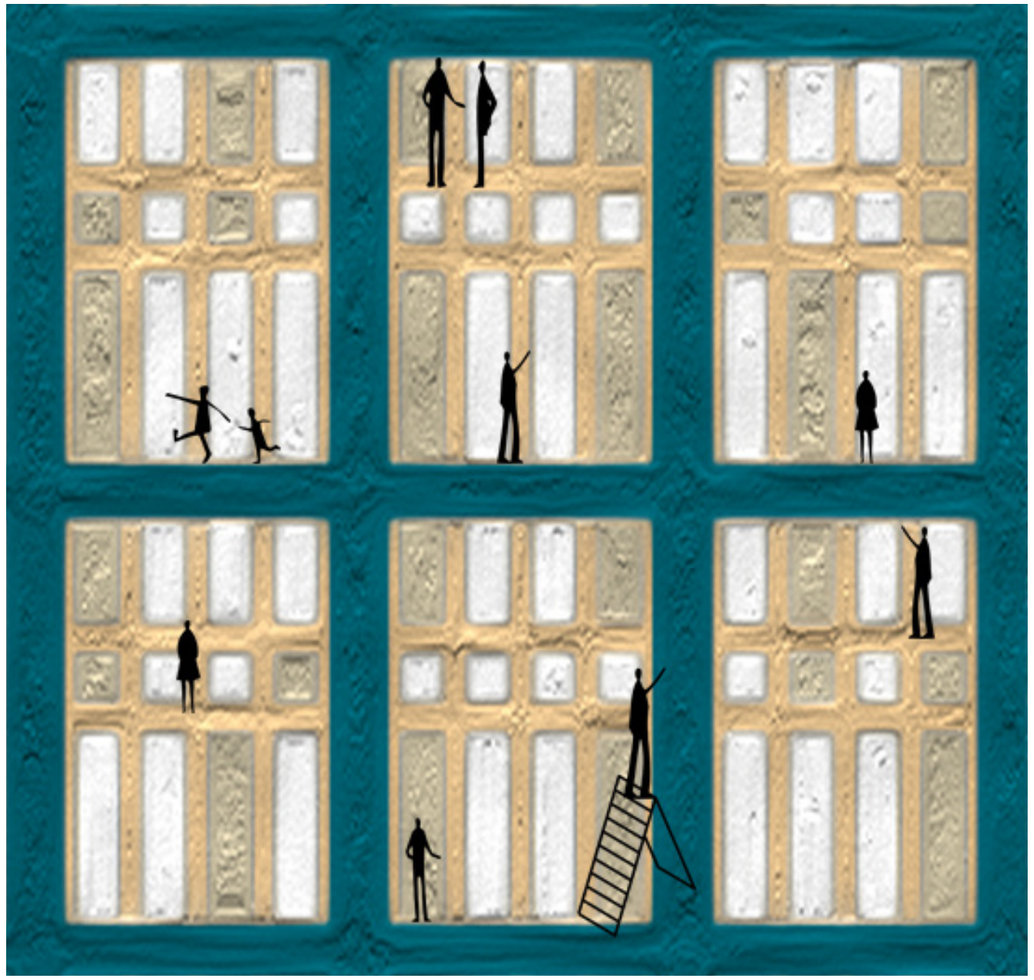


BETTER LIVING ONE
FLEXIBLE SHARING COMMUNITY

P5 07/07/2020

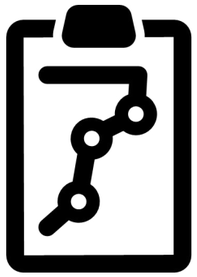
ARCHITECTURAL ENGINEERING

Integration of architecture and engineering

'In our Architectural Engineering programme we seek innovative and inspiring architectural **solutions for environmental and societal issues.** We are driven by the need to think differently about our building culture. Understanding existing potentials, knowing the possibilities of renewal and discovering **how to design, innovate and change.**'

HOW TO INNOVATE

Creativity by the brain



Blunt, Alison, and Robyn M Dowling. Home. Key Ideas in Geography. New York NY: Routledge, 2006.
Robinson, W. Heath, and K.R.G Browne. How to Live in a Flat. London: Hutchinson, 1936.
Lawrence, Roderick J. Housing, Dwellings and Homes : Design Theory, Research and Practice. Chichester West Sussex: Wiley, 1987.
Fromm, Dorit. Collaborative Communities : Cohousing, Central Living, and Other New Forms of Housing with Shared Facilities. New York: Van Nostrand Reinhold, 1991.
Susumu Masuda. The anatomical chart of homes. Toì"kyoì" : Ekusunarejji, 2009.
Brown, G. Z, and Mark DeKay. 2013. Sun, Wind, and Light: Architectural Design Strategies. Third [edition] ed. Hoboken: Wiley.
Sabine Jansen. 2014. Exergy Guidebook for Building Professionals. Version 2. Delft University of Technology. https://klimapedia.nl/publicaties/exergy-for-building-professionals/
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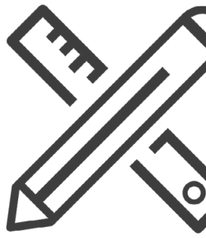
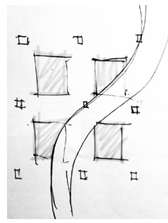
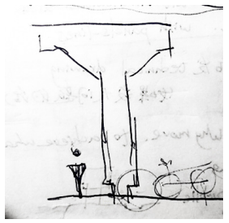
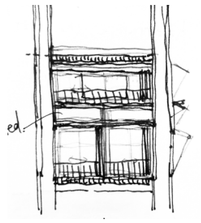
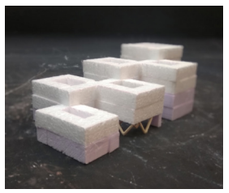










Research

???

Design

ARCHITECTURAL EXPRESSION

Materilization&Tectonics

BETTER LIVING ONE
FLEXIBLE SHARING COMMUNITY

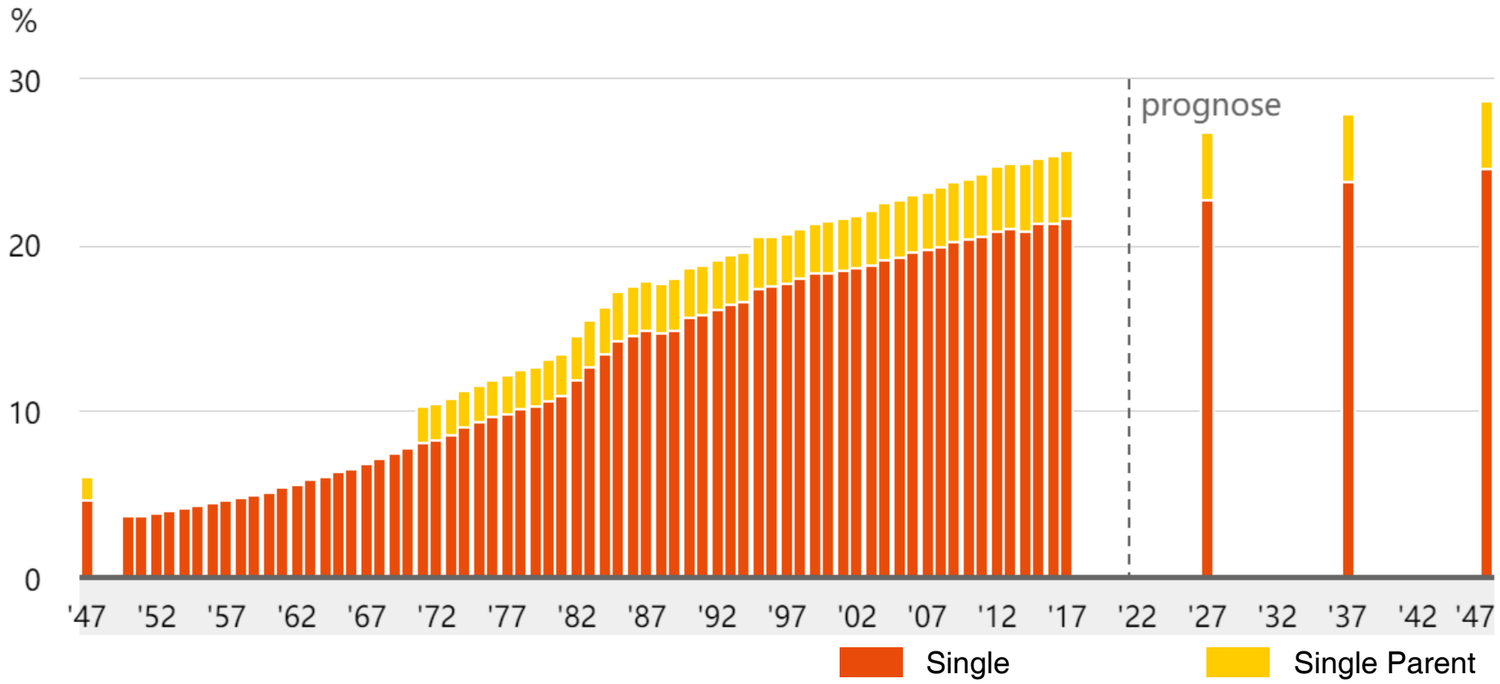
CONTENT

A NEW WAY OF LIVING

SINGLE POPULATION INCREASING

A NEW TREND

The period of single living is entended largely nowadays.



Finding Soulmate

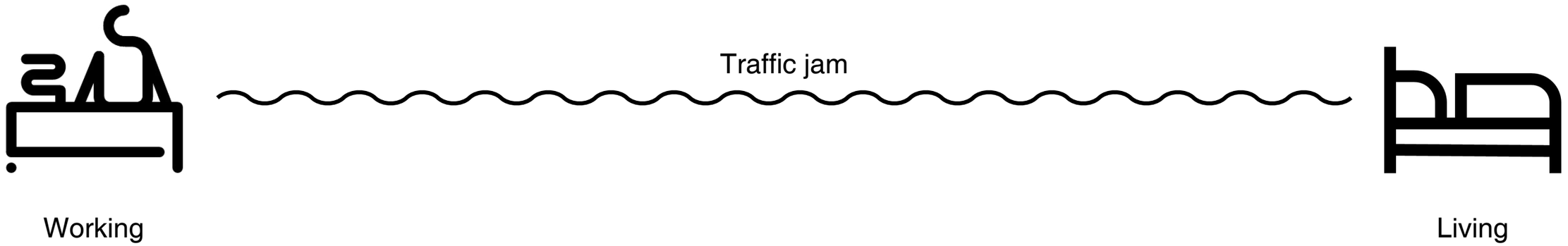
Economic power

New lifestyle

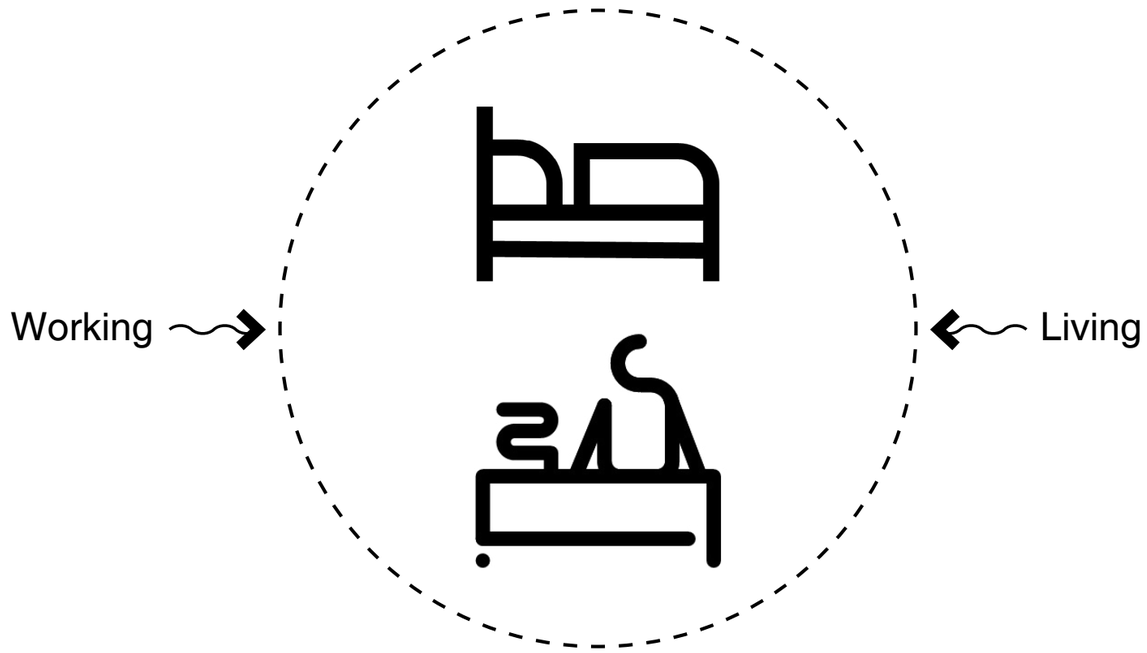
....

Source:
"One hundred years of single people" 25-6-2018 https://www.cbs.nl/nl-nl/achtergrond/2018/26/honderd-jaar-alleenstaanden
“Going Solo: The Extraordinary Rise and Surprising Appeal of Living Alone” Eric Klinenberg. (2012). New York, NY

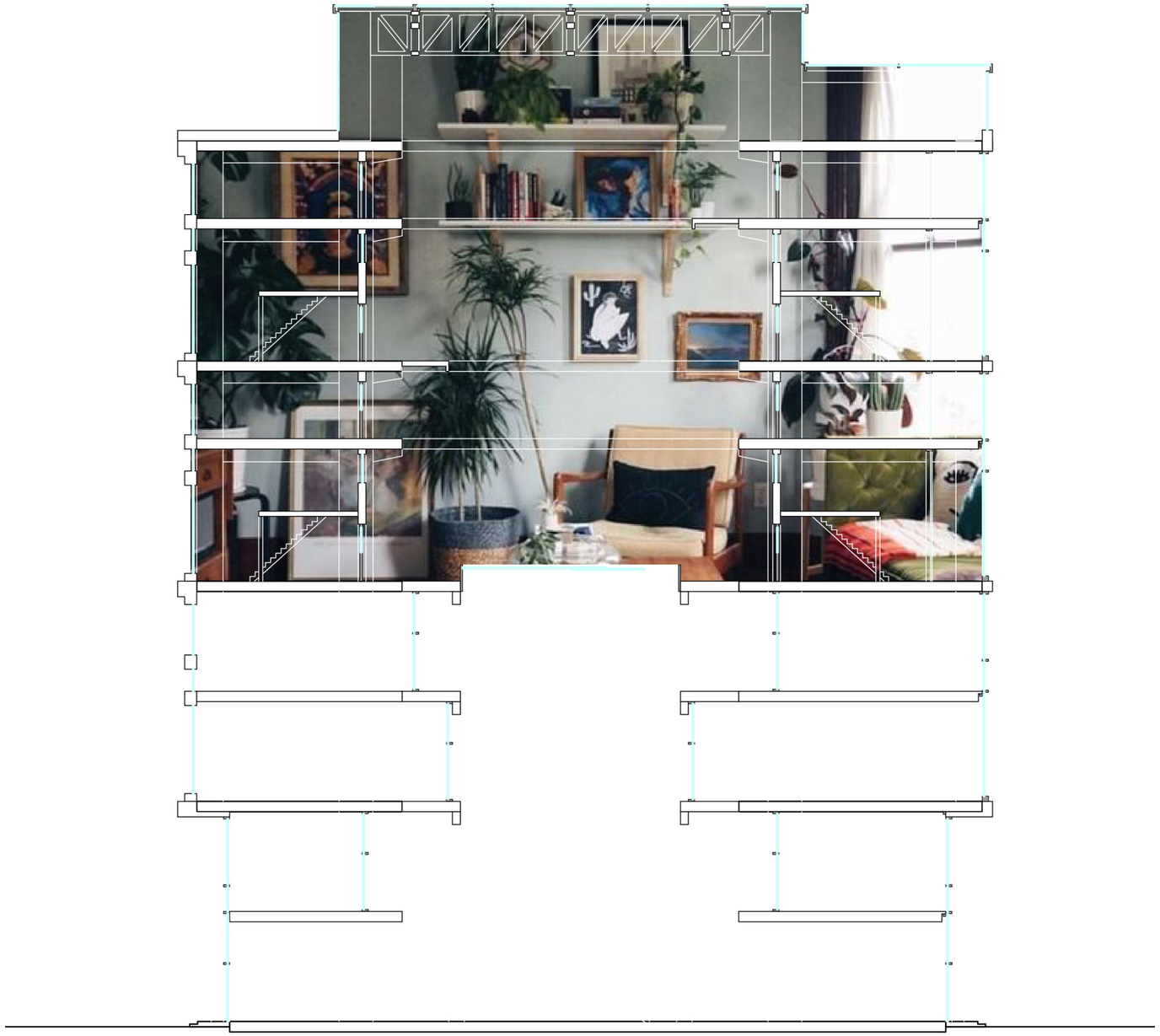
URBAN SCALE: WORKING&LIFE BALANCE



URBAN SCALE: WORKING&LIFE BALANCE



BUILDING SCALE: SHARING COMMUNITY



A. Shared Living

WHY SHARED LIVING COMMUNITY

Social connection helps with urban loneliness

The pain of urban loneliness

social isolation

Deepa Ballal, Jan 07, 2017,

Understanding the Unique Challenges of Urban Loneliness

Let's acknowledge that loneliness and depression is common among urban re and figure out ways urban planning can foster connections and social interacti between people.

Kayla Matthews | @KaylaEMatthews | May 3, 2018, 6am PDT

Share Tweet

Why is living in a big city so isolating?

By Lydia Smith

Aaaaahhh look at all the lonely people. Image: Getty.

LONELINESS → **SOCIAL CONNECTION** → **SHARING COMMUNITY**

WHY SHARED LIVING COMMUNITY

Needs of young people

100%

85%

45%

10%

Private → Public

PRIVATE SPACE ⟷ **SHARING COMMUNITY**

RULES FOR SHARED LIVING

Scale and hierarchy

"Collaborative Communities" by Fromm Dorit

< 15 persons	create a more intimate community but more social friction may occur because of the small number of people
18-35 persons	provide more choice of association and are small enough to allow members to know each other well
> 35 persons	afford a greater number of shared amenities, but their large size means that a certain percentage of households will probably not participate in common dining because of the less intimate nature of the large group

"One shared house 2030" by Space 10

think 4-10 is the right amount of people for a community

Studio	Cluster	Group	Buidling
1	4-12	20-50	150-300
Minimum + Extended everyday	Collaborative 4-7 times a week	Collaborative 1-3 times a week	Public sharing once a week

INTERVIEWS

1. What your best experience/memory in your home? (Enjoyable, cozy, comfort, happy…)
WEATHER; HOBBY; ACCOMPANY; STATE/MEMORY.

2. What is the essential quality/the imagination of your dream home?
FRESH FEELINGS; PERSONAL SPACE; VIEWS; PRIVACY;
NATURAL SUNLIGHT & VENTILATION; PUBLIC SPACE; CONVENIENCE; CONTROL.

3.What extra space would you like to have if you have a very big apartment?
MOVIE; CAT; SPORTS; MUSIC; WORKSHOP.

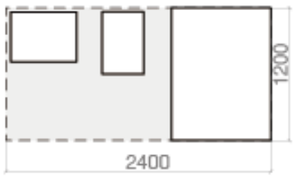
4.What spaces would you share with others if you have to choose one/two/three?
LIVING ROOM, KITCHEN > TOILET > BEDROOM

5.Which one do you prefer? A studio totally belongs to yourself, or a sharing house living with others?
IT DEPENDS...

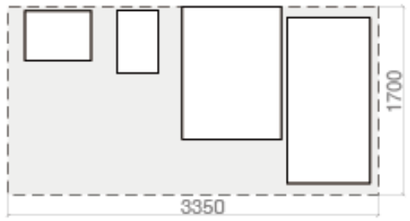
Thanks to Yaqi, Yingda, Yi, Gongbu, Yuchen, Alex, Ton

RULES FOR SHARED LIVING

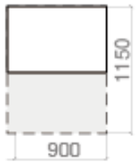
Bathing 2.9m2



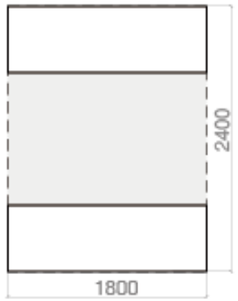
Bathing 5.7m2



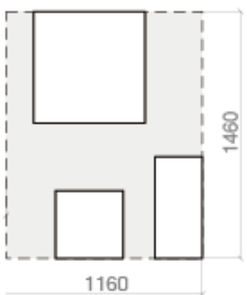
Dressing 1.1m2



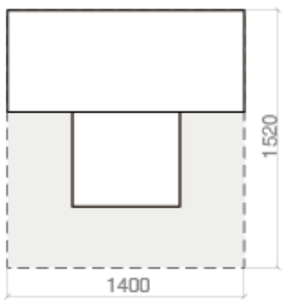
Dressing 4.3m2



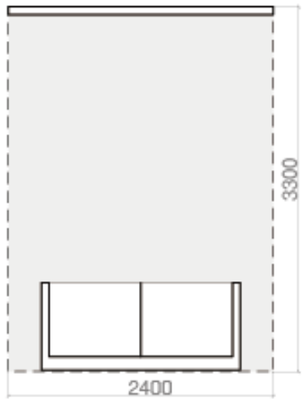
Living 1.7m2



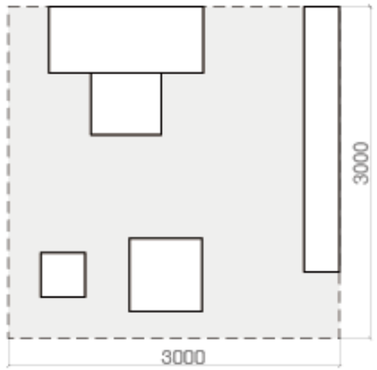
Working 2.1m2



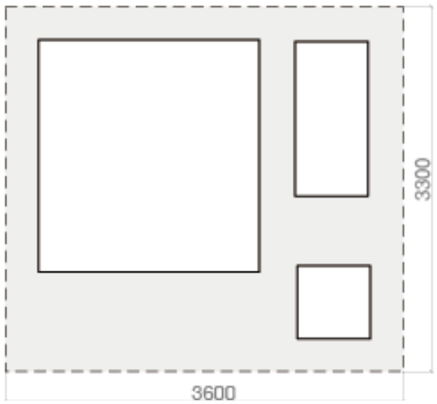
Video room 7.9m2



Reading Working 9m2

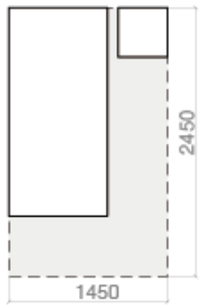


Sports 11.8m2

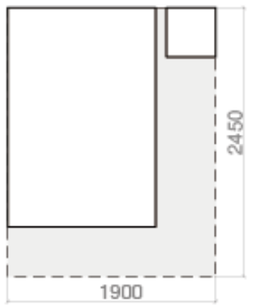


RULES FOR SHARED LIVING

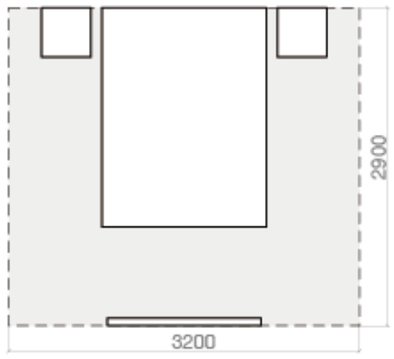
Sleeping 3.6m2



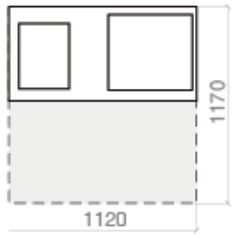
Sleeping 4.7m2



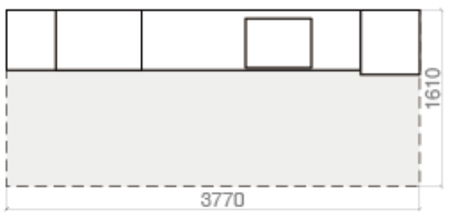
Sleeping 9.3m2



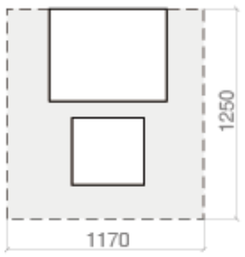
Kitchenette 1.3m2



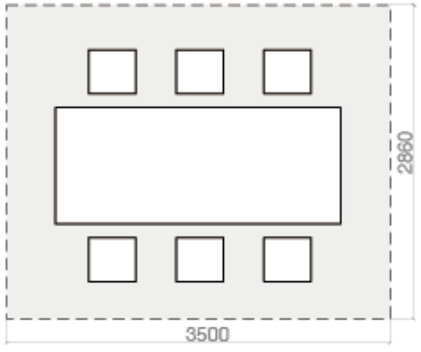
Kitchen 6.1m2



Dining 1.5m2



Dining 10m2



WHY SHARED LIVING COMMUNITY

Smaller space with SUSTAINABLE quality

Collaborative

RULES FOR SHARED LIVING

30m^2+sharing = basic & personality + social & luxurious

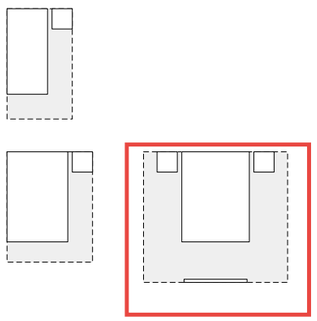
Private

Public

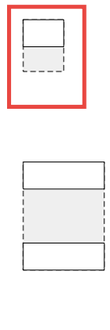
PRIVATE

~30m^2

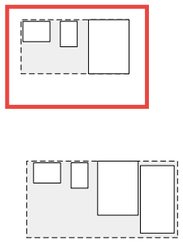
Sleeping



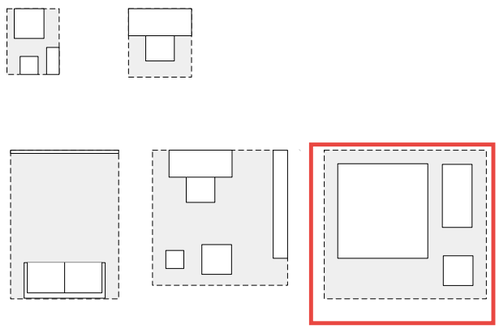
Dressing



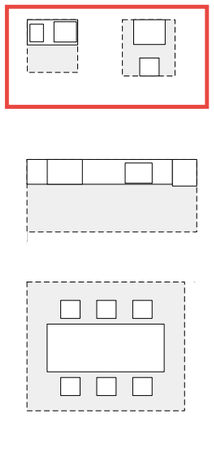
Bathing



Living + working



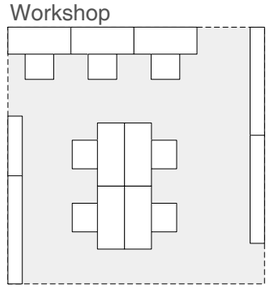
Cooking + eating



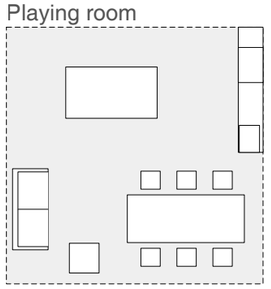
SHARING

~7m^2 / person

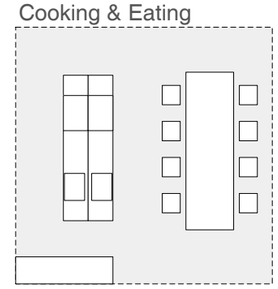
Workshop



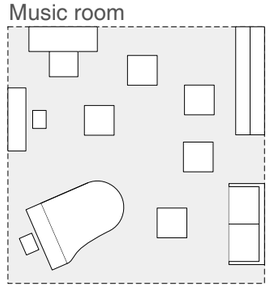
Playing room



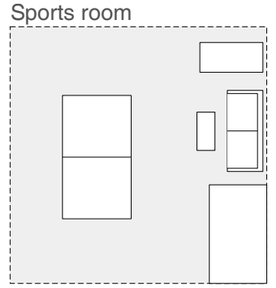
Cooking & Eating



Music room



Sports room

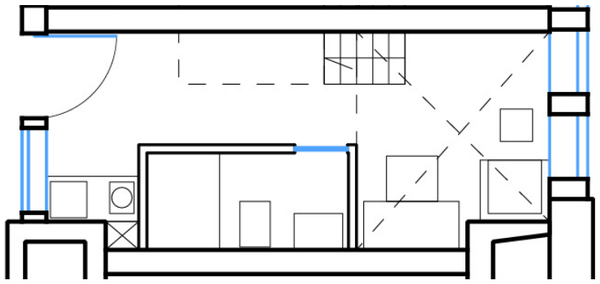


LOFT APARTMENT

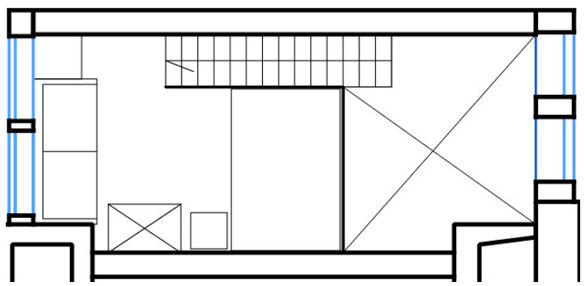
Choice 1: sharing kitchen and dining space

Sharing member: 9

Private space



entrance floor plan

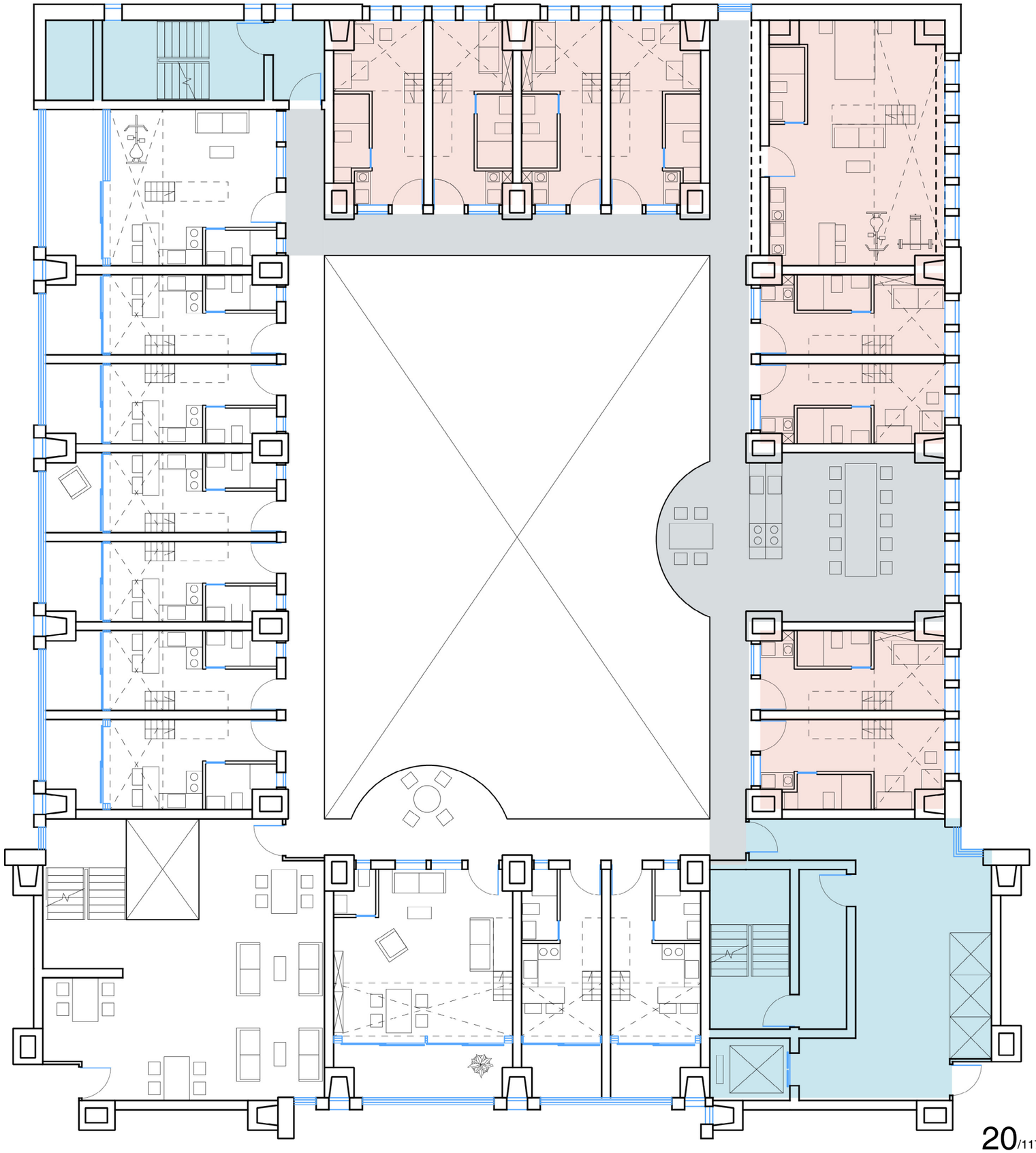


first floor plan

private space

semi-private cluster sharing space

semi-public group sharing space

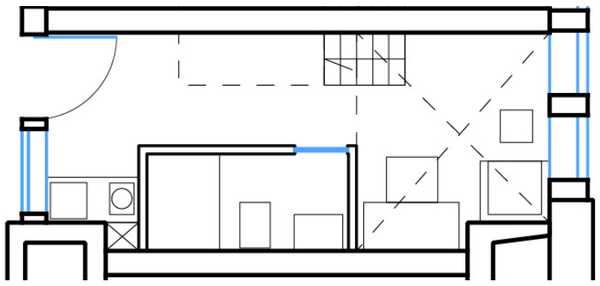


LOFT APARTMENT

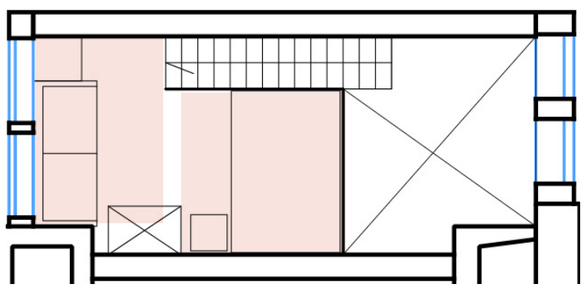
Choice 1: sharing kitchen and dining space

Sharing member: 9

Private space: 25m^2



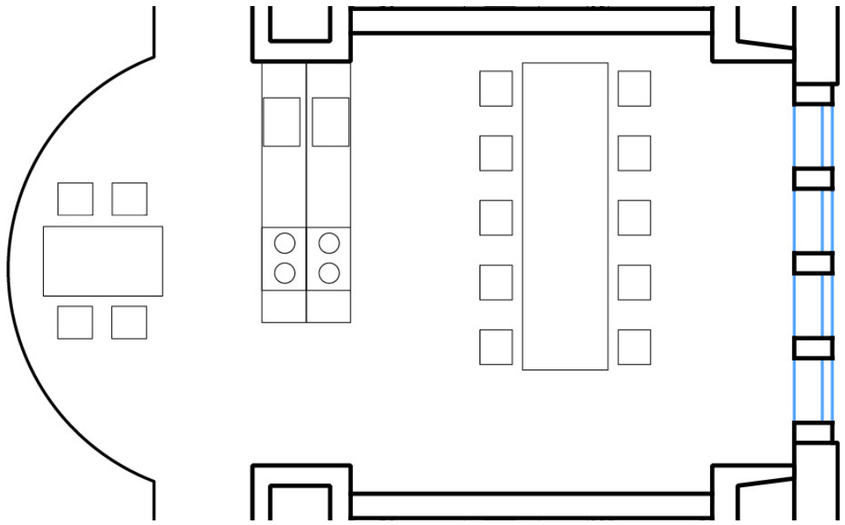
entrance floor plan



first floor plan

Personal space

Sharing space: 50m2

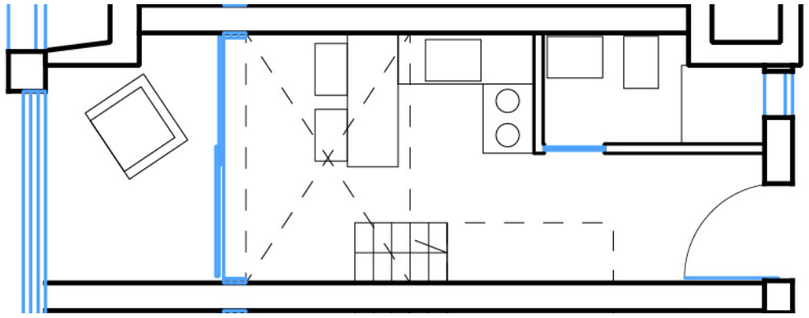


LOFT APARTMENT

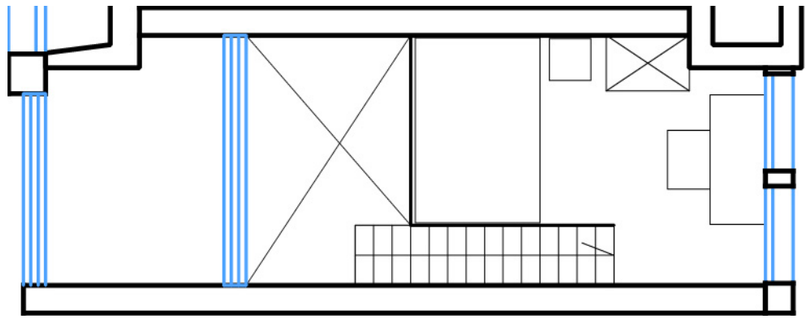
Choice 2: sharing the living and working space

Sharing member: 9

Private space



entrance floor plan



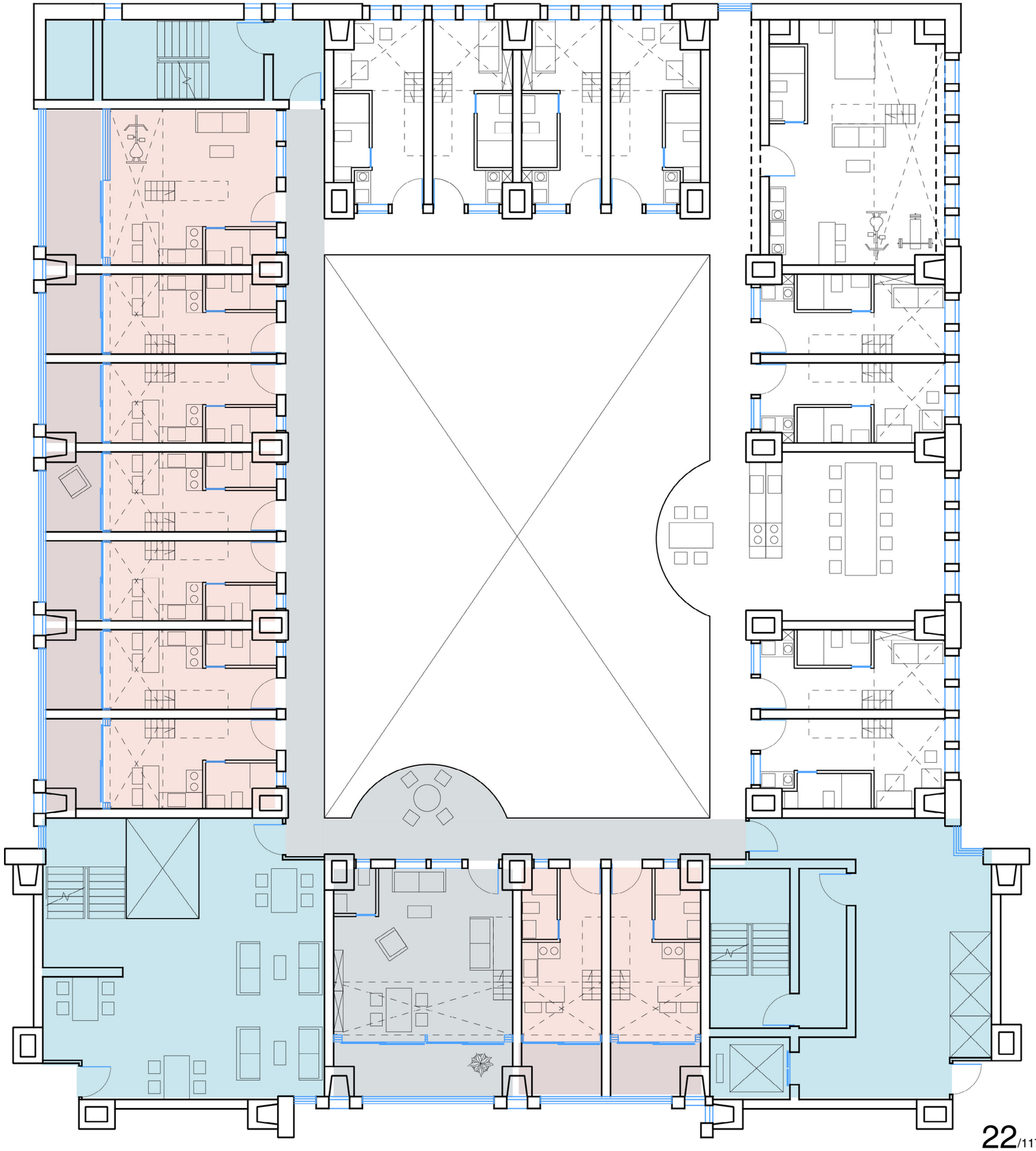
first floor plan

semi-private balcony

private space

semi-private cluster sharing space

semi-public group sharing space

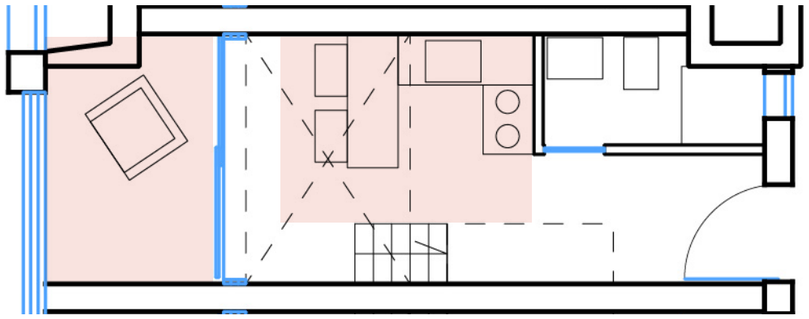


LOFT APARTMENT

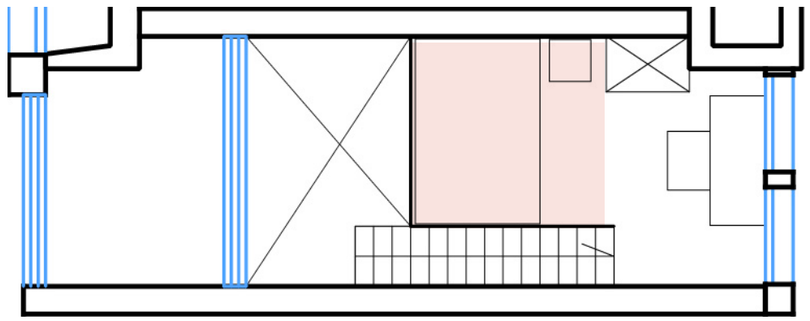
Choice 2: sharing the living and working space

Sharing member: 9

Private space: 29m^2

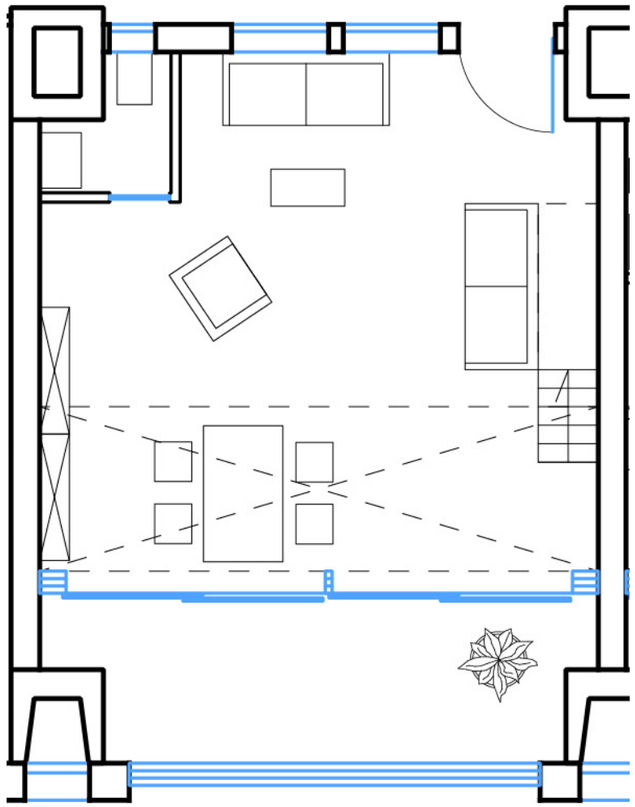


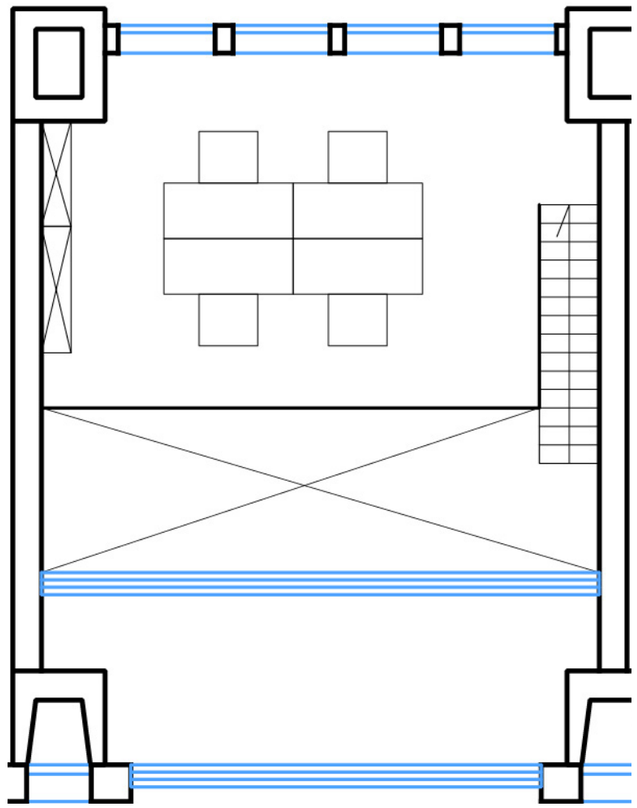
entrance floor plan



first floor plan

Sharing space: 65m2



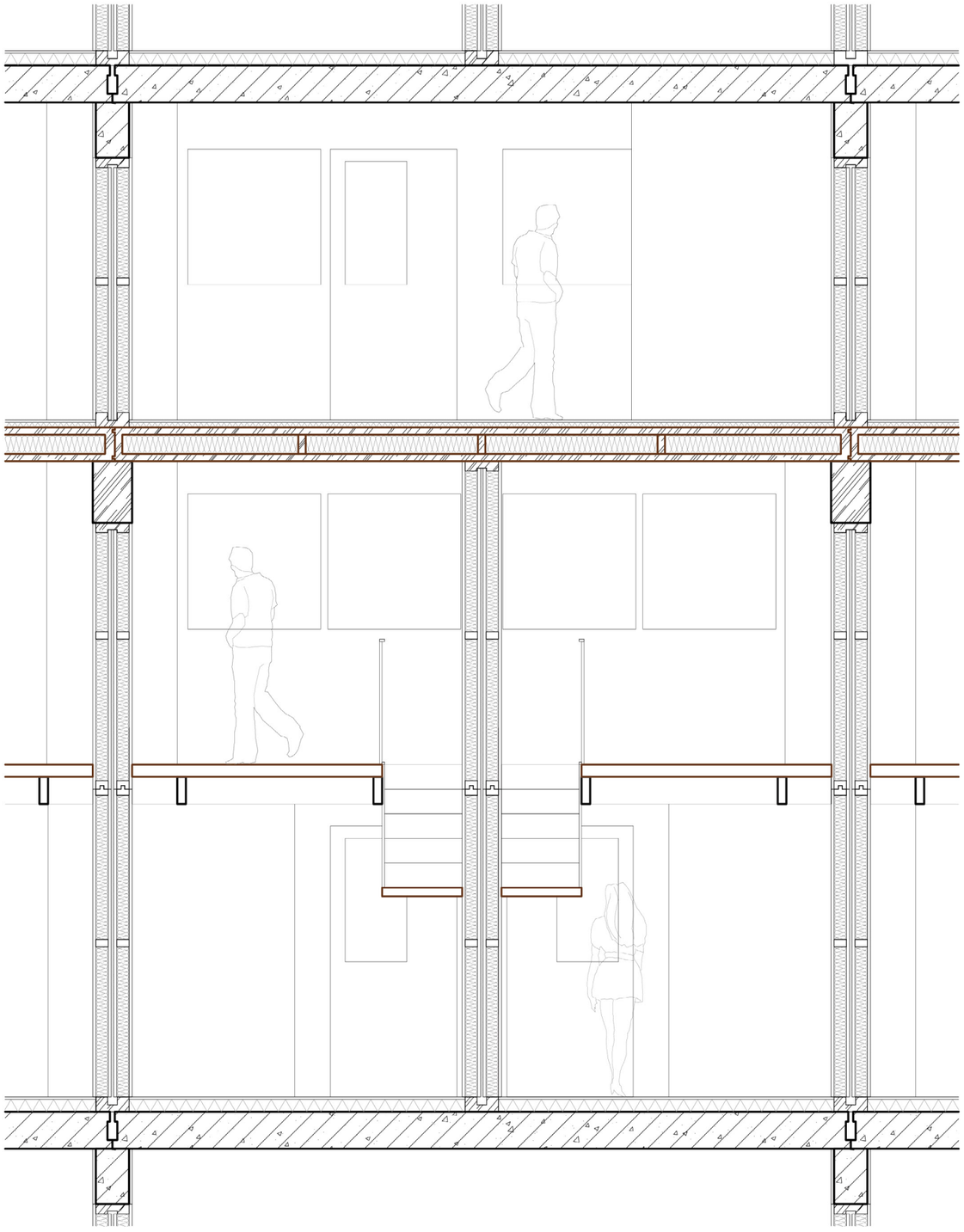


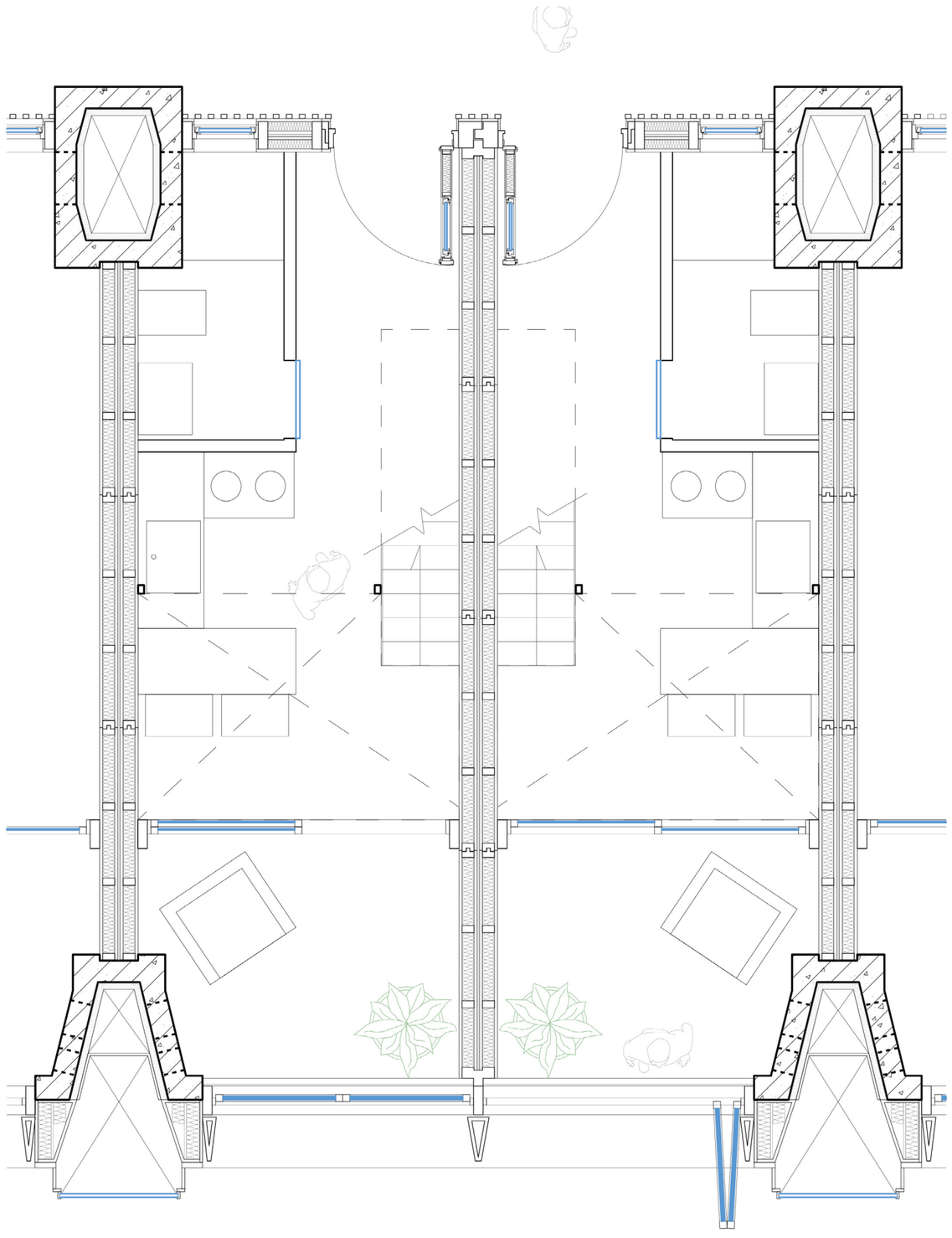
Personal space

LOFT APARTMENT

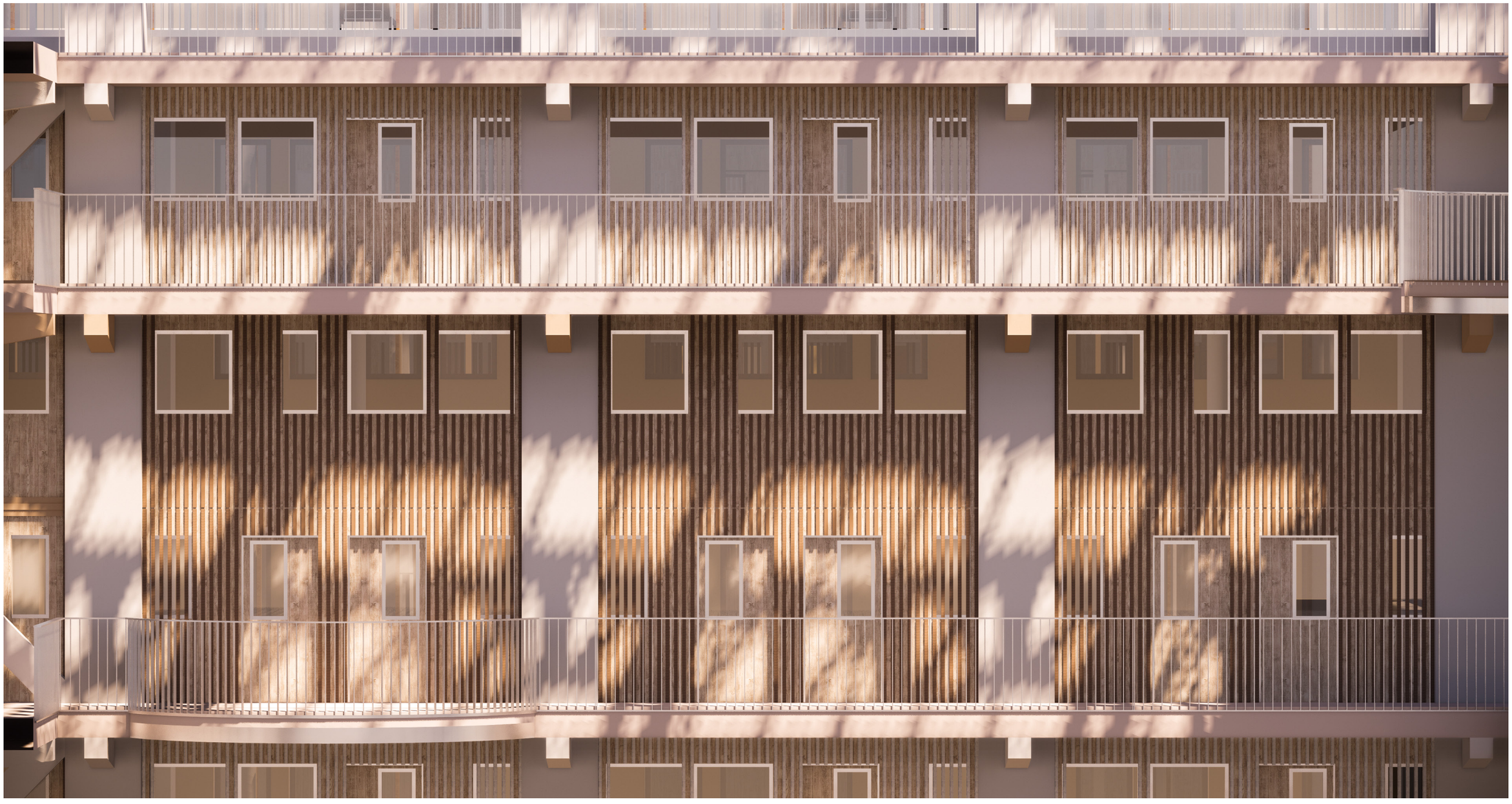
LOFT APARTMENT

LOFT APARTMENT





ATRIUM FACADE



ATRIUM FACADE

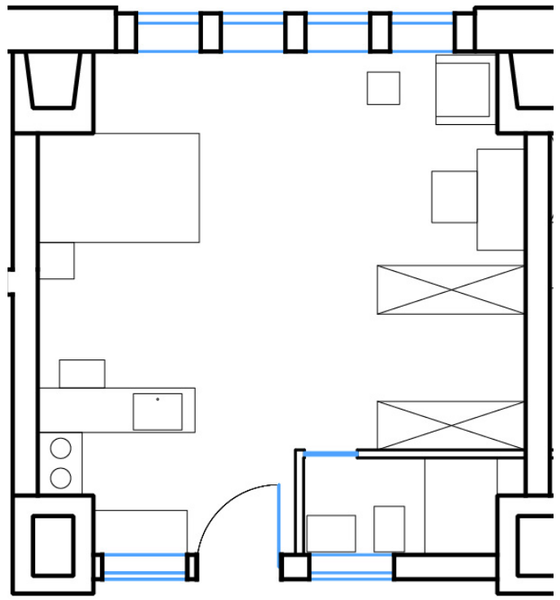
EXTERIOR FACADE

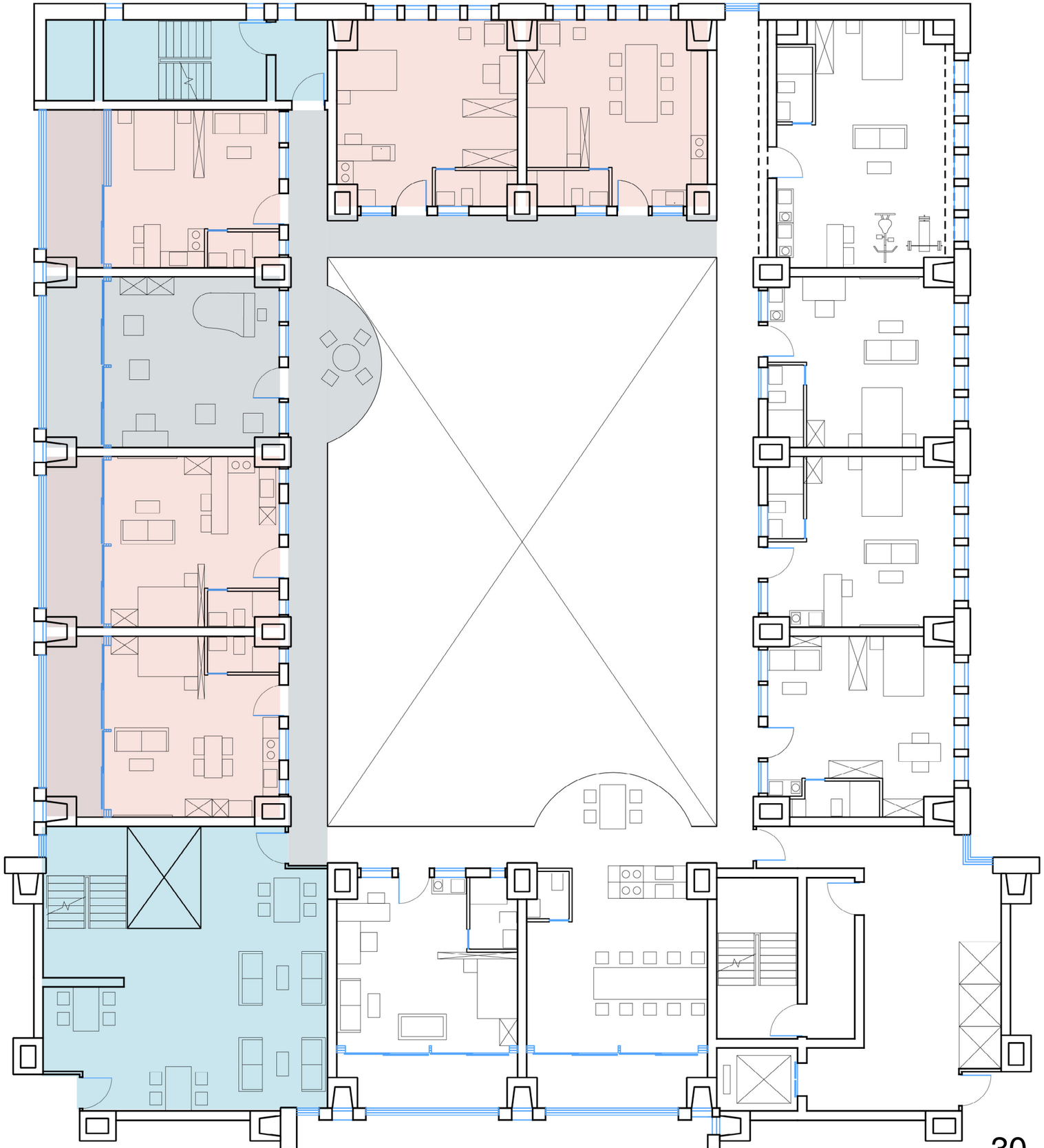
1F APARTMENT

Choice 3: sharing music recording room

Sharing member: 5

Private space





semi-private balcony

private space

semi-private cluster sharing space

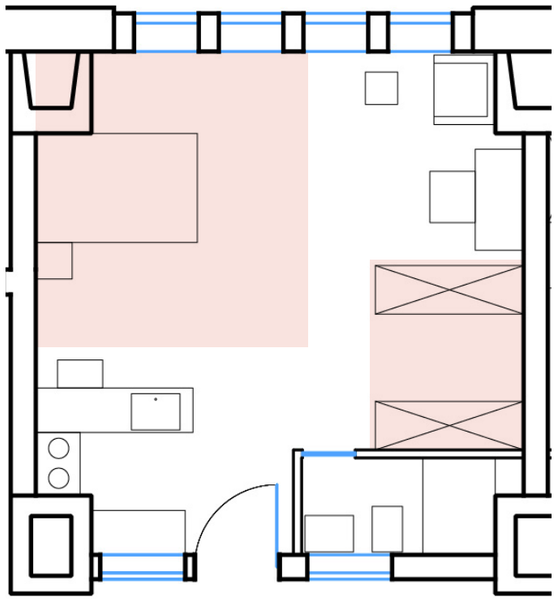
semi-public group sharing space

1F APARTMENT

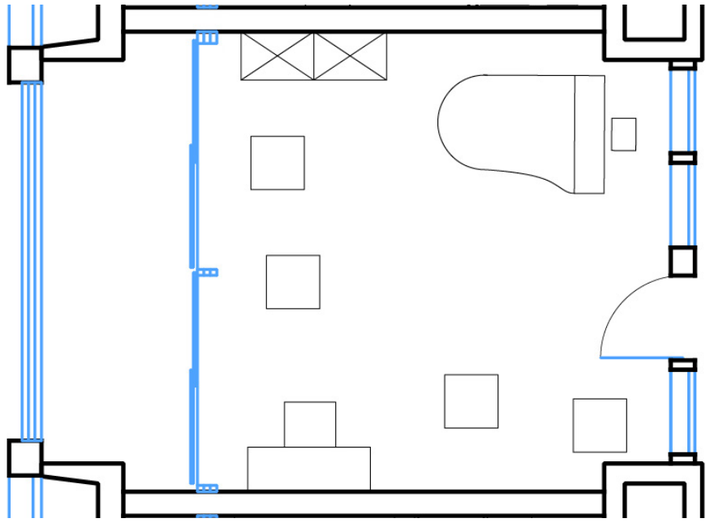
Choice 3: sharing music recording room

Sharing member: 5

Private space: 35m^2



Sharing space: 44m2



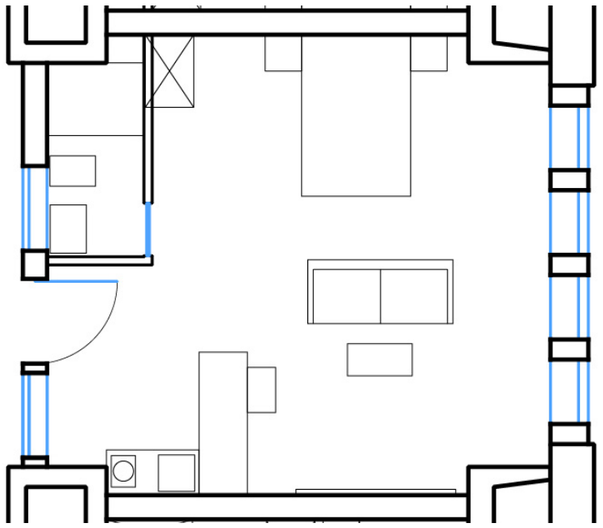
Personal space

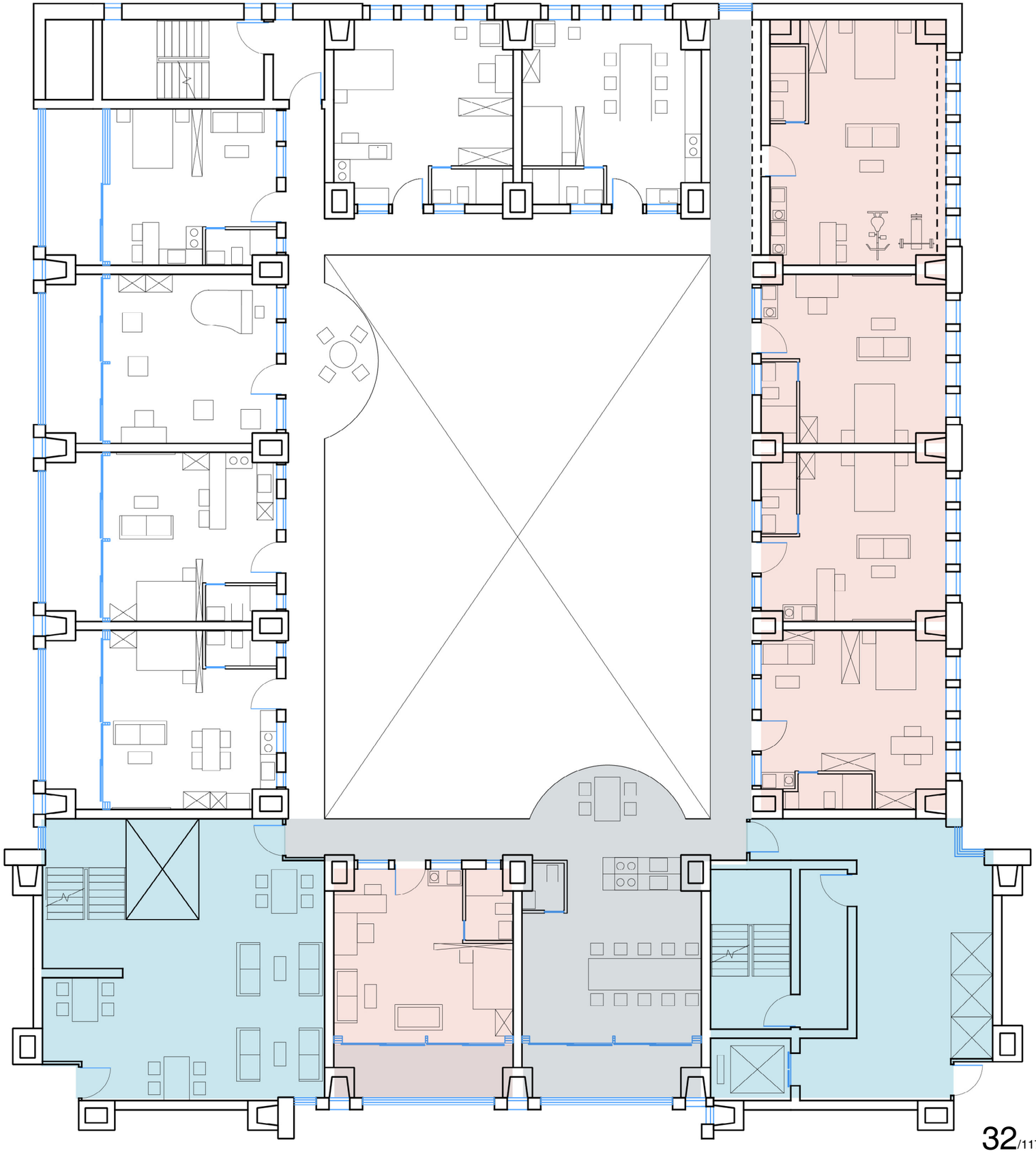
1F APARTMENT

Choice 4: sharing kitchen and dining space

Sharing member: 5

Private space





semi-private balcony

private space

semi-private cluster sharing space

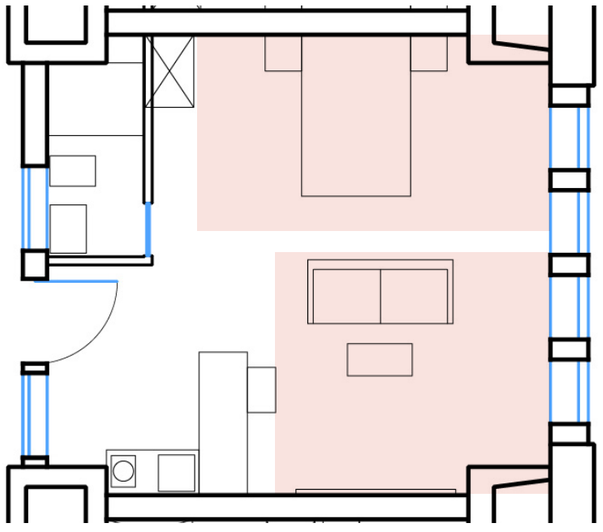
semi-public group sharing space

1F APARTMENT

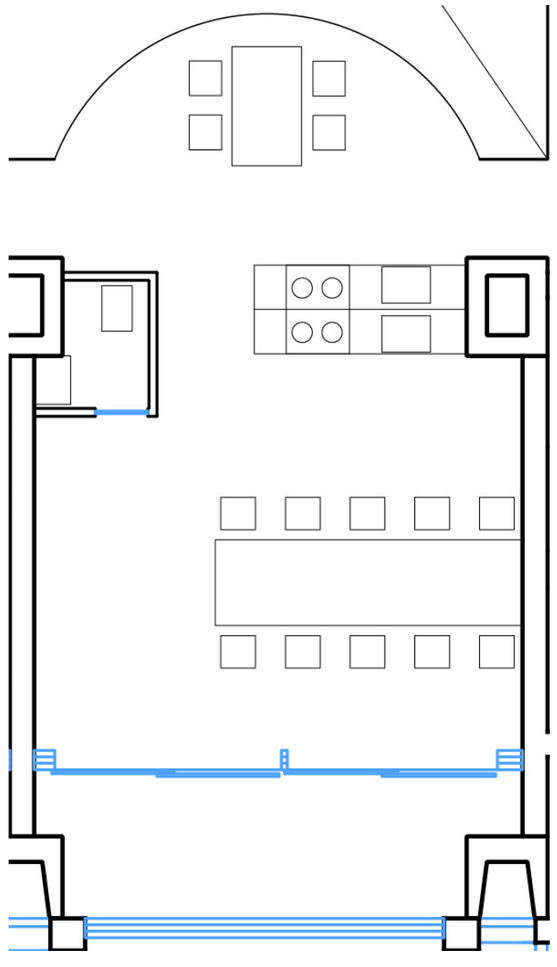
Choice 4: sharing kitchen and dining space

Sharing member: 5

Private space: 35m^2



Sharing space: 50m2



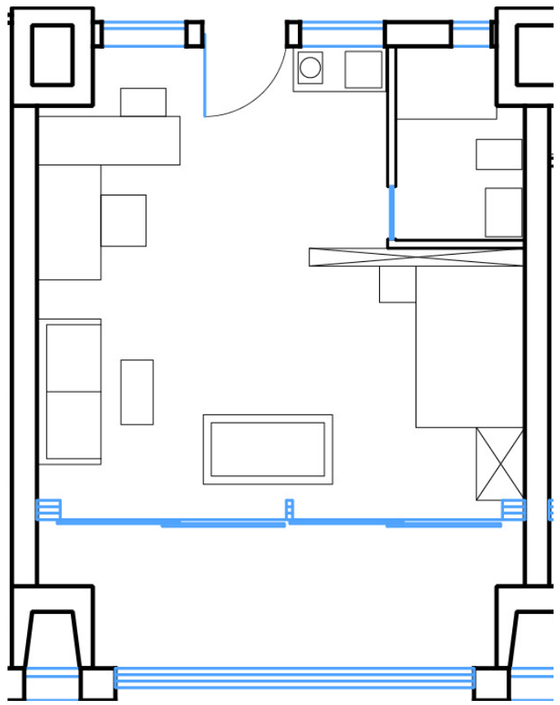
Personal space

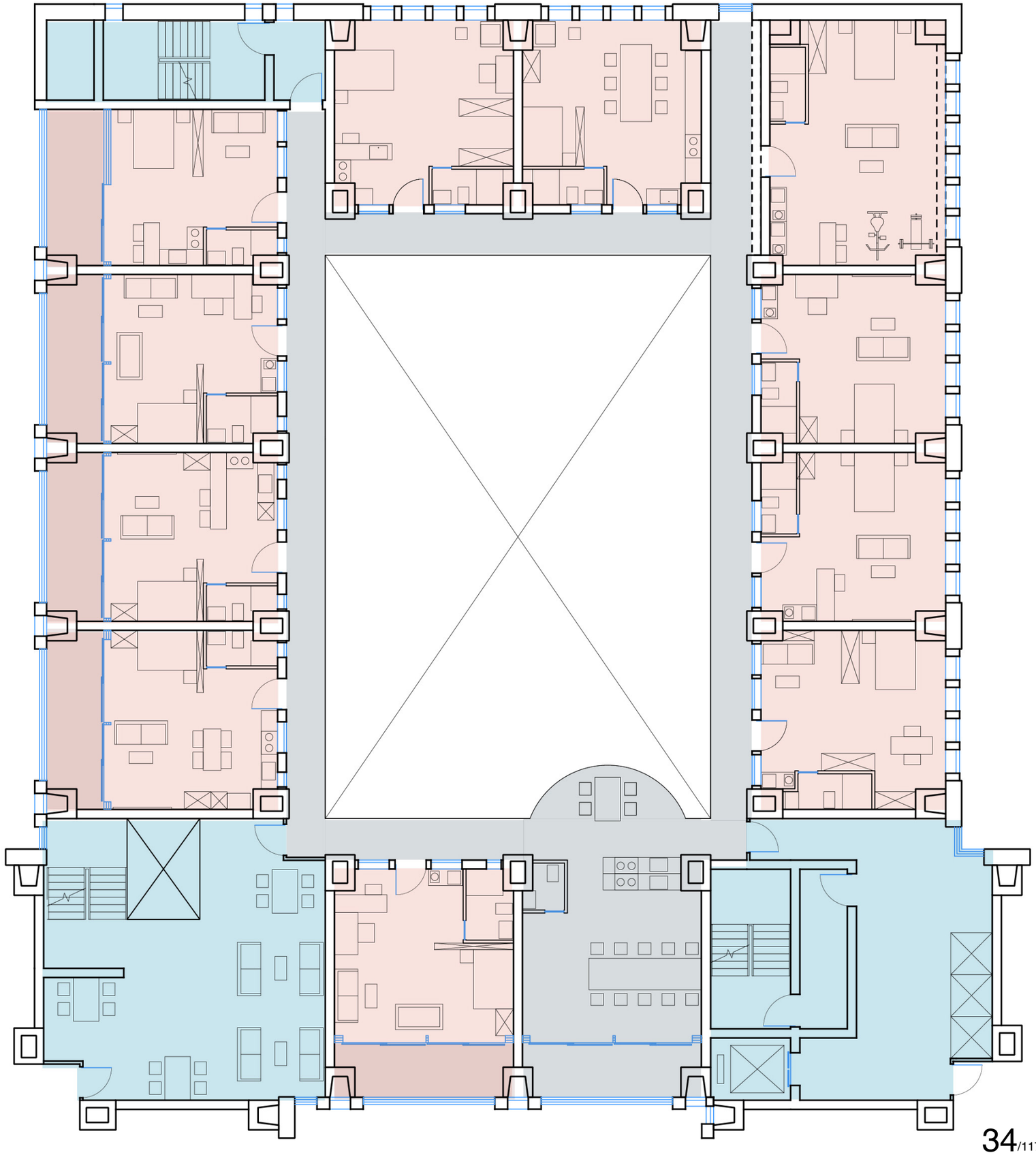
1F APARTMENT

Choice 5: sharing kitchen and dining space

Sharing member: 11

Private space





semi-private balcony

private space

semi-private cluster sharing space

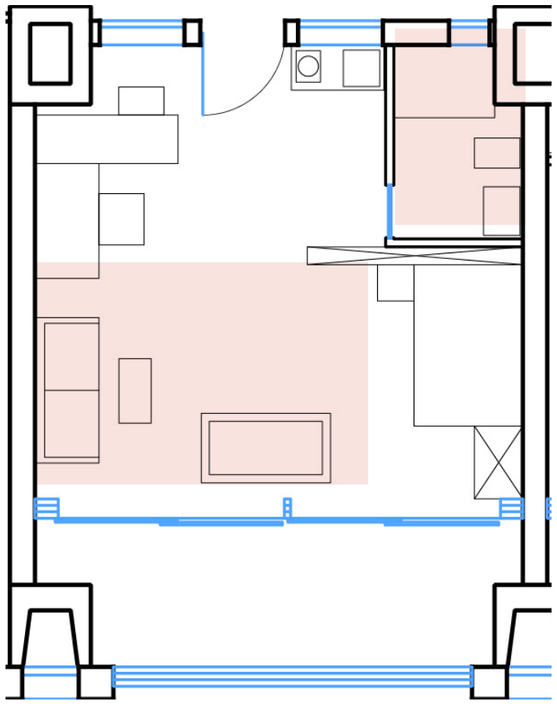
semi-public group sharing space

1F APARTMENT

Choice 5: sharing kitchen and dining space

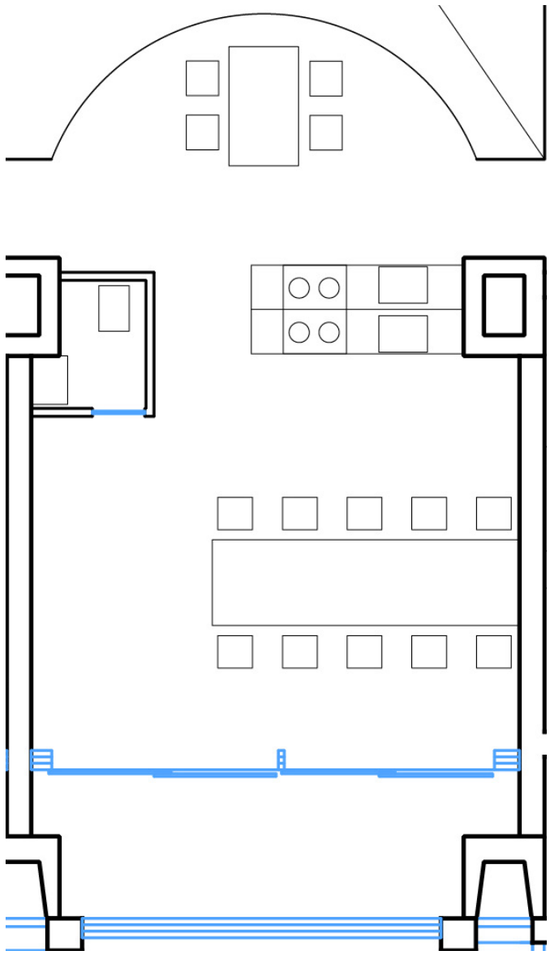
Sharing member: 11

Private space: 44m^2



Personal space

Sharing space: 50m2



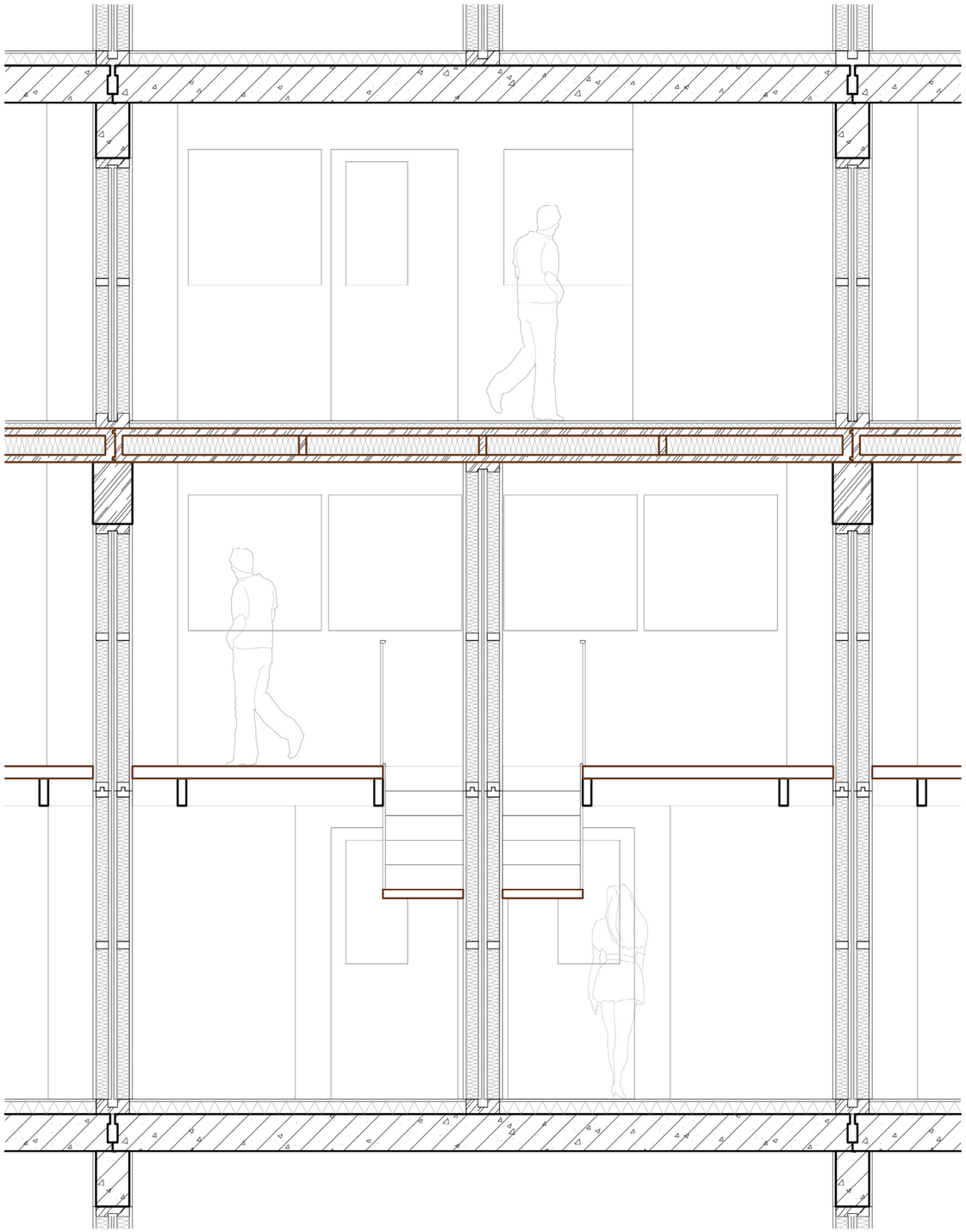
1F APARTMENT

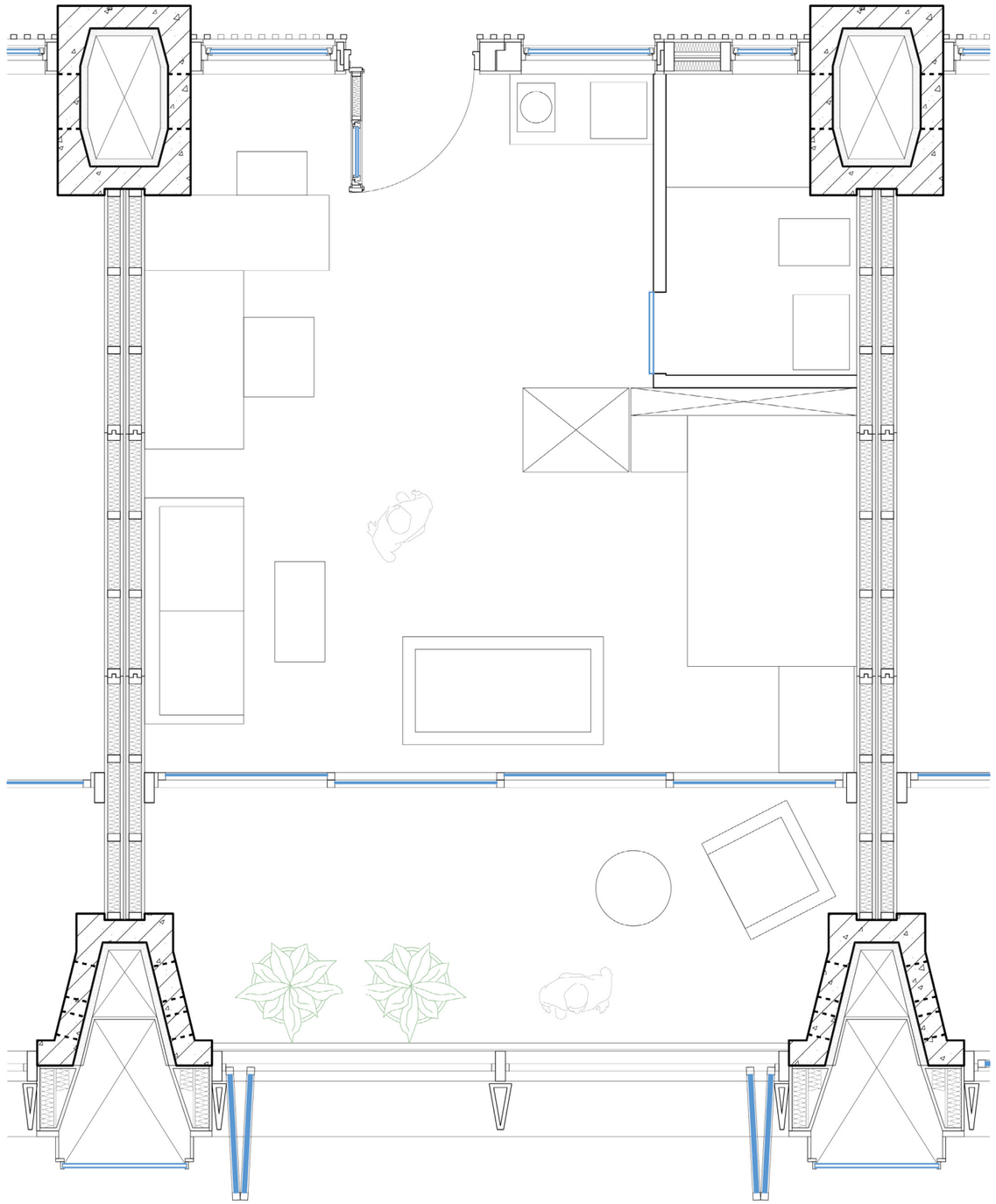
Private space

1F APARTMENT

Sharing space

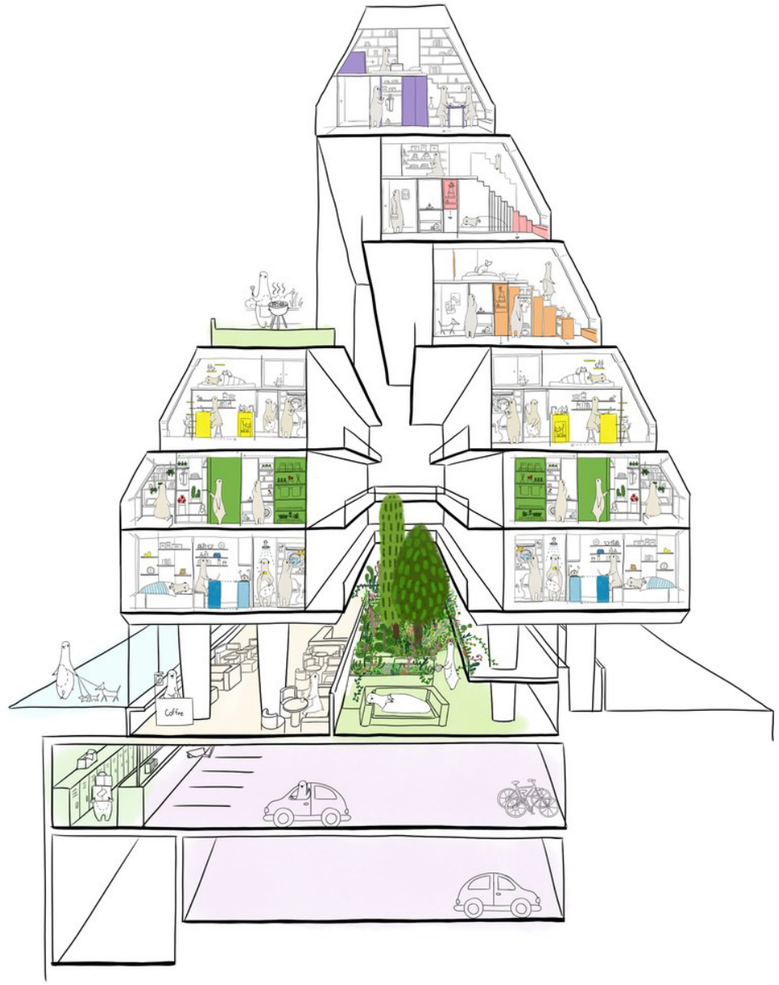
1F APARTMENT





ATRIUM

Symbol of Sharing community

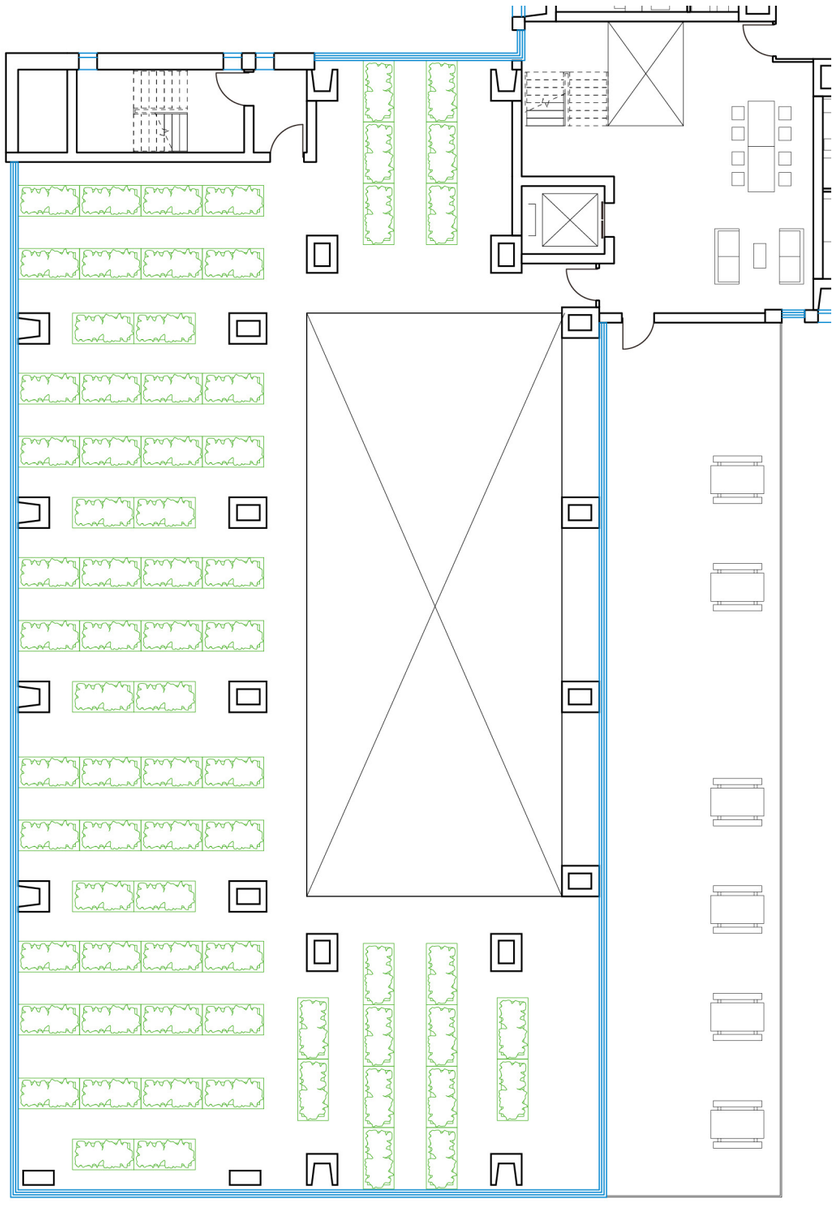


Source:
Treehouse Apartment Building / Bo-DAA
https://www.archdaily.com/932735/treehouse-apartment-building-bo-daa?ad_medium=gallery

ATRIUM

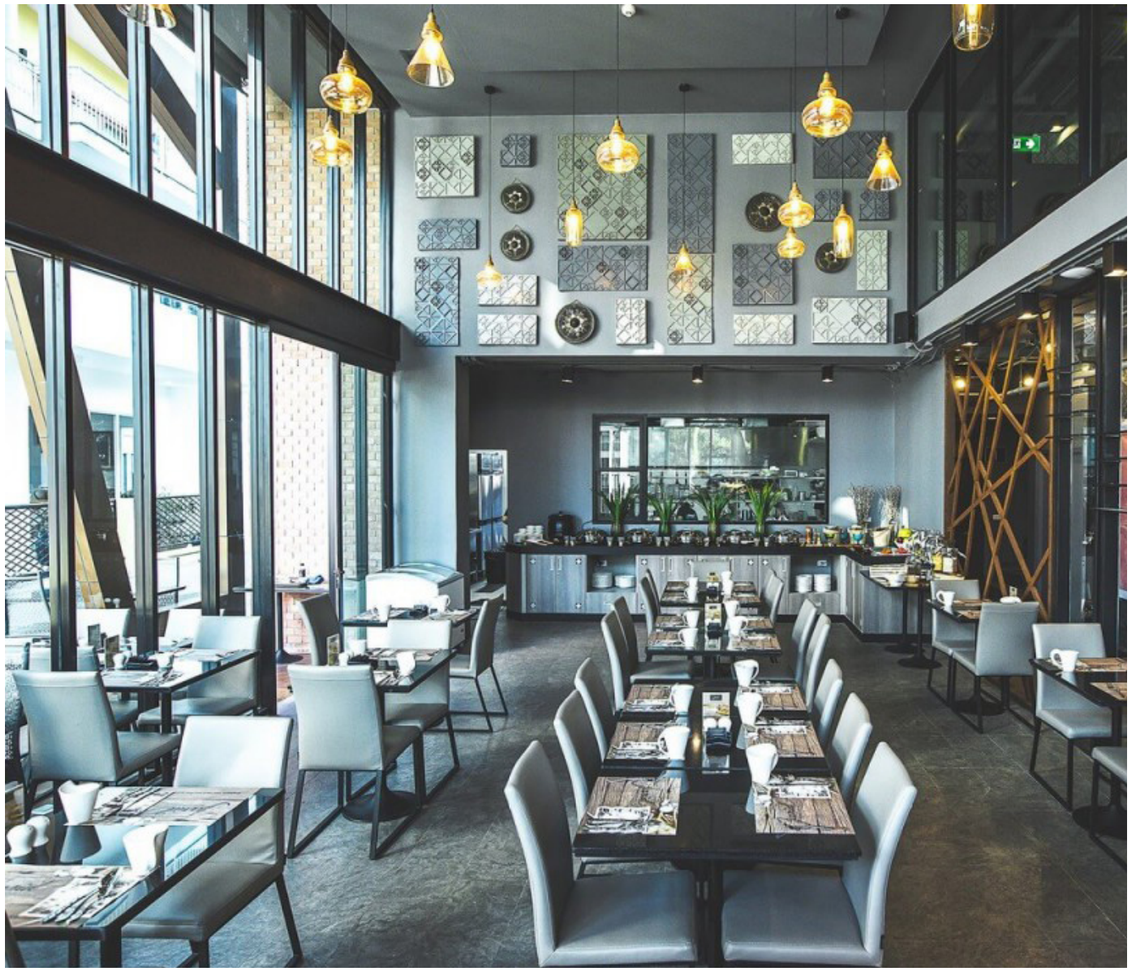
Core of Sharing community

ROOF GARDEN

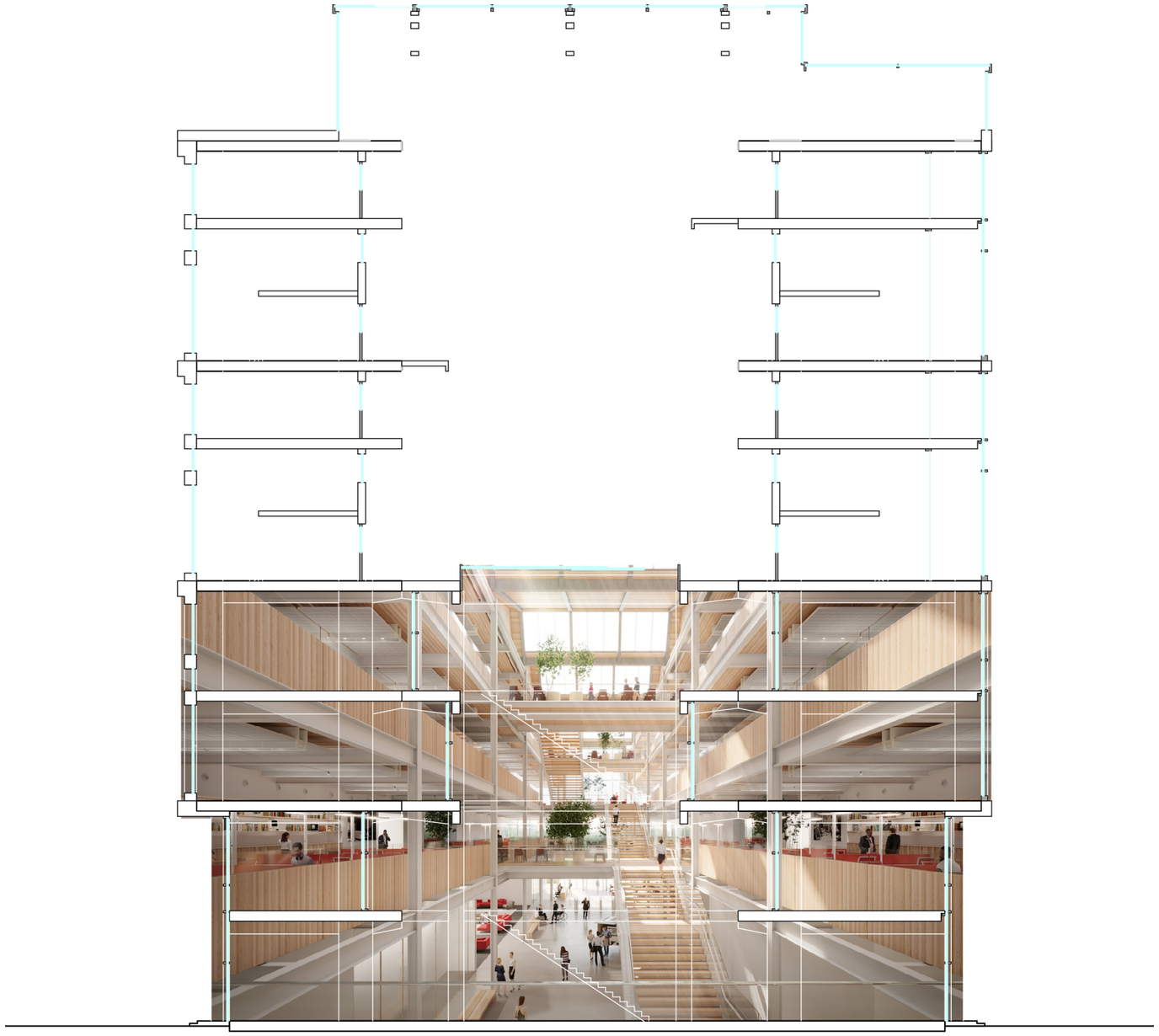


Roof Garden Plan

PUBLIC GYM & RESTAURANT



WORKING&LIFE BALANCE



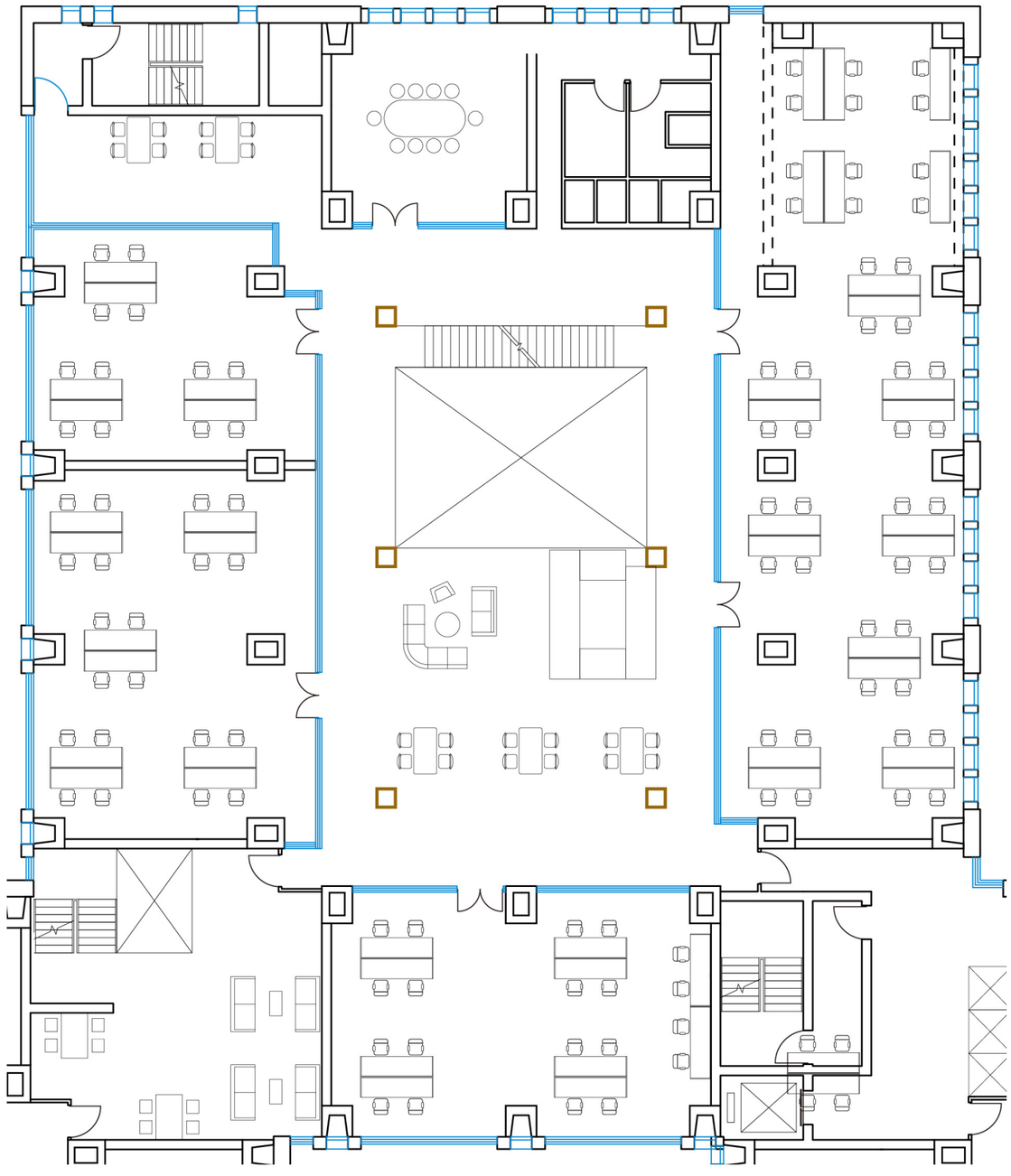
B. Shared Working

SHARING WORKING COMMUNITY

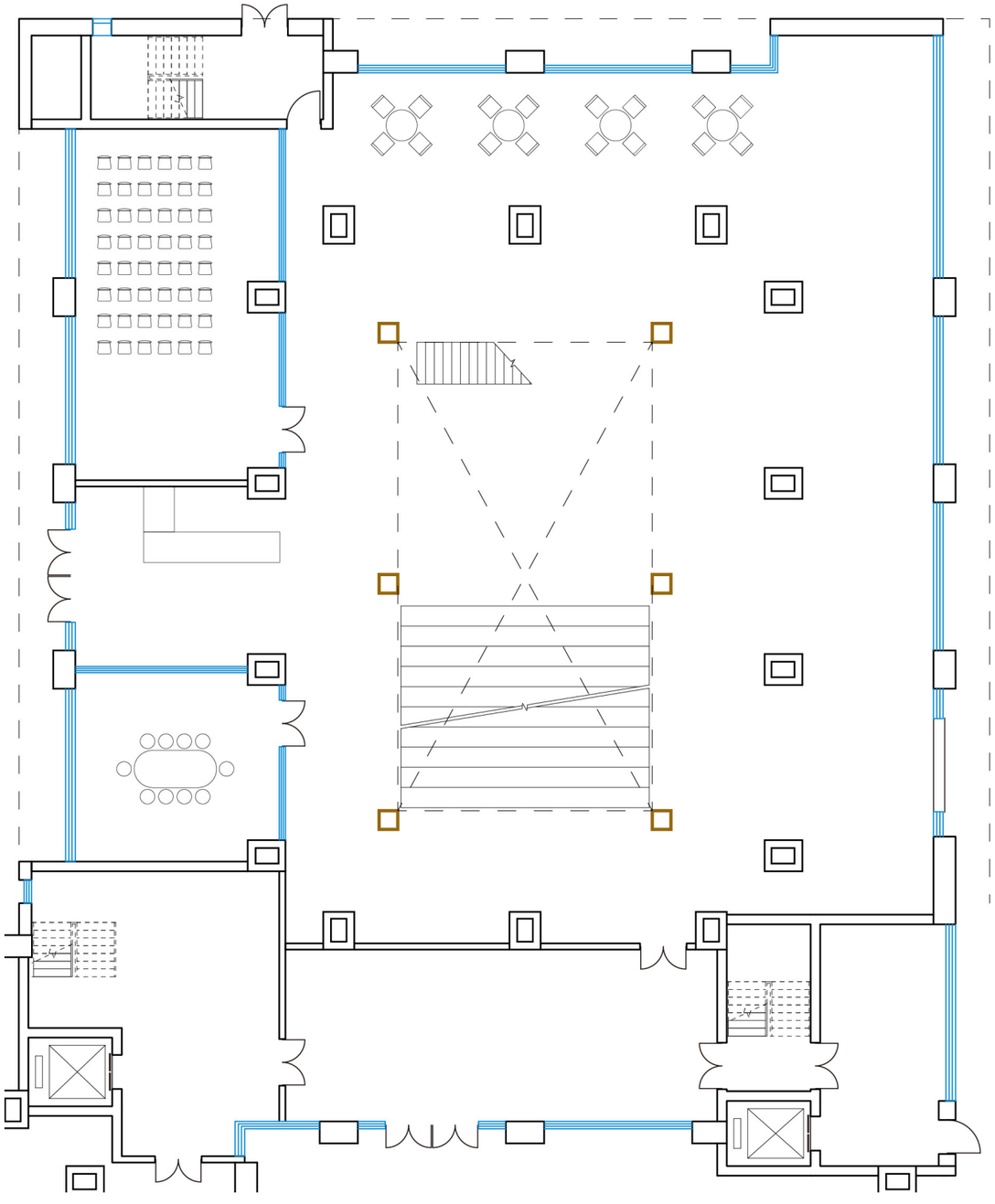
Connection, Cooperation, Inspiration for freelancers and companies

Common maker space and exhibition

PLANS OF SHARING WORKING SPACE

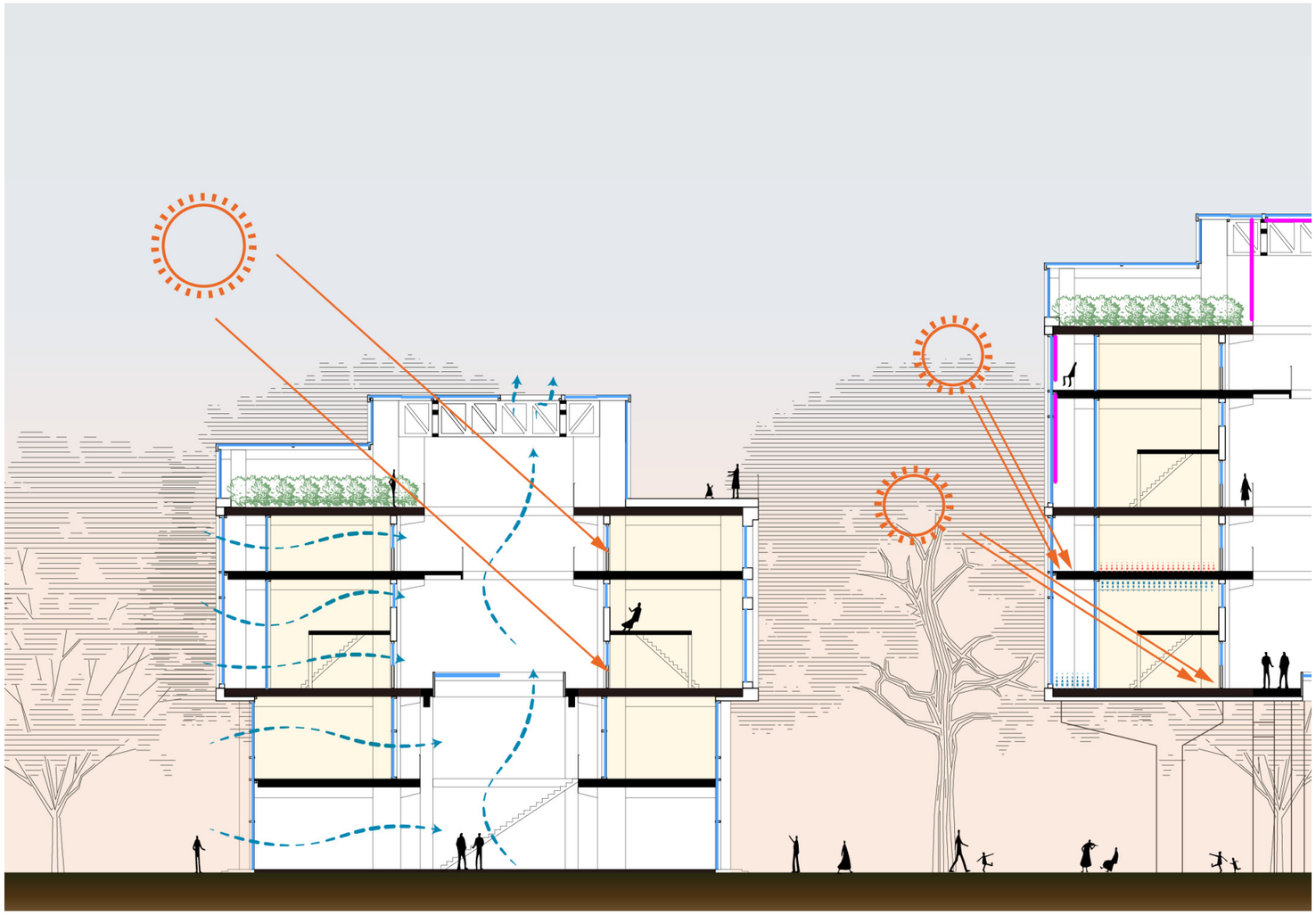


Shared working space



Public exhibition space

EXHIBITION SPACE



AN ARCHITECTURAL INTEGRATION OF ENERGY EFFICIENCY

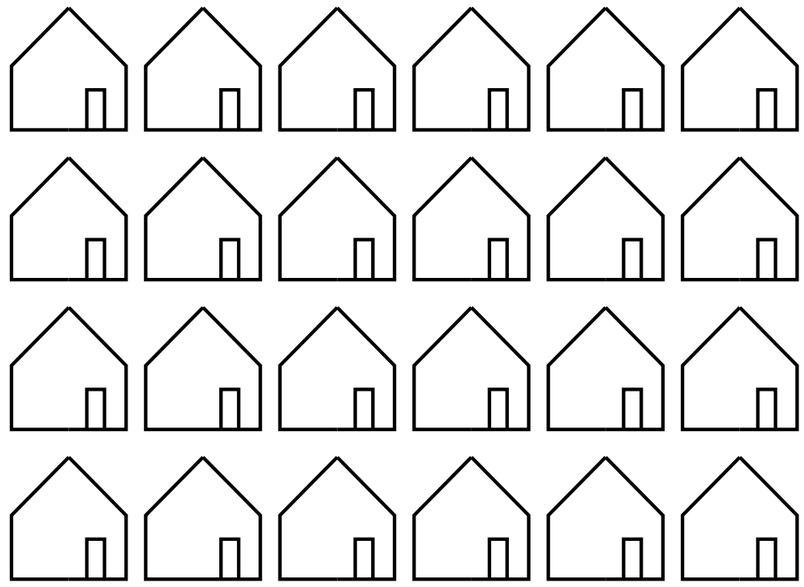
CHALLENGES IN THE BUILT ENVIRONMENT

CONSUMPTION IN THE BUILT ENVIRONMENT

36% CO2 40% ENERGY

· All new buildings must be nearly zero-energy buildings (NZEB) by 2020.
· High energy performance + renewable energy sources.
· Reduce the need and demand: passive, bioclimatic design.

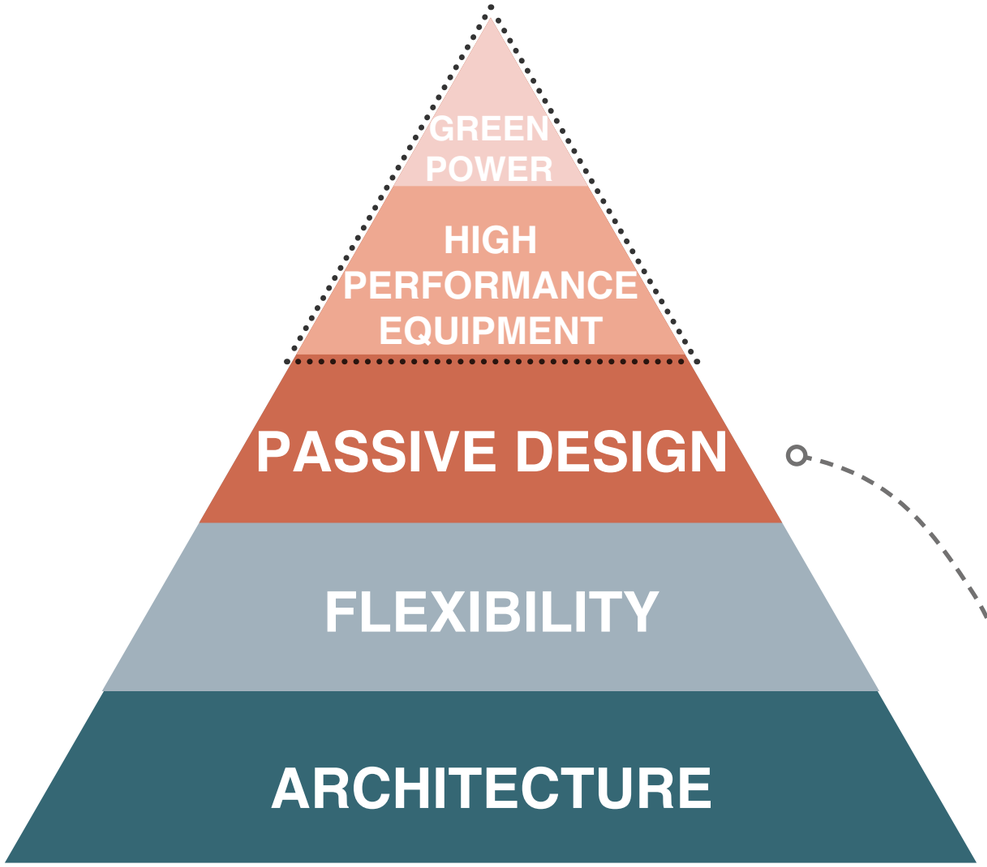
DEMAND FOR AFFORDABLE STARTERS HOUSING

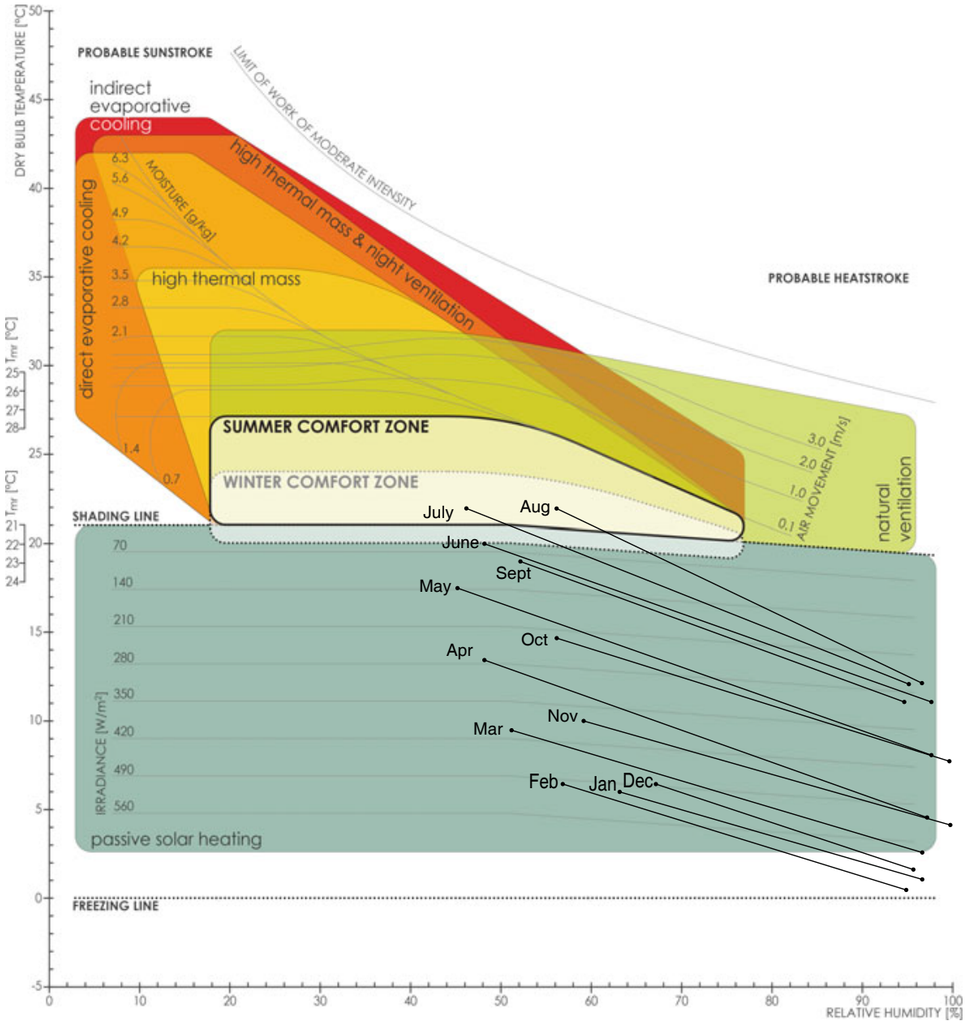


+ 1 Million New Homes by 2030

Source: https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-performance-of-buildings/energy-performance-buildings-directive

PASSIVE FIRST





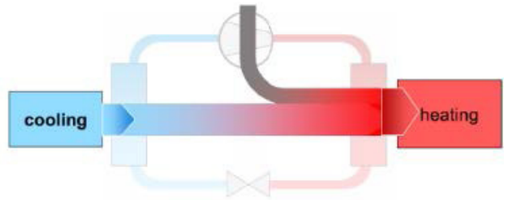
HOW TO BE SUSTAINABLE?

MAKE USE OF THE ENVIRONMENTAL RESOURCES

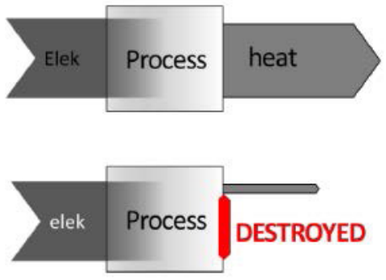
ENERGY-EFFICIENCY ACTIVE SOLUTION

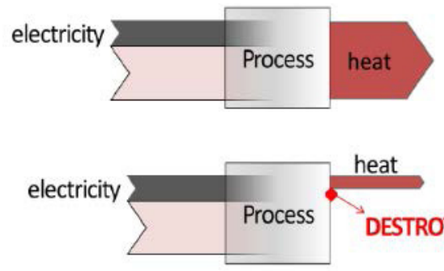
	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	1	4	1	0	0	0	0	0
5	0	0	0	2	25	44	28	4	0	0	0	0
6	0	0	1	34	97	133	100	49	12	0	0	0
7	0	0	30	128	216	247	211	140	85	16	0	0
8	1	21	113	256	339	362	332	248	199	84	15	0
9	31	83	212	362	436	472	434	319	308	174	68	21
10	84	151	273	419	503	552	511	356	388	222	118	65
11	129	209	307	462	527	592	537	375	435	251	150	95
12	156	229	319	496	536	575	537	416	431	252	166	108
13	146	216	304	479	534	580	562	405	398	238	151	97
14	112	196	279	439	488	533	517	381	354	205	106	69
15	62	139	225	383	436	485	467	331	293	145	55	29
16	15	70	166	298	362	414	400	291	205	72	9	2
17	0	14	80	175	258	313	294	190	98	12	0	0
18	0	0	13	66	139	185	179	98	20	0	0	0
19	0	0	0	8	45	76	71	21	0	0	0	0
20	0	0	0	0	3	14	10	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0

Electrical heaters



Heat Pump





$$\text{COP real} = \eta \times \text{COP Carnot} = \eta \times \frac{T_{design}}{T_{design} - T_{source}}$$

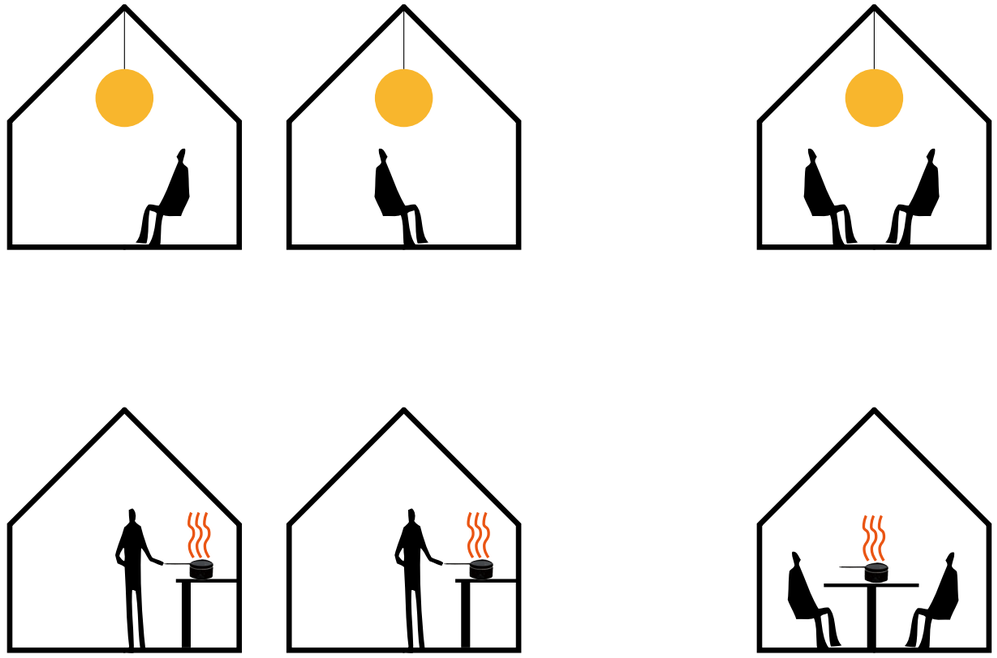
1 W electrical energy can provide 6.7 W heat

Heat pump system combined with **low-temperature floor heating** and **geothermal source** can reduce lots of energy consumption.

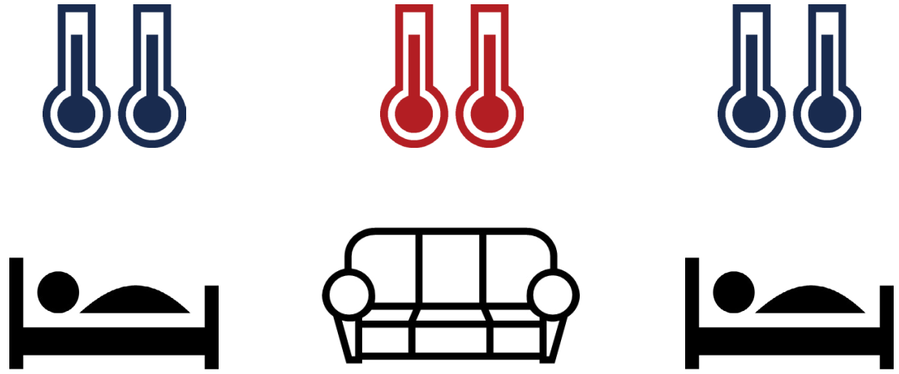
Solar radiation per hour (W/m2) Rotterdam.
Source: http://www.soda-pro.com/home

SHARED ENERGY

Sharing consumes less energy



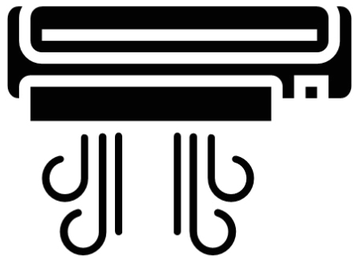
Shared heating area



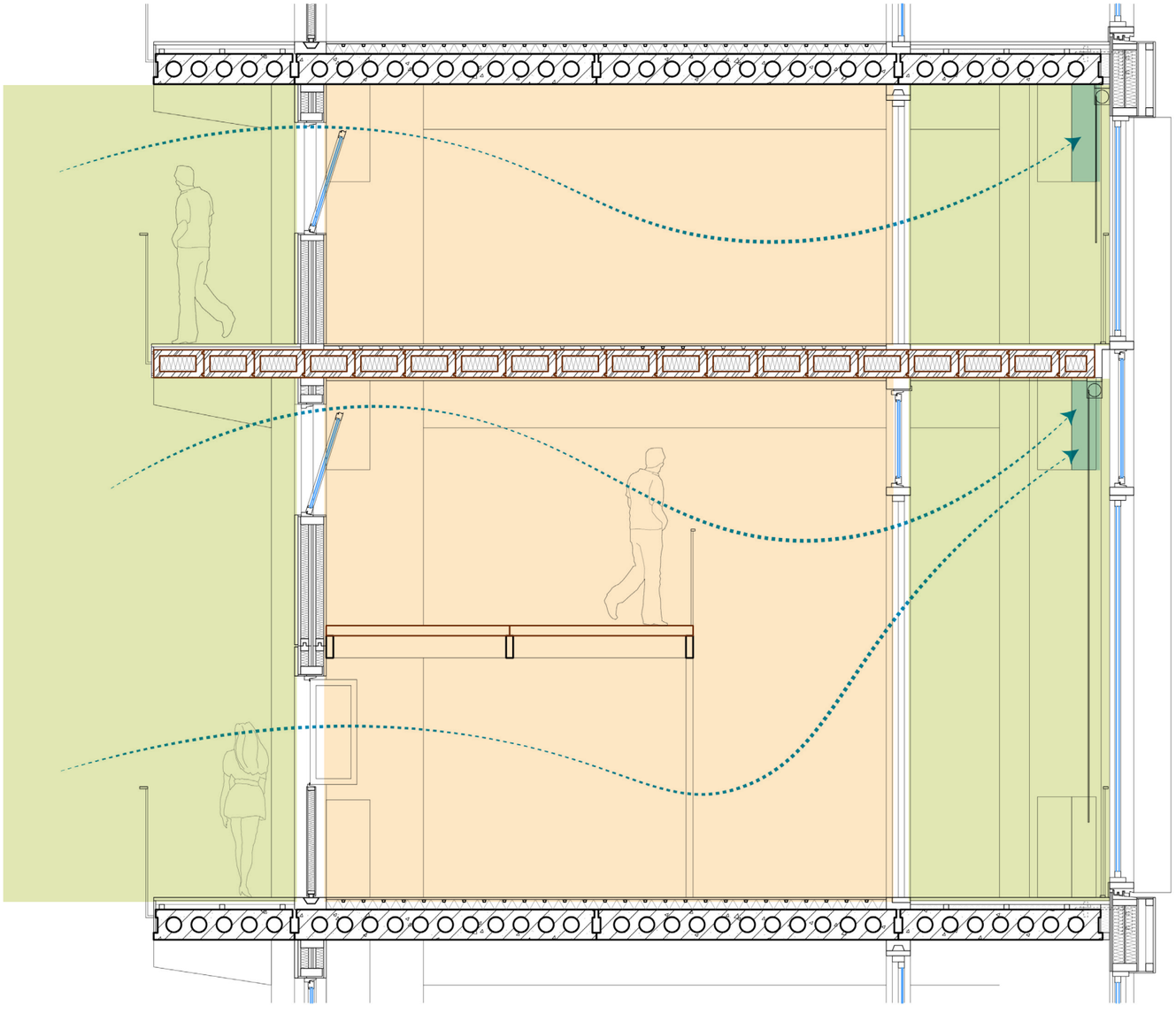
During the cold period, inhabitants **share a warm common living and dining room**, the temperature inside each studio can be lower only for sleeping.

NATURAL VENTILATION

Nature ventilation

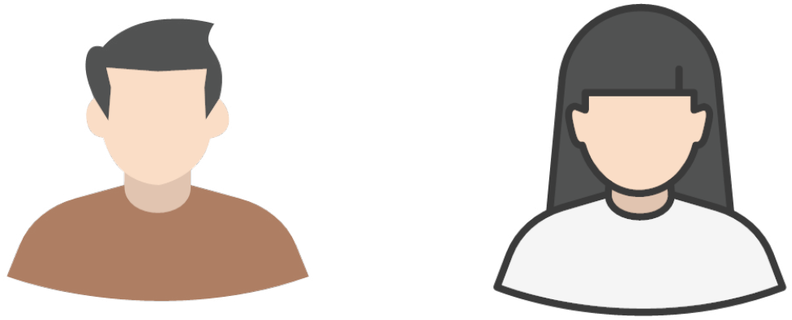


Mechanical ventilation



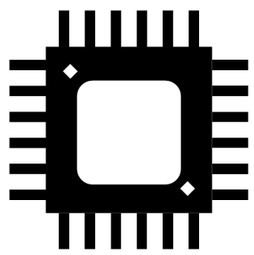
USERS' CONTROL

There is no Single Comfort Temperature.



Users's control has the priority, computer control assists.

opening a window for fresh air, choosing different areas for daily activities, pulling down the shading, and turning on the heating system.....



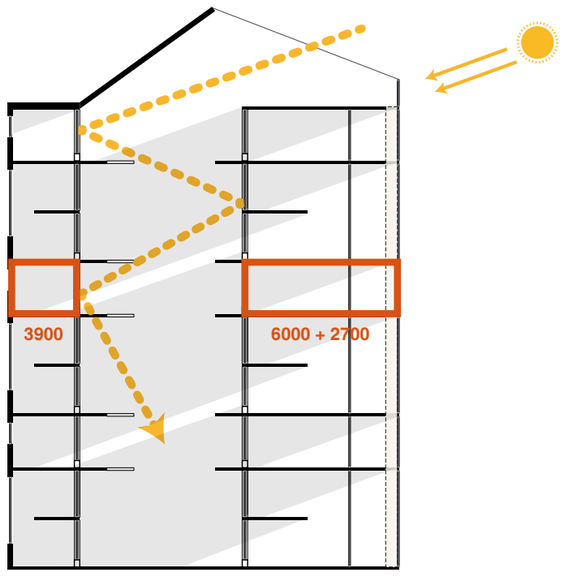
automatic control acts once every three hours

Researches show that if inhabitants have some form of input to the **control of their own indoor environment**, their **subjective view** of comfort zone changes and they are more willing to accept **wider conditions**.

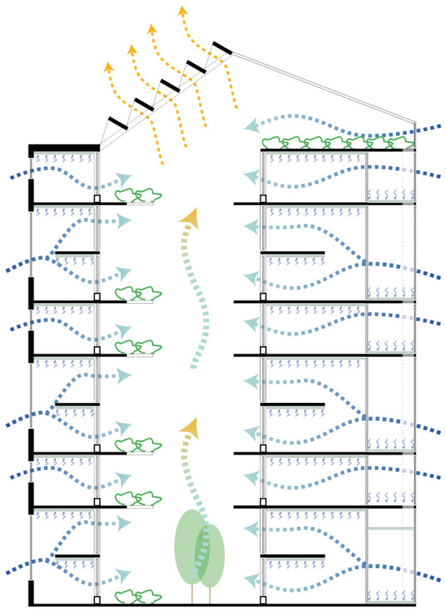
ARCHITECTURAL INTEGRATION

Atrium

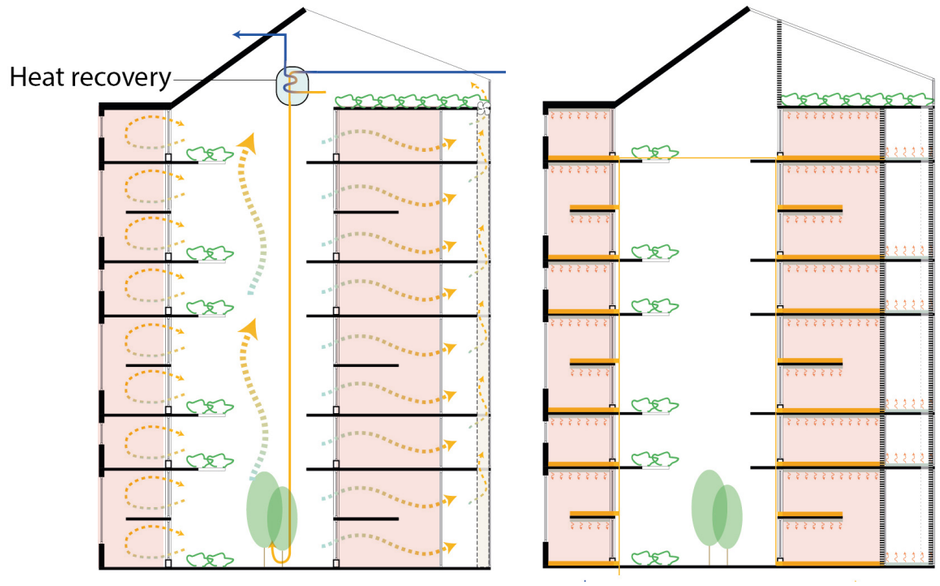
SOLAR ENERGY



STACK VENTILATION



BUFFER ZONE & PREHEAT



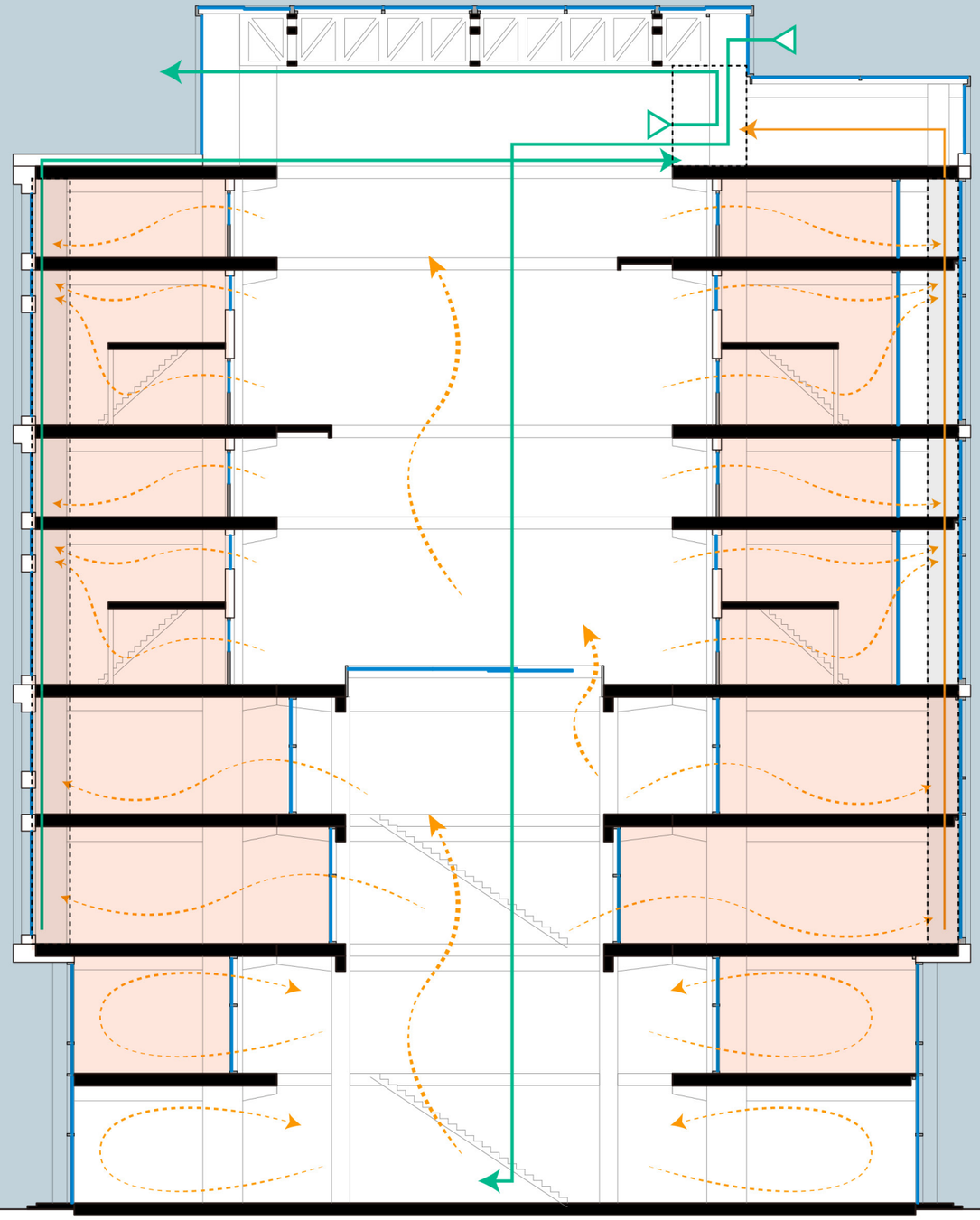
ATRIUM

Solar energy

ATRIUM

Energy Efficiency

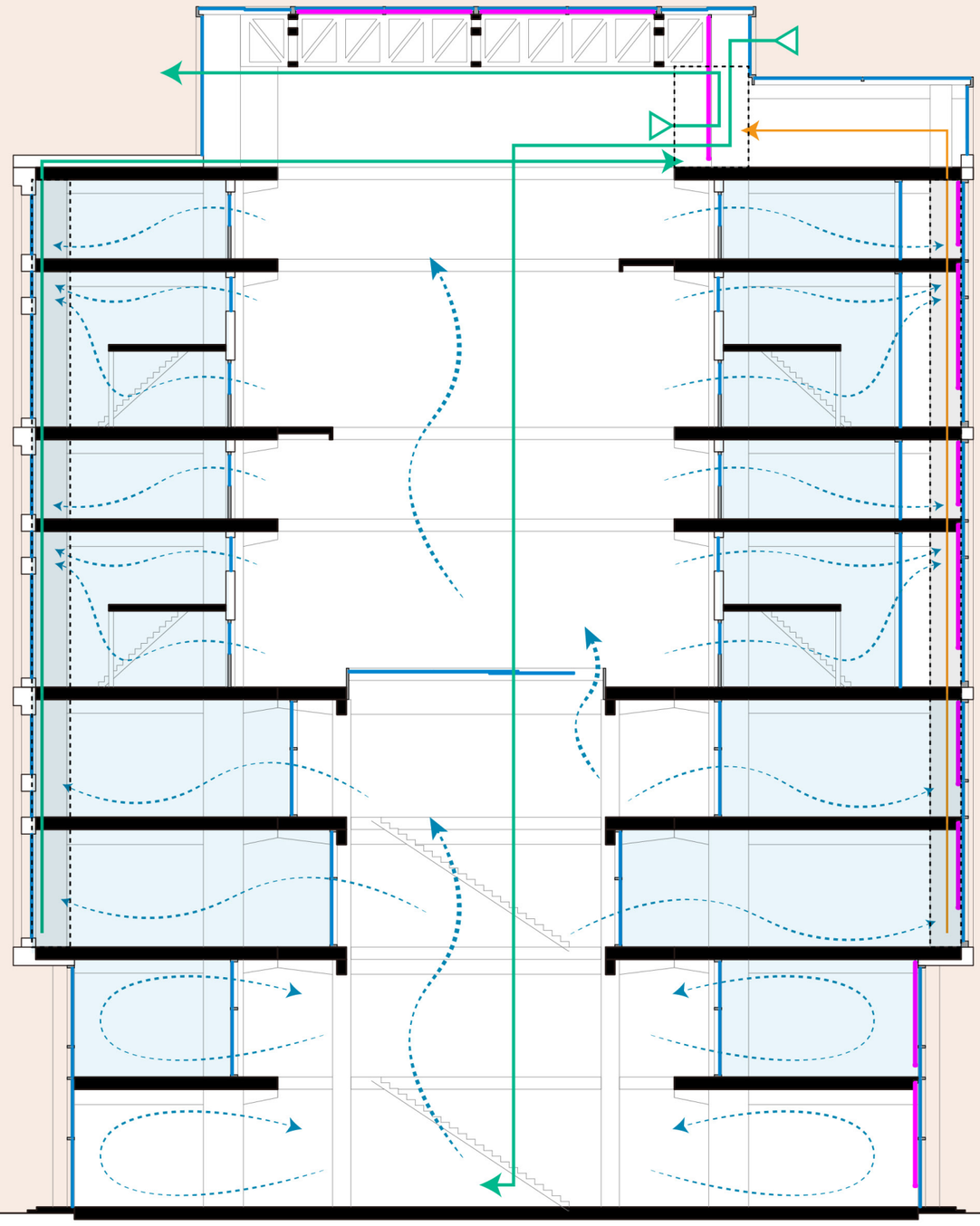
Closed Mode
<14°C (1m/s)



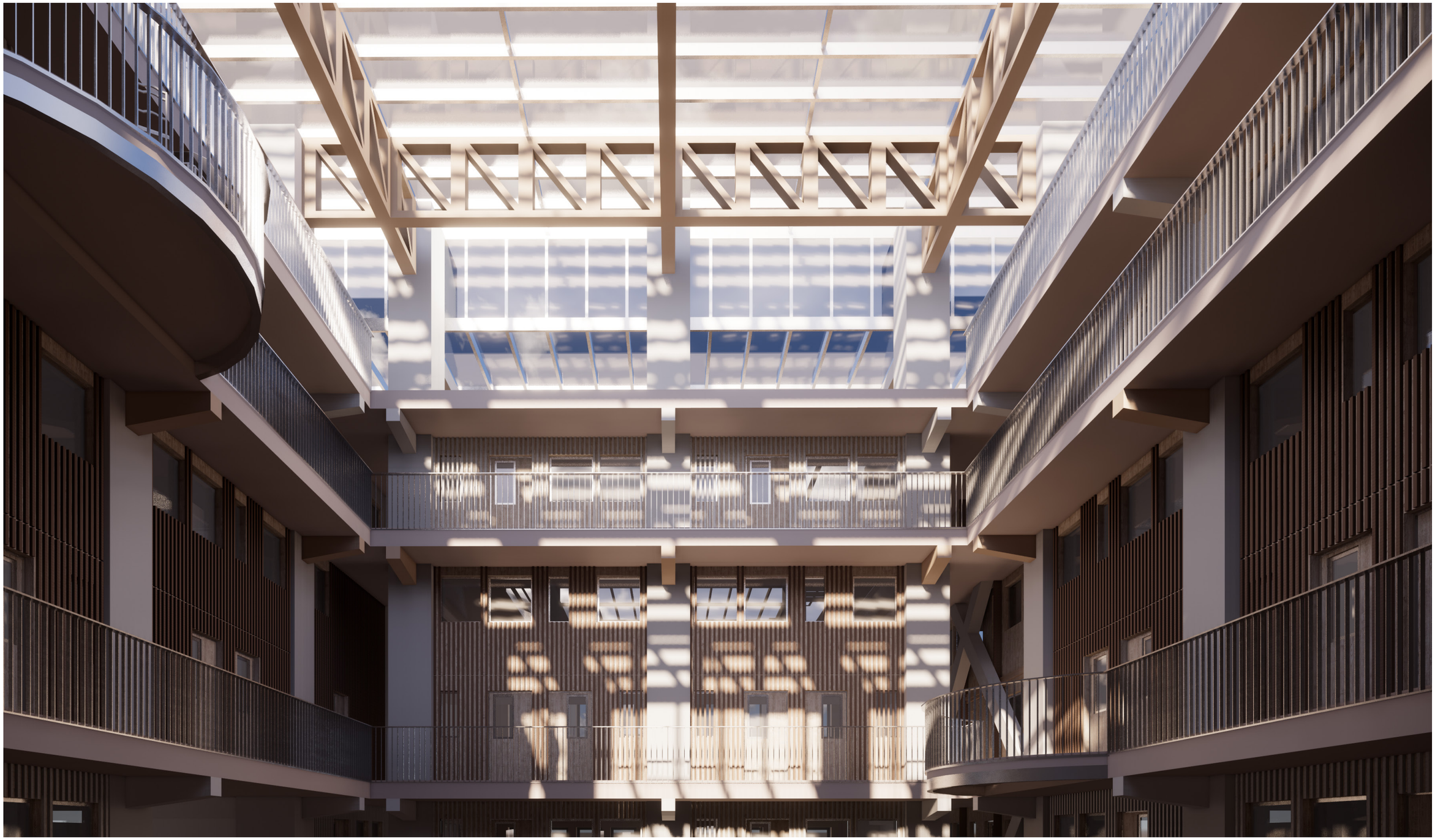
ATRIUM

Energy Efficiency

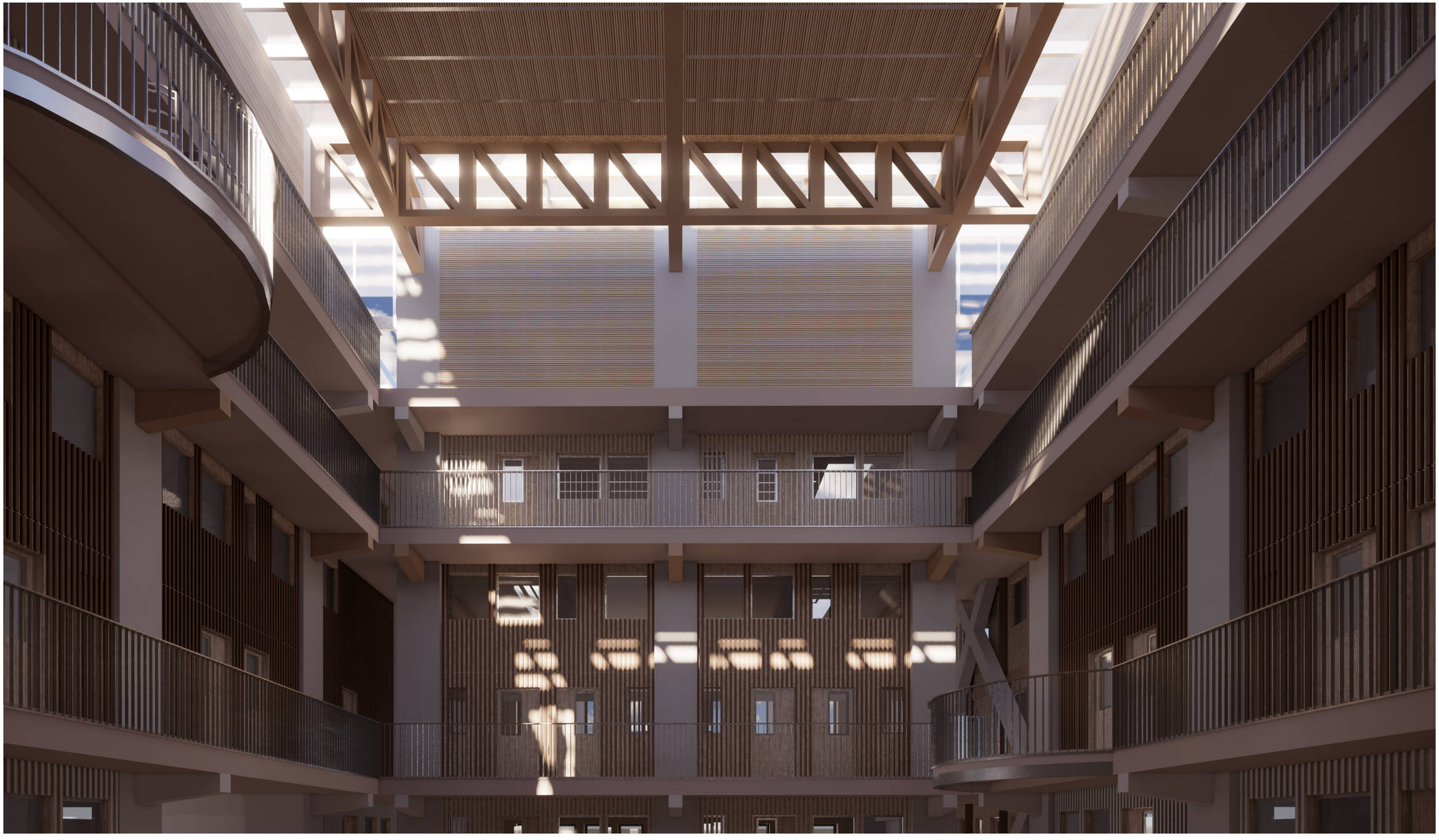
Closed Mode
>26°C (1m/s)



WINTER



SUMMER

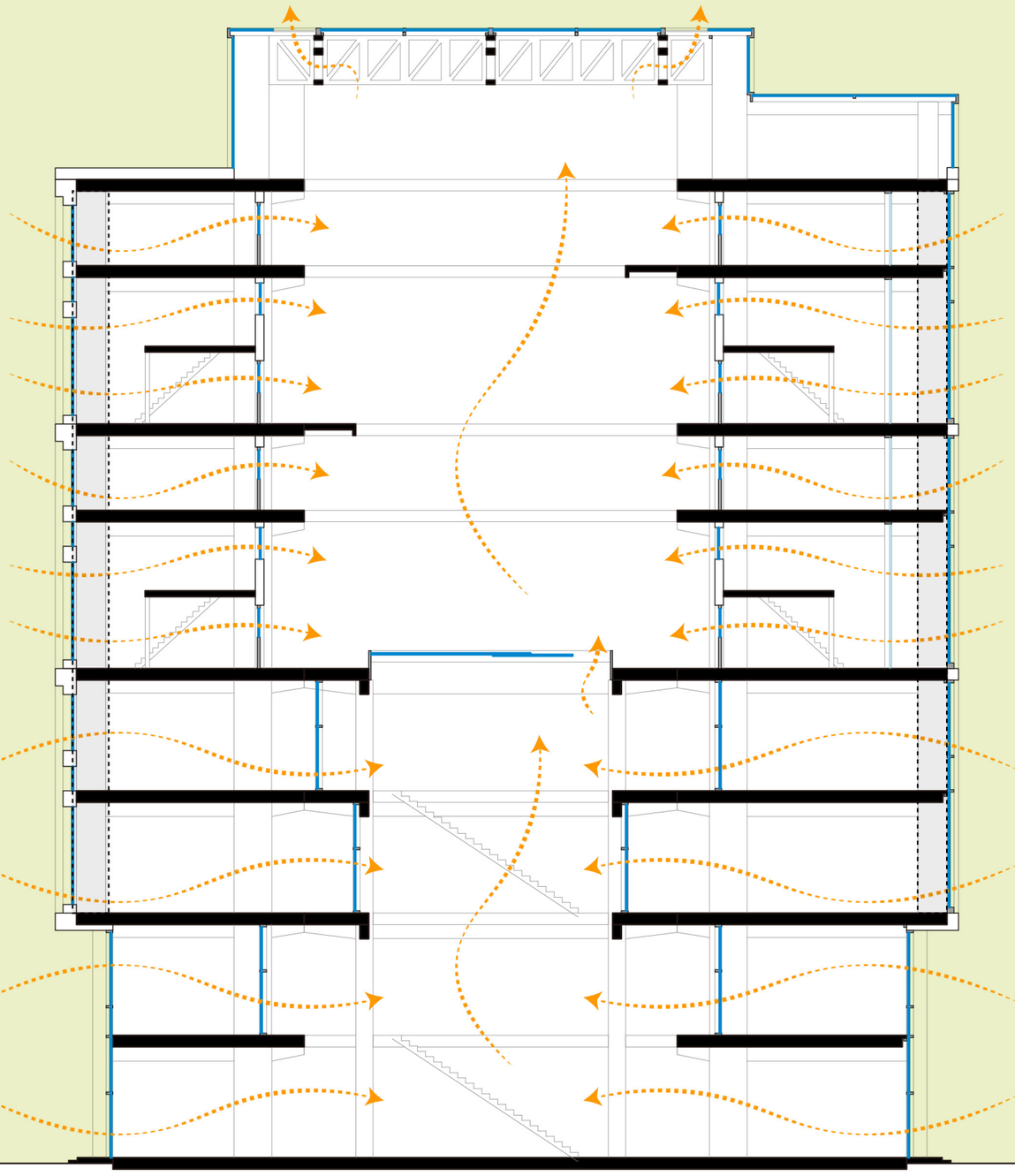


ATRIUM

Energy Efficiency

Mild Mode

>16°C and <22°C (1m/s)

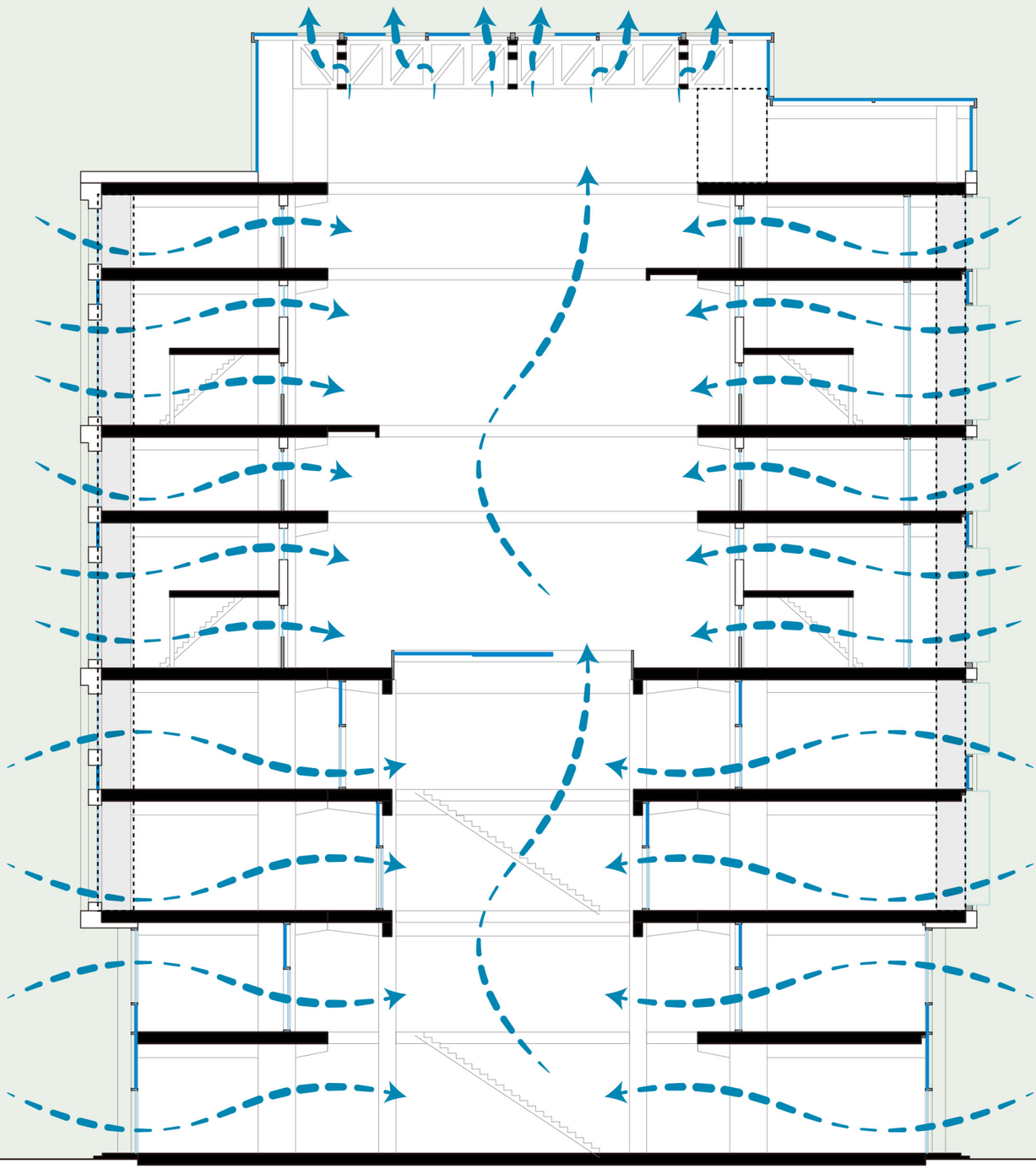


ATRIUM

Energy Efficiency

Open Mode

Summer <20°C (3-5m/s)

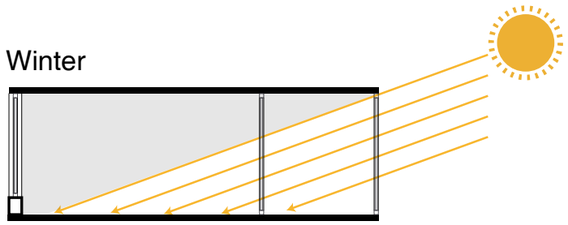


ARCHITECTURAL INTEGRATION

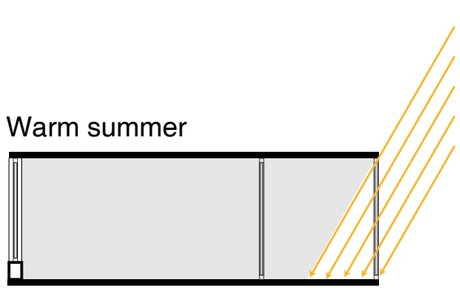
Balcony

SHADING

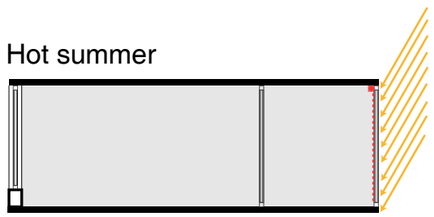
Winter



Warm summer

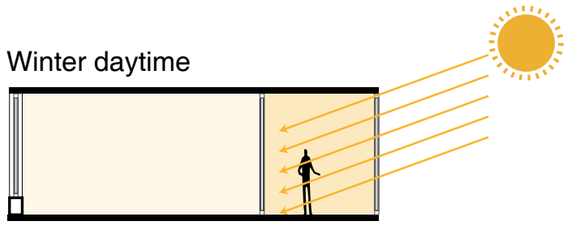


Hot summer

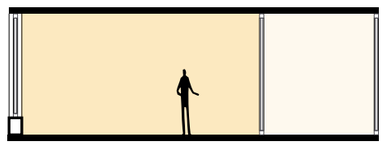


MIGRATION & BUFFER ZONE

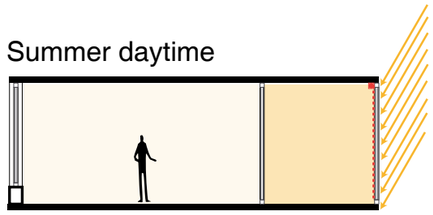
Winter daytime



Winter night

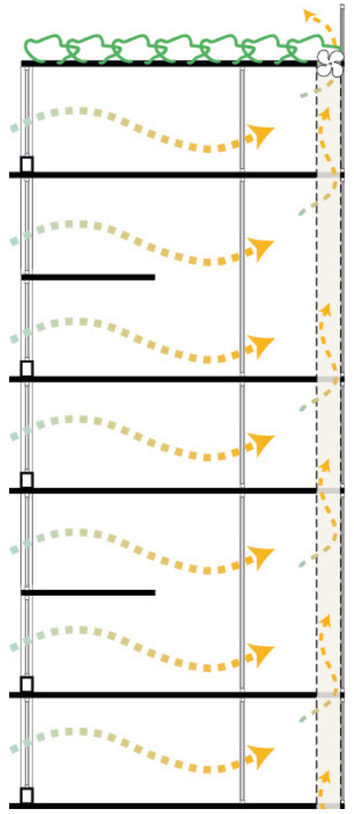


Summer daytime

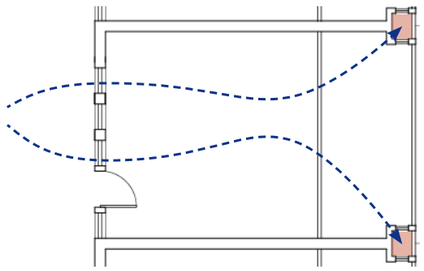


Summer night

VENTILATION



Section

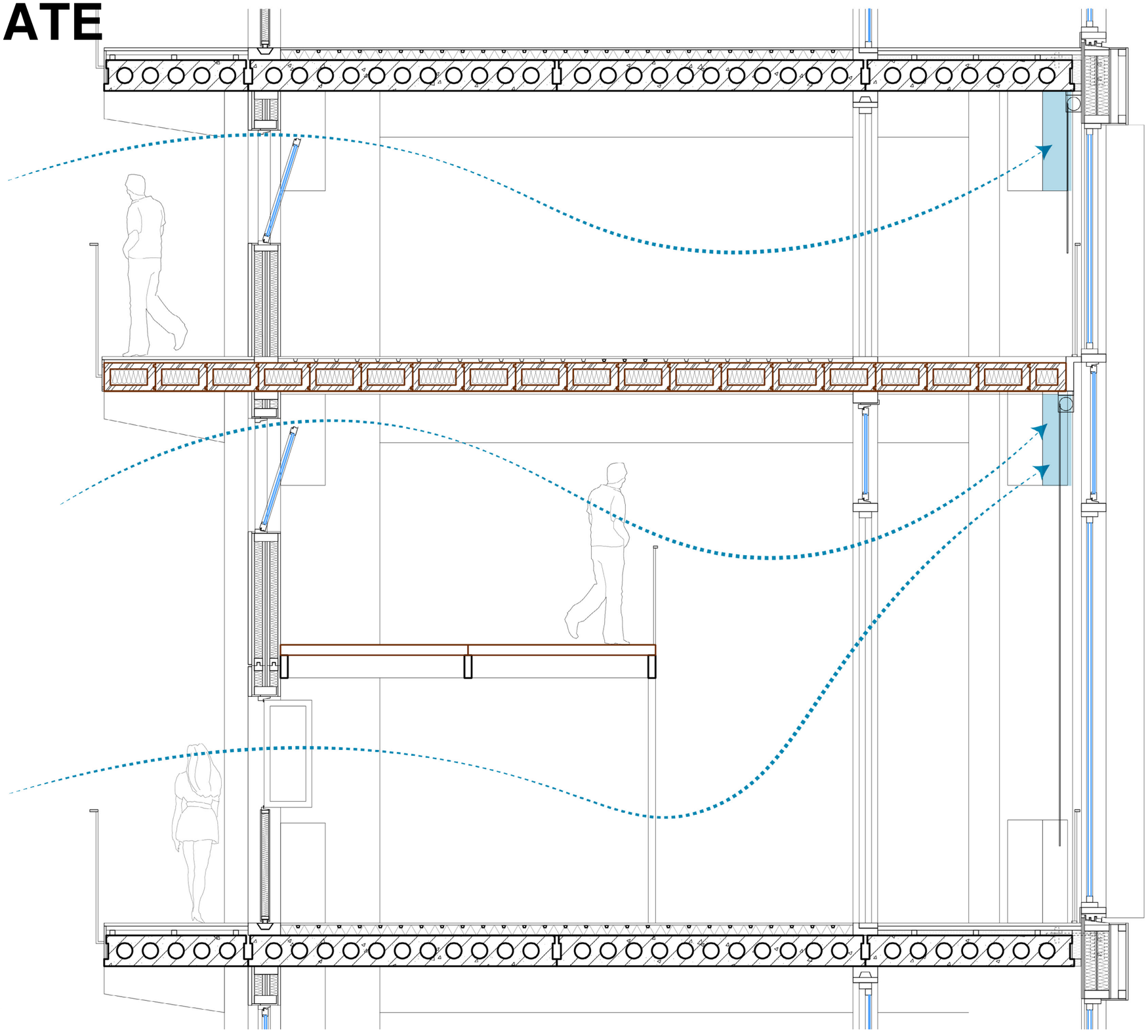


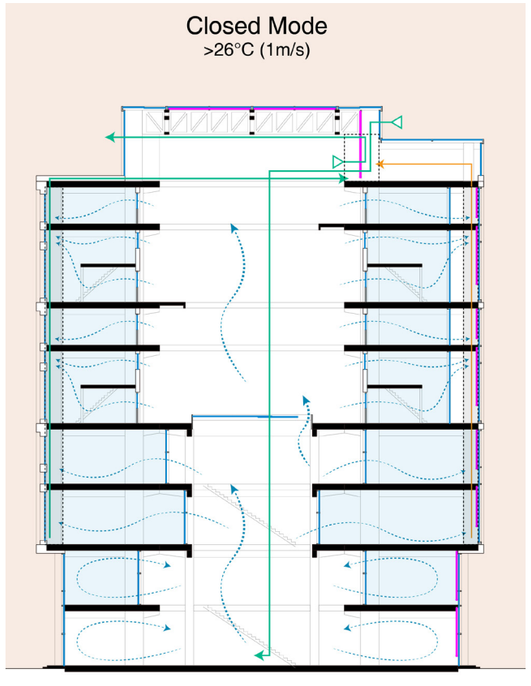
Plan

Brown, G. Z, and Mark DeKay. 2013. Sun, Wind, and Light: Architectural Design Strategies. Third [edition]. Hoboken: Wiley. p. 224-23

INDOOR CLIMATE

Closed mode

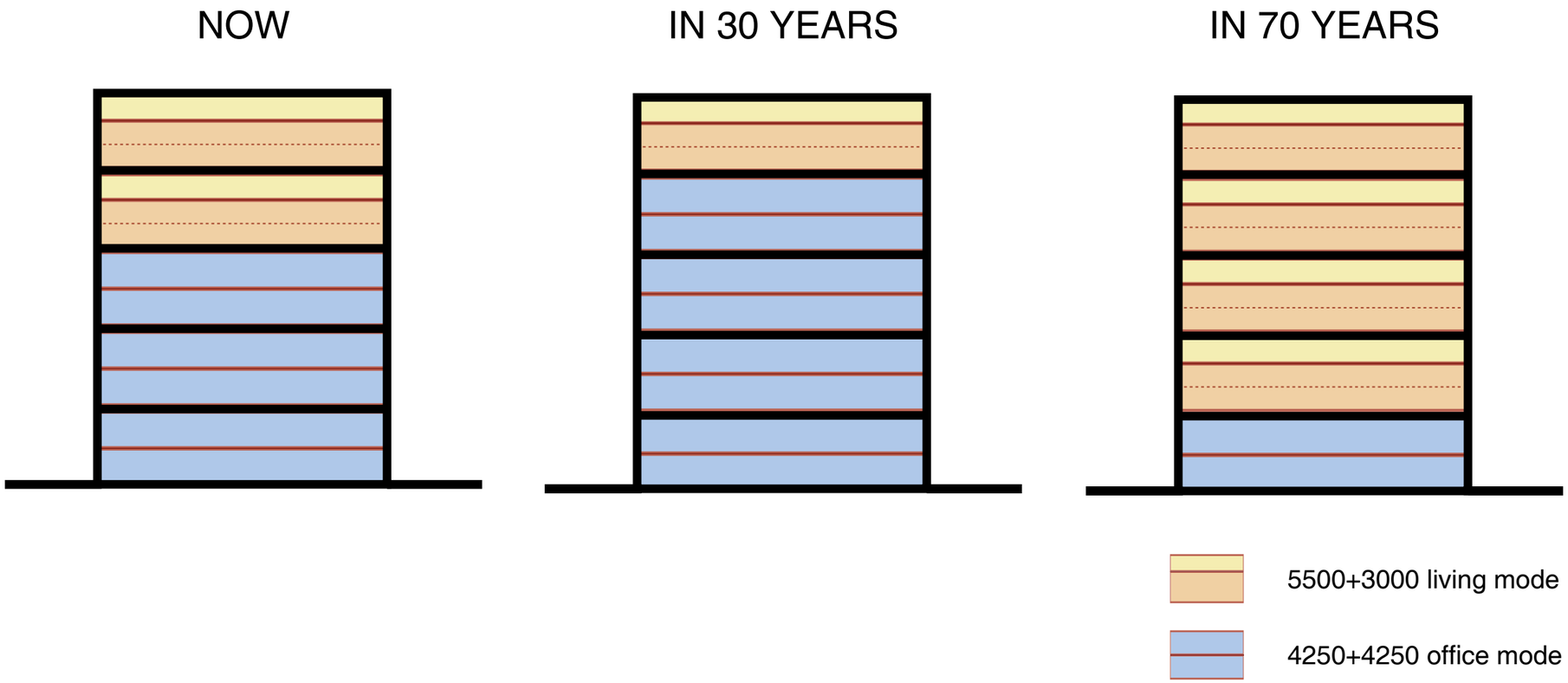




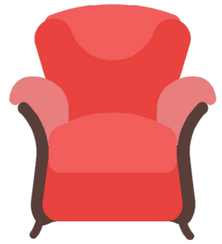
INDOOR CLIMATE

Open mode

A FLEXIBLE WAY OF BUILDING



LAYERS OF THE BUILT ENVIRONMENT



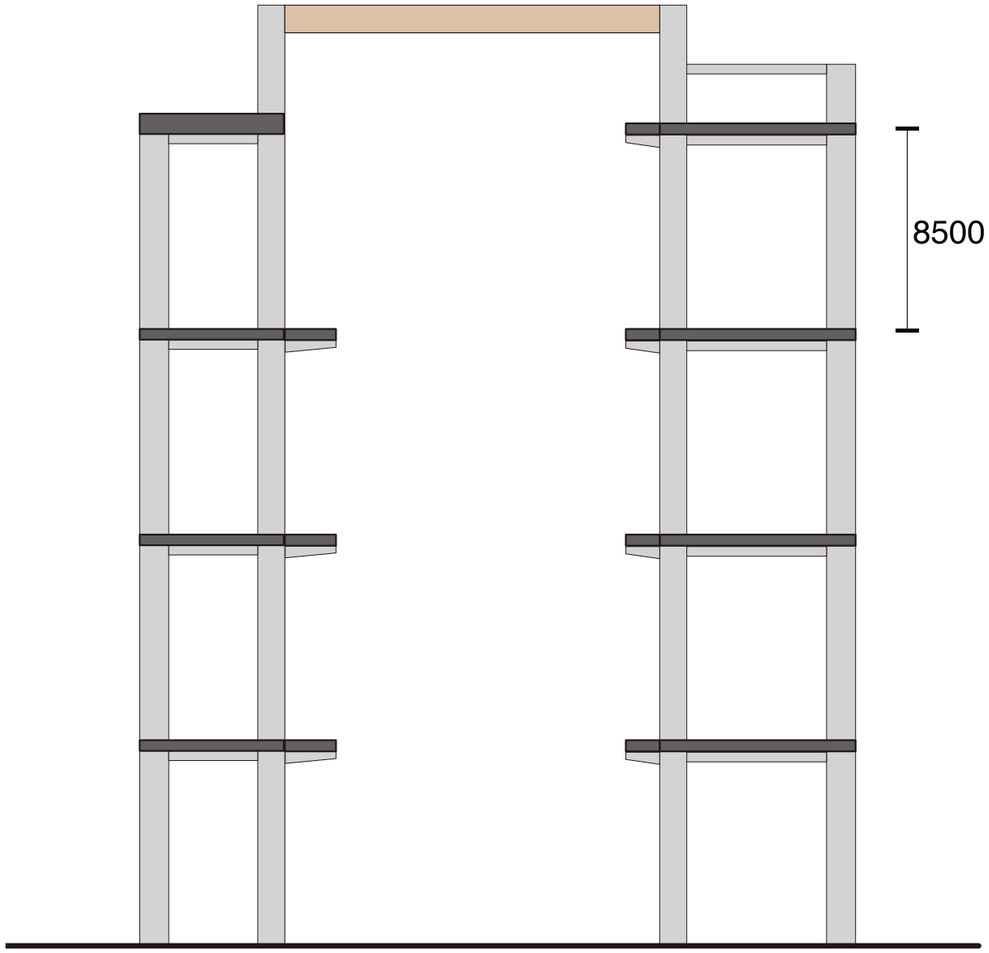
Furniture

Building

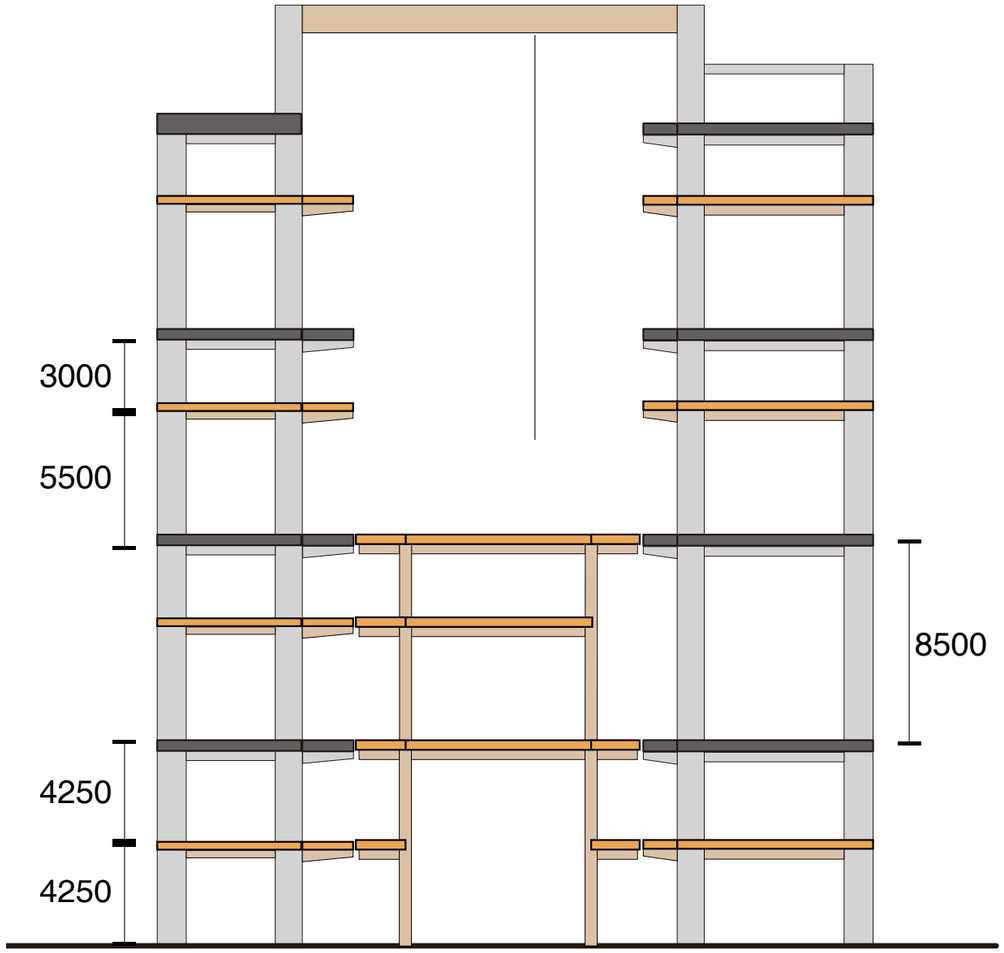
Infrastructure

NEW INFRASTRUCTURE

Mega concrete & Wooden infilling



1. Pre-fab concrete mega structure



2. Light-weight wooden infills with small slabs

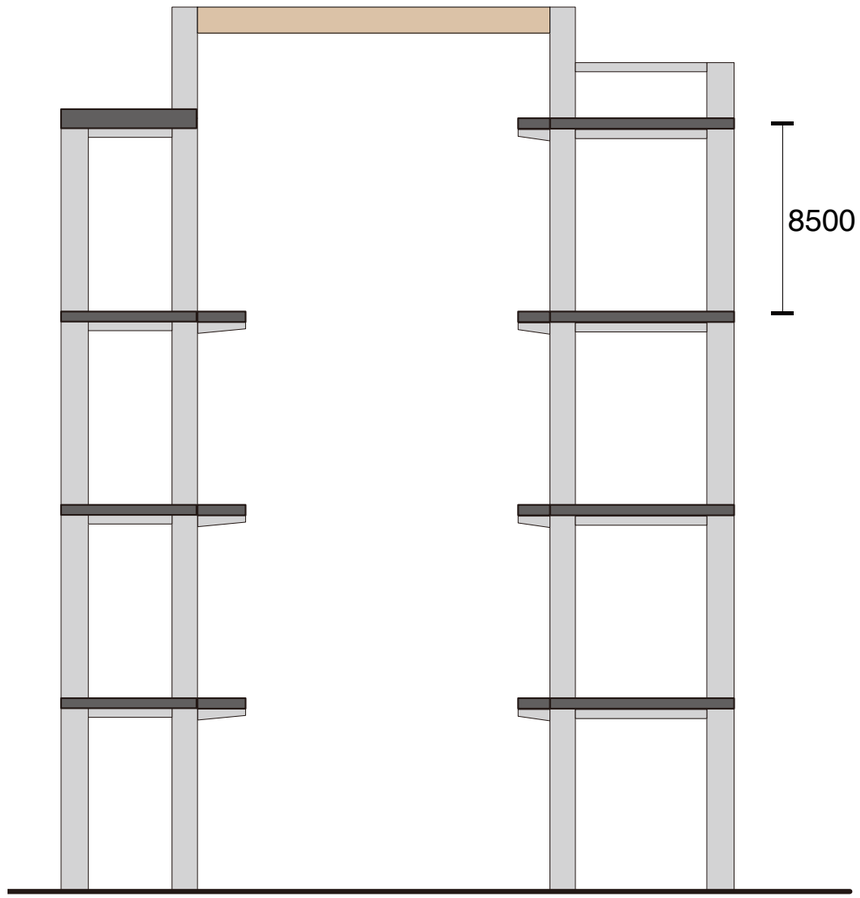
STRUCTURE ORDER

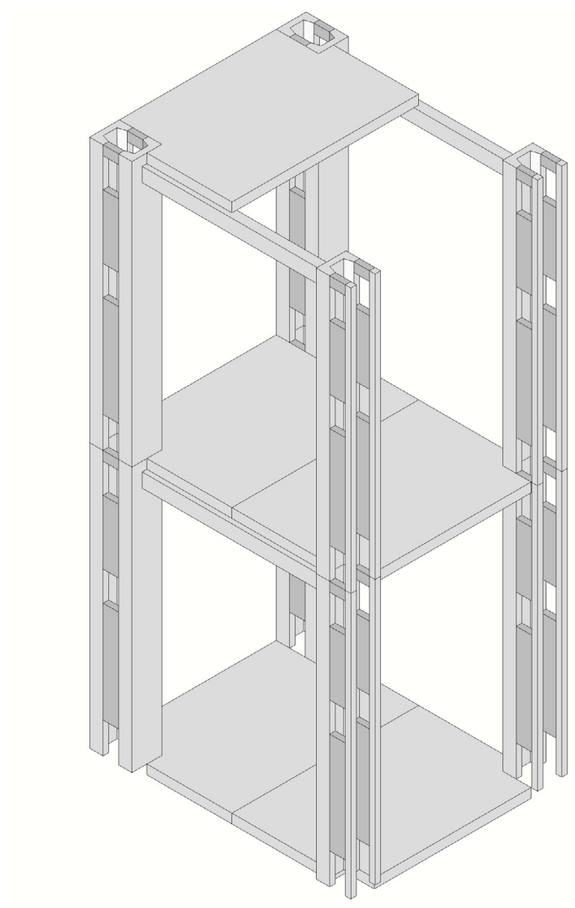
1.Pre-fab concrete mega structure (relatively permanent)

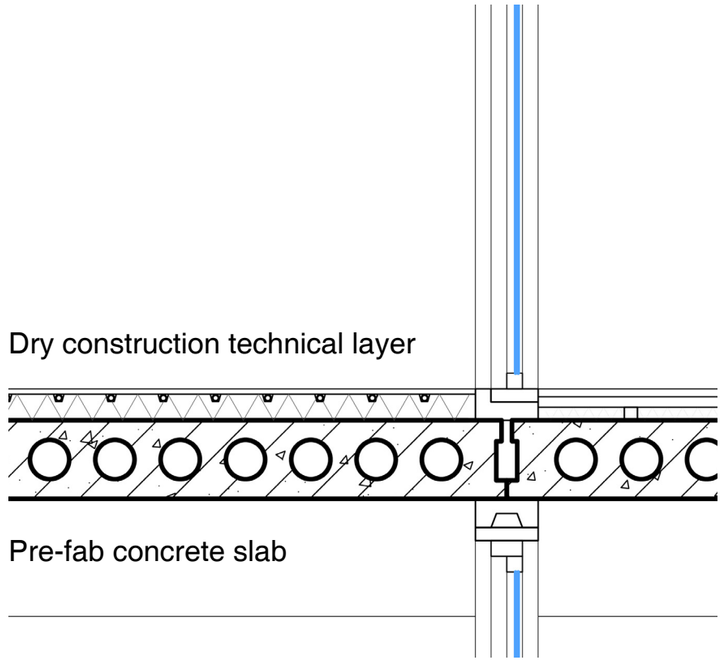
Shelf(columns)

Beams

Floors



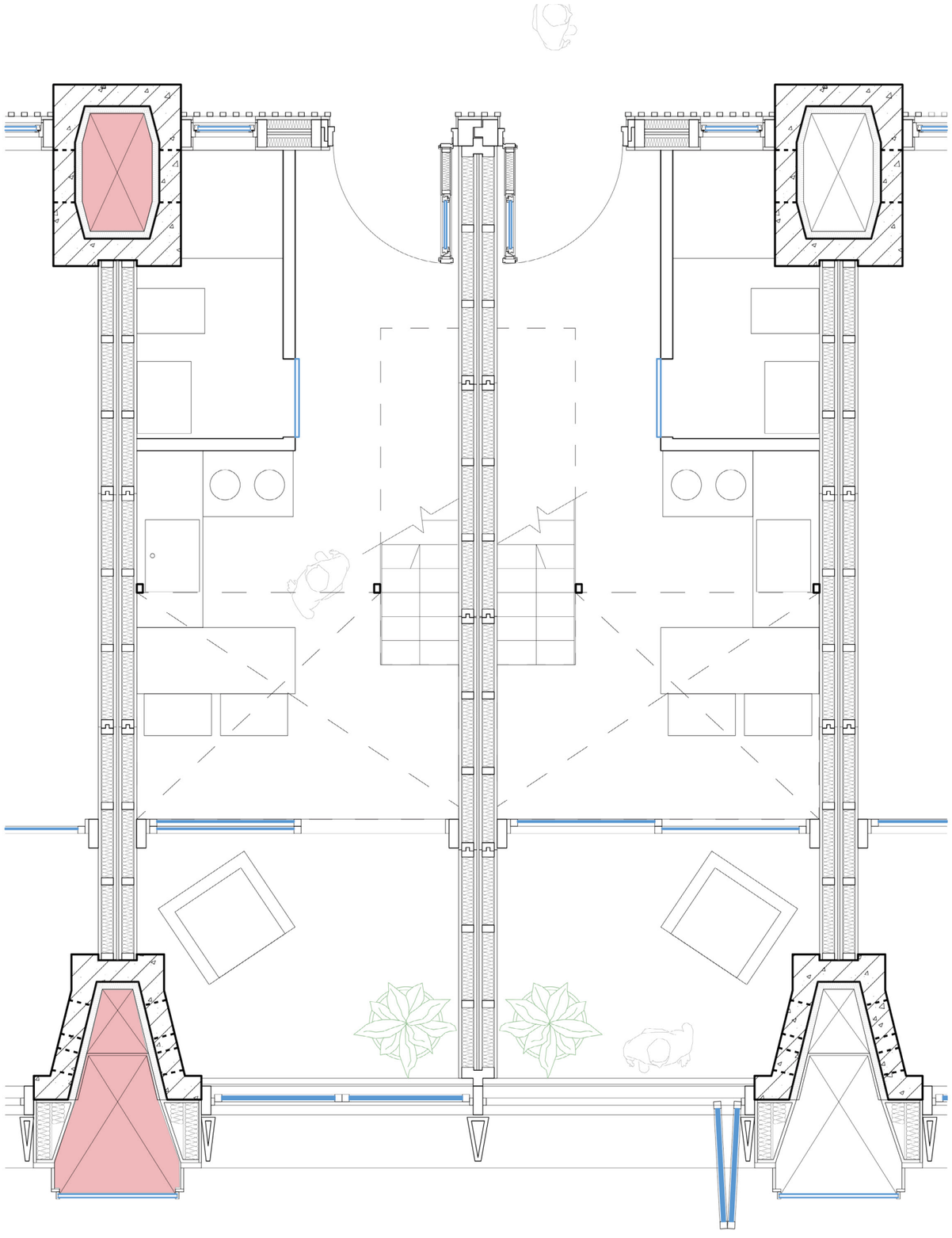




SHELF

Shelf 1:

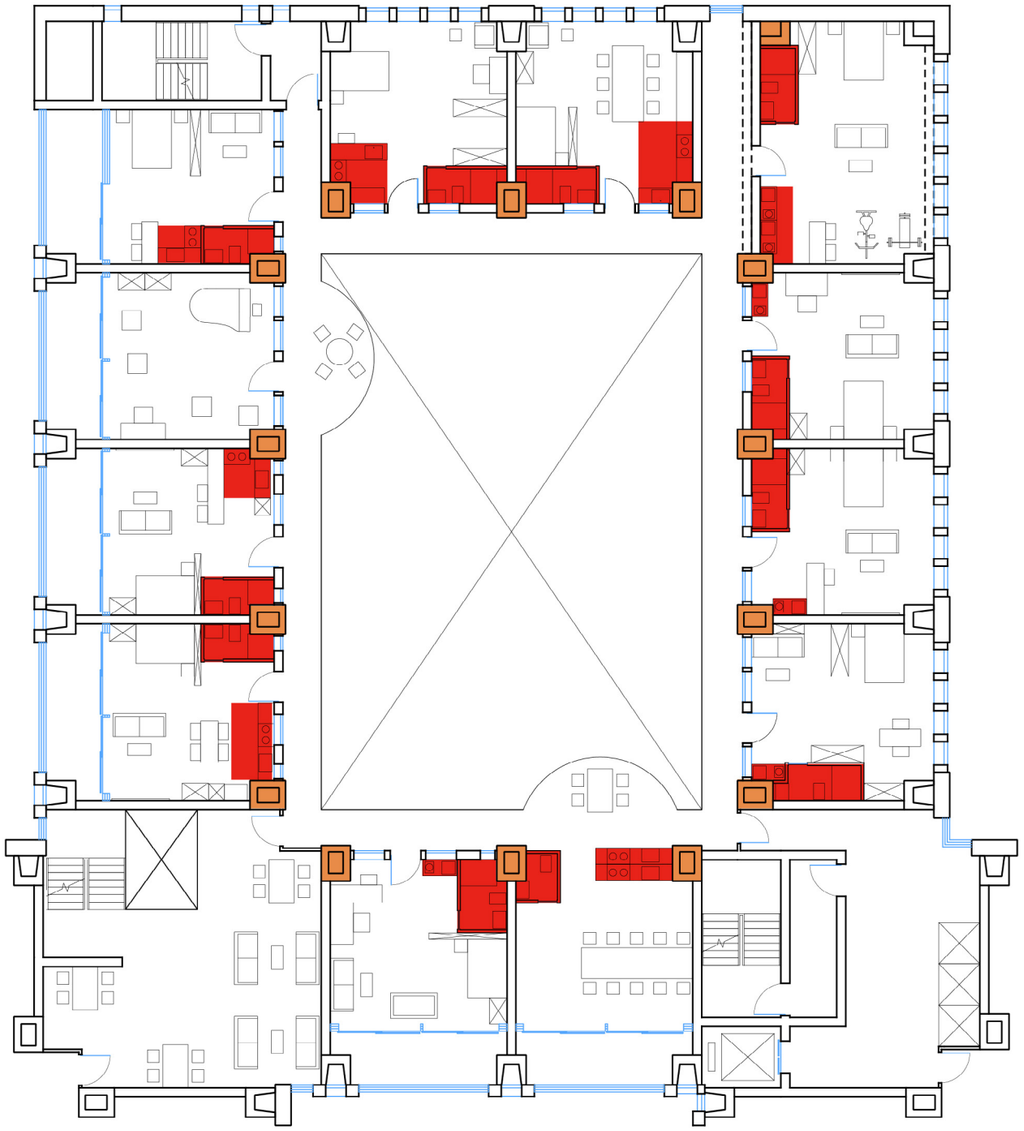
1.electricity
2.Internet
2.LTP floor heating/cooling
3.water (normal+hot)
4.sewage pipes
5.ventilation for toilet and kitchen

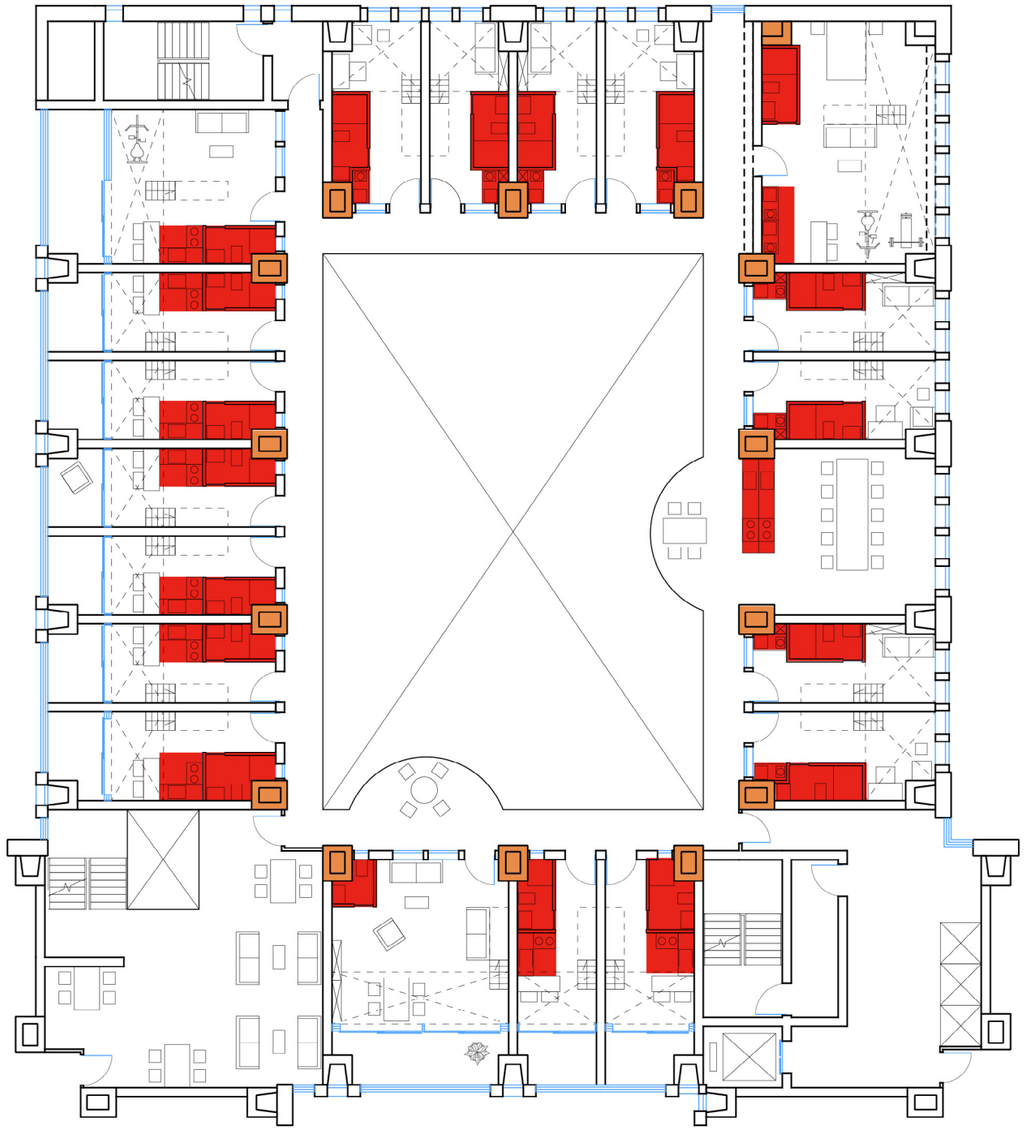


Shelf 2:

1.Natural ventilation exhaust
2.Possible spare space eg.mechanical ventilation input pipes

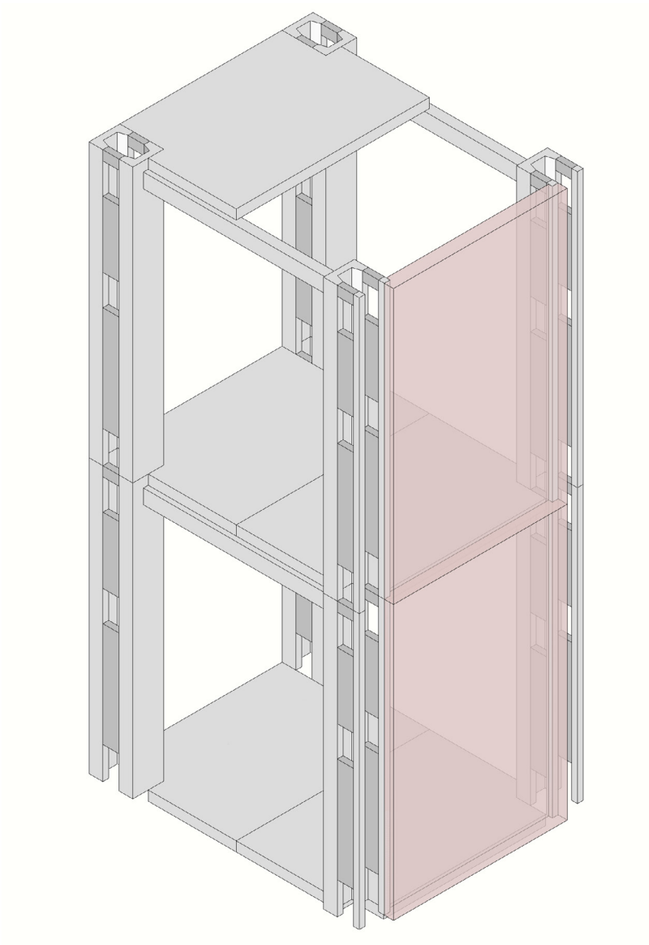
SHELF AND FLEXIBLE KITCHEN TOILET

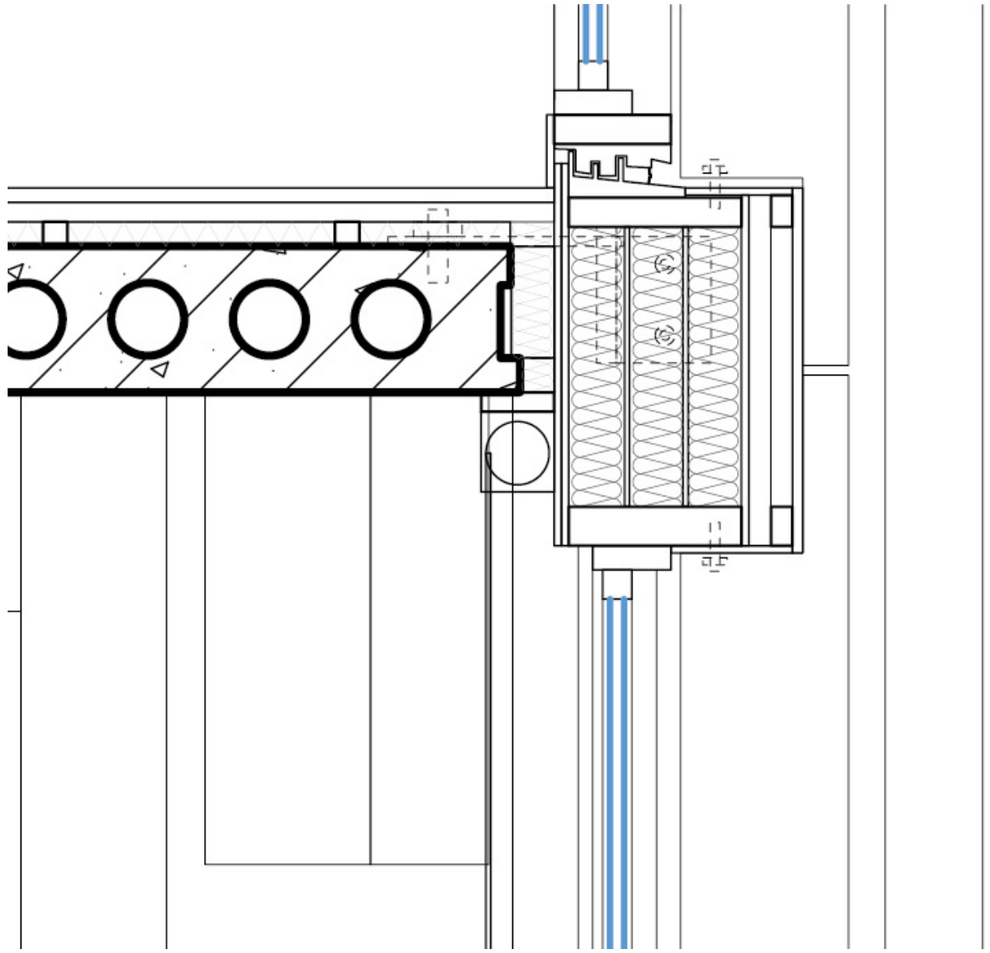




STRUCTURE ORDER

2.Exterior facade
relatively permanent and need to be installed from outside

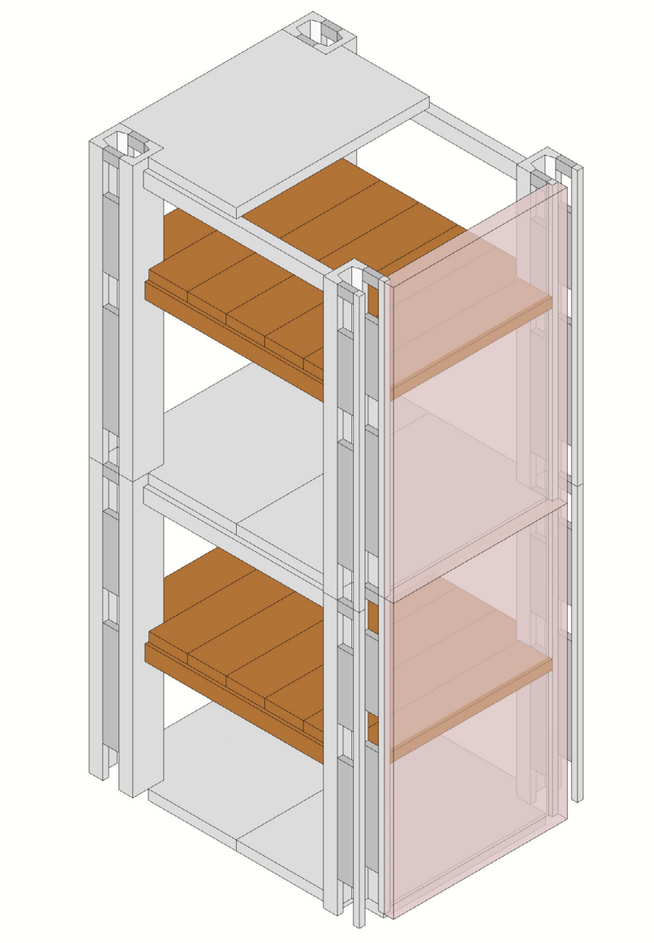


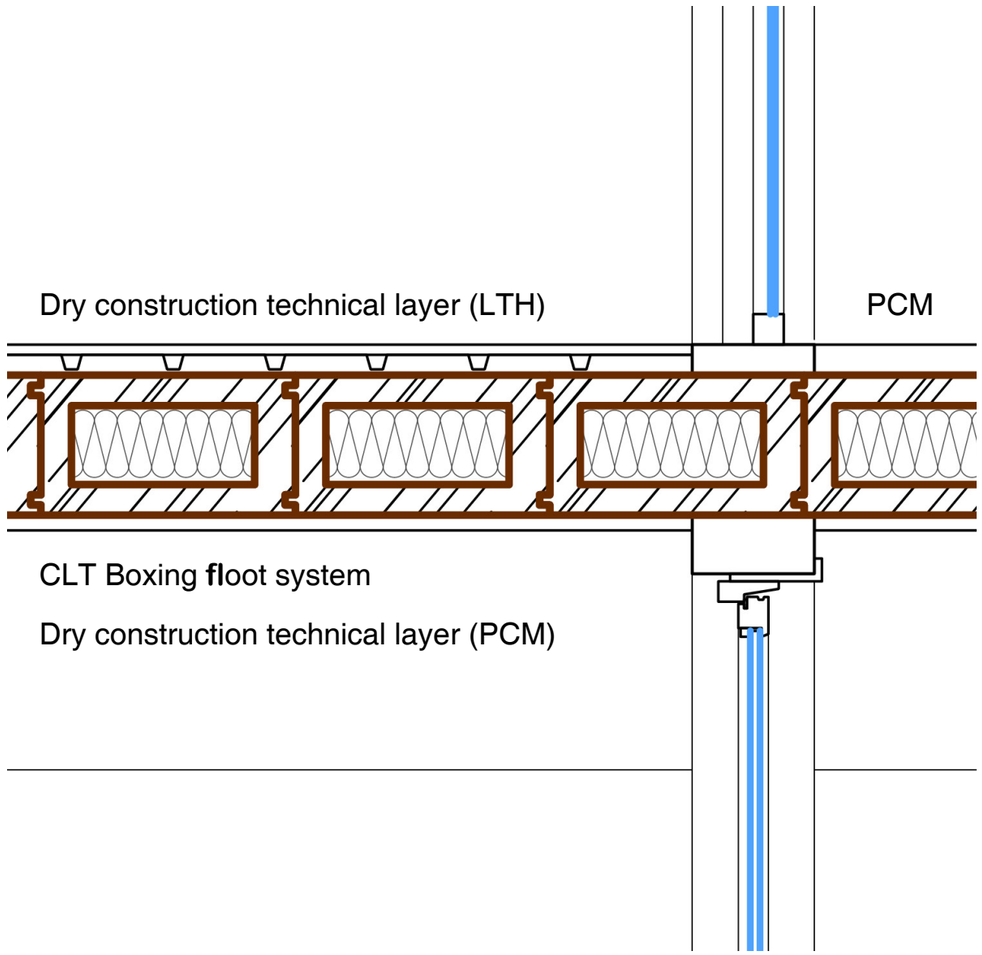


8500-height panel fixing on the concrete **fl**oor

STRUCTURE ORDER

3.Secondary pre-fab timber structure
relatively flexible and can be installed through the atrium
CLT beams and boxing floor elements
<250kg per piece



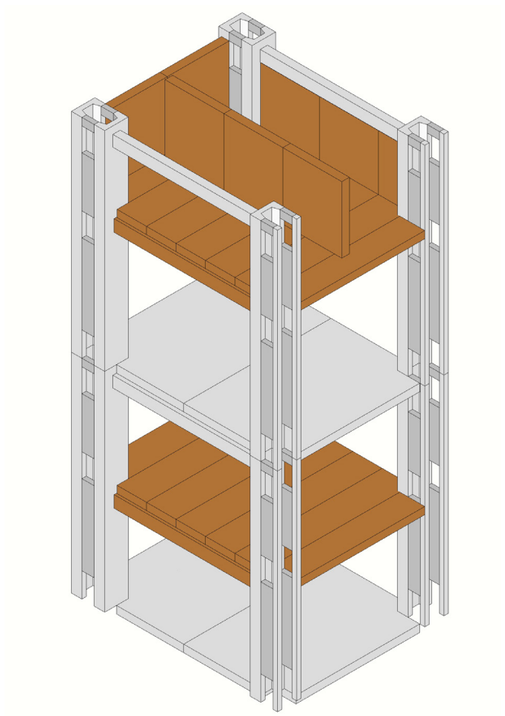


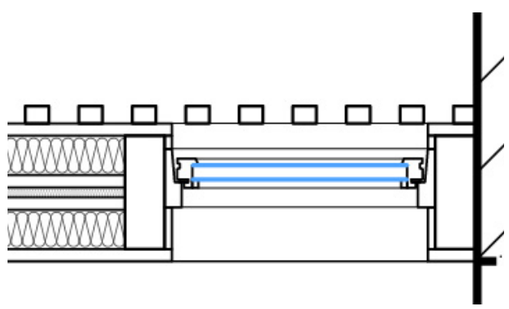
References

STRUCTURE ORDER

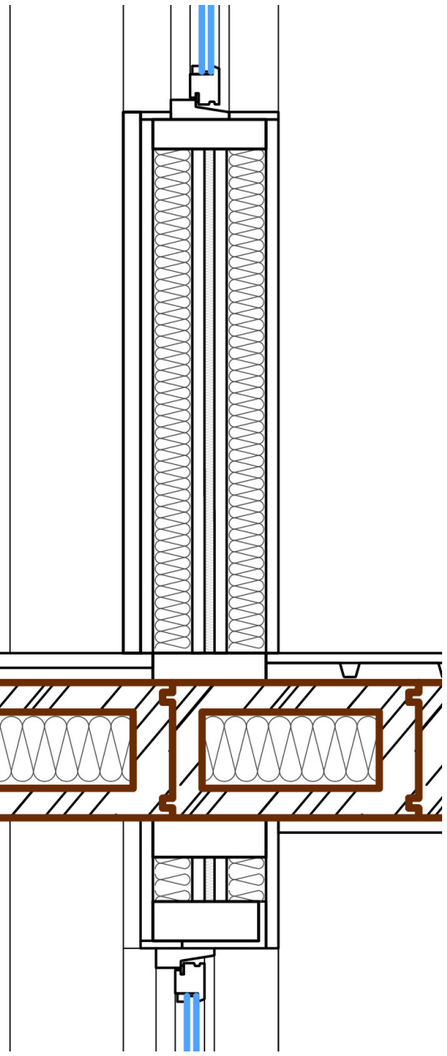
4.Inner division wall (relatively flexible and can be installed through the atrium)

<250kg per piece
facade towards the atrium
partition walls

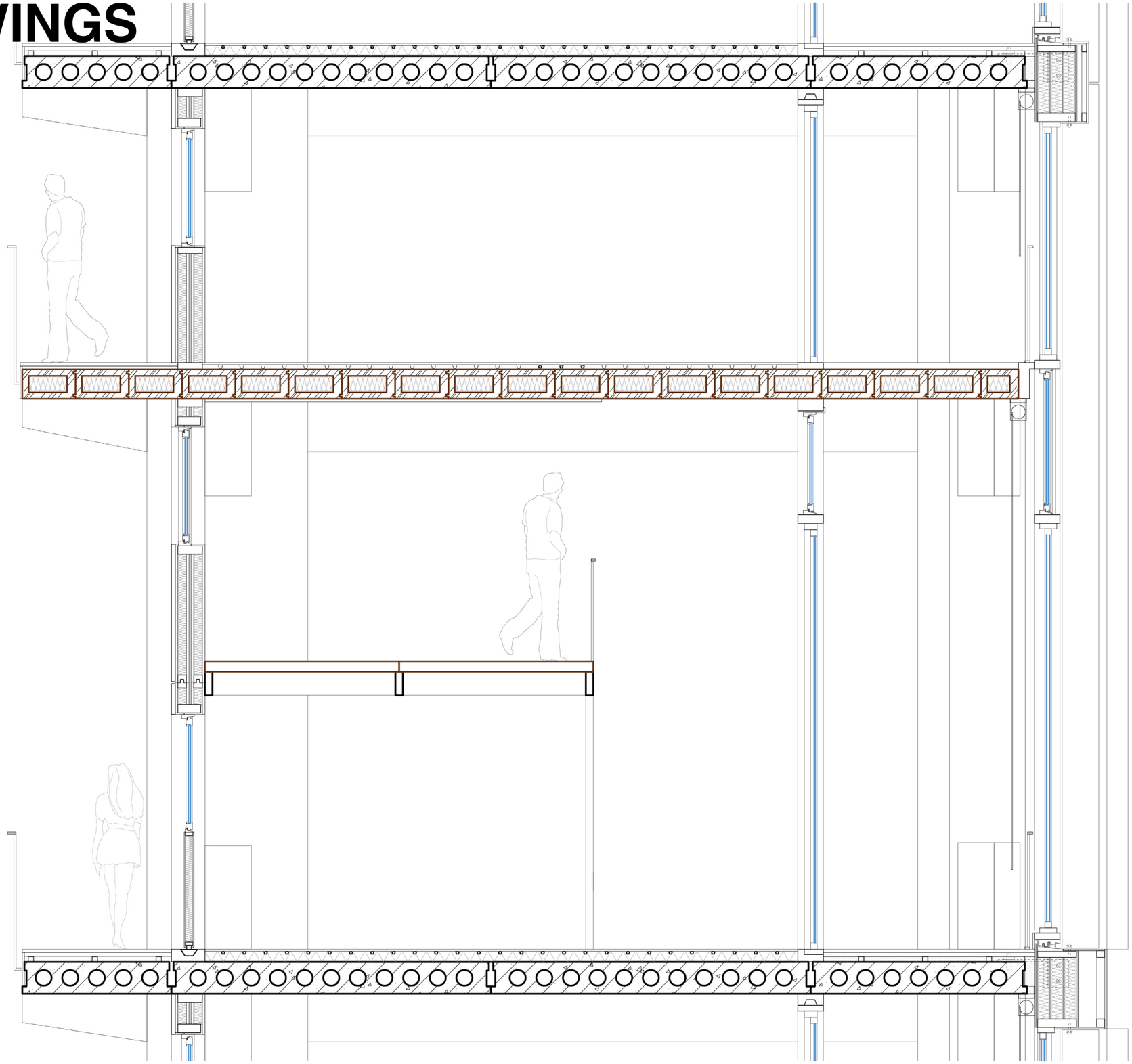




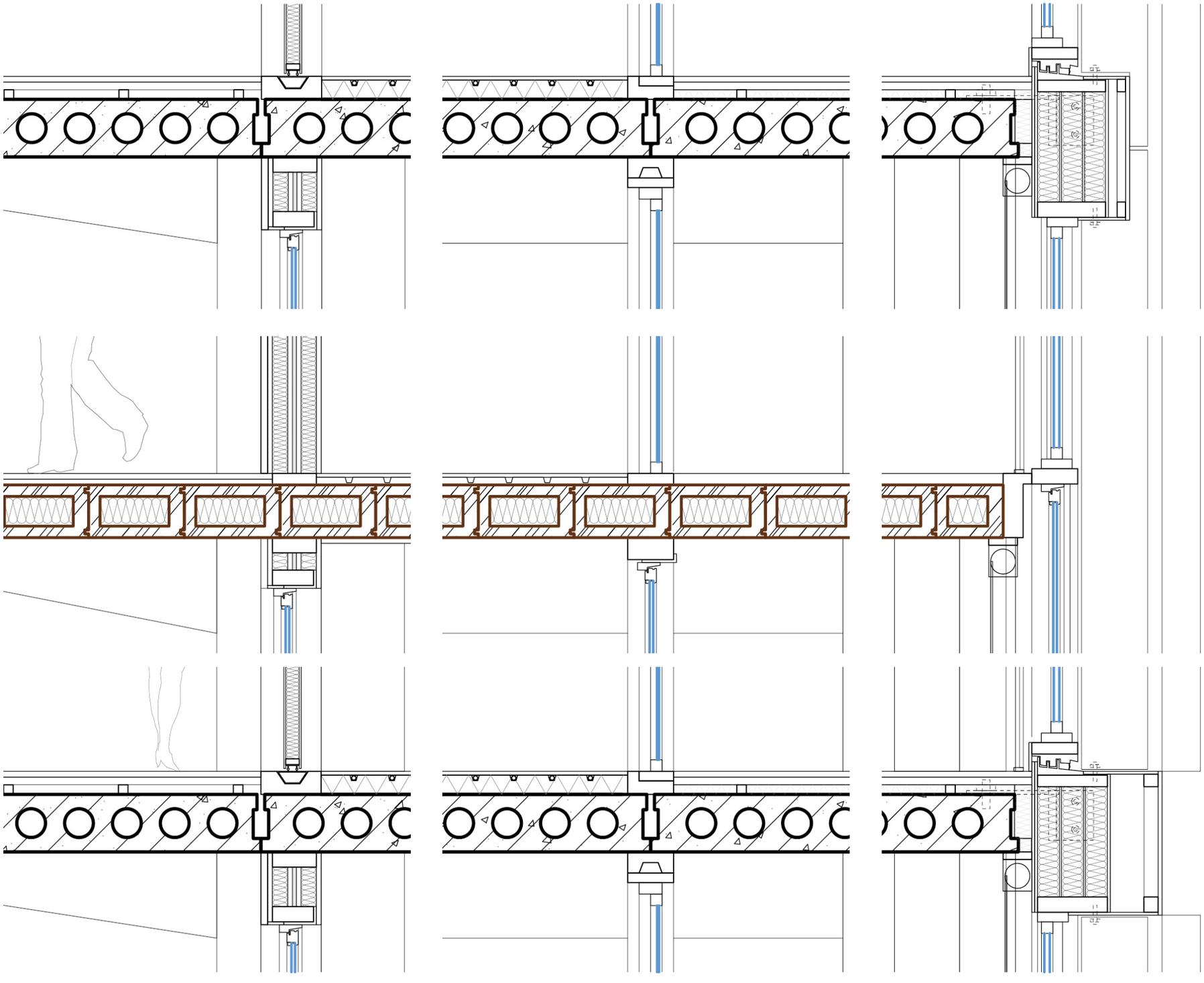
Double wall in timeber panel structure



DETAIL DRAWINGS

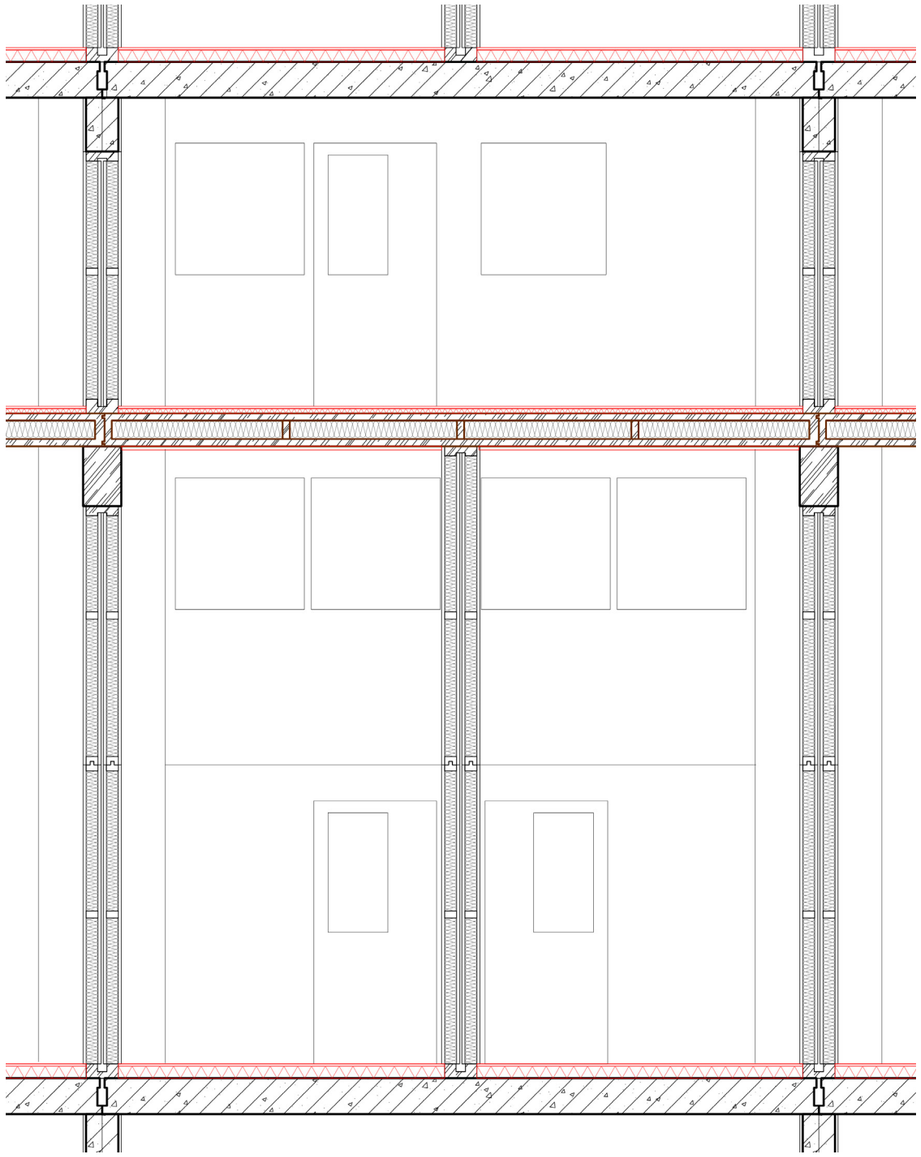


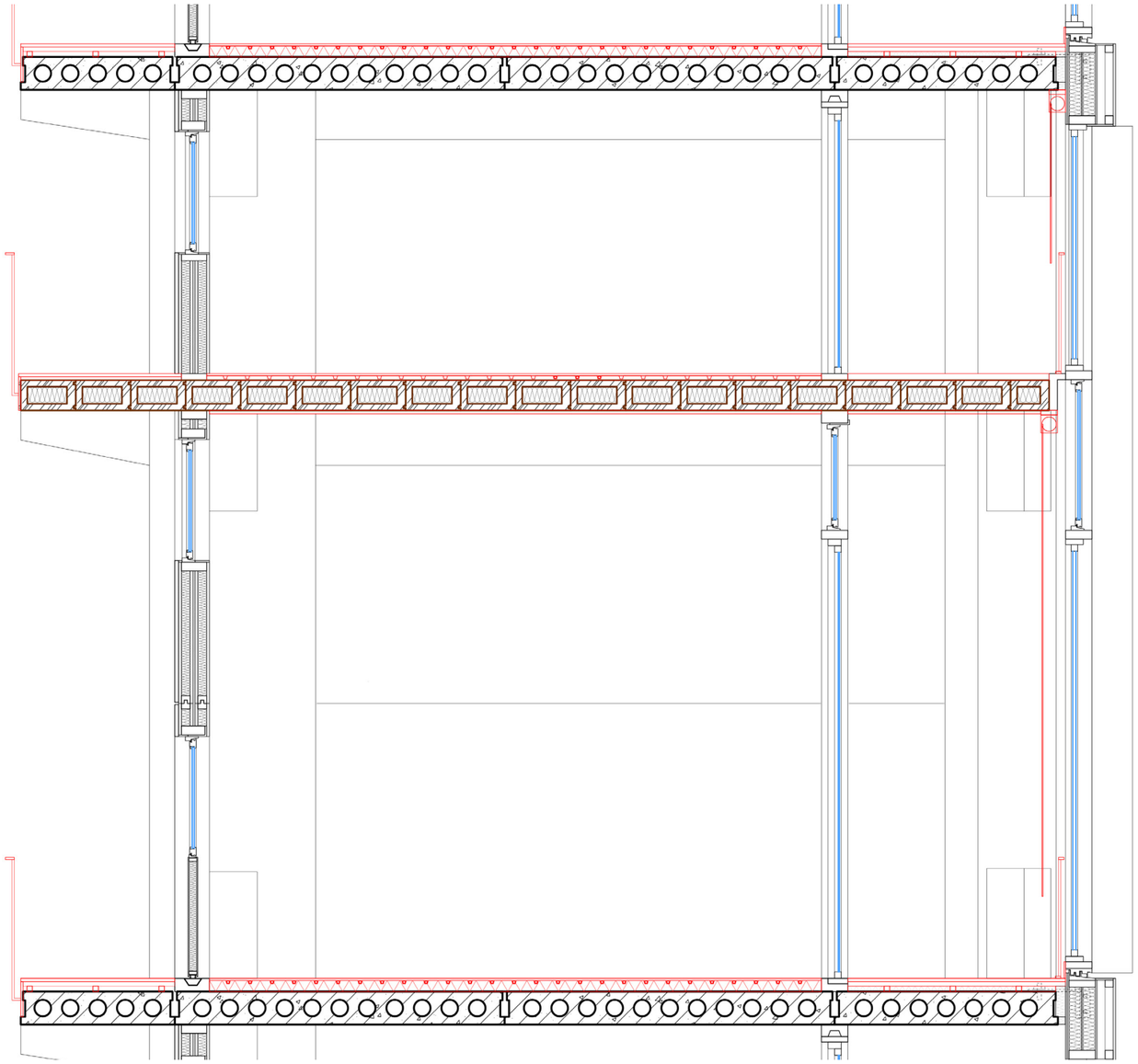
DETAIL DRAWINGS



ADAPTABLE COMPONENTS

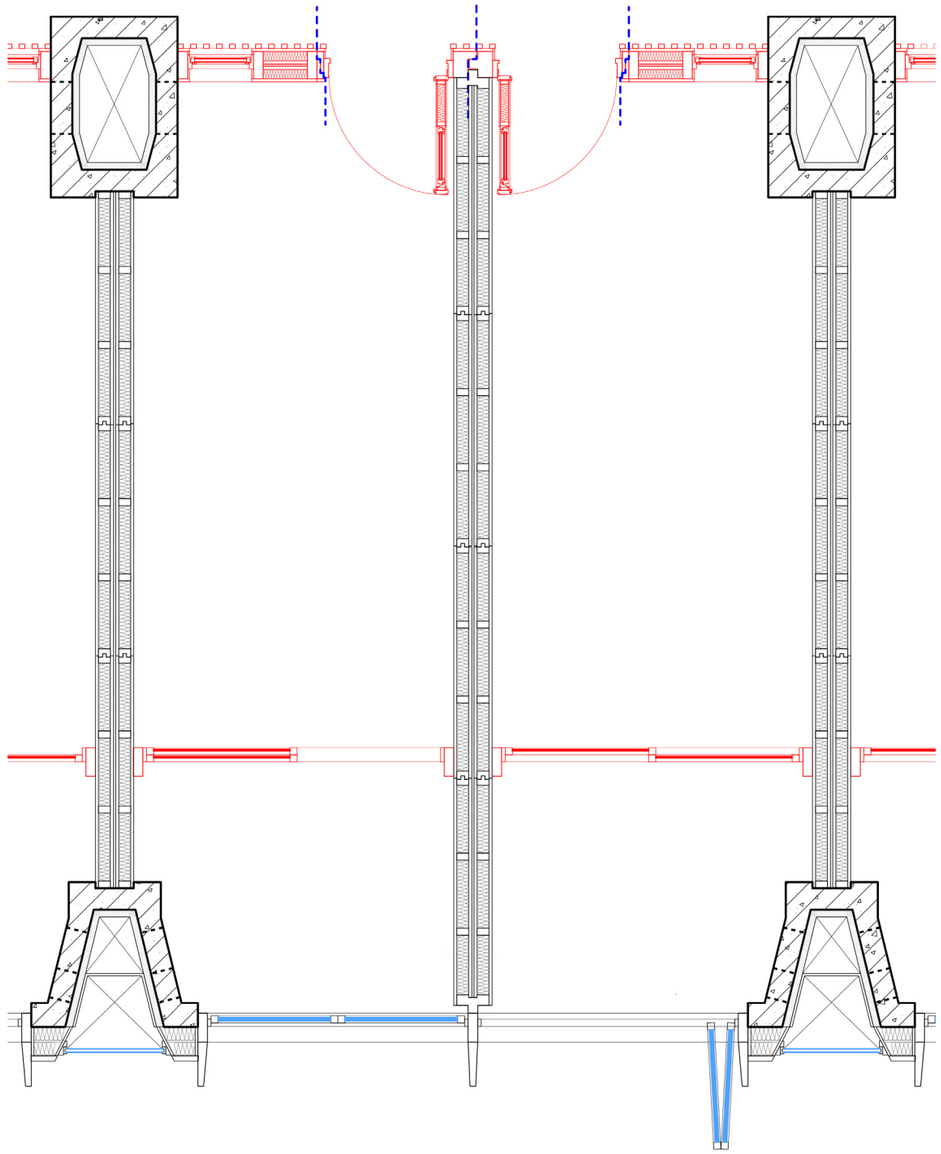
STEP 1

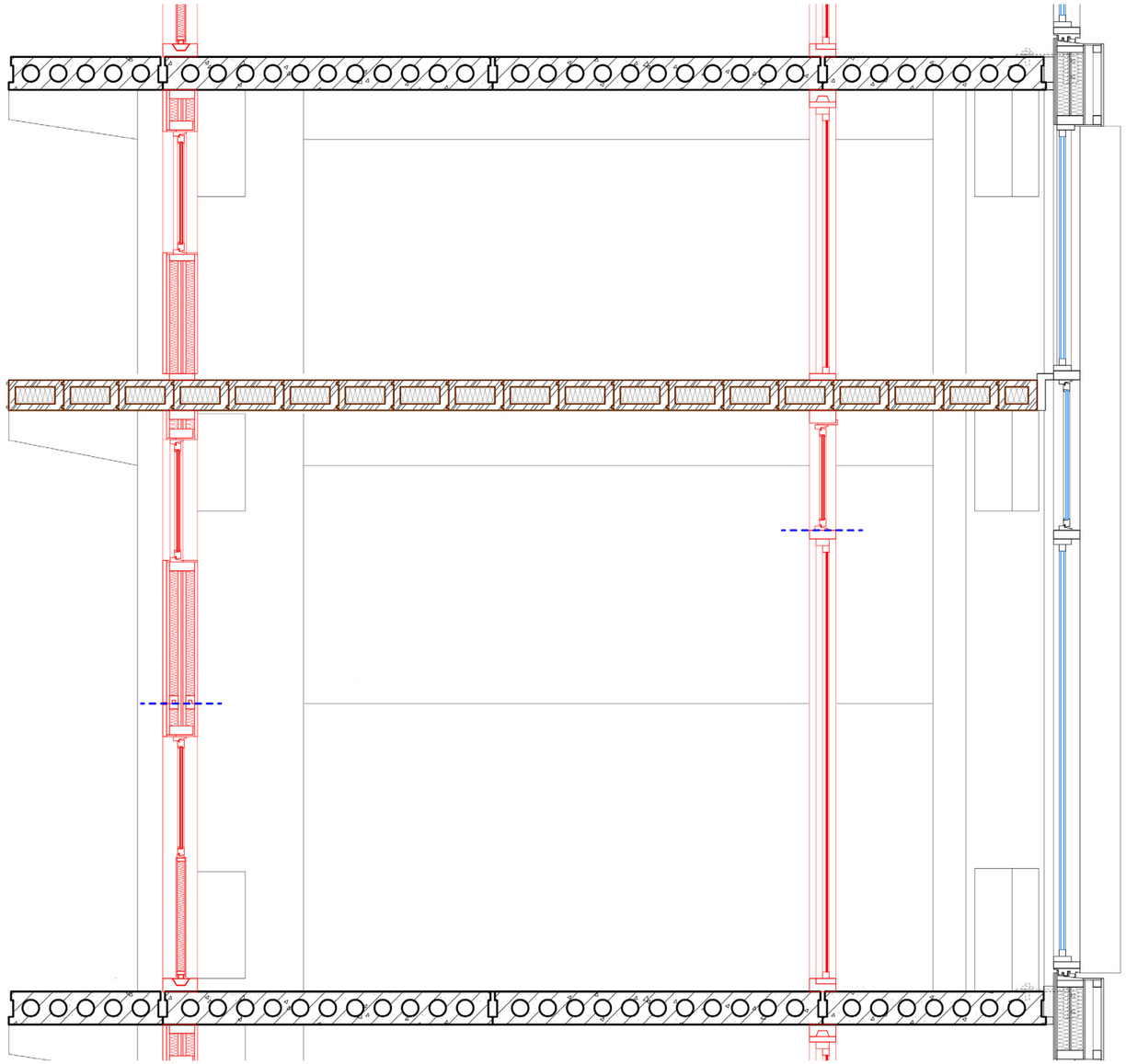




ADAPTABLE COMPONENTS

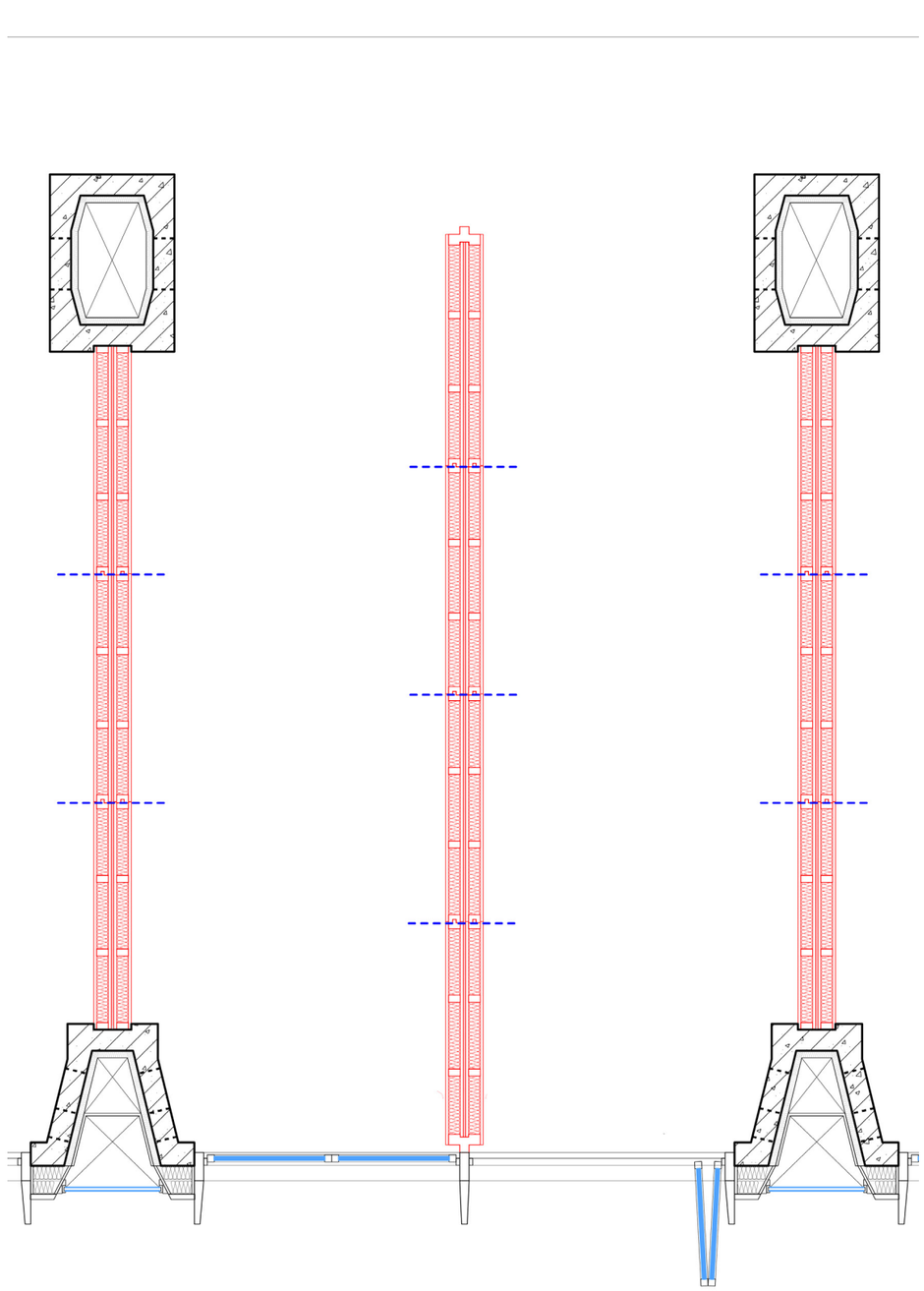
STEP 2

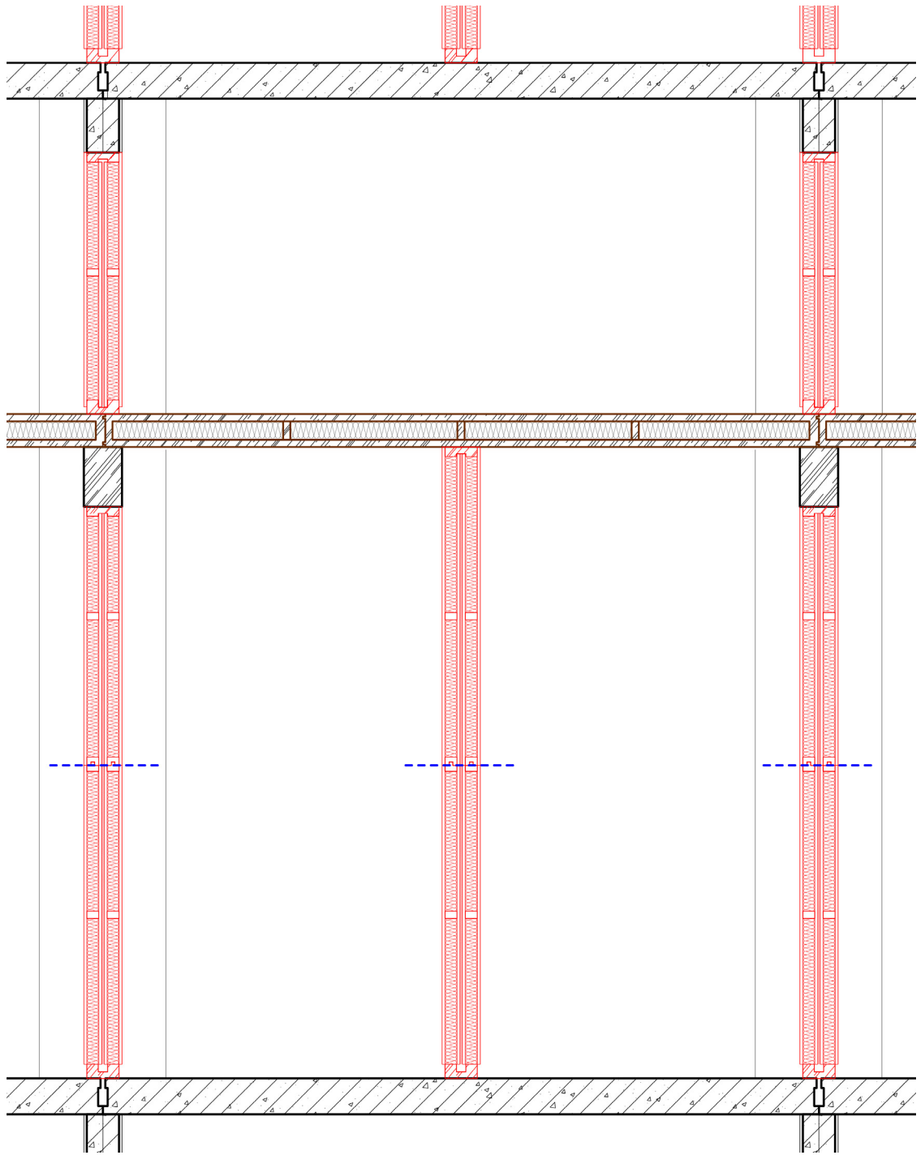




ADAPTABLE COMPONENTS

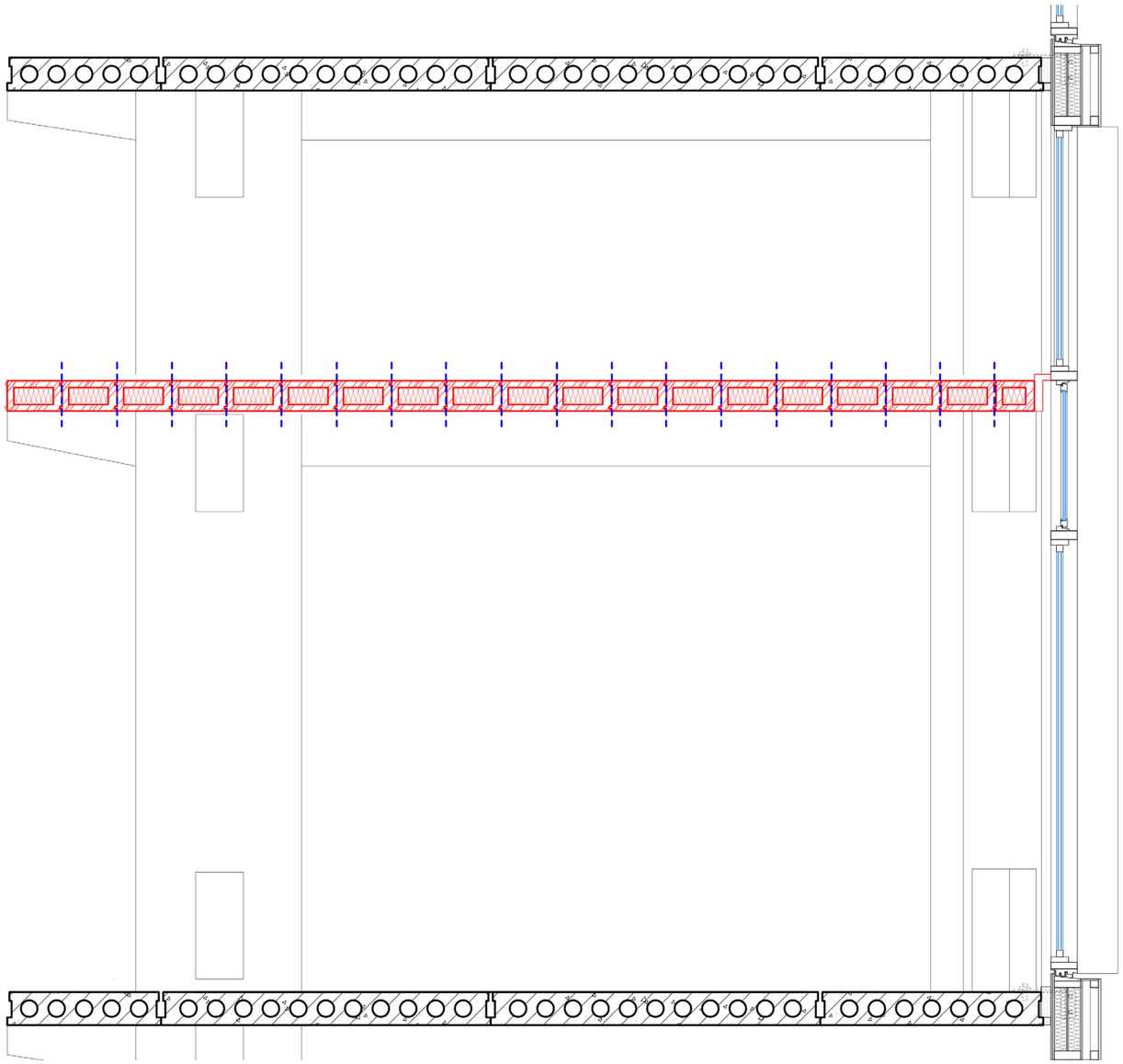
STEP 3

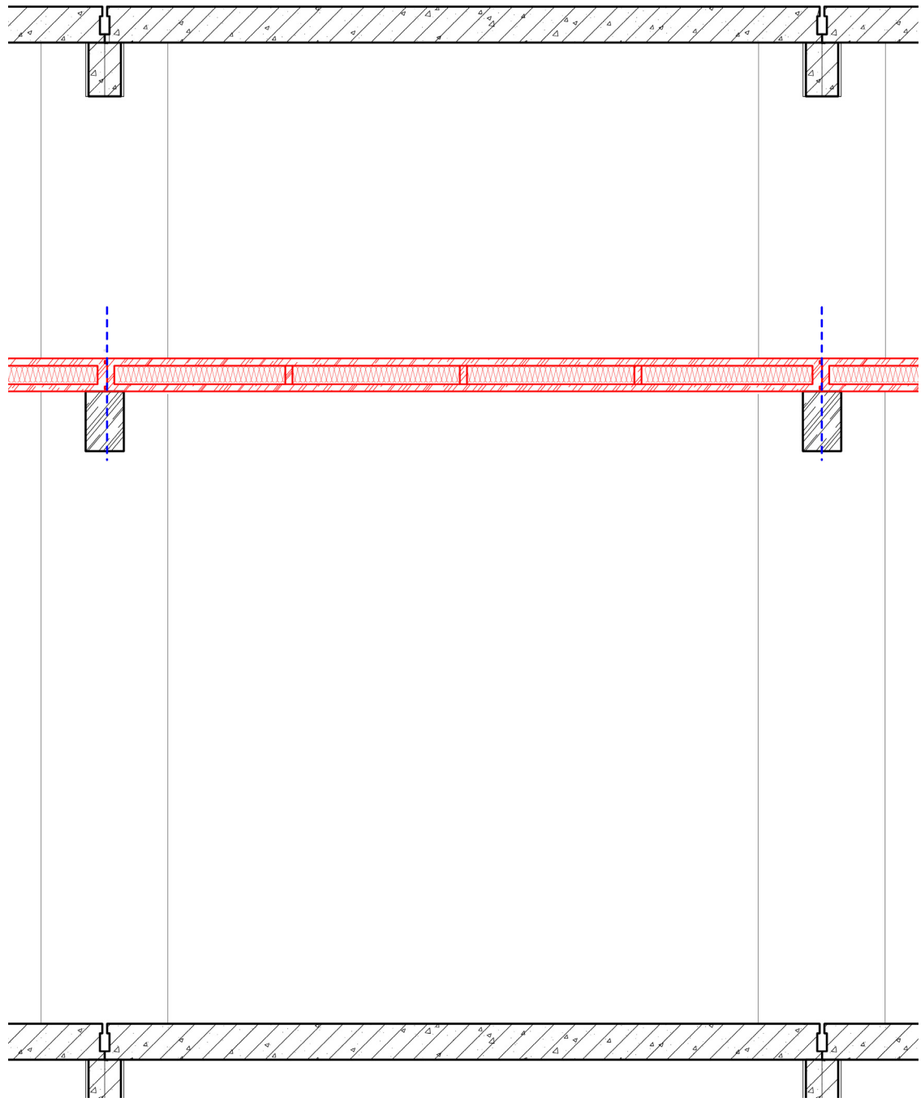




ADAPTABLE COMPONENTS

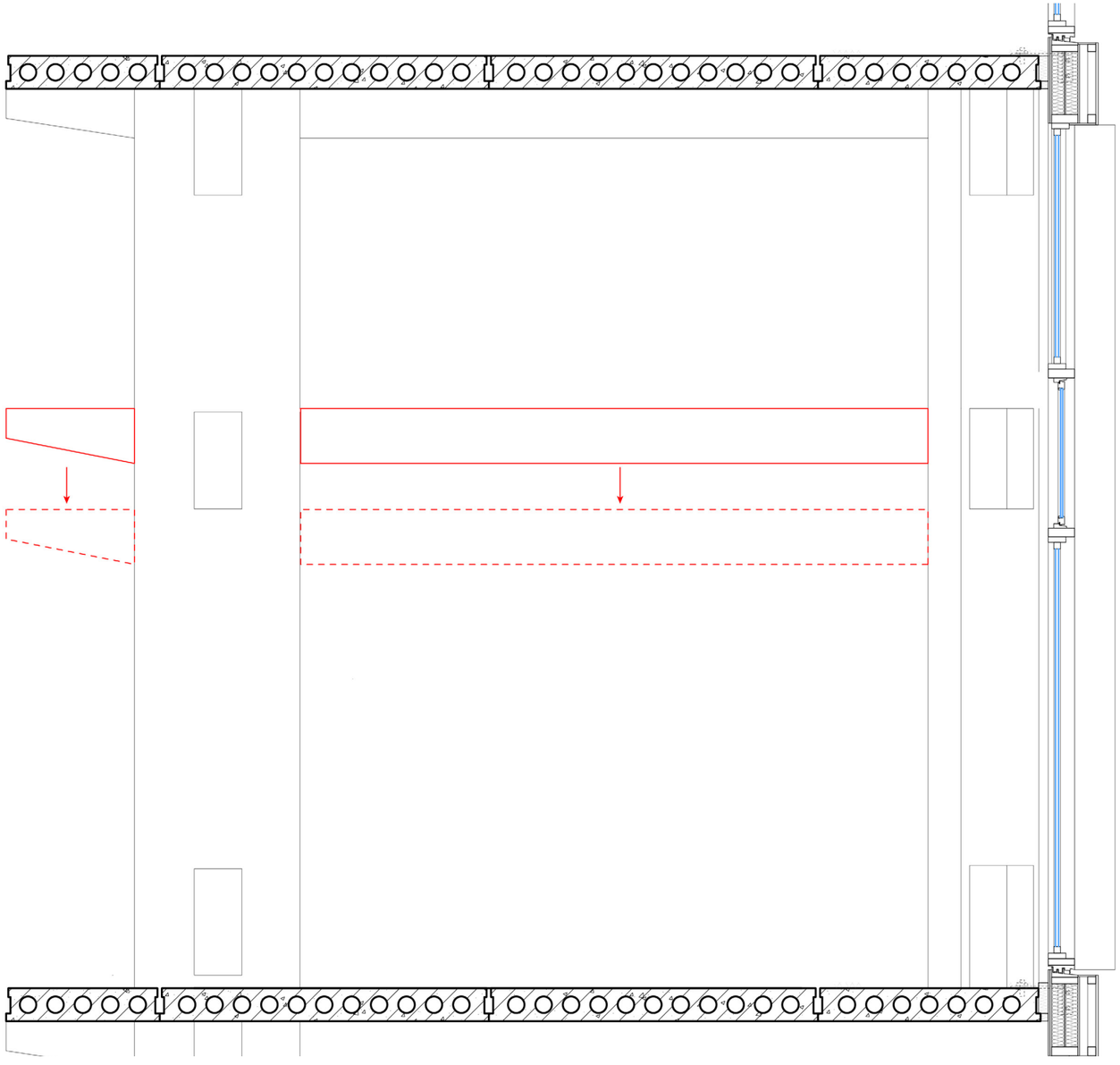
STEP 4

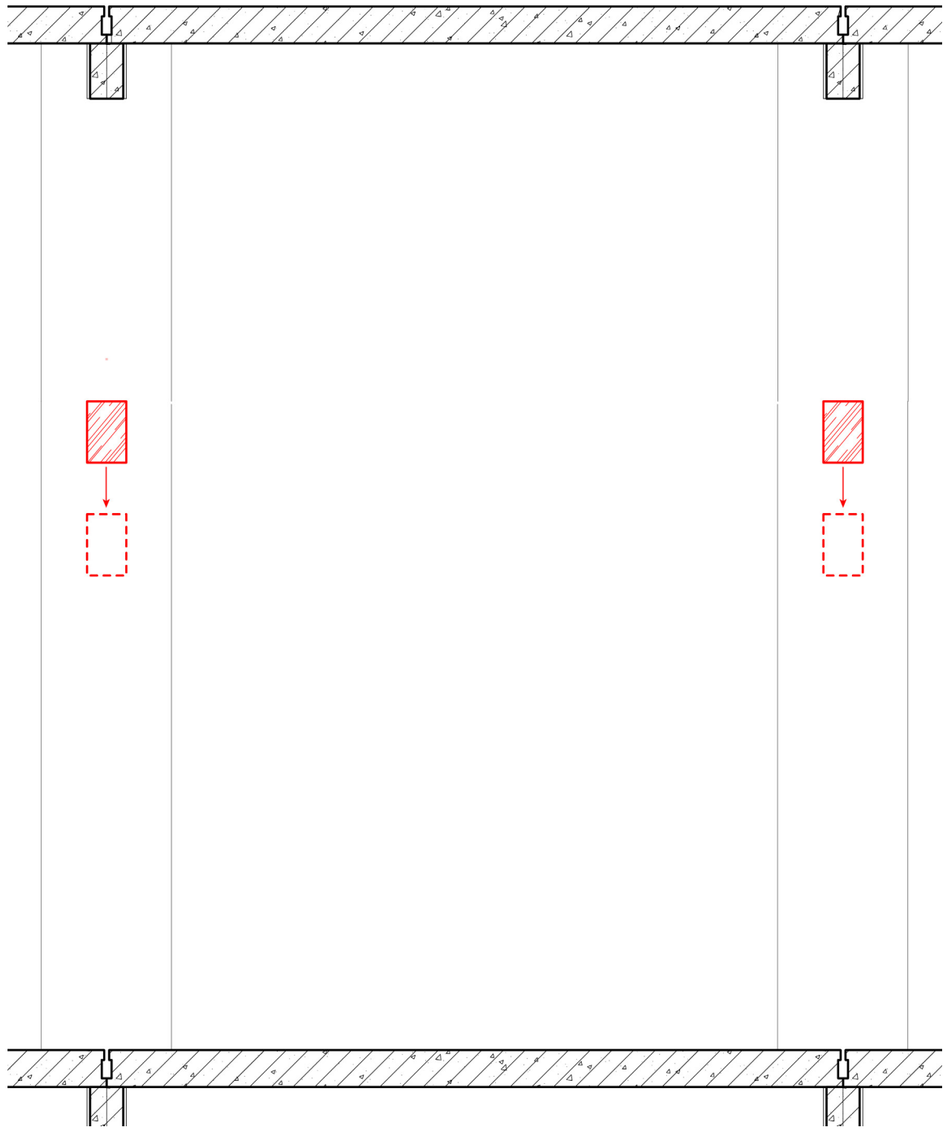




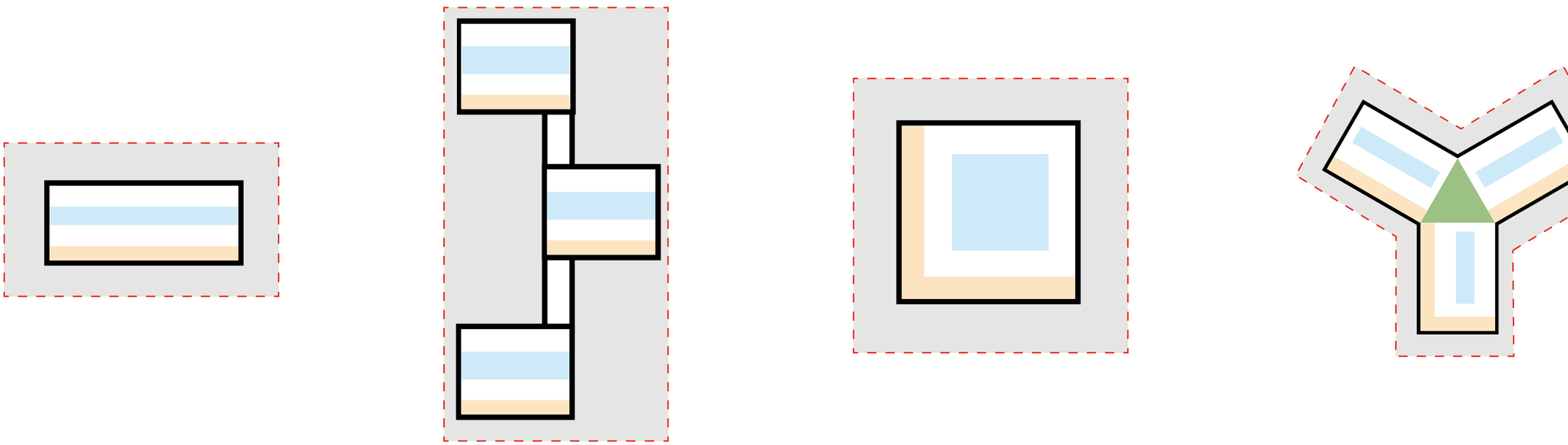
ADAPTABLE COMPONENTS

STEP 5





APPLICATION&POSSIBILITIES



II. CONTEXT&DESIGN

SITE

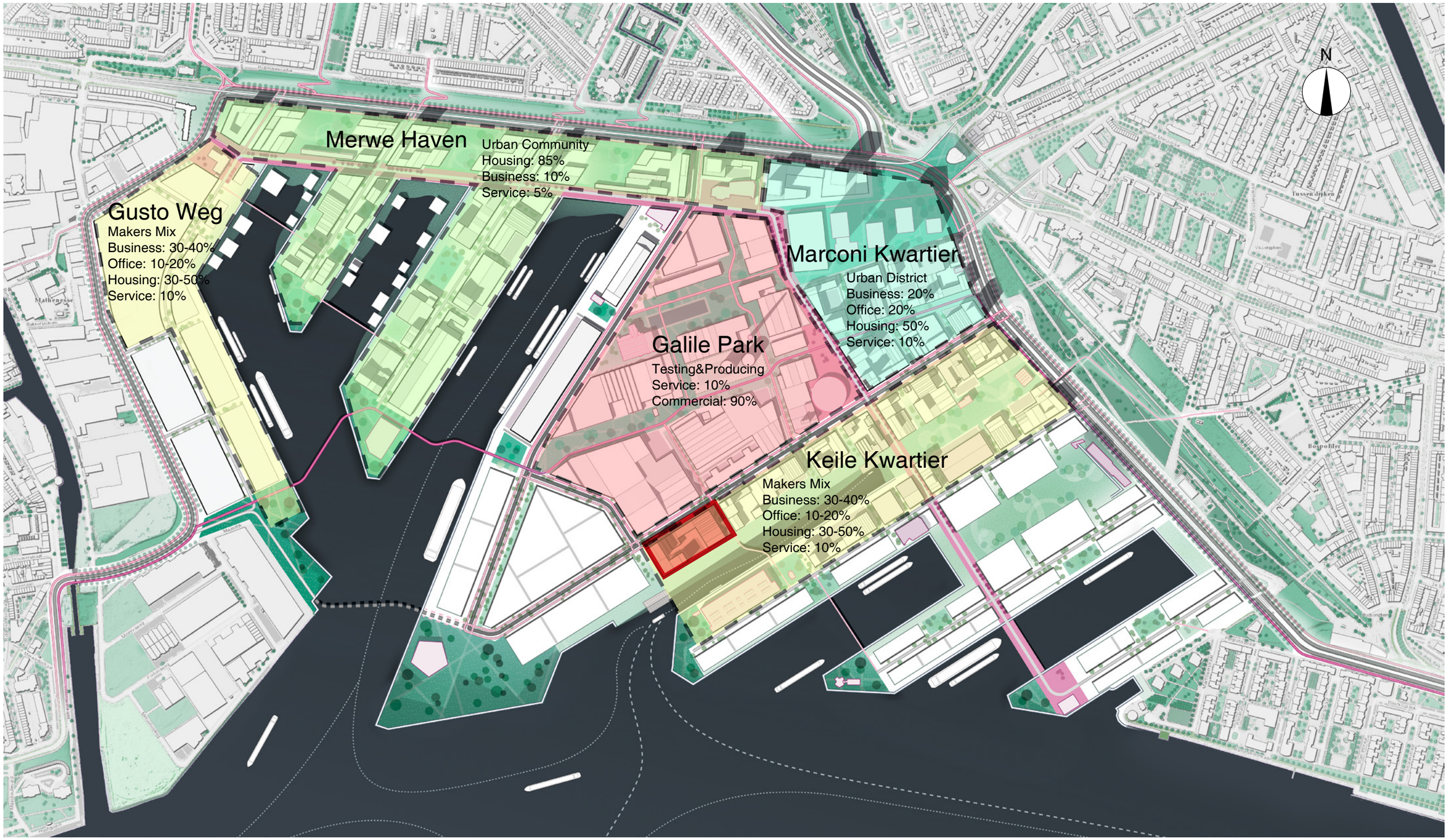
Merwe Vierhavens (M4H), Rotterdam
A old harbor in Rotterdam transforming into Makers District.

Current situation

Source:https://m4hrotterdam.nl/

SITE

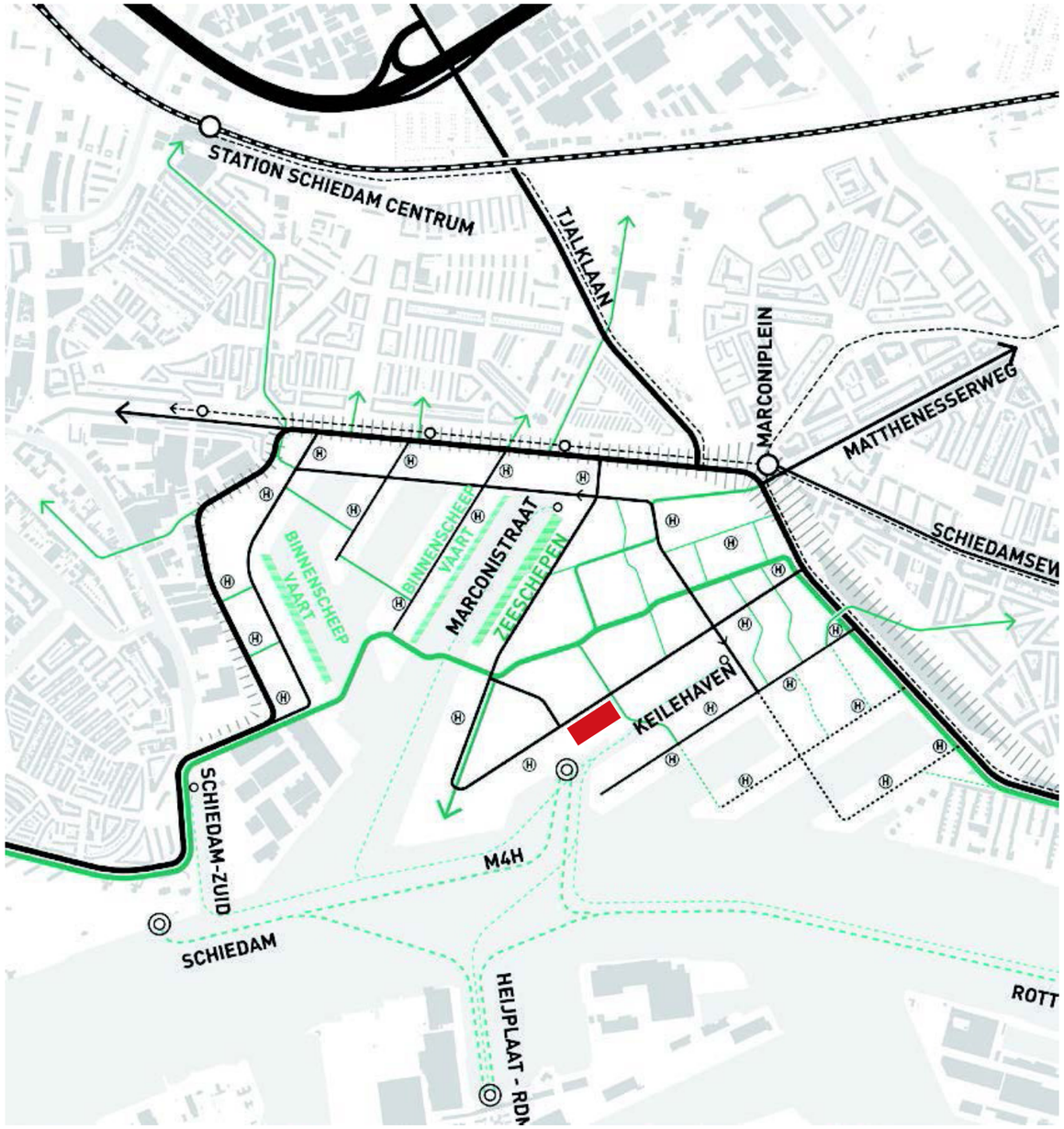
'Companies out - houses in' is broken and replaced by a mix of working and living destinations.

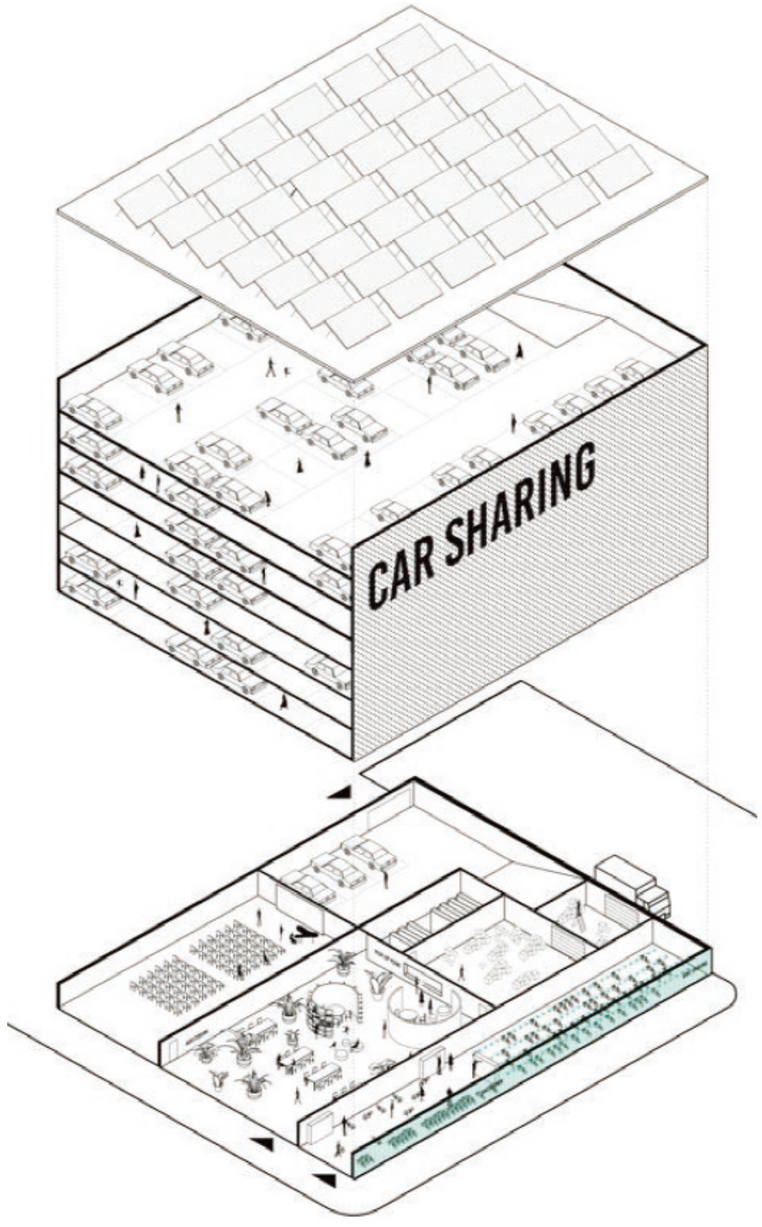


Source:https://m4hrotterdam.nl/

MOBILITY & PARKING

Mixing facilitates sharing, for example, of parking spaces (during the day for workers, in the evening for residents).Parking does not take place on the street and is not per company solved on its own lot. Instead there will be collective places. A mobility transition (less car, more public transport and bicycle) will be applied in this area.

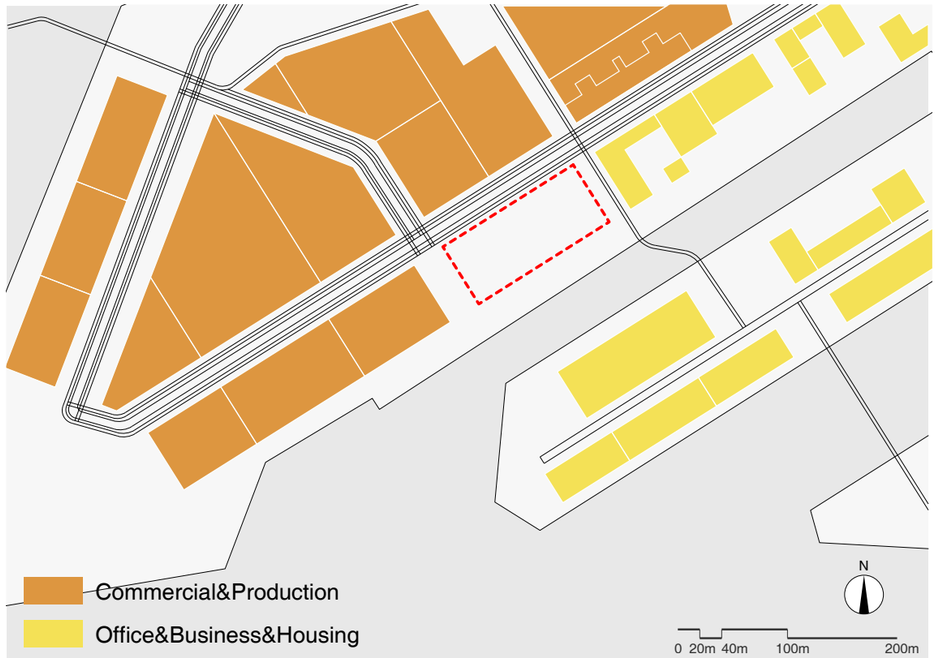




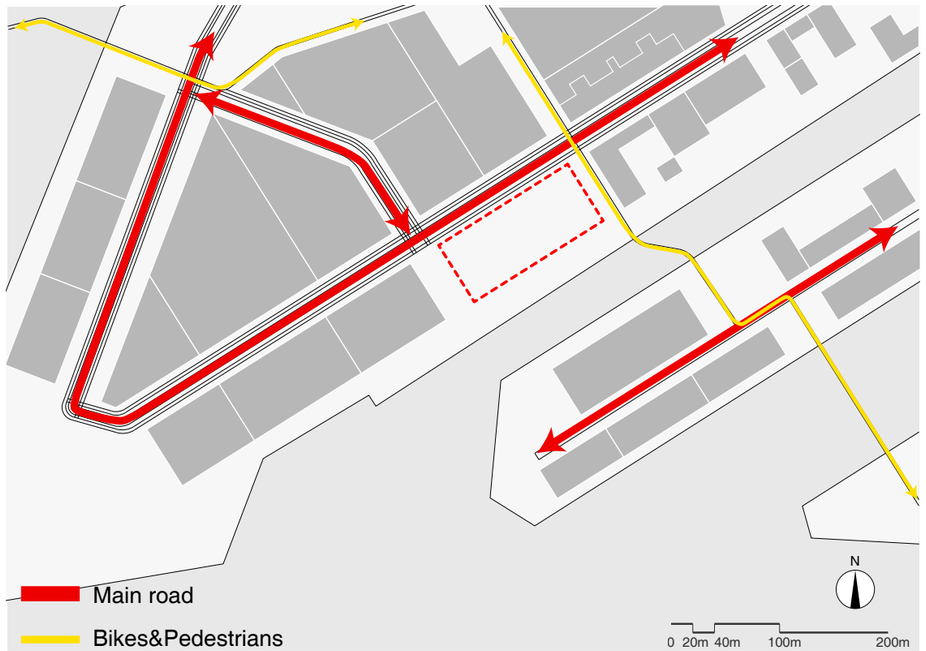
Source:https://m4hrotterdam.nl/

SITE: 11200M^2

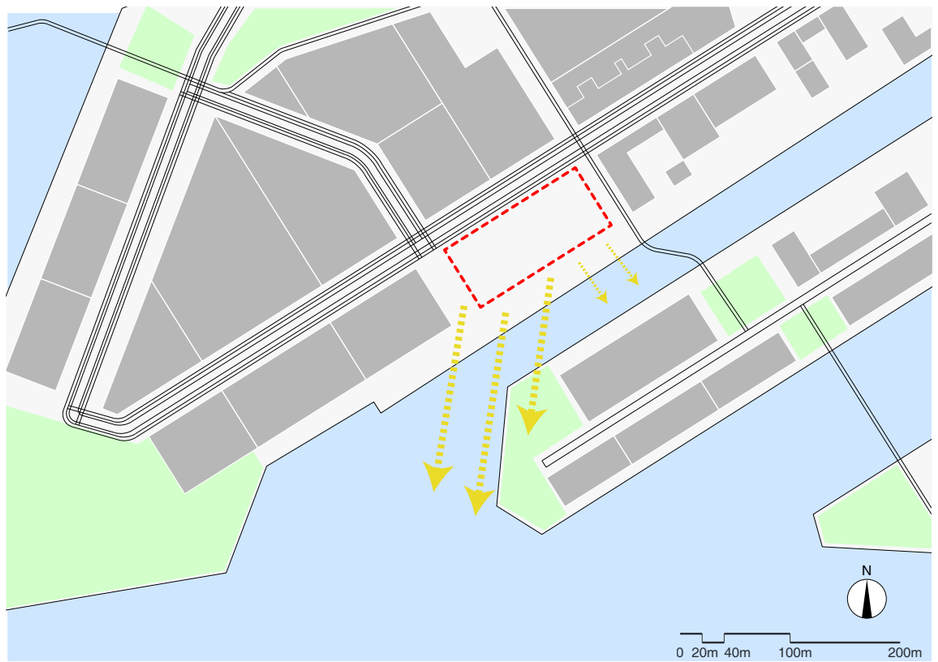
CONTEXT ANALYSIS



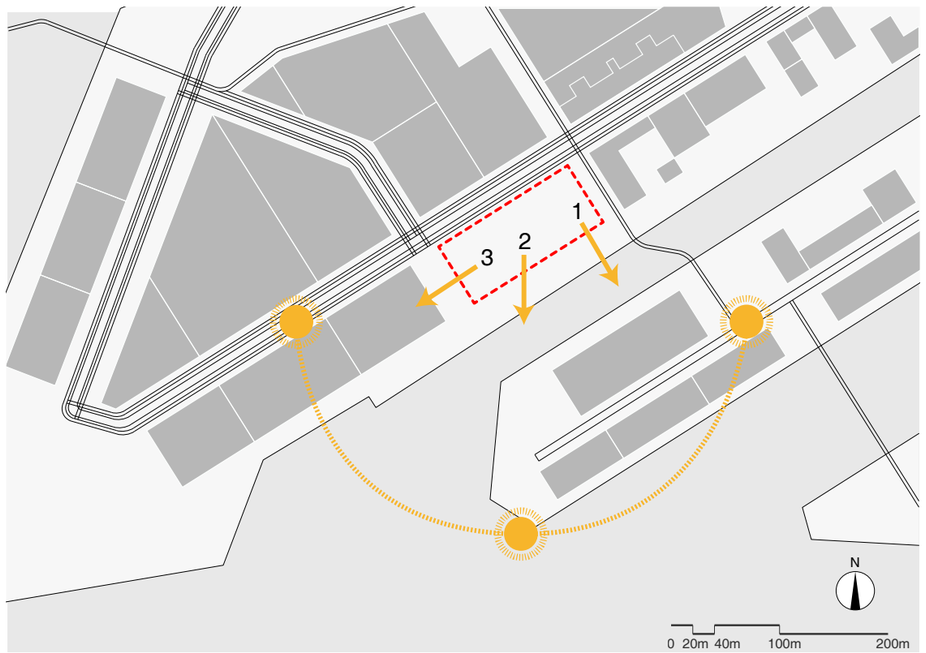
Function & Scale



Traffic

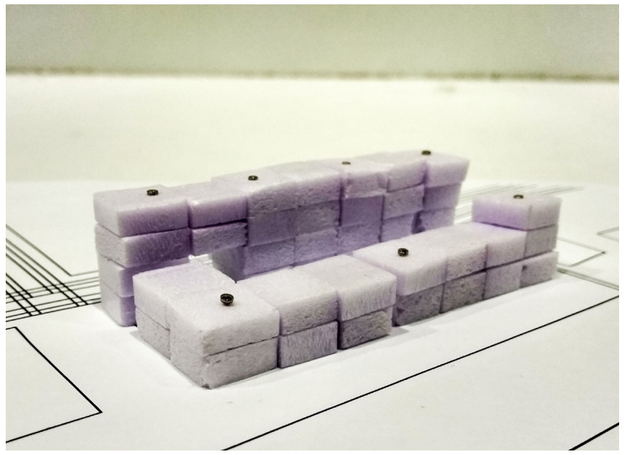


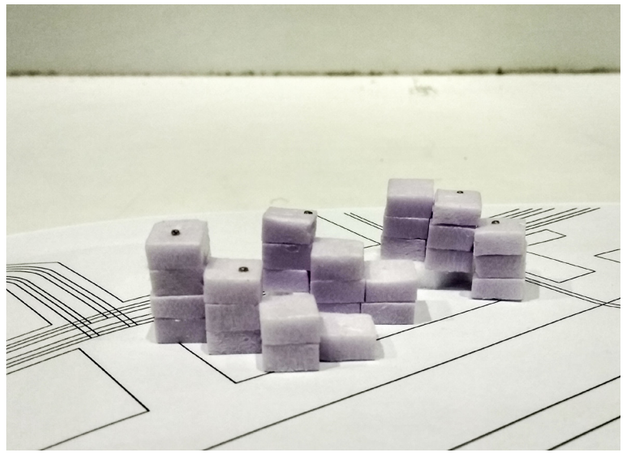
Water & View

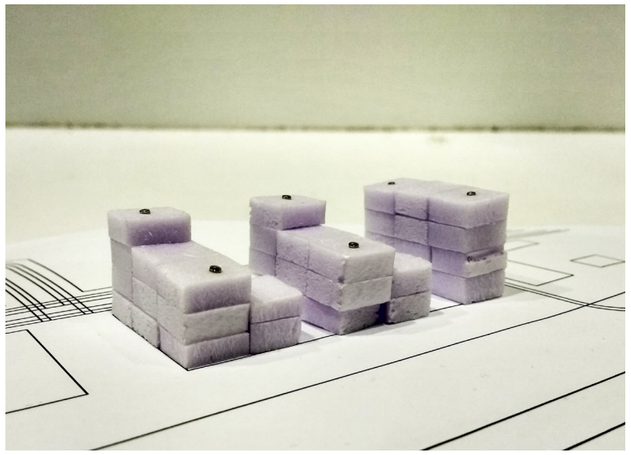


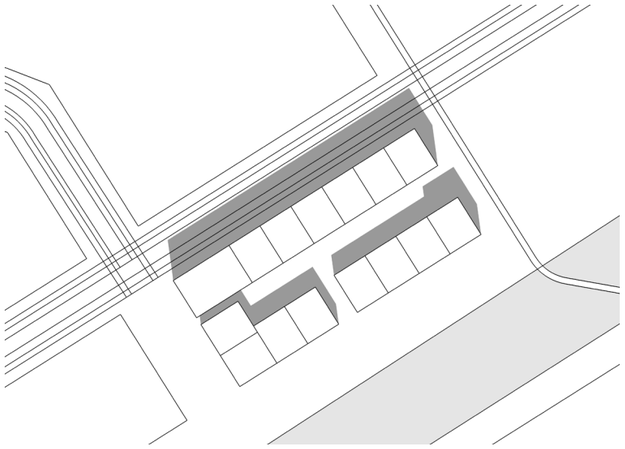
Orientation & Sunlight

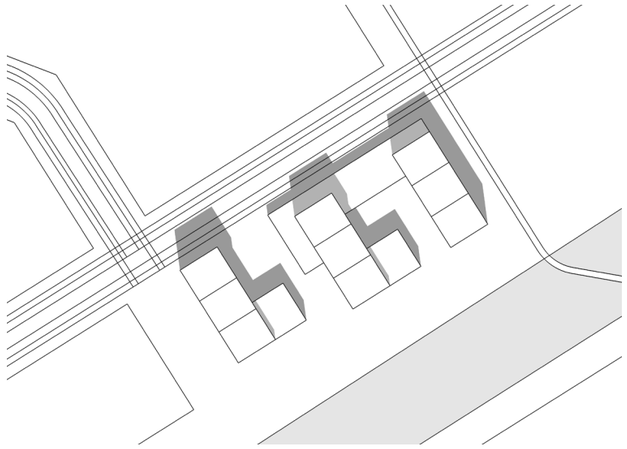
TRYING

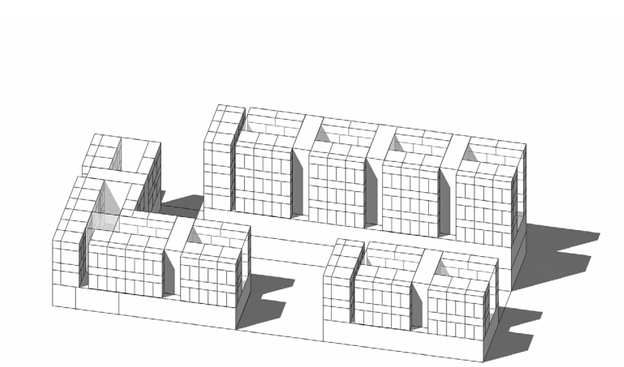


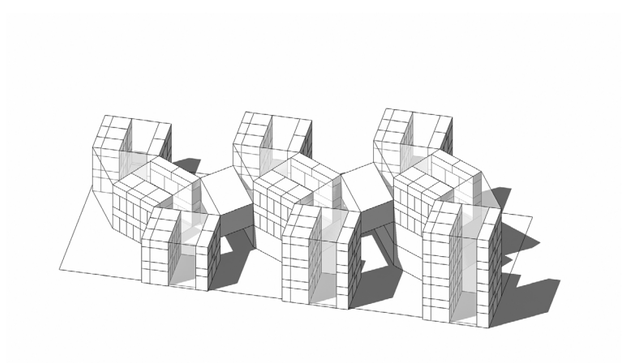


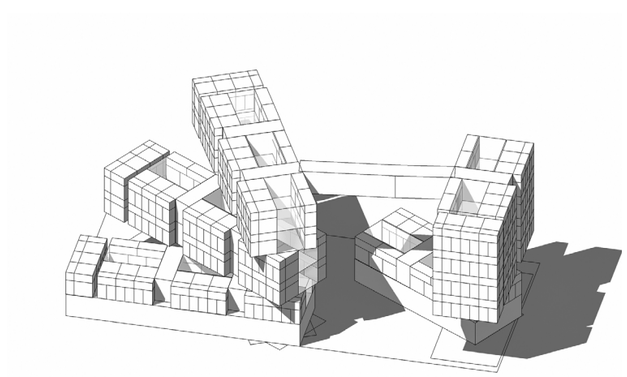




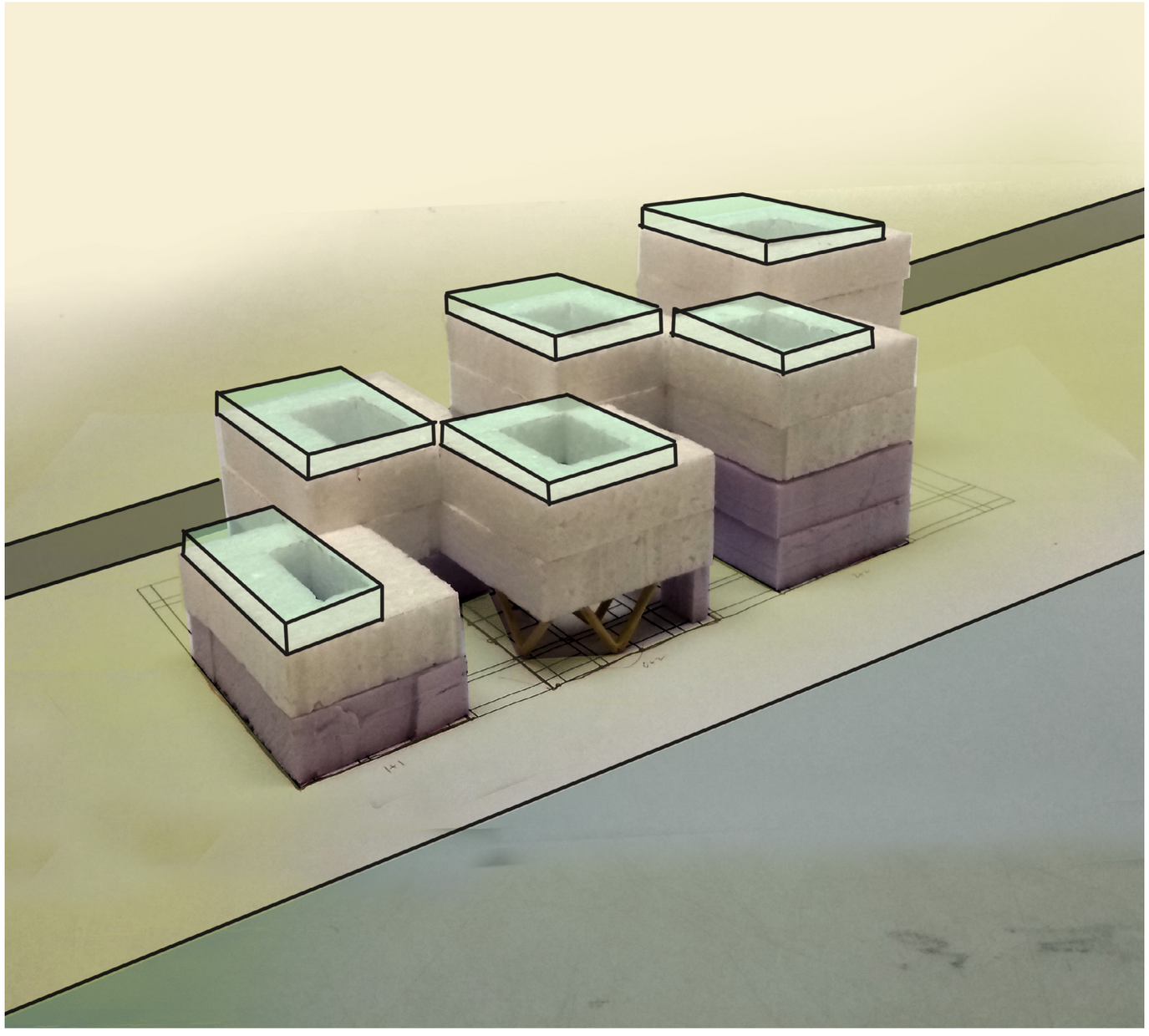


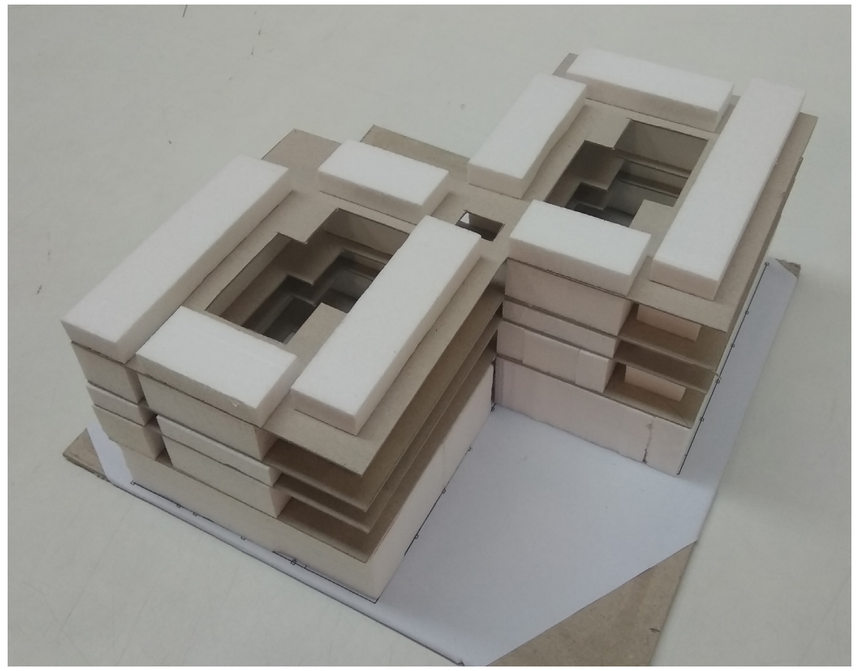


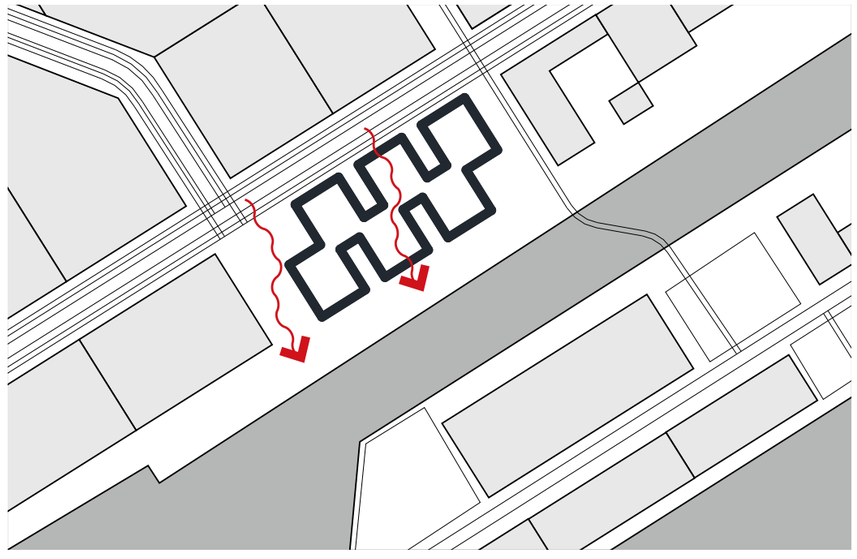




OPTIONS







PROGRAM

Maker space
2050m^2

Co-working
10050m^2

Public&exhibition
890m^2

Restaurant
650m^2

Gym
600m^2

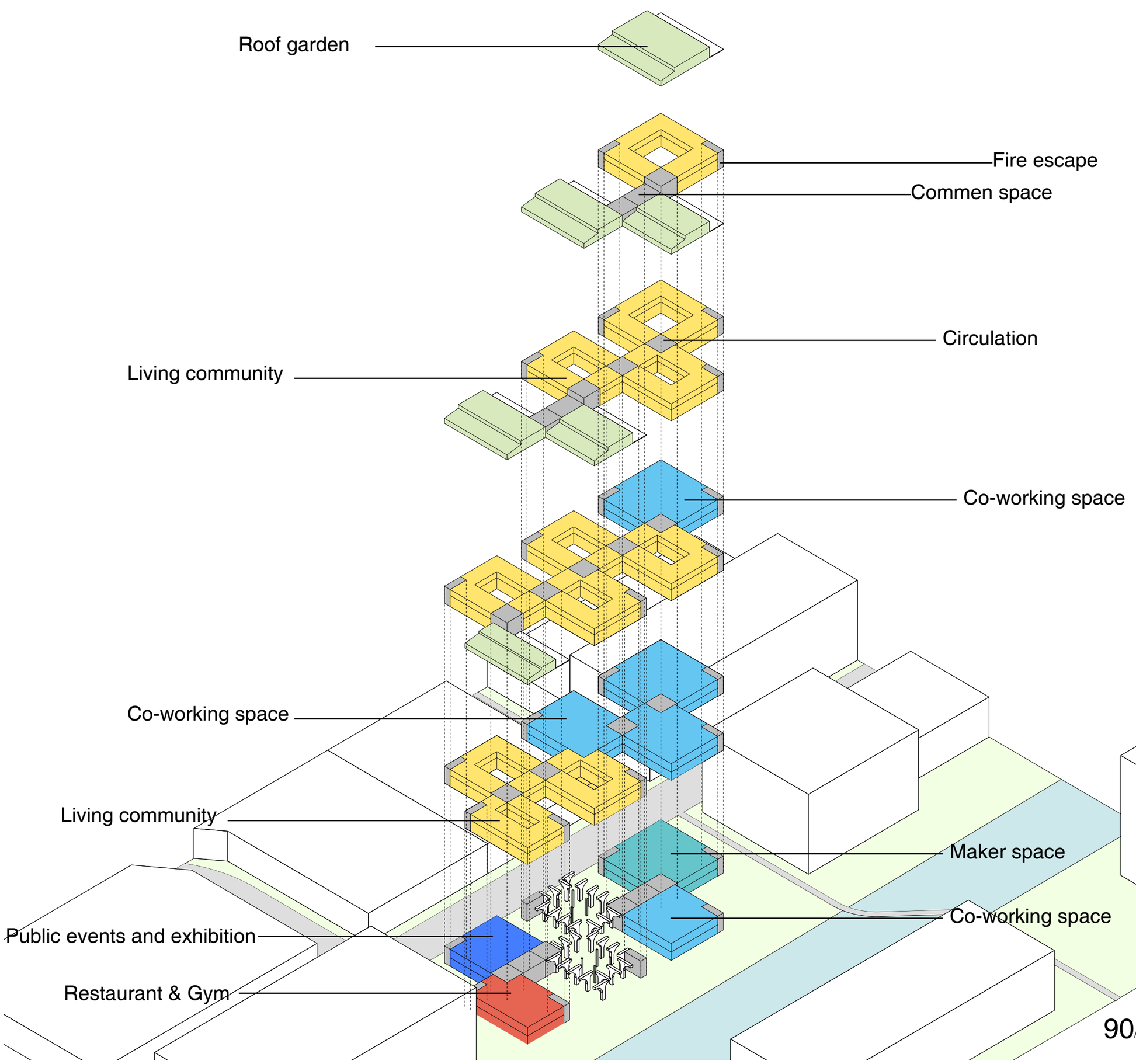
Loft living (205 units)
14000m^2

1-F living (126 units)
10200m^2

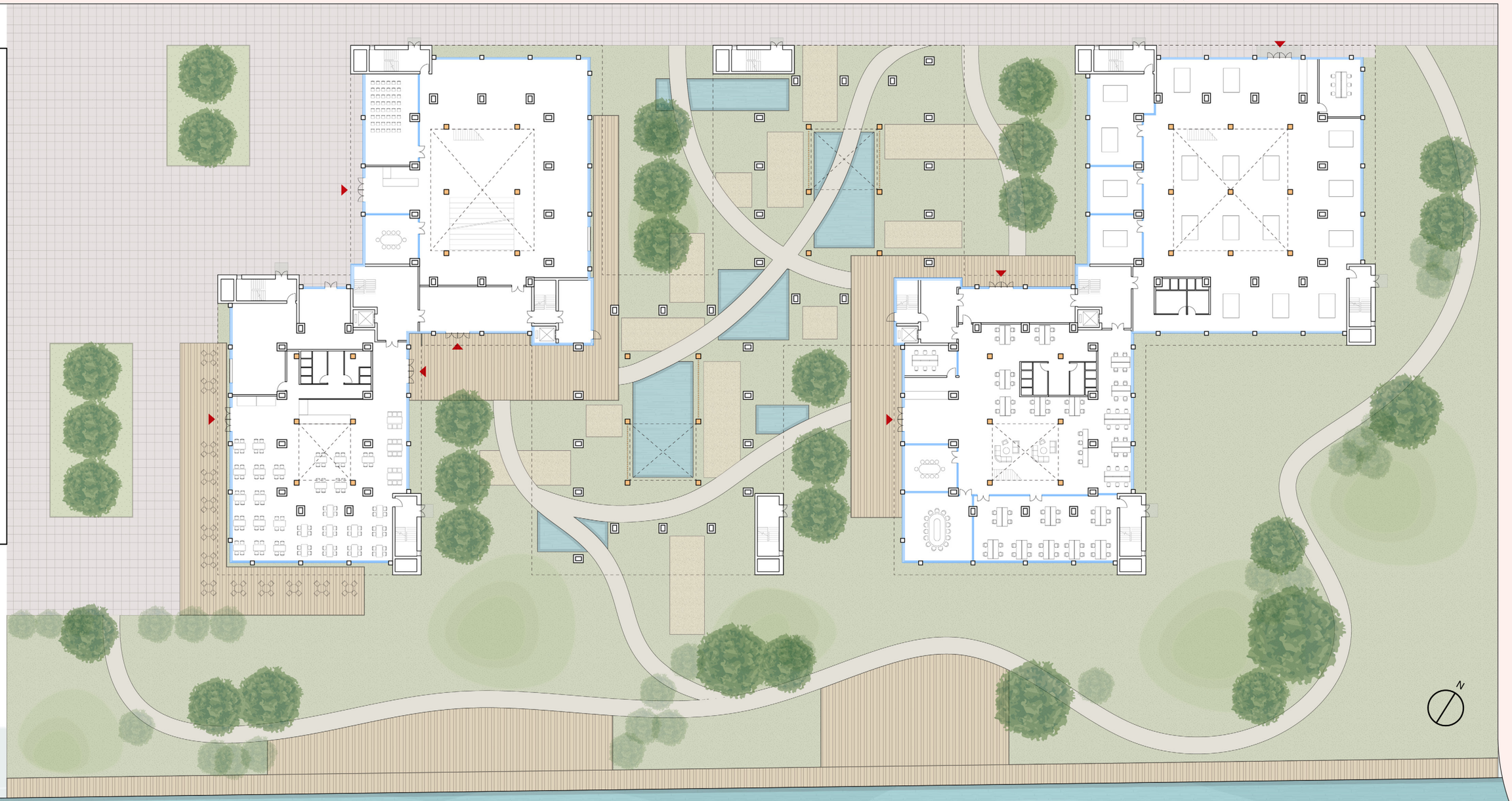
Roof garden
3050m^2

Other
4500m^2

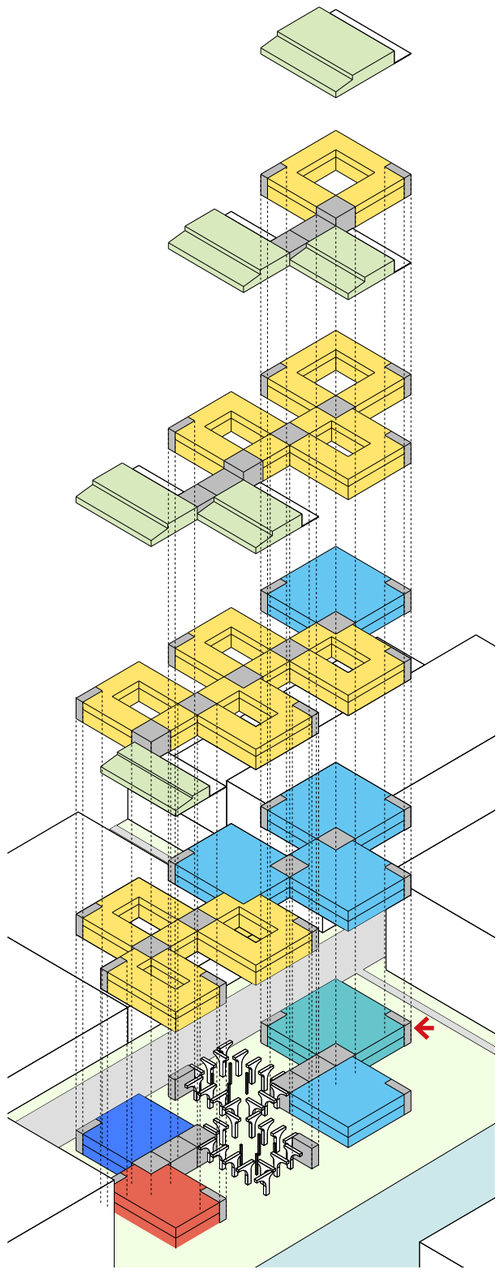
Total 45990m^2

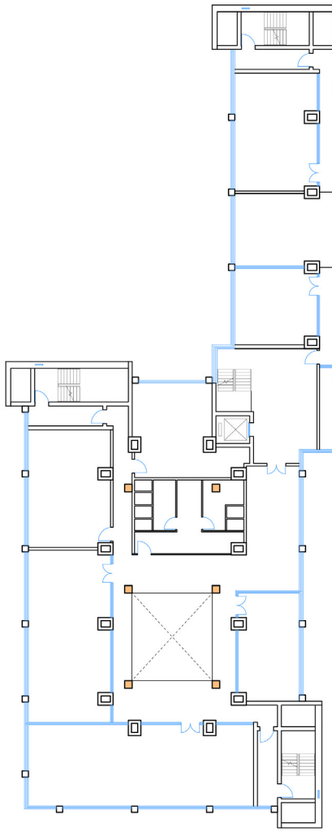


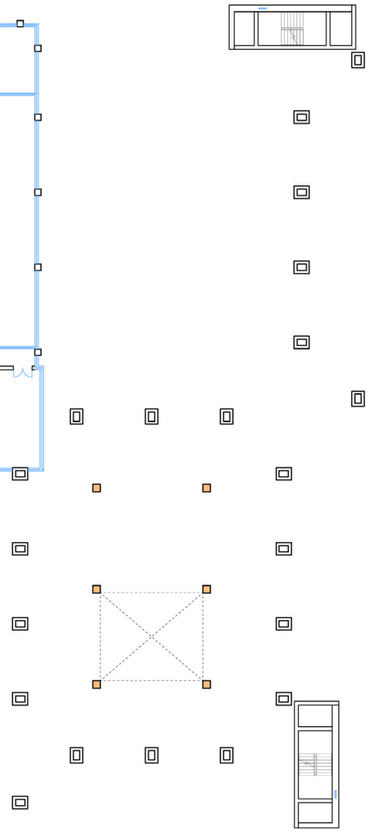
GROUND FLOOR PLAN

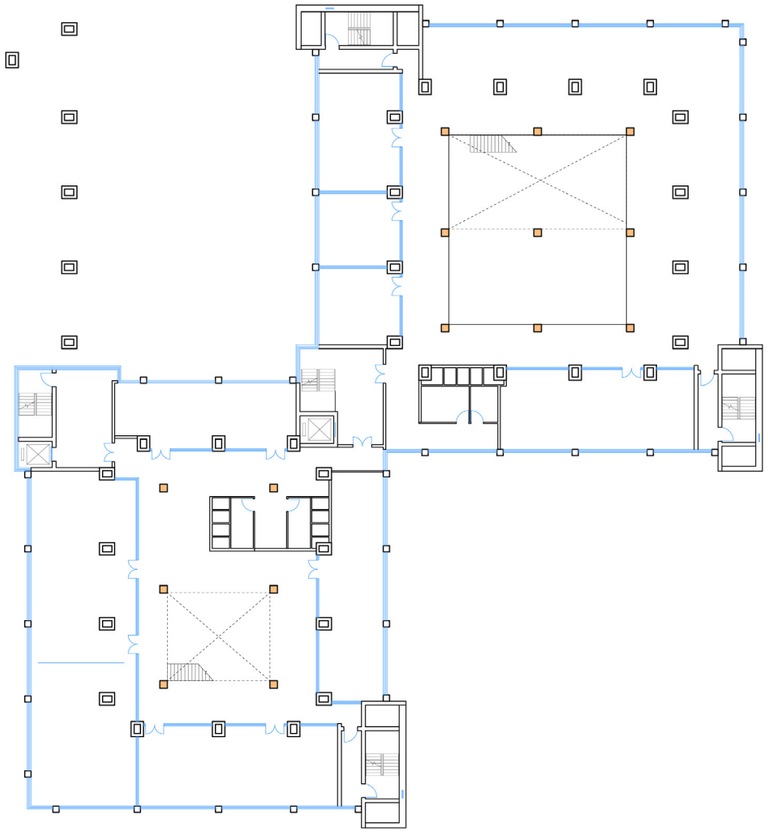


PLANS



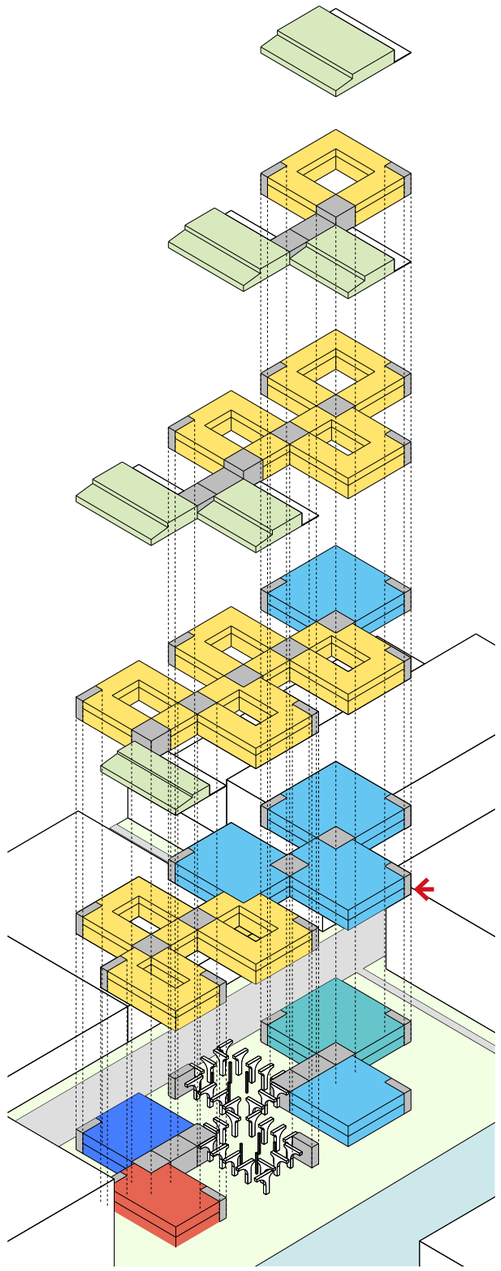


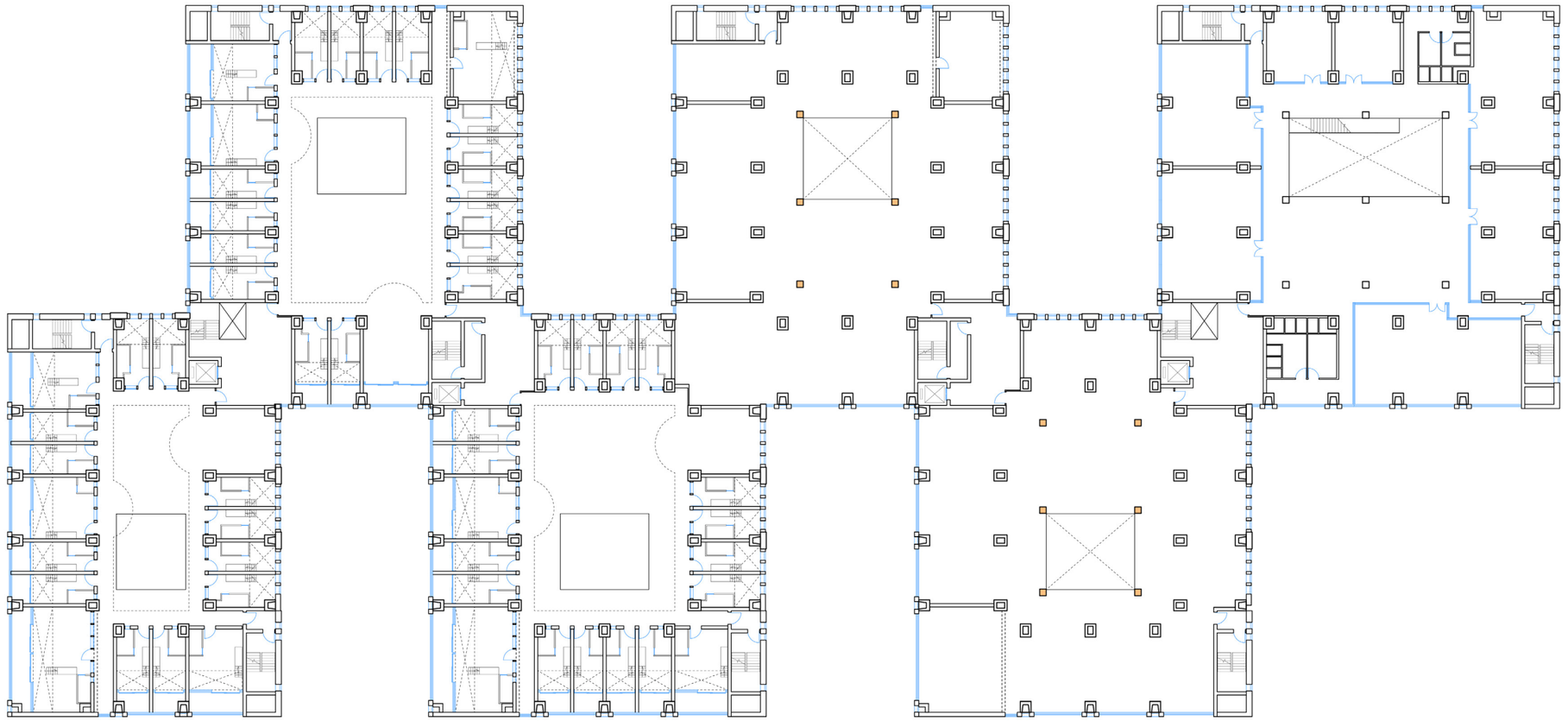




1F PLAN

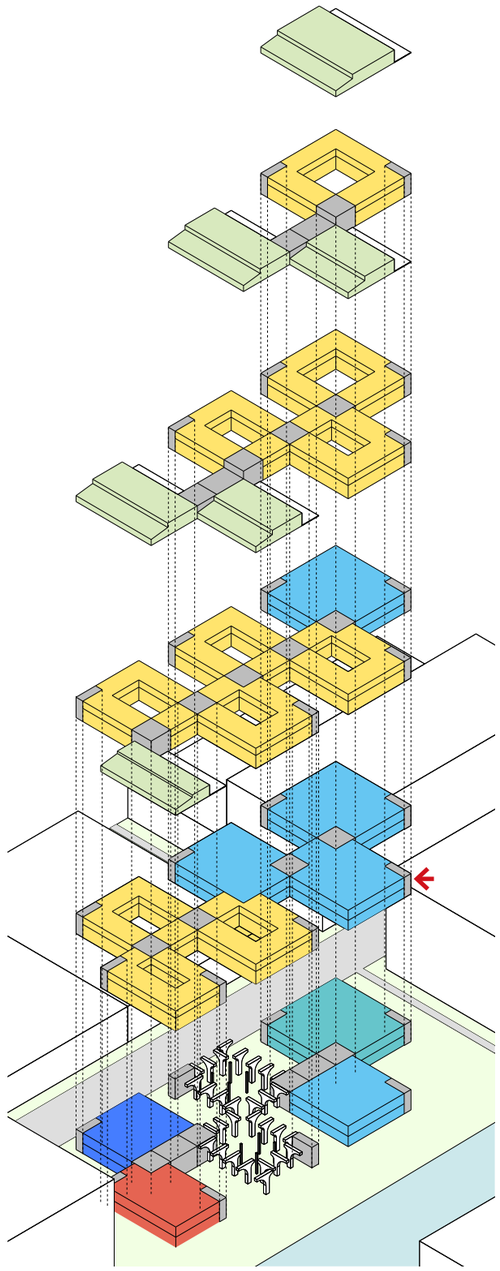
PLANS

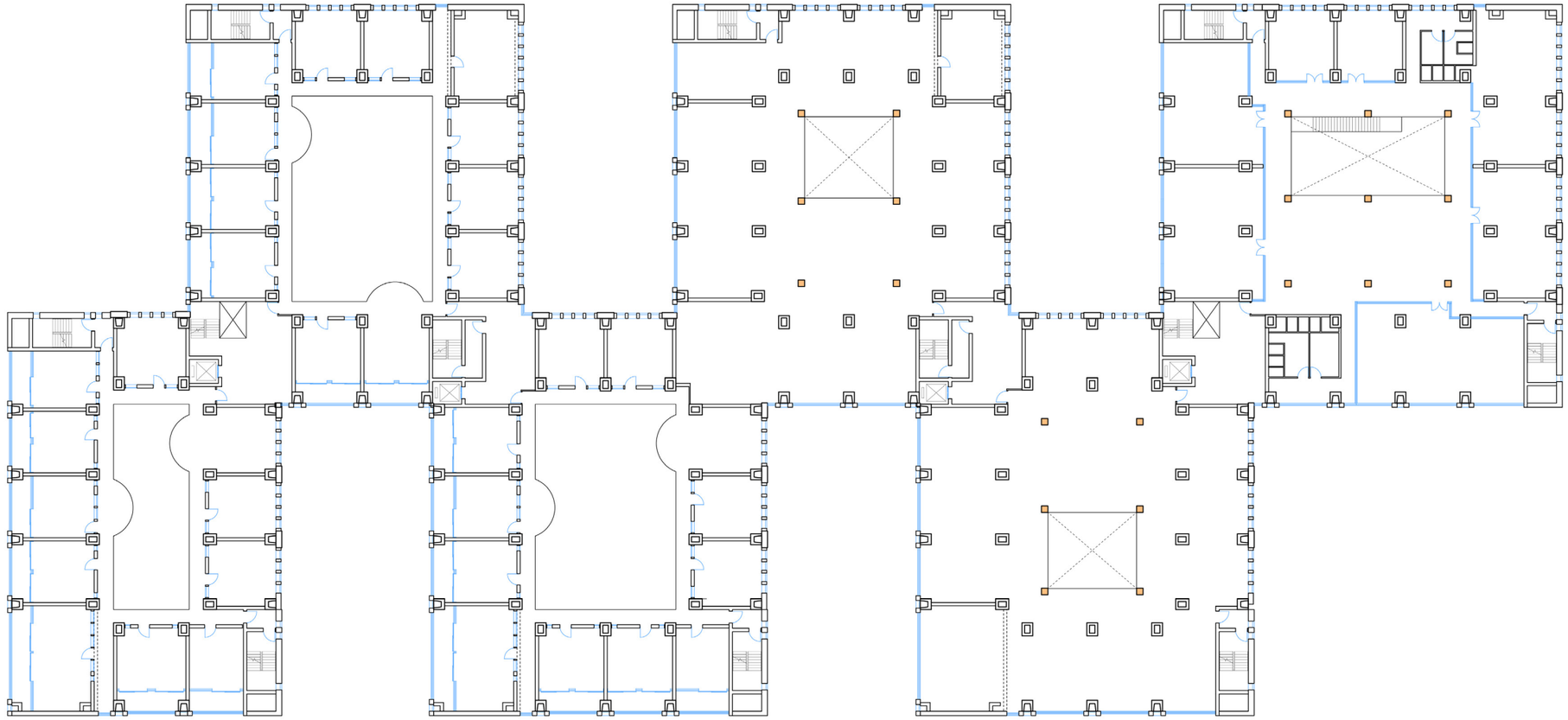




2F PLAN

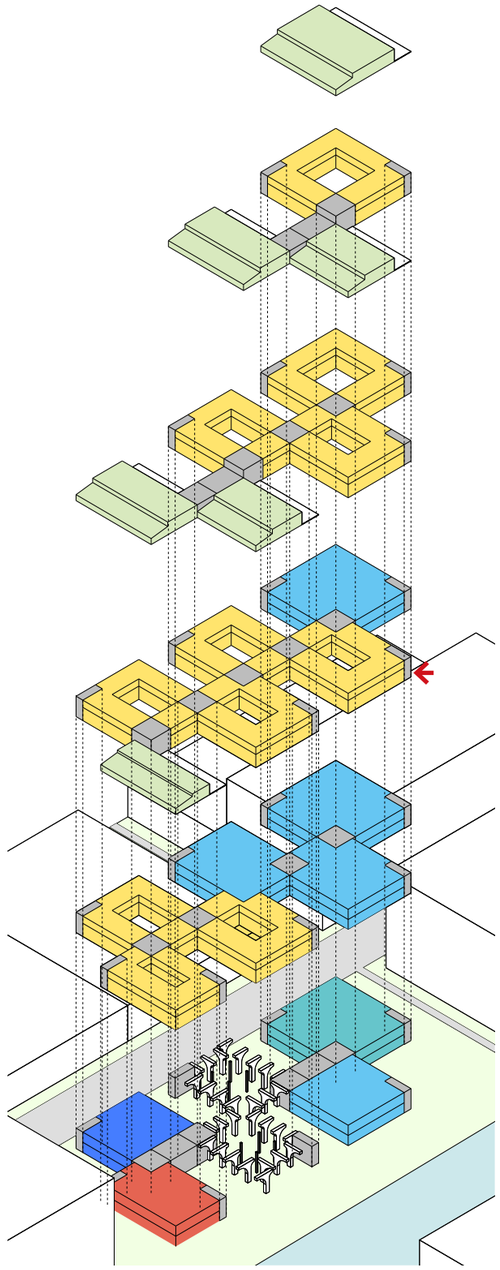
PLANS

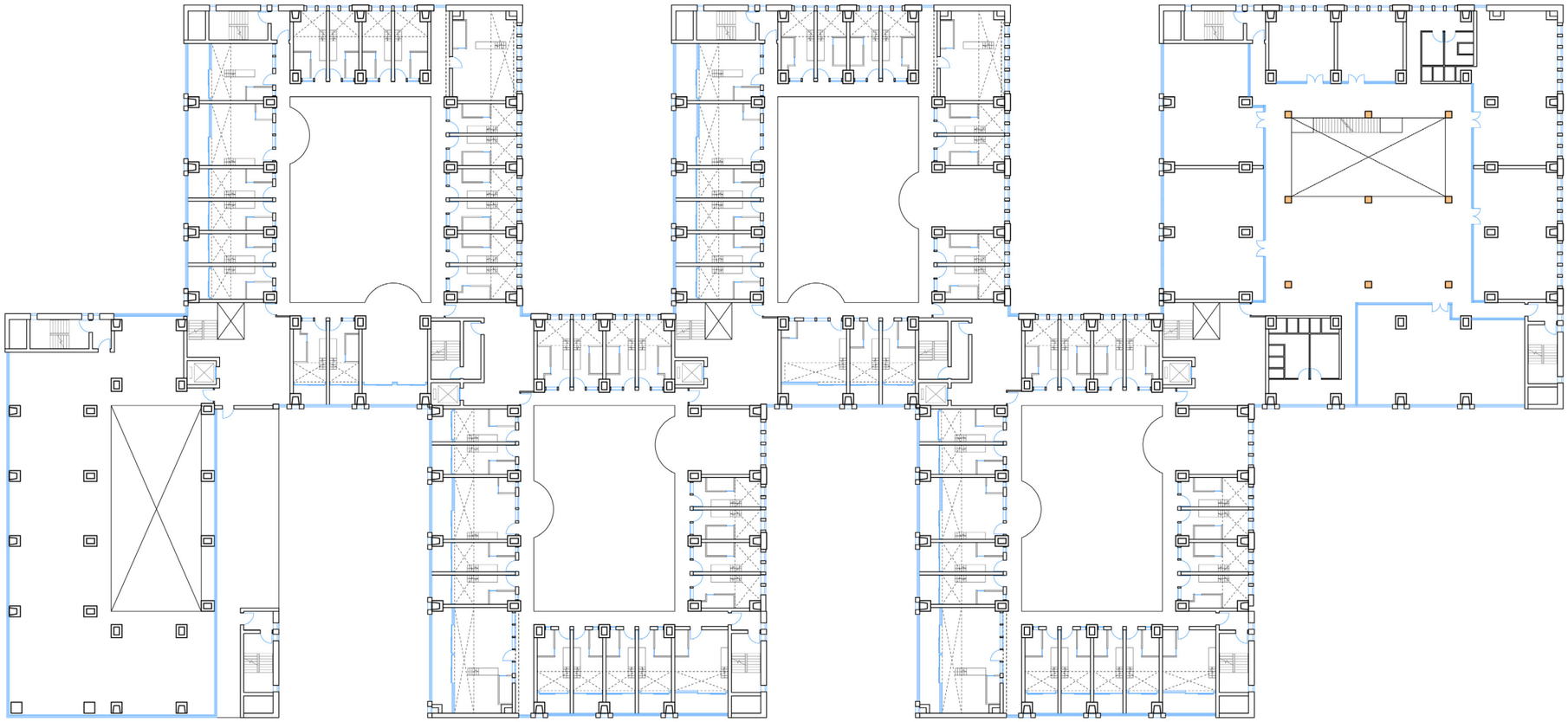




3F PLAN

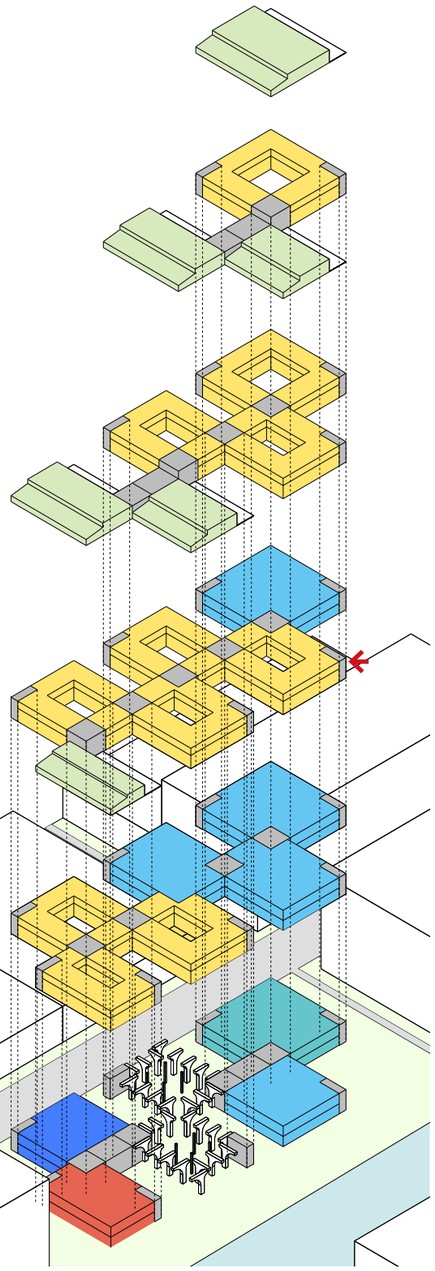
PLANS

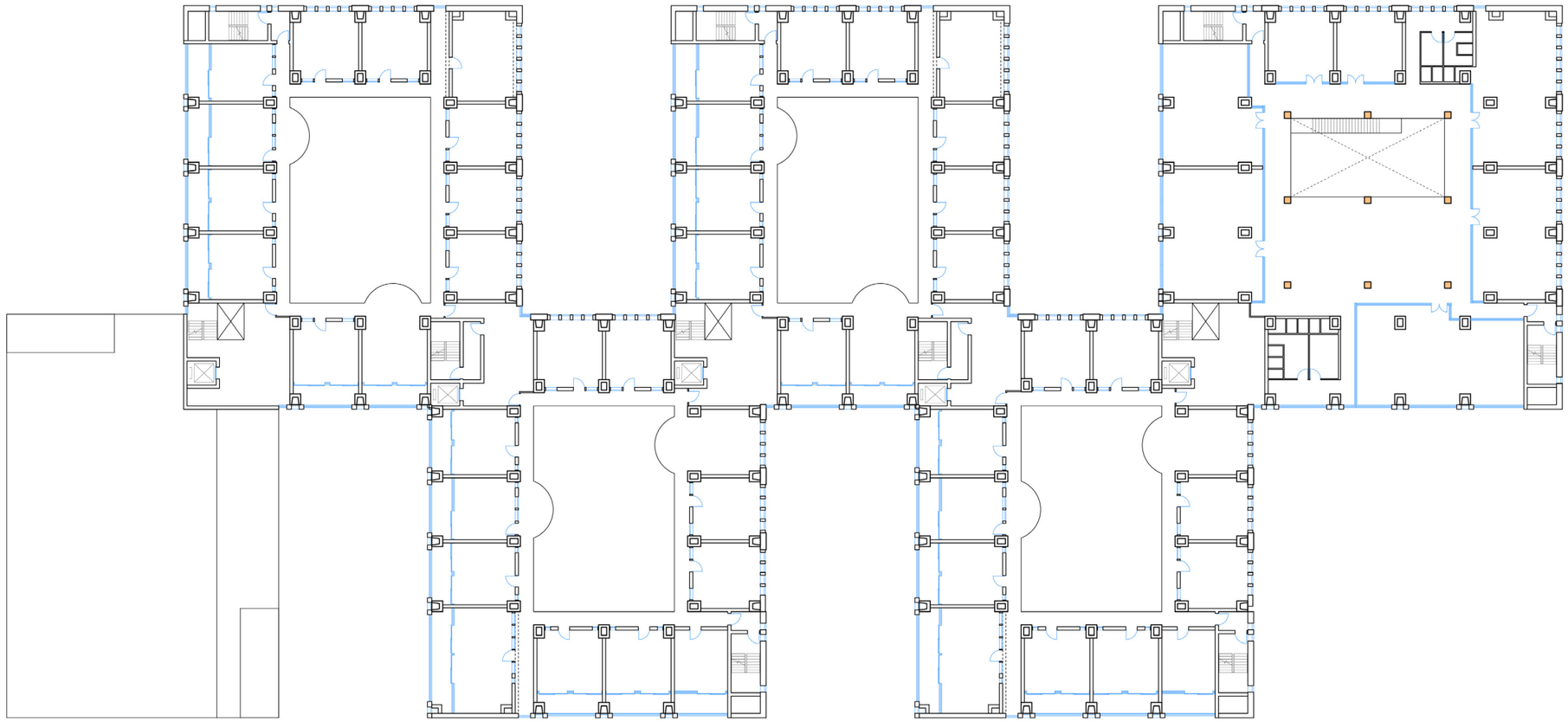




4F PLAN

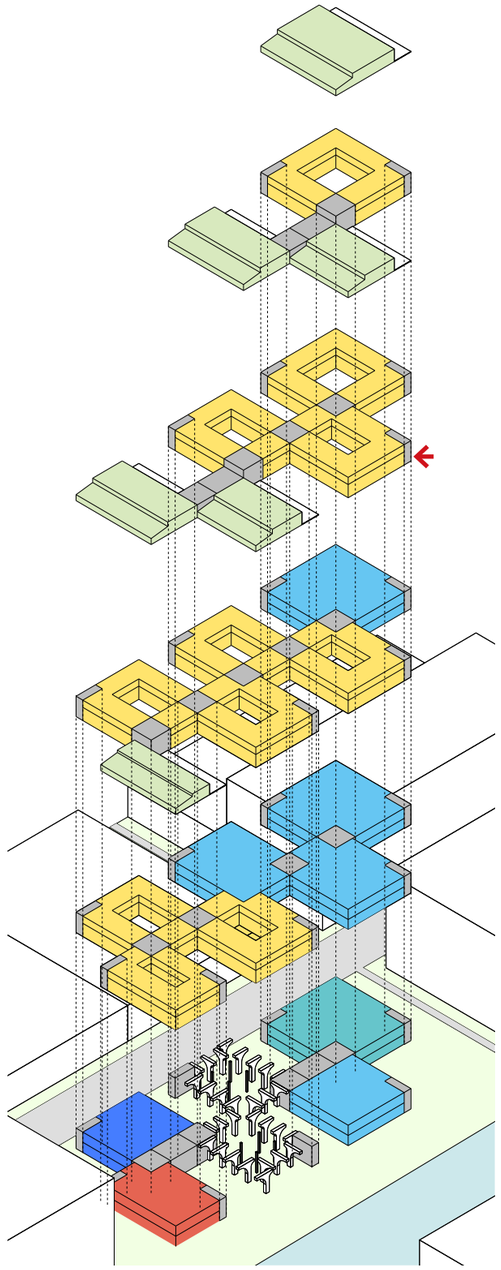
PLANS

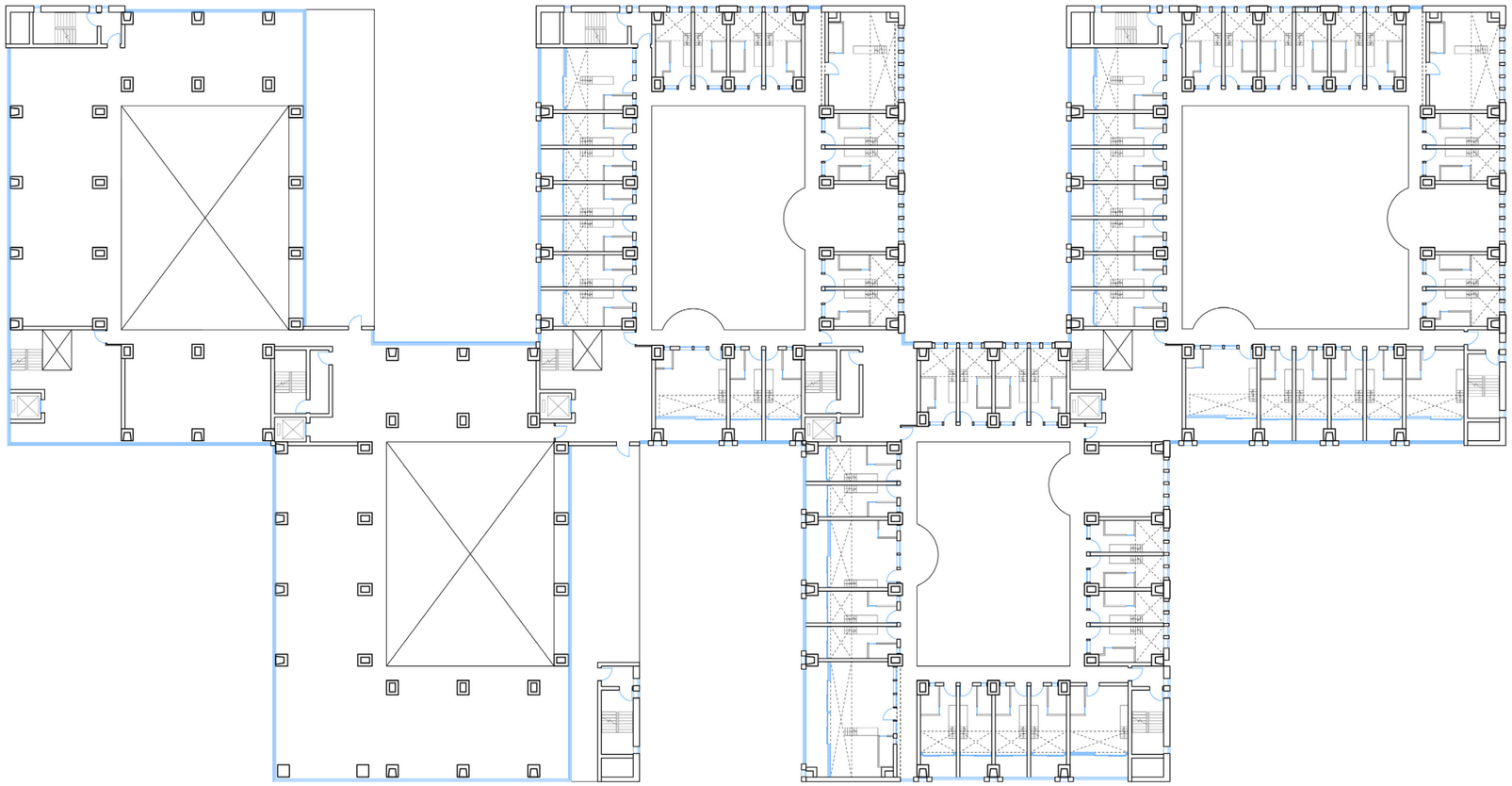




5F PLAN

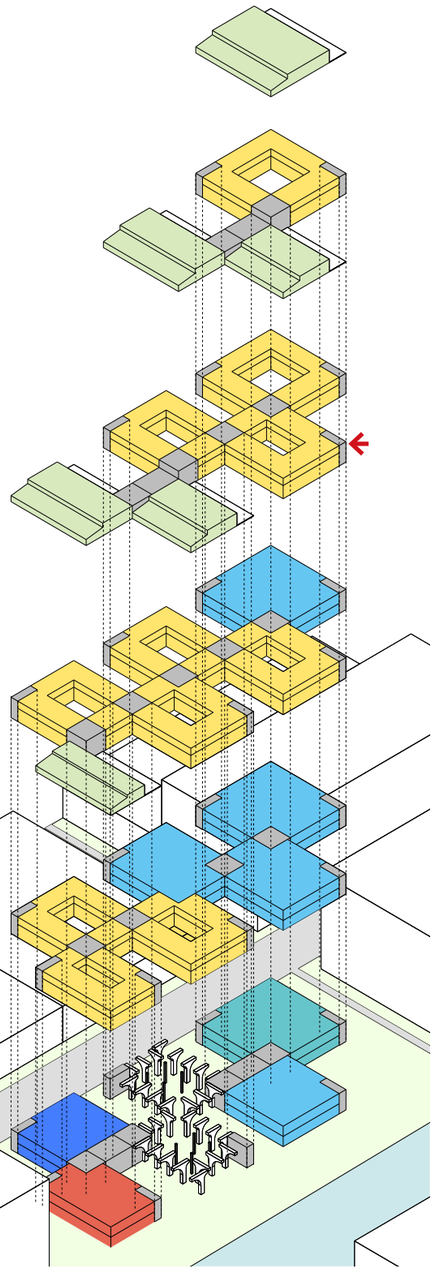
PLANS

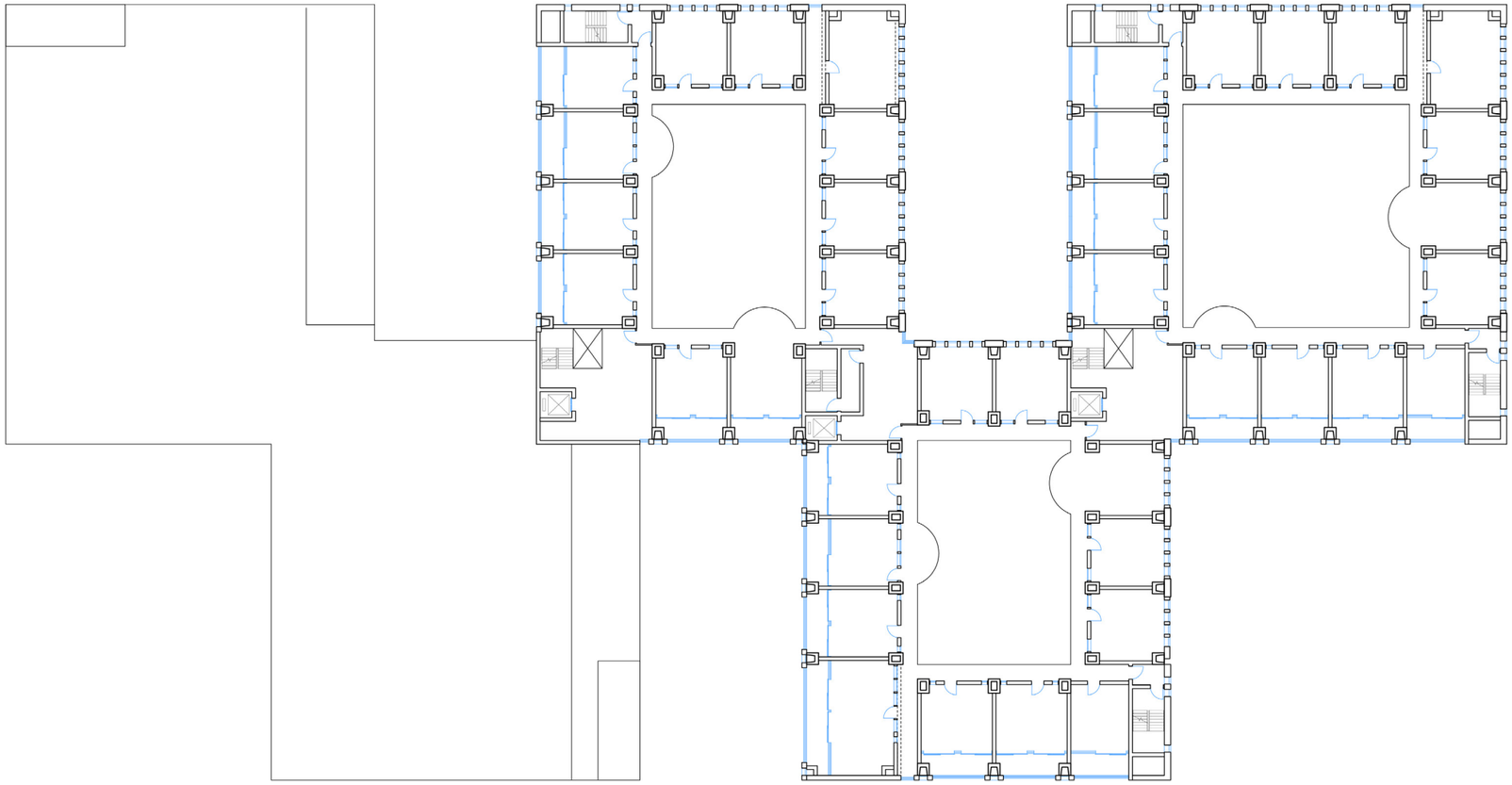




6F PLAN

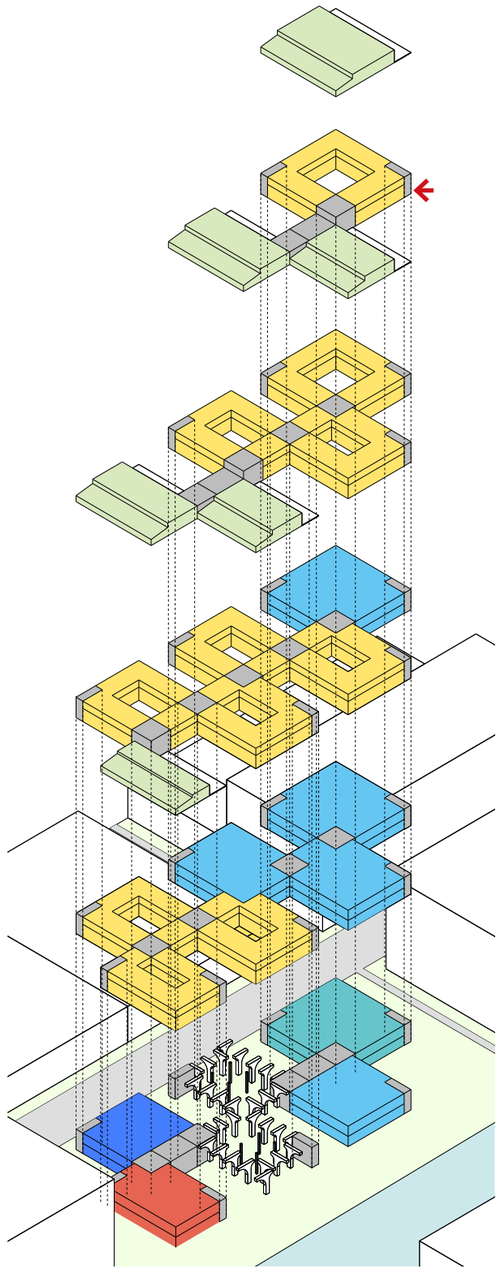
PLANS

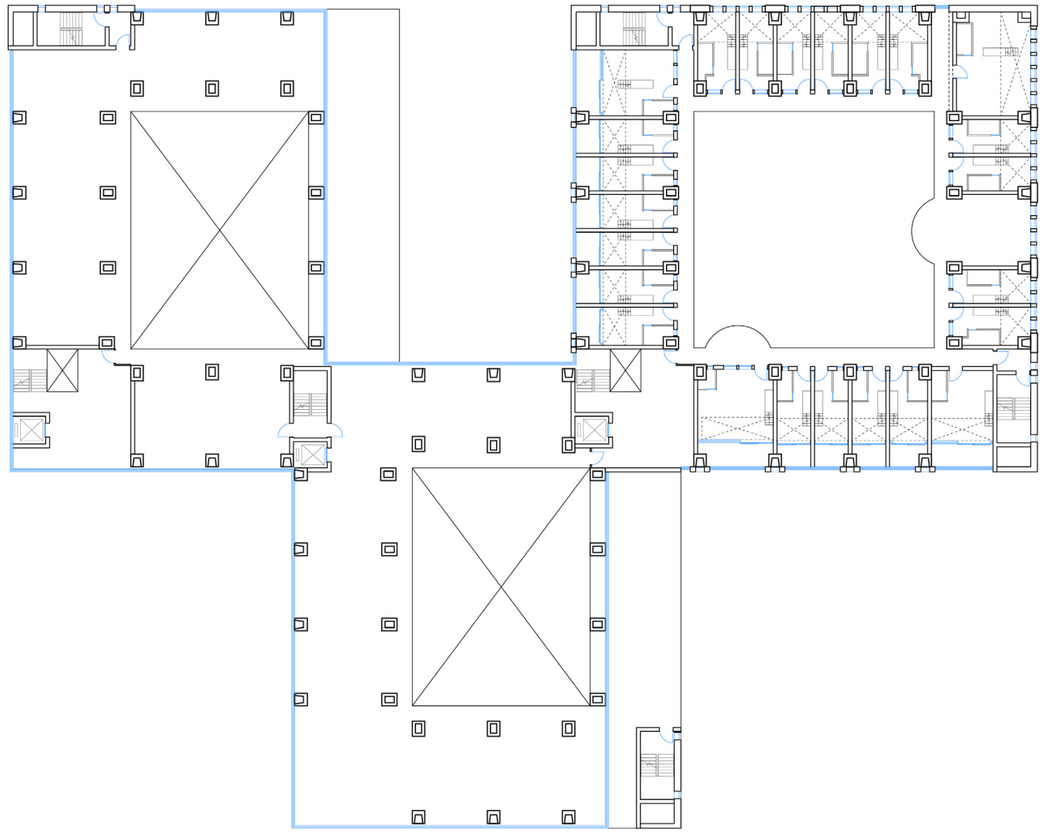




7F PLAN

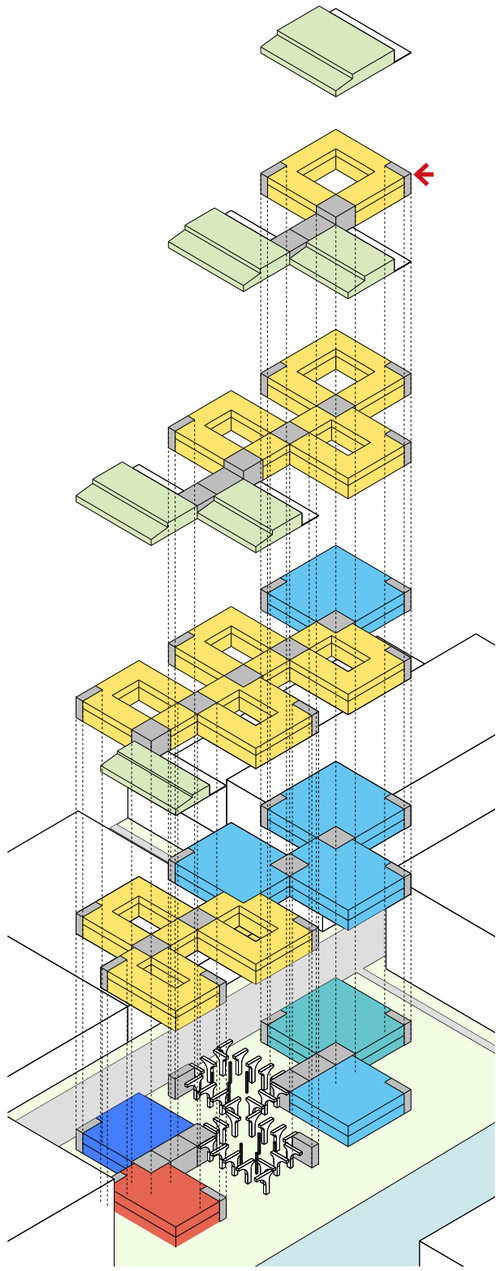
PLANS

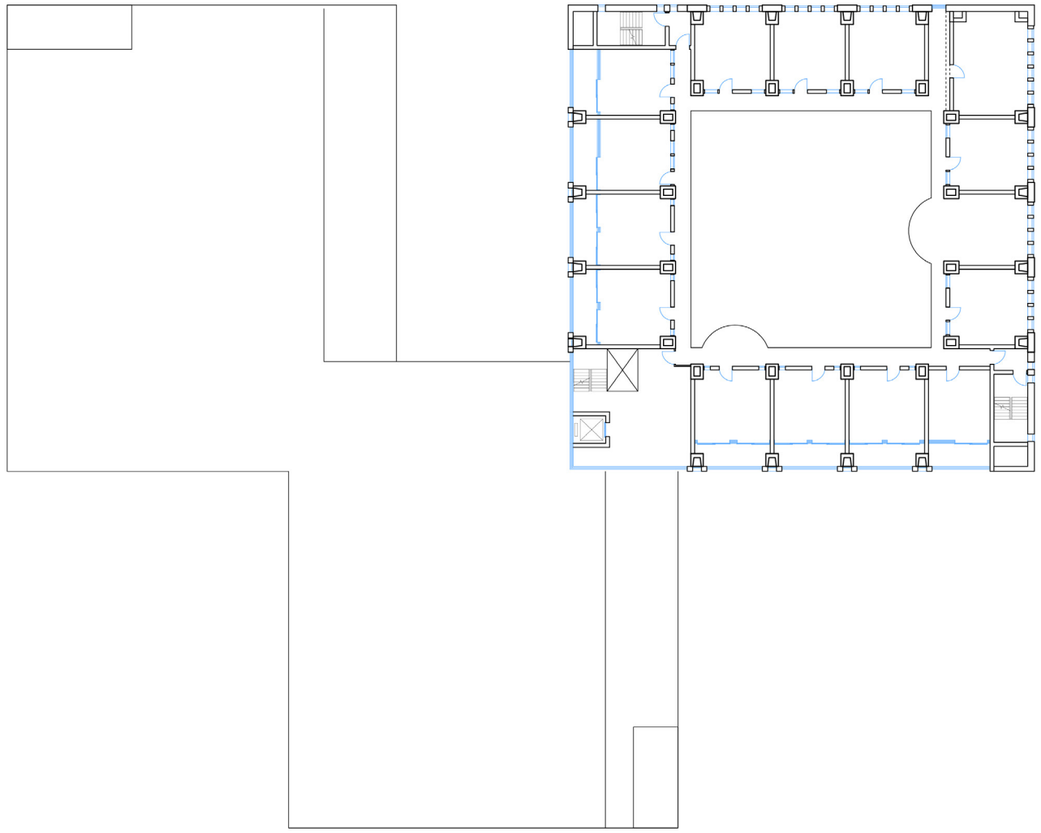




8F PLAN

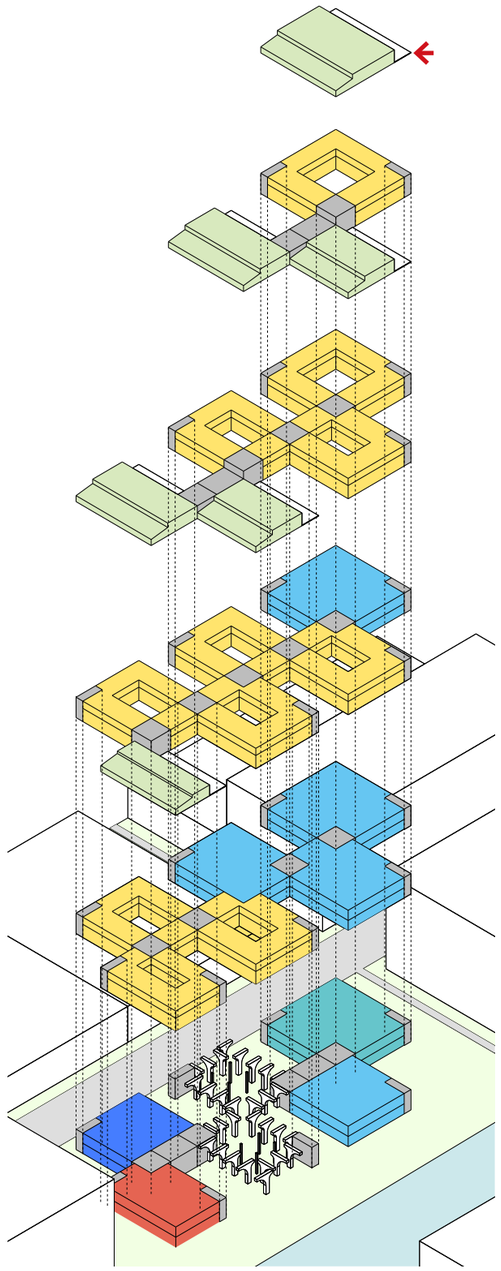
PLANS

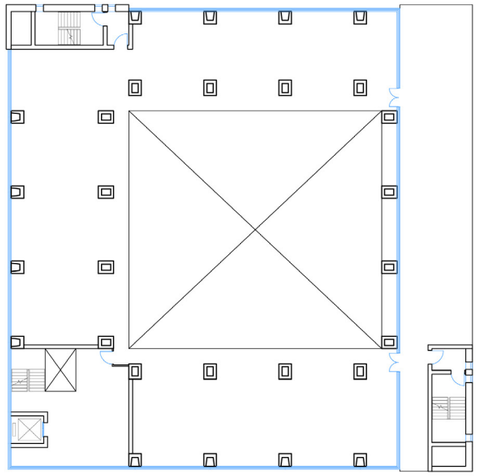




9F PLAN

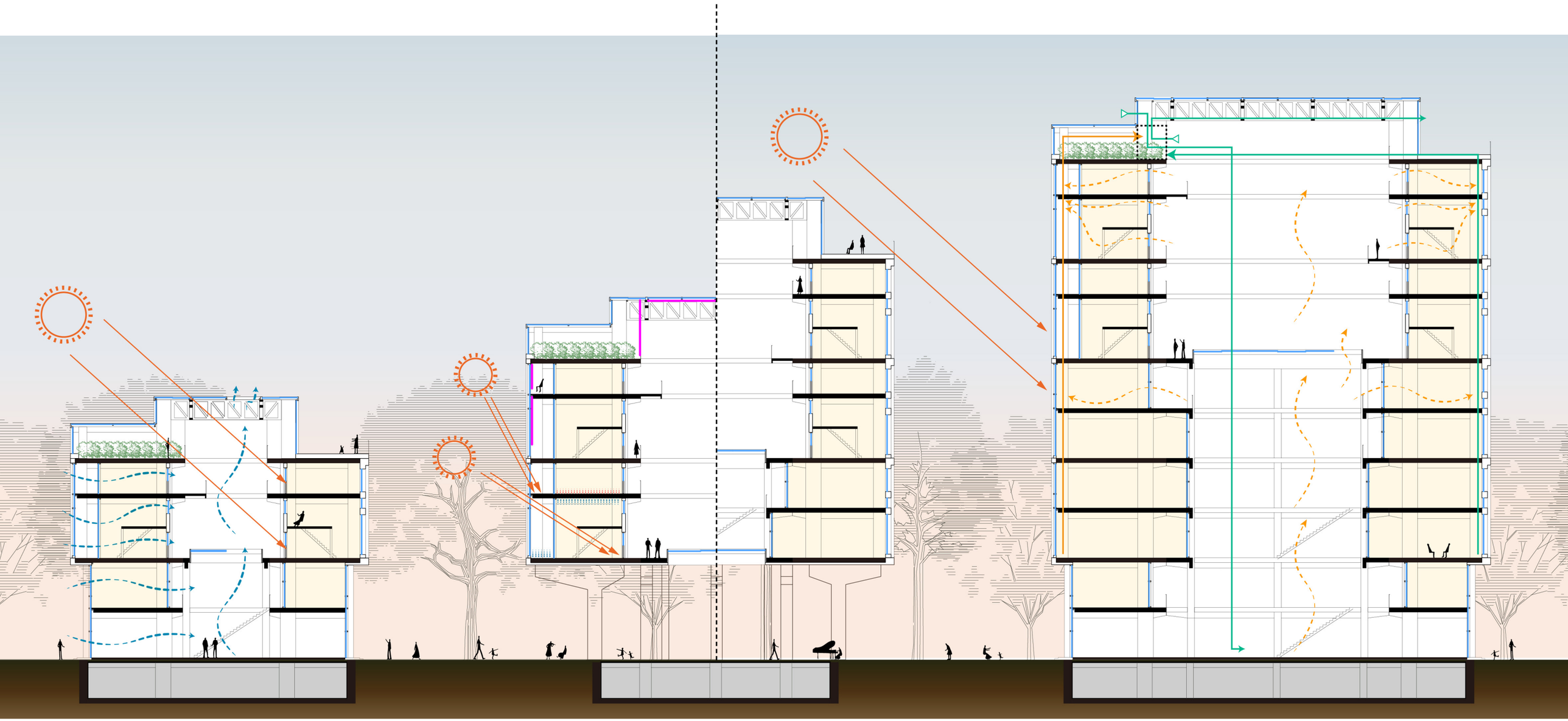
PLANS





10F PLAN

SECTION



NORTH FACADE

NORTH FACADE

SOUTH FACADE

SOUTHERN FACADE

SOUTHEAST FACADE

SOUTHEAST FACADE

SOUTHEAST FACADE

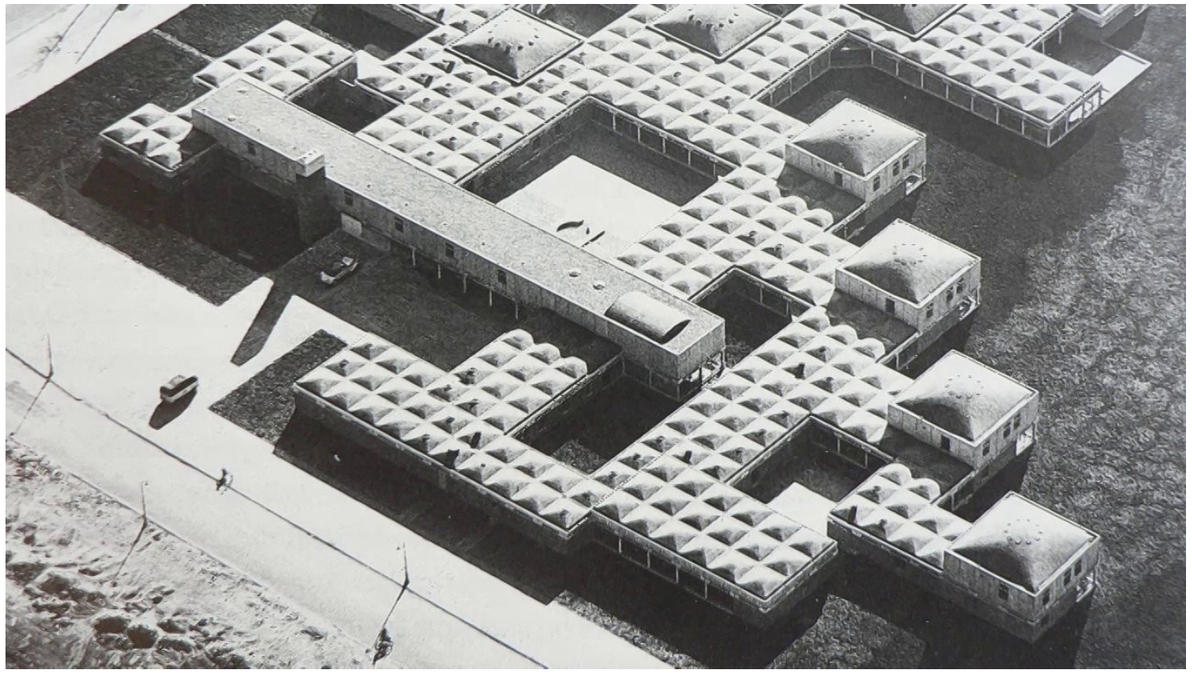
PERSPECTIVE

PERSPECTIVE

PERSPECTIVE

CONCLUSION

NEW INTERPRETATION OF STRUCTURALISM



Order means freedom.

Completed Flexiblility: interventions by the occupants, open to users.

To organise a building as a pattern of linked identical spatial units.

Draw people together.

CONCLUSION

Illusion of the industrial harbor

CONCLUSION

WHAT WE ACHIEVE

A community for young people to settle down in cities, where they can meet friends and enjoy a happy balanced life.

We provide living facilities with quality as well as possibilities for social life. There are big kitchens and living rooms for parties, a gym and restaurant for sports and food, roof gardens where you can plant your own fresh vegetables... There are both practical social space and quality living space. The community is a platform from where you can start your wonderful life.

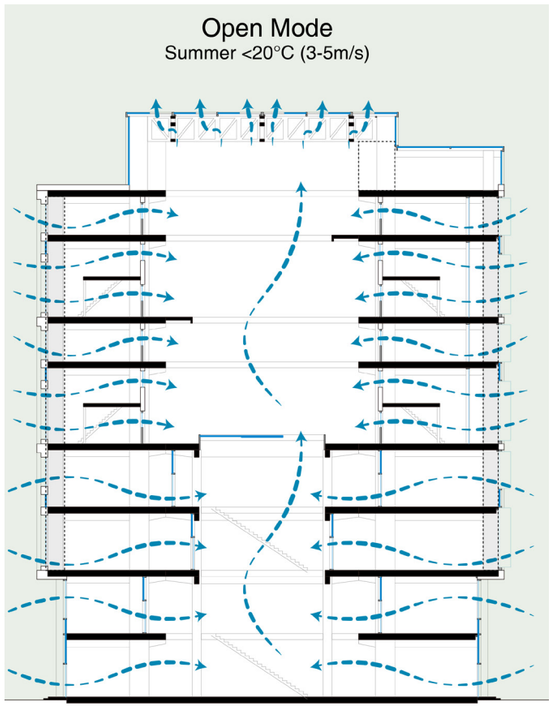
CONCLUSION

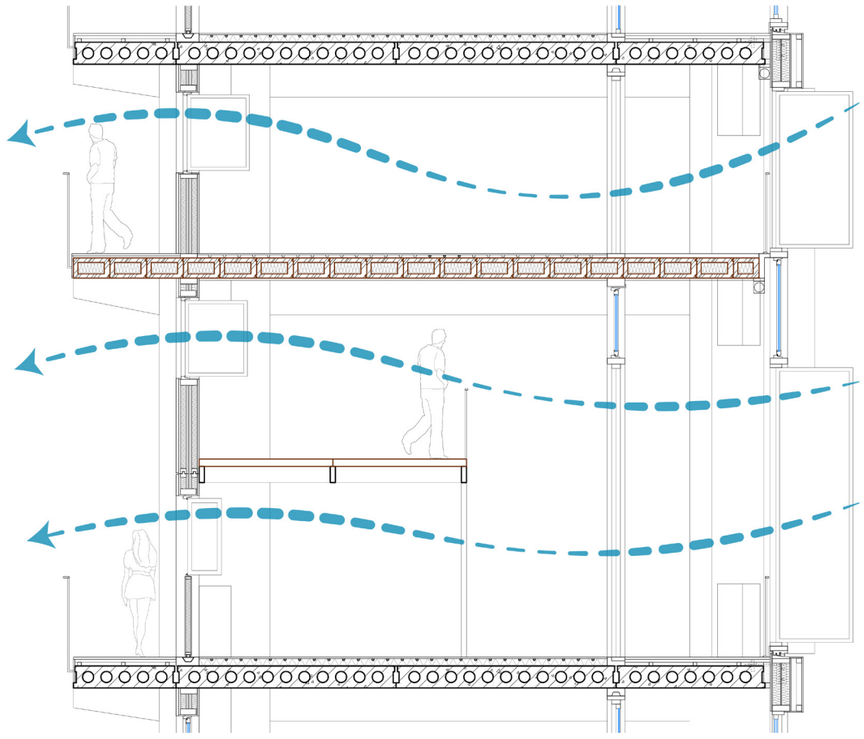
WHAT WE ACHIEVE

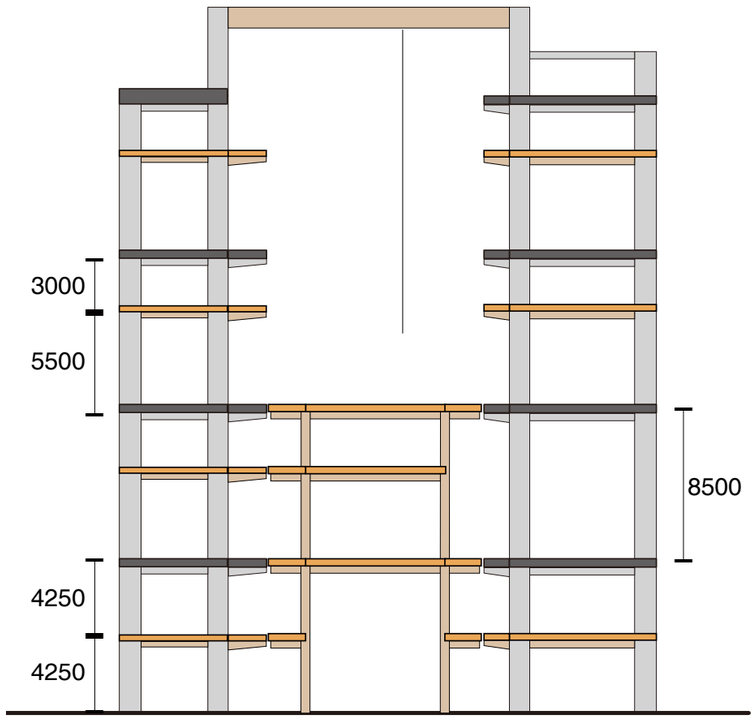
A natural controllable indoor climate and a flexible structure system.

The project achieves good integration of the architectural elements and the energy-efficient system. It advocates natural ventilation and using natural resources. Inhabitants are encouraged to control their own living environment based on their feelings and the advice of the system.

The concrete megastructure acts as the first layer to support the building. The infilling wooden elements create different spaces based on the function and they can be moved to a new position if the function changed. The flexible structure system provides small spaces for living as well as big spaces for social events and working.







CONCLUSION

ECONOMIC SCENARIO

The building is owned by one company. They provide rental housing to young people as starters and rent working space to company agency or freelancers. The rental contract is at least 6 month to maintain the stability of the community.

The company can provide similar working and living community at different locations and different cities. The service of rental living and working space can become a membership for young people, so they can work and live around the world and easily settle down anywhere.

The Farm

New York City

Weserland

Berlin

werqwise

San Francisco

Margot House

Barcelona

BUREAU

Washington, D.C.