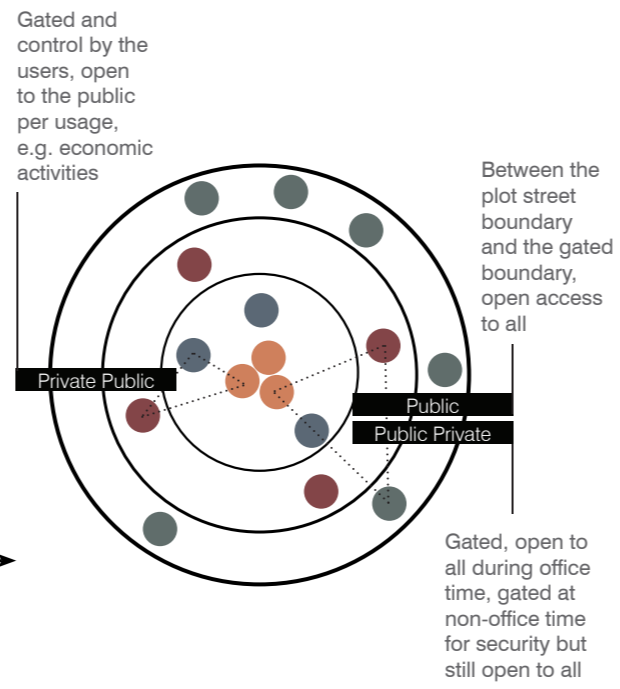


In search for nomadic application of aluminium from  
urban mining in the design of a recycle learning center

P5 Presentation  
Hui Wing Hei Joanna  
SID:4908376

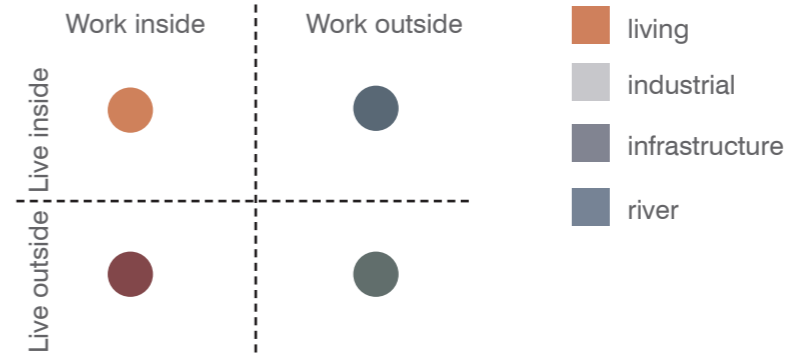


Coexistence of living and working



Symbiosis created by shared space

Legend



1930



1987



2004



2019

Morphological analysis

Living and Working



Edge 1/  
Bound by the railway, inanimate walls and gates and chaotic parking, creating a hostile atmosphere.



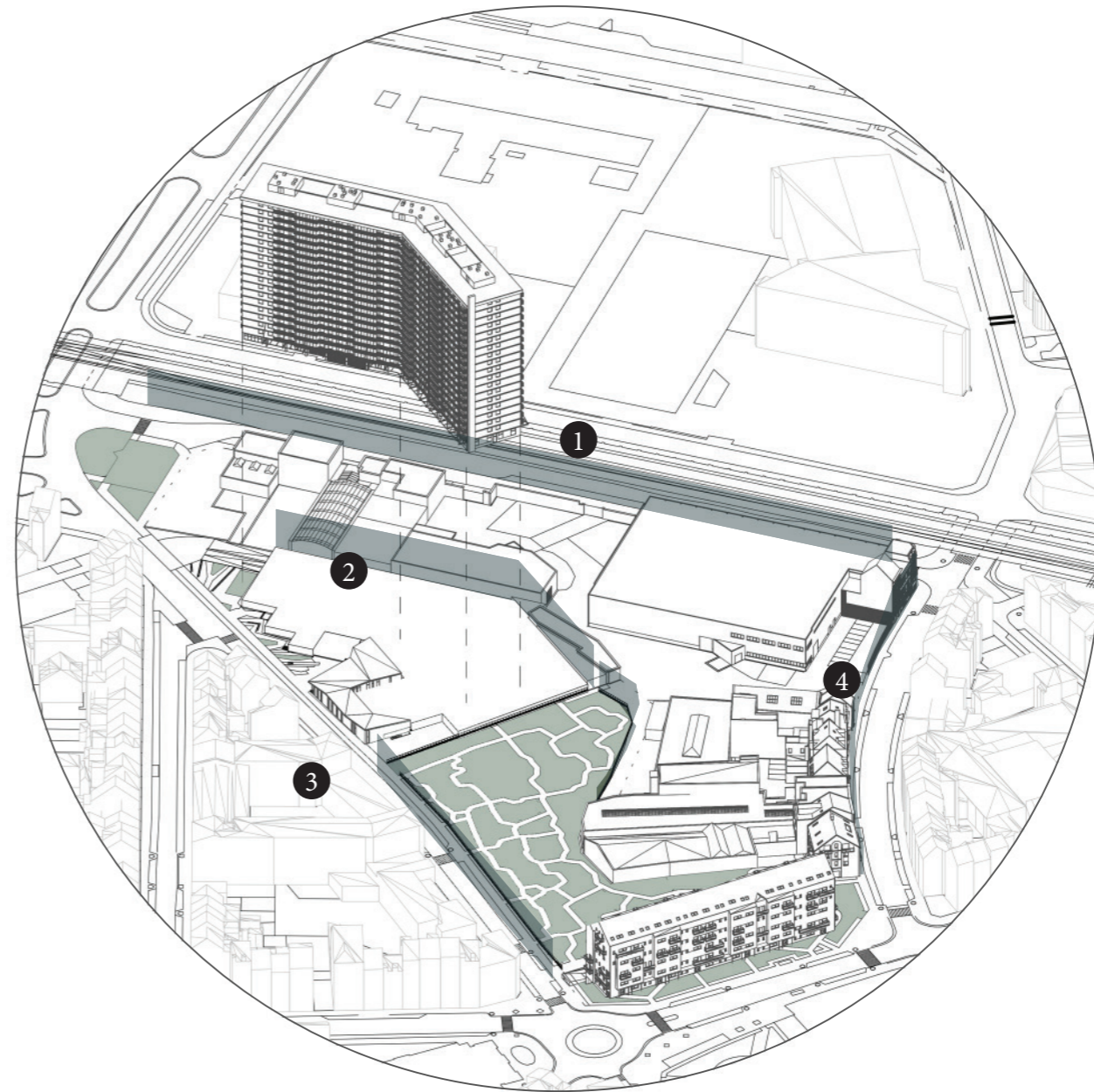
Edge 2/  
The interface between working and living spaces. The void separates the working and living groups with circulation, dumpsters and rows of fences.



Edge 3/  
An institutional street filled with kids and their parents. However, the park confronting the schools is densely gated which make a lot of kids playing on the street.



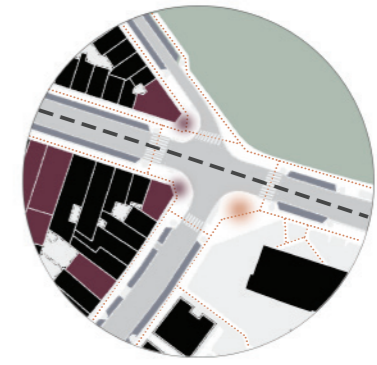
Edge 4/  
A residential side usually filled with unwanted furniture and rubbish.



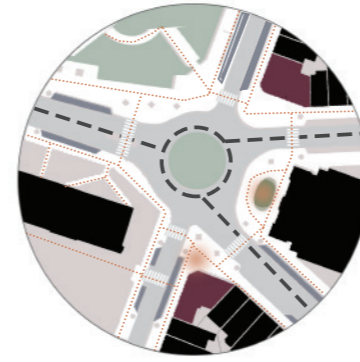
Edge Analysis



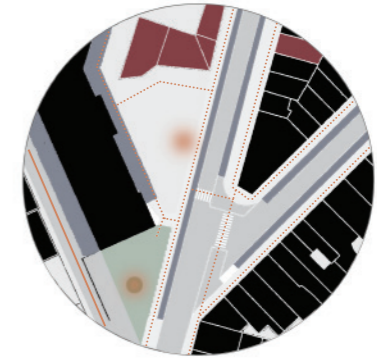
Node 1



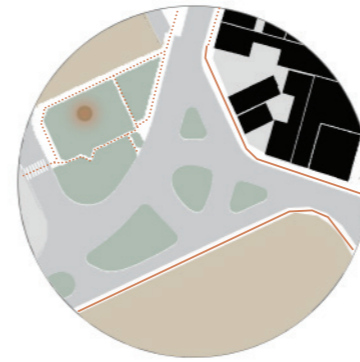
Node 2



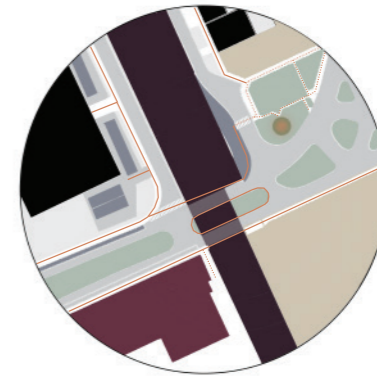
Node 3



Node 4



Node 5



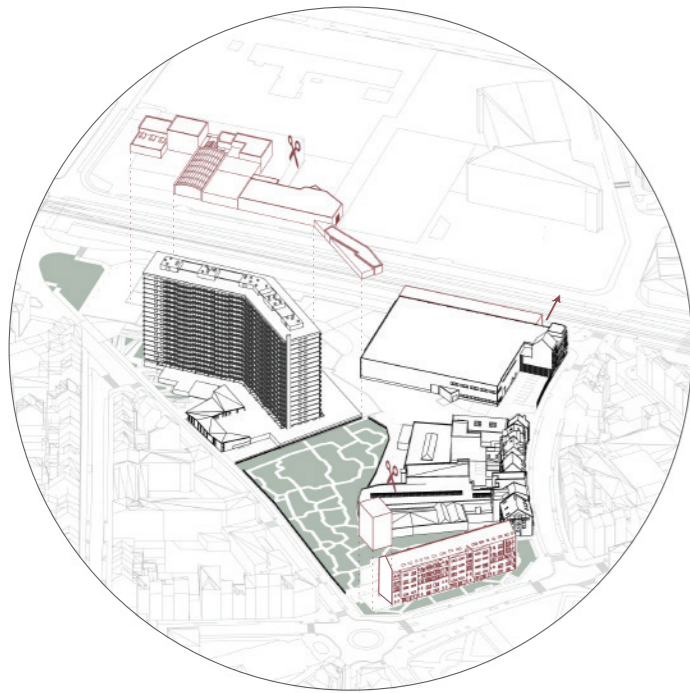
Node 6

Legend

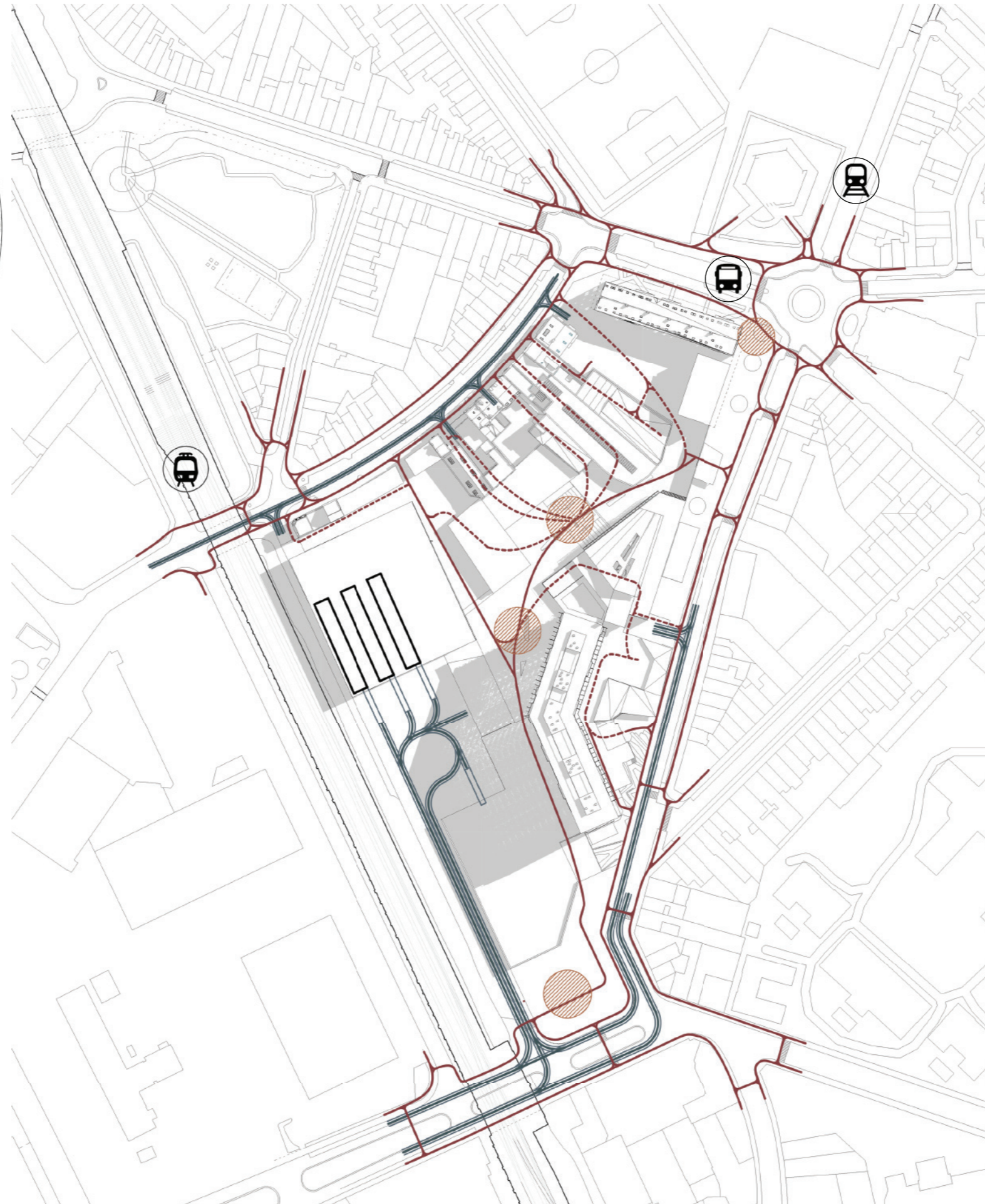
Circulation

- fast-moving pedestrian route
- ⋯ pedestrian route
- - - main car road
- ▭ vehicle route
- ▭ private
- ▭ public
- outdoor sitting
- extended commercial activities

Node Analysis



1. Demolishing poorly conditioned buildings, modifying the private slab houses to open up the plot entrance and extending the Rotor building.



Legend

- major pedestrian circulation
- - - secondary pedestrian circulation
- car circulation
- node
- Ⓜ train
- Ⓜ metro
- Ⓜ bus



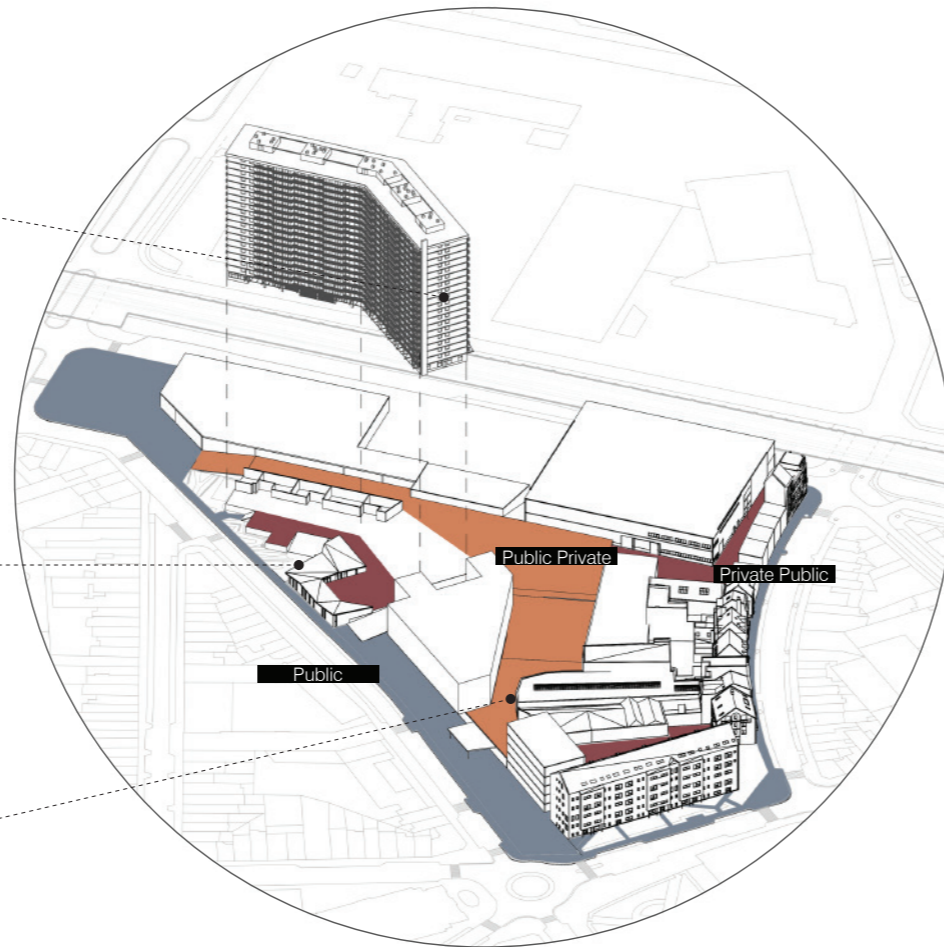
spatial transition



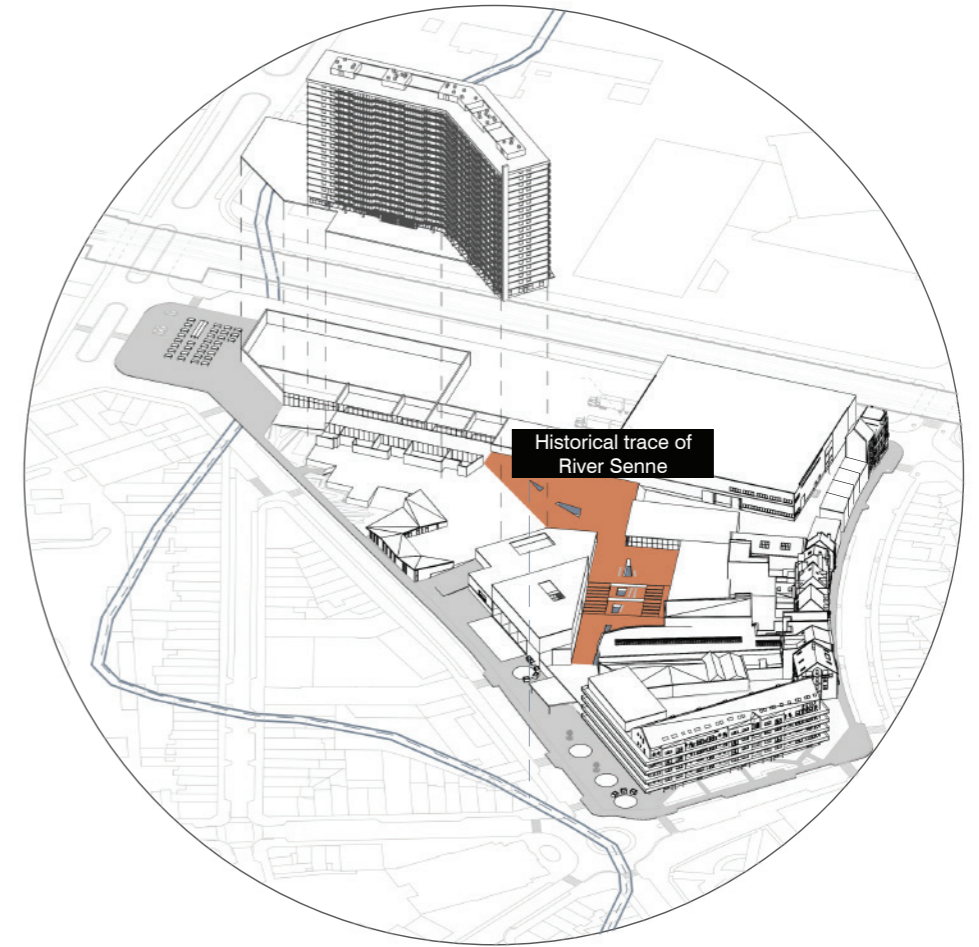
facade of public space



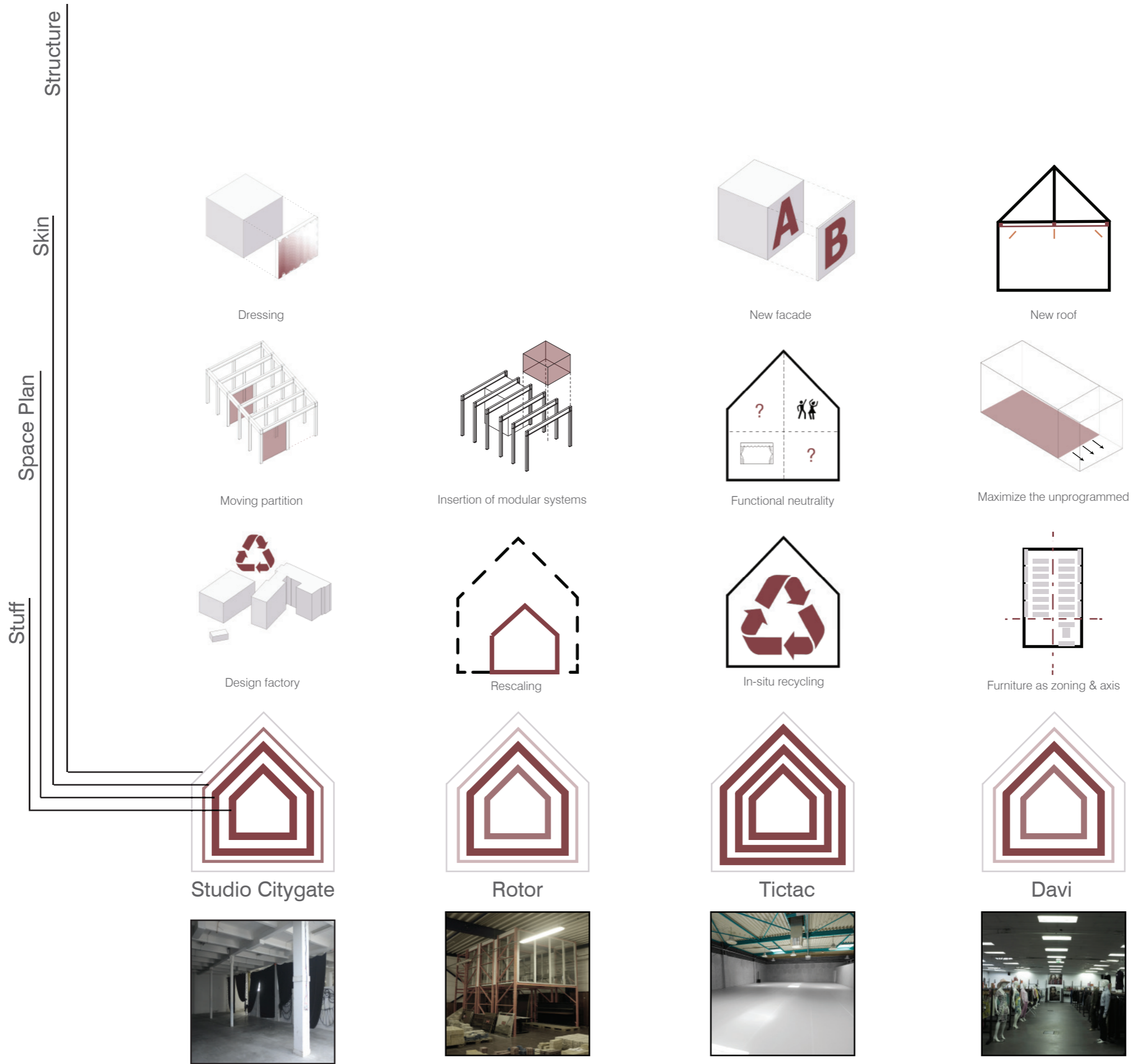
entrance of public interior



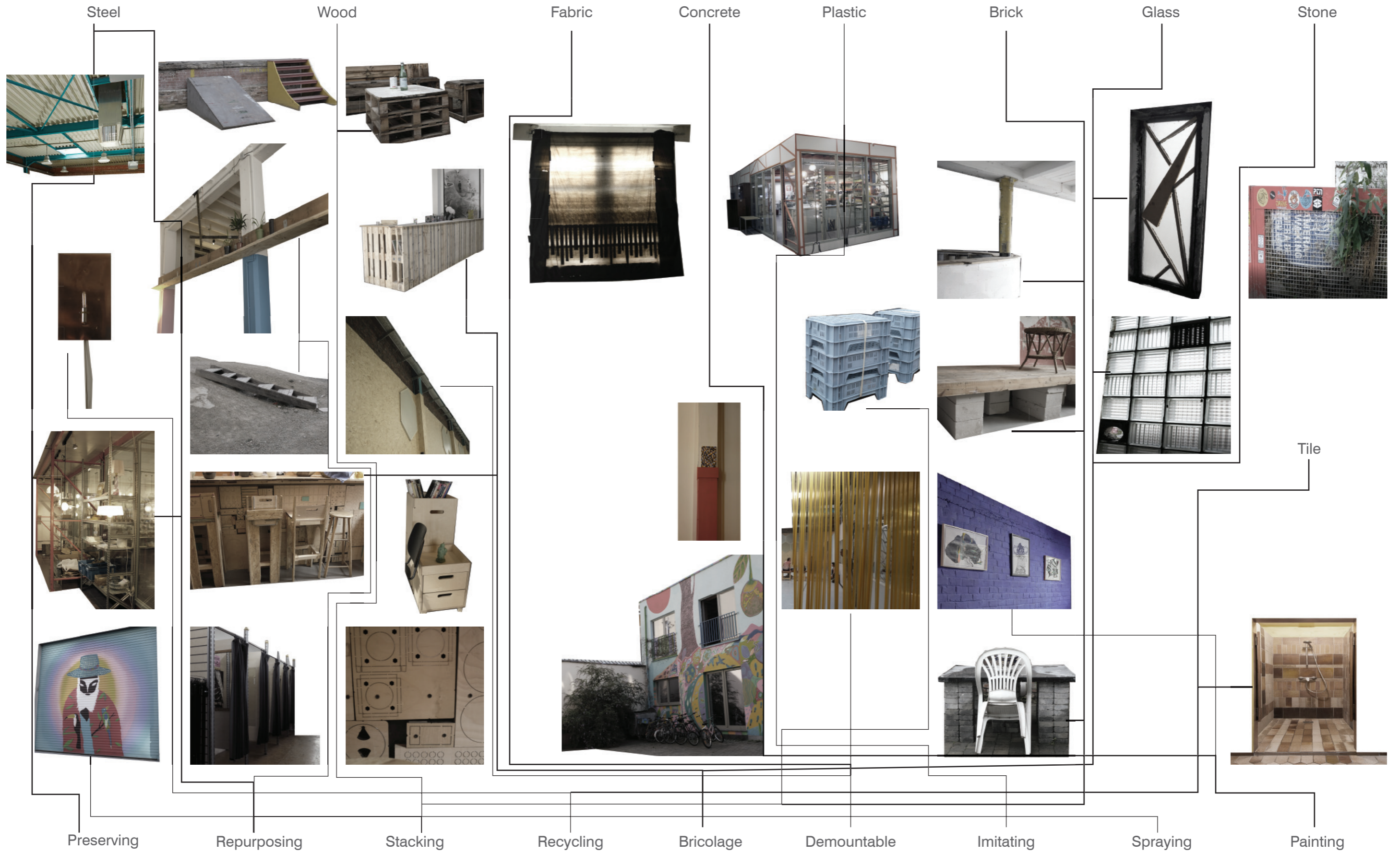
2. Redrawing the boundaries of public and private in response to edges and nodes. A public private alley-yard is created. Existing built surfaces are used as spolia as different roles.



3. The inner plaza is further differentiated into two, one dedicates to Recyclage and the other one to Le goujon. The two plazas are narrated with progressive uncovering of the water of Senne. Pedestrians are always meandering with the presence of water, the old and the new.

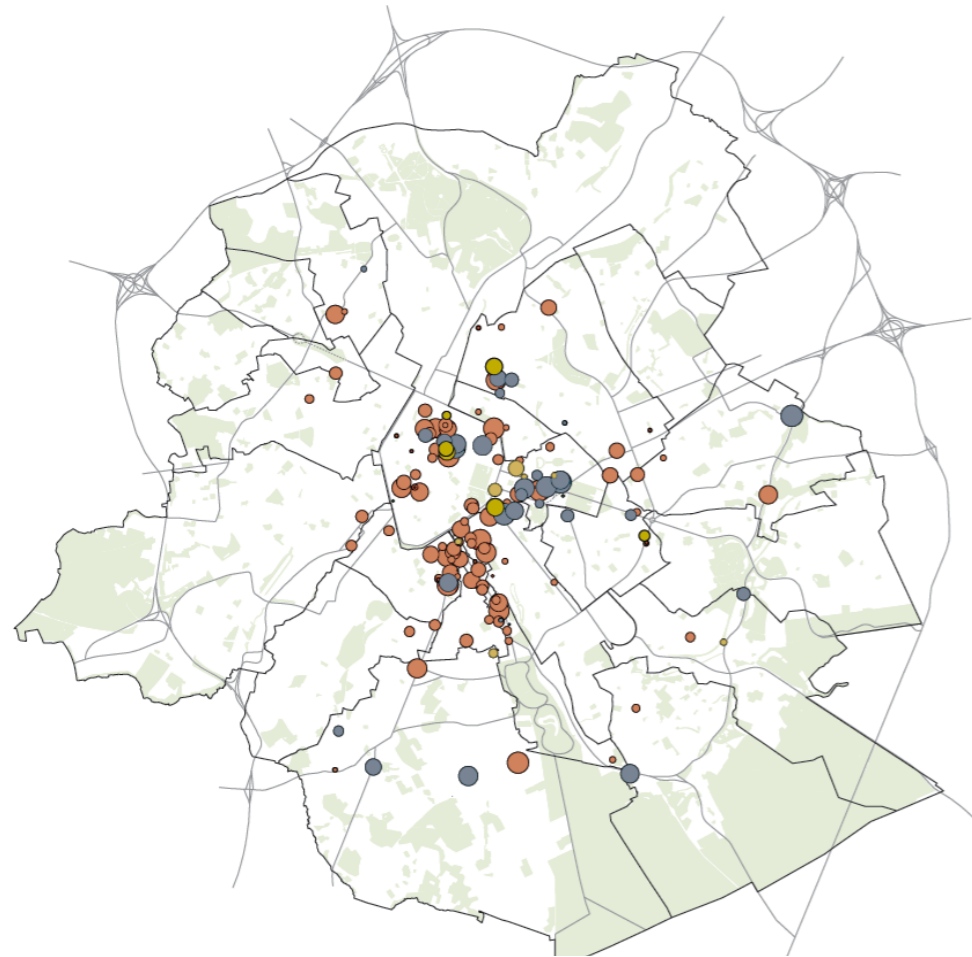


Adaptation in Building Layers



**Informal Urban Mining**





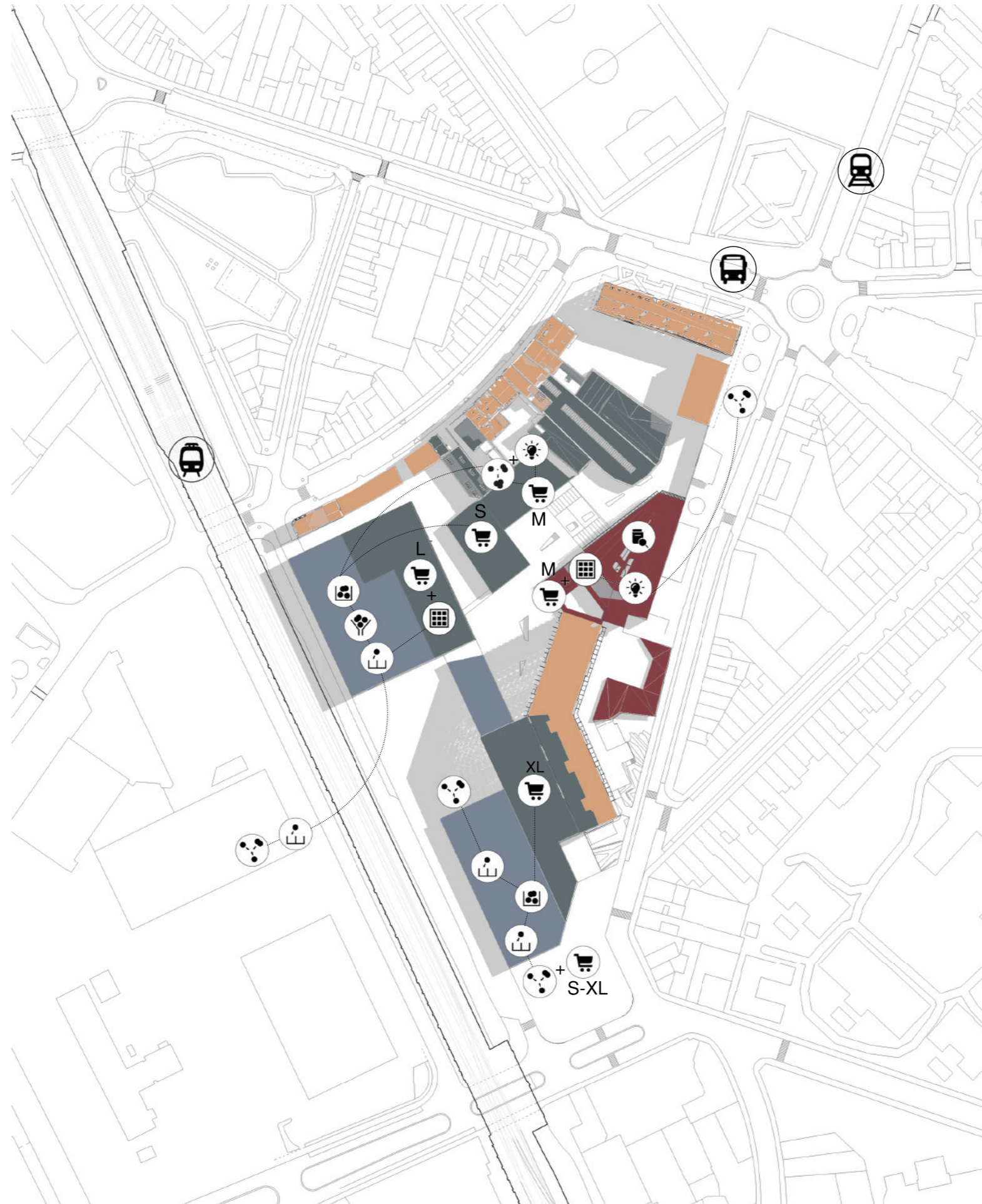
1. Functional change of office buildings in Brussels from 1997 to 2017



2. Distribution of the recycle park, main centers for the collection / sorting of waste in the Brussels

Legend

- 1. Office buildings converted to:
  - Housing
  - Industrial
  - Commercial
- 2.  CDW collection/sorting centers
- Recycle park



Legend

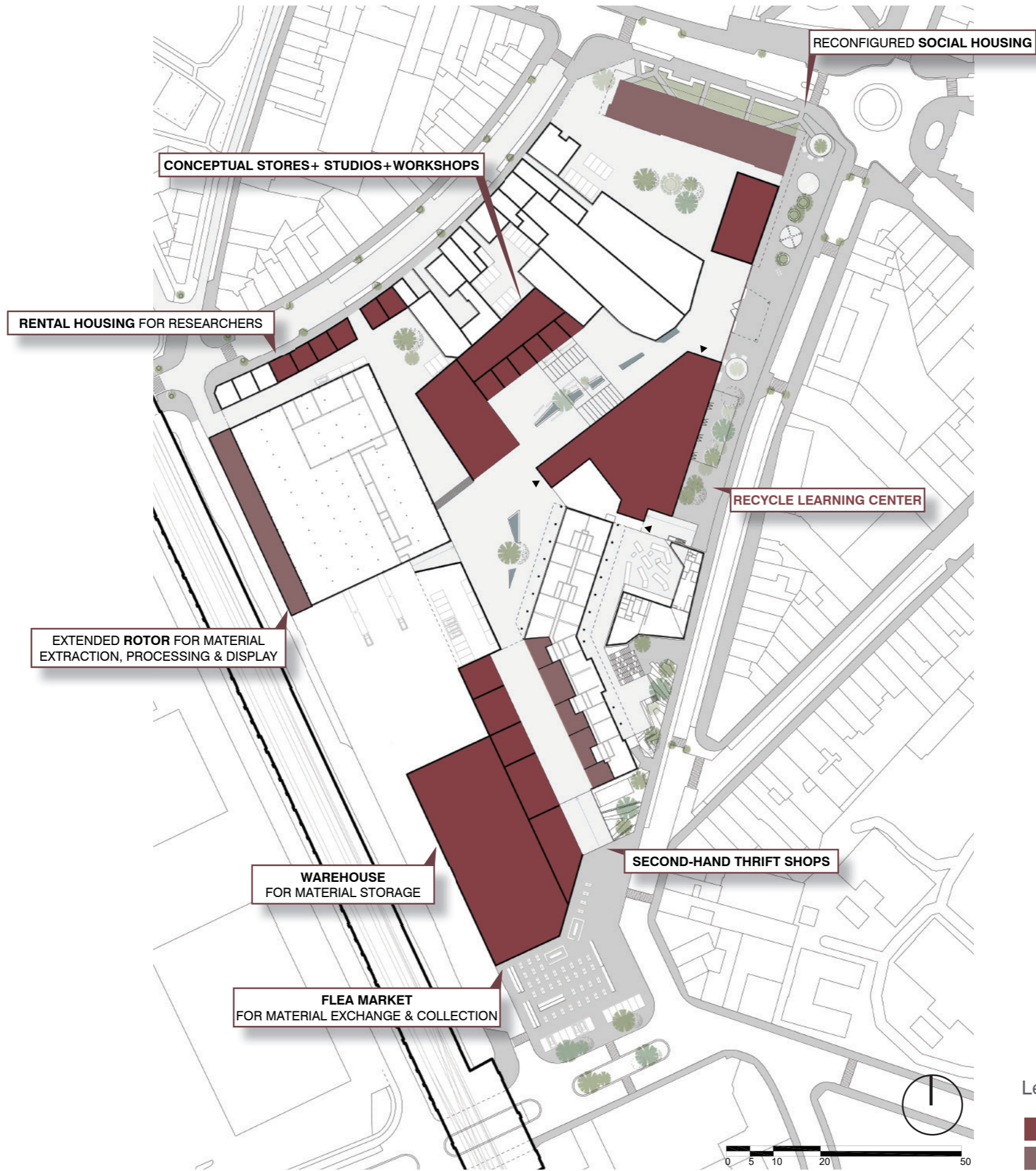
Landuse

- cultural/recreational
- industrial
- residential
- commercial

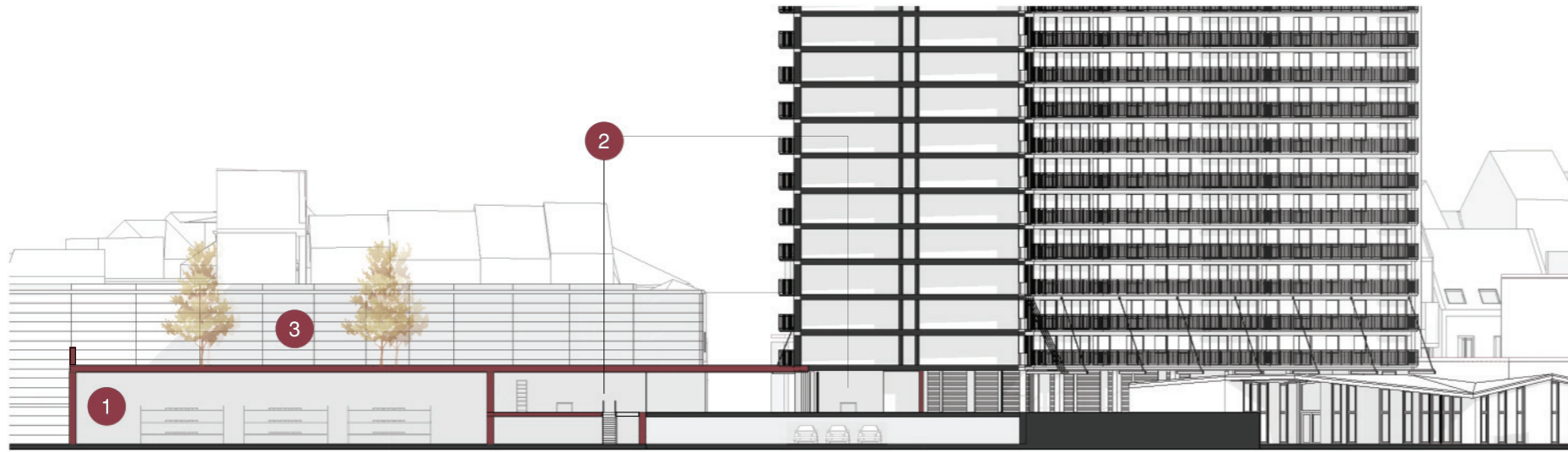
Material flow

- collection
  - research
  - sorting
  - reinvention
  - extraction
  - display
  - storing
  - trade
  - reassembly
- XL/ Second-hand furniture  
 L/ Salvaged building components  
 M/ Reassembled secondary products  
 S/ Primary raw materials

Zoning and Material Flow



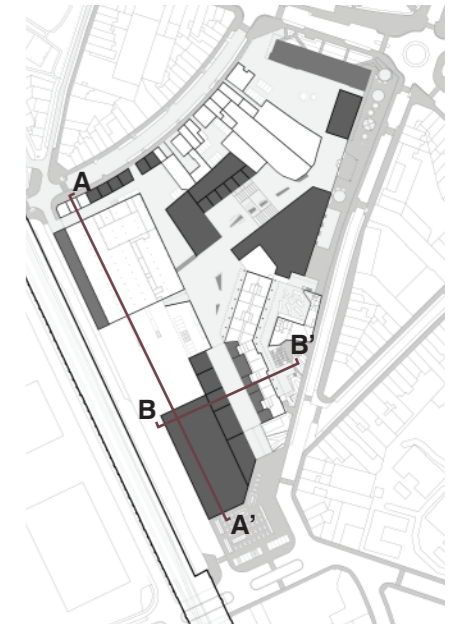
Urban Plan



Section AA' 1:500

*Legend*

- Urban planning  
 1. Warehouse  
 2. Second-hand thrift shop  
 3. Communal rooftop garden

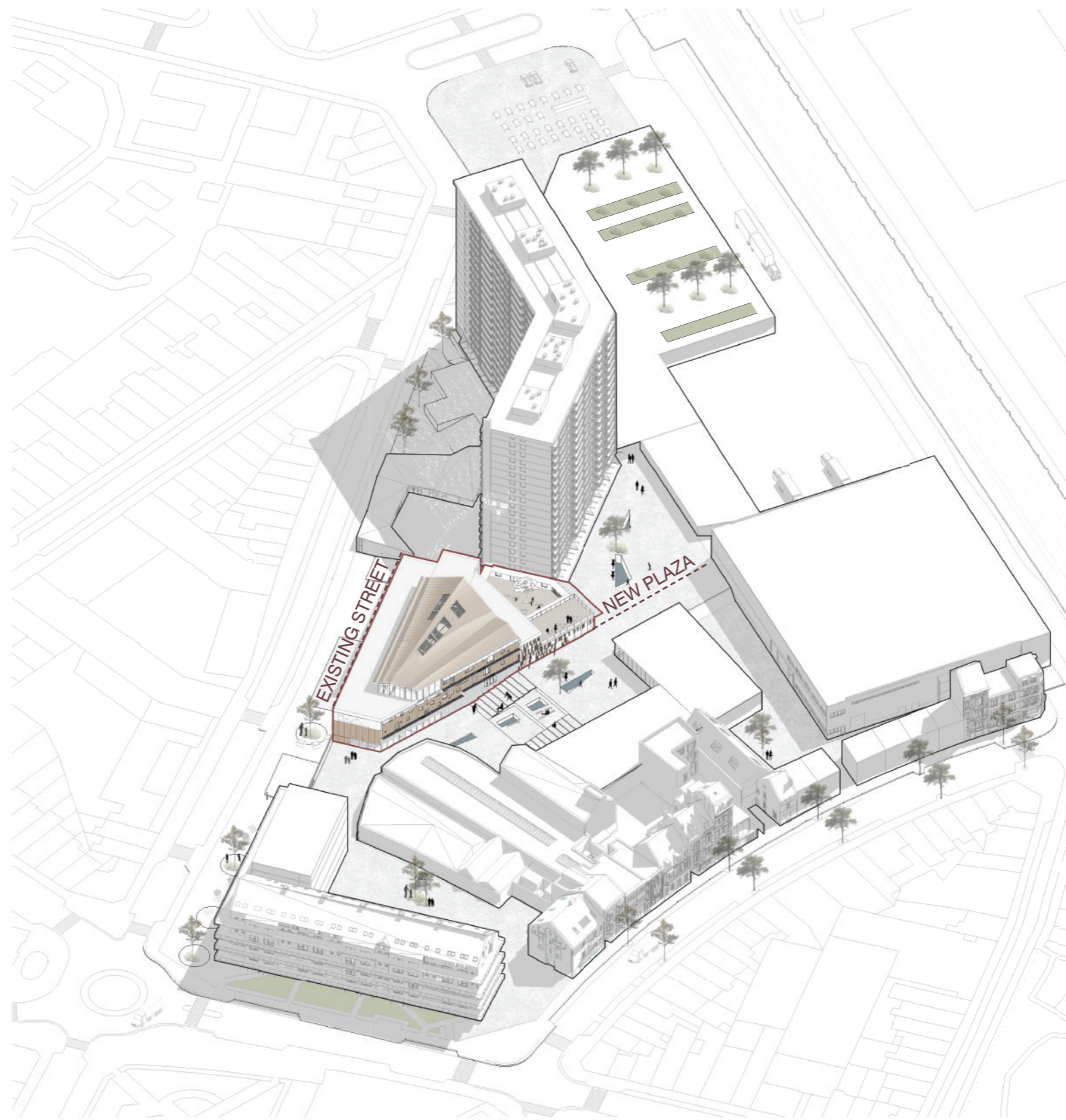


Section BB' 1:500

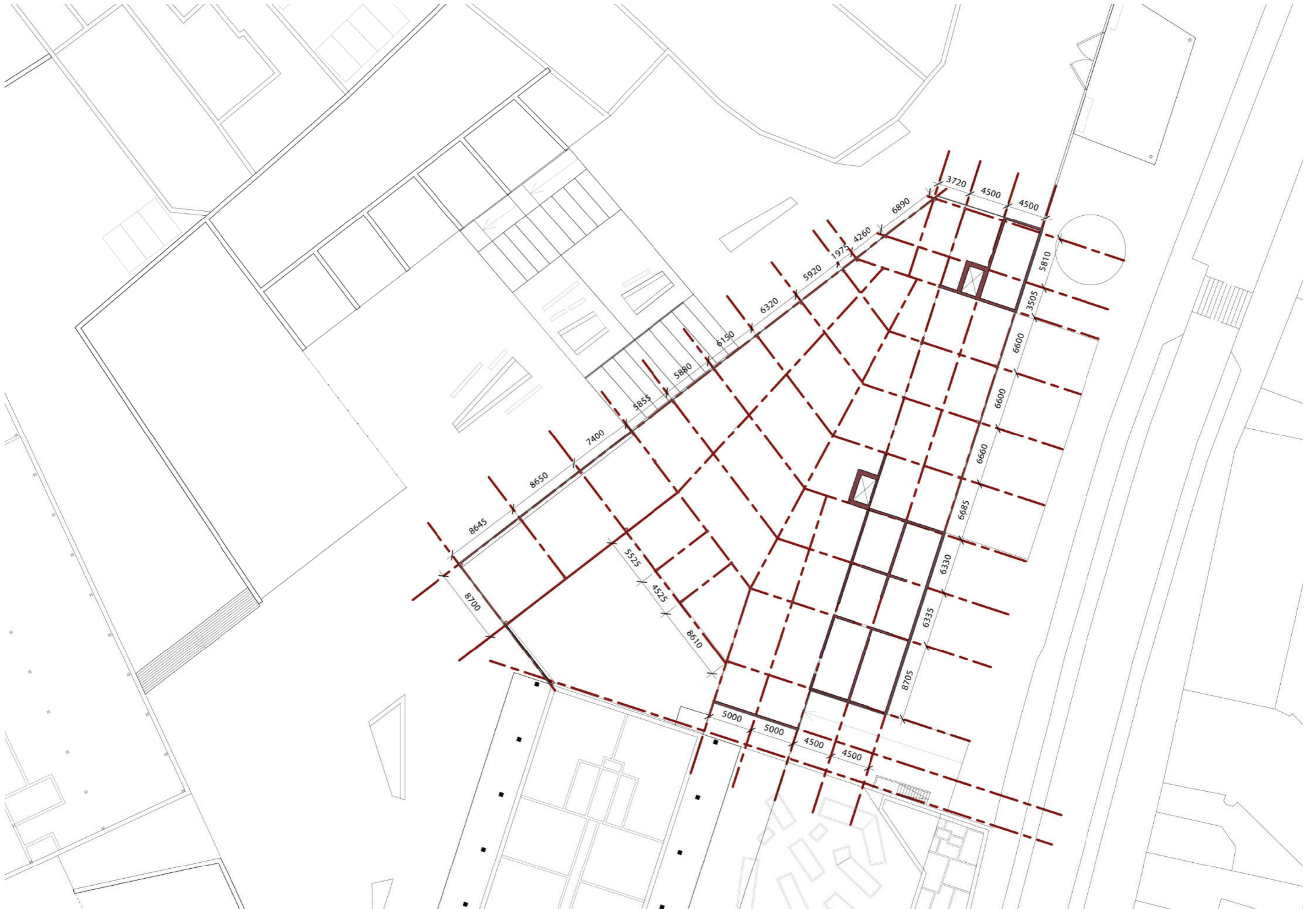
*Legend*

- Urban planning  
 1. Existing residential building  
 2. Extraction and shredding plant  
 3. Loading/unloading  
 4. Warehouse  
 5. Flea market

Site Section



Mingling with Contextual Axes



Structural Grid

*What are the following form of aluminium do you prefer it to have interaction interaction with?*

curved and wavy

hammered

colour coated

corrugated

#5

*How would you interact with the material?*

How do you touch it?

- stroke
- rub
- scratch
- press
- poke
- pat
- knock
- peel
- fiddle
- hold
- push
- compress
- graze

How do you make it move?

- push
- pull
- stretch
- hang
- grasp
- pick
- bend

Do you touch the trace/ defect? Yes/No

How do you touch the trace/ defect?

- stroke
- rub
- scratch
- press
- poke
- pat
- knock
- peel
- fiddle
- hold
- push
- compress
- graze

#1

*Where do you expect aluminium is applied in a building?*

INTERIOR SPACE PLAN: walls, ceilings, doors and windows

INTERIOR STUFF: furniture and decoration

EXTERIOR BUILDING SKIN

STRUTURE

#6

*How would you describe the material?*

- hard
- smooth
- flat
- matte
- non-reflective
- cold
- brittle
- opaque
- tough
- strong
- light
- dull
- clean
- soft
- rough
- with relief
- glossy
- reflective
- warm
- elastic
- transparent
- ductile
- weak
- heavy
- colourful
- scratchy

What are the type of traces on the material?

- corrosion/ bend on surface
- scratch
- abrasion

#2

*How is aluminium related to Belgium/Brussels/ the neighbourhood?*

#7

*What is your first memory with aluminium? Where was it located?*

#6

*What is the unique quality of the material?*

#7

*What is the meaning of the material to you?*

- toy-like/professional
- humble/aggressive
- cozy/hostile
- ordinary/futuristic
- ancient/modern
- elegant/vulgar
- masculine/feminine
- nostalgic/futuristic

*Do you like traces on the material? Why or why not?*

#3

*What form of imperfection do you want to keep?*

ALUMINIUM

*What are the following appearances do you prefer it to have?*

10

0

NEGATIVE

- disgust
- shame
- fear
- boredom
- sadness
- disappointment
- rejection
- confusion
- frustration
- discomfort

POSITIVE

- desire
- curiosity
- hope
- happiness
- pride
- calm
- surprise
- respect
- comfort

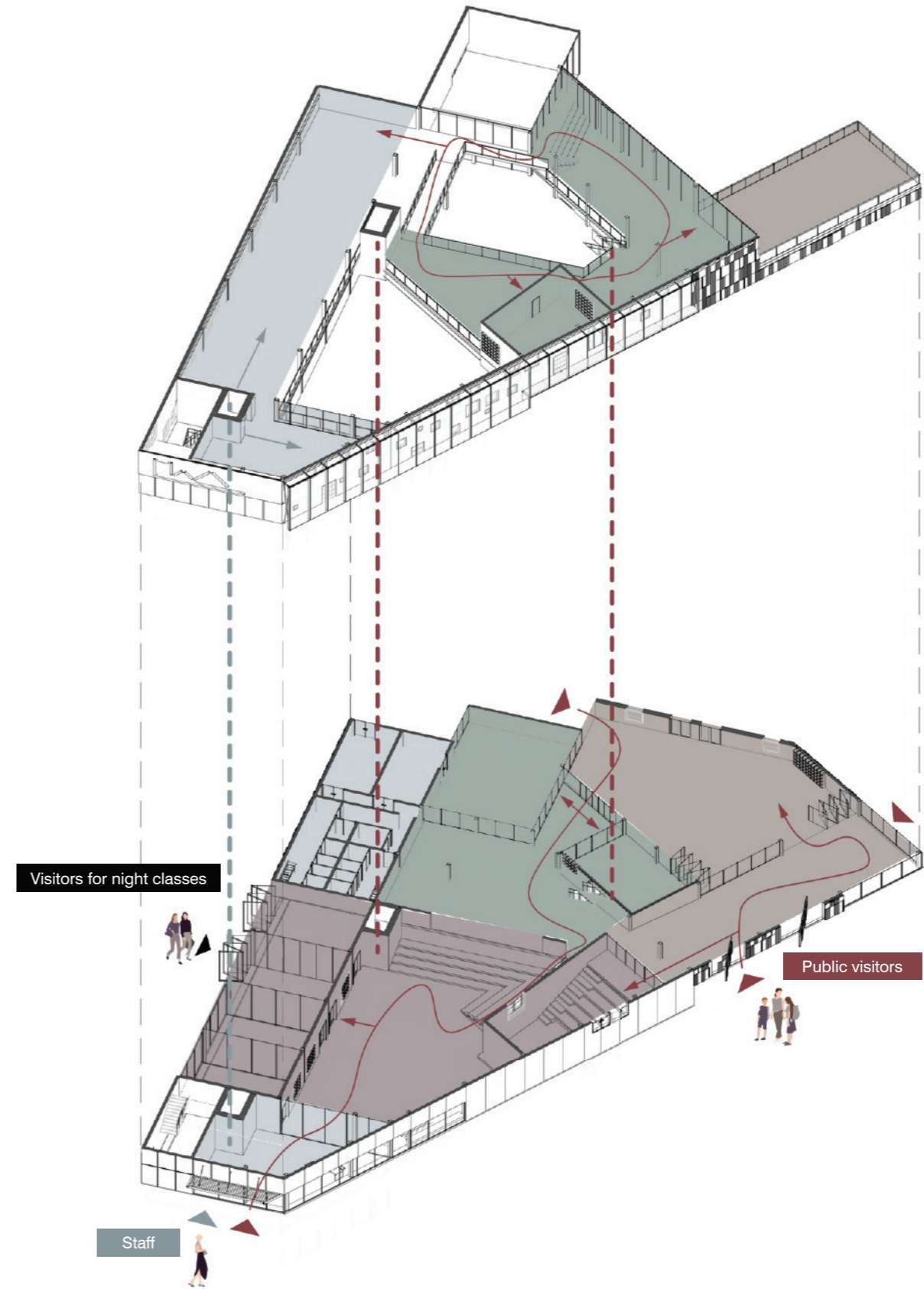
#4

Pedagogical environment for recycling learning

Knowledge acquisition	Inspiration	Realization	Support
1. auditorium			
2. classrooms			
3. material library			
	4. courtyard/roof terrace		
	5. cafe/retail for prototype		
	6. group workshop		
	7. flexible makerspace		
	8. gallery		
	9. seminar room		
	10. co-working space for researchers		
	11. material archive		
	administration		
	back of house		

- 330 m<sup>2</sup>
- 430 m<sup>2</sup>
- 200 m<sup>2</sup>
- 200 m<sup>2</sup>
- 170 m<sup>2</sup>
- 355 m<sup>2</sup>
- 90 m<sup>2</sup>
- 55 m<sup>2</sup>
- 230 m<sup>2</sup>
- 96 m<sup>2</sup>
- 210 m<sup>2</sup>

Total area: 2366 m<sup>2</sup>



Spatial Zoning

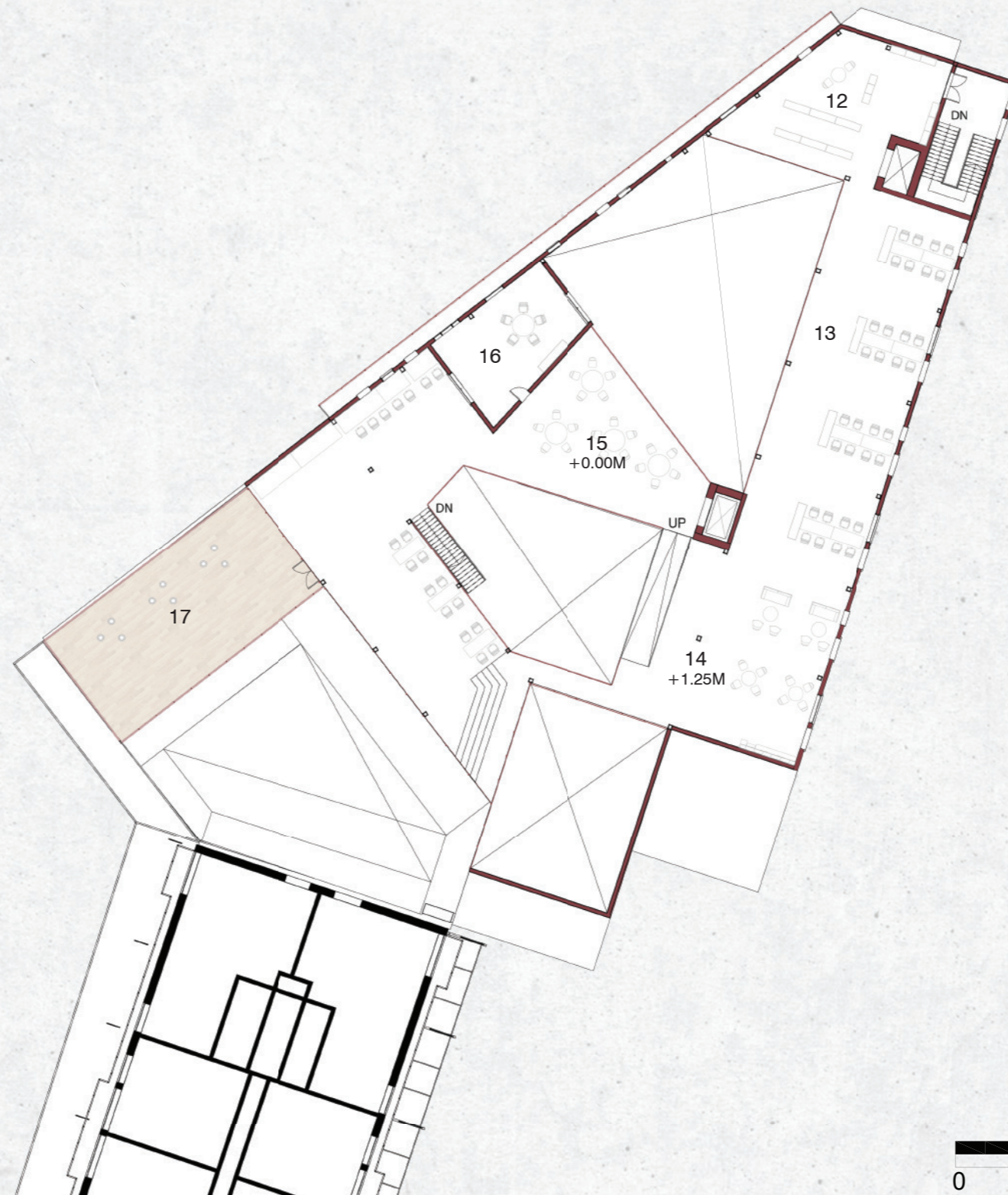




*Legend*

- 1. Reception
- 2. Material library
- 3. Classroom
- 4. Auditorium
- 5. Gallery
- 6. Cafe/ retail for prototype
- 7. Group workshop
- 8. Makerspace (Wood/ metal)
- 9. Courtyard
- 10. Storage
- 11. Mechanical room

G/F Plan

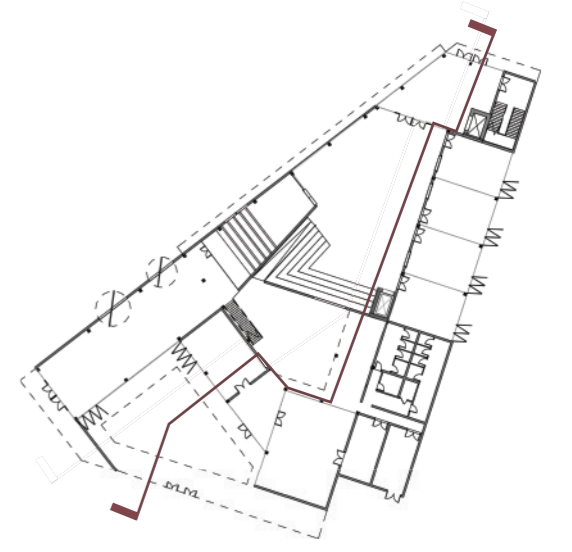


*Legend*

- 12. Material archive
- 13. Open workstation for researchers
- 14. Breakout space
- 15. Makerspace (digital)
- 16. Conference room
- 17. Roof terrace

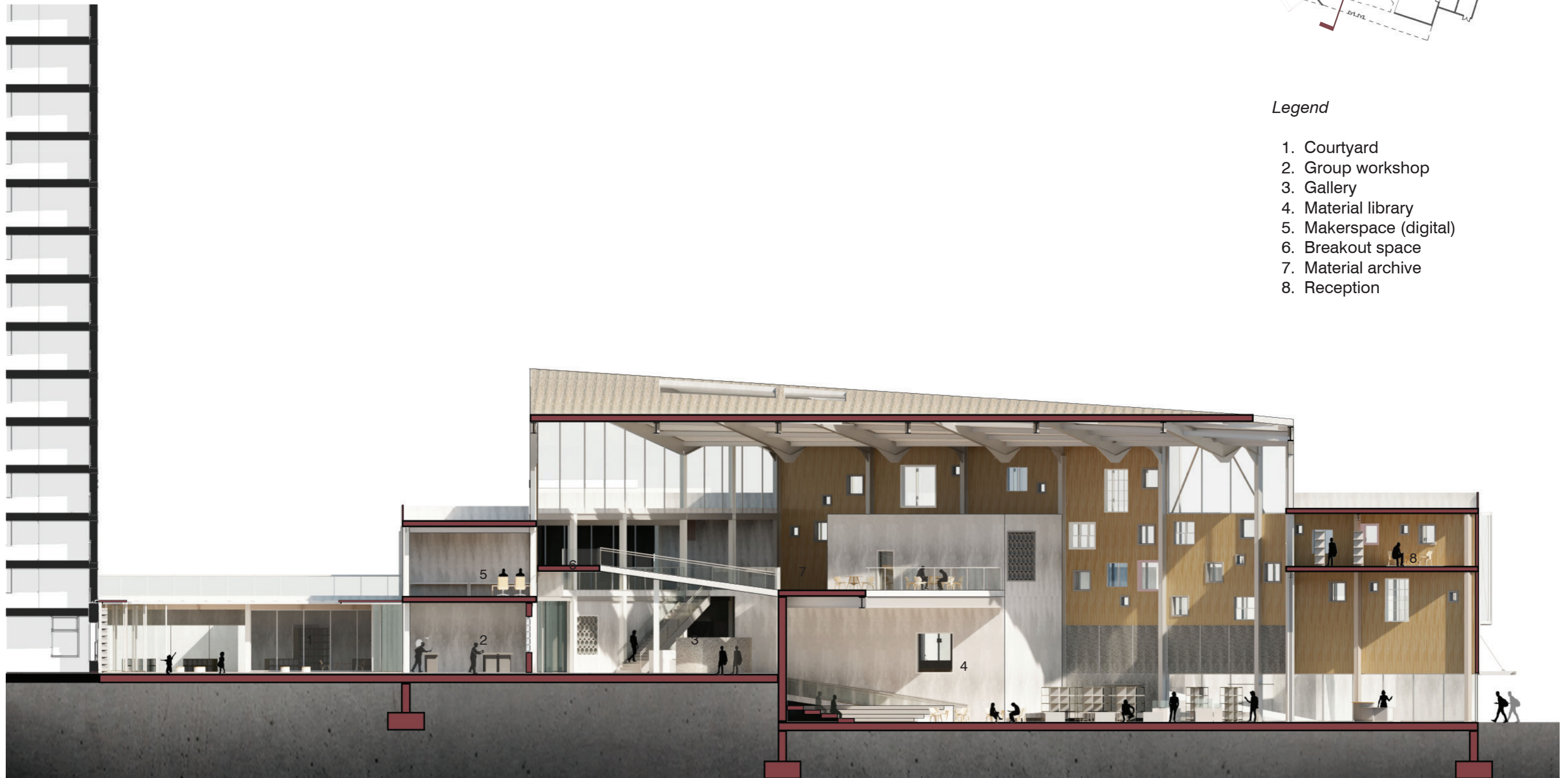


1/F Plan

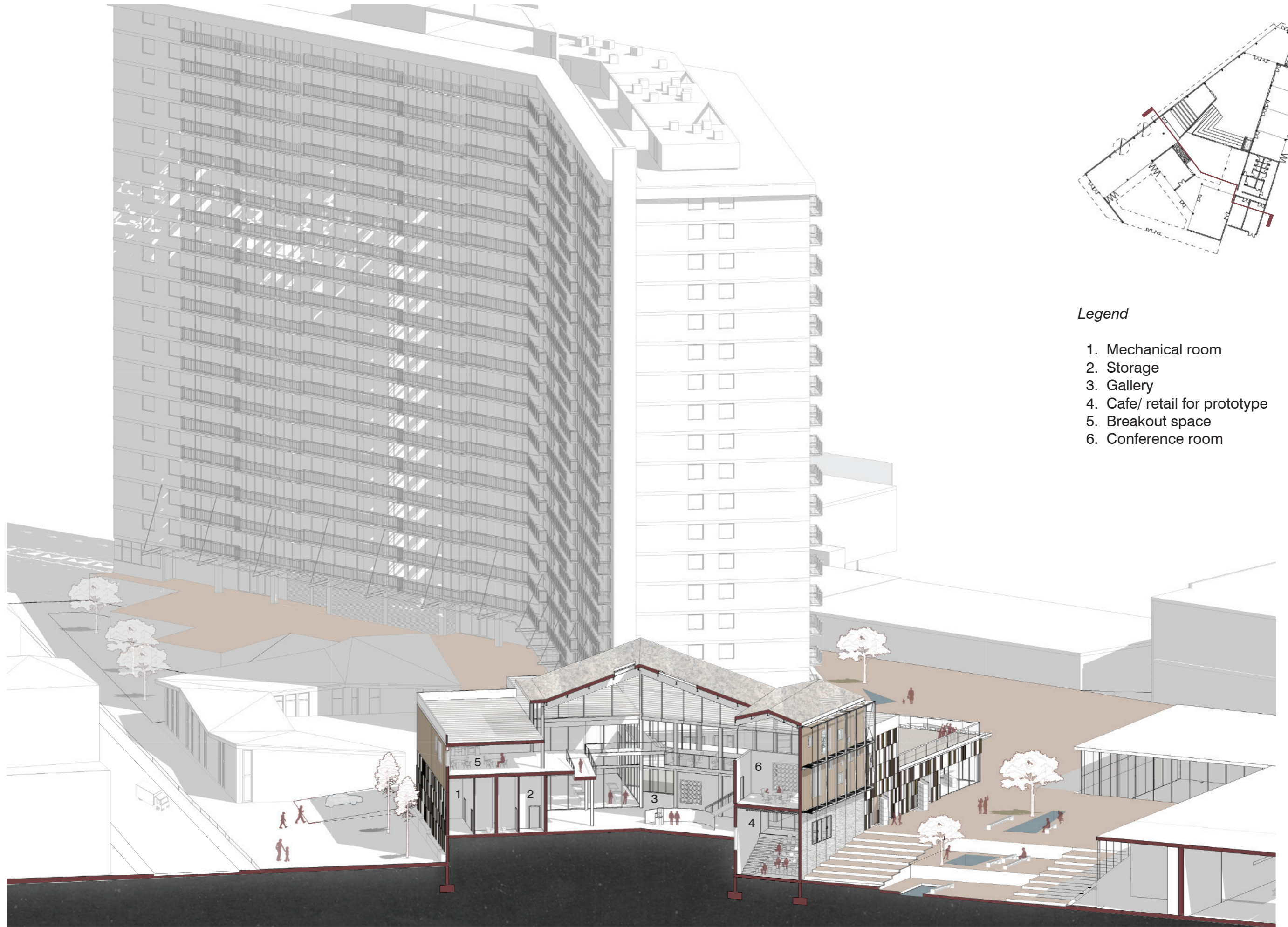


*Legend*

- 1. Courtyard
- 2. Group workshop
- 3. Gallery
- 4. Material library
- 5. Makerspace (digital)
- 6. Breakout space
- 7. Material archive
- 8. Reception



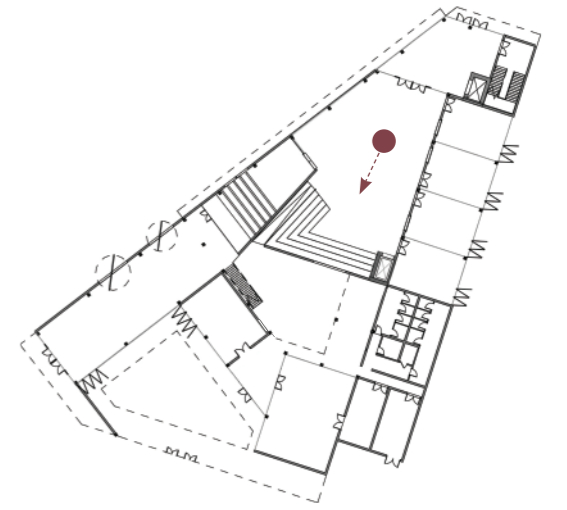
Section AA' 1:250



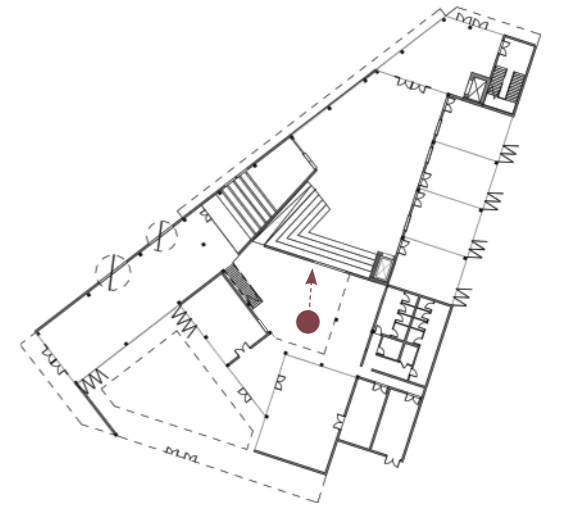
*Legend*

- 1. Mechanical room
- 2. Storage
- 3. Gallery
- 4. Cafe/ retail for prototype
- 5. Breakout space
- 6. Conference room

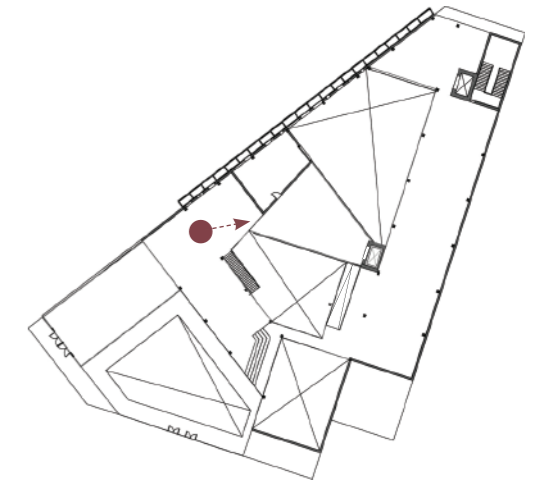
Section BB' 1:250



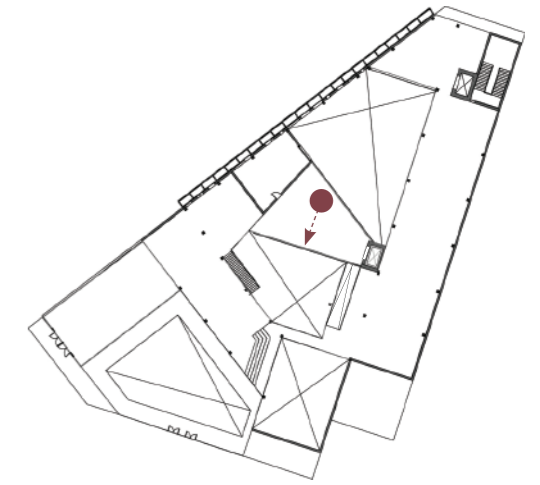
Material library



Gallery

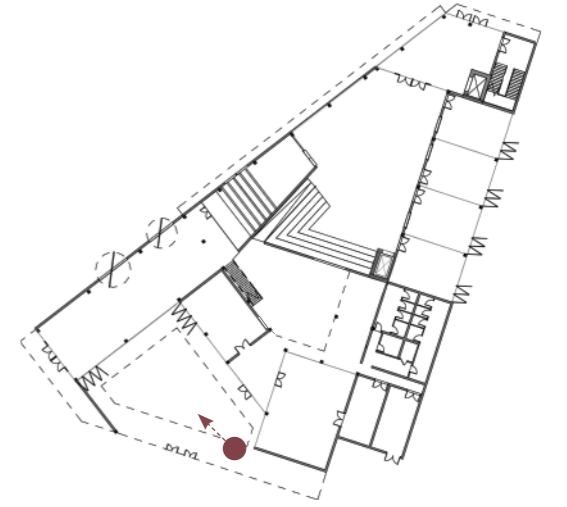


Makerspace



Makerspace





Courtyard



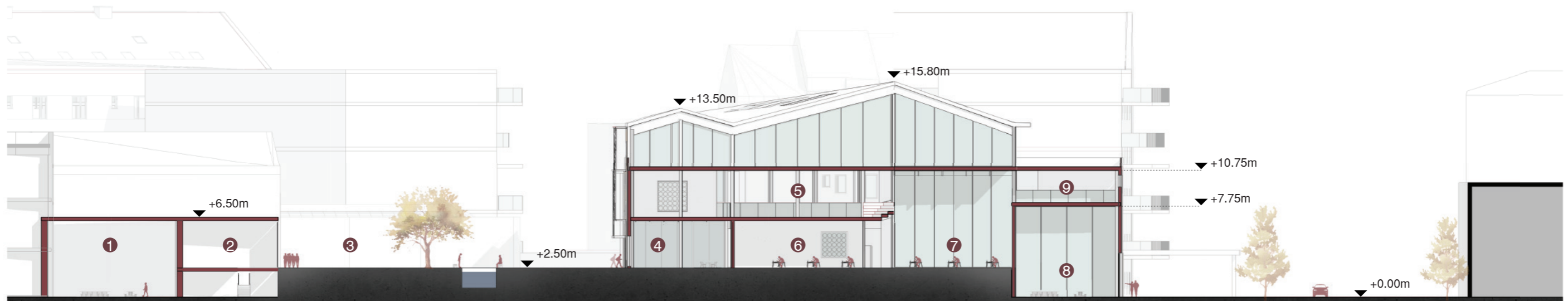
*Legend*

*Urban planning*

- 1. Workshop
- 2. Conceptual store/working studio
- 3. Plaza

*Recyclage*

- 4. Cafe/ retail for prototype
- 5. Makerspace (digital)
- 6. Group workshop
- 7. Makerspace (metal/wood)
- 8. Classroom
- 9. Open workstation for researchers



**Site Section 1:500**



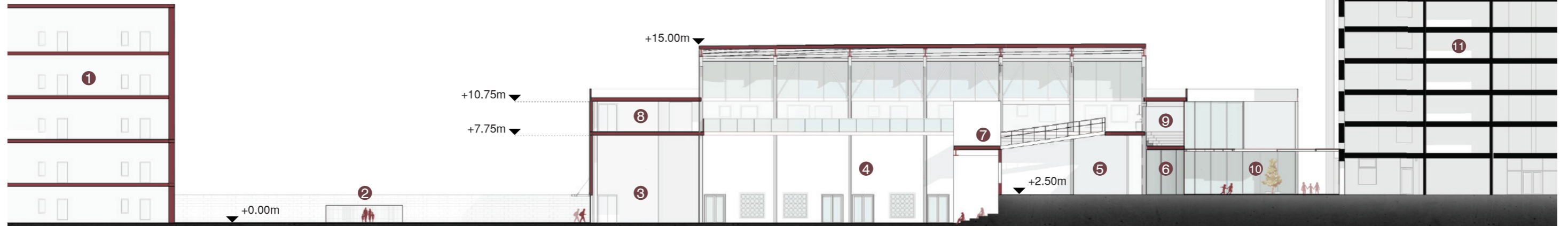
Legend

Urban planning

- 1. Renovated slab housing
- 2. Entrance gate
- 11. Le Goujon

Recyclage

- 3. Reception
- 4. Material library
- 5. Gallery
- 6. Group workshop
- 7. Makerspace (digital)
- 8. Material archive
- 9. Sitting steps
- 10. Courtyard



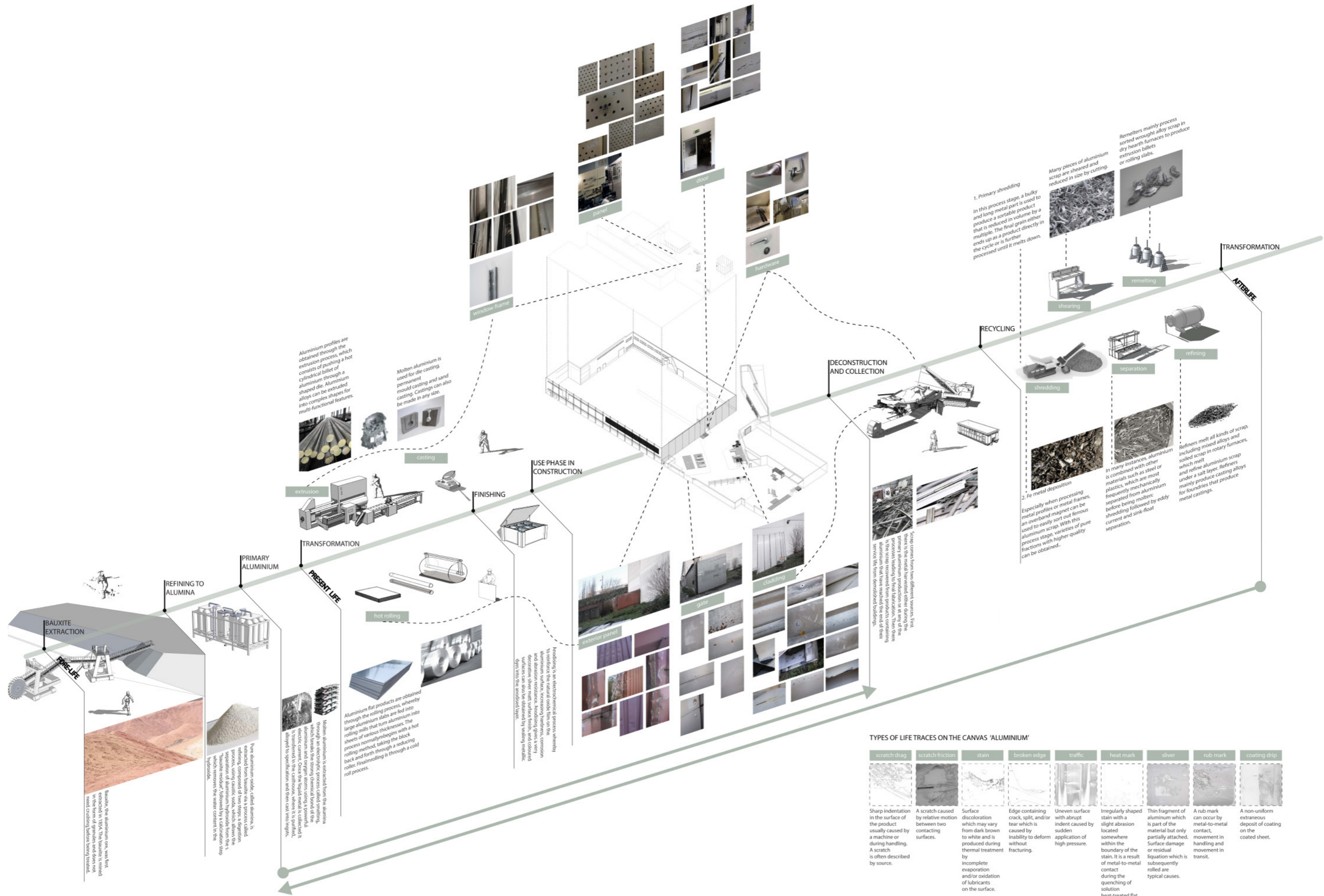
Site Section 1:500



Perspectives



Aluminium around the Site



Life Cycle of Aluminium

**TYPES OF LIFE TRACES ON THE CANVAS 'ALUMINIUM'**

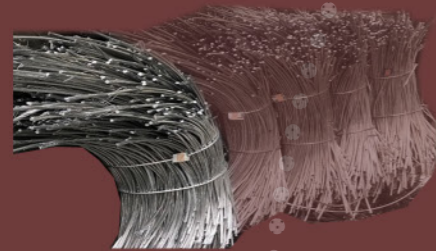
scratch drag	scratch friction	stain	broken edge	traffic	heat mark	silver	rub mark	coating drip
Sharp indentation in the surface of the product usually caused by a machine or during handling. A scratch is often described by source.	A scratch caused by relative motion between two contacting surfaces.	Surface discoloration which may vary from dark brown to white and is produced during thermal treatment by incomplete evaporation and/or oxidation of lubricants on the surface.	Edge containing crack, split, and/or tear which is caused by inability to deform without fracturing.	Uneven surface with abrupt indent caused by sudden application of high pressure.	Irregularly shaped stain with a slight abrasion located somewhere within the boundary of the stain. It is a result of metal-to-metal contact during the quenching of solution heat-treated flat sheet or plate.	Thin fragment of aluminium which is part of the material but only partially attached. Surface damage or residual liquidation which is subsequently rolled are typical causes.	A rub mark can occur by metal-to-metal contact, movement in handling and movement in transit.	A non-uniform extraneous deposit of coating on the coated sheet.



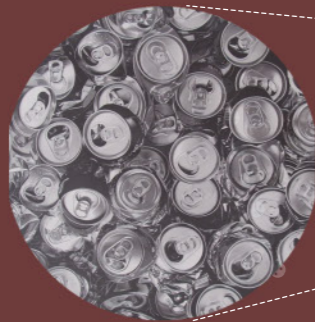
*Aluminium rims/* aluminum rims are all over on cars or trucks. They also exist in scooters, motorcycles, and even some lawn mowers.



*Aluminium extrusion/* they are mainly tubes and pipes.



*Aluminium wires/* insulated aluminum wire is commonly used in all types of electrical work from residential to commercial.



XS

*Aluminium cans & beverage cartons/* they consist of soft drink and food cans.

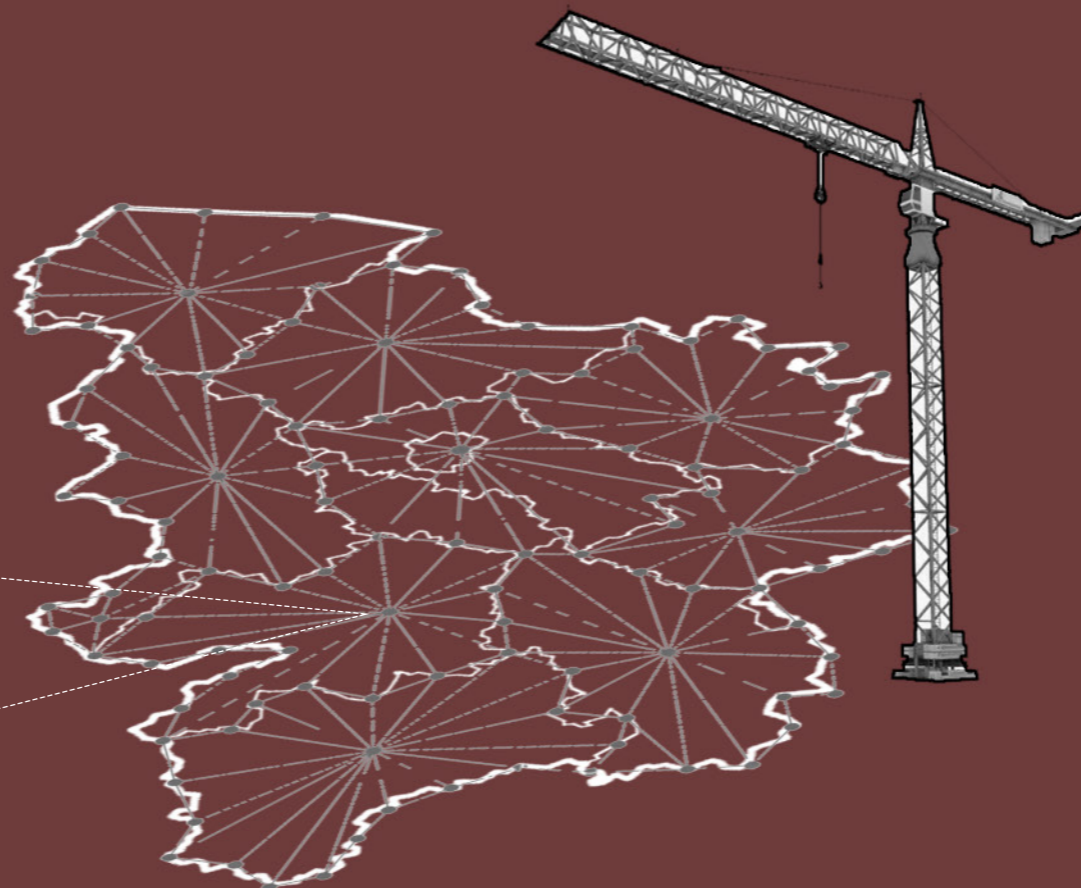


*Dirty aluminium profiles /* they are mainly window frames with small amounts of plastic or steel attached.



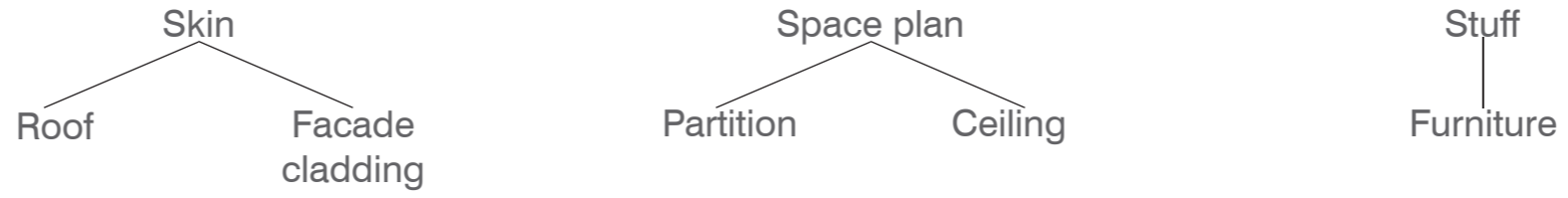
*Sheet Aluminum/* they are mainly aluminum gutters and siding salvaged by roofers and contractors.

XL



**Types of Scraps**

BUILDING LAYERS



size of aluminium scrap

TRANSFORMATION STRATEGIES

Reuse



salvaged windows

Repurpose



metal mesh façade



wheel rims

Reconfigure



tuff roof



profile



open cell ceiling



pipe

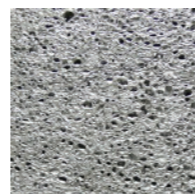


pipe



corrugated panels

Transform



aluminium foam

Material Inventory





1500W x 2250H



1000W x 2150H



500W x 500H



1540W x 1450H



1310W x 1570H



700W x 1200H



1250W x 1440H



2990W x 2090H



2359W x 2570H



950W x 2200H



1030W x 1300H



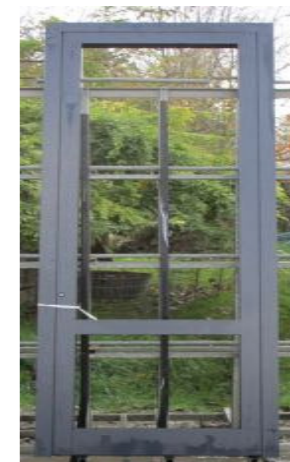
1120W x 1190H



1080W x 1200H

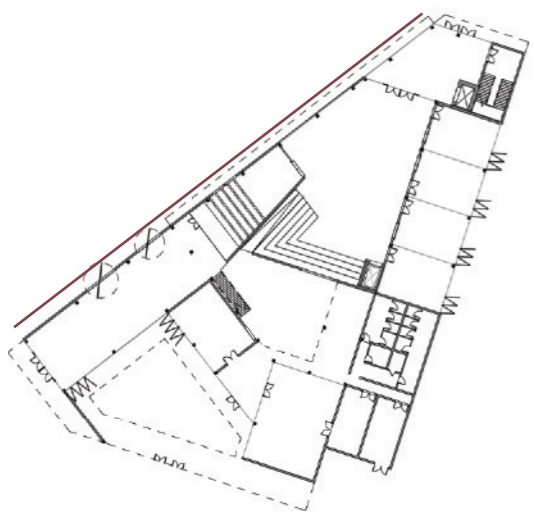


1240W x 1330H



950W x 2730H

**Salvaged Windows**



West Elevation 1:250

*Process of materials/ Materials/*

*Reference/*

REUSE

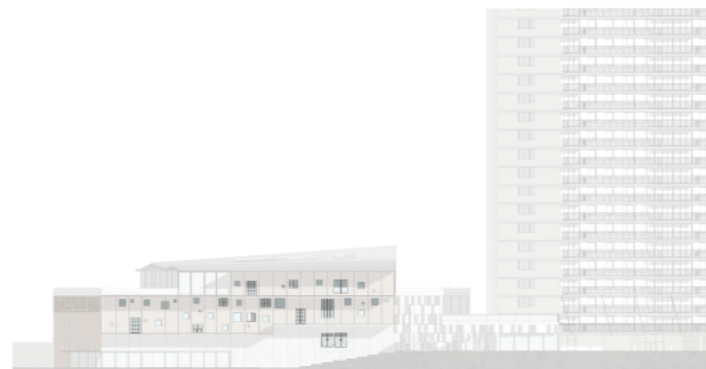


double facade with reclaimed wood lumber



Quartier Des Spectacles / Ædifica

REUSE  
+  
REPURPOSED



salvaged aluminium window and door frames



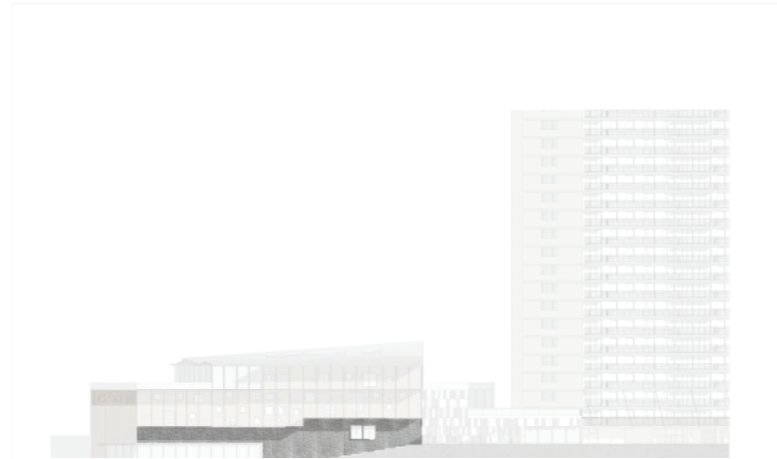
Collage House / S+PS Architects

**Facade Design**

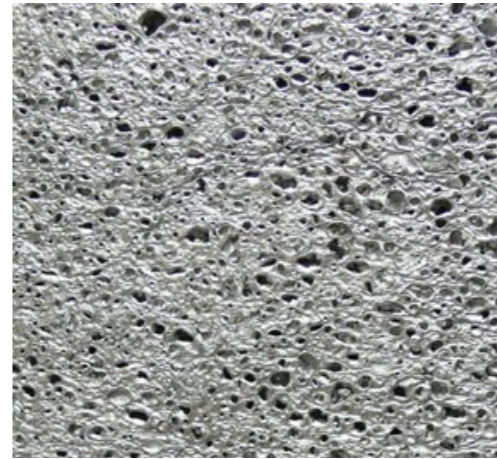
Process of materials/ Materials/

Reference/

TRANSFORMED

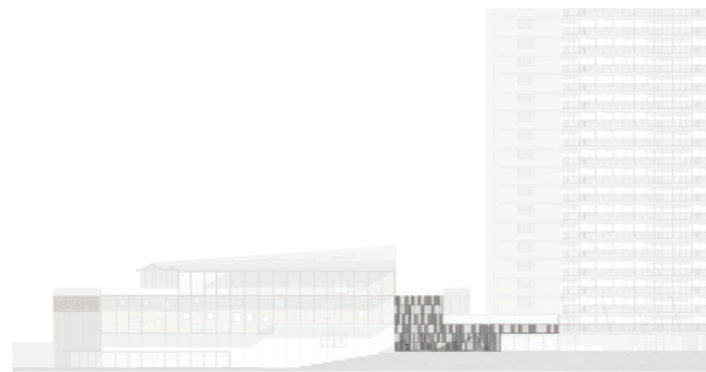


aluminium foam



Evangelical Temple in Terrassa / OAB

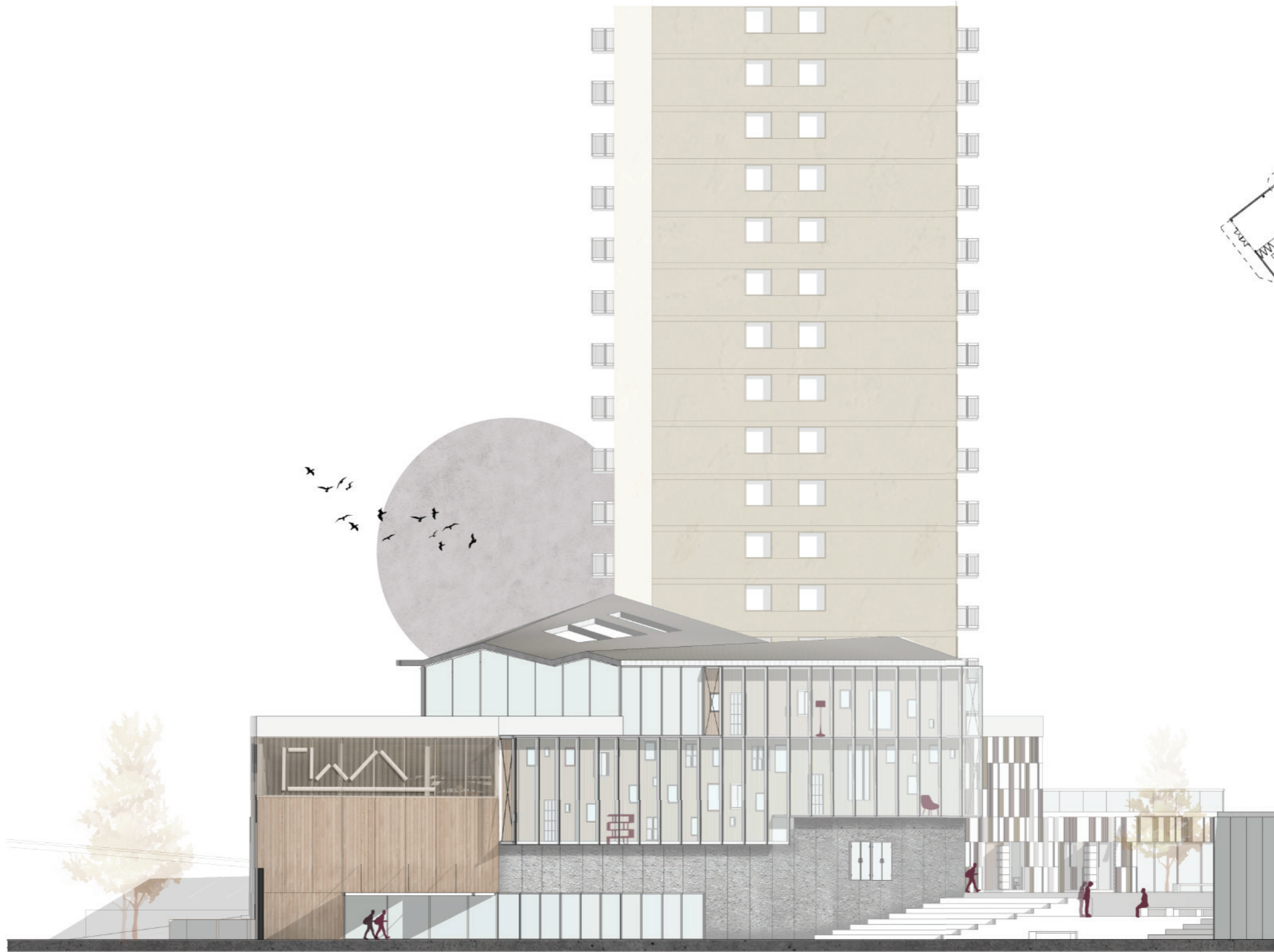
RECONFIGURED



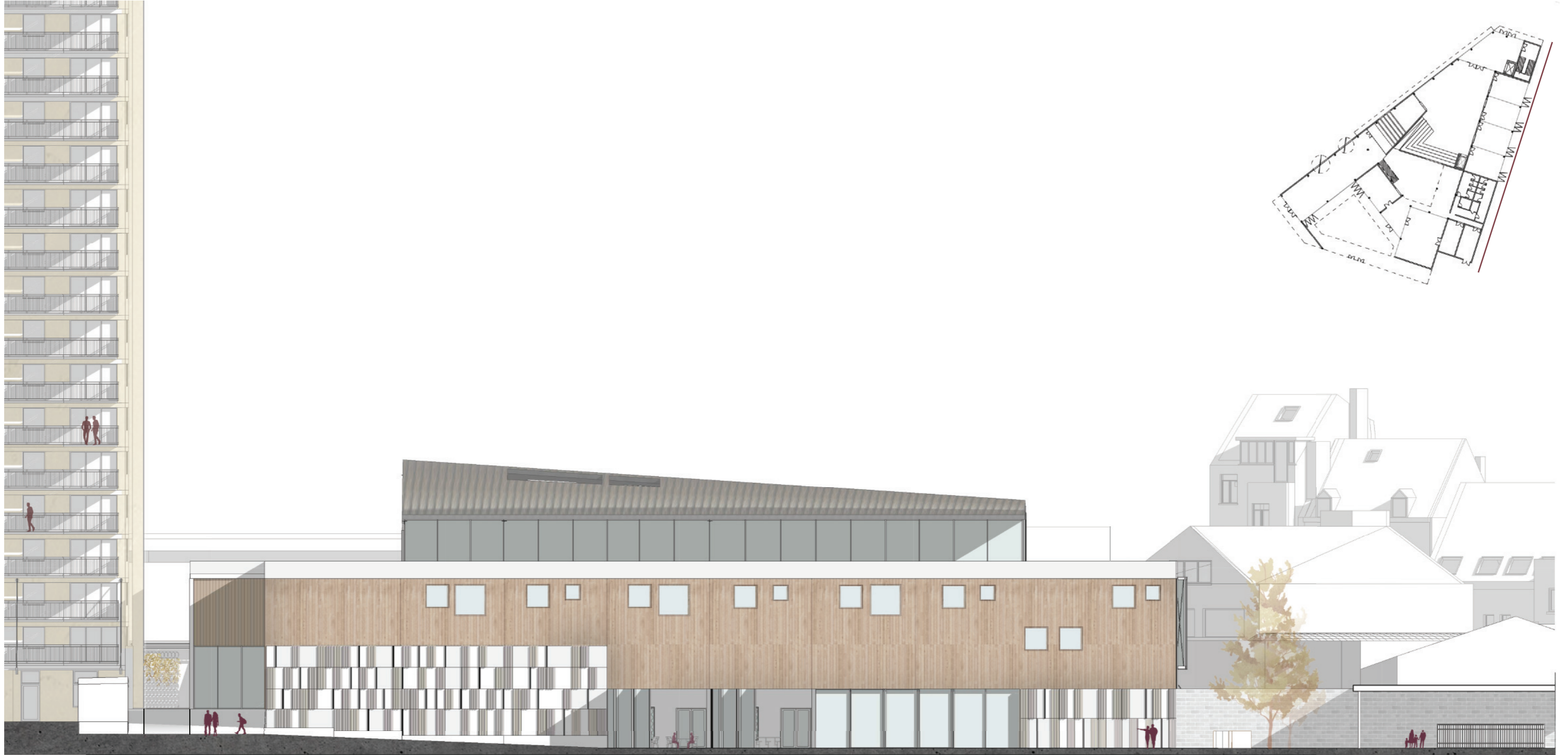
patchwork panels with aluminium scrap



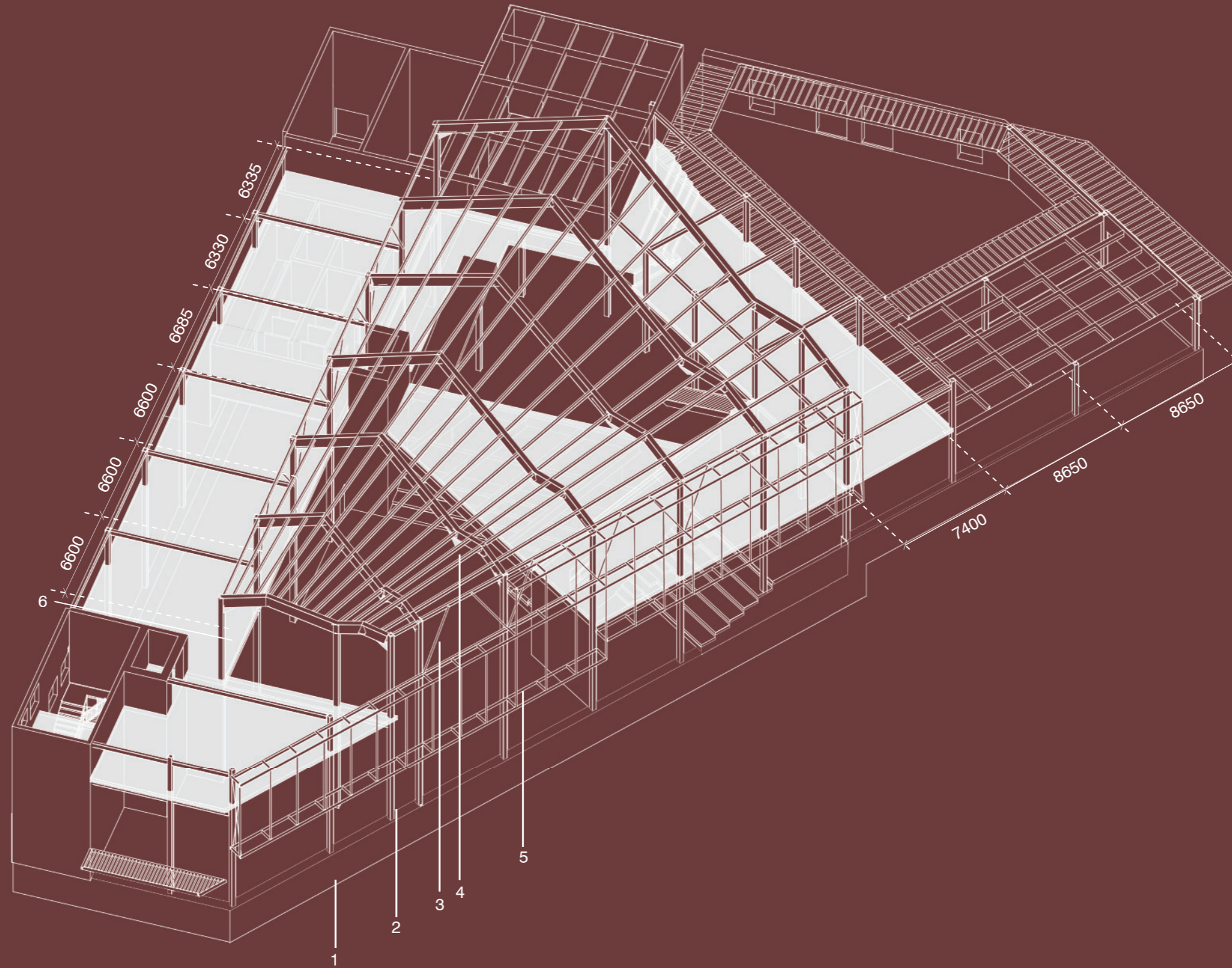
Scigno del Cielo, architecture in a window”/ Cherubino Gambardella and Simona Ottieri



North Elevation 1:250

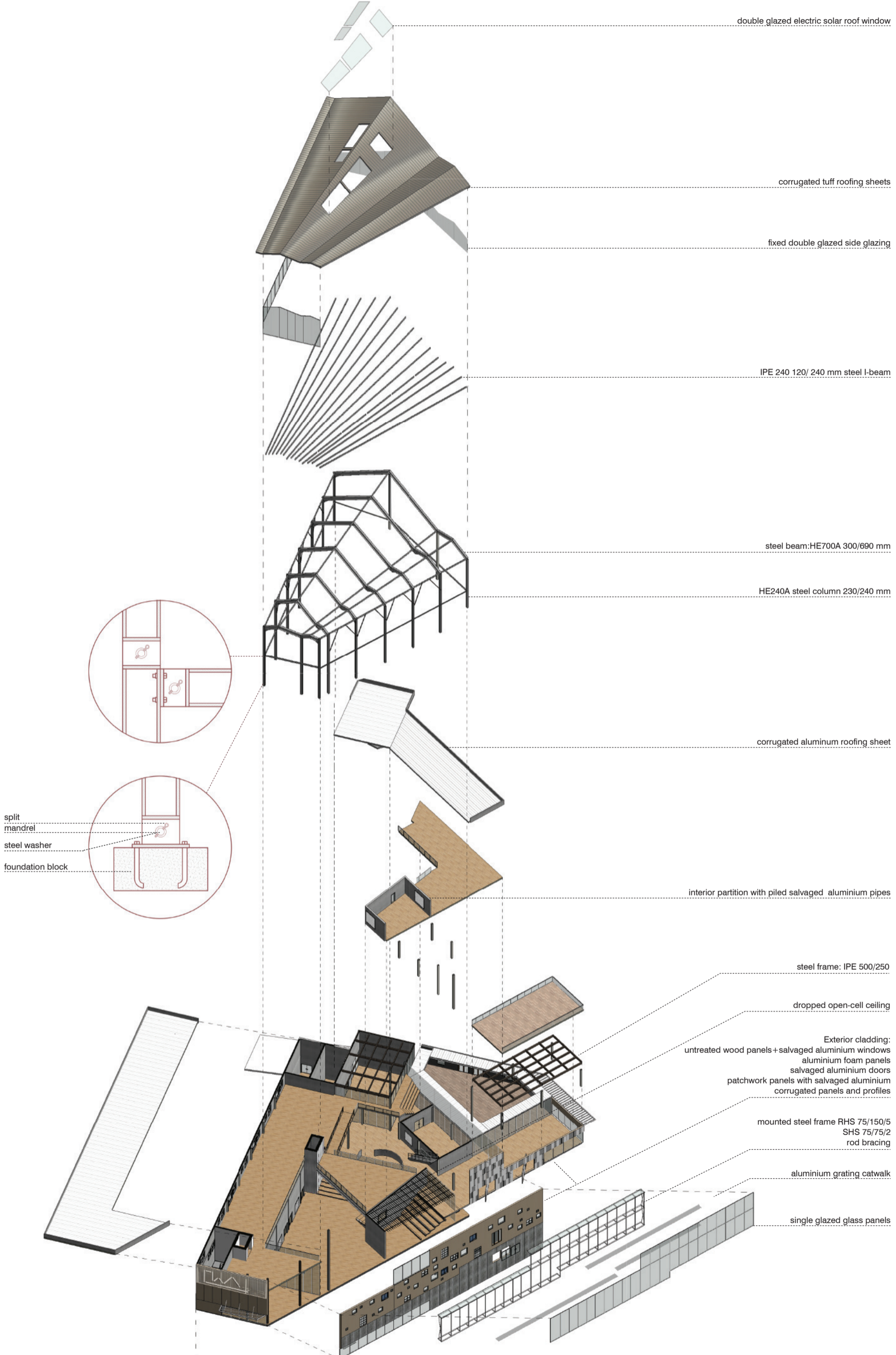


East Elevation 1:250



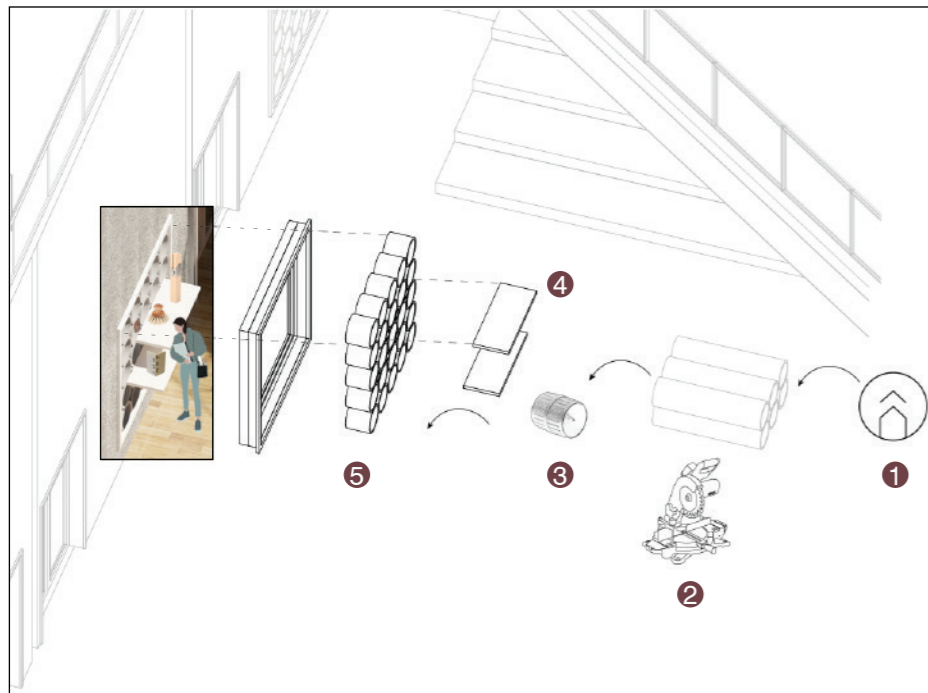
*Legend*

- 1. Strip foundation
- 2. Steel portal frame
- 3. Knee bracing
- 4. Apex haunch
- 5. Sidewall grit
- 6. Bottom haunch



Structural Design





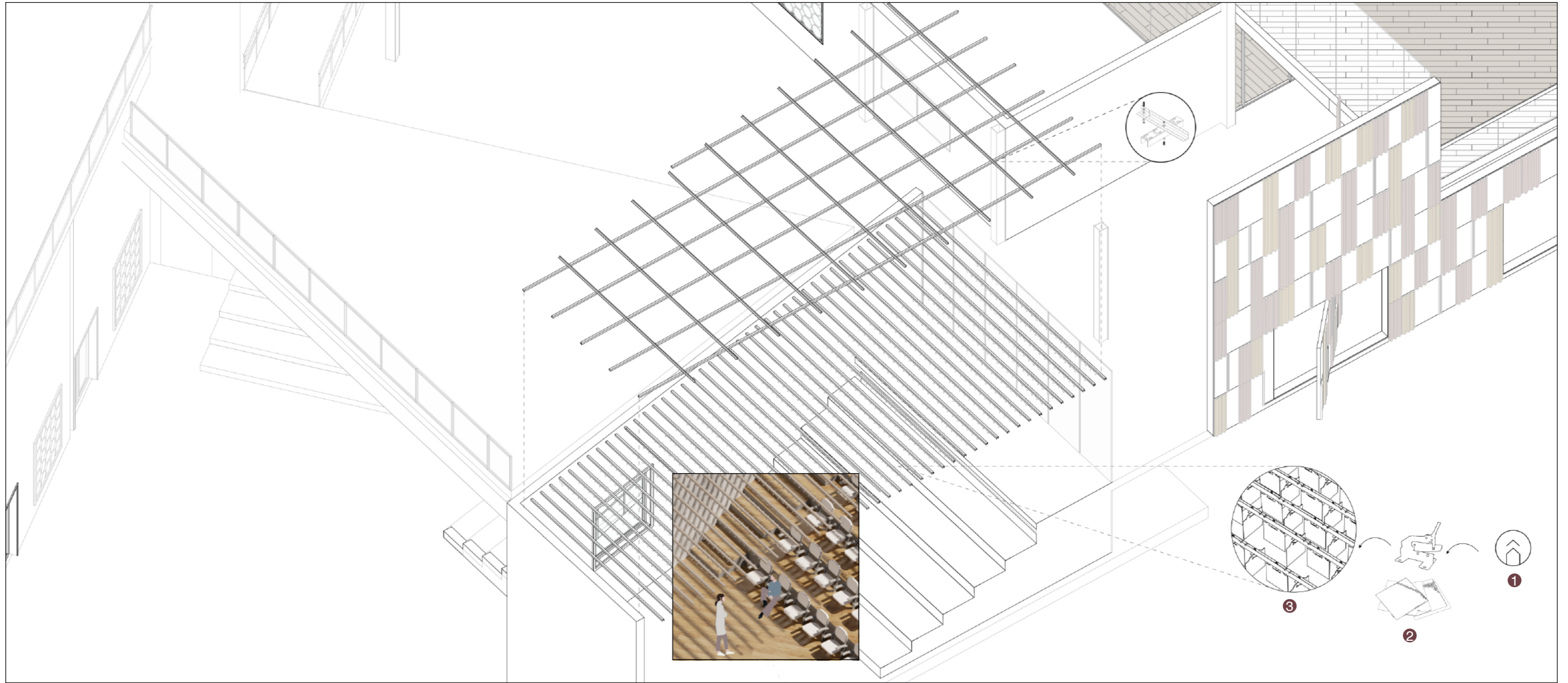
*Aluminium pipe partition*

1. Deconstruction
2. Cutting of salvaged aluminium pipes
3. Deburring of the cut sections
4. Shelves can be plugged into the pipe partition
5. Sections are stacked to infill the wall opening



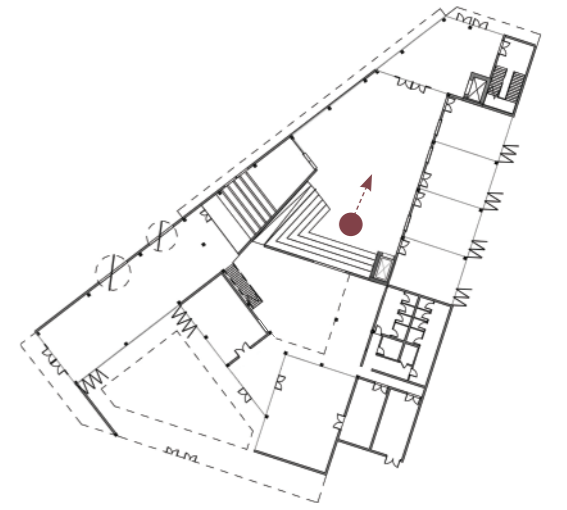
*'Patchwork' cladding*

1. Deconstruction
2. Cutting of salvaged aluminium profiles , corrugated and flat cladding sheets
3. Hardware components such as hinges, locks and brackets are retained
4. Corrugated sheets and profiles are fastened on the flat back panels with slats
5. The reconfigured panels are hung on the steel profiles
6. Clips on the steel back frame allow refitting and dismantling

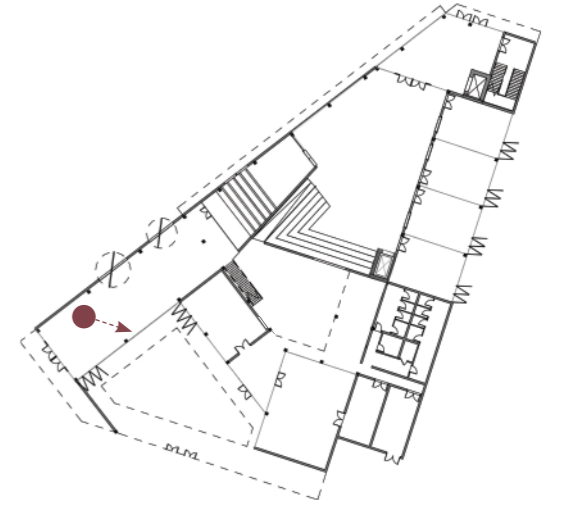


*Aluminium open-cell ceiling*

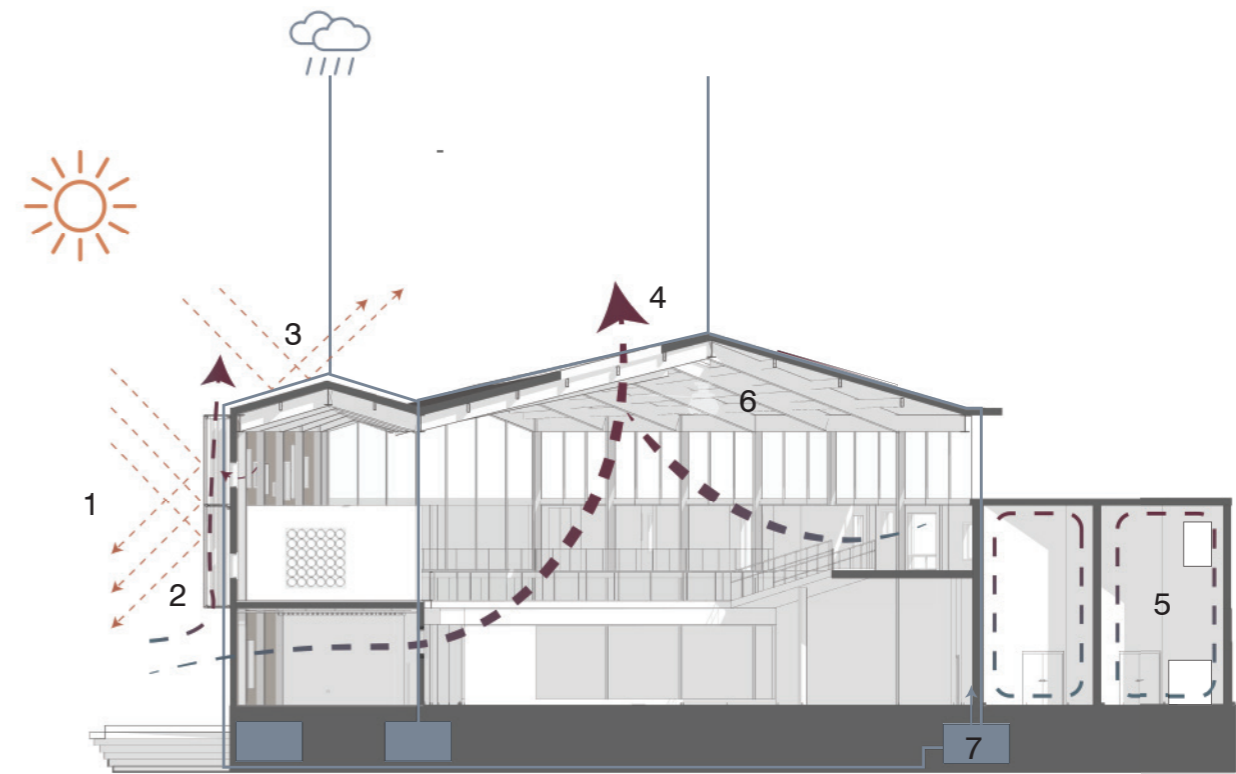
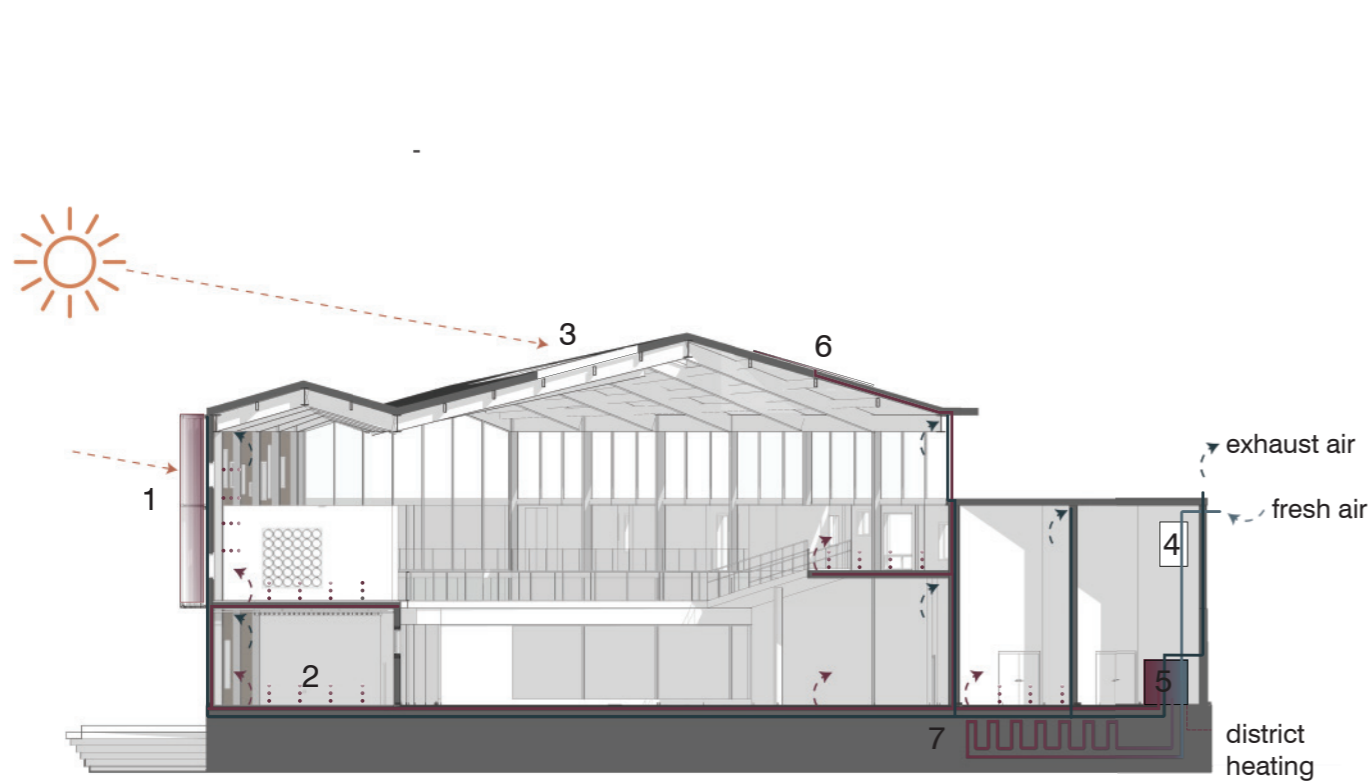
1. Deconstruction
2. Cutting of salvaged aluminium sheets
3. The blades are hung onto the carrier profiles in multiple directions.  
Each row of blades can be folded down and removed individually.



Material Library



Cafe & Retail for Prototype

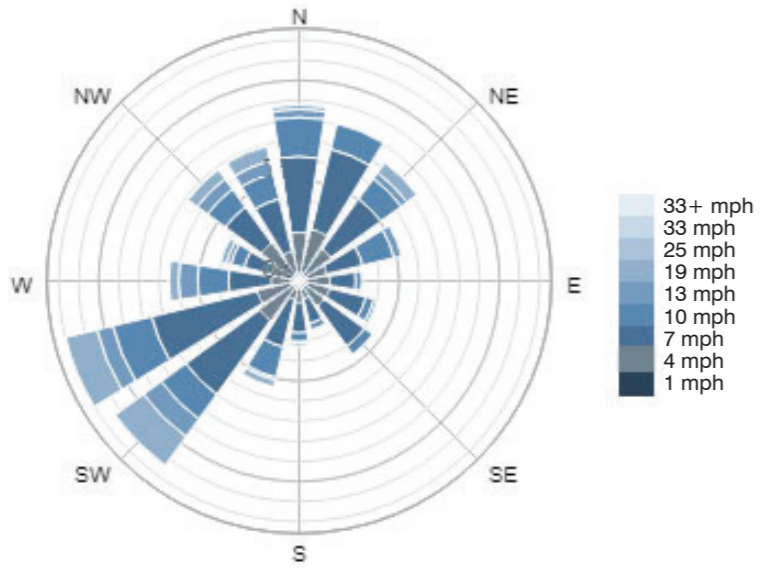


*Winter (passive + mechanical heating & mechanical ventilation)*

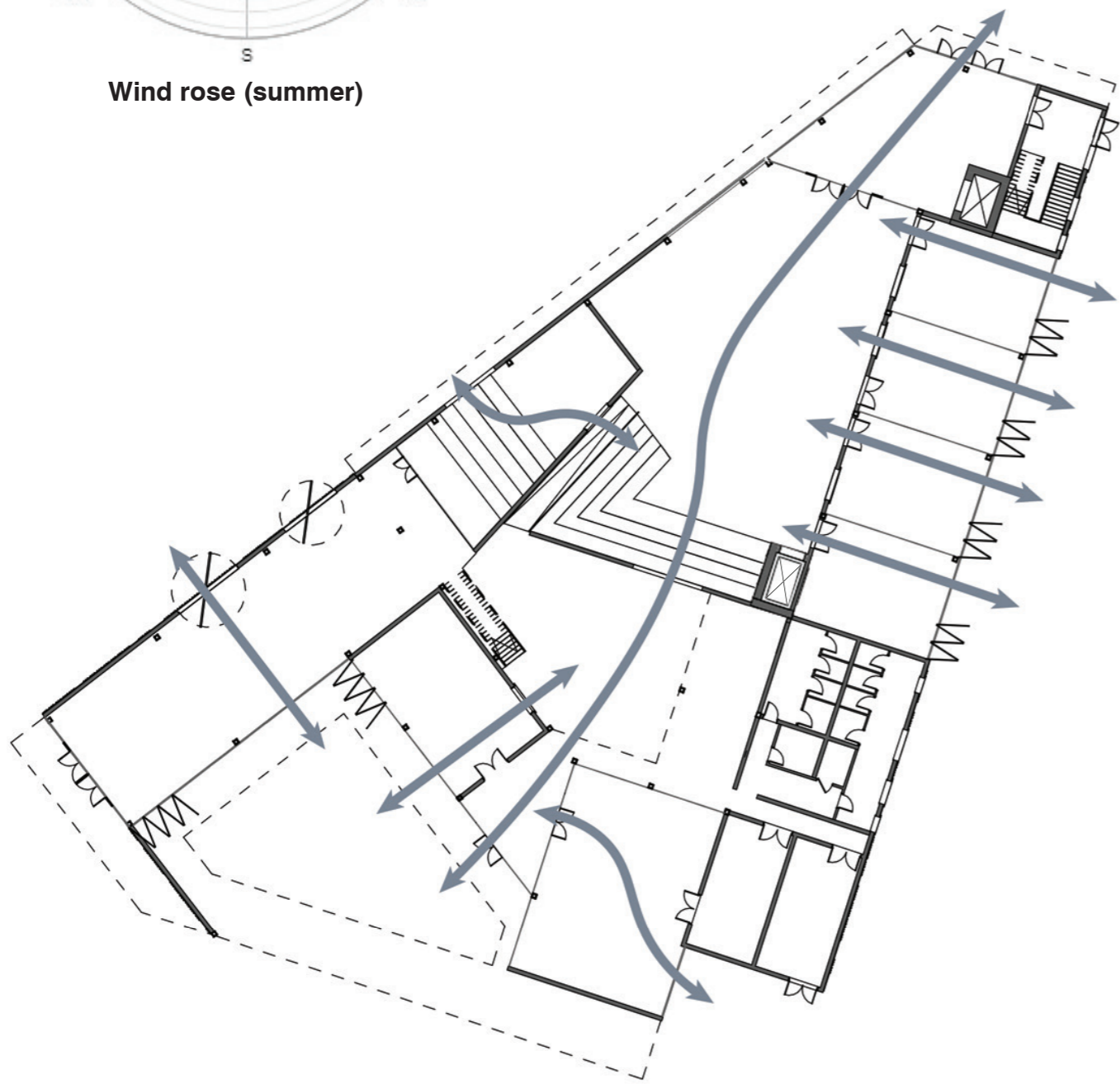
1. Twin-face facade creates air buffer which works as a barrier to heat loss. Sun-heated air contained in the cavity can heat spaces outside the glass, reducing the demand for indoor heating systems.
2. Radiant floor heating
3. Natural illumination and heat gain from skylight
4. External air filter
5. Heat pump to enable hybrid ventilation with heat recovery for days in which the weather does not allow natural ventilation.
6. Solar thermal collectors for domestic hot water, room heating and seasonal storage. During summer solar cooling works with heat pump.
7. Seasonal storage of heat underground can store energy in summer which is to be used in winter.

*Summer (passive + mechanical cooling & ventilation)*

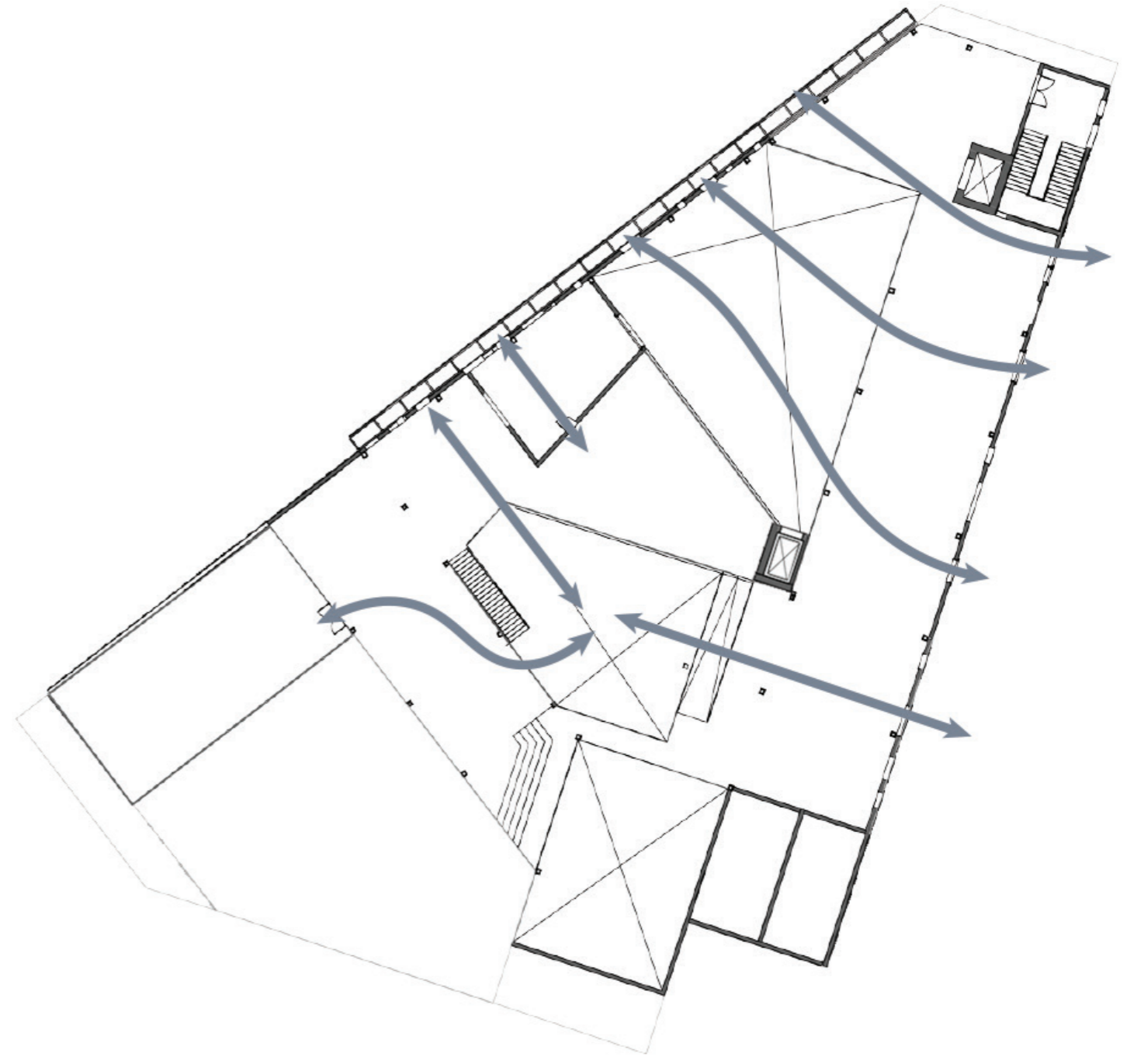
1. Double skin facade reduces solar gain
2. The cavity twin-face facade can be vented outside the building to mitigate solar gain and decrease the cooling load. Excess heat is drained with chimney effect, where differences in air density create a circular motion that causes warmer air to escape. As the air temperature in the cavity rises, it is pushed out, bringing a slight breeze to the surroundings while isolating against heat gain.
3. Cross ventilation and stack effect ventilation
4. Reflective roof clad with corrugated aluminum
5. Mechanical cooling and ventilation
6. Ceiling fan to facilitate stacking ventilation
7. Water tank to collect rain water for storm water reuse



Wind rose (summer)

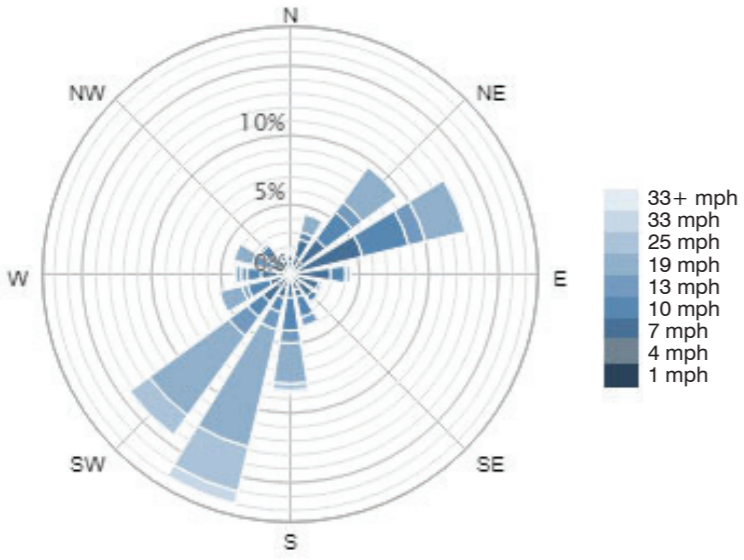


G/F

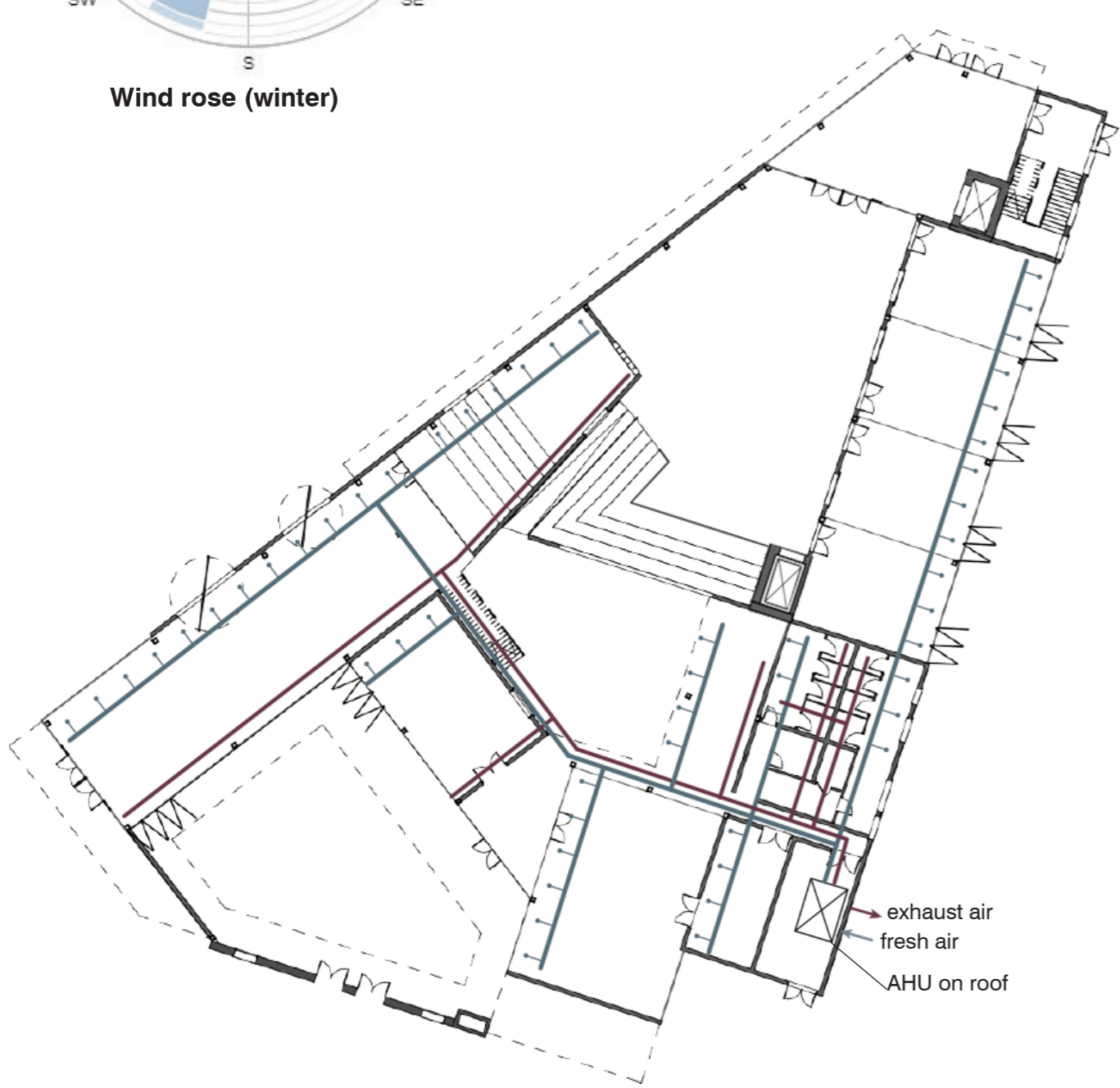


1/F

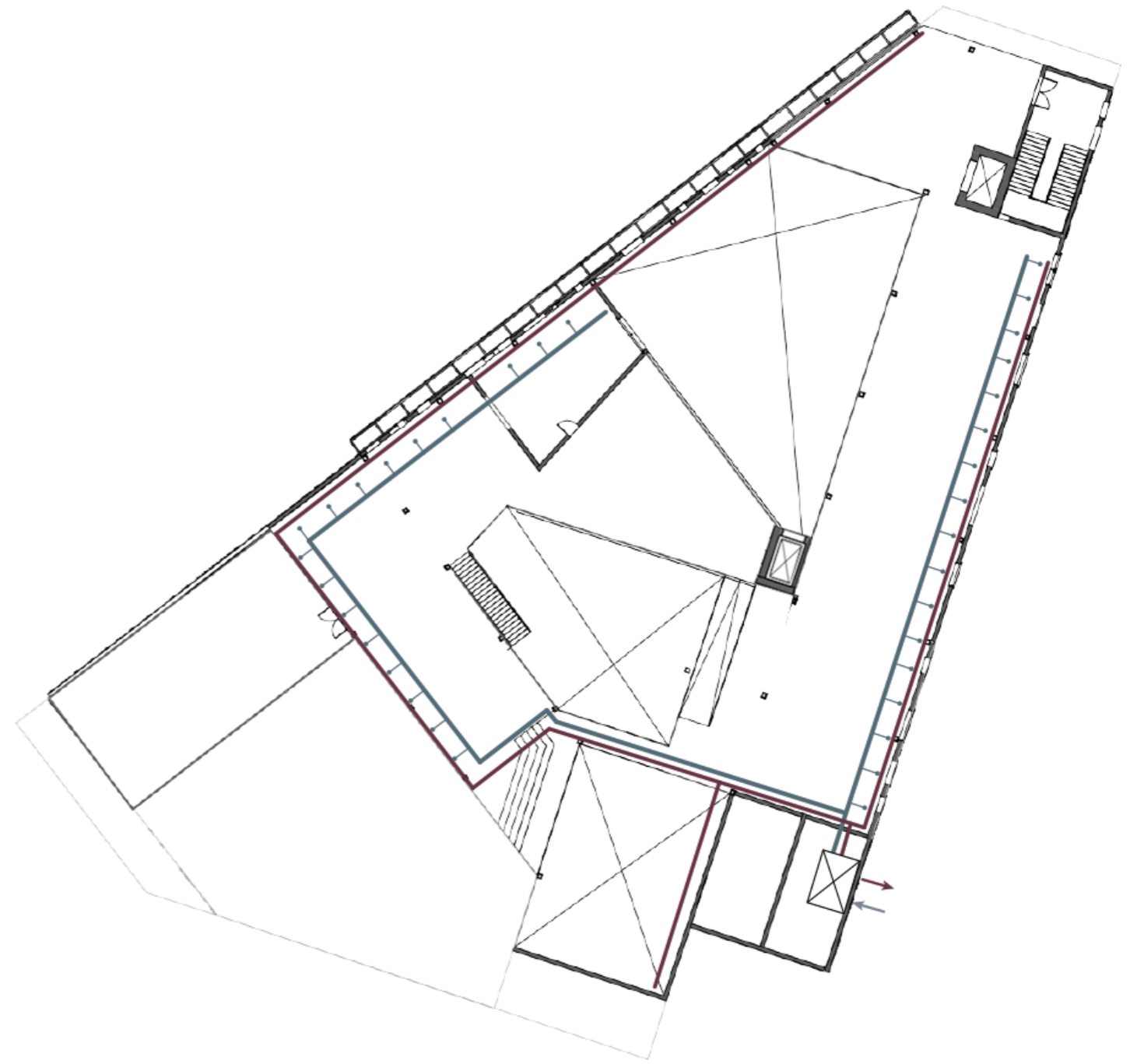
Hybrid Ventilation- Cross Ventilation



Wind rose (winter)

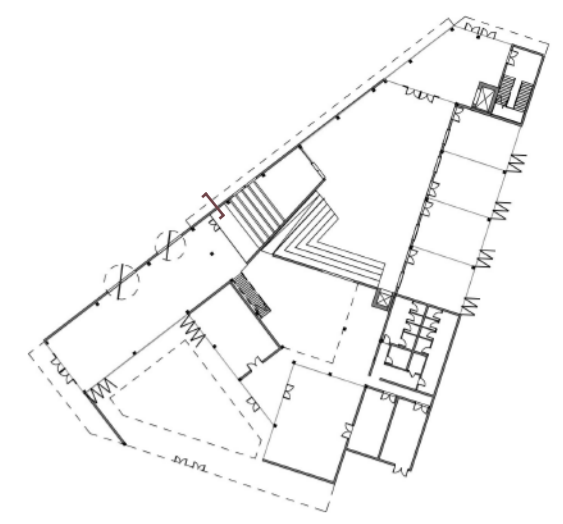


G/F



1/F

Hybrid Ventilation- Mechanical Ventilation

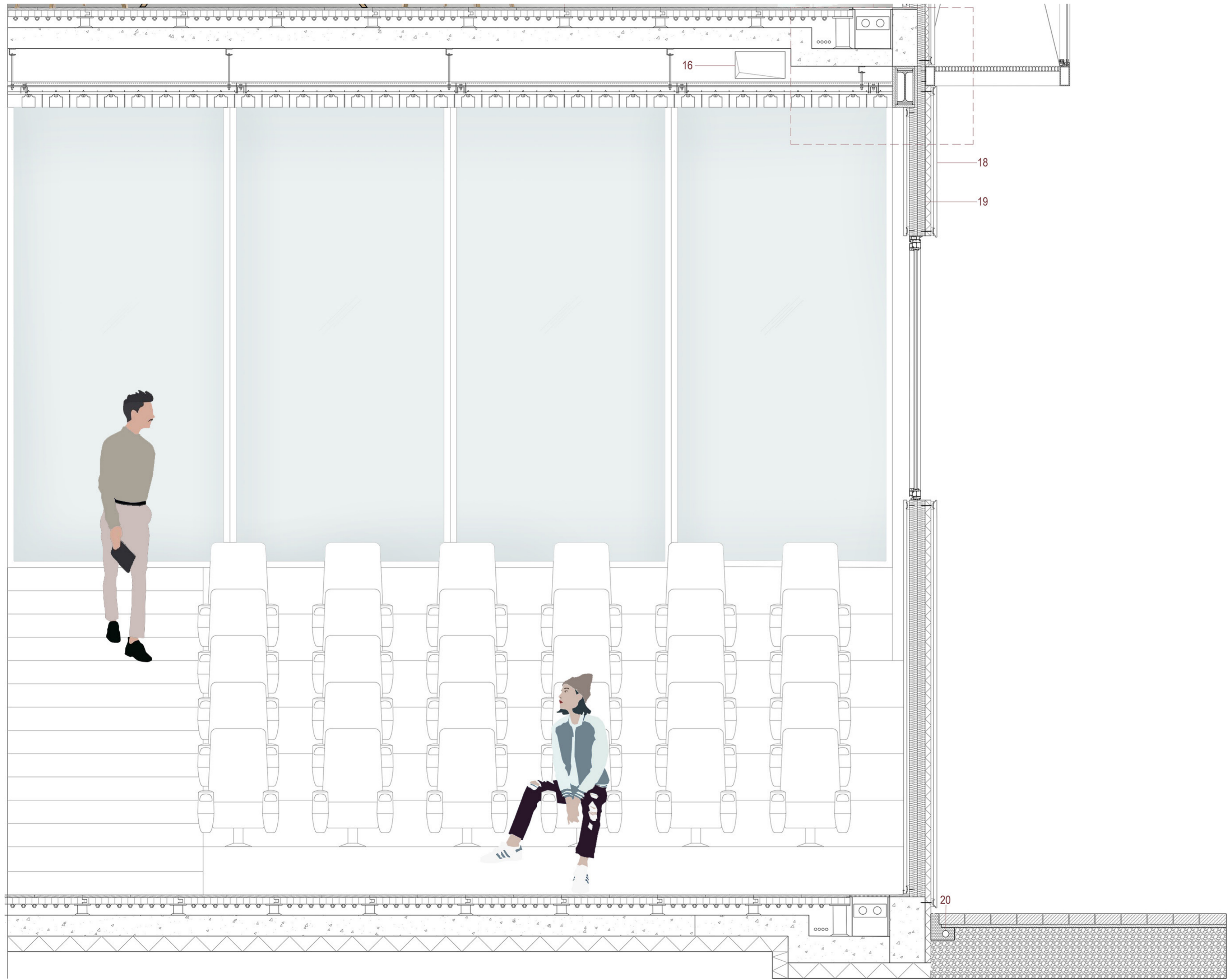


Legend

- 1. Rooftop cap
- 2. Roof construction:  
4mm tuff roof/ corrugation: 45mm  
200mm rock wool insulation  
sub-purlin  
50mm structural deck
- 3. 120/ 240 mm IPE 240 steel I-beam
- 4. Rainwater down pipe
- 5. Stainless steel grated channel
- 6. Glazing with aluminium profiles with motorized opening part
- 7. 75/150 mm steel RHS beam
- 8. Fixed single glazing panel :12mm lam. safety glass
- 9. 30mm reclaimed barn wood panel
- 10. 25 + 20 mm gypsum panels
- 11. Reclaimed double-glazed aluminium window
- 12. Linear graze luminaire
- 13. Aluminium grating catwalk for maintenance
- 14. Floor construction:  
20mm oak parquet  
60mm raised floor system floor  
underfloor heating pipes  
160mm precast concrete slab
- 15. Floor convector
- 16. 25mm aluminium foam cladding
- 17. Dropped open-cell ceiling with reclaimed aluminium blades
- 18. 120mm rockwool insulating panels
- 19. HVAC system
- 20. 100mm dia. PVC pipe connectd to storm drain
- 21. Pendant line luminaire

1:20 Section





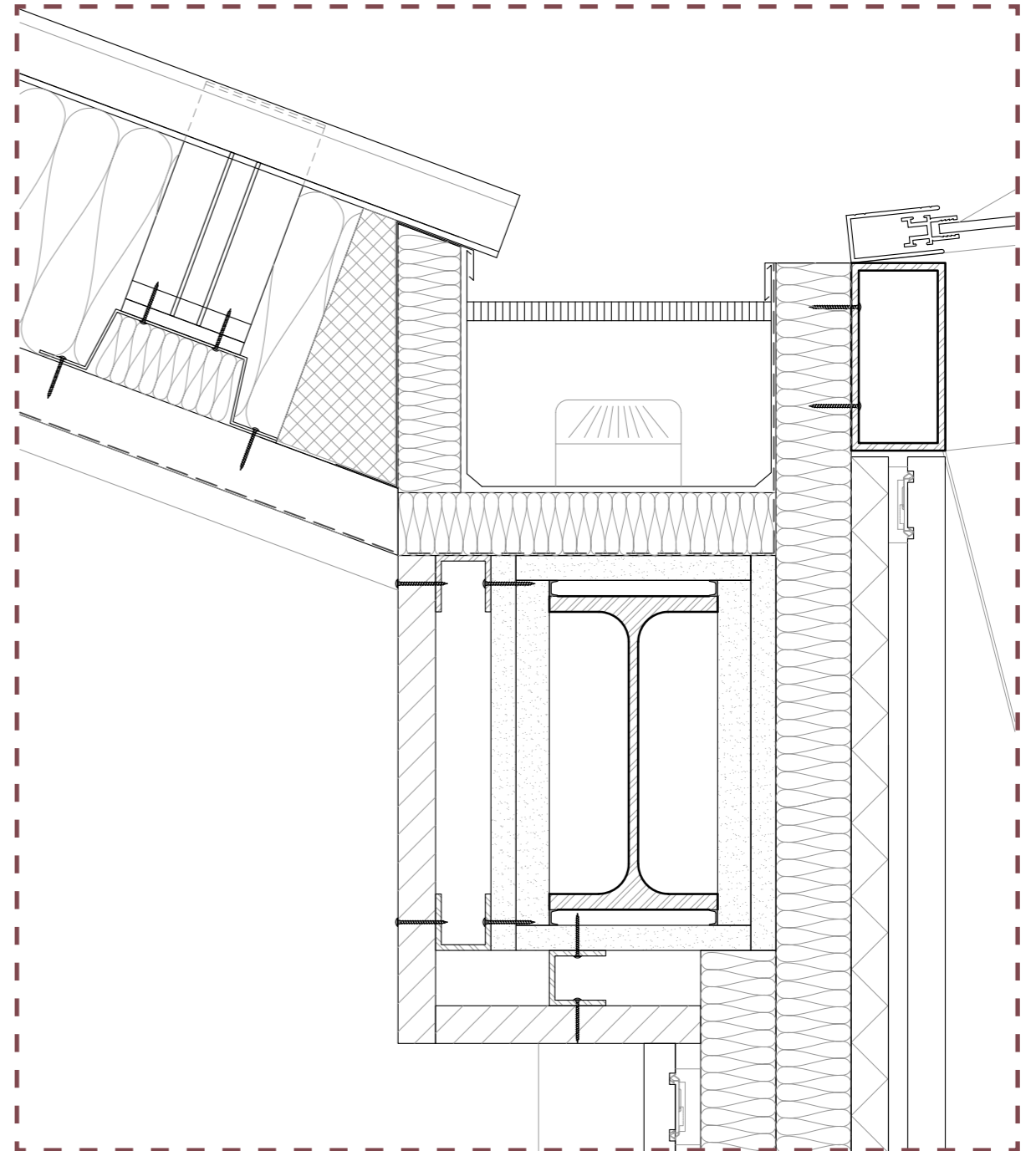
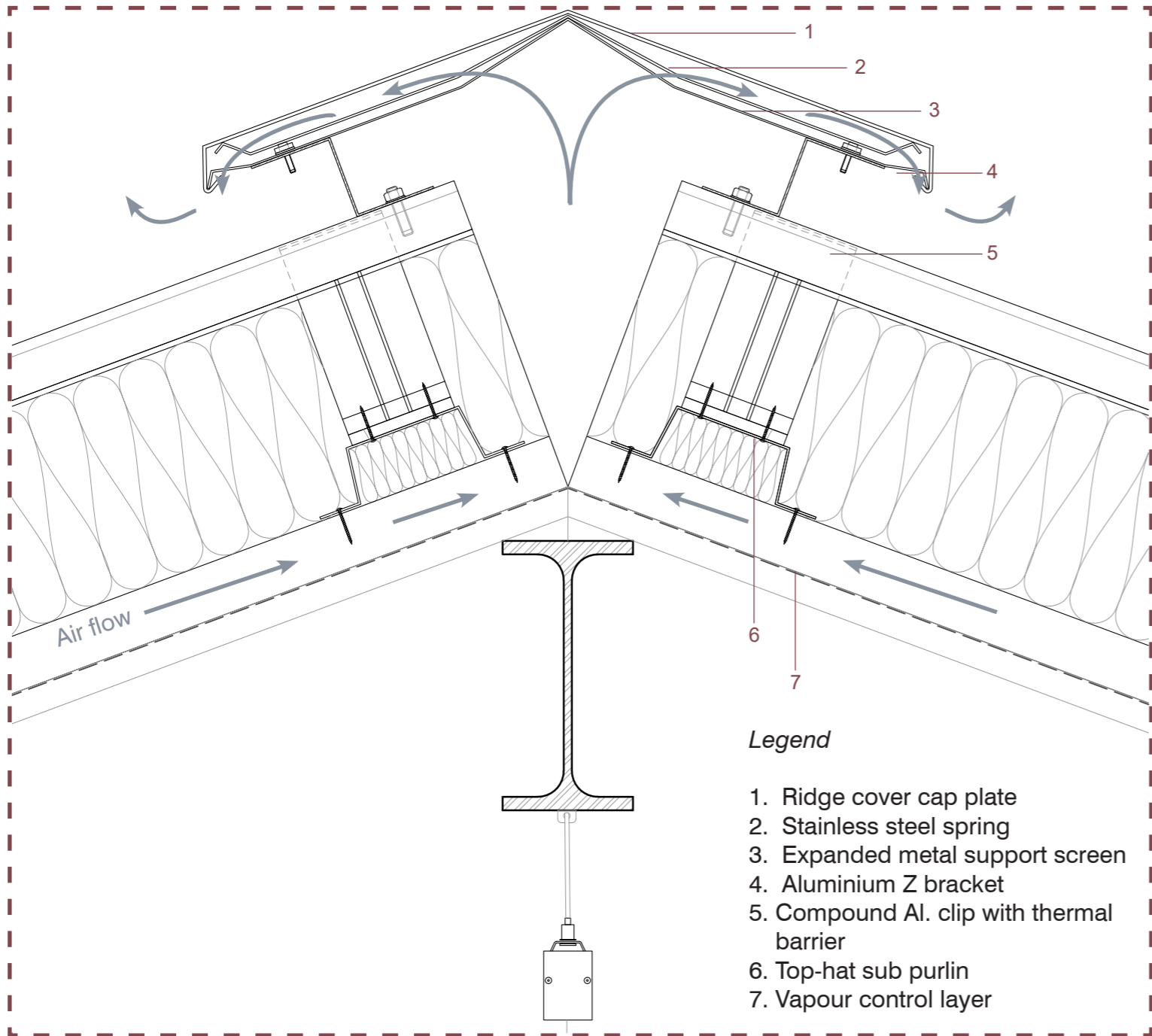
*Legend*

- 1. Rooftop cap
- 2. Roof construction:  
4mm tuff roof/ corrugation: 45mm  
200mm rock wool insulation  
sub-purlin  
50mm structural deck
- 3. 120/ 240 mm IPE 240 steel I-beam
- 4. Rainwater down pipe
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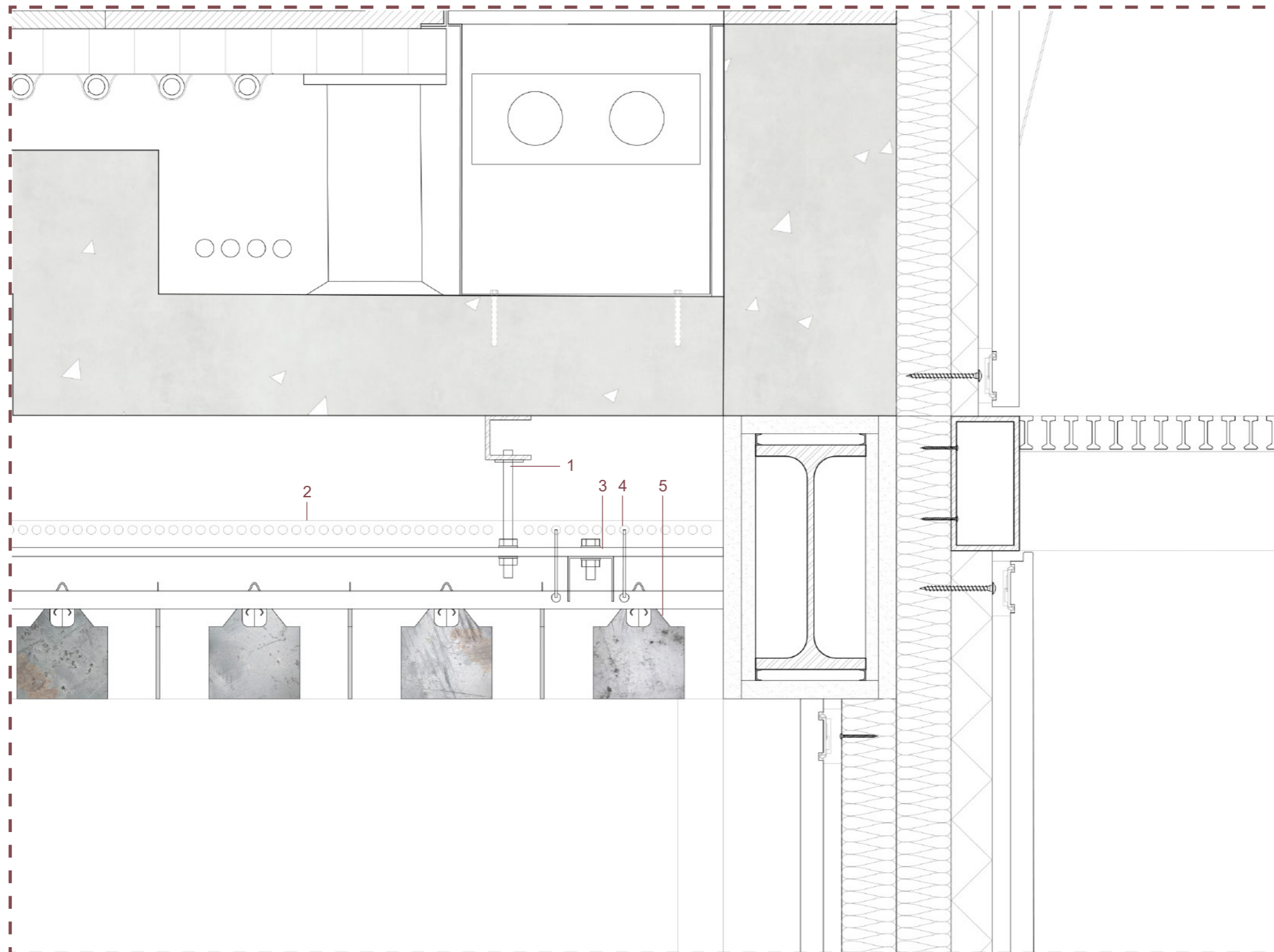
**1:20 Section**



1:100 Elevation



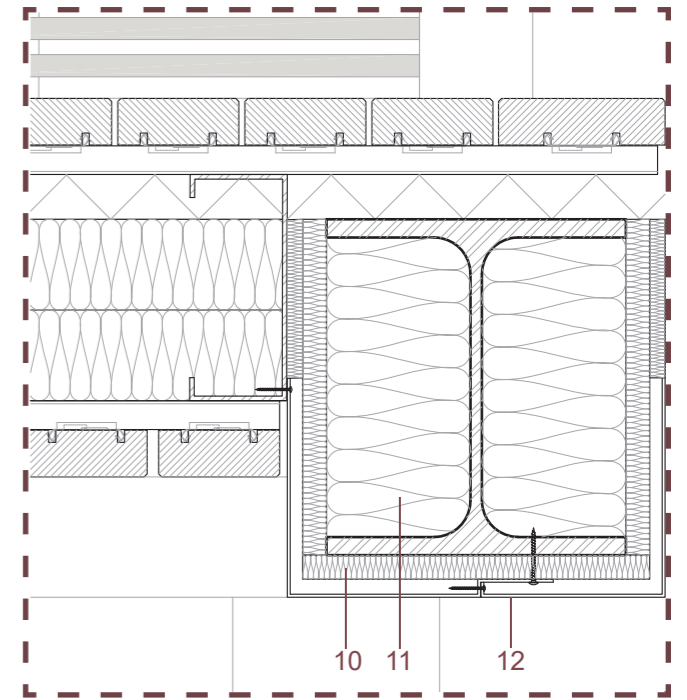
1: 5 Detail



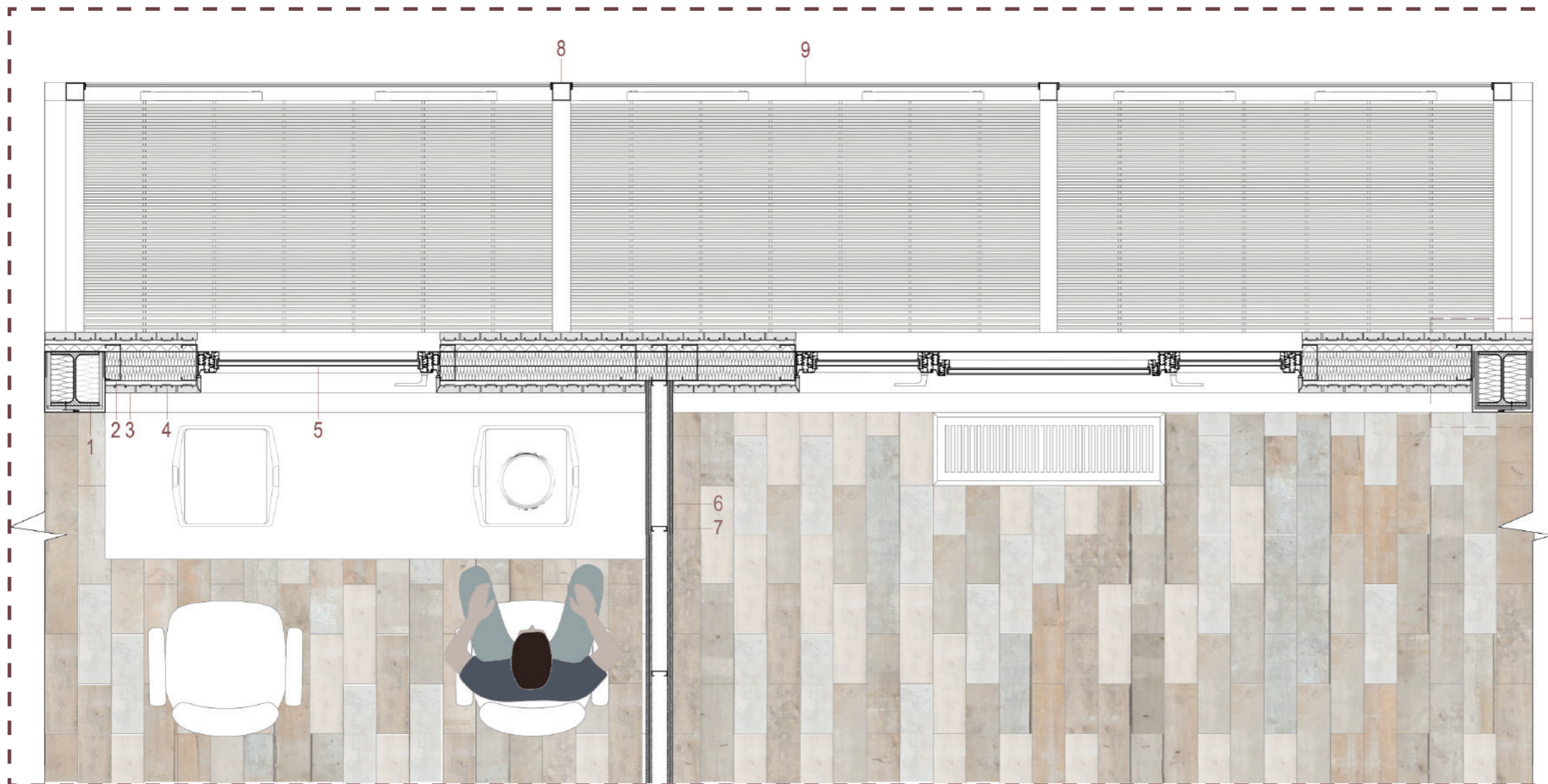
*Legend*

- 1. 6mm dia. threaded rod
- 2. L-shaped primary carrier
- 3. Carrier-U
- 4. Spring panel hanger
- 5. Reclaimed aluminium blade

**1: 5 Detail**



1: 5 Detail



1: 20 Plan

*Legend*

1. 230/240 mm HE240A steel column
2. 65/150 mm metal stud
3. 30mm reclaimed wood panel
4. clip
5. reclaimed double-glazed aluminium window
6. 2x 10 mm gypsum panel
7. 20/65 mm metal stud
8. 75/75 mm SHS steel profile
9. 6mm laminated glazing
10. 20mm dense mineral wool panel
11. Cavity filled with mineral wool
12. 2mm aluminium casing

T H A N K Y O U !



MATERIAL LIBRARY

