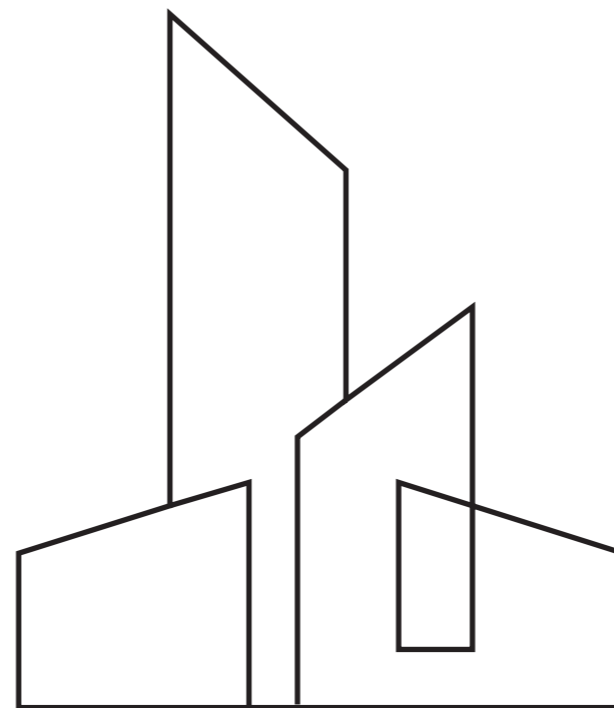


Young professionals in the city
Designing affordable dwellings for young professionals

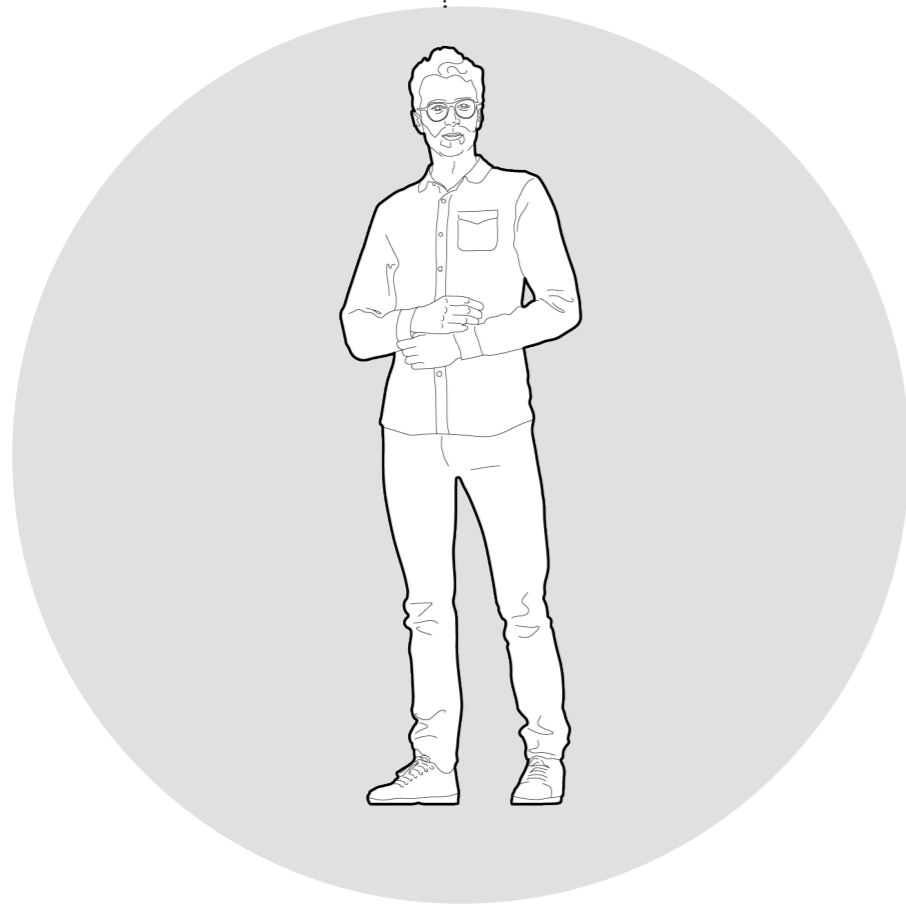


Research
Architecture - design
Building Technology

Research

Who are Young Professionals?

Young Professional: is the stage of life that comes after the stage of the student's life (HBO or WO), it is between the age of 20 to around mid 30s.



Problem

Trouw

Huizenprijzen

Segregatie op de woningmarkt: veel starters kunnen geen huis kopen zonder 'eigen geld'

Het Parool

'Ik ben niet rijk maar ook niet arm genoeg voor een geschikte woning'

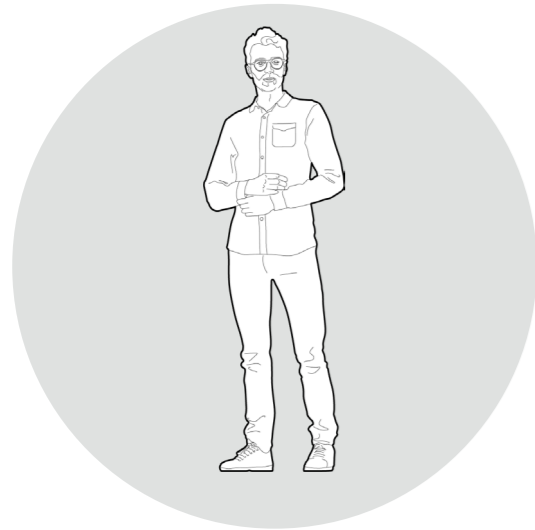
Ook zij zoekt dat klompje goud in de Amstel: een normale, betaalbare huurwoning. Maar Helma van Aalderen hoort tot de groep sociale huurders zonder recht op woonsubsidie en valt dus helemaal buiten de boot.

'Jongeren zijn de dupe van dit eigenaardige huursysteem'

Nederland ziet graag meer internationaal jong talent komen, maar kan jongeren nauwelijks fatsoenlijk woonruimte aanbieden, schrijft Charlie McGregor. 'De Nederlandse huurwoning stamt uit een ander tijdperk.'

Tekort aan woningen in de regio wordt alleen maar groter: jongeren de dupe

Ondanks de ambitieuze [bouwplannen](#) voor de regio Rijnmond, dreigt het woningtekort de komende jaren alleen maar groter te worden. Komend jaar zal er in de regio een tekort van bijna 18.000 woningen zijn. In 2025 zijn dat er naar verwachting 21.100, zo blijkt uit nieuw onderzoek van Capital Value en ABF Research. Vooral jongeren zijn de dupe.



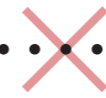
Young professionals

- Annual average income 42.000 to 45.000 euro



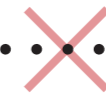
Social housing sector

- Maximum annual income 39.055 euro
- Waiting period not less than 5 years



Owner occupied sector

- Low income to get enough mortgage
- Too much study debts



Private rental sector

- It consumes about 41% of their income

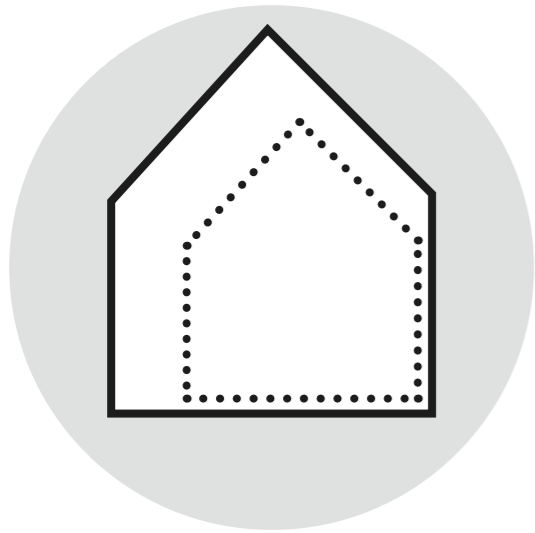
Research question

How to provide **affordable** and **suitable** dwelling for the Young Professionals?

Suitability: What are the housing needs of Young Professionals?

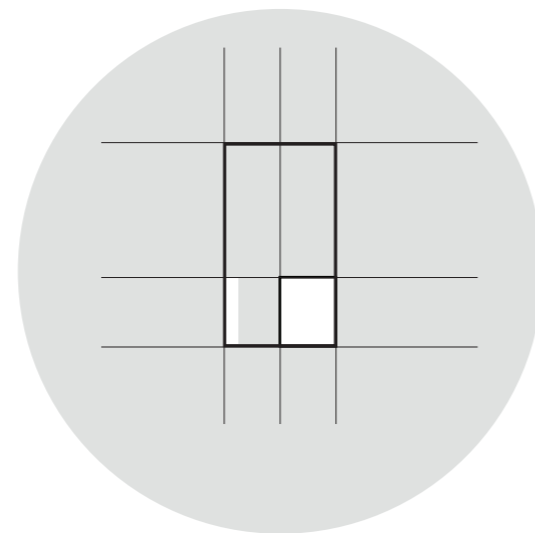
Affordability: Which architectural strategies impact the affordability of a residence?

Affordability



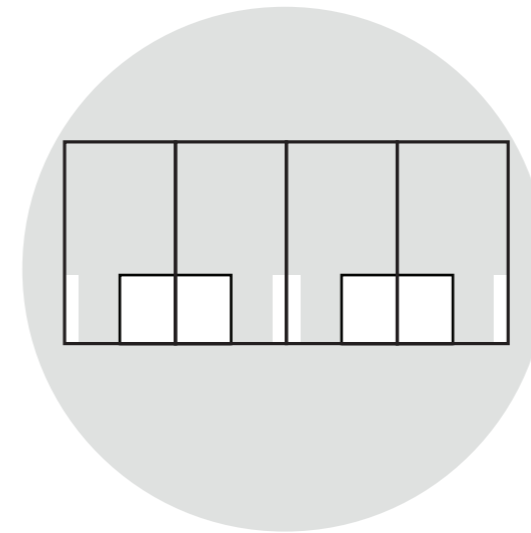
Reducing the square meters

- By shrinking the size of the apartment into micro-apartment the rent will be affordable to the tenants.



Standardization

- By standardizing the repetitive elements in the dwelling, such as the WC or the private outdoor spaces. Here, no additional calculation must be done on the total cost of the facility.



Repetition

- By repeating the standardized elements in order to avoid the extra costs in the building process. Repeating the method of standardization and repetition can lead to prefabrication.

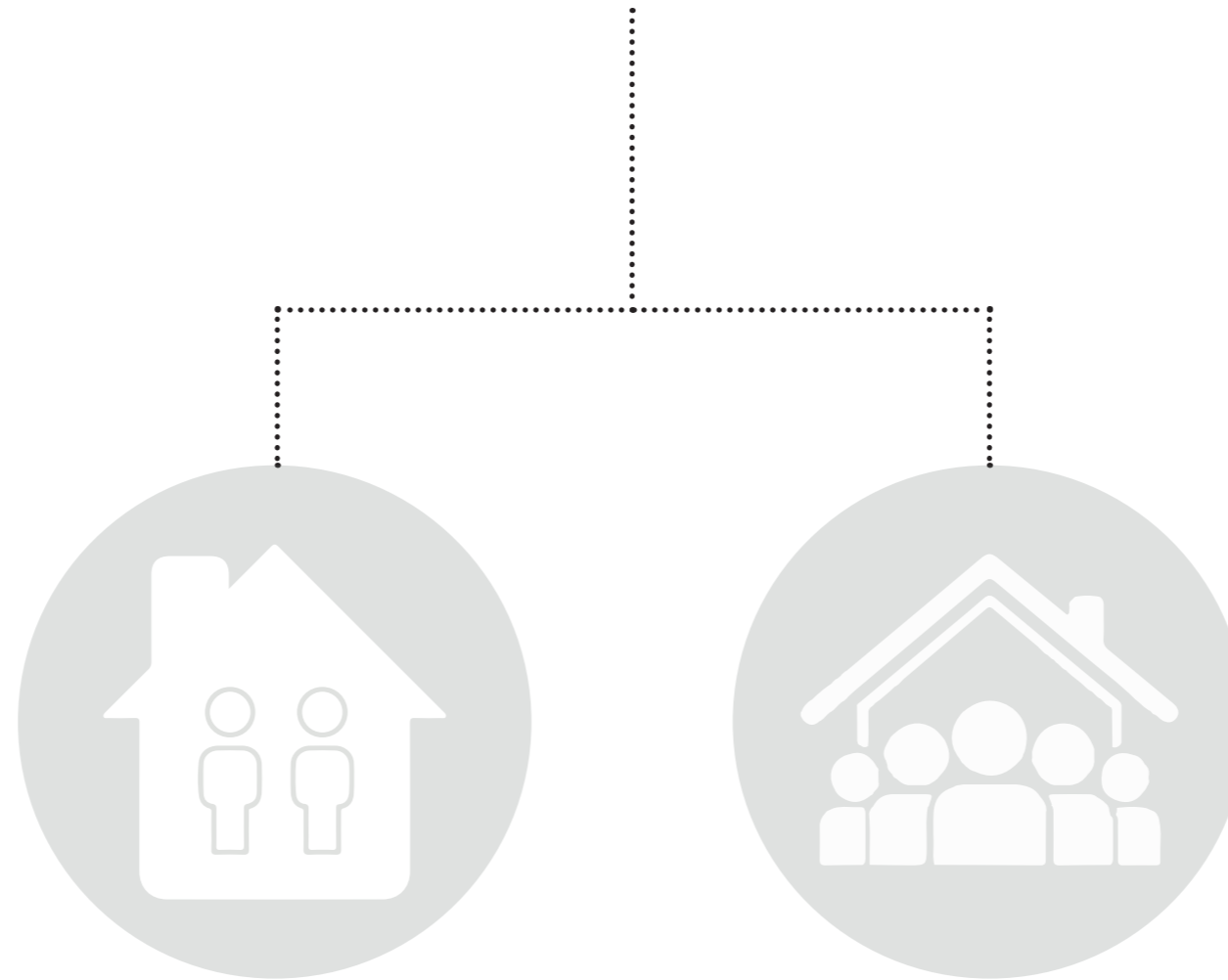


Renewable resources

- Depending on renewable resources can help reducing the cost of the monthly paid bills.

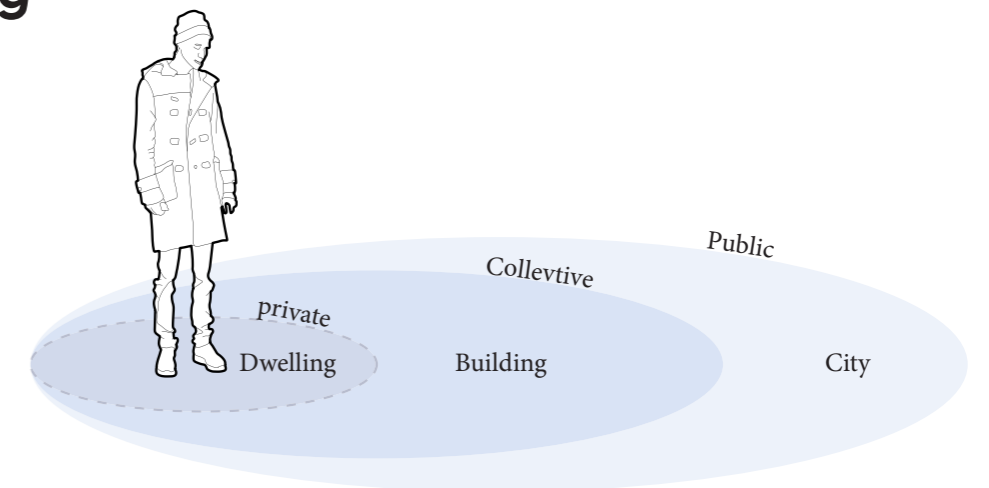
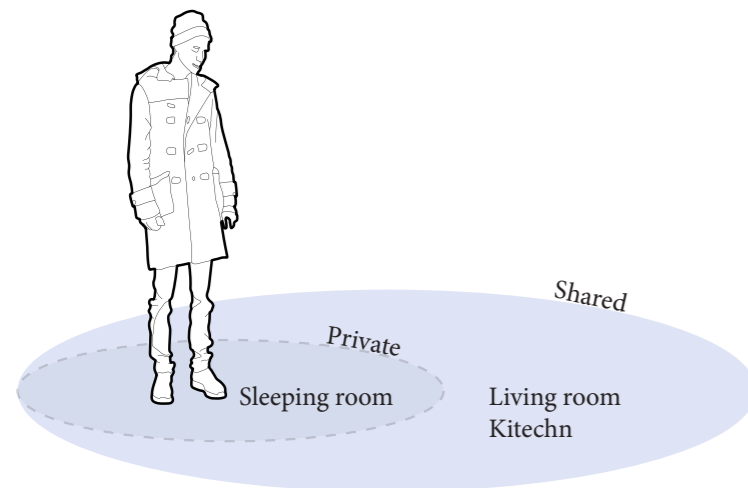
Suitability

Shared living

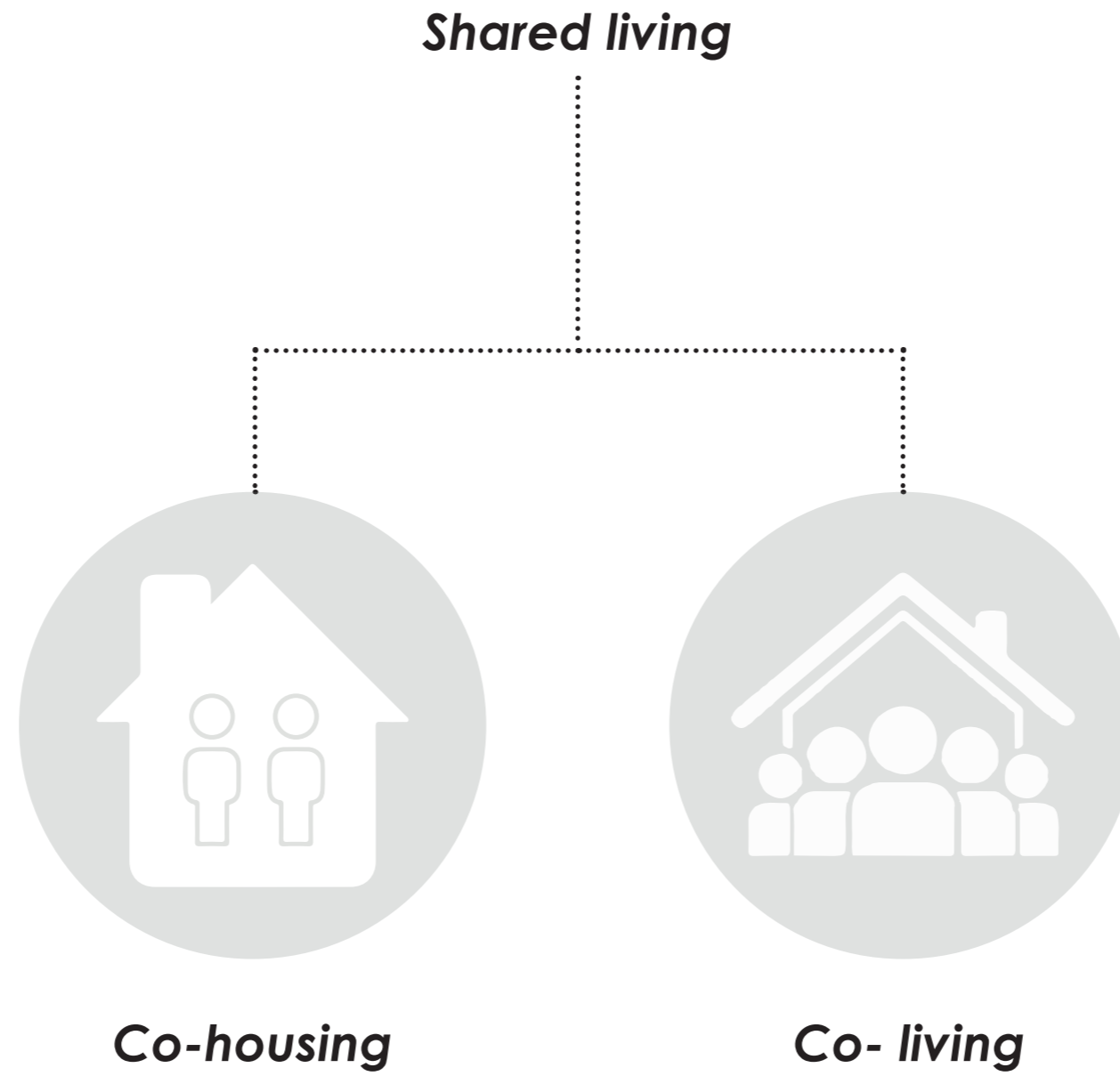


Co-housing

Co-living



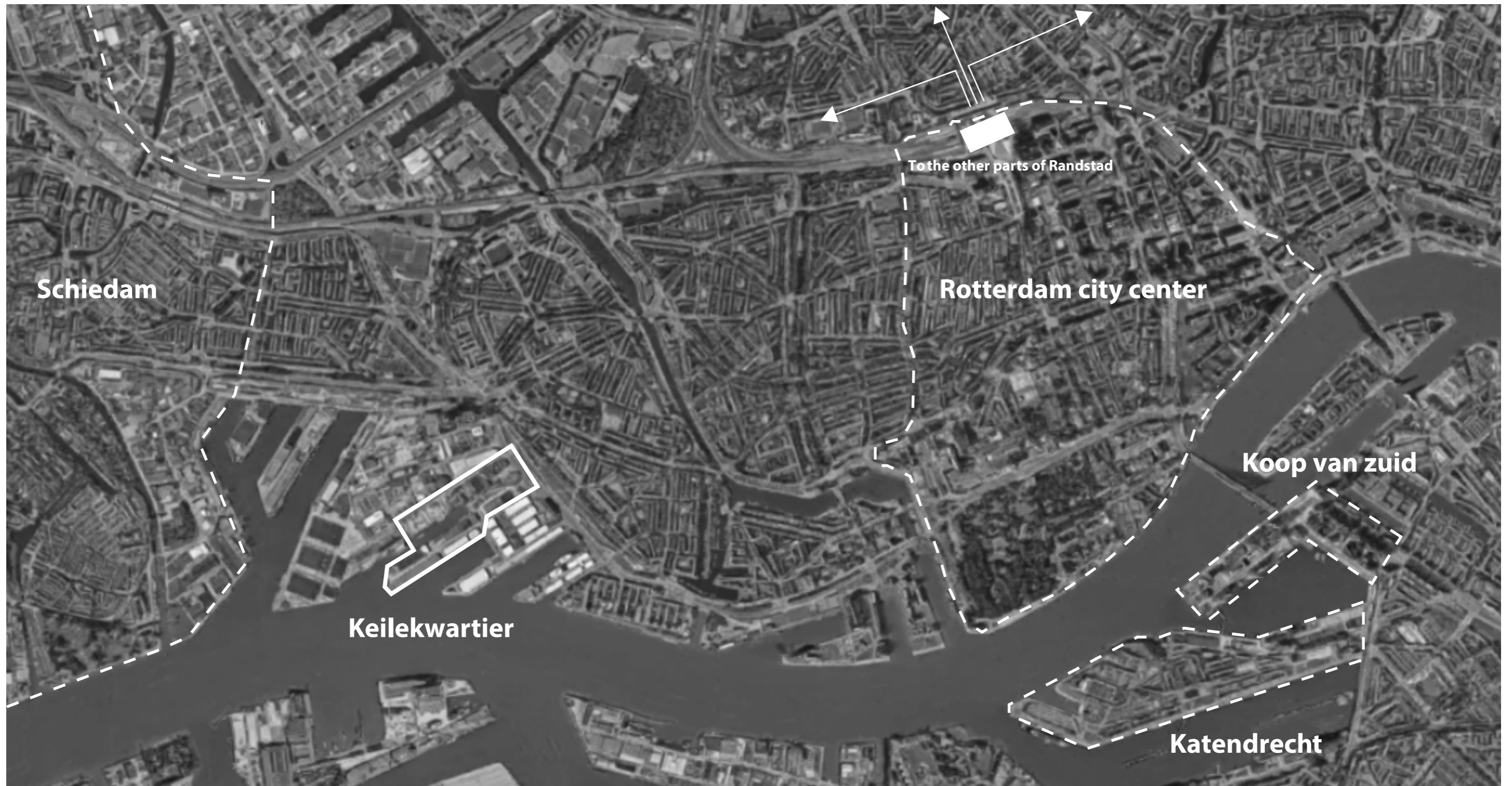
Suitability



Yes

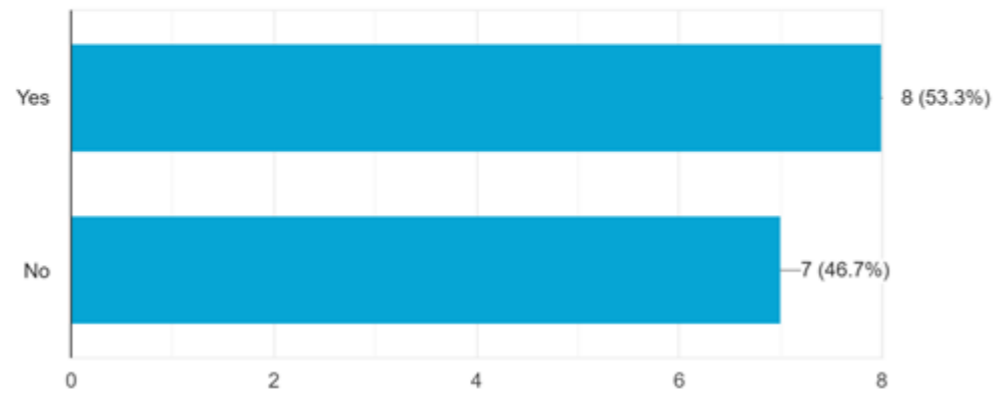
No

Merwe vierhaven, Rotterdam



Suitability/Questionnaire Results

Do you prefer to live alone or to share your dwelling with other tenants (such as a friend)?
15 responses



What would you prefer to have in your current accommodation?

8 responses

Extra storage area

Maybe, large windows to the floor. I visited a friend of mine who has these windows. The sunlight was amazing and the apartment seemed to be bigger

For sure, updated water cys and bathroom. And a bigger living room, especially, during the COVID19 and everything is closed so we use it frequently.

A bigger living room and a bigger balcony.

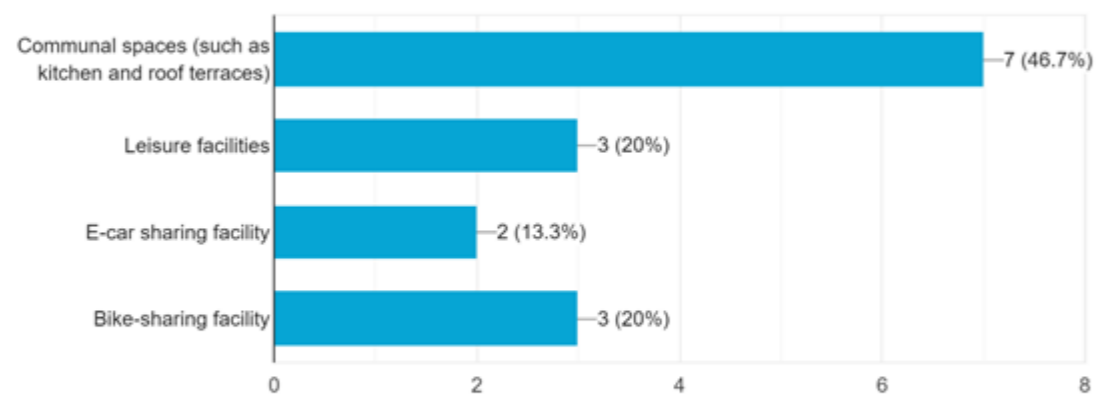
I still living with my parents. however I prefer to have a big living room with a nice view.

Maybe a bigger bedroom, because the one that we have is really small and it does not fit a big closet

An adequate area to place my desk.

Storage for my bike

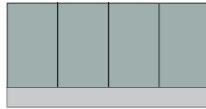
What are the building-related facilities that influence your decision?
15 responses



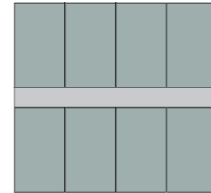
Suitability

Related reference projects

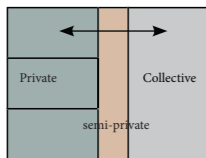
Gallery



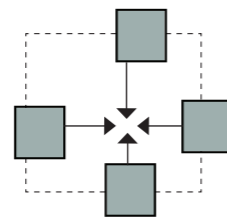
Corridor



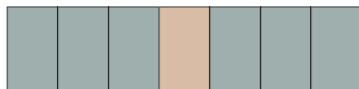
Transition zones



Interaction among clusters

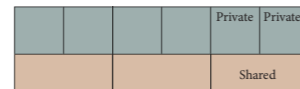


Co-living



Clusters: dwellings and communal facilities and dwelling division

Co-housing



shared facilities in the same dwelling and dwelling division



Villa Mokum by Kampman Architecten



Westbeat by Studioninedots



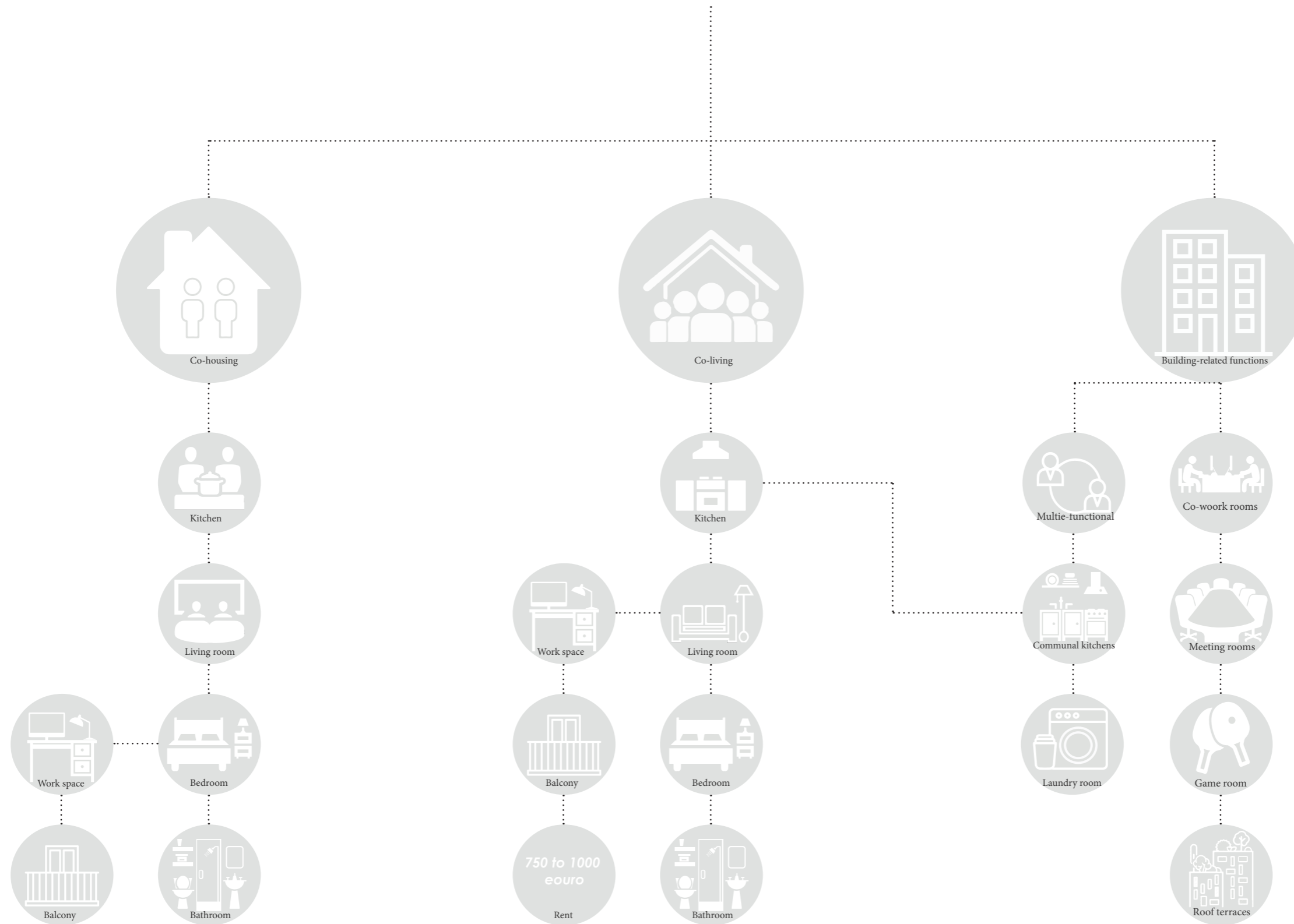
The FIZZ Don Bosco by Studioninedots



Tietgen Dormitory by Lundgaard & Tranberg

Outcomes

Shared living

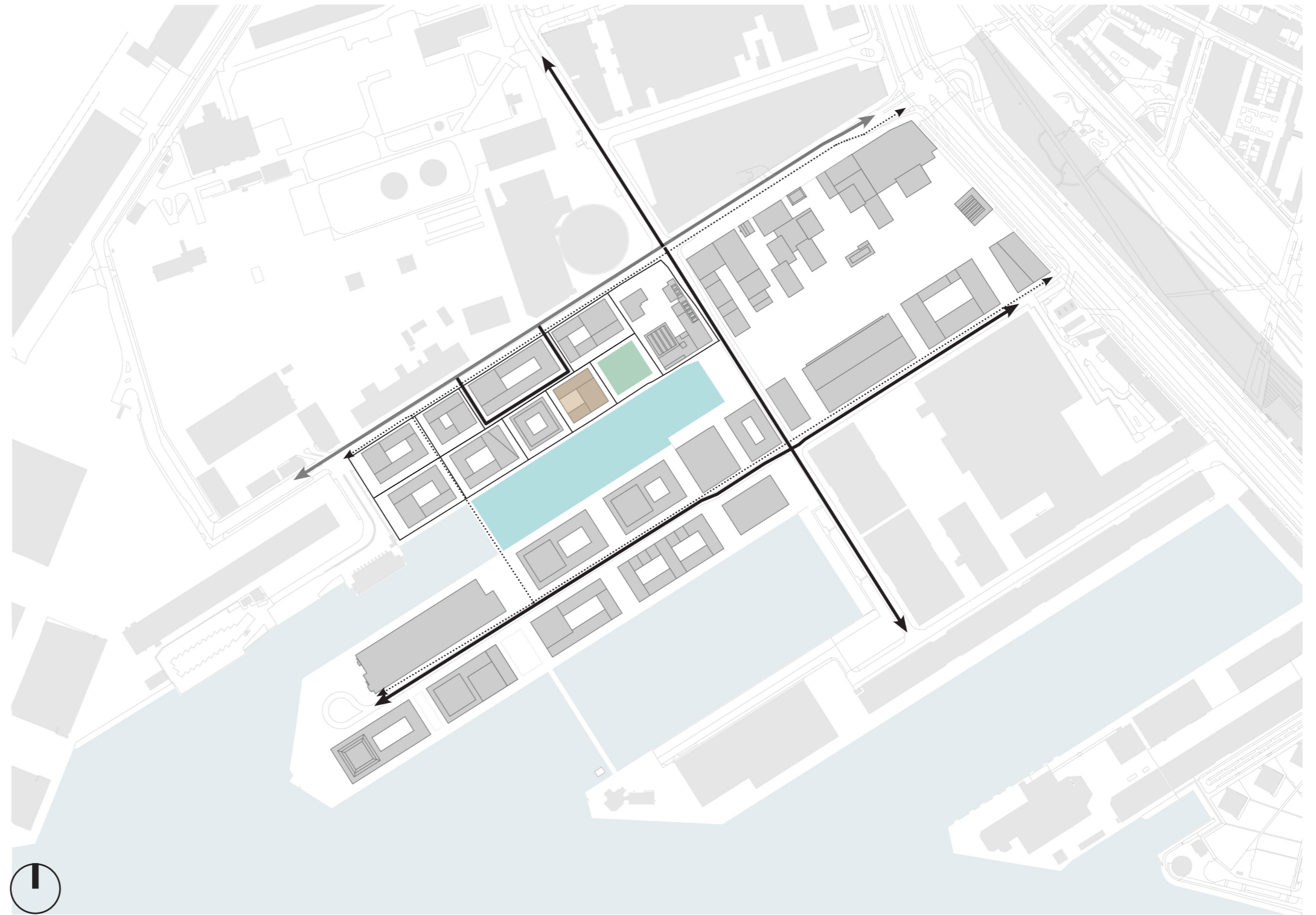


M4H, Rotterdam

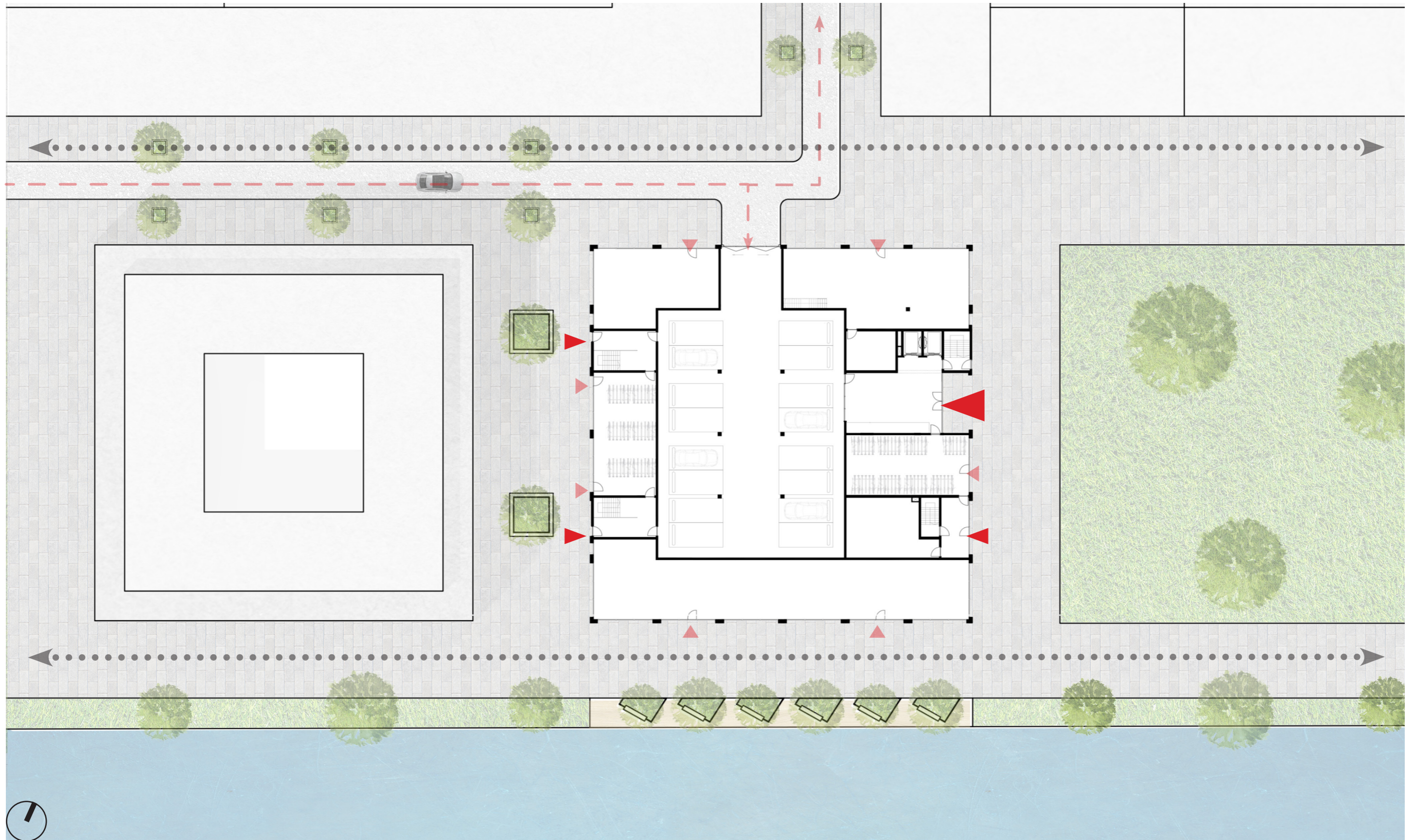


Master-plan

- Vehicular routes
- ⋯ Bicycle routes
- Pedestrian routes
- Park
- Water-front
- Plot 21



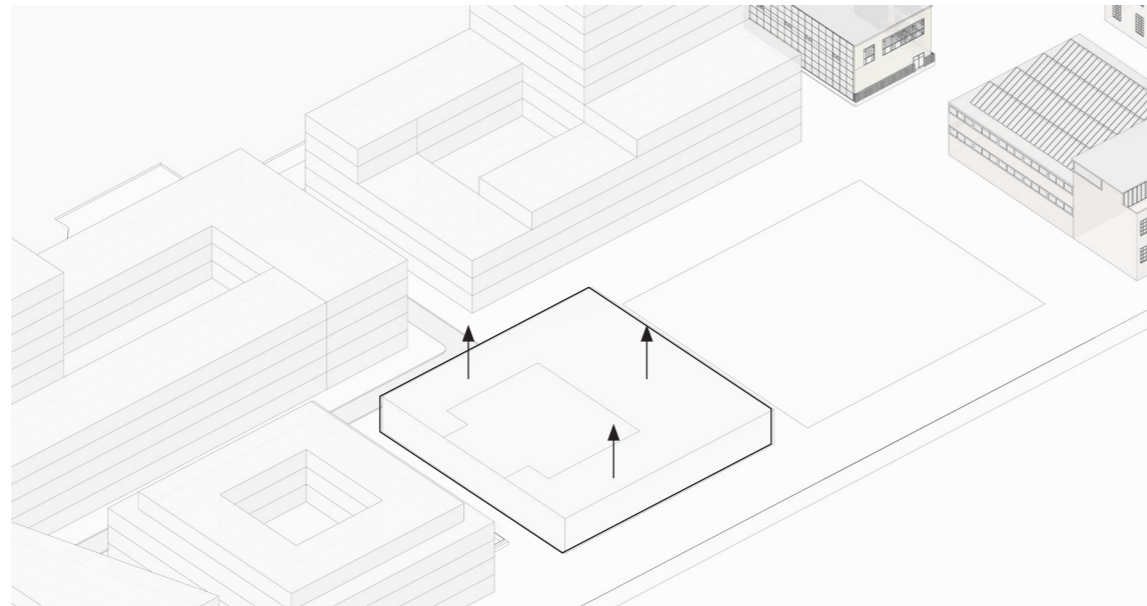
Master-plan



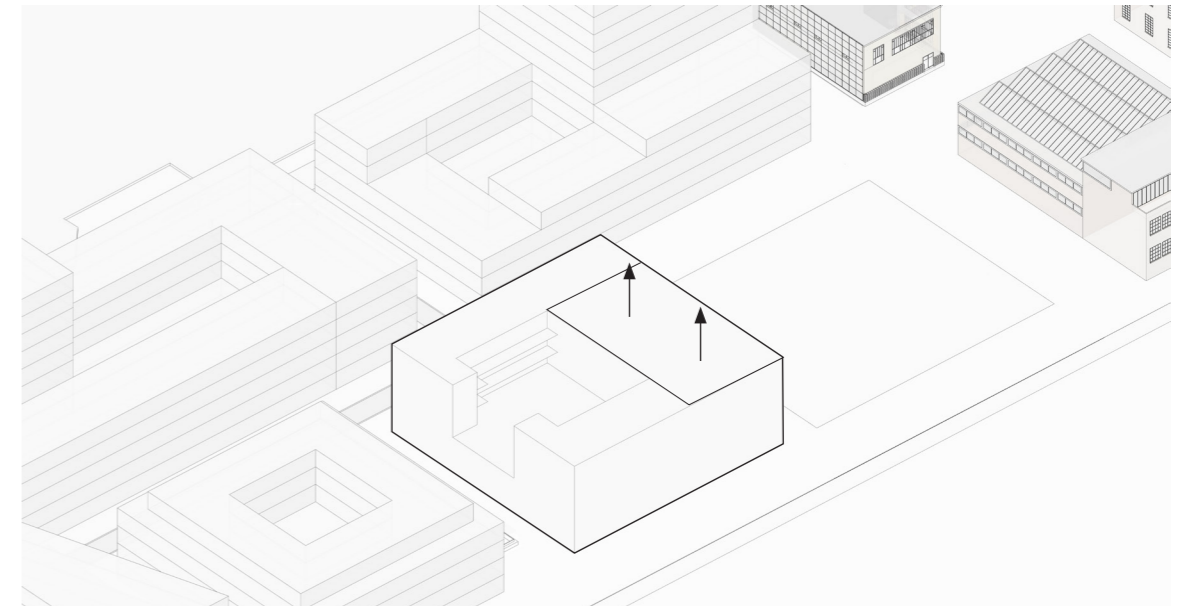


Morphology of the block

Concept

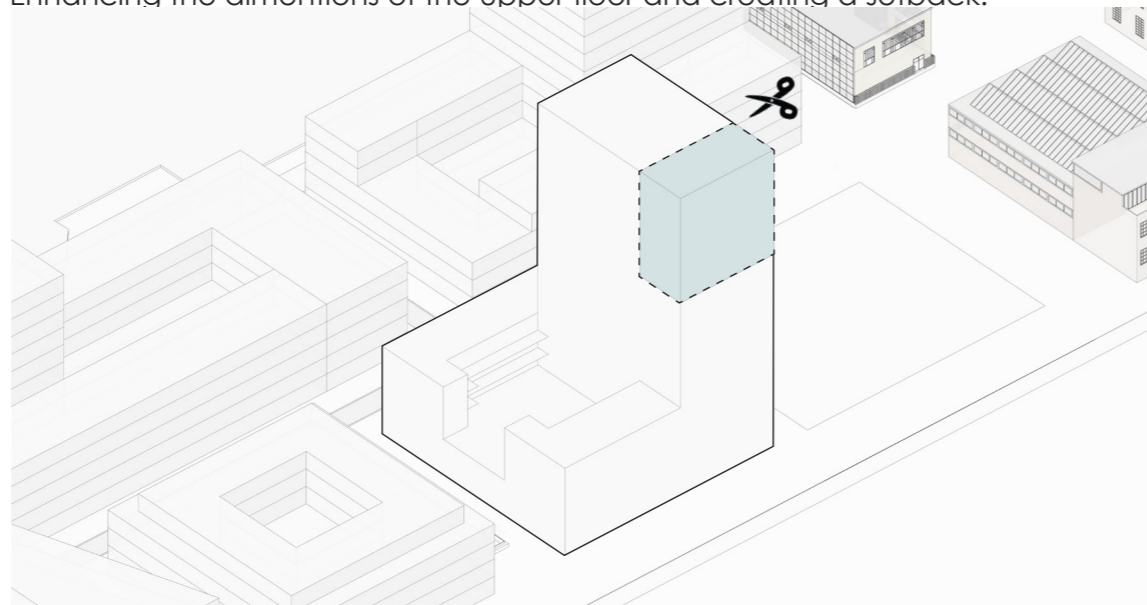


Adding the commercial function to the ground floor. In addition, the parking for both cars and bikes is in the ground floor. The total height of the plinth is 6m.

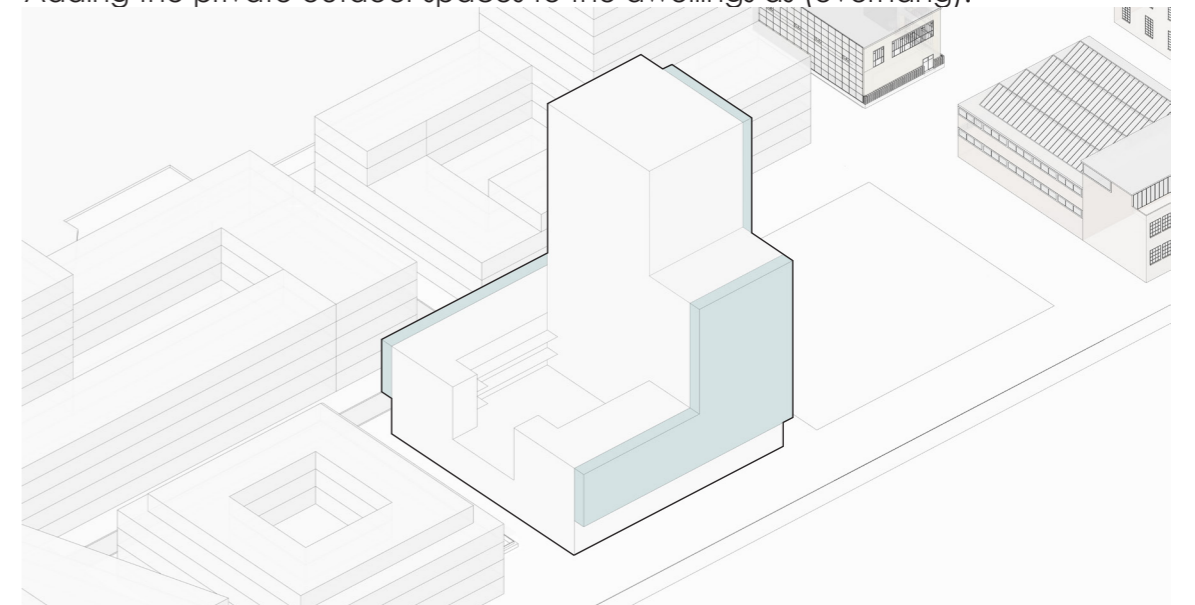


Densifying the FSI by expanding the expansion vertically.

Enhancing the dimensions of the upper floor and creating a setback.



Adding the private outdoor spaces to the dwellings as (overhang).



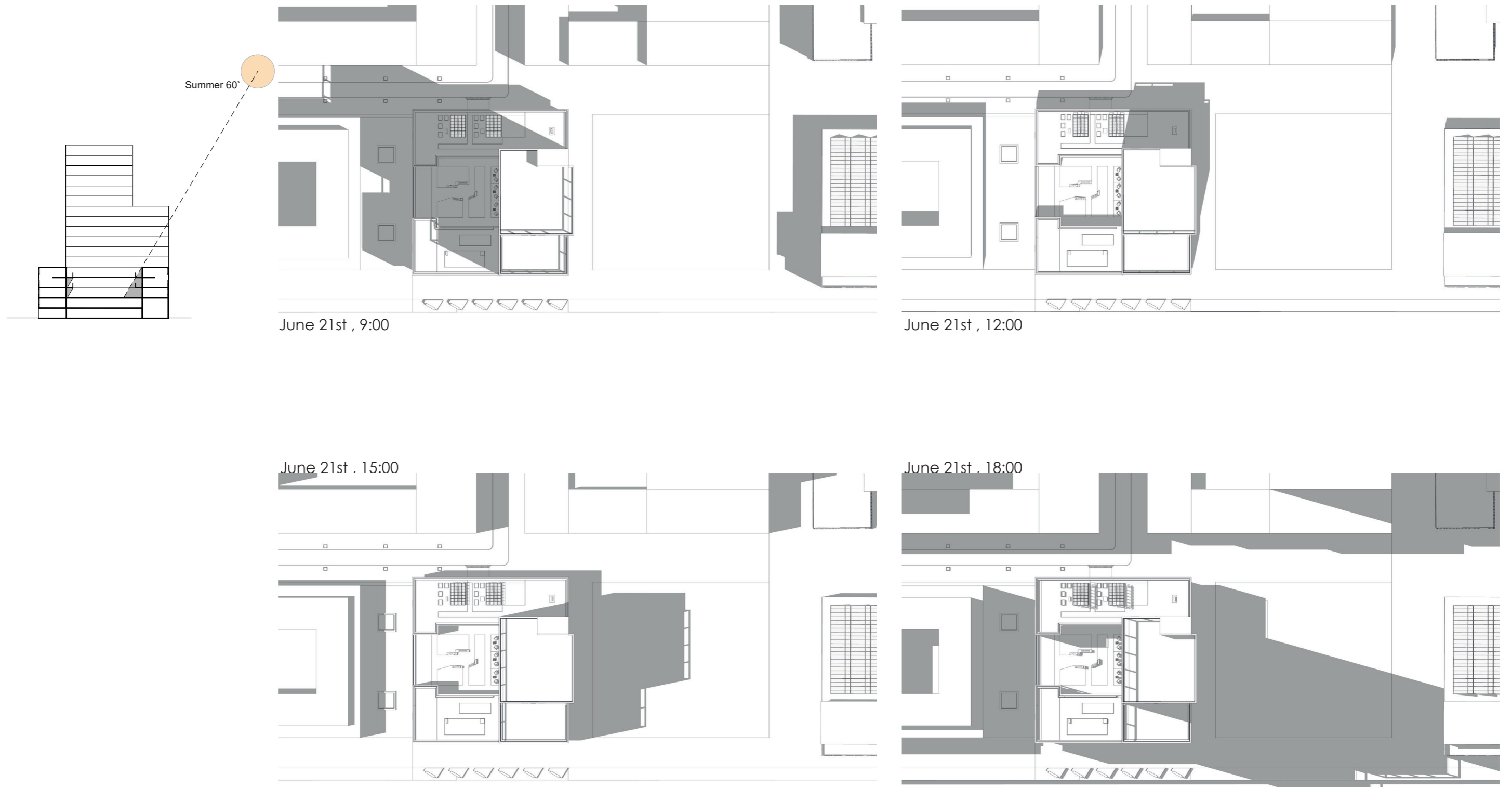
Orientation

Sun and shadows

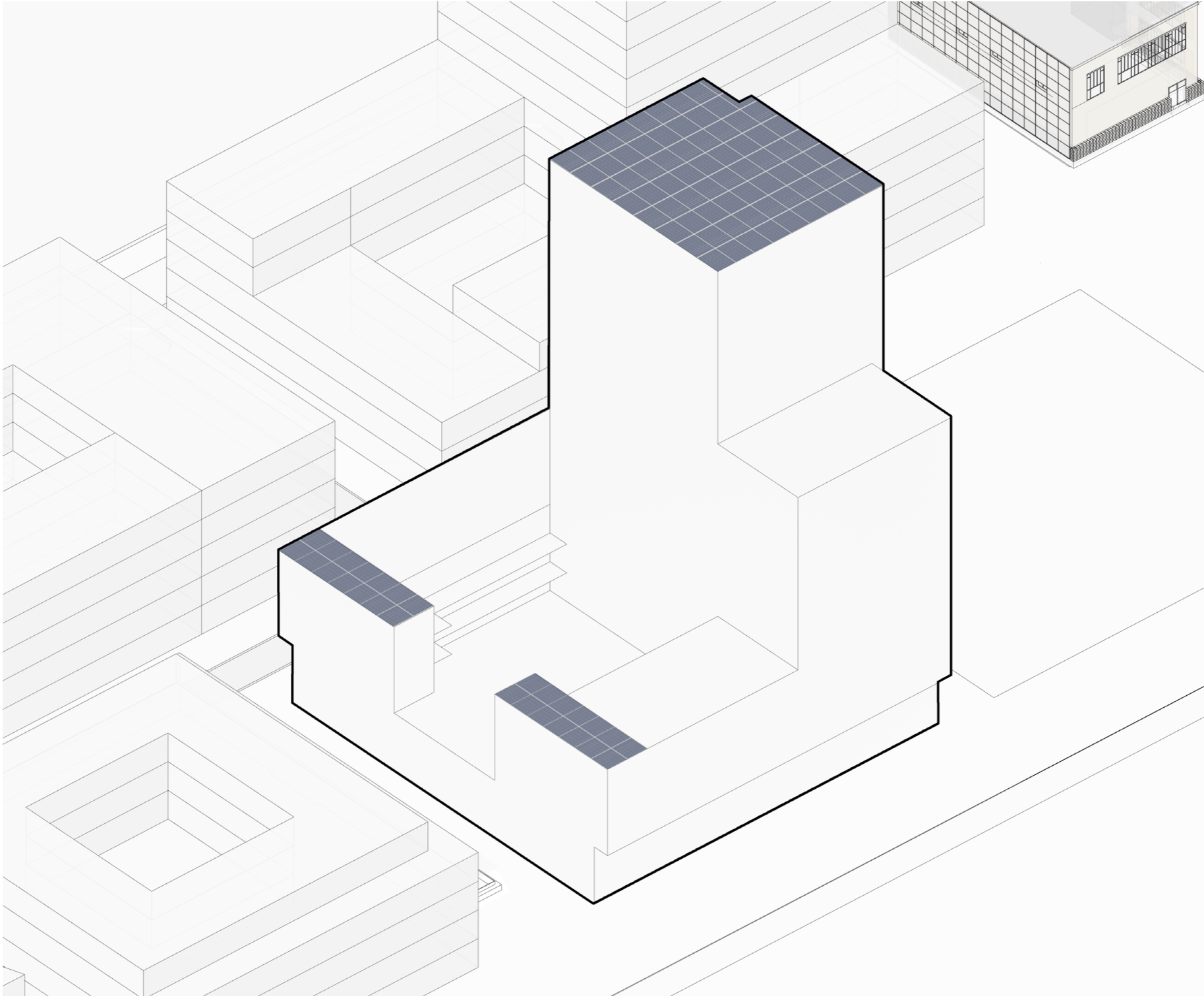


Orientation

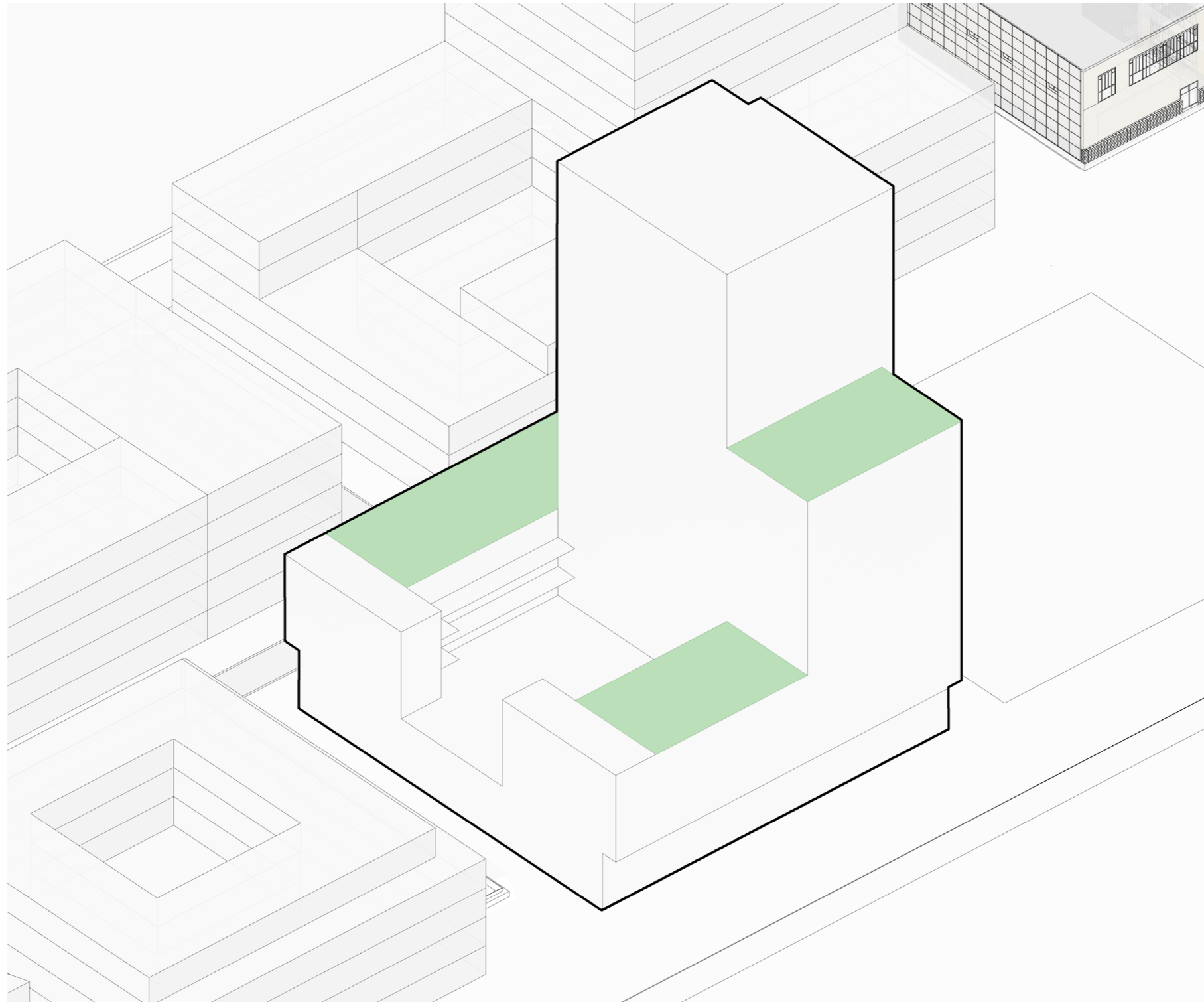
Sun and shadows



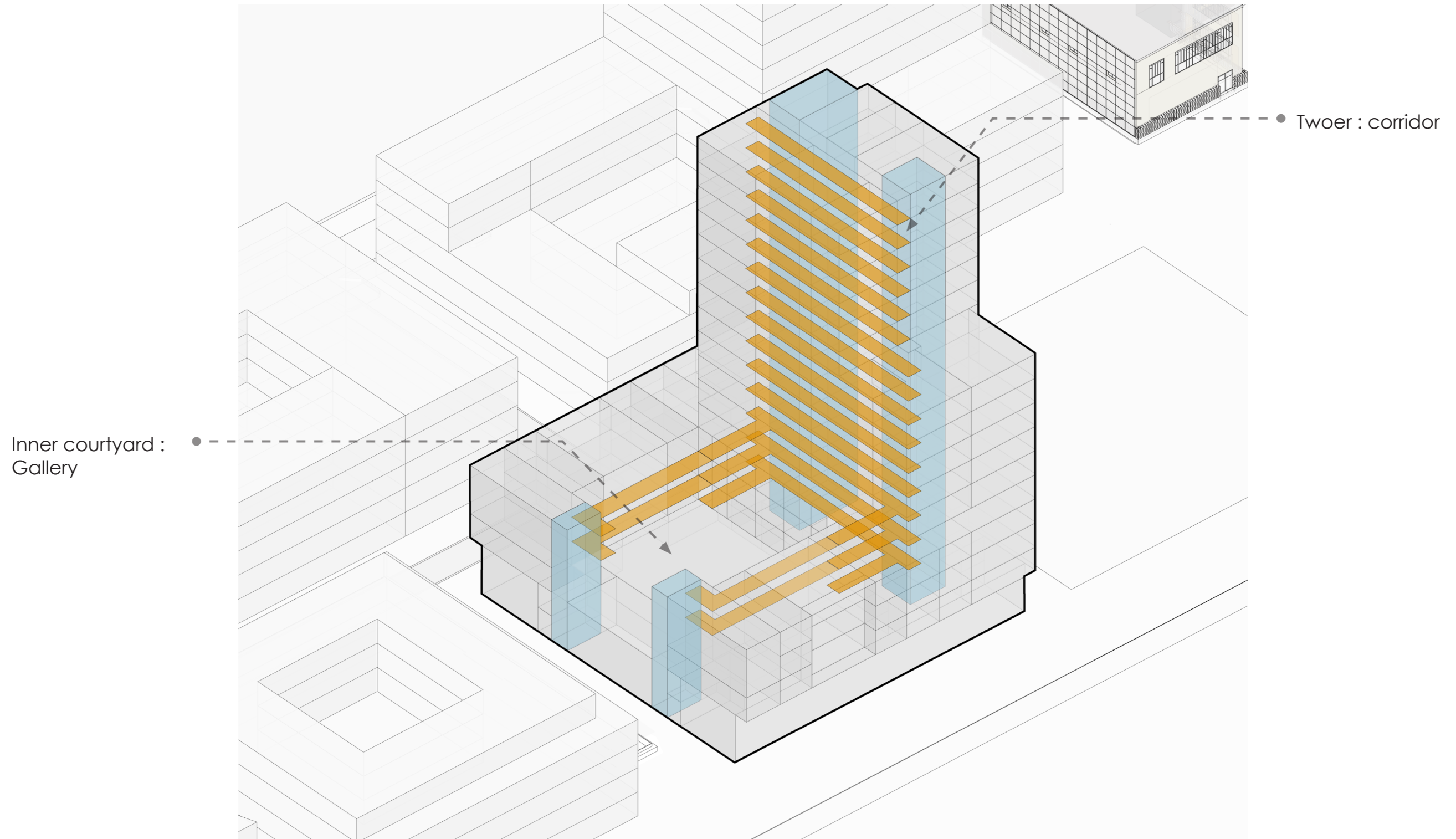
Allocating spaces for solar panels



Creating roof terraces




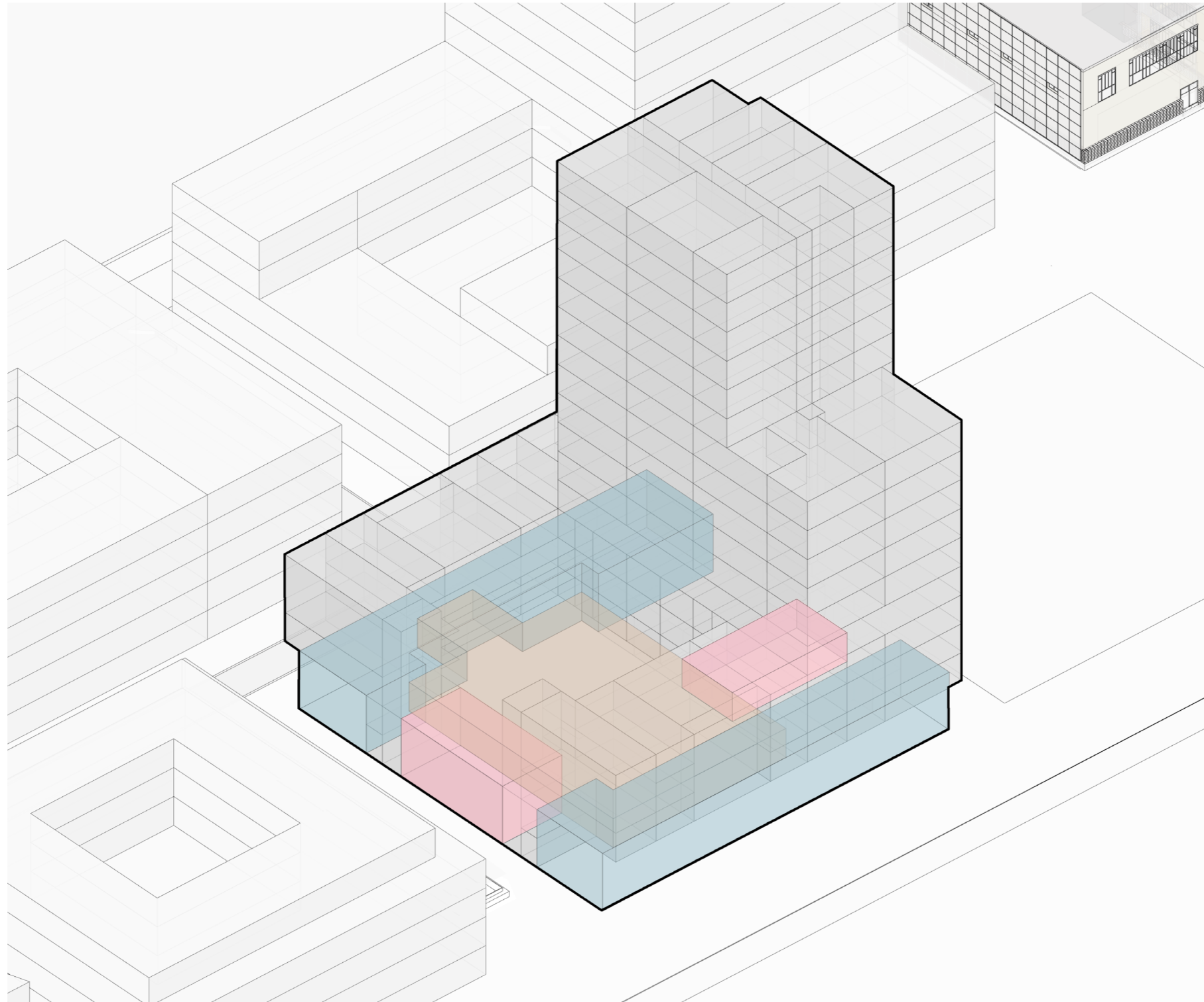
Circulation



Plinth

Functions

-  Cars Parking
-  Bikes parking
-  Commercial

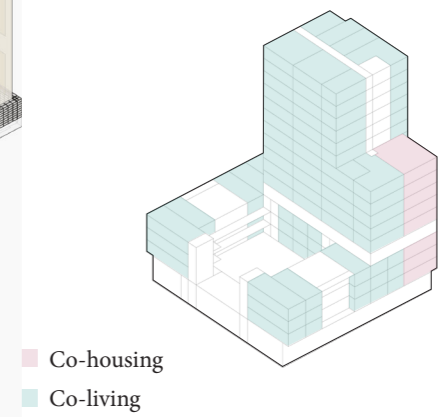
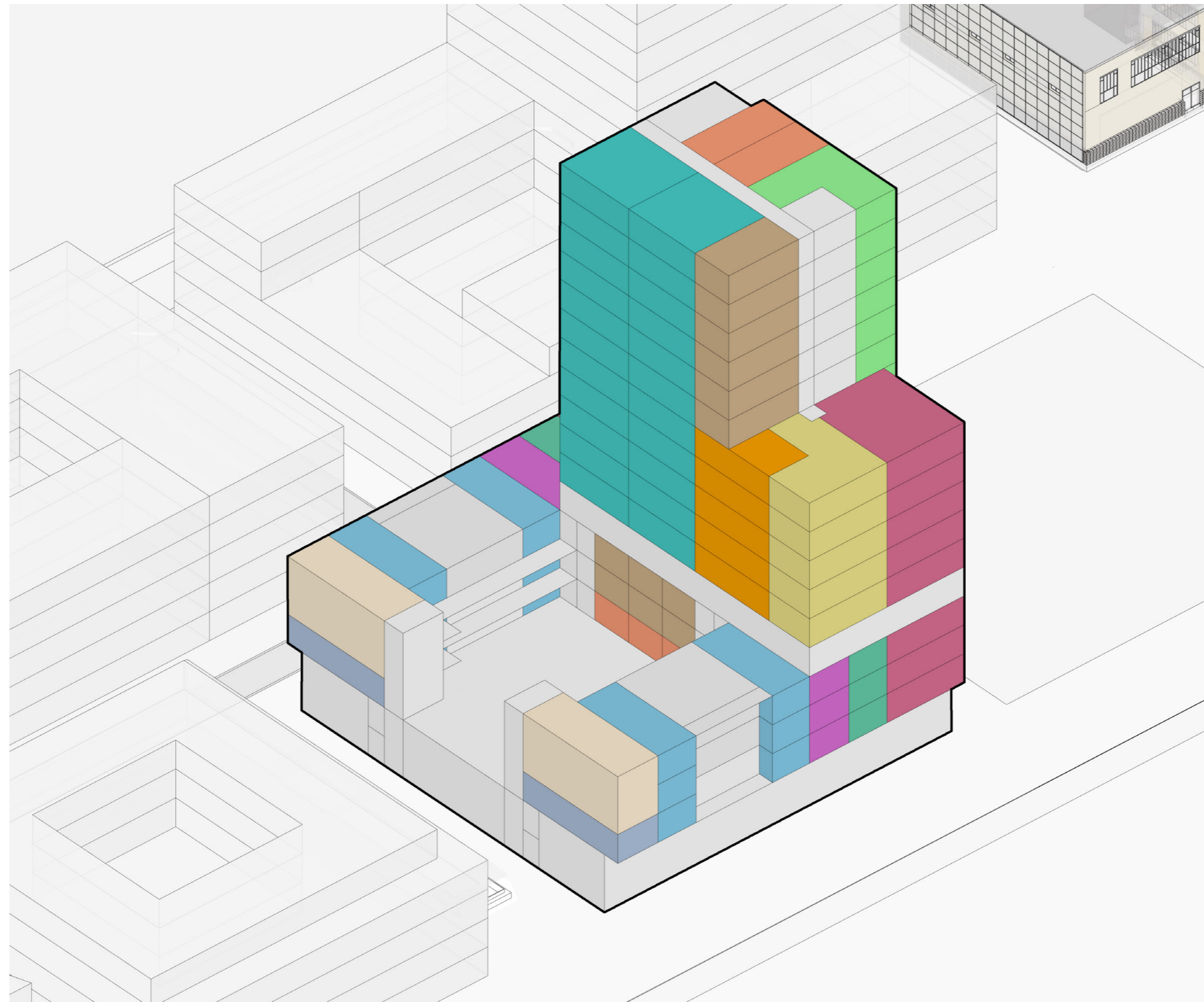


Dwelling types

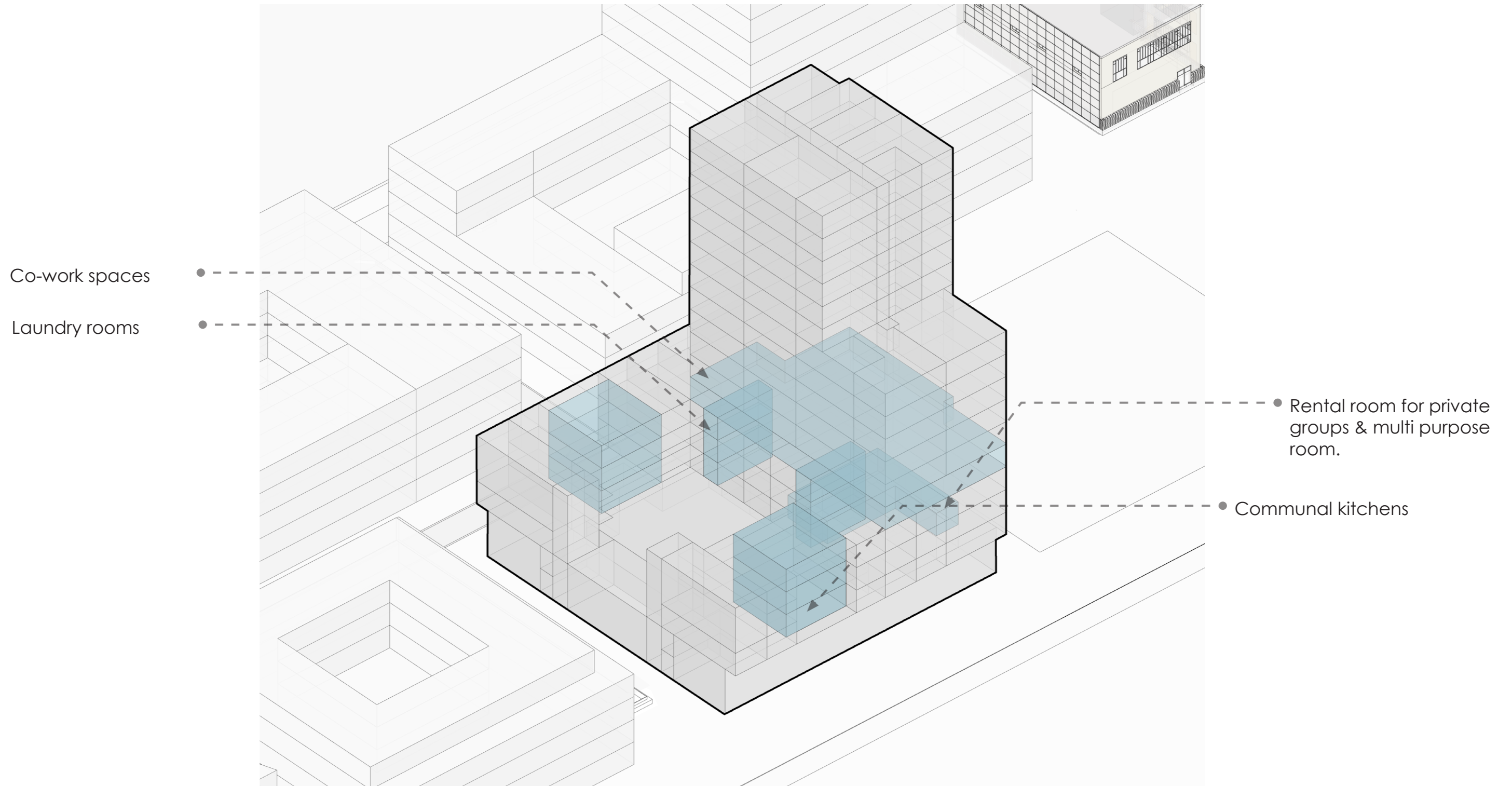
Co-housing and co-living

- Type: T1
Total number: 25
- Type: T2
Total number: 22
- Type: T3
Total number: 6
- Type: T4
Total number: 6
- Type: T5
Total number: 12
- Type: T6
Total number: 12
- Type: T7
Total number: 14
- Type: T8
Total number: 5
- Type: T9
Total number: 5
- Type: T10
Total number: 2
- Type: T11
Total number: 11
- Type: T12
Total number: 2

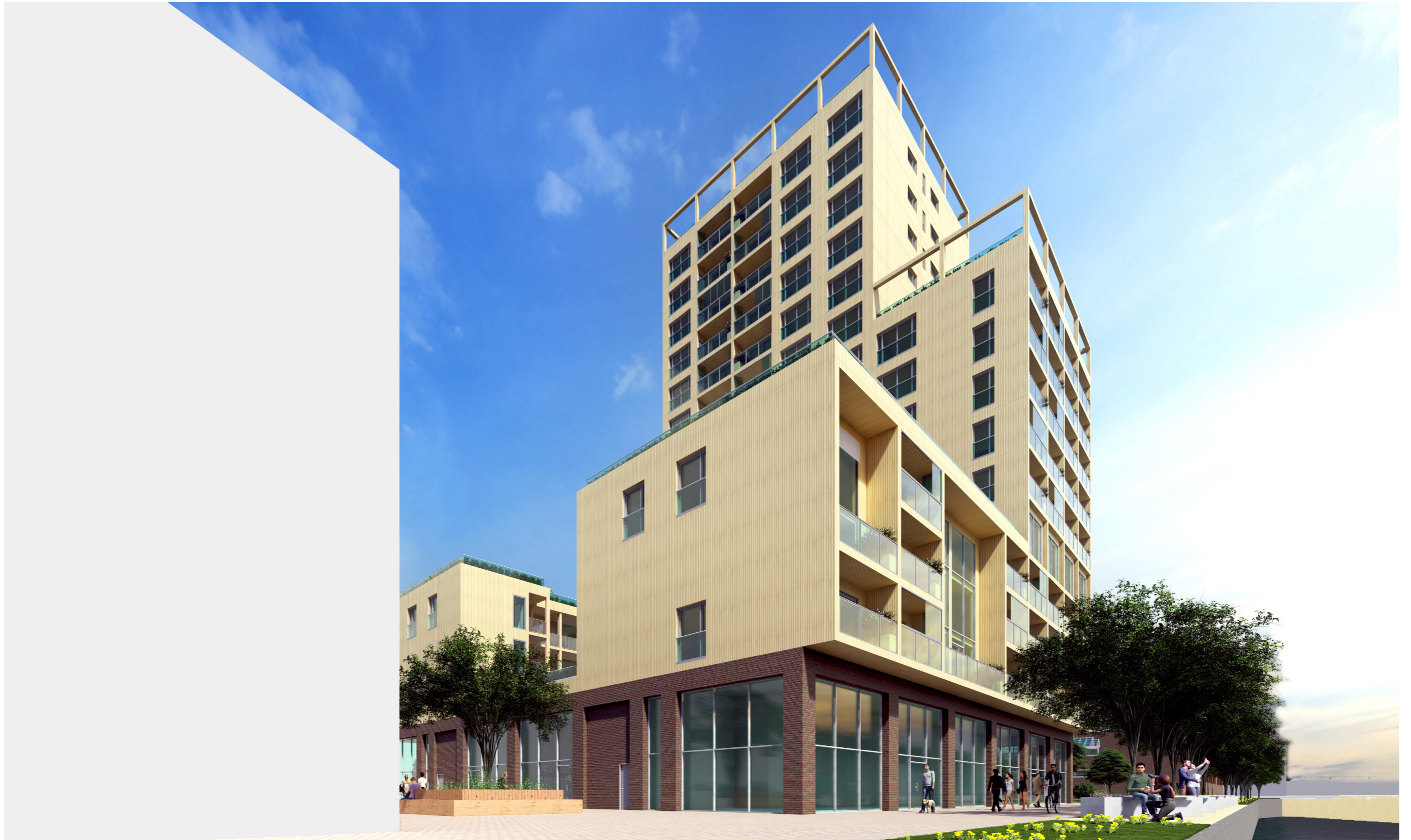
In total, there are 132 dwellings.



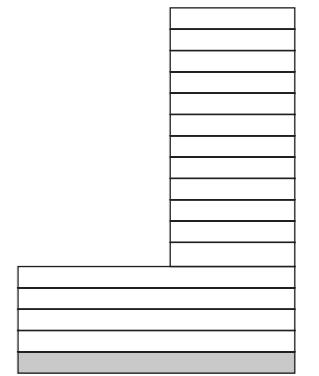
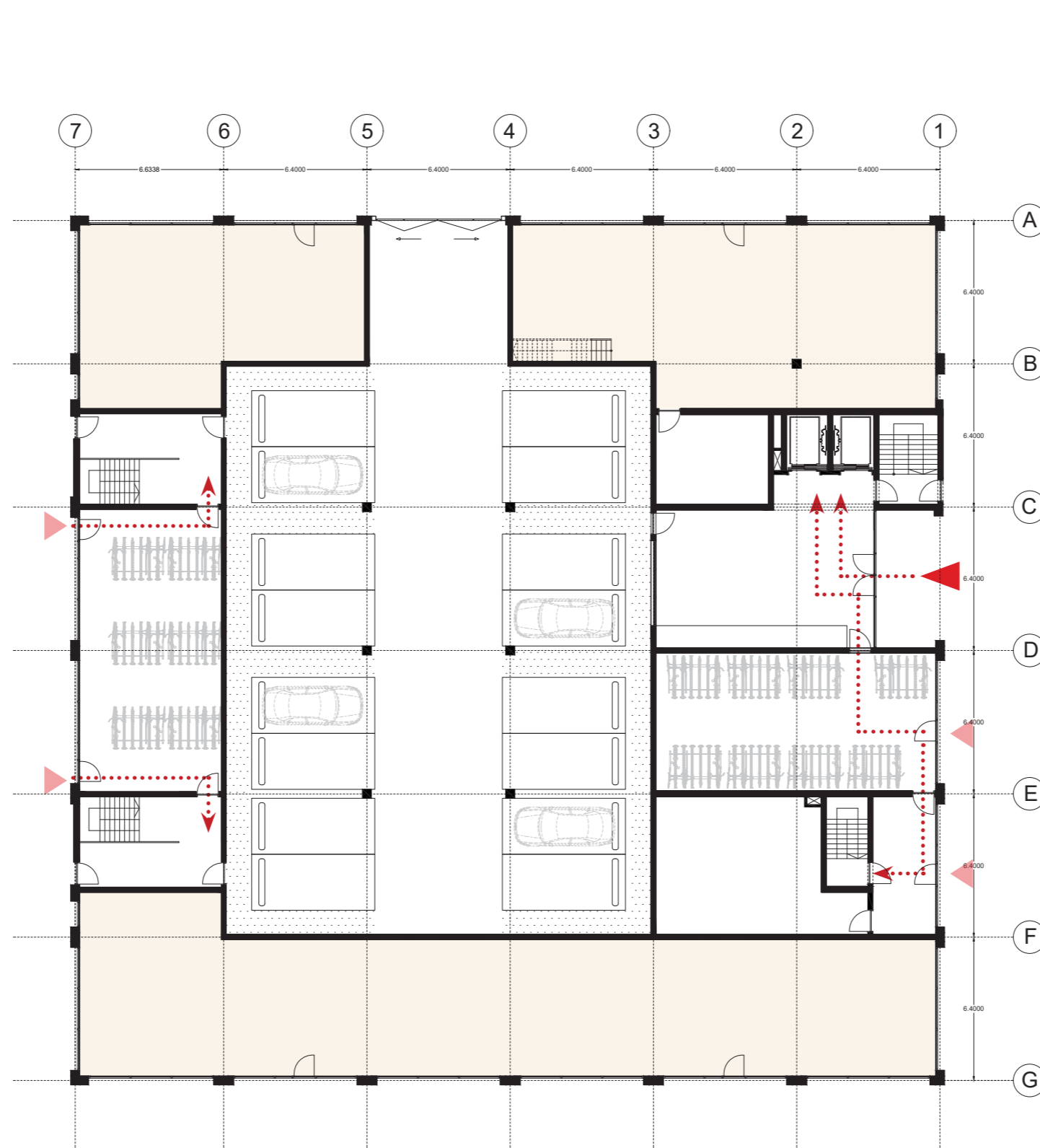
Communal facilities



Design



Ground floor



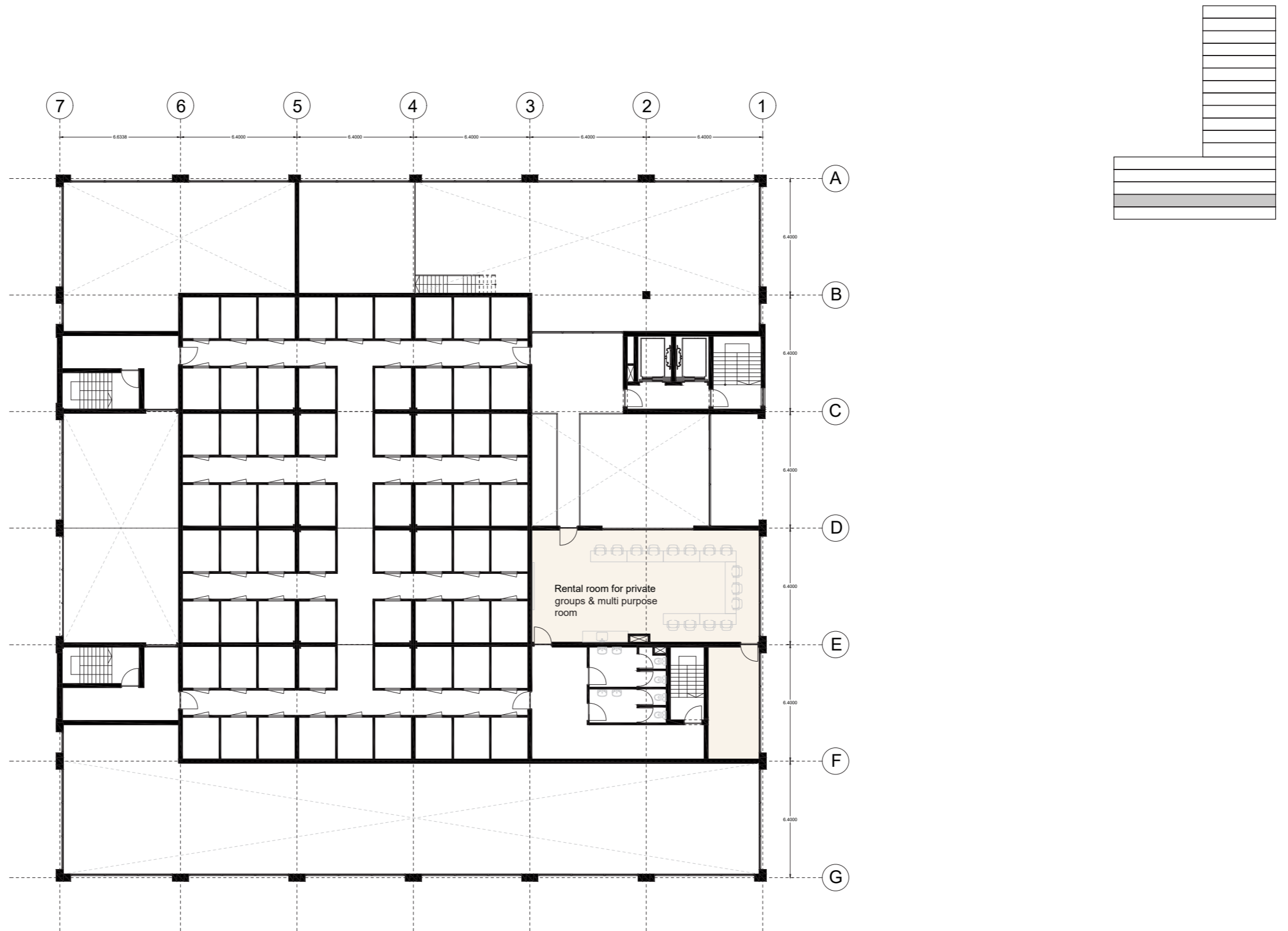
 Caffe and retails

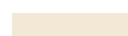






First floor



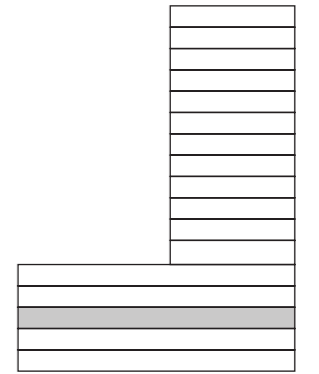
 Rental room for private groups/ multi-purpose room





Second floor

Cluster 1

Cluster 2



-  Communal kitchen
-  Laundry rooms





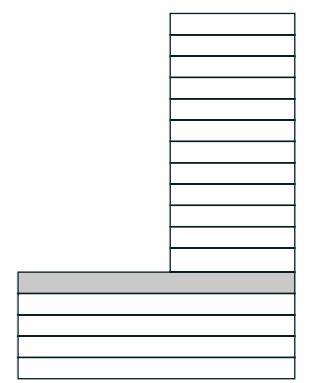




Fourth floor

Cluster 1

Cluster 2



 Dwellings with access to the communal kitchen

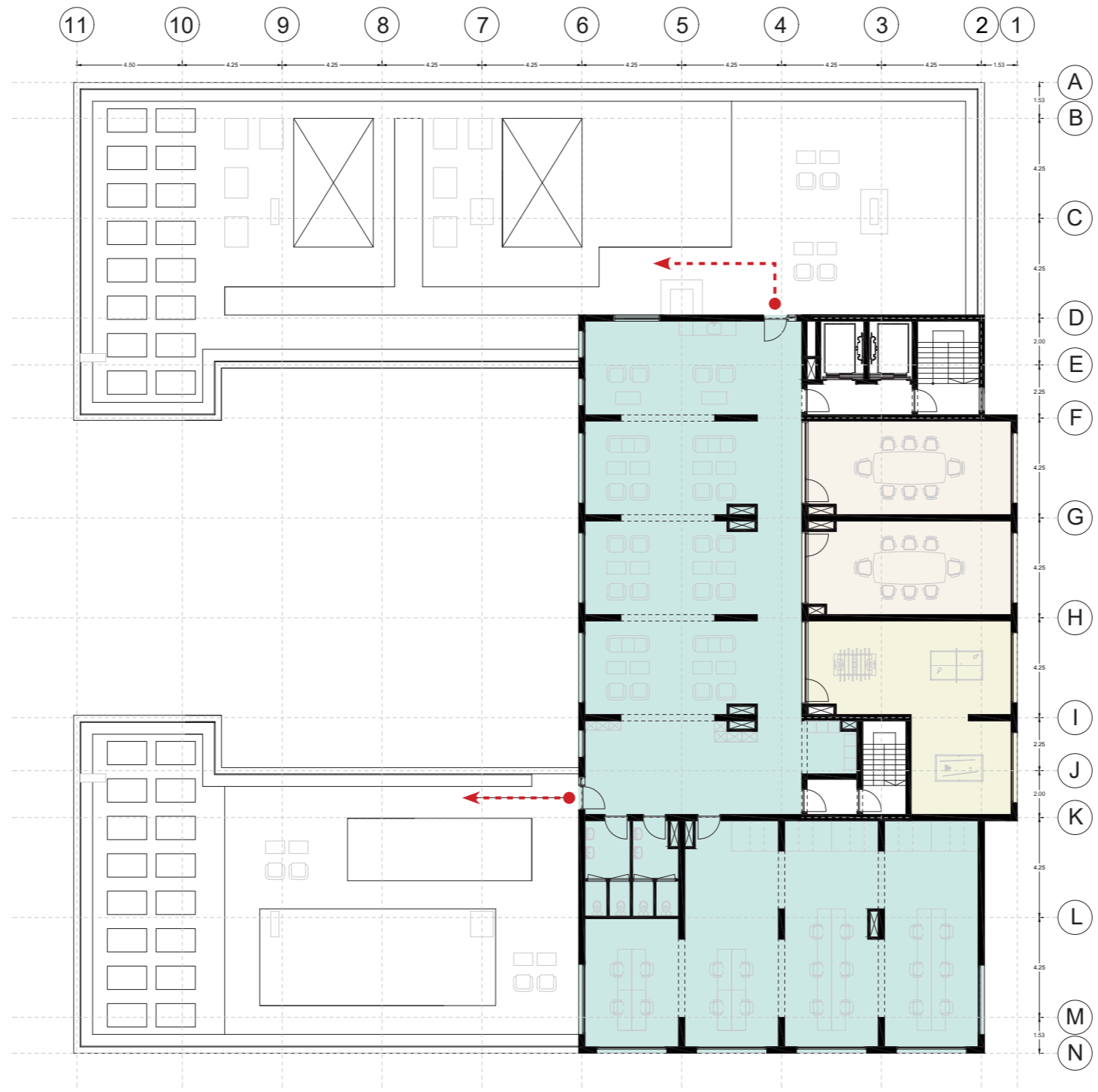




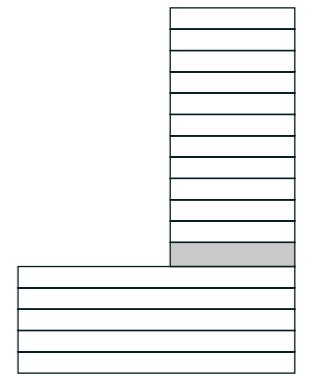
Main section



Fifth floor



- Game room
- Meeting rooms
- Co-work spaces



Co-work space



Roof terrace



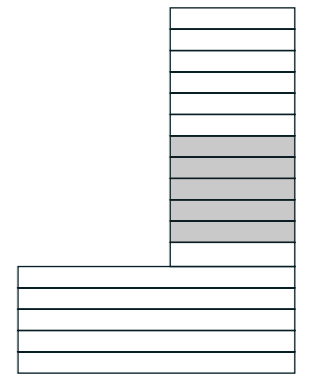
Meeting room



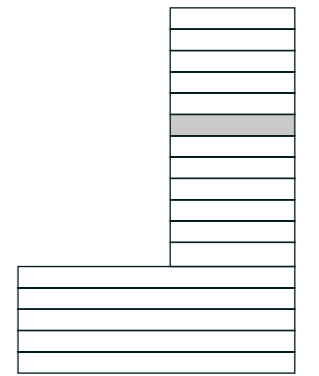
Roof garden



Sixth to tenth floor



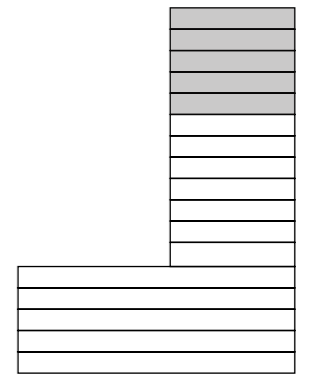
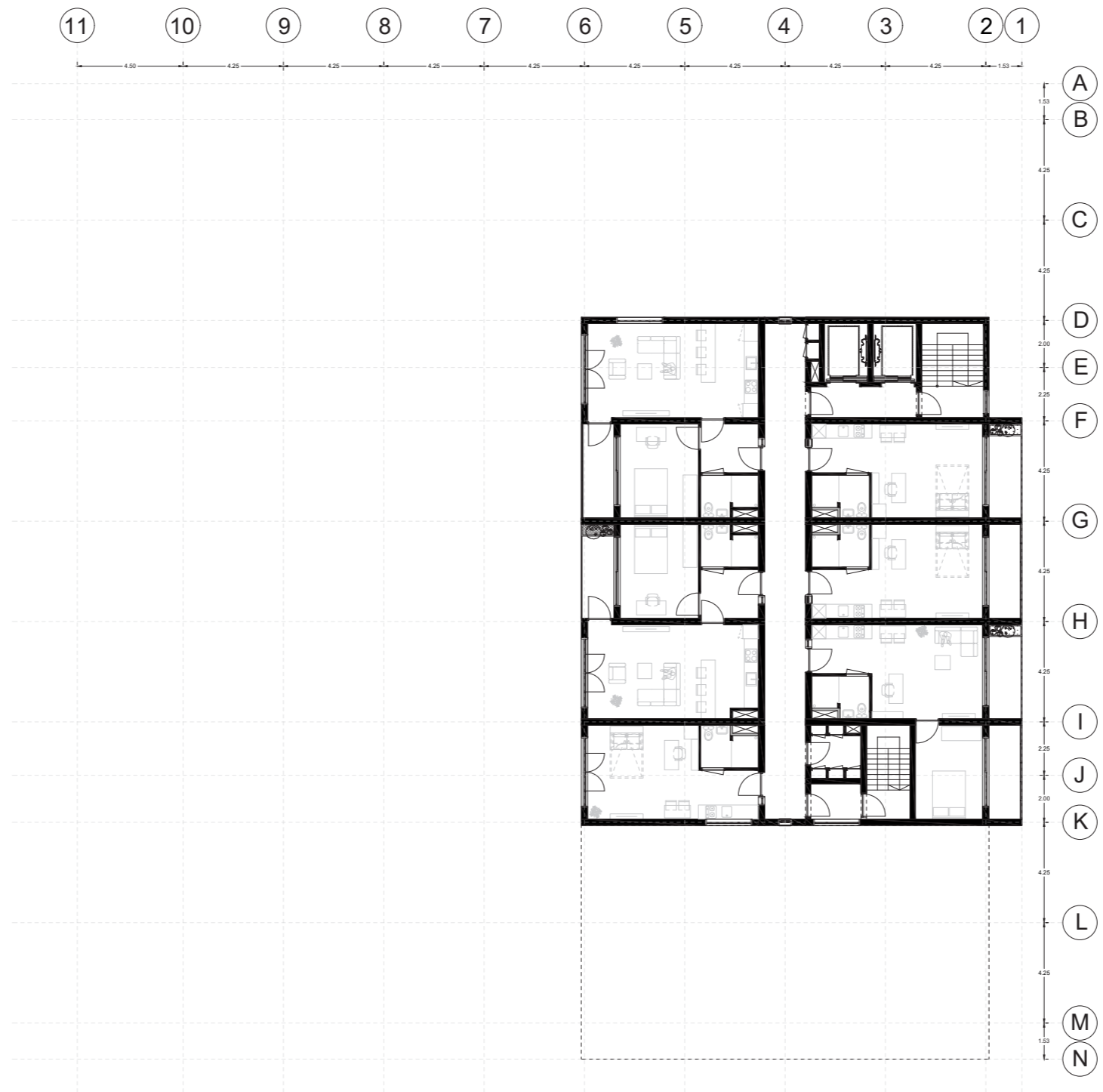
Eleventh floor



Natural lighted corridor



Twelfth floor to sixteenth floor



Façades

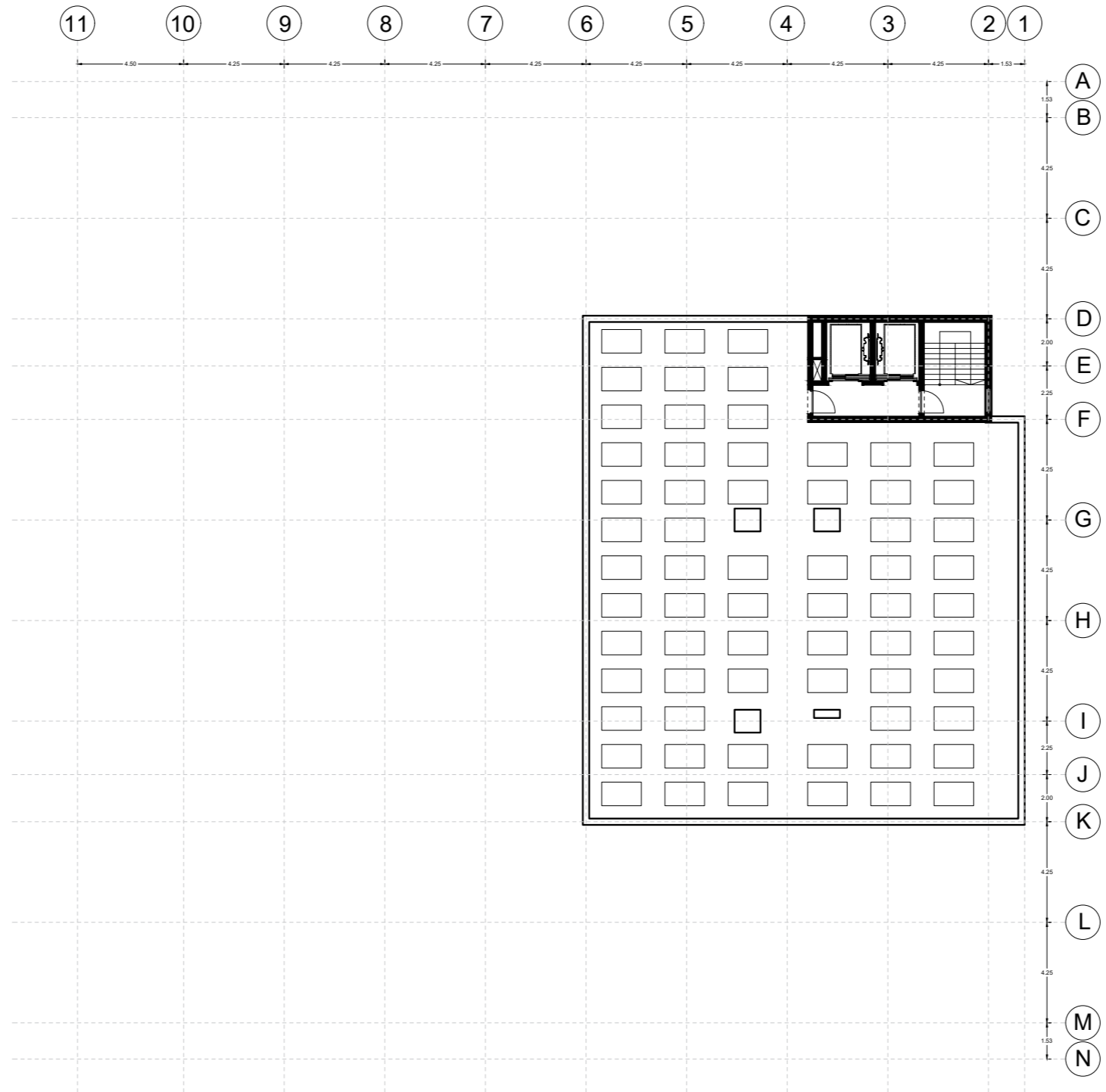


South elevatoion



West elevatoion

Roof



Main section



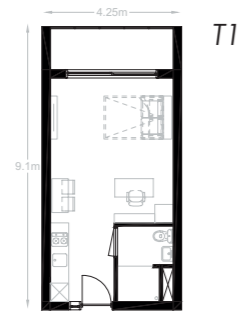


Dwelling types

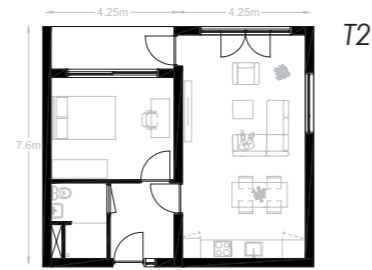
According to Friederike Schneider

Zoning

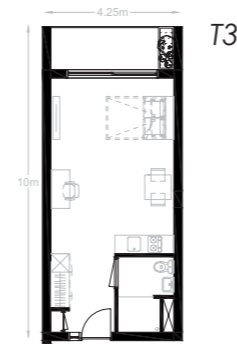
On the one hand, it distinguishes between the general living space, which includes the living room, kitchen, and dining area, and the bedroom section, which includes separate rooms and a bathroom.



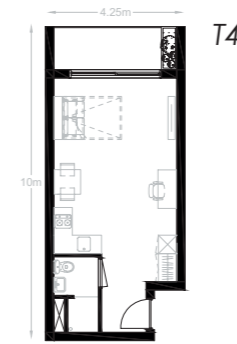
T1



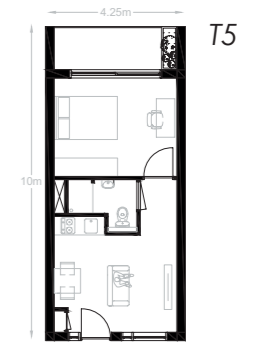
T2



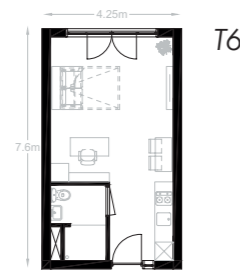
T3



T4



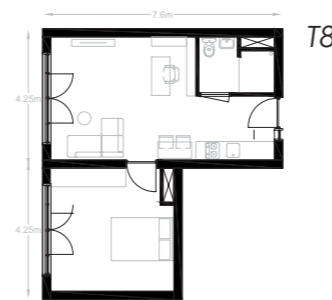
T5



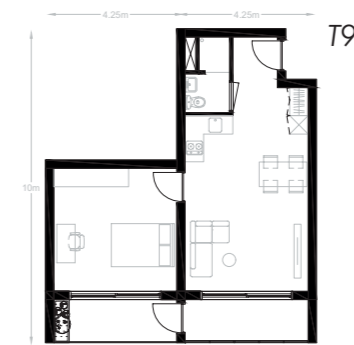
T6



T7



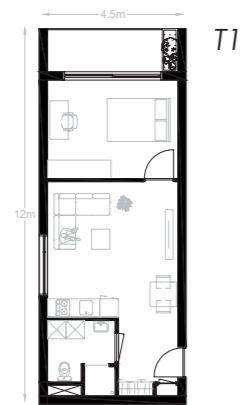
T8



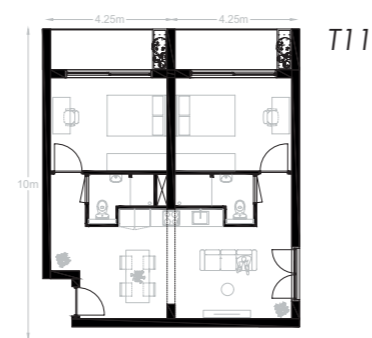
T9

Living Room as Circulation Center

The living room is the focal point of the floor design, which extends outwards and around it.



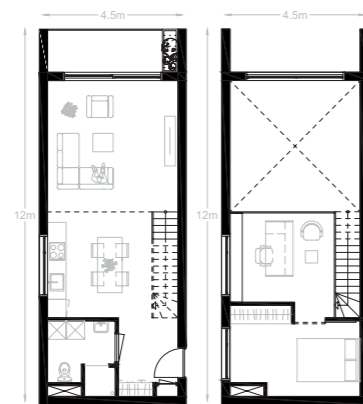
T10



T11

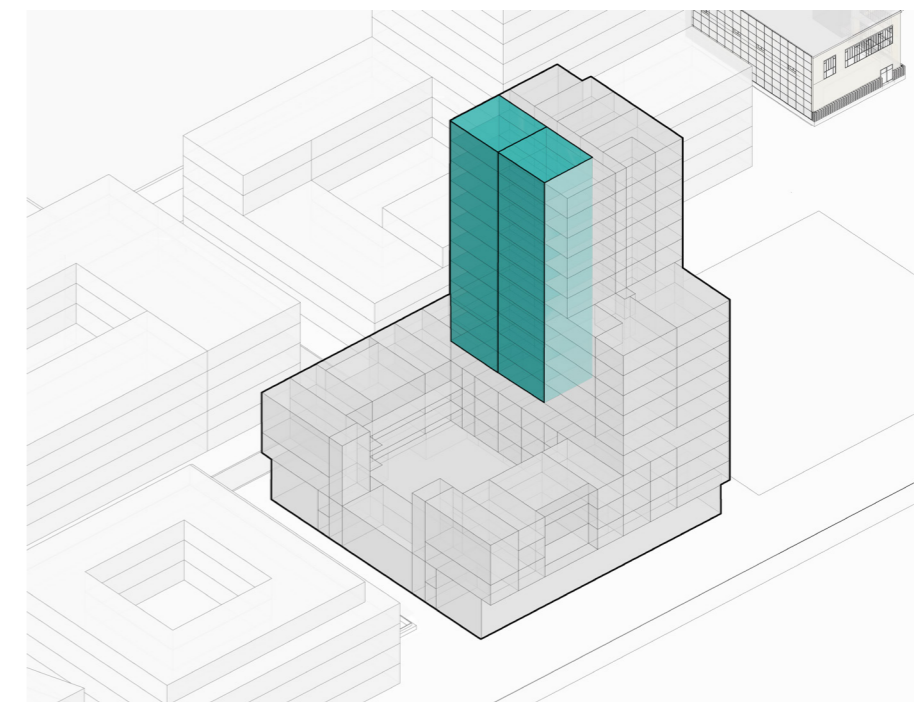
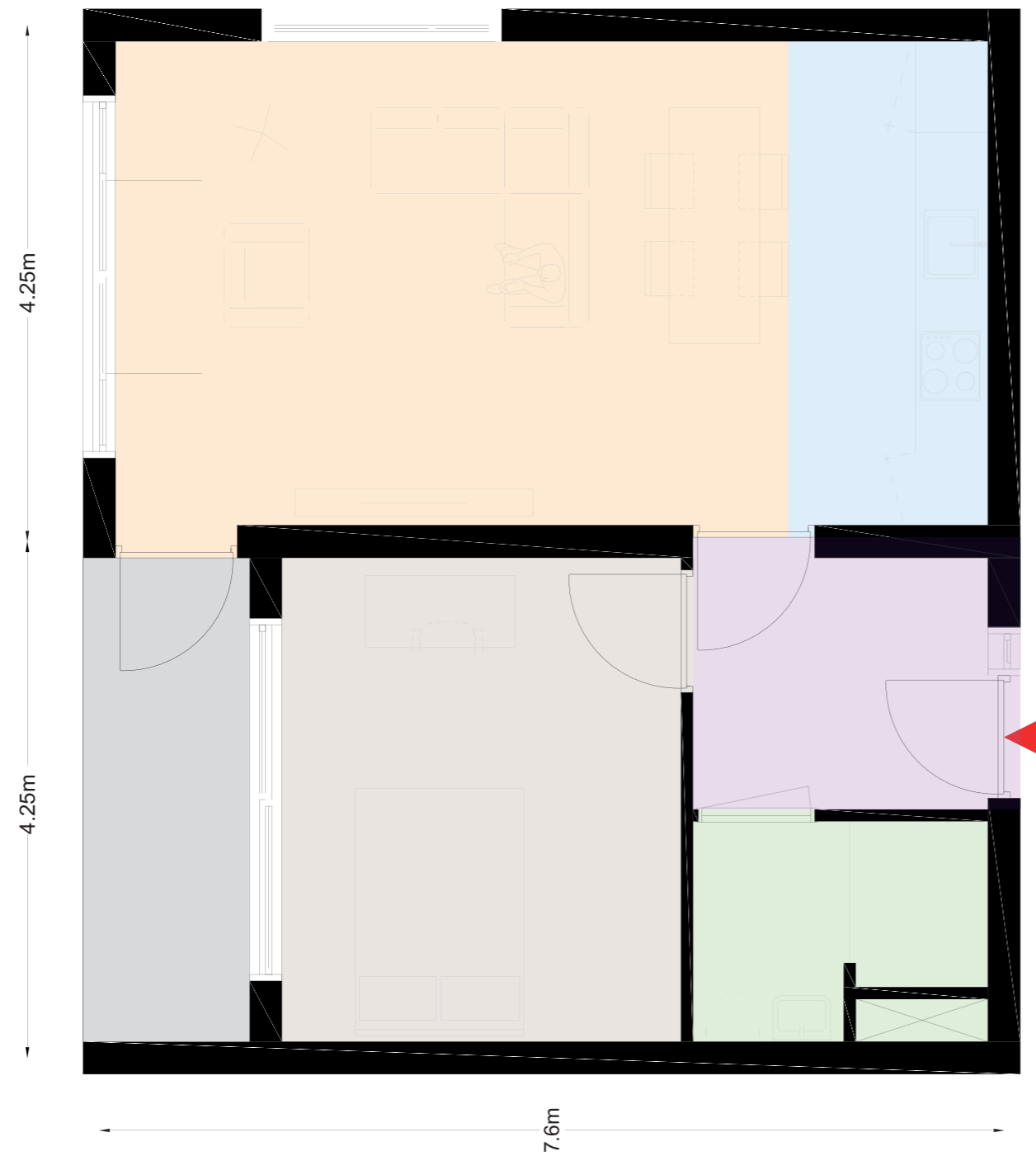
Maisonette

The maisonette floor plan typology is distinguished by the fact that the residence extends across multiple full stories. It is typically two stories high.



T12

Dwelling T2 and points system



- | | | | |
|---|-----------------|---|--------------------|
|  | Bed room |  | Bathroom |
|  | Entrance |  | Living room |
|  | Balcony |  | Kitchen |



Puntentelling voor zelfstandige woningen

| Oppervlak vertrekken [1 punt per m ²] | | | |
|---|--|----------------|-------------|
| Woonkamer | <input type="text" value="18"/> | m ² | 18.00 |
| Slaapkamer | <input type="text" value="16"/> | m ² | 16.00 |
| 2e slaapkamer | <input type="text"/> | m ² | |
| 3e slaapkamer | <input type="text"/> | m ² | |
| 4e slaapkamer | <input type="text"/> | m ² | |
| 5e slaapkamer | <input type="text"/> | m ² | |
| Badruimte | <input type="text" value="3.5"/> | m ² | 3.50 |
| Keuken | <input type="text" value="6"/> | m ² | 6.00 |
| Zolderkamers | <input type="text"/> | m ² | |
| Andere kamers | <input type="text"/> | m ² | |
| Toilet bevindt zich in douche of badruimte? | <input checked="" type="checkbox"/> | | -1.00 |
| Totaal vertrekken | | | 43 |
| Overige ruimtes [¾ punt per m ² , tenminste 2m ²] | | | |
| Kelder | <input type="text"/> | m ² | |
| Bijkeuken | <input type="text"/> | m ² | |
| Wasruimte | <input type="text"/> | m ² | |
| Berging/schuur | <input type="text"/> | m ² | |
| Vaste en ingebouwde kasten | <input type="text"/> | m ² | |
| Garage | <input type="text"/> | m ² | |
| Zolderruimte | <input type="text"/> | m ² | |
| Andere ruimten | <input type="text" value="4.6"/> | m ² | 3.45 |
| Zolder aanwezig maar geen vaste trap naar zolder | <input type="checkbox"/> | | |
| Totaal overige ruimten | | | 3.75 |
| Verwarming & installaties | | | |
| Type verwarming | <input type="text" value="Overige"/> | | |
| Aantal verwarmde vertrekken (open keuken telt als apart vertrek) | <input type="text" value="4"/> | | 8.00 |
| Aantal overige ruimten met verwarming (maximaal 4 punten) | <input type="text"/> | | |
| Video hallofoon | <input type="checkbox"/> | | |
| Totaal verwarming | | | 8 |
| Energieprestatie | | | |
| Soort woning | <input type="text" value="Eengezinswoning"/> | | |
| Datum energielabel/-index | <input type="text" value="Na 01-01-2021"/> | | |
| <small>[Zoek op via postcode en huisnummer op www.ep-online.nl]</small> | | | |
| Gebruiksoppervlak | <input type="text" value="≥ 40m<sup>2</sup>"/> | | |
| Energielabel | <input type="text" value="Label A+"/> | | 40 |
| Totaal energie | | | 40 |

| Keuken | | | |
|--|---|----------------|--------------|
| Lengte aanrechtblad | <input type="text" value="2 meter of meer"/> | | 7.00 |
| <small>Het maximale puntenaantal voor dit onderdeel is 4 bij een aanrechtblad <1m. Anders is het het dubbele van het puntenaantal van het aanrechtblad</small> | | | |
| Kookplaat | <input type="text" value="inbouw inductiekookplaat"/> | | 1.50 |
| Oven | <input type="text" value="- maak een keuze -"/> | | |
| Afzuigkap | <input type="text" value="inbouw afzuigkap"/> | | 0.50 |
| Inbouw magnetron | <input type="checkbox"/> | | |
| Inbouw koelkast | <input checked="" type="checkbox"/> | | 0.75 |
| Inbouw vrieskast | <input type="checkbox"/> | | |
| Inbouw vries/koelcombinatie | <input type="checkbox"/> | | |
| Inbouw vaatwasmachine | <input type="checkbox"/> | | |
| Dubbele spoelbak | <input type="checkbox"/> | | |
| Luxe mengkraan | <input type="text"/> | stuks | |
| Thermostatische watermengkraan | <input type="text" value="1"/> | stuks | 0.50 |
| Extra enkele kast | <input type="text"/> | stuks | |
| Extra dubbele kast | <input type="text"/> | stuks | |
| Extra wandbetegeling (vanaf 2m ²) | <input type="text"/> | m ² | |
| Vloertegels (vanaf 2m ²) | <input type="text"/> | m ² | |
| Algehele luxe uitvoering (maximaal 2 punten) | <input type="text"/> | punten | |
| Totaal keuken | | | 10.25 |
| Sanitair | | | |
| Aantal toiletten | <input type="text" value="1"/> | | 3.00 |
| Waarvan hangende toiletten | <input type="text"/> | | |
| <small>De extra punten voor hangende toiletten worden meegeteld met de luxe voorzieningen onder douche en bad.</small> | | | |
| Aantal wastafels, fonteintjes, lavetten en bidets | <input type="text" value="1"/> | | 1.00 |
| Douche en/of bad? | <input type="text" value="Douche aanwezig"/> | | 4.00 |
| <small>Het maximale puntenaantal voor het onderdeel is het dubbele van het puntenaantal van de douche en bad, plus de punten voor de toiletten en wastafels.</small> | | | |
| Design radiator | <input checked="" type="checkbox"/> | | 0.25 |
| Kastje, waarin ingebouwd een wastafel | <input checked="" type="checkbox"/> | | 0.25 |
| Toiletkastje met ingebouwde verlichting | <input checked="" type="checkbox"/> | | 0.25 |
| Extra voor een bubbelbad (whirlpool) | <input type="checkbox"/> | | |
| Schuif- of vouw wand met aluminium frame | <input checked="" type="checkbox"/> | | 1.00 |
| Luxe mengkraan (b.v. Eénhandsbediening) | <input type="text"/> | stuks | |
| Themostatische watermengkraan | <input type="text" value="1"/> | stuks | 0.50 |
| Extra wandbetegeling (vanaf 2m ²) | <input type="text"/> | m ² | |
| Algehele luxe uitvoering (maximaal 2 punten) | <input type="text"/> | punten | |
| Totaal sanitair | | | 10.25 |

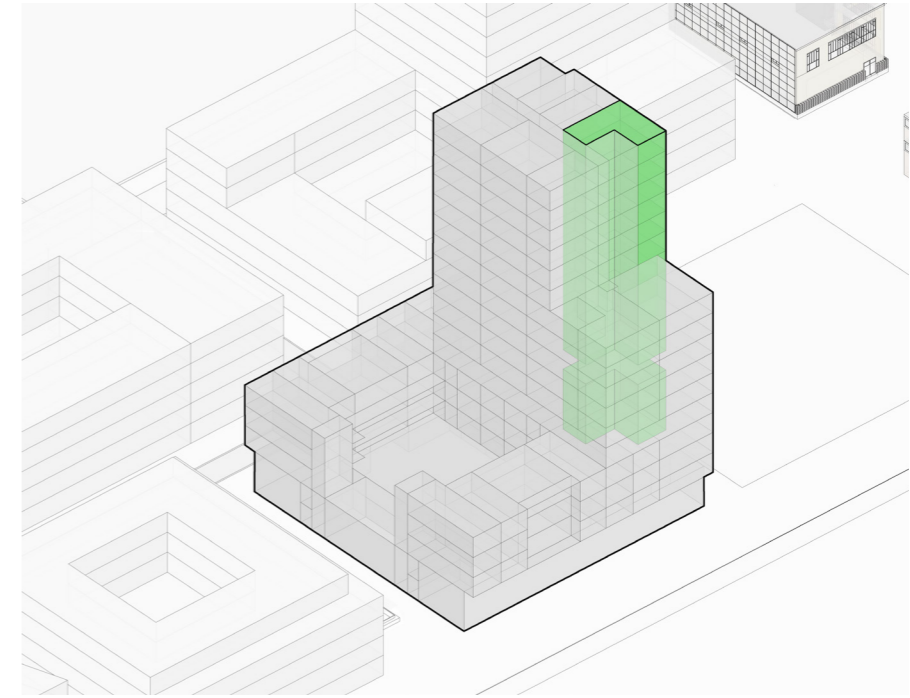
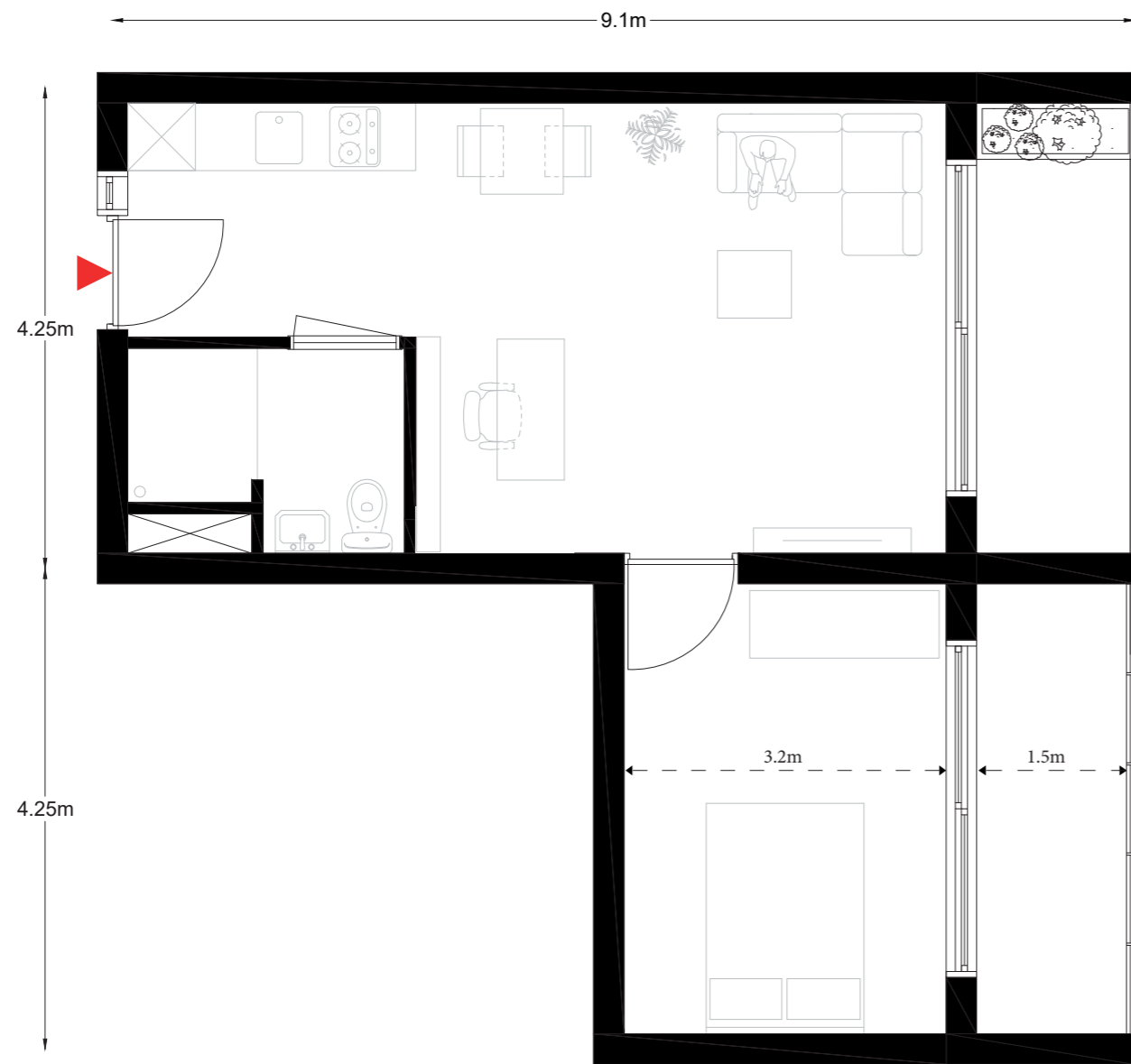
| Buitenruimte | | |
|-----------------------------------|--------------------------|-------------|
| Buitenruimte | tot 25m ² ▼ | 2.00 |
| Buitenruimte is gemeenschappelijk | <input type="checkbox"/> | |
| Carport | <input type="checkbox"/> | |
| Totaal buitenruimte | | 2.00 |

| WOZ-waarde (minimaal € 55888) | | |
|---|-------------------------------------|---------------|
| Vul de WOZ-waarde van de woning in (Op te vragen bij het WOZ-waardeloket) | € 190000 | |
| Nieuwbouwwoning 2015 of later (zie evt website kadaster) / Of verbouwd in 2015 of later met energieprestatie conform nieuwbouw- eisen (Bouwbesluit 2012) | <input checked="" type="checkbox"/> | |
| Oplevering (nieuwbouw/verbouwd) in: | 2021 ▼ | |
| In welke gemeente ligt de woning? | Rotterdam | |
| WOZ punten absoluut | | 17.21 |
| WOZ punten rato oppervlak | | 23.50 |
| Totaal WOZ-waarde | | 41 |
| Totalen | | |
| Totaal puntenaantal (Minimaal 40 punten) | | 158 |
| Maximale kale huurprijs | € | 838,54 |
| Een bedrag van (47.1€) voor gemeenschappelijke voorzieningen | € | 985,64 |
| Een bedrag van (100€) voor energie- en waterverbruik (couples) | | |

| Designations | |
|---------------------------------|--------------------------------|
| Size | 64.5 m² |
| Rent (all inclusive) | 985.64 € |
| Division of the dwelling | Separated bedroom |
| Points | 158 |
| Storage | Yes |
| Kitchen | Full Kitchen |
| Private outdoor space | Loggia or Winter-garden |
| Communal facilities | Yes |
| Car sharging | Yes |
| Bicycle storage | Yes |



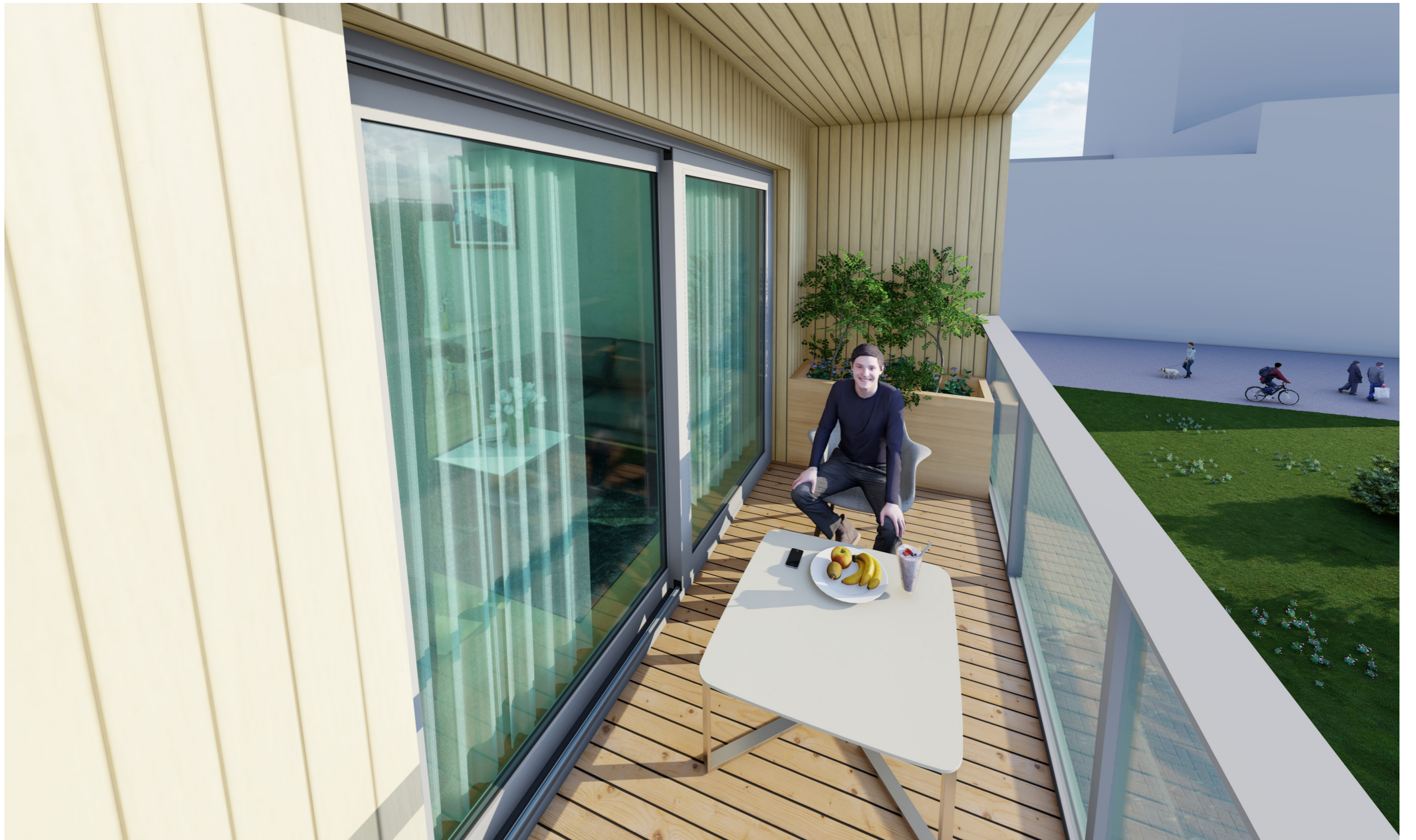
Dwelling type T7



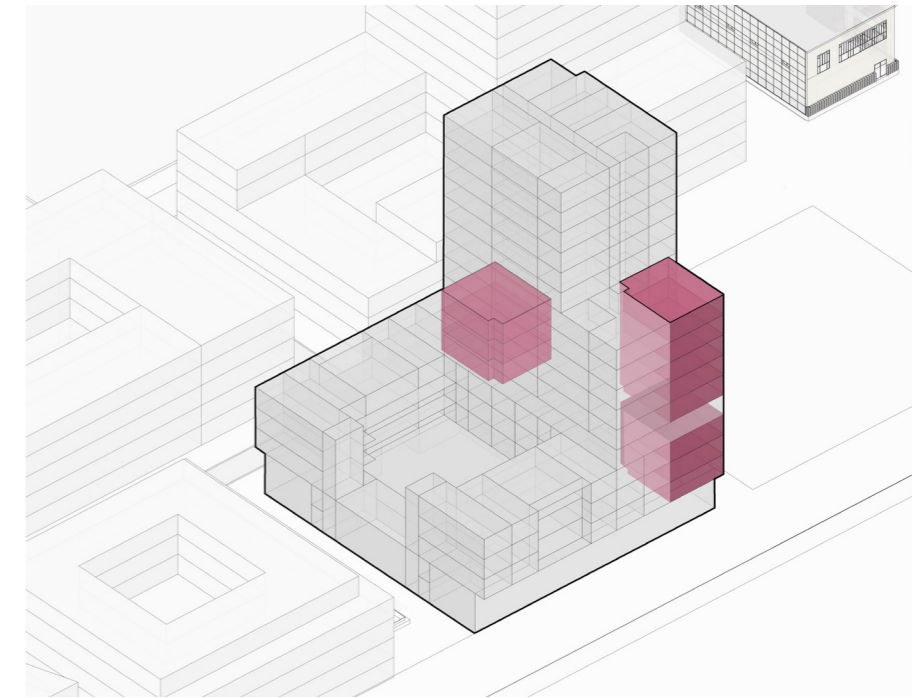
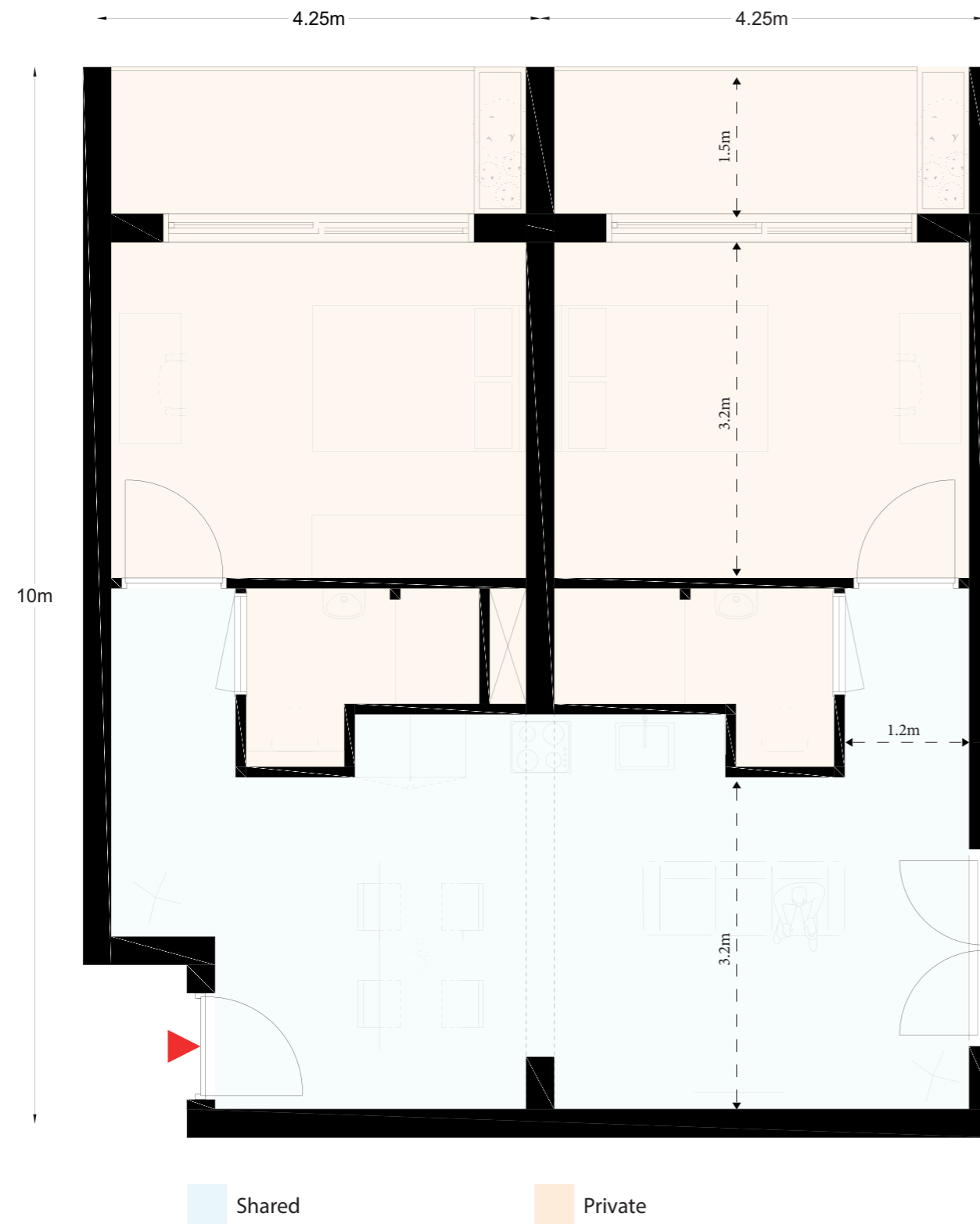
| Designations | |
|--------------------------|---------------------------------|
| Size | 54 m ² |
| Rent (all inclusive) | 1,045.21 € or 935.46 € |
| Division of the dwelling | Separated bedroom |
| Points | 149 |
| Storage | Yes |
| Kitchen | Standard |
| Private outdoor space | Loggia or Winter-garden |
| Communal facilities | Yes + communal kitchen (2 to 4) |
| Car sharging | Yes |
| Bicycle storage | Yes |







Dwelling type T11 / friends apartment

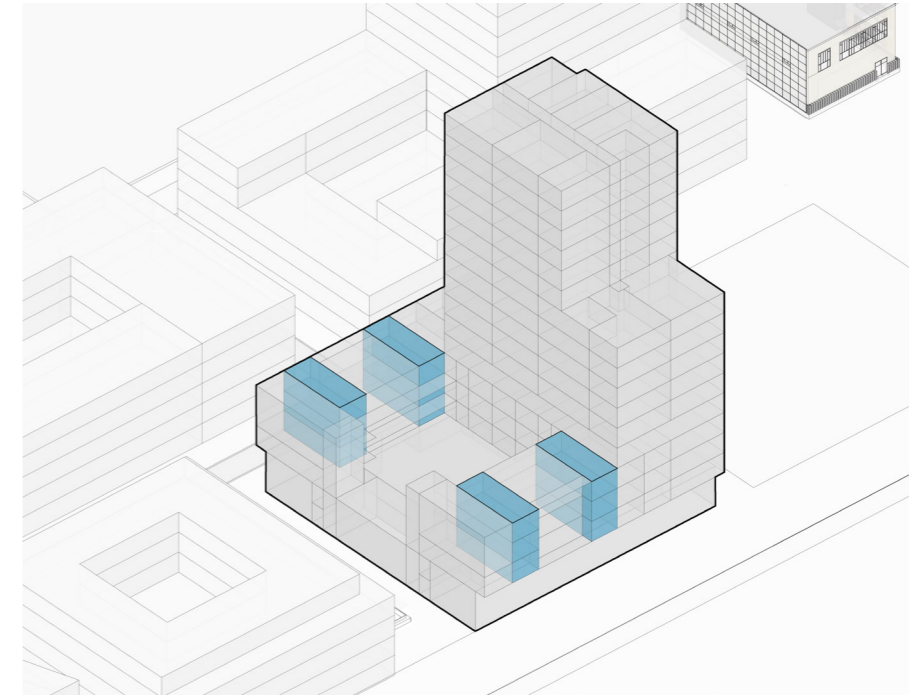
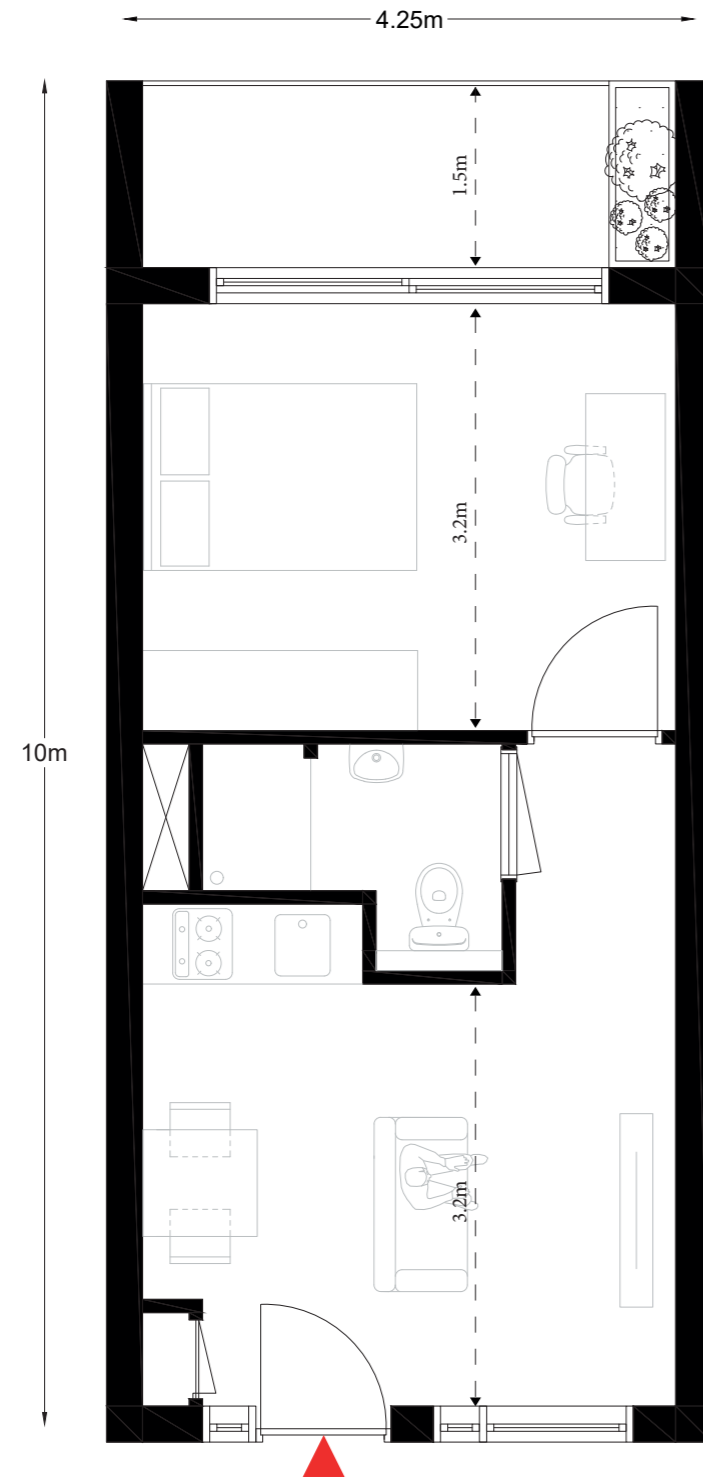


| Designations | |
|--------------------------|---------------------------|
| Size | 83.5 m ² |
| Rent (all inclusive) | 1,082.98 € (two tenants) |
| Division of the dwelling | Fiends apartment |
| Points | 242 |
| Storage | Yes |
| Kitchen | Full kitchen |
| Private outdoor space | Loggia |
| Communal facilities | Yes |
| Car sharging | Yes |
| Bicycle storage | Yes |





Dwelling type T5

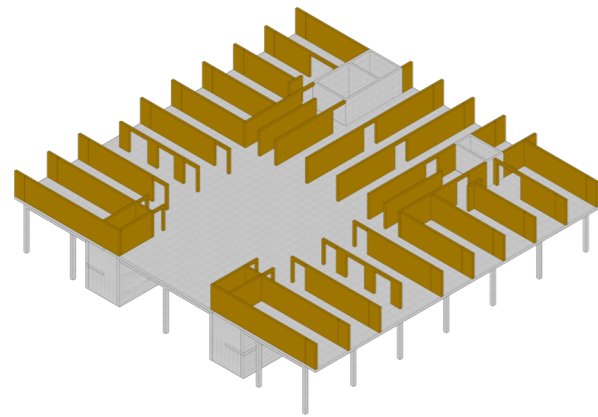


| Designations | |
|--------------------------|-------------------------|
| Size | 42.5 m ² |
| Rent (all inclusive) | 1007.42 € |
| Division of the dwelling | Separated bedroom |
| Points | 144 |
| Storage | No |
| Kitchen | Kitchenette |
| Private outdoor space | Loggia or Winter-garten |
| Communal facilities | Yes + communal kitchen |
| Car sharging | Yes |
| Bicycle storage | Yes |

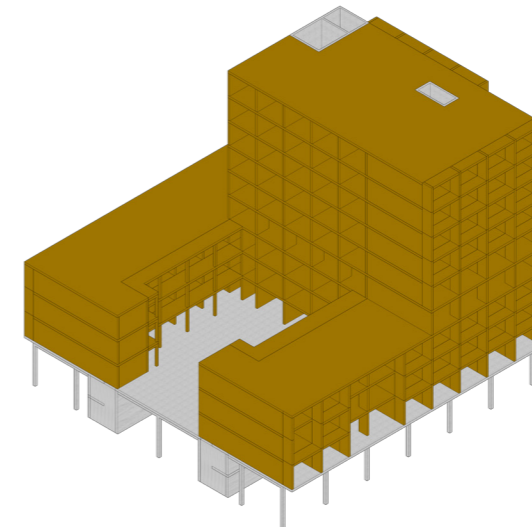




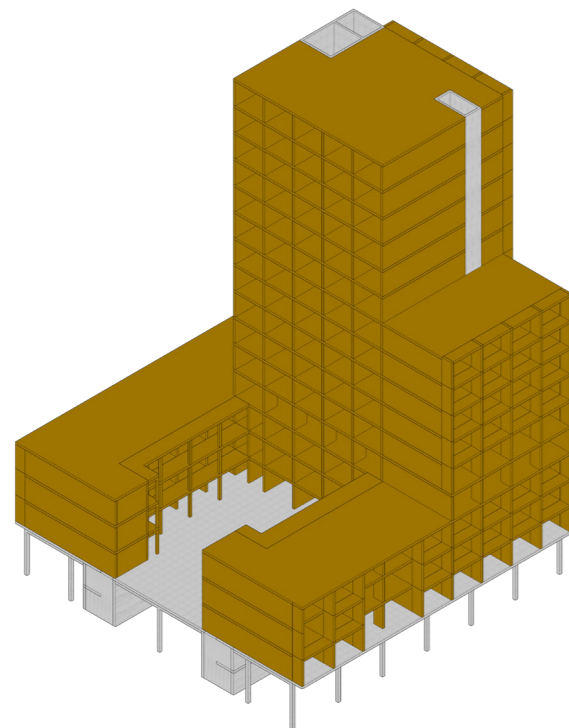
Building Technology



Concrete plinth.



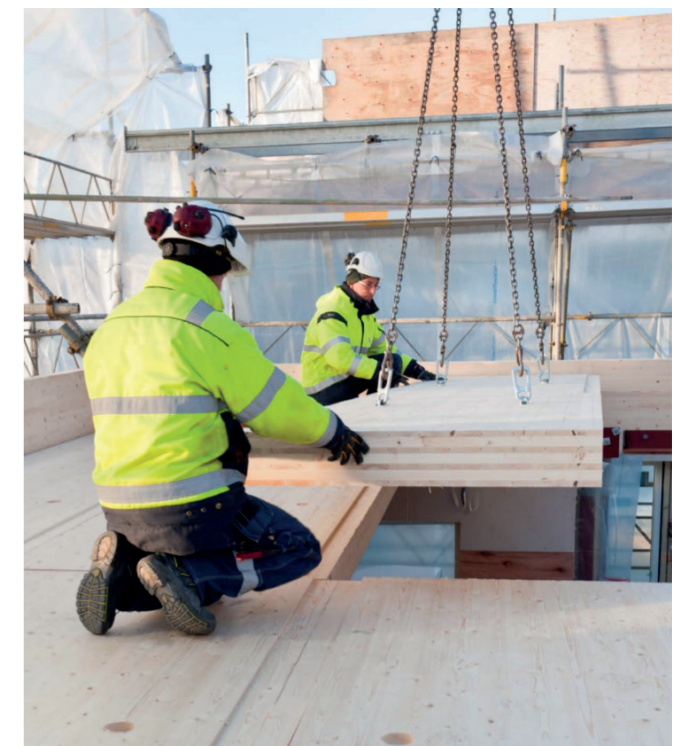
Cross laminated timber as construction material for the upper floors.



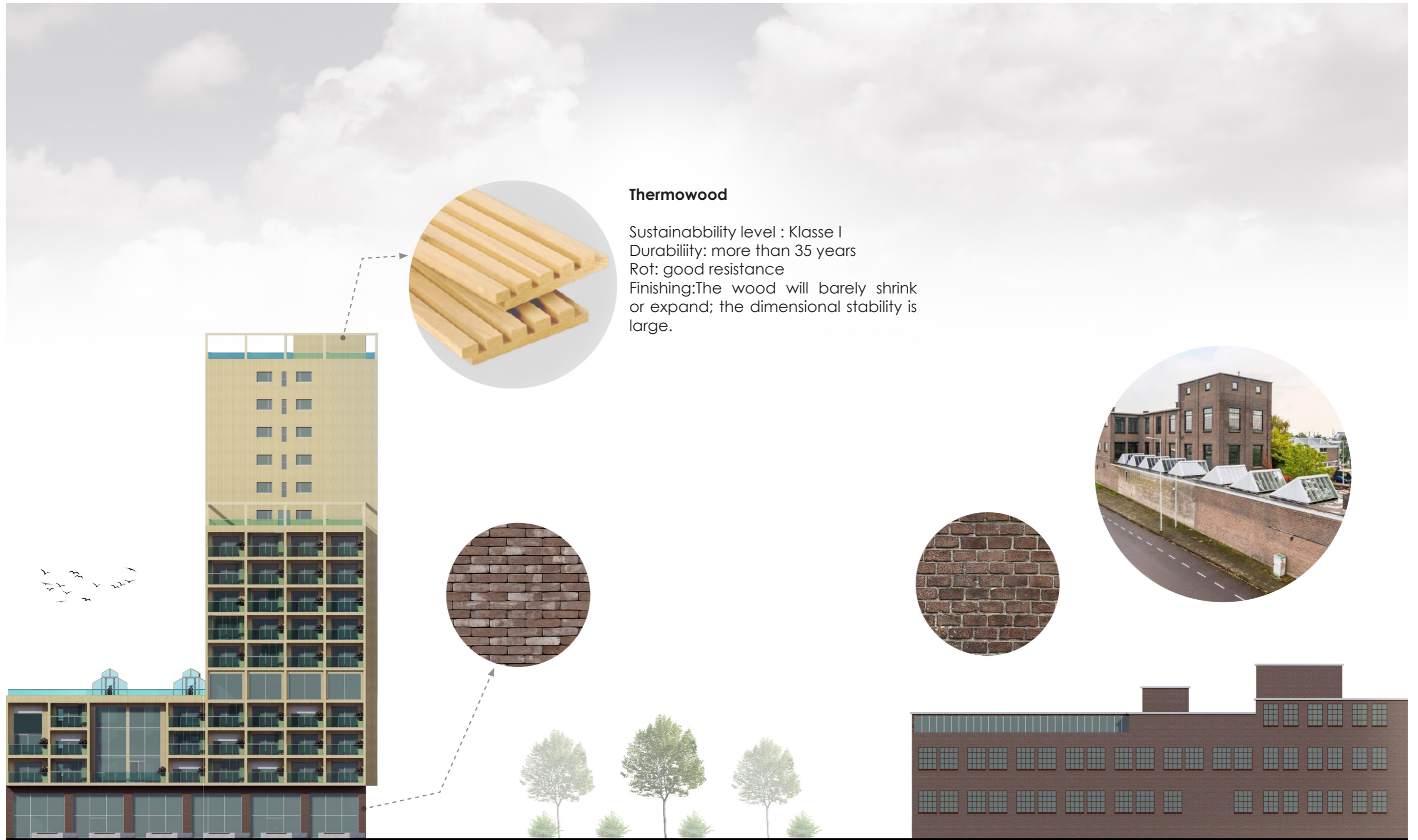
Continuous concrete staircases in the tower for more stability.



CLT as a main construction material.



Materiality



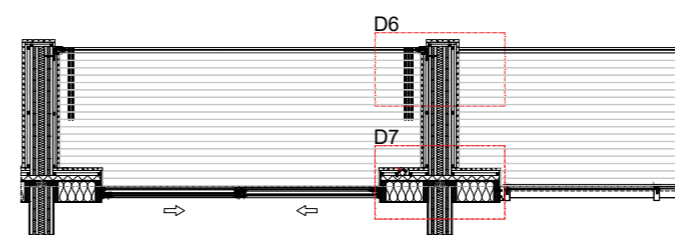
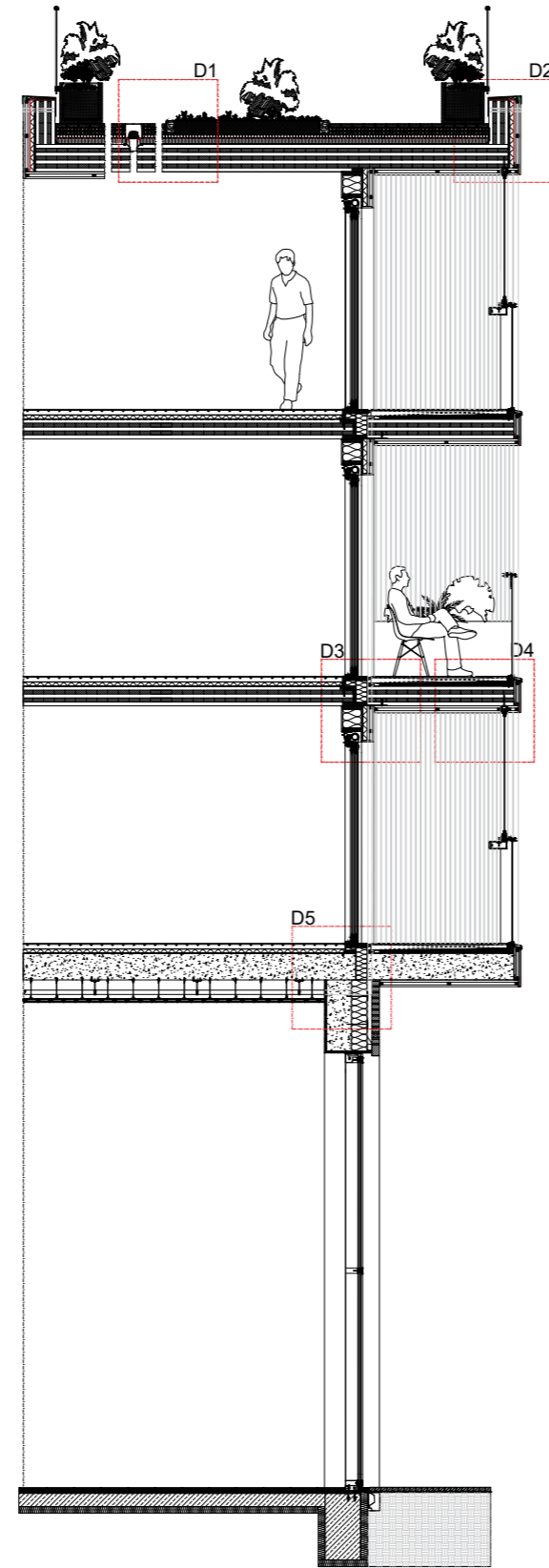
Thermowood

Sustainability level : Klasse I
Durability: more than 35 years
Rot: good resistance
Finishing: The wood will barely shrink or expand; the dimensional stability is large.

Connection with the monumental building

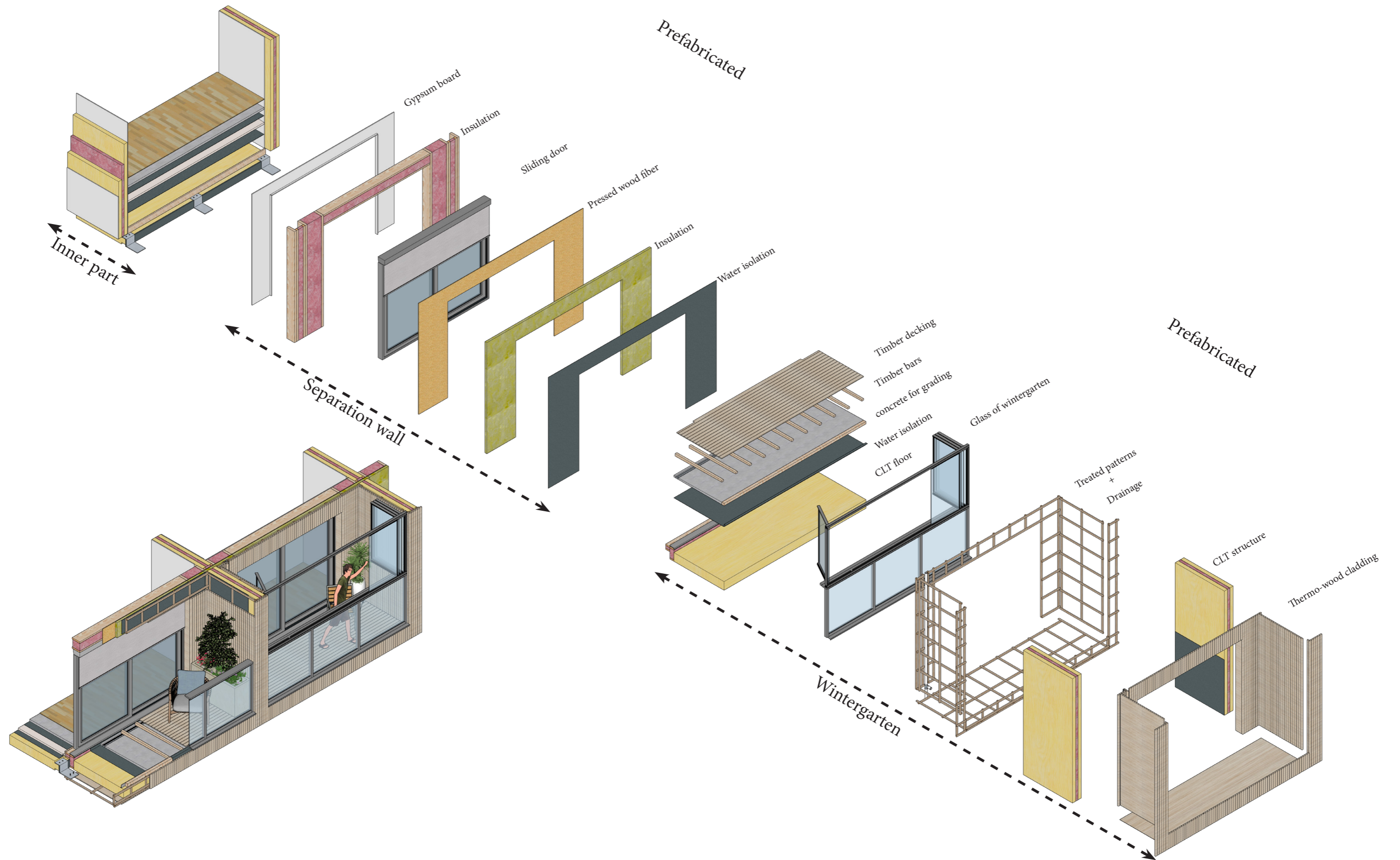


Façade fragment



Exploded diagram

Axonometric



Details

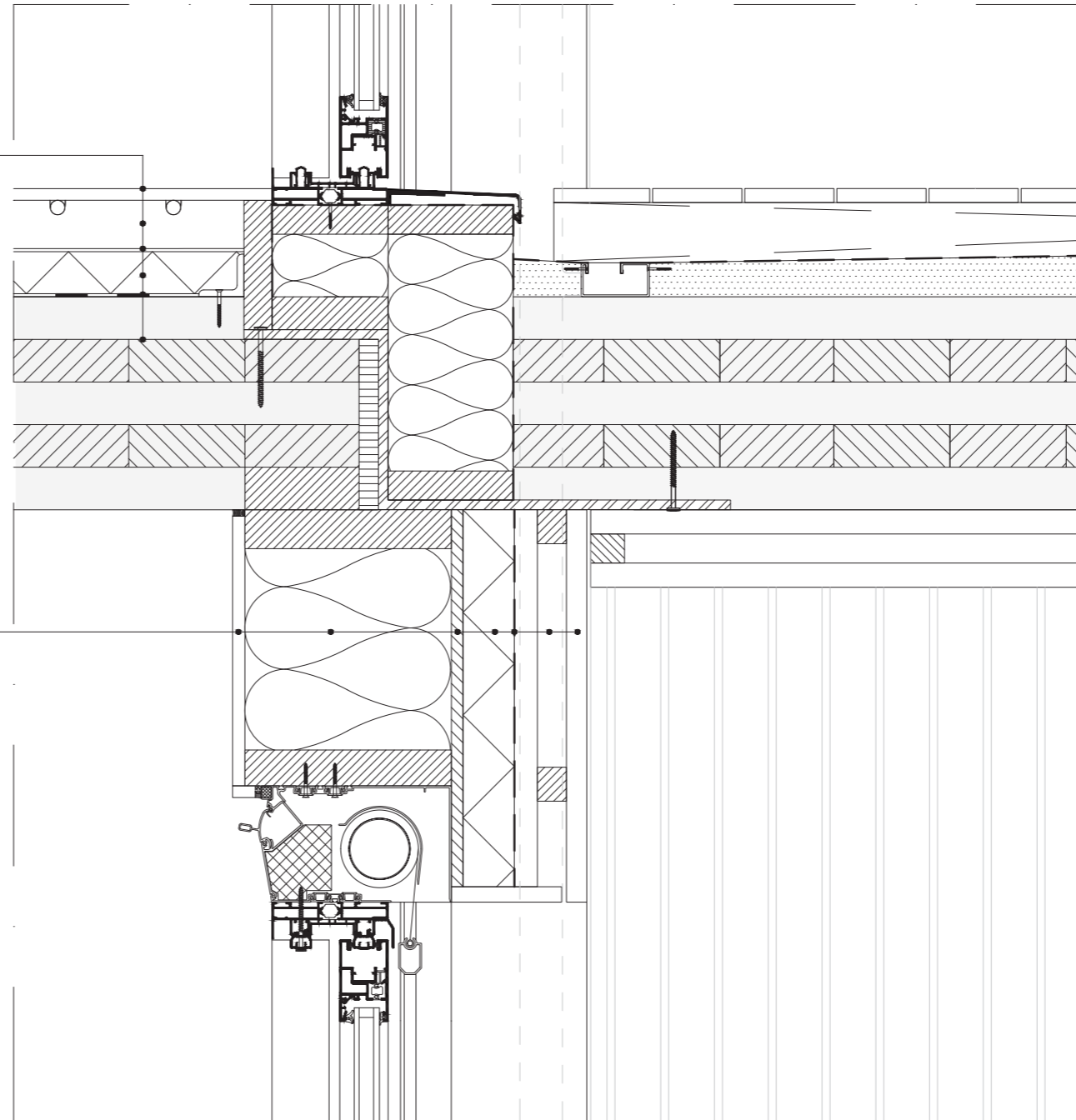
D3

Layers: up to down

- Laminate floor 10mm
- Cement screed with integrated under-floor heating 50mm
- Separating layer
- Impact sound insulation 33mm
- Protection layer
- Load-bearing CLT structure 220mm

Layers: left to right

- Fire safety gypsum-board 13mm
- Insulation 200mm
- Pressed wood fiber insulation 13mm
- Insulation 53mm
- Waterproofing membrane
- Treated patterns
- Thermo-wood cladding

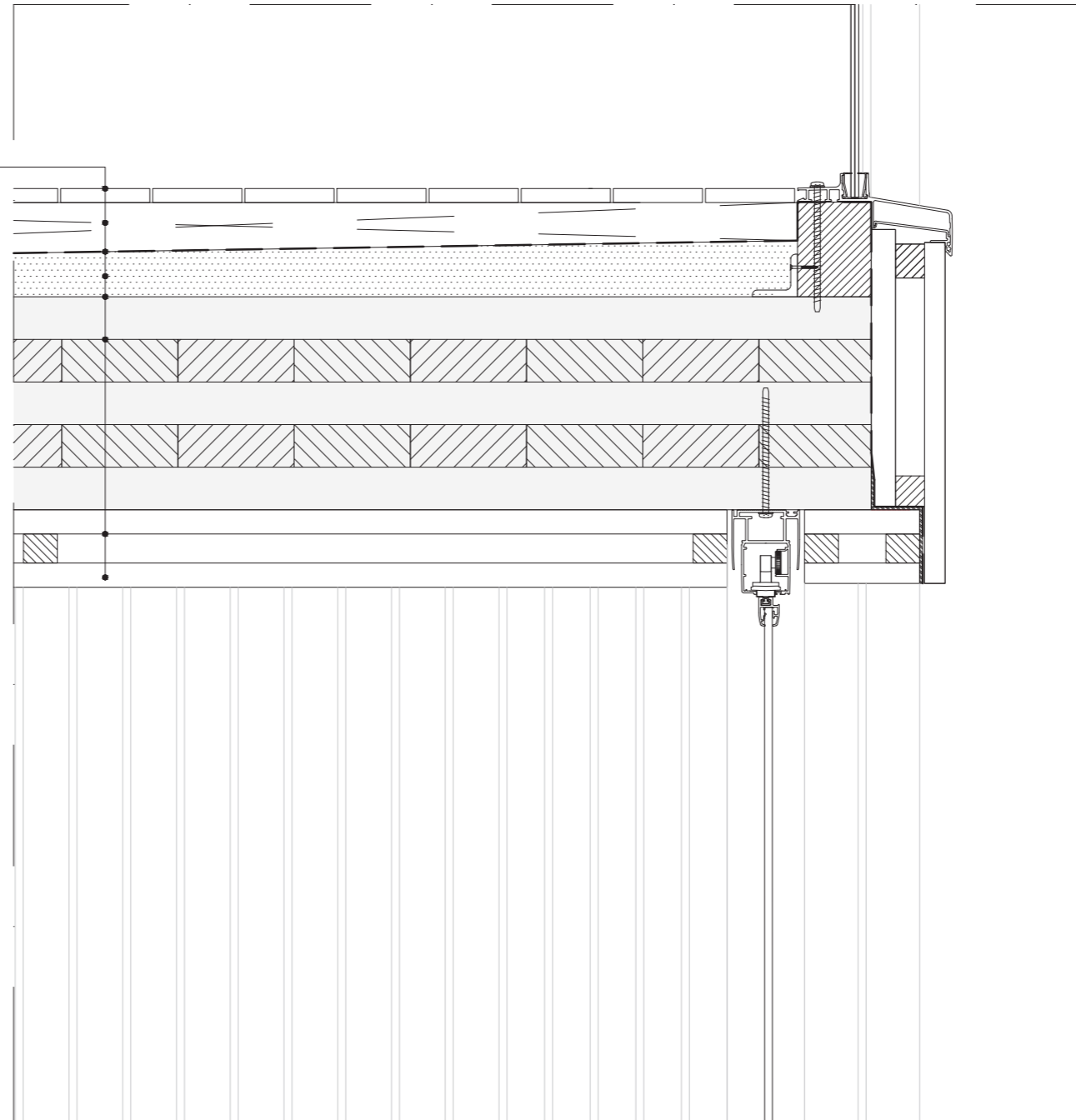


Details

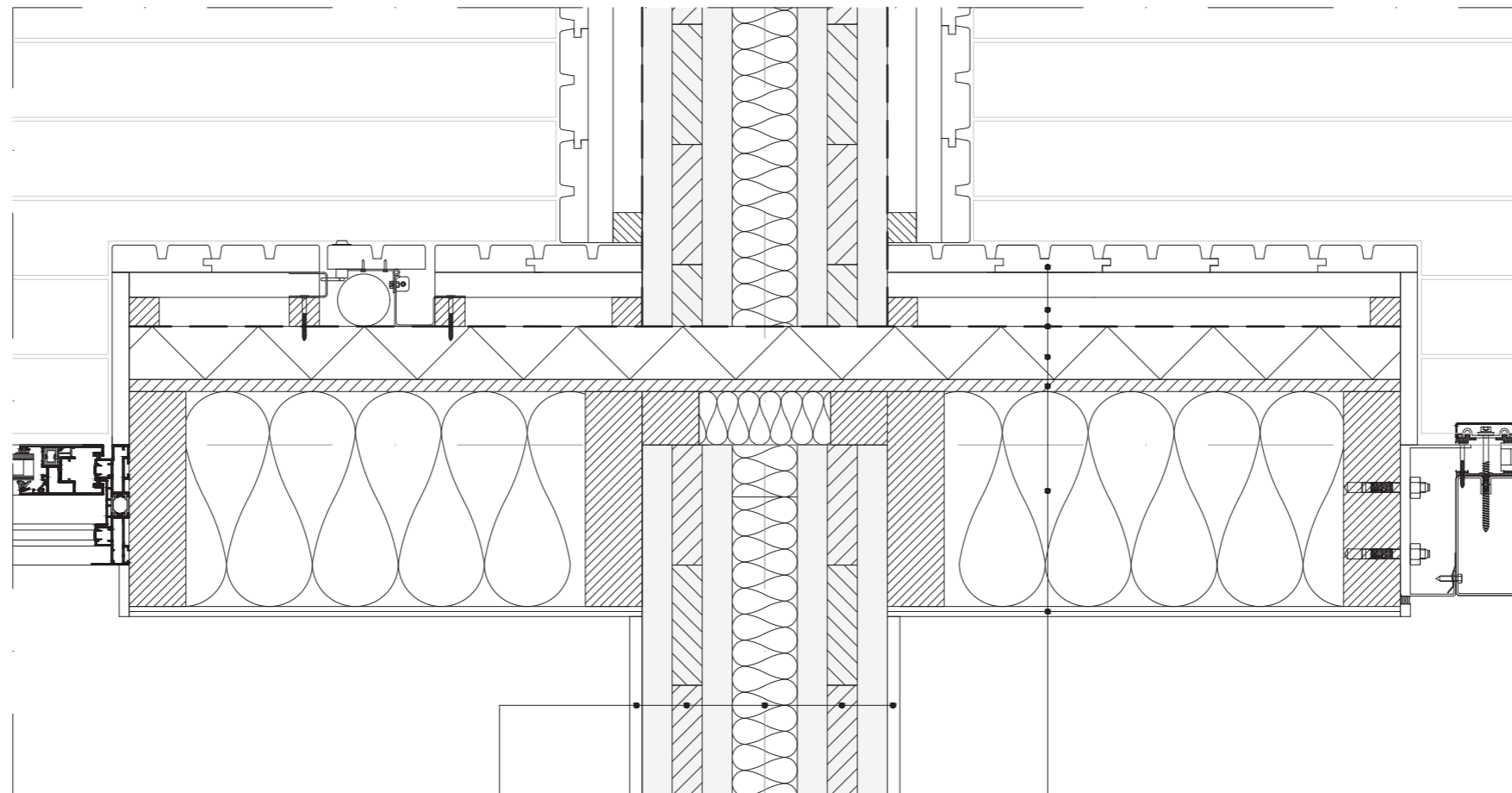
D4

Layers: up to down

- Timber decking
- Timber bars for raising the floor
- Waterproofing membrane
- concrete layer for grading (slope of 1%)
- Separation layer
- Load-bearing CLT structure 220mm
- Treated patterns
- Thermo-wood cladding



D7



Layers: inner wall from left to right

- Gypsum board 12,5mm
- Load bearing CLT wall 90mm
- Insulation 65mm
- Load bearing CLT wall 90mm
- Gypsum board 12,5mm

Layers: outer-wall from up to down

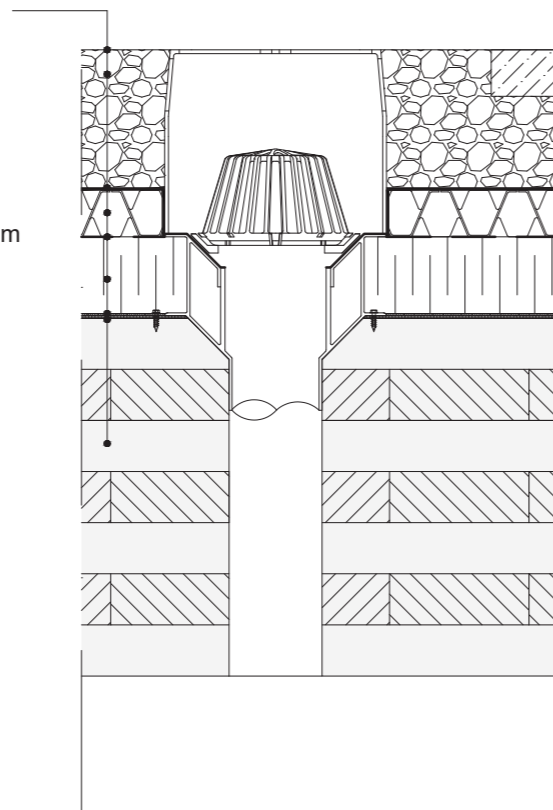
- Thermo-wood cladding
- Treated patterns
- Waterproofing membrane
- Insulation 53mm
- Pressed wood fiber insulation 13mm
- Timber frame with soft-wood fiber Insulation 210mm
- Gypsum board 10mm

Details

D1

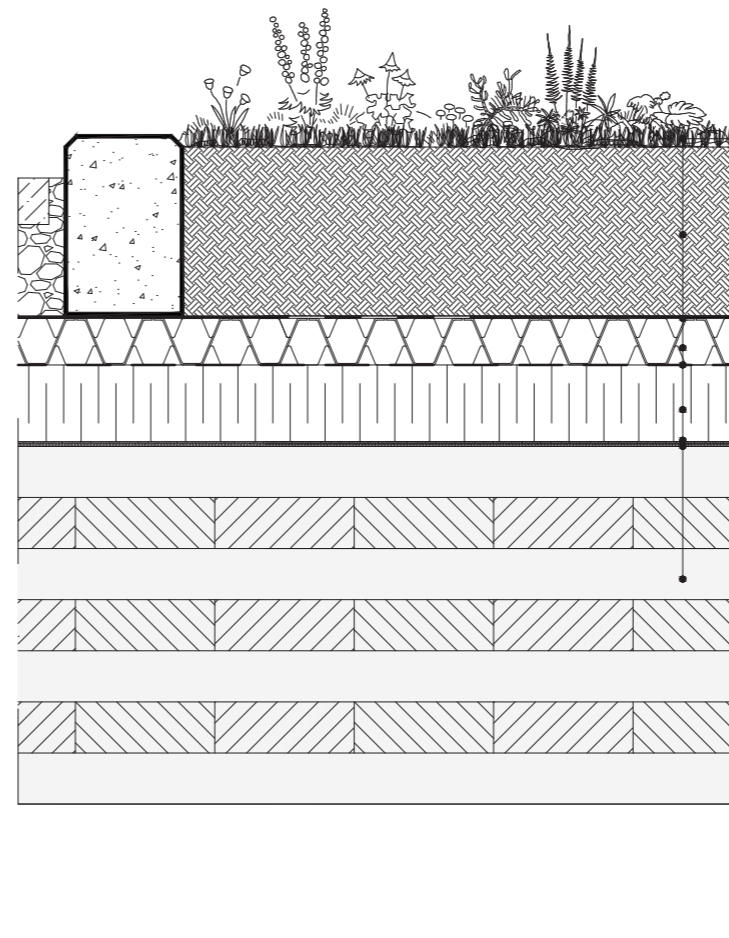
Layers: up to down

- Pavers
- Smooth gravel 100mm
- Filtration layer
- Drainage board
- Water protection
- Foundation foil
- Rigid insulation (XPS foam) 70mm
- Root protection
- Vapor control later
- CLT slap 300mm

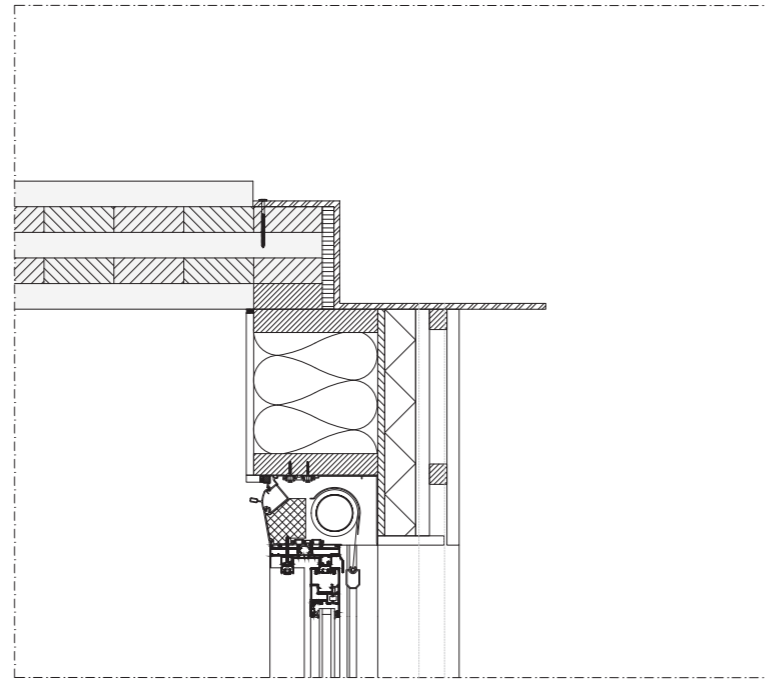


Layers: up to down

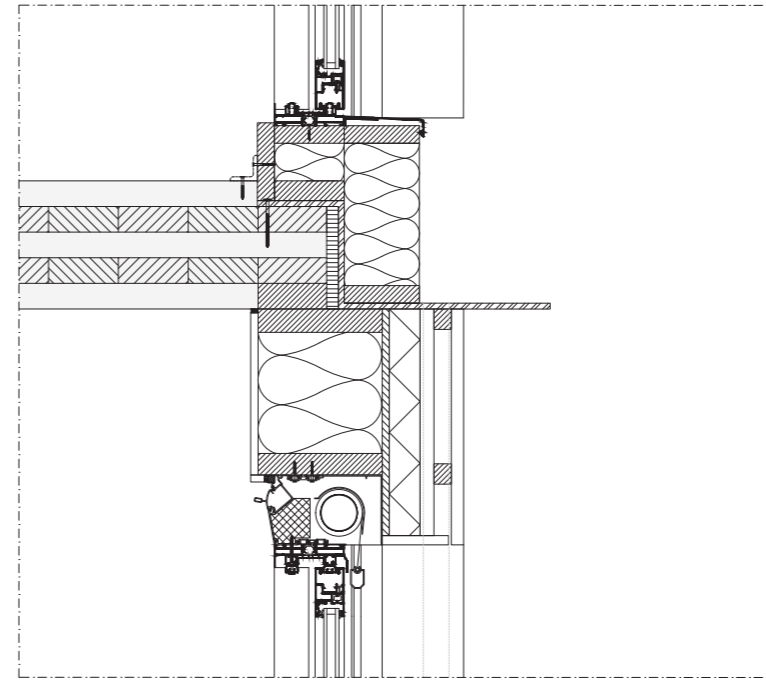
- Vegetation
- Vegetation layer 140mm
- Filtration layer
- Drainage board
- Water protection
- Rigid insulation (XPS foam) 70mm
- Root protection
- Vapor control later
- CLT slap 300mm



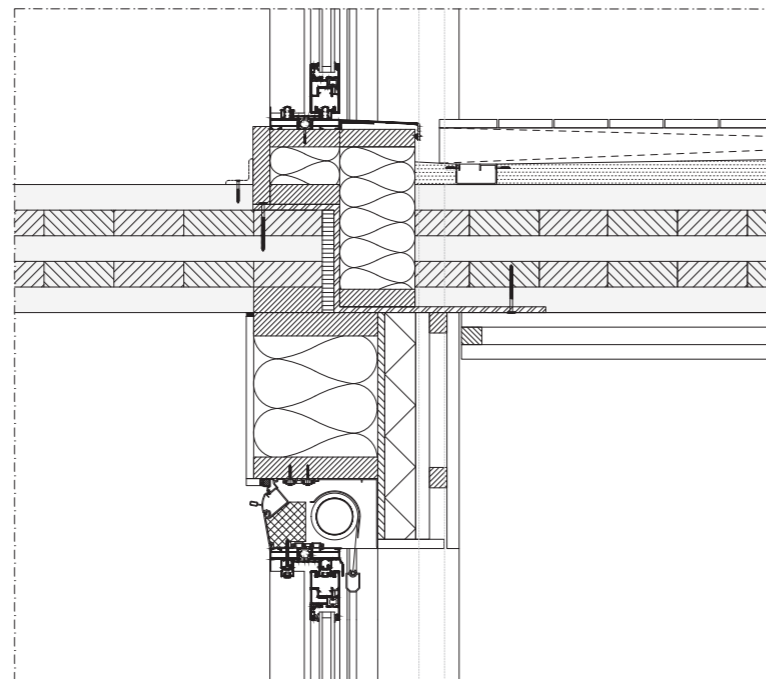
Assembly process



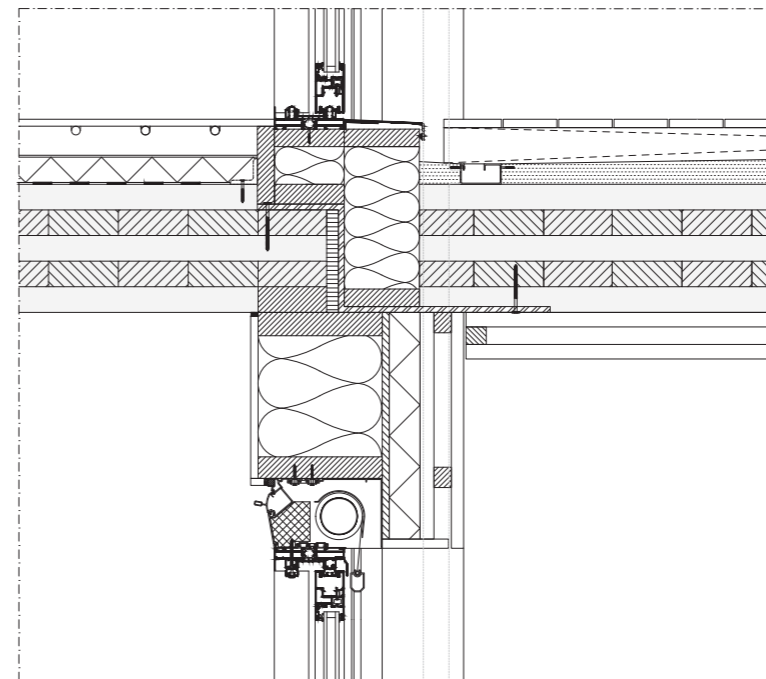
1-The CLT floor is on place.



2-Placing the prefabricated inner wall.



3-Connecting the prefabricated loggia/winter-garden with the structure of the floor.



3-Adding the upper layers of the floor.

Climate design

1- Solar panels to provide the dwellings with electricity. Providing the dwellings with LED lighting devices will improve the amount of power saved.

2- Ventilation system type C (natural input and mechanical output).

3- The collected rainwater from loggias, wintergarts, and roofs goes to the water reservoir.

4- Loggias and wintergarts will enhance the shading and reduce the overheating.

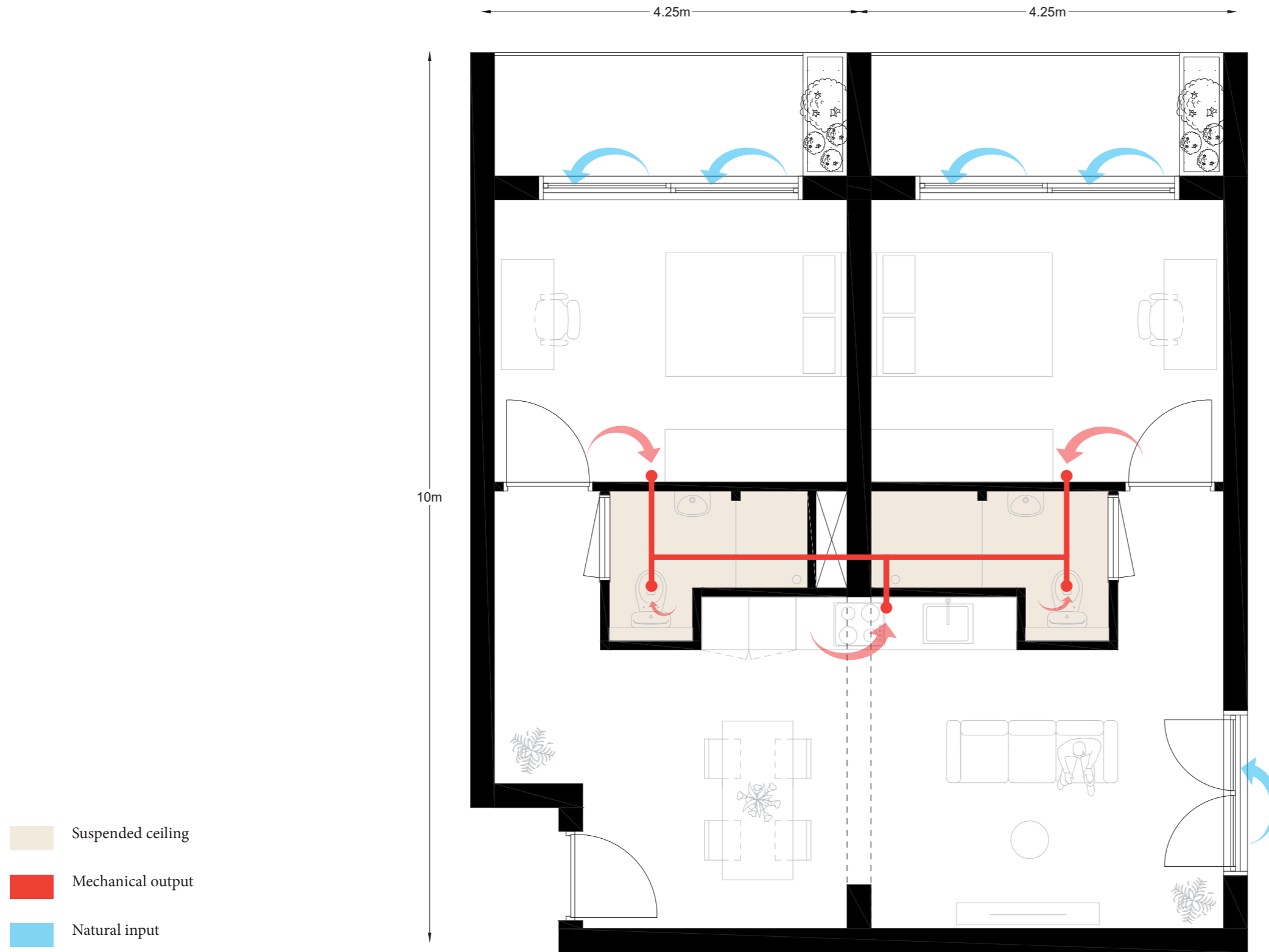
5- Heat exchanger as heating system (ground heat pump).

6- Providing the building with roof gardens will attribute to the enhancement of biodiversity in the surrounding.

7- The gathered water will be used to irrigate the plants and the WC flush tanks.



Ventilation system



Materials and weathering

Impact of weathering



Materials before the weather has an impact on them.



Materials after around 5 years.



Augmented Reality

Augmented 3D :

In order to make the presentation interactive and to let the attendees explore the outside of the block from different angles, the Augmented 3D is introduced to fulfill this aspect. All you need is an internet-connected mobile phone to take a look at the project by the mean of *Augmented Reality*.

How to use it ?

- Scan the QR- code then press on the link.
- Wait few seconds until the 3D model is loaded.
- Press on 3D button.
- Now you can explore the 3D, press on the question mark to know how to zoom, pan, and rotate.

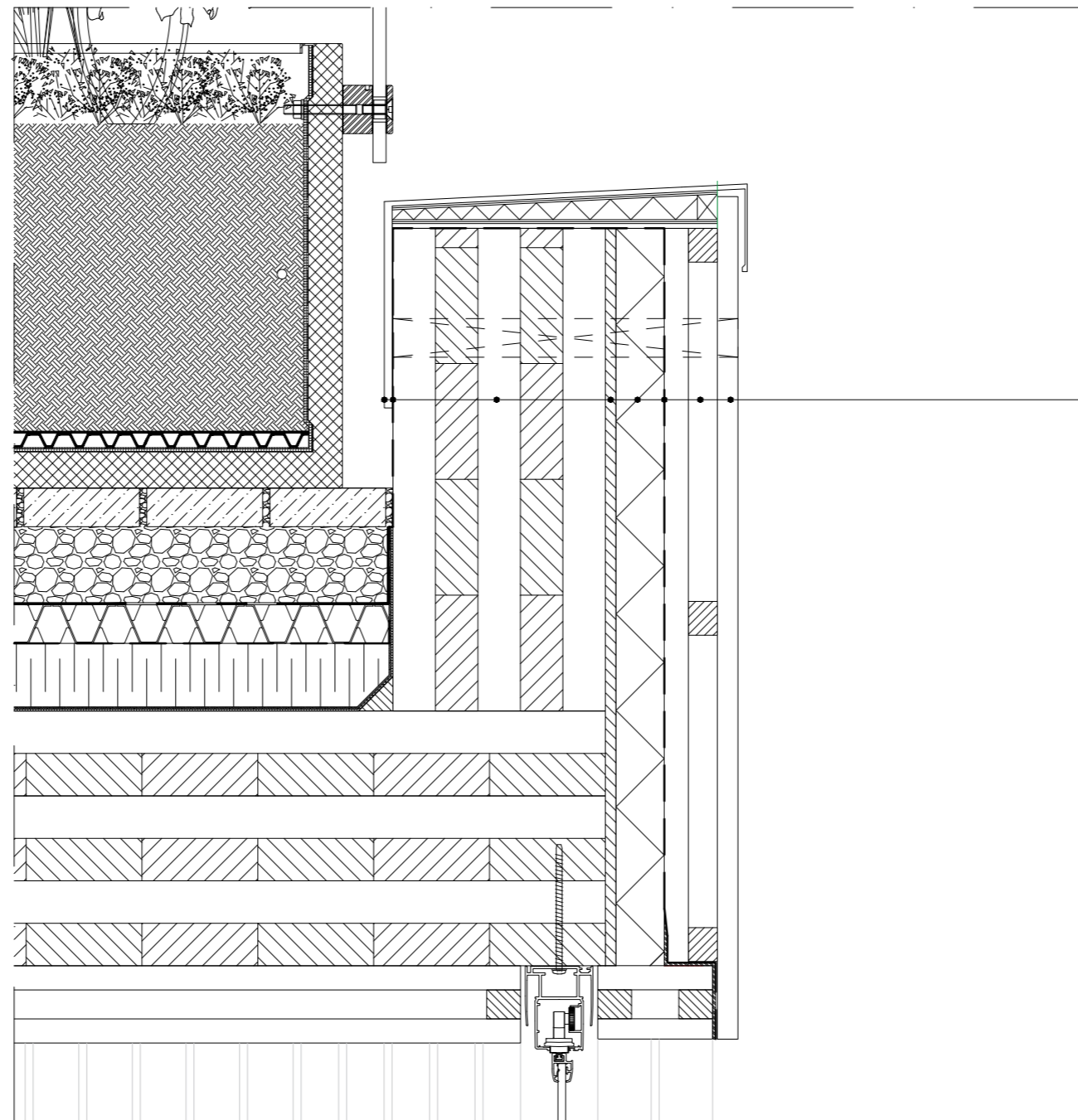


Thanks for your attention



Appendix

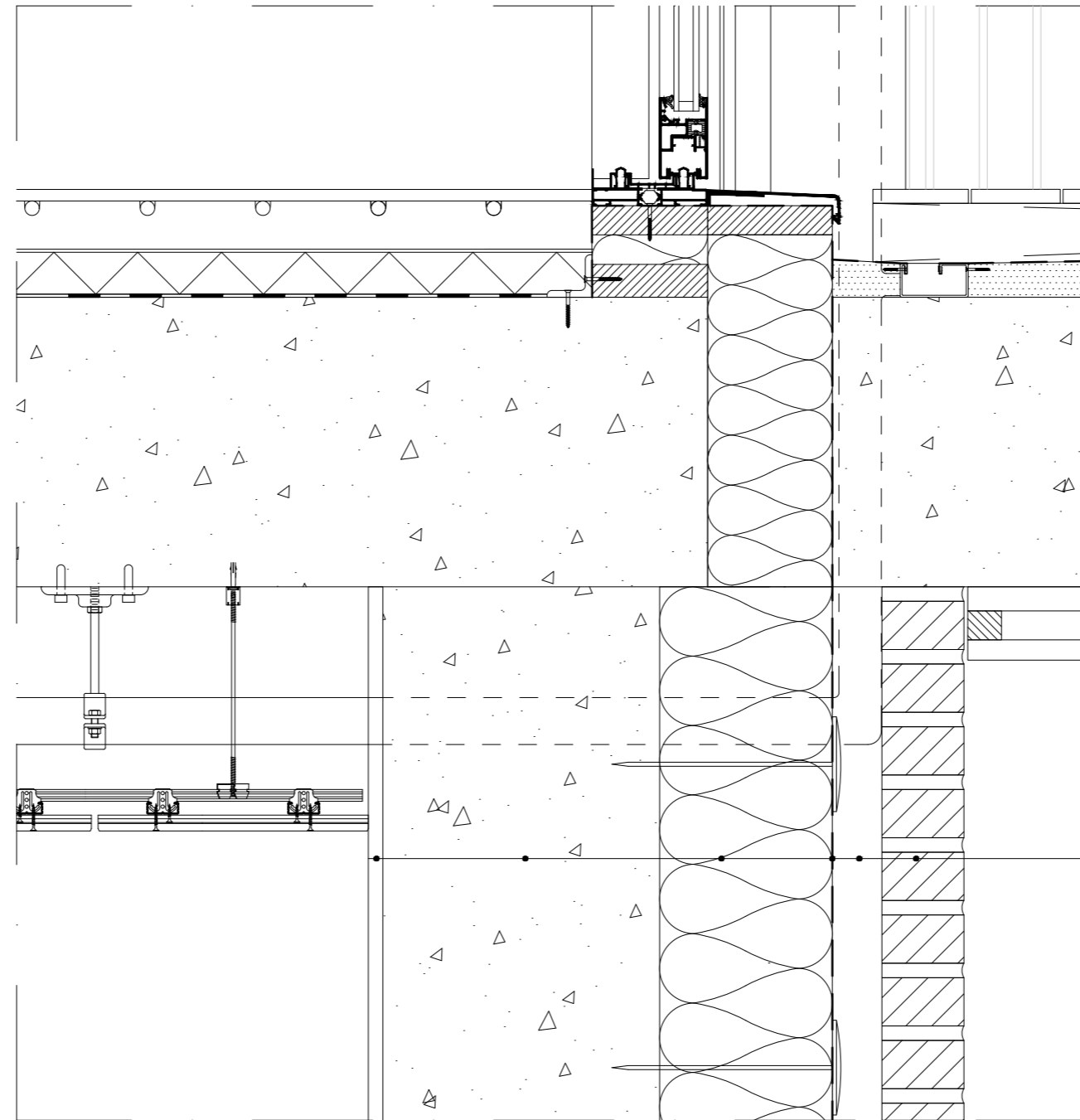
D2



Layers: from left to right

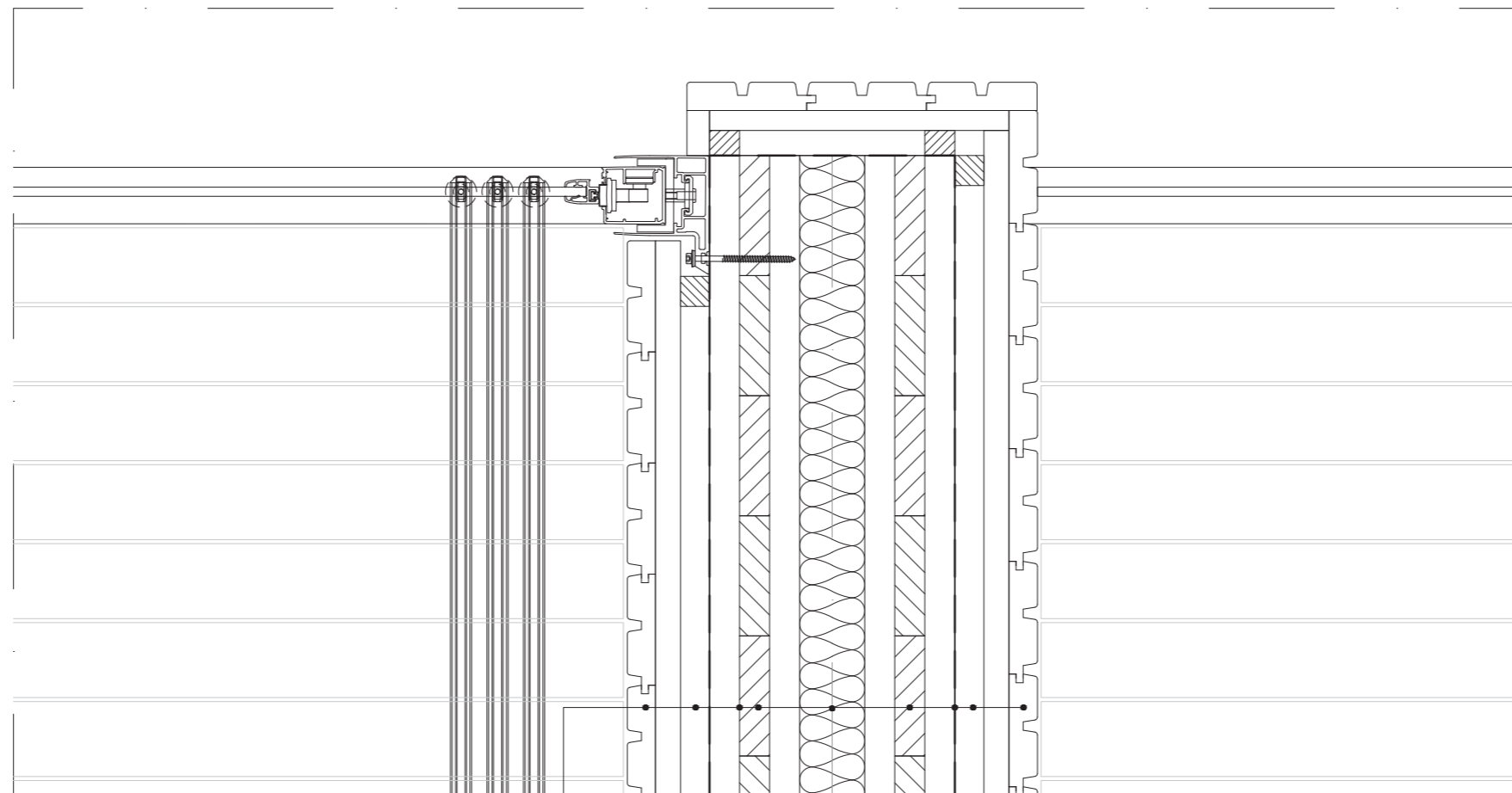
- Sheet-metal parapet cap sloped to drain roof side
- Waterproofing membrane
- CLT wall 220 mm
- Pressed wood fiber insulation 13mm
- Insulation 53mm
- Waterproofing membrane
- Treated patterns
- Thermo-wood cladding

D5



- Layers: left to right
- Gypsum-board 15mm
 - Concrete beam
 - Insulation 180mm
 - Waterproofing membrane
 - Air cavity 60mm
 - Brick 100mm

D6



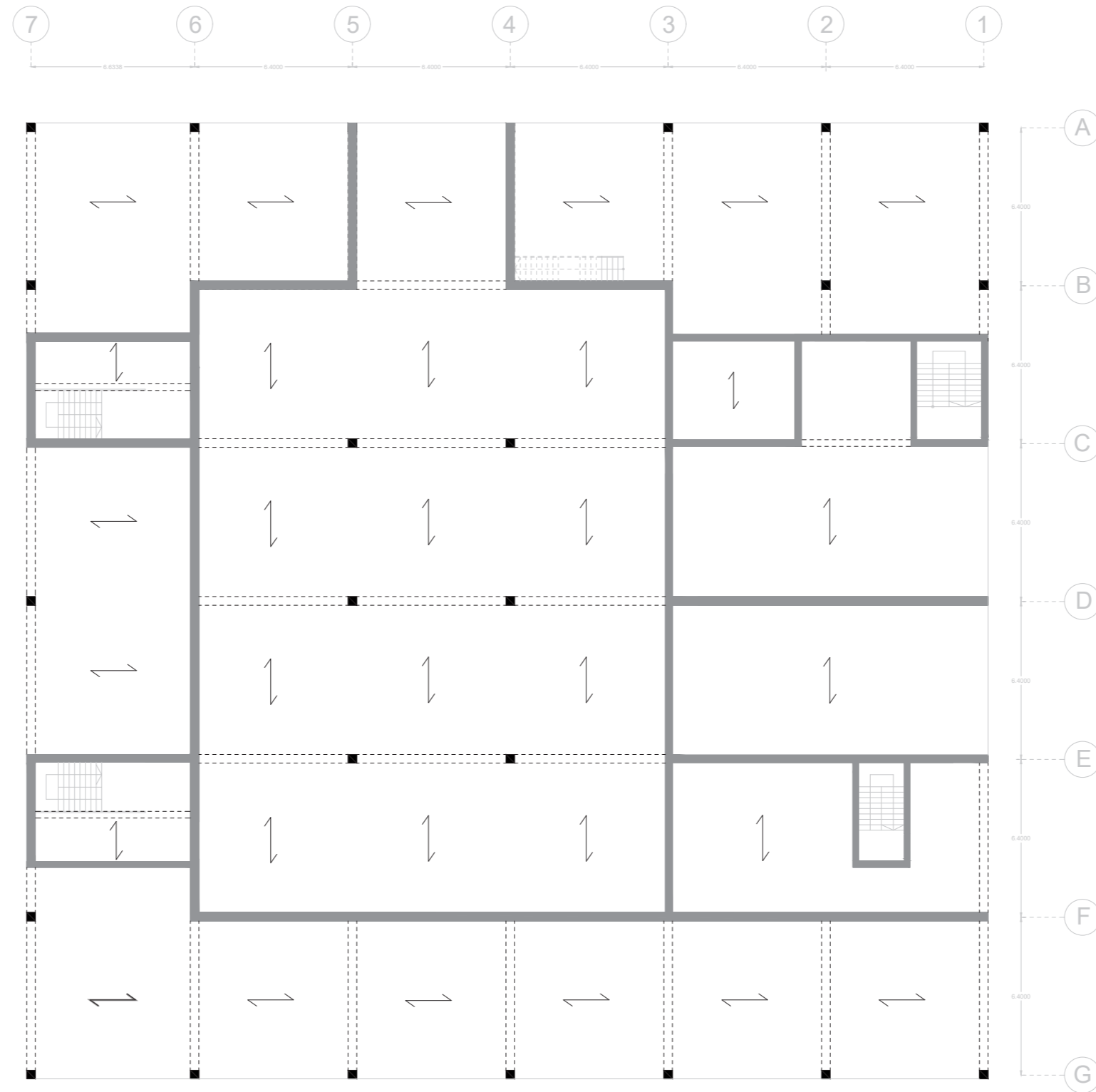
Layers: inner wall from left to right





- Thermo-wood cladding
- Treated patterns
- Waterproofing membrane
- CLT wall 90mm
- Insulation 65mm
- CLT wall 90mm
- Waterproofing membrane
- Treated patterns
- Thermo-wood cladding

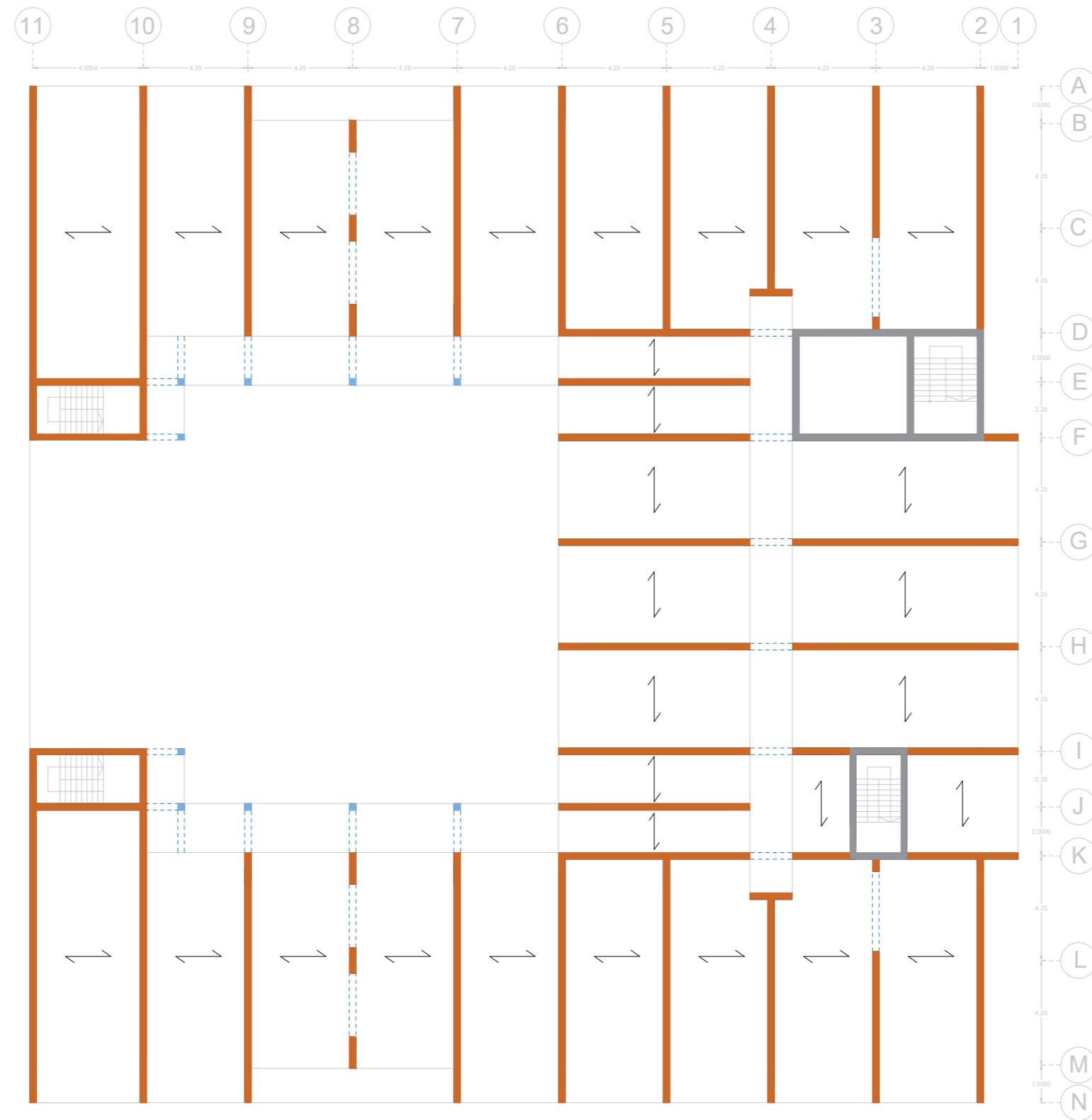
Façades







-  spans direction
-  Concrete load bearing wall
-  Concrete beam
-  Concrete column



- Timber column
- spans direction
- Concrete core
- CLT beam
- CLT load bearing structure