



Healthy Aging

**design as a tool supporting prevention of
modern diseases among middle-aged people**

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my first bicycle moments



cycling on TU Delft campus



"Cycling in Holland can be Holland"
(Foto: Thomas Zwart)

bicycle courier



"deliveroo rider speeding hot food to another hungry customer"

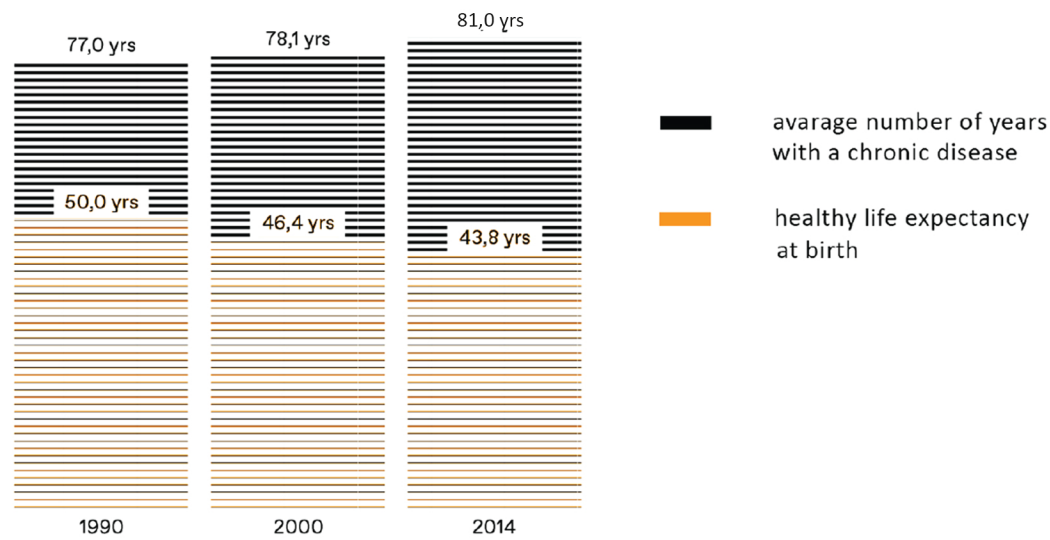
1 million households



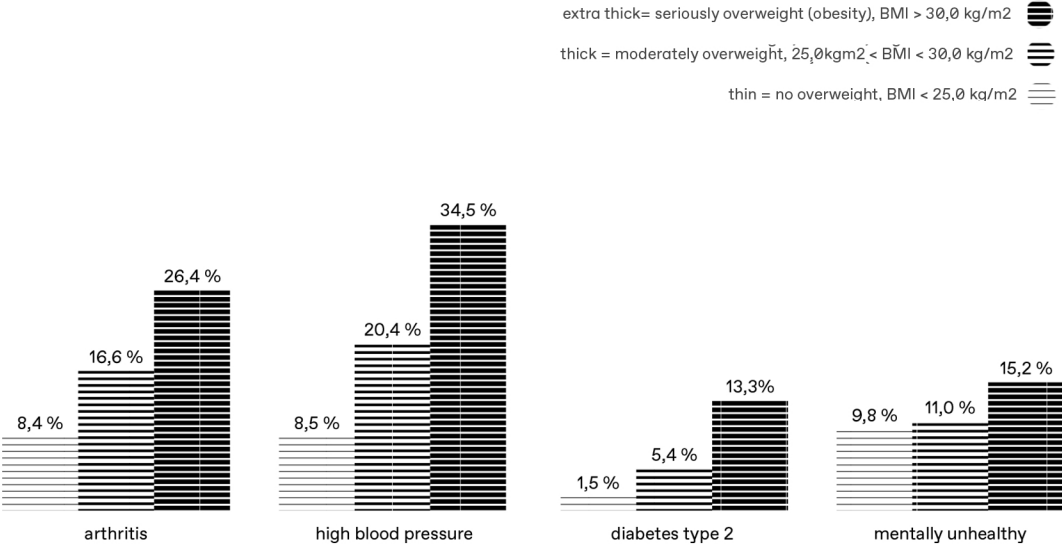
*The Nieuwe Mass River
and Mervehaven from
bird-eye view*

What are the suitable dwellings for the changing population of the next decade(s)?

life expectancy and chronic diseases

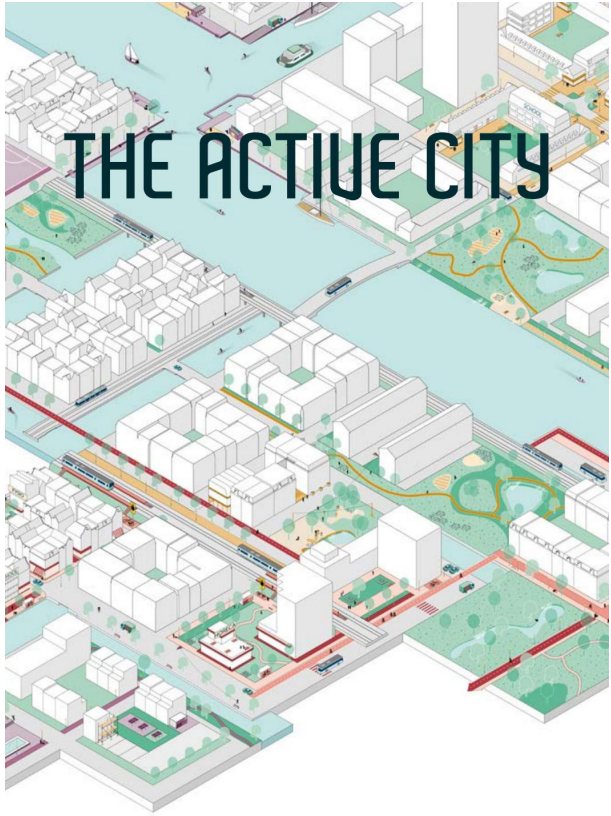


Change in life expectancy and healthy life expectancy in Netherlands over the last 30 years



Relation between being overweight and having a chronic disease







design strategies encouraging physical activity



Which spatial characteristics of a dwelling can improve the physical and psychological health of middle-aged inhabitants?

Presence of BETA Office principles:





1. NEIGHBOURHOOD CONNECTIONS

-  variety and continuity around the building encourage physical activity
-  multiple entrances and transparency activate public space
-  well integrated entrances generate movement between interior and exterior
-  canopies and awnings provide shelter
-  stairs and ramps act as a buffer between private and public space
-  destinations in public space encourage physical activity













2. ROUTES

-  unique stair configuration invite use
-  stairs on the main routes are more likely to be used
-  stairs near the elevator are more likely to be used
-  stairs near the entrance are more likely to be used
-  interior and exterior views are rewarding
-  combining routes and destinations create experience
-  horizontal variation enhances experience
-  stairs with lower inclination are easier to climb
-  wide stairs are more appealing
-  hidden elevators are less likely to use
-  curiosity evokes movement
-  natural ventilation makes welcome change
-  well-lit stair environment is safer and more inviting
-  a programmed elevator makes climbing stairs
-  high-quality materials last longer
-  make stairs as appealing as adjacent area
-  senses ask to be stimulated
-  signage encourages physical activity
-  visible stair environment stimulate use
-  daylight attracts

3. ACTIVITY PROGRAMME

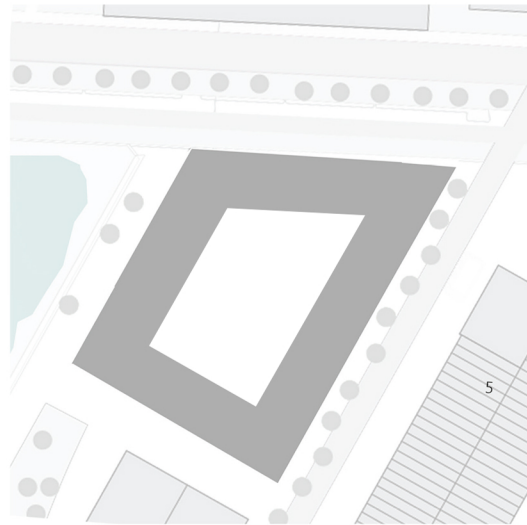
-  active furniture promotes health
-  activity spaces encourage physical activity
-  exercise equipment prompts physical activity
-  visible activity spaces with a view are more frequently used
-  broadly oriented activity spaces are more frequently used
-  bicycle parking encourage activity use
-  changing rooms and showers encourage activity use
-  storage encourages sports

4. DESTINATIONS

-  a variety of models makes people move
-  social hubs attract
-  drinking fountains encourage short breaks
-  centralization benefits activity and environment
-  keep distances reasonable and practical
-  collective spaces attract
-  grouping auxiliary functions generates social contact
-  dispersal of auxiliary functions prompt movement
-  communal outdoor spaces form a destination
-  entrance functions on alternate floors prompt movement
-  combining destinations and routes encourages movement
-  placing of frequently used functions at a distance

Merve 4 Havens

masterplan

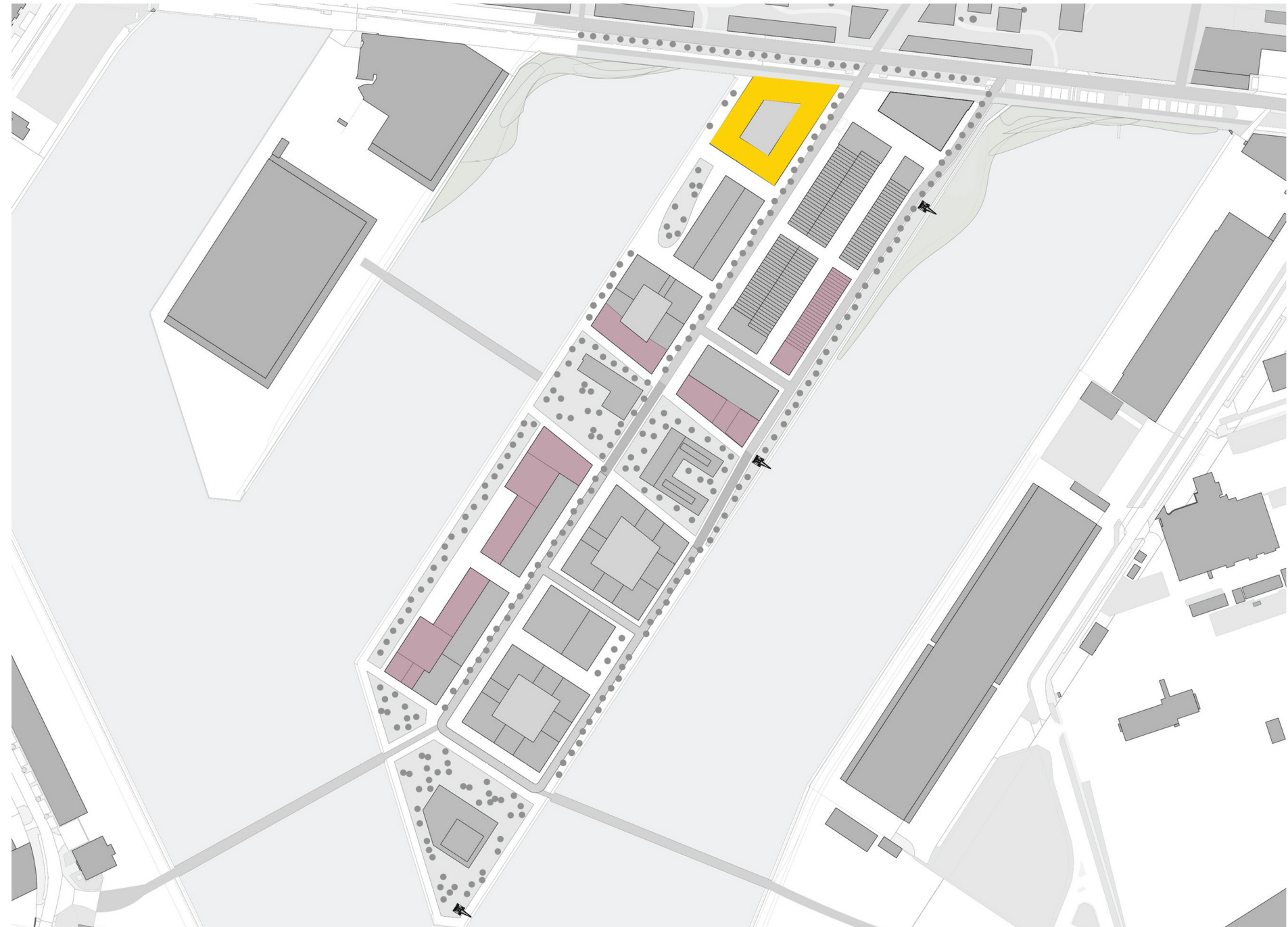


52 m x 72 m x 72 m x 80 m



The Marconistraat along the dyke

4 N

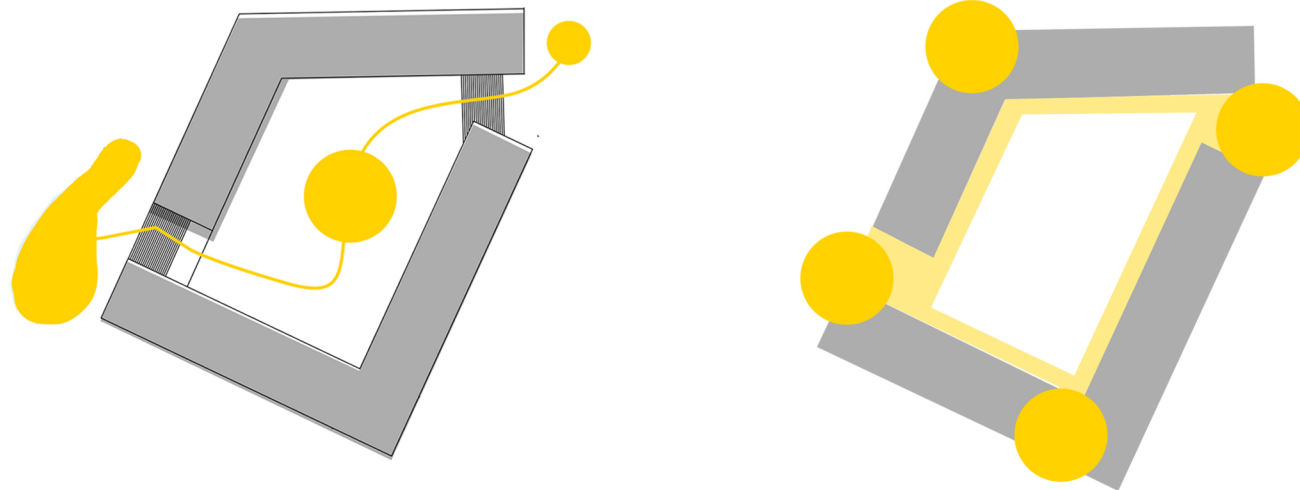


Forming the Volume

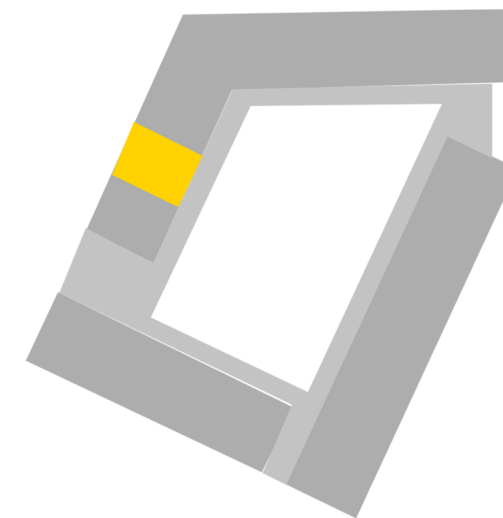
1. creating large scale routes



2. creating medium scale routes



3. creating small scale routes





Urban Context

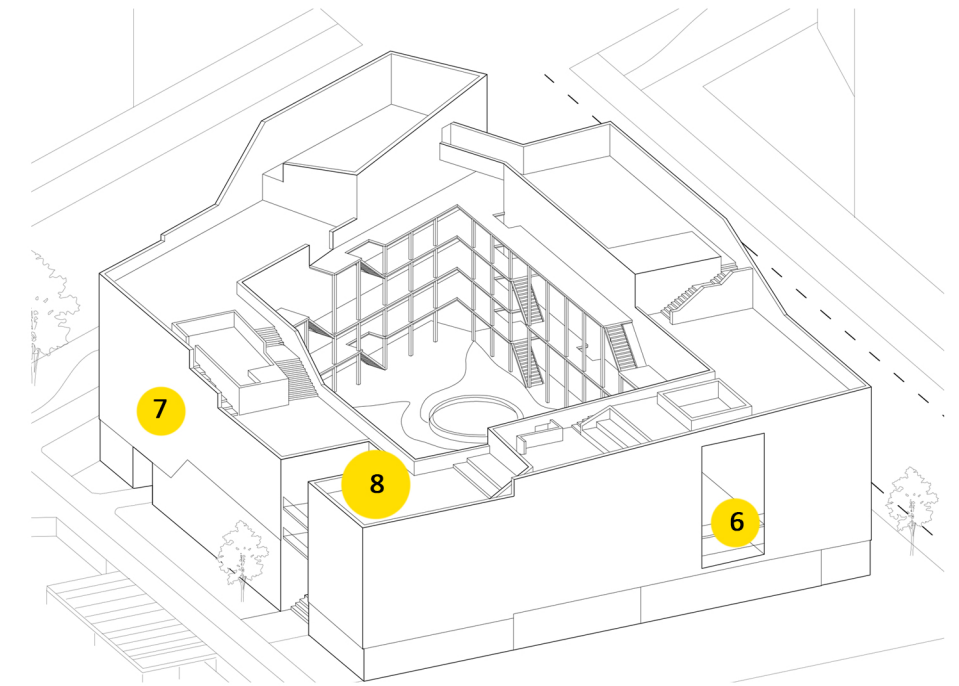
scale 1:500



51°54'46.1"N 4°24'56.7"E



Connections with the neighbourhood



points of interest for the public:

- 1 Fruithaven Square
- 2 Stairs to the courtyard
- 3 Entrance Hall
- 4 Skatepark
- 5 Timber Pier

eyes on the stret:

- 6 Gallery with a view
- 7 Balconies
- 8 Roofs

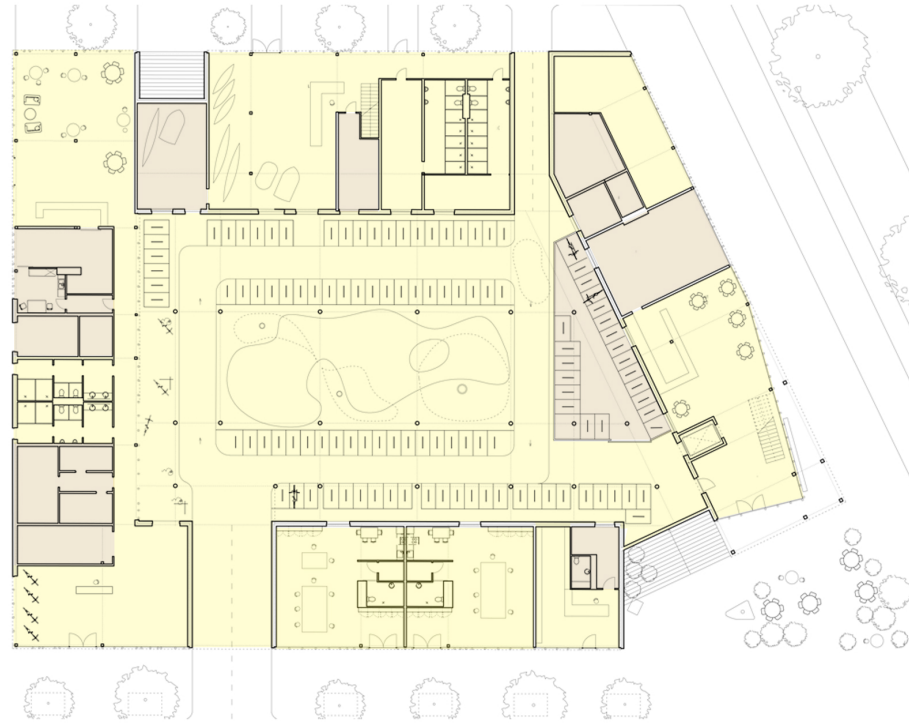
9 *facade detail*

services:

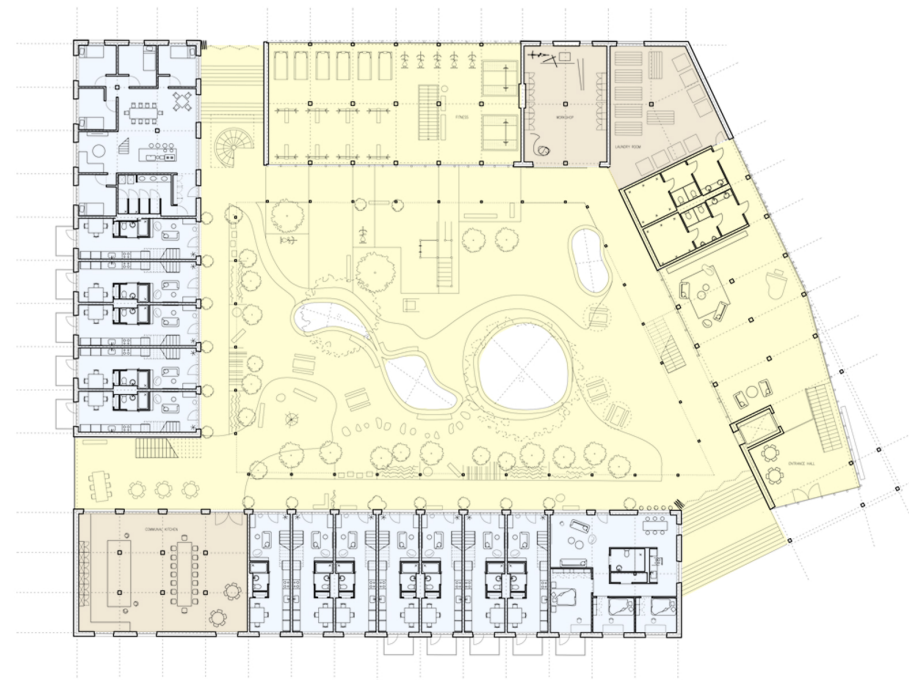
- 11 Newsagent
- 12 Offices
- 13 Bicycle Service
- 14 Bicycle Cafe
- 15 Gym
- 16 Electronic Store

Accessibility

Floor 0, Street Level



Floor 1, The Courtyard



day

public



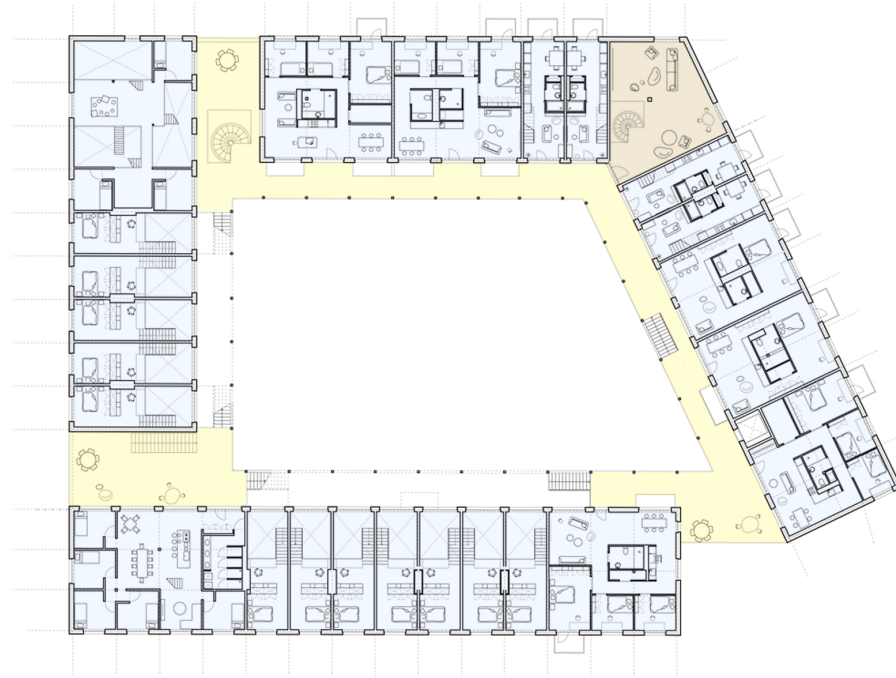
semi-public



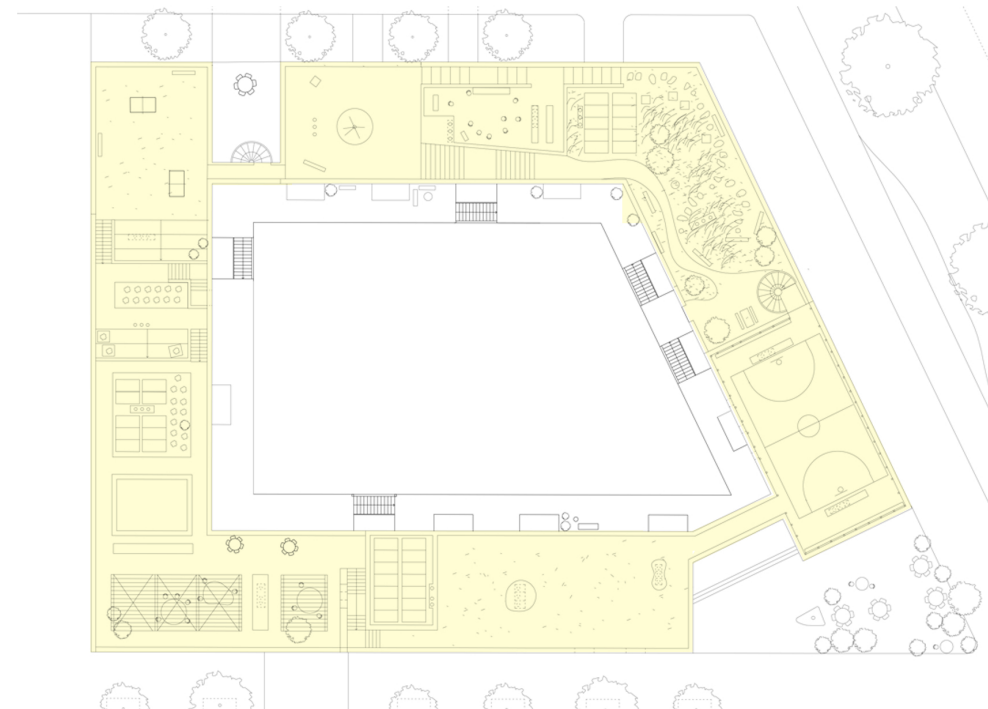
private



Floor 2

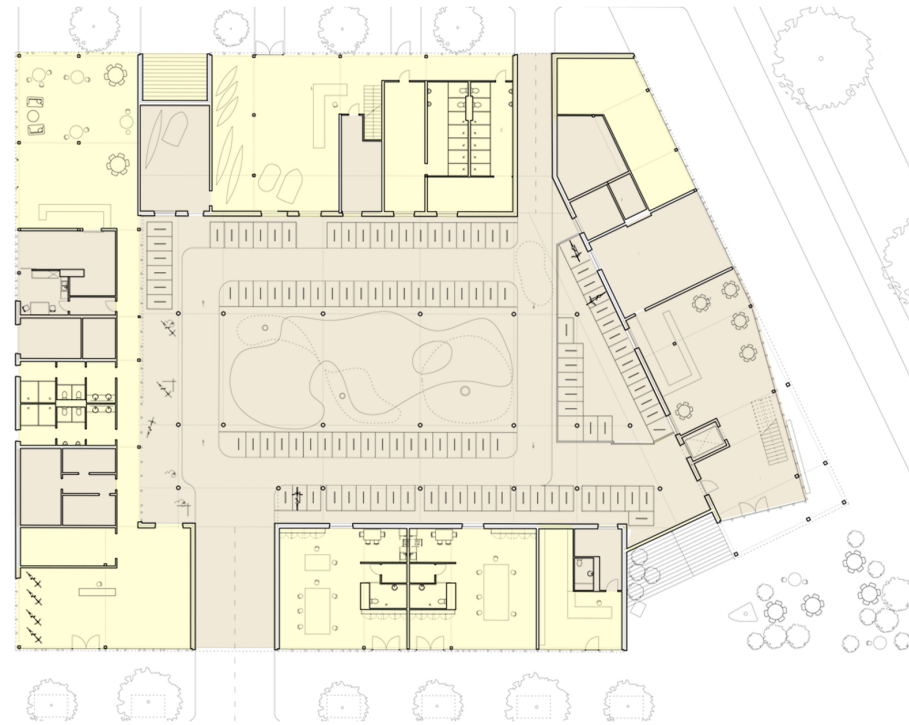


Floor 6, The Roof

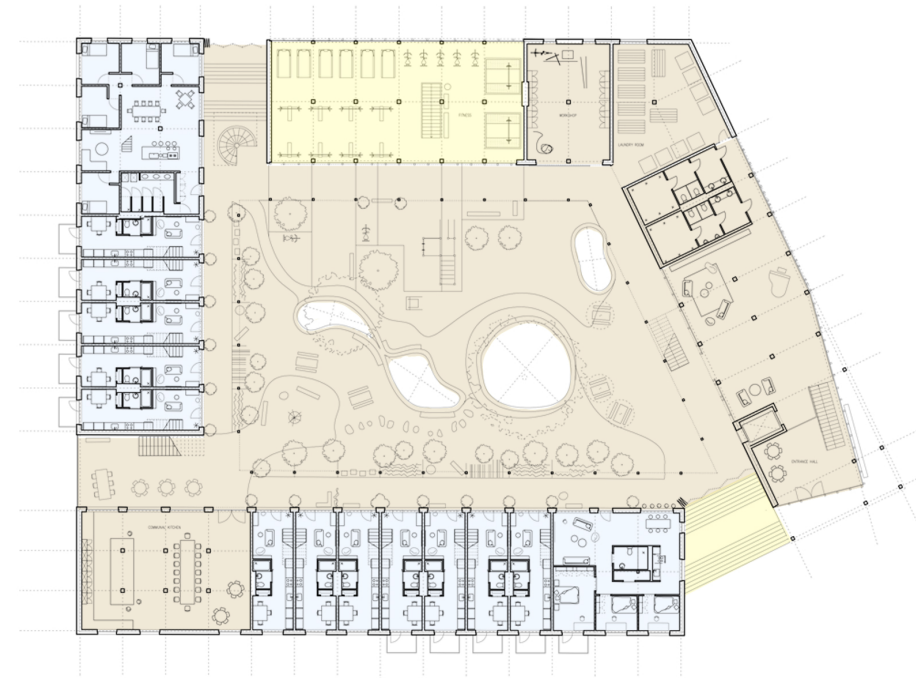


Accessibility

Floor 0, Street Level



Floor 1, Courtyard



night

public



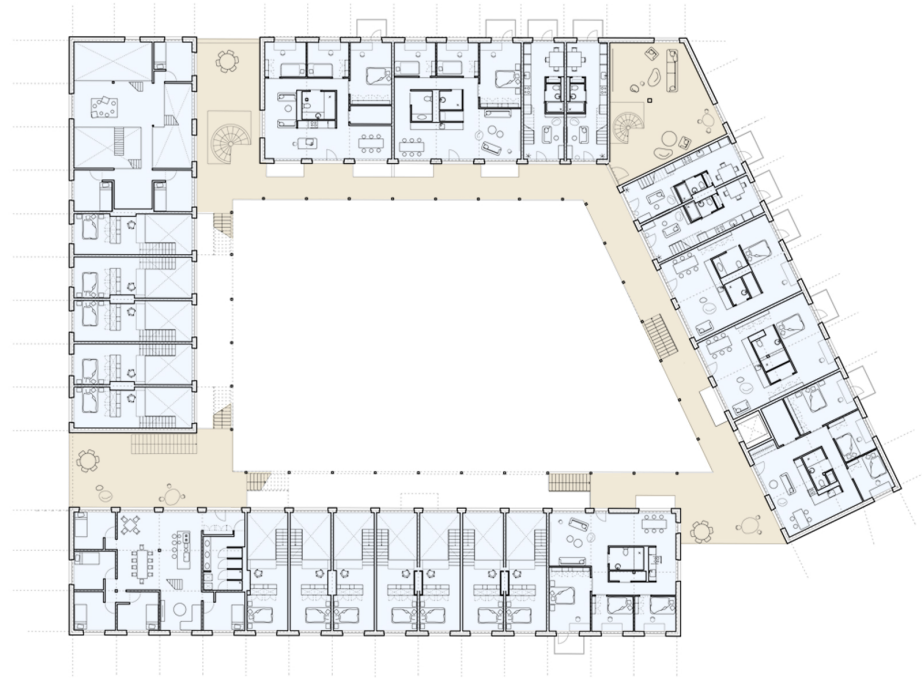
semi-public



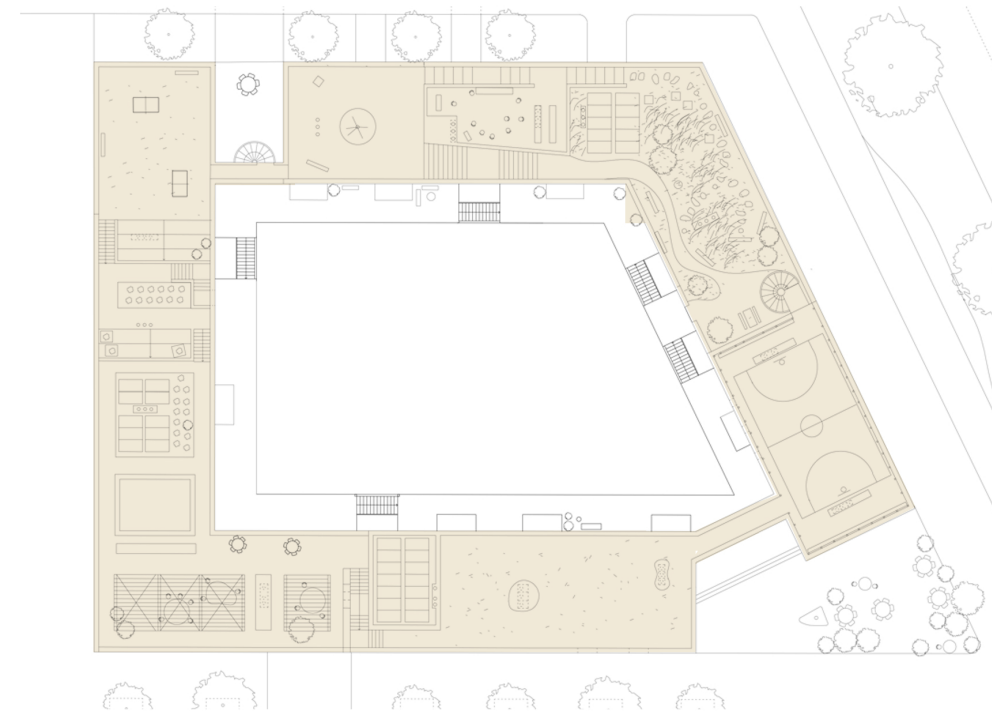
private



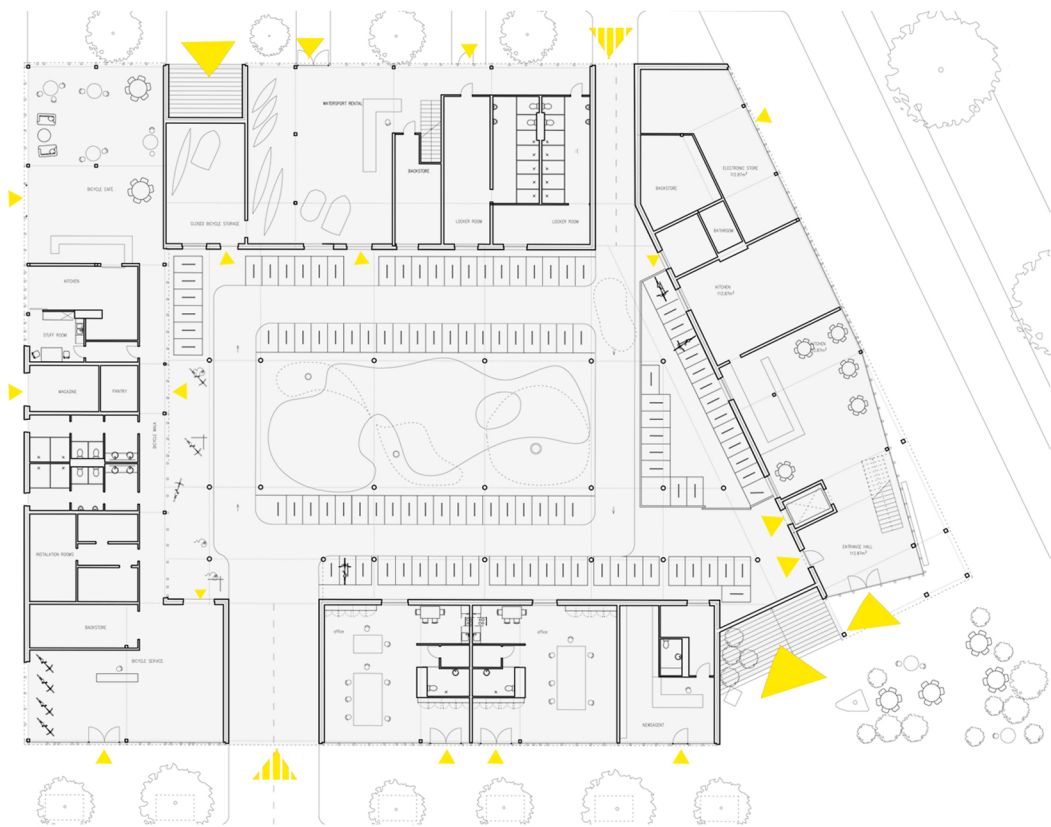
Floor 2



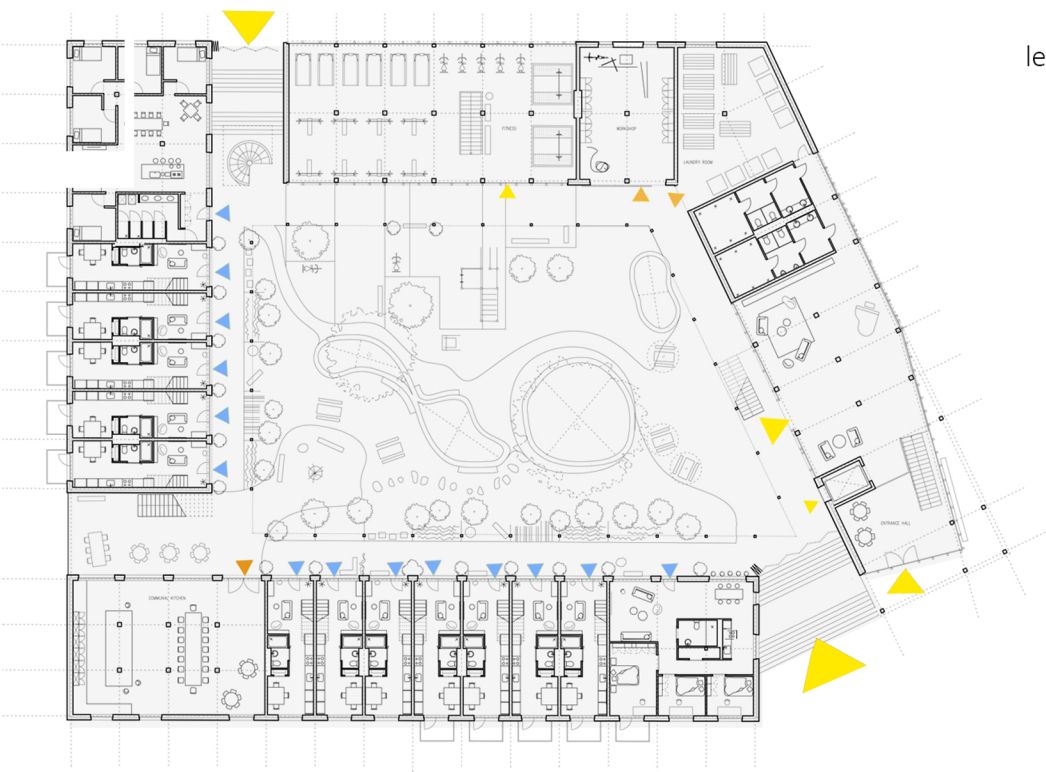
Floor 6, Roof





Entrances





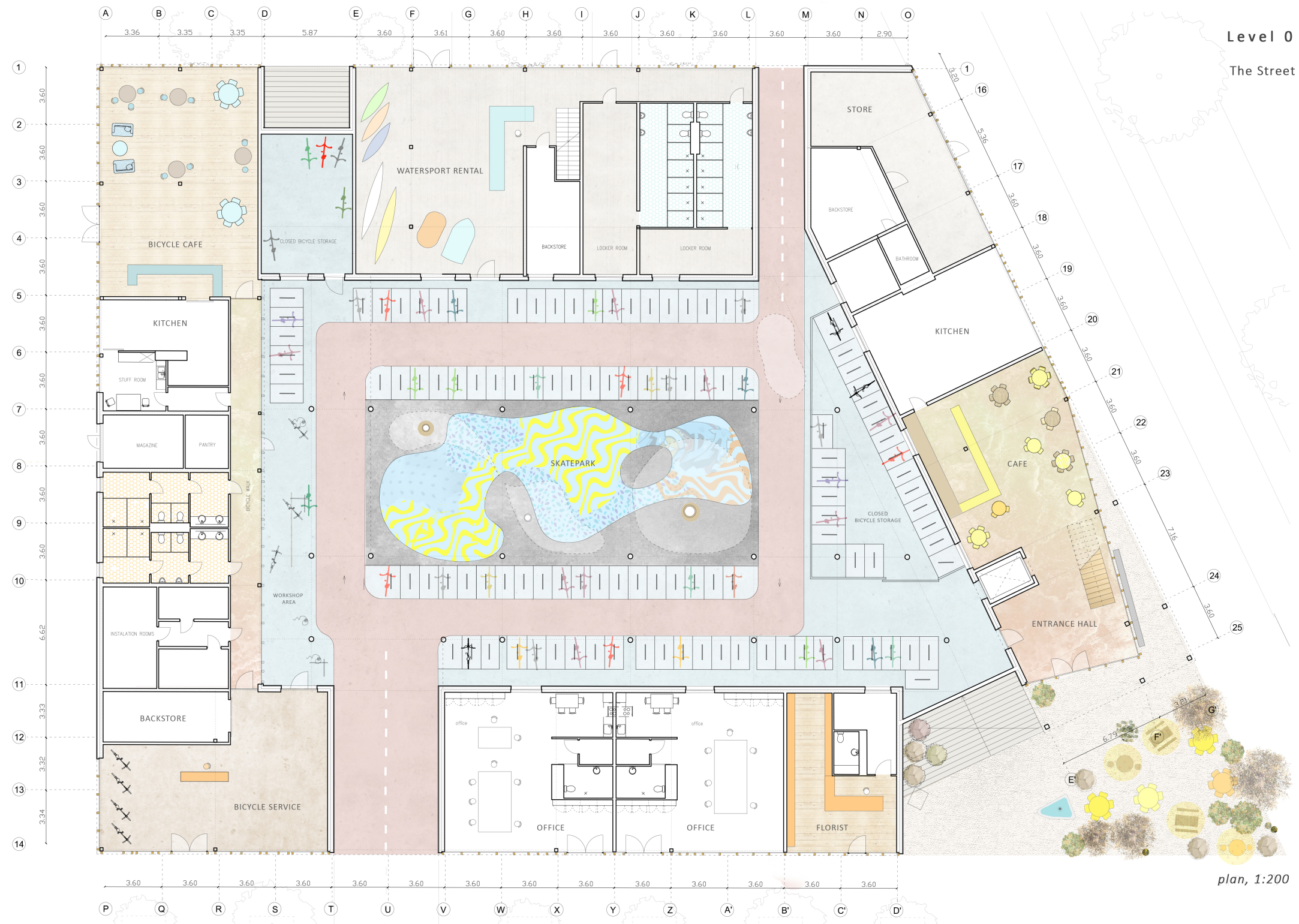
level 0



level 1

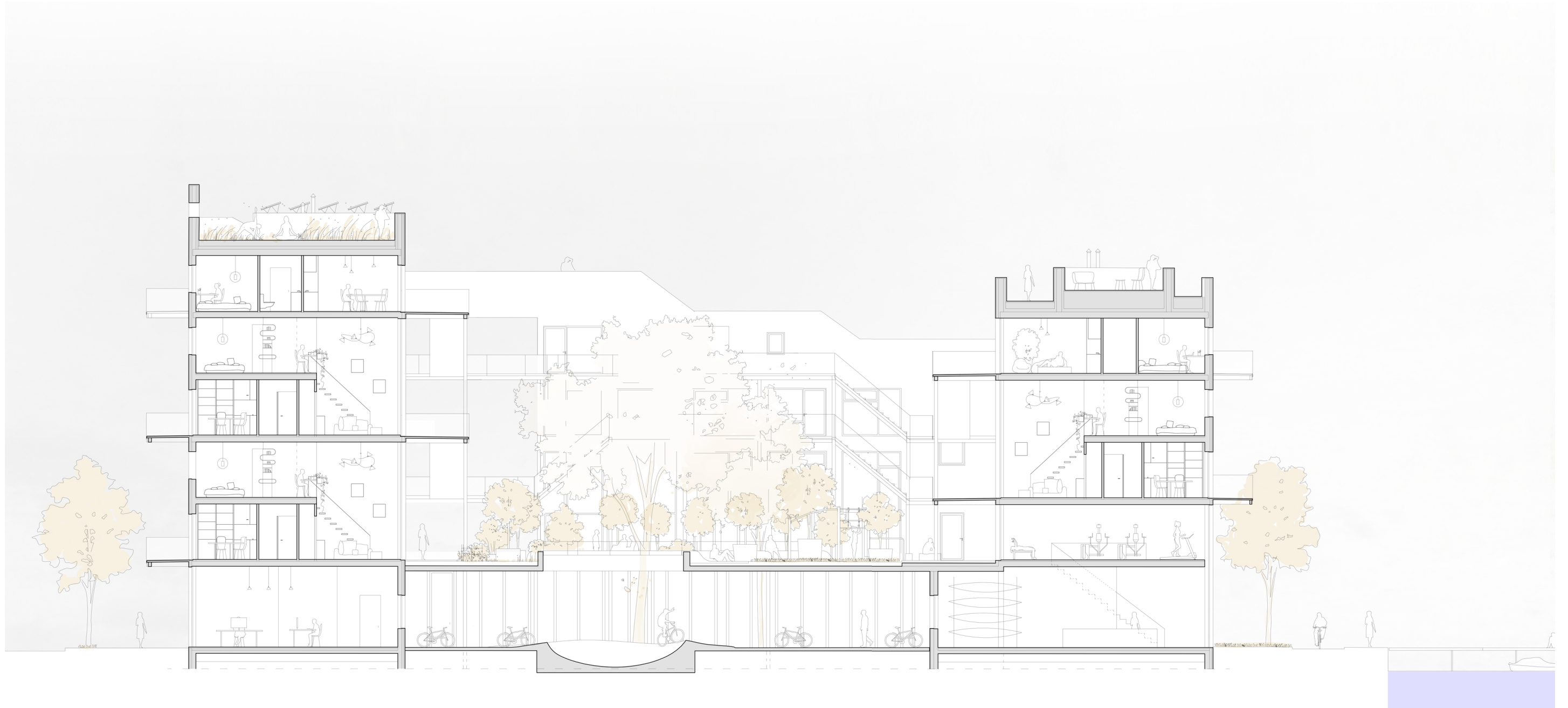
-  public entrance
-  public entrance for bicycles

-  semi+public entrances
-  private entrances

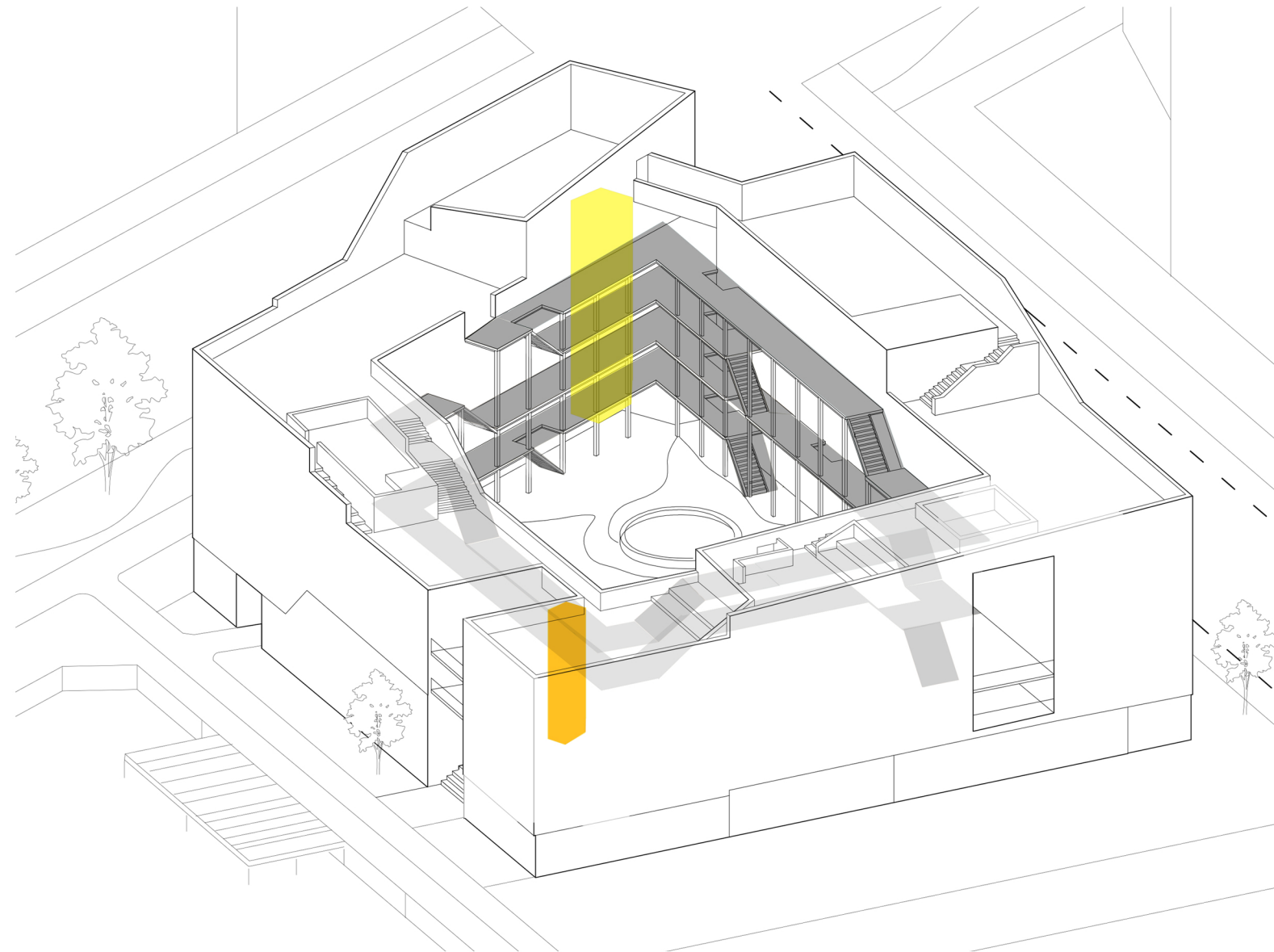


Section AA

scale 1:200

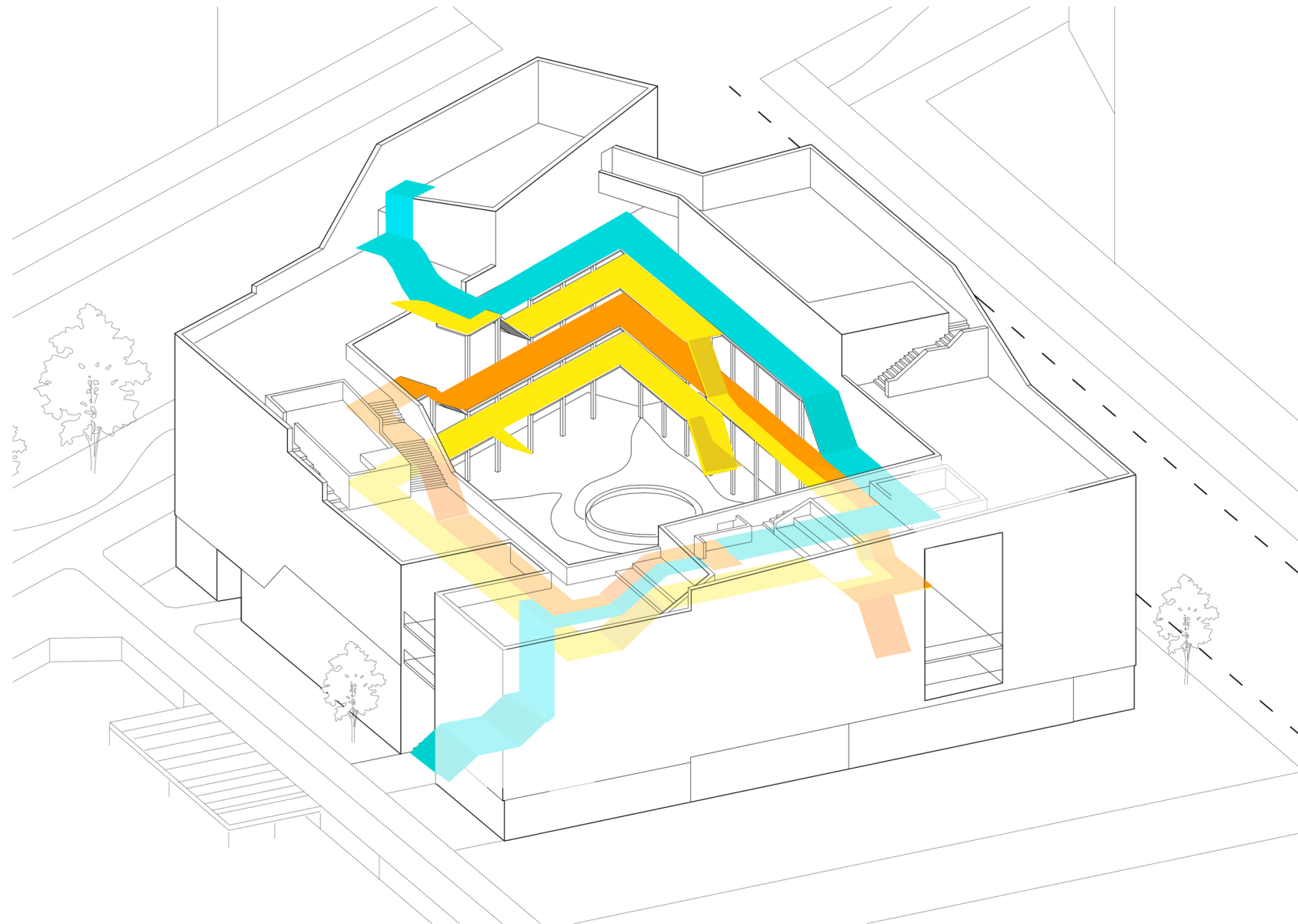


Circulation



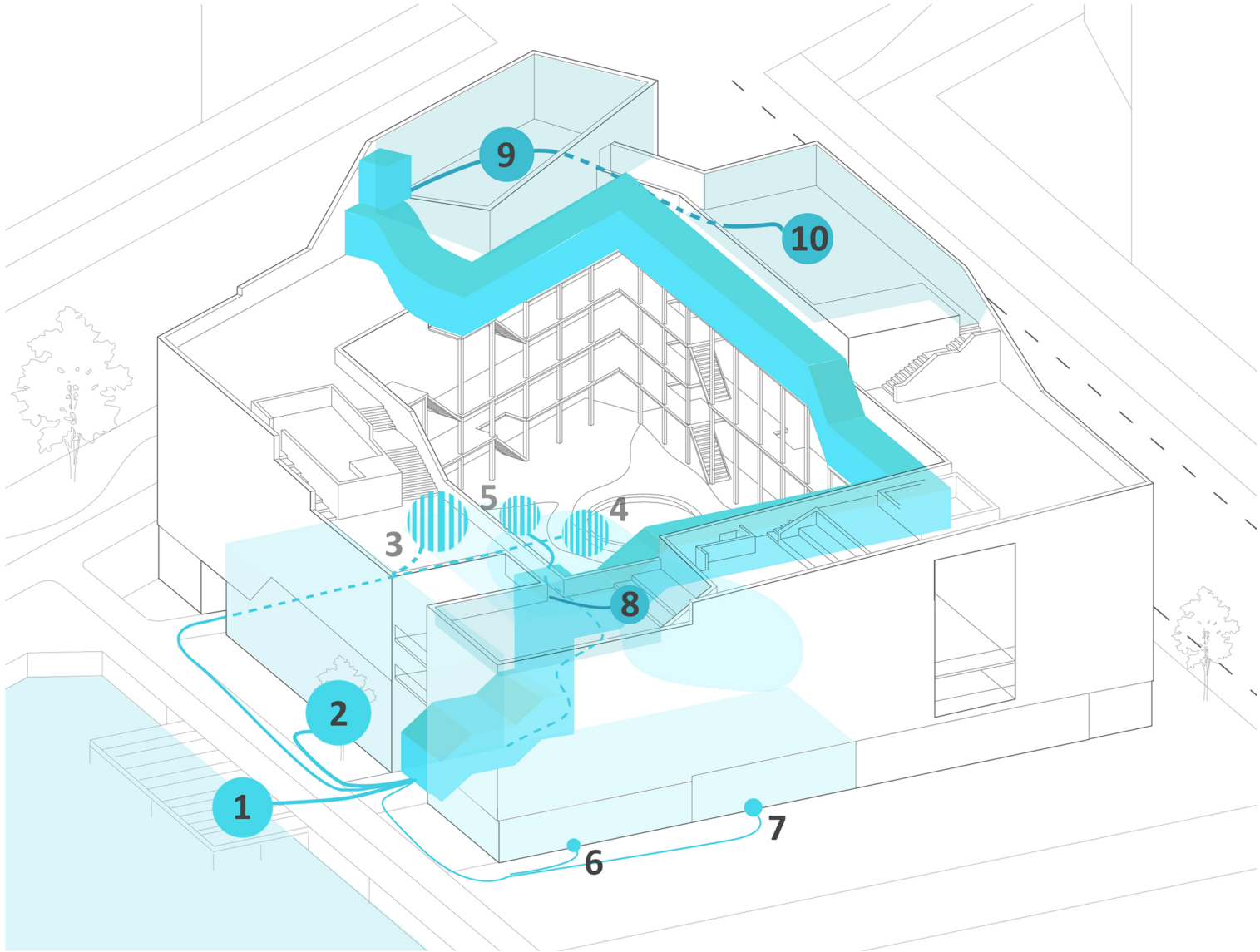
- gallery
- lift
- staircase

Medium Scale Routes



Routes and Destinations

*medium scale
routes*

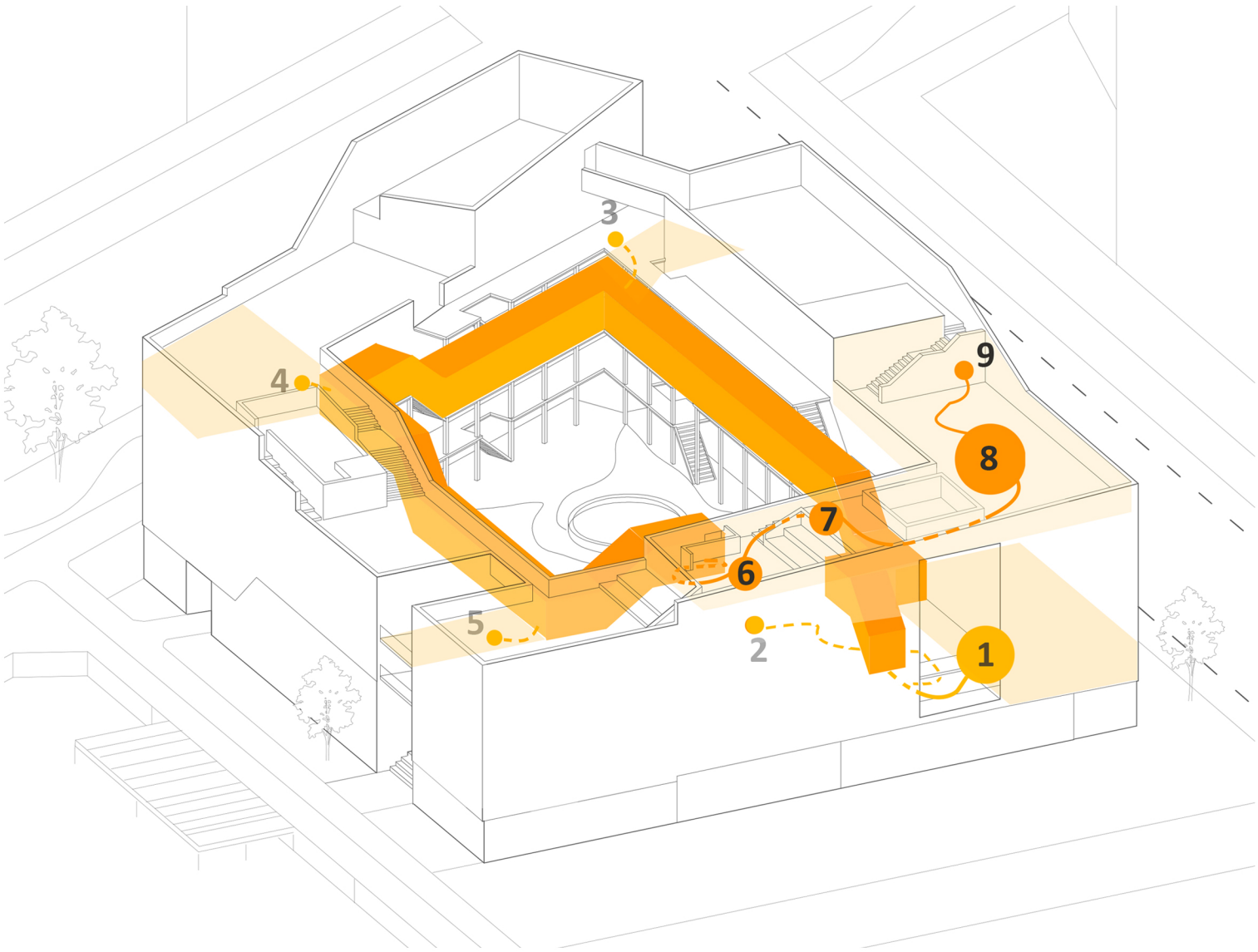


Sport Route

- 1 Pier – boating, fishing, kayaking, and more
- 2 Fitness
- 3 Bicycle Parking and Storage in the Basement
- 4 Small Skatepark in the Basement
- 5 Outdoor Gym in the Courtyard
- 6 Bicycle Cafe
- 7 Bicycle Service
- 8 Table Tennis Roof
- 9 Multisports Court
- 10 Yoga Roof

Routes and Destinations

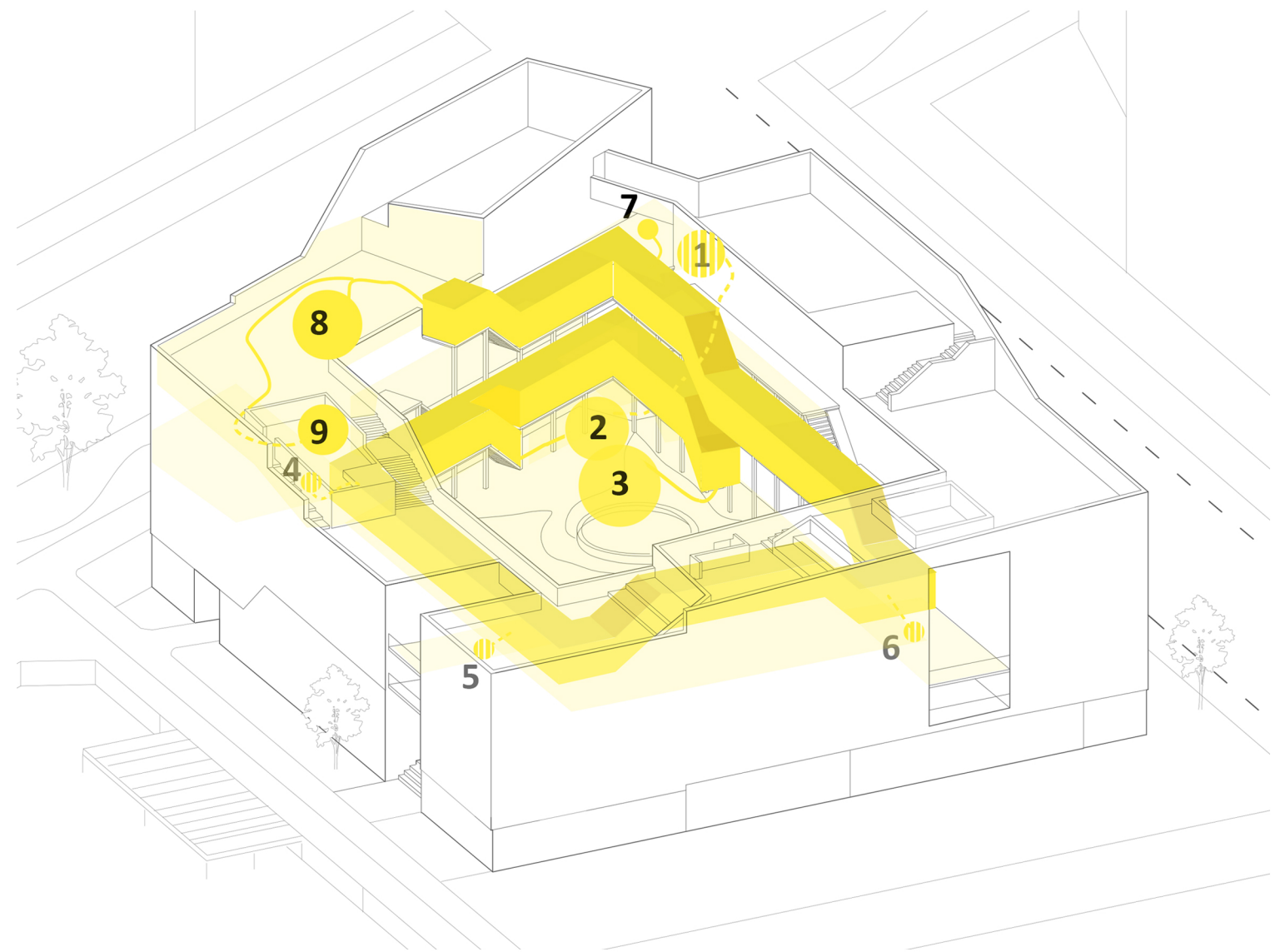
medium scale routes



Cooking Route

- 1 Communal Kitchen
- 2 Tables at the Courtyard
- 3 Table Corner on the Gallery
- 4 Lounge Room
- 5 Table Corner on the Gallery
- 6 Vegatable Patches
- 7 Vegatable Patches
- 8 Barbeque Roof
- 9 Barbeque and Kitchen Equipment Room

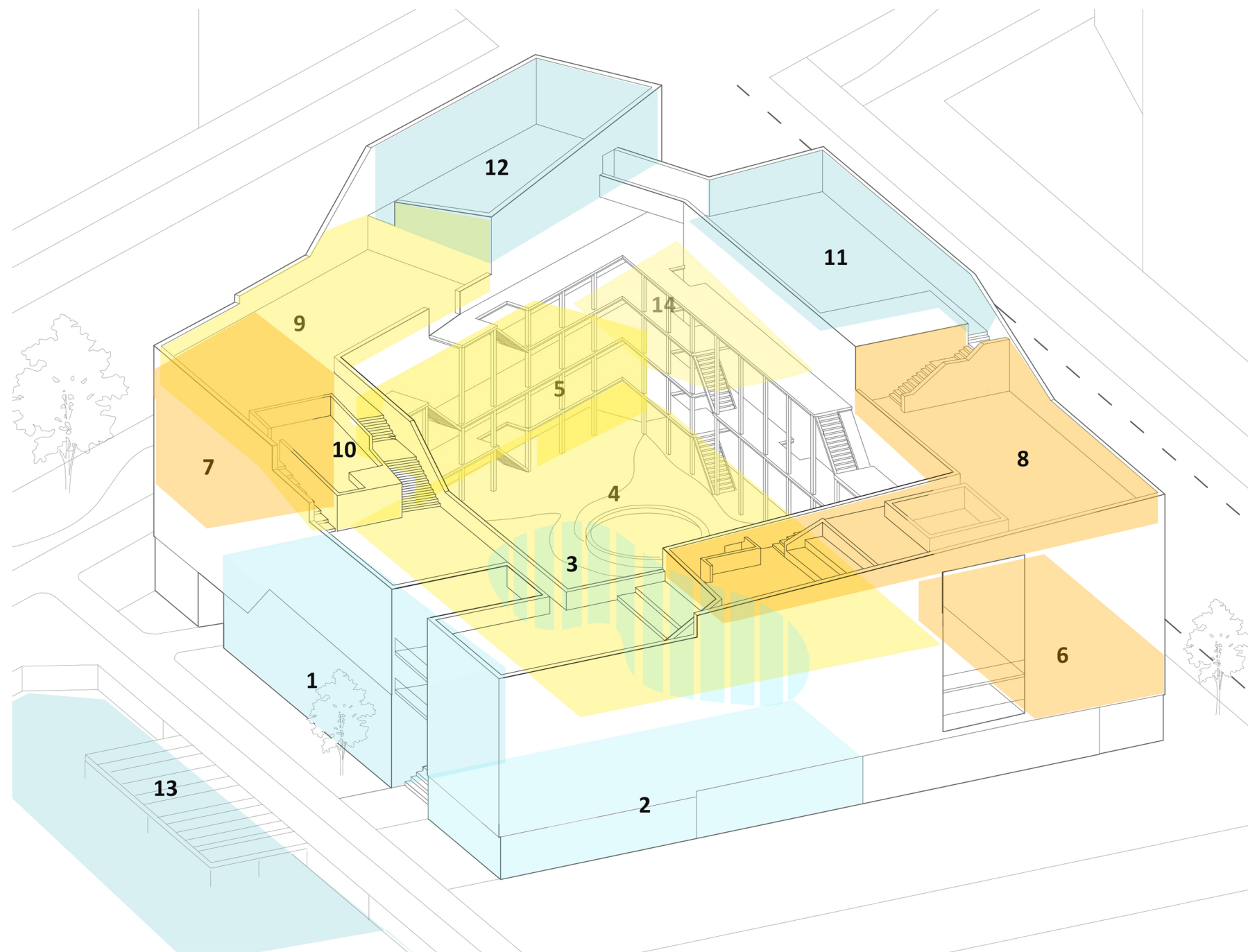
Routes and Destinations
medium scale routes



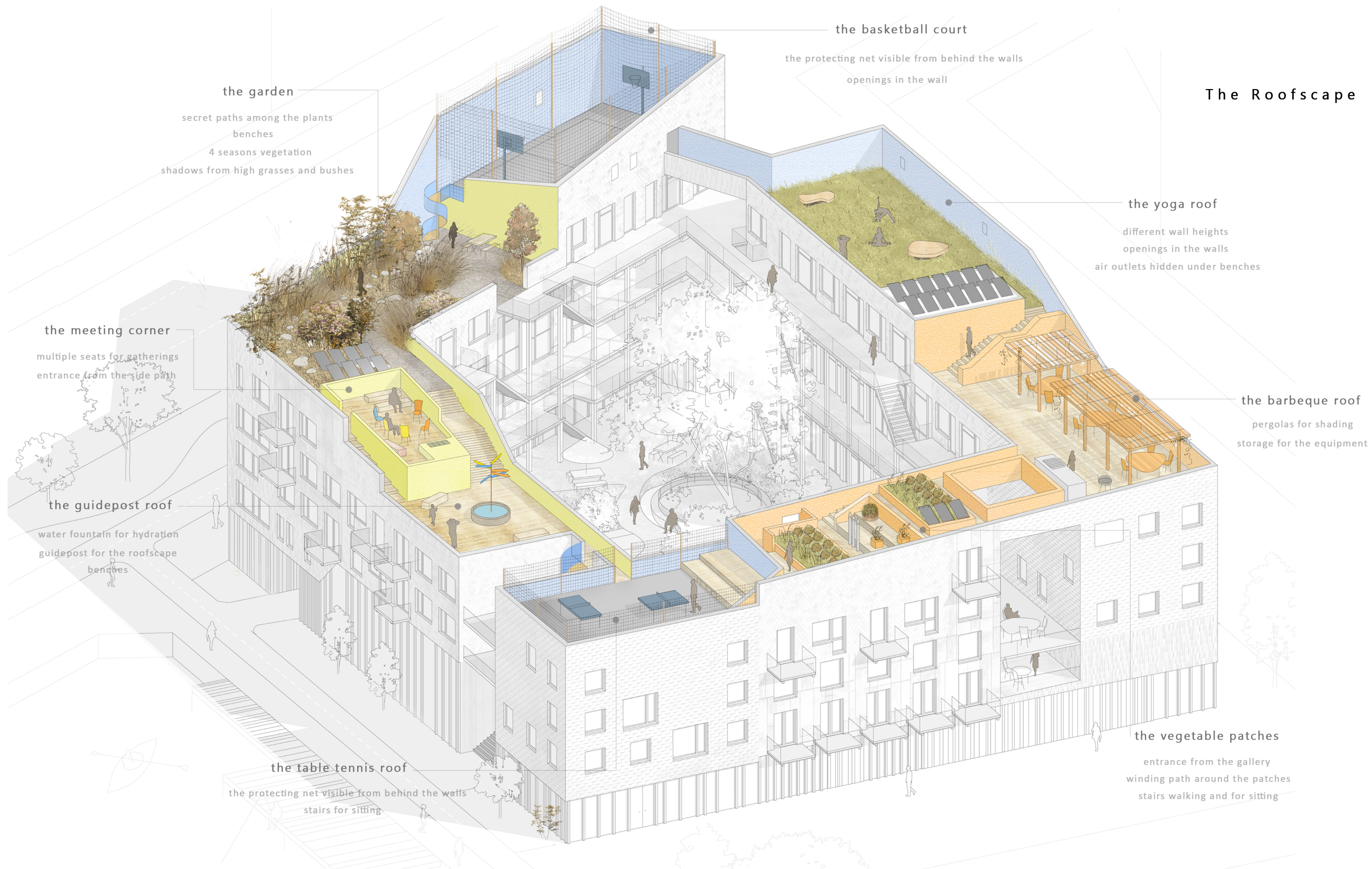
Social Route

- 1 Fruithaven Square
- 2 Entrance Hall
- 3 Courtyard
- 4 Lounge Room
- 5 Table Corner
- 6 Table Corner
- 7 Table Corner
- 8 Garden
- 9 Meeting Roof

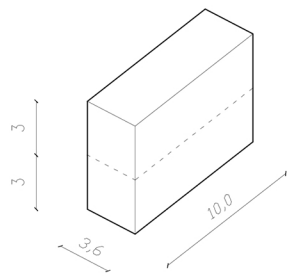
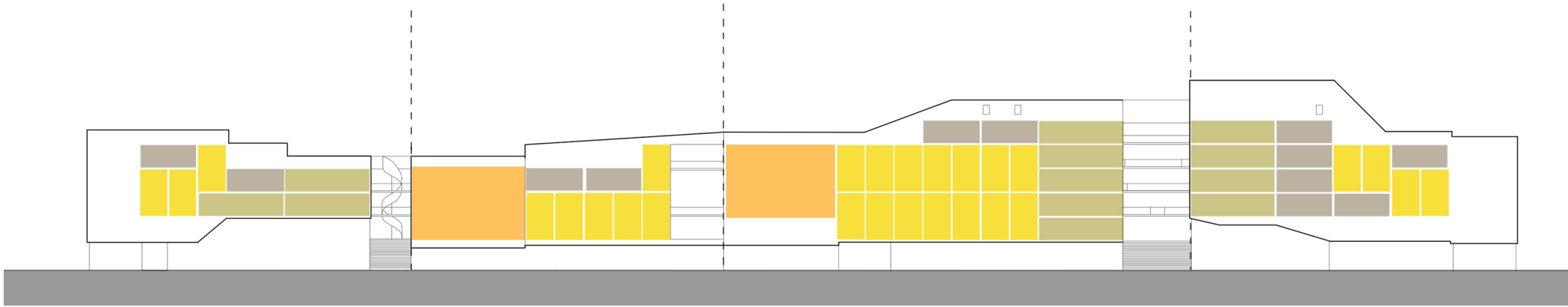
Activity Programme



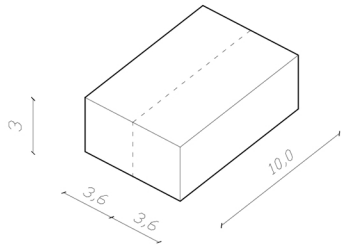
- 1** Fitness
- 2** Bicycle Cafe
- 3** Small Skatepark in the Basement
- 4** Courtyard
- 5** Entrance Hall
- 6** Communal Kitchen
- 7** Lounge Room
- 8** Barbeque Roof
- 9** Garden
- 10** Meeting Roof
- 11** Yoga Roof
- 12** Multisports Court
- 13** Fruithaven Square
- 14** Pier



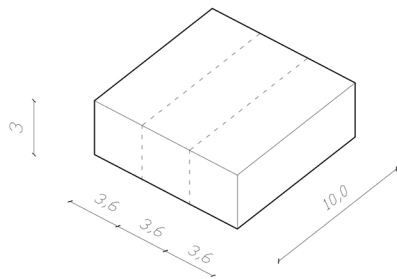
Dwelling Typologies



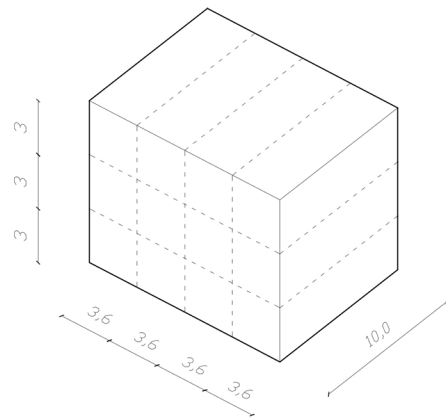
Number of Units: 27
Inhabitants: 1 or 2 (couple)
Area: 65 m²



Number of Units: 11
Inhabitants: 2
Area: 68 m²

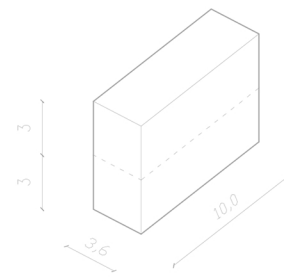
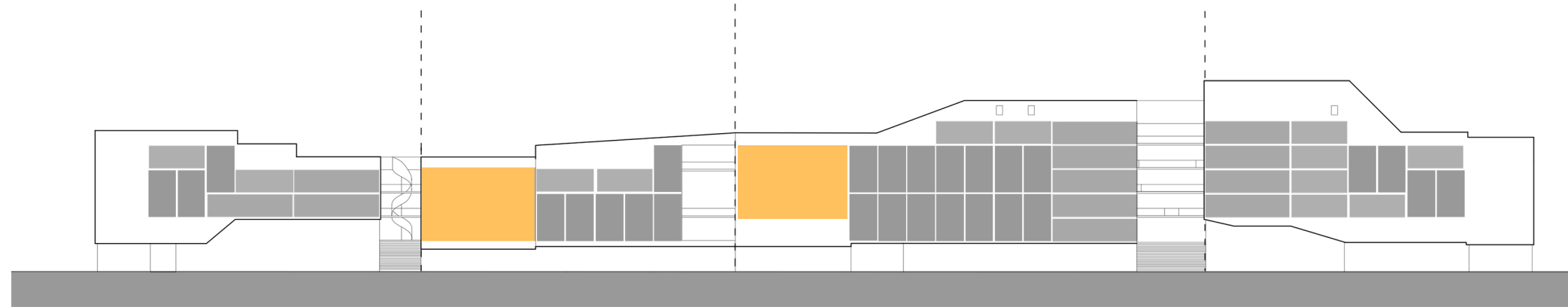


Number of Units: 12
Inhabitants: 3 or 4
Area: 104 m²



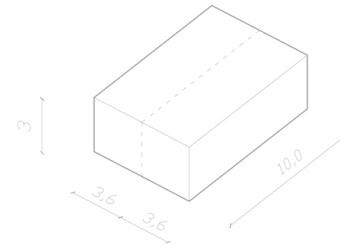
Number of Units: 2x13
Inhabitants: 13
Area: 279 m²

1. Co-housing



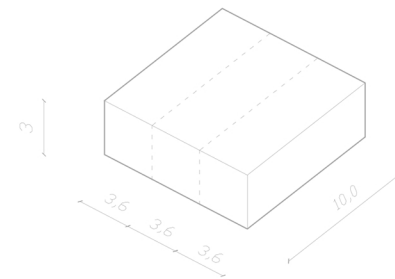
■

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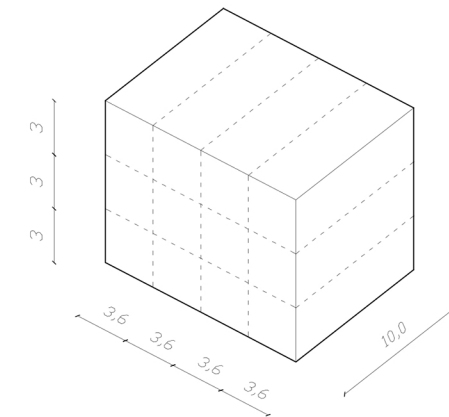
■

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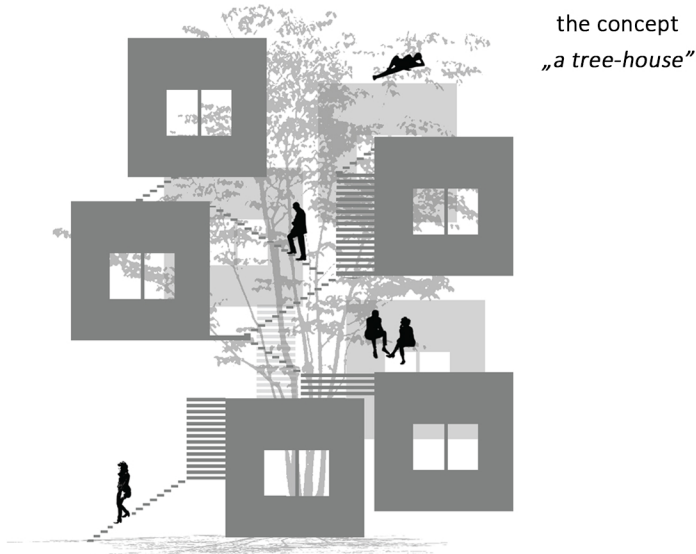


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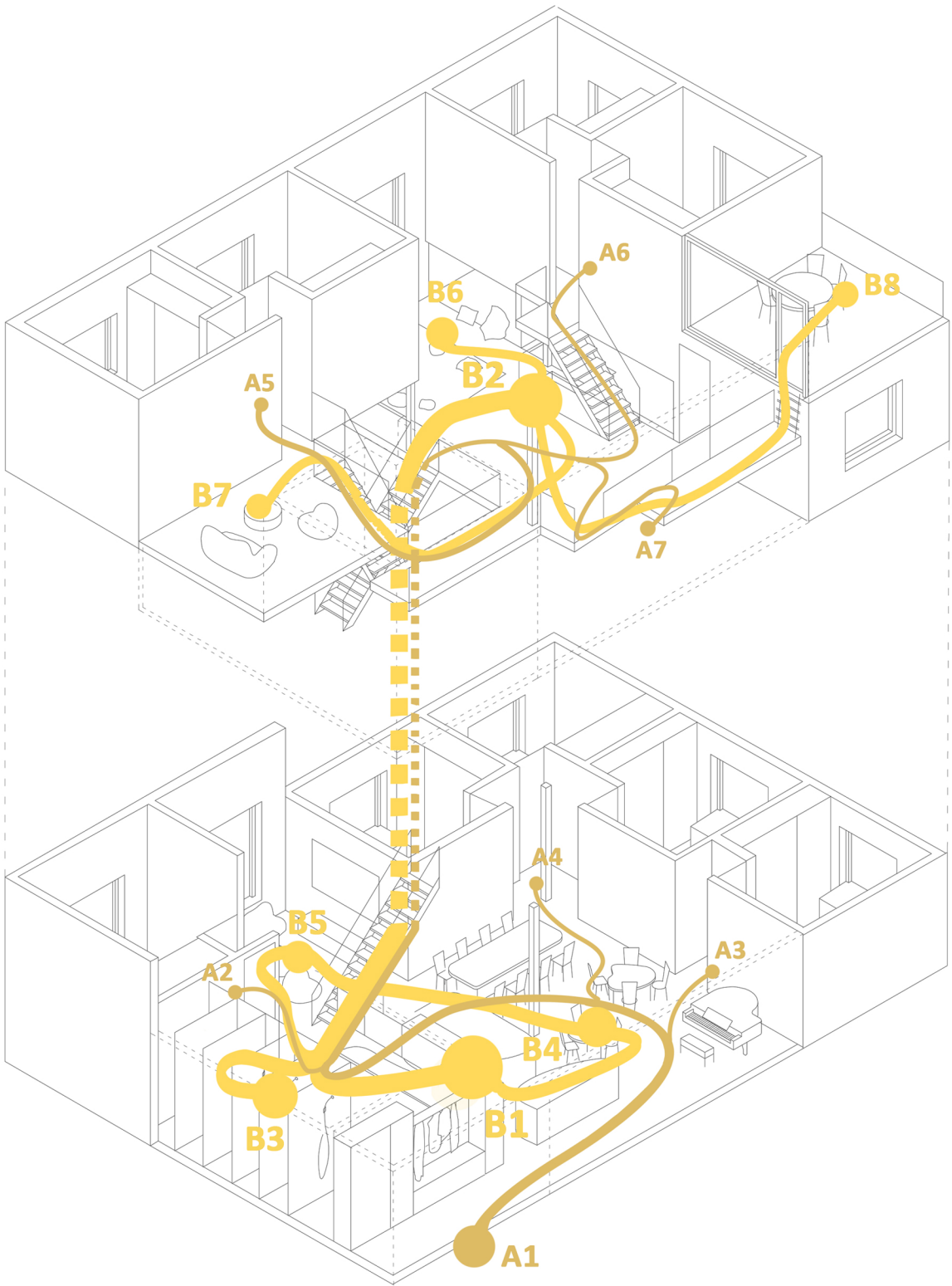
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1. Co Housing

Introducing small scale routes



location and access



routes and destinations

Destinations

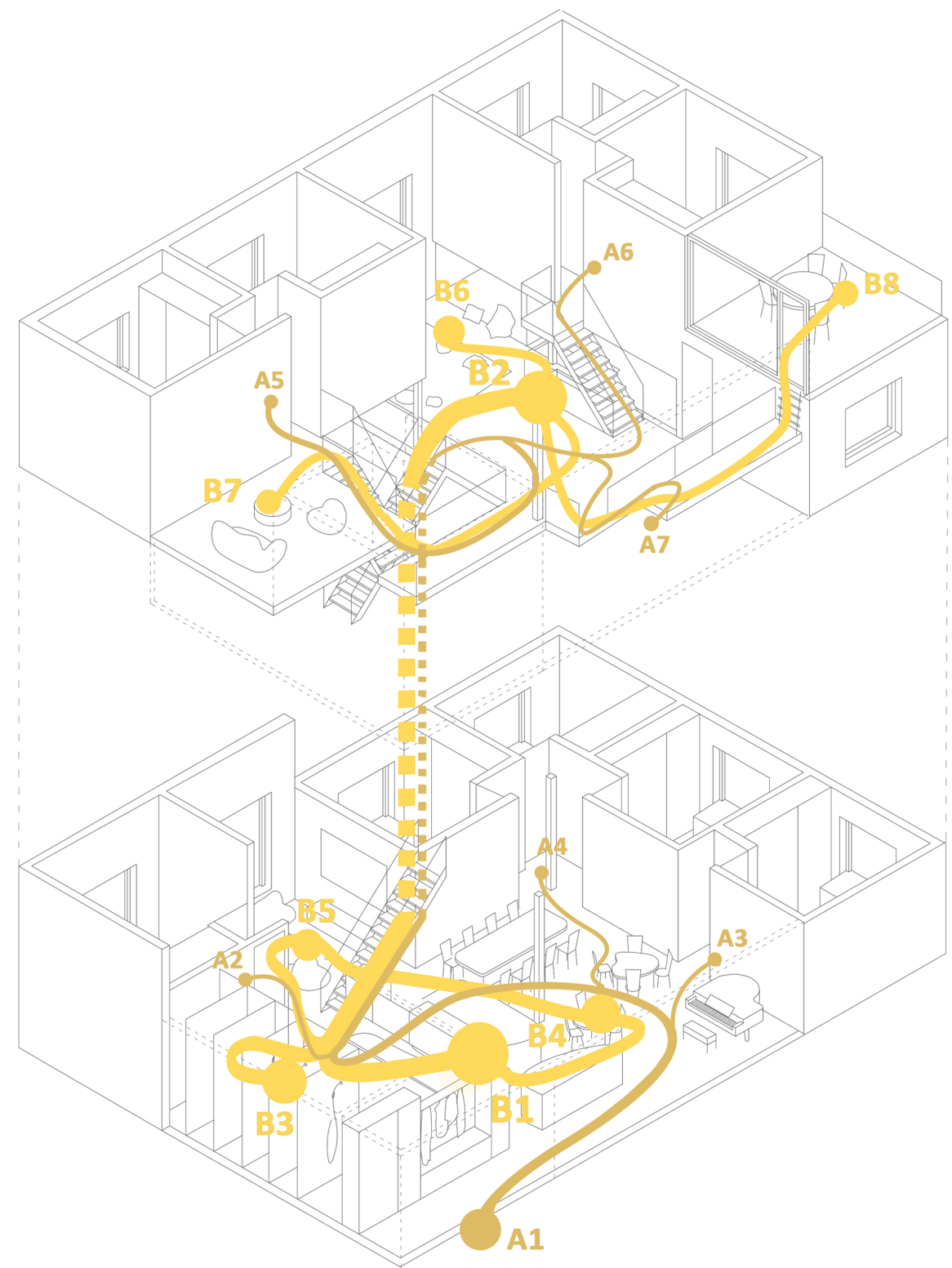
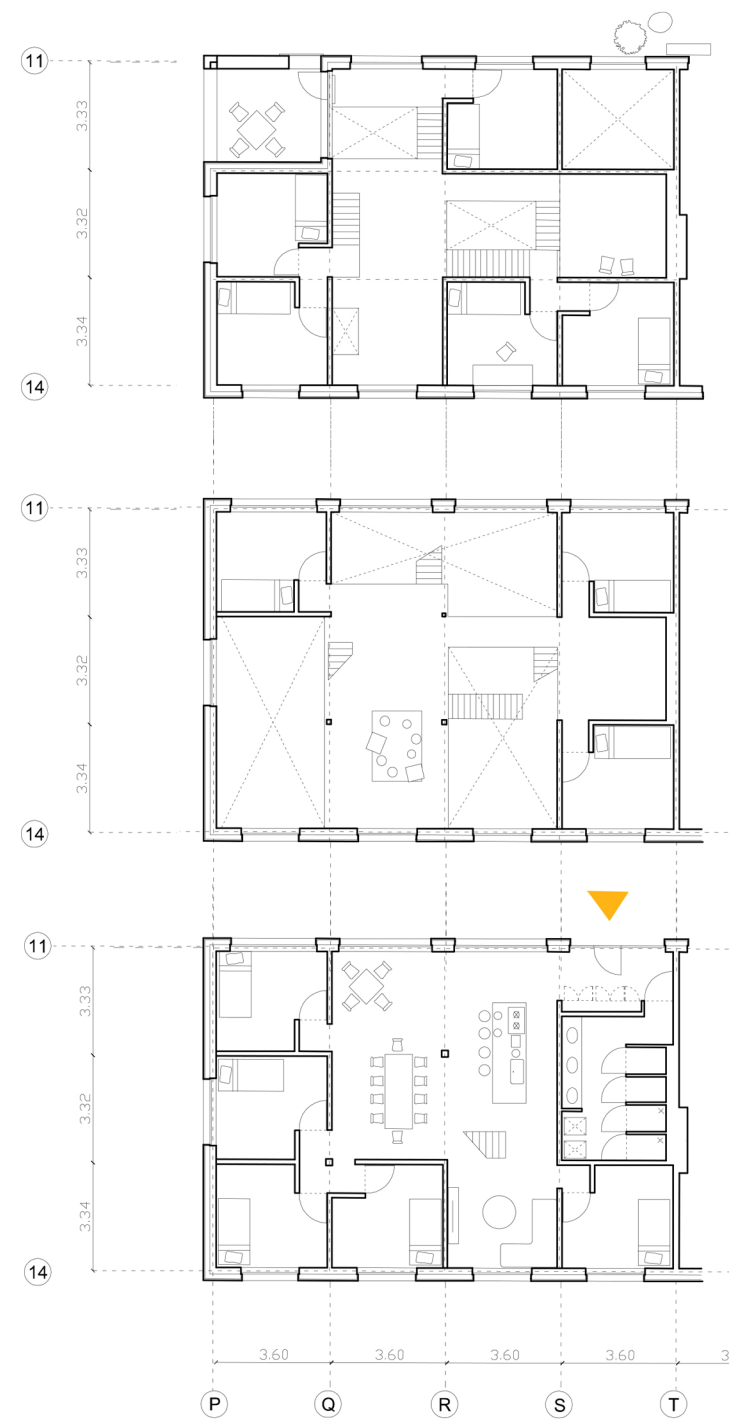
- A1 entrance
- A2, A3, A4, A5, A6, A7 unit zones
- B1 kitchen
- B2 common space 1st floor
- B3 bathroom
- B4 dining room
- B5 living room
- B6 toilet 1st floor
- B7, B8 terraces

Routes

- | | |
|--------------|-----------------------------------|
| B1 - B2 | kitchen - 1st floor common area |
| A1 - A2...A7 | entrance - unit |
| A1 - B2 | entrance - 1st floor common space |
| B1 - B4 - B5 | kitchen - dining / living room |
| B2 - B3 | bathroom - 1st floor common area |

1. Co Housing

Introducing smll scale routes



routes and destinations

Destinations

- A1 entrance
- A2, A3, A4, A5, A6, A7 unit zones
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Routes

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| B2 - B3 | bathroom - 1st floor common area |

Co - housing

neutral background

The CLT walls is a natural background for the various vivid colours and rich textures.

eyes on the street

Presence of balconies and windows to the street increases walkability around the buildings

„social” theme

The colours of the living room’s furnishing is yellow - following the „social” theme

mobile furniture and flexible space

The furnitures are all easy to move like light bean bag couches and tables on wheels. The space can quickly transfrom into a little gym

„sport” theme

The floor of the common spaces represents the „sport” theme with its blue colour. The material is rubber, often used in indoor gyms.

„food” theme

The colours of the kitchen’s floor and furnishing is orange - following the „food” theme

colour-coded rooms

The bedrooms do not follow any of the three themes, but each room has another different colour assigned to them to keep the environment vivid and stimulant.

voids

Transparency between levels increases interactions with other inhabitants and in the end the activity level

staircases

multiple differently orientated staircases (and a ladder) between split levels with a view on the common spaces on all the levels.

exercice equipment

The exercise equipment appears loosely on the area of blue floor including the the smaller spaces in front of the rooms, filled with pull rods.

high quality materials

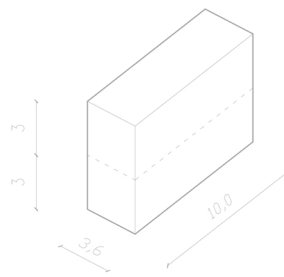
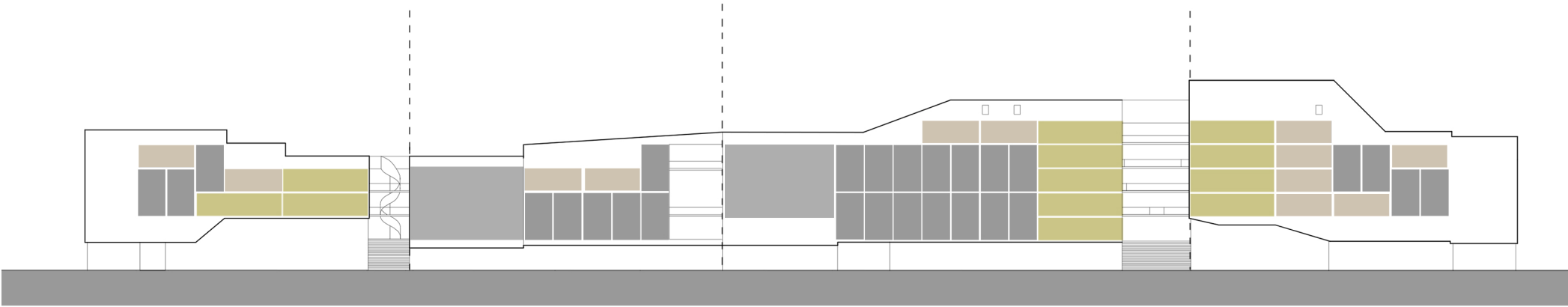
The materials are long-lasting and high quality. there is variety of materials and textures and colours, contributing to the stimulation

eyes on the courtyard

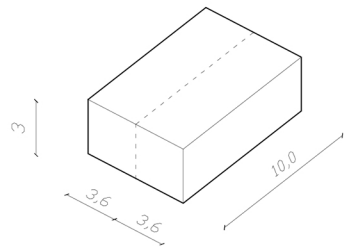
Large windows facing the courtyard add to interactions with other building users.



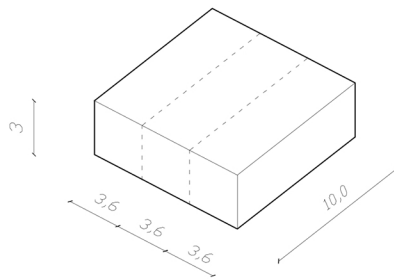
3. Horizontal Double and Triple Units



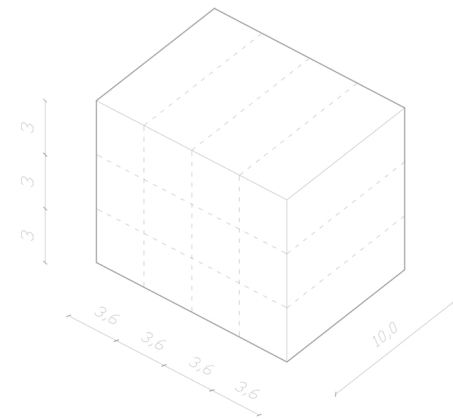
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Number of Units: 27
Inhabitants: 1 or 2 (couple)
Area: 65 m²



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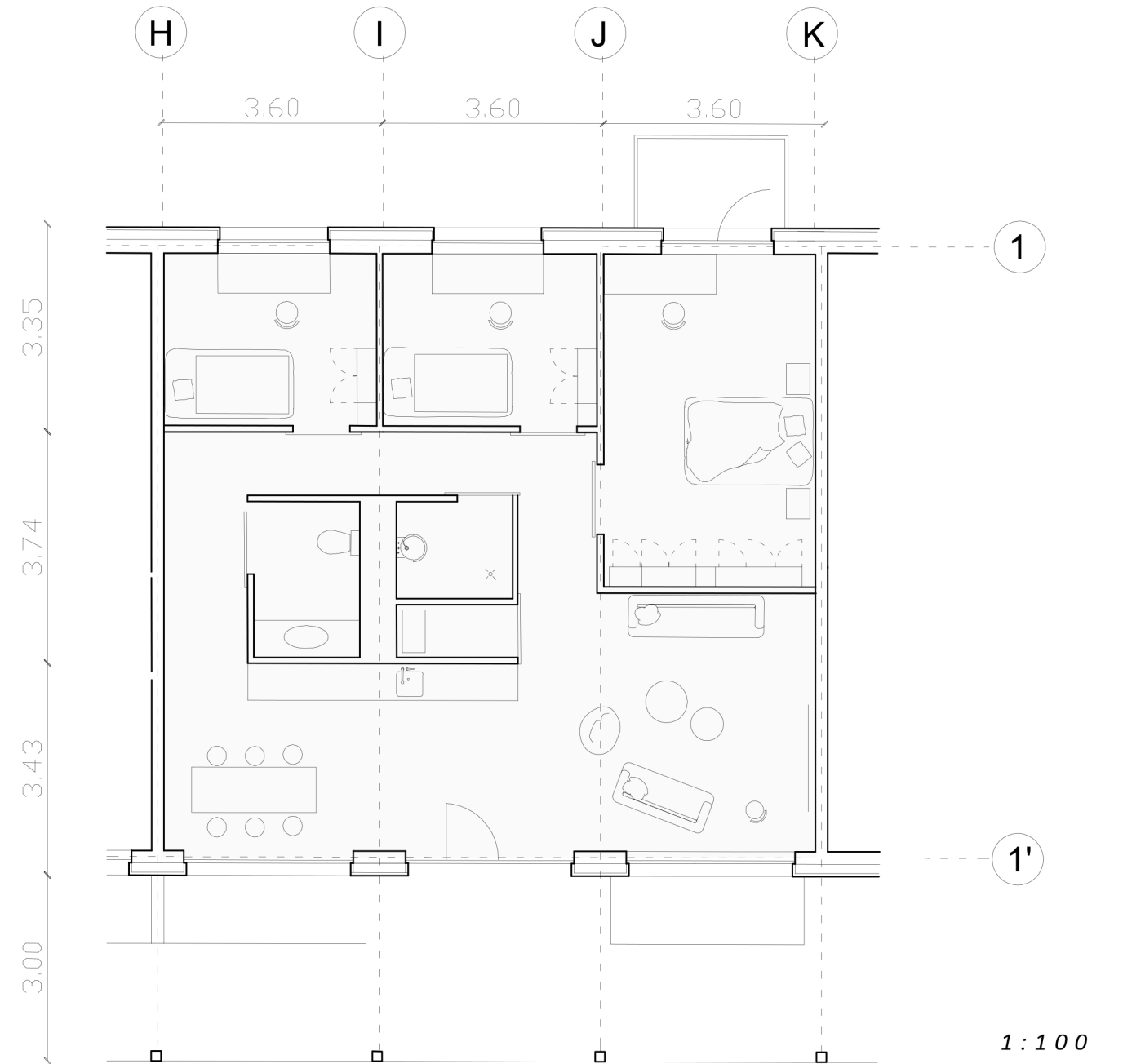
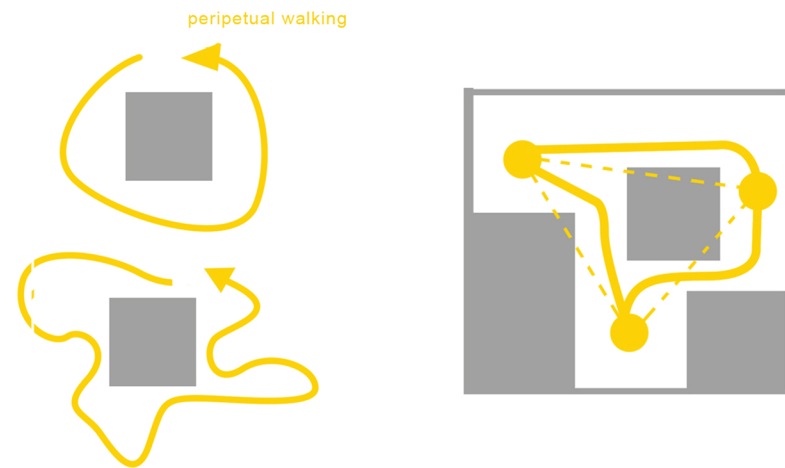
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■
Number of Units: 2x13
Inhabitants: 13
Area: 279 m²

1. Triple Horizontal Units

Introducing small scale routes



Triple Horizontal Unit

small scale active features

neutral background

The CLT walls is a natural background for the various vivid colours and rich textures.

eyes on the courtyard

Large windows add to interactions with other building users

„food” theme

The colours of the kitchen’s floor and furnishing is orange- following the „food” theme

„sport” theme

The floor of the common spaces represents the „sport” theme with its blue colour. The material is rubber, often used in indoor gyms.

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eyes on the street

Presence of balconies and windows to the street increases walkability around the buildings

exercise equipment

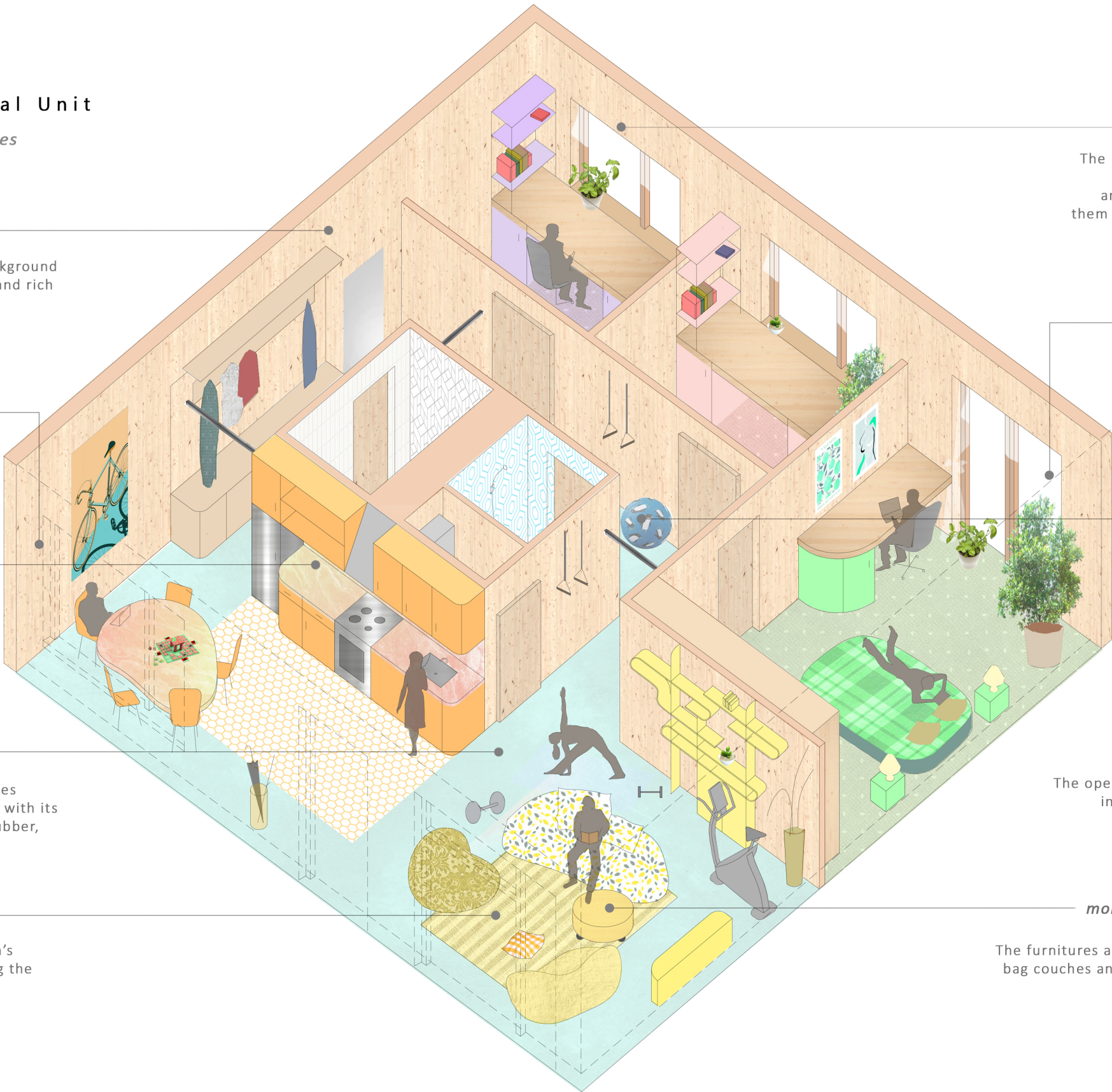
The exercise equipment appears loosely on the area of blue floor including the the smaller spaces in front of the rooms, filled with pull rods.

open plan

The open plan with the core in the middle increases transparency and enables choosing different paths

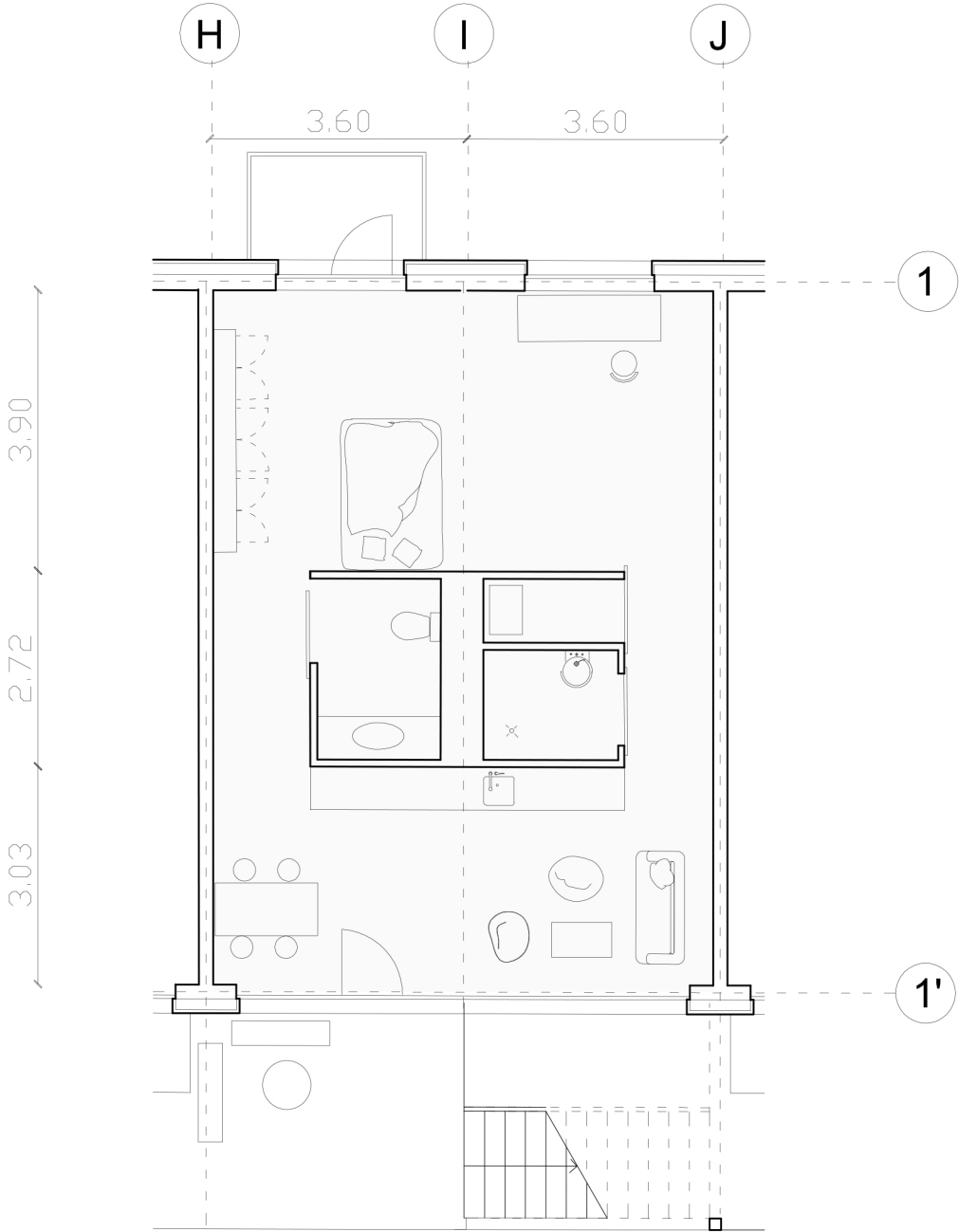
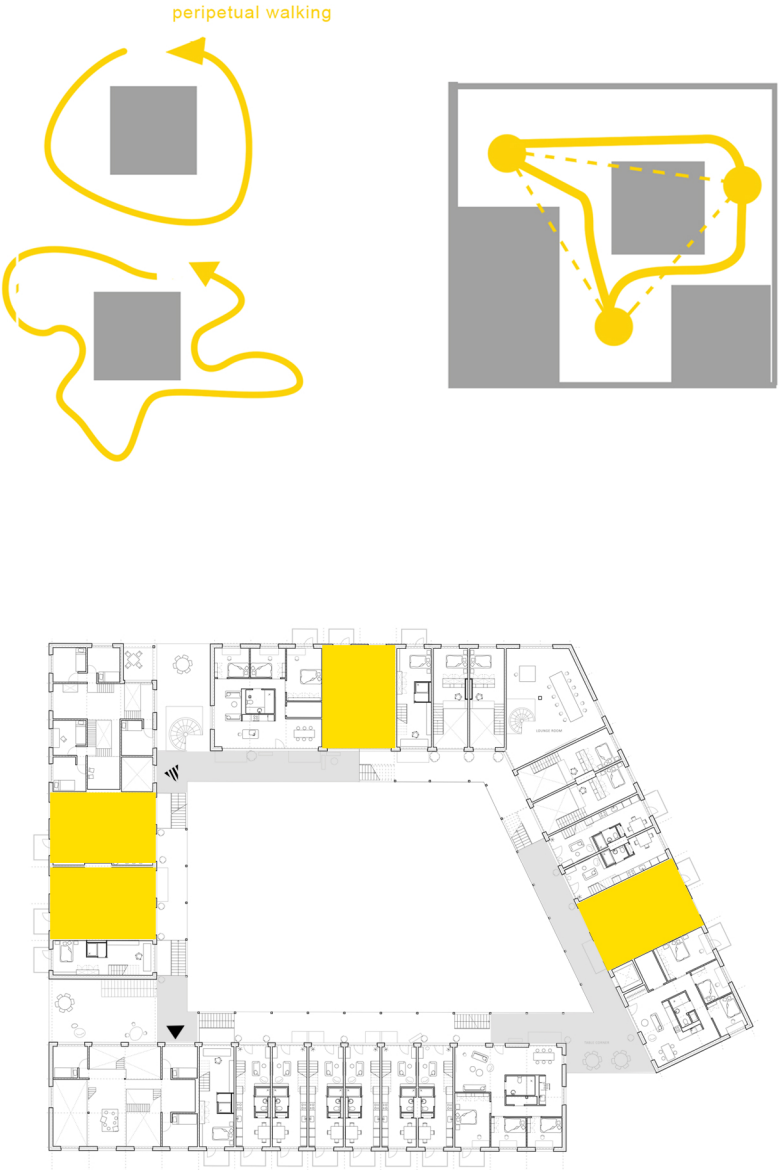
mobile furniture and flexible space

The furnitures are all easy to move like light bean bag couches and tables on wheels. The space can quickly transform into a little gym



1. Double Horizontal Units

Introducing small scale routes



Double Horizontal Unit

small-scale active features

natural background

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„food“ theme

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eyes on the courtyard

Large windows add to interactions with other building users

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mobile furniture and flexible space

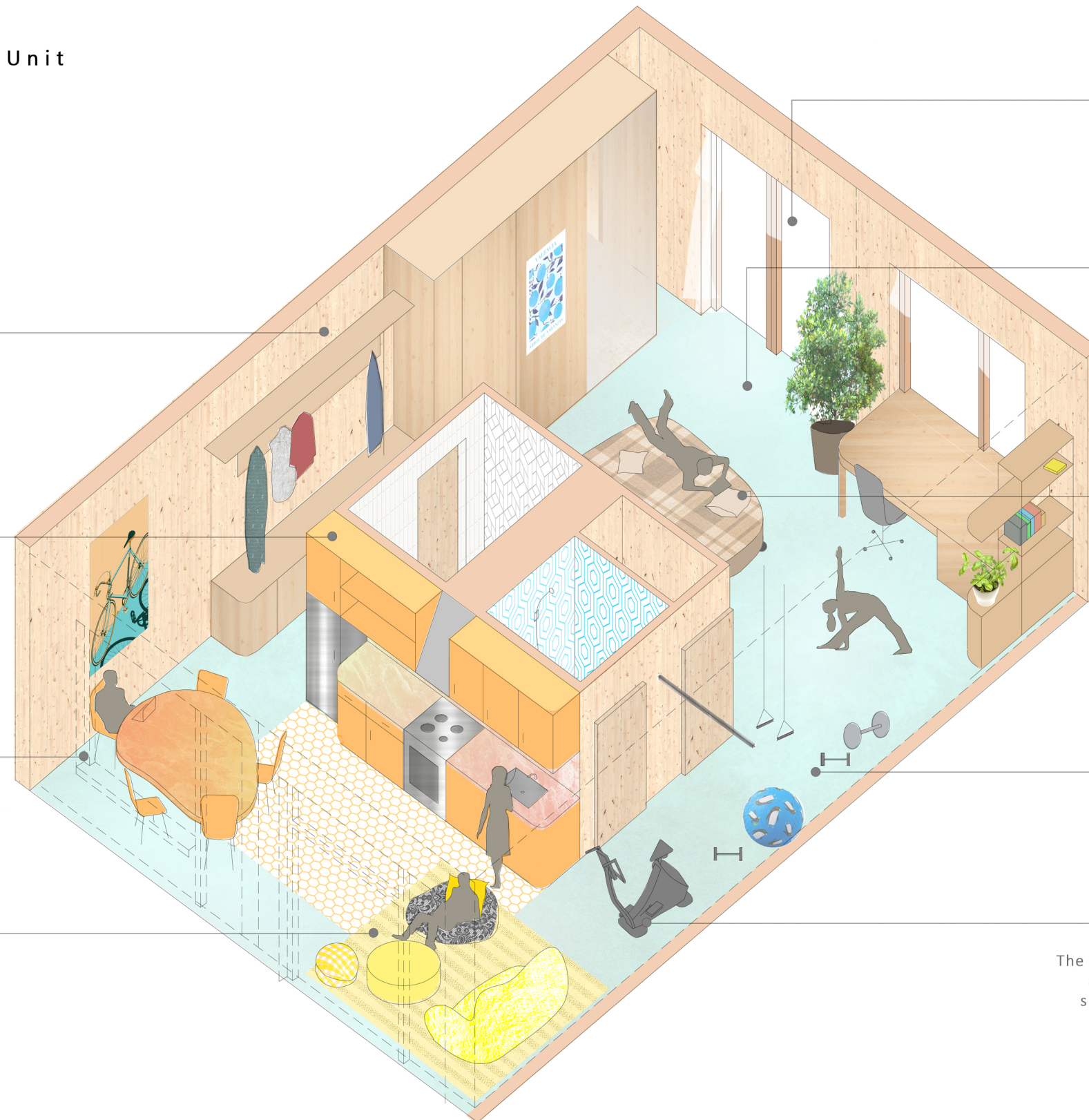
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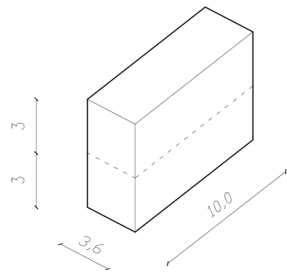
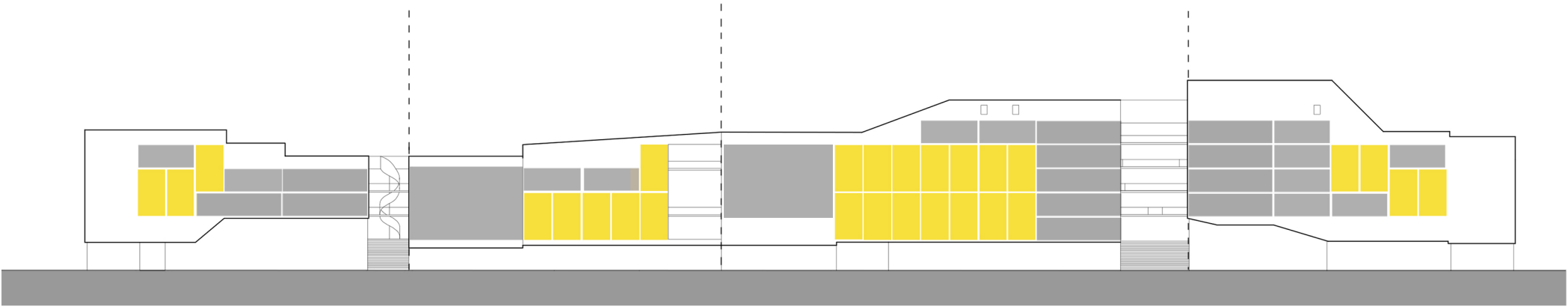
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exercise equipment

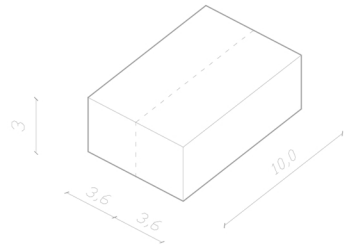
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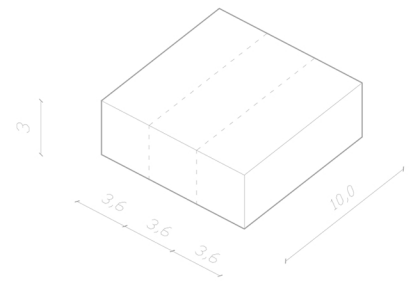
2. Double Vertical Unit



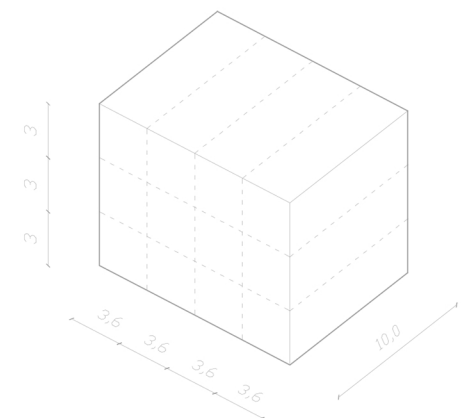
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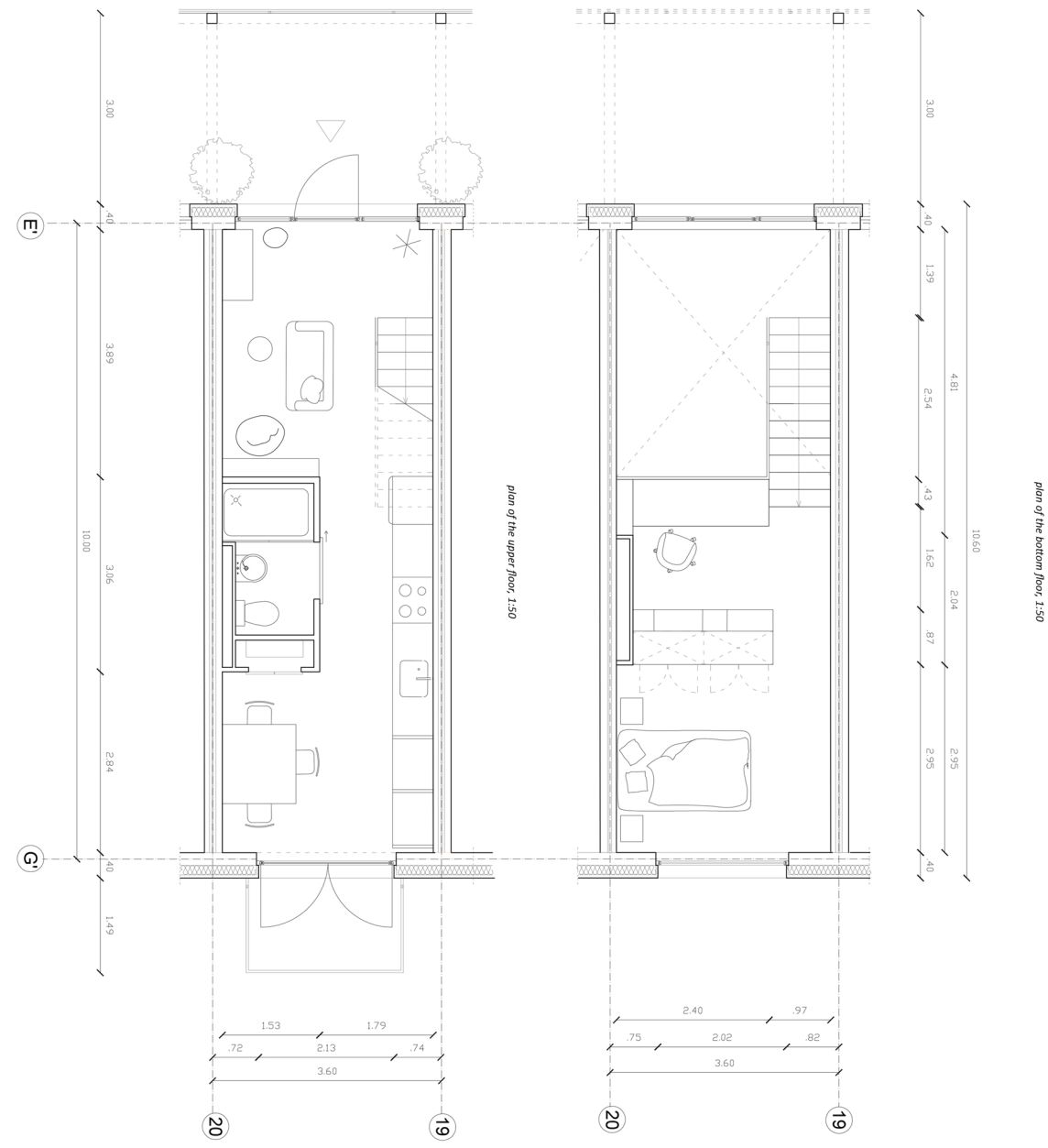
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Number of Units: 2x13
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1. Double vertical Unit

Introducing small scale routes



Double Vertical Unit

small scale active features

neutral background

The CLT walls is a natural background for the various vivid colours and rich textures.

eyes on the courtyard

Large windows and a desk facing the courtyard add to interactions with other building users.

staircase

vertical circulation with a view on the courtyard, with a balustrade of yellow glass playing with light

„sport” theme

The floor of the common spaces represents the „sport” theme with its blue colour. The material is rubber, often used in indoor gyms.

„social” theme

The colours of the living room’s furnishing is yellow- following the „social” theme

eyes on the street

Presence of balconies and windows to the street increases walkability around the buildings

high quality materials

The materials are long-lasting and high quality. there is variety of materials and textures and colours, contributing to the stimulation

exercise equipment

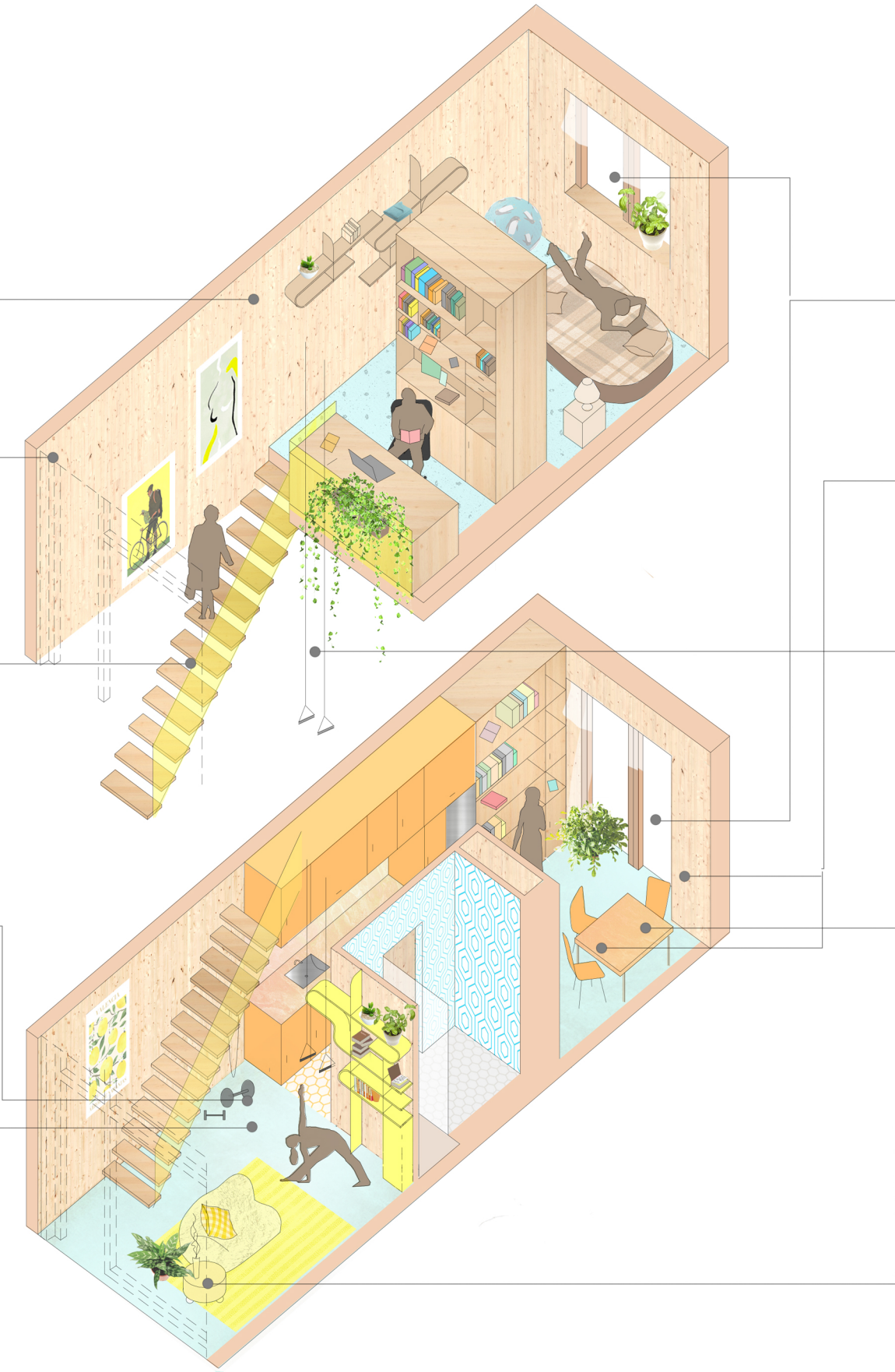
The exercise equipment appears loosely on the area of blue floor including the the smaller spaces in front of the rooms, filled with pull rods.

„food” theme

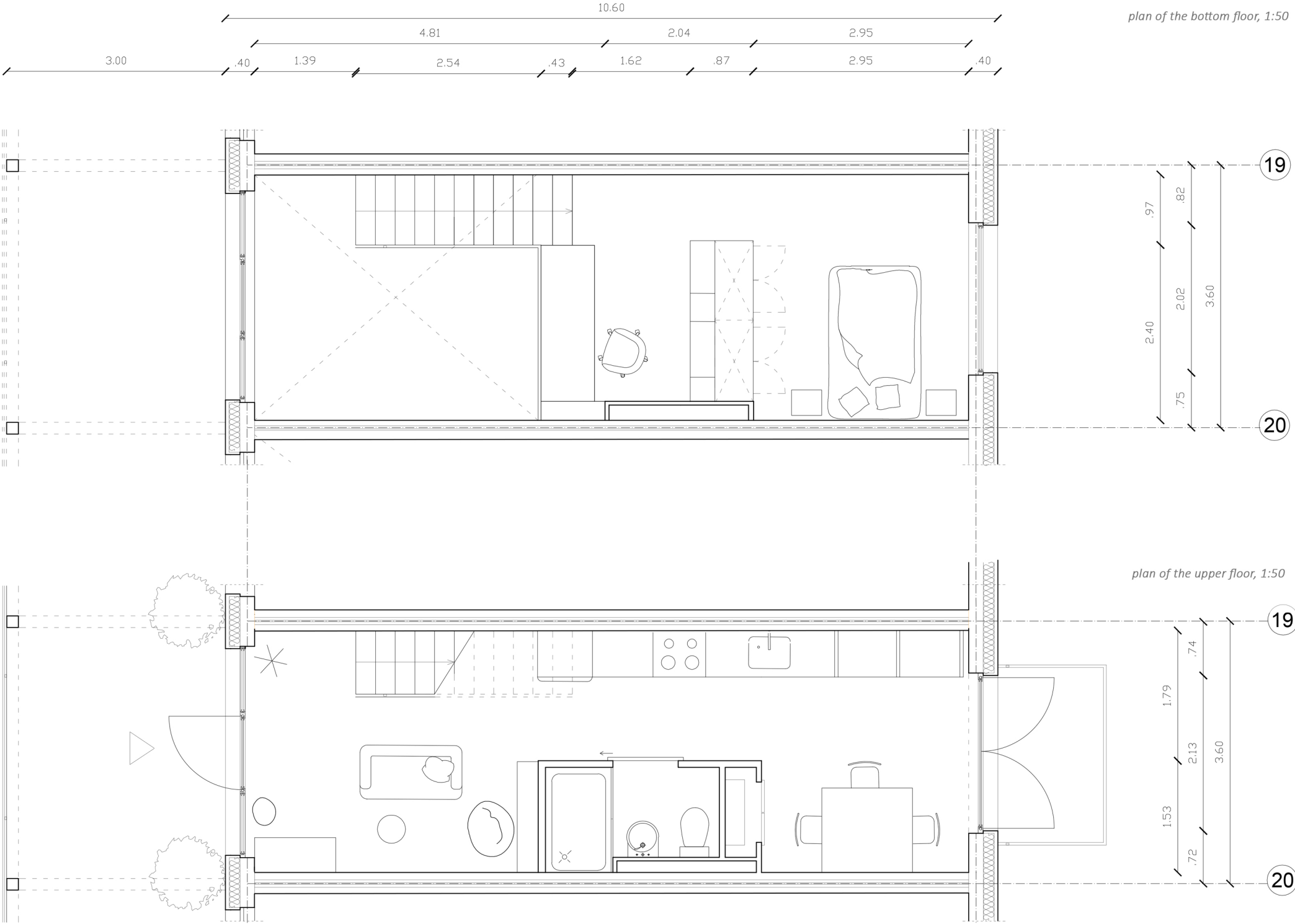
The colours of the kitchen’s floor and furnishing is orange- following the „food” theme

mobile furniture and flexible space

The furnitures are all easy to move like light bean bag couches and tables on wheels. The space can quickly transfrom into a little gym



3. Double Vertical Unit

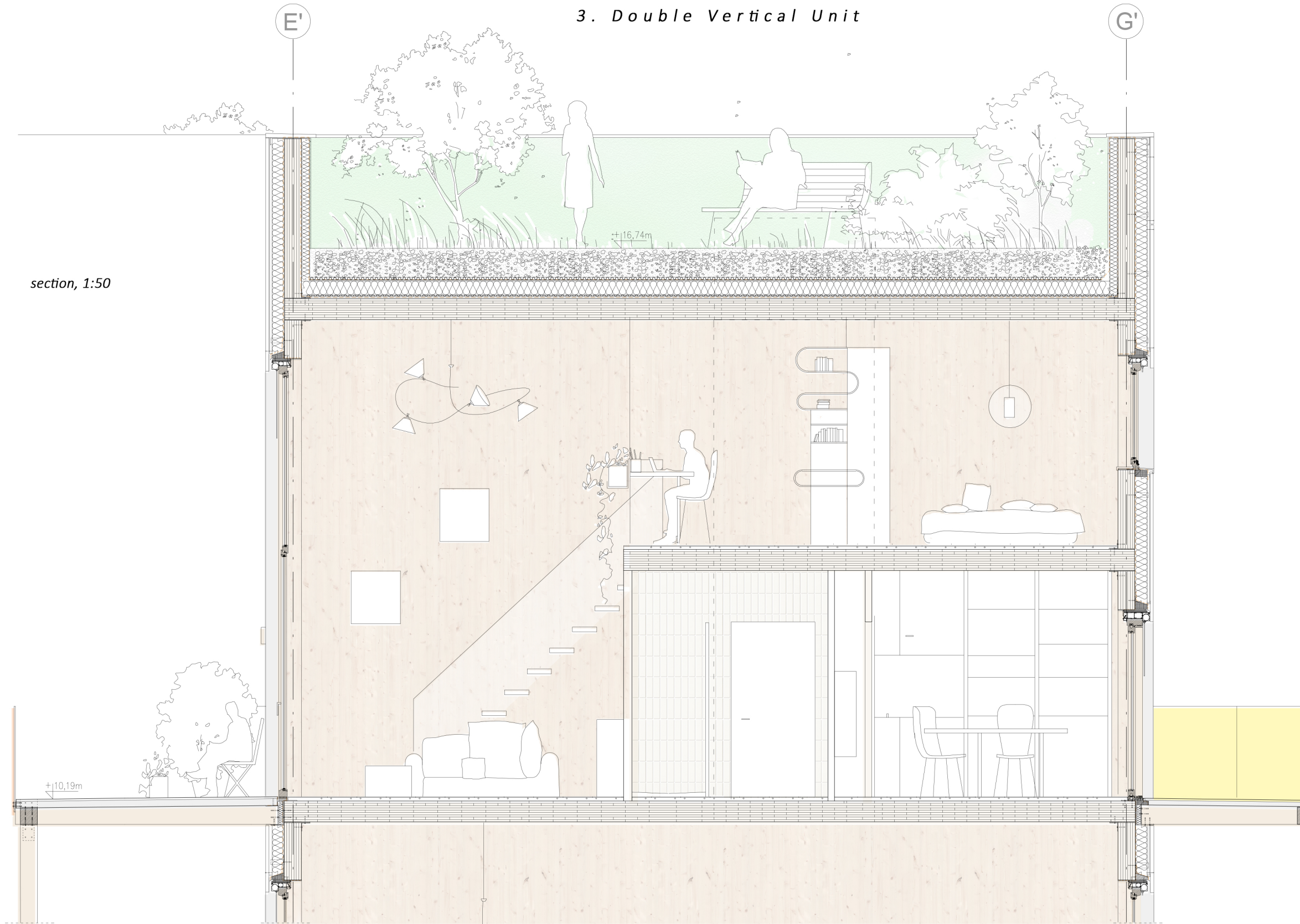


3. Double Vertical Unit

E'

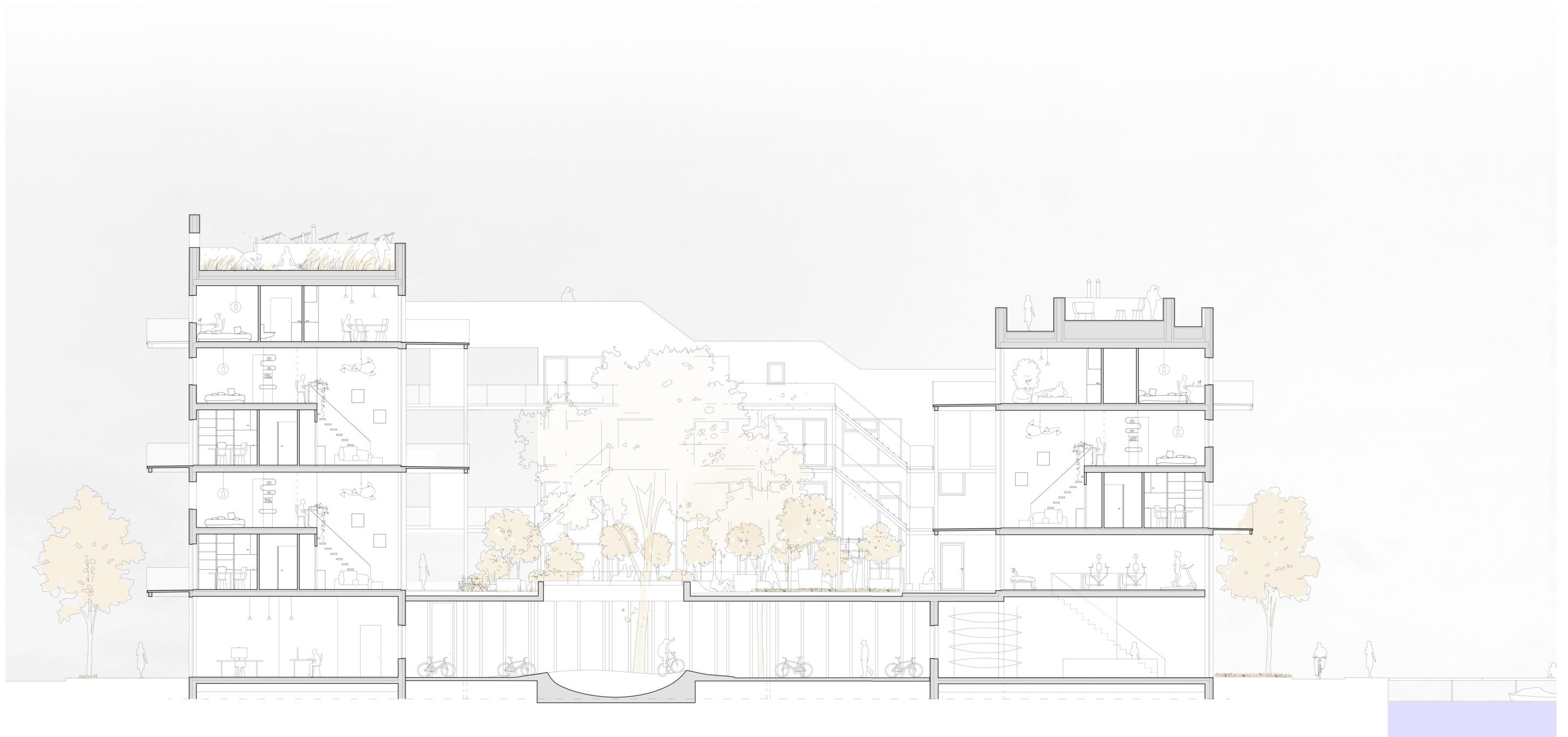
G'

section, 1:50

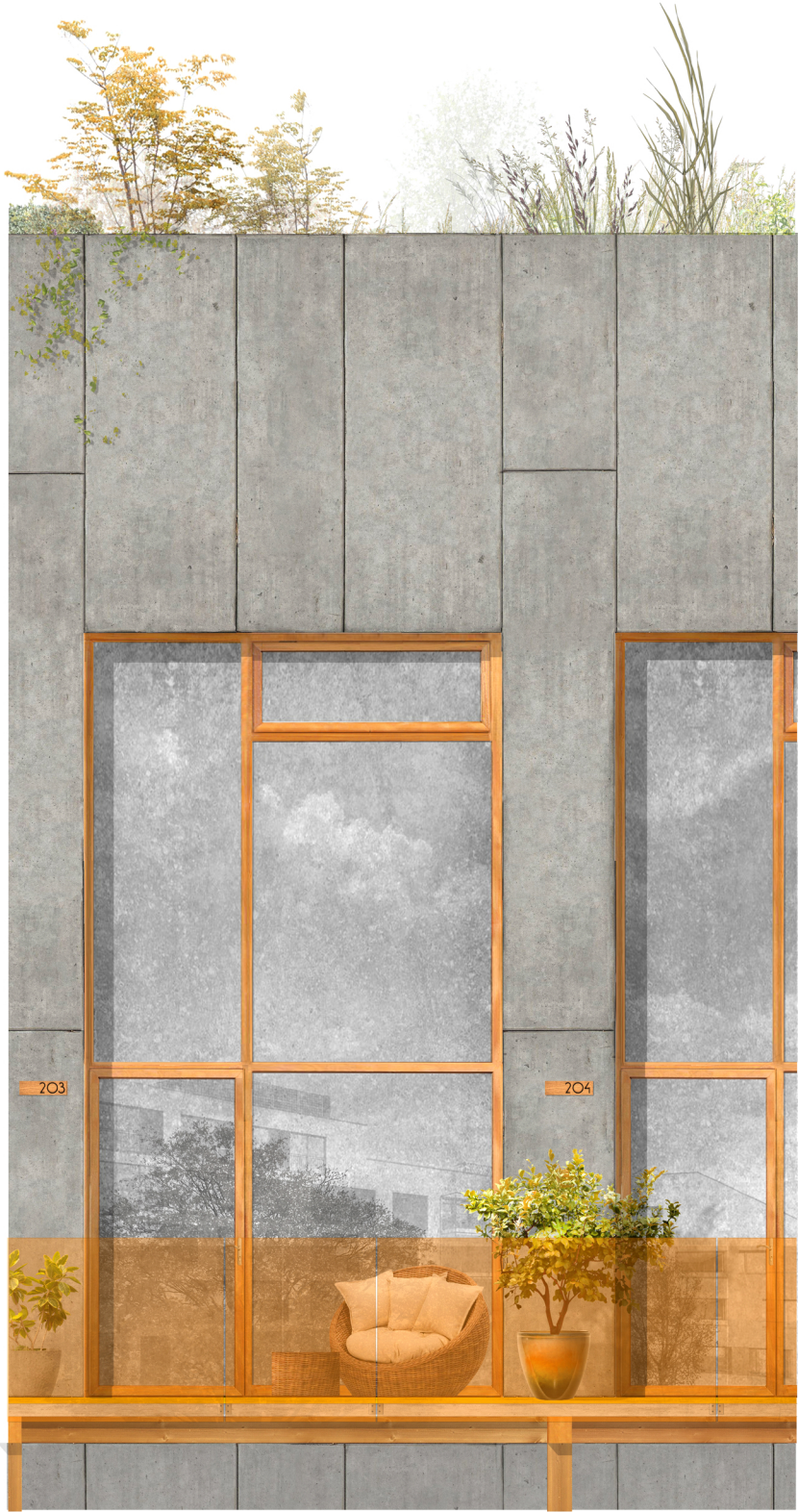


Section AA

scale 1:200

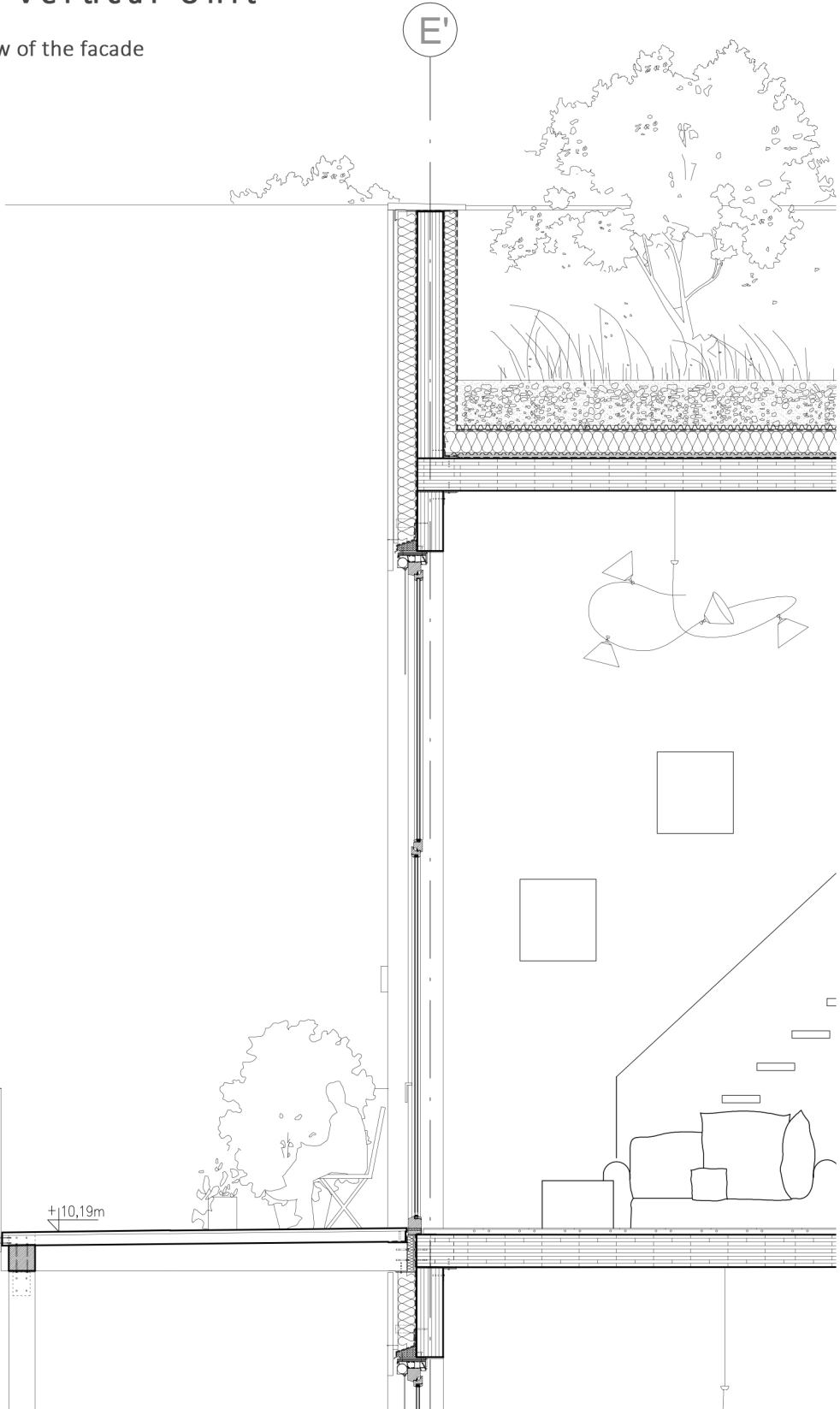


facade, 1:50



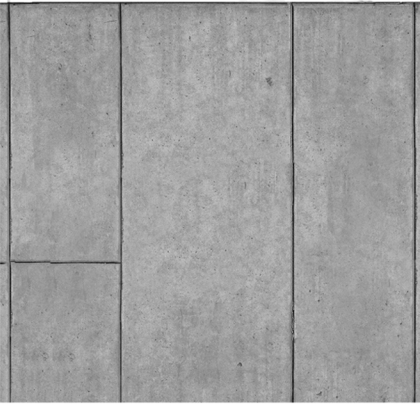
Double Vertical Unit

view of the facade

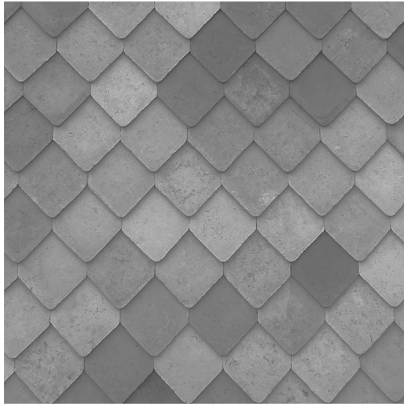


section, 1:50

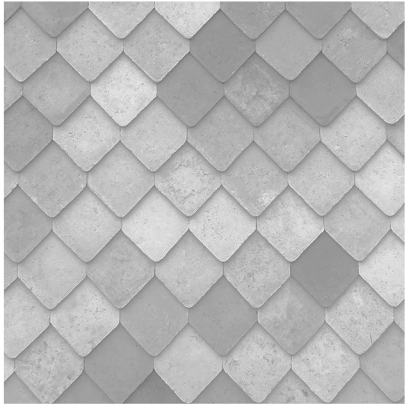
facade materials



CLT pannels



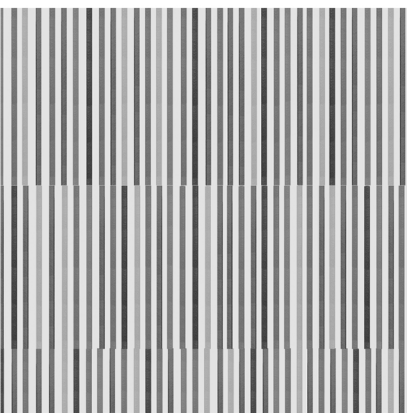
concrete tiles of the
Yardhouse



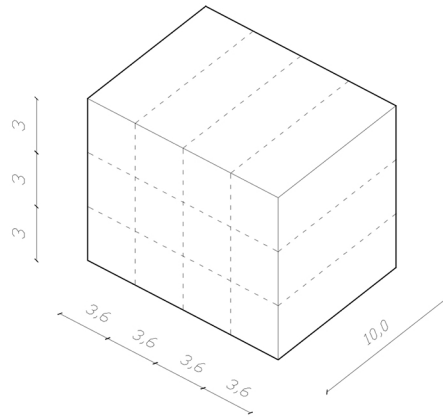
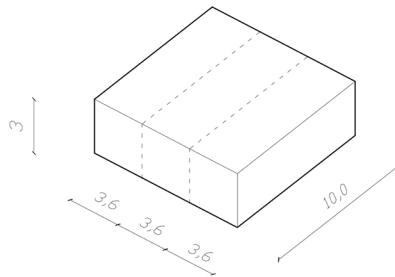
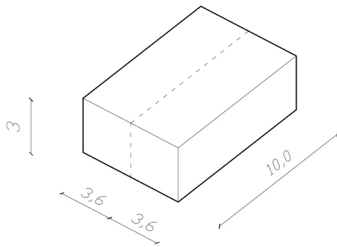
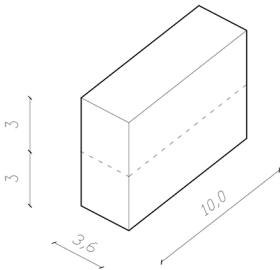
concrete tiles of the
Yardhouse



eternit tiles

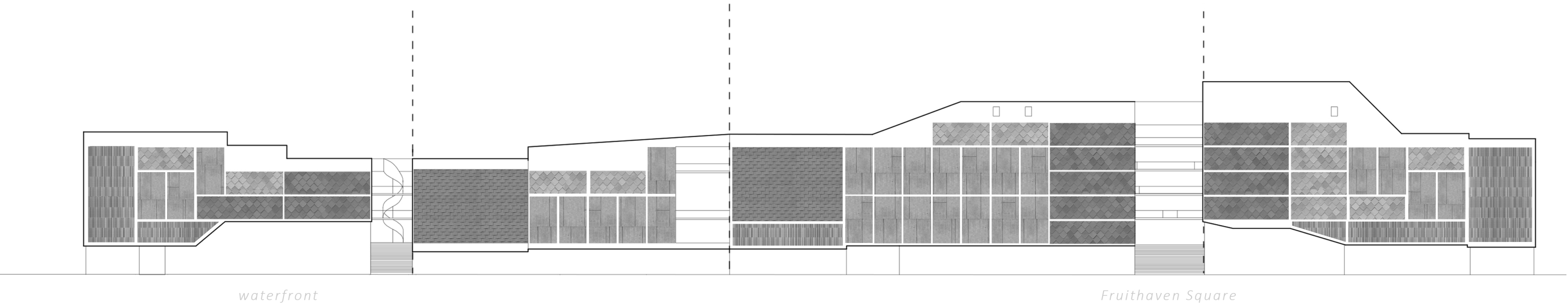


mosaic glass tiles

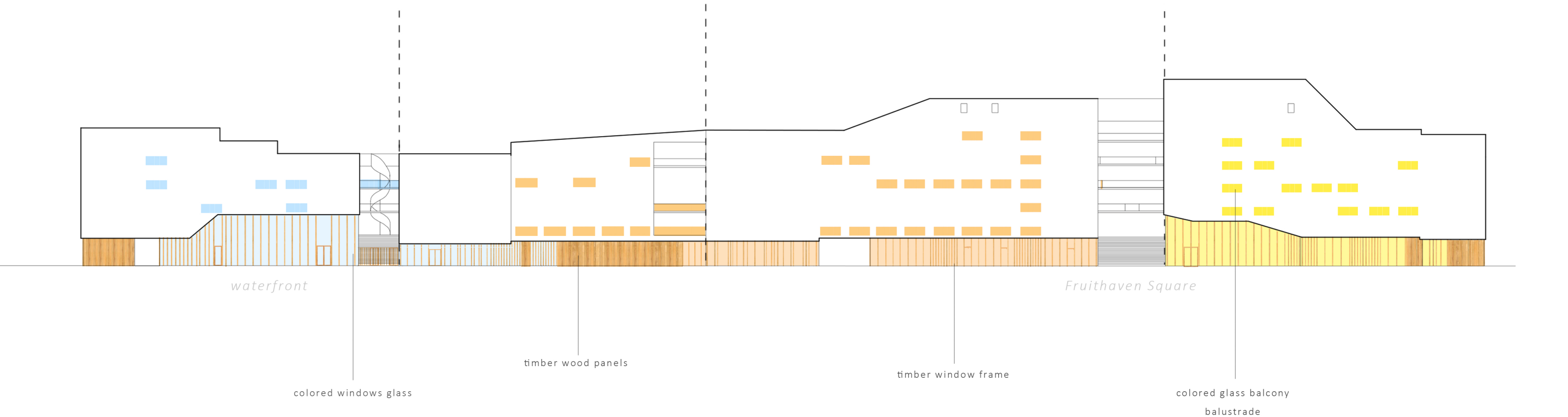


communal spaces
/ other functios

facade materials

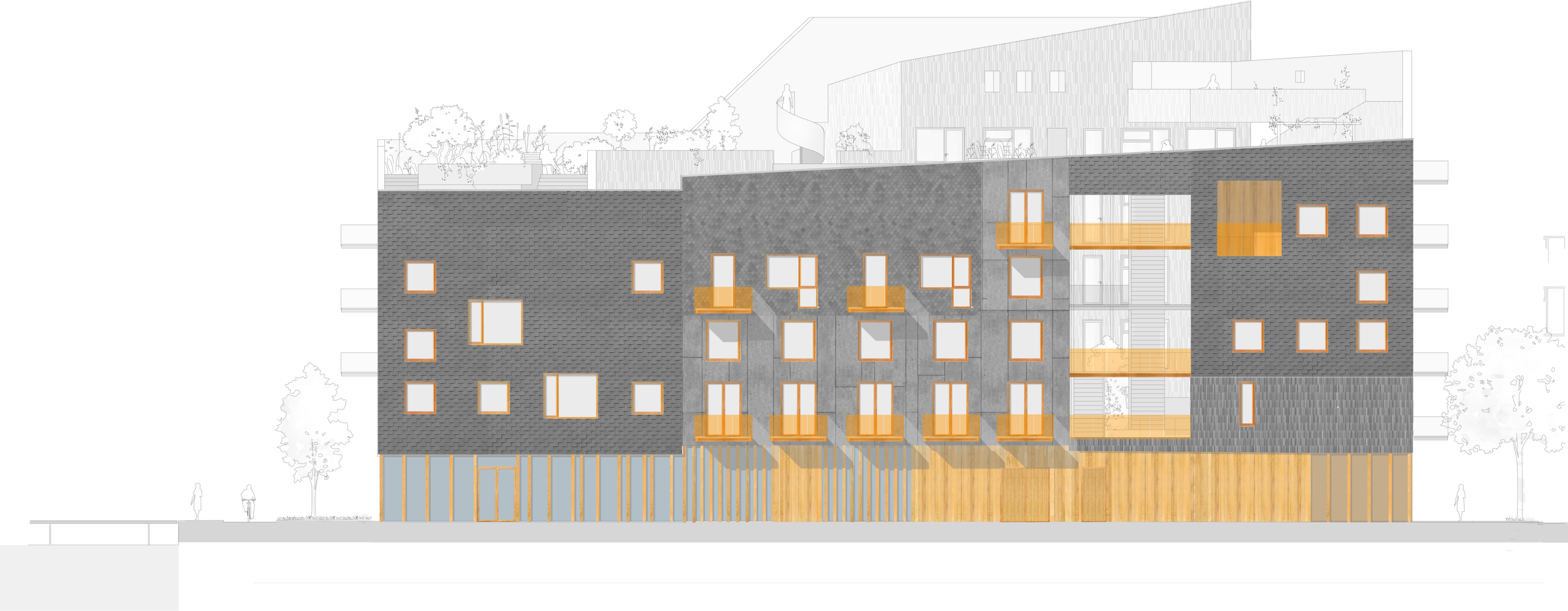


facade materials



South-Western Facade

scale 1:200



North-Western Facade

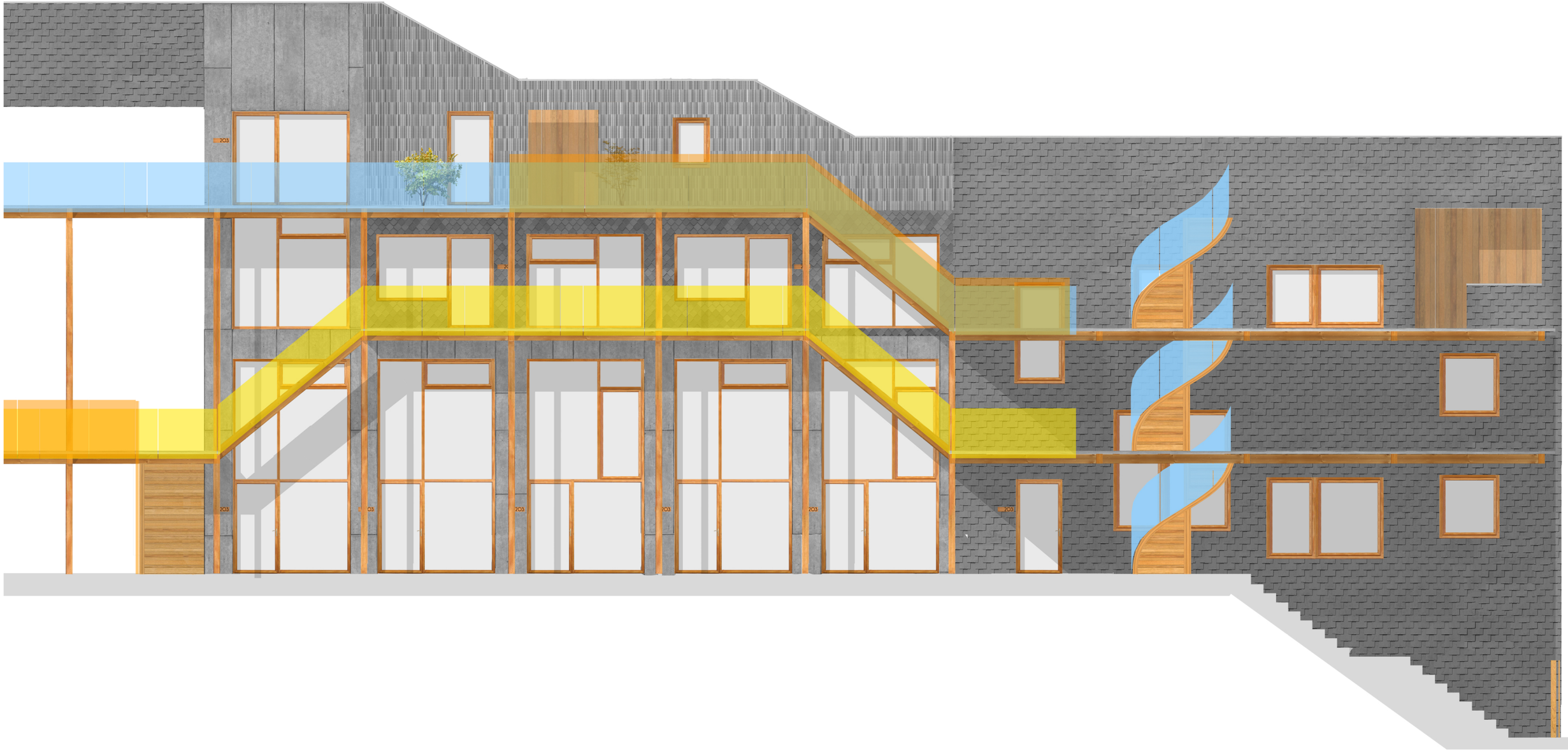
the waterfront

scale 1:200

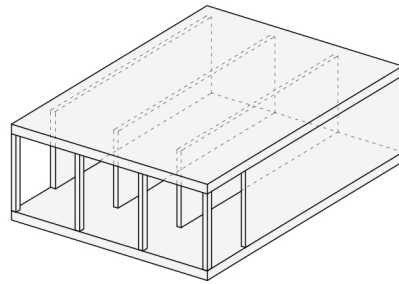


North+Eastern Facade
the courtyard

scale 1:100

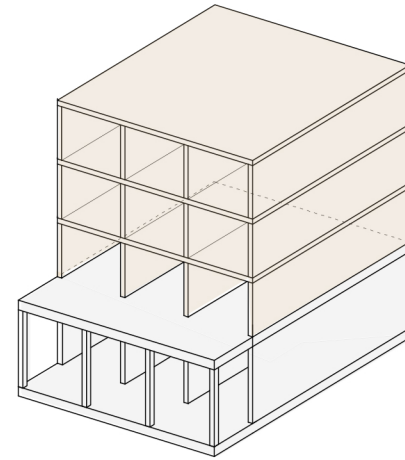


Sequence of Assembly



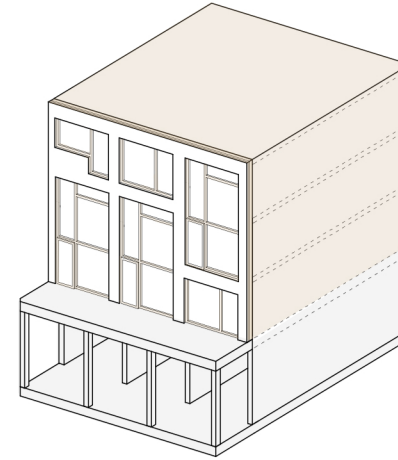
1

The lowest level consists of concrete elements including foundations, columns and walls. Similarly, the slab above the level is made of concrete including the deck of the courtyard.



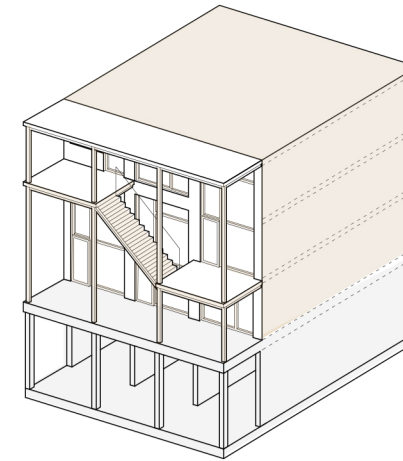
2

The construction of the floors above the ground level consists of CLT walls and slabs.



3

The facade consists of the CLT wall, the insulation layer, and on the outside of CEM panels or ceramic tiles. The windows are made of timber.



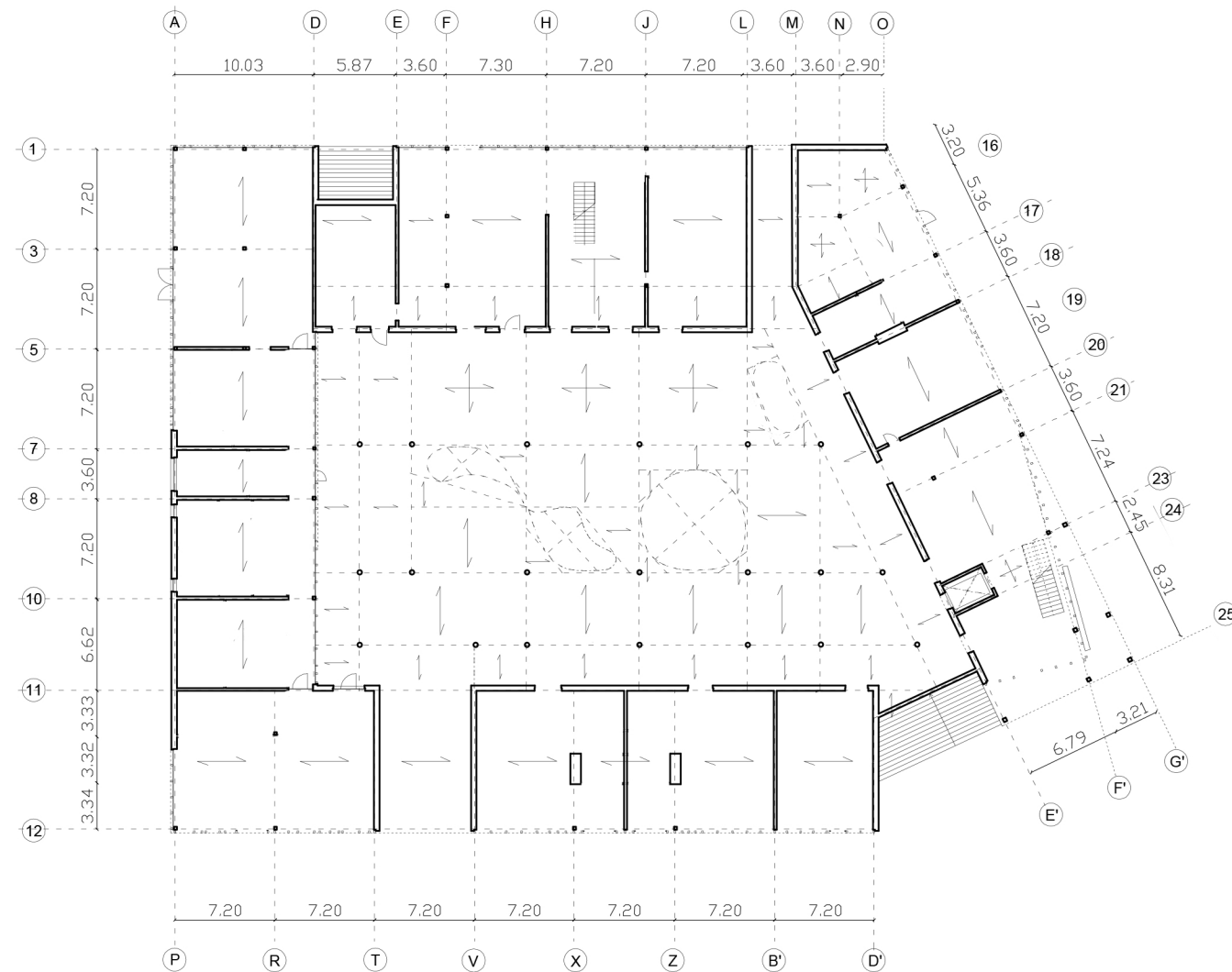
4

The timber gallery is attached to the main construction and the facade.

Arrangement of slabs

Floor 0 (street level)

1:500

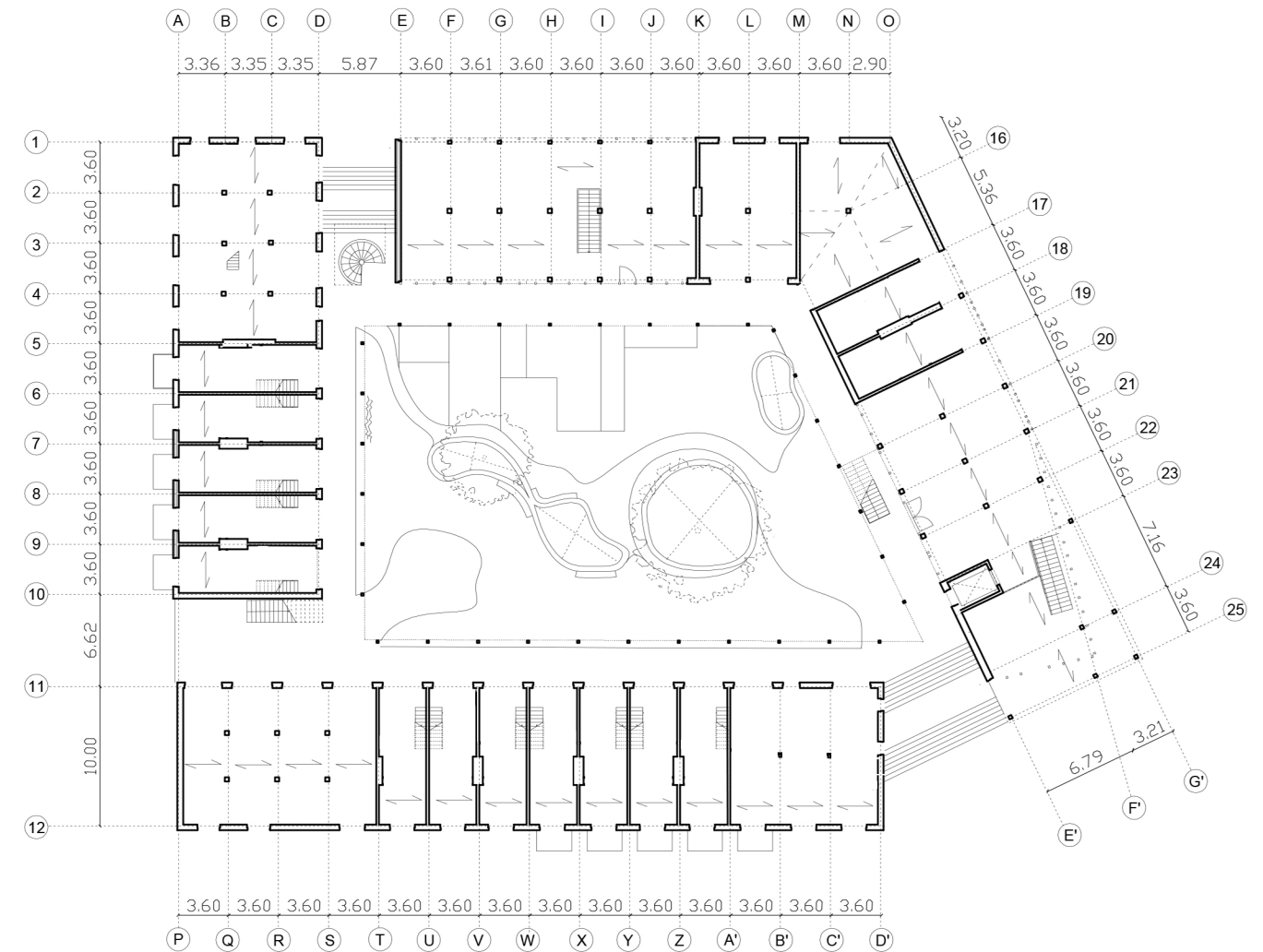


Material: Concrete

Common floorspan: 720 cm

Floor 1 (courtyard level)

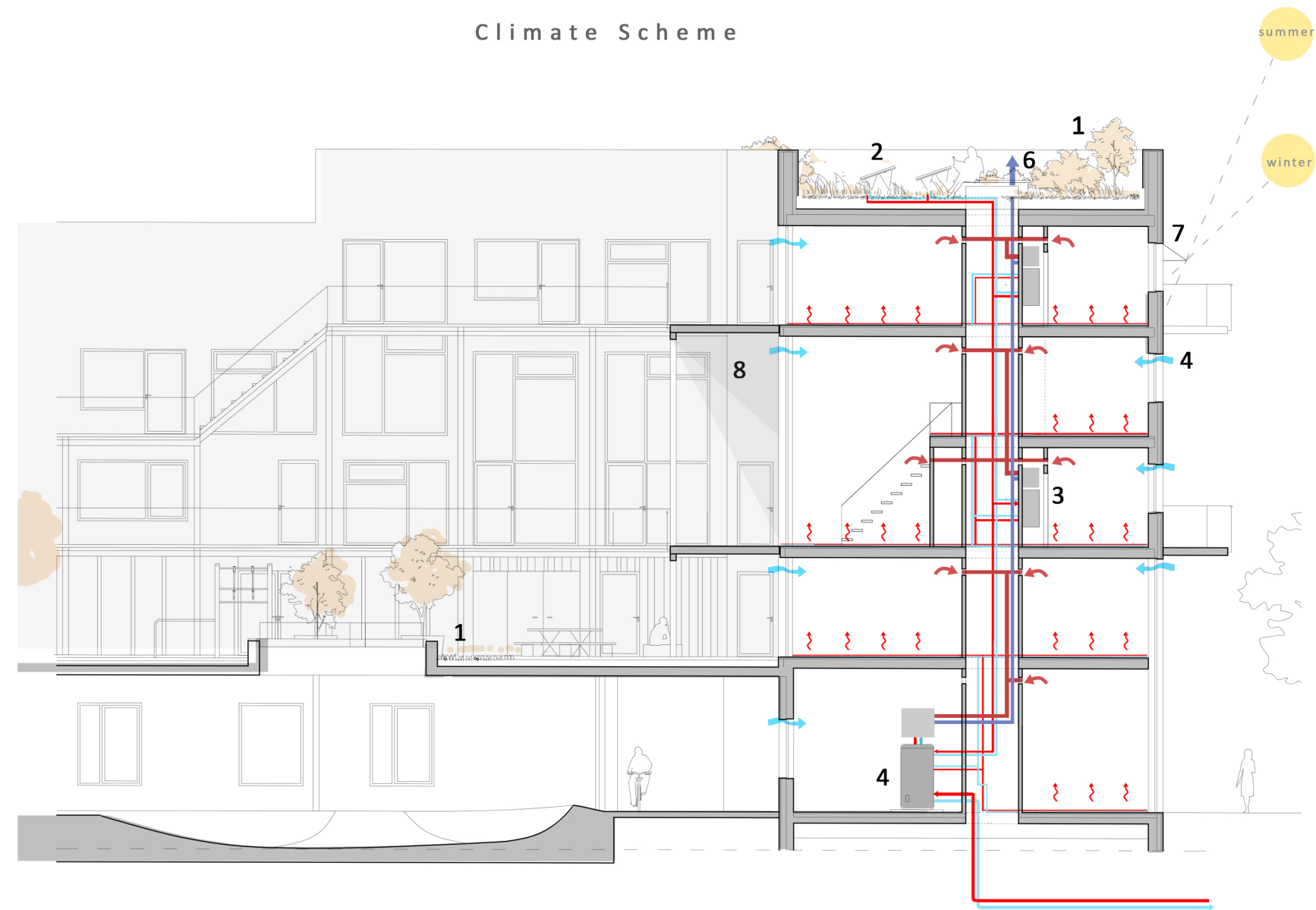
1:500



Material: CLT, timber

Common floorspan: 360 cm

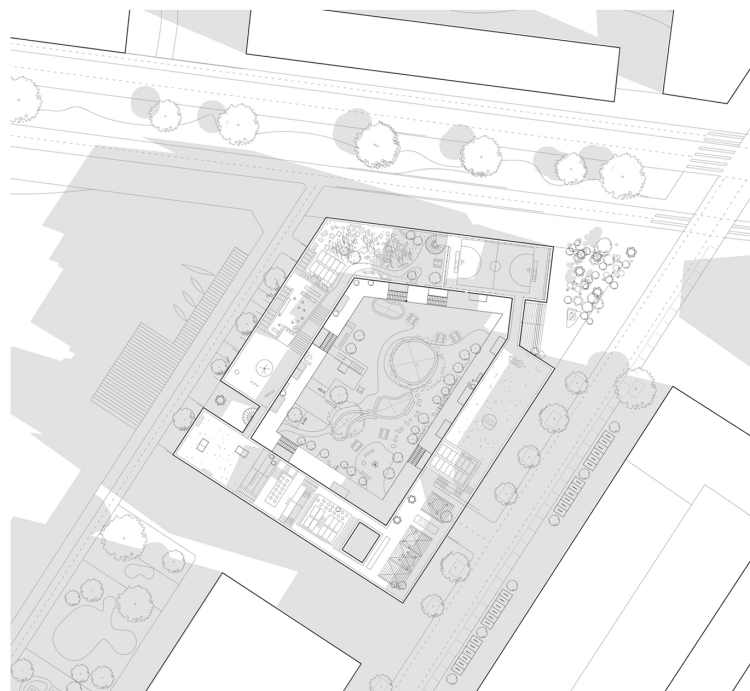
Climate Scheme



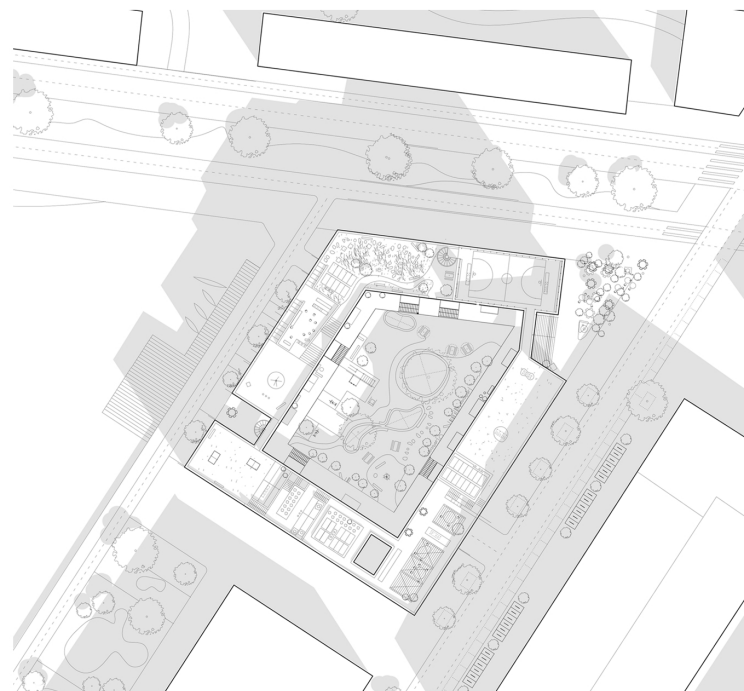
- | Greenery | | Heating | | Ventilation | | Sun Exposure | |
|-----------|--|----------|---|-------------|---|--------------|---|
| 1 | The greenery of the courtyard and the green roof help to purify the air, create environment for animals to settle, encourage biodiversity in the neighbourhood and help to reduce the heat island. | 2 | PVT panels located on the roofs are used for generating heat and electricity and warming-up | 5 | Cross-ventilation through ventilation grills in the windows | 7 | Shading blinds on the outside of the windows |
| 1a | The green roof incorporates the system of rainwater collection under the soil and is transported down through a water drainage in shafts | 3 | Heat pump collects water from the harbour based on the temperature difference and process it for heating. It is responsible for heating the ground floor. | 6 | Heat is recovered from air in each dwelling and discarded outside through the shaft | 8 | The overhanging galleries reduce the sun exposure in the summer, but allow more |
| | | 4 | The system of boiler and floor heating in each unit distributes the warmth through the flat. | | | | |

Sun Study

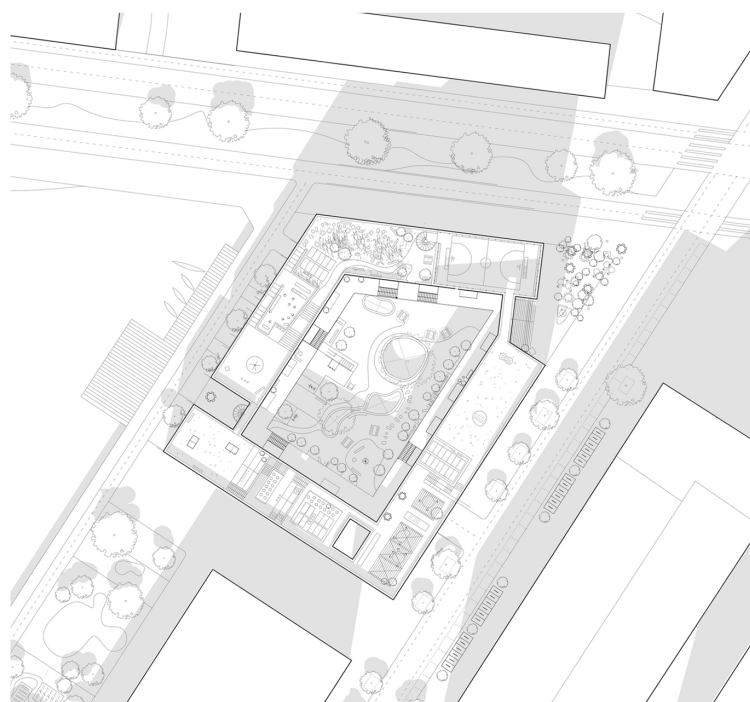
March 21st



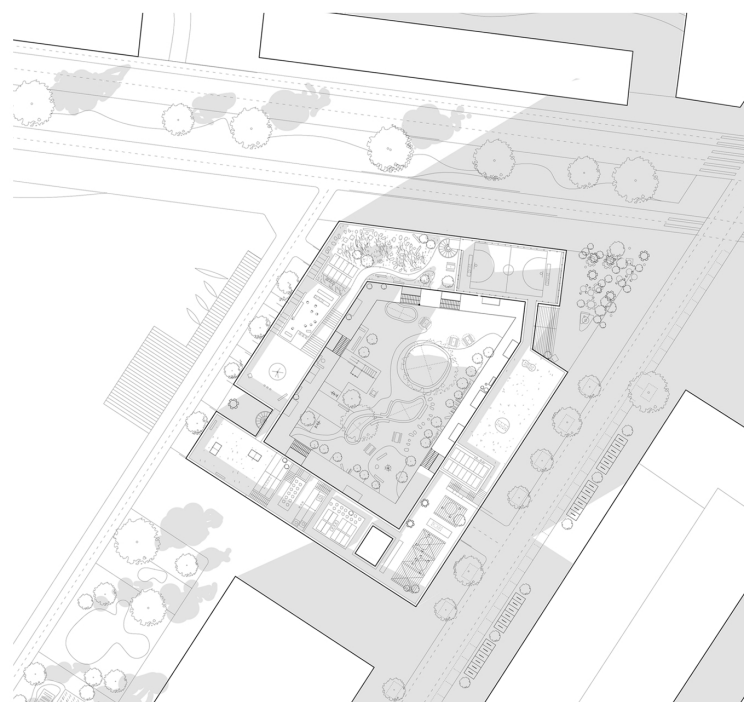
9.30



11.00

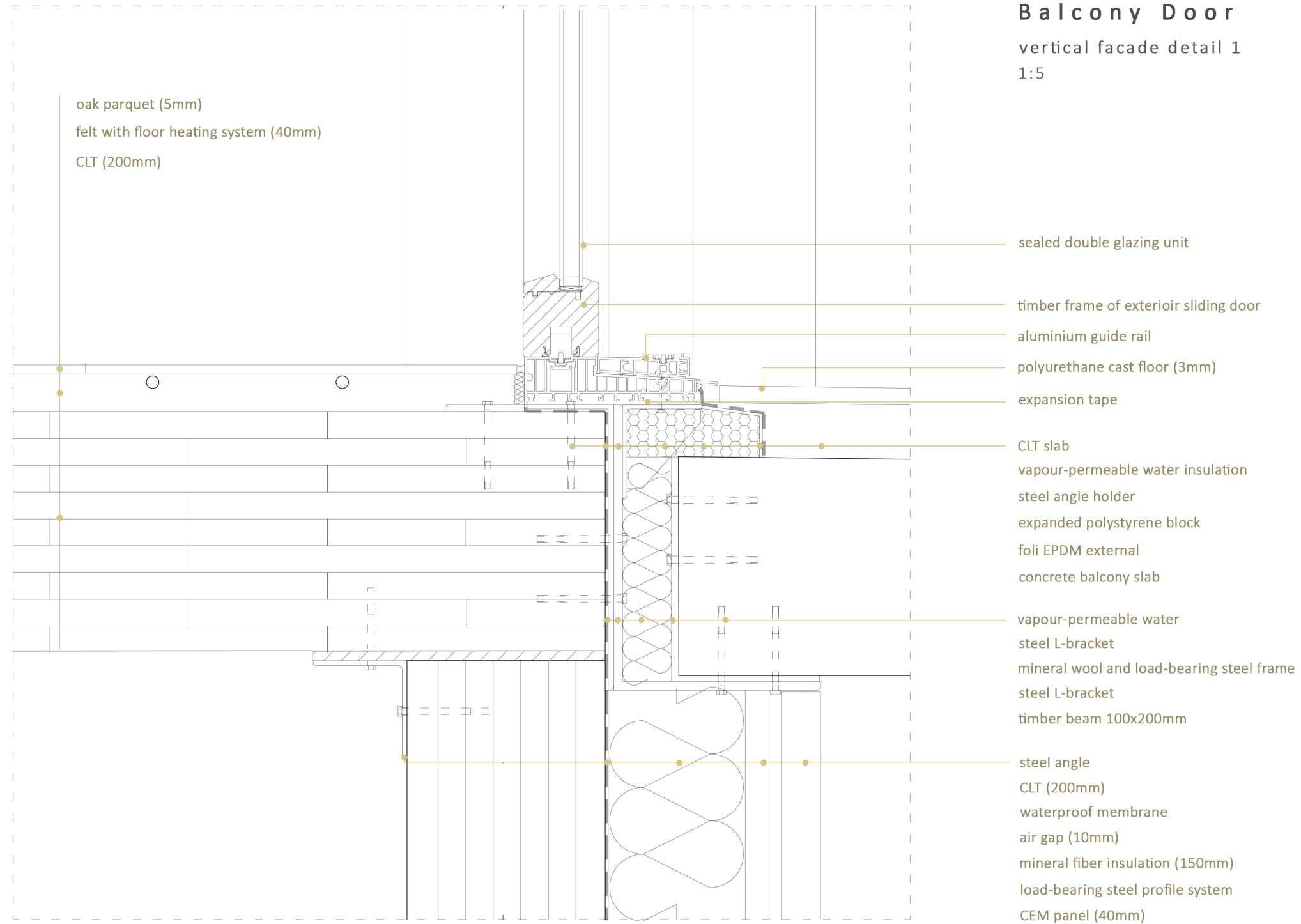


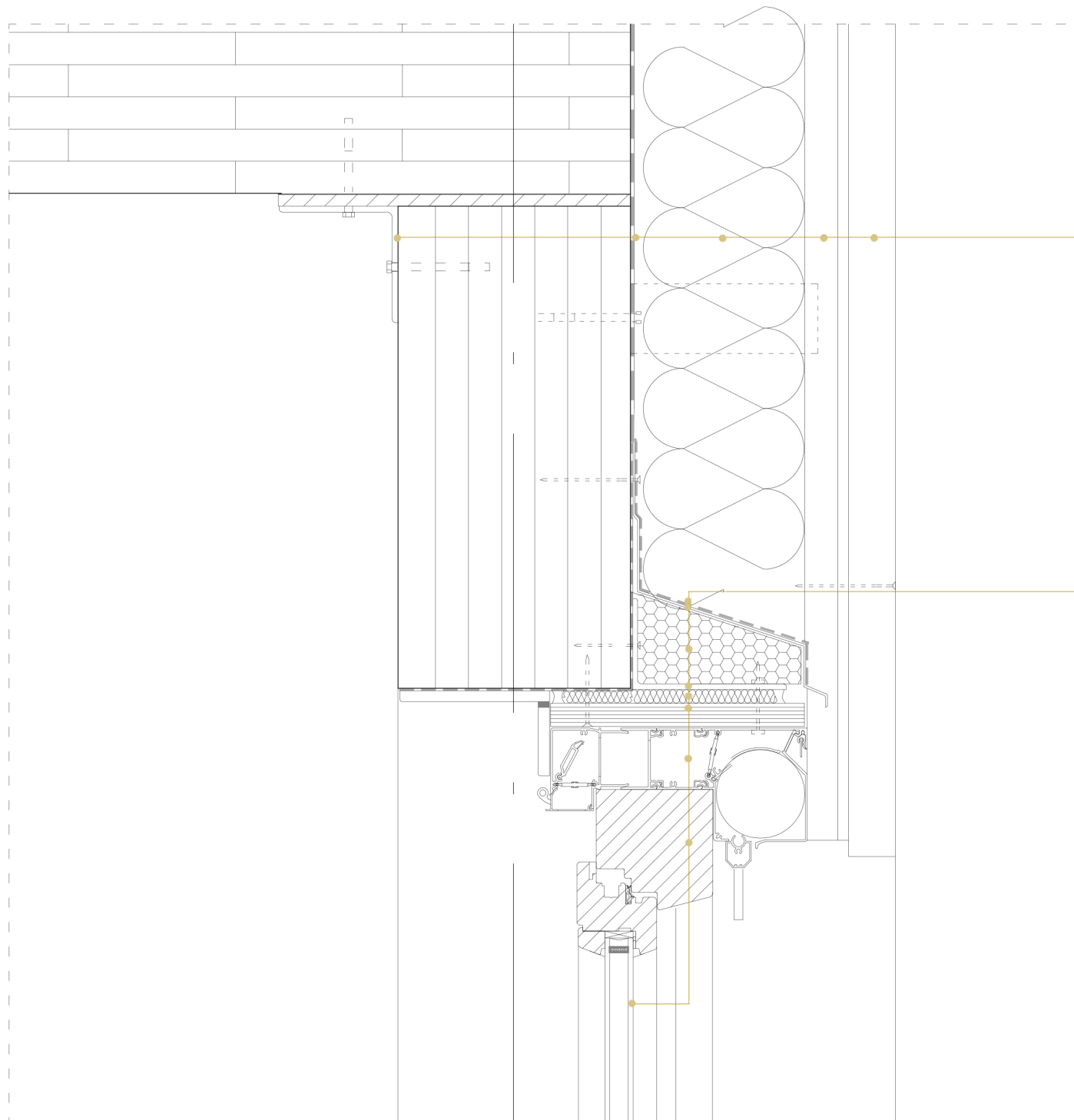
14.00



16.30

4 N





Window Head

vertical facade detail 2
1:5

steel angle
CLT (200mm)
vapour-permeable water insulation
air gap (10mm)
mineral fiber insulation (150mm)
load-bearing steel profile system
CEM panel (40mm)

sealed double glazing unit
timber window frame
duco ventilation grill with shading
some piece of wood for attaching?
expansion tape
steel angle holder
expanded polystyrene block
flexible flashing tape
flashing steel plate

Axonometry









View from the Dyke


















Presence of BETA Office principles:


1. NEIGHBOURHOOD CONNECTIONS

-  variety and continuity around the building encourage physical activity
-  multiple entrances and transparency activate public space
-  well integrated entrances generate movement between interior and exterior
-  canopies and awnings provide shelter
-  stairs and ramps act as a buffer between private and public space
-  destinations in public space encourage physical activity













2. ROUTES

-  unique stair configuration invite use
-  stairs on the main routes are more likely to be used
-  stairs near the elevator are more likely to be used
-  stairs near the entrance are more likely to be used
-  interior and exterior views are rewarding
-  combining routes and destinations create experience
-  horizontal variation enhances experience
-  stairs with lower inclination are easier to climb
-  wide stairs are more appealing
-  hidden elevators are less likely to use
-  curiosity evokes movement
-  natural ventilation makes welcome change
-  well-lit stair environment is safer and more inviting
-  a programmed elevator makes climbing stairs
-  high-quality materials last longer
-  make stairs as appealing as adjacent area
-  senses ask to be stimulated
-  signage encourages physical activity
-  visible stair environment stimulate use
-  daylight attracts

3. ACTIVITY PROGRAMME

-  active furniture promotes health
-  activity spaces encourage physical activity
-  exercise equipment prompts physical activity
-  visible activity spaces with a view are more frequently used
-  broadly oriented activity spaces are more frequently used
-  bicycle parking encourage activity use
-  changing rooms and showers encourage activity use
-  storage encourages sports


4. DESTINATIONS

-  a variety of models makes people move
-  social hubs attract
-  drinking fountains encourage short breaks
-  centralization benefits activity and environment
-  keep distances reasonable and practical
-  collective spaces attract
-  grouping auxiliary functions generates social contact
-  dispersal of auxiliary functions prompt movement
-  communal outdoor spaces form a destination
-  entrance functions on alternate floors prompt movement
-  combining destinations and routes encourages movement
-  placing of frequently used functions at a distance

Presence of BETA Office principles:

1. NEIGHBOURHOOD CONNECTIONS

 variety and continuity around the building

 multiple destinations in public space
(and destinations for the public inside the building)

2. ROUTES

 unique stair environment invite use

 combining routes and destinations creates experience

 senses ask to be stimulated

 visible stair environment

3. ACTIVITY PROGRAMME

 exercise equipment prompts physical activity

 visible activity spaces with a view are more frequently used

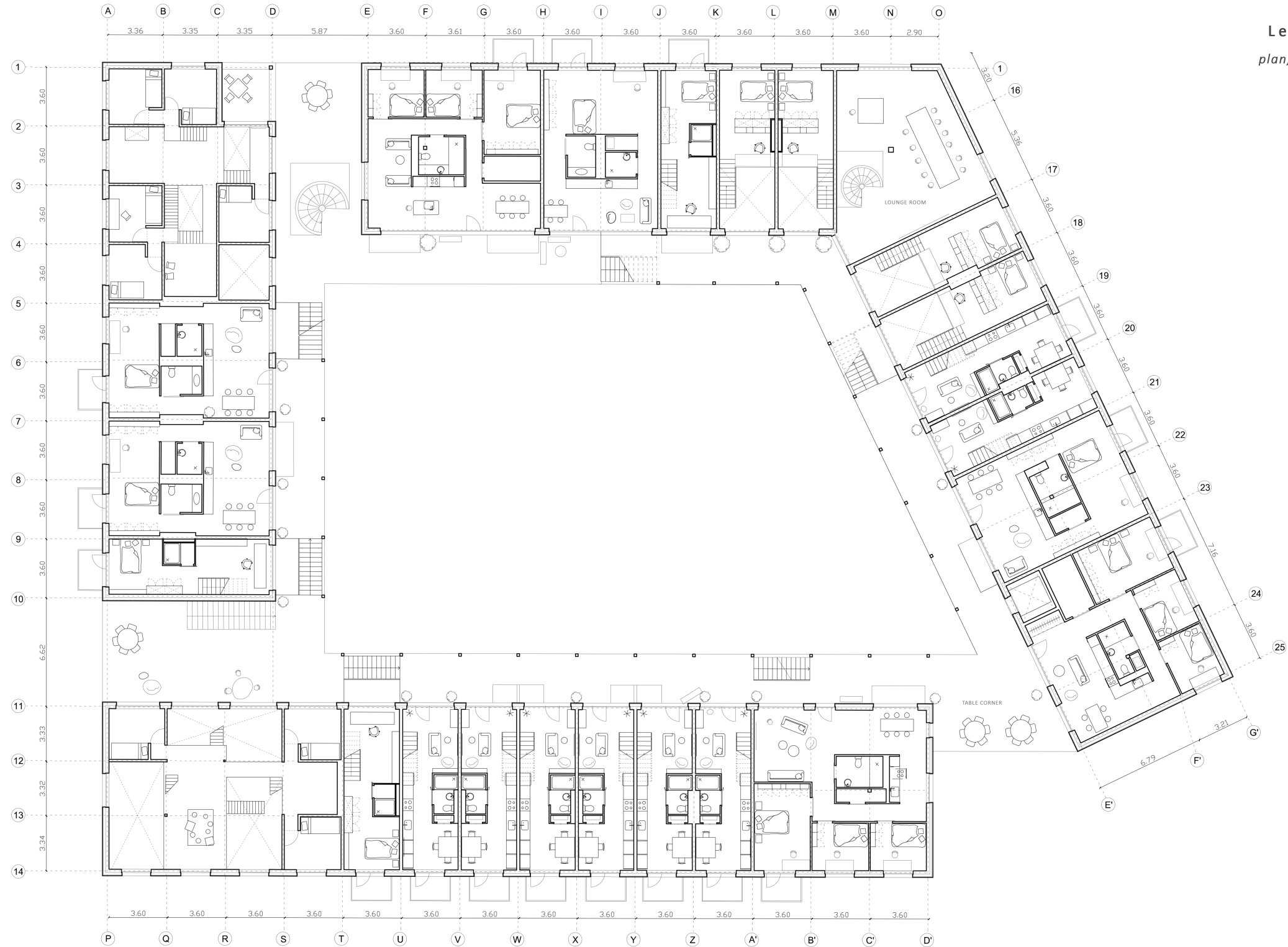
4. DESTINATIONS

 centralization benefits activity and environment

 communal outdoor spaces form a destination

 combining destinations and routes encourages movement

 placing of frequently used spaces at a distance



Level 3

plan, 1:200

Level 6

The Roof

plan, 1:200

