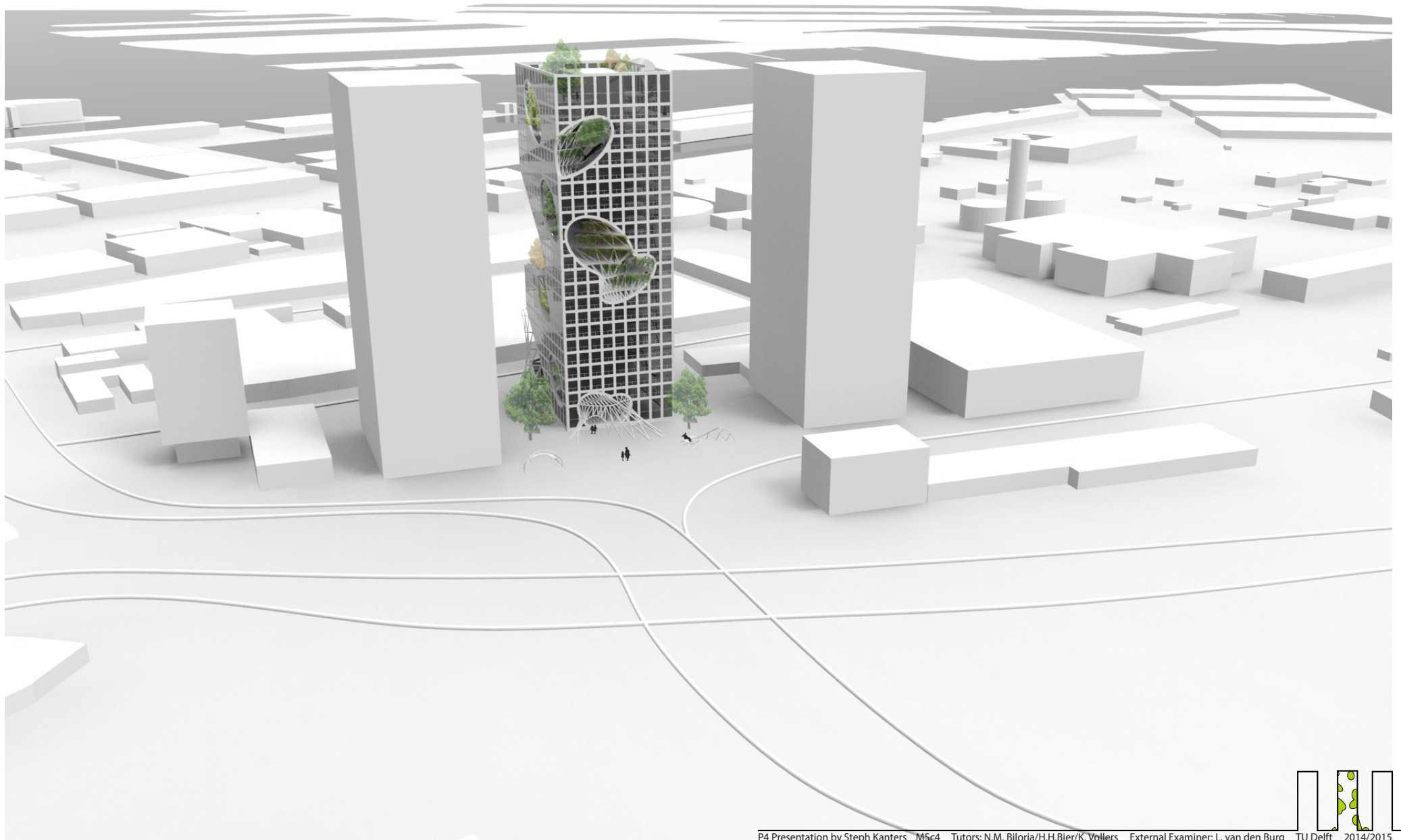
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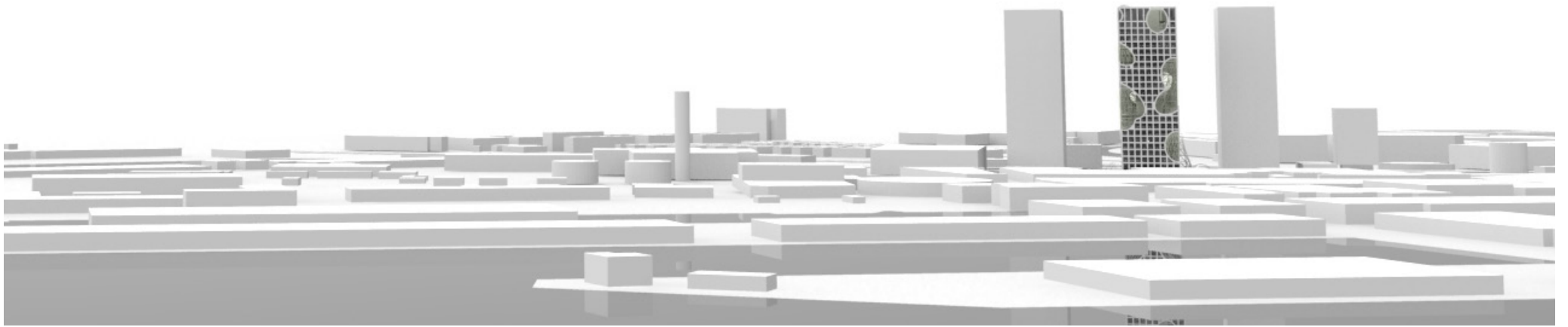


# Visualisation



# Visualisation





Thank you