

# REVITALISING RURAL HERITAGE

P5 PRESENTATION ARCHITECTURAL ENGINEERING GRADUATION



**Daan van Dortmont**

**Mo Smit** – Design tutor

**Pierre Jennen** – Research tutor

**Paddy Tomesen** – Building technology tutor

**Marcel Bilow** – Examiner

Exploring local resource management and innovative biobased building methods to accomodate **viable**, self-sufficient, multifunctional and **sustainable** rural heritage sites

**TU Delft**  
**BK Bouwkunde**



# Prelude

Observation: Contrast in our landscape



**country estate**  
Nijmegen



**green house**  
Delfgauw

Two types of production landscapes



# Prelude

Starting point



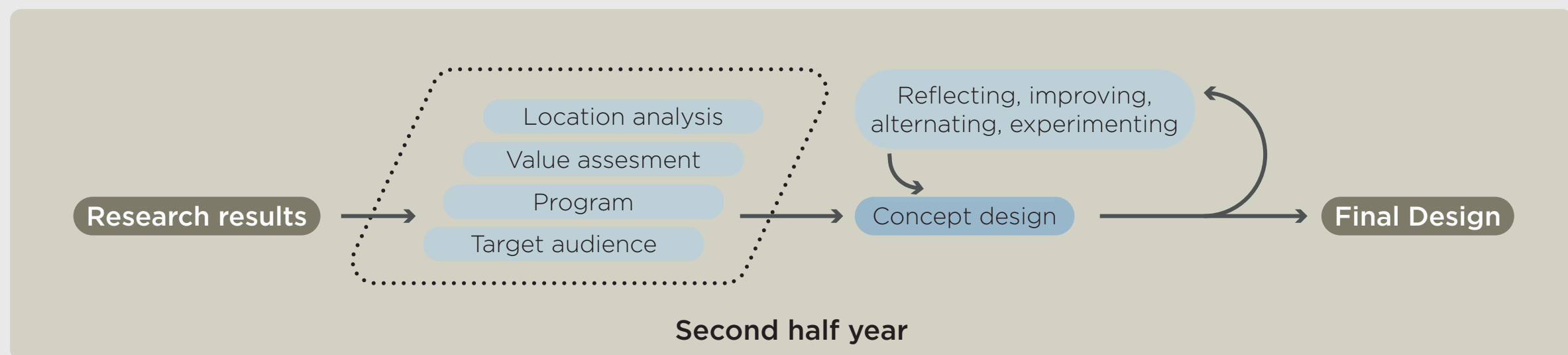
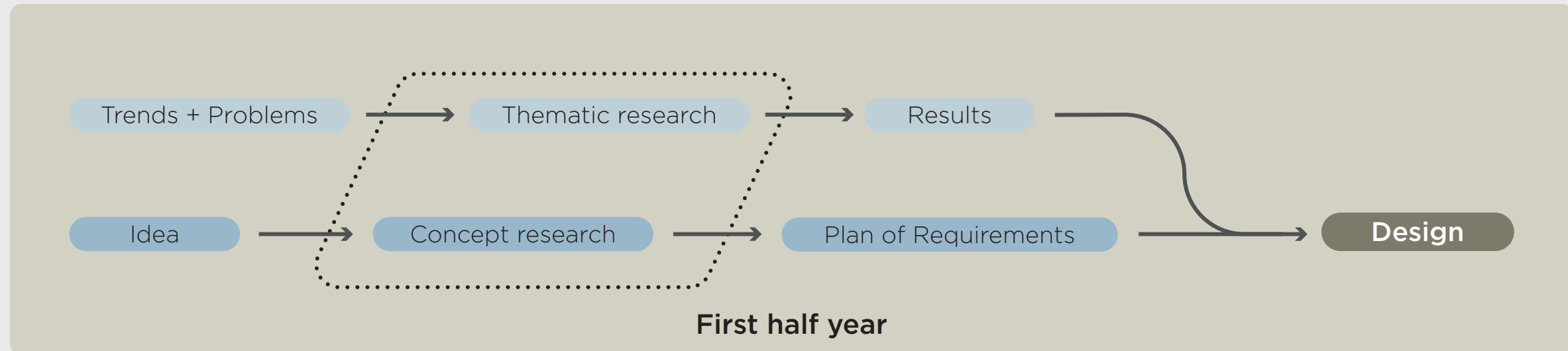
## Fascination

Broad interest in rural landscapes, cultural heritage and sustainable initiatives



# Prelude

## Planning



Structure of my graduation year



---

# **PROBLEM STATEMENT**

---

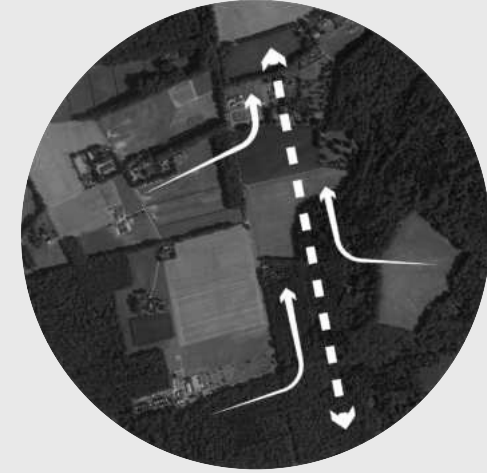


# Challenges of the contemporary countryside

Problem statement

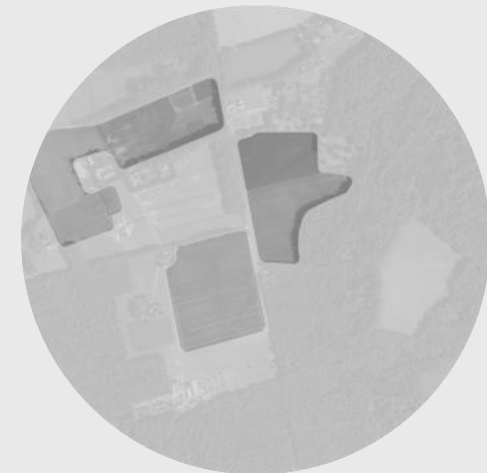
## Rural depopulation + ageing communities

a national demographical problem that is emphasized in rural areas



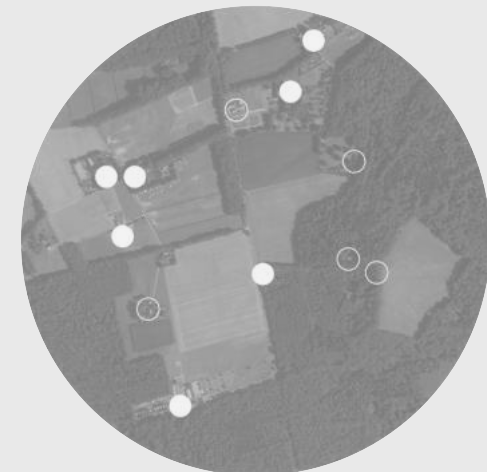
## Polluting agricultural practices

degradation of ecosystems and emission of greenhouse gasses create an urgent need for sustainable transition



## Missing economic perspectives for cultural heritage

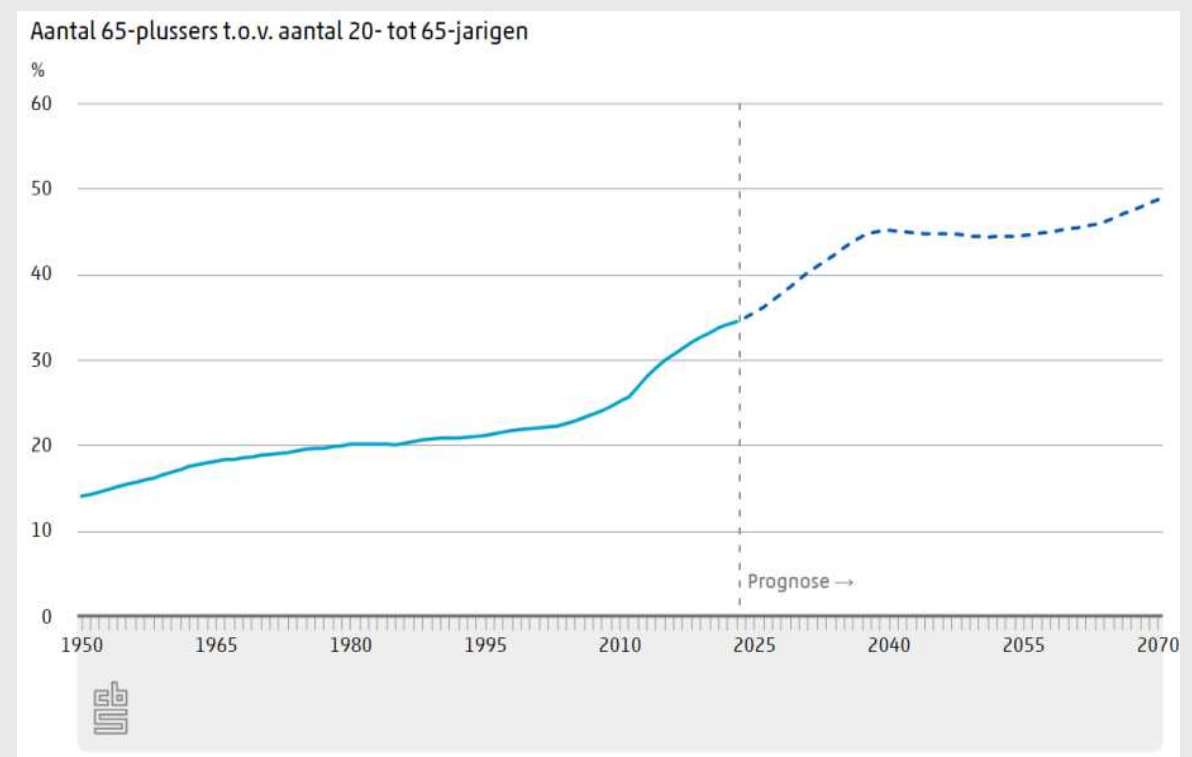
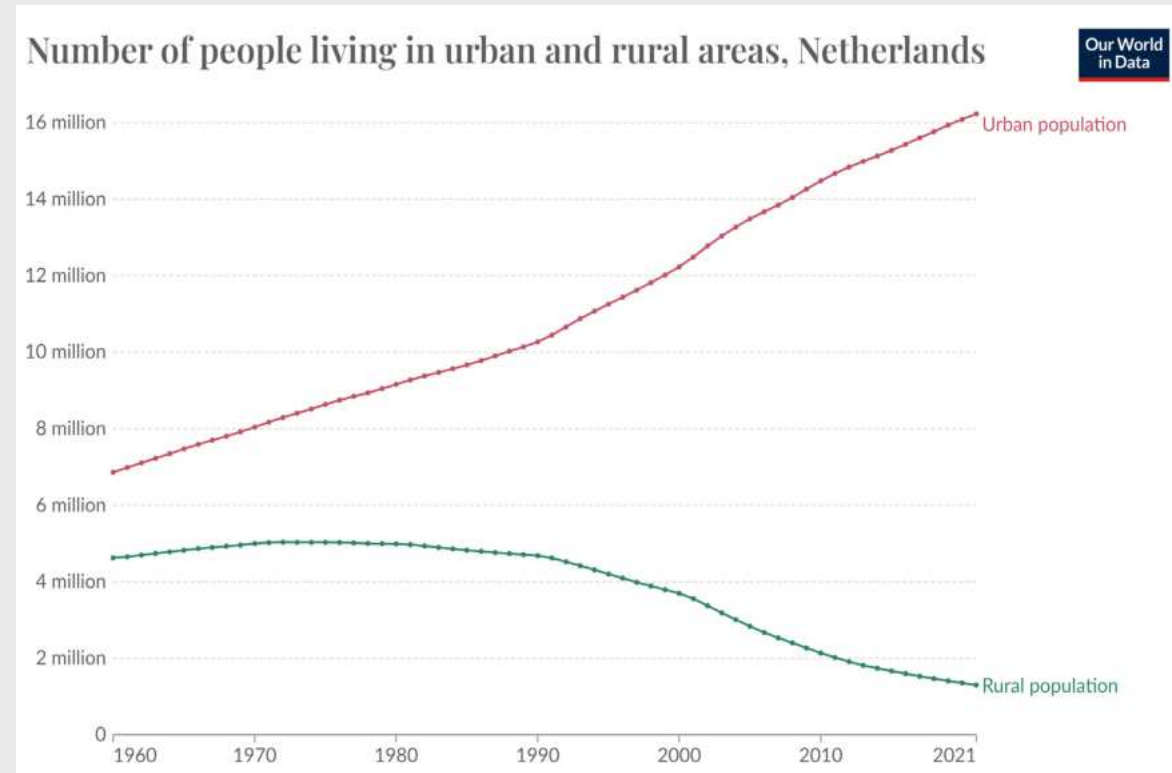
need for a viable business case and valuable preservation





# Rural depopulation + ageing communities

## Problem statement



## Trends: Urbanisation and Ageing

Mid-20<sup>th</sup> century



# Challenges of the contemporary countryside

## Problem statement

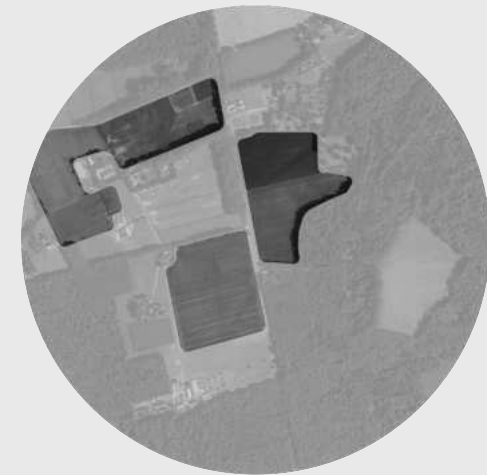
### **Rural depopulation + ageing communities**

a national demographical problem that is emphasized in rural areas



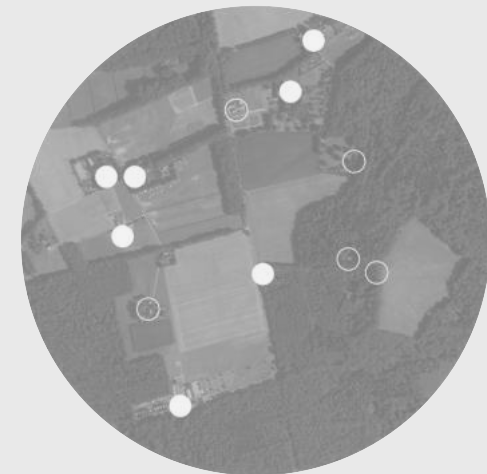
### **Polluting agricultural practices**

degradation of ecosystems and emission of greenhouse gasses create an urgent need for sustainable transition



### **Missing economic perspectives for cultural heritage**

need for a viable business case and valuable preservation





# Polluting agricultural practices

Problem statement



**Trends: Land consolidation + Industrialisation**

Moving from a rational to an economic landscape



# Challenges of the contemporary countryside

## Problem statement

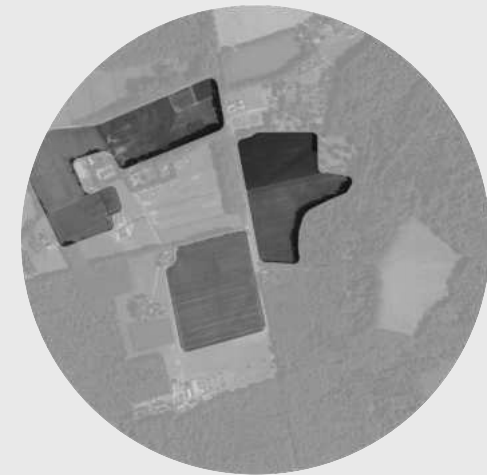
### **Rural depopulation + ageing communities**

a national demographical problem that is emphasized in rural areas



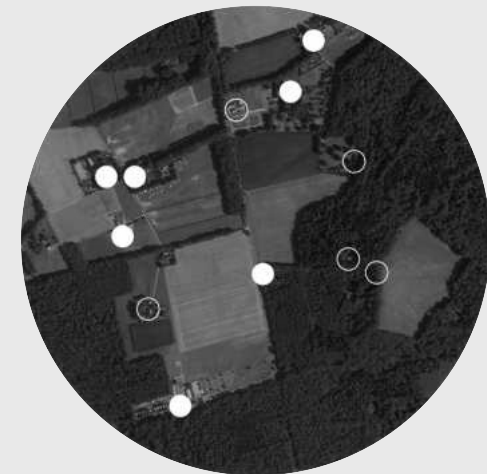
### **Polluting agricultural practices**

degradation of ecosystems and emission of greenhouse gasses create an urgent need for sustainable transition



### **Missing economic perspectives for cultural heritage**

need for a viable business case and valueable preservation





# Missing economic perspectives for cultural heritage

Problem statement



**Adaptive re-use: repurposing architecture + landscapes to preserve their future.**

Predikheren, Mechelen | Landschaftspark, Duisburg



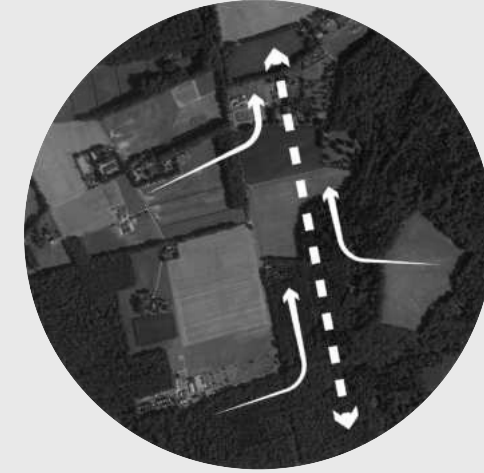
# Challenges of the contemporary countryside

## Problem statement

### Rural depopulation + ageing communities

a national demographical problem that is emphasized in rural areas

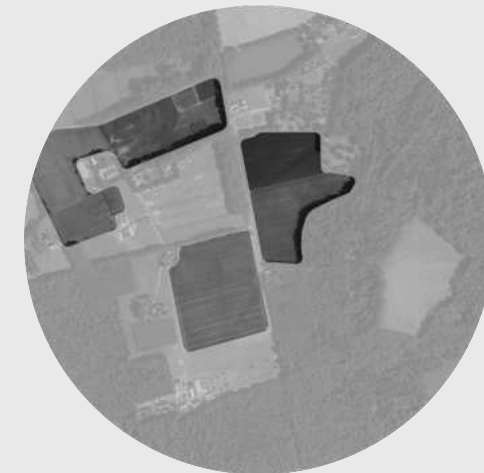
Trends of urban migration and ageing led to rural depopulation



### Polluting agricultural practices

degradation of ecosystems and emission of greenhouse gasses  
create an urgent need for sustainable transition

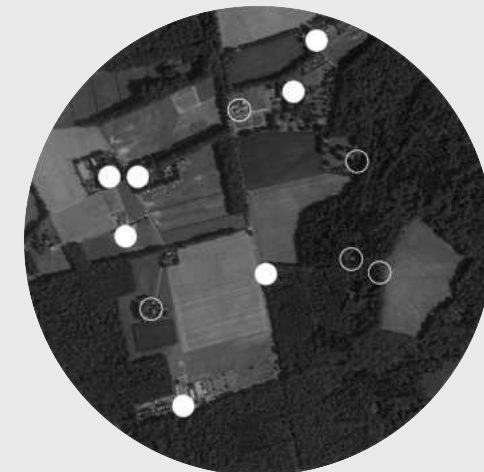
industrial agriculture fuelled by mechanization and industrialisation  
results in large monocultures leading to biodiversity loss



### Missing economic perspectives for cultural heritage

need for a viable business case and valueable preservation

rural heritage sites lack perspectives that prevent decay and  
abandonment



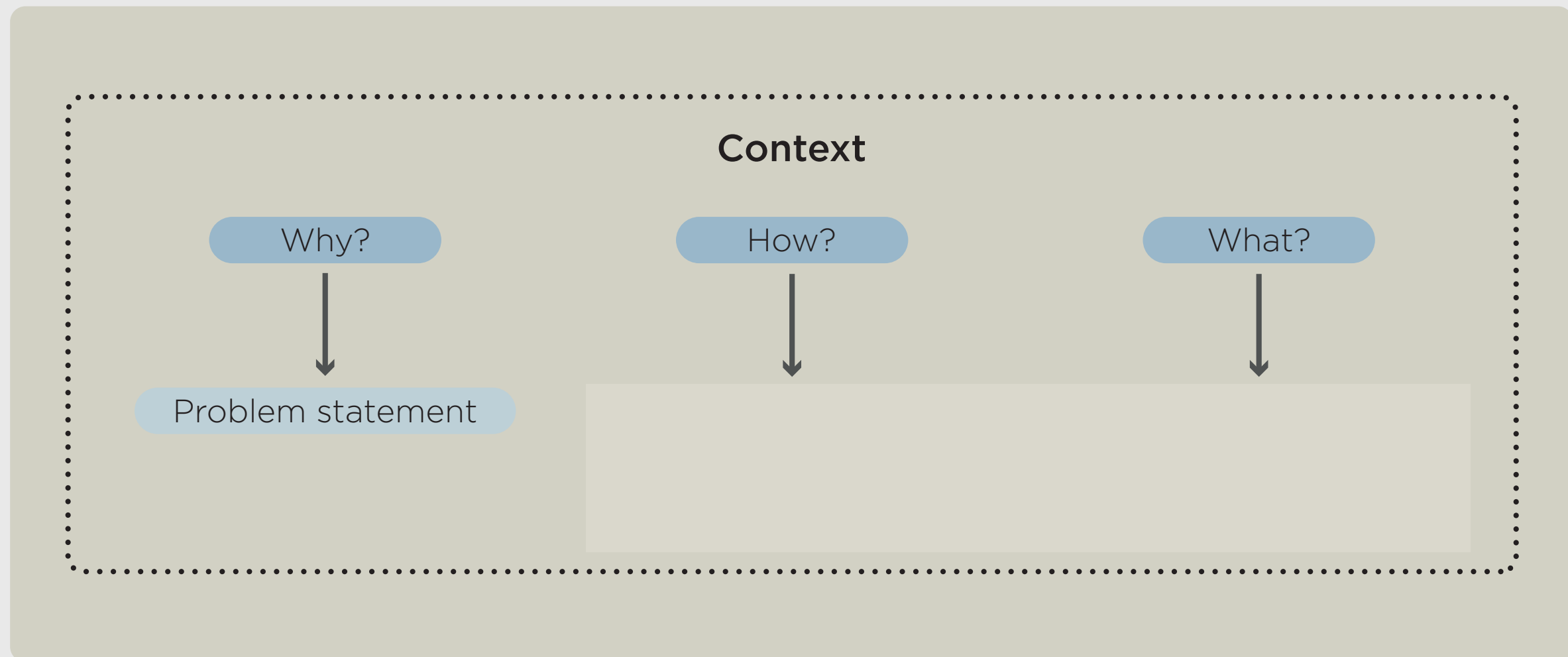


# OBJECTIVE



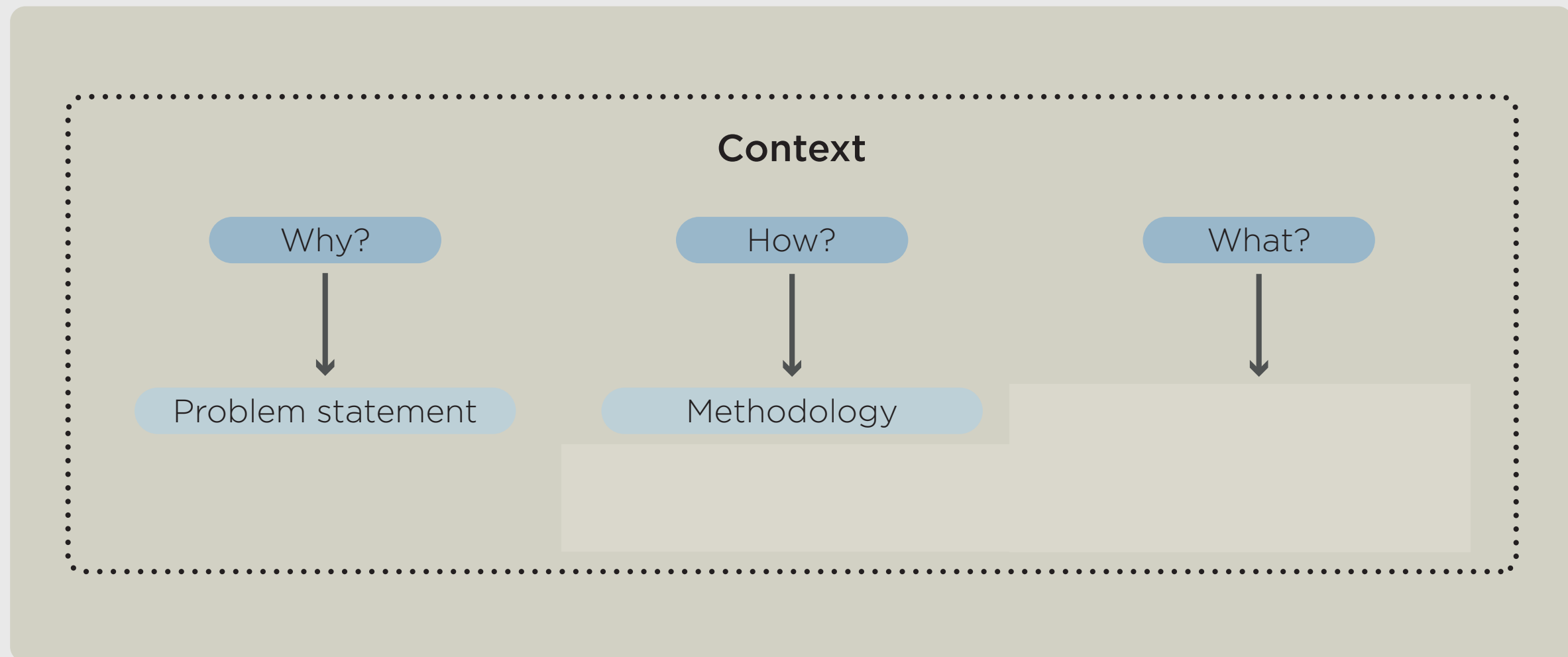
# Objective

Graduation framework



# Objective

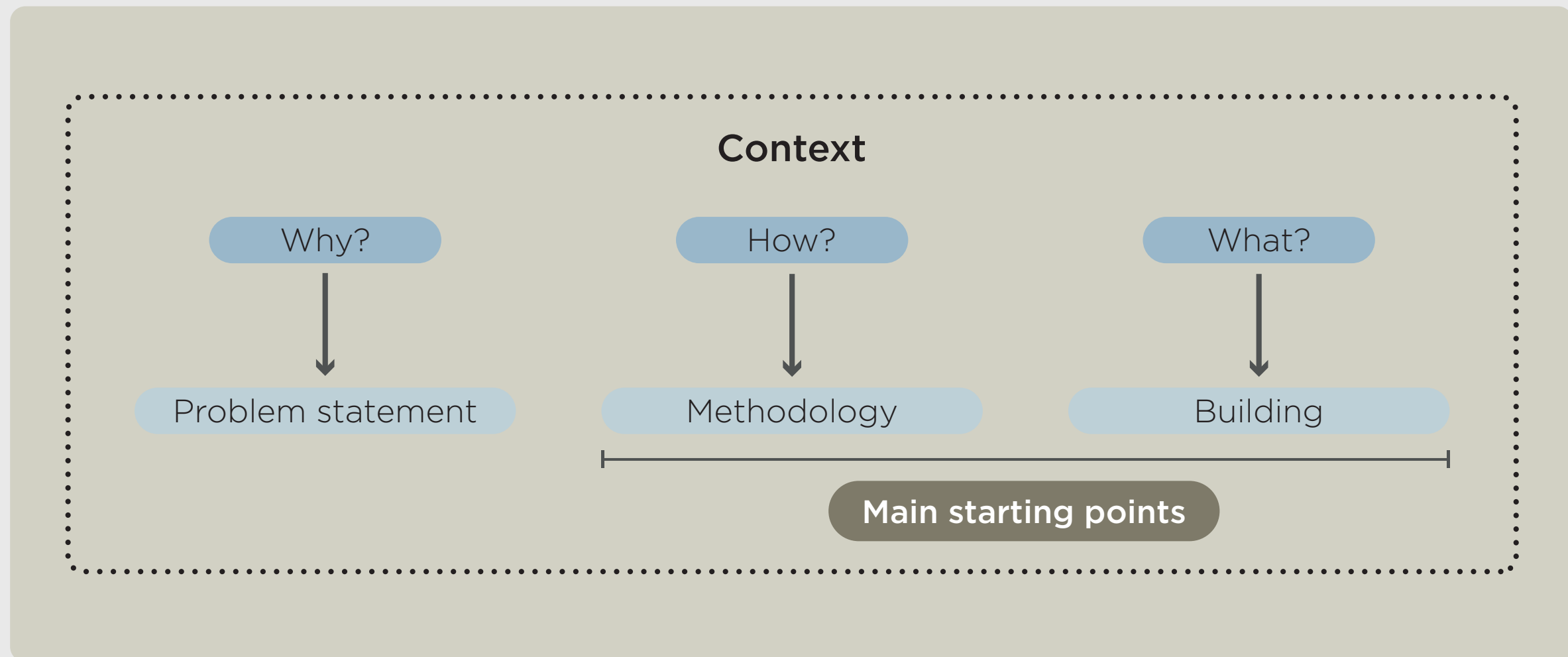
Graduation framework





# Objective

Graduation framework



# Potential of the [contemporary] countryside

Design objective



The objective of the graduation project is to *develop a methodology* for the *revitalisation of Dutch countryside areas*. By focussing on a specific design location, the methodology can be projected on other case studies afterwards.

Main objective



# Potential of the [contemporary] countryside

Design objective

## Management and production of renewable natural resources

buildings out of a locally sourced biobased material flow, consisting of forestry and agriculture (by-products)



## Active communities

creating a space fitted for a specific target audience, with architecture fitted to their needs and a focus on engagement for a sense of belonging



## Culture, tourism and education

preserved cultural heritage with a viable strategy for the upcoming decades by providing economical activities



# Potential of the [contemporary] countryside

Design objective

## Management and production of renewable natural resources

buildings out of a locally sourced biobased material flow, consisting of forestry and agriculture (by-products)



## Active communities

creating a space fitted for a specific target audience, with architecture fitted to their needs and a focus on engagement for a sense of belonging



## Culture, tourism and education

preserved cultural heritage with a viable strategy for the upcoming decades by providing economical activities





# Potential of the [contemporary] countryside

Design objective

## Management and production of renewable natural resources

buildings out of a locally sourced biobased material flow, consisting of forestry and agriculture (by-products)



## Active communities

creating a space fitted for a specific target audience, with architecture fitted to their needs and a focus on engagement for a sense of belonging



## Culture, tourism and education

preserved cultural heritage with a viable strategy for the upcoming decades by providing economical activities



# Potential of the [case-study] countryside

Design objective

## Management and production of renewable natural resources

buildings out of a locally sourced biobased material flow, consisting of forestry and agriculture (by-products)



## Active communities

creating a space fitted for a specific target audience, with architecture fitted to their needs and a focus on engagement for a sense of belonging



## Culture, tourism and education

preserved cultural heritage with a viable strategy for the upcoming decades by providing economical activities





---

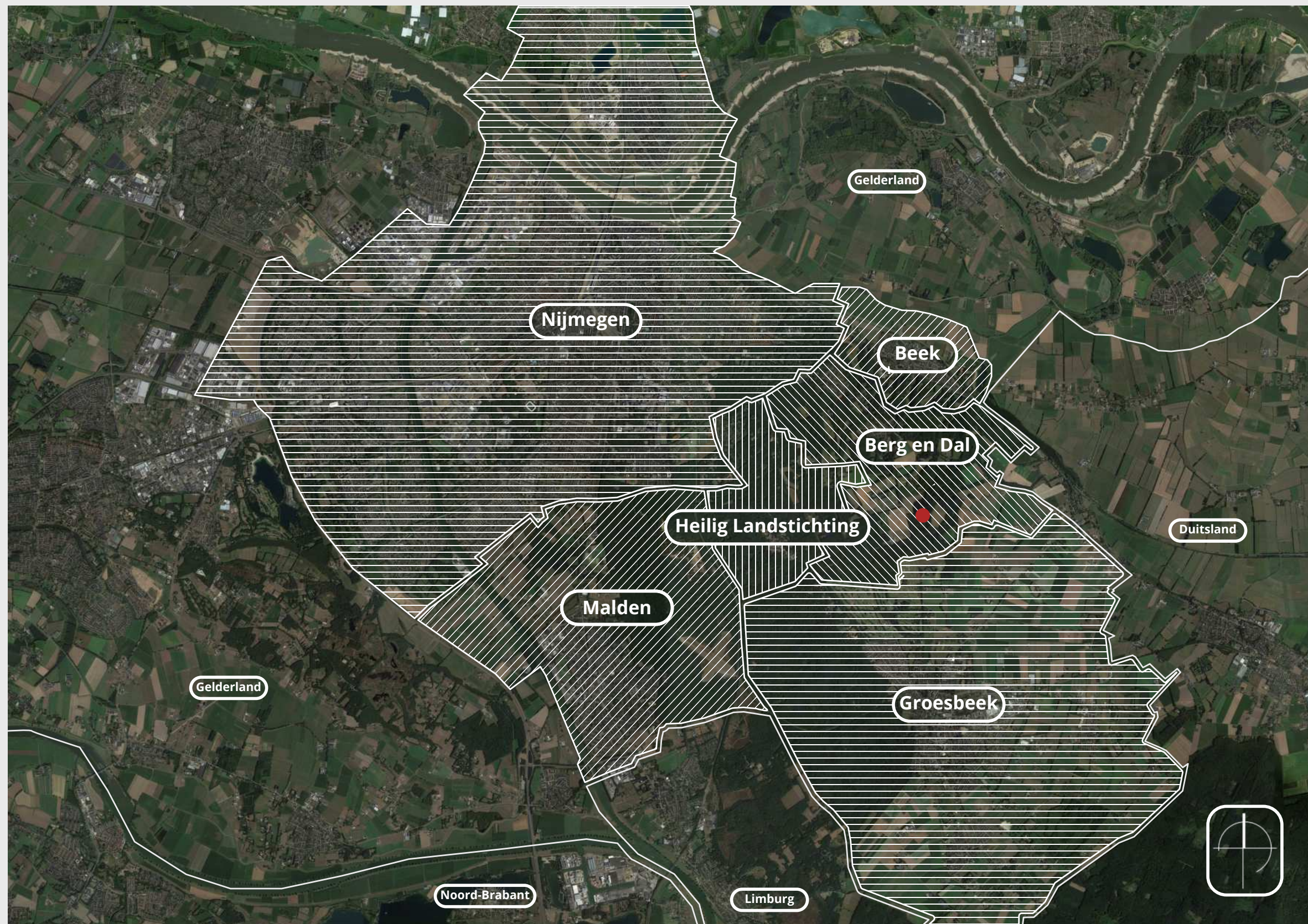
# CONTEXT

---



# Context

Case-study

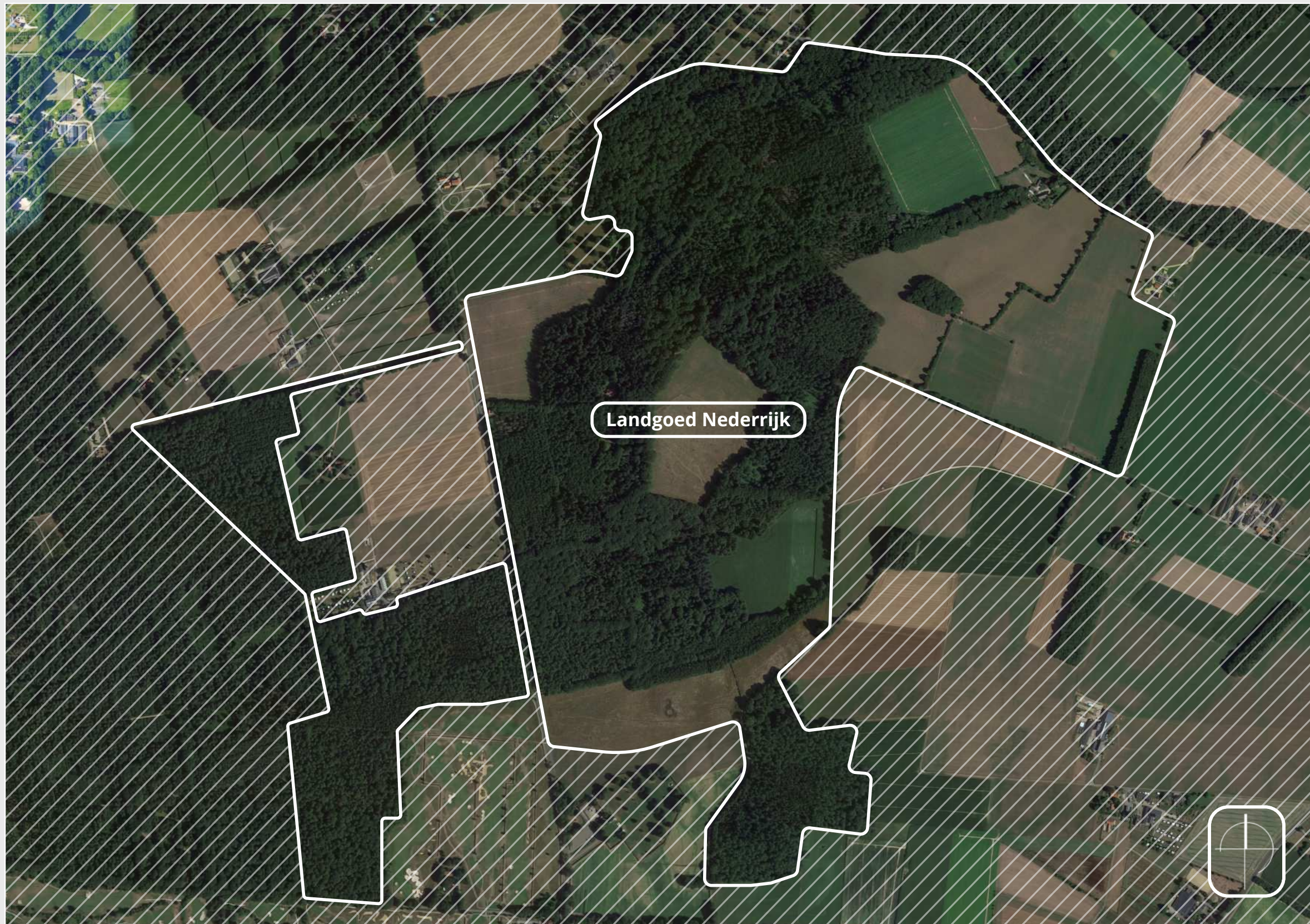


**Nijmegen**  
Macro scale



# Context

Case-study



**Country estate Nederrijk**

Macro scale



# Context

Case-study



**Jurgens family**  
Macro scale



# Context

## Case-study

erdag 15 Po-  
oeslag, tel-  
dags 11 uur,  
n den Heer  
ubliek

**VERKOOPEN:**

ILAND, ge-  
ag te Aam,  
er Sectie C.  
0 H.A.  
lelijk na den

il 1917.  
Januari 1917.  
gen zijn te  
re van voor-

**ekers.**

w  
omen  
onstruiken

mbazen.

erij

lappelen ?

s, die uitge-  
ie, bekomen  
reven wordt,  
agten

i.h. Boomgaardstuk o.d. Park.

**Houtverkoop**

Dinsdag 30 Januari 1917  
'smiddags 1½ uur in Café  
VERSTEGEN te Berg en Dal

**VERKOOPING van:**

a. 1 pere. Beuken- en Eiken-  
snoeihout i.d. Valkenlaagte en  
Holdeurn; b. 71 pere. geh.  
Dennen geschikt voor Balken,  
Slieten en Brandhout aldaar; c.  
13 pere. Dennen dunsel a.d. weg  
over de Zevenheuvelen; d. 8  
vint drooge Bossen in 4 mijten  
aldaar; e. 3 pere. Beukensnoei-  
hout b.h. huis v. Hermssen in  
de Valkenlaagte; f. 2 pere. Klos-  
sen b.d. Pannenfabriek; g. 2  
pere. geh. Dennen b.h. Boonen-  
stakenboschje; h. Tophout van  
5000 Dennen in div. pere. bij  
Ariaans op den Boxheuvel, alles  
op het landgoed Nederrijk onder  
Groesbeek; een zware Den voor  
het Heerenhuis op Rhätla.

De onder a en b genoemde  
pere. liggen binnen de om-  
heining, die onder c tot h buiten  
de omheining.

Voor bezichtiging v.h. binnen  
de omheining gelegen Hout is  
de ingang b.d. nieuwe woning  
v.d. jachtopzichter Visser a.d.  
weg over de Zevenheuvelen, die  
evenals de boschwachter Th.  
Hermssen i.h. Nederrikschwald

huis, 1 per  
Bergakker, 1  
den Kleinen  
heer J. M. J.  
hout o.h. C  
3de en 4de N  
heer L. van V  
Wilghout en  
wilgen gese  
makers, o.d.  
A. v. de W  
1 pere. Wilg  
pere. Wilgho  
a.d. Straat;  
van Olst, J. f  
en Peppelen  
weide, 20 Pr  
Pas o.h. Spi  
Wed. A. O.  
Elshout o.d.  
weide.

**Onder**

Voor Mej.  
termans, 1  
Hoekje b.d.

**Onder**

Voor den  
3 Lindebo  
pere. Appell  
gaard b.z. h

**Onder**

Voor de  
Angeren, ee  
o.d. Dries;  
Rossum, 4  
Steegske; V  
C. van Straa

GT 824 des nam. 2 uur, in 't café BRINKS  
te Zeddam, ten overstaan van  
Notaris A. H. van ROMONDt, te  
Didam. 815

**Bericht van Inzet**

De VRUCHTBARE HOFSTEDE,  
gelegen te Wehl, in Nieuw-Wehl,  
totaal groot 1.68.05 H.A., eigendom  
van den Heer W. JANSEN is ingezet  
als volgt:

Perc. I Huisperceel 1.01.50 H.A. op  
f 4130.—

Perc. II Weiland, 0.66.55 H.A. op  
f 1282.36.

Massa op f 5261.—

TOESLAG Maandag 3 Januari 1938,  
des nam. 2 uur in het Café van den  
Heer H. A. VAN BEEK, te WEHL,  
in Nieuw-Wehl, ten overstaan van  
Notaris A. H. VAN ROMONDt te  
Didam. 825

**Houtverkoop**  
**GROESBEEK**

Woensdag, 29 December 1937 's midd.  
tén uur in Café VERSTEGEN te  
BERG EN DAL,

**VERKOOPING**

van: 109 perc. SLIETEN, 40 perc.  
BOONSTAKEN, 8 perc. BALK-  
HOUT, 3 perc. eiken WEIPALEN,  
— alles gelegen op het landgoed  
„NEDERRIJK” a. d. Zevenheuvelen-  
weg, nabij Berg en Dal. — Bezich-  
ting dagelijks behalve op eersten  
Kerstdag. — Aanwijzing door den  
opzichter J. VISSERS, aldaar.

F. VAN HAAREN & ZOON  
Rentmeesters  
Beek bij Nijmegen

846

**Houtverkoop**

**NIJMEEGSCHE VEREENIGING VOOR  
NATUURSCHOON**

**Excursie naar het landgoed Nederrijk**

Bovengenoemde vereeniging hield Zaterdag,  
onder leiding van den voorzitter, den heer mr.  
B. G. A. Smeets, een uitstekend geslaagde ex-  
cursie naar het landgoed Nederrijk onder Berg  
en Dal. Onder de ruim 50 aanwezigen was ook  
de commissaris der Koningin in Gelderland,  
mr. S. Baron van Heemstra. Ook enkele raads-  
leden hadden van hun belangstelling doen blij-  
ken. De deelnemers werden op het landgoed  
ontvangen door den heer R. Jurgens-Prinzen,

Forestry as a main income: distribution of timber over the years  
Papers from 1916-1956



# Context

Case-study



**Missing economic perspective**

Current status



# Evolution of the Nederrijk countryside

Context



primeval forest  
150.000 B.C.



reclamations  
0 - 1890



country estates  
1890 - 1930



degradation  
1960 - 2024



circular countryside  
2024

---

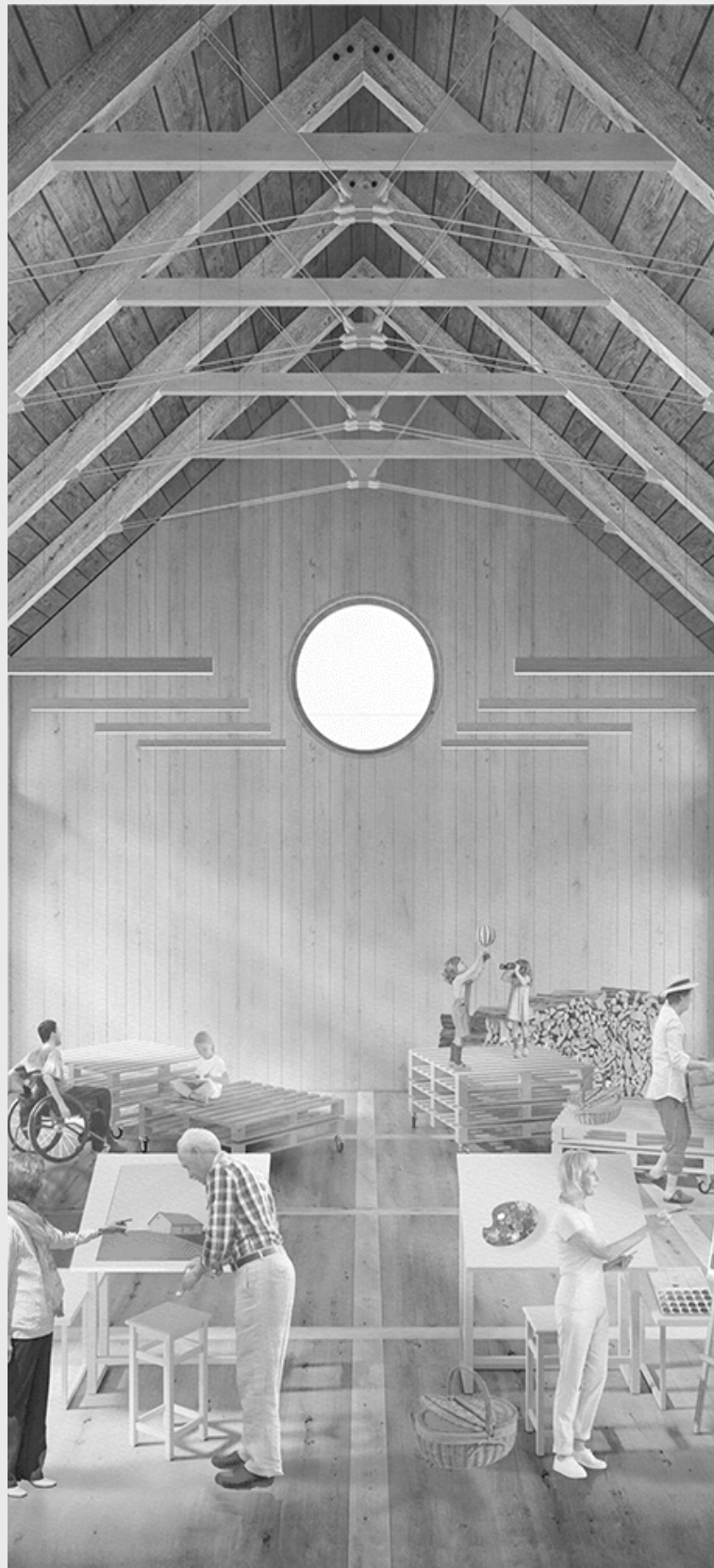
# **HOW? METHODOLOGY**

---



# How?

## Methodology



### Design

How can Dutch rural countryside areas be revitalised and transformed into multifunctional, ecological sustainable and community-oriented spaces, while preserving cultural heritage and addressing contemporary challenges?

Why?

How?

What?

## Research questions

# How?

## Methodology



### Design

How can Dutch rural countryside areas be revitalised and transformed into multifunctional, ecological sustainable and community-oriented spaces, while preserving cultural heritage and addressing contemporary challenges?

Why?

How?

What?

⋮

### Thematic

To what extent can the local and nature-inclusive cultivation of crops and tree varieties be utilized as a sustainable and viable source of biobased building materials for the construction of a building at the country estate Nederriijk?

Tools

Context

Interplay

## Research questions



# Results in three domains

## Thematic research

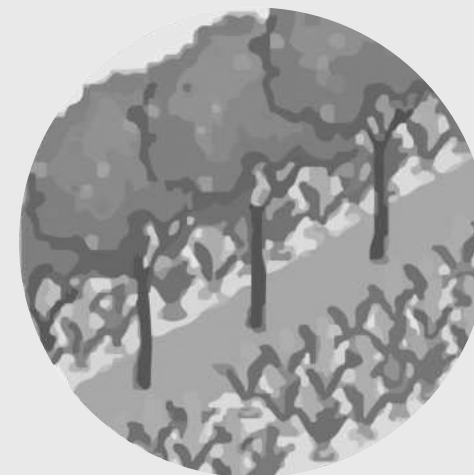
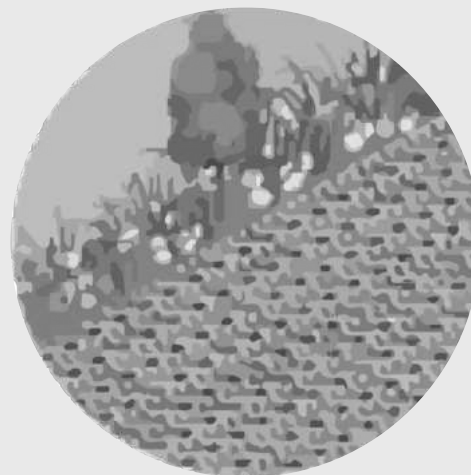
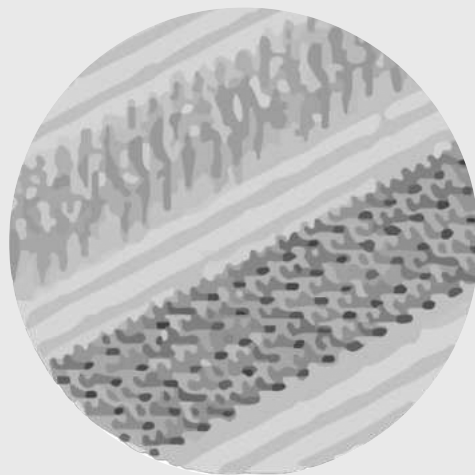
### Thematic Research

The thematic research aims to explore the potential of locally sourced building materials, with a particular focus on sustainable cultivation as a resource for biobased construction materials.

What are nature-inclusive methods for agriculture?

What is the botanical composition of the case study location, considering the interplay between soil properties, available vegetation and climate factors?

What crop and tree types are suitable for effective cultivation as biobased building materials in consideration of the design location?



---

# **HOW? RESULTS**

---



# Results

Nature-inclusive agriculture

**Agroforestry system**



**Buffer zones**



**Relay strip intercropping**



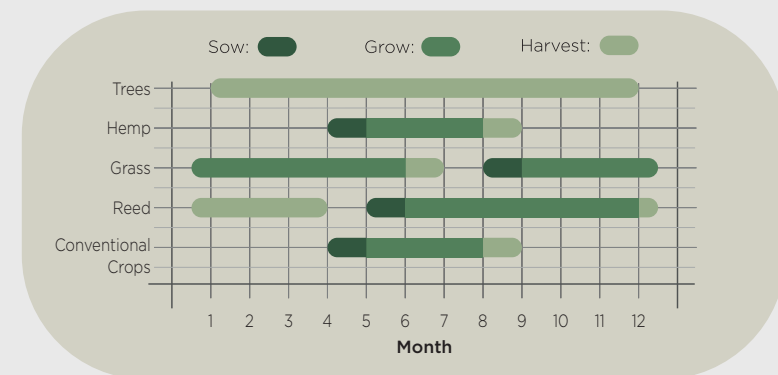
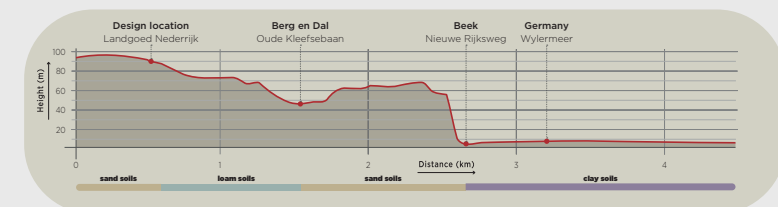
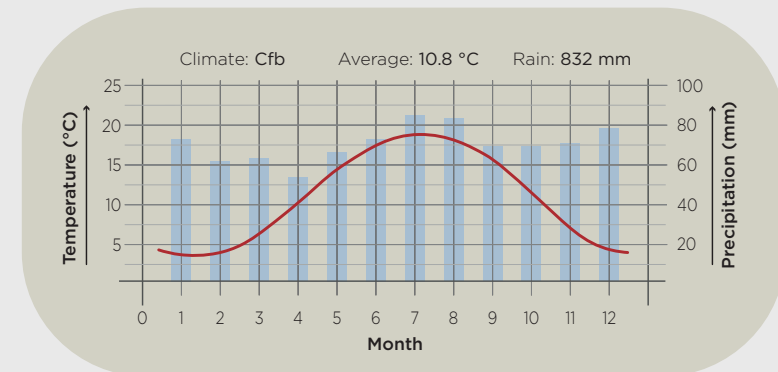
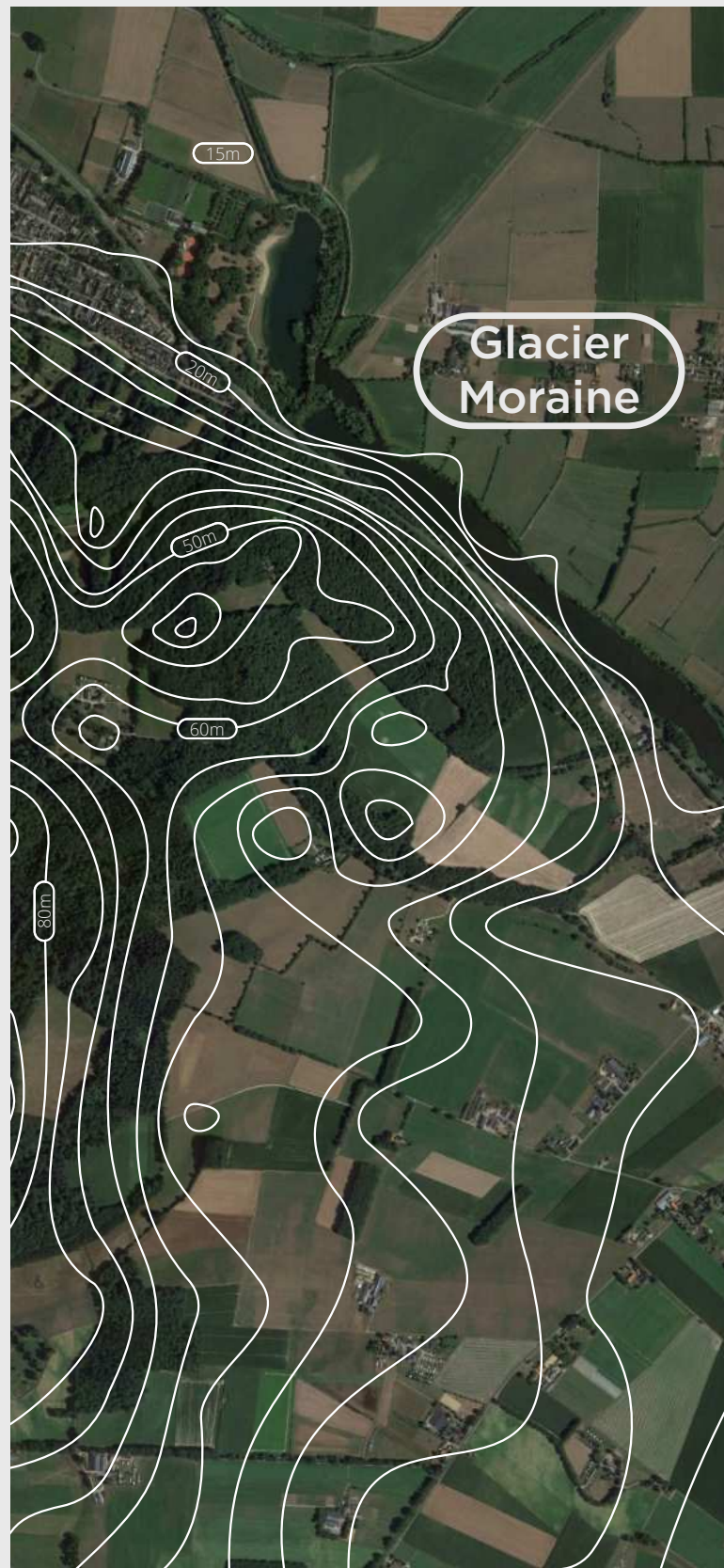
**High thinning**





# Results

## Case study analysis



### Geographical morphology

soil types - height profiles - landscape usage - ecology division - climate - growing seasons



# Research conclusion

Thematic Research

## High thinning



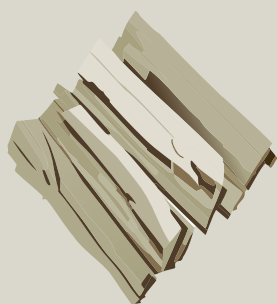
maintaining forest

waste flow

**obtaining wood**



Beams



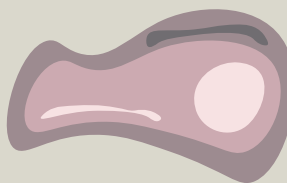
Planks, shell parts



Grass insulation



Reed bunches



Loam stucco

**Utilize agriculture as a viable source of biobased buidling materials**

Results to include + apply in the design

# Research conclusion

## Thematic Research

| Construction                   | Trees<br>Beech | Copper beech  | Oak           | Spruce        | Pine                                                                                                                                                                                                                                                                                          | Larch                                                                                                                                                       | Acacia                                                                                                                                               | Chestnut                                                                                                                                                  | Birch | Poplar        | Linden | Alder         | Willow | Variety of species                                                                                                                                                                                                                                                                               | Plants<br>Grains | Grass | Corn | Loam | Hemp                                                                        | Flax                                                                             | Cattail | Miscanthus | Reed |  |
|--------------------------------|----------------|---------------|---------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------|--------|---------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------|------|------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------|------------|------|--|
| Availability                   | +++            | +++           | +++           | ++            | ++                                                                                                                                                                                                                                                                                            | +                                                                                                                                                           | +                                                                                                                                                    | +                                                                                                                                                         | ++    | +             | +      | +             | +      | +++                                                                                                                                                                                                                                                                                              | ++               | +++   | ++   | ++   | Relay strip<br>intercropping                                                | Relay strip<br>intercropping                                                     | -       | +          | ++   |  |
| Collection/ cultivation method | High thinning  | High thinning | High thinning | High thinning | High thinning                                                                                                                                                                                                                                                                                 | High thinning                                                                                                                                               | High thinning                                                                                                                                        | High thinning                                                                                                                                             |       | High thinning |        | High thinning |        |                                                                                                                                                                                                                                                                                                  |                  |       |      |      |                                                                             |                                                                                  |         |            |      |  |
| Process                        | Identical      | Identical     | Identical     | Identical     | <div><br/>↓<br/>Yield through waste/<br/>sawing<br/>↓<br/>Sawed to size<br/>↓<br/>Beams<br/>↓<br/>Drying<br/>↓<br/></div> | <div><br/>↓<br/>Side flow<br/>↓<br/>Wood fibres<br/>↓<br/>Insulation</div> | <div><br/>↓<br/>Side flow<br/>↓<br/>Planks<br/>↓<br/>Drying</div> | <div><br/>↓<br/>Side flow<br/>↓<br/>Shell parts<br/>↓<br/>Drying</div> |       | Identical     |        | Identical     |        | <div><br/>↓<br/>Yield through waste/<br/>sawing<br/>↓<br/>Sawed to size<br/>↓<br/>Beams<br/>↓<br/>Drying<br/>↓<br/></div> | X                | X     | X    | X    | Hempcrete<br>Local<br>-<br>-<br>+++<br>++<br>++<br>+++<br>Construction<br>+ | Flax profile<br>Factory<br>-<br>-<br>++<br>++<br>+<br>+++<br>Construction<br>+++ | X       | X          | X    |  |
| Product                        | Beams          | Beams         | Beams         | Beams         | Beams                                                                                                                                                                                                                                                                                         | Beams                                                                                                                                                       | Beams                                                                                                                                                | Beams                                                                                                                                                     | x     | Beams         | X      | Beams         | X      | CLT (Nailed)                                                                                                                                                                                                                                                                                     | X                | X     | X    | X    | Hempcrete                                                                   | Flax profile                                                                     | X       | X          | X    |  |
| Process location               | On site        | On site       | On site       | On site       | On site                                                                                                                                                                                                                                                                                       | On site                                                                                                                                                     | On site                                                                                                                                              | On site                                                                                                                                                   |       | On site       |        | On site       |        | On site                                                                                                                                                                                                                                                                                          |                  |       |      |      | Local                                                                       | Factory                                                                          |         |            |      |  |
| Process energy usage           | -              | -             | -             | -             | -                                                                                                                                                                                                                                                                                             | -                                                                                                                                                           | -                                                                                                                                                    | -                                                                                                                                                         |       | -             |        | -             |        | -                                                                                                                                                                                                                                                                                                |                  |       |      |      | -                                                                           | -                                                                                |         |            |      |  |
| Flow interference              | -              | -             | -             | -             | -                                                                                                                                                                                                                                                                                             | -                                                                                                                                                           | -                                                                                                                                                    | -                                                                                                                                                         |       | -             |        | -             |        | -                                                                                                                                                                                                                                                                                                |                  |       |      |      | -                                                                           | -                                                                                |         |            |      |  |
| Economic Chain                 | +++            | +++           | +++           | +++           | +++                                                                                                                                                                                                                                                                                           | ++                                                                                                                                                          | +                                                                                                                                                    | +                                                                                                                                                         | +++   | +++           |        | ++            | +      | +++                                                                                                                                                                                                                                                                                              | ++               | +     | +    | +    | +++                                                                         | ++                                                                               |         |            |      |  |
| Reuseability                   | ++             | ++            | ++            | ++            | ++                                                                                                                                                                                                                                                                                            | ++                                                                                                                                                          | ++                                                                                                                                                   | ++                                                                                                                                                        |       | ++            |        | ++            |        | ++                                                                                                                                                                                                                                                                                               | ++               |       |      |      | ++                                                                          | ++                                                                               |         |            |      |  |
| CO2 capture                    | ++             | ++            | ++            | ++            | ++                                                                                                                                                                                                                                                                                            | ++                                                                                                                                                          | ++                                                                                                                                                   | ++                                                                                                                                                        |       | ++            |        | ++            |        | ++                                                                                                                                                                                                                                                                                               | ++               |       |      |      | ++                                                                          | +                                                                                |         |            |      |  |
| Fitted for application         | +++            | +++           | +++           | +++           | +++                                                                                                                                                                                                                                                                                           | +++                                                                                                                                                         | +                                                                                                                                                    | +++                                                                                                                                                       |       | +++           |        | +++           |        | +++                                                                                                                                                                                                                                                                                              | +++              |       |      |      | +++                                                                         | +++                                                                              |         |            |      |  |
| Application location           | Construction   | Construction  | Construction  | Construction  | Construction                                                                                                                                                                                                                                                                                  | Construction                                                                                                                                                | Construction                                                                                                                                         | Construction                                                                                                                                              |       | Construction  |        | Construction  |        | Construction                                                                                                                                                                                                                                                                                     |                  |       |      |      | Construction                                                                | Construction                                                                     |         |            |      |  |
| Building physical performance  | +++            | +++           | +++           | +++           | +++                                                                                                                                                                                                                                                                                           | +++                                                                                                                                                         | +                                                                                                                                                    | ++                                                                                                                                                        |       | ++            |        | ++            |        | +++                                                                                                                                                                                                                                                                                              |                  |       |      |      | +                                                                           | +++                                                                              |         |            |      |  |
| (compared to same category)    |                |               |               |               |                                                                                                                                                                                                                                                                                               |                                                                                                                                                             |                                                                                                                                                      |                                                                                                                                                           |       |               |        |               |        |                                                                                                                                                                                                                                                                                                  |                  |       |      |      |                                                                             |                                                                                  |         |            |      |  |



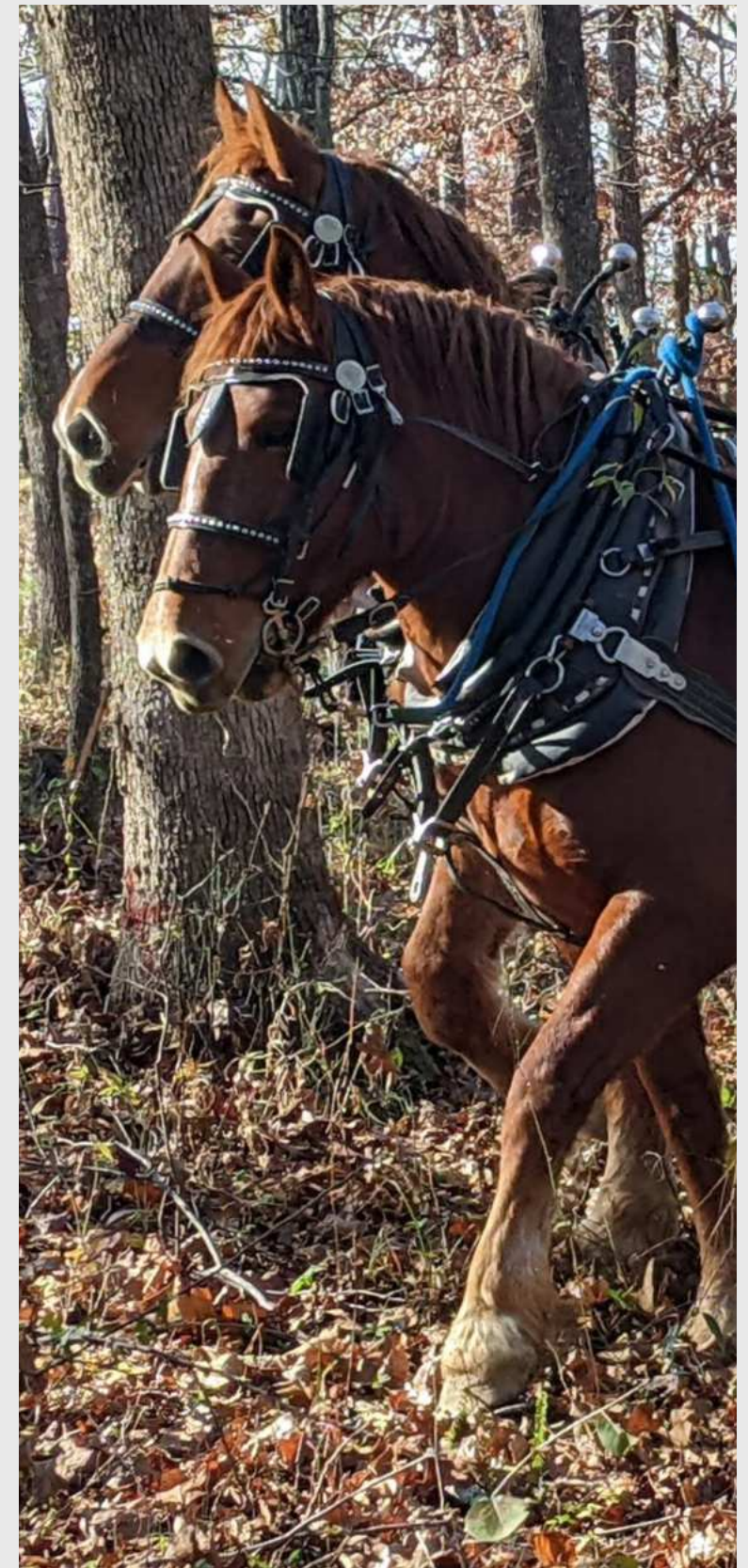
### Material Matrix

Suitable biobased construction materials



## Research conclusion

# Thematic Research



## Timber in abundance

Tree lined avenues + infections



# Research conclusion

Thematic Research



**Harvesting different resources**

Waste flow > agricultural interference



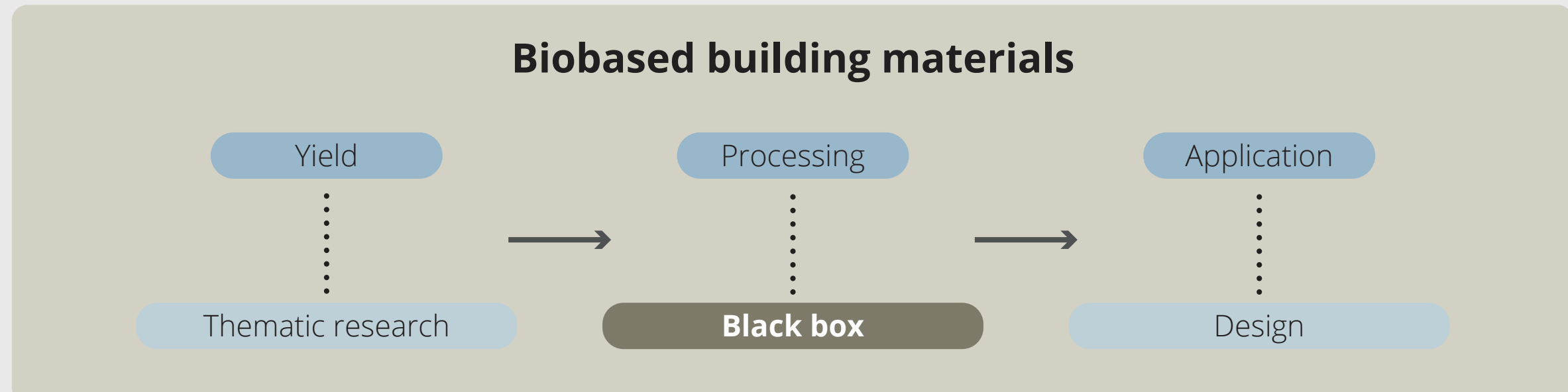
---

# **HOW? PROCESSING**

---

# Processing of materials

Thematic Research

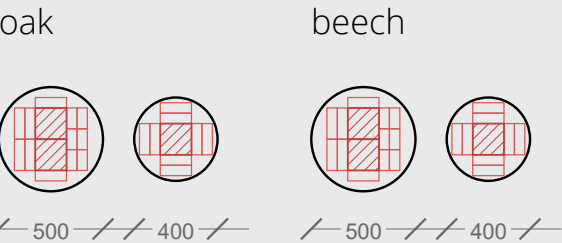




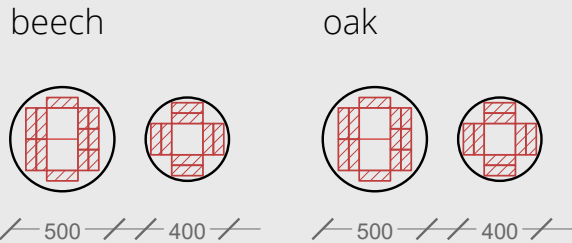
# Resource availability as a starting point

Thematic Research

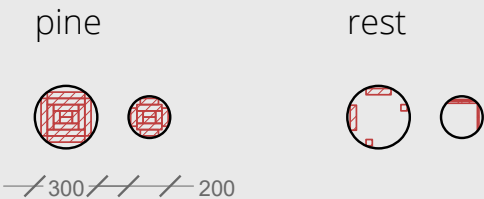
## Outside Construction



## Inside Construction



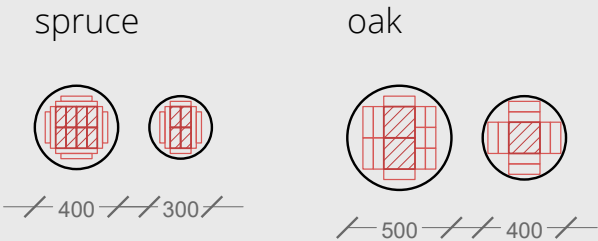
## Outside Fills



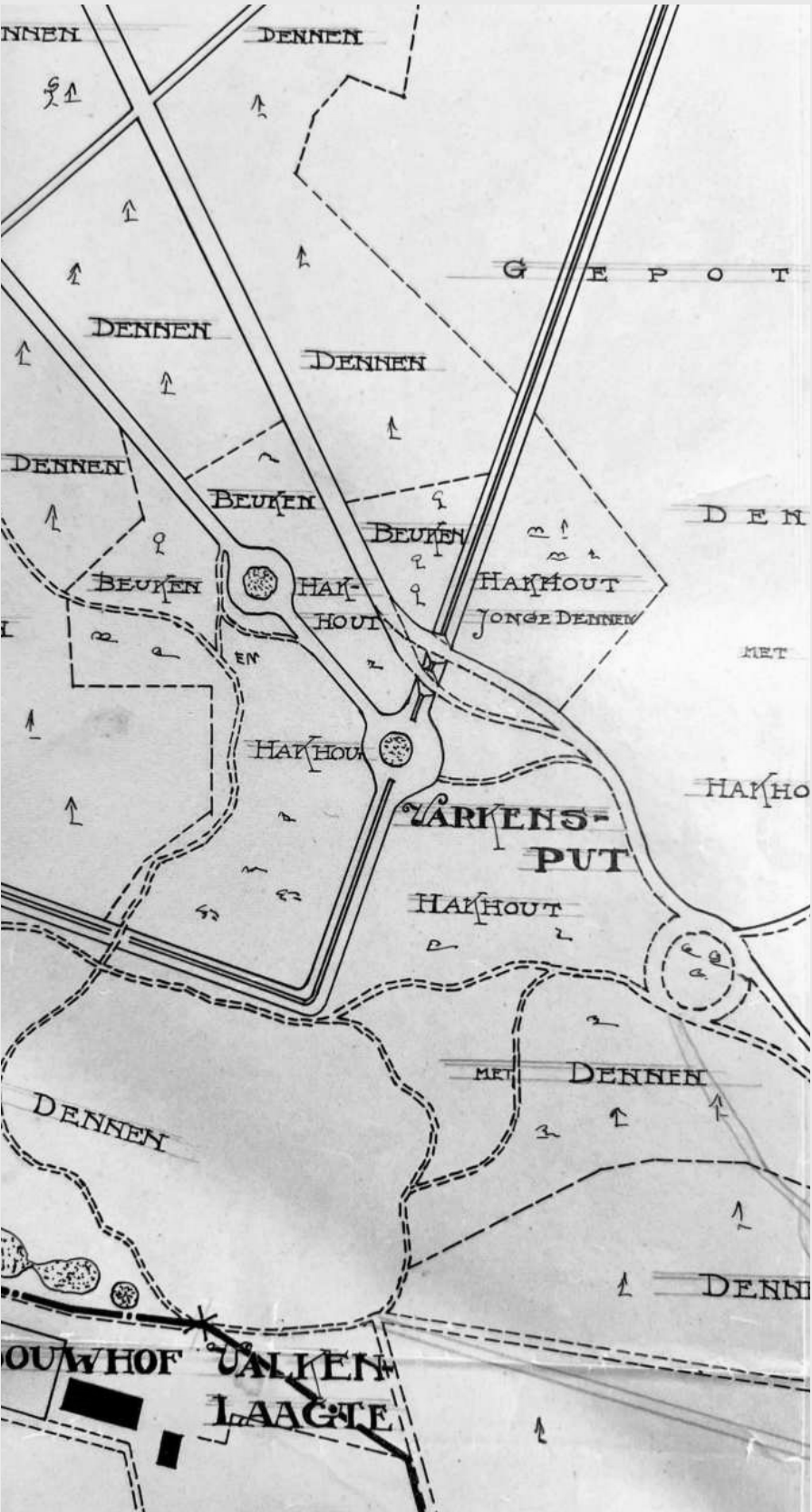
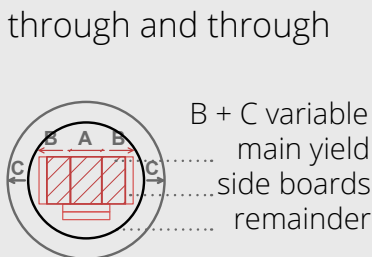
## Inside Finishing



## Roof Truss



## Area Division



## Timber ratio



Timber distribution  
application division



# Resource availability as a starting point

Thematic Research

## Conversion Methods

Thourgh and through



simple  
cheap  
little waste  
shrinkage  
distortion

Tangential



strong  
floor joists  
beams  
decorative  
flame grain

Quarter sawn



expensive  
best quality  
radial sawn  
no shrinkage  
no distortion

Boxed heart



rotten core  
tangetial  
quarter



1. Columns
2. Beams
3. Louvres
4. Timber Frame Construction
5. DLT planks
6. HSB
7. Window frames
8. Roof boarding
9. Facade boarding
10. Foundation boarding
11. Shingles
12. Interior wood/ fire wood

core  
construction



middle  
frames



bark  
cladding



**Timber distribution**  
sawing division



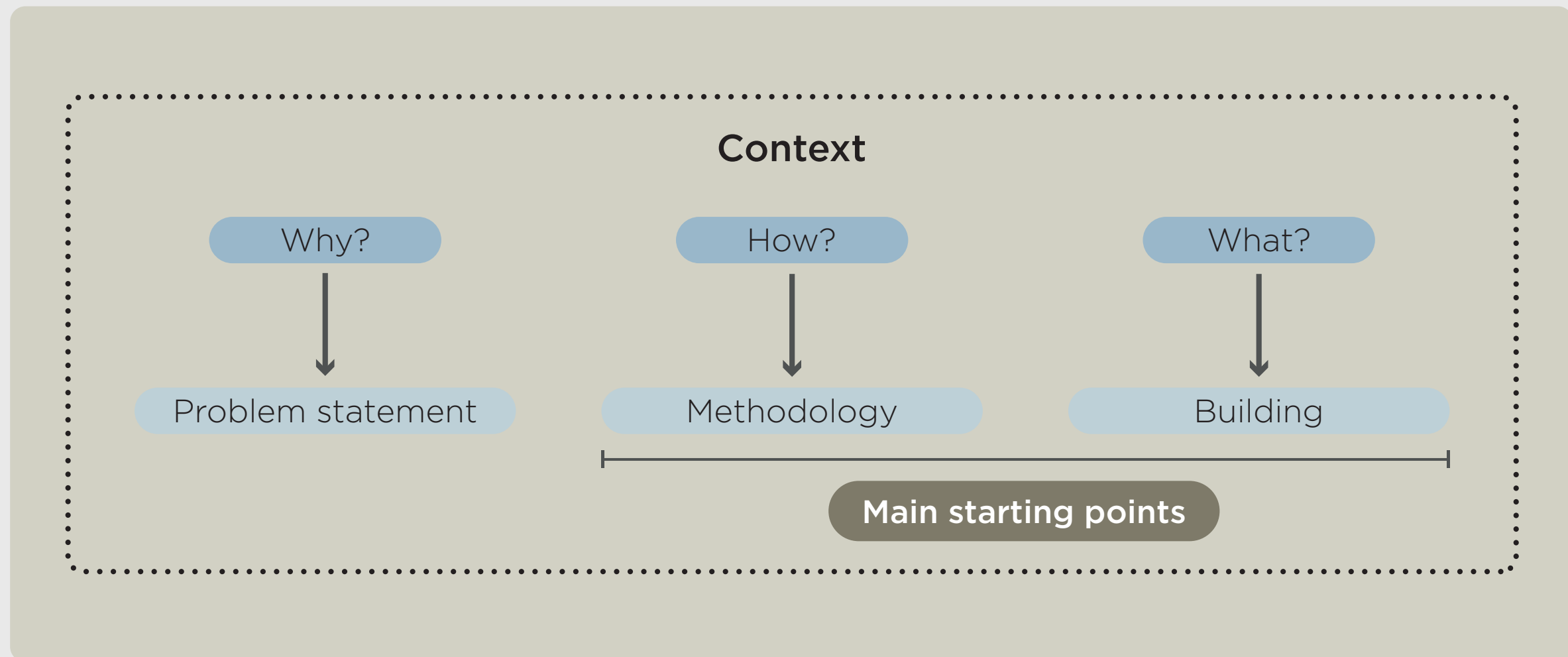
---

# **WHAT? DESIGN**

---

# Objective

Graduation framework





# What?

Site analysis

## What?

What is going to be redeveloped?

⋮

What is going to be built?

# Value Assessment

Site analysis

macro

meso

micro



Coach house



Barn



Porter house



Forester house

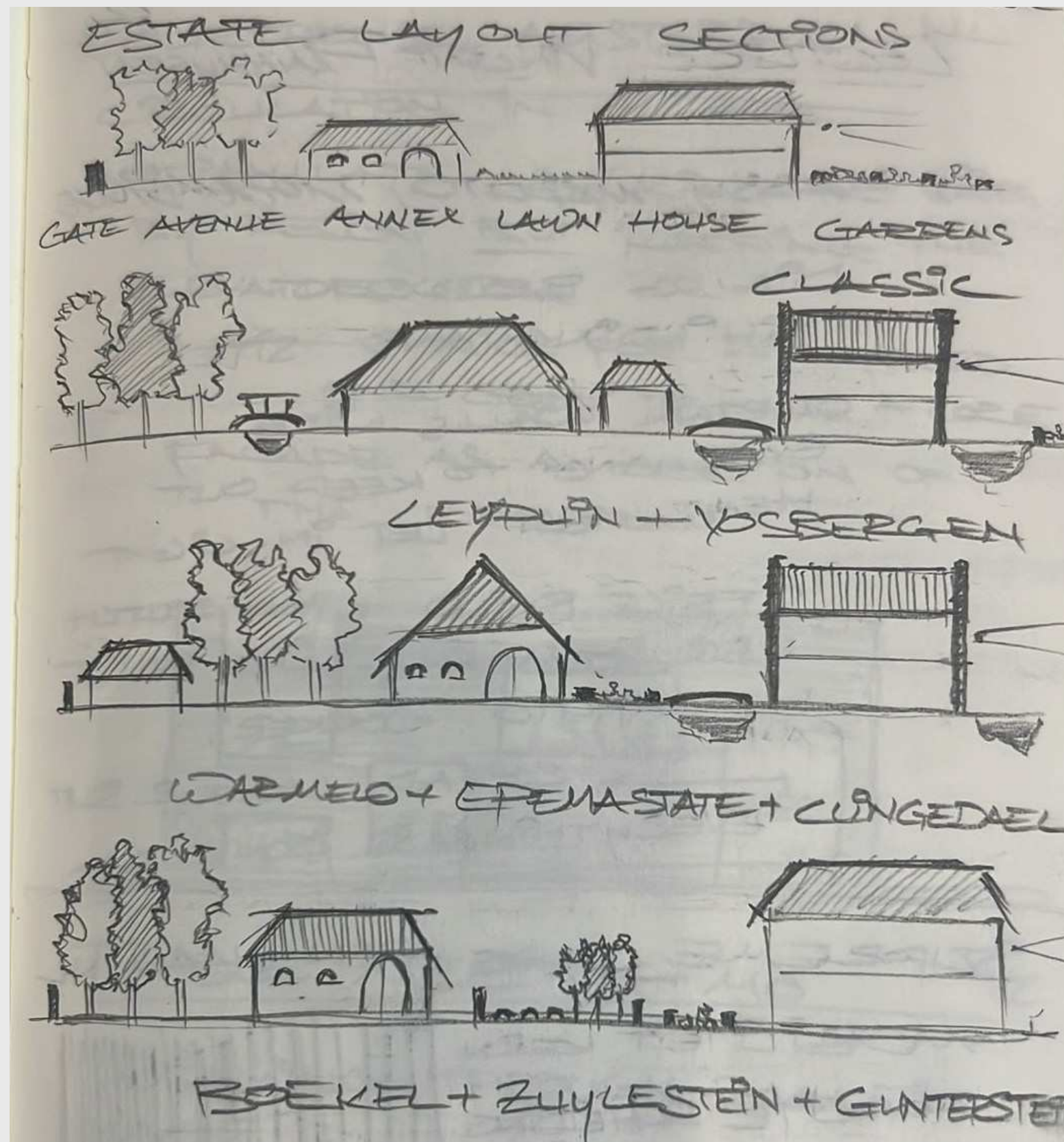
## Current situation

Droplet driveway + outbuildings



# Fall back on historical principles

Value Assessment



macro

meso

micro

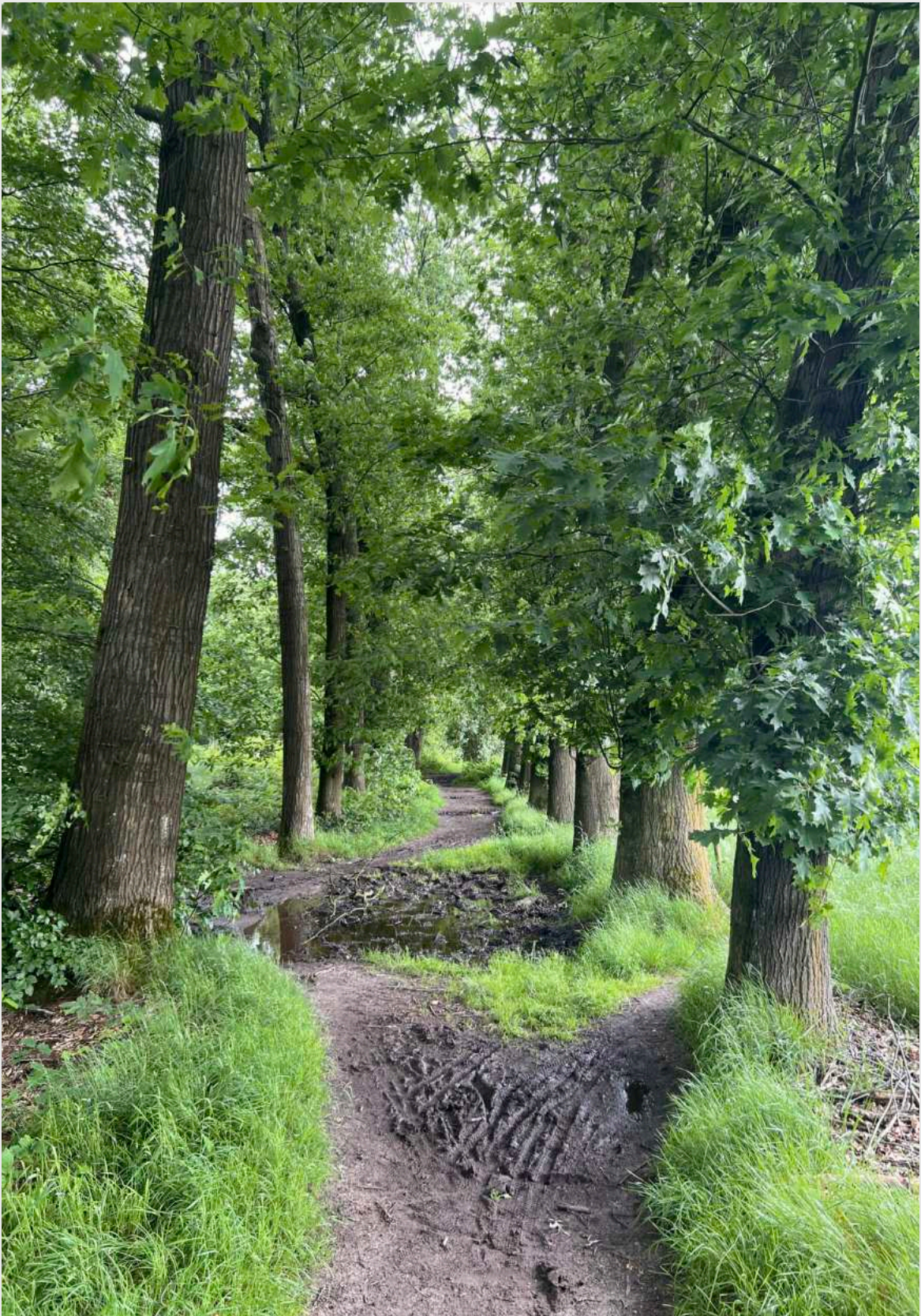
**Country estate as a system: ecological balance within the boundaries of the estate**

vegetable gardens - herb gardens - orchards - forest maintenance - hunting - production



# Un-Dutch landscape

Value Assessment



macro  
meso  
micro

Unique vs. Underused



# Tree variety

## Value Assessment



macro



meso



micro

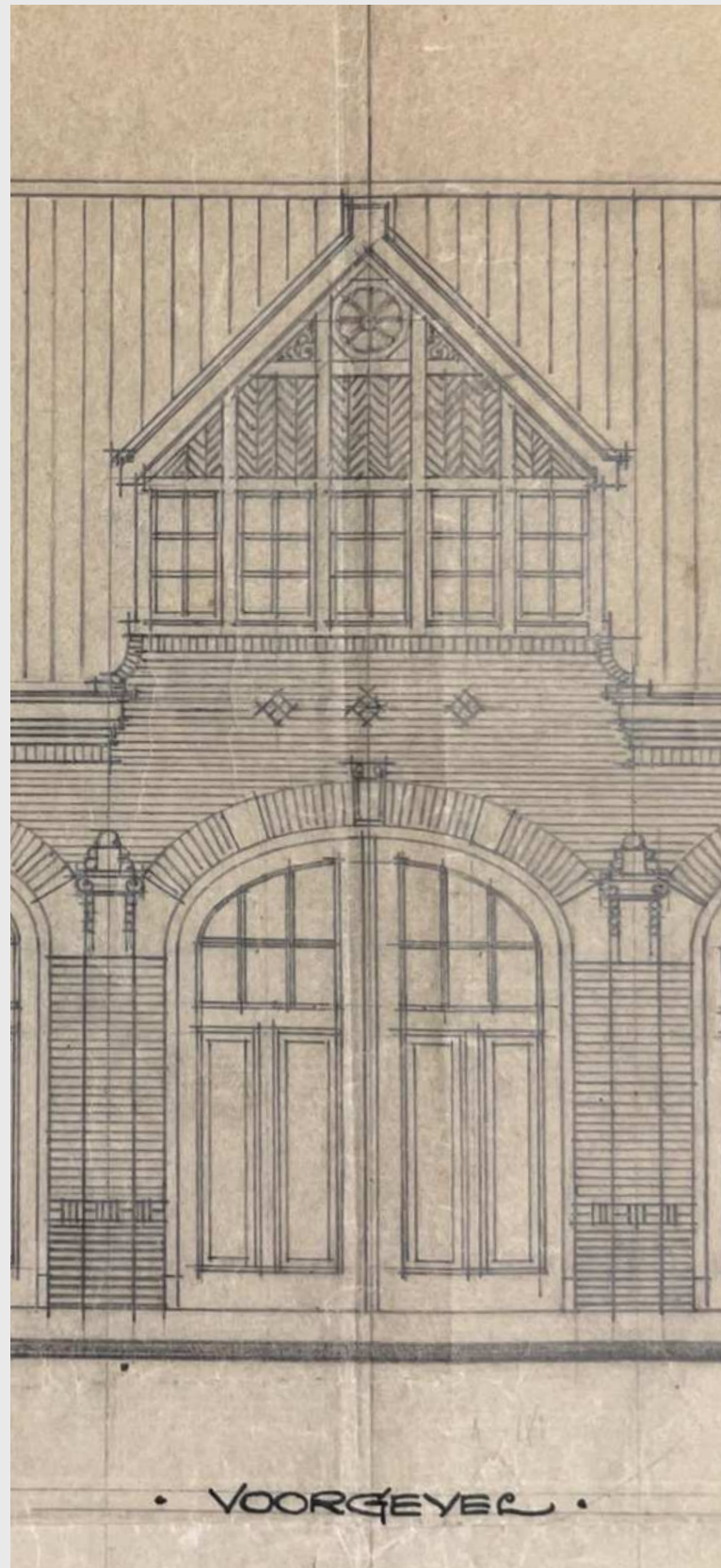


Unique vs. Underused



# Trend in architecture

Value Assessment



macro  
meso  
micro

Hollandse neorenaissance



# Eye for detail

Value Assessment



macro  
.....  
meso  
.....  
**micro**

Hollandse neorenaissance



# Lack of maintenance

Value Assessment



Neglected heritage



macro  
meso  
micro



---

# PROGRAM

---



# Potential of the Nederrijk countryside

Design objective

## Management and production of renewable natural resources

buildings out of a locally sourced biobased material flow, consisting of forestry and agriculture (by-products)



## Active communities

creating a space fitted for a specific target audience, with architecture fitted to their needs and a focus on engagement for a sense of belonging



## Culture, tourism and education

preserved cultural heritage with a viable strategy for the upcoming decades by providing economical activities





# Relieving healthcare institutions: extramural care

Target audience - elderly





# Rejoining society through nature

Target audience - rehabilitants



## **Supported living**

household group, 6 rooms

2 individual studios

barn workshop

agricultural practices

gathering courtyard



# Combining daytime activities with agriculture

Target audience - Light Mentally Disabled

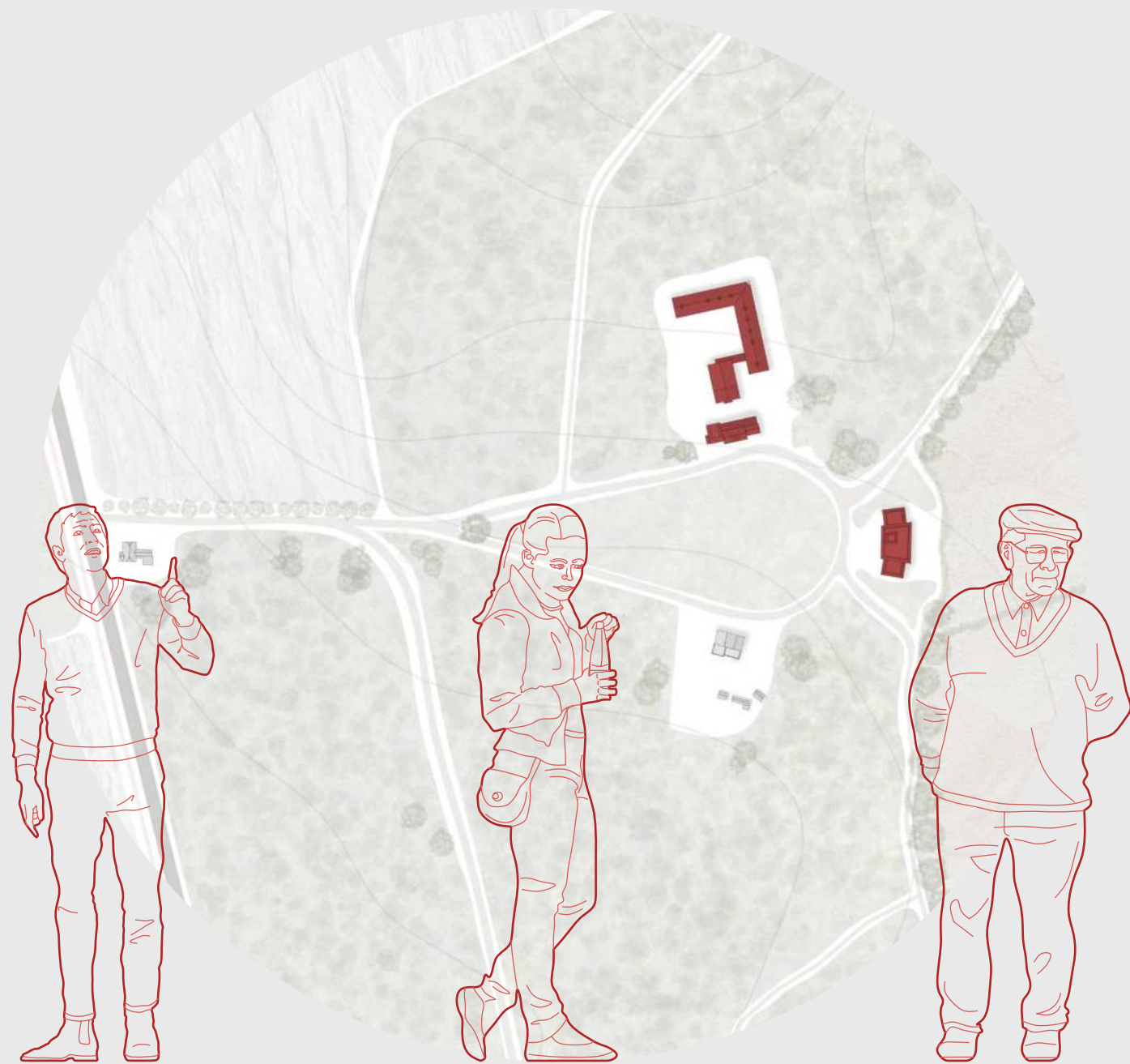


## **Communal living**

6 studios + 1 caregiver  
barn workshop  
agricultural practices  
daytime activities with elderly

# Community engagement

Program



## Local community

resource management, sense of belonging, gardening, dining, educating, workshops



---

# CONCEPT

---

# Nederrijk holds a huge potential

Concept



current Nederrijk



circular Nederrijk

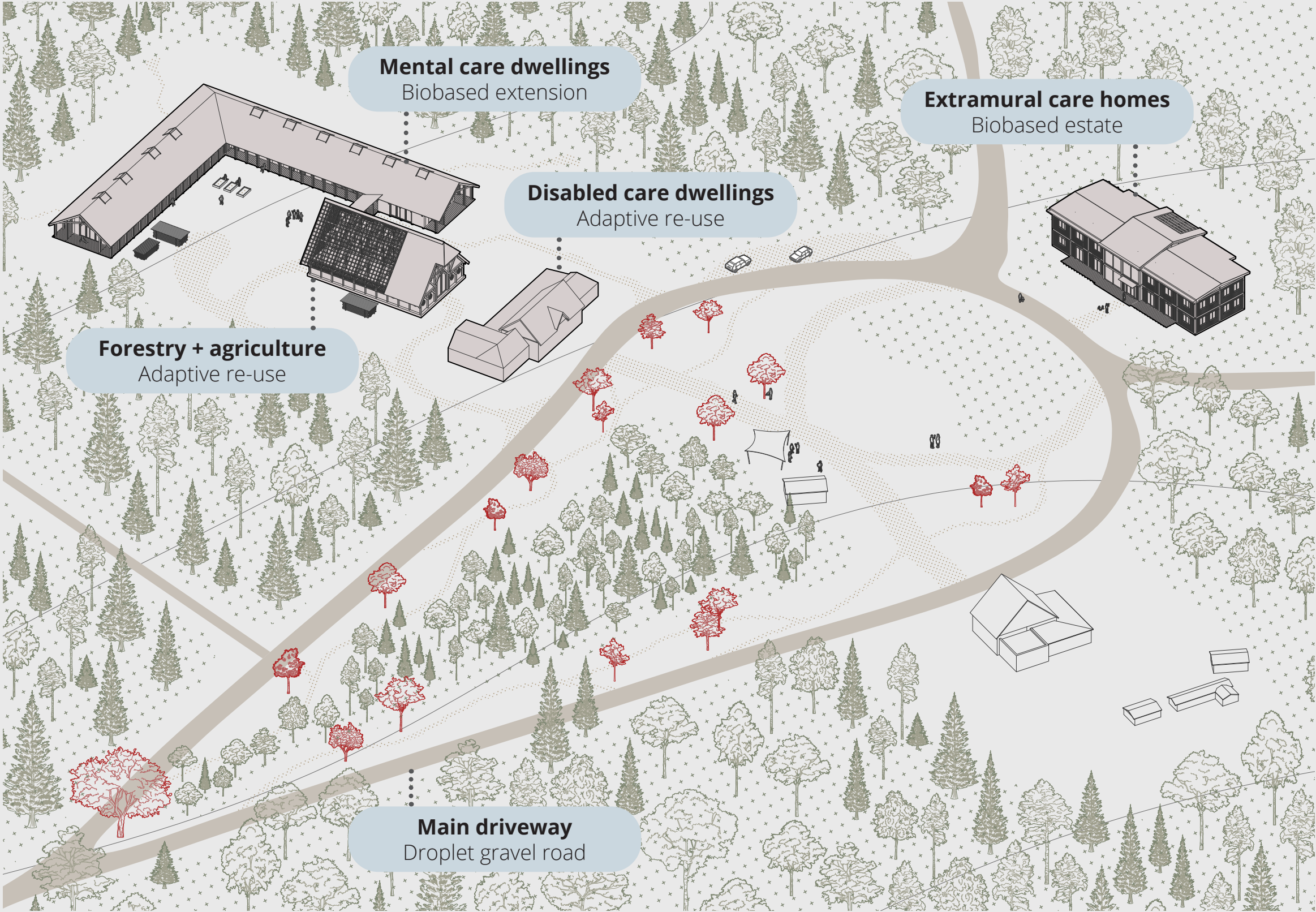
**Hidden behind the treeline is a landscape that has a lot to offer**





# Masterplan

## Design

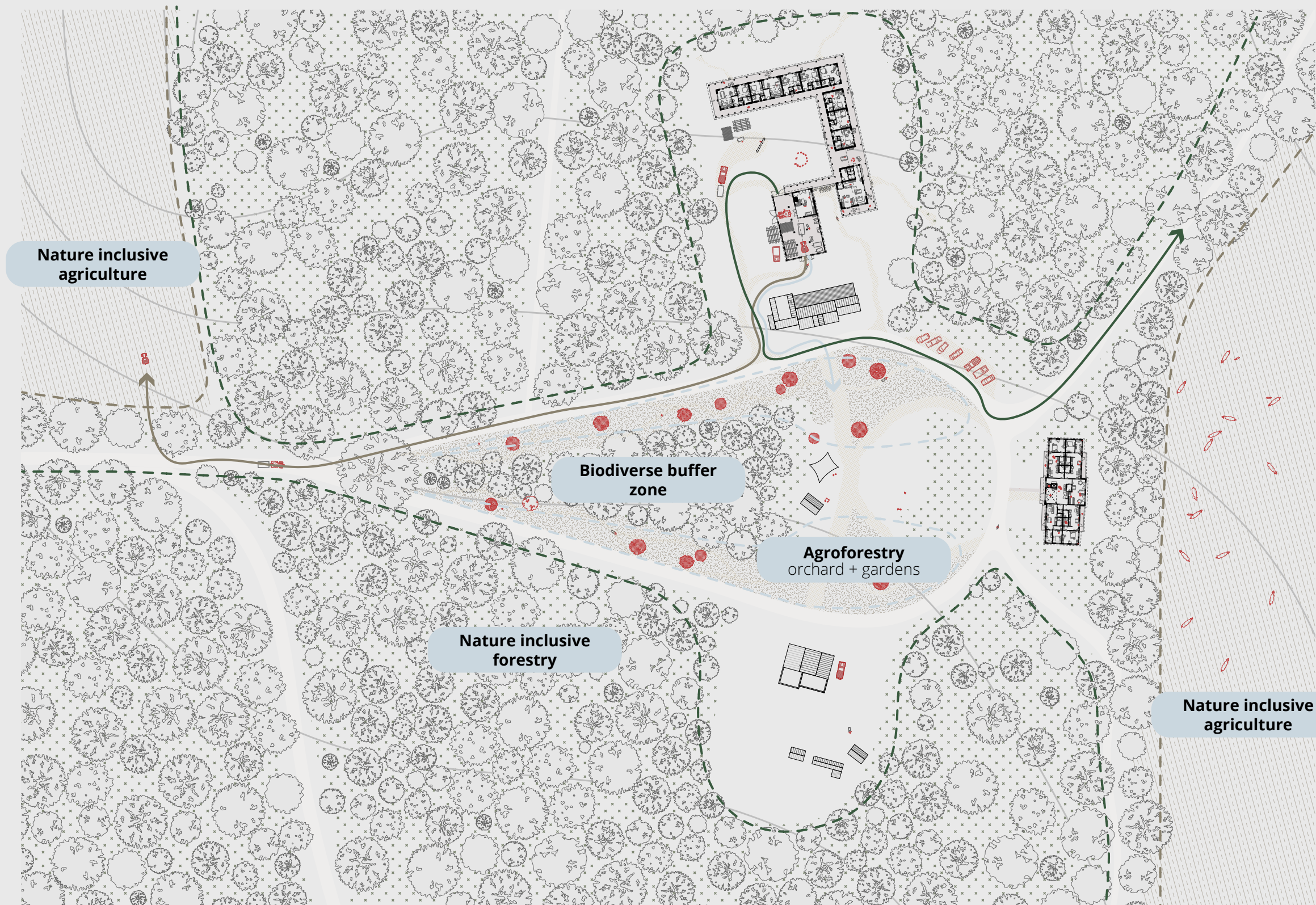


## Interventions



# Masterplan

Titel



## Commuting flows

agriculture - forestry - residents - caretakers - visitors - recreants - animals

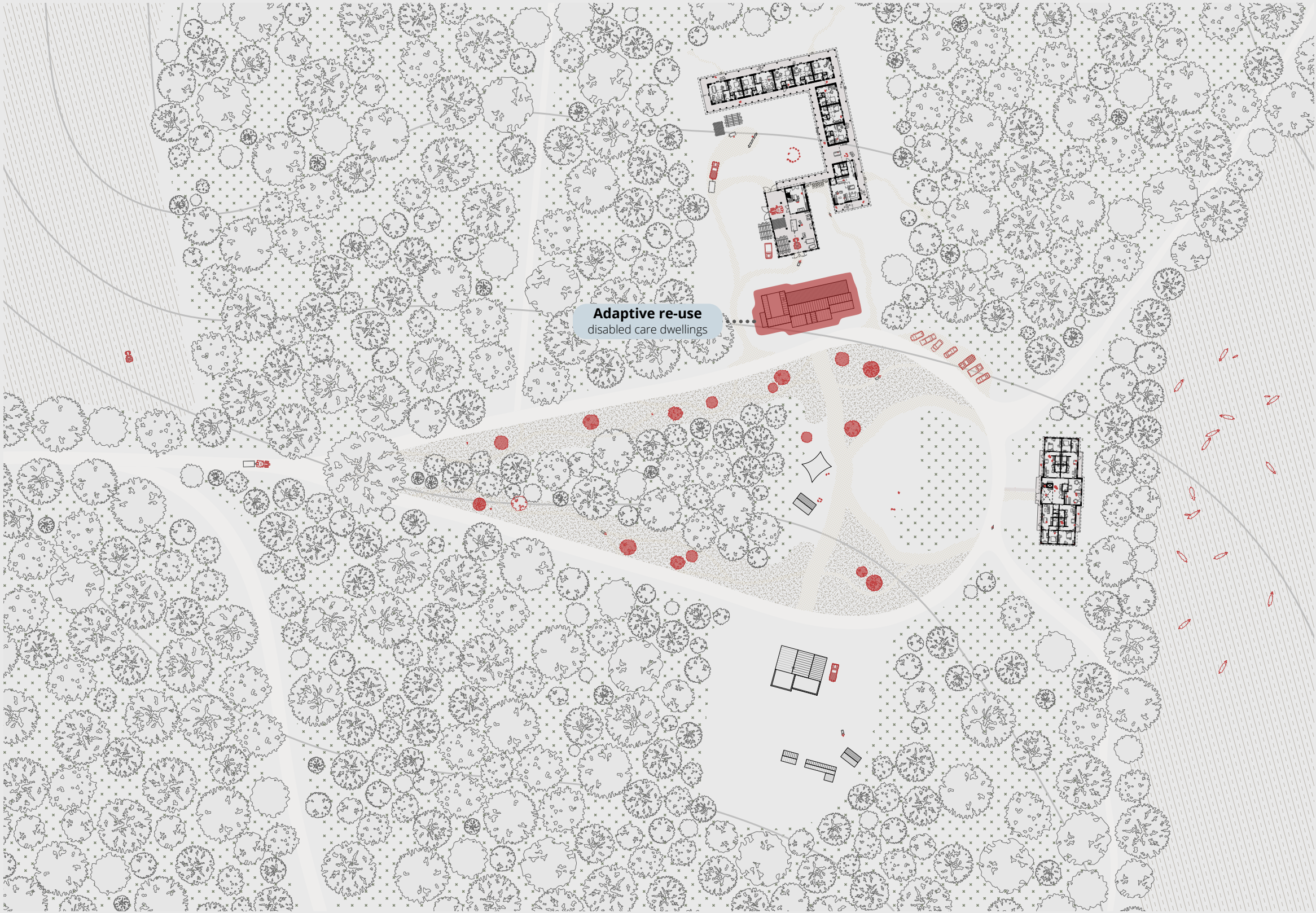




# ELABORATION

# Masterplan

Design



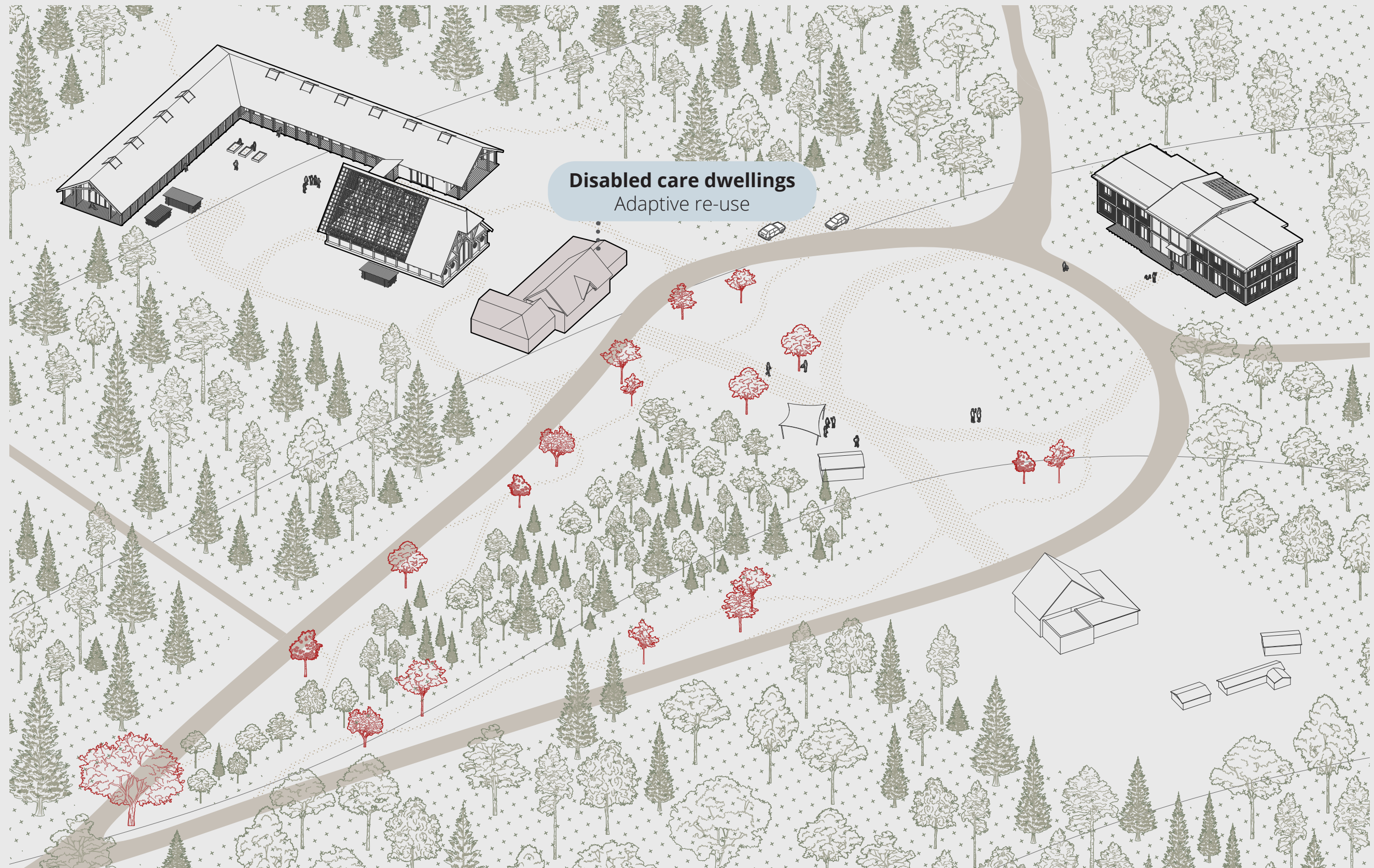
Zooming in on: Coach House





# Masterplan

## Design

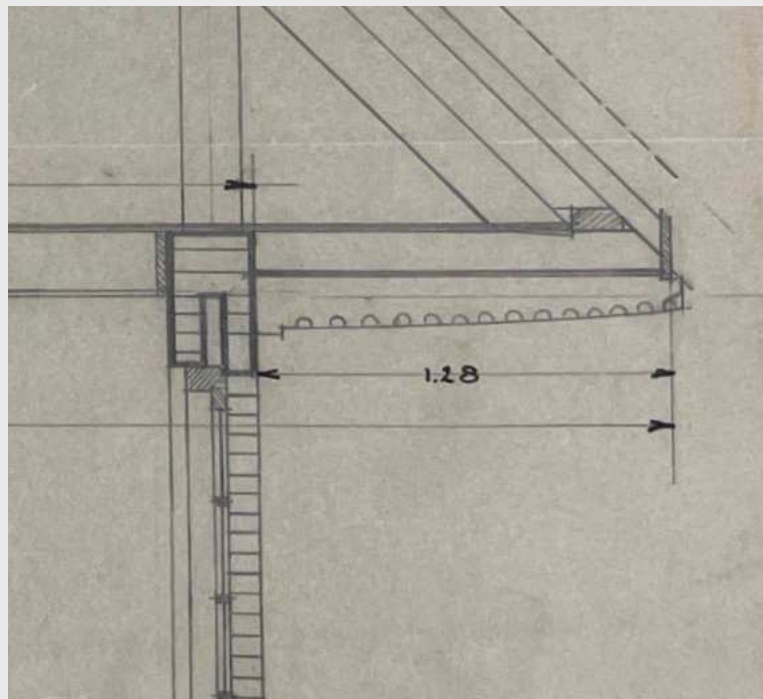


Zooming in on: coach house



# Zooming in: Coach house

Adaptive re-use



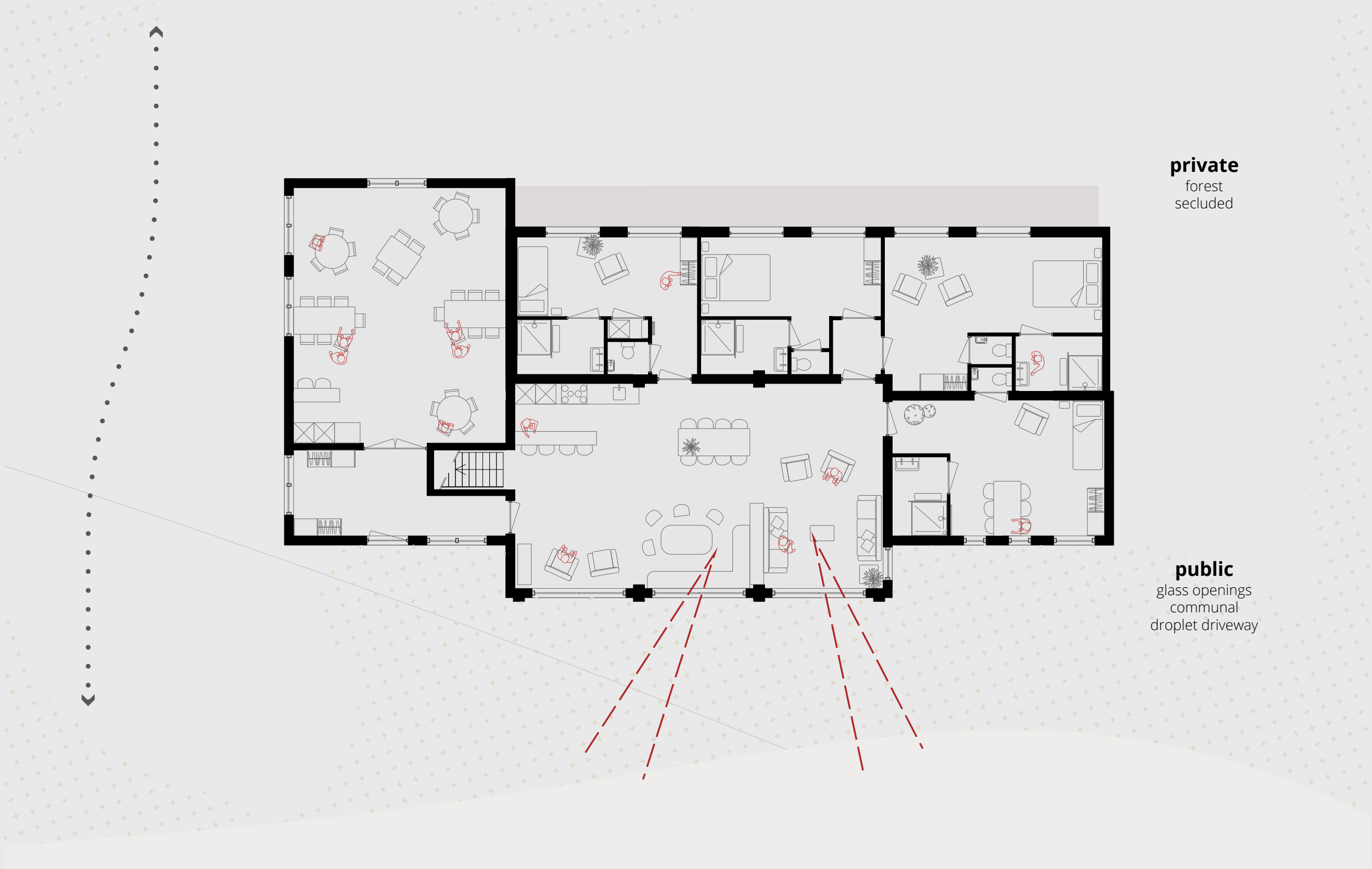
**Subtle + readable interventions**

Value Assessment as a source of inspiration



# Zooming in: Coach house

Adaptive re-use



← Patient Care giver →



# Zooming in: Coach house

Adaptive re-use



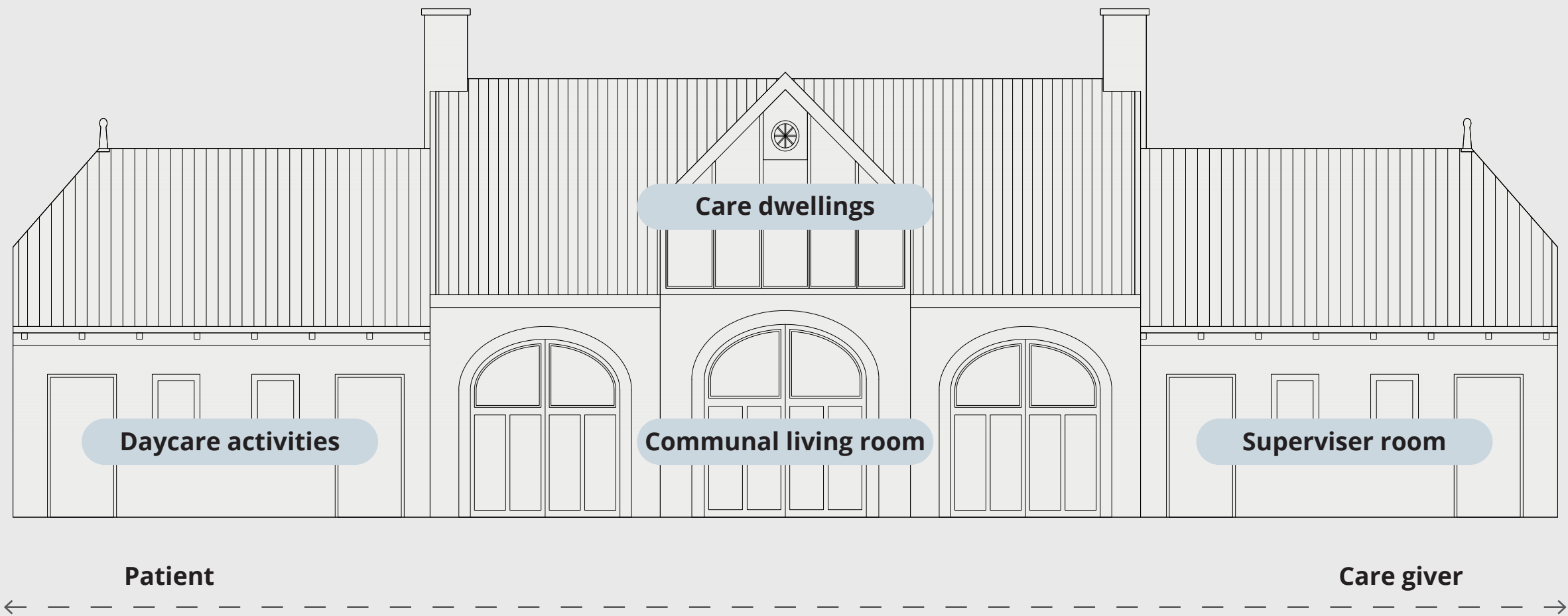
**Window interventions**

Impression



# Zooming in: Coach house

Adaptive re-use



Zoning



# Zooming in: Coach house

Adaptive re-use

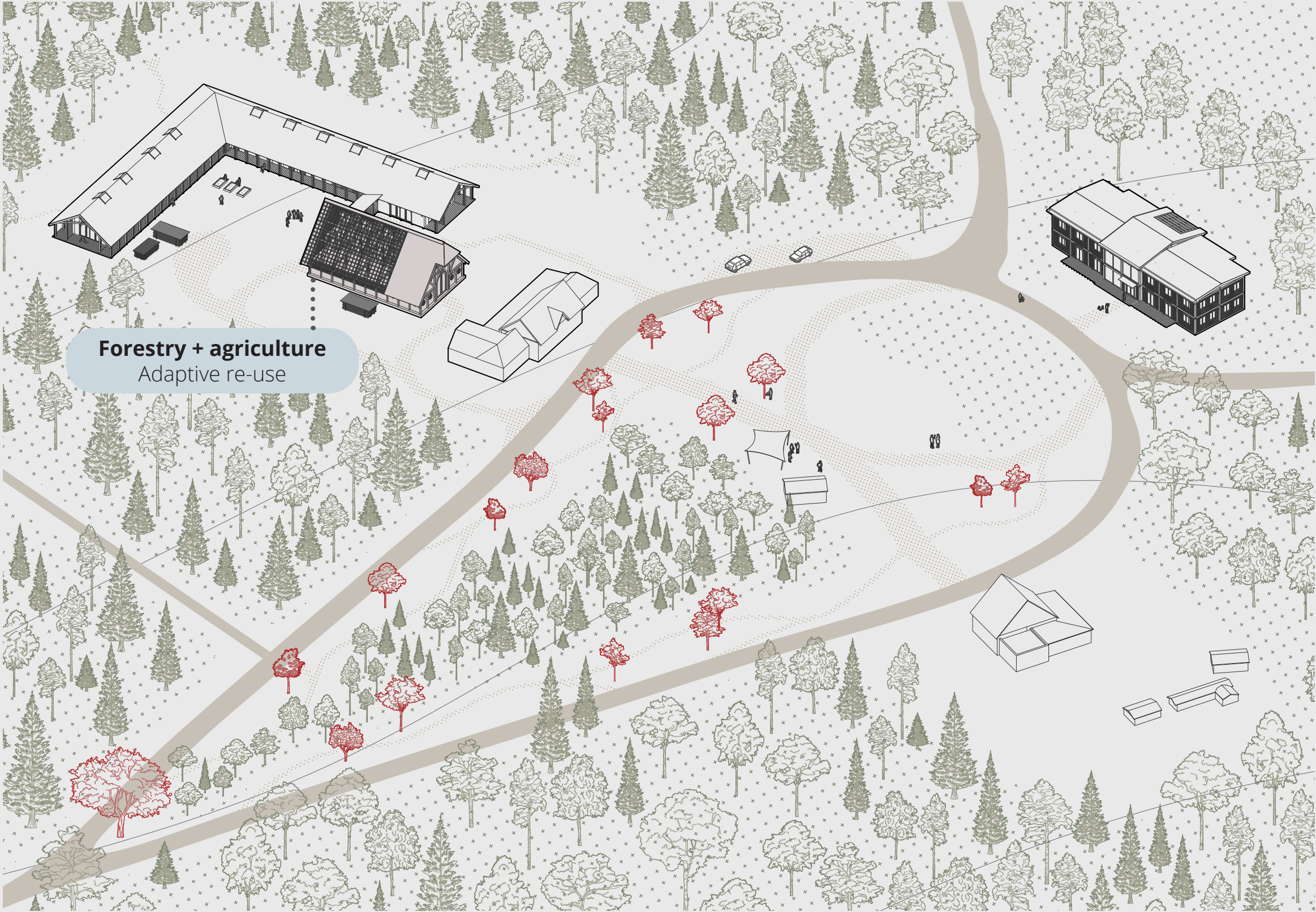


**Future proofing**  
Impression



# Masterplan

## Design



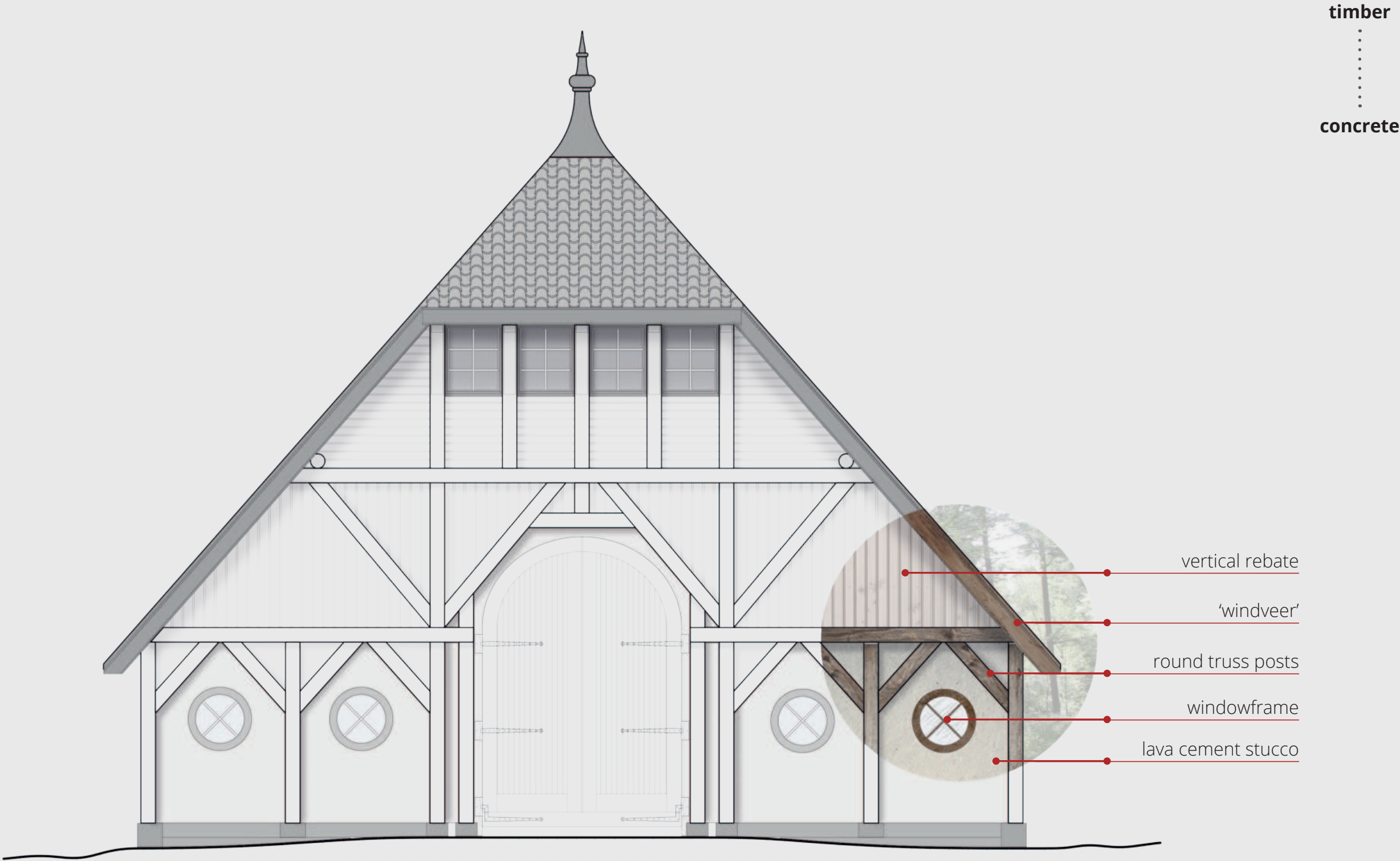
**Forestry + agriculture**  
Adaptive re-use

**Zooming in on: Historic Barn**



# Zooming in: Historic Barn

Adaptive re-use extension



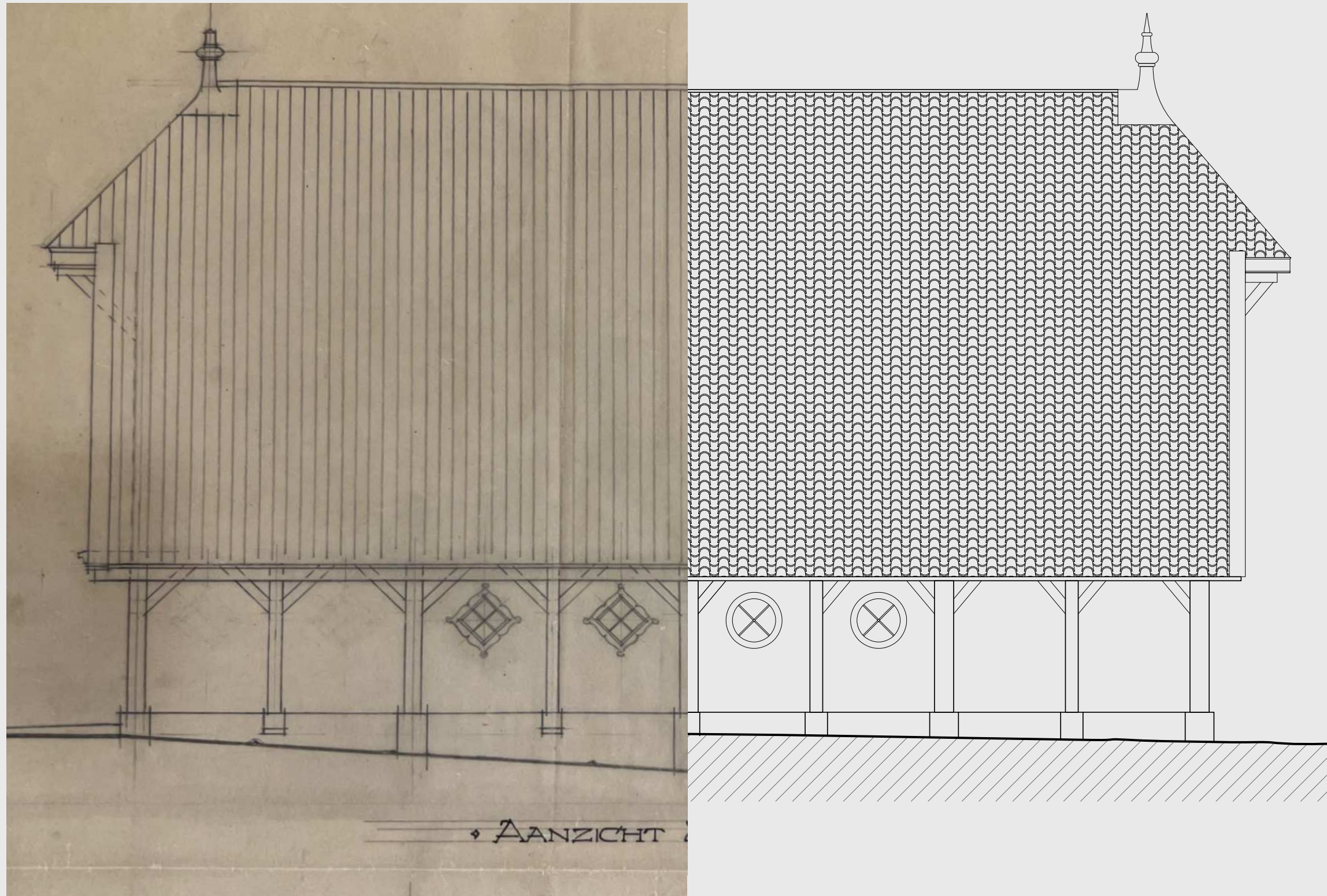
## Chalet style facade

Herringbone steel sheeting with concrete plaster



# Zooming in: Historic Barn

Adaptive re-use extension

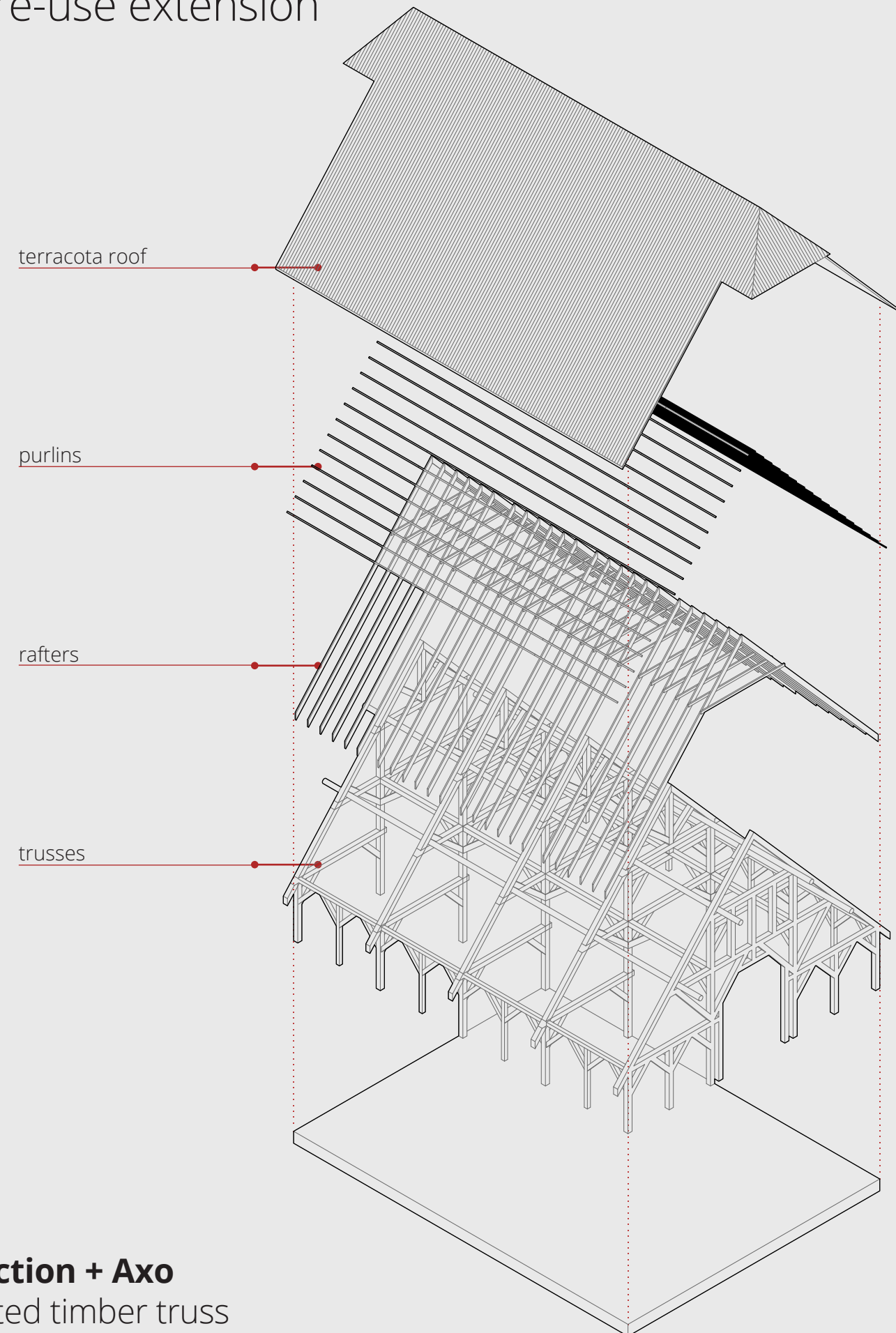
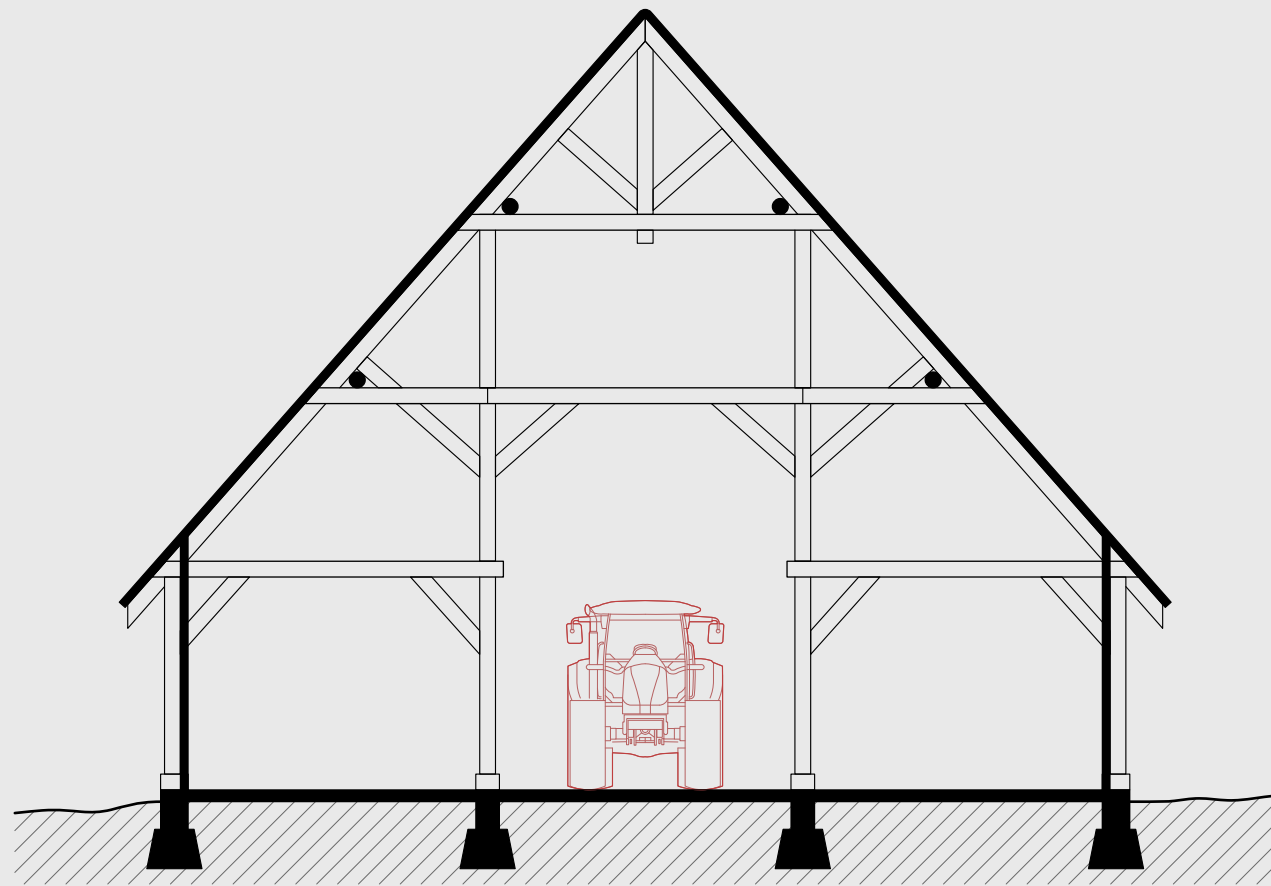


**Tangible construction: load bearing on outside**

Rhythm: 4m + 2m grid

# Zooming in: Historic Barn

Adaptive re-use extension

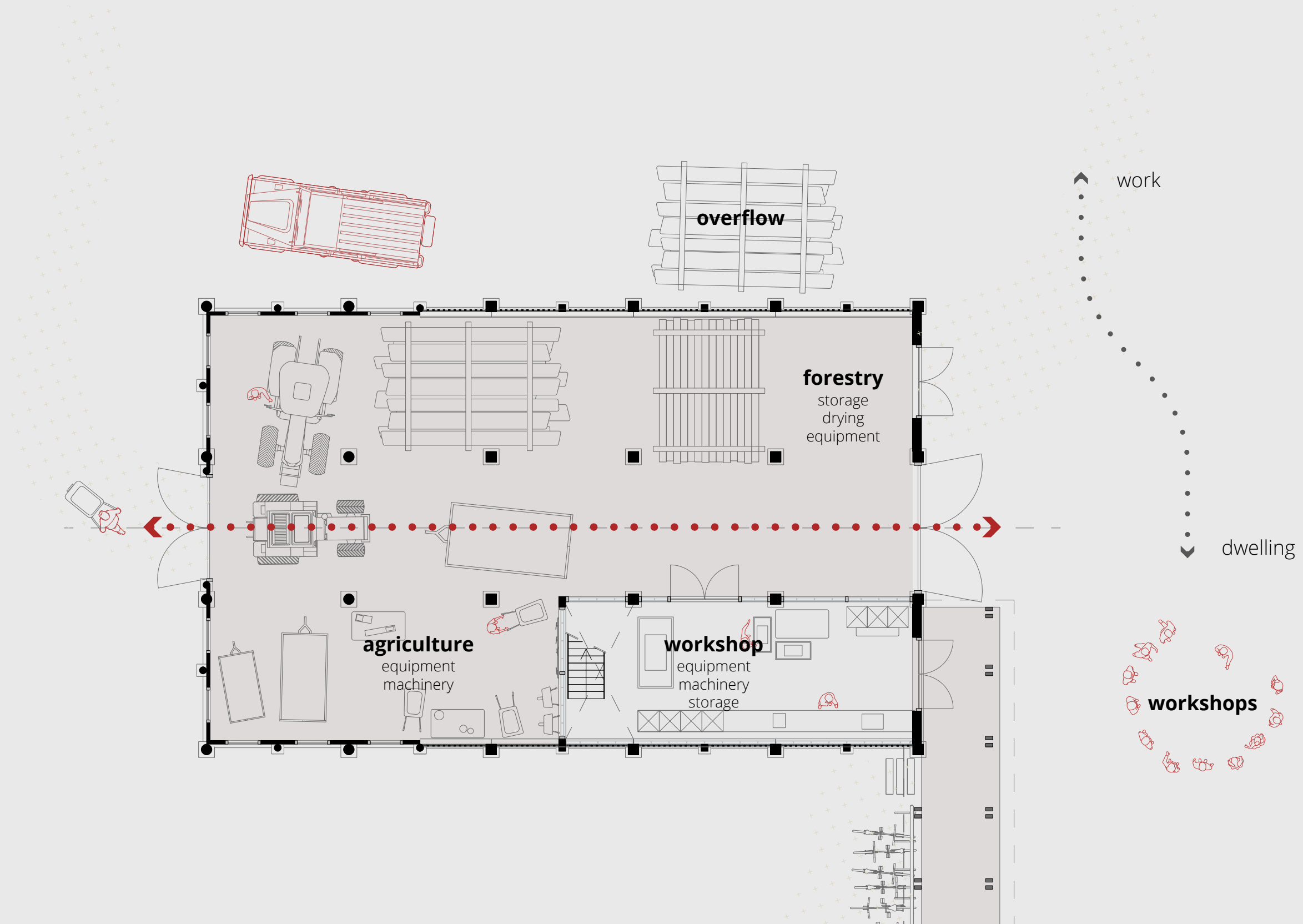


**Section + Axo**  
Repeated timber truss



# Zooming in: Historic Barn

Adaptive re-use extension



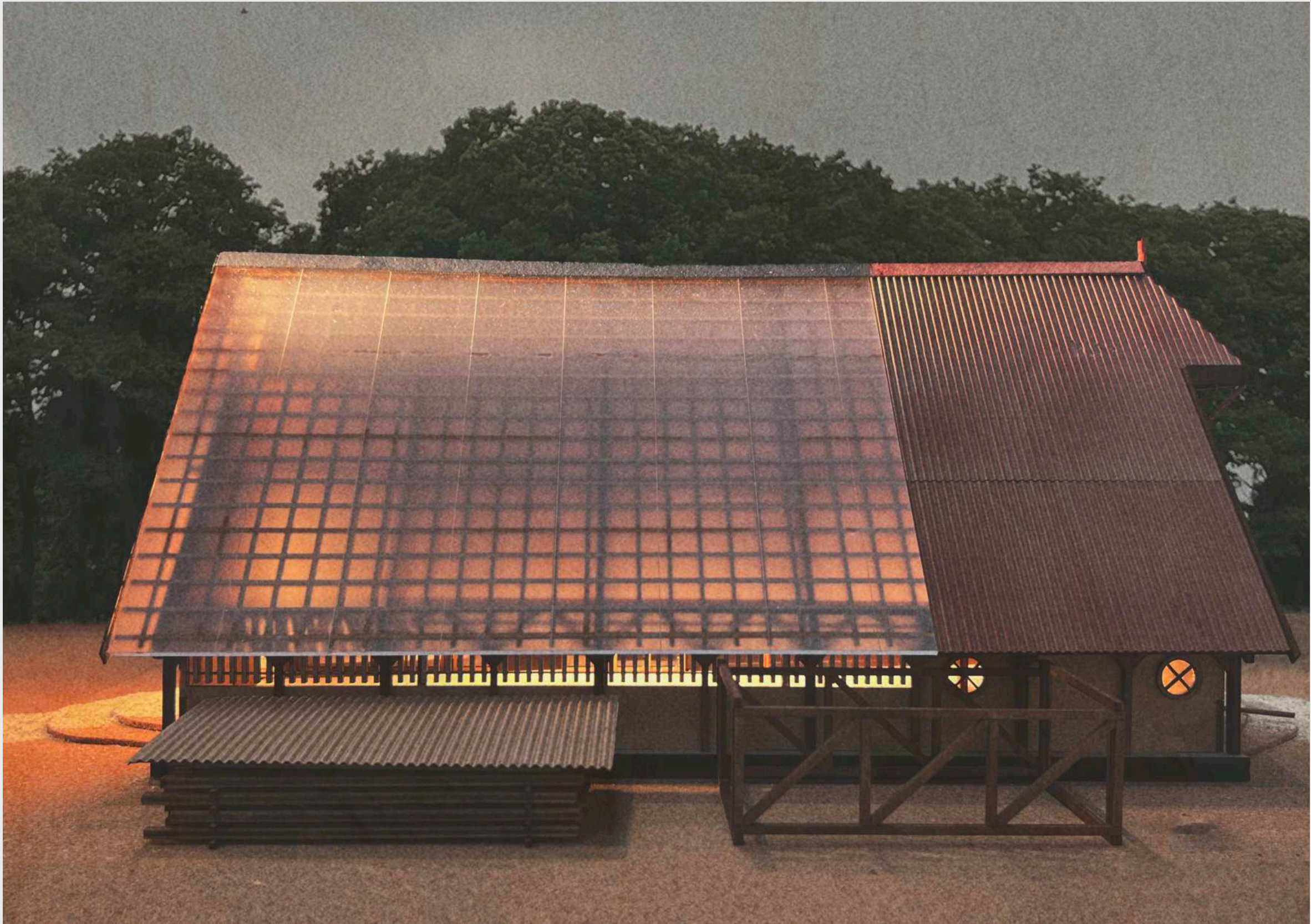
Zoning





# Zooming in: Historic Barn

Adaptive re-use extension



Adaption ..... Renovation  
Impression



# Zooming in: Historic Barn

Adaptive re-use extension

timber  
.....  
concrete

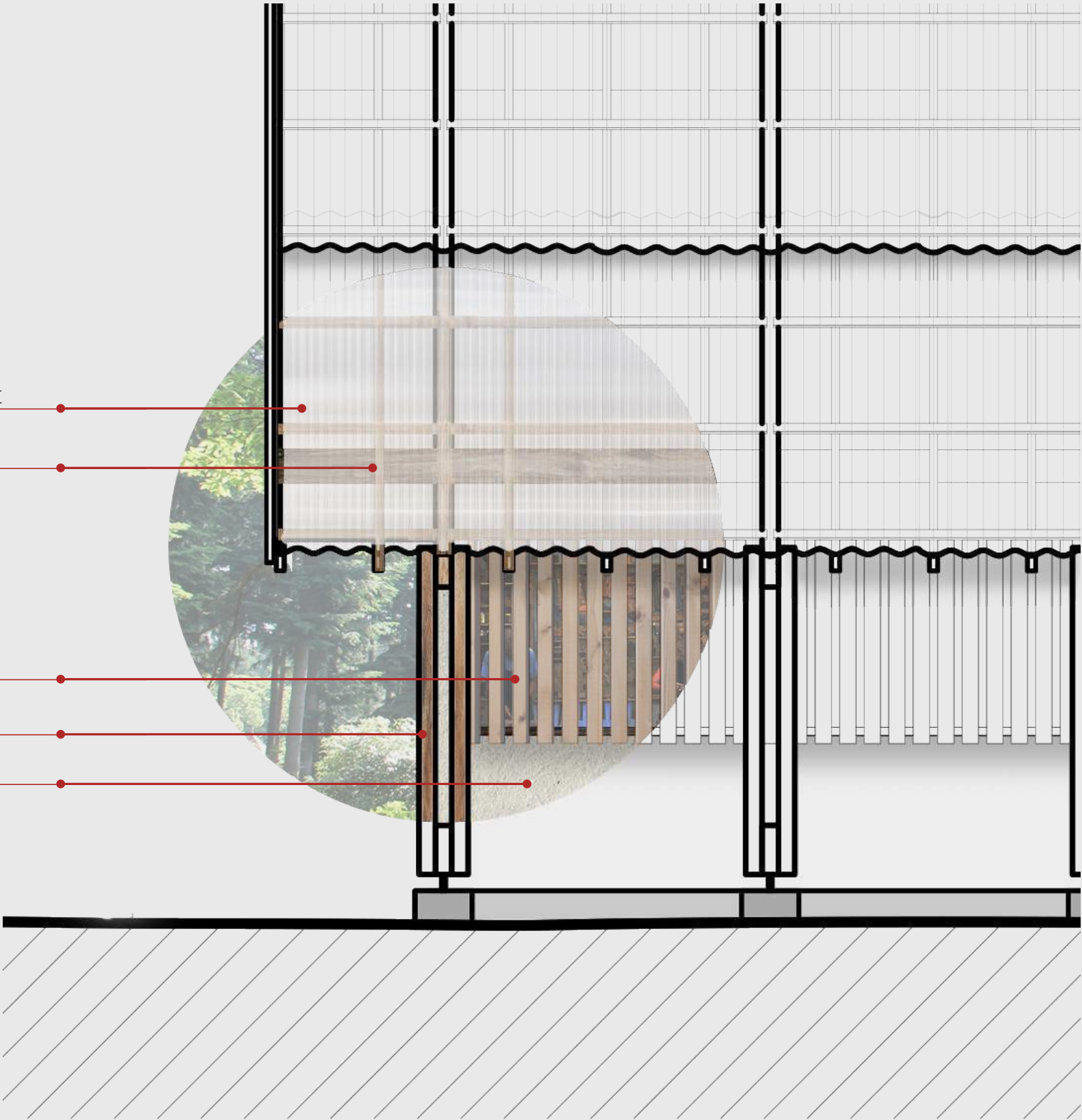
polycarbonate roof sheet

solid oak rafter

vertical pine cladding

solid oak truss

loam stucco



Materialisation



# Zooming in: Historic Barn

Adaptive re-use extension

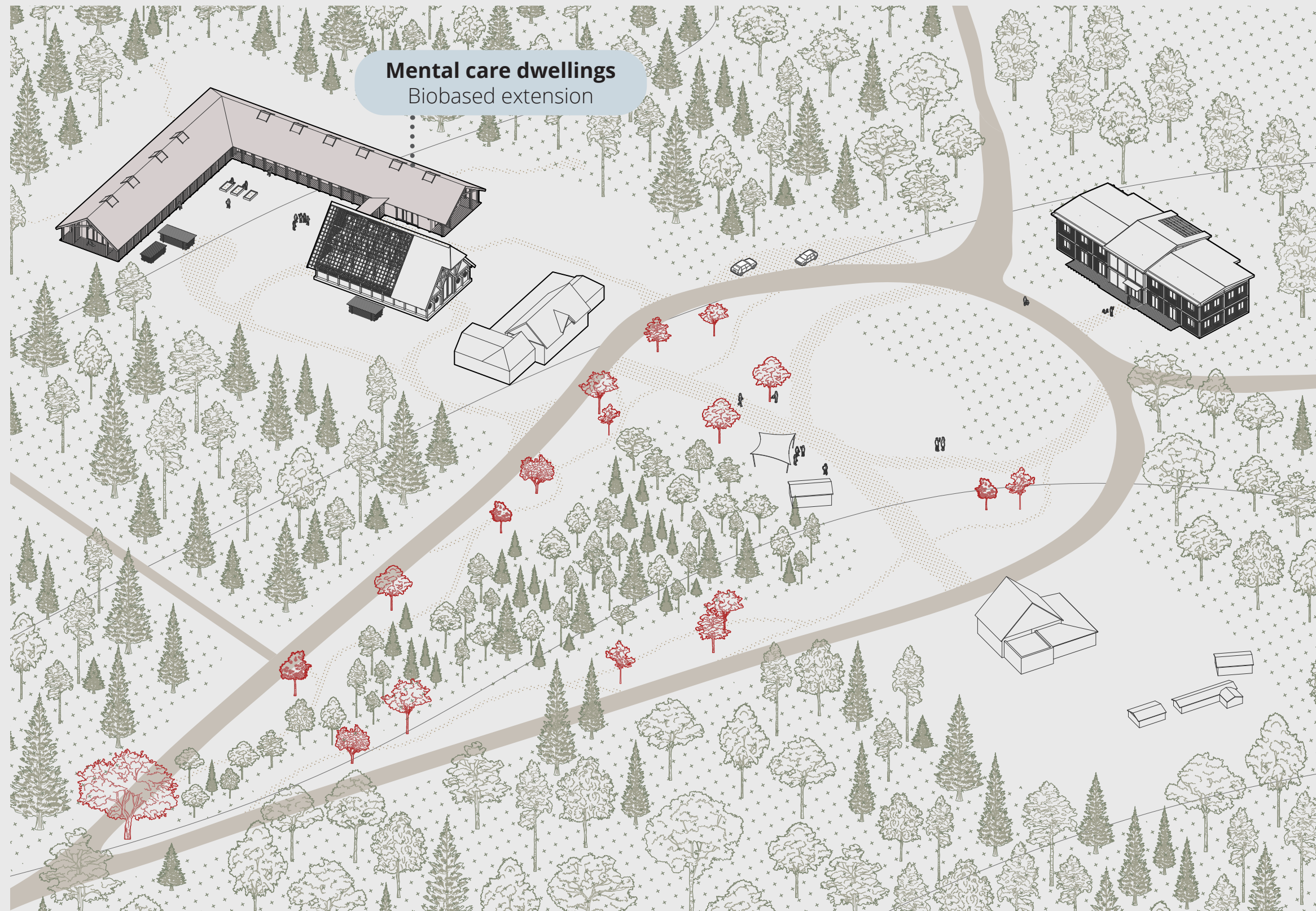


**Working under a century old inspired roof**  
Impression



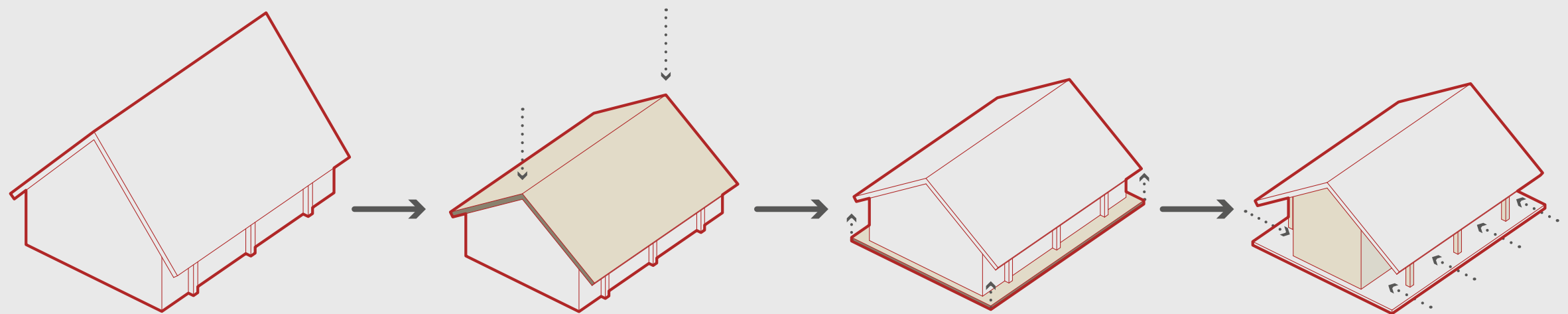
## Zooming in: Barn Extension

## Adaptive re-use extension



# Zooming in: Barn Extension

Adaptive re-use extension



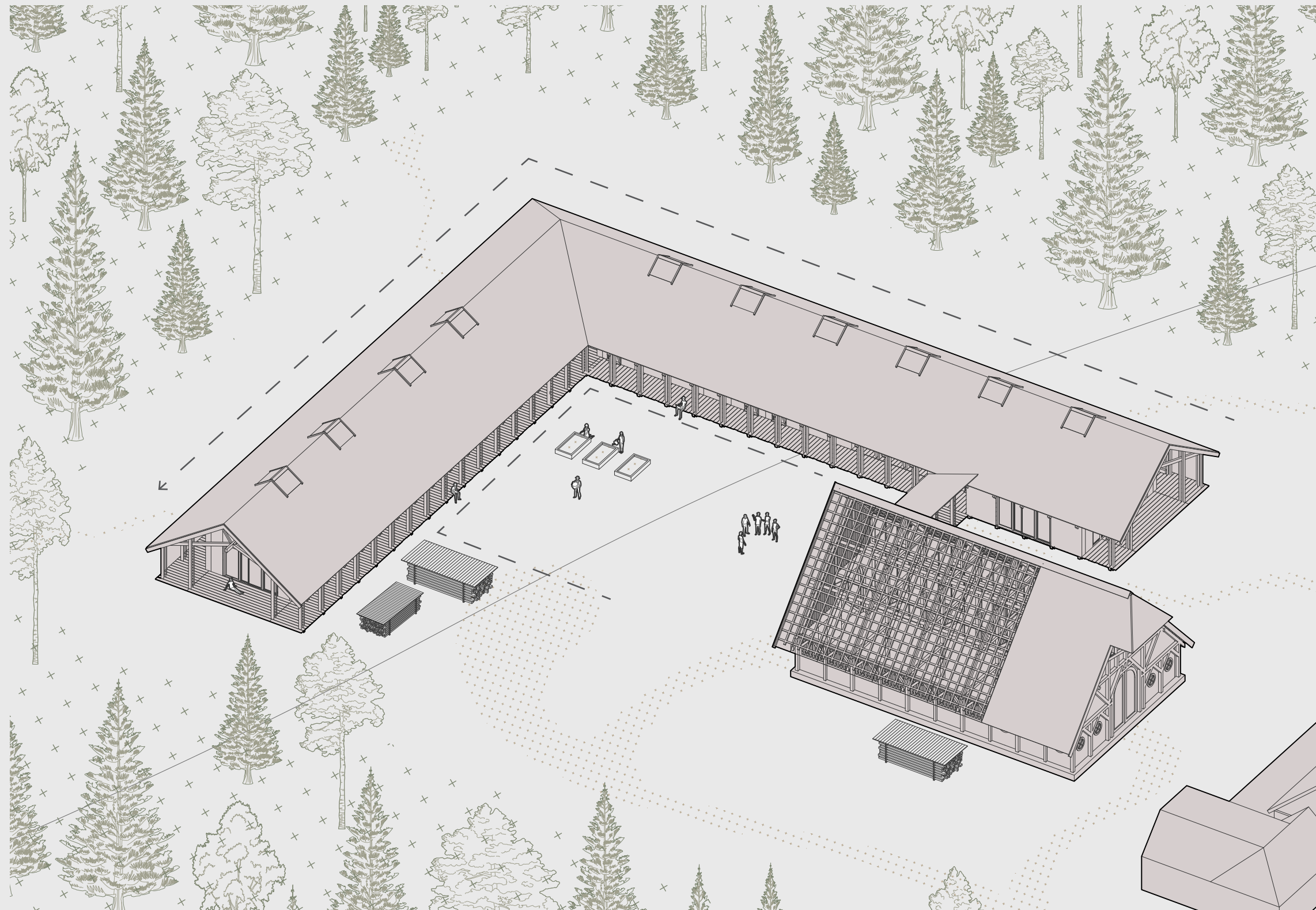
**Design grammar**

Reinterpretation of barn tectonics



# Zooming in: Barn Extension

Adaptive re-use extension

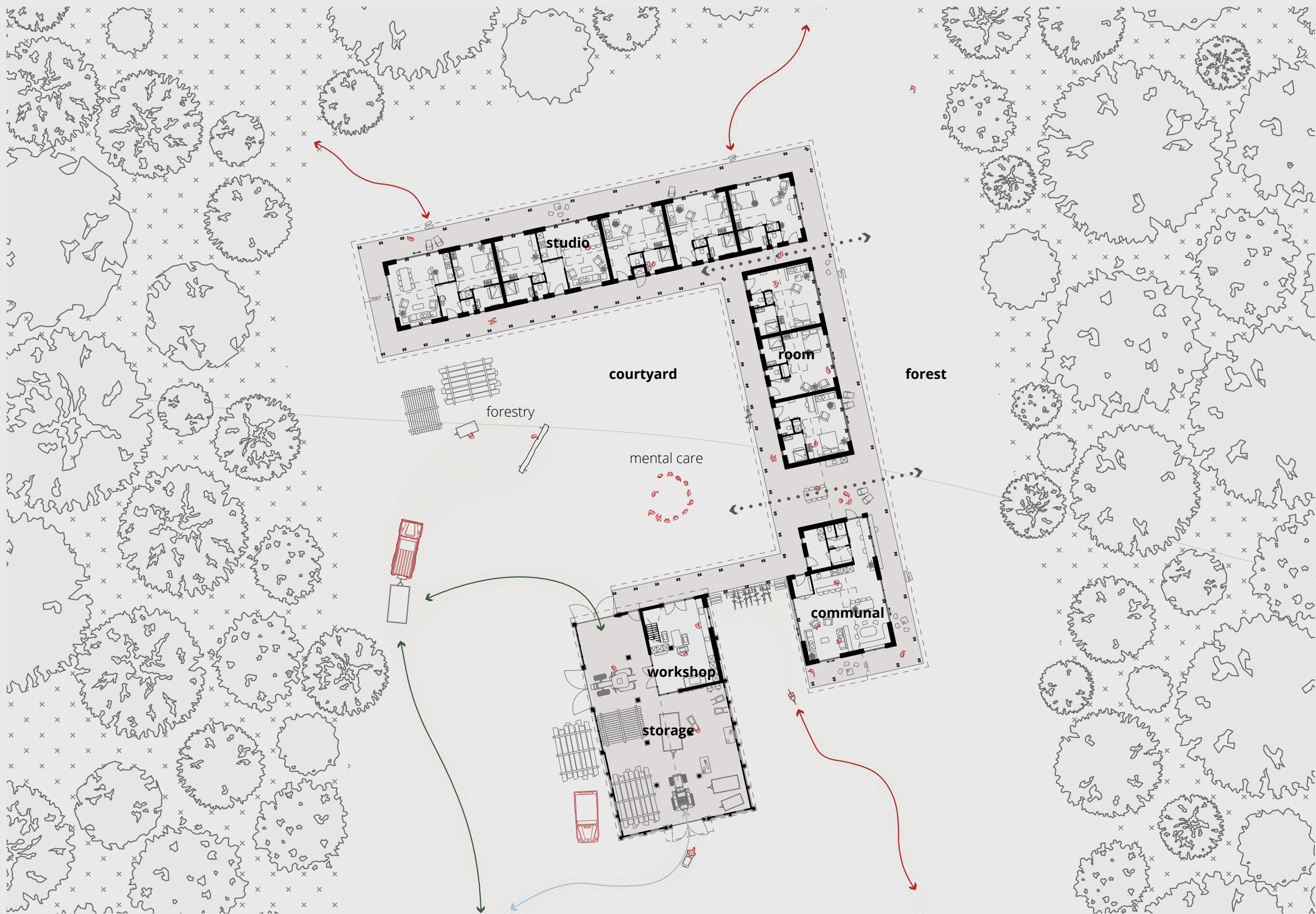


## Design grammar

Refer back to barn as a place of harvesting

# Zooming in: Barn

Adaptive re-use extension



## Flows

Residents - agriculture - forestry



1:300

Author (2024).



# Zooming in: Barn

Adaptive re-use extension



**Modern interpretation of historic facade**

Impression



## Adaptive re-use extension

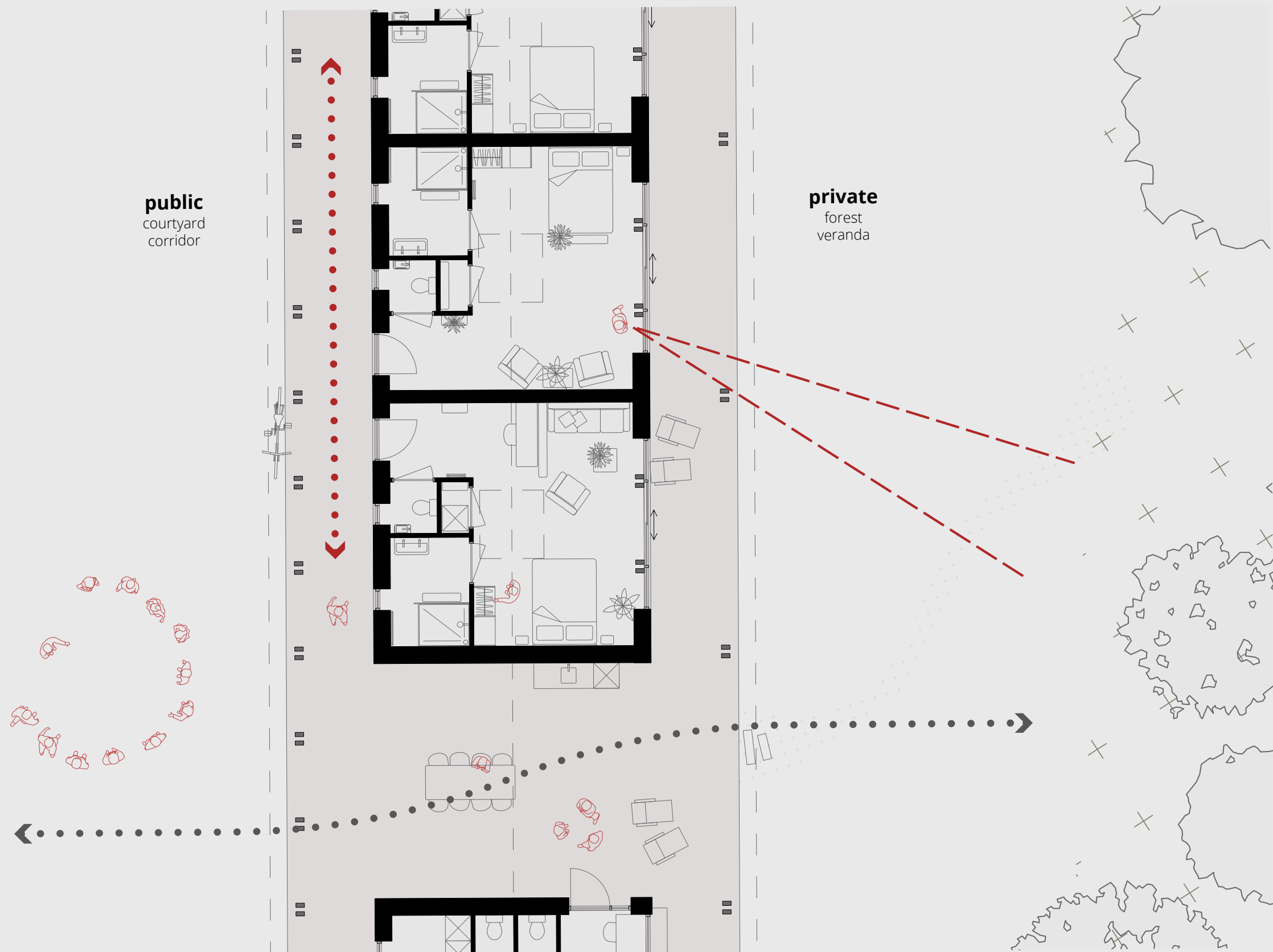
## Adaptive re-use extension





# Zooming in: Barn

Adaptive re-use extension



**Relation corridor - veranda**  
public - private



1:50

Author (2024).



# Zooming in: Barn

Adaptive re-use extension



**courtyard**

public  
close  
rhythm  
timber

**Corridor**  
Impression



# Zooming in: Barn

Adaptive re-use extension

**forest**  
private  
open  
interruption  
glass

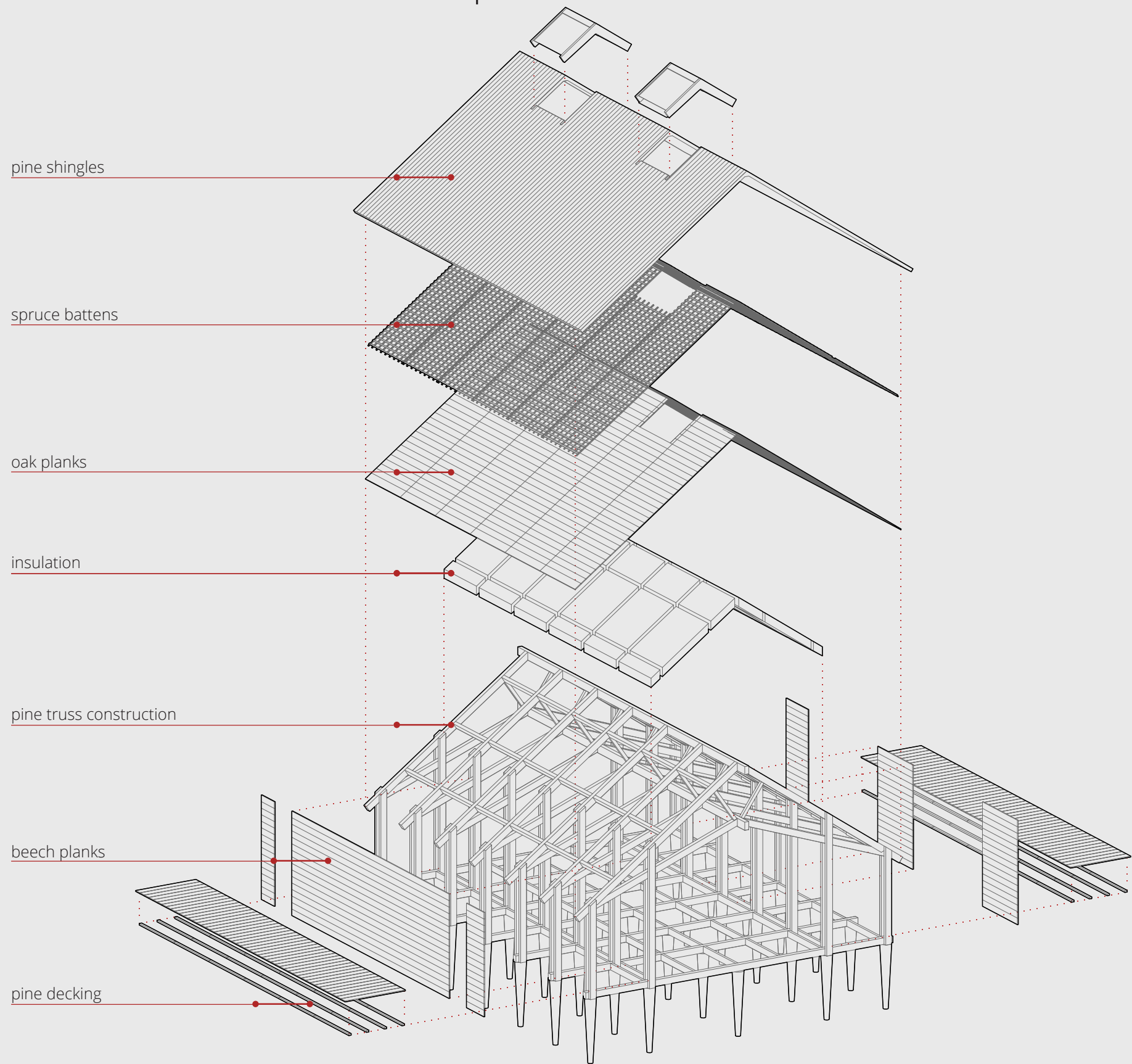


**Veranda**  
Impression

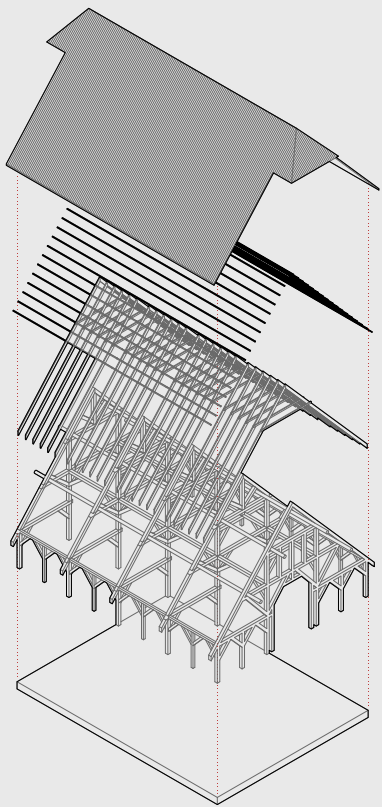


# Zooming in: Barn

Adaptive re-use extension



**Axo built up**



**historic**



# Zooming in: Barn

Adaptive re-use extension

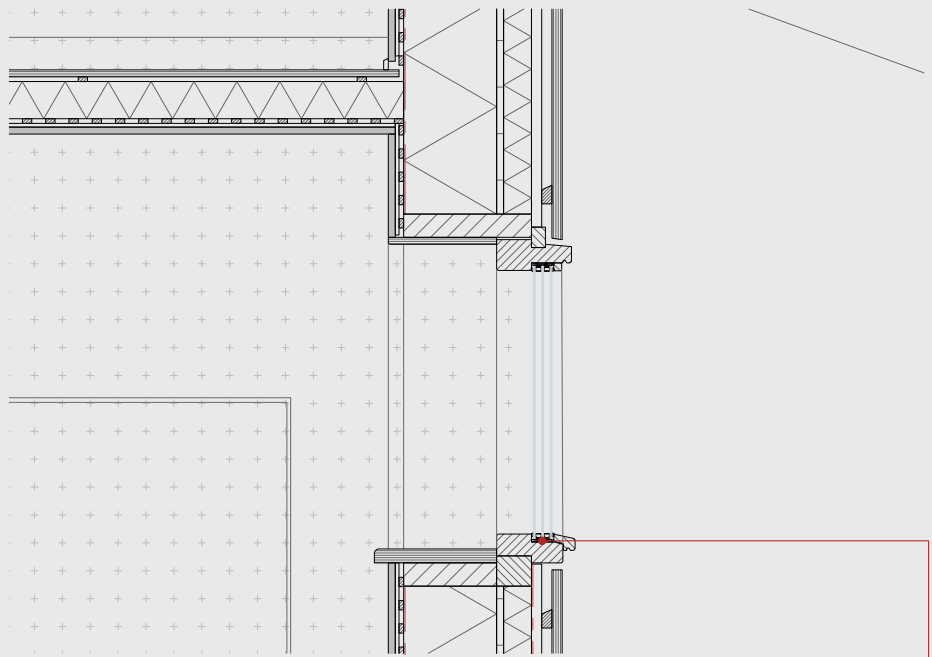
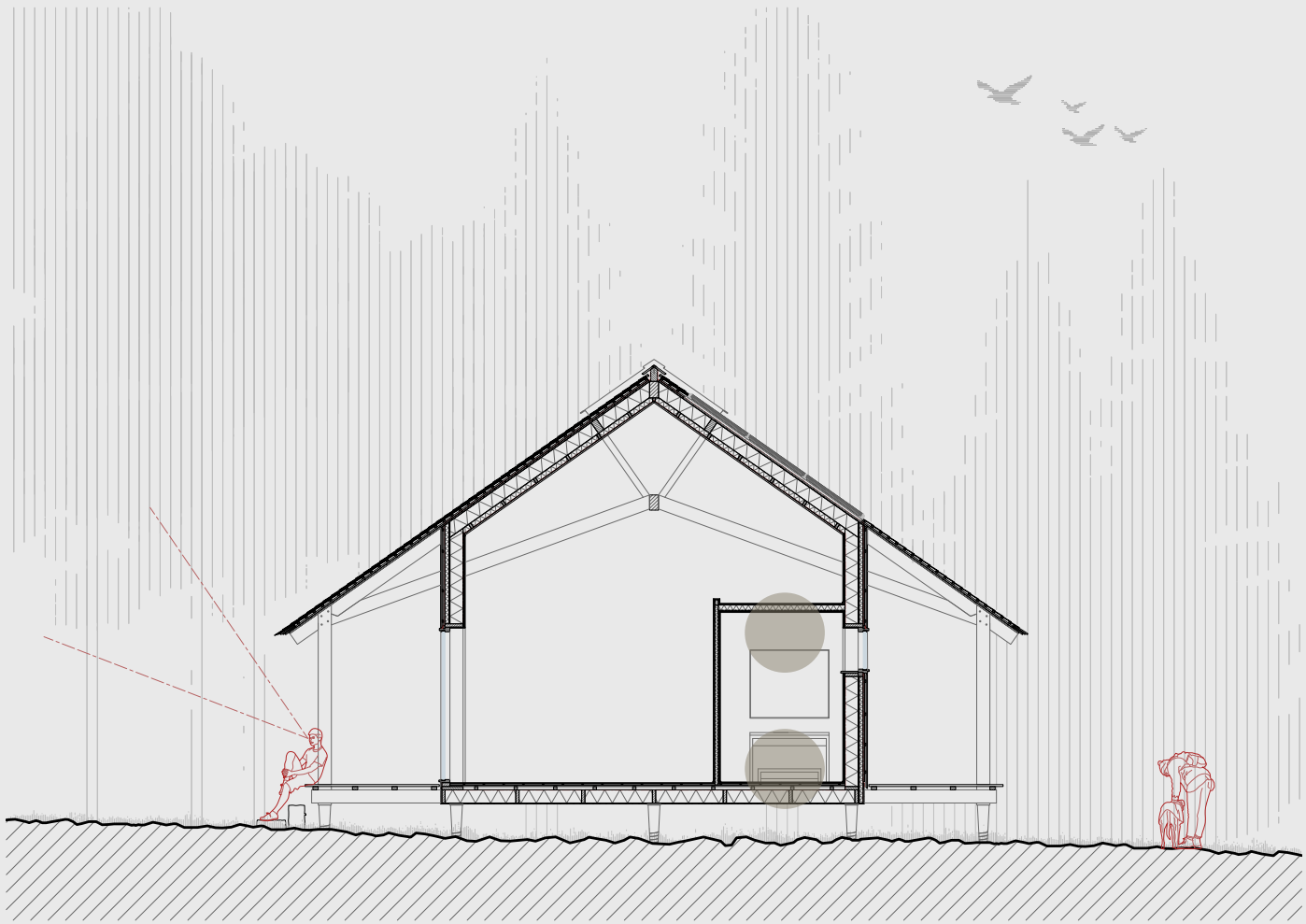


**Materialisation**  
readable origin



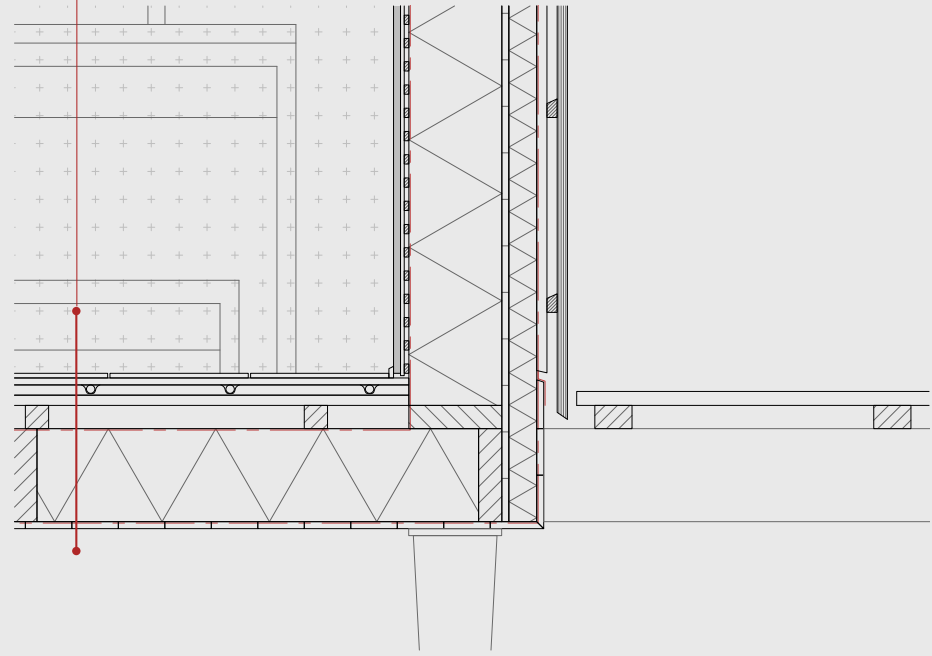
# Zooming in: Barn

Fragment series



rough sawn rabat planks  
CNC dreaded grooves with floor heating

timber frame construction  
CNC'ed windowframes



Fragment A



# Zooming in: Barn

Adaptive re-use extension

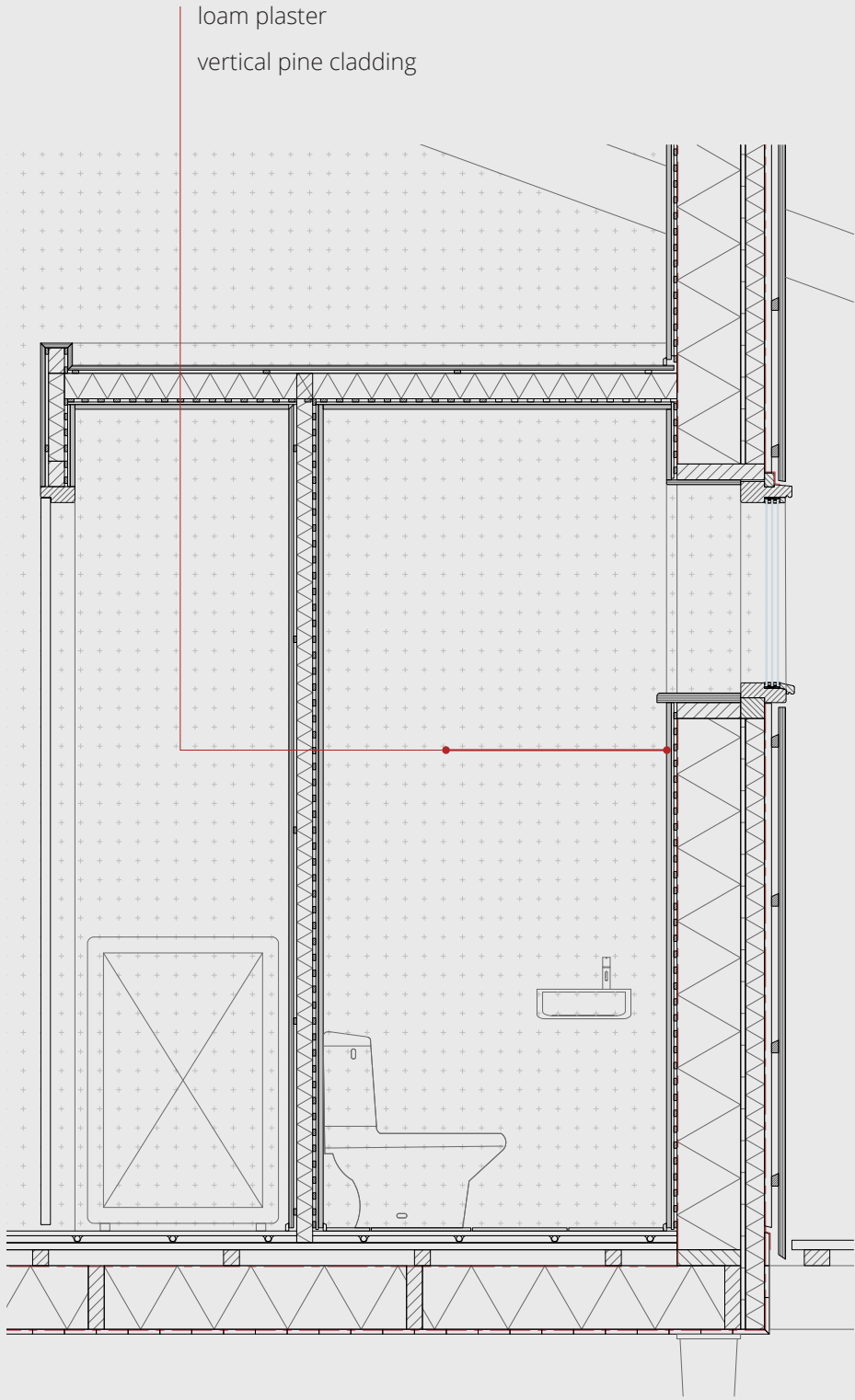
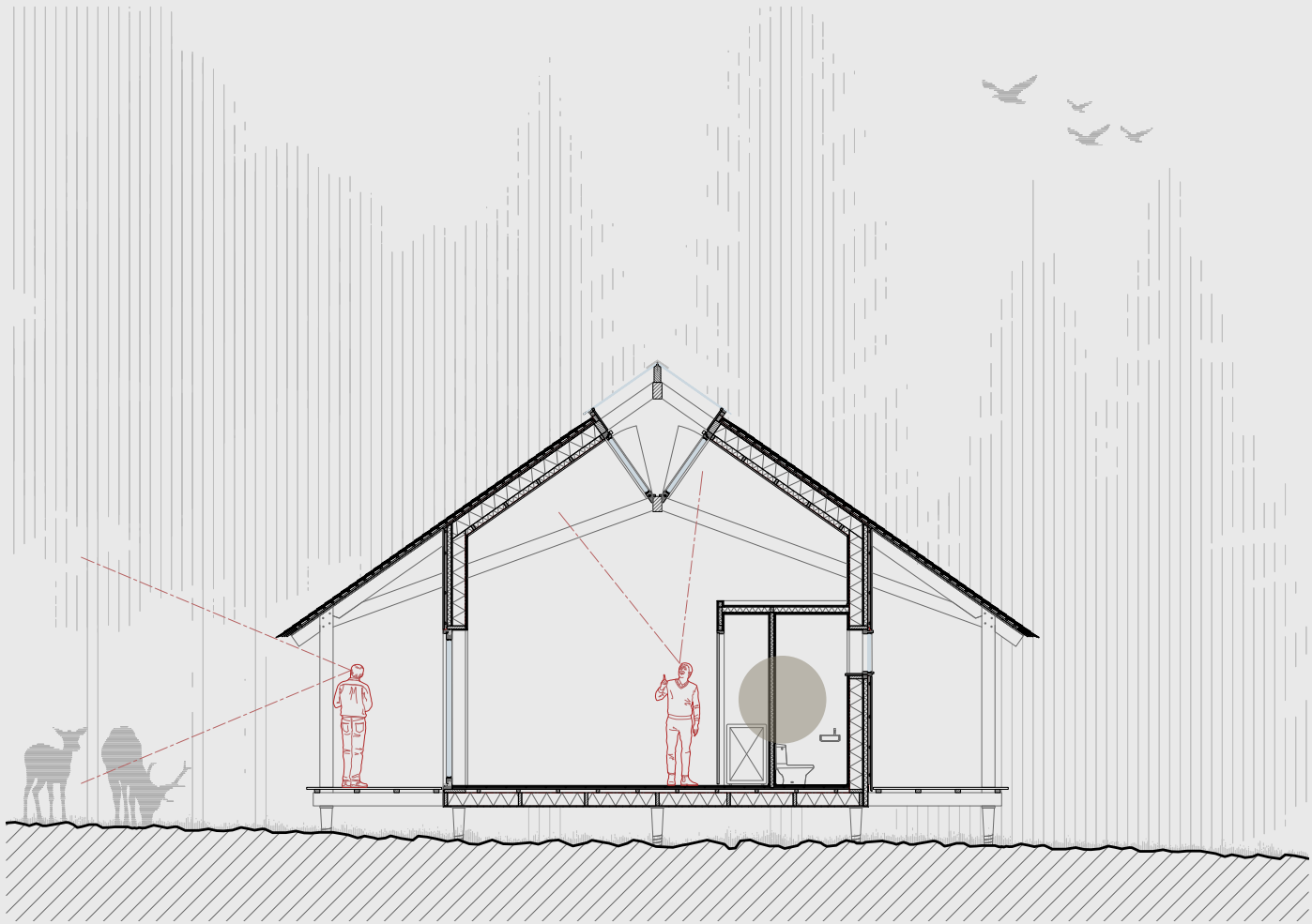


**Tangible materials**  
Impression



# Zooming in: Barn

Fragment series



Fragment B



# Zooming in: Barn

Adaptive re-use extension



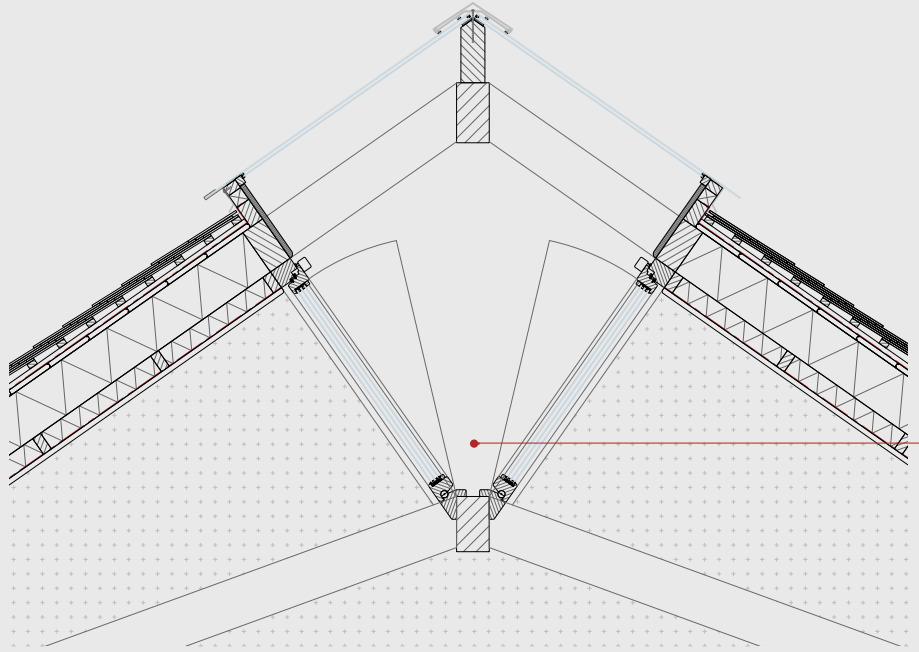
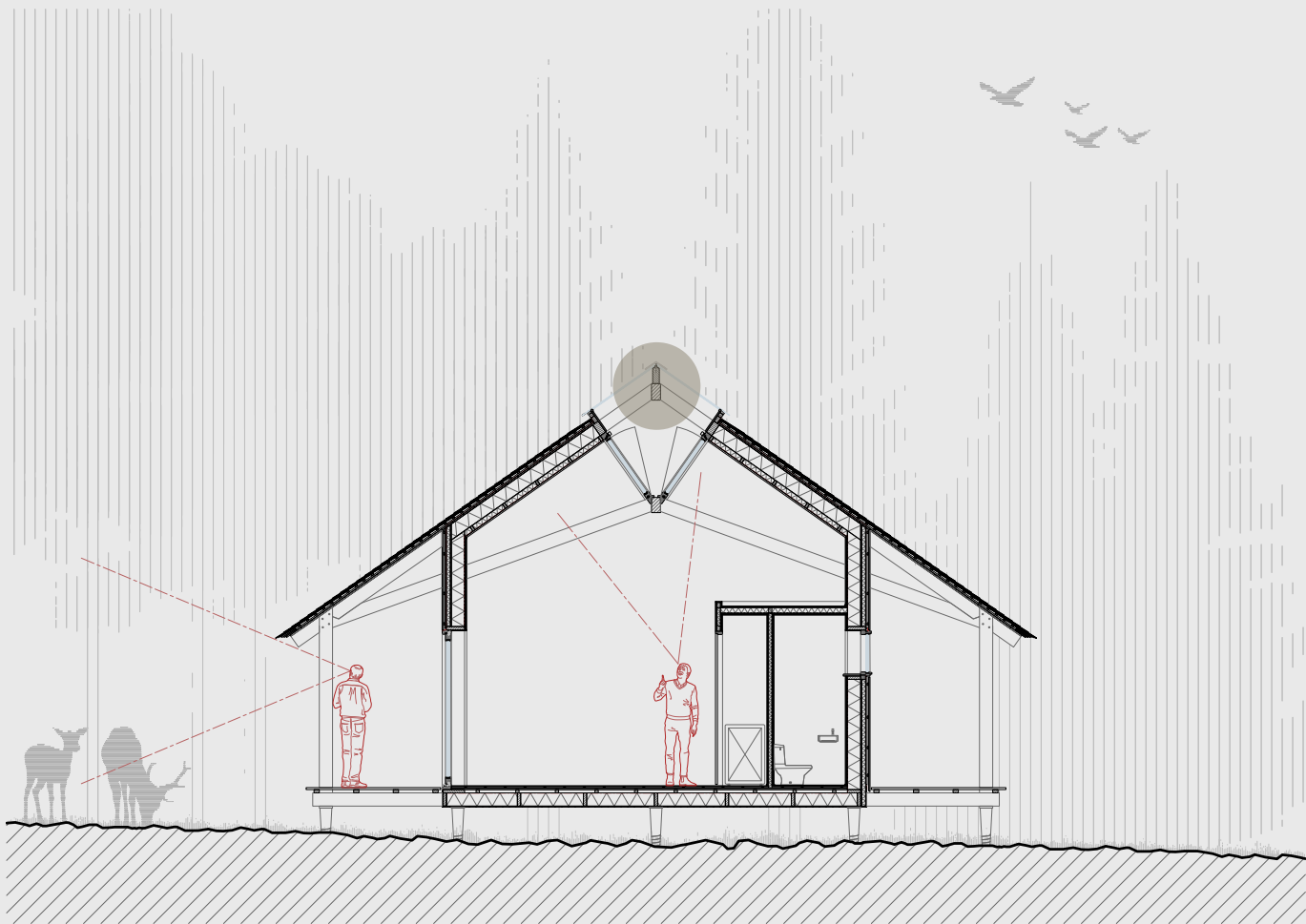
**Daylight casted on local natural materials**

Impression

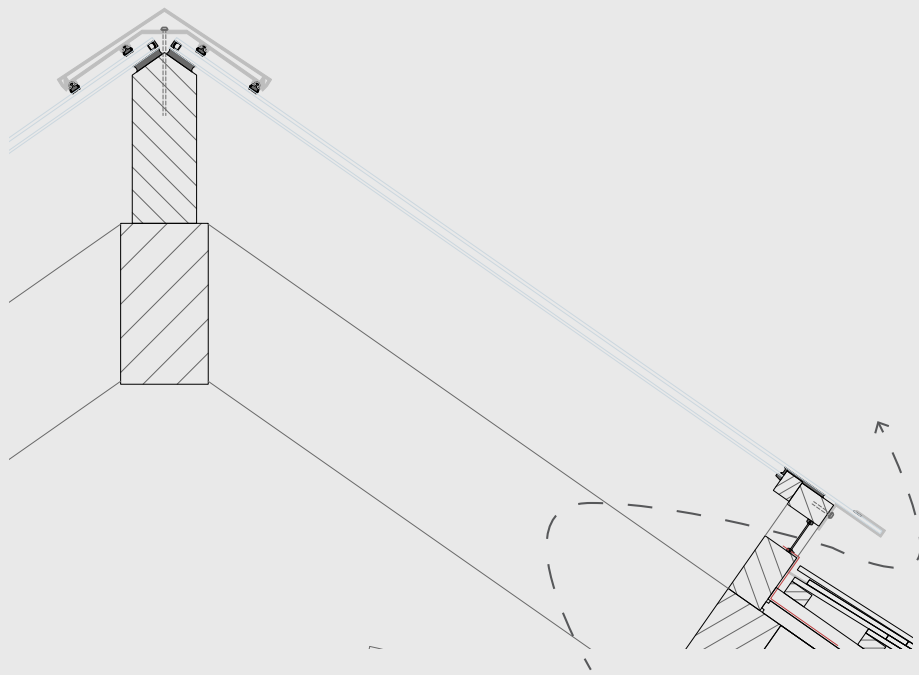


# Zooming in: Barn

Fragment series



double skylight glass pane (5-11-4)  
pine pivoting window frame (FAKRO)  
triple glazed window (4-14-4-14-4)  
chain window extender



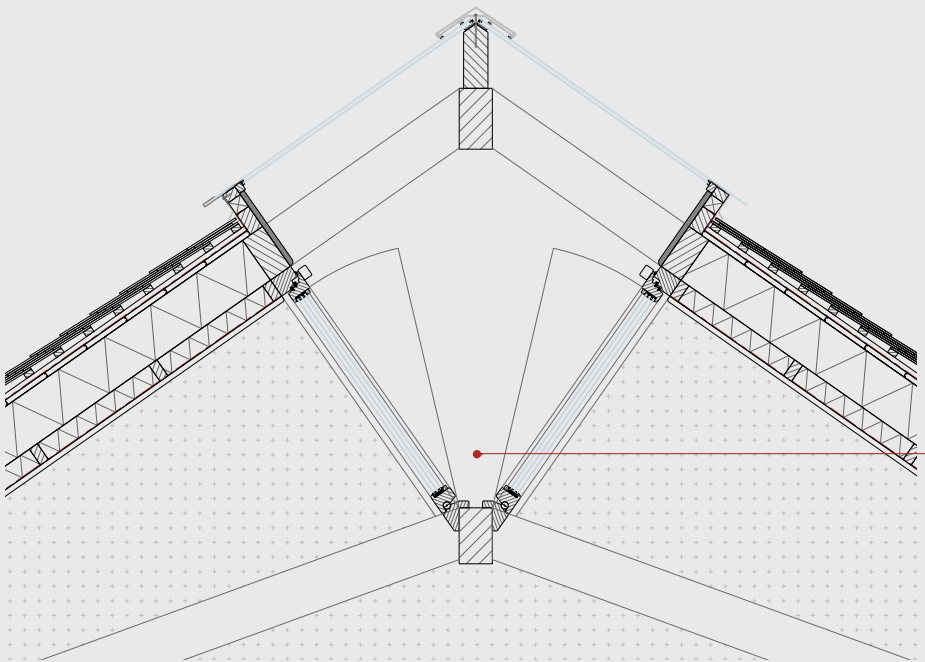
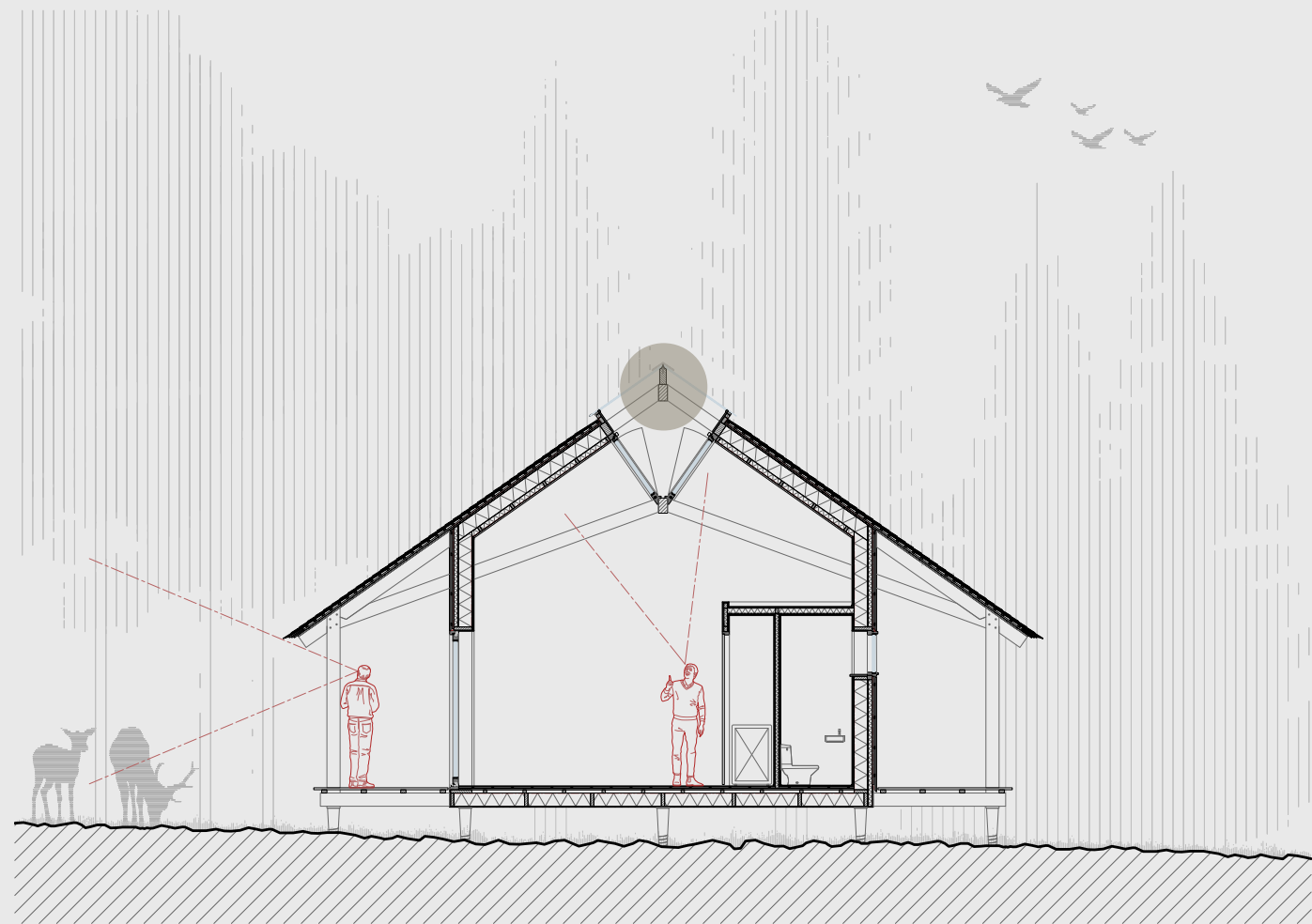
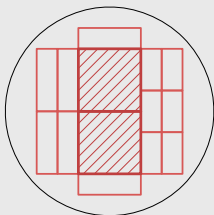
Fragment B.2



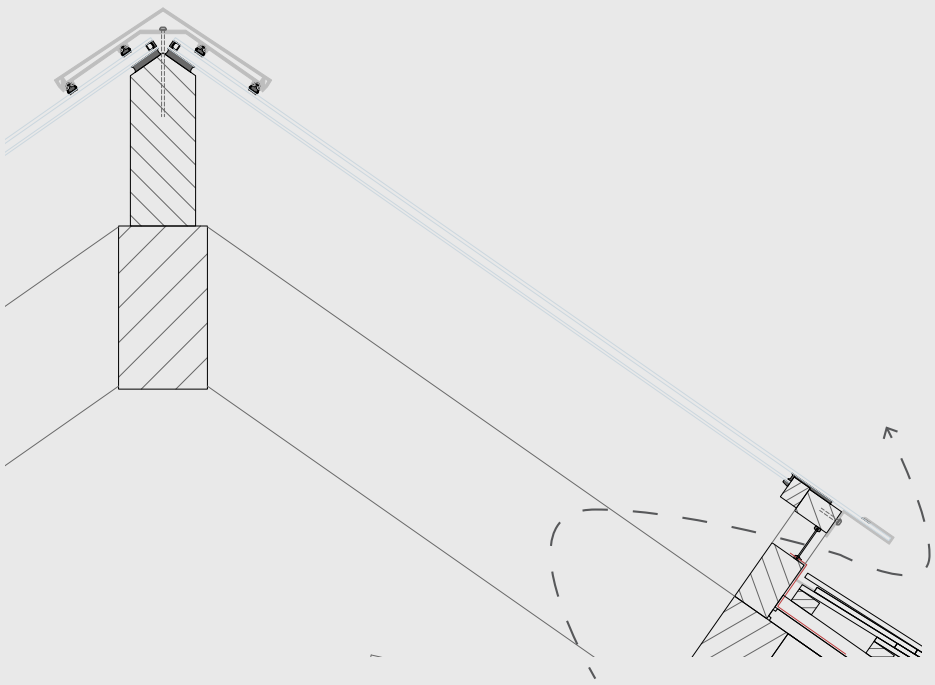
# Zooming in: Barn

Fragment series

resource processing ..... viability statement



double skylight glass pane (5-11-4)  
pine pivoting window frame (FAKRO)  
triple glazed window (4-14-4-14-4)  
chain window extender

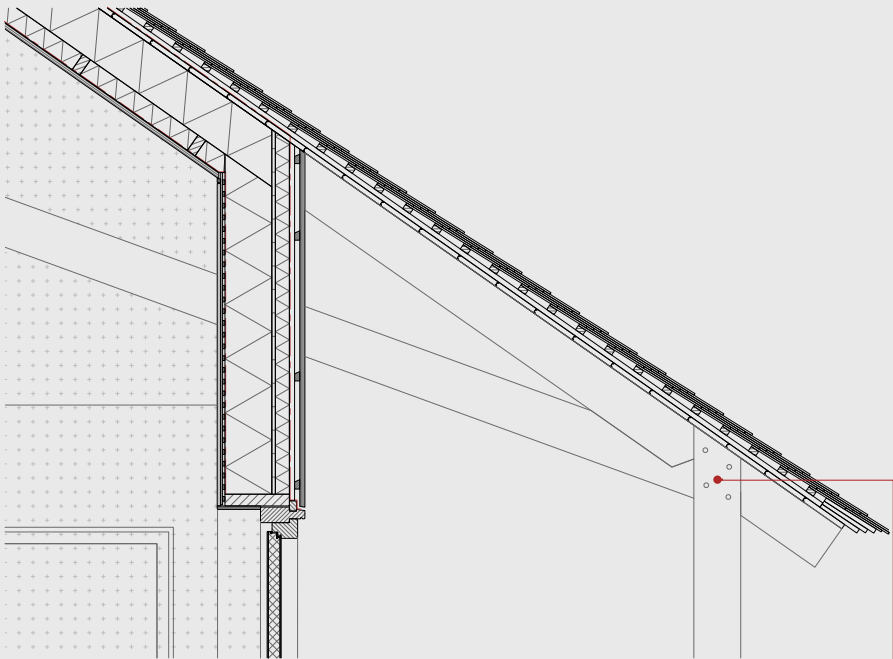
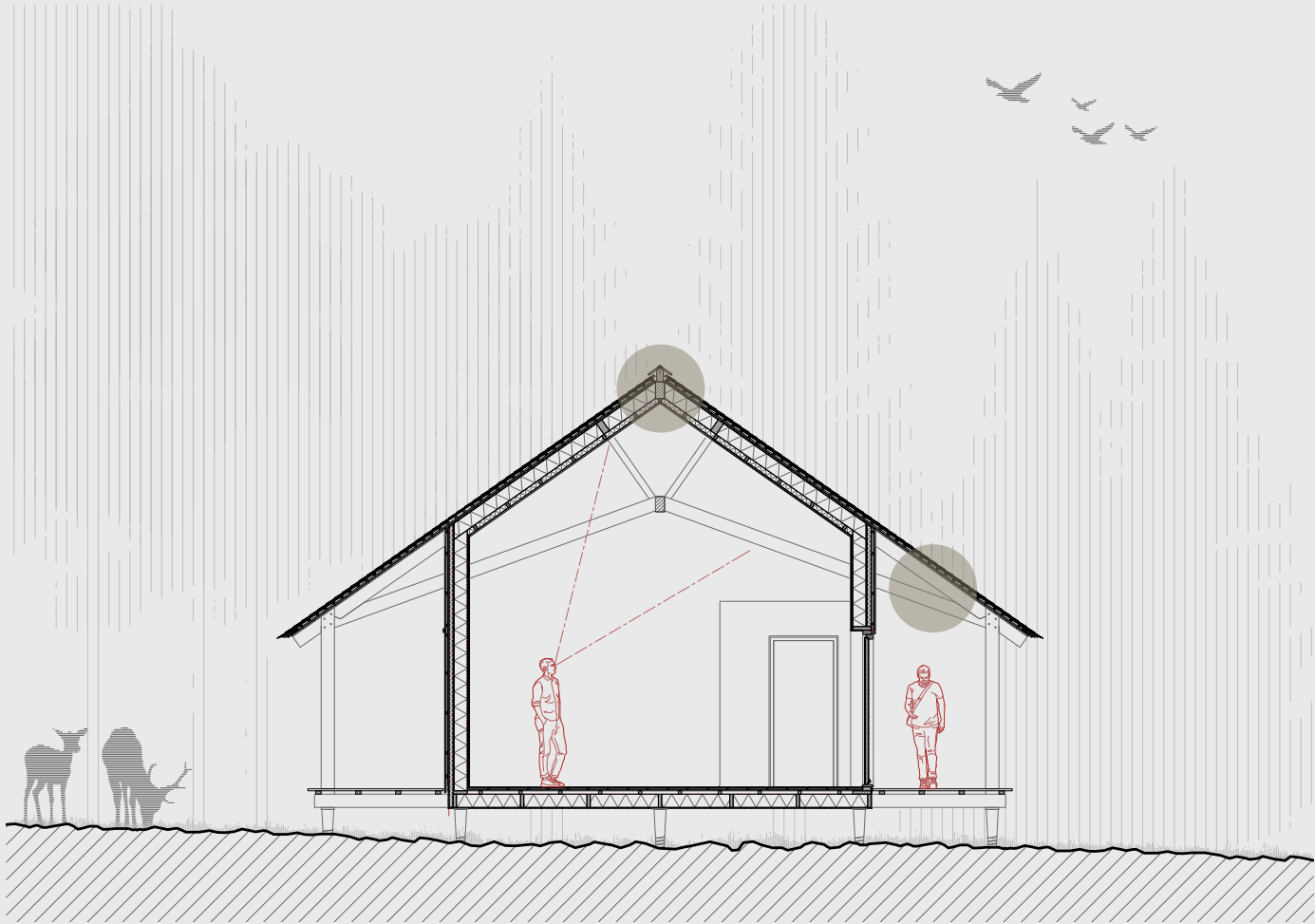


Fragment C



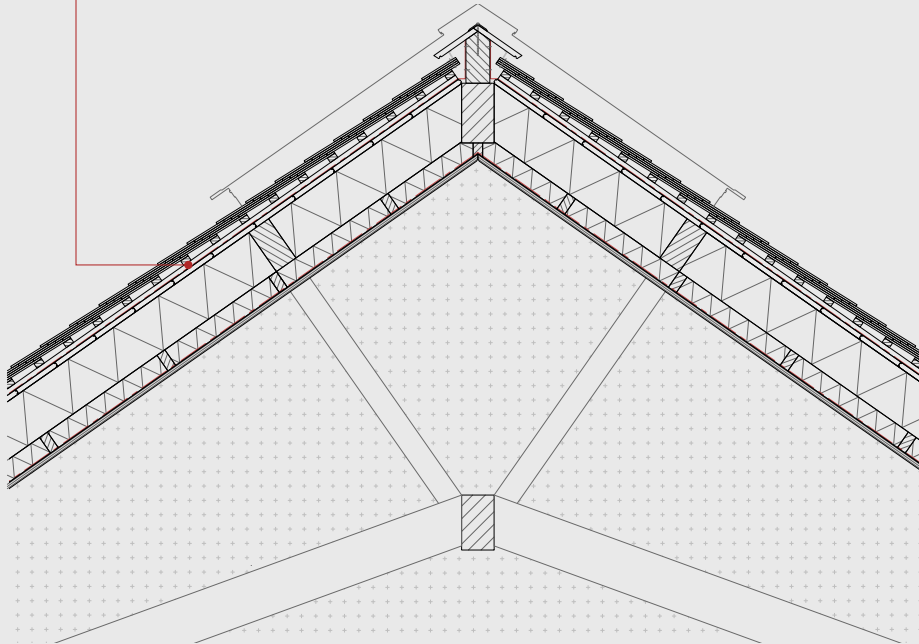
# Zooming in: Barn

Fragment series



pine shingle roof  
EPDM water barrier

oak beams (leaving at 35° / 20°)  
oak column  
moment resistant screwed dowels

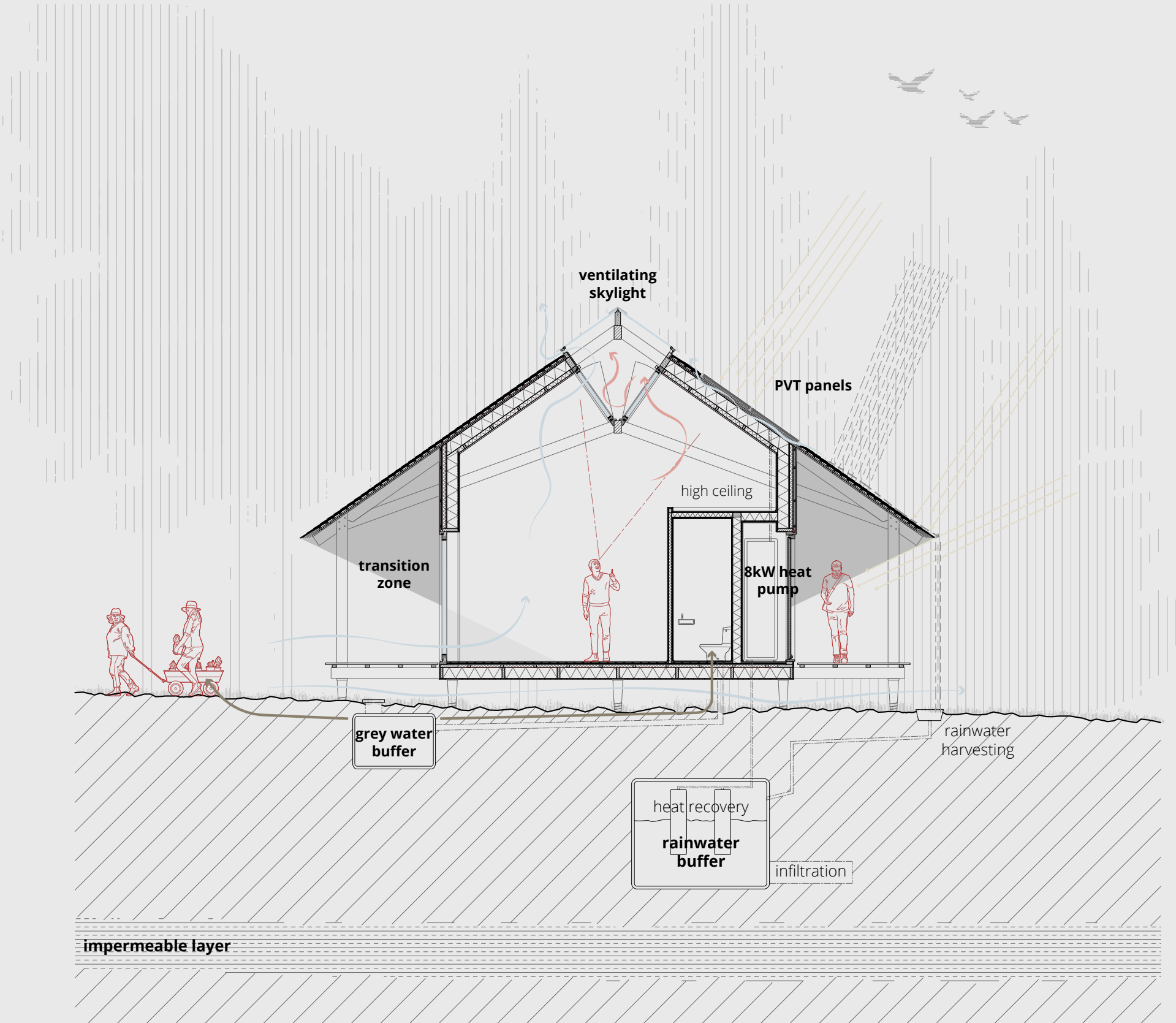


Fragment C



# Zooming in: Barn

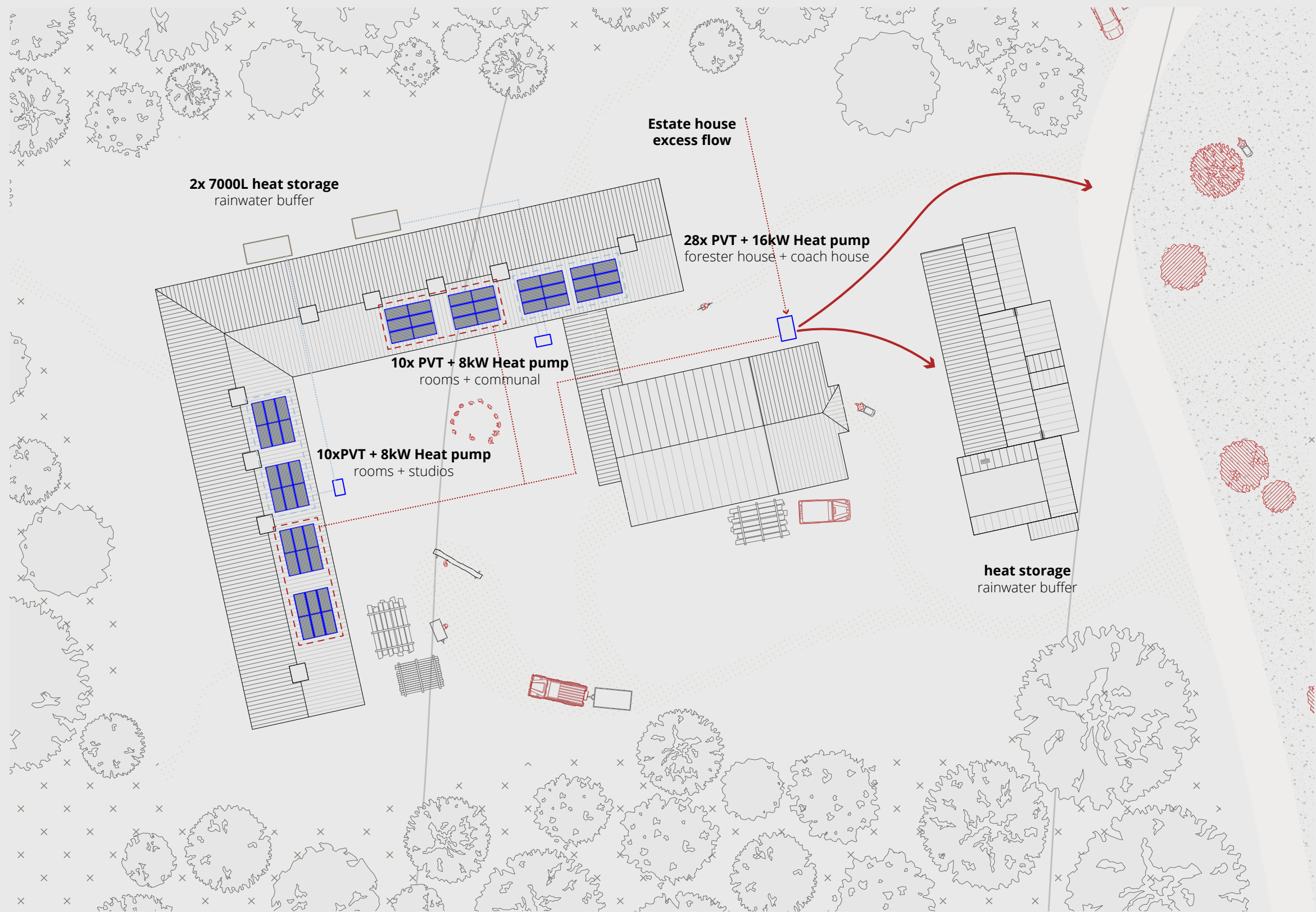
Climate concept



**Energy neutral to self-sufficient**  
PVT system + rainwater buffer heat storage

# Zooming in: Barn

Climate concept



**Providing energy to the estate**  
extra 28x PVT + 16KW heat pump



# Zooming in: Barn

Construction



**Shingle roof + PVT application**  
Reference



# Zooming in: Barn

## Overview

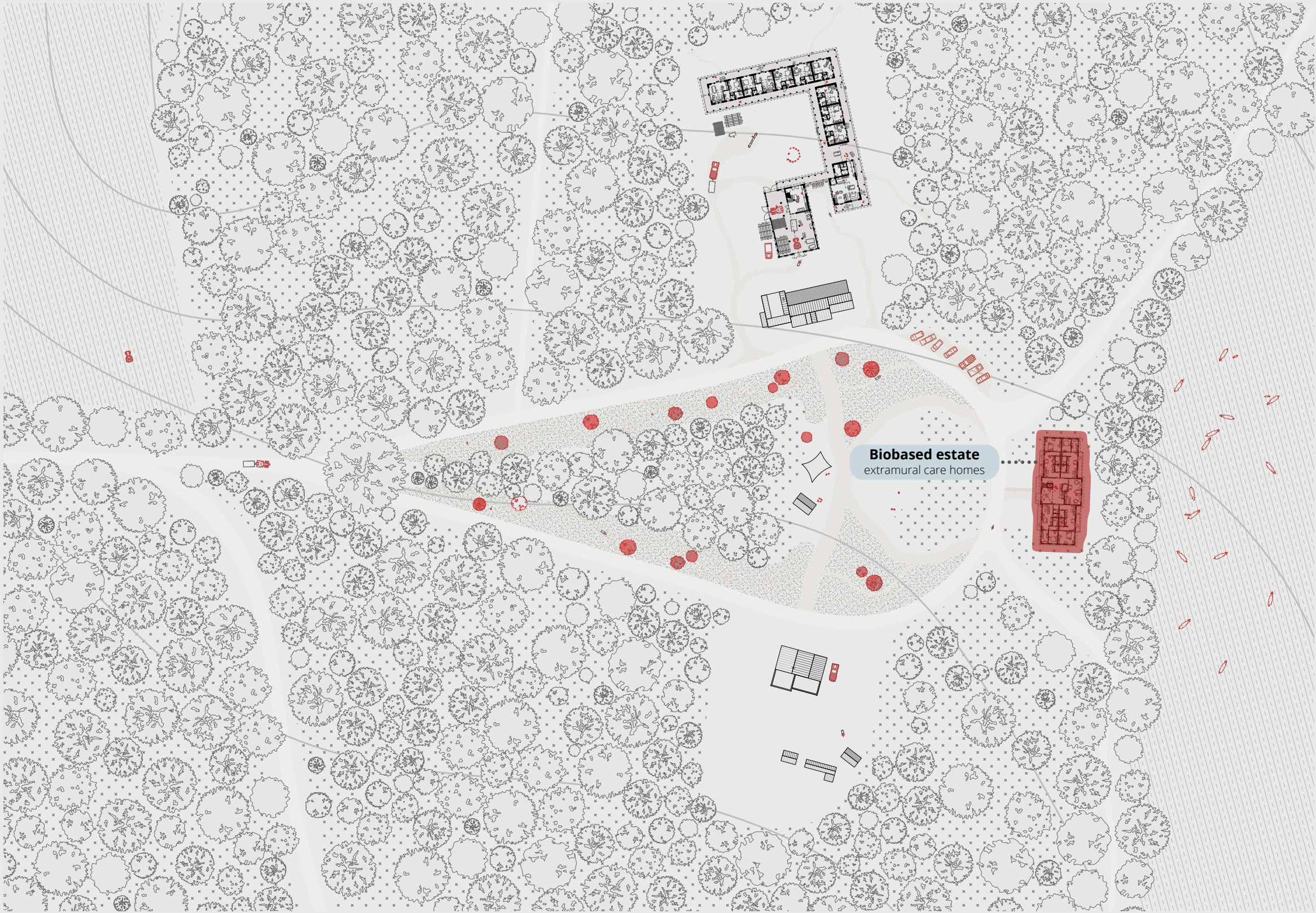


**Continuation historic design grammar in contemporary extension**  
Longitudal section + elevation



# Masterplan

Design

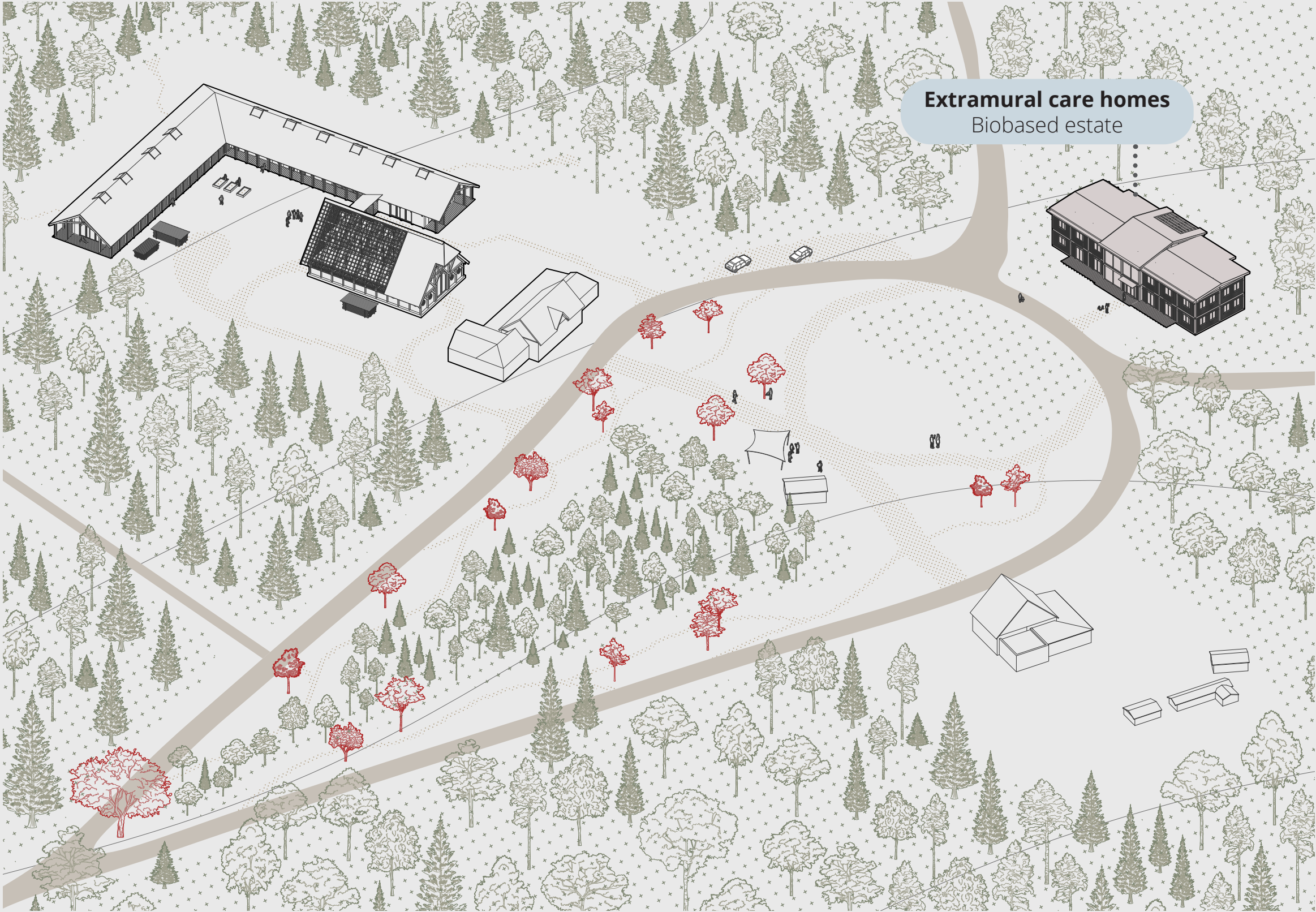


Zooming in on: Estate house



# Masterplan

Design



Zooming in on: Estate house



# Zooming in: Estate house

Biobased construction



**Surrounding estates vs. Biobased 'estates'**

Watermeerwijk vs. Büttenhardt

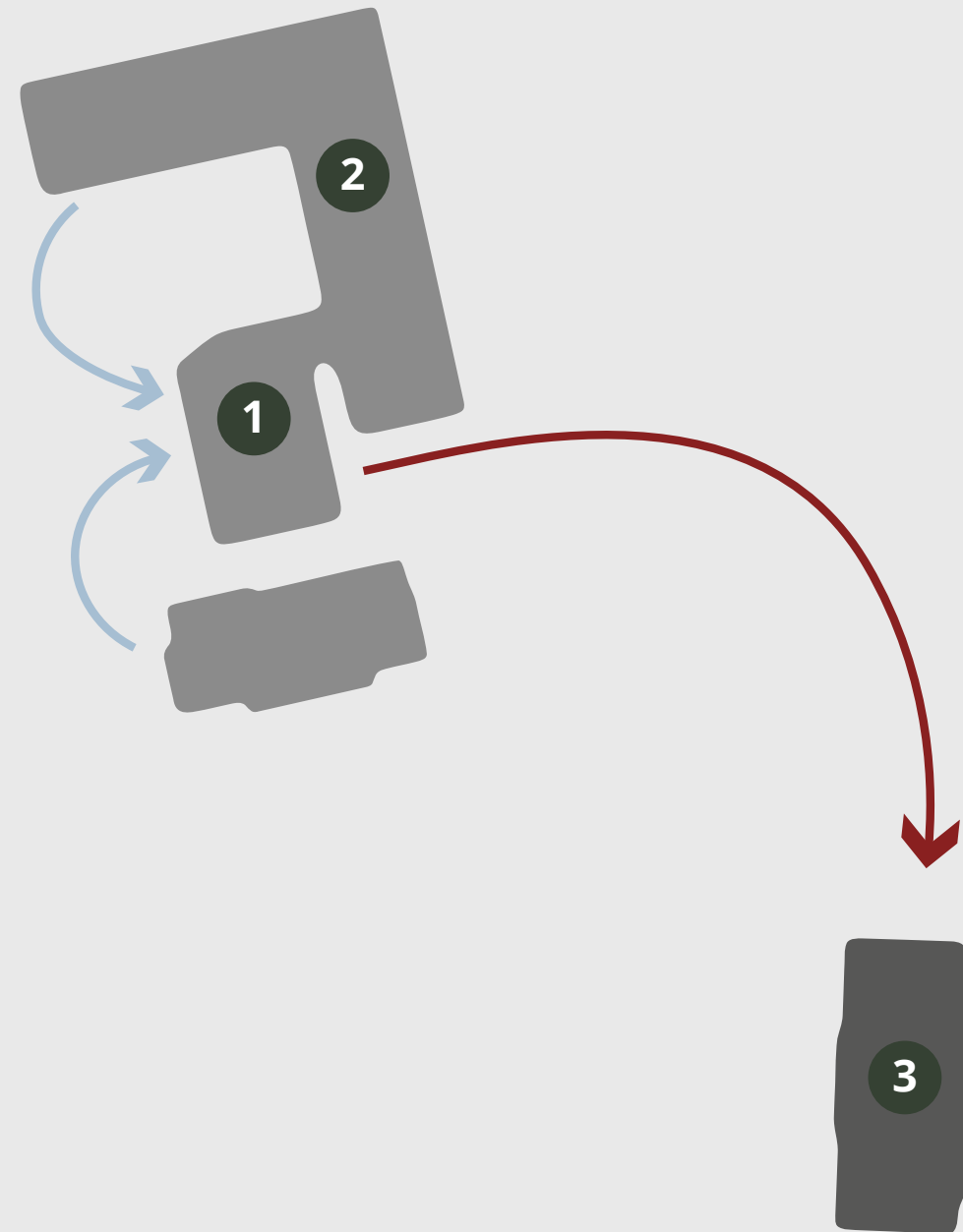


# Zooming in: Estate house

Starting points



**Tangible materials**  
origin

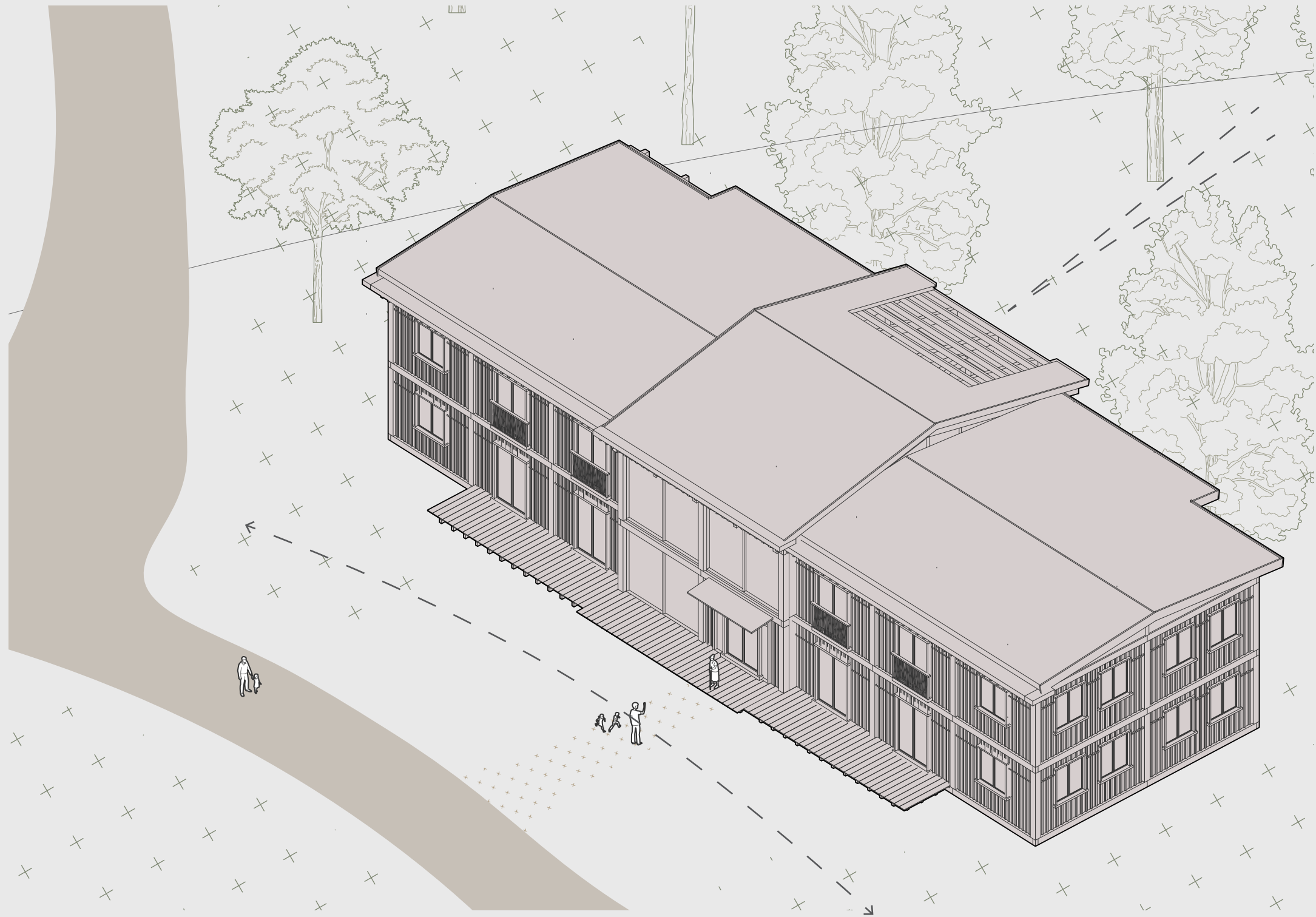


**Building sequence**  
community



# Zooming in: Estate house

Starting points

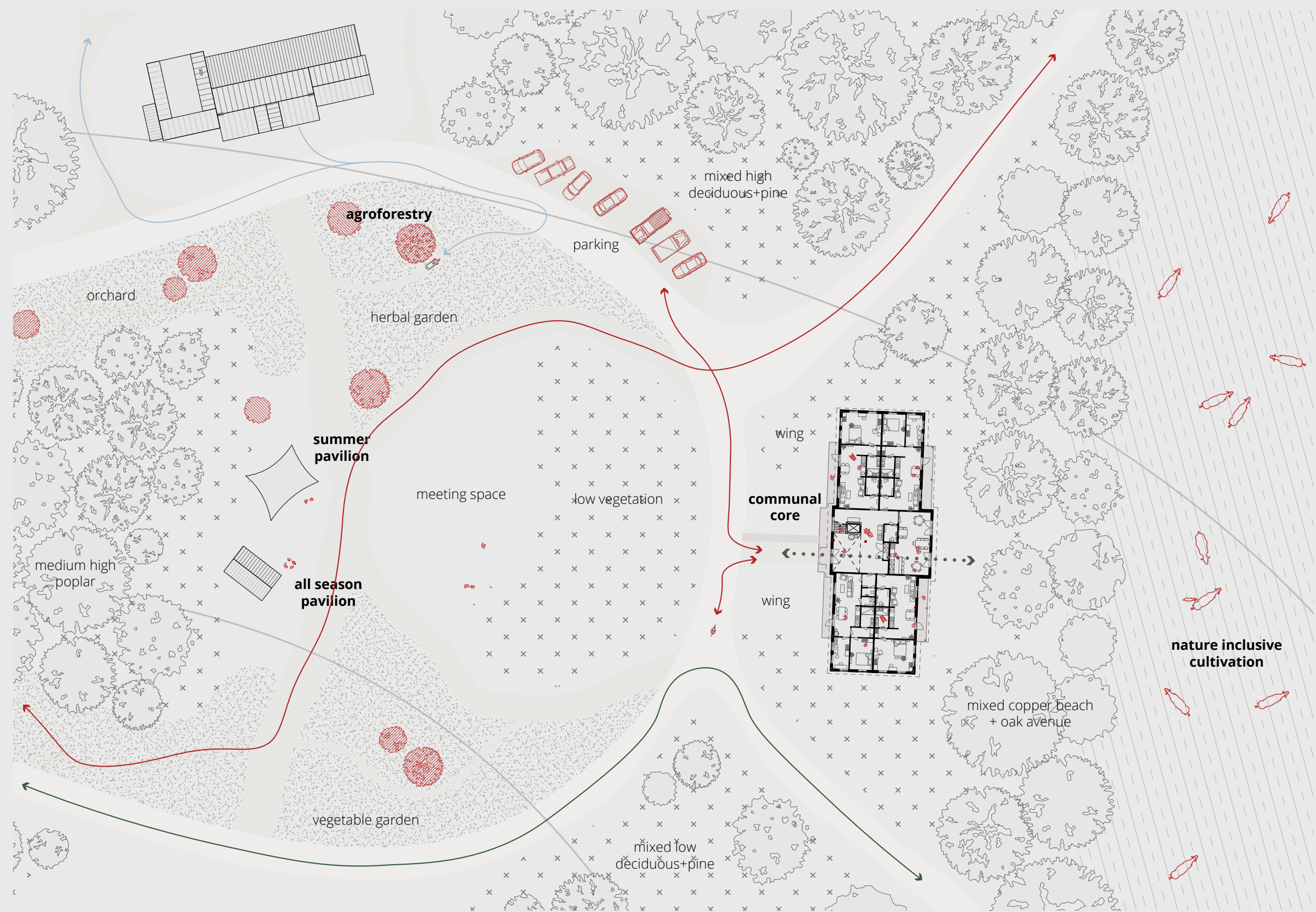


Design grammar



# Zooming in: Estate house

Biobased construction

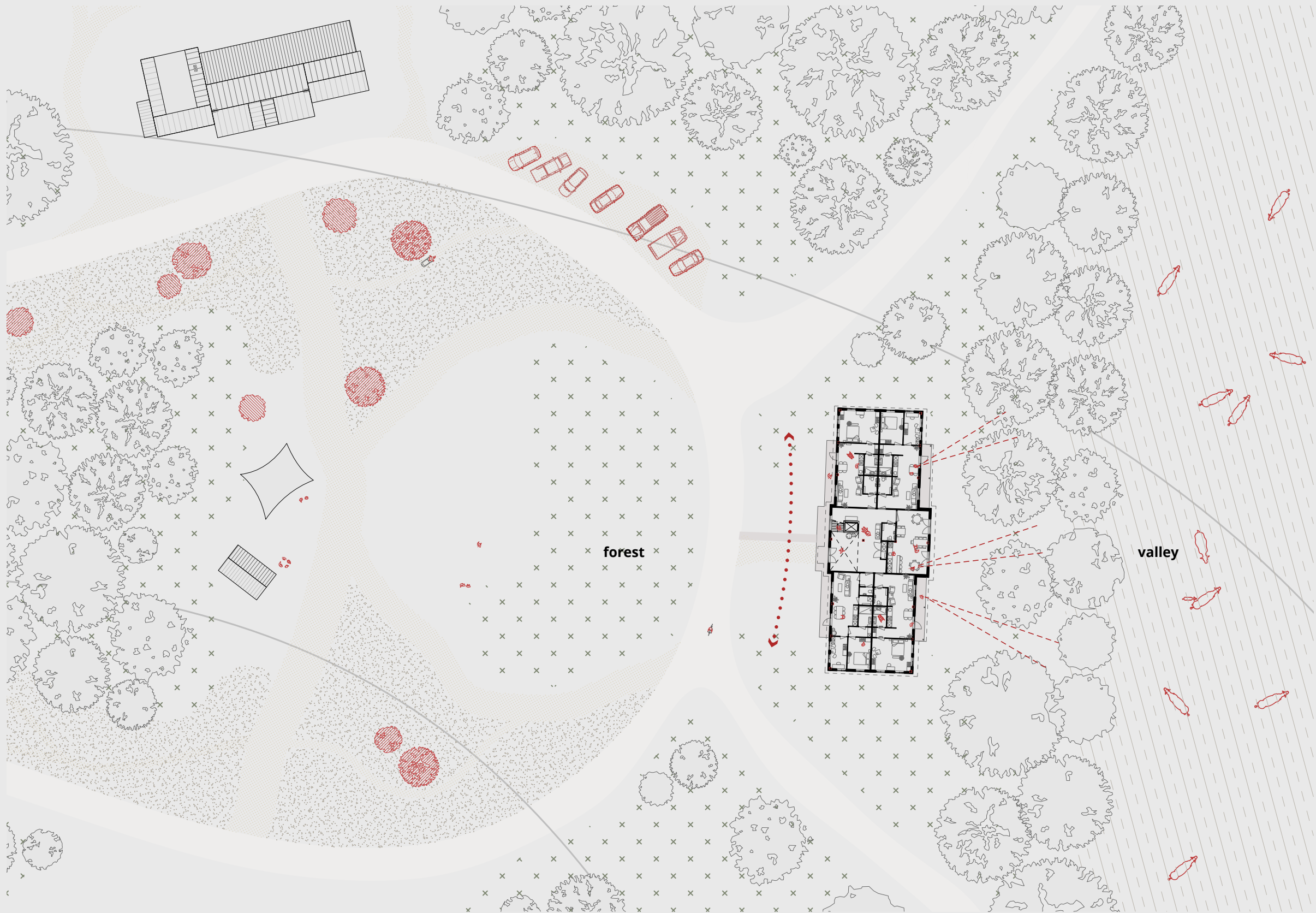


**Flows**  
Residents - meeting - cultivation



# Zooming in: Estate house

Biobased construction



**Division**  
forest - valley





# Zooming in: Estate house

Biobased construction



**Forest**  
secluded

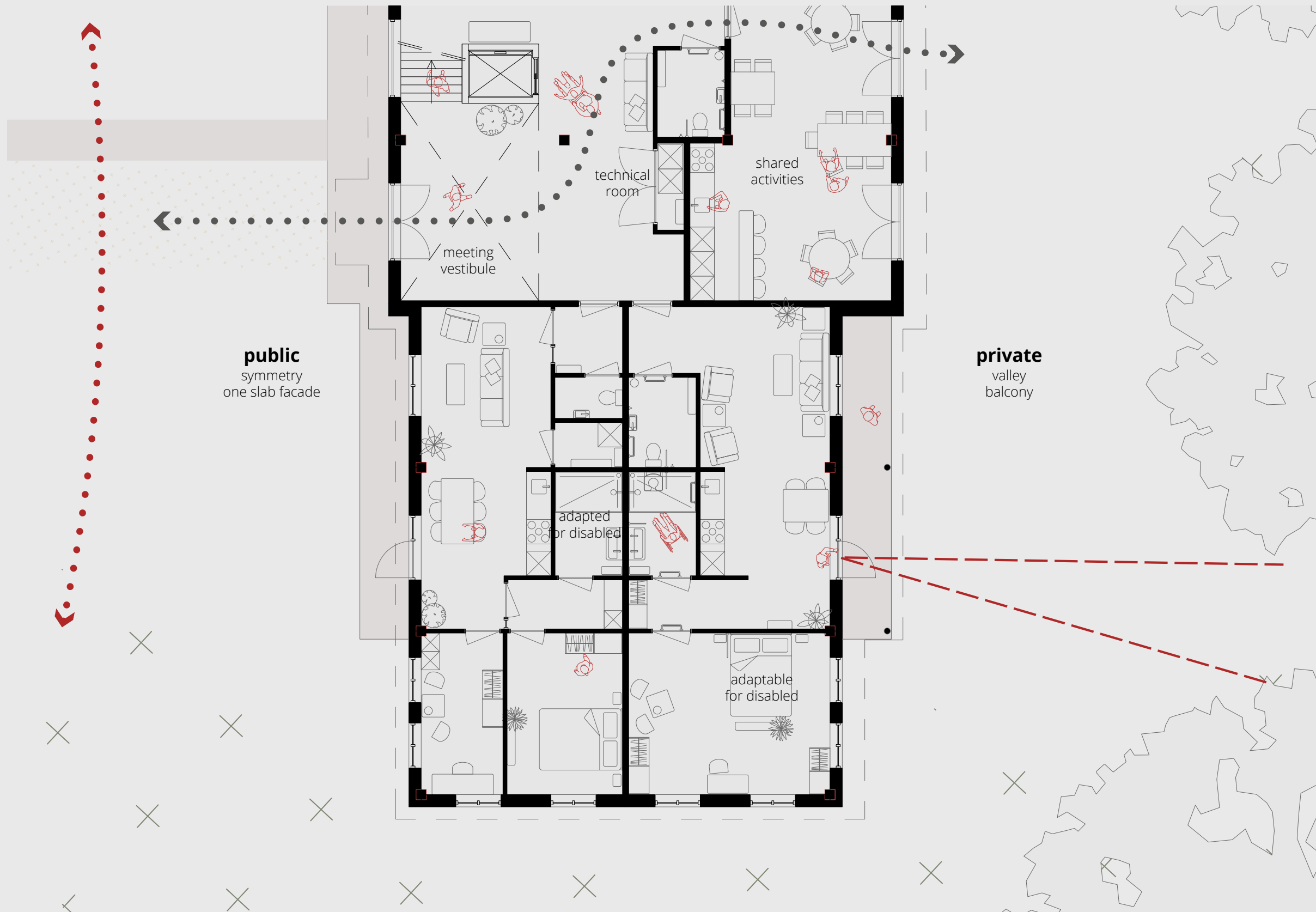


**Valley**  
Kranenburg



# Zooming in: Estate house

Biobased construction



**Relation public - private**  
Communal core - shared activities - adaptable houses



# Zooming in: Estate house

Biobased construction



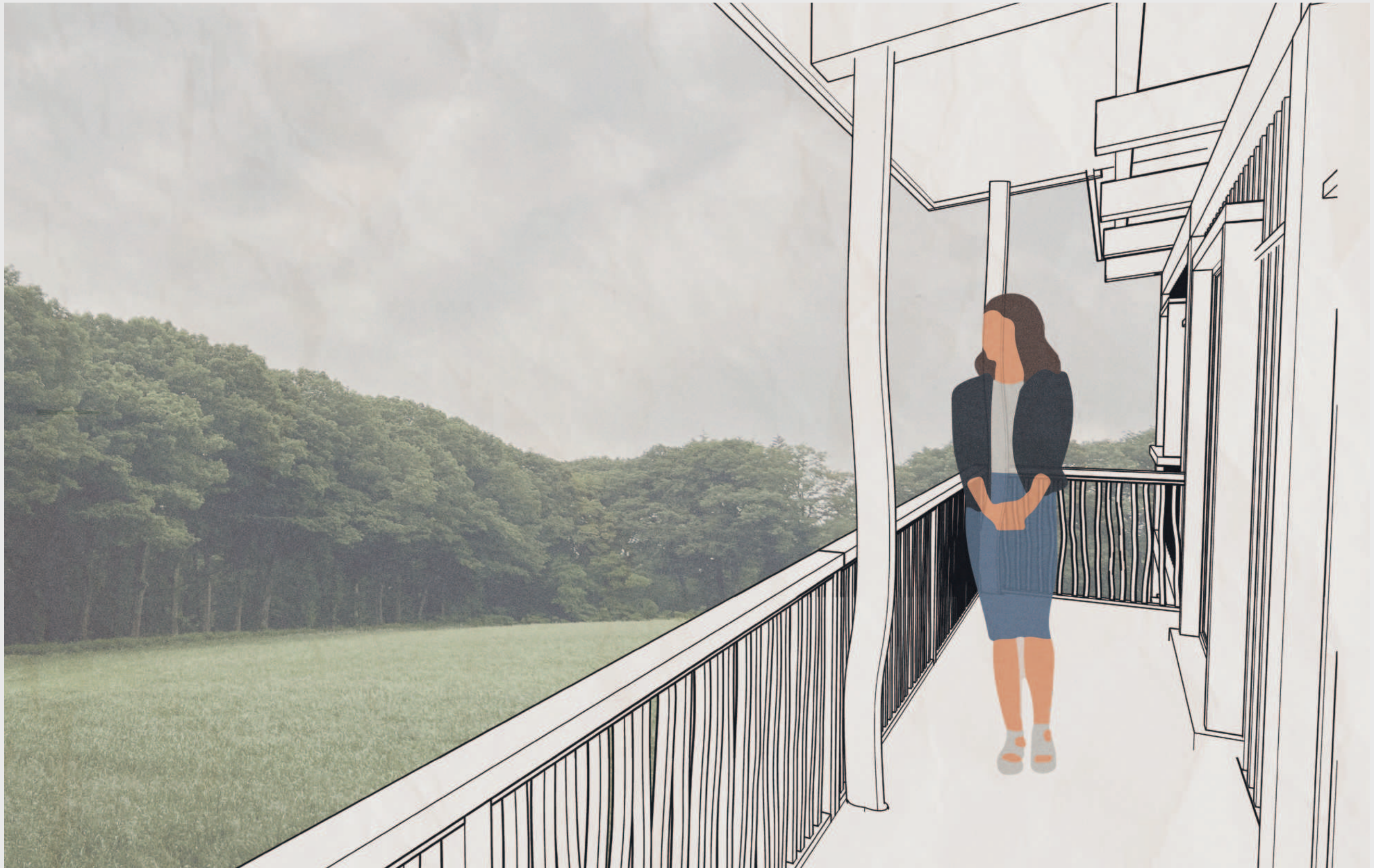
## Elevation

Eaves - rhythm - hierarchy - contemporary interpretation



# Zooming in: Estate house

Biobased construction



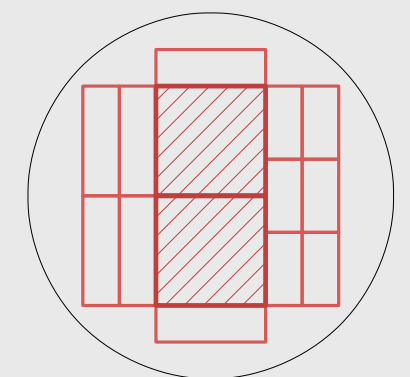
**Valley view from the balcony**

Impression



# Zooming in: Estate house

Biobased construction



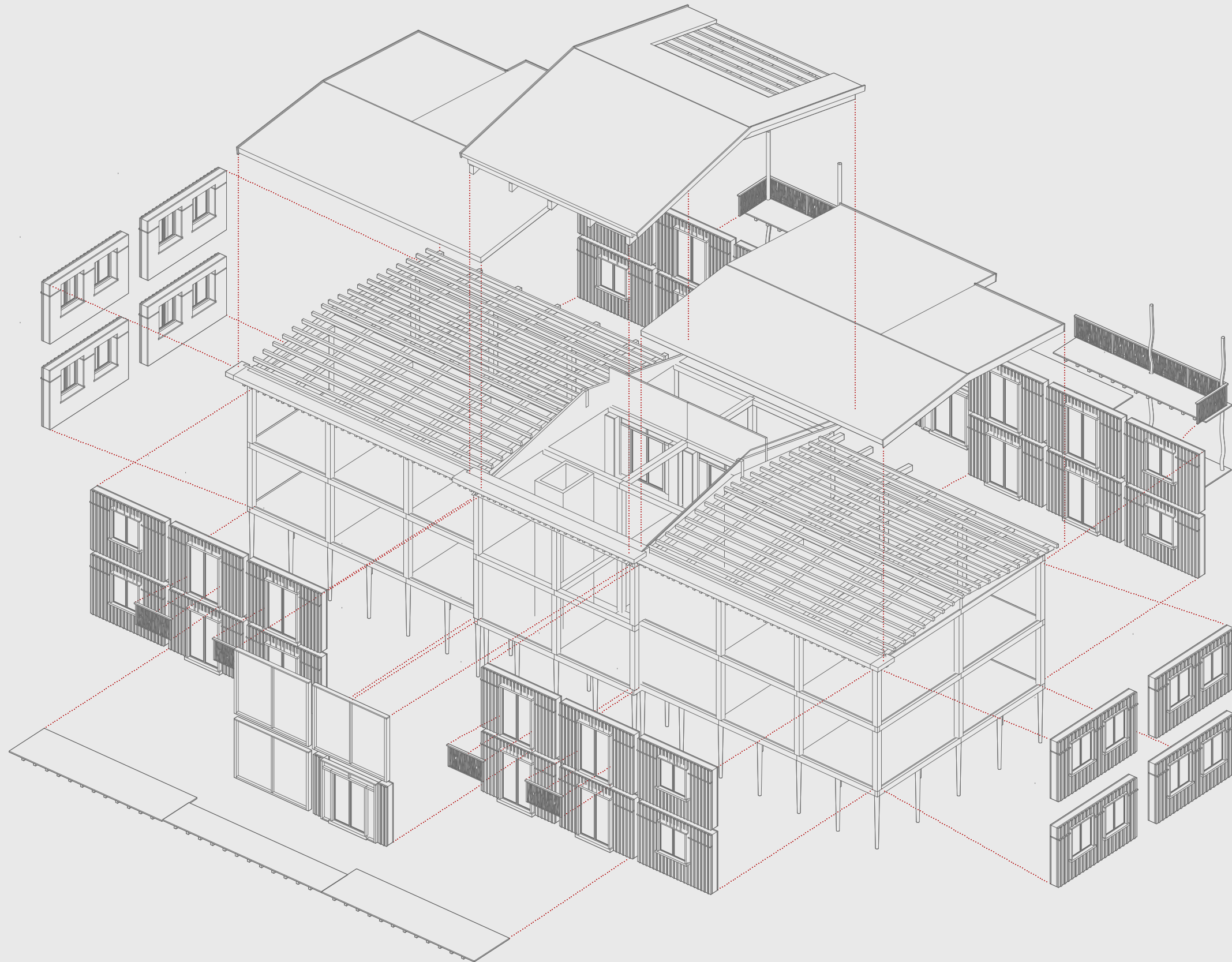
resource  
processing

**Elevation zoom in**  
material origin and processing



# Zooming in: Estate house

Biobased construction



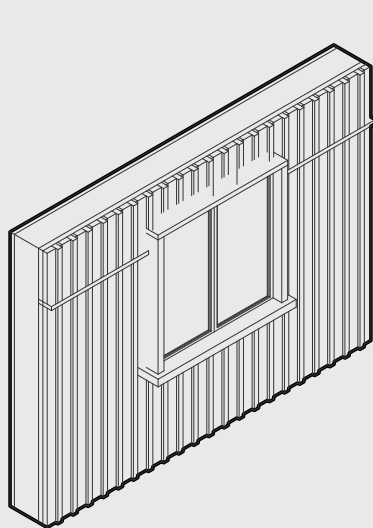
## Building technology axo

HSB elements in a DLT + beams and post load bearing construction

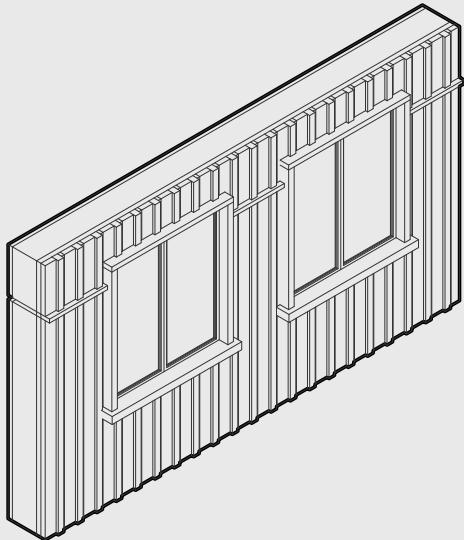


# Zooming in: Estate house

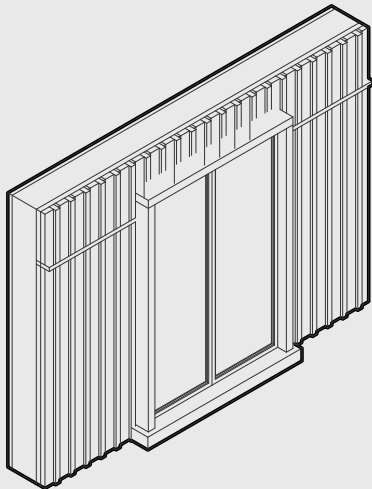
Biobased construction



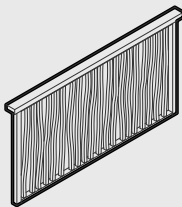
**8x Wall element A**  
0,97 m<sup>3</sup> construction  
0,68 m<sup>3</sup> cladding  
0,76 m<sup>3</sup> finishing



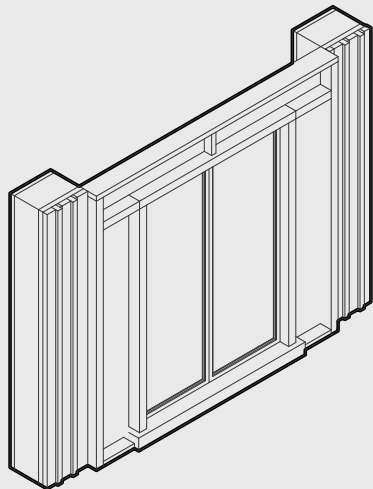
**8x Wall element B**  
1,87 m<sup>3</sup> construction  
1,24 m<sup>3</sup> cladding  
1,56 m<sup>3</sup> finishing



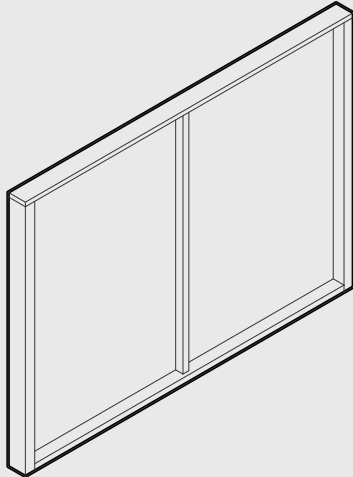
**16x Wall element C**  
0,84 m<sup>3</sup> construction  
0,52 m<sup>3</sup> cladding  
0,61 m<sup>3</sup> finishing



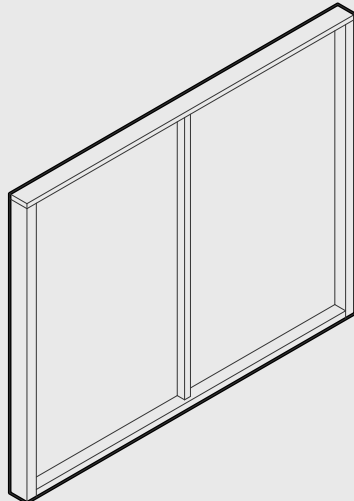
**15x Balcony element A**  
0,06 m<sup>3</sup> construction



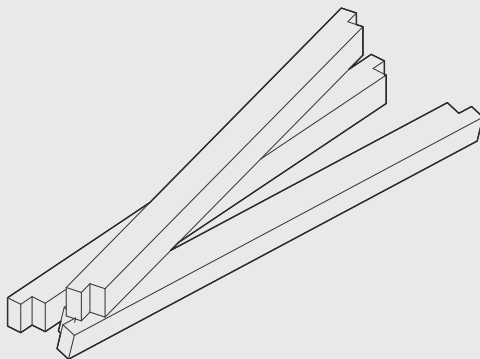
**3x Wall element A**  
0,31 m<sup>3</sup> construction  
0,15 m<sup>3</sup> cladding  
0,18 m<sup>3</sup> finishing



**1x Wall element A**  
0,23 m<sup>3</sup> construction



**2x Wall element A**  
0,28 m<sup>3</sup> construction



**88x Columns and beams**  
20,35 m<sup>3</sup> construction

**Kit of tools**  
111,74 m<sup>3</sup> of timber - 38 trees



---

# CONCLUSION

---

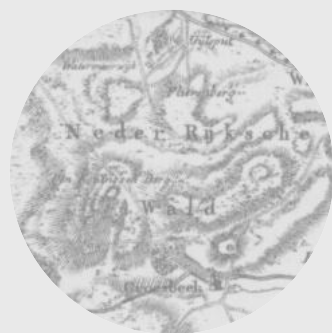
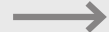


# Conclusion

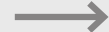
## Summary



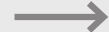
primeval forest  
150.000 B.C.



reclamations  
0 - 1890



country estates  
1890 - 1930



degradation  
1960 - 2024

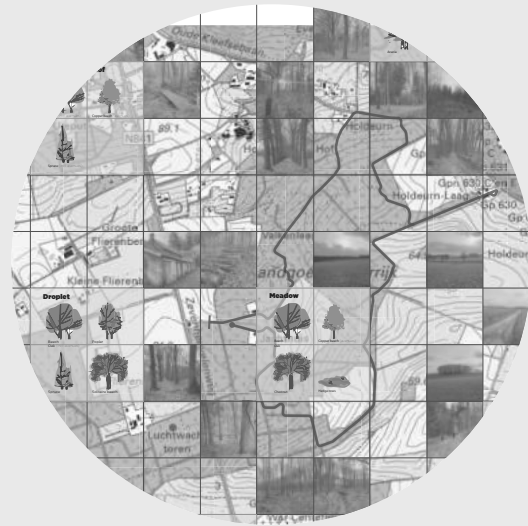


circular countryside  
2024

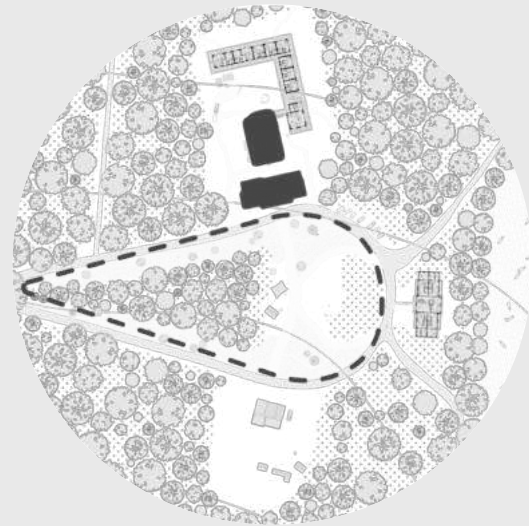


# Conclusion

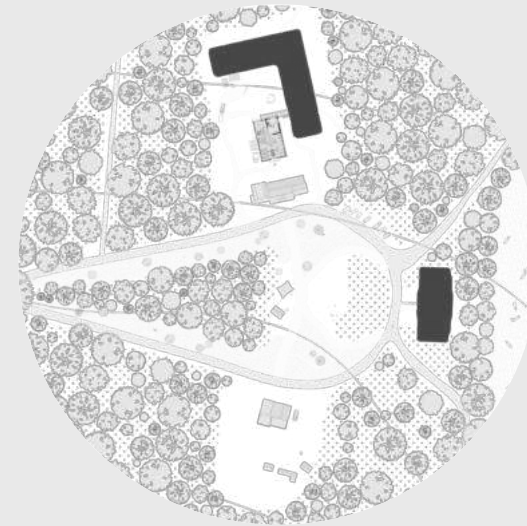
## Summary



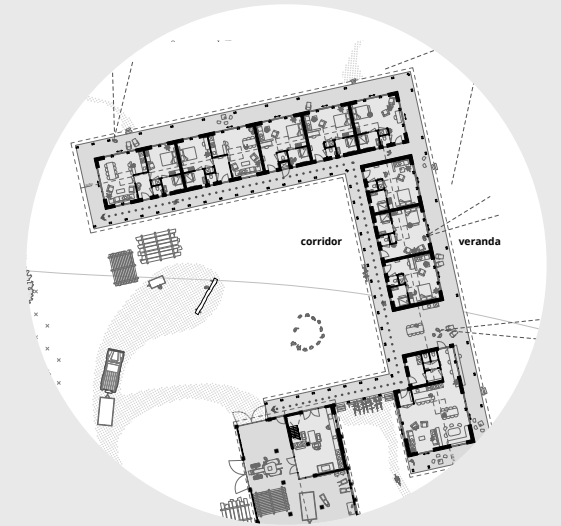
identifying and analysing  
existing underused landscape



adapting existing  
structures



introducing new  
biobased buildings



creating a viable  
future

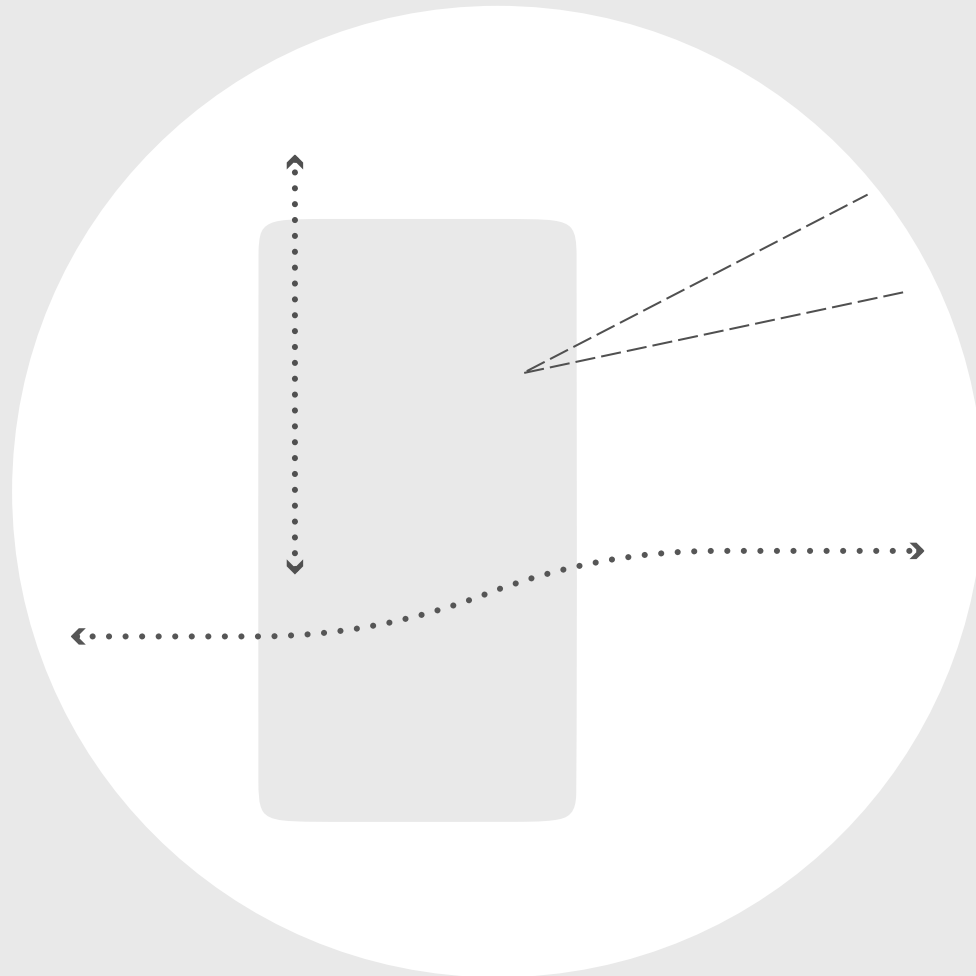
## Interventions

By taking from the landscape without depleting it,  
something is given back to guarantee its future.

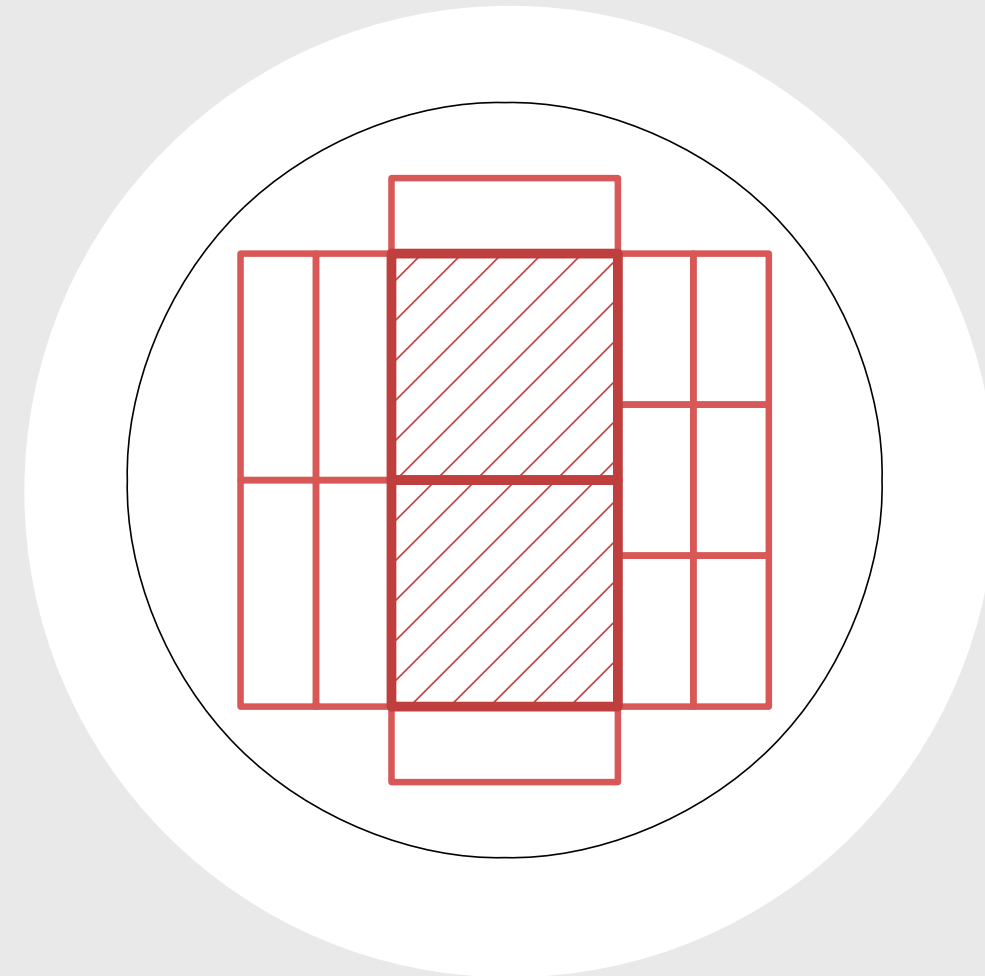


# Conclusion

## Summary



**Public - private**  
open - intimate  
connection



**Resource availability**  
harvest - processing - application

## Design



# Conclusion

Methodology



## Broader context

Country estate Westerhelling: € 3.000.000

---

**THANK YOU**

---



# REVITALISING RURAL HERITAGE

P5 PRESENTATION ARCHITECTURAL ENGINEERING GRADUATION



**Daan van Dortmont**

**Mo Smit** – Design tutor

**Pierre Jennen** – Research tutor

**Paddy Tomesen** – Building technology tutor

**Marcel Bilow** – Examiner

Exploring local resource management and innovative biobased building methods to accomodate **viable**, self-sufficient, multifunctional and **sustainable** rural heritage sites

**TU Delft**  
**BK Bouwkunde**