Symphony

AR3AH105 | Resourceful housing | Adapting 20th century heritage

P5 - presentation

Bram Turkstra | 4802470 | 24.06.2024



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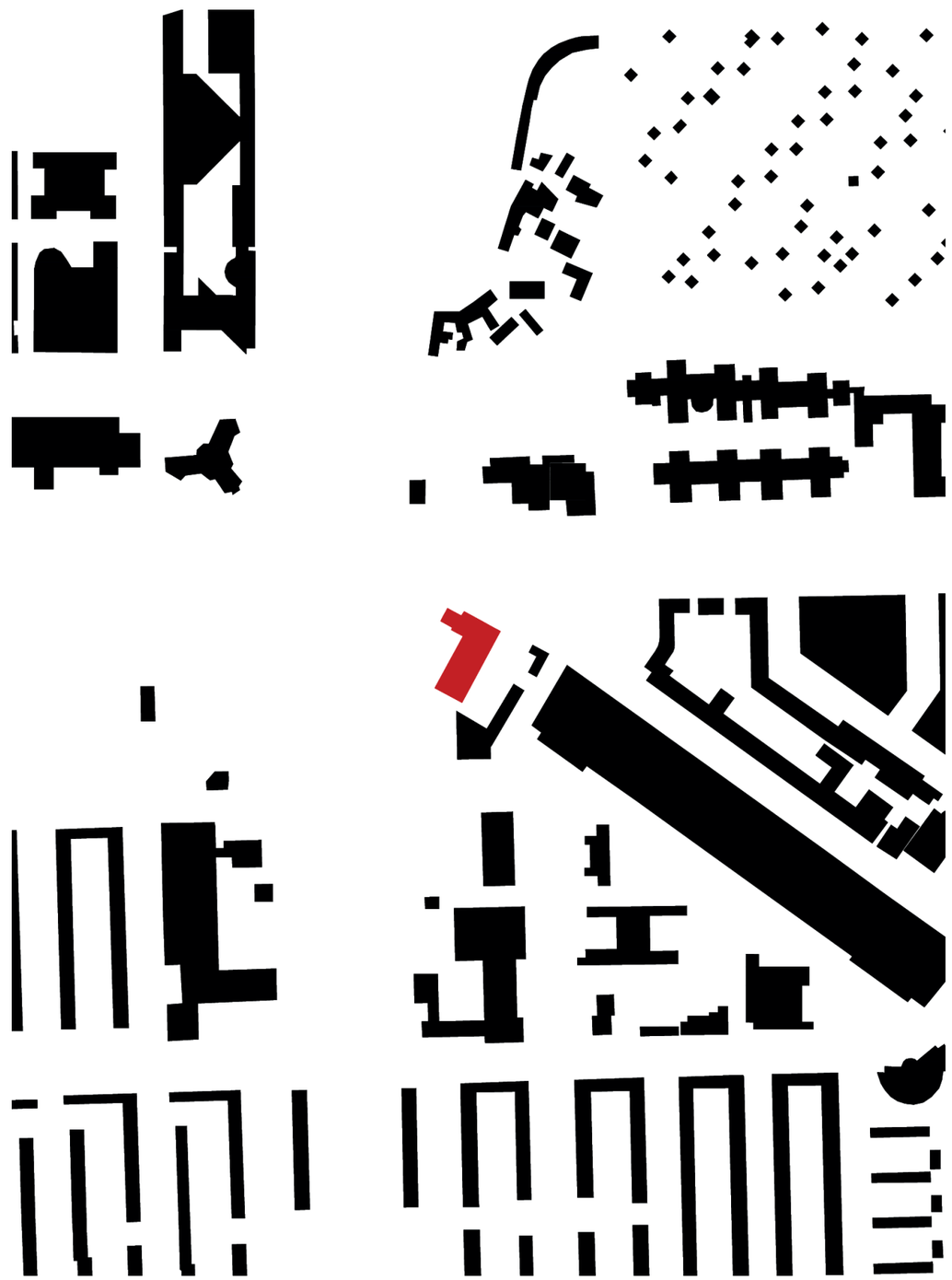

Problem statement

The Problem:



Construction sector is **largest C and N emitters** and **users of water**
(Ethical Unicorn, 2020)



Urban outdoor space is reaching a **ceiling** for **city expansion**
(Nederland is druk en vol (column), 2018)



Construction industry is **linear process**
(Gagg, 2014)

New produced materials from **non-renewable raw resources**
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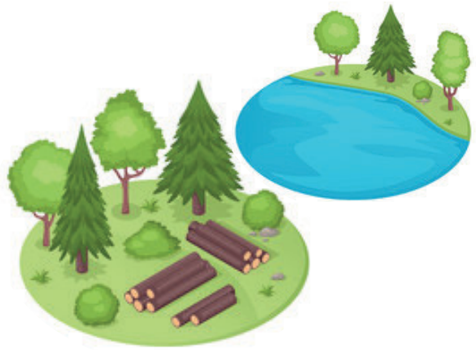
The Potential:







Bio-based materials can help transform the sector to a **circular sector** with **positive** contribution to **climate goals**
(Chayaamor-Heil et al., 2023)

Materials industry from **renewable origins**, blend **historical authenticity** with **ecological responsibility**
(Melià et al., 2014)

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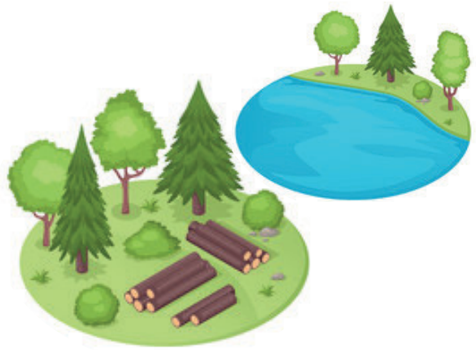

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Research question

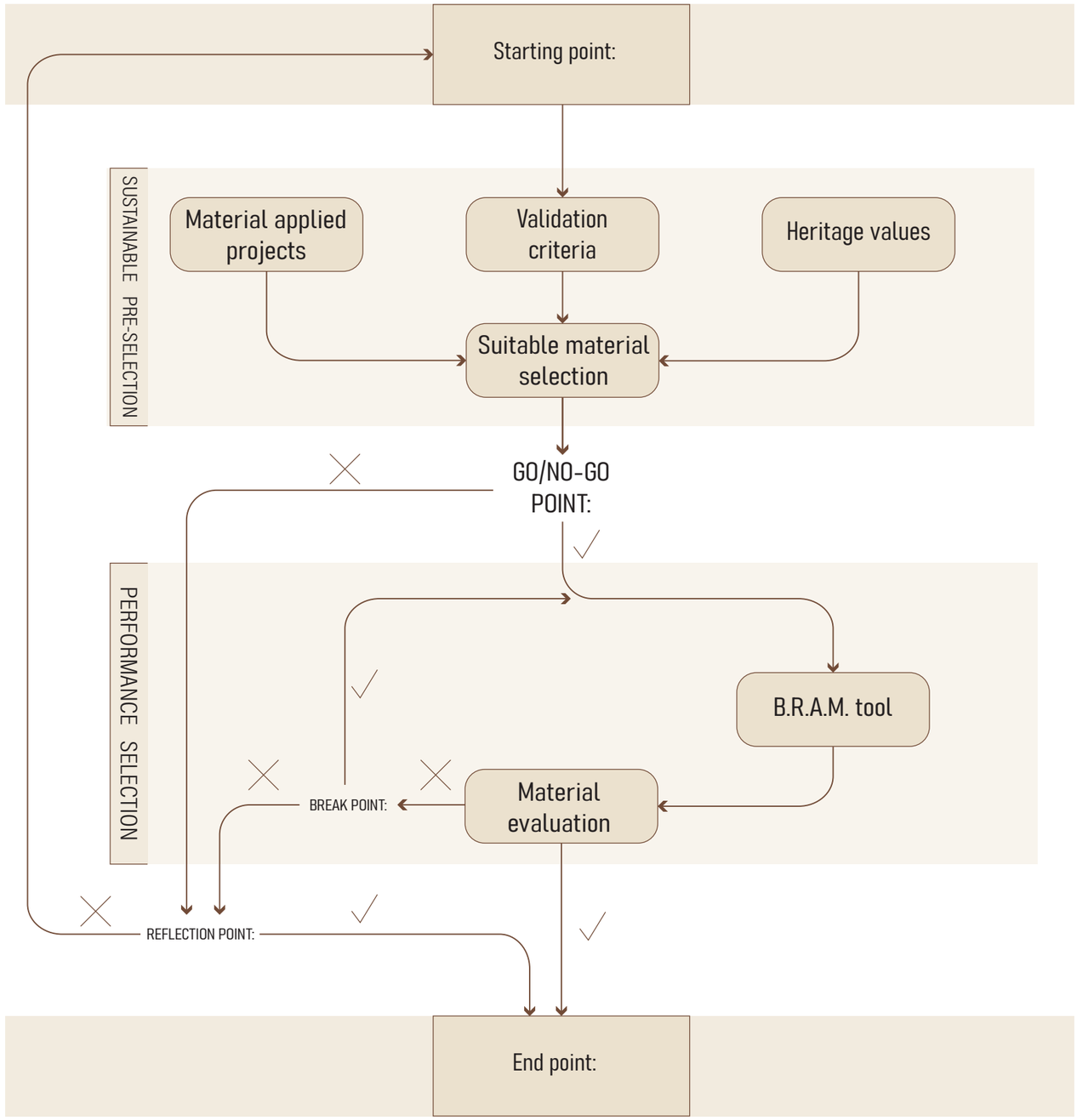
"How can **bio-based materials** enhance **sustainability and circularity** in architectural renovation while **prioritizing** the conservation & preservation of **architectural heritage**?"

Methodology

Framework

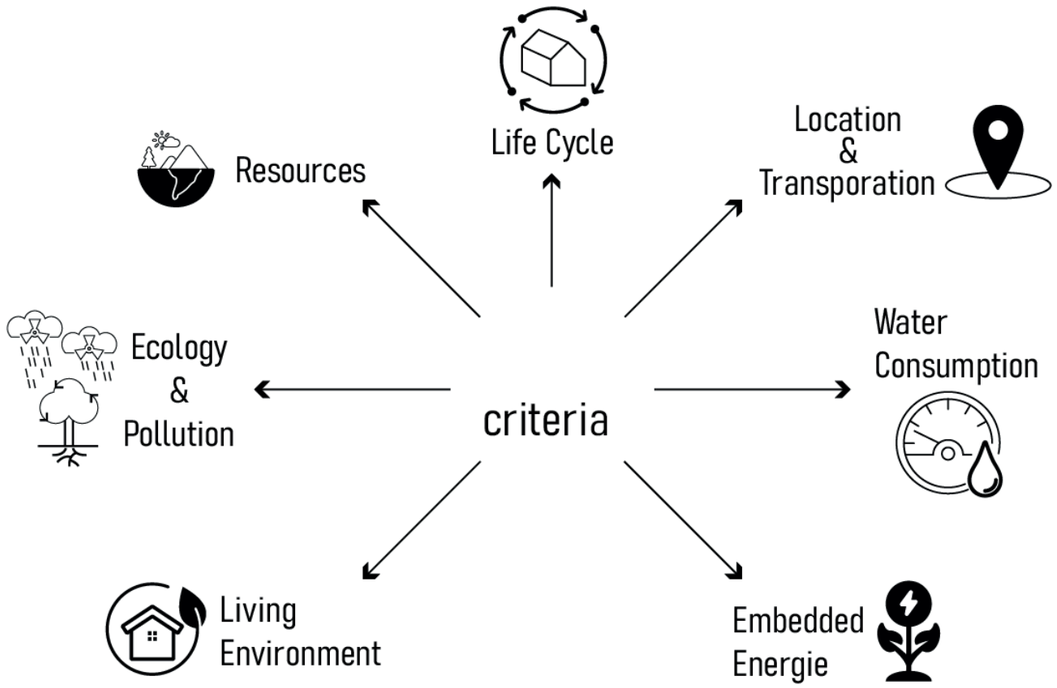
The 10-R's of circularity
Measuring system for a circular economy
(Potting et al., 2017)

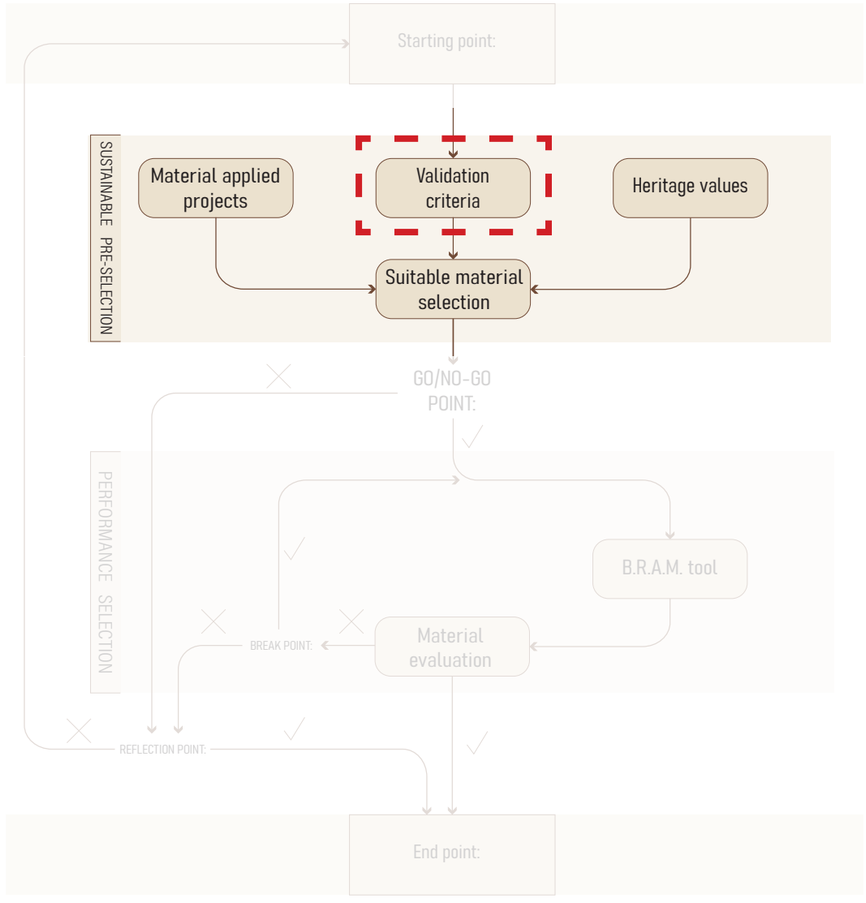
The criteria systems of the **BREEAM** and **LEED**
Validation criteria for sustainable buildings
(Awadh 2017) & (Park, Yoon, and Kim 2017)



Conclusions

A sustainable pre-selection





Comprehensive set of criteria

- Adhere to sustainable practices and principles
  - Preserve the historical significance

Conclusions

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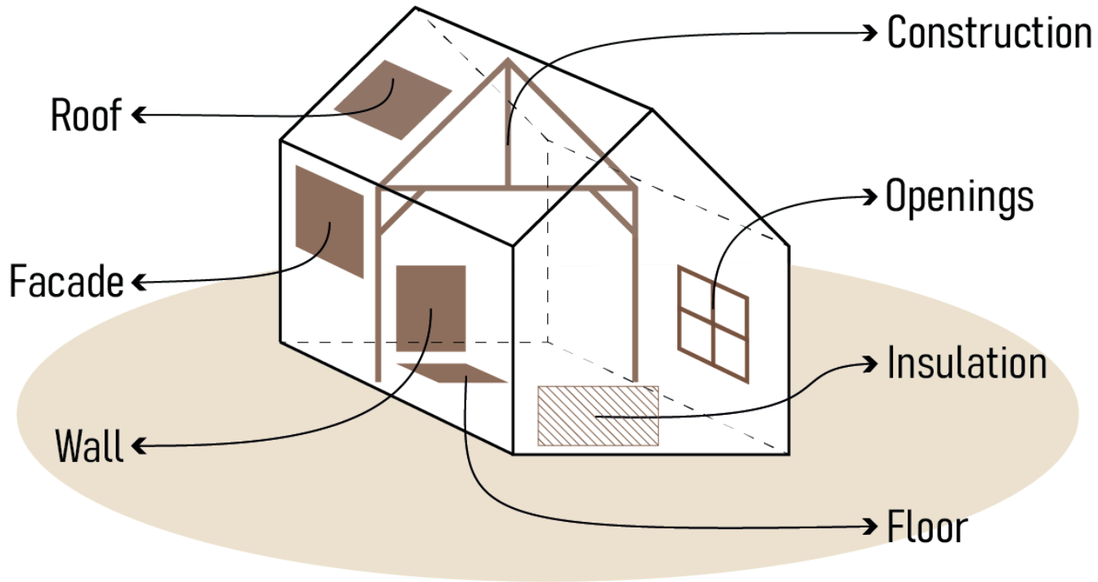
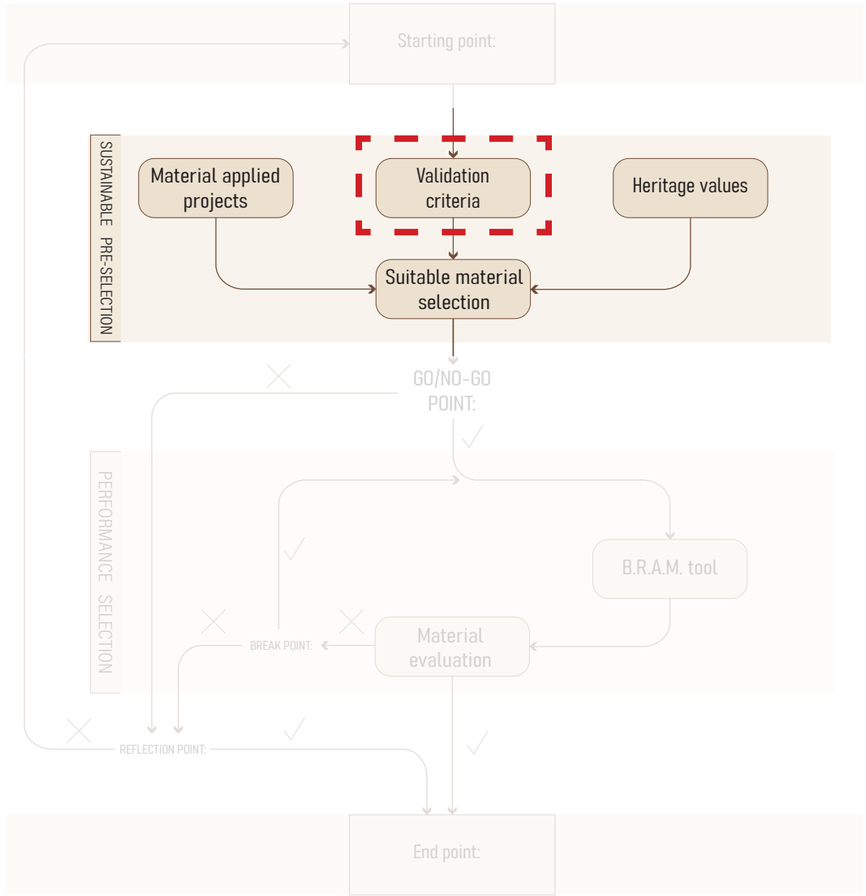


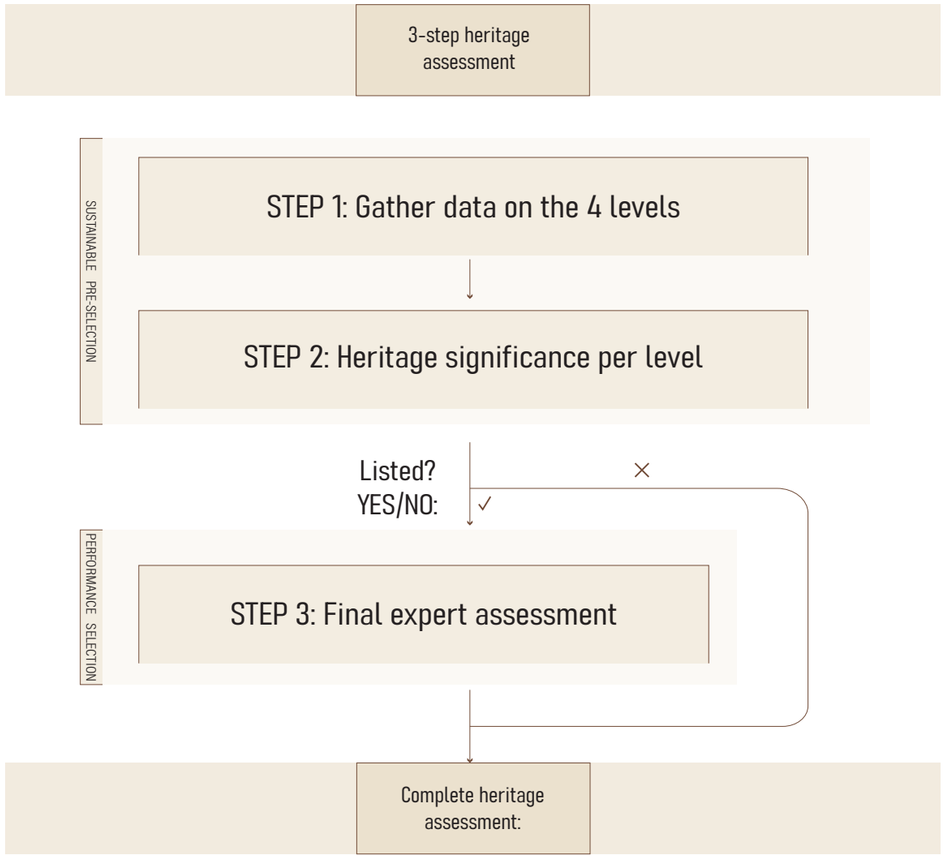


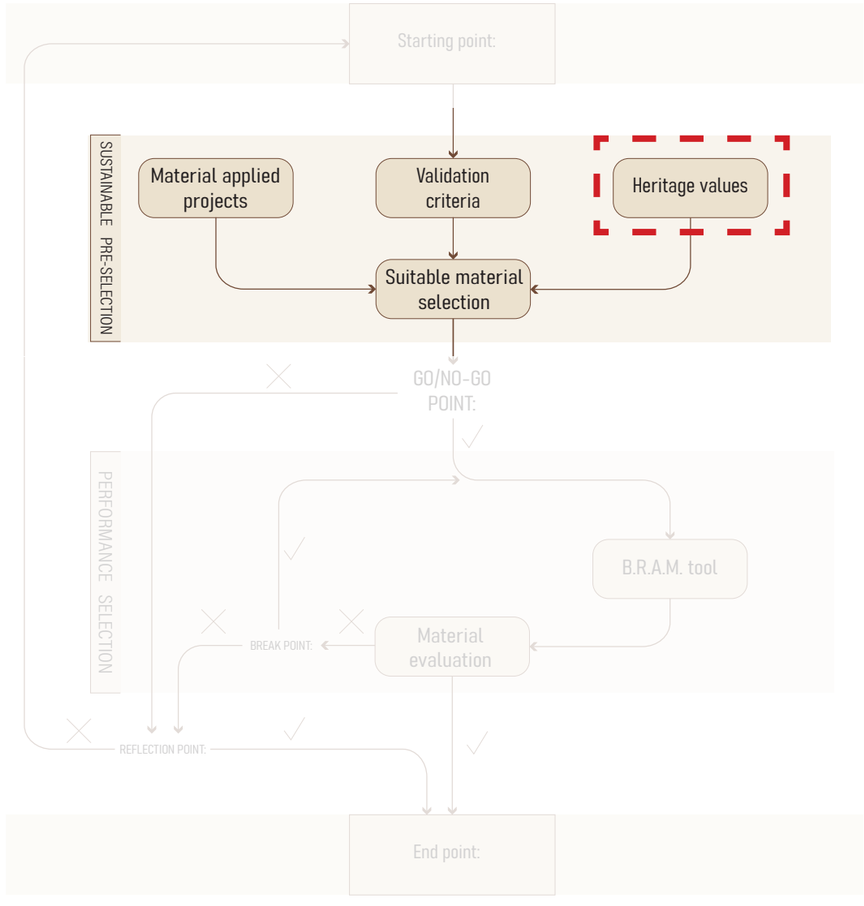
Material recommendations

- Building categories related to interventions
- In order to find a suitable material more easily

Conclusions

A sustainable pre-selection



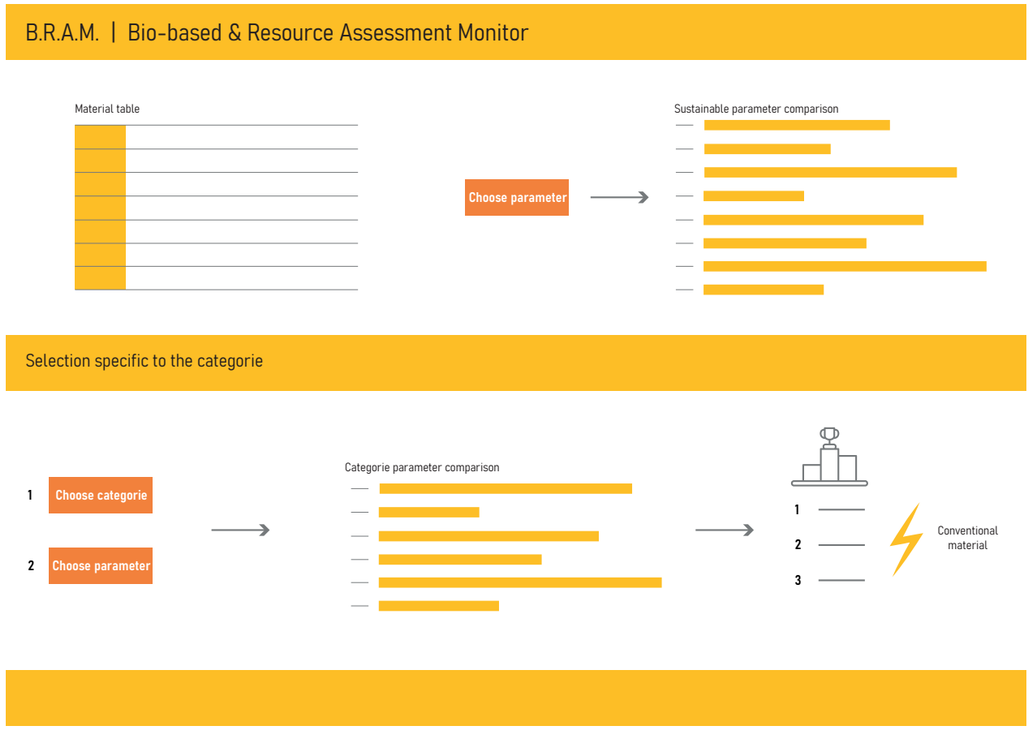


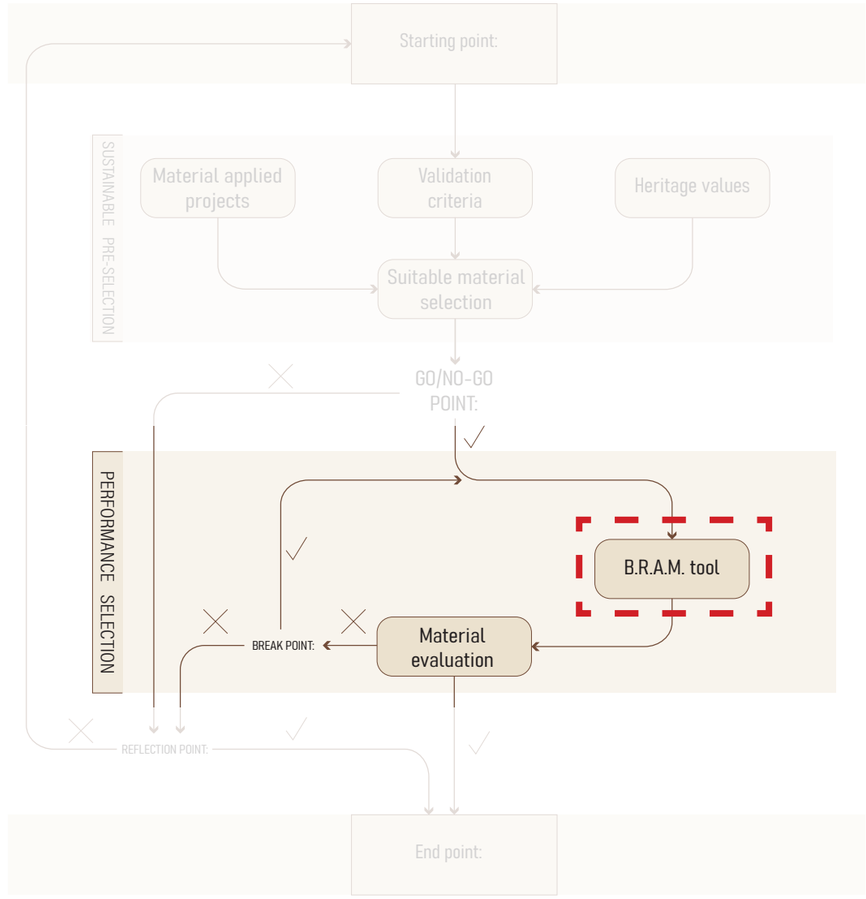
3-step heritage preservation

- To improve upon current guidelines
- Consistent approach for each different project

Conclusions

B.R.A.M. tool - A performance selection

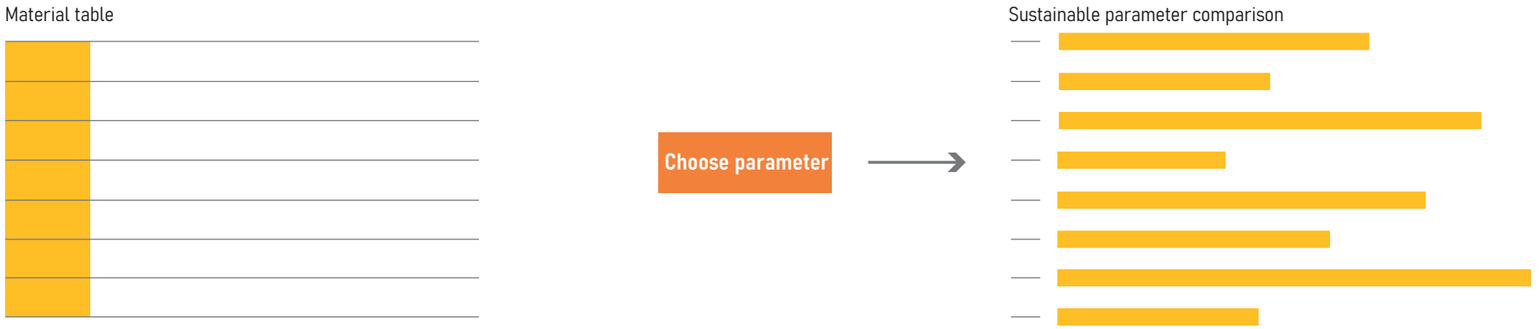




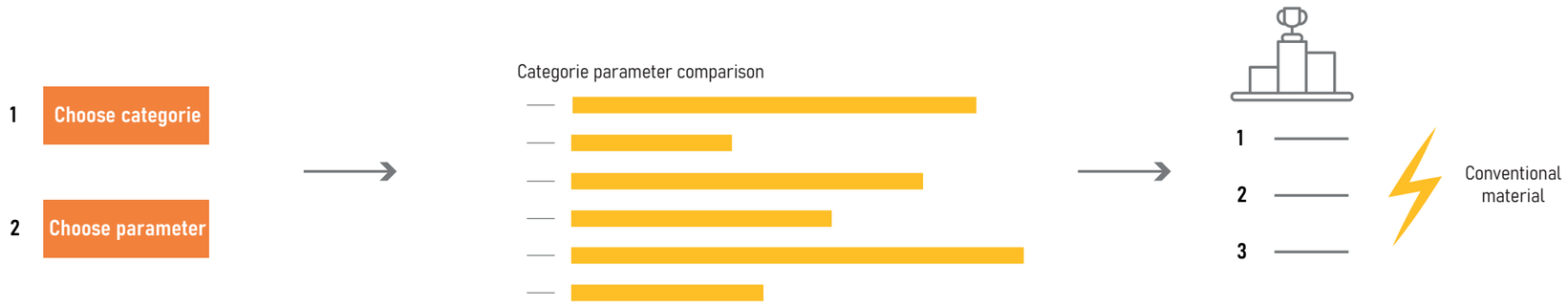
Conclusions

B.R.A.M. tool - A performance selection

B.R.A.M. | Bio-based & Resource Assessment Monitor



Selection specific to the categorie



Conclusions

To evaluate



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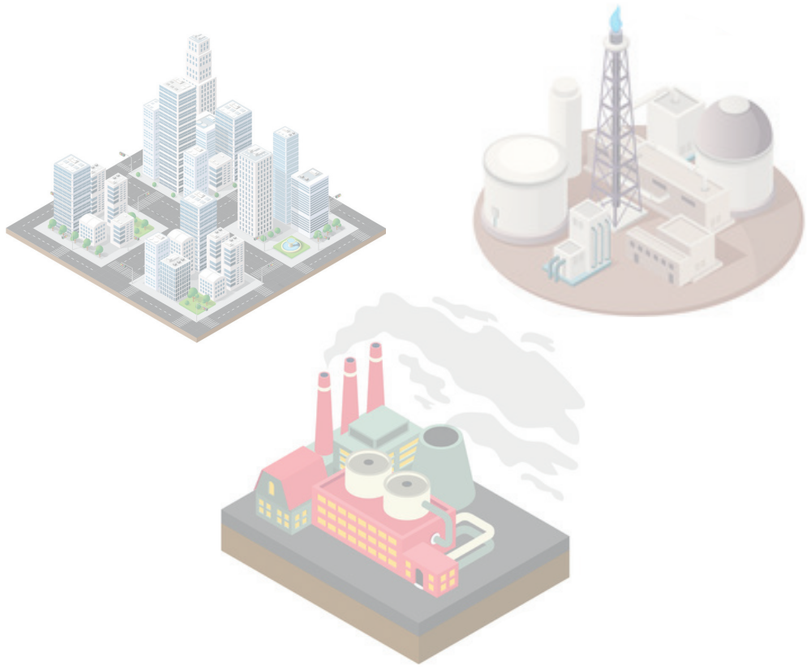

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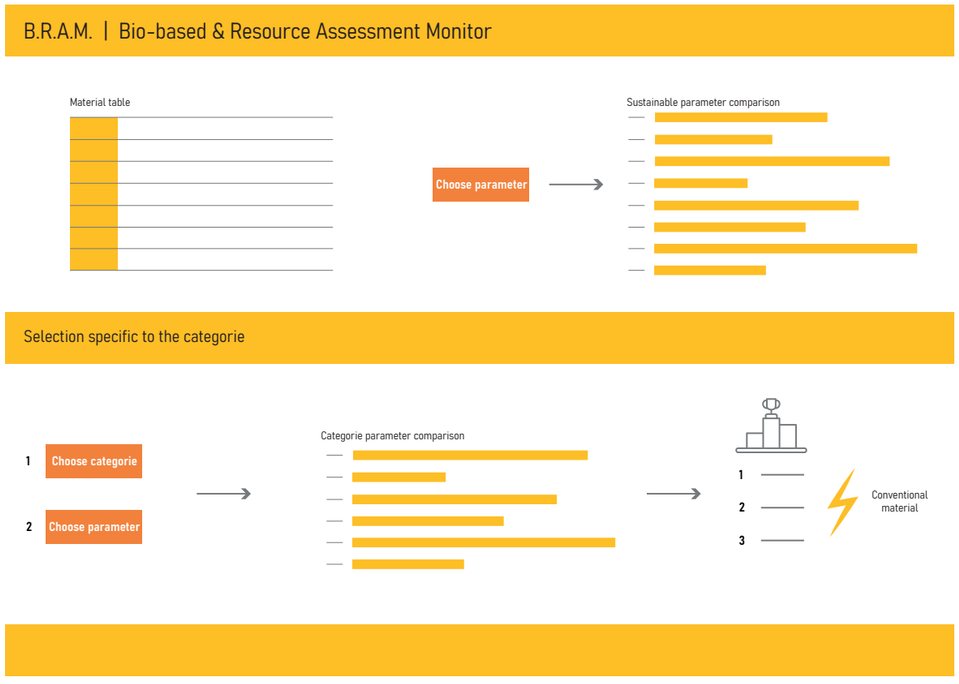

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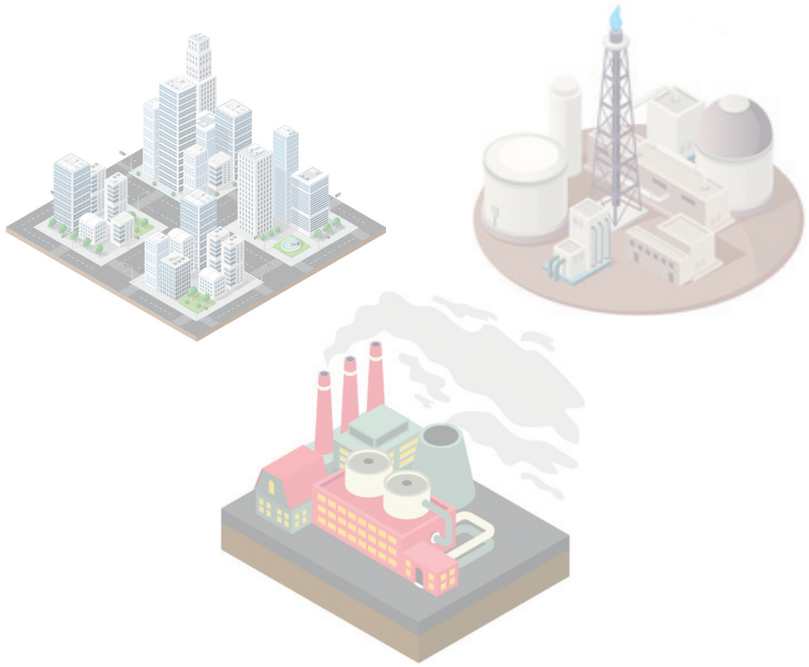

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Research implemented in the design case

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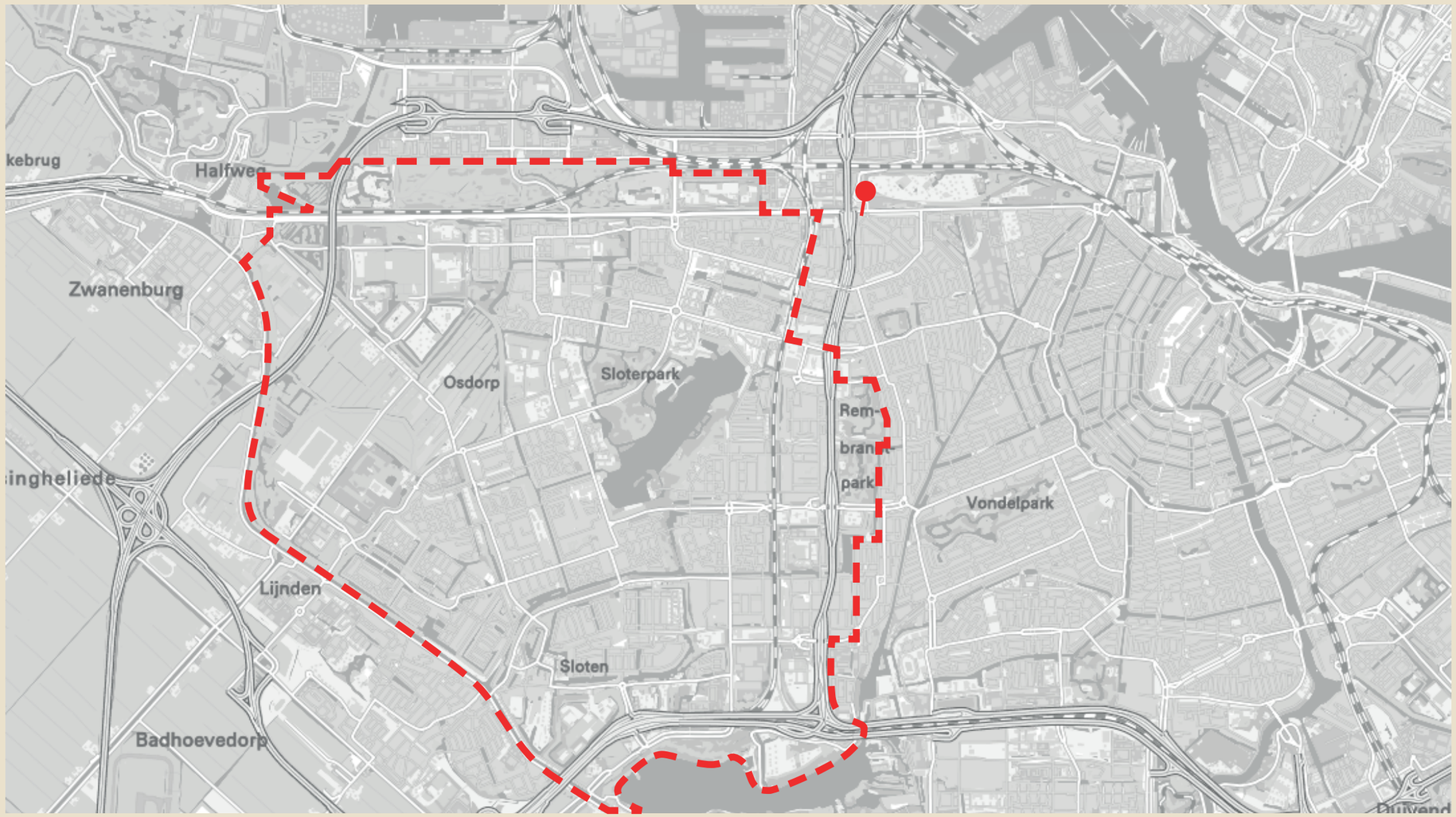
Design case

History



Design case

History



1922

Design case

History



1930

Design case

History



1977

Design case

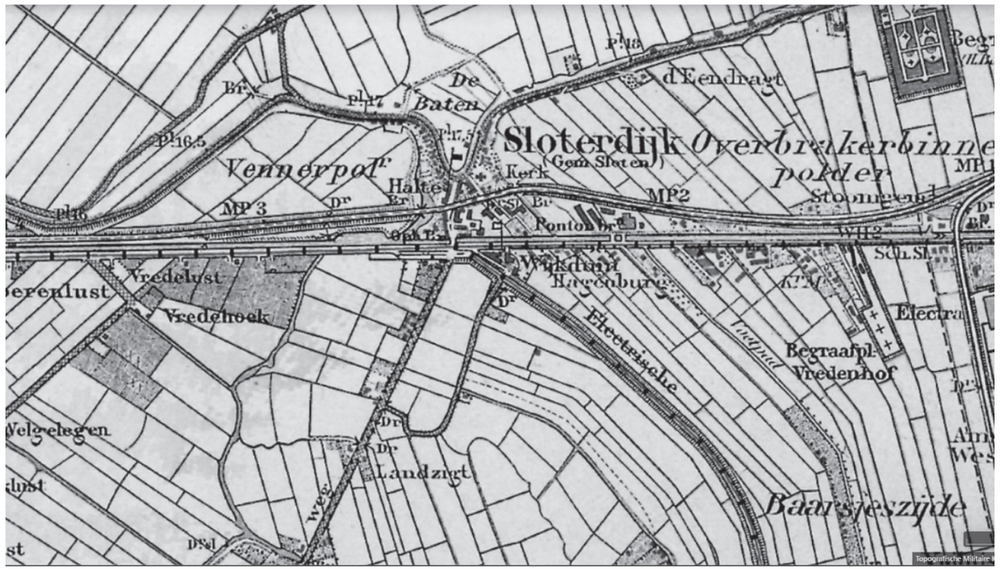
Future

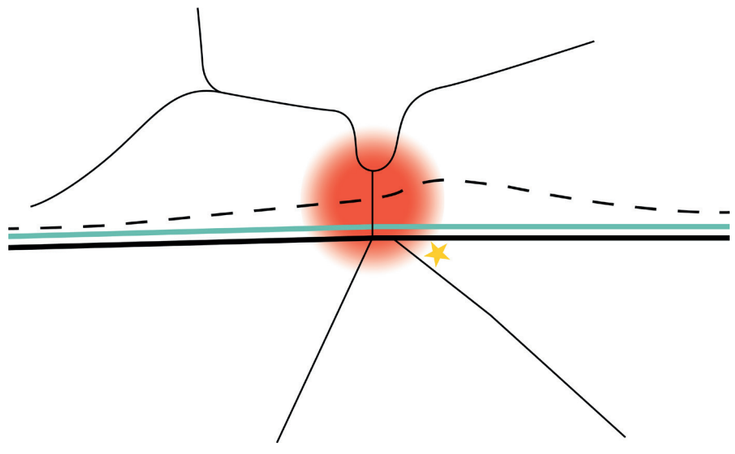


2024 ⟶

Design case

Location research

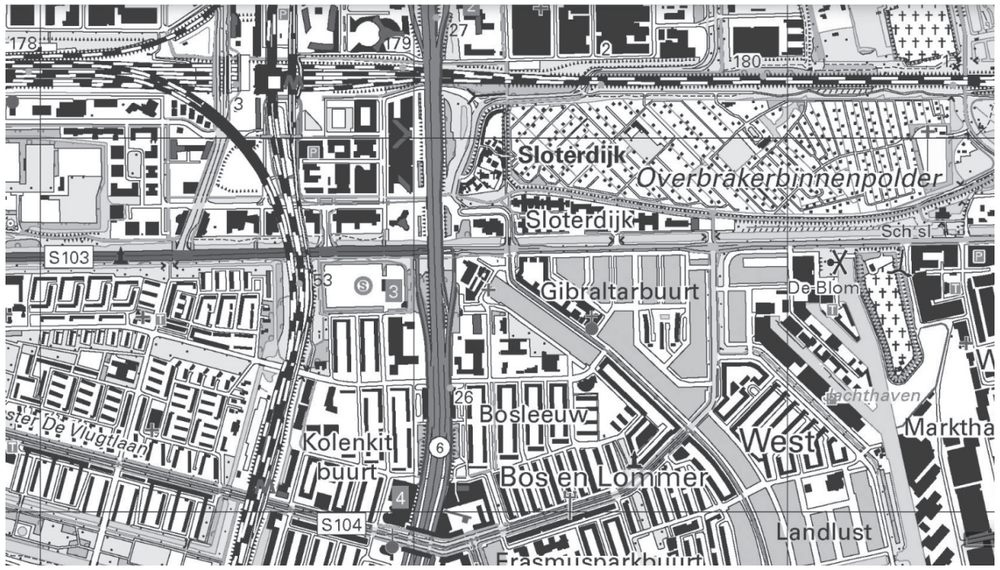


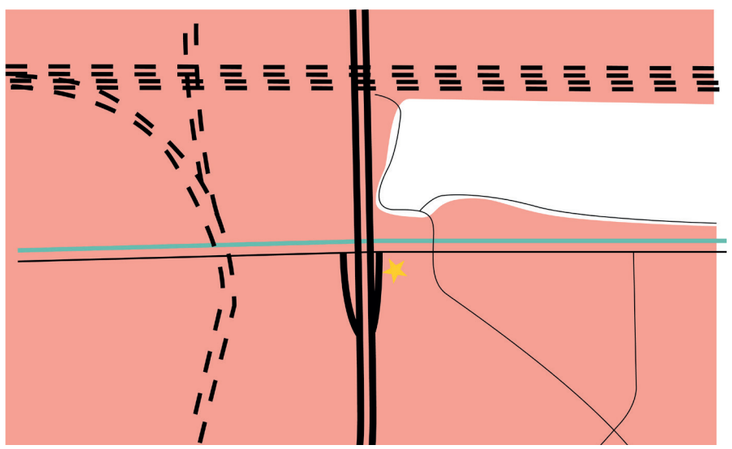


1922 - urban setting

Design case

Location research

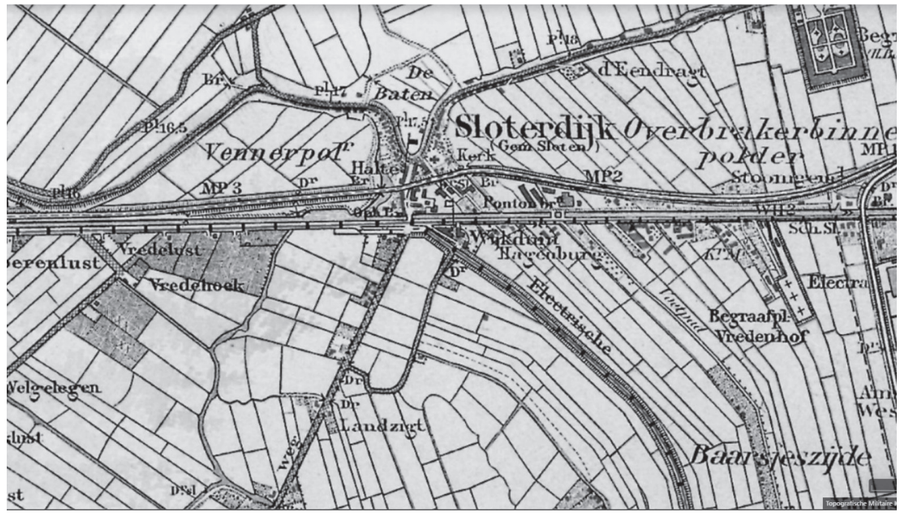


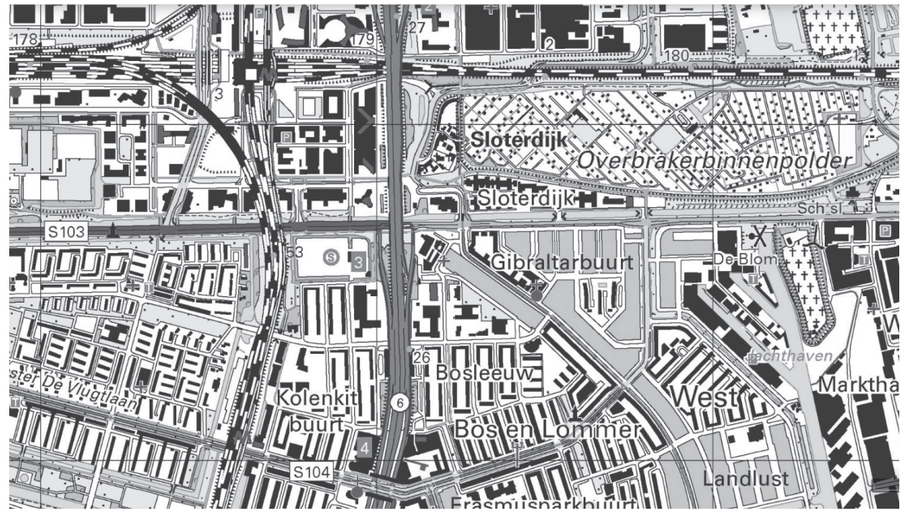


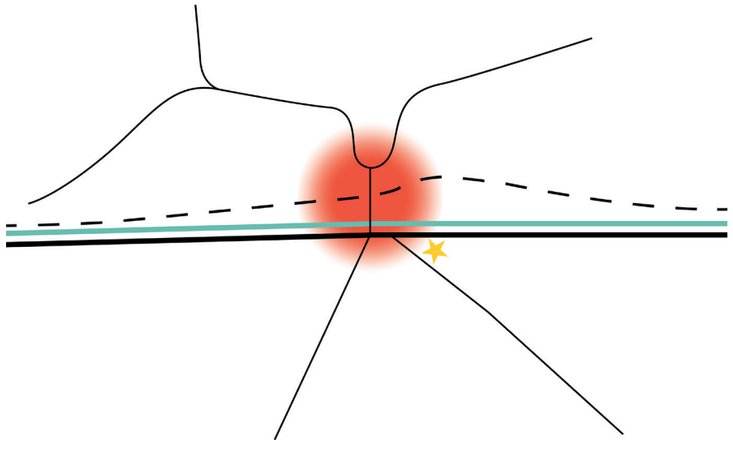
2024 - urban setting

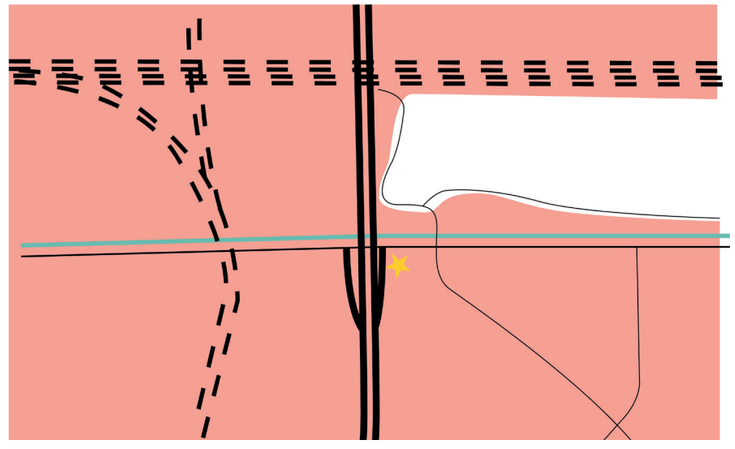
Design case

Location research







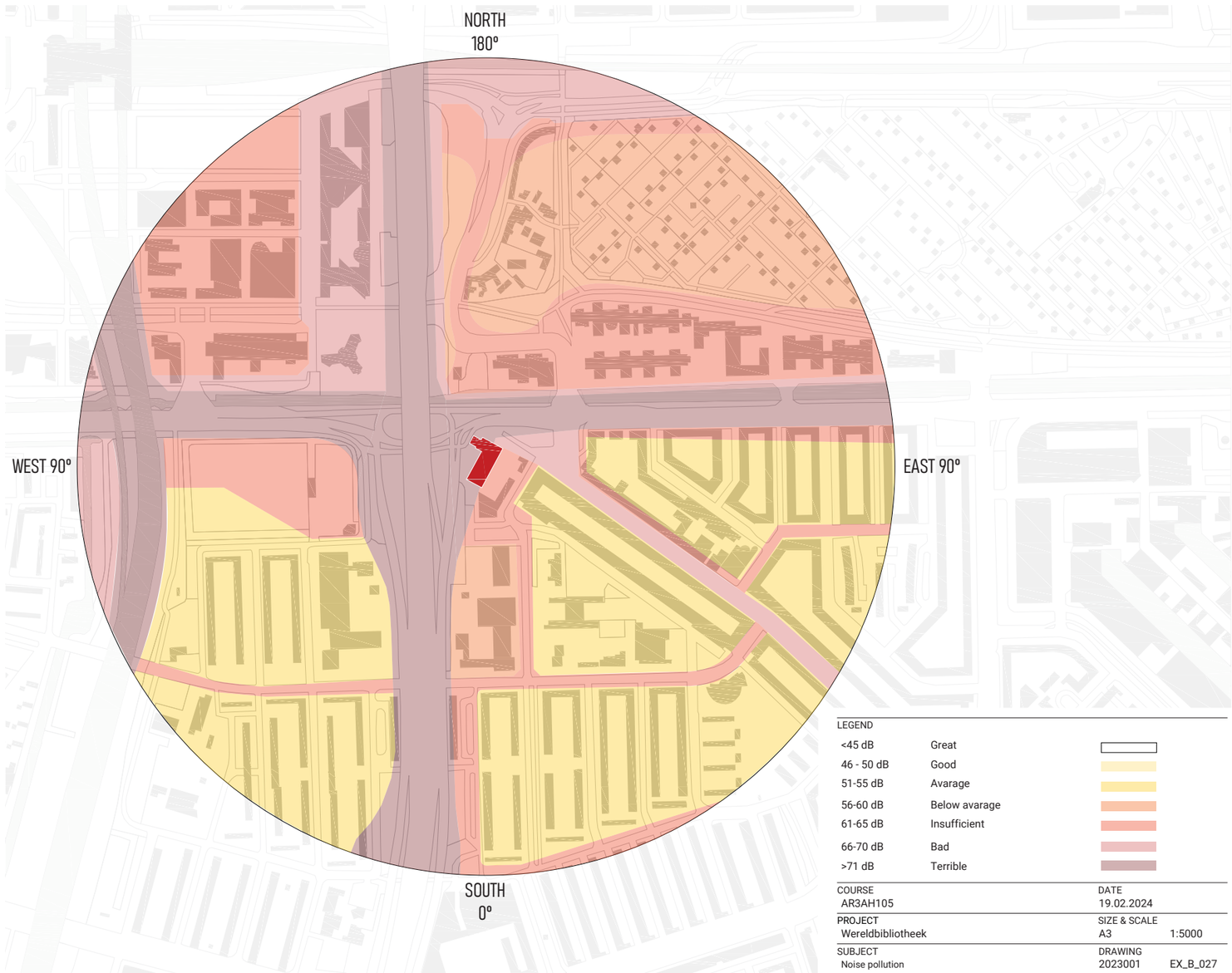


1922 - urban setting

2024 - urban setting

Design case

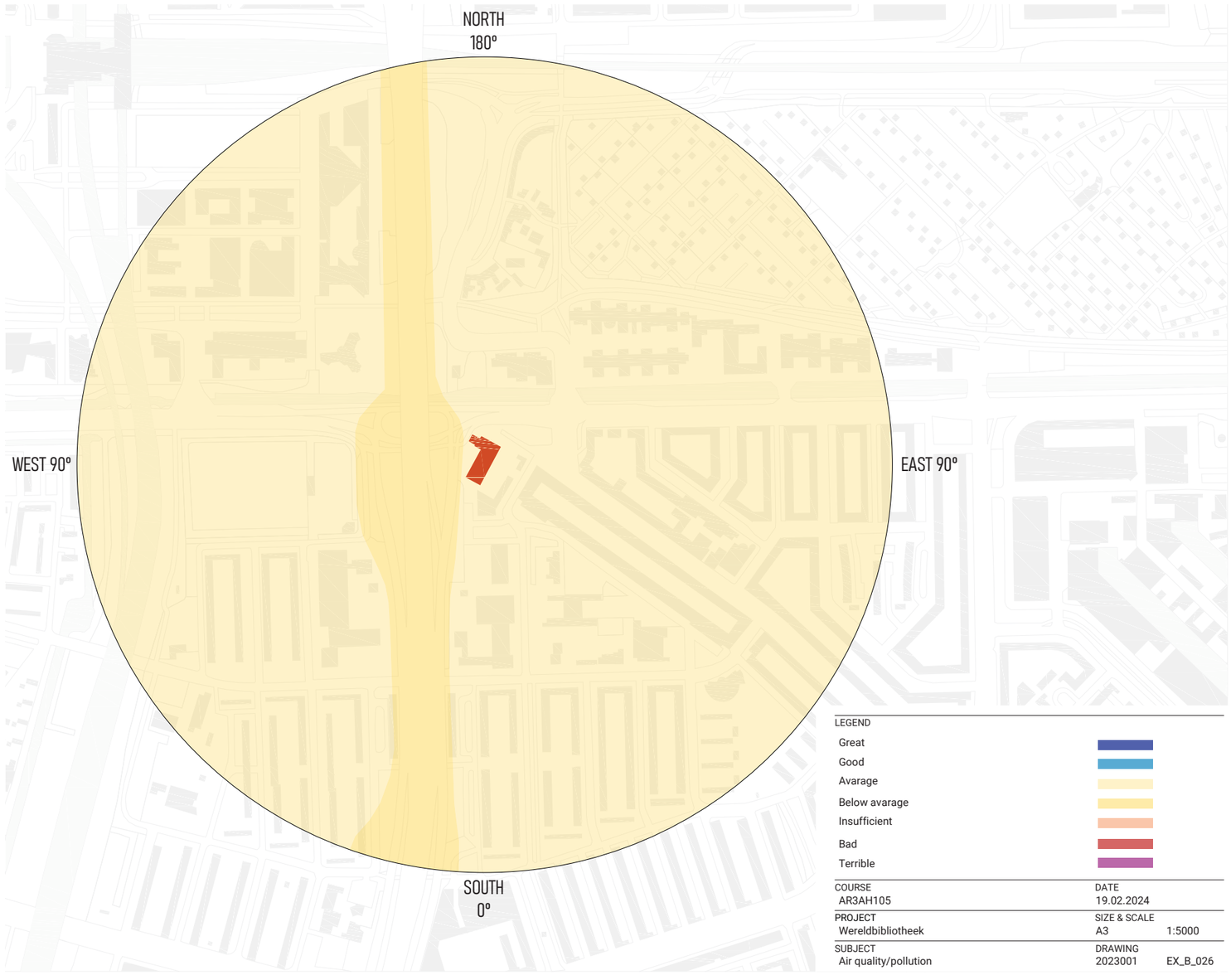
Location research



Noise pollution

Design case

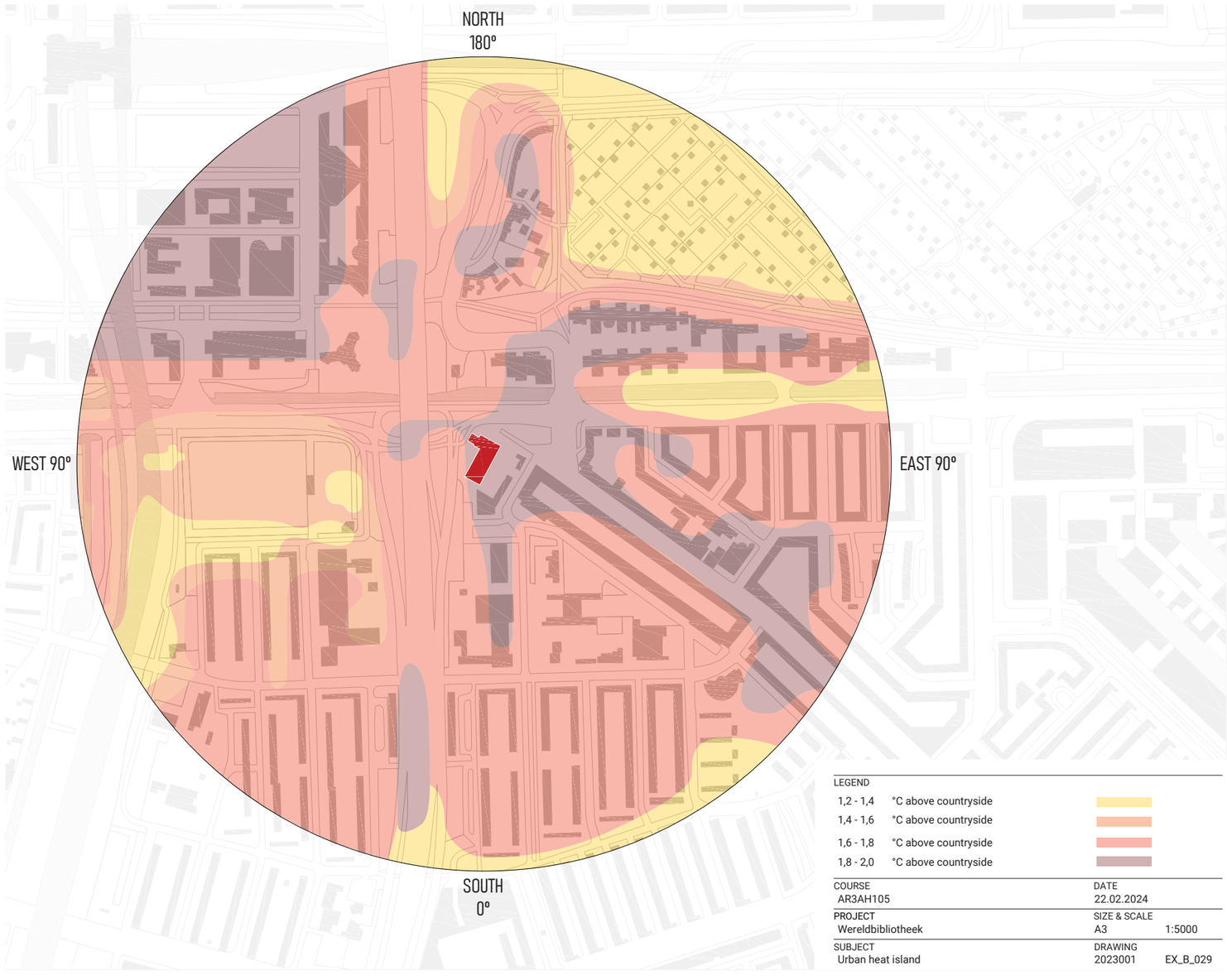
Location research



Air quality

Design case

Location research



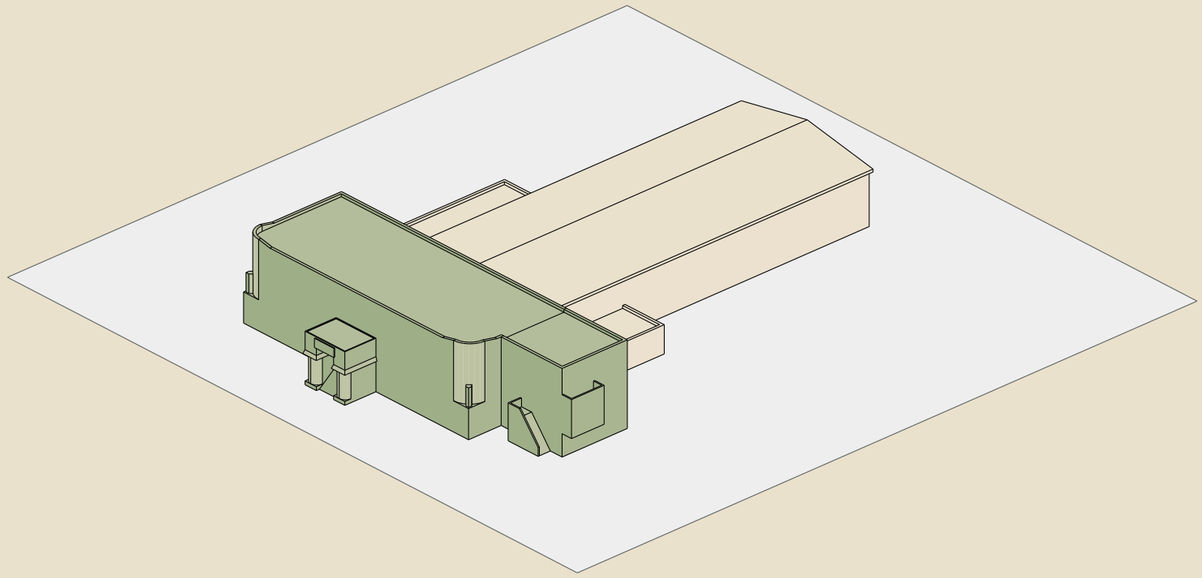
Urban heat island

Design case

Ambitions & concept

Bio-based materials

Preserving heritage

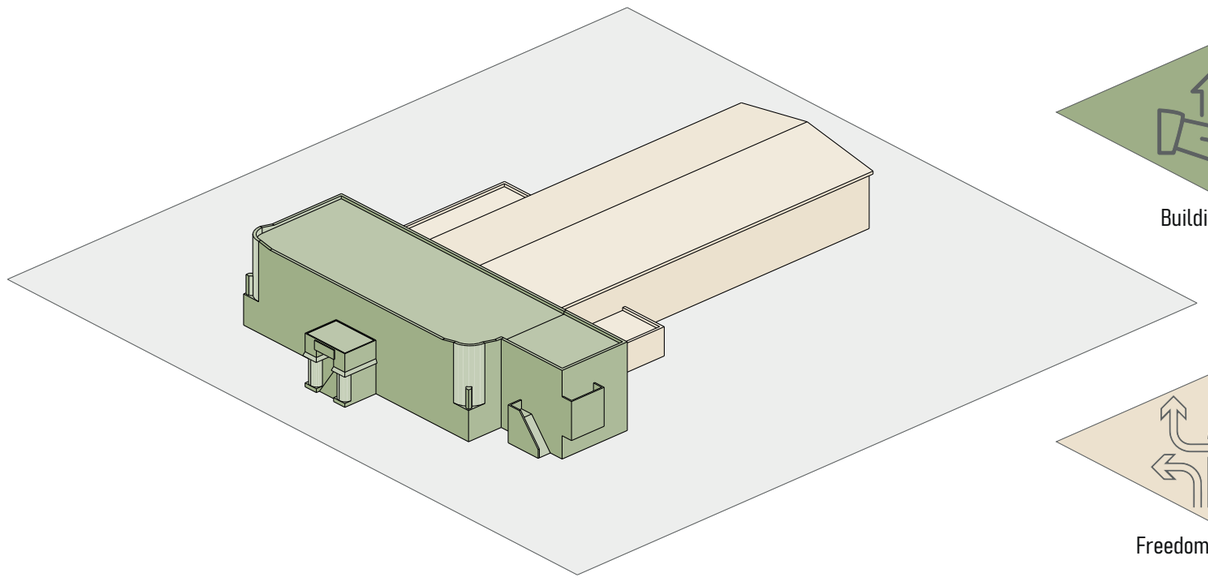


Living together

Two faces

Design case

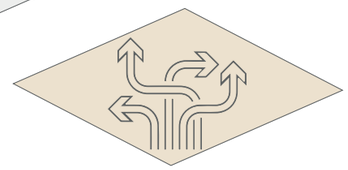
Ambitions & concept



Preserving Heritage



Building value



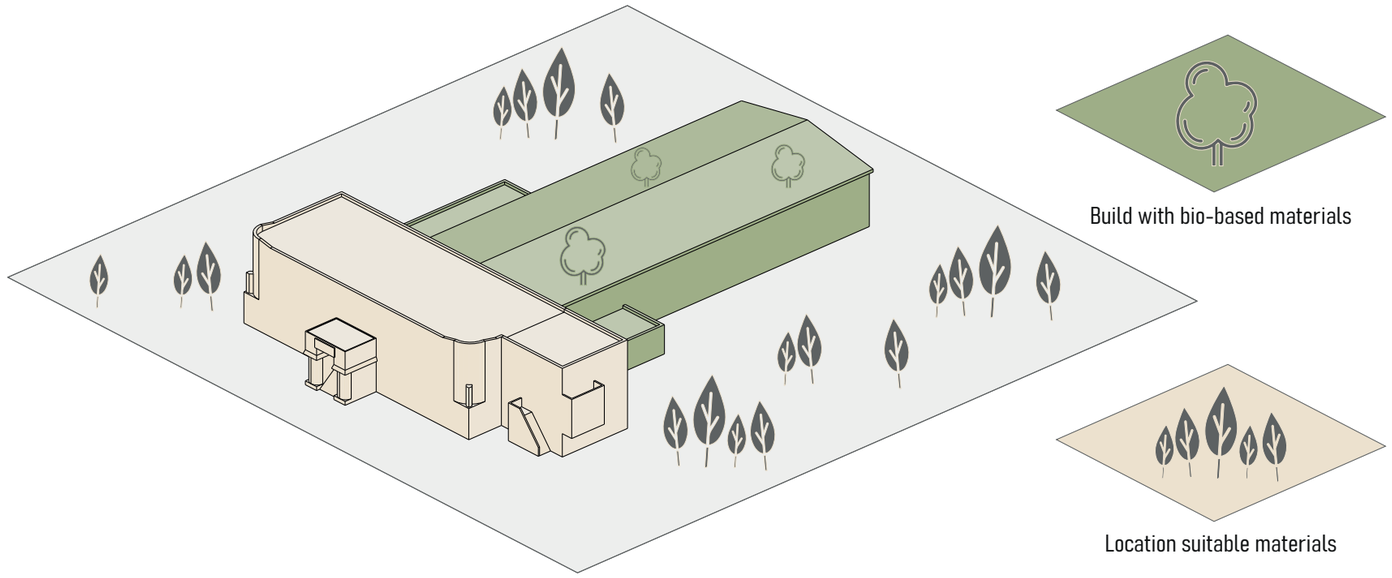
Freedom for change

Research ambition - big scale

Maintain the character of the building for it's future

Design case

Ambitions & concept



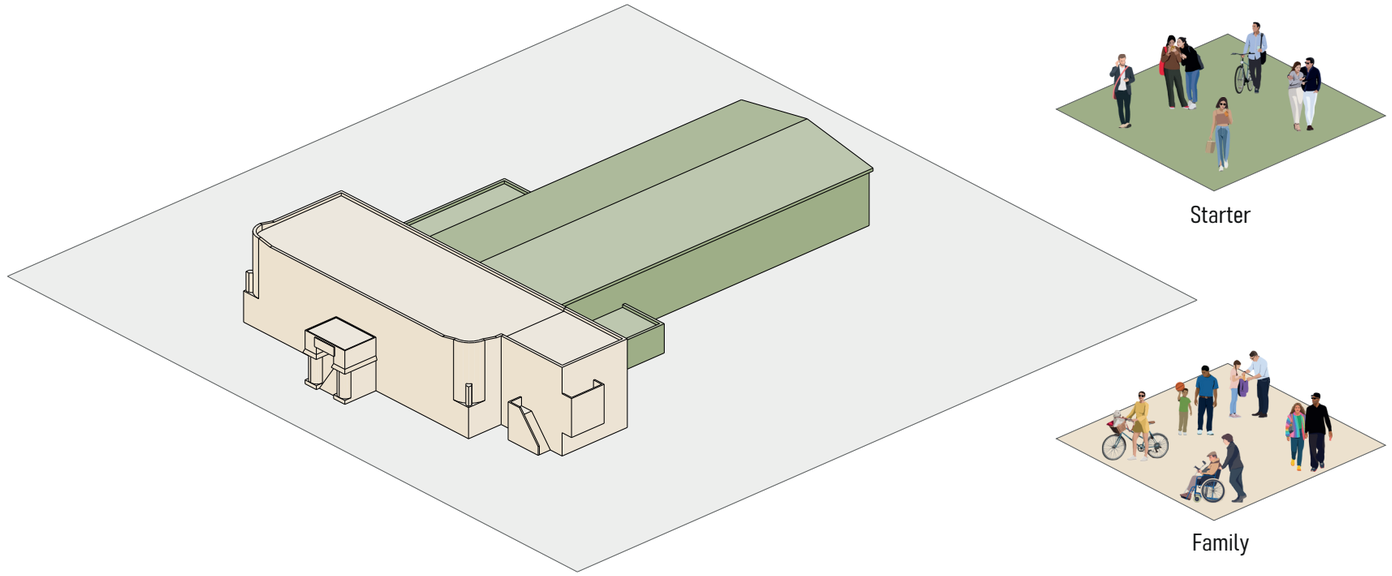
Bio-based materials

Research ambition - small scale

Using bio-based materials selected with use of the research

Design case

Ambitions & concept

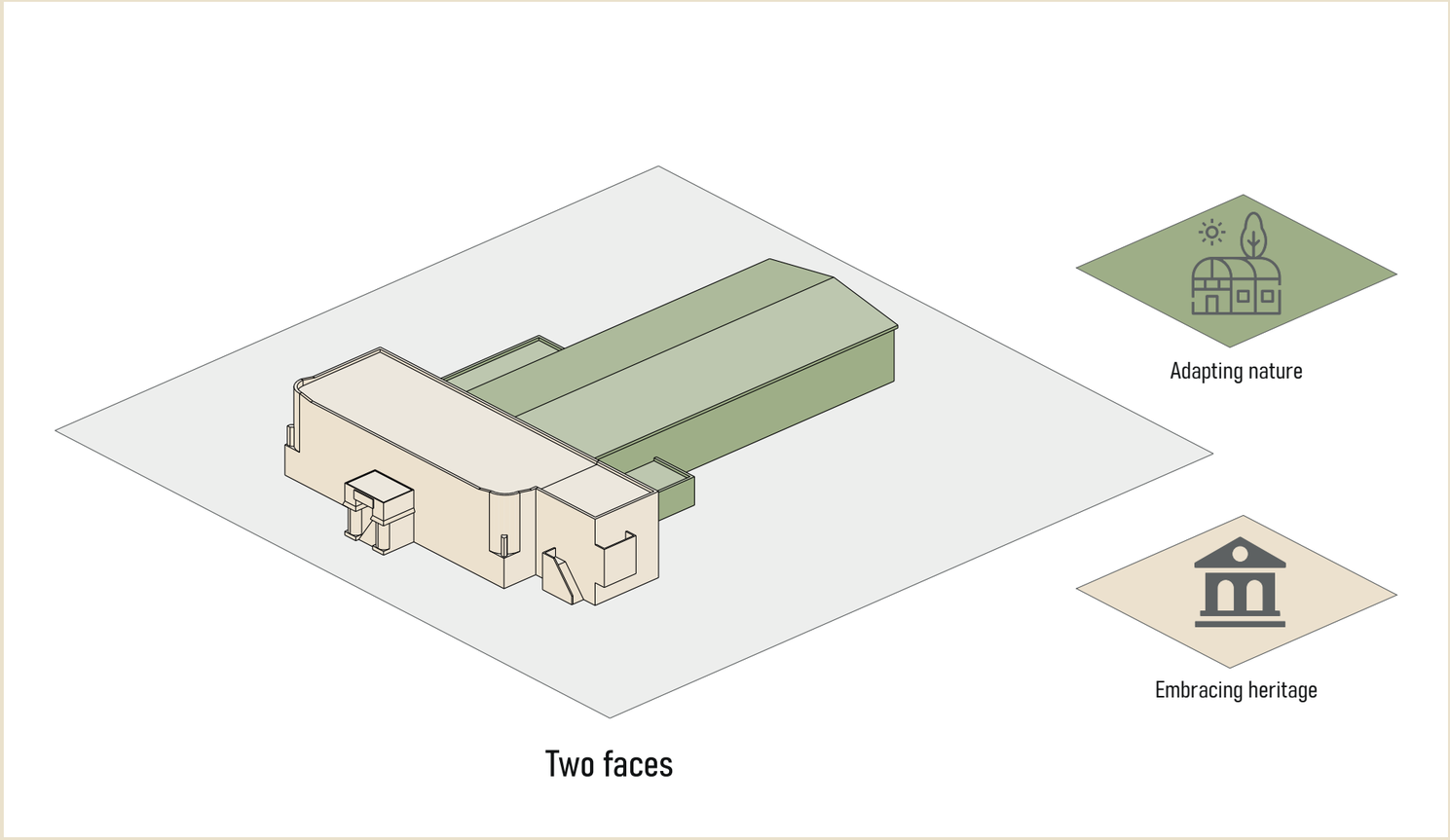


Design ambition - big scale

Attracting different target groups into the building

Design case

Ambitions & concept

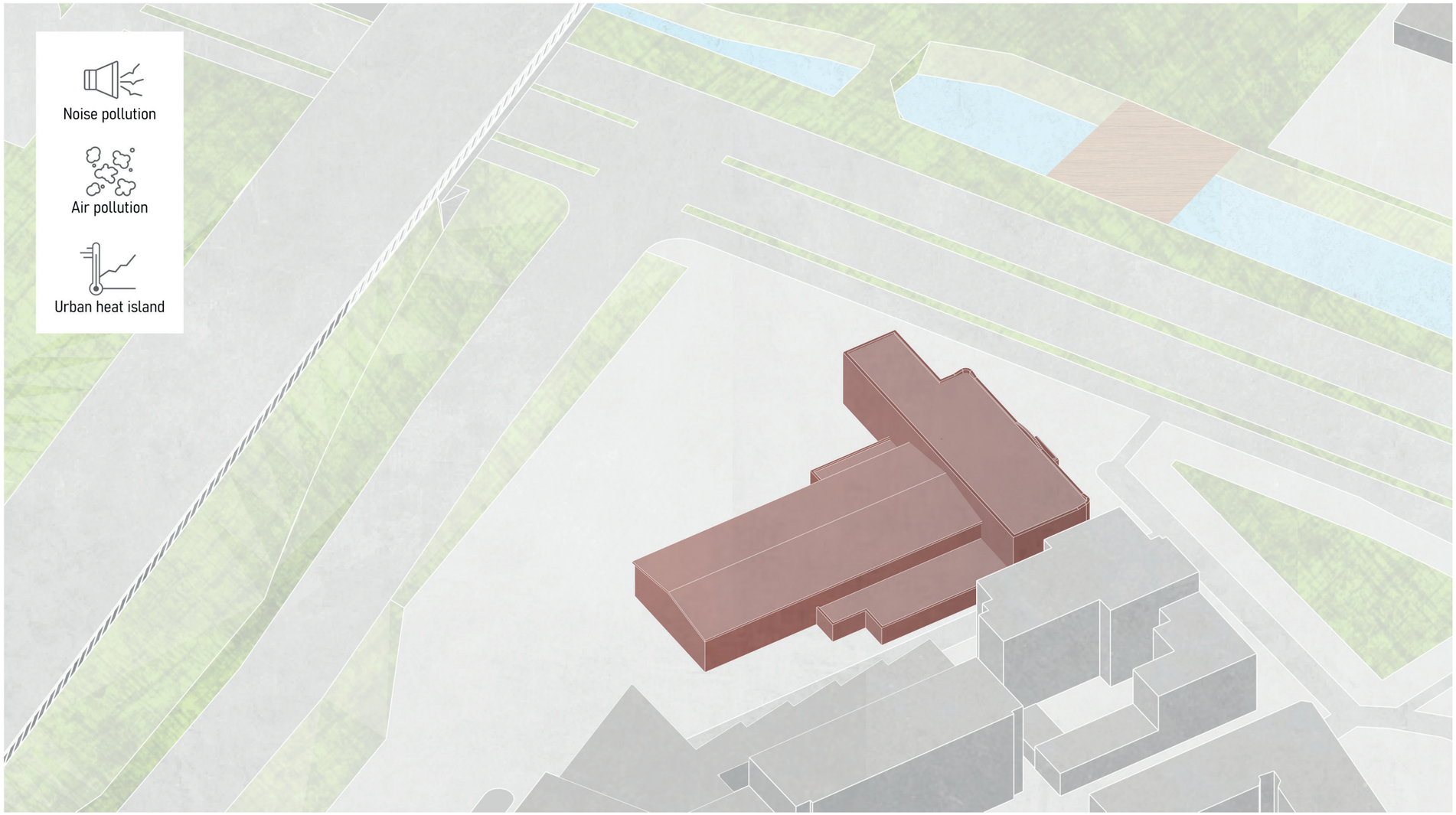


Design ambition - small scale

Showing the history as well as the future of the building

Design case

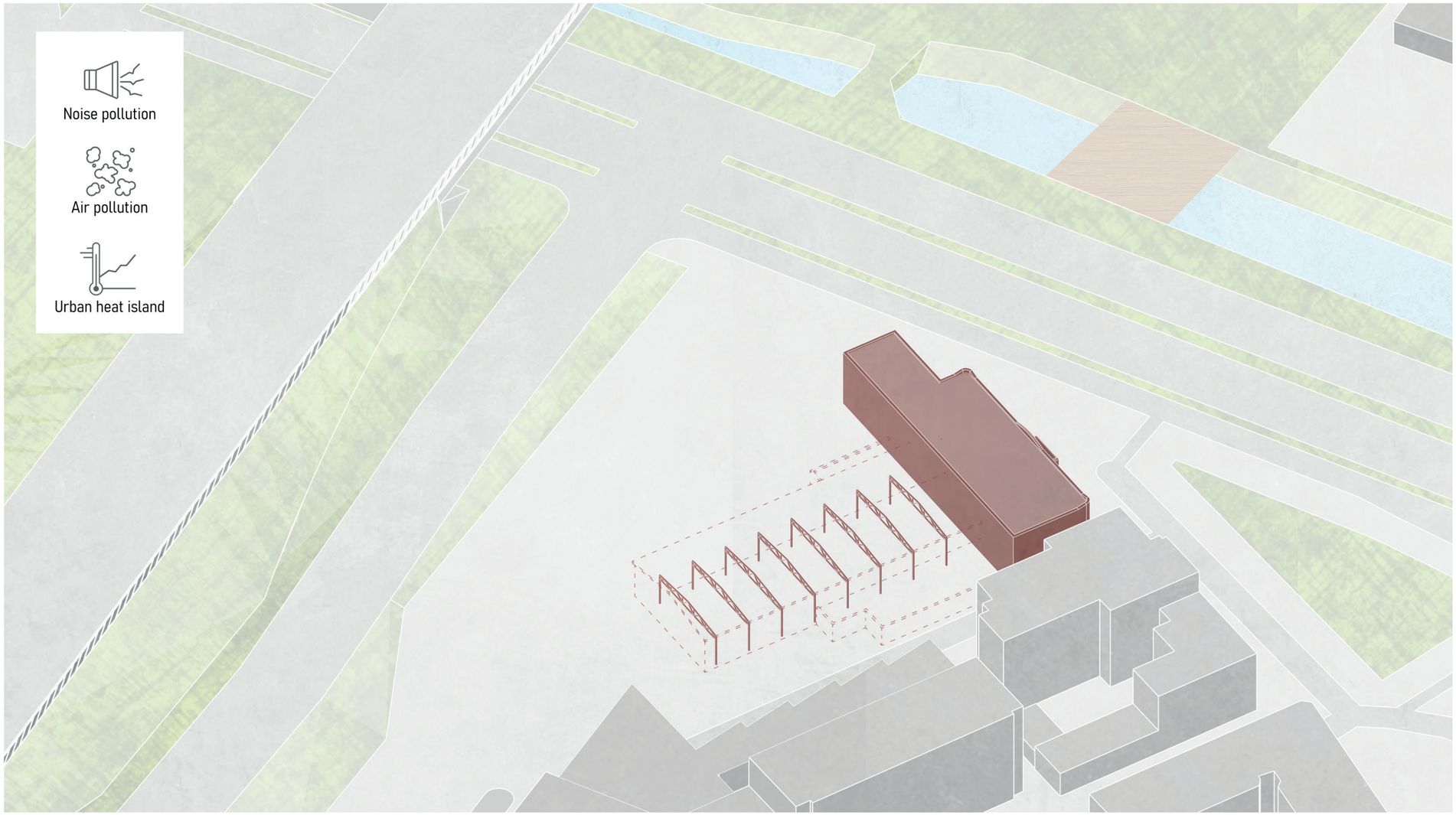
Ambitions & concept



Existing situation

Design case

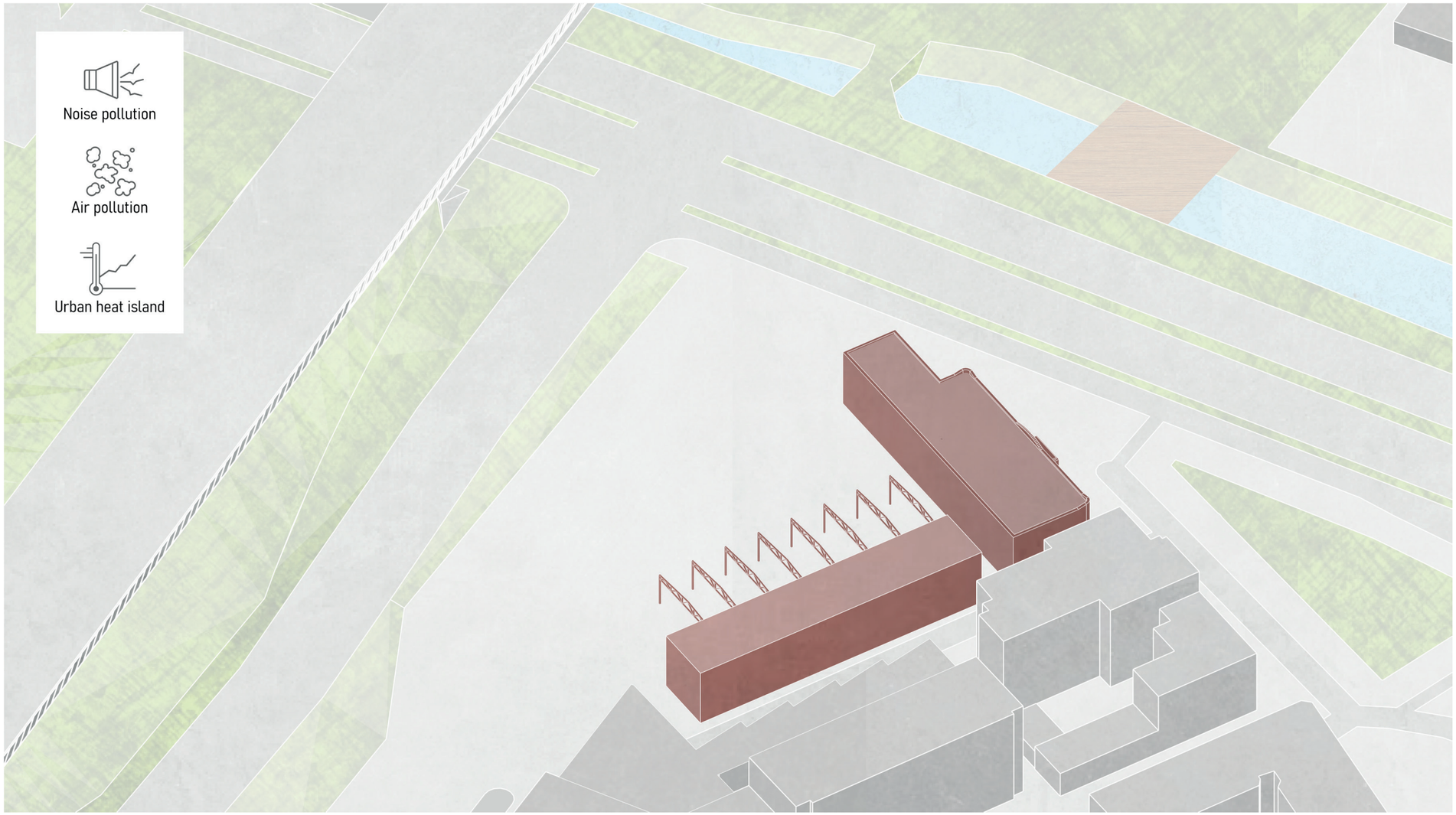
Ambitions & concept



Step 1: Elements to be retained

Design case

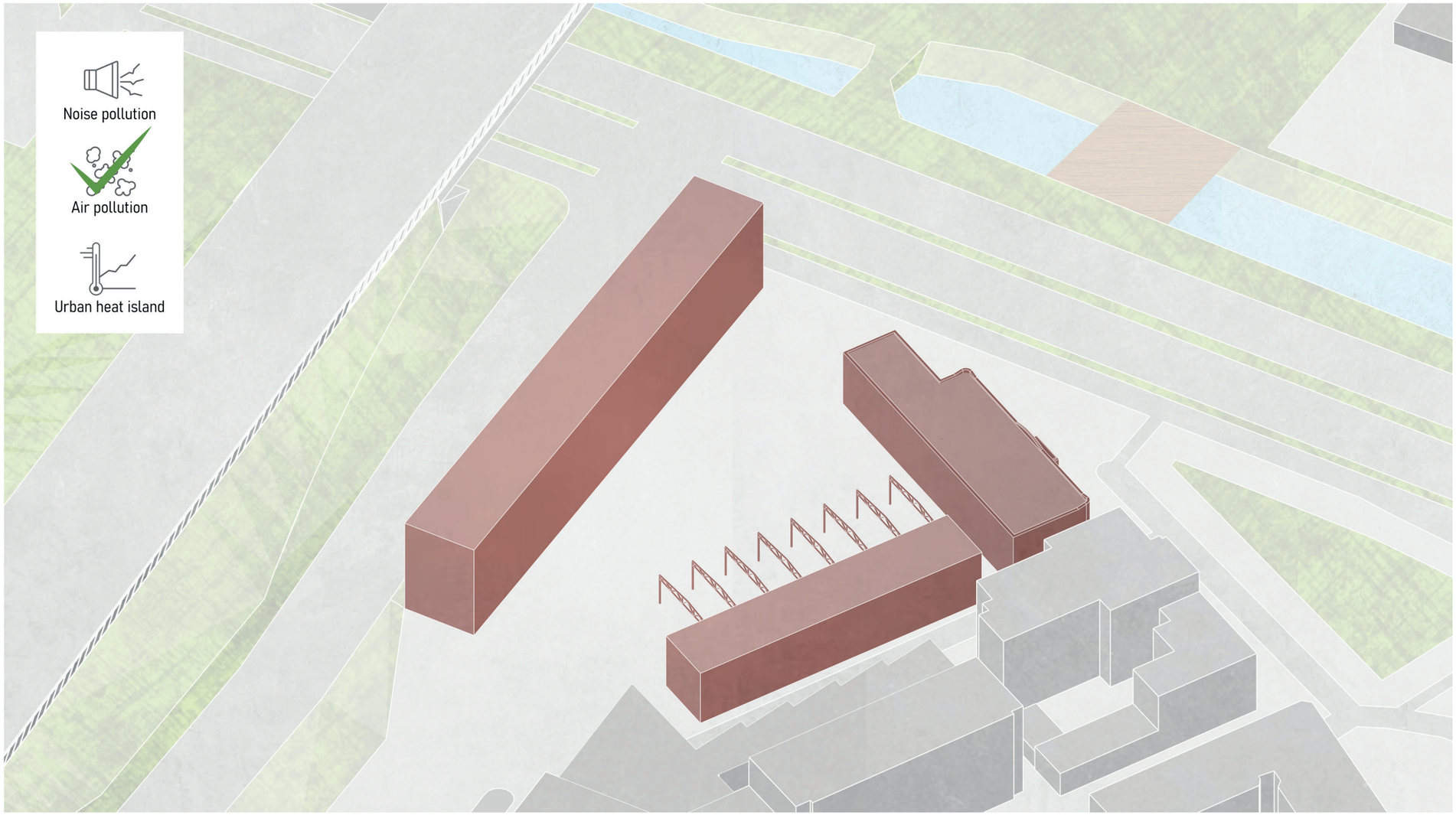
Ambitions & concept



Step 2: The Esthetical wall

Design case

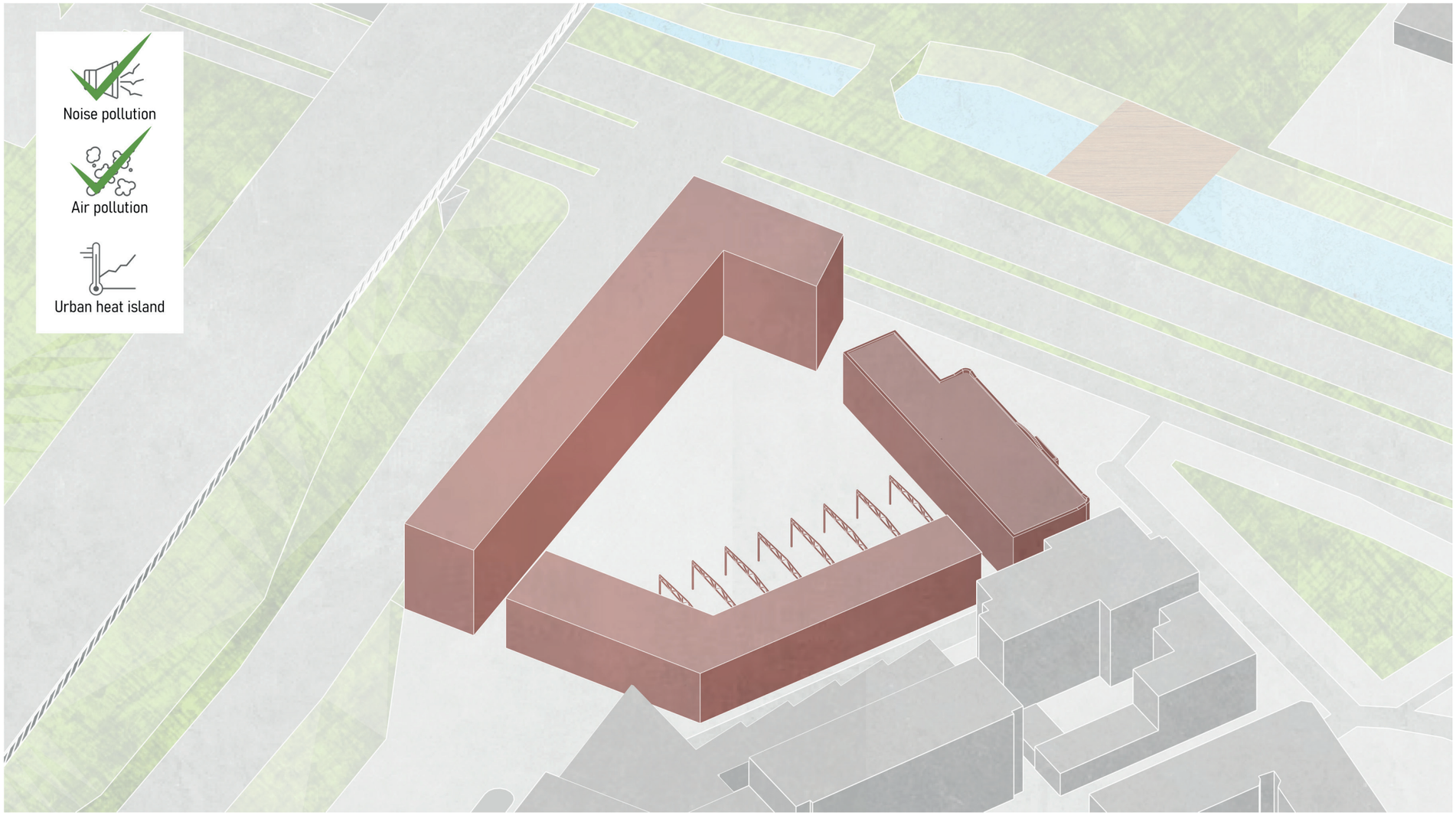
Ambitions & concept



Step 3: The Practical wall

Design case

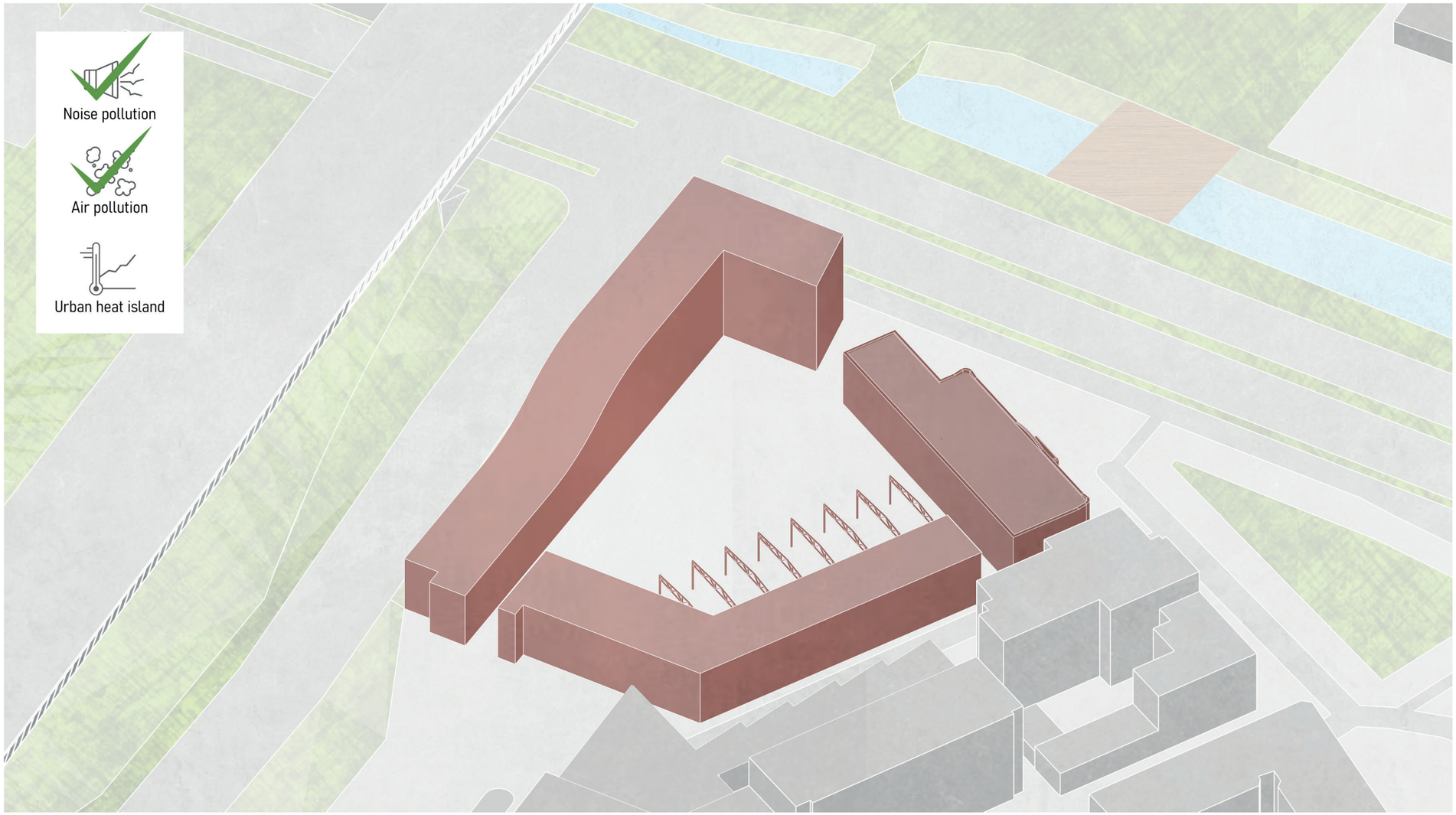
Ambitions & concept



Step 5: Making the L-shape

Design case

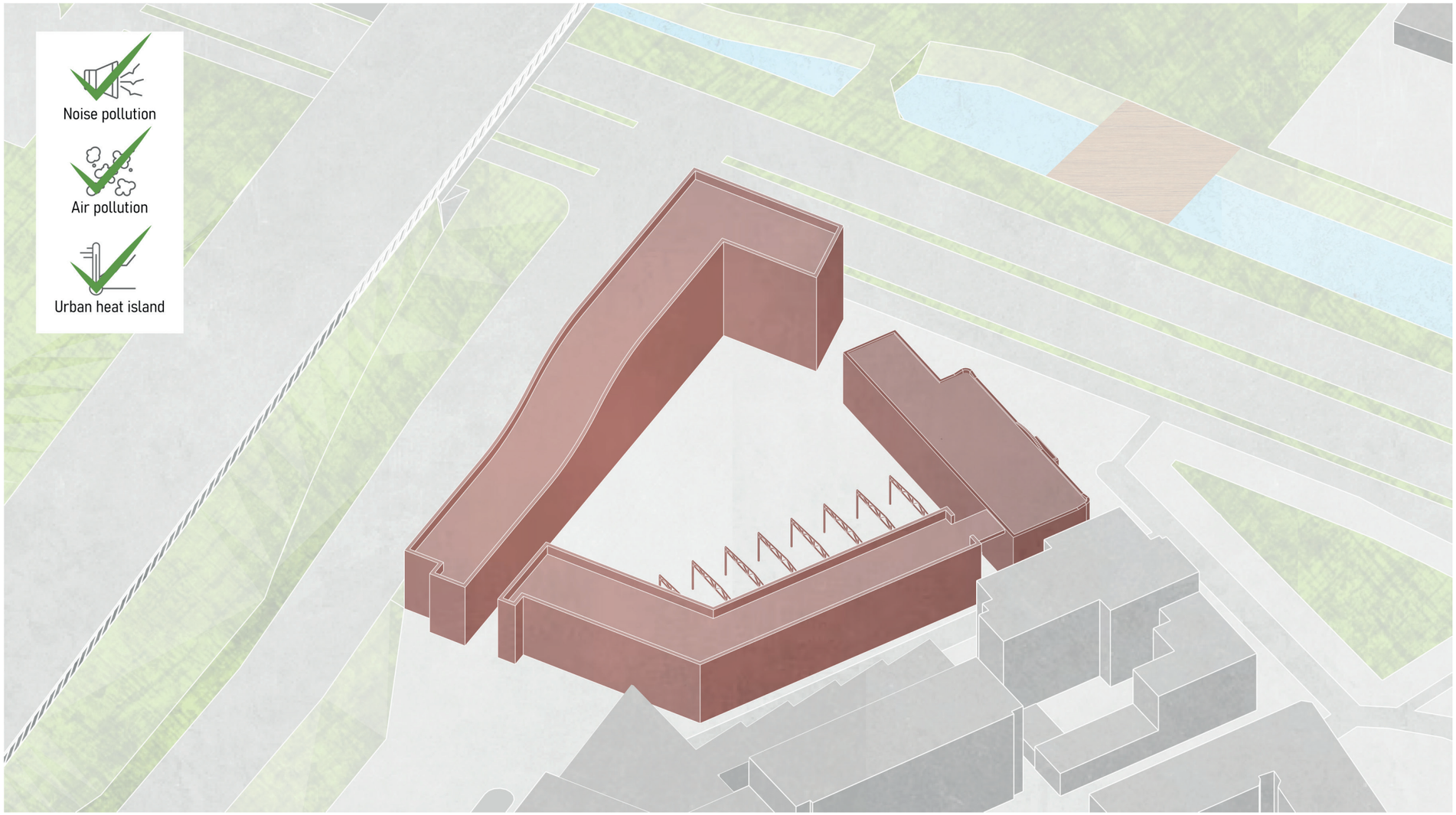
Ambitions & concept



Step 6: Making the curve

Design case

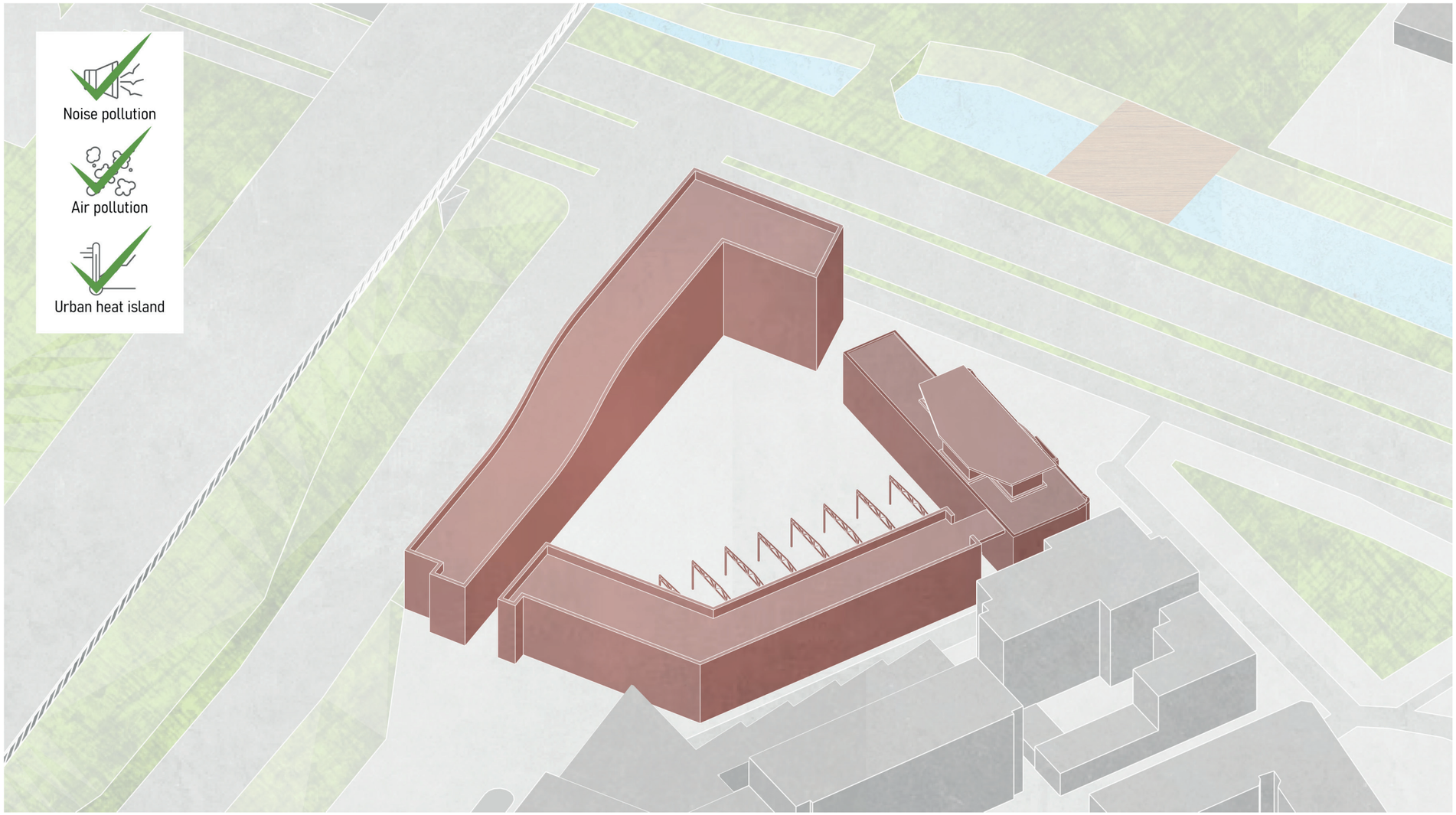
Ambitions & concept



Step 7: Adding the roof edge

Design case

Ambitions & concept



Step 8: Adding the Pavillion

Design case

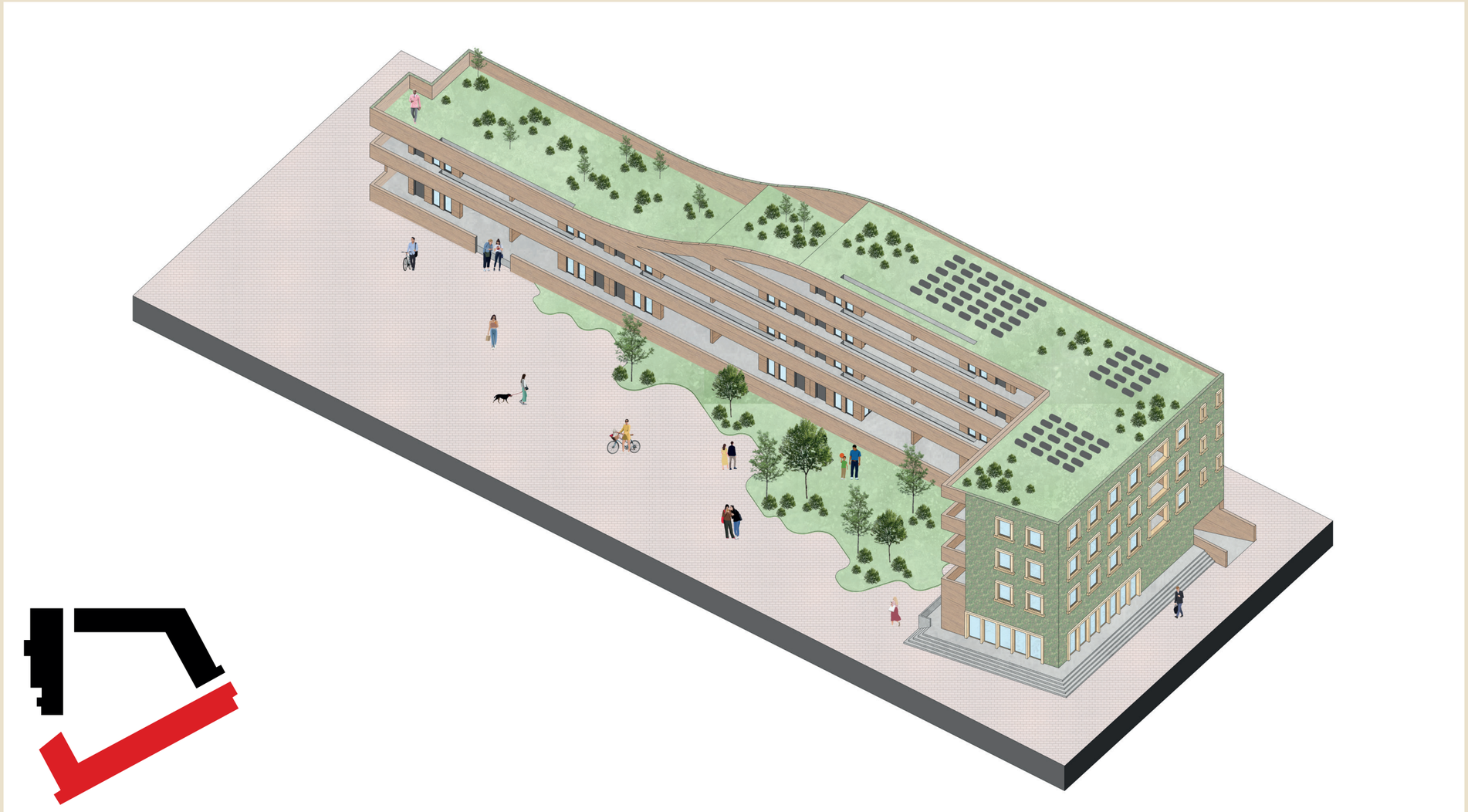
Ambitions & concept



Complete view on Symphony

Design case

To make symphony: meet the walls



The Functional wall

Design case

To make symphony: meet the walls



The Historical wall

Design case

To make symphony: meet the walls



The Esthetical wall

Design case

Final design: Symphony

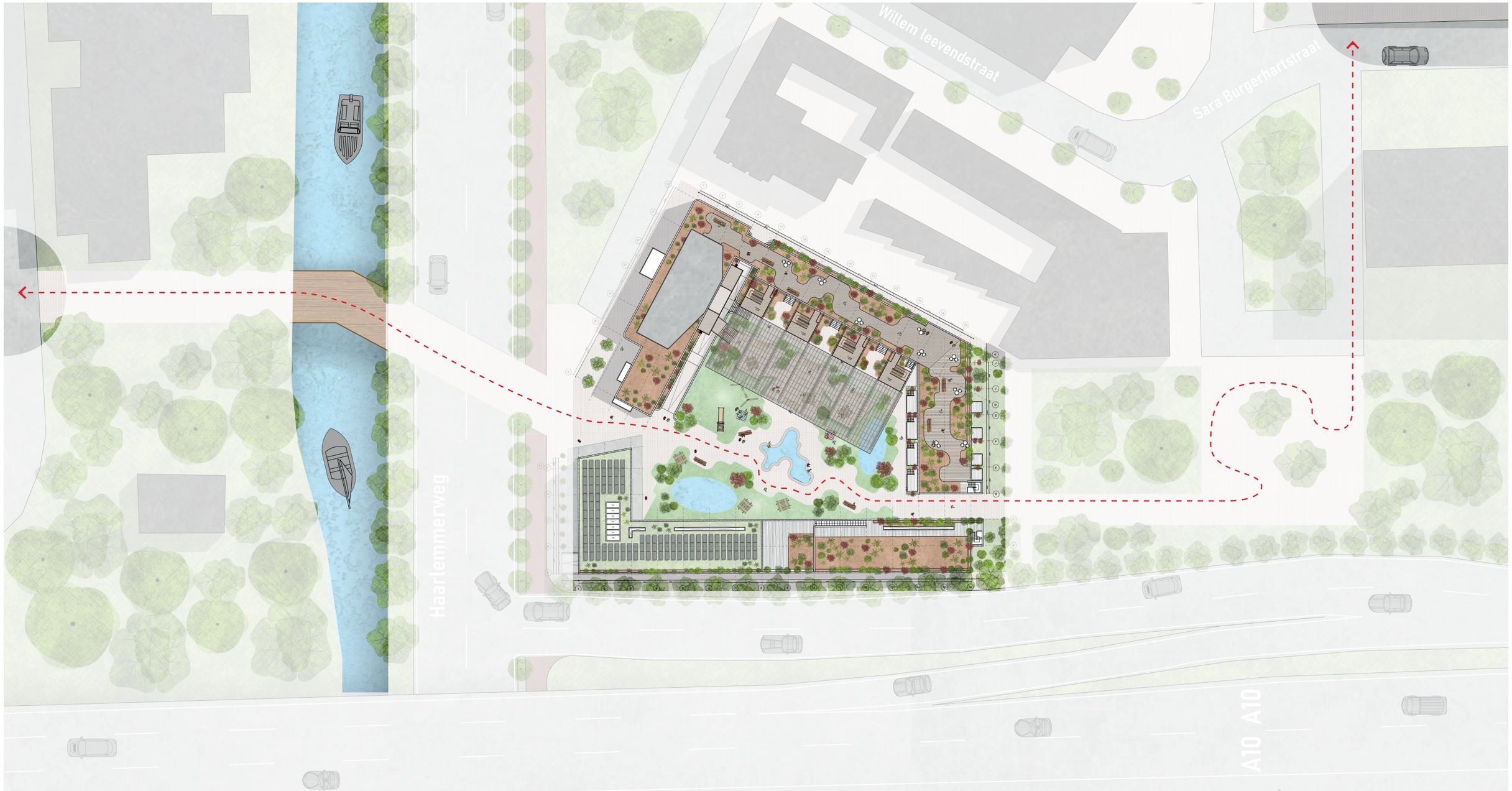
Situation



Design case

Final design: Symphony

Situation



Design case

Ambitions & concept







Walk through the building

Design case

Final design: Symphony

Ground floor



Design case

Final design: Symphony

Ground floor - zoomed in



Design case

Final design: Symphony

Ground floor - The wooden deck



Design case

Final design: Symphony

Ground floor - The souterrain



Design case

Final design: Symphony

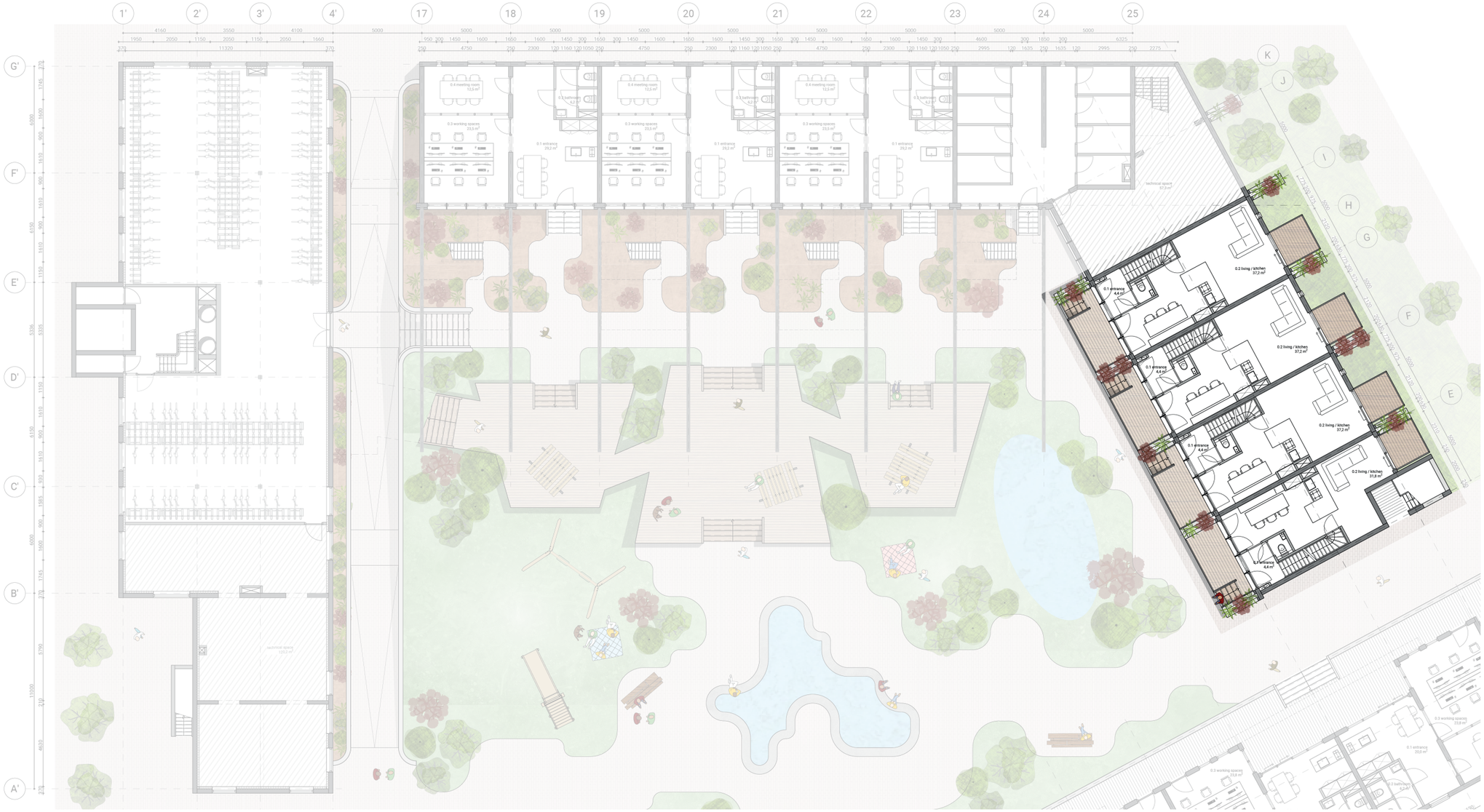
Ground floor - Office space



Design case

Final design: Symphony

Ground floor - Ground bound dwellings



Design case

Final design: Symphony

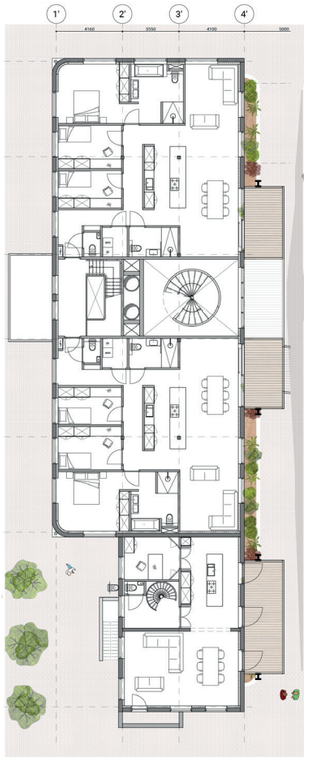
Render: Symphony by night



Design case

Final design: Symphony

First floor (and second of the Historical wall)



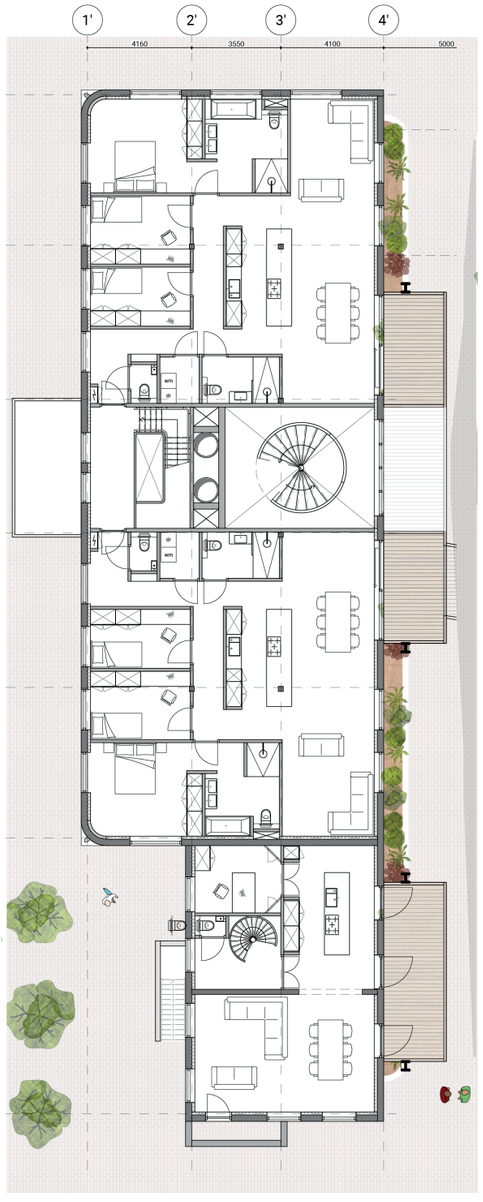


Design case

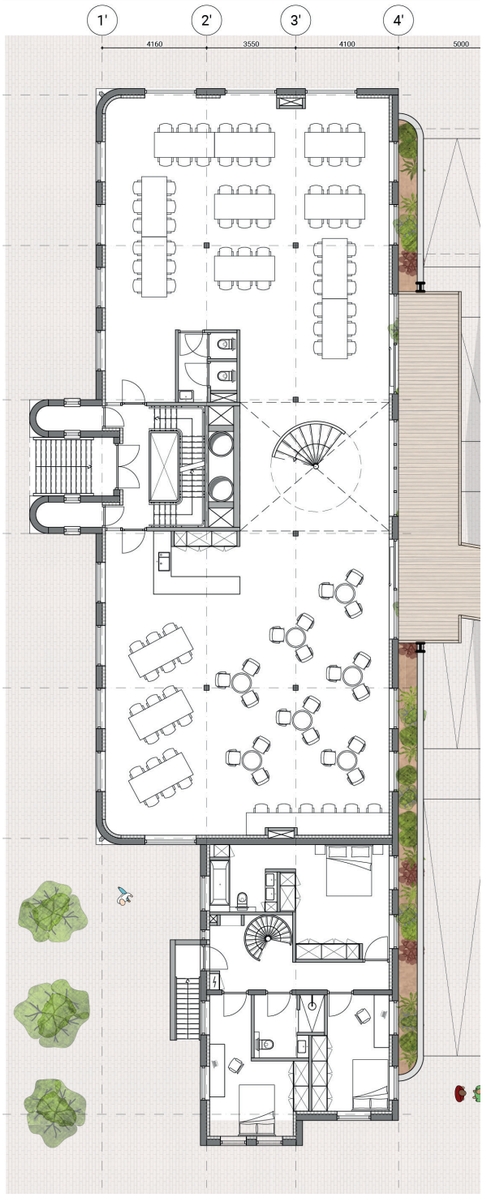
Final design: Symphony

First and second floor - The Historical wall





Second floor - The Historical wall



First floor - The Historical wall

Design case

Final design: Symphony

Render: Front of the building

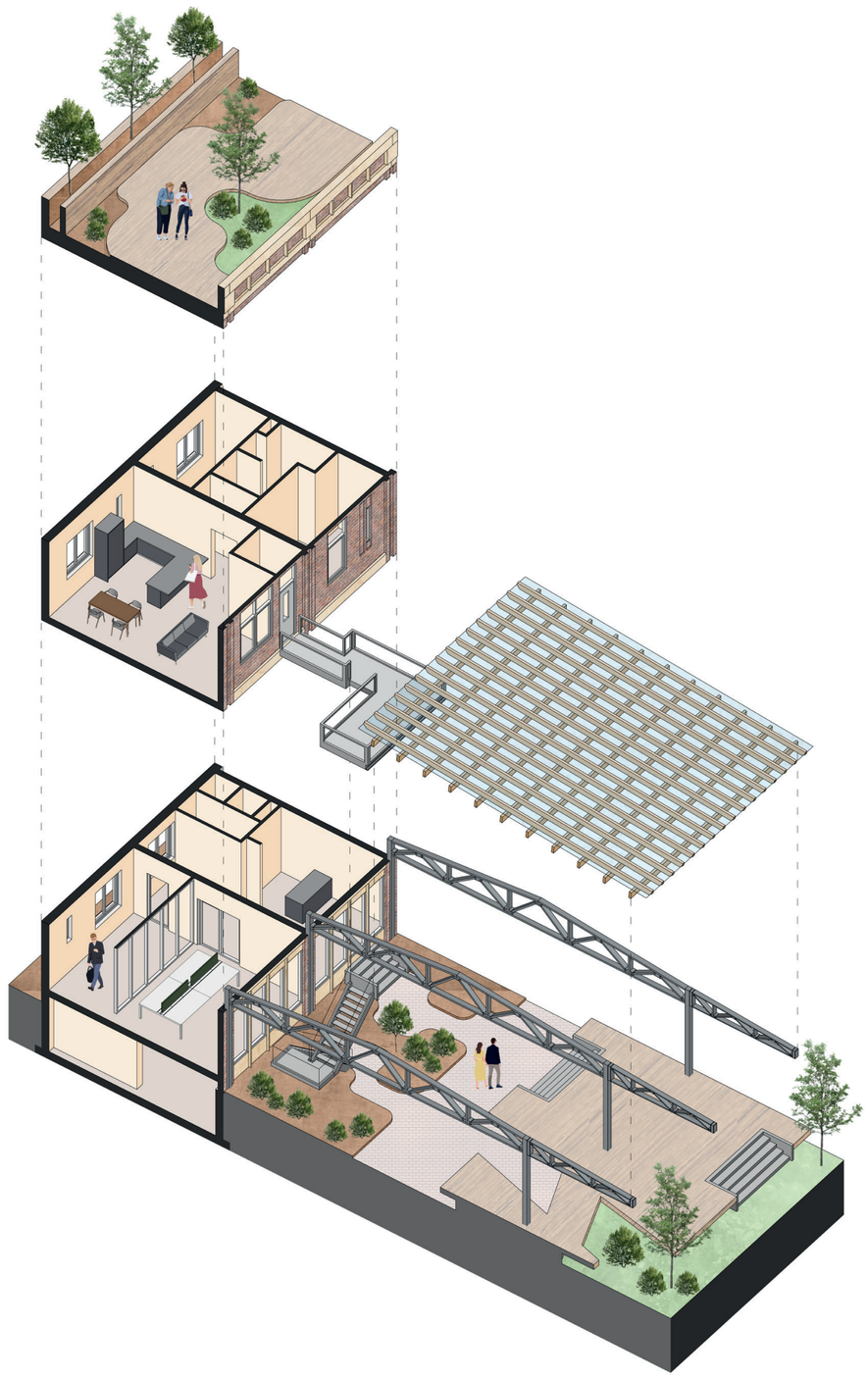


Design case

Final design: Symphony

First & second floor: Esthetical wall





Design case

Final design: Symphony

Render: Below the trusses



Design case

Final design: Symphony

Second floor



Design case

Final design: Symphony

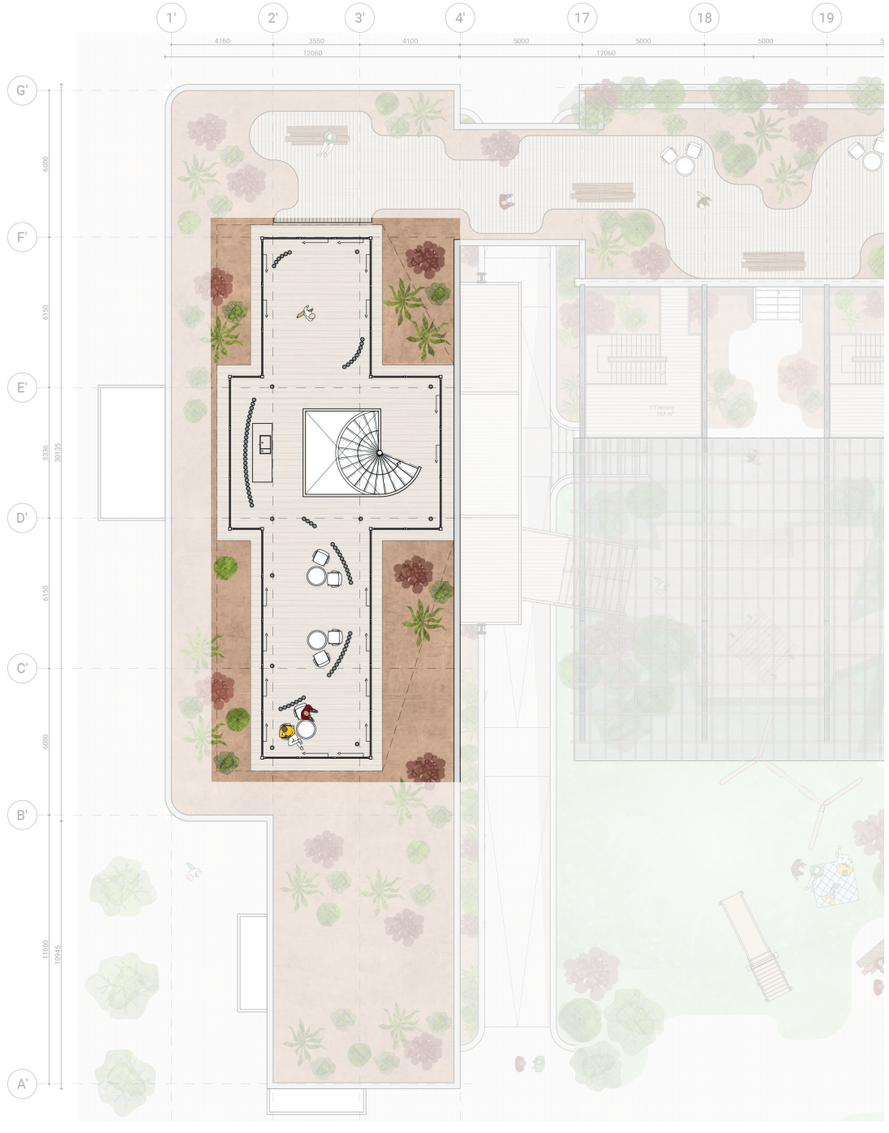
Second floor - The roof garden



Design case

Final design: Symphony

Second floor: The Pavillion





Design case

Final design: Symphony

Render: The pavillion



Design case

Final design: Symphony

Roof



Design case

Final design: Symphony

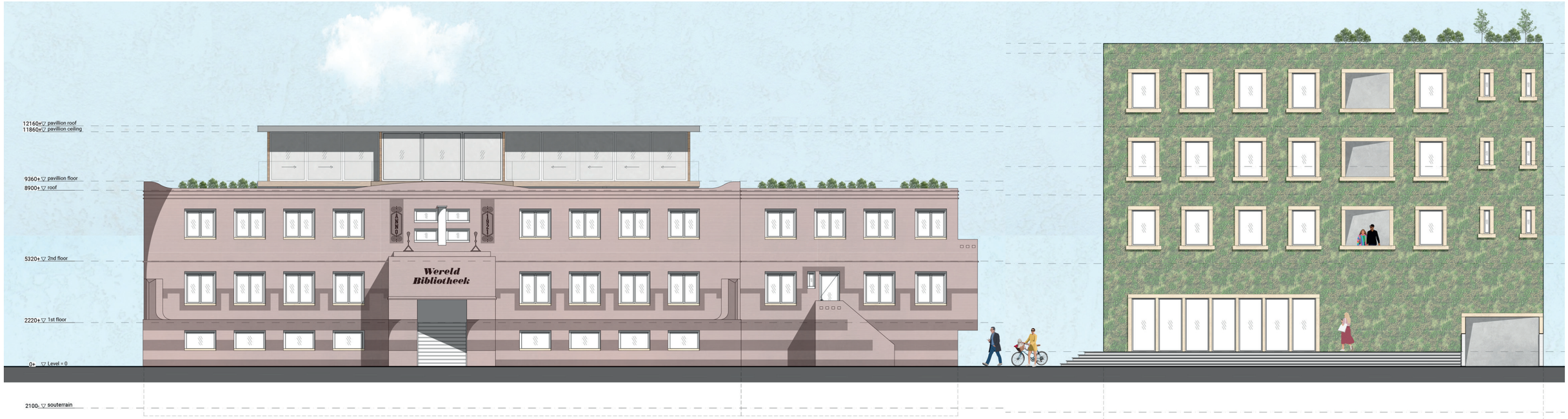
Roof: The energy roofs

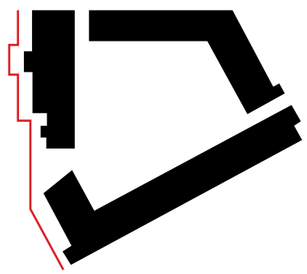


Design case

Final design: Symphony

Elevation: Historical & Functional wall (Haarlemmerweg side)



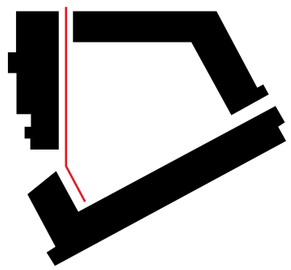


Design case

Final design: Symphony

Elevation: Historical & Functional wall (courtyard side)

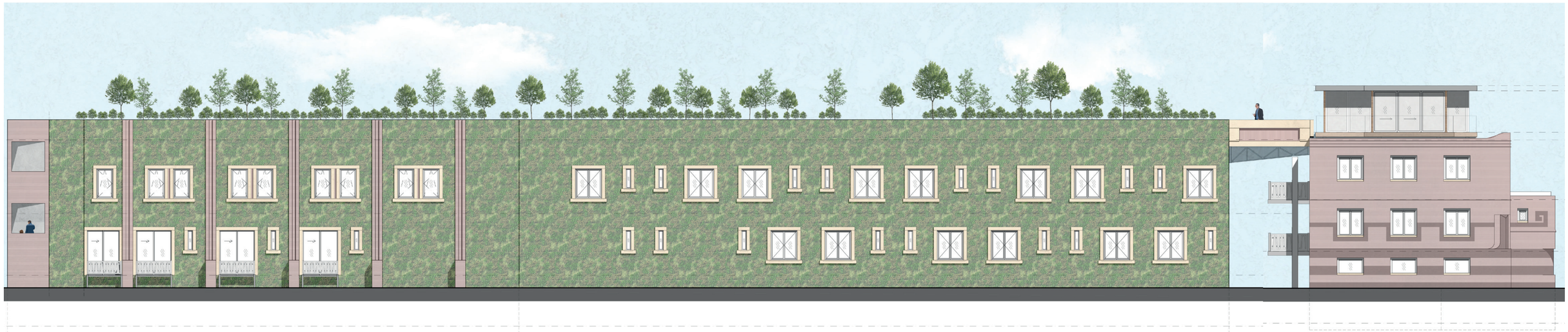


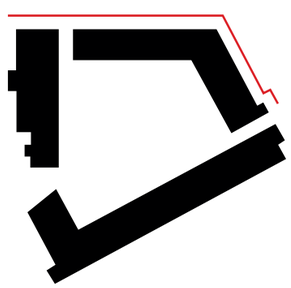


Design case

Final design: Symphony

Elevation: Esthetical & Historical wall (alley side)



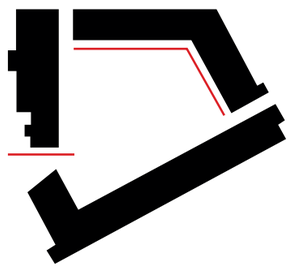


Design case

Final design: Symphony

Elevation: Esthetical & Historical wall (courtyard side)



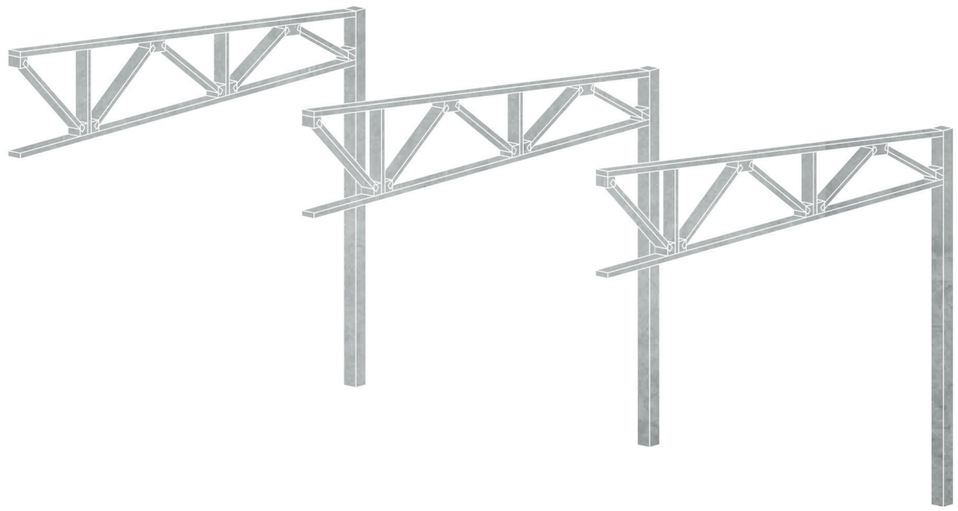


Design case

Final design: Symphony

Esthetical wall conceptual build-up



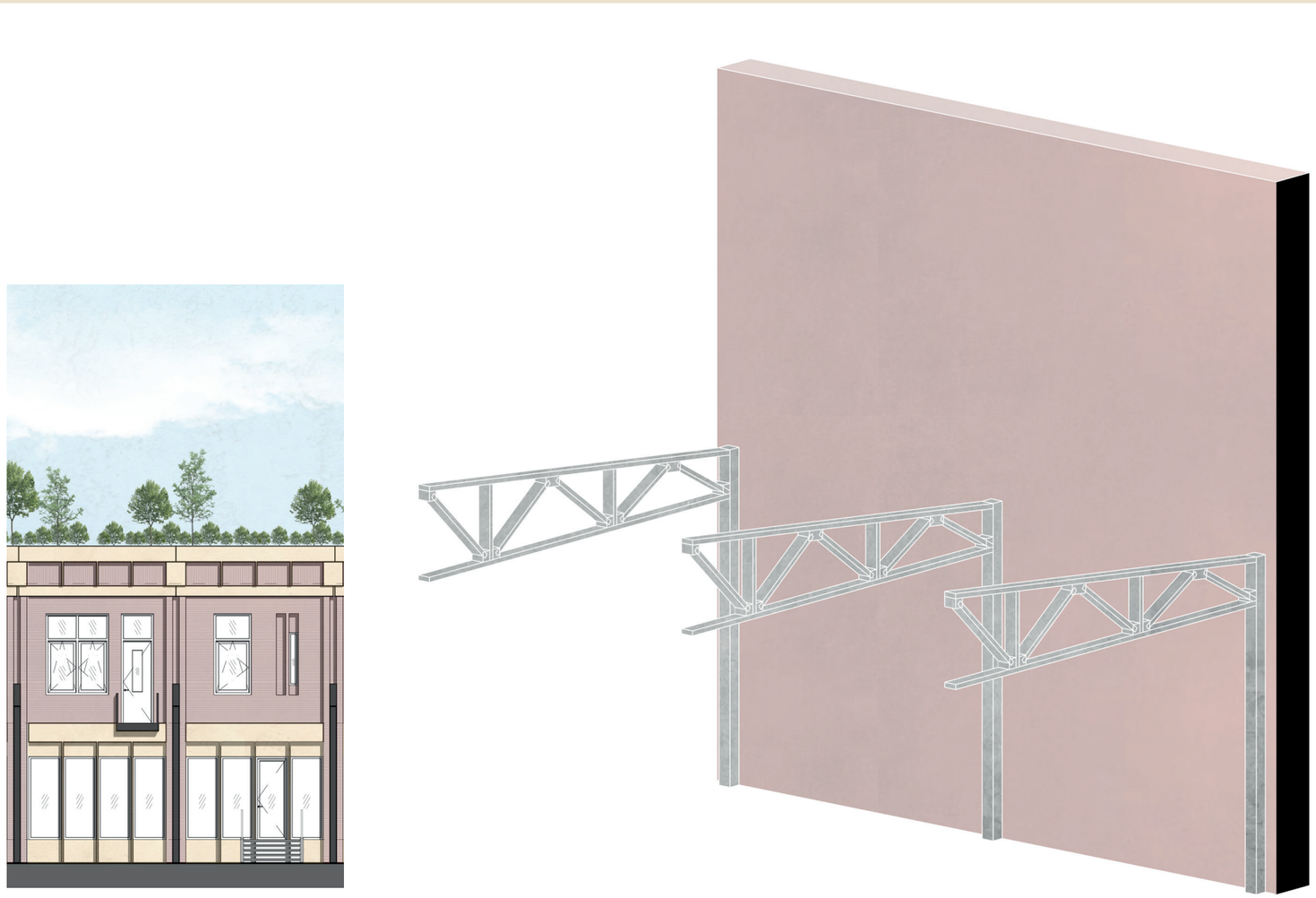


Step 1: steel trusses

Design case

Final design: Symphony

Esthetical wall conceptual build-up

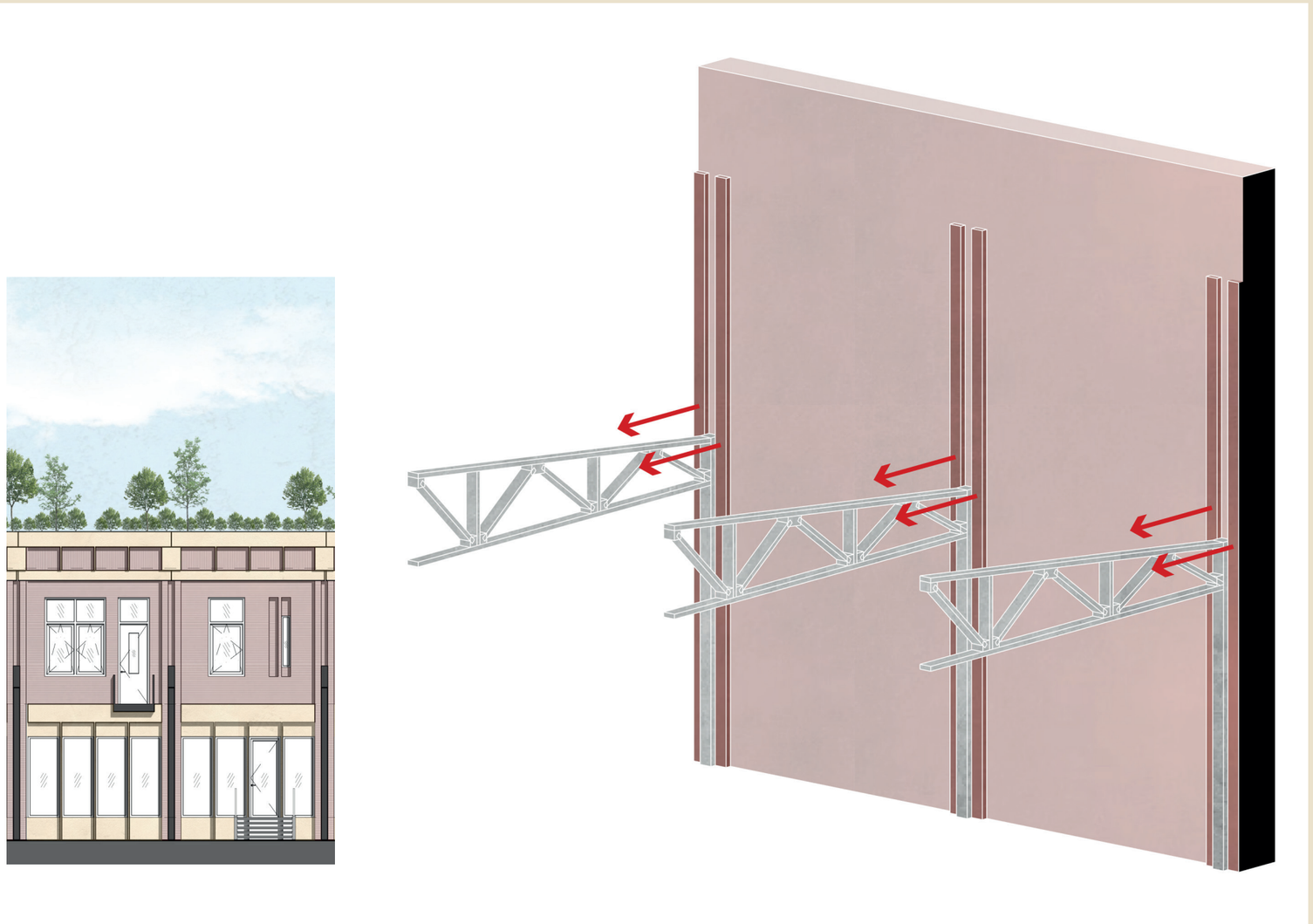


Step 2: Wall addition

Design case

Final design: Symphony

Esthetical wall conceptual build-up

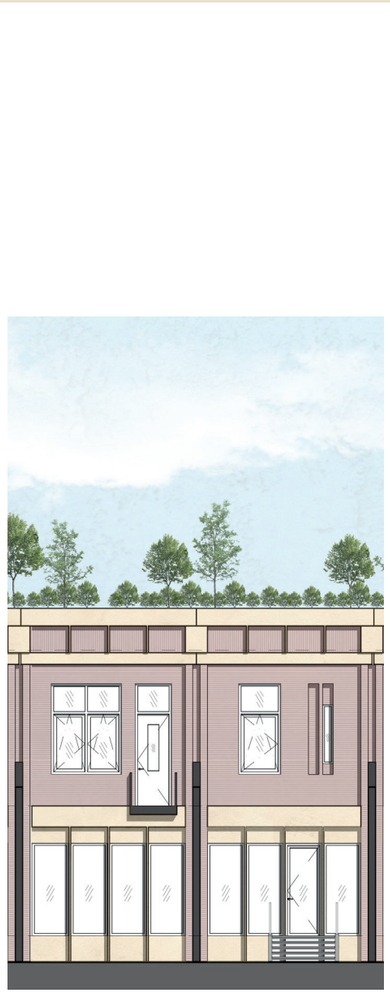


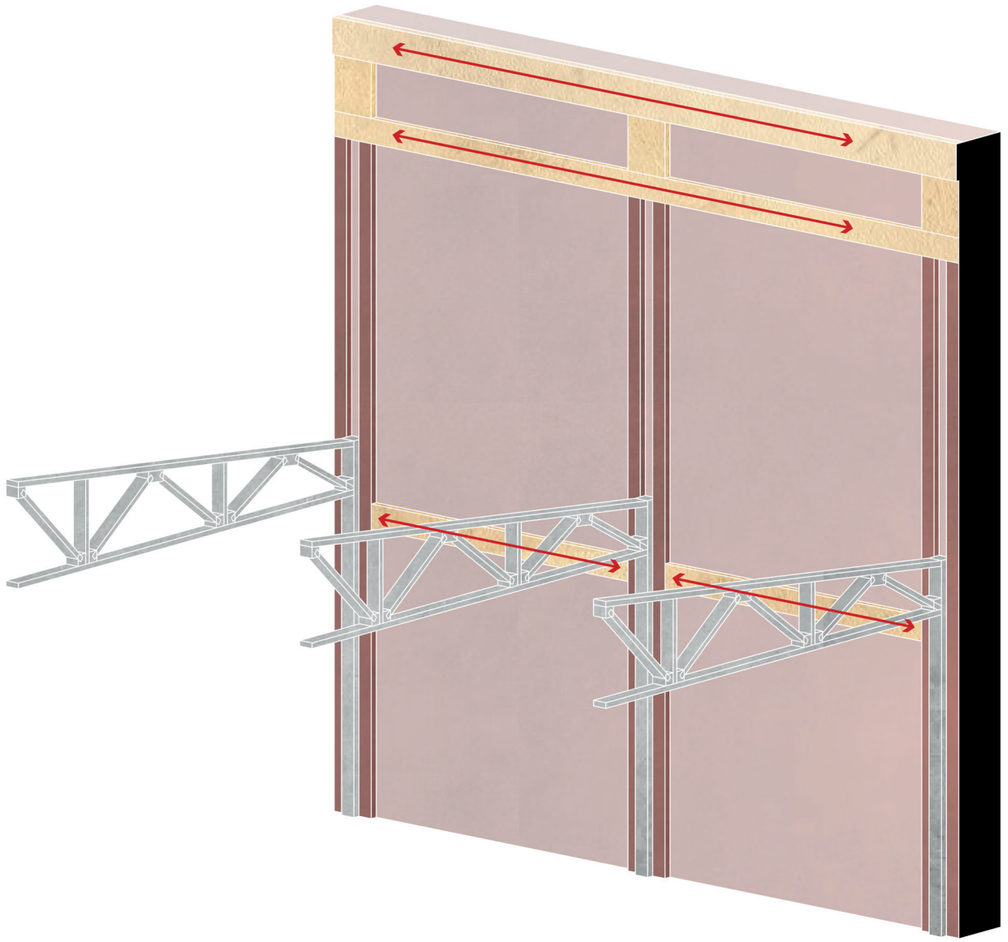
Step 3: Vertical masonry columns

Design case

Final design: Symphony

Esthetical wall conceptual build-up



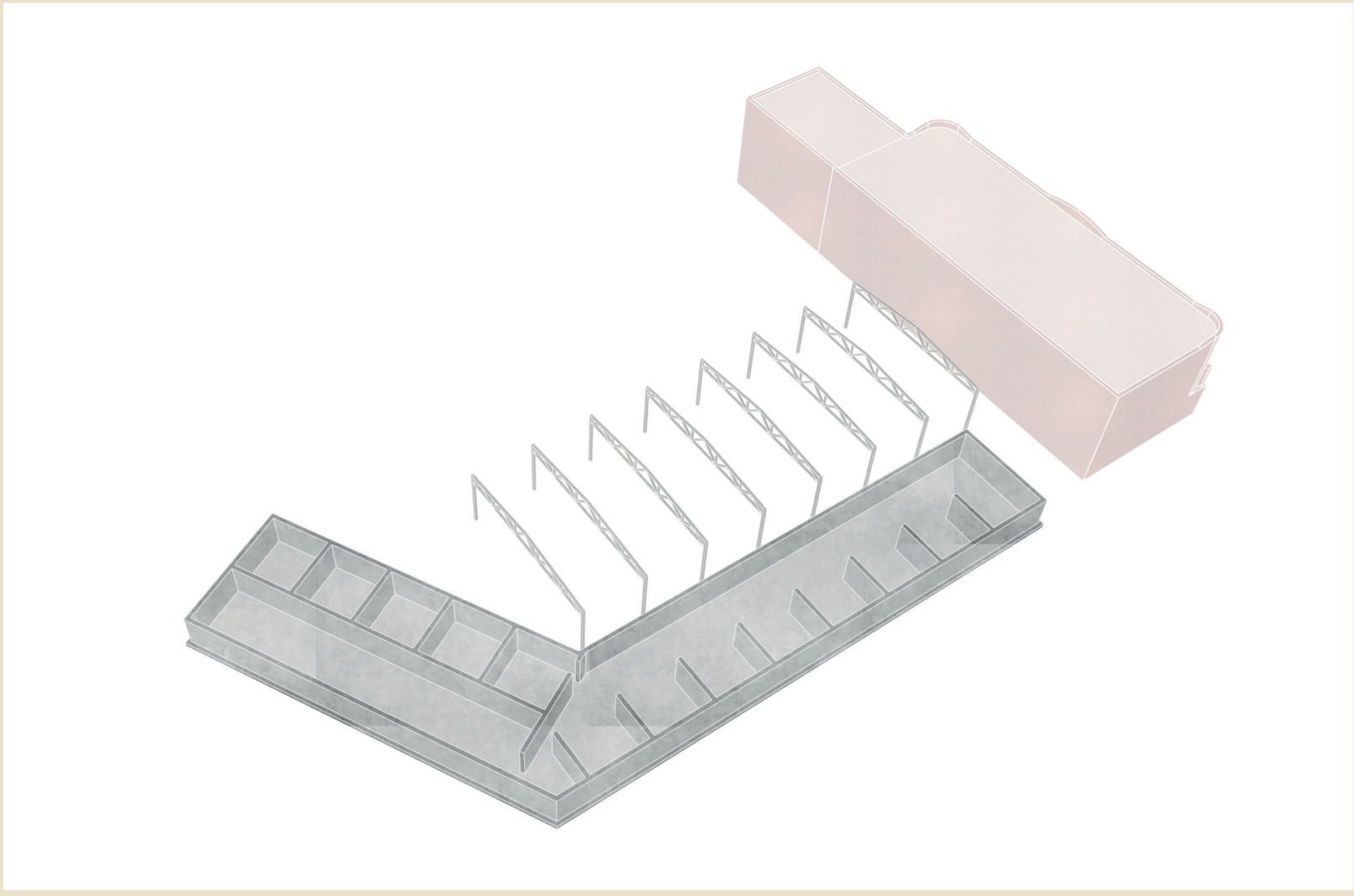


Step 4: Horizontal stone elements

Design case

Final design: Symphony

Construction build-up

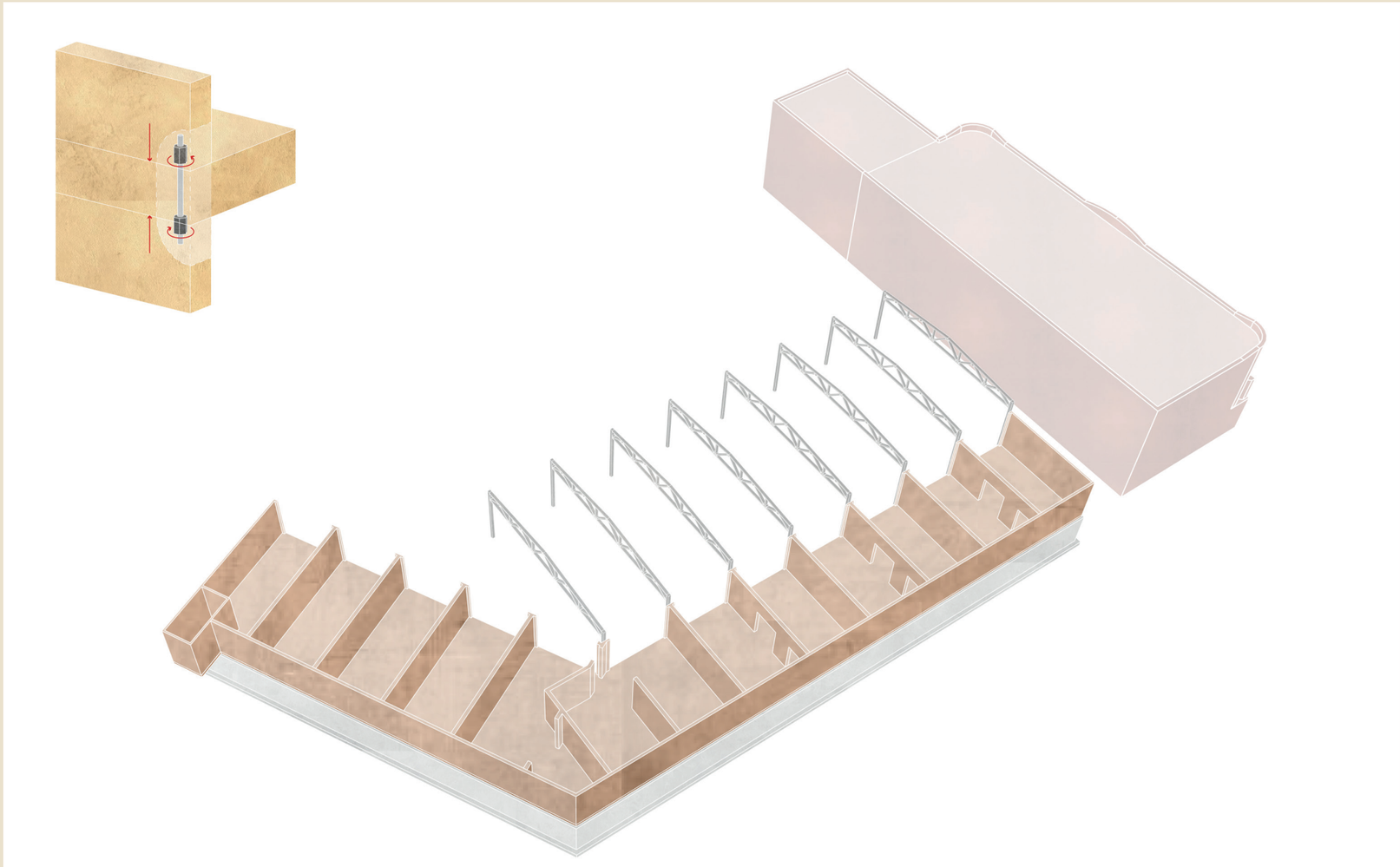


Step 1: Concrete basement

Design case

Final design: Symphony

Construction build-up

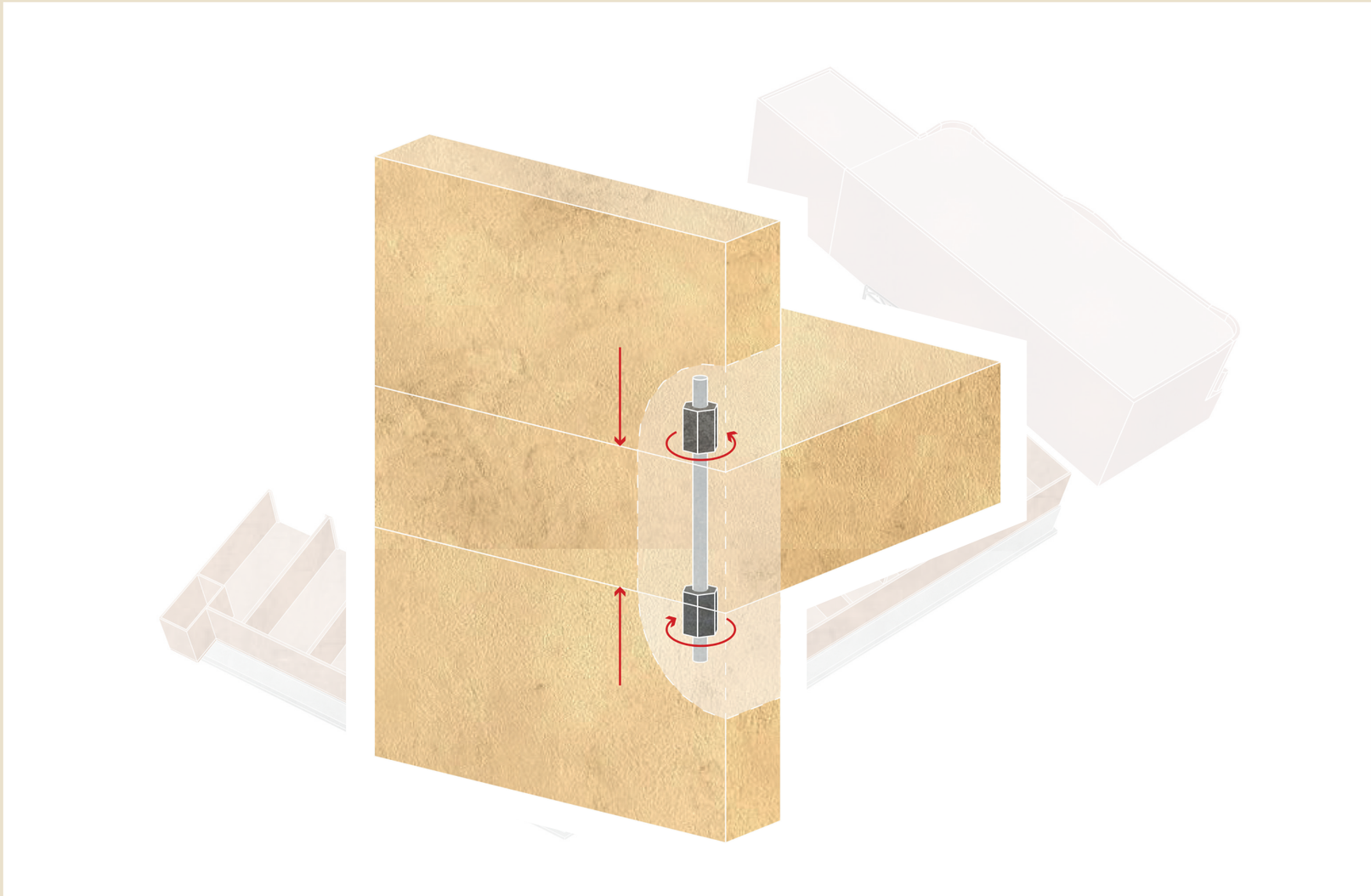


Step 2: CLT floor & walls ground floor

Design case

Final design: Symphony

Construction build-up

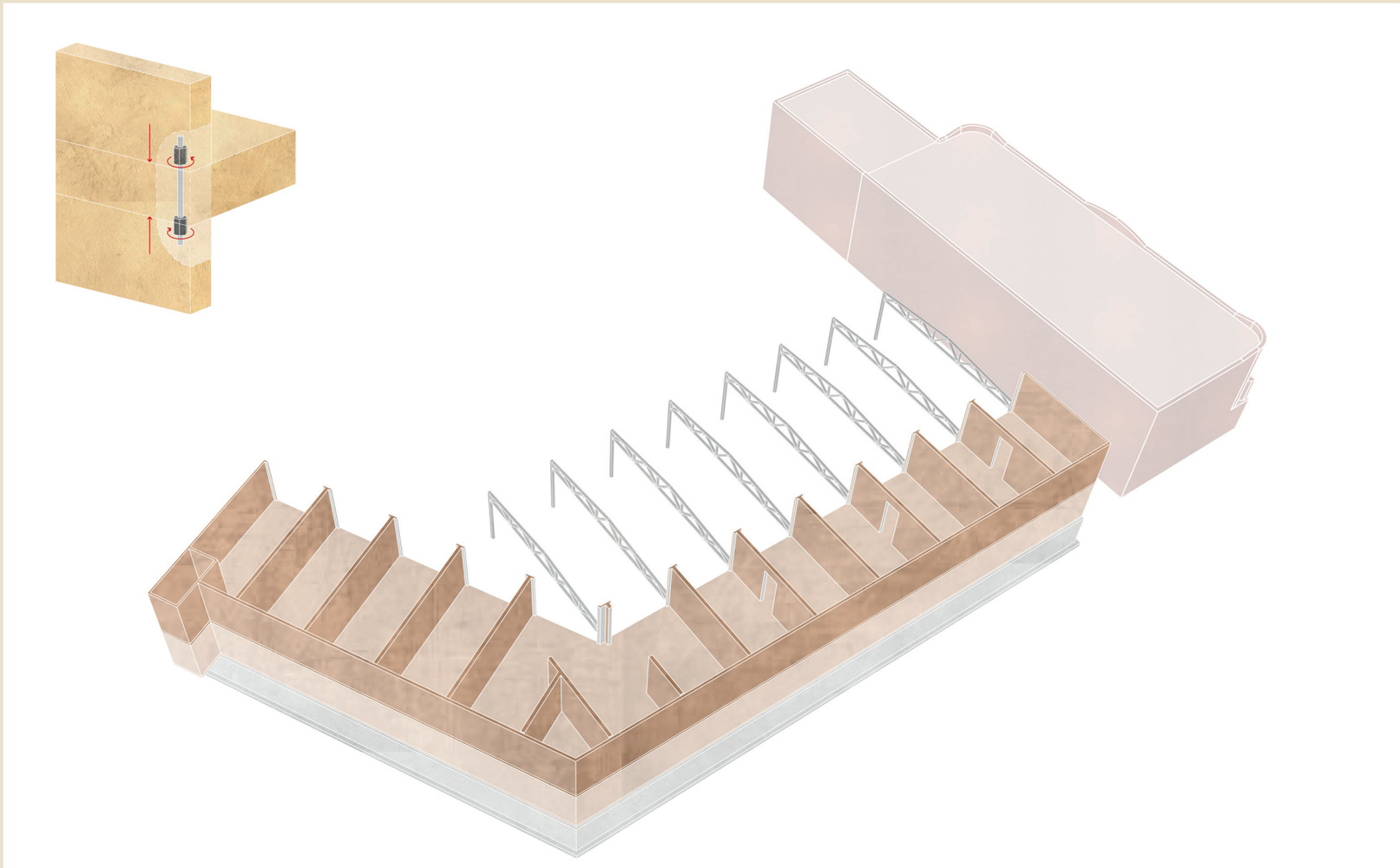


CLT connection principle

Design case

Final design: Symphony

Construction build-up

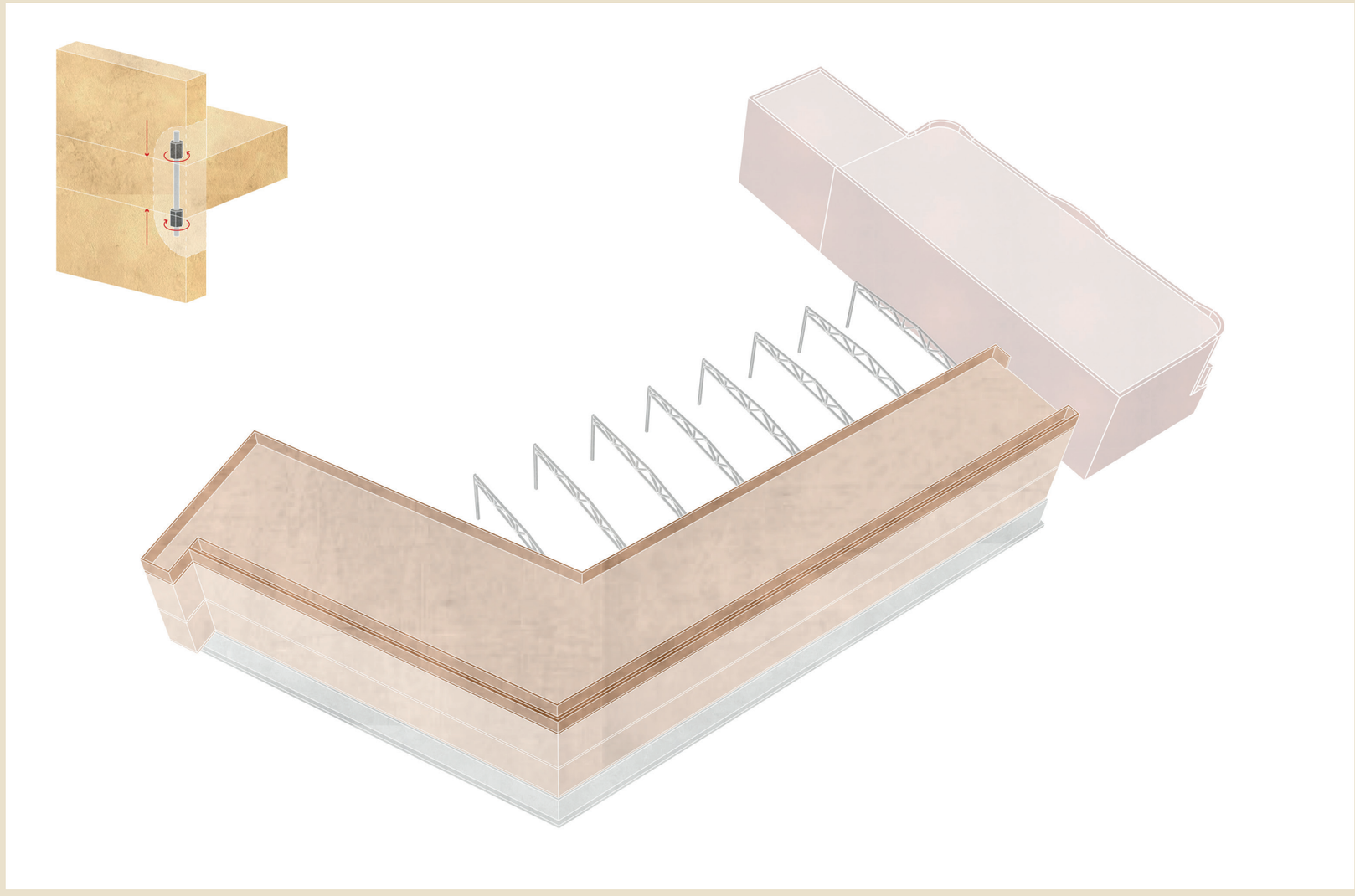


Step 3: CLT floor & walls 1st floor

Design case

Final design: Symphony

Construction build-up

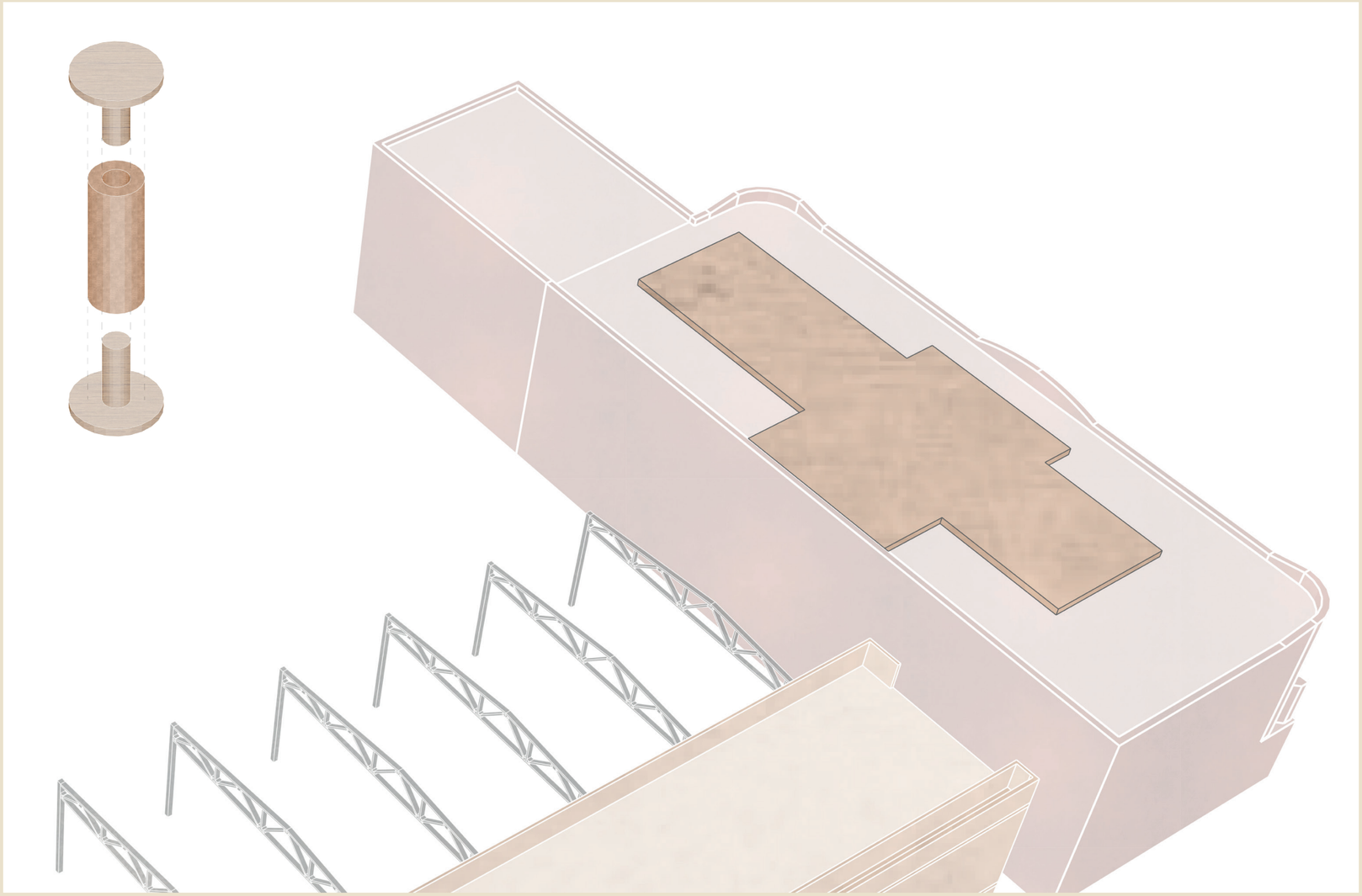


Step 4: CLT roof & roof edge

Design case

Final design: Symphony

Construction build-up

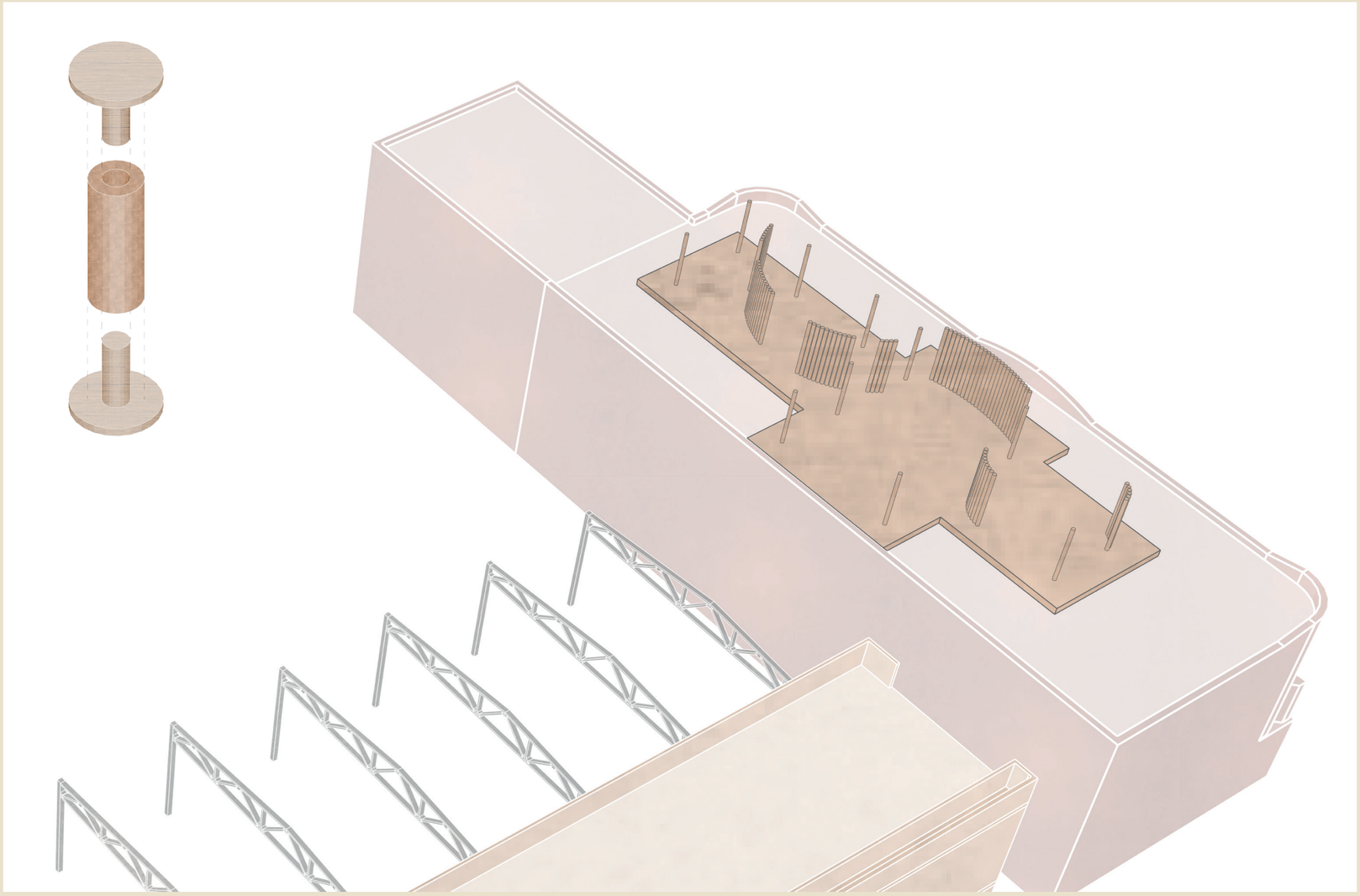


Step 5: Pavillion floor

Design case

Final design: Symphony

Construction build-up

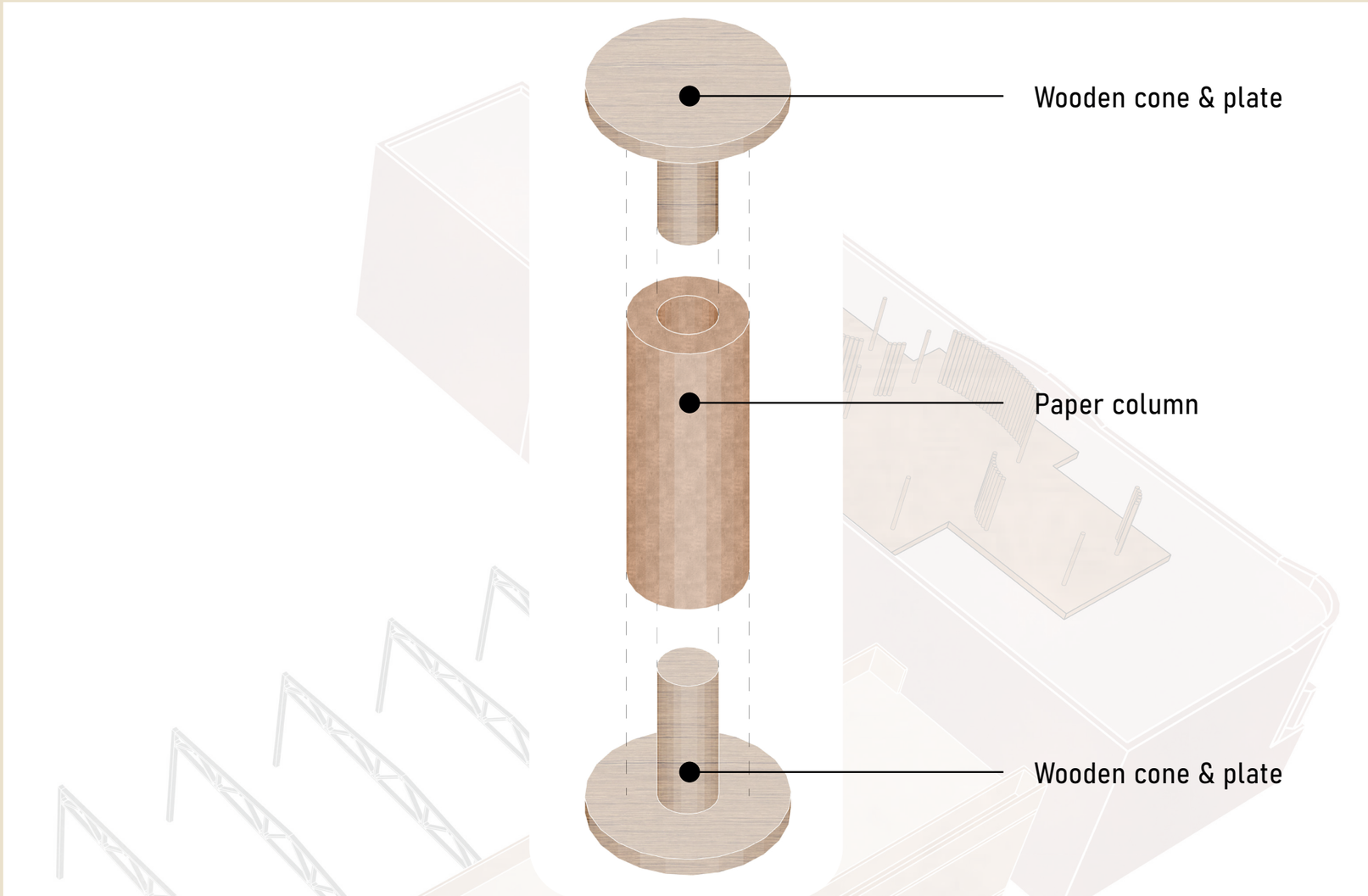


Step 6: Paper columns

Design case

Final design: Symphony

Construction build-up

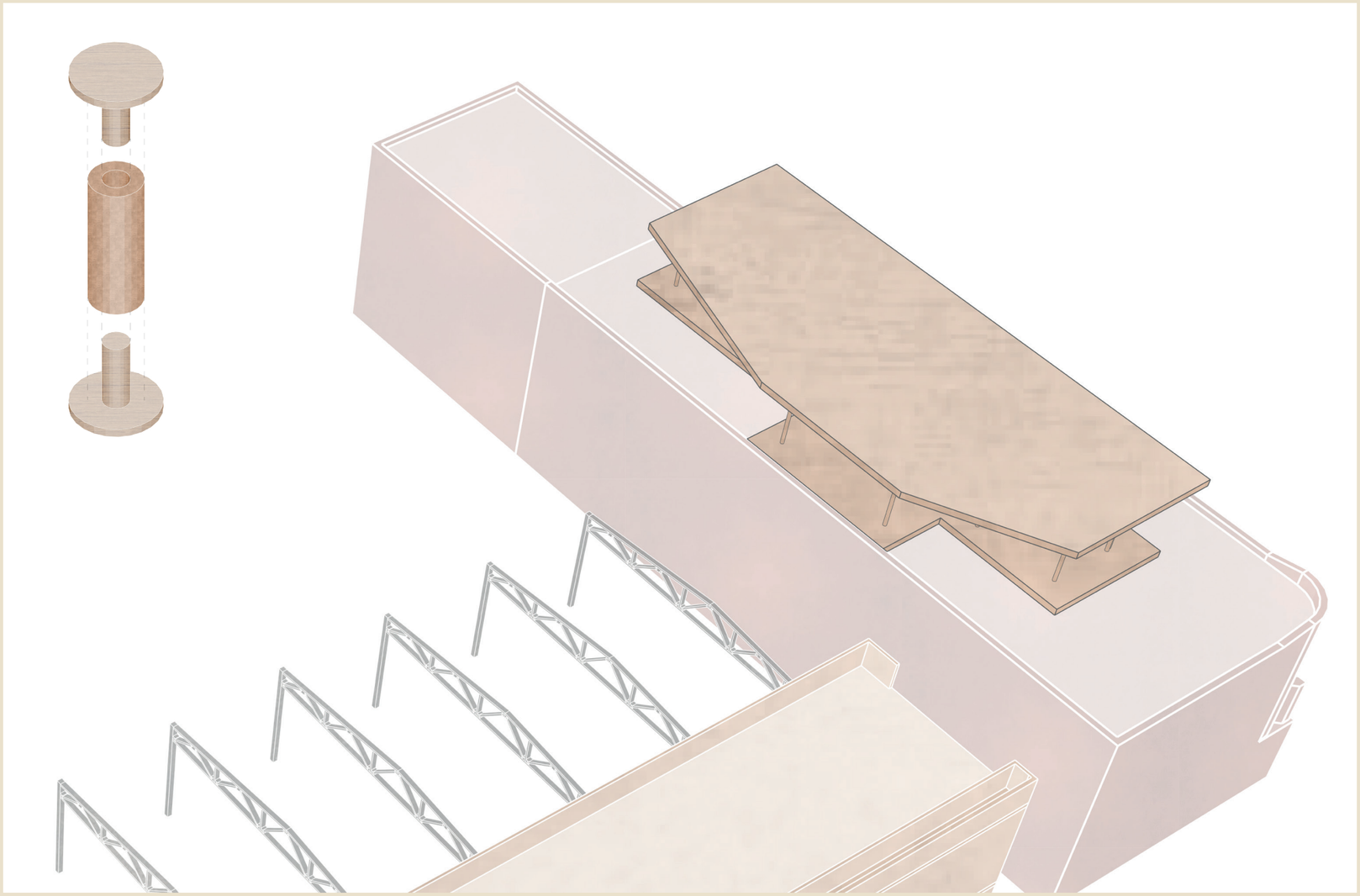


Paper columns connection principle

Design case

Final design: Symphony

Construction build-up

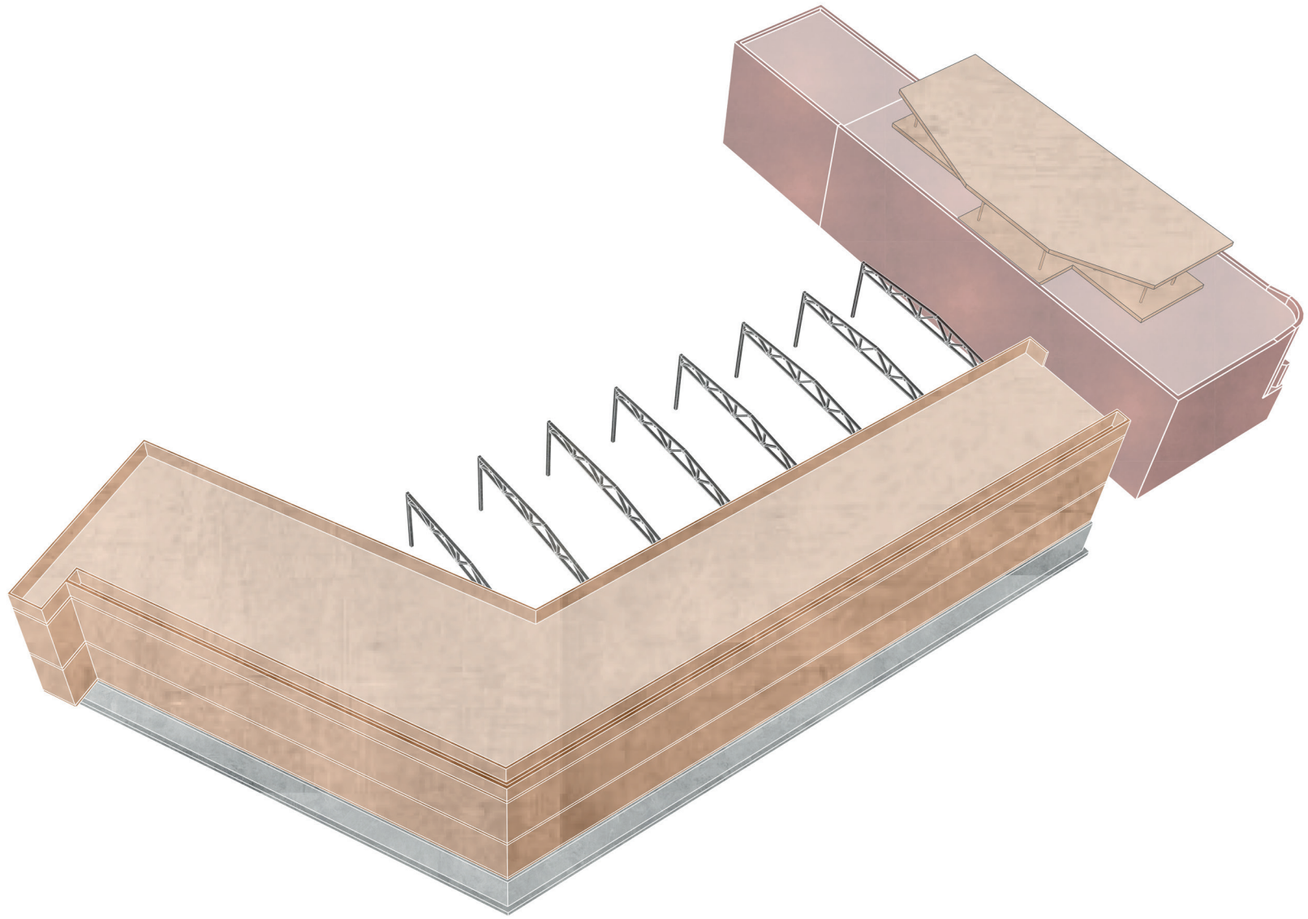


Step 7: Pavillion roof

Design case

Final design: Symphony

Construction build-up

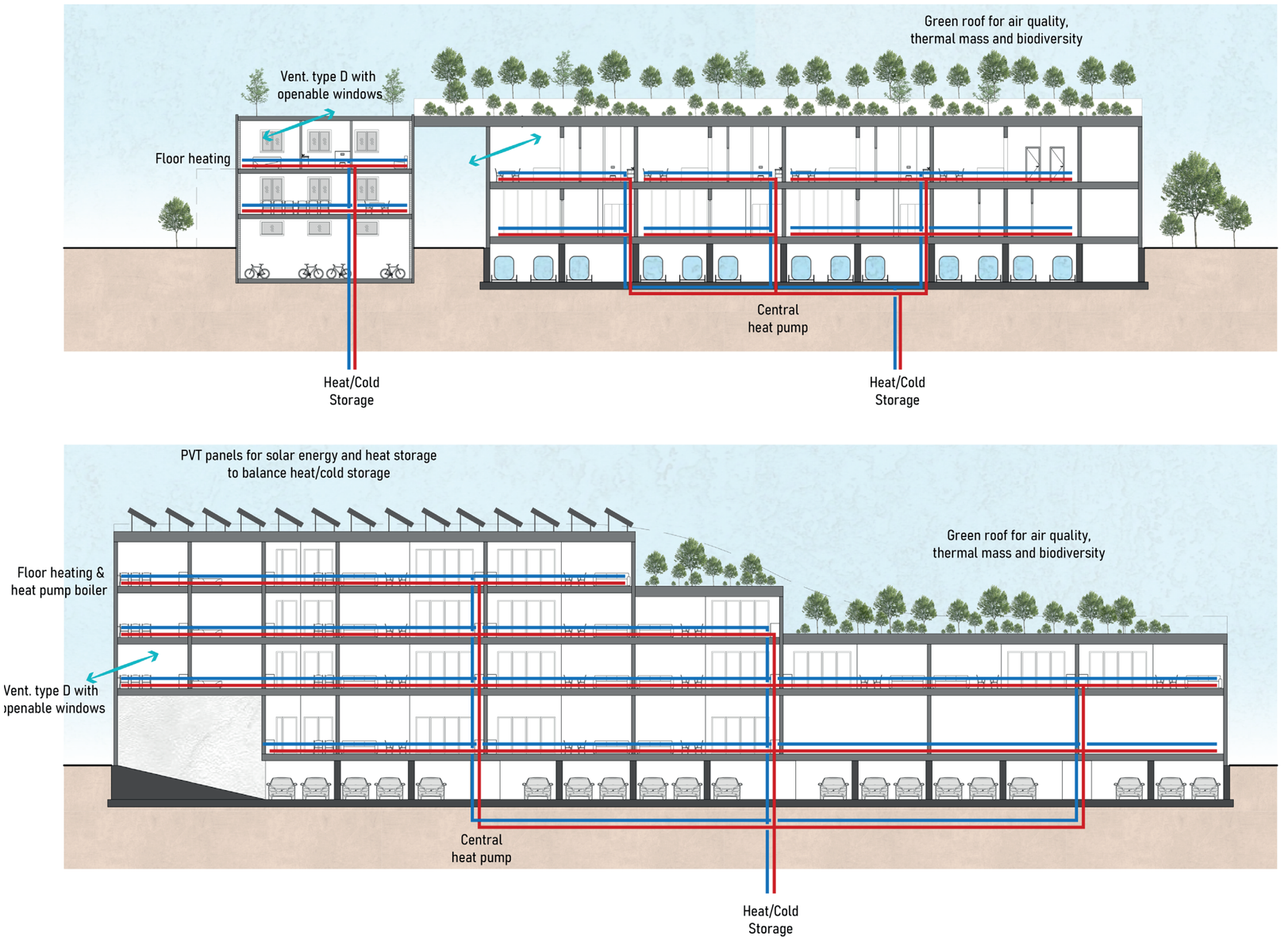


Totall construction

Design case

Final design: Symphony

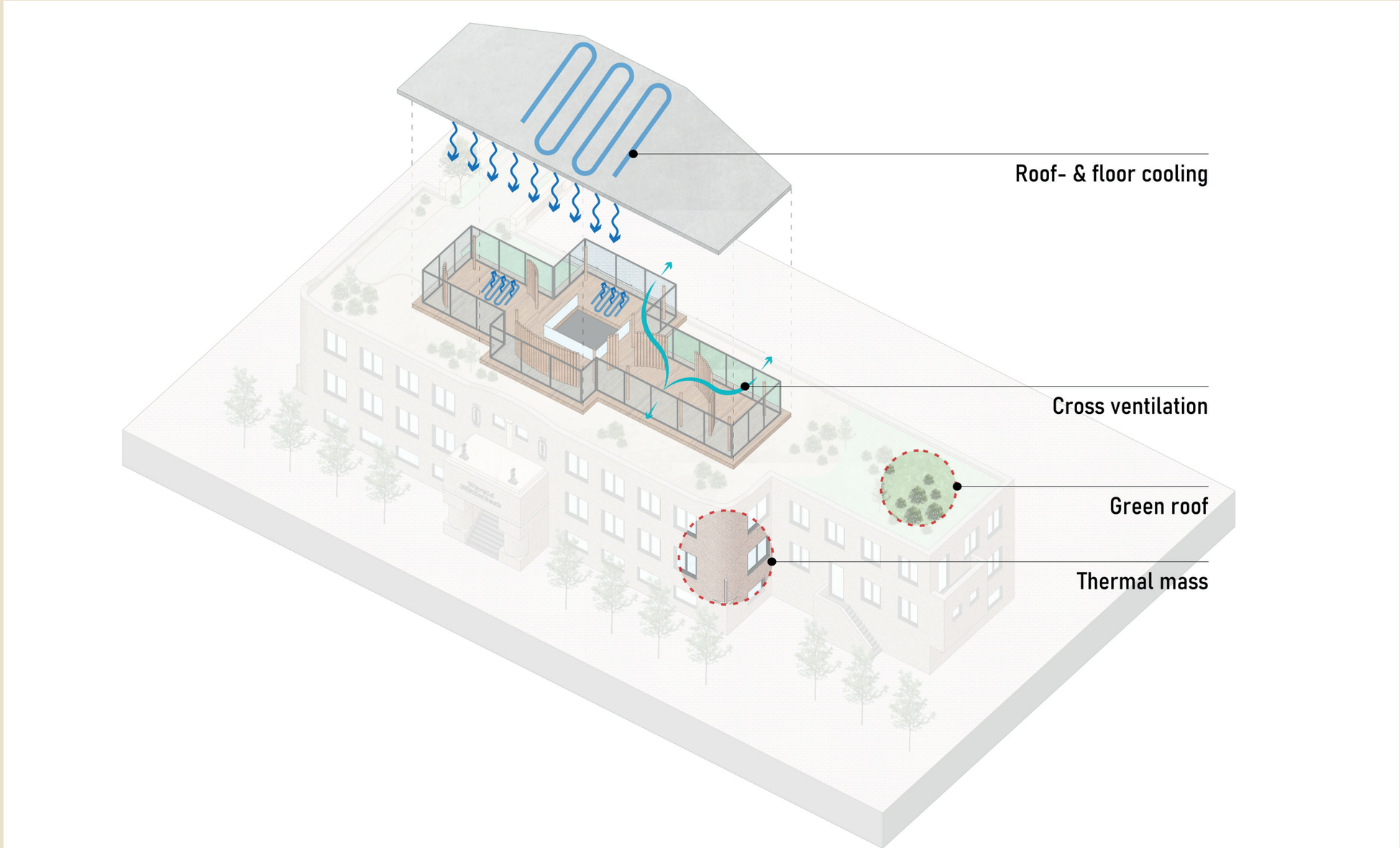
Climate build-up



Design case

Final design: Symphony

Climate build-up pavillion



Design case

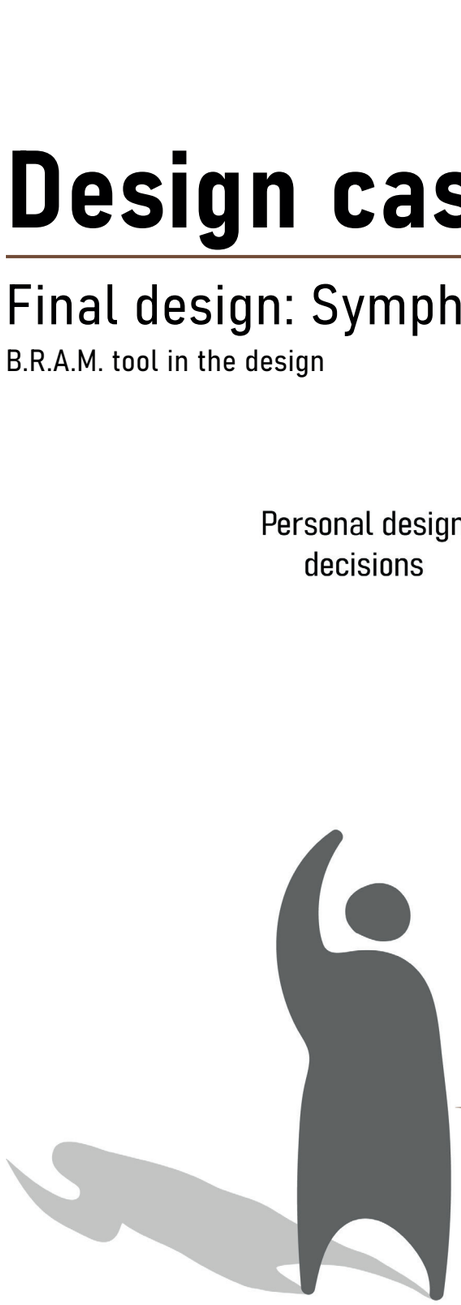
Final design: Symphony

B.R.A.M. tool in the design

Personal design decisions

Subject of influence on the design

Resulting construction type



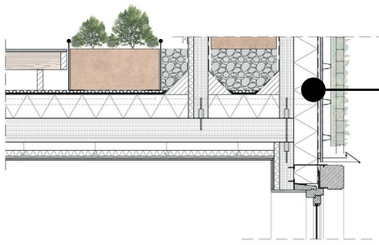
Location impact

- Air Quality
- Noise pollution
- Urban heat island

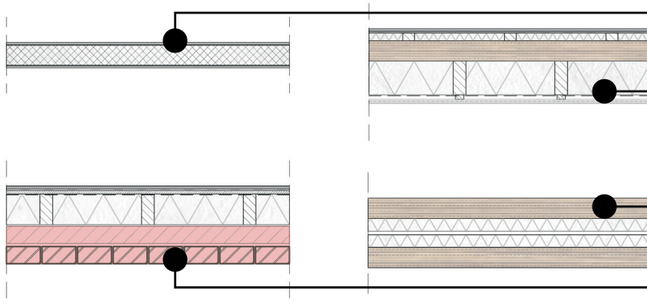
Research results

B.R.A.M. tool

Heritage values



Green roof & facade

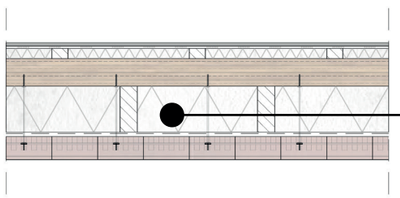


Hempcrete partition wall

Wooden facade

CLT dwelling partition wall

Hempcrete pre-wall with existing wall

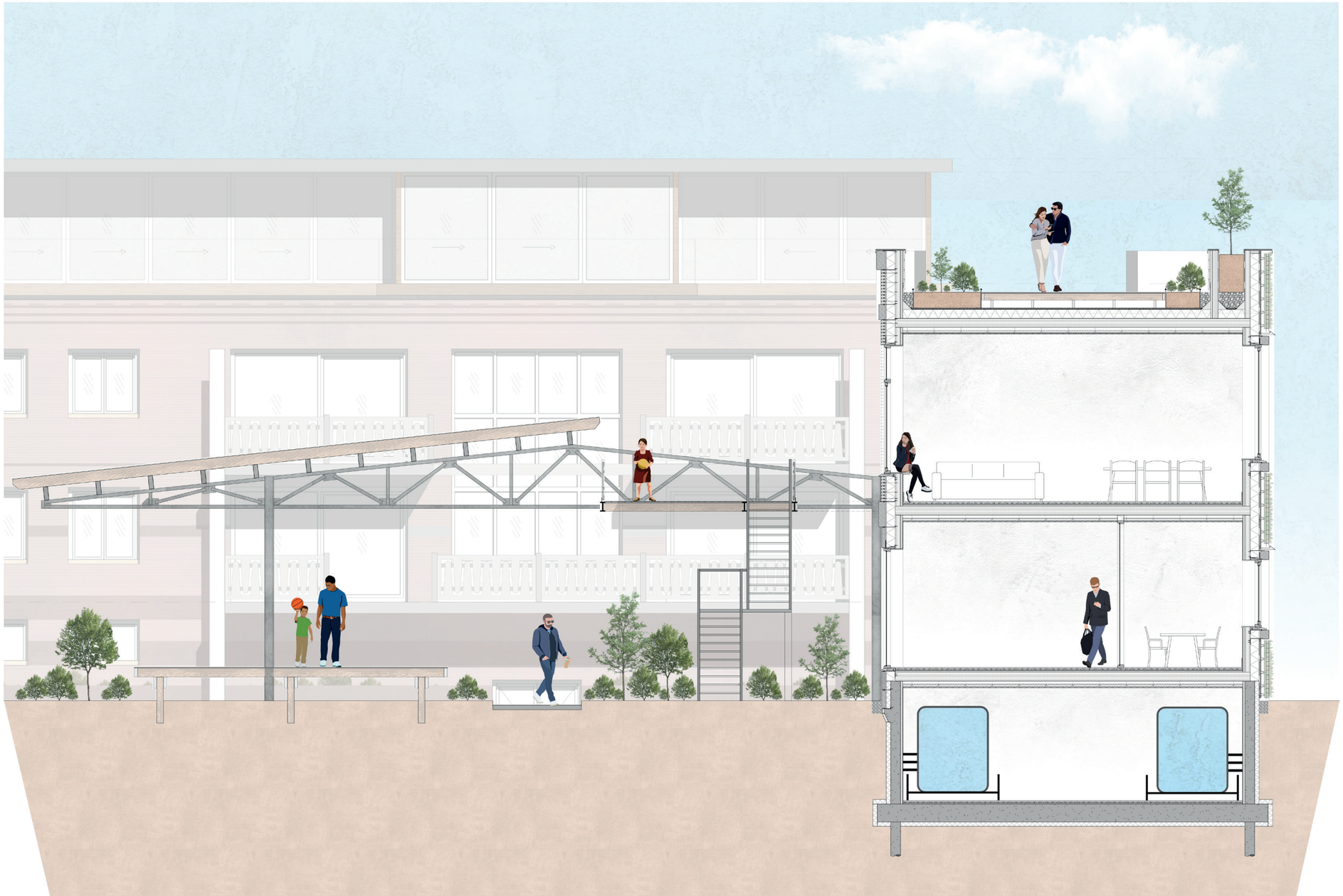


Click-brick facade

Design case

Final design: Symphony

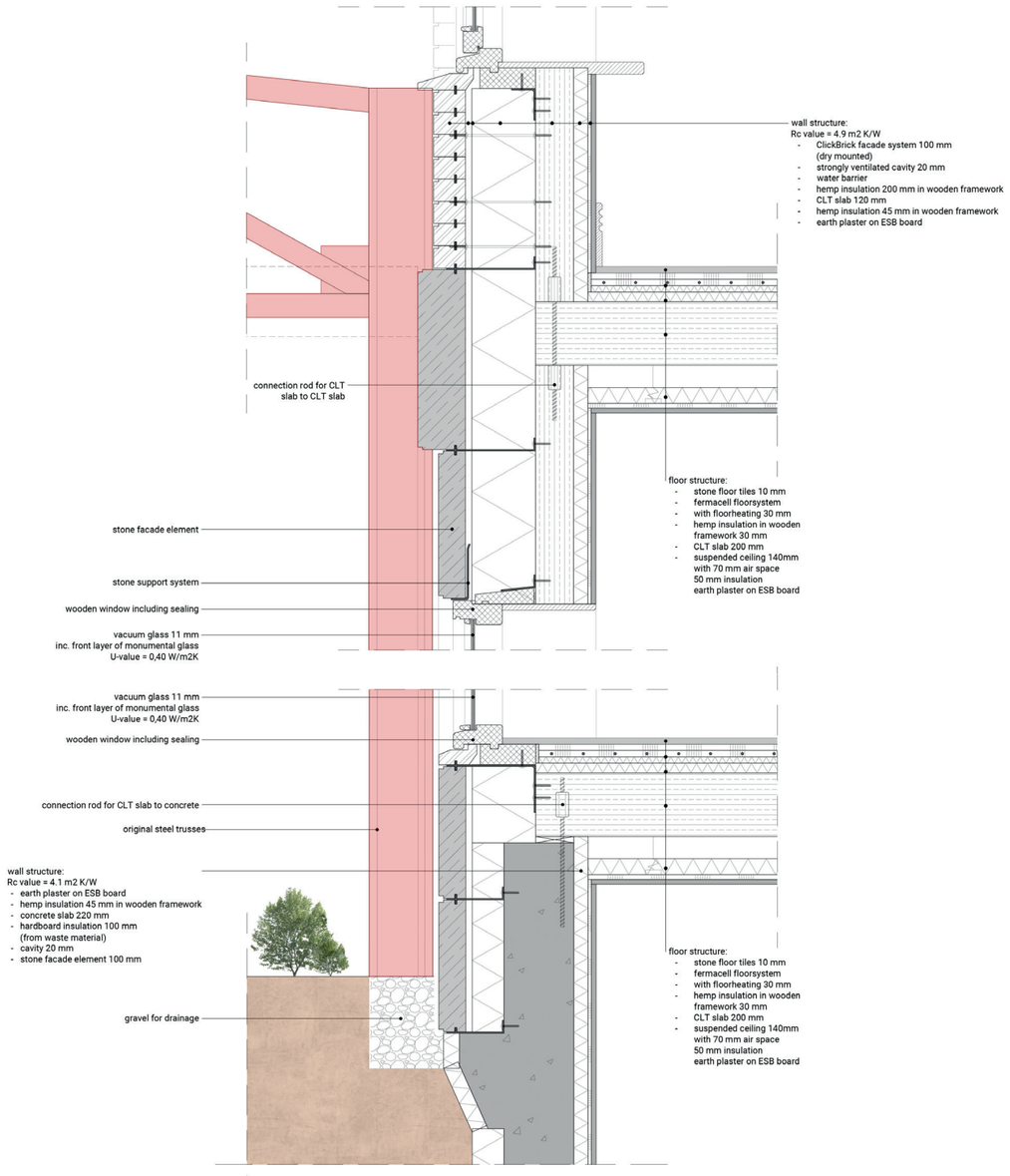
Facade fragment: Esthetical wall

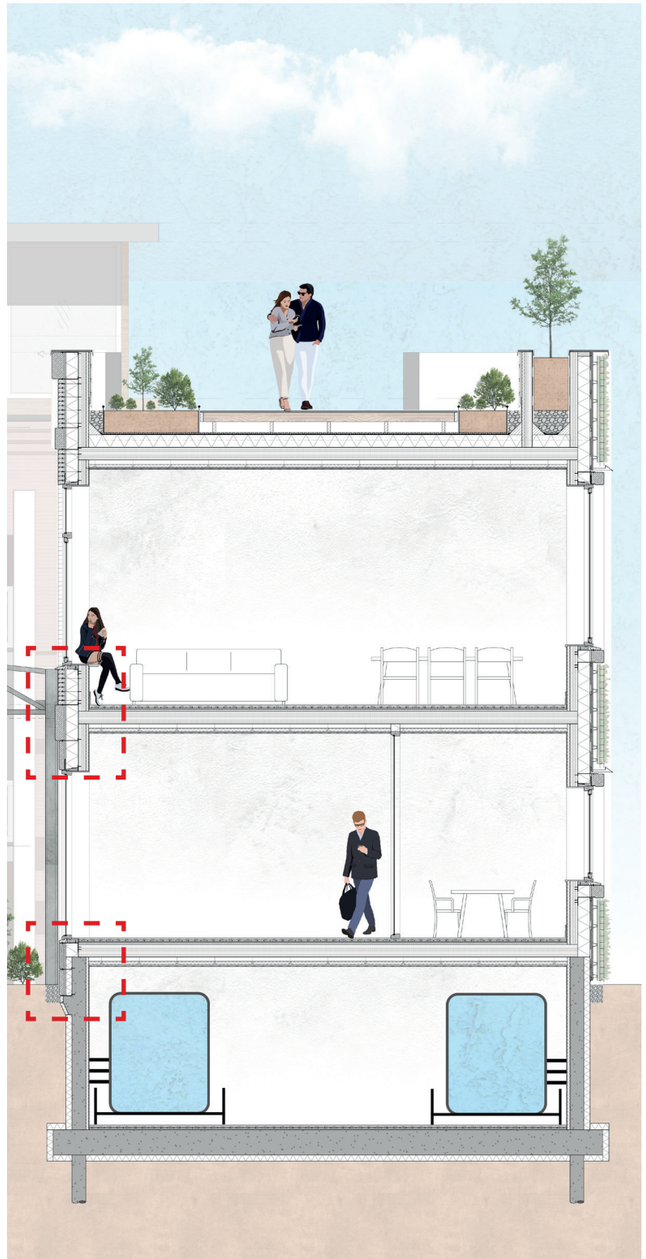


Design case

Final design: Symphony

Detailling: Esthetical wall

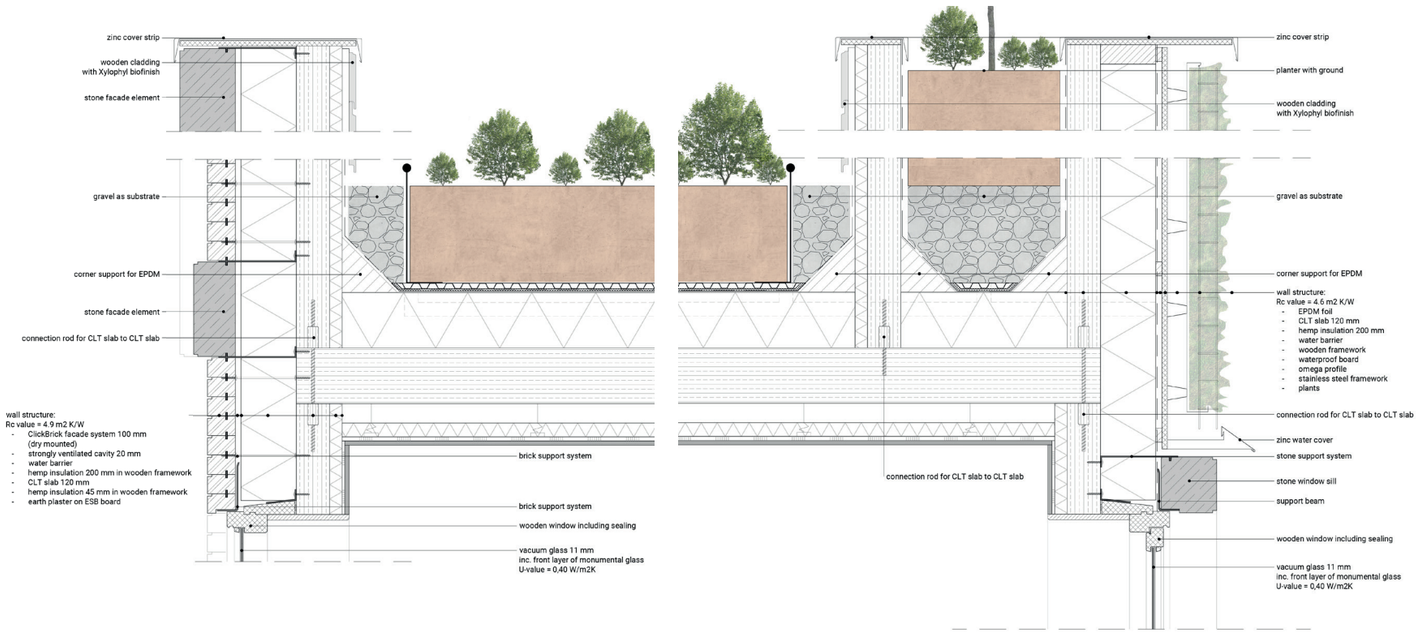


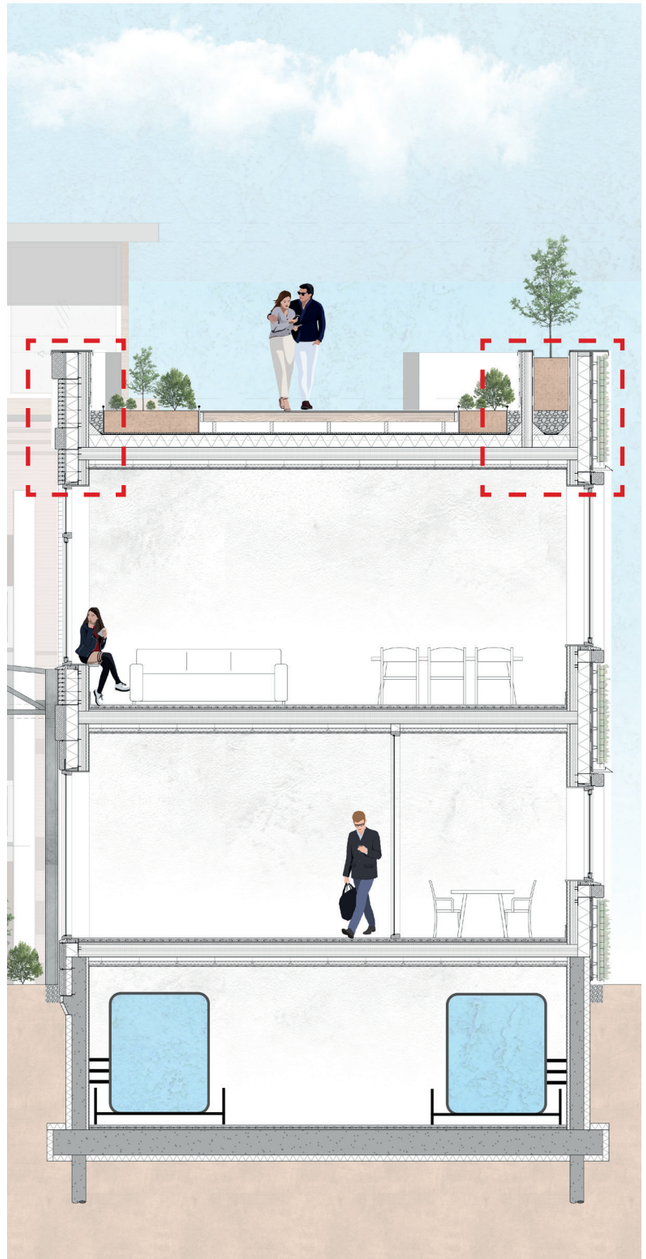


Design case

Final design: Symphony

Detailling: Esthetical wall

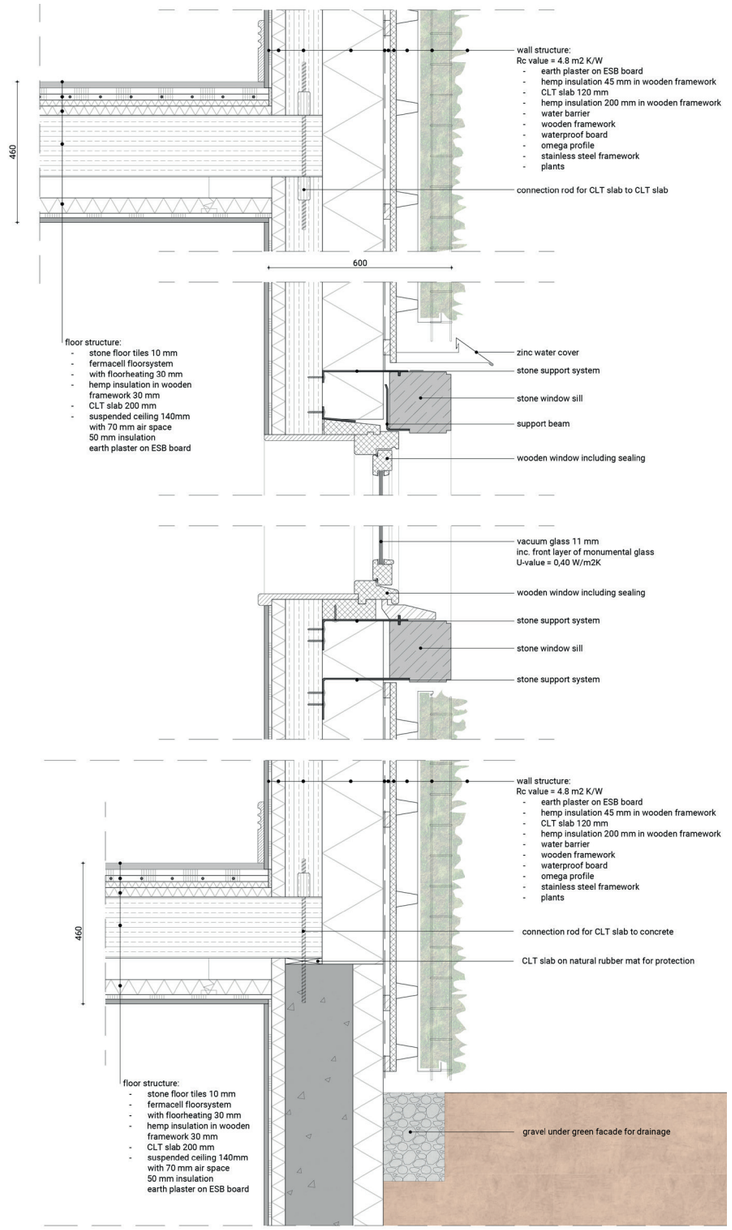


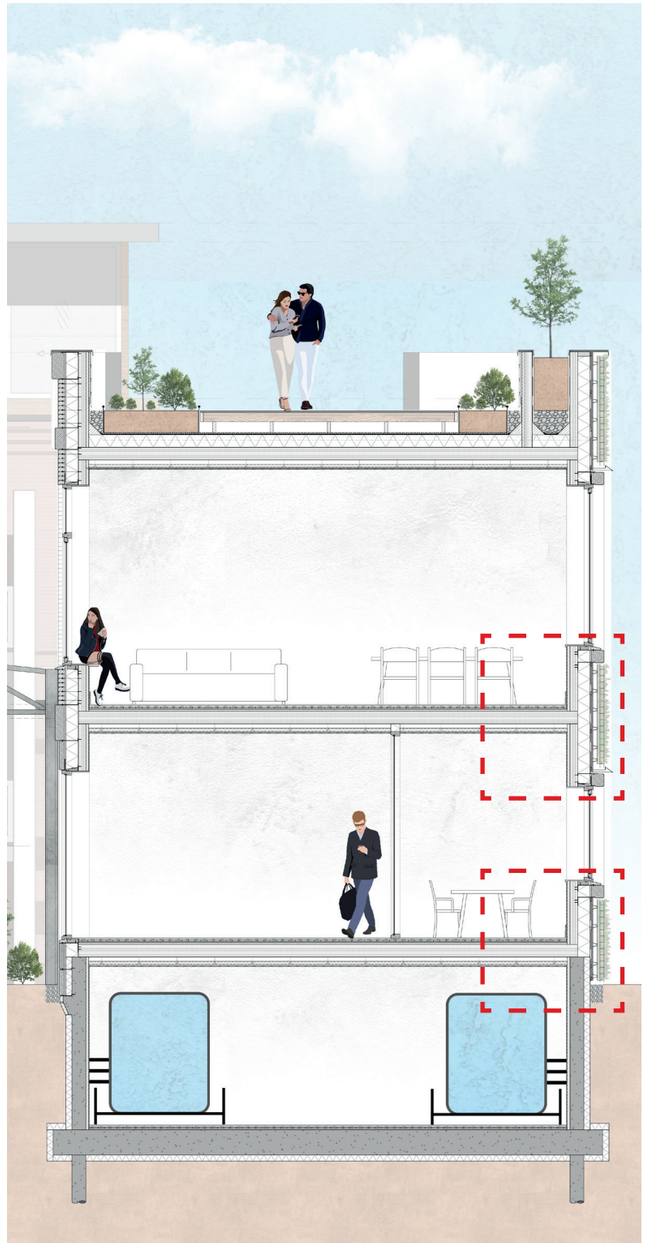


Design case

Final design: Symphony

Detailling: Esthetical wall





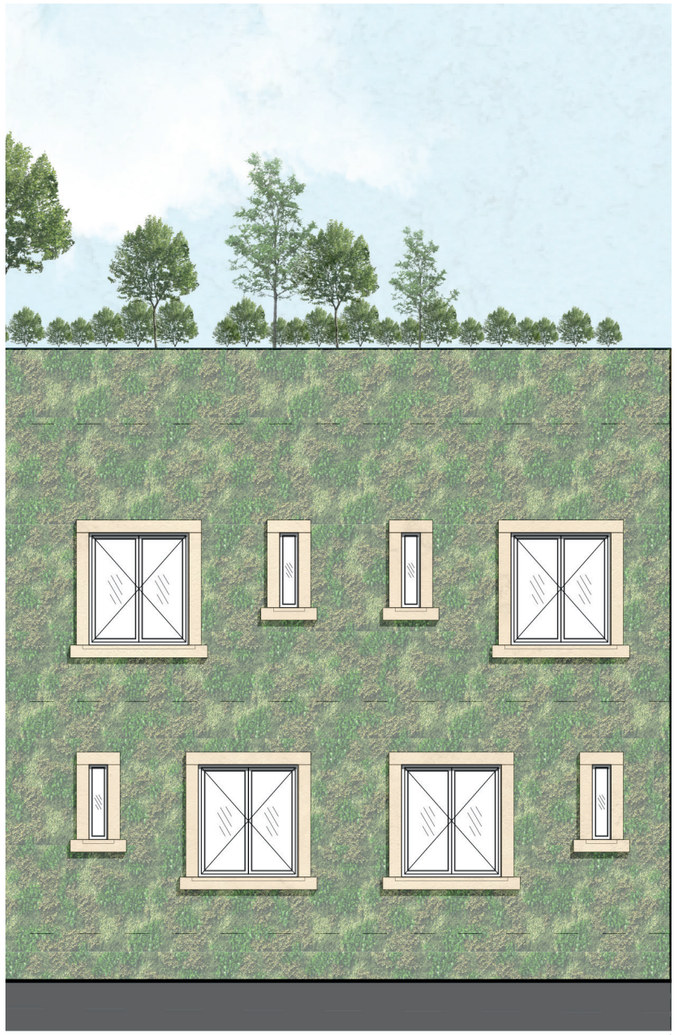
Design case

Final design: Symphony

Facade fragment comparison



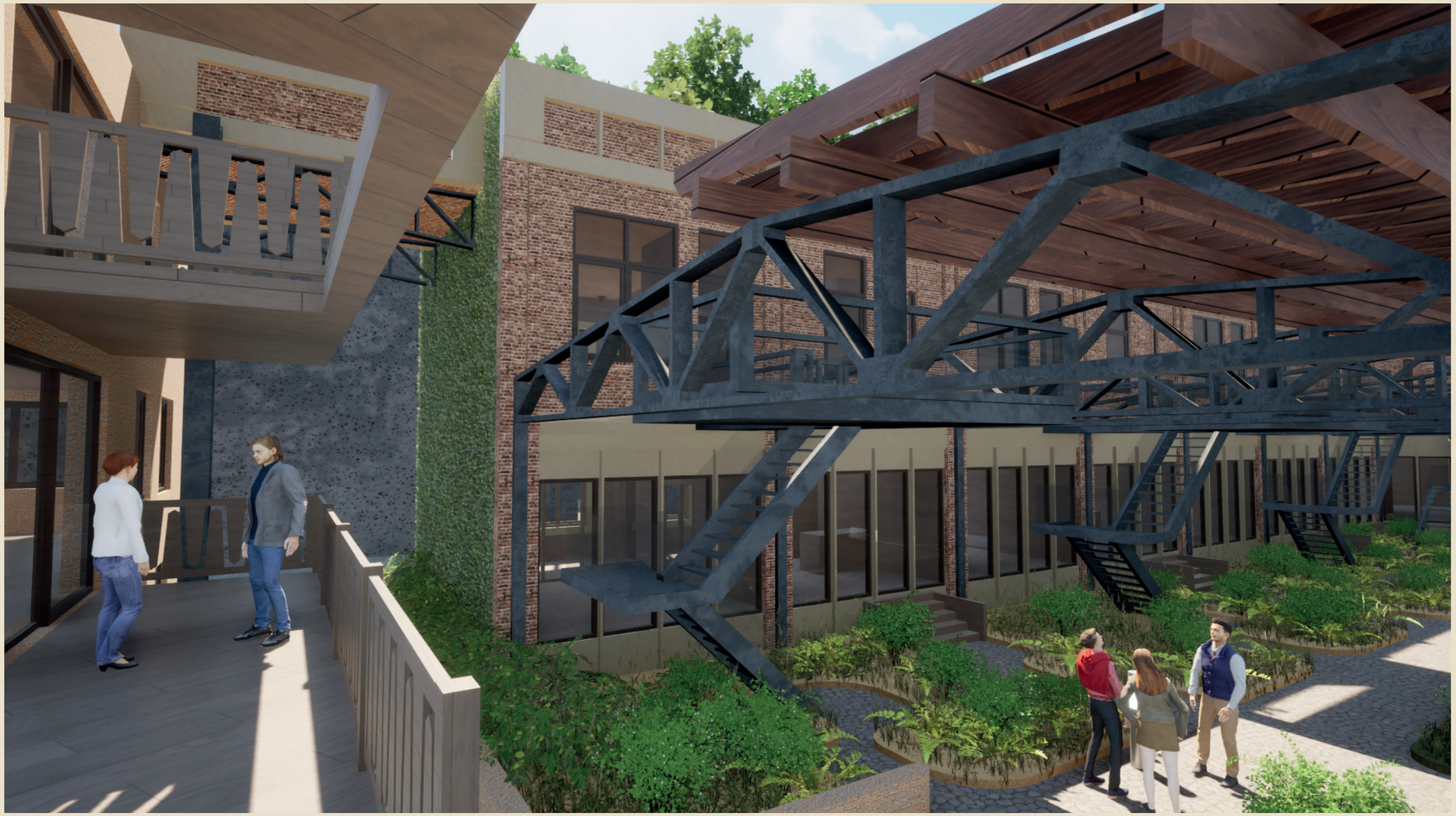




Design case

Final design: Symphony

Render: Green- & Brick facade



Design case

Final design: Symphony

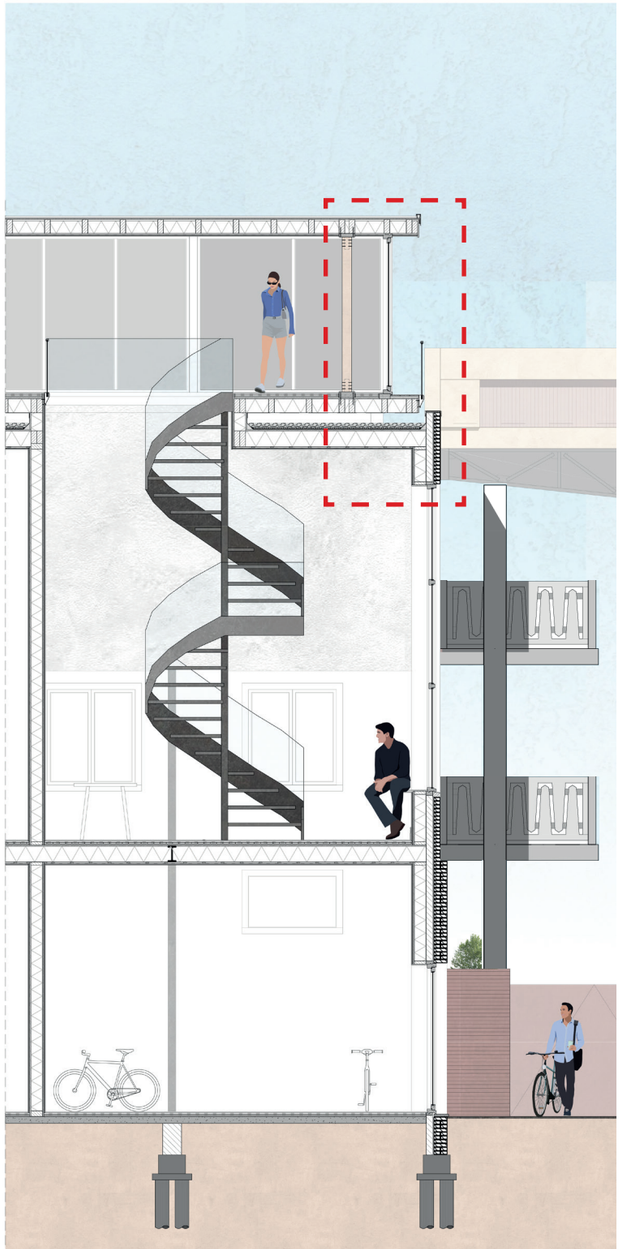
Facade fragment: Historical wall

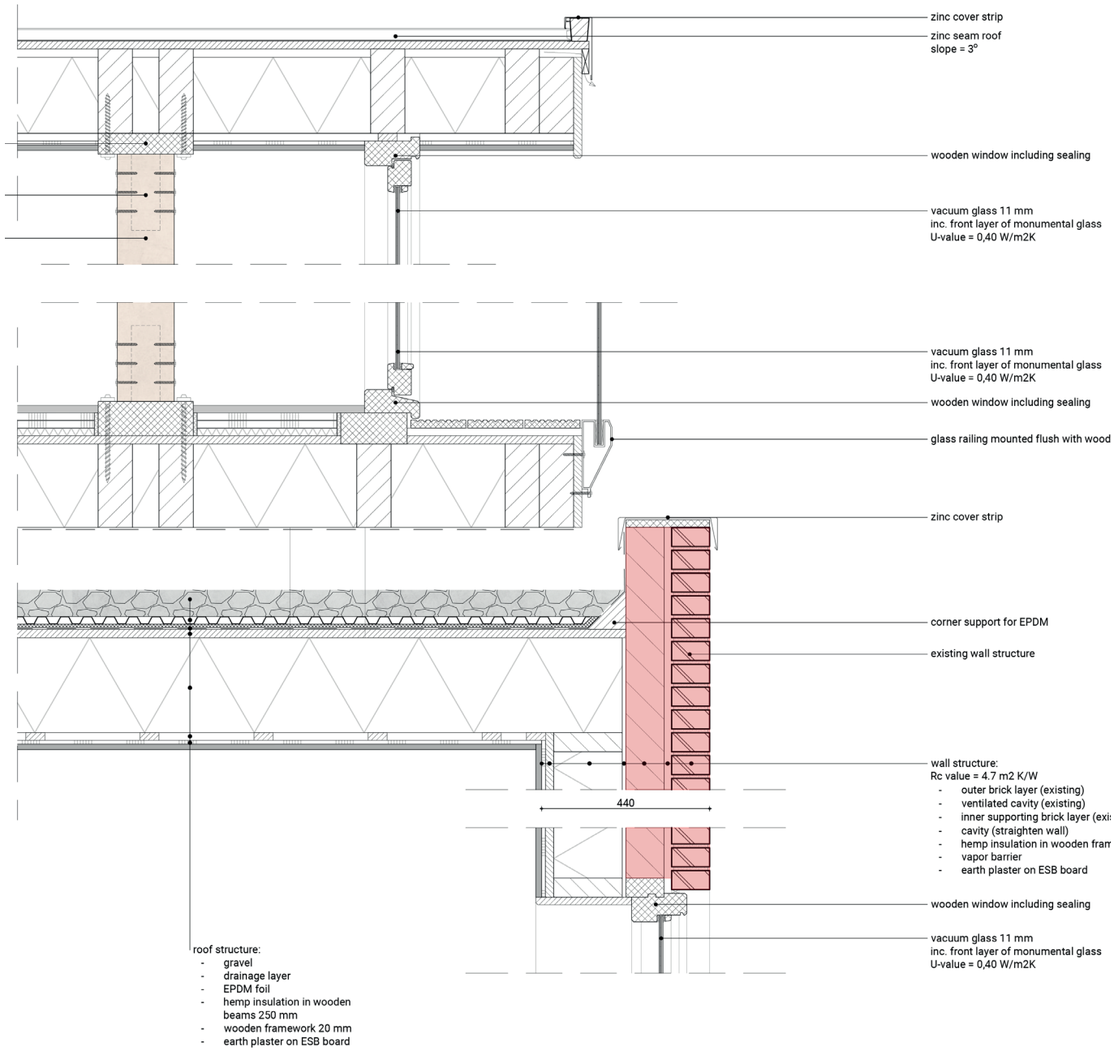


Design case

Final design: Symphony

Detailling: Historical wall



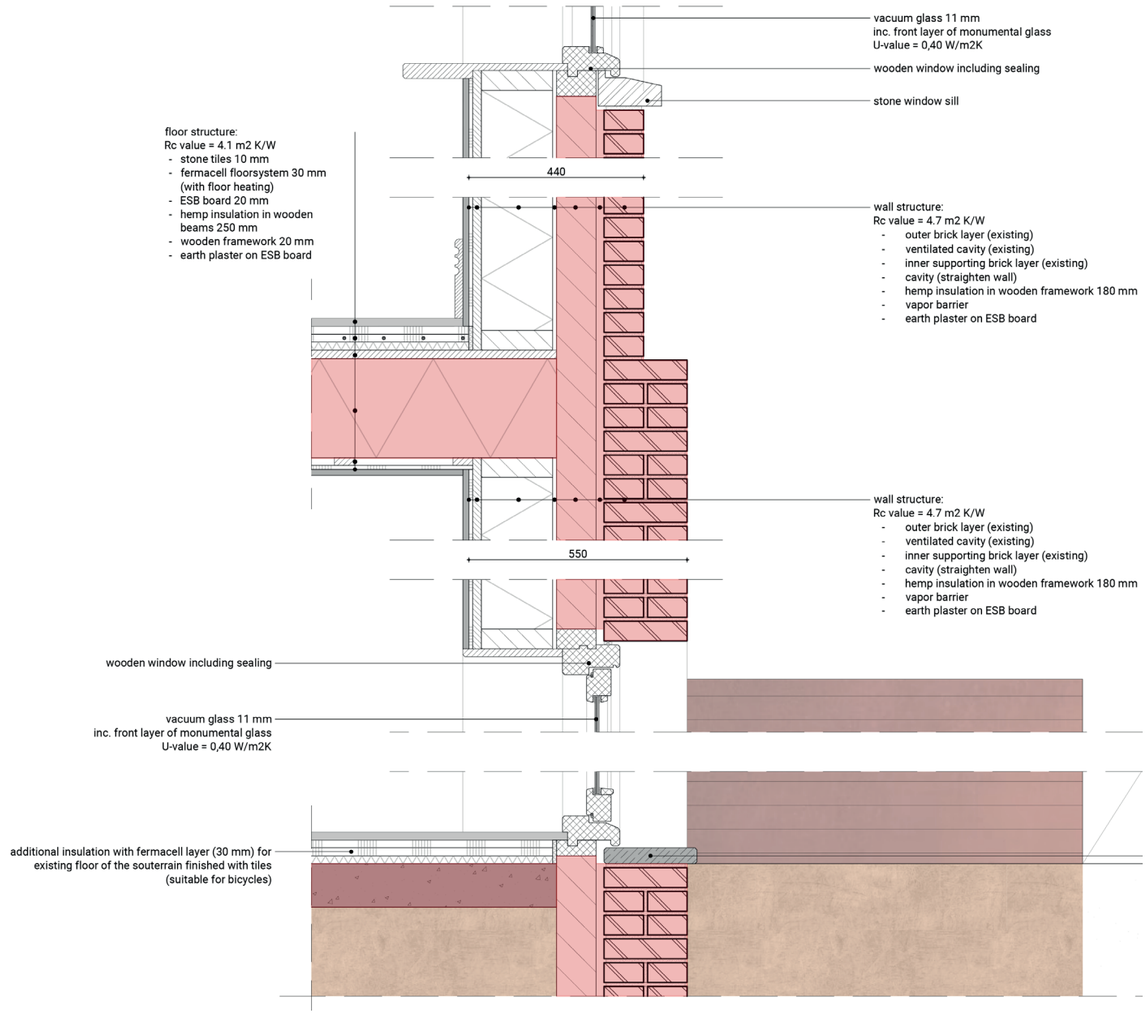


Design case

Final design: Symphony

Detailling: Historical wall





Design case

Final design: Symphony

Facade fragment: Historical wall





Design case

Final design: Symphony

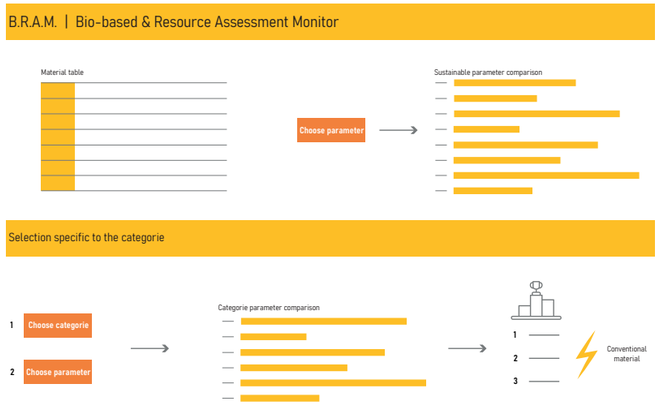
Render: Historical wall backside



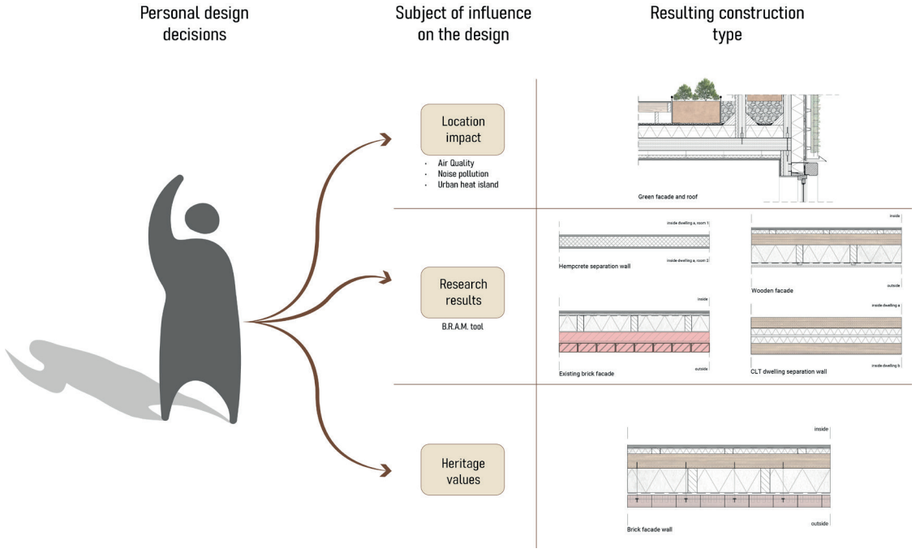
Design case

Final design: Symphony

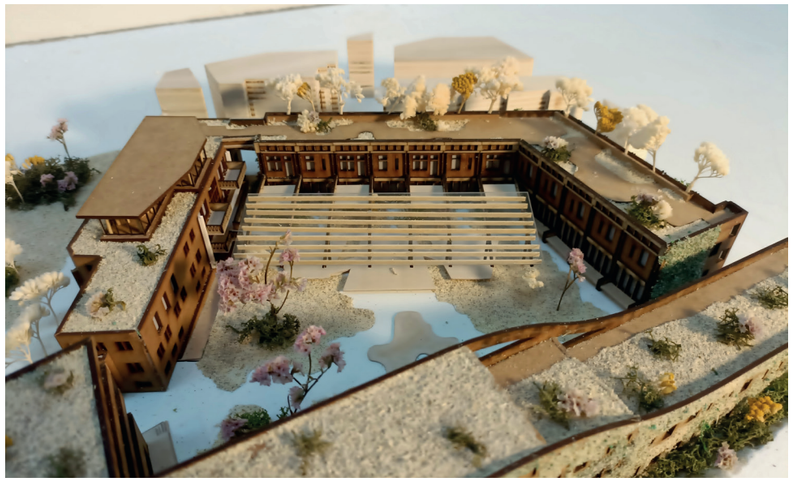
To conclude: Usability (and) for the next user



Research tool



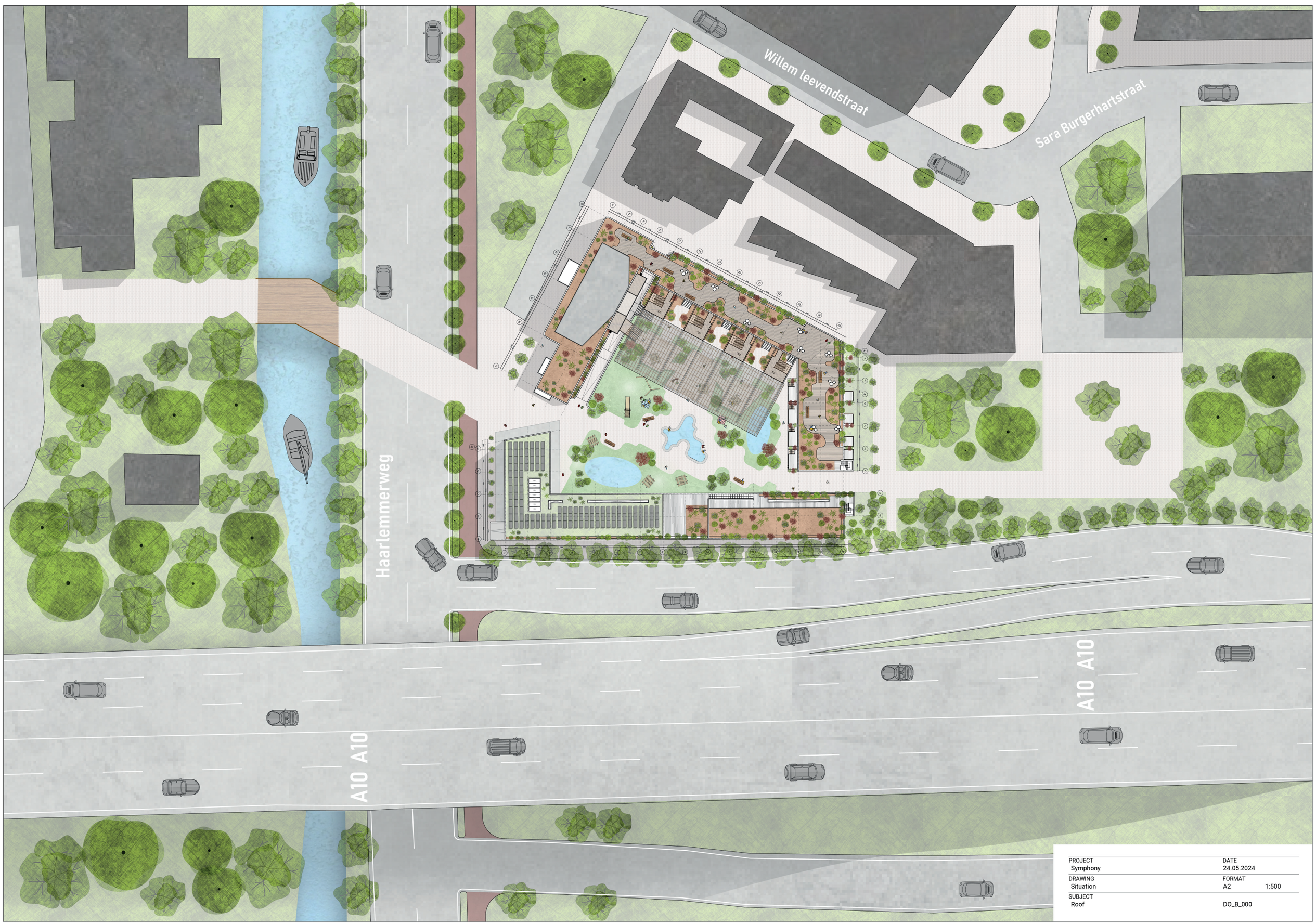
Technical possibilities



Final design

Symphony





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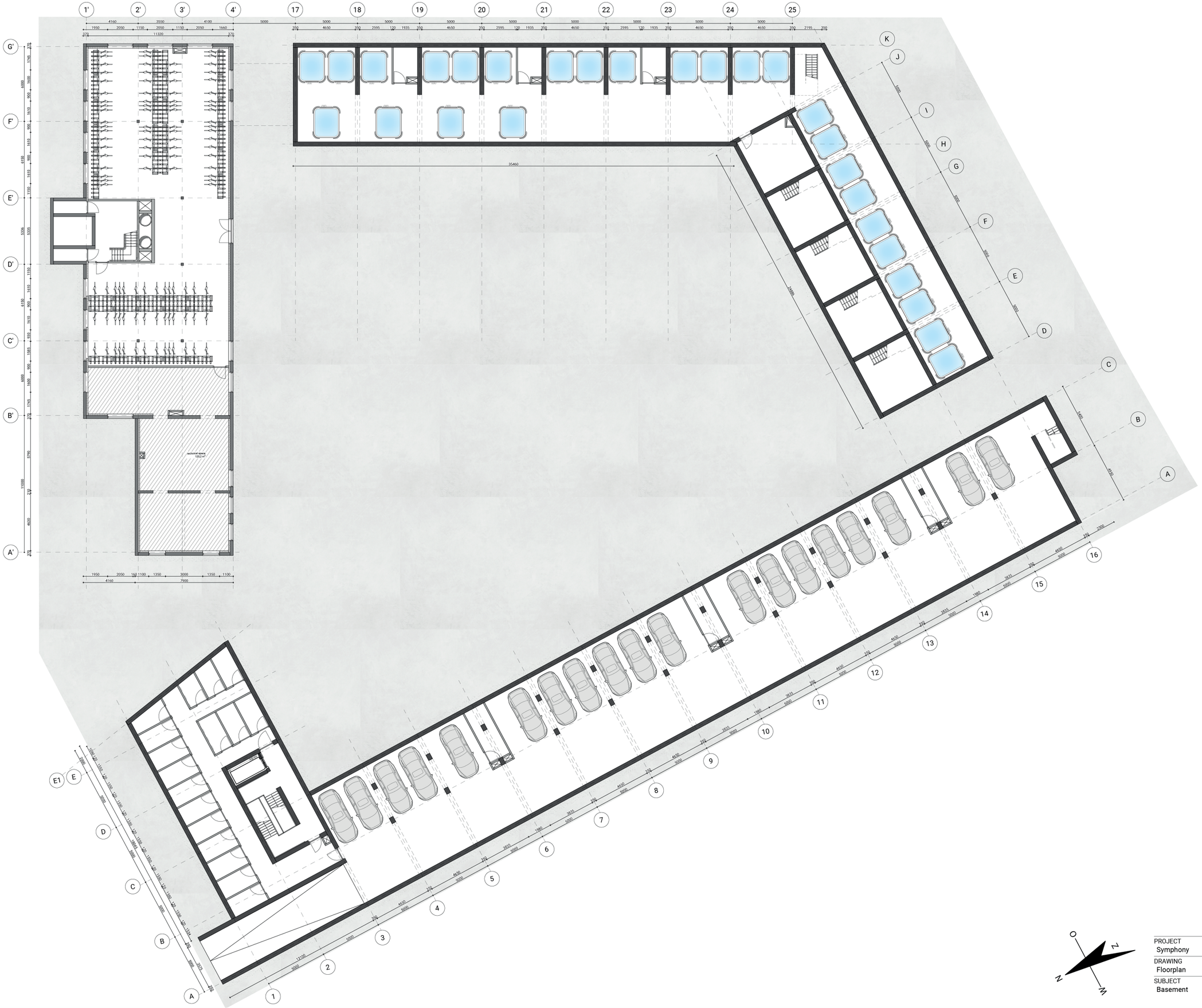
DRAWING Situation	FORMAT A2	1:500
SUBJECT Roof	DO_B_000	



PROJECT Symphony	DATE 24.05.2024
DRAWING Floorplan	FORMAT A2 1:100
SUBJECT Basement	DO_B_1-1


0.4 meeting room 13,5 m²
0.3 bathroom 6,2 m²
0.3 working spaces 23,5 m²
0.1 entrance 29,2 m²
technical space 57,3 m²
technical space 120,3 m²
0.2 living / kitchen 37,2 m²
0.1 entrance 4,4 m²
0.2 working spaces 23,8 m²
0.4 meeting room 12,5 m²
0.1 entrance 20,0 m²
0.2 bathroom 5,2 m²
0.3 working spaces 23,8 m²
0.4 meeting room 12,5 m²
0.1 entrance 20,0 m²
0.2 bathroom 5,2 m²
0.2 working spaces 23,8 m²
0.4 meeting room 12,5 m²
0.1 entrance 20,0 m²
0.2 bathroom 5,2 m²
0.1 entrance 4,4 m²
0.2 living / kitchen 37



PROJECT Symphony	DATE 24.05.2024
DRAWING Floorplan	FORMAT A2 1:100
SUBJECT 1st floor (+2nd floor existing building)	DO_B_110

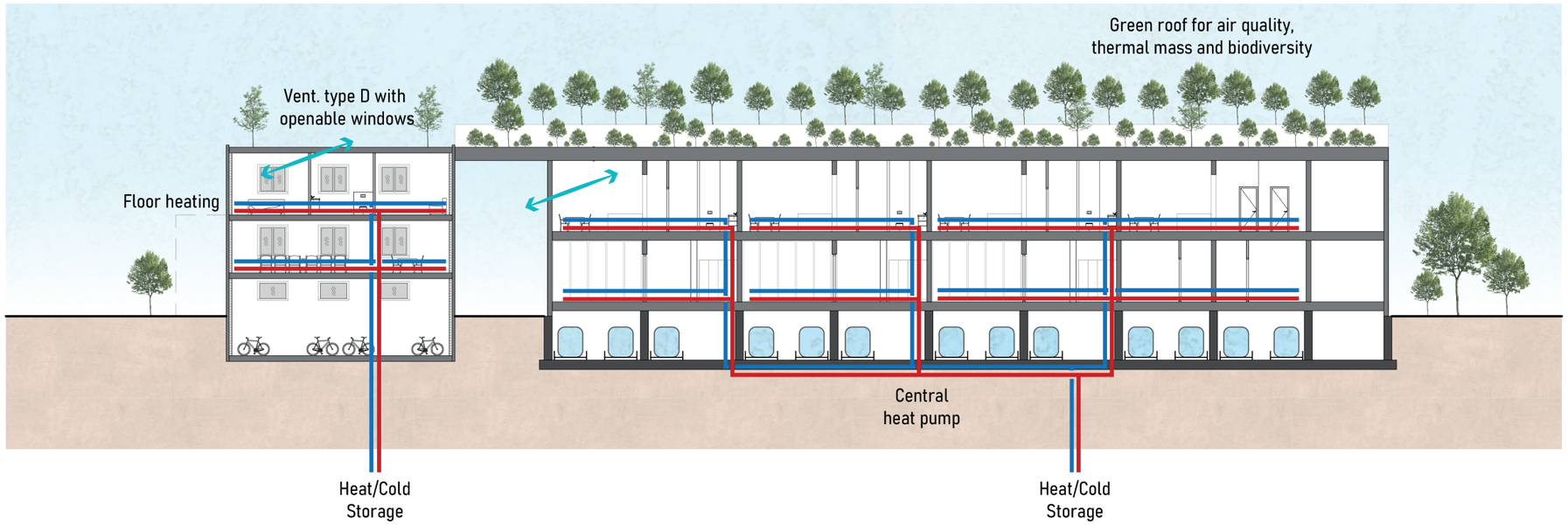

1' 2' 3' 4' 17 18 19 20 21 22 23 24 25
4160 3550 4100 5000 5000 5000 5000 5000 5000 5000 5000 5000
12060 12060 42675
G' F' E' D' C' B' A'
6000 6150 5376 30135 6150 6000 11000 19645
K J I H G F E D C B 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
5000 5000 5000 5000 5000 5000 5000 5000 5000 5000 5000 5000 5000 5000 5000
E1 E D C B A
1450 2000 1200 1000 1200 1000 1200 1

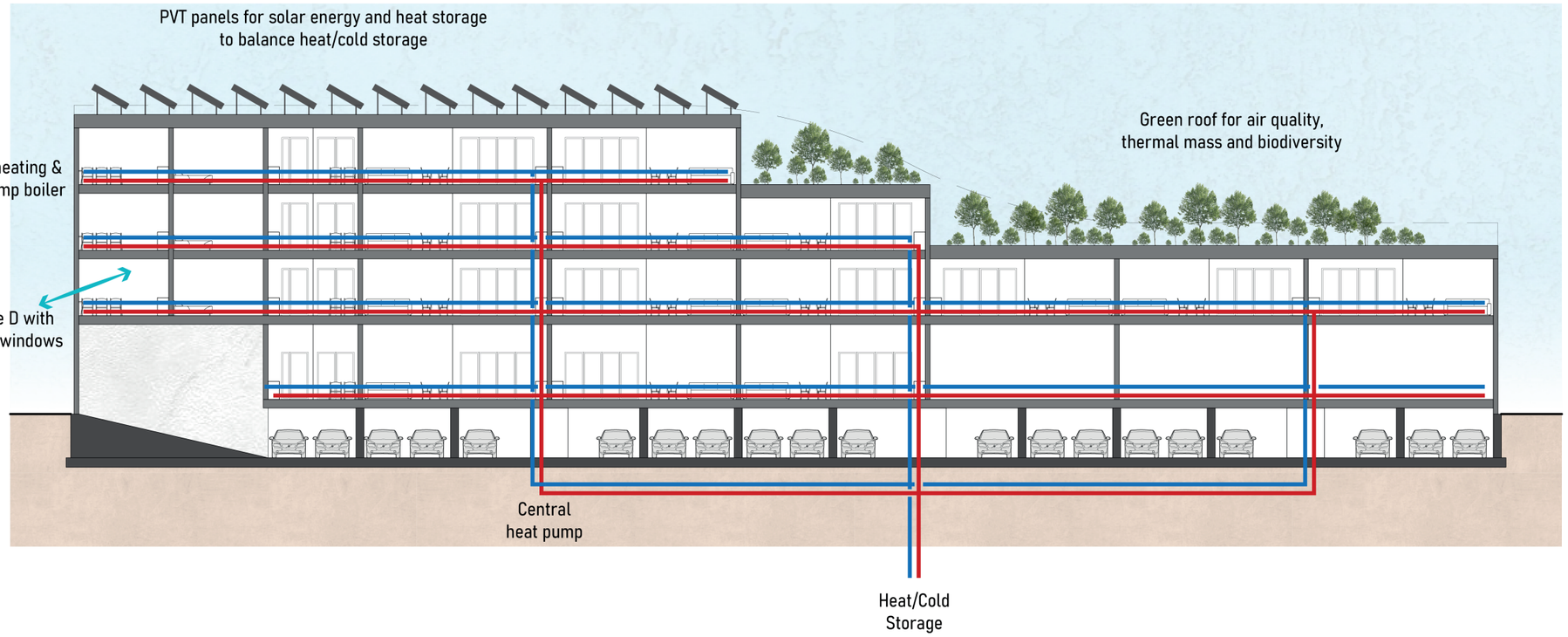


PROJECT Symphony	DATE 24.05.2024
DRAWING Floorplan	FORMAT A2 1:100
SUBJECT 3rd floor	DO_B_130



PROJECT Symphony	DATE 24.05.2024
DRAWING Floorplan	FORMAT A2 1:100
SUBJECT Roof	DO_B_140





PROJECT Symphony	DATE 24.05.2024
DRAWING Section	FORMAT A2 1:100
SUBJECT Historical wall & Practical wall	DO_B_200



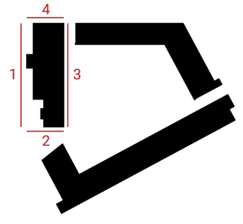
Facade 1

Facade 2



Facade 3

Facade 4



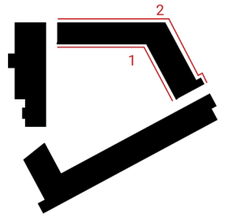
PROJECT	DATE
Symphony	24.05.2024
DRAWING	FORMAT
Elevation	A1 1:100
SUBJECT	
Existing building	DO_B_300



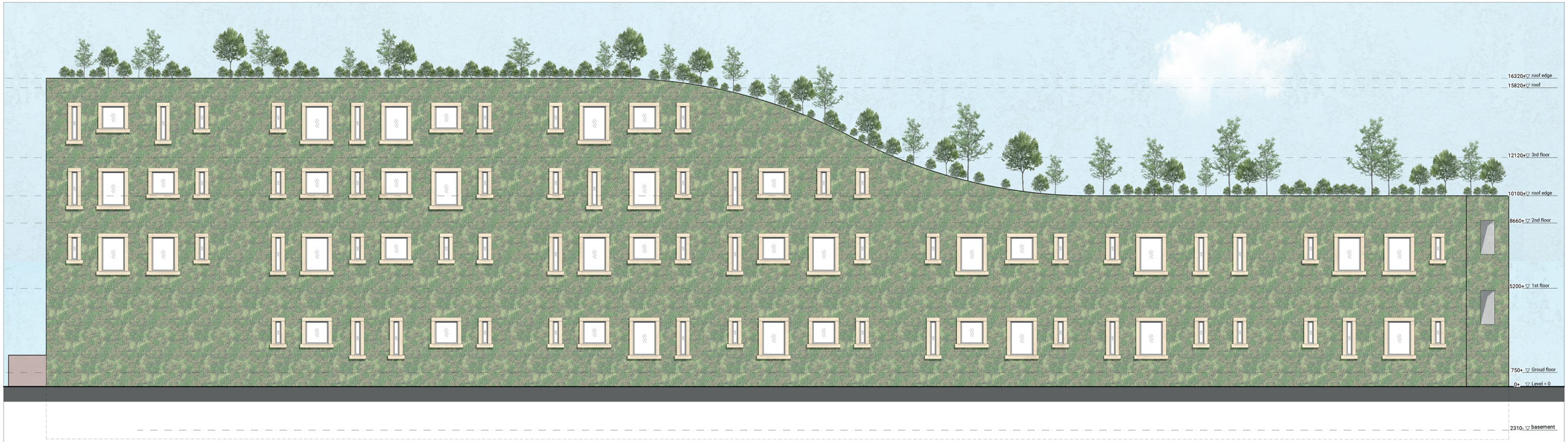
Facade 1



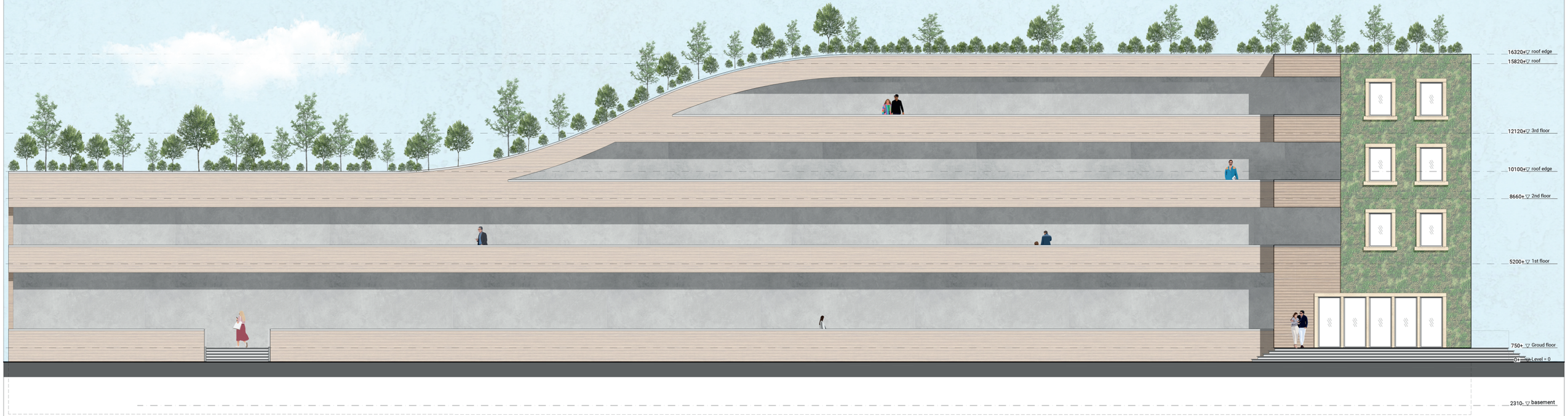
Facade 2



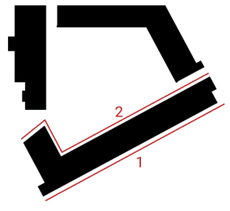
PROJECT Symphony	DATE 24.05.2024	
DRAWING Elevation	FORMAT A1	1:100
SUBJECT Esthetical wall - inner and outer facade	DO_B_301	



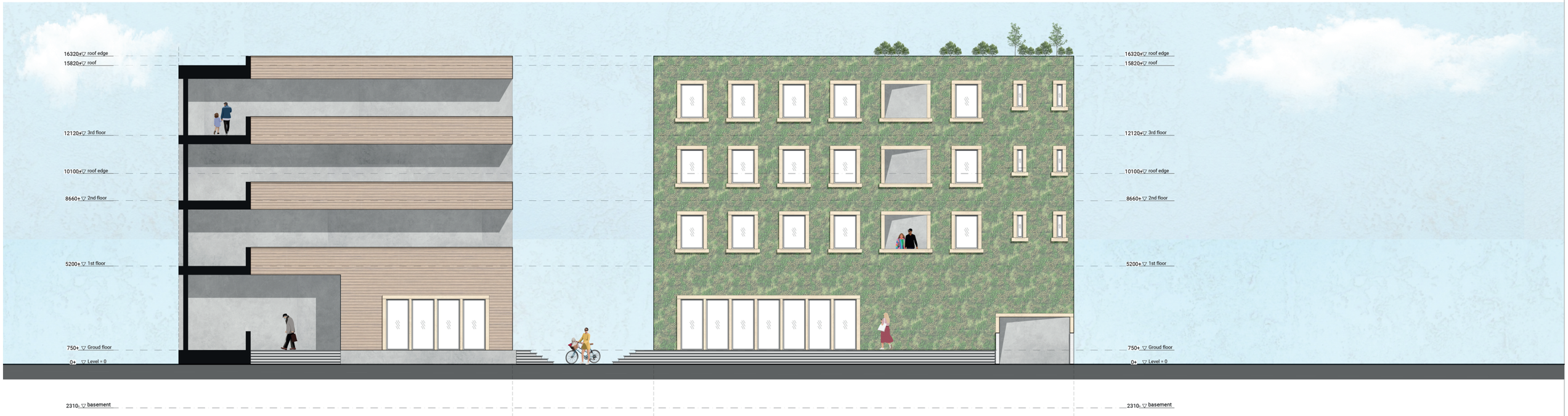
Facade 1



Facade 2



PROJECT Symphony	DATE 24.05.2024
DRAWING Elevation	FORMAT A1 1:100
SUBJECT Practical wall - inner and outer facade	DO_B_302



Facade 1

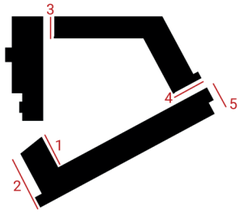
Facade 2



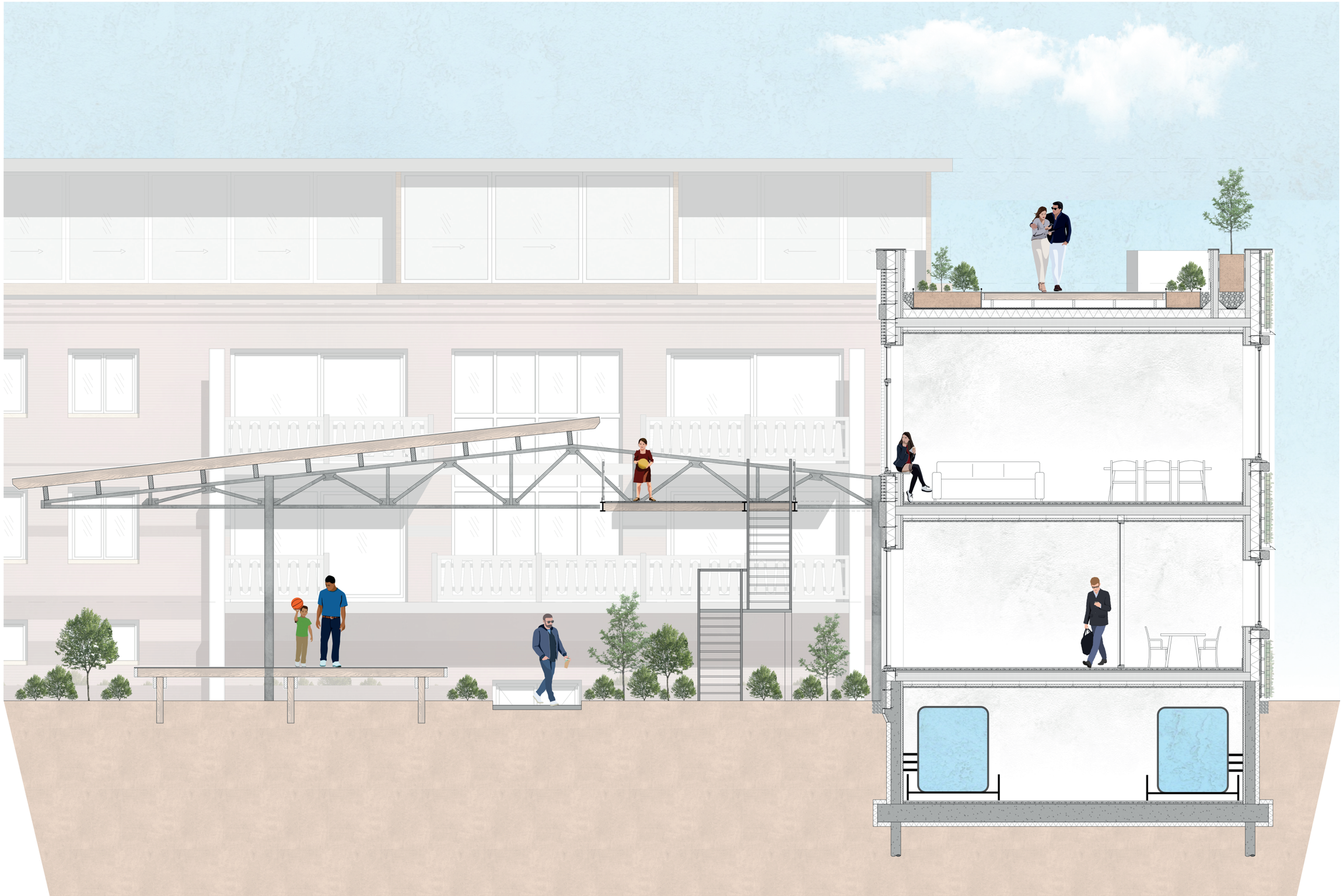
Facade 3

Facade 5

Facade 5



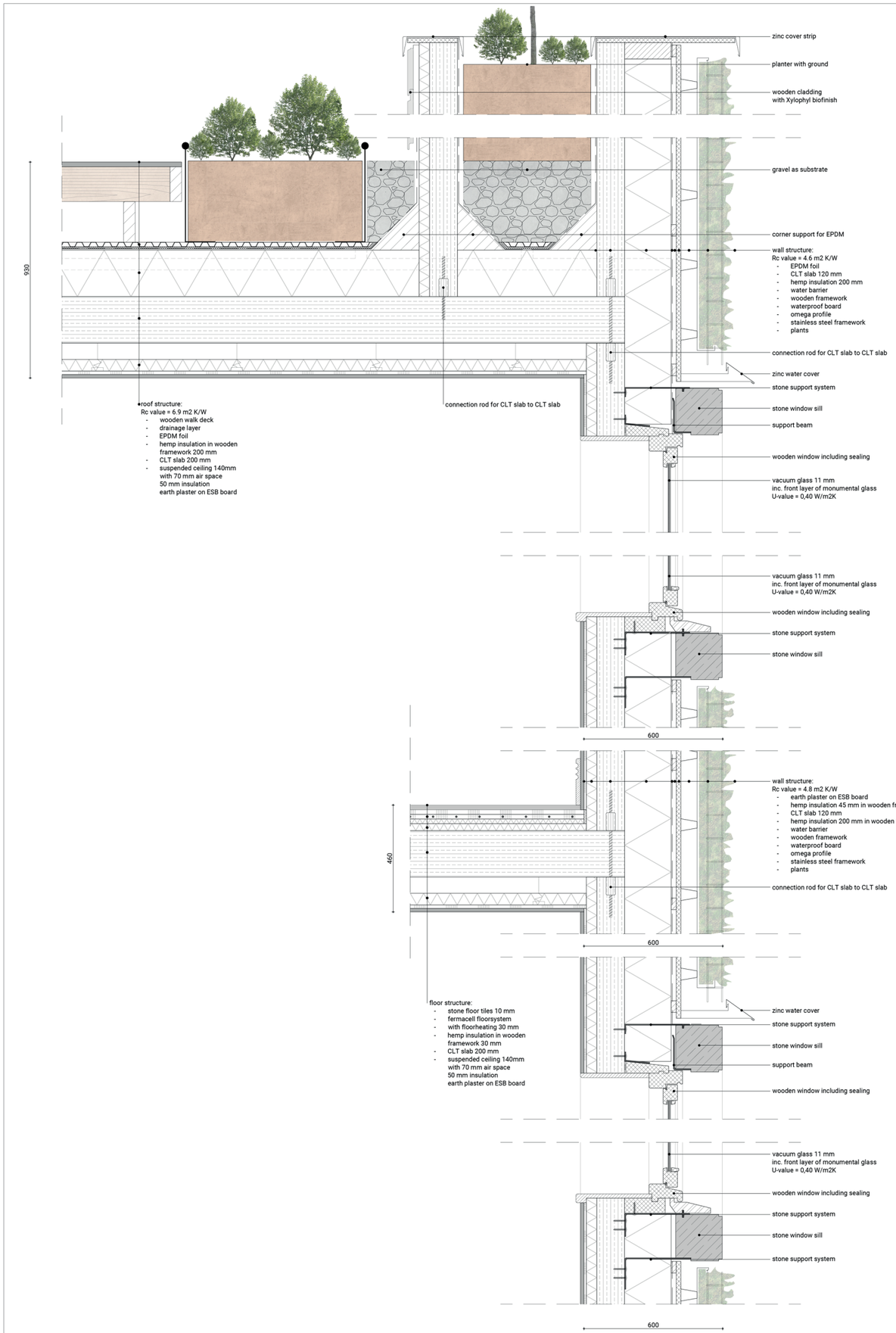
PROJECT	DATE
Symphony	24.05.2024
DRAWING	FORMAT
Elevation	A1 1:100
SUBJECT	
End facades	DO_B_303



PROJECT	DATE
Symphony	24.05.2024
DRAWING	FORMAT
1:20 section	A1 1:20 to 1:40
SUBJECT	
Esthetical wall	DO_B_400



PROJECT	DATE
Symphony	24.05.2024
DRAWING	FORMAT
1:20 section	A1 1:20 to 1:40
SUBJECT	
Historical wall	DO_B_401



DETAIL
V01

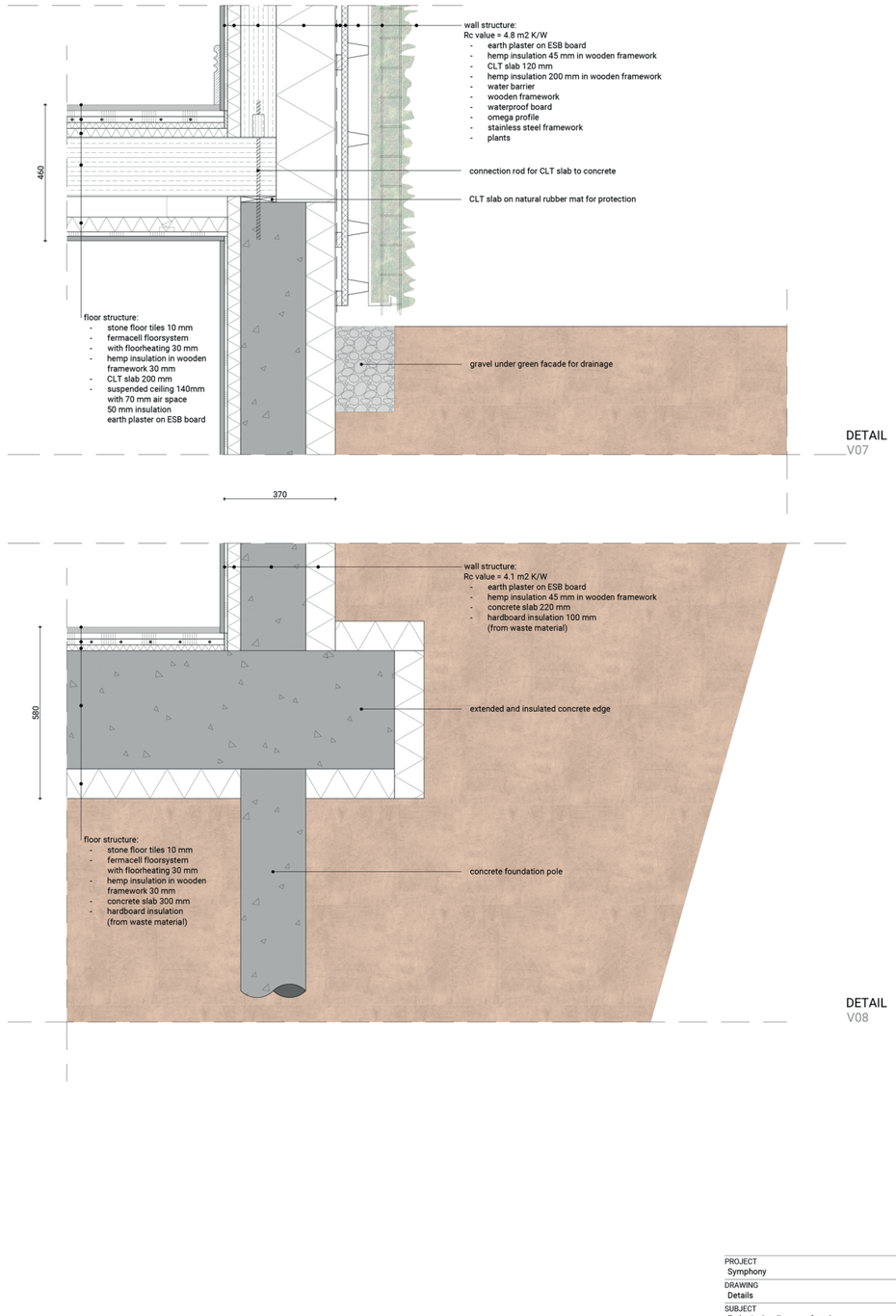
DETAIL
V02

DETAIL
V03

DETAIL
V04

DETAIL
V05

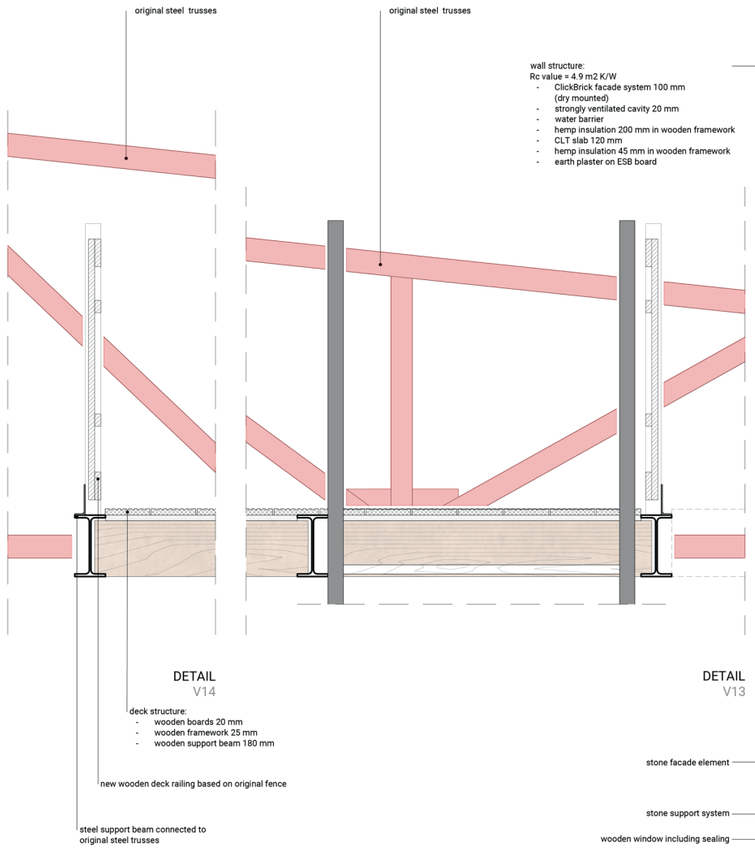
DETAIL
V06



DETAIL
V07

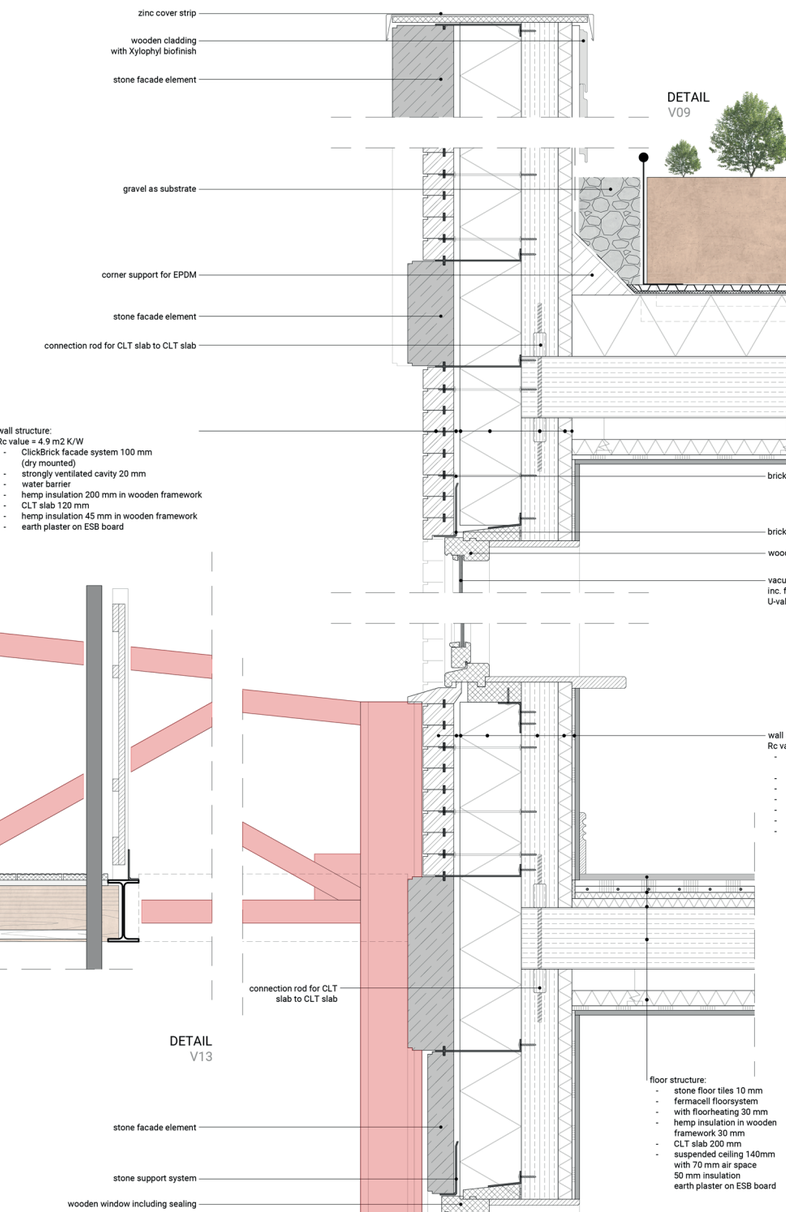
DETAIL
V08

PROJECT Symphony	DATE 24.05.2024
DRAWING Details	FORMAT A1 1:5 to 1:10
SUBJECT Esthetical wall - green facade	DO_B_600

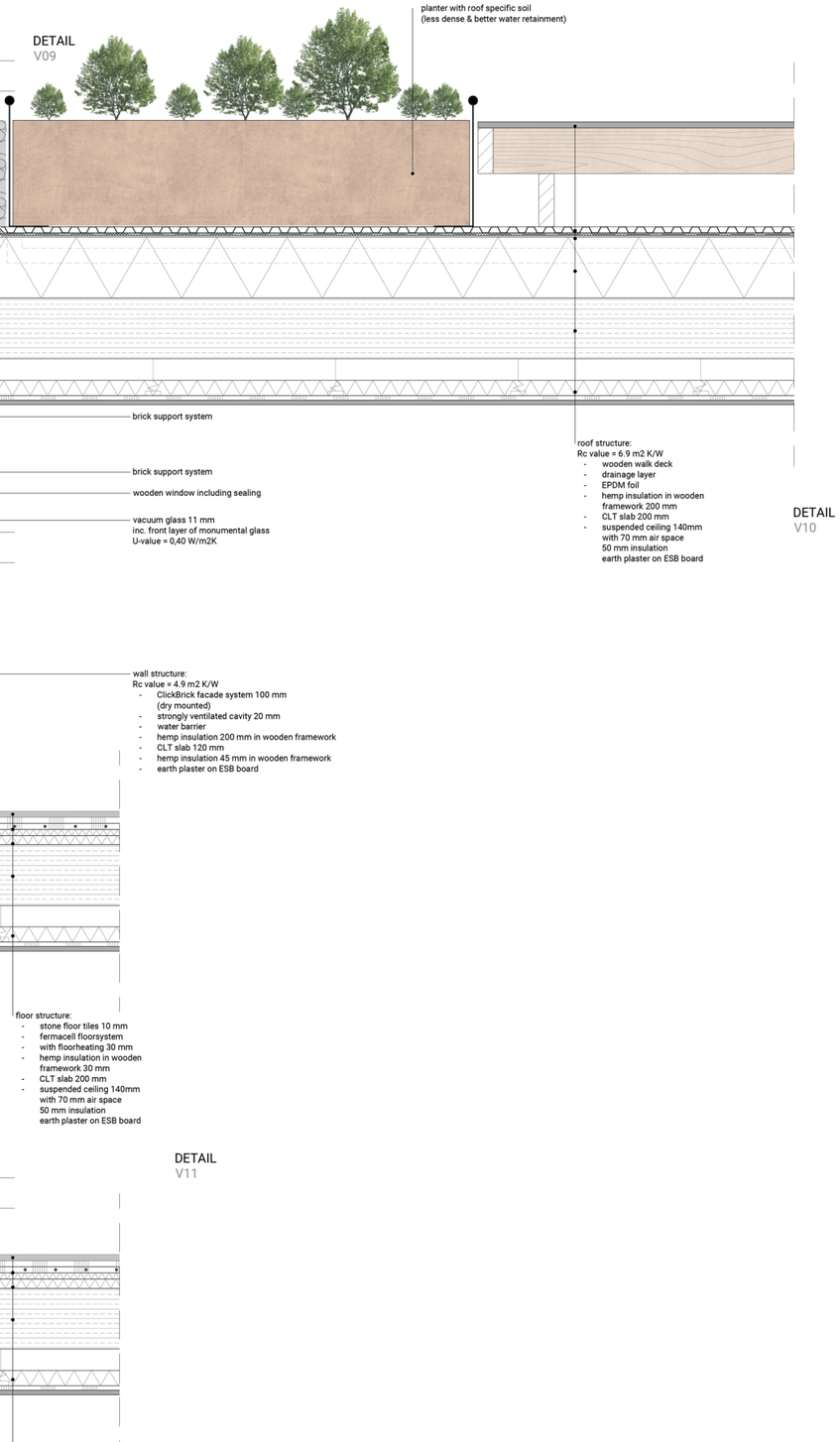


DETAIL
V14

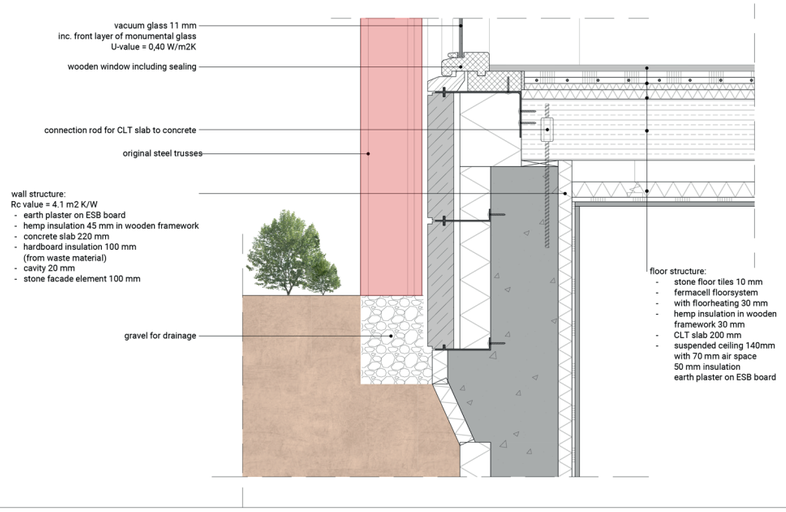
DETAIL
V13



DETAIL
V11



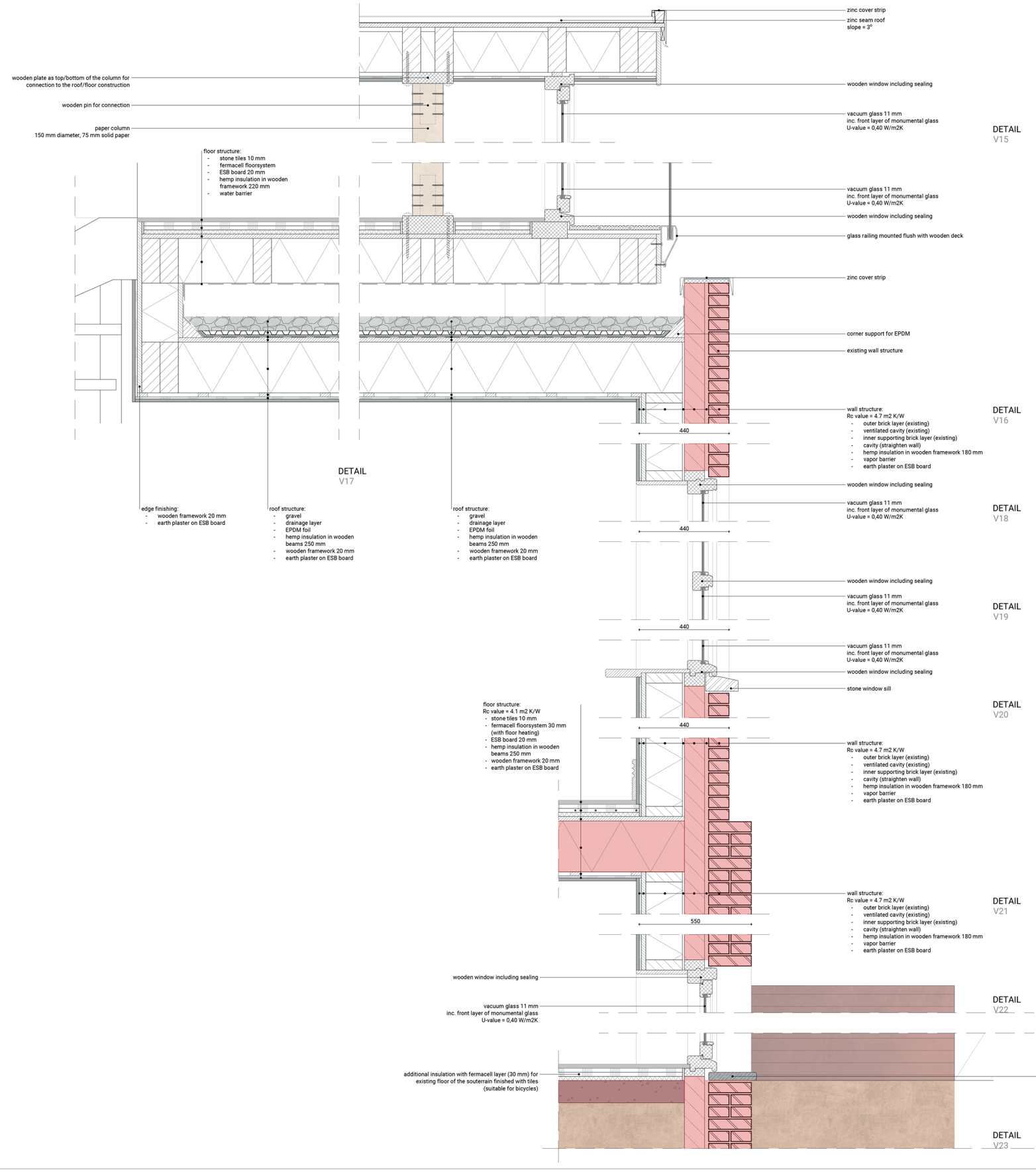
DETAIL
V10



DETAIL
V12

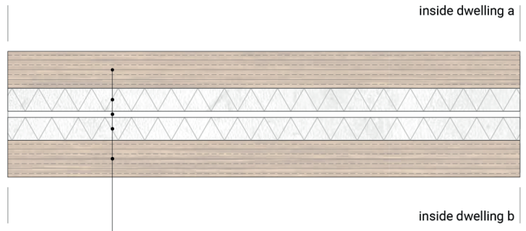
Existing structures

PROJECT	DATE
Symphony	24.05.2024
DRAWING	FORMAT
Details	A1 1:5 to 1:10
SUBJECT	
Esthetical wall - brick facade	DO_B_601



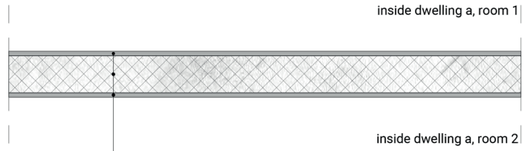
PROJECT	DATE
Symphony	24.05.2024
DRAWING	FORMAT
Details	A1 1:5 to 1:10
SUBJECT	
Historical wall - back facade	DO_B_602

NEW WALL TYPES:
interior



DETAIL
H01

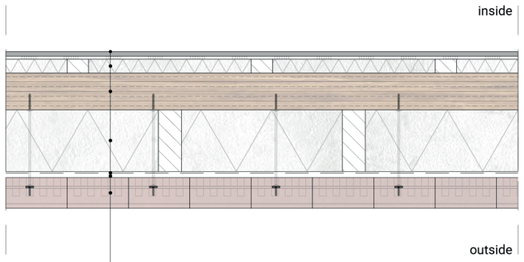
wall structure (dwelling separation wall):
sound reduction = 39 dB
- CLT slab 120 mm
- hemp insulation 75 mm in wooden framework
- cavity 20 mm
- hemp insulation 75 mm in wooden framework
- CLT slab 120 mm



DETAIL
H02

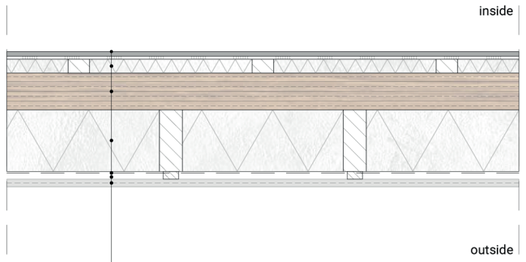
wall structure (room separation wall):
sound reduction = 39 dB
- earth plaster 15 mm
- hemp blocks 120 mm
- earth plaster 15 mm

NEW WALL TYPES:
exterior



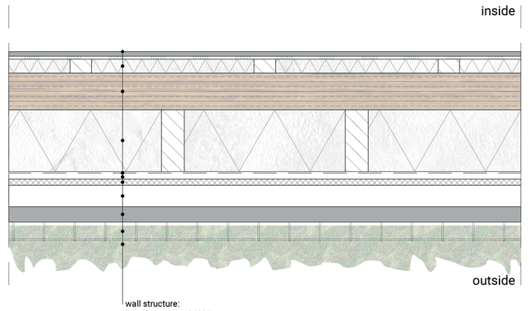
DETAIL
H03

wall structure:
Rc value = 4.9 m2 K/W
- earth plaster on ESB board
- hemp insulation 45 mm in wooden framework
- CLT slab 120 mm
- hemp insulation 200 mm in wooden framework
- water barrier
- strongly ventilated cavity 20 mm
- ClickBrick facade system 100 mm (dry mounted)



DETAIL
H04

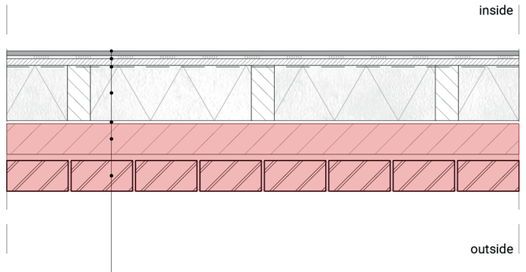
wall structure:
Rc value = 4.8 m2 K/W
- earth plaster on ESB board
- hemp insulation 45 mm in wooden framework
- CLT slab 120 mm
- hemp insulation 200 mm in wooden framework
- water barrier
- wooden framework
- wooden cladding (with Xylophyl biofinish)



DETAIL
H05

wall structure:
Rc value = 4.8 m2 K/W
- earth plaster on ESB board
- hemp insulation 45 mm in wooden framework
- CLT slab 120 mm
- hemp insulation 200 mm in wooden framework
- water barrier
- wooden framework
- waterproof board
- omega profile
- stainless steel framework
- plants

EXISTING WALL TYPES:



DETAIL
H06

wall structure:
Rc value = 4.7 m2 K/W
- outer brick layer (existing)
- ventilated cavity (existing)
- inner supporting brick layer (existing)
- cavity (straighten wall)
- hemp insulation in wooden framework 180 mm
- vapor barrier
- earth plaster on ESB board

Existing structures

PROJECT Symphony	DATE 24.05.2024
DRAWING Details	FORMAT A1 1:5 to 1:10
SUBJECT Facade types	DO_B_603