Transferium For Almere Pampus 2030

Zeying Song

Hyperbody Msc4 graduation

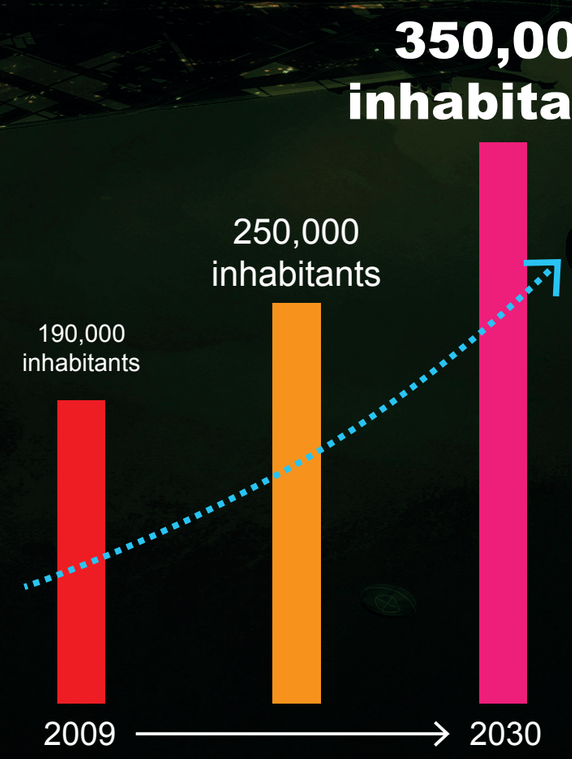
Tutors: Nimish Biloria, Henriette Bier, Martin Sobota

Introduction | Environment | Transformation | Materialization

01

Introduction | Environment | Transformation | Materialization

Almere could grow from to 350,000 inhabitants. What will the increase in scale mean for the city and the region?

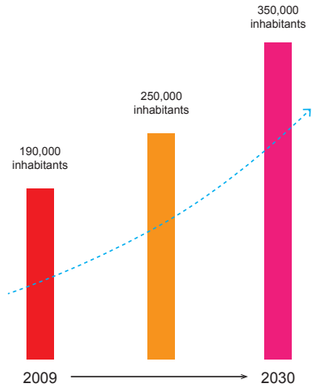


The Growth of Almere Population

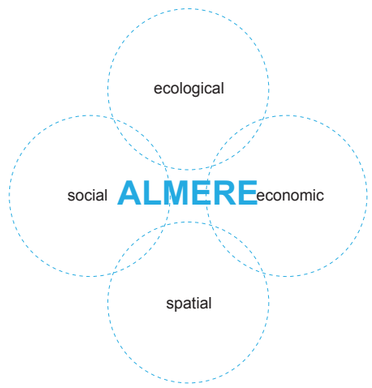
Almere 2.0

- imagination about Almere in 2030

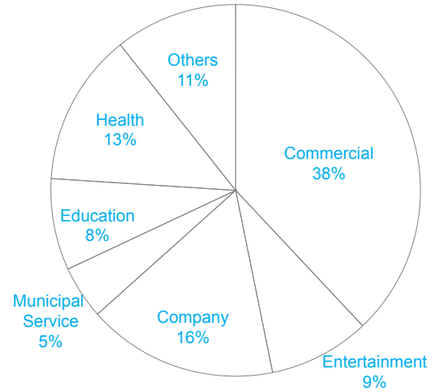
> **“The Almere Principles form the departure point for an ecologicial, socially and economically sustainable leap in scale.**
>
> There is a good reason why we want to make this leap in scale. There is a fundamental coherent vision on, among others, people, nature, the surroundings, the existing city and the past, present and future. This vision indicates how people and nature relate to each other, the opportunities and possibilities the city must offer, how people could lead pleasant lives here and how we want to deal with the existing city. There is also a vision that forms the basis of the Schaalsprong Almere – one that you can rely on at any time, one with the power repeatedly to give direction to actions. The starting point for the increase in scale is that the current suburban Almere should expand into an **ecologically**, **socially** and **economically** sustainable city. This aspiration is described in the Almere Principles... ”
>
> ---------- Summary, Draft Structural Vision Almere 2.0



The Growth of Almere Population



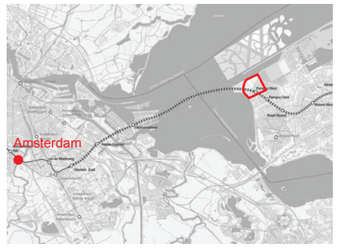
The Strategy of Almere Development



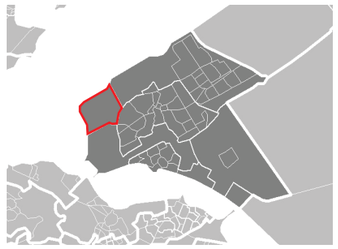
Job Occupation

Masterplan of Amlere in 2030

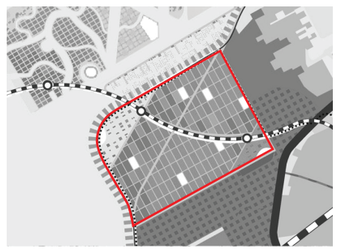
Masterplan of Almere Pampus



Reginal Map
Showing Connection To Amsterdam



Reginal Map of Almere

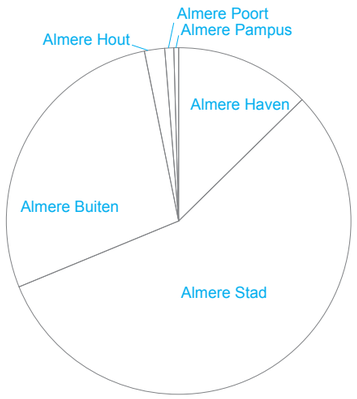


Reginal Map of Almere Pampus

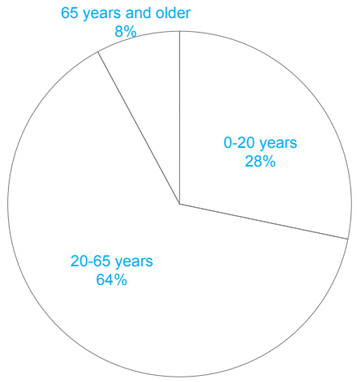
MASTER PALN OF ALMERE PAMPUS

Basic Information of Residents

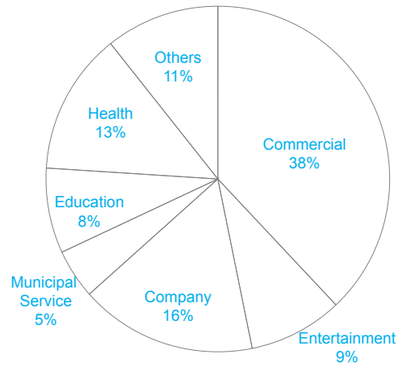
- information of locals
- information of commuters



REGIONAL POPULATION



POPULATION ACCORDING TO AGES

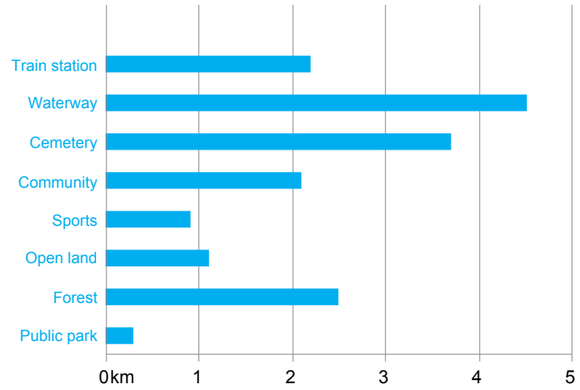


JOB DOMAINS

Profiles:

60,000 inhabitants
12,000 jobs
5,000 train travellers
3,000 train & car commuters per 24 hr.

Residential area per person 45 m²
Gross residential area 2,700,000 m²
Built area 1,143,800 m²
Green area 740380 m²



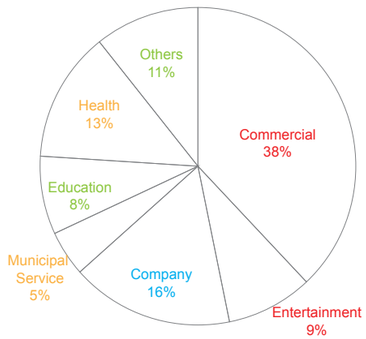
AVERAGE ACCESSIBILITY

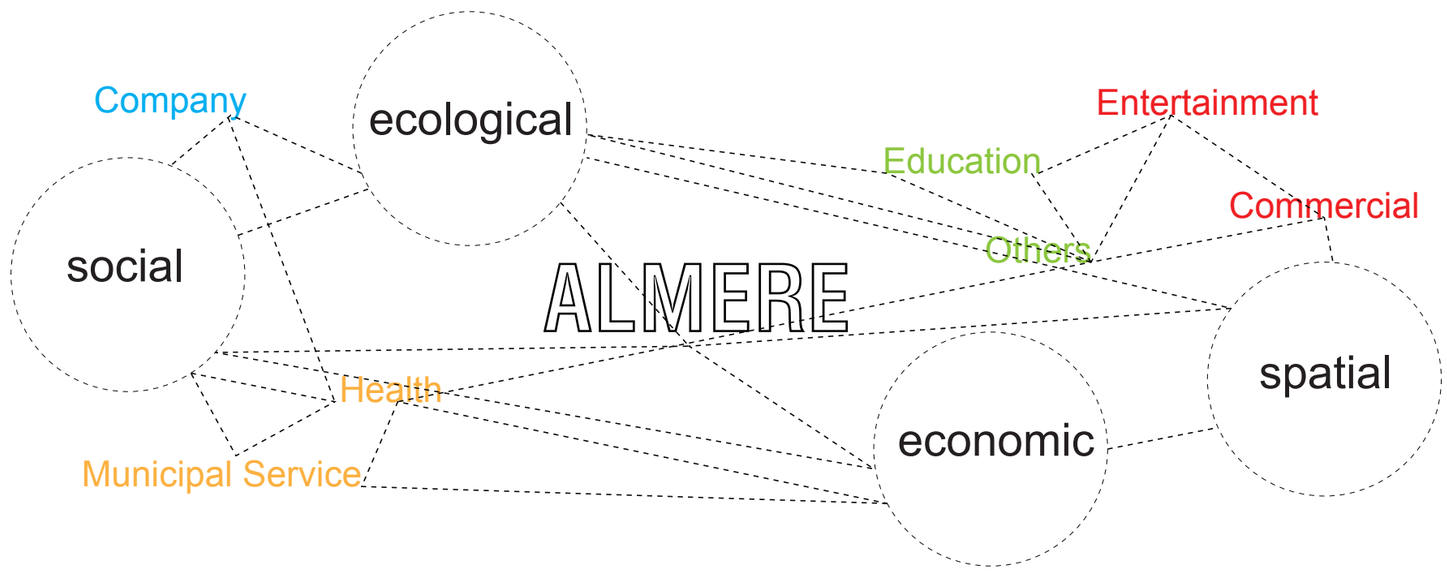
Design Strategy

1) To investigate Transferium as urban tissue that affects everyday's life of residents.

2) From different domains to aspects regarding social, ecological, economic activities, to find the relations between them.

3) According to the main job occupation, I build the categories of urban activities, including commerical, green space, service and office.





02

Collection For Simulation

- basic population data
- the link: http://www.cbs.nl

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Local units by municipalities, January 1

Table explanation Changed on April 08 2011. Frequency: yearly.

change selection

Link Download Print Help

Table Graph Map

	Subjects	Number of local units				
	Periods	2006	2007	2008	2009	2010
Economic activity (NCEA 2008)	Regions	*number*				
A-U All economic activities	Almere	6 275	6 940	7 670	8 345	8 560
A Agriculture, forestry and fishing	Almere	80	75	75	75	75
B Mining and quarrying	Almere	0	0	0	0	0
C Manufacturing	Almere	315	330	340	360	350
D Electricity and gas supply	Almere	5	5	5	5	5
E Water supply and waste management	Almere	10	10	5	10	10
F Construction	Almere	680	765	885	1 040	1 040
G Wholesale and retail trade	Almere	1 535	1 705	1 810	1 890	1 905
H Transportation and storage	Almere	260	280	305	330	325
I Accommodation and food serving	Almere	200	215	225	260	270
J Information and communication	Almere	380	440	505	565	585
K Financial institutions	Almere	160	160	170	165	150
L Renting, buying, selling real estate	Almere	140	145	150	140	130
M Other specialised business services	Almere	1 095	1 235	1 425	1 570	1 640
N Renting and other business support	Almere	425	460	520	585	580
O Public administration and services	Almere	5	0	0	5	5
P Education	Almere	245	265	290	325	345
Q Health and social work activities	Almere	345	405	445	495	575
R Culture, sports and recreation	Almere	85	95	105	110	110
S Other service activities	Almere	315	350	400	420	460

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Simulation System

- based on the population data of Almere

TOTAL POPULATION > JOB OCCUPATION > AVERAGE AREA/PERSON > EMPLOYEE NUMBER > AGENT

			2030	2025	2020	2015
Population	600		60000	19000	3600	600
Jobs	115					
			o	c	g	s
Employee No.%	15%		18%	38%	15%	26%
Jobs in one domain	17					
			o	c	g	s
APC	35		30	40	35	48
			2030	2025	2020	2015
M	5		35	25	15	5
Green Space Area	51.04					
otal area of A_pampus	5762700					
			o	c	g	s
Agent		Y2030	72	152	60	104
		Y2025	54	114	45	78
		Y2020	36	76	30	52
		Y2015	18	38	15	26

Evaluation Parameter and Formula:

P = Total Population;
c% = (Employee number/P)%
APC= Total Area Per Capita;
M = Members in one group;
N= Total Number of Activities;
Forest area = 51hm²

Area =P*64%*30%*cp*APC/10000;
Nmuber = P*0.64*30%*cp/M;
Proximity =(APC*M/π)^(1/2)/0.75*10.
Green space area =Area + Forest area

	APC(m²)	NUMBER	AREA(hm²)	PROXIMITY(m)
Year 2030	35	3	0.04	729

APC: Average area per capita;
NUMBER: Average number of activities;
AREA: Average range of activities;
PROXIMITY: Average distance from location of activities to local inhabit

Sub-system of Simulation

- 4 basic types sorted by system
- type: commercial, green space, office and service

	APC(m²)	NUMBER	AREA(hm²)	PROXIMITY(m)
Year 2030	35	3	0. 04	729

Commercial

	APC	NUMBER	AREA	PROXIMITY
Year 2015	40	9	0. 12	458
Year 2020	40	18	0. 70	324
Year 2025	40	55	3. 70	182
Year 2030	40	125	11. 67	121

Green space

	APC	NUMBER	AREA	PROXIMITY
Year 2015	35	3	51. 04	729
Year 2020	35	7	51. 24	515
Year 2025	35	22	52. 28	290
Year 2030	35	49	55. 03	193

Service

	APC	NUMBER	AREA	PROXIMITY
Year 2015	48	6	0. 10	554
Year 2020	48	12	0. 58	391
Year 2025	48	38	3. 04	220
Year 2030	48	86	9. 58	146

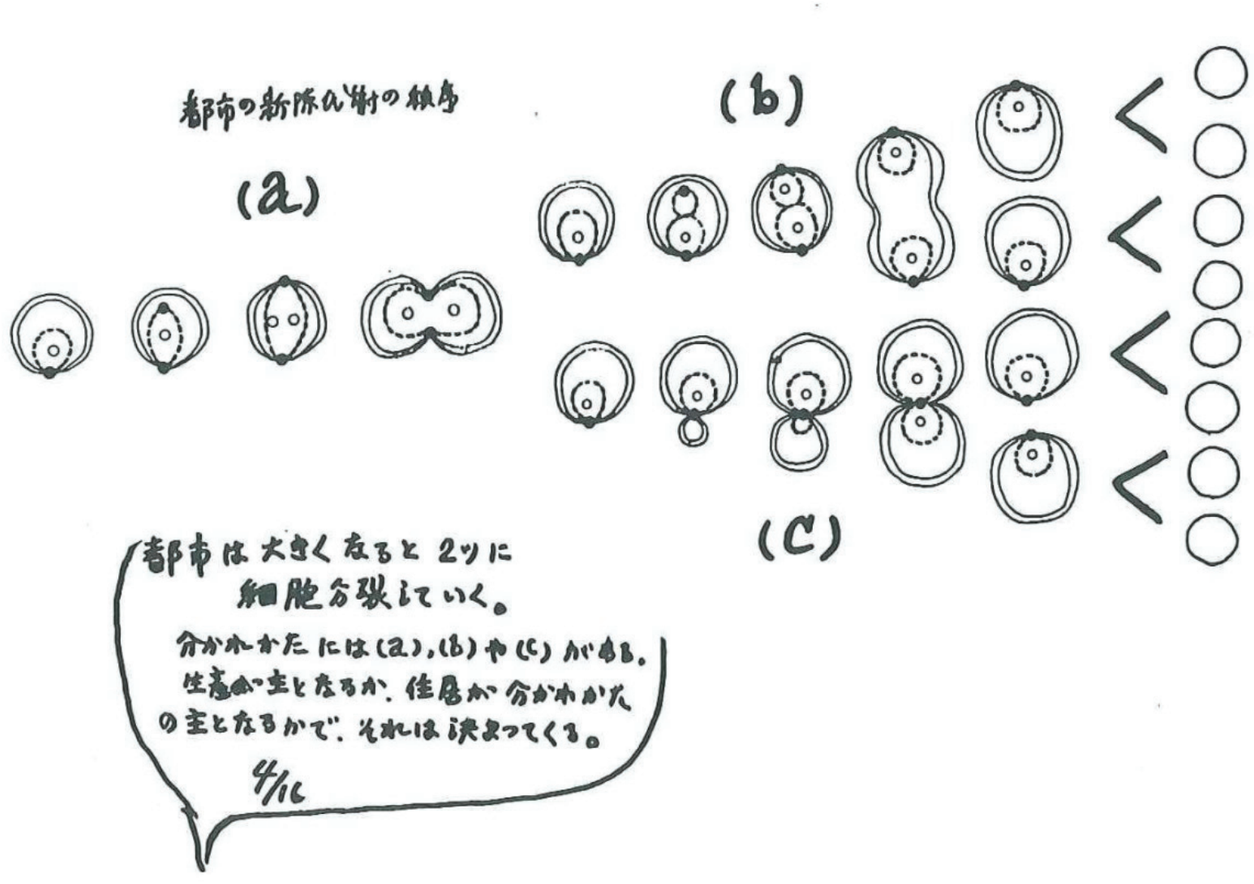
Office

	APC	NUMBER	AREA	PROXIMITY
Year 2015	30	4	0. 04	665
Year 2020	30	8	0. 25	470
Year 2025	30	26	1. 31	264
Year 2030	30	59	4. 15	176

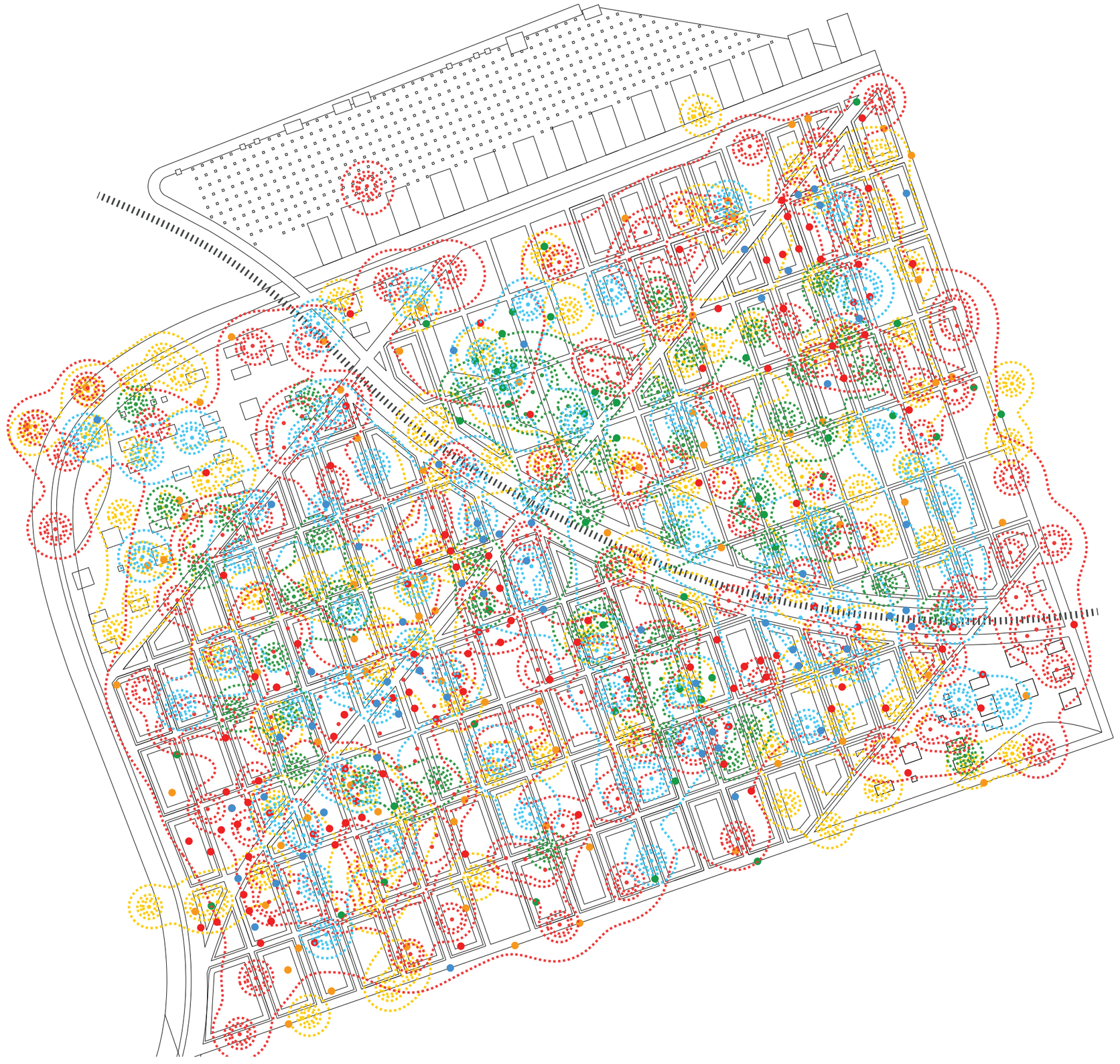
APC: Average area per capita;
NUMBER: Average number of activities;
AREA: Average range of activities;
PROXIMITY: Average distance from location of activities to local inhabit

Introduction of Metaball system

- drawing from Japanese Metabalism architect



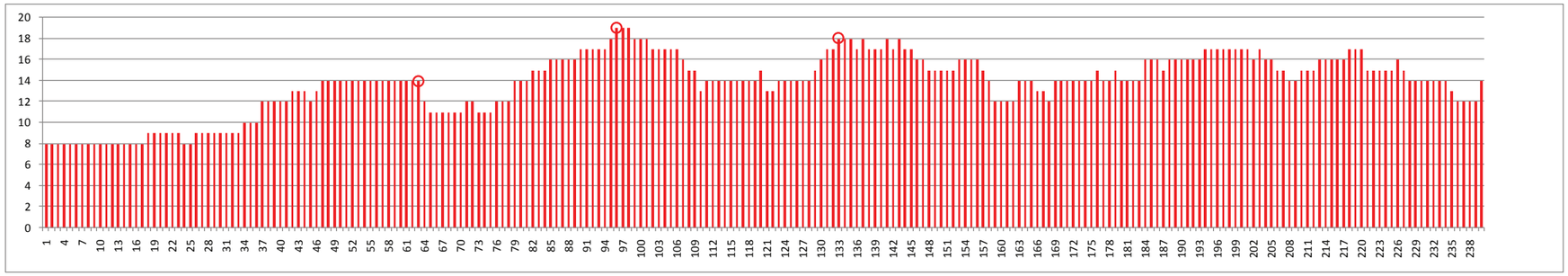
Maximum Siuation of Metaball Movement in Masterplan of Pampus



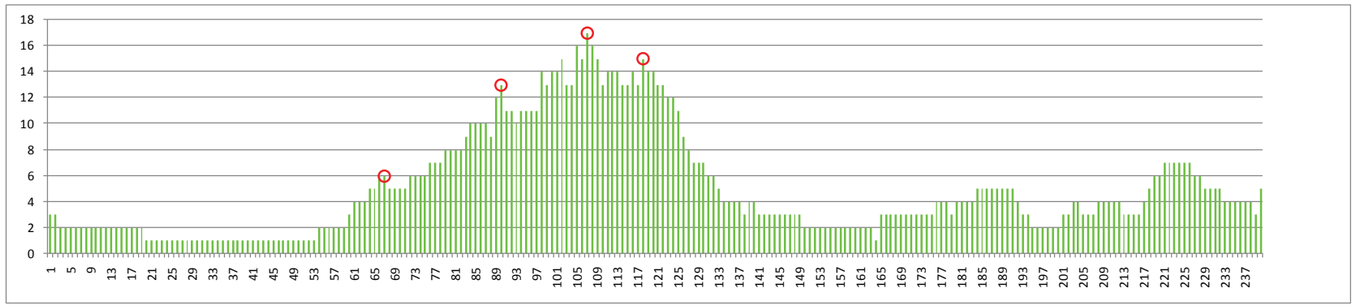
Influence Bewteen Urban Activities And Main Road

- intersection read by timeline

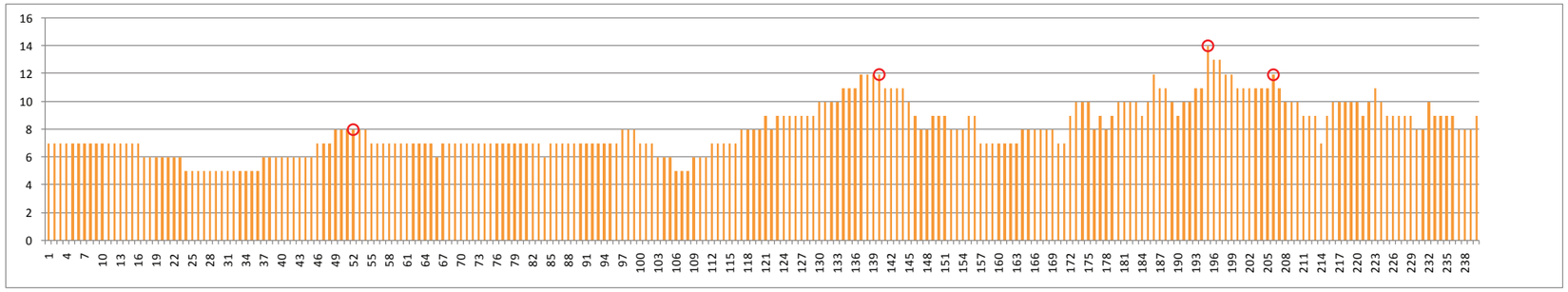
Following the time line, I found the maximun connections between agents and the main road, according to the given distance.



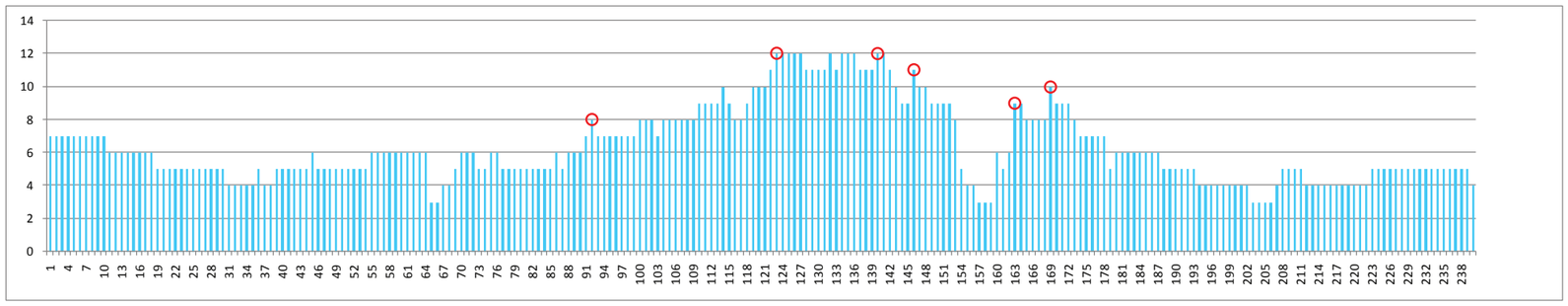
COMMERCIAL



GREEN SPACE

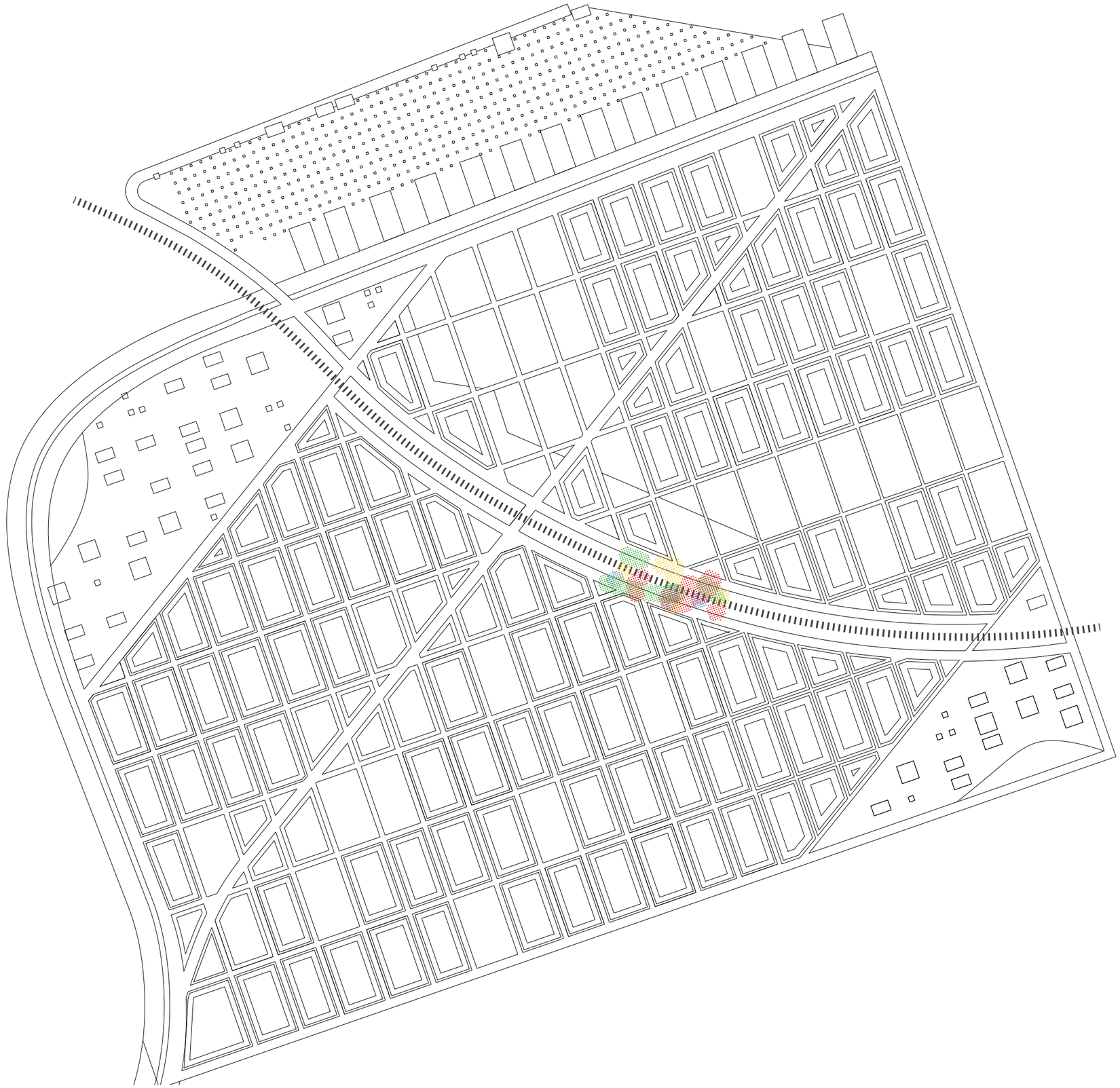


SERVICE

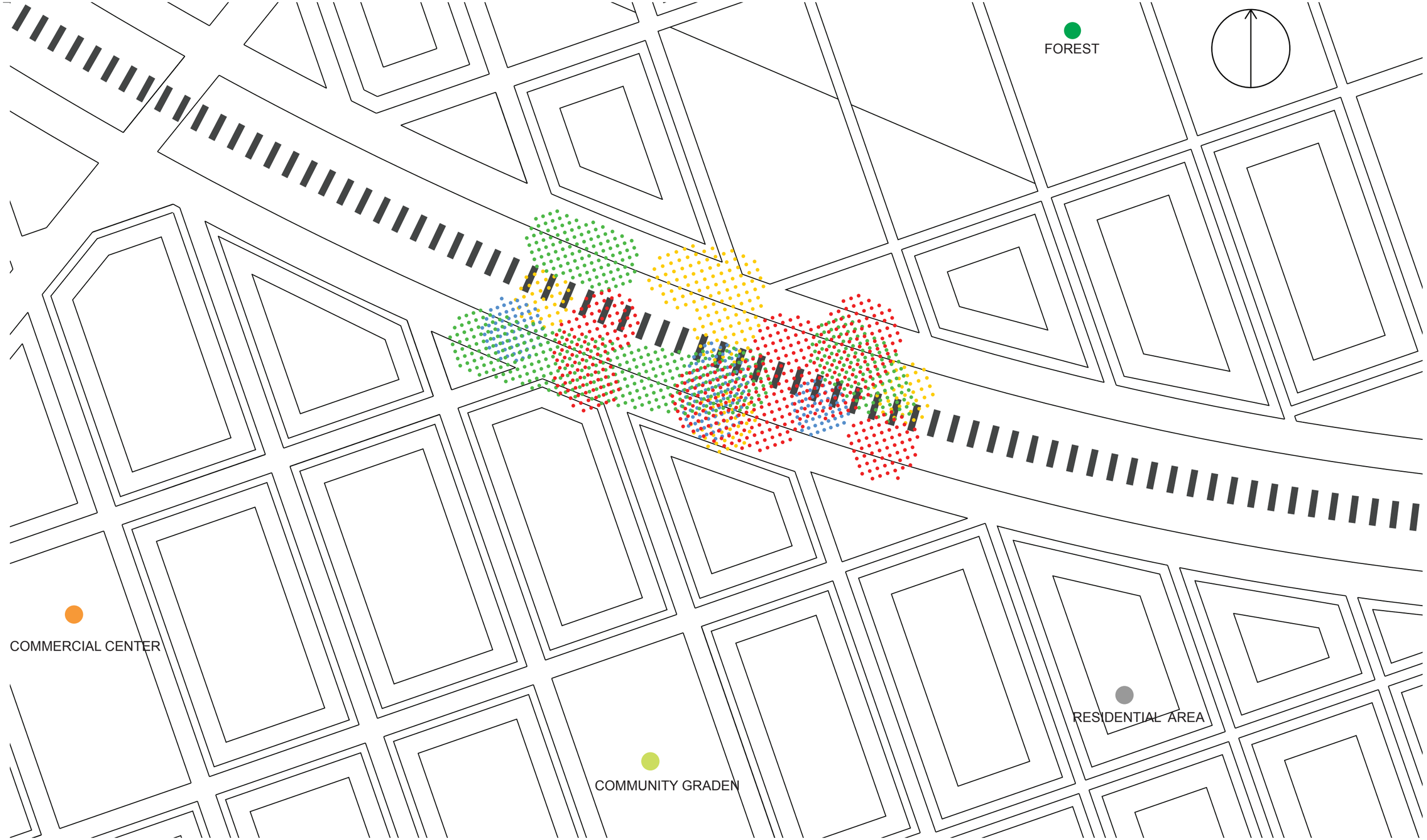


OFFICE

Site Selection For Transferium

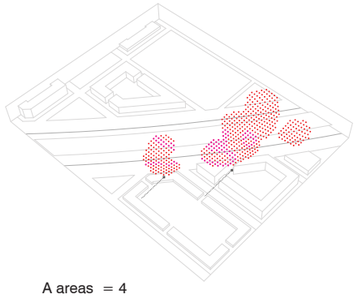


Site Selection



Movement in Vector Field

- integration with metaball range
- accessible areas
- exist & enterance points



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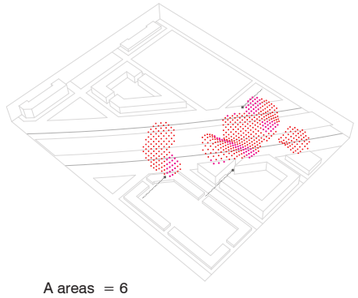

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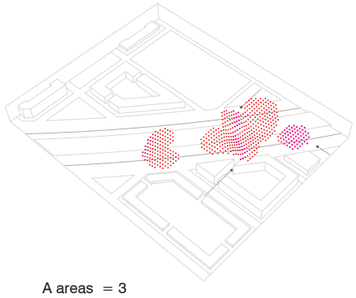

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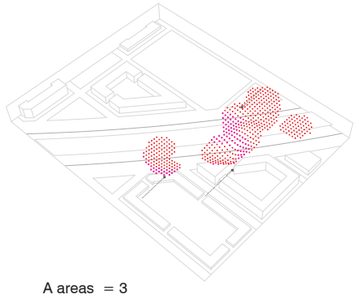

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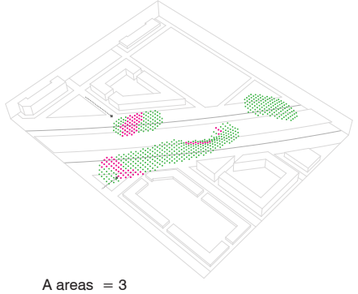

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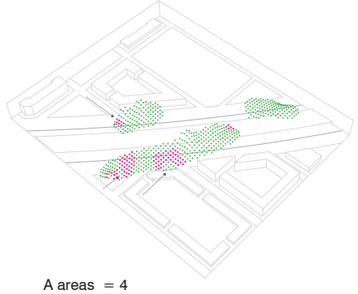

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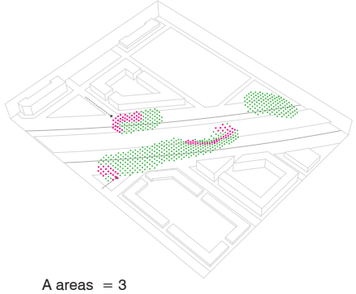

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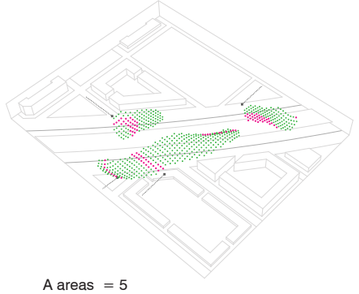

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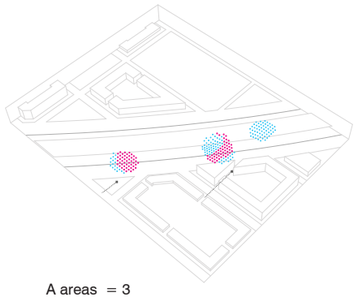

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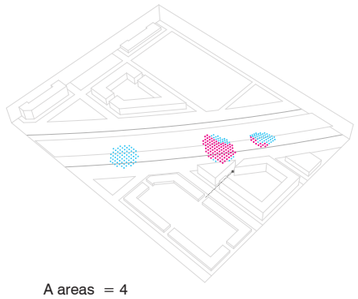

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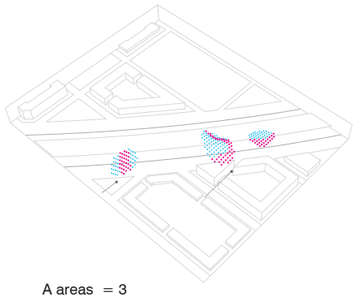

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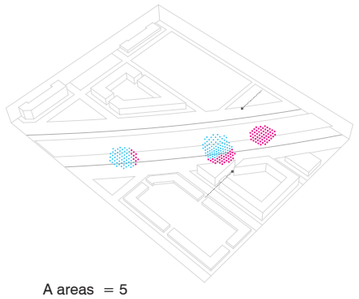

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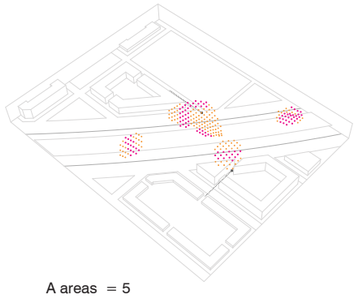

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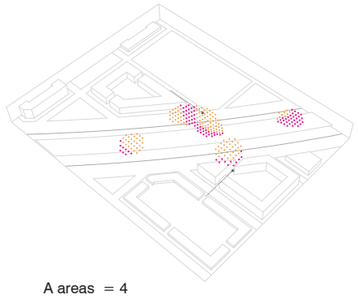

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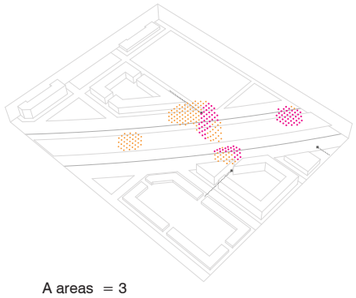

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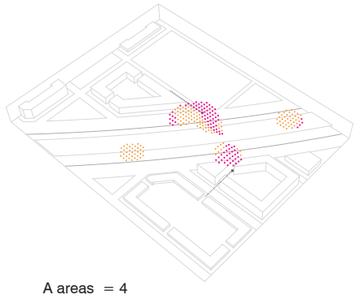
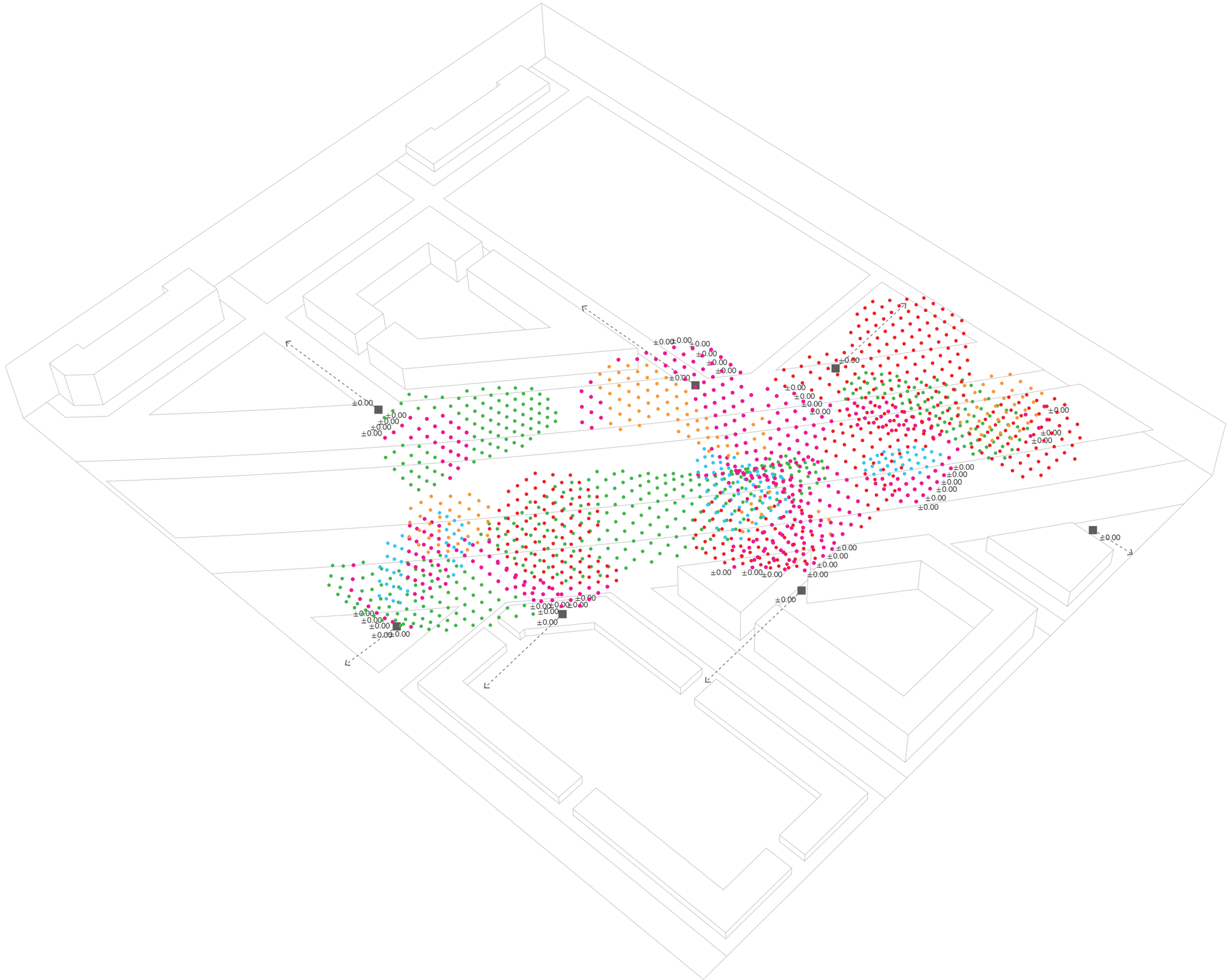


A areas = 4
E points = 2

Reading 3D Condition



Environmental Influence

- reference

EcoHomes (http://en.wikipedia.org/wiki/EcoHomes)

EcoHomes is an environmental rating scheme for homes in the United Kingdom. It is the domestic version of the Building Research Establishment's Environmental Assessment Method BREEAM, which can also be applied to a variety of non-residential buildings. It was replaced by the Code for Sustainable Homes in April 2007.
EcoHomes can be applied to new private and social housing schemes, as well as in the case of major refurbishment. Special assessments can be made of communal housing such as student halls of residence and care homes. EcoHomes was first developed and used commercially in 2000, EcoHomes Assessments fall under one of four versions, Pre-2002, 2003, 2005 or the current version 2006.
The rating system has gone through four major revisions, the latest being EcoHomes 2006. As a consequence, it is not possible to compare homes built under one revision of the standard with homes built under another.

EcoHomes 2006

In particular, the 2006 version of EcoHomes increases the standards for energy efficiency, following the 2006 revisions energy efficiency requirements of the Building Regulations. It also incorporates a number of other changes.
Under the scheme, credits are first given for standards reached in the following areas:

Energy
Ene 1 - Dwelling Emission Rate
Ene 2 - Building fabric
Ene 3 - Drying space
Ene 4 - Ecolabelled goods
Ene 5 - Internal lighting
Ene 6 - External lighting

Transport
Tra 1 - Public transport
Tra 2 - Cycle storage
Tra 3 - Local amenities
Tra 4 - Home office

Pollution
Pol 1 - Insulant GWP
Pol 2 - NOx emissions
Pol 3 - Reduction of surface runoff
Pol 4 - Renewable and low emission energy source
Pol 5 - Flood risk

Materials
Mat 1 - Environmental impact of materials
Mat 2 - Responsible sourcing of materials: basic building elements
Mat 3 - Responsible sourcing of materials: finishing elements
Mat 4 - Recycling facilities
Water
Wat 1 - Internal potable water use
Wat 2 - External potable water use

Land Use and Ecology
Eco 1 - Ecological value of site
Eco 2 - Ecological enhancement
Eco 3 - Protection of ecological features
Eco 4 - Change of ecological value of site
Eco 5 - Building Footprint

Health and Wellbeing
Hea 1 - Daylighting
Hea 2 - Sound insulation
Hea 3 - Private space

Management
Man 1 - Home user guide
Man 2 - Considerate constructors
Man 3 - Construction site impacts
Man 4 - Security

A weighting system is then used to designate the home as Pass, Good, Very Good, or Excellent.
All homes funded by the Housing Corporation or by English Partnerships are required to meet the 2006 Very Good standard. Previously a Good designation sufficed. It is expected that this requirement will be replaced by compliance with the Government's proposed Code for Sustainable Homes, currently being finalised, which is expected to be 'closely aligned' to EcoHomes [1].

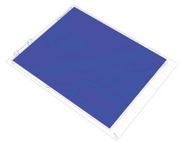
Ecotect Simulation

Solar Radiation Access
ECOTECT V5

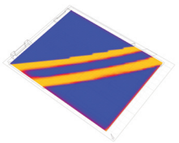
SPRING
0.00 M
0 - +1300 WH

SUMMER
0.00 M
0 - +1300 WH

AUTUMN
0.00 M
0 - +1300 WH

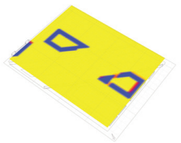


WINTER
0.00 M
0 - +1300 WH



SUMMER
-10.00 M
0 - +1300 WH

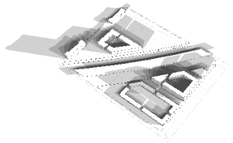
SUMMER
0.00 M
0 - +1300 WH



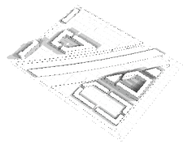
SUMMER
+10.00 M
0 - +1300 WH

SUMMER
+20.00 M
0 - +1300 WH

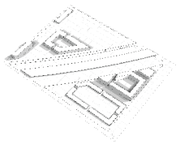
Shading and Shadow
ECOTECT V5



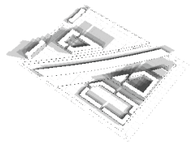
03:00 PM
JAN
0 - 90 Levels



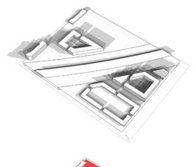
03:00 PM
APR
0 - 90 Levels



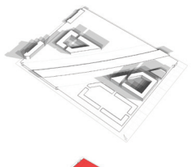
03:00 PM
JUL
0 - 90 Levels



03:00 PM
OCT
0 - 90 Levels



03:00 PM
OCT
0 - 90 Levels
- 10.00 M



03:00 PM
OCT
0 - 90 Levels
0.00 M

03:00 PM
OCT
0 - 90 Levels
+ 10.00 M

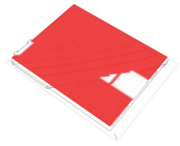
03:00 PM
OCT
0 - 90 Levels
+ 20.00 M

Visibility Analysis
Actual Visible Area
ECOTECT V5

+0.50 M
0 - +20 M2

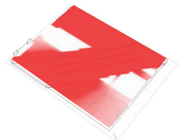
+6.50 M
0 - +20 M2

+12.50 M
0 - +20 M2

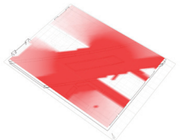


+20.00 M
0 - +20 M2

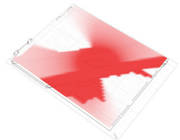
+10.00 M
0 - +20 M2
ROAD SIZE
400 M



+10.00 M
0 - +20 M2
ROAD SIZE
200 M

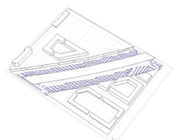


+10.00 M
0 - +20 M2
ROAD SIZE
150 M

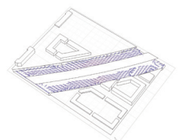


+10.00 M
0 - +20 M2
ROAD SIZE
50 M

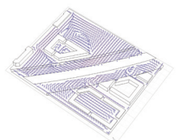
CFD Analysis
Flow Vector
ECOTECT V5



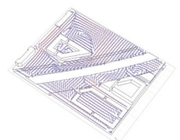
SUMMER
-10.00 M
0 - +5 M/S



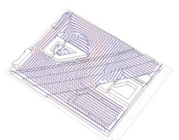
SUMMER
-5.00 M
0 - +5 M/S



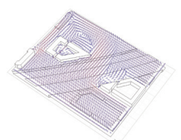
SUMMER
0.00 M
0 - +5 M/S



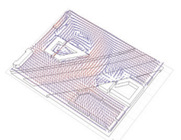
SUMMER
+5.00 M
0 - +5 M/S



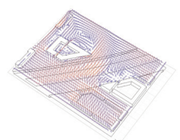
SUMMER
+10.00 M
0 - +5 M/S



SUMMER
+15.00 M
0 - +5 M/S

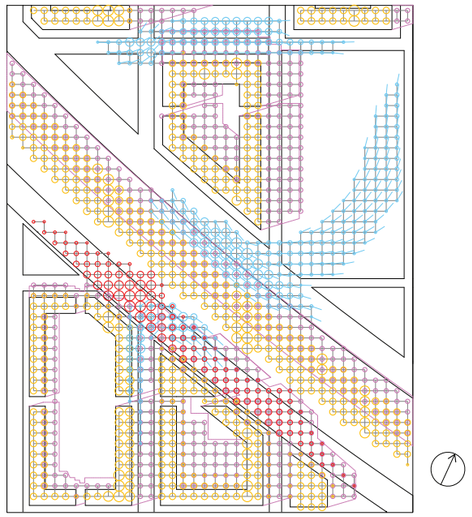


SUMMER
+20.00 M
0 - +5 M/S

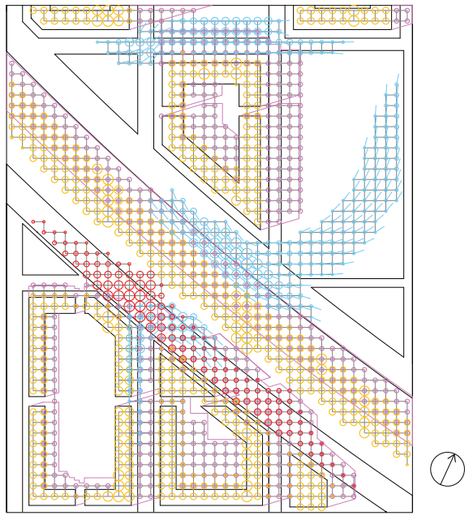


SUMMER
+30.00 M
0 - +5 M/S

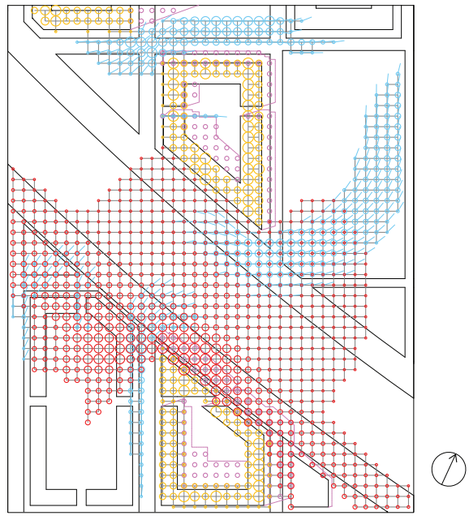
Environmental Datalanscape



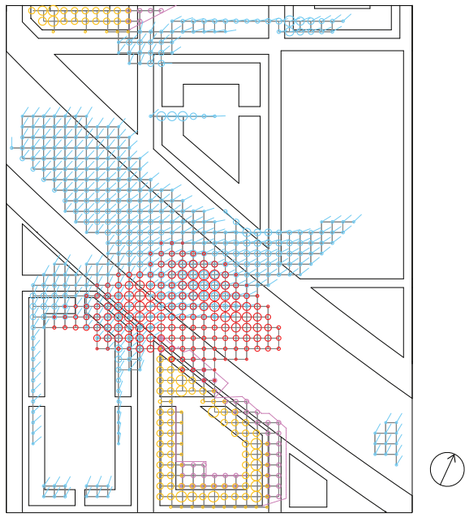
-10.00 M



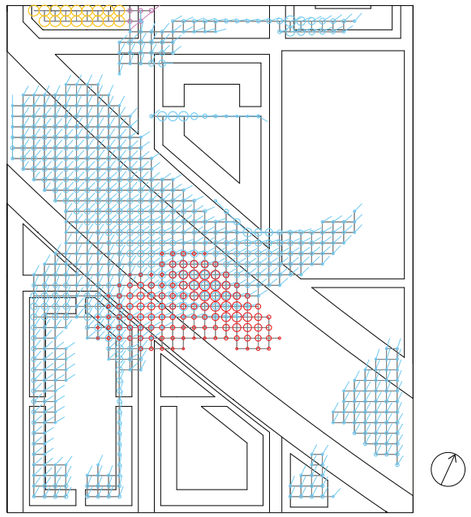
±0.00 M



+10.00 M



+20.00 M

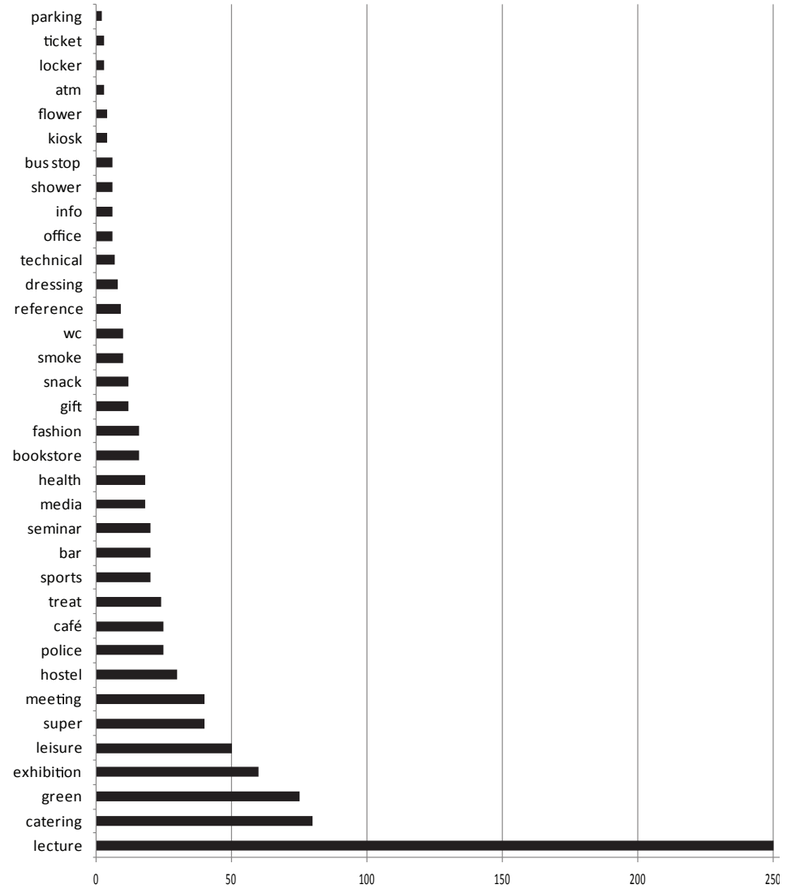


+30.00 M

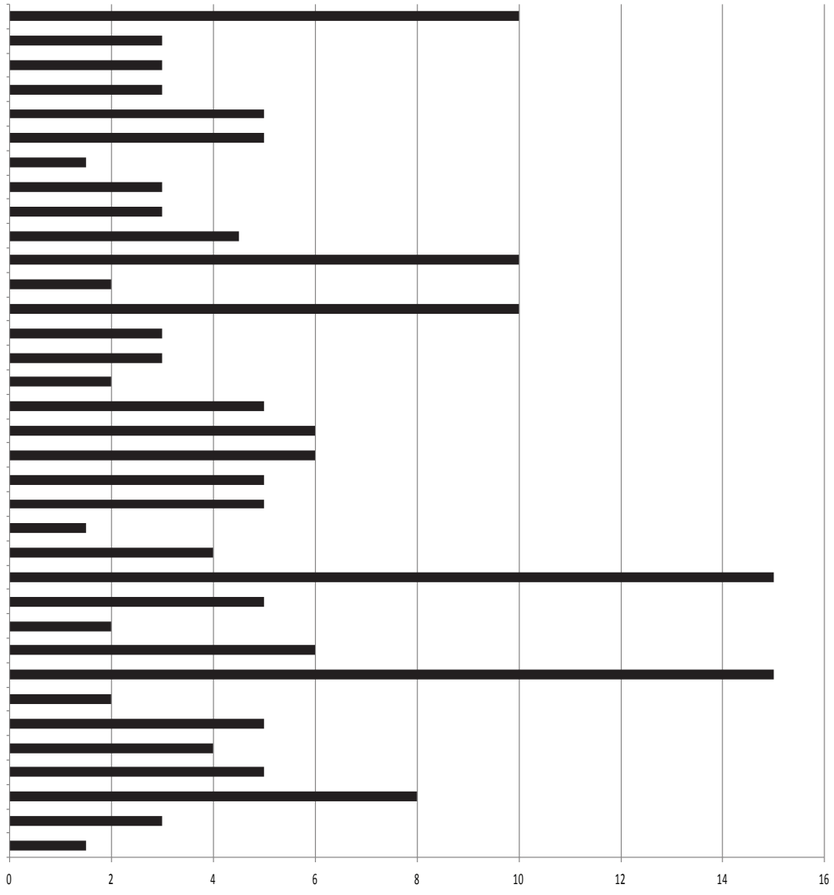
03

occupy space per person...

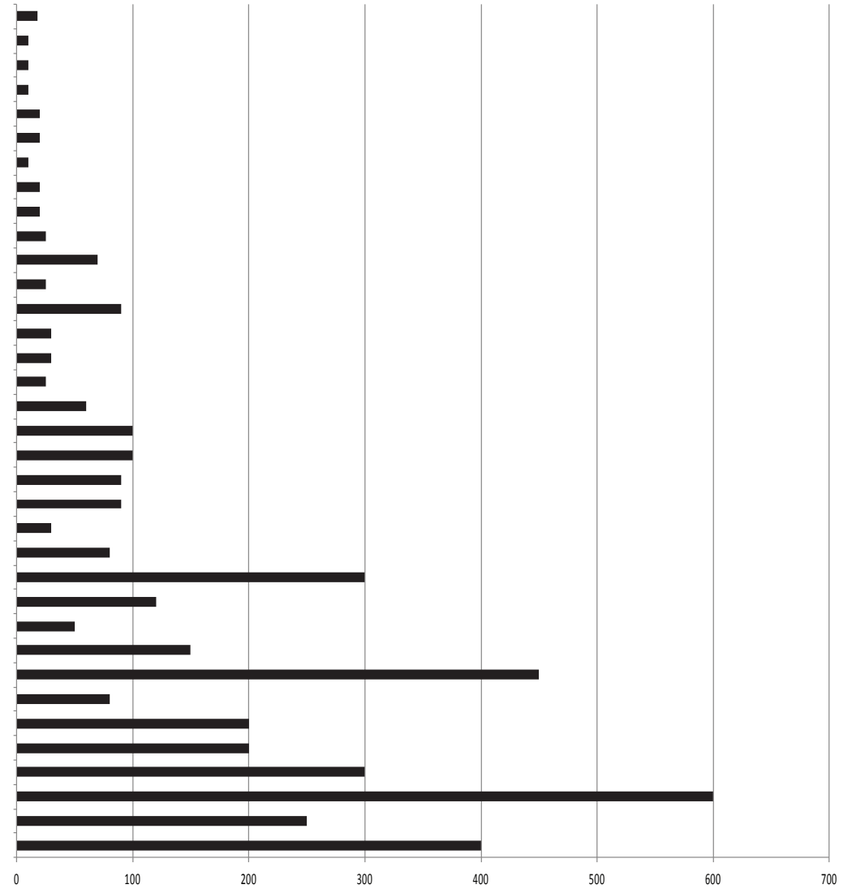
Relation Between Population, Density and Area



Number of people



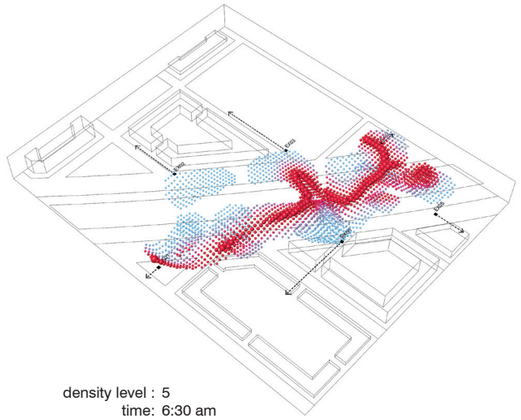
Density(m2/person)



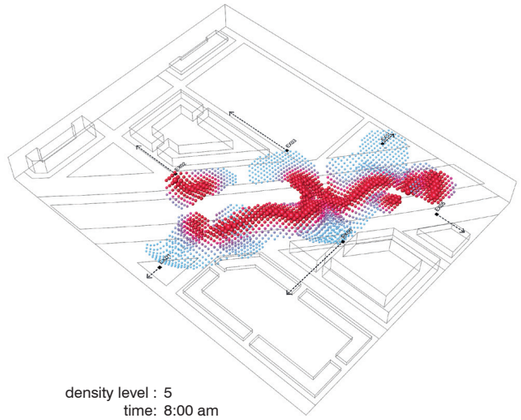
Area(m2)

Usual Conditions about Density in the Site

- according to the timeline



density level : 5
time: 6:30 am



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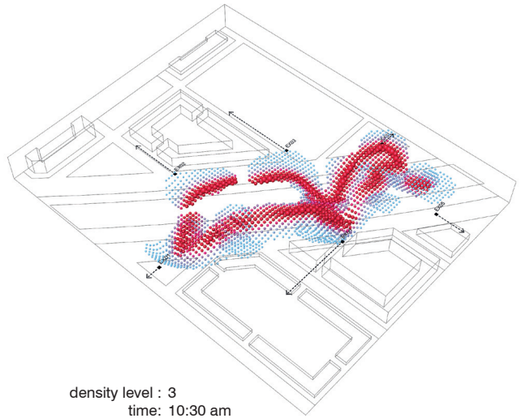

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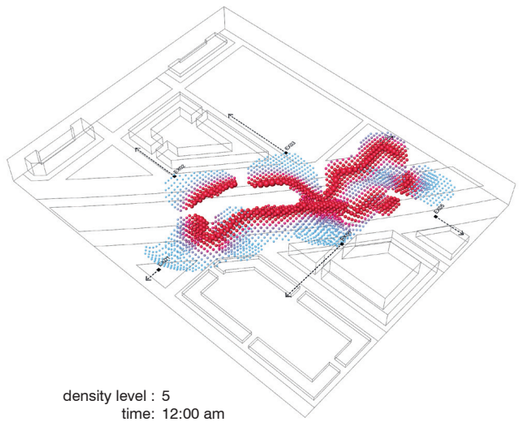

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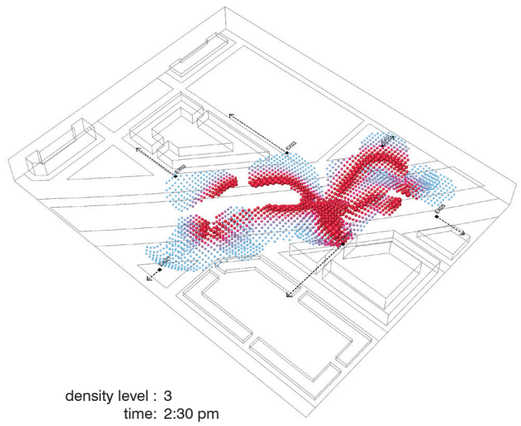

density level : 3
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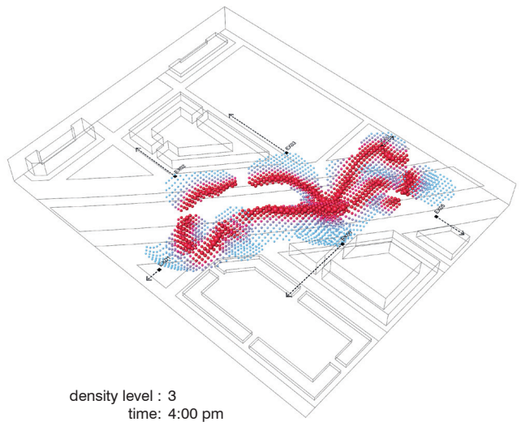

density level : 3
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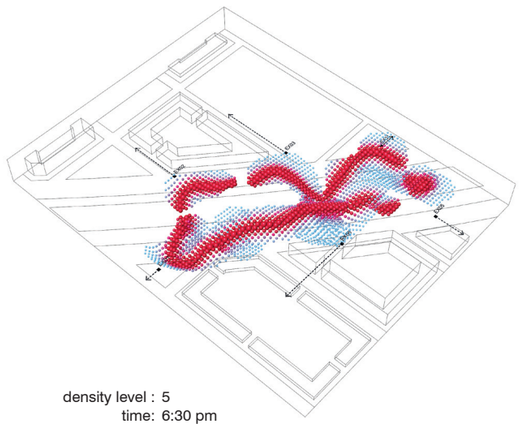

density level : 5
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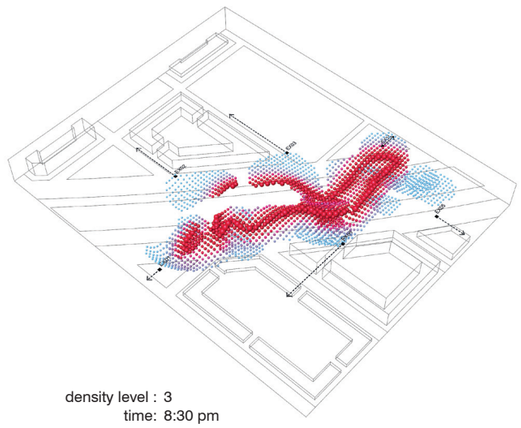

density level : 3
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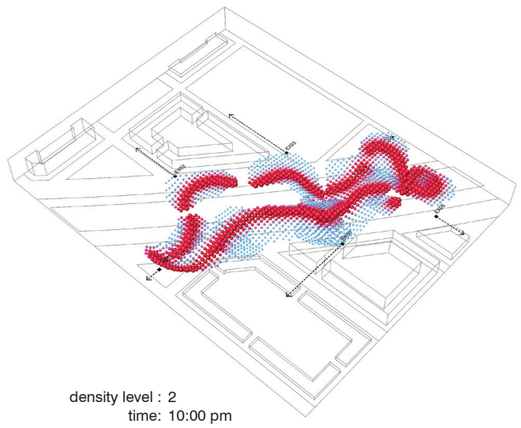
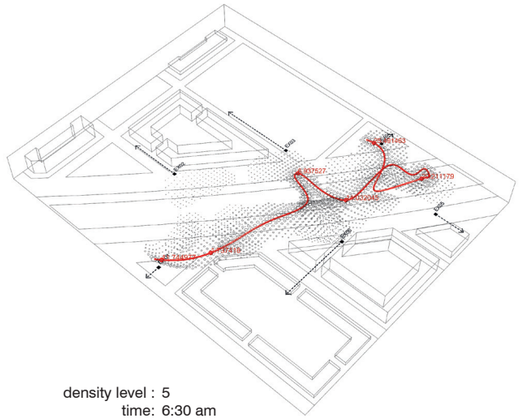


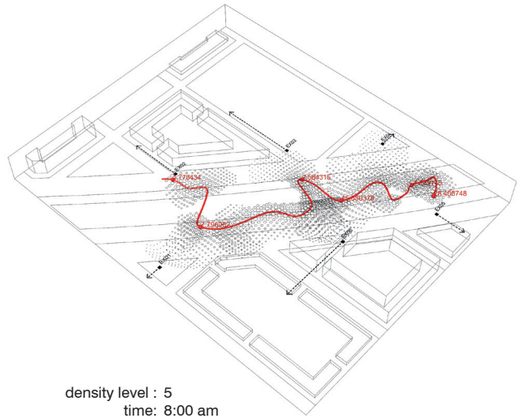
density level : 2
time: 10:00 pm

Circulation Reading

- based on conditions exsiting in one day



density level : 5
time: 6:30 am
max height: 25.5 m
mini height: 1.7 m



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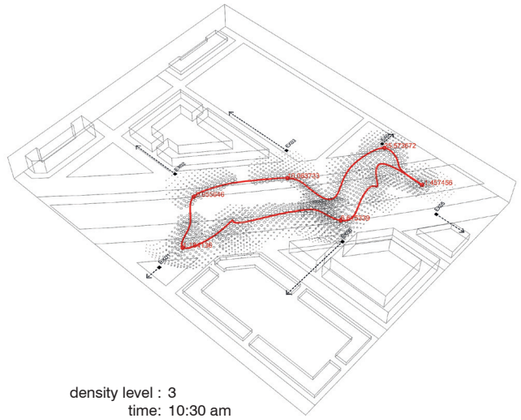

density level : 3
time: 10:30 am
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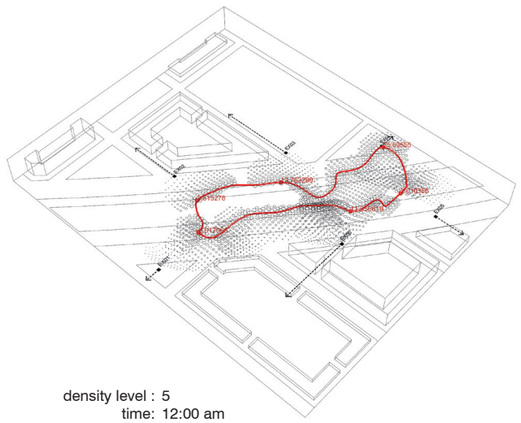
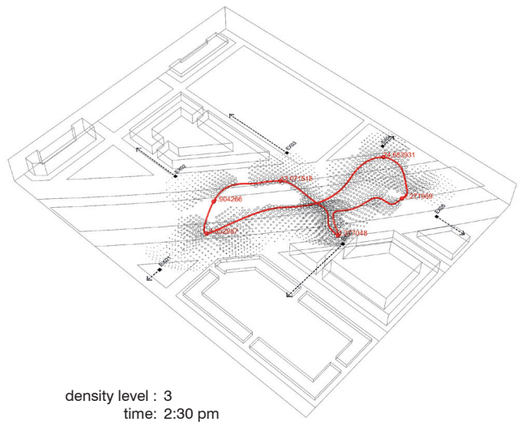
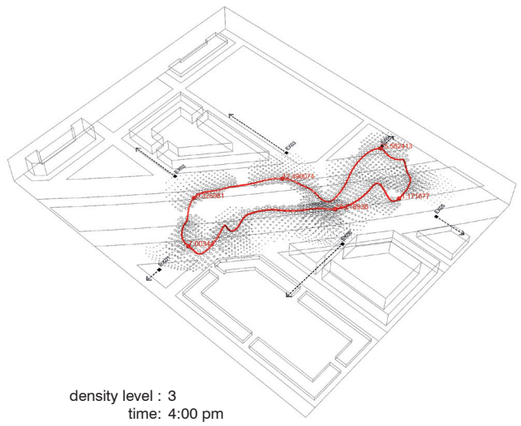
mini height: 0.9 m



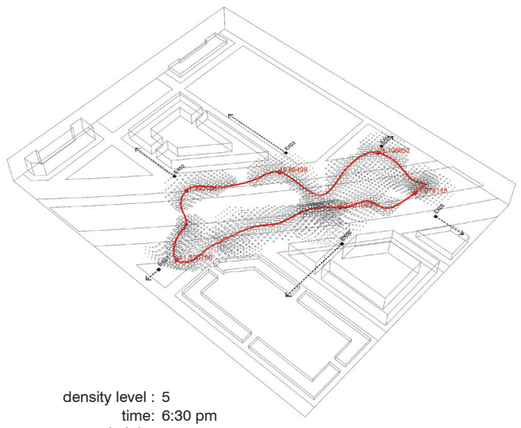
density level : 5
time: 12:00 am
max height: 25.7 m
mini height: 3.5 m



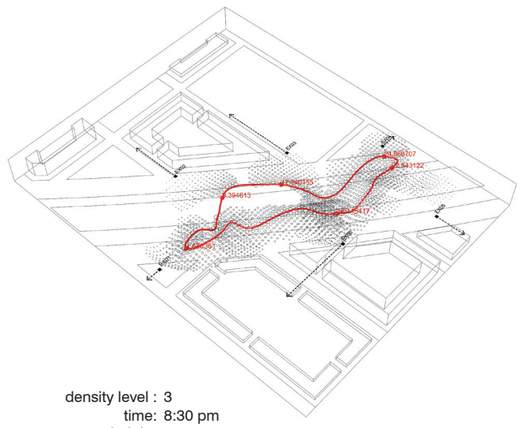
density level : 3
time: 2:30 pm
max height: 24.6 m
mini height: 1.4 m



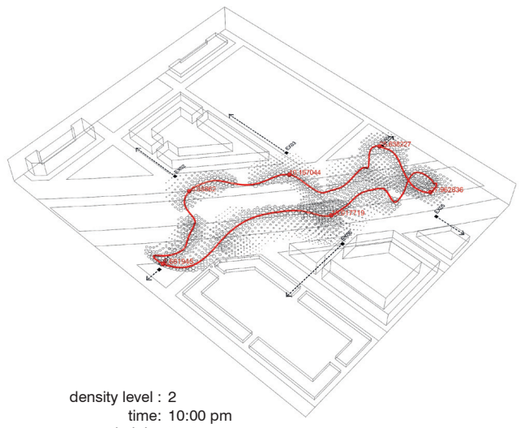
density level : 3
time: 4:00 pm
max height: 25.6 m
mini height: 0.3 m



density level : 5
time: 6:30 pm
max height: 25.1 m
mini height: 1.4 m



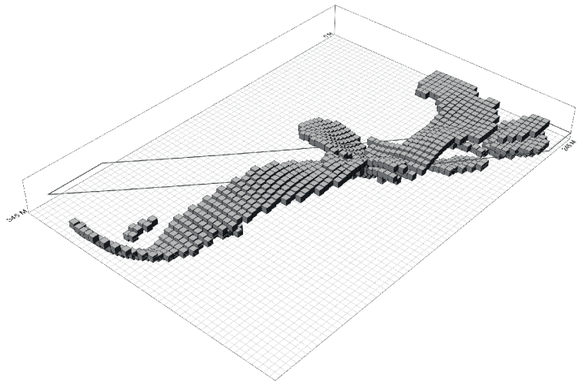
density level : 3
time: 8:30 pm
max height: 24.9 m
mini height: 1.9 m



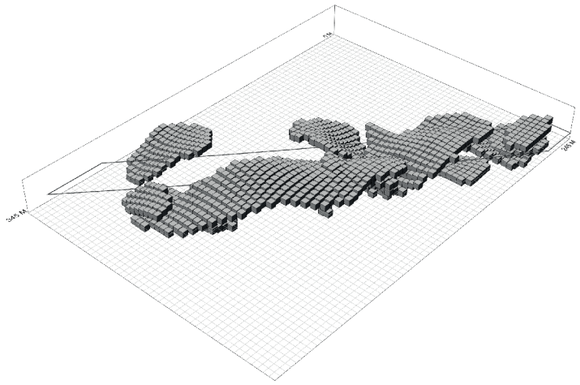
density level : 2
time: 10:00 pm
max height: 25.6 m
mini height: 0.9 m

Voxelization Reading

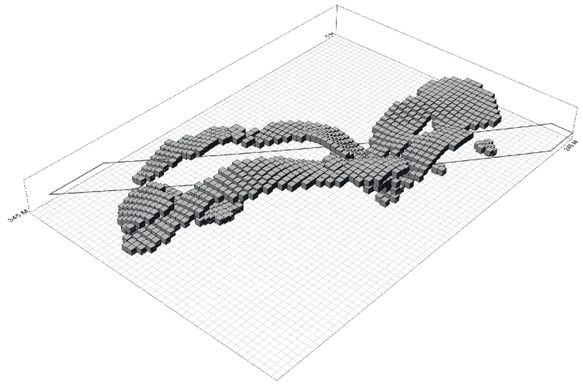
- 9 conditions exsiting in one day



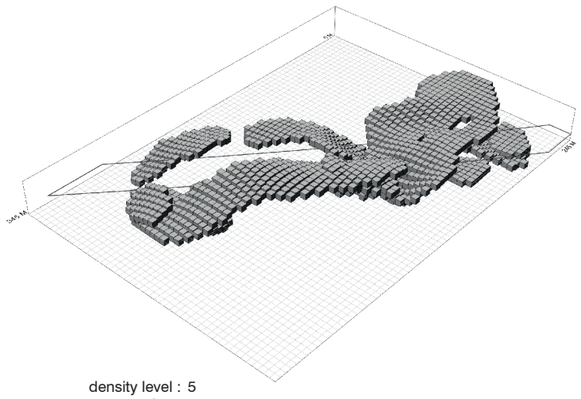
density level : 5
time: 6:30 am



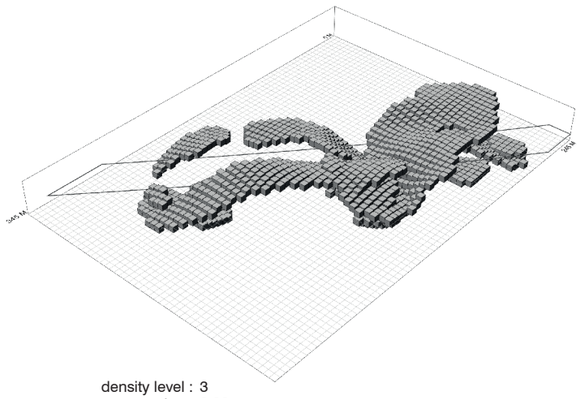
density level : 5
time: 8:00 am



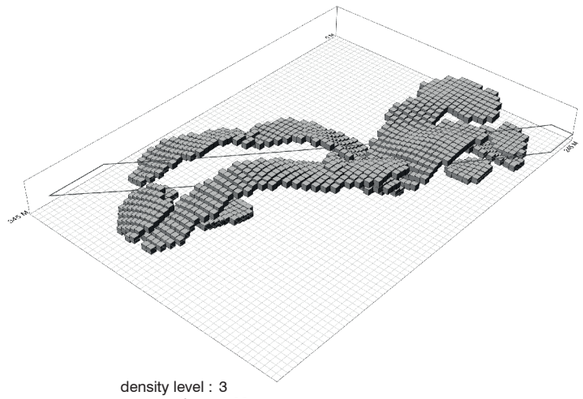
density level : 3
time: 10:30 am



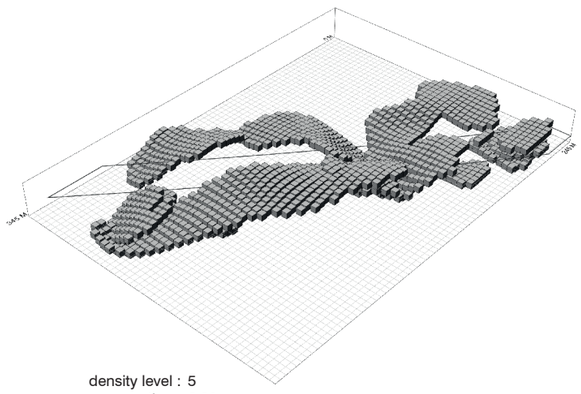
density level : 5
time: 12:00 am



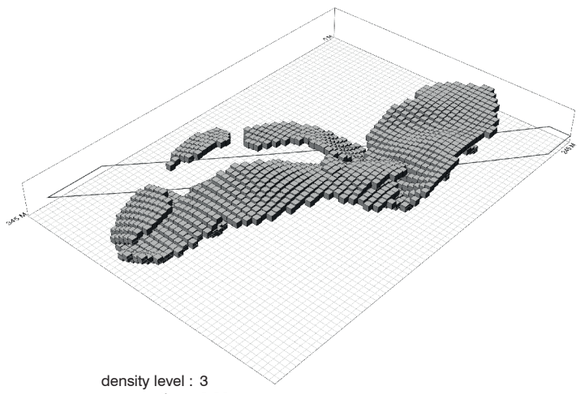
density level : 3
time: 2:30 pm



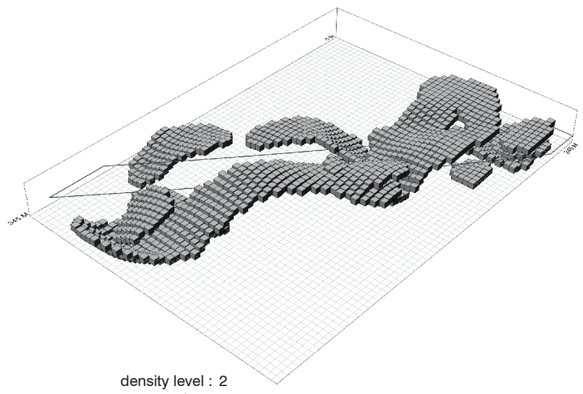
density level : 3
time: 4:00 pm



density level : 5
time: 6:30 pm



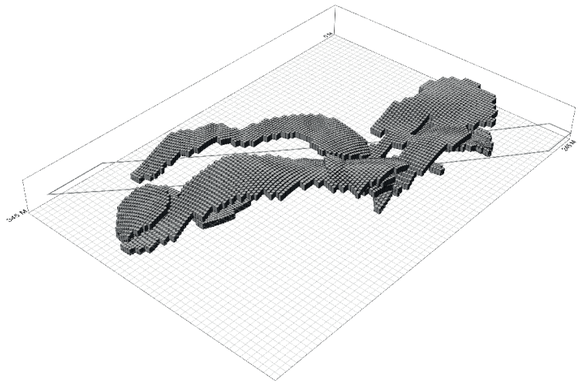
density level : 3
time: 8:30 pm



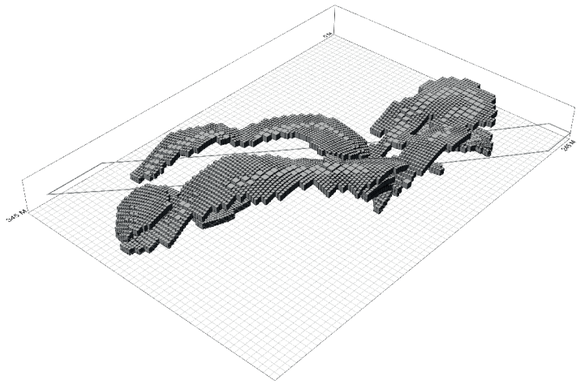
density level : 2
time: 10:00 pm

Voxelization Reading by Scaling

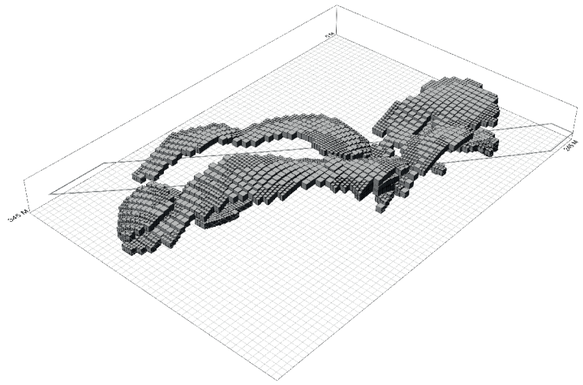
- 9 levels of action



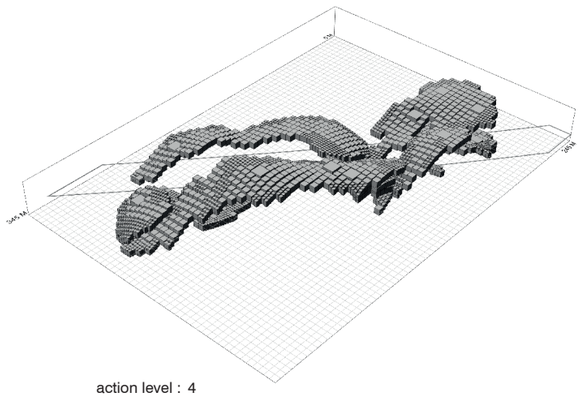
action level : 1



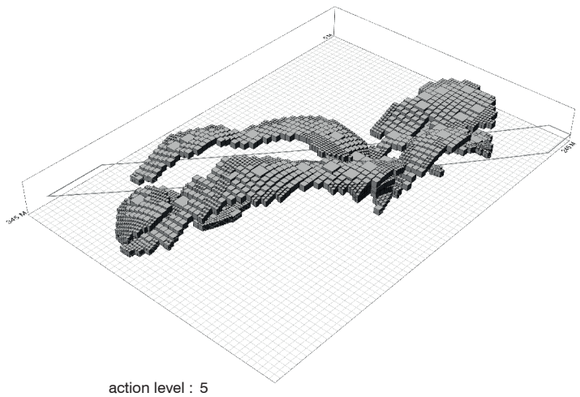
action level : 2



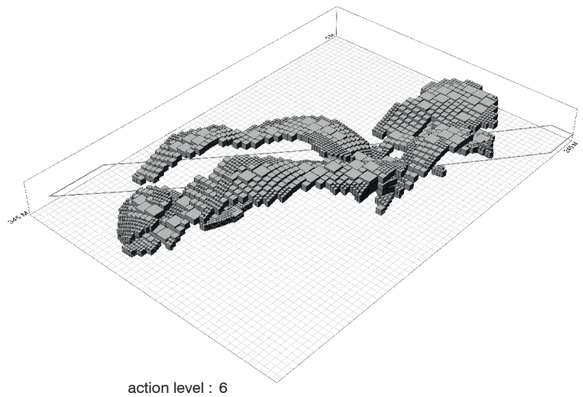
action level : 3



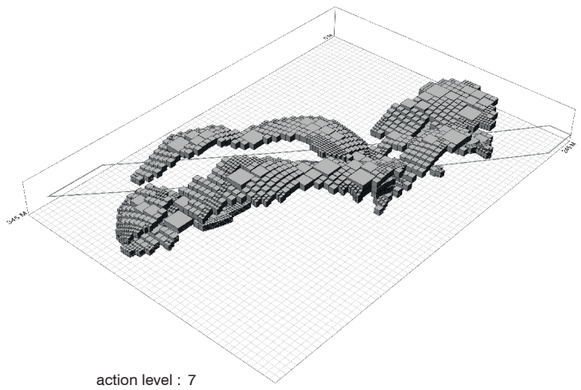
action level : 4



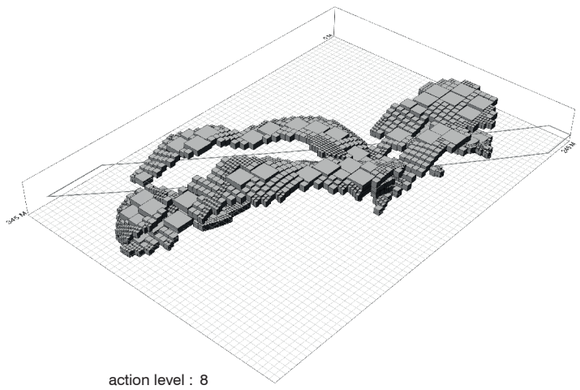
action level : 5



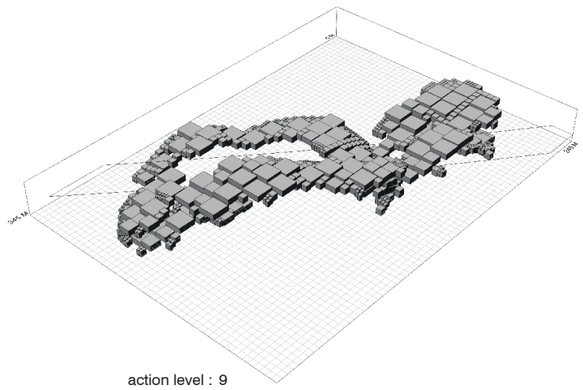
action level : 6



action level : 7



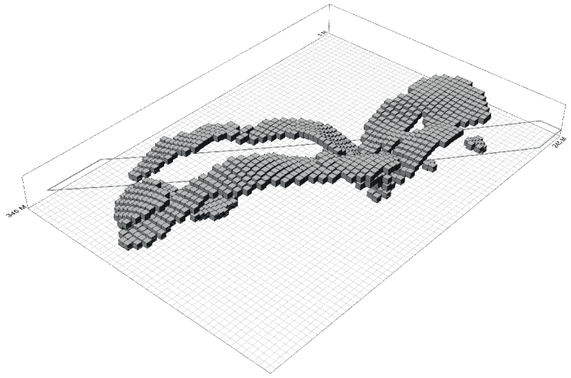
action level : 8



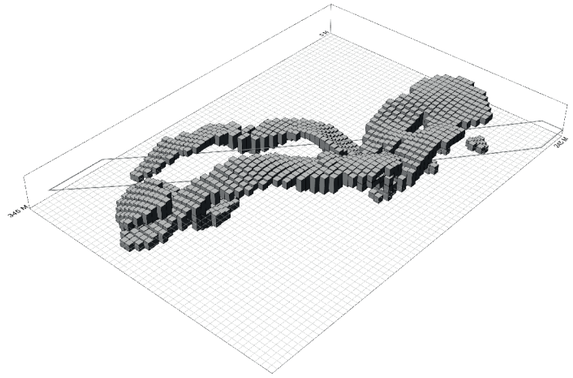
action level : 9

Voxelization Reading by Vertical Movement

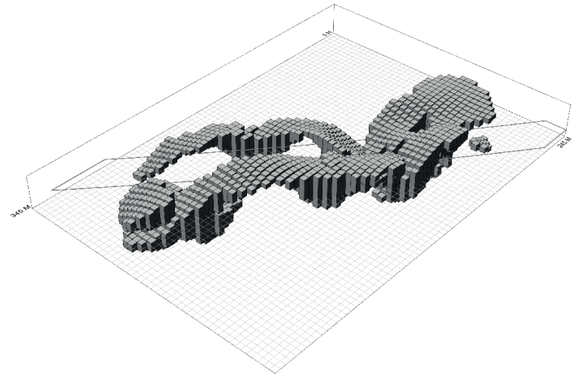
- simulation about external connection



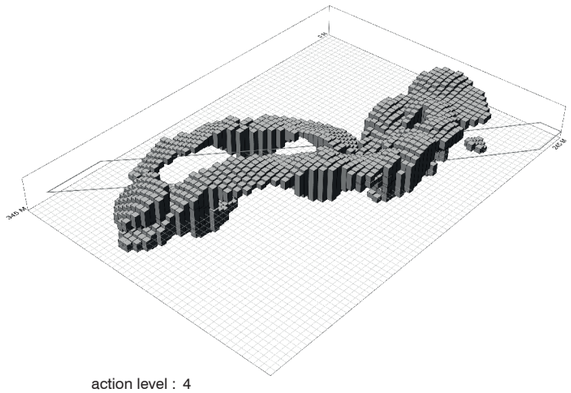
action level : 1



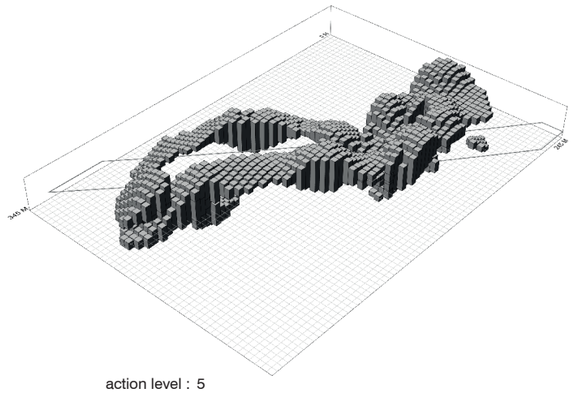
action level : 2



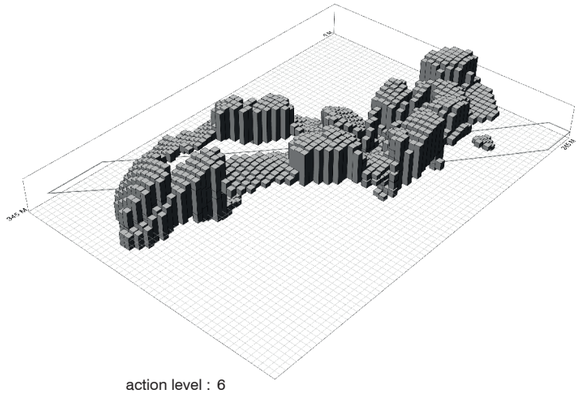
action level : 3



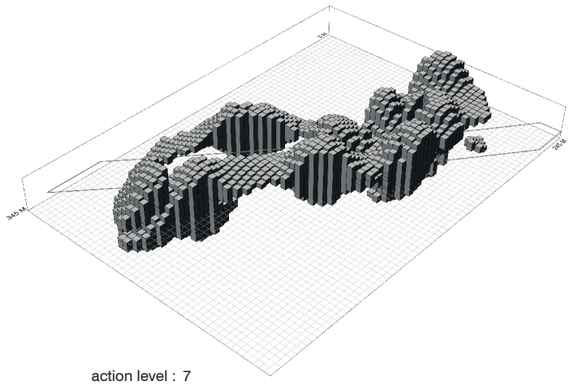
action level : 4



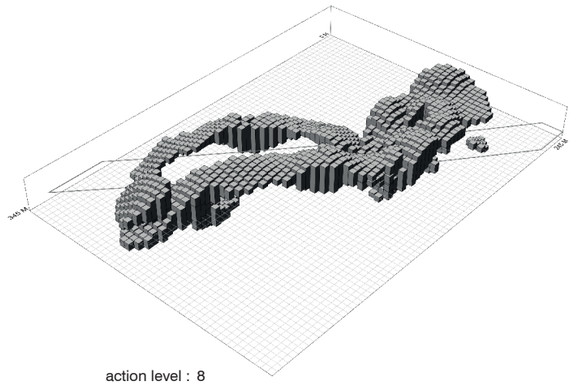
action level : 5



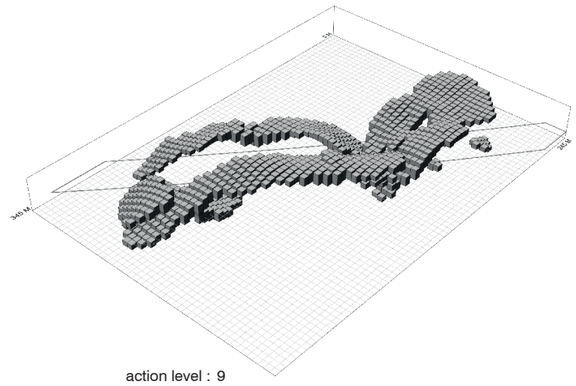
action level : 6



action level : 7



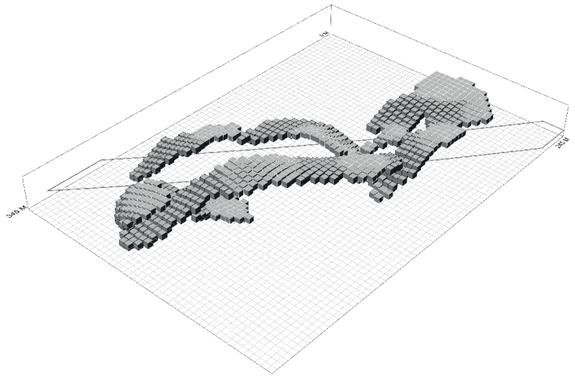
action level : 8



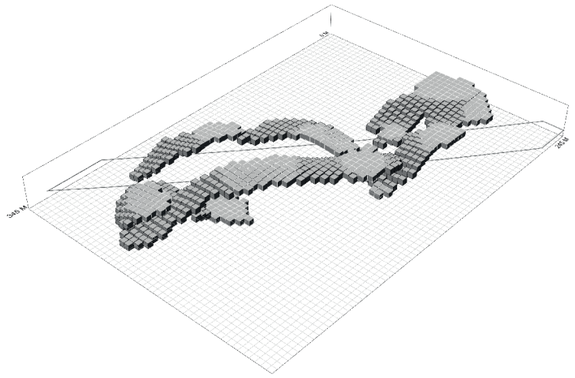
action level : 9

Voxelization Reading by Flateness

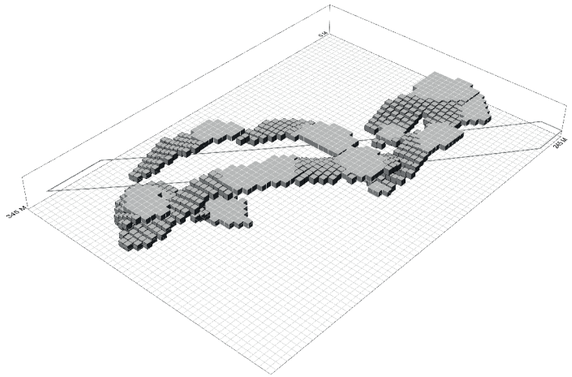
- simulation about internal connection



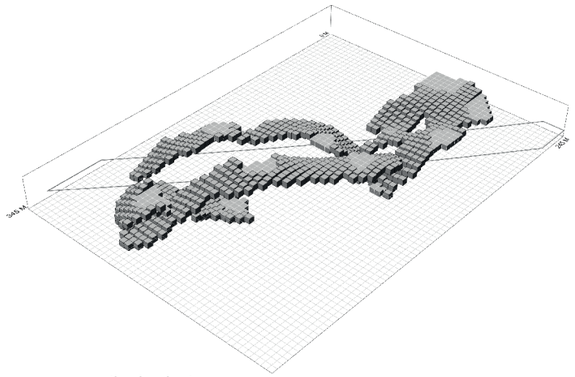
action level : 1



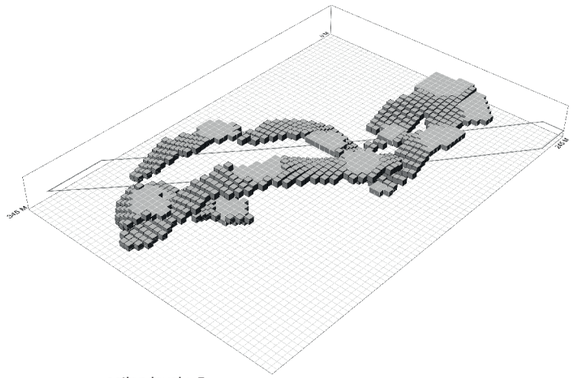
action level : 2



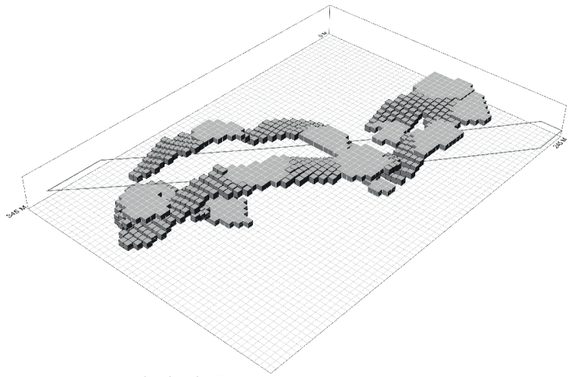
action level : 3



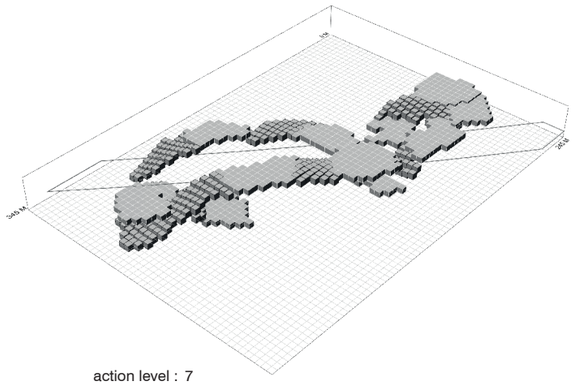
action level : 4



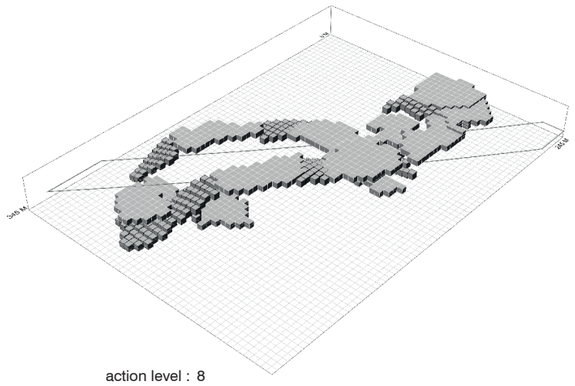
action level : 5



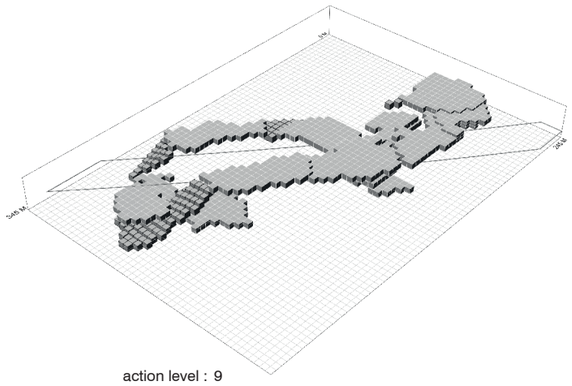
action level : 6



action level : 7



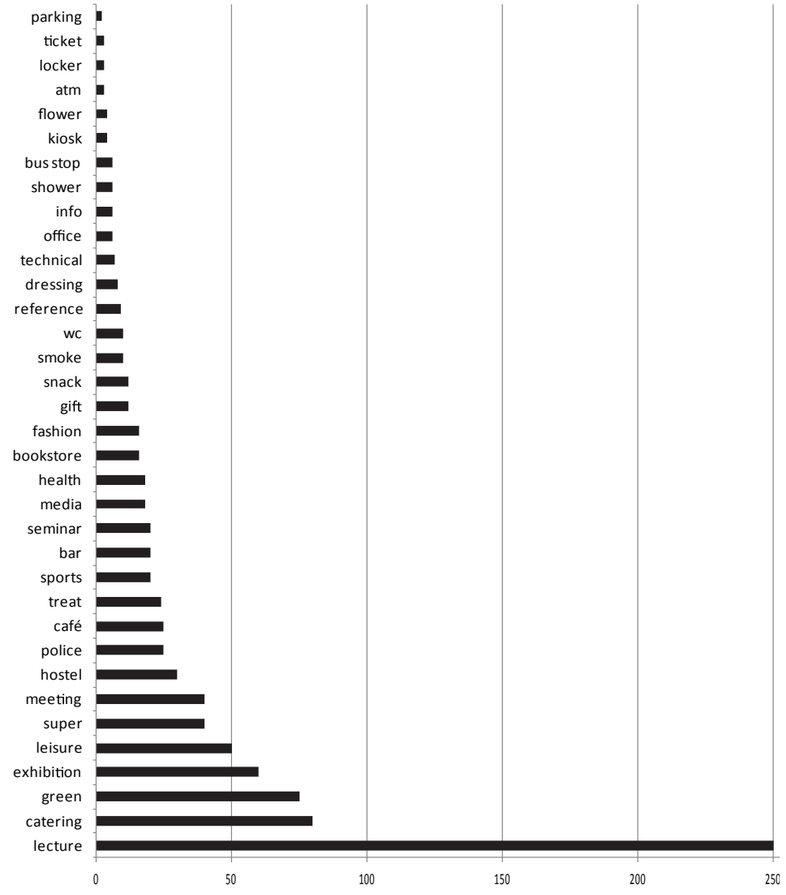
action level : 8



action level : 9

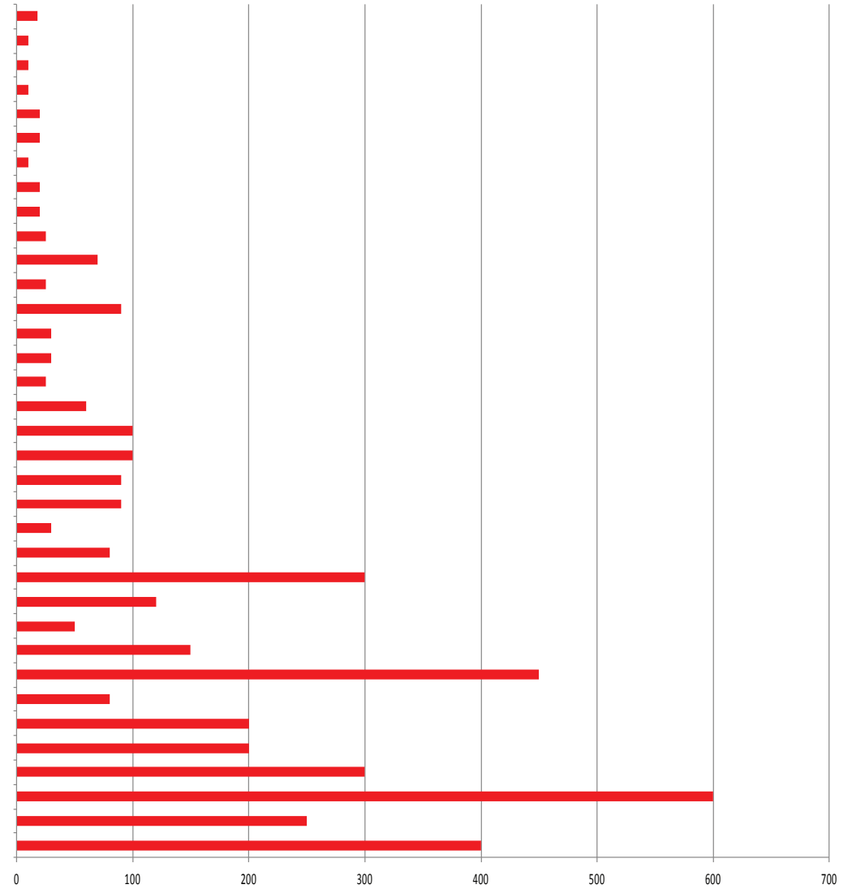
Movement in Vector Field

- integration with metaball range
- accessible areas
- exist & enterance points



Number of people

Density(m2/person)



Area(m2)

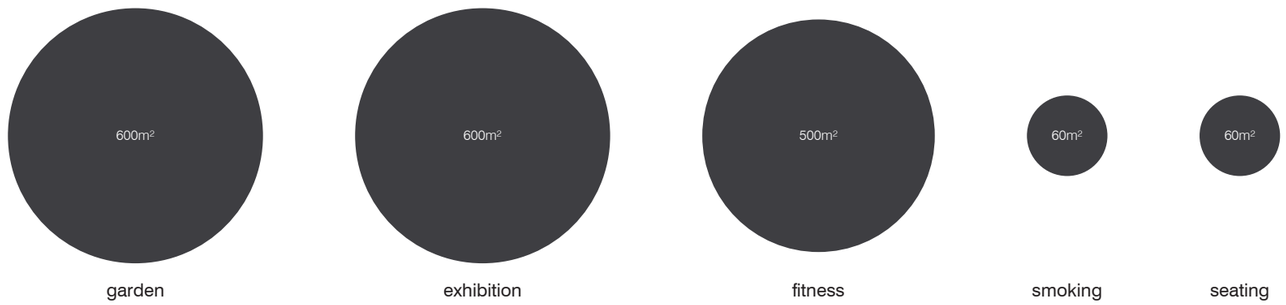
Programme Introduction

Commerce

Function sum: 10
Total area: 1440 m²
Maximum area: 300 m²
Minimum area: 30 m²

Green space

Function sum: 5
Total area: 1820 m²
Maximum area: 600 m²
Minimum area: 60 m²

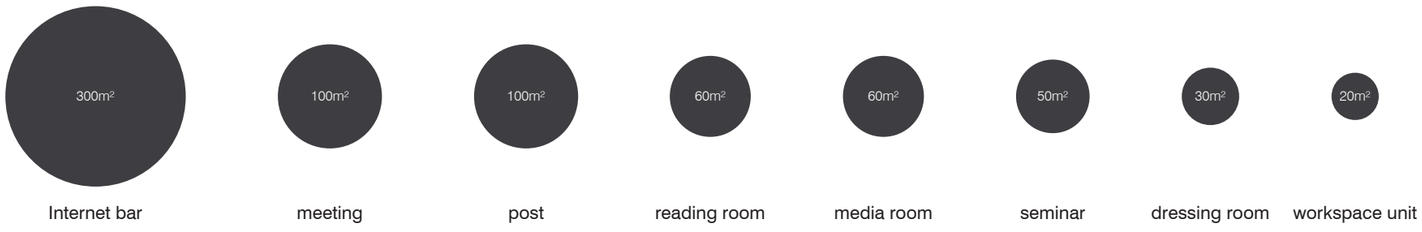


Service

Function sum: 9
Total area: 795 m²
Maximum area: 500 m²
Minimum area: 15 m²

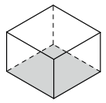
Office

Function sum: 8
Total area: 720 m²
Maximum area: 300 m²
Minimum area: 20 m²

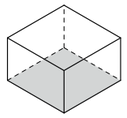


Programme Introduction

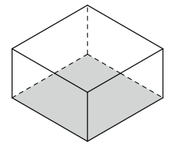
width=4 m
height=3 m
area=16 m²
CASE:
ticket



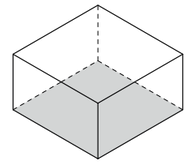
width=5 m
height=3.6 m
area=25 m²
CASE:
kiosk



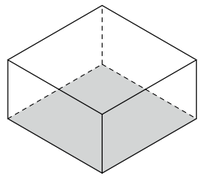
width=6 m
height=3.9 m
area=36 m²
CASE:
dressing room



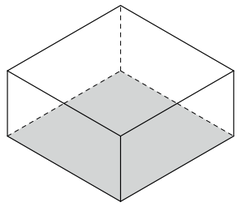
width=8 m
height=4.5 m
area=64 m²
CASE:
police office



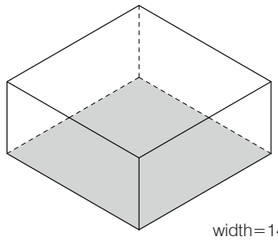
width=9 m
height=5.1 m
area=81 m²
CASE:
treatment



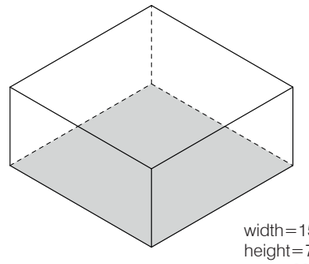
width=10 m
height=5.4 m
area=100 m²
CASE:
media shop



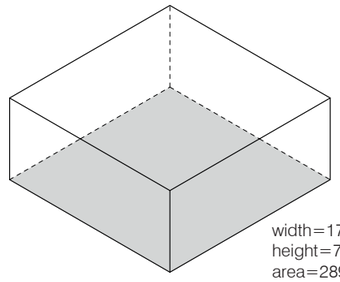
width=12 m
height=6 m
area=144 m²
CASE:
bookstore



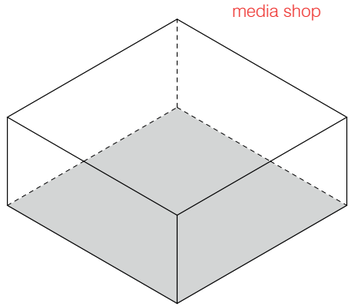
width=14 m
height=6.6 m
area=196 m²
CASE:
bar



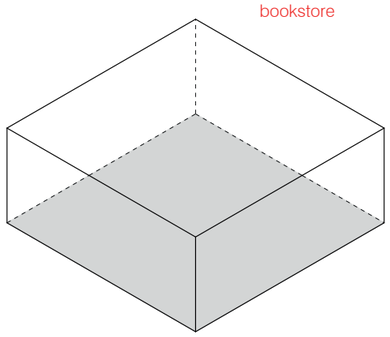
width=15 m
height=7.2 m
area=225 m²
CASE:
supermarket



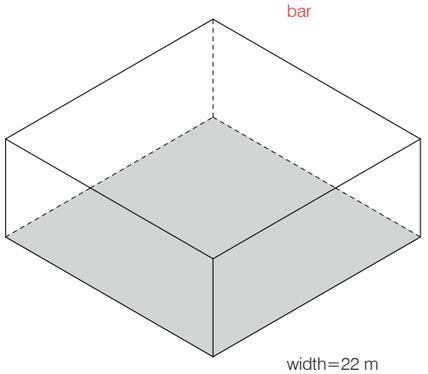
width=17 m
height=7.5 m
area=289 m²
CASE:
Internet bar



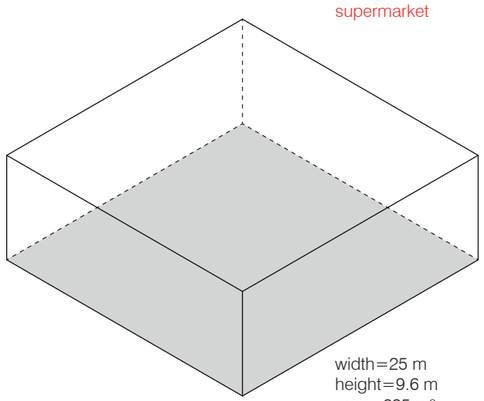
width=18 m
height=8.1 m
area=324 m²
CASE:
catering



width=20 m
height=8.7 m
area=400 m²
CASE:
fitness



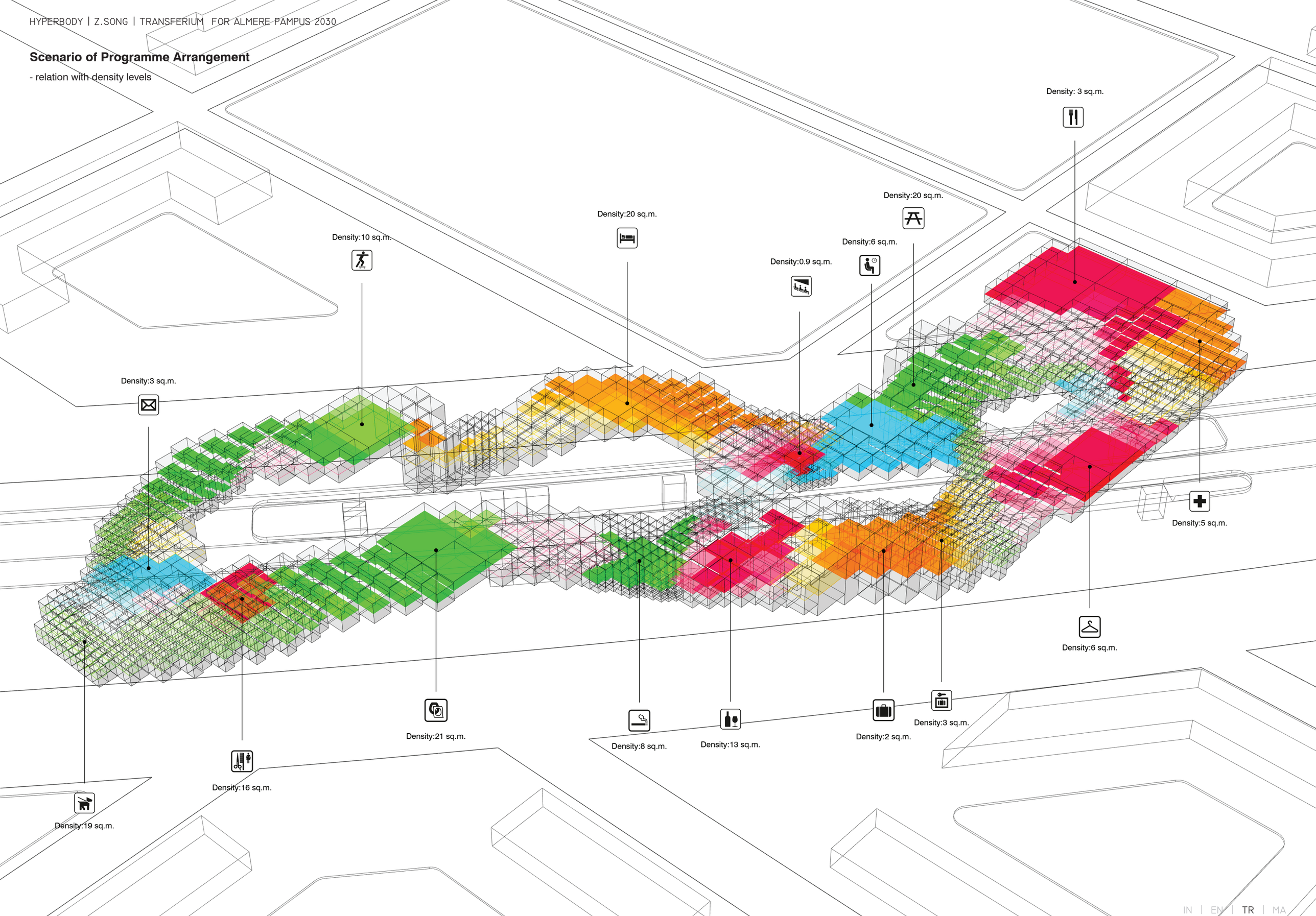
width=22 m
height=9 m
area=484 m²
CASE:
hostel



width=25 m
height=9.6 m
area=625 m²
CASE:
ticket

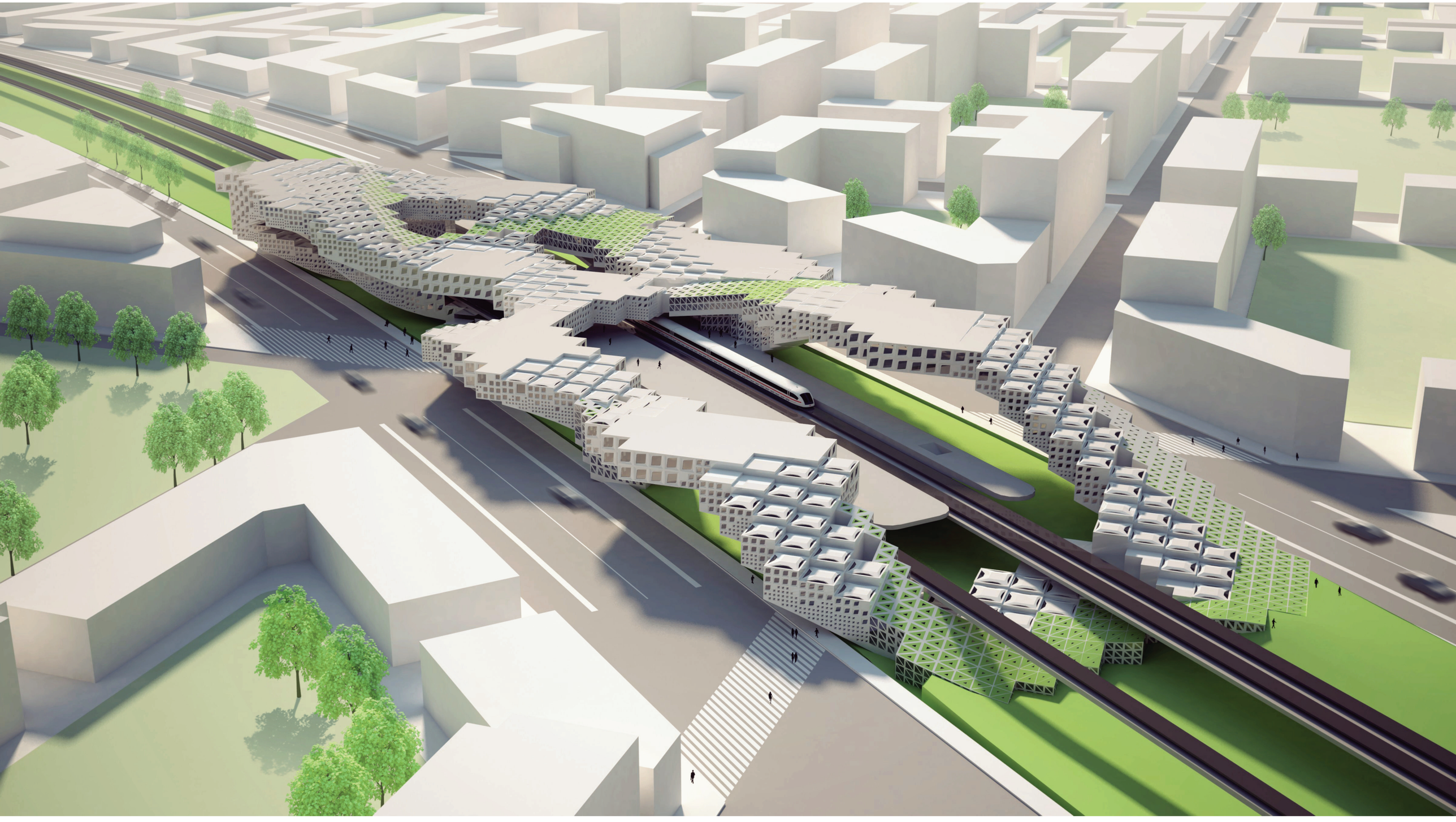
Scenario of Programme Arrangement

- relation with density levels

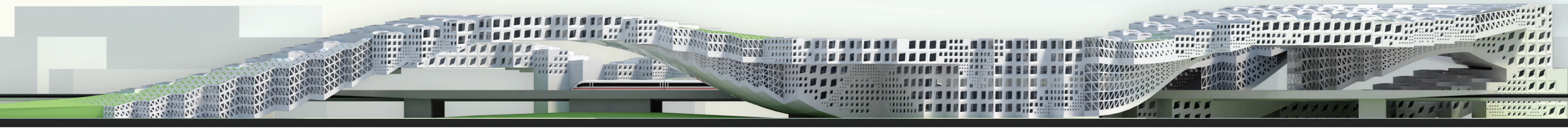


04

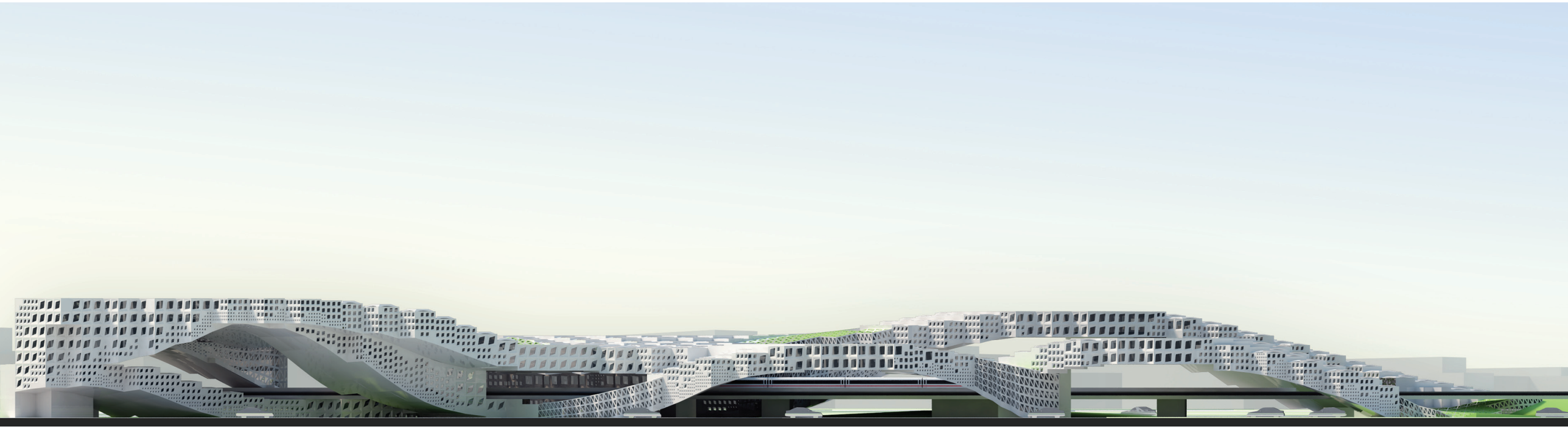
Perspective



Elevation

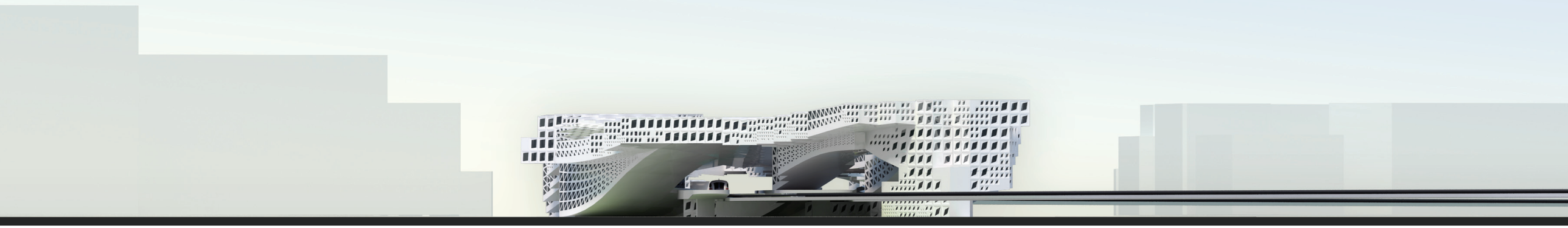


South View

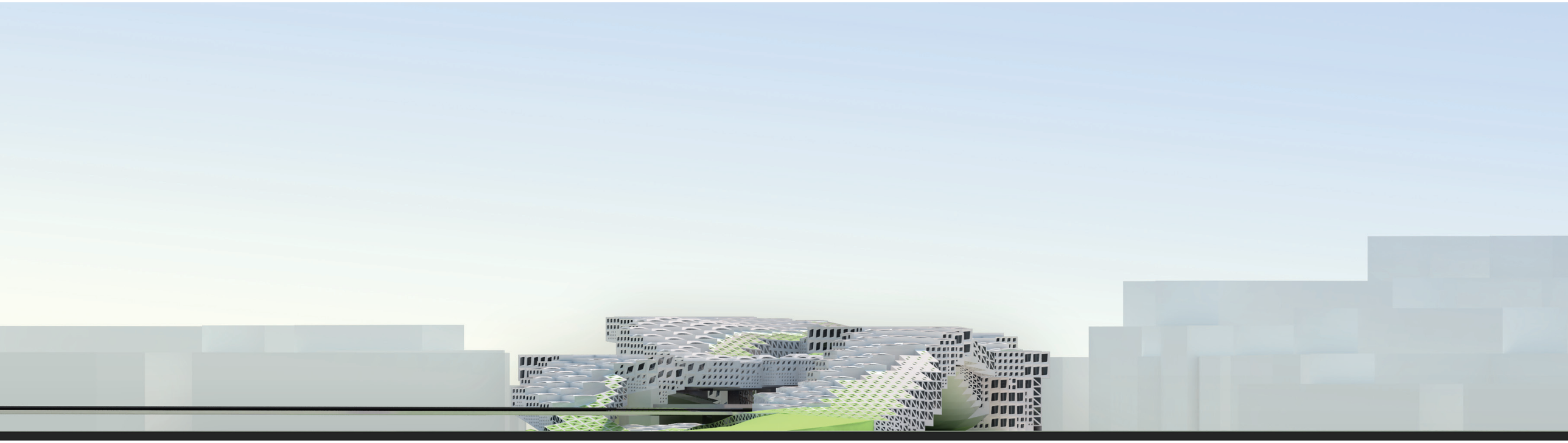


North View

Elevation



East View

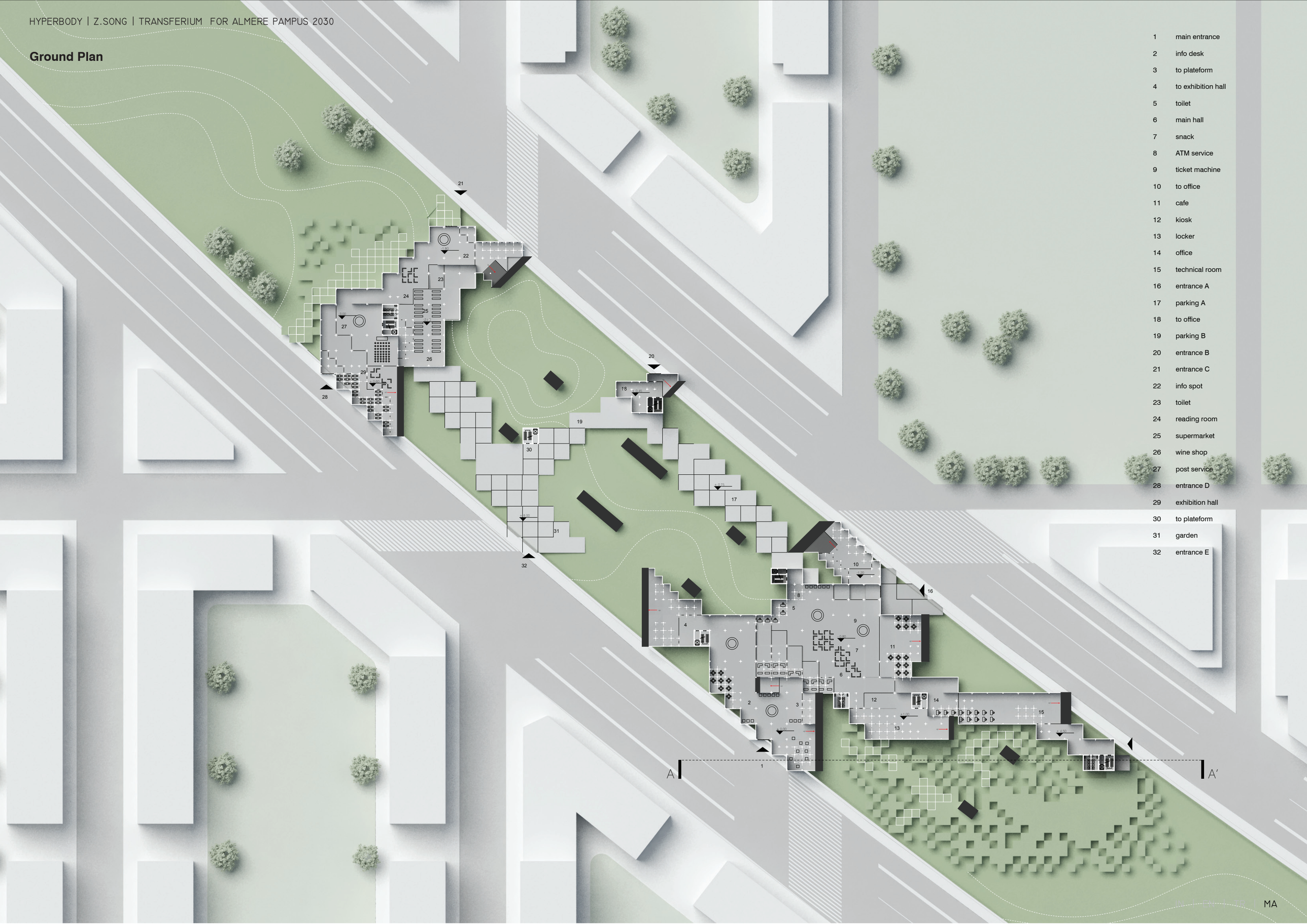


West View

Top View

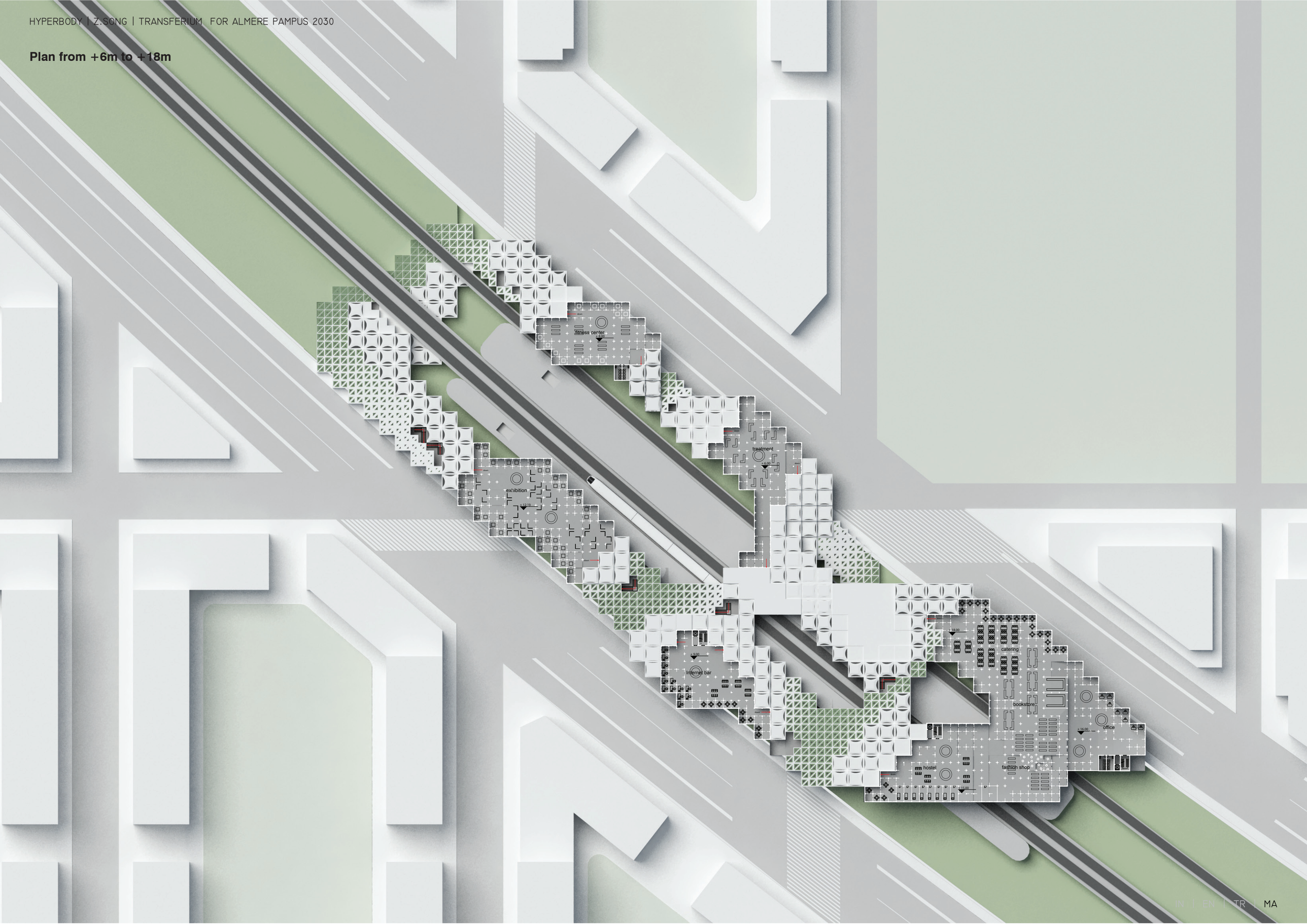
Top View Scale 1:500

Ground Plan

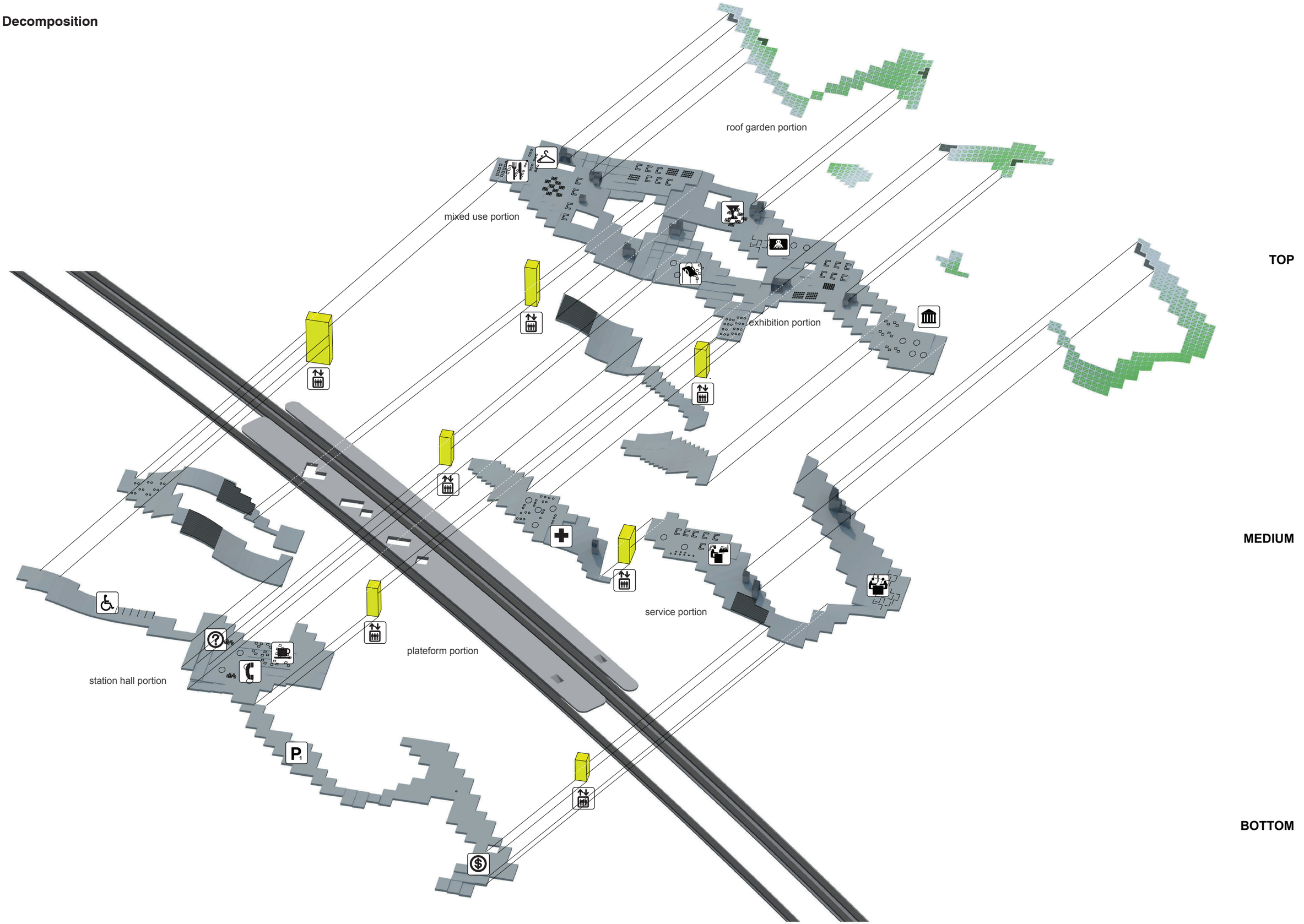


1 main entrance
2 info desk
3 to plateform
4 to exhibition hall
5 toilet
6 main hall
7 snack
8 ATM service
9 ticket machine
10 to office
11 cafe
12 kiosk
13 locker
14 office
15 technical room
16 entrance A
17 parking A
18 to office
19 parking B
20 entrance B
21 entrance C
22 info spot
23 toilet
24 reading room
25 supermarket
26 wine shop
27 post service
28 entrance D
29 exhibition hall
30 to plateform
31 garden
32 entrance E

Plan from +6m to +18m



3D Decomposition

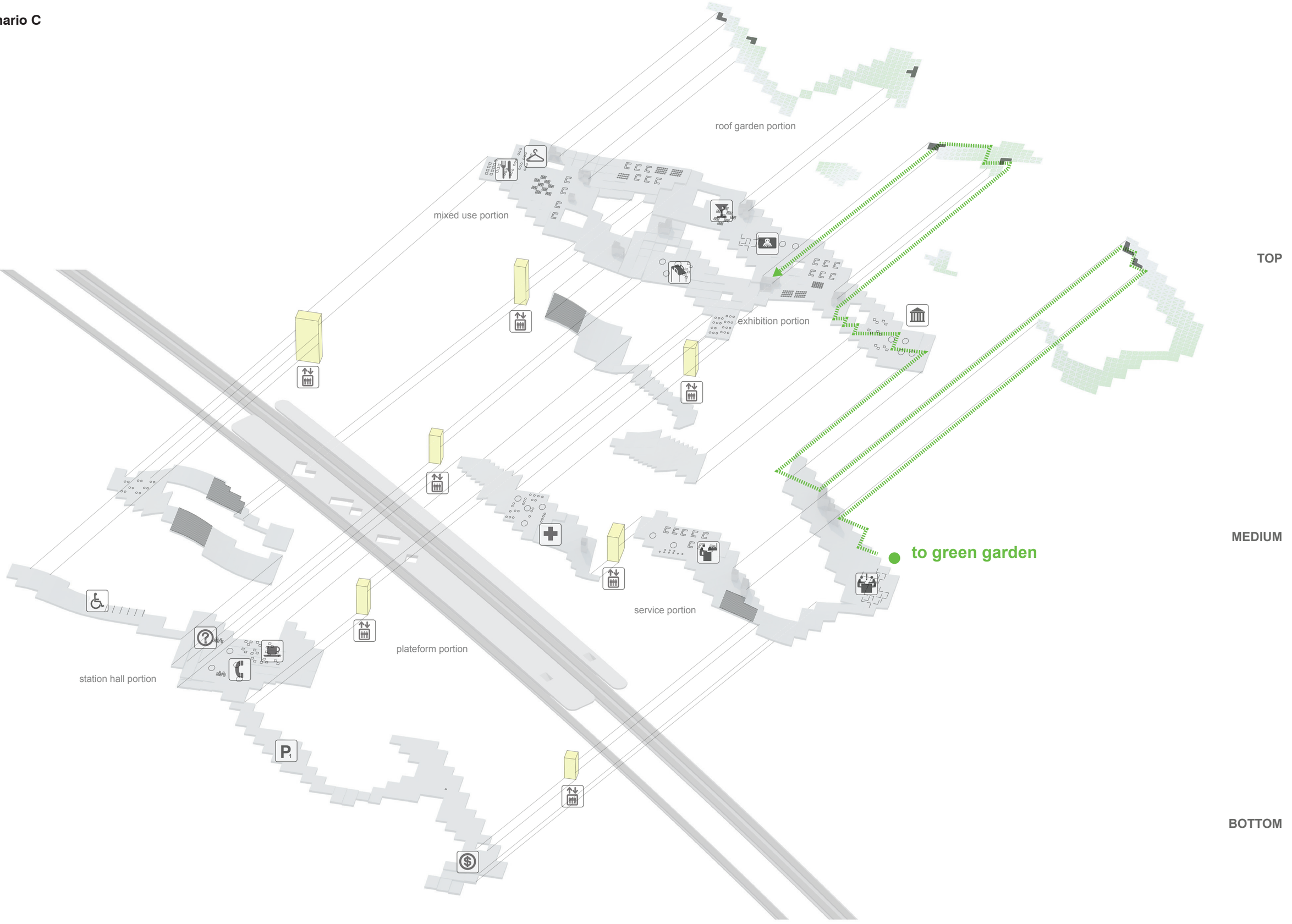


TOP

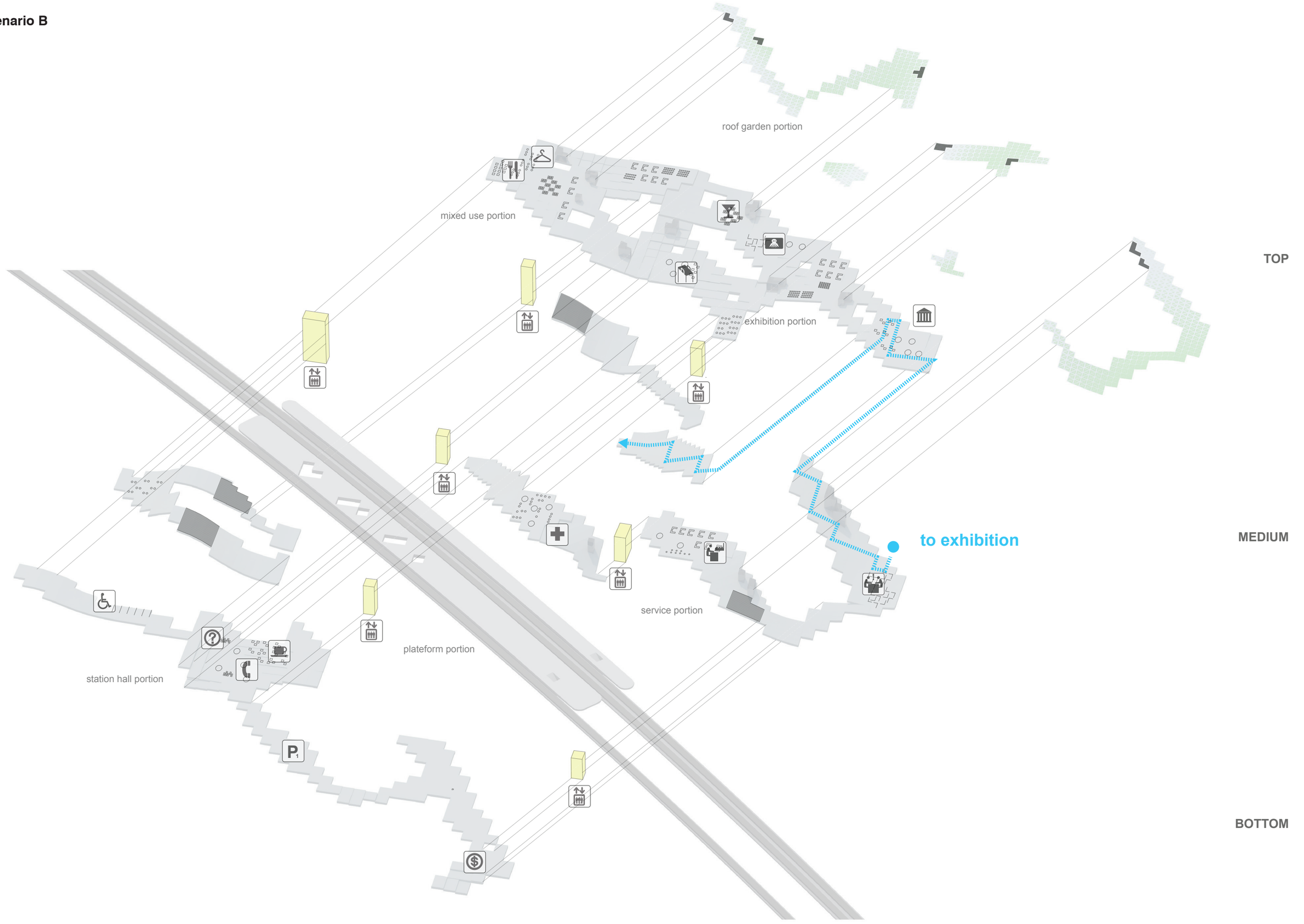
MEDIUM

BOTTOM

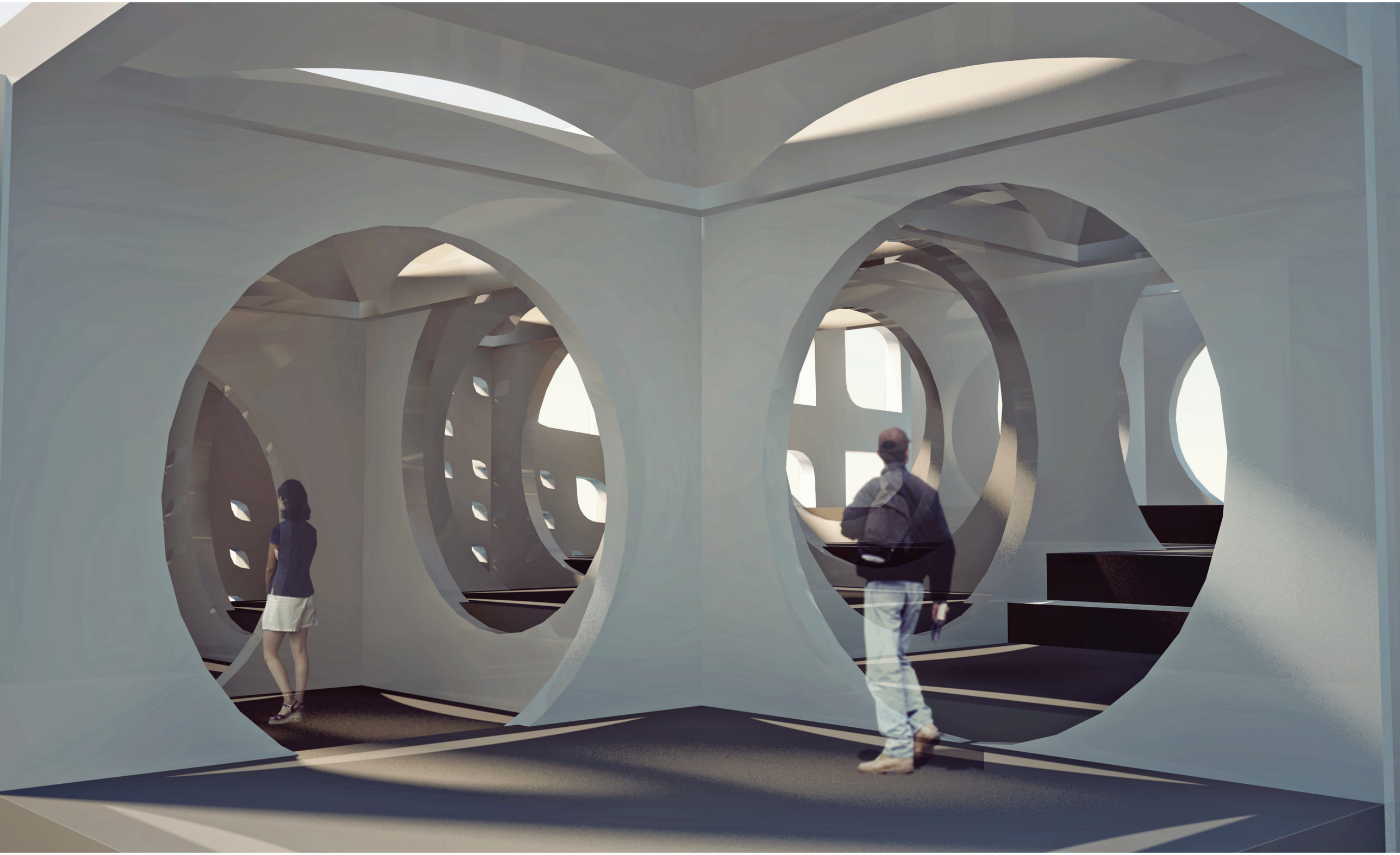
Scenario C


roof garden portion
mixed use portion
exhibition portion
service portion
plateform portion
station hall portion
to green garden
TOP
MEDIUM
BOTTOM

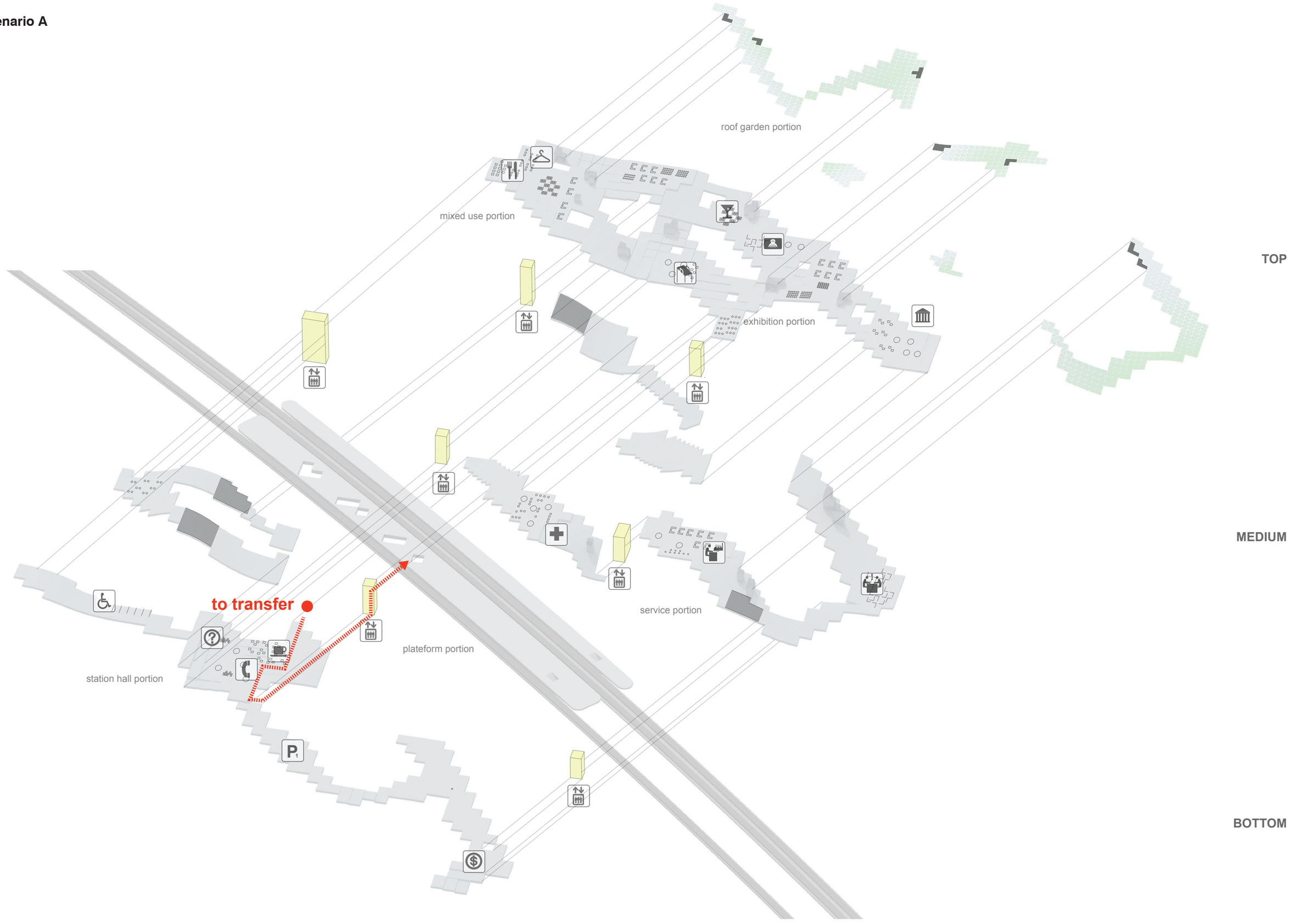
Scenario B


roof garden portion
mixed use portion
exhibition portion
TOP
to exhibition
MEDIUM
service portion
plateform portion
station hall portion
BOTTOM

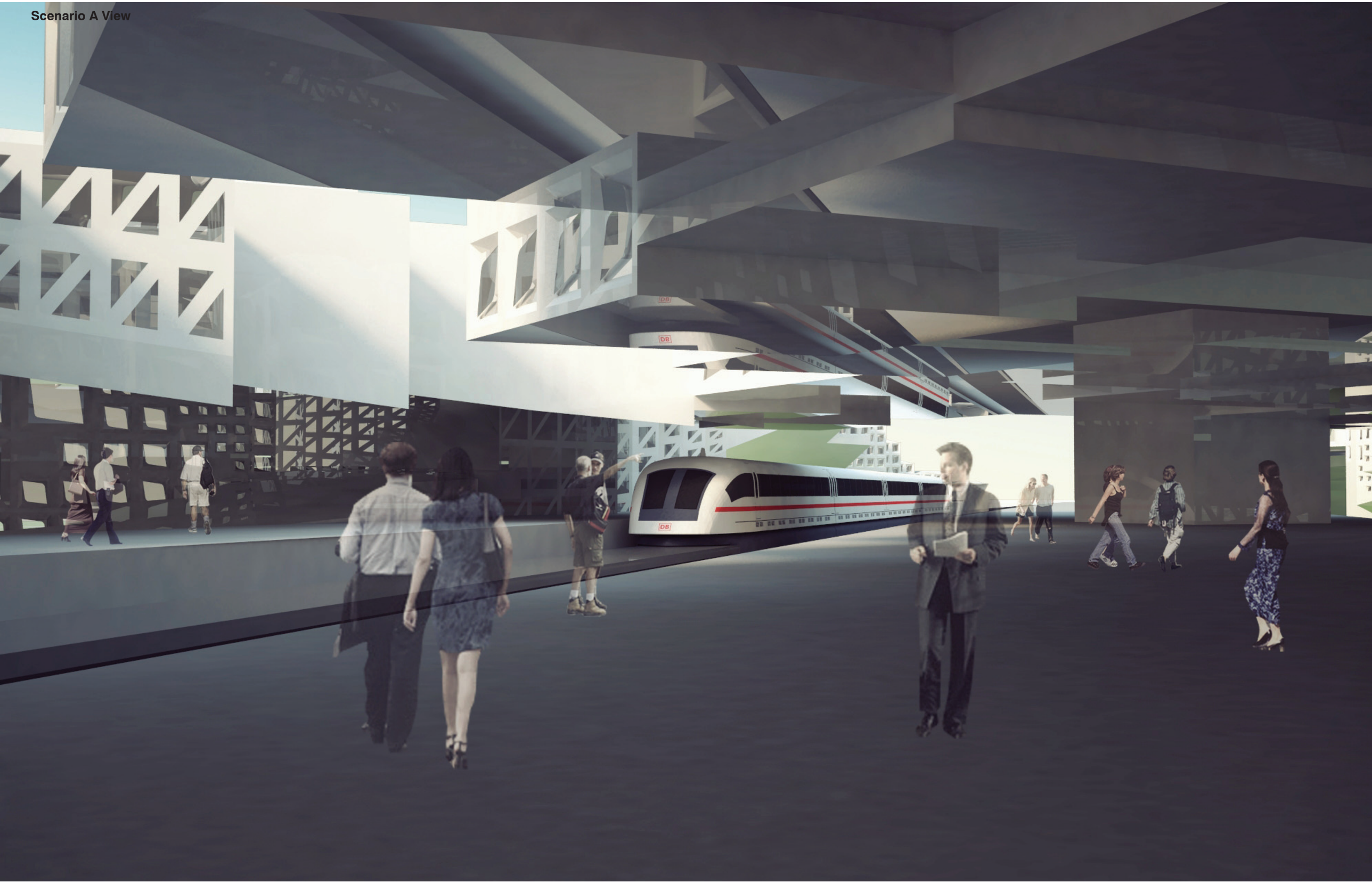
Scenario B View



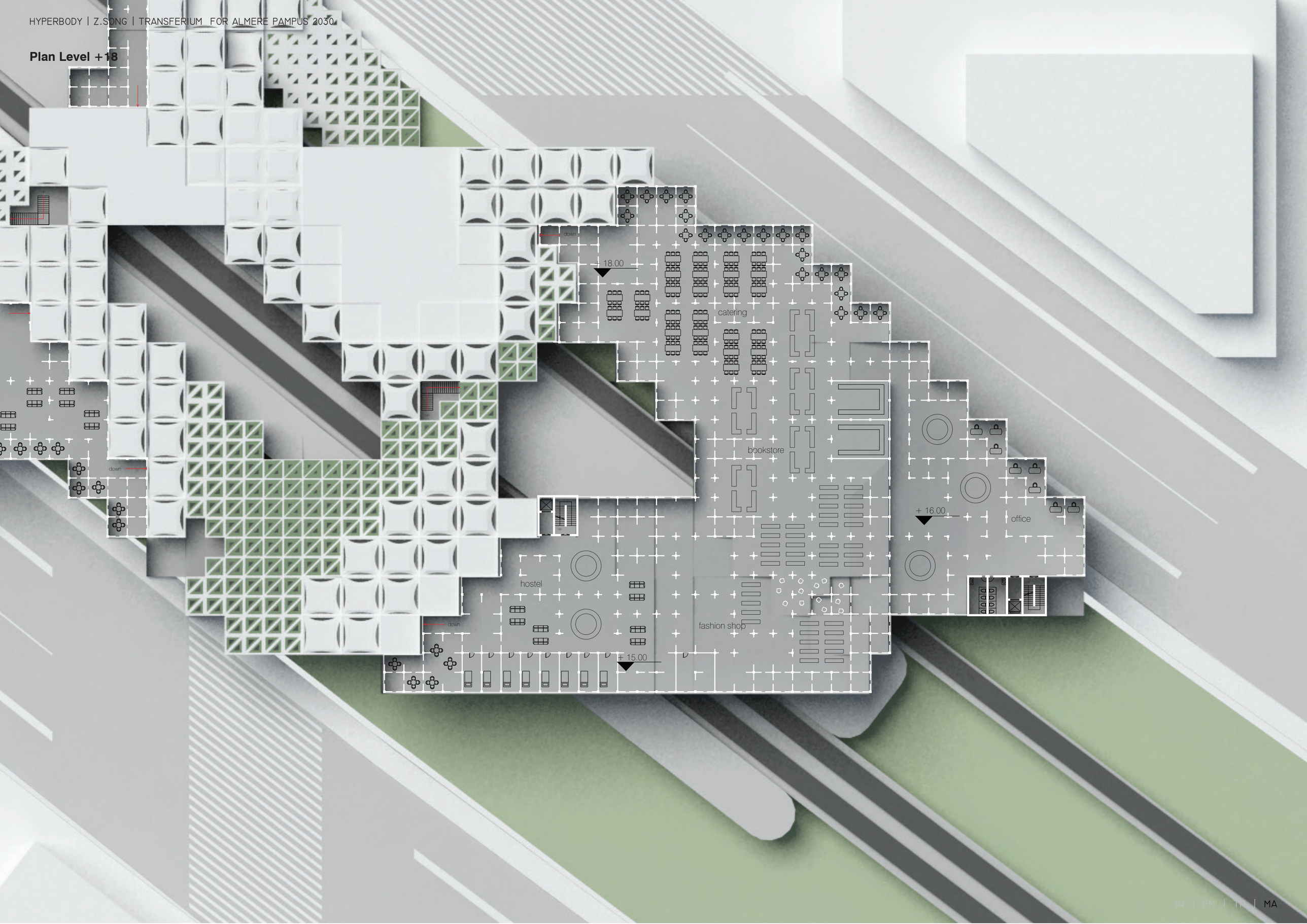
Scenario A


roof garden portion
mixed use portion
exhibition portion
service portion
plateform portion
station hall portion
to transfer
P1
TOP
MEDIUM
BOTTOM

Scenario A View

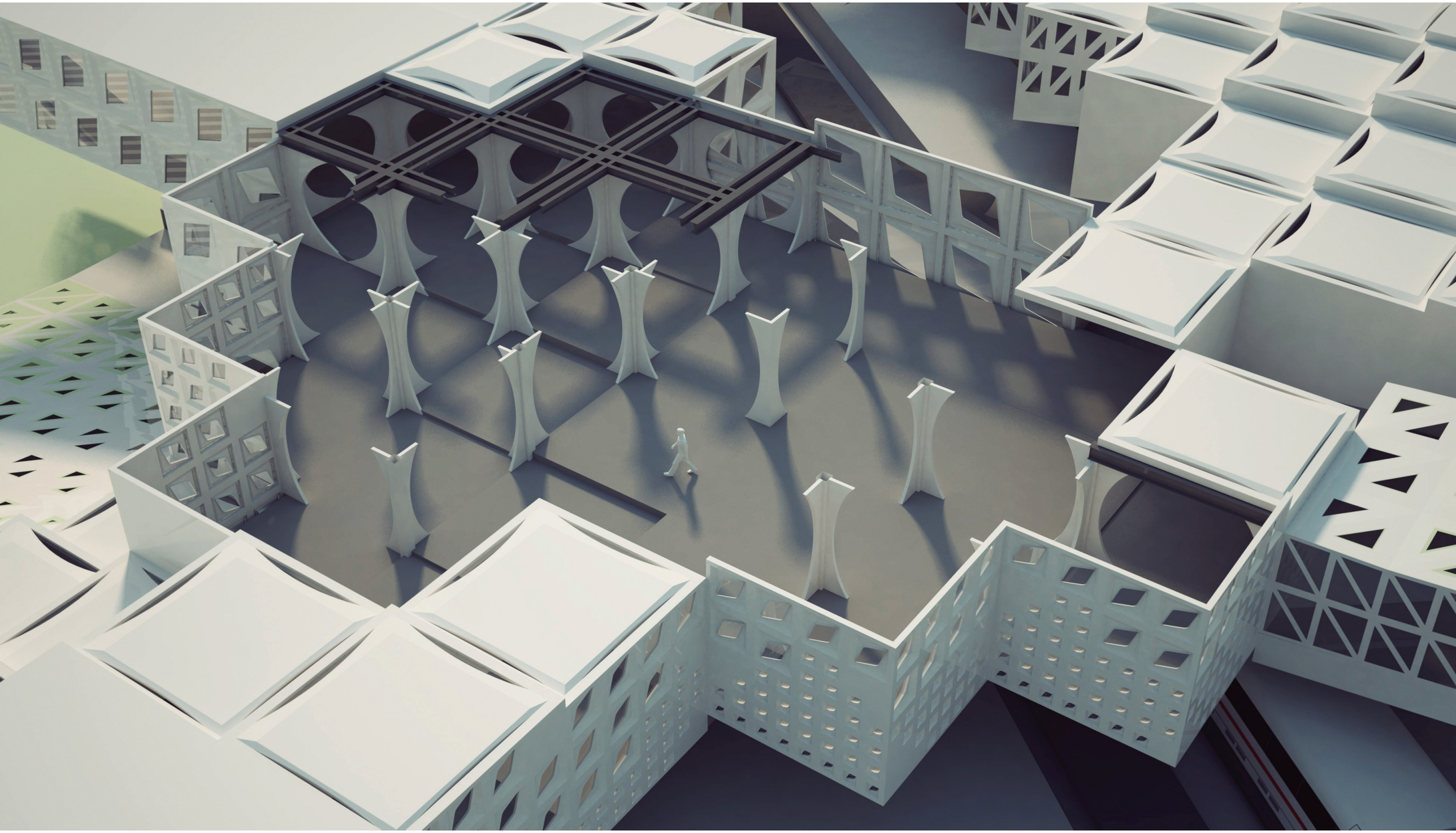


Plan Level +18



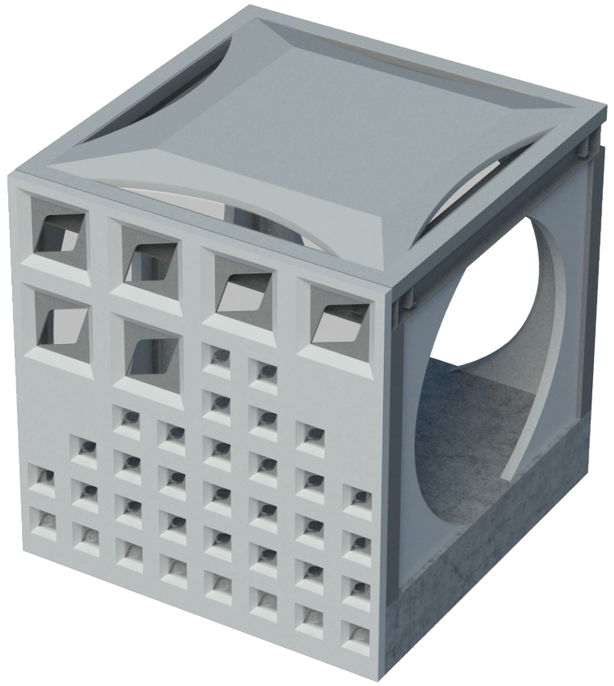
Cluster

- read internal spatial quality

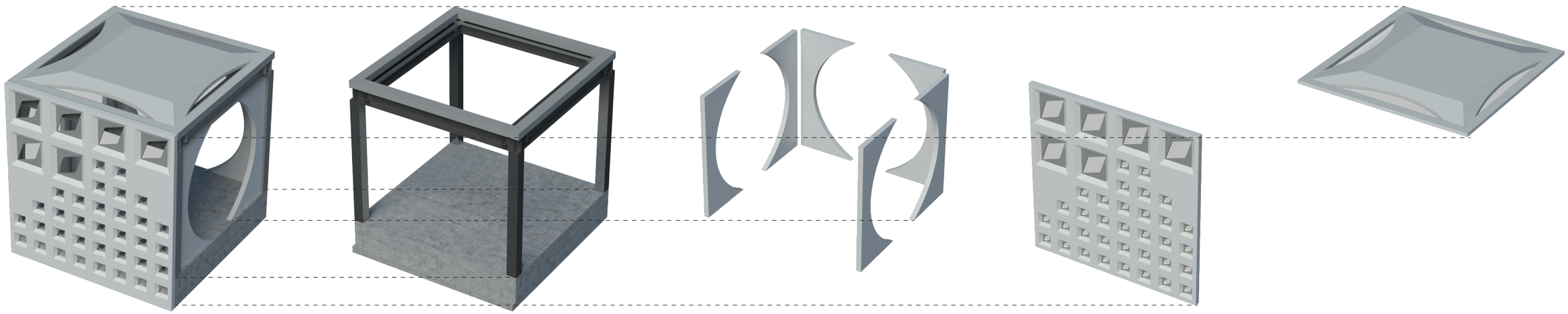


Component Analysis

- according to 3 requirements



Basic Unit 5X5m



Decomposition

Basic Structure

as basic frame to creat cube system

Internal Component

the mapping tool for density

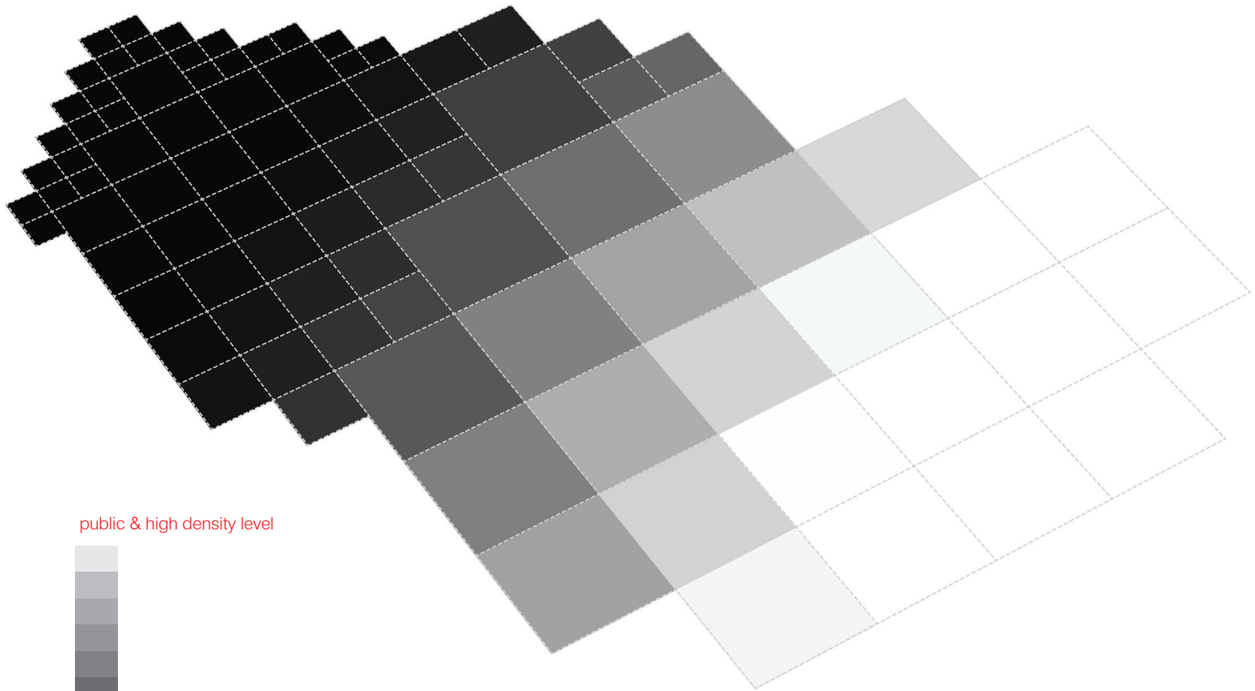
Facade Component

response to visibility and daylight

Roof Compoent

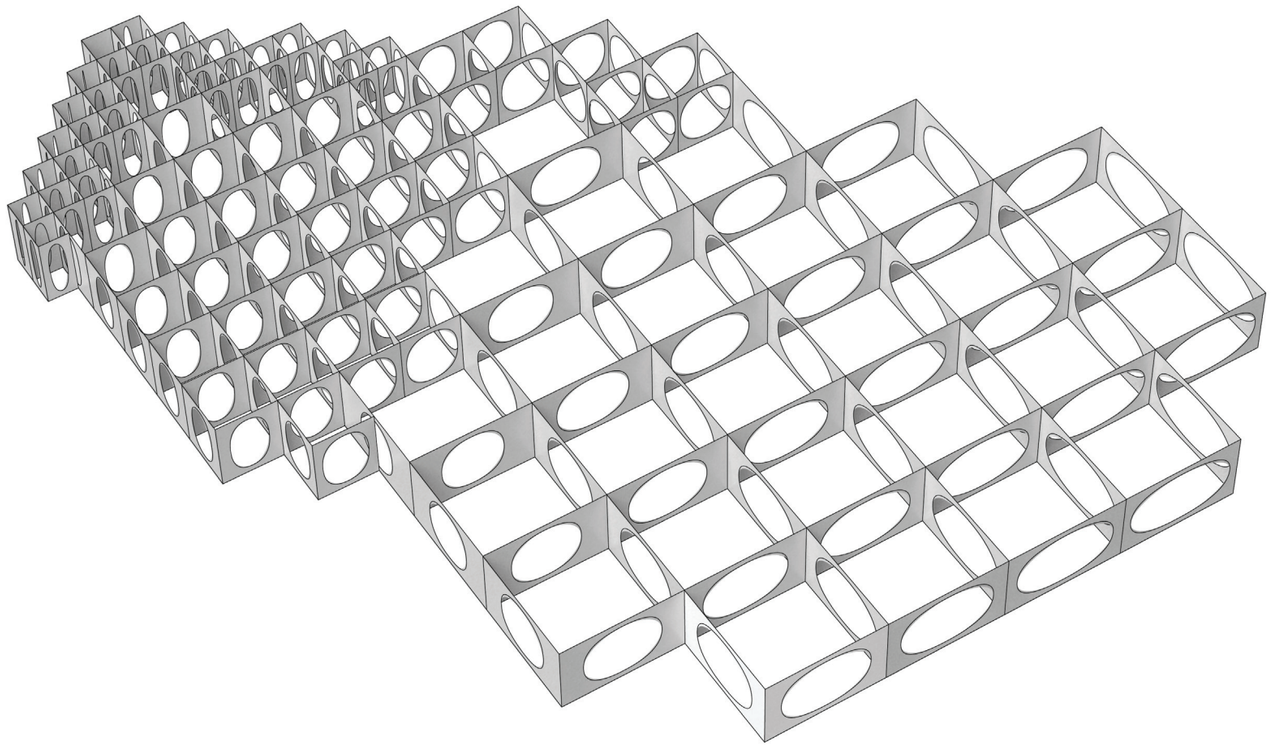
response to solar readiation

TYPE A Dernsity Component
- mapping density



public & high density level

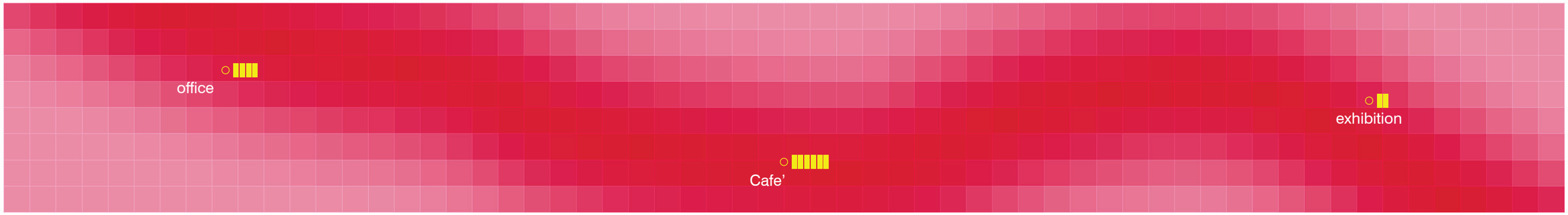
private & low density level



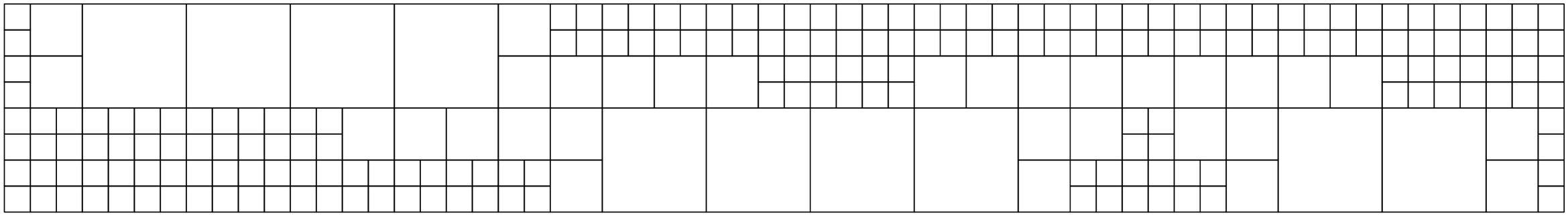
Cluster

- read internal spatial quality

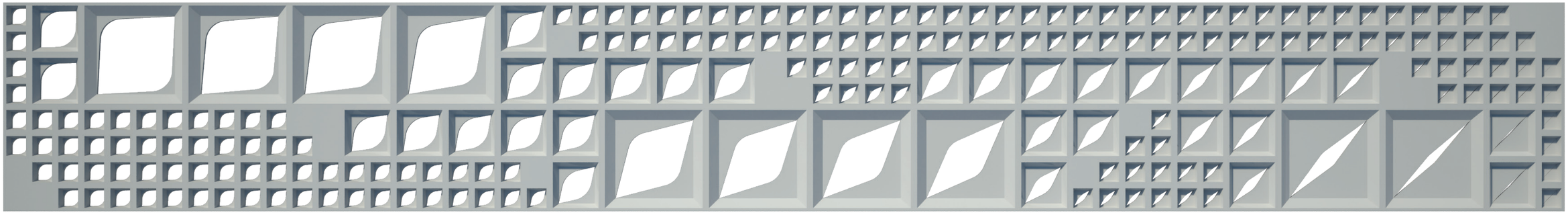
TYPE B Facade Component
- mapping private and public levels
- more precisely control lighting and visibility



datalandscape of visibility

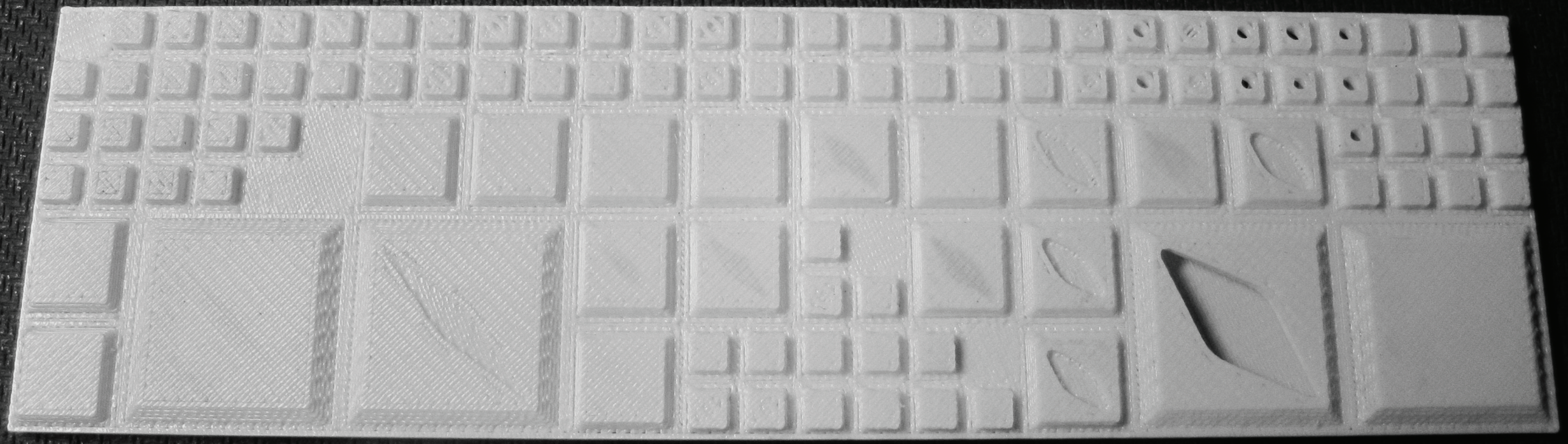


mapping by square

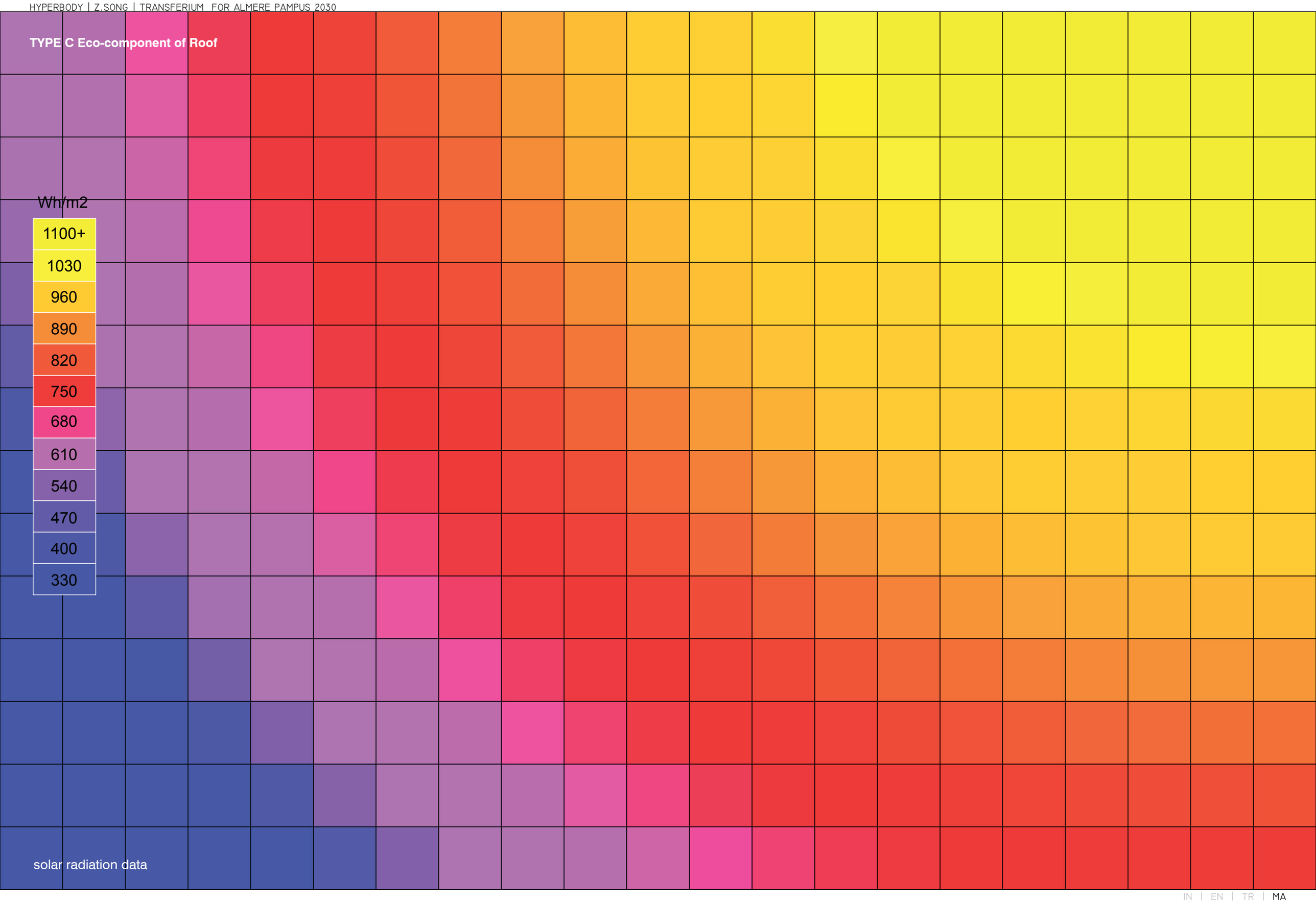


adaptive facade

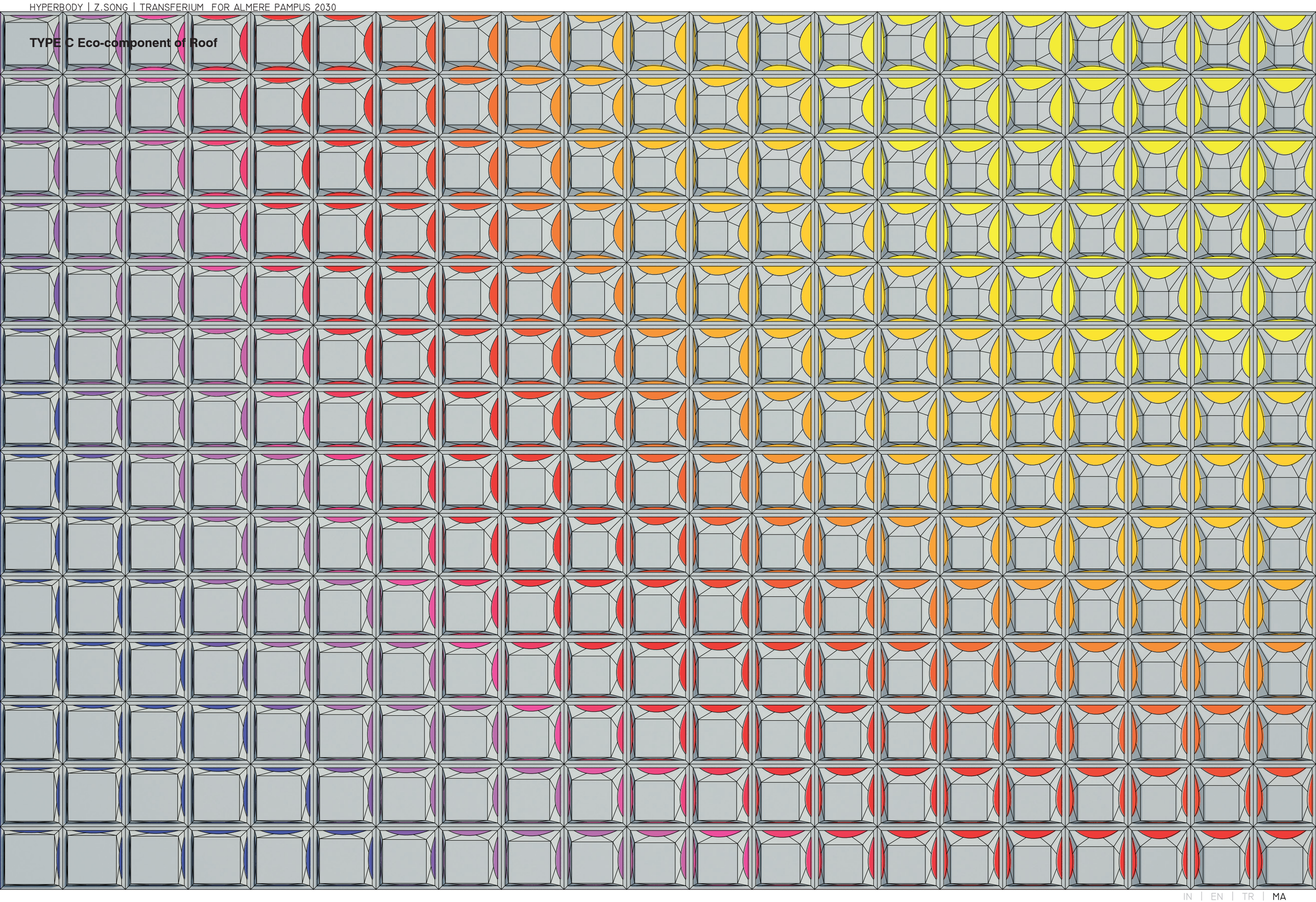
TYPE B Facade Component



TYPE C Eco-component of Roof

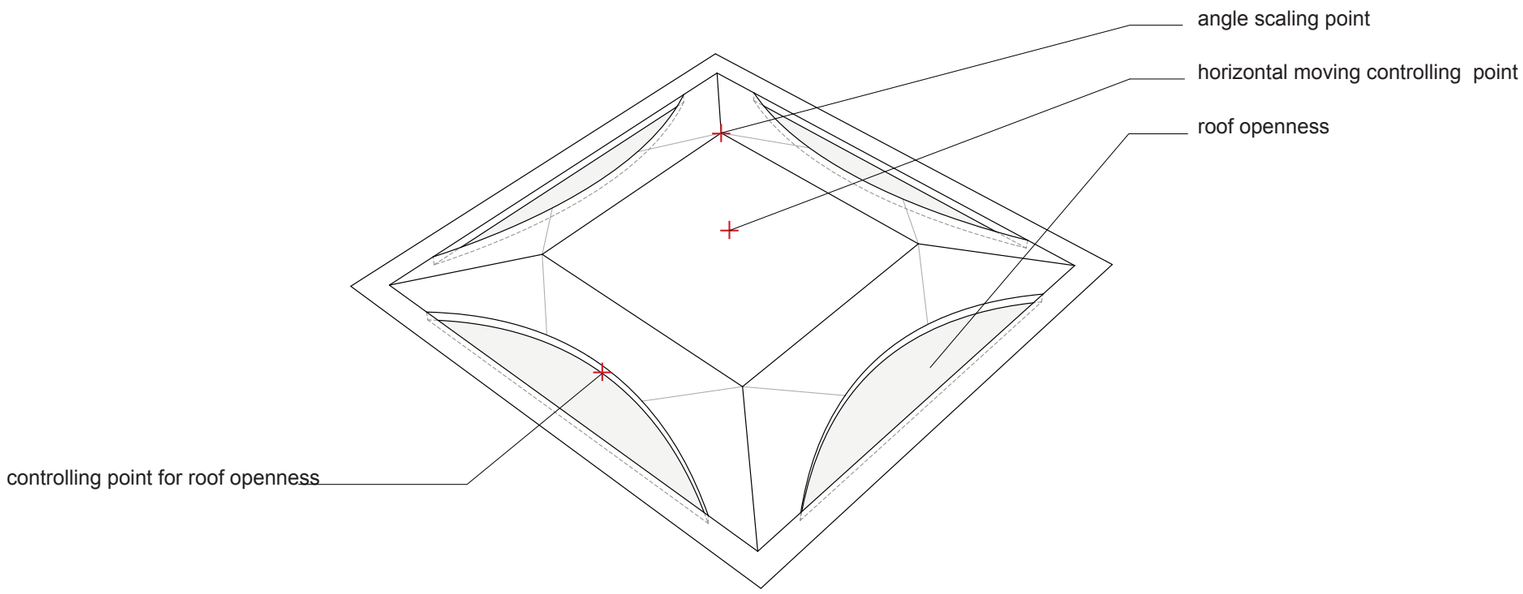


TYPE C Eco-component of Roof

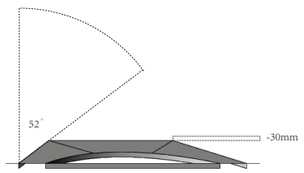


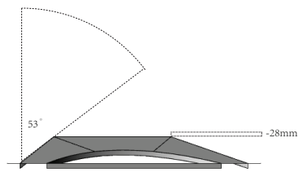
TYPE C Eco-component of Roof

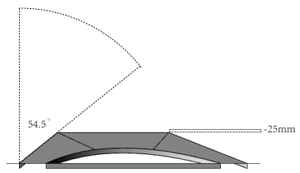
- action1: scaling central top roof
- action2: horizontal movement
- actions: size of openness

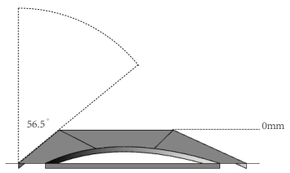


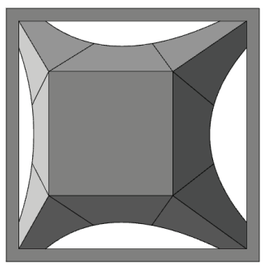
Phase 1: to read solar data
Phase 2: to build adaptive shading system

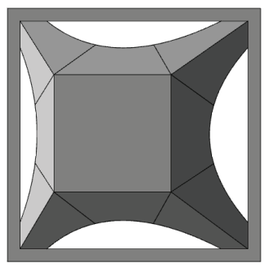


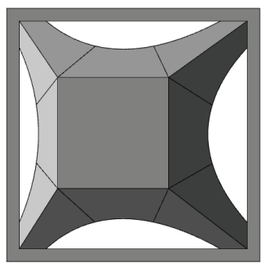


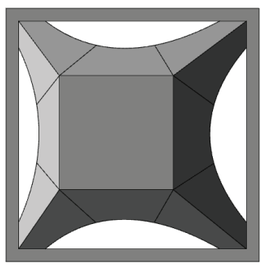




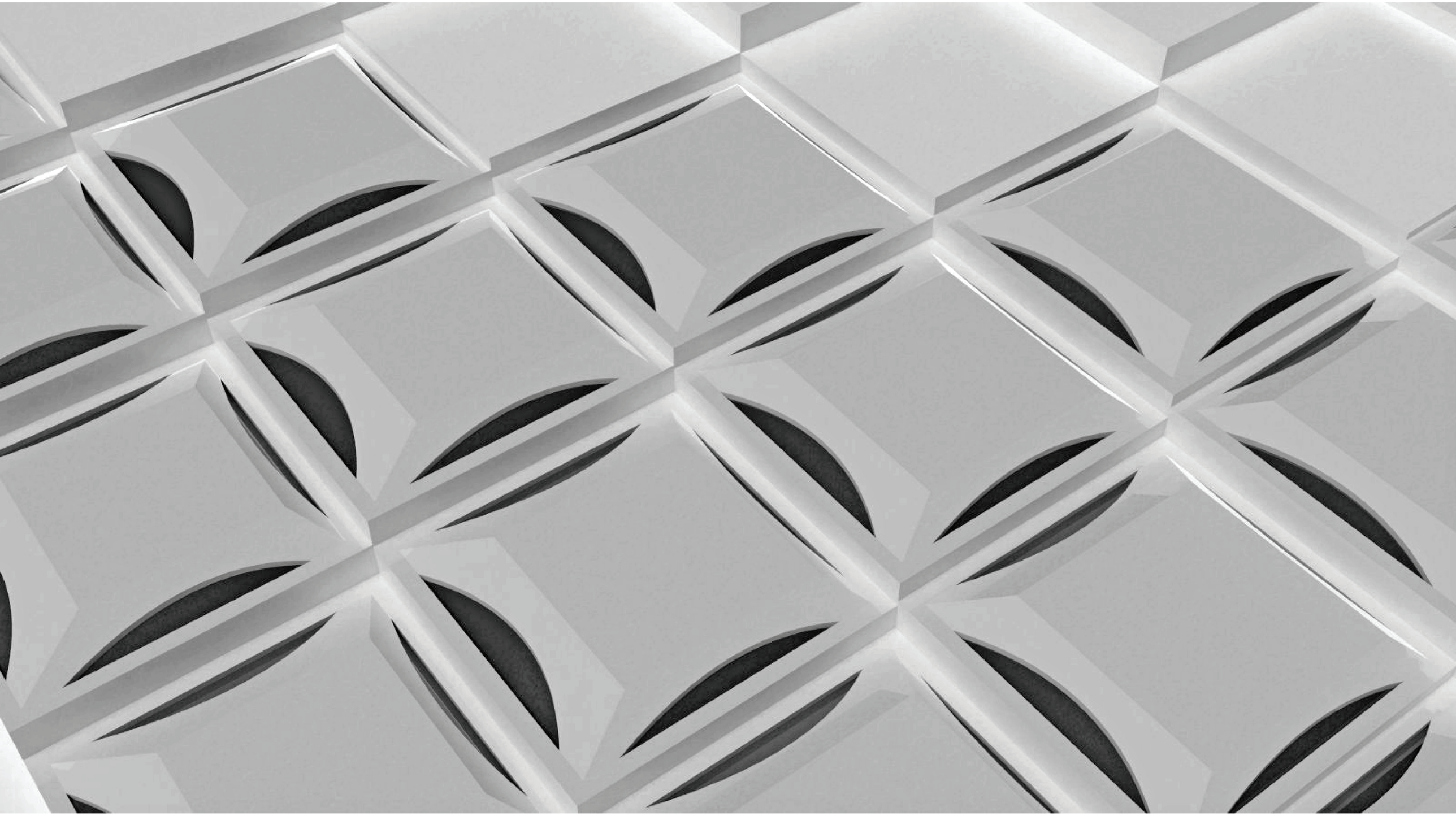




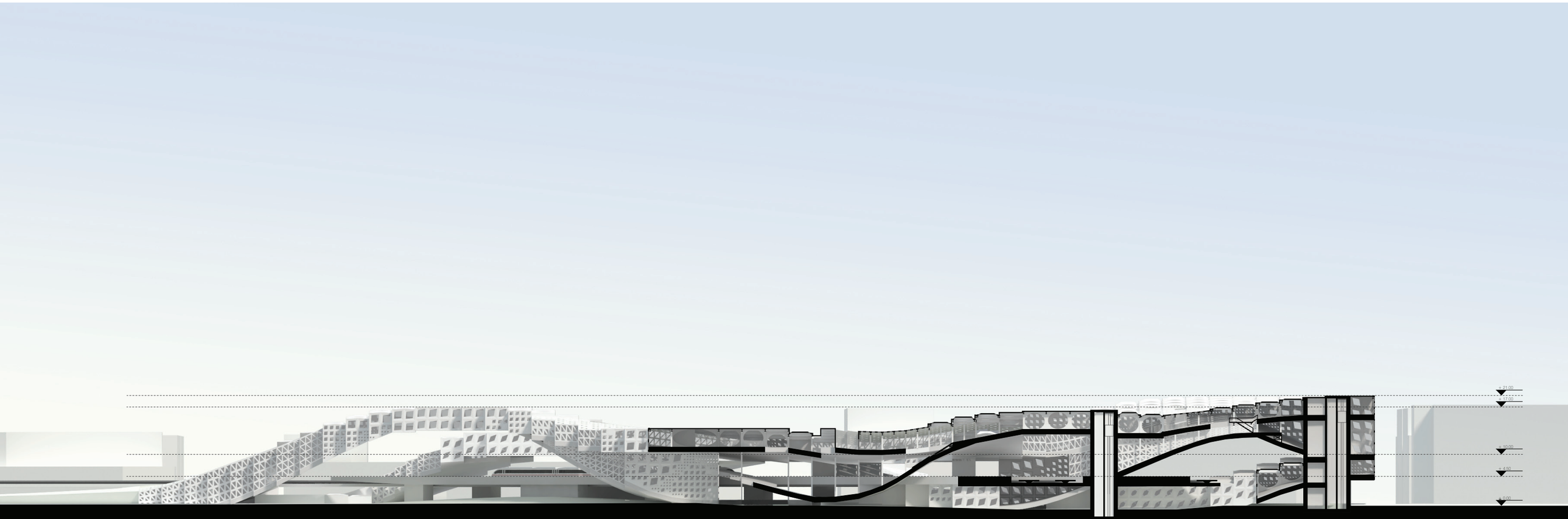




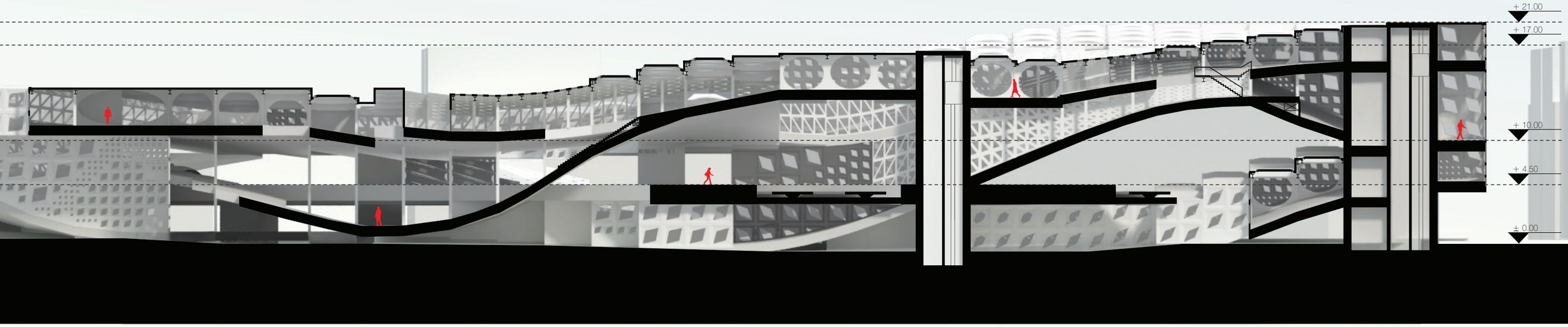
TYPE C Eco-component



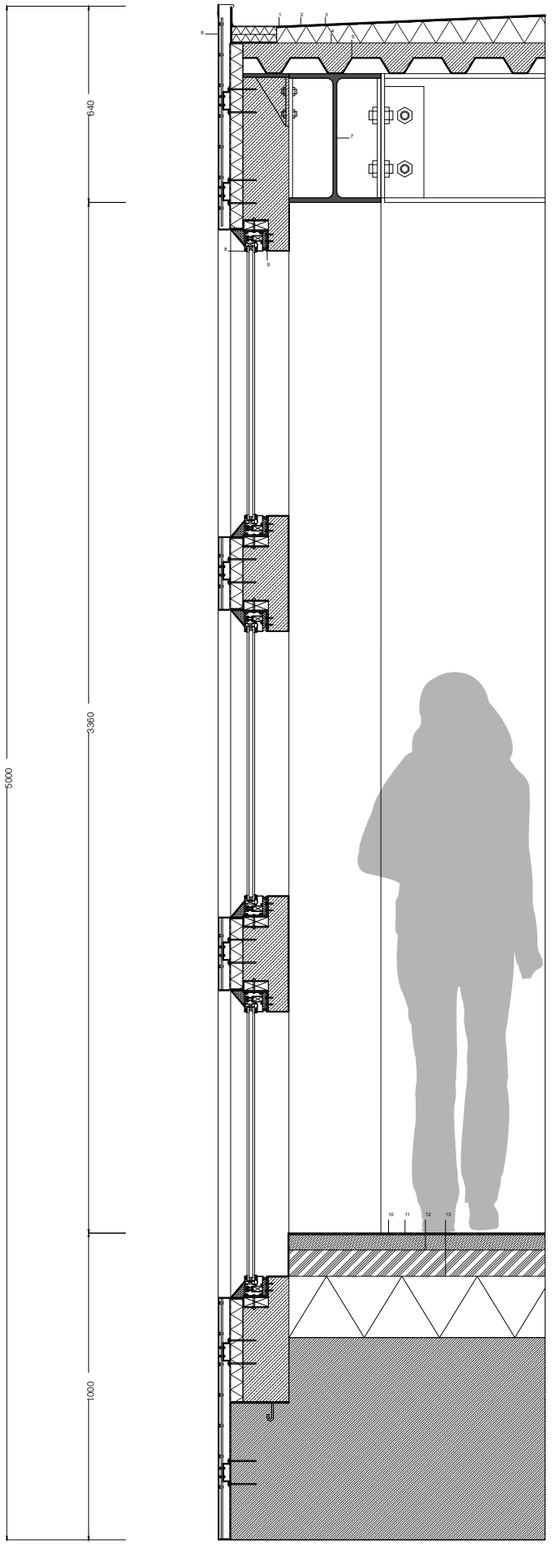
Cross-cut A-A'

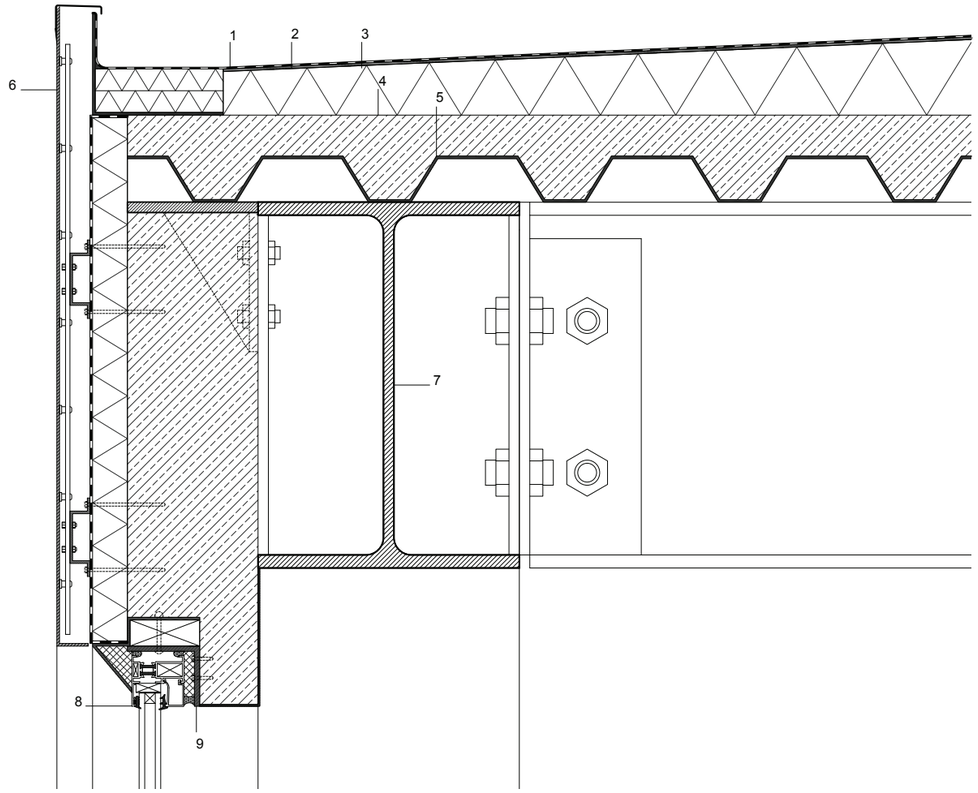


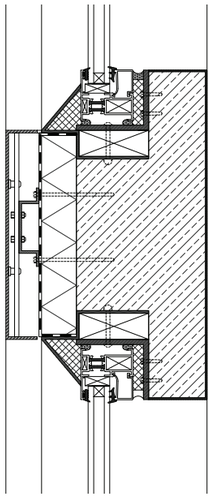
Cross-cut A-A' Scale 1:200



Details







Facade Detail Scale 1:5

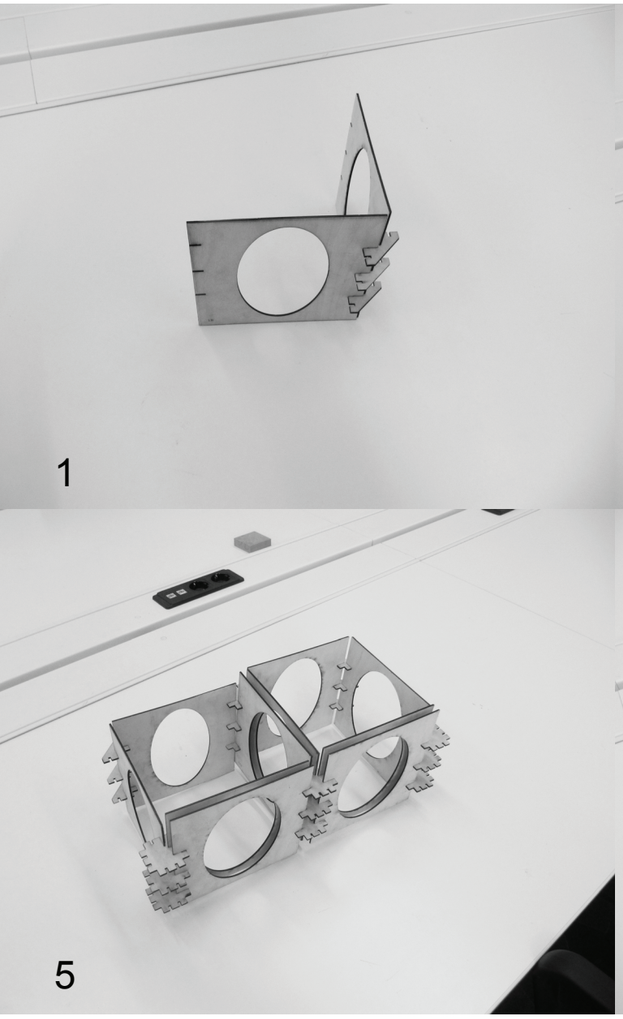
1	3 mm bituminous layer
2	3 mm waterproof gypsum-based composite layer
3	120 mm thermal insulation
4	50 mm polished concrete
5	50 mm metal deck
6	cladding 5 mm perforated cast iron panels
7	steel I beam 420 mm deep
8	cladding anodized aluminum window frame
9	80/50/6 mm steel angle
10	5 mm carpet layer
11	50 mm screed layer
12	85 mm damp-proof membrane
13	200 mm mineralwool insulation

Physical Modeling

- Lasercutting for basic component
- process
- test result

Physical Modeling

- Lasercutting for basic component
- process
- test result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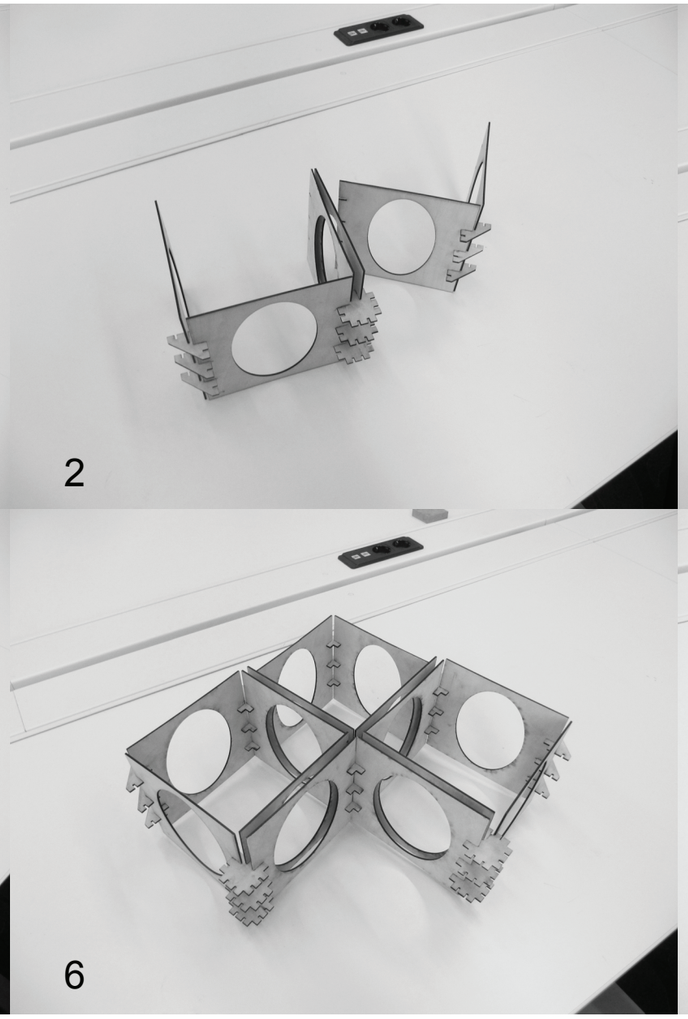
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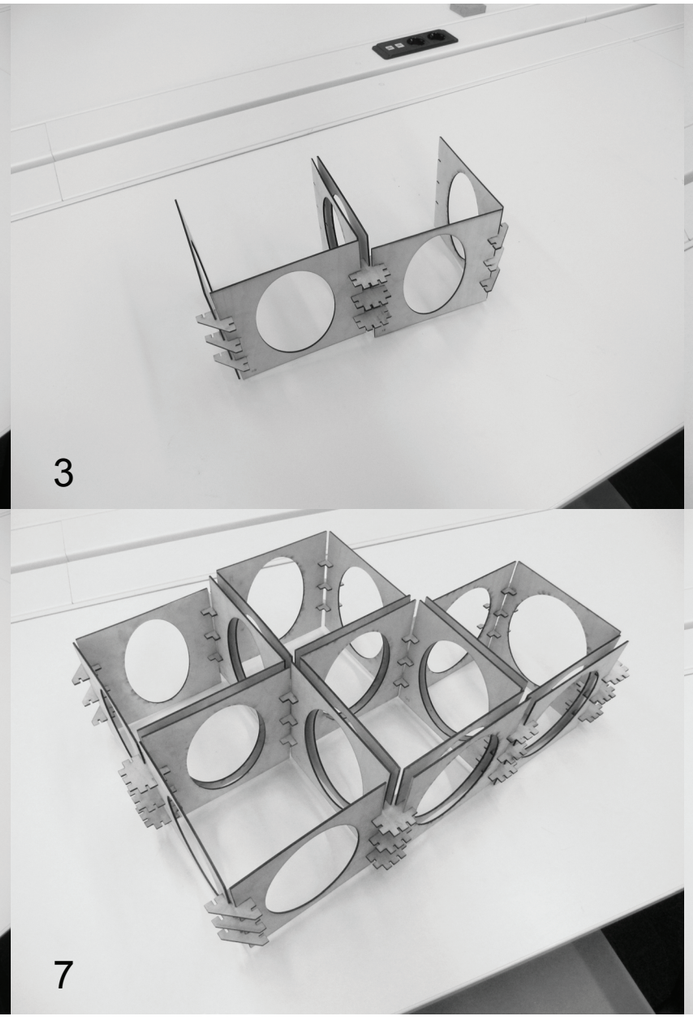
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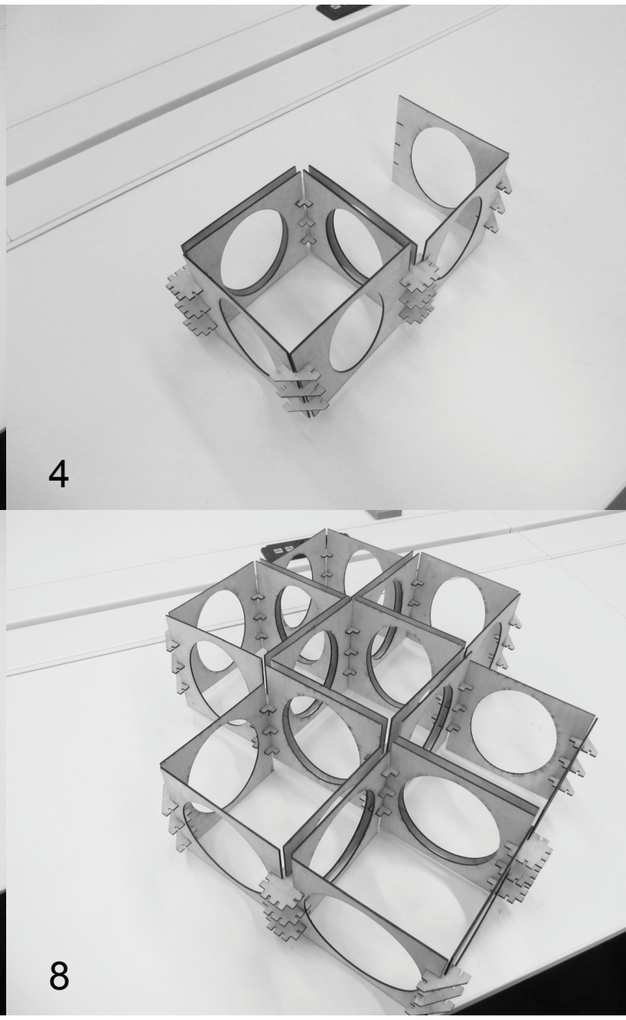

4

5

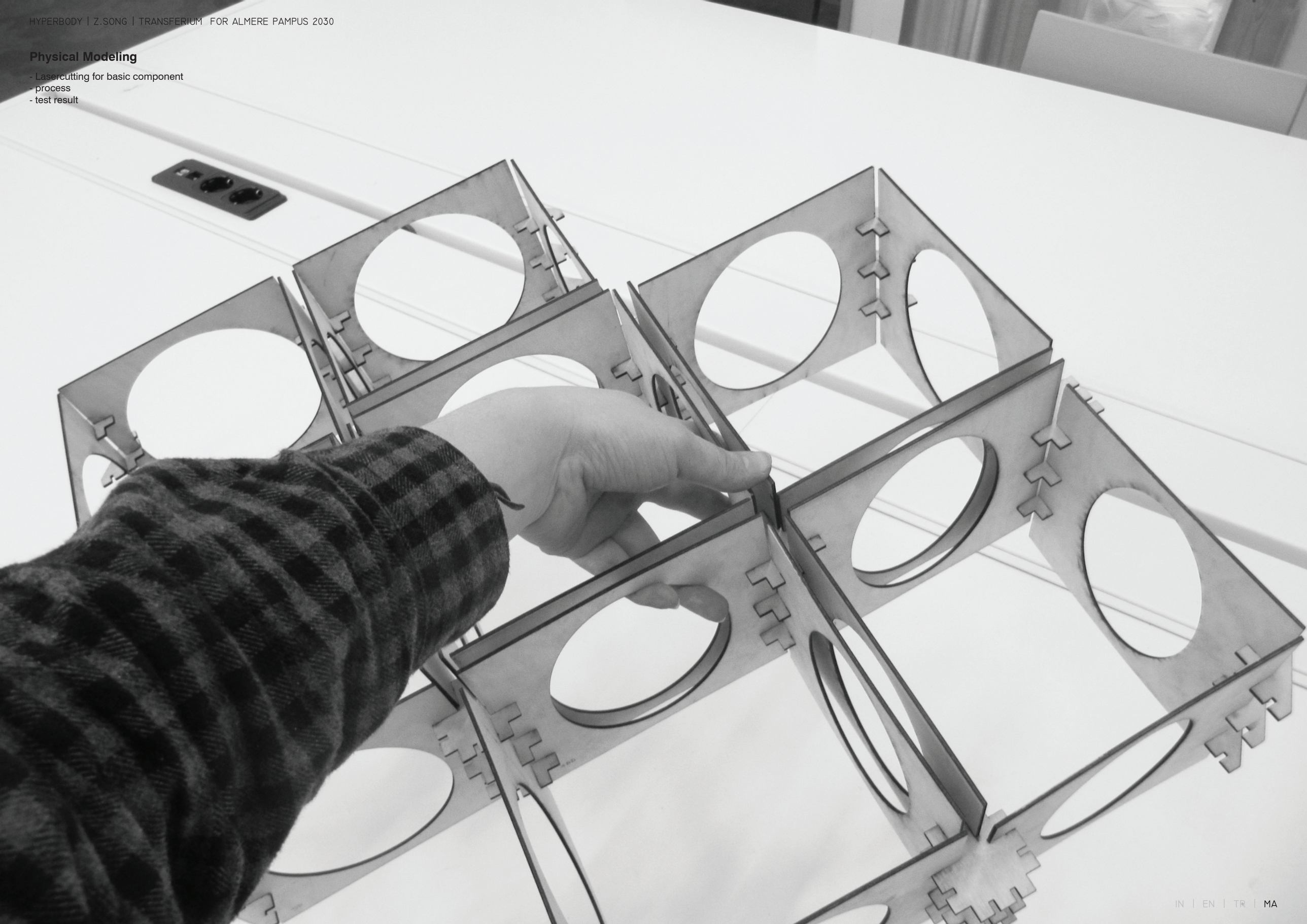
6

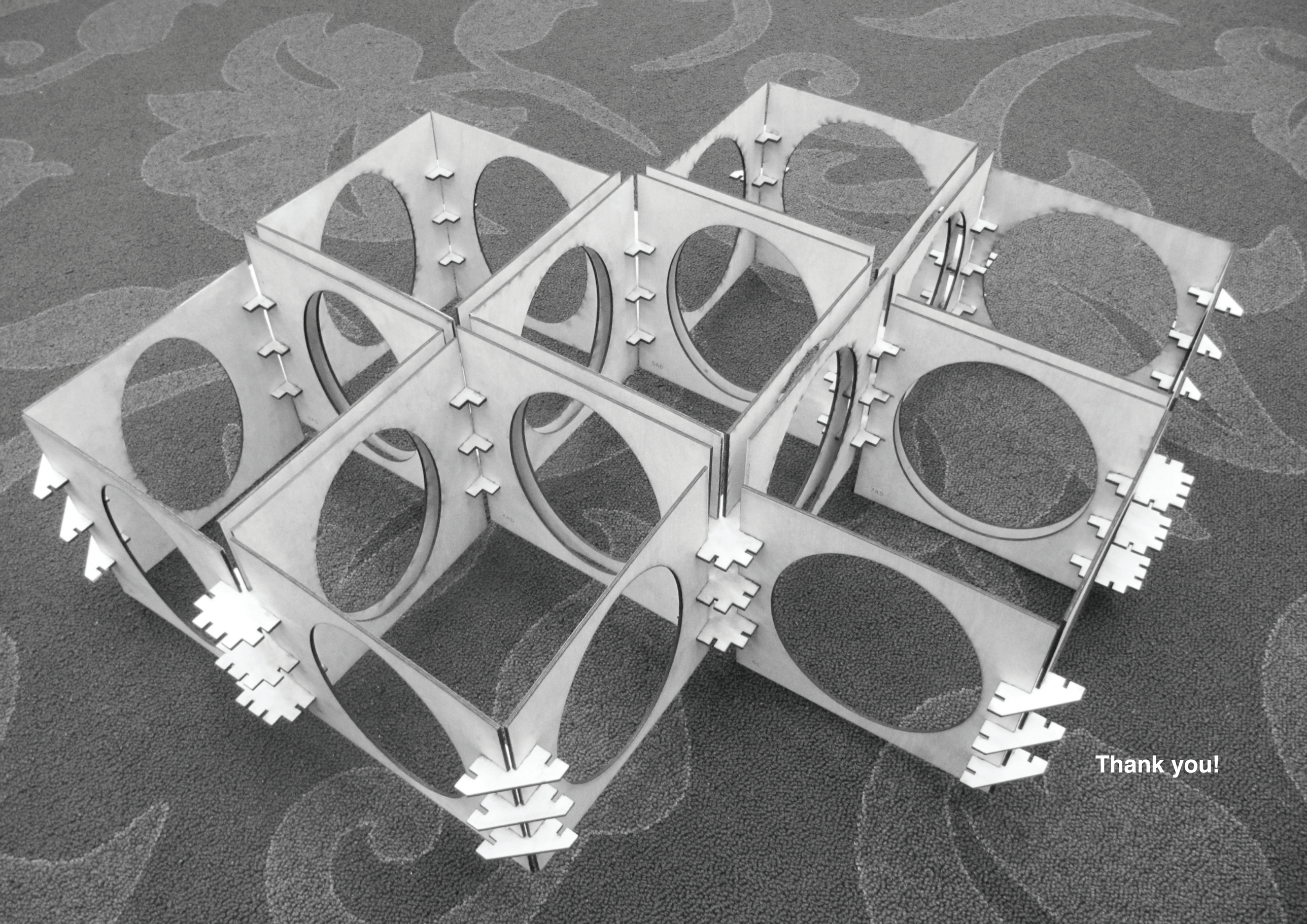
7

8

Physical Modeling

- Lasercutting for basic component
- process
- test result





Thank you!