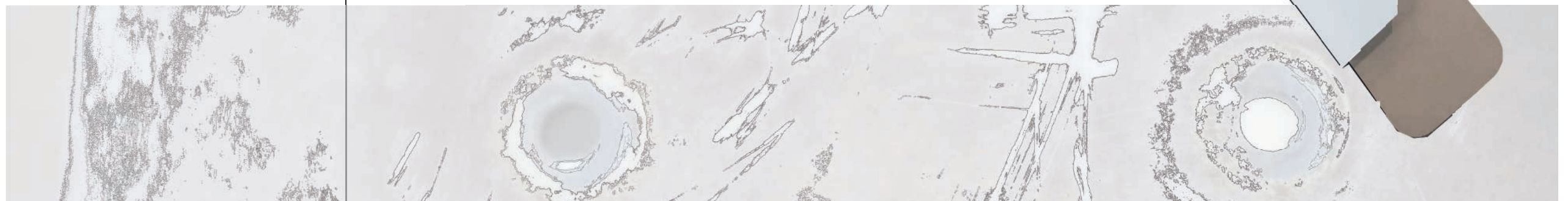


Recyclage /

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



Manifesto



Educational specimen box, a tool for object-based teaching to enhance the holistic transmission of cognitive knowledge, manual skills, and ethical values; all through interaction with materials and things.

“Everyone is equipped by nature to receive and to assimilate sensory experiences. Everyone is sensitive to tones and colors, everyone has a sure ‘touch’ and space reactions, and so on.”

Lehmann, 2017

The project site in Anderlecht, Belgium exists a fragmented urban fabric in terms of morphological evolution in the post-industrial period, functional mix of the urban plot, connection with the immediate urban grains and the ephemeral state of ownership of spaces around the site. However, the nomadic site actors practise informal ‘urban mining’ which enables material flow despite physical distance of the urban fragments. The flow of resource becomes the immaterial spolia that gives experiential qualities and grants adaptability to the neighbourhood. The urban planning proposal thus endeavors to orchestrate the process of urban mining from collection, disassembly, extraction, recovery, consumption and reinvention within the site plot, challenging the status quo of recycling industry as infrastructure. Besides industrial programmes, educational, cultural and commercial spaces can be derived from the elaborated process of urban mining. The master plan endowed contrasting characters to recycling spaces which can integrate production and consumption, infrastructure with education, and practicality with playfulness. It is significant to weave different kinds of working and living relationship within the plot to sustain the vibrancy and security of the neighbourhood. To achieve this, redrawing the boundary between private and public, providing a spectrum of spatial hierarchy for the communal space among these groups help generate the symbiosis of consumption and production activities of the neighbourhood. The site is re-zoned into a production strip, mixed commercial and production public interior strip, and a cultural strip, forming a sprawling alley-yard internally that connects the major urban nodes of the plot at its periphery. The organization stitches the urban fragments thematically and functionally with narrating the process of urban mining.

“Everyone is equipped by nature to receive and to assimilate sensory experiences,” (Lehmann, 2017). Recyclage is a hybrid that encompasses a material library, makerspace for material experiment, exposition space for new prototypes, auditorium, meeting rooms, office space for researchers and archive, providing a converge point for inhabitants,

entrepreneurs, researchers and everyday makers. Being juxtaposed with teaching space of Le goujon and confronting the street of institutions, the recycle learning center serves as an extension of the educational cluster. The programmes are devised in zones that foster a pedagogical environment based on the observation of how a person understands and approaches material when I conducted the sensory experience mapping for the research. The spatial arrangement suggests exploratory and ascending movement with constant sightlines towards Le goujon which predominantly constitutes to the site context. The center interpreted materials as interlocutor between people from all walks of life, unleashing the inherent material literacy of individuals, reinventing architectural opportunities between traces of events, time as well as memories.

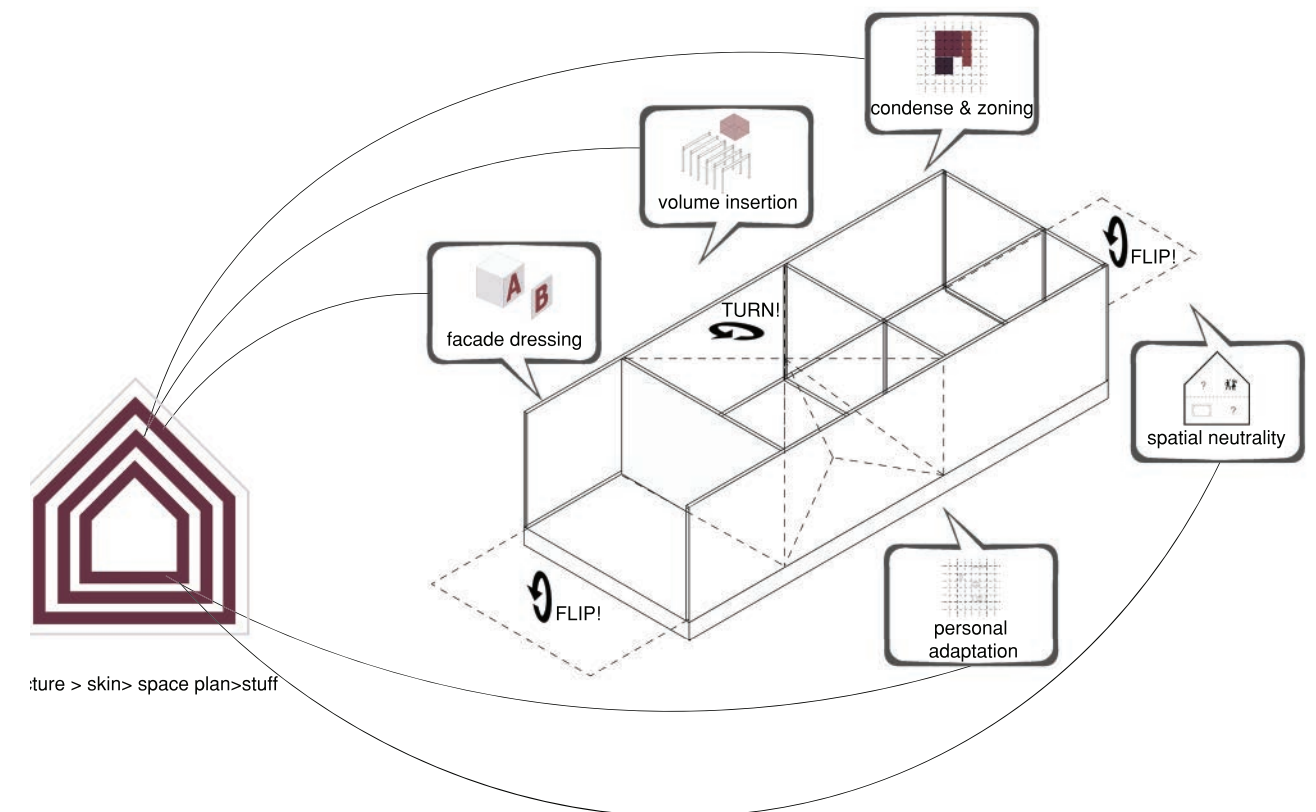
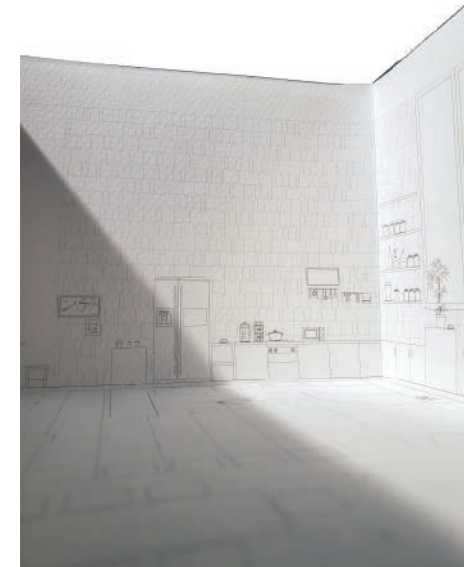
The materiality of the building illustrates the boundless possibility of materials and the humanized facet of urban mining. Aluminium is highly available, omnipresent in ever-changing commercial and residential buildings, and associated with domestic life and the remembrance of Anderlecht being a post-industrial city. The architecture ensemble is depicted as a living life account of aluminium that it is finished with mainly reused aluminium which undergoes a myriad of transformation strategies: reuse, repurpose, reconfigure and transform to take up different expressions. The 'patchwork' language presents an amateur character and recognizes the potential of anthropocene waste in elevating the design outcome.

Preliminary/

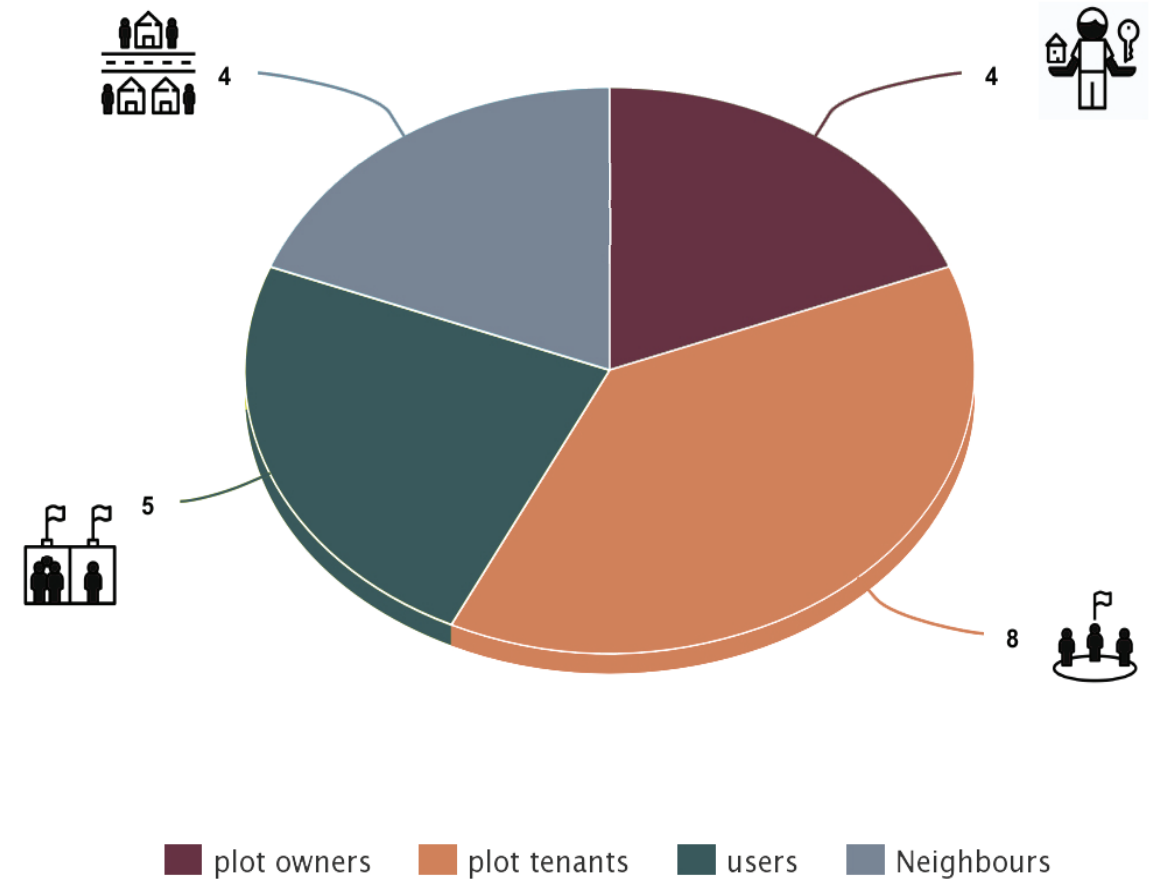
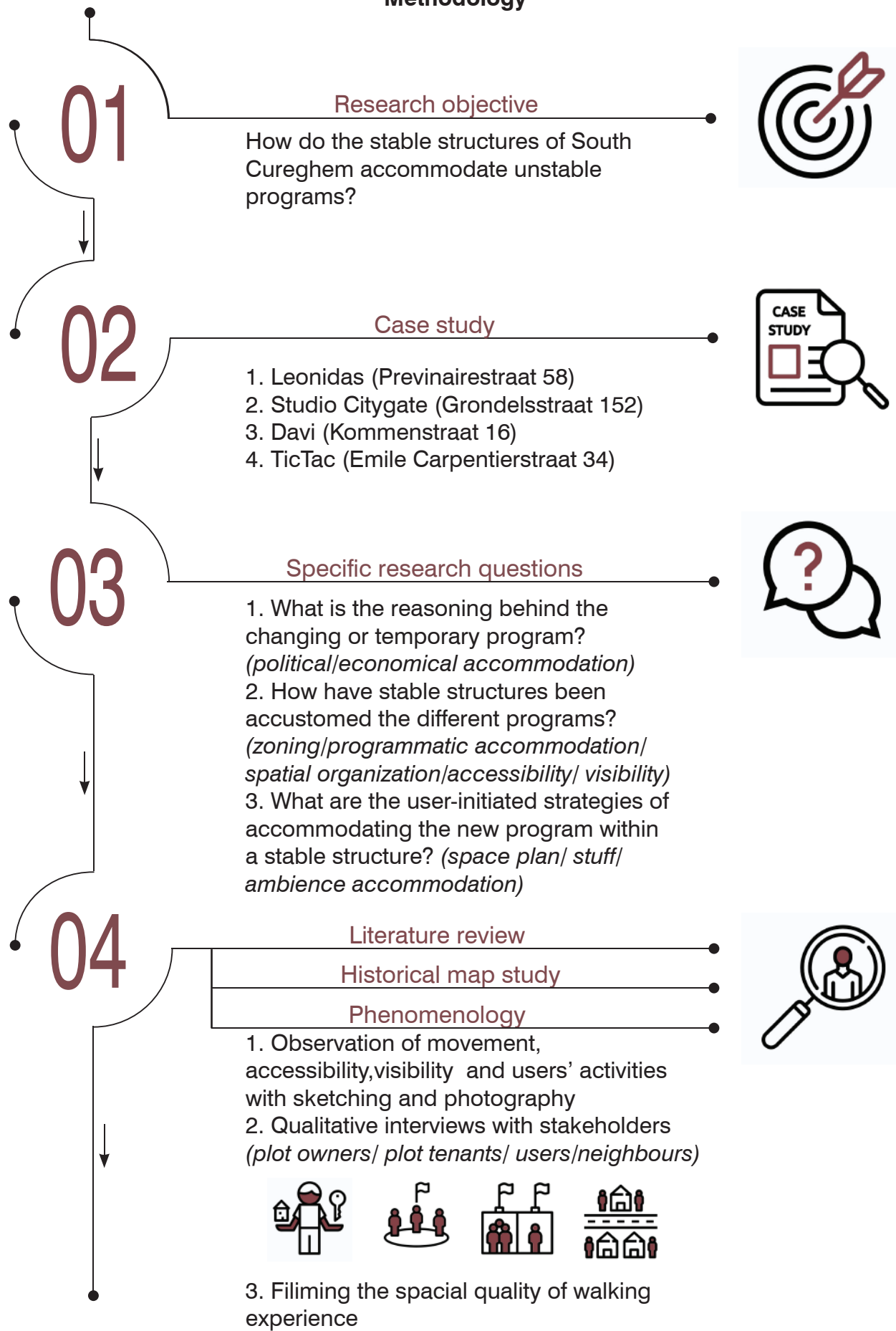
The unstable city_
unstable programme in stable structures

Structure | Space

Structure serves as the permanent frame of the building which allows changes in the requirements imposed on it over times without damaging its essential characters. Adaptive reuse is transformation which is not inferior to a the structure; nor is it a compromise to the existing. The architecture responds to the instability fostered by uncertainty and time in accordance to different building layers: skin, space plan and stuff, at different pace. The independence of layers is recognised and the changeability of space planning and stuff is exploited more often due to the limitation of knowledge, time and cost. A promising trend of providing a spectrum of space with predetermined bandwidth of functions (functional flexibility) and polyvalent space that promotes affordance (indeterminate flexibility) can be discerned. By designing the proportion and organization of these spaces, and calculating the user scenarios, we could be closer to authentic flexibility.



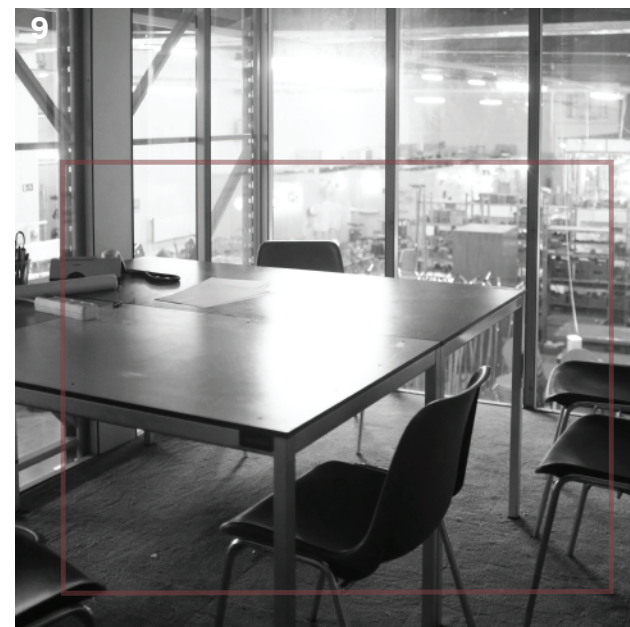
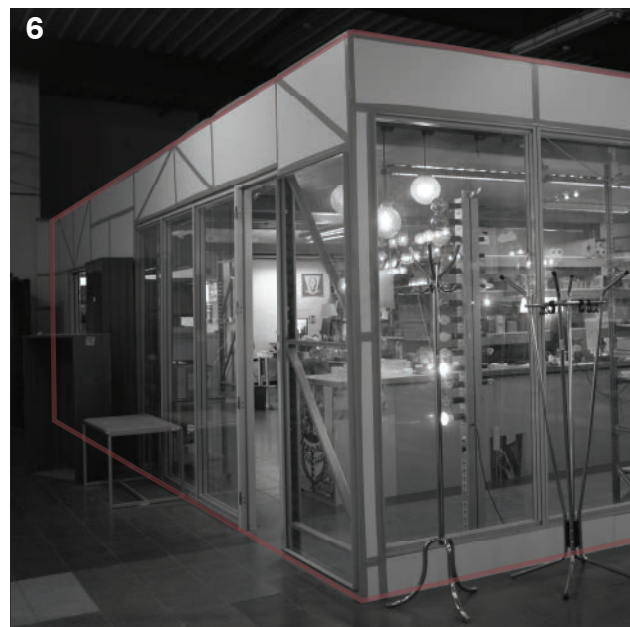
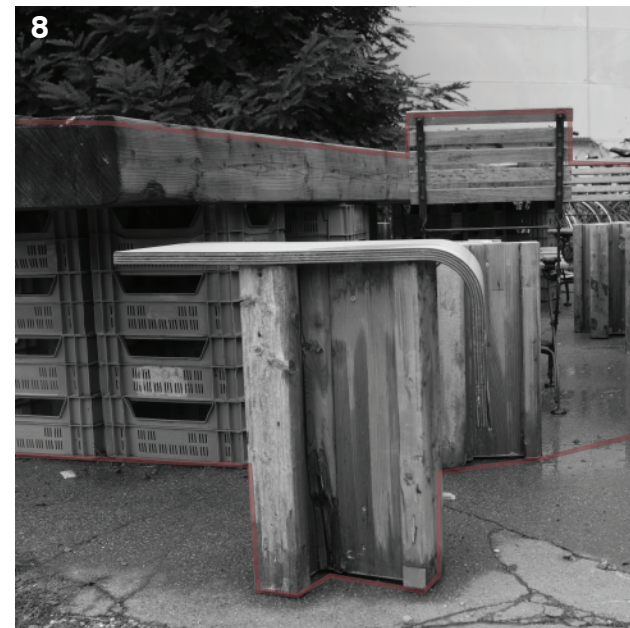
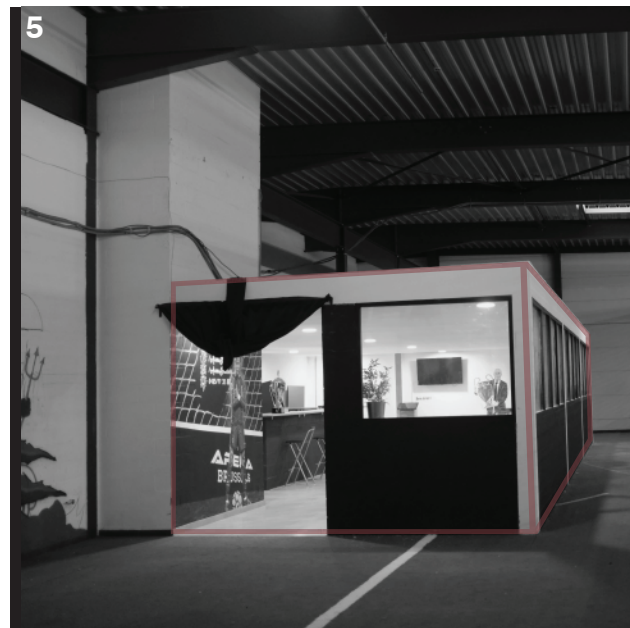
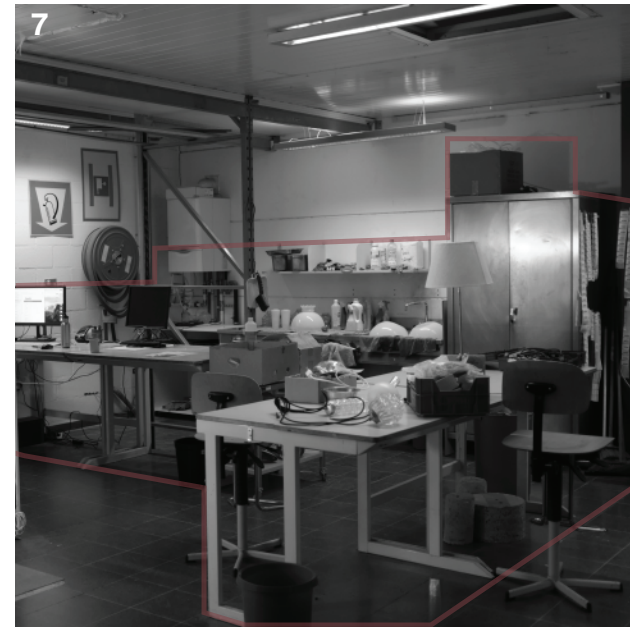
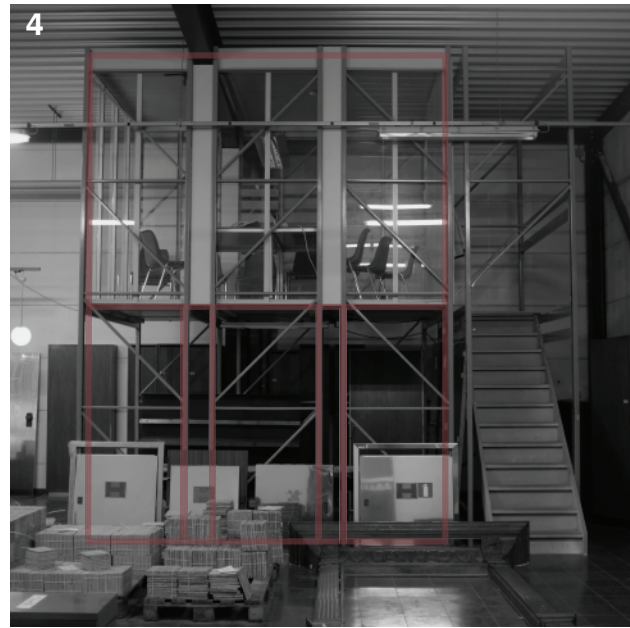
Methodology



Interview Results

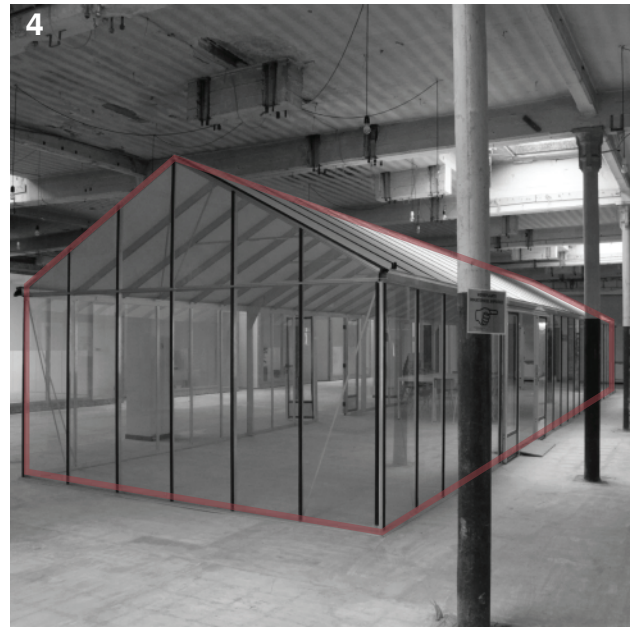
Interview with plot tenants

	Site	Leonidas			Studio Citygate					
	Tenants	Rotor	Arena Brussels (Indoor Football)	AdHoc interior (Cabinet Maker)	Wing B floor 3: Petite Île (climbing hall)	Wing A G/F: Antidote (pop-up bar/cafe/canteen)	Wing B floor 0: Byrrrh And Skate	Wing A Floor 2: Marlies de Clerck	Wing B floor 3: Petite Île (climbing hall)	
	Questions									
General	1.1	Age range sex	29 F	28 (M)		38 (M)		~30 (F)	~28(F)	
	1.2	Nationality	Belgain, living in the neighbourhood	Belgain	Belgian, living in Sant Gilles			Belgian, living in the north of Brussels	Italian, have been in brussels for 7 years	
	1.3	How long have you been in this position?	Empoyee since the establishment of the company	Since it open	He has his own workshop since October in this building. Even though he is sharing it with an iron maker.		The cafe has been opened for 2 weeks.	He is the first tenant of the buidling.	Since a year, before this an old office building in Leopold neighborhood. Now adaptive resued for homeless people.	1 to 2 years, ever since it was open.
	1.4	Why do you choose this place?								Wanted to have a bouldering gym, a friend of her knew the place and she contacted the owner
Social Embedment	2.1.1	What are the users? (keeper and consumer)		Kids, the neighbourhood, families, schools, the football club with regular training only open when there is booking, all by reseravtion, but the family or some people do not have team, they will help matching them and the users start to know each other and form a circle of users	He never invites his clients to his workshop, because it is not representable. His clients are all over Belgiun and Brussels.	High demand from neighborhood schools for school and extracurricular activities. Public of all Brussels municipalities (not really a neighborhood equipment) According to the managers, there is a huge lack of sports facilities in the neighborhood, as well as a library.	Tenants in citygate and people from nearby cities	Kids from Anderlecht and nearby cities because it is the only indoor skating park in Brussels	She is an artist, so she invites her clients in her atelier	Keeper >they are know each other through friends, most of them are investor, some are immigrants for many years, but very diverse from different parts of europe Consumer >many of them are from everywhere in brussels, some of them are from the neighbouring town, because this is the only bouldering gym in the brussels kid and family do come but there are difficulties to separate them from the user around 20 to 30s because no body reallly like kids shouting and screaming around, they are trying to have course for kids in the weekdays to minimize the concentration of different people in the weekend many climbers are beginners as before this, there is no bouldering gym in brussel

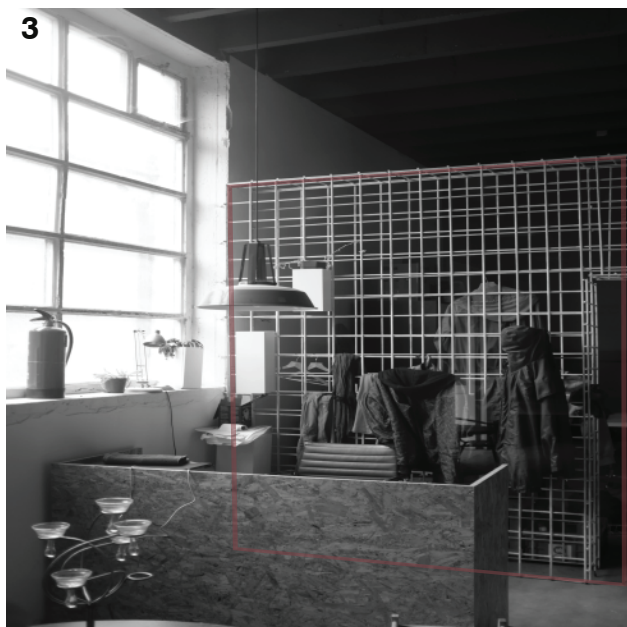
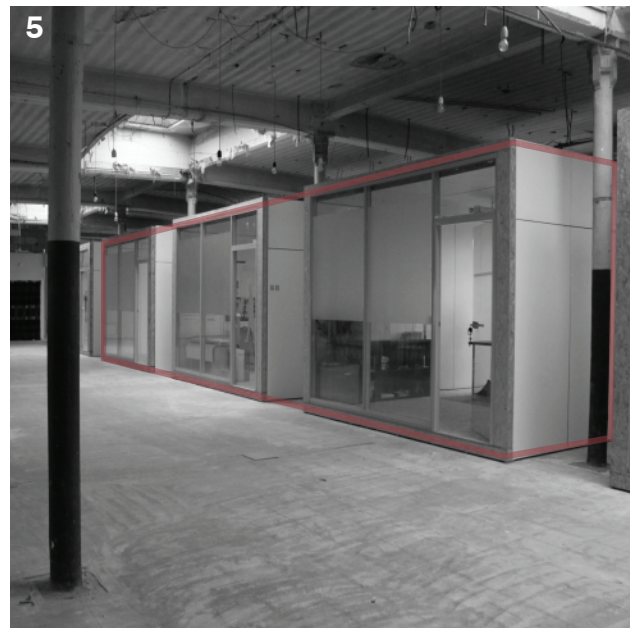


Space Planning
Leonidas

1-3 Erasing programmes with permeability
and non-hierarchical space
4-6 Insertion of modular systems
7-9 Personal adaptation



Space Planning
Studio Citygate

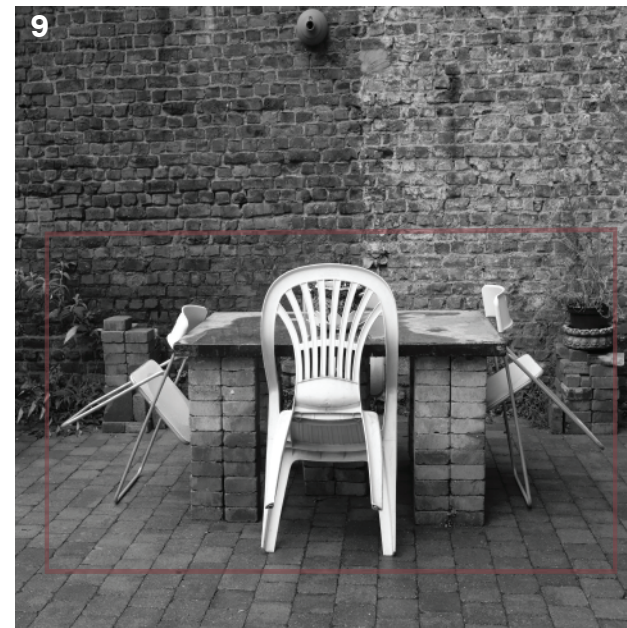
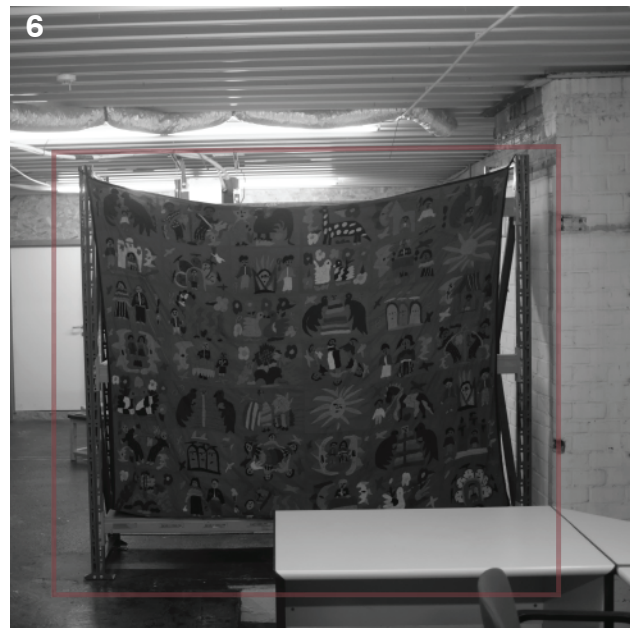
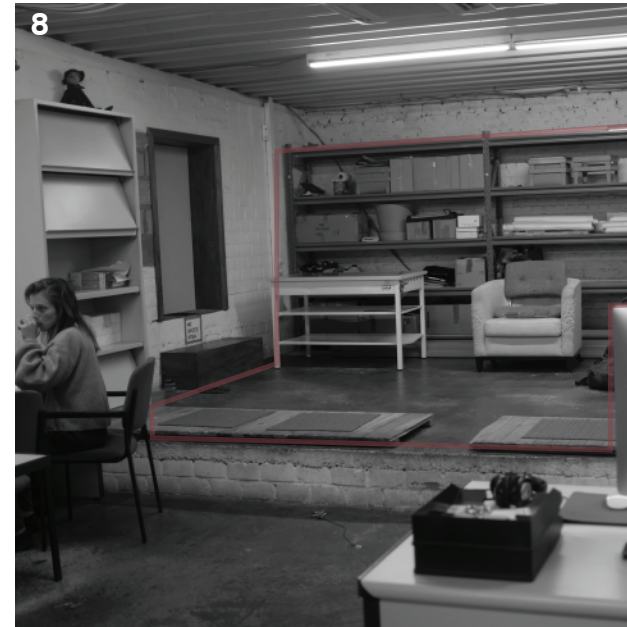


1-3 Operational elements
4-6 Insertion of modular systems
7-9 Personal adaptation



Space Planning
TicTac Art Center

Flexibility is attained by the provision of neutral space that promotes affordance. For example, the dance studio can support individual rehearsing, dialogue dancing, group learning, performance and so on and so forth due to its airy and naturally lit-up space. The additional volume contains the amenity that support the major programmes and produces another loft space for more functional opportunities. Personal adaptation can be witnessed on all surfaces to give character of each sections.

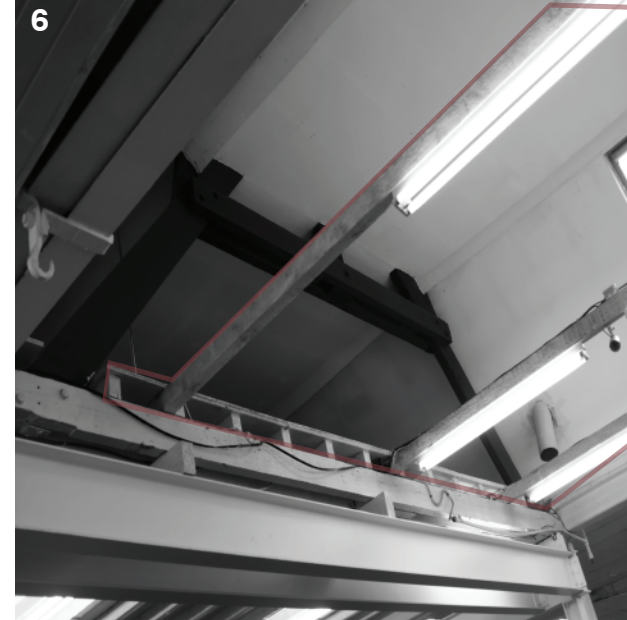


1-3 Spatial neutrality
4-6 Insertion of modular systems
7-9 Personal adaptation

Space Planning

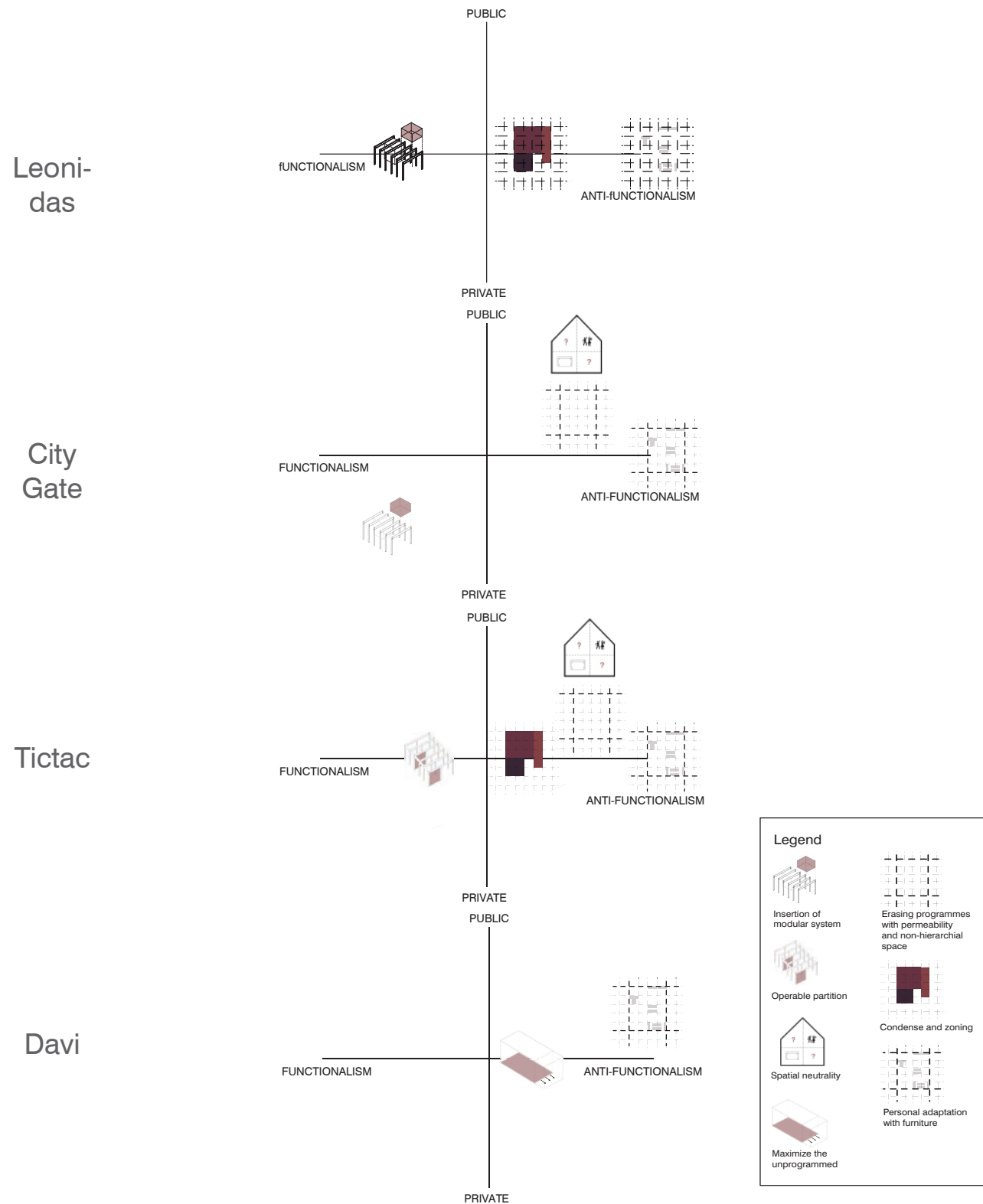
Davi

The flexibility is attained by zoning, which condenses functional systems and allows users to use the rest of the space as they want. Abundant circulation space is included for more flexible layout of the display shelves and racks. The furniture also helps to highlight the regularity of the shop and spatial axis.



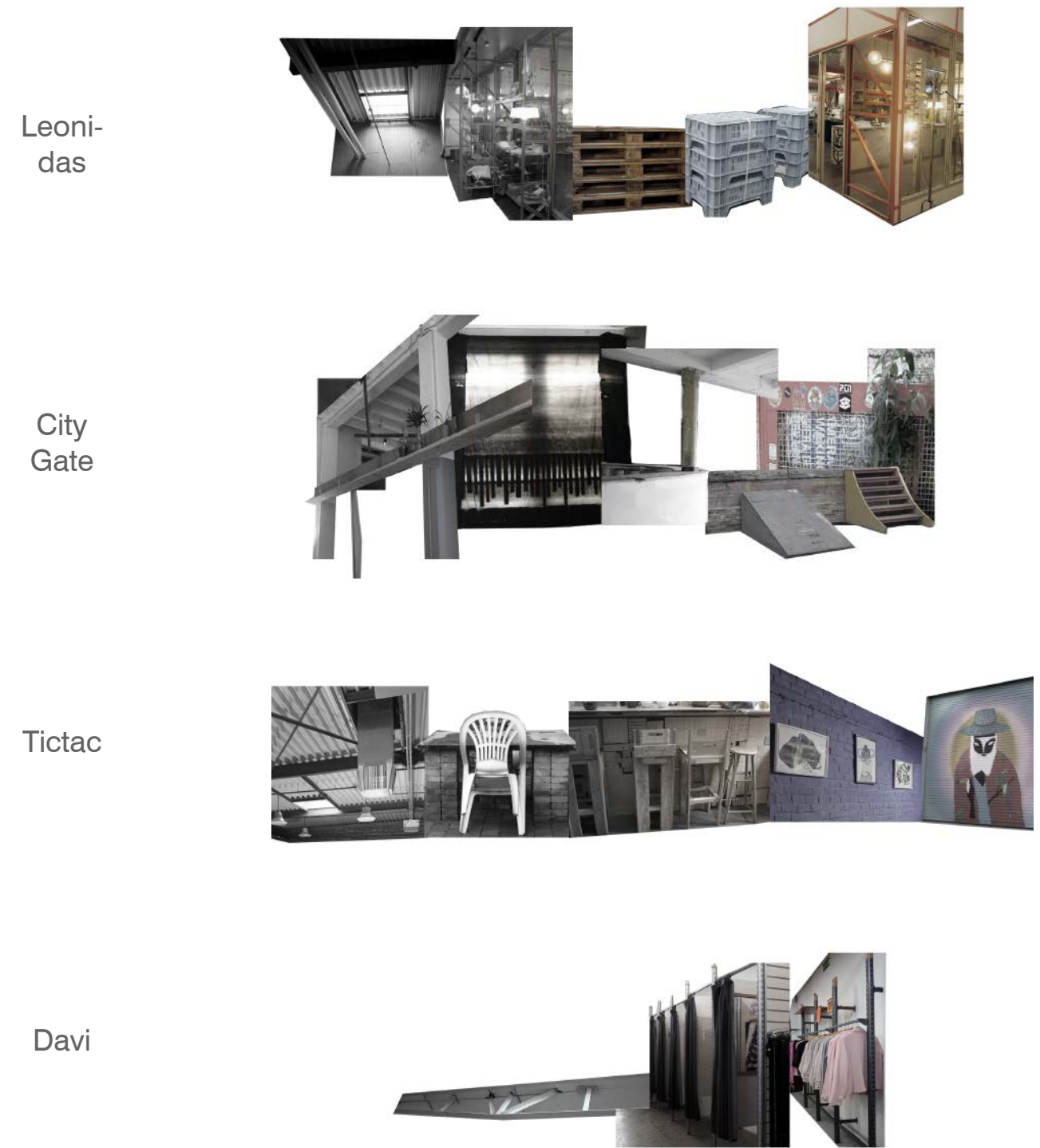
1-2 Maximizing the unprogrammed
3-4 Insertion of modular systems
5-6 Personal adaptation

Space planning adaptation



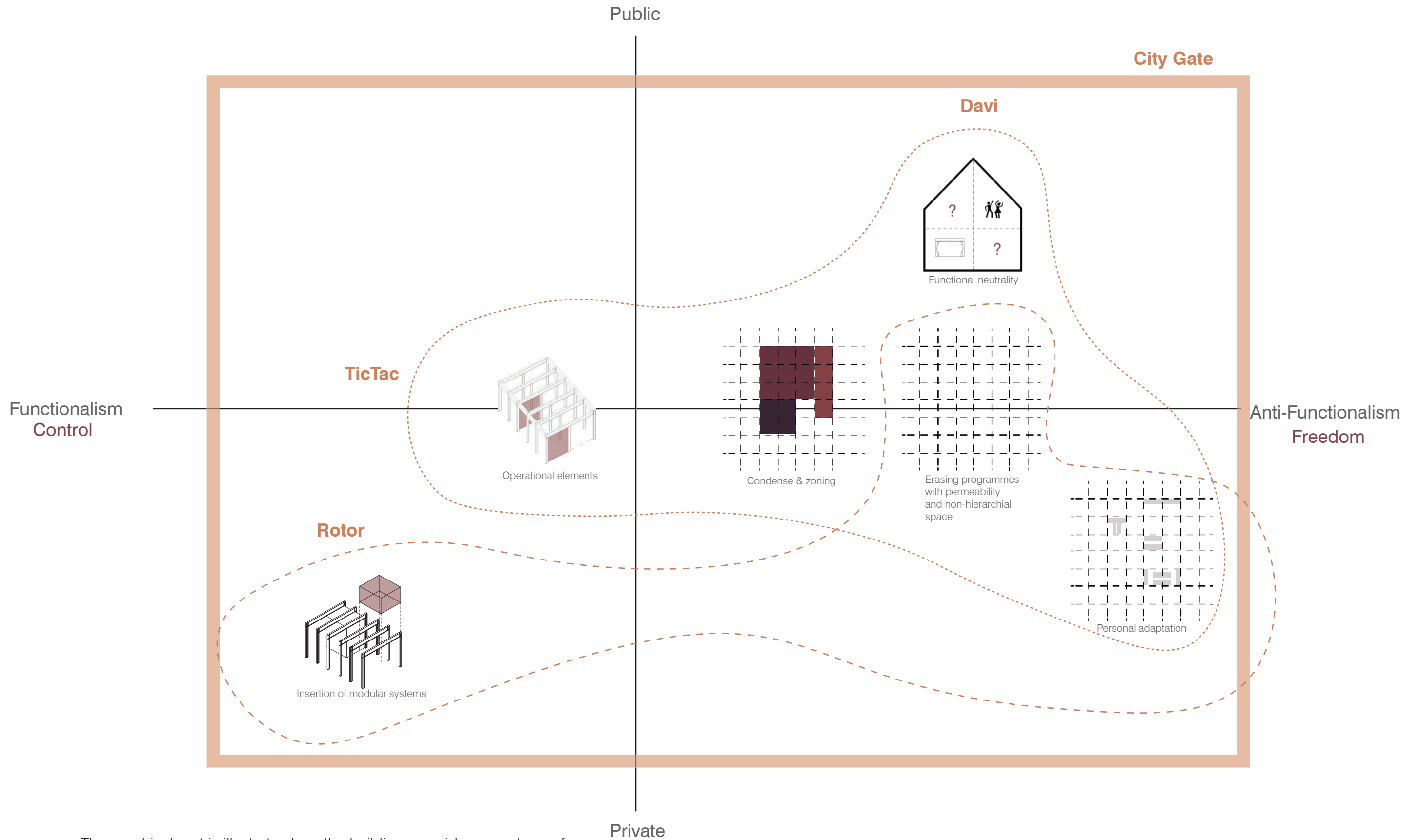
The space planning strategies applied are the resolution of tension between control and freedom. Extra modular volumes are tended to be added to give room for more private functions such as working and meeting given it can limit the heating requirement within the poorly insulated industrial buildings. The public programme is usually designed with neutrality that welcomes affordance.

Material adaptation



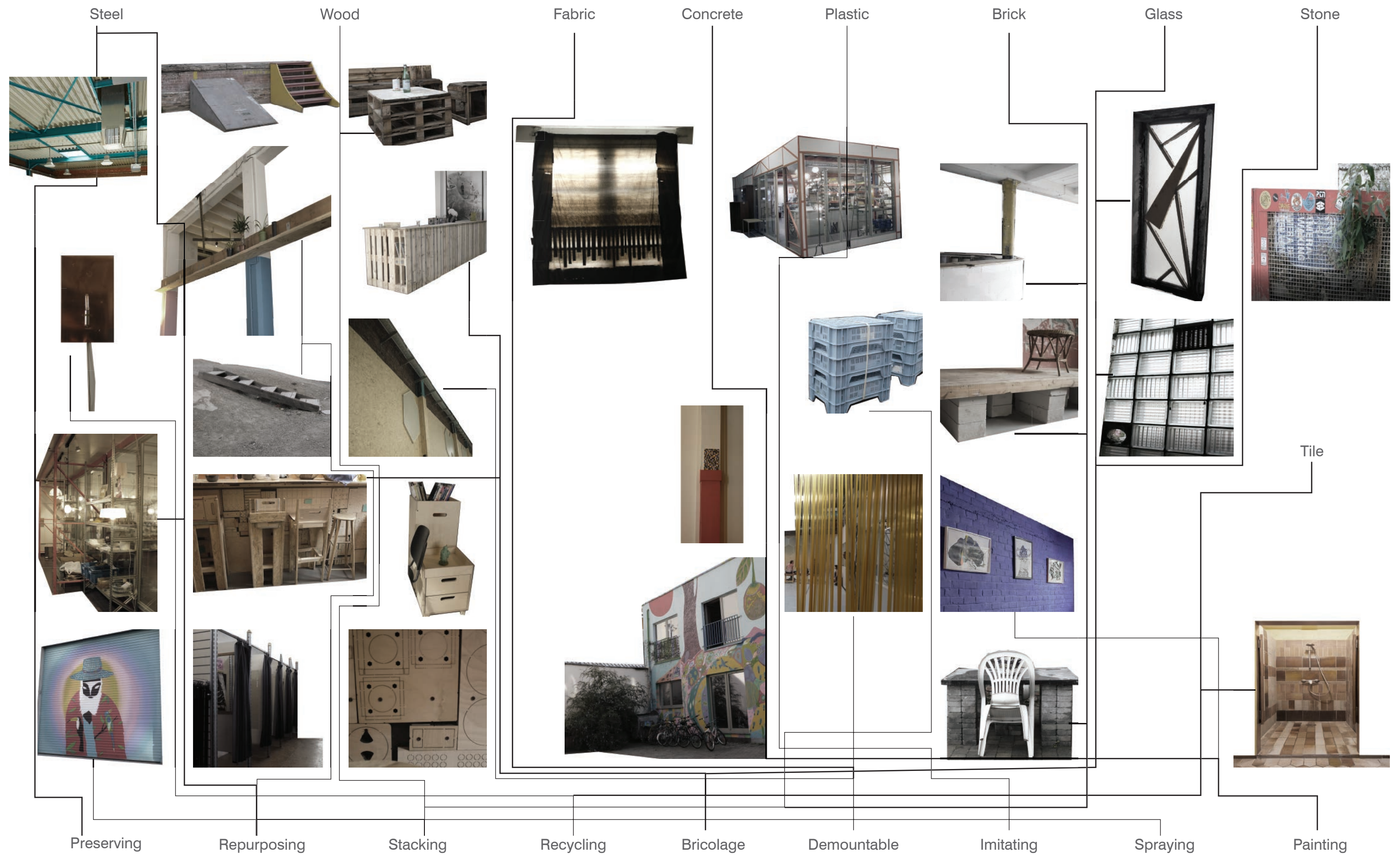
Increasing change of property and expression of original materiality

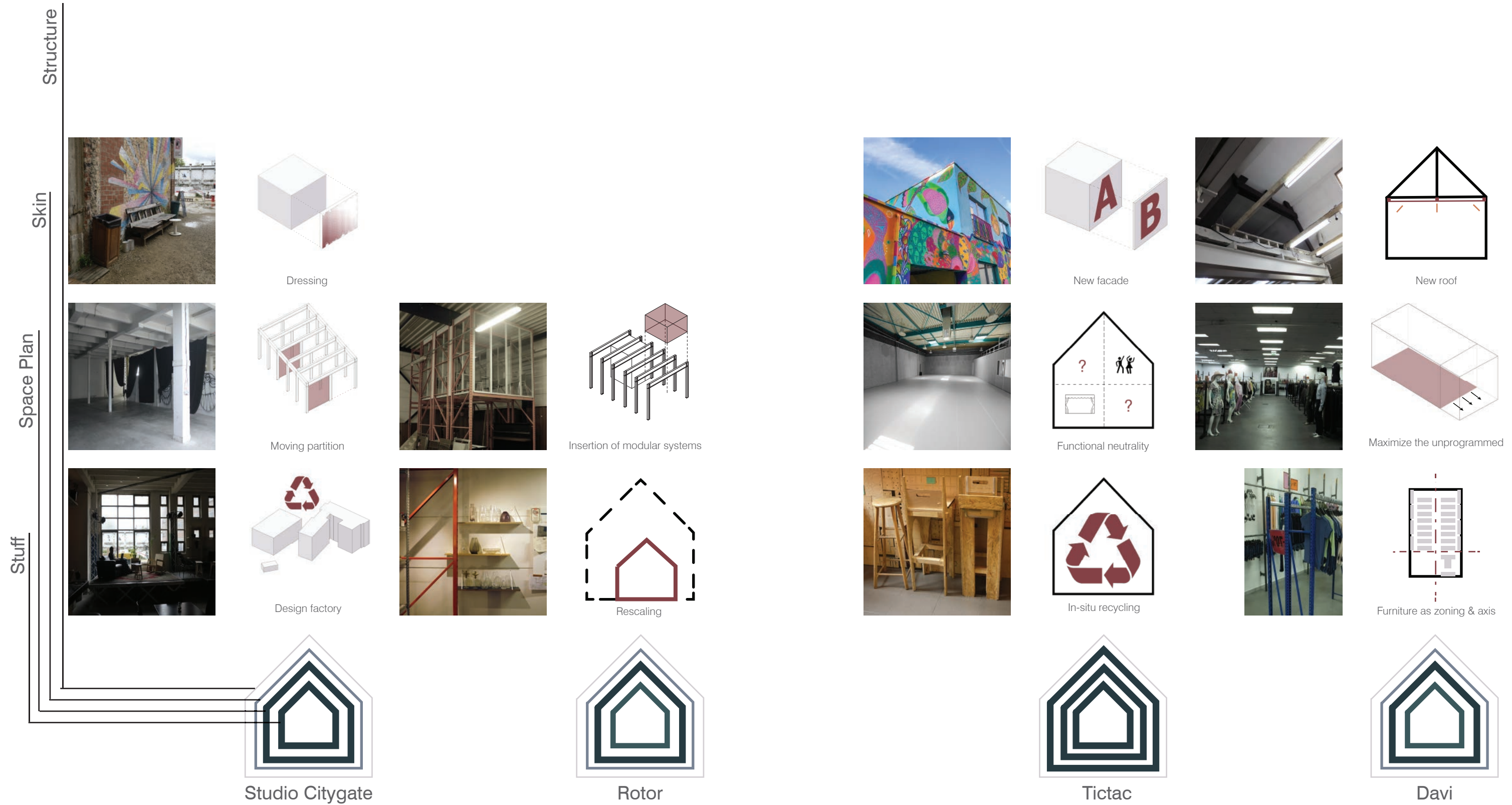
The collages of materials deliver the idea of how the industrial features are retained in different ways, such as bricolage, stacking, repurposing and preserving the in-situ salvaged materials. Layering styles gives a tasteful vintage look and also avoids unnecessary finishings. Huge graphics define a bold urban image, and are also the cheapest way to brand a blind wall. Thus, industrial appearance is part of the charm of reused places.



The graphical matrix illustrates how the buildings provide a spectrum of indeterminate (i.e. the space is interpreted and is used in various ways within a certain boundary) and functional flexibility (i.e. the space performs various intended functions with limited room for interpretation).

Synthesis and transformation of materials

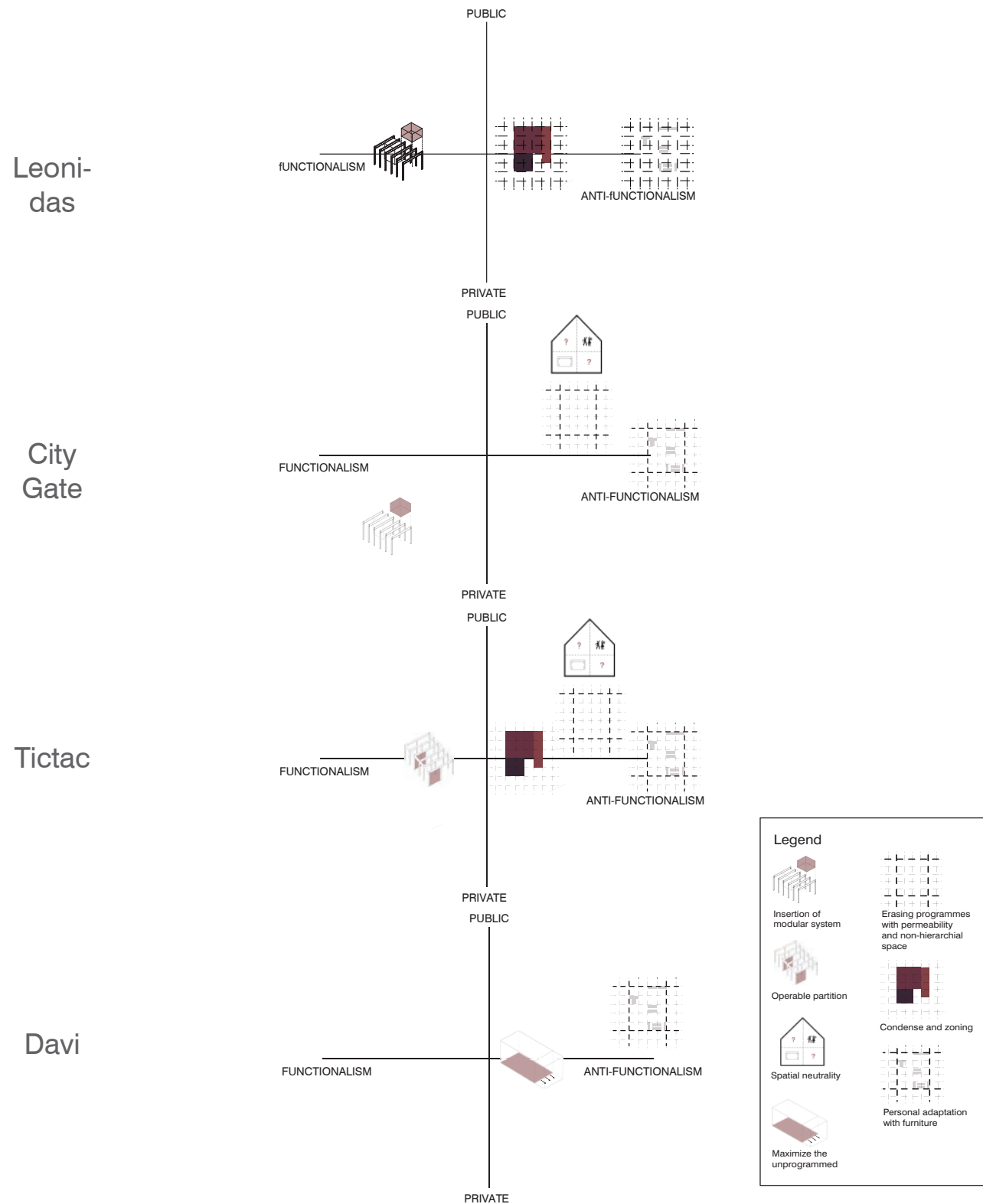




Building layers

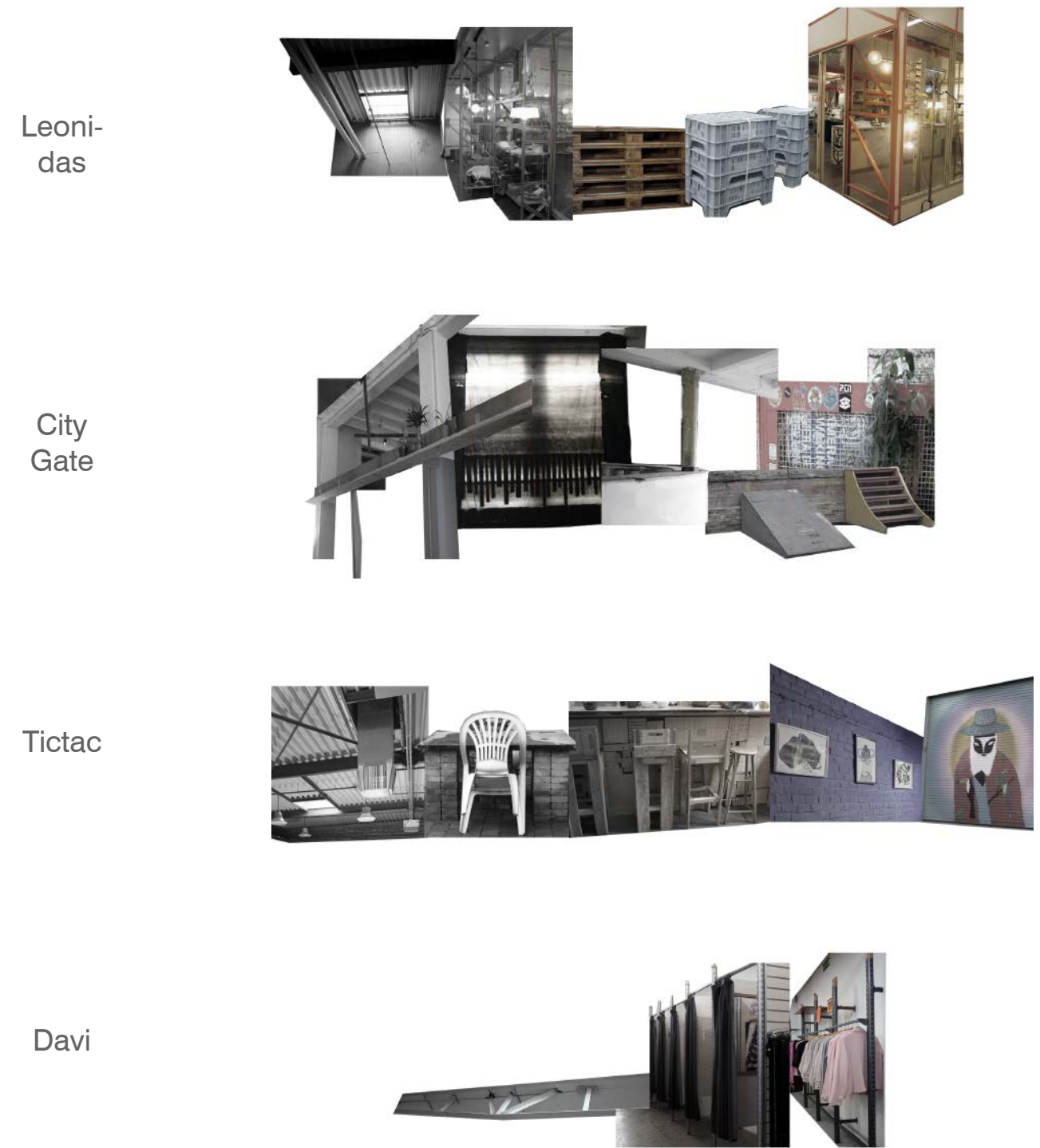
Buildings are composed of levels that absorb and respond to changes in varying time and functions. The fast-changing inner layers are usually dictated by the outer layers. The projects have been accommodating to the changing programme mostly in the stuff and space plan layers. It is crucial to optimize the adapting capacity of all building layers and make them coherent to each other.

Space planning adaptation



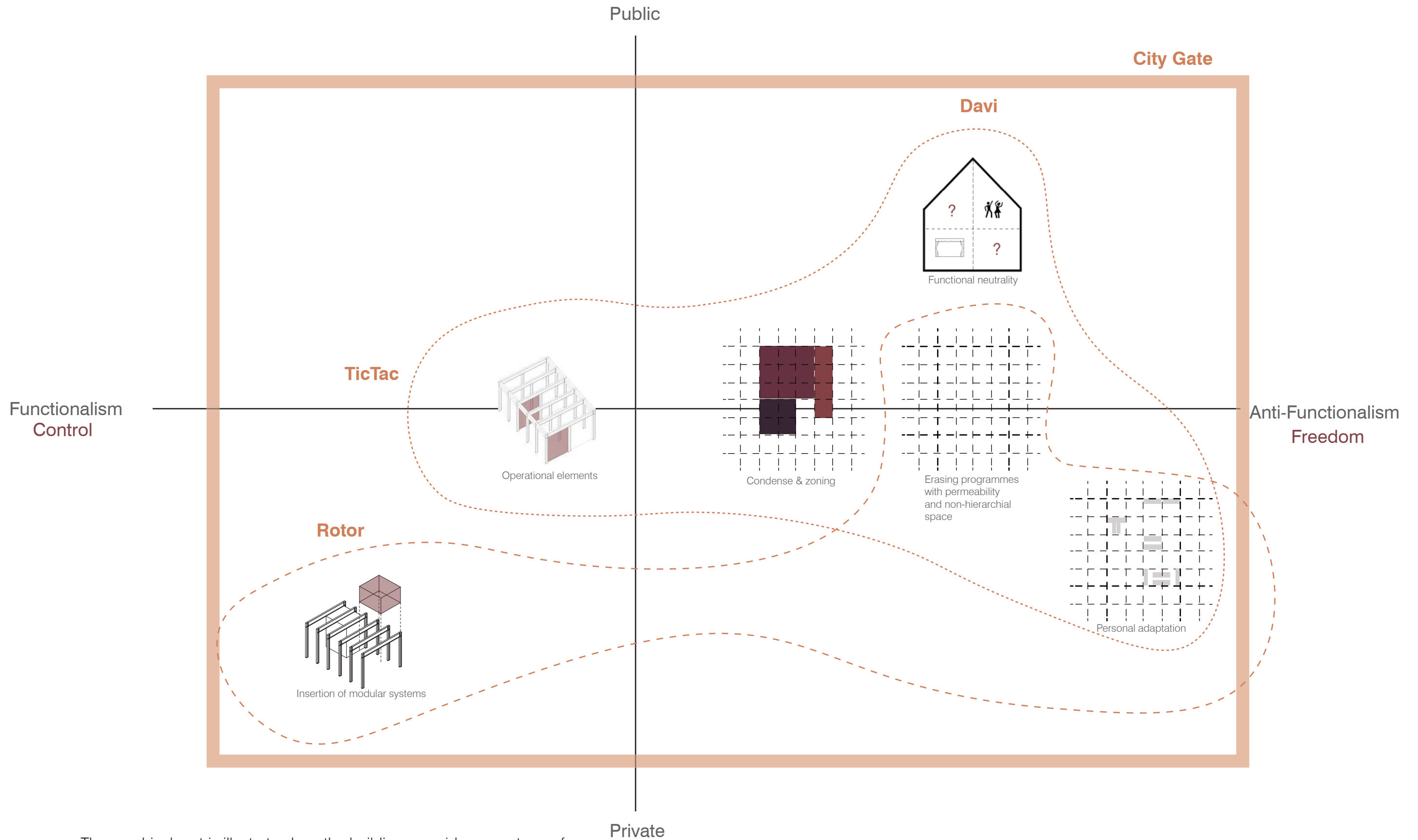
The space planning strategies applied are the resolution of tension between control and freedom. Extra modular volumes are tended to be added to give room for more private functions such as working and meeting given it can limit the heating requirement within the poorly insulated industrial buildings. The public programme is usually designed with neutrality that welcomes affordance.

Material adaptation



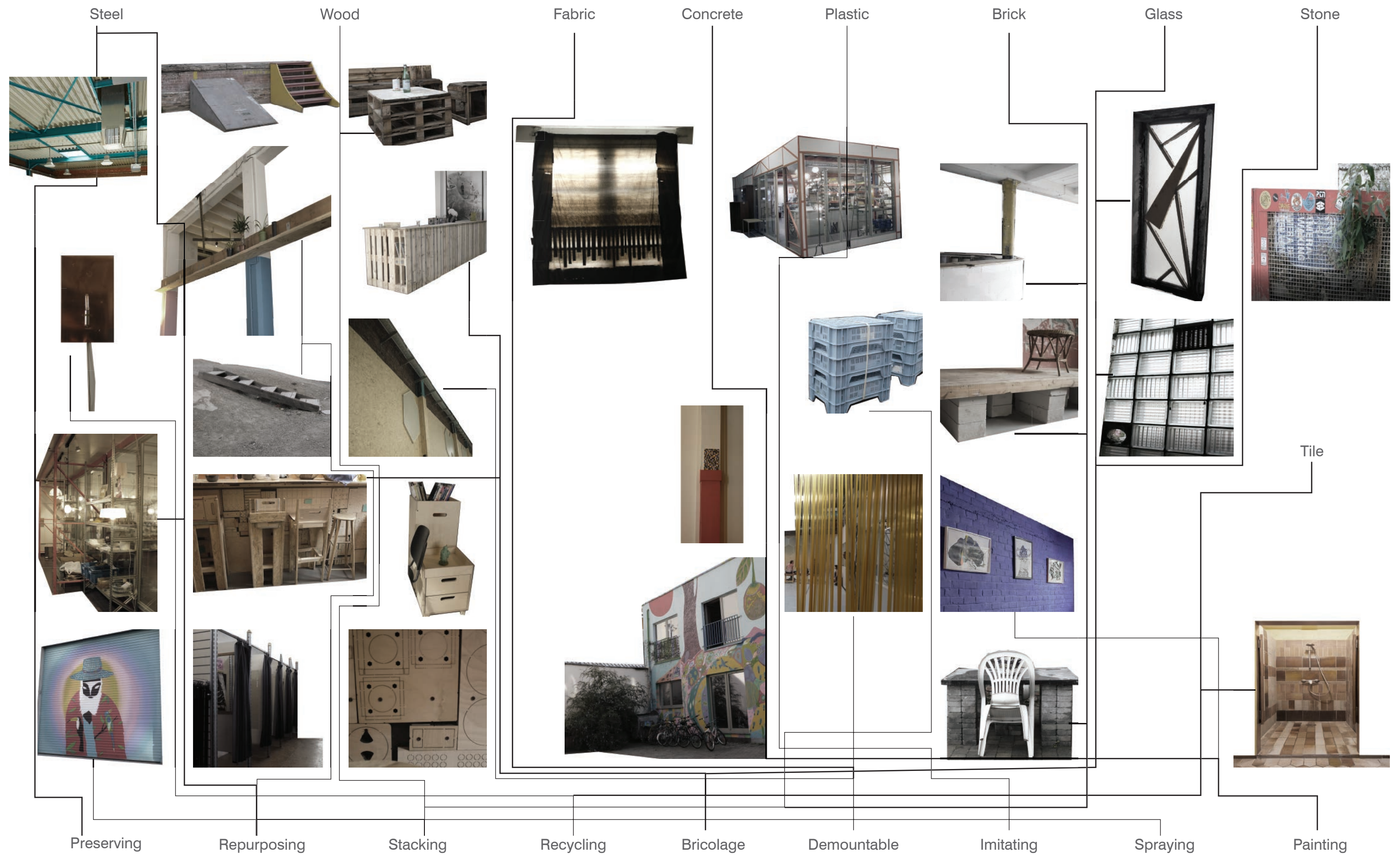
Increasing change of property and expression of original materiality

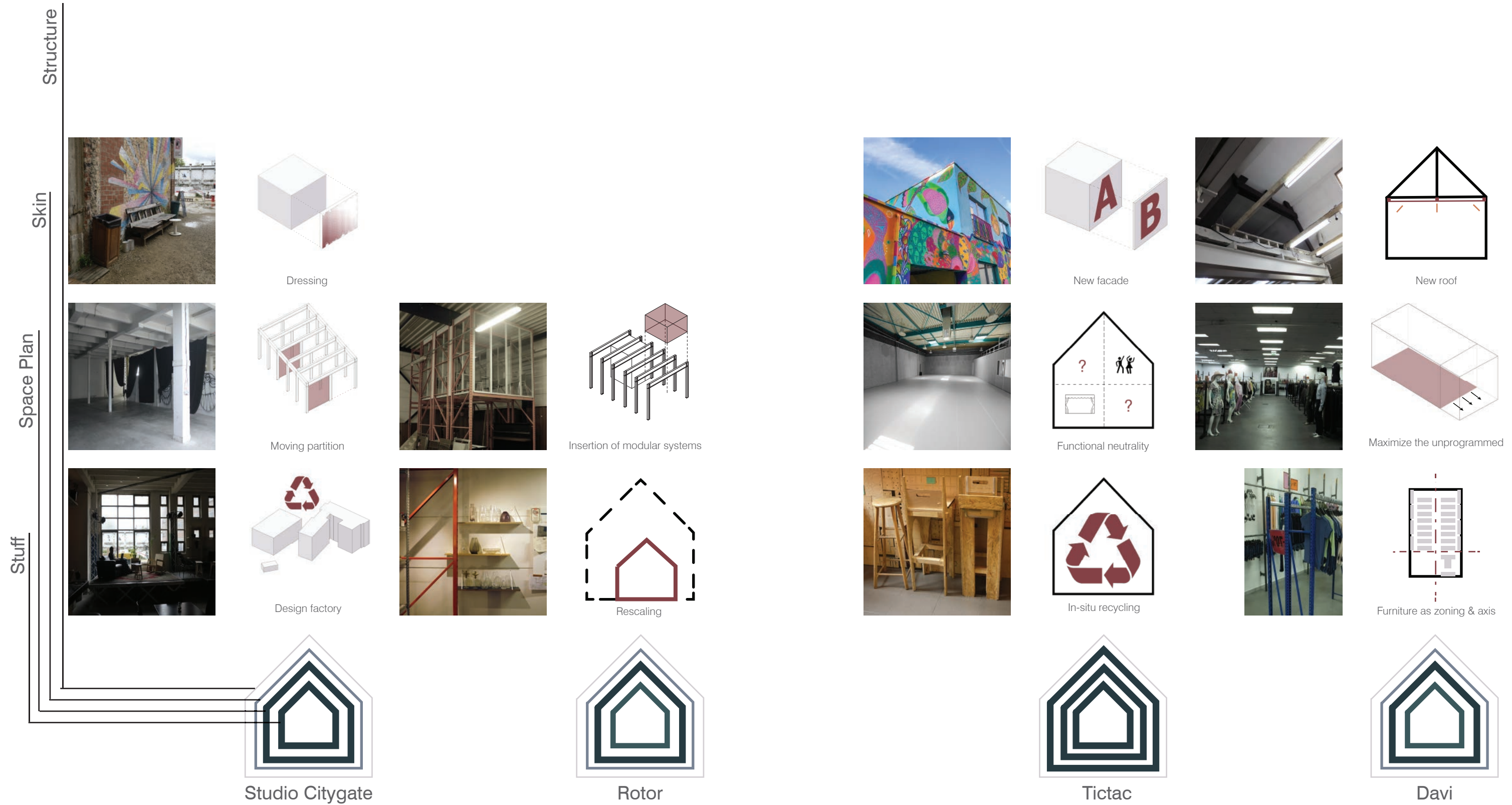
The collages of materials deliver the idea of how the industrial features are retained in different ways, such as bricolage, stacking, repurposing and preserving the in-situ salvaged materials. Layering styles gives a tasteful vintage look and also avoids unnecessary finishings. Huge graphics define a bold urban image, and are also the cheapest way to brand a blind wall. Thus, industrial appearance is part of the charm of reused places.



The graphical matrix illustrates how the buildings provide a spectrum of indeterminate (i.e. the space is interpreted and is used in various ways within a certain boundary) and functional flexibility (i.e. the space performs various intended functions with limited room for interpretation).

Synthesis and transformation of materials





Building layers

Buildings are composed of levels that absorb and respond to changes in varying time and functions. The fast-changing inner layers are usually dictated by the outer layers. The projects have been accommodating to the changing programme mostly in the stuff and space plan layers. It is crucial to optimize the adapting capacity of all building layers and make them coherent to each other.

Site Analysis/

Context

Accessibility_Edge · Path · Node

Working · living



- permanent (>25 years)
- semi-permanent (5-25 years)
- temporary (<5 years)
- greened land
- infrastructure

1. Residential buildings show the greatest resistance over time.
2. Patches along the major infrastructure exhibit higher degree of instability.

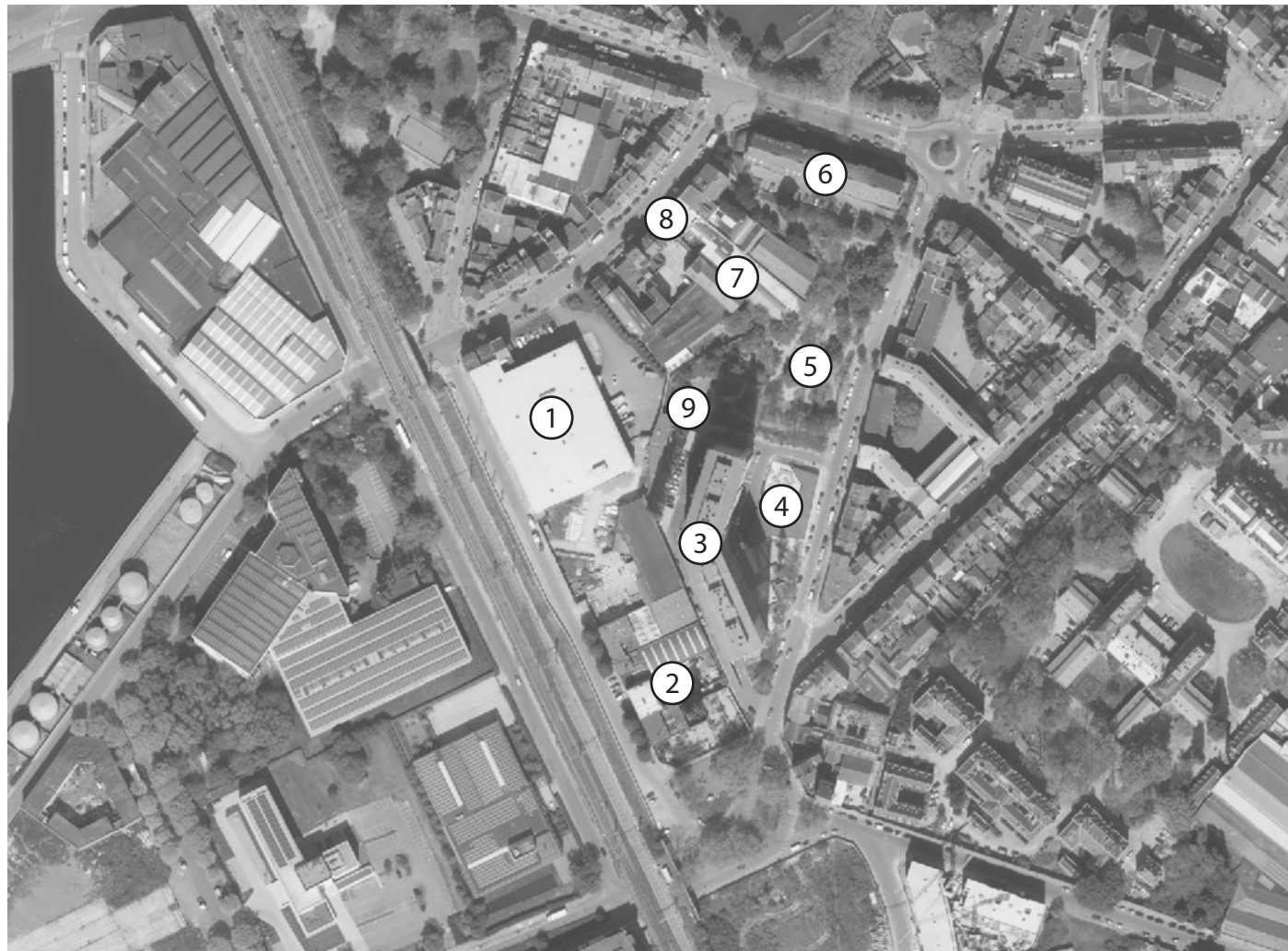
Building status



- major production
- secondary production
- consumption/ production

1. The plot consists of both consumption and production spots of metal waste
2. The consumption and production spots are not integrated or supporting each other.

Consumption/production of metal waste



Keep

Remove

1 Leonidas factory

- Highly adaptable structure for space of production and consumption

- Confusing circulation due to the different tenants occupation
- poor condition of the warehouse

2 Production Squatter

- Highly adaptable structure for space of production and consumption

- High vacancy

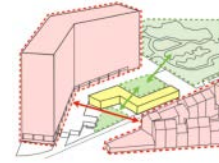
3 De Goujons



- The height and density for increasing population
- the faded landmark identity

- Poor equipment HVAC, not insulated
- the lack of social interaction and connection
- The inequality of "front and back"

4 The communal restaurant



Keep

Remove

- the form responding to the surrounding
- the program intention to connect the Goujons and the neighborhood

5 The Park



- the program intention to satisfy the need of social and leisure space from the inhabitants nearby

- Highly gated and unfriendly presence

6 The Row House



- The connection to the park

- The insufficiency of private communal space

7 The Consumption Squatter

- the potential of share space as catalysing the symbiotic relationship between living and working
- Highly adaptable structure for space of production and consumption

- The confusing, hidden and long route of access

8 The houses



- The potential of turning to commercial on ground floor

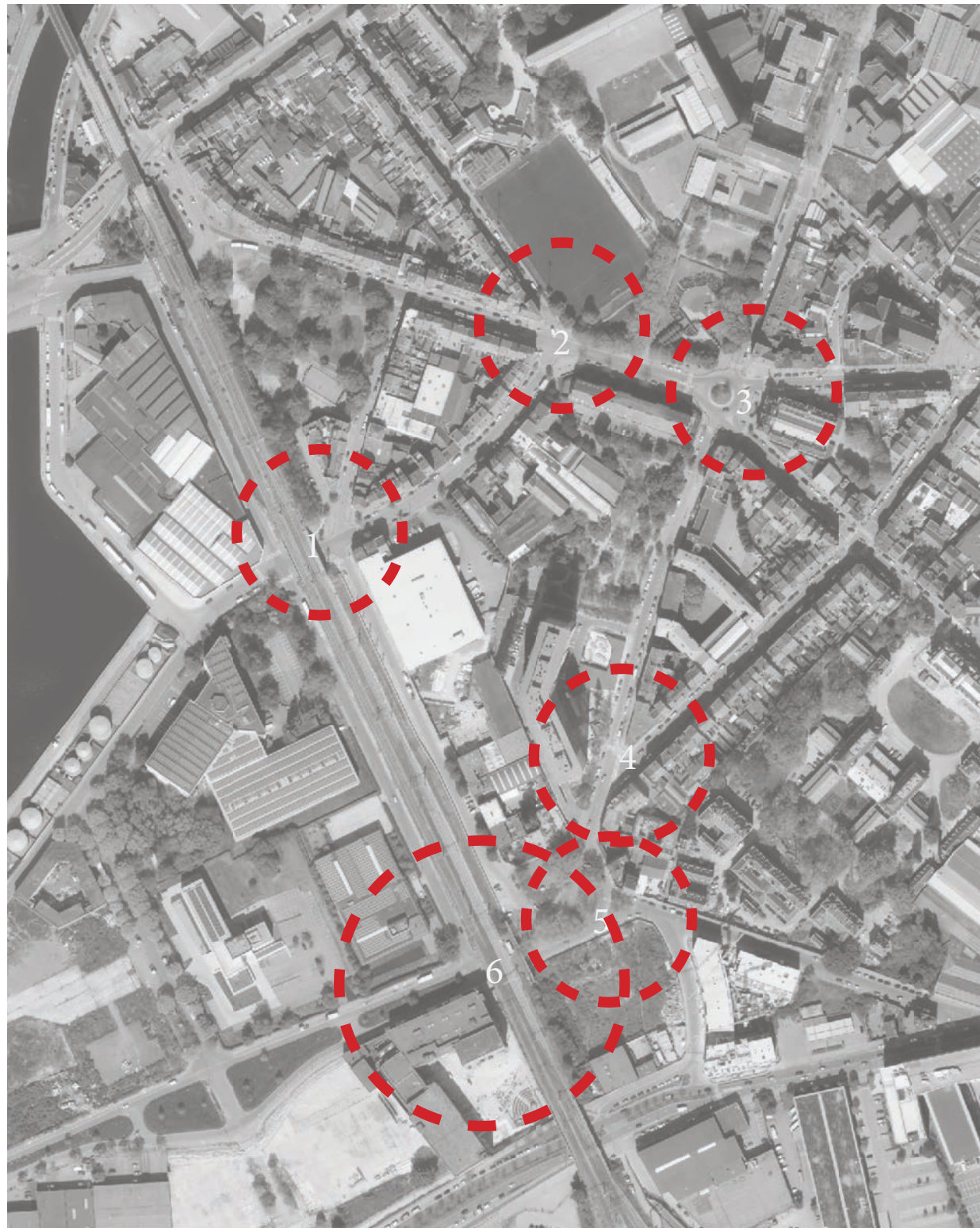
- Confusion of access, publicity and use

- the flexibility of access to the shared space between living and working

9 The Covered Zenne

- The natural morphology of the back facade of the consumption squatter

- The conflict between the curvy urban morphology and edgy urban plot boundary



Legend

Landuse

- railway
- industrial/storage
- institutional
- mixed-use
- residential
- shop
- restaurant
- greenery
- brownfield
- parking

Circulation

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

Building status

Node 1

Node 2

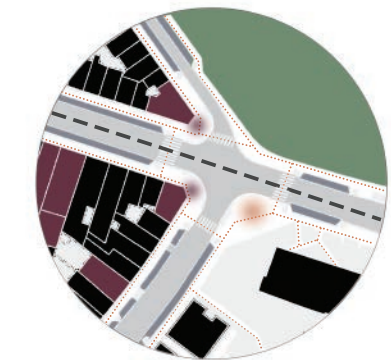
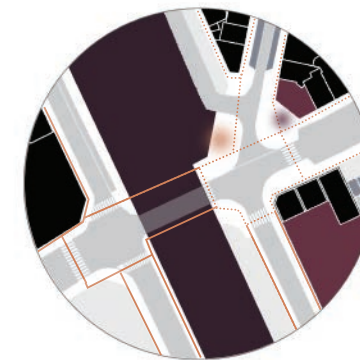
Solid & void



Landuse



Circulation



Problem/

1.The interface of corners are dissected by car circulation

Potential/

- 1.Congregation node for the immediate neighbourhood
- 2.Continue the inclusive intersection on the east of the railway towards the west
- 3.Junction is formed by chamfered corners with setback buildings
- 4.Pubic programme extends into the public area
- 5.urban furniture allows communal function

Problem/

1.The corner is detached from its immediate housing slab

Potential/

- 1.Extrovert and active node
2. All the corners are complete with either triangular open space or green area
- 3.The corners are stitched to the main road
- 4.Pubic programme extends into the public area
- 5.urban furniture allows communal function

Node

Node 3

Node 4

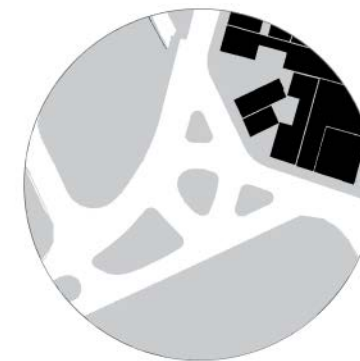
Node 5

Node 6

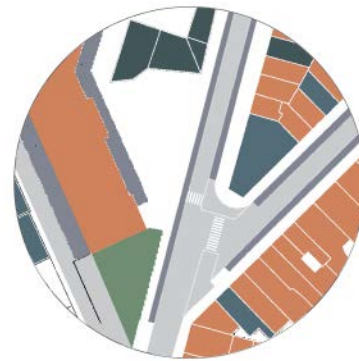
Solid & void



Solid & void



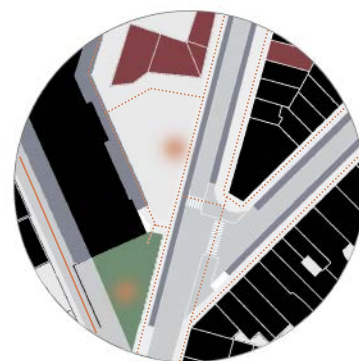
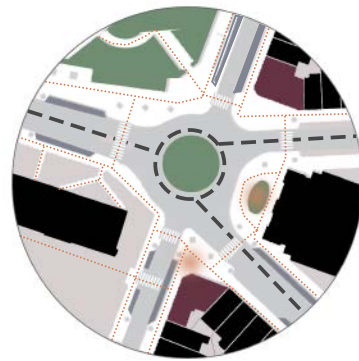
Landuse



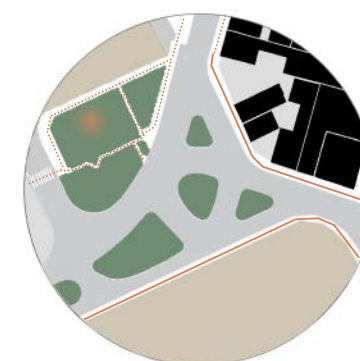
Landuse



Circulation



Circulation



Problem/

- 1.The roundabout obstructs the interaction of the five corners
2. The corner where the private housing slab is situated is not addressing the roundabout

Potential/

- 1.The main node connecting to the city center
2. Both pedestrian and car traffic are regulated

Problem/

1. There is no accessible buffer zone at the junction
- 2.The splitting of the car circulation is abrupt and can be prone to car accidents
- 3.The point of interest and open space are gated

Potential/

1. Relocate or reduce the ground plot size of the corner office building to generate more generous buffer zone for pedestrians
2. Create point of interest on the existing greenery as a orientation reference

Problem/

- 1.The islands are alienating the corners without proper crossings
- 2.The corner buildings on the residential/ office block is dividing up the corner
- 3.Both the car and pedestrian circulation among the corners are confusing
- 4.The profile of the corners are not interactive and responding to each other

Potential/

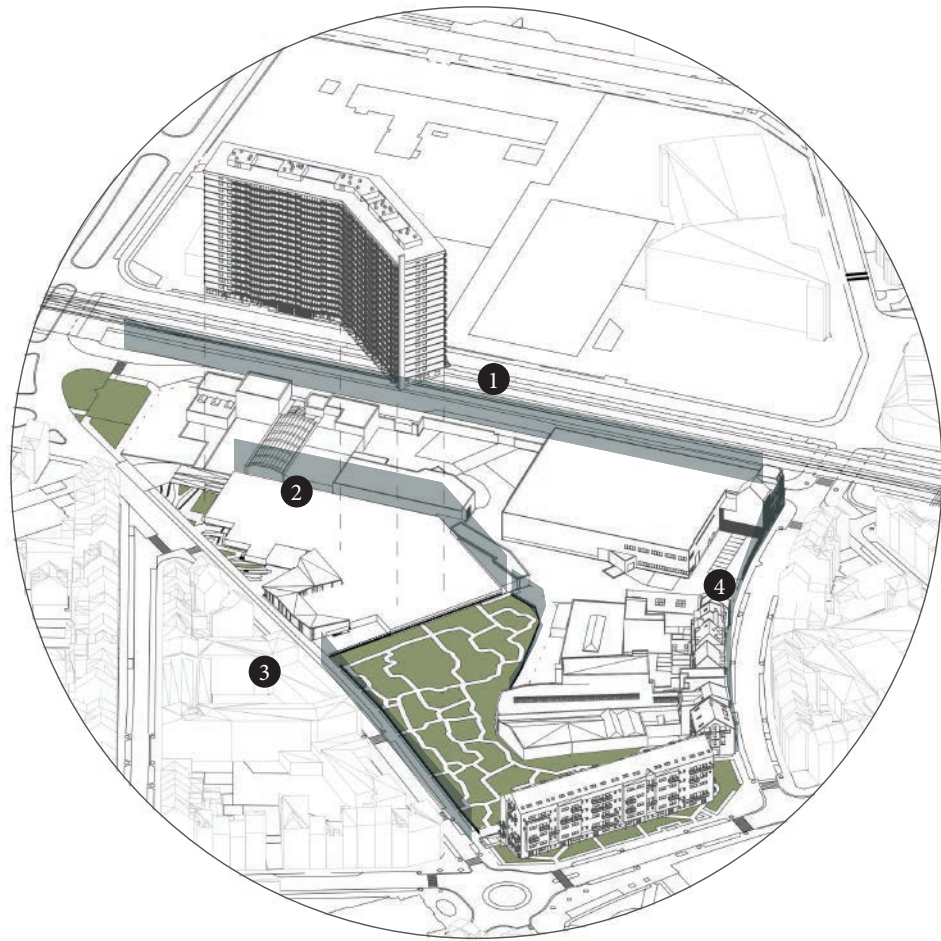
1. Reconnect the corner park to the interfacing building patches

Problem/

- 1.The islands, railway, car parking zone beneath the railway are separating the plot in terms of connectivity and visibility

Potential/

- 1.Make use of the islands
- 2.Relocate the car parking zone beneath the railway



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



1930

River Senne flowed through the site plot and nourished the growth of factories and housing units for the workers. The street facade was the most complete compared to the later times.



1987

After de-industrialization, River Senne was covered and building density decreased. Le Goujons with a concave built-form was constructed, creating an invisible boundary along the river trace. Housing units resided only on the east of the railway.



2004

The density of factories further reduced while more housing units were built along the plot periphery.



2019

The site vacancy was filled and complemented in a piecemeal approach with clearer alienation of working and living space.

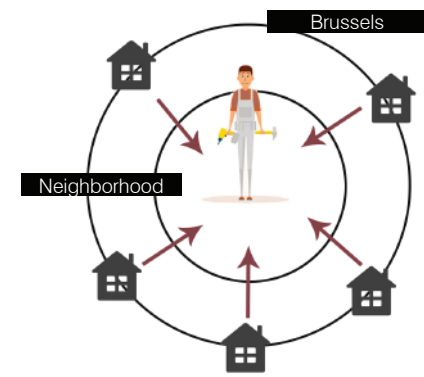
- living
- industrial
- infrastructure
- river

Morphology

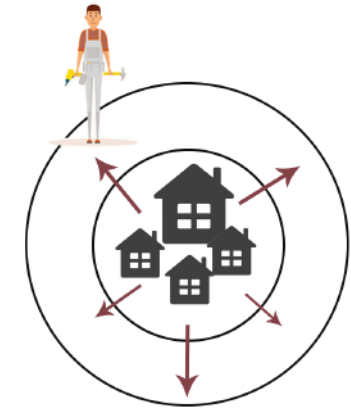


1. production space are separate from the living space by the railway
2. the plot is an extraordinary mixed various living space and working space
3. neighbouring plot are dominated by shophouse boundary with some working space infilled

Living and working



Work inside/ Live outside

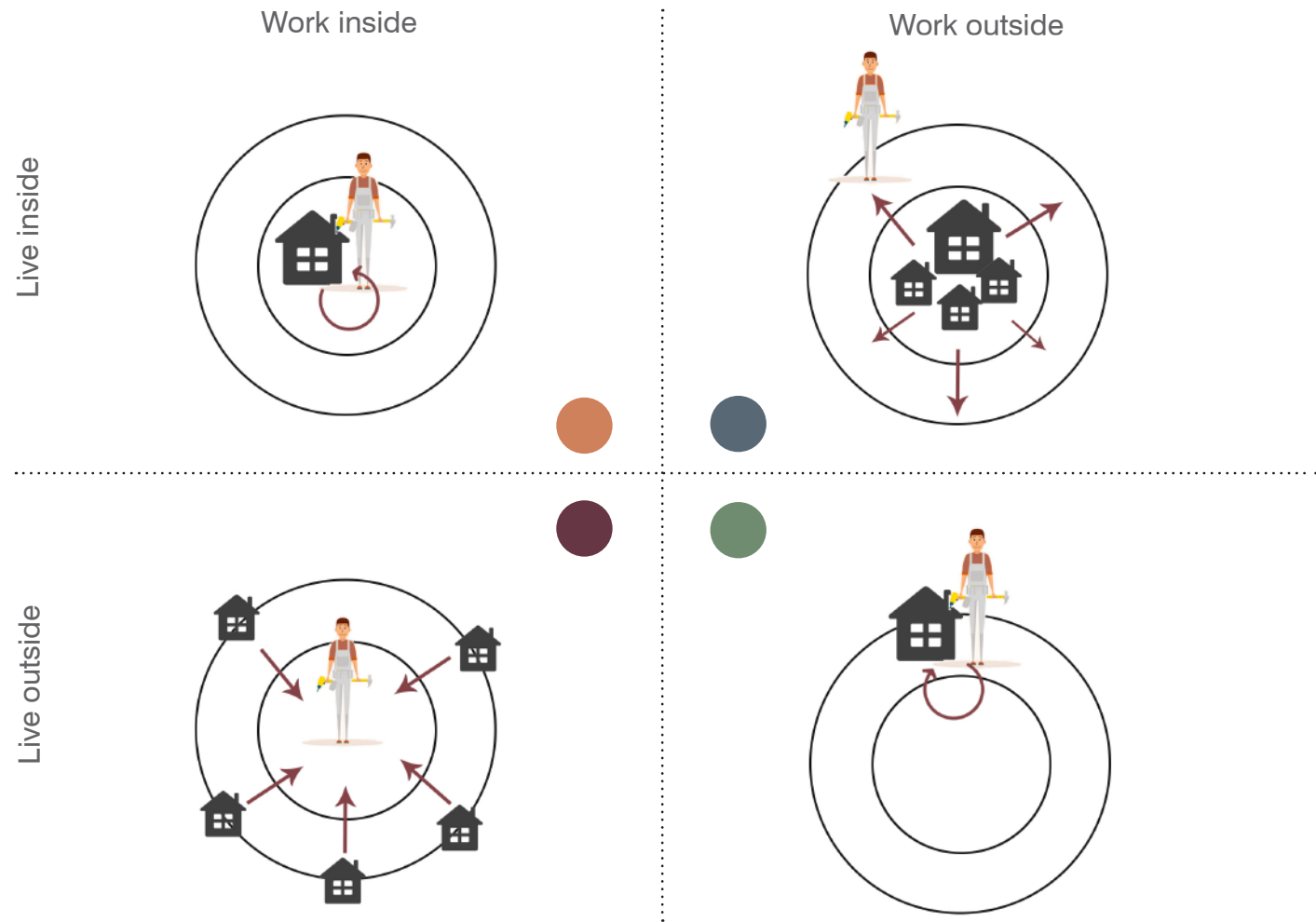


Work outside/ Live inside

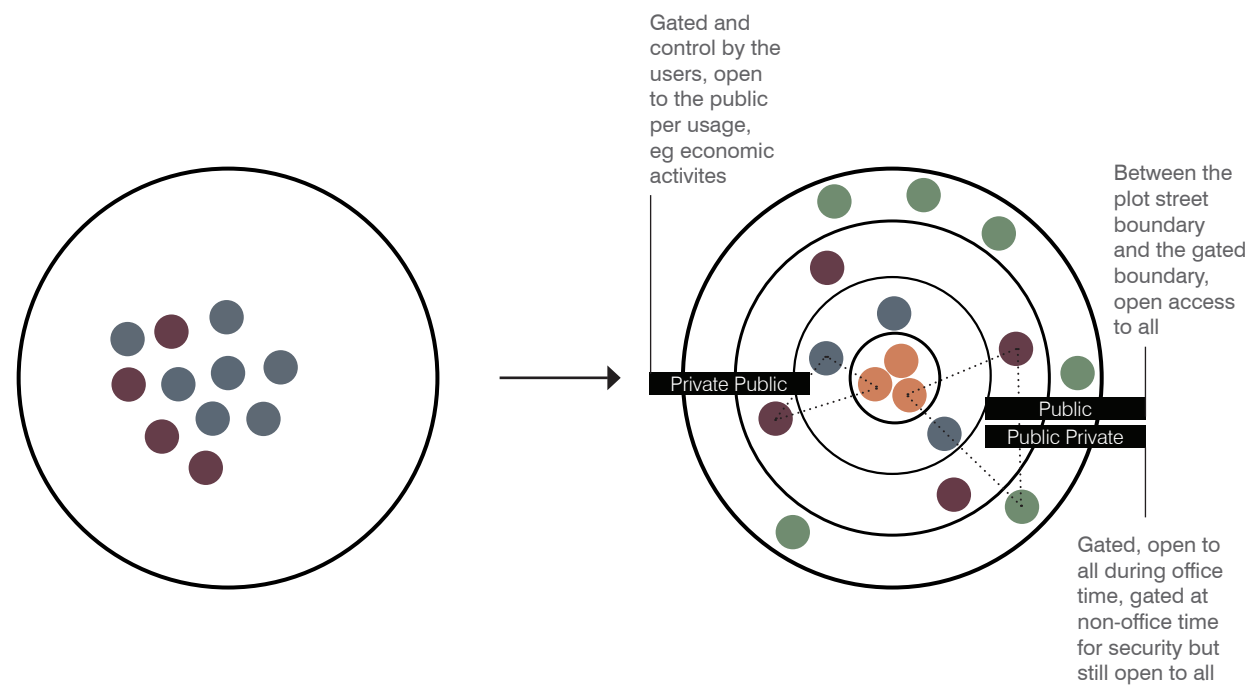


The existing living and working groups are physically situated beside each other. This situation is attributed to the lack of communal space that connects the working and living spots. They are consuming and occupying the site at different times without encounters. The working group is hidden behind the facades and at the backside of the plot next to the railway. It is important to weave different kinds of working and living relationship within the plot to sustain the vibrancy and security of the neighbourhood. To achieve this, redrawing the boundary between private and public, providing a spectrum of spatial hierarchy for the communal space among these groups help generate the symbiosis of consumption and production of the neighbourhood.

Existing living/working mode



Envisioned living/working mode



Coexistence

Symbiosis created by shared space

Living and working

Urban Design/

A plot for urban mining

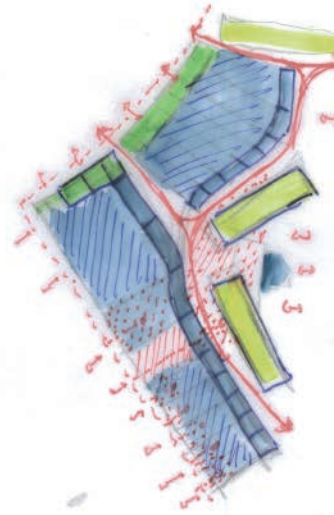
Scheme A



Passageways to reconnected the fragmented plot.

- 02a. main passage way define the inner street.
- b. Small actors can decide the permeability and program.
- c. housing rescale ~~to~~ to breakdown the "wall" betw work & live.
- 03a. actors can control the connection betw outer street & inner street.
- b. actors can control the form along the grid.
- c. reshape the river.
- d. reorganize the plot with grids respondy to the urban trace.

Typology



Morphology



→ passage way
Grid
solid

Legend

LEGEND

01 Narrative
tools + purpose.

02 Typology
 - blue hatched: main circulation
 - red hatched: car circulation
 - red hatched: parking
 - red hatched: underground parking
 - blue hatched: production
 - blue hatched: mixed zone of production & consumption
 - green hatched: space of consumption
 - green hatched: slopehouse
 - green hatched: housing + social housing block

03 Morphology
 - red circle: subject that allow future morphology
 - blue line: hard boundary respect form
 - red line: soft boundary respect form

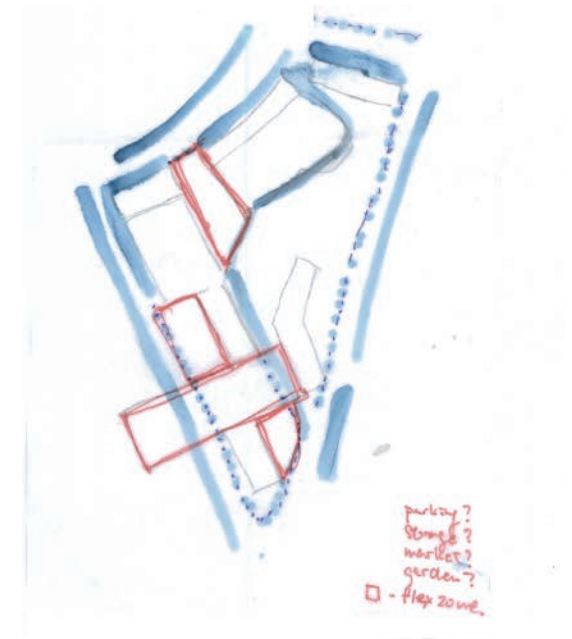
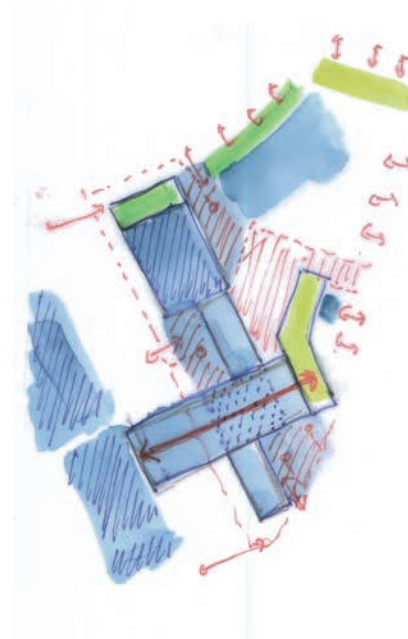
* boundary respect form of accessibility & permeability.
 * be semi-permeable & double one.
 * represent how the new boundary respect to its opposite existing boundary.

Scheme B



Flexible Yards to breakdown the infrastructural boundary

- 02a. connecting the mega social housing, new production & consumption space at the existing footprints over the infrastructure.
- b. undulating strip of live → consumption → production → consumption → production.
- 03a. changeable yards for Δ needs of Δ actors in Δ time.
- b. engulfing the boundary with niches.



parking?
storage?
market?
garden?
- flex zone.

03 Morphology
 - red circle: subject that allow future morphology
 - blue line: hard boundary respect form
 - red line: soft boundary respect form

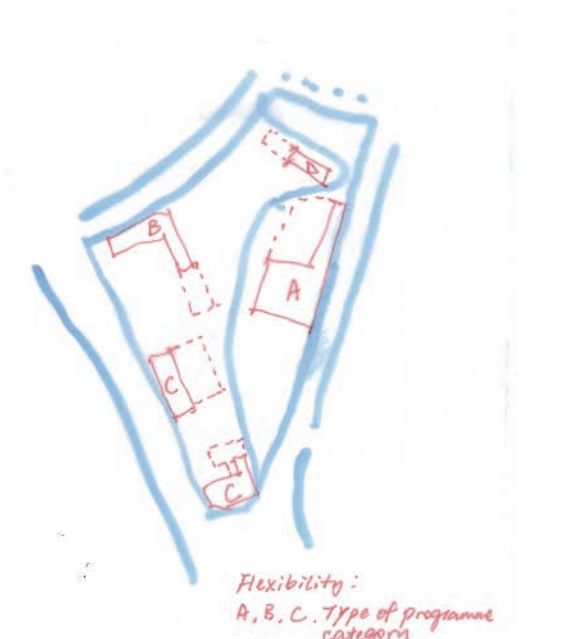
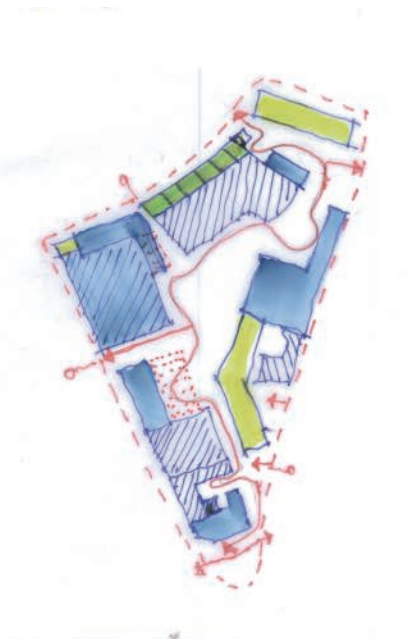
* boundary respect form of accessibility & permeability.
 * be semi-permeable & double one.
 * represent how the new boundary respect to its opposite existing boundary.

Scheme C



Solid & Void to activate the fragment boundaries

- 02a. juxtaposing production and consumption space to create a hinge relationship for efficient transport of materials
- b. Introducing the main pedestrian circulation with communal space to make the plot more pedestrian-friendly
- 03a. the additional consumption spaces complete the plot boundary: as and streetscape
- b. the communal void generated by the existing production and new consumption space retrieve the hidden trace of Senne.
- c. the new consumption space can be the zoning guidance for the future (programmatic re-zone)



Flexibility:
A, B, C. Type of programme category

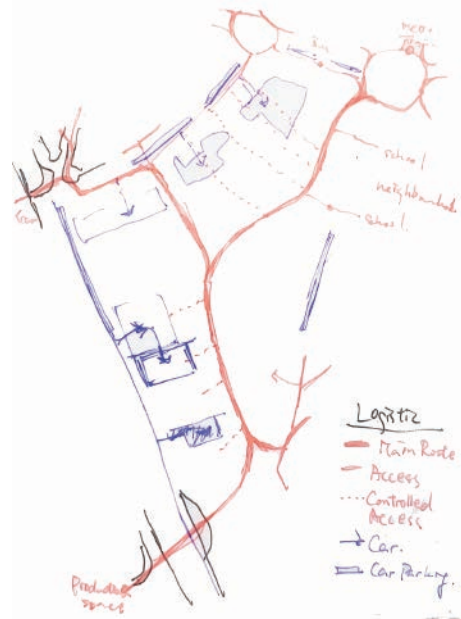
- Existing building
- New intervention
- Flexible space

Scheme D



Shared space
 public
 public/privat
 private/public
 projected/
 optional

Hierarchy of shared space



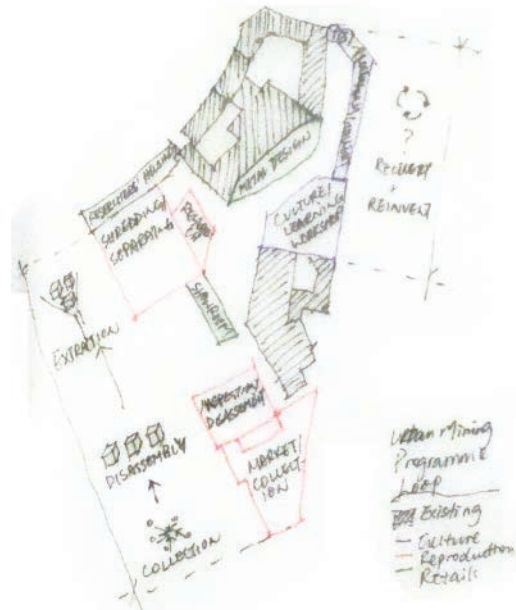
Logistic
 - Main Route
 - Access
 - Controlled Access
 - Car
 - Car Parking

Logistics



Programme
 Culture
 Reproduction
 Retail
 Housing

Programme zoning

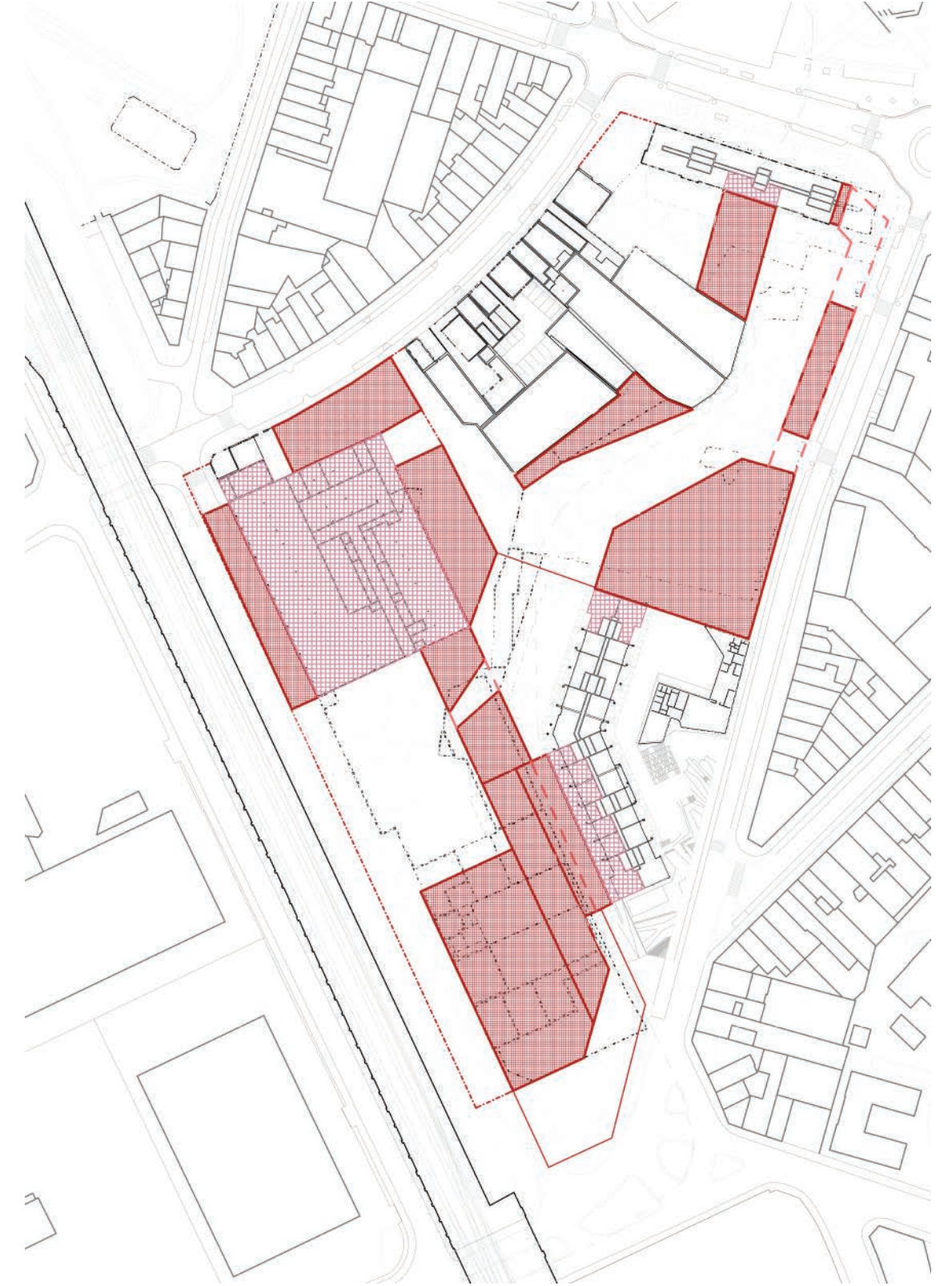


Urban Mining
 Programme
 Loop
 Existing
 Culture
 Reproduction
 Retail

Programme integrated with urban mining

Legend

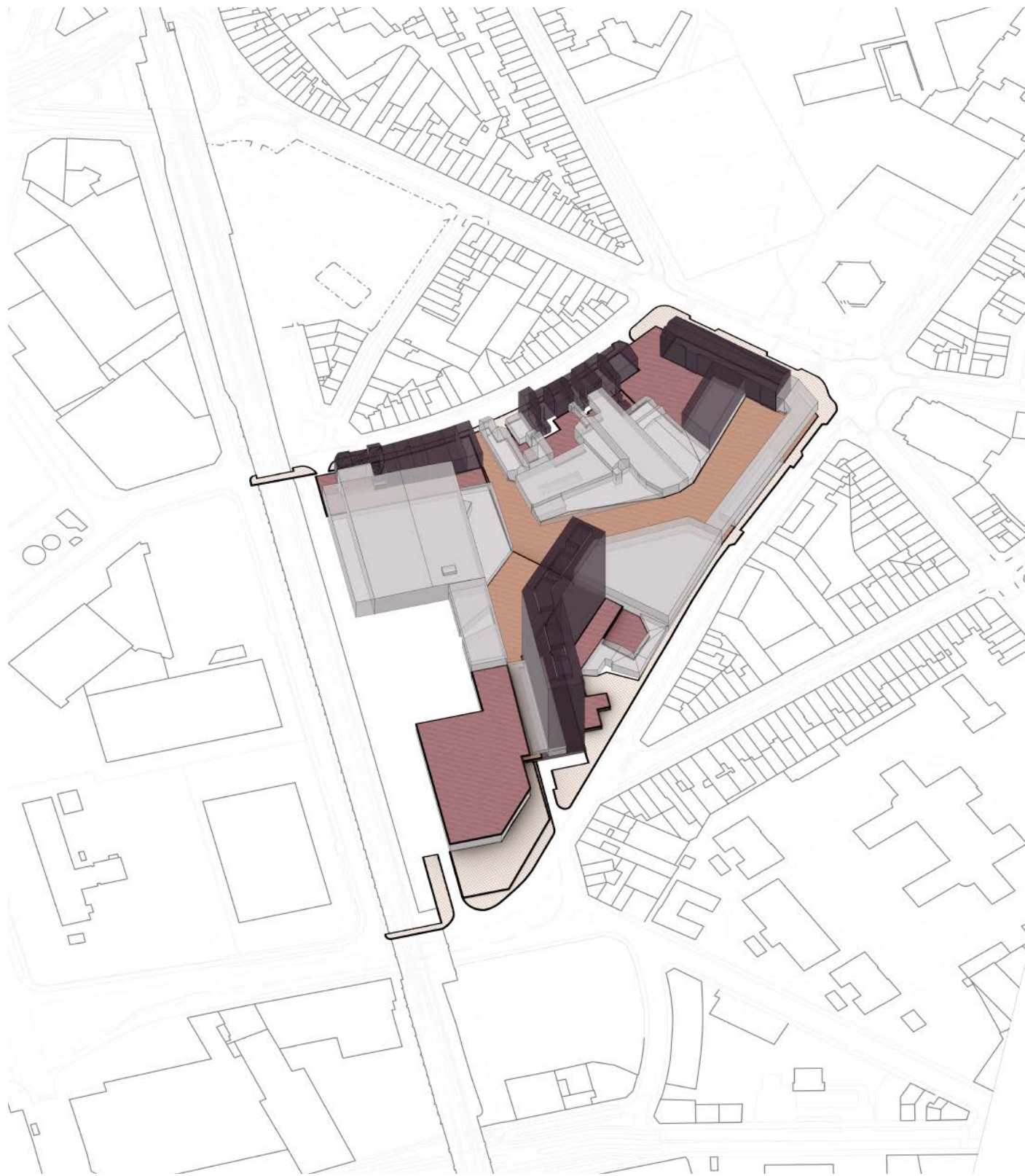
- Existing building
- New intervention
- Flexible space



- building mass
- gated open space
- infrastructure
- void

1. the block scale diminished eastward
2. gated void define the boundary
3. typology_solid scatted in the middle, void enclosed, void engulfing the boundary

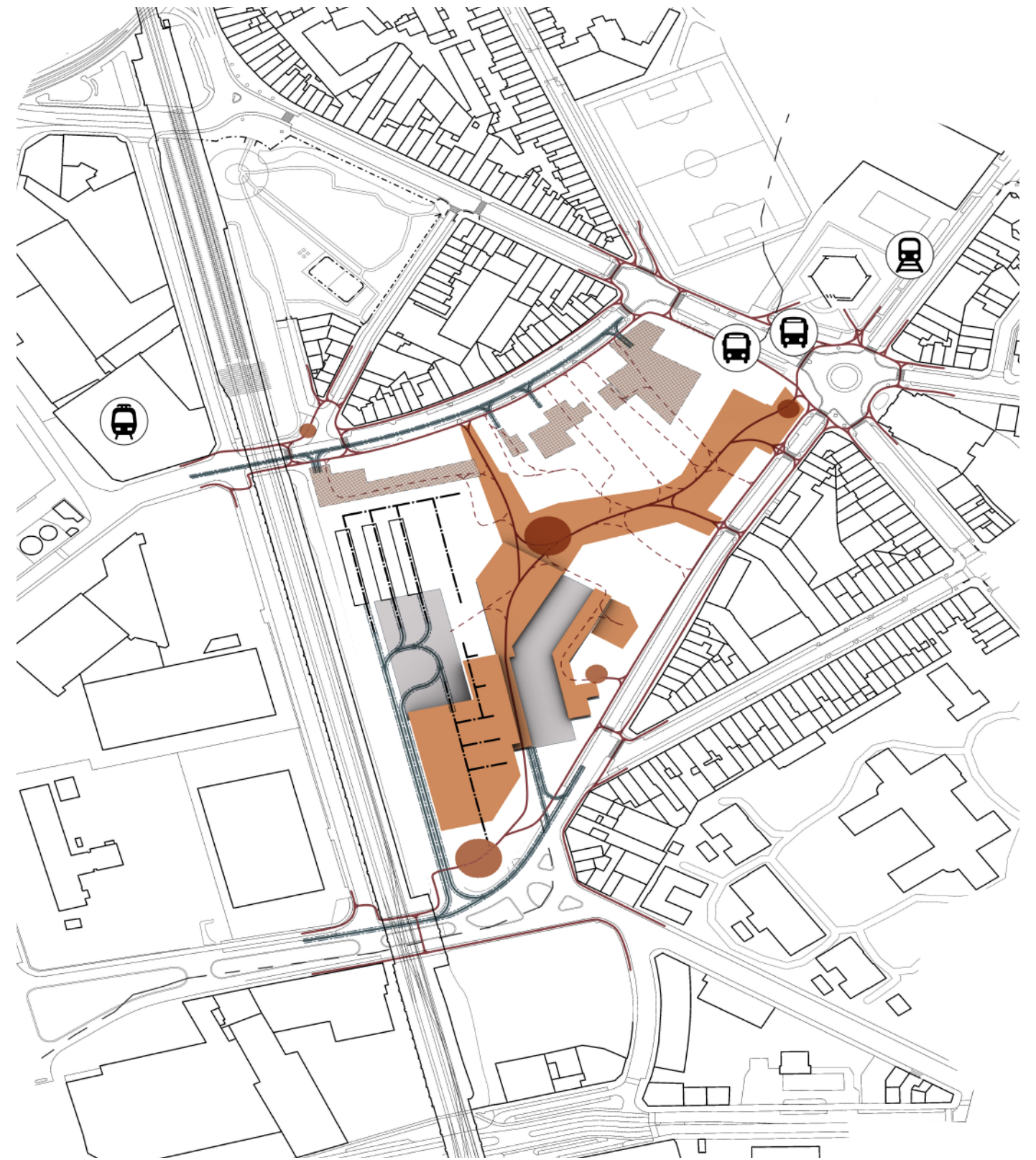
Solid and Void



- Public
- Public Private
- Private Public

1. Fragmented organization
2. Inequality, not all shared space are connected to the private space

Shared Space



- flexible yard
- car park
- walkways
- road

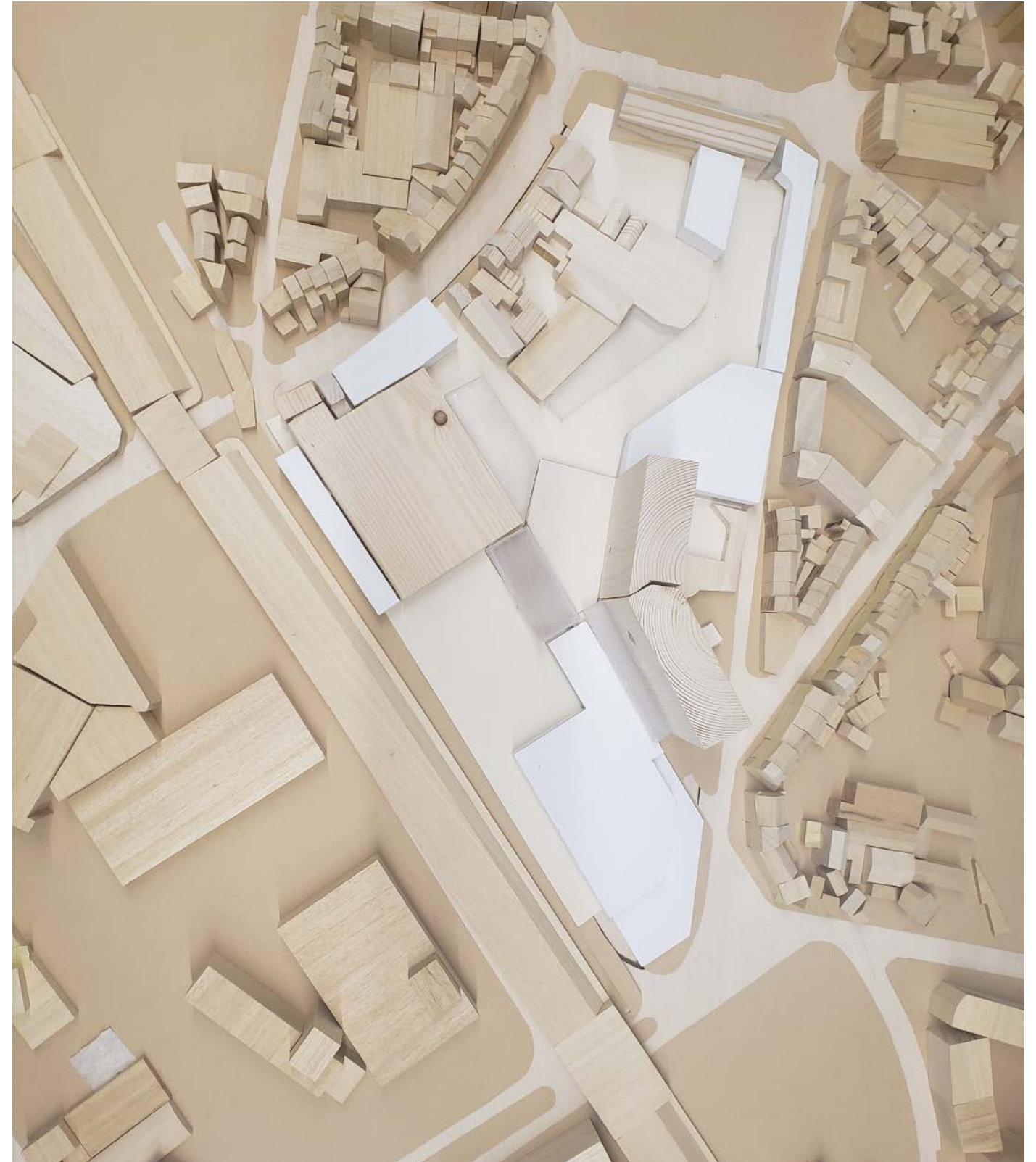
1. walkways at the corner are usually widen with some turn to flexible yards
2. the boundary of the plot are evaded by both human and traffic activities
3. the parking are found along the road and inside the boundary, sometimes merge with the flexible yards

Traffic

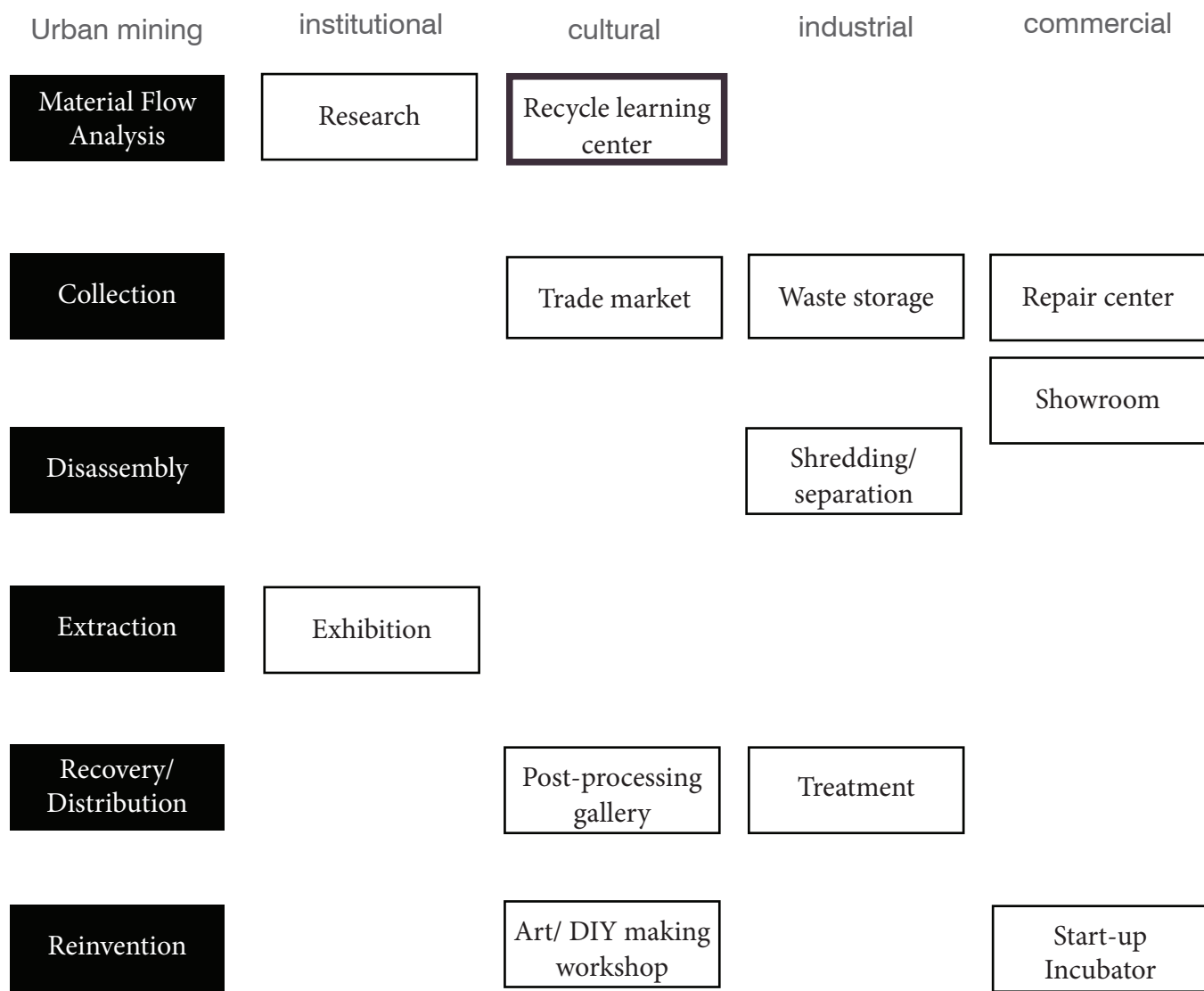


- Solid Wall
- Fencing
- Greenery as boundary
- Pedestrian Access to consumption and public space
- Car Access

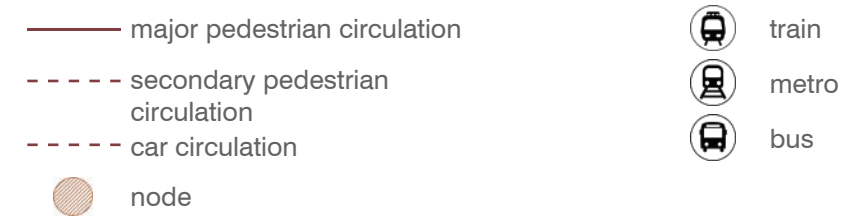
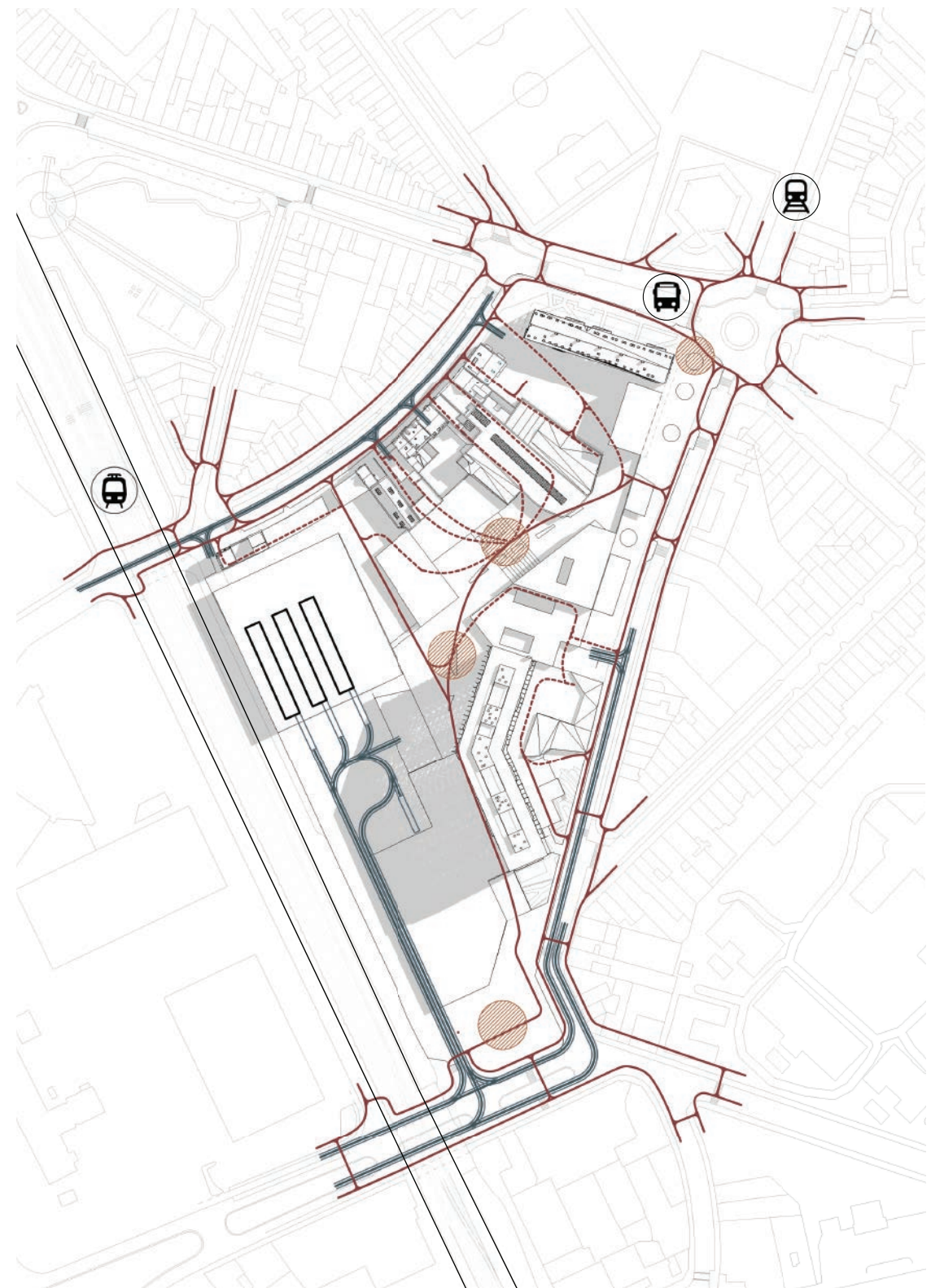
Accessibility



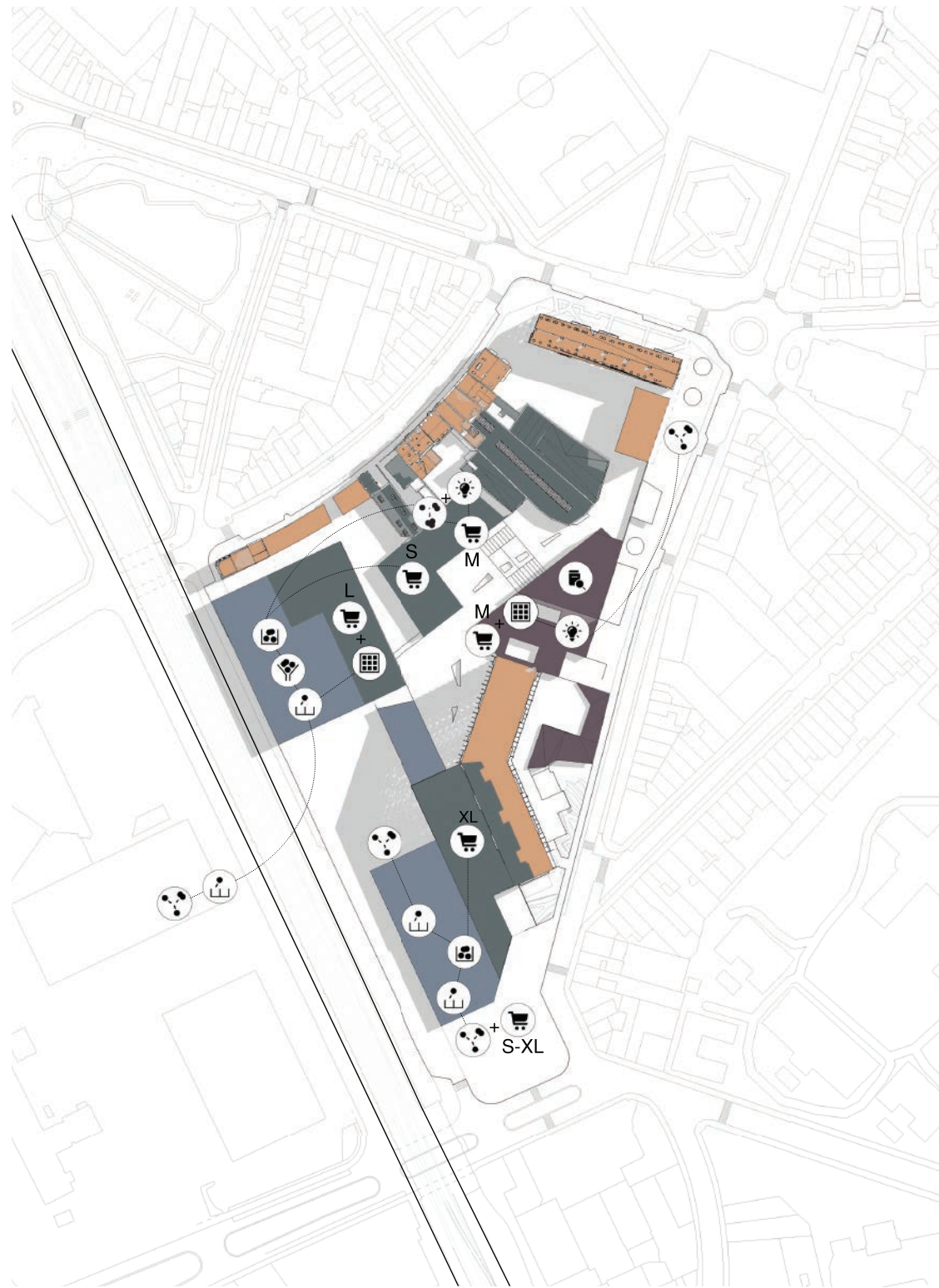
Model



Urban mining and public engagement



Logistics



Landuse

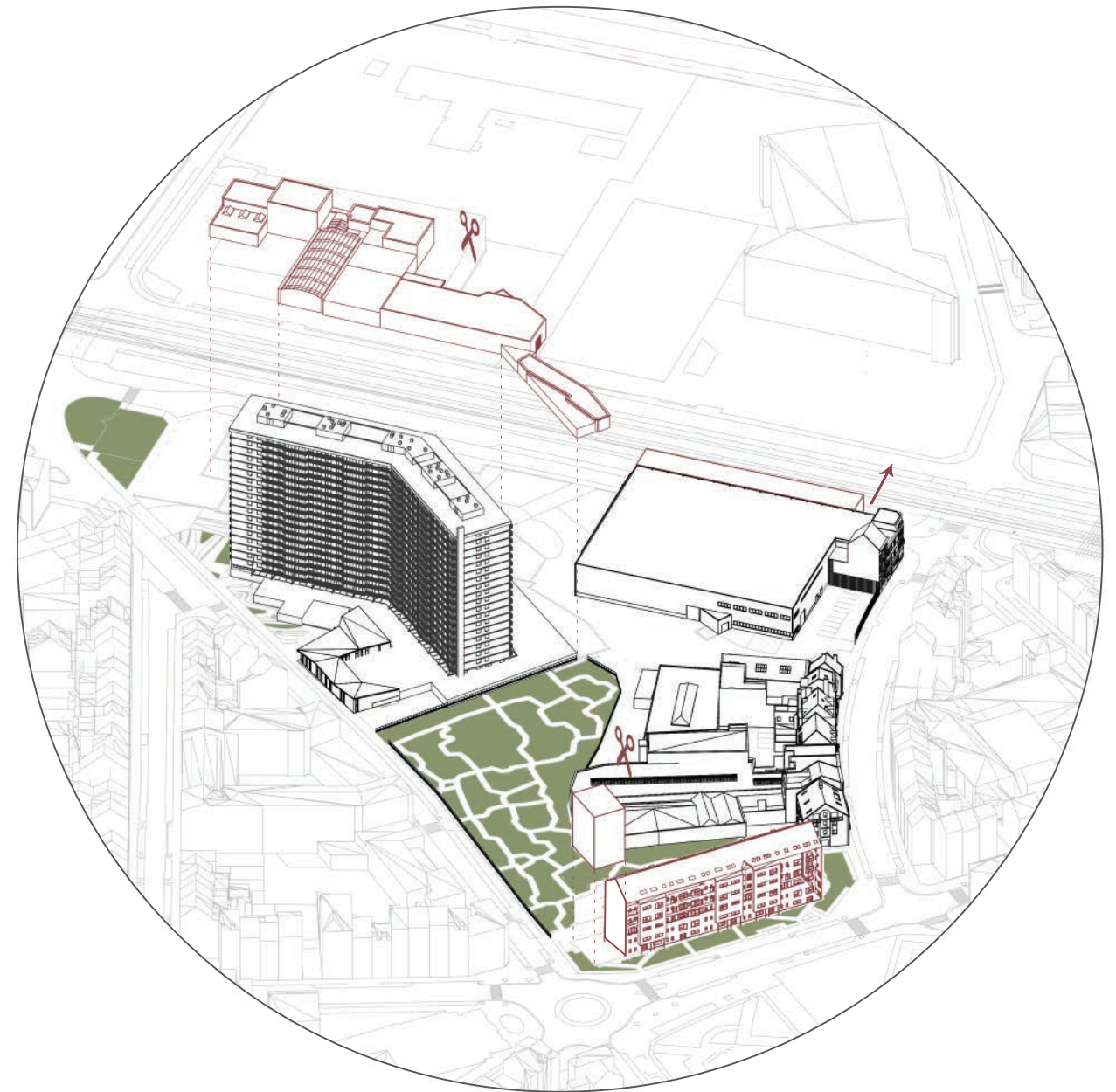
- cultural/recreational
- institutional
- industrial/storage
- commercial

Material flow

- collection
- research
- sorting
- reinvention
- extraction
- display
- storing
- trade
- reassembly

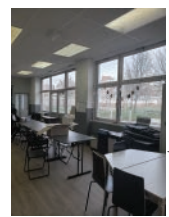
- XL/ Second-hand furniture
- L/ Salvaged building components
- M/ Reassembled secondary products
- S/ Primary raw materials

Zoning and material flow



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

Urban proposal



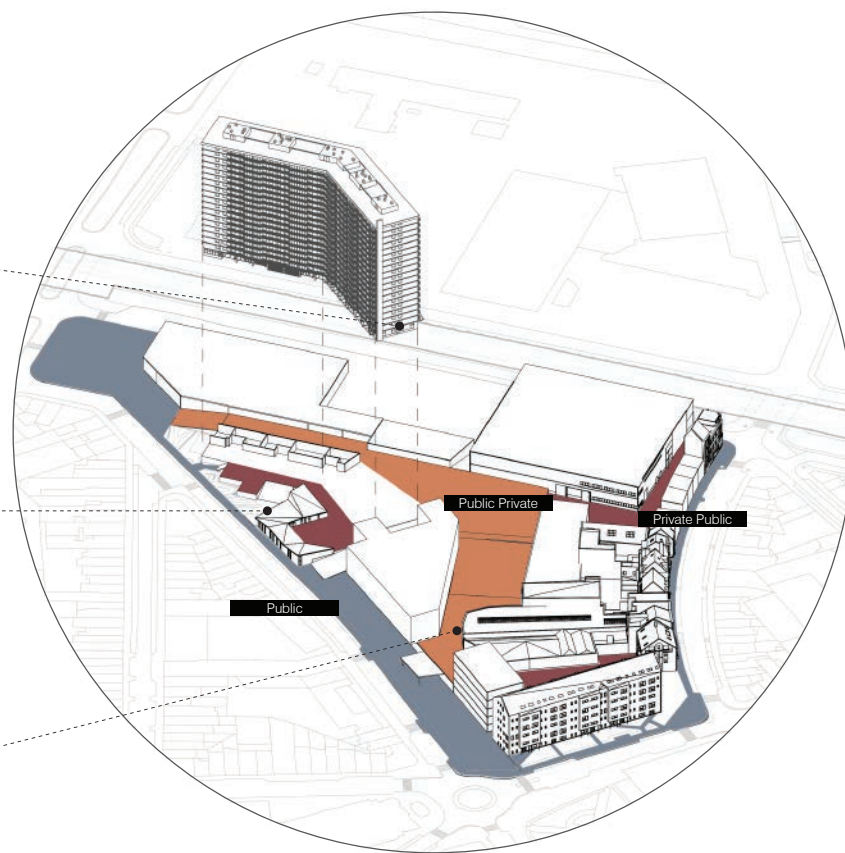
spatial transition



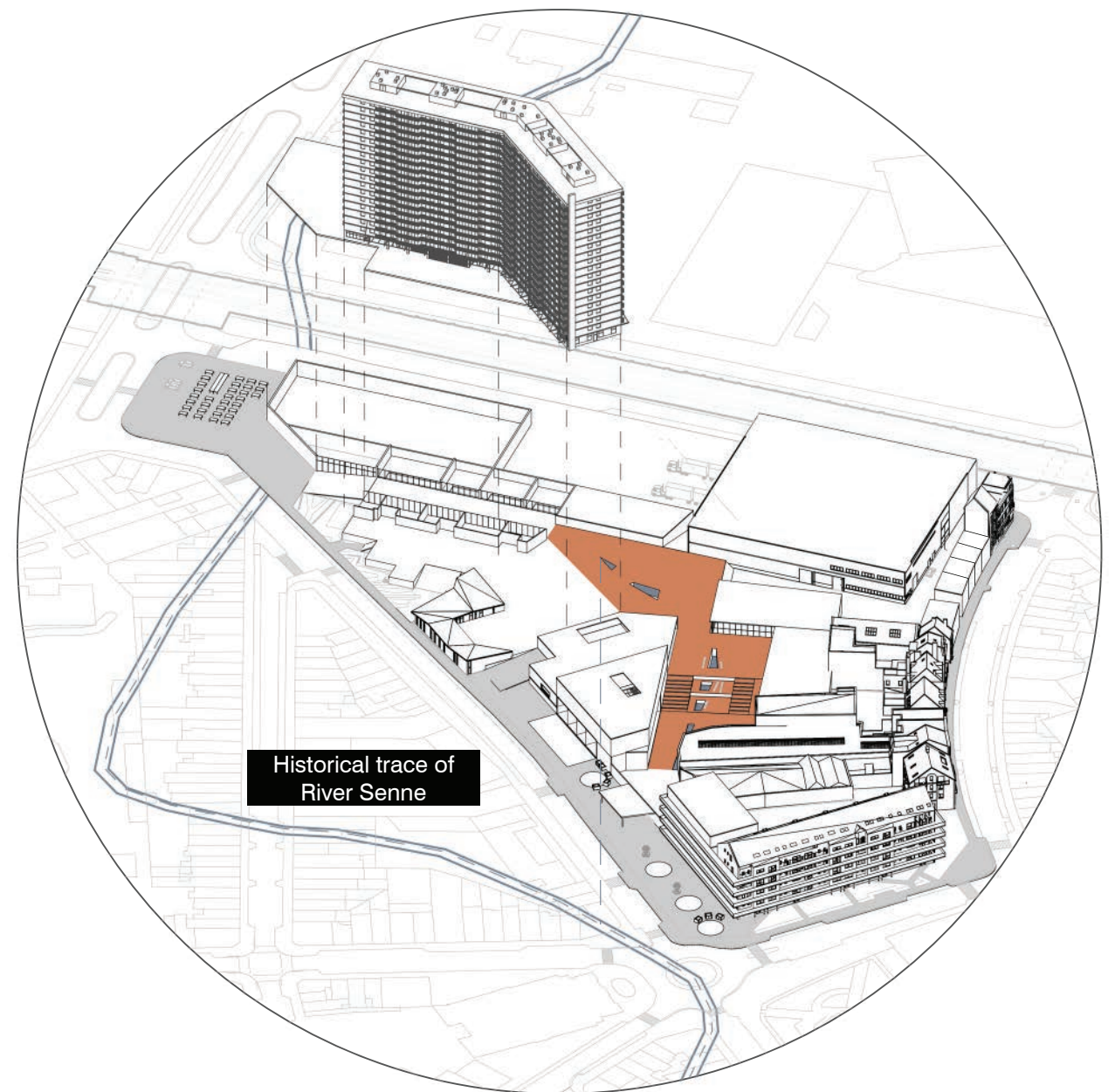
facade of public space



entrance of public interior



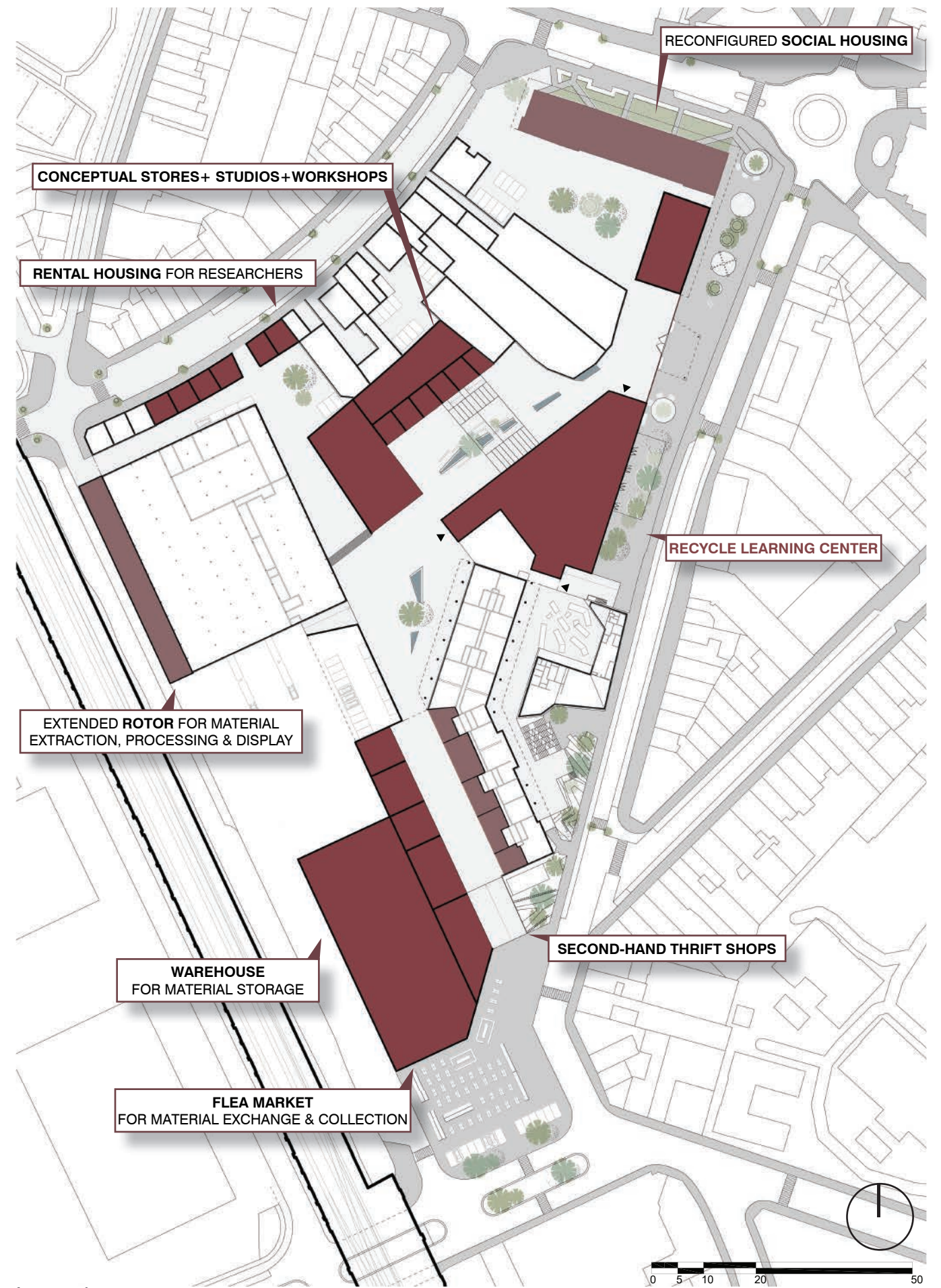
2. Redrawing the boundaries of public and private. A public private alley-yard is created. Existing built surfaces are used as spolia as different roles.



3. The inner plaza is further differentiated into two, one dedicated 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.



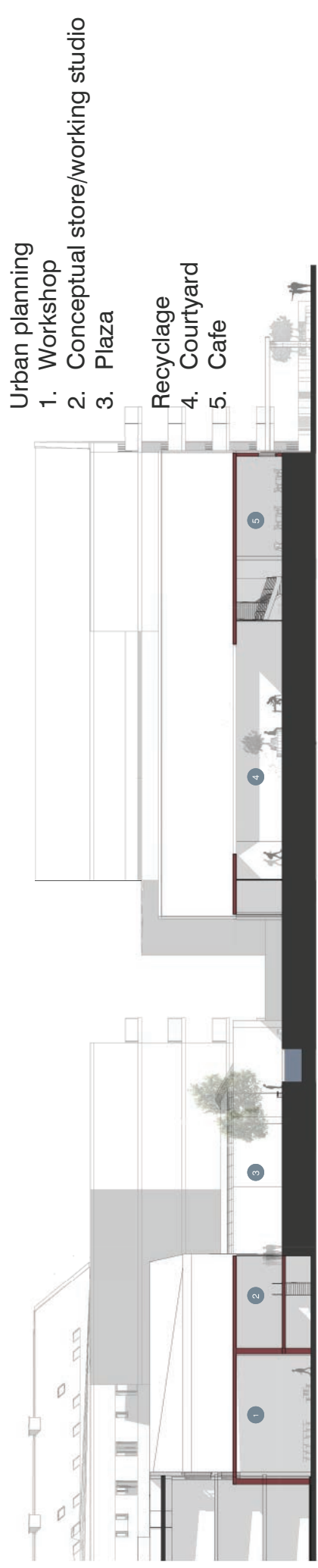
Master plan



Legend

- new buildings
- existing buildings which are partially adapted

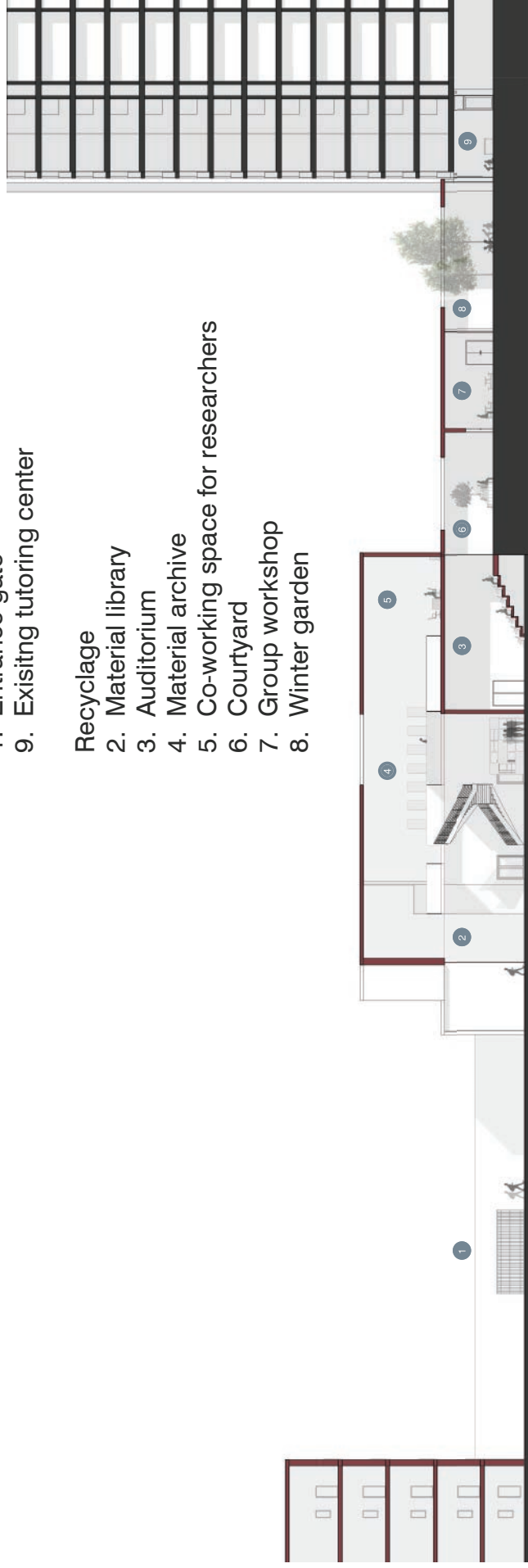
Legend



Section AA'

Legend

- Urban planning
- 1. Entrance gate
- 9. Existing tutoring center
- Recyclage
- 2. Material library
- 3. Auditorium
- 4. Material archive
- 5. Co-working space for researchers
- 6. Courtyard
- 7. Group workshop
- 8. Winter garden



Section BB'

Legend

- Urban planning
- 1. Workshop
- 2. Conceptual store/workng 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



Section AA'

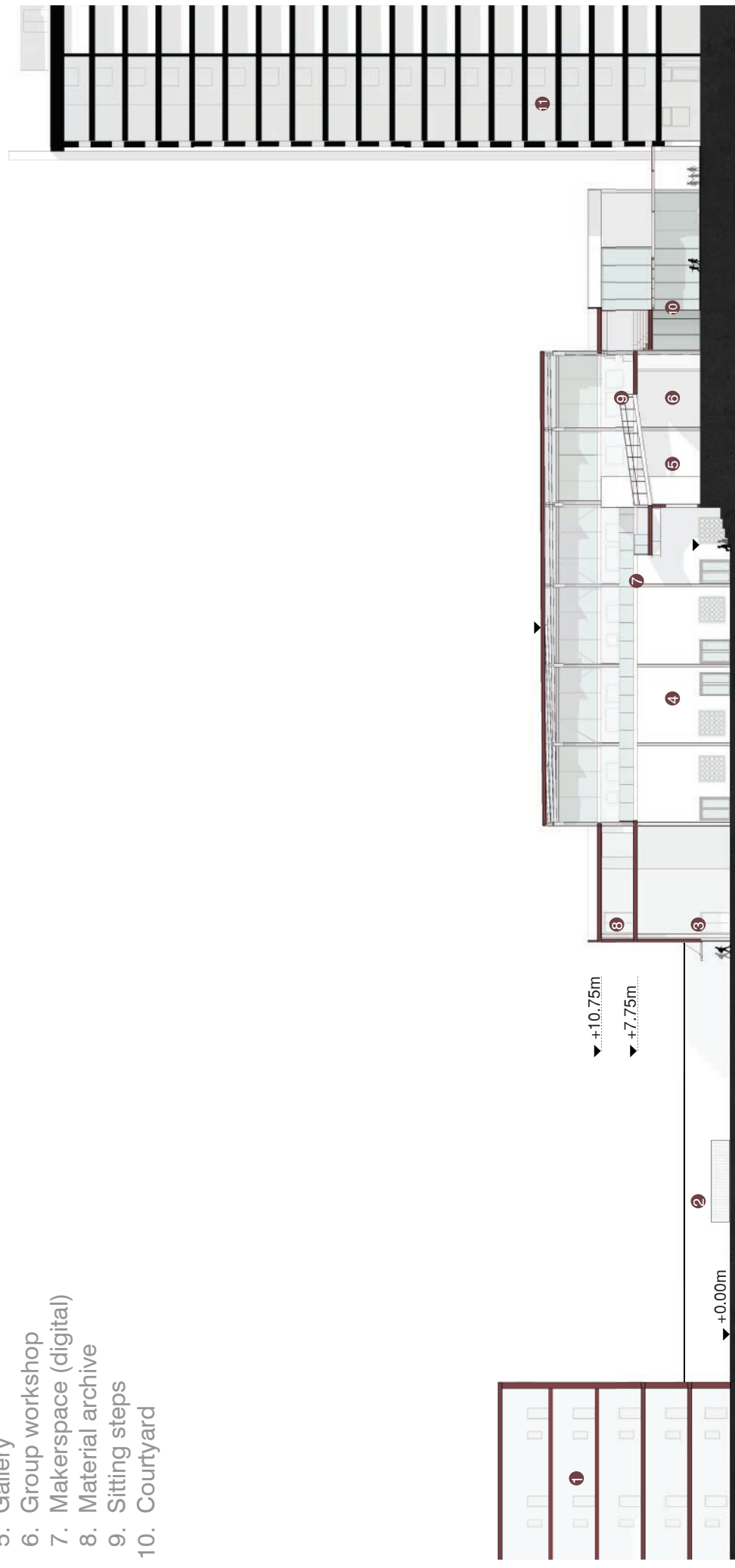
Legend

Urban planning

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

Recyclage

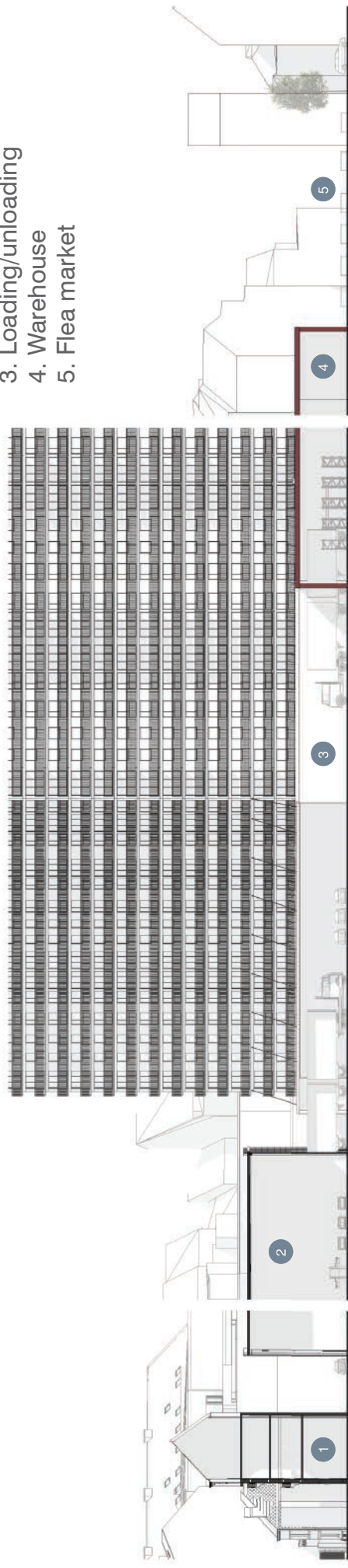
- 3. Reception
- 4. Material library
- 5. Gallery
- 6. Group workshop
- 7. Makerspace (digital)
- 8. Material archive
- 9. Sitting steps
- 10. Courtyard



Legend

Urban planning

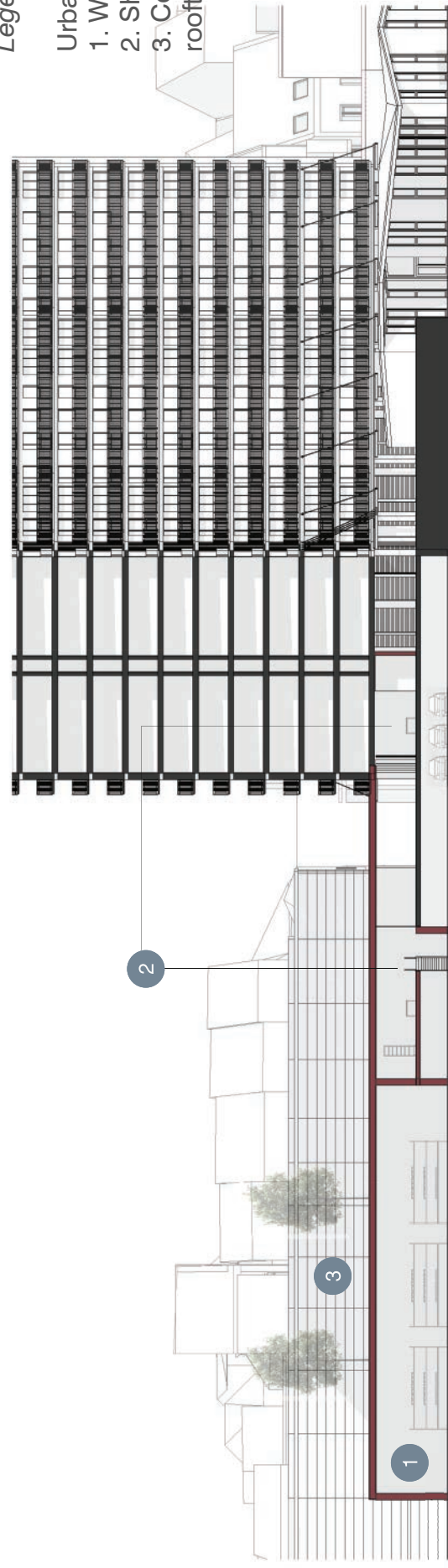
- 1. Existing residential building
- 2. Extraction and shredding plant
- 3. Loading/unloading
- 4. Warehouse
- 5. Flea market



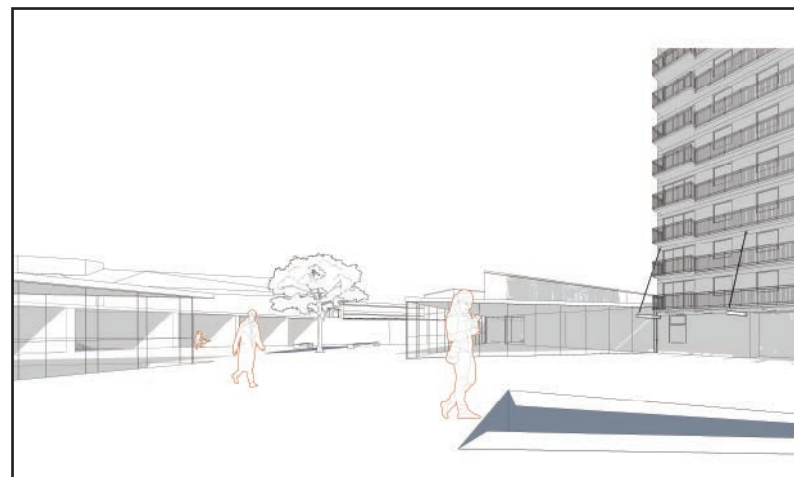
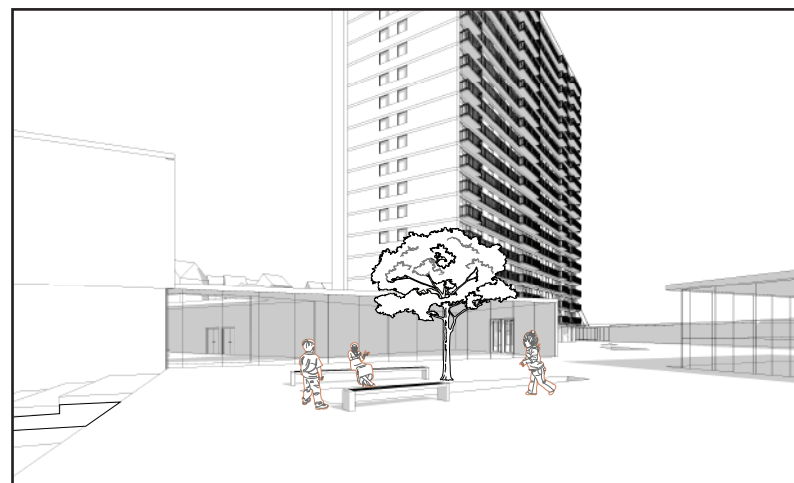
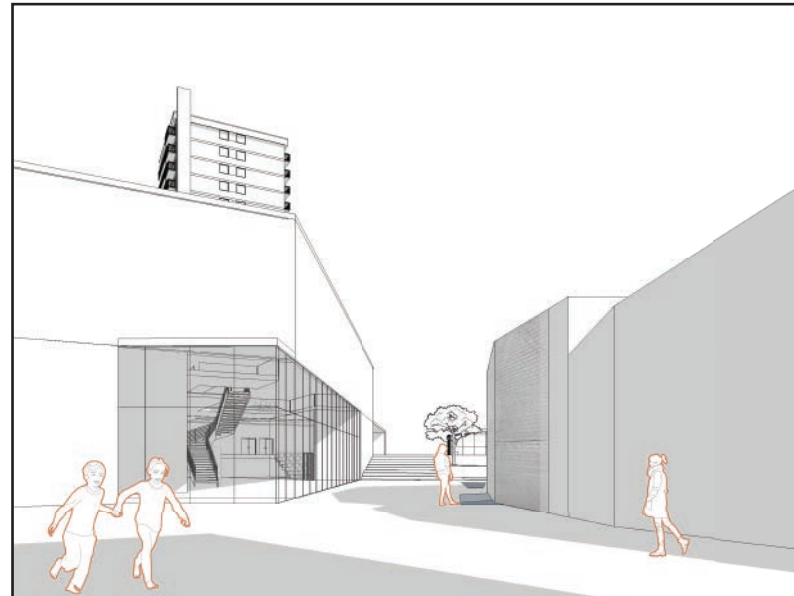
Section CC'

Legend

- Urban planning
- 1. Warehouse
- 2. Shop
- 3. Communal rooftop garden



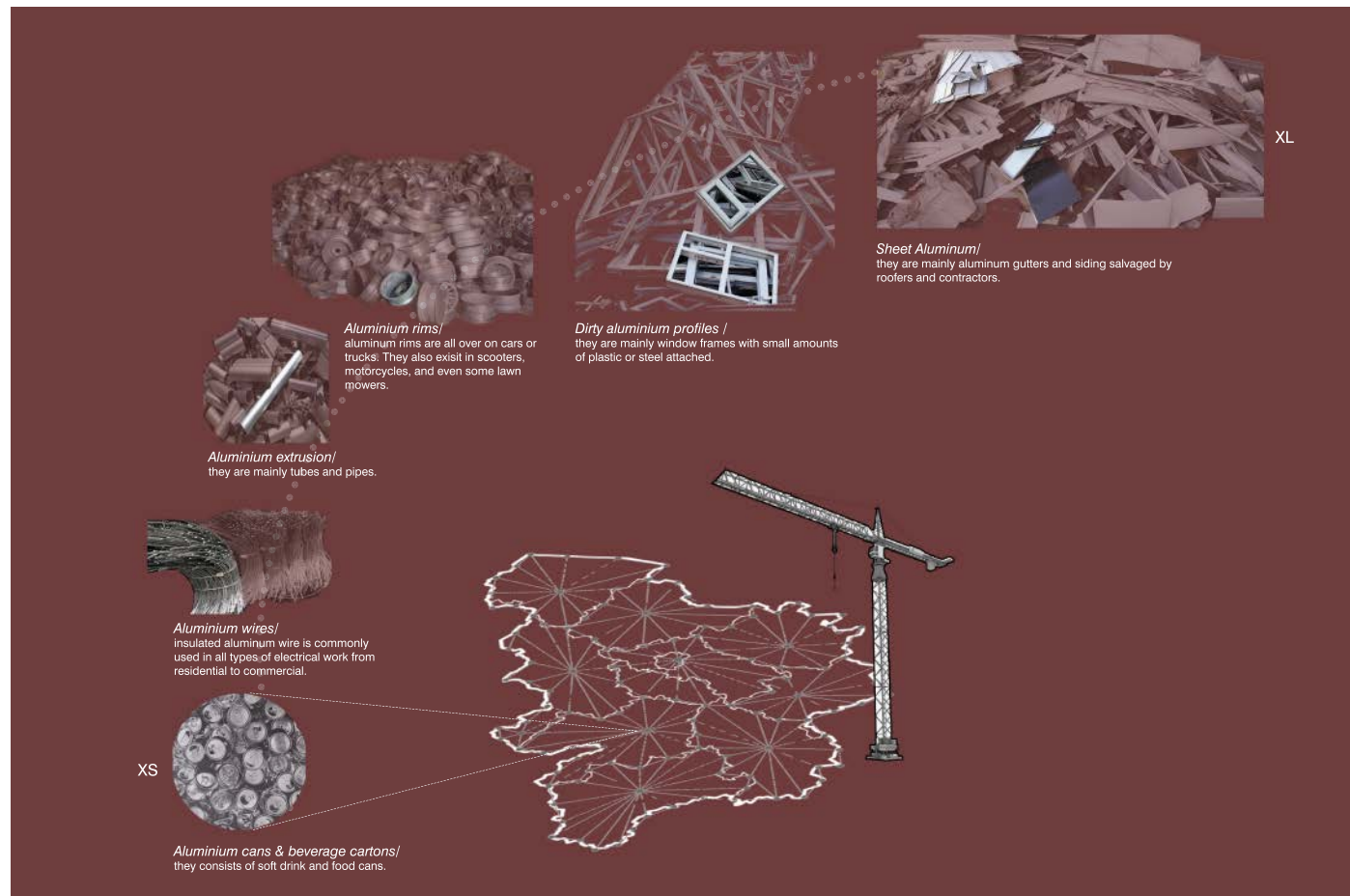
Section DD'



Sequential perspectives

Material Proposal/

Reuse and application of aluminium

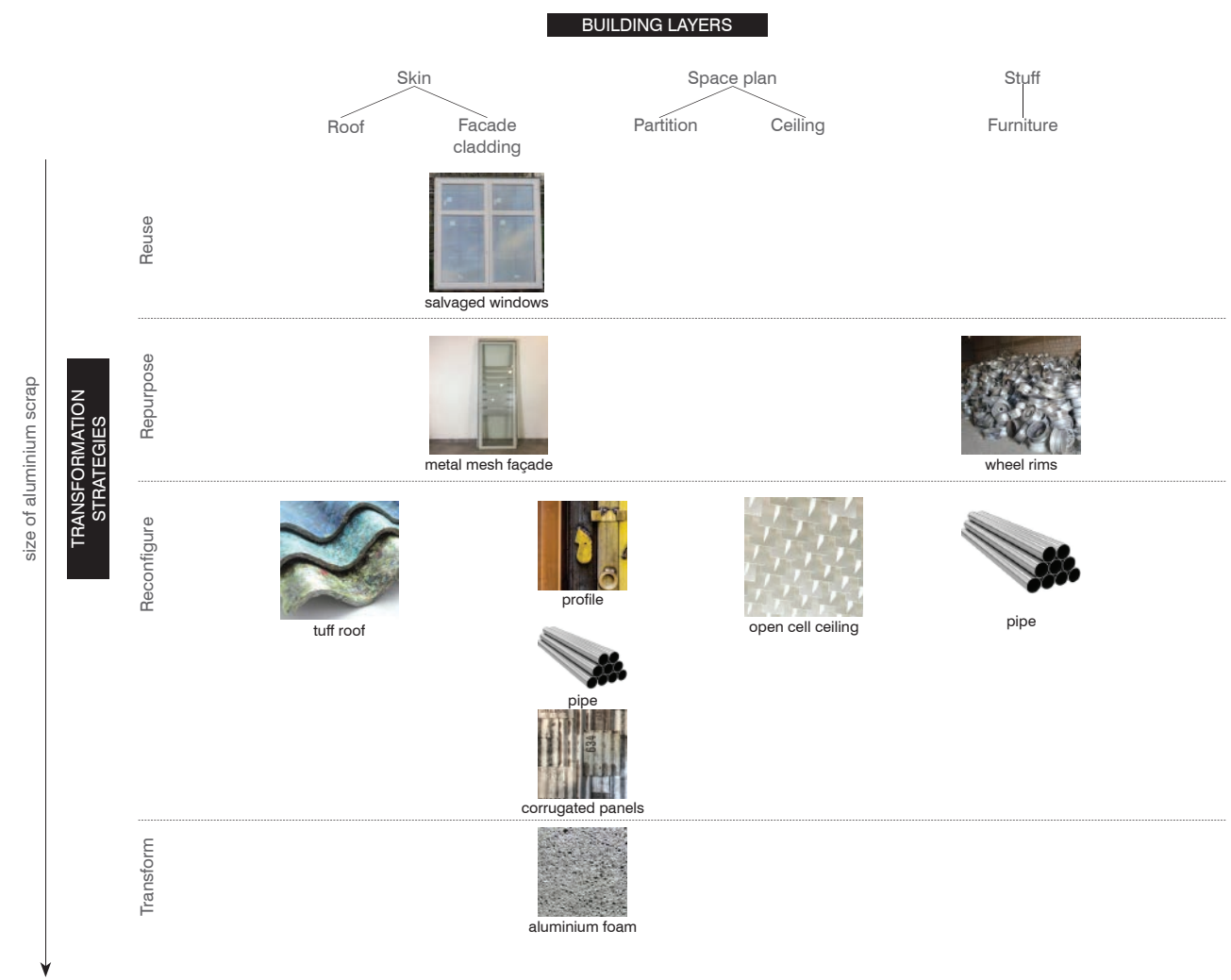


Types of scraps

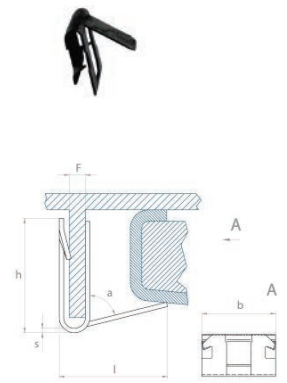
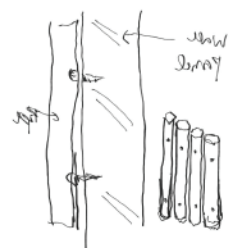
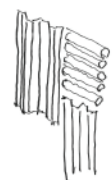
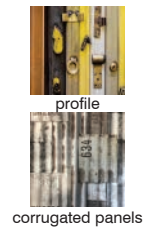


Salvaged windows

Salvaged windows



Material inventory



Patchwork panel design

Process of materials/ Materials/

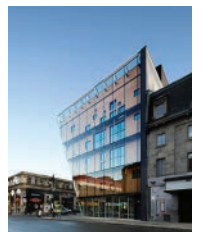
REUSE



double facade with reclaimed wood lumber



Reference/



Quartier Des Spectacles / Edifica

REUSE + REPURPOSED



salvaged aluminium window and door frames



Collage House / S+PS Architects

TRANSFORMED



aluminium foam



Evangelical Temple in Terrassa / OAB

RECONFIGURED

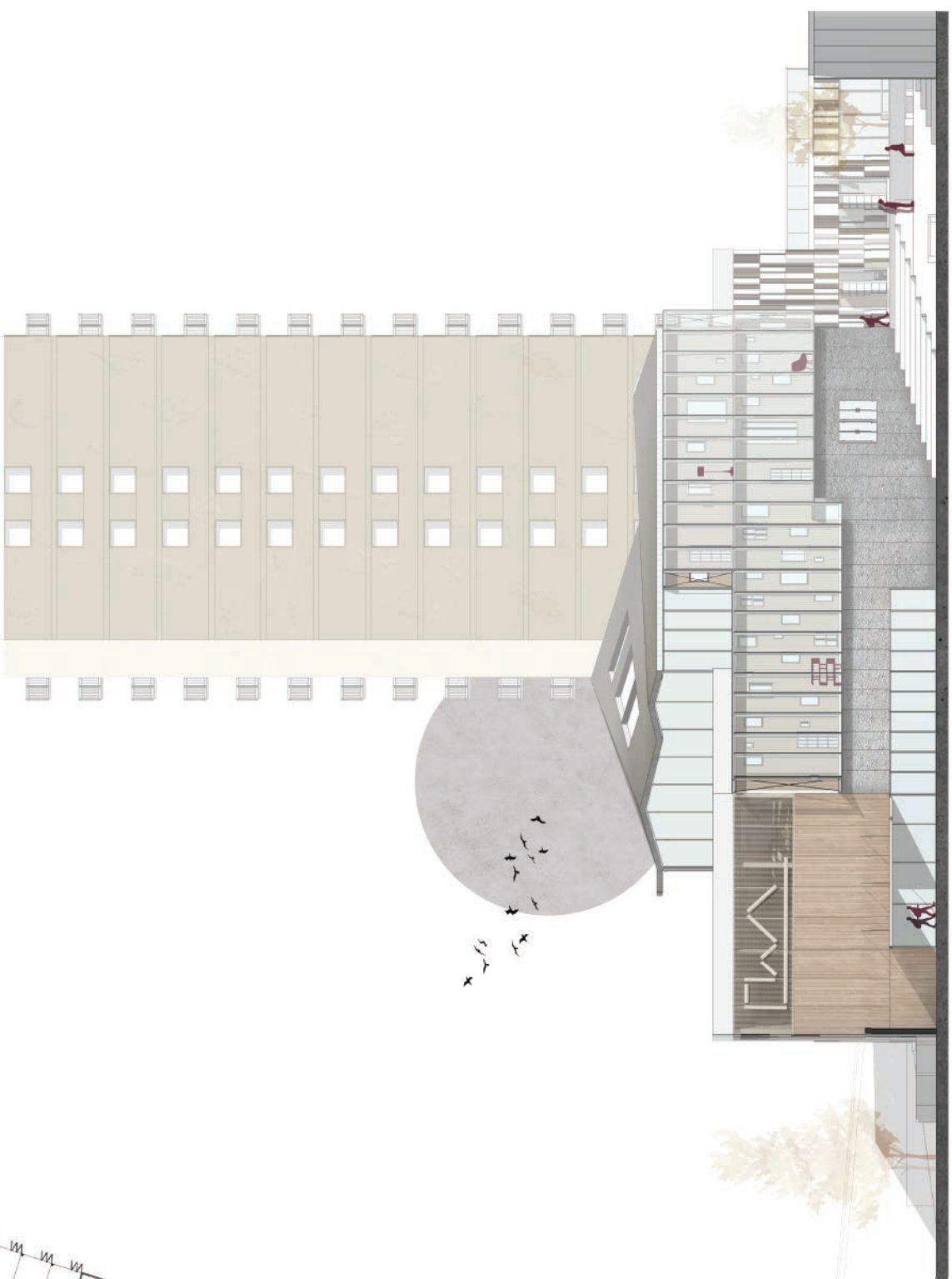
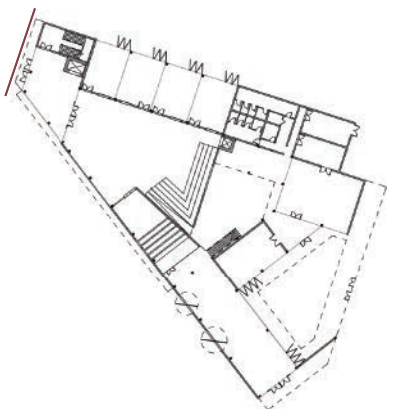
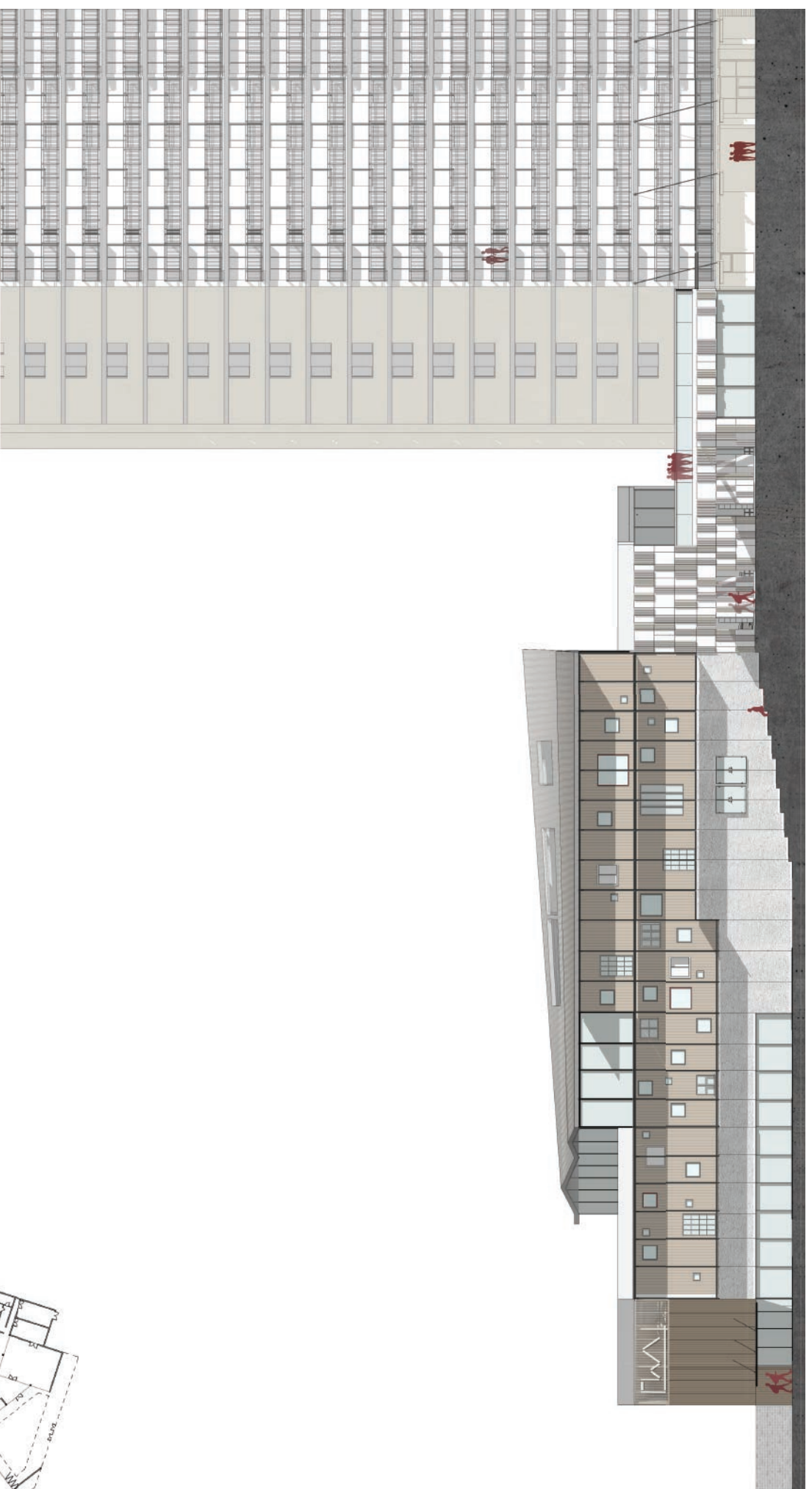
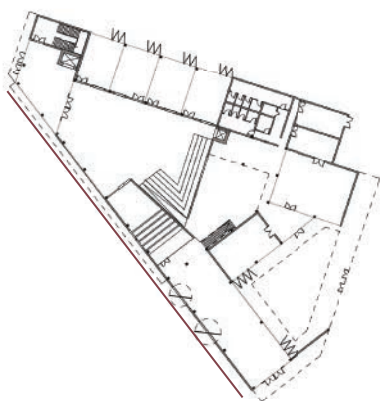


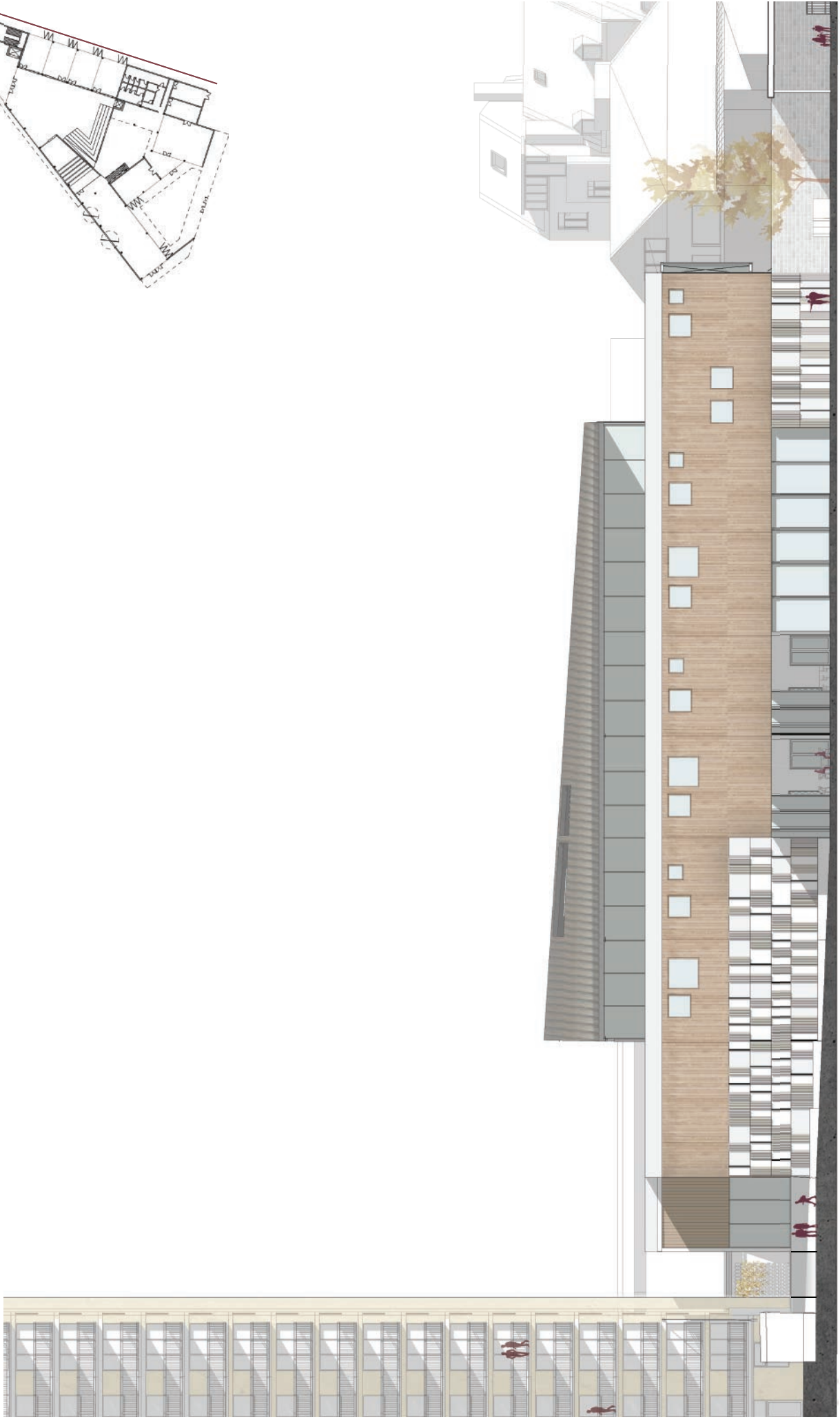
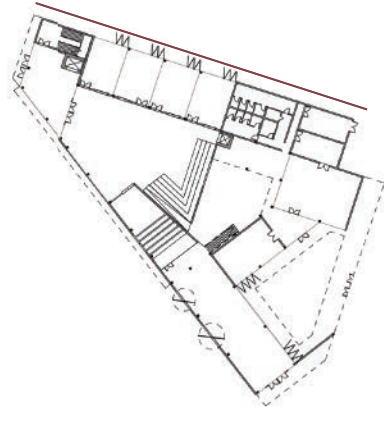
patchwork panels with aluminium scrap



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

Facade design





Architectural Design/

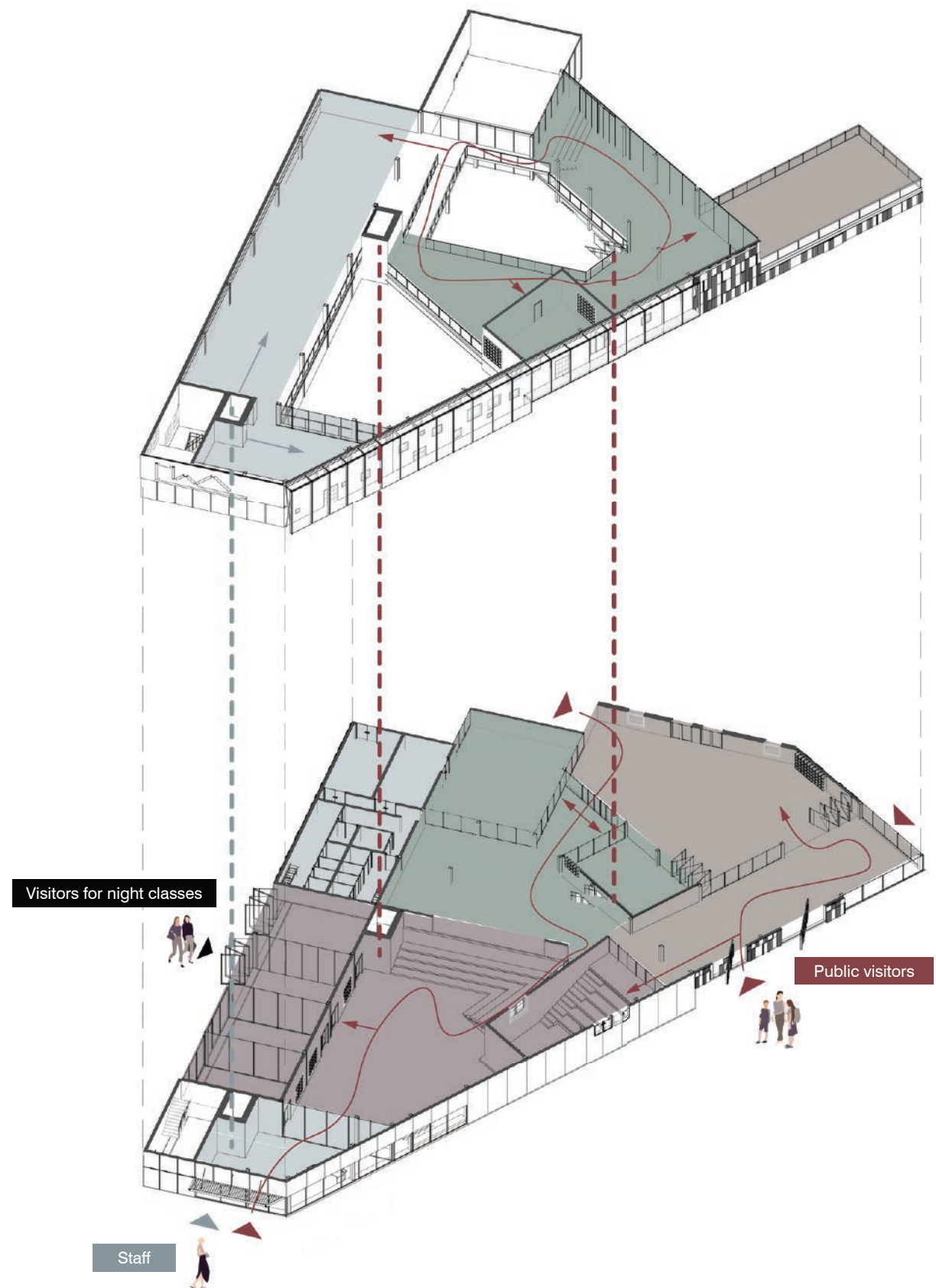
A pedagogical environment for material learning

Pedagogical environment for recycling learning

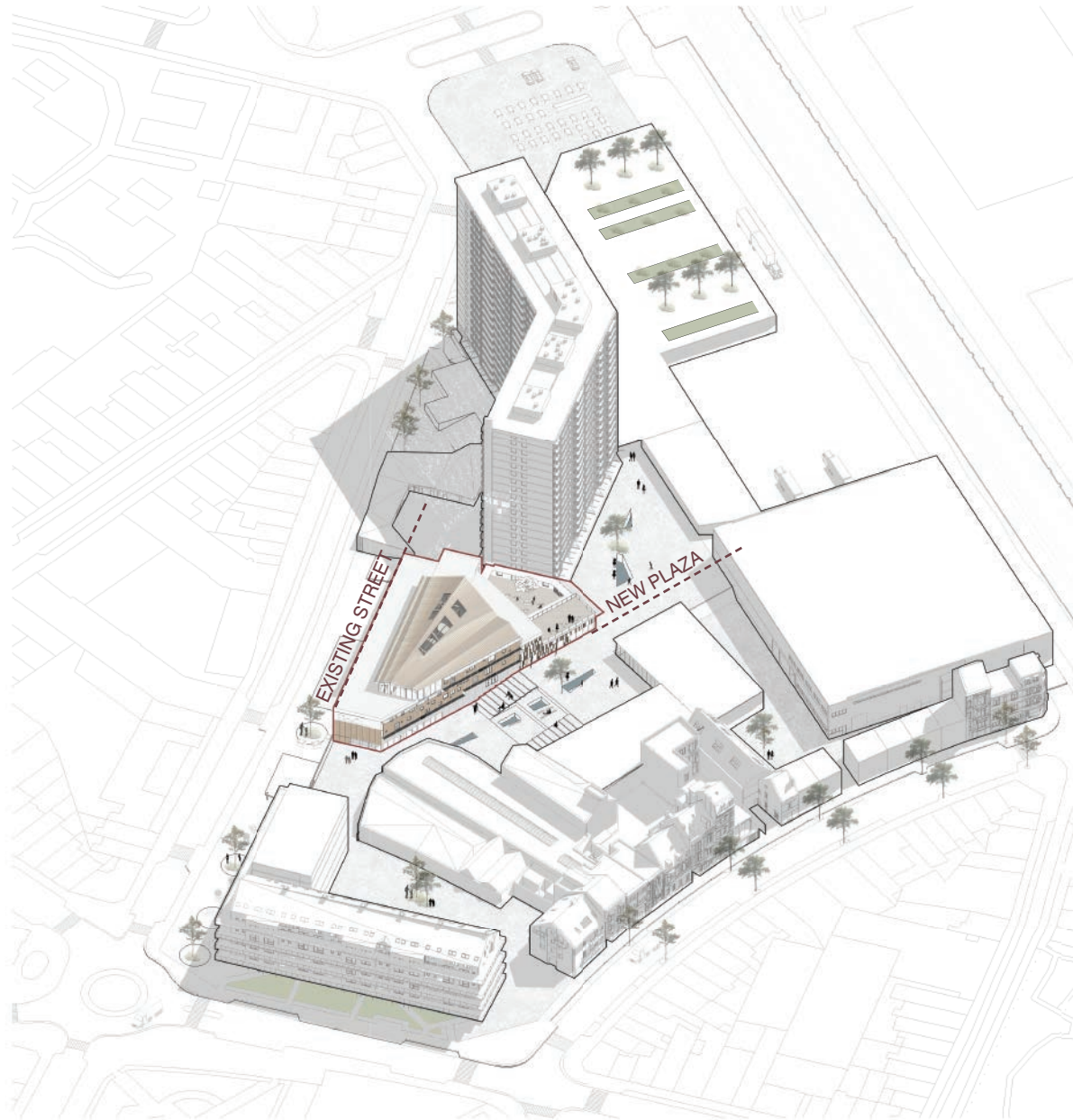
Knowledge acquisition	Inspiration	Realization	Support
1. auditorium			
2. classrooms			
3. material library			
	4. courtyard/roof terrace		
	5. cafe/retail for prototype		
		6. group workshop	
		7. flexible makerspace	
		8. gallery	
		9. seminar room	
		10. co-working space for researchers	
		11. material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

330 m²
 430 m²
 200 m²
 200 m²
 170 m²
 355 m²
 90 m²
 55 m²
 230 m²
 96 m²
 210 m²

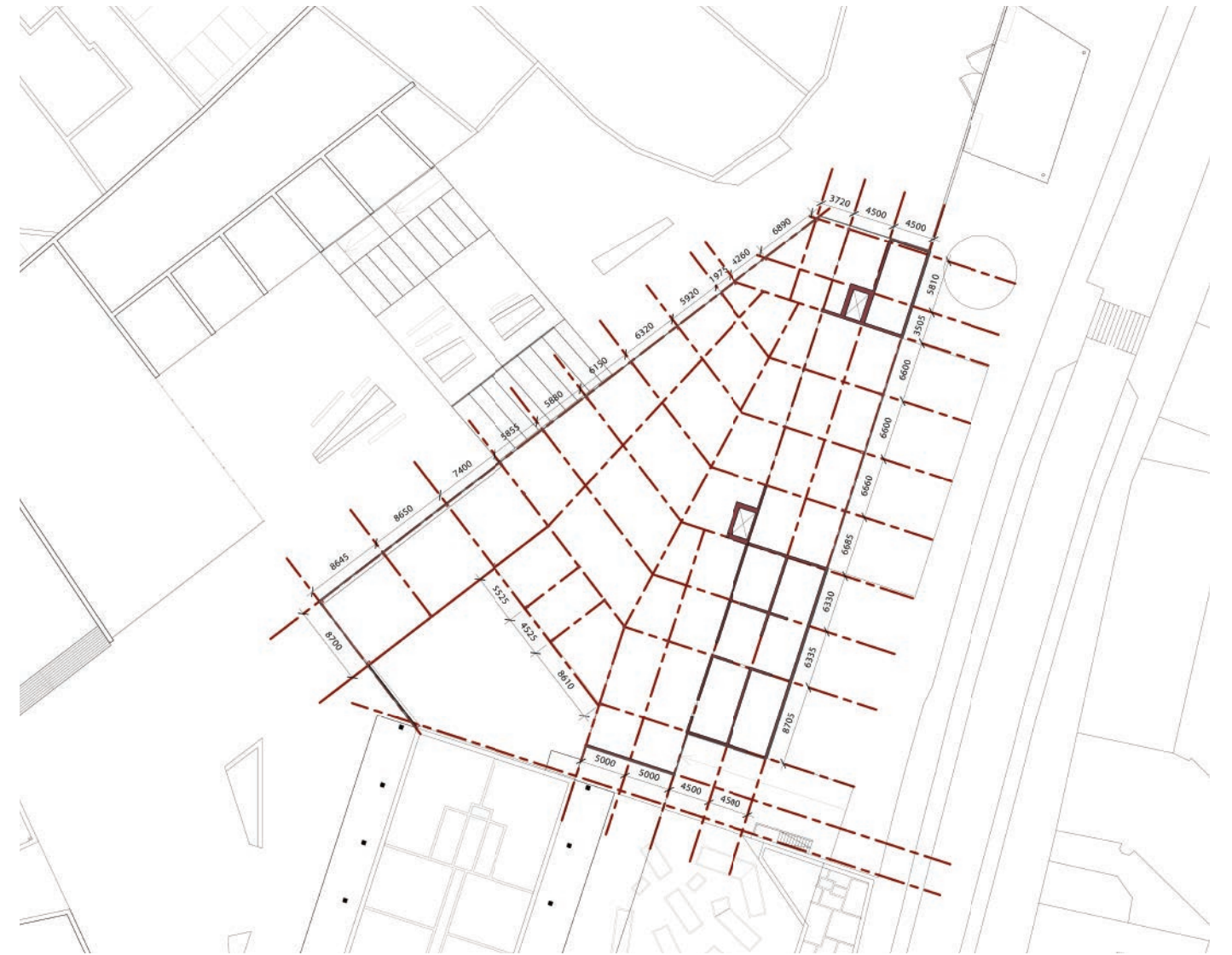
Total area: 2366 m²



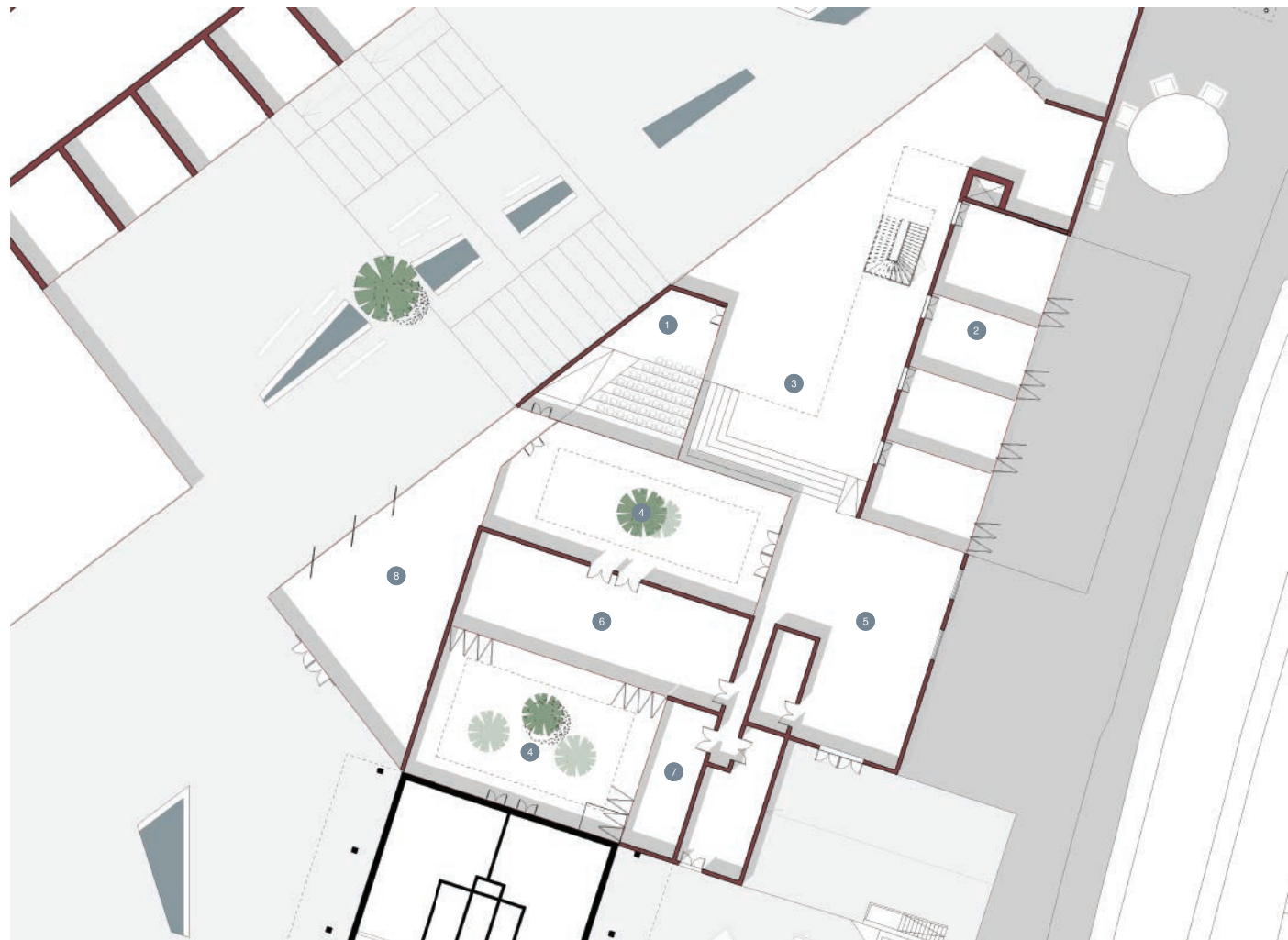
Programme



Mingling with contextual axes



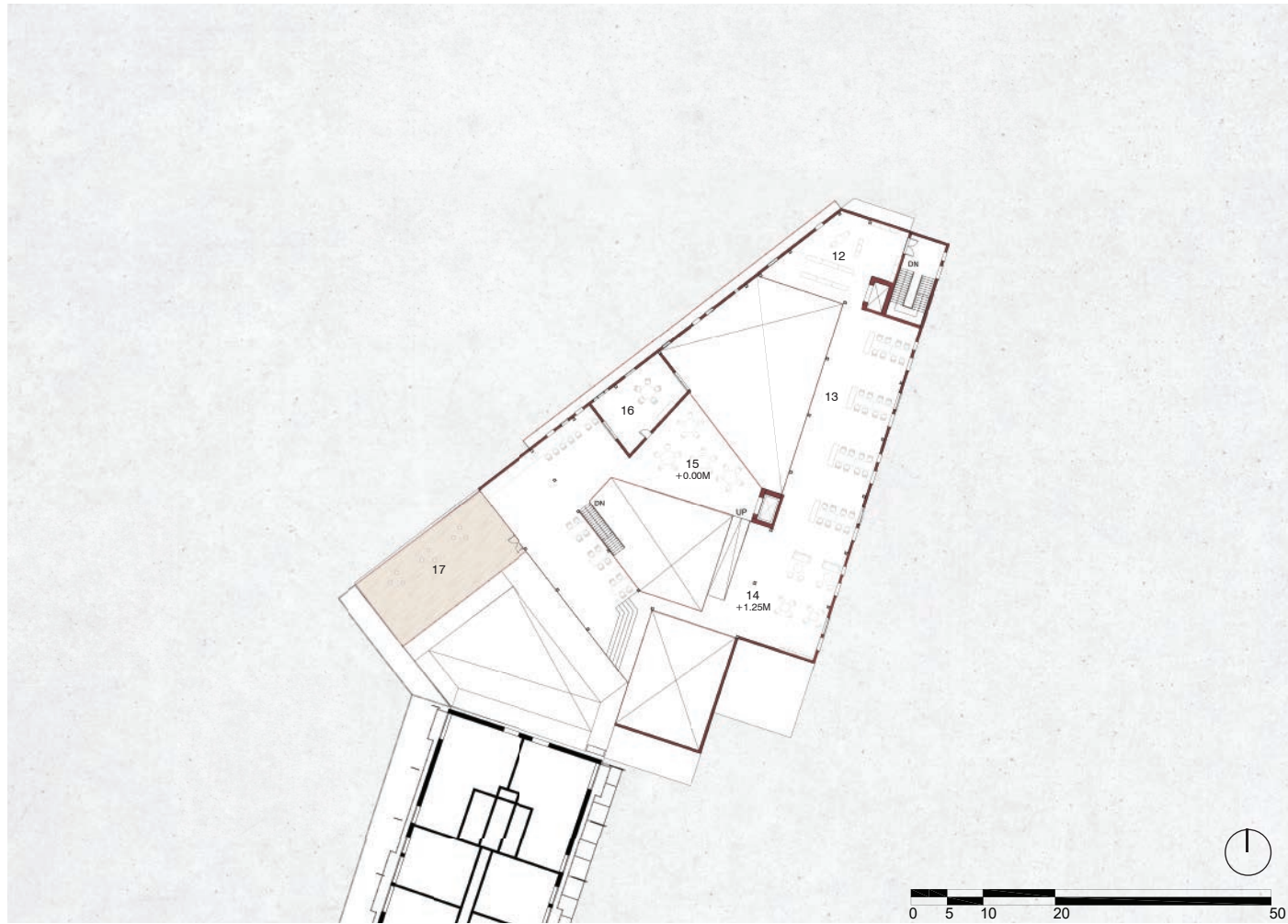
Structural grid



Ground floor plan

Legend

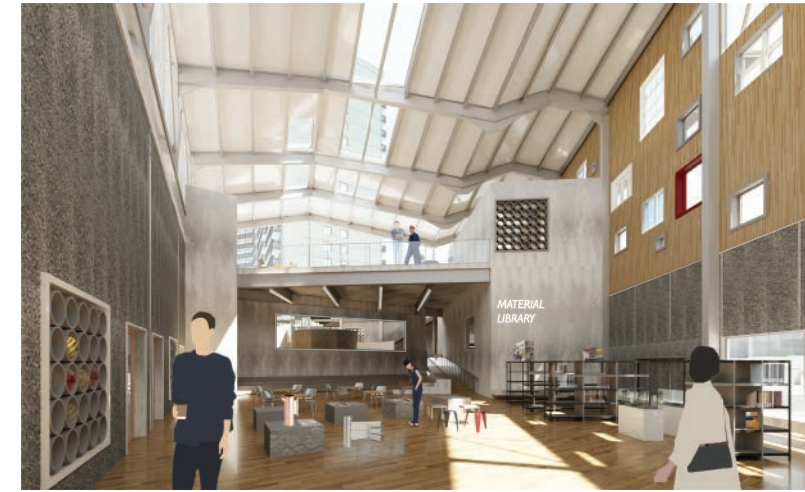
- | | |
|---------------------|-------------------------------|
| 1. Reception | 6. Cafe/ retail for prototype |
| 2. Material library | 7. Group workshop |
| 3. Classroom | 8. Makerspace (Wood/ metal) |
| 4. Auditorium | 9. Courtyard |
| 5. Gallery | 10. Storage |
| | 11. Mechanical room |



Legend

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

1st floor plan



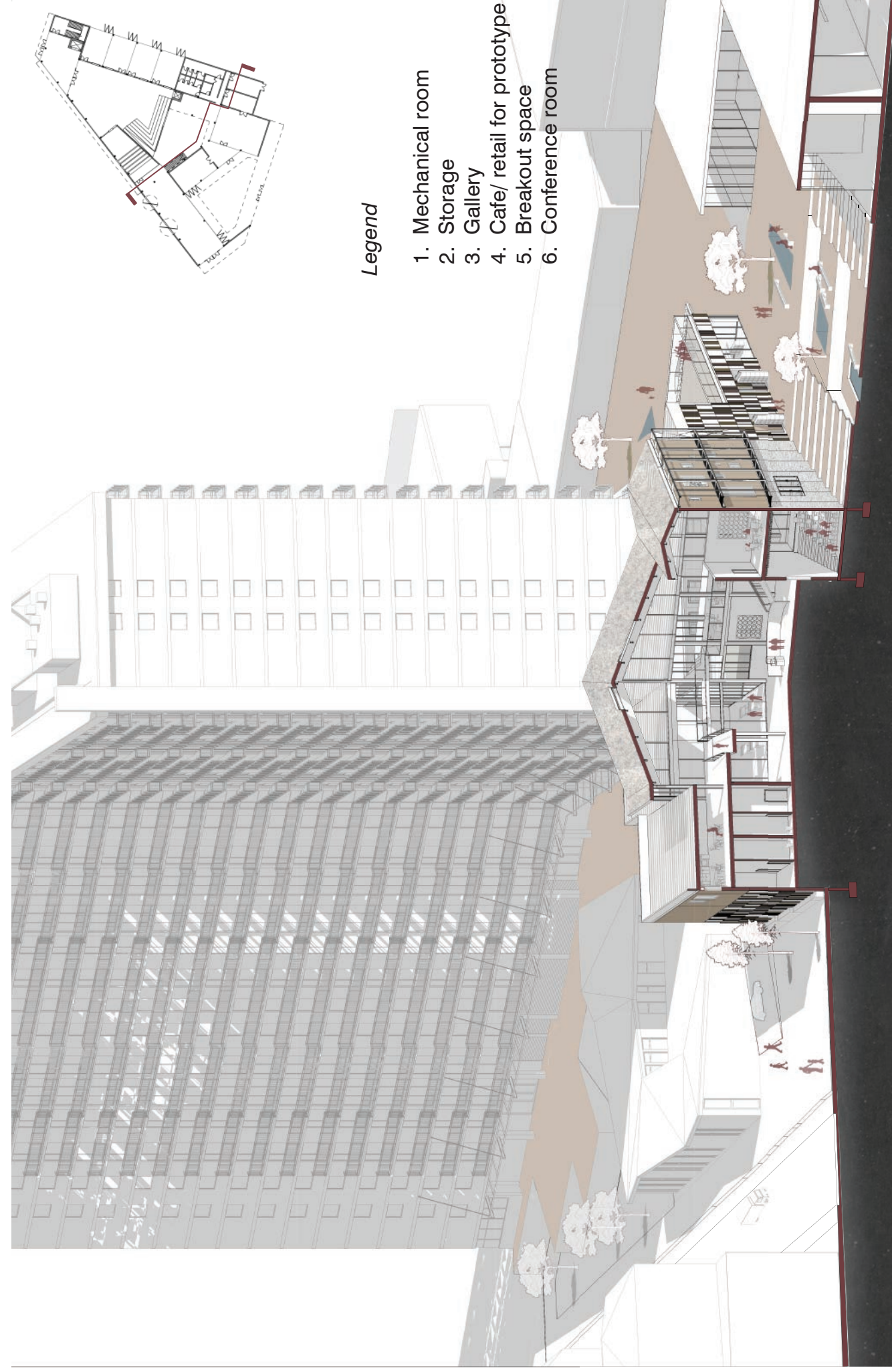
Perspectives





Legend

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

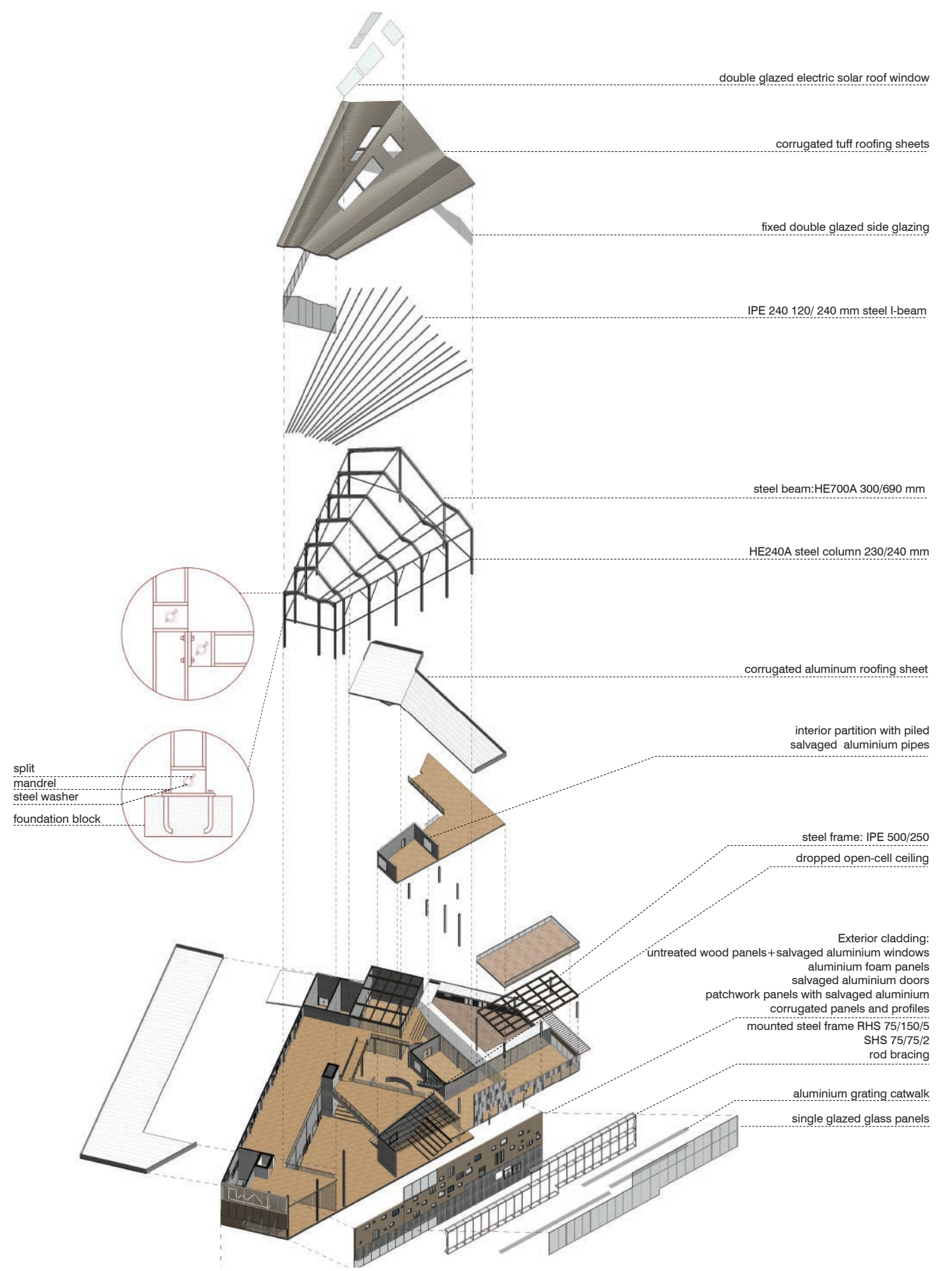
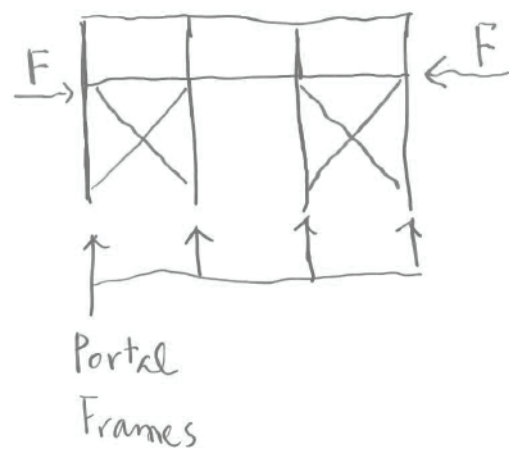
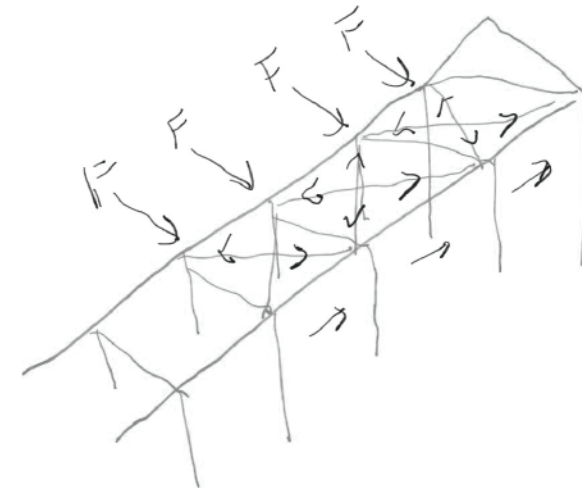
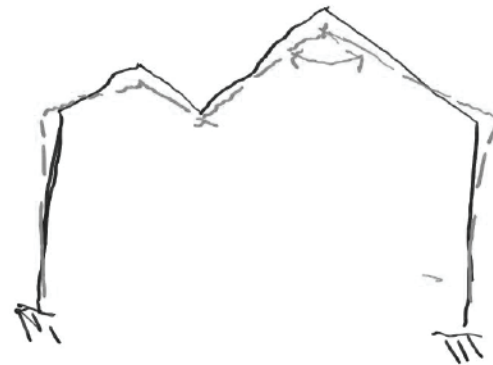
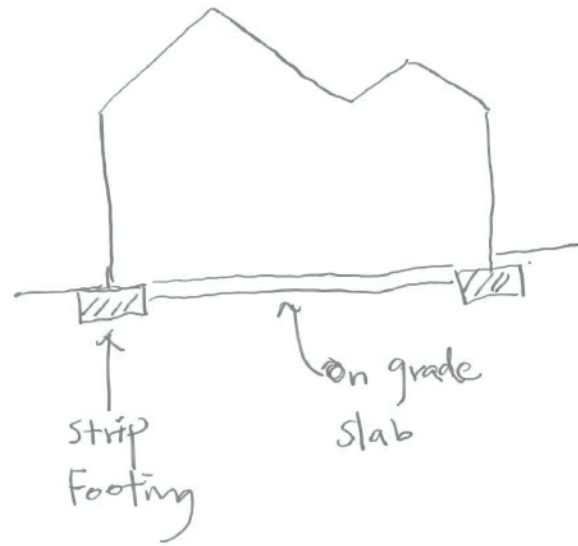


Legend

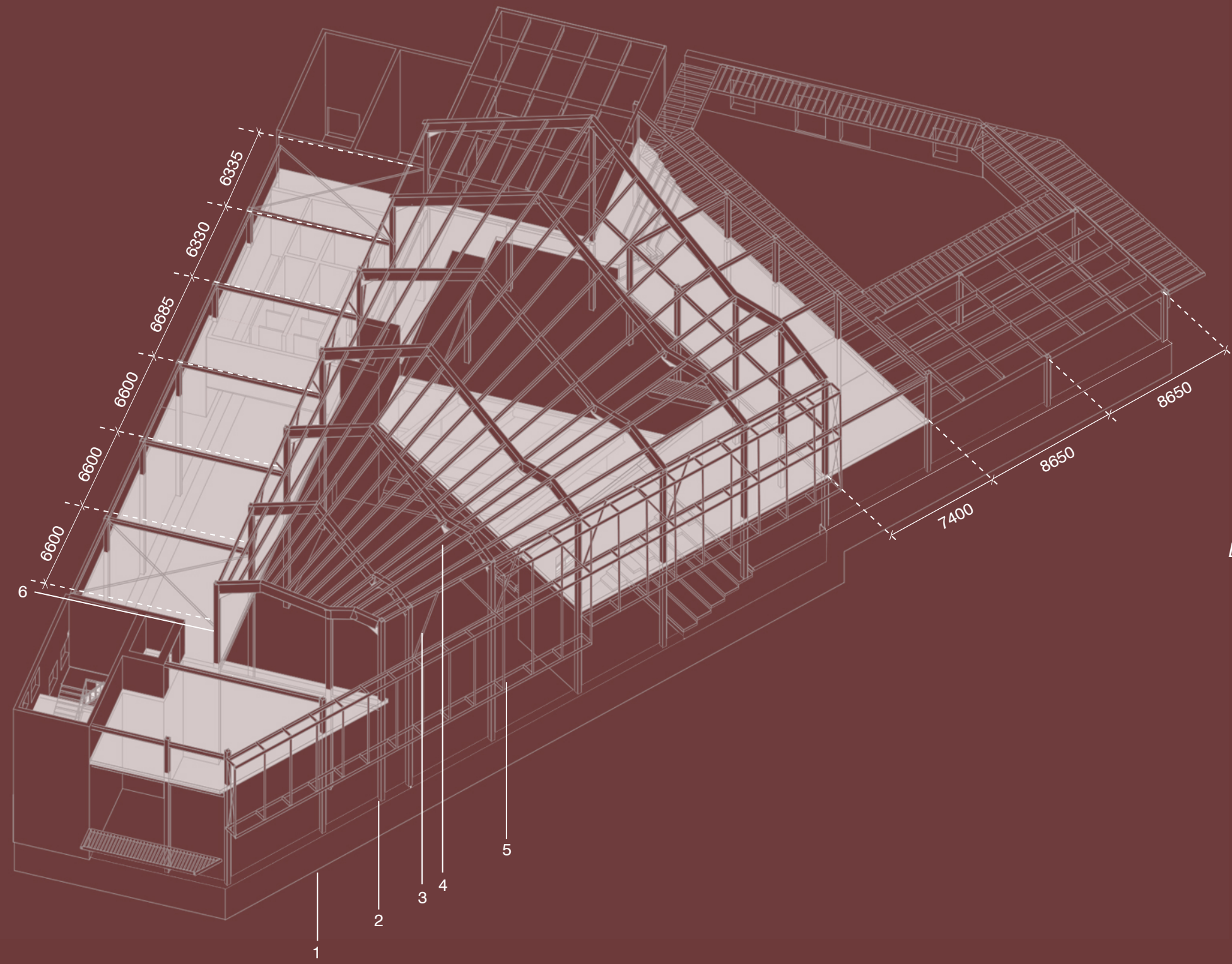
- 1. Mechanical room
- 2. Storage
- 3. Gallery
- 4. Cafe/ retail for prototype
- 5. Breakout space
- 6. Conference room

Building technology/

Structure · Climate · Details

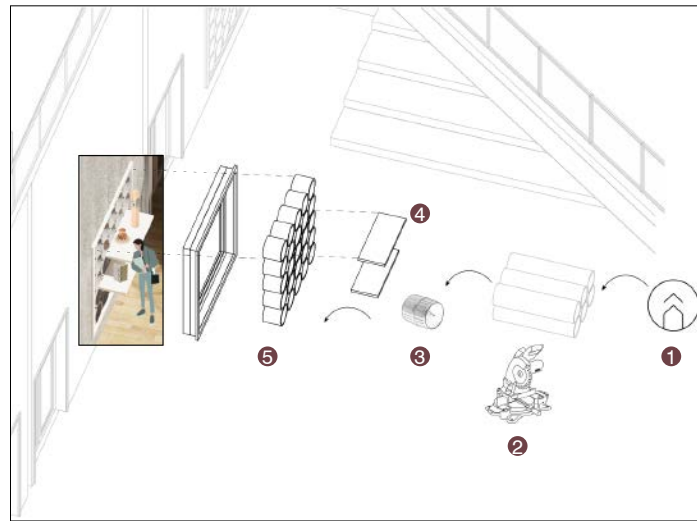


Structure design



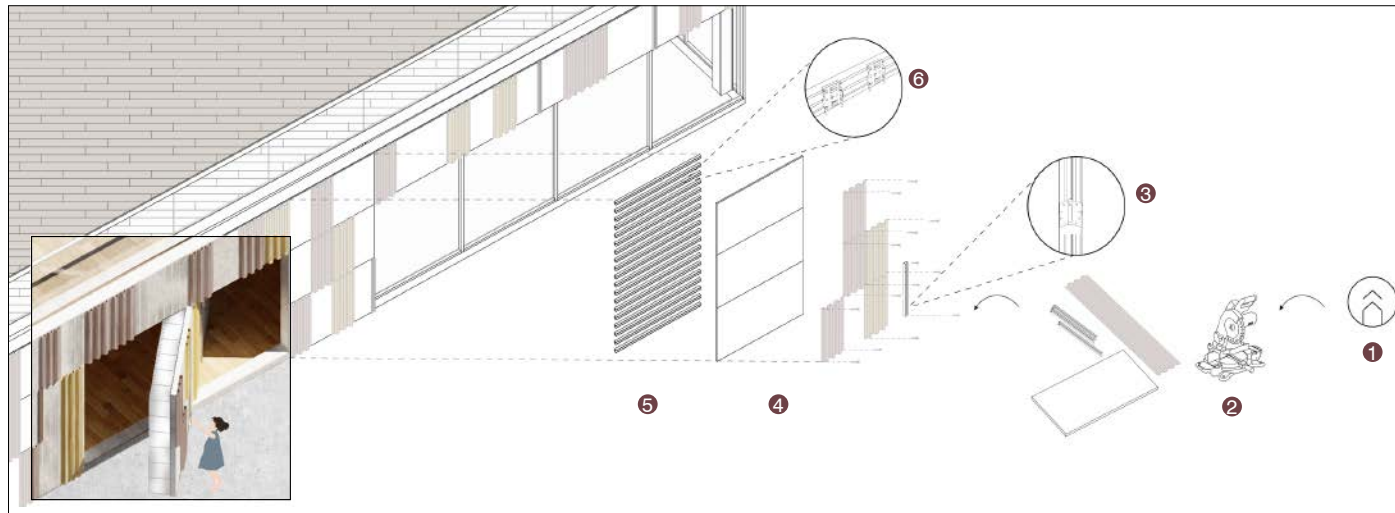
Legend

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



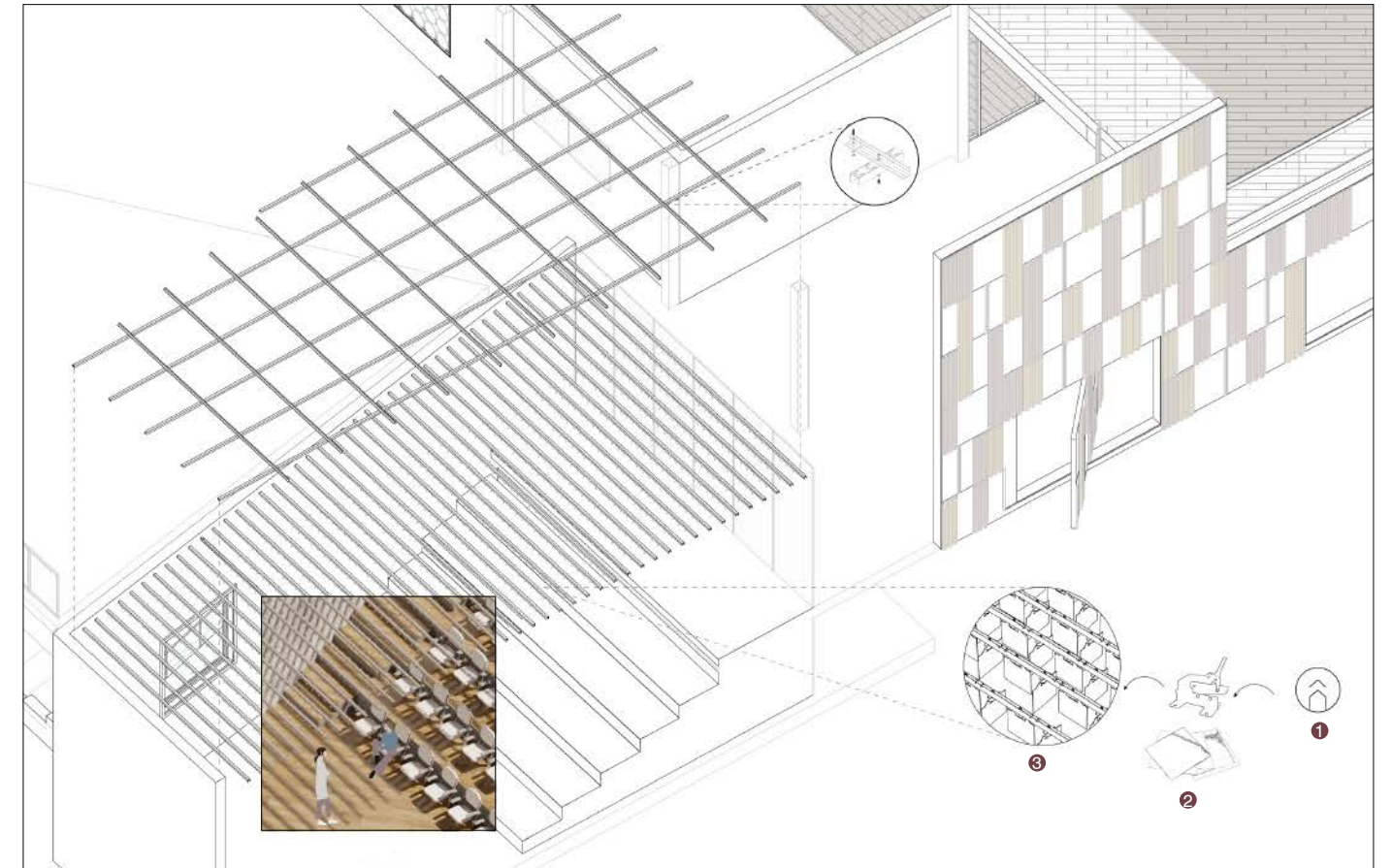
Aluminium pipe partition

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



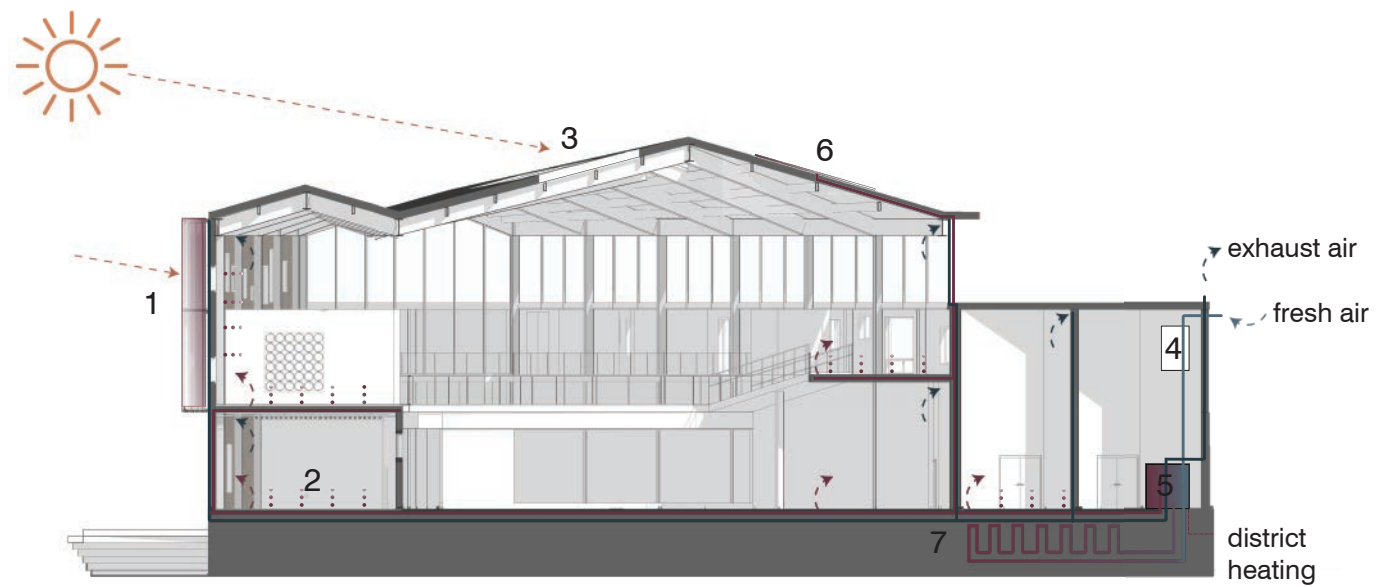
'Patchwork' cladding

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



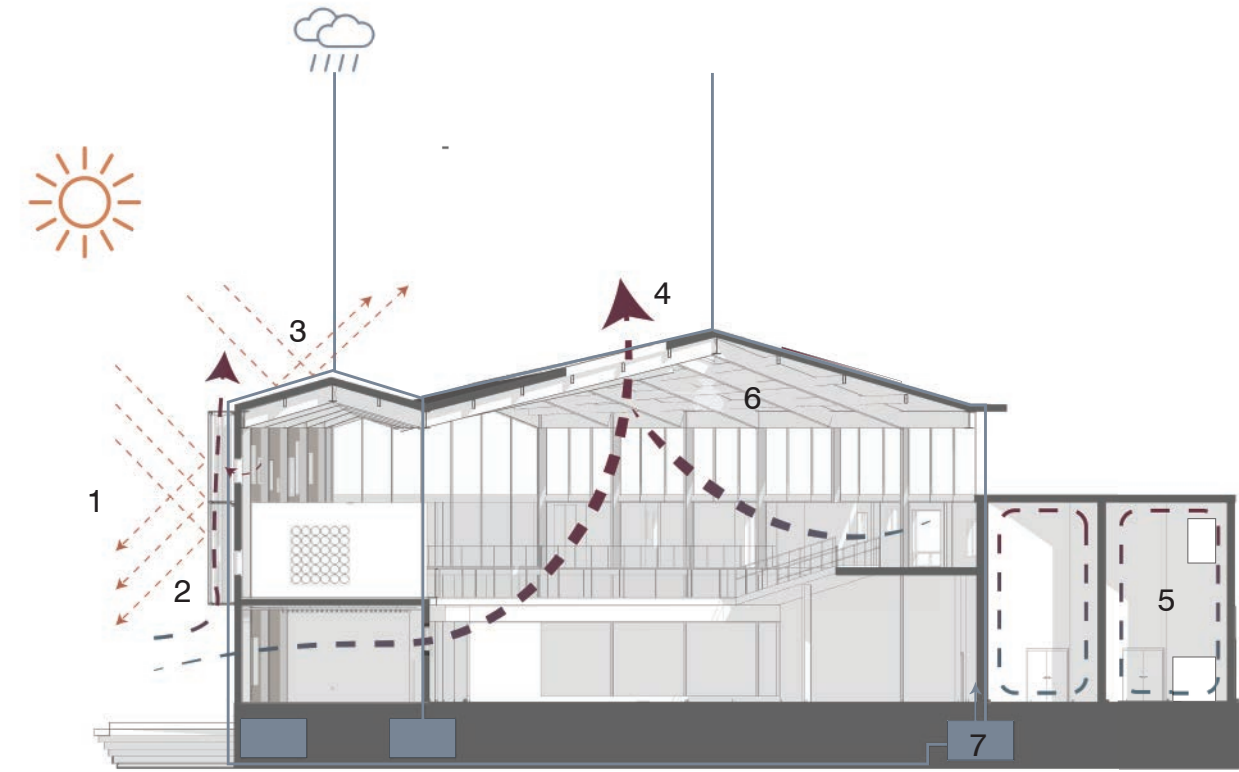
Aluminium open-cell ceiling

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.



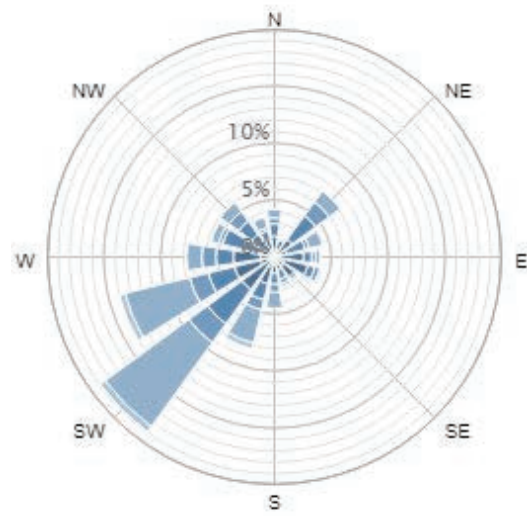
Winter (passive + mechanical heating & mechanical ventilation)

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.

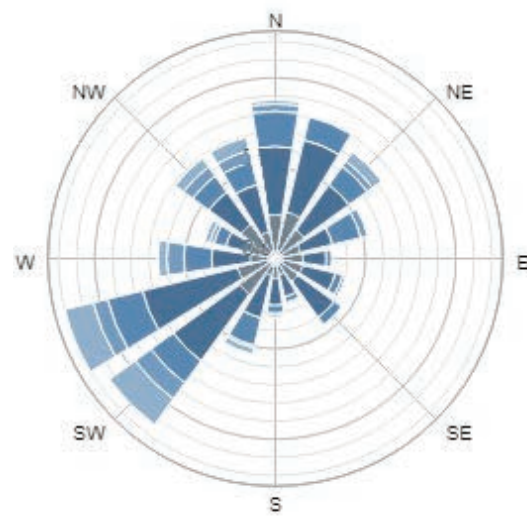


Summer (passive + mechanical cooling & ventilation)

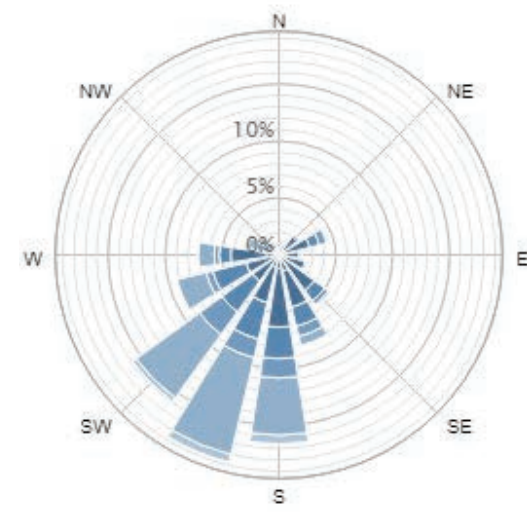
1. Double skin facade reduces solar gain
2. The cavity twin-face facade can be vented outside the building to mitigate solar gain and decrease the cooling load. Excess heat is drained with chimney effect, where differences in air density create a circular motion that causes warmer air to escape. As the 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 cladded 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



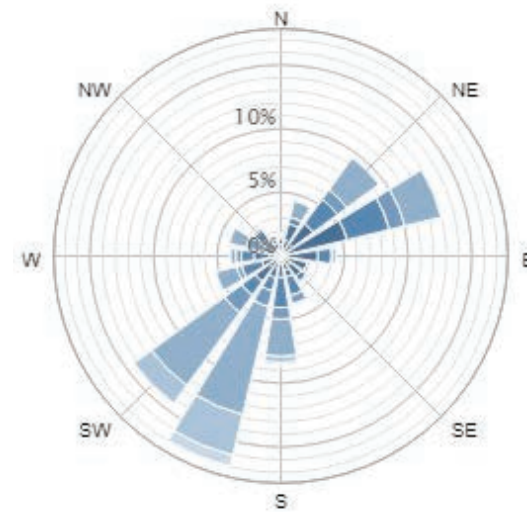
Mar - May



Jun - Aug



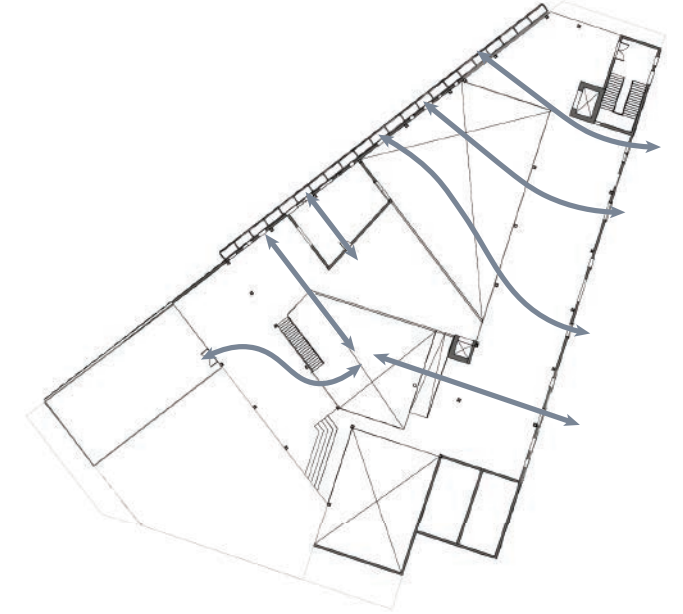
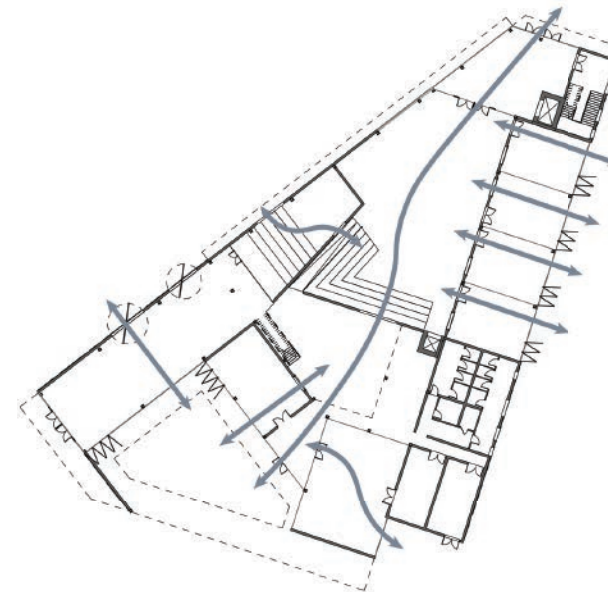
Sep - Nov



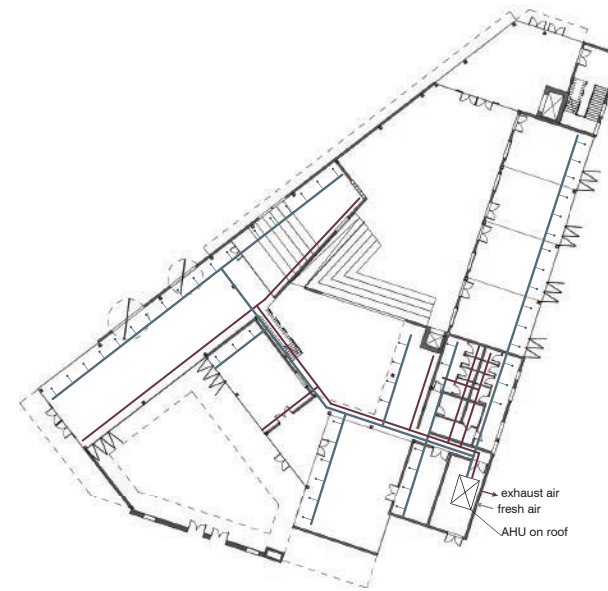
Dec - Feb

Wind rose

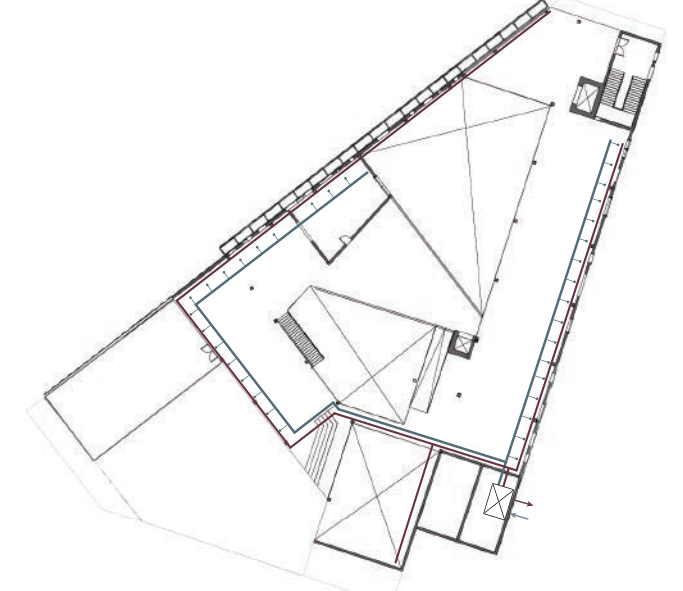
Cross ventilation



Mechanical ventilation



G/F



1/F

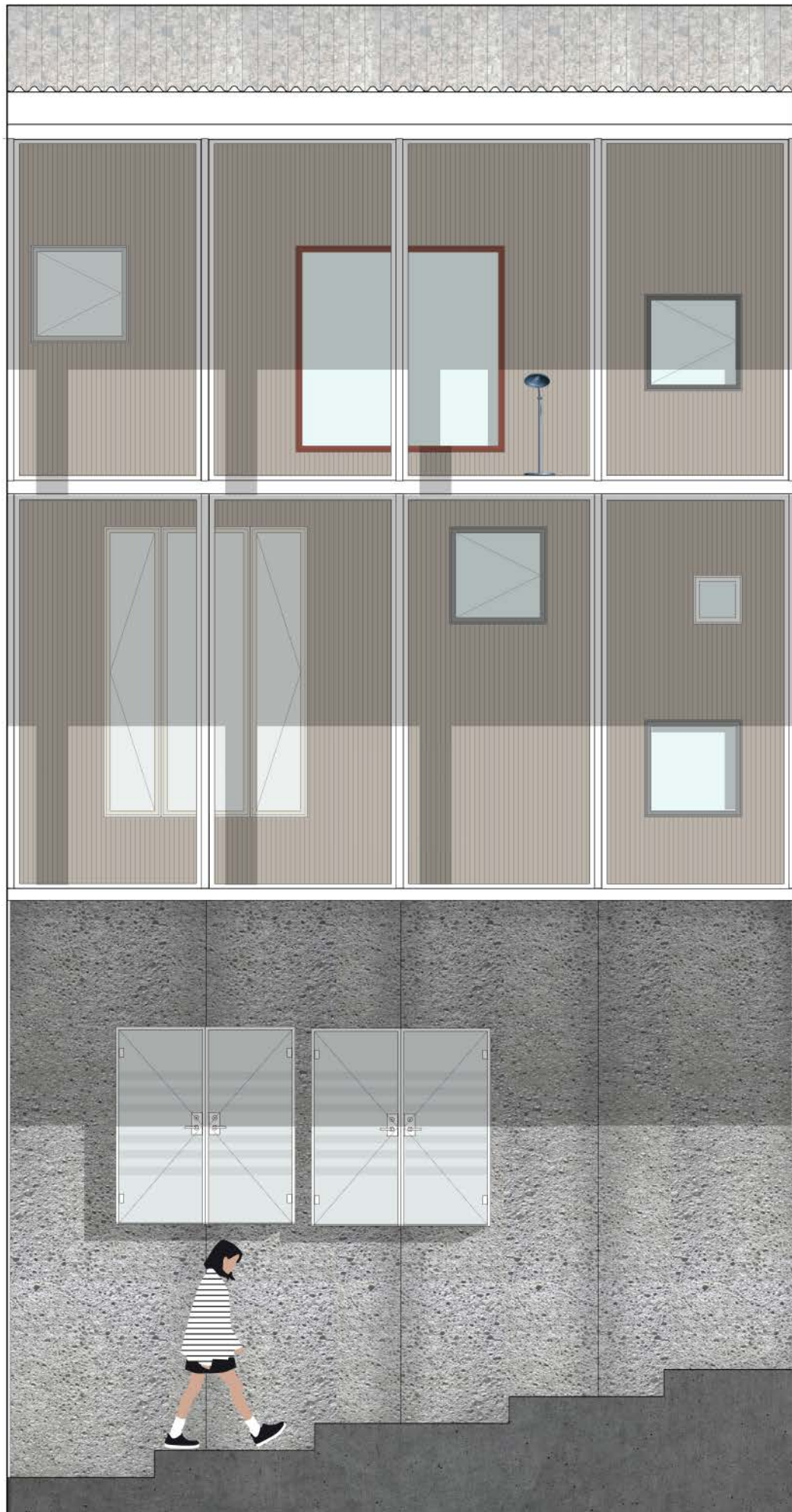
Hybrid ventilation- cross ventilation



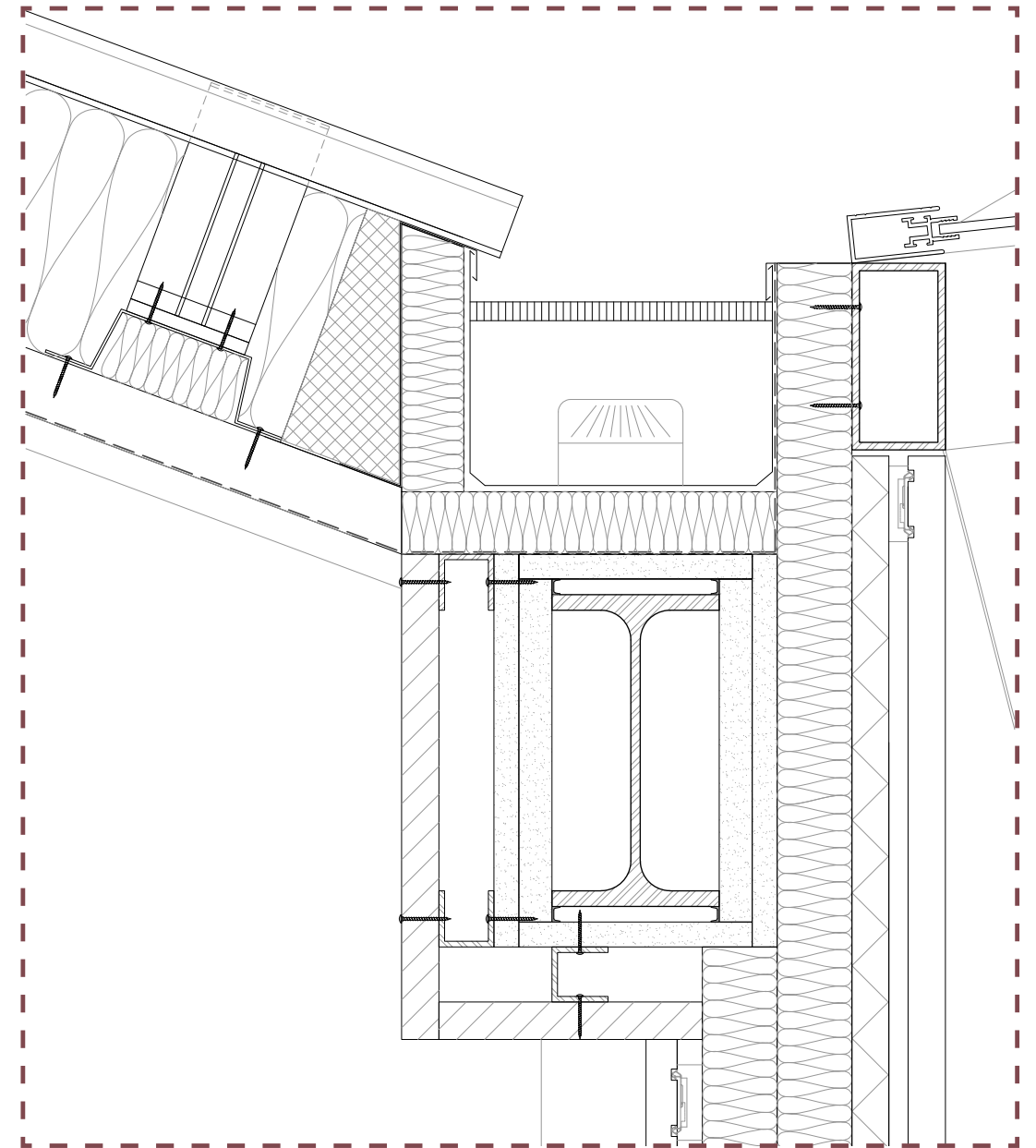
Legend

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

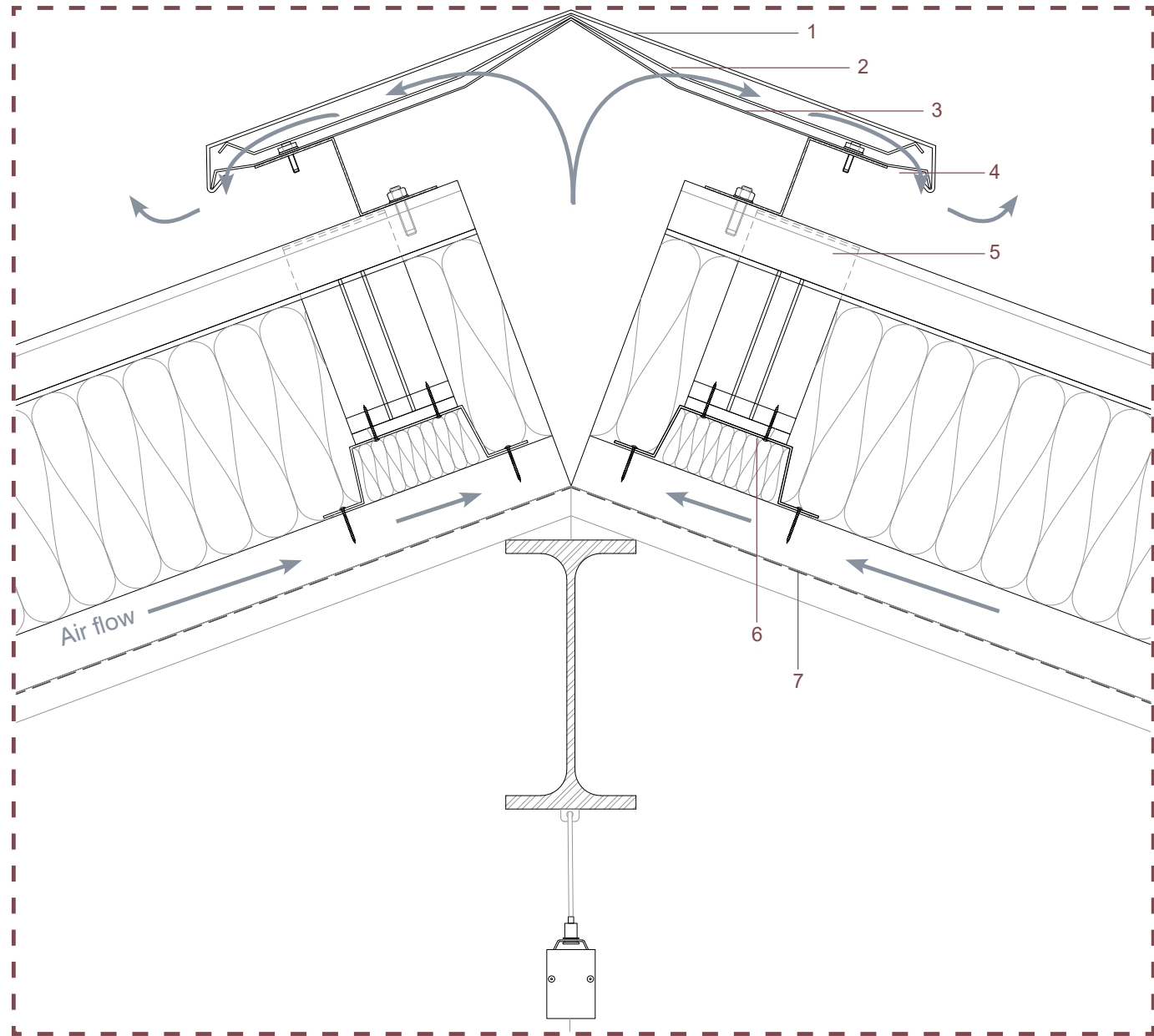
1:50 Section



1:50 Elevation

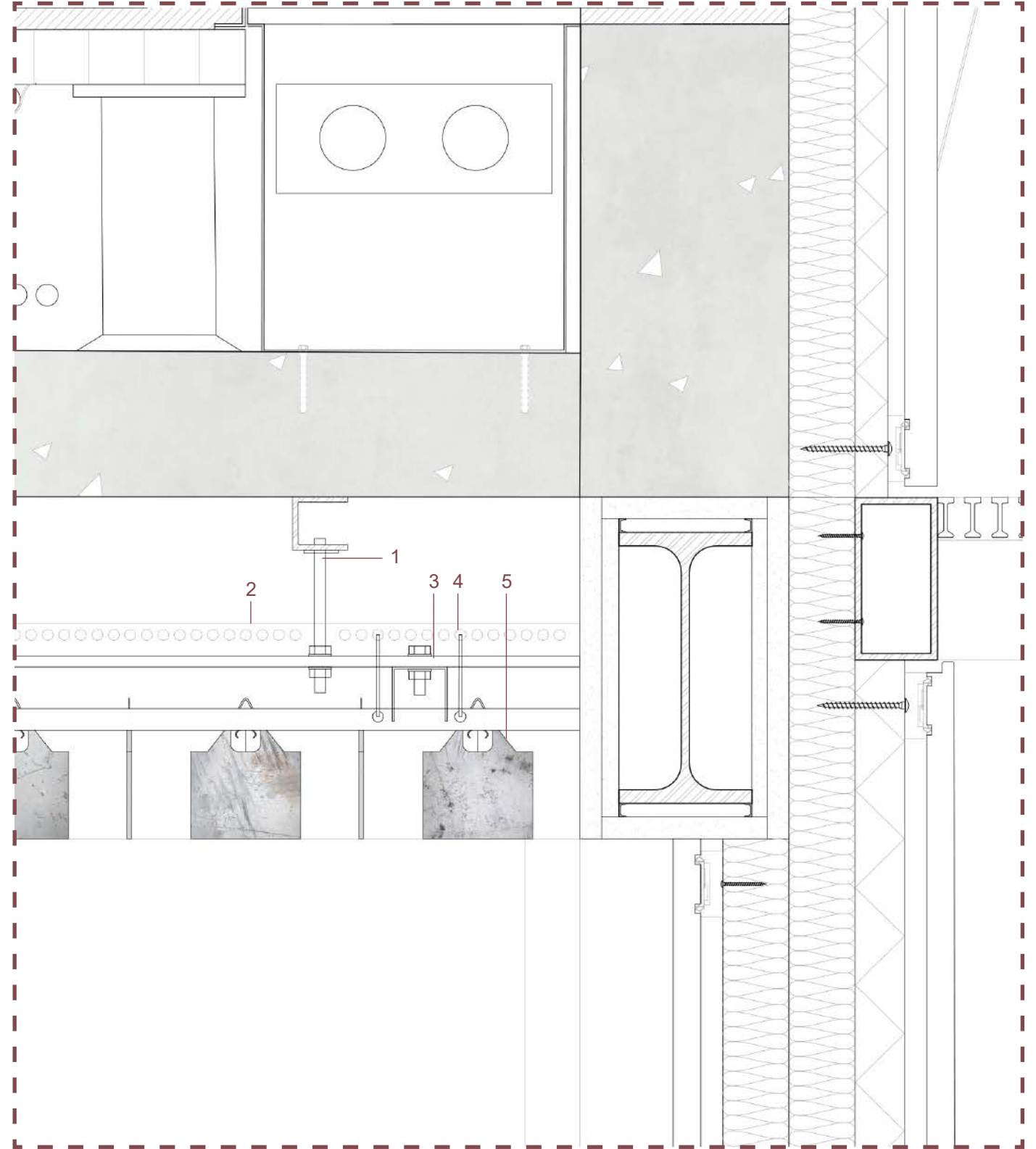


1:5 Detail



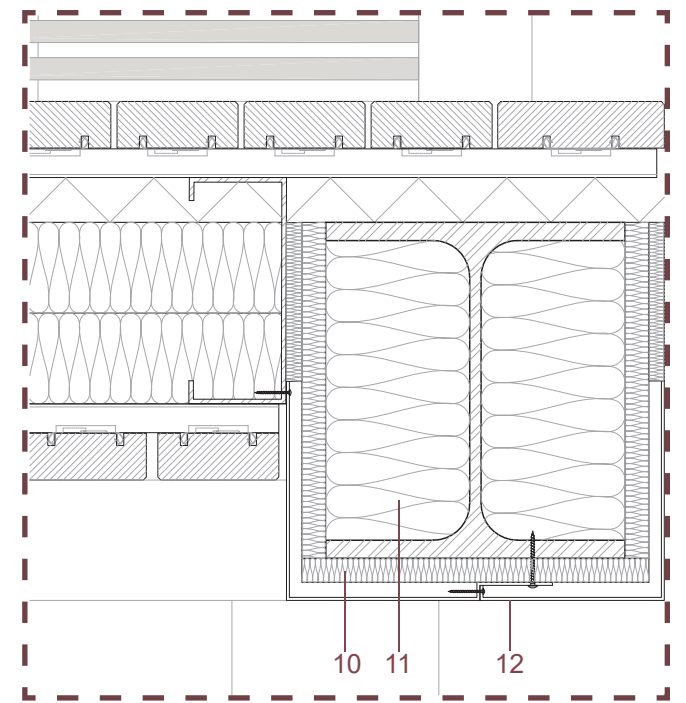
Legend

- 1. Ridge cover cap plate
- 2. Stainless steel spring
- 3. Expanded metal support screen
- 4. Aluminium Z bracket
- 5. Compound Al. clip with thermal barrier
- 6. Top-hat sub purlin
- 7. Vapour control layer

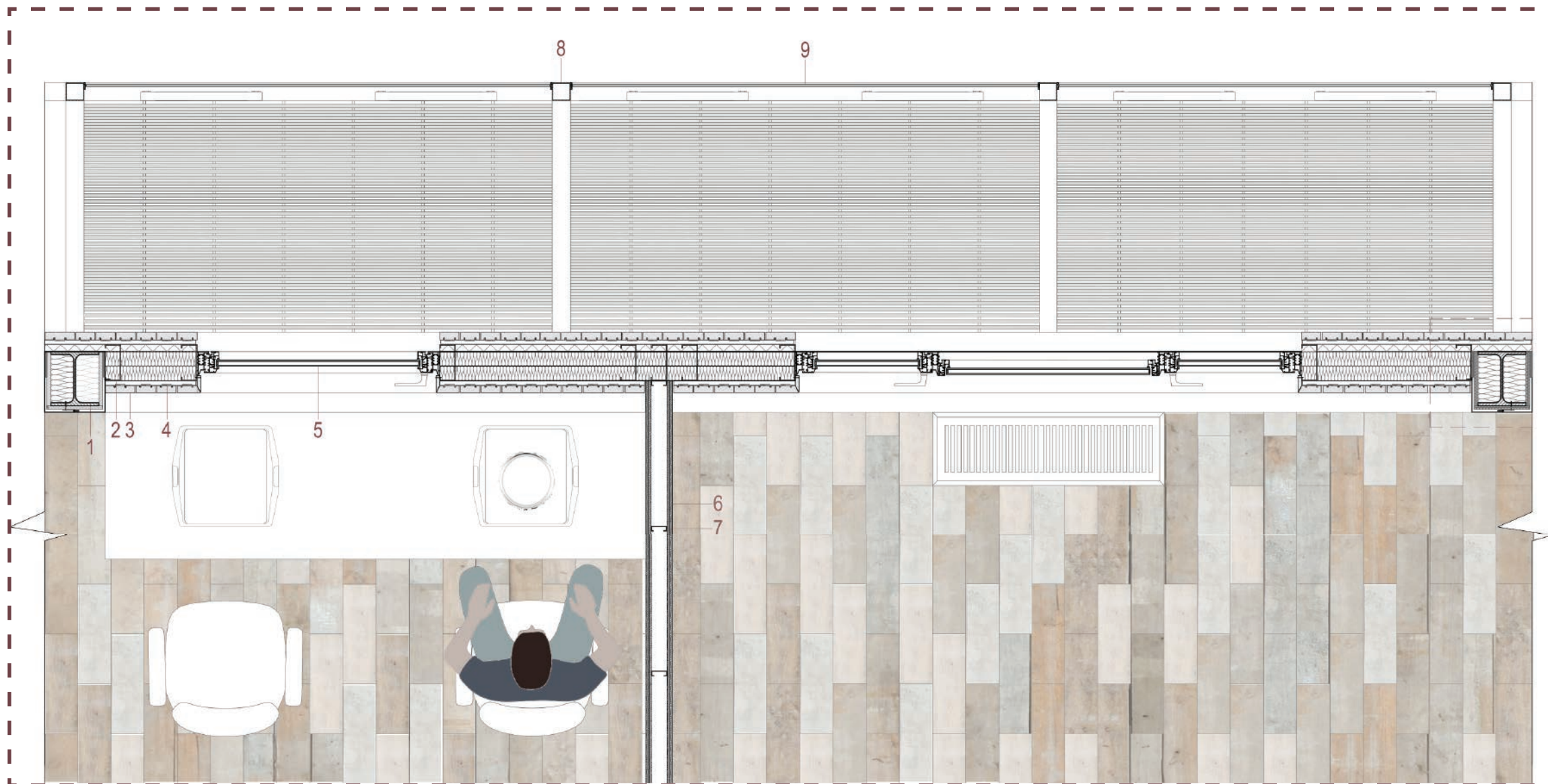


Legend

- 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: 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