legacy lab

a holistic approach to the adaptive reuse of industrial heritage through a hybrid public condenser

AR3AP100 P5
Public Building Graduation Studio
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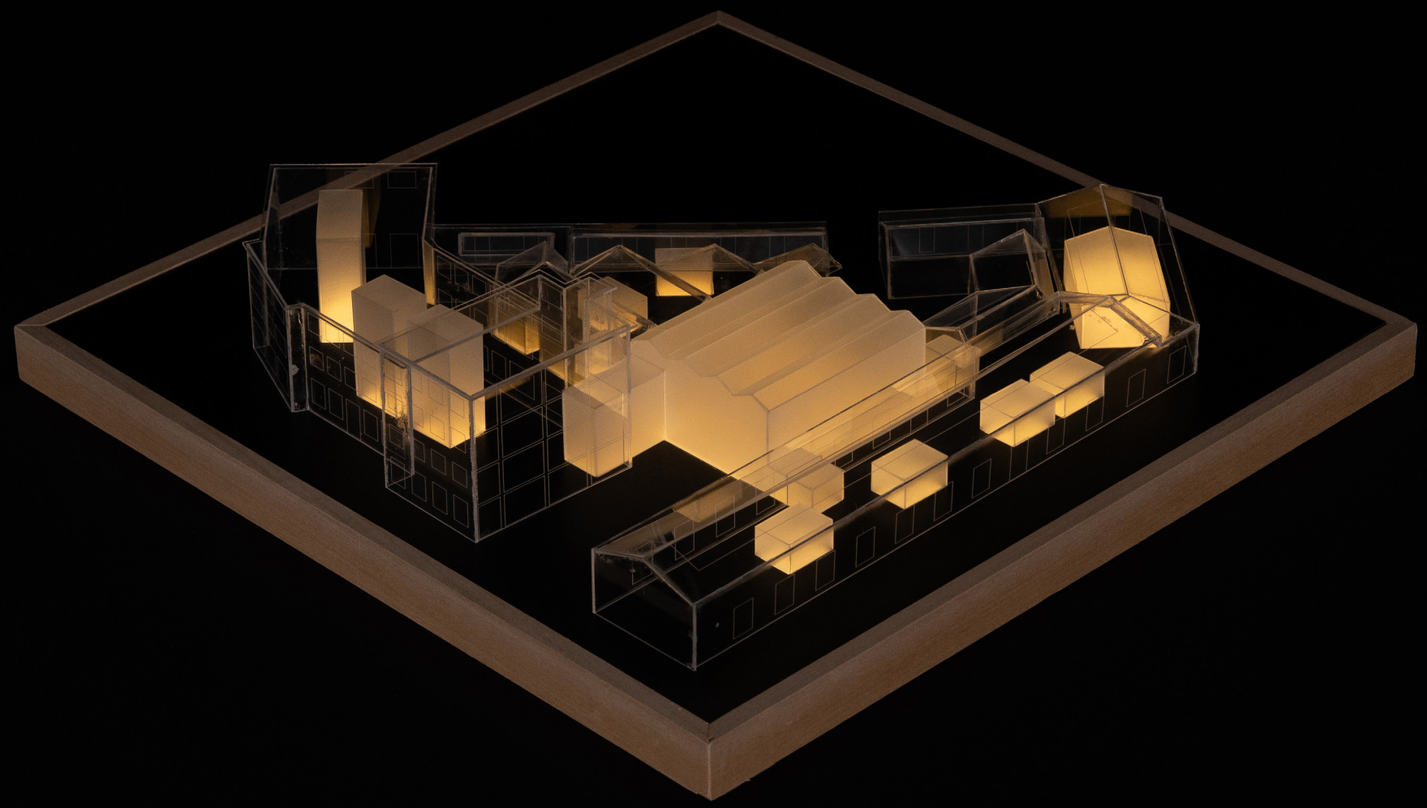
content

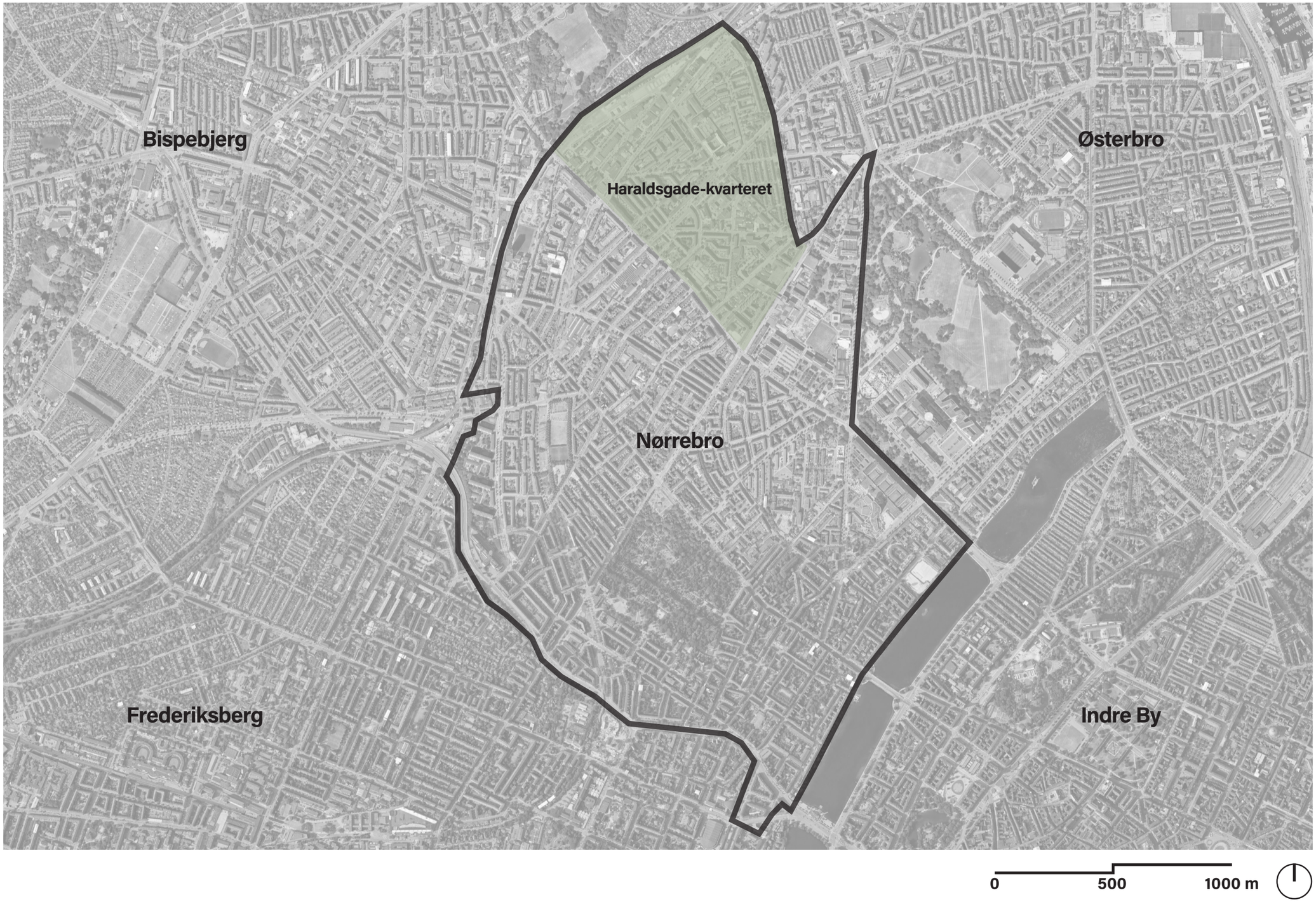


01
assignment

*Design a **"Public Condenser"** – a communal building integrating recreational, educational and social functions to foster health and community.*

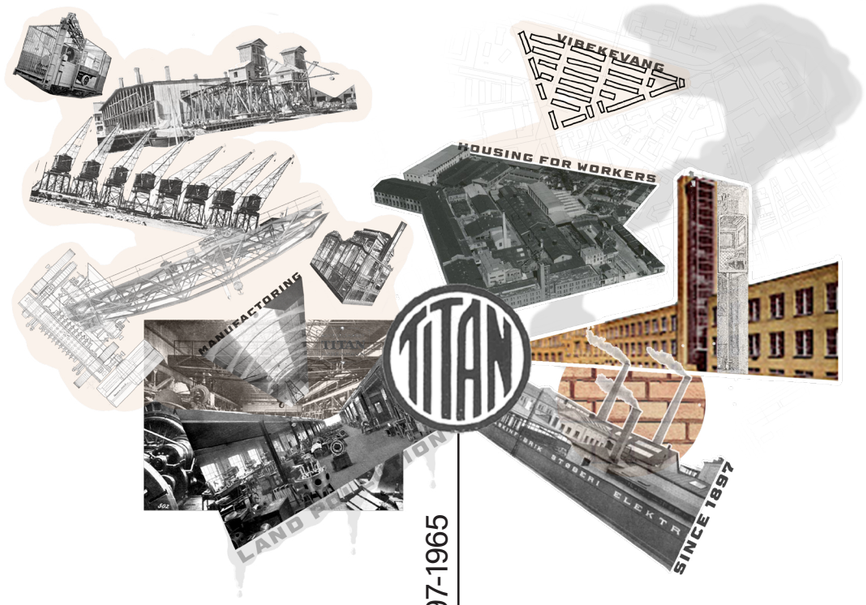
Focus on hybridity, resilience, multiplicity, sustainability, healthiness and nature inclusiveness.

01
assigned area



01
assigned area

01
history



1897-1965

Industrial decline

1960's

Social housing

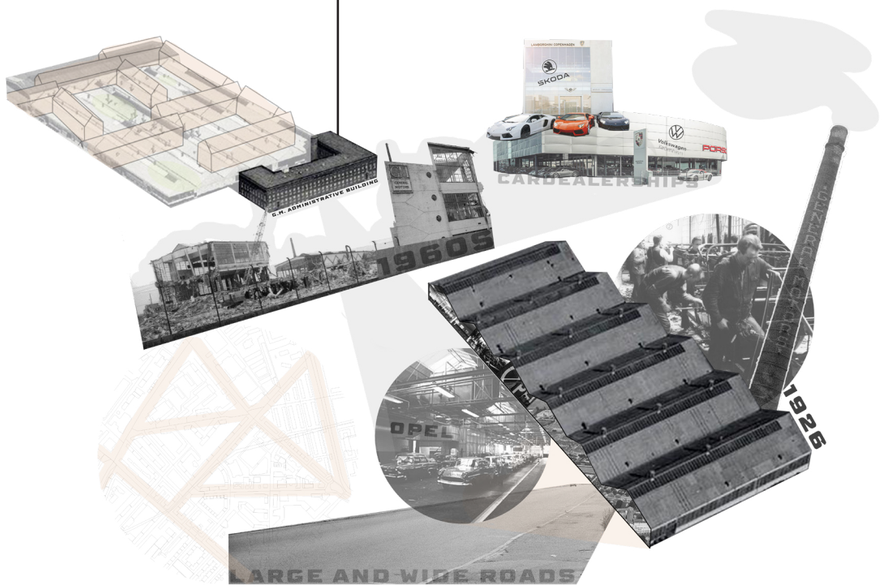
1970's-1980's

University College Copenhagen

2008

1900

1929-1974

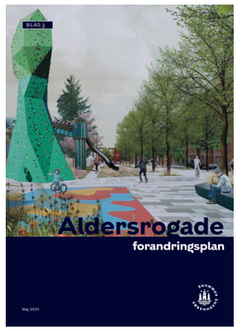


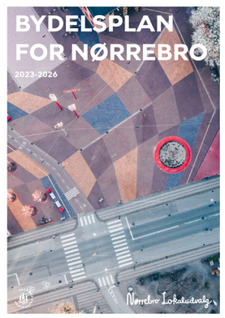
2019

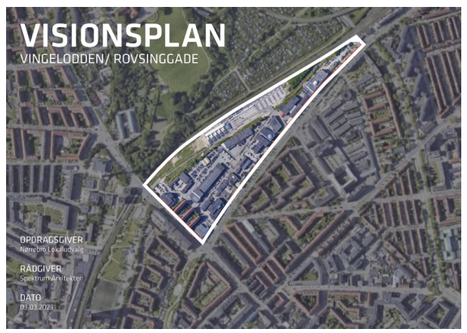
Metro Skjolds Plads

01
neighbourhood identity

01
existing plans







01
preservation act in denmark

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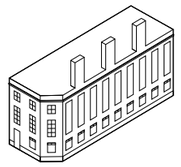
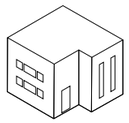
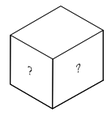
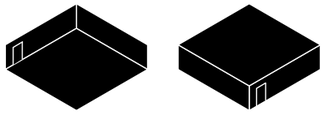
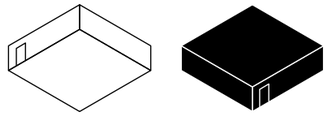
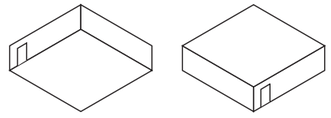
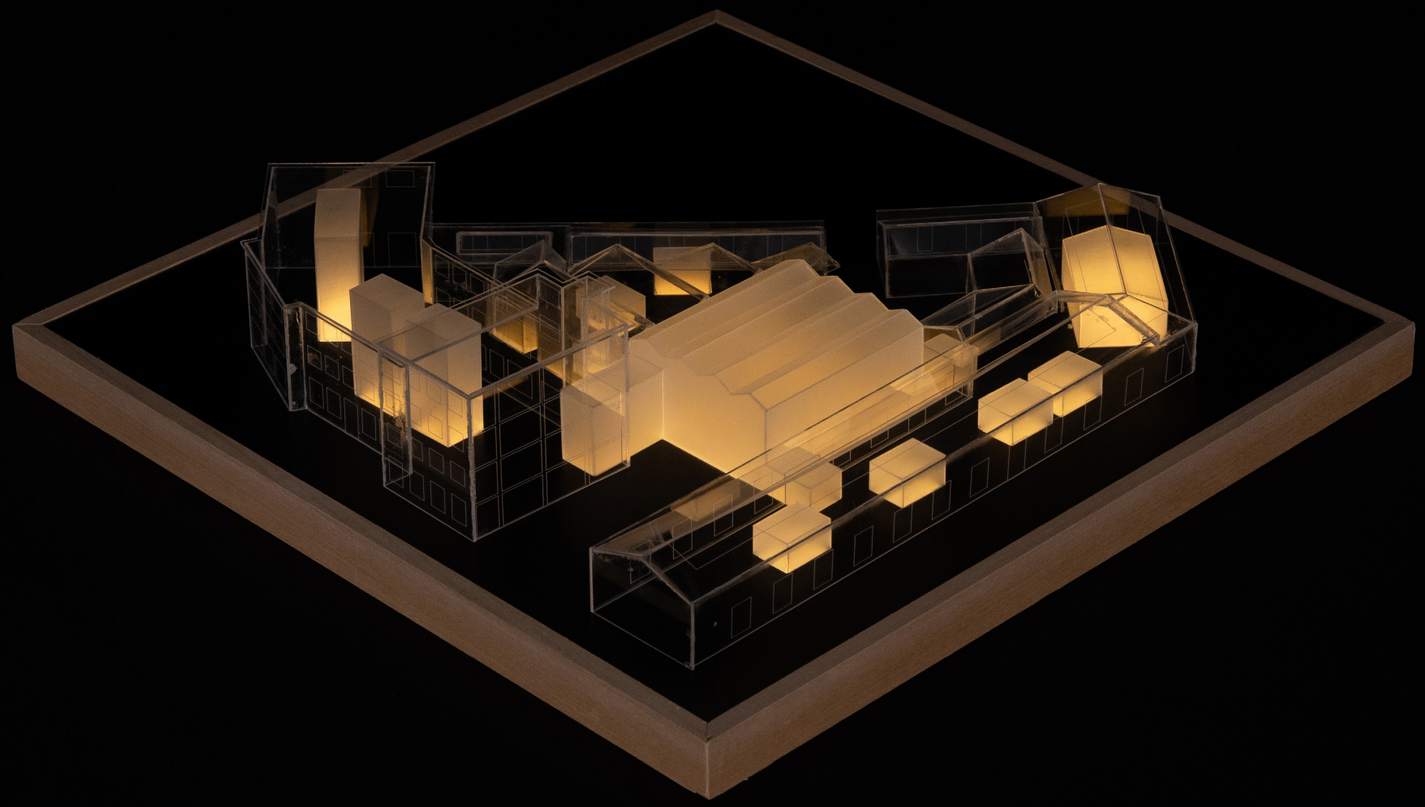
category	 listed buildings	 buildings worth of preservation	
protection	 in- & exterior	 exterior	 none

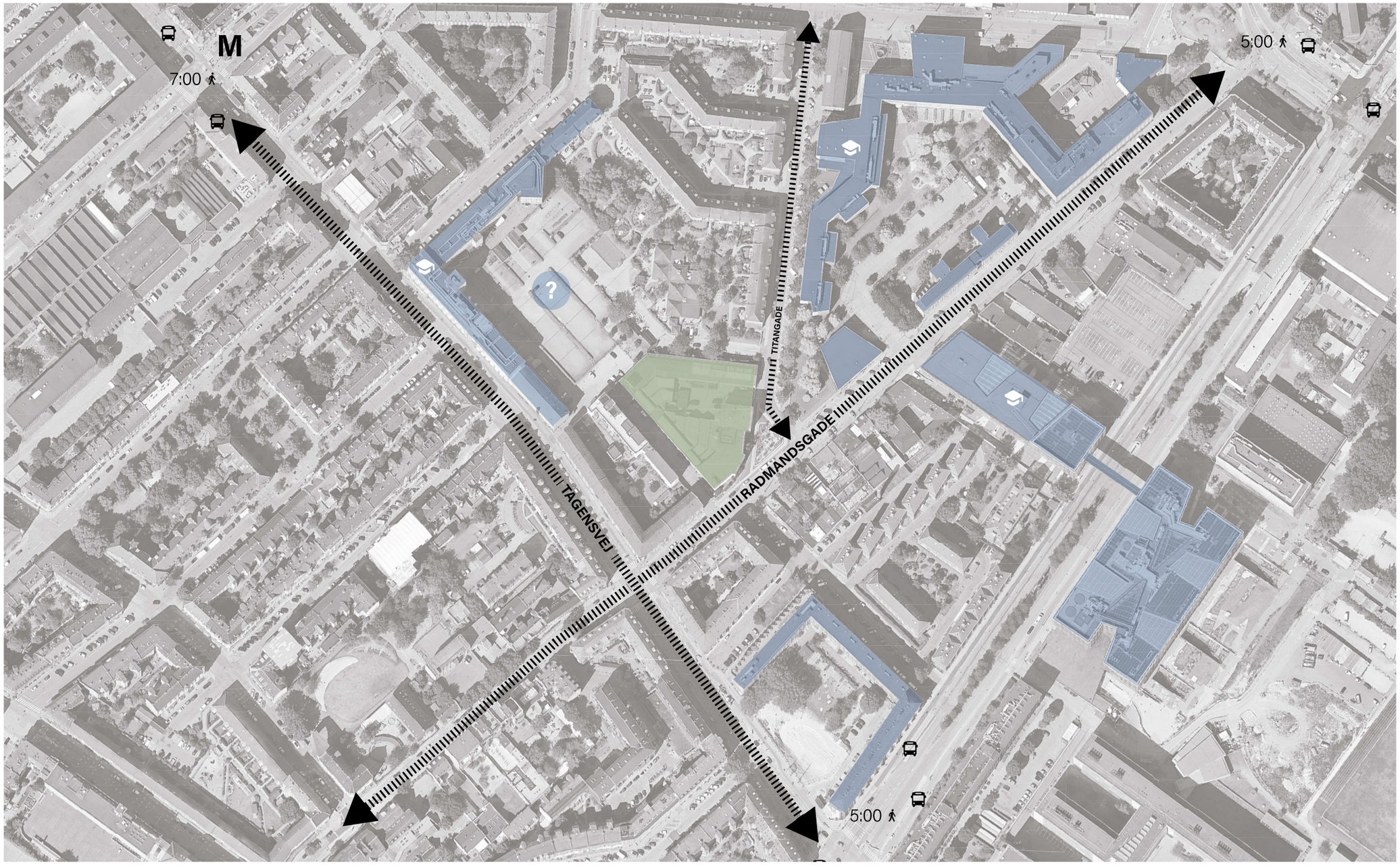
01
research question

“How can the adaptive reuse of industrial heritage as a hybrid public condenser contribute to preserving neighbourhood identity in areas undergoing urban redevelopment?”

content



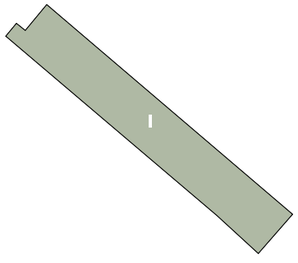
02
location



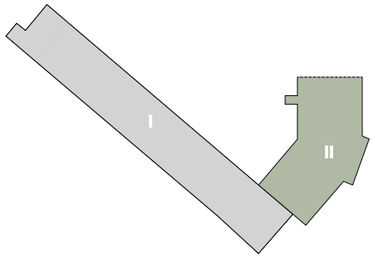
site attributes

- marked for demolition: **no**
- listed heritage: **no**
- conservation value: **low**
- site area: **5729 m²**
- vacant: **yes**

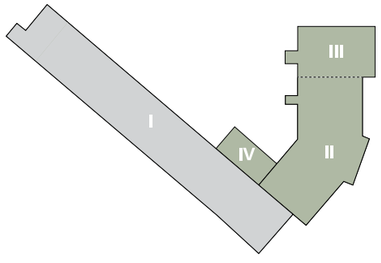
site history



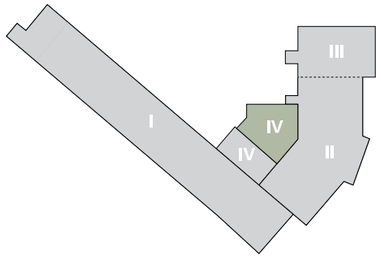
A) 1921



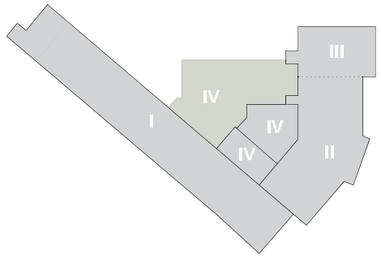
B) 1930



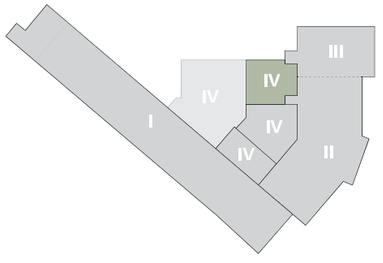
C) 1938



D) 1944



E) 1948



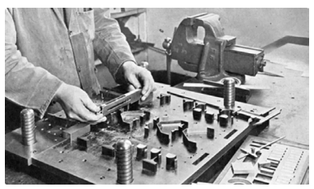
F) 1952

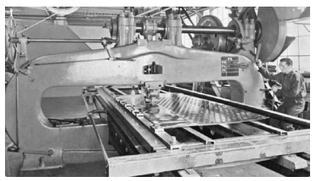
A B C D E F

1901

Establishment of Richard Müller A/S

"Not only making production tools but also producing the products for which the tools were made"





1906

Expanding into perforation

"Avoiding debt to ensure steady controlled expansion, providing a solid foundation for future growth"

1925

Generational transition

"Richard Müller passed away at the age of 52. His son, Ernst Müller, trained as a toolmaker within the company and took over leadership at just 26 years old."

1930

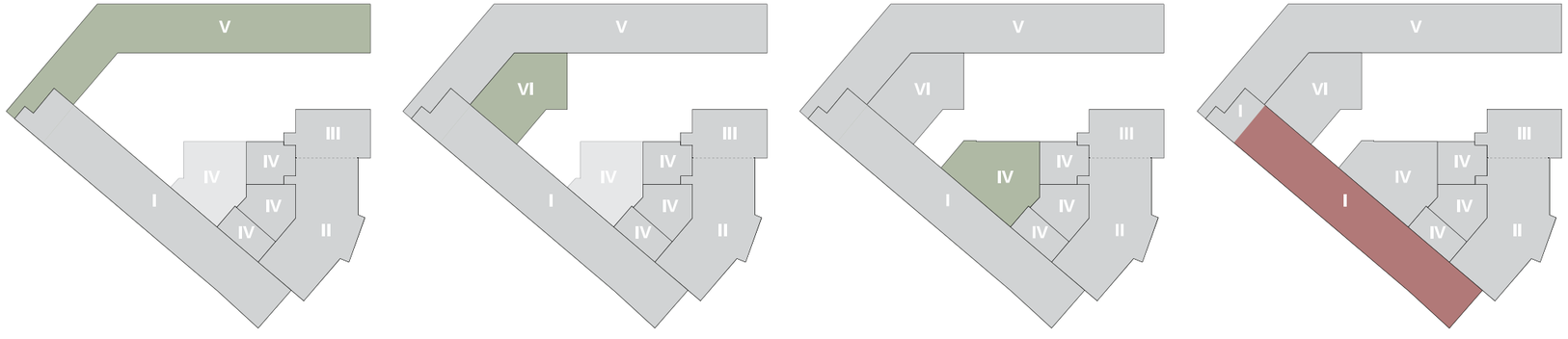
Social consciousness

"Paid holidays were introduced. They were the first company within Danish metal industry to do so"

1936

A new corporate structure

"Transition from an individually owned business into a limited liability company, with Ernst Müller as the controlling shareholder and managing director."



G) 1952 *H) 1955* *I) 1957* *J) 2000*

G

1960

New technology, new opportunities

"Not only producing perforation tools, but manufacturing the machines to make the tools themselves."

H

1965

New generation and location

"Establishment of foundation which exist until this day. Considerable export activity, need for larger production facility emerged. Move to Ballerup."

I

1971

A/S Solicath' Express Co.
(new owner)

Subletting to other companies:
- *gears manufacturer*
- *geotechnical institute*
- *engraving firm*
- *"kliché" factory*

1993

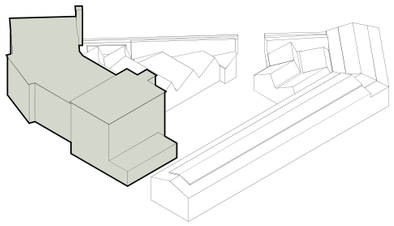
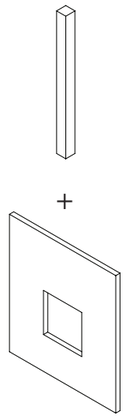
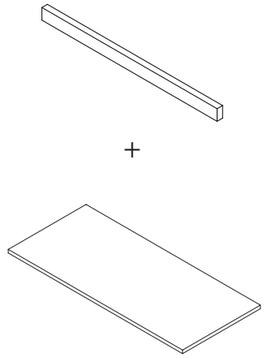
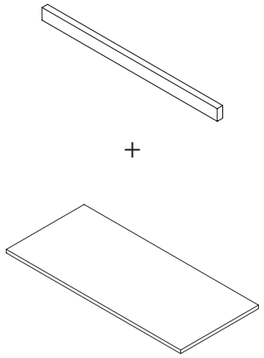
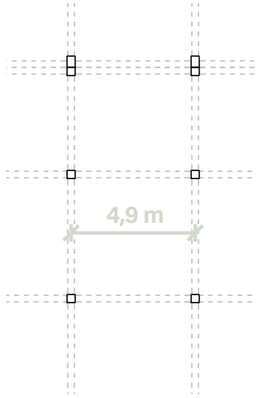
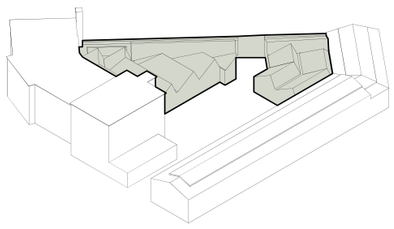
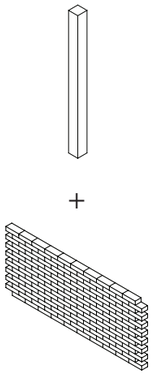
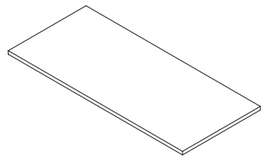
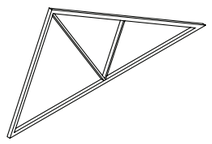
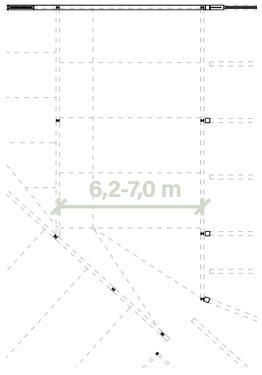
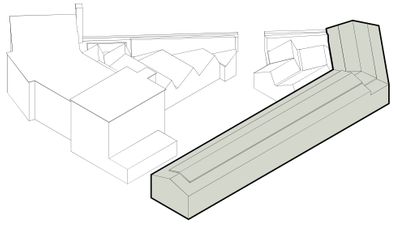
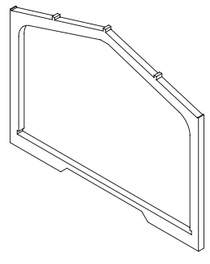
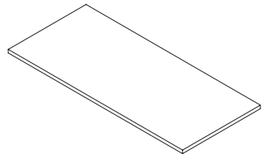
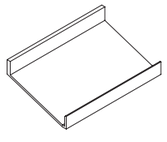
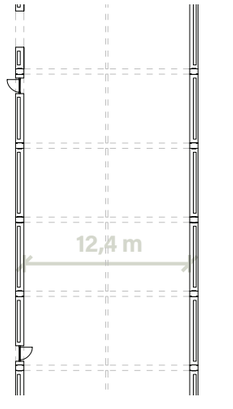
EBH Nordisk Film
(new owner)

"For several decades the Rådmandsgade-complex has been home to various media-production companies, such as the tv-channel DK4."

"Studio 55 is the concert hall of the TV station DK4, where their live music recordings, award shows, etc. are held."

?

02
components & characteristics

	area	*structural components*			*materials*	*internal organization*
						
						
						

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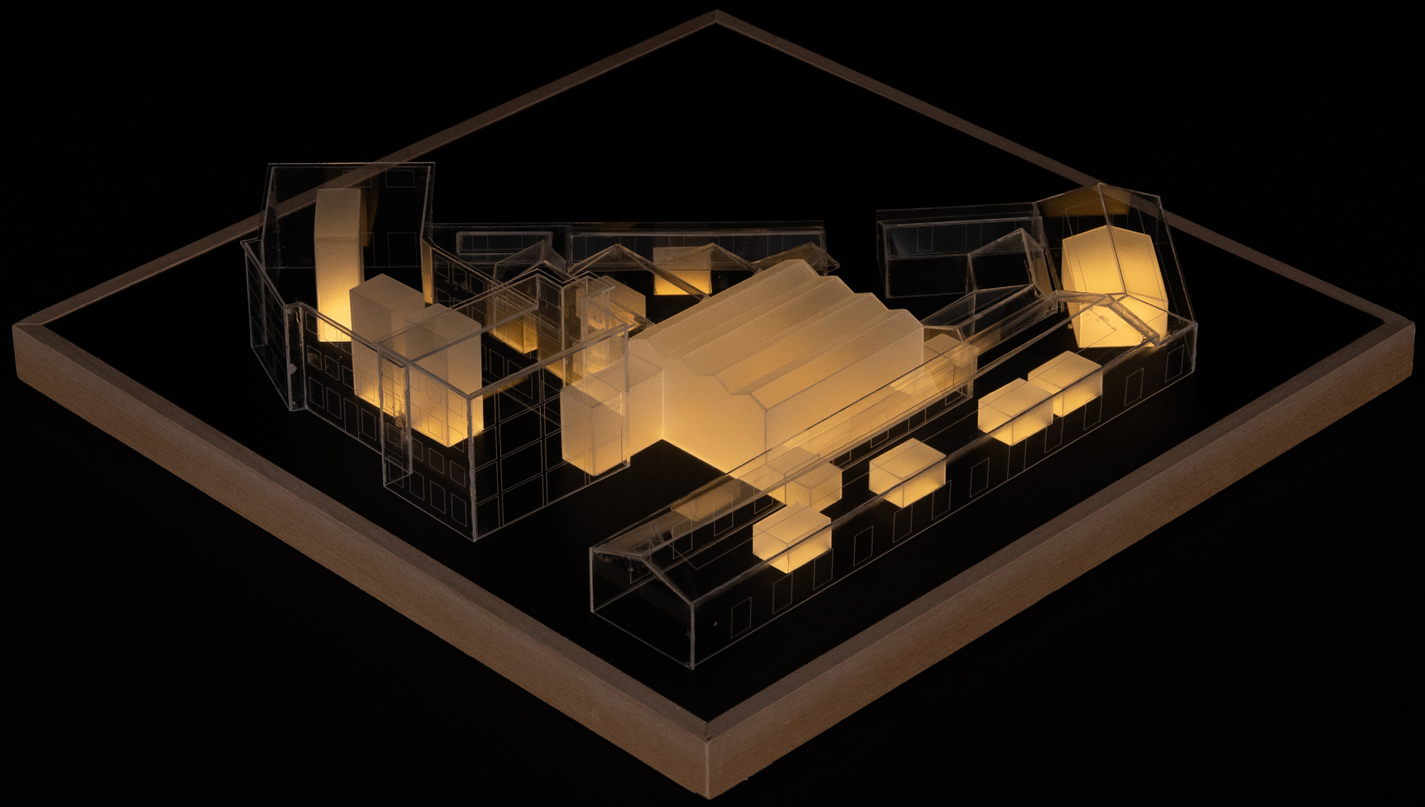
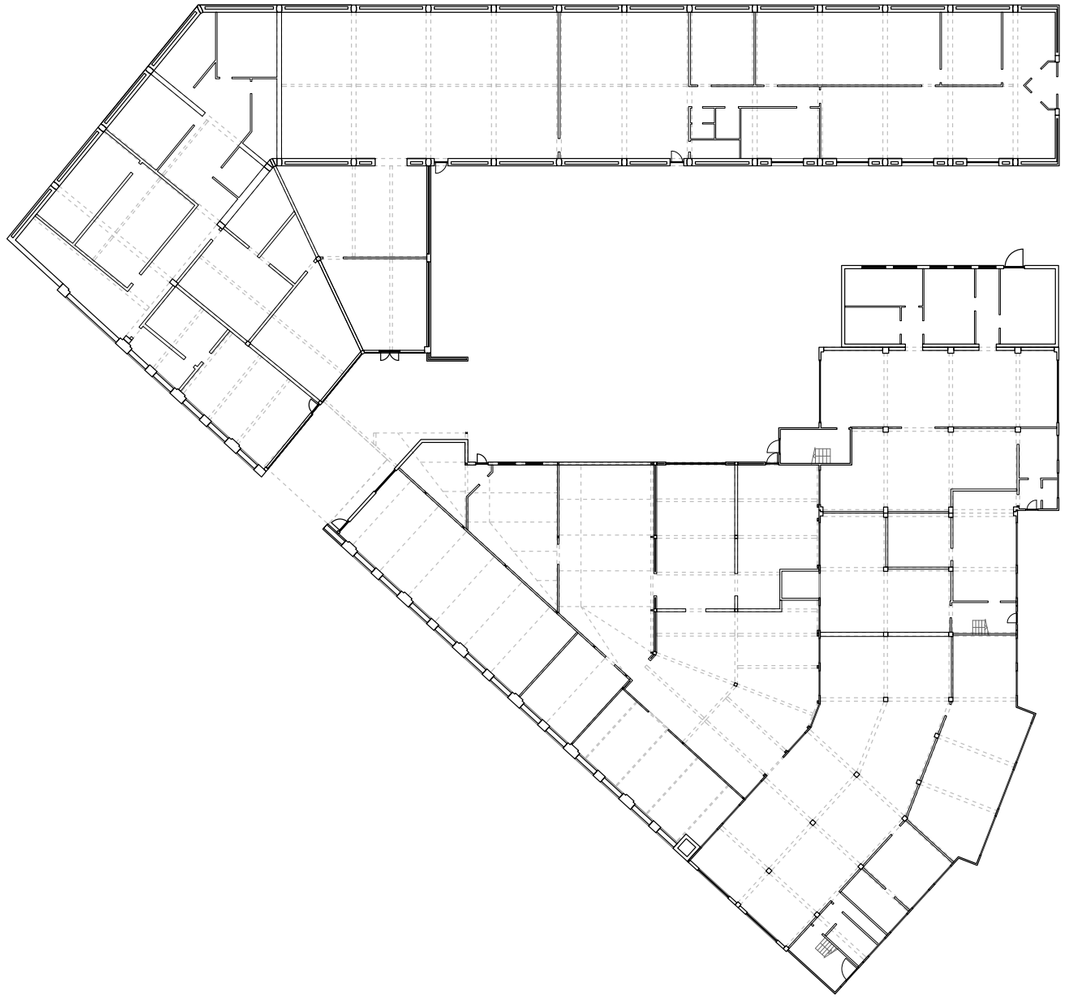
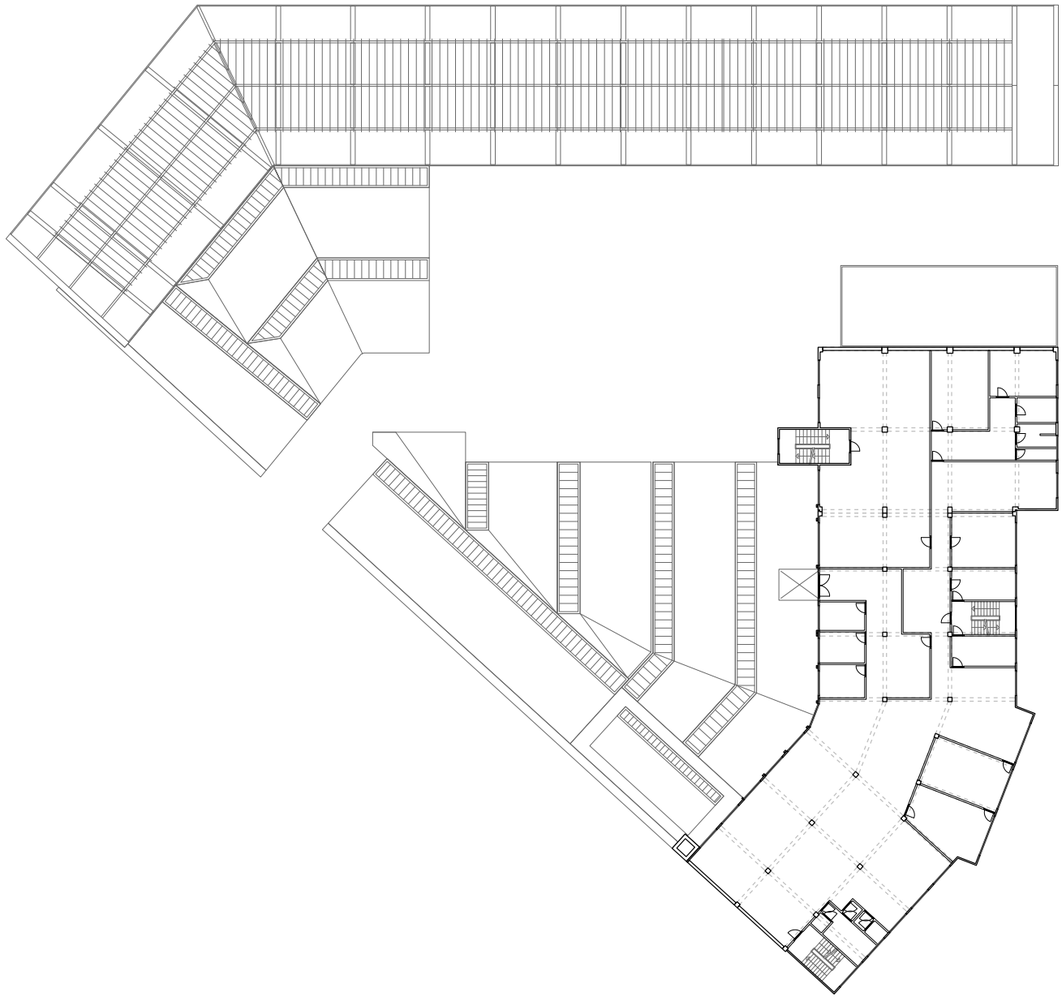


existing situation

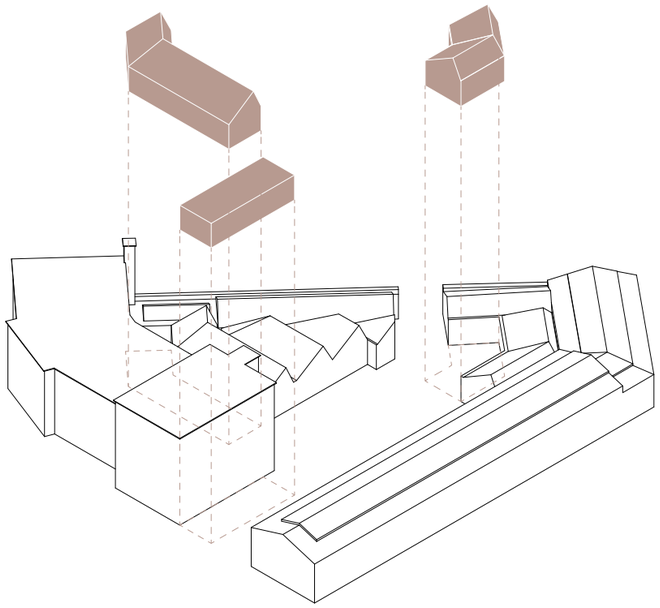


level 0

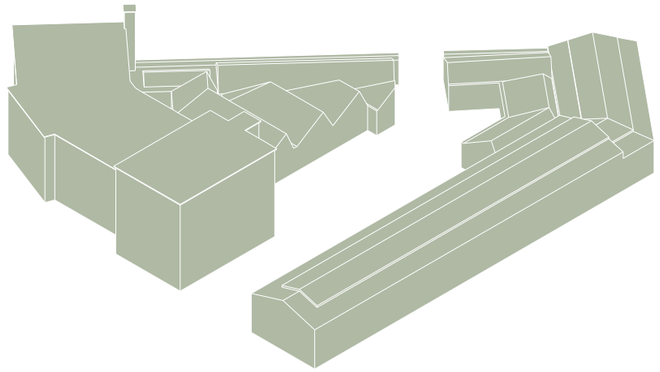


level 1

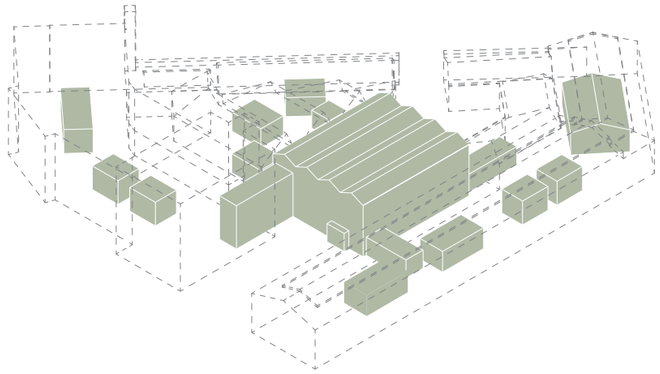
03
concept



remove



improve



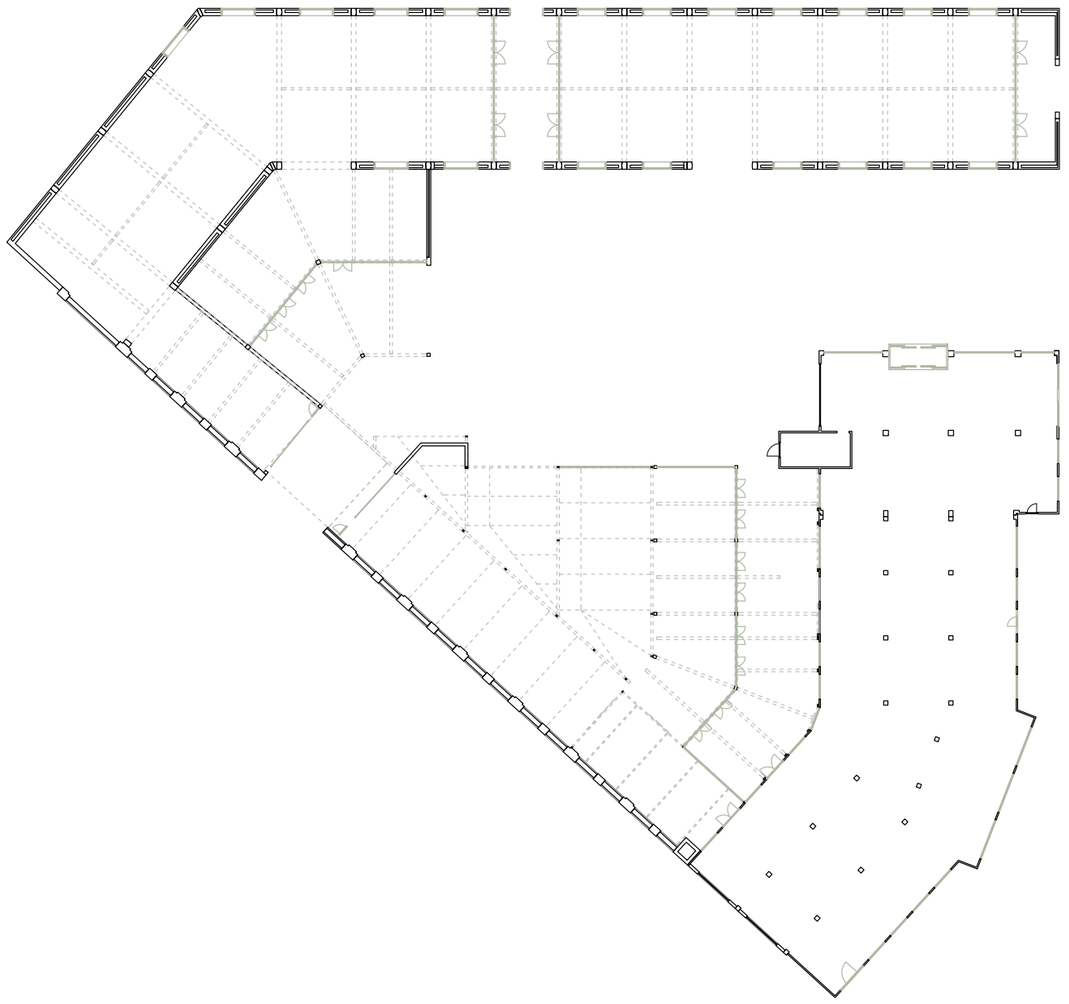
add

03
remove

infill

volumes

skin sustainability



skin transparancy

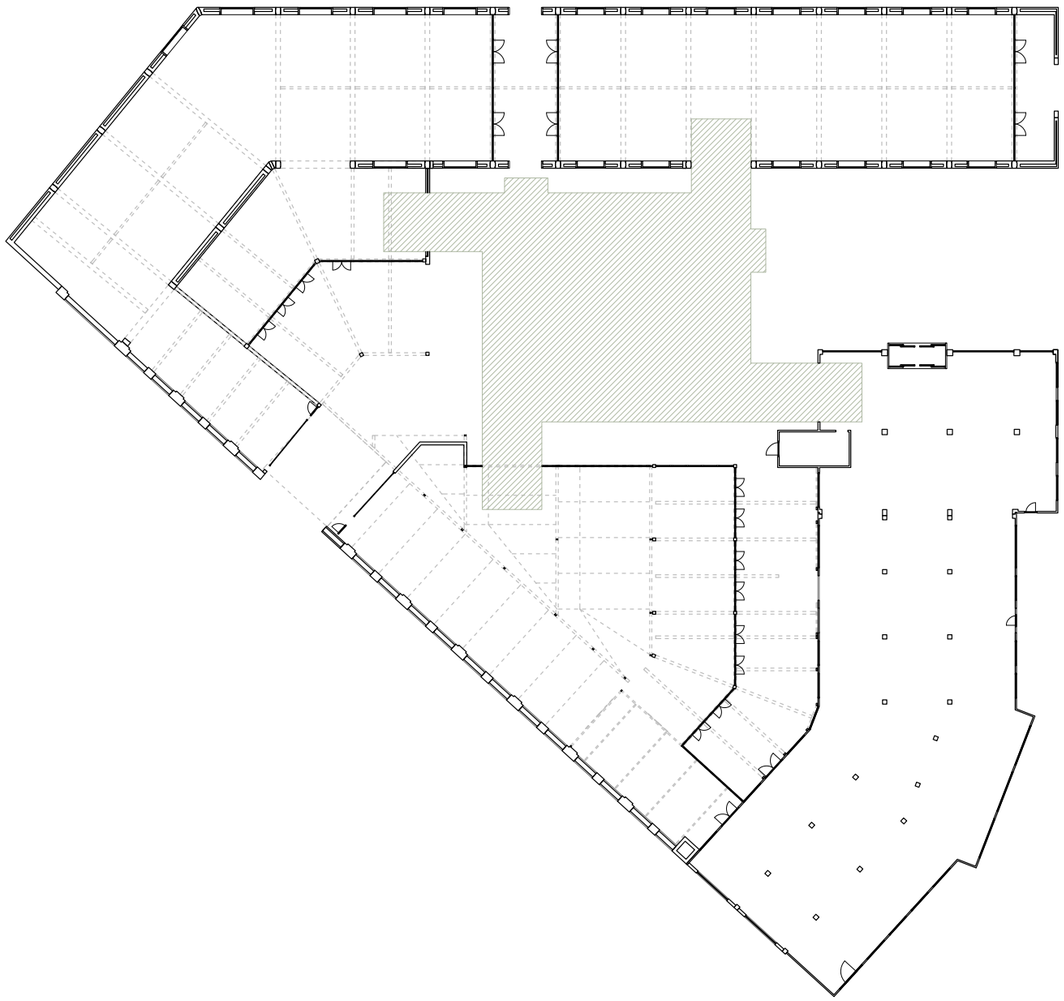
The Crystal Palace, 1851-1936

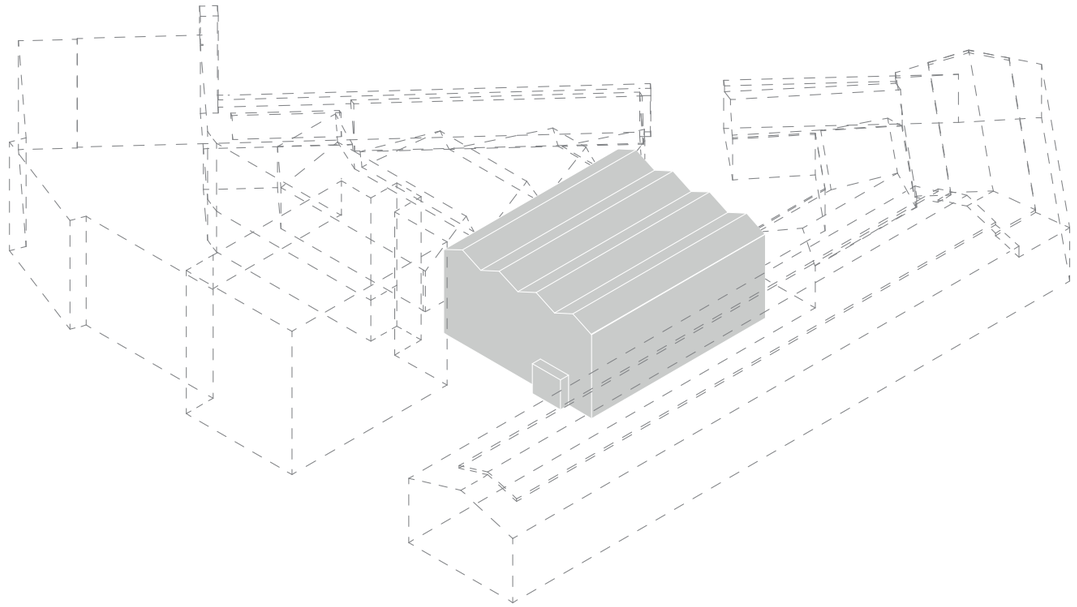
Galerie des Machines (Gallery of Machines), 1889-1909

Venlo greenhouse, interior

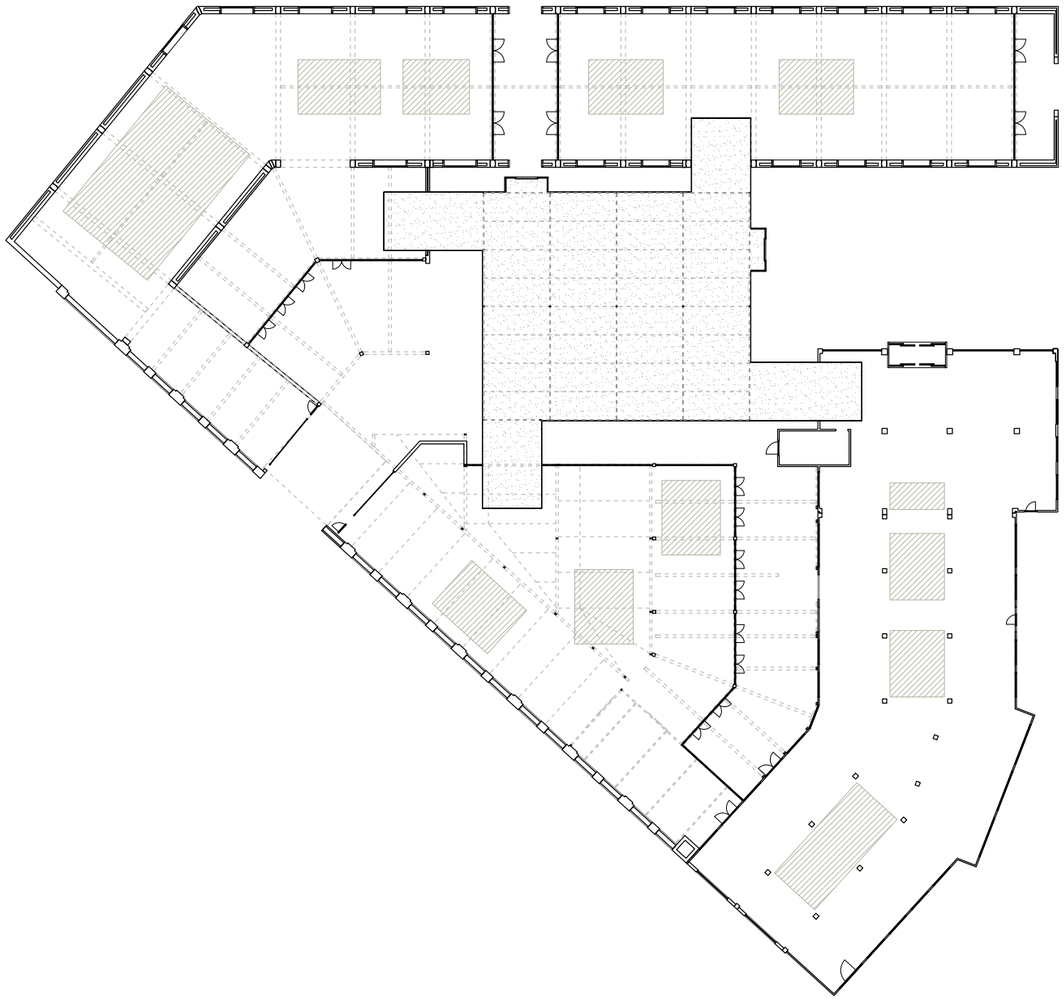
Venlo greenhouse, exterior

03
add

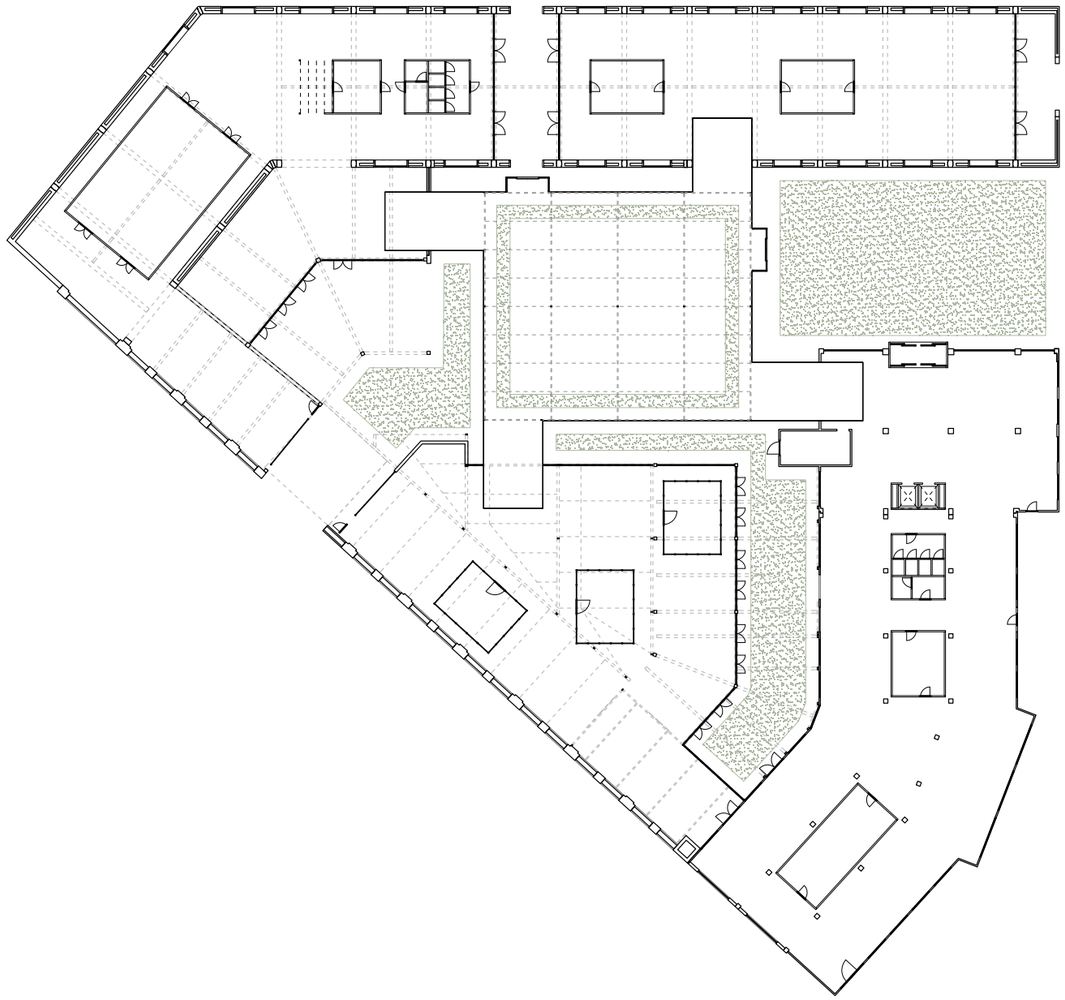




volume to connect existing buildings



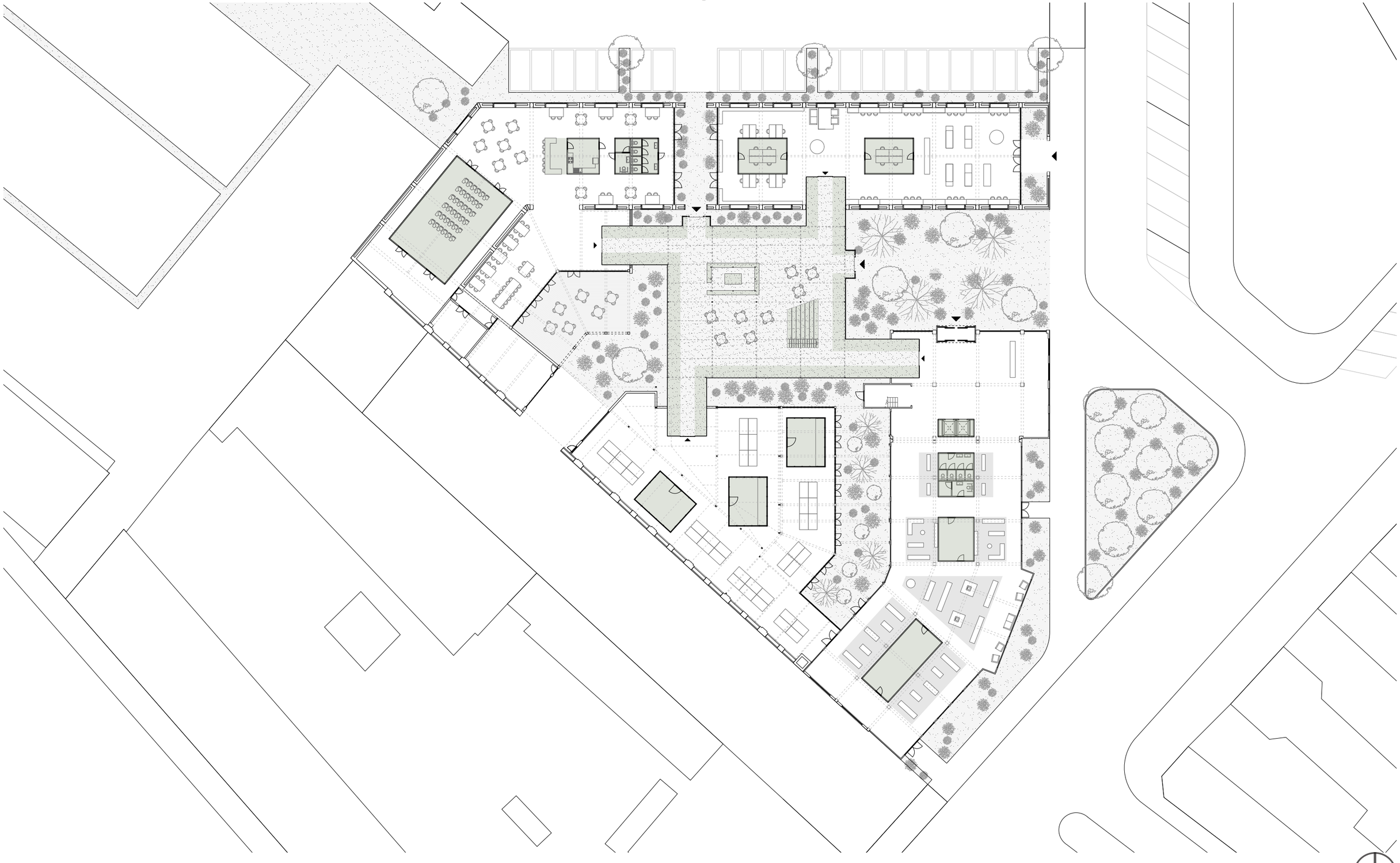
specialised modules



biodiversity

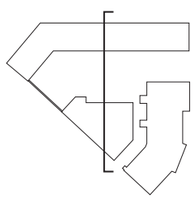
03

floorplan



1:400

03
section



1:300

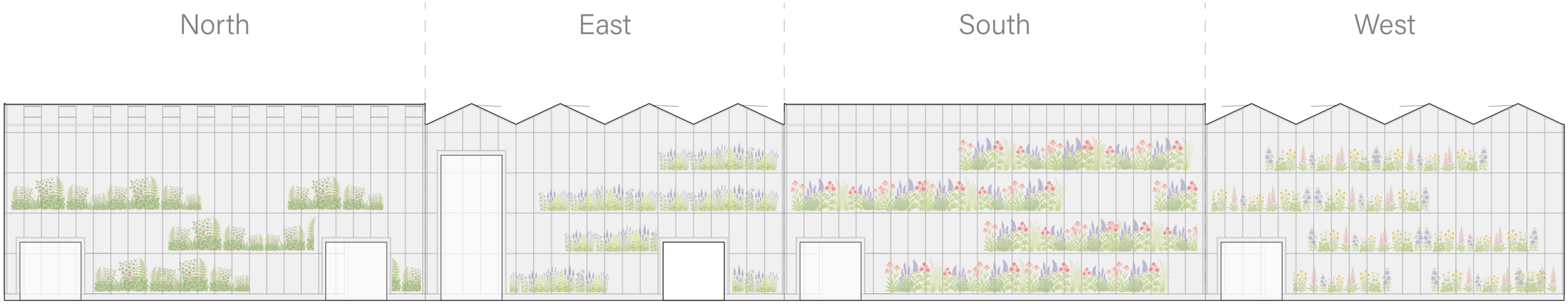
03
biodiversity

North

East

South

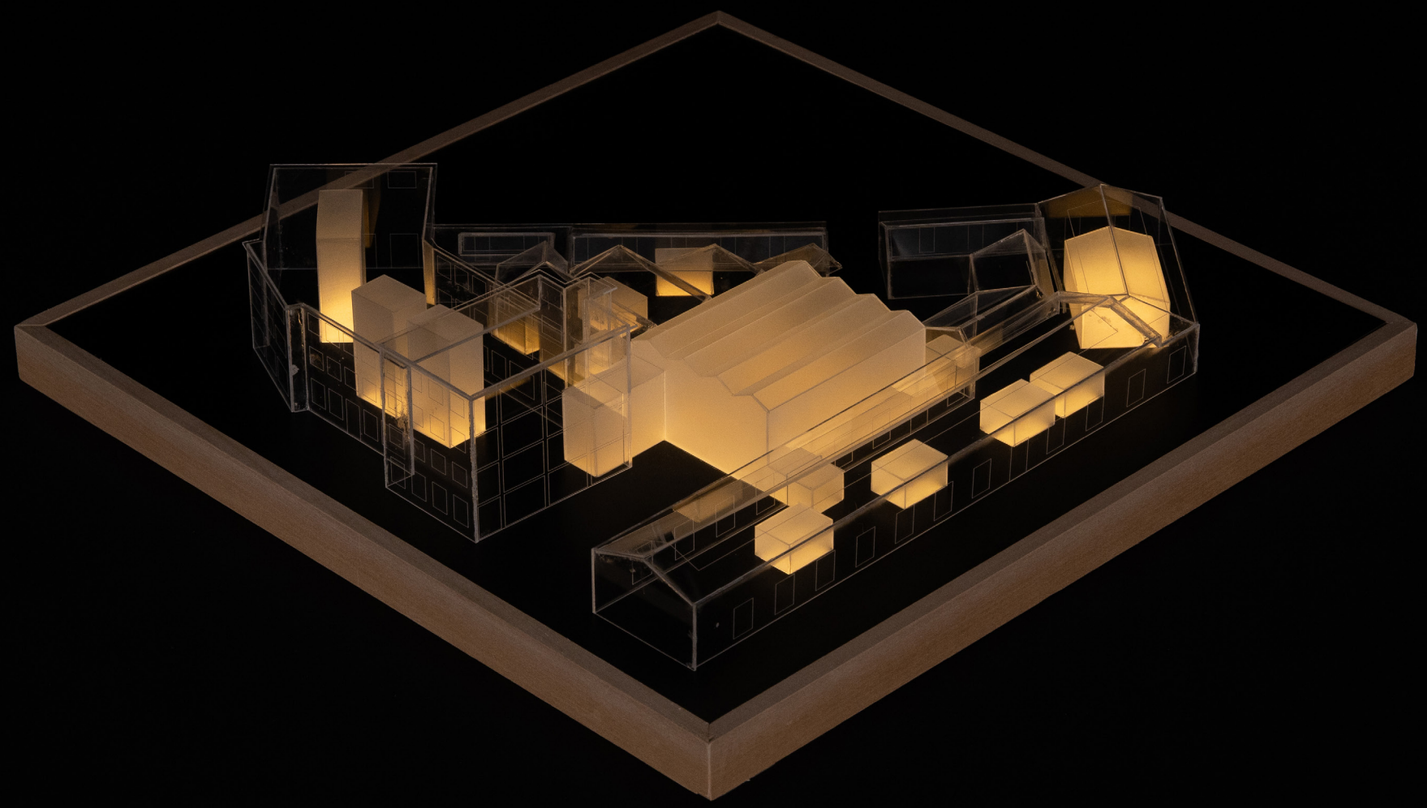
West



03
biodiversity

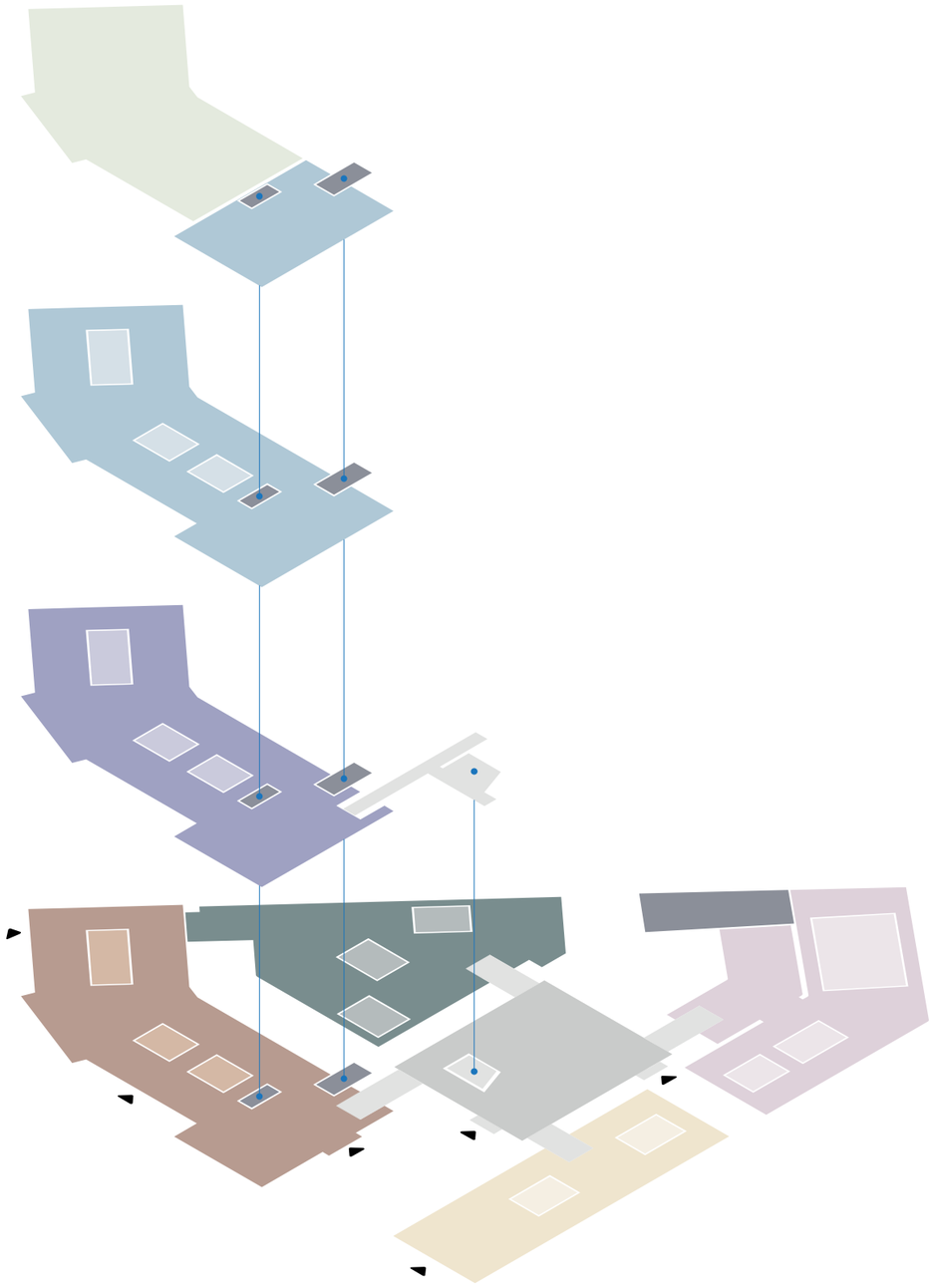
03
biodiversity

content



holistic approach

04
programmatic placement

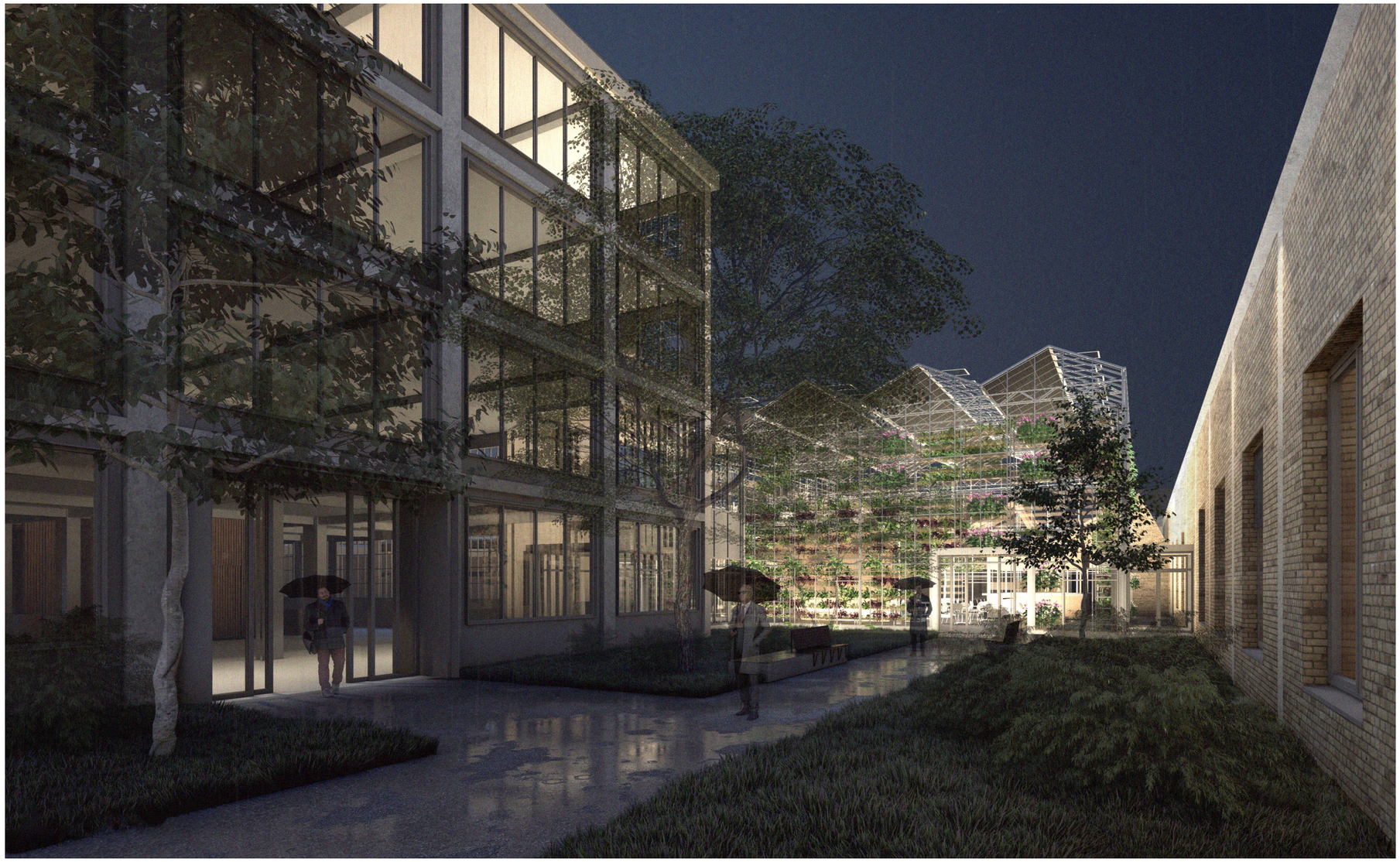


GreenLAB	*443 m²*
▪ *Central Café*	*21 m²*
▪ *Open area*	*422 m²*
KnowledgeLAB	*366 m²*
▪ *Open library*	*320 m2*
▪ *Writing room*	*23 m2*
▪ *Counter + storage*	*23 m2*
Restaurant + EventLAB	*558 m²*
▪ *Restaurant*	*426 m²*
▪ *EventLAB (multifunctional room)*	*100 m²*
▪ *Kitchen + bar*	*32 m²*
MakersLAB	*516 m²*
▪ *Open workspace*	*441 m²*
▪ *Machine room*	*25 m²*
▪ *Paint studio*	*25 m²*
▪ *Textile studio*	*25 m²*
MarketLAB	*730 m²*
▪ *Open retail area*	*652 m²*
▪ *Storage*	*78 m²*
WorkLAB	*830 m²*
▪ *Open office*	*672 m²*
▪ *Focus rooms M*	*20 m²*
▪ *Focus room L*	*38 m²*
▪ *Canteen*	*100 m²*
LearnLAB	*830 m²*
▪ *Open studio*	*672 m²*
▪ *Focus rooms M*	*20 m²*
▪ *Focus room L*	*38 m²*
▪ *Canteen*	*100 m²*
Services	*227 m²*
▪ *Services*	*85 m²*
▪ *Toilets*	*82 m²*
▪ *Staircases + elevators*	*60 m²*
Rooftop garden	*233 m²*
TOTAL	***4500 m²***

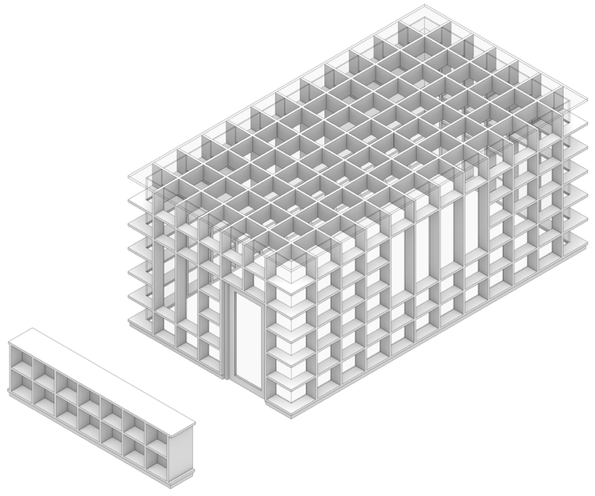
04
day

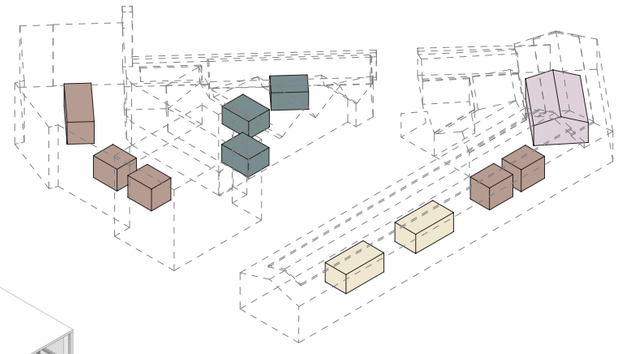
04
evening / night

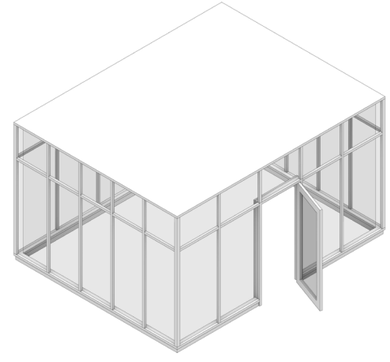
04
evening / night



04
specialised modules





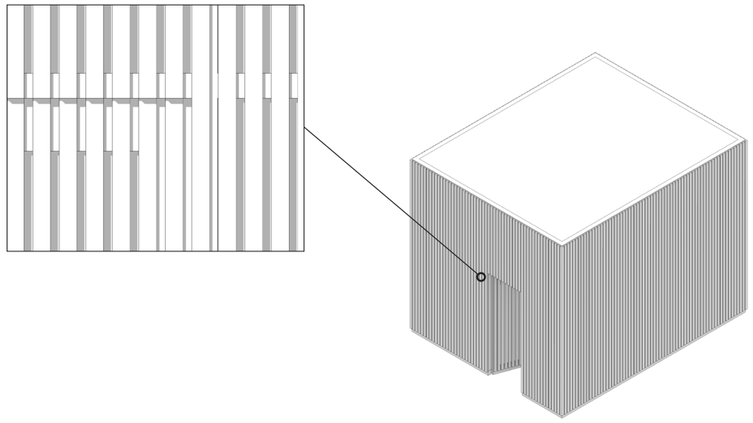


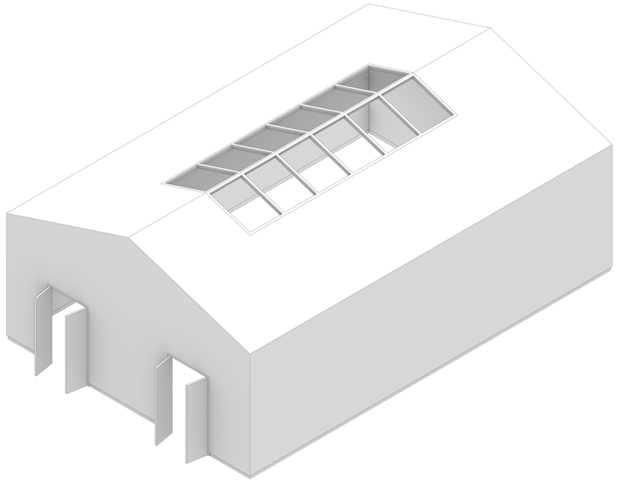
KnowledgeLAB

- semi-transparant
- multifunctional (shelves)
- soundproof
- targeted heating & cooling

MakersLAB

- transparency
- targeted heating & cooling
- extraction of dirty air





MarketLAB / WorkLAB / LearnLAB

- semi-transparant or closed
- targeted heating & cooling
- soundproof

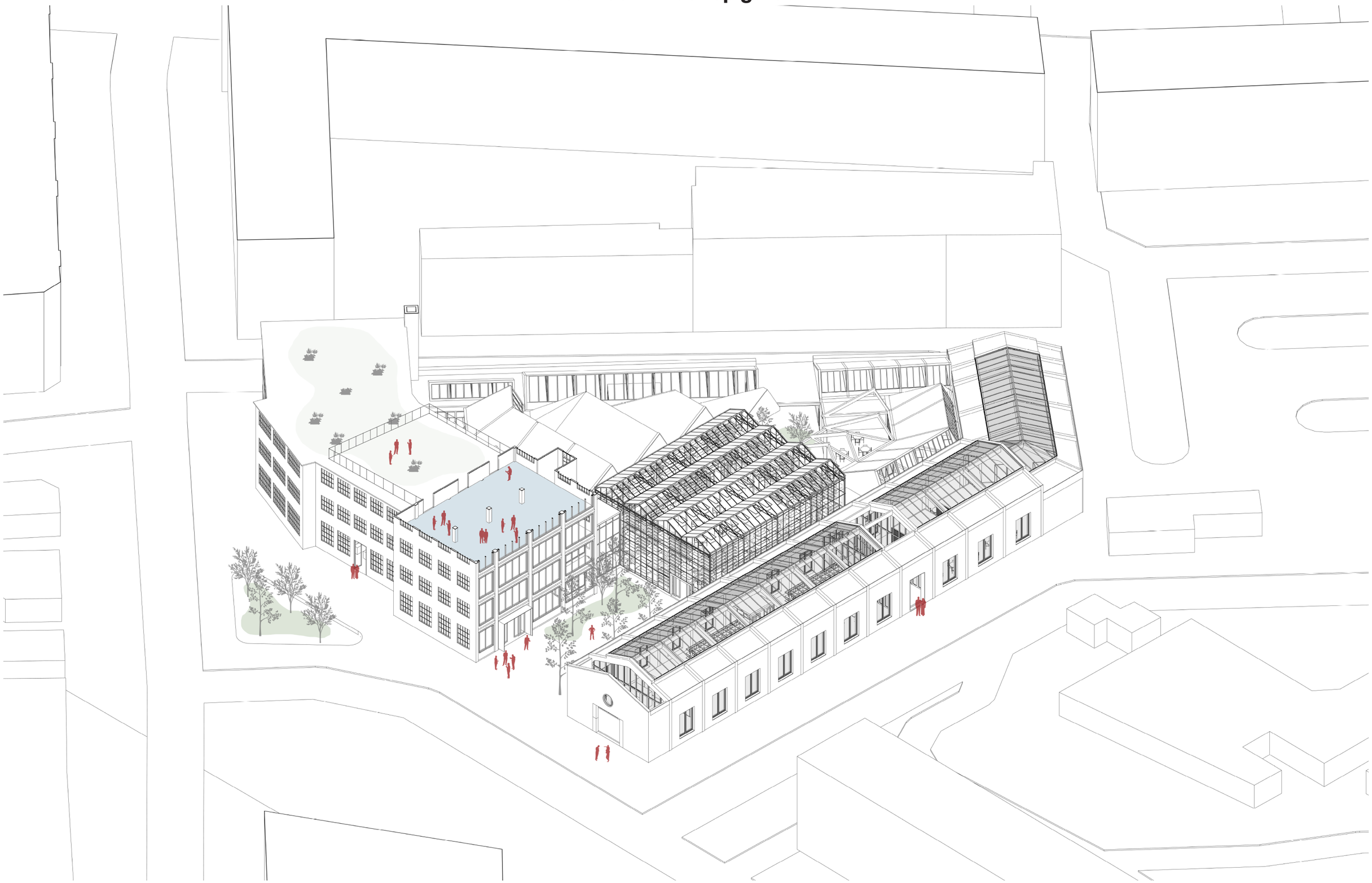
EventLAB

- targeted heating & cooling
- daylight entry with screens
- sound absorption to reduce reverberation

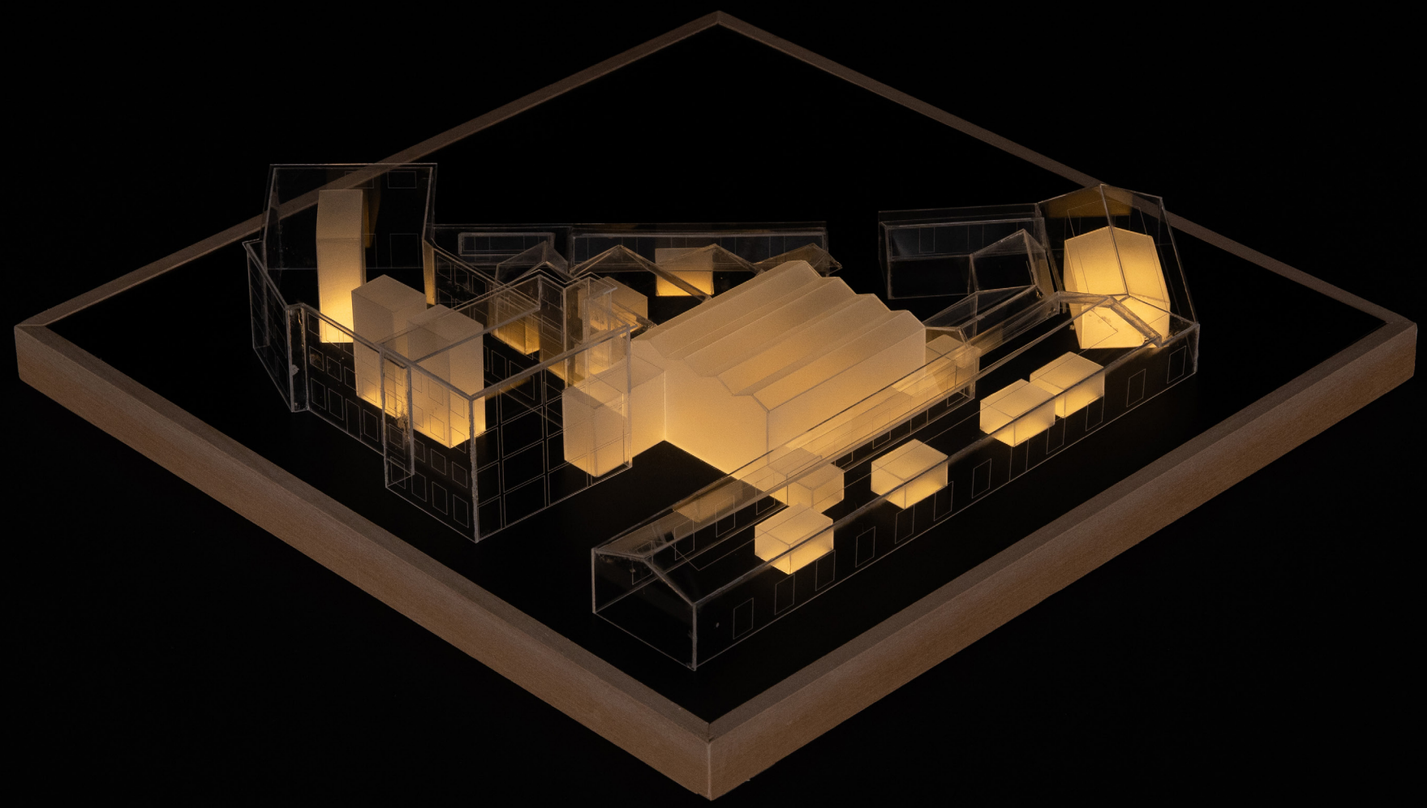
04
office

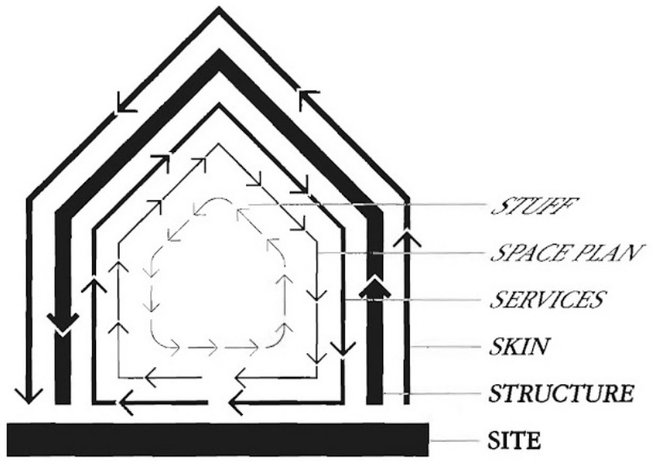
04

canteen + rooftop garden



content





Stewart Brand, *How Buildings Learn (1994)*

1. preserving in place
(existing structure + skin)

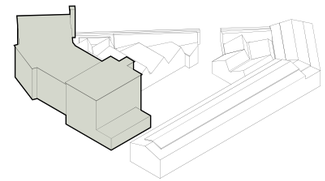
2. re-using and upcycling
(i.e. removed brick as base layer)

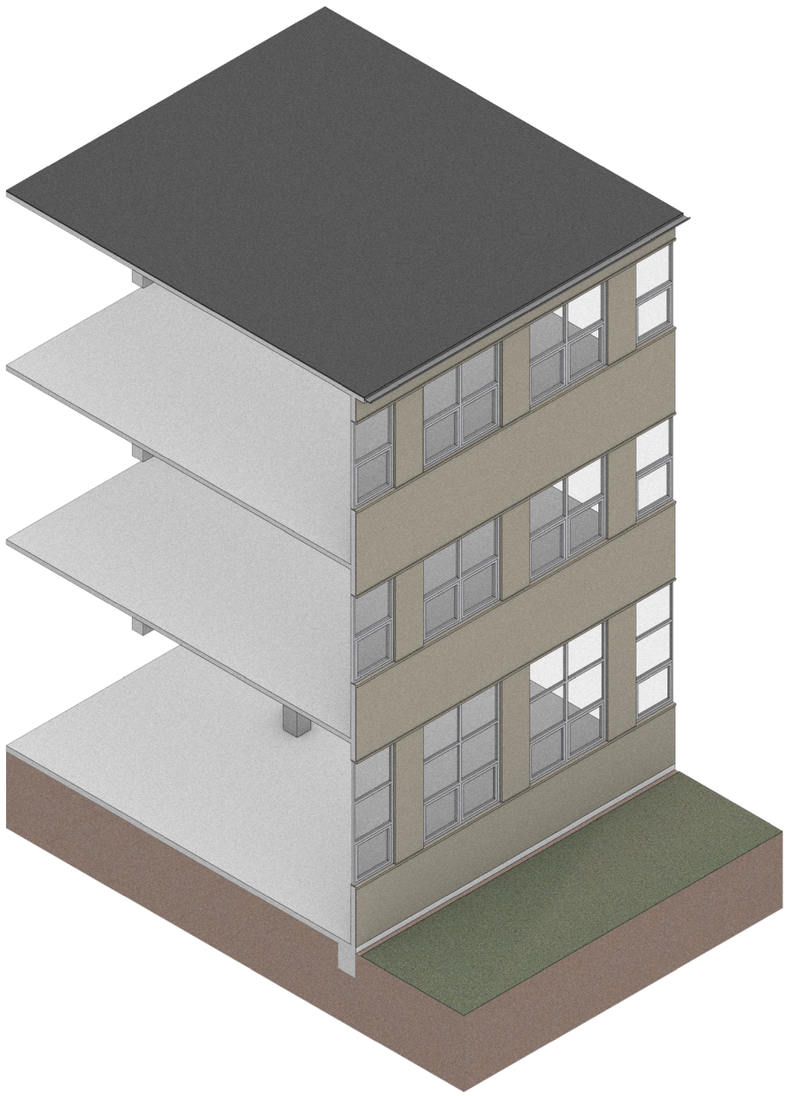
3. adding new, biogene materials
(i.e. timber facade elements)

4. adding new, reusable materials
(i.e. design for disassembly)

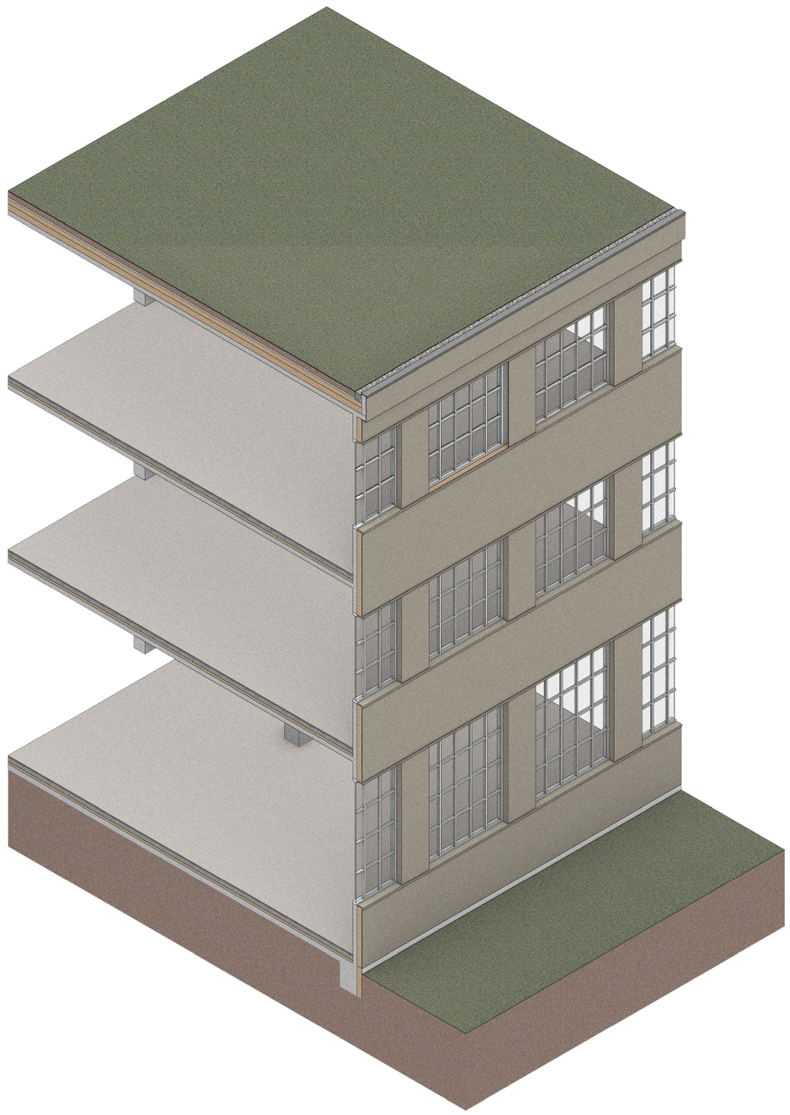
'resource stair' approach

improve + restore

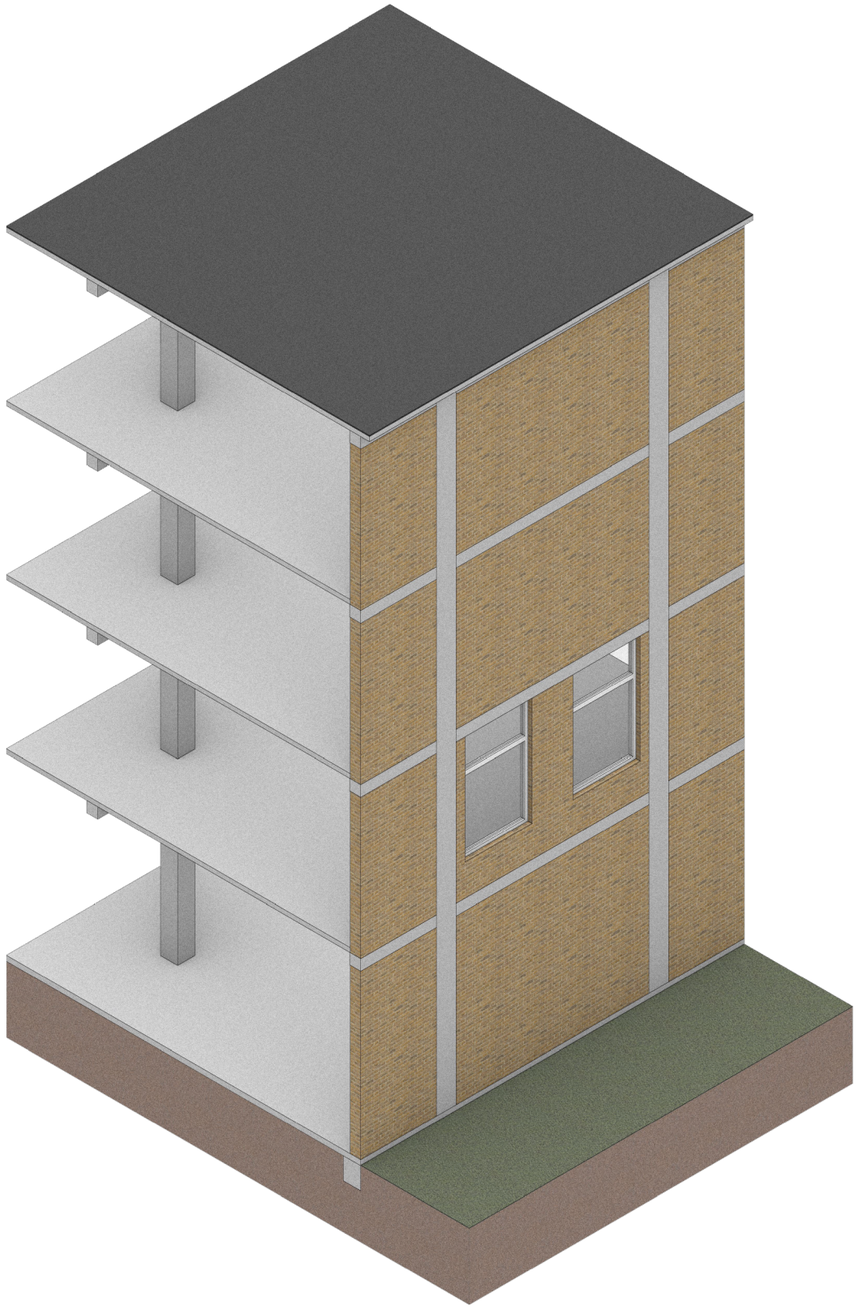




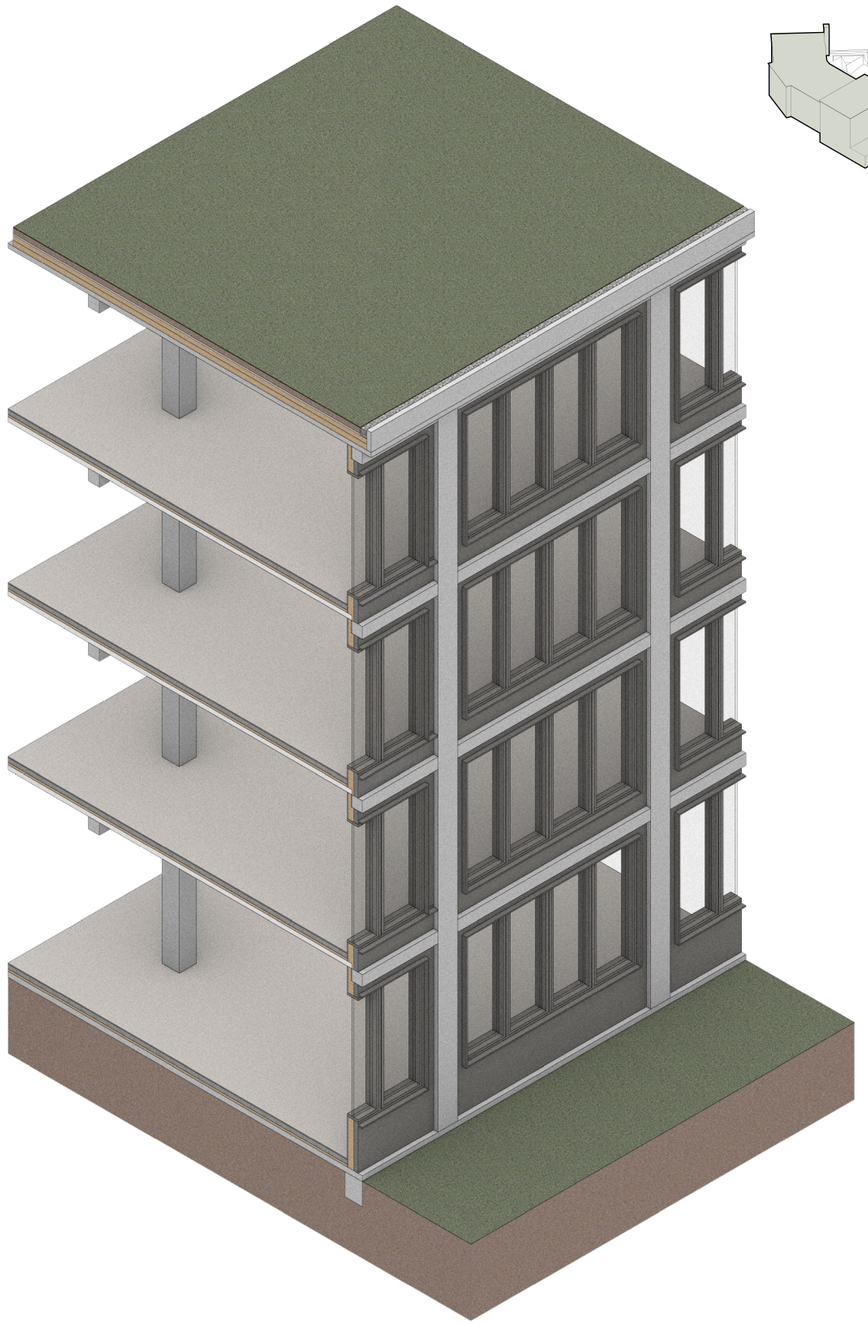
existing



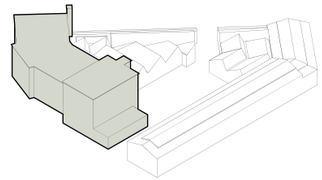
improved + restored

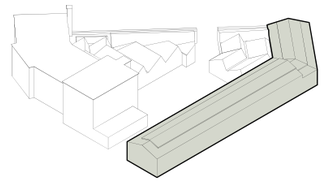


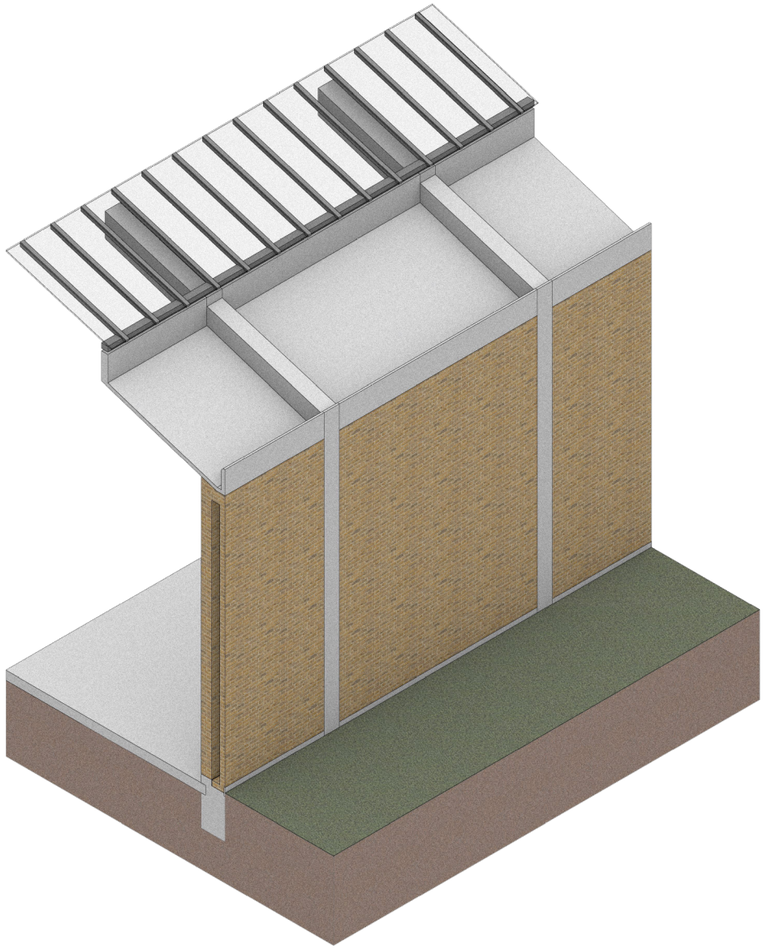
existing



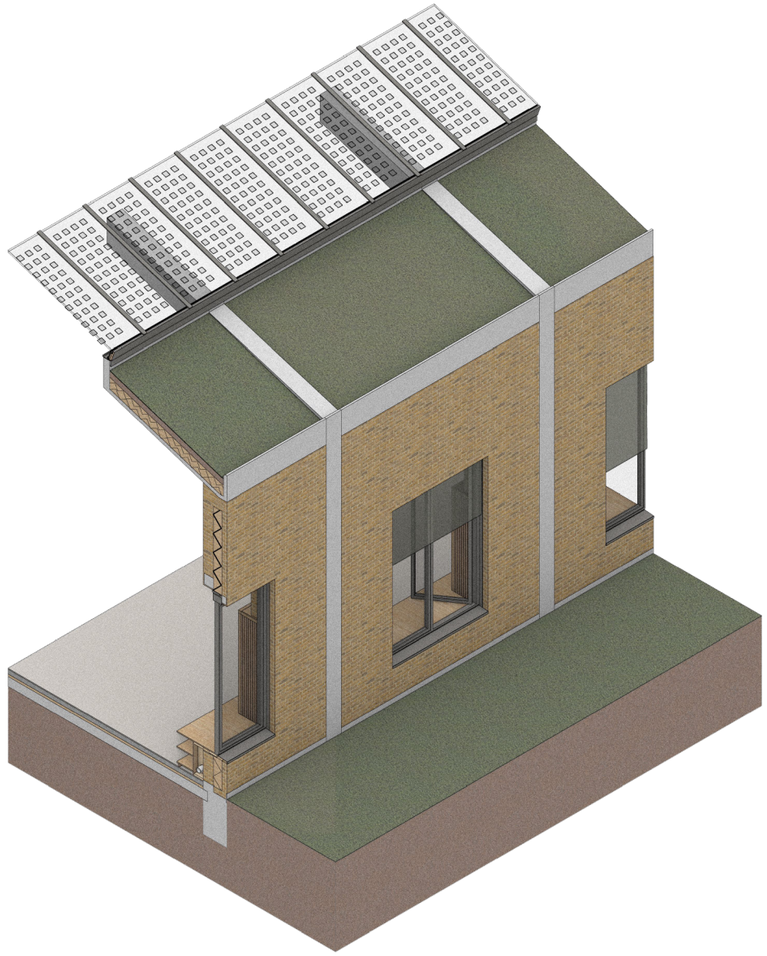
improved







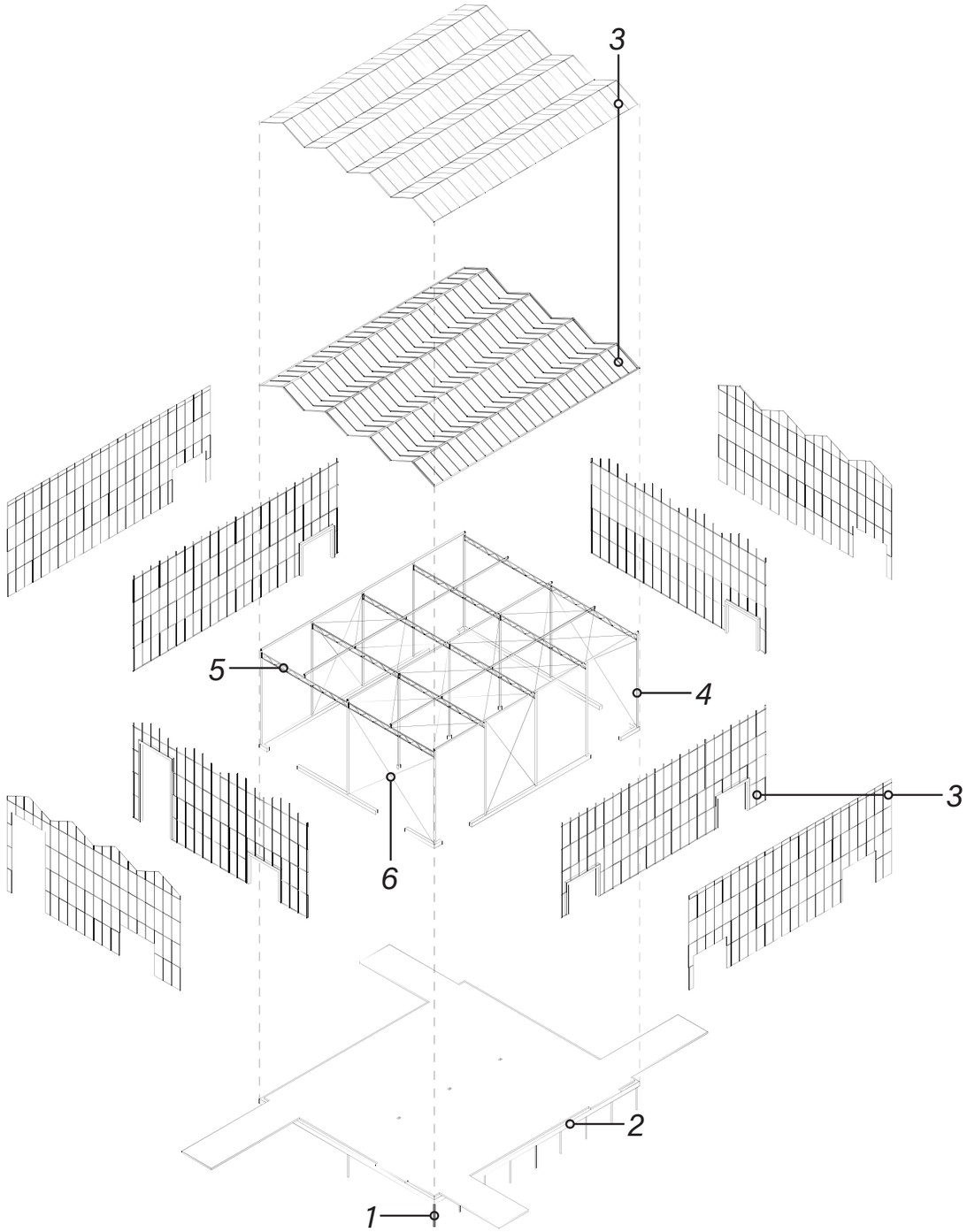
existing



improved

05

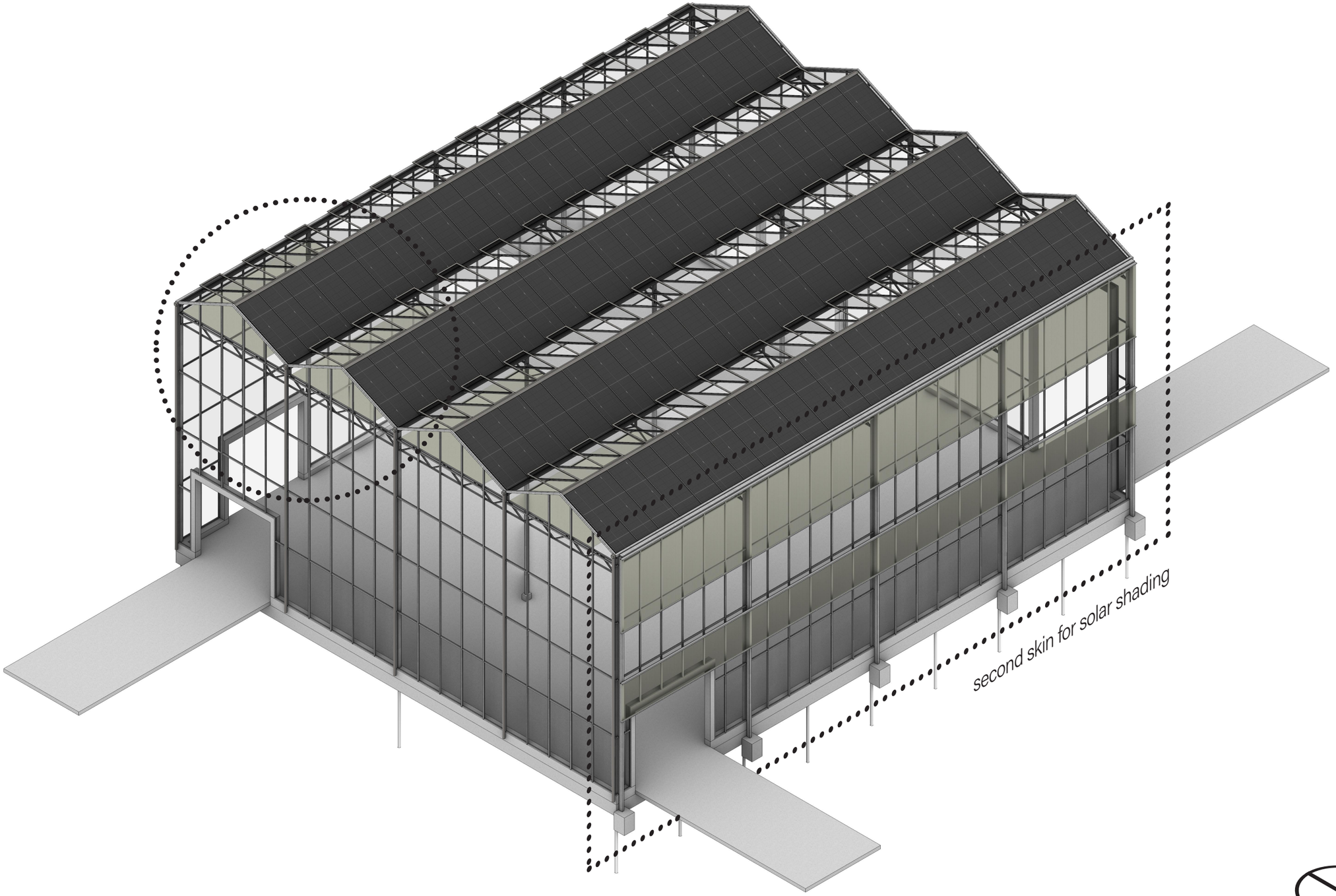
venlo greenhouse - design for disassembly

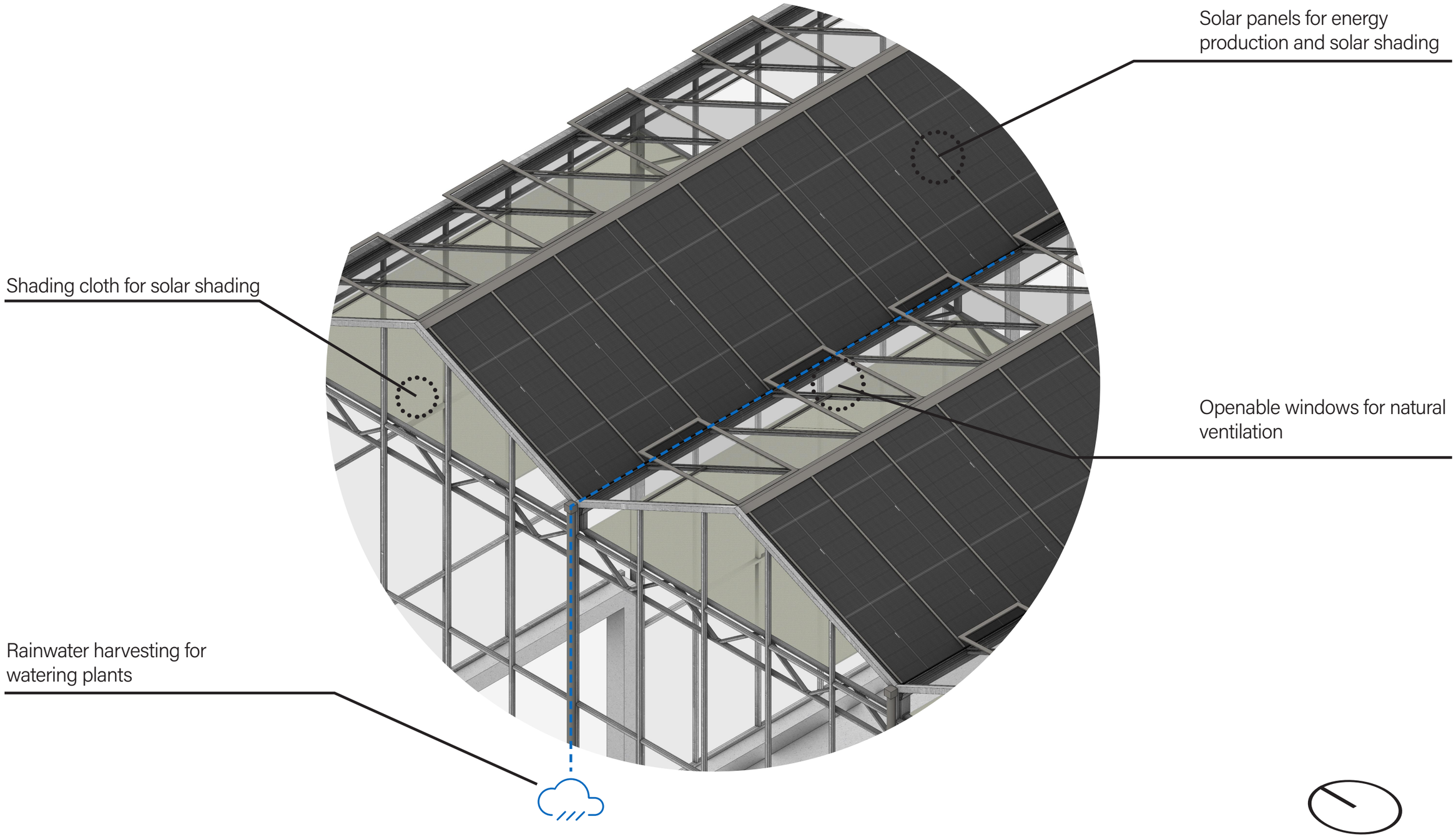


1 *screw pile foundation*
2 *foundation beam*
3 *insulated glass in aluminium mullions*
4 *aluminium columns*
5 *lattice beams*
6 *windbracing*

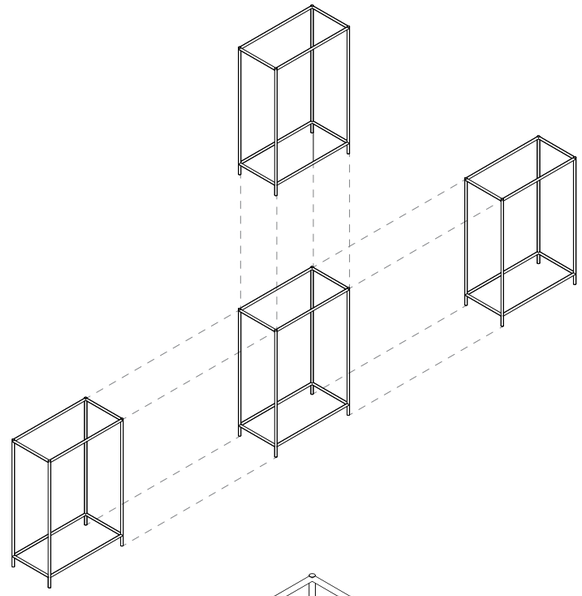
05

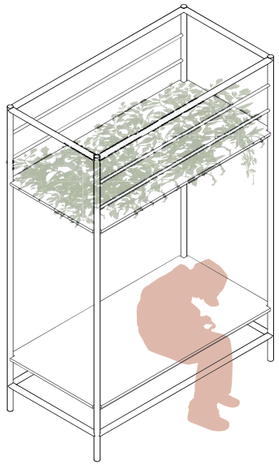
climatising the greenhouse




Solar panels for energy production and solar shading
Shading cloth for solar shading
Openable windows for natural ventilation
Rainwater harvesting for watering plants

05
modular planter system

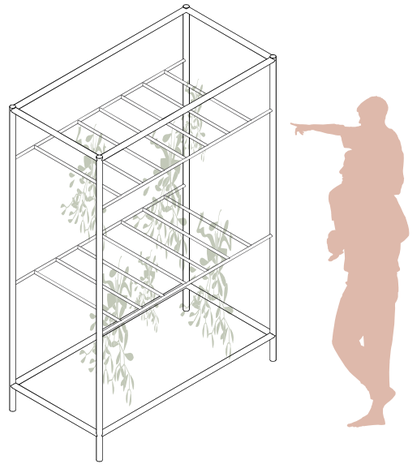




"a place to stay among the plants"

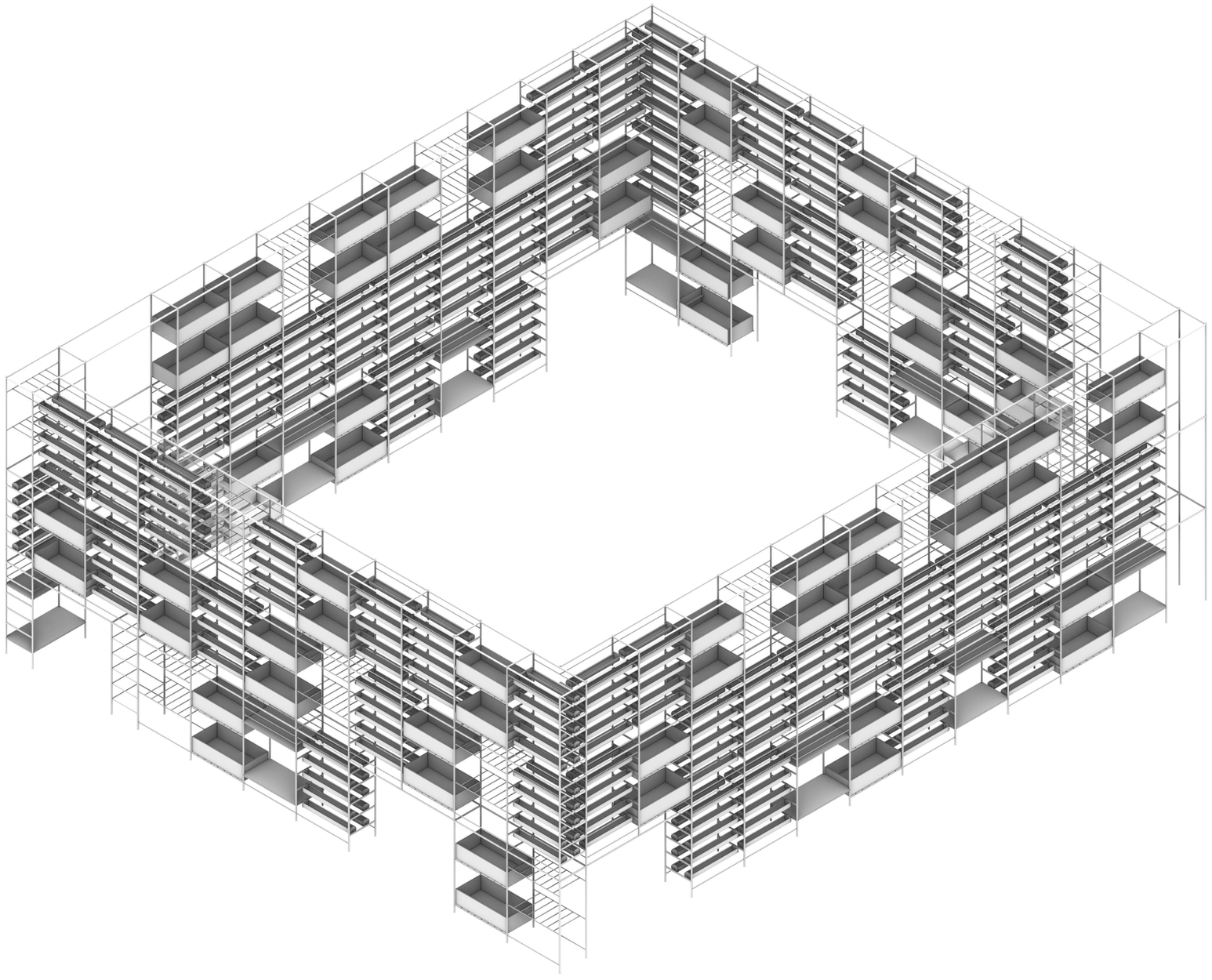
"vertical planter system"

"large planters"



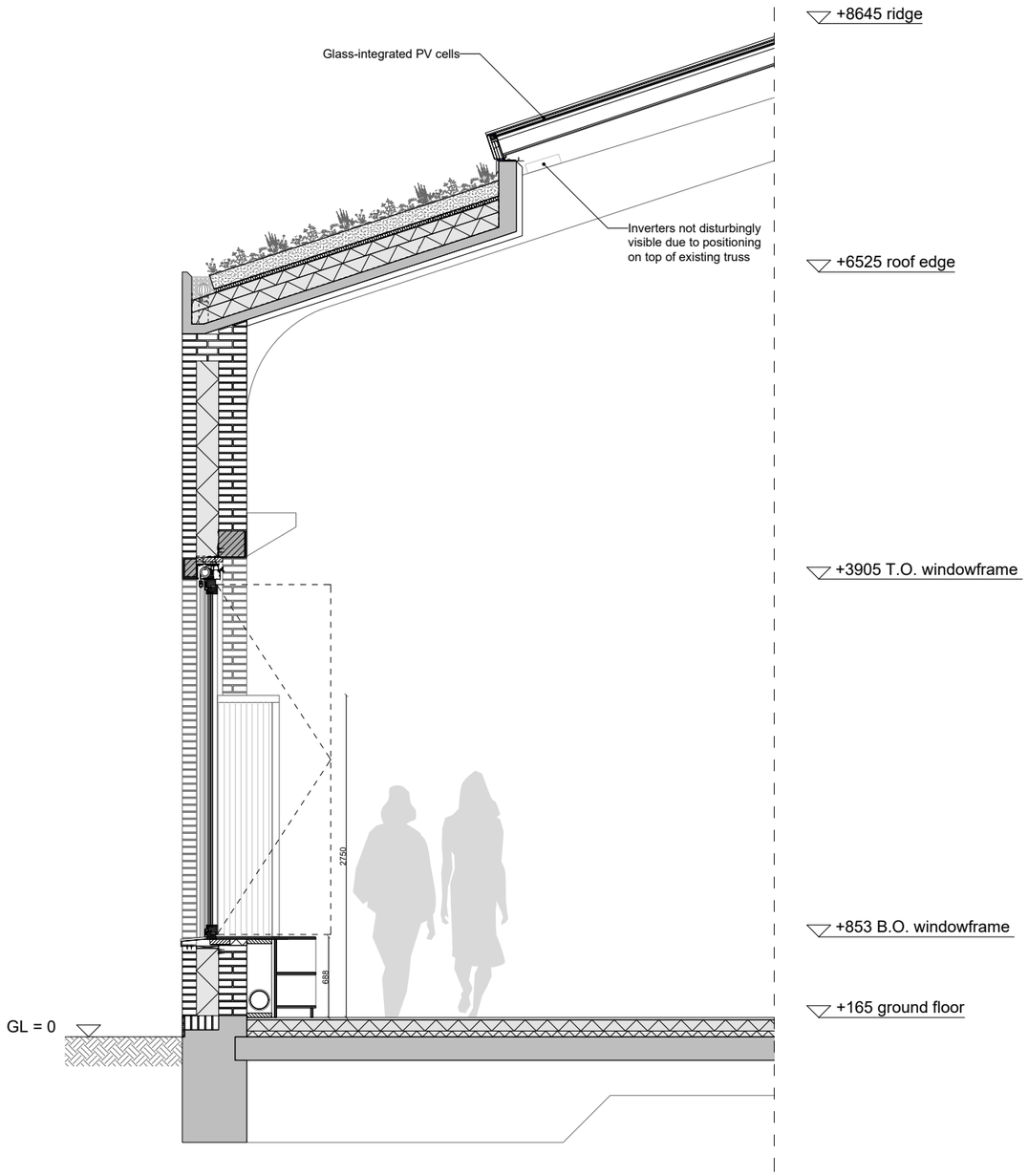
"trellis"

05
modular planter system



05
greenhouse environment


370
880


+8645 ridge
Glass-integrated PV cells
Inverters not disturbingly visible due to positioning on top of existing truss
+6525 roof edge
+3905 T.O. windowframe
2750
688
+853 B.O. windowframe
+165 ground floor
GL = 0

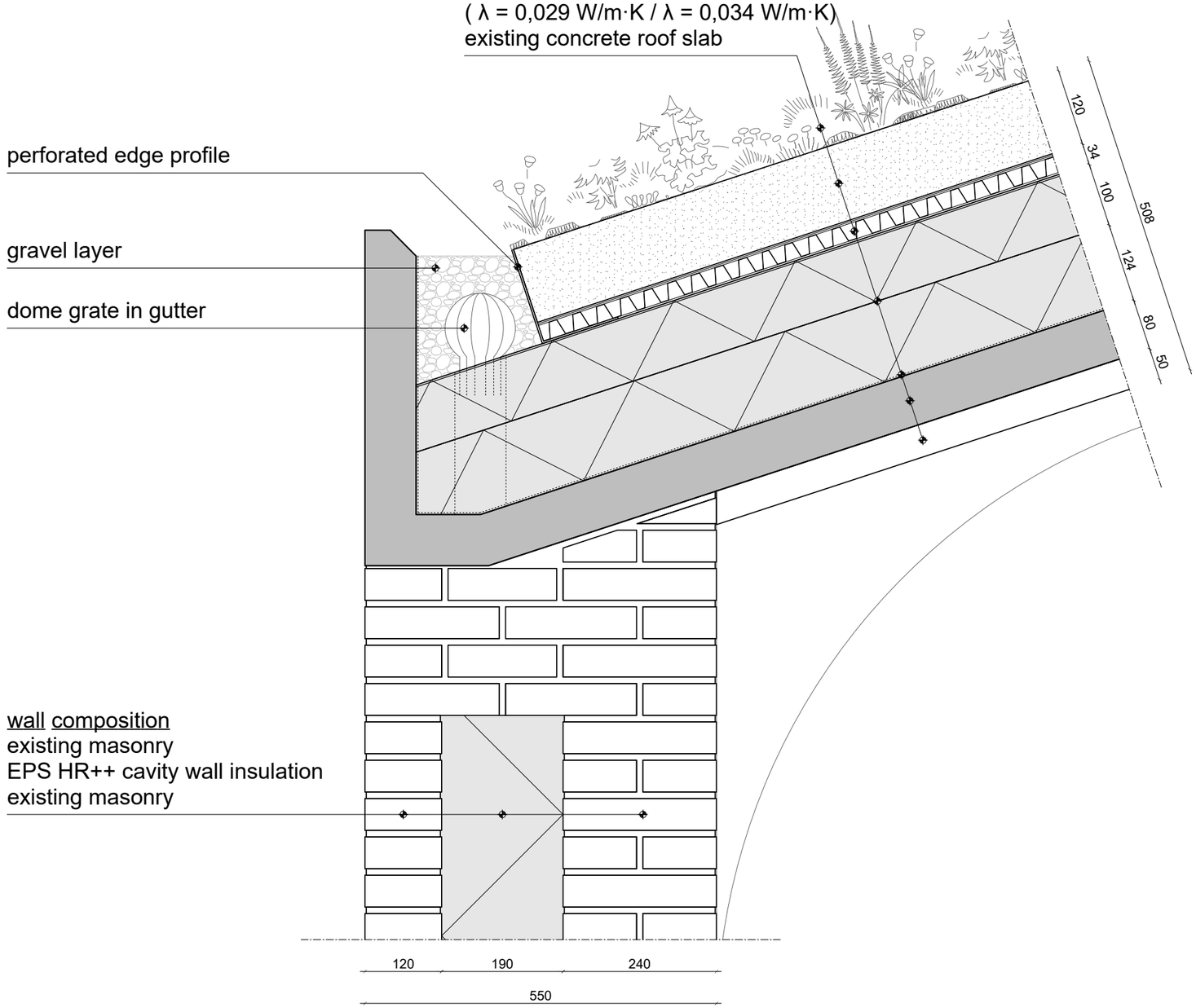
technical elaboration

Roof composition
extensive vegetation
green roof substrate
drainage layer
waterproofing membrane
Rigid foam insulation boards
(λ = 0,029 W/m·K / λ = 0,034 W/m·K)
existing concrete roof slab

perforated edge profile

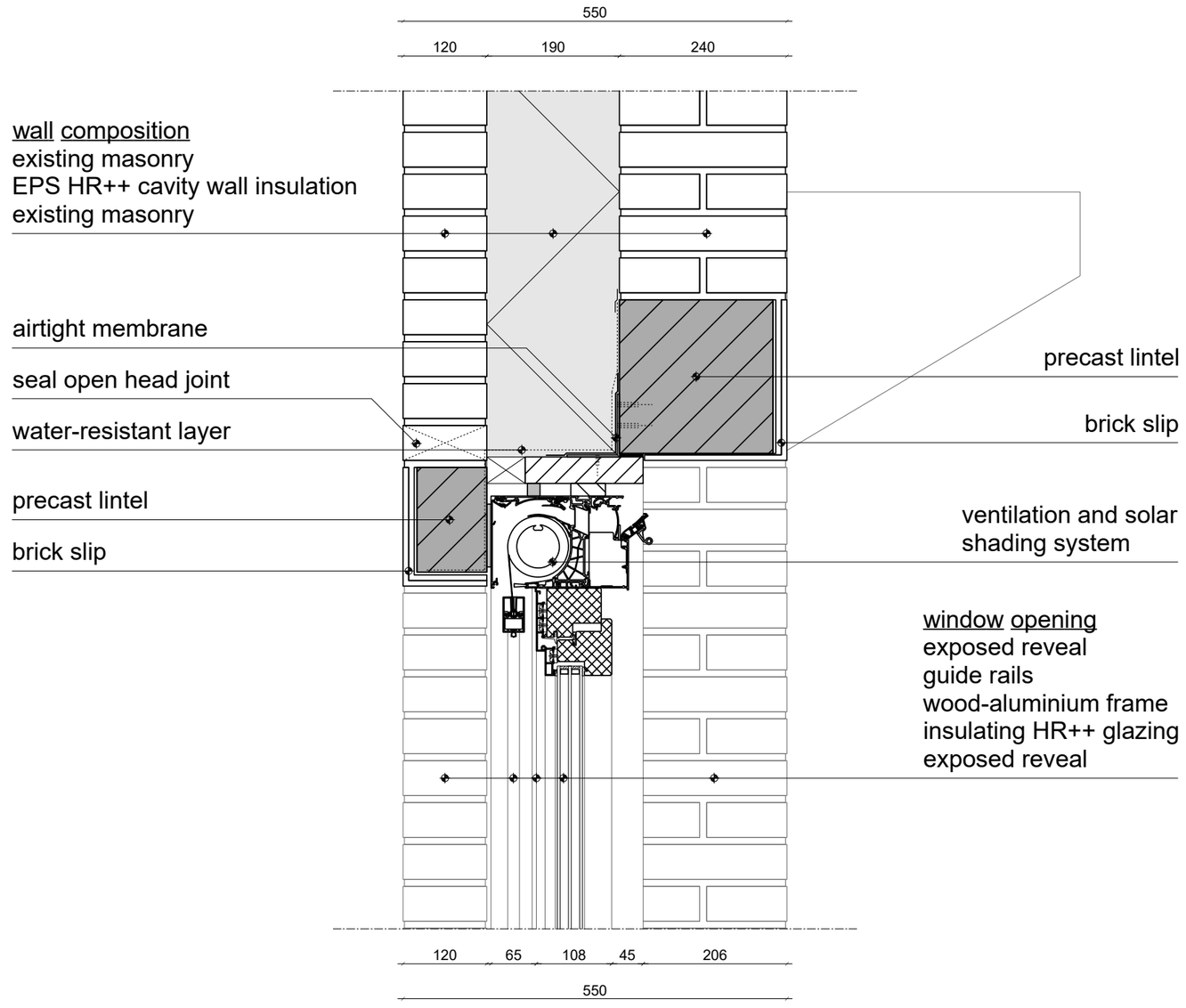
gravel layer

dome grate in gutter

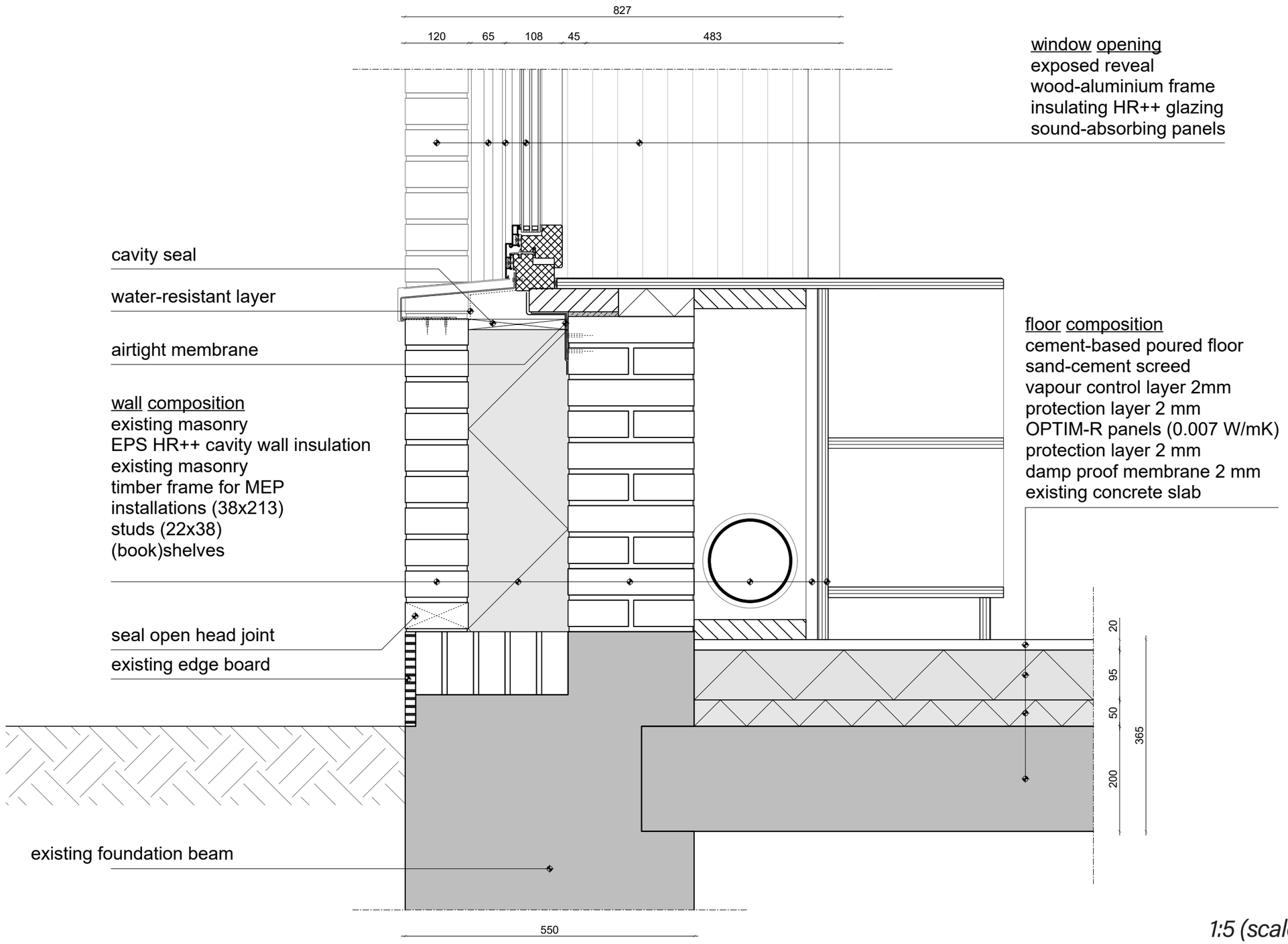


wall composition
existing masonry
EPS HR++ cavity wall insulation
existing masonry

1:5 (scaled)

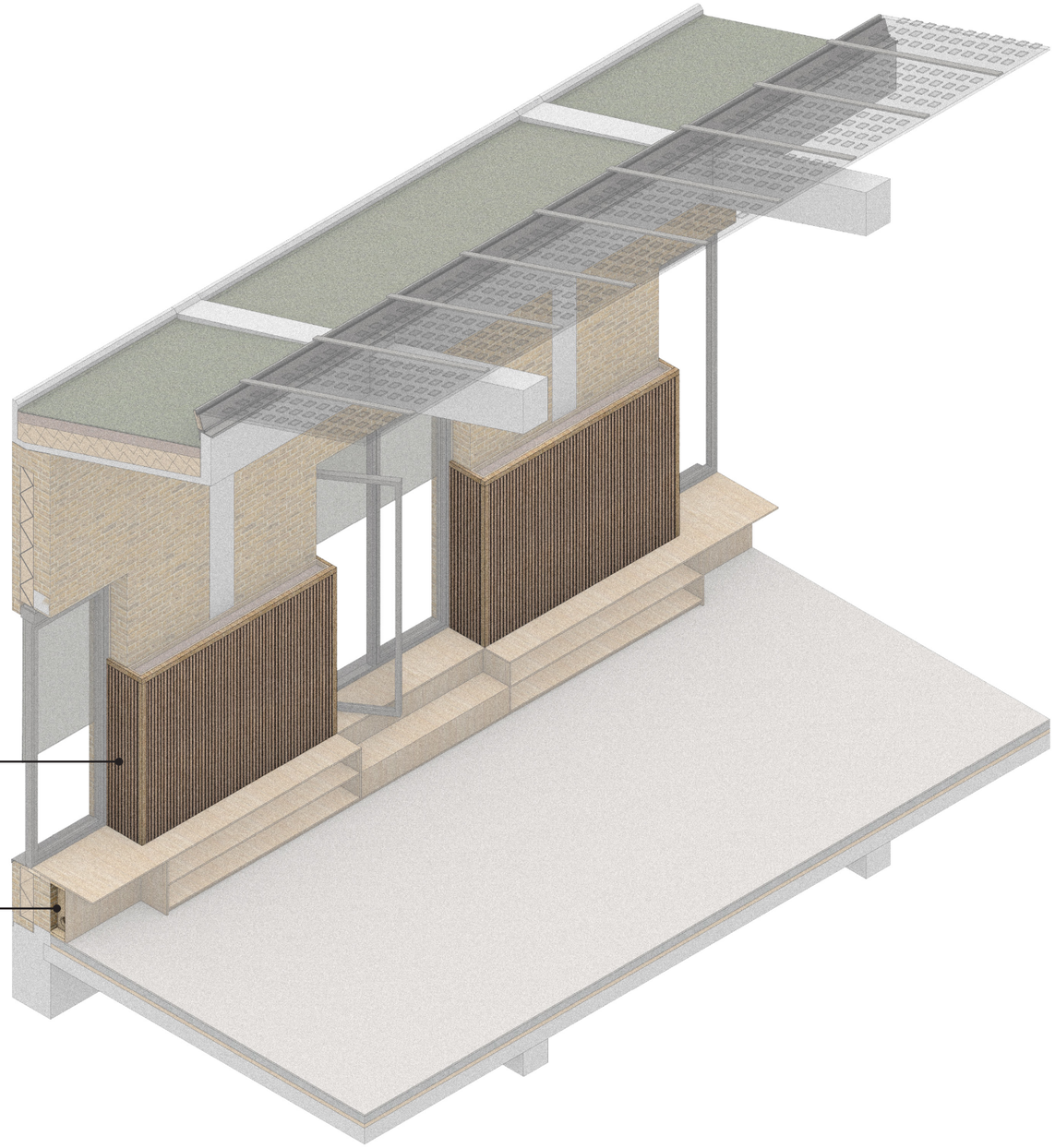

550
120
190
240
wall composition
existing masonry
EPS HR++ cavity wall insulation
existing masonry
airtight membrane
seal open head joint
water-resistant layer
precast lintel
brick slip
precast lintel
brick slip
ventilation and solar
shading system
window opening
exposed reveal
guide rails
wood-aluminium frame
insulating HR++ glazing
exposed reveal
120
65
108
45
206
550

1:5 (scaled)

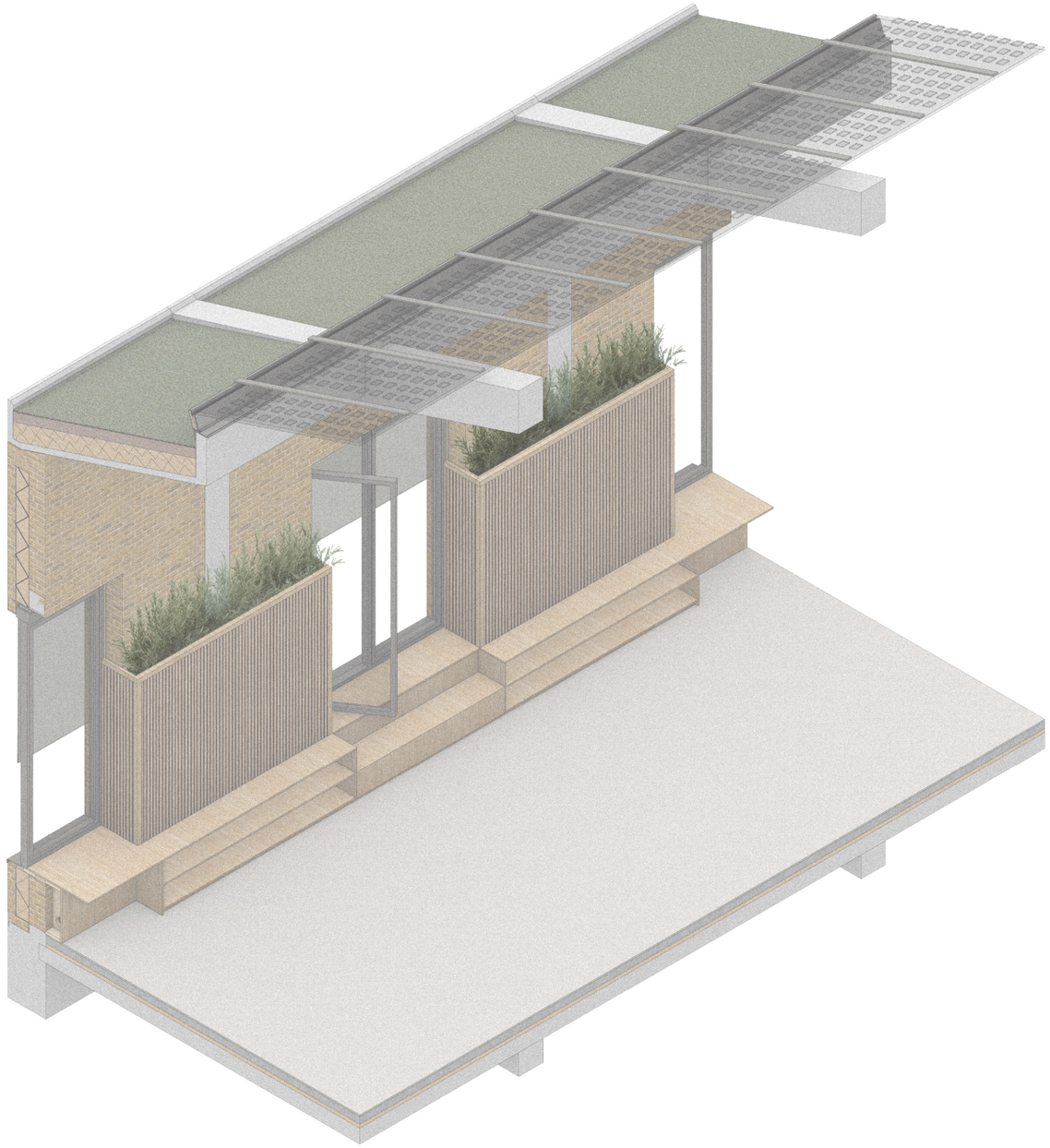

827
120
65
108
45
483
window opening
exposed reveal
wood-aluminium frame
insulating HR++ glazing
sound-absorbing panels
cavity seal
water-resistant layer
airtight membrane
wall composition
existing masonry
EPS HR++ cavity wall insulation
existing masonry
timber frame for MEP
installations (38x213)
studs (22x38)
(book)shelves
seal open head joint
existing edge board
existing foundation beam
floor composition
cement-based poured floor
sand-cement screed
vapour control layer 2mm
protection layer 2 mm
OPTIM-R panels (0.007 W/mK)
protection layer 2 mm
damp proof membrane 2 mm
existing concrete slab
20
95
50
200
365
550

1:5 (scaled)

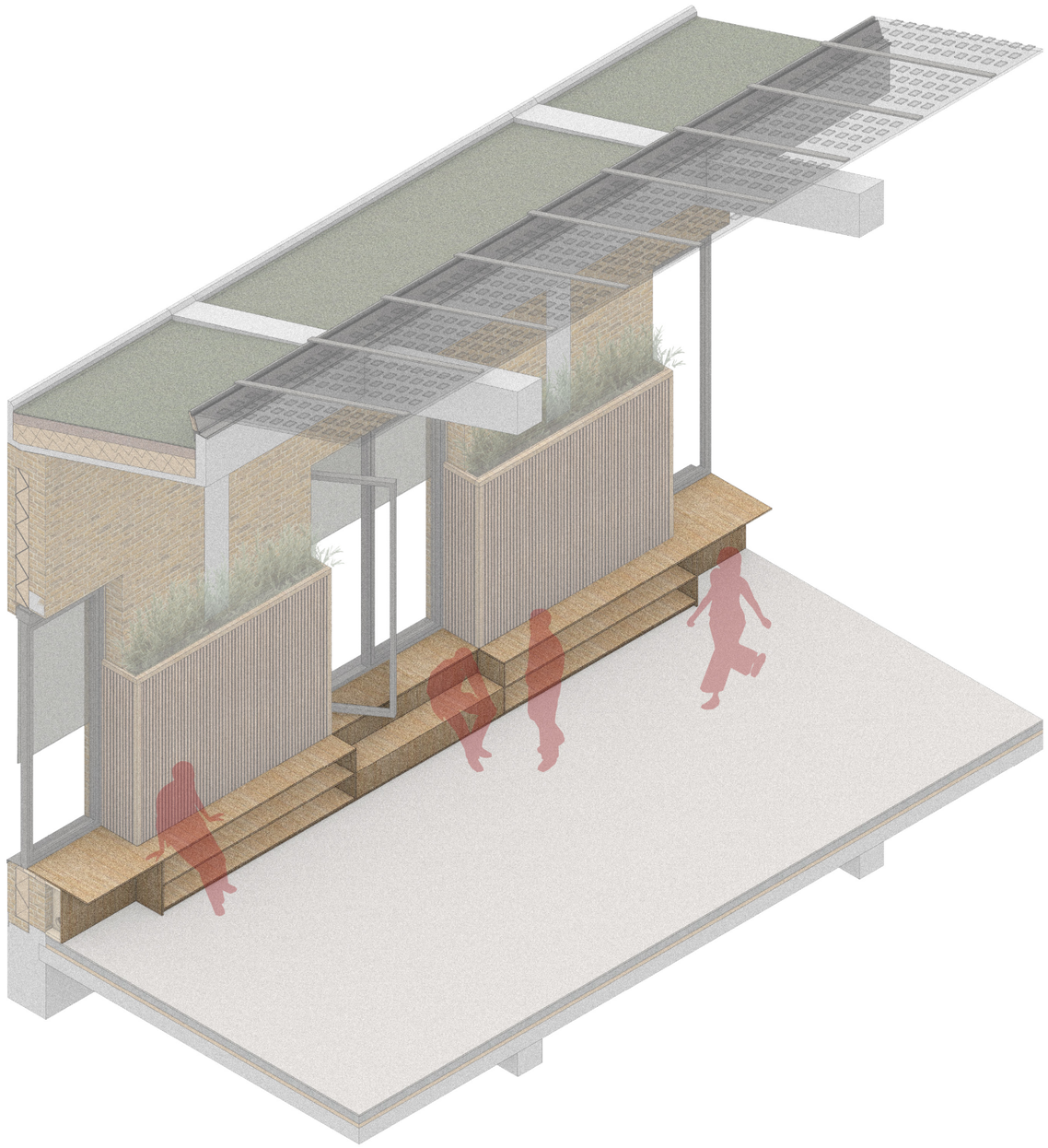
05
interior facade elements


Sound-absorbing panels
Cavity for services

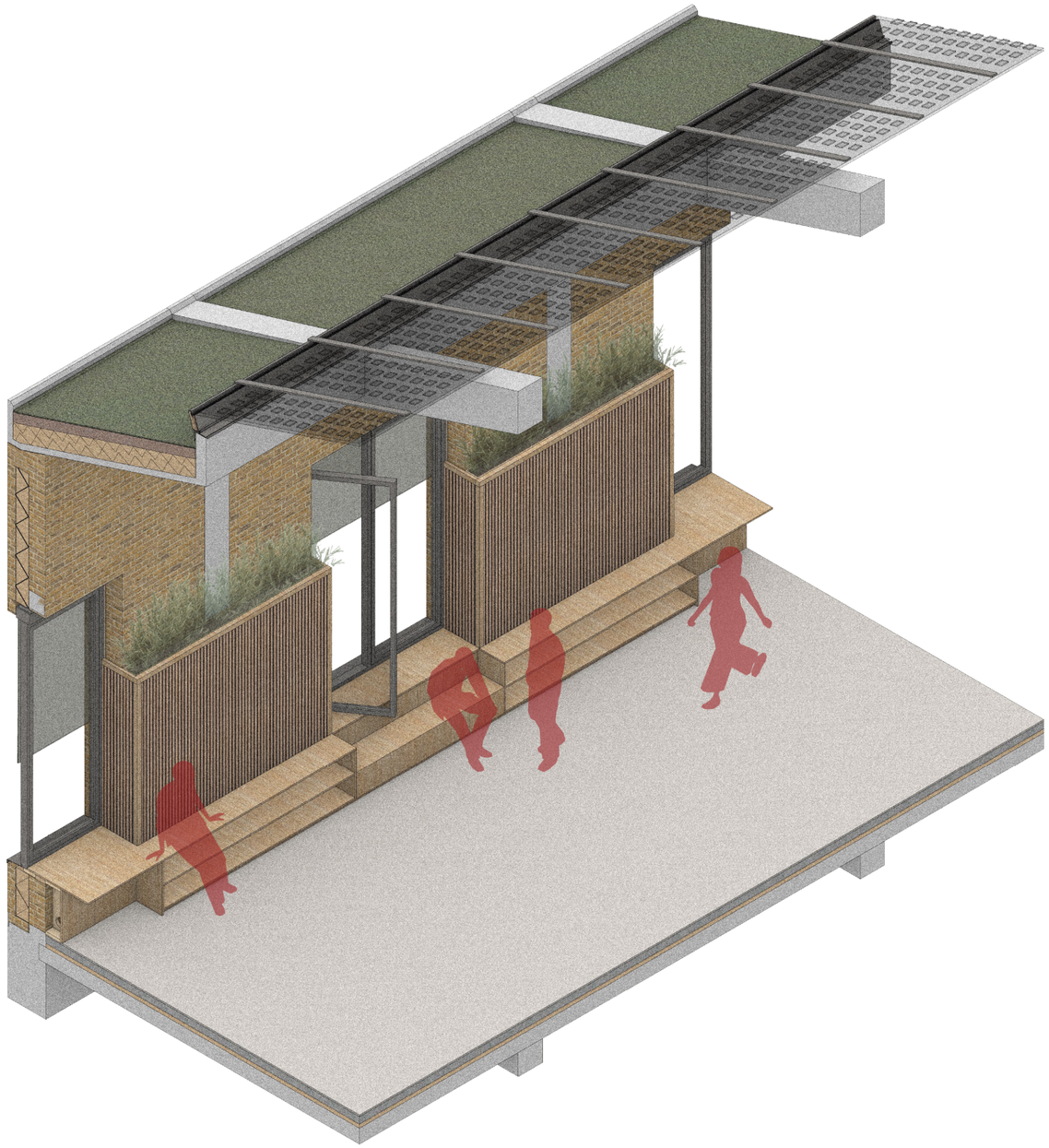
05
nature-inclusiveness



05
multifunctionality

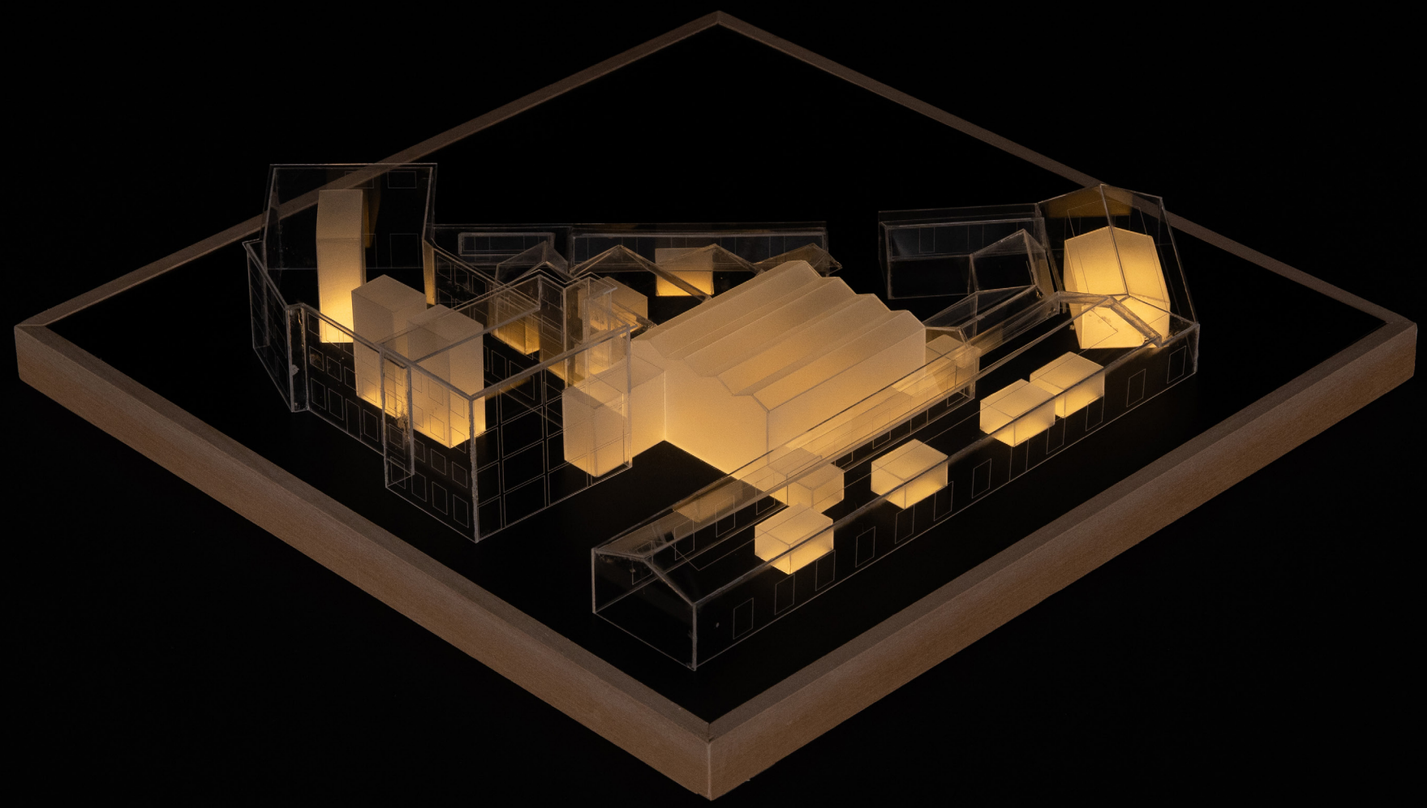


05
interior facade elements



05
interior facade elements

content



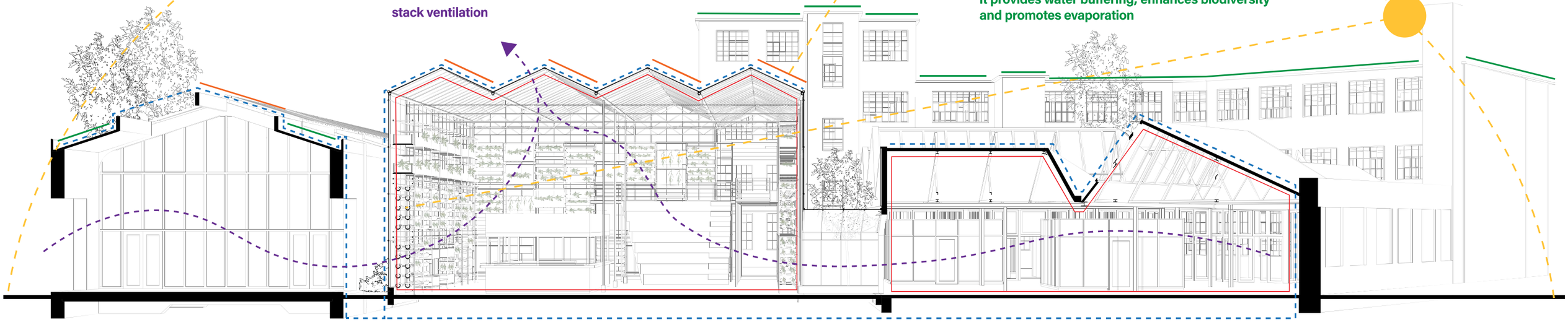
summer:
block radiation

winter:
let radiation through

solar panels for
energy production
and prevention of
overheating

vegetation protects the roof from
sunlight and other weather conditions;
it provides water buffering; enhances biodiversity
and promotes evaporation

stack ventilation



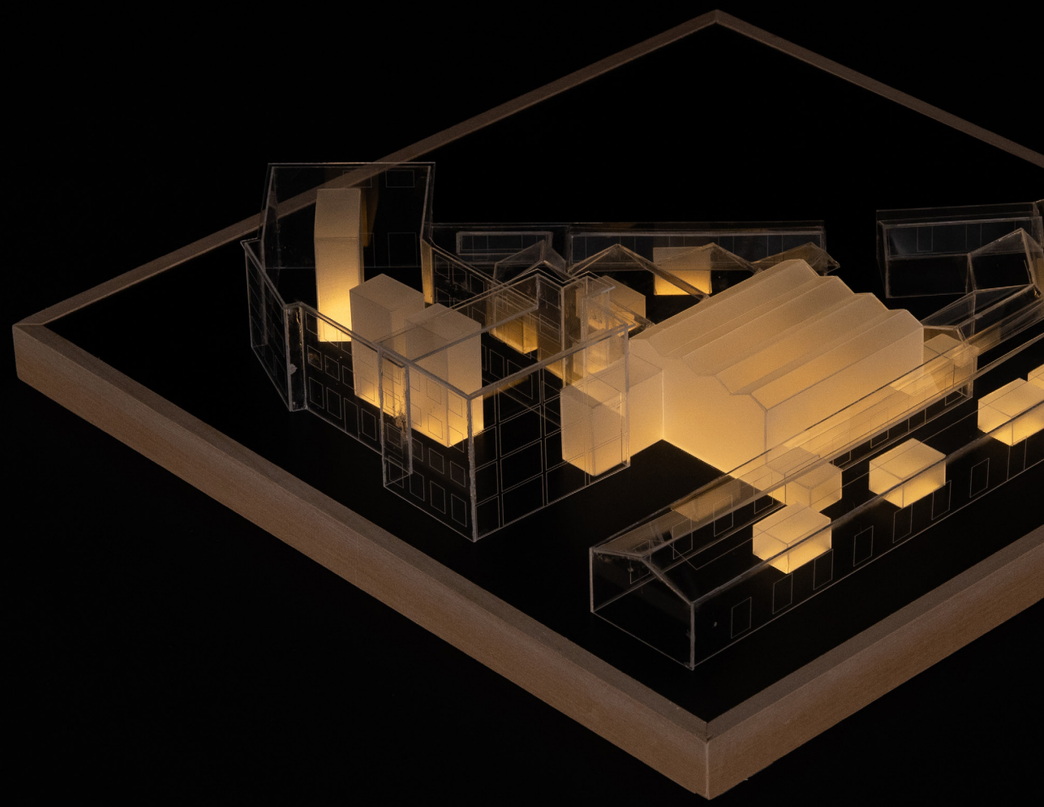
rainwater
harvesting and
collection

I Underfloor heating and cooling in retail + office + education areas ensure even temperature distribution.

II Fan coil units are installed in modules for targeted heating and cooling.

III Air heating and cooling are used in open areas of the hall.

research conclusion



research question:

“How can the adaptive reuse of industrial heritage as a hybrid public condenser contribute to preserving neighbourhood identity in areas undergoing urban redevelopment?”