

Grochowska Row Revival

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Design Mentor: Roel van de Pas
BT Mentor: Rufus van den Ban





Poland



Warsaw



Grochów

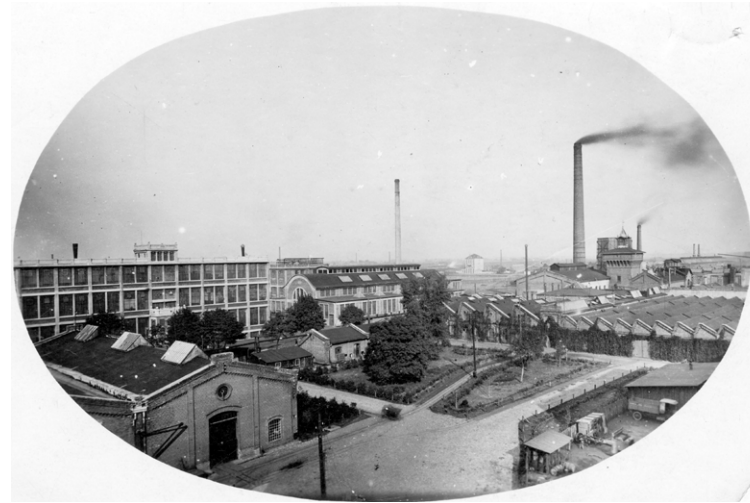




https://fotopolska.eu/80386.str.html?map_z=17&f=2284128-foto

~1920s

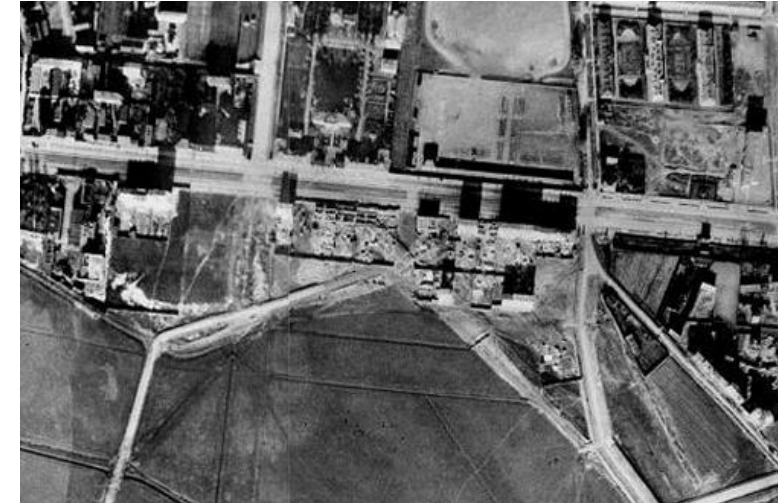
Grochów district being Warsaw's "far-west", swamps, fields, wooden huts.



https://fotopolska.eu/408985.obiekt.html?map_z=17&f=1371179-foto

~1930s

Growing industrial hub, rail, various factories defining the landscape.



<https://mapa.um.warszawa.pl/>

1935

First non-timber mass housing constructed for incoming workers, Grochowska street becomes hard surface.



<https://fotopolska.eu/1836879,foto.html>

Rapid Growth

Grochów experiences rapid growth during the inter-war period, with factories and new housing directly neighbouring fields and slums.

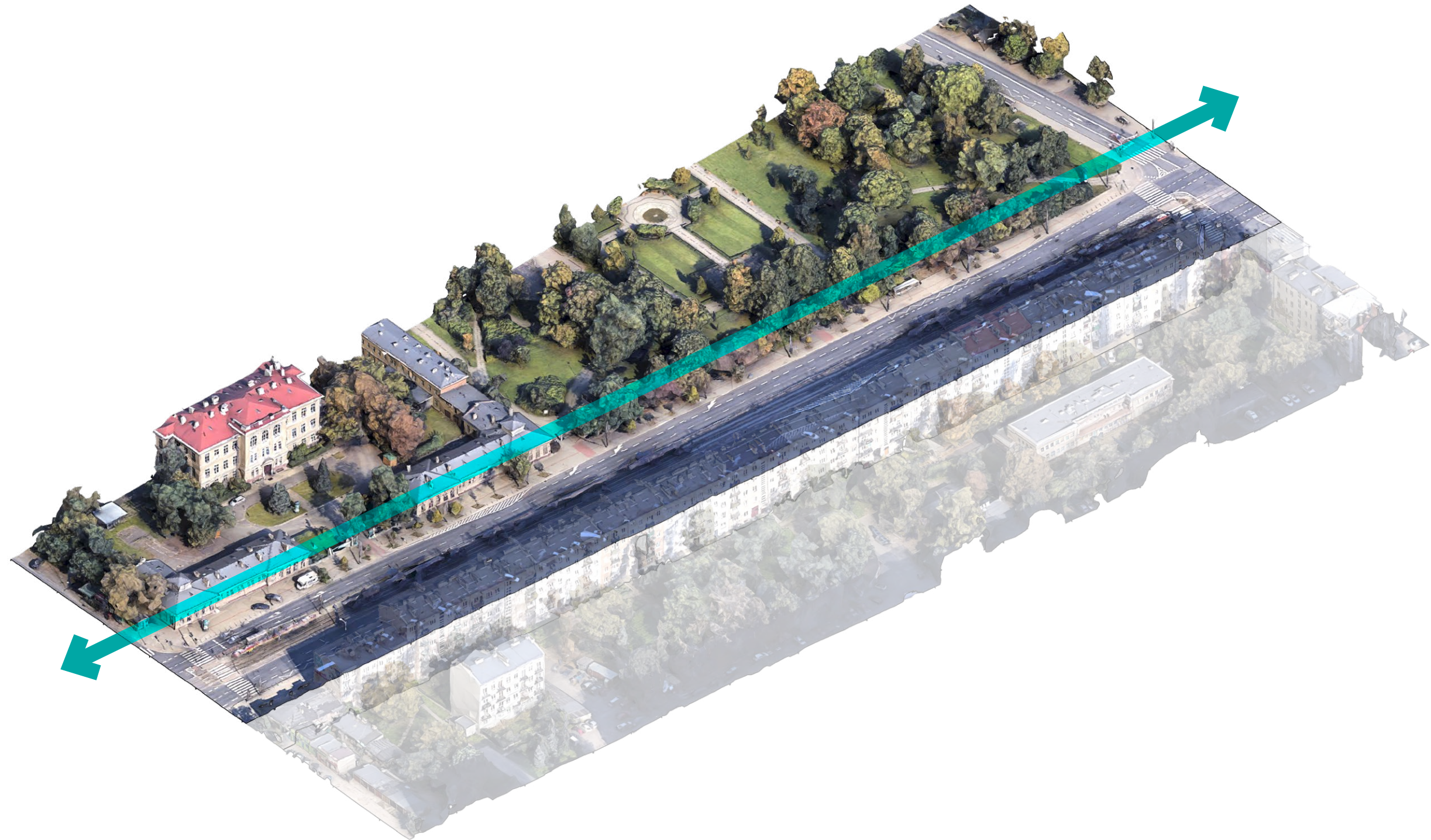


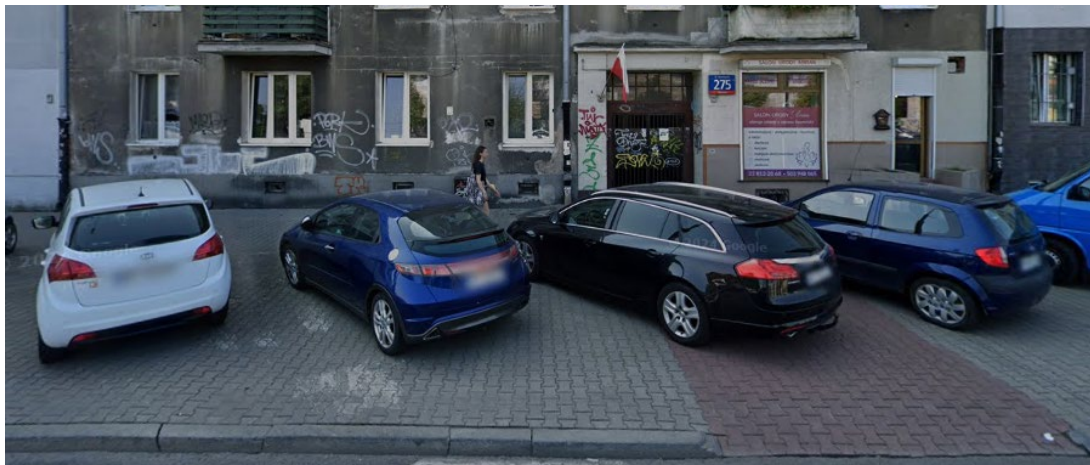
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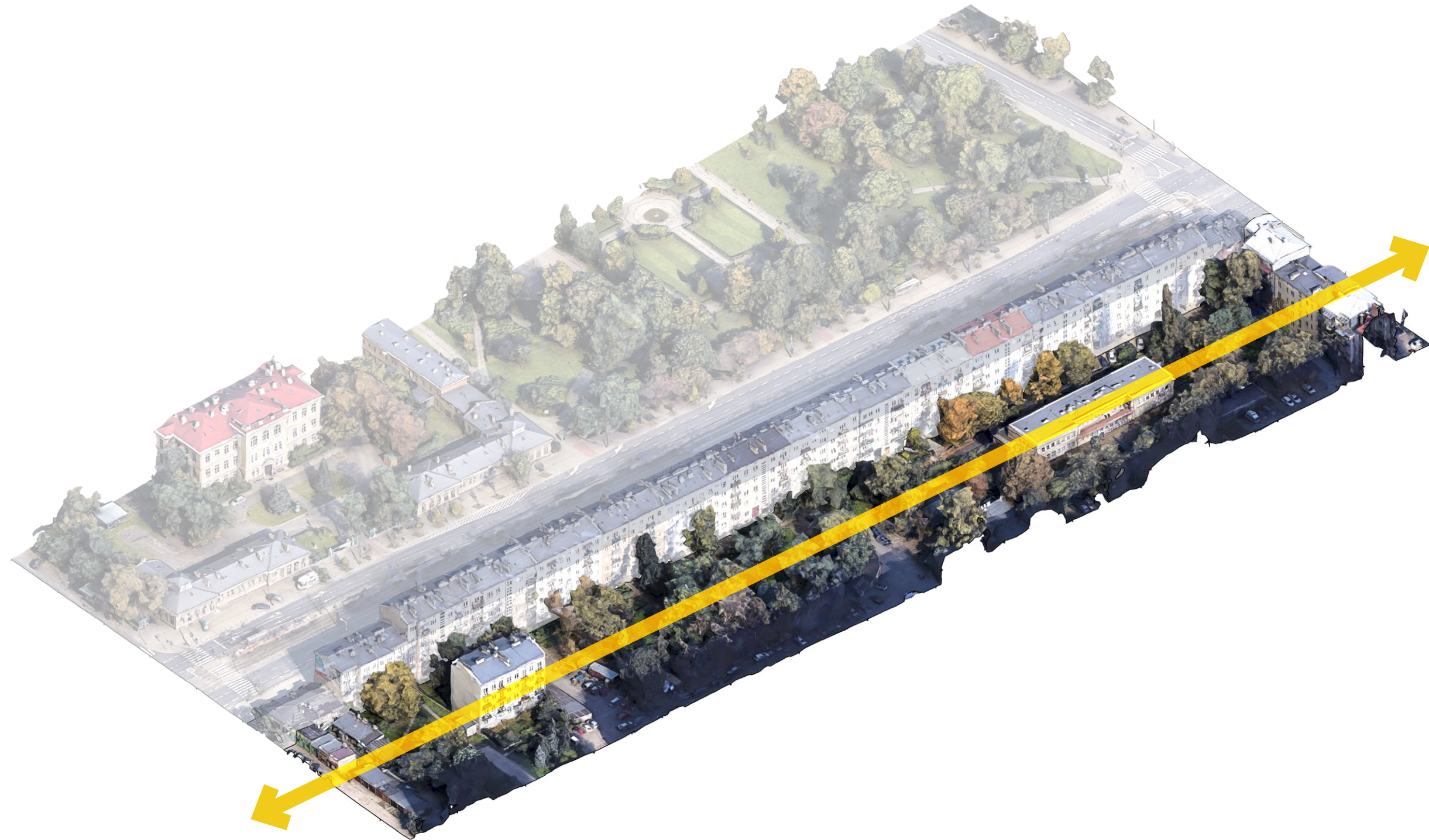
Mass Housing

Mass housing built just before the war to provide for workers needs, with sewage and running water. Erected in batches, probably by the same teams.













Elderly

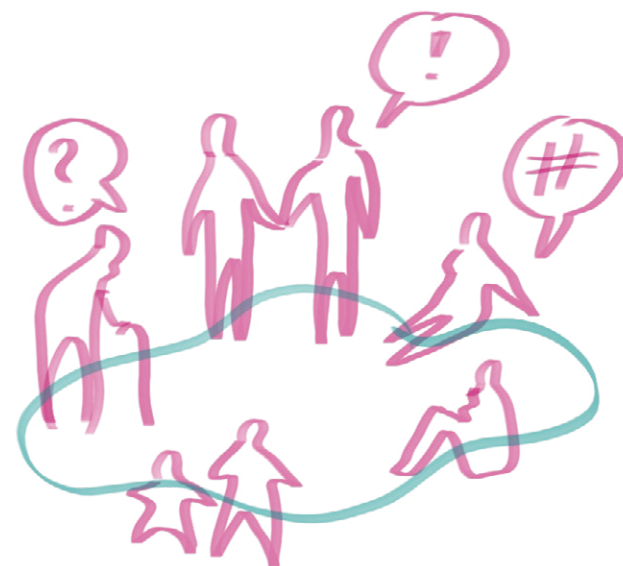


Elderly

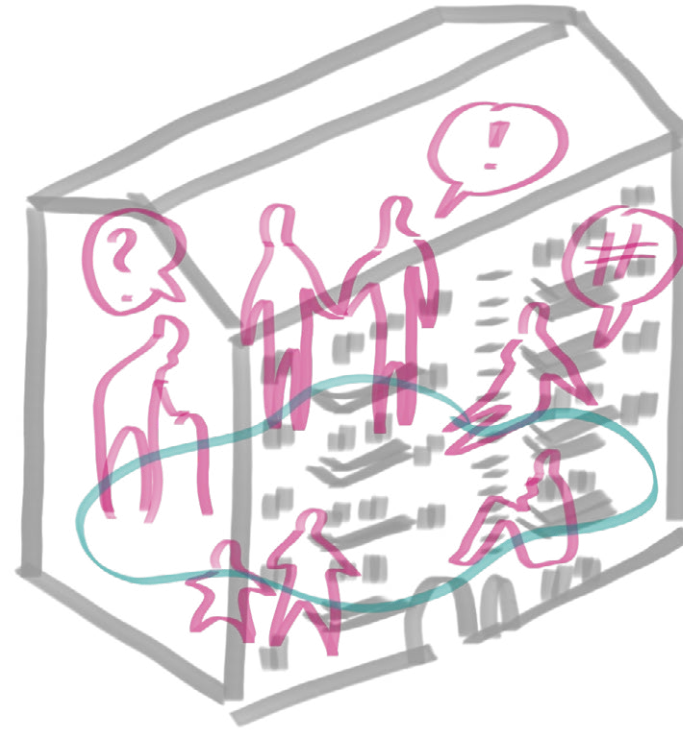


Local Family





Lively Symbiosis

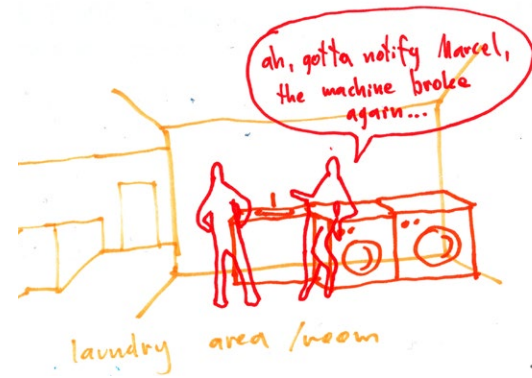
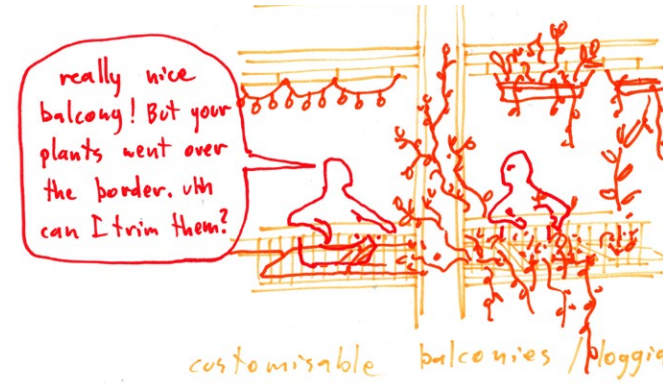


Lively Symbiosis

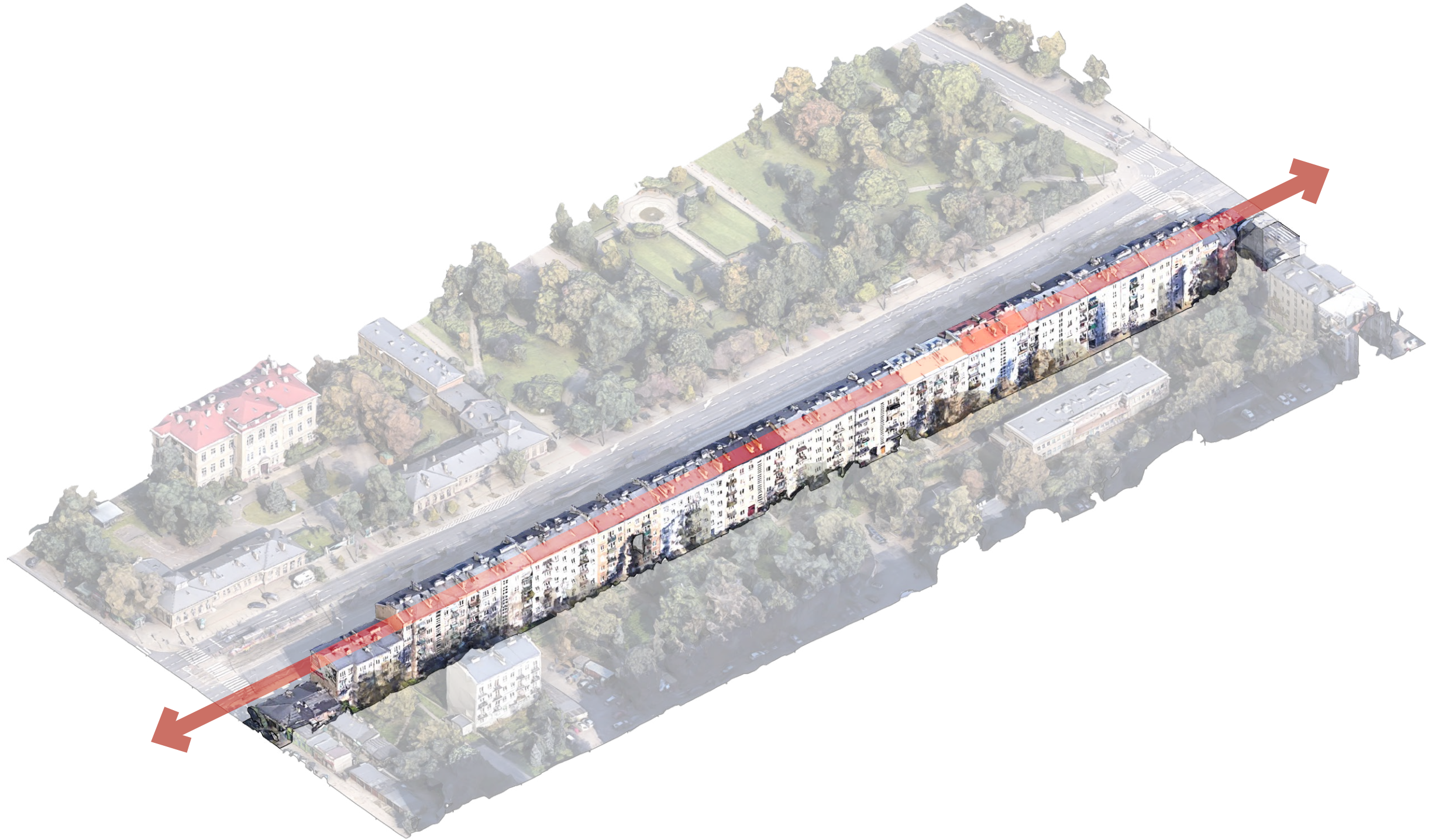


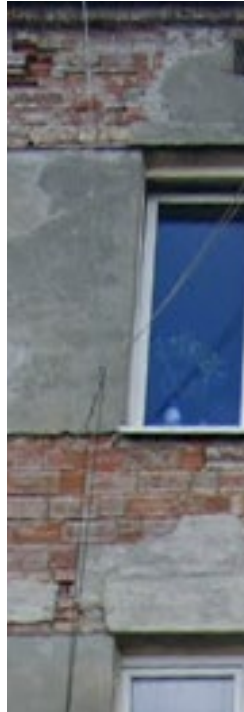
Building (self)Healing

Buildings can “heal themselves” if the community action is strong among residents. How can I facilitate that more with the design?



Can design build community?





Google.pl



Deterioration

Many buildings did not see treatment since construction, bare brick faces the exterior.



Google.pl

Chaotic Progress

Potential for systematic action is overlooked, leading to chaos and deepened inequalities.



Google.pl

User Exclusion

In the process, the needs of users, the most vulnerable, are often forgotten.



Murator.pl

Conservative Practice

Rarely a circular approach is even taken into account in Polish practice.



Visible Similarity

Though not modular, such as post-war “big-plate” mass housing, those buildings share key similarities within typology.

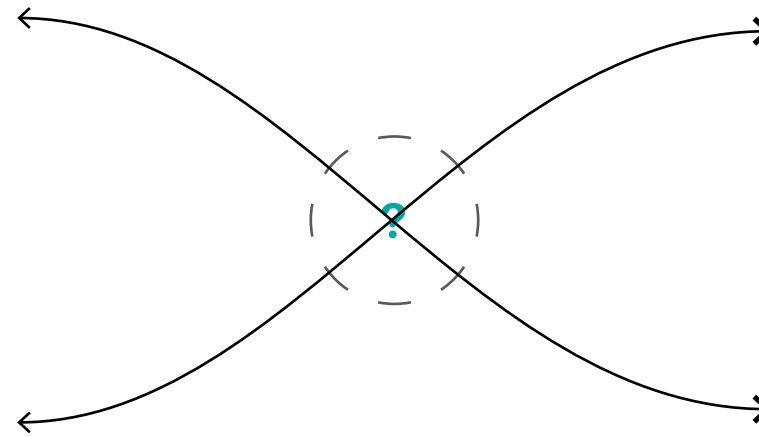


<http://ukosne.um.warszawa.pl/>

Is there more?



Original averaged Grochowska typology



Comparison to Grochowska typology via DINOv2 foundation model

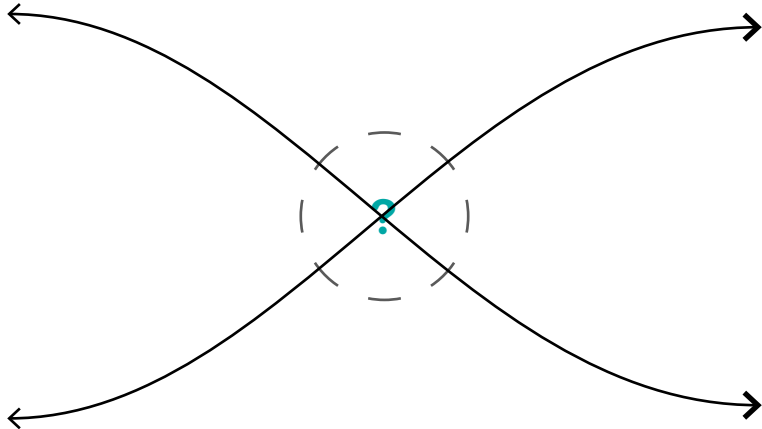


<http://ukosne.um.warszawa.pl/>

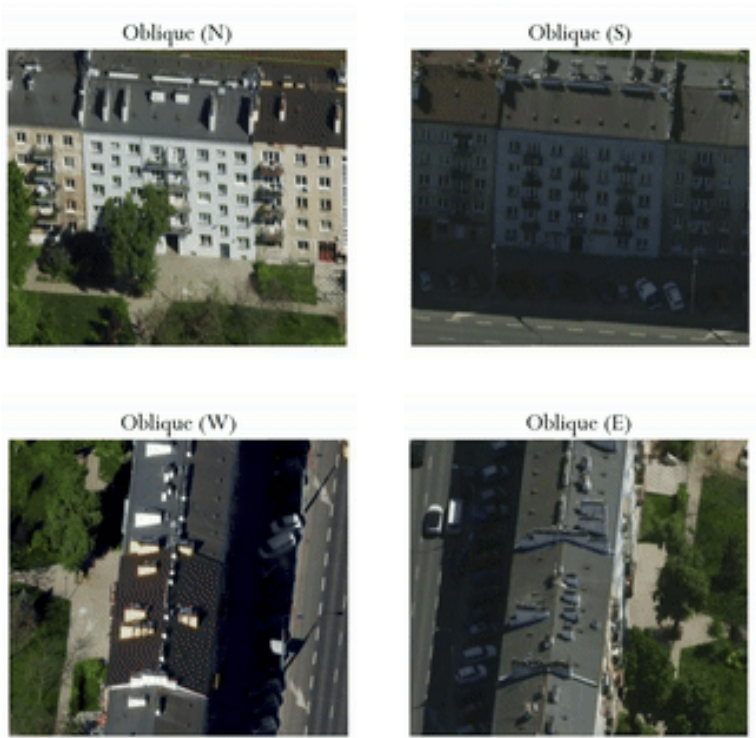
Checking ismilarity with 3200 buildings from Warsaw. Pre-filtered with geospatial data.



Original averaged Grochowska typology



Comparison to Grochowska typology via DINOv2 foundation model



<http://ukosne.um.warszawa.pl/>

Checking ismilarity with 3200 buildings from Warsaw. Pre-filtered with geospatial data.



→

*sorting
ranking
empirical analysis*

~450 Buildings closely matching
Grochowska typology

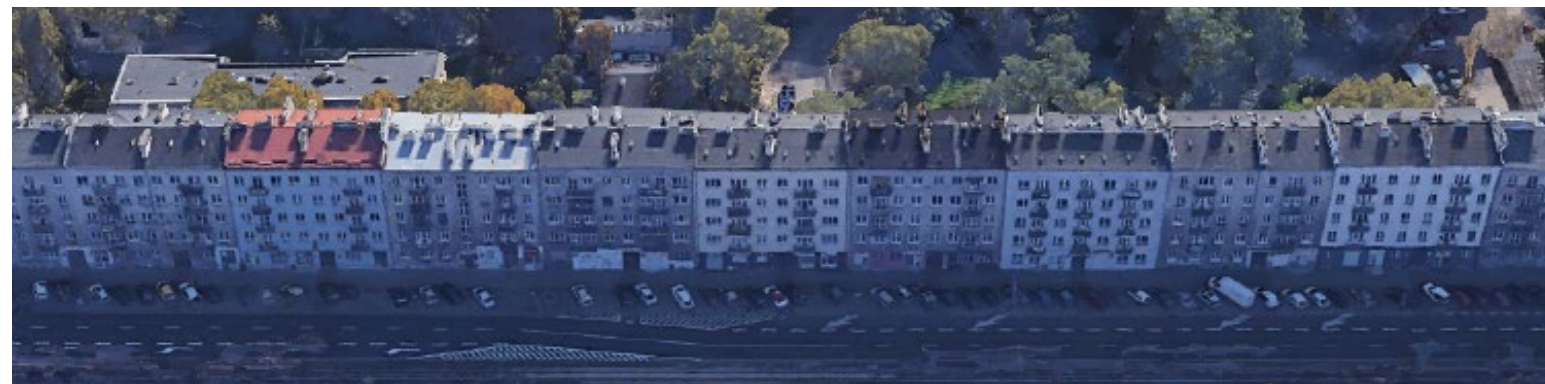
~120 Buildings of exact typological
match







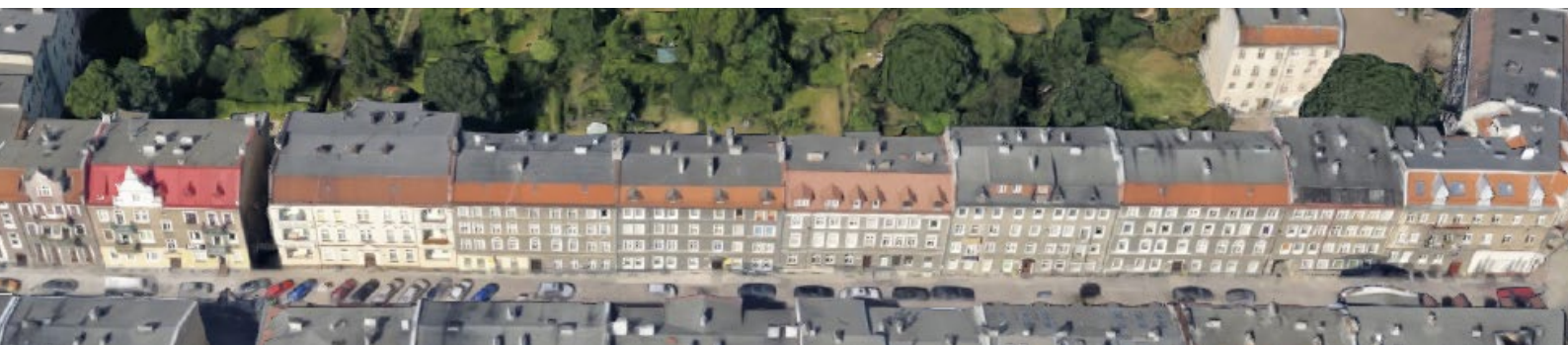
Mokotów



Grochowska



Sosnowiec



Gdańsk



Pruszków

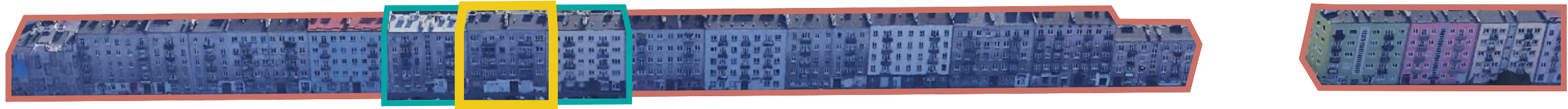


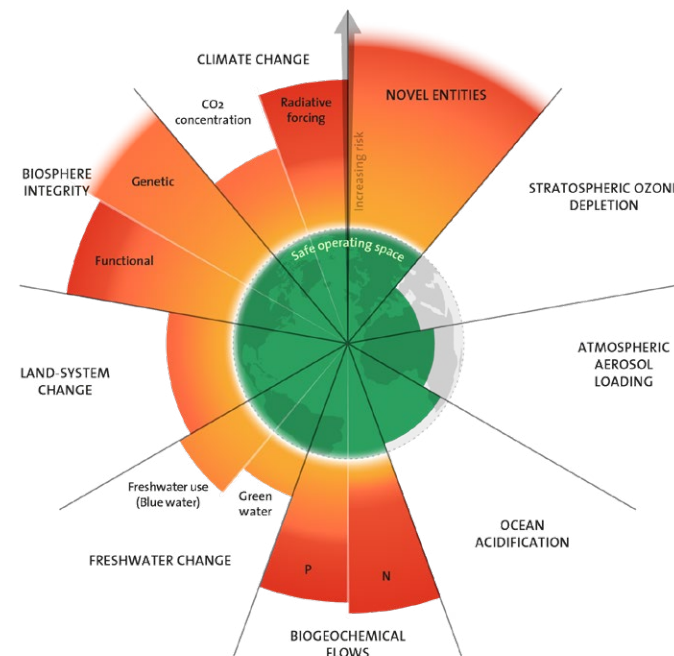
A System! to enable scalable impact

Similar topologies common in other parts of Warsaw and other cities in Poland. There is a potential for considerable, scaled improvement by designing a “system” for refurbishment that could be easily applied to other buildings from this same typology.

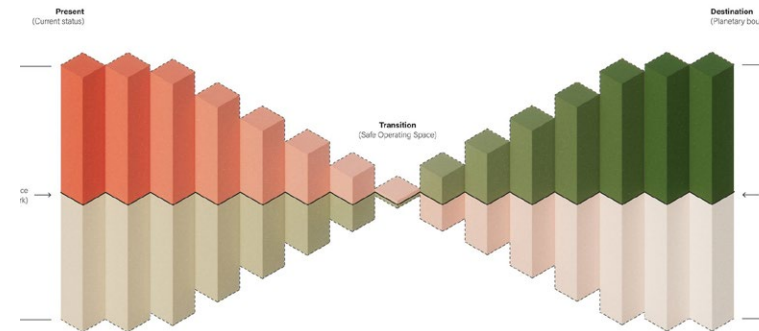








stockholmresilience.org



reductionroadmap.dk



dezeen.com

Call for drastic measures

IPCC, EU, WEF, and many other institutions leave no doubt that a paradigm shift is needed to break from the marasmus of climate inaction.

No carbon budget left

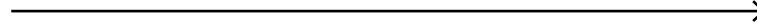
Reduction Roadmap, among many, shows that we simply do not have almost any carbon budget left for construction, to stay safe.

Stop building!

We need to reduce emissions by 96%, as estimated by Reduction Roadmap. So we either stop building, or do so completely differently.



www.tegnestuenlokal.dk



www.tegnestuenlokal.dk

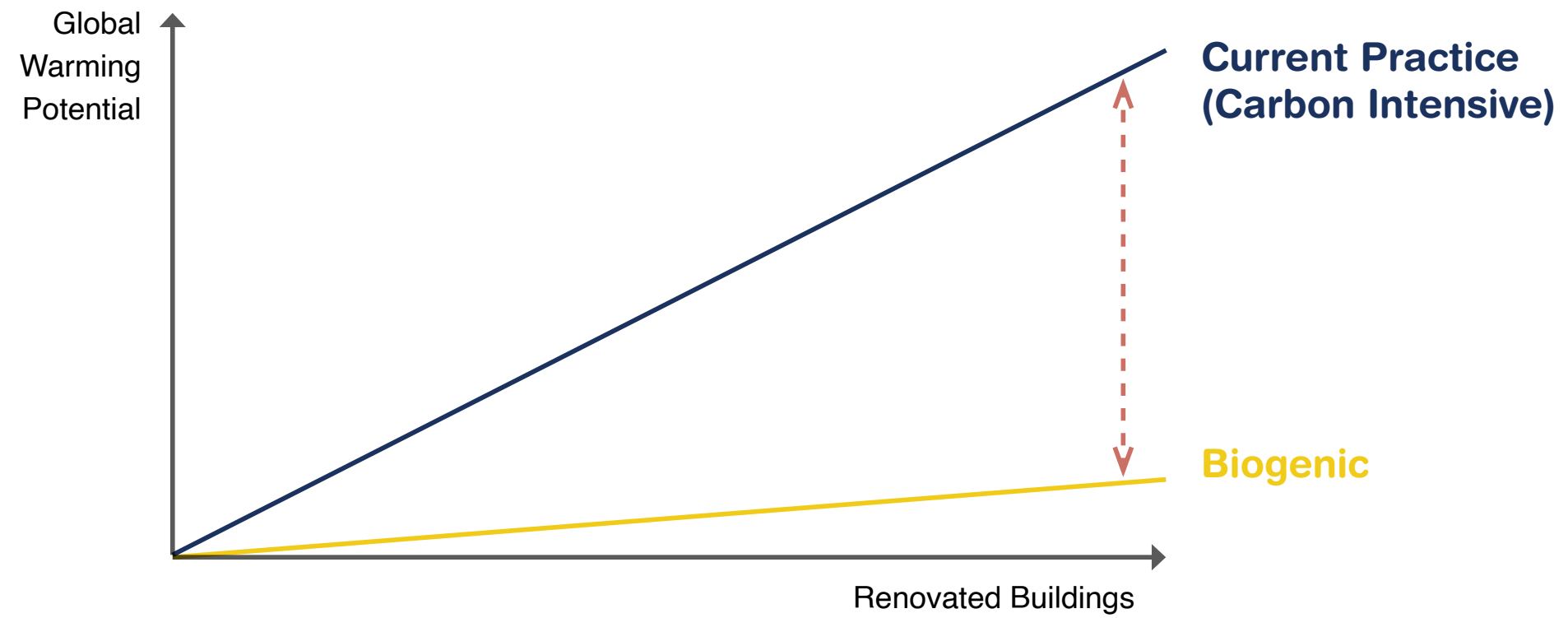
Make use of what's out there first

Better materials or techniques will not save us if we continue building at this rate anyway, but we cannot stop building fully. We must cleverly reuse and upgrade what is available.

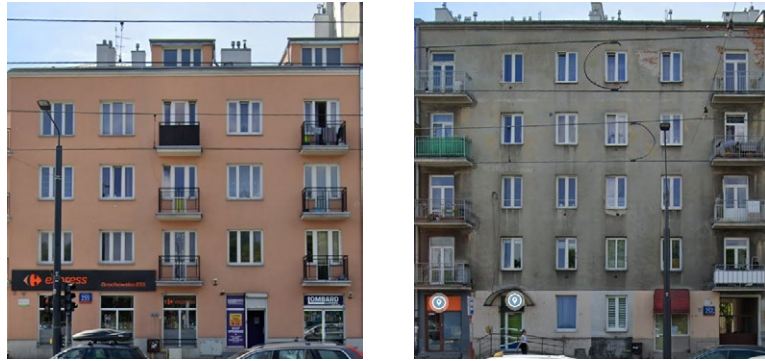


Let's maximise bio-based material use

Biogenic materials are renewable, biodegradable, can store carbon, are proven to be safe by millennia of architecture practice, and we can do even better now, rediscovering them.



Scale makes a difference

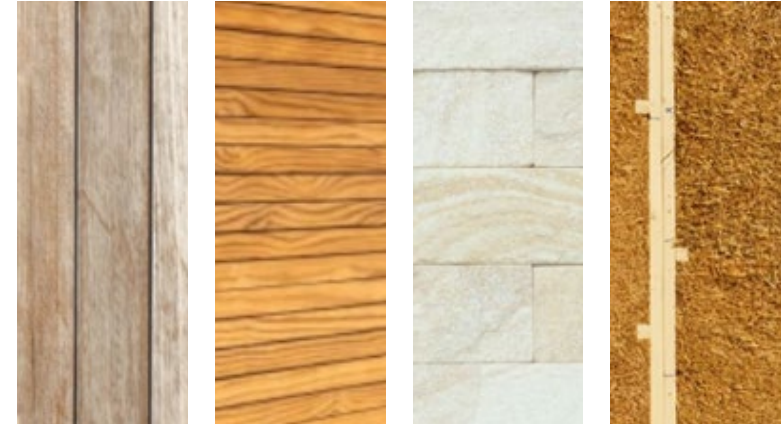


Regulations + Habits

Limited Availability



Lack of Knowledge



Helping myself and contributing to others

How to integrate bio-based solutions in masonry building retrofitting, considering both technical requirements and user preferences?

What are the technical requirements while futureproofing masonry buildings?

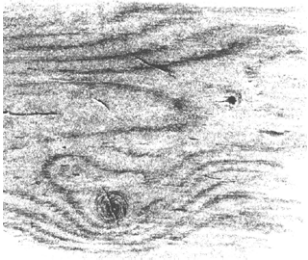
What are the user needs and priorities in transition towards biobased futureproofing?

How biogenic materials fit into these predefined metrics?


How can an accessible knowledge base of biobased refurbishment strategies help advance their adoption rate?

How to do it right?

BIO-BASED MATERIAL CATALOGUE



Jan Zawadzki | Delft | 2025



Grass Fibre | Gramitherm

Main Material

Grass Fibre

Main Purpose

Insulation

Short Description

Soft and flexible grass fibre insulation boards

GWP A1-3 [kg CO2 eq/m3]

-50.1

Standard Thickness [mm]

100

Density [kg/m3]

40

Thermal Conductivity_{W/mK}

0.04

Primary Energy A1-3 [MJ/m3]

1298

Fire Resistance Class

E


Organic Content [%]

92

Compostable

No

Insulation 2



Softwood Cladding | Latvia Timber

Main Material

Wood

Main Purpose

Finishing

Short Description

Plained softwood products for finishing elements eg. cladding

GWP A1-3 [kg CO2 eq/m3]

-647

Standard Thickness [mm]

20

Density [kg/m3]

438.95

Thermal Conductivity_{W/mK}

not listed

Primary Energy A1-3 [MJ/m3]

17500

Fire Resistance Class

not listed


Organic Content [%]

100

Compostable

Yes

Finishing 19



OSB Ecoboard | Sonae Arauco

Main Material

Wood

Main Purpose

Structure

Short Description

Oriented Strand Boards

GWP A1-3 [kg CO2 eq/m3]

-658

Standard Thickness [mm]

20

Density [kg/m3]

600

Thermal Conductivity_{W/mK}

0.13

Primary Energy A1-3 [MJ/m3]

30530

Fire Resistance Class

D

Organic Content [%]

95

Compostable

No

Structure 26

The Catalogue
Of Bio-Based materials suitable for masonry
housing refurbishment.

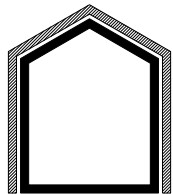
Strategies for masonry building retrofitting



Jan Zawadzki | TU Delft Architecture

Walls and Windows

Exterior Insulation



Insulating the exterior side is a much more preferred way in terms of moisture control, durability, and overall building physics. It also means that occupants are not disturbed much and can stay in their homes for most of the time. The masonry wall, after insulation, becomes a part of the warm interior and can also act as thermal mass, perfect for managing interior comfort.

The feasibility of this approach depends on how much thickness can be added to the façade, what local

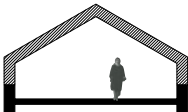
laws dictate regarding façade preservation and styling, and other situational factors such as property boundaries and aesthetic regulations. Early consultation with local authorities or heritage expert may be necessary to ensure compliance.

Exterior insulation can be applied in various ways:

- 1. Insulation boards with external protection: Boards are applied directly to the main wall using adhesives and bolts, followed by a layer of plaster or other protective coating. This approach is cost-effective and straightforward, suitable for a wide range of building types.
- 2. Substructure with ventilated insulation: A supporting framework is installed, allowing soft or rigid insulation boards to be placed between the structural elements. This assembly is then covered

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Top-Up



If site specific regulations and structural integrity of exterior walls and floors allow, another fully usable floor can be added on top with brand new walls and roof. This would have similar benefits as replacing the roof, with significant upgrades, the new usable space can be bigger and even more comfortable. That would allow for more revenue for the association. This should be combined with overall refurbishment of

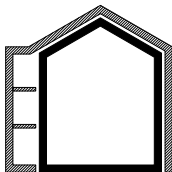
the building, preferably adding external insulation or a second façade. Similarly, as with a new roof, everything can be done with lightweight bio-based construction, like wooden frame structure combined with renewable insulation. As with any building work, quality should be of highest priority, with special care put into water and moisture control, especially where brickwork meets with new construction.

Insulation Structure Finishing

Soft fibre boards; rigid boards for exterior side; loose fill fibre insulation; Wooden roof structure with osb or plaster-board covering; Ceramic roof tiles on the exterior; clay or natural plasters for interiors;

15

Second Façade



If conditions like local laws, daylight, and space availability allow, adding a second façade to the existing wall is an interesting option that gives new possibilities. It is a form of external insulation, but with extra steps.

In this case, the existing wall does not need to be changed much or at all, except for some basic repairs, like removing old plaster or repainting. The second façade can be added at a distance while the insulation can be placed either on the outside of the original wall, making the loggias or terraces exterior

unheated buffer spaces protecting the wall, or in the new façade layer, making the new loggias unheated (or heated) interior spaces. These can be closed completely, allowing for balconies and terraces to form a kind of winter garden. This approach not only adds more usable space but also allows for significant personalization on a larger scale, moving beyond the current trends of small cluttered balconies. Along personalization, additional features could be installed, like adjustable shading elements that could provide more sun during winters, or more shade during summers. The new façade also offers an opportunity to integrate modern building services like ventilation systems or heat pumps, avoiding any prolonged interior works and enhancing overall building performance.

In terms of materials, the new façade can be made entirely out of structural wood elements.

8

and The Guidebook
Of Refurbishment strategies for inter-war masonry residential housing.



Strengthening the **Community**



Extending Available **Space**



Giving a Sense of **Agency** and **Belonging**



Improving **Comfort** and **Health**



Maximising **Circularity**



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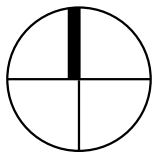
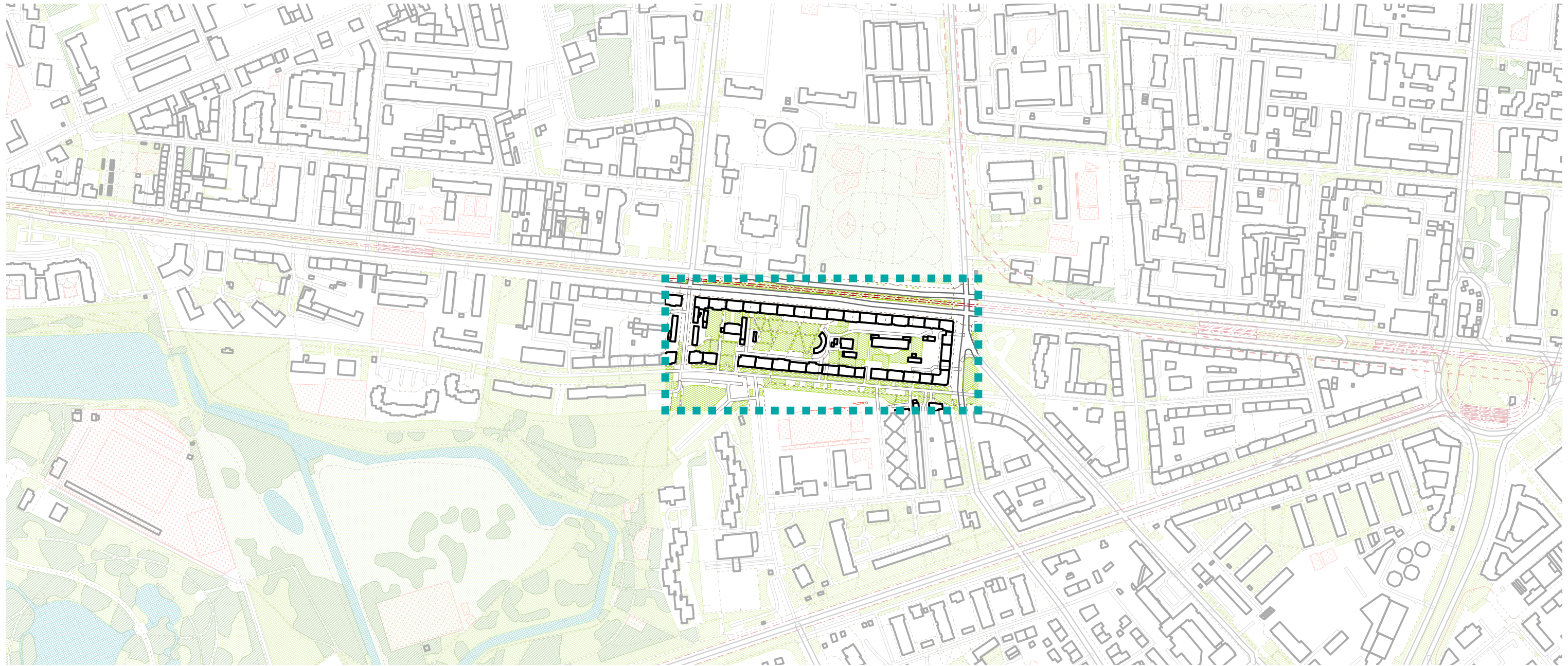
Giving a Sense of **Agency and Belonging**

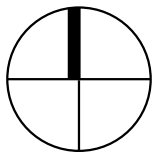


Improving **Comfort and Health**

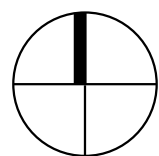
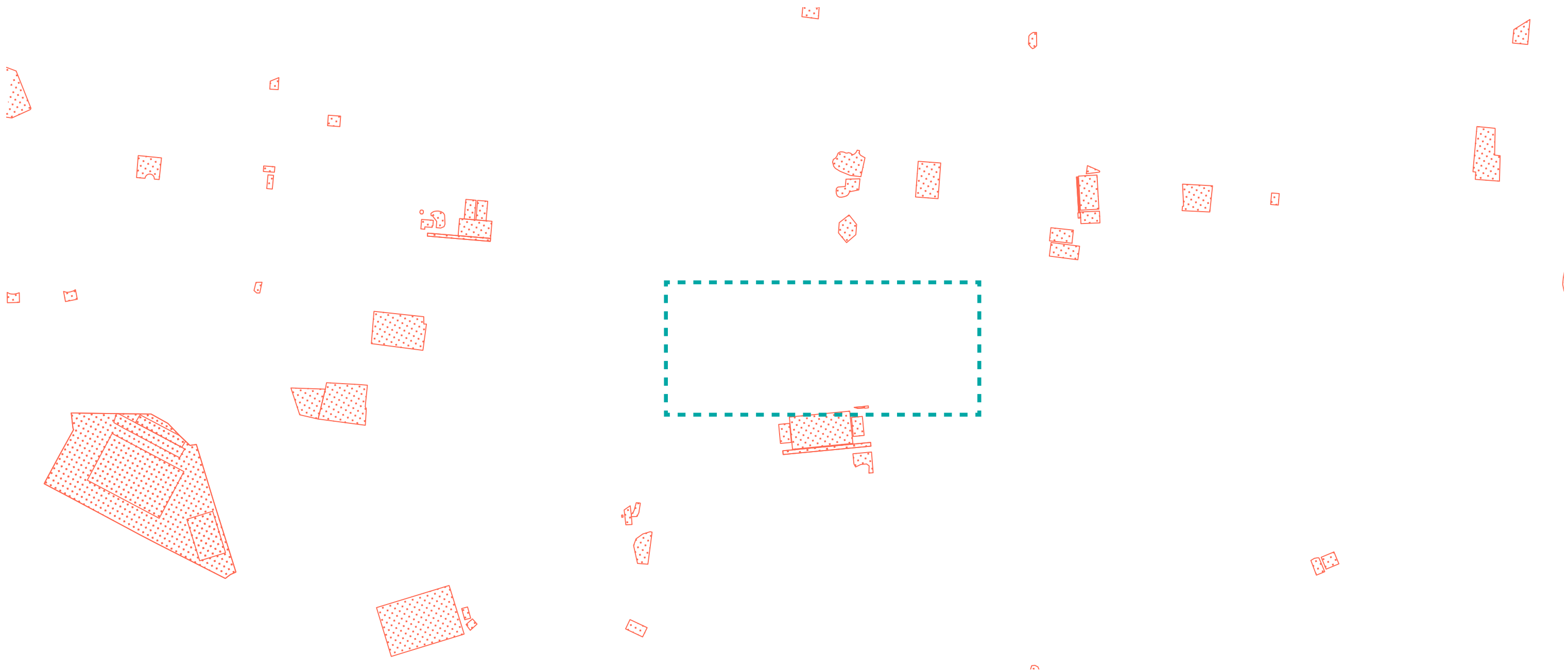


Maximising **Circularity**

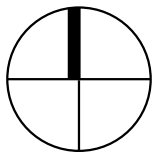
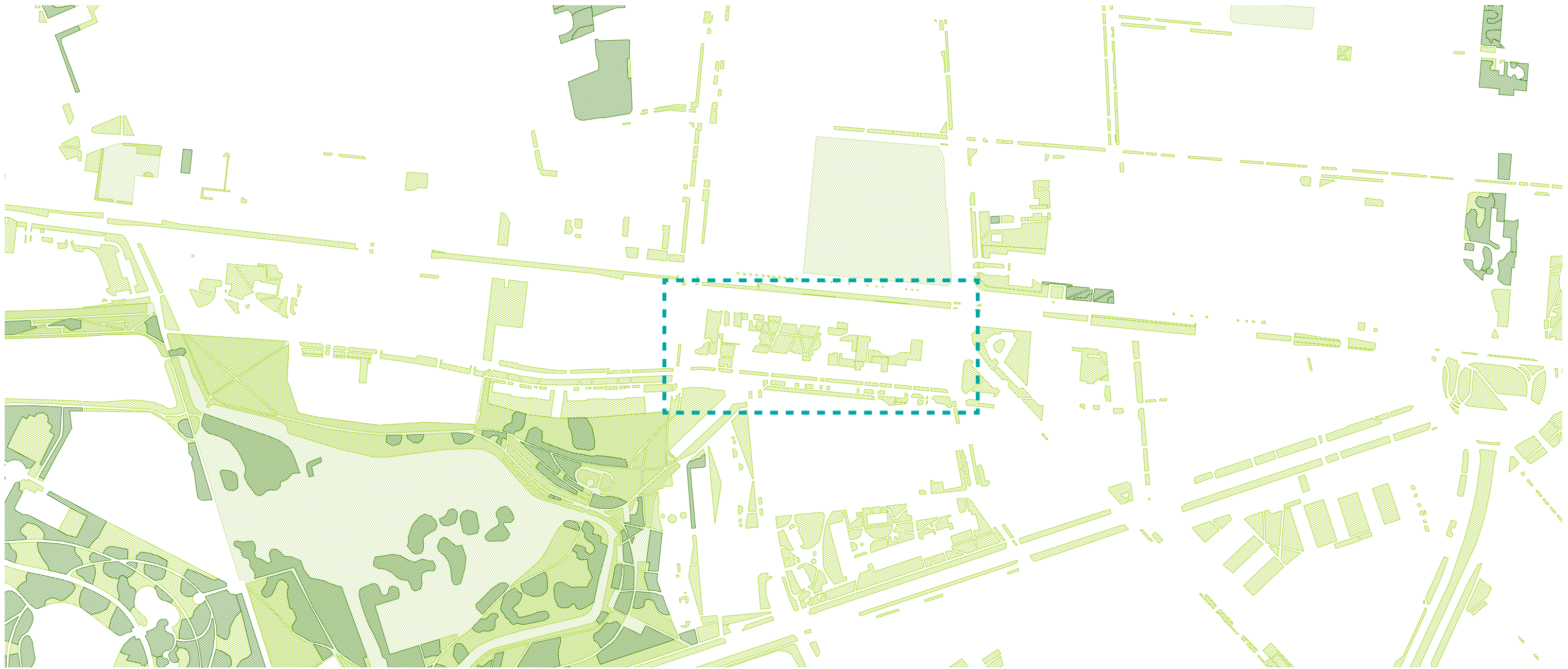




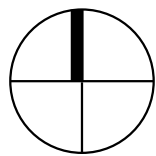
Buildings

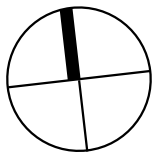
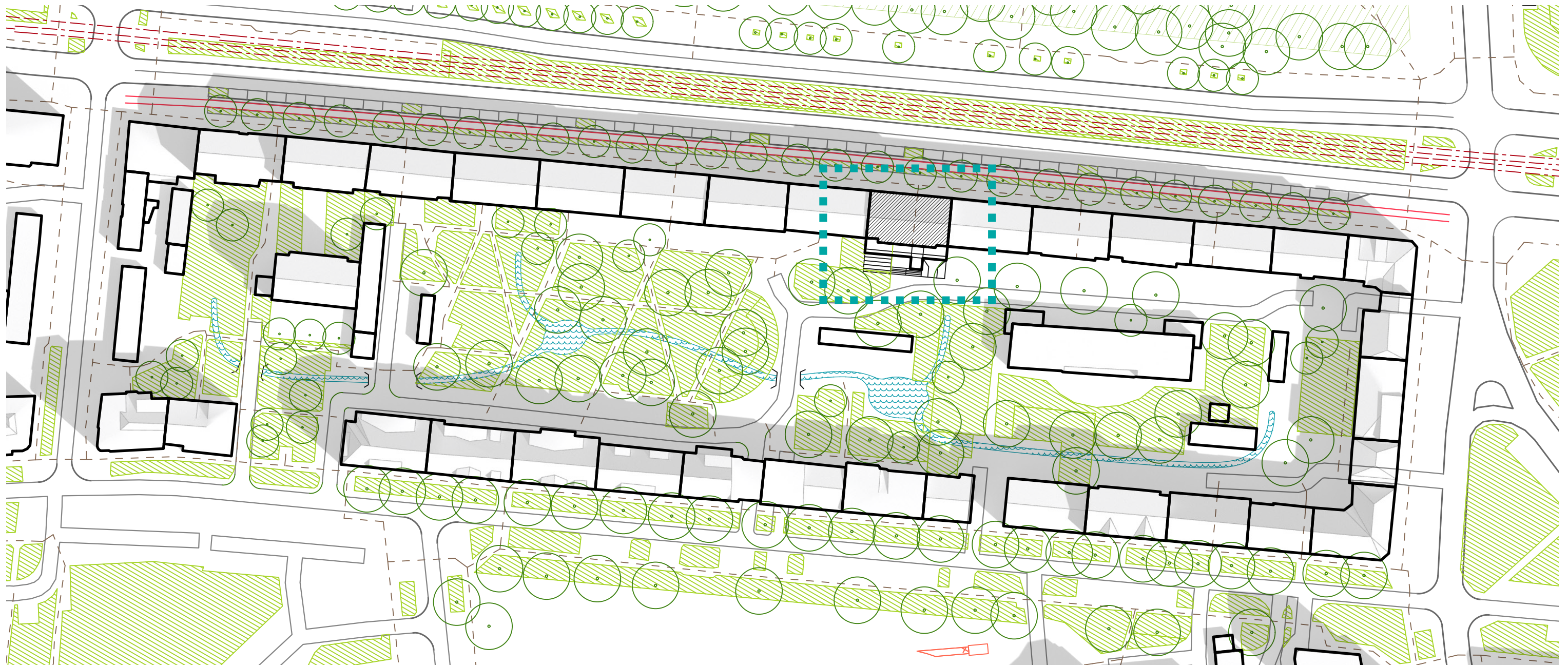


Sport and Play

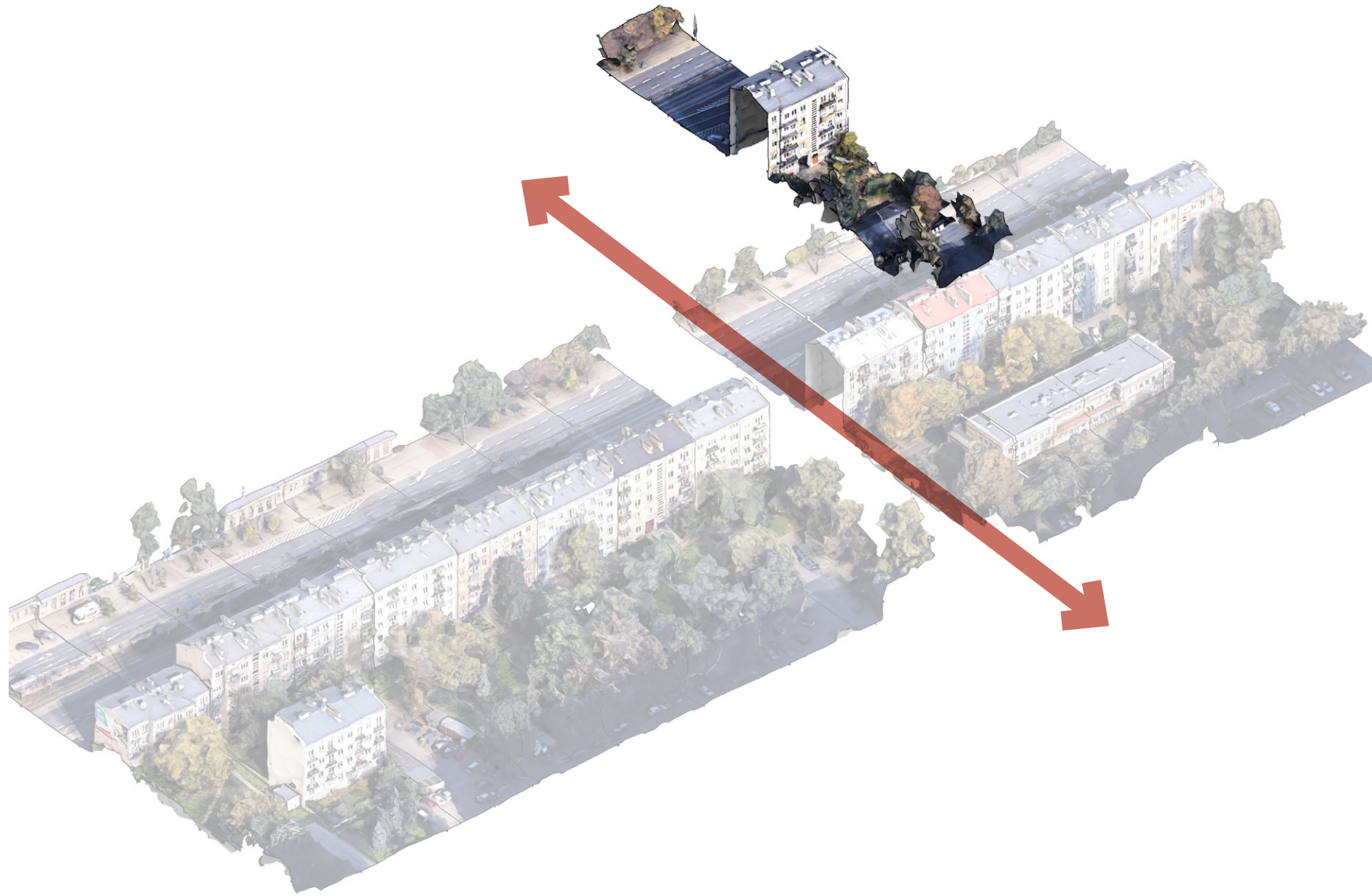


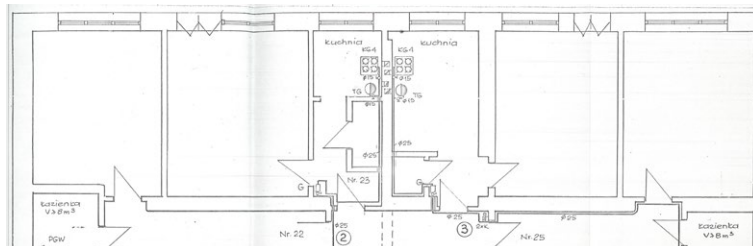
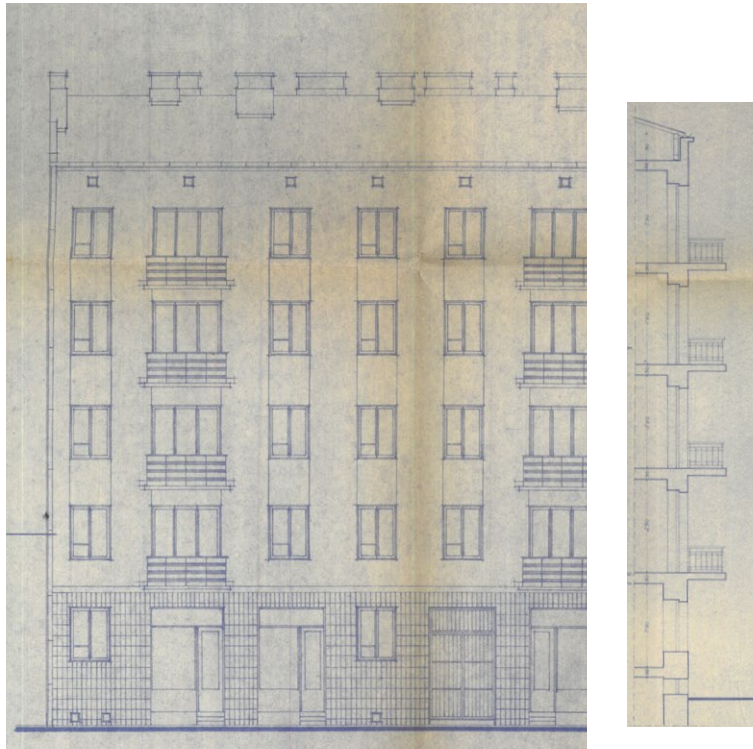
Greenery and Leisure







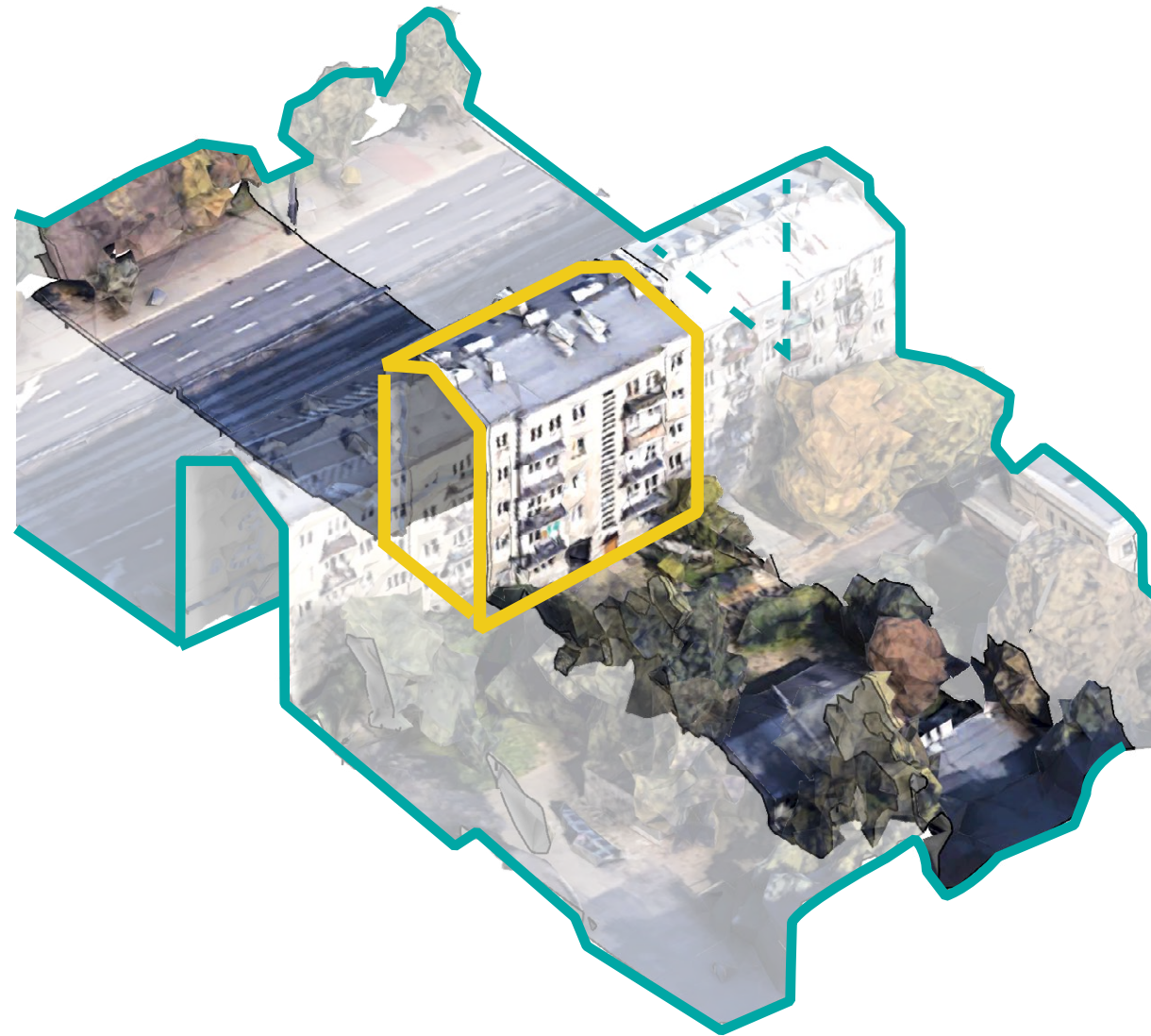


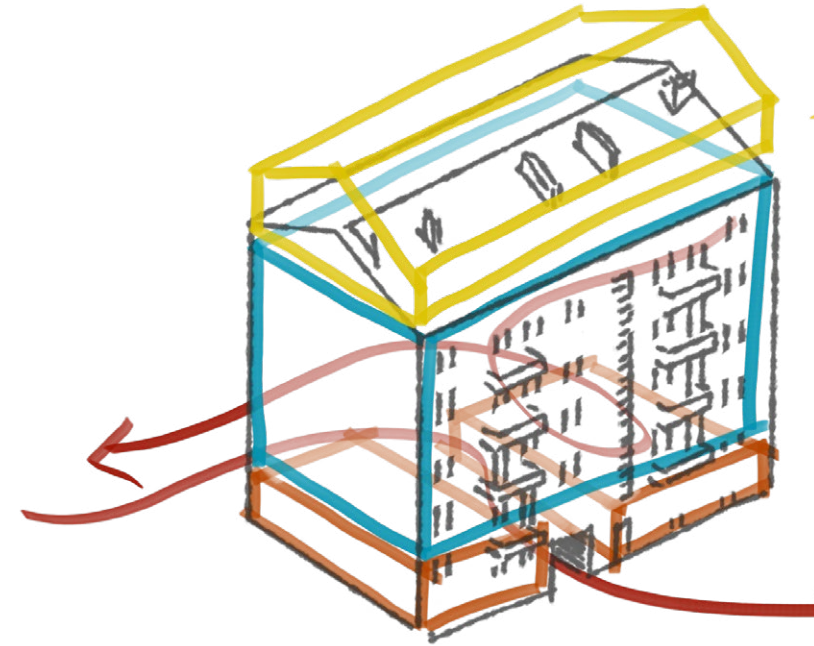
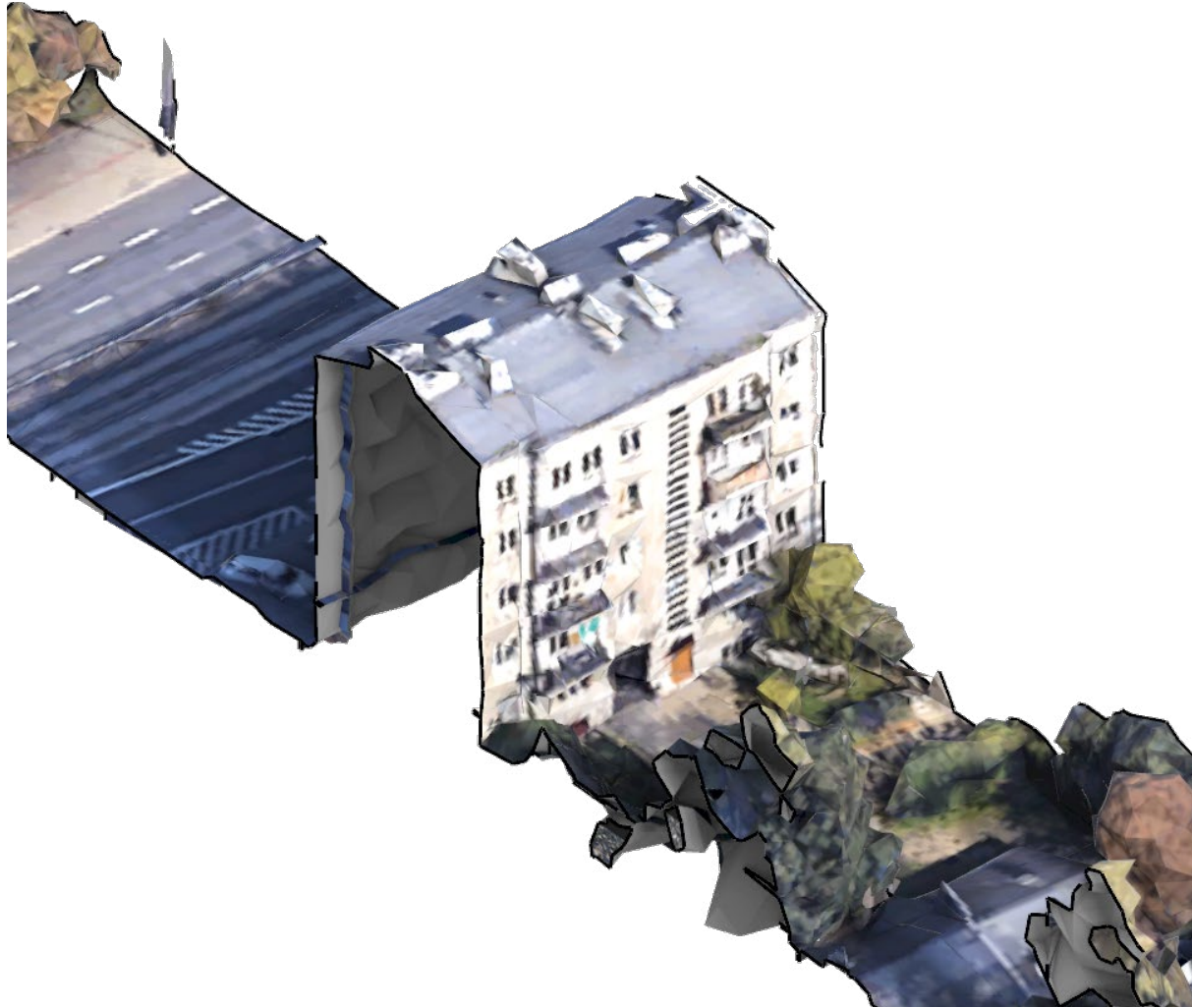


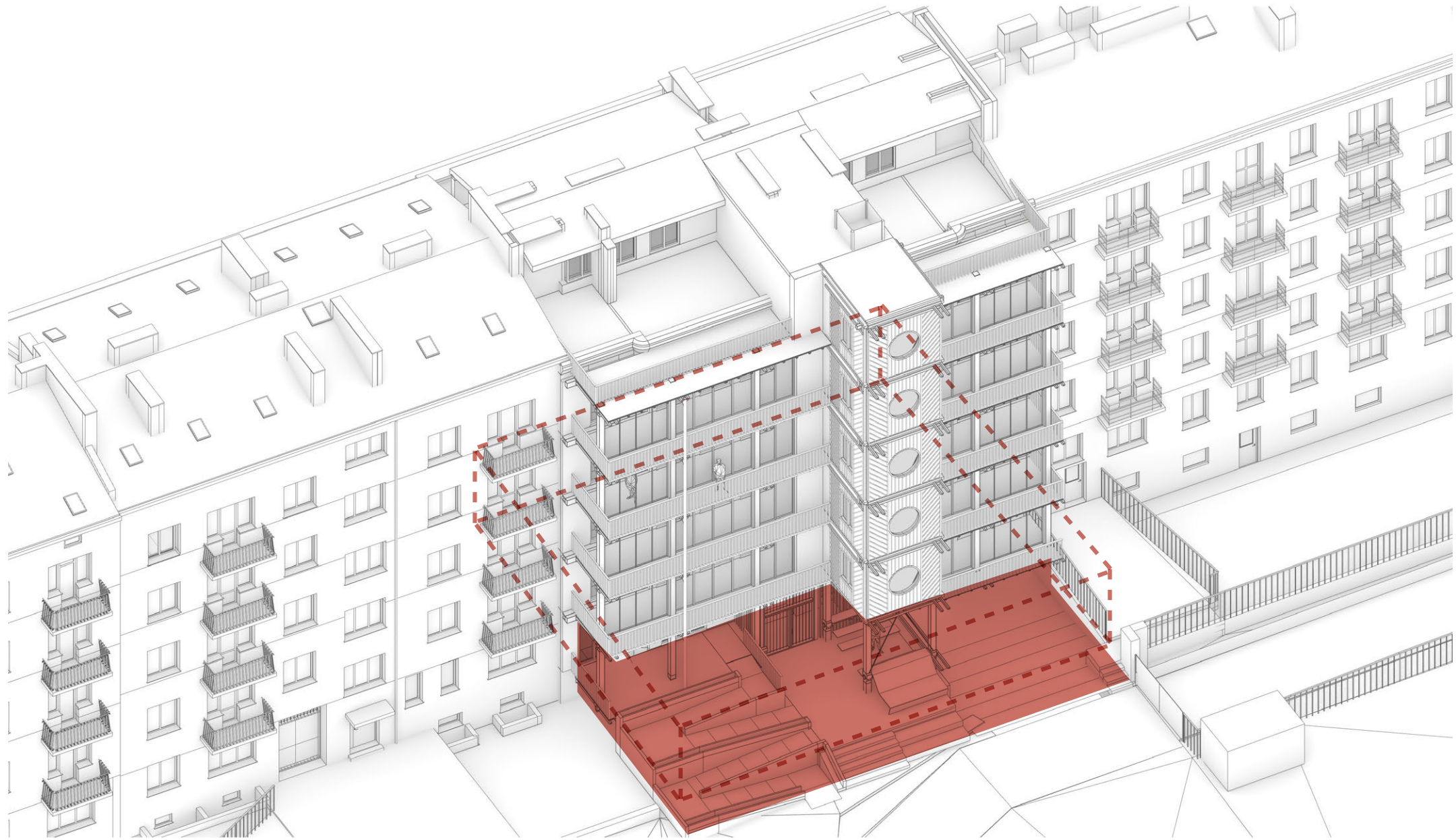
Archiwum Dzielnicy Praga Południe

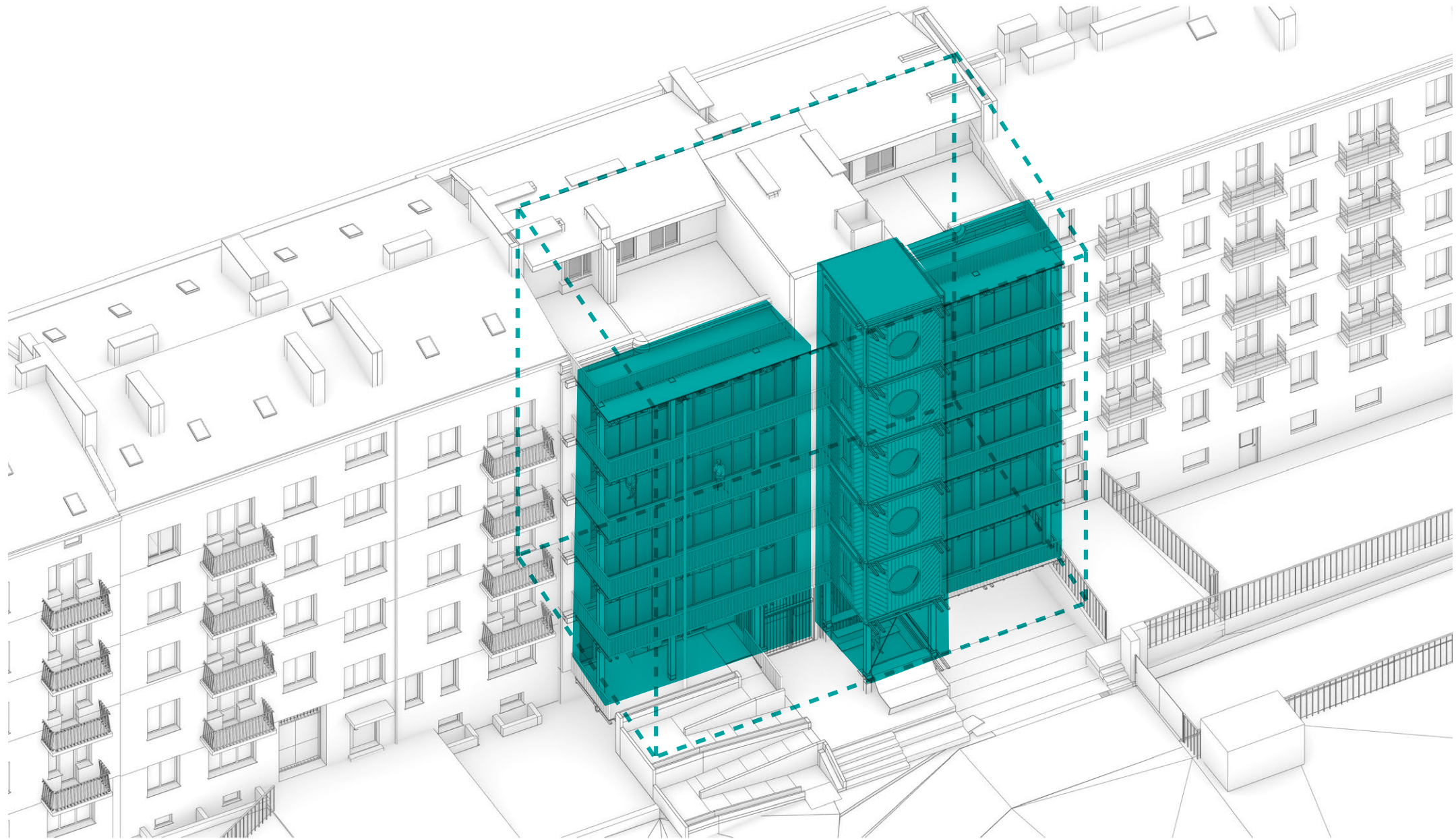


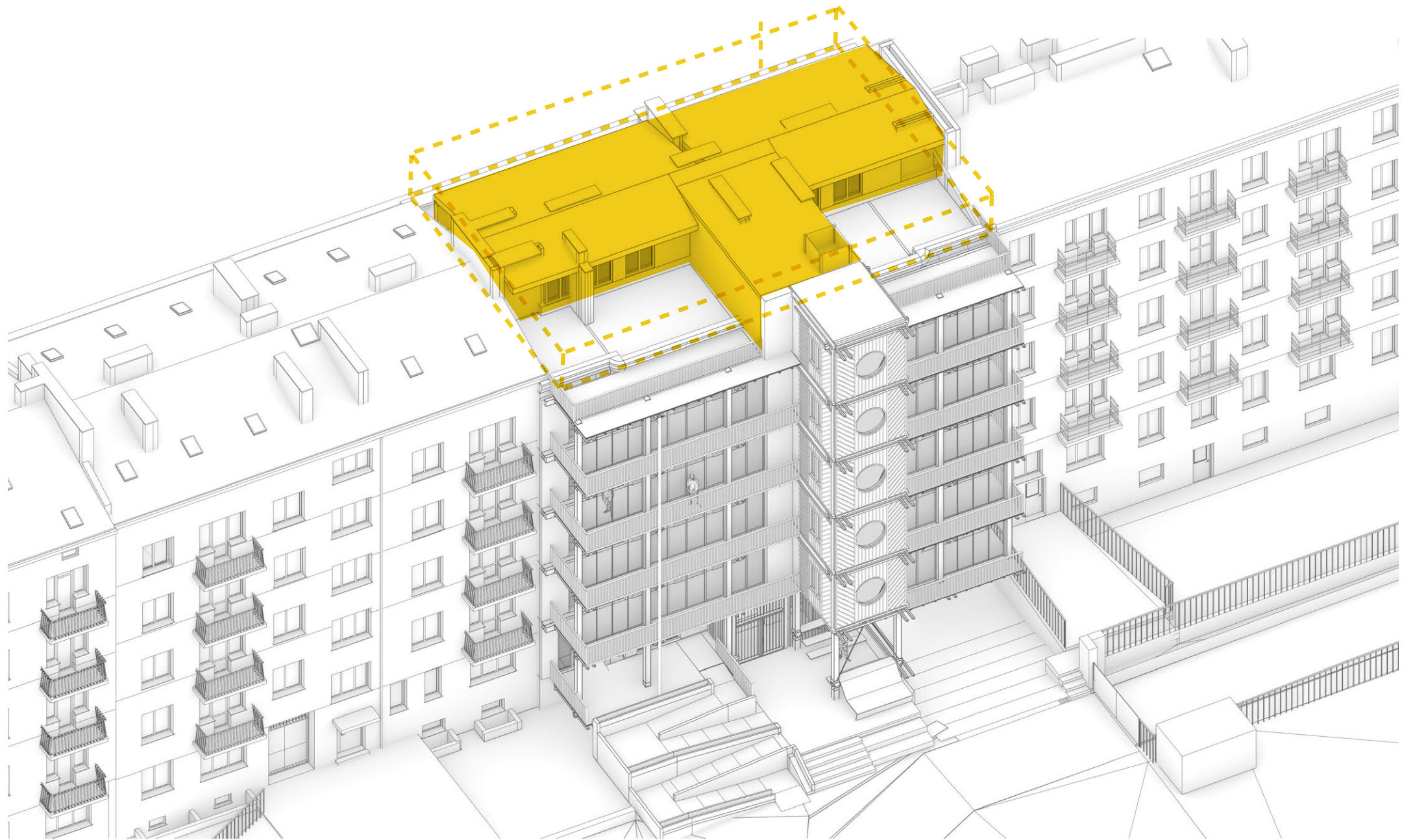
- 730mm mass brick structural walls
- 300mm Klein brick floors
- storage basements
- shops and amenities on the groundfloors
- 5 above ground floors
- originally 2 apartments / floor, now ~4 apartments / floor
- wooden ventilated roof
- small staircase without an elevator
- ground floor gate passage leading to the courtyard and entrance

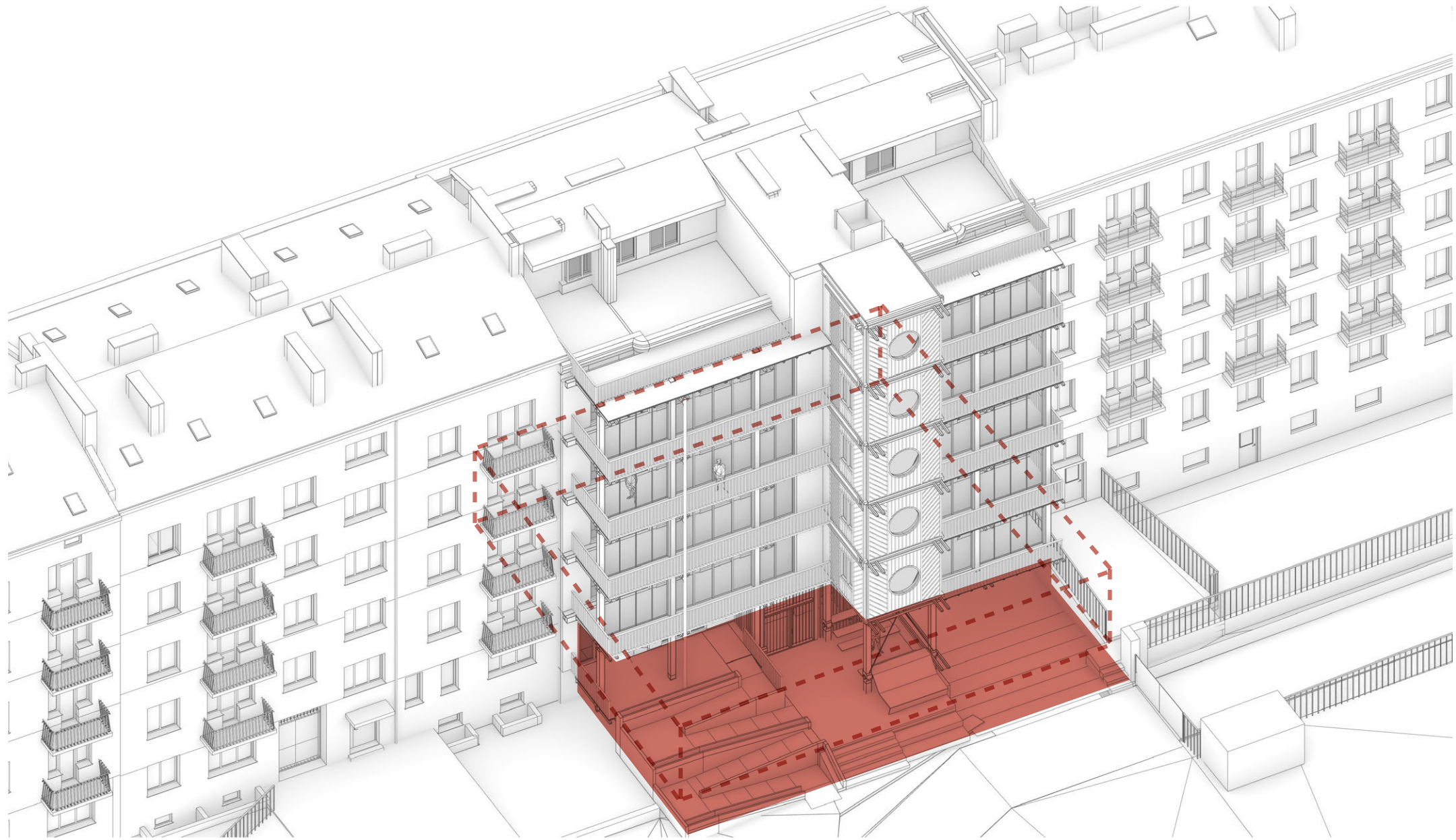




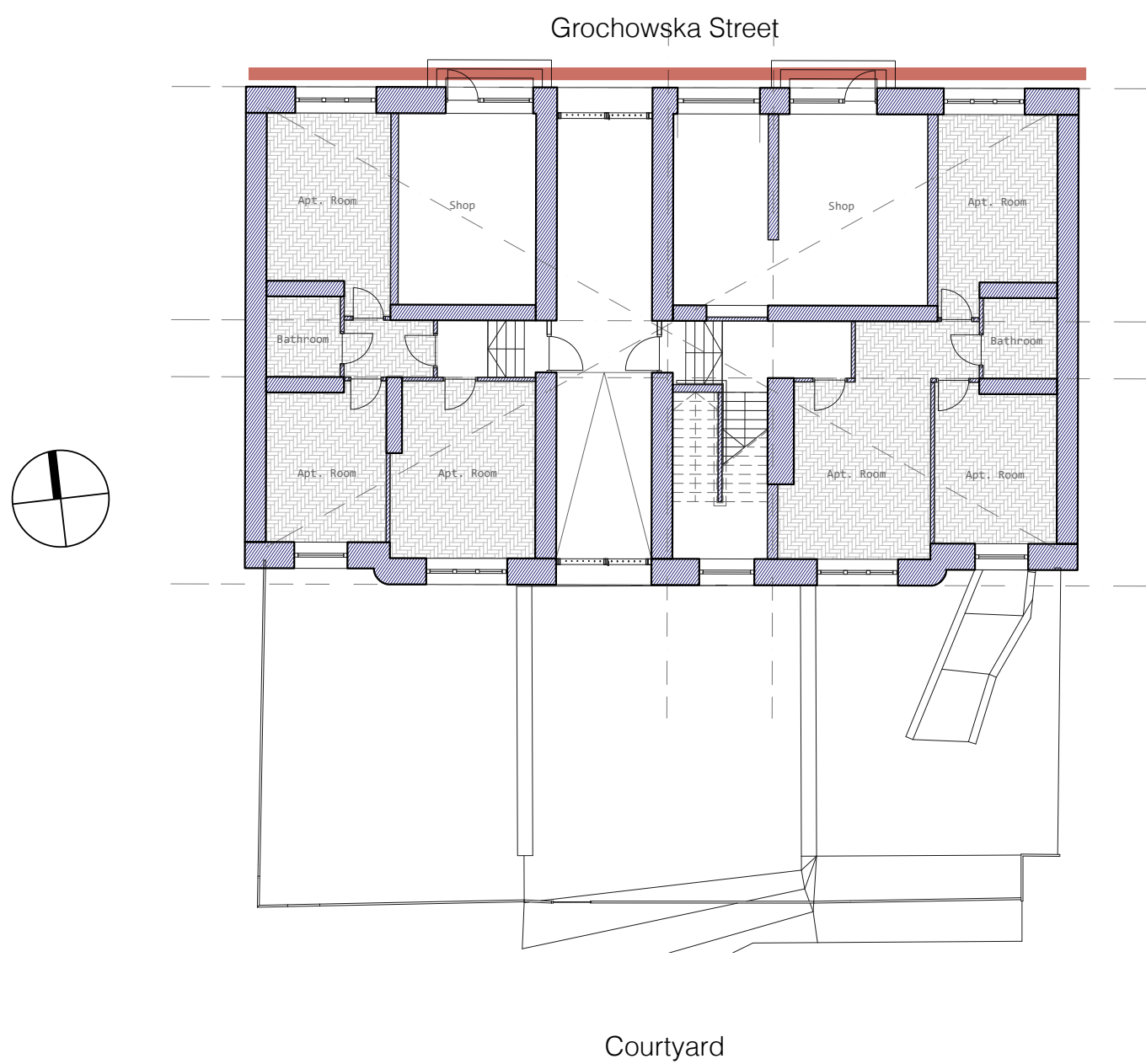


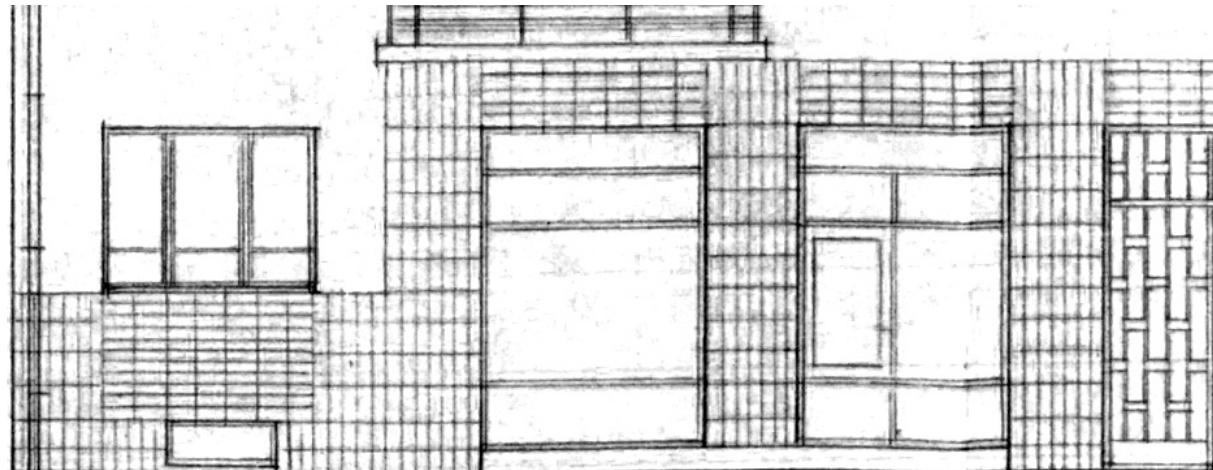


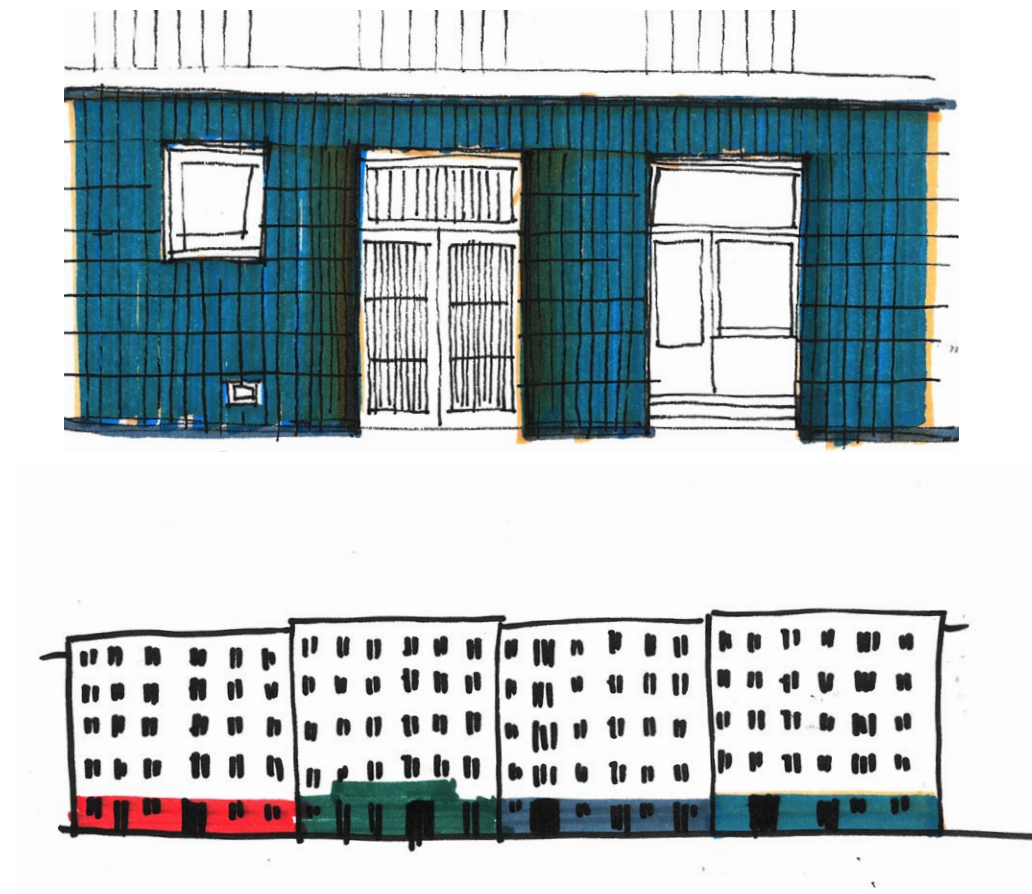


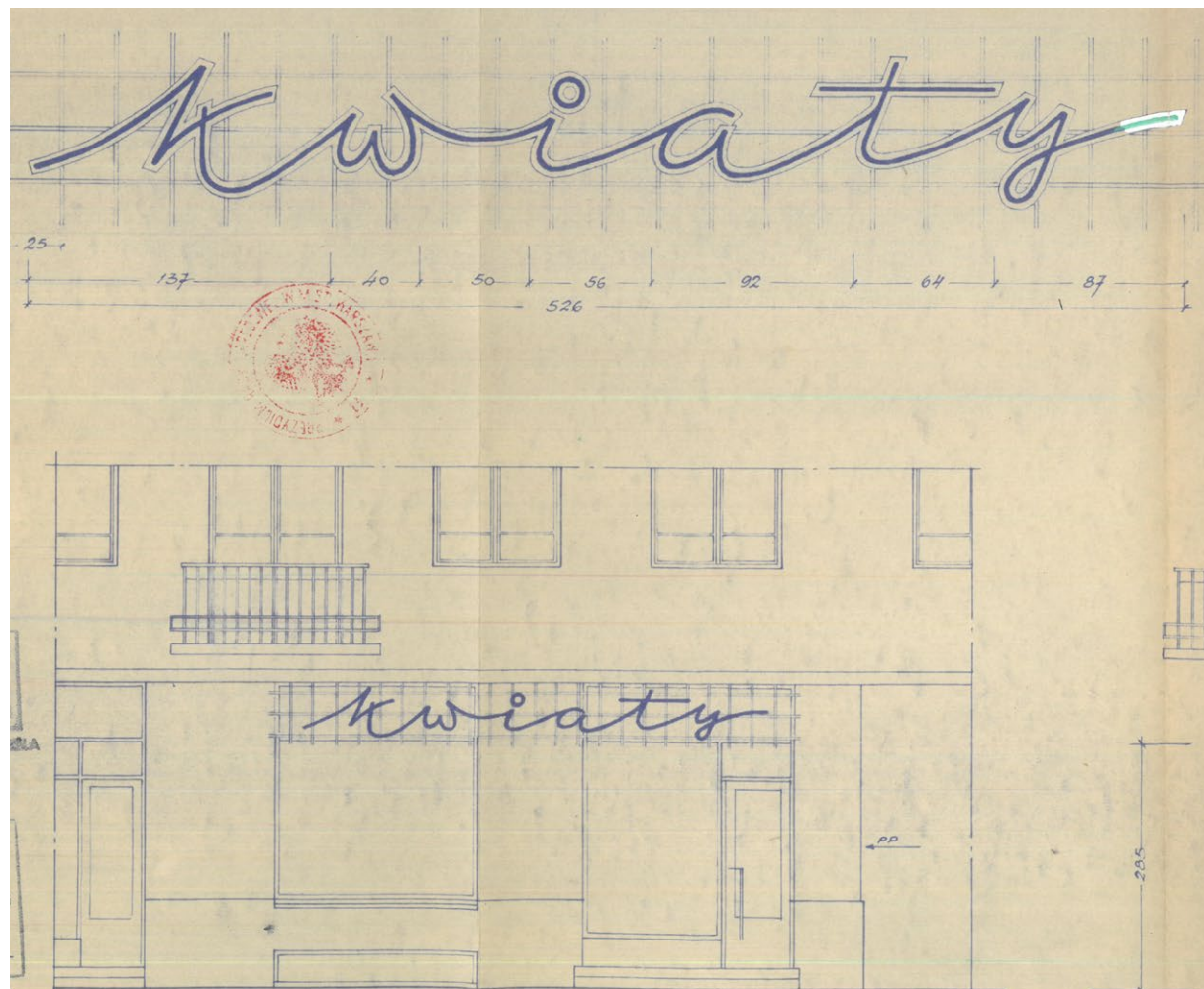




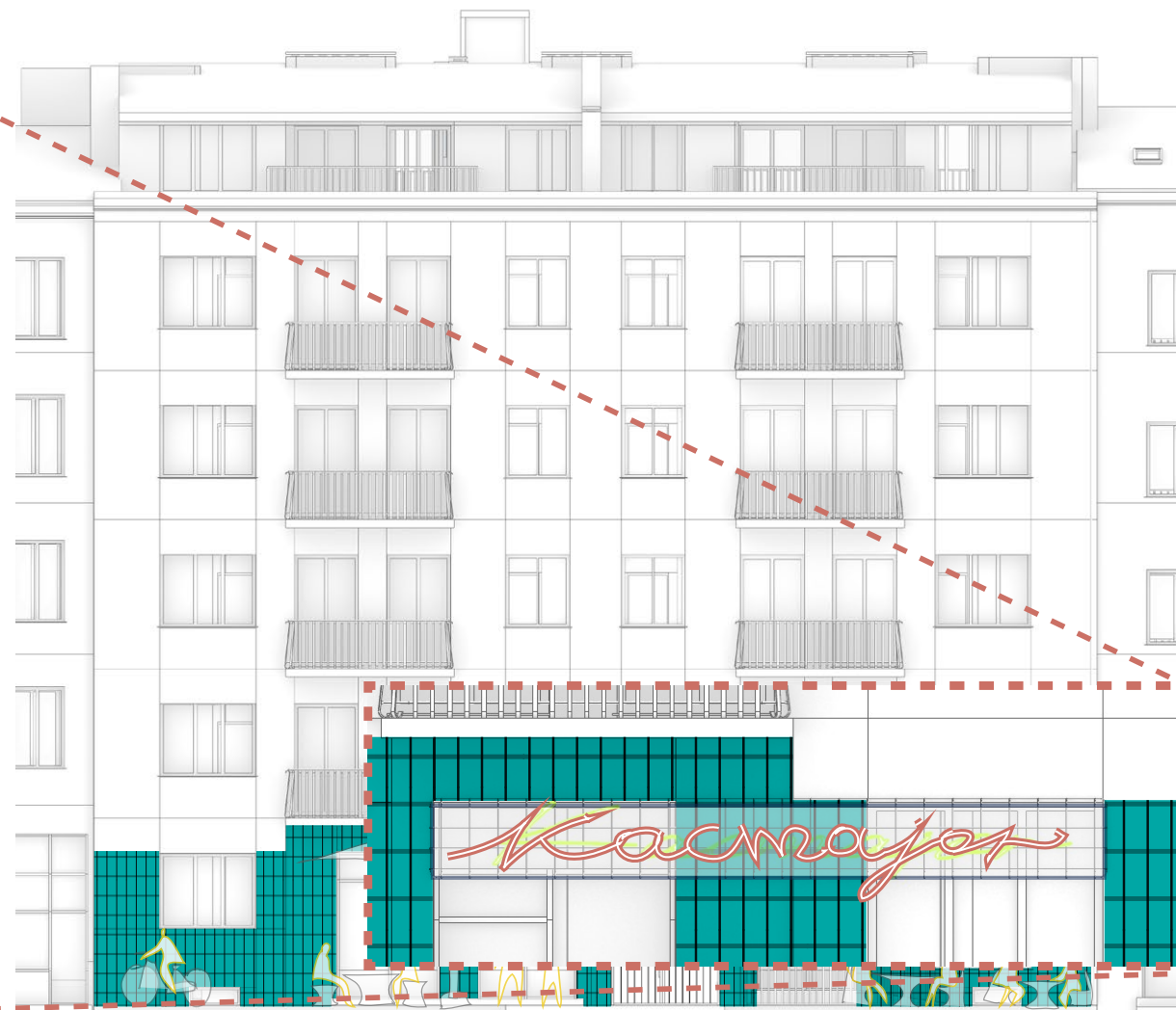






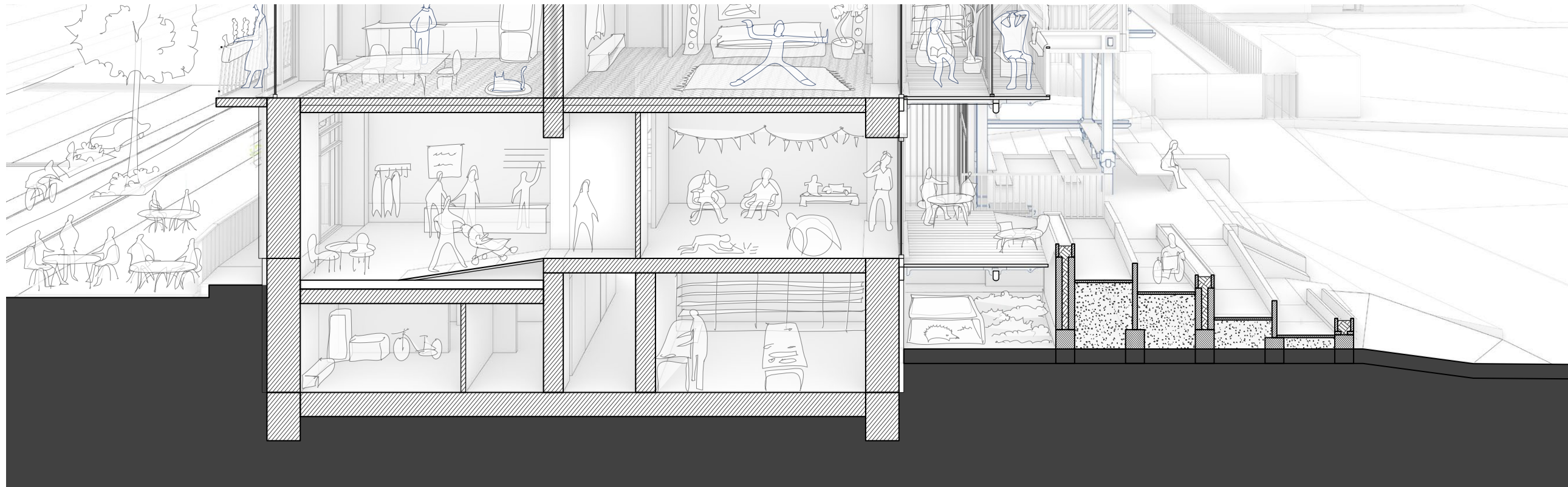


Archiwum Dzielnicy Praga Południe

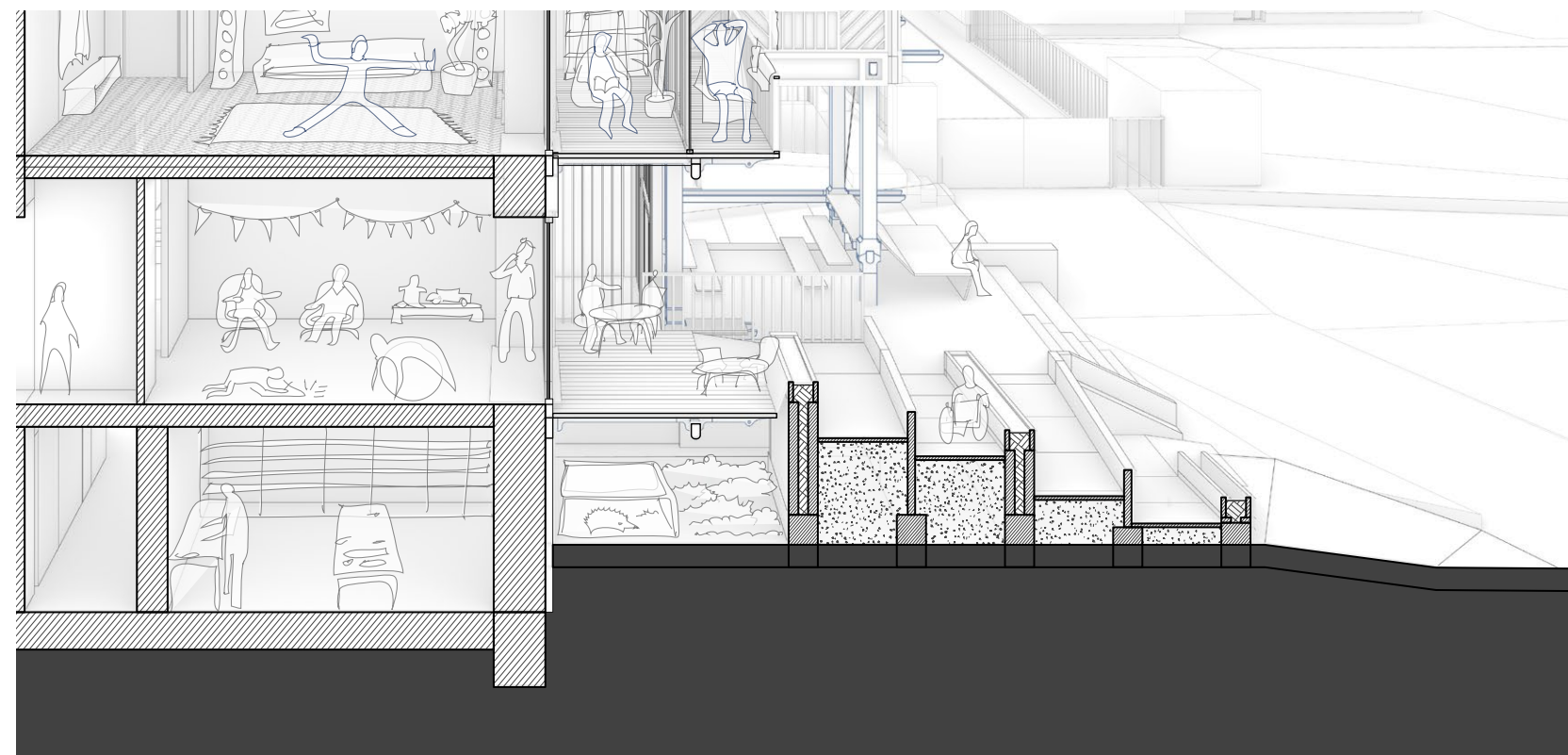
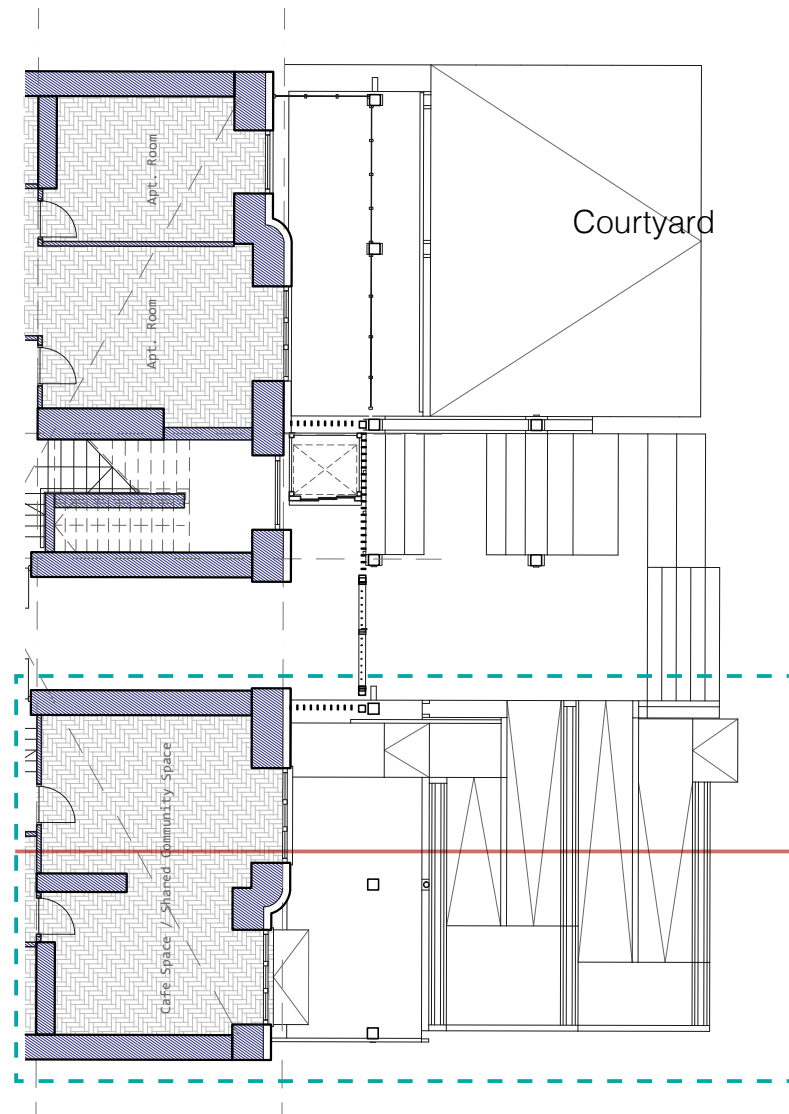
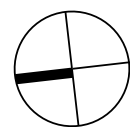


Vibrant past

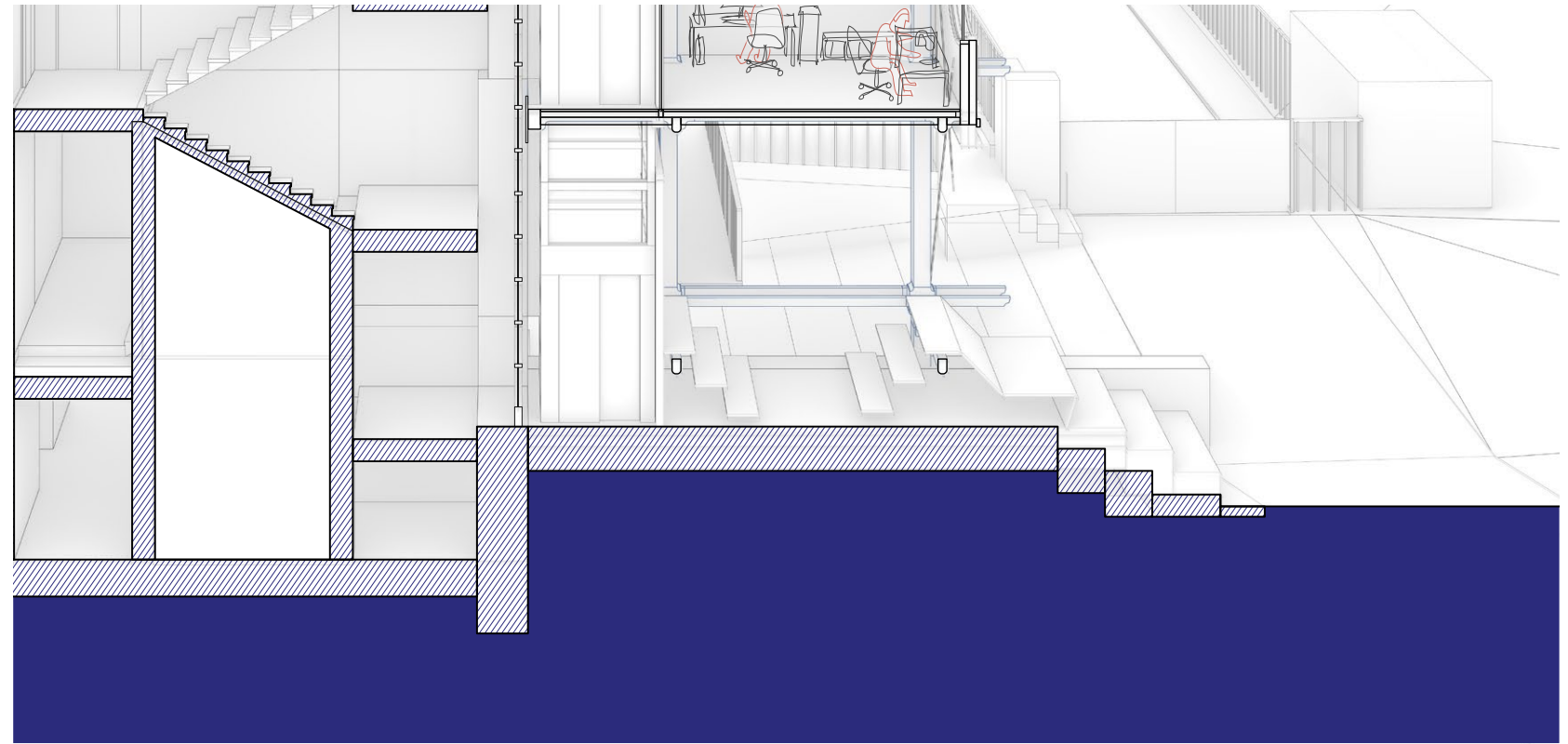
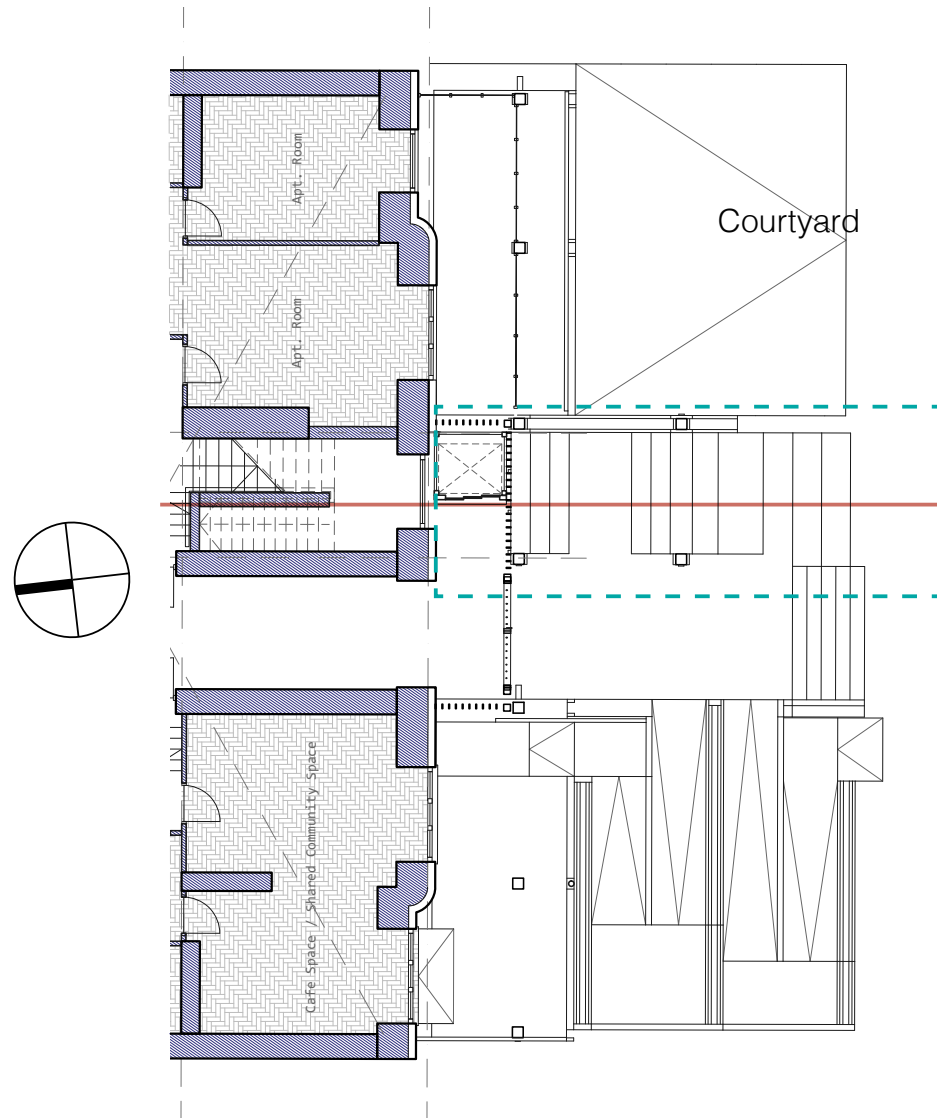




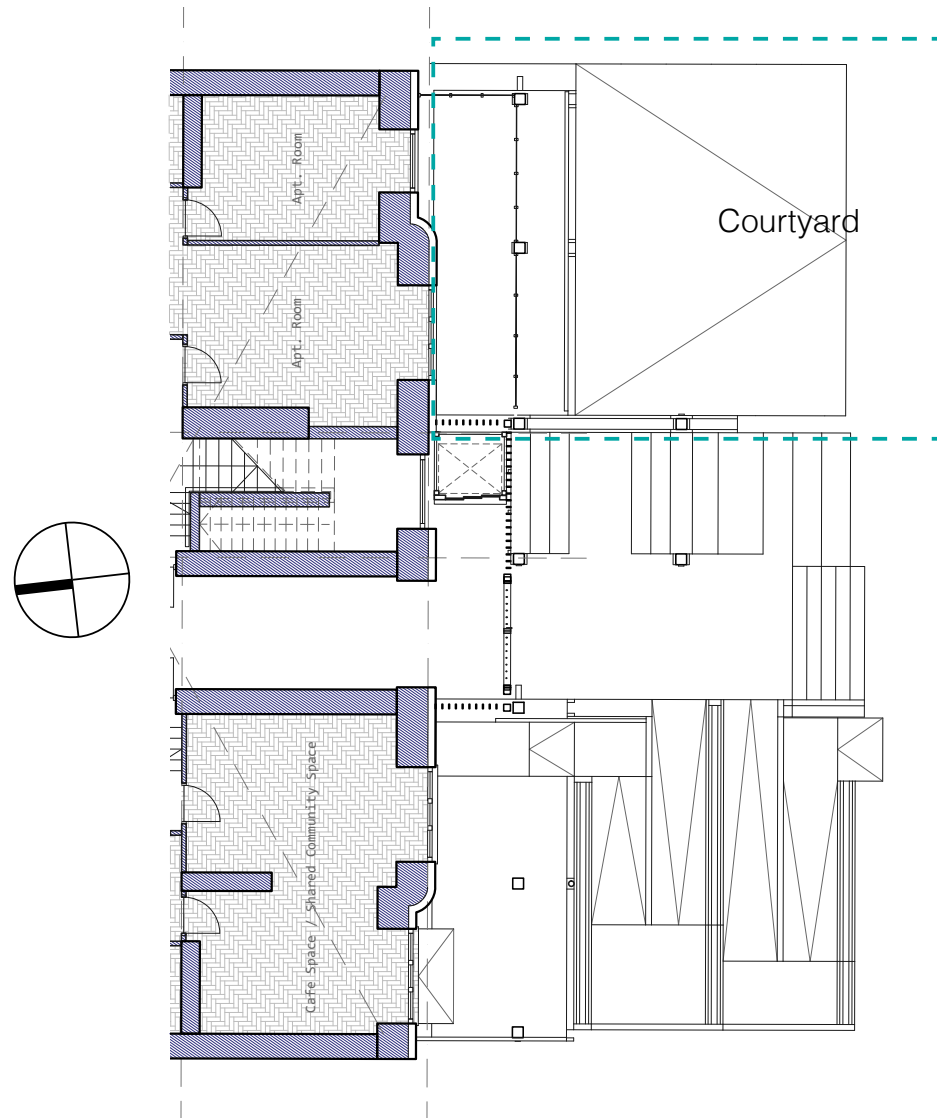
Life on the ground floor



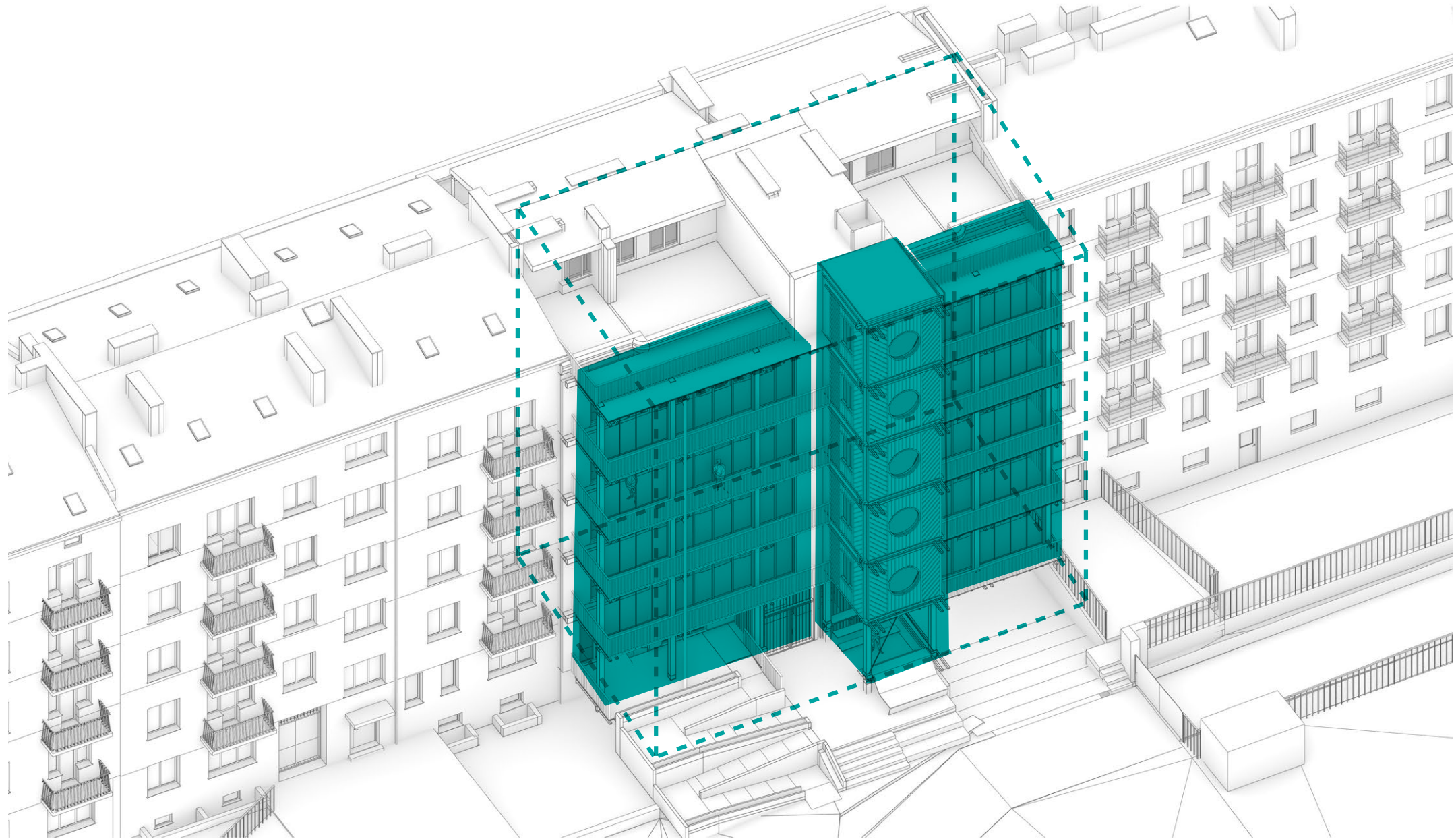
Community space for everybody

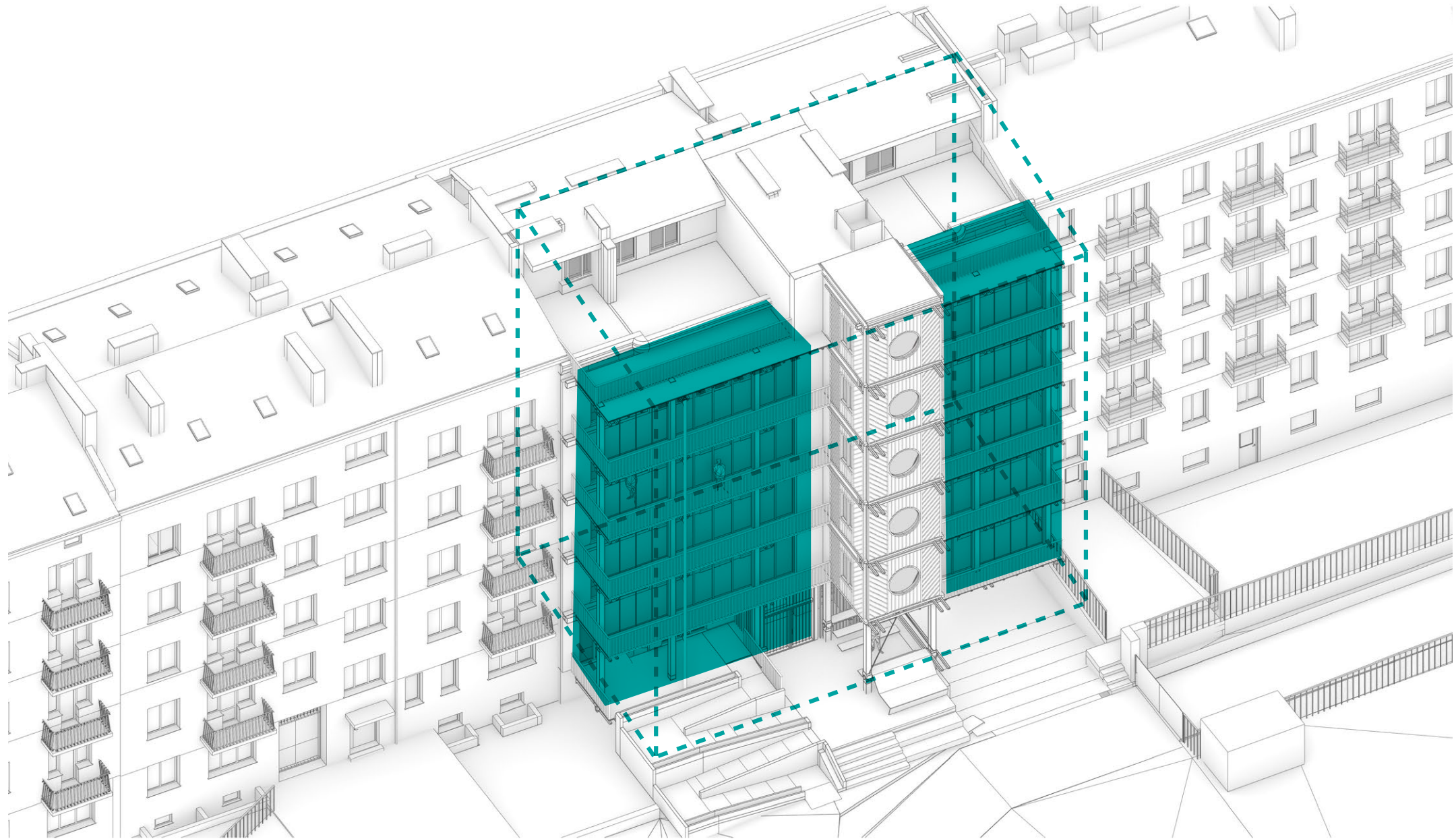


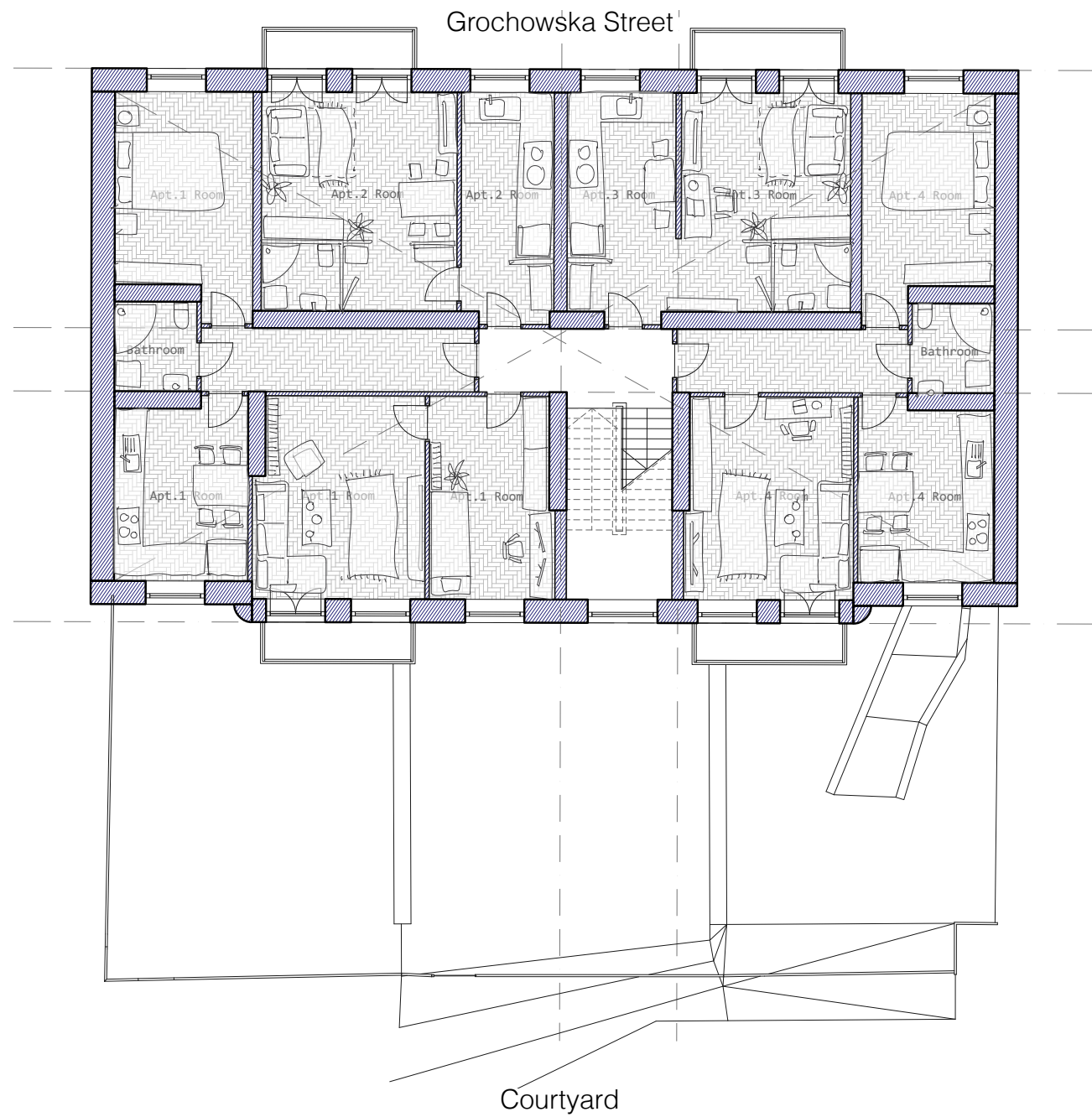
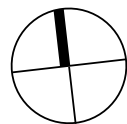
Waiting for a friend
Or policing the courtyard

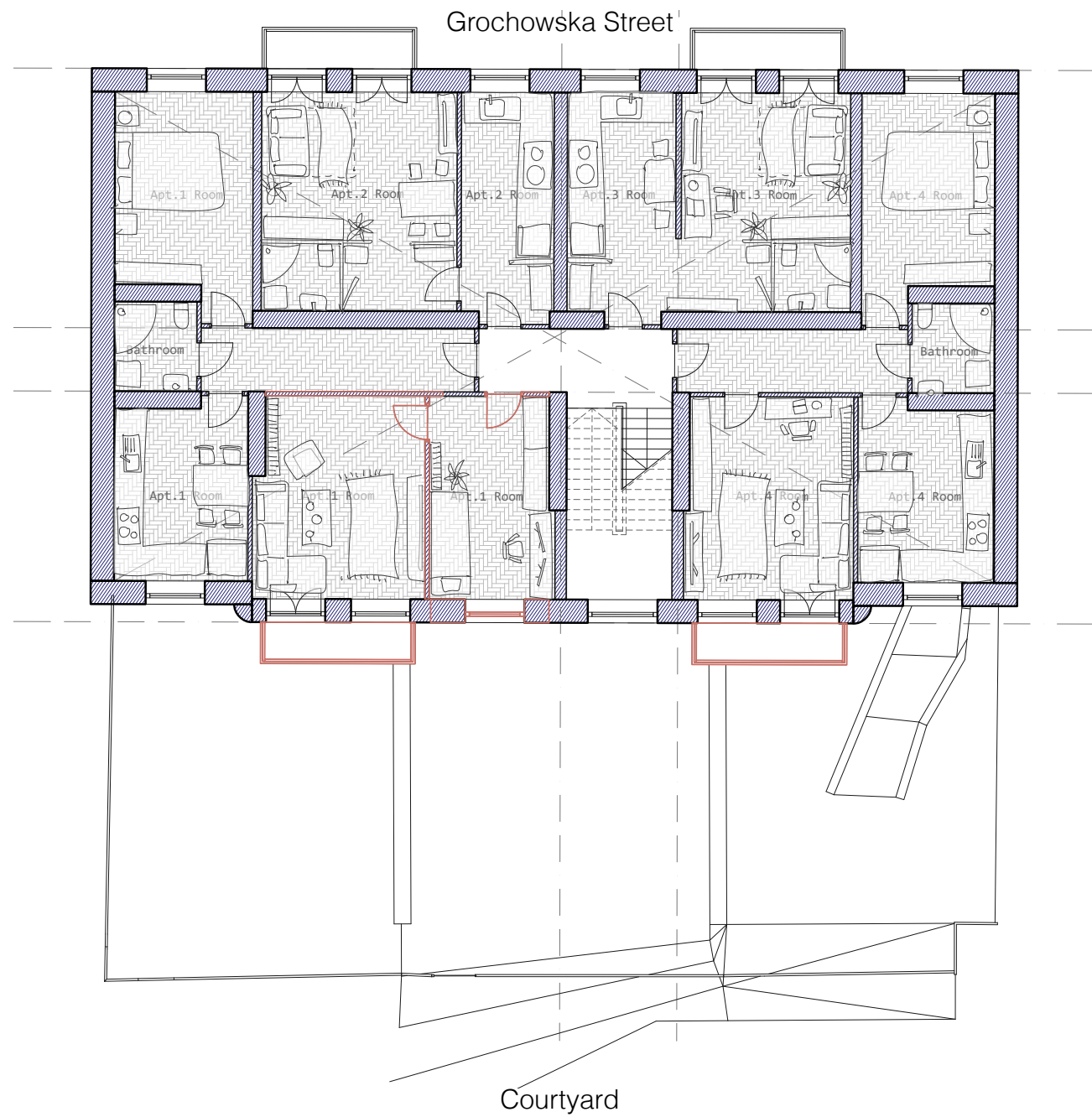
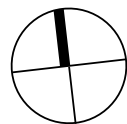


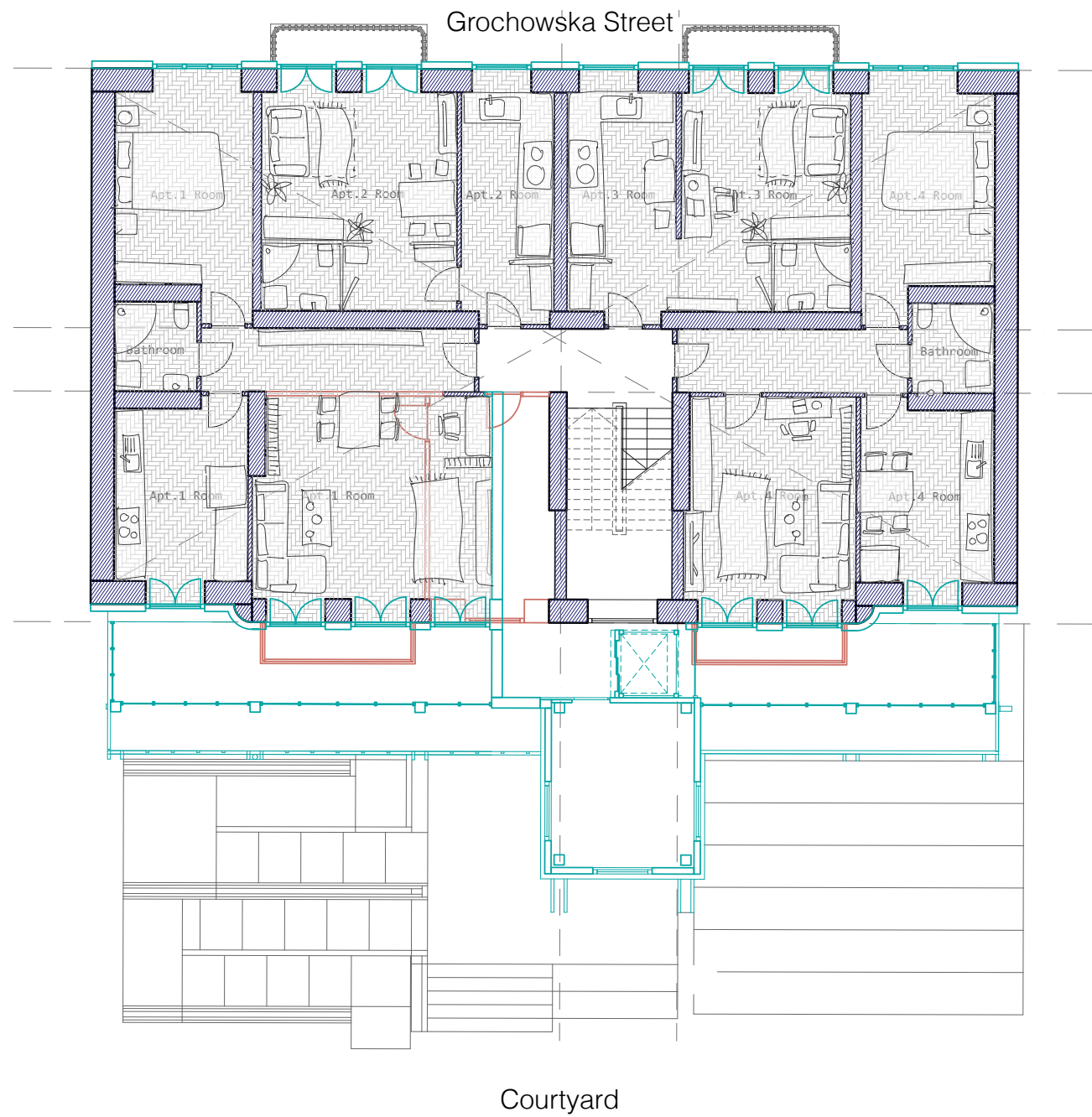
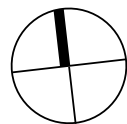
Bicycles safely stored

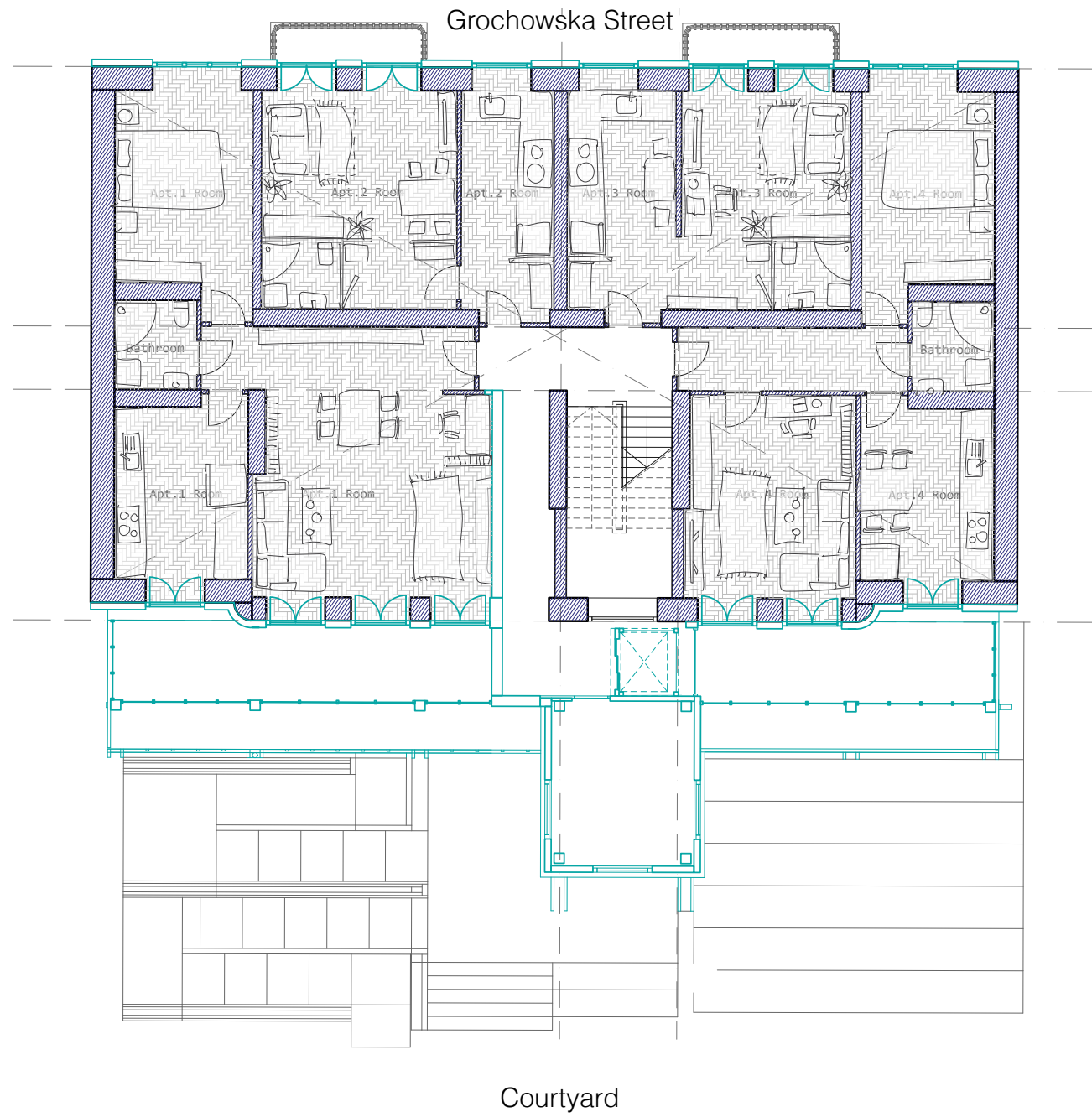
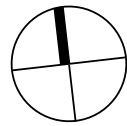


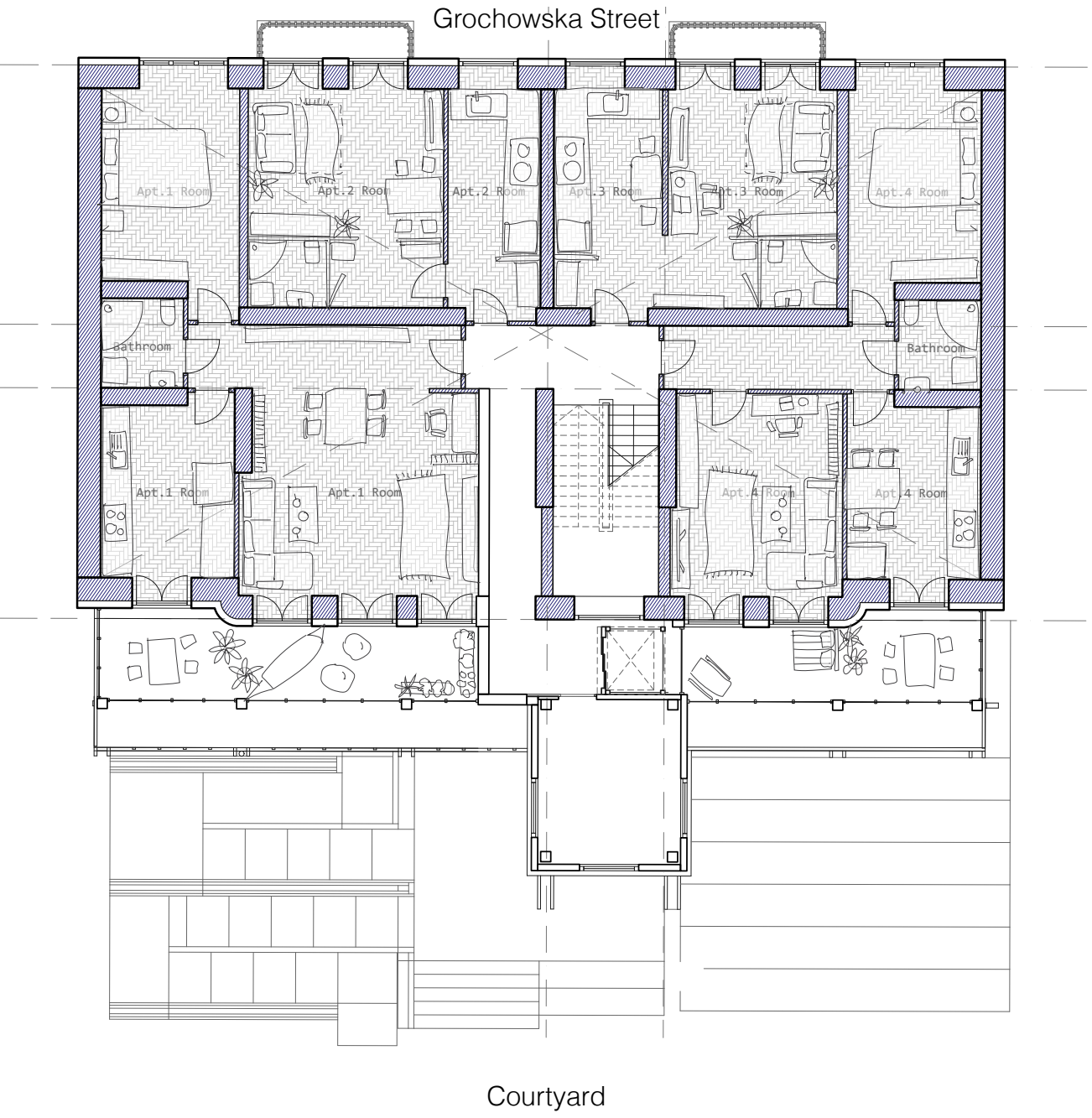
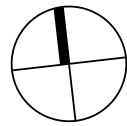






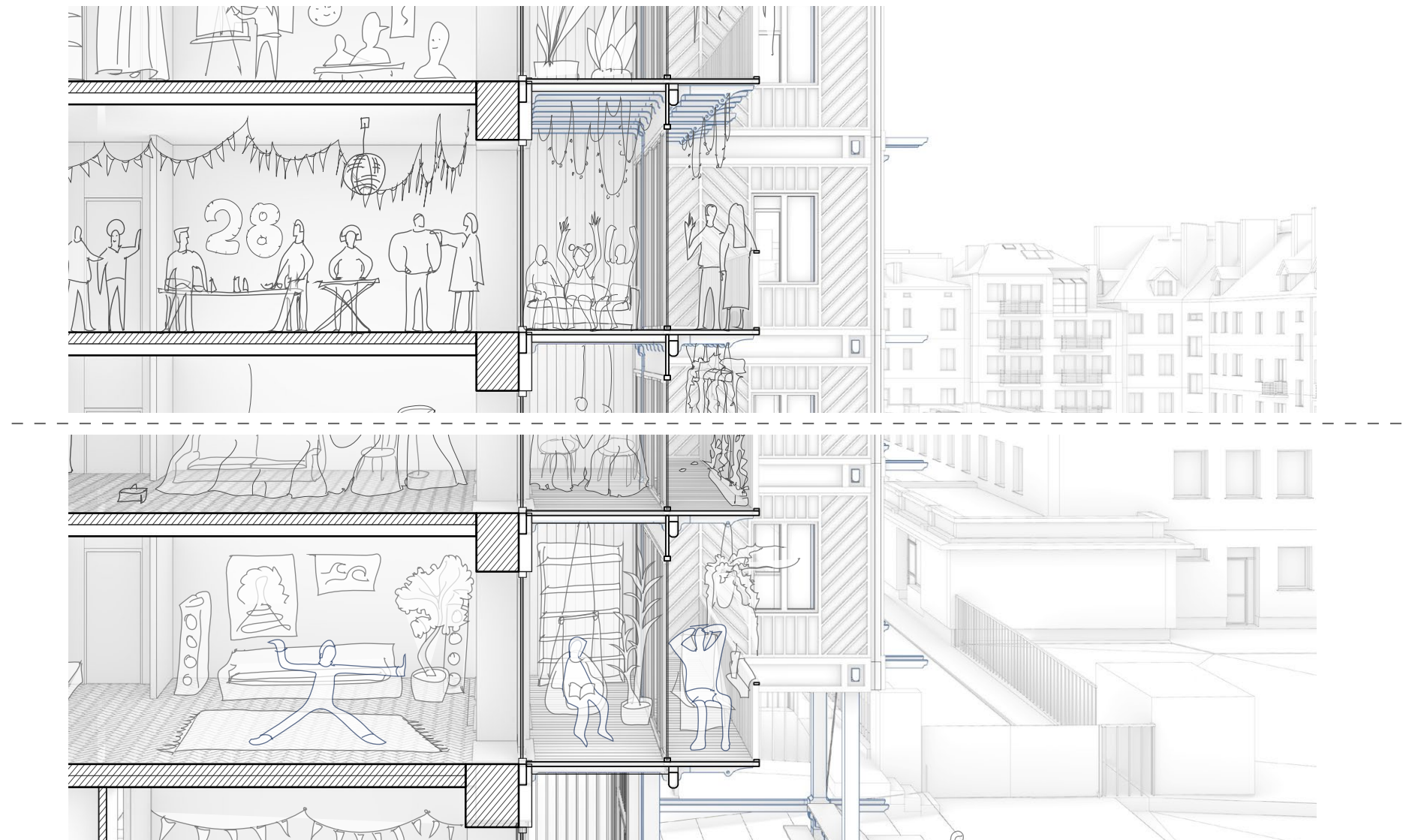
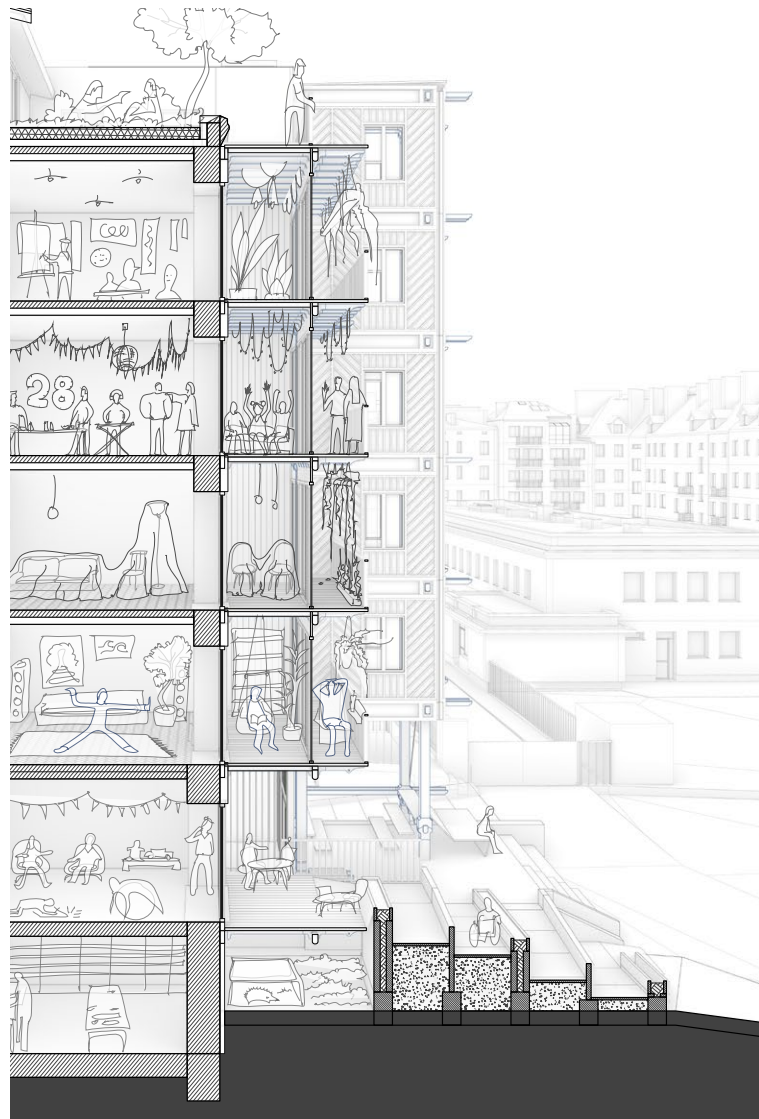












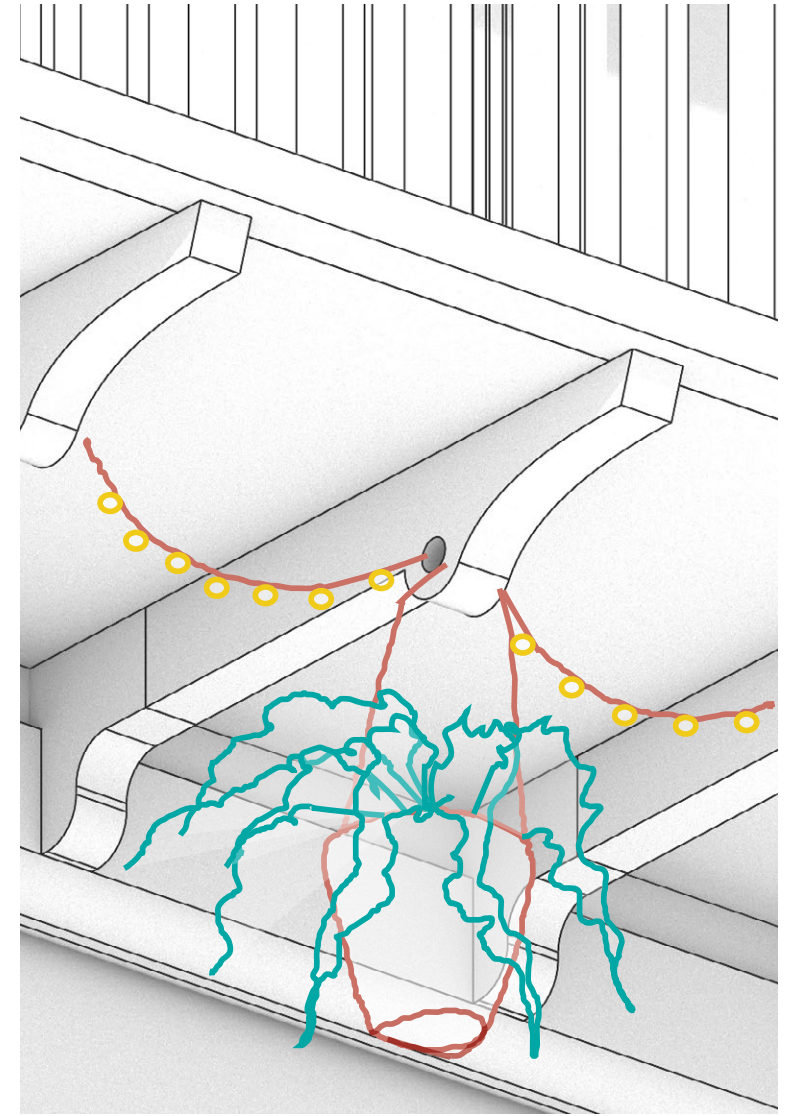
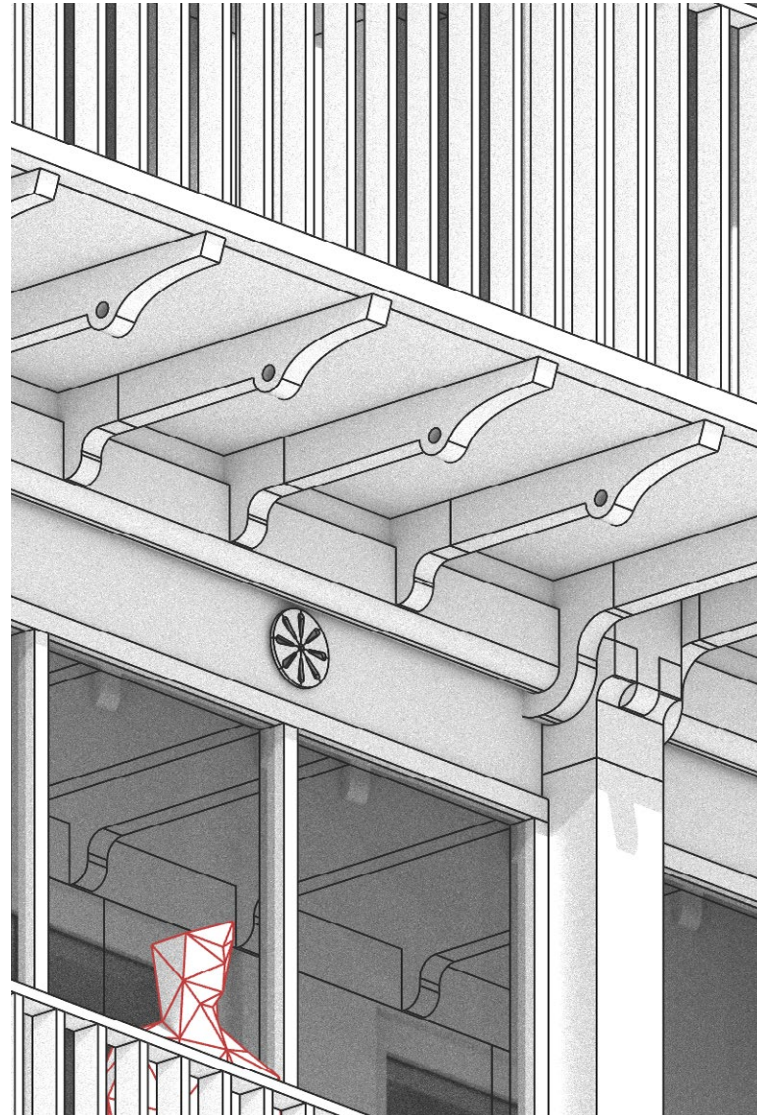
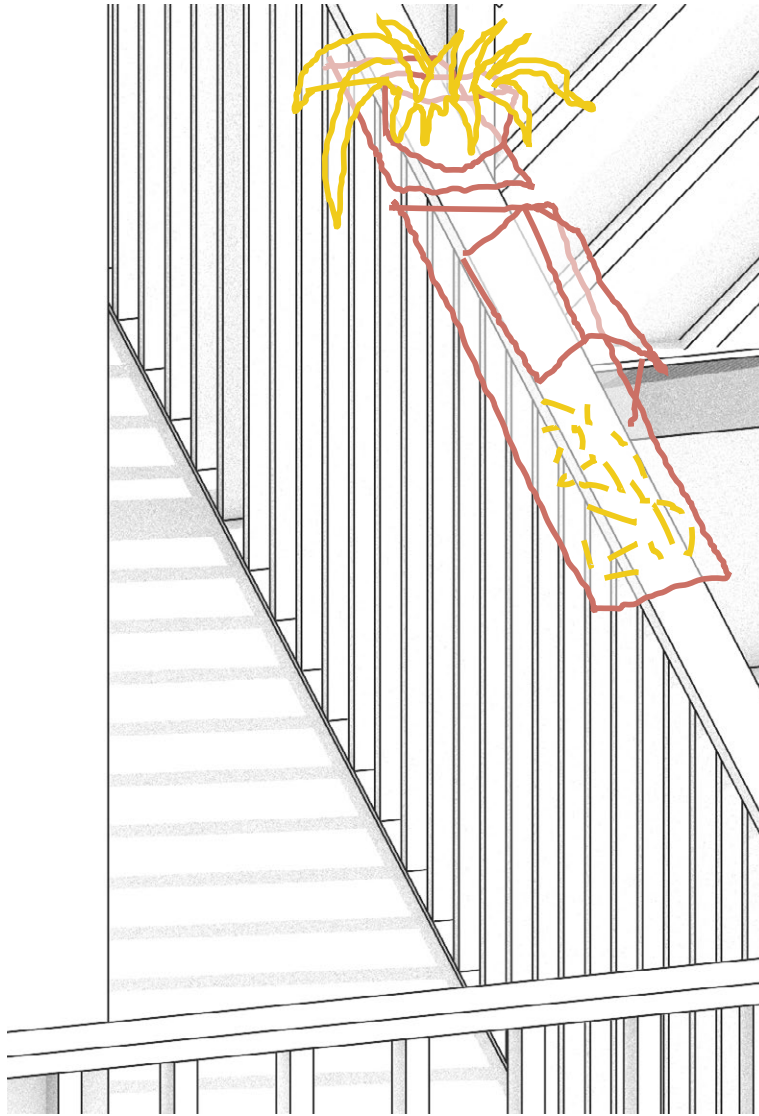
New possibilities



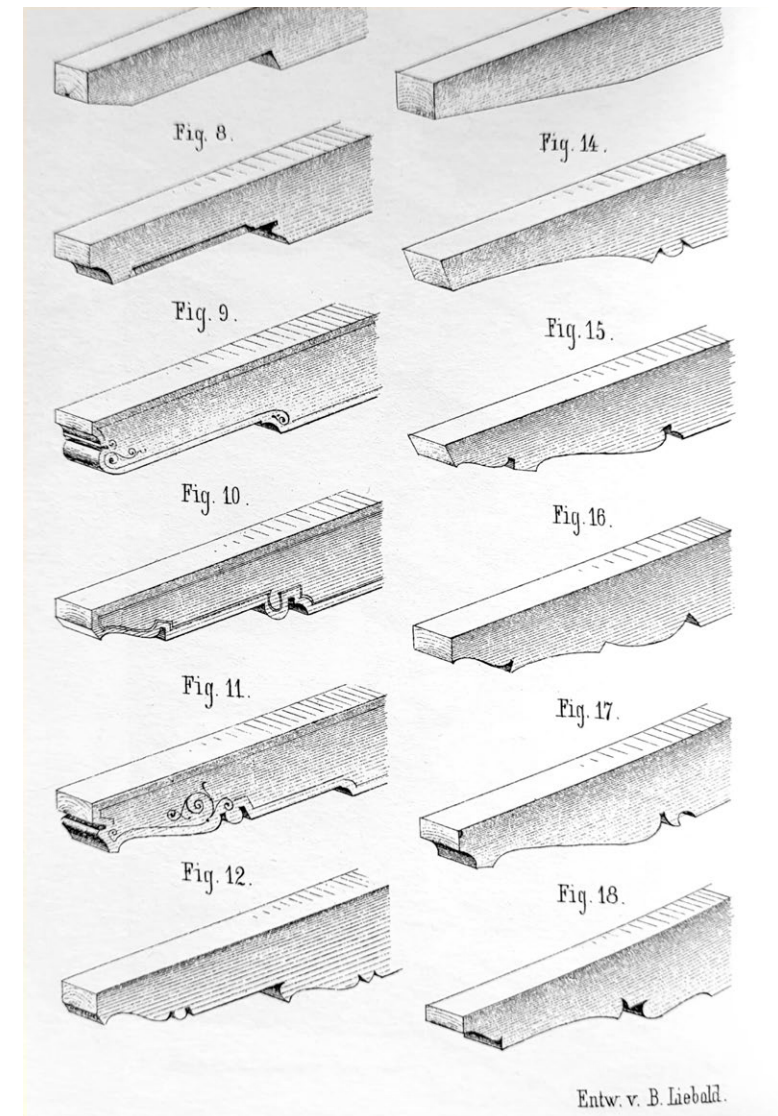
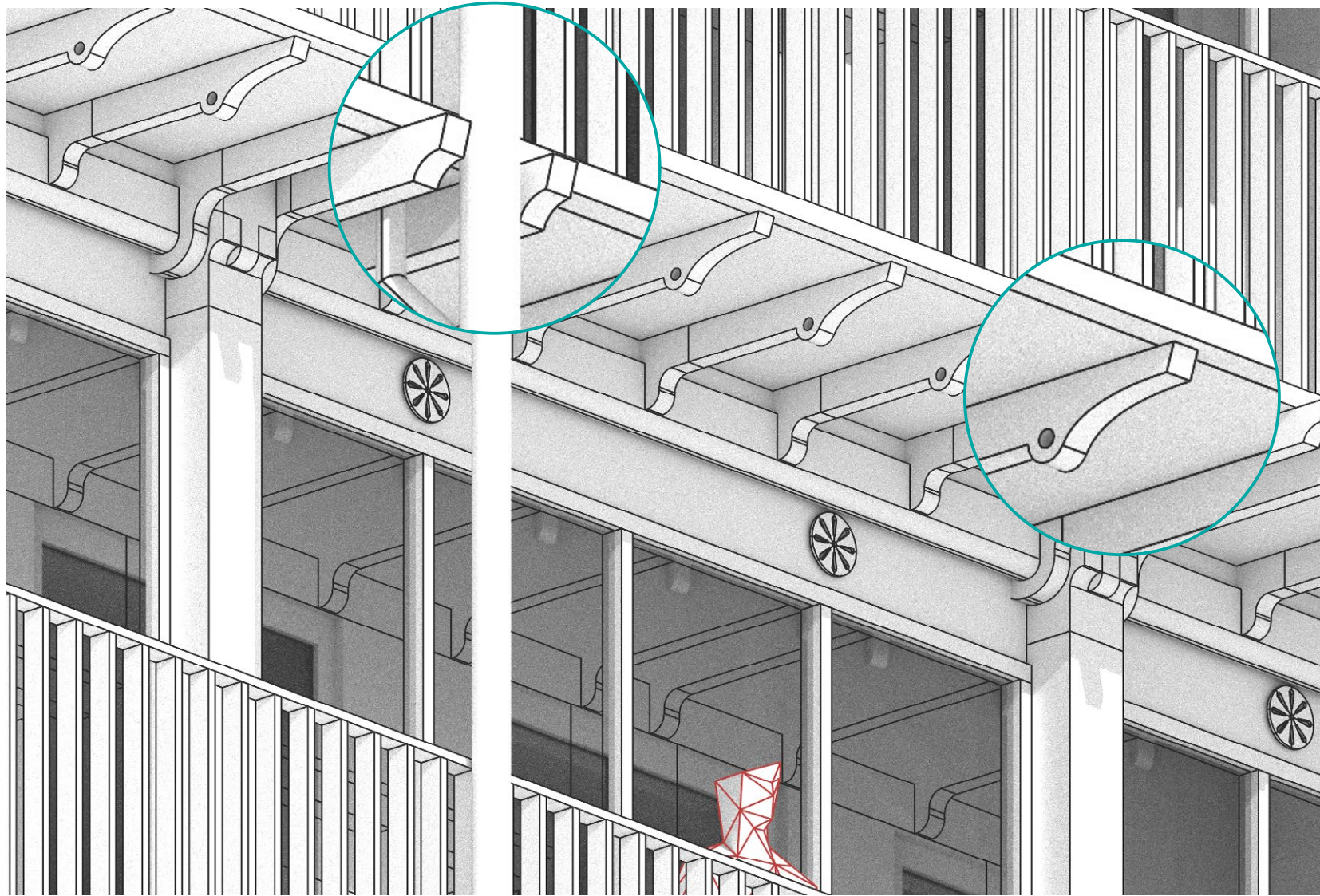


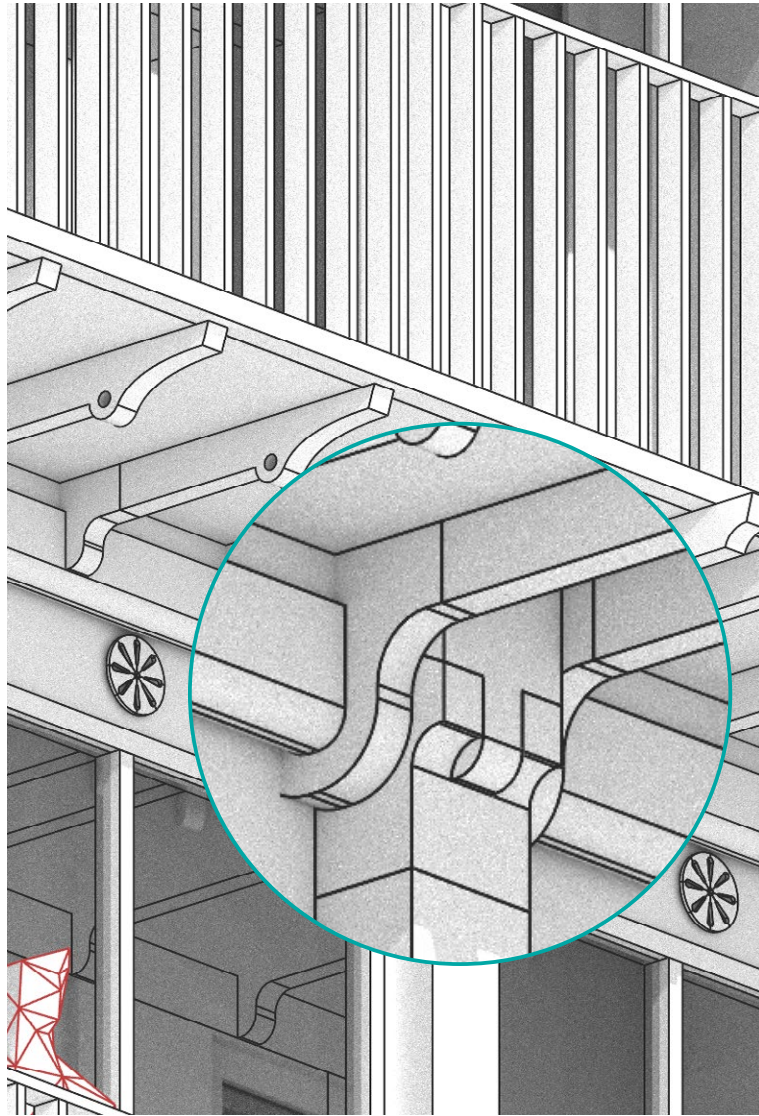


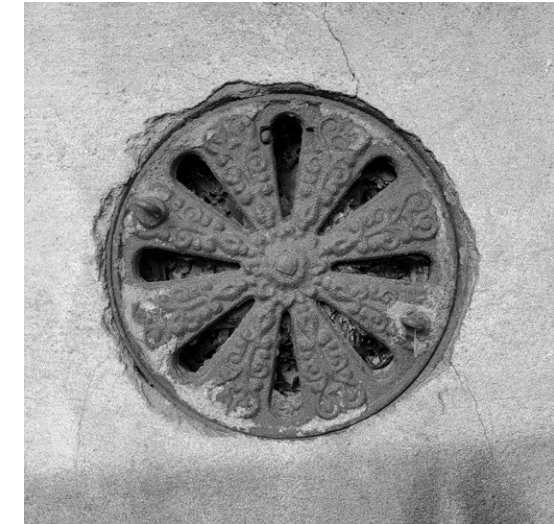
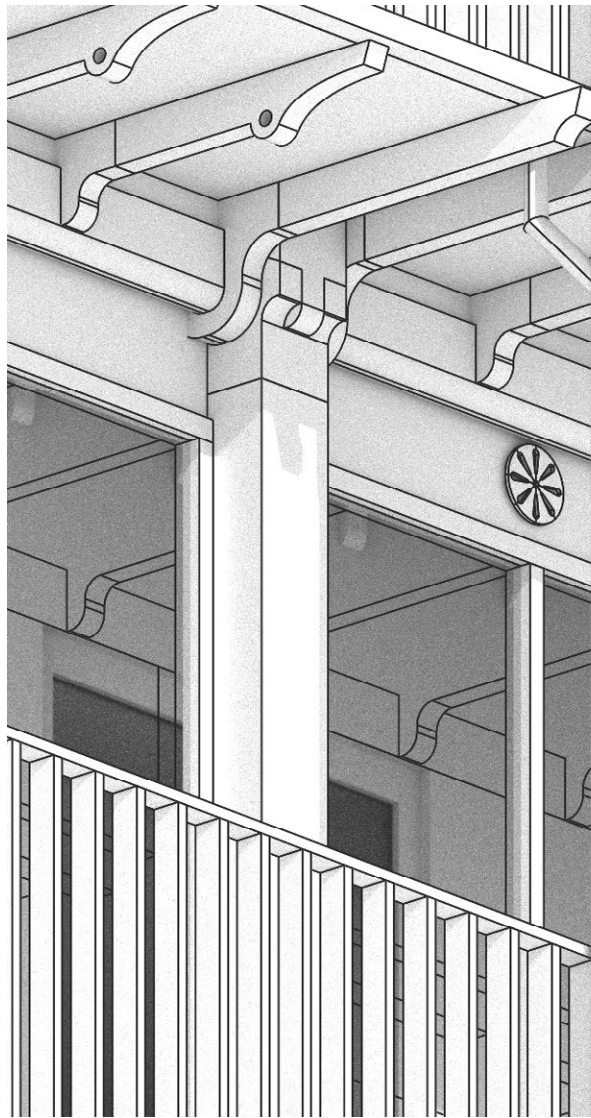
Make it your own!

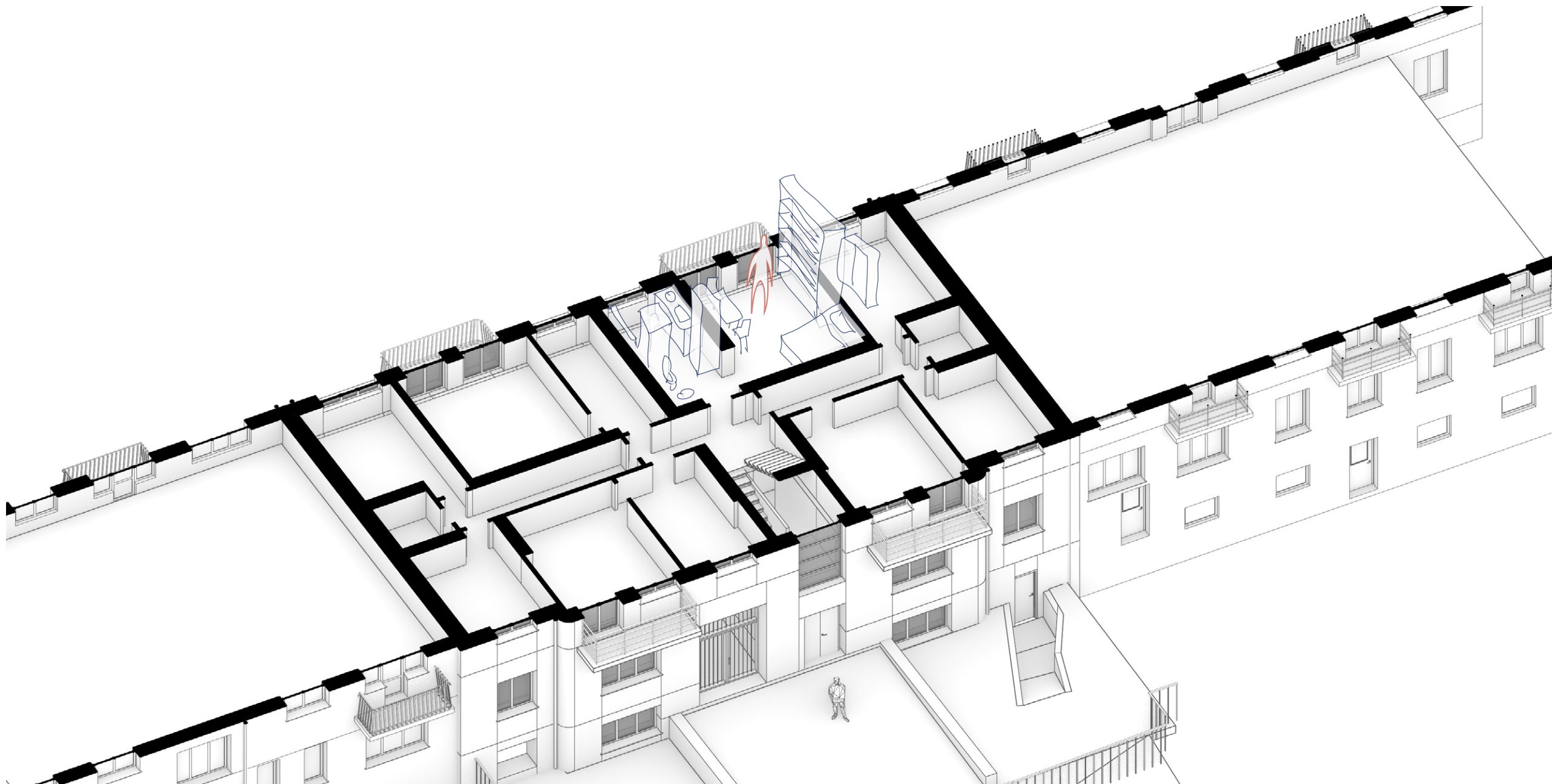


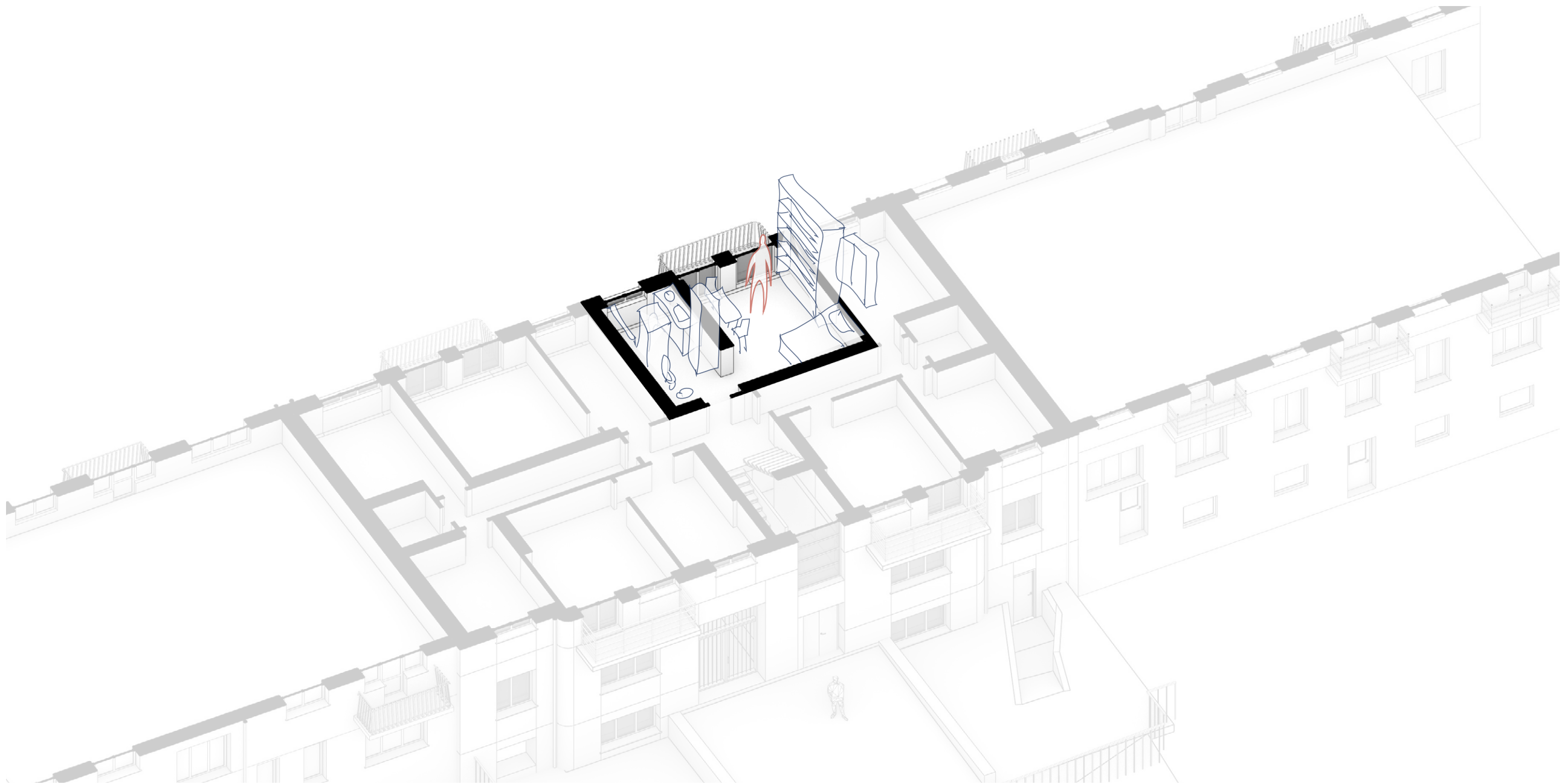
New affordances

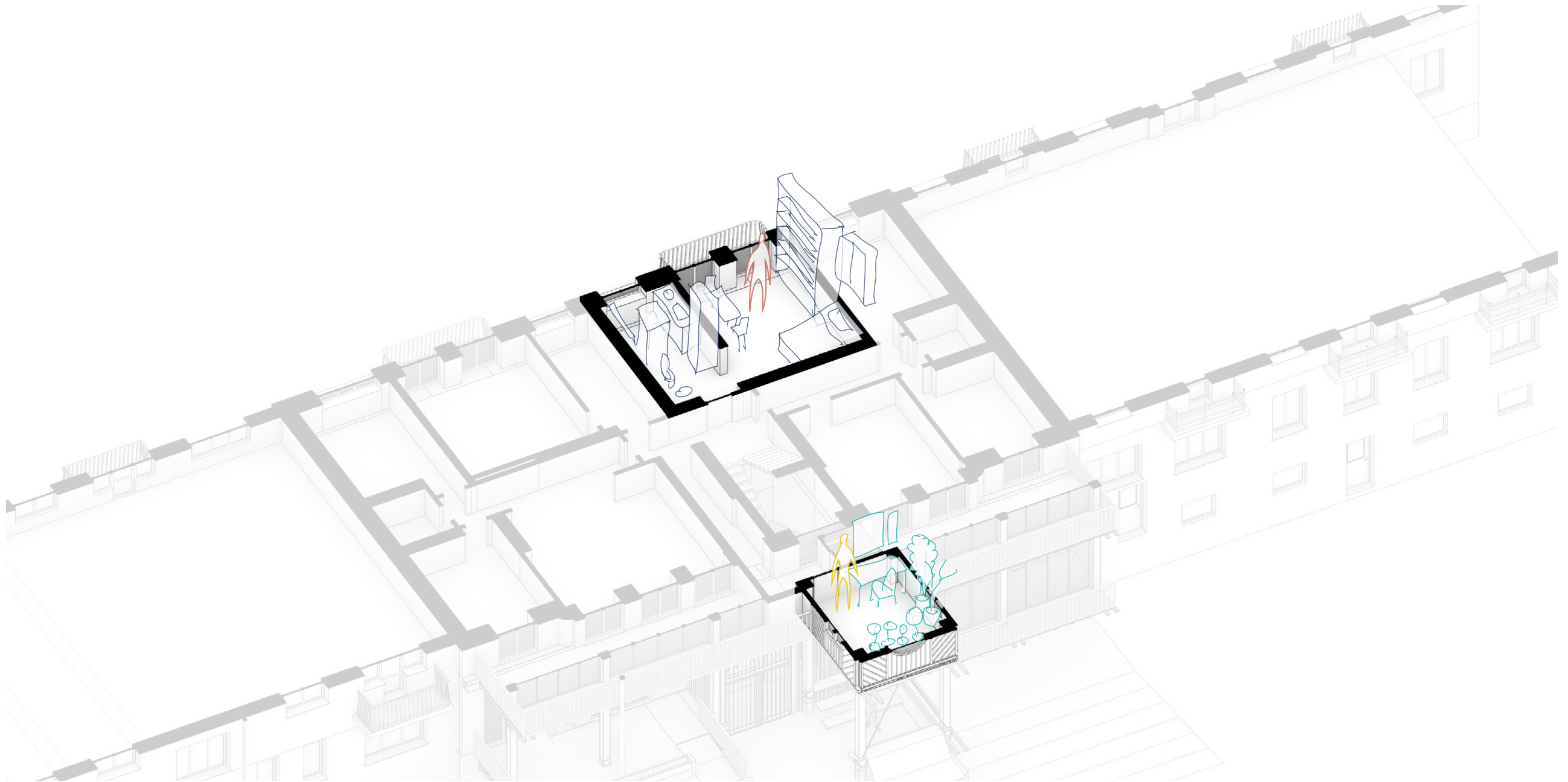


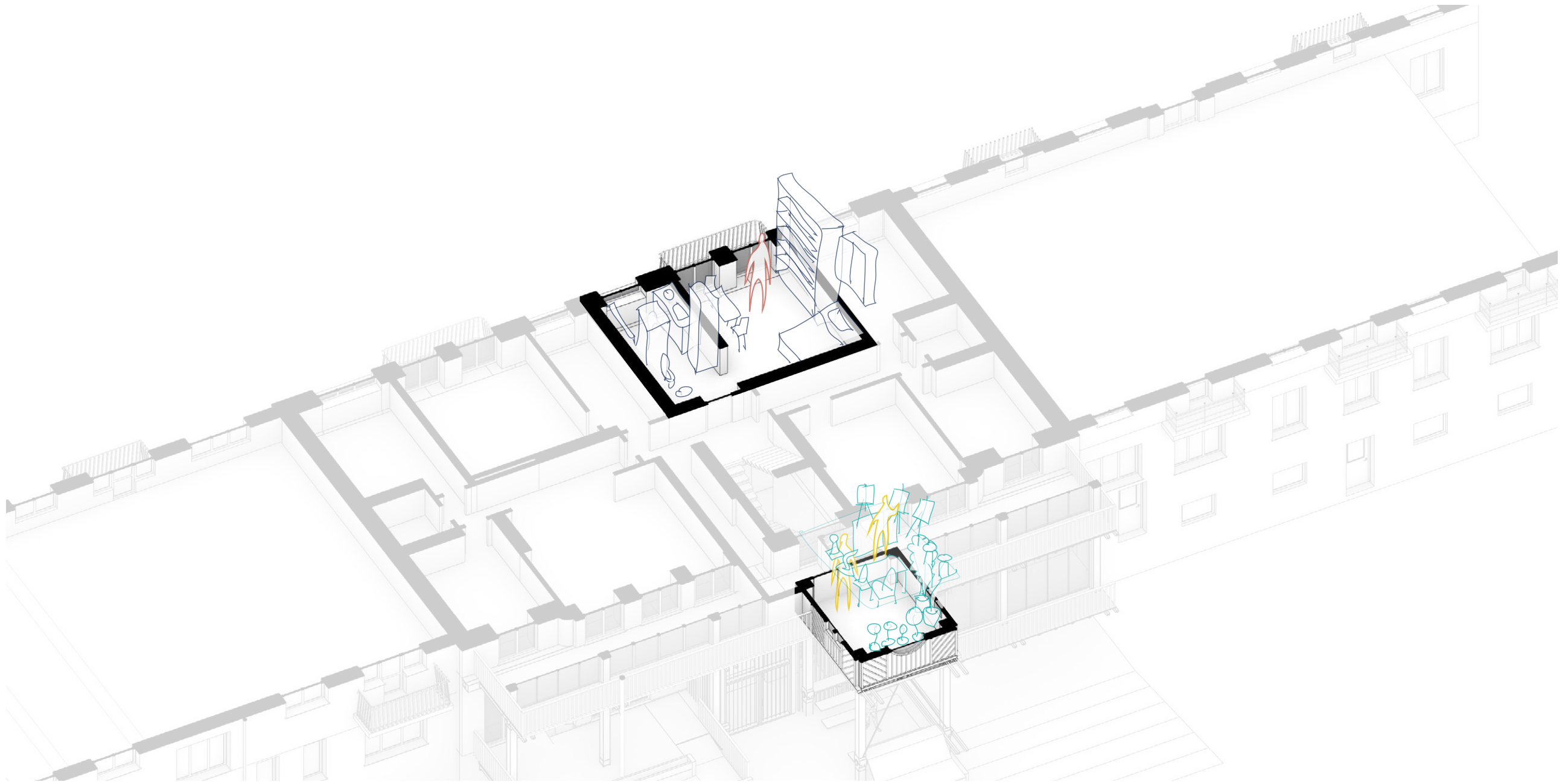


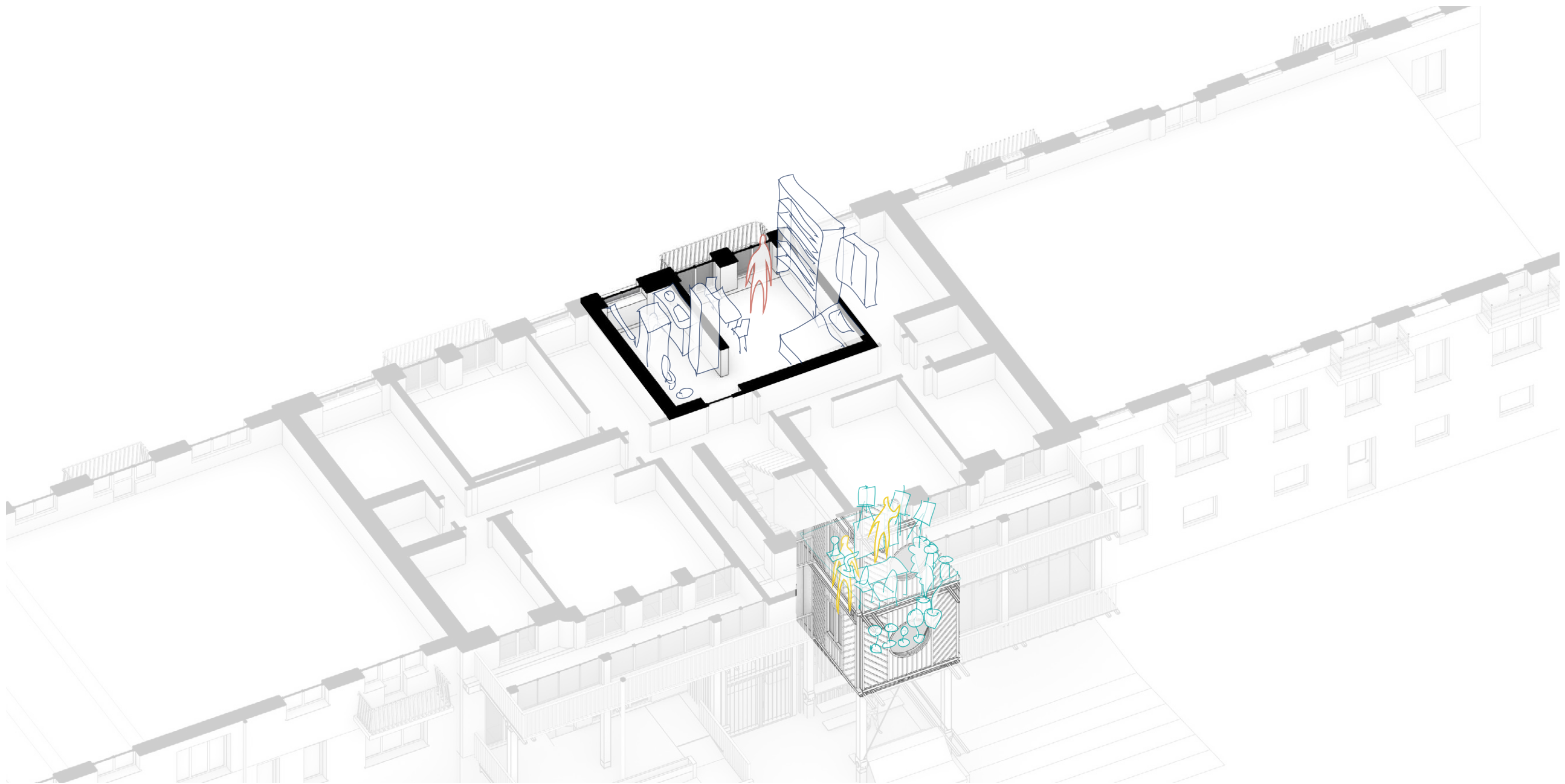


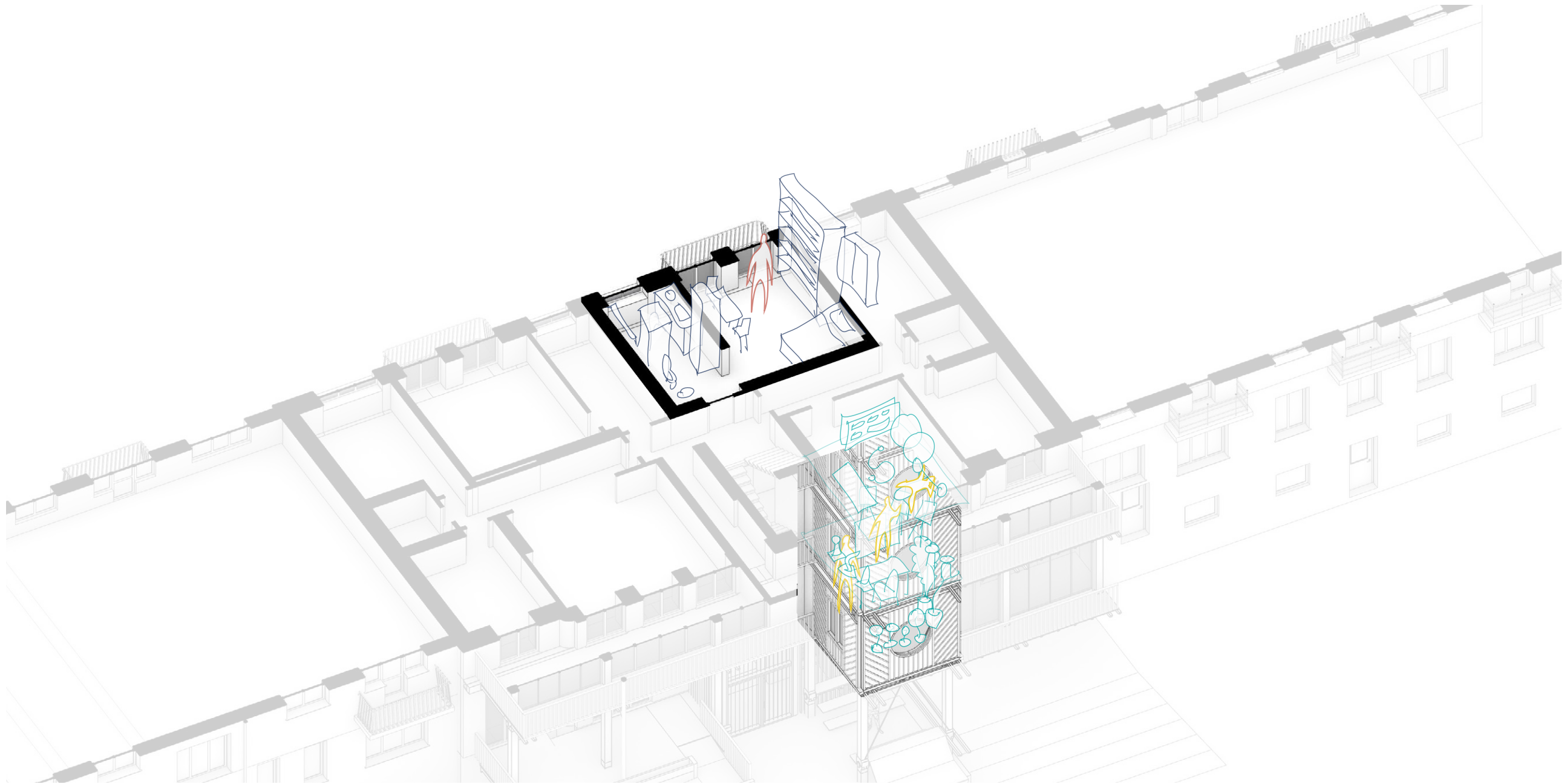








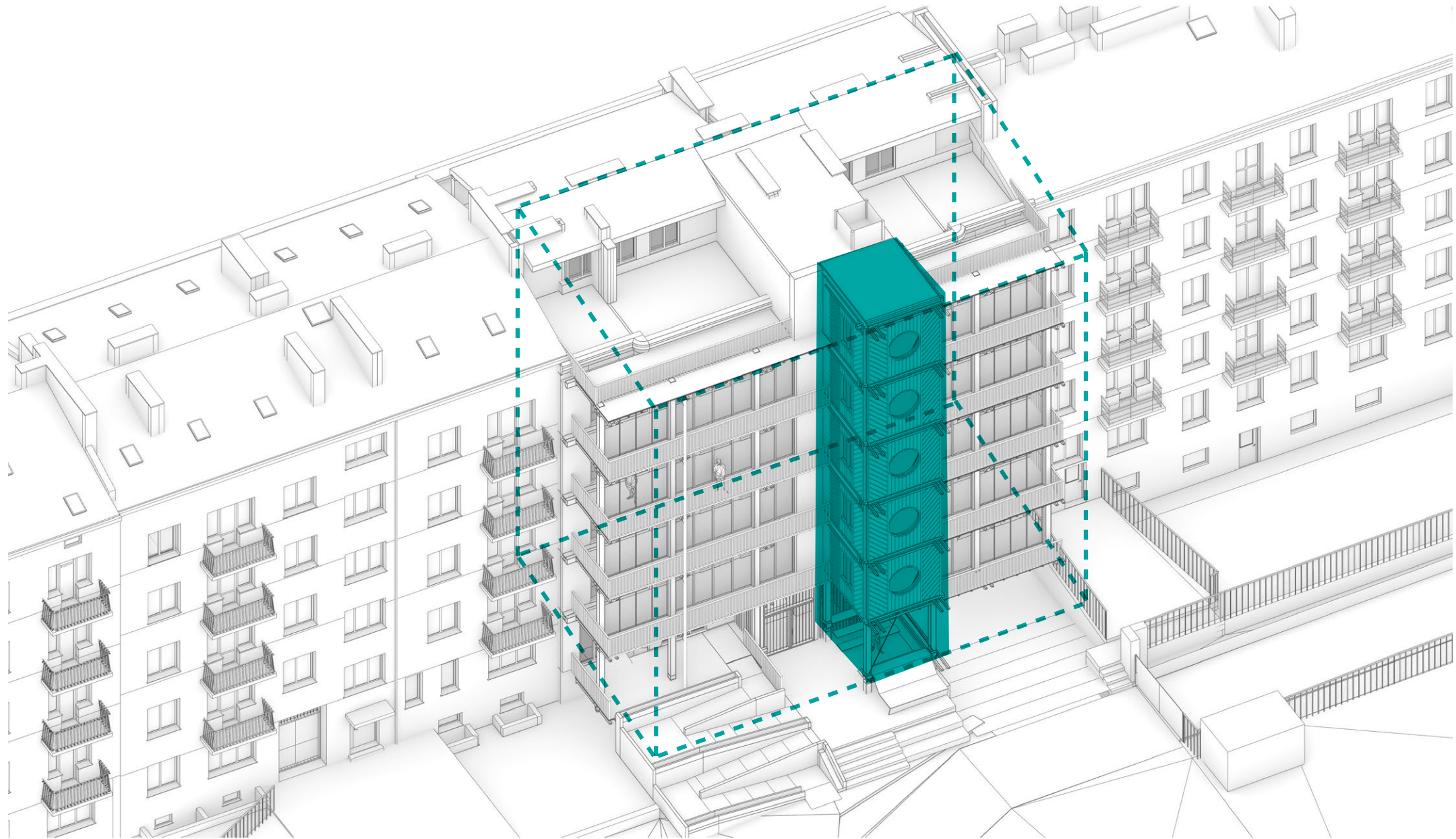


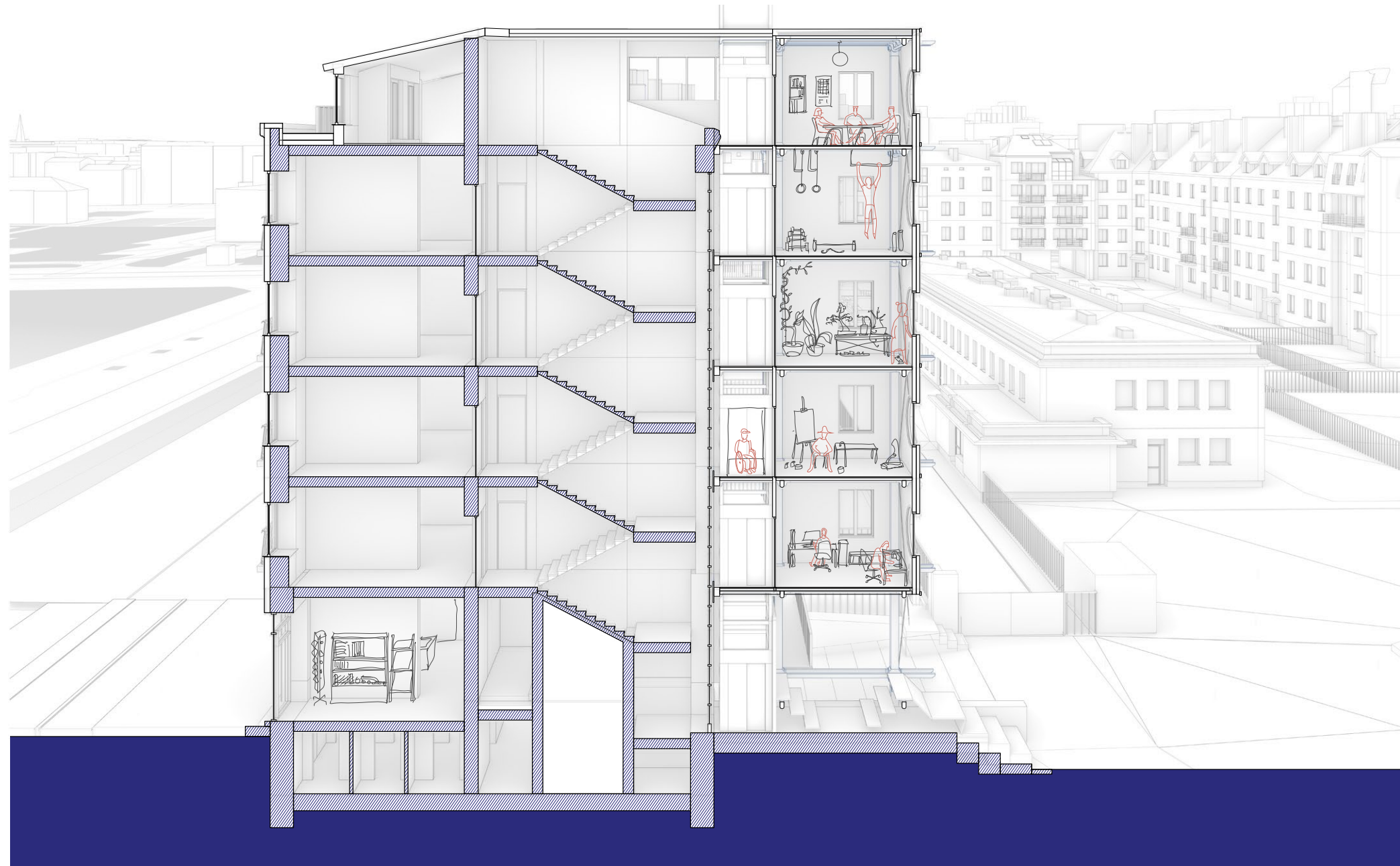


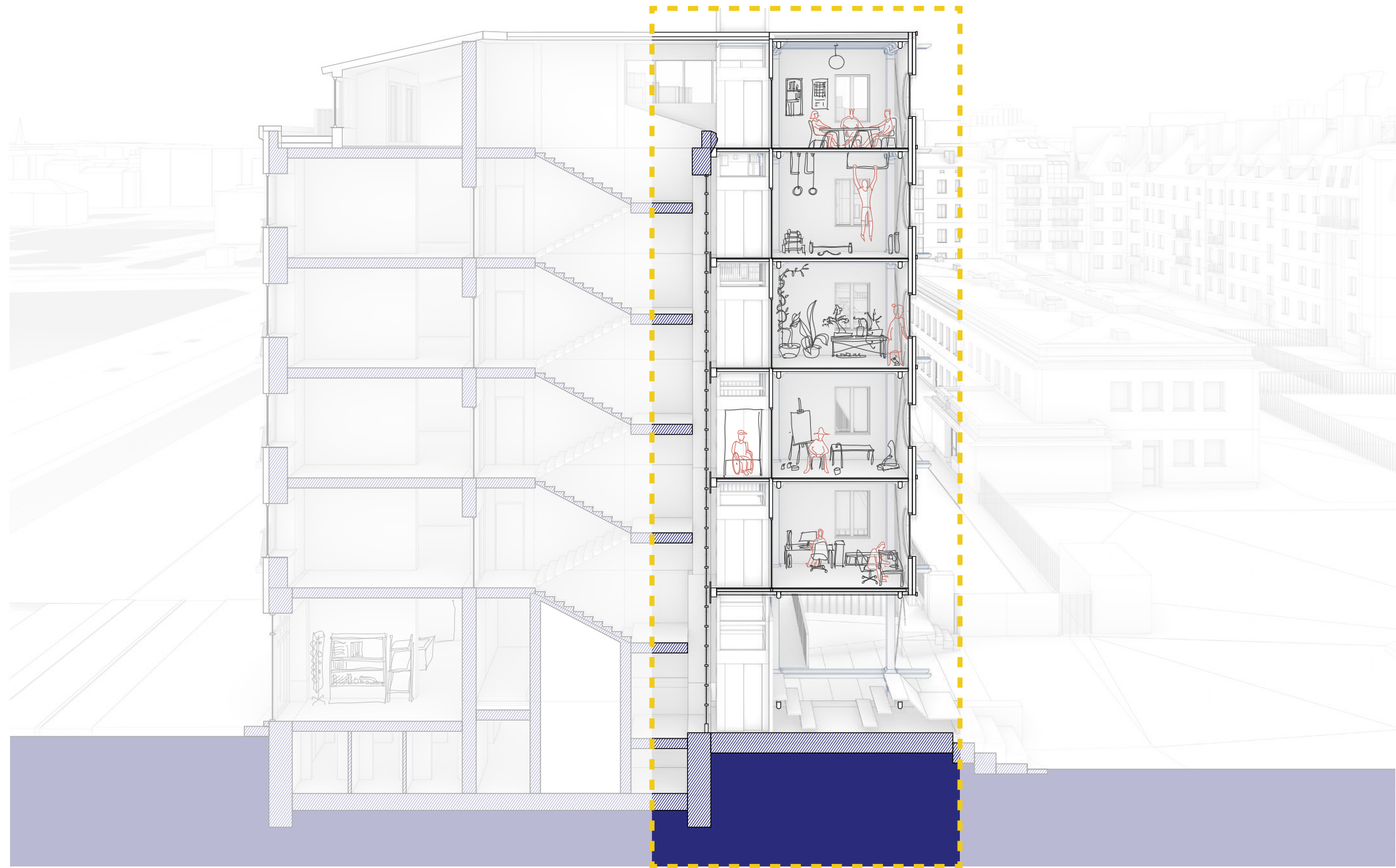


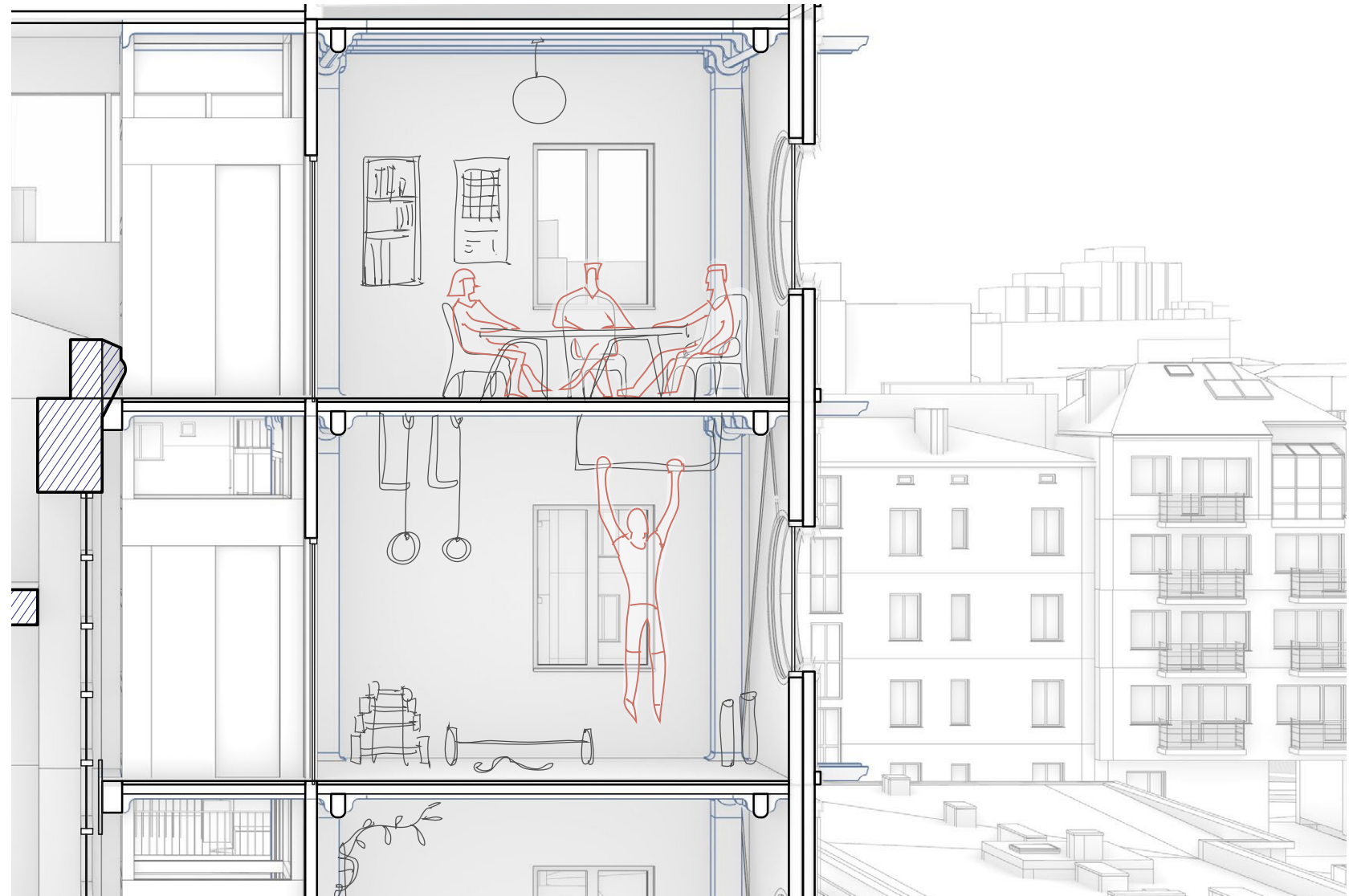
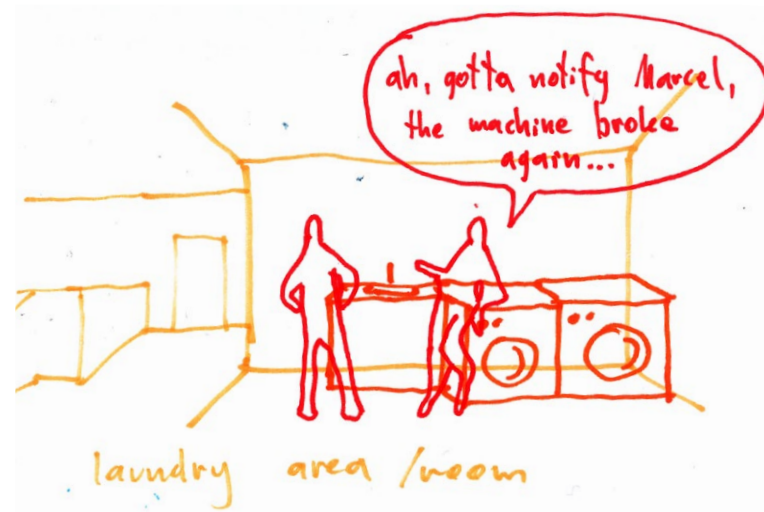


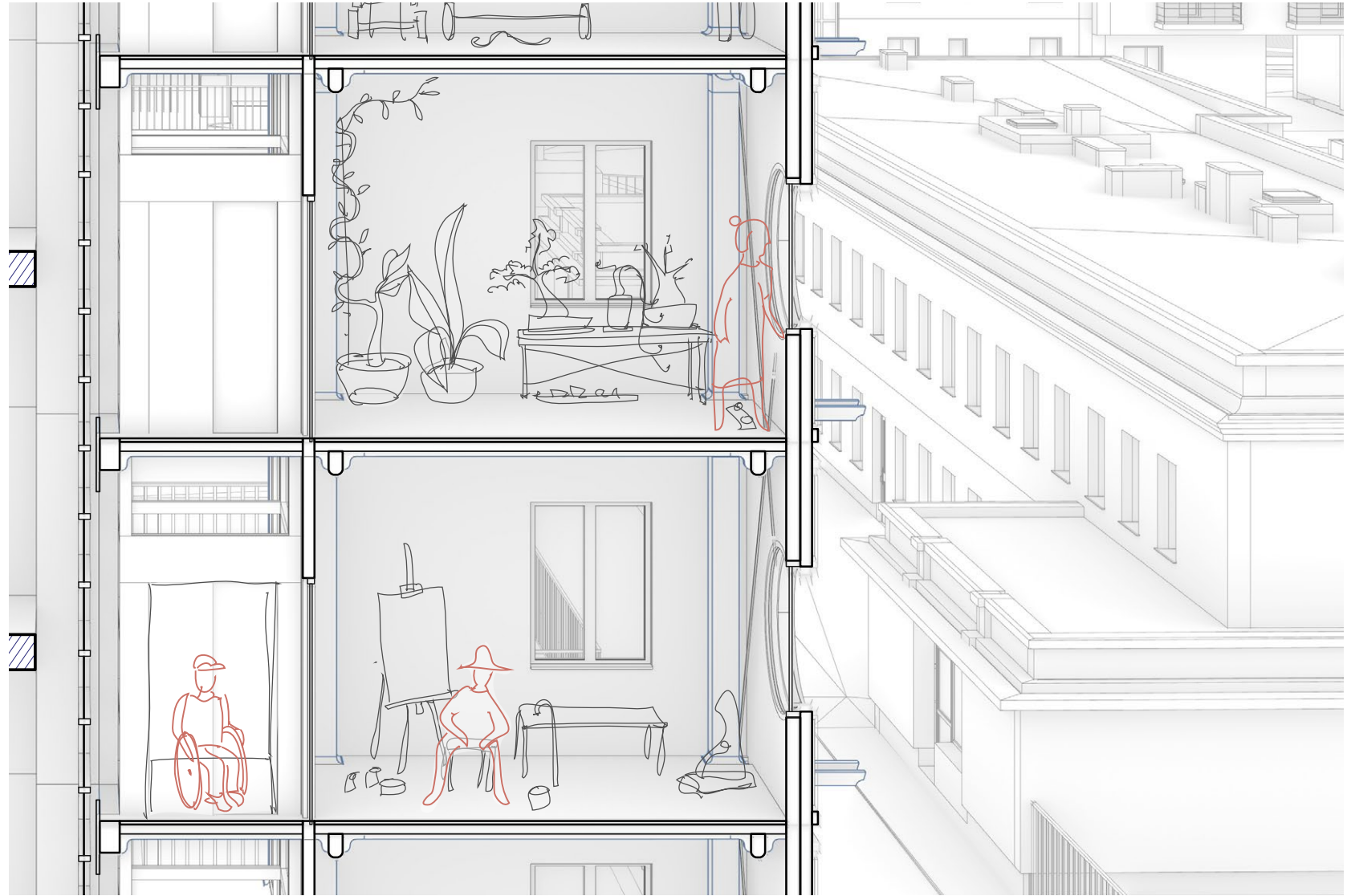


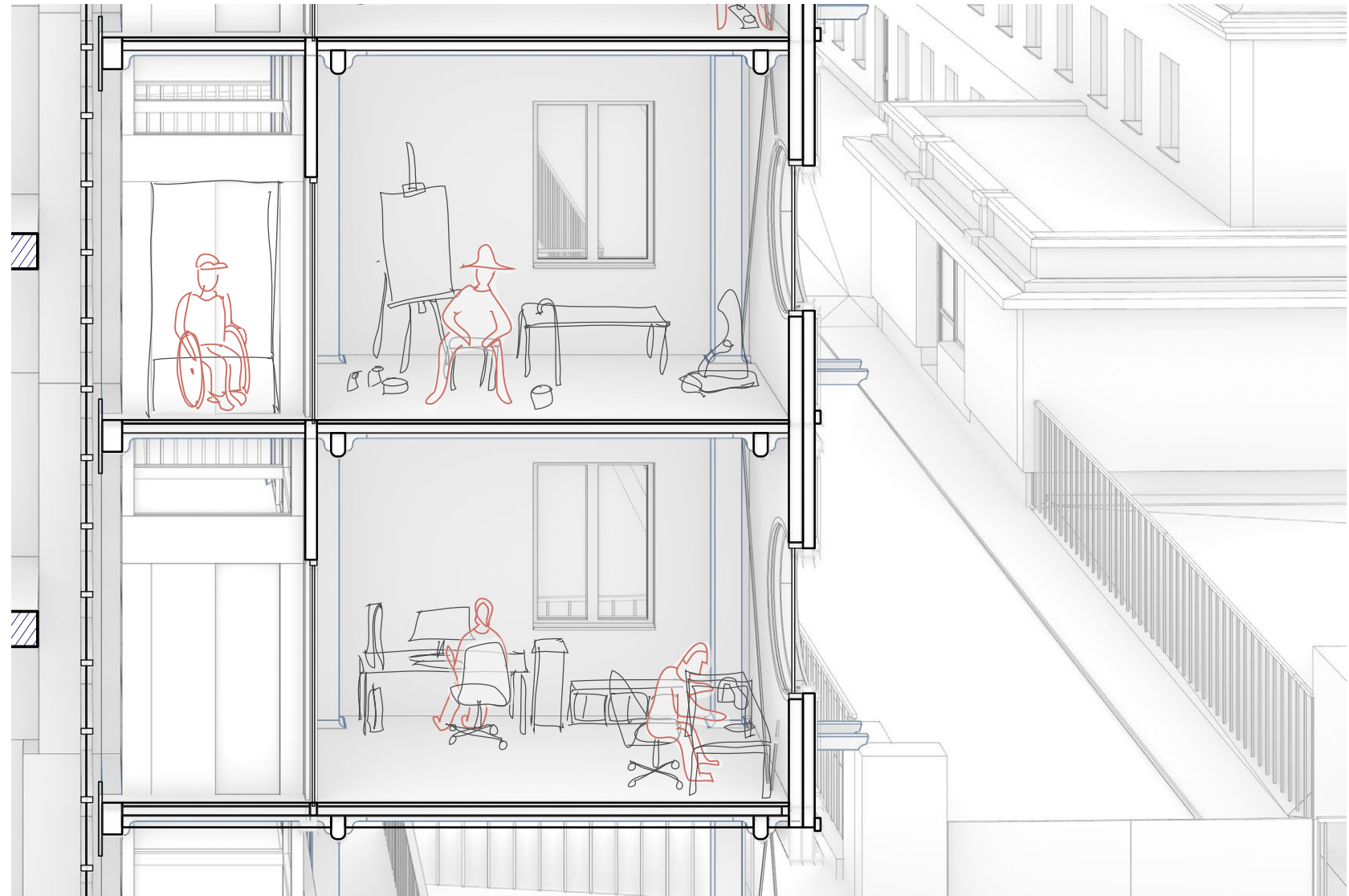


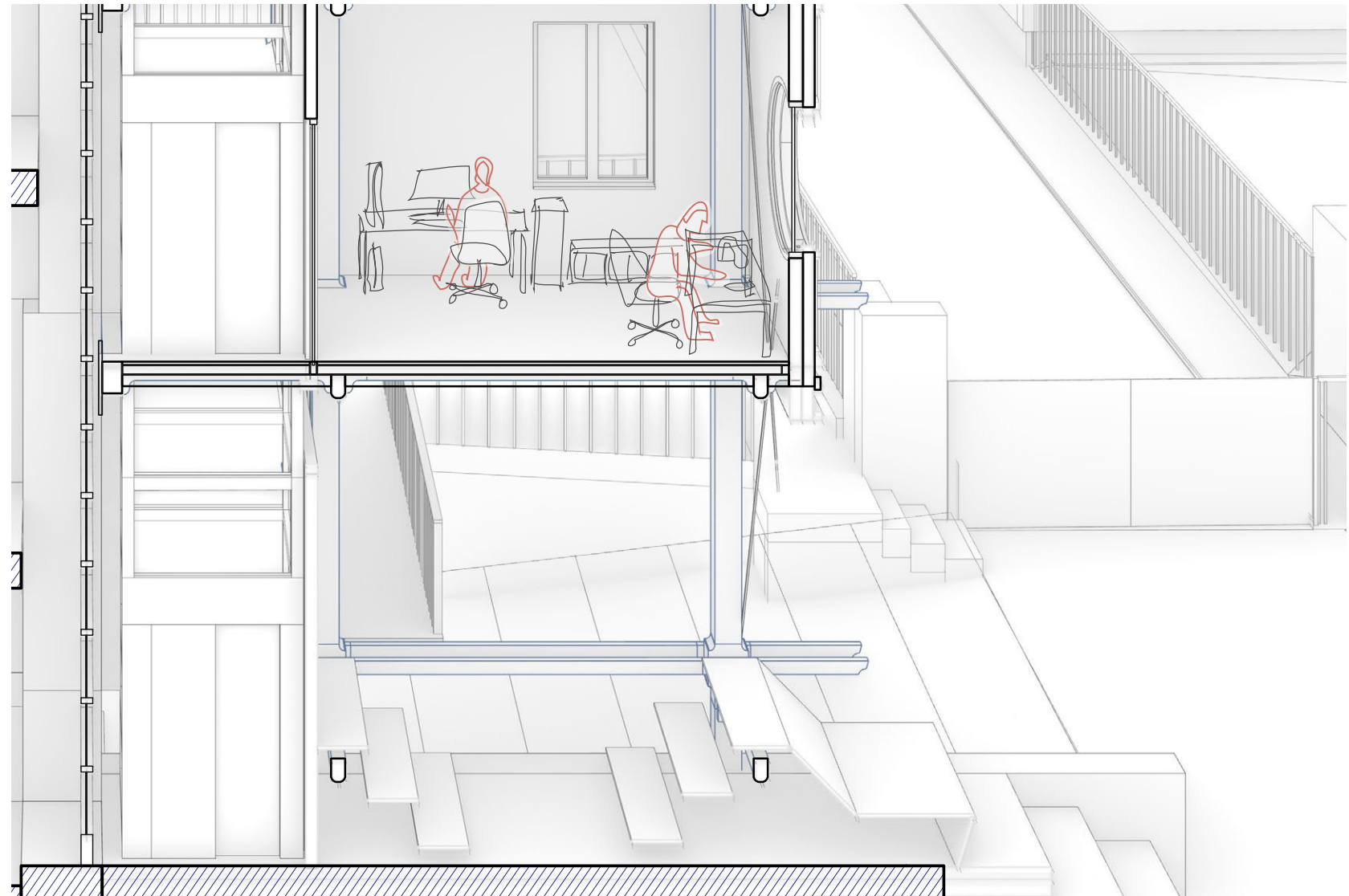
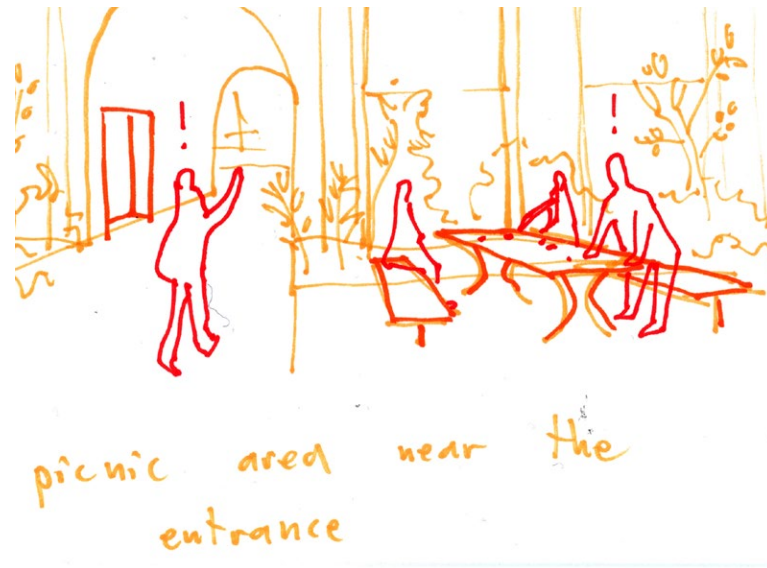




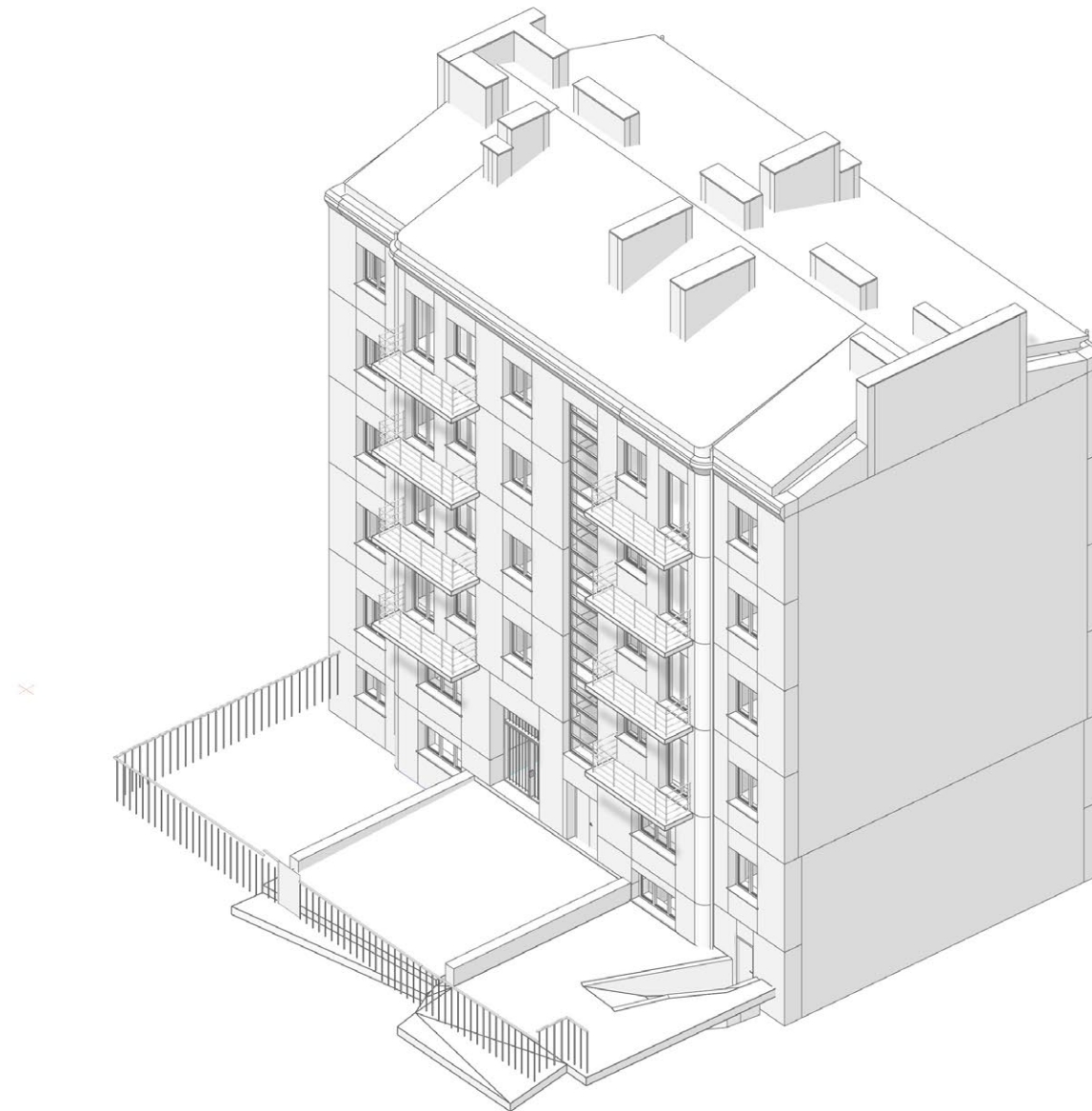


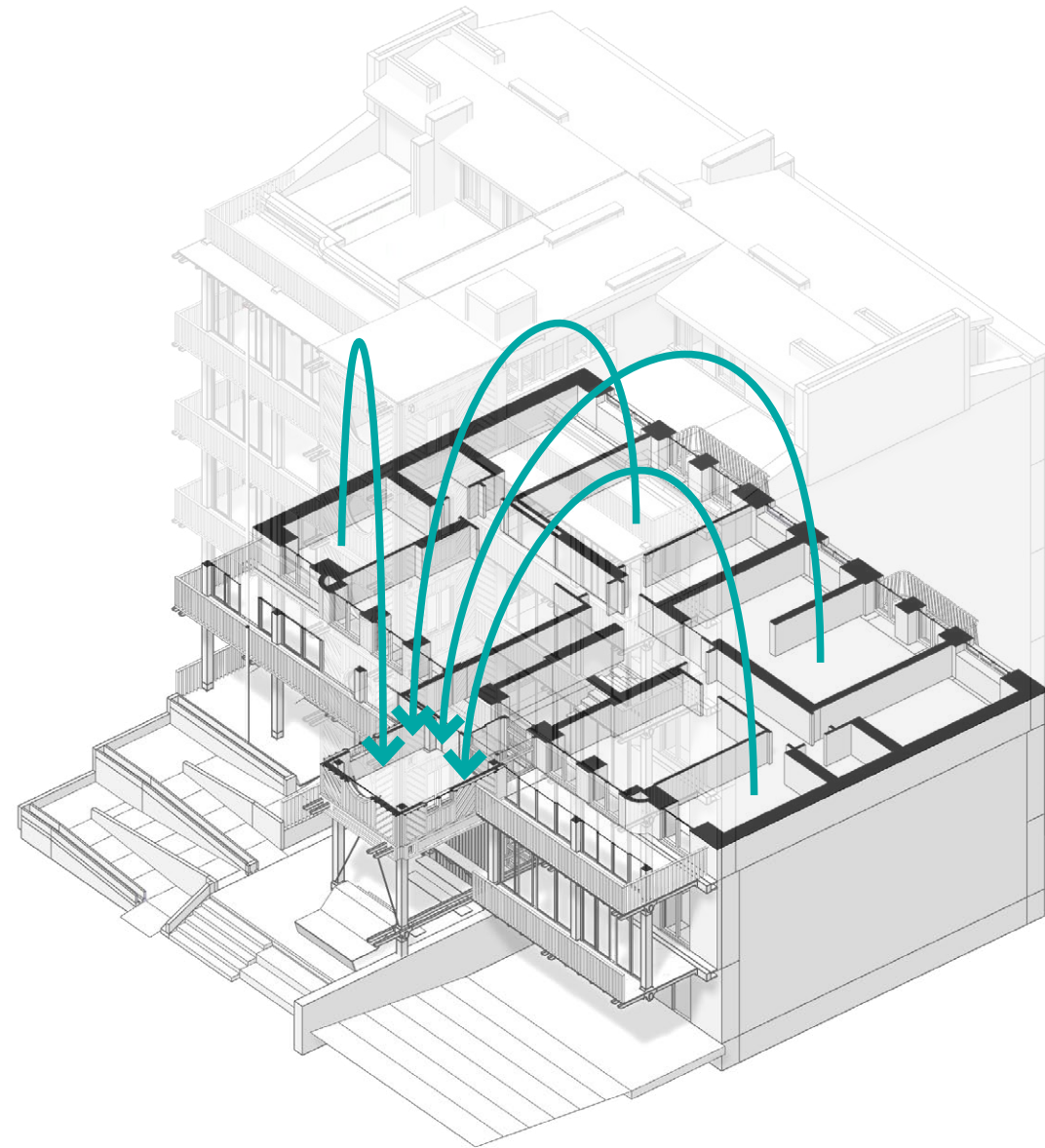


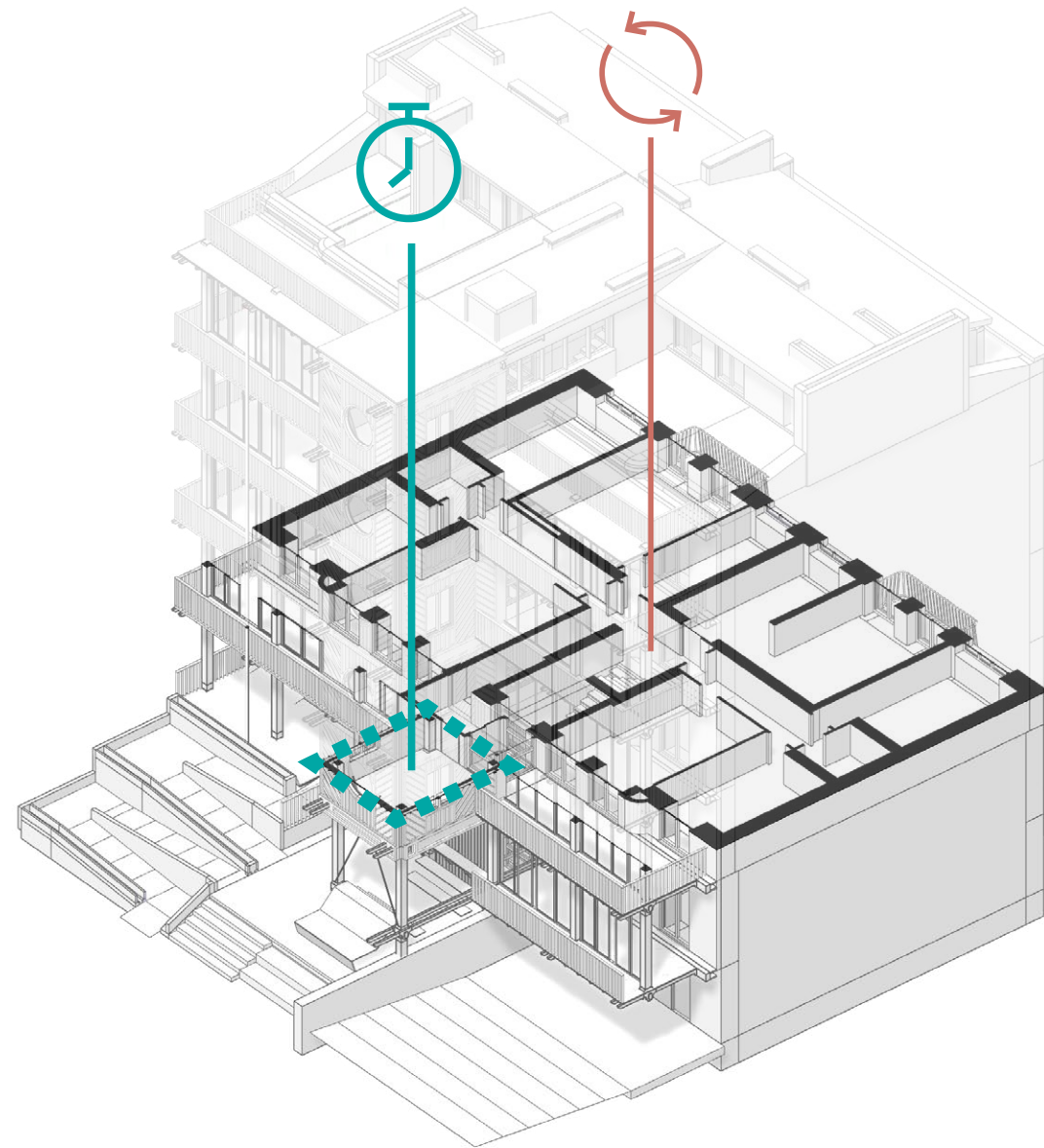


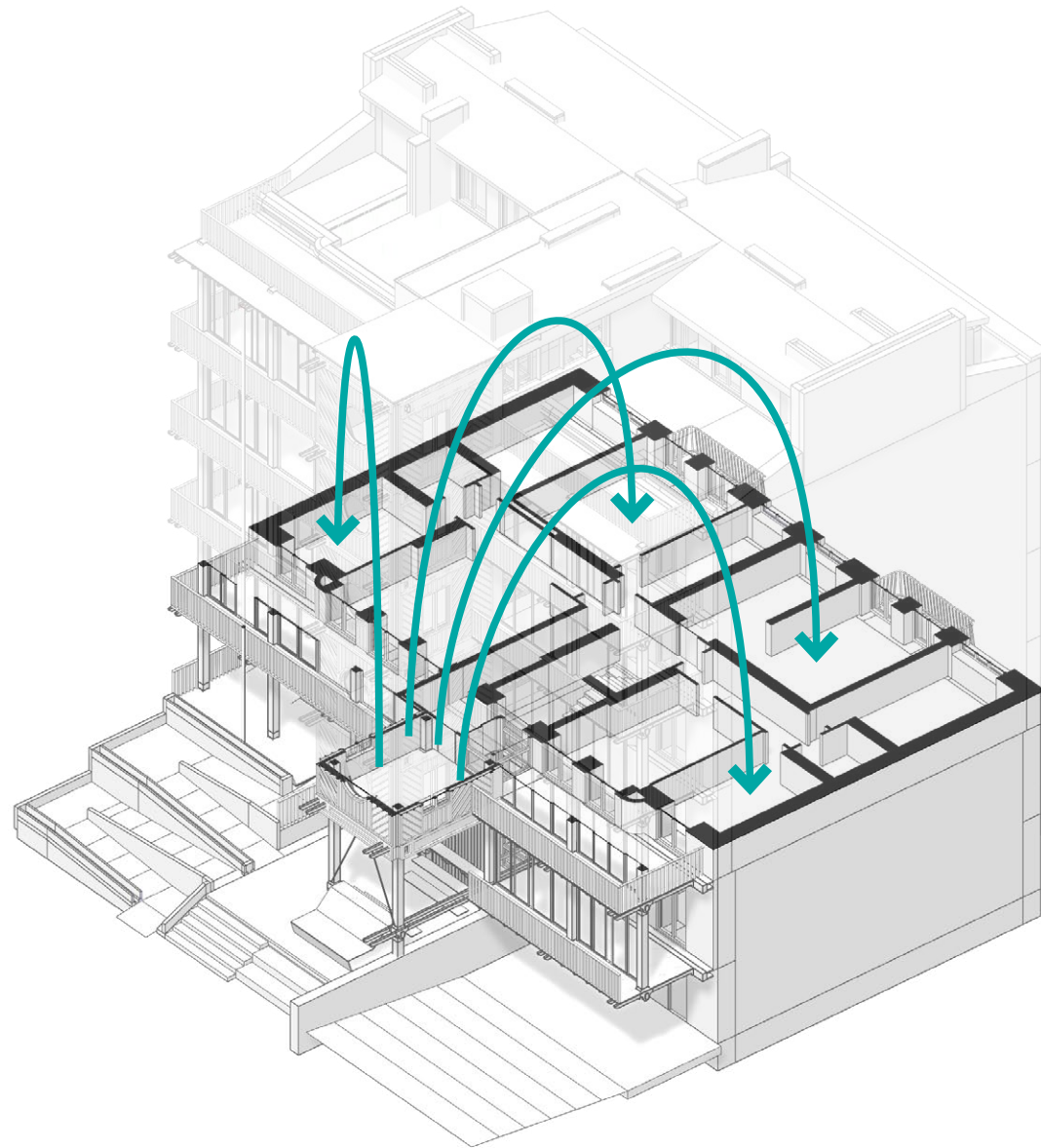


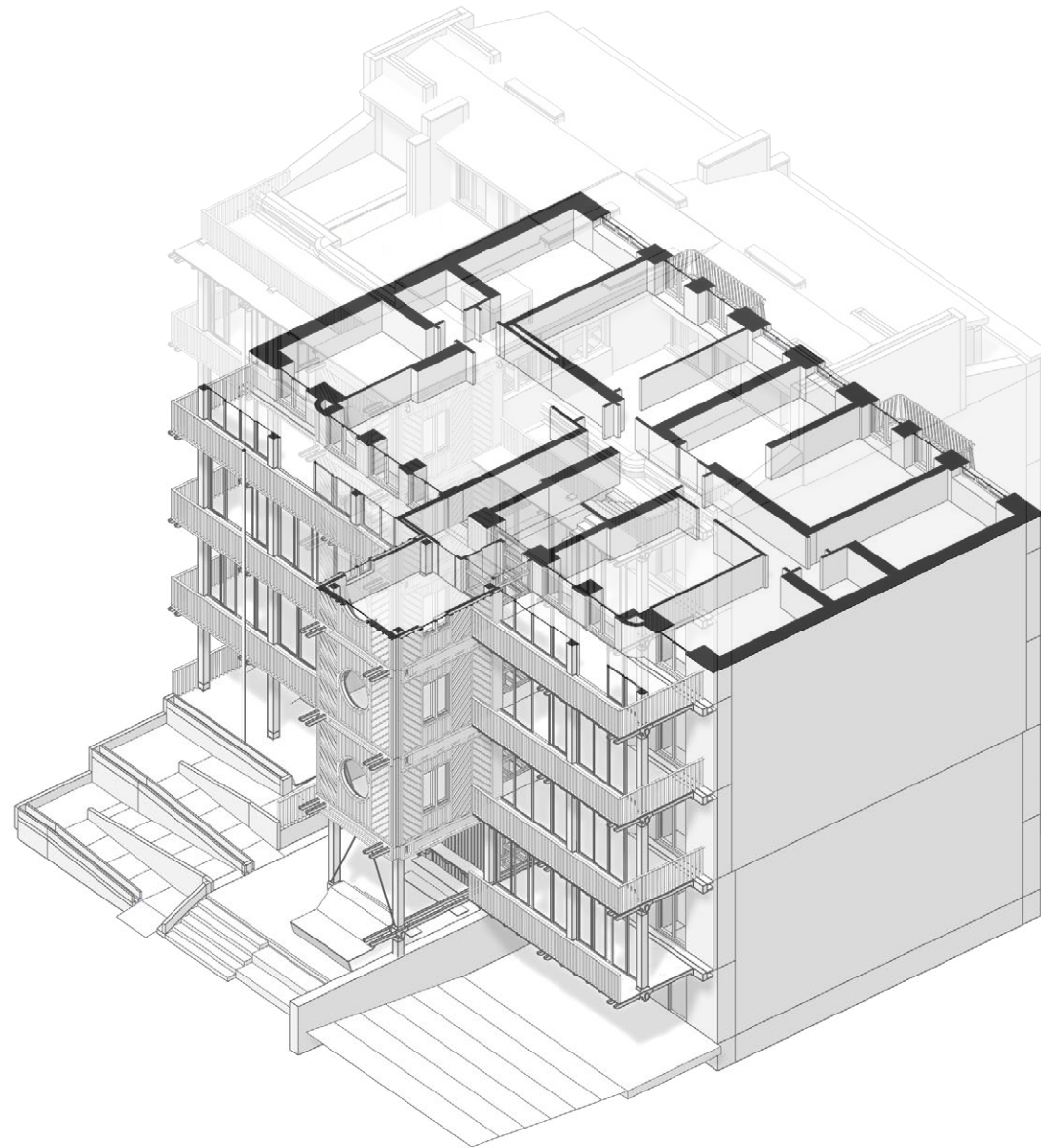


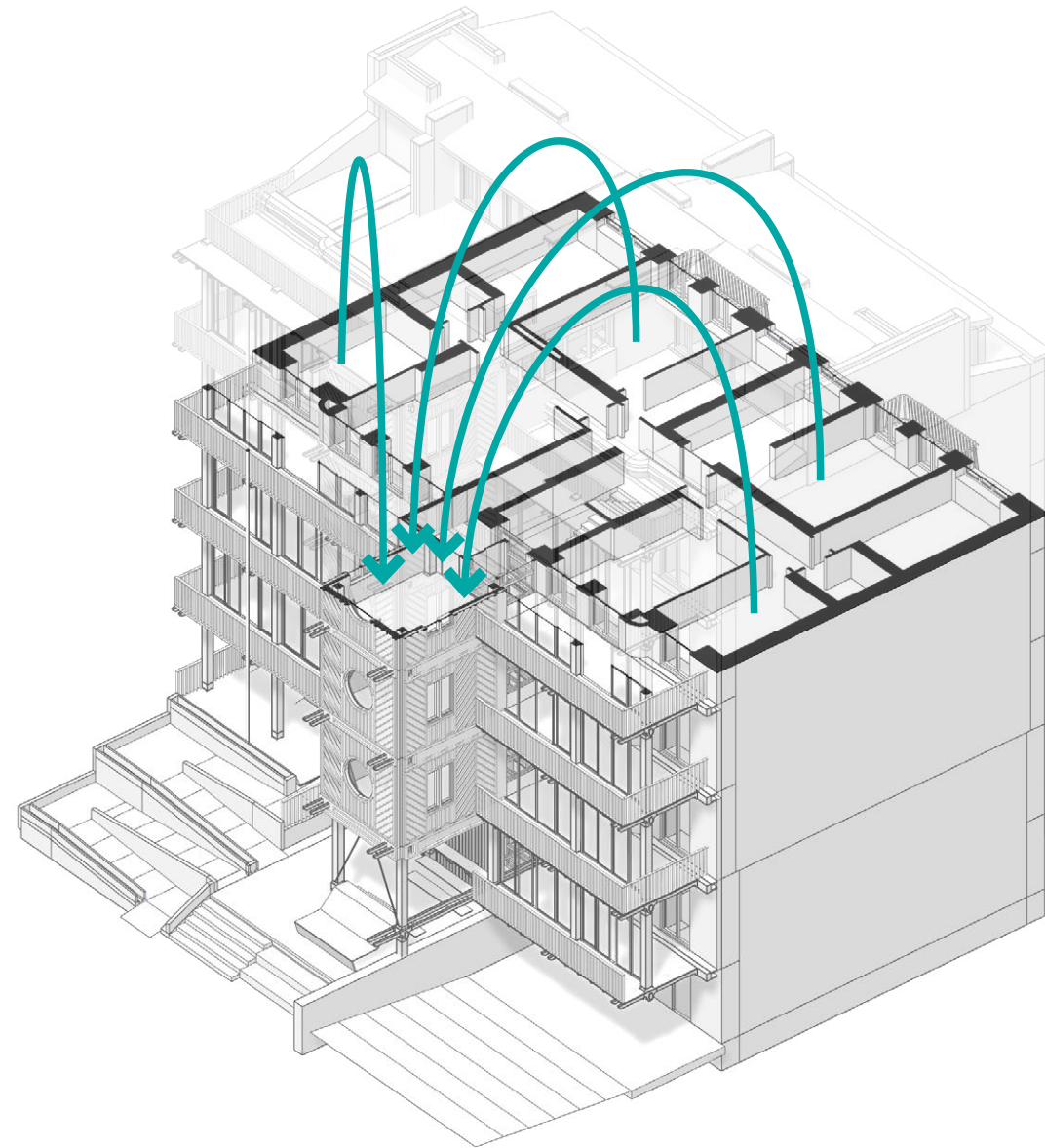


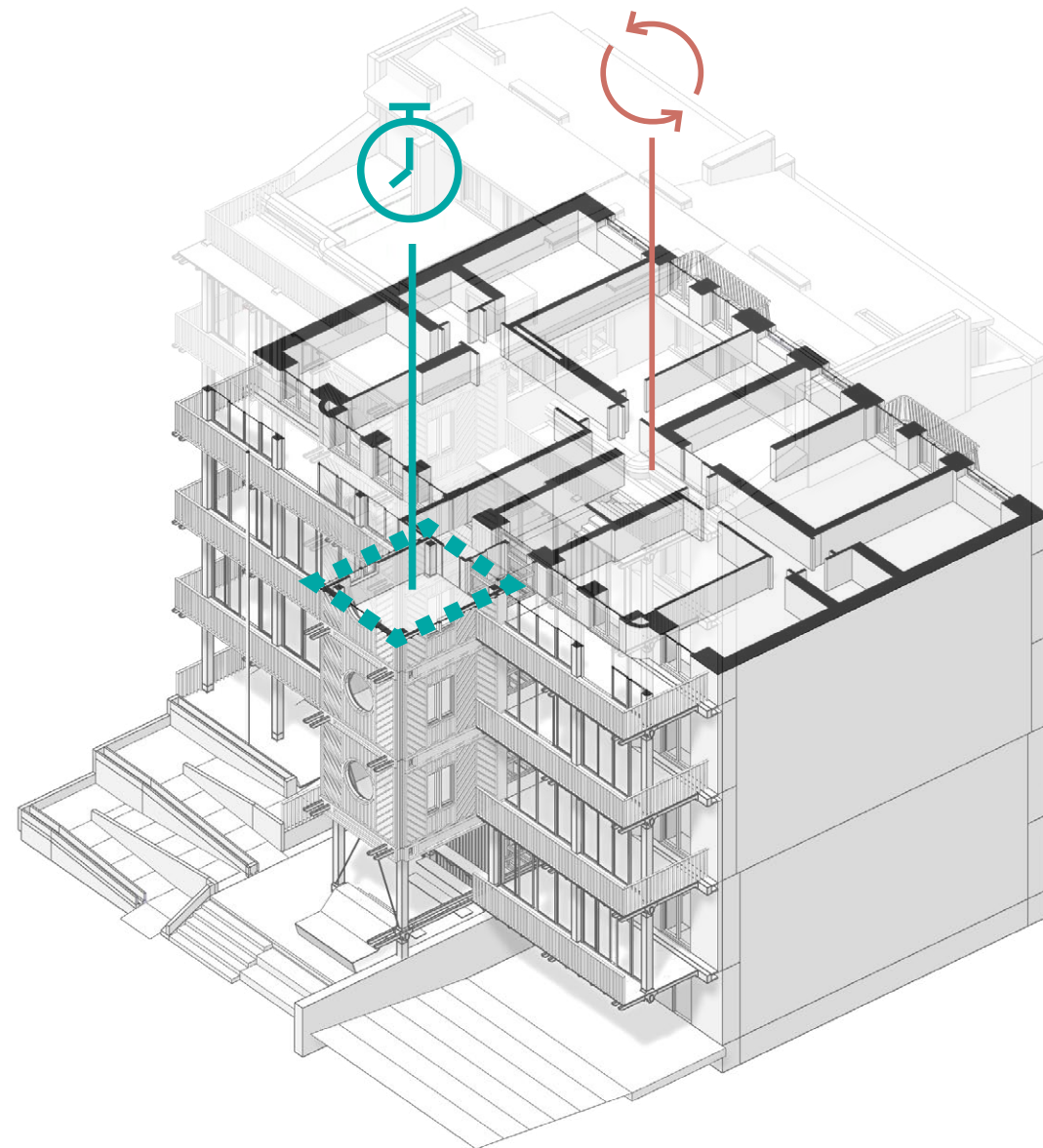


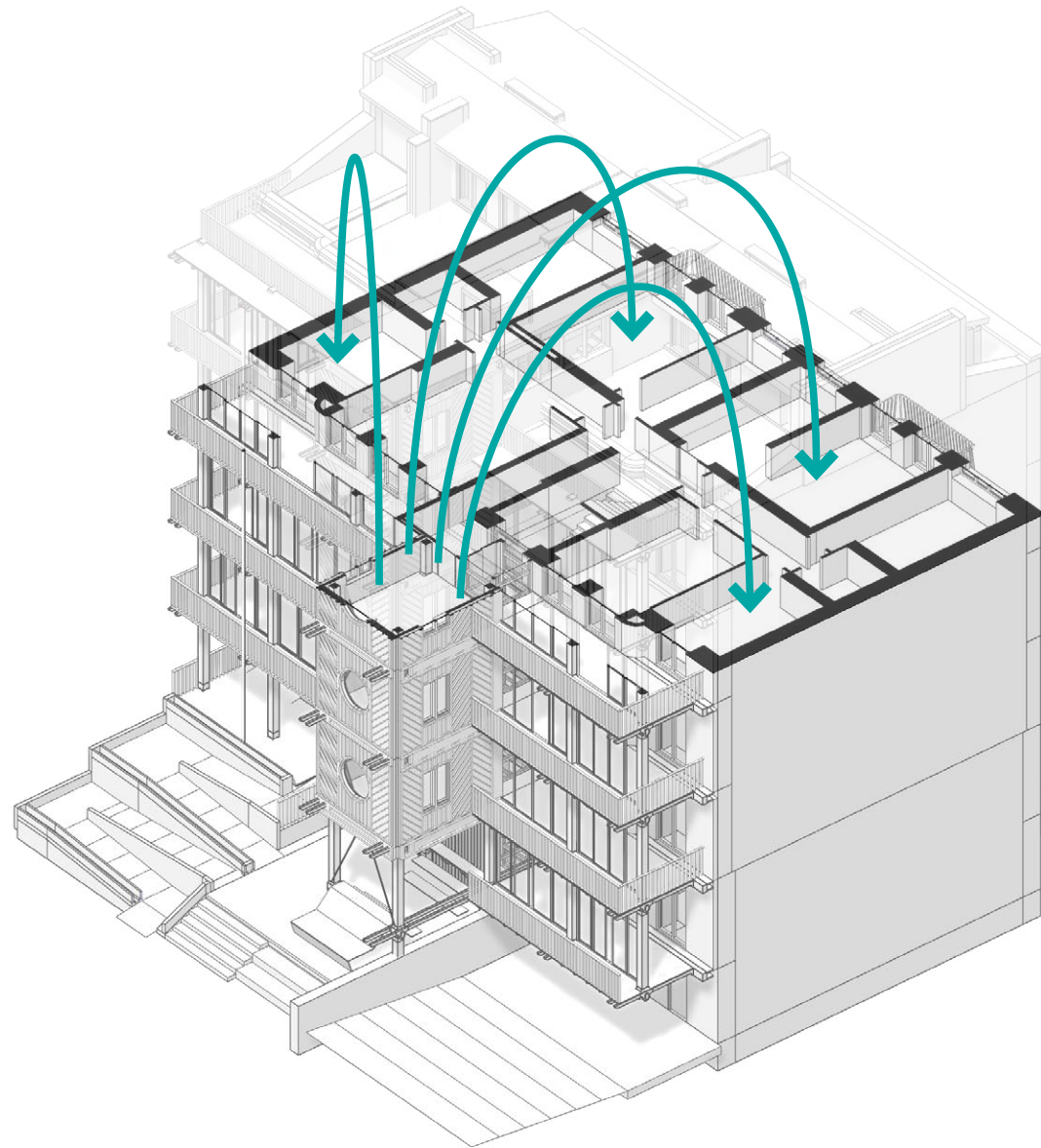


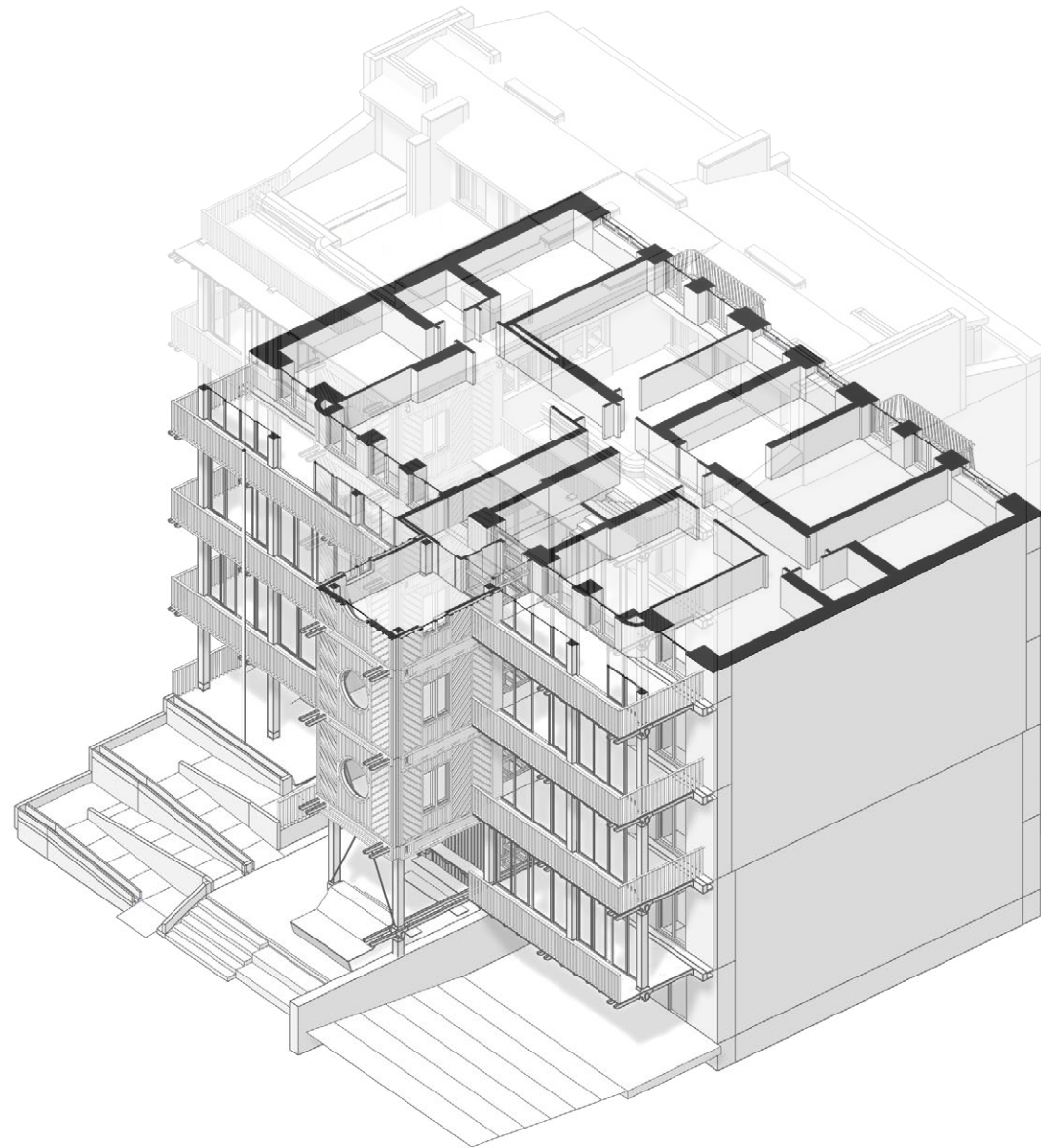


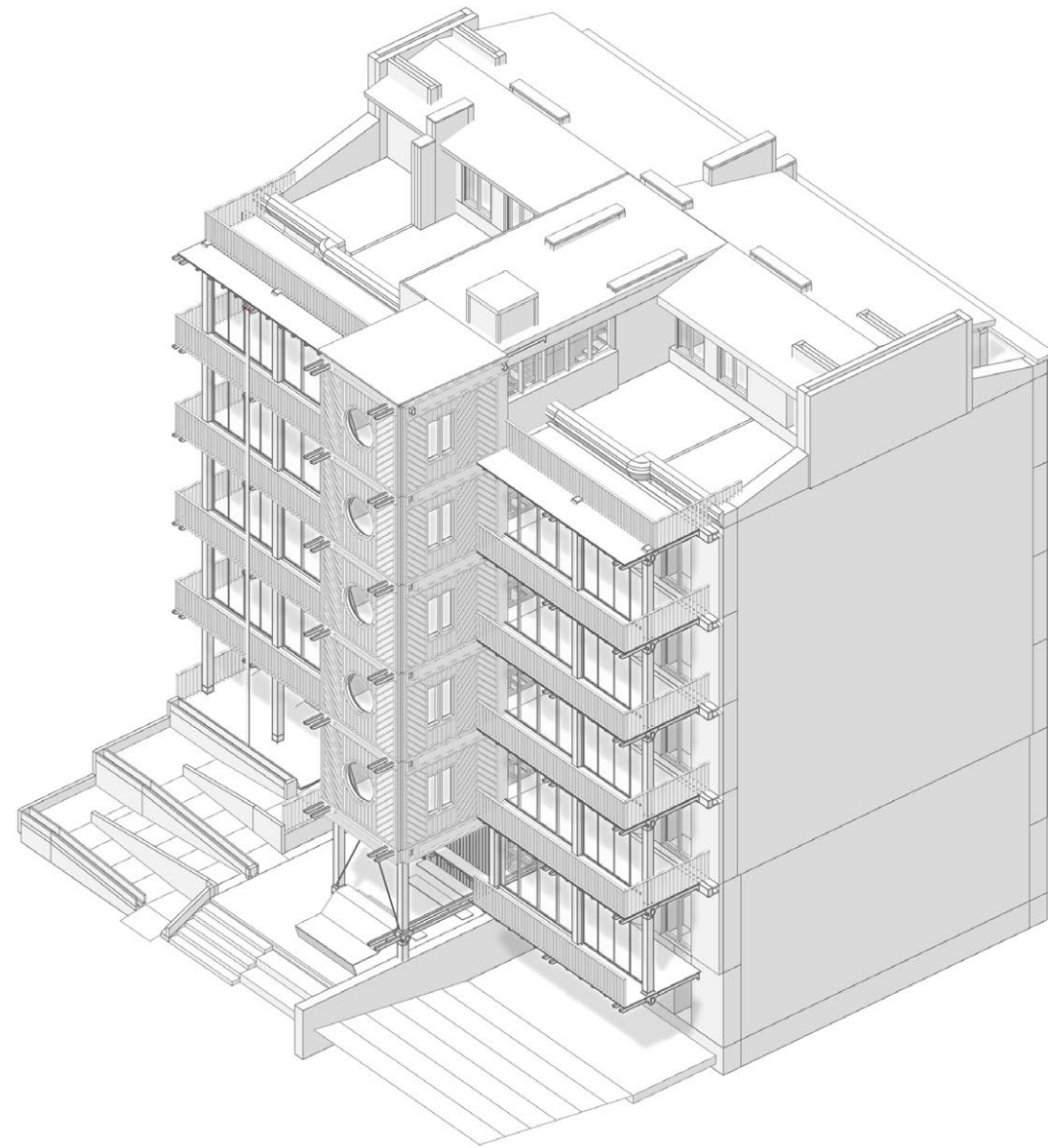


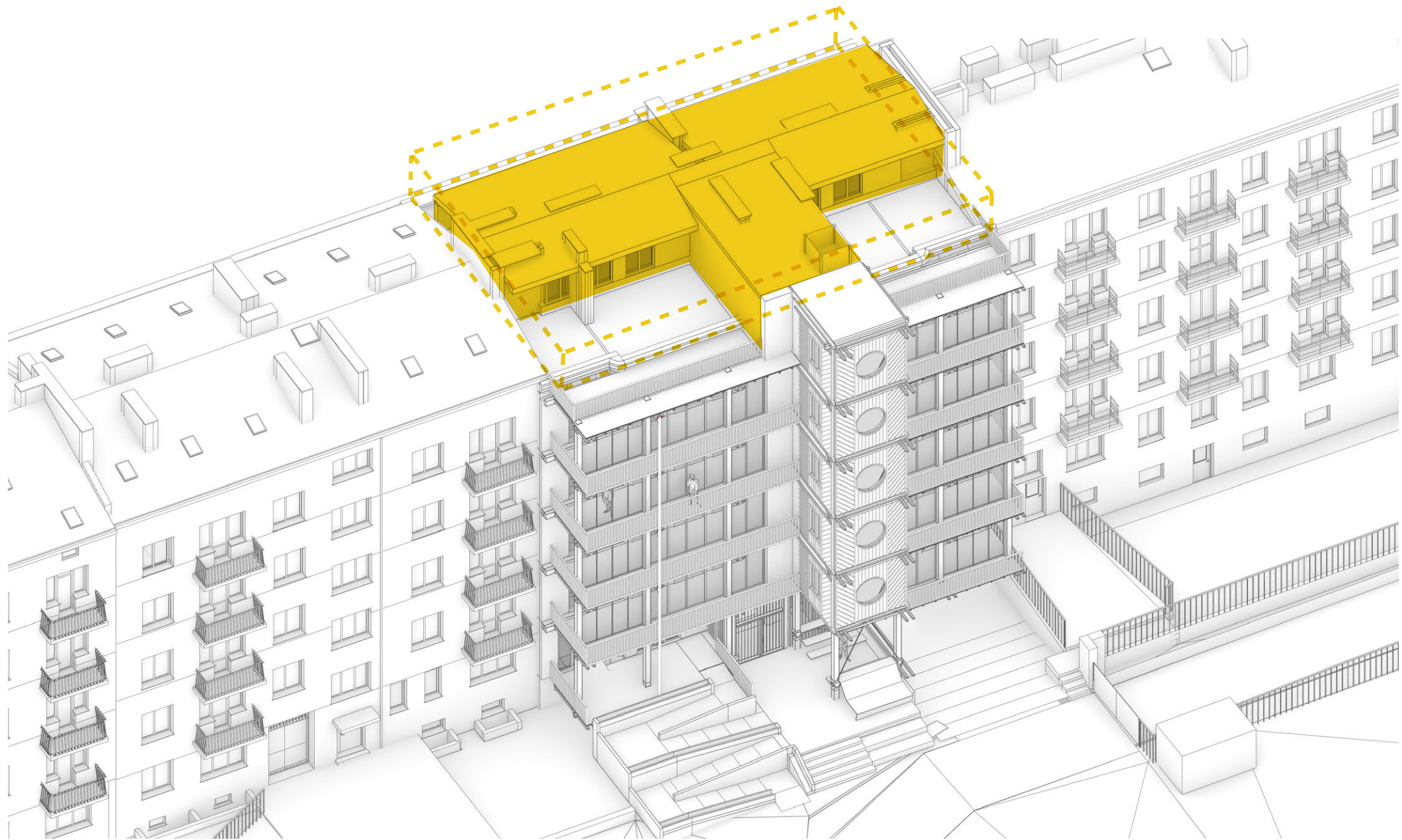




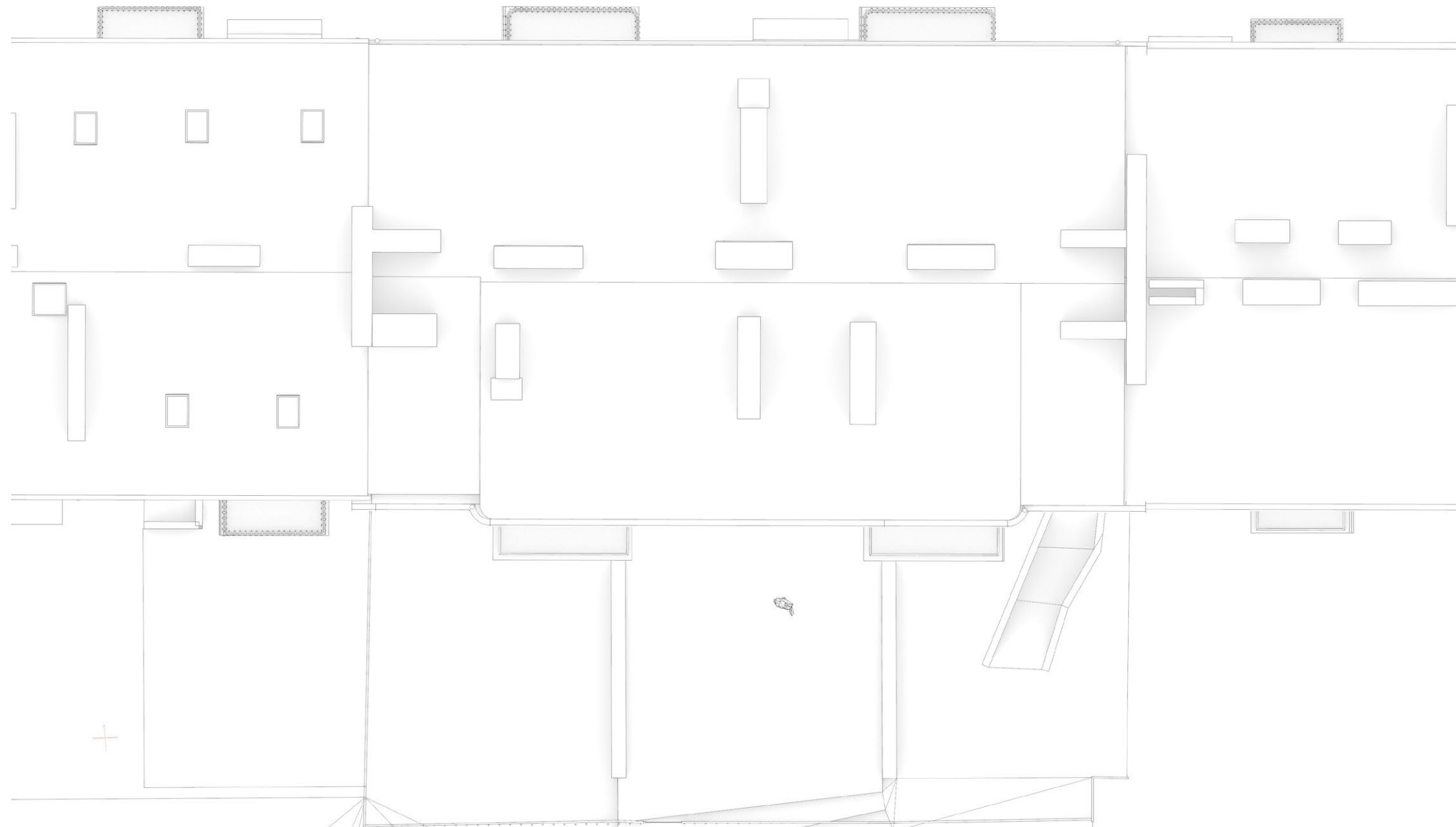
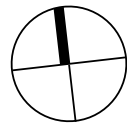




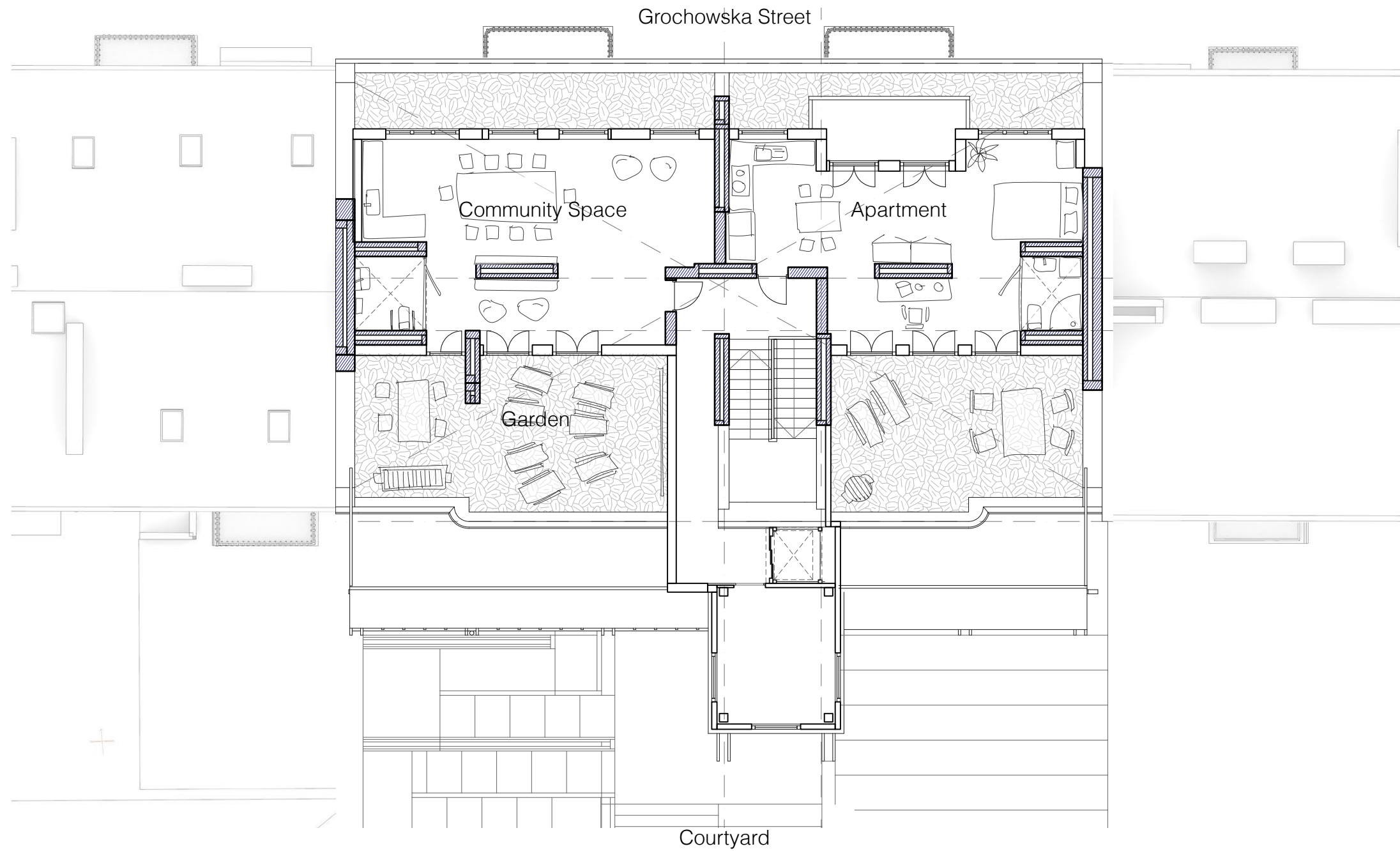
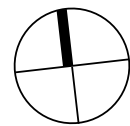


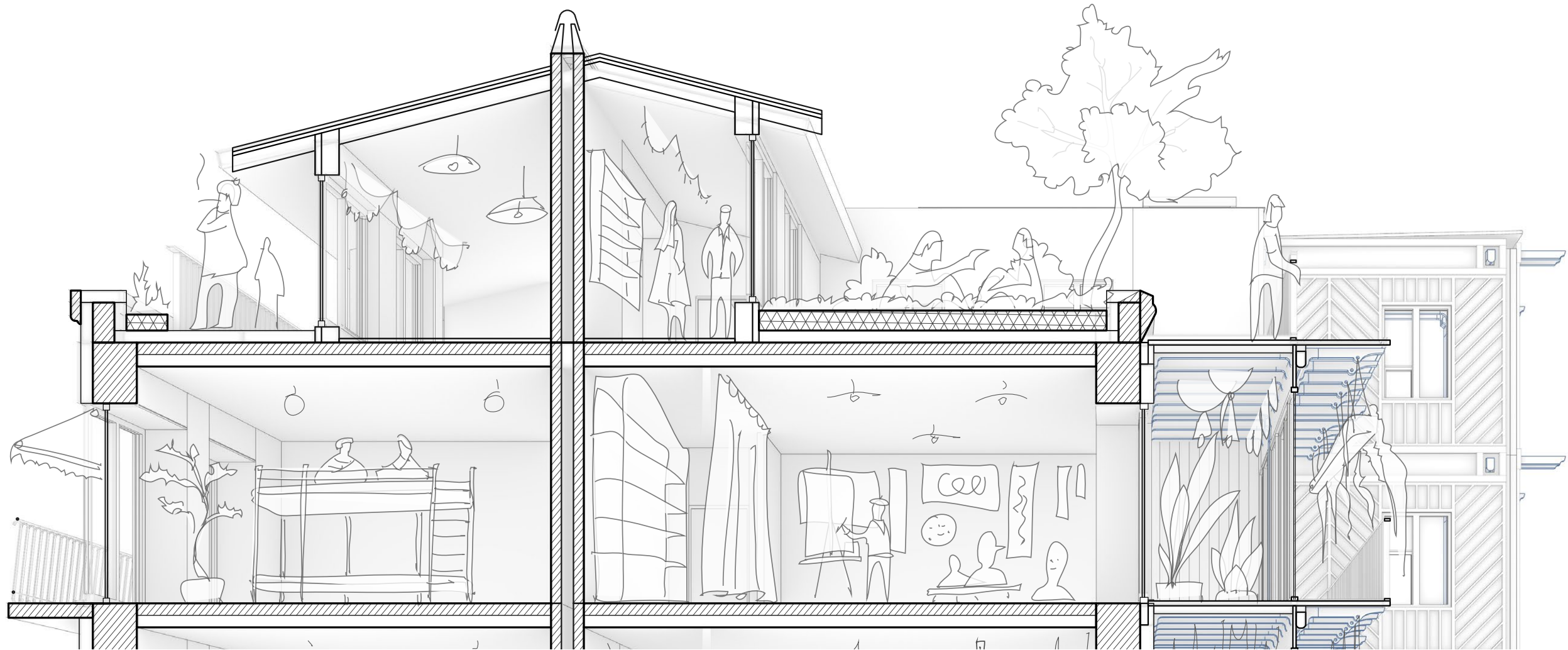


Grochowska Street



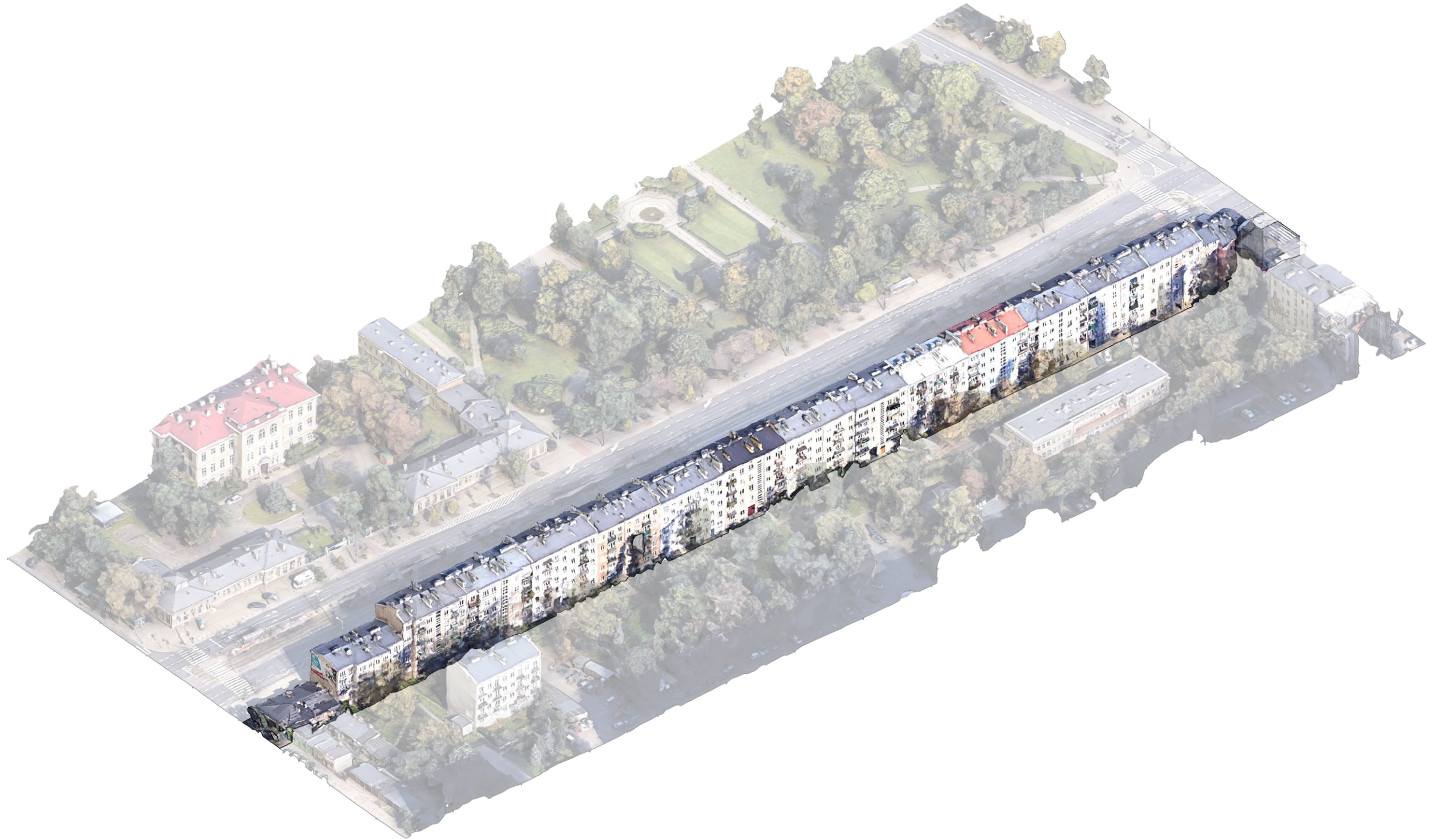
Courtyard

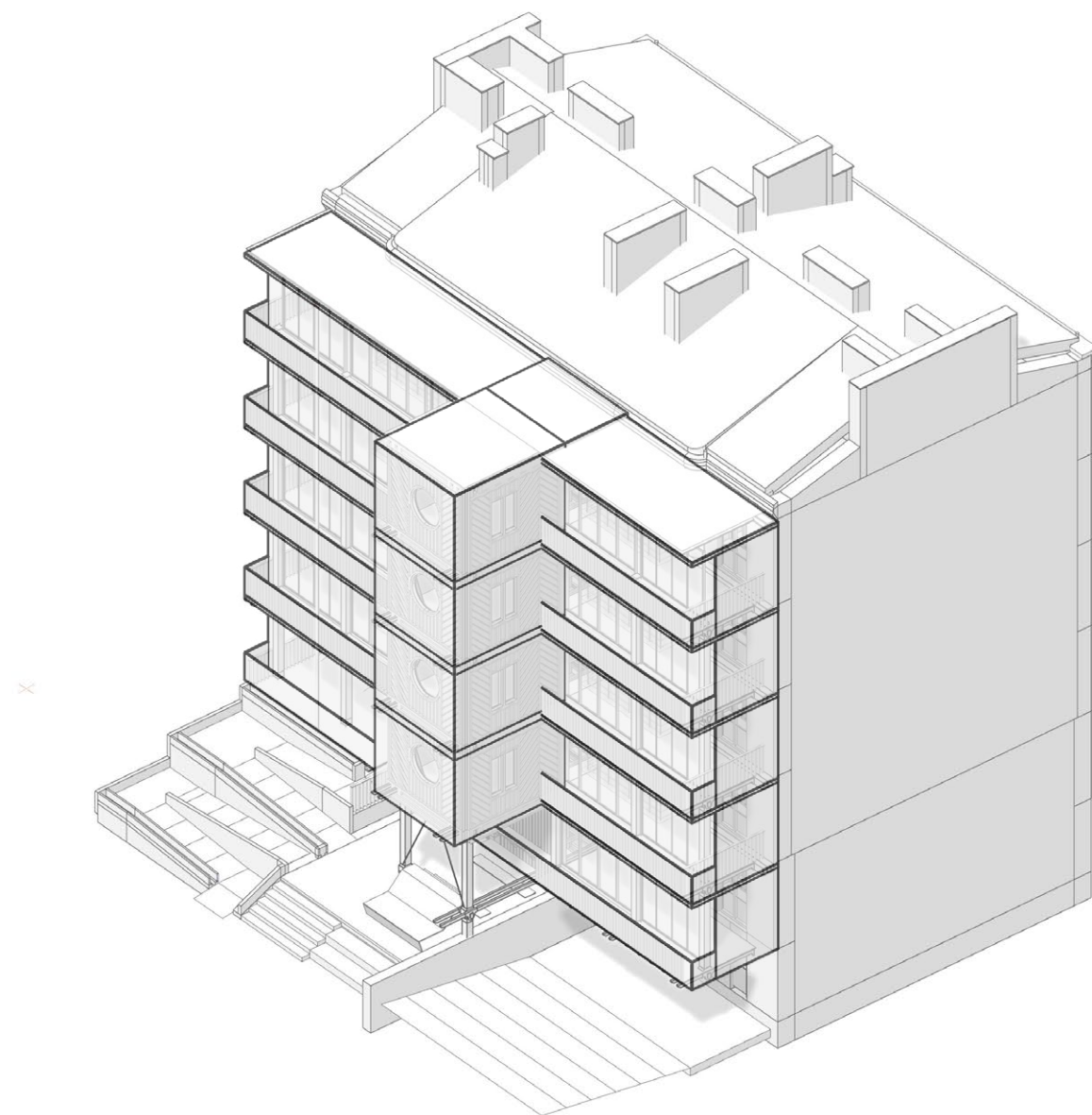


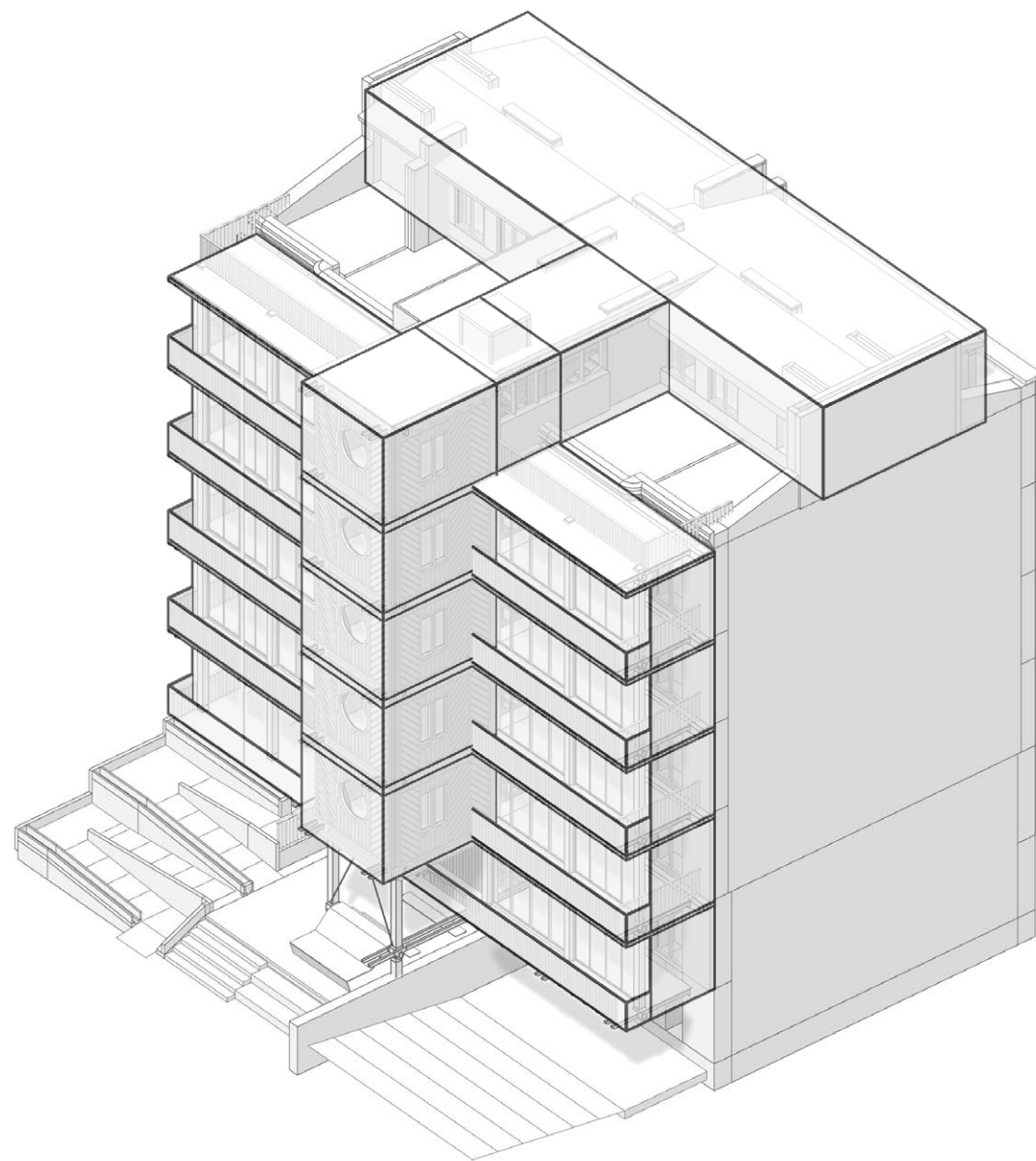


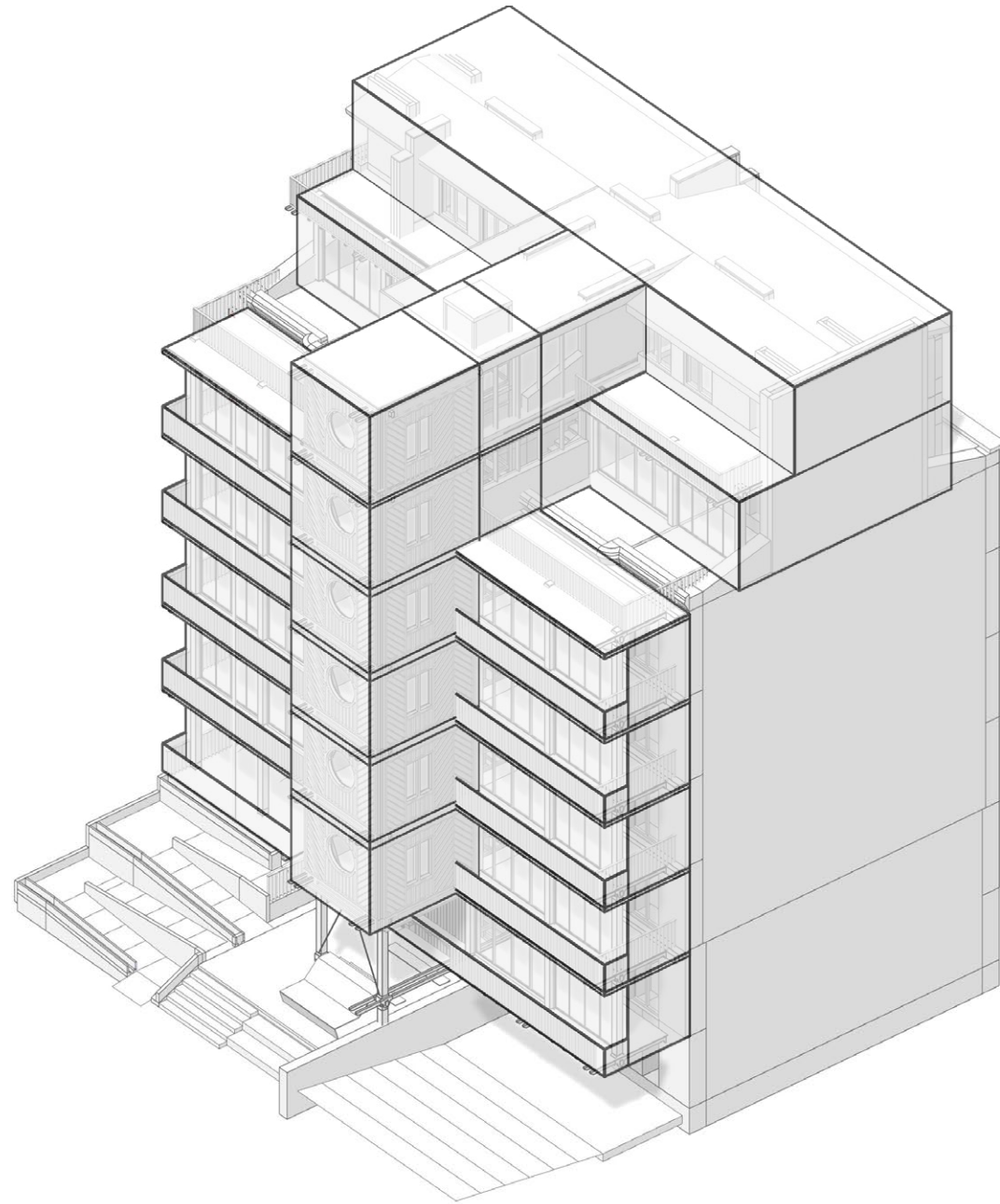
Roof-Top Hang-Outs

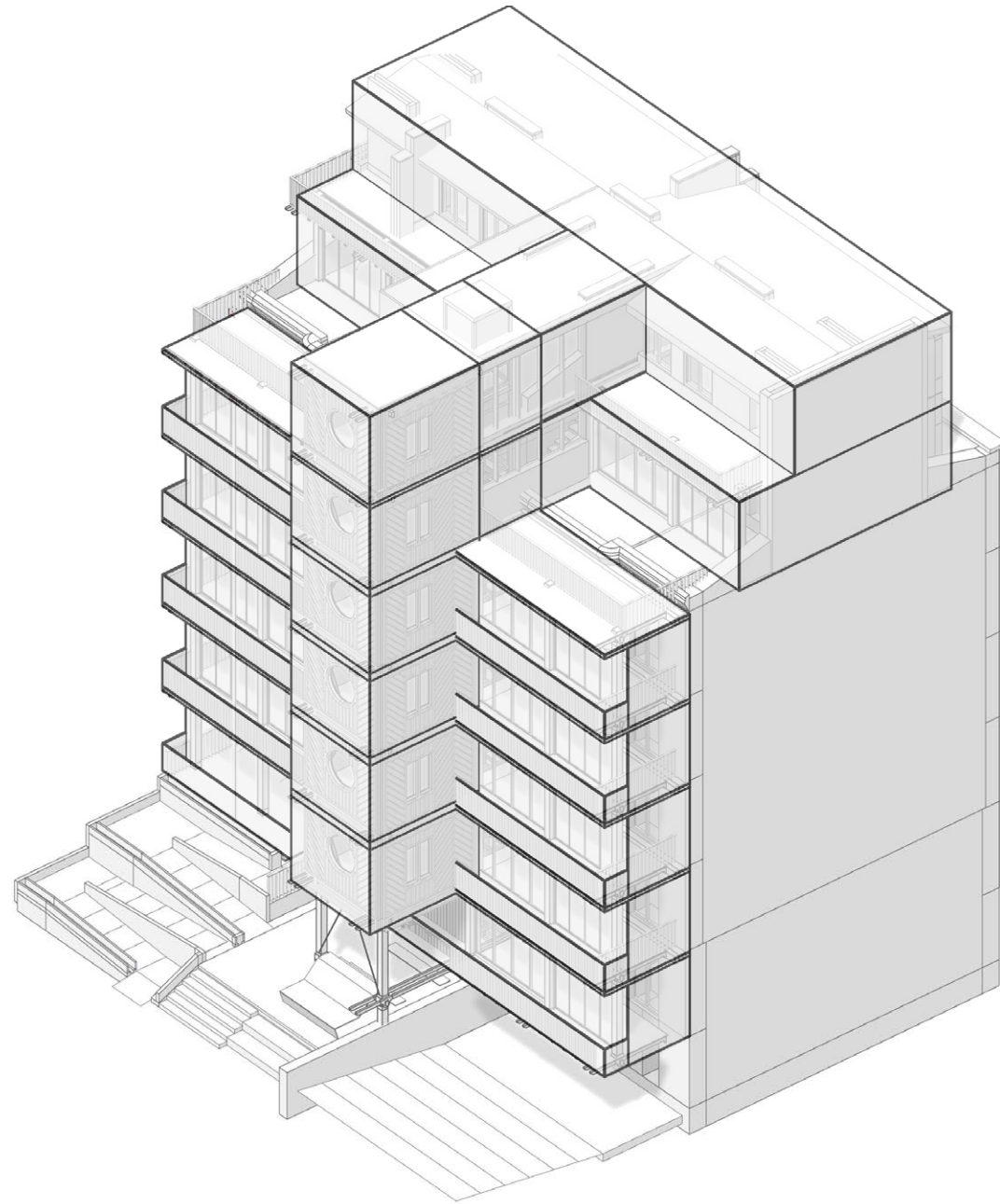


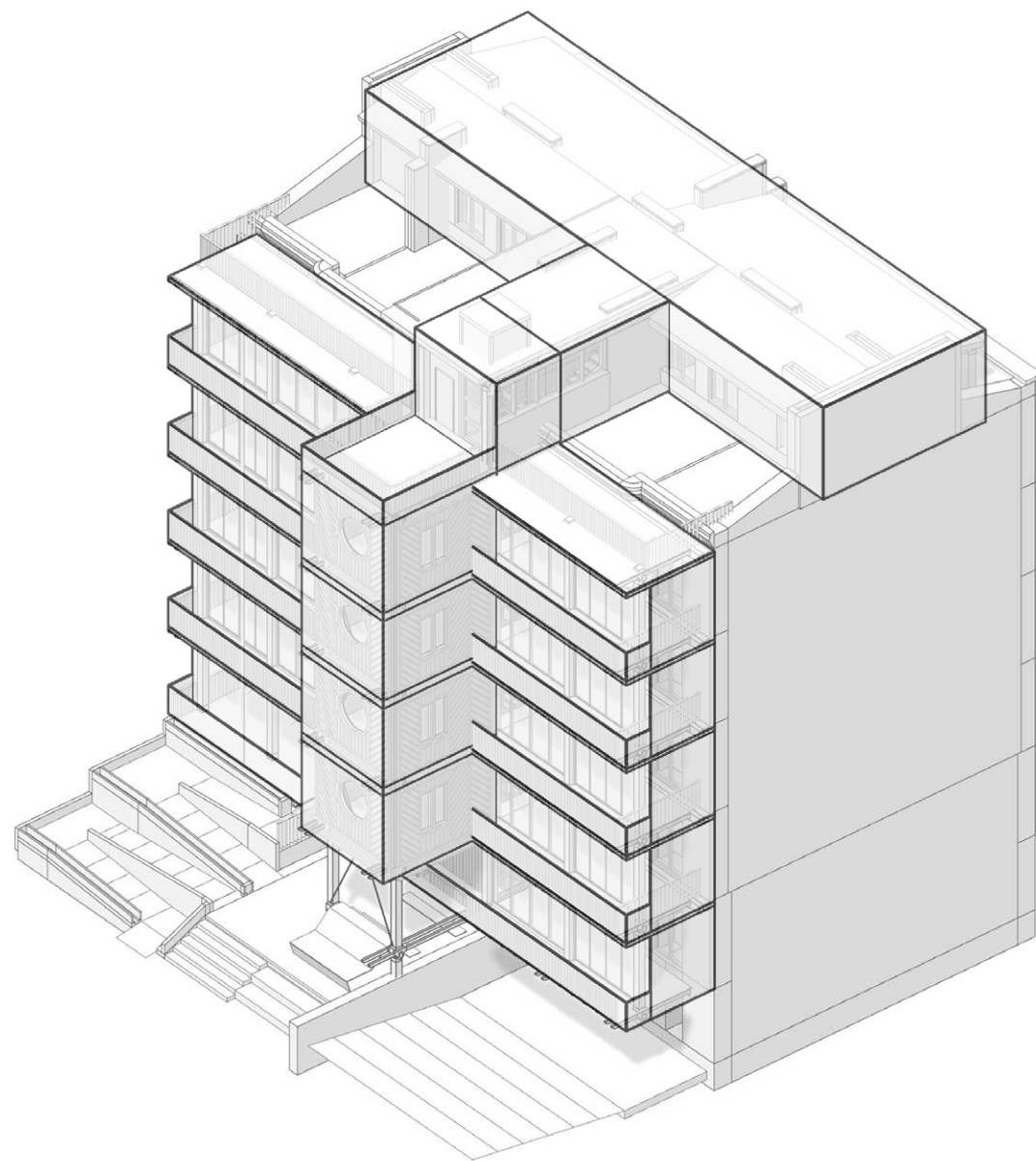


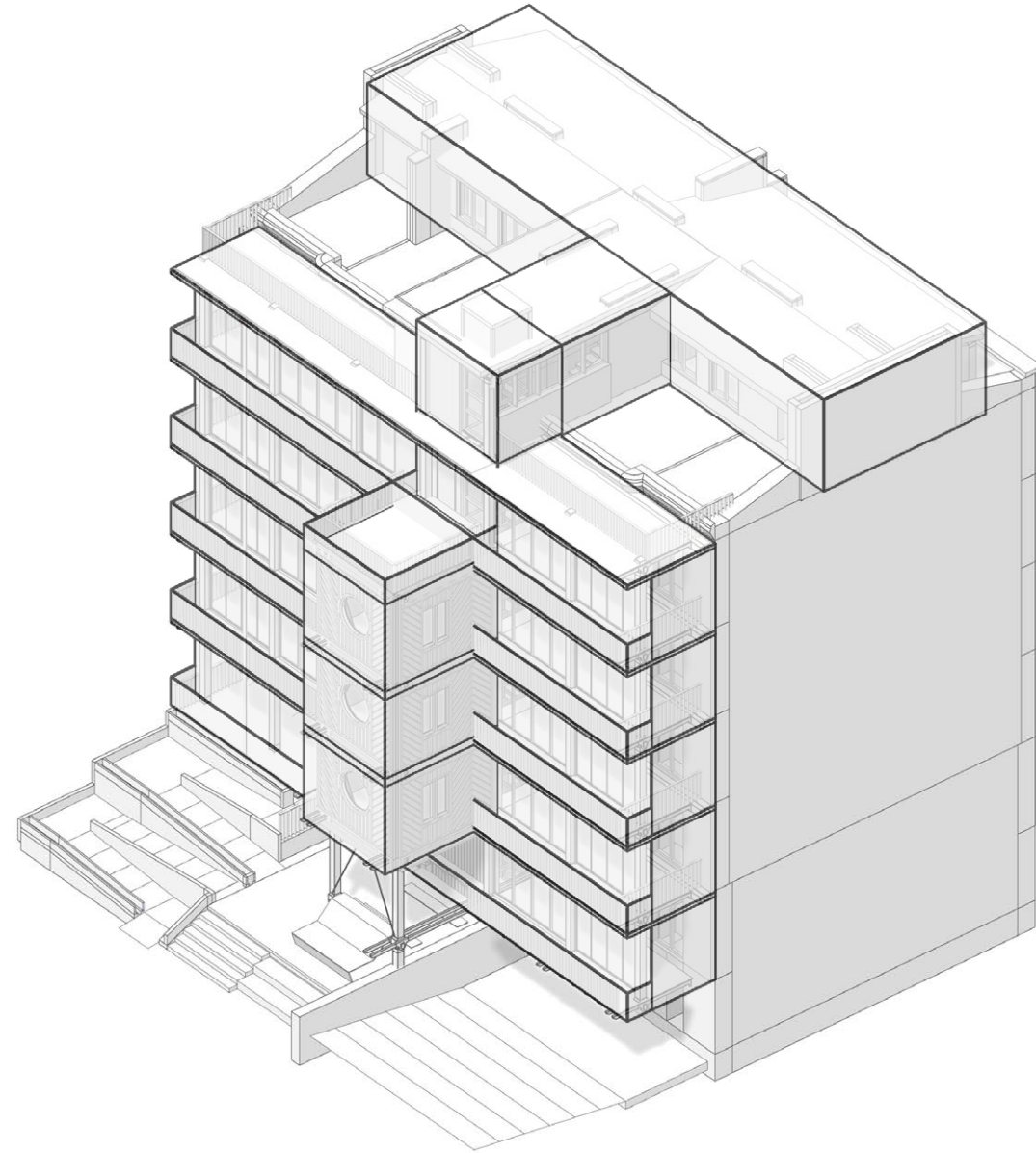


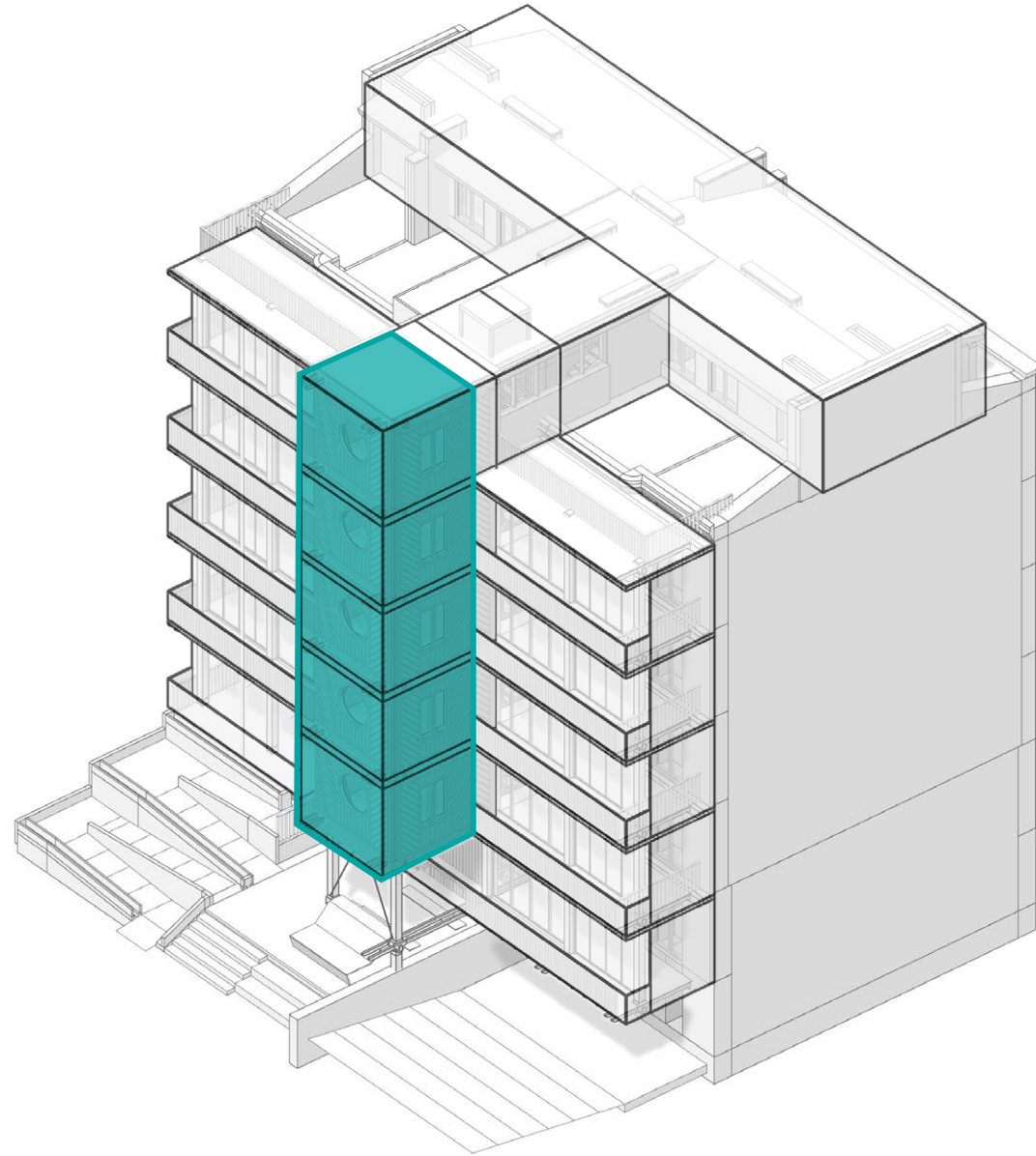


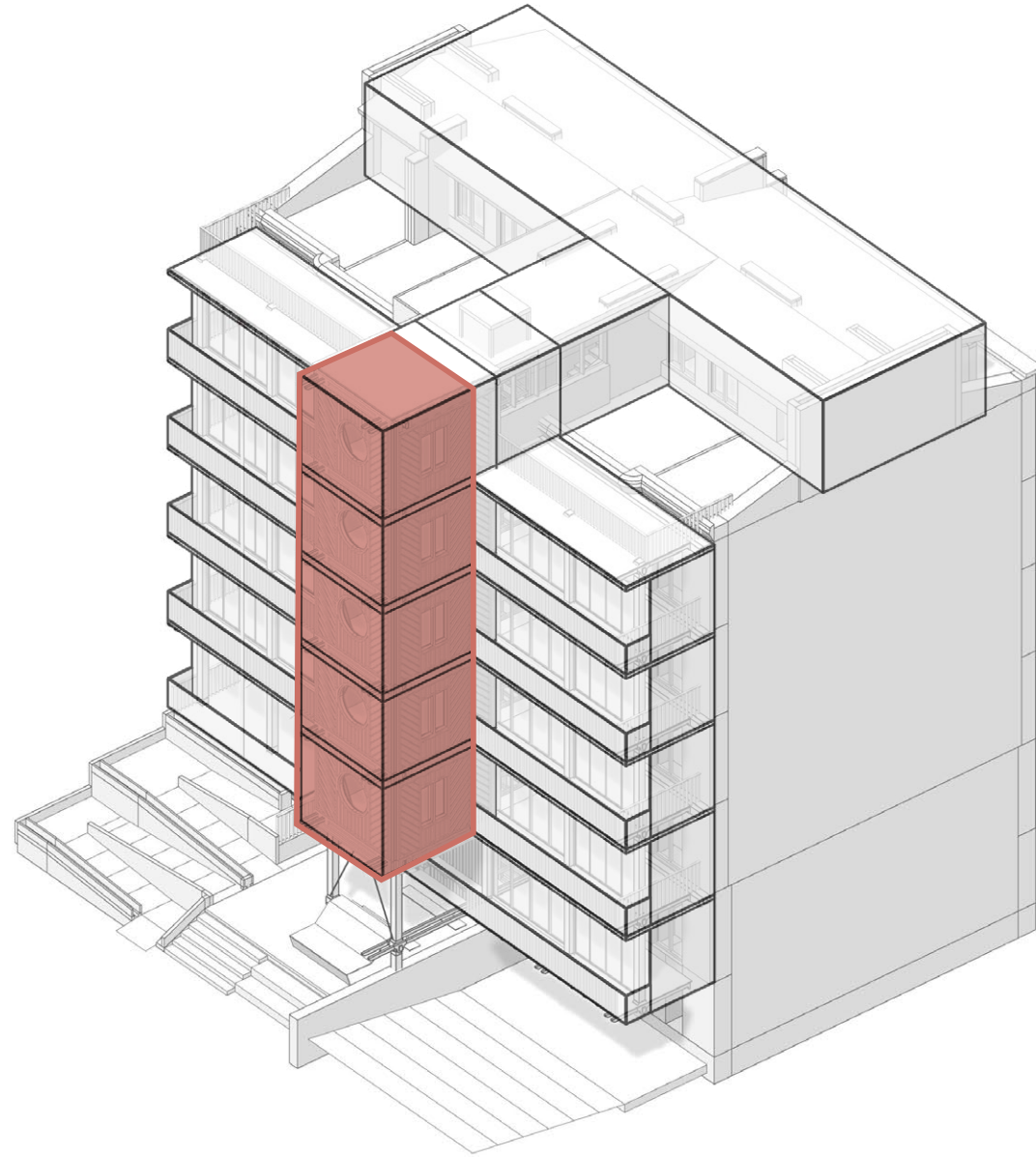


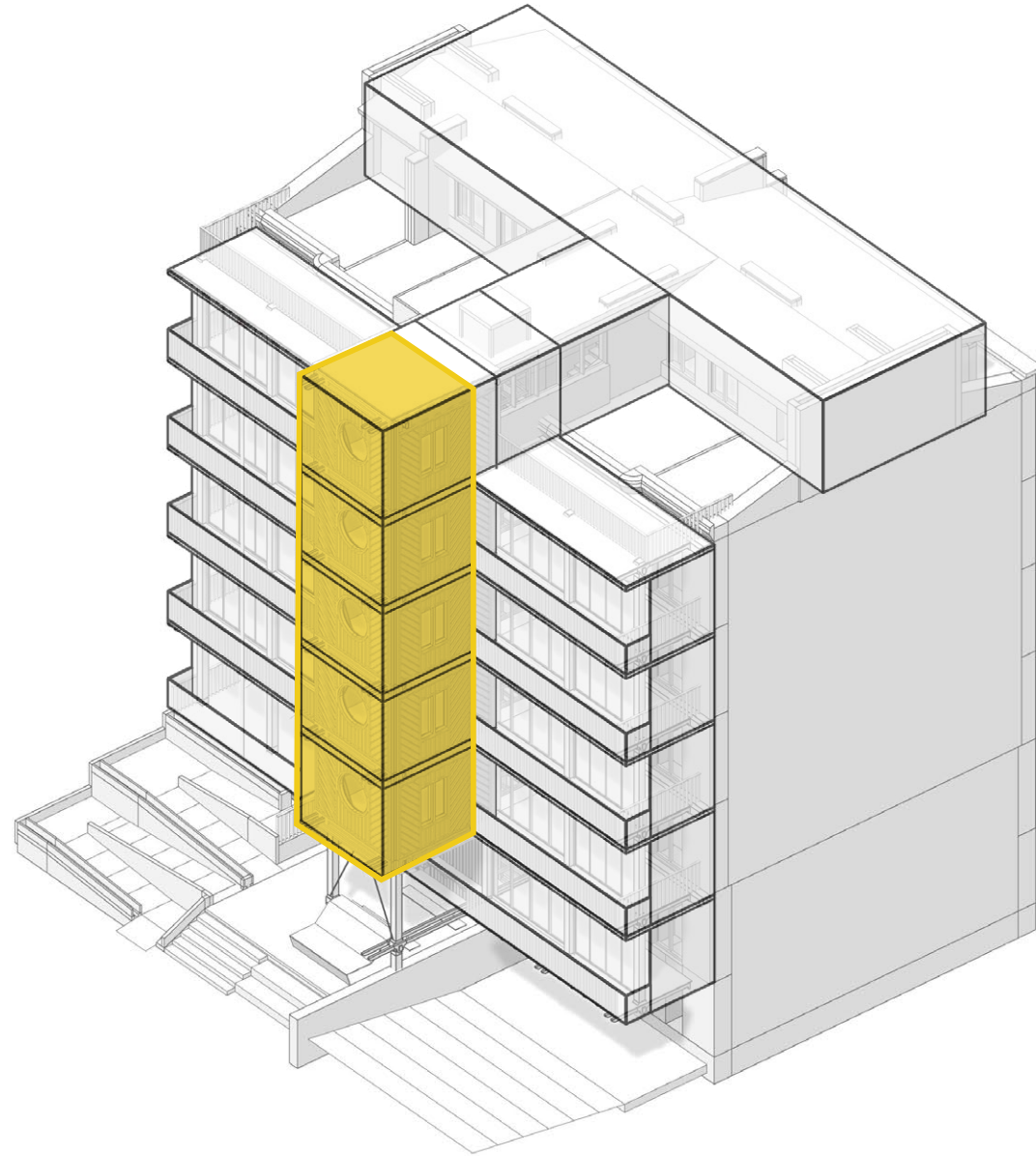


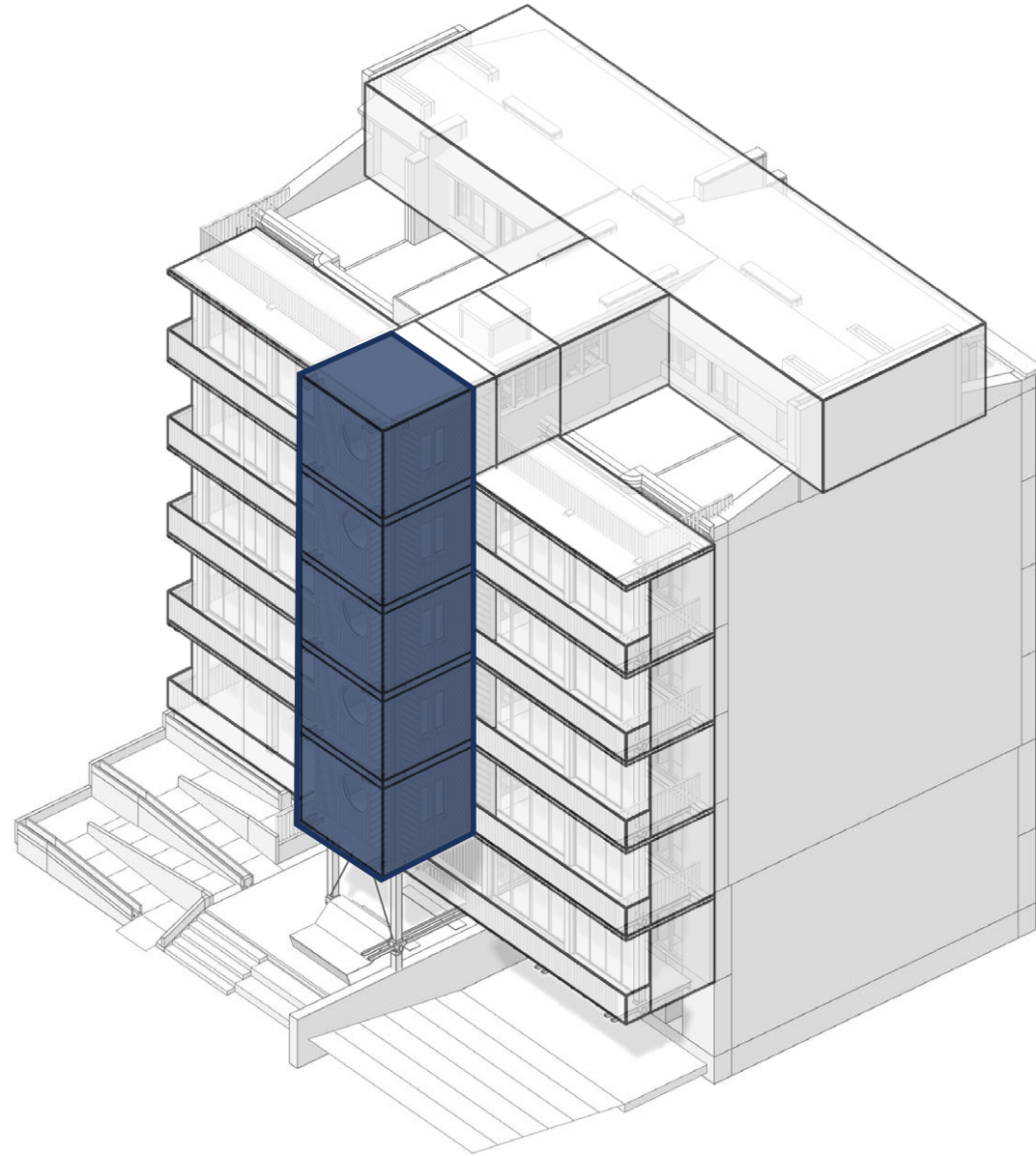
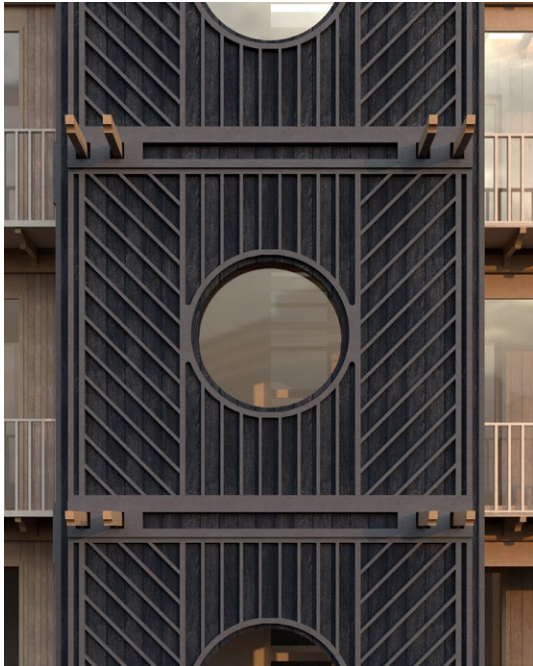




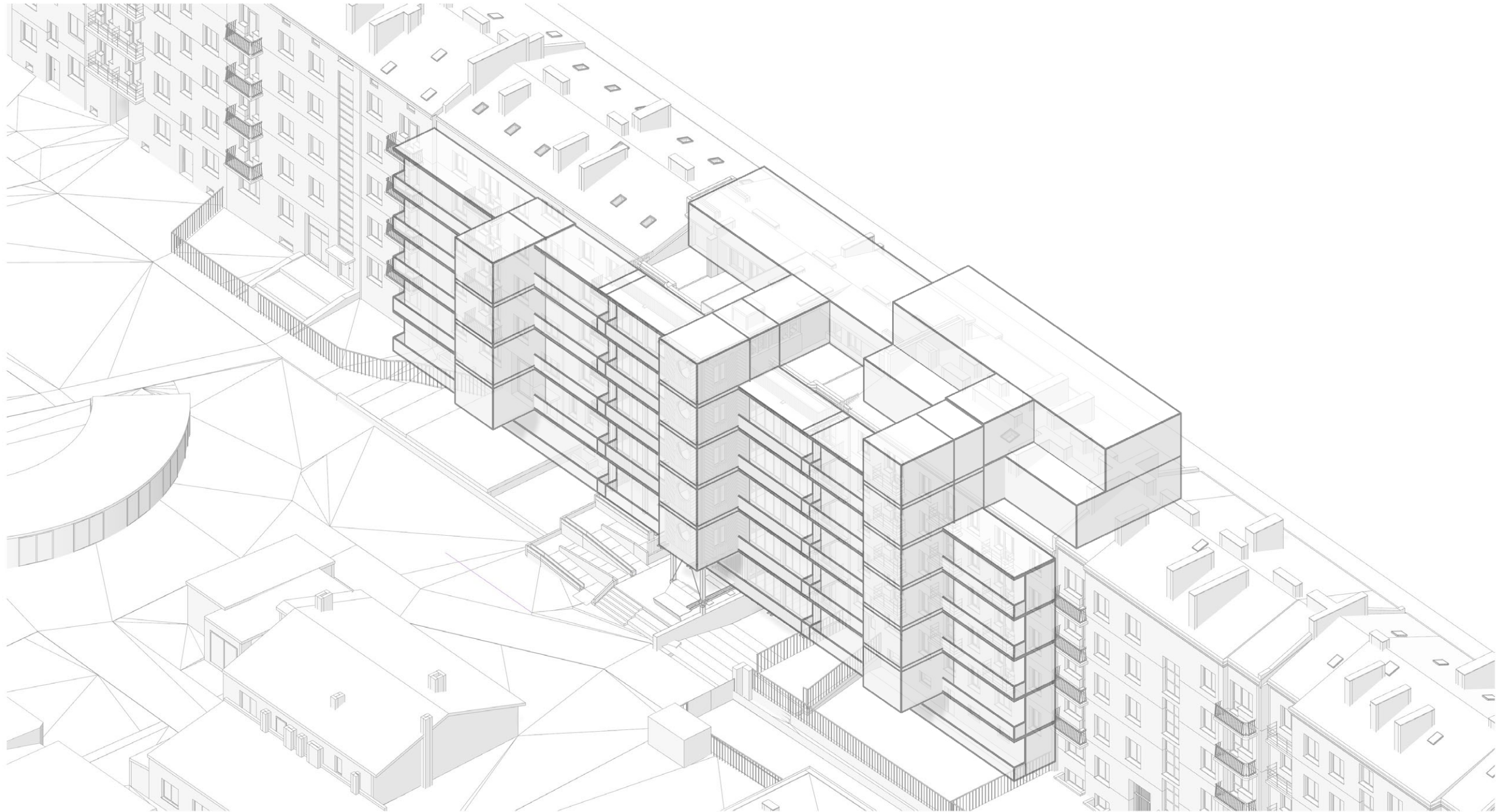


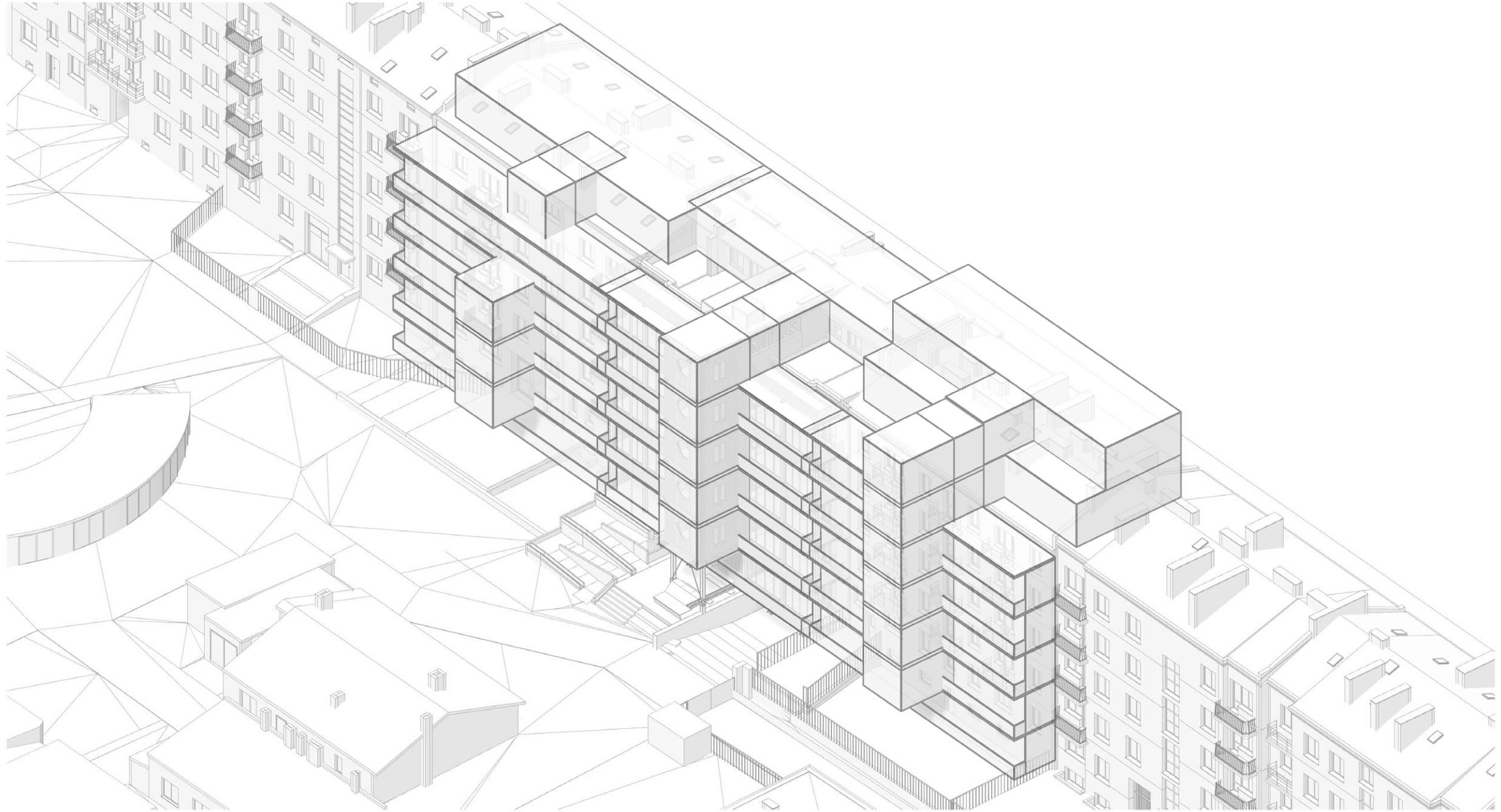


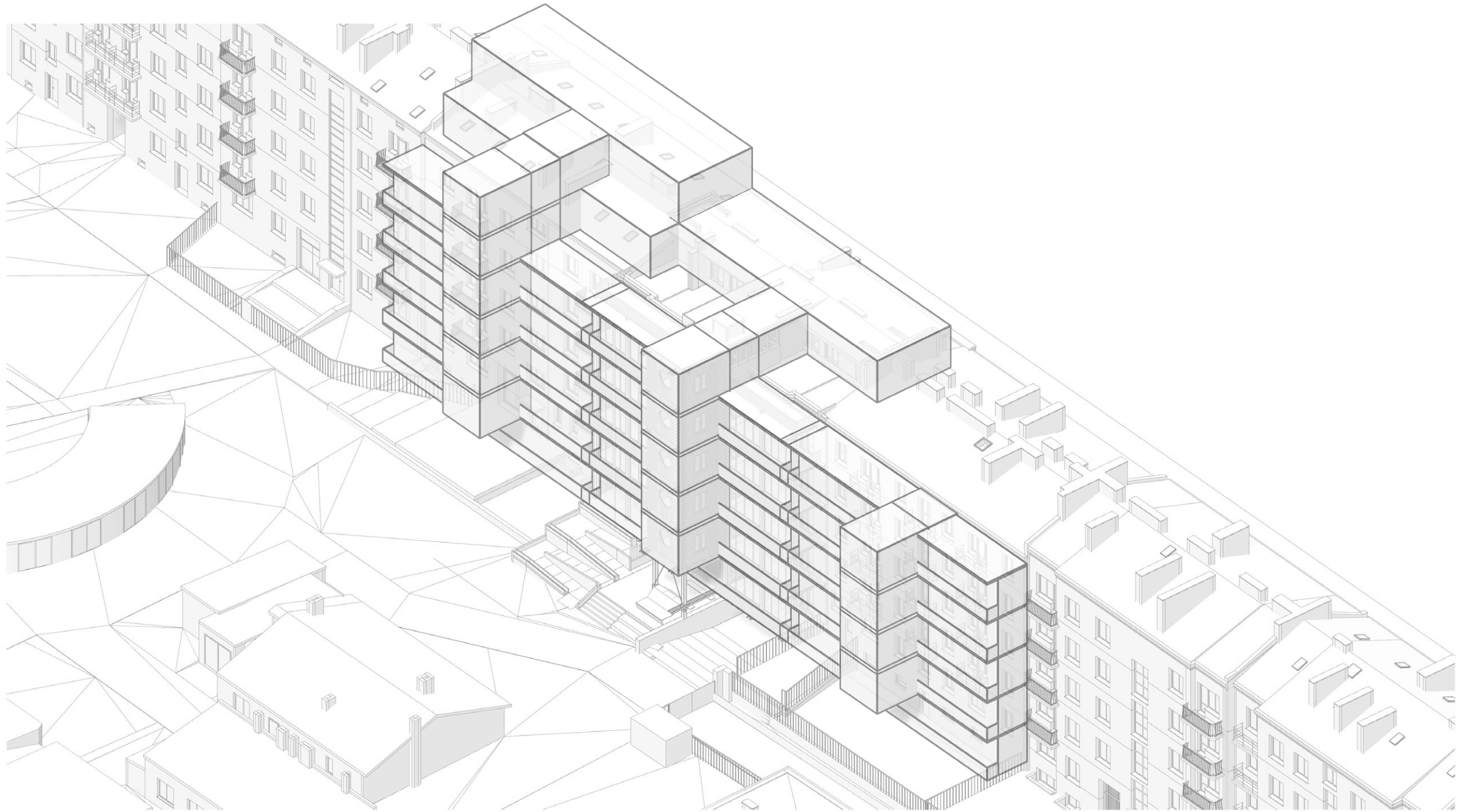


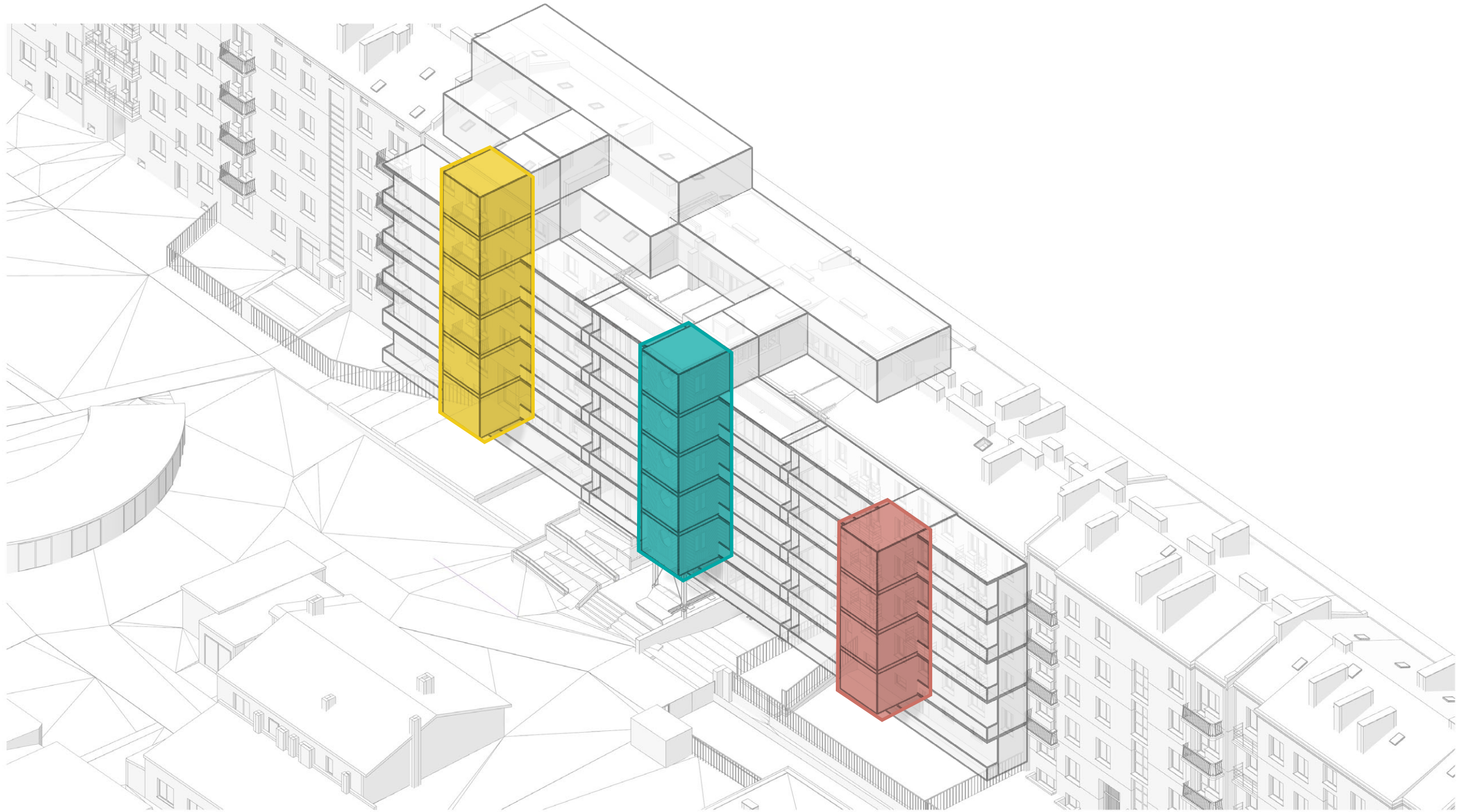


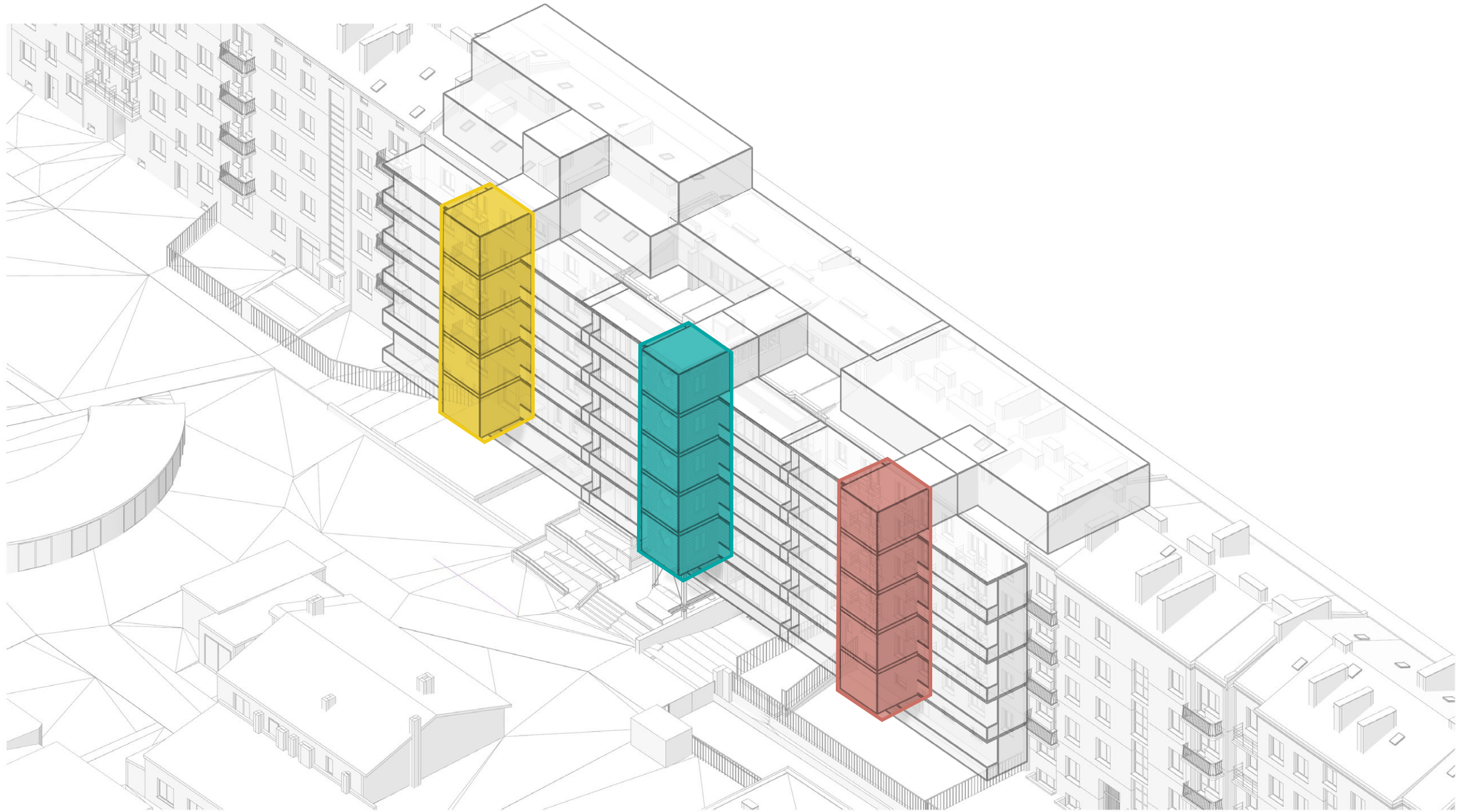


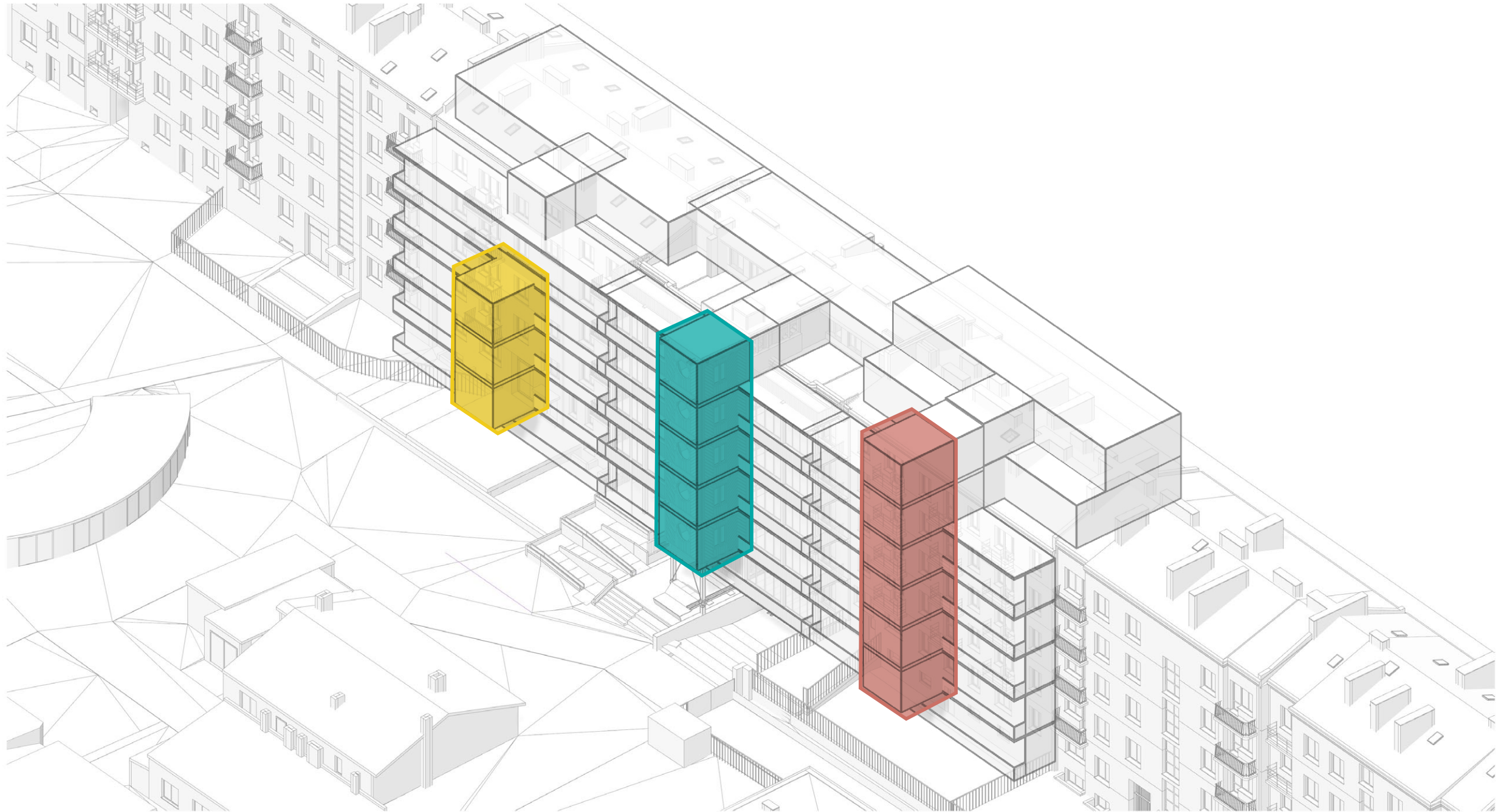


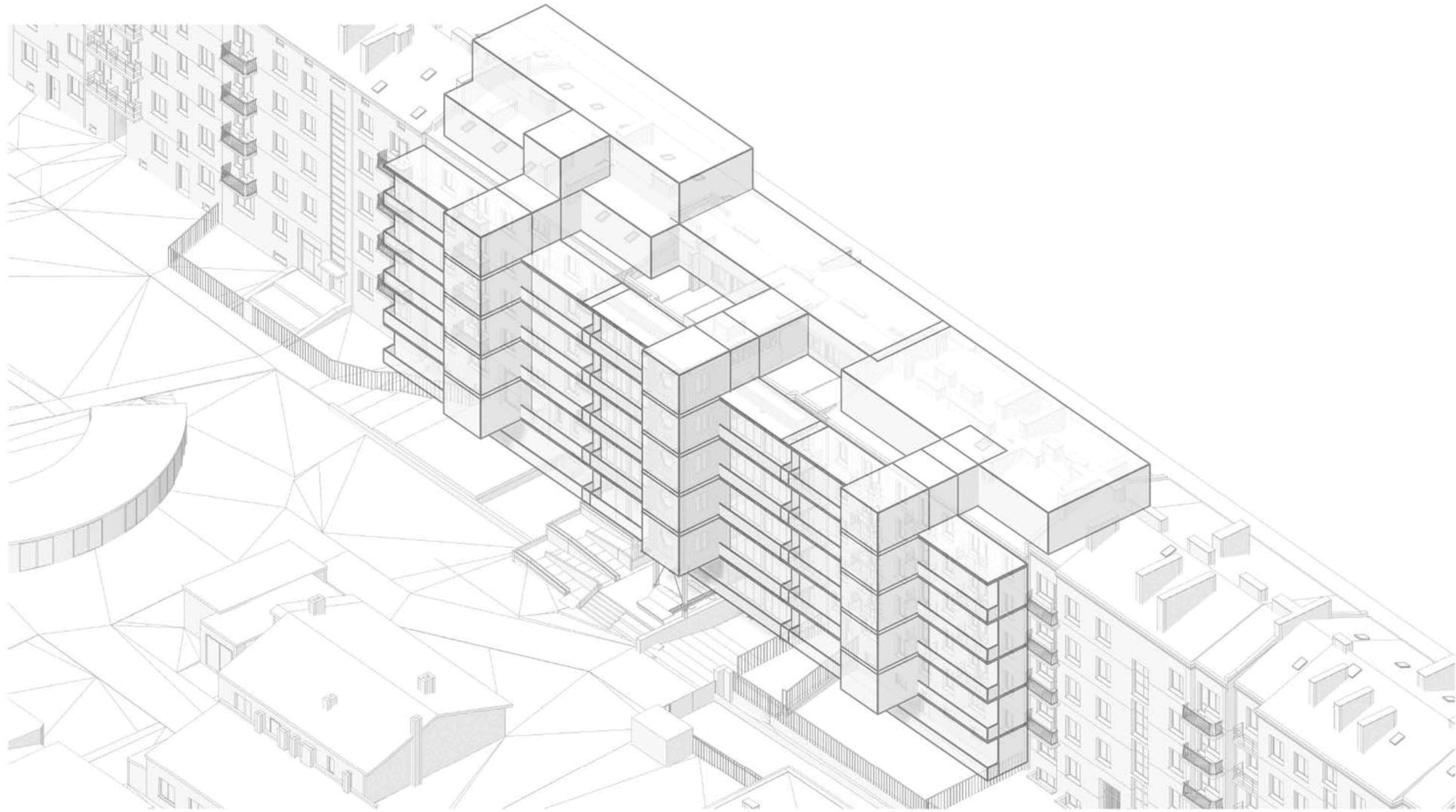


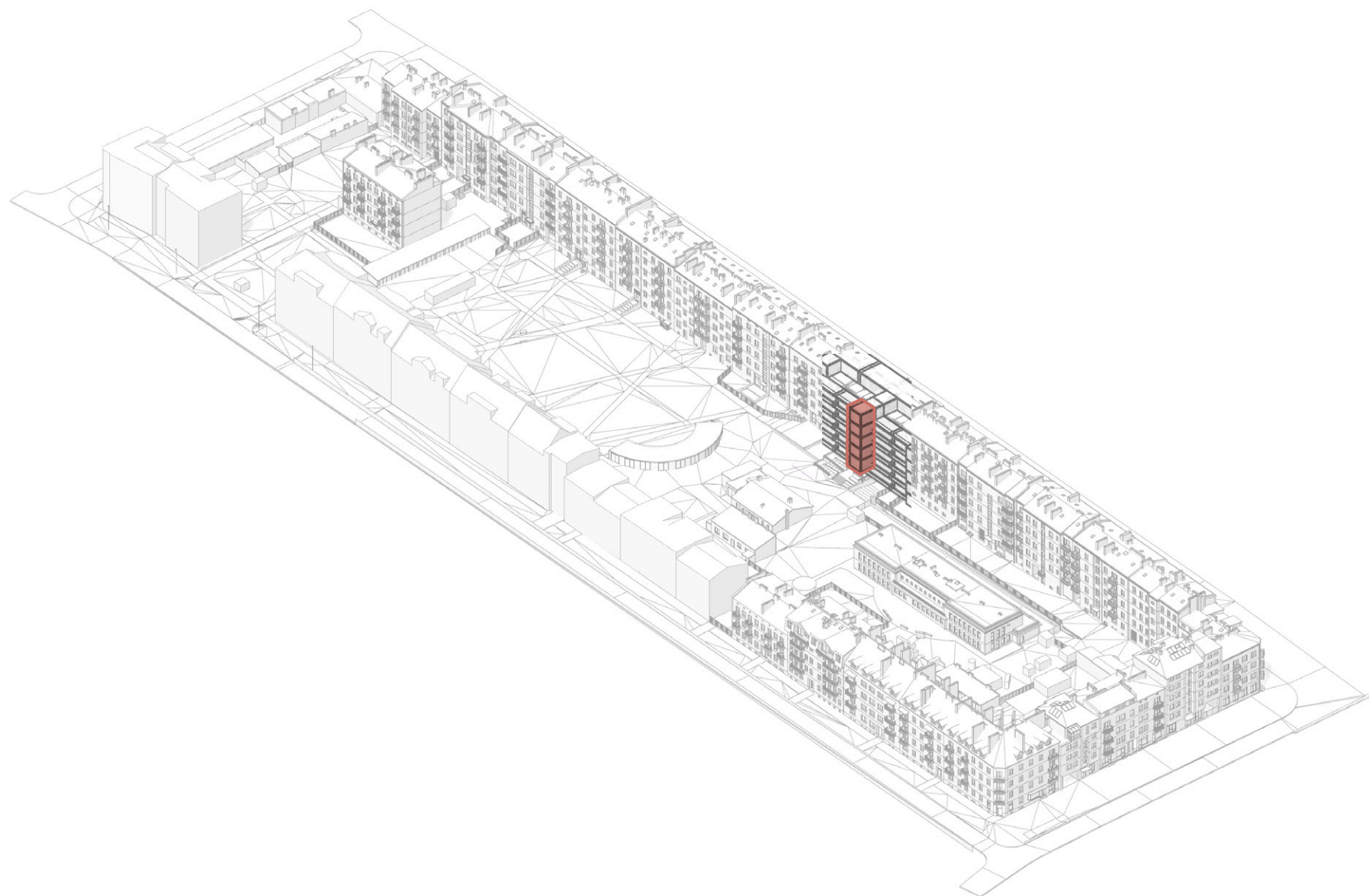


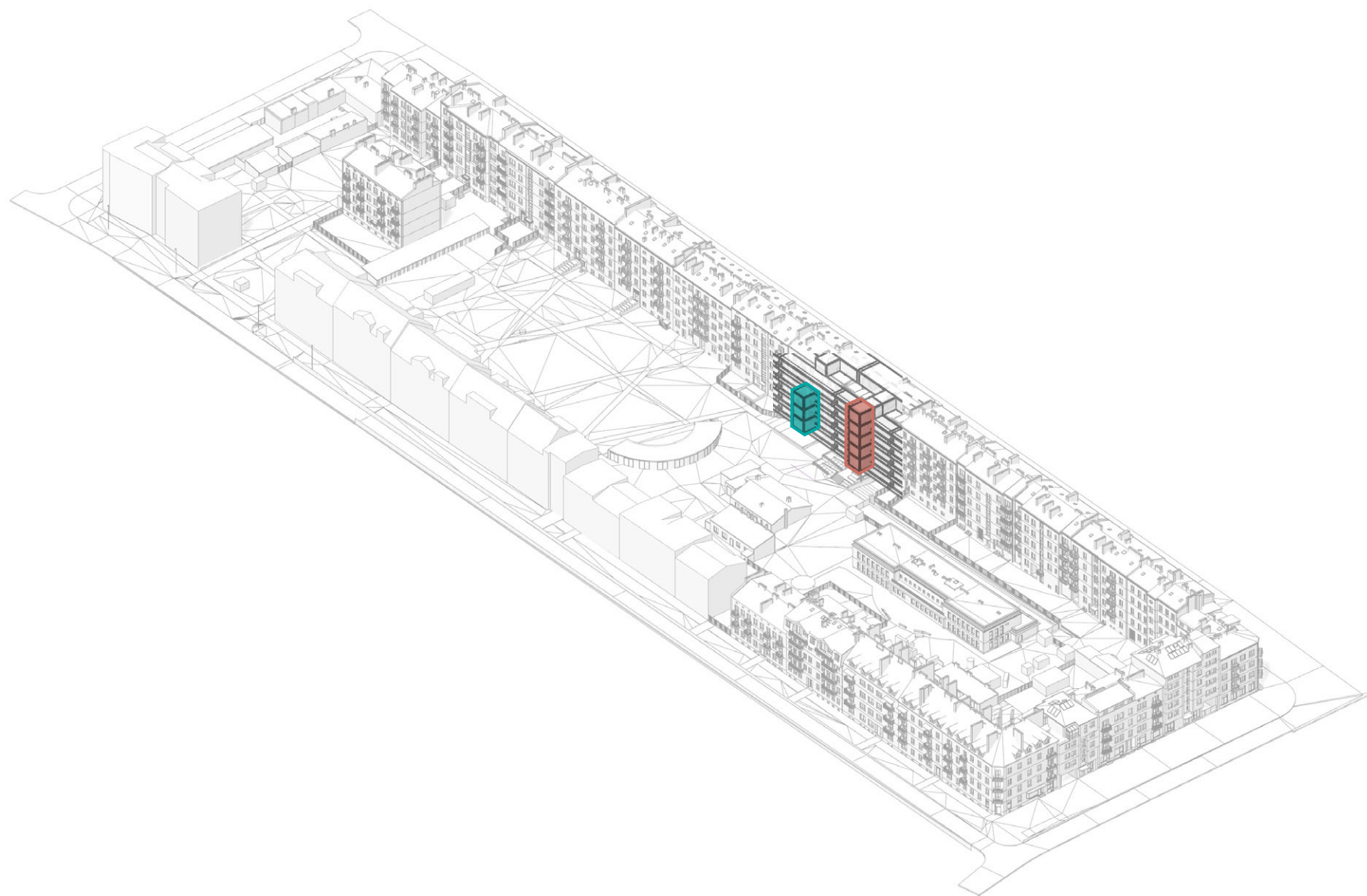


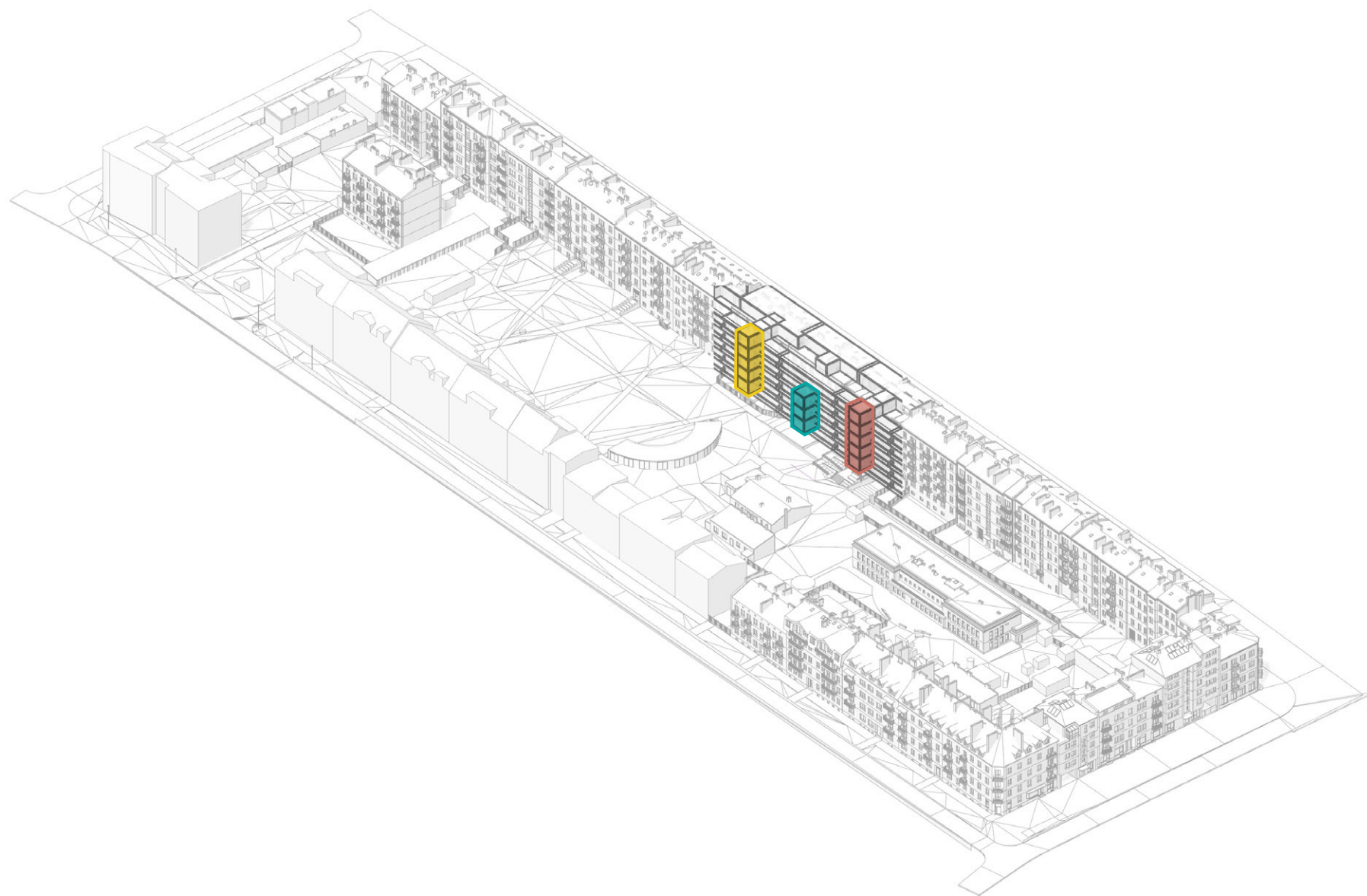


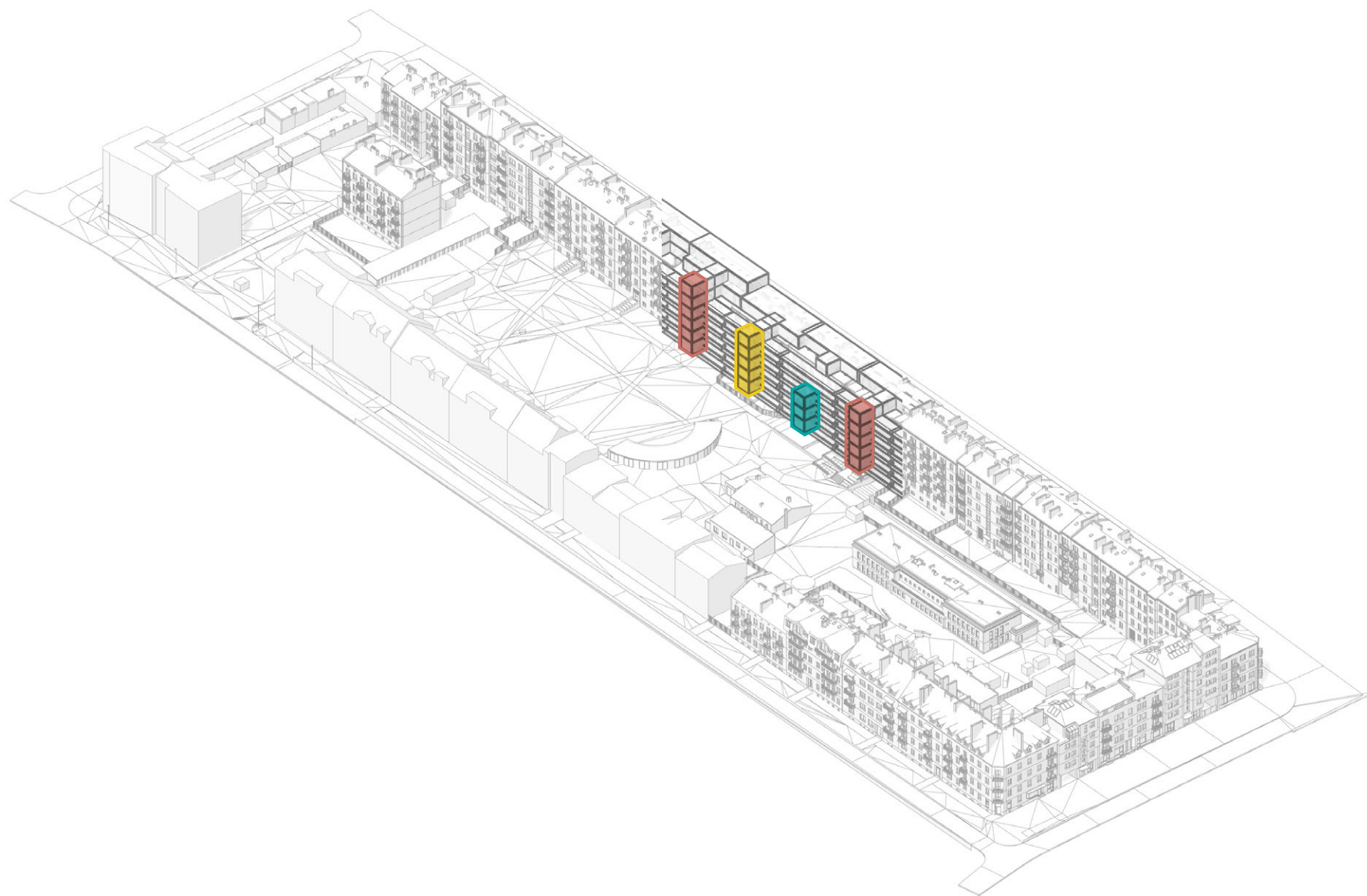


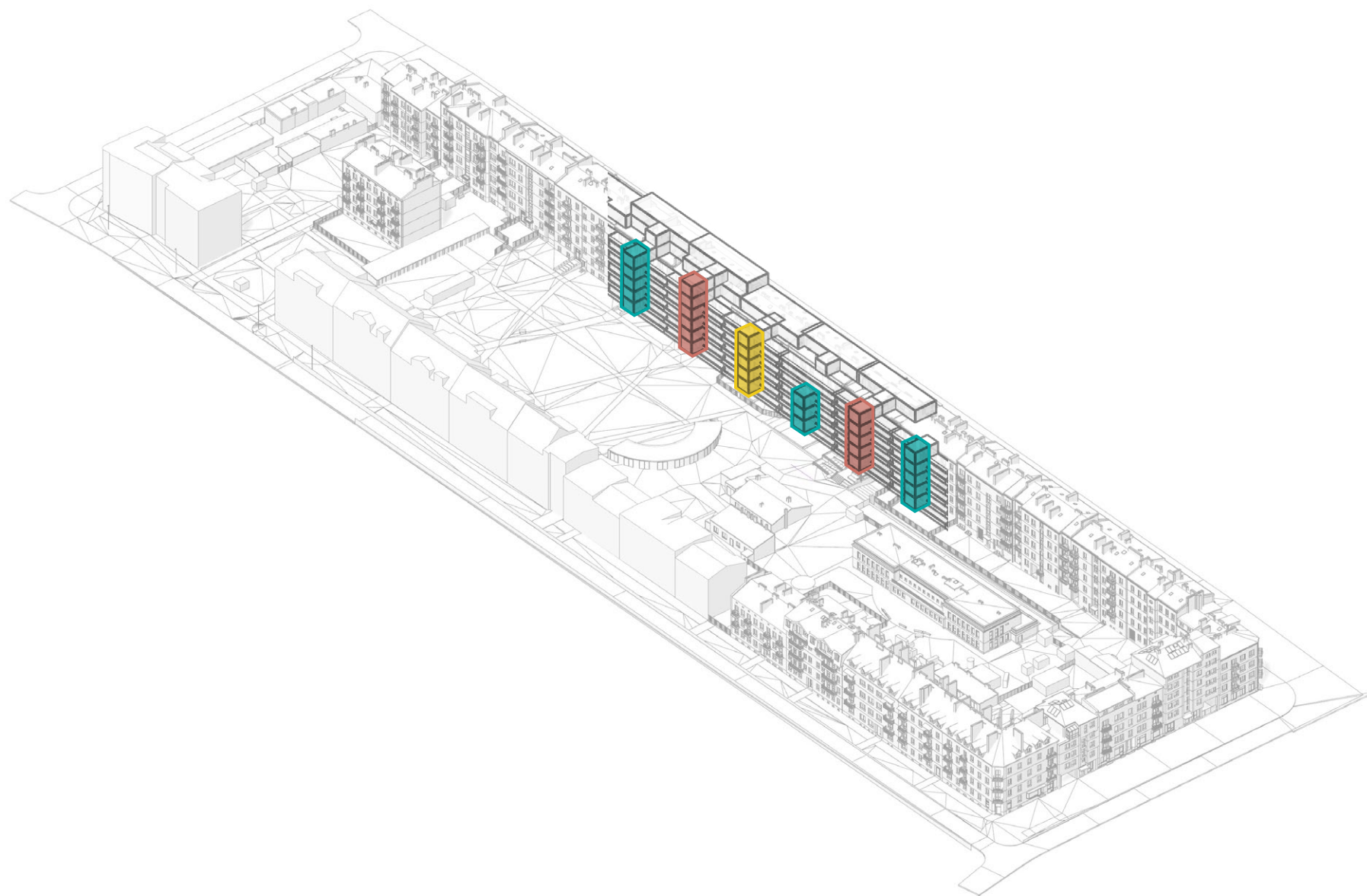


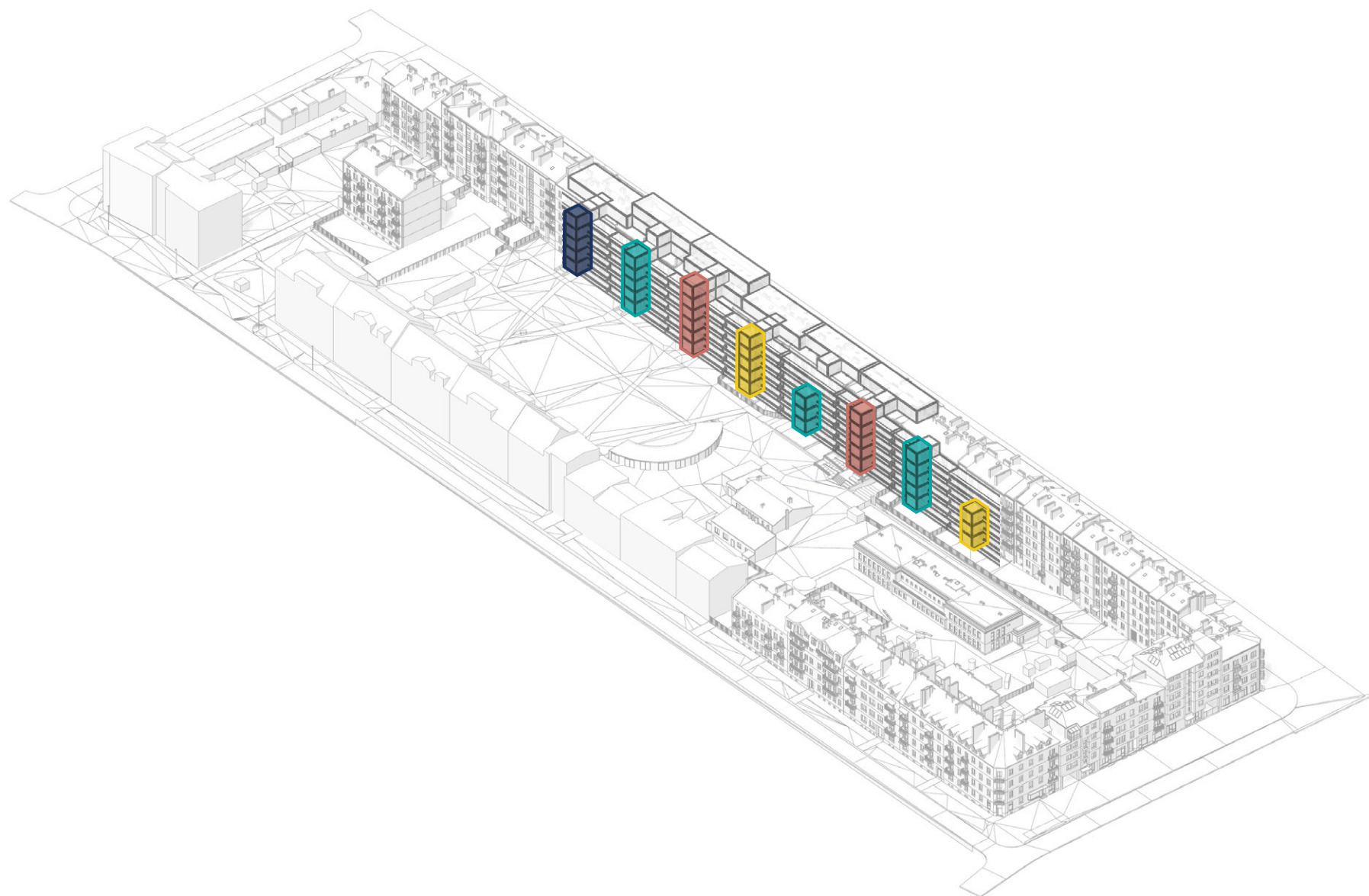


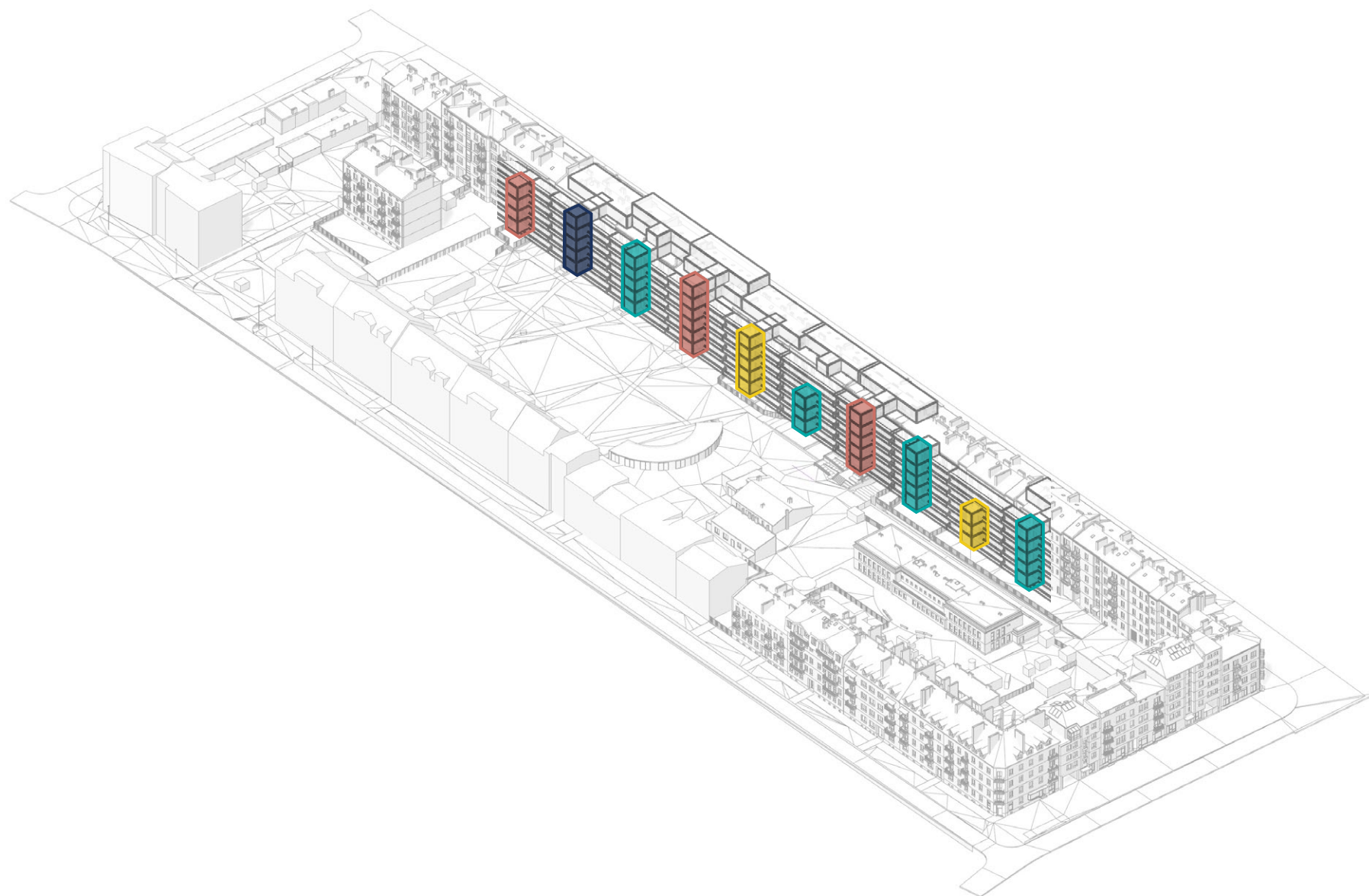


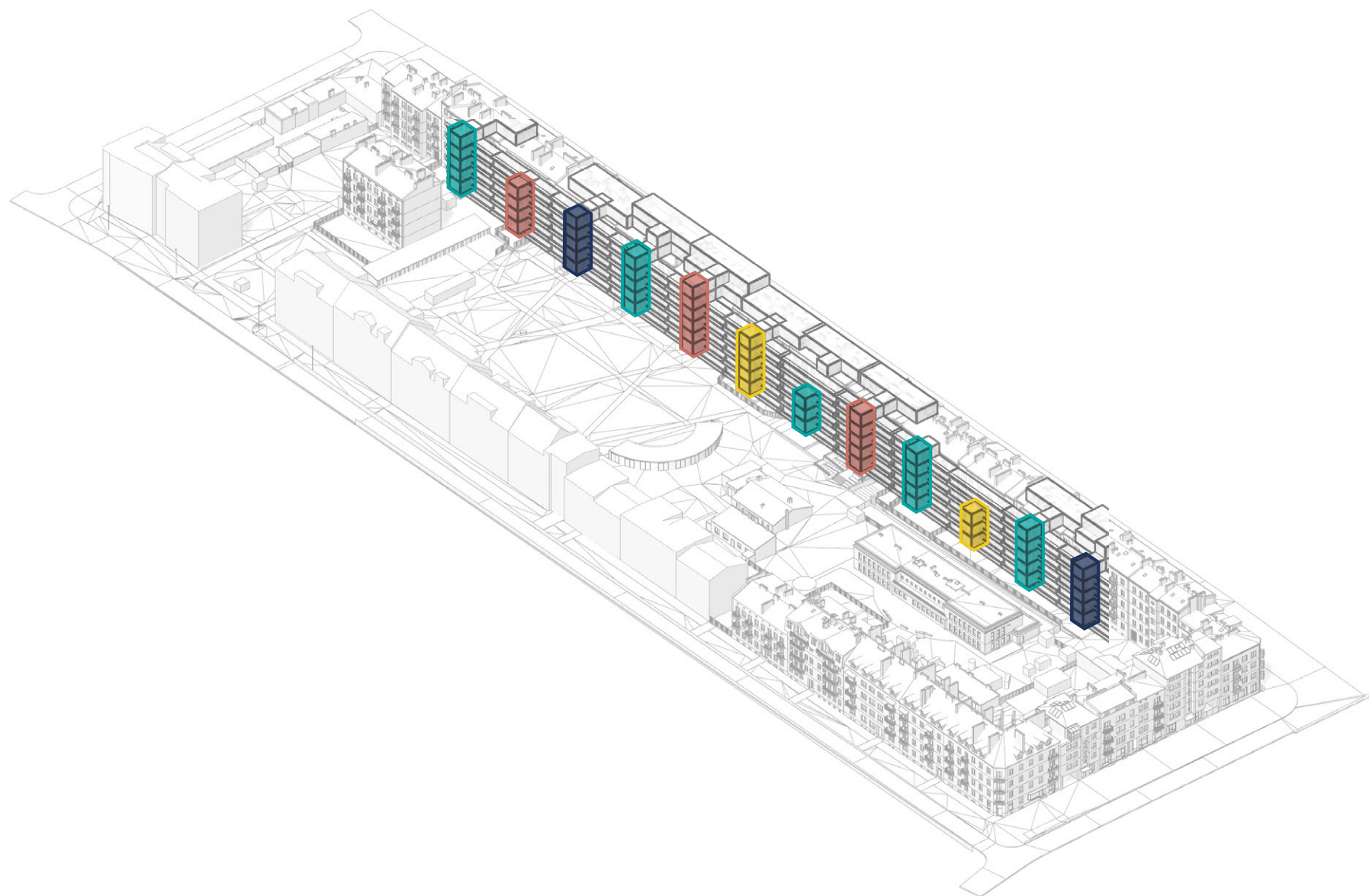


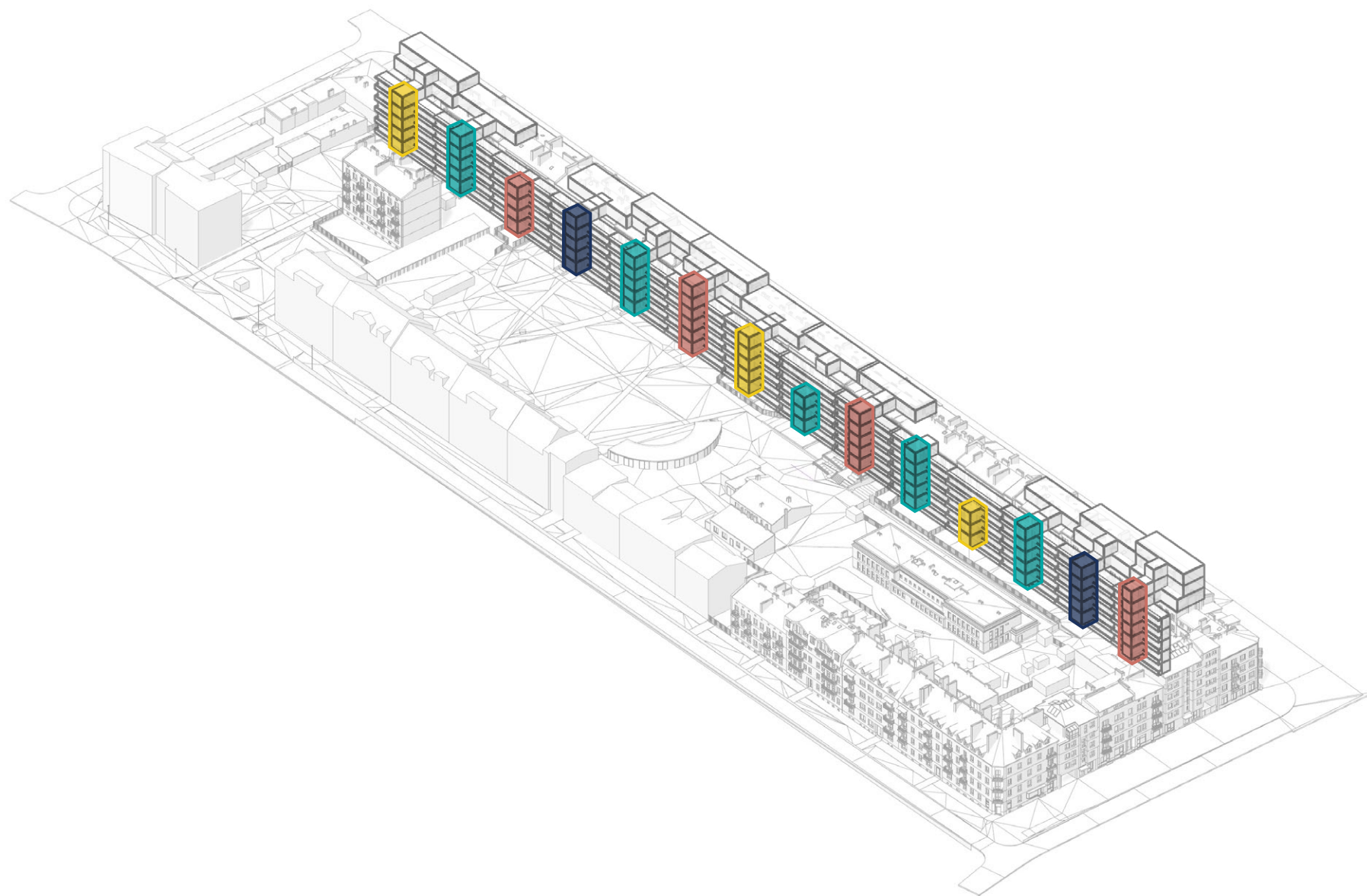


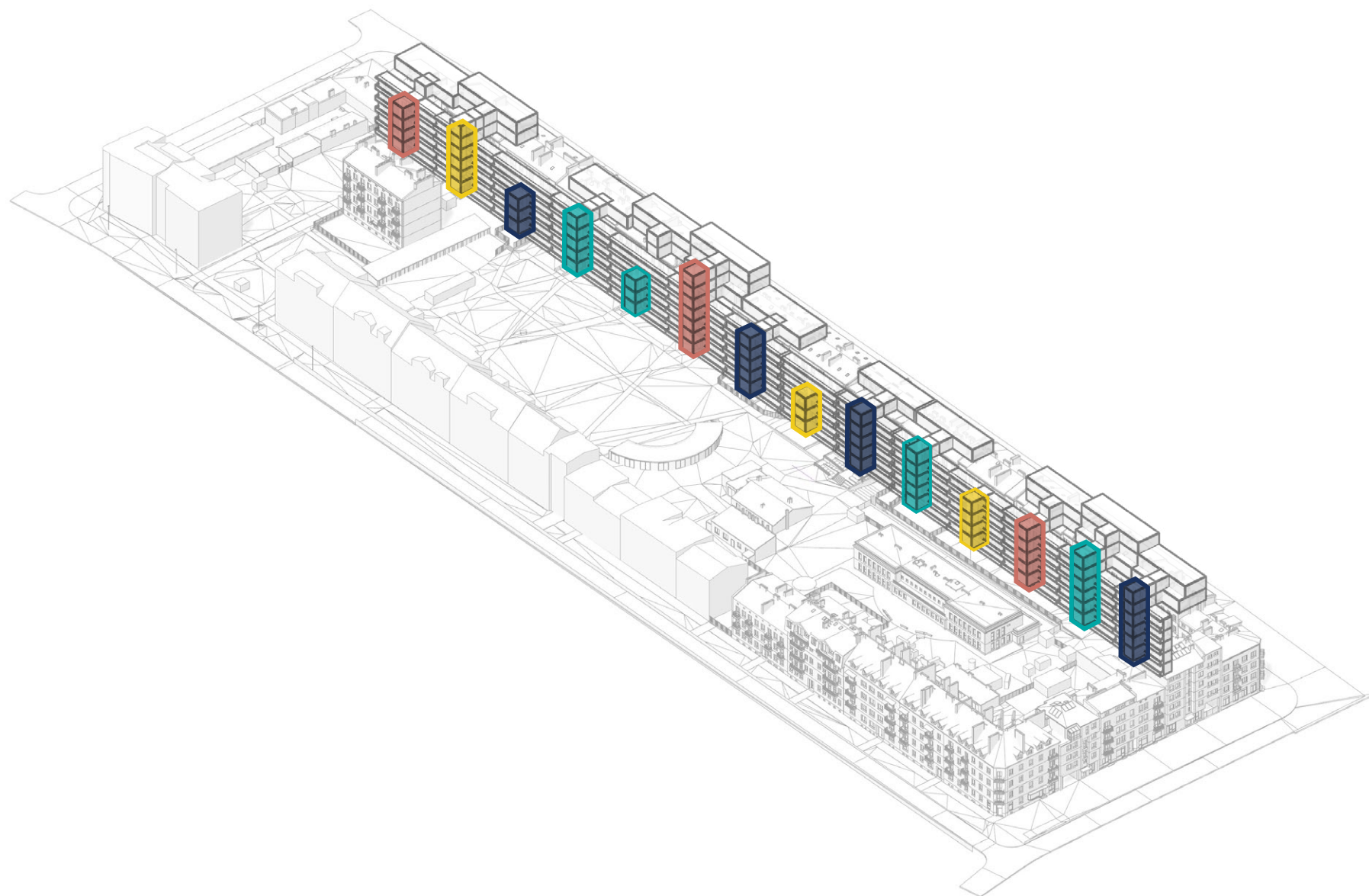


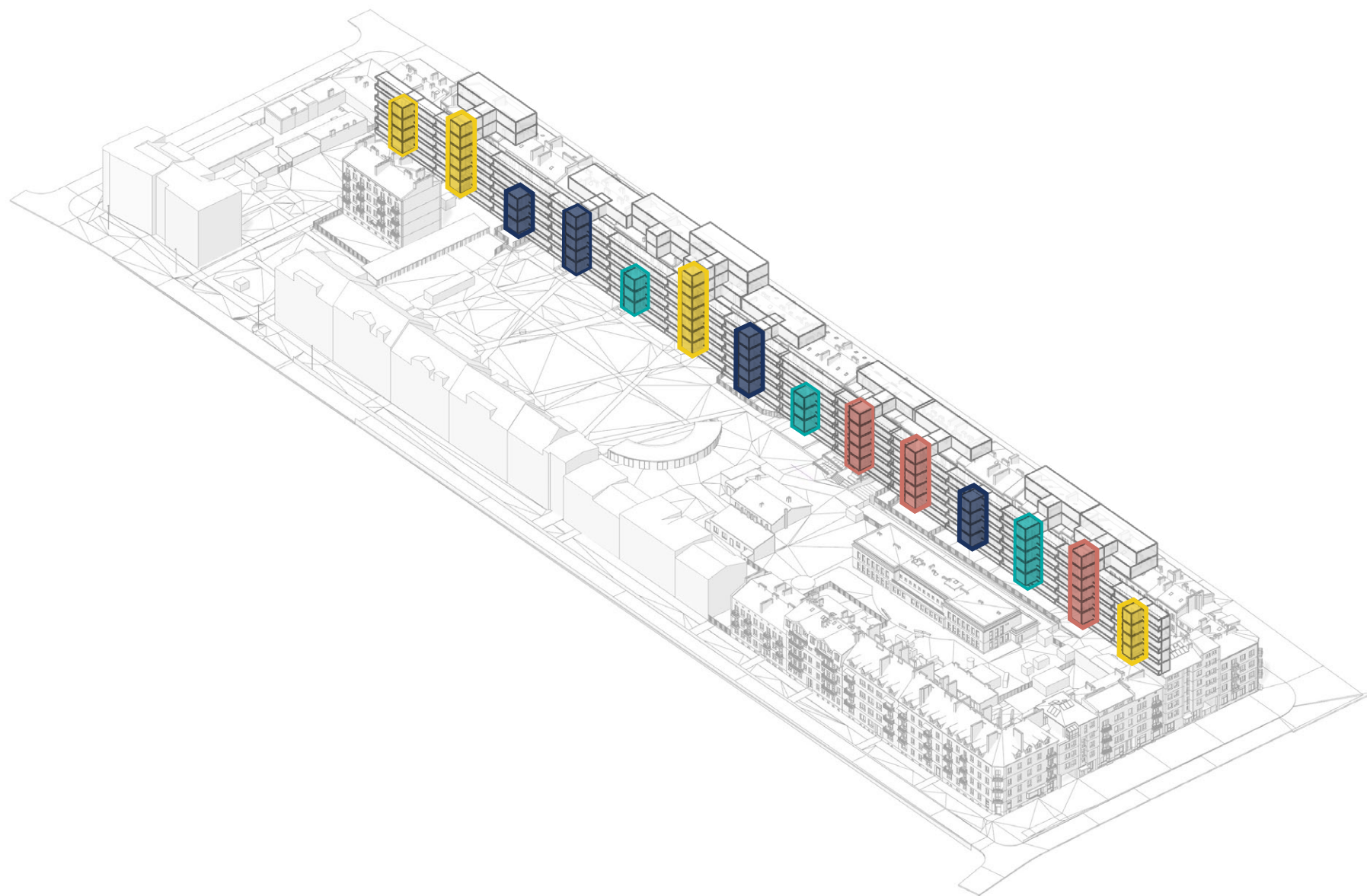


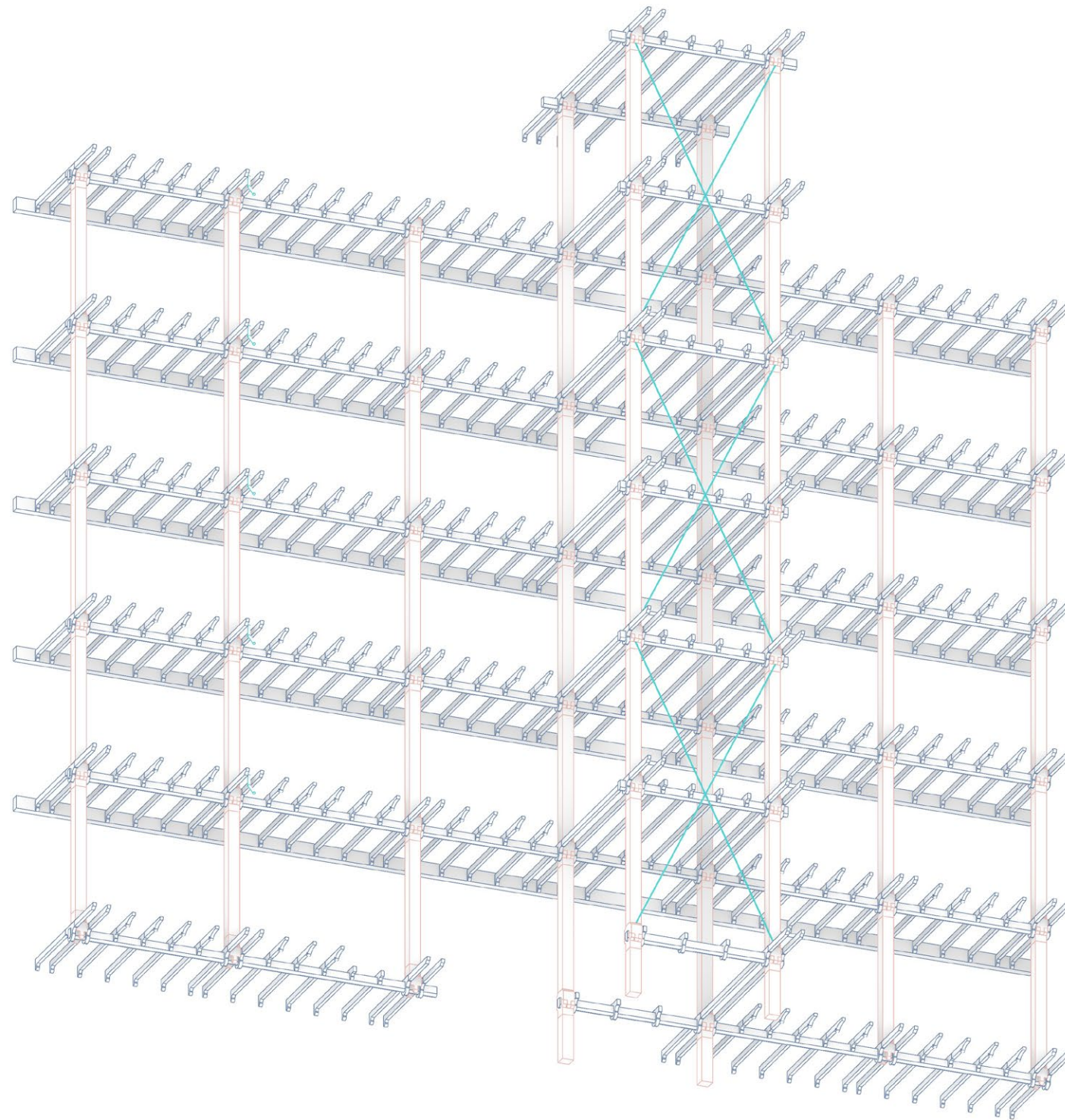


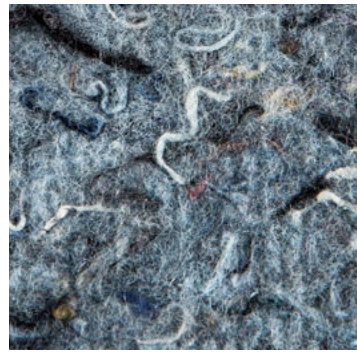
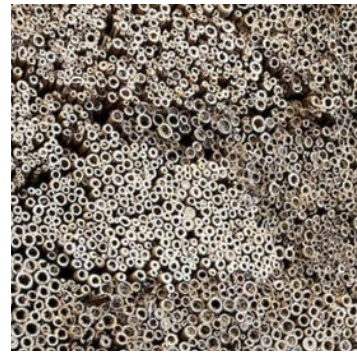








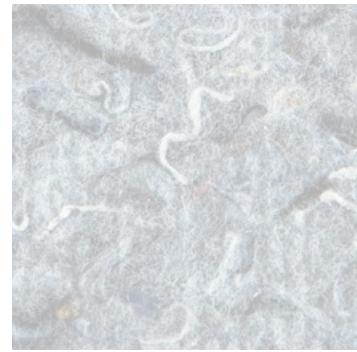
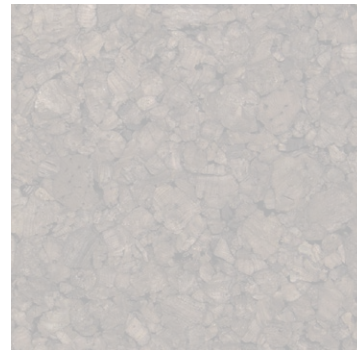
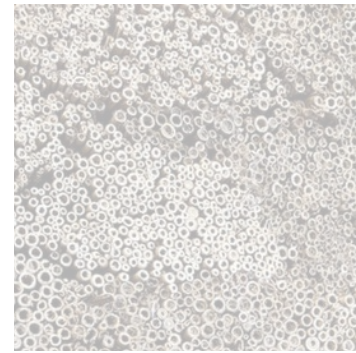




Structure

Insulation

Finishings

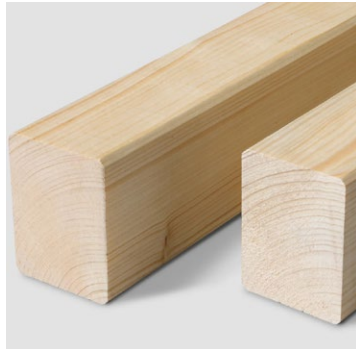


Structure

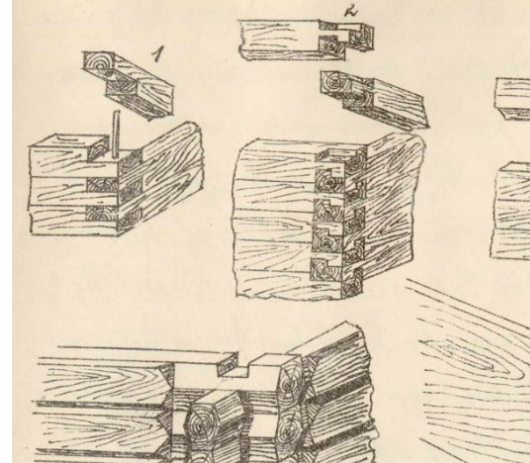
Insulation

Finishings



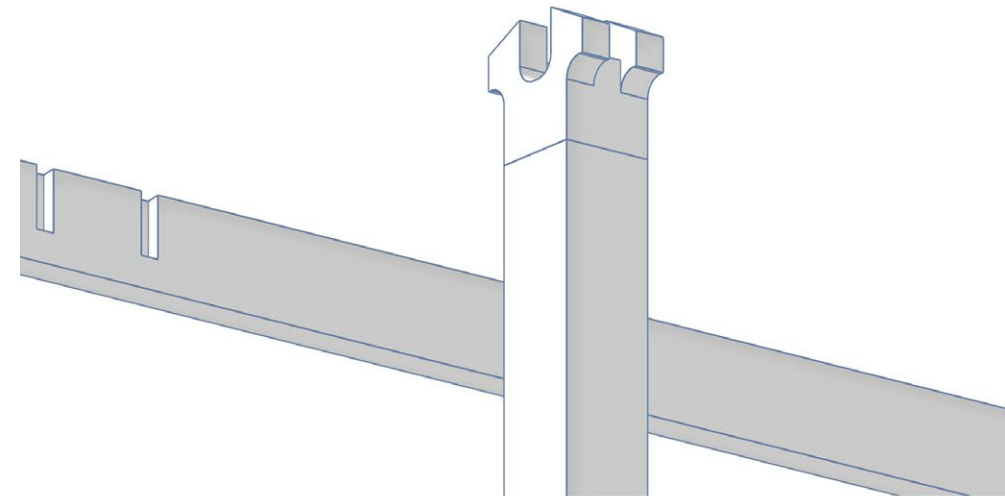
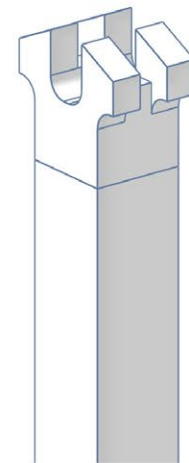
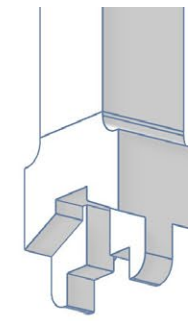
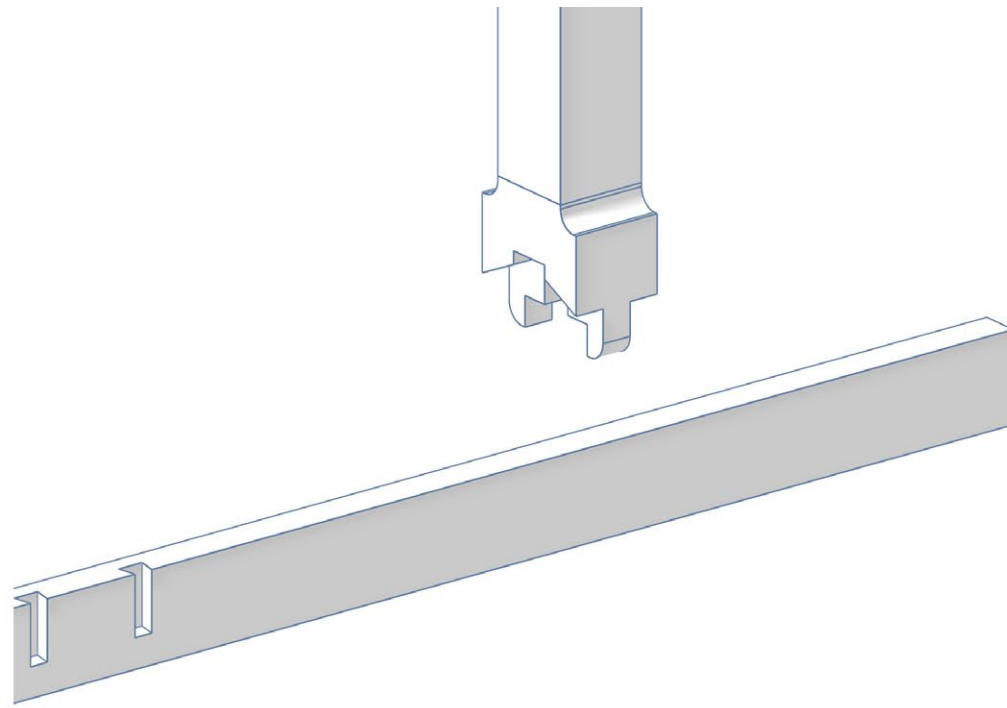


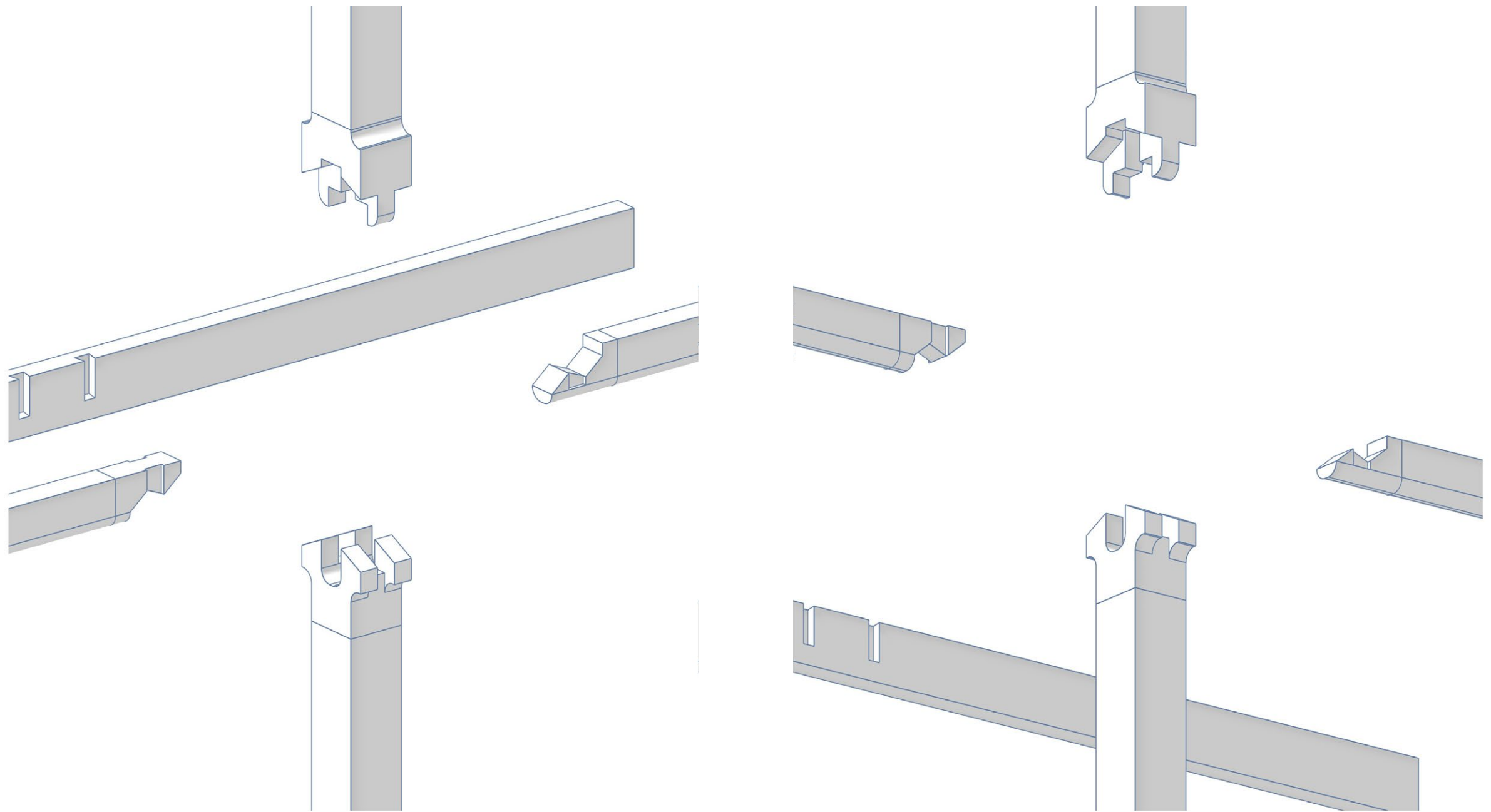
© Dylan Iwakuni,

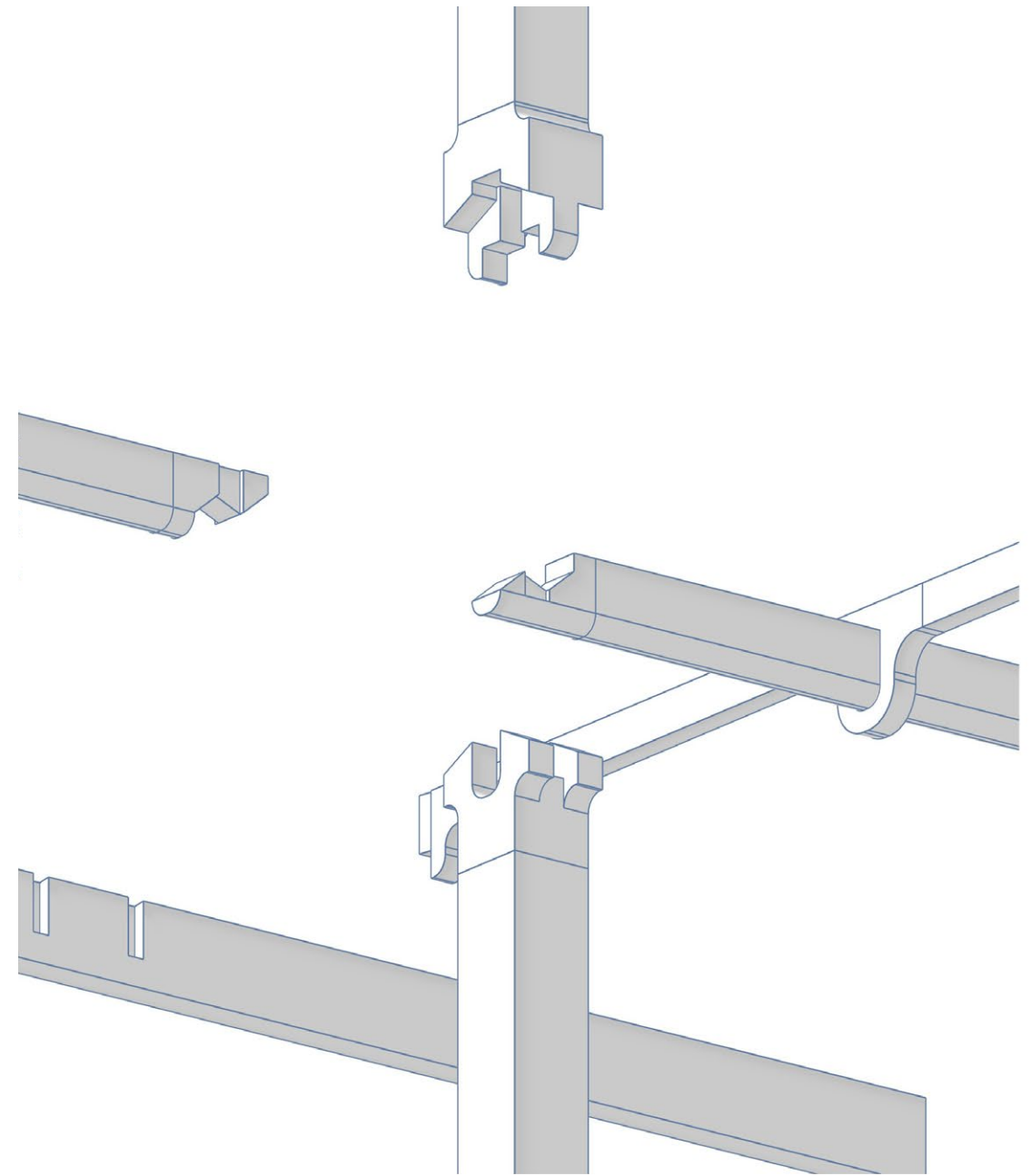
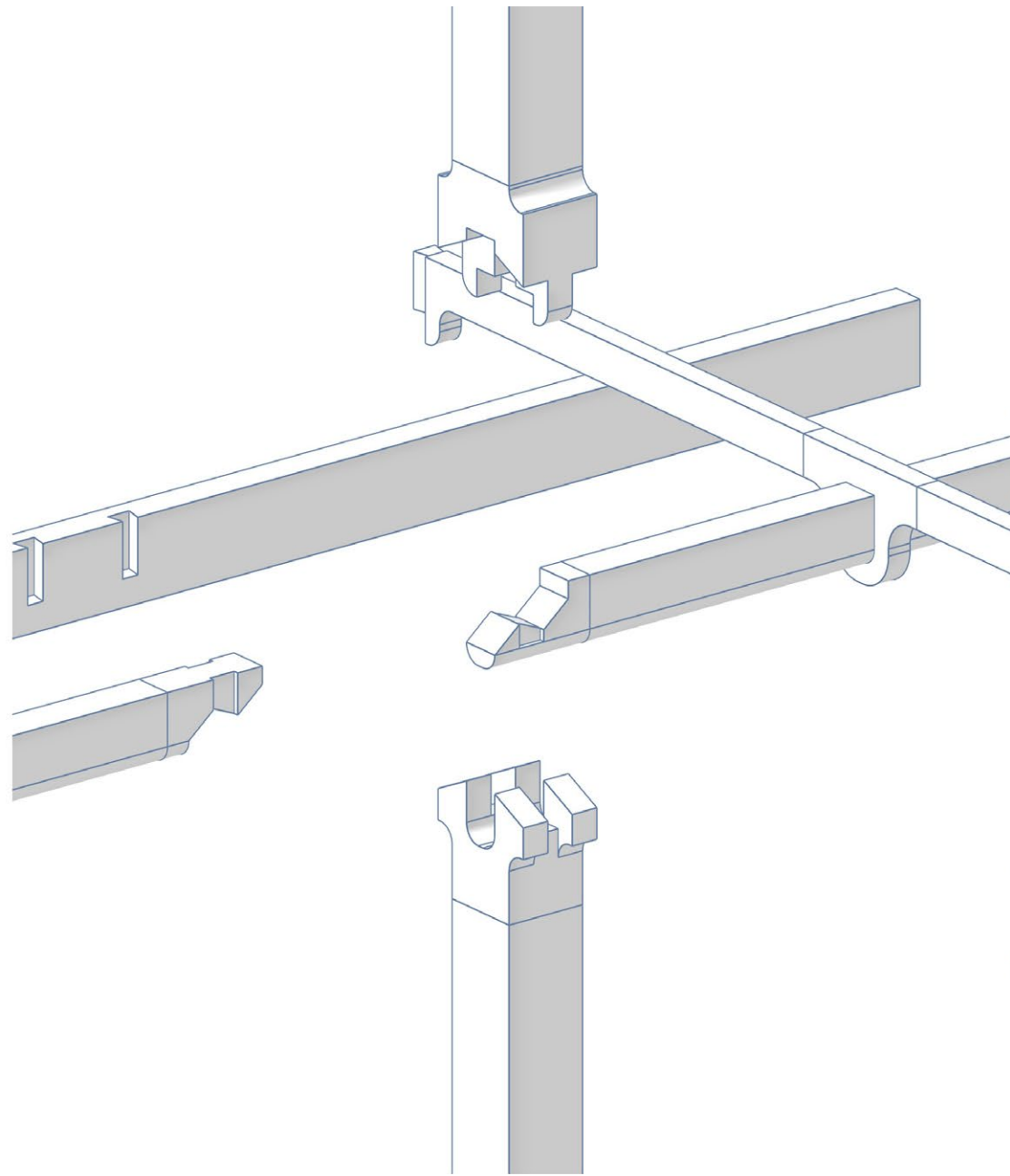


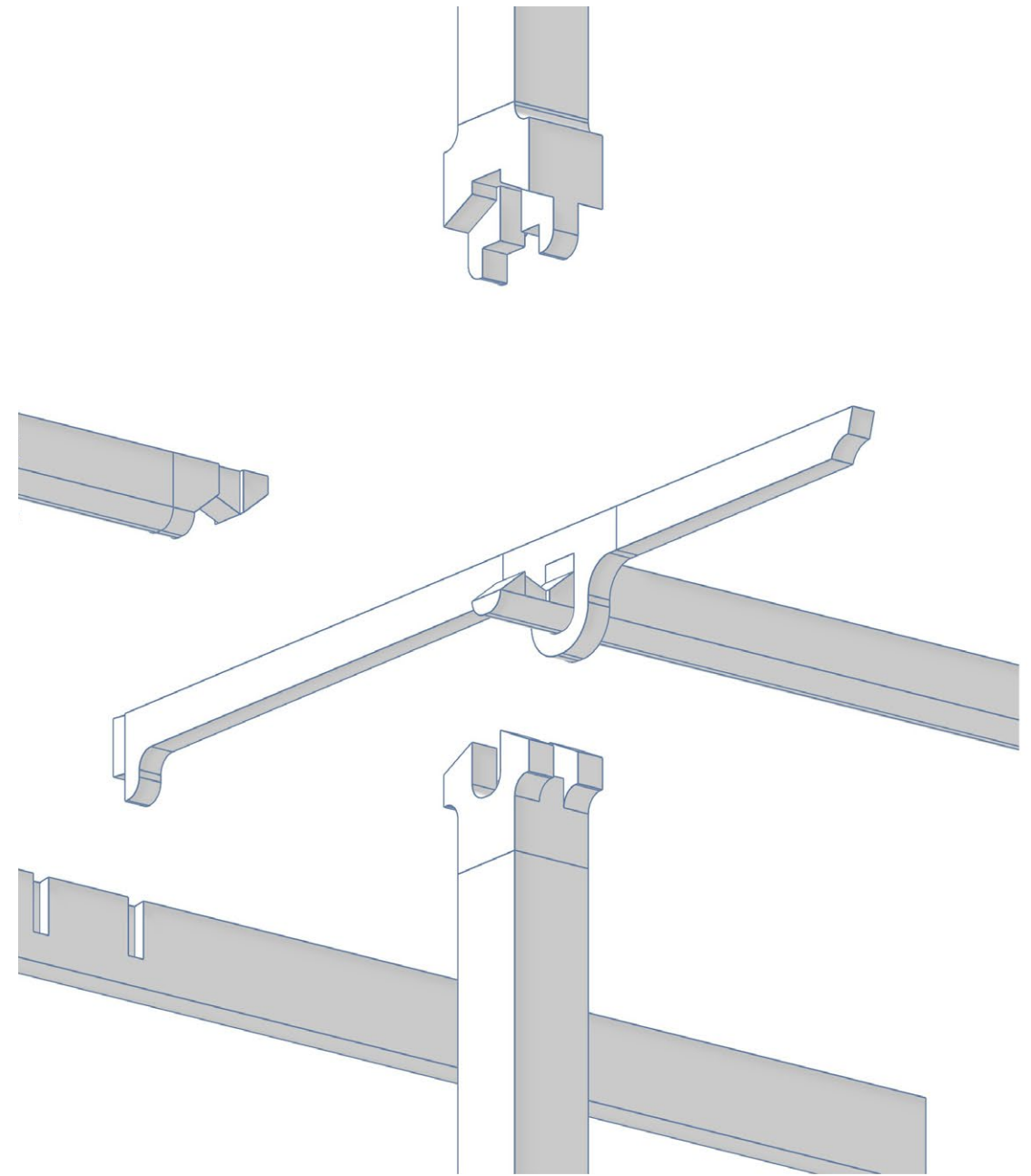
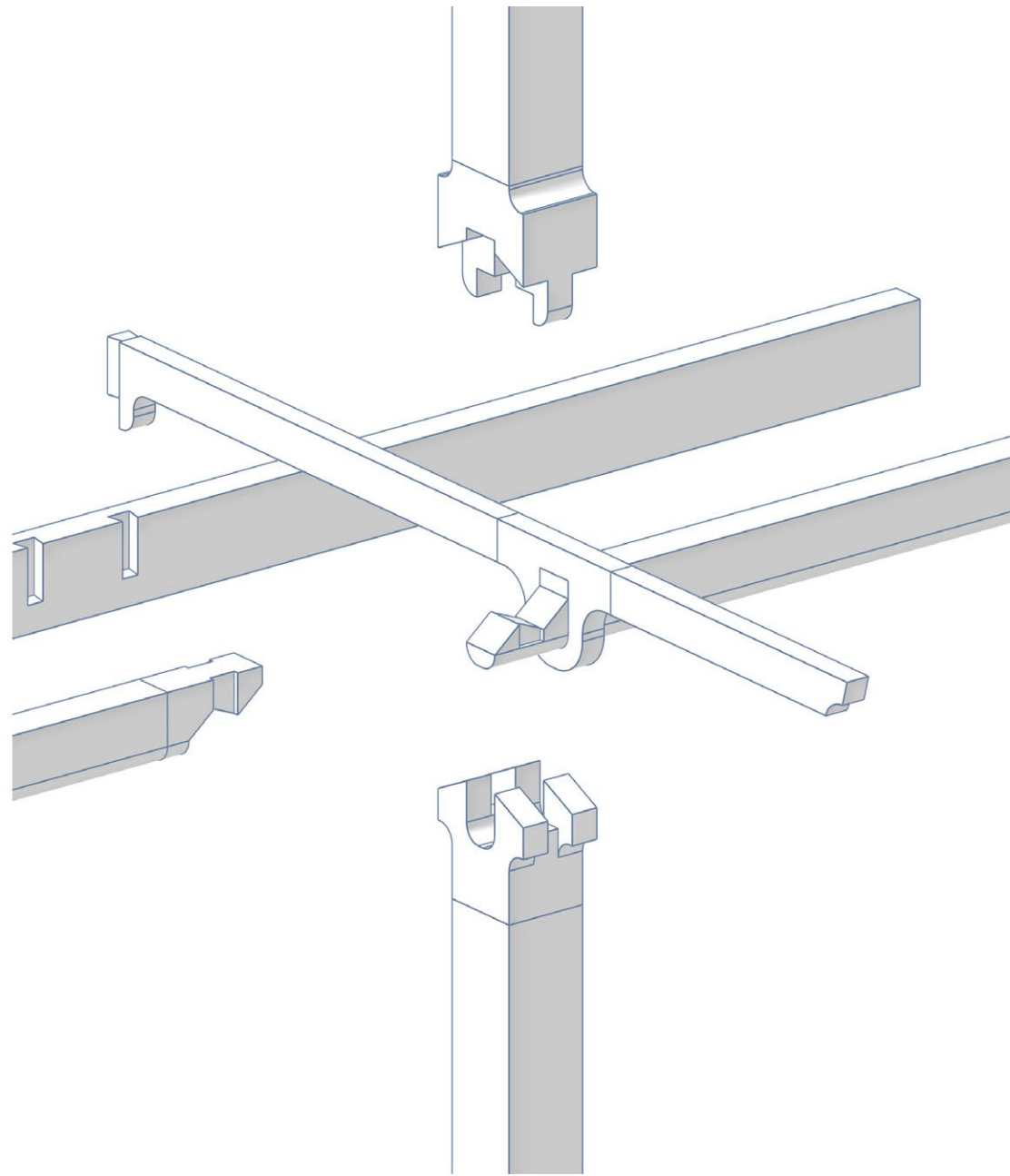
Timber Joinery

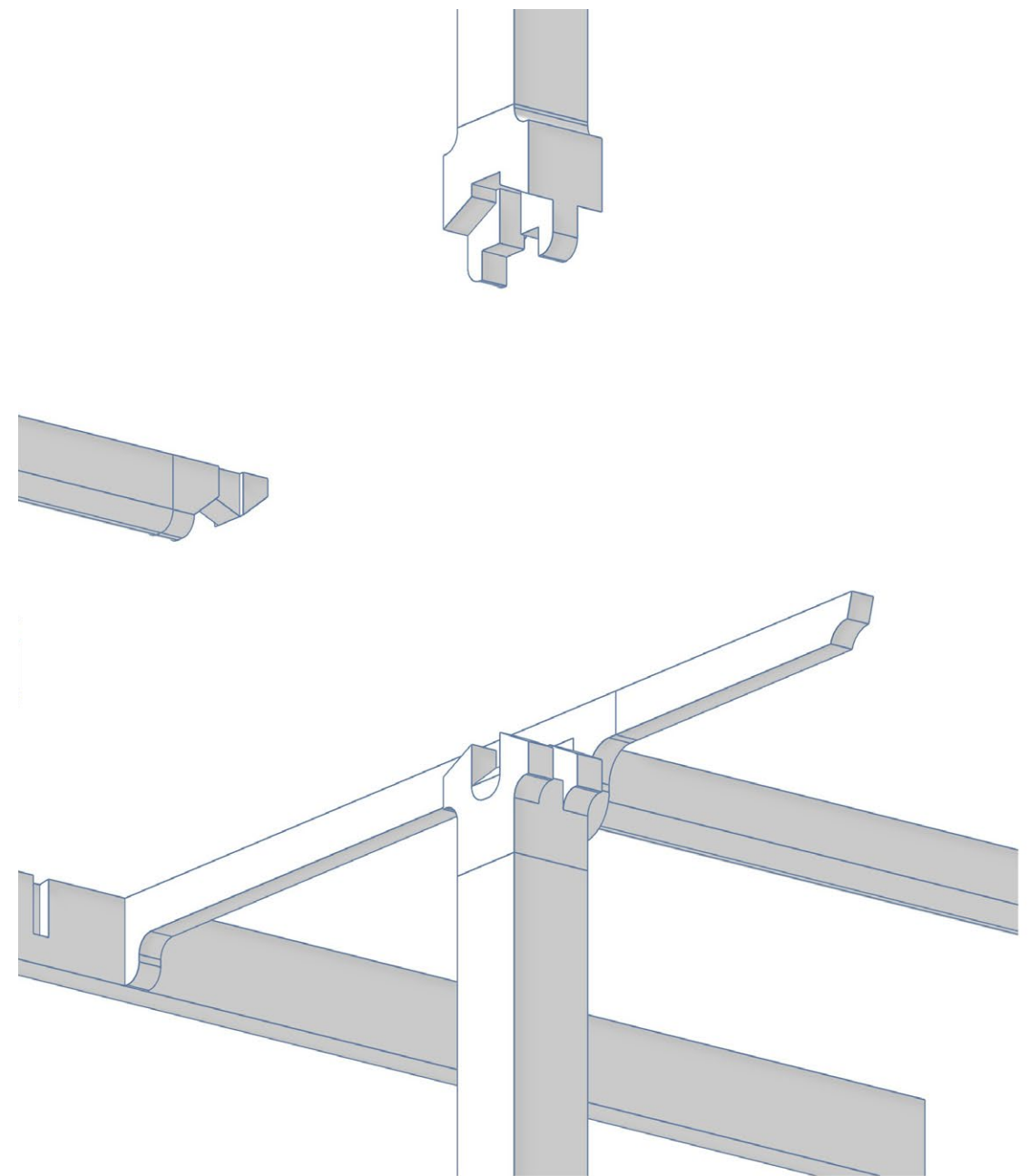
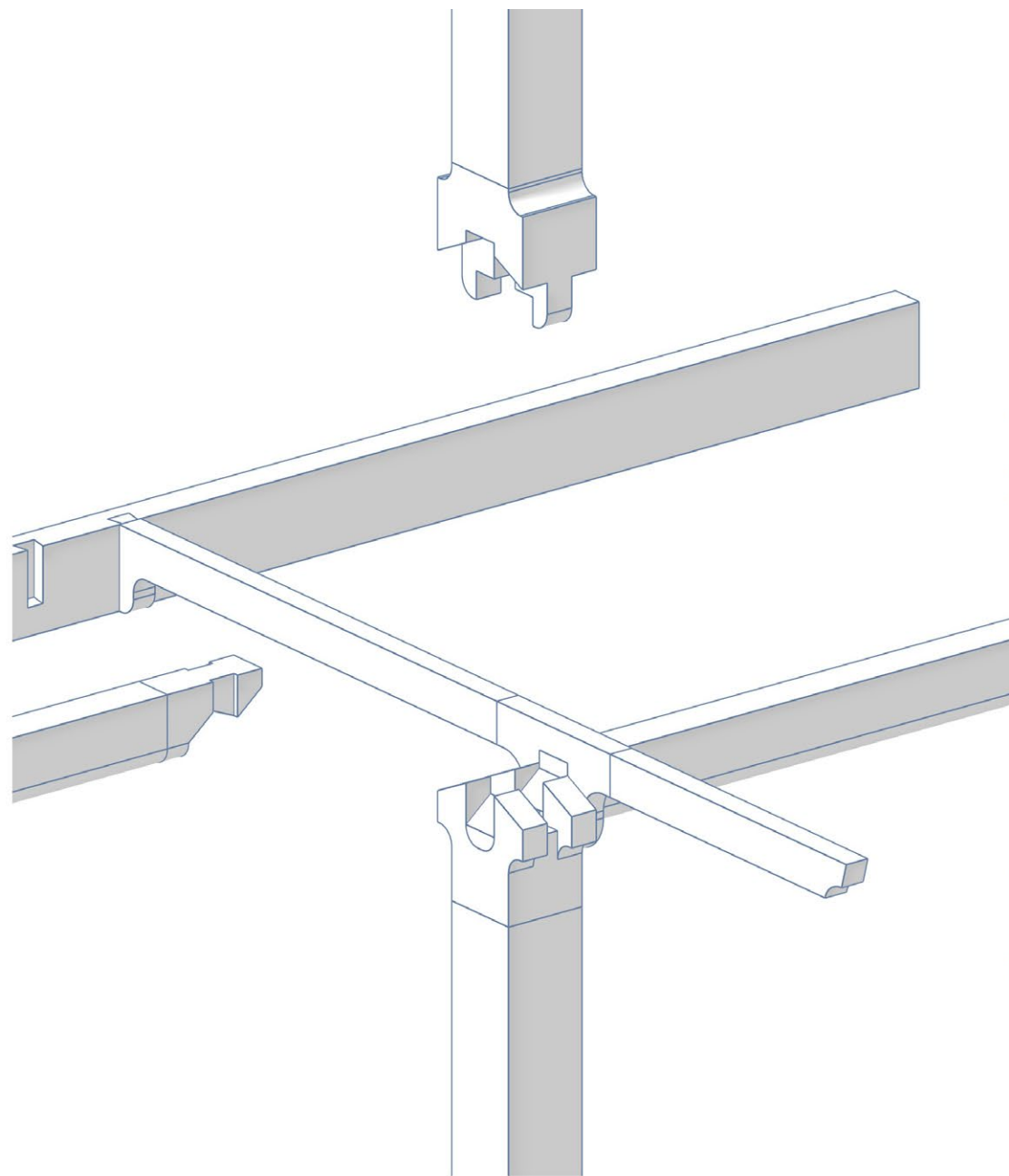
Drawing inspiration from japanese, polish, and modern international approaches to timber joint design.

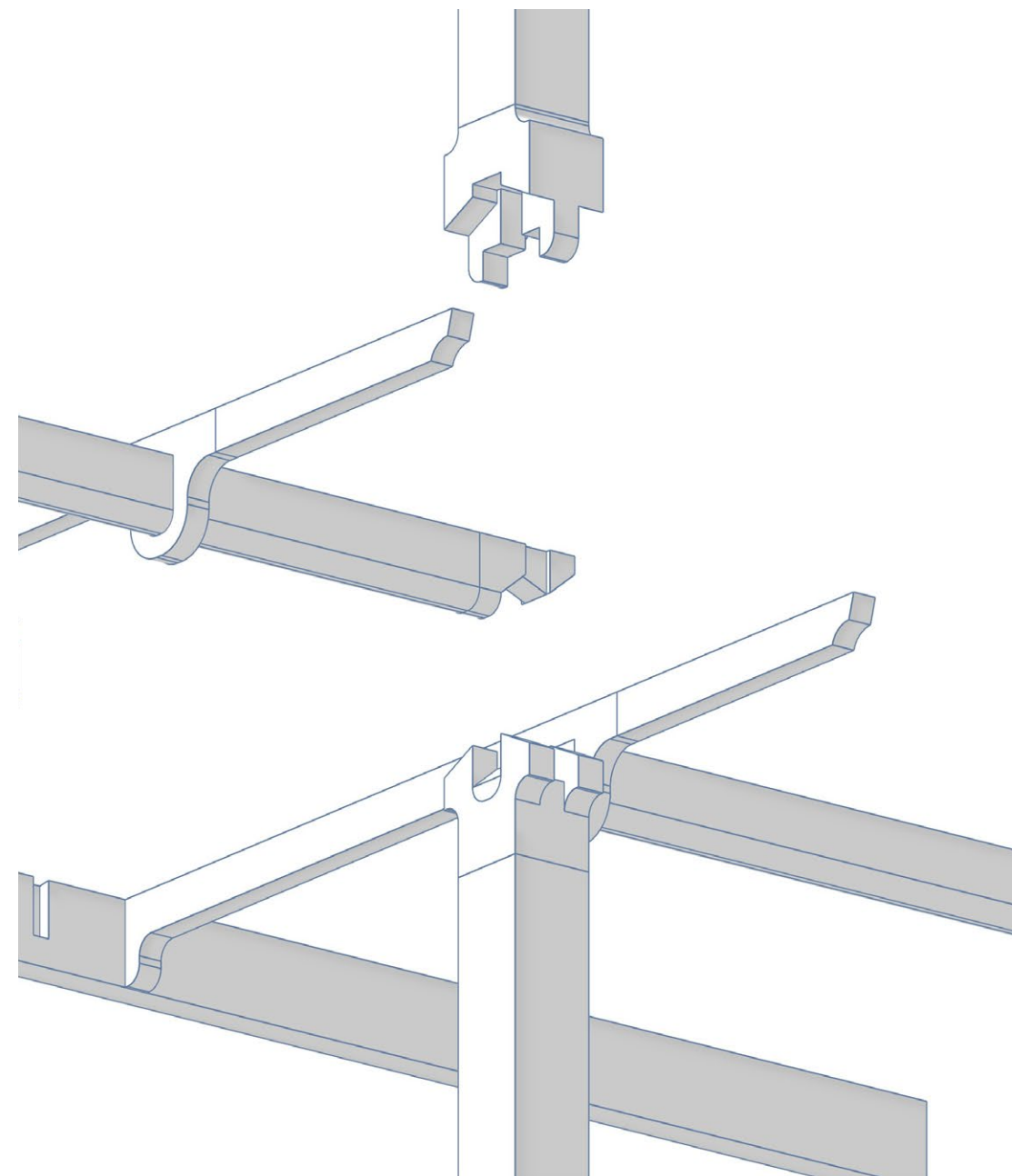
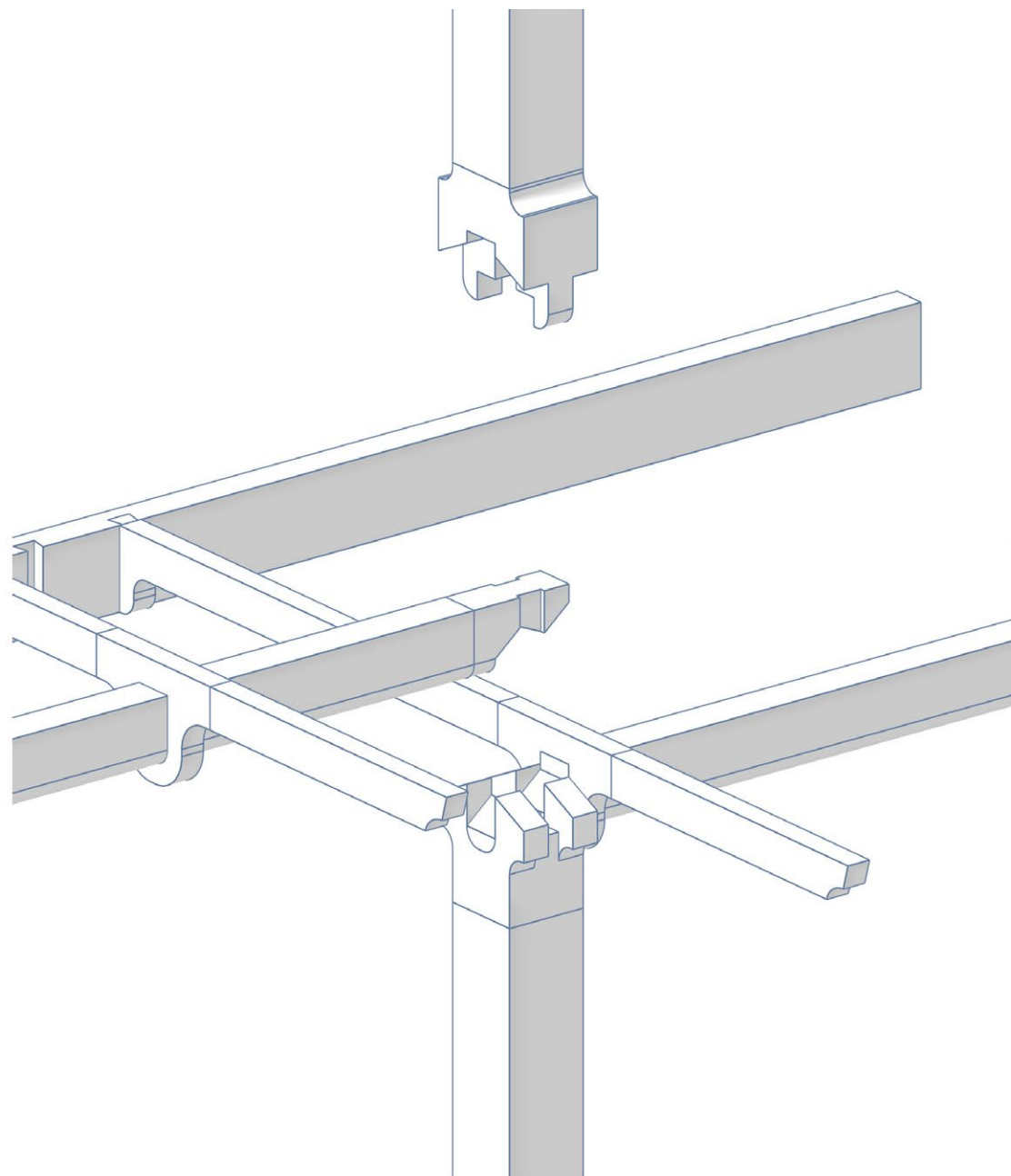


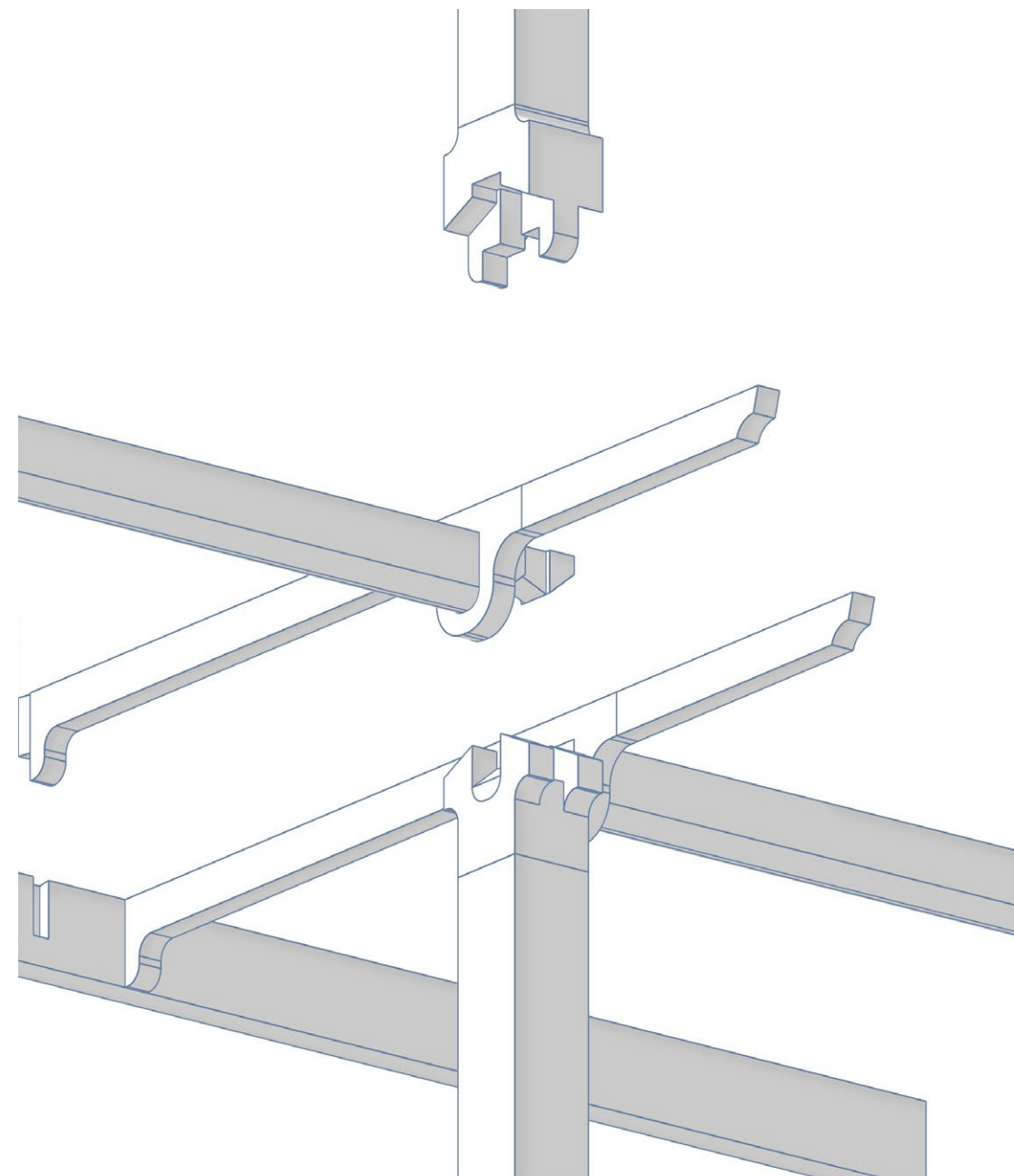
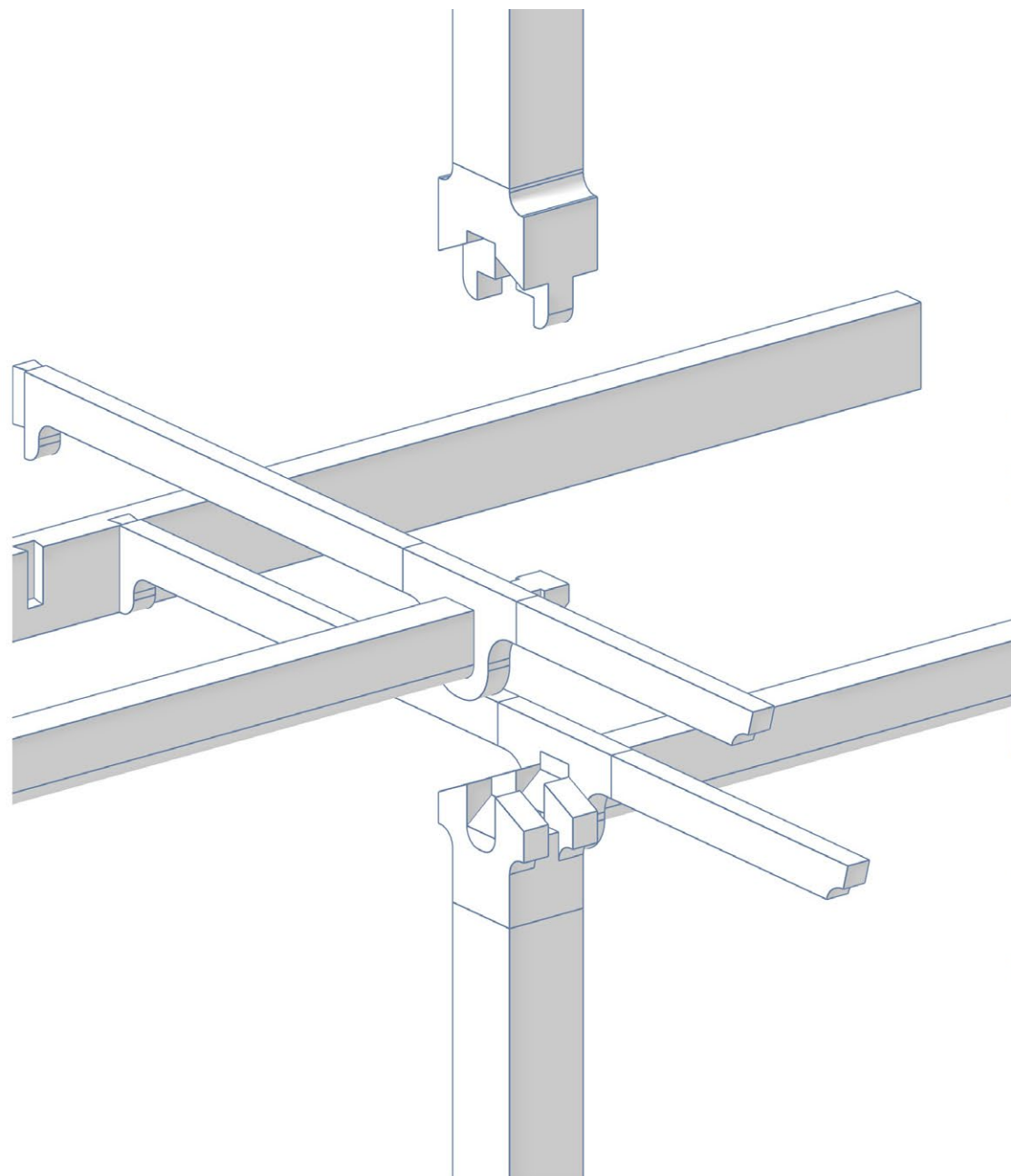


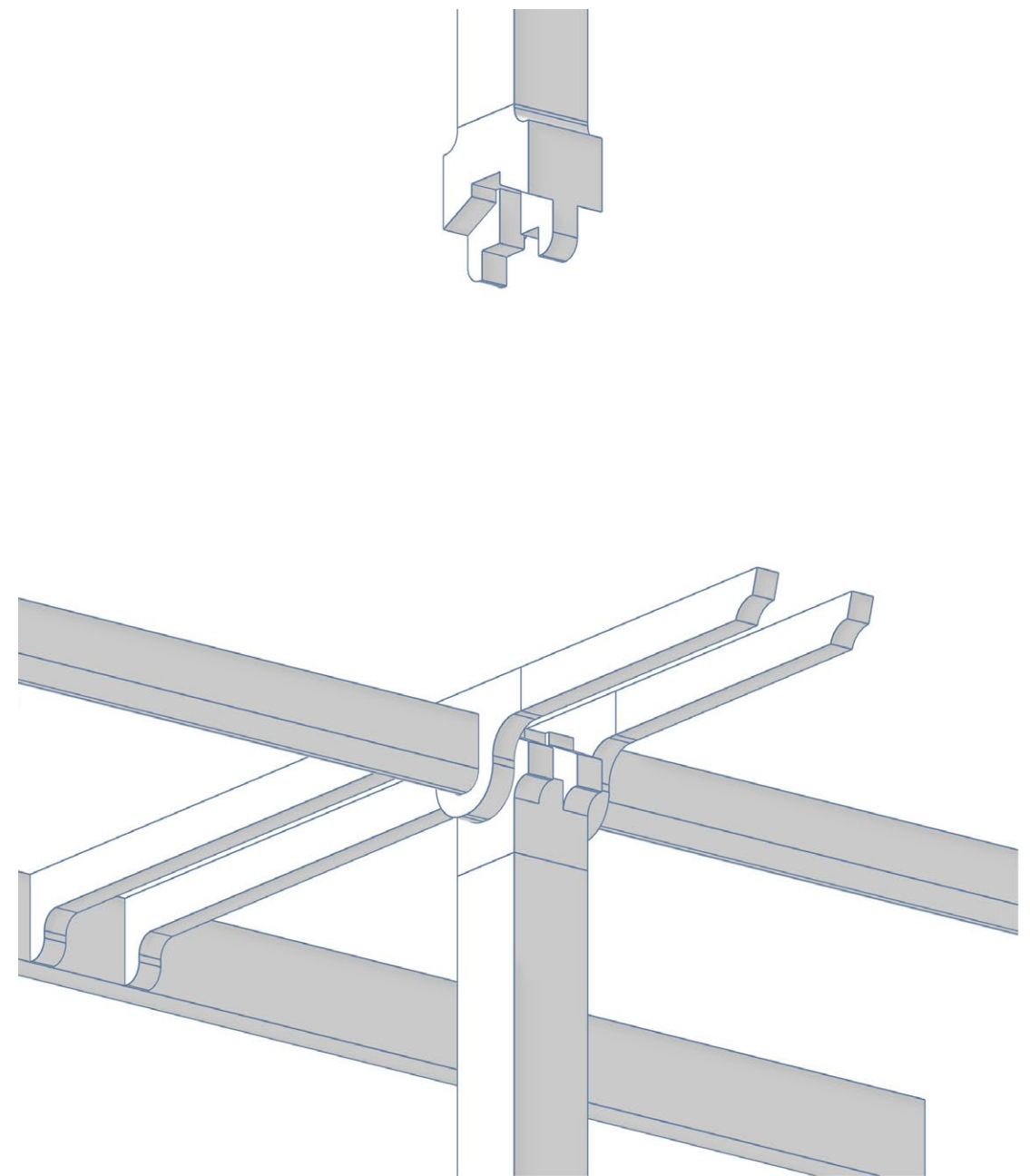
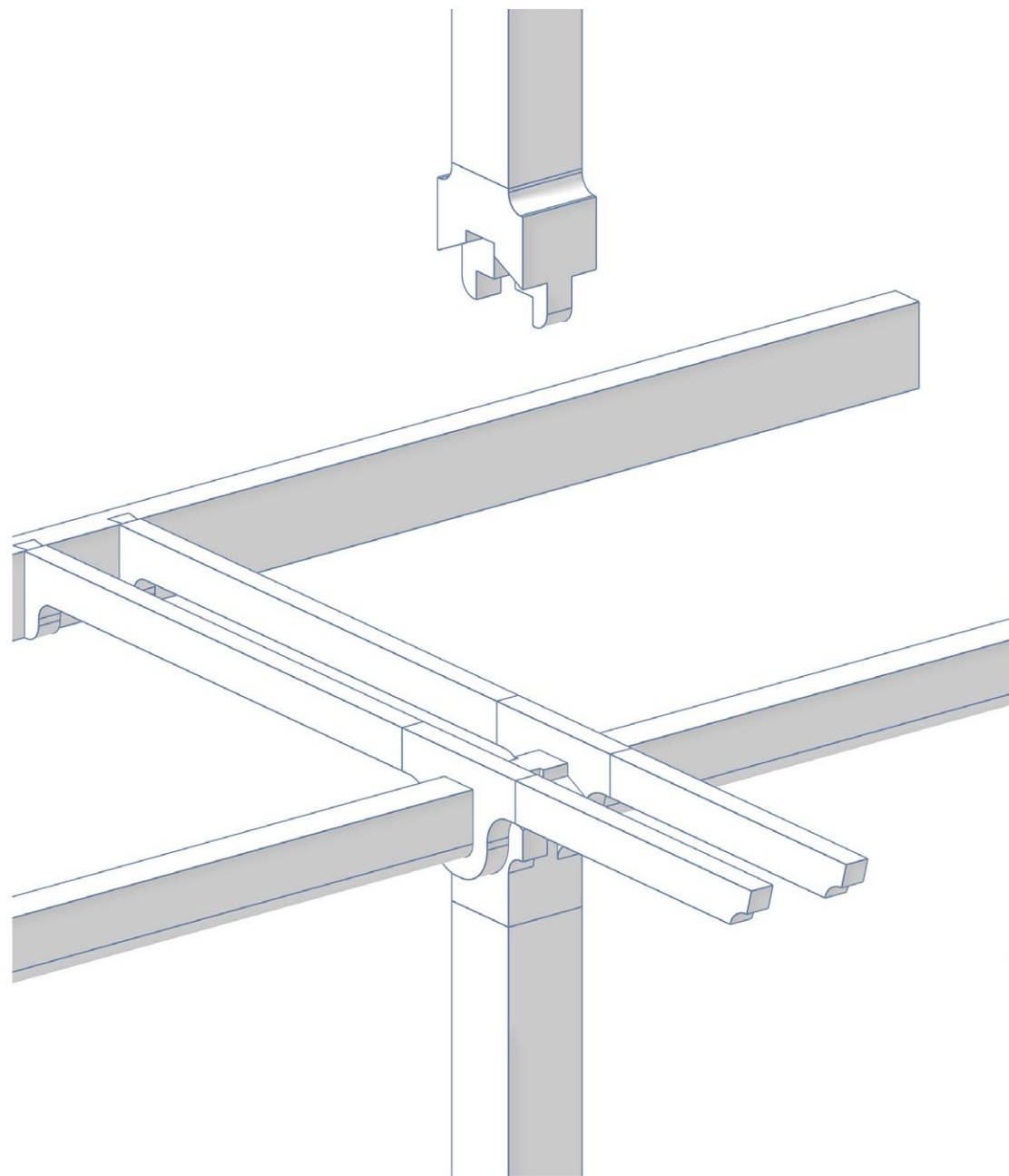


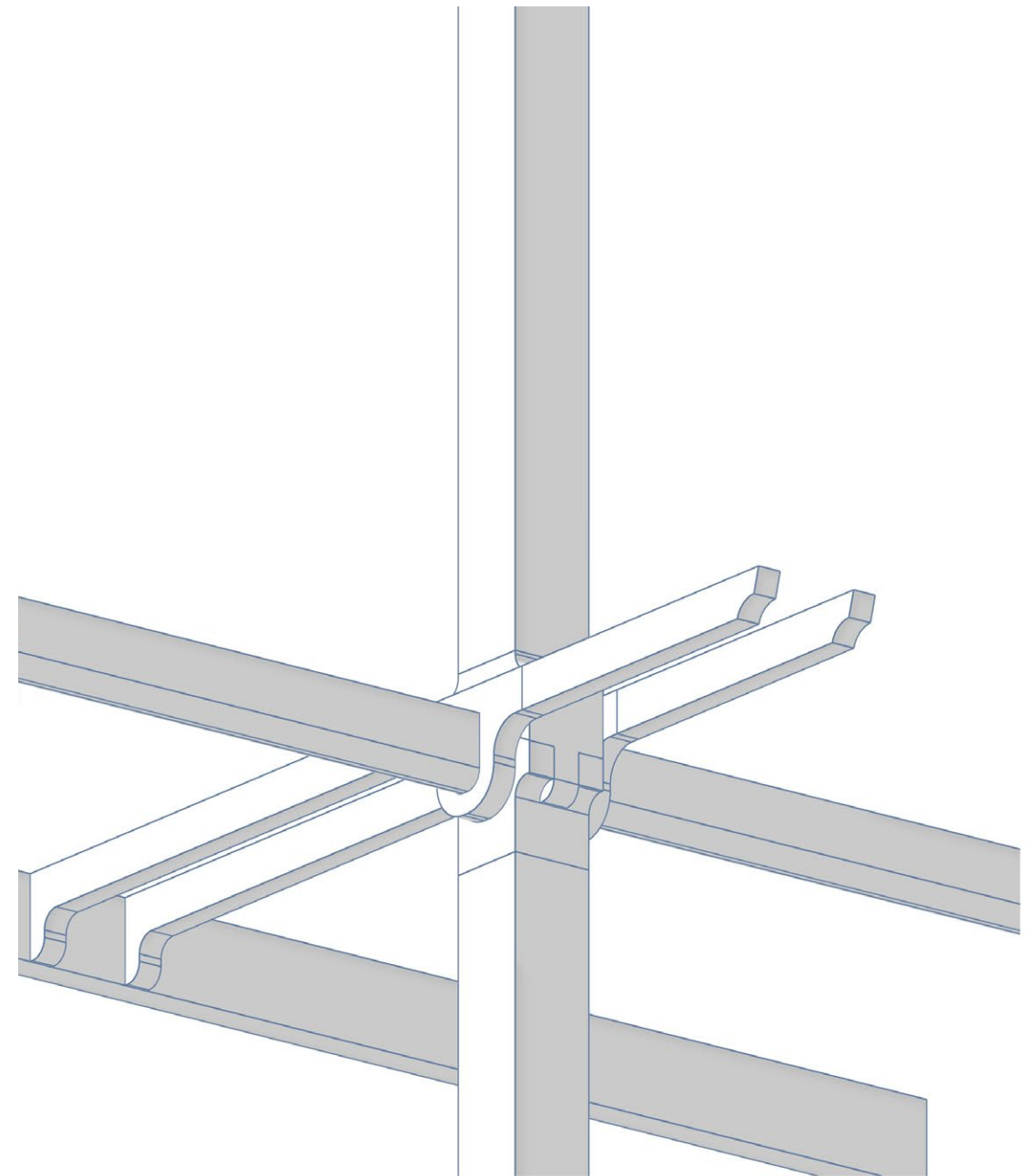
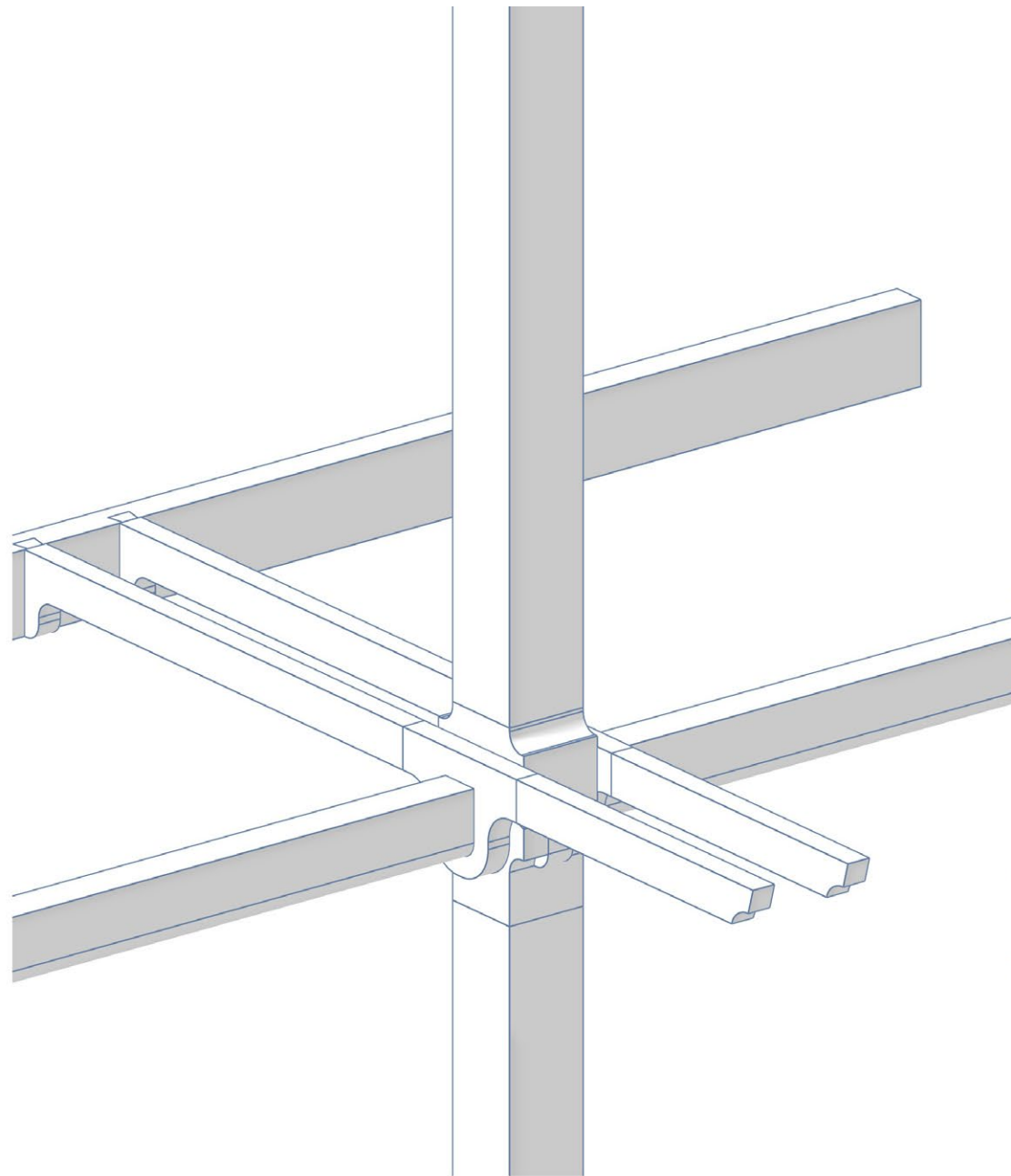


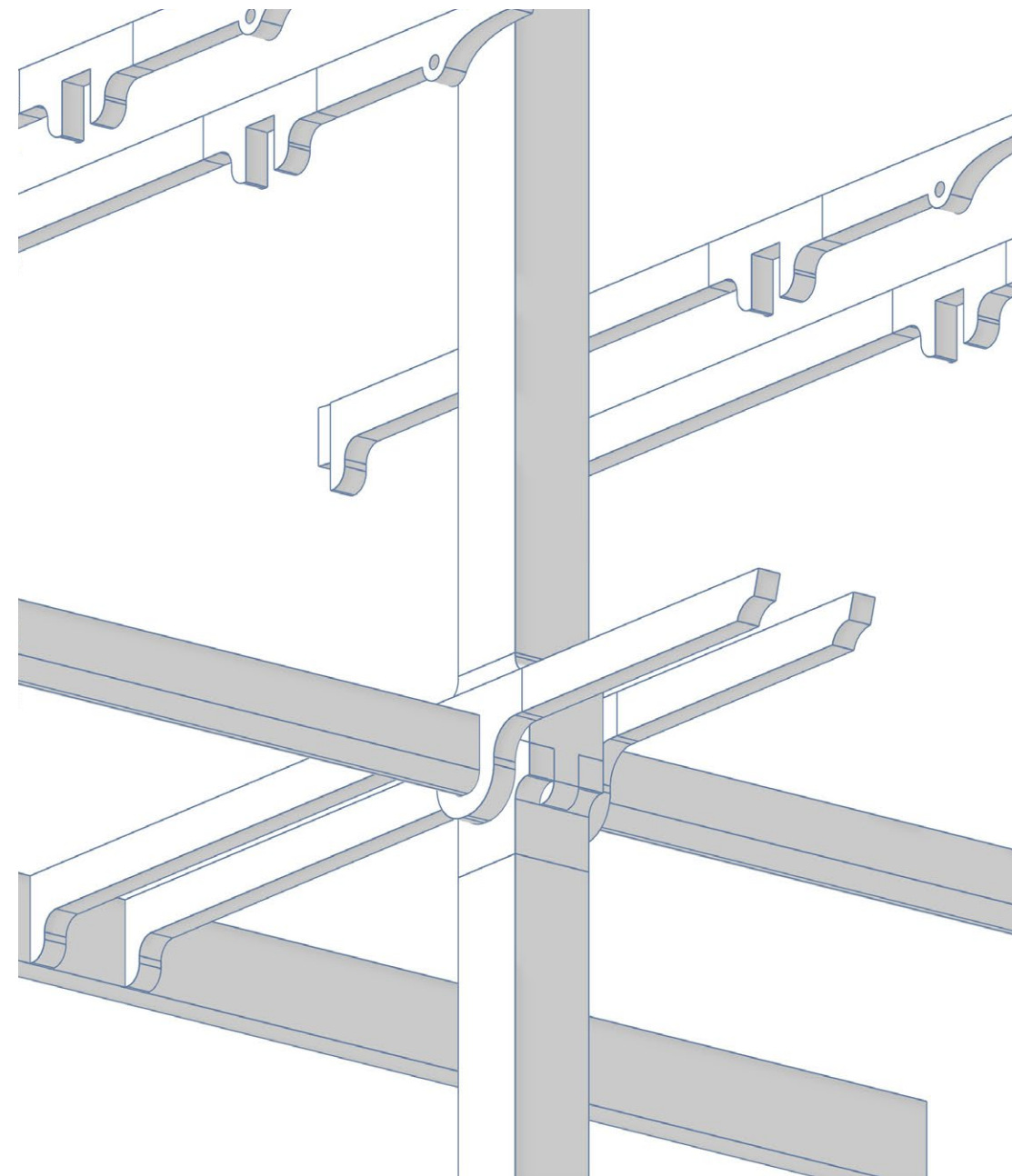
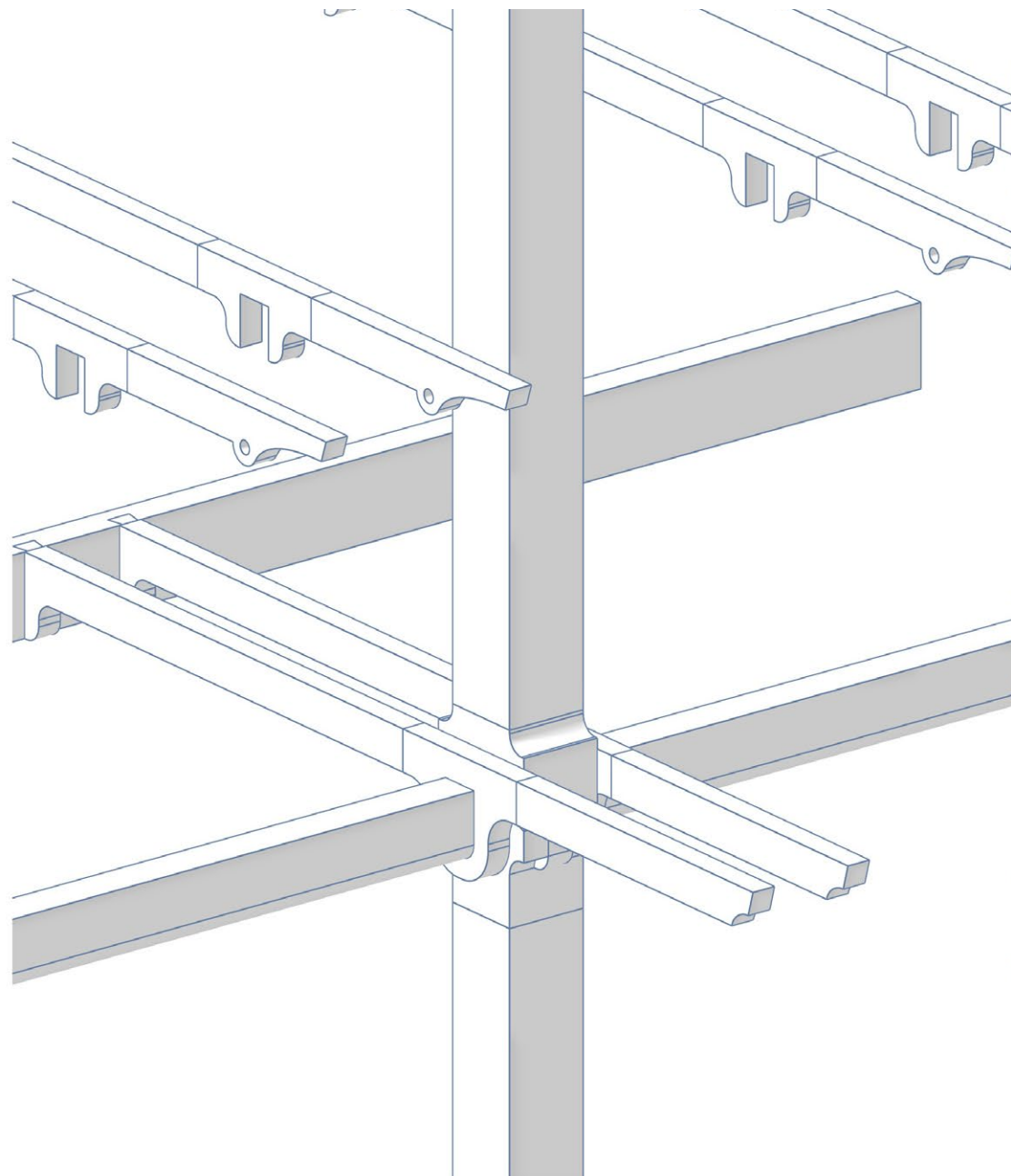


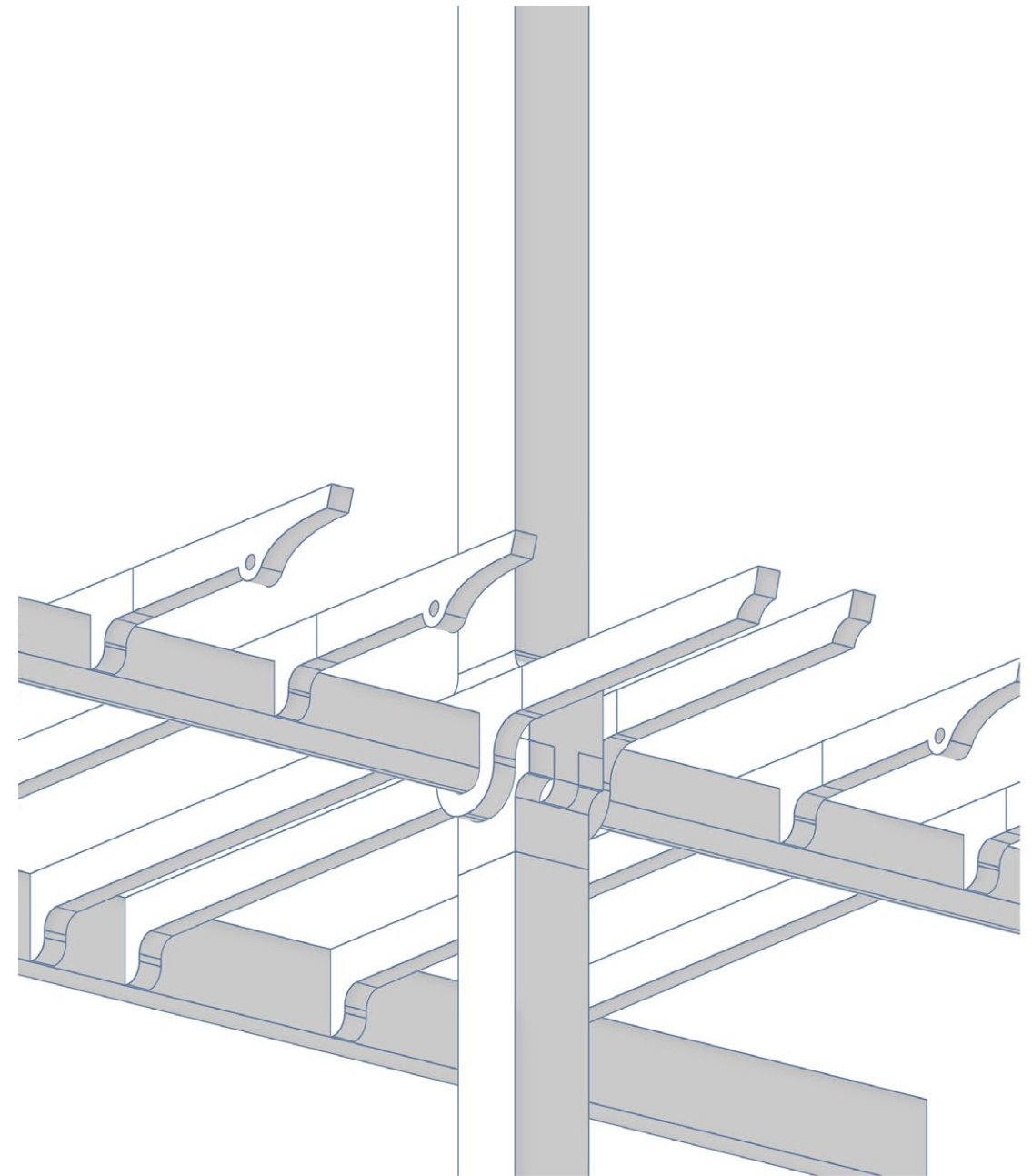
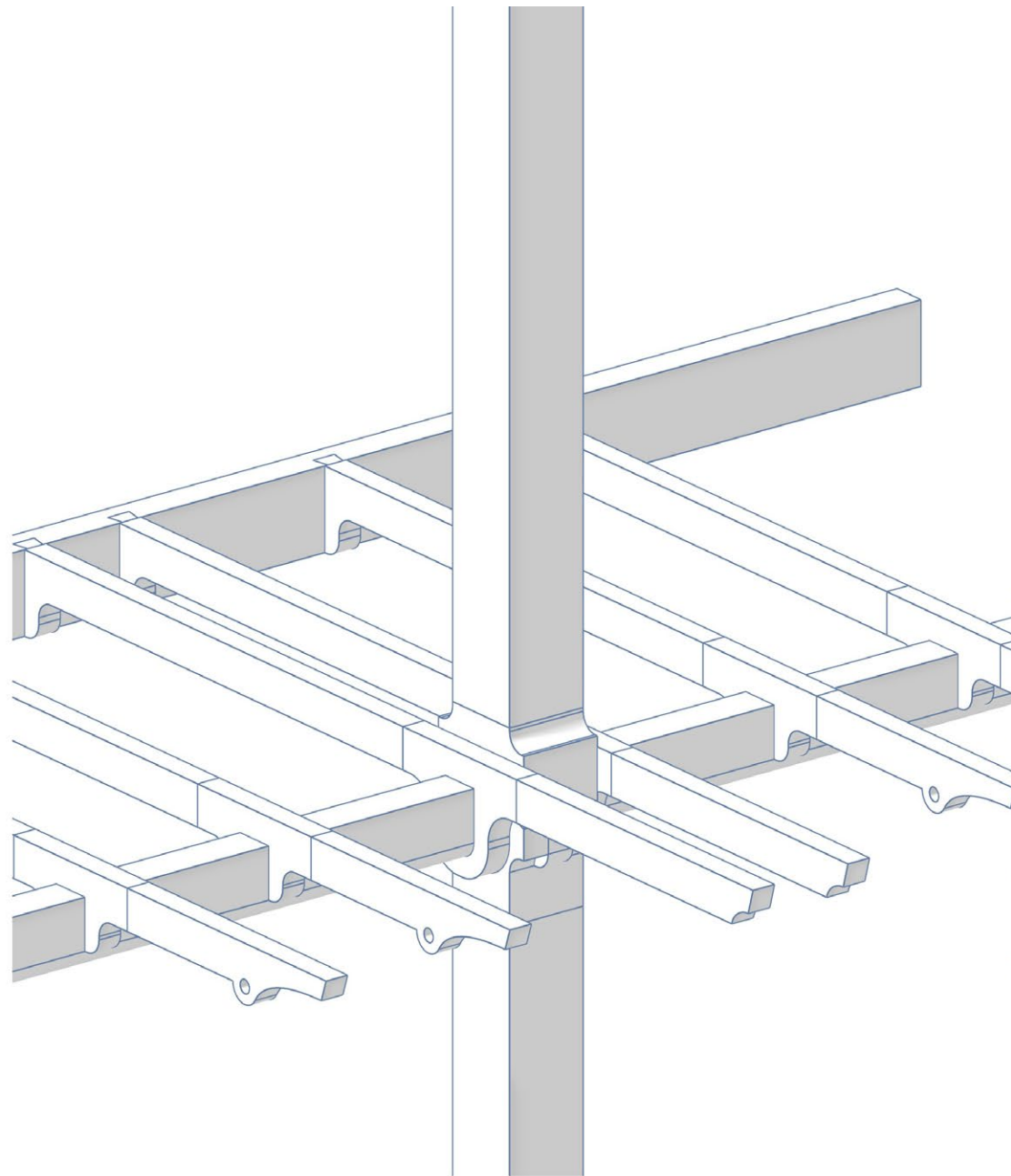


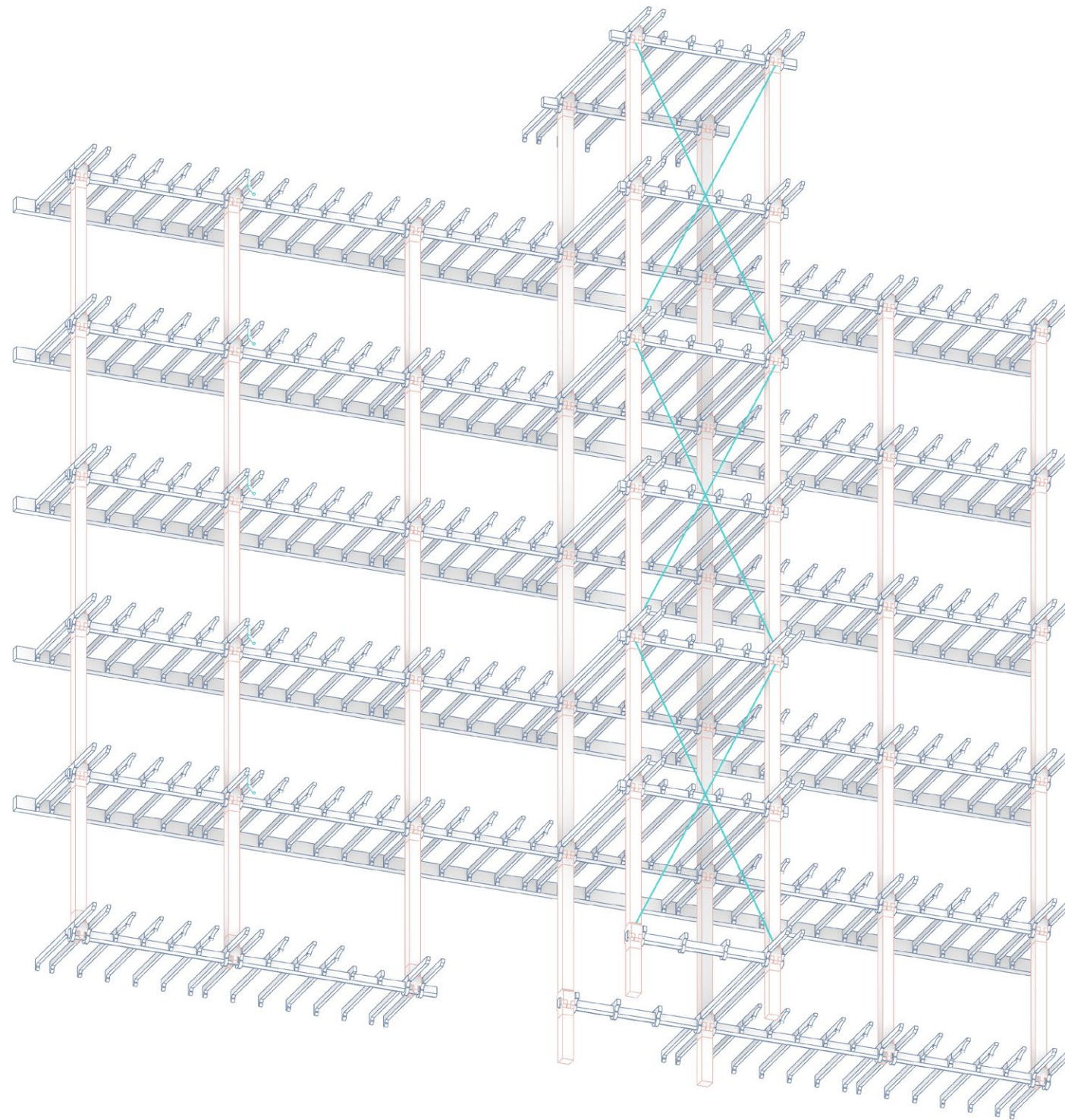


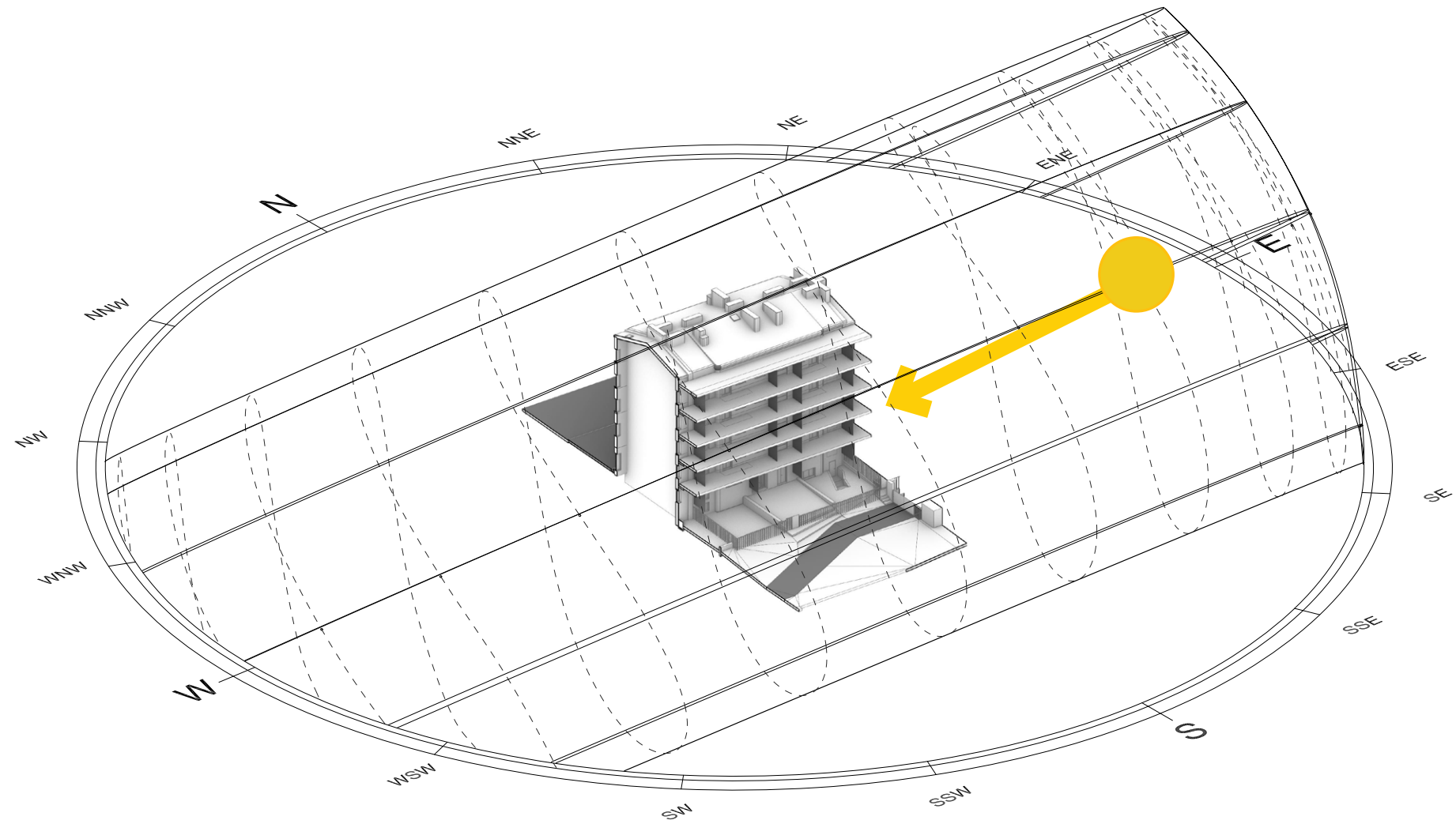


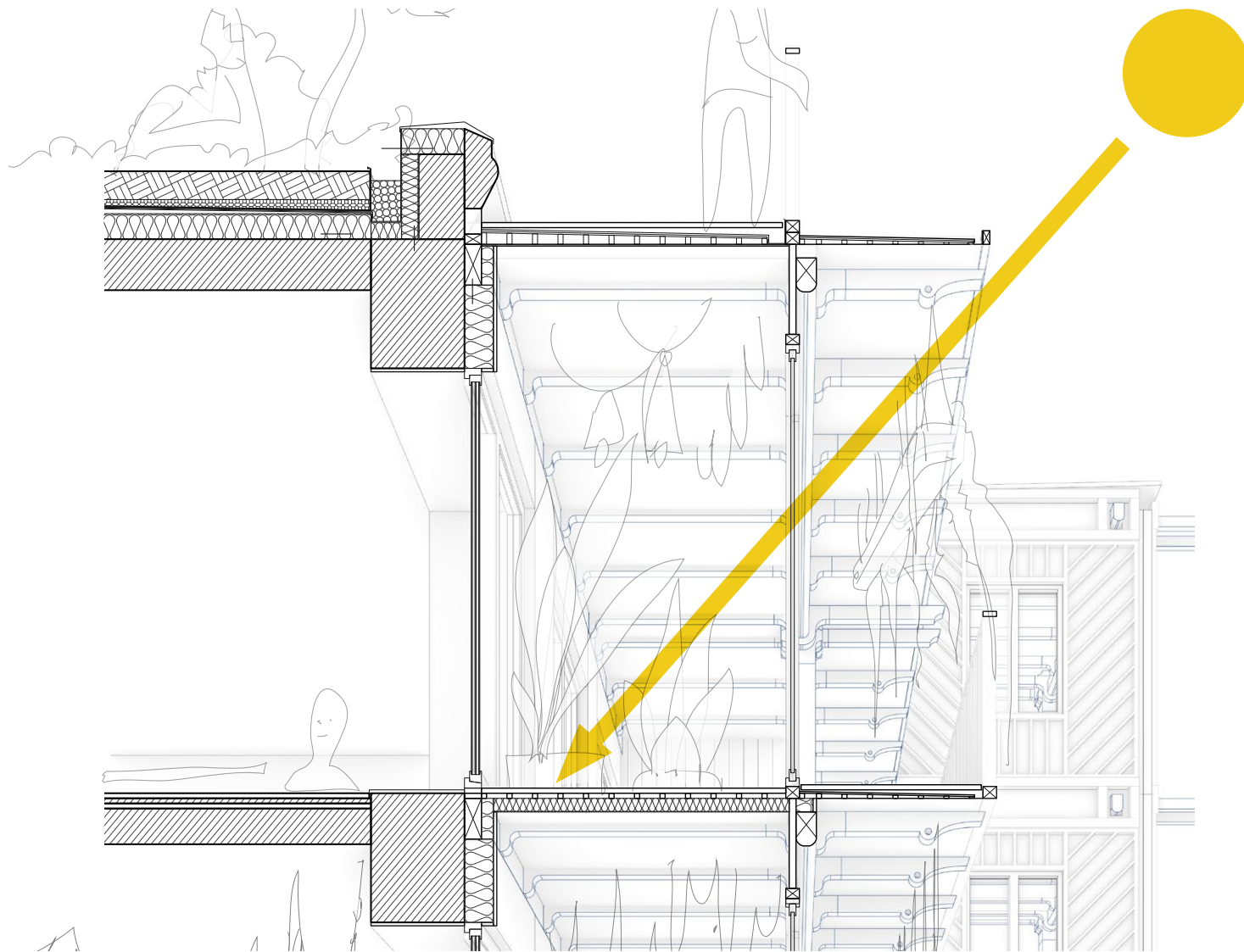




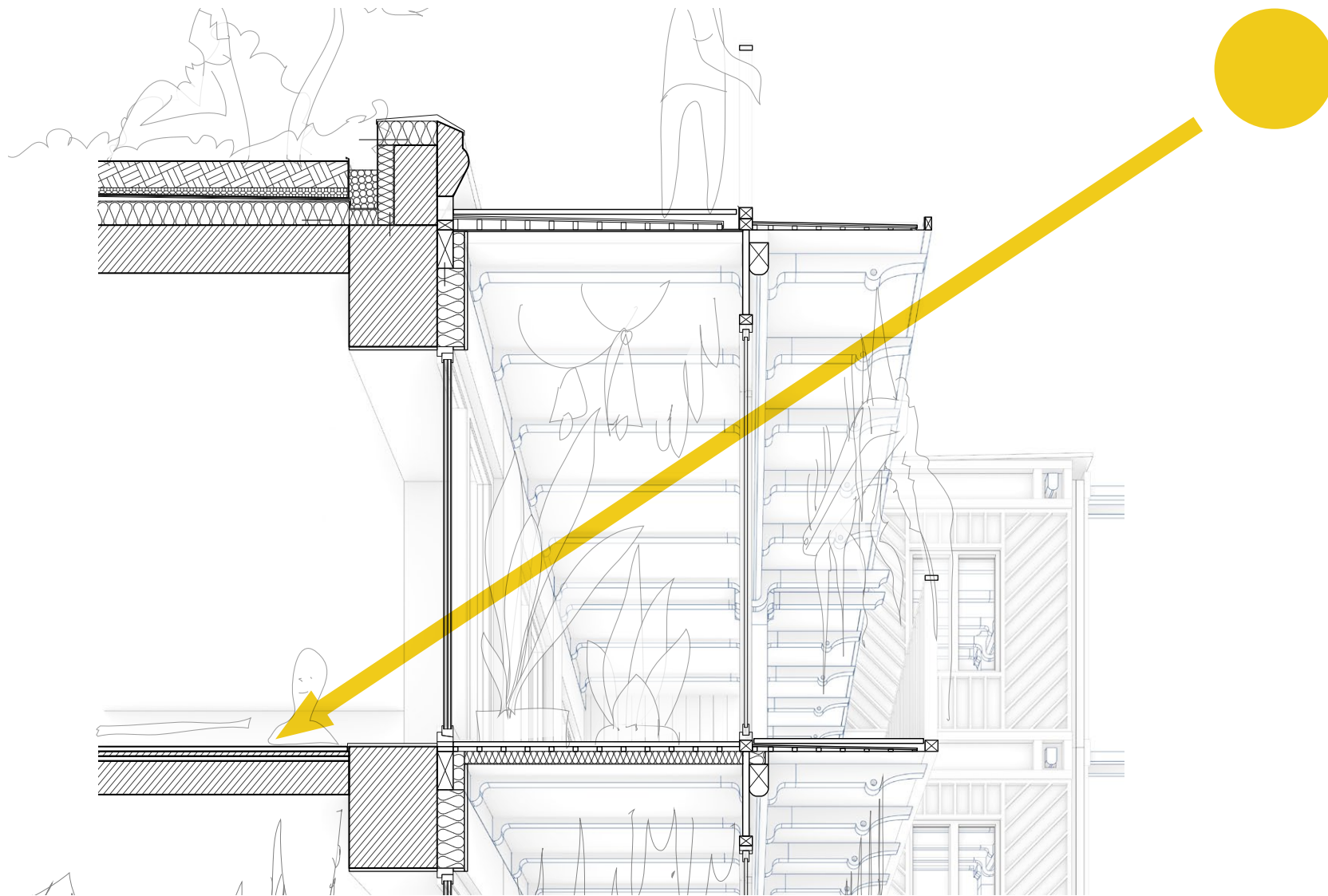




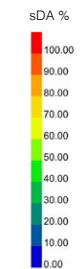
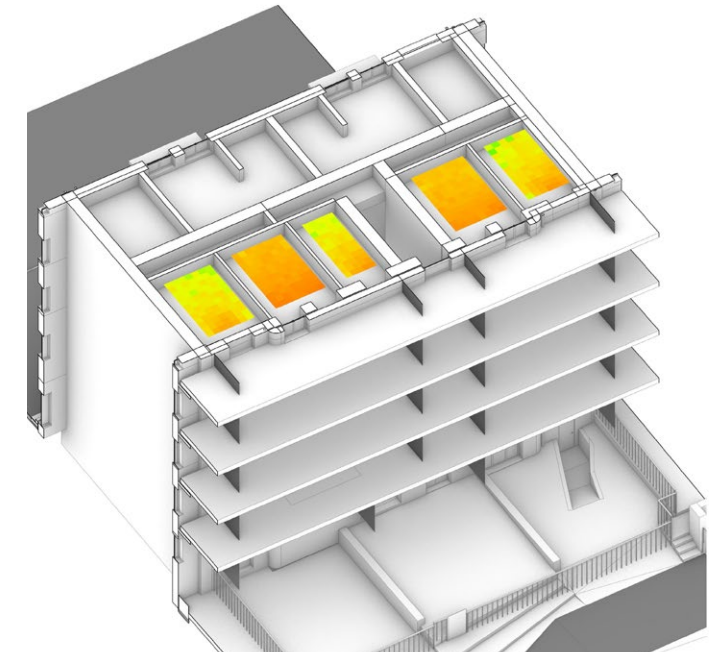
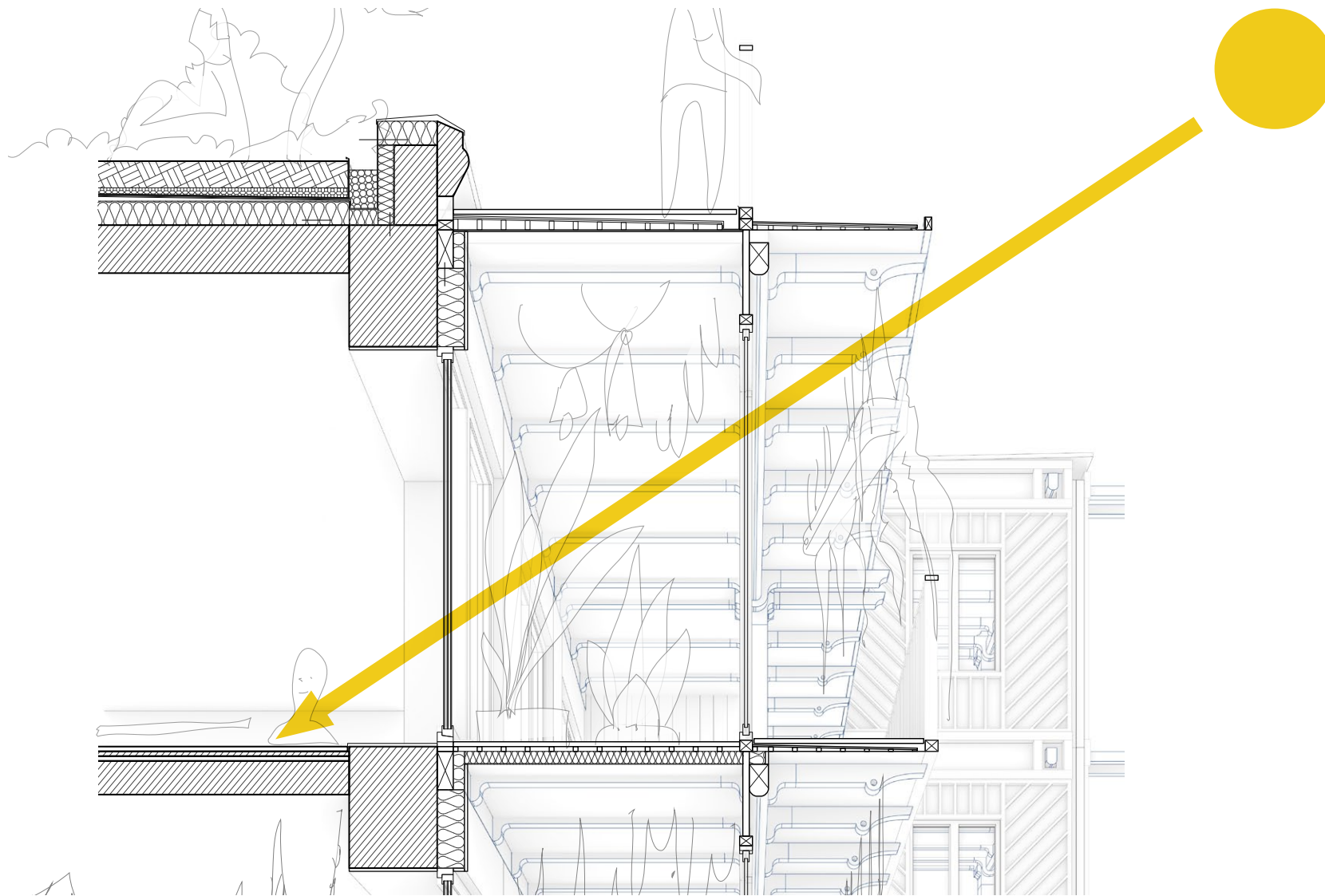




Summer



Winter



Option 1. Simulation: Spatial Daylight Autonomy (2-3 points, 1-2 points Healthcare)

Demonstrate through annual computer simulations that spatial daylight autonomy300/50% (sDA300/50%) of at least 55%, 75%, or 90% is achieved. Use regularly occupied floor area. Healthcare projects should use the perimeter area determined under EQ Credit Quality Views. Points are awarded according to Table 1.

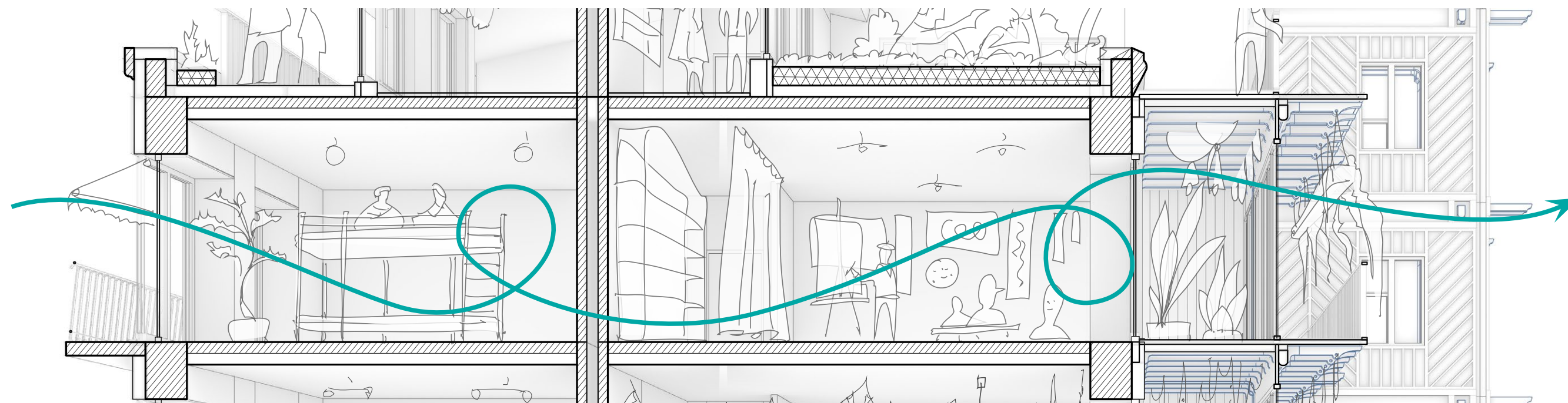
Table 1. Points for daylit floor area: Spatial daylight autonomy

New Construction, Core and Shell, Schools, Retail, Data Centers, Warehouses & Distribution Centers, CI, Hospitality
Points sDA (for regularly occupied floor area)

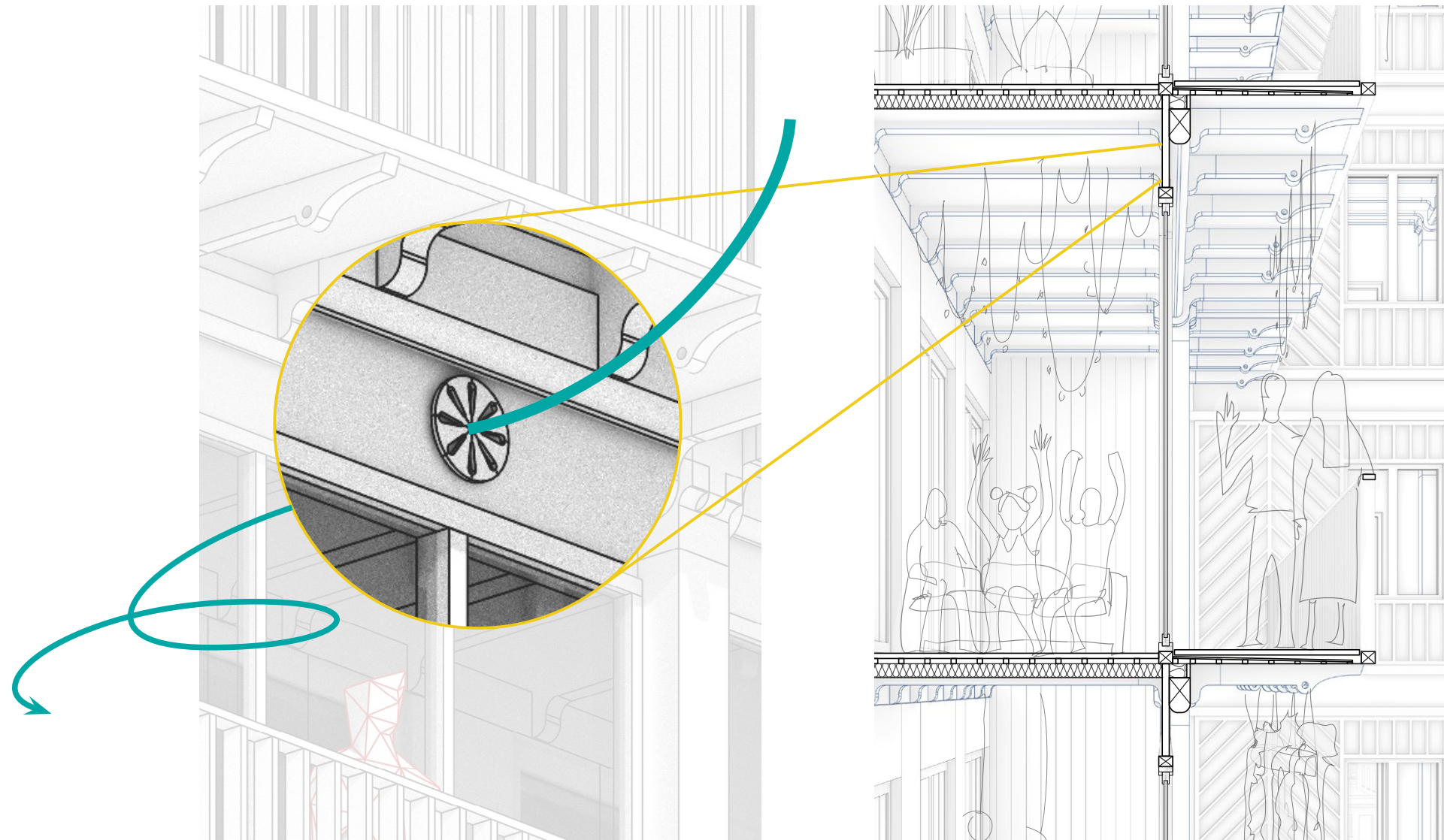
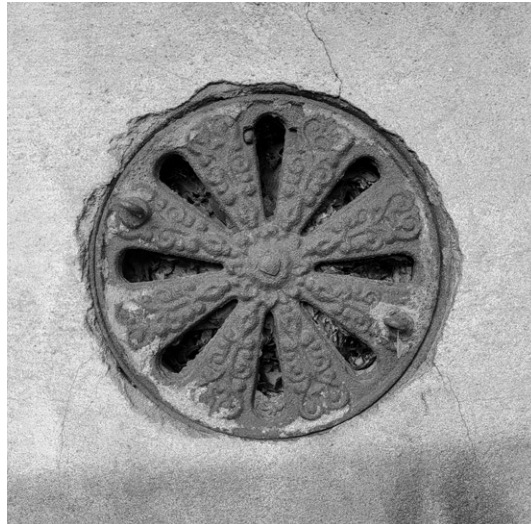
55% - 2
75% - 3

AND Demonstrate through annual computer simulations that annual sunlight exposure1000,250 (ASE1000,250) of no more than 10% is achieved. Use the regularly occupied floor area that is daylit per the sDA300/50% simulations. The sDA and ASE calculation grids should be no more than 2 feet (600 millimeters) square and laid out across the regularly occupied area at a work plane height of 30 inches (760 millimeters) above finished floor (unless otherwise defined). Use an hourly time-step analysis based on typical meteorological year data, or an equivalent, for the nearest available weather station. Include any permanent interior obstructions. Movable furniture and partitions may be excluded.

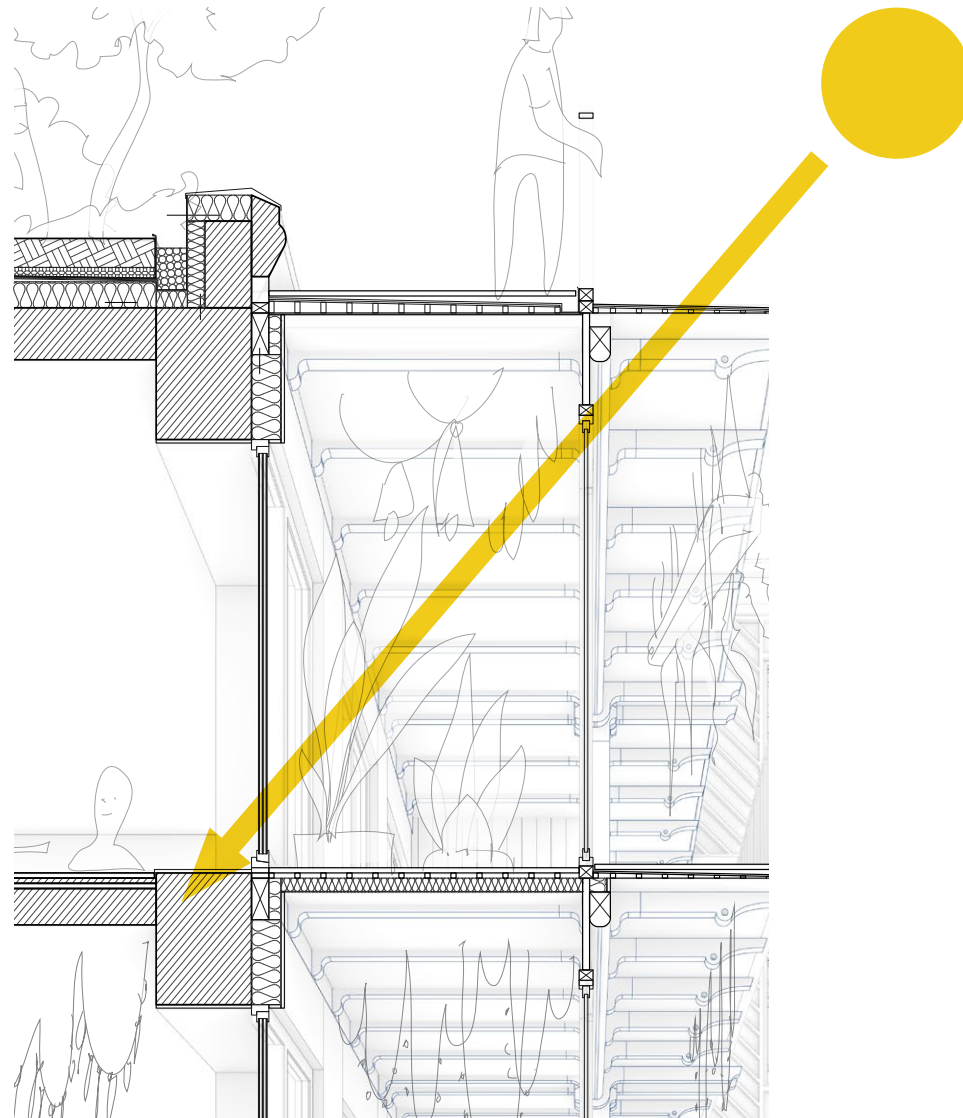
Ensuring Enough Daylight



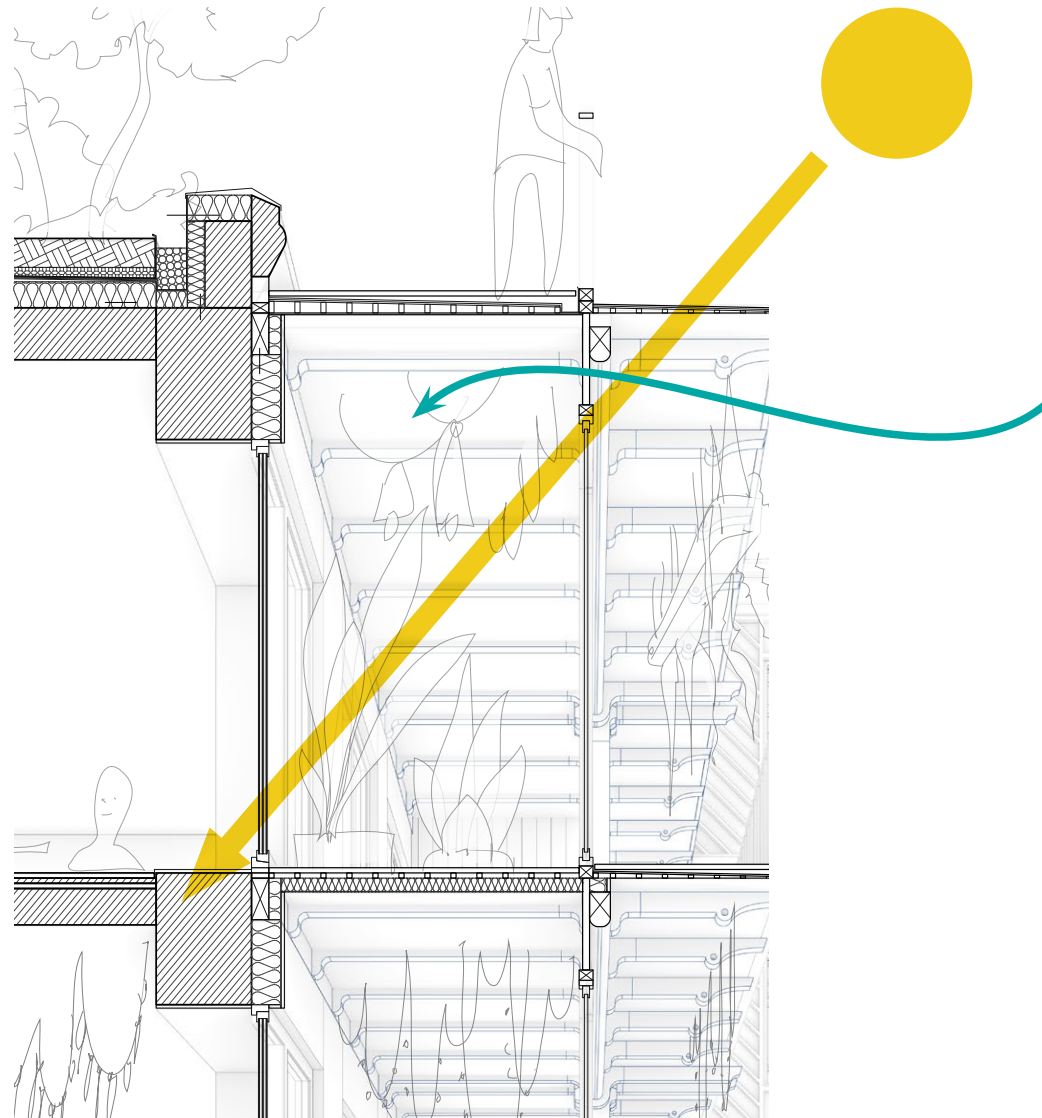
Summer Cross Ventilation



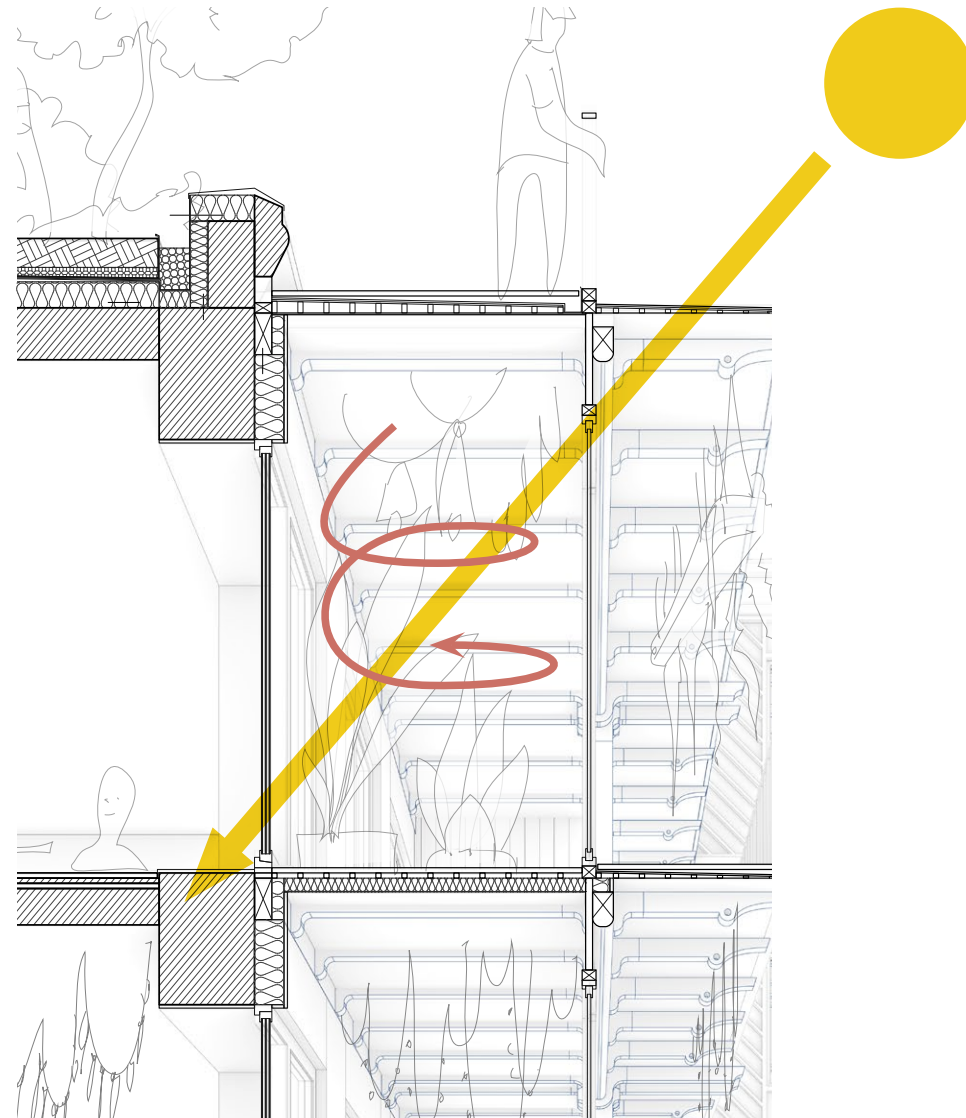
Adjustable Vents



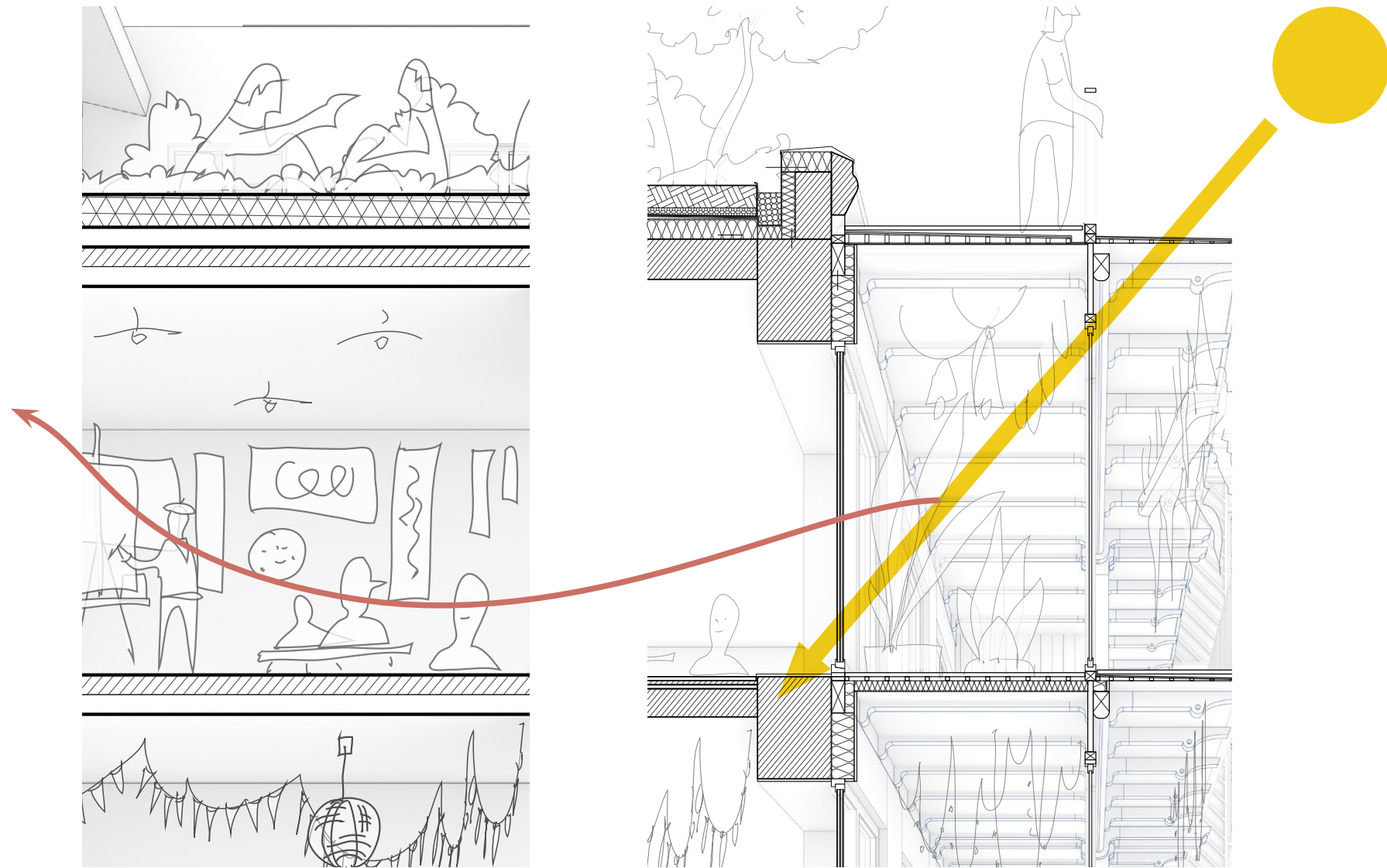
Winter Buffer



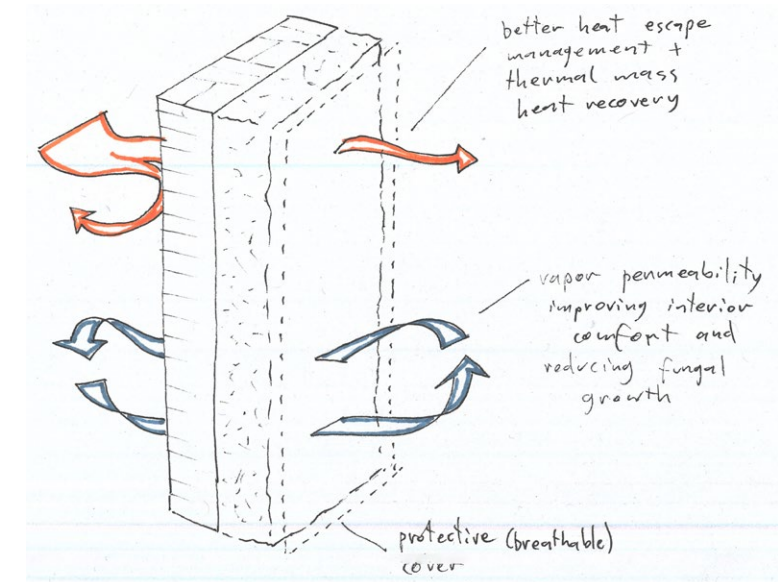
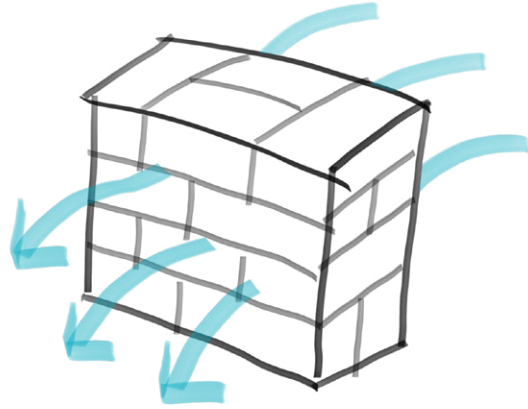
Pre-heating air



Pre-heating air



Pre-heating air



Natural Humidity Management

Bio-Based insulation materials can be bonded with masonry to form a continuous, humidity permeable barrier. That improves indoor comfort and reduces mold issues.











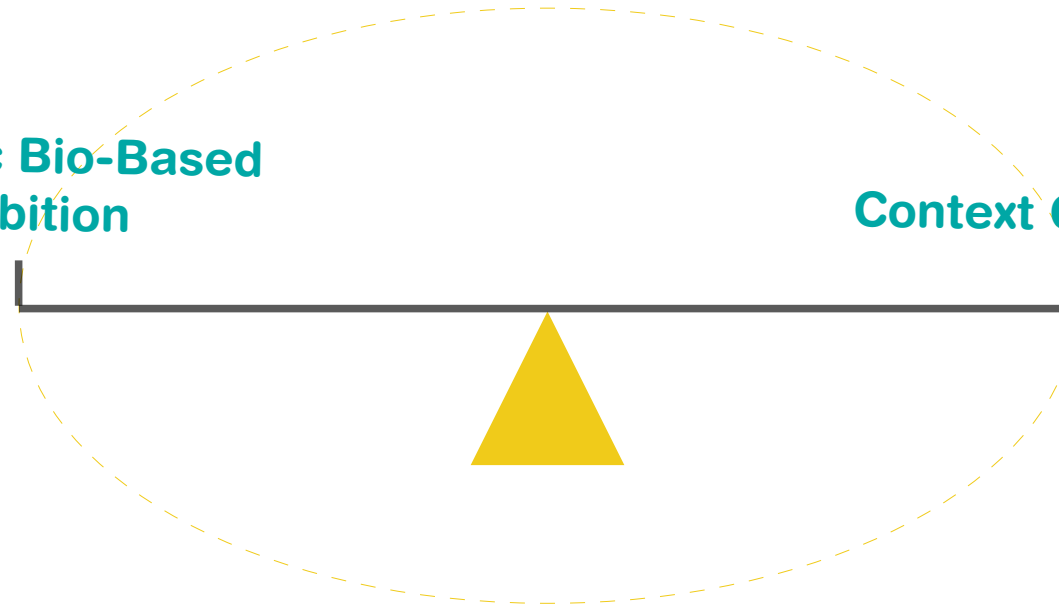




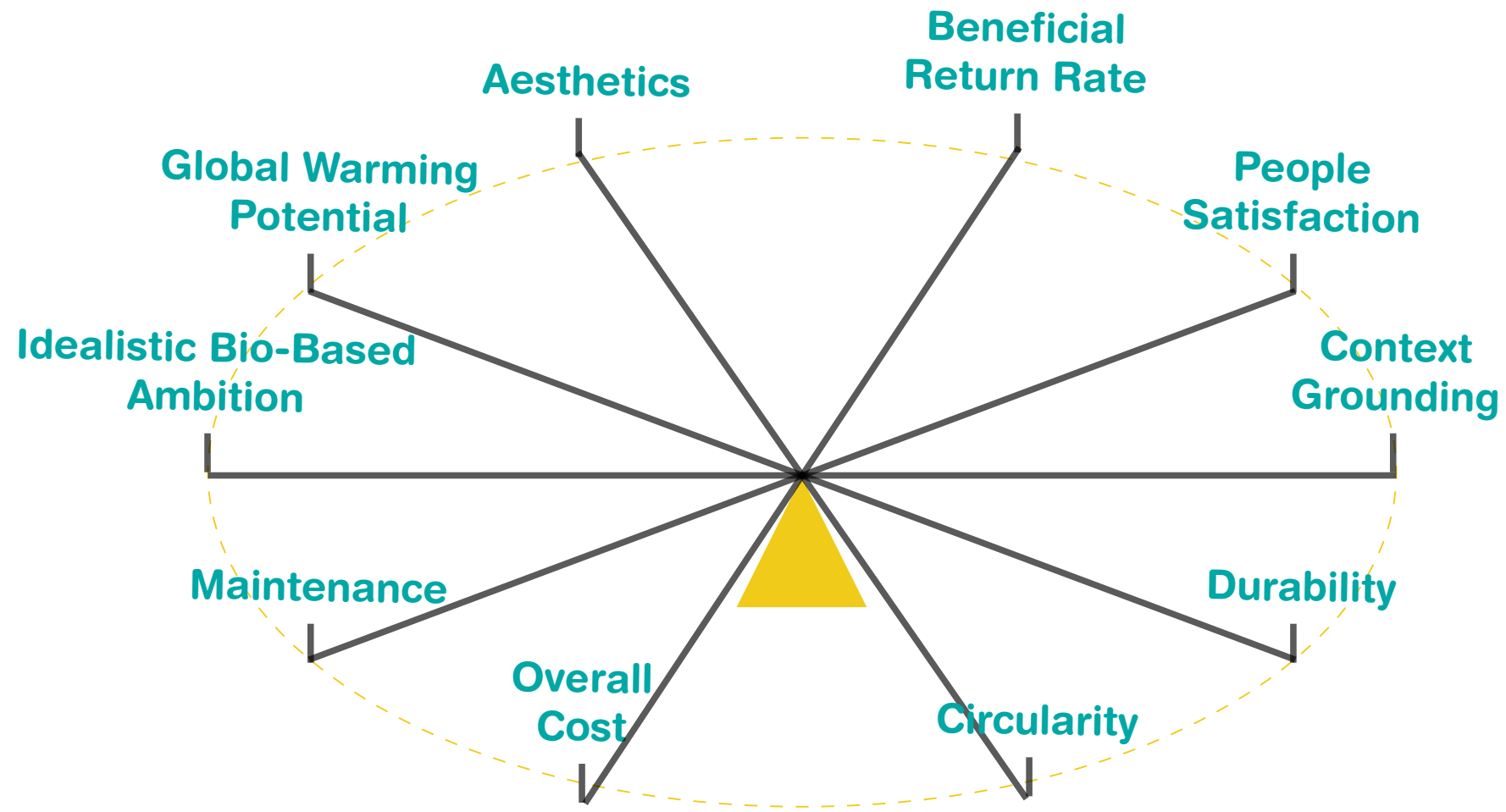


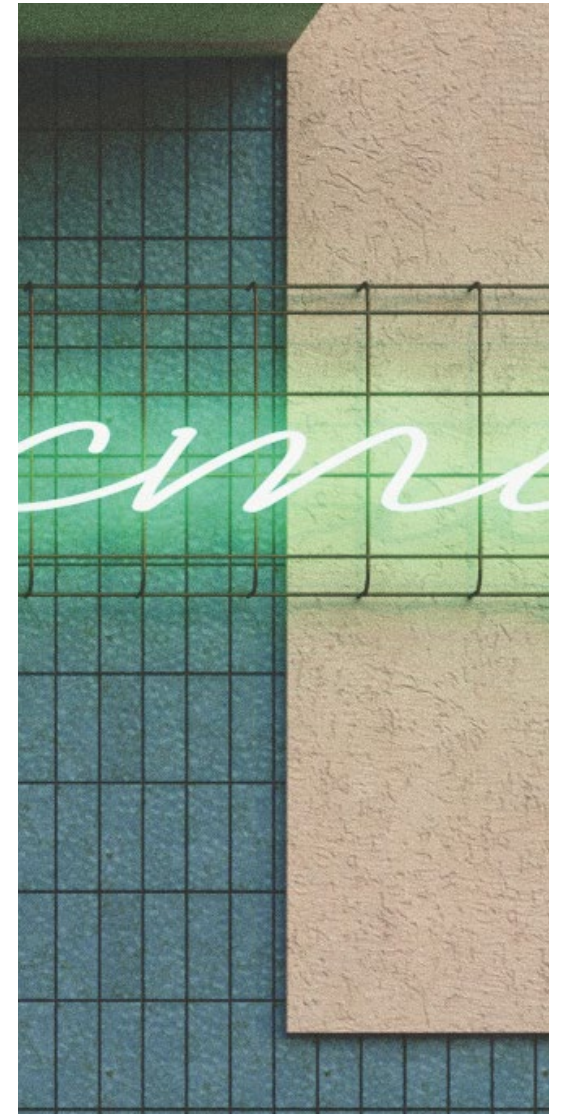
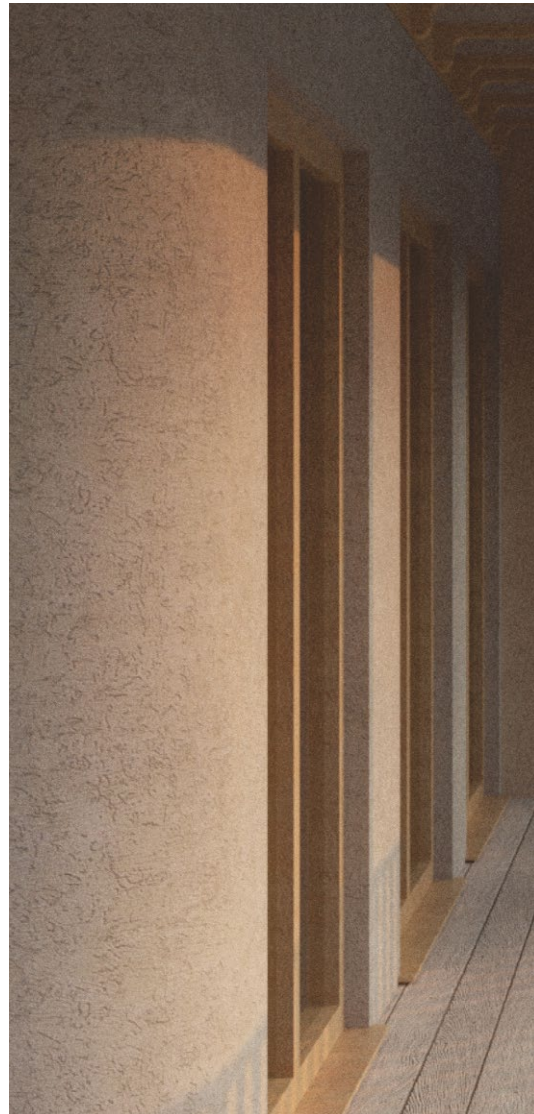
**Idealistic Bio-Based
Ambition**

Context Grounding

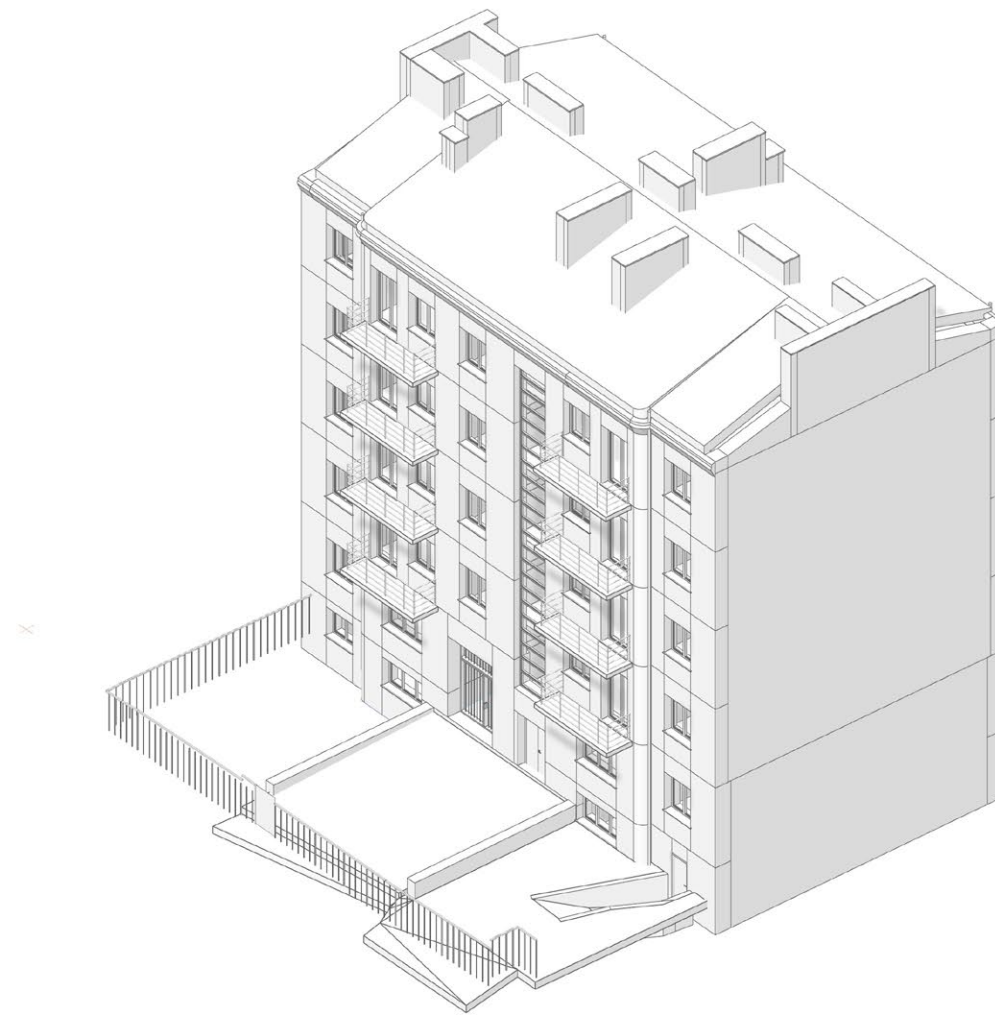


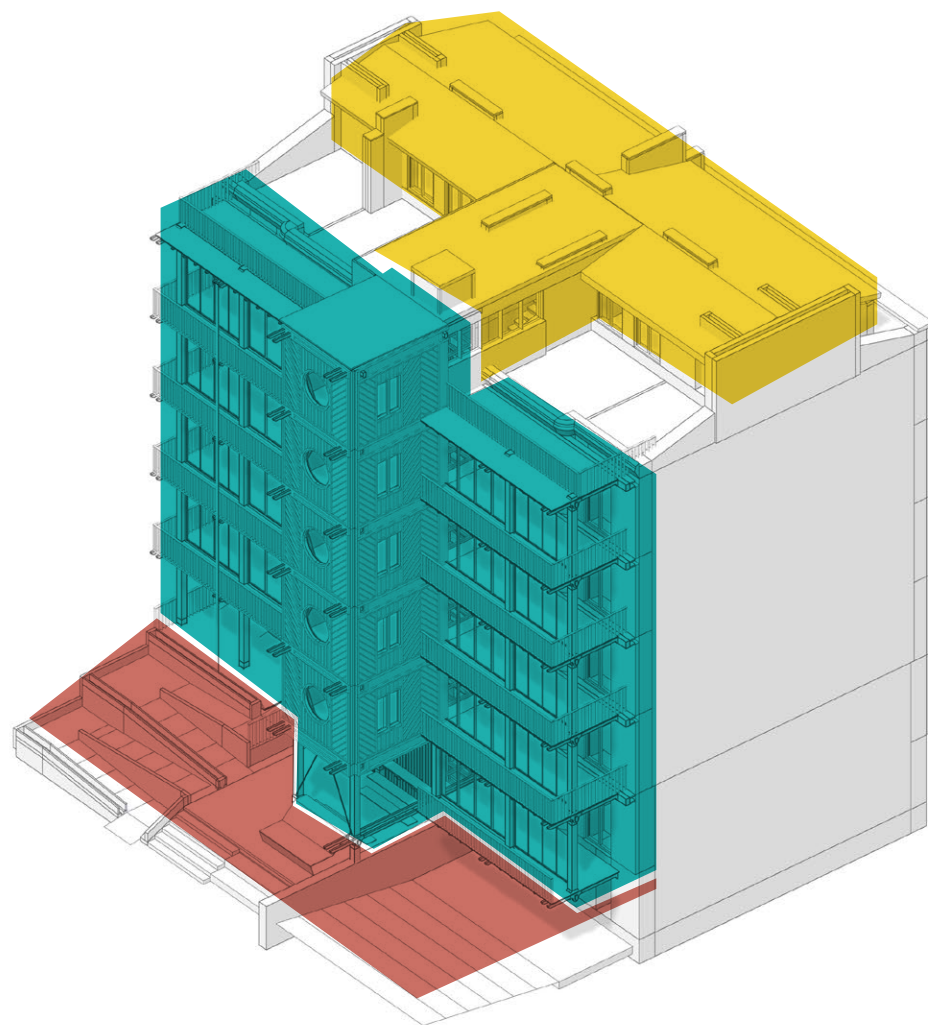
Contradiction of Factors

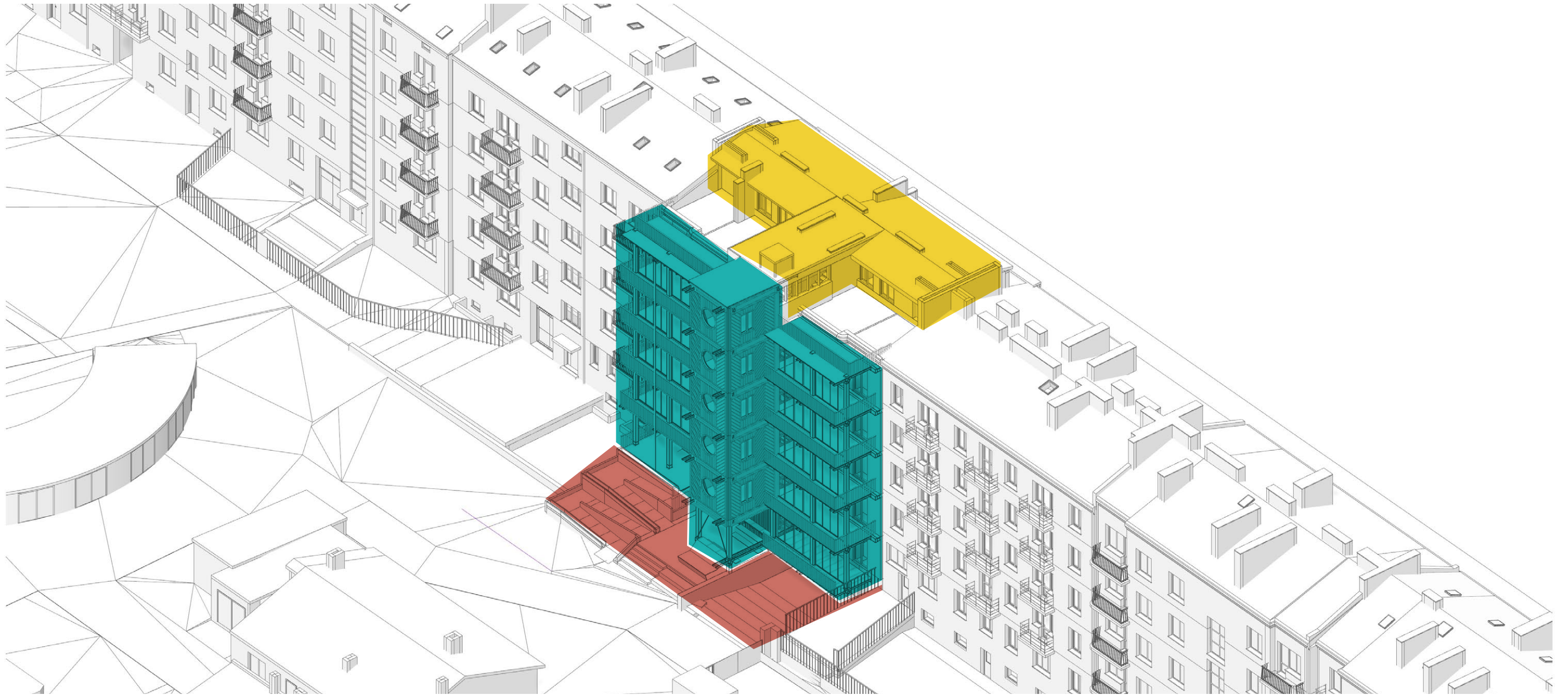




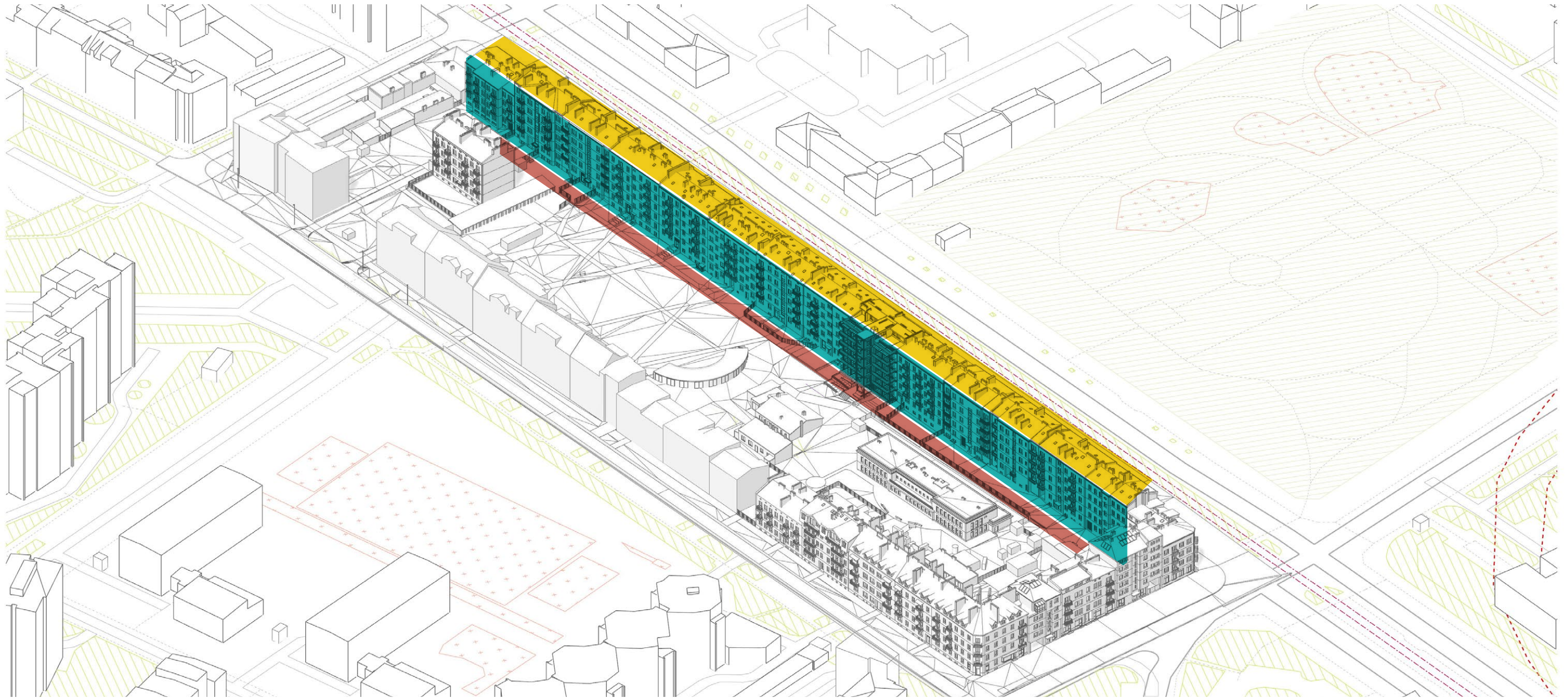
Material Decisions







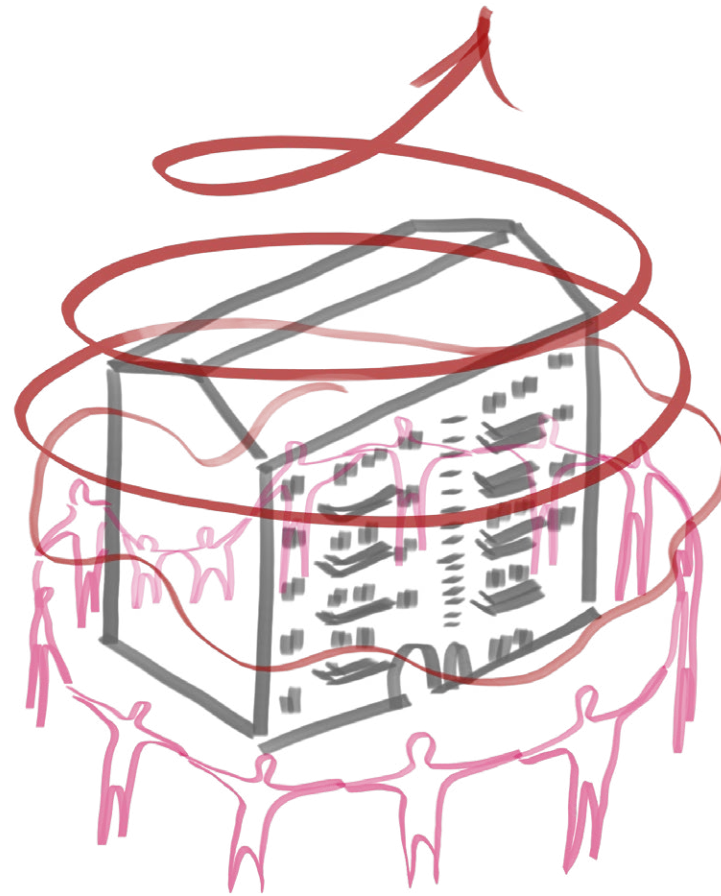






Hundreds of buildings to benefit





We can start with just one

Thank You!

