



**P5 Presentation**  
**Local Production Centraal Beheer**

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5096553

Gradution Project Overview

Research: Local Materials

Program

Urban Scale

Residential Scale

Residential Unit



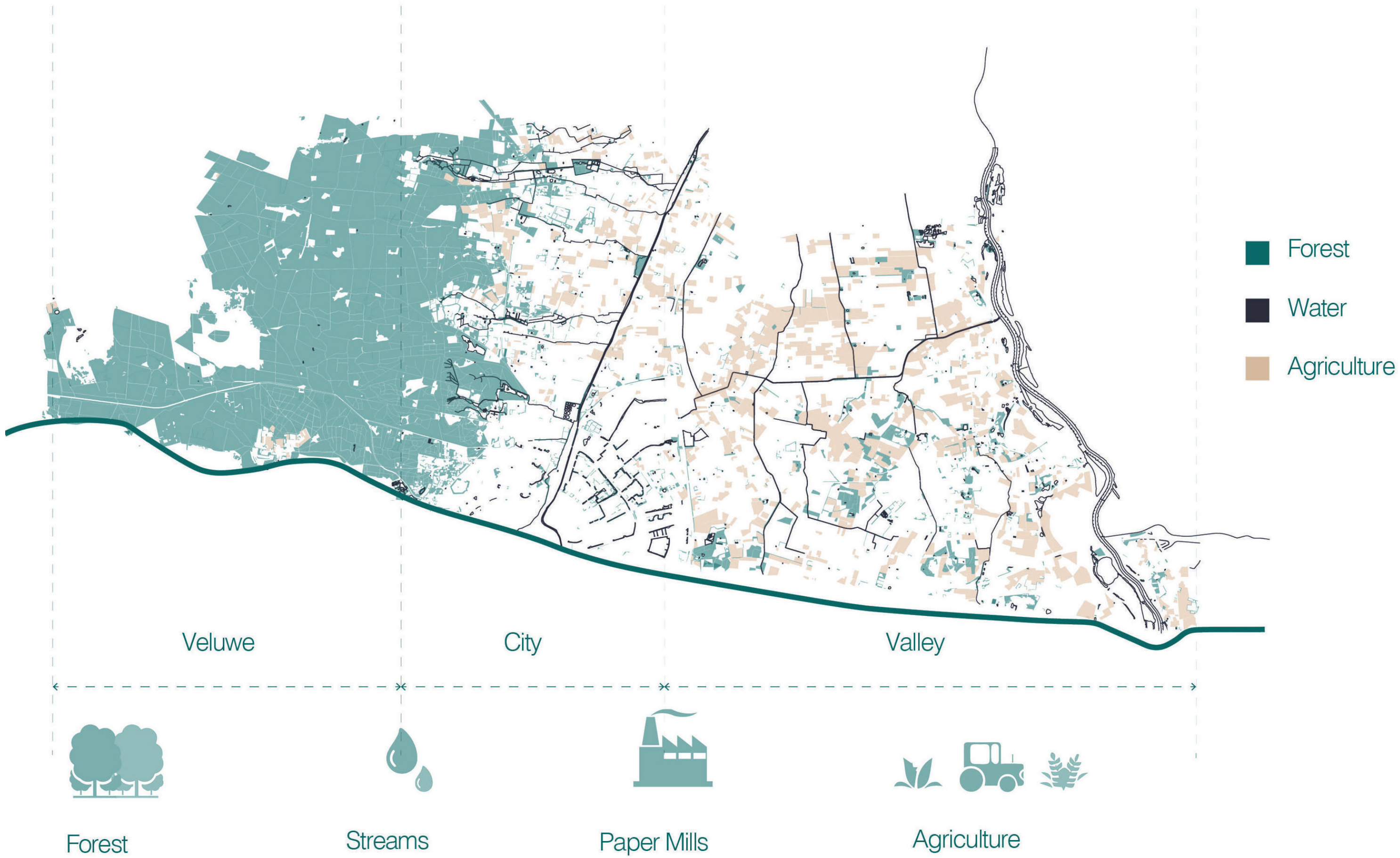
## Context: Apeldoorn City Centre

Population Growth :  
**from 160,000 to 200,000**  
by 2040

Spoorzone:  
**1,500 New Homes**  
**60,000 m2 New Workspace**  
**New Leisure**



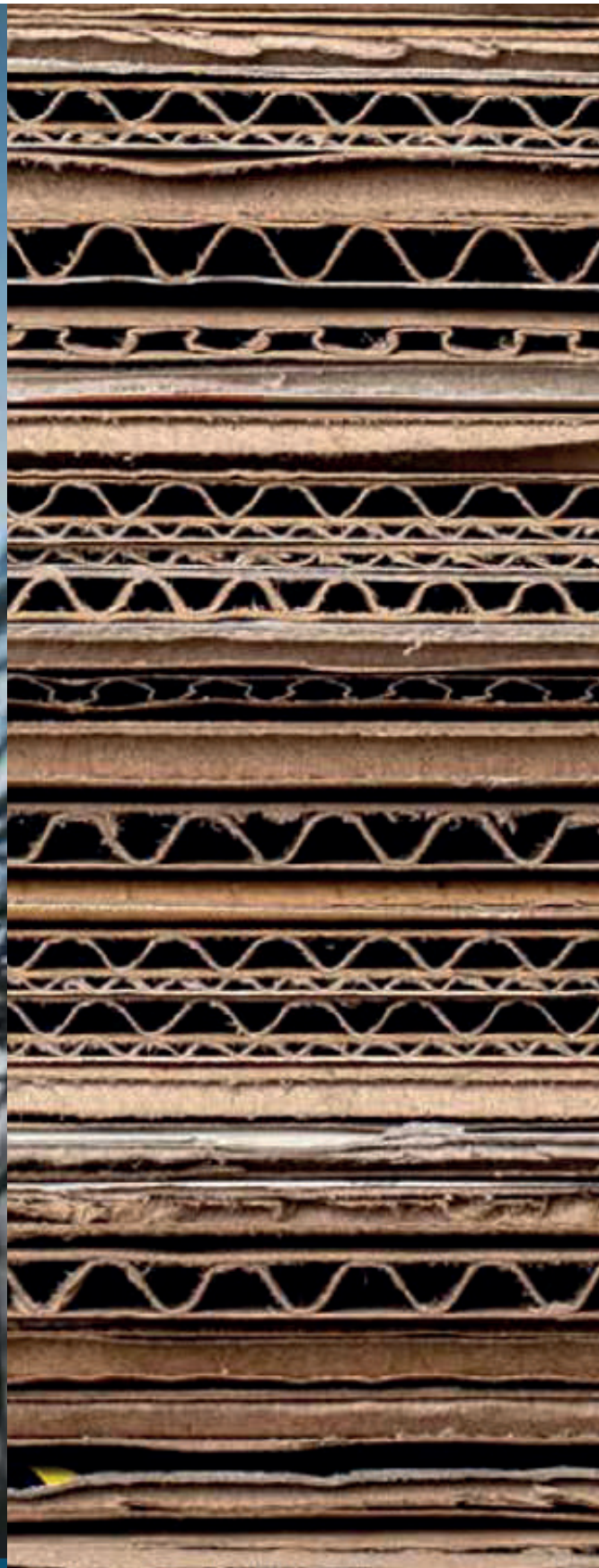






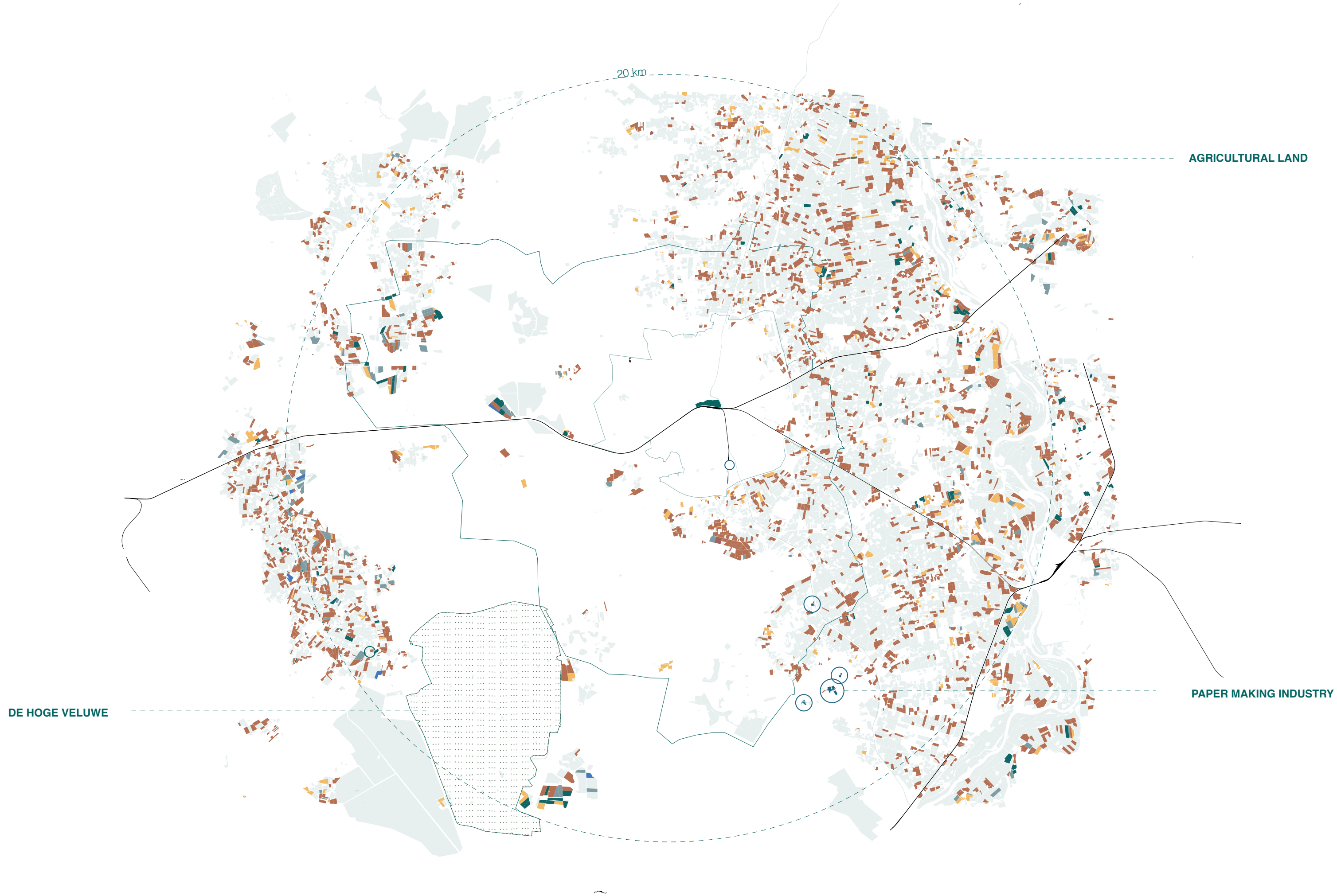


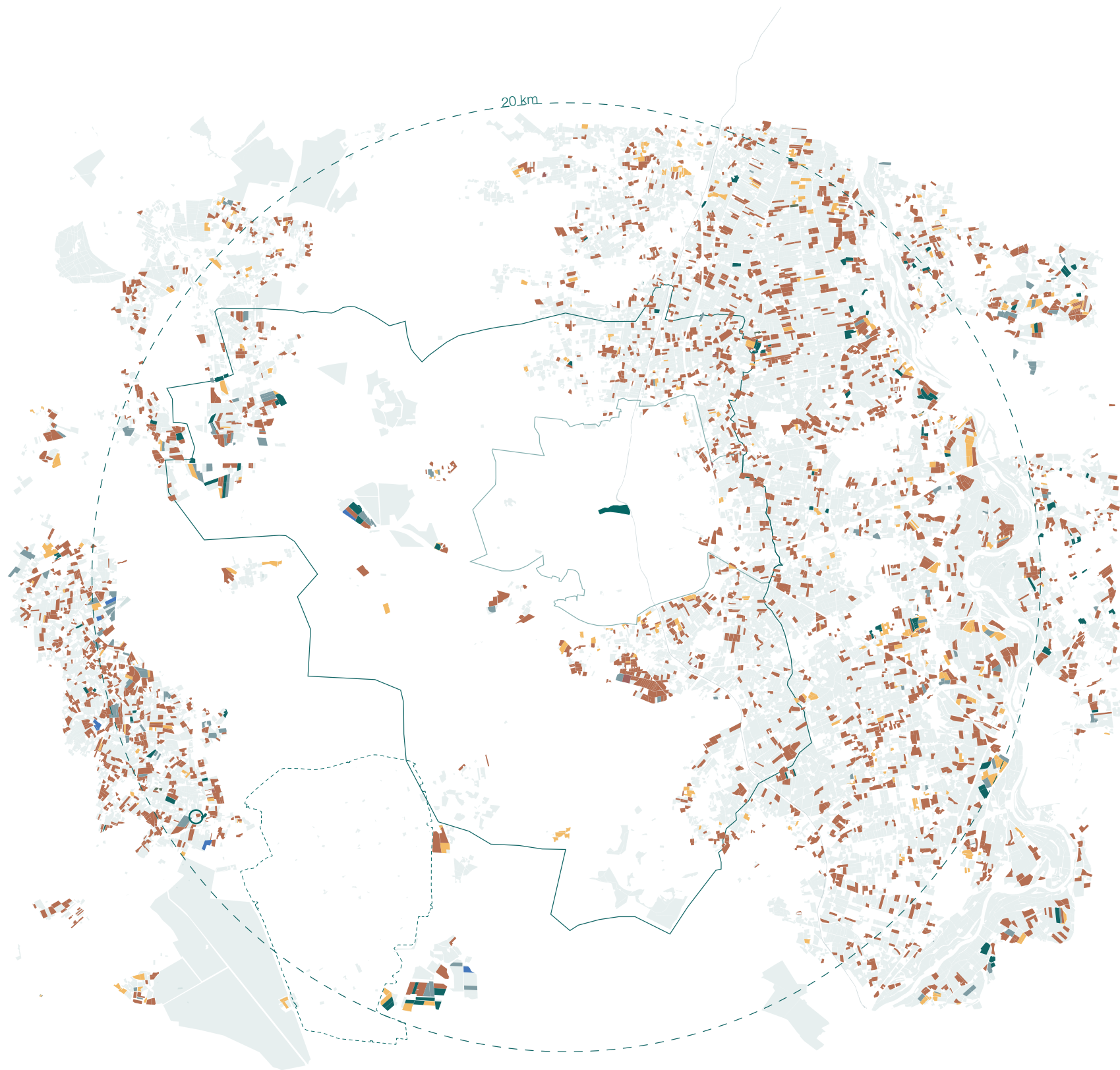






**Research:** Local Materials





## AGRICULTURAL LAND

### Potential Material Output:

**Maize:** 436 tonnes (<1% of annual production)



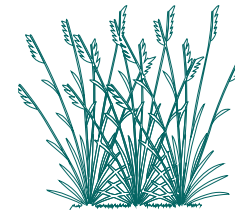
**Wheat Straw:** 1,410 tonnes (<3% of annual production)



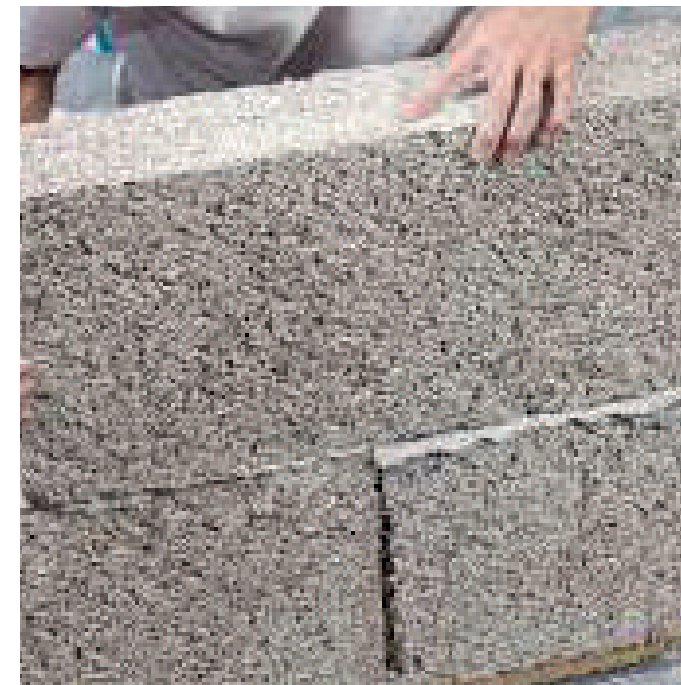
**Hemp:** 223 tonnes (50 % marginal Land)



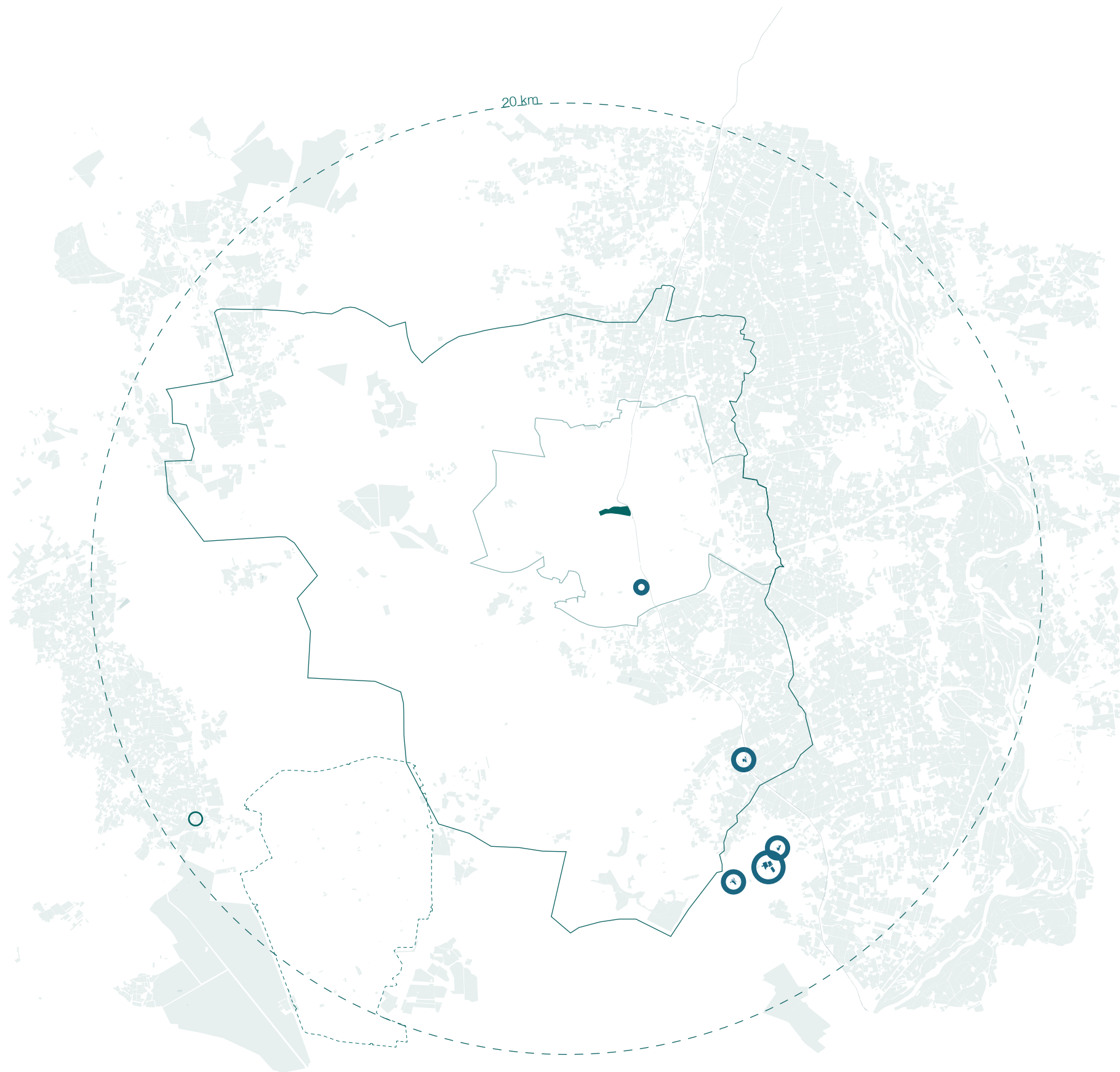
**Miscanthus/Cattail:** 298 tonnes ( 50 % marginal Land)







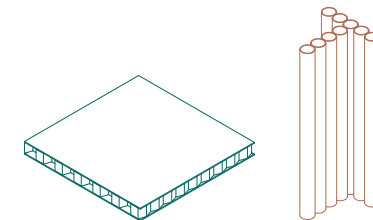




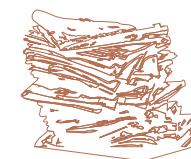
## PAPER MAKING INDUSTRY

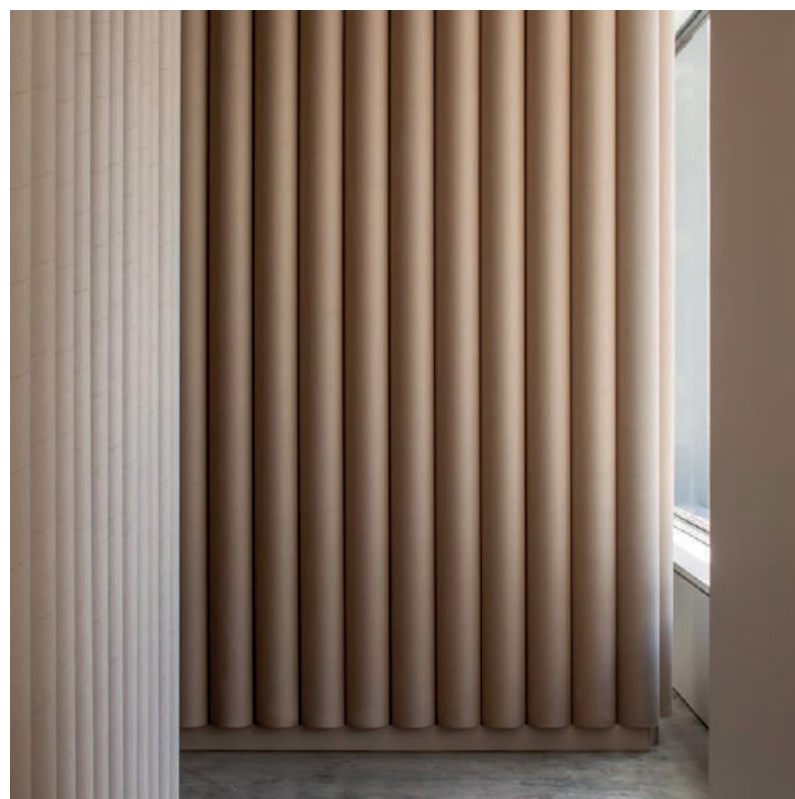
Potential Material Output:

Paper Product: 870 Tonnes

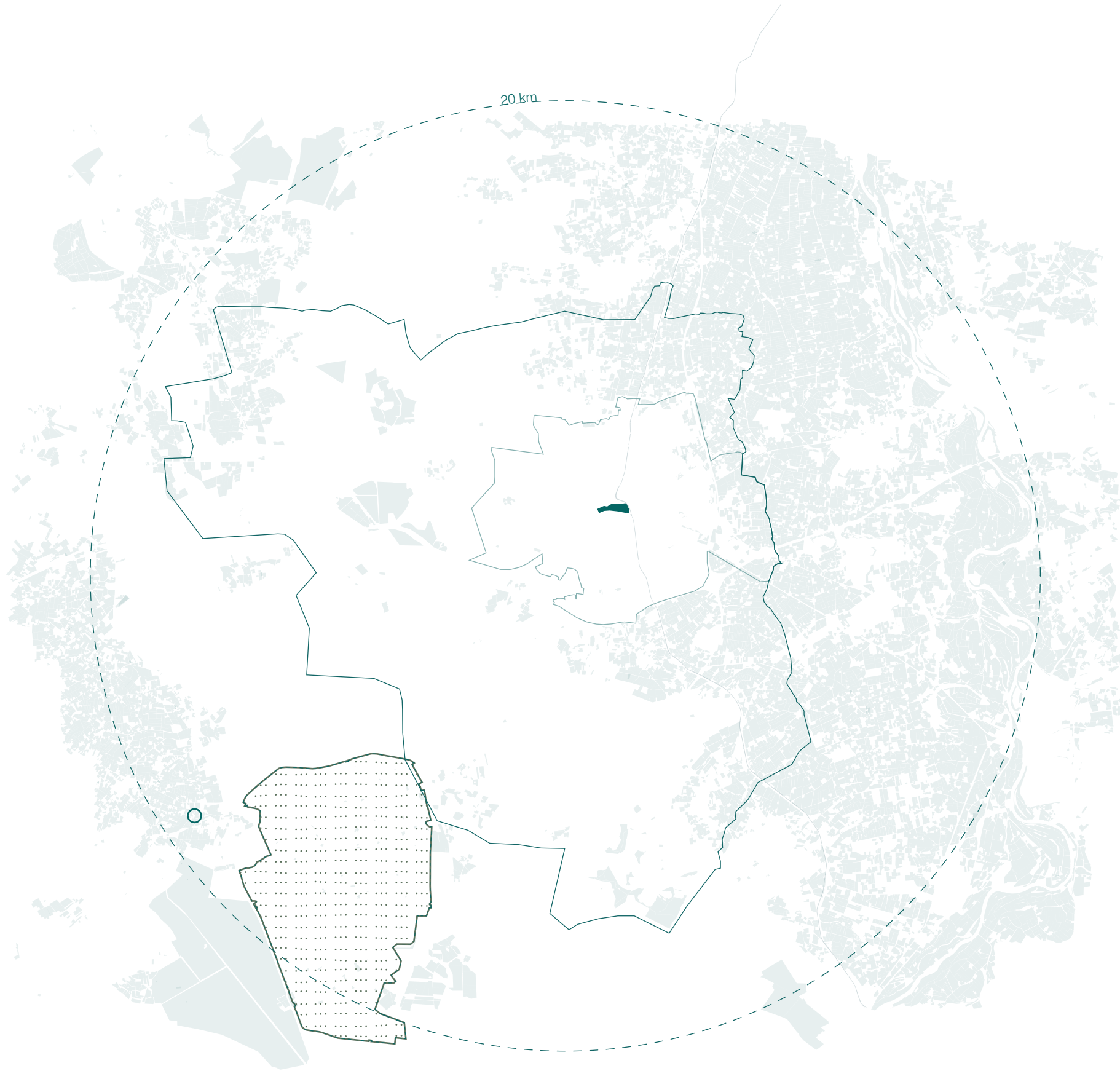


Cellulose Waste : 130 Ktons









**DE HOGE VELUWE**

**Potential Material Output:**

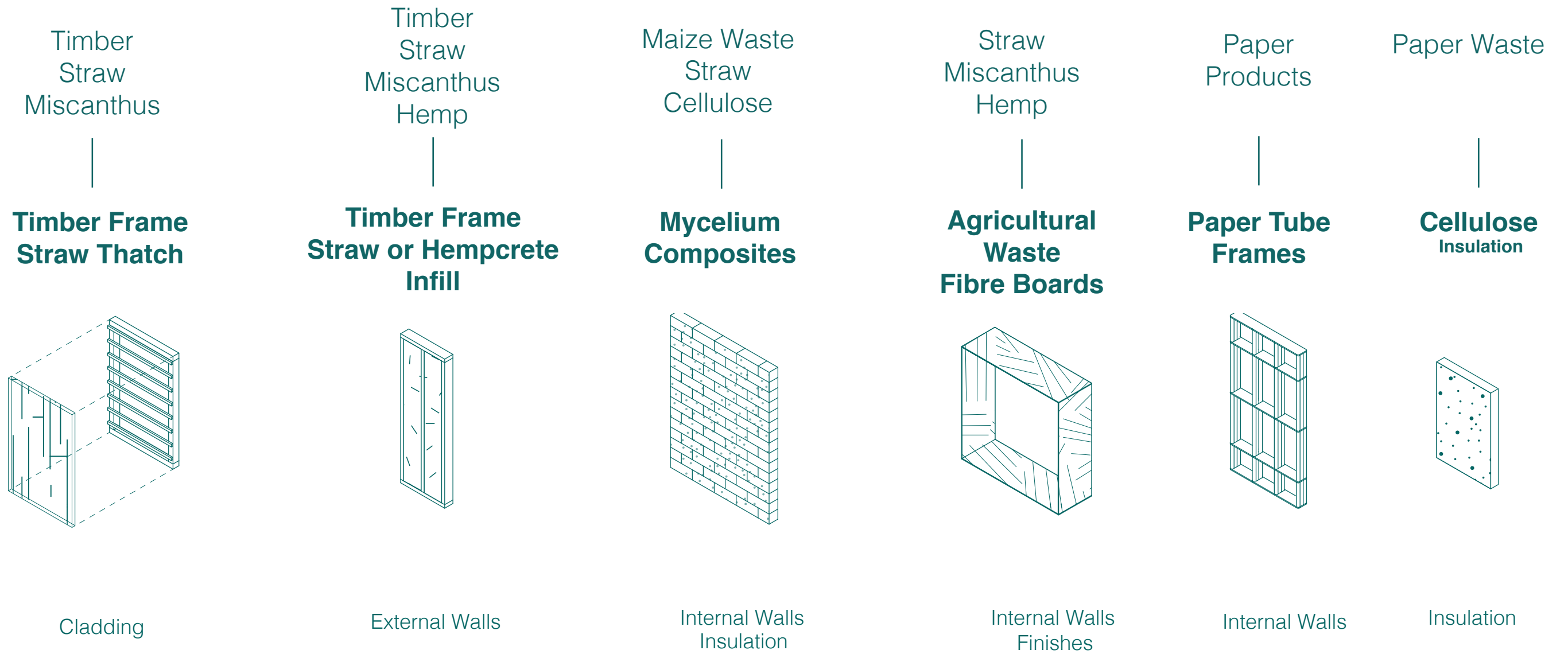
5500 Ha Timber Output

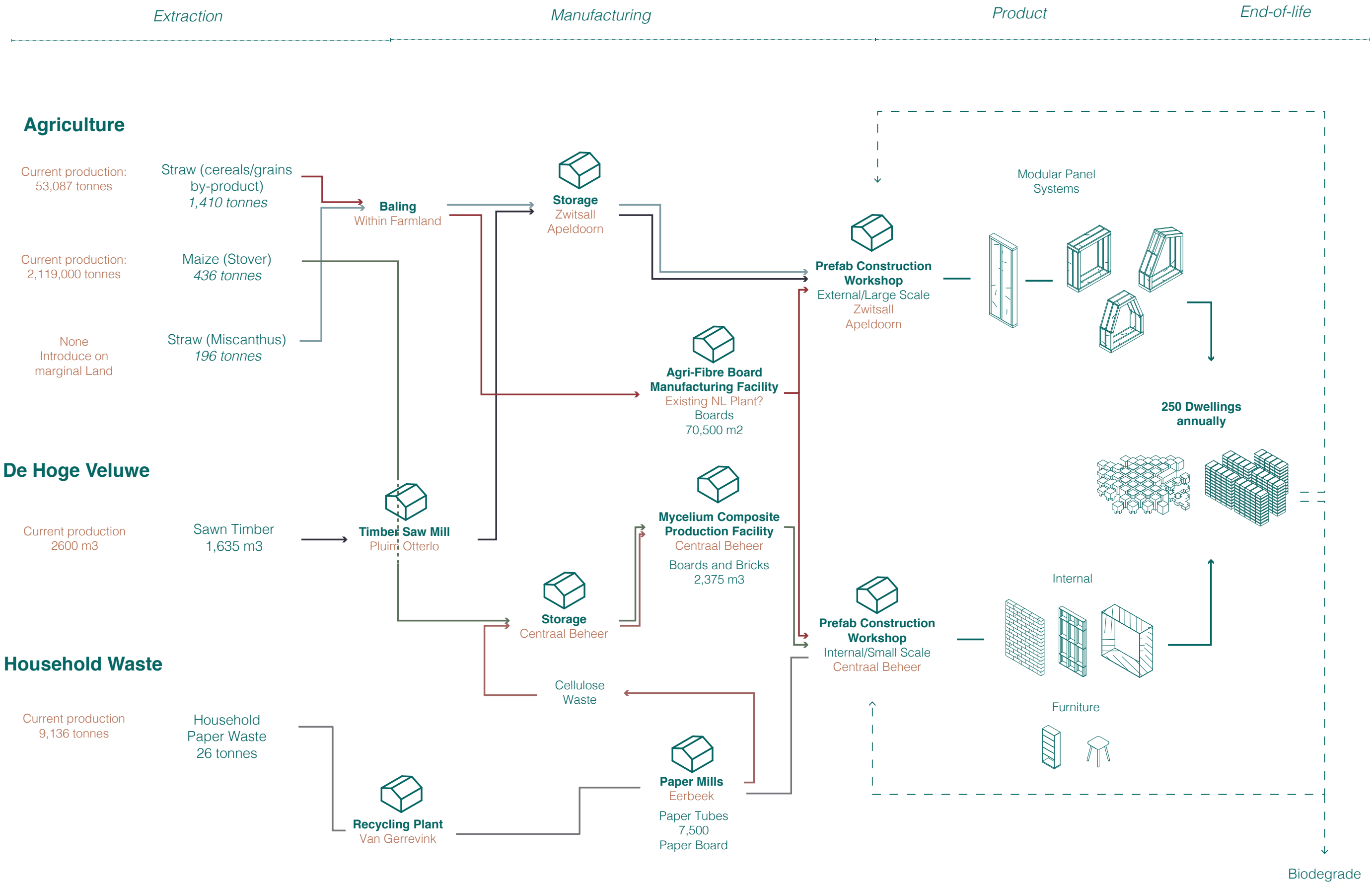
Douglas Spar, Larch, Pine:	2600m3 Sawn timber
	1200 m3 Wood Pellets
	8000 m3 Wood Chip









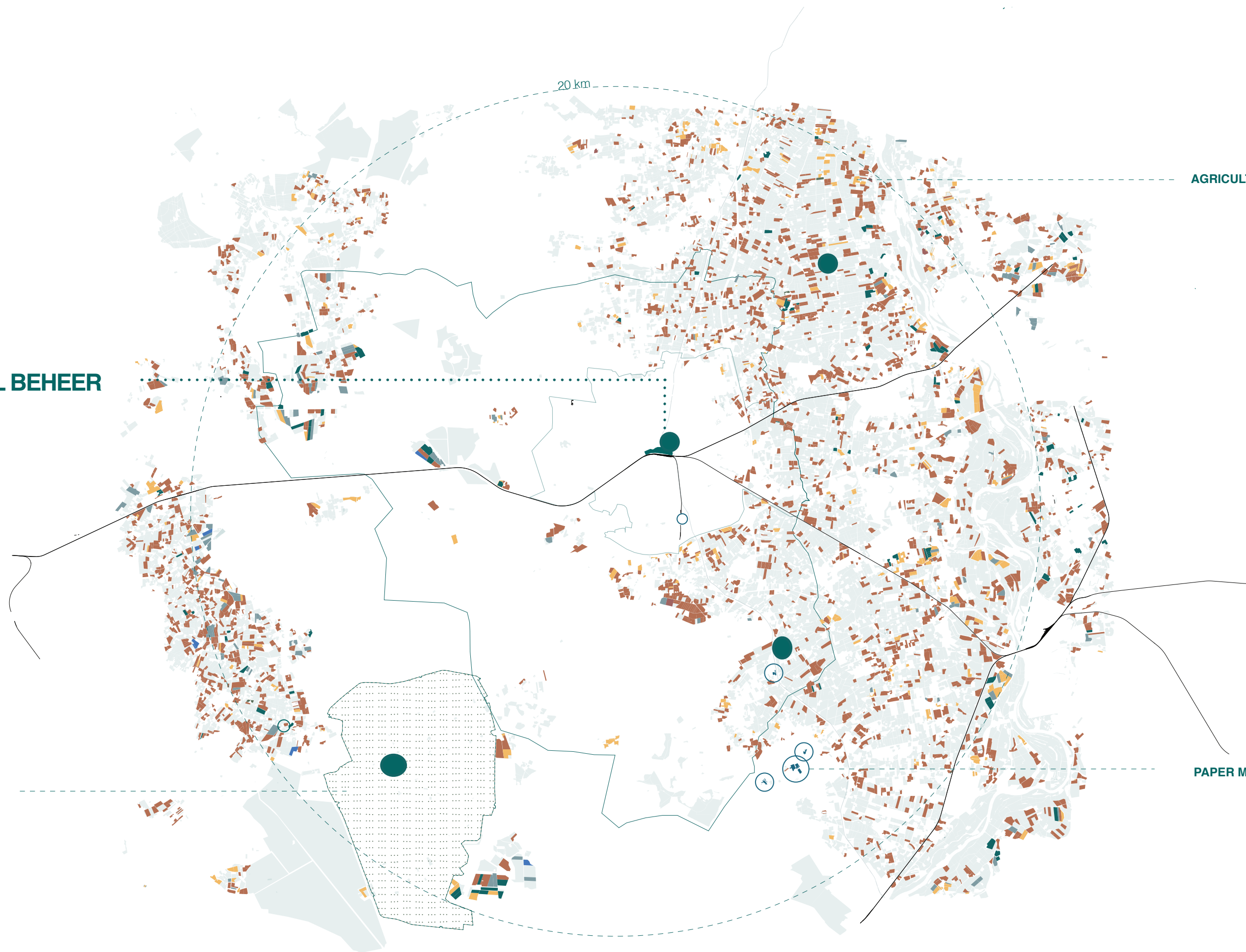


CENTRAAL BEHEER

DE HOGE VELUWE

AGRICULTURAL LAND

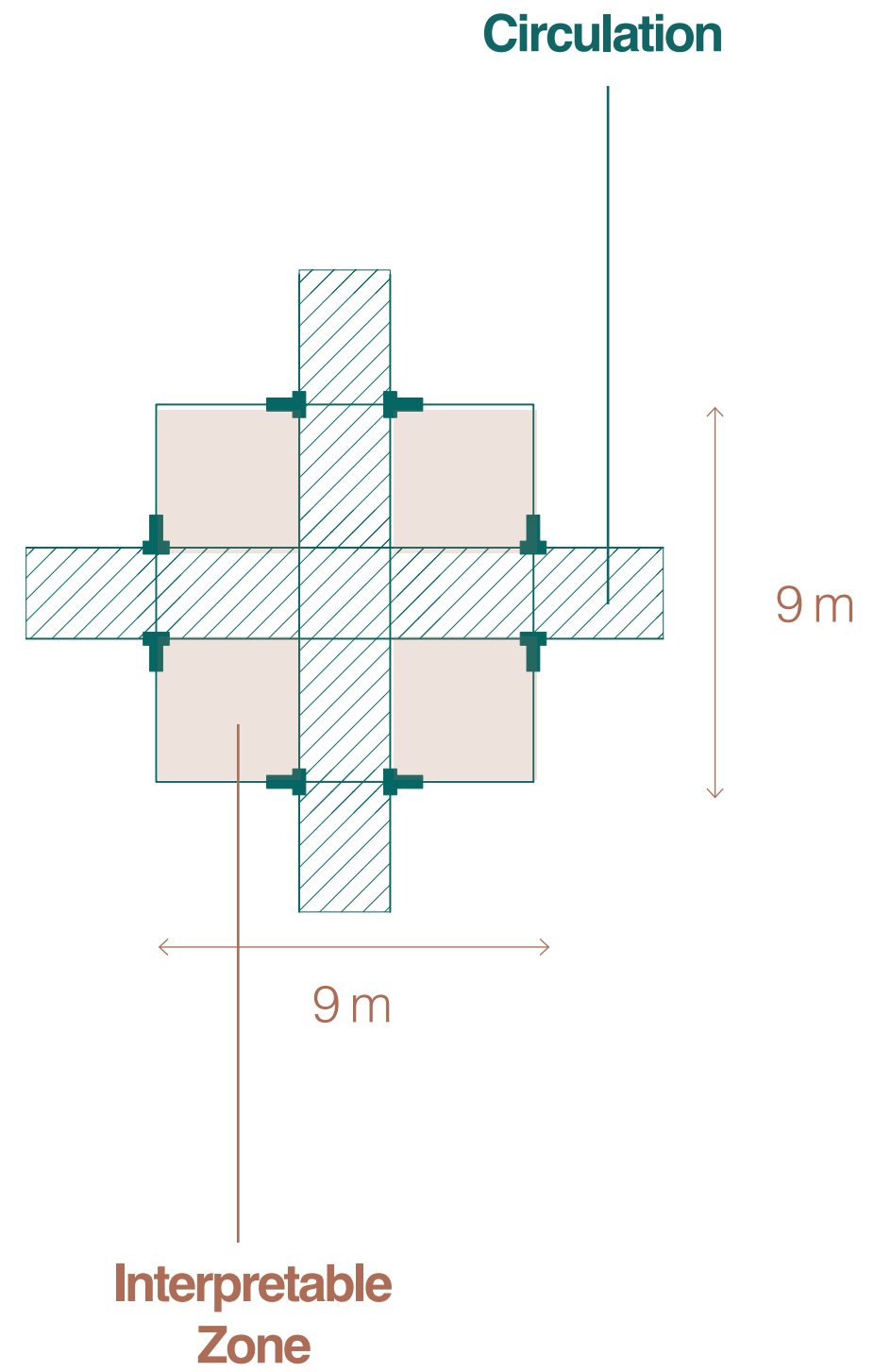
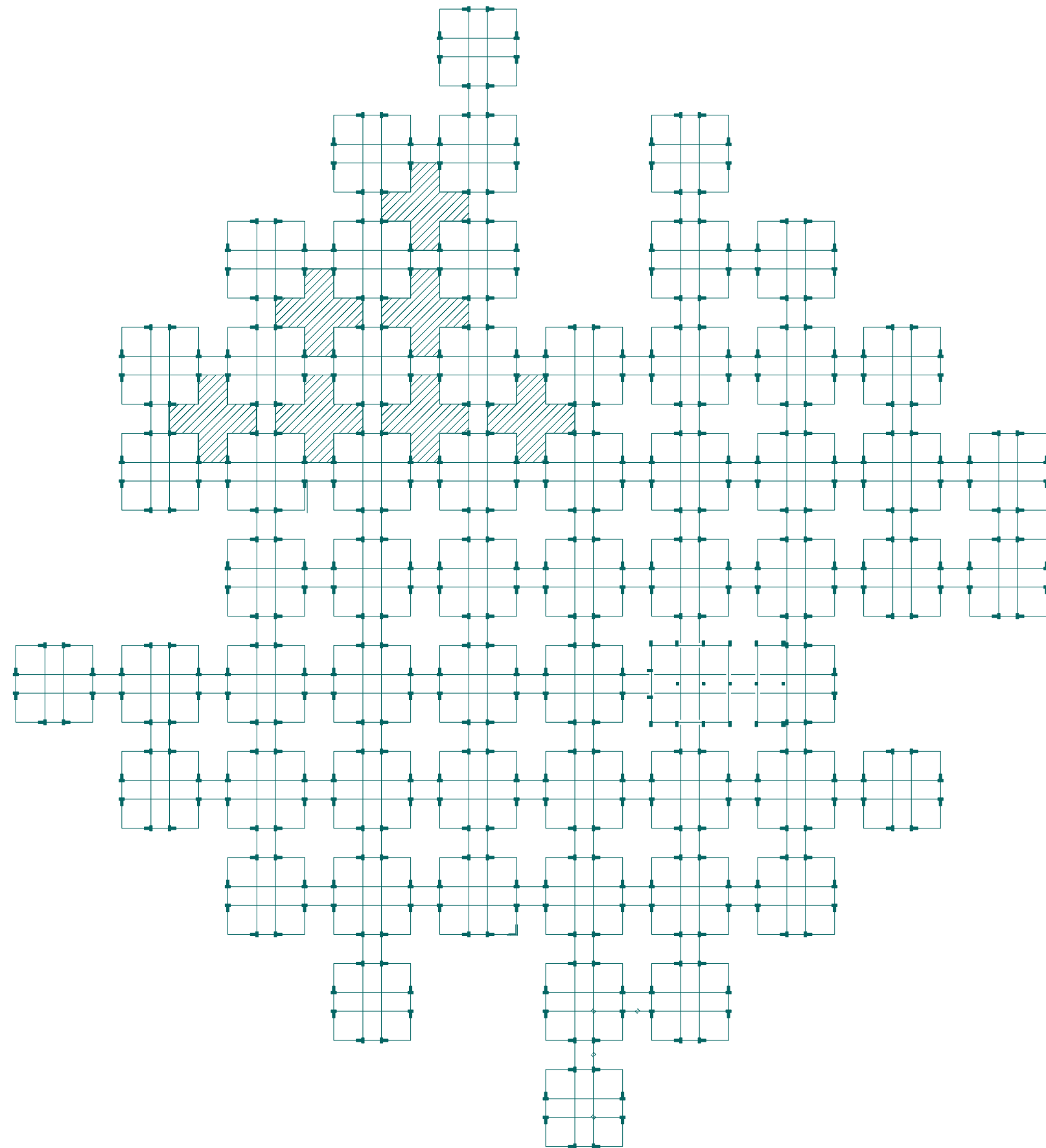
PAPER MAKING INDUSTRY

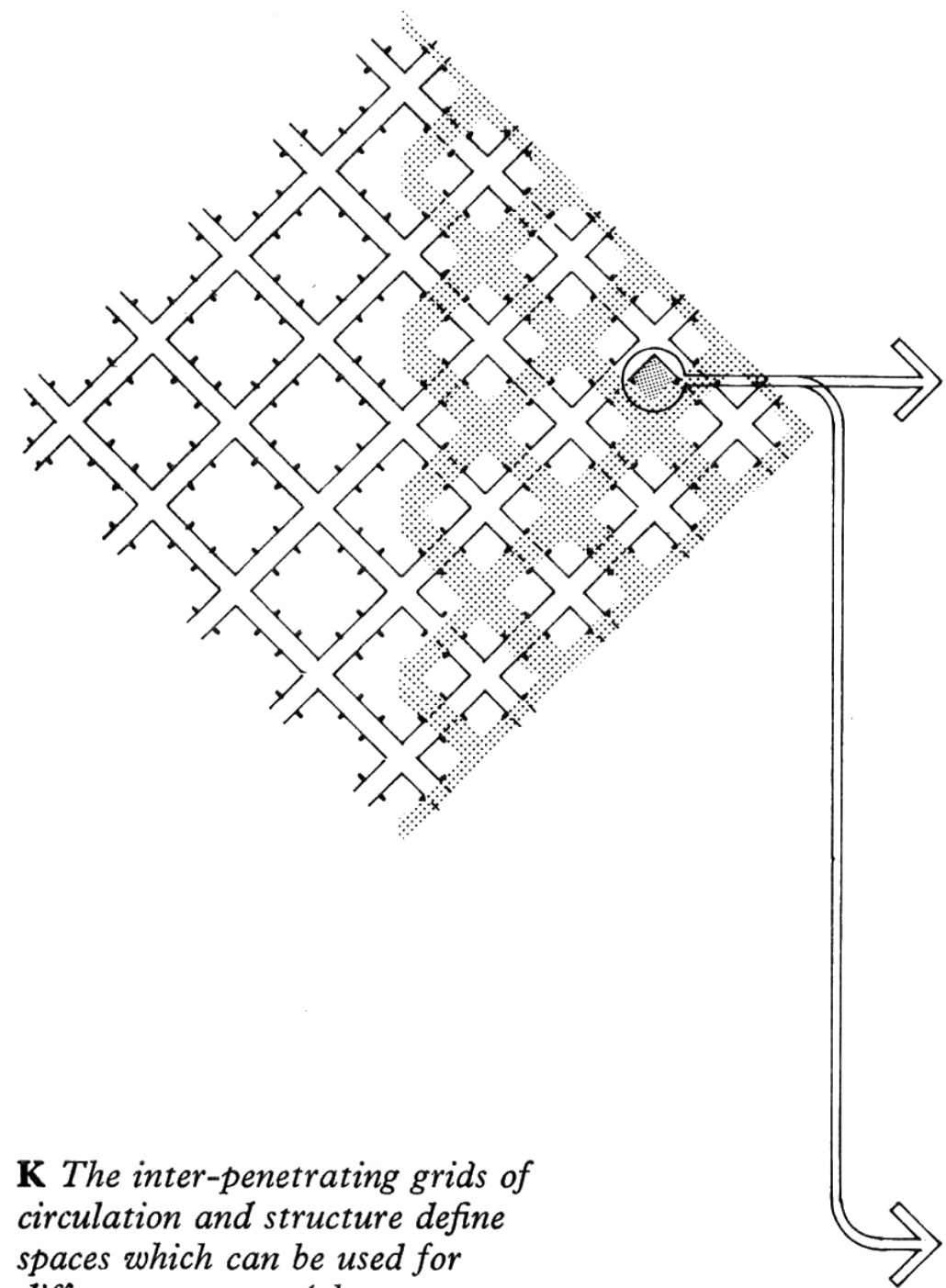




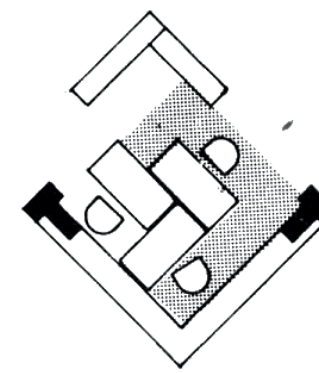




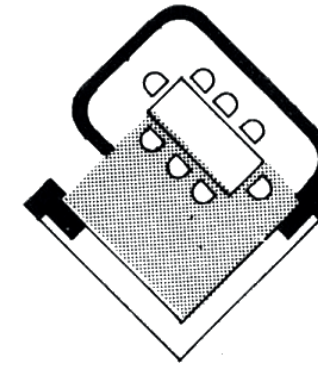




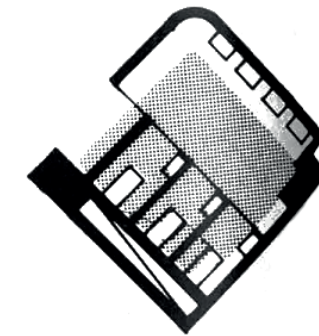
**K** The inter-penetrating grids of circulation and structure define spaces which can be used for different purposes (the interpretable zone): work stations, meeting, lavatories, break areas, restaurant.



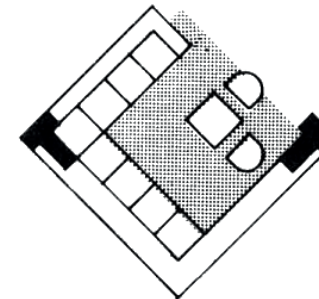
office area



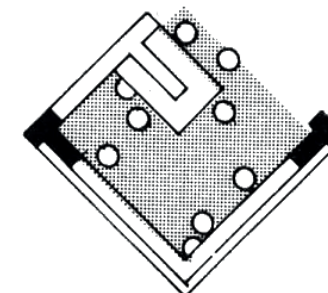
meeting area



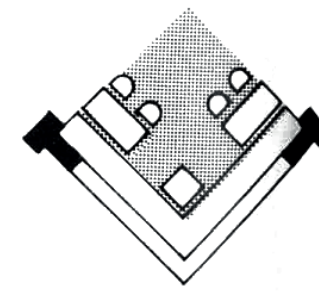
lavatory area



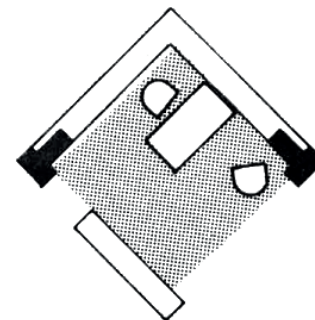
sitting area



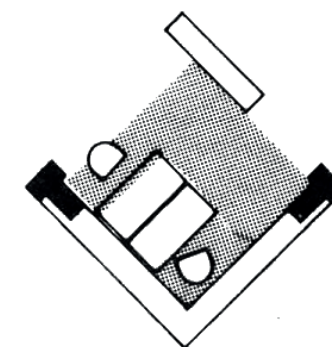
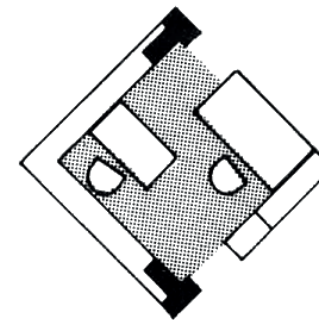
refreshment area



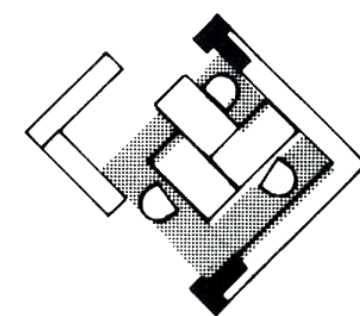
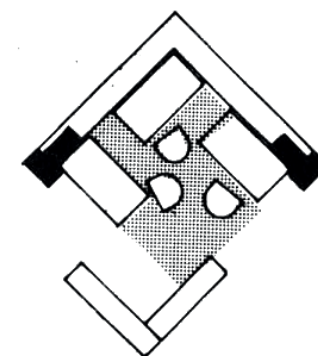
restaurant area



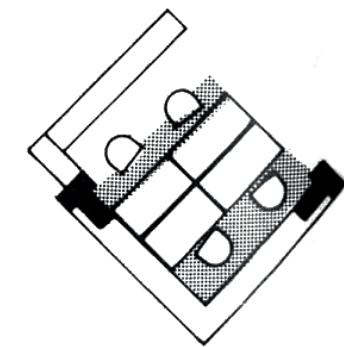
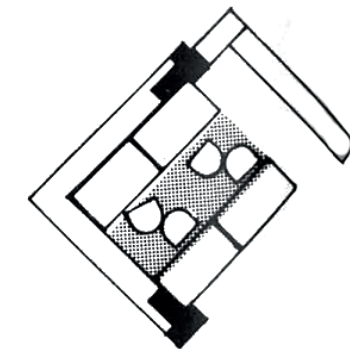
1 person



2 person



3 person



4 person





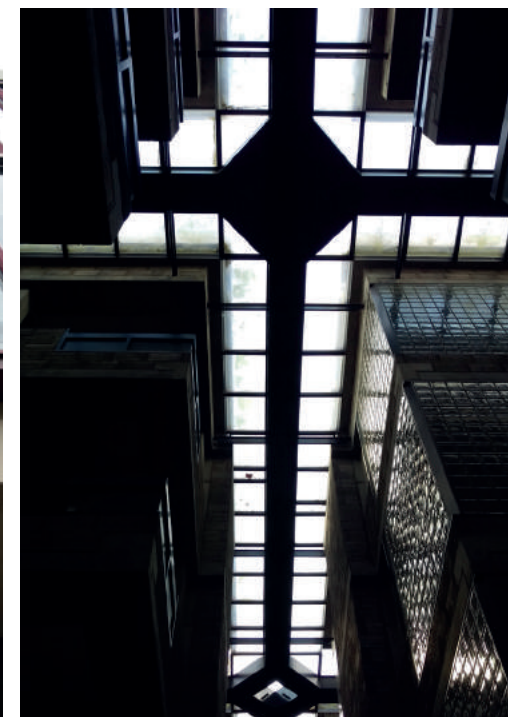
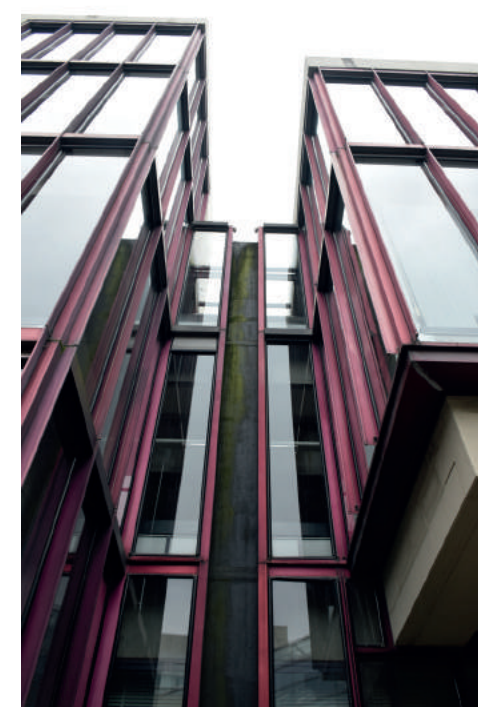
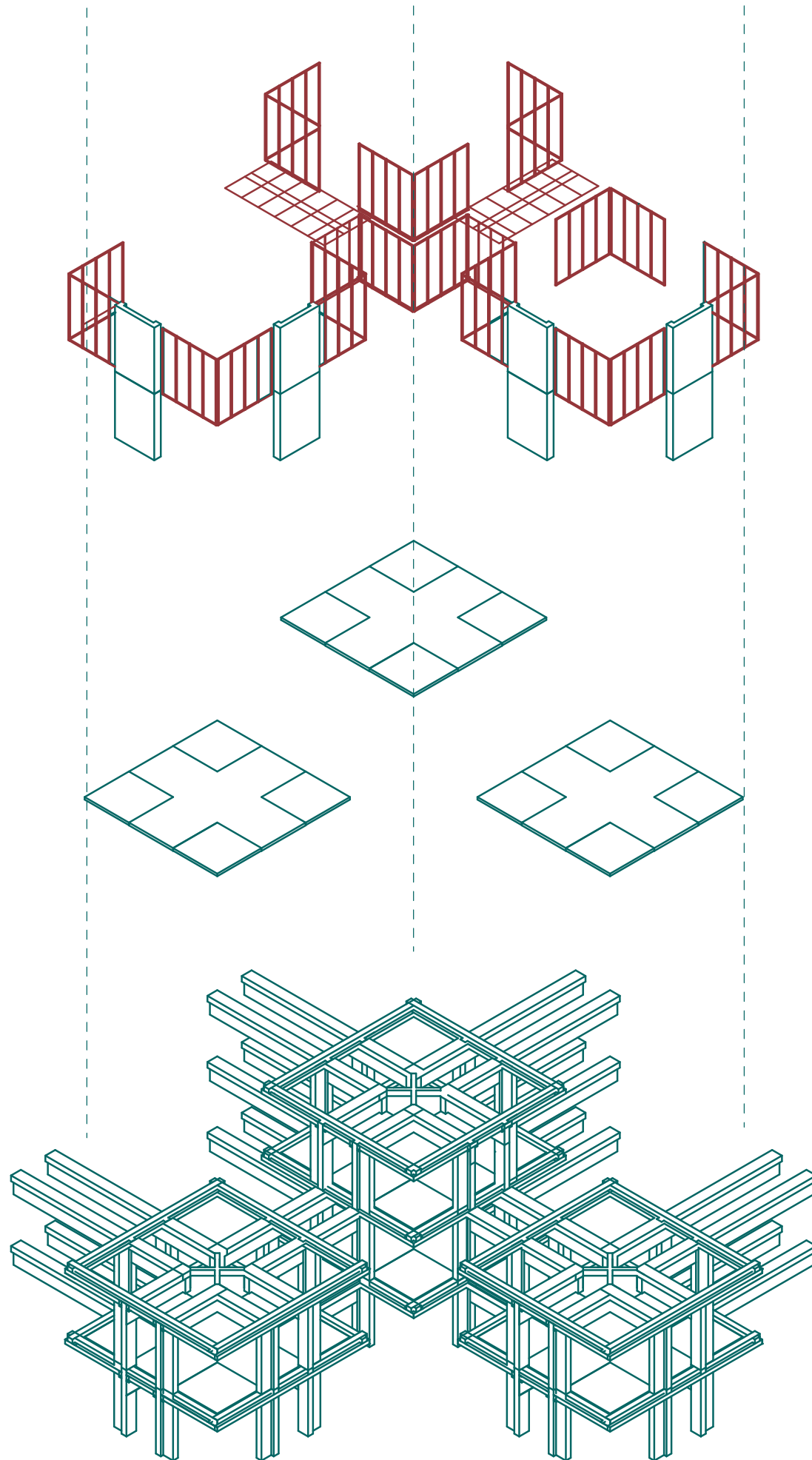




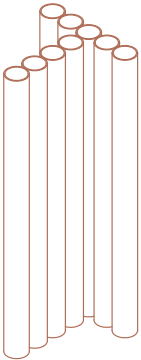
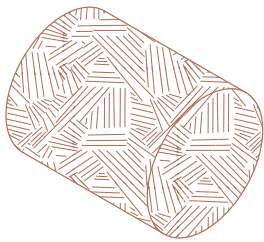
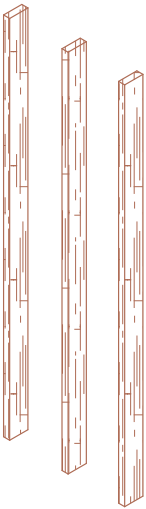
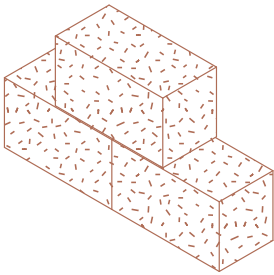
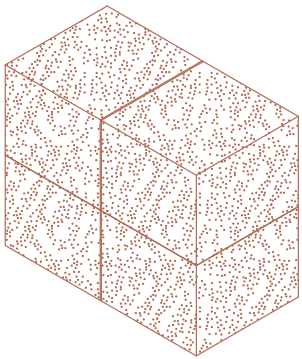
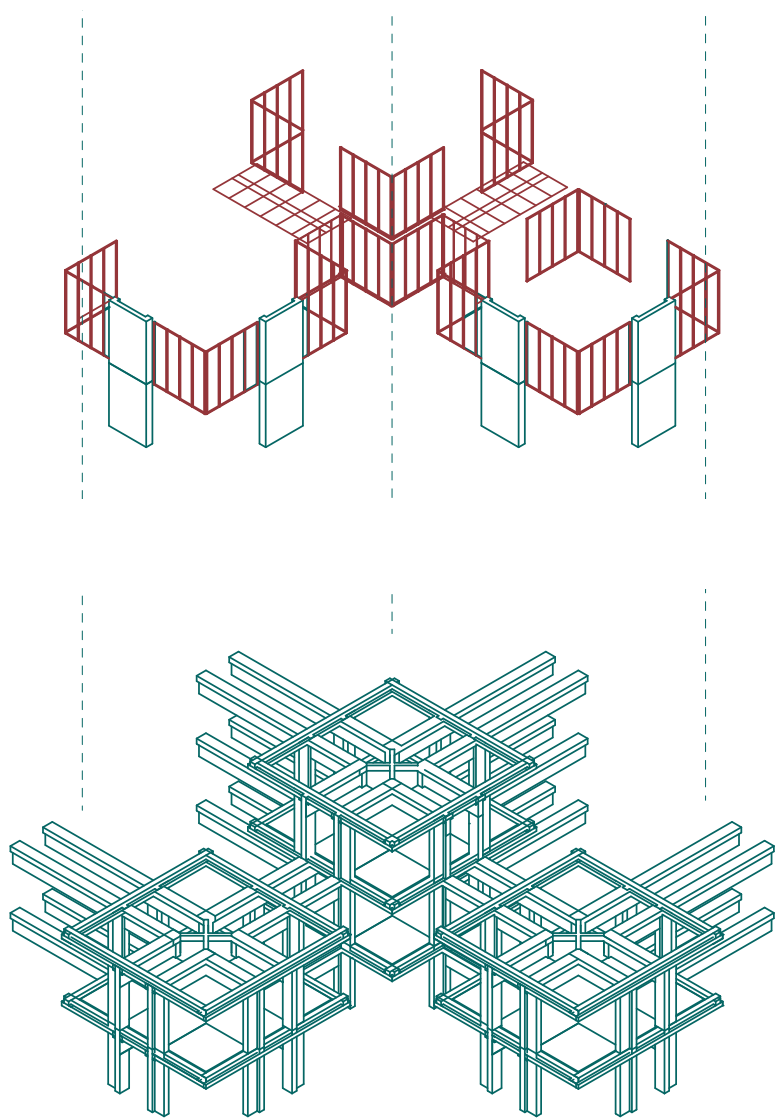








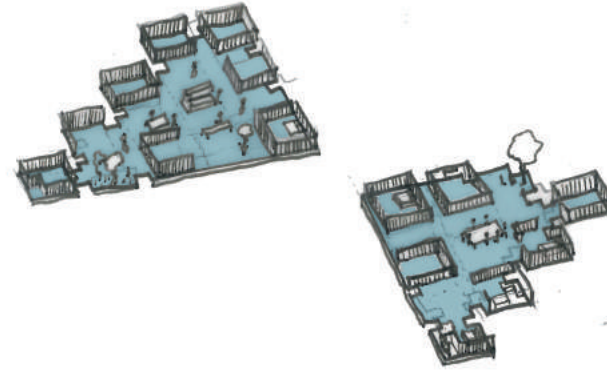
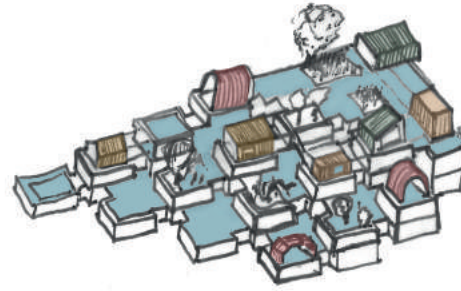
**Local Resource:**  
Combined Qualities



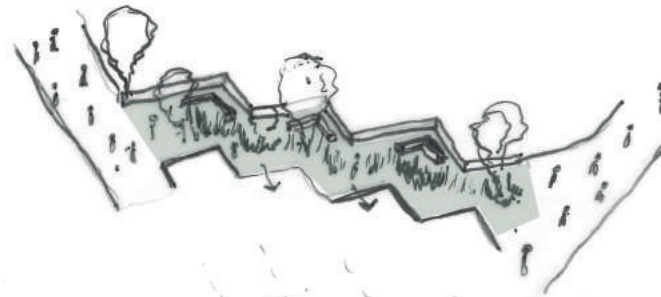


**Program:** Lokale Productie Centraal Beheer

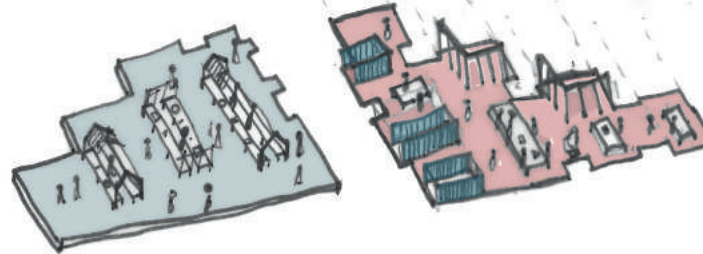
LIVE



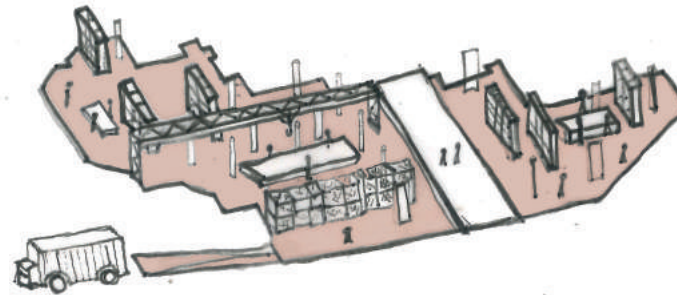
RESEARCH



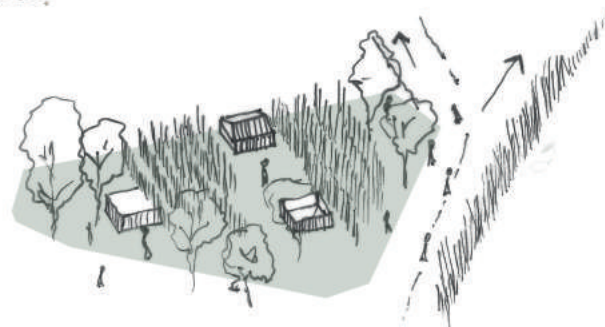
TRADE



MAKE

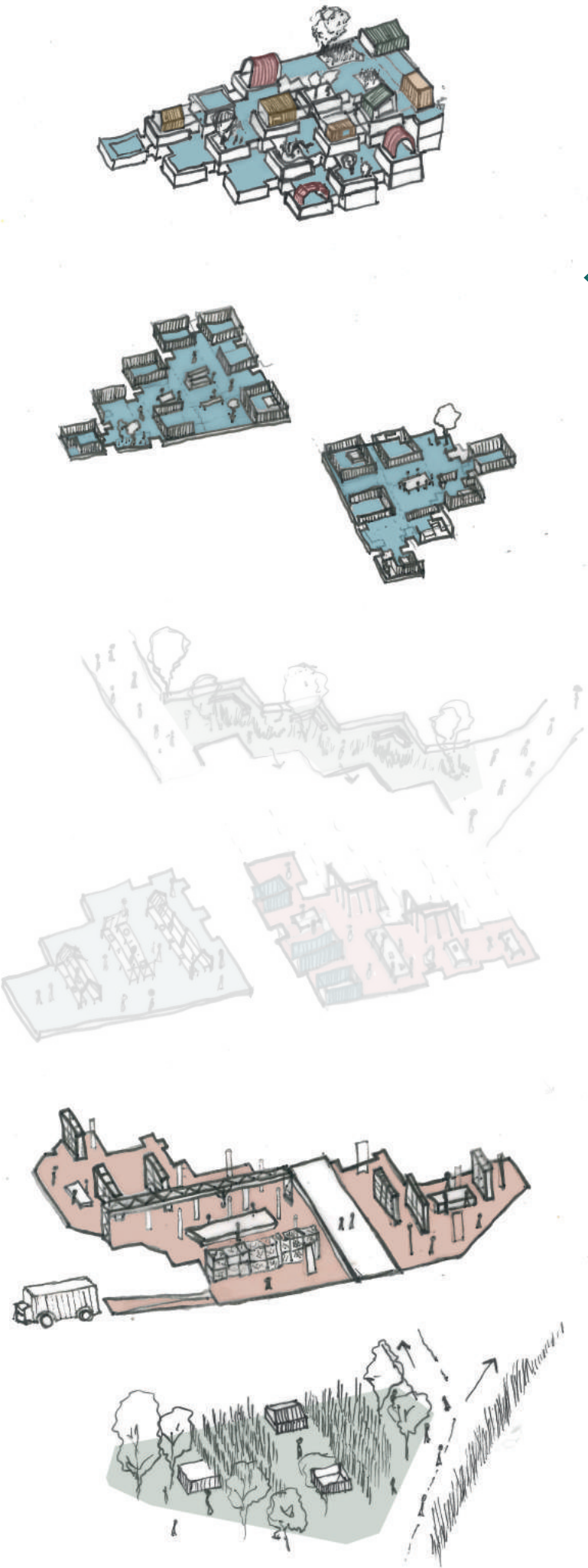


GROW



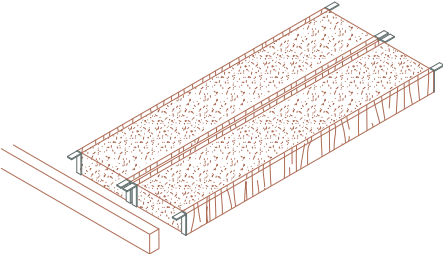


**Residential:**  
Co-Housing + Self Build Housing

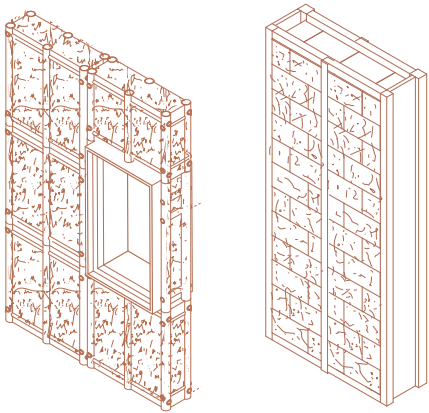


**Construction Workshop +  
Local Material Storage**

**Floors:**



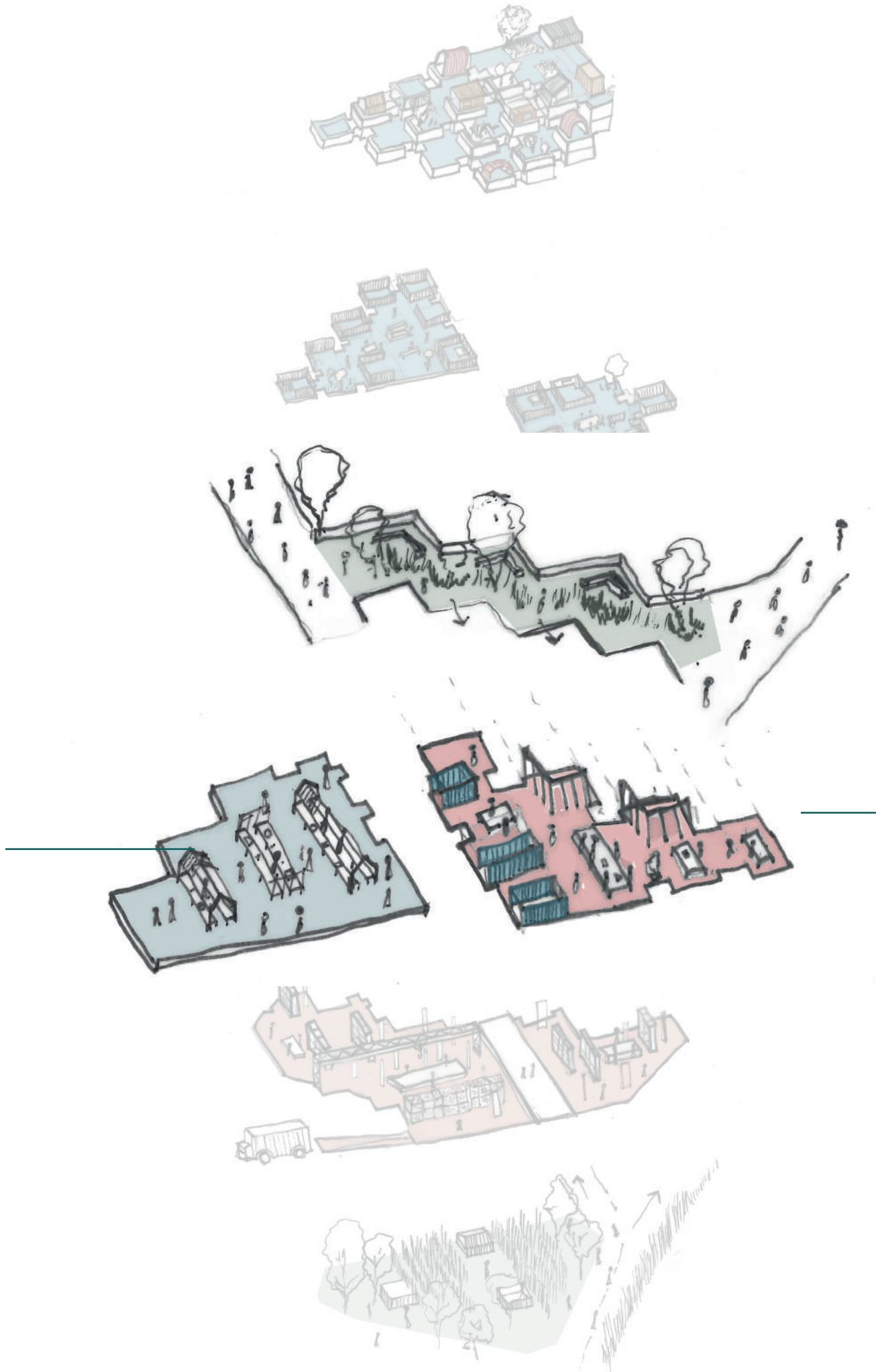
**Walls:**



**Public Market Place**

Made in Apeldoorn  
Second Hand Exchange

**Material Research Workspace**



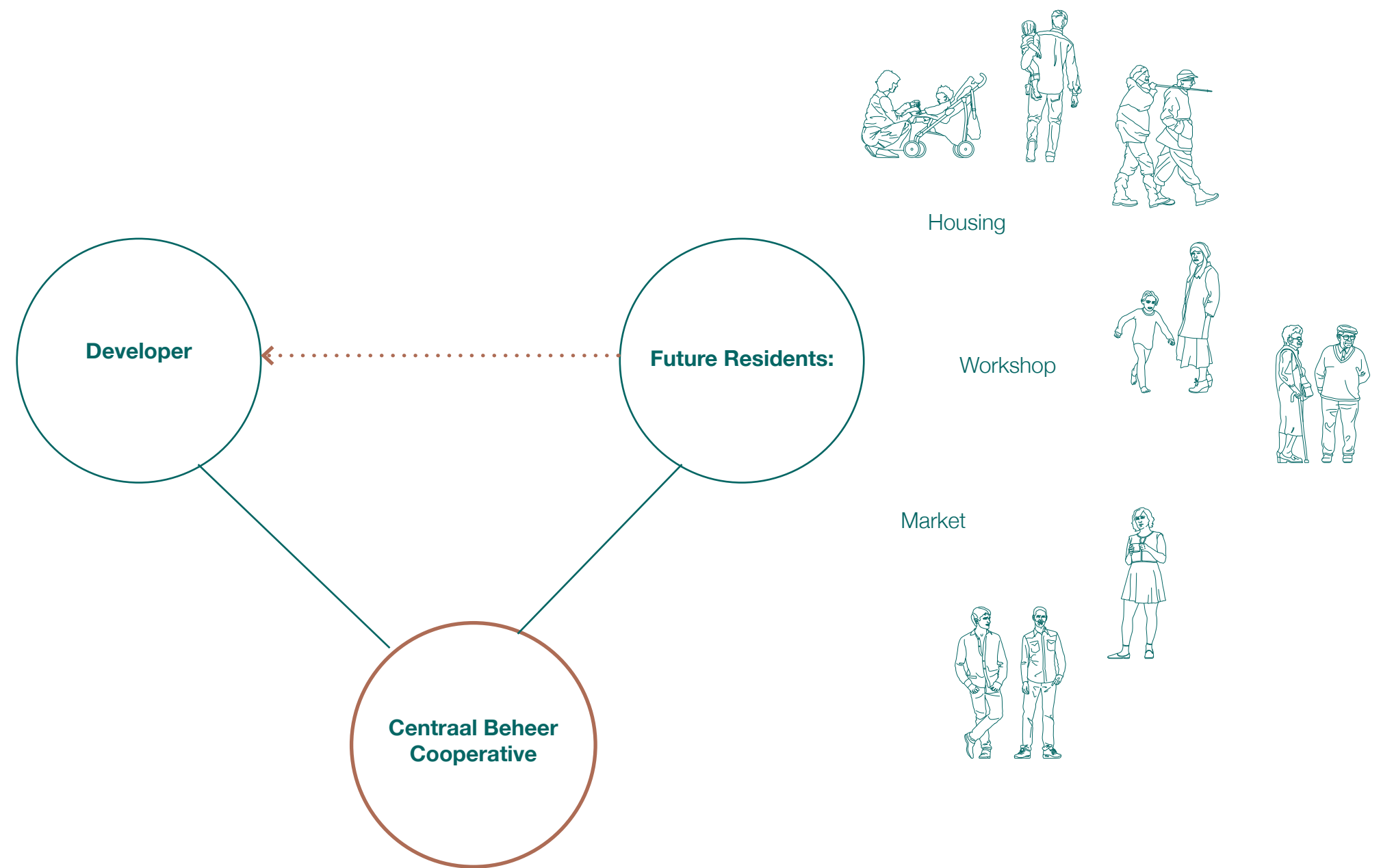


Co - Determination

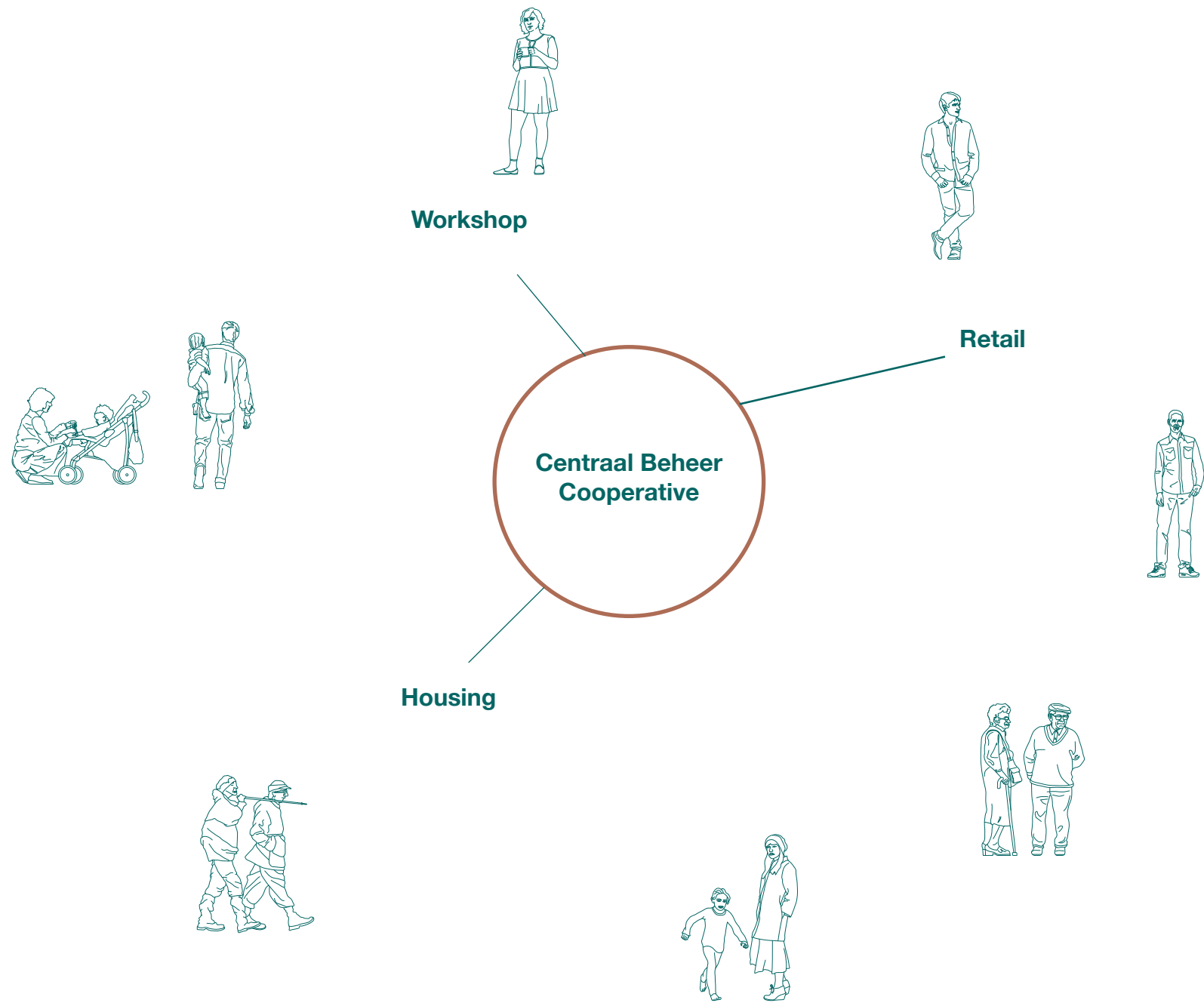
Dwellers

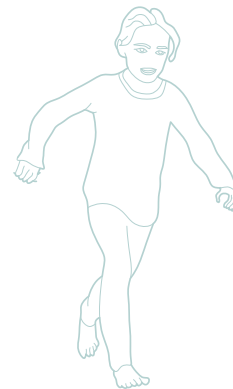
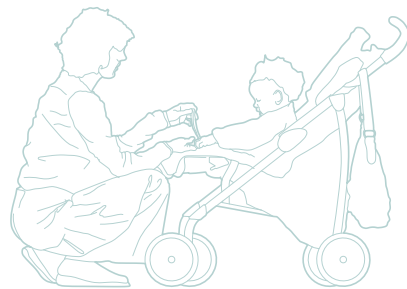
Architect



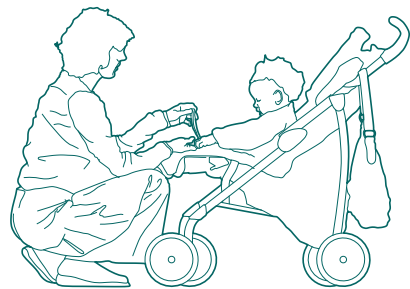


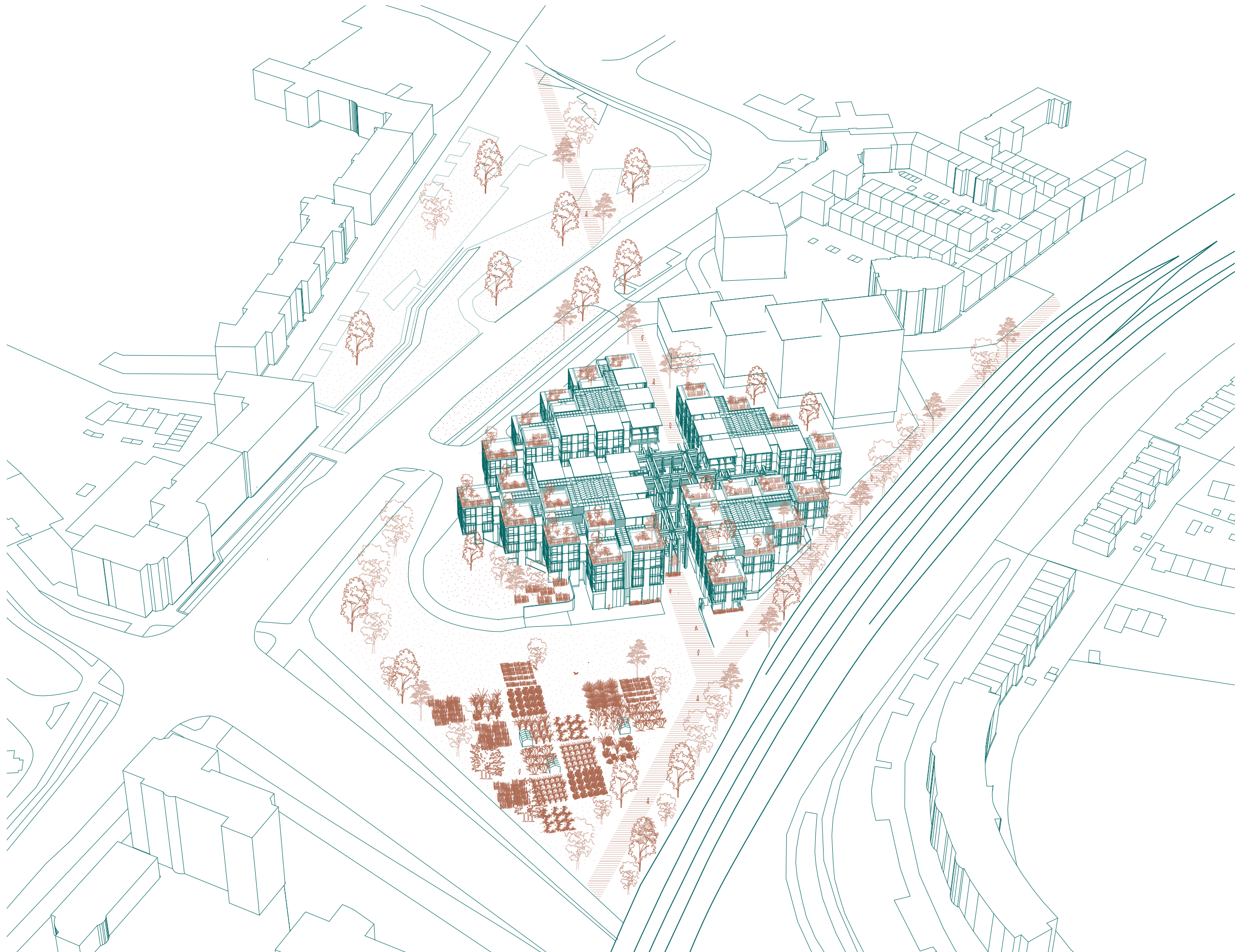






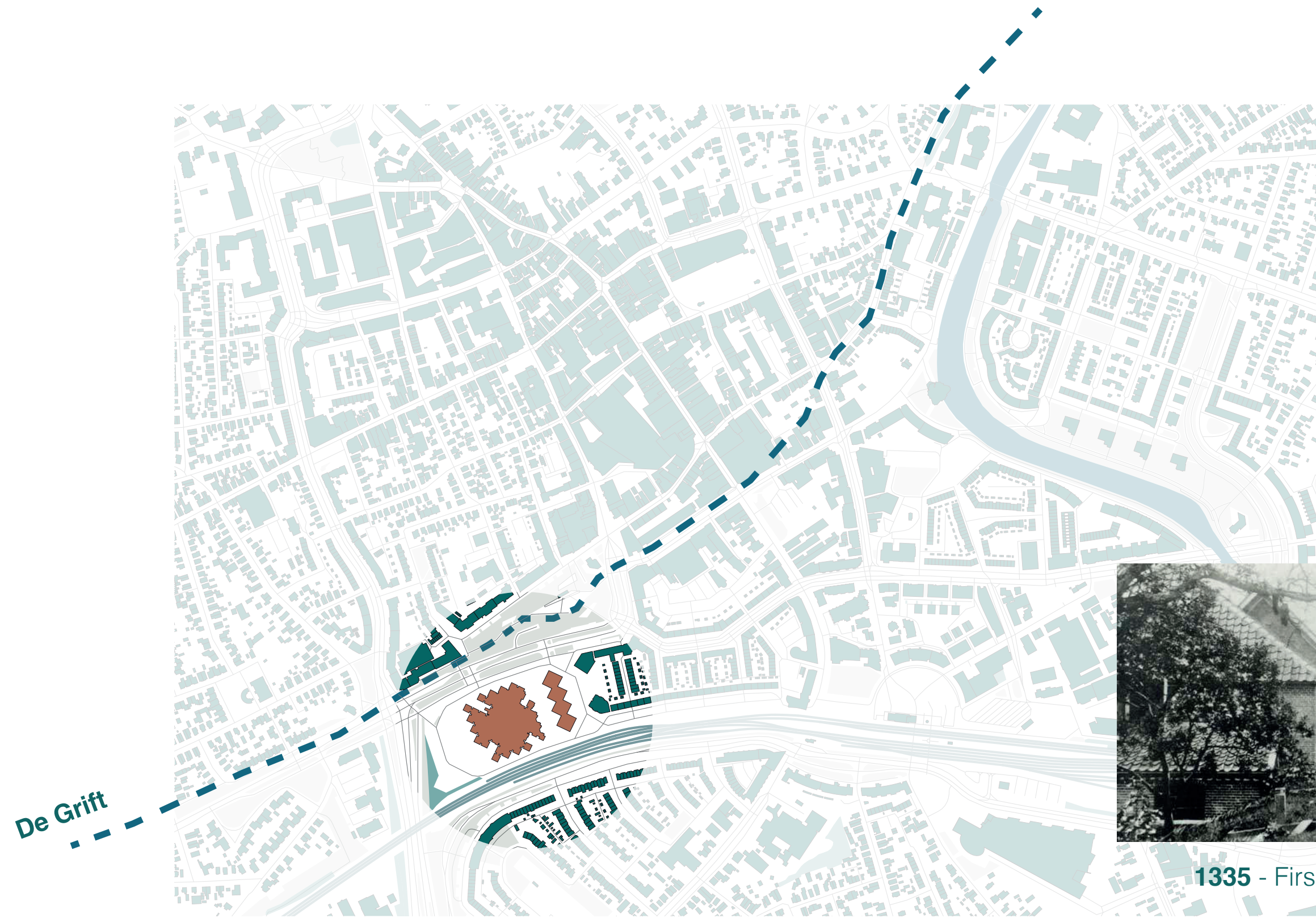






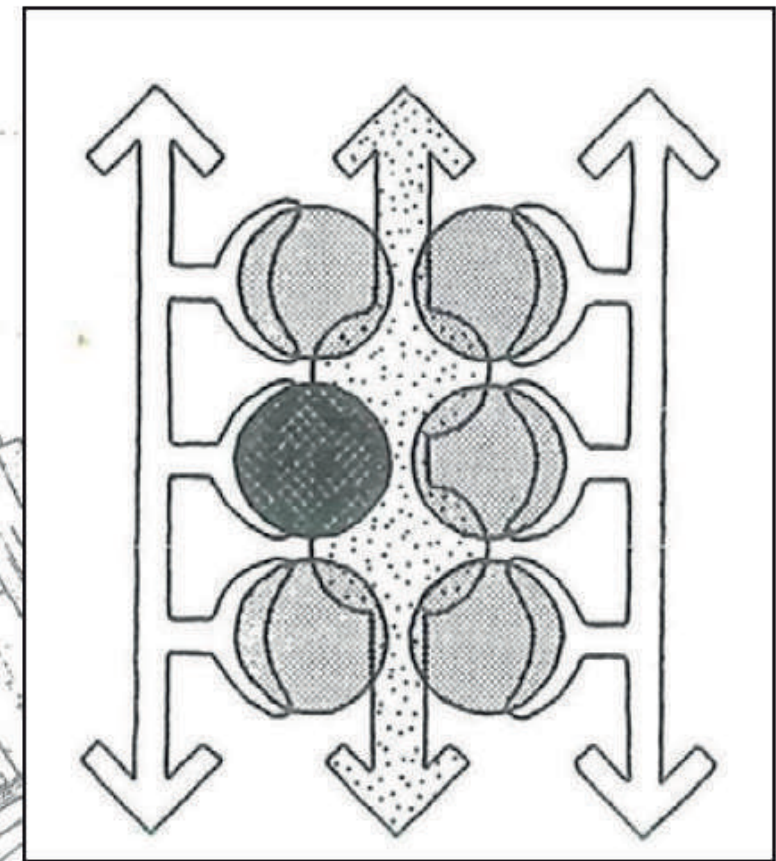
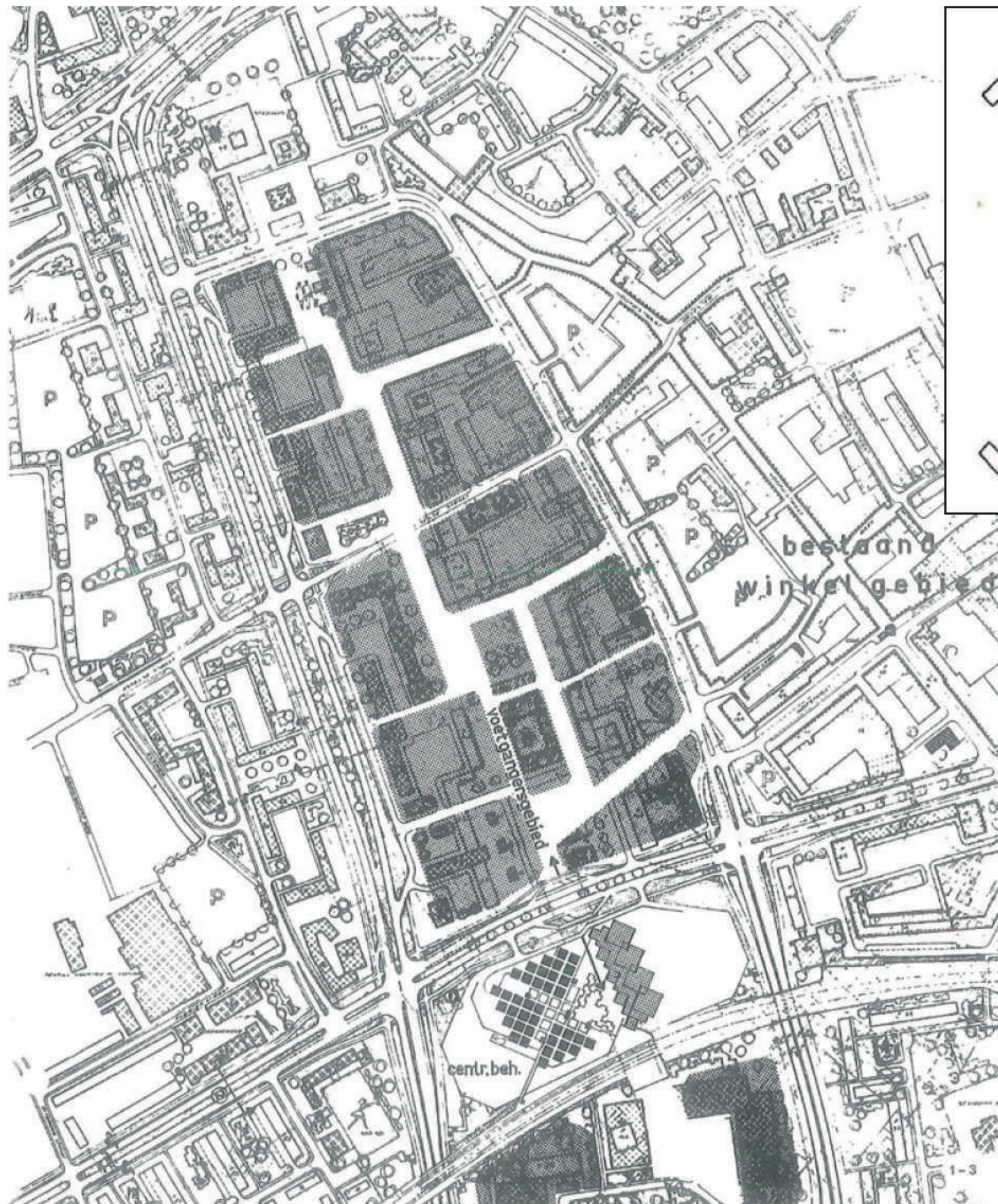


**Urban Scale**

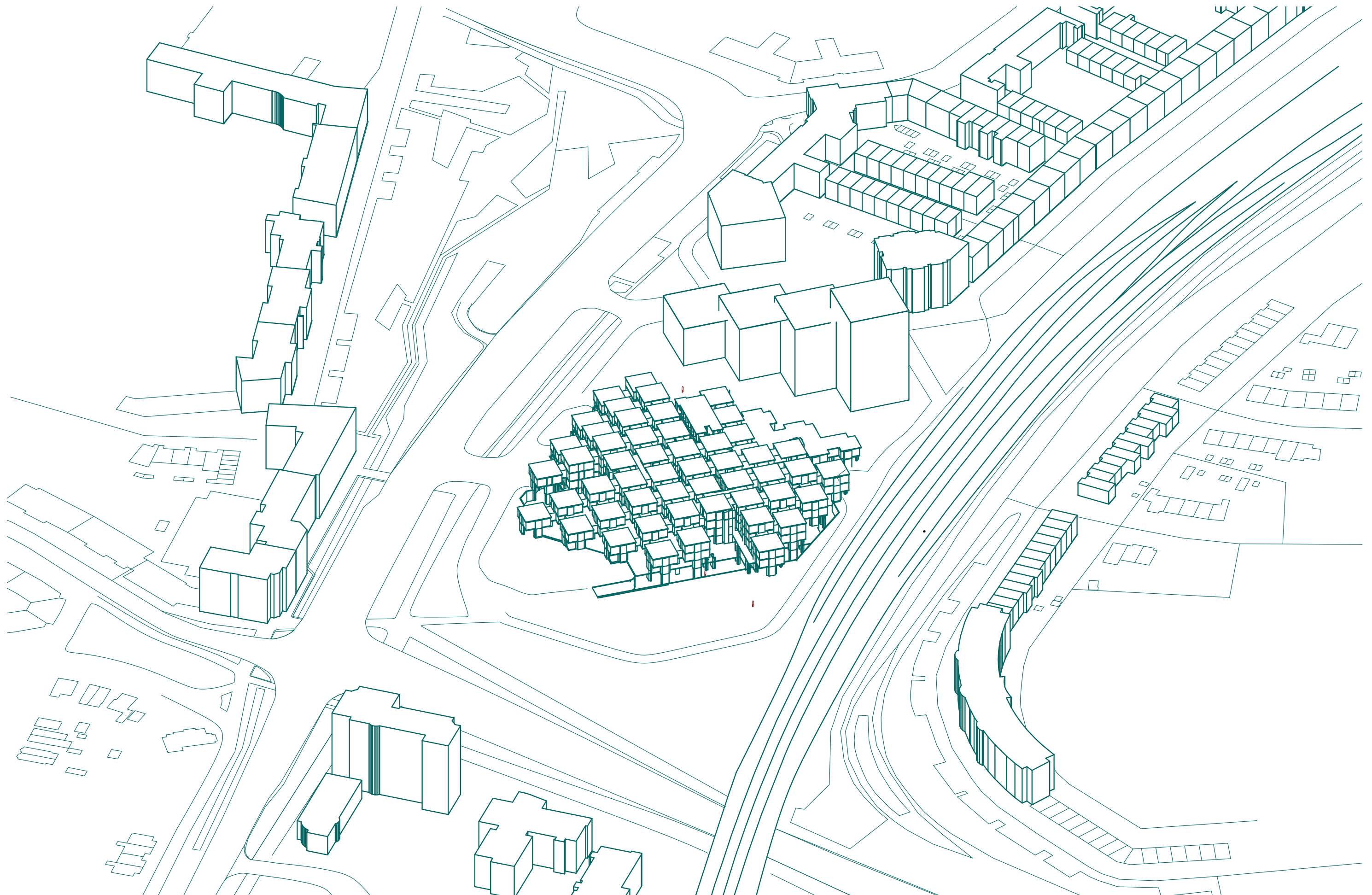


1335 - First Mill In Apeldoorn





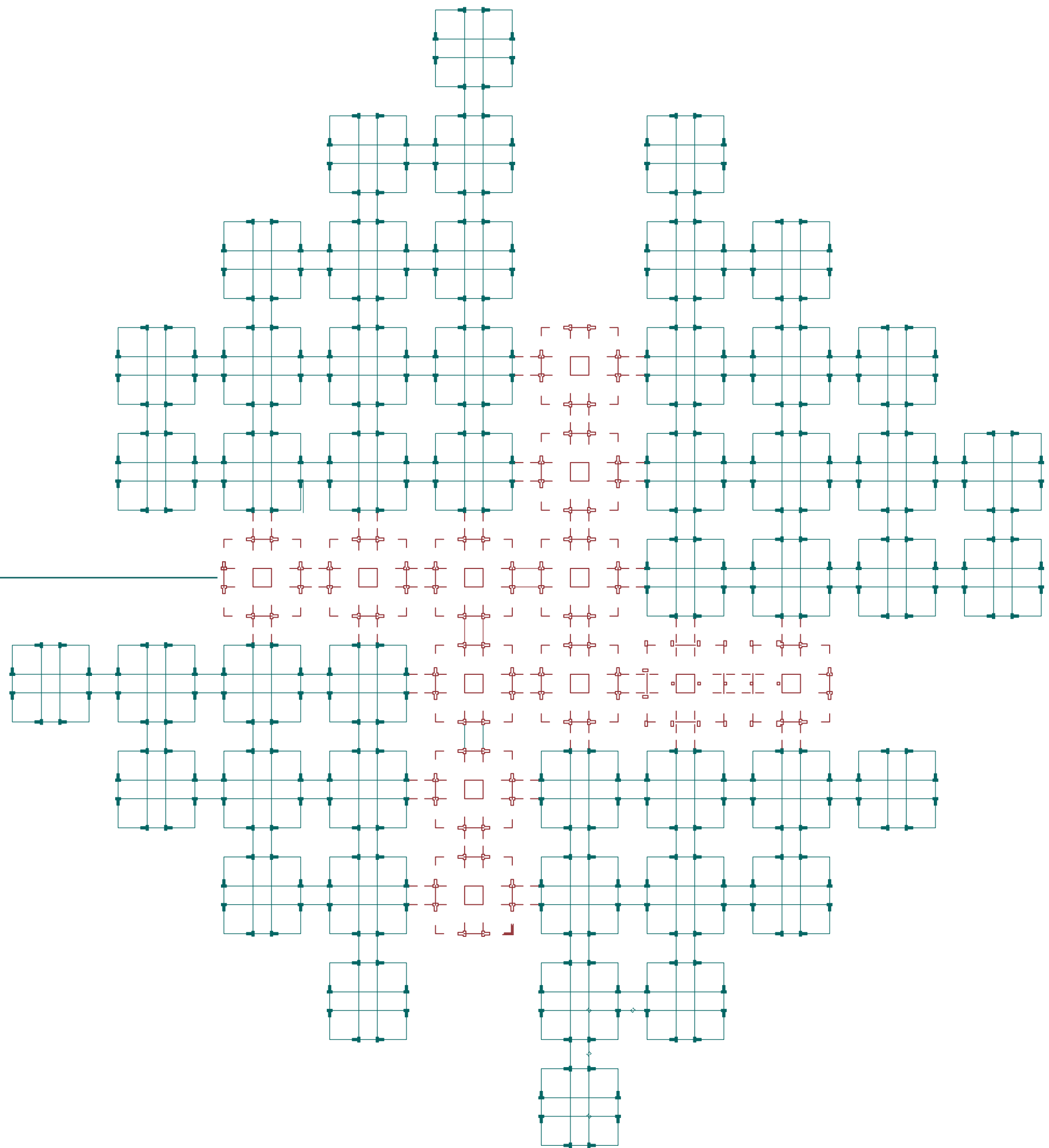




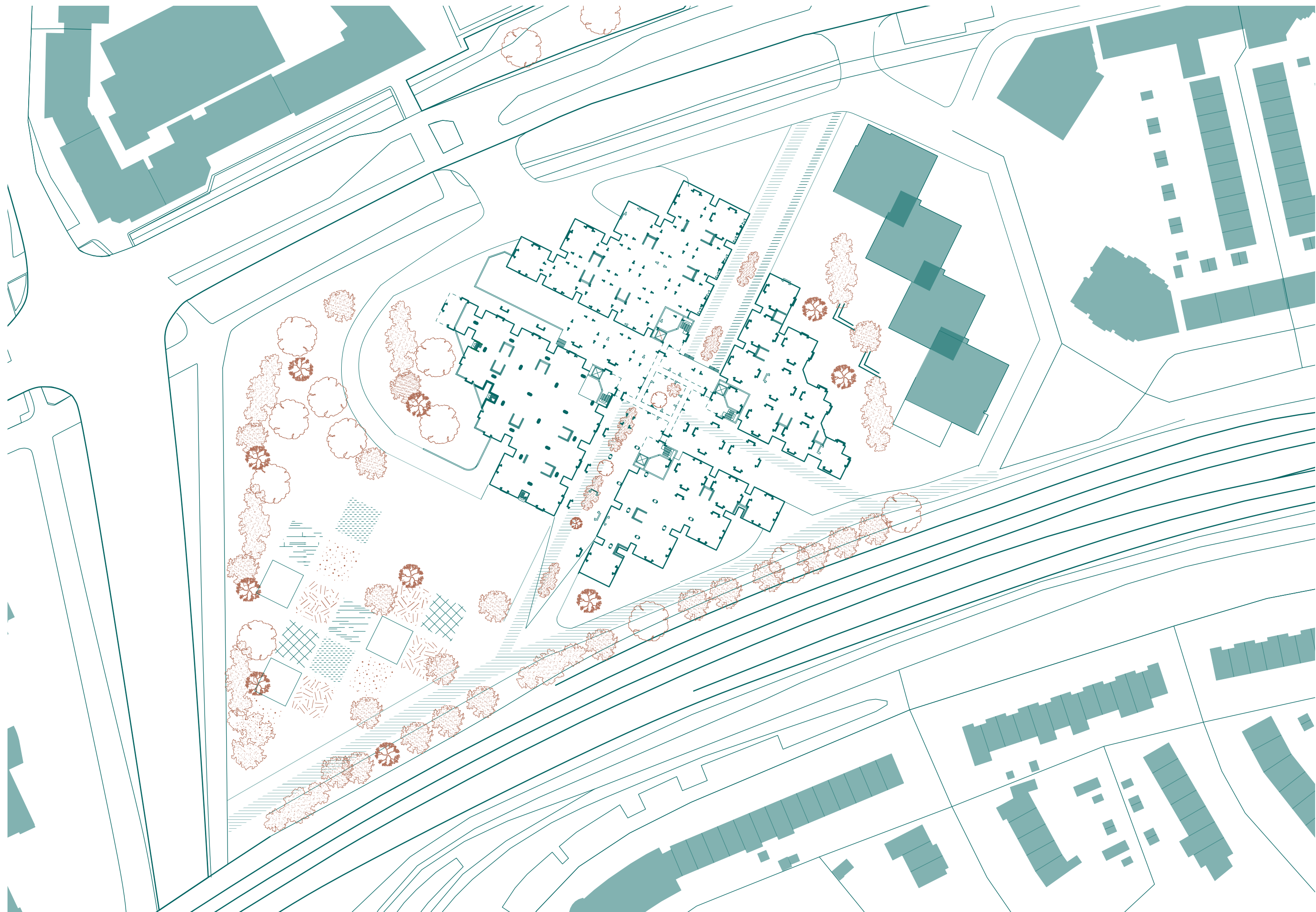


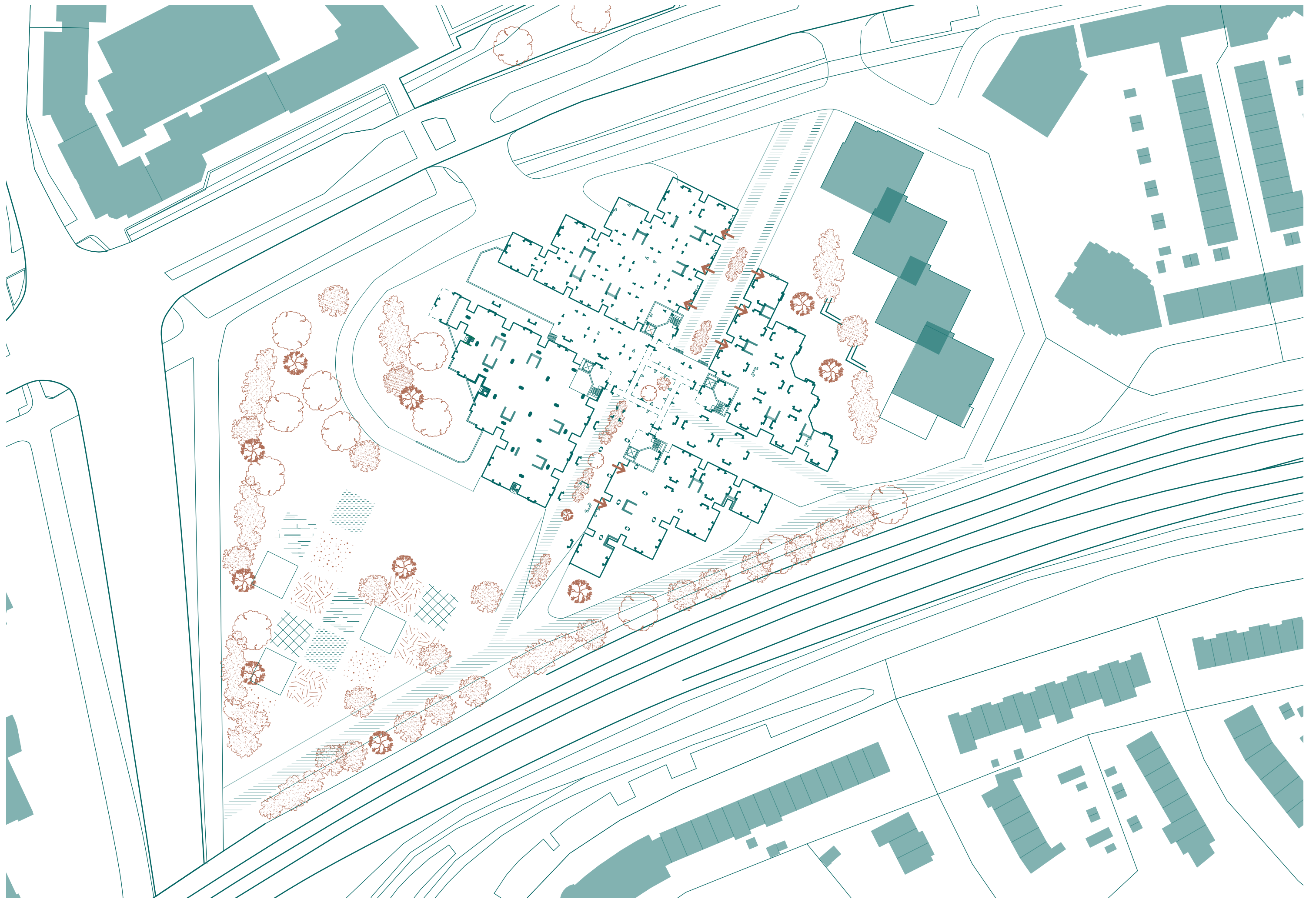


Removed  
Structure



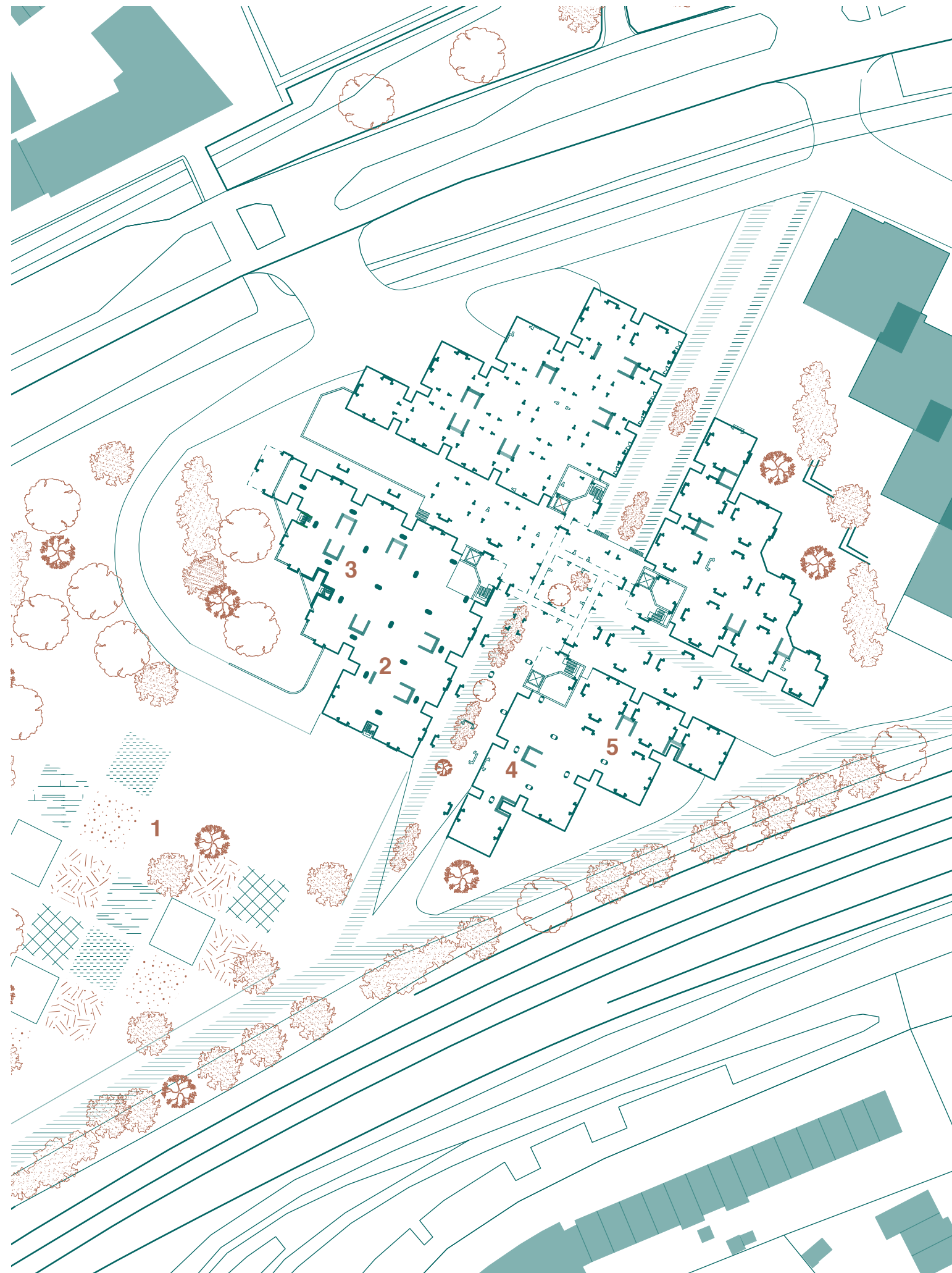
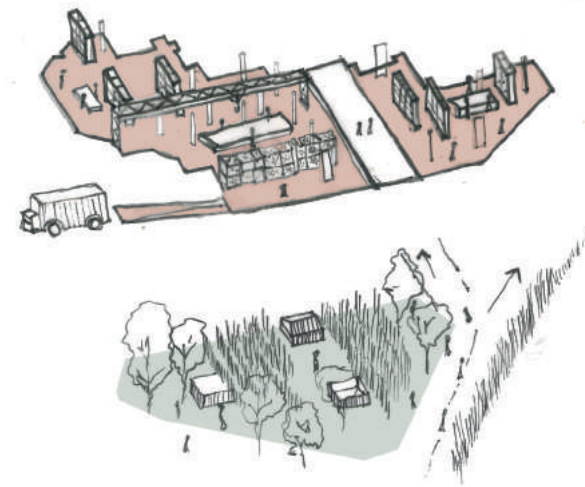


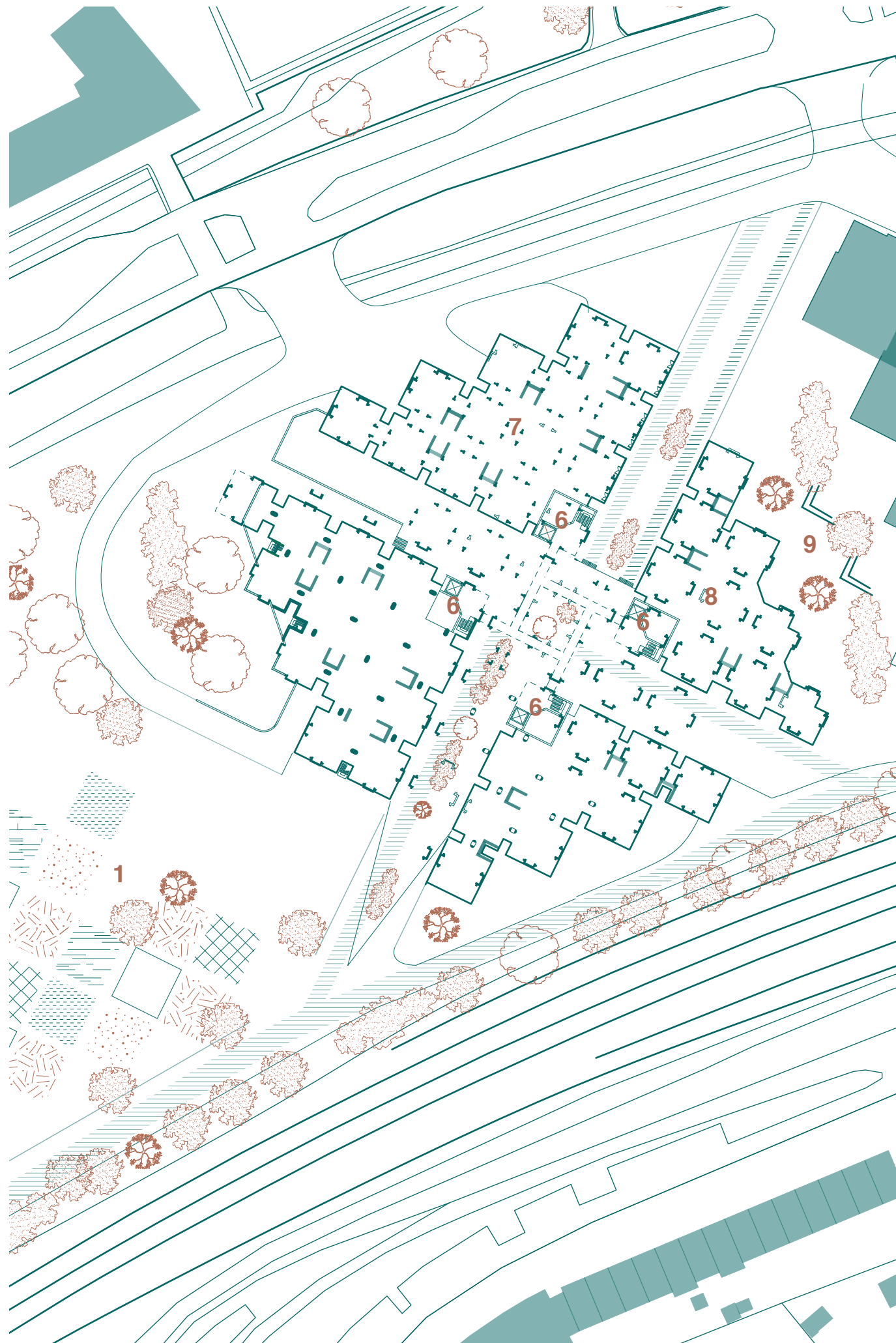






- 1. Productive Landscape
- 2. Construction Workshop
- 3. Material Storage
- 4. Design Meeting Space
- 5. Community Workshop





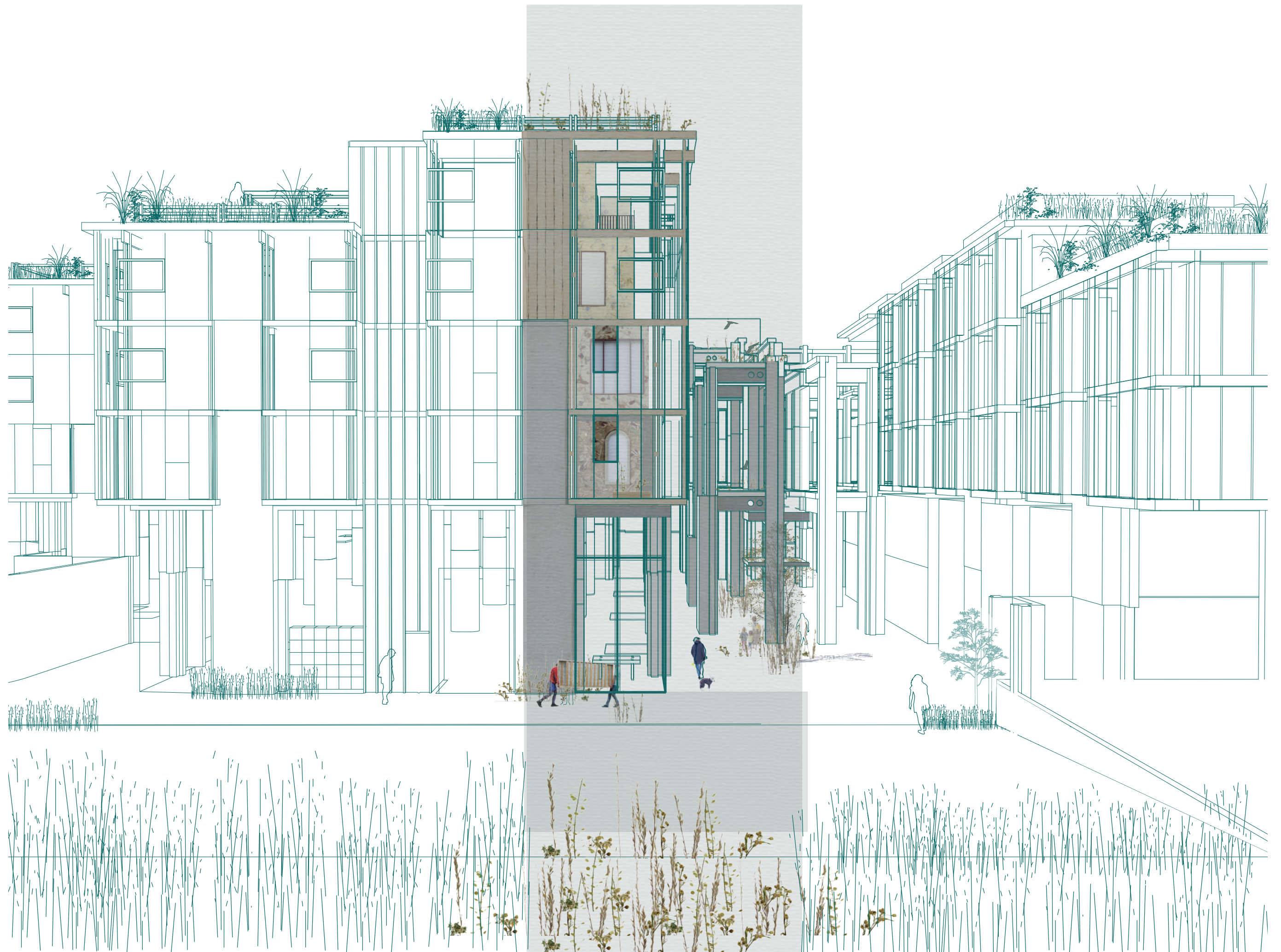
**6. Residential Access + Plant Room**

**7 . Market/ Retail Space**

**8. Cafe + Research Workspace  
(Stadspark Atilier)**

**9. Public Plaza**

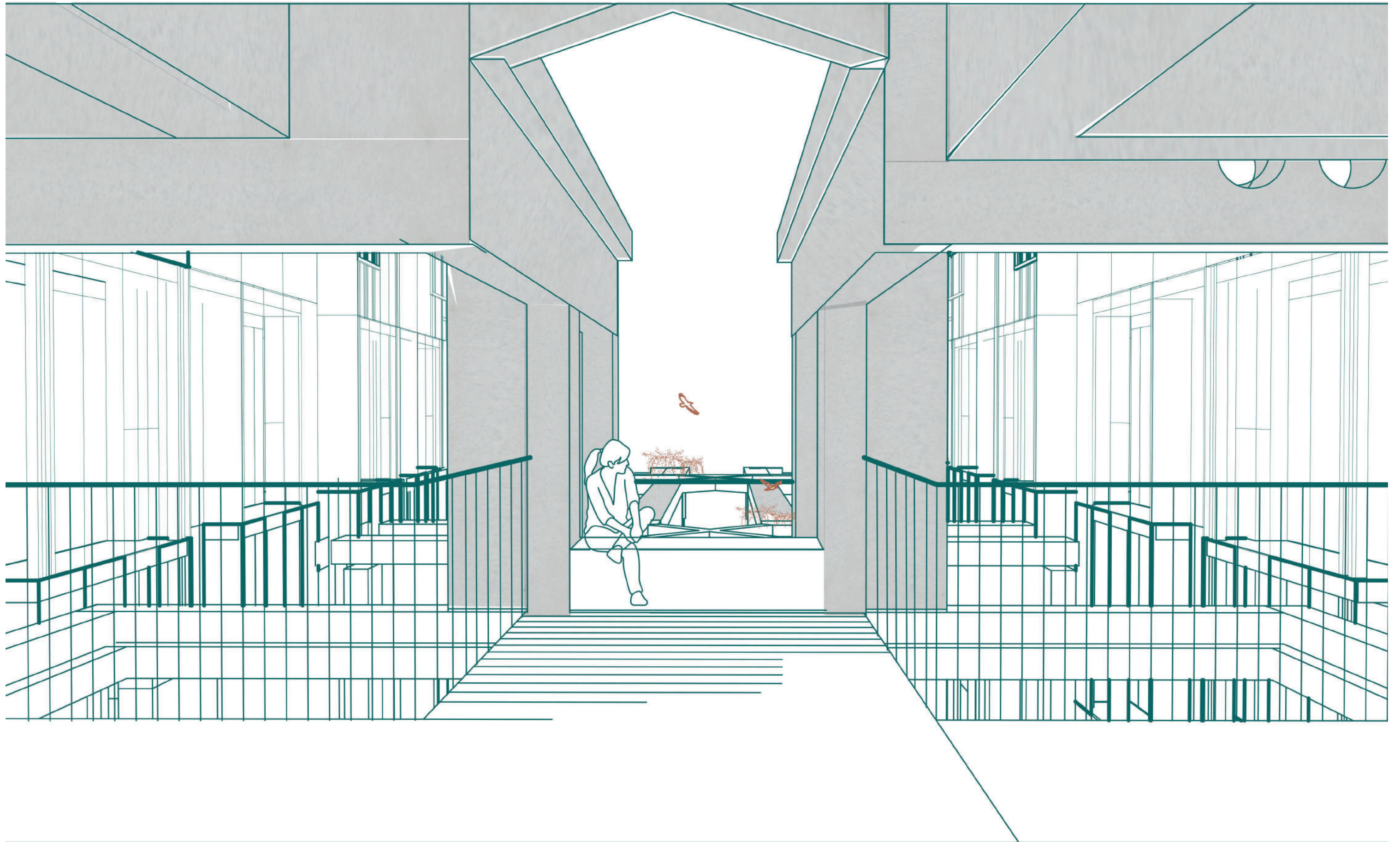






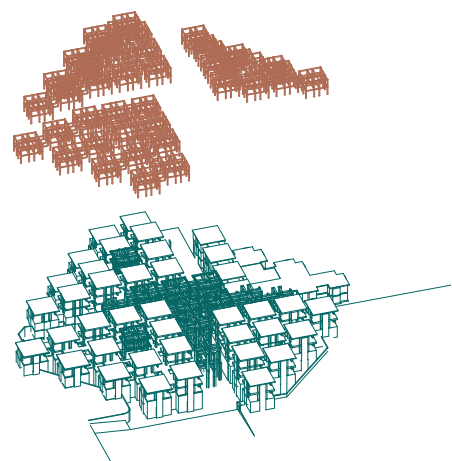
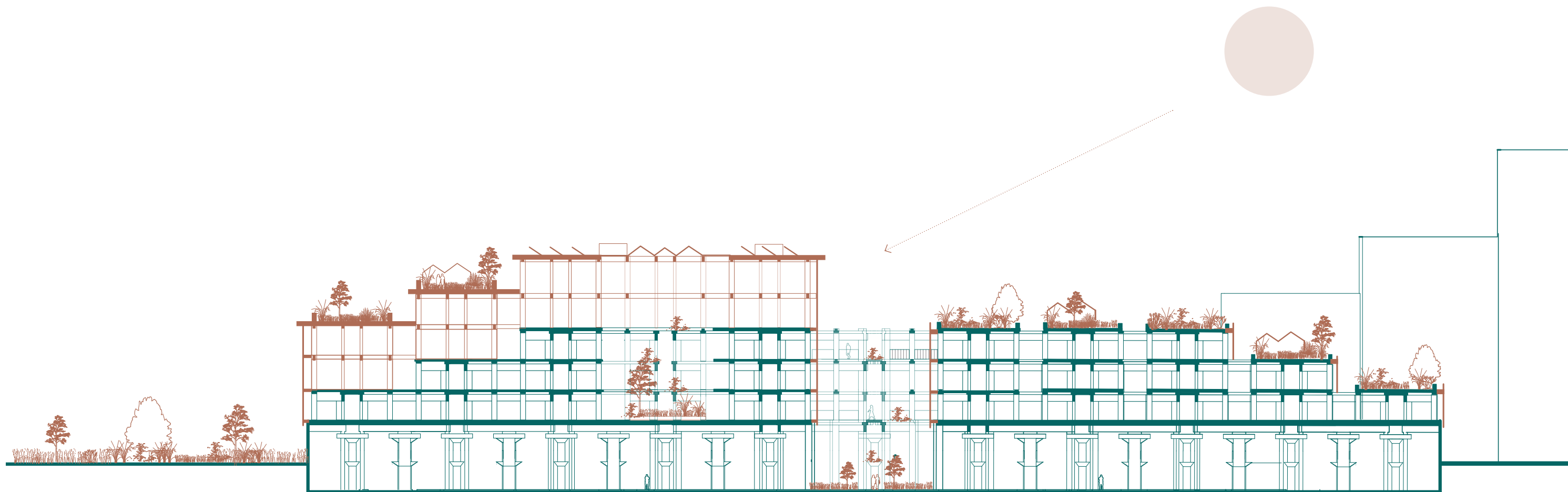


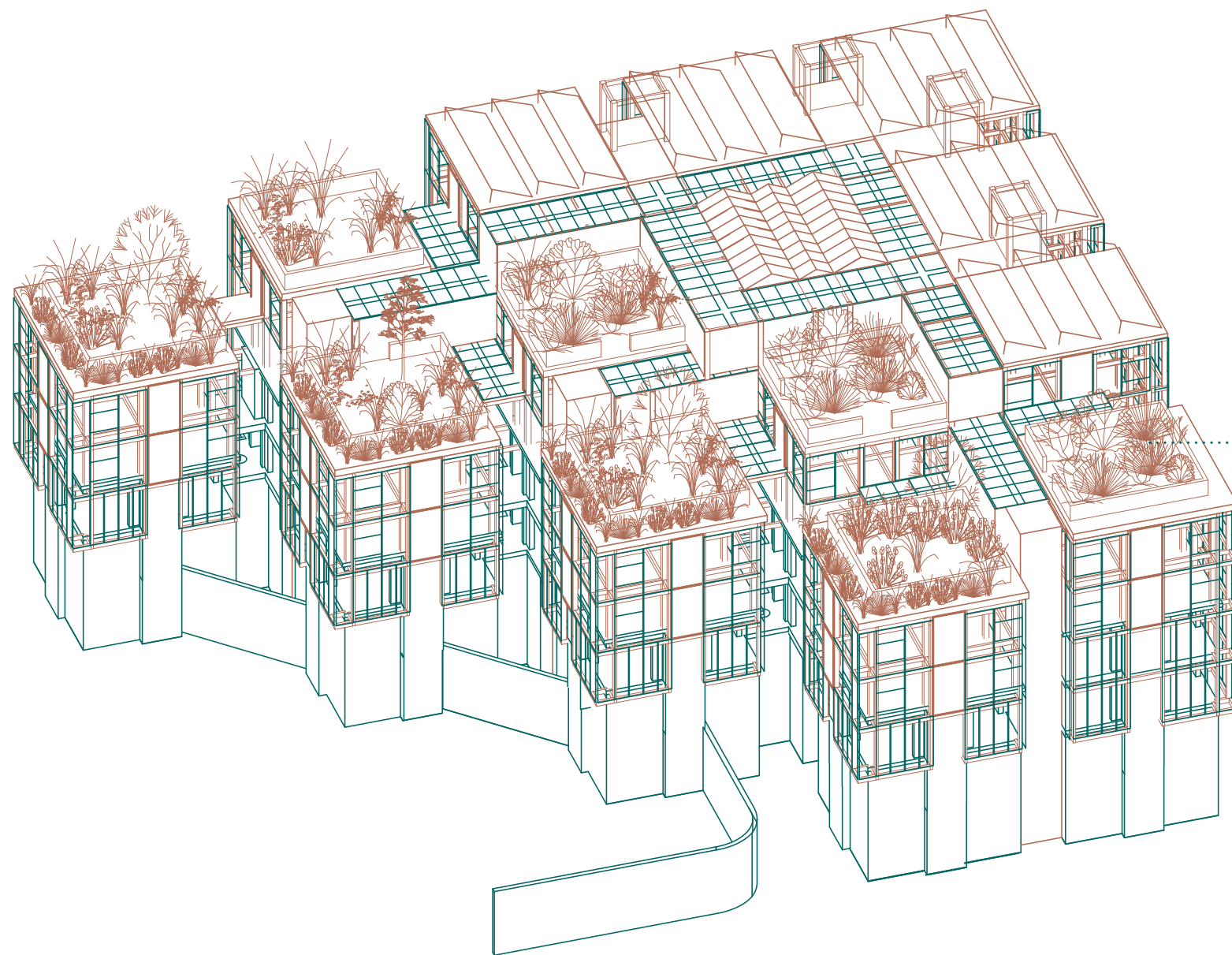






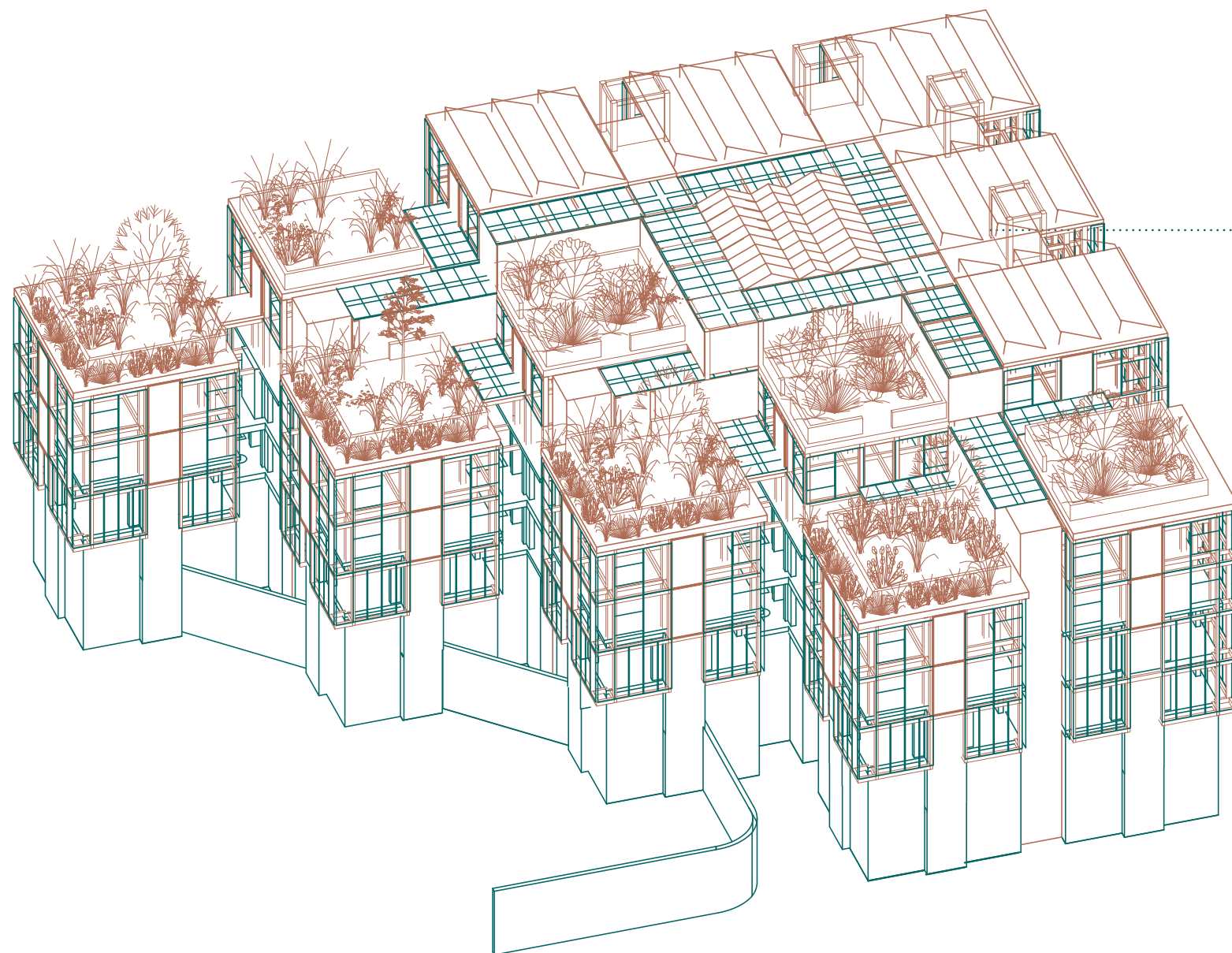






**Shared Roof Gardens**





## Water and Solar Harvesting Roof

Rainwater Storage Tanks

852 m<sup>2</sup> Roof

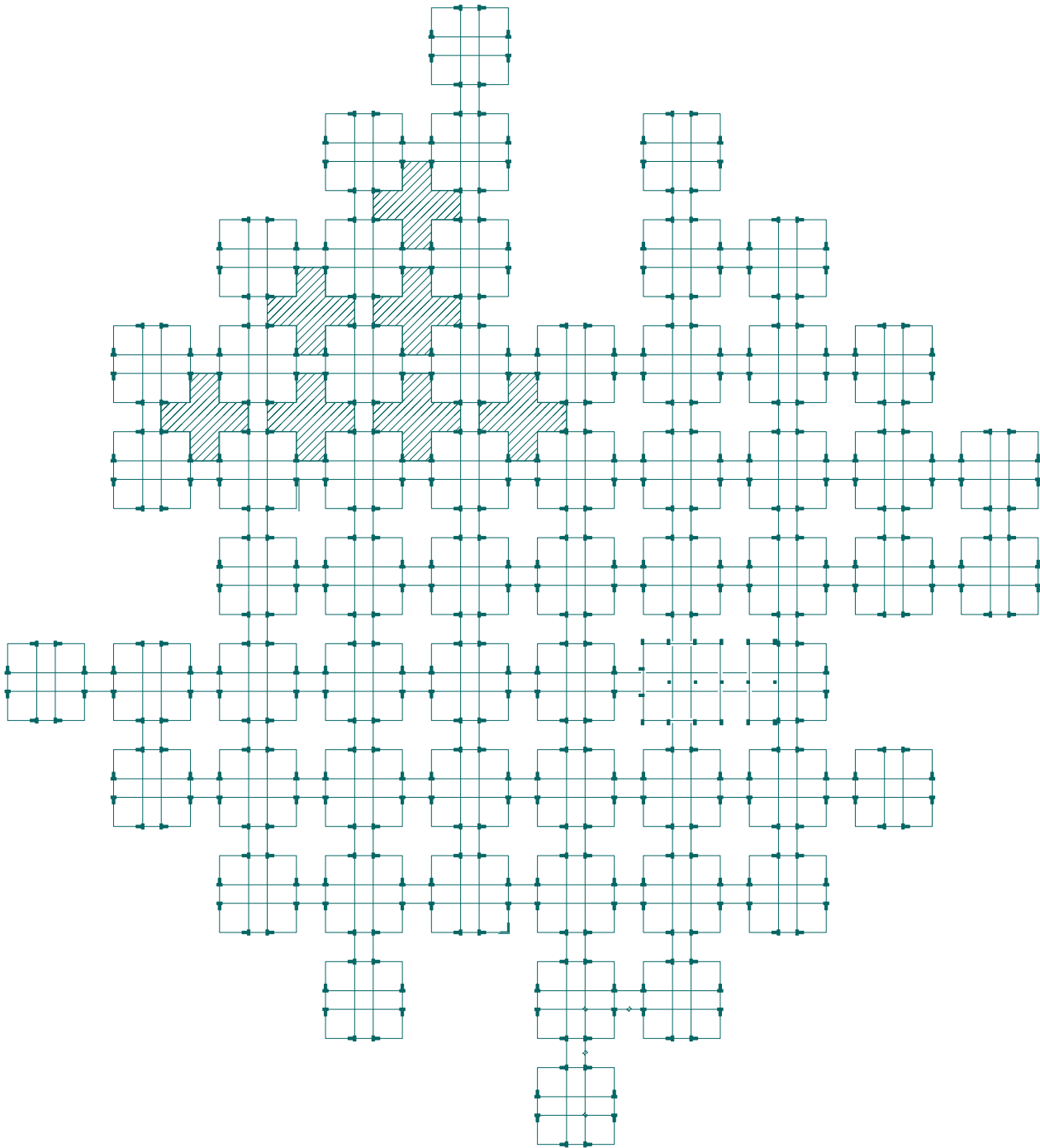
54,385 L per month

14 Households per month

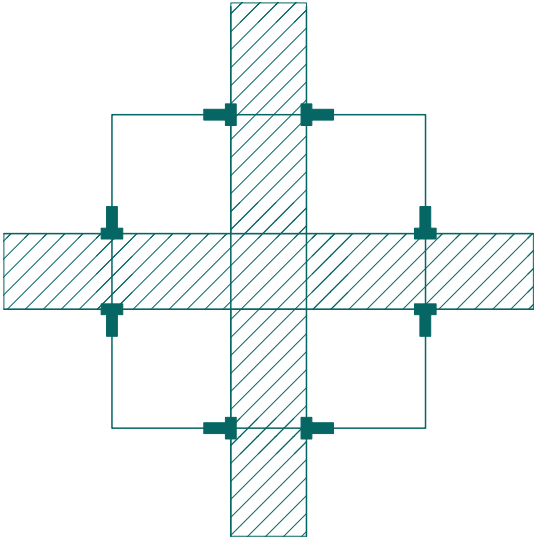
**Residential:** Structuring Space



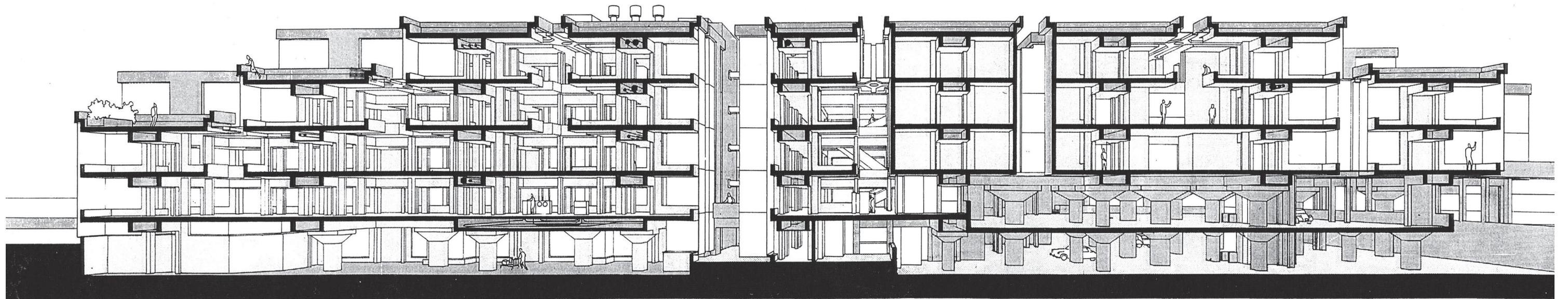
Existing: Non-hierachical



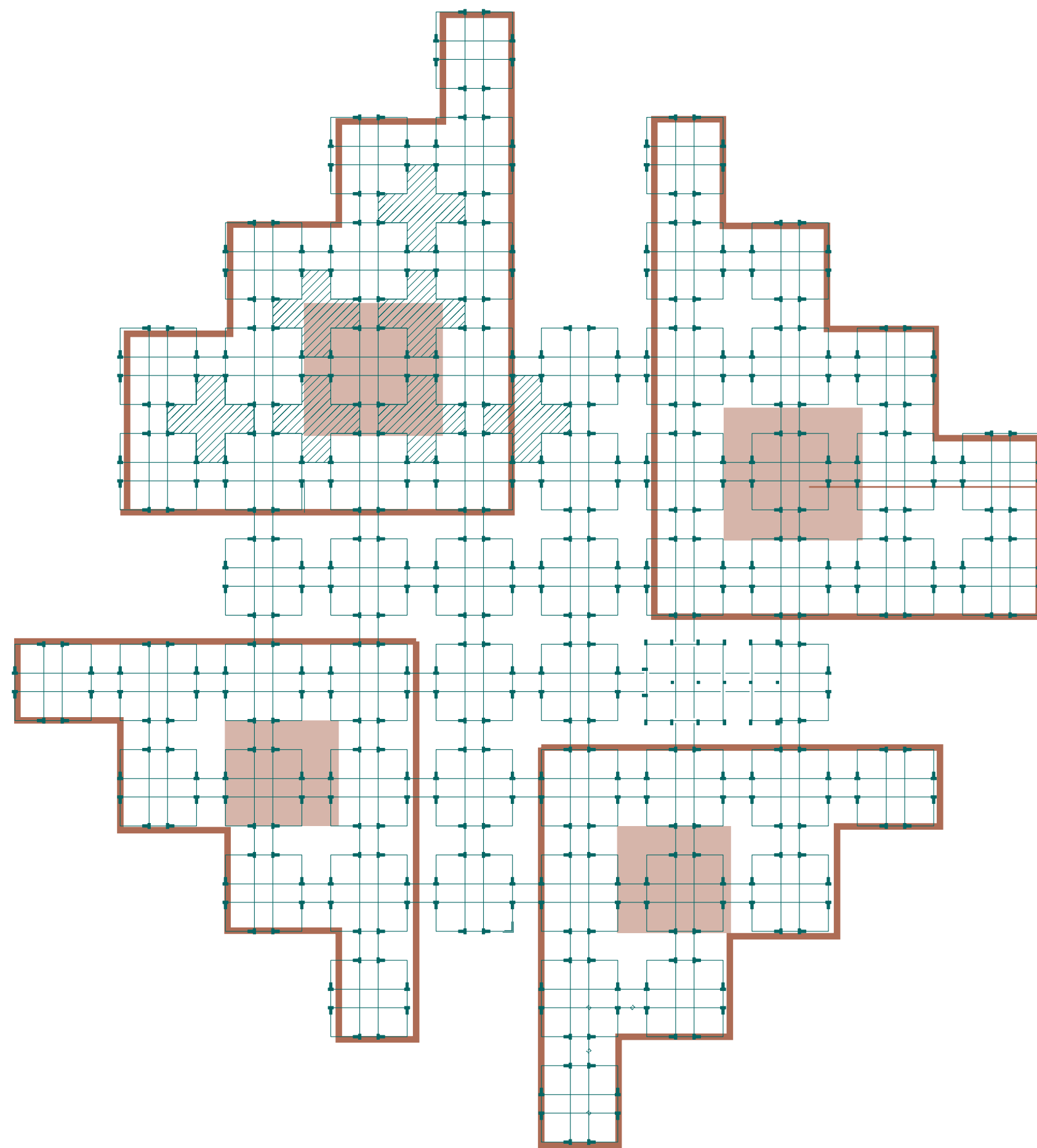
Circulation



Interpretable  
Zone

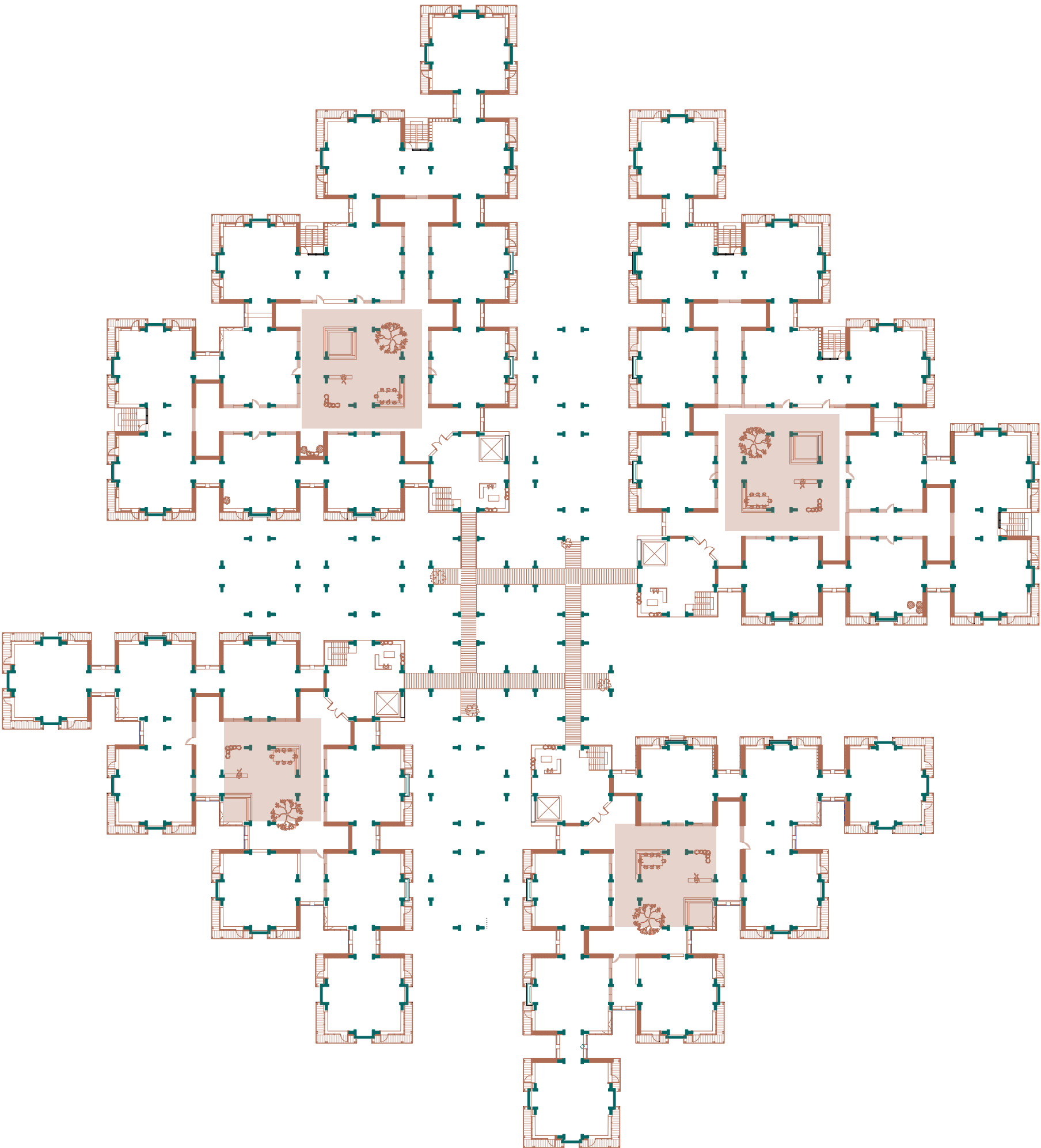






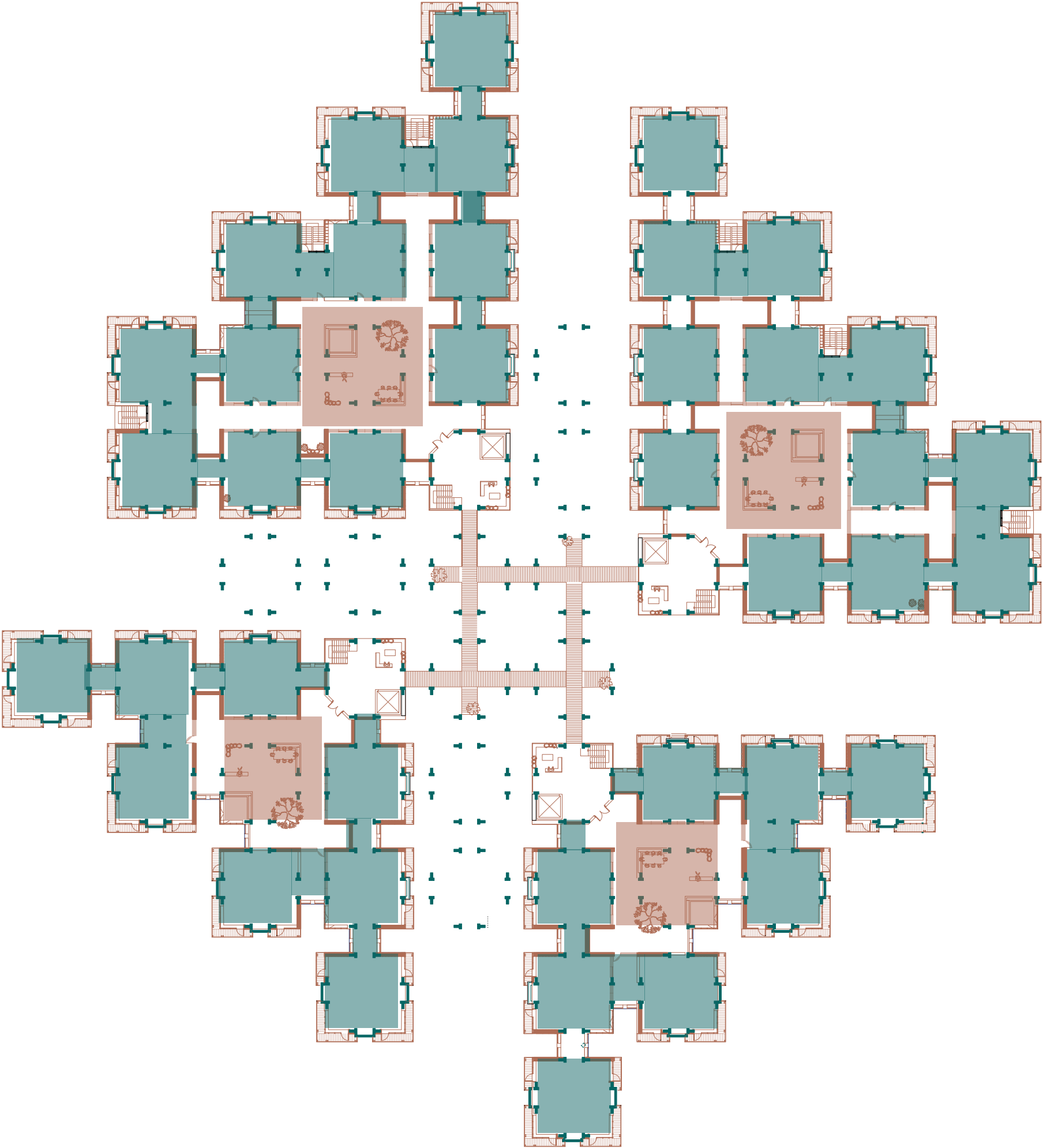
Collective  
Space

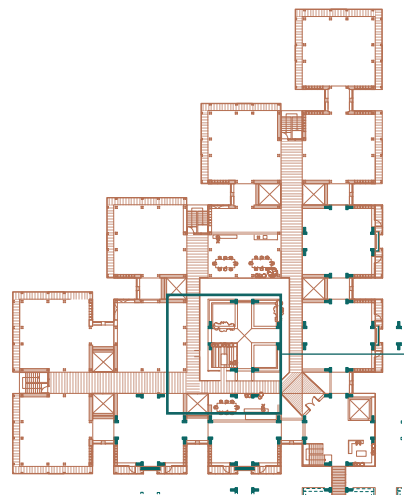
Floor Plan: Level 2





Floor Plan: Level 2









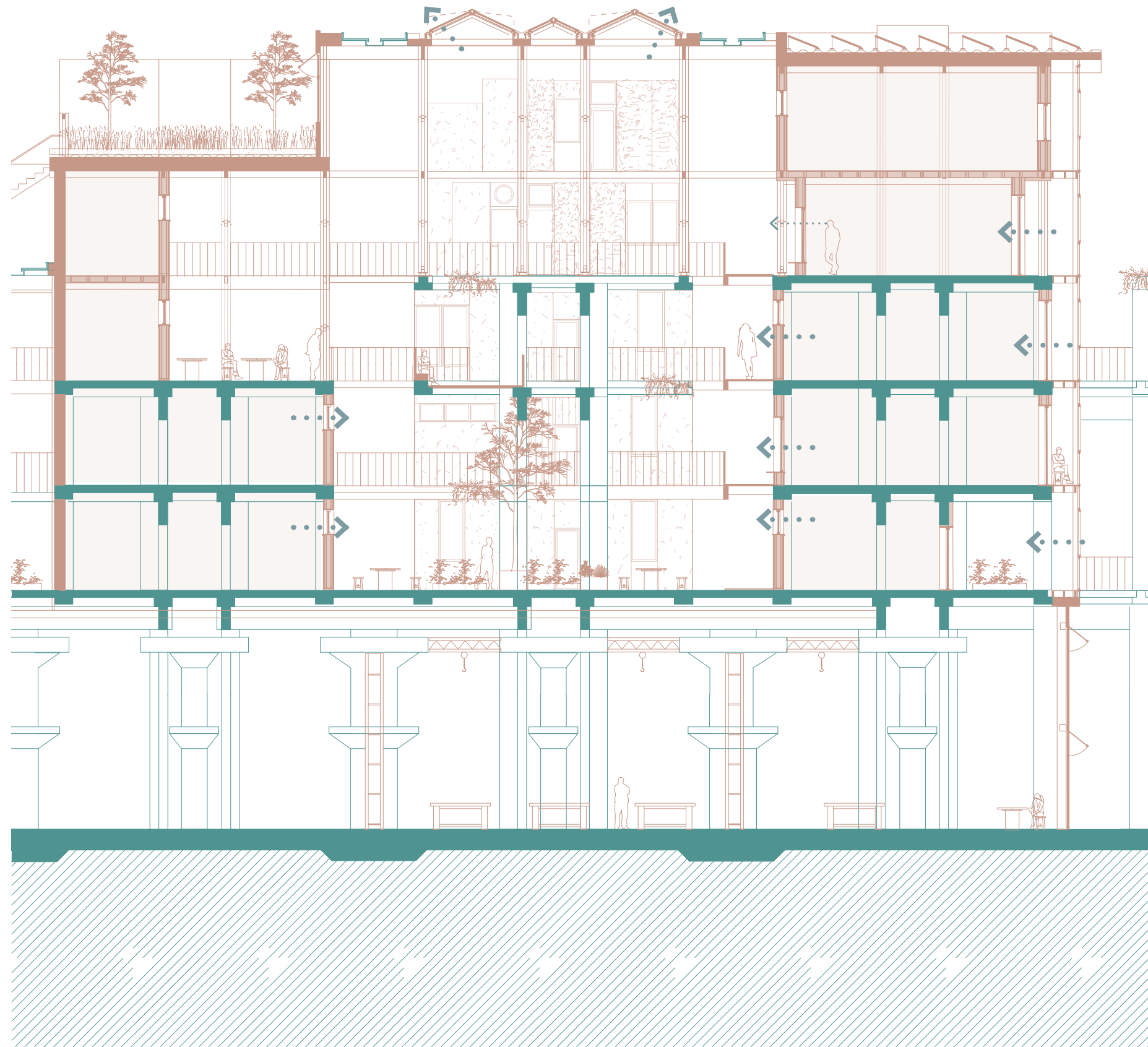


**Rooflights: Reclaimed**  
Increased Slope







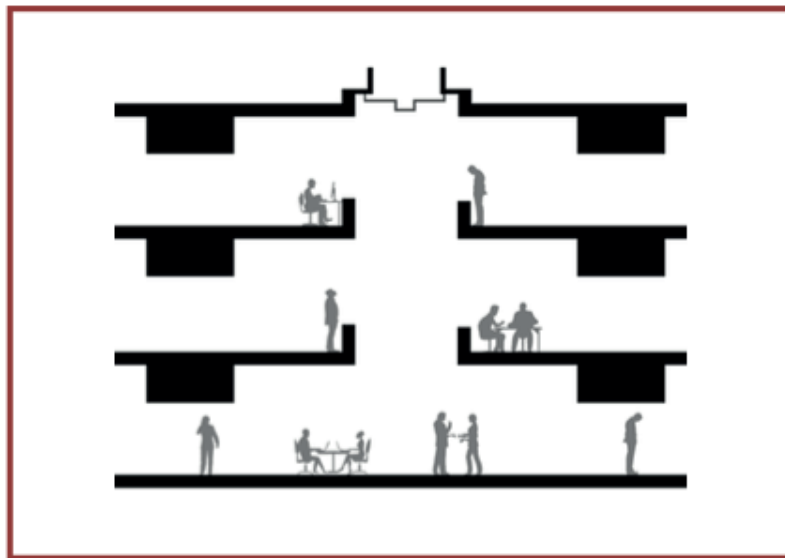








## Vertical Connections



Source: Unit: The Future of Structuralism:  
Ebbenhorst, Dankers, Boogaard,  
Uittenbogert, de Vries













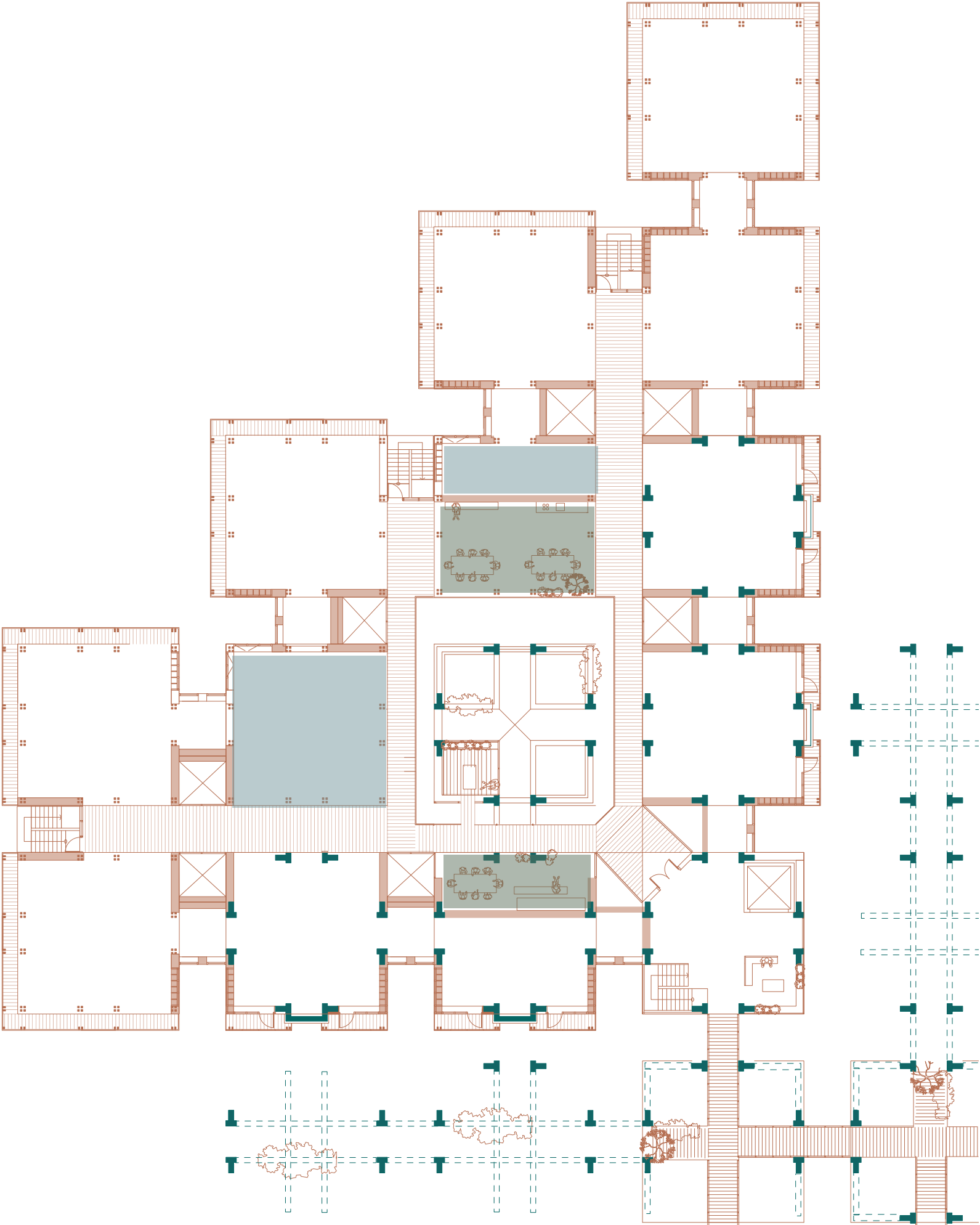




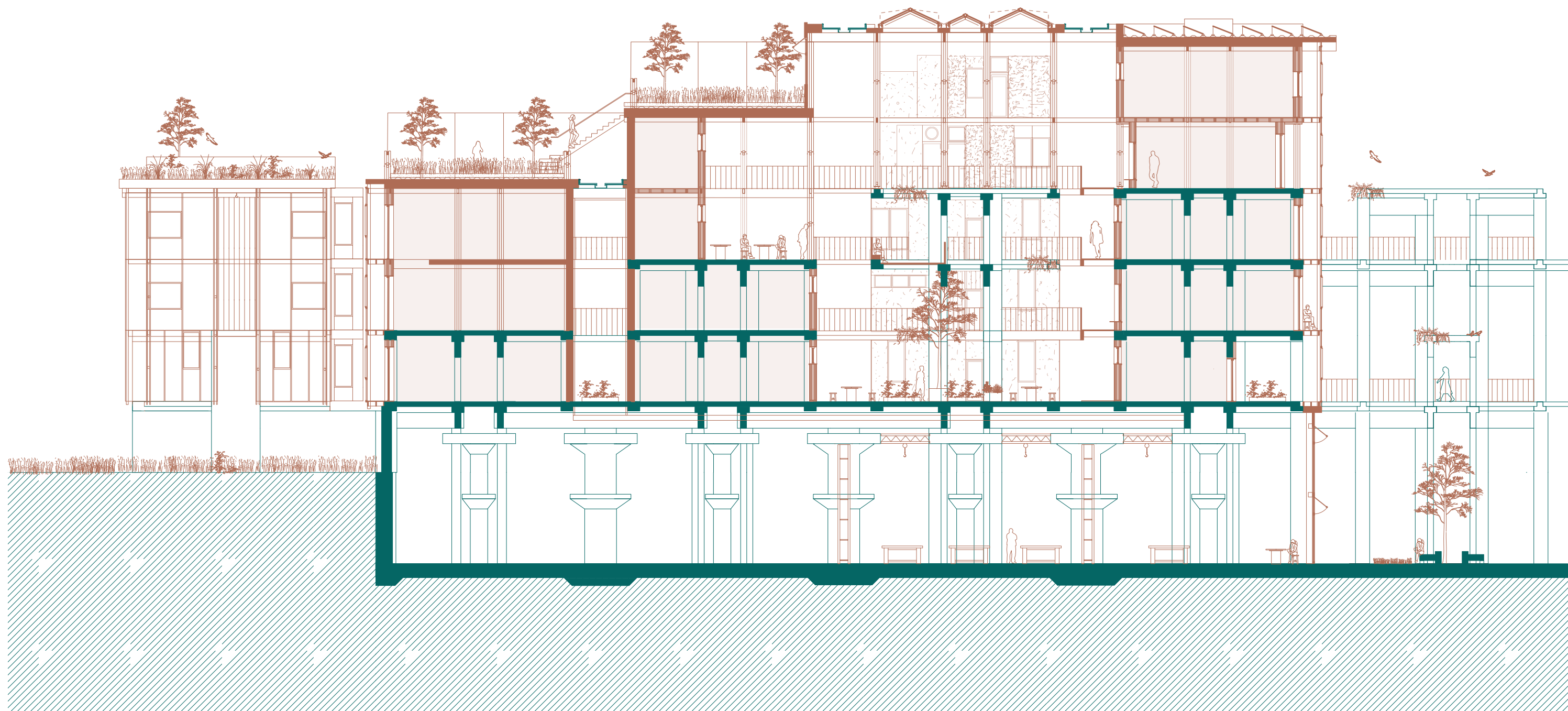




Floor Plan: Level 4

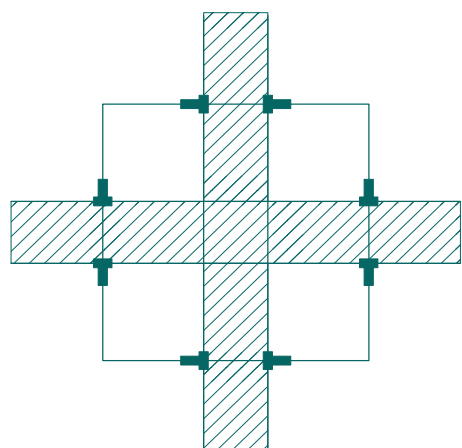


- 1. Rentable Workspace + Storage
- 2. Communal Dining + Living



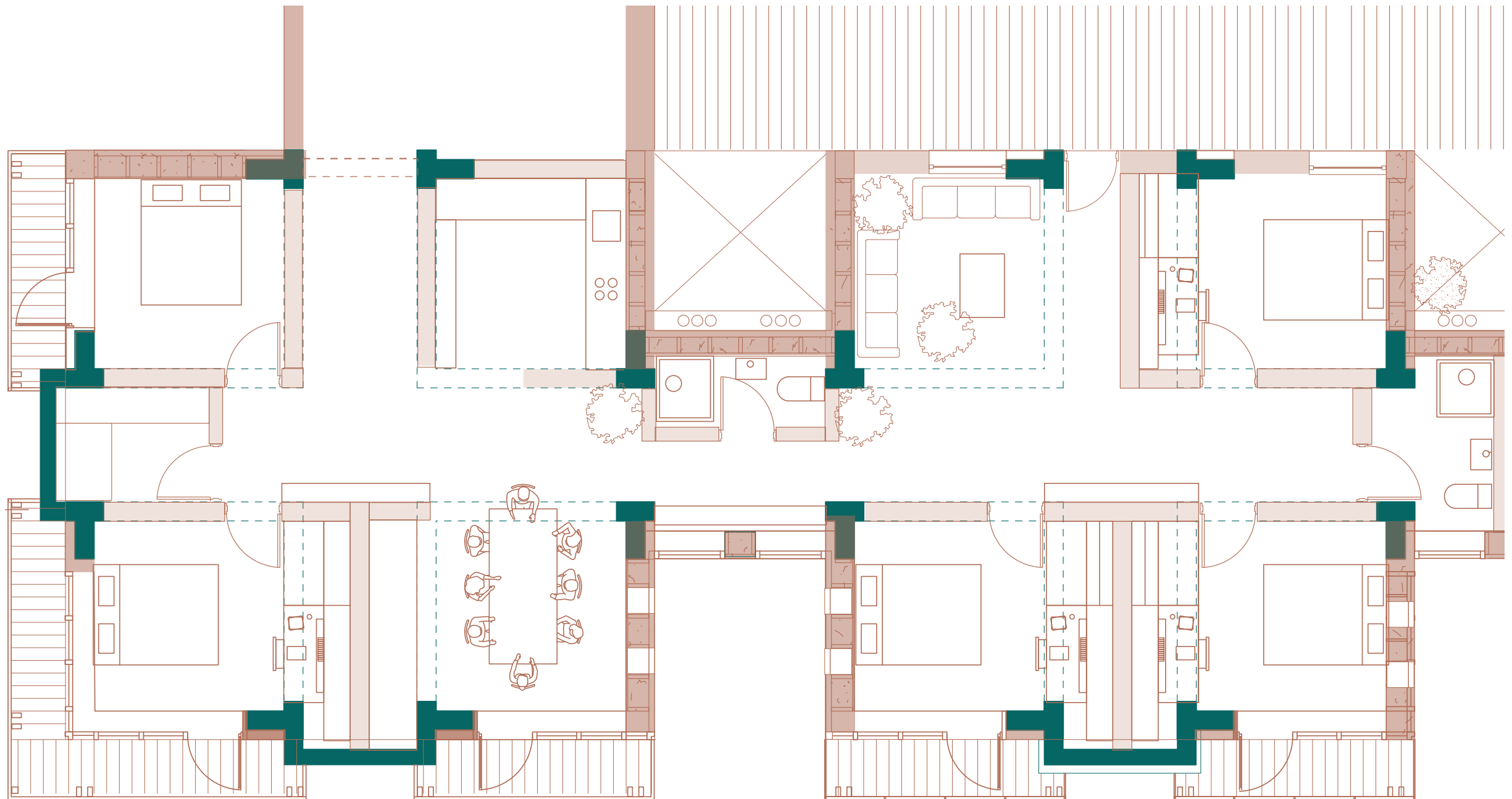


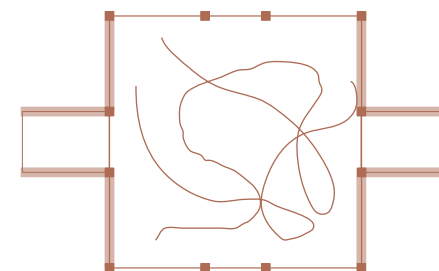
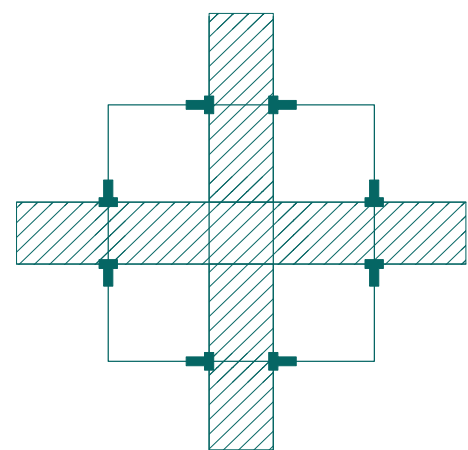
**Residential Unit :** Order + Freedom





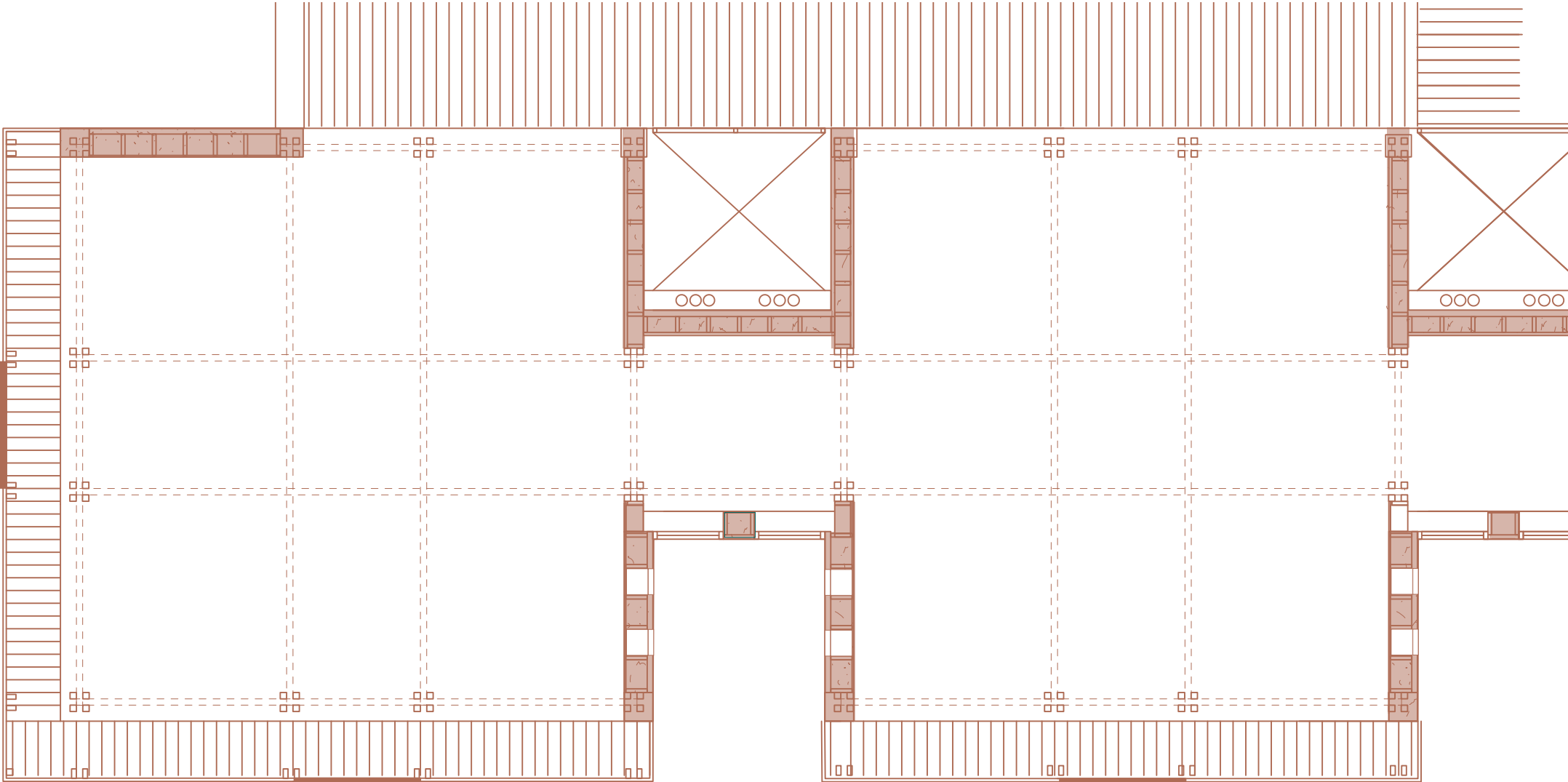
## Level 2+ 3 Residential Unit: Co-Housing



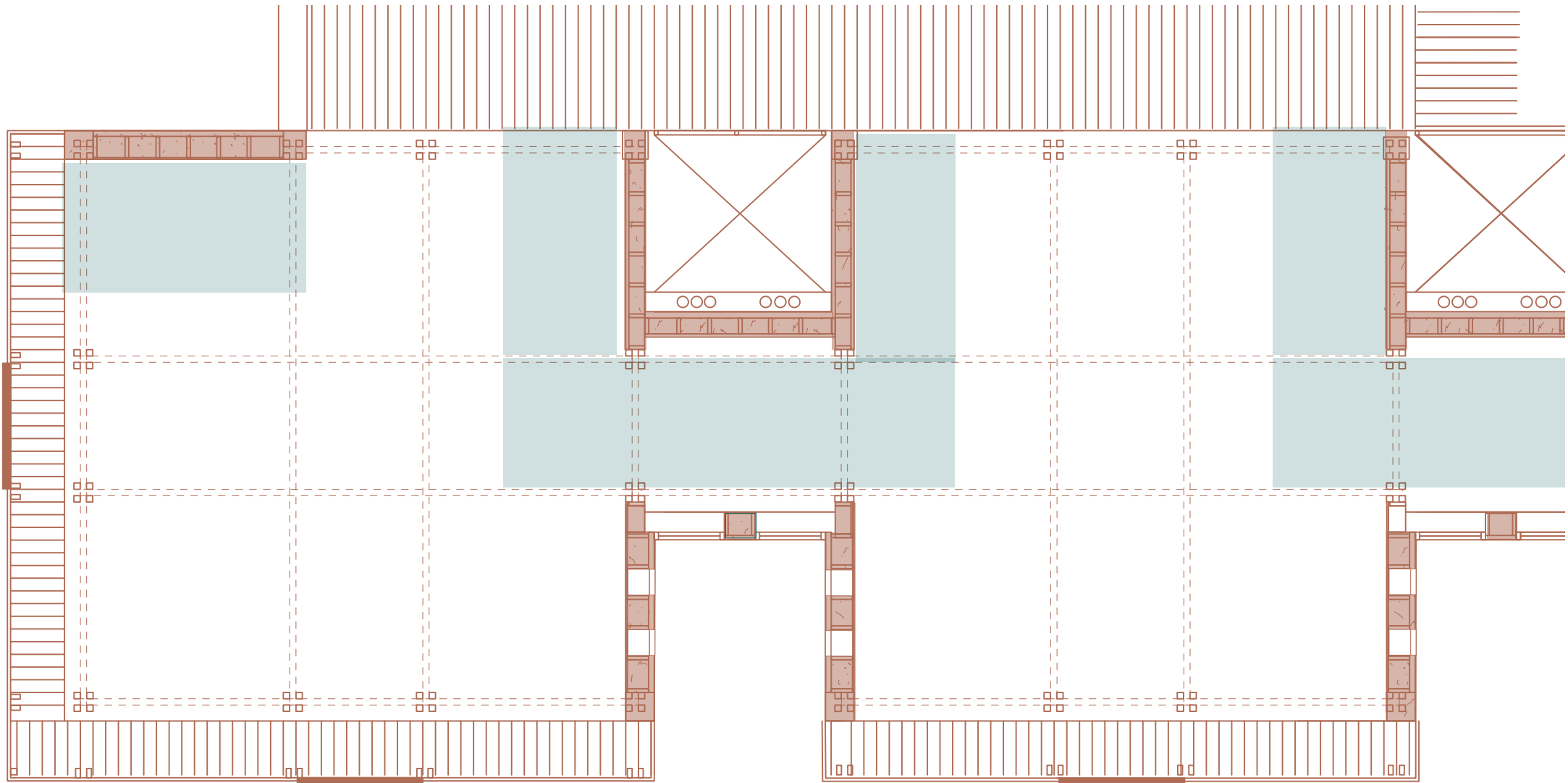




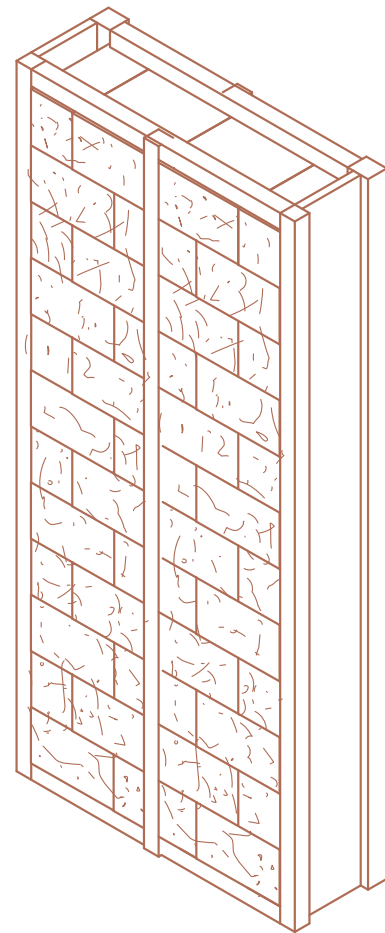
New Unit Floor Plan: Order



Order: Services

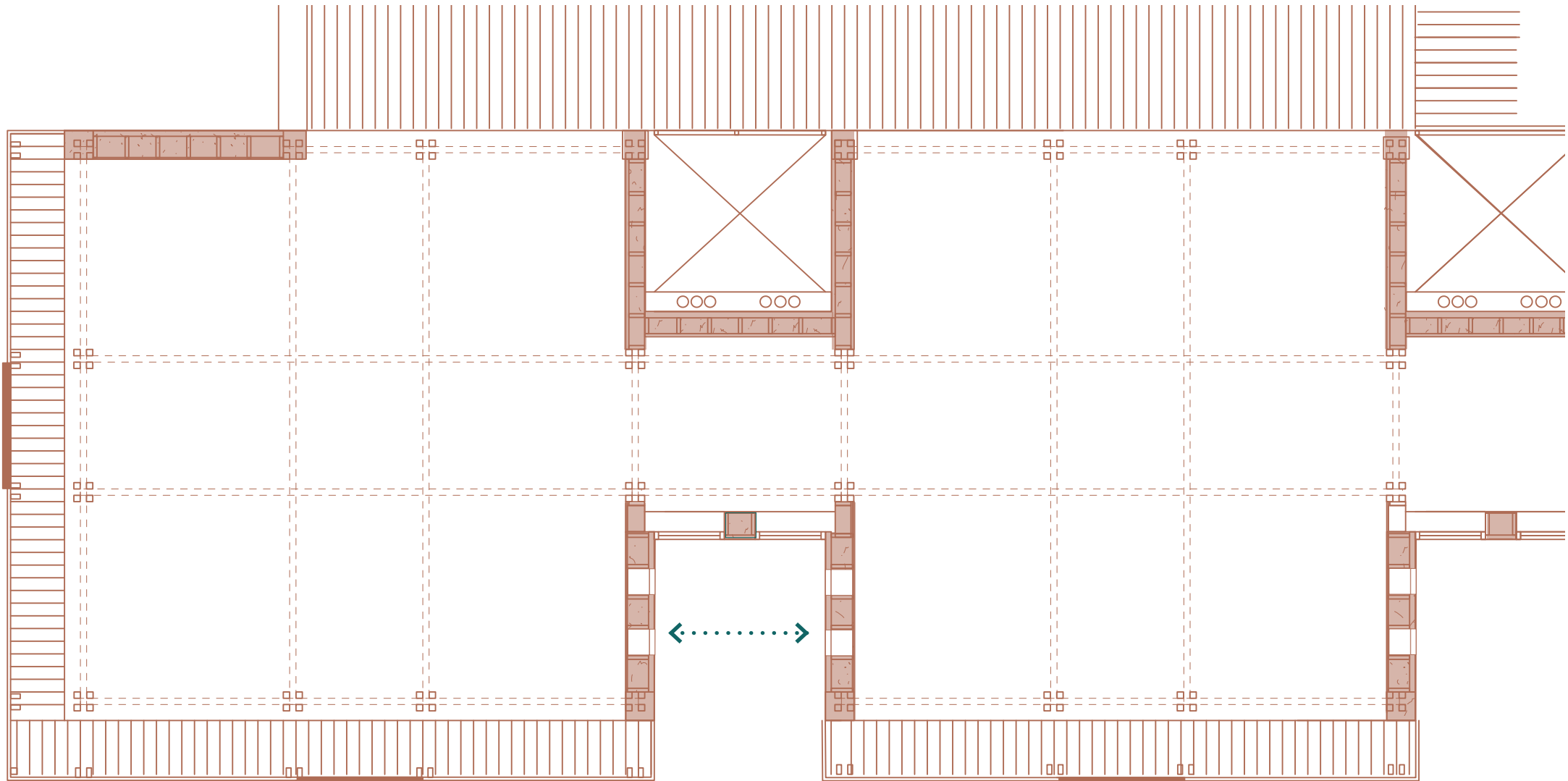






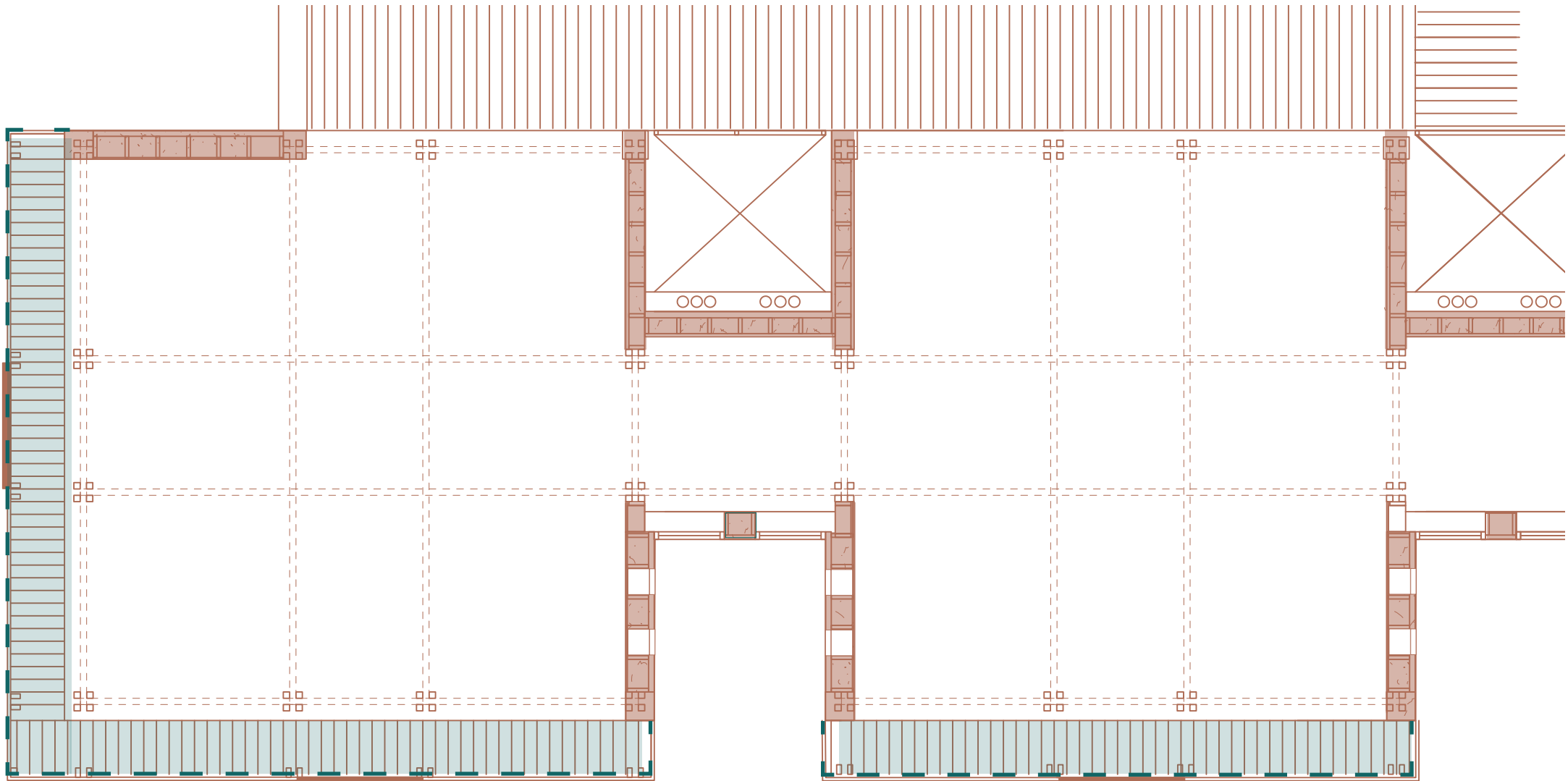
Timber Frame + Hempcrete Block  
Panel

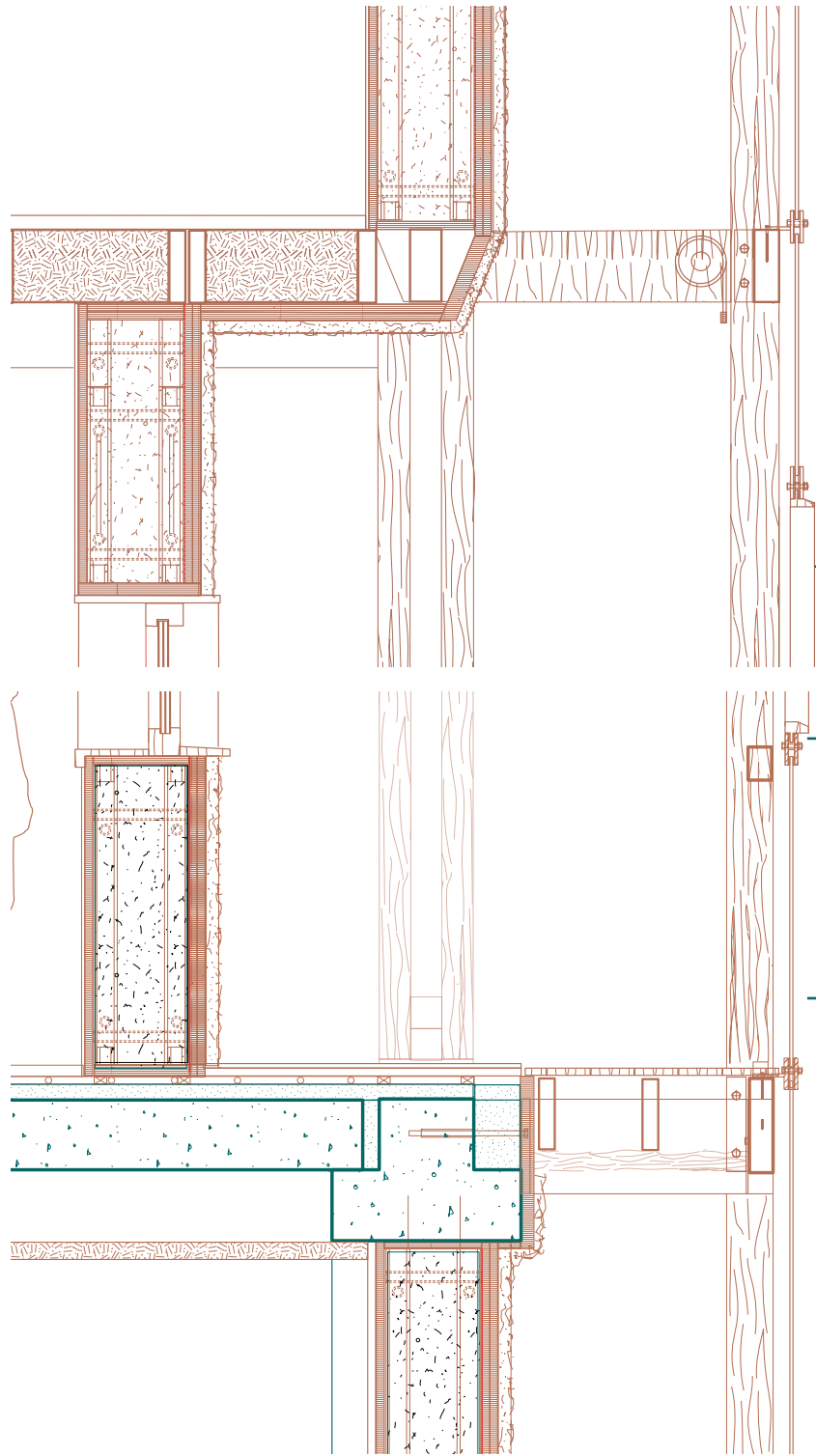
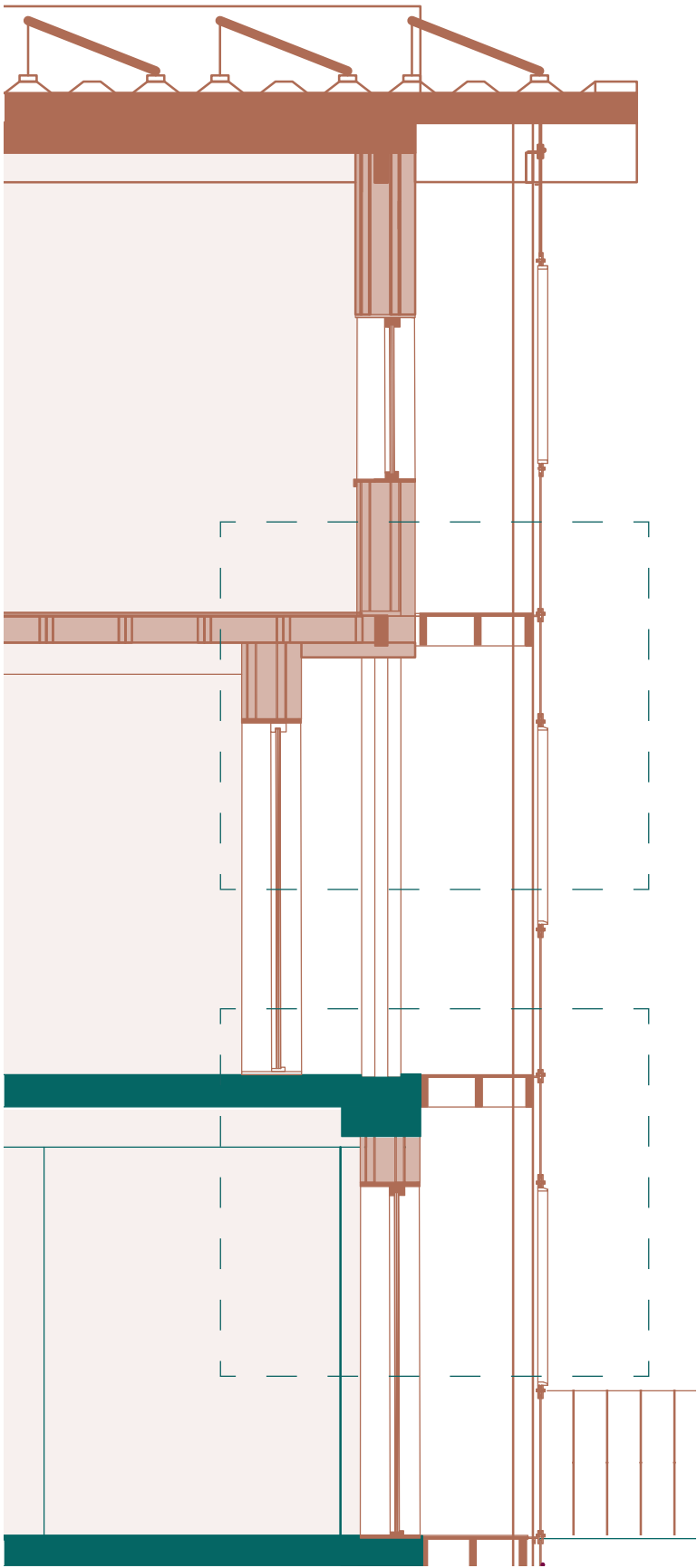
Order: Privacy





Order: Facade + Buffer Zone





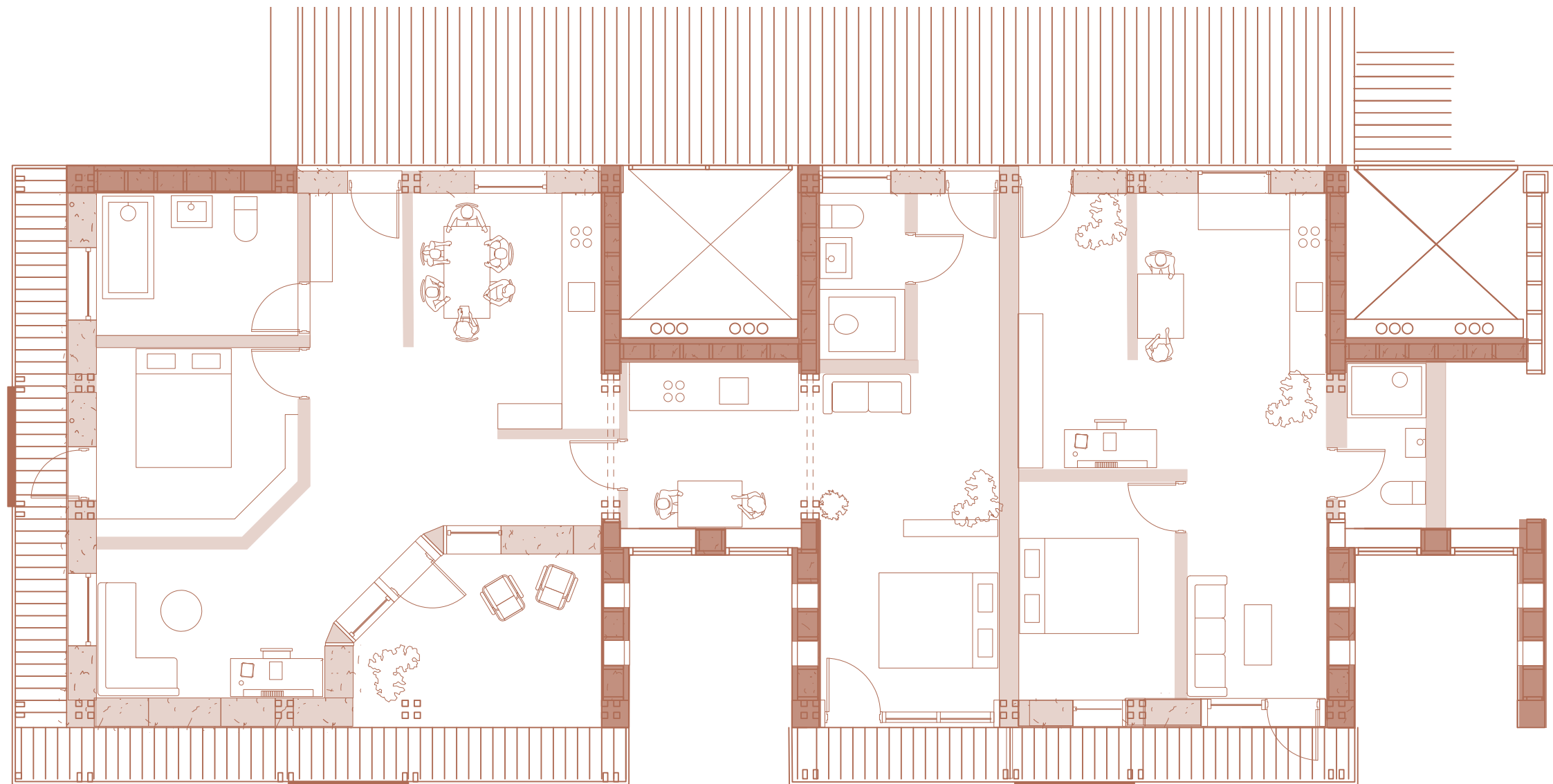
— Timber Frame Openings

— Steel Clamps

— Reclaimed Single Glazing



## Freedom: Dwelling Variation



71 m<sup>2</sup>

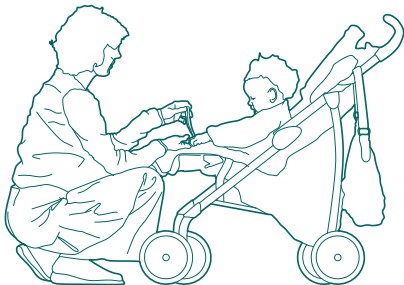
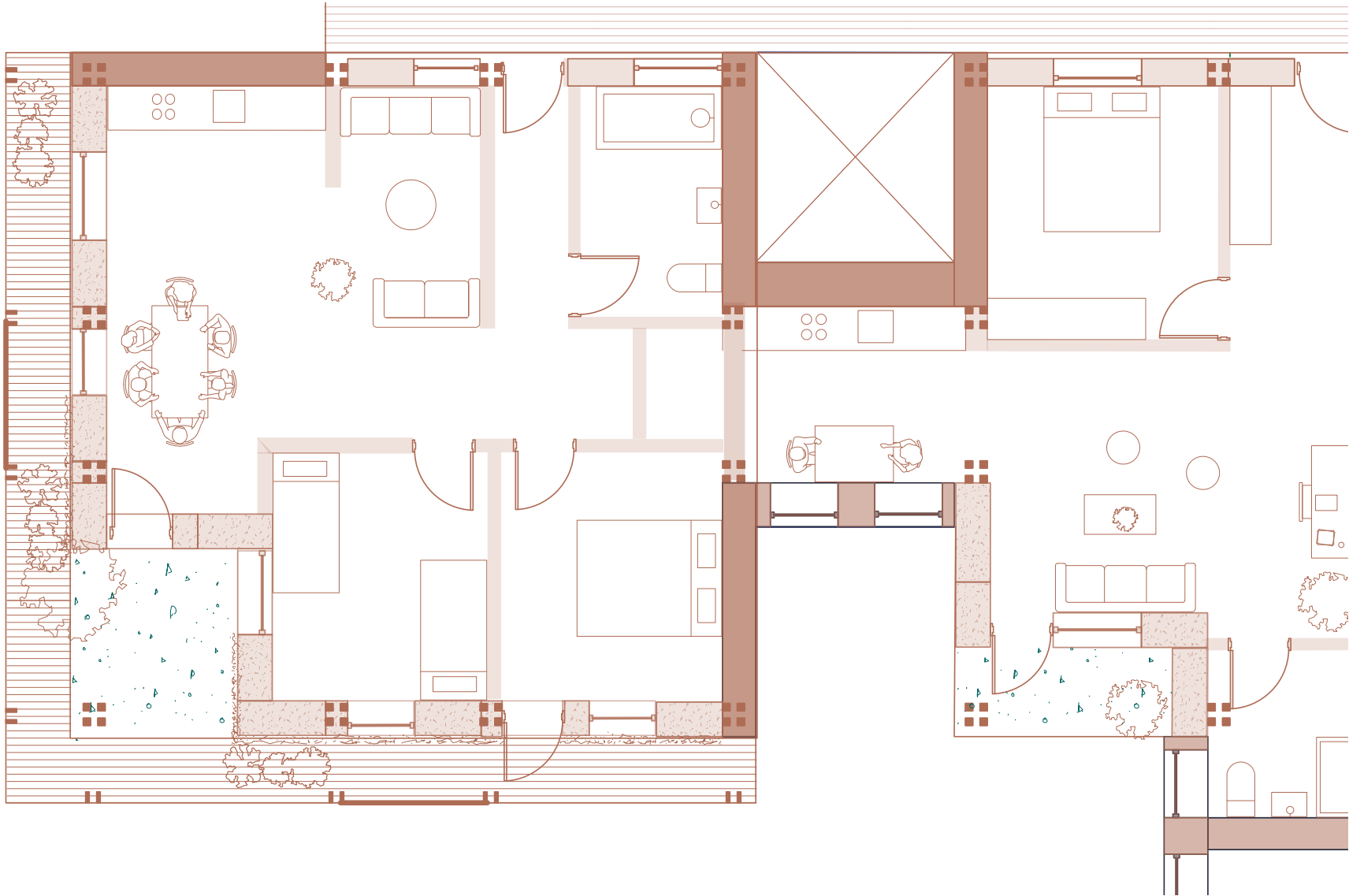


34 m<sup>2</sup>

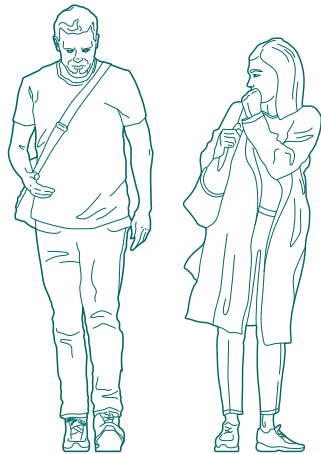


50 m<sup>2</sup>

Freedom: Dwelling Variation

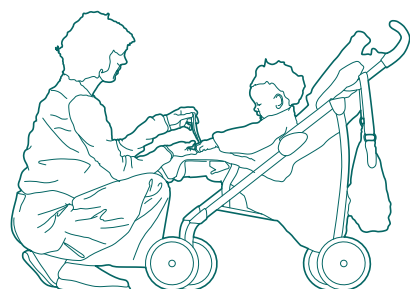
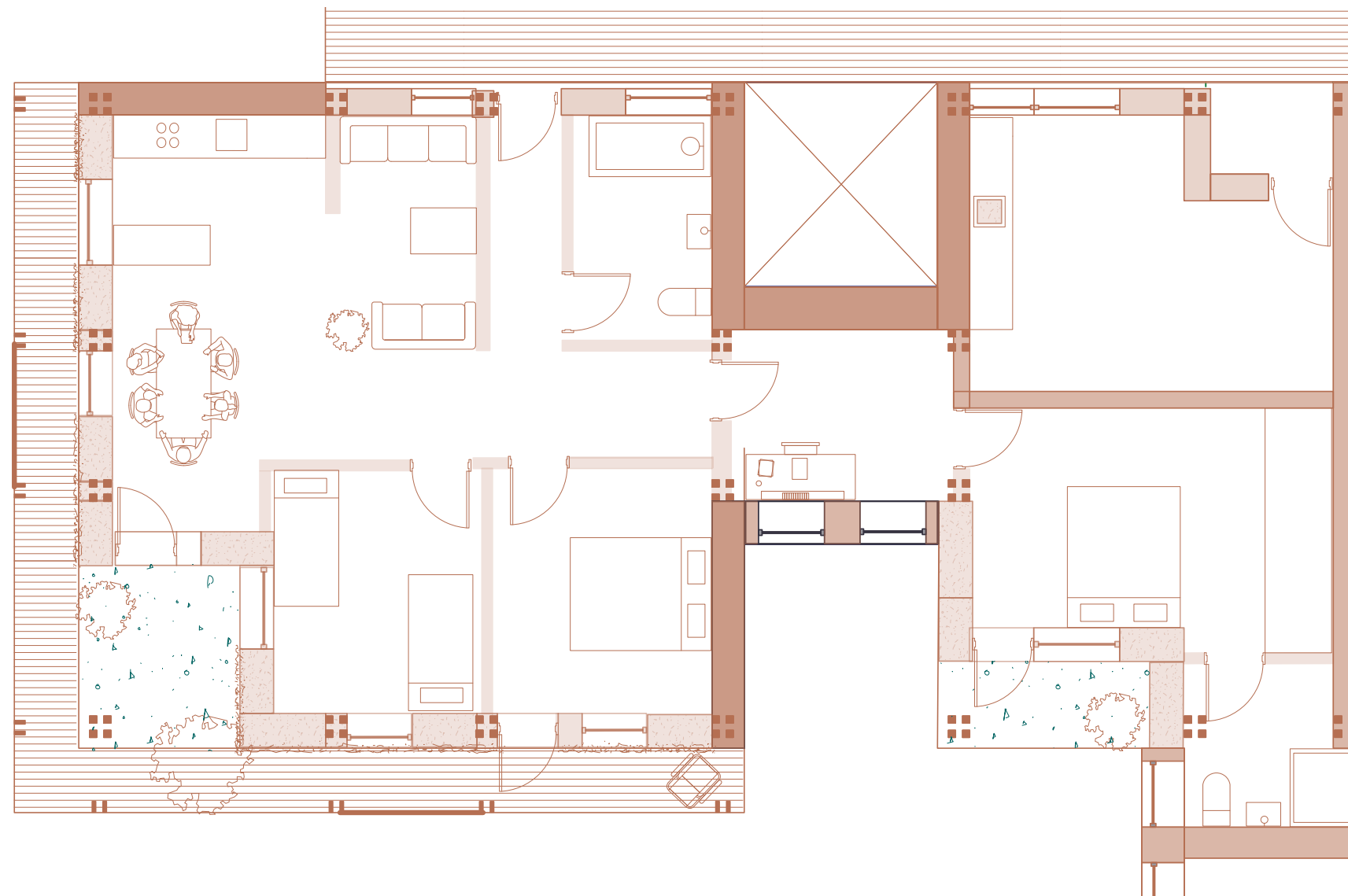


71 m<sup>2</sup>

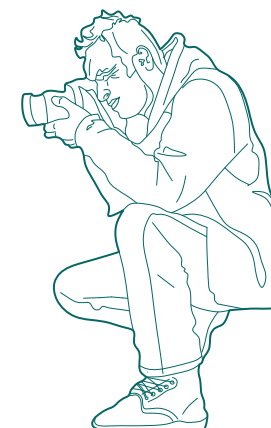


54 m<sup>2</sup>

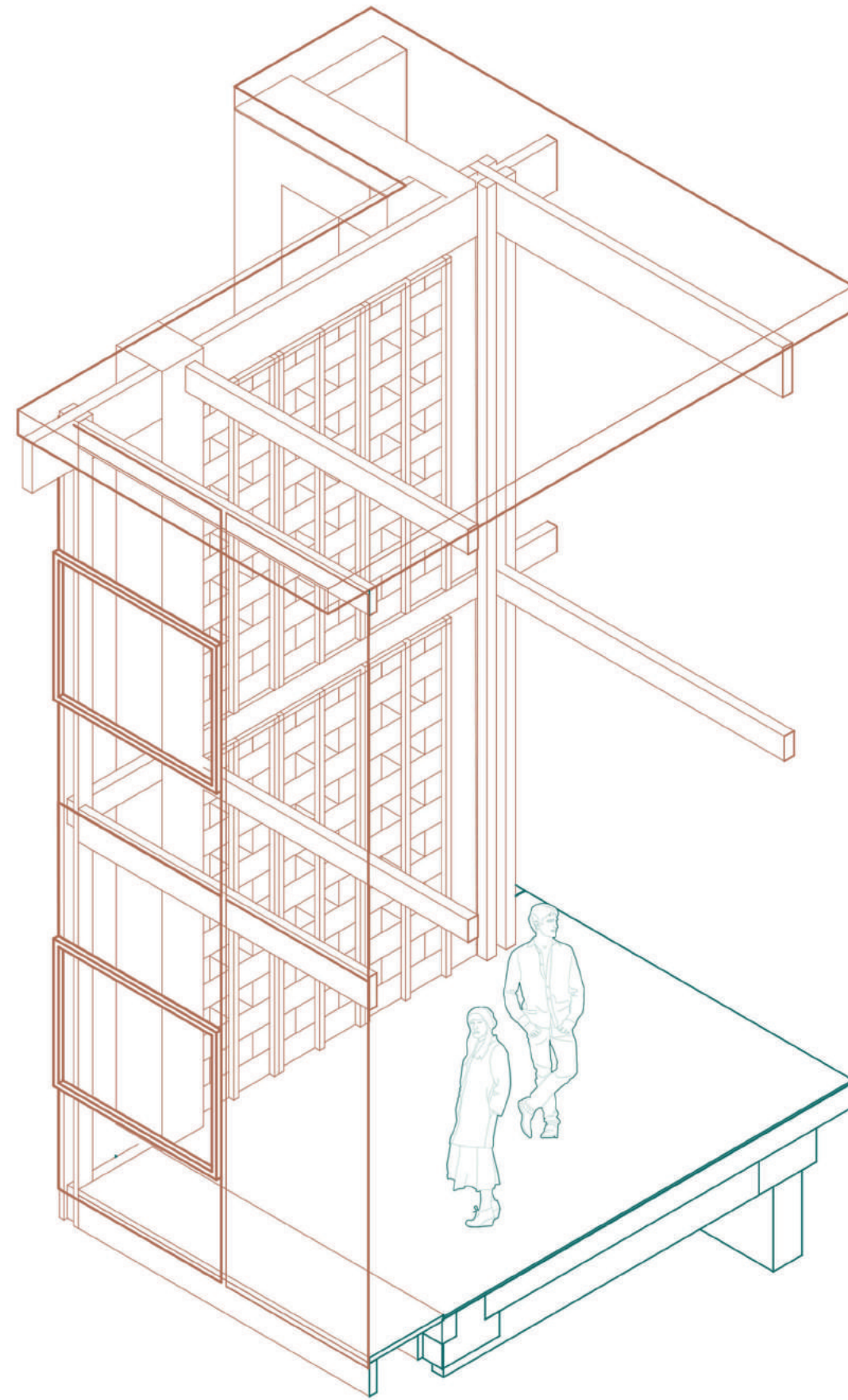




100 m<sup>2</sup>

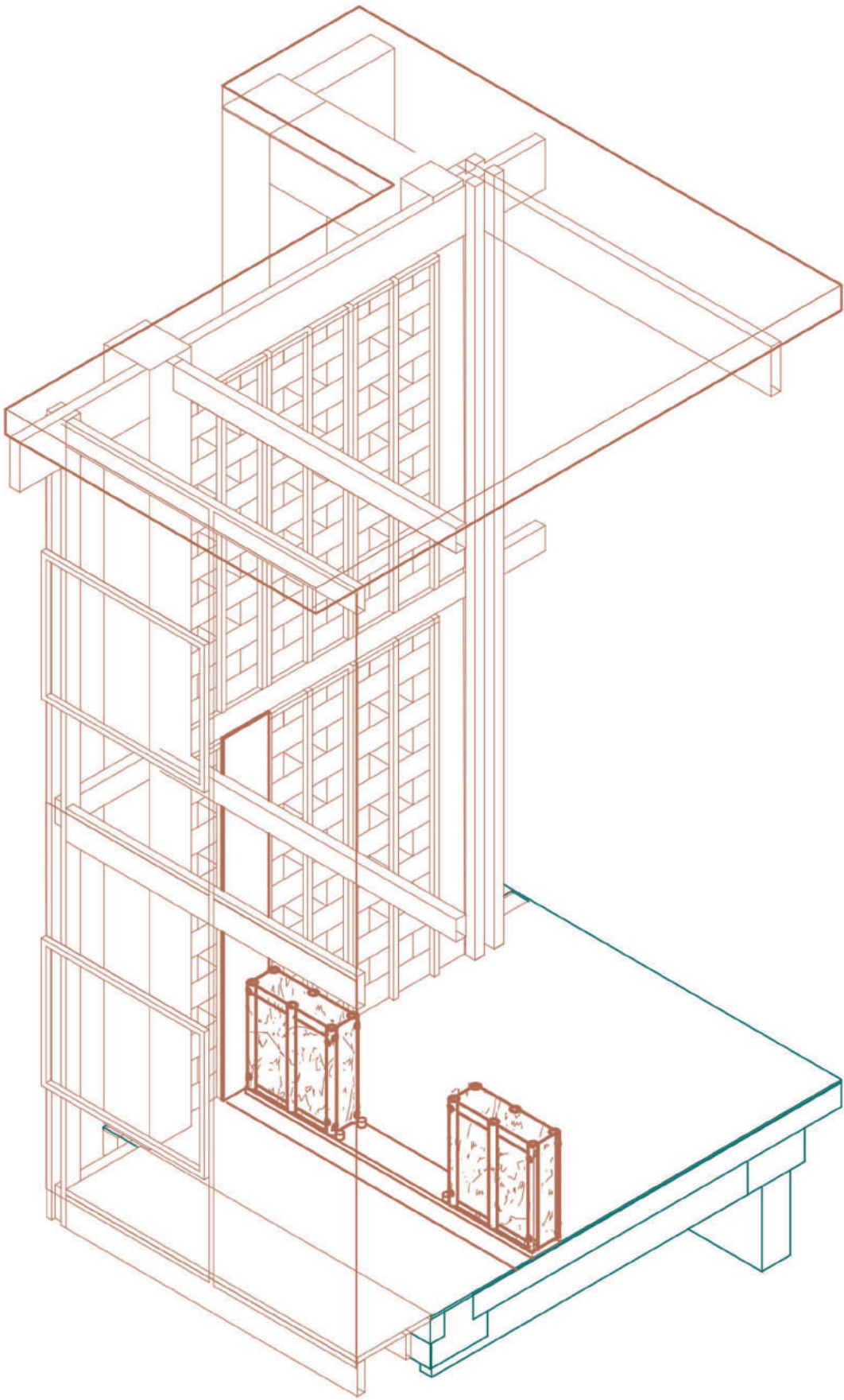
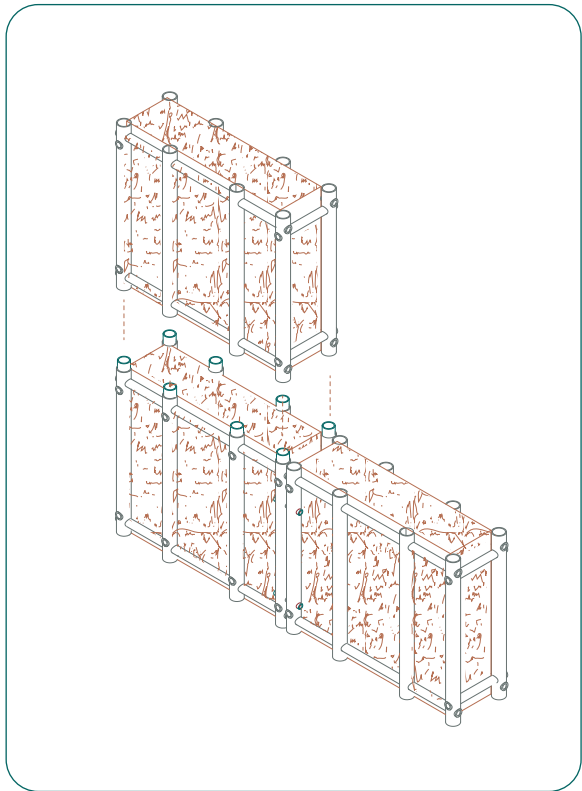


20 m<sup>2</sup>

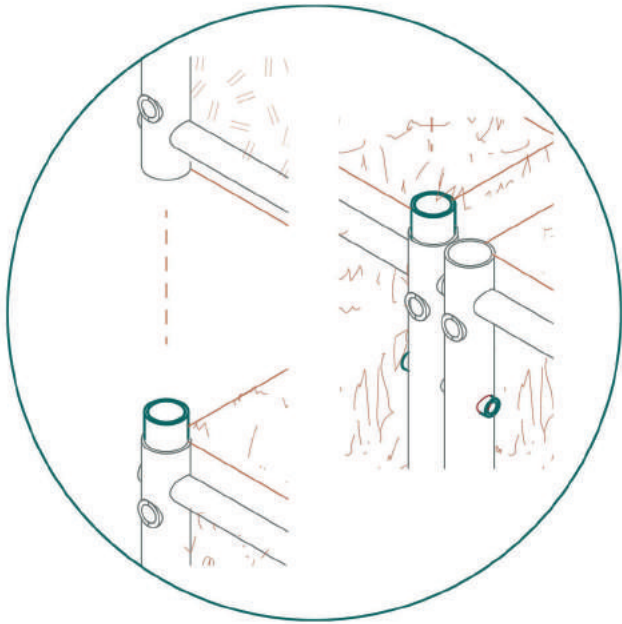


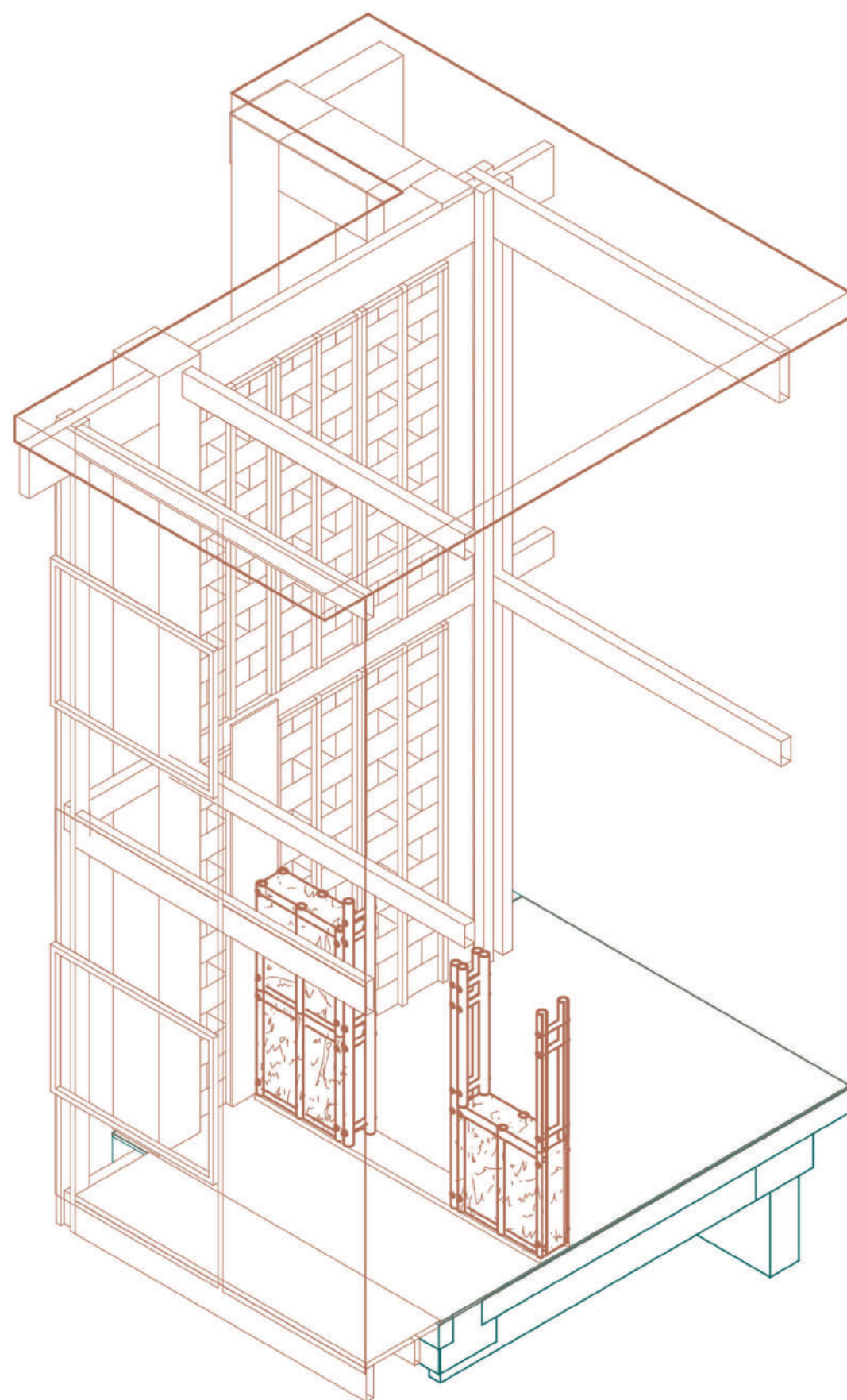
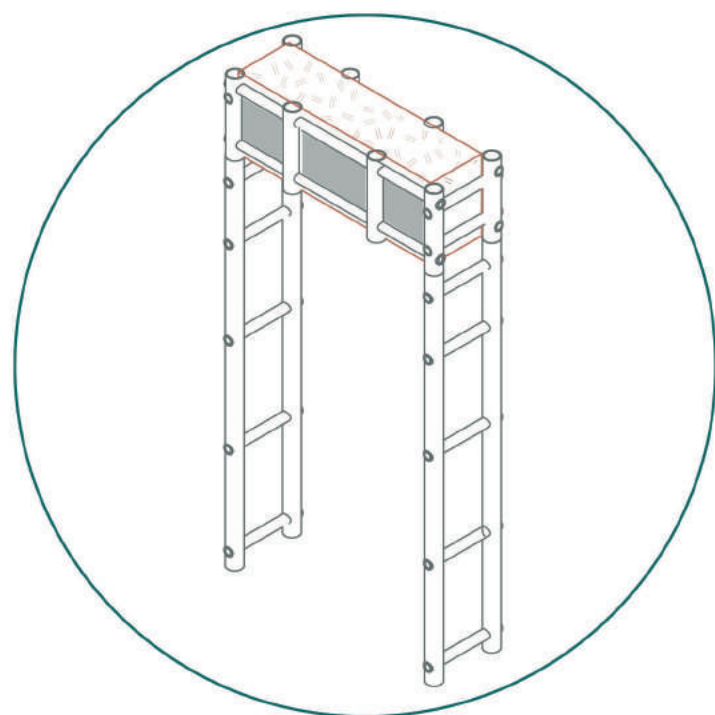


Paper Tube + Straw Panel

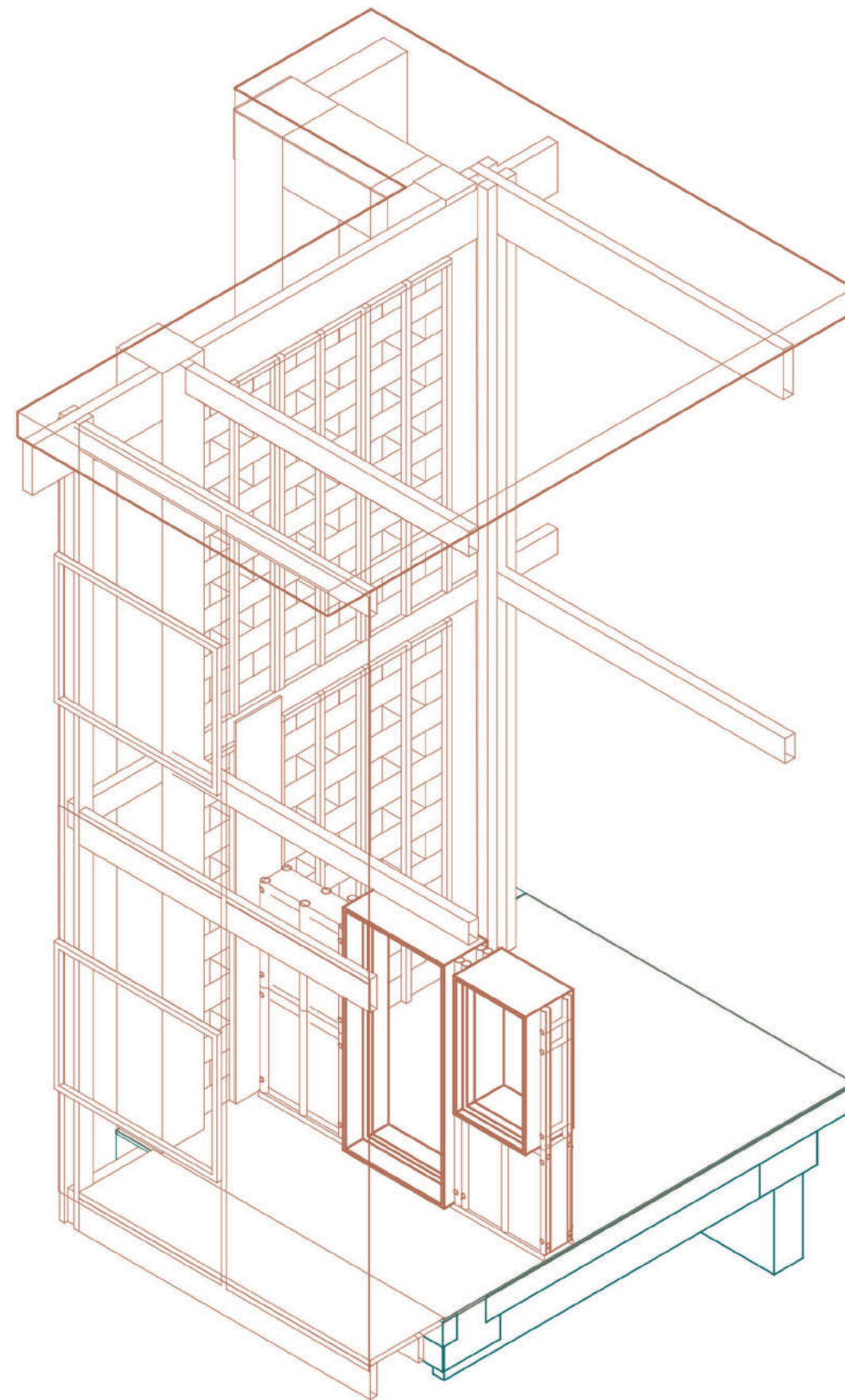


Demountable Connections

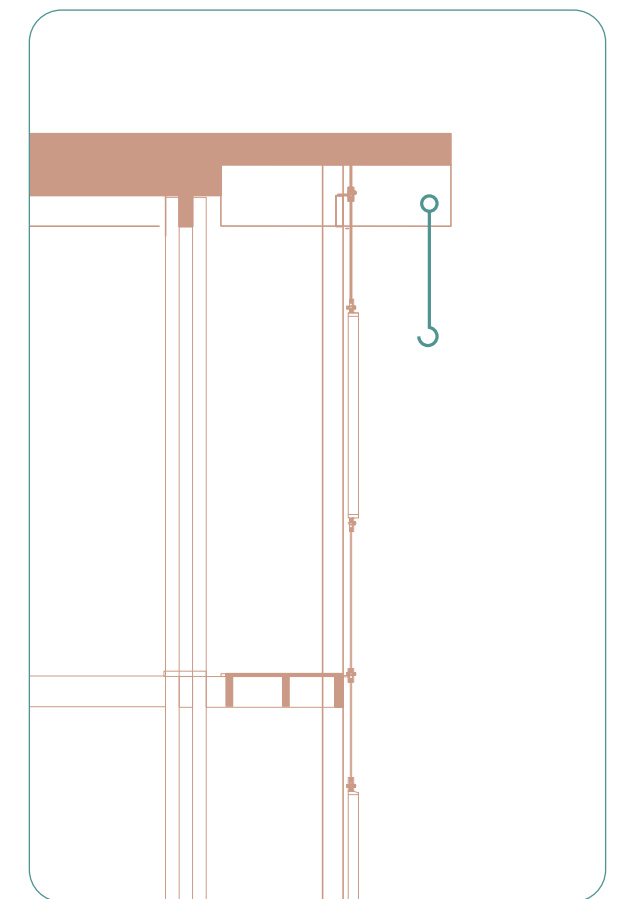


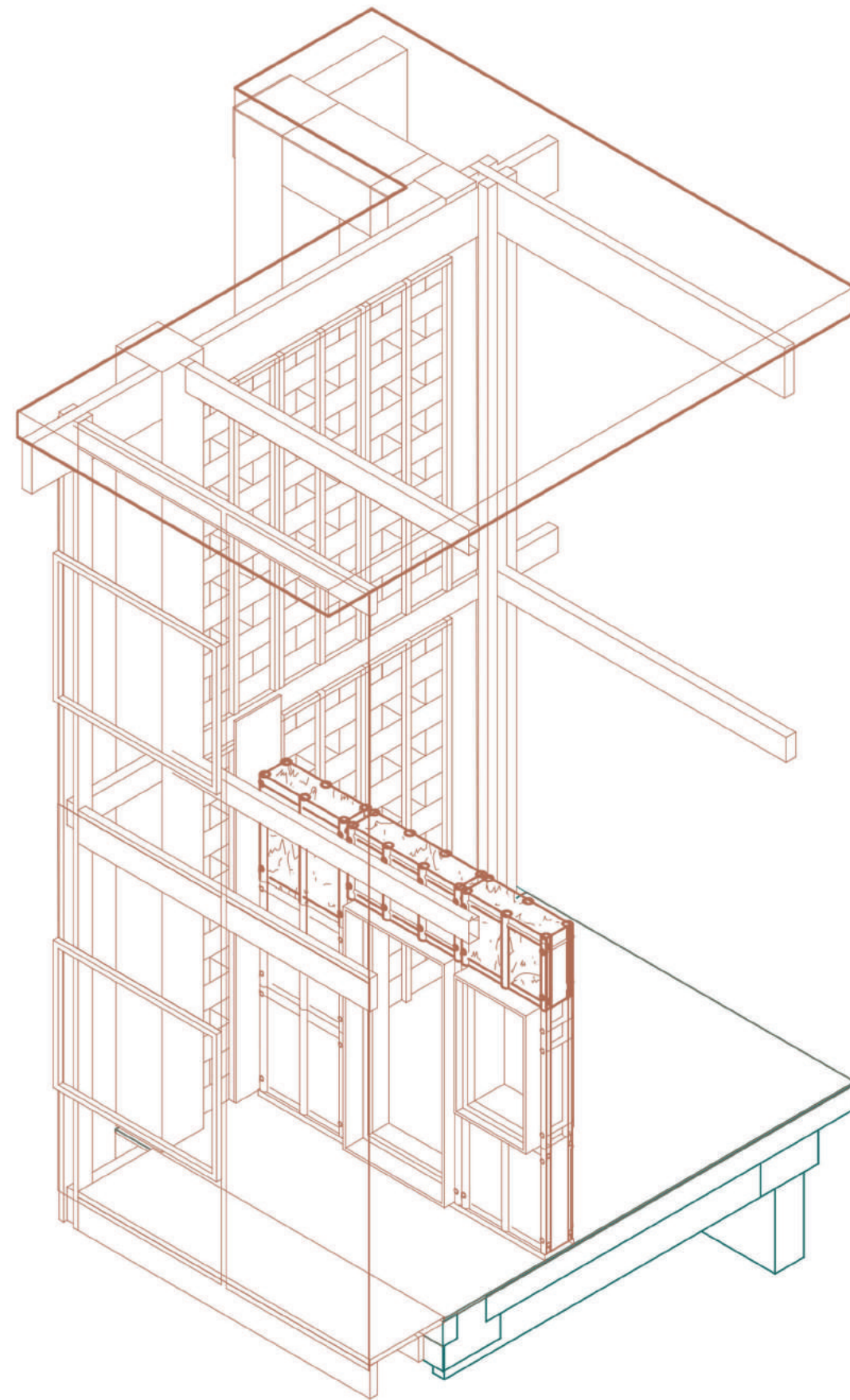




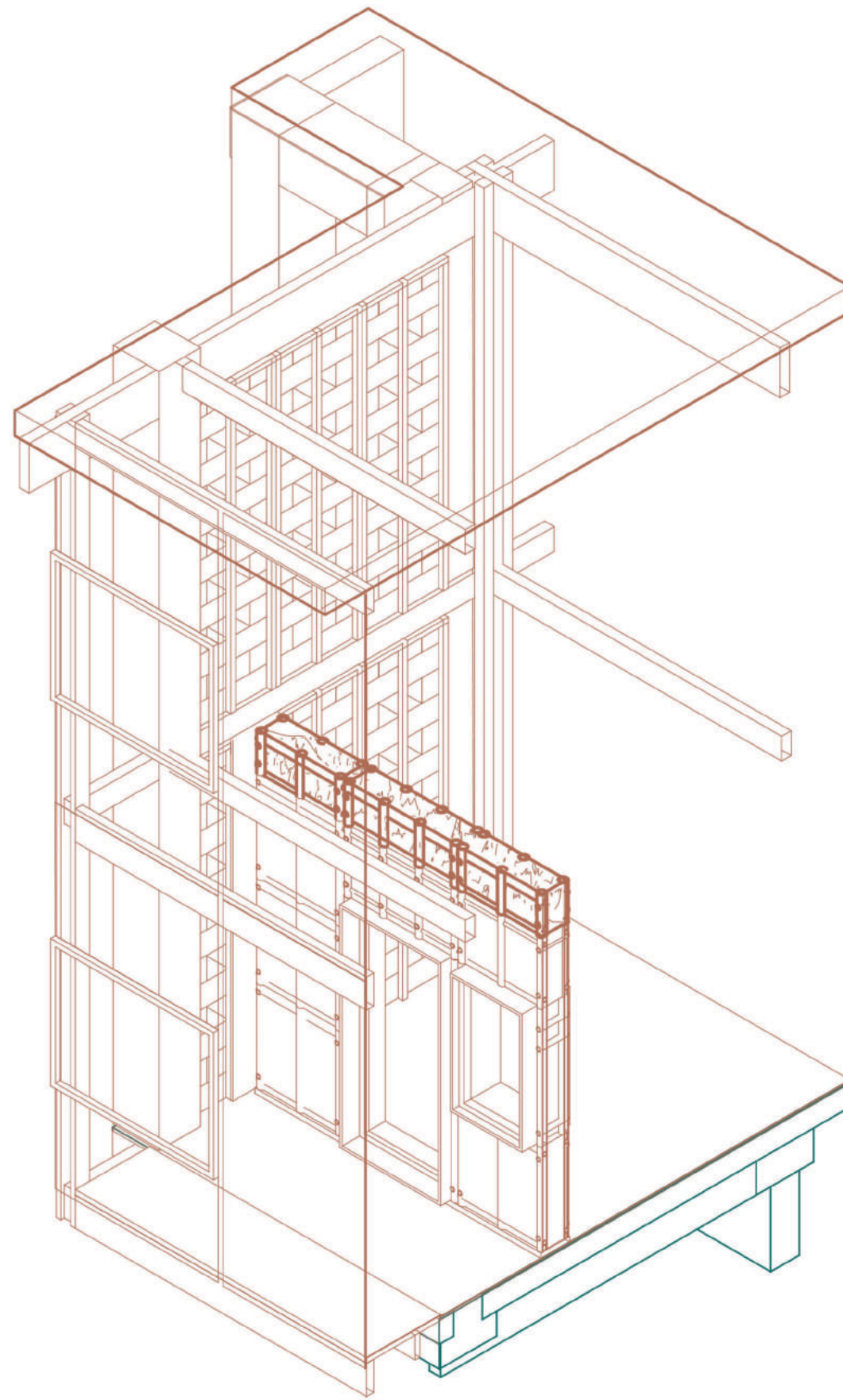


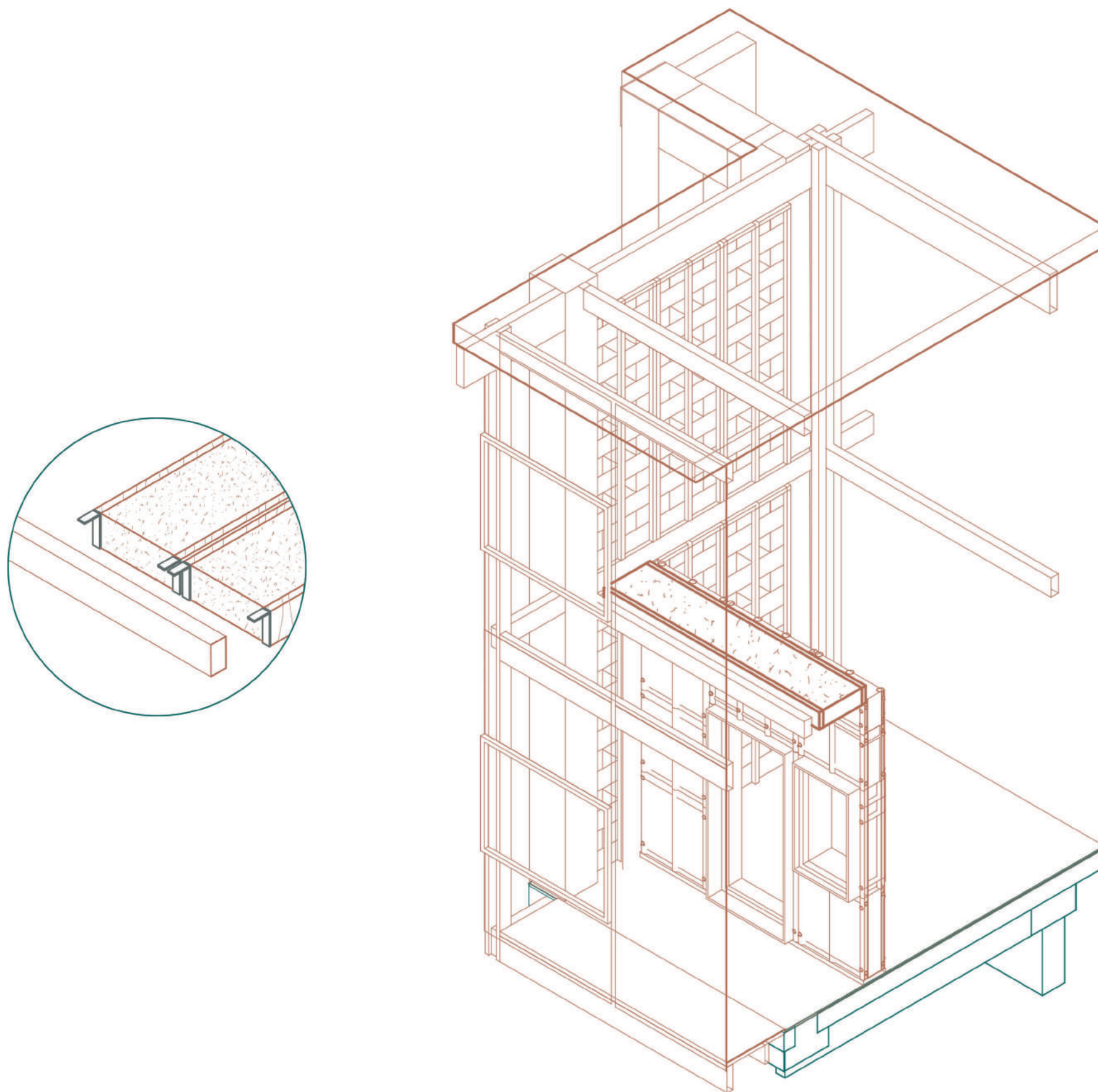
**Lifting Pulley**







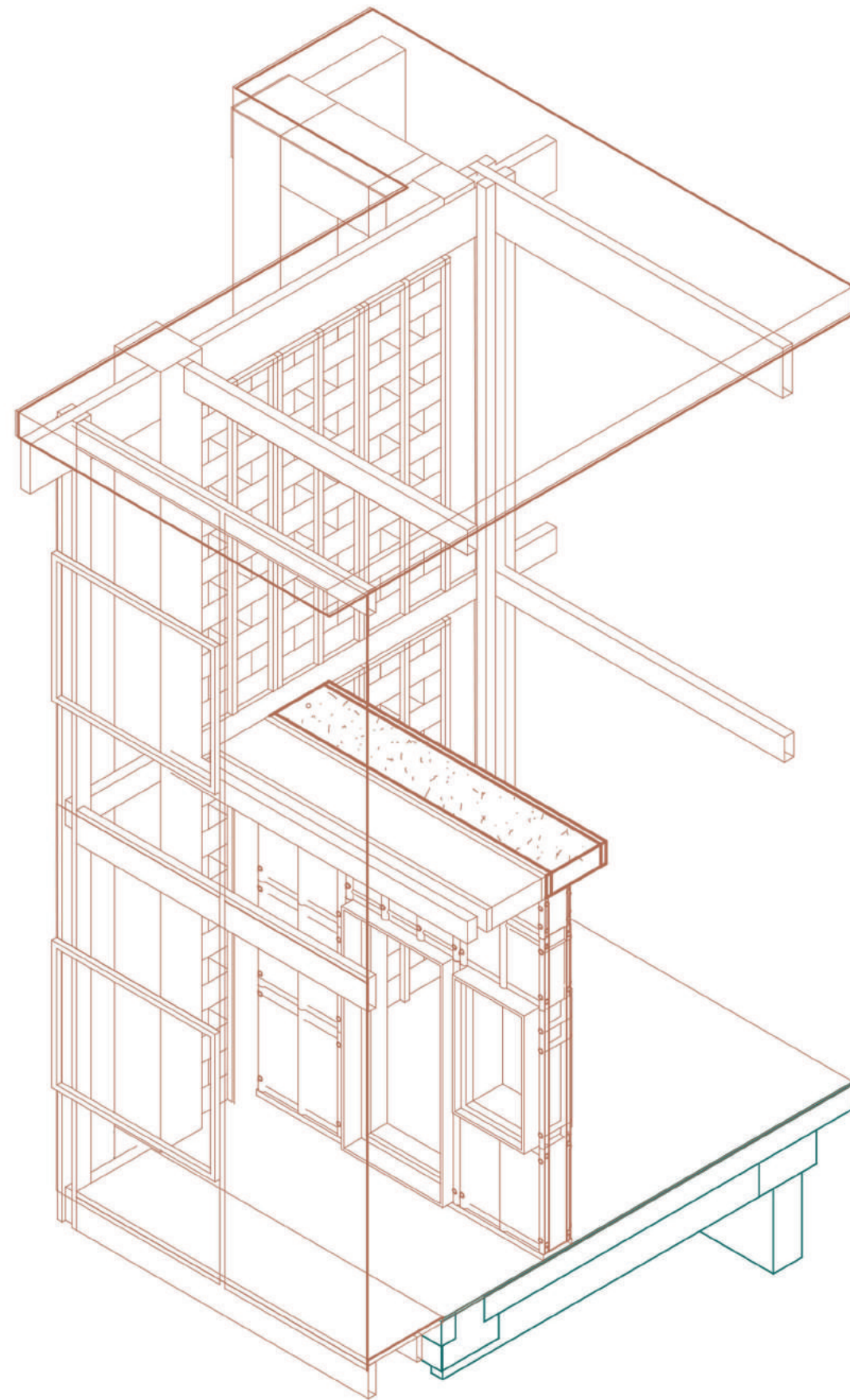


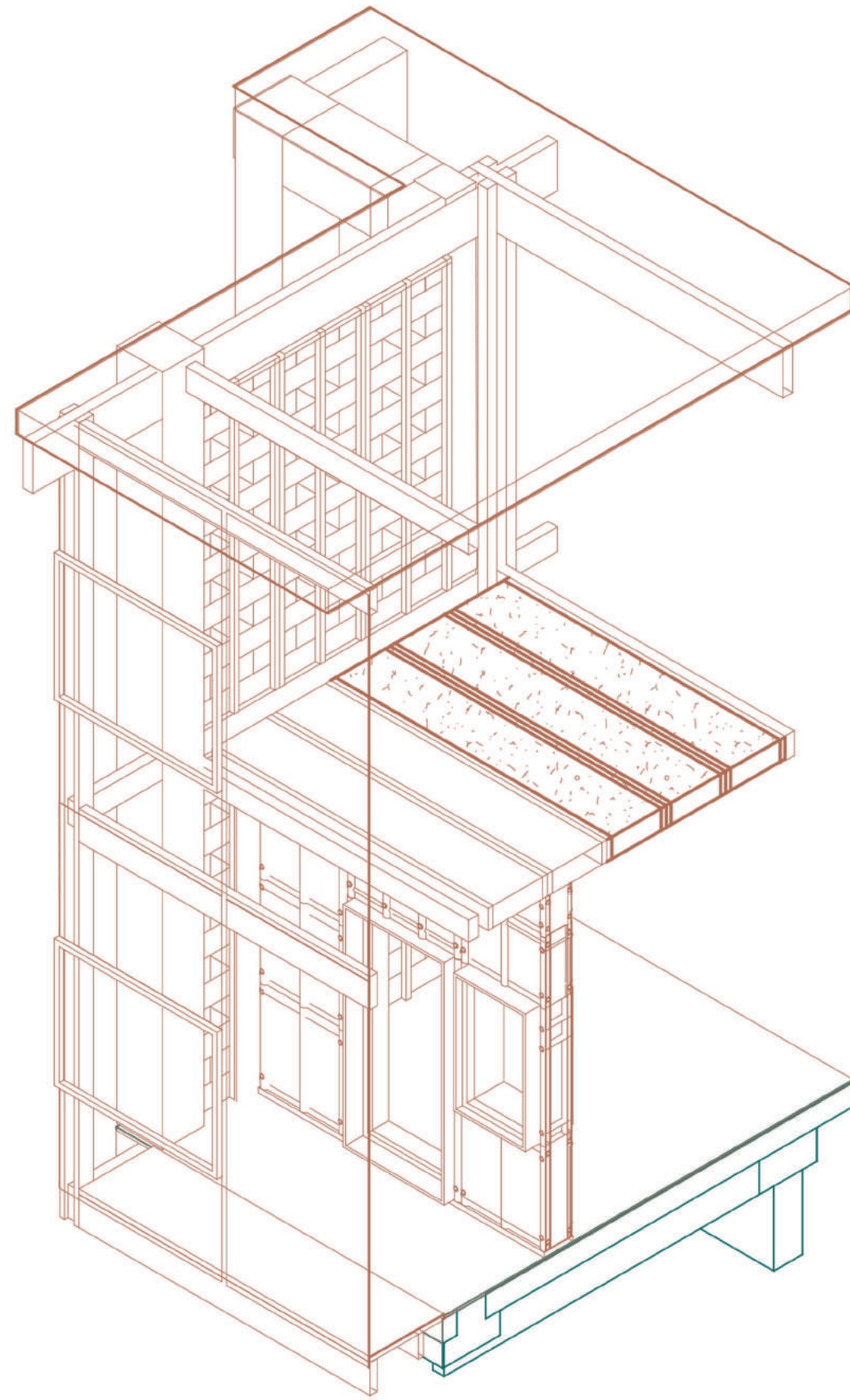


**Floor: Timber + Mycelium Panel**

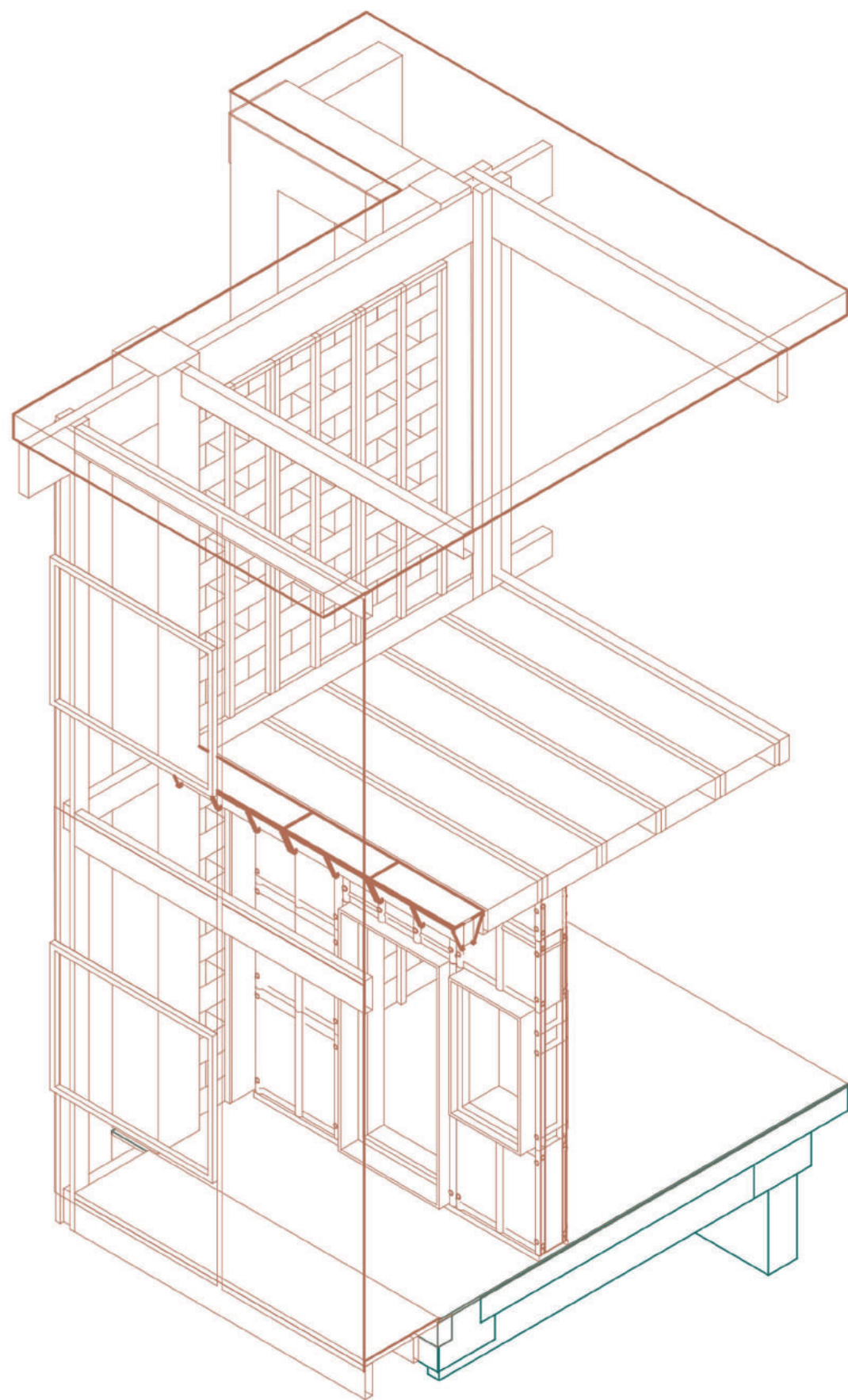
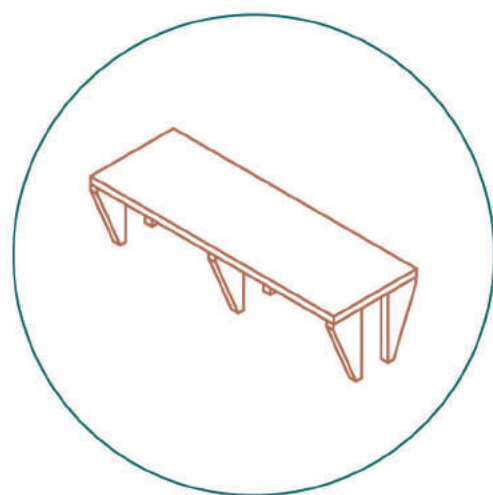
Total weight = 36 kg

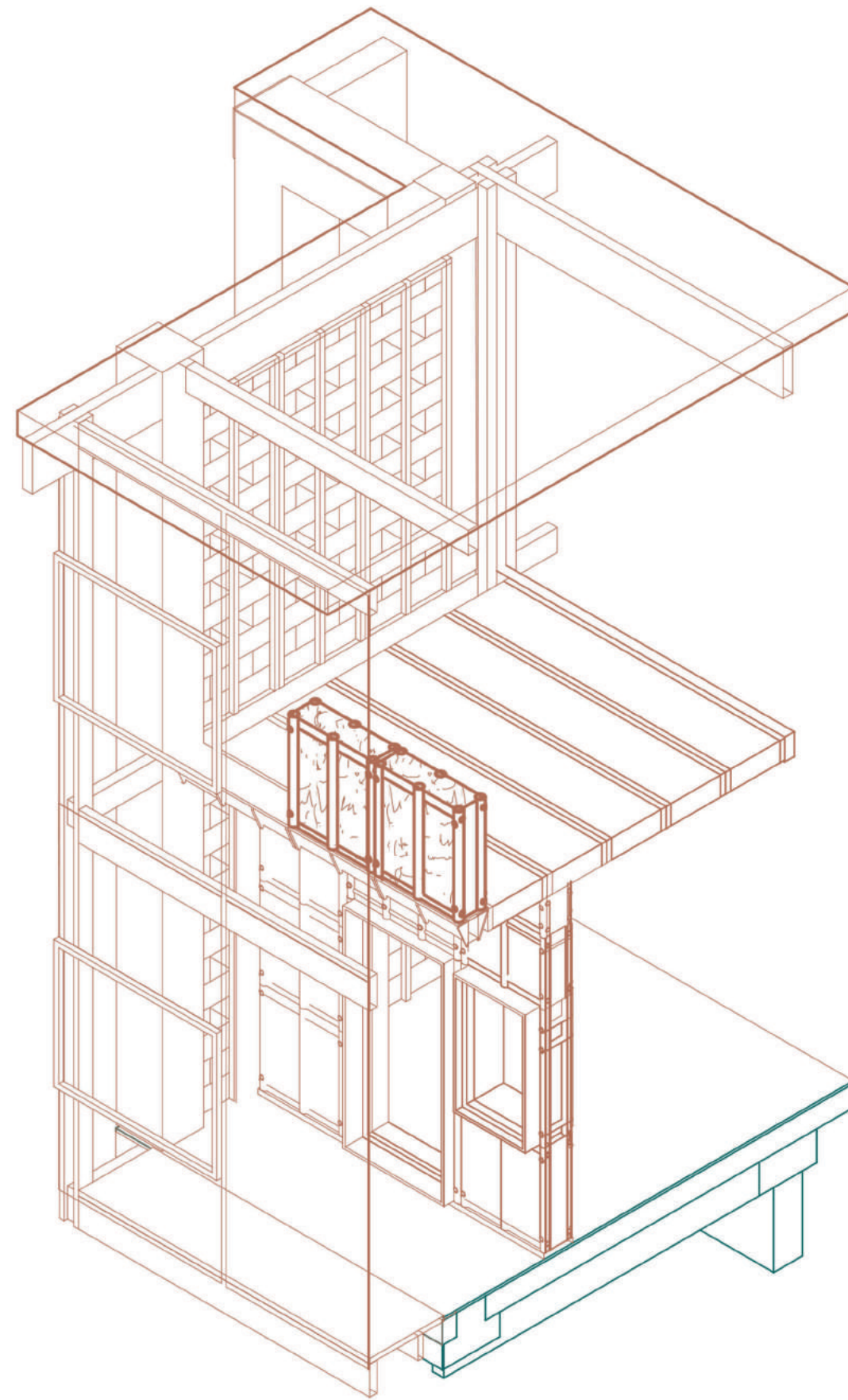




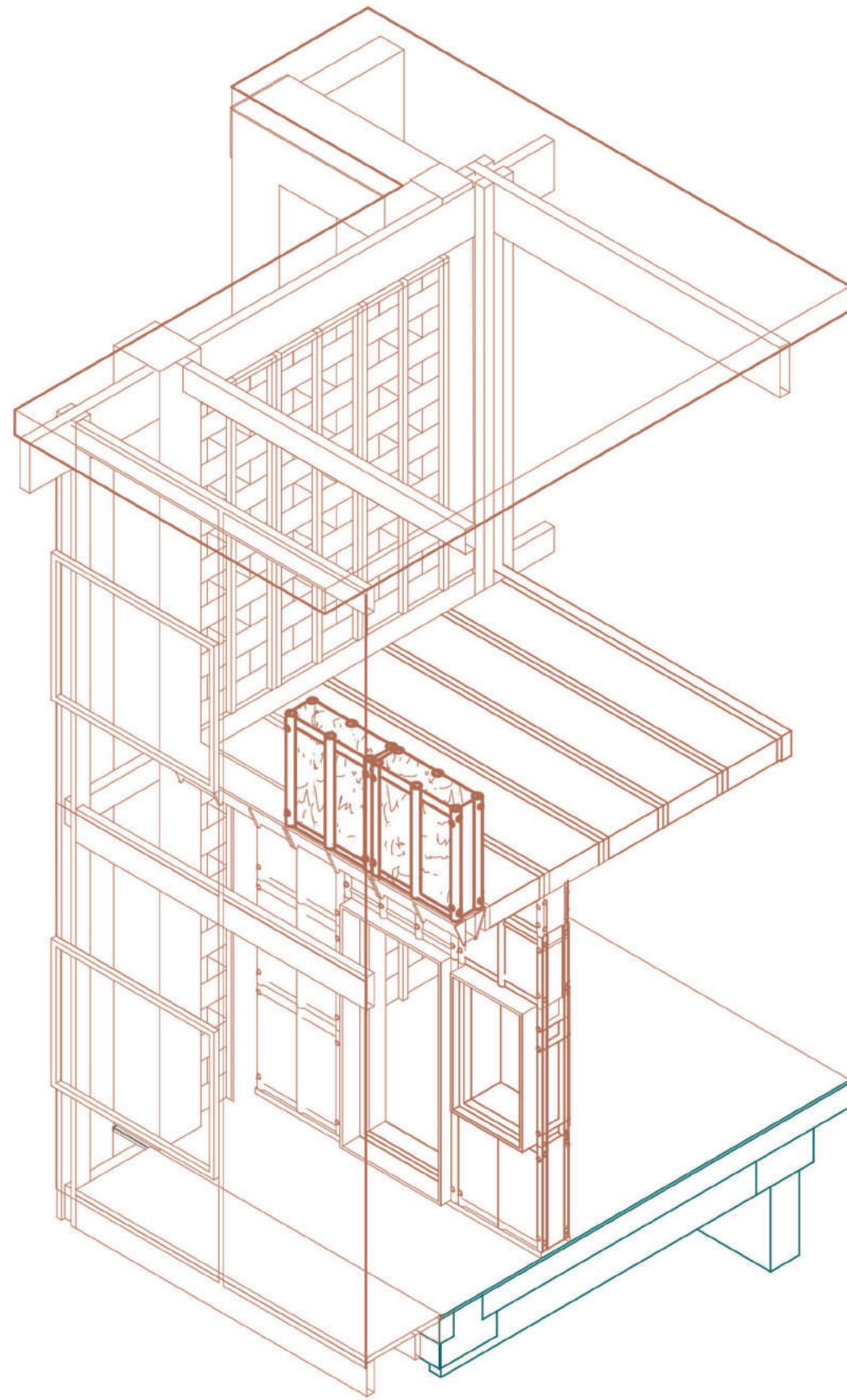


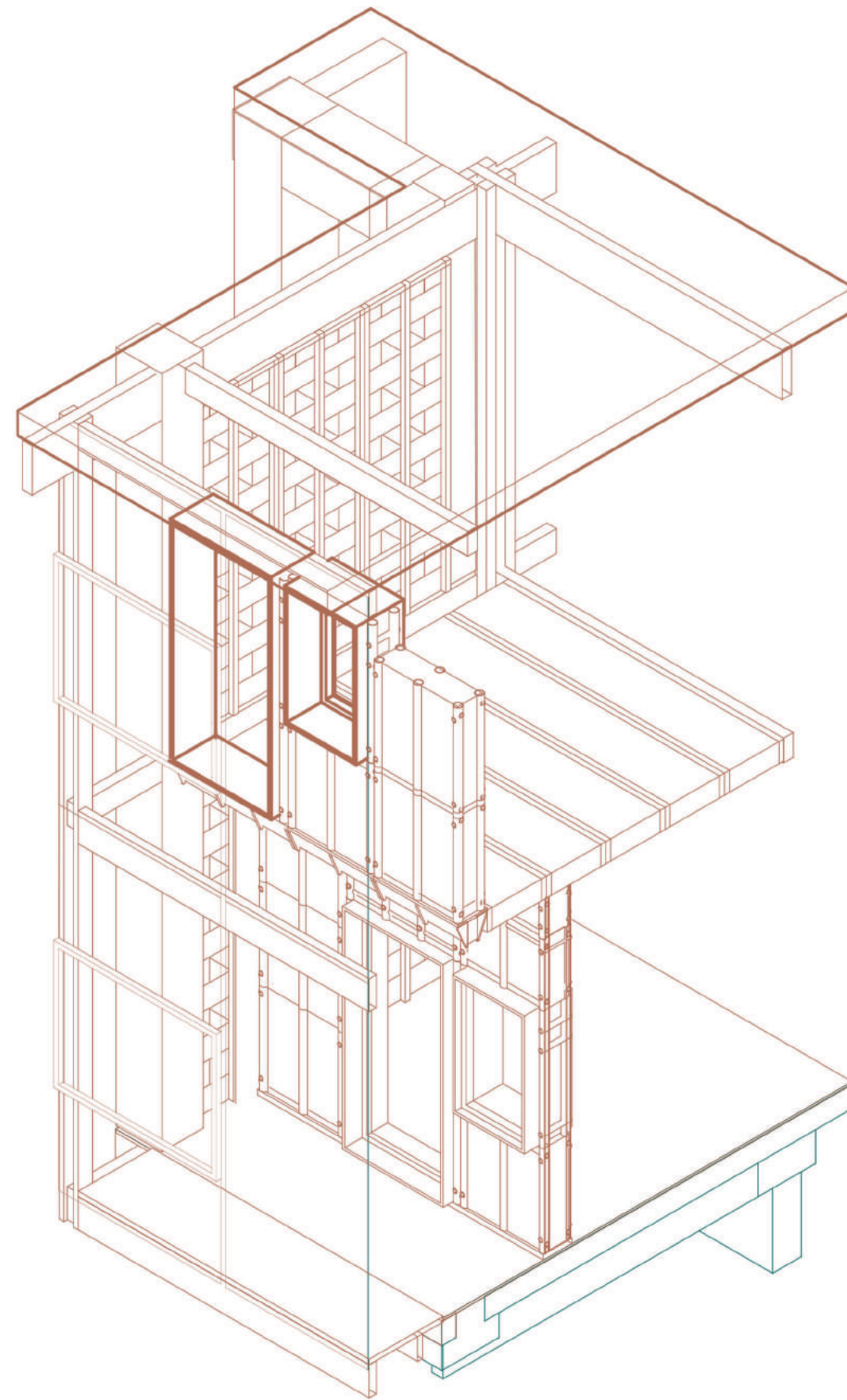




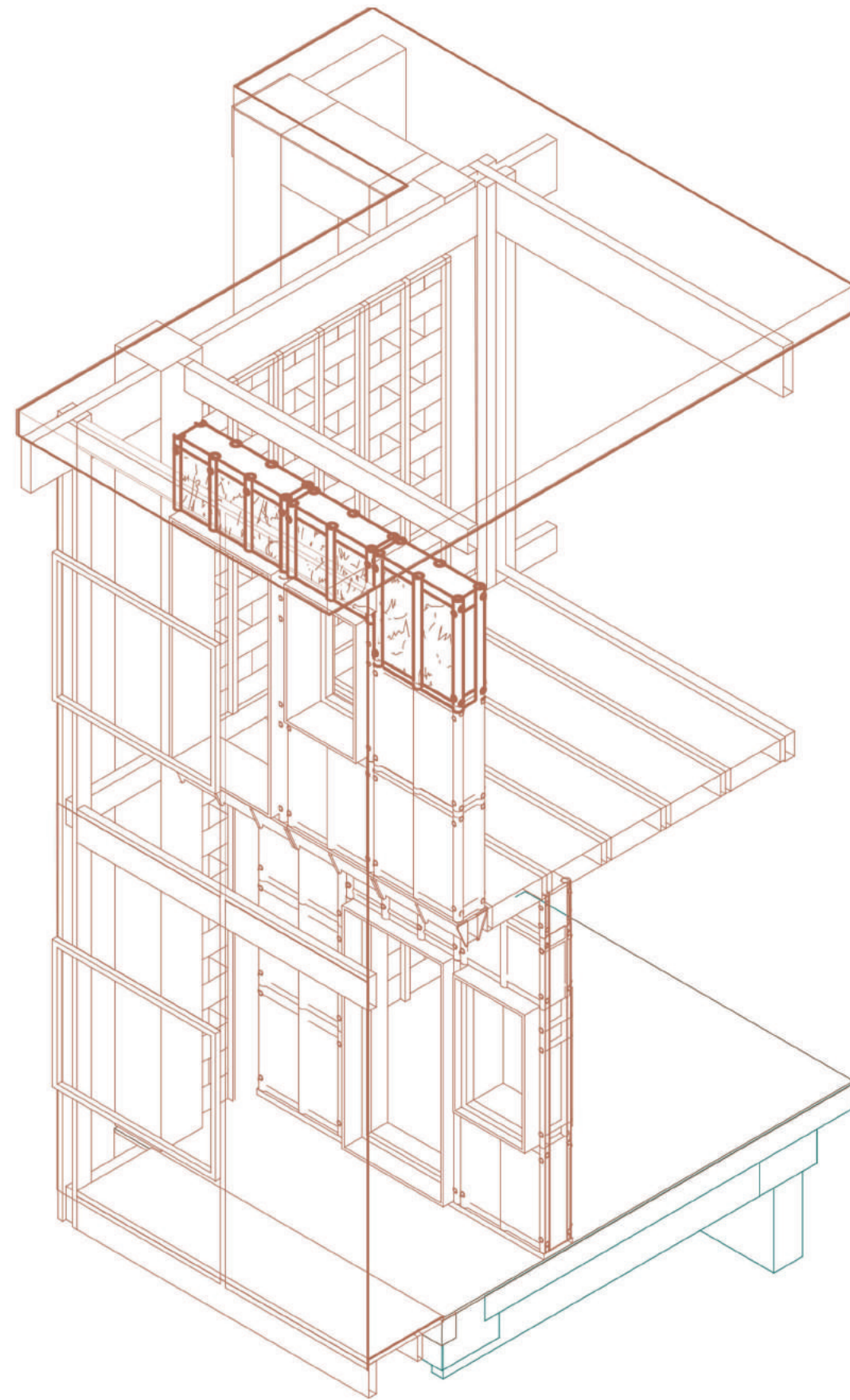


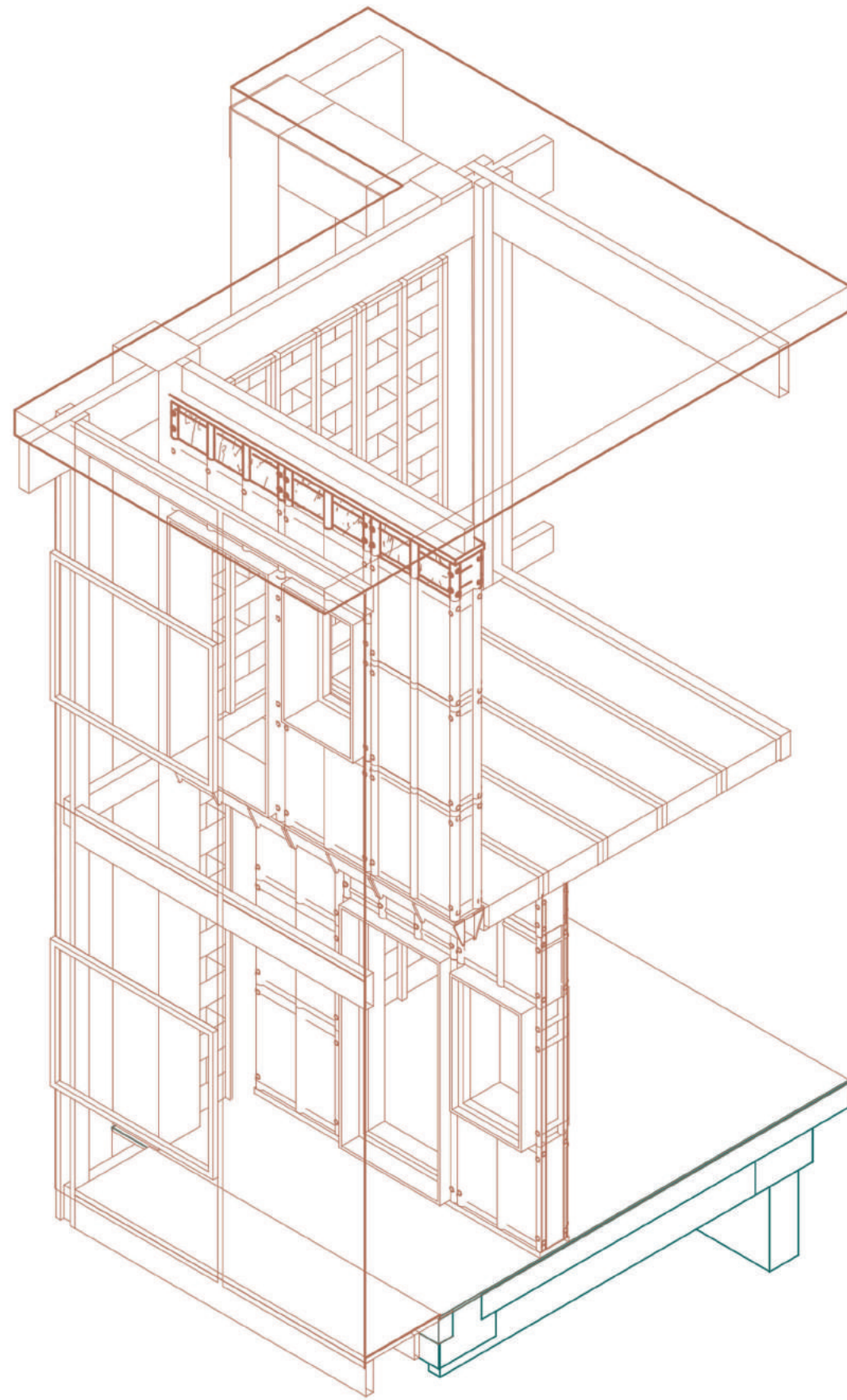




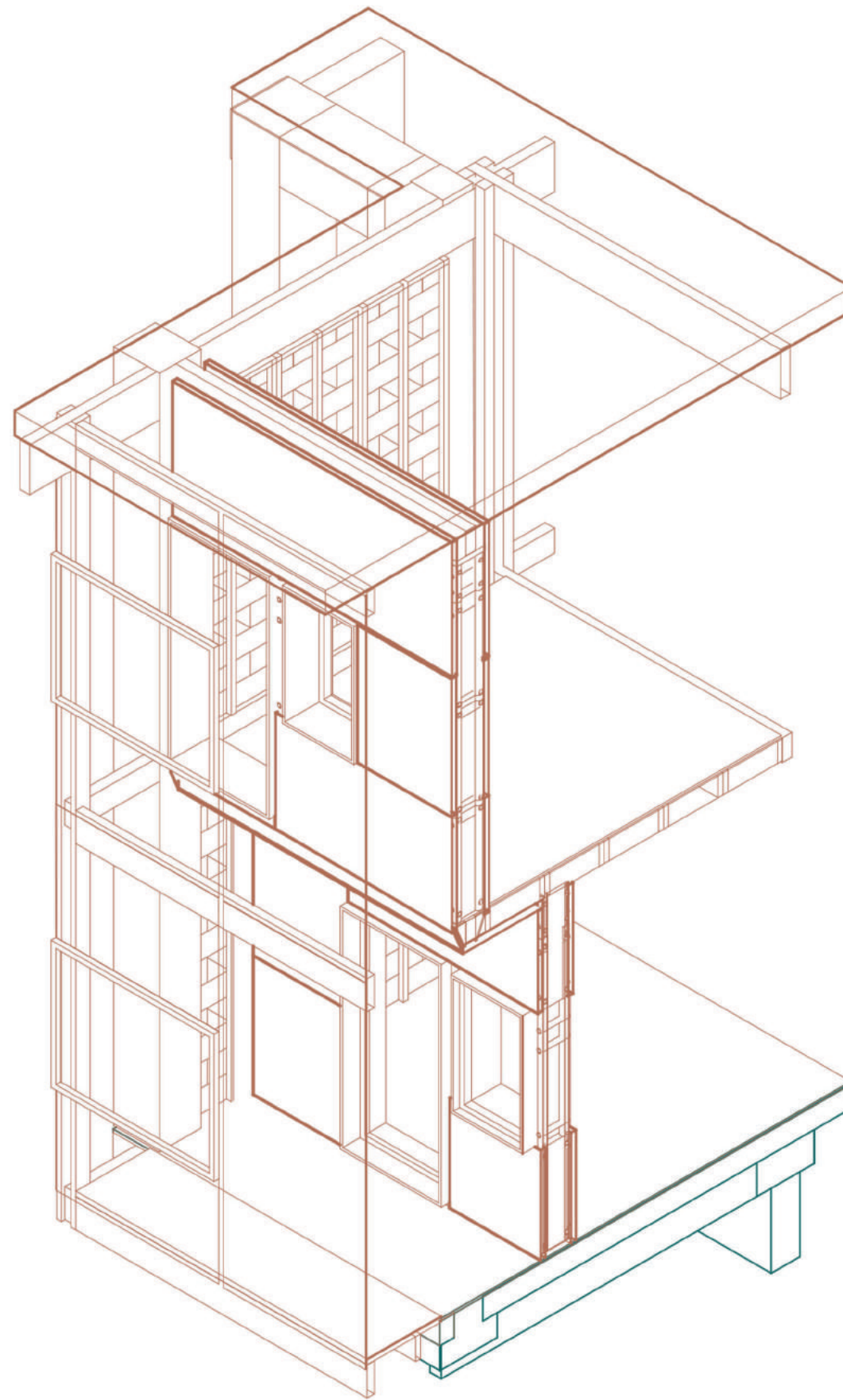






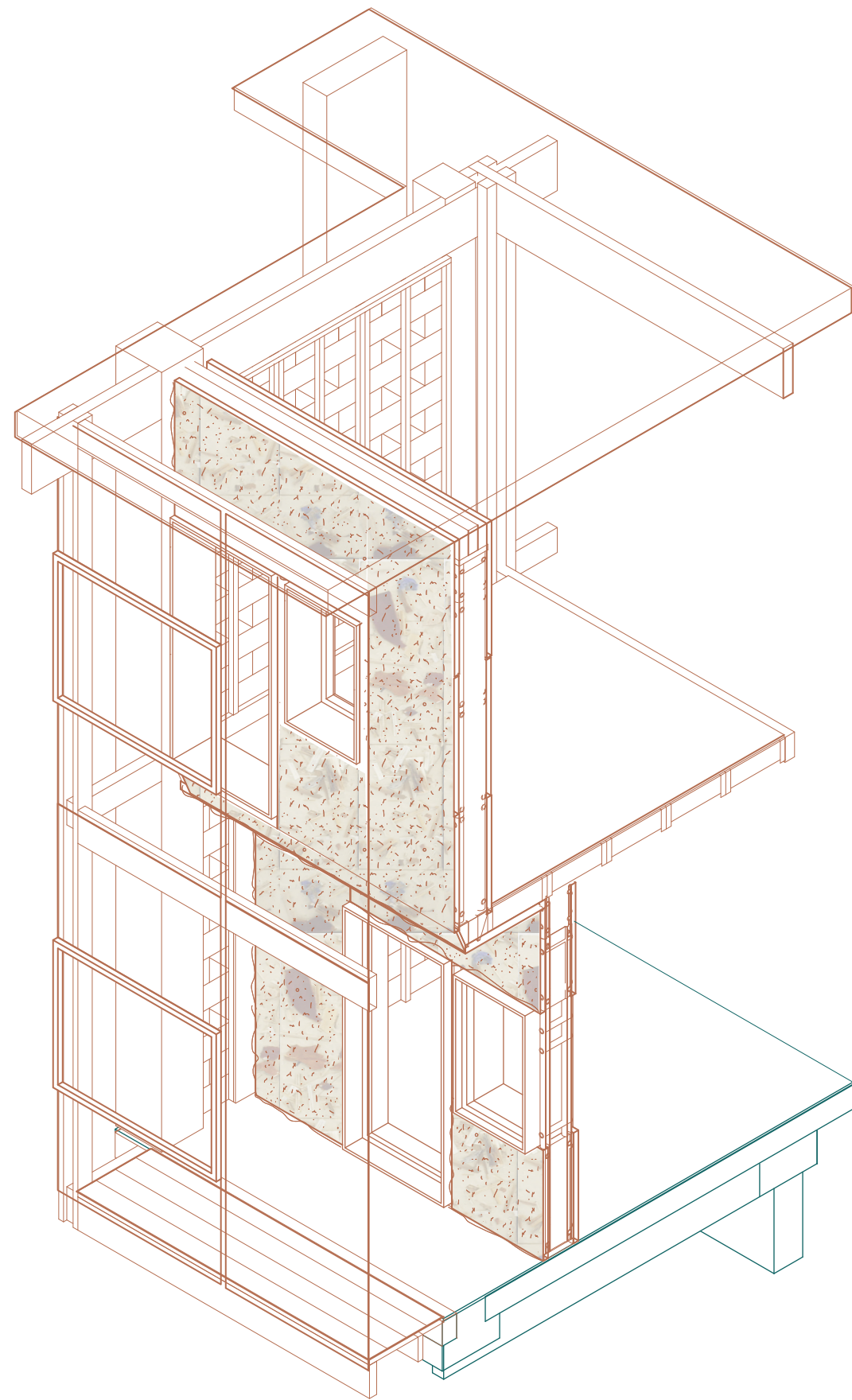






### **Honeycomb Board:**

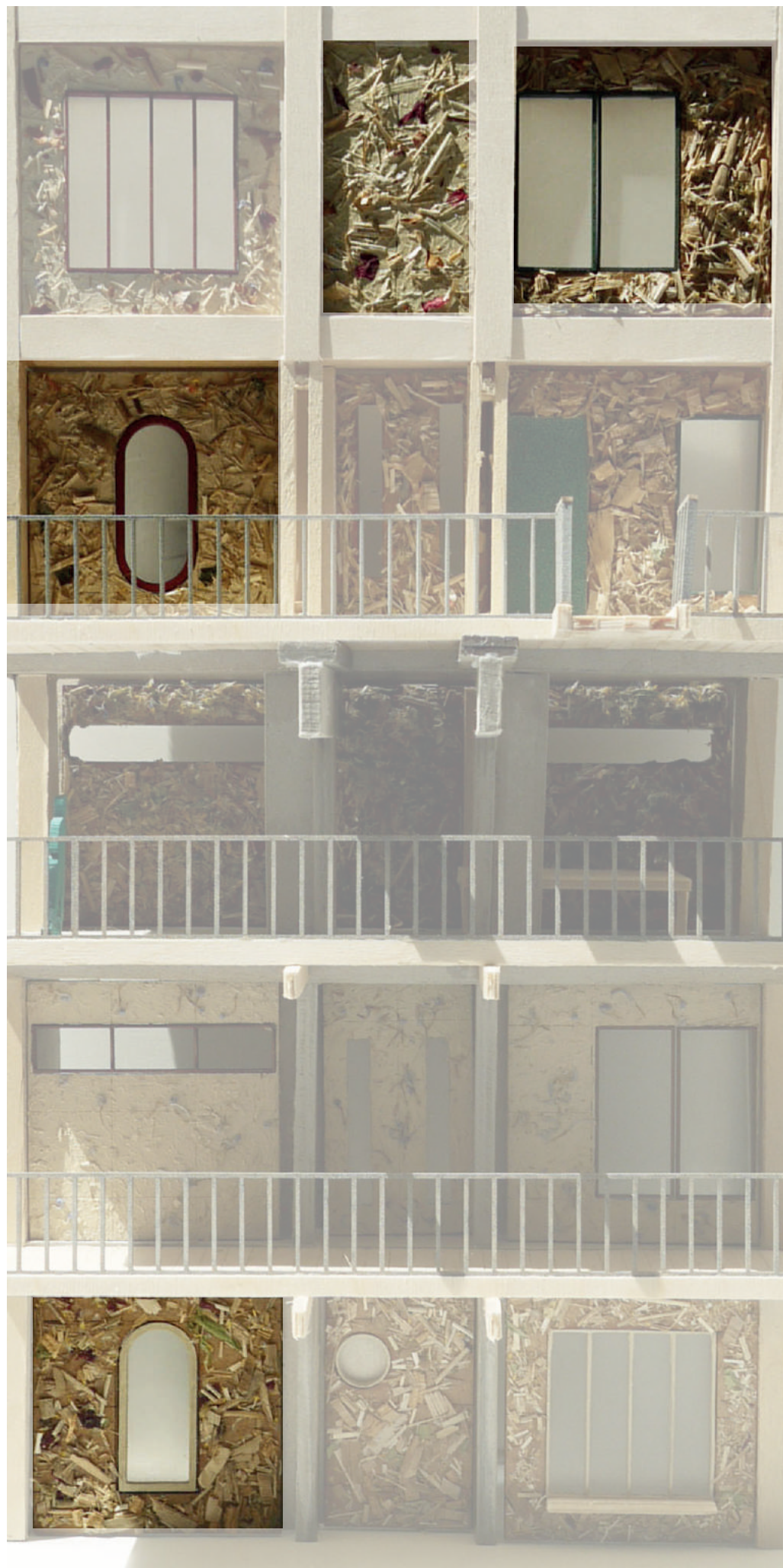
- Provides rigidity
- Highly insulating k value =  $0.089 \text{ W/mk}$
- Added Wet Strength
- Recyclable



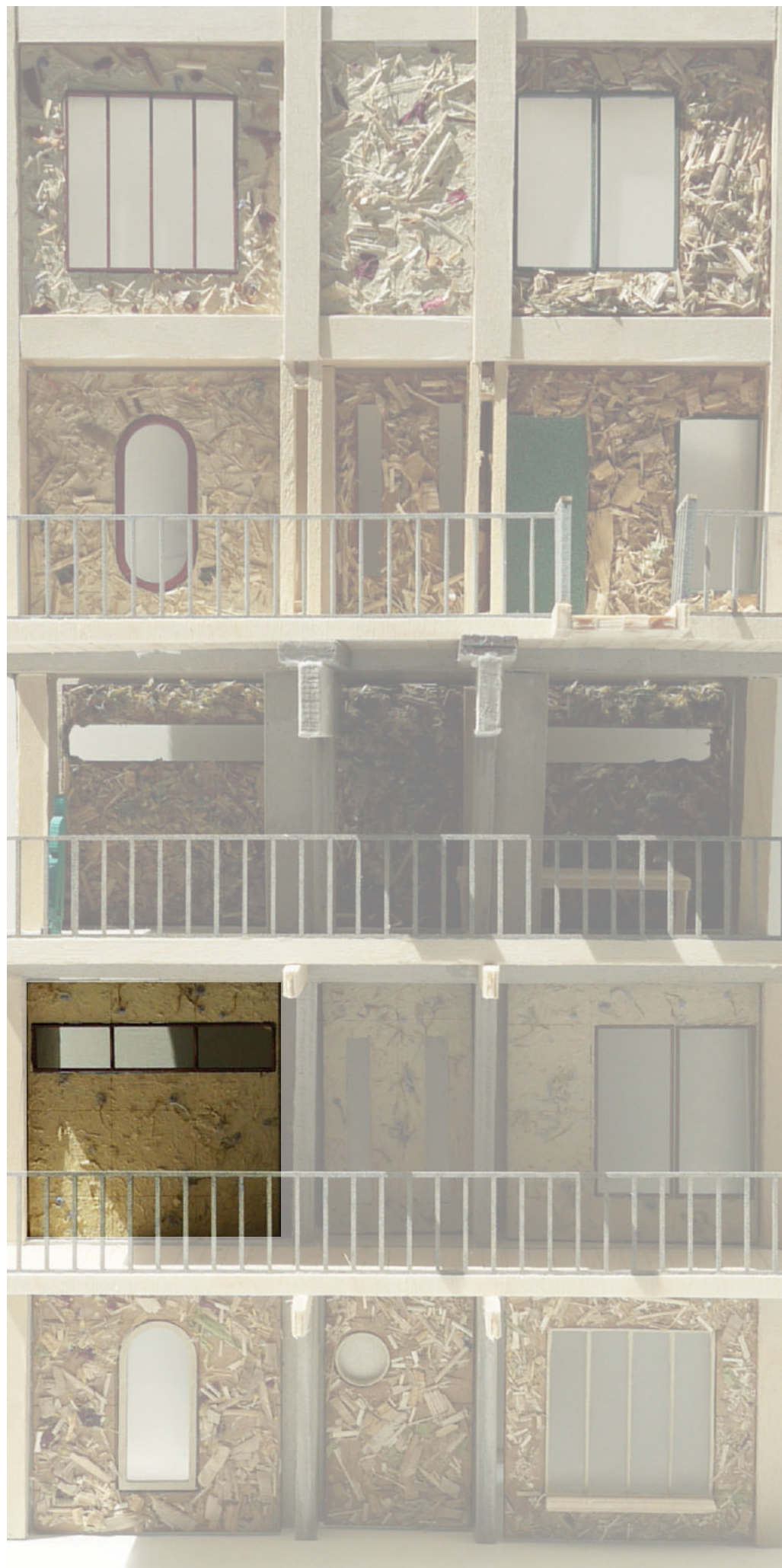




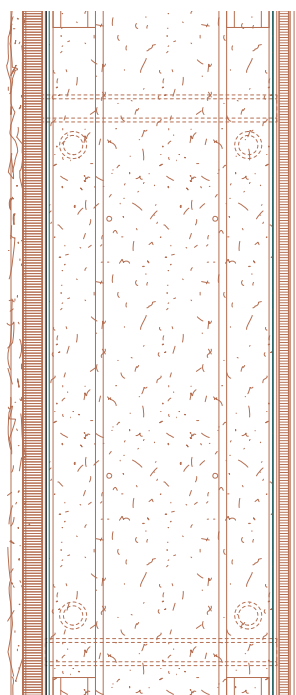






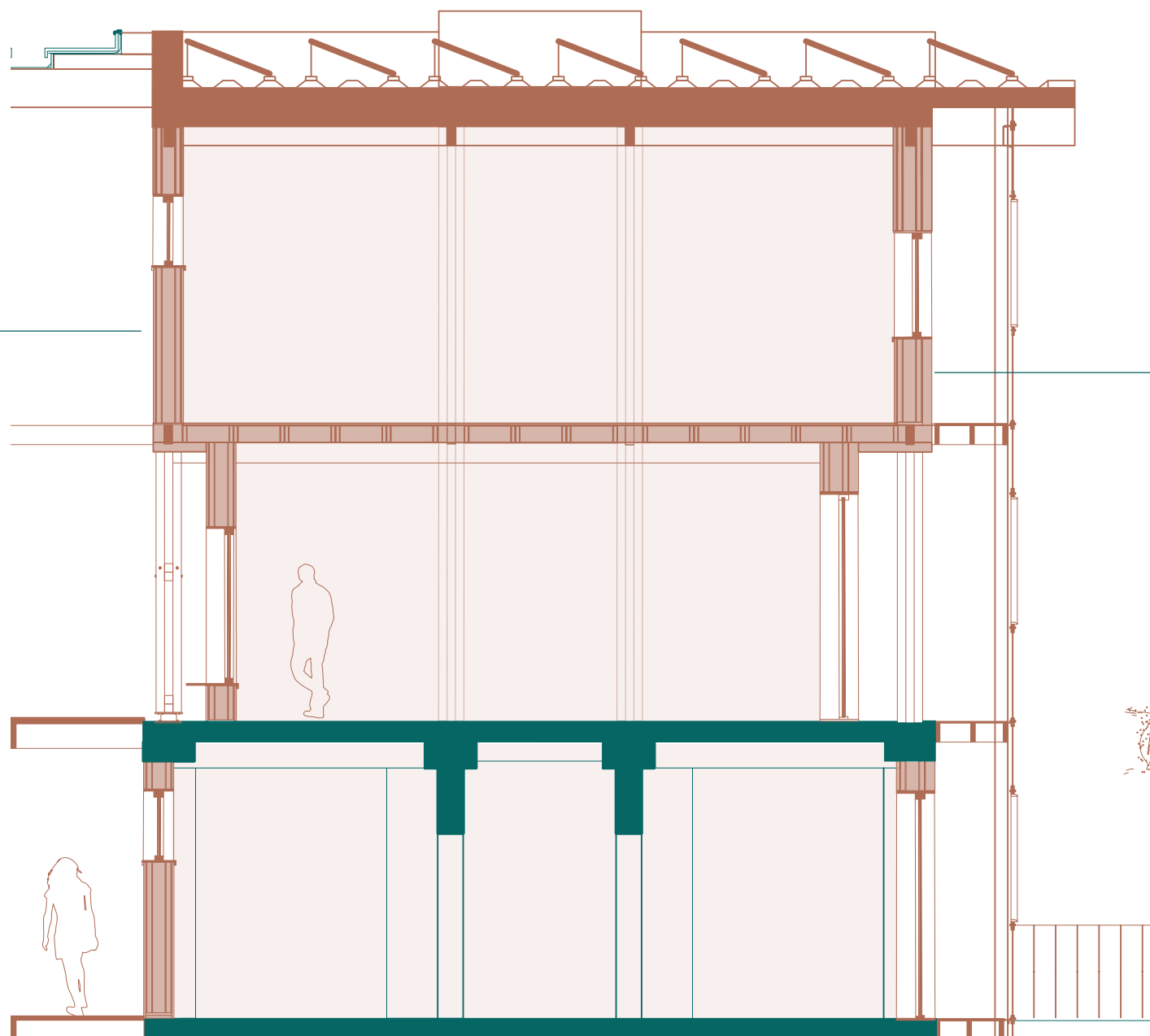






**Inner Wall Build Up: 340 mm Thick**

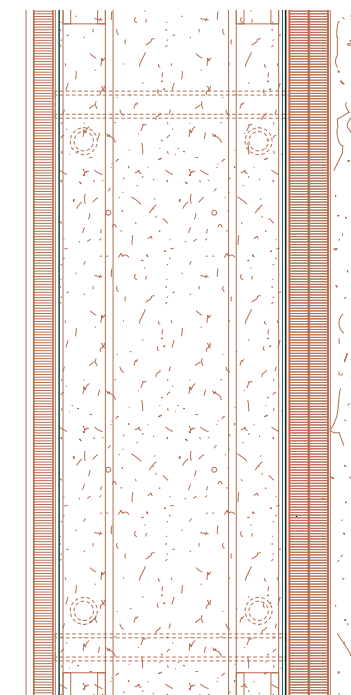
10 mm Pressed Organic Board/Clay Plaster  
 15 mm Honeycomb  
 300 mm Paper and Straw Panel  
 15 mm Honeycomb  
 10 mm Pressed Organic Board/Clay Plaster



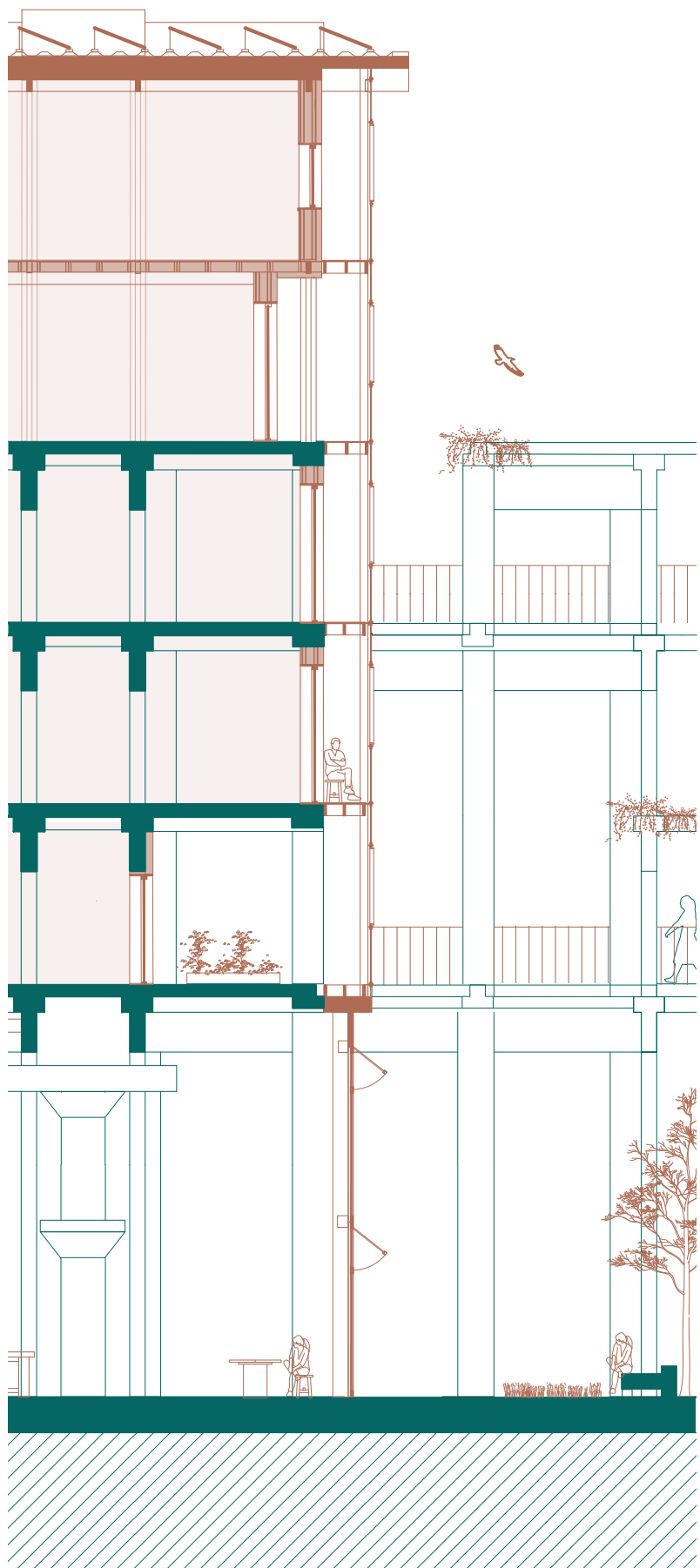
**Outer Wall Build Up: 415 mm Thick**

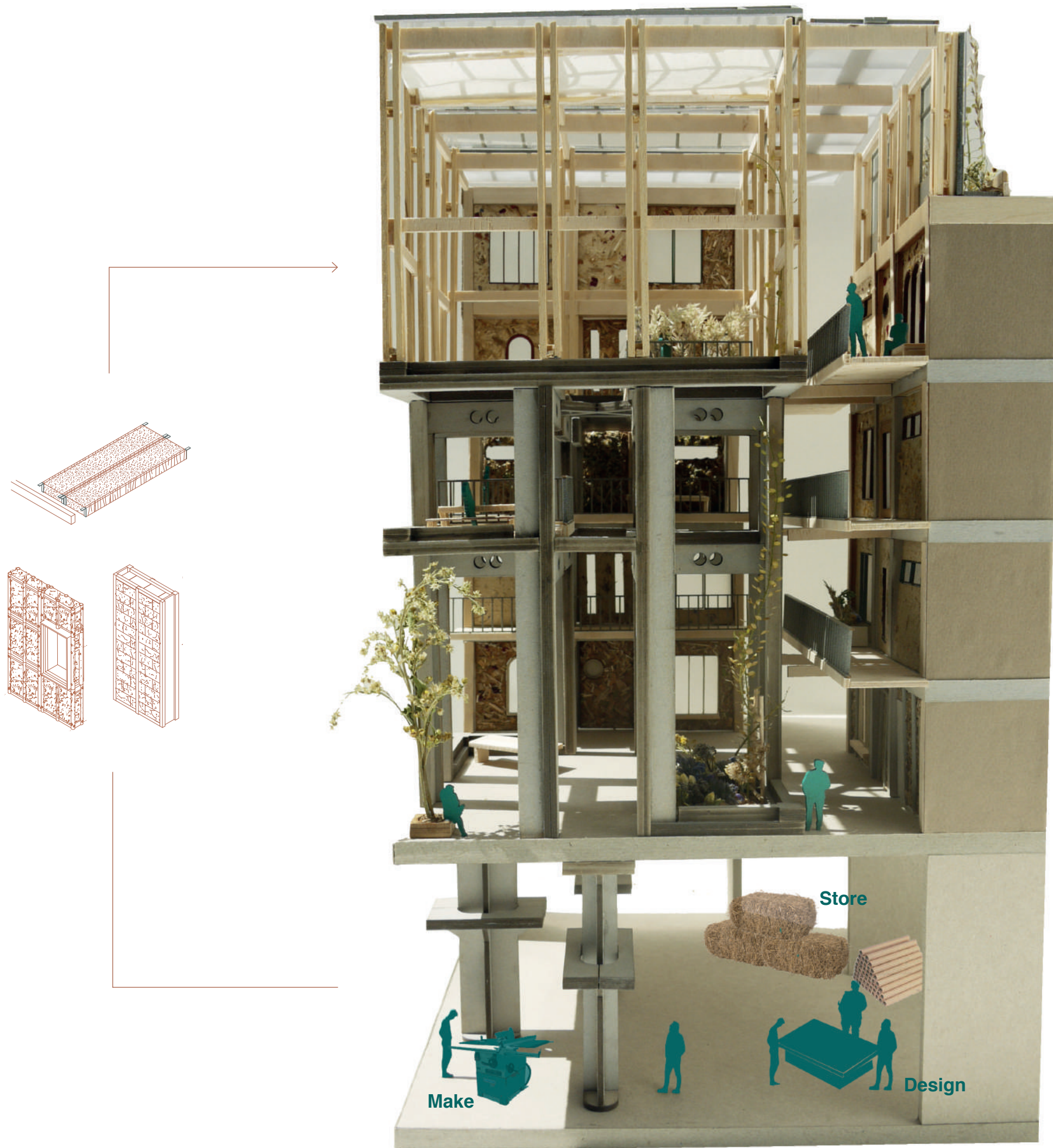
R- Value = 5.8 m<sup>2</sup>/WK

30 mm Reed Matt with Clay Plaster  
 50 mm Honeycomb Board  
 300 mm Paper + Straw Panel  
 25 mm Honeycomb Cardbaord  
 10 mm Pressed Organic Board/Clay Plaster



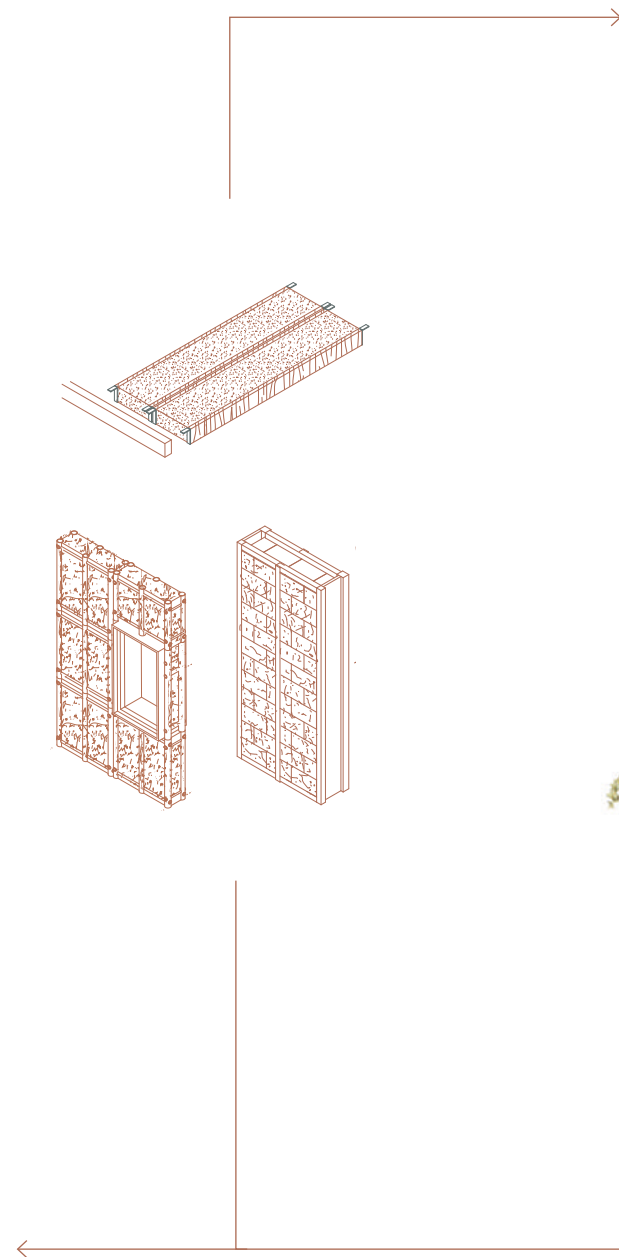








Apeldoorn



**Estimated Material for 250 Houses Annually:**

Maize: 436 tonnes  
Straw: 1,410 tonnes  
Hemp: 223 tonnes  
Miscanthus/Cattail: 298 tonnes

Paper Products: 22 tonnes  
Cellulose Waste: 130

Sawn Timber : 1635 m3



Thank you,



for all your help!