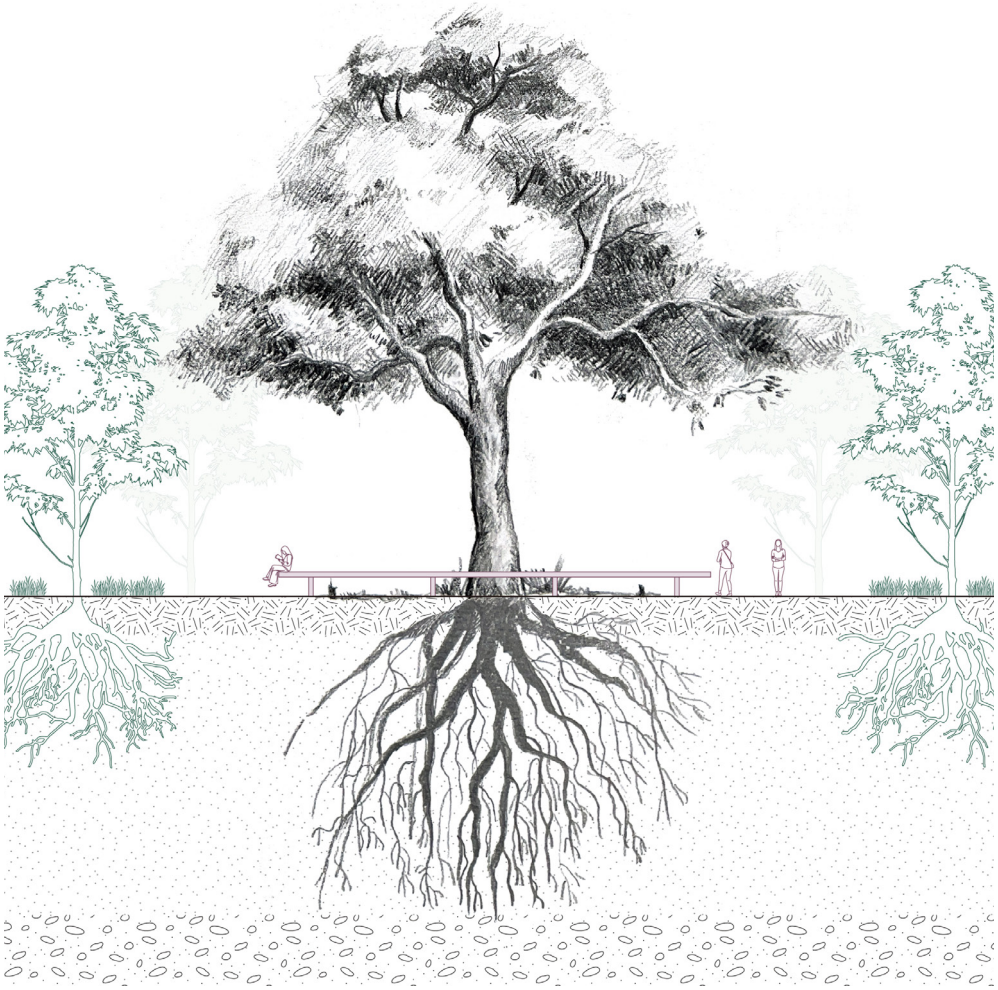
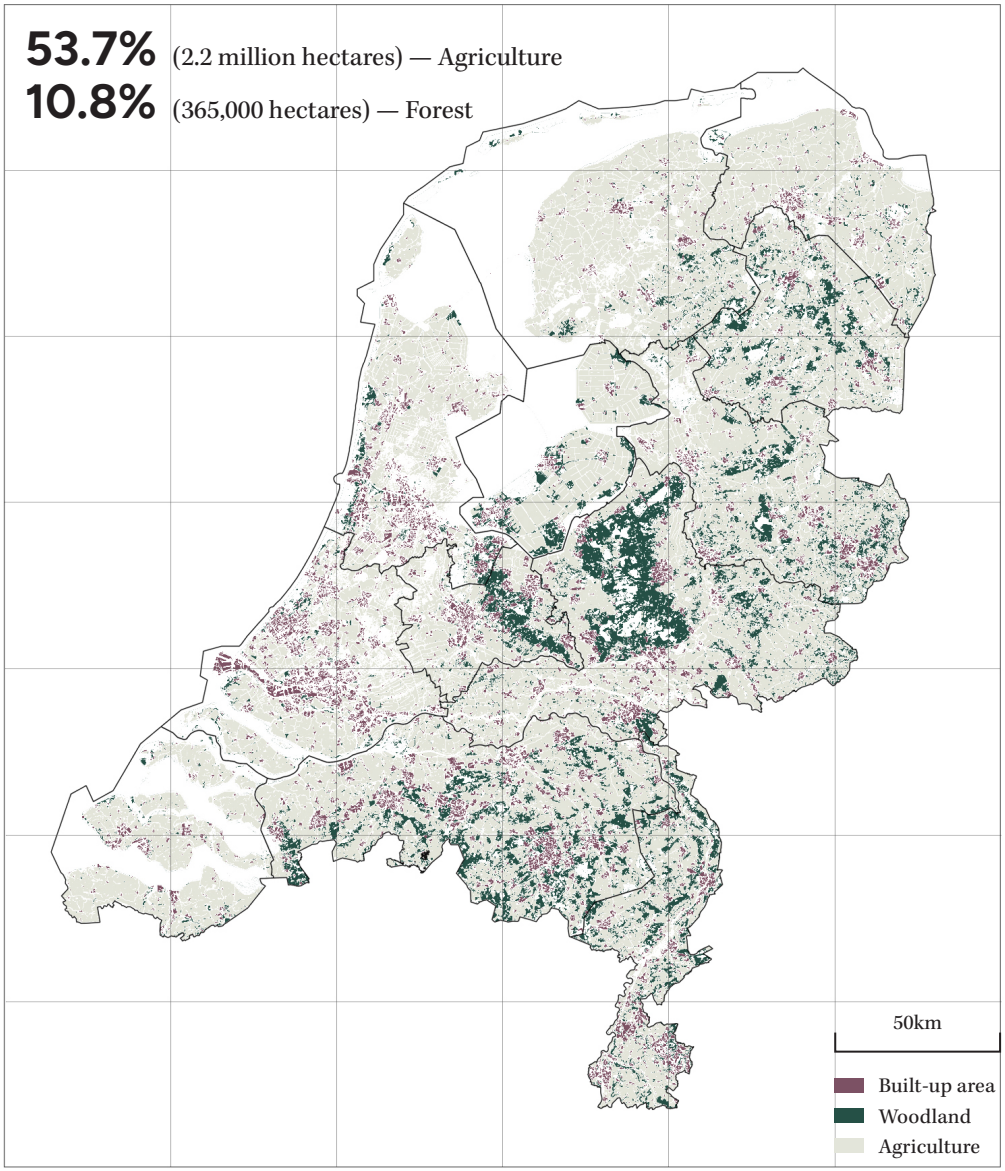
Utrechtse Heuvelrug:
Designing a Future Forest Metropolis



P5 presentation | 20-06-2025
Flowscapes Studio - Urban Forestry Lab
Qianlin Xu

BACKGROUND

A history of deforestation and reforestation

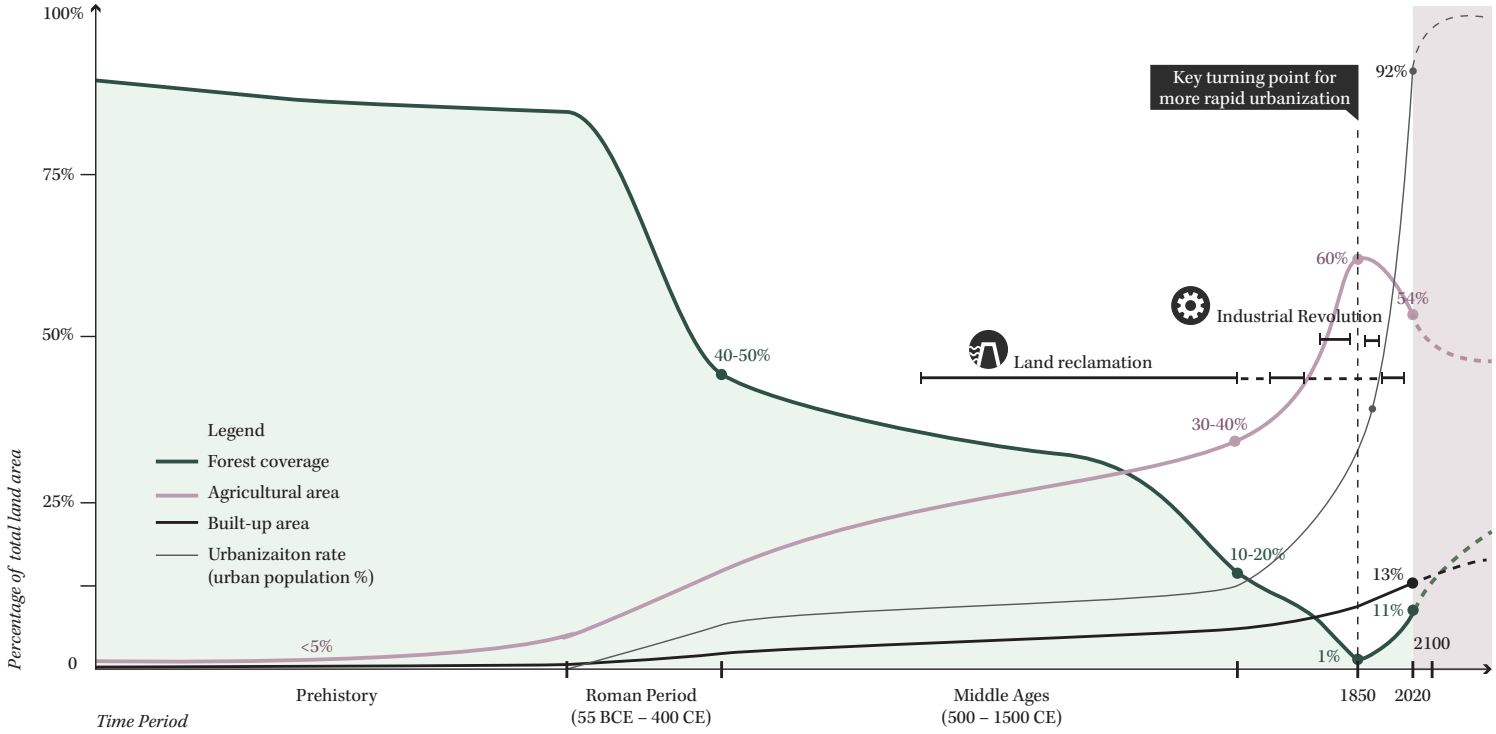


Land use map with agriculture, forest and built-up area layers in the Netherlands, 2015.

Adapted from *Land use in the Netherlands, 2015*, by Statistics Netherlands et al., 2020.

BACKGROUND

A history of deforestation and reforestation



Historical changes in land use and urbanization in the Netherlands

Data from Boosten, 2016; Centraal Bureau voor de Statistiek, 2023; Feng, 1997, p. 42; Food and Agriculture Organization of the United Nations, 2020; van der Meulen, 2003.

BACKGROUND

A history of deforestation and reforestation

In the Netherlands,

370,000 ha
existing forest
+
37,000 ha
new forest, by 2030

15,000+- ha in the NNN
19,000 ha outside the NNN

In Utrecht,

4,570 ha
new nature
=
1,570 ha
in the NNN, by 2027
+
3,000 ha
in the Green Contour

In Utrecht,

18,000 ha
existing forest
+
1,500 ha
new forest, by 2040

500 ha in the NNN
500 ha in the Green Contour
500 ha in rural areas, around towns and villages

Data from Interprovinciaal Overleg & Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2020; Provincie Utrecht, 2021; Provincie Utrecht, 2022; Provincie Utrecht, 2024.

BACKGROUND

A history of deforestation and reforestation

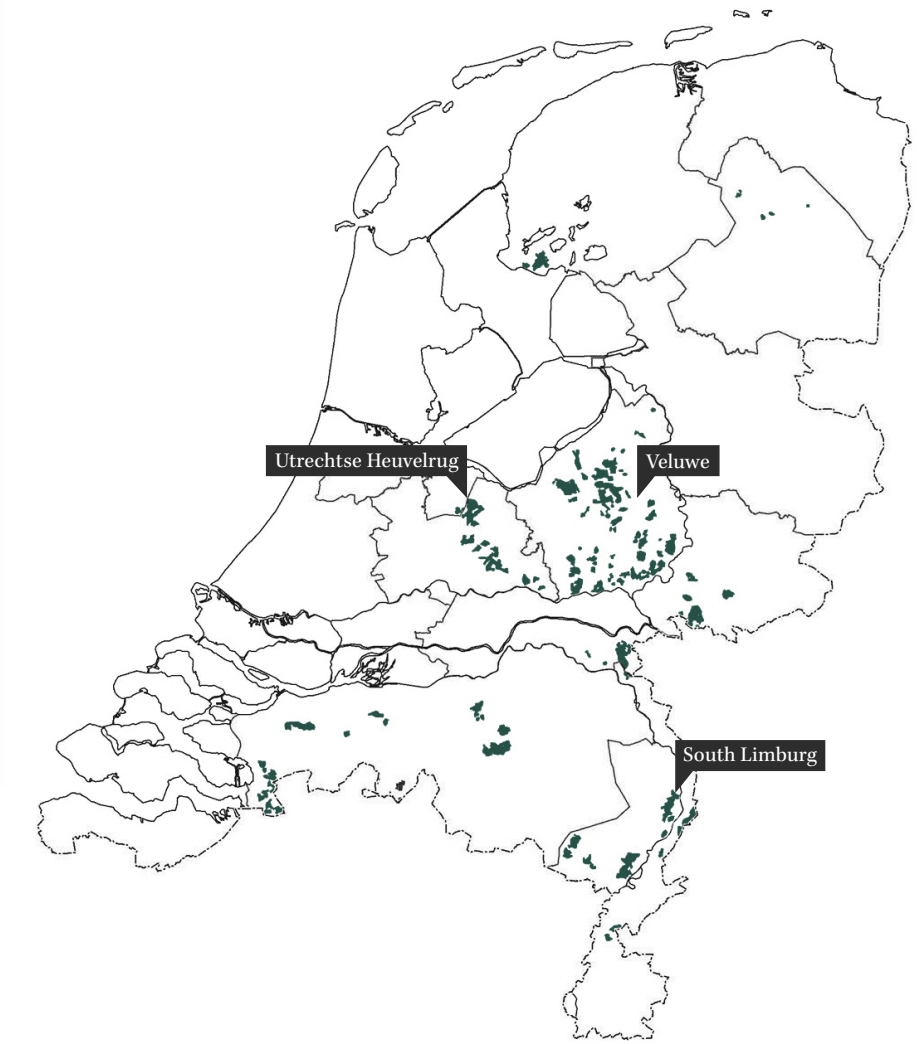
Increasing reforestation needs: newly planted trees, Amerongse Bos

BACKGROUND

A history of deforestation and reforestation

From *Door het toevoegen van kalk wordt de bodem gezonder* [Adding lime makes the soil healthier], by Provincie Utrecht, 2025b.

Site location in Utrecht province, the Netherlands

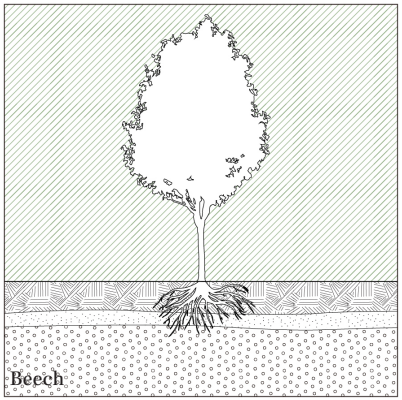


Distribution of ancient woodlands in the Netherlands

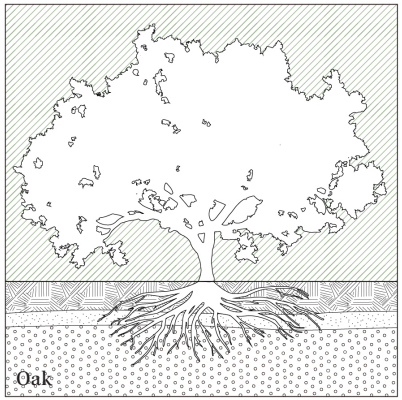
Adapted from Distribution of 'ancient woodland', based on HISTLAND (Dirkx and Nieuwenhuizen, 2013), by Groenewoudt et al., 2022.

Physical essentials: object/structure

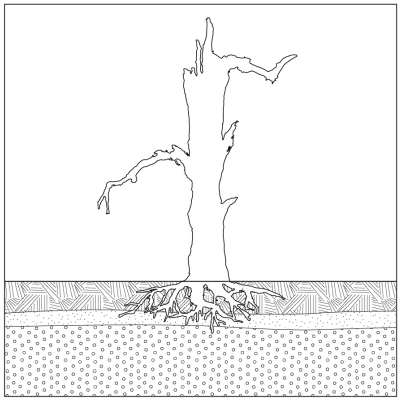
Young tree



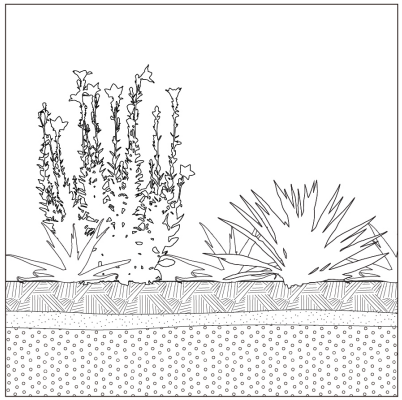
Ancient tree



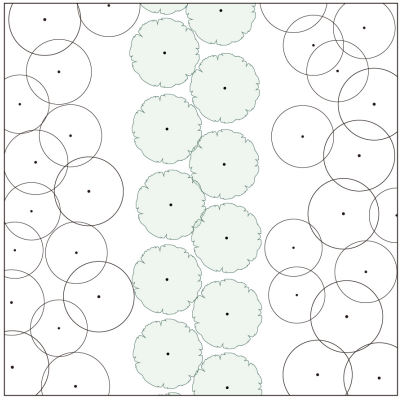
Decayed tree



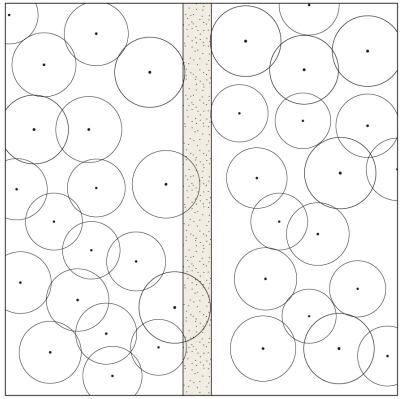
Shrub layer and ground cover



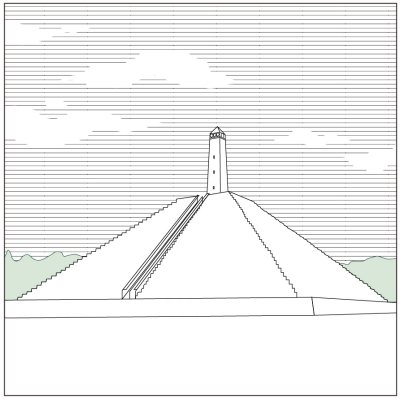
Tree avenue in the forest



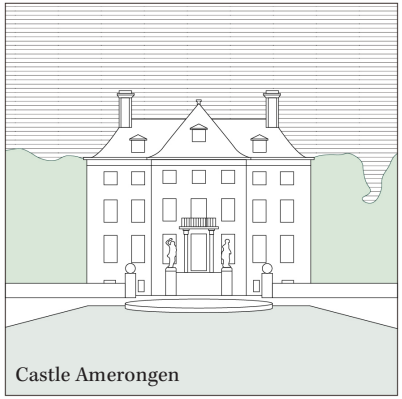
Cart track



Pyramid of Austerlitz



Historic Estates and Castles



A typical tree avenue, Amerongse Bos

BACKGROUND

Dutch forests as a cultural landscape

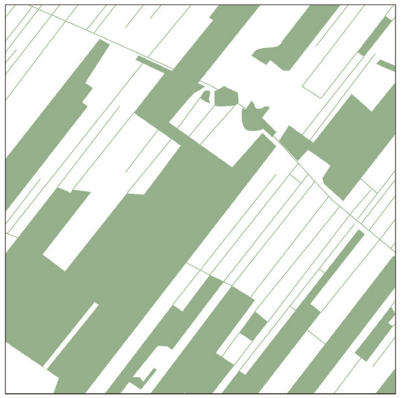
Spelderholt Estate, Beekbergen

DeVrolijkeSchrijver, 2002, in Wikimedia Commons.

Morphological essentials: form/pattern/size

Linear Woodland

Kasteel Sandenburg



Star Woodland

De eenzame eik, Amerongen

Cluster Woodland

Hoge Ginkel, Leersum

Hybrid Grid Forest

Bosreservaat Galgenberg, Amerongen

Based on satellite map from Google Earth.

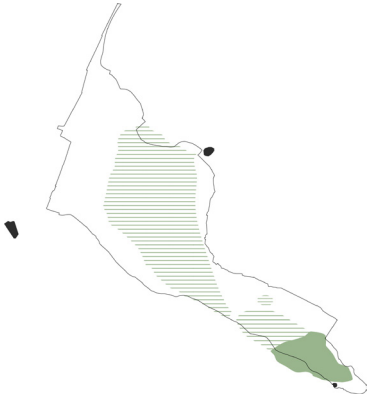
Aerial photograph of woodlands near Kasteel Weerdesteyn

Kraan, 2020, in Google Maps.

BACKGROUND

Evolving landscapes, changing city-forest relationship

1630

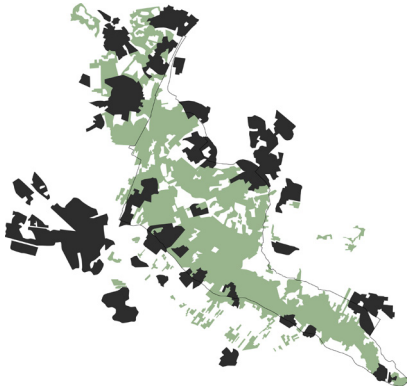


1815

1850

1920

2024



Boundary of Utrechtse Heuvelrug landscape unit

Built-up area excluding industrial area

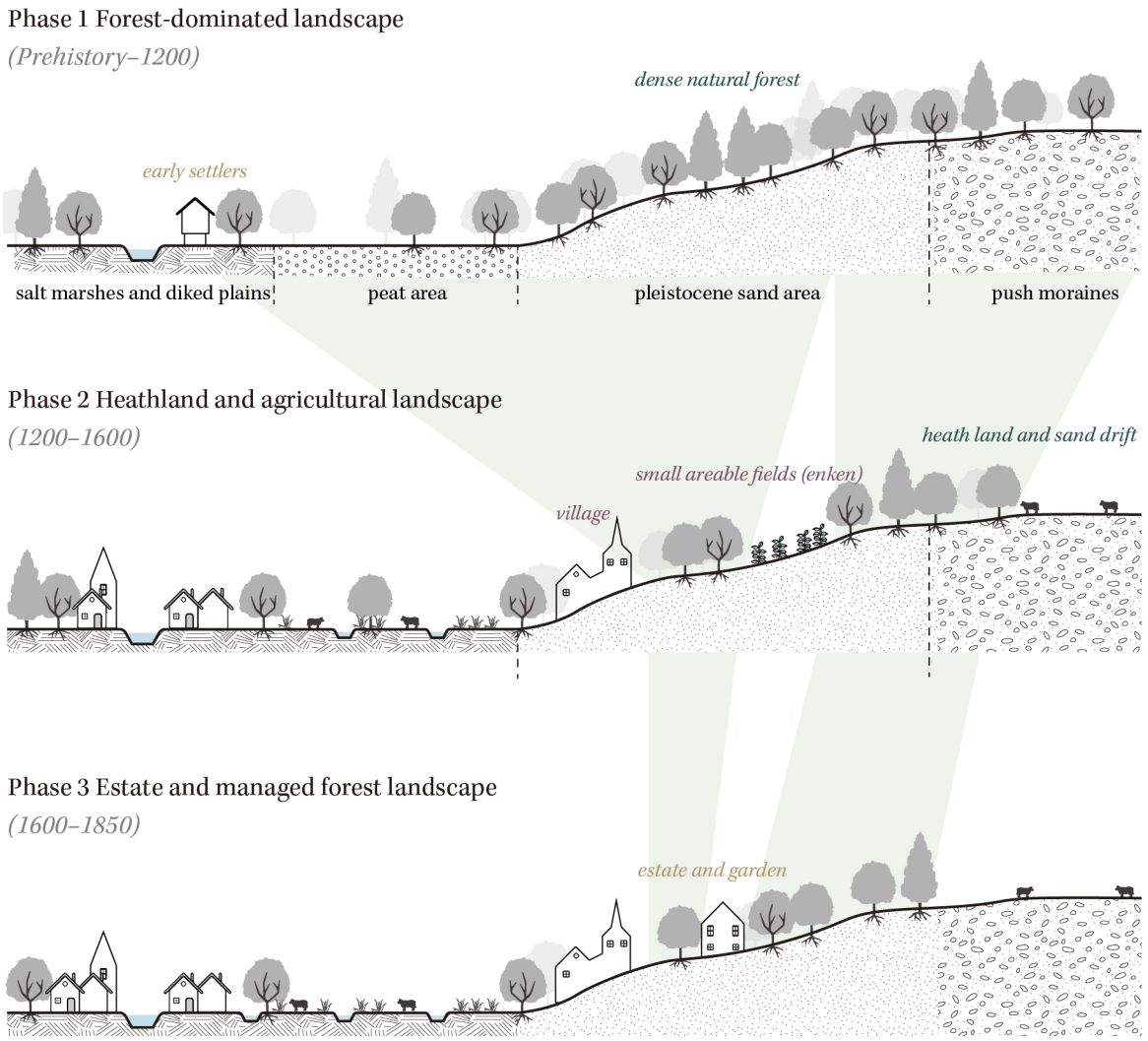
Woodland

Woodland (with sparse trees)

Data from PDOK, 2024; Blaeu, 1630; Smulders, 1920; Kadaster, n.d.

BACKGROUND

Evolving landscapes, changing city-forest relationship



Data from Flux Landscape Architecture, 2021; Nationaal Park Heuvelrug Nieuwe Stijl, n.d.

BACKGROUND

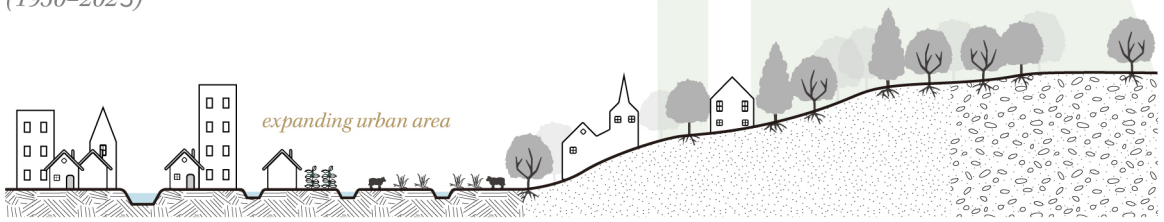
Evolving landscapes, changing city-forest relationship

Phase 4 Fragmented landscape

(1850–1950)

Phase 5 Compact landscape

(1950–2025)



Phase 6 Integrated landscape?

(2025-2050)

?

Data from Flux Landscape Architecture, 2021; Nationaal Park Heuvelrug Nieuwe Stijl, n.d.

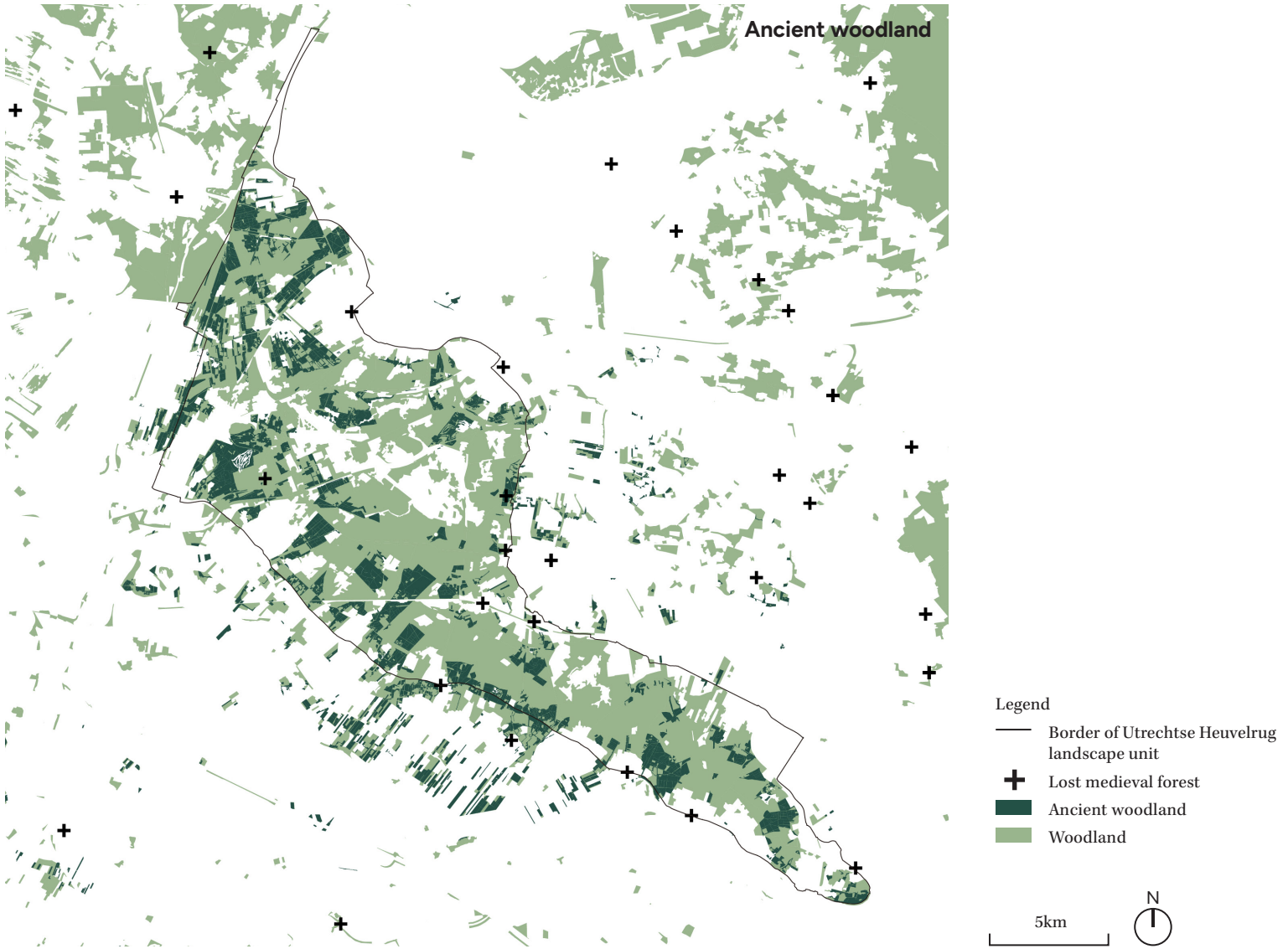
BACKGROUND

Evolving landscapes, changing city-forest relationship

Data from Flux Landscape Architecture, 2021; PDOK, 2024.

BACKGROUND

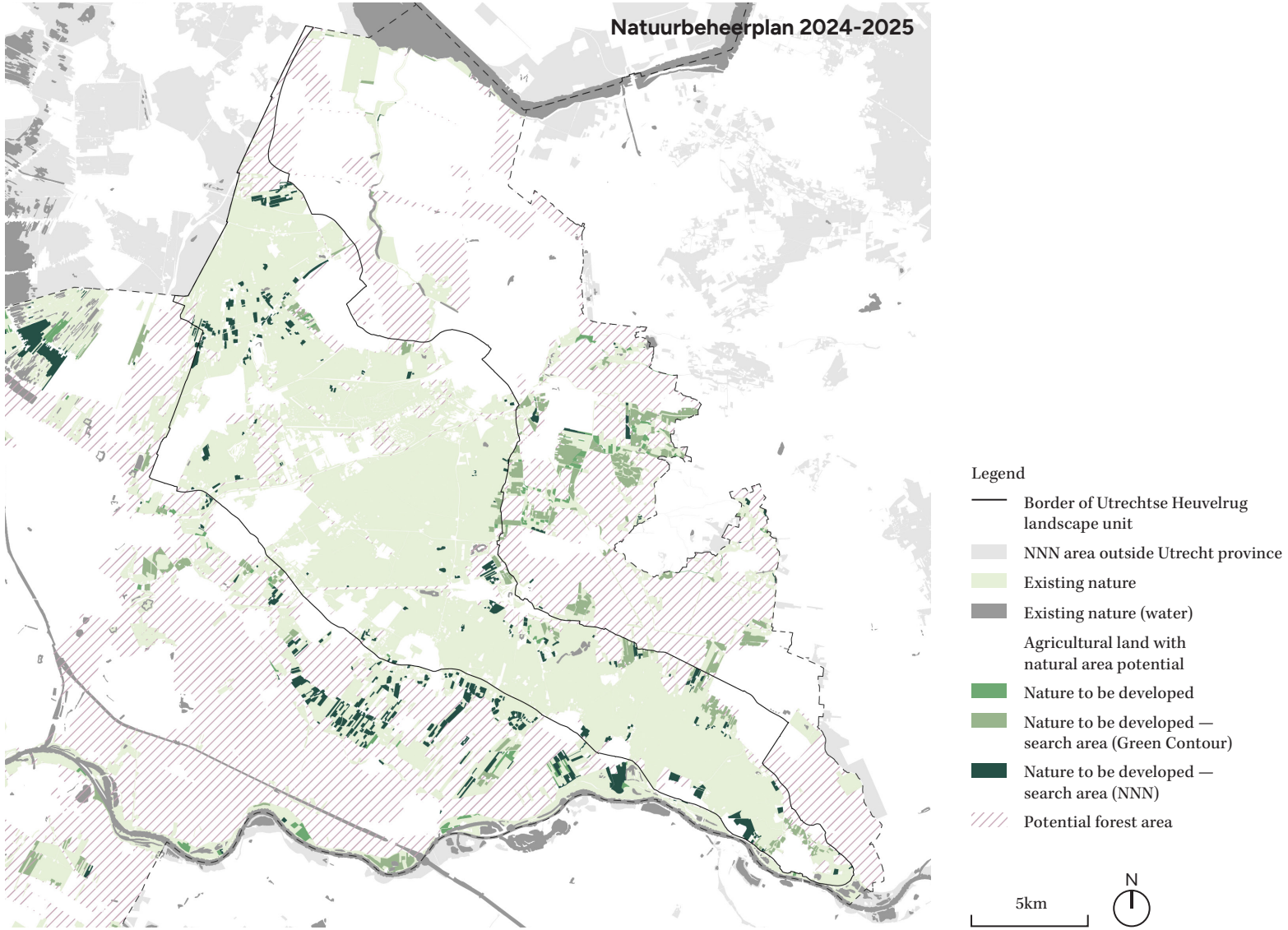
Evolving landscapes, changing city-forest relationship



Data from Provincie Utrecht, 2023; Rijksdienst voor het Cultureel Erfgoed, 2023.

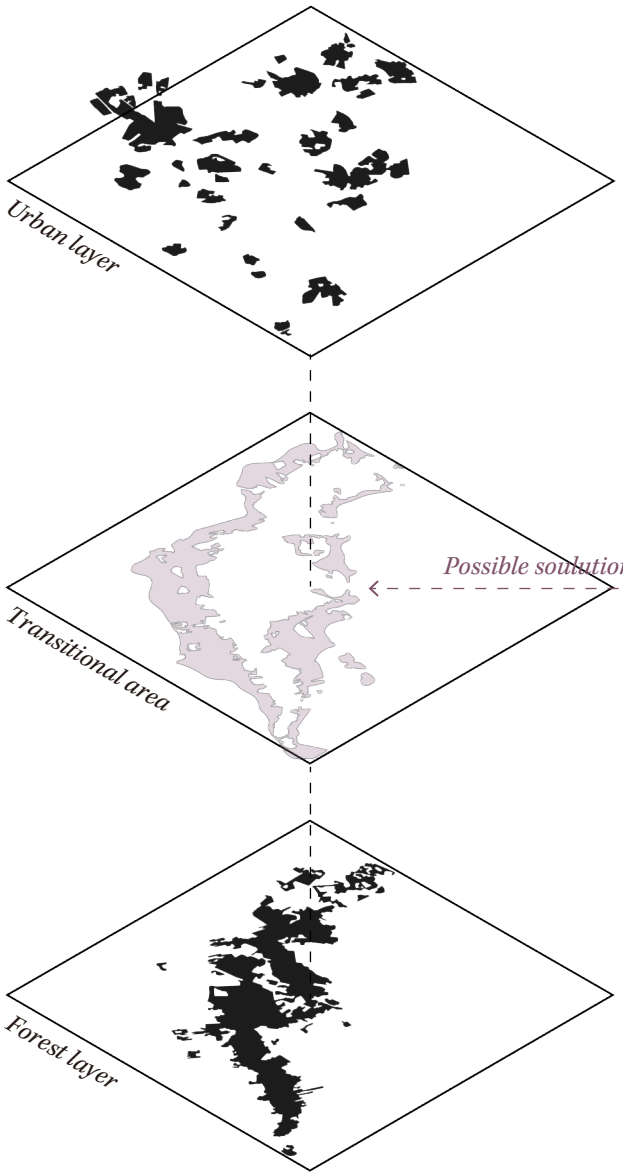
BACKGROUND

Evolving landscapes, changing city-forest relationship



Data from Provincie Utrecht, 2024b; Provincie Utrecht, 2024c.

PROBLEM FIELD



Increasing housing and recreational needs — **Social**

Weak forest cultural identity
Poor urban-forest connection — **Spatial & Cultural**

Water-related issues
Increasing risk of forest fires and diseases
Strong acidic soil
Limited adaptability to climate extremes — **Environmental & Ecological**

Spatial fragmentation of forests — **Spatial**

RESEARCH QUESTION

Main content of the design
What?

How can the transitional landscapes between the urban area and ancient woodlands be designed to strengthen the human-forest cultural connection, in envisioning a future forest metropolis in the Utrechtse Heuvelrug?

Aim of the design
Why?

Location of the design
Where?

ANALYSIS: CITY – ? – FOREST

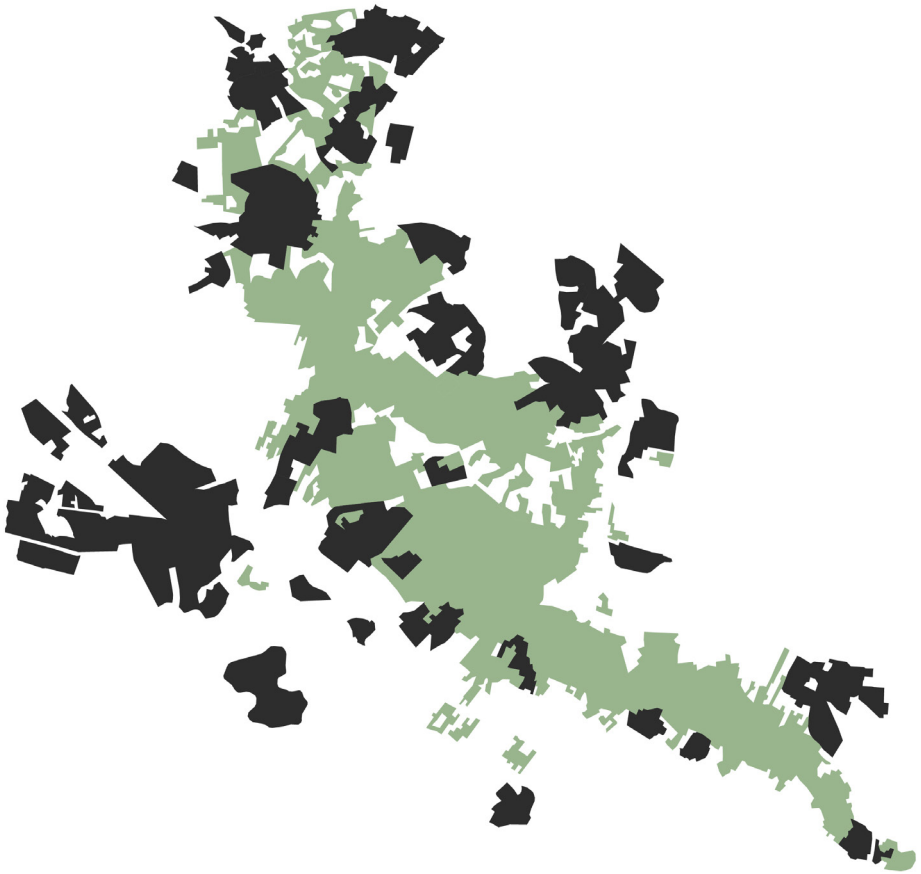
Utrechtse Heuvelrug as a city-forest hybrid system

Forest

Data from PDOK, 2024.

ANALYSIS: CITY – ? – FOREST

Utrechtse Heuvelrug as a city-forest hybrid system

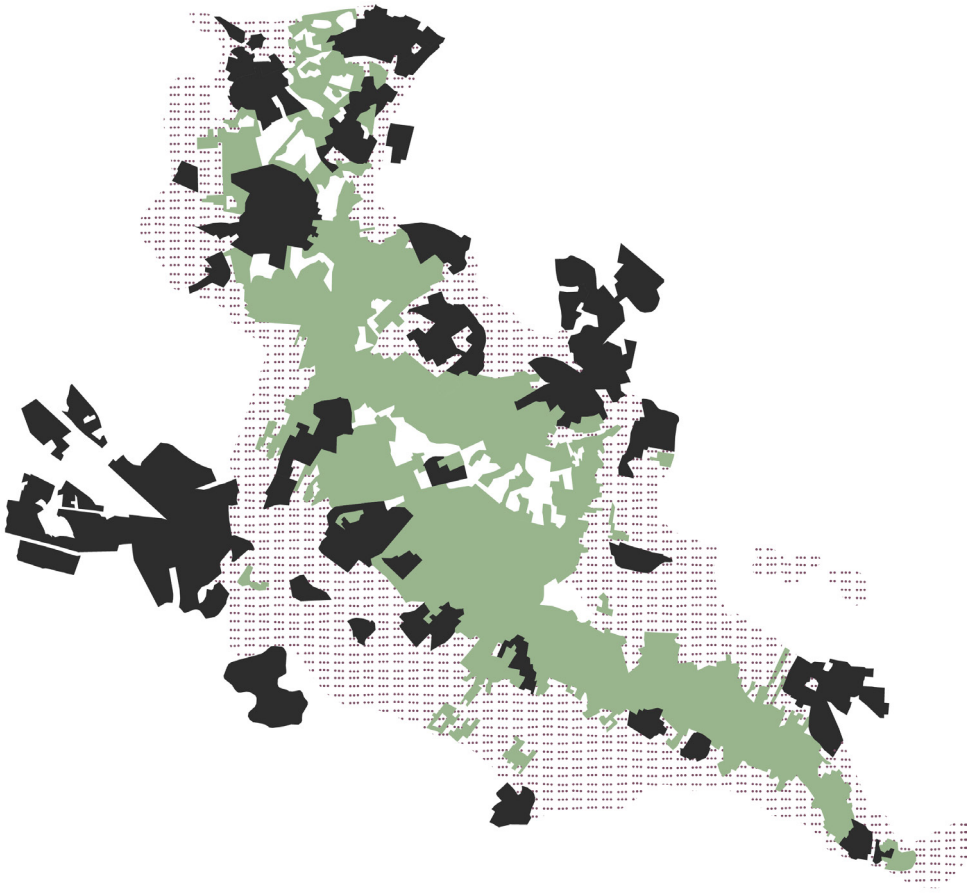


Forest + City

Data from PDOK, 2024.

ANALYSIS: CITY – ? – FOREST

Utrechtse Heuvelrug as a city-forest hybrid system



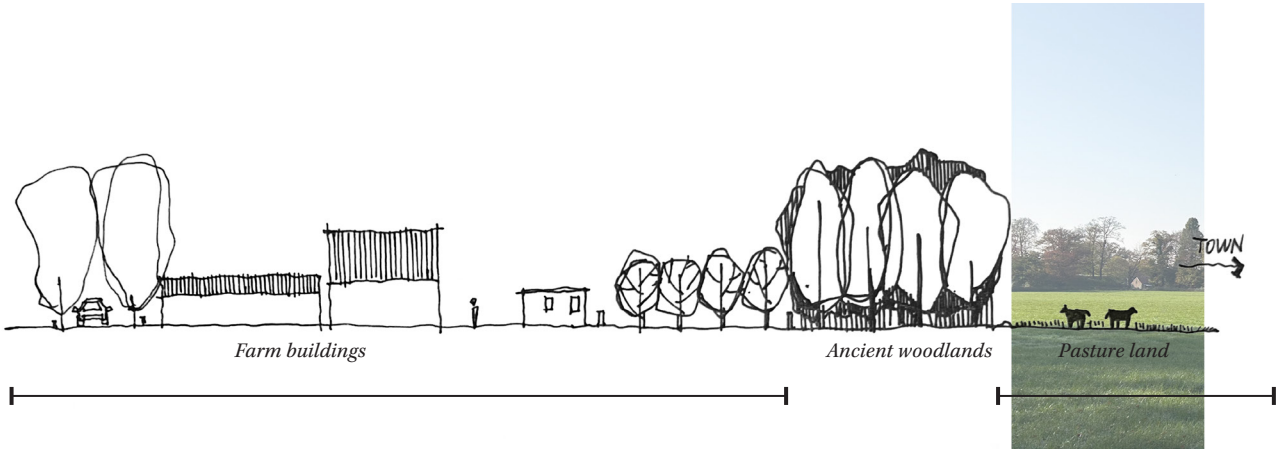
Forest + City + Transitional area = City-forest hybrid system

Data from PDOK, 2024.

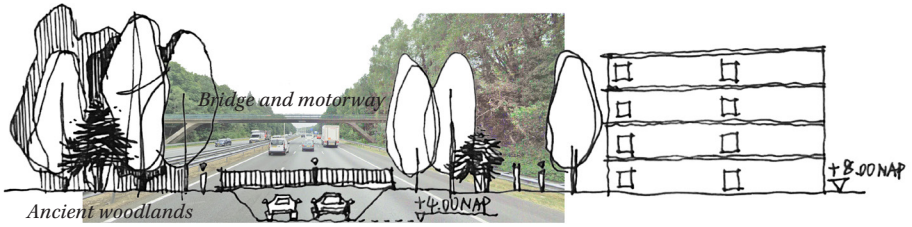
ANALYSIS: CITY – ? – FOREST

Transitional zones

1. Agricultural land



2. Infrastructure



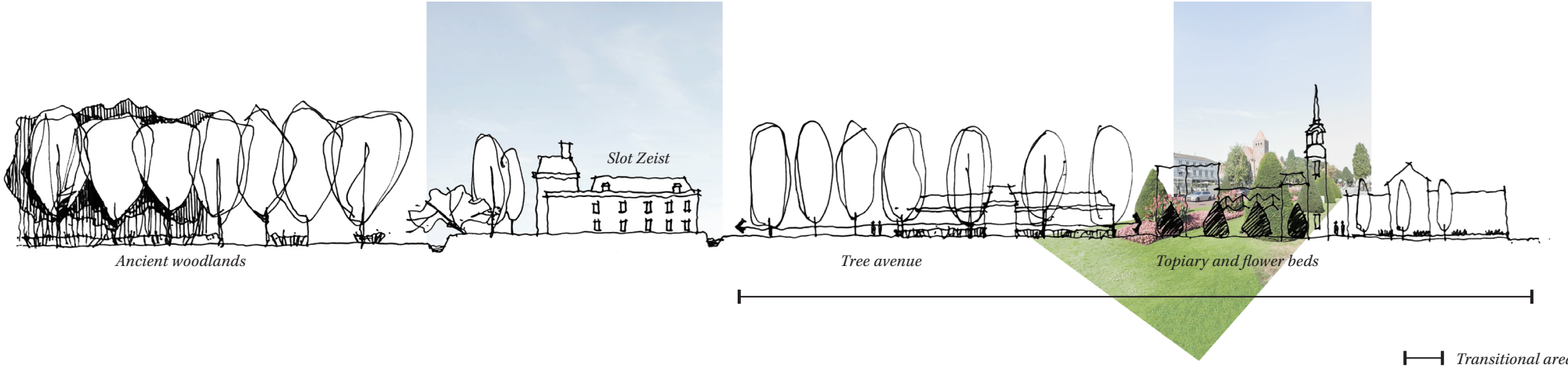
Transitional area

ANALYSIS: CITY – ? – FOREST

Transitional zones

3. Other woodlands or green spaces

4. (Sub)urban built-environment



ANALYSIS: CITY – ? – FOREST

Transitional zones

Tree-Lined Avenue in front of Slot Zeist

ANALYSIS: CITY – ? – FOREST

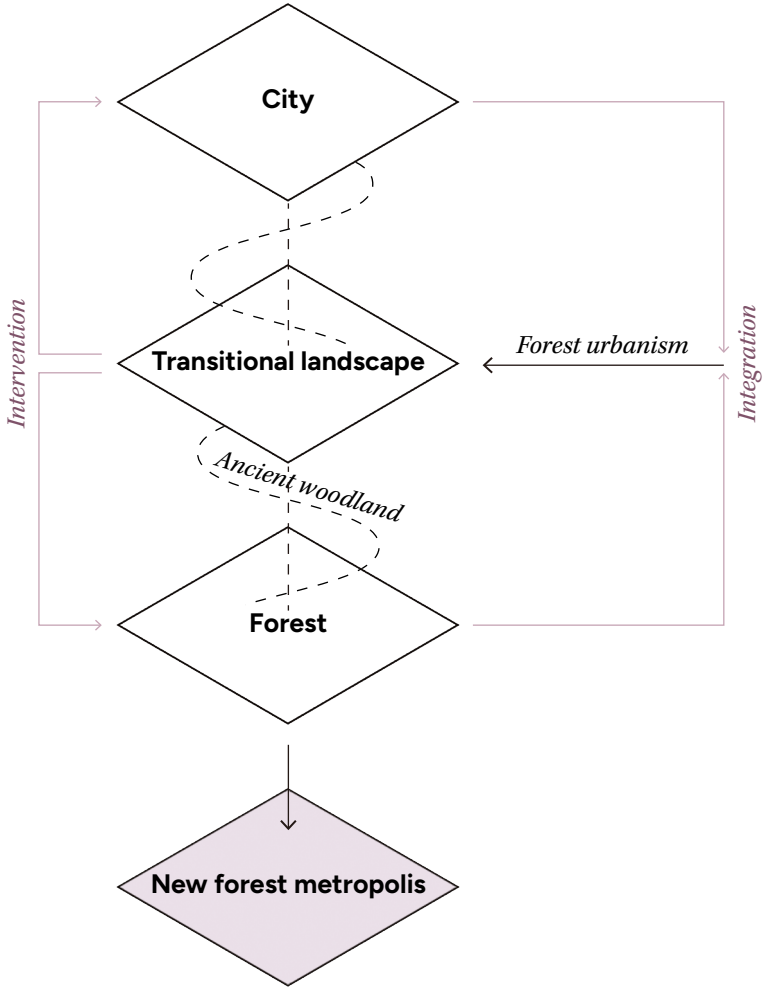
Transitional zones

Disordered urban fringe

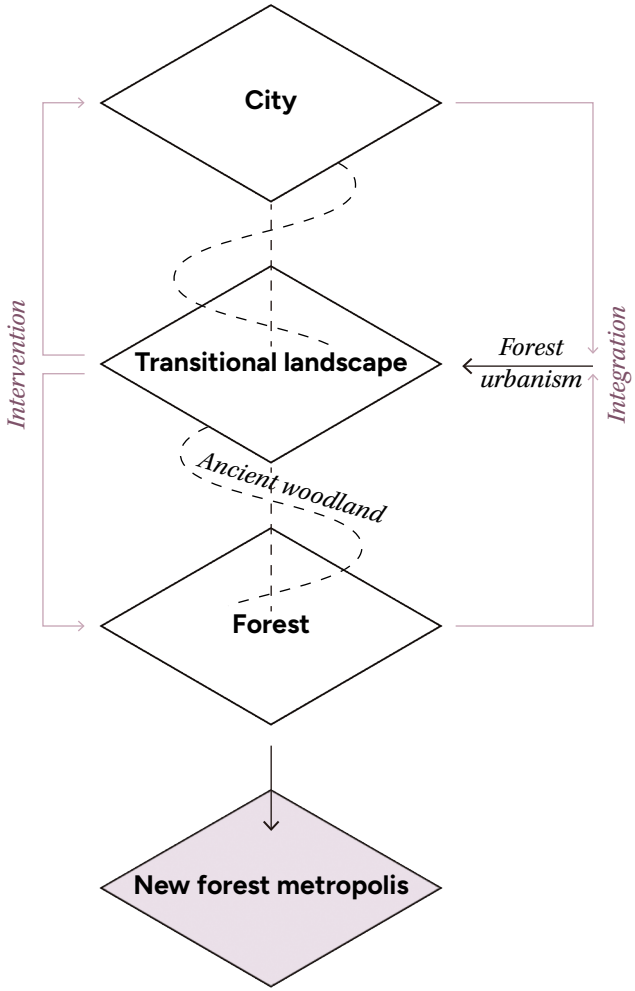
ANALYSIS: CITY – ? – FOREST

Transitional zones

Railway cutting through the forest



Coexsitence of cultural identity, environmental sustainability, and urban growth



Design assignment

How does it work?

Principles and Strategies
Spatial principles
New forest typologies

What does it look like?

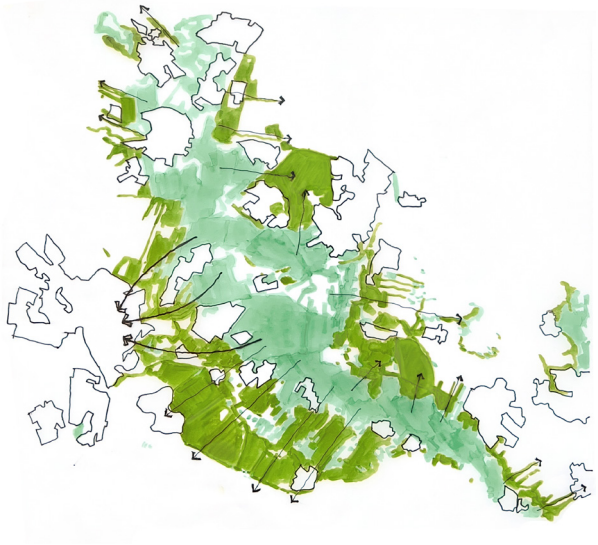
Local Scale
Zoom-in designs of
urban-forest interfaces

What does it look like?

Territorial Scale
Metropolitan planning of
Forest network
New forest locations
Phasing
Mobility
Infrastructure
public services
Urban centers...

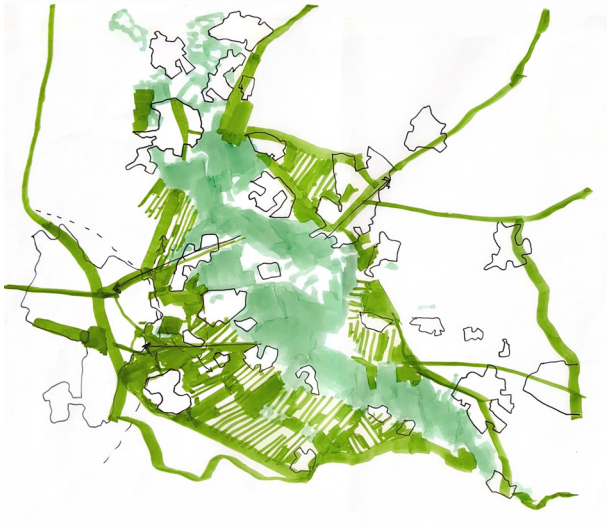
DESIGN RESULT

Experiments

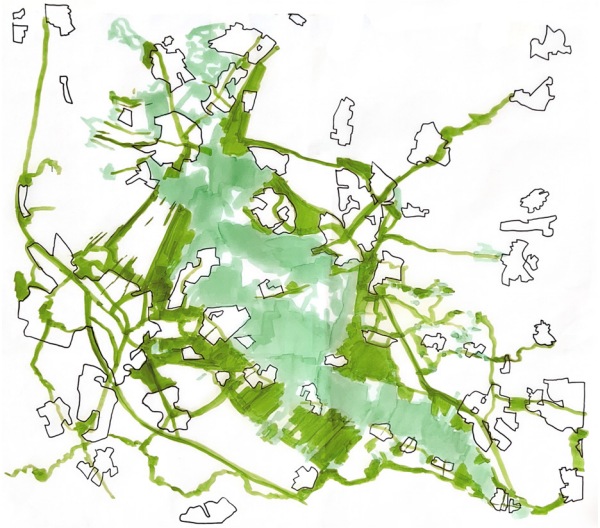


Expand

Surround



Trace



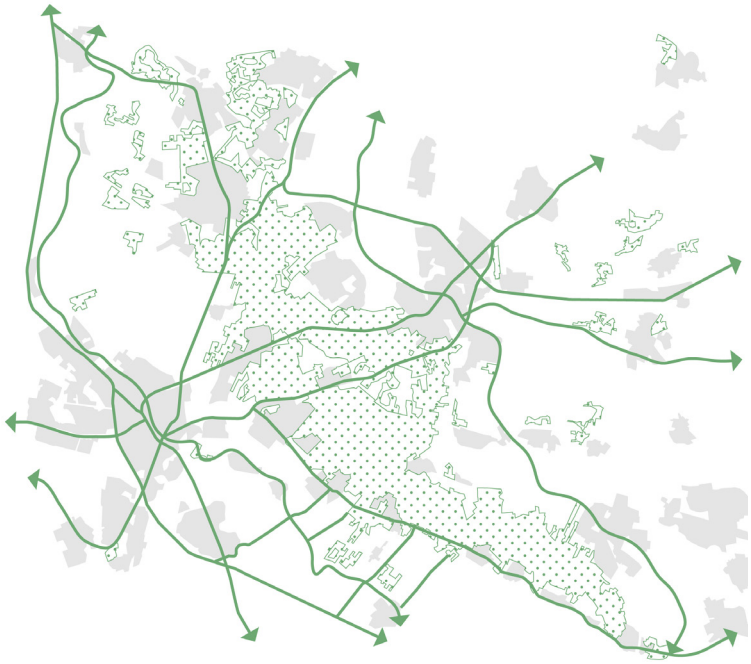
Connect

Existing forest

New forest

DESIGN RESULT

Spatial principles



1. Continuous green network

2. Expand along both sides of the ridge

DESIGN RESULT

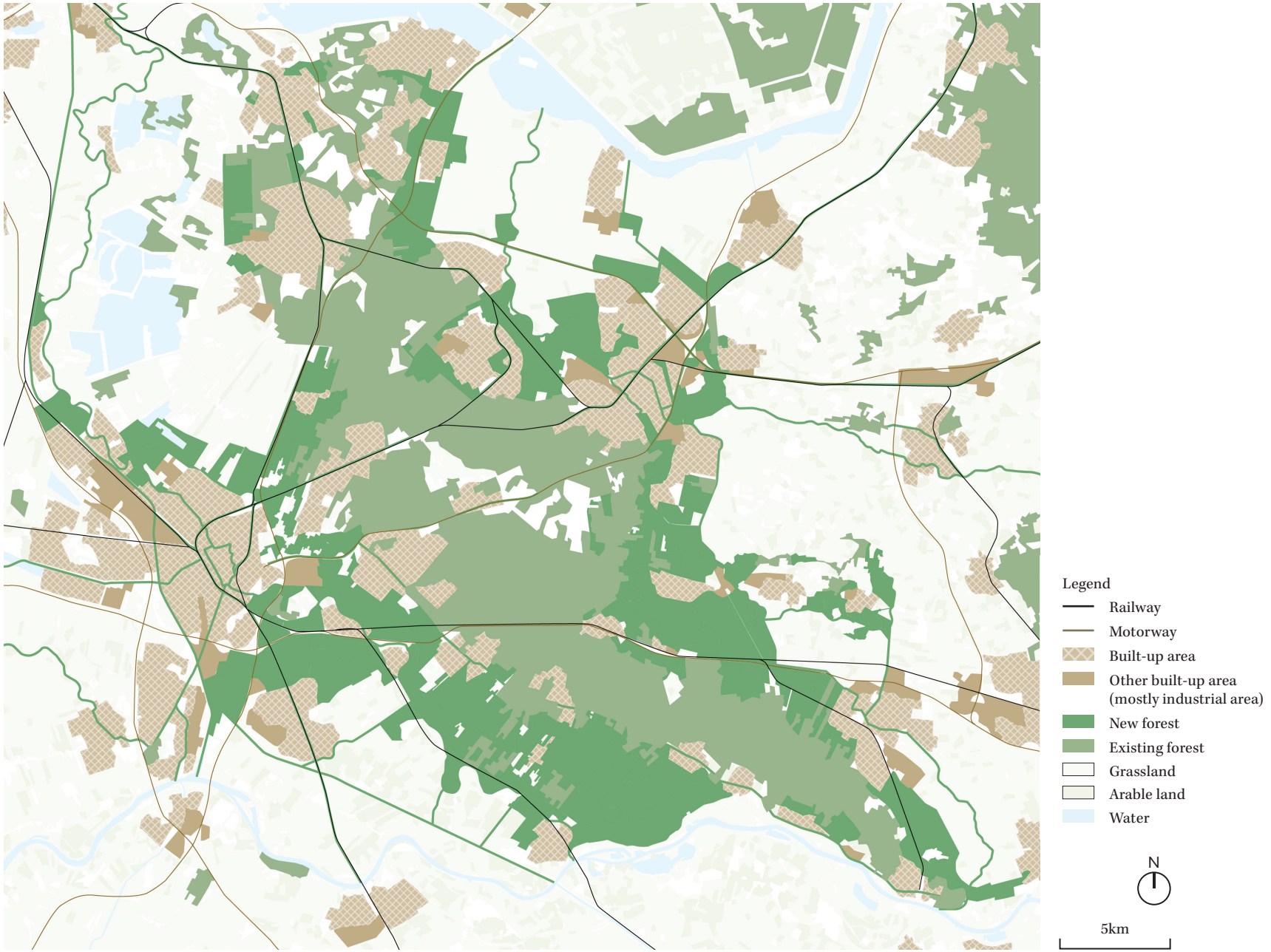
Spatial principles

3. Buffers around ancient woodlands

4. Continuity of cultural patterns

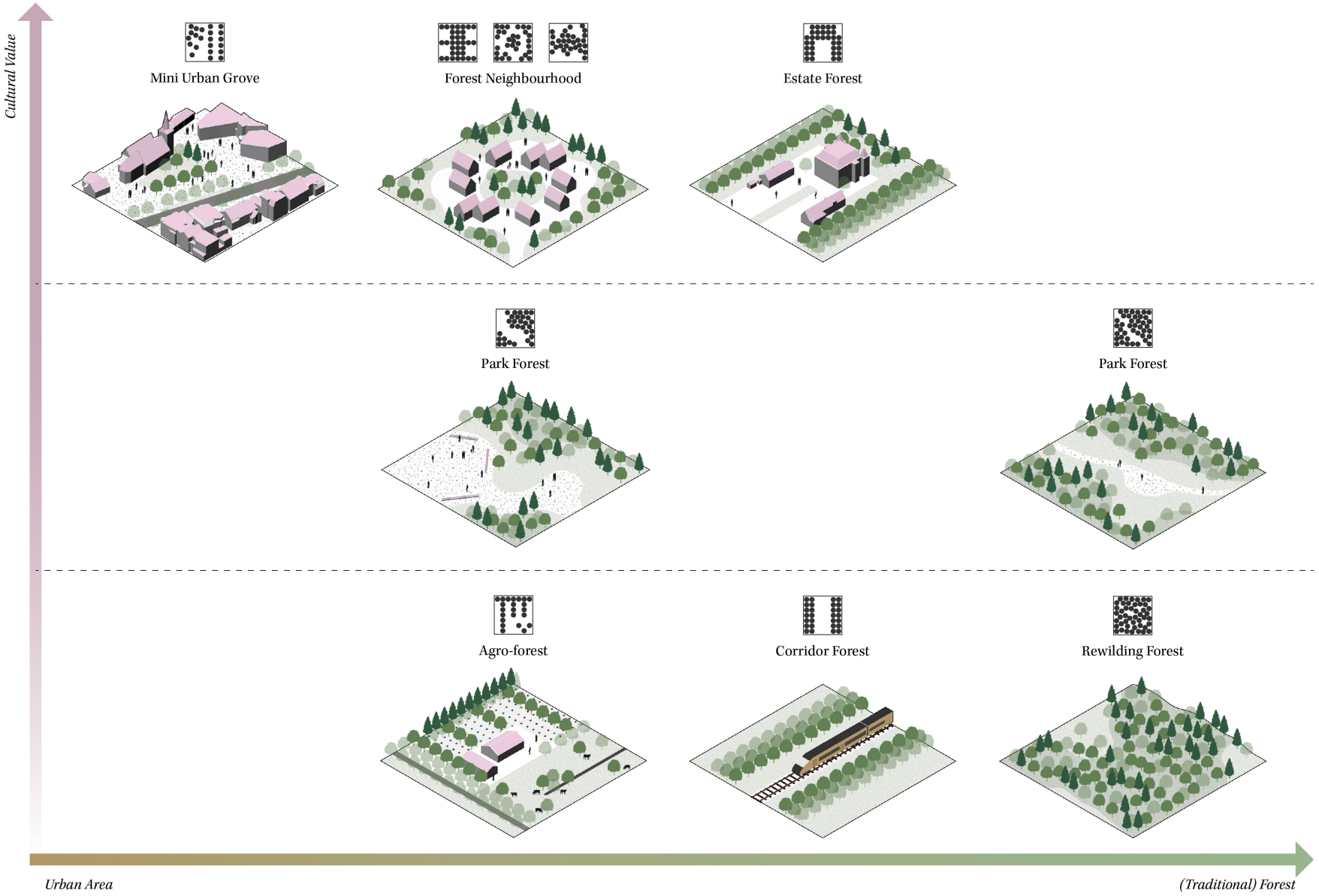
DESIGN RESULT

Master plan



DESIGN RESULT

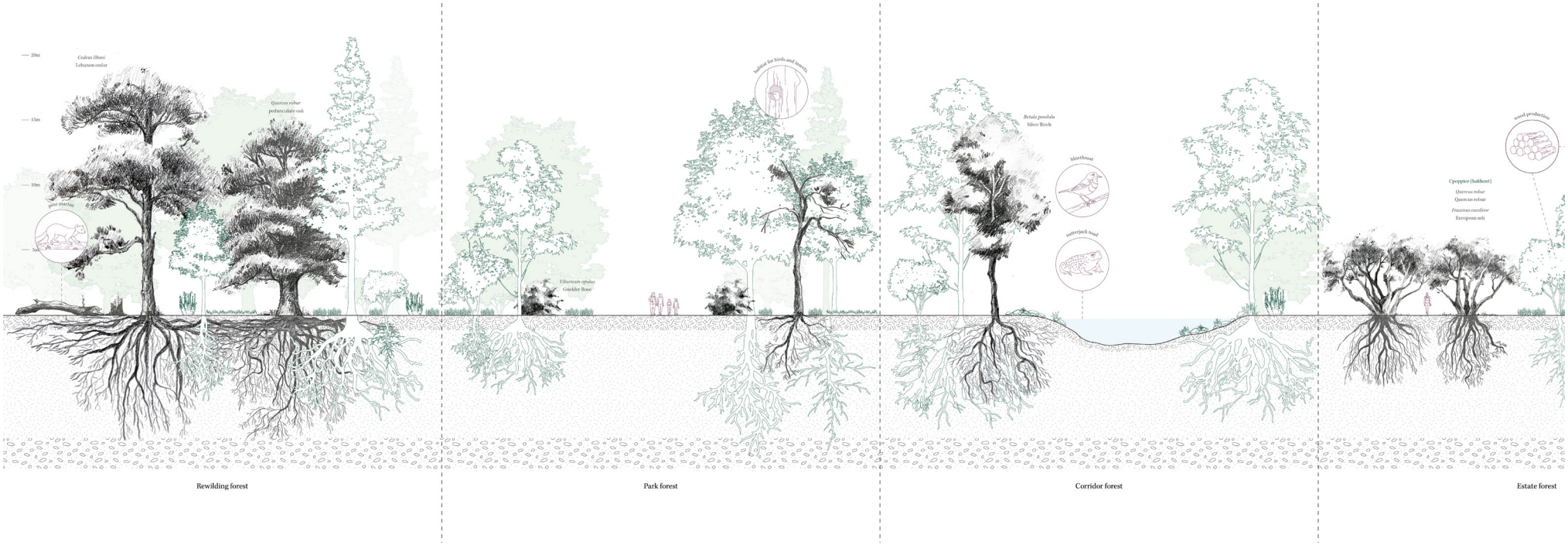
Strategies: eight new forest types



New forest typologies: distribution, cultural value, and spatial character

DESIGN RESULT

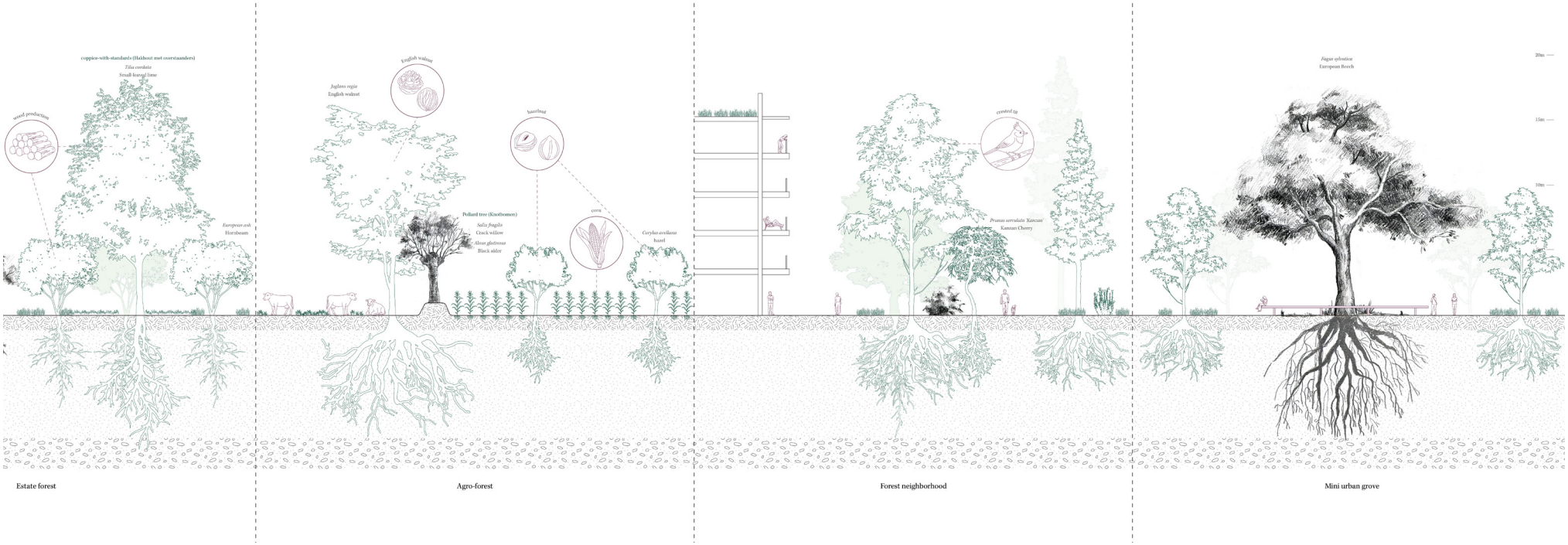
Strategies: eight new forest types



New forest typologies: vertical structure and function

DESIGN RESULT

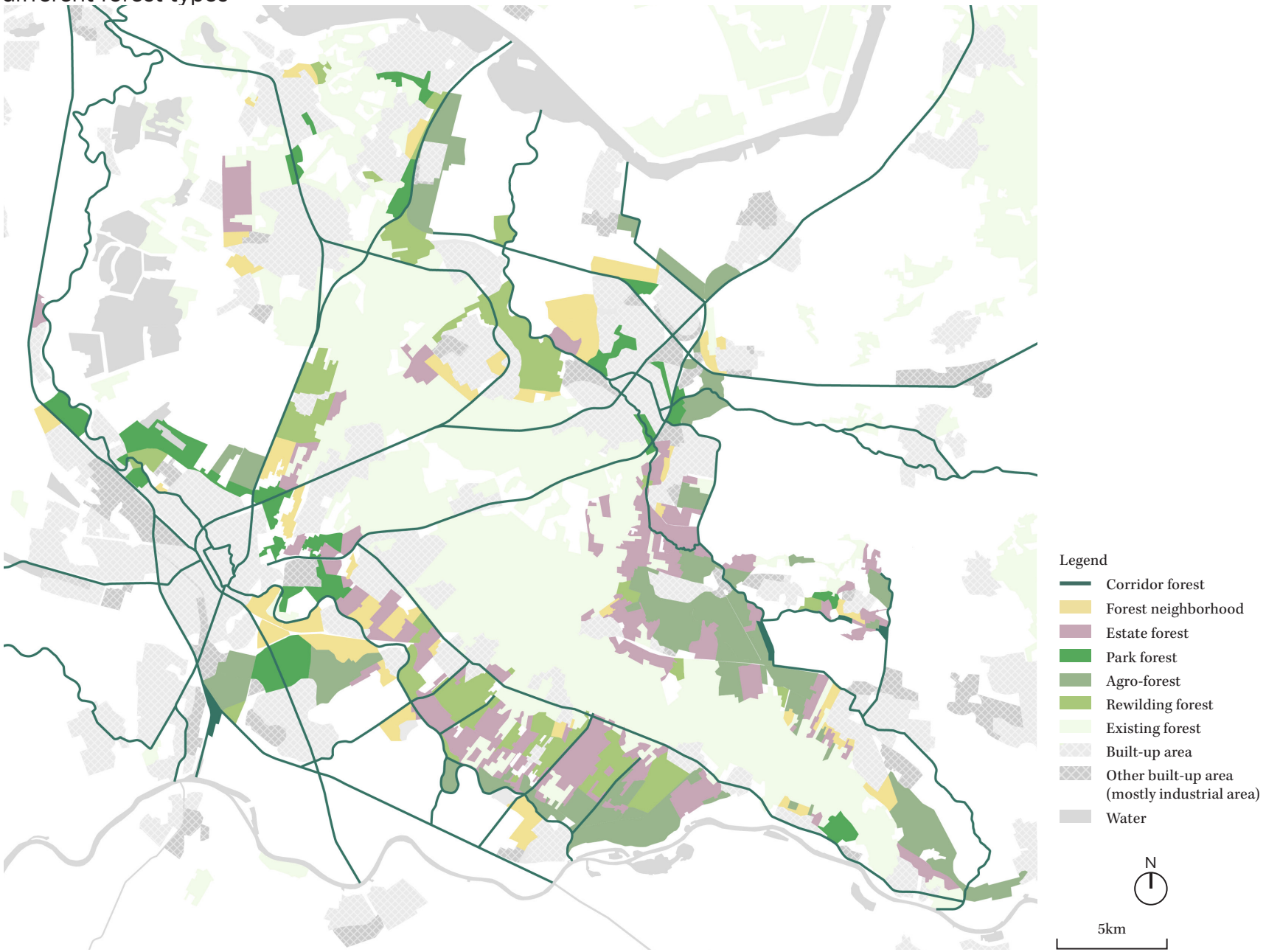
Strategies: eight new forest types



New forest typologies: vertical structure and function

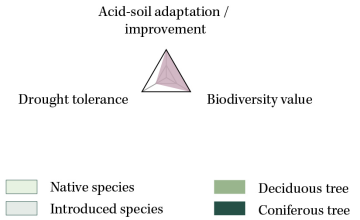
DESIGN RESULT

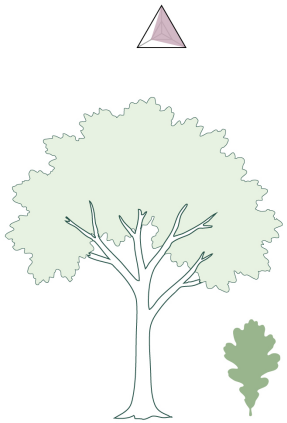
Master plan: locating different forest types



DESIGN RESULT

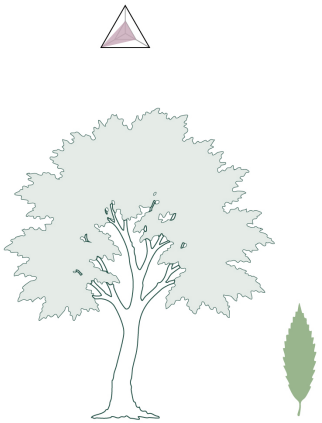
Tree Toolkit – Climate-resilient tree species





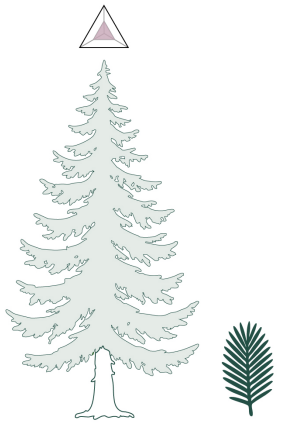
Quercus robur
pedunculate oak

Quercus petraea
sessile oak

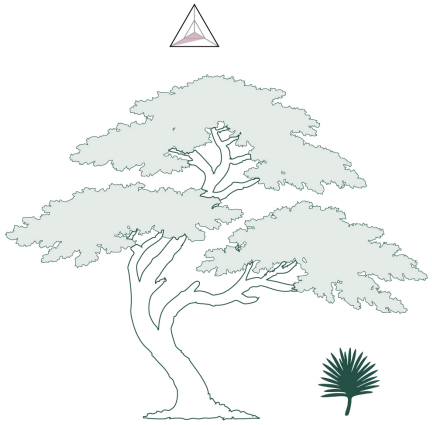


Castanea sativa
sweet chestnut

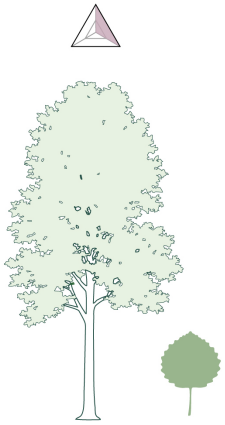
Prunus avium
sweet cherry



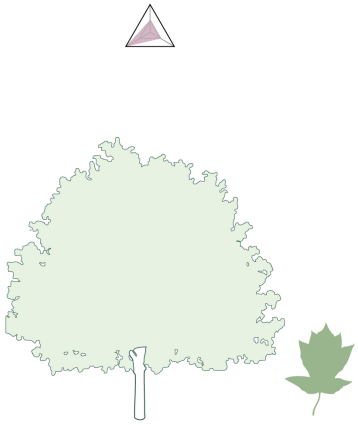
Abies bornmuelleriana
Turkish fir



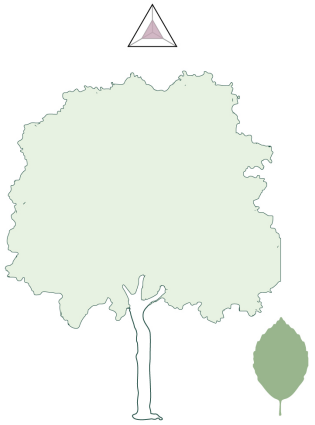
Cedrus libani
Lebanon cedar



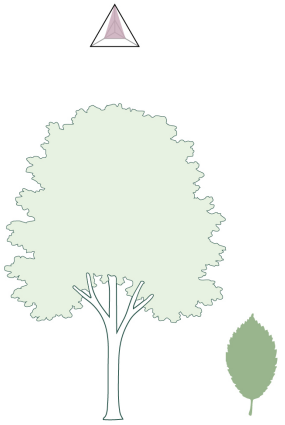
Populus tremula
European aspen



Sorbus torminalis
wild service tree



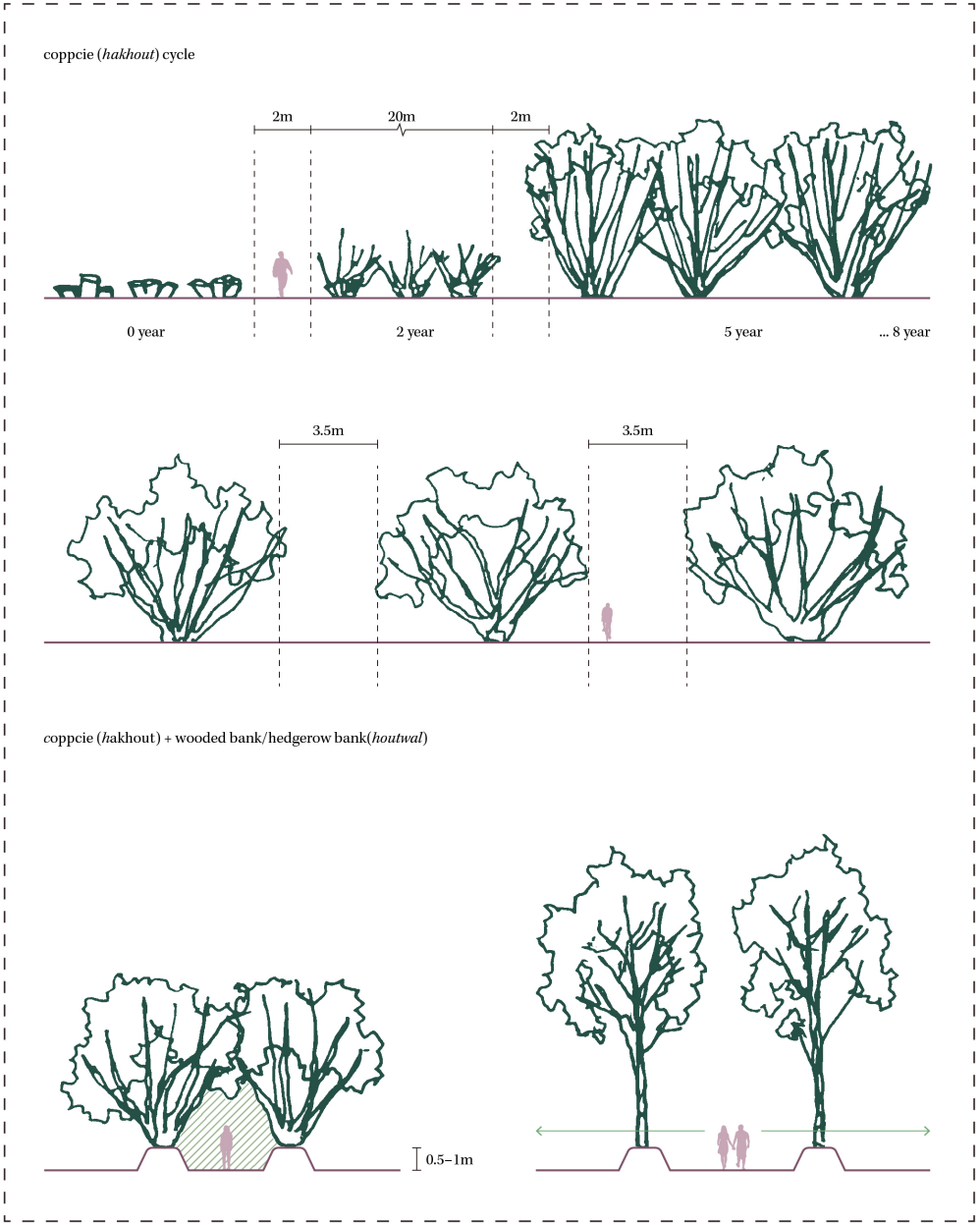
Fagus sylvatica
European beech



Carpinus betulus
European hornbeam

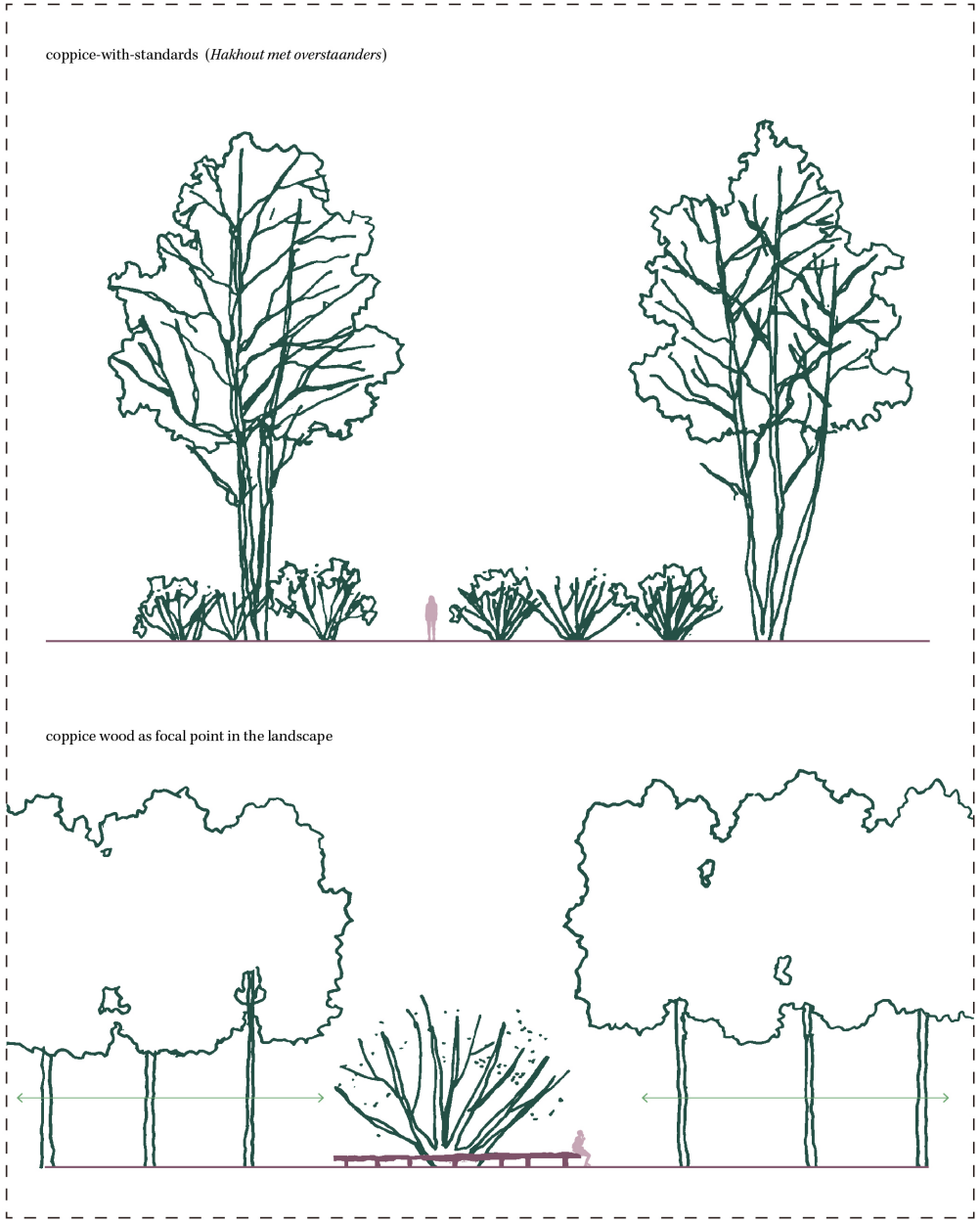
DESIGN RESULT

Tree Toolkit – Coppice woodland management



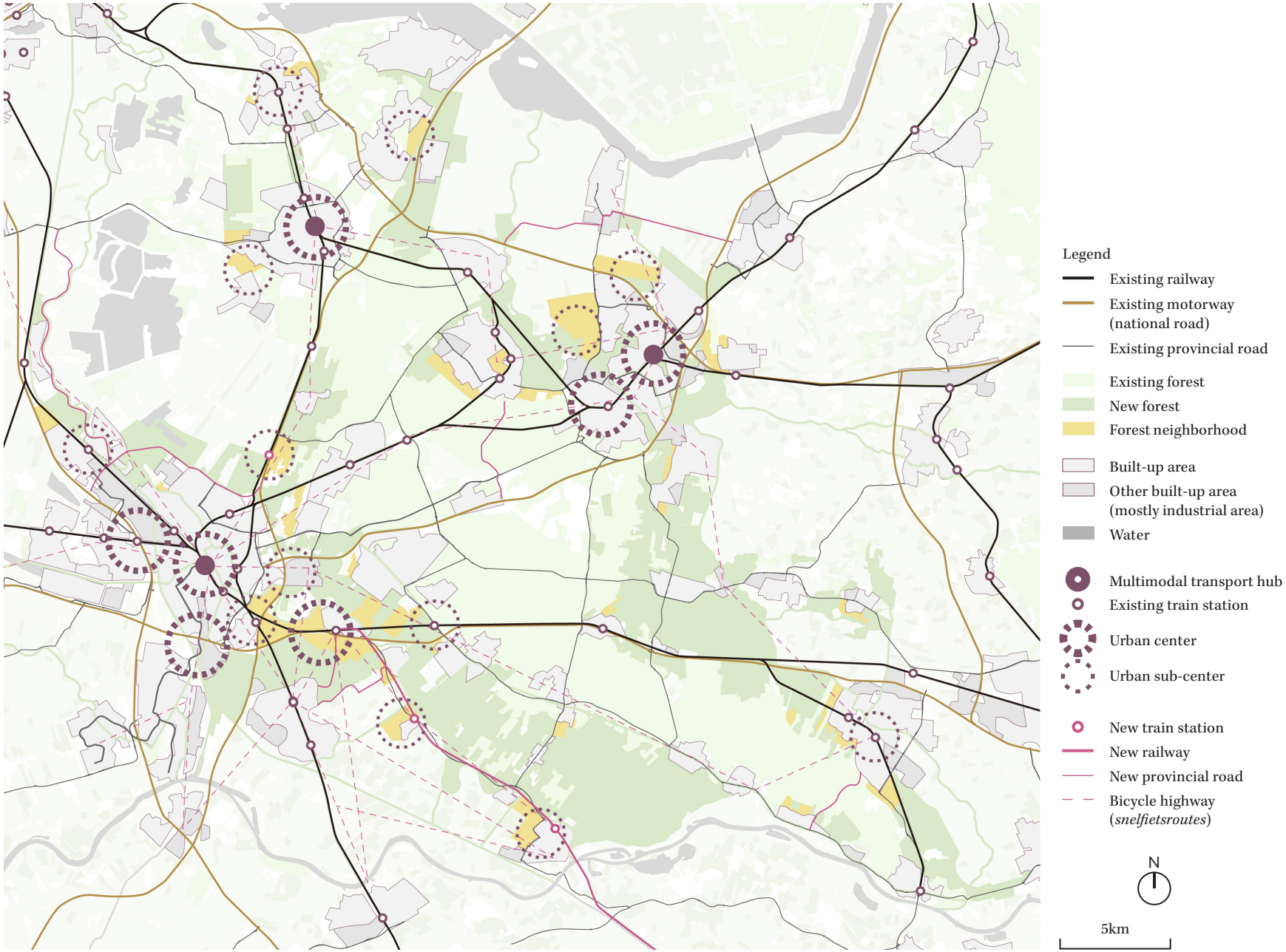
DESIGN RESULT

Tree Toolkit – Coppice woodland management



DESIGN RESULT

Master plan: mobility, infrastructure and urban centers



DESIGN RESULT

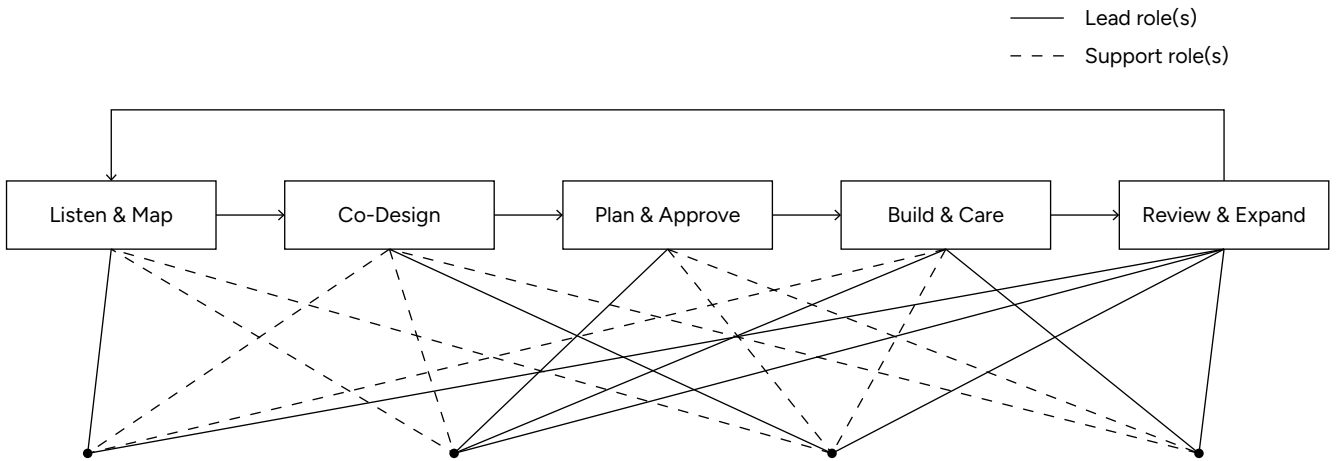
Phasing

Phase	Scale	Green System	Ecological Impact	Social Functions	Cultural Value
Phase 1 (2025–2030) Initiation and Connectivity	Pilot-scale	Primary green corridors, (urban) tiny forests, agroforestry	Improved connectivity and biodiversity	Recreation, Housing	Cultural “hotspots”, Growing awareness
Phase 2 (2030–2045) Expansion	Large-scale	Green corridor networks, regional forest parks, extensive agroforestry	Enhanced groundwater recharge, biodiversity restored	Recreation, Housing, sustainable agriculture	Cultural integration
Phase 3 (2045–2050) Long-term Management	All-scale	Forest network	Stable and resilient ecological network	Balance between nature and urban development, broad community engagement	Cultural identity and lifestyle

Table: Three-phase plan for creating a forest metropolis in the Utrechtse Heuvelrug (2025–2050)

DESIGN RESULT

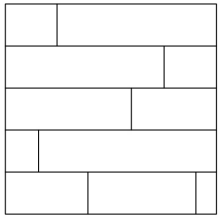
Collaborative governance model



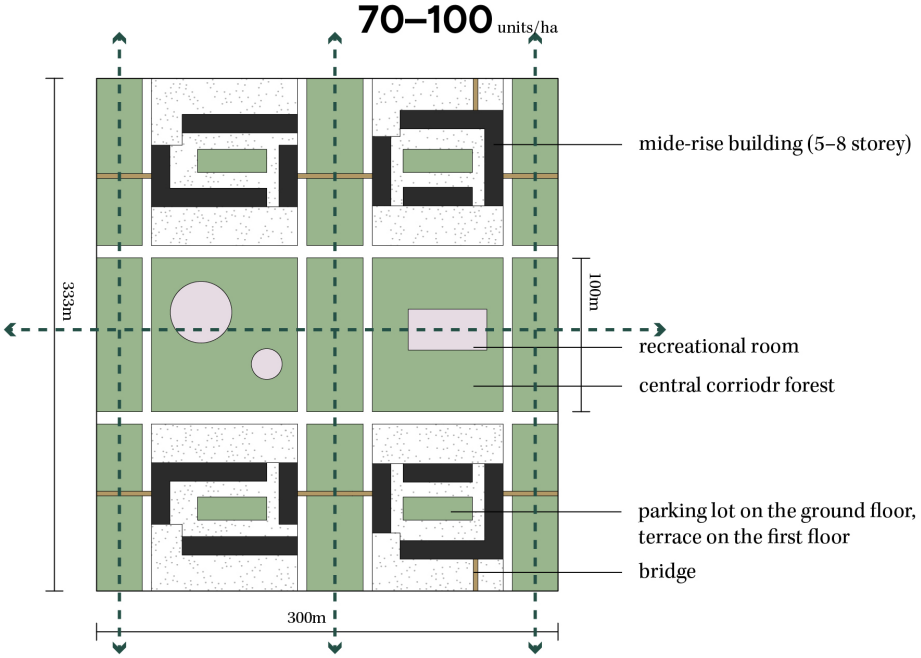
Collaborative loop

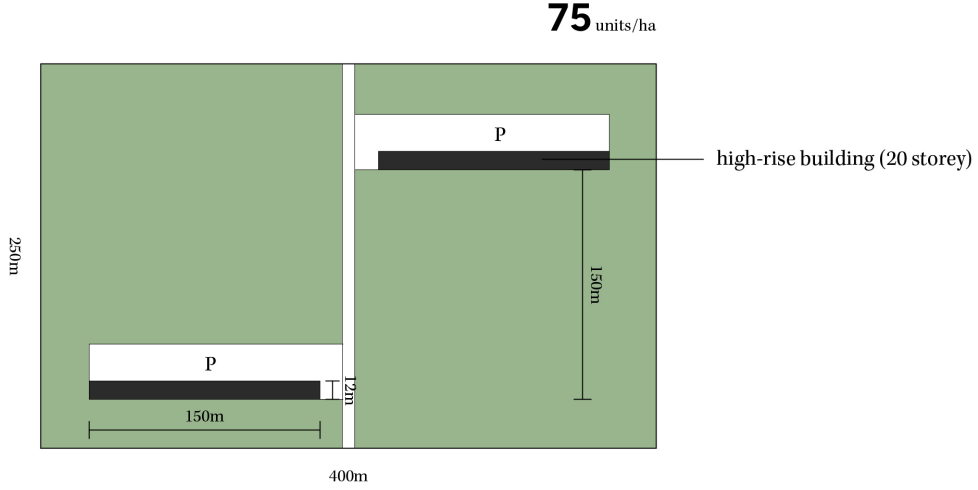
DESIGN RESULT

Zoom-in: Forest neighbourhood



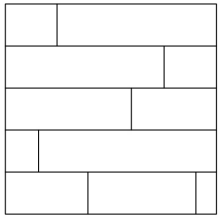
Linear organazation



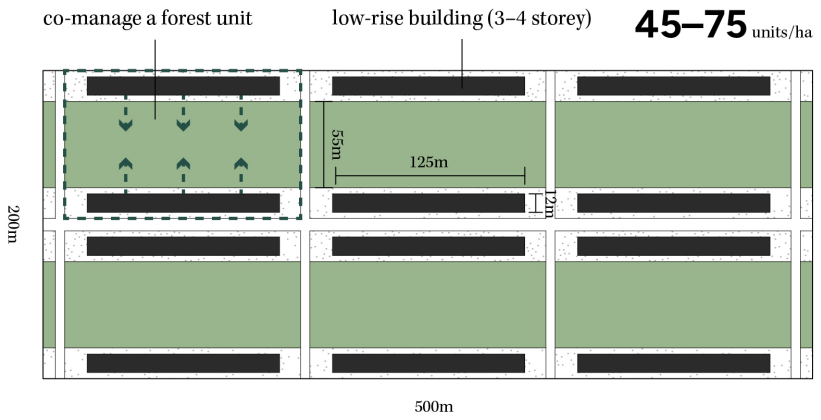


DESIGN RESULT

Zoom-in: Forest neighbourhood

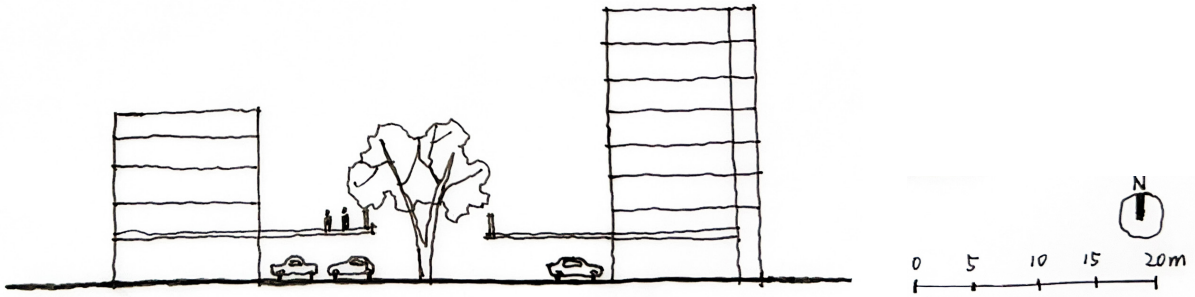


Linear organazation

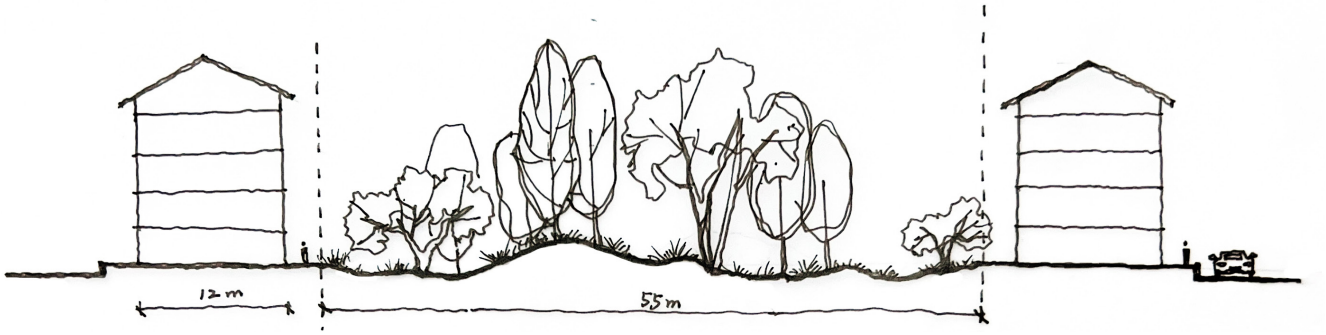


DESIGN RESULT

Zoom-in: Forest neighbourhood



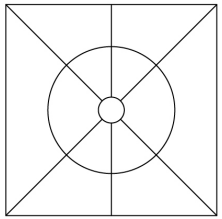
Parking on the ground floor, terrace on the first floor



Co-managed forest unit

DESIGN RESULT

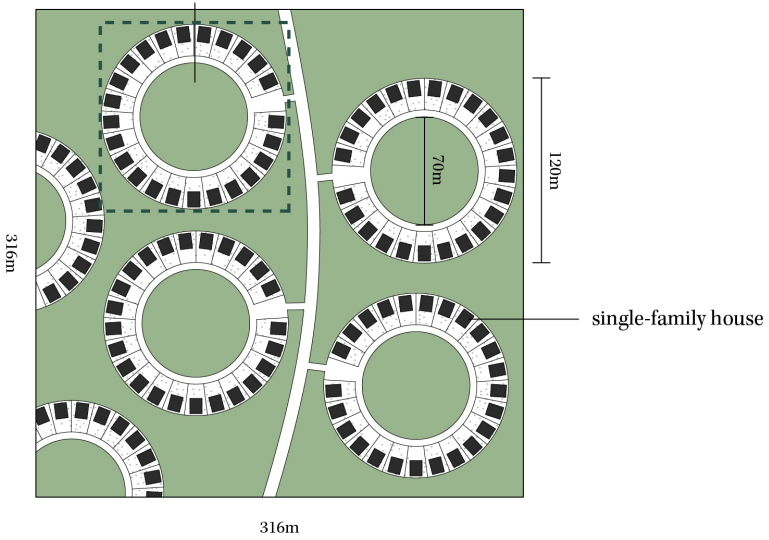
Zoom-in: Forest neighbourhood



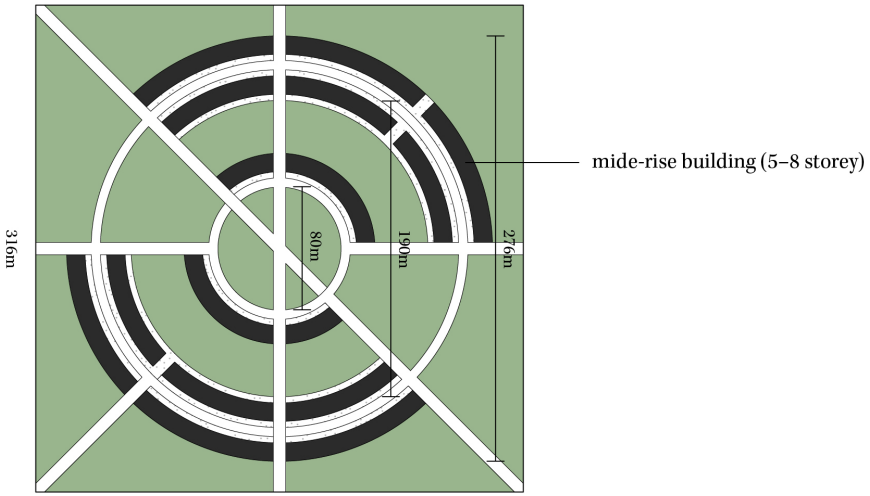
Centralized organazation

15 units/ha

co-manage a forest unit

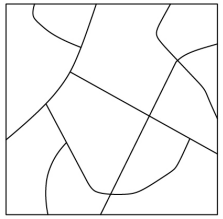


80–100 units/ha



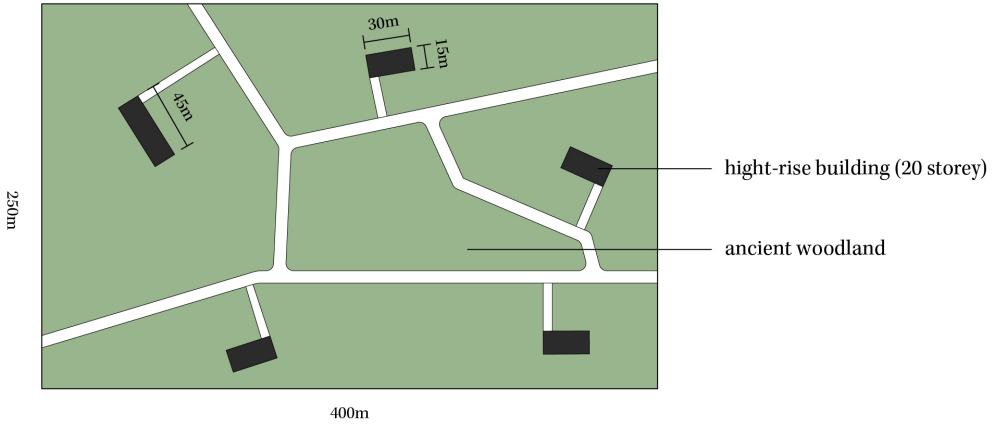
DESIGN RESULT

Zoom-in: Forest neighbourhood



Hybrid organazation

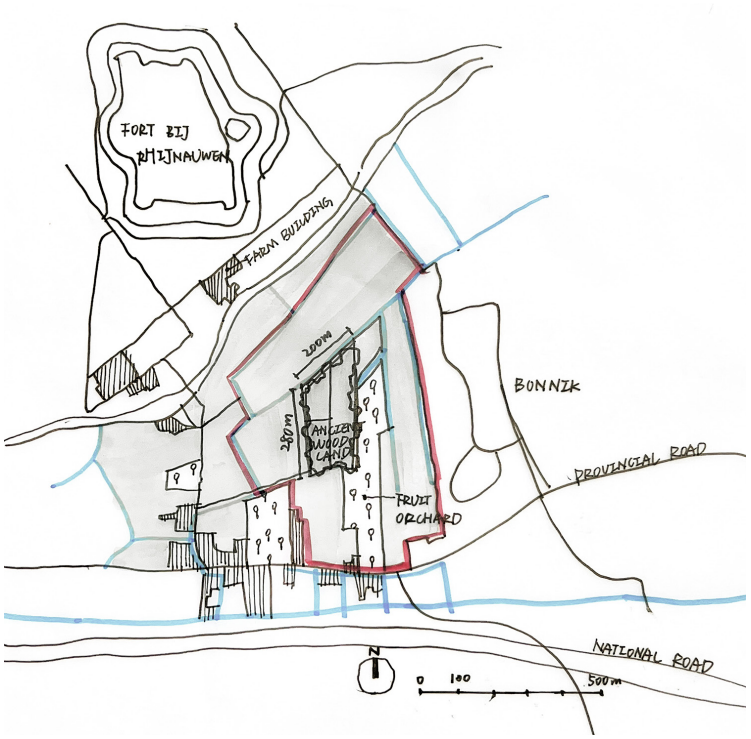
50 units/ha



60–100 units/ha

DESIGN RESULT

Zoom-in: Forest neighbourhood



Current land use analysis of the site in Bunnik

DESIGN RESULT

Zoom-in: Forest neighbourhood

Master plan of forest neighborhoods in Bunnik

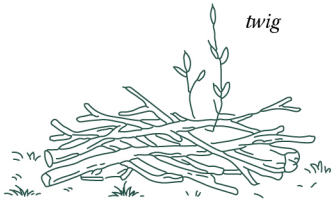
DESIGN RESULT

Zoom-in: Urban tiny forest

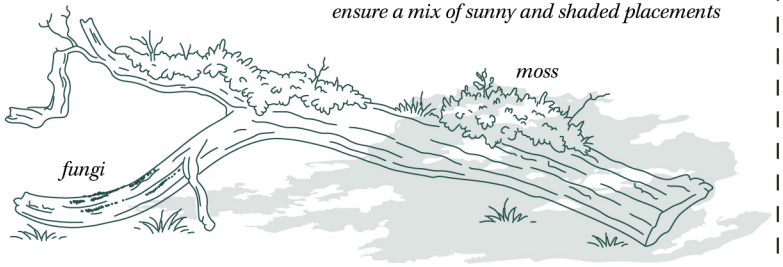
Tree Toolkit – Deadwood management and design

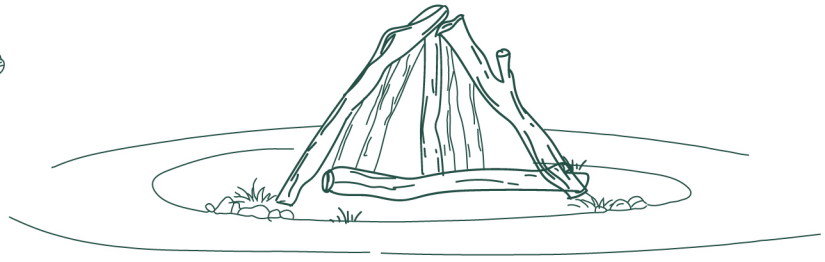
Leave fallen logs and branches in place

leave the logs and major woody debris in place



ensure a mix of sunny and shaded placements

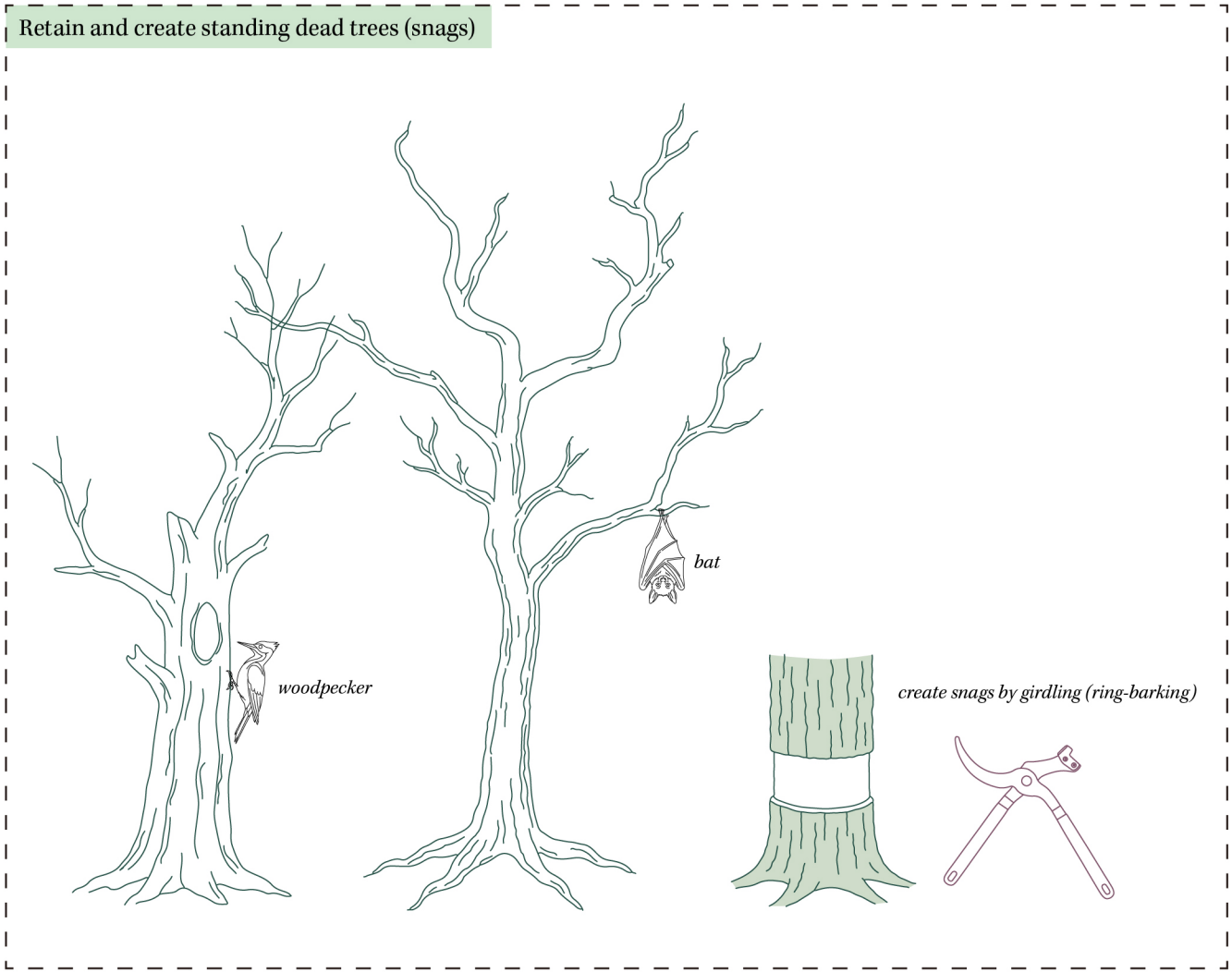




relocate some fallen wood for design purpose

DESIGN RESULT

Zoom-in: Urban tiny forest

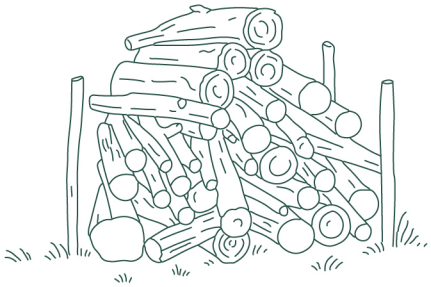


DESIGN RESULT

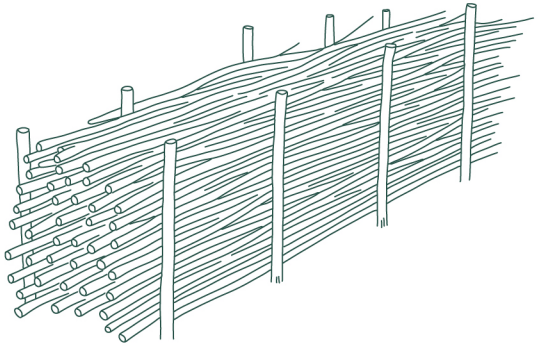
Zoom-in: Urban tiny forest

Create deadwood micro-habitats and structural diversity

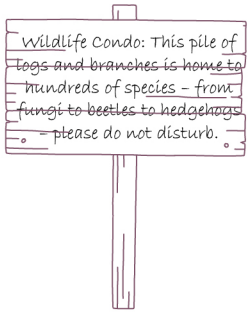
log pile

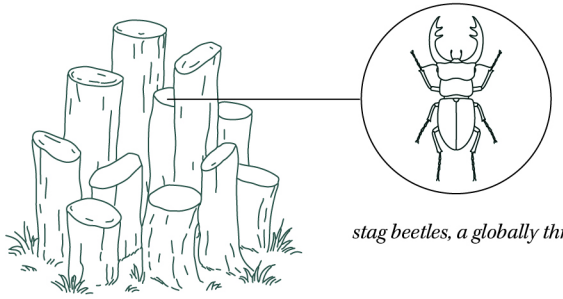


wood hedges (takkenrillen)



loggery: cut stumps of various heights





stag beetles, a globally threatened species

DESIGN RESULT

Zoom-in: Urban tiny forest

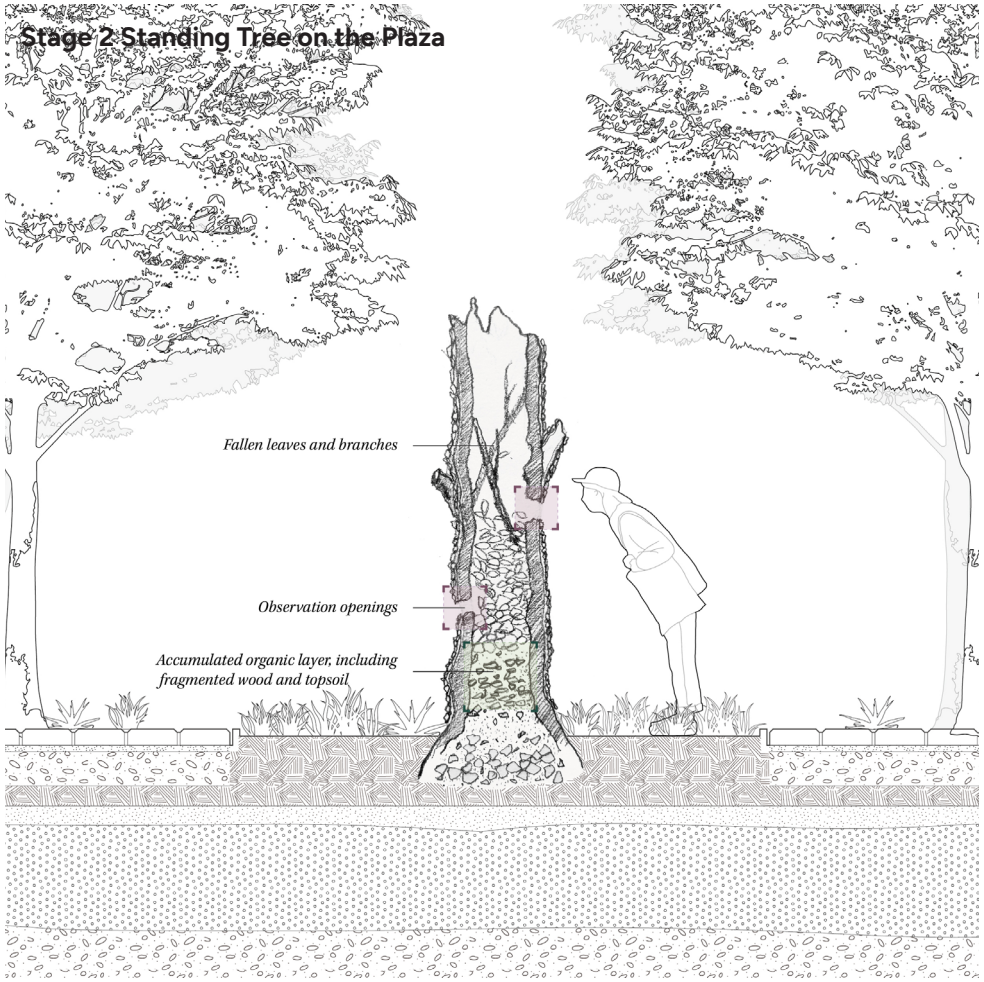
Redesign dead trees in urban settings

0 – 1 year

DESIGN RESULT

Zoom-in: Urban tiny forest

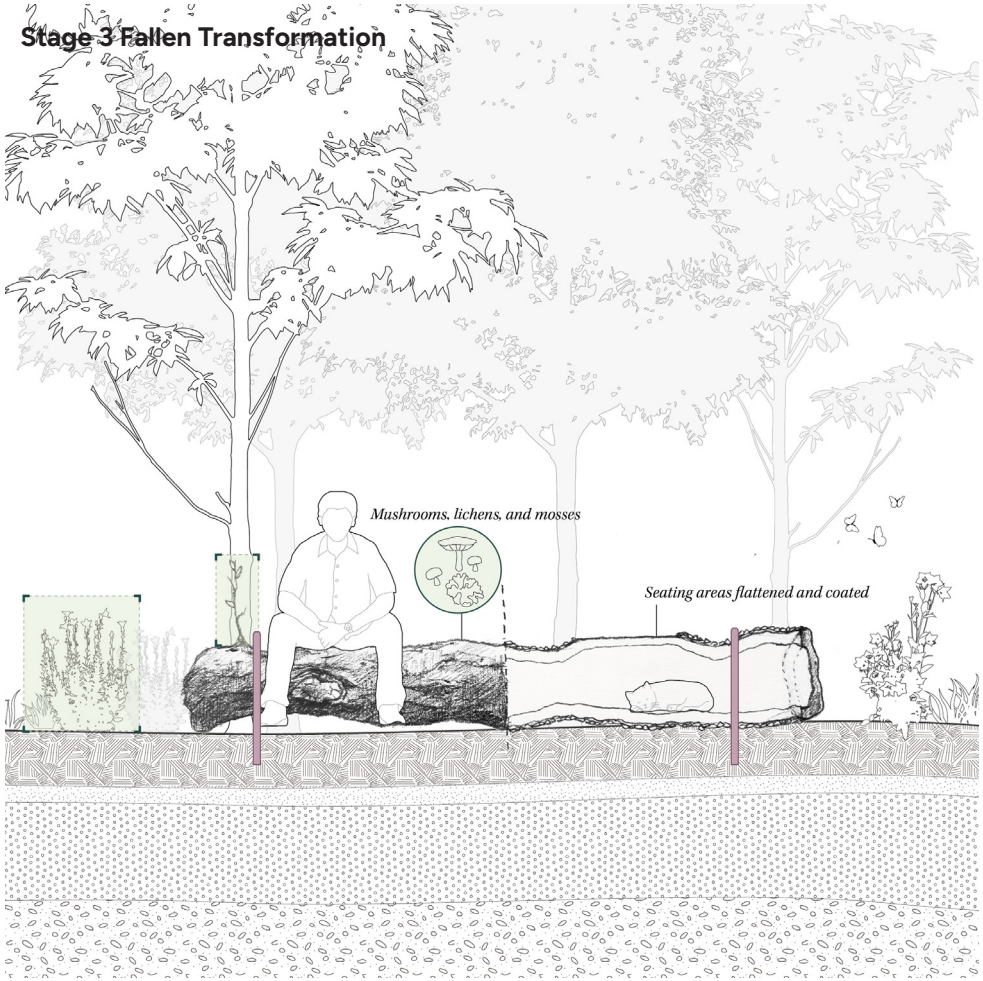
4 year



DESIGN RESULT

Zoom-in: Urban tiny forest

7 year

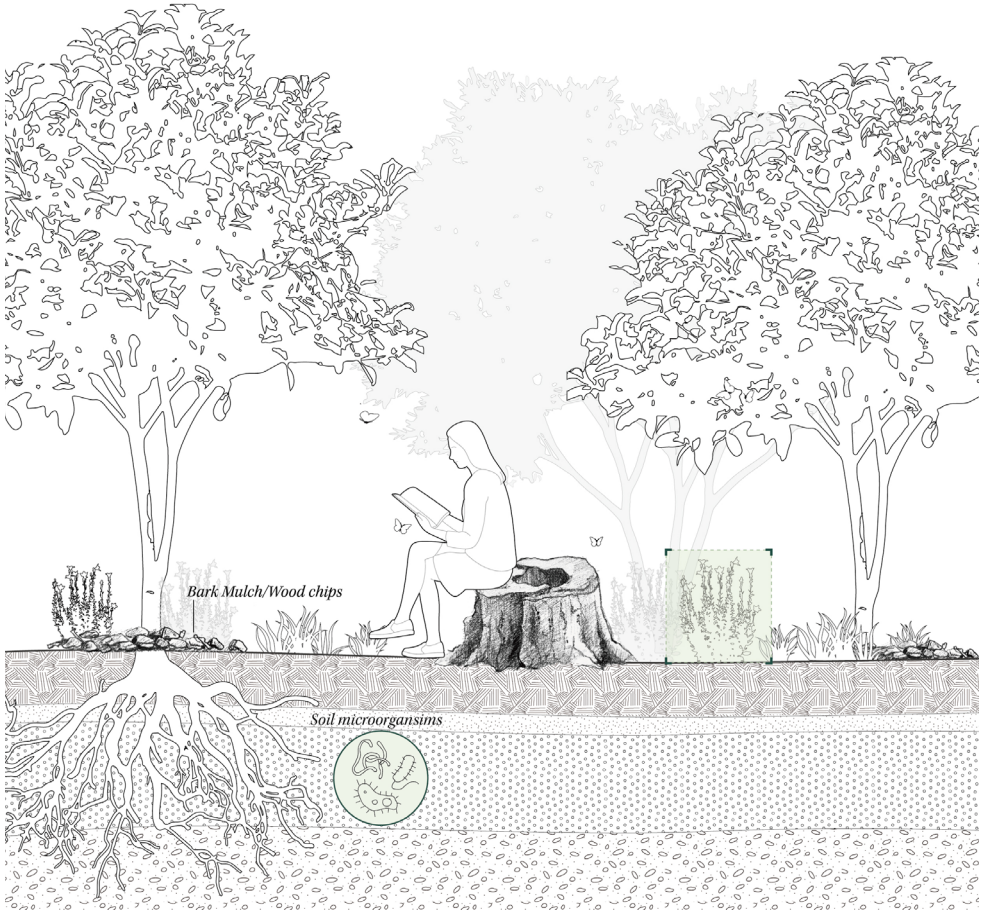


DESIGN RESULT

Zoom-in: Urban tiny forest

10 year

Stage 4 Decomposition and Rebirth



I. The Dutch history of deforestation and reforestation calls us to *rethink* our (cultural) bond with forests.

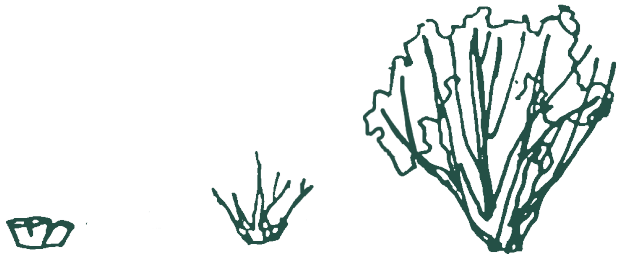
II. Forest urbanism can *align* new forests with housing, farming, ecology, recreation, and production, easing land-use pressure.

III. Transitional landscapes, due to their dynamic and hybrid nature, offer the potential to be *redesigned*.

IV. Therefore, to *apply* the forest urbanism approach in the Utrechtse Heuvelrug, we need to *transform* transitional landscapes into places where space, function, and identity are integrated.

V. Moreover, we need to *design* new forests that grow from the site's cultural history to strengthen **local identity**.

VI. From beginning to end, forest urbanism asks us to *switch views* between **"city to forest"** and **"forest to city"** to break boundaries.



THANK YOU!