



**Utrechtse Heuvelrug:
Designing a Future Forest Metropolis**

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ABSTRACT

The Dutch history of deforestation and reforestation, especially in the recent two hundred years, challenges us to rethink about the relationship between humans and forests. From a feared wilderness, to a productive asset, from a romantic retreat to a managed public green space, as an important cultural landscape, the forest reflects evolving human relationships with nature. In today's Netherlands, where afforestation and sustainability are actively promoted, a culturally informed vision of future forests and cities can foster a new model of co-development that enhances the forest's positive impact on well-being and cultural identity.

In this graduation project, the study area is the Utrechtse Heuvelrug region: its forests, nearby cities, towns and villages, and the transitional areas. The challenges it faces go beyond internal issues like forest fragmentation and a weak forest culture identity. They also include external pressures such as recreation, housing, agriculture, and extreme climate. Therefore, forest urbanism serves as an integrated approach that links forest expansion with urban development. By redesigning the transitional landscapes, this project aims to integrate complex functions, spatial experiences, and cultural identities in the new forests.

The result is a new forest metropolis in the Utrechtse Heuvelrug region. Eight types of forests are embedded within the transitional landscape under specific spatial principles. The outcome ranges from territorial-scale planning to local-scale urban-forest interface design. This project shifts perspectives between "seeing the forest from the city" and "seeing the city from the forest," challenging conventional boundaries between the city and nature, the functional roles of forests, and the potential contributions of landscape architecture to future urban development.

Keywords: Forest urbanism; Transitional landscape; Ancient woodland; Cultural landscape

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GLOSSARY

Ancient woodland

“It’s any area that’s been wooded continuously since at least 1600 AD. It includes:

- ancient semi-natural woodland mainly made up of trees and shrubs native to the site, usually arising from natural regeneration

- plantations on ancient woodland sites - replanted with conifer or broadleaved trees that retain ancient woodland features, such as undisturbed soil, ground flora and fungi”

(Natural England and Forestry Commission, 2022)

The concept of ancient woodland, was developed by the ecologist Oliver Rackham in his book *Ancient Woodland, its History, Vegetation and Uses in England* (Rackham, 1980). Nowadays the term is formally used by the Natural England and Forestry Commission in the United Kingdom for developing guidelines for the conservation and management of ancient woodlands (Natural England and Forestry Commission, 2022). In the United States, Canada, and Australia, the similar term for woodlands that include very old trees is usually “old-growth forest” (White & Lloyd, 1995). However, it is a bit different from “ancient woodlands”. “Old-growth forest” mostly refers to old forests without any human intervention, while “ancient woodland” refers to forests with some artificial management.

In this thesis, the specific definition and range of ancient forests in Utrechtse Heuvelrug comes from the *Strategic Forest Policy 2023-2028 (Strategisch bosbeleid 2023-2028)* compiled by Provincie Utrecht. Although the term old forest growth sites (oude bosgroeiplaatsen) is used in this document, its meaning can be understood as equivalent to the ancient woodlands mentioned above.

First, the definition of ancient forests in Utrechtse Heuvelrug is:

“An old forest growth site is a current forest area that, more or less continuously, can be traced back to a forest growth site from

before 1832. These sites are refuges for forest organisms that depend on the relatively continuous presence of native deciduous forest. Old forest growth sites represent the limited remnants left after much of the original forest disappeared, with only a few forests escaping overgrazing, cultivation, or the planting of non-native tree species.

They host the existing and potential biodiversity of forest organisms reliant on the uninterrupted presence of native deciduous forest.”

It is important to note that as the latest policy and research on ancient woodlands in Utrecht, this document also includes the old forest cores (oude boskernen) as part of the old-growth forest area.

Old forest cores are old forest growth sites that contain substantial native trees and shrubs, including wild (or autochthonous) populations. Autochthonous trees and shrubs are native species that have naturally existed in the region for a very long time, having reached the Netherlands independently after the last Ice Age. Of the current trees and shrubs in Utrecht, only 3% are autochthonous.

Second, the range of ancient forests in Utrechtse Heuvelrug is:

Old forest growth sites (Oude bosgroeiplaatsen) in the province of Utrecht currently include forests located on higher sandy soils and in the riverine areas. These sites are identified based on open forested areas from topographical maps, without interruption, dating back at least to a forest growth site from before 1832, specifically:

- Areas marked as “forest” or “pine forest” according to the cadastral map from 1832.

- Areas marked as “heath with shrubs” according to the cadastral map from 1832 (in newer maps, these are often designated as forests).

The following “old forest cores” (oude boskernen) from before 1832 are also included (from the existing province of Utrecht):

- Old forest cores that are not classified as “forest” according to the cadastral map of 1832 but whose boundaries align with or overlap those marked as “forest” in 1832.

- Old forest cores that are not classified as “forest” on the 1832 cadastral map but appear as wooded areas on the Topographical and Military Map from 1850.

The following are not counted as old forest growth sites:

- Linear elements

- Parcels smaller than 0.5 hectares

- Parcels that are visibly urbanized and significantly altered

(Translated from Dutch to English)

(Provincie Utrecht, 2022)

Ancient and veteran trees

“Ancient and veteran trees can be individual trees or groups of trees within wood pastures, historic parkland, hedgerows, orchards, parks or other areas. They are often found outside ancient woodlands...”

A veteran tree may not be very old, but it has significant decay features, such as branch death and hollowing. These features contribute to its exceptional biodiversity, cultural and heritage value.

All ancient trees are veteran trees, but not all veteran trees are ancient. The age at which a tree becomes ancient or veteran will vary by species because each species ages at a different rate.”

(Natural England and Forestry Commission, 2022)

Forest Urbanism

According to René van der Velde (In-lab lecture, 2024),

the concept of forest urbanism is “research, planning, design, engineering and managing built environment (eco)systems as novel forest complexes.”

Green Heritage

“Green Heritage is the collective name for historical green spaces such as gardens, parks, residential areas, fortifications, cemeteries, country estates, and manors. Cultural landscapes with greenery influenced by humans, such as coppice forests and hedgerows, also fall under the category of Green Heritage.

Green Heritage was conceived or created by people in the past. This heritage is preserved or maintained for the benefit of future generations. These sites are visual witnesses to the ever-evolving relationship between humans and nature. Part of this green heritage is protected as national monuments. The Netherlands has over 1,400 nationally protected gardens, parks, and cemeteries. In addition, there are around 75 protected green fortifications.”

(Translated from Dutch to English)

(Rijksdienst voor het Cultureel Erfgoed, n.d.-b)

Moraine

A moraine consists of debris that a glacier leaves behind as it moves. This debris typically includes rocks and soil. (National Geographic Society, n.d.)

Utrechtse Heuvelrug is a moraine—more specifically, it’s a push moraine (also called a terminal or end moraine) that was formed during the Saalian glaciation, around 150,000 years ago. During this ice age, glaciers from the north pushed sediment, sand, and rocks ahead of them, creating ridges as they advanced. The Utrechtse Heuvelrug is one of those ridges, left behind when the ice retreated (Posthumus, 2013, p. 215; van den Brink, 2021).

MRA and MRDH

Metropoolregio Amsterdam (MRA) and Metropoolregio Rotterdam Den Haag (MRDH)

Natuurbeheerplan 2025

According to Provincie Utrecht (2024), *Natuurbeheerplan 2025* is the official nature management plan for the province of Utrecht. It outlines the policy goals, guidelines, and subsidy frameworks for the development, maintenance, and restoration of natural areas and agricultural landscapes. The plan includes:

- Strategies for achieving nature and biodiversity goals set by EU, national, and provincial policies
- Criteria for managing different types of natural landscapes and ecosystems
- Maps and area descriptions guiding where and how nature development can take place
- A system of subsidies to support landowners, farmers, and nature managers

Compared with the 2024 version, the new plan updated some contents on climate adaptation, forest expansion, and species protection.

Natuurnetwerk Nederland (NNN)

“The nature network is a network of areas in the Netherlands where nature takes priority. The network helps prevent plants and animals in isolated areas from becoming extinct and helps preserve the value of nature reserves. Larger nature areas are beneficial for biodiversity and the quality of the living environment. When nature areas are also connected, it becomes easier for animals and plants to survive.” (Translated from Dutch to English)

(Atlas Leefomgeving, 2022).

The NNN was previously known as the Ecologische Hoofdstructuur (EHS), Ecological Main Structure in English.

Reforestation/Afforestation

“Reforestation refers to the planting of forest on land that was forest but has been out of forest cover for a certain duration. For the first commitment period of the Kyoto Protocol this was defined as planting on land that did not contain forest on the 31 December

1989. In North America and in the lead up to post-2012 negotiations ‘on land that has been out of forest for at least 10 year’s is a likely alternative.

Afforestation refers to the establishment of forest on land that is considered to not have been forest previously.” (FAO, 2008)

Rewilding

Rewilding is a conservation strategy focused on returning ecosystems to their natural, self-regulating states by reintroducing native species and reducing human influence. This approach aims to enhance biodiversity and ecological resilience by allowing natural processes to shape the environment. (Cambridge University Press, n.d.-b)

Transitional Landscape

A transitional landscape is commonly understood as a spatial or conceptual zone where different land uses, ecosystems, or cultural practices meet and interact (Forman & Godron, 1986; Antrop, 2004; Palang & Fry, 2003). It is defined by its dynamism—a place actively undergoing transformation in its function, form, or identity. As a result, these areas frequently show overlapping characteristics (e.g., rural–urban mixes, post-industrial regrowth, ecological succession).

The concept has emerged from multiple disciplines, including landscape ecology, geography, and planning, rather than having a single origin. From ecological transitions to peri-urban developments and liminal spaces in architecture, these varied emphasize how landscapes can bridge different domains.

Urban Forestry

Konijnendijk et al. (2006) state that “urban forestry is generally defined as the art, science and technology of managing trees and forest resources in and around urban community ecosystems for the physiological, sociological, economic, and aesthetic benefits trees provide society.”

I Dutch Forests As A Cultural Landscape

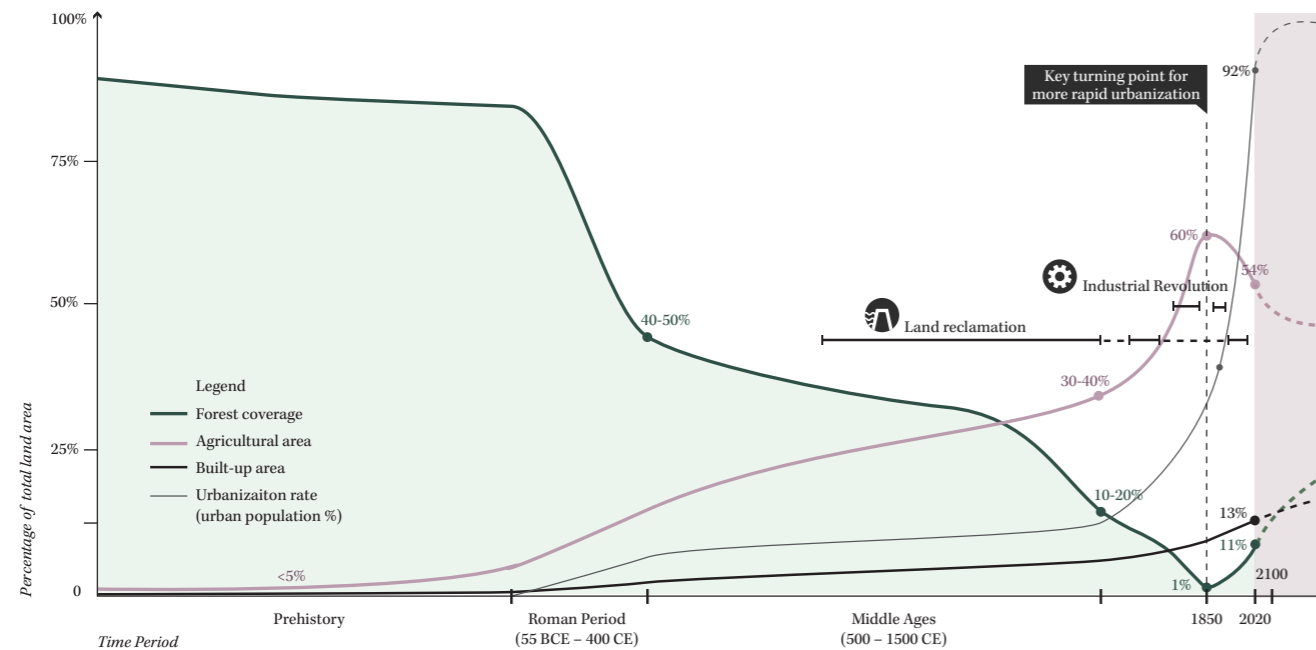


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1.1 BACKGROUND

A history of deforestation and reforestation

Estimation of historical changes in land use and urbanization in the Netherlands



Would you consider the Netherlands a forested country? A thousand years ago, the answer might have been yes.

This diagram depicts the historical changes in land use and urbanization in the Netherlands. In prehistory, the region was largely forested, but by the Roman period, significant portions of these forests had been cleared to accommodate agriculture and settlements. This trend accelerated during the Middle Ages, driven by population growth and the demand for farmland, timber, and grazing land. By 1850, forest cover had declined to nearly 1–5% (Boosten, 2016; van der Meulen, 2003), and agriculture dominated the landscape, encompassing approximately 60% of the land area (Feng, 1997, p. 42).

In the 20th century, urbanization expanded rapidly, leading to the fragmentation of agricultural areas and a resurgence of forest planting, particularly monoculture production forests. Today, the Netherlands is a densely populated and heavily managed landscape, with 54% allocated to agriculture, 11% to forests, and 13% to built-up areas (Centraal Bureau voor de Statistiek, 2023; Food and Agriculture Organization of the United Nations, 2020).

This transformation reflects centuries of human intervention and innovation, reshaping the natural environment to balance economic needs, urban expansion, and a growing awareness of environmental conservation. Various positive signs suggest that more forests are likely to be introduced in the future.

53.7% (2.2 million hectares) — Agriculture

10.8% (370,000 hectares) — Forest



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.

Afforestation policies

In recent years, the Netherlands has introduced various afforestation and reforestation policies aimed at climate adaptation, biodiversity enhancement, and sustainable resource management. These measures have sought to balance ecological preservation with socio-economic goals, often integrating forestry with agriculture, urban development, and water management.

1. Natuurnetwerk Nederland (NNN)

Formerly known as the Ecologische Hoofdstructuur (EHS) and established in 1990, Natuurnetwerk Nederland was conceptualized to build a robust network of interconnected natural areas. Its main objectives include protecting core nature reserves, creating wildlife corridors, and enhancing ecosystem services (Atlas Leefomgeving, 2022). By linking forests, wetlands, and other habitats, the NNN contributes to biodiversity conservation and offers opportunities for afforestation in strategic ecological zones. Provincial authorities primarily manage its implementation, ensuring that new forests complement existing conservation areas (Rijksoverheid, n.d.).

2. Bossenstrategie (Forest Strategy)

According to Interprovinciaal Overleg & Ministerie van Landbouw, Natuur en Voedselkwaliteit (2020),

The national government's Forest Strategy outlines the creation of 37,000 hectares of forest by 2030.

This plan focuses on carbon sequestration, climate resilience, and sustainable wood production. It promotes the integration of forested areas with other land uses, such as housing, agriculture, and water management, aiming for multifunctional landscapes.

By emphasizing ecological connectivity and carbon storage, this policy demonstrates the government's strategic alignment with broader climate goals.

3. Plan Boom

Led by Nature and Environmental Federations and

supported financially by the PostcodeLoterij, Plan Boom planted over five million trees over the last five years. The nationwide project was completed in 2024, but some associations and organizations are still busy with follow-up tree-planting projects. In this way, Plan Boom has transformed the physical living environment and raised awareness among many individuals and institutions. It empowers citizens to initiate and propose planting sites. The plan organizers work with residents, groups and municipalities to find out where there is space and where it would be best to plant trees. This bottom-up approach broadens public engagement in climate action, while simultaneously addressing urban heat mitigation and air quality. The plan also aims to strengthen local biodiversity by creating green corridors for flora and fauna. (Natuur en Milieufederaties, n.d.)

In conclusion, these policies underscore the Netherlands' commitment to ecological sustainability and climate resilience through afforestation.

However, while they effectively prioritize carbon sequestration, biodiversity, and land-use synergy, the cultural and historical significance of forests tends to be overlooked. Integrating these dimensions could enrich forest landscapes, fostering a deeper connection between people and their environment.

At the same time, concrete and feasible spatial design solutions are also necessary to promote afforestation, and landscape architects should take part in this responsibility. Beyond the numerical increase in forest area, landscape designers should focus on the diverse functions and spatial experiences of forests, exploring the cultural significance of forests and tailoring design solutions to local conditions.

(Not) A child of forest

Most Dutch people probably wouldn't describe themselves as "children of the forest." Marshes, dunes, and lowlands are more typical landscapes in the Netherlands. Over centuries, people came to see the land as an asset for cultivation and trade rather than as a mysterious wilderness to fear.

This contrasts with regions like Finland or Germany, where ancient forests strongly influenced national identity. For instance, the German fairy tales collected by the Brothers Grimm, often center on woodlands inhabited by witches and wolves. In Finland, the epic *Kalevala* vividly portrays a deep bond with nature, weaving forests into its heroic legends. By comparison, Dutch folk culture is rich in seafaring tales and windmill-dotted farmland scenes, offering fewer narratives where woodlands serve as a central motif.

Over time, however, attitudes in the Netherlands have evolved. In the 19th century, there was an increased interest in nature and romantic ideals, leading to the reforestation of areas such as the Veluwe. Writers and poets began to embrace the idea of forests as places of tranquillity and escape. For example, in the book *De kleine Johannes* (van Eeden, 1887/2004), the young protagonist Johannes begins a fantastical journey that includes encounters in forests. *De kleine Johannes* depicts woodland spaces as tranquil and transformative places—where characters gain insights into humanity and spirituality. Forest scenes, although not dominant, mark a shift in the Romantic view of nature as an reflective and enchanting realm.

Artists of the Hague School also occasionally depicted wooded scenes in their landscapes, though these were less prominent than the country's characteristic dunes and polders. Julius van de Sande Bakhuyzen (1835–1925) once painted forest scenes—*Forest landscape* is one example—where he captured the soft light in the woodlands, leisurely grazing cattle and a cowherd. It shows a quieter side of Dutch nature, and reflects the period's Romantic interest in serene natural areas within larger busy pictures.

van Gogh (1853–1890) created a drawing *Pollard Birches* in 1884. Pollarding is a long-standing tradition in the Netherlands, where trees, often willows, are regularly cut back to promote new growth. Pollard trees are mostly in rural wetlands and along canals. In addition to pollarding, two other common woodland management practices in the Netherlands are

coppicing and shredding (Regionaal Landschap Lage Kempen, n.d.). The cultural landscapes shaped by these methods are often found in or near forests.

Today, the Dutch relationship with forests centers mostly on recreation and environmental stewardship. Though the Netherlands does not possess deep forest traditions, contemporary society values these green spaces and their cultural potential, forging new forms of connection between people and the woodlands.



Pollard Birches
Vincent van Gogh, 1884,
Van Gogh Museum, Amsterdam (Vincent van Gogh Foundation)



Forest landscape
Julius van de Sande Bakhuyzen, n.d., WikiArt.

1.2 PERSONAL FASCINATION

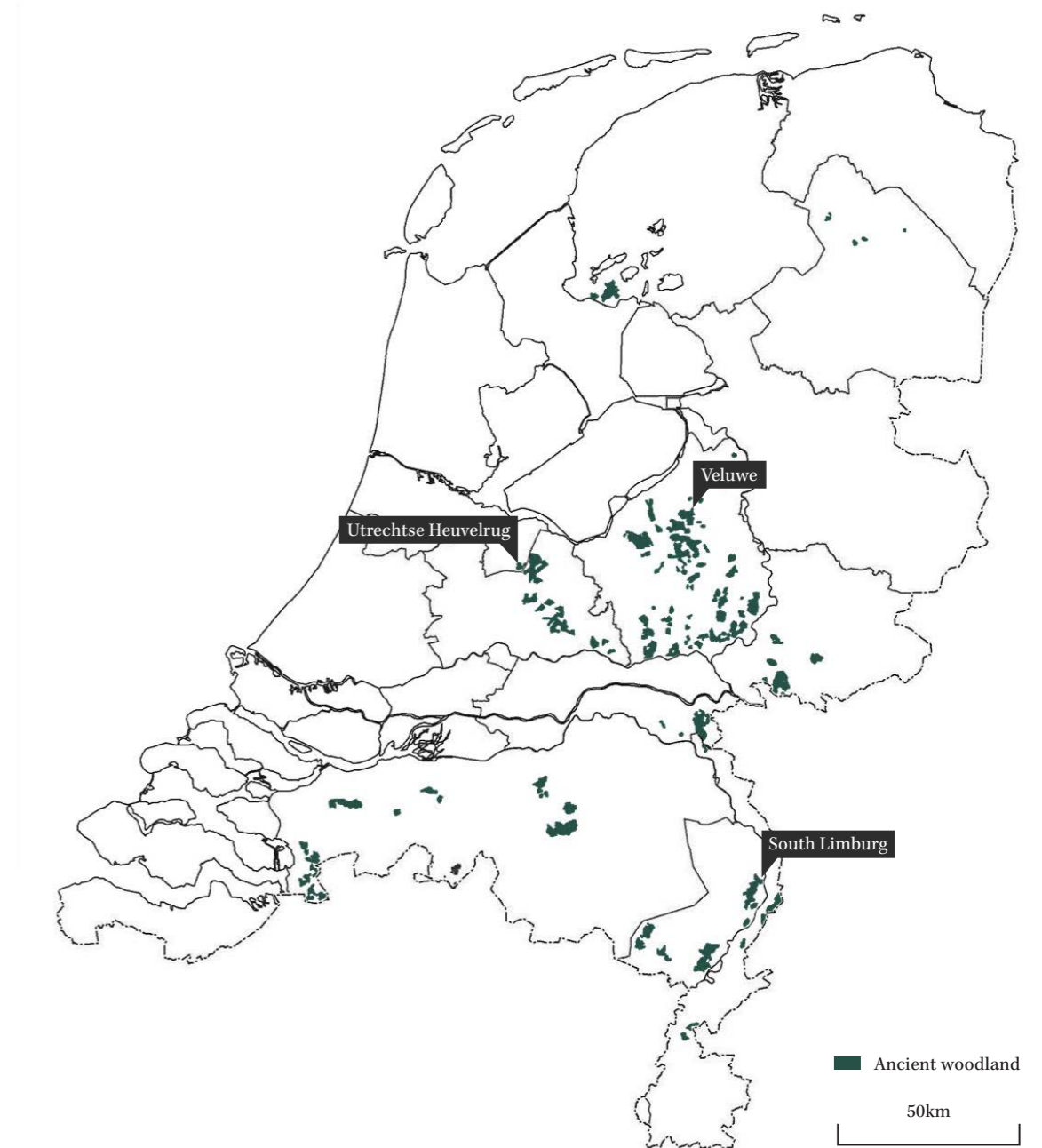
Trees as recorders, Ancient woodlands as archives

My fascination with trees lies in their cultural significance and their role as living symbols of resilience, memory, and transformation. Trees have long served as spiritual symbols across cultures, representing life, growth, and wisdom. Beyond their ecological benefits, I believe trees are the most insightful recorders of human history and natural evolution. The way trees grow, adapt, and respond to their environment encapsulates invaluable knowledge about the past and provide guidance for the future. Ancient woodlands, in particular, record the long history of a place. In these age-old woods, one can trace the marks left by centuries of interaction between humans and the forest. As a cultural landscape, the way we treat ancient forests mirrors humanity's relationship with nature.

Therefore, I chose the Urban Forestry Lab. I am particularly drawn to how the studio explores the role of trees as agents of change in urban environments, bridging the gap between nature and human life. Trees not only shape landscapes, but they also influence human culture, identity, and well-being. I want to learn more about how urban forestry can strengthen the connection between people and nature, while addressing contemporary challenges such as climate change, biodiversity loss, and urban expansion. This studio offers the platform for me to integrate the cultural and environmental significance of trees into urban design.

“Where nature and culture meet, landscapes emerge.”

Konijnendijk, 2018



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.

1.3 PROBLEM STATEMENT AND RESEARCH QUESTIONS

Overall landscape-related challenges

The forests of the Netherlands have undergone profound transformation over the centuries. Initially covered by vast woodlands, the landscape was gradually cleared for agriculture, infrastructure, and urban development. By around 1850, centuries of intensive deforestation left only about one percent of the land forested (van der Meulen, 2003). In the 19th and 20th centuries, the government and various landowners initiated reforestation projects, transforming the country's remaining forests into carefully managed and restored areas. More recent plans, like the National Forest Strategy, aim to reconnect fragmented habitats and increase forest cover by about 10% by 2030 (Interprovinciaal Overleg & Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2020). Although these efforts have brought back some trees and wildlife, but nearly all of the woodlands in Netherlands are now human-influenced rather than naturally evolved. Despite the appearance of being a "green" country, the reality is that most of these green spaces are agricultural, with true forest landscapes remaining highly fragmented and often disconnected from the surroundings.

Contemporary Dutch forests face several challenges. Spatially, they remain fragmented, often existing as small and disconnected patches. Culturally, forests lack a deep-rooted significance within national identity. With an agricultural and water-management heritage dominating the cultural narrative, forested areas struggle for recognition as a valued part of the country's heritage. Other challenges include impacts of climate change such as drought and flooding (Environmental), high recreational demand (Social), and a delicate balance between economic activity and environmental conservation (Economic).

“The forests become a backdrop rather than a defining feature of local identity, hindering the formation of a shared narrative that ties human activities closely to the surrounding natural environment.”



Site location in Utrecht province, the Netherlands

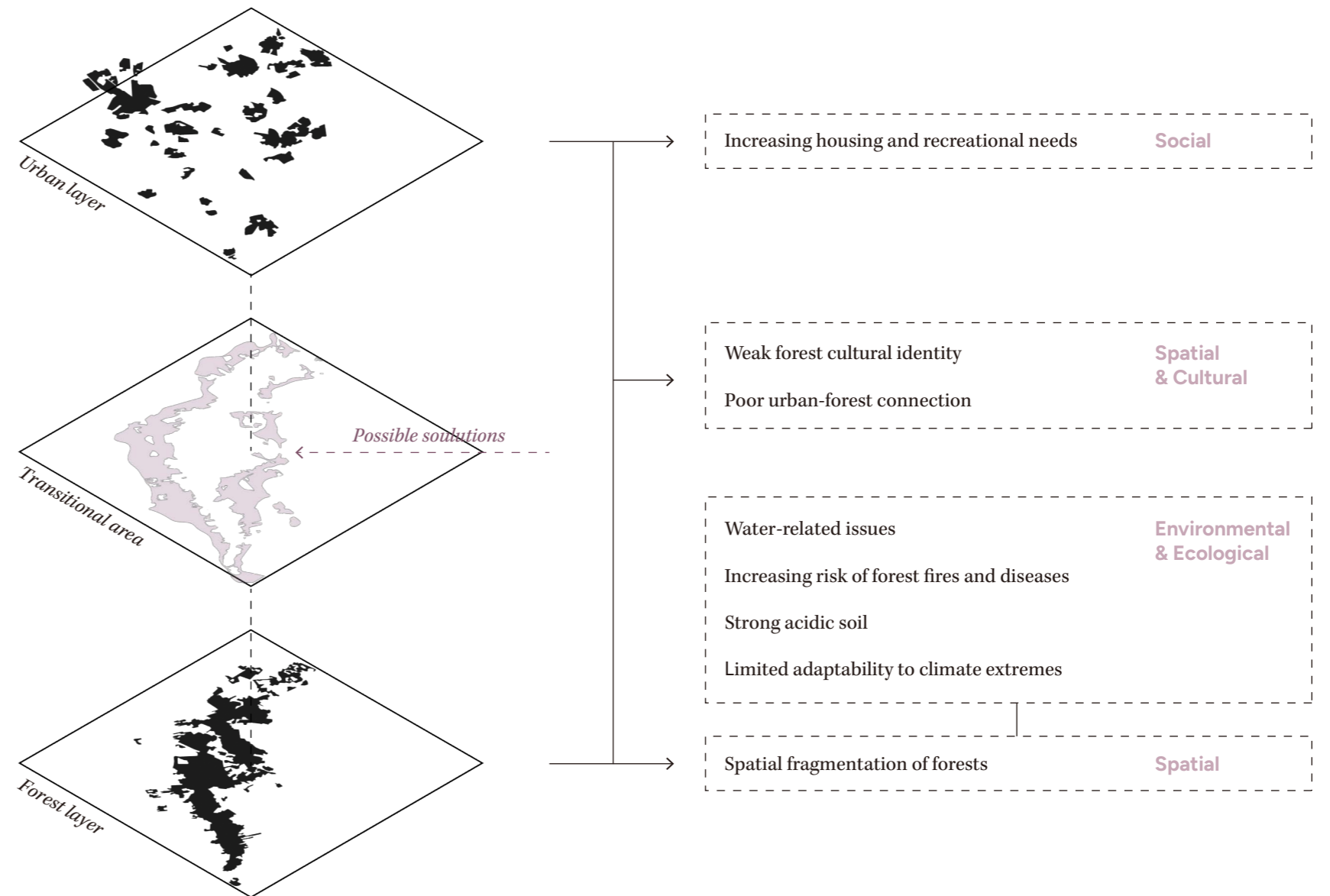
Site-specific problems

The Utrechtse Heuvelrug region has been selected as the design site. It is the second largest forest area in the Netherlands after Veluwe.

Urban expansion and infrastructure development have fragmented the ancient woodlands in this region, leaving them as isolated patches rather than continuous landscapes systems. These forests also lack spatial connections to the surrounding urban fabrics. Therefore, although the green heritage here is rich, the cultural identity associated with forests is not strong. For example, in the Utrechtse Heuvelrug region, there are hundreds of old forest cores that contain valuable native species (Provincie Utrecht, 2022). These forests also feature distinctive planting patterns and forms. However, in the neighboring cities, the cultural attributes of these woodlands are not reflected in residents' daily lives or in the broader community landscape. As a result, the forests become a backdrop rather than a defining feature of local identity, hindering the formation of a shared narrative that ties human activities closely to the surrounding natural environment. Over time, this lack of embedded cultural significance can reduce public stewardship, making it more challenging to support for conservation and restoration efforts.

Additionally, the Utrechtse Heuvelrug faces several environmental and ecological challenges. Water-related issues include groundwater depletion caused by excessive drainage, conflicting water-level demands, and water-quality deterioration due to agricultural pollution (Flux Landscape Architecture, 2021; H+N+S Landschapsarchitecten, n.d.). The region also has limited adaptability to climate extremes such as drought and flooding. Moreover, there is an increasing risk of forest fires and diseases, along with reduced biodiversity and weakened ecosystem resilience (Provincie Utrecht, 2022). Due to long-term monoculture and excessive nitrogen deposition, some forest soil has become strongly acidic. Combined with more frequent droughts and heavy rains, the vitality of some stands has declined in recent years (Provincie Utrecht, 2025b). Together they are threatening the long-term health and sustainability of the landscape.

Lastly, in terms of social issues, the growing population and increasing number of visitors place pressure on the region, particularly in terms of housing and recreational needs.



Problematique of the Utrechtse Heuvelrug



△ Increasing reforestation needs: newly planted trees, Amerongse Bos

▷ Local wood production, Amerongse Bos

Research questions

This graduation thesis explores transitional landscapes as a key to reconnecting the urban area and the forest in the Utrechtse Heuvelrug region. This thesis is based on the theory of urban forestry and aims to design various urban-forest interfaces that integrate complex functions, spatial experiences, and cultural identities, ultimately envisioning a forest metropolis.

The main research question is:

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?

Main content of the design
What?

Location of the design
Where?

The sub-questions are posed from three perspectives:

Background Understanding

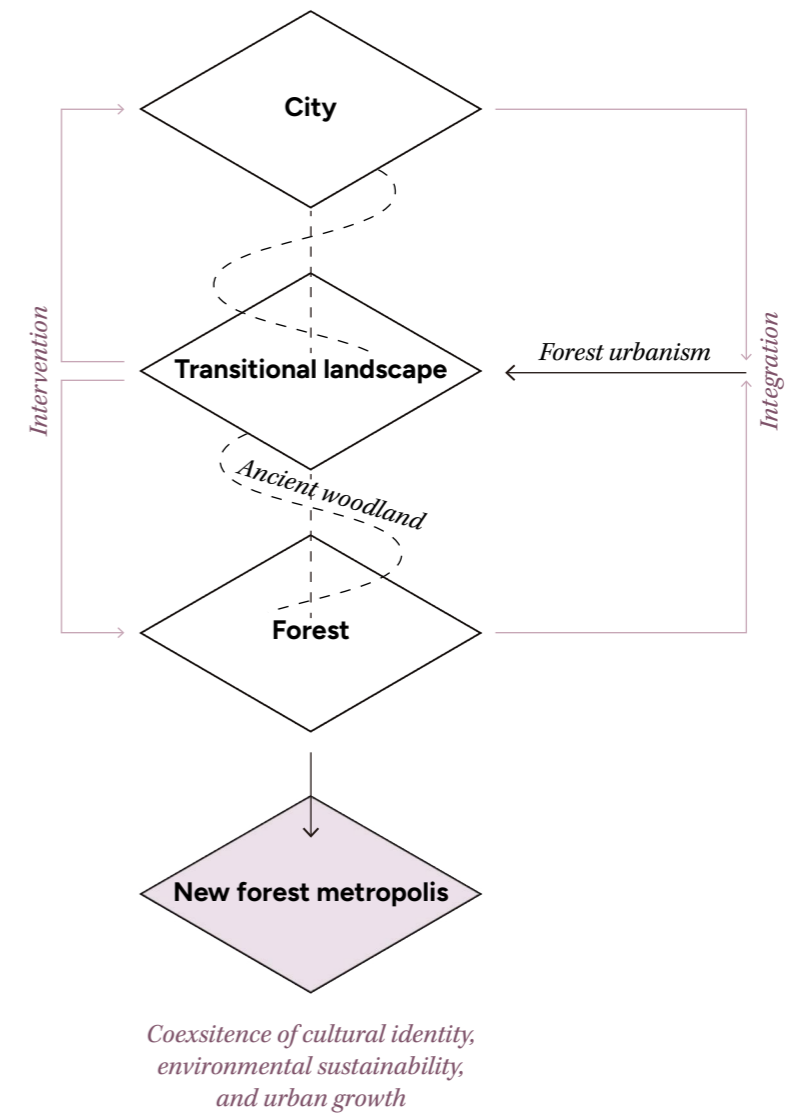
- What are the historical and cultural connections between humans and forests in the Utrechtse Heuvelrug region and in the Netherlands?
- How have historical land use practices contributed to the current situation of the ancient woodlands in the Utrechtse Heuvelrug?

Design Principle & Strategy

- How can transitional landscapes enhance forest spatial continuity and strengthen connections with surrounding urban areas while balancing ecological, social and recreational needs?
- What historical essentials from ancient woodlands can be adapted or reinterpreted in the new urban forests?
- What principles are essential for shaping a new form of urbanity within the forest metropolis?

Reflection

- How can the design be implemented over time to adapt to future challenges and provide lessons for similar "forest metropolis"?



1.4 THEORETICAL UNDERPINNINGS

The design of sustainable landscapes at the interface of urban areas and natural ecosystems has become increasingly important in contemporary landscape architecture. This project proposes a vision for a forest metropolis in the Utrecht Heuvelrug by redesigning the transitional landscapes. The project explores how cultural identity, environmental sustainability, and urban growth can coexist through the reintegration of forests into the heart of urban life. To guide the design effectively, it is crucial to understand and integrate key theoretical concepts related to urban forestry, urban planning, and landscape.

Forests and landscapes hold ecological, cultural, and social values essential for sustainable urban development. Concepts such as transitional and peri-urban landscapes address the unique ecological and social challenges that emerge at the boundaries of urbanization. At the same time, urban perspectives, including metropolitan planning and decentralized planning, provide strategies to accommodate urban growth sustainably and resiliently. At the intersection of these approaches lies the concept of forest urbanism, a guiding principle that seeks to harmonize urban and forest ecosystems within shared landscapes.

This section outlines these theoretical foundations, examining how they shape the conceptual and practical approaches necessary for the design of a forest metropolis in Utrecht Heuvelrug.

“Where nature and culture meet, landscapes emerge.”
(Konijnendijk, 2018)

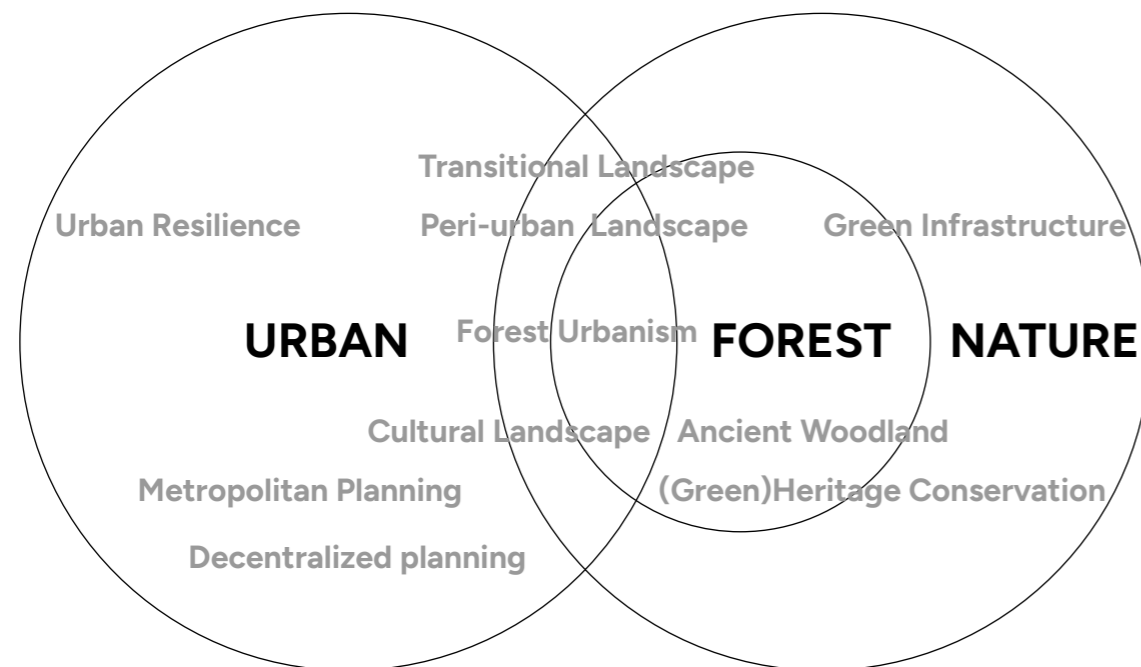


Diagram of interrelated theories in urban and forest contexts

Forest & landscape perspectives

From the forest to the urban area, various kinds of land use overlap in the Utrecht Heuvelrug region, including semi built-up area, farmland, woodland and heathland. To study this complex in-between area, this project draws on three intertwined bodies of thought: transitional-landscape theory, cultural-landscape theory, and ancient-woodland conservation. Together they explain what this in-between area is, why it matters, and how it can be shaped.

Transitional landscape theory

Transitional landscapes refer to a spatial or conceptual zone where different land uses, ecosystems, or cultural practices meet and interact (Forman & Godron, 1986; Antrop, 2004; Palang & Fry, 2003). The defining property is hybridity—different elements overlap rather than succeed one another. They have highways next to dairy farms, houses near young pine forests, and markets near logistics warehouses. Their defining character is not a particular land use but constant flux (Wandl et al., 2014). It changes over time due to population growth, the economy and natural process.

Since they change quickly, these areas take on pressures that main cities can't—like housing needs, logistics, recreation, and biodiversity offsets. If unmanaged, this can harm nature and local identity. But with good planning, the same pressures can create multifunctional green spaces that improve resilience and reconnect people to nature.

There are some fundamental principles from transitional landscape theory can provide insights for the Utrechtse Heuvelrug project:

- **Networked terrain.** Utrechtse Heuvelrug should first be seen as a complete region or territory. It is made up of diverse units and elements and shouldn't be simplified as just “forest and surroundings,” “forest and city,” or “urban and rural”. Like much of Europe, the Utrechtse Heuvelrug region has many transitional zones that don't fit the usual urban–rural divide (Wandl et al., 2014). These in-between areas should be understood as relations (Qviström, 2007). They form networks—both ecological ones, like green corridors, and social ones. The networks are mapped first, then parcels and boundaries follow. This reverses the usual practice of filling leftover land with green spaces.

- **Multi-functionality.** Productive, recreational,

infrastructural, and ecological functions coexist. Design should enhance cooperation and reduce conflicts.

- **Time as a design layer.** Transitional landscapes are never finished. The design should account for the site's uncertainty, imagining possible scenarios and solutions for different challenges. The design should also set phased goals to let nature develop alongside urban growth.

Cultural landscape theory

Cultural-landscape theory began with Carl Sauer's call to study “the impress of the works of man upon the area” (Sauer, 1925/1969). Later scholars, like Cosgrove (1985), argued that landscapes are not just shaped physically, but are also visual constructions tied to memory, identity, and especially power, reflecting how societies see, structure, and control space. A cultural landscape is both a physical pattern, like dikes, gardens and orchards, and a story told by people who live there. UNESCO and ICOMOS formalized the idea of cultural landscapes in 1992 by introducing it as a World Heritage category, bringing it into global conservation efforts (Fowler, 2003). Today the cultural landscape lens is widely applied in heritage management and landscape architecture. It frames landscapes as living, evolving systems that carry historical layers, social meanings, and ecological functions.

Landscapes rich in shared memory help people form emotional bonds and a sense of responsibility. They offer insights for shaping future places in ways that respect local identity. If these cultural traces are ignored, we risk losing collective memory and replacing unique environments with generic and disconnected designs.

Applying cultural-landscape thinking in the Utrechtse Heuvelrug project means:

- **Reading the palimpsest.** The term palimpsest originally referred to reused parchment, where earlier writing was removed to make room for new text, though faint marks of the original often remained (Cambridge University Press, n.d.-a). In landscape architecture, this idea helps us understand landscapes as layered records of change over time (Bobbink & de Wit, 2020). Cultural landscapes, in particular, hold traces of past land uses, social practices, and ecological

patterns. These layers may blend, conflict, or coexist, shaping how a place is experienced and understood (Bobbink & de Wit, 2020). Recognizing a landscape as a palimpsest allows designers to work with its visible and hidden histories, using them as a foundation for future interventions that respect the memory and identity of the place.

According to Wei & Zhu (2019), palimpsest can serve both as an analytical tool and as a design approach. They suggest that palimpsest-based design methods can be further categorized into two types: “autonomous palimpsest-based design” and “relational palimpsest-based design”. The former focuses on the autonomy of space, emphasizing the formal qualities and inner logic of the design itself. It values layering, contrast, and the coexistence of old and new without relying too much on external meanings. The latter is relational, highlighting the interaction between space and external factors such as people, culture, and memory. It uses overlap, tension, and connection to create spaces that invite engagement and reinterpretation. Both approaches aim to reveal depth and complexity by allowing multiple layers of meaning to coexist within the landscape.

A good example is the Grote Markt project by VOGT. The Grote Markt is one of the most important public squares in Groningen, and has been the site of many significant historical events for centuries. By relocating the historic 1926 compass rose, which was originally a reinterpretation of a 13th-century marker, beneath a new tree canopy, the design preserves historical layers while adapting to contemporary urban life (Vogt Landscape Architects, n.d.). This integration of past and present shows how acknowledging and reinterpreting historical elements can inform modern public spaces.

Over the past two centuries, Utrechtse Heuvelrug has seen major changes in both its natural and urban environment. Its country estates, military earthworks, and ancient woodlands are valuable cultural landscapes. To understand their meaning and the shifting relationships between them, it’s important to view the site through the lens of palimpsest.

- **Enabling co-authorship.** Co-authorship ensures that diverse perspectives and local knowledge shape the cultural landscape. It also builds a shared sense of ownership and responsibility. In the case

of the Utrechtse Heuvelrug, at least four groups of stakeholders are brought together: the local community, public authorities and agencies, experts, and economic and community partners. In this project, it is important to clarify the roles and responsibilities of different stakeholders and explore possible models of governance.

Ancient woodland

According to Provincie Utrecht (2022), the ancient woodland in the Utrechtse Heuvelrug refers to a forested area that has existed, more or less continuously, since before 1832. The detailed definition of ancient woodland can be found in the glossary.

Oliver Rackham first defined the “ancient woodland” and demonstrating their irreplaceable ecological value (Rackham, 1980). George Peterken translated this insight into practice: he worked with the Nature Conservancy Council to start the Ancient Woodland Inventory (AWI) and set out management rules such as prioritizing the planting of small coupes and protecting woodland edges (Peterken, 1981). Keith Kirby helped turn the concept into policy by co-authoring the *Ancient Woodland Inventory for England and Wales*, which provides a systematic framework for identifying, locating, quantifying, and assessing the potential value of ancient woodlands in England (Spencer & Kirby, 1992). Together, their work created the intellectual, technical, and policy foundations that continue to guide ancient-woodland conservation today.

For the conservation and management of ancient woodlands, existing research offers many strategies that could inform the Utrechtse Heuvelrug. For example, Peterken argued that conservation should focus on native species most at risk, which are dependent on semi-natural habitats, limited in range, or vulnerable to change, because they are hardest to replace and essential to maintaining ecological continuity (Peterken, 1981, pp. 200–201). He also suggested some other strategies such as making efforts to “preserve semi-natural deciduous woodlands and natural forests”, maintaining habitat biodiversity “by not straightening margins”, planning and controlling “recreational use of forests”, etc (Peterken, 1981, p. 308). The Natural England and Forestry Commission (2022) suggested to use buffer zones to protect ancient woodlands. It mentioned that for ancient woodlands, a buffer of at least 15 meters should be maintained from the woodland edge to protect tree roots. In the case of ancient or veteran trees, including those along the boundary, the buffer should extend to at least 15 times the tree’s diameter. In the Utrechtse Heuvelrug, this could mean placing housing and busy trails outside a buffer belt, using native shrub or wood-pasture as transitional vegetation to protect core beech–oak areas.

Urban perspectives

Metropolitan planning and decentralized planning

Urban planning theory offers two complementary lenses for the Utrechtse Heuvelrug: metropolitan planning, which treats the city and its surroundings as one strategic system, and decentralized (polycentric) planning, which spreads activity across linked centers while preserving the land in between.

Metropolitan planning is a strategic approach to guide and manage changes in urban regions. It focuses on long-term goals rather than just legal rules or regulations. Its main role is to shape development across different areas and scales, from small neighborhoods to the entire metropolitan region. It’s not just about supporting growth, but about understanding how cities evolve and using planning to respond to those changes effectively (Gleeson et al., 2004).

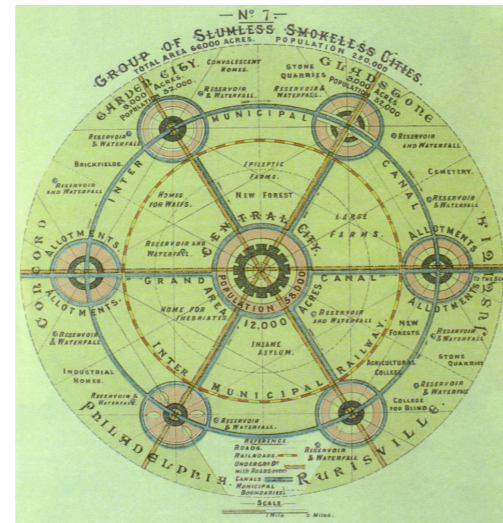
Furthermore, Gleeson et al. (2004) argue that metropolitan planning today reflects eight core priorities central to integrated planning: pursue sustainability, manage finite resources, guide regional growth, integrate cross-sector policies, remain publicly accountable, respect social diversity, reshape urban structure, and navigate uncertainty. Together, these priorities shift planning away from fixed designs toward guiding dynamic systems—balancing nature’s limits, infrastructure, and diverse community needs in a fast-changing world. The focus is now on sustainability, joined-up governance, and open, inclusive decision-making, even in the face of uncertainty.

Decentralized urban planning developed through bold ideas in the 20th-century. Ebenezer Howard’s Garden City (1898) introduced satellite towns surrounded by farmland and connected to a parent city by rail (Howard, 1898/2003). Frank Lloyd Wright’s Broadacre City (1932) spread homes across one-acre plots, relying on cars and communication tech to shape a low-density, democratic society (Wright, 1932). In the 1940s, Ludwig Hilberseimer’s New City proposed flexible, linear neighborhoods with public transport and green spaces, responding to post-war needs (Hilberseimer, 1944). By the 1960s, Branzi and his group Archizoom’s No-Stop City imagined an endless urban grid focused on infrastructure and consumption (Branzi, 2006). Together, these visions mark a shift from garden-like suburbs to networked, centerless

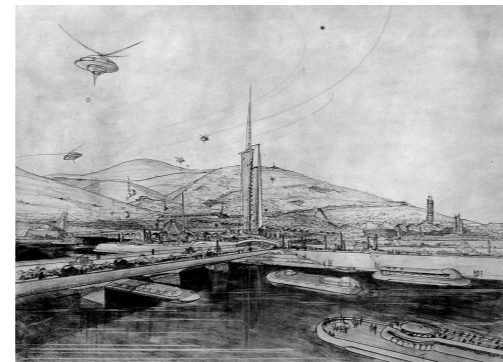
urban forms shaped by evolving technologies and values.

In the 21st century, decentralized or polycentric urban planning is more about managing mature city-regions as flexible and low-carbon networks of connected towns and protected landscapes. The Netherlands shows a long-standing commitment to decentralized and polycentric urban planning, especially in the Randstad. According to Spaans et al. (2021), rather than creating a single metropolitan authority, governance has evolved through multi-level cooperation between municipalities and provinces. Bodies like the MRA and MRDH demonstrate how voluntary and network-based planning can function across administrative boundaries, focusing on shared goals like transport and economic development. However, the system remains highly dependent on national funding and lacks formal democratic structures. While the approach supports regional diversity and coordination, it also faces challenges in achieving full integration and strategic coherence across all urban areas.

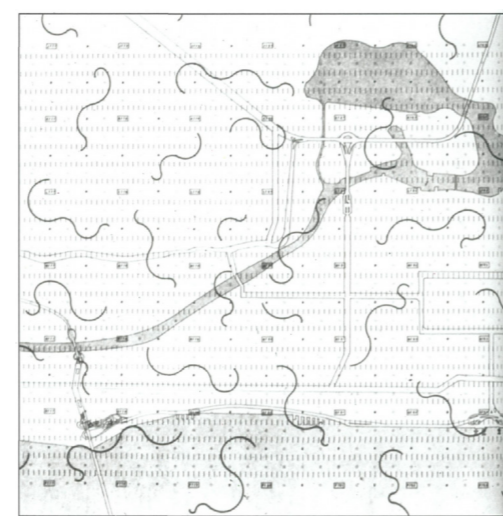
For the Utrechtse Heuvelrug, looking at the site from both perspectives means a project that balances scale and dispersion, rather than choosing just one. From a metropolitan view, the forest isn't just a scenic site; it's a key part of the region's systems, supporting housing, transport, recreation and climate adaptation. On the other hand, decentralized thinking warns against seeing the forest as free land that is simply surrounded by urban areas. Instead, it encourages a deeper look at how cities and forest can work together and how several compact centers could care for the forest without turning it into only suburban area. Seen this way, the Utrechtse Heuvelrug is not simply wilderness or a flexible development zone, but a shared landscape shaped by the community.



Ebenezer Howard's Garden City map
From *The Garden City concept*, by E. Howard, 1902, Wikimedia Commons.



Frank Lloyd Wright's Broadacre City sketches
From *Wright Sketches for Broadacre City 2*, uploaded by Flickr user kjell, 2005.



Conceptual drawing showing the urban form of No-Stop City
From *No-stop city* (p. 56), by Branzi, 2006.

Integrated approach: forest urbanism

After combining urban, forest and landscape perspectives, forest urbanism emerges as the integrative approach of this thesis. It connects large-scale urban growth with local, detailed design, bringing together planning, ecological, and cultural agendas into a cohesive framework.

Forest urbanism builds on urban forestry by fully integrating trees and forest systems into the structure of the city, not just seeing them as components within it (De Meulder & Shannon, 2024). It even goes further: "conceiving the city as a forest in its own right" (van der Velde, 2022).

"Forest Urbanism is a plea for a constructive dialogue of forestry, agriculture and urbanism. It implies the abandonment of the categorical zoning of the world. It advocates a necessary multiplicity that forestry, agriculture and urbanism all (need to) have." (De Meulder & Shannon, 2024).

There are some good projects embody forest-urbanism principles in the Netherlands, such as the Amsterdamse Bos, Máximapark and Green Heart regional planning. These examples show how Dutch practice turns forests into an integral infrastructure of the city, however, there is still a lack of concrete examples where the entire city development and forests are closely integrated.

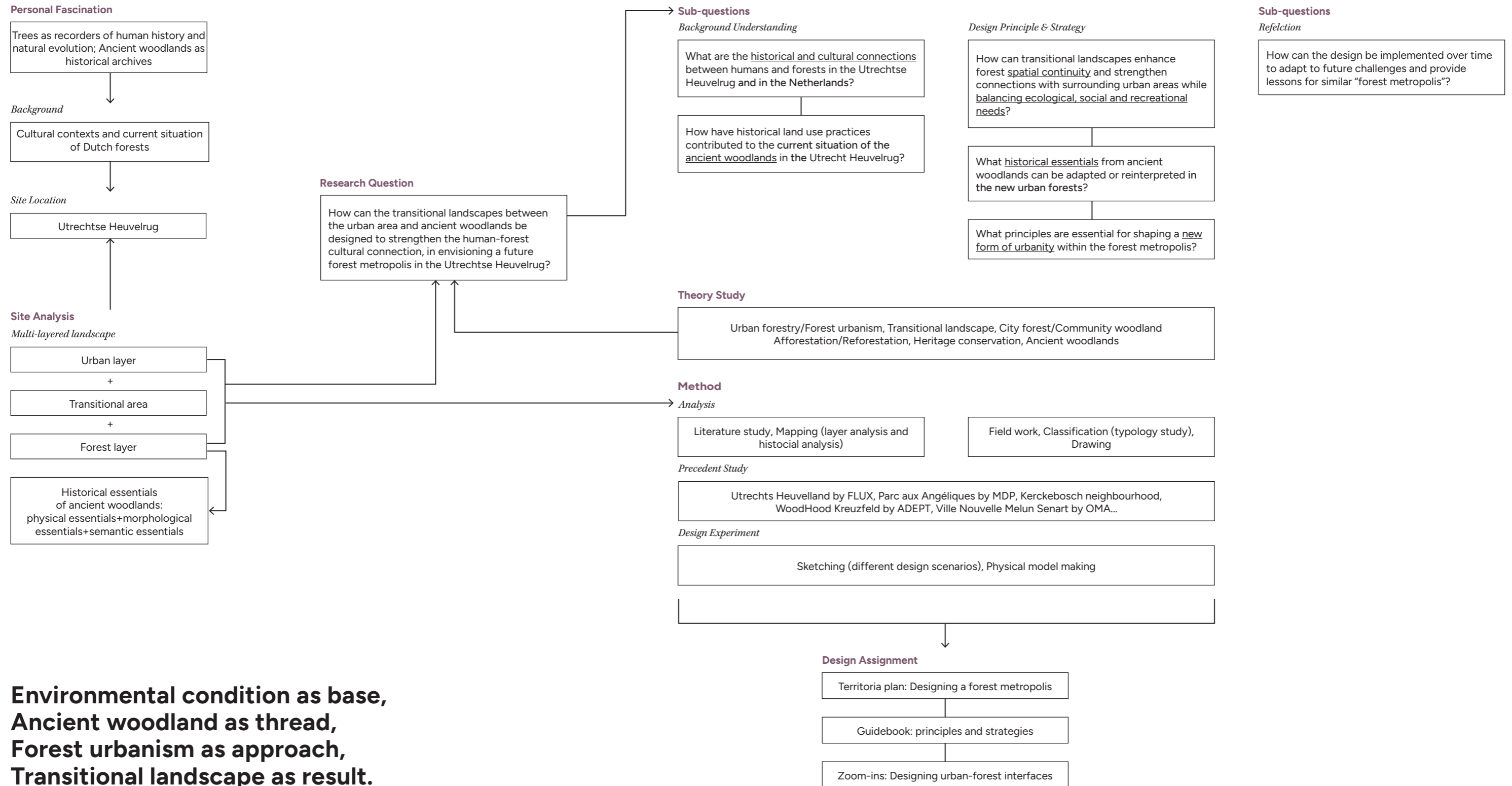
This thesis is a graduation project from the Master's program of Landscape Architecture track at the Faculty of Architecture & the Built Environment, TU Delft. It is part of the Urban Forestry Lab, supervised by Dr. René van der Velde. The lab usually explores projects at three different scales: small-scale new urban woodlands (such as city squares and community parks), city and regional-scale urban forestscapes, and large-scale territorial planning based on forest urbanism. For the Utrechtse Heuvelrug region, given its important position in the central part of the

Netherlands and its connection to several mid- to large-sized cities like Utrecht and Amersfoort, forest urbanism undoubtedly offers an effective framework for addressing complex challenges and developing bold strategies toward a forest metropolis in the future.

To apply forest urbanism meaningfully on the Utrechtse Heuvelrug, the idea of the "city as forest" must be more than just a slogan. There are several aspects need attention. For example, sensitive ancient woodlands require protection from overuse. Moreover, forest development must align with clear mobility and housing policies to avoid scattered growth and land fragmentation. Access to new green spaces should be balanced across all communities to support social equity. Finally, long-term stability is crucial. Forest strategies need lasting legal and financial support to stay effective beyond changing policy priorities. These steps are essential to create a forest-based urban future.

1.5 METHODOLOGY

Methodological framework



**Environmental condition as base,
Ancient woodland as thread,
Forest urbanism as approach,
Transitional landscape as result.**

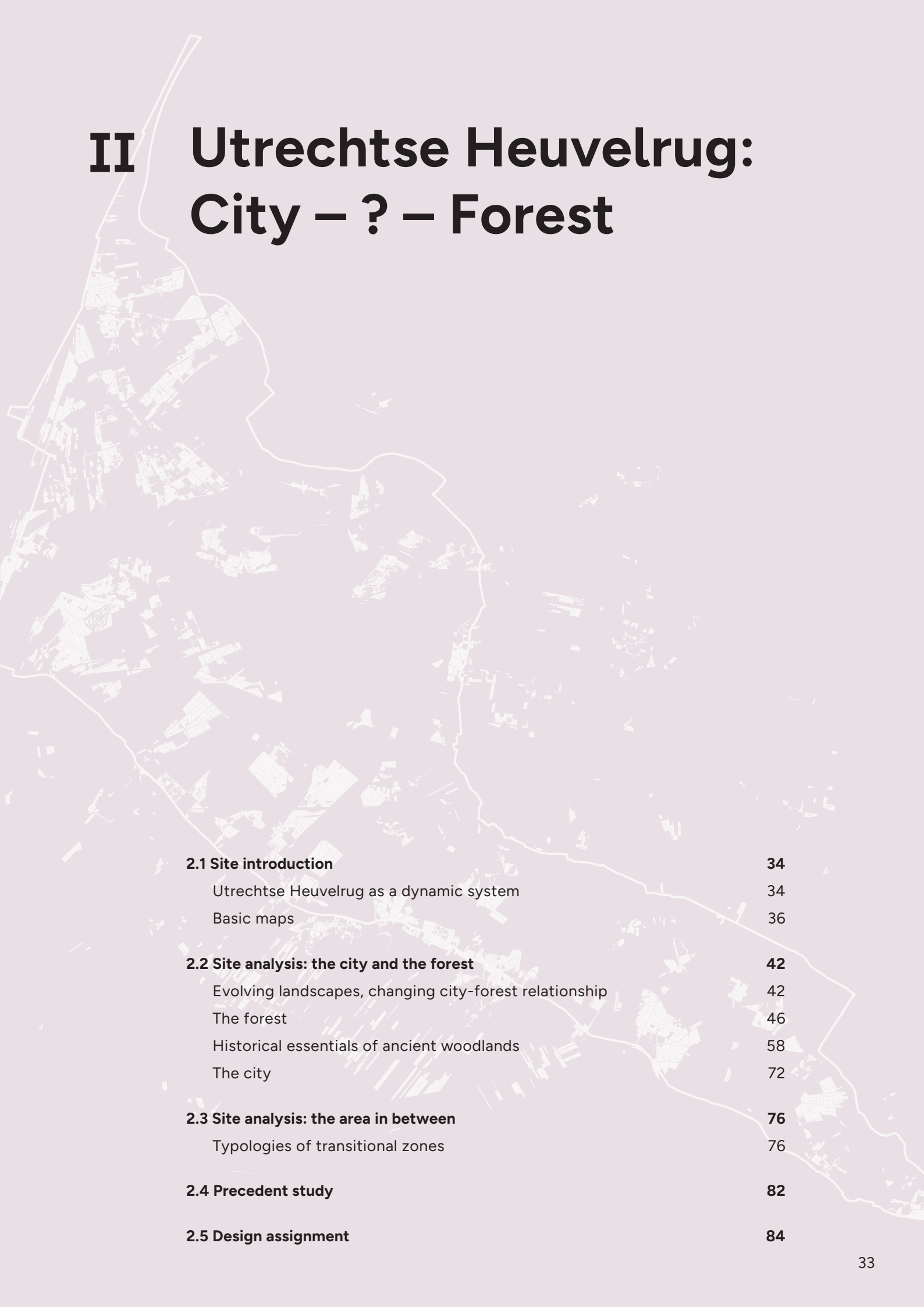
Position as a landscape architect

Landscape exists at the intersection of nature, urbanization, and cultural heritage. Landscape architecture requires and has the capacity to mediate between competing priorities—ecological conservation, agricultural production, recreational needs, and heritage preservation. The focus of this project is on urban-forest interfaces, or boundaries and edges that, despite their significant potential, are sometimes overlooked by architects and urban planners (Marot, 1999). In these areas, landscapes play a dual role: they can repair existing damage while also revealing and highlighting the unique cultural characteristics of the site (Konijnendijk, 2018). Rather than creating something entirely new, landscape architecture emphasizes discovering and strengthening connections in the transitional zones.

In the specific context of this project, landscape architecture should protect the ecological value of the forest while offering people rich spatial and cultural experiences. By applying “environmental conditions as a base” the design must align with the site’s existing environmental characteristics and aim to restore fragmented and degraded forest areas. “Ancient woodlands as a thread” connects the historical context with the design narrative. “Forest urbanism as an approach” ensures a balanced integration of old forest conservation, new forest planting and urban growth. At last, “Transitional landscape as the outcome” embodies the project’s final goal: creating a forest metropolis that reconnects people with nature by redesigning these transitional landscape.

Landscape architects should advocate for a design approach that positions landscape as a mediator of cultural restoration. A harmonious, poetic, subtle yet powerful approach usually works more effectively, rather than one that is radical, overt, or completely disruptive. Landscapes should be treated as a kind of infrastructure integral to urban systems, not as foreign elements imposed on a site (Bélanger, 2009). Sometimes, the goal can be achieved with few, ordinary elements rather than complex tools. Thus, in this project, trees—or forests—take center stage.

II Utrechtse Heuvelrug: City – ? – Forest



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2.1 SITE INTRODUCTION

Utrechtse Heuvelrug as a dynamic system

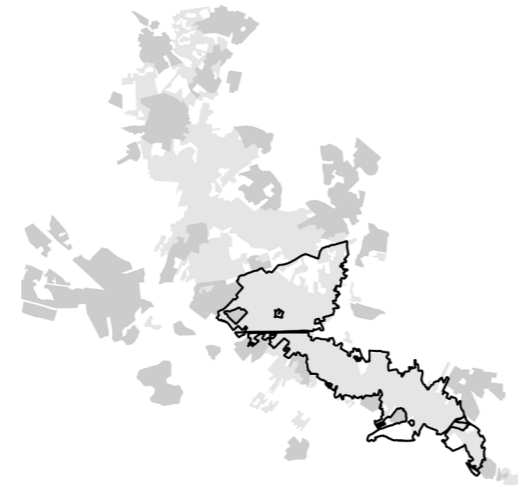
From a geographical perspective, the Utrechtse Heuvelrug is a moraine formed around 150,000 years ago. It was shaped during an ice age, when advancing glaciers pushed sand, sediment, and rocks southward, leaving behind a ridge as they retreated. The Utrechtse Heuvelrug is primarily made up of sediments deposited by the Rhine River (van den Brink, 2021). Its highest point is the Amerongse Berg, which is 69 meters tall (Nationaal Park Utrechtse Heuvelrug, n.d.-b).

When people hear “Utrechtse Heuvelrug,” many first think of the national park. According to Nationaal Park Heuvelrug Nieuwe Stijl (n.d.), the park covers around 10,000 hectares and provides recreational spaces for nearby cities such as Utrecht, Amersfoort, Wageningen, and even parts of the Randstad. The park is known for its vast ancient woodlands and heathlands, as well as other diverse natural and cultural features, such as country estates, castles, bastions, floodplains and meadows.

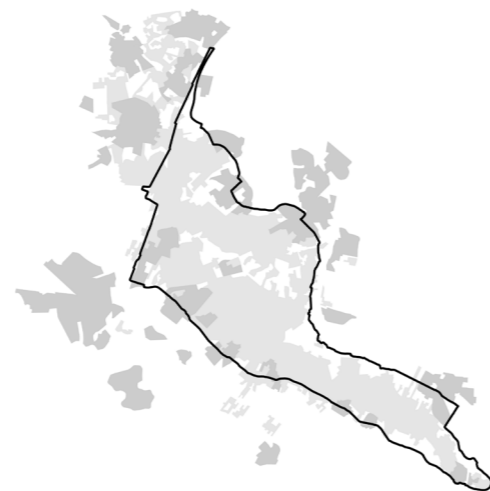
Beyond the national park, it is the broader Utrechtse Heuvelrug landscape unit. According to the *Natuurbeheerplan 2025* by Provincie Utrecht (2024), the province is divided into eleven landscape units, one of which is the Utrechtse Heuvelrug. In fact, Nationaal Park Heuvelrug Nieuwe Stijl (n.d.) notes that the entire Heuvelrug consists of 20,000 hectares of continuous forest and heath, and up to 40,000 hectares when including surrounding slopes. For centuries, nature and the economy have developed hand in hand in this region and fostered a rich culture.

In the context of this thesis, the Utrechtse Heuvelrug refers to the entire region: its forests, nearby cities, towns and villages, and the transitional areas.

Taking such a system that goes beyond administrative boundaries as the subject of study helps to better understand the dynamic relationship between the nature and city.



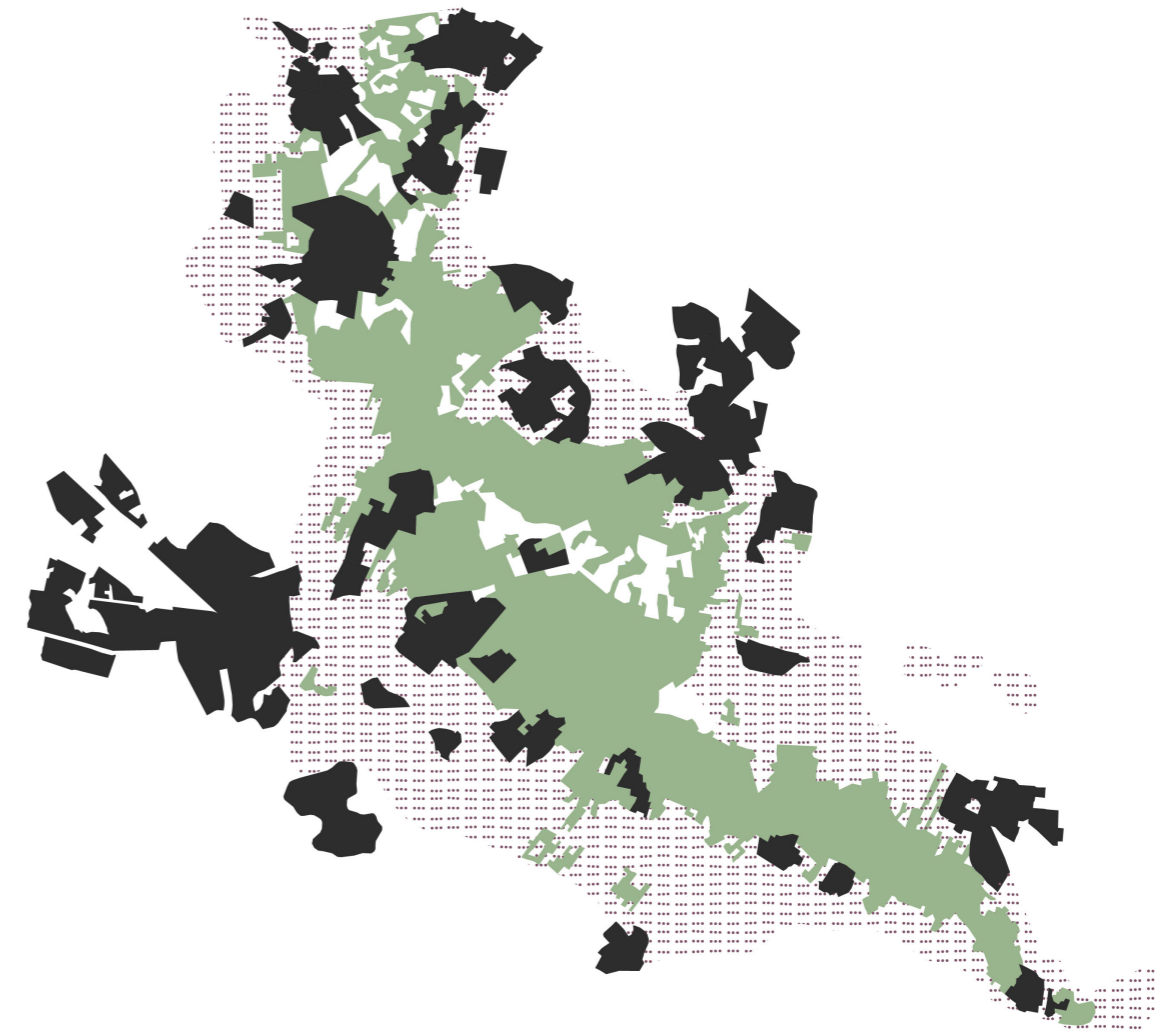
National Park Utrechtse Heuvelrug



Utrechtse Heuvelrug landscape unit



Utrechtse Heuvelrug moraine



△ The study area of the Utrechtse Heuvelrug region
Data from PDOK, 2024.

◁ Different boundaries of the Utrechtse Heuvelrug
Data from Provincie Utrecht, 2017; DennisM, 2010; Provincie Utrecht, 2024d. (From top to bottom)

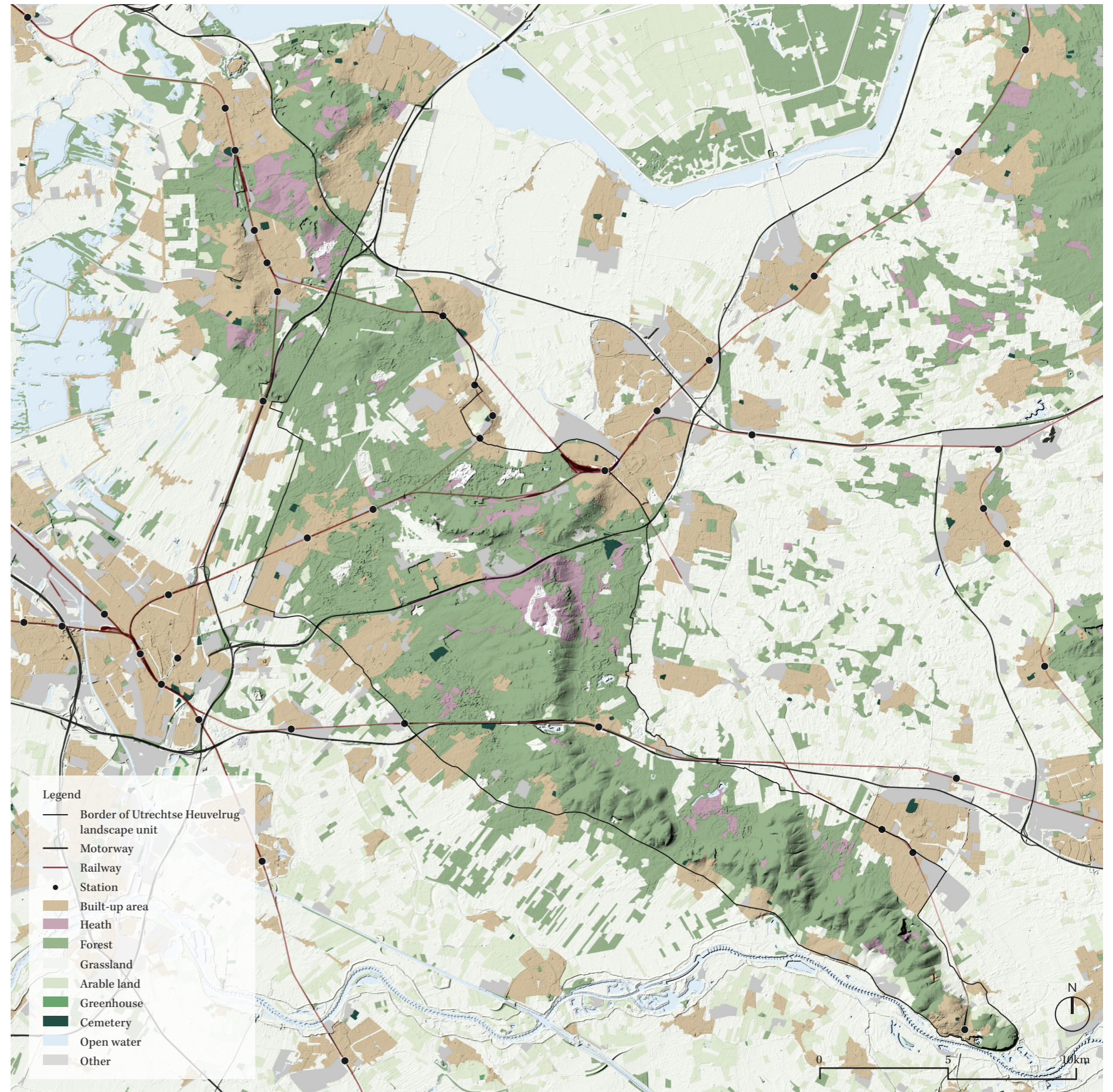
Basic maps

Land use

From the map, it is evident that, excluding agricultural lands, the majority of green space in the Utrechtse Heuvelrug region consists of forest. This forest stretches from the northern Gooimeer to the southern Nederrijn, with roughly 50 kilometers in a straight line. It is the second-largest forested area in the Netherlands after the Veluwe. The province of Utrecht has rich and diverse natural landscapes. According to the *Omgevingsvisie Provincie Utrecht* by Provincie Utrecht (2021), the region can be broadly categorized into five landscape types based on their characteristics: the extremely open Eemland, known for its strip-parceling and peat meadows; the Gelderse Vallei, with low vegetation and a mix of grasslands, small forests, and heathlands; the (part of) Groene Hart, featuring peat meadows; the Rivierengebied, with strong spatial contrasts and a coherent water system; and the Utrechtse Heuvelrug, known for its unified structure, distinctive topography, and historical layers. In the *Natuurbeheerplan 2025* by Provincie Utrecht (2024), these are further detailed into eleven distinct landscape units.

The forest lies between two major cities: Utrecht and Amersfoort. Along the western slope of the ridge, there is a chain of small towns and villages, including Zeist, Driebergen-Rijsenburg, Doorn, Leersum, Amerongen, Elst, and Rhenen. On the eastern slope, towns are fewer, mainly Veenendaal, Maarn, and Woudenberg. The larger city to the north of the Utrechtse Heuvelrug is Hilversum.

As shown on the map, the natural forest landscape of the Utrechtse Heuvelrug has become fragmented due to the construction of various buildings and infrastructure. While the core area still retains relatively intact forest, the slopes and edges are discontinuous and lack gradual transitions. In the Gelderse Vallei to the east and the Kromme Rijn region to the west, there are many small woodlands, but they do not form a connected system.



▷ Land use map of the Utrechtse Heuvelrug
Data from PDOK, 2024.

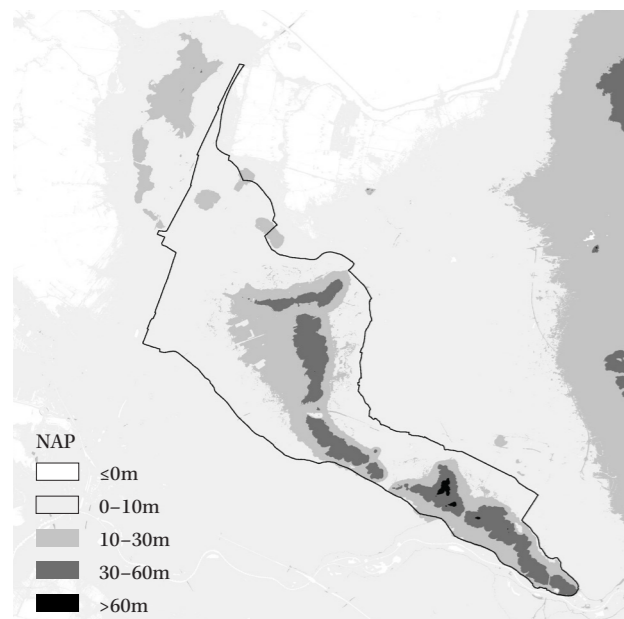
Landscape units

As described before, according to the *Natuurbeheerplan 2025* by Provincie Utrecht (2024), the province is divided into eleven landscape units: De Venen, Vechtvallei, Midden West, Zuid West, Uiterwaarden, Vijfheerenlanden, Noorderpark, Kromme Rijngebied, Utrechtse Heuvelrug, Eemland, and Gelderse Vallei. Their corresponding English names can be translated as: The Peatlands, Vecht Valley, Central West, South West, Floodplains, Land of the Five Lords, Northern Park, Eemland, Utrecht Ridge, Kromme Rijn Area, and Gelderse Valley.

The *Natuurbeheerplan 2025* also describes each unit's characteristics and its visions for the protection and development of landscape and agriculture. For the Utrechtse Heuvelrug (referring only to the ridge, excluding the slopes), the following nature management types have the highest development priority (classified as priority 1 in the document): moist heath, weak buffer peat, and wet poor grassland. The next level (priority 2) includes: acid fen or raised bog, dry heath, sand drift, moist hay meadow, dry poor grassland, hornbeam and ash forest, and pine, oak, and beech forest (Provincie Utrecht, 2024, pp. 21–22).

▷ Landscape unit map of the Utrechtse Heuvelrug
Data from Provincie Utrecht, 2024d. Based on satellite map from Google Earth.

▽ Elevation map of the Utrechtse Heuvelrug
Data from AHN, n.d.

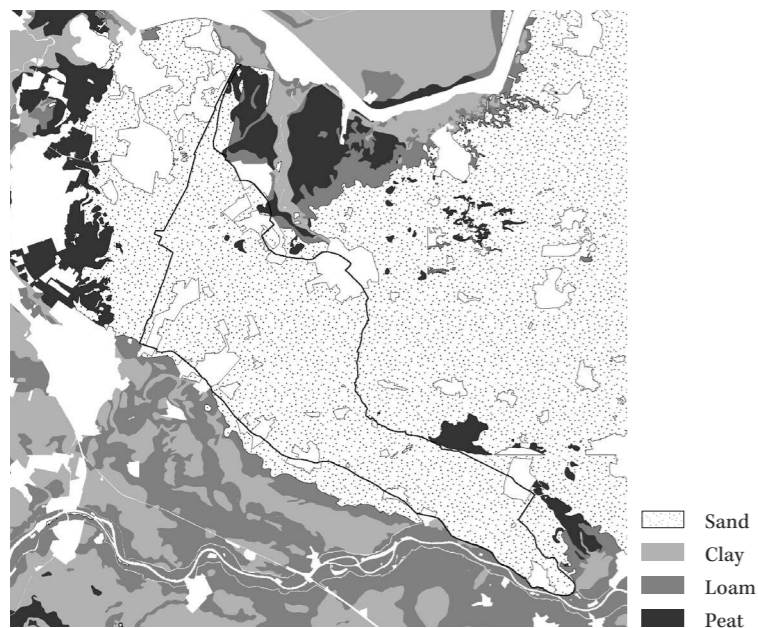


Archaeological landscape

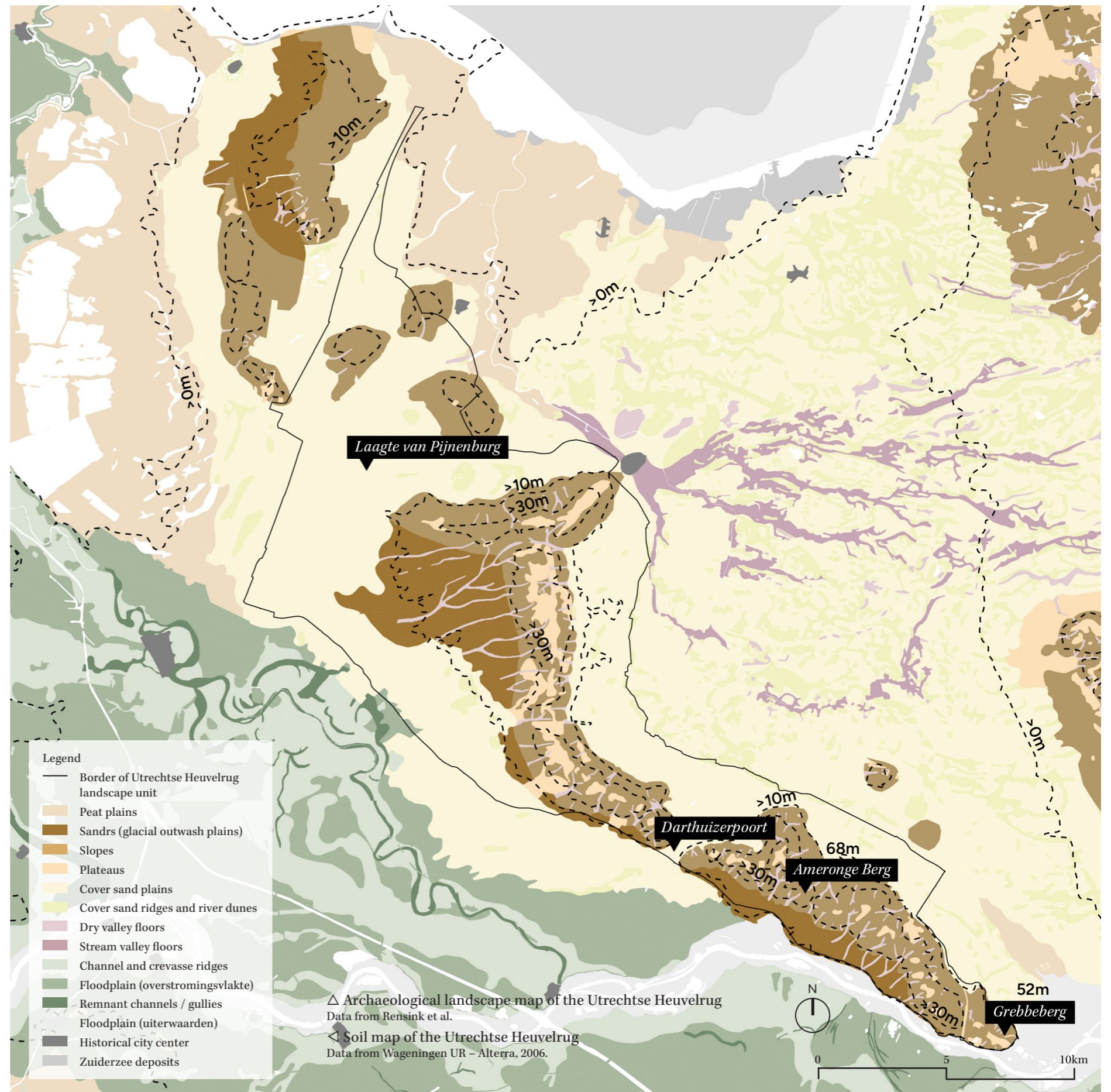
The Archaeological Landscape Map is based on landscape characteristics. Landscape zones such as loess plateaus, cover sand ridges, and stream valley floors offered both opportunities and limitations for settlement, burial, economic activity, and ritual practices (Rijksdienst voor het Cultureel Erfgoed, n.d.-a). Elevated or well-drained areas were favorable for settlement, while others were too wet or unstable. Sandy soils were often preferred for burial due to ease of digging. The Utrechtse Heuvelrug is therefore famous for its large number of burial mounds (Landschap Erfgoed Utrecht, n.d.). Certain landforms supported agriculture, grazing, or access to water, offering economic value, while others limited such uses. In short, each type of terrain shaped where and how people lived and worked.

From a geographical perspective, the Utrechtse Heuvelrug region can be roughly divided into a higher sandy soil area to the east and a river area to the west, using the western slope of the moraine as a boundary, based on the Fysisch Geografische Regio dataset. There is also some peatland in the northwest (Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2013).

The current distribution of soil types follows a similar pattern: peat soil surrounds the Oostelijke Vechtplassen nature reserve. The area west of the moraine and north of the Nederrijn can be generally understood as clay soil, while the ridge itself and the eastern part consist mainly of sandy soil.



Sand
 Clay
 Loam
 Peat



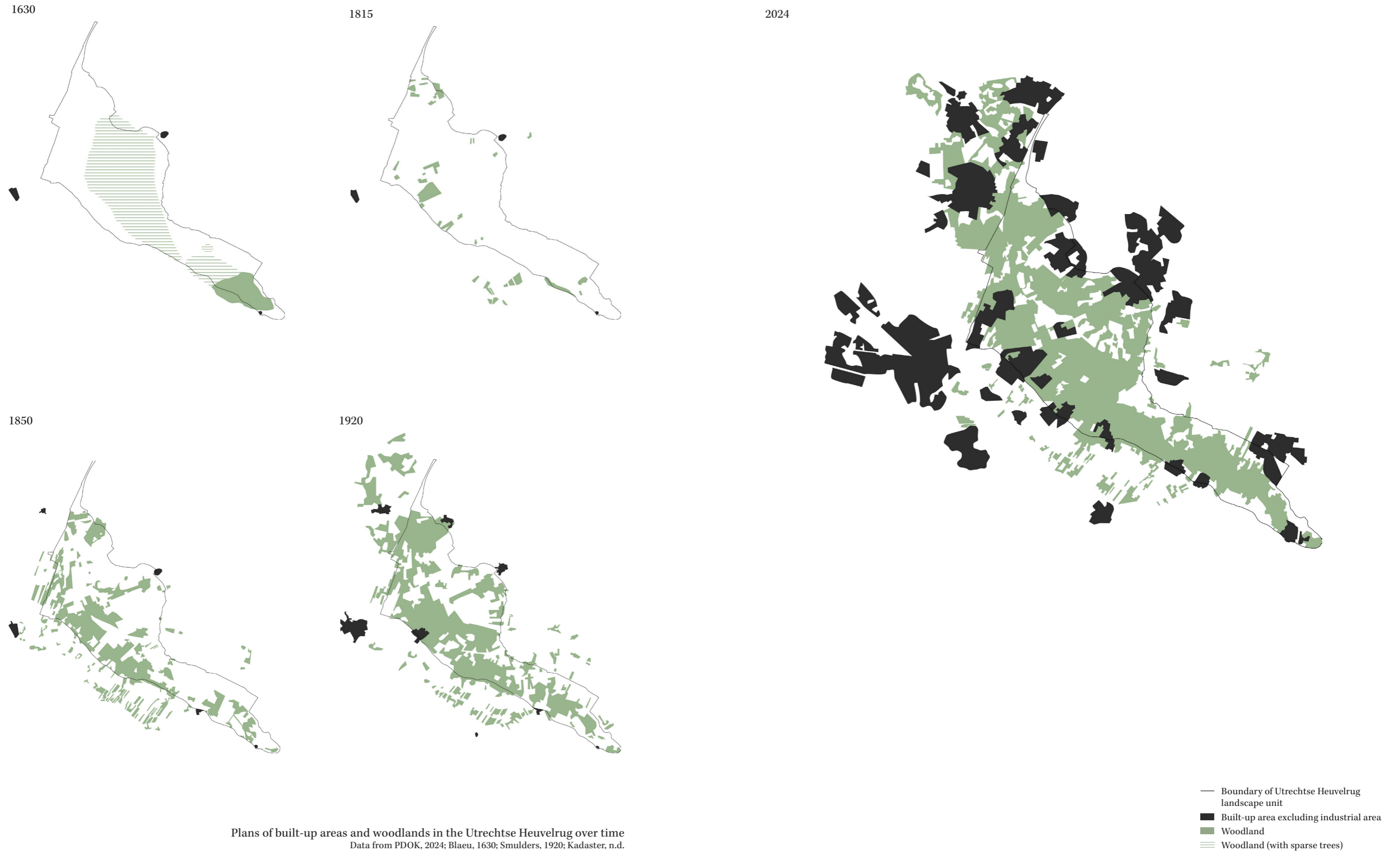
Legend

- Border of Utrechtse Heuvelrug landscape unit
- Peat plains
- Sands (glacial outwash plains)
- Slopes
- Plateaus
- Cover sand plains
- Cover sand ridges and river dunes
- Dry valley floors
- Stream valley floors
- Channel and crevasse ridges
- Floodplain (overstromingsvlakte)
- Remnant channels / gullies
- Floodplain (uiterwaarden)
- Historical city center
- Zuiderzee deposits

△ Archaeological landscape map of the Utrechtse Heuvelrug
 Data from Rensink et al.
 ◁ Soil map of the Utrechtse Heuvelrug
 Data from Wageningen UR – Alterra, 2006.

2.2 SITE ANALYSIS: THE CITY AND THE FOREST

Evolving landscapes, changing city-forest relationship



The city-forest relationship in the Utrechtse Heuvelrug has evolved from coexistence to increasing fragmentation due to expanding agriculture, estate developments, urban growth, and forestry practices through history. Each phase reflects shifting human priorities, from subsistence and aesthetic pleasure to economic exploitation and urban expansion. Despite a renewed interest in forest conservation in recent decades, the original connectivity and cultural richness of the forests still receive insufficient attention.

Phase 1: Forest-dominated landscape (Pre-Middle Ages, before 1200)

Before widespread human intervention, the Utrechtse Heuvelrug region was covered almost entirely by dense natural forest. Scattered early settlements were made near the forest. The research project *Erfgoed Gezocht* discovered that the Utrechtse Heuvelrug contains many remnants of *raatakkers* (Celtic fields), dating from around 1000 BC to 200 AD (Landschap Erfgoed Utrecht, n.d.). This suggests that early agricultural activities in the area may have been more extensive than people assumed. Sand drifts and heathlands, which would become more prominent later, had not yet emerged. The landscape was defined by ecological continuity, rich biodiversity, and little fragmentation.

Phase 2: Heathland and agricultural landscape (Early Middle Ages, 1200–1600)

By the early Middle Ages, population growth and settlement began to reshape the Utrechtse Heuvelrug. Forests were cleared to make way for small-scale agriculture. These raised arable fields known were as “enken”. Peat lands and clay lands at the edge of the Utrechtse Heuvelrug were also reclaimed for grazing. As a result, overgrazing and the harvesting of wood for fuel and construction gradually degraded the land, leading to the formation of heathlands and drifting sand areas on the ridge. Small hamlets appeared along the slopes, often clustered near the cleared fields. This period marked the start of significant ecological transformation, with an increasingly fragmented landscape of cultivated fields, open heath, and isolated woodlands.

Phase 3: Estate and managed forest landscape (1600–1850)

From the 17th century, the Utrechtse Heuvelrug

attracted wealthy city dwellers, who established country estates along its slopes. These estates featured ornamental gardens, managed woodlands, and manors, offering an escape from the urban environment during summer time. At the same time, efforts were made to reforest some previously cleared areas, especially along the western slopes, where the Stichtse Lustwarande began to take shape. This phase brought a new layer of cultural structure to the landscape, blending leisure, timber production, and aesthetic landscape designs in a managed environment.

Phase 4: Fragmented landscape (1850–1950)

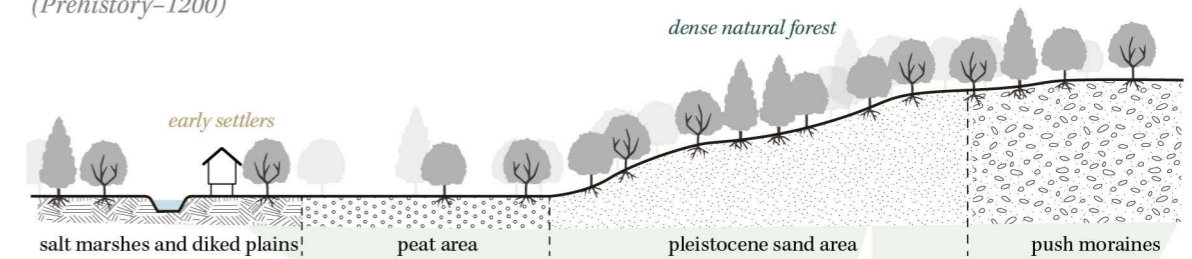
Starting around 1850, the Utrechtse Heuvelrug entered a phase of dramatic change. The production forests were planted, and from 1920 onward this effort accelerated rapidly, replacing much of the heathland with monocultures of pine. At the same time, towns and villages expanded, going further into former agricultural and forest areas. Increased agricultural intensification added to the fragmentation, dividing the landscape into a mosaic of isolated forest patches, open fields, and growing settlements. The once cohesive natural and cultural landscape was increasingly broken into smaller and functionally separated zones.

Phase 5: Compact landscape (1950–2025)

In the post-war period, the Utrechtse Heuvelrug landscape became more compact. Rapid urban development has further occupied natural and semi-natural lands. As a result, forested areas became more isolated, forming dense but smaller blocks surrounded by different land uses such as agricultural land, infrastructure and urban built-up areas. Traditional open landscapes such as heathlands and transitional woodland zones continued to decline. What remains today is a condensed forest core, ringed by fragmented rural and urban areas, reflecting decades of spatial compression and competing land-use demands.

*All the information under “Evolving Landscapes, changing city-forest relationship” is from or refers to: *Utrechtse Heuvelrug: Een ruimtelijk toekomstperspectief voor nieuw bos rondom de Utrechtse Heuvelrug* by Flux Landscape Architecture, 2021. *De Heuvelrug: Bron van natuur en cultuur* by Nationaal Park Heuvelrug Nieuwe Stijl, n.d.

Phase 1 Forest-dominated landscape (Prehistory–1200)



Phase 2 Heathland and agricultural landscape (1200–1600)



Phase 3 Estate and managed forest landscape (1600–1850)



Phase 4 Fragmented landscape (1850–1950)



Phase 5 Compact landscape (1950–2025)



Sections of the Utrechtse Heuvelrug over time

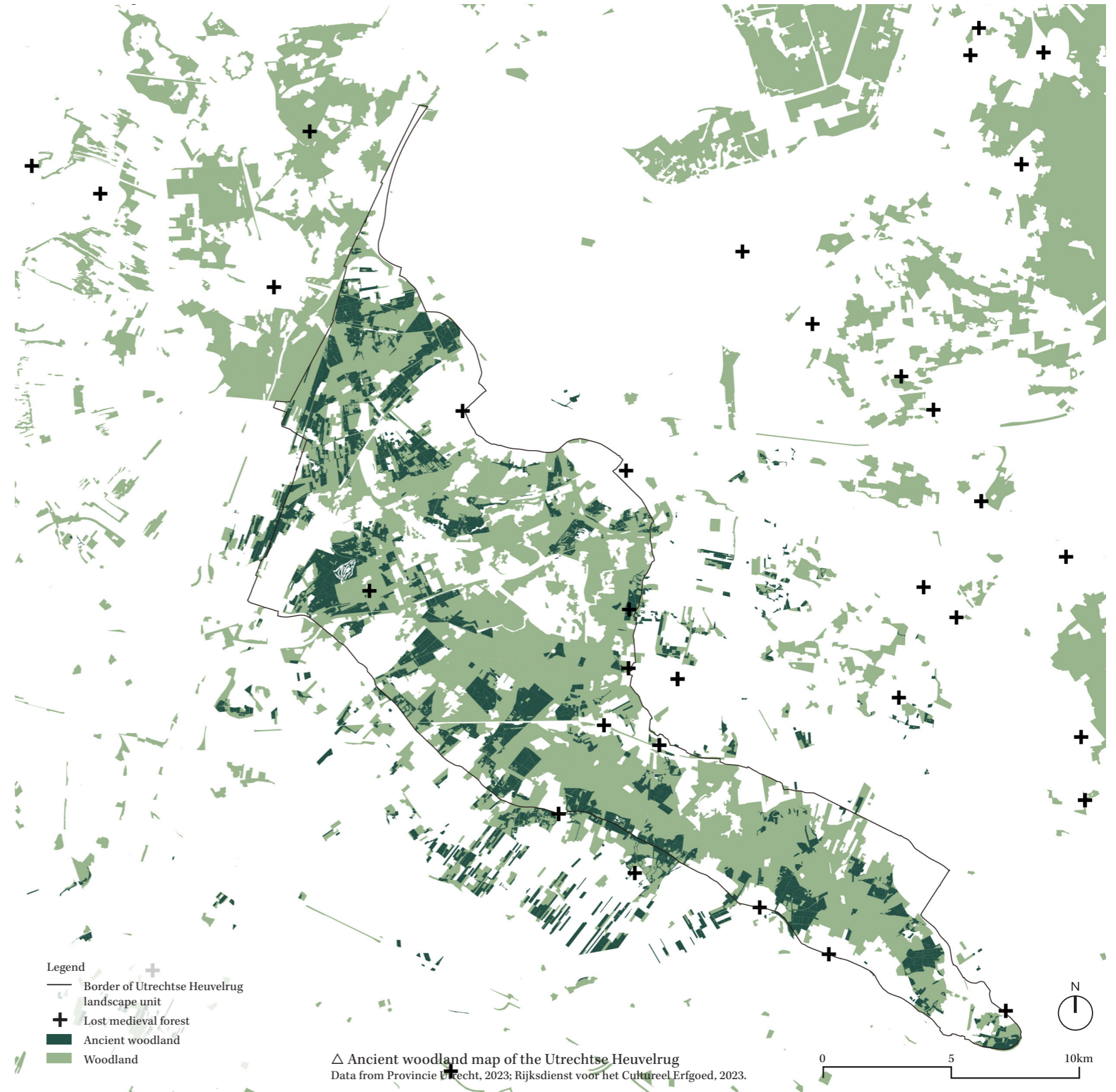
The forest

Forest structure and ancient woodland

The Utrechtse Heuvelrug lies on acidic, sandy soils. Its forests grow on poor, free-draining sand, forming a classic dry sand-dune woodland. The forests are mainly drought-tolerant conifers and oak-dominated broadleaves. According to Utrechts Landschap (n.d.), key native trees include *Pinus sylvestris* (Scots pine), *Betula pendula* (Silver birch), *Quercus robur* (Pedunculate oak) and *Fagus sylvatica* (European beech). In the 19th–20th centuries, foresters introduced *Pseudotsuga menziesii* (Douglas fir), *Quercus rubra* (Northern red oak) and *Picea abies* (Norway spruce). After several decades of nature-oriented management, the forest stands are now more mixed. More native broad-leaved trees appeared, and understory plants and wildlife became more diverse.

As described before, the ancient woodland in the Utrechtse Heuvelrug refers specifically to a forested area that has existed, more or less continuously, since before 1832, according to Provincie Utrecht (2022). The dark green areas in the map on the right show the distribution of these ancient woodlands. They are mainly concentrated on the western slopes and in the Kromme Rijn region, and their spatial patterns reveal a high degree of fragmentation. As most of these forests are semi-natural and shaped by human planting and management, their forms also reflect human influences: in the Laagte van Pijnenburg area to the north, ancient forests appear as long strips; on the western slopes, many have clearly defined straight edges and some show geometric structures. In the Kromme Rijn region, they take on strip forms that follow the patterns of the polders.

Ancient woodlands hold high ecological value. They are home to many native deciduous tree species, such as *Quercus robur*, *Quercus petraea*, *Alnus glutinosa*, *Fagus sylvatica*, and *Betula pendula* (Rijksdienst voor het Cultureel Erfgoed & Maes, n.d.). These forests also serve as important habitats for various animal species. In the ancient forests of the Utrechtse Heuvelrug, valuable species such as the European pine marten, the red bat, and the black woodpecker can be found. At least 8 of the 15 amphibian and reptile species found in the Netherlands live in the Utrechtse Heuvelrug National Park, along with up to 100 bird species (Nationaal Park Utrechtse Heuvelrug, n.d.-a).



Estate

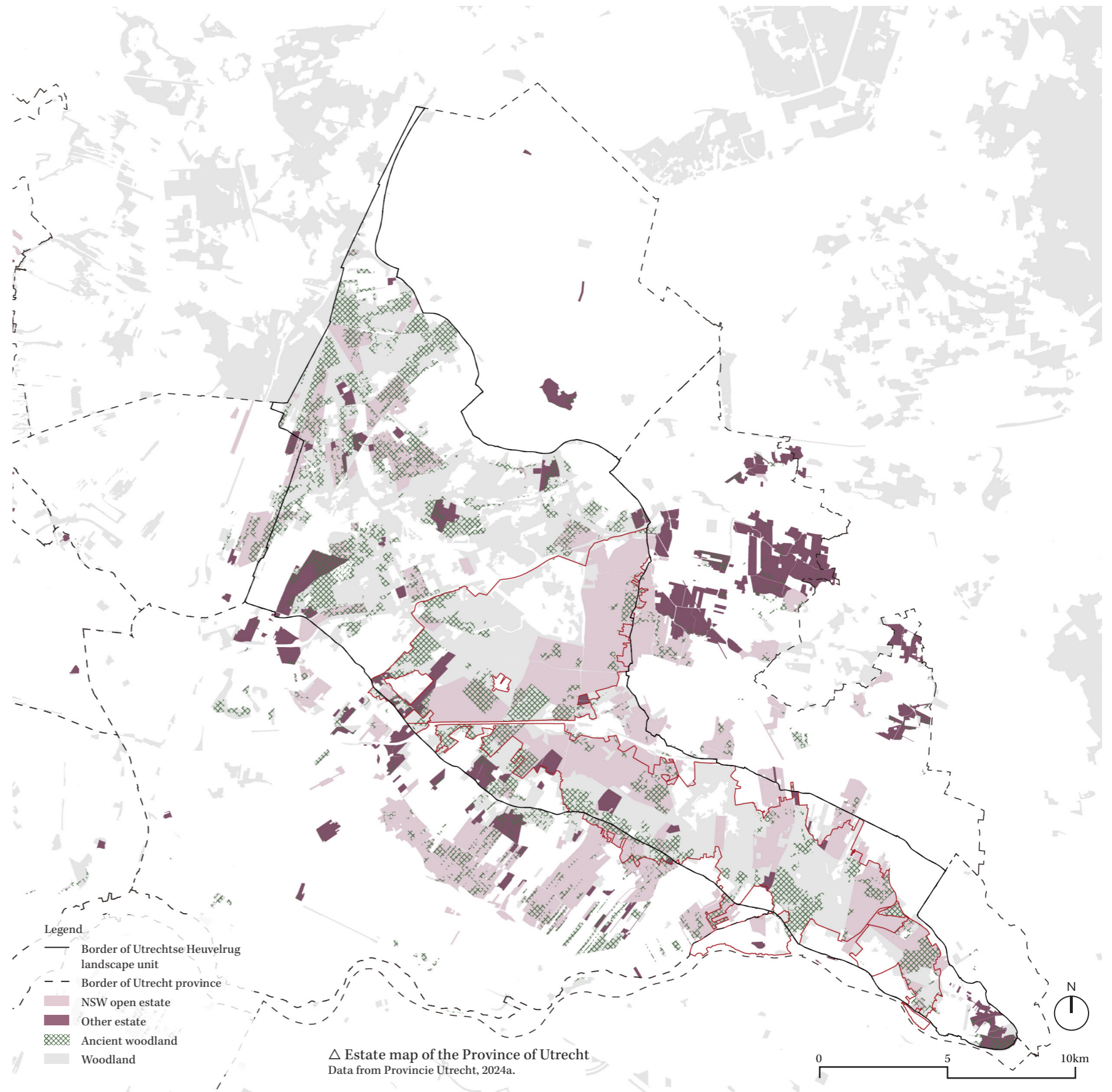
According to Provincie Utrecht (2025a), there are nearly 300 historic estates, castles, and country houses in the province. These places shape the character of the landscape and local surroundings. They preserve cultural heritage and contribute to regional identity. In addition to their historical value, they also possess natural and scenic value. Moreover, they are commonly used for leisure and recreation.

There are two types of historic estates shown on the map on the right: estates that have the Natuurschoonwet (NSW) status and is open to the public and estates that are not open and/or do not have NSW status. The data is from the data set *Landgoederen* from Provincie Utrecht (2024a). These estates are very large and often consist of both historic buildings and natural landscapes. The buildings may include castles, country houses, and farm structures, while the natural elements can include meadows, forests, gardens, and agricultural land.

The Natuurschoonwet 1928 (NSW) is a Dutch law aimed at protecting historic estates. It encourages estate owners to preserve scenic landscapes and open parts of their land to the public by offering tax benefits to those who meet specific criteria. To obtain NSW status, estates generally need to meet certain requirements, such as minimum size, the quality of the natural environment, and historical or cultural significance (Rijksdienst voor Ondernemend Nederland, 2025).

According to the *Omgevingsvisie Provincie Utrecht* by Provincie Utrecht (2021), in the past, the estates served as summer residences for wealthy urban families. An estate typically consists of a manor house surrounded by a beautiful garden, often dating back to the 17th century. They are usually located in Historic Estate Zones with distinct characteristics. The most well-known are the belts along the Vecht River and the Stichtse Lustwarande.

Today, these estates face significant pressure. It is not only in terms of their own preservation, but also due to external social pressures like urban expansion. In this project, it is important to keep the integrity of the estates as cultural heritage, while also exploring ways to generate economic benefits through careful development to support their long-term conservation.





Fenced forest

Adapted from [Street view image of Bisschopsweg 2, De Bilt, Utrecht], by Google, 2022, in Google Maps.



From top to bottom:

Hydepark, Doorn
Speelman (n.d.-c)

Aardenburg, Doorn
Speelman (n.d.-a)

Beerschoten, De Bilt
Speelman (n.d.-b)

De Breul, Zeist
Naaktgeboren (n.d.)

Photos above are all accessed from Beeldbank RCE, found on the website *Landschappelijk groen erfgoed* of Rijksdienst voor het Cultureel Erfgoed, n.d.

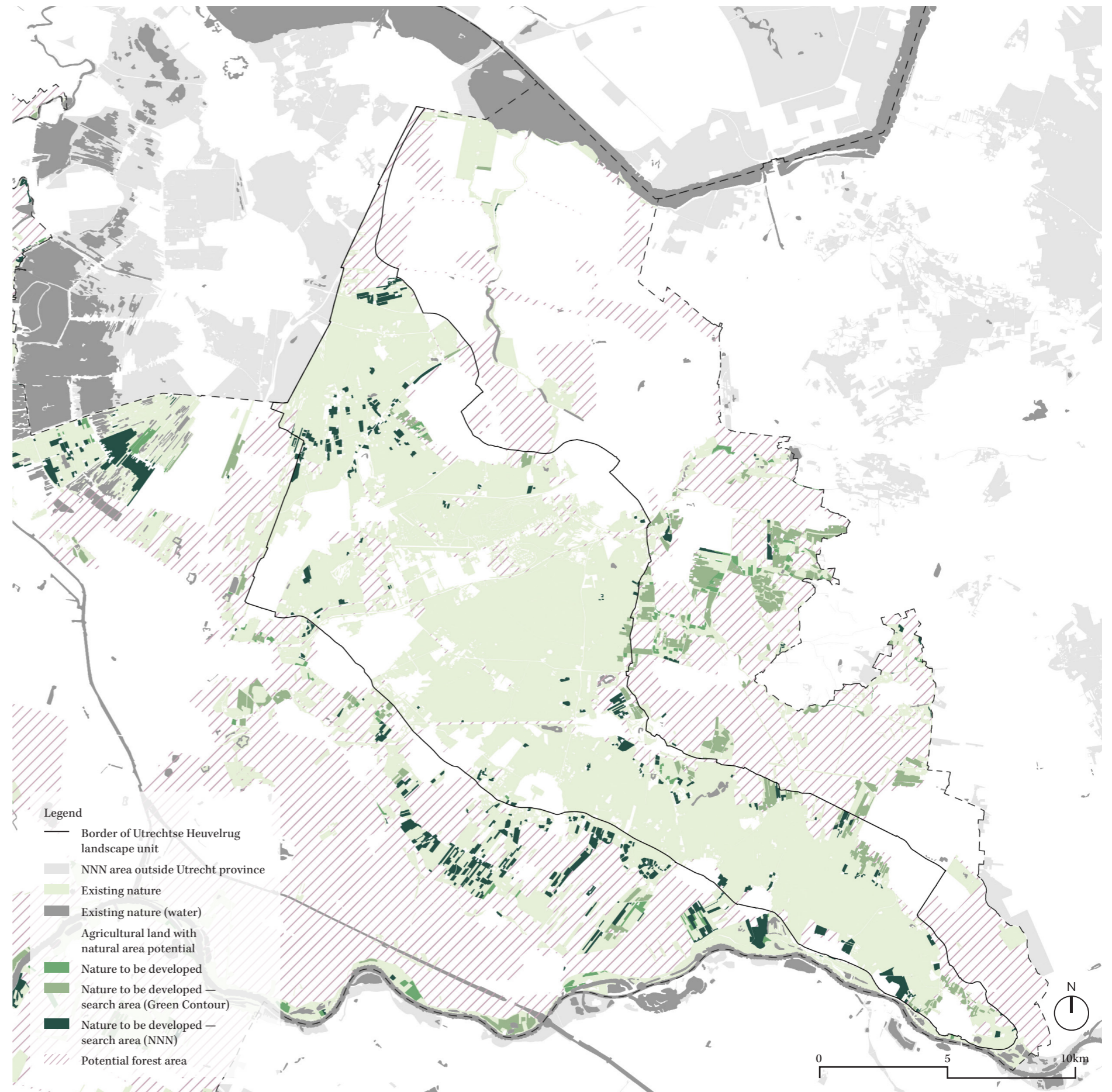
Nature Management Plan 2025

As the official nature management plan for the province of Utrecht, The *Natuurbeheerplan 2025* (Nature Management Plan 2025) sets out the future development plan of natural areas in Utrecht (Provincie Utrecht, 2024, p. 6).

In the plan, the boundaries of both existing nature areas and areas designated for nature development are indicated. The “areas designated for nature development” refers to agricultural plots that can be converted into natural landscapes. These plots are divided into three categories: “**Nature to be developed**,” “**Nature to be developed — search area (Green Contour)**,” and “**Nature to be developed — search area (NNN)**.” The “search area” means an area identified as potentially suitable for transformation into nature (e.g., forests, wetlands, grasslands), based on ecological, spatial, or policy criteria.

According to Provincie Utrecht (n.d.), from 1990 to 2012, over 5,000 hectares of farmland in Utrecht were transformed into natural areas. Since 2013, a further **4,570 hectares** have been planned for nature development. The planned new nature will also be developed on former agricultural land. Of the total 4,570 hectares, **1,570** are included in the **National Nature Network (NNN)**, while the other **3,000** are located within the **Green Contour**. In the *Akkoord van Utrecht* (Utrecht Agreement), it was agreed the 1,570 hectares would be developed by 2027 (Provincie Utrecht, 2024, p. 18).

The budget is currently a big challenge. The budget of the province of Utrecht is not enough to fully fund the transformation of all 3,000 hectares (Provincie Utrecht, n.d.). This financial limitation presents a significant challenge for large-scale ecological restoration and calls for alternative strategies that go beyond traditional government-led interventions. More flexible approaches are needed to fill this gap. Low-cost and sustainable methods of greening and afforestation are key topics worth exploring in this project.



▷ Nature Management Plan 2025 map of the Province of Utrecht
Data from Provincie Utrecht, 2024b; Provincie Utrecht, 2024c.

In addition to defining the areas designated for nature development, the *Natuurbeheerplan 2025* also introduces the “**Search Area for Forest Outside the NNN**”, a new addition compared to the 2024 version of the plan (Provincie Utrecht, 2024, p. 7). It refers to designated agricultural land outside the National Nature Network (NNN) that may be eligible for voluntary forest development. Although these areas are not officially part of the NNN, landowners can apply for subsidies to convert them into new forests if certain conditions are met, such as ecological value, landscape value, and approval from the local municipality. This approach allows for additional forest growth beyond the NNN boundaries while keeping participation optional (Provincie Utrecht, 2024, p. 43). The “Search Area for Forest Outside the NNN” is labeled as “Potential forest area” on the previous page’s map and is marked with purple lines.

In Utrecht,

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

*All the information under “Nature Management Plan 2025” is from or refers to:
Natuurbeheerplan 2025 (Nature Management Plan 2025) by Provincie Utrecht, 2024.
Ontwikkeling van nieuwe natuur (Development of new nature) by Provincie Utrecht, n.d.

Other policies

At the national level, the most important policy for forest protection and development is **the National Forest Strategy and Policy Agenda 2030**. It was jointly developed by the Interprovinciaal Overleg (Interprovincial Consultation, IPO) and the Ministerie van Landbouw, Natuur en Voedselkwaliteit (Ministry of Agriculture, Nature and Food Quality, LNV). IPO represents the collective interests of the Dutch provinces, while LNV is a national government body responsible for agriculture, nature conservation, and food quality. Together, they created this strategy to guide forest development and protection in line with climate and biodiversity goals (Interprovinciaal Overleg & Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2020, p.4).

The main goal of the National Forest Strategy and Policy Agenda 2030 is to “pass on forests and all their functions intact to future generations”. The strategy identifies climate change and biodiversity loss as the biggest challenges in the coming decades, requiring a long-term and integrated approach (Interprovinciaal Overleg & Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2020, p.4). Key visions of the strategy include:

- **More forest.** Increase forest cover by 10% before 2030, which means adding 37,000 hectares of new forest. The national government and provinces have jointly committed to creating more than 18,000 hectares, and the strategy also explores whether and how to add an additional 19,000 hectares outside NNN. The 19,000 hectares of forest represent a big challenge due to limited spaces in the Netherlands. It is therefore preferable to combine forest expansion with other land-use functions. For details, see the table on the next page: “Table: Indicative effects of preferred strategies for forest development outside the NNN by 2030”.

- **Higher-quality forests.** Improve forest quality and climate resilience through environmental measures and adjusted management, such as reducing nitrogen deposition and enhancing water retention to cope with drought. High-quality forests aim to be more complete (with trees of all ages) and more diverse (with a greater variety of species).

- **Planting trees outside forests.** This focuses on two

aspects: 1. Establishing a 10% green-blue network in rural areas, including hedgerows, ditches, field edges, and tree lines. 2. Promoting agroforestry as a way to better integrate agriculture and nature.

- **Sustainable use of trees and forest resources.** This includes strategies like expanding forest areas and

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)

spatially distributing recreation activities, modestly increasing timber harvesting based on scientific assessment, and promoting the use of high-quality wood.

(Interprovinciaal Overleg & Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2020, pp. 4–6)

The Forest Strategy of the province of the Utrecht is a provincial elaboration of the National Forest Strategy. It outlines the region’s long-term vision for forest development and management by 2040. It offers concrete actions and financial planning to support sustainable forestry across rural and urban areas in Utrecht (Provincie Utrecht, 2022, p. 3).

The document states that its overall vision is: “more, vibrant, future-oriented, protected, and socially valuable forests.” Currently, the Province of Utrecht has 18,000 hectares of forest (Provincie Utrecht, 2022, p. 3). The strategy aims to add 1,500 hectares of forest by 2040. The specific breakdown is as follows:

- 500 hectares of new forest in the National Nature Network (NNN) (by 2028)

- 500 hectares of new forest in the Green Contour. This

includes 52 hectares of forest compensation for Natura 2000 areas.

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)**

- 500 hectares of new forest in rural areas, around towns and villages. This includes 120 hectares of small landscape elements (trees and forests) in rural areas and 300 hectares of agroforestry, with 75 hectares designated as food forests.

- More trees and forests in cities and towns

(Provincie Utrecht, 2022, p. 8)

Another related provincial policy is the *Omgevingsvisie Provincie Utrecht (Environmental Vision for the Province of Utrecht)* by Provincie Utrecht (2021). This vision outlines the overall spatial planning for the physical living environment of the Province of Utrecht up to the year 2050. It is built around seven main themes: “healthy city and countryside; climate-resilient and water-robust; sustainable energy; vibrant cities and villages; sustainably, healthily, and safely accessible; living landscape, heritage and culture; future-proof nature and agriculture (Provincie Utrecht, 2021, p. 20).”

Among them, under the theme of future-proof nature and agriculture, the vision for the nature network in Utrecht province is:

“2050: The Province of Utrecht has established a

robust, climate-resilient nature network of high quality.

2050: Within and outside the National Nature Network (NNN), in both rural and urban areas, there is a favorable conservation status for protected and endangered flora and fauna, and biodiversity has improved compared to 1990.

2050: Nature offers a high experiential value and enjoys strong public engagement.

2040: A total of 3,000 hectares of nature has been realized within the Green Contour and added to the NNN.

2040: Wooded areas contribute to clean air, landscape quality, increased biodiversity, and CO₂ storage.

2028: All new nature still needed for the National Nature Network has been designated and developed as high-quality nature.”

(Translated from Dutch to English)
(Provincie Utrecht, 2021, p. 117)

*All the information under “Other policies” is from or refers to:

Bos voor de toekomst: Uitwerking ambities en doelen landelijke Bossenstrategie en beleidsagenda 2030 (Forest for the future: Elaboration of ambitions and objectives of the national Forest Strategy and policy agenda 2030) by Interprovinciaal Overleg & Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2020.

Natuurbeheerplan 2025 (Nature Management Plan 2025) by Provincie Utrecht, 2024.

Omgevingsvisie Provincie Utrecht (Environmental Vision for the Province of Utrecht) by Provincie Utrecht, 2021.

Strategisch bosbeleid: Meer en beter bos voor Utrecht (Strategic forest policy: More and better forest for Utrecht) by Provincie Utrecht, 2022.

	Bio-diversity	Nature, Landscape and Recreation	Climate-Mitigation	Climate-Adapation	Potential area (ha)	Governance
Stream valleys and creek ridges	++	+	++	++	2000	Waterboard
Major rivers	++	+	++	+	2000	National government
Combined with agriculture	+	++	+	+	7000	Provinces in collaboration with municipalities
Combined with housing	+	++	+	++	5000	Municipalities in collaboration with provinces
Wind energy	0	+	++	0	3000	Provinces in collaboration with municipalities
Peatlands	++	+	++	++	pm	Provinces in collaboration with municipalities and waterboard

Table: Indicative effects of preferred strategies for forest development outside the NNN by 2030

++ = strong positive effect
+ = moderate positive effect
0 = no effect
pm = to be measured / to be determined

Adapted from *Tabel: Indicatieve effecten van voorkeursstrategieën bosaanleg in 2030 buiten het NNN*, by Interprovinciaal Overleg & Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2020, p. 12, translated from Dutch to English.

Historical essentials of ancient woodlands

According to Professor Eric Luiten (in-class lecture, October 23, 2024), when designing with history, it is important to define three historical essentials: physical essentials, including object, pattern, and structure; morphological essentials, including form, shape, and size; and semantic essentials, including meaning, character, and significance. There are many different ways of editing these essentials. For example, in terms of physical remains, it is possible to fit in, save, affix, reduce, or superimpose; while for morphological essentials, the designer can stylize, quote, reconstruct, or duplicate.

This graduation project adopts this analytical approach by categorizing the components of ancient woodlands into four scales and linking them to these historical essentials.

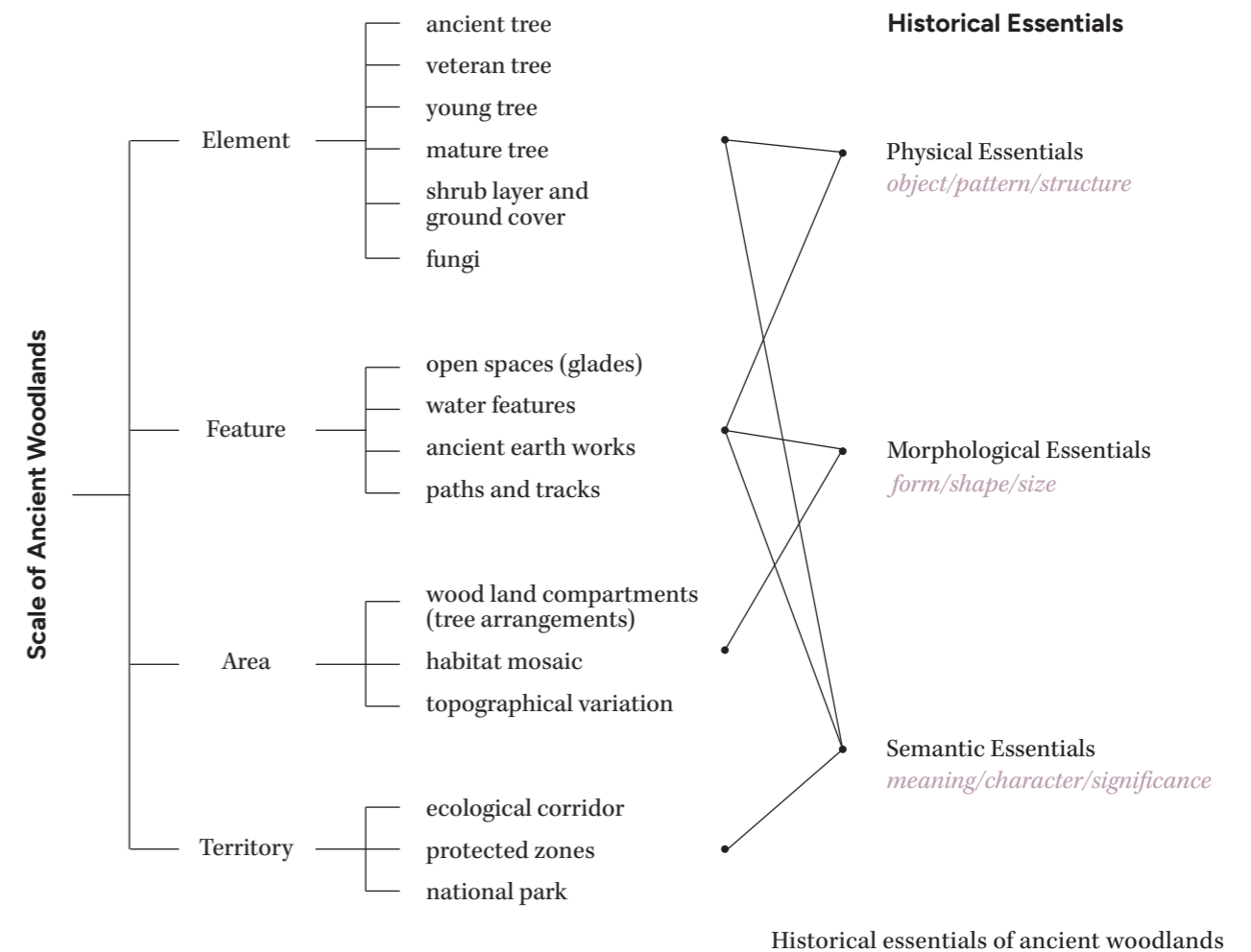
Semantic essentials

The semantic essentials tend to be more abstract than physical or morphological aspects. While physical essentials focus on tangible characteristics like ancient trees in the forest, semantic essentials are more about the intangible qualities. They are deeper meanings, cultural resonance, and symbolic significance that these elements evoke.

Semantic essentials carry diverse meanings for individuals, communities, and nations. Each person may have their own special stories connected to a particular tree or forest, holding unique memories filled with joy or sadness. A decayed tree symbolizes the loss of life but also implies rebirth, showing how the same object can evoke different interpretations. Similarly, the semantic essentials of the ancient woodlands of the Utrechtse Heuvelrug are complex and dynamic. Historically, as estate woodlands, they symbolized enclosure and exclusivity, whereas today, as part of a national park, they represent openness, democracy, and tranquility.

However, this does not mean their semantic essentials cannot be summarized. The ancient woodlands of the Utrechtse Heuvelrug embody intertwined narratives of nature and culture. Currently, their key characteristics include resilience, timeless beauty, peace, and richness. For today's visitors, these ancient woodlands often evoke feelings of reflection, nostalgia, contemplation,

or refreshment. For the nation as a whole, they represent an irreplaceable cultural heritage which is green, ancient, ecological, and inclusive. They offer perspectives into past land-use practices and societal values. Their layered history and continued presence in a densely populated modern region highlight their importance as carriers of collective memory and identity.



Physical essentials

The physical essentials of ancient woodlands mainly correspond to the “element” and “feature” scale components. As shown in the image on the right, they can generally be divided into three categories:

1. **Fully natural elements**, such as ancient trees, young trees, coppice wood, shrubs, and ground cover.

As described in the “the forest” section, due to a series of reasons such as poor soil, low water retention, and a deep groundwater table, forests in the Utrechtse Heuvelrug area are mainly composed of drought-tolerant and nutrient-tolerant conifers and oak species (Utrechts Landschap, n.d.). In the understory of these pine-oak mixed forests, acid-soil indicator plants like bilberry, lichens, and heather shrubs are common, reflecting a poor and acidic forest environment.

2. **Human traces left in nature**, such as cart tracks, tree avenues (*lanen*), and burial mounds.

According to BIJ12 (2023), tree avenues were usually planted with a single species of tall trees of similar age, placed along both sides of a road. They could stretch from at least 50 meters to even several kilometers

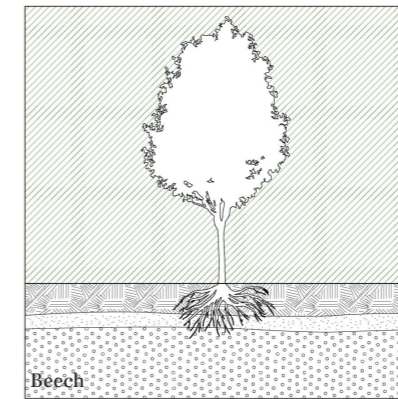
During the 17th and 18th centuries, many estates and country villas were built in the Utrechtse Heuvelrug region. Estate owners often designed long, straight avenues and sightlines in their gardens. These *lanen* often led directly to the main house or to scenic viewpoints, forming a central axis that gave the landscape a grand and formal appearance. Some of these old avenues still exist today and have become part of the public road network.

Overall, these *lanen* are a cultural heritage of the 17th-century forest landscape. They reflect the estate owners’ wish for order, beauty, and practical function. In some cases, tree avenues are the remaining traces of old plantations. While the plantations themselves no longer exist, parts of their layout have been preserved.

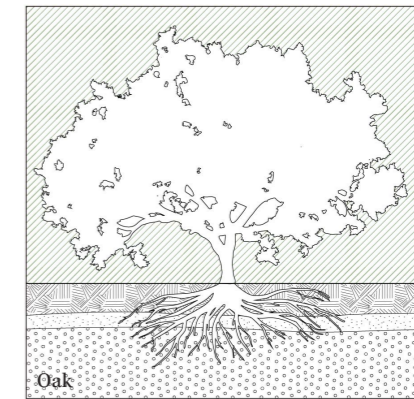
3. **Man-made structures**, including military remains, historic castles and estates located within the forest.

▷ Diagrams of physical essentials of ancient woodlands

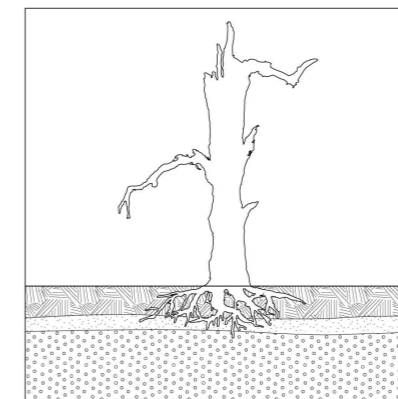
Young tree



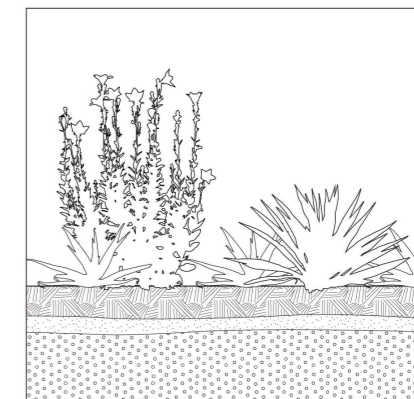
Ancient tree



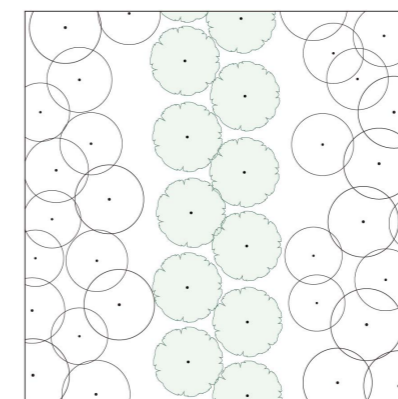
Decayed tree



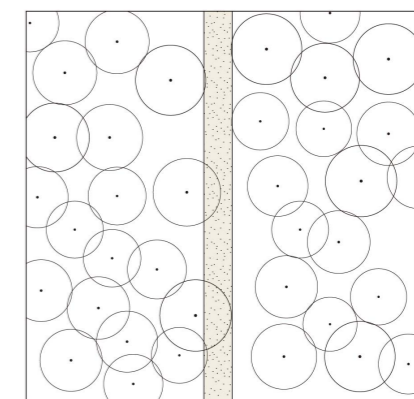
Shrub layer and ground cover



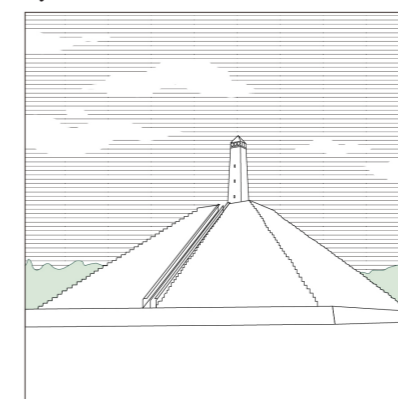
Tree avenue in the forest



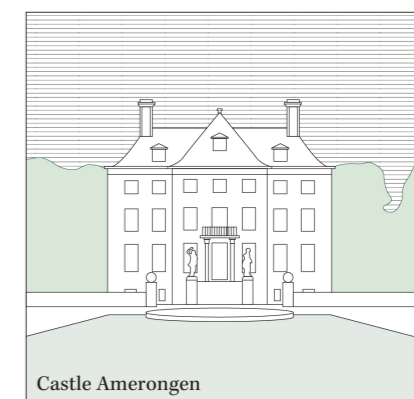
Cart track



Pyramid of Austerlitz



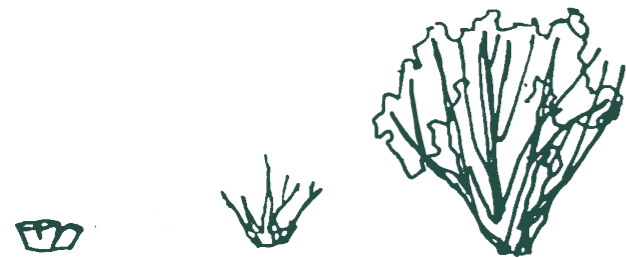
Historic Estates and Castles



Coppice (*Hakhout* in Dutch) is an old woodland system in which young trees are regularly cut back to their base. The stump stays alive and grows new shoots, which are harvested every 8 to 10 years. Over time, this repeated cutting creates thick, knotted stumps, or called stools, that keep regrowing and can live for centuries, sometimes spreading up to 30 meters wide.

On the Utrechtse Heuvelrug, this method shaped large oak forests and, in some areas, beech forests. These trees were once harvested for things like firewood, charcoal, bark, and fencing. Today, many of those old stools have grown tall again, often as multi-stemmed or single retained stems (called *spartelgen*). Since the roots were never destroyed, coppicing offered a nearly endless supply of wood while preserving the native trees, some of which now make up the region's oldest remaining forests.

(Wildschut et al., 2004)



▷ Spelderholt Estate, Beekbergen

DeVrolijkeSchrijver, 2002, in Wikimedia Commons.





△ A typical tree avenue, Amerongse Bos

On both sides of the path, tall *Fagus sylvatica* (European beech) trees are planted in rows. This kind of straight, double-rowed tree avenue is called a *laan* (plural: *lanen*) in Dutch. Since the 17th century, *lanen* have been an important feature in estate gardens. They were valued not only for their beauty, but also for practical reasons such as wind protection, shade, and timber production.

▷ The ancient oak tree “*Eenzame Eik*” in the center of the star forest, Amerongse Bos





△ Fallen dead tree, Amerongse Bos
▷ Stading dead tree, Amerongse Bos



Morphological essentials

In this graduation project, the ancient woodlands in the Utrechtse Heuvelrug are divided into four categories based on their morphological characteristics.

1. Linear Woodland

Linear woodlands are elongated woodlands of trees that follow a linear feature or boundary in the landscape. They often occur as long strips along historic roads, property lines, or field edges, reflecting their origin as hedgerows, wood-banks (*Houtwal*), or windbreak plantings. Many were established in the 18th to 19th centuries to mark estate or field boundaries and to provide resources like coppice (*hakhout*) woods (Vrienden van Amelisweerd, n.d.; Wildschut et al., 2004). These woodland strips have a clearly linear spatial logic and often function as transitional edges between open land and denser forest.

2. Star woodland

Star woodlands (*sterrenbos*) are forests designed with straight paths that spread out from a central point, forming a star-like shape. These paths, usually 5–8 or more, divide the forest into wedge-shaped sections. This design was popular in the 18th and early 19th centuries, mainly for decorative hunting grounds on estates. The layout let landowners stand at the center and watch game being driven toward them along the paths (Mathilde, 2019). Many estates on the Utrechtse Heuvelrug used this design for both beauty and sport, sometimes aligning the paths with distant landmarks. While some of these woods have grown denser over time, the star-shaped pattern is still visible in the landscape.

3. Cluster woodland

Cluster woodlands are made up of several small patches of trees grouped together, often surrounded by open areas like heath or grassland. These woodlands commonly appear where forests meet heathlands, with tree patches spreading irregularly into the open land. They usually develop through natural succession, starting in the late 19th century, when trees like birch or pine began growing on unused heaths or fields with little grazing. This creates a varied landscape of

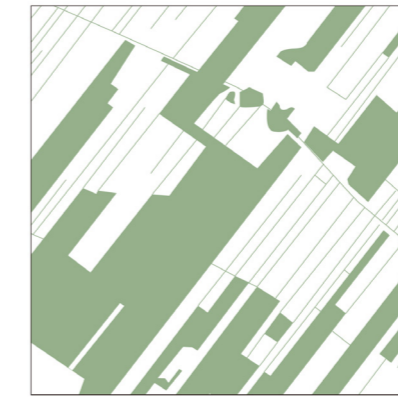
heath, shrubs, and tree groups. Over time, the patches may grow and join together, but where grazing or conservation is used, they stay as separate groups with soft edges. This type of woodland shows a gradual shift from open land to closed forest.

4. Hybrid grid woodland

Hybrid grid forests are woodlands with a partly geometric, grid-like layout, mixed with irregular features. This pattern reflects a combination of planned planting and existing landscape elements. These forests were mainly created during reforestation in the late 19th and 20th centuries, when large heathlands and sand areas were planted with fast-growing conifers (Flux Landscape Architecture, 2021). Trees were planted in straight blocks to stabilize the soil, creating straight firebreaks and access routes. However, older woodlands, natural terrain, or property lines were sometimes included, breaking the grid. As a result, these forests show a mix of man-made structure and natural variation. It shows how modern forestry was added onto an older, varied landscape. The hybrid grid layout is now the most common woodland on the Utrechtse Heuvelrug.

Linear Woodland

Kasteel Sandenburg



1.5 km

Star Woodland

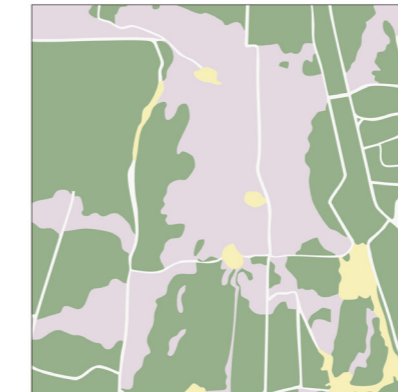
De eenzame eik, Amerongen



1 km

Cluster Woodland

Hoge Ginke, Leersum



1 km

Hybrid Grid Forest

Bosreservaat Galgenberg, Amerongen



1 km

▷ Diagrams of morphological essentials of ancient woodlands



In the Utrechtse Heuvelrug region, the “linear woodland” are especially frequent in the Kromme Rijn region. The region had a large number of coppice woodlands (*hakhoutbossen*) in the 19th century, which were a very important part of the landscapes of the estate. Later on, many of these woods were gradually abandoned or converted (Wildschut et al., 2004). Many of them are now “high forest”.

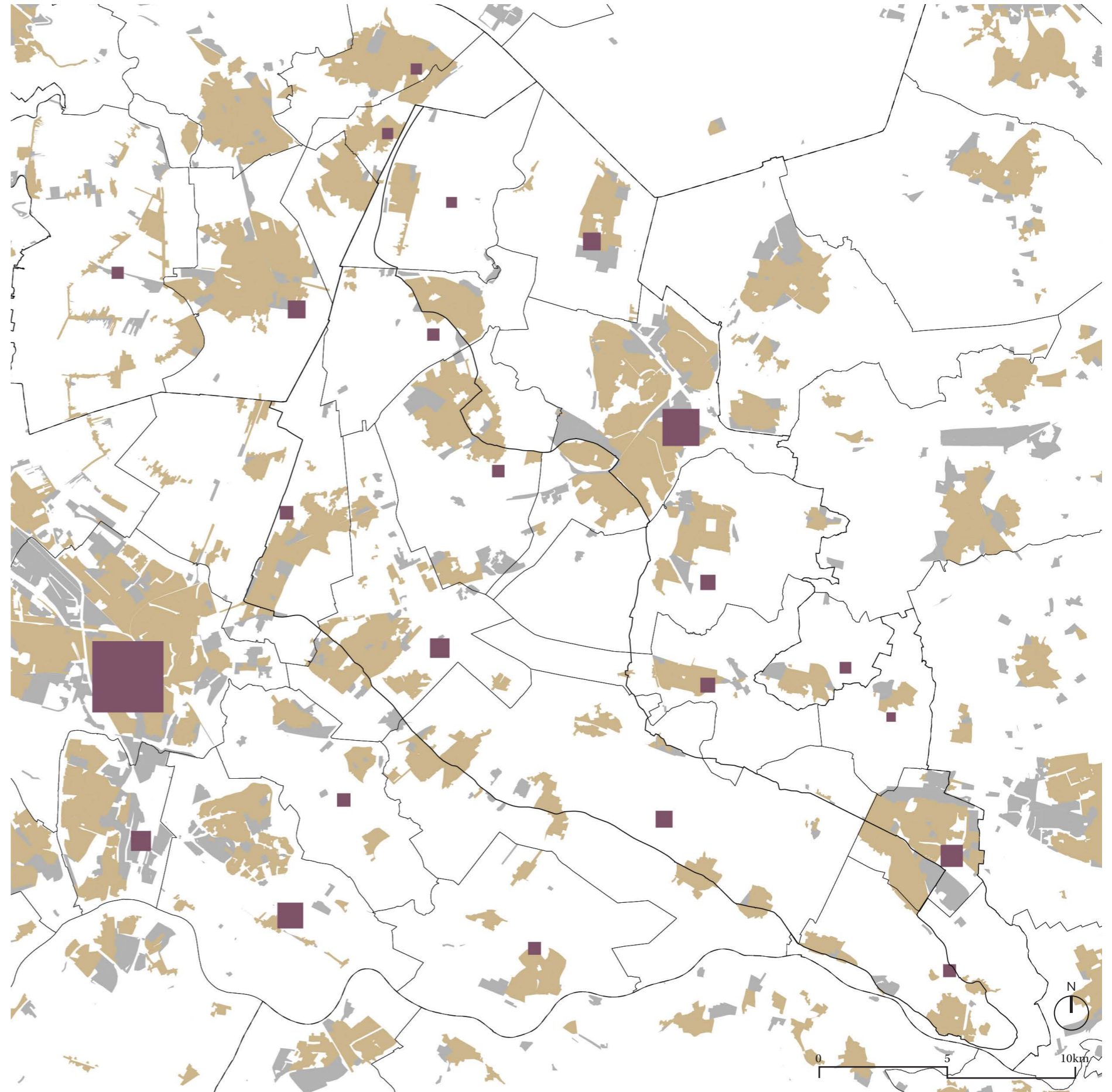
▷ Aerial photograph of woodlands near Kasteel Weerdesteyn
Kraan, 2020, in Google Maps.

The City

In today's Netherlands, the greatest challenge for cities in the Utrechtse Heuvelrug region is finding land to build new housing. This problem reflects a nationwide housing crisis. According to Flux Landscape Architecture (2021), by around 2040, approximately **75,000 new homes** are expected to be constructed in and around the Utrechtse Heuvelrug region. Most of this development will take place in major cities like Utrecht and Amersfoort, while towns and villages such as Veenendaal, Zeist, and Bunnik will bear the remaining pressure. The map on the right is adapted from Flux's report and shows the projected housing area needed for each municipality in the Utrechtse Heuvelrug region. It shows required housing area per municipality up to 2030 based on household projections, assuming 50 dwellings per hectare.

The map clearly shows that the land required to accommodate these new homes is substantial. In such a densely used region, this scale of housing demand inevitably brings significant pressure and risks conflict with agricultural land or natural areas. Therefore, this project calls for a rethinking of how these new built-up areas would look like, exploring ways for urban growth to coexist with nature. A land can be both city and forest at the same time.

* In Dutch official statistics, the term “**dwelling**” (*woning*) refers to a single, self-contained housing unit—essentially one address where a household can live (Centraal Bureau voor de Statistiek, n.d.). It is not a whole building: a five-storey block with 40 apartments is counted as 40 dwellings, and a 20-storey tower with 150 apartments is counted as 150 dwellings.



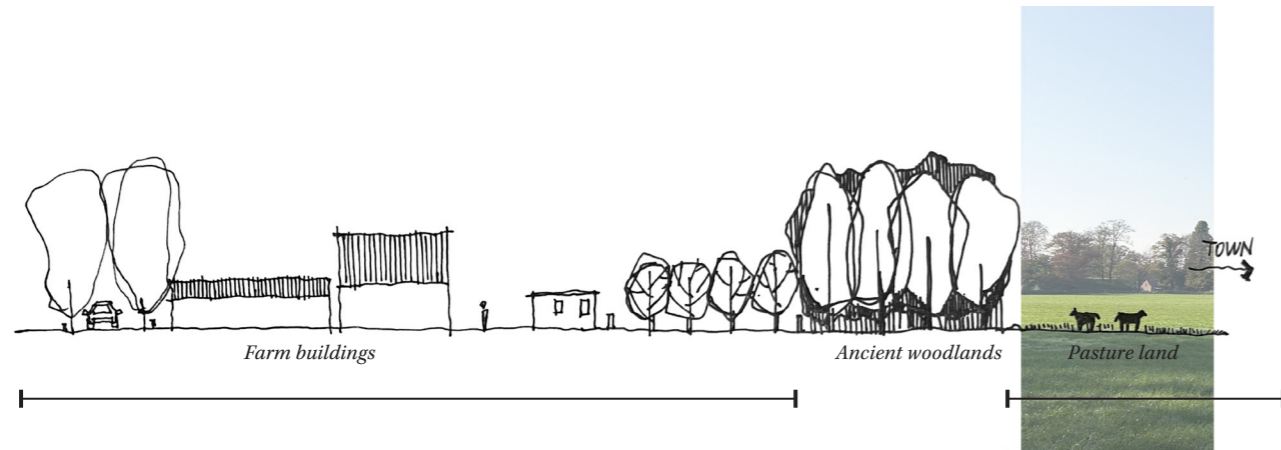


△ City center of Utrecht
▷ Construction site, Ede

2.3 SITE ANALYSIS: THE AREA IN BETWEEN

Typologies of transitional zones

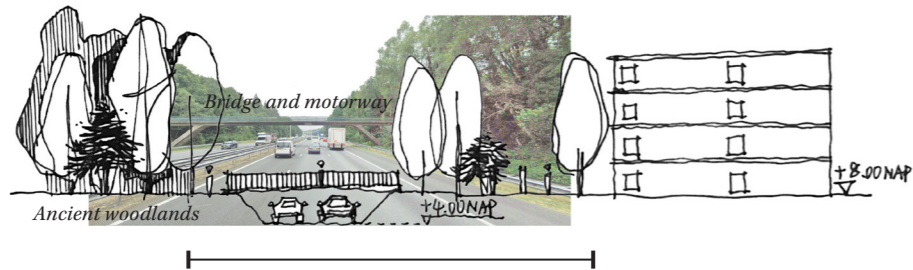
1. Agricultural land



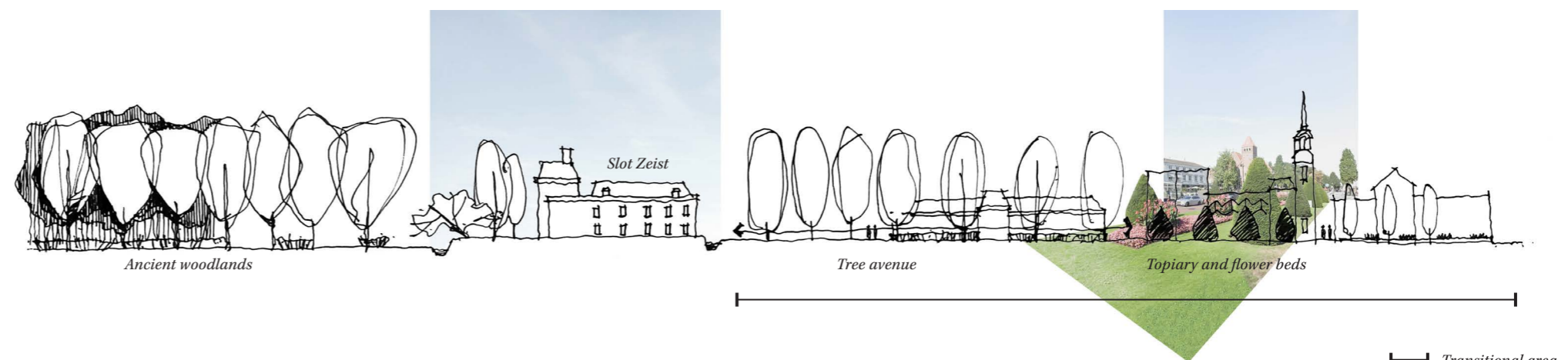
3. Other woodlands or green spaces



2. Infrastructure



4. (Sub)urban built-environment



— Transitional area



△ Railway cutting through the forest
▷ Disordered urban fringe



△ Tree-Lined Avenue in front of Slot Zeist
▷ Kerckebosch, Zeist



2.4 PRECEDENT STUDY

Parc aux Angéliques

Location: Bordeaux, France

Year: 2012–2018

Area: 75 ha

Type: Urban Parks, Public spaces, Urban strategies

Project Team:

MDP Michel Desvigne Paysagiste (lead consultant)

IHA Inessa Hansch Architect

Artelia Bordeaux

Number of trees:

Sequence Queries: 20 ha - 4108 trees

Sequence Brazza: 10 ha - 1930 trees

Total: 30 ha - 6038 trees

(Data from Michel Desvigne Paysagiste, n.d.)

According to Inessa Hansch (n.d.) from the project team, this project focuses on reconnecting the urban district with the Garonne River by introducing walkways, bridges, and platforms that create new visual and spatial links. Each crossing structure responds to its surroundings, such as trees, water, and nearby infrastructure. In a way, trees may be the most important element of this project. Through various configurations and different growth stages, the design shows how trees can shape different types of spaces in the park throughout time.

This precedent and my graduation project both seek to strengthen the connection between nature and urban areas, while in this project the “nature” is river and in mine is forest. We both get the inspiration of composition from historical heritage and try to reinterpret it using the element of trees. This precedent demonstrates that the tree layer should not be considered separately but with other layers such as road layer, grass and shrub layer, building layer, landscape construction layer and topography layer, to achieve a coherent design. Another take-away from this project is that attention needs to be paid to attributes of trees when constructing a planting guidebook or catalogue, including tree spacing, species, height, size, texture and pattern.

▷ Rows of trees perpendicular to the Garonne River

(From top to bottom)

All images from Michel Desvigne Paysagiste. Photos 1–2 (n.d.), photographer unknown; Photo 3 by Guillaume Leuregans (n.d.).



Kerckebosch neighborhood

Location: Zeist, the Netherlands

Year: 2009–now

Area: 46.5 ha

Type: Urban planning and design, Neighborhood development

Project Team:

wUrck

BDP.Khandekar (until 2008)

(Data from Wurck, n.d.)

According to Kerckebosch Zeist (n.d.), on their neighborhood association website, over the past 15 years, Kerckebosch has changed a lot. Nine old 1960s social housing blocks were replaced with 1,000 diverse and affordable homes. Public facilities were updated, and forested areas now connect seamlessly with nearby nature reserves. The new six residential areas extending like fingers into the green landscape. Forest and heath connect them to the Heidestein reserve, making nature felt everywhere.

In this project, trees are also a key element, but unlike Parc aux Angéliques, Kerckebosch’s approach focuses on preserving as many existing trees as possible (Wurck, n.d.). Even trees that had to be removed were partly reused to create public amenities, such as benches, picnic tables, bike racks, and fence posts.

To promote a healthier forest ecosystem, some non-native species like the American oak and black cherry were replaced with native ones like beech and birch (Kerckebosch Zeist, n.d.). Overall, the small wooded areas between housing blocks enhance the community’s character, offer nearby recreational space, and serve as ecological buffers between ancient woodlands and residential areas.

The Kerckebosch project is a practical and beautiful example. This project, starting from 15 years ago, gave me a lot of inspiration on woodland conservation, timber recycling and public participation. However, it is probably still not bold enough, because in some ways it is just the typical model of “residential area and green spaces interspersed in it”, which is of course in the consideration of the project’s feasibility. But is there a more innovative neighborhood form that allows people live closer to nature? Is there a new urban morphology than can be applied on a larger scale to create living spaces without specific boundaries? These are questions I need to reflect on in my project.



Master plan of Kerckebosch

From [Master plan of Kerckebosch], by Wurck, n.d.

2.5 DESIGN ASSIGNMENT

After completing a thorough analysis of the site's natural environment, historical and cultural background, and social conditions, and identifying key issues, the next step is to revisit the research questions and define the specific design assignments.

Based on the *Conceptual diagram of project goal and approach*, a new diagram of the design assignments has been created. The design should primarily respond to three key questions:

- How does the approach of forest urbanism work through spatial design strategies?
- What does this new forest metropolis look like, and how does it function?
- What do the redesigned transitional landscapes look like?

The specific design assignments are as follows:

1. Principles and Strategies: A guidebook for forest urbanism, including spatial principles and new forest typologies. These principles should inform territorial planning, showing how the existing forest structure can be expanded and connected, and how space is organized within transitional landscapes. The new forest typologies should demonstrate that reforestation is not just about adding green areas, but that design can create rich spatial experiences and functions within new forests.

2. Territorial Scale: Metropolitan planning for the Utrechtse Heuvelrug region, including the forest network, new forest locations, phasing, mobility, infrastructure, public services, urban centers, etc.

3. Local Scale: Zoom-in designs of urban-forest interfaces, with a focus on how new forests are integrated with housing.

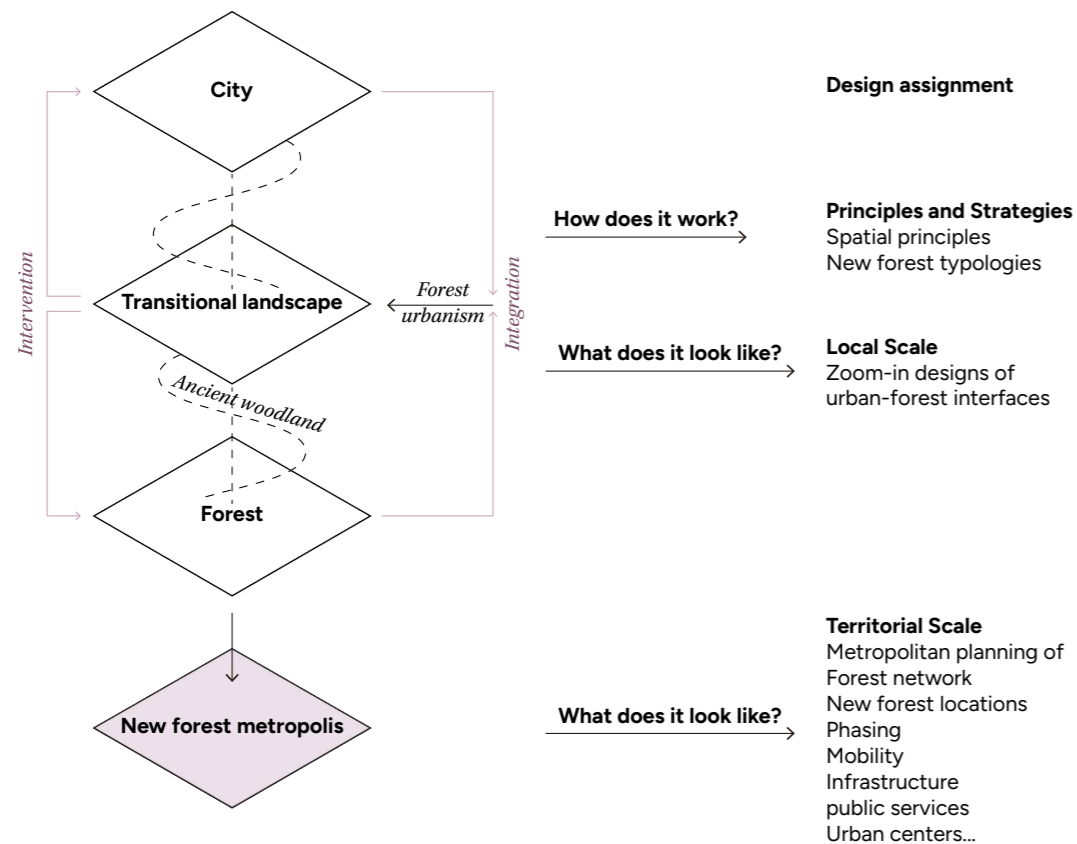


Diagram of design assignments

III Designing a Future Forest Metropolis

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Spatial principles	90
Strategies: eight new forest types	92
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3.1 DESIGN EXPERIMENTS

The focus of the design experiments is to explore the relationship between existing forests and new forests, as well as the spatial connection between the overall forest system and the city. Four scenarios were developed.

Expand

New forests extend from the Heuvelrug into the surrounding open land, reaching into cities and towns like green fingers. Reforestation mainly takes place on the slopes on both sides, where activities are also relocated, allowing the core forest on the ridge to be preserved.

Surround

Thick forest rings wrap each city and town. Settlements sit like clearings inside one big green blanket that blocks noise, heat, and views of roads.

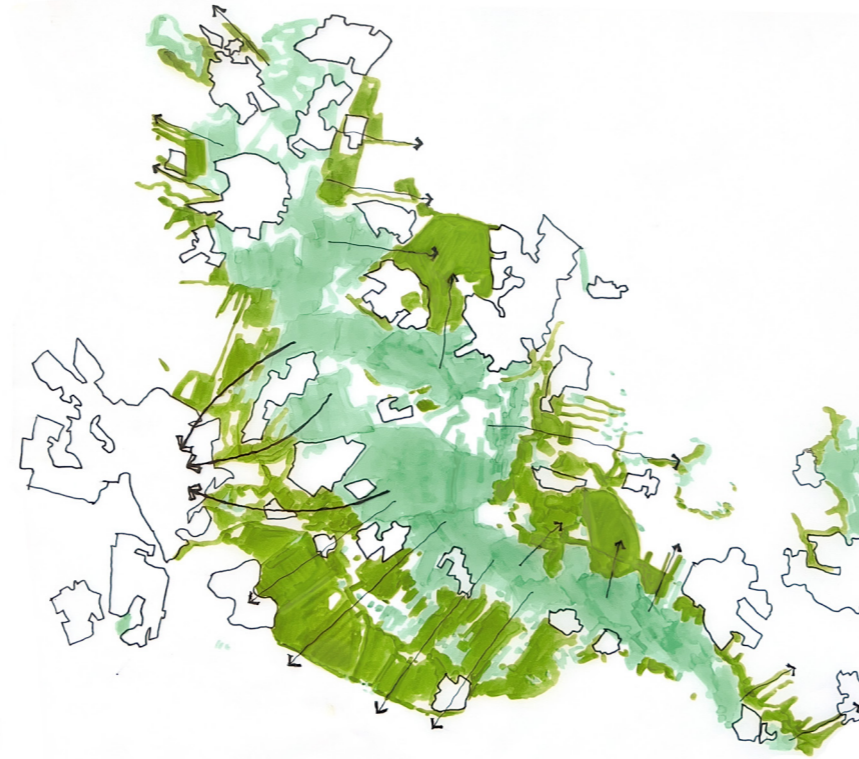
Trace

New plantings follow old estate lanes, polder structures, canals, and roads. The pattern shows local history while linking cities to the wider forest.

Connect

Long forest corridors join many small woods into one network. It supports the movement of animals, water flow, and slow travel.

The design experiments also offer an insight: these four scenarios are not mutually exclusive—they could represent different phases of a plan. The detailed phasing plan is presented in the later “Phasing” section.



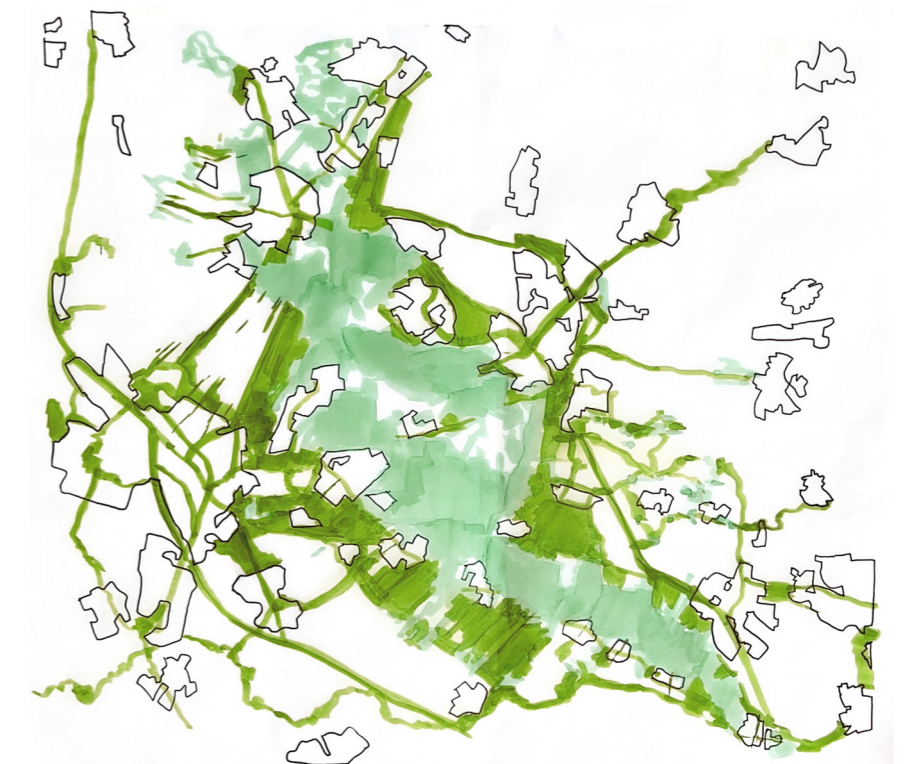
Expand



Surround



Trace



Connect

Sketches of design experiments

Existing forest
New forest

3.2 CONCEPT

The design concept diagram on the right is an extension of the earlier *Conceptual diagram of project goal and approach*. It shows how transitional landscapes mediate between urban growth and forest development by **integrating space, function, and identity**.

Spatially, scattered groves within the city gradually expand into broader new forests, eventually merging with the main forest. These new forests help reconnect fragmented ancient woodlands, forming a continuous forest network.

Functionally, land use in the transitional landscape becomes more mixed: forests combine housing, recreation, ecology, and production. The growing pressure for housing is relieved in these areas. Some recreational functions are shifted from the core of the Utrechtse Heuvelrug to the transitional area, which helps protect key habitats on the ridge while providing nearby leisure spaces for urban residents.

In terms of identity, urbanity is developed through the new forest, while the narrative of the ancient woodland is continued there. Together, these layers create a dynamic transitional landscape that links cities and forests through everyday life.

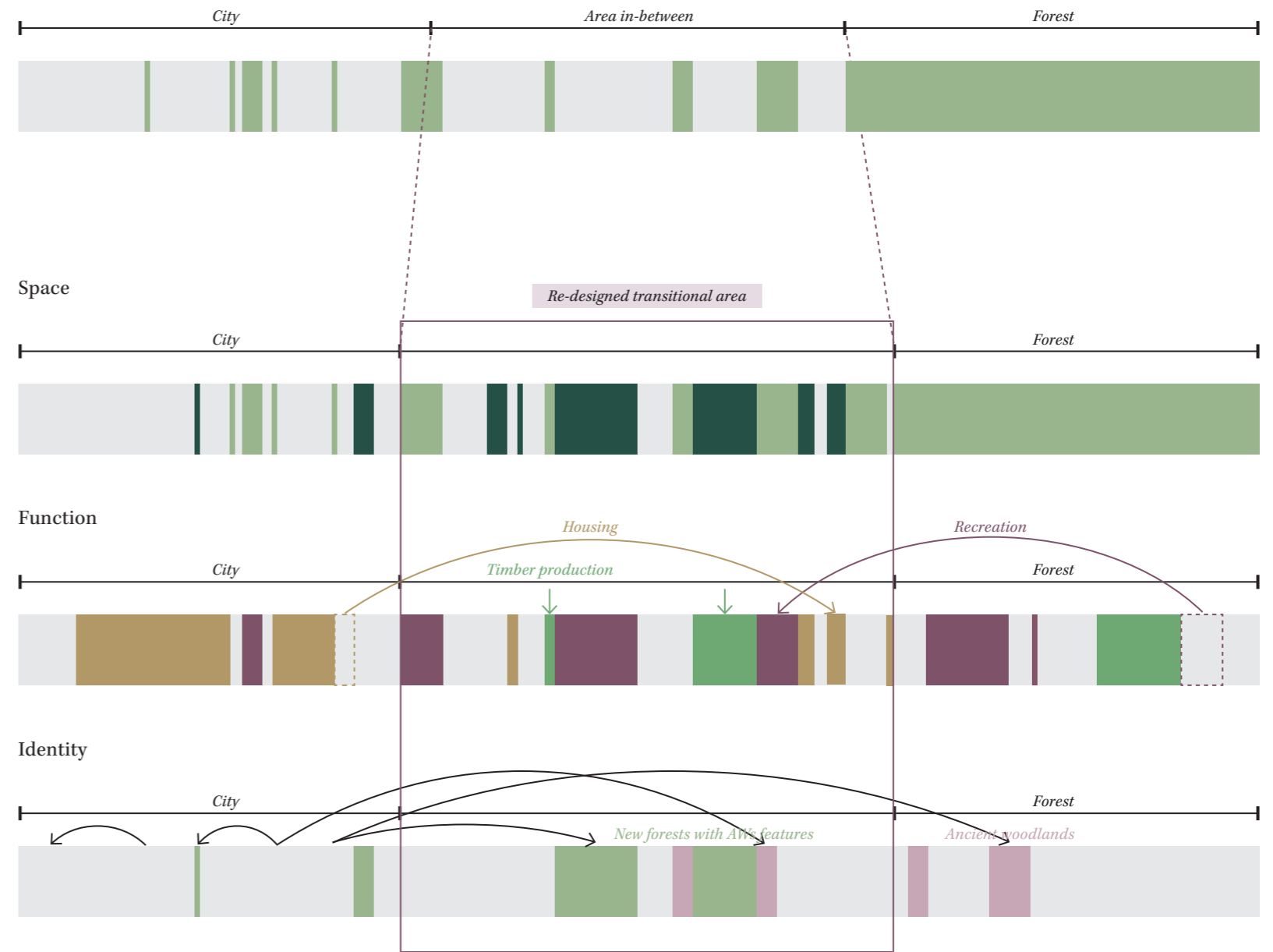
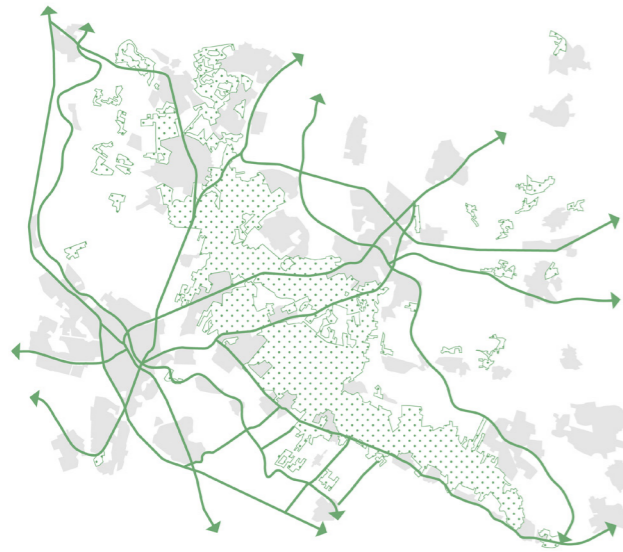


Diagram of design concept

3.3 PRINCIPLES AND STRATEGIES

Spatial principles



1. Continuous green network

Link existing forests, new forests, waterways, and cycle routes into one uninterrupted network. This network lets wildlife migrate, cool air flow, and people travel car-free across the entire metropolis.



2. Expand along both sides of the ridge

Grow new forests east and west of the Heuvelrug spine. The expansion embraces adjacent towns rather than pushing them further outward. Some activities are relocated here, which helps protect the core forest on the ridge.



3. Buffers around ancient woodlands

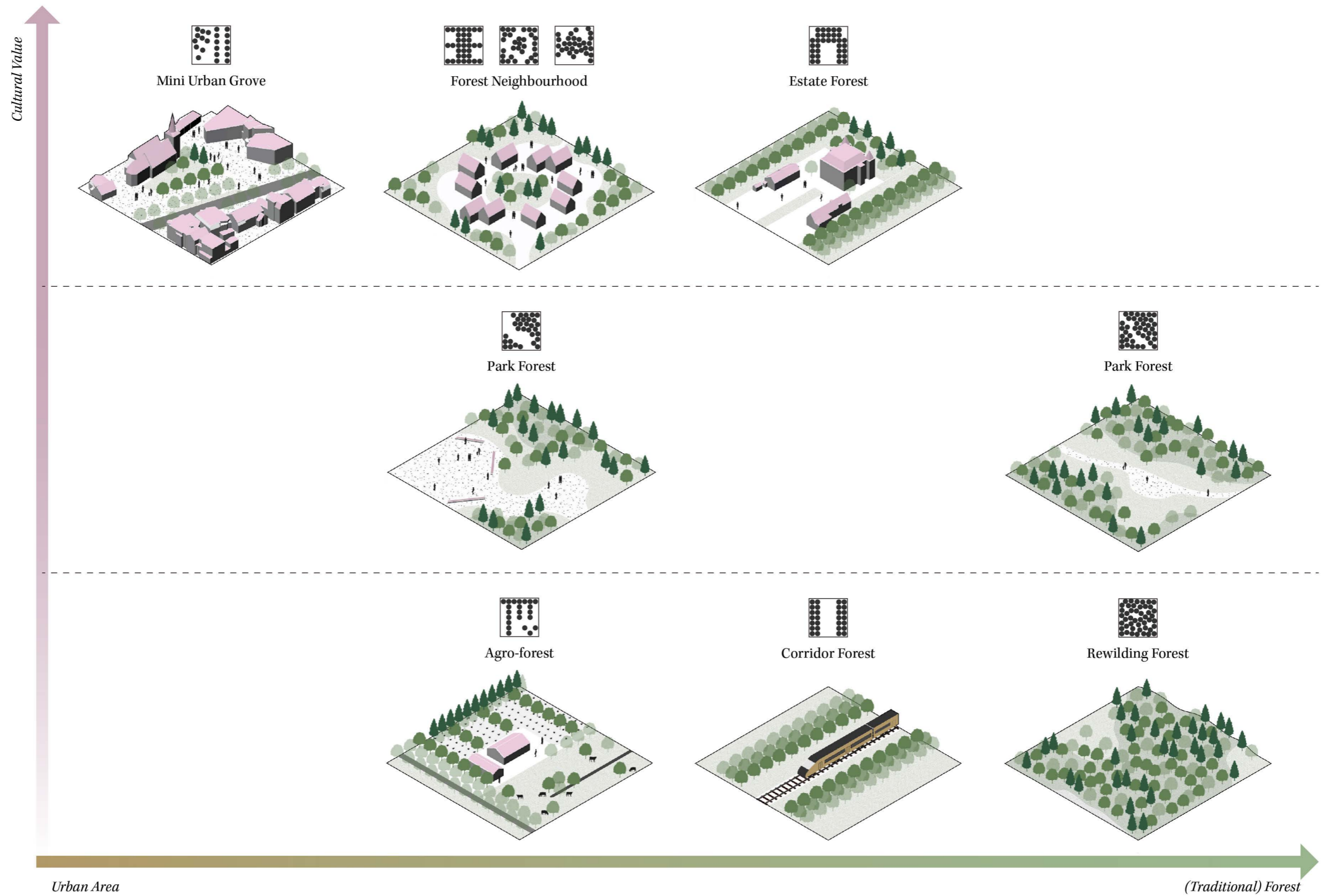
Create protective buffers at least 15 meters wide around ancient woodlands. Buffers reduce edge stress, and give space for gradual native regeneration.



4. Continuity of cultural patterns

Apply the morphological characteristics of ancient woodlands to the layout of new reforestation and community development. Reinforcing these recognizable patterns connects everyday life with the cultural landscape.

Strategies: eight new forest types



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

— 20m

Cedrus libani
Lebanon cedar

— 15m

Quercus robur
pedunculate oak

— 10m

pine marten

— 5m



habitat for

Viburnum opulus
Guelder Rose



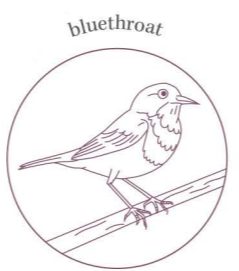
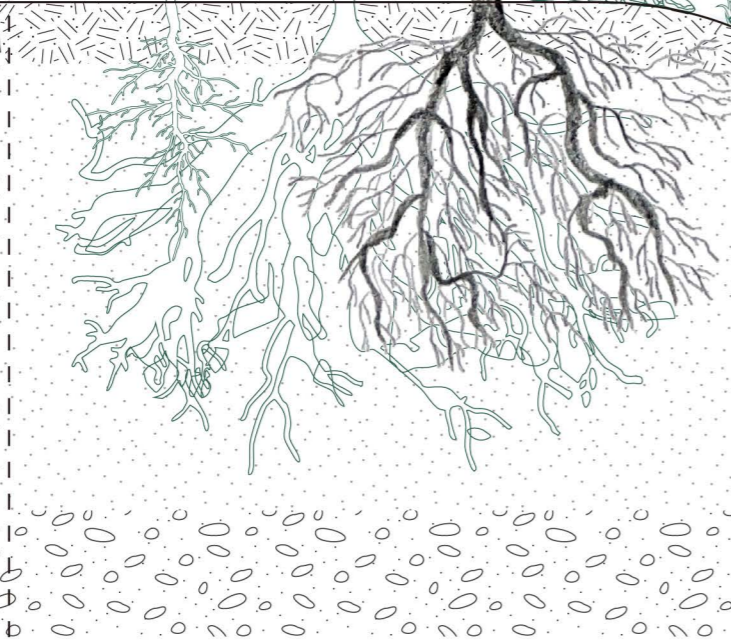
Rewilding forest

Park forest

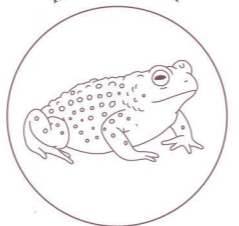
or birds and insects.



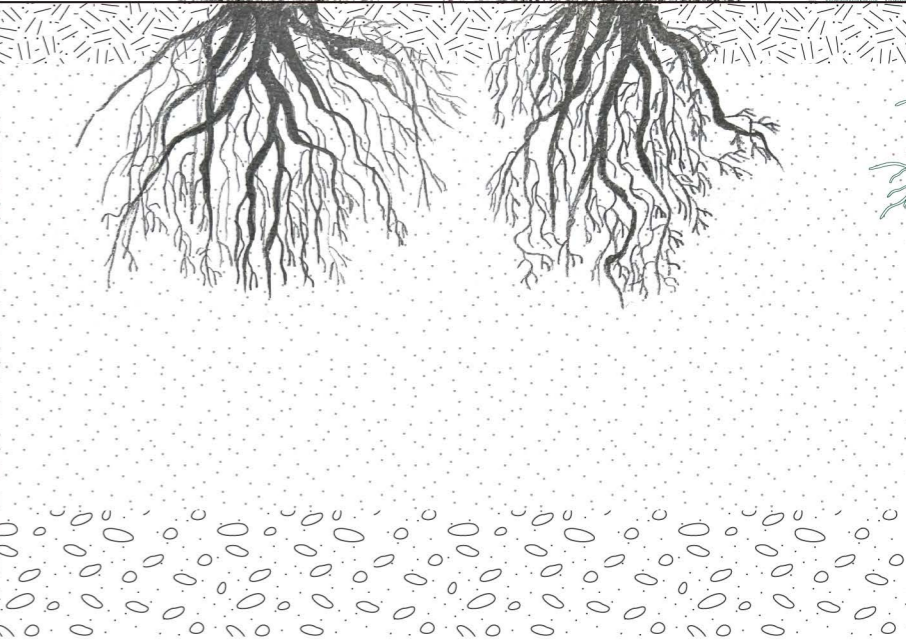
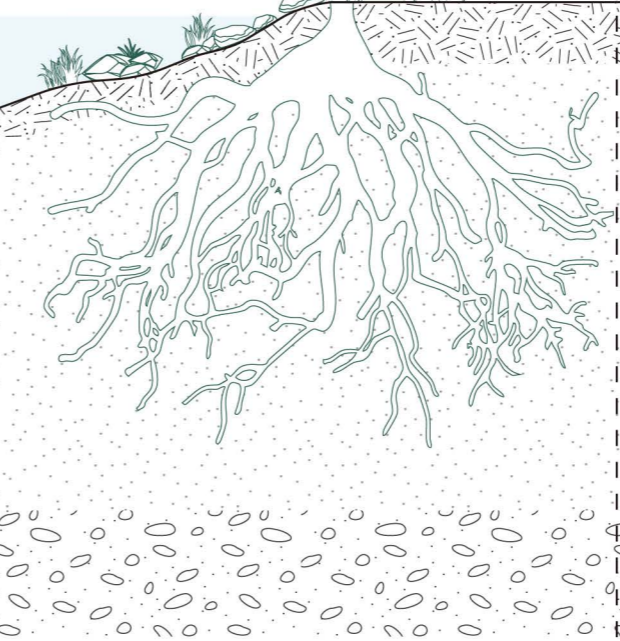
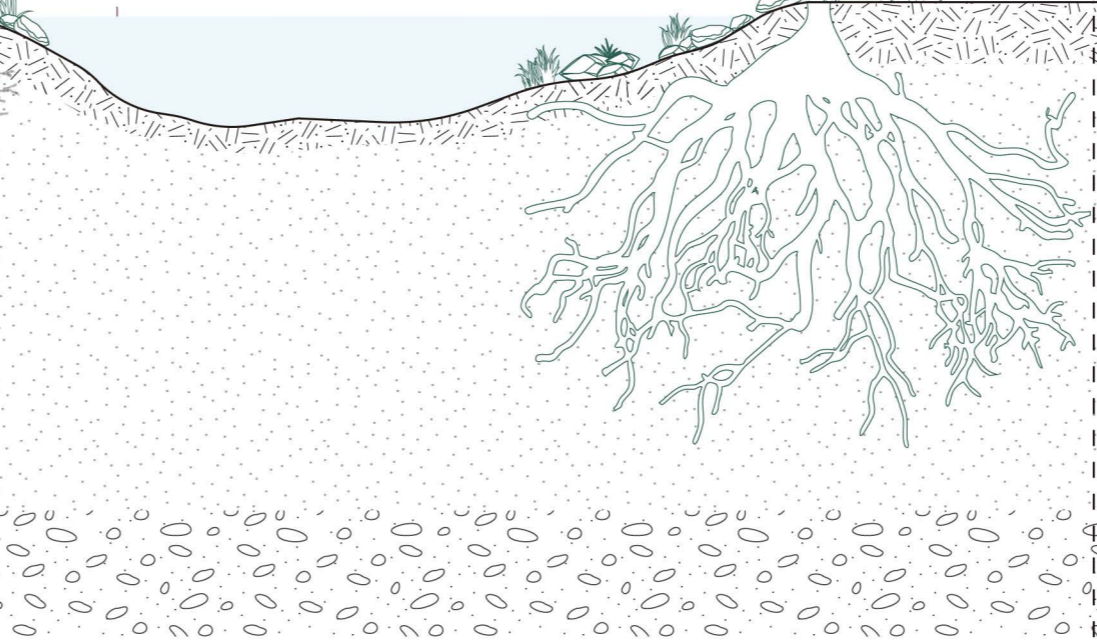
Betula pendula
Silver Birch



bluethroat



natterjack toad



Coppice (hakhout)

- Quercus robur*
- Quercus robur*
- Fraxinus excelsior*
- European ash



wood prod

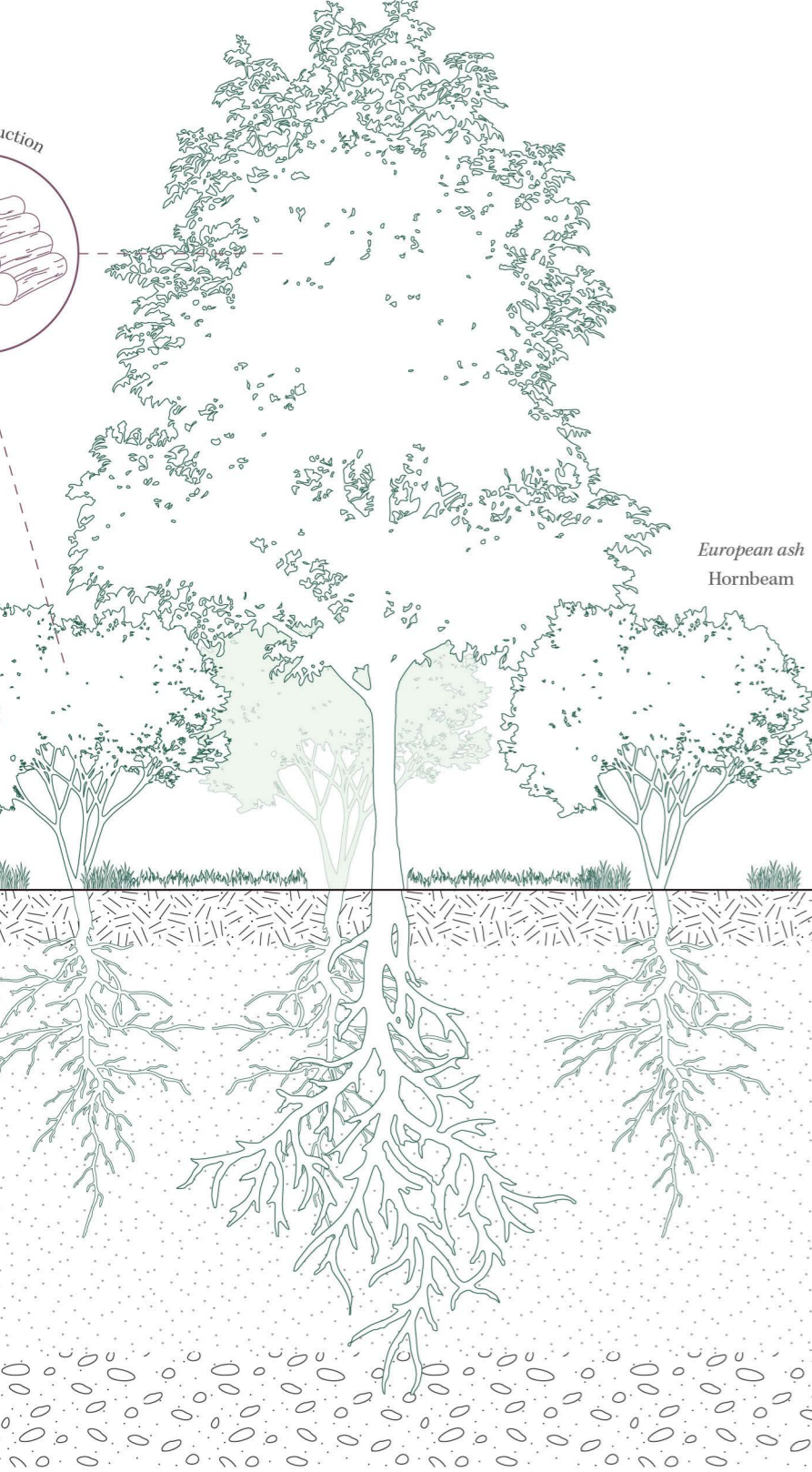
Corridor forest

Estate

coppice-with-standards (Hakhout met overstanders)

Tilia cordata
Small-leaved lime

European ash
Hornbeam



Juglans regia
English walnut

English walnut



hazelnut



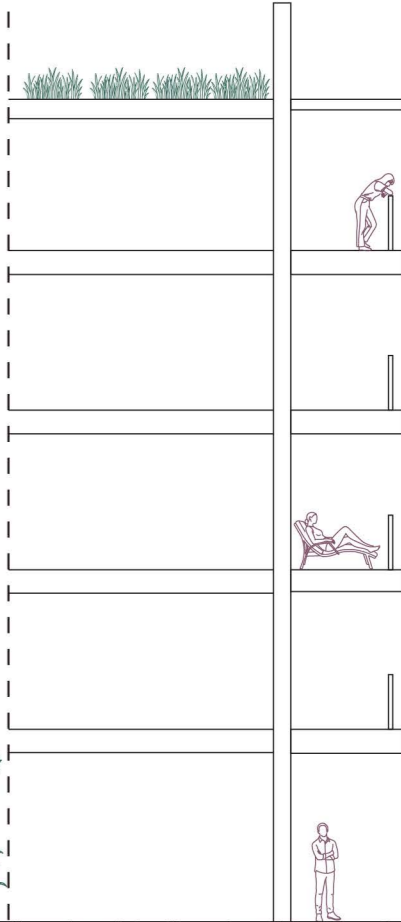
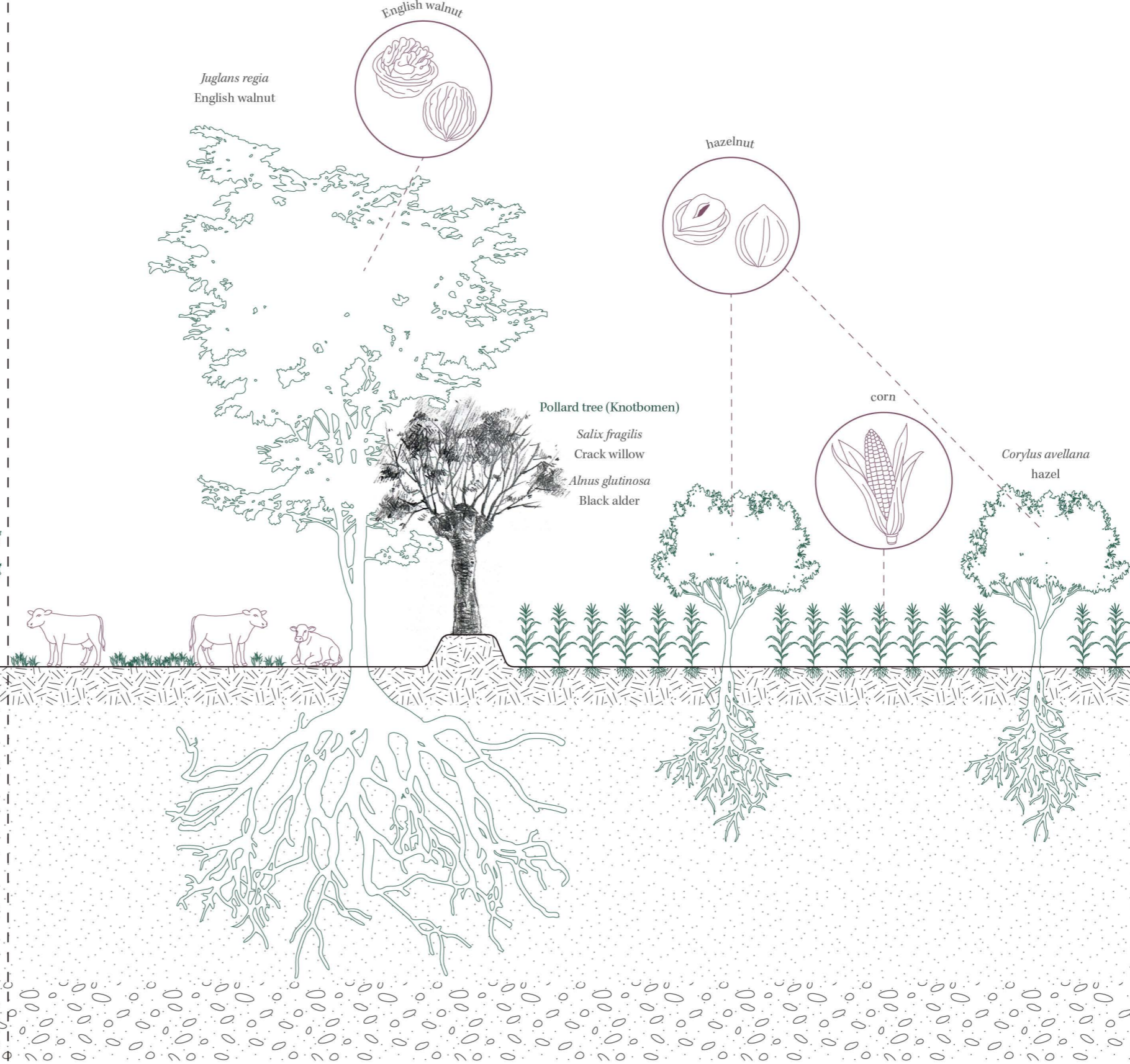
corn



Corylus avellana
hazel

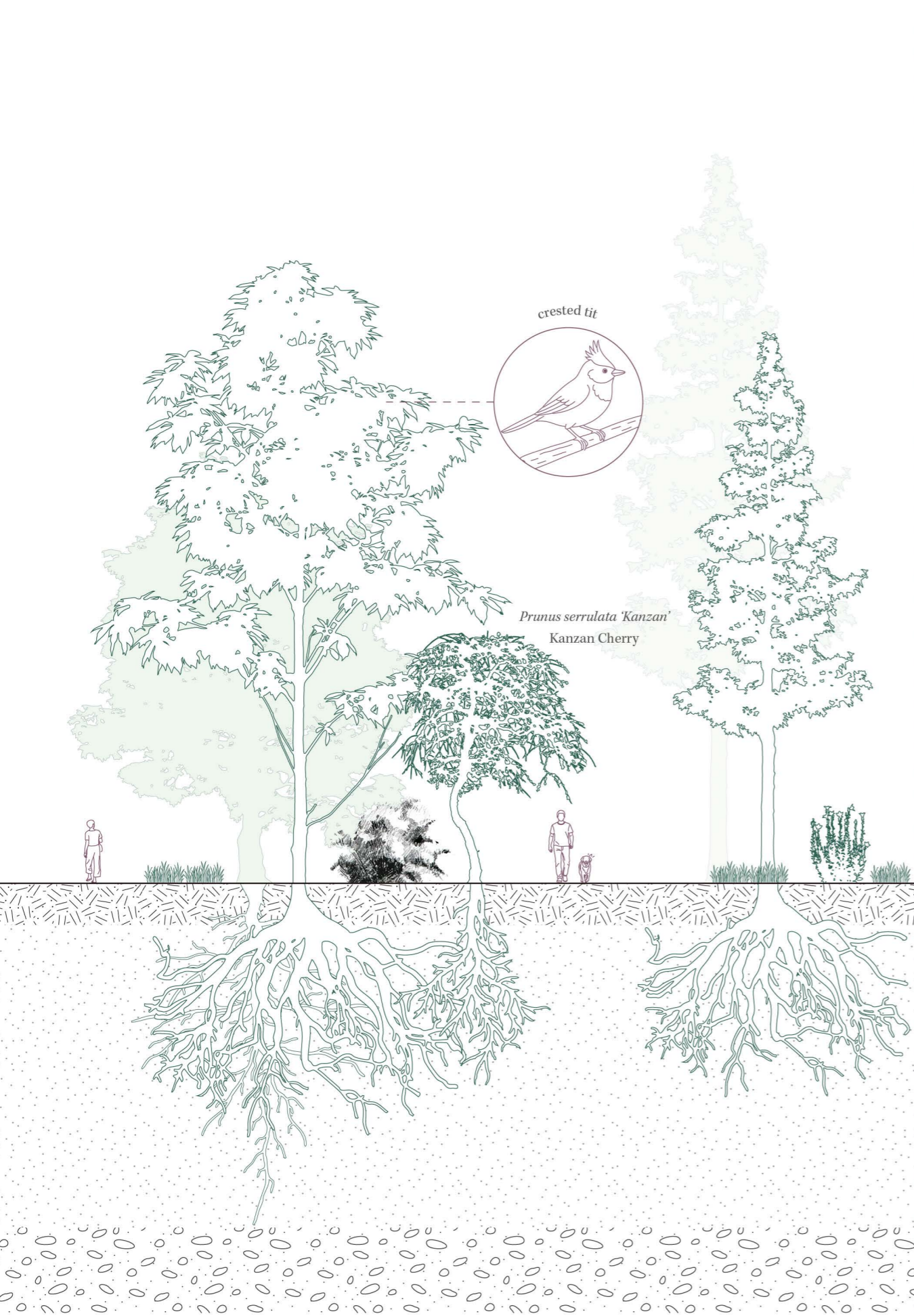
Pollard tree (Knotbomen)

Salix fragilis
Crack willow
Alnus glutinosa
Black alder

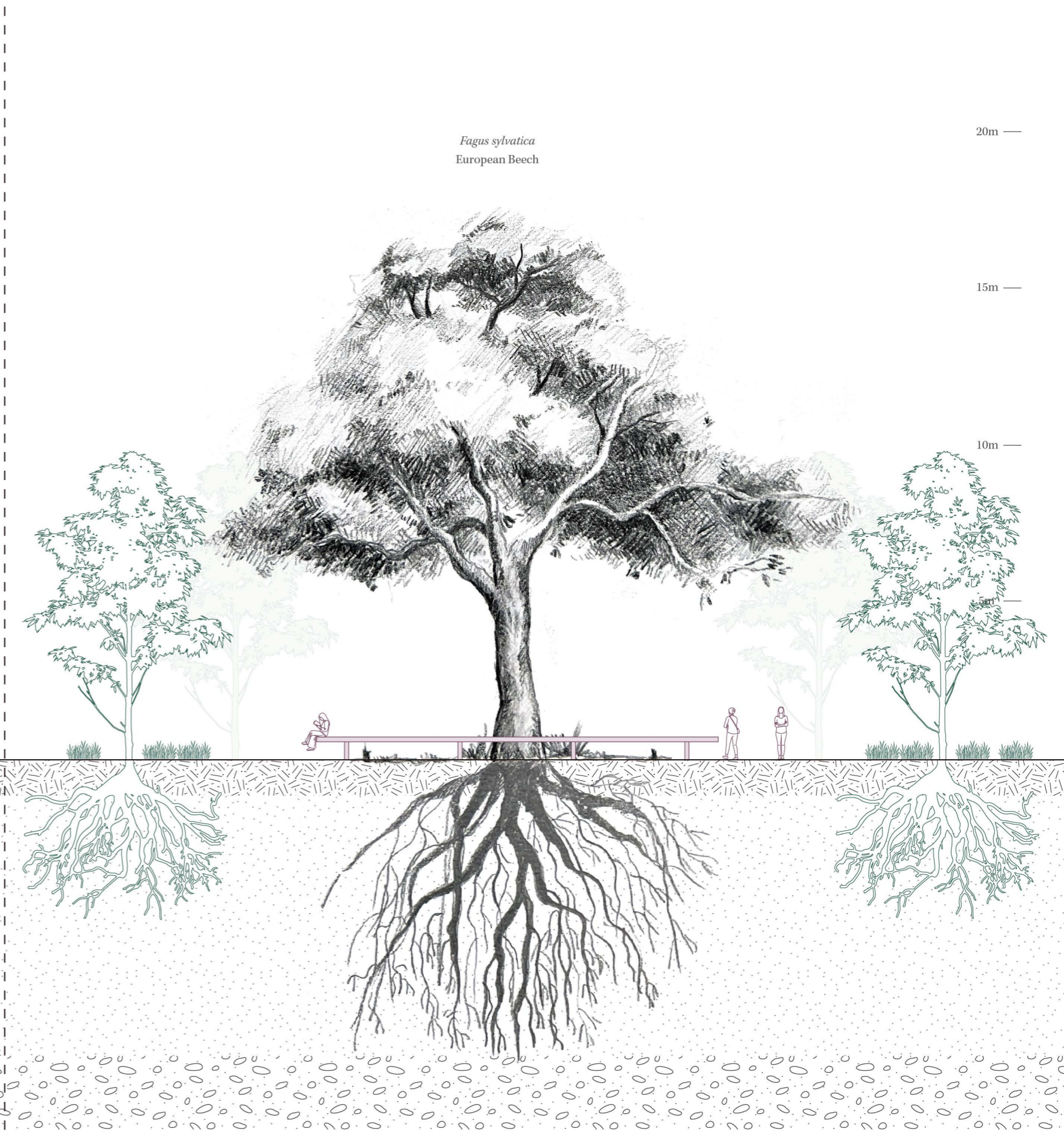


forest

Agro-forest

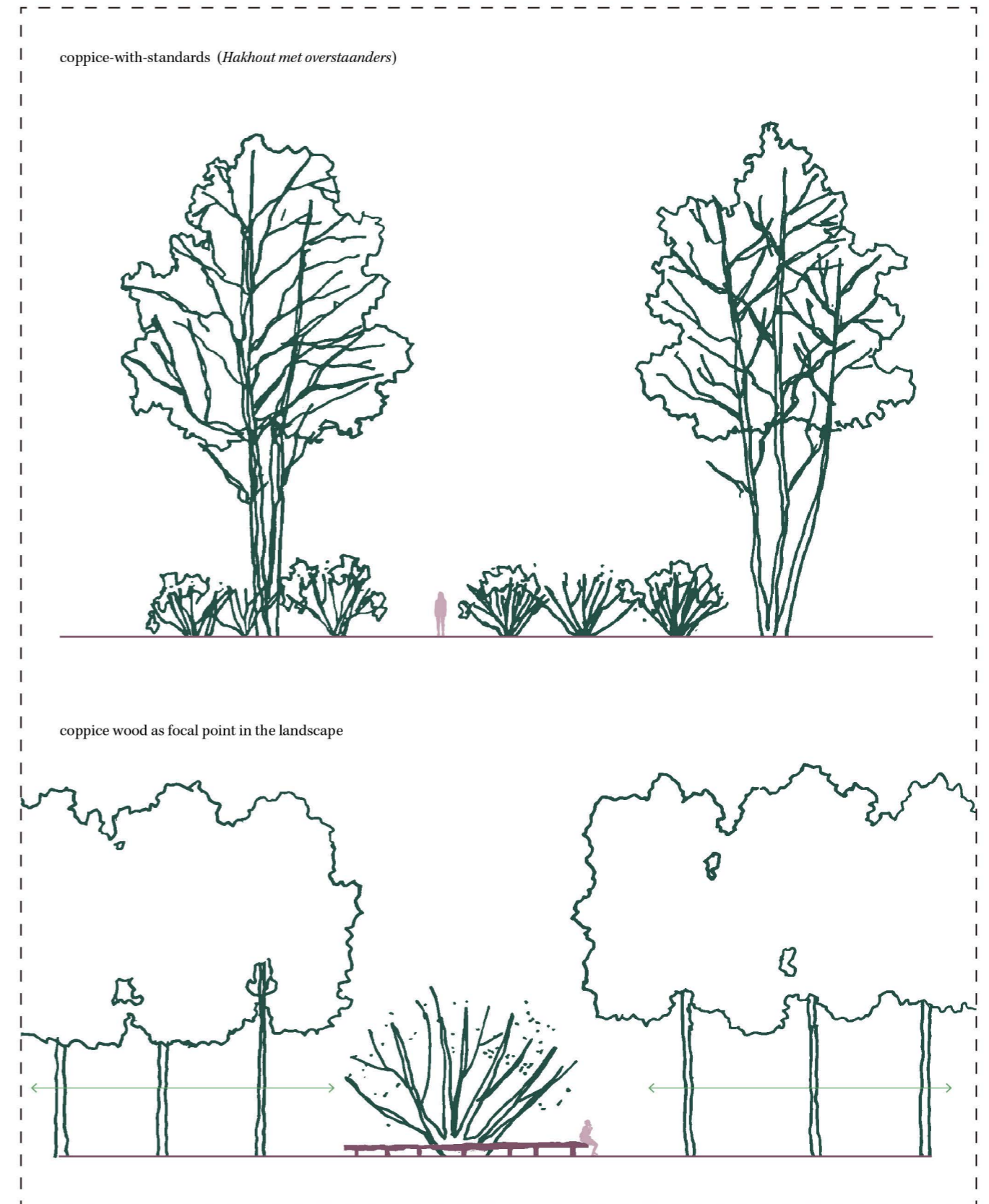
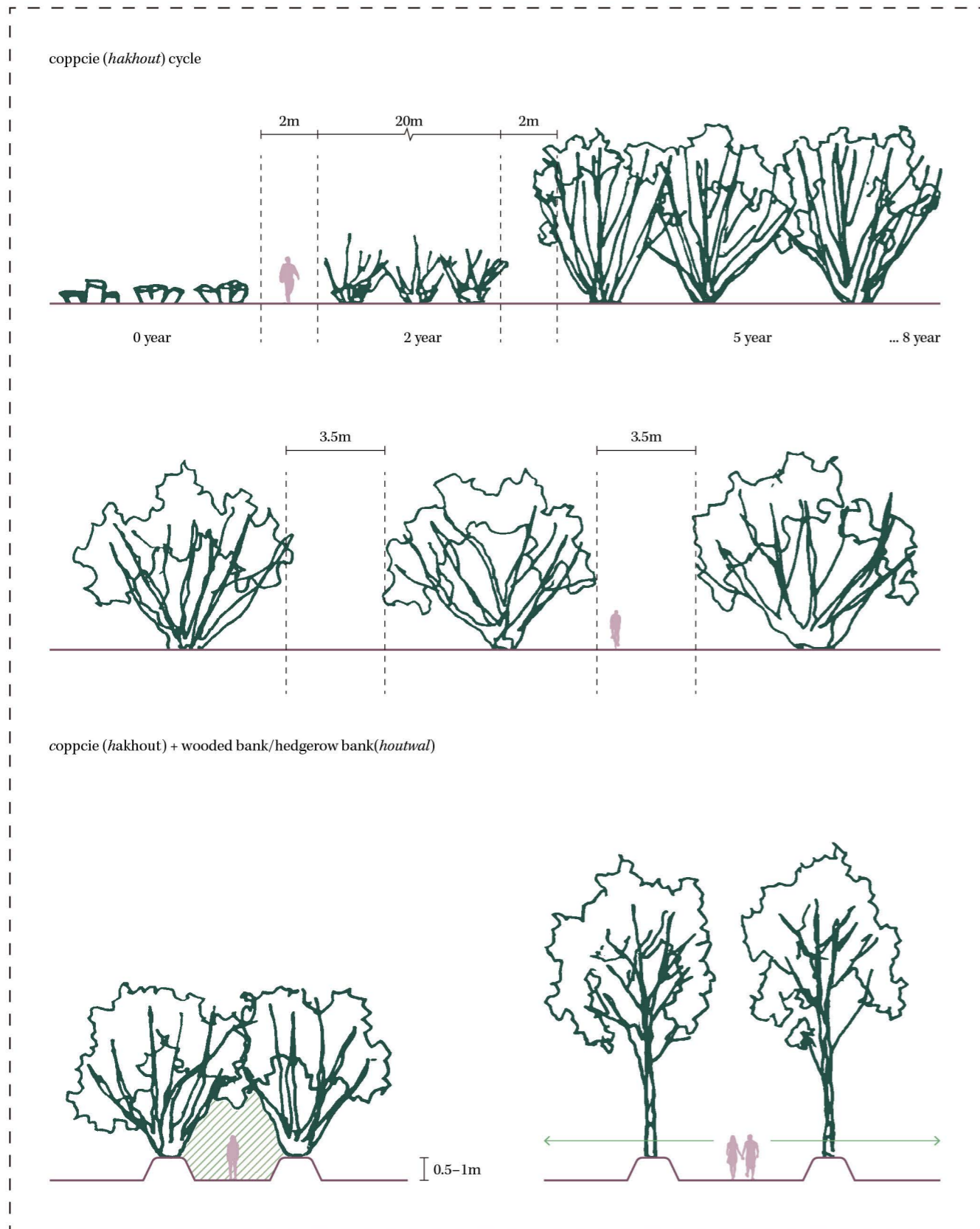


Forest neighborhood



Mini urban grove

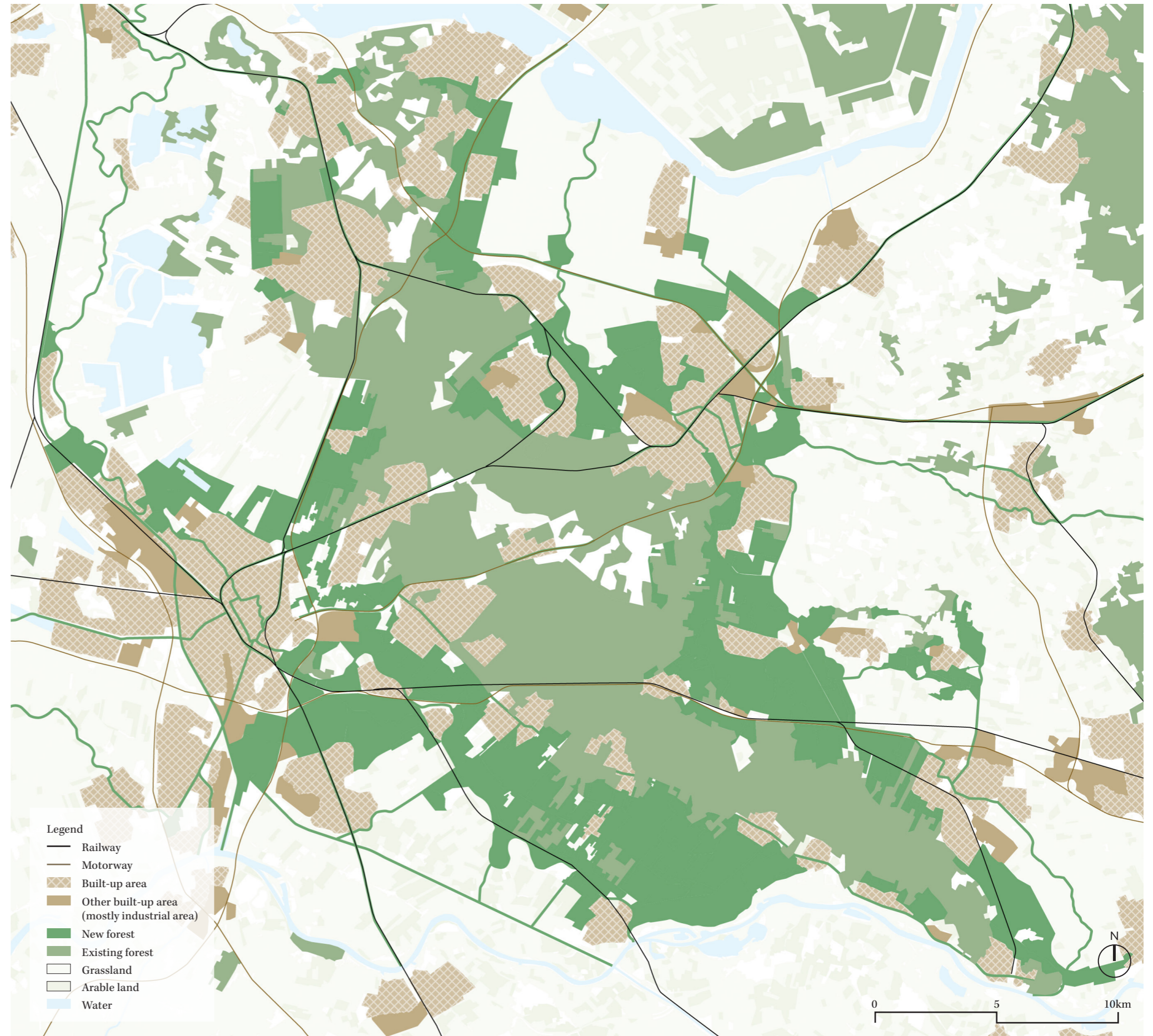




3.4 TERRITORIAL PLAN

Master plan

This master plan shows the final stage of the forest metropolis. It somehow resembles the “Surround” scenario from the design experiments, where the forest wraps around cities and towns like a blanket. The plan was developed based on the four spatial principles. It mainly illustrates the location of new forests, which are not in the traditional sense of purely tree-covered areas, but as multifunctional spaces with varied types, and how they act as transitional landscapes connecting urban areas with the existing forest.

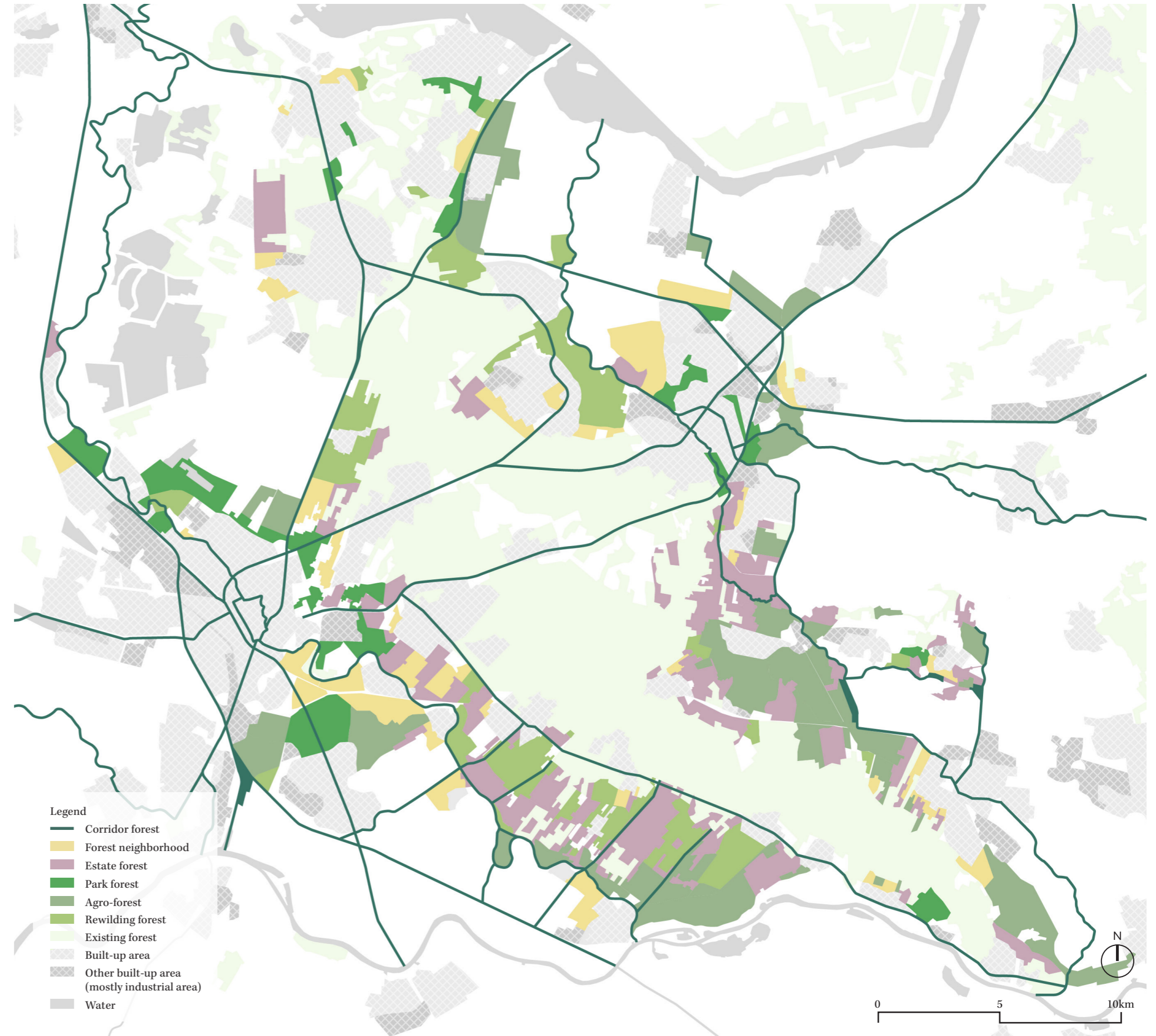


▷ Master plan of the city, existing forest, and new forest

Locating different forest types

This plan shows the location of new forest types from the "Strategies" section, except for the "mini urban grove", which involves small-scale interventions within existing urban areas and cannot be represented at this scale.

The location choices are based on the analyses presented in Chapter 2, taking into account factors such as environmental conditions, cultural heritage, and social needs. For example, "forest neighborhoods" are mainly placed around existing urban areas, in locations with good transportation access, or in relatively remote areas near forests that have high development potential.



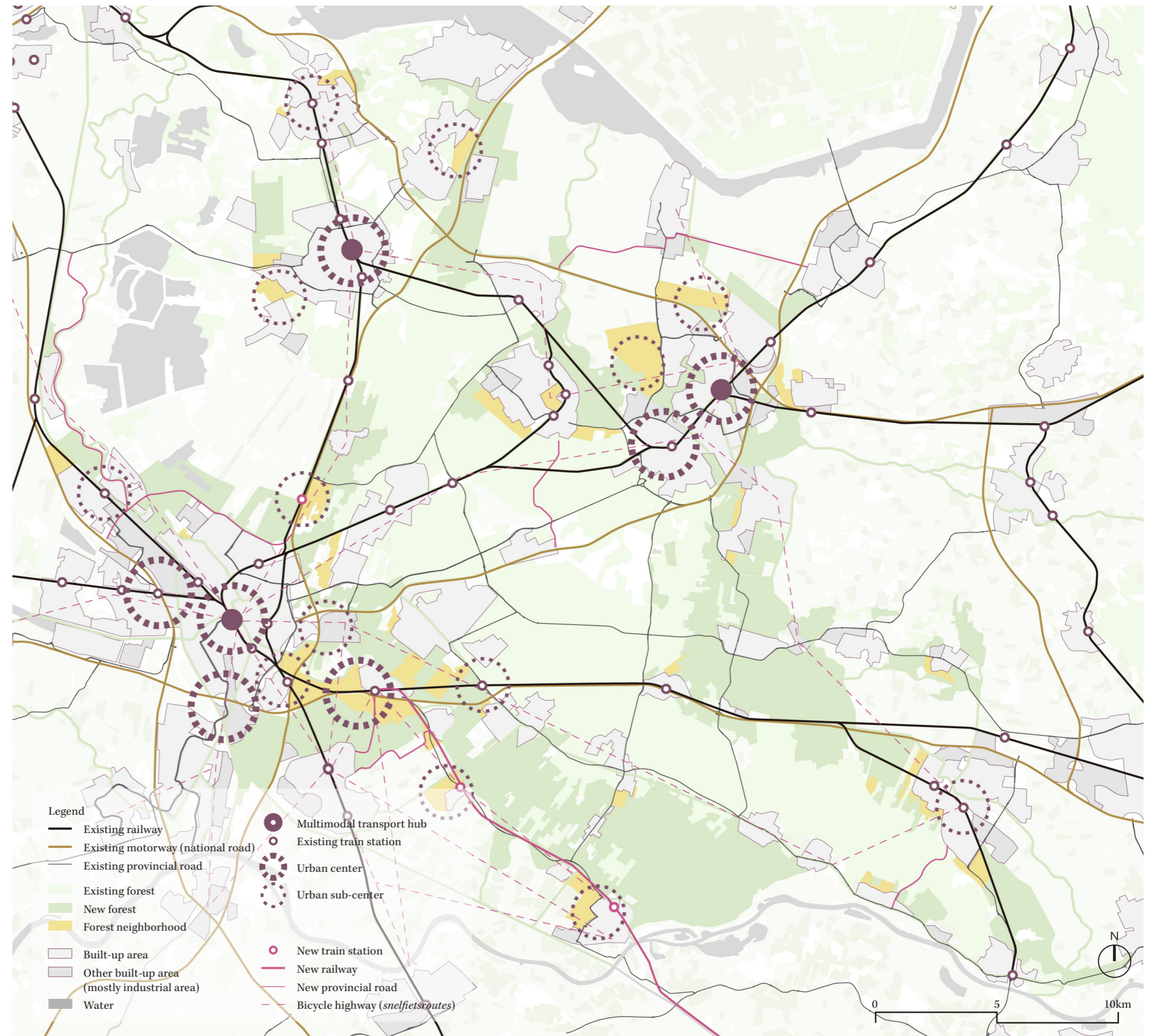
▷ Master plan of the distribution of new forest types

Mobility, infrastructure and urban centers

This project envisions a polycentric metropolitan region in which high-capacity, high-speed public-transport corridors knit together multiple urban centers, while each center is organized as a walkable neighborhood that minimizes daily travel distances for residents.

From the diagram, it can be seen that some “forest neighborhoods” have developed into new urban centers or sub-centers. These are located around the three main existing cities and along the edges of the new forests. Notably, a new railway and several train stations have been added along the western edge of the new forest. This new connection is expected to support the expansion of towns along the route and attract more people to settle in the area. The design also introduces several important provincial roads and a number of bicycle highways. Some of these new routes are based on the data from *Omgevingsvisie Provincie Utrecht* by Provincie Utrecht, 2021.

Overall, it is “a city of high mobility in regional connectivity, low mobility in everyday life”.



3.5 CO-AUTHORSHIP OF THE METROPOLIS

Phasing

Looking at the final master plan, this project may be seen as a radical proposal. It calls not only for large-scale afforestation and reforestation, but also for integrating urban development with forest systems to ultimately create a forest metropolis. This transformation is not just physical, but also cultural. To make such a long-term vision more achievable, phased design and collaborative management are essential.

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

Phase 1: Initiation and Connectivity (2025–2030)

Objective: Establish important green corridors connecting urban areas with forests, focusing on recreational forests and forests combining with housing (“forest neighborhood” as described in this thesis). This initial phase serves as an experimental step.

Actions:

- The top priority is to develop “mini urban groves”, “corridor forests”, and “forest neighborhoods”. Secondary priorities are “agro-forests” and “forest parks (at the urban edge)”. These areas can serve well as spaces for public engagement and demonstration.

- Establish primary green corridors linking the Utrechtse Heuvelrug and urban areas, with pedestrian and cycling paths. For example, corridors along the river Kromme Rijn, the Amsterdam-Rijnkanaal, and the Valleikanaal.

- Establish buffers around ecologically sensitive areas of forest zones along the ridge and adjacent lowland to protect wetlands and drinking water sources.

- Establish buffers around ancient woodlands.

- Pilot the agroforestry model and identify suitable local tree species, planting patterns, management approaches, etc.

- Develop collaboration models with local communities, public authorities, experts and businesses.

- Establish nature education centers and forest classrooms for public awareness.

Phase 2: Expansion (2030–2045)

Objective: Expand the scale of afforestation and reforestation, develop an extensive green network, and deepen forest integration with agriculture, water management, and urban development.

Actions:

- The top priority is to develop “agro-forests”, “estate forests”, and “rewilding forests”. Secondary priorities are “forest parks” and “forest neighborhoods”. The previous phase is like defining the shape and structure on a canvas, while this phase is about adding colors.

- Expand green corridor networks across the region, creating continuous ecological linkages.

- Restore large areas of mixed and native forests in the ridge, slopes and edges of the Utrechtse Heuvelrug, with a focus on repairing ecosystems, improving groundwater conditions, and enhancing biodiversity.

- Establish a large, multifunctional forest park system in the transitional areas to provide diverse recreational and cultural experience.

- Promote agroforestry and circular farming models to drive agricultural transformation through forest-based approaches.

- Introduce activities such as eco-tourism, forest therapy, and nature education to enhance socio-economic value.

Phase 3: Maturation and Long-term Management (2045-2050)

Objective: Finalize the integrated and stable forest network, achieving a long-term balance of ecological, economic, and social benefits. In this envisioned forest metropolis, urbanity and forest culture are deeply intertwined. Forests are not something to escape to, but something people grow with.

Actions:

- The top priority is to further develop the various types of forests established in the previous two phases and to explore potential connections with areas beyond the Utrechtse Heuvelrug. This phase is like refining details and adjusting the final effect in a painting.

- Strengthen the established green network, enhance

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)

natural regeneration and resilience of forest ecosystems to secure long-term ecological stability.

- Strengthen the integration of forests with agriculture and urban life, and expand their ecosystem services.

- Establish mature forest conservation and maintenance strategies, such as pest control and disaster responses.

- Establish a collaborative governance model which encourages participation from all kinds of stakeholders including local communities, public authorities, experts, and economic partners.



Collaborative governance model

This project groups the key stakeholders and their roles in this way:

1. Local community:

- Residents & Farmers: Share place-based knowledge, cultural memories, and everyday needs.

- Recreational visitors: Provide feedback on tour experience, transportation, services, pricing, etc.

2. Public authorities & agencies

- Municipalities & Provinces: Provide funding, set regulations, and coordinate cross-sector collaboration.

- Public landscape and heritage agencies: This could include water boards, Staatsbosbeheer (SBB; Dutch Forestry Service), Rijksdienst voor het Cultureel Erfgoed (RCE; The Cultural Heritage Agency), Utrechts Landschap (Utrecht Landscape Foundation), Vereniging Natuurmonumenten (Association of Natural Monuments), etc. They safeguard ecological health and historical sites, advise on conservation standards.

- Conservation NGOs: Advocate for biodiversity, mobilize volunteers, and monitor project impacts.

3. Experts & Creatives

- Landscape architects & ecologists: Design interventions that balance economy, ecology, and culture.

- Academic researchers: Document site history, evaluate outcomes, and refine methods.

- Artists: Translate ideas into legible installations and public art

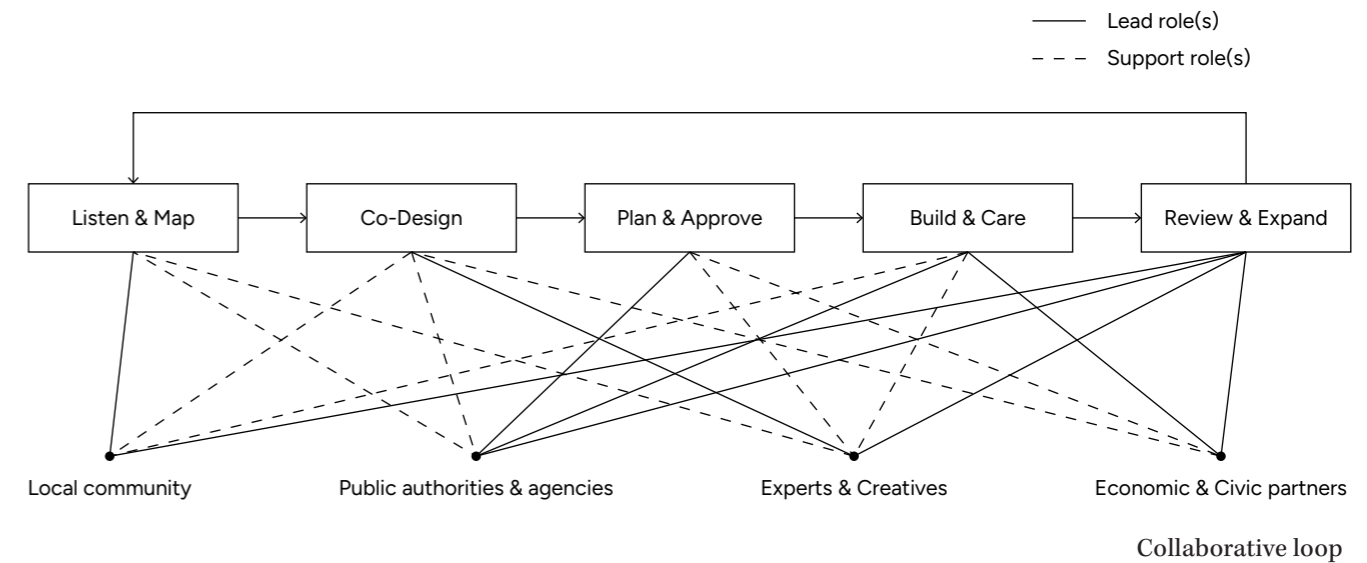
4. Economic & Civic partners

- Local businesses: Align economic development with heritage values and visitor experience.

- Estate owners / other landowners & developers: Manage historic houses and woodlands and enable possible land swaps.

- Community associations: Facilitate outreach, host workshops, and ensure ongoing local involvement.

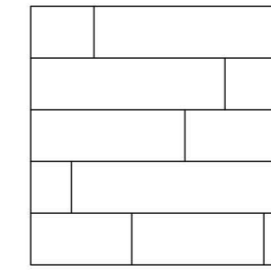
Together, these groups share authorship of the Utrechtse Heuvelrug, each bringing distinct knowledge, resources, and responsibilities.



3.6 ZOOM-INS: DESIGNING URBAN-FOREST INTERFACES

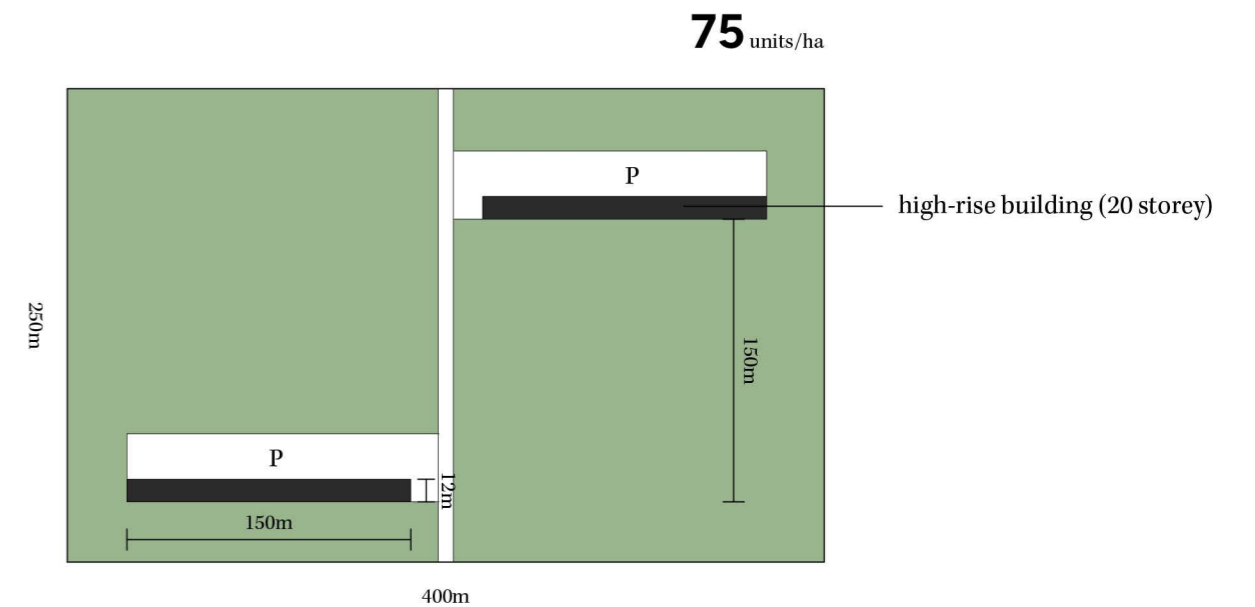
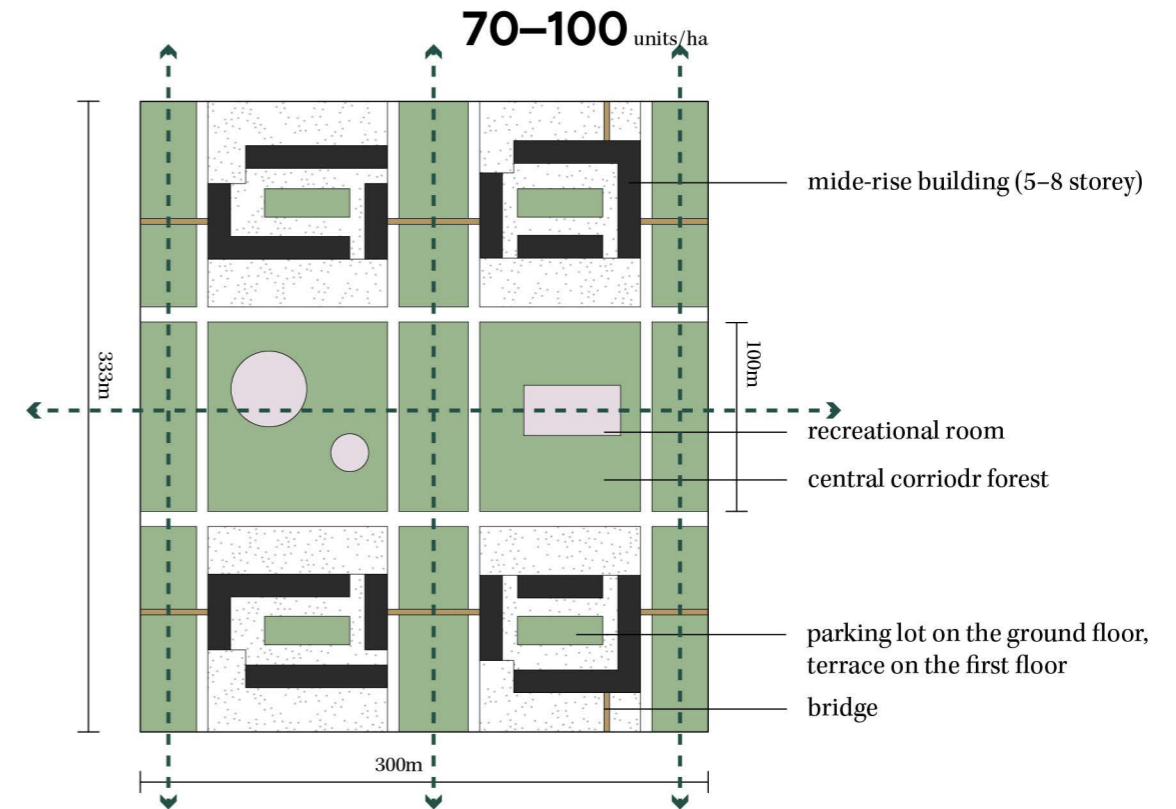
Forest neighborhood

Interpreted from the morphological essentials of the ancient woodlands, there are three types of spatial organization of forest neighborhoods: linear organization, centralized/radial organization, and hybrid organization. The design uses a modular approach based on 10-hectare units to explore how communities can better integrate with the forest. Each modular design specifies the building type, size, and the estimated number of home units (*woningen*) per hectare. As shown, the designs cover a wide range of residential densities, from 15 to 100 home units per hectare, supporting diversity and equity within the forest neighborhoods.

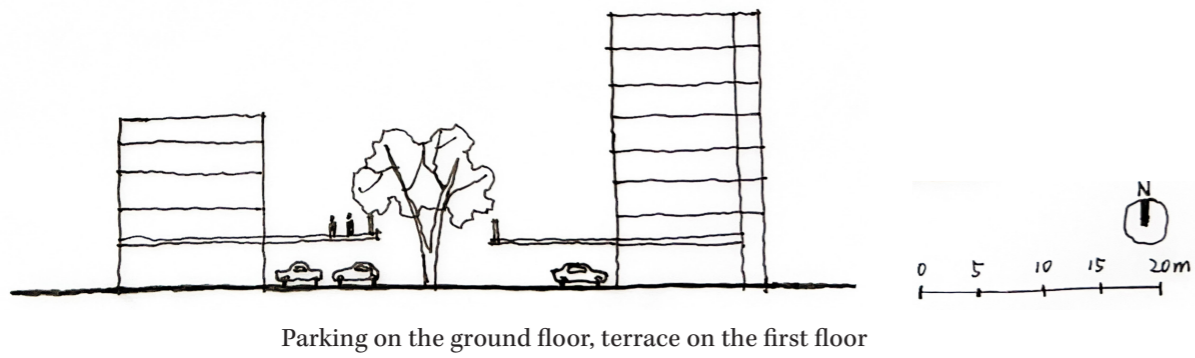


Linear organization

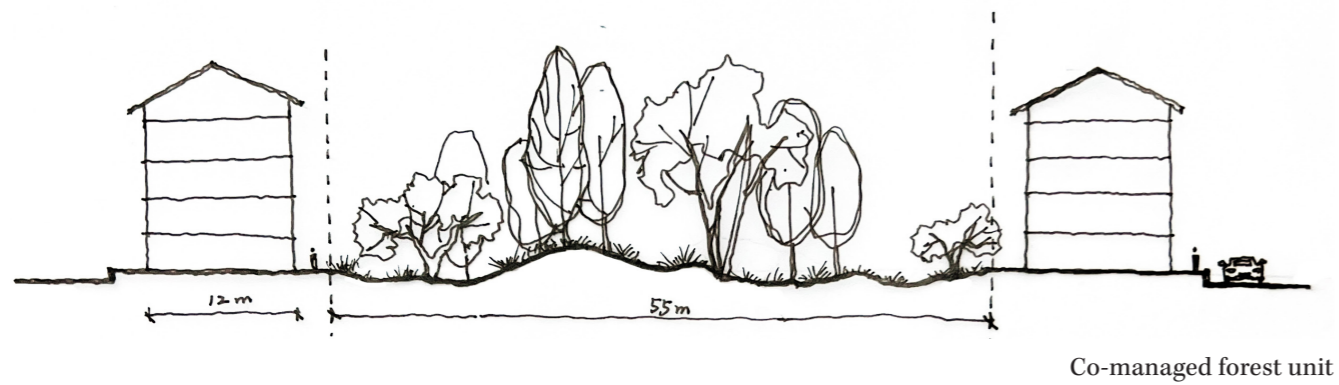
*1 home unit = 1 dwelling = 1 *woning*
 *Every modular design = 10 ha



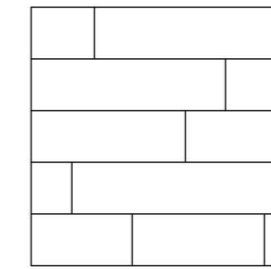
10 hectare modular design of forest neighborhood



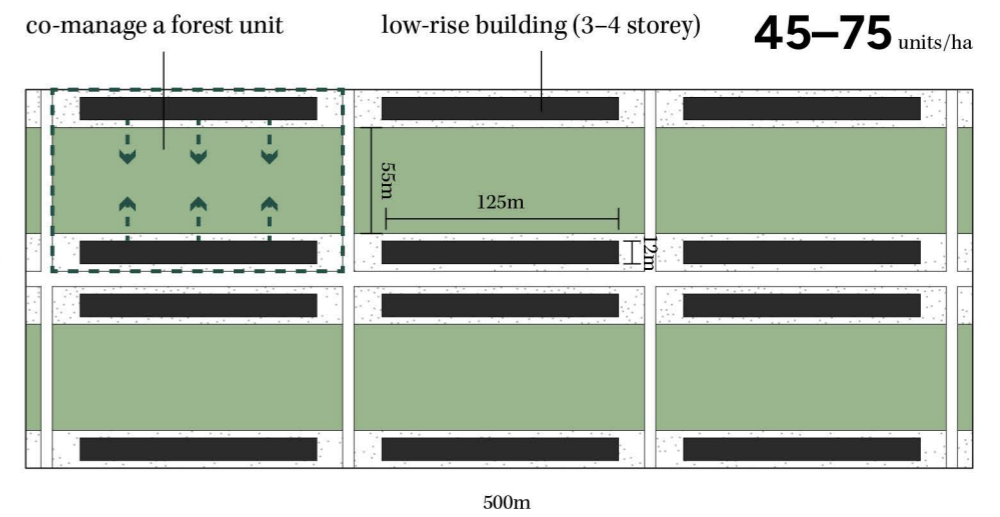
Parking on the ground floor, terrace on the first floor



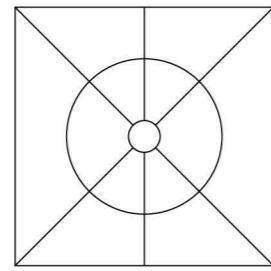
Co-managed forest unit



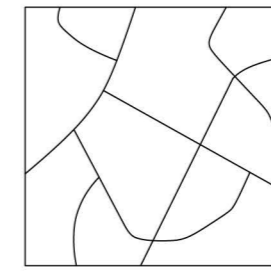
Linear organization



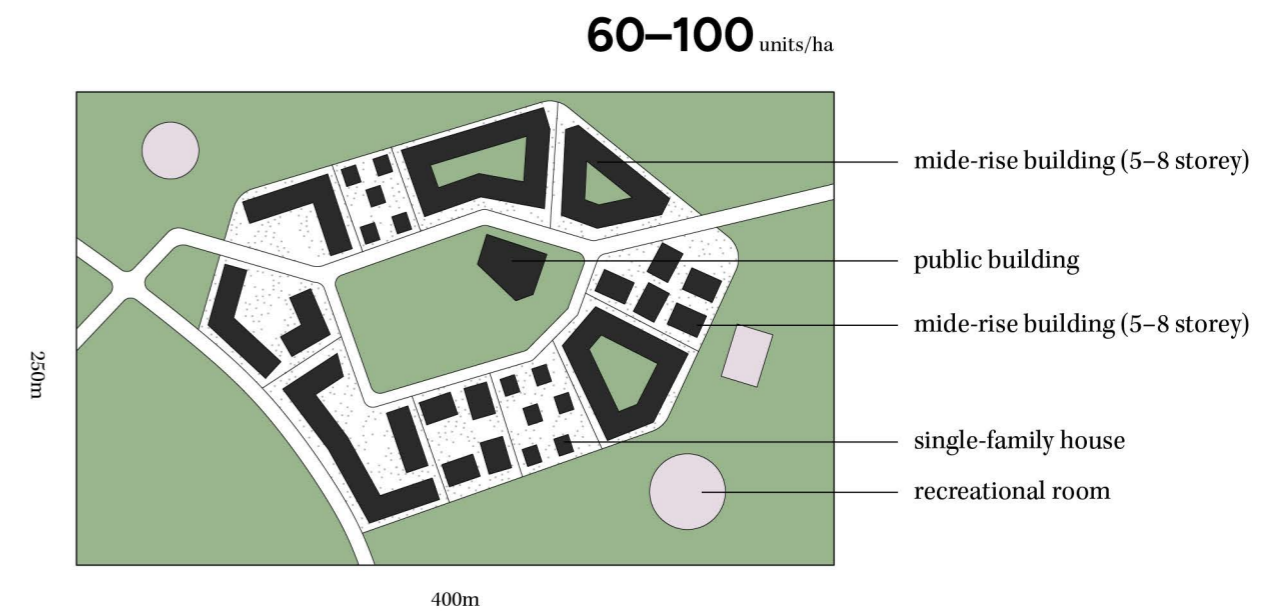
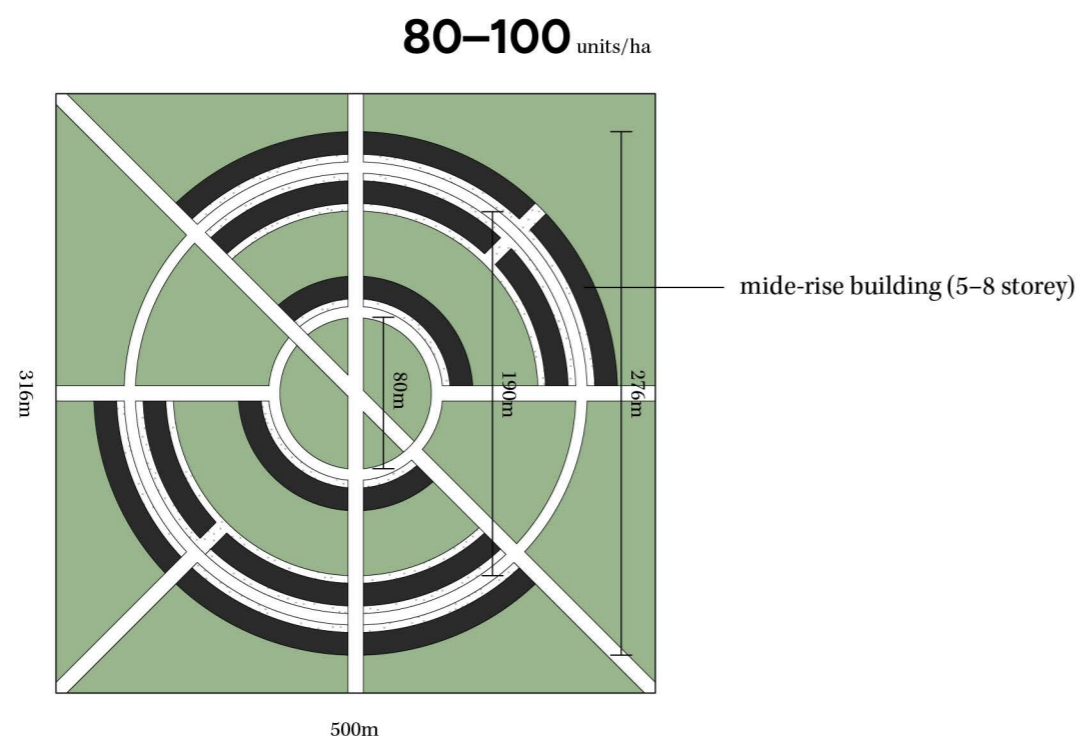
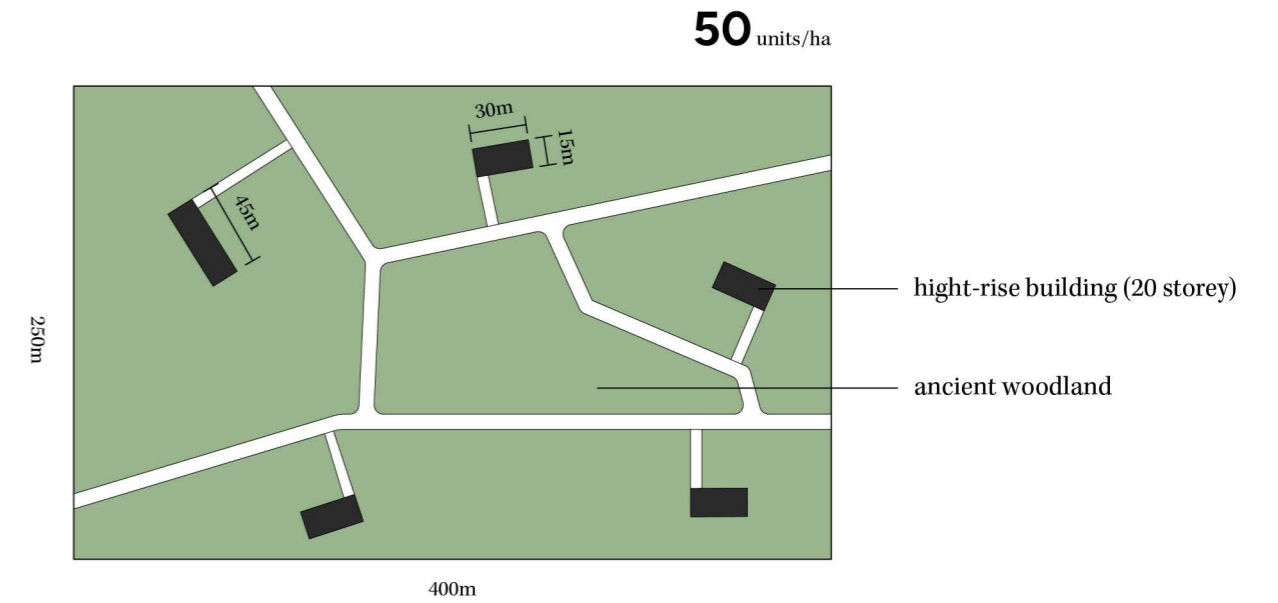
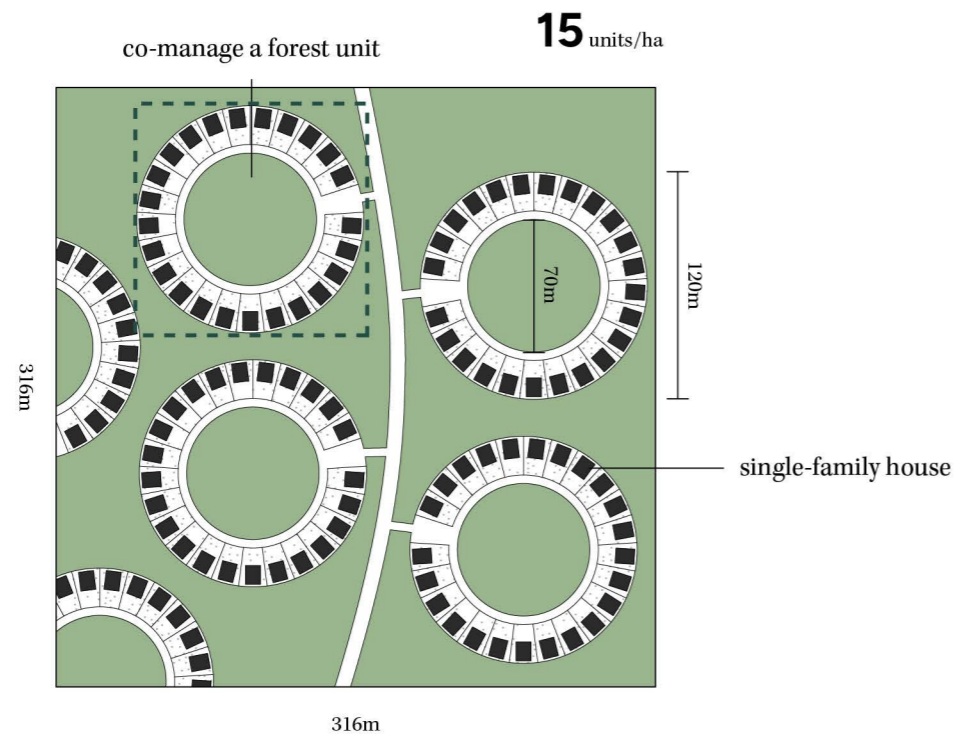
10 hectare modular design of forest neighborhood



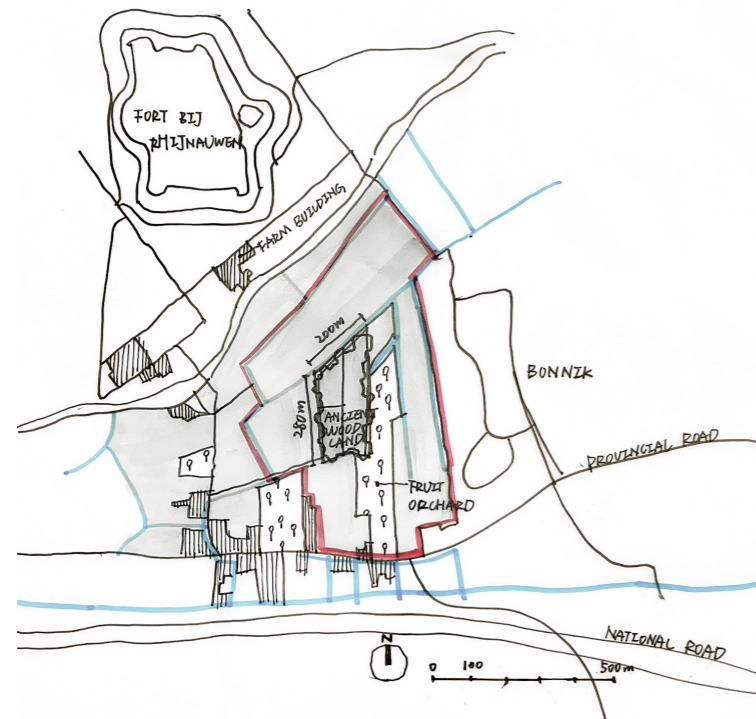
Centralized organization



Hybrid organization



10 hectare modular design of forest neighborhood



This design shows the application of a forest neighborhood in a real location. Bunnik is a small town near the city of Utrecht, well-connected by railway and highway. The Kromme Rijn river flows along the northern edge of the town. In this graduation project, this area has been designated as a forest neighborhood and a new urban center.



△ Master plan of forest neighborhoods in Bunnik
 ◁ Current land use analysis of the site in Bunnik

Decaying tree plaza

Deadwood, the standing snags and fallen logs left behind when trees die, is increasingly recognized as a vital component of forest ecosystems. In the Utrechtse Heuvelrug region, nature managers are working to boost deadwood levels as part of forest restoration. Forest managers are encouraged to maintain about 4% of the total forest volume as dead wood (Dieryck & Vanlerberghe, 2007). They stated “dood hout is namelijk waardevol voor het bos” (“dead wood is valuable for the forest”) because it provides habitat for many insects and other organisms, which in turn support overall biodiversity (Provincie Utrecht, 2025c). However, incorporating dead trees into managed landscapes requires balancing ecological benefits with aesthetics and public perception. This toolkit offers practical strategies to manage deadwood in the Utrechtse Heuvelrug in ways that enhance ecological value and landscape character.

1. Leave fallen logs and branches in place

After a tree falls or is cut, leave the logs and major woody debris in place as much as possible, arranging them strategically if needed rather than removing them. Create clusters of logs and branches in selected areas, and ensure a mix of sunny and shaded placements to maximize ecological value. Only relocate fallen wood if necessary for trail clearance or design purpose, and even then, keep it within the forest (for example, moving it a few meters off a path rather than hauling it away).

Fallen deadwood is not waste – it is habitat. Logs in various stages of decay nurture fungi, mosses, and invertebrates. They gradually release nutrients into the soil, improving forest health (Woodland Wildlife Toolkit, n.d.).

2. Retain and create standing dead trees (snags)

Identify and preserve a number of standing dead trees (snags) per hectare in the forest, especially large-diameter native trees. In areas lacking natural snags, consider creating them by girdling (ring-barking) a few less valuable or non-native trees to allow them to slowly die standing (Kapteijns & Kamp, 2024). This practice ensures a continuous presence of deadwood habitat. Standing dead trees provide critical nesting cavities, food, and shelter for birds, bats, insects, and fungi (Woodland Wildlife Toolkit, n.d.).

3. Create deadwood micro-habitats and structural diversity

This includes measures like building log piles or “wood hedges” (*takkenrillen*) at forest edges, partially burying sections of trunk to create breeding mounds for stag beetles, and leaving cut stumps of various heights as micro-habitats (Brown, 2022).

Such interventions should be done in a design-conscious way. For example, placing a log pile where it also functions as a natural buffer or arranging it in an artistic way.

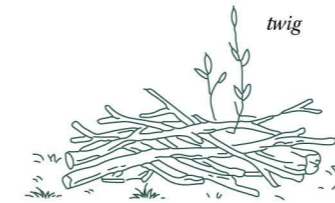
4. Redesign dead trees in urban settings

Some dead trees can be selected, transported from the forest, and reused as part of the landscape in urban environments. This both extends the tree’s life in symbolic form and brings a bit of the forest’s story into the public life. In this project, the zoom-in design of the decayed wood plaza is a testament of this strategy.

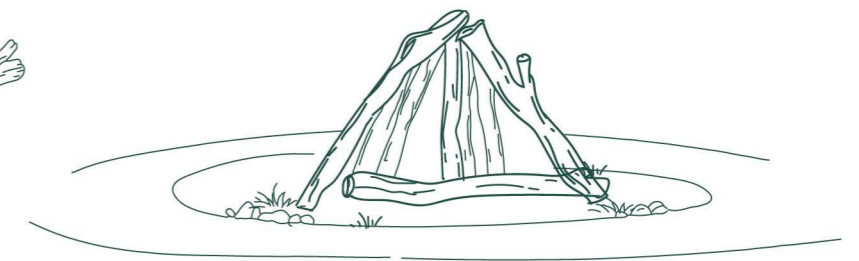
Tree Toolkit – Deadwood management and design

Leave fallen logs and branches in place

leave the logs and major woody debris in place

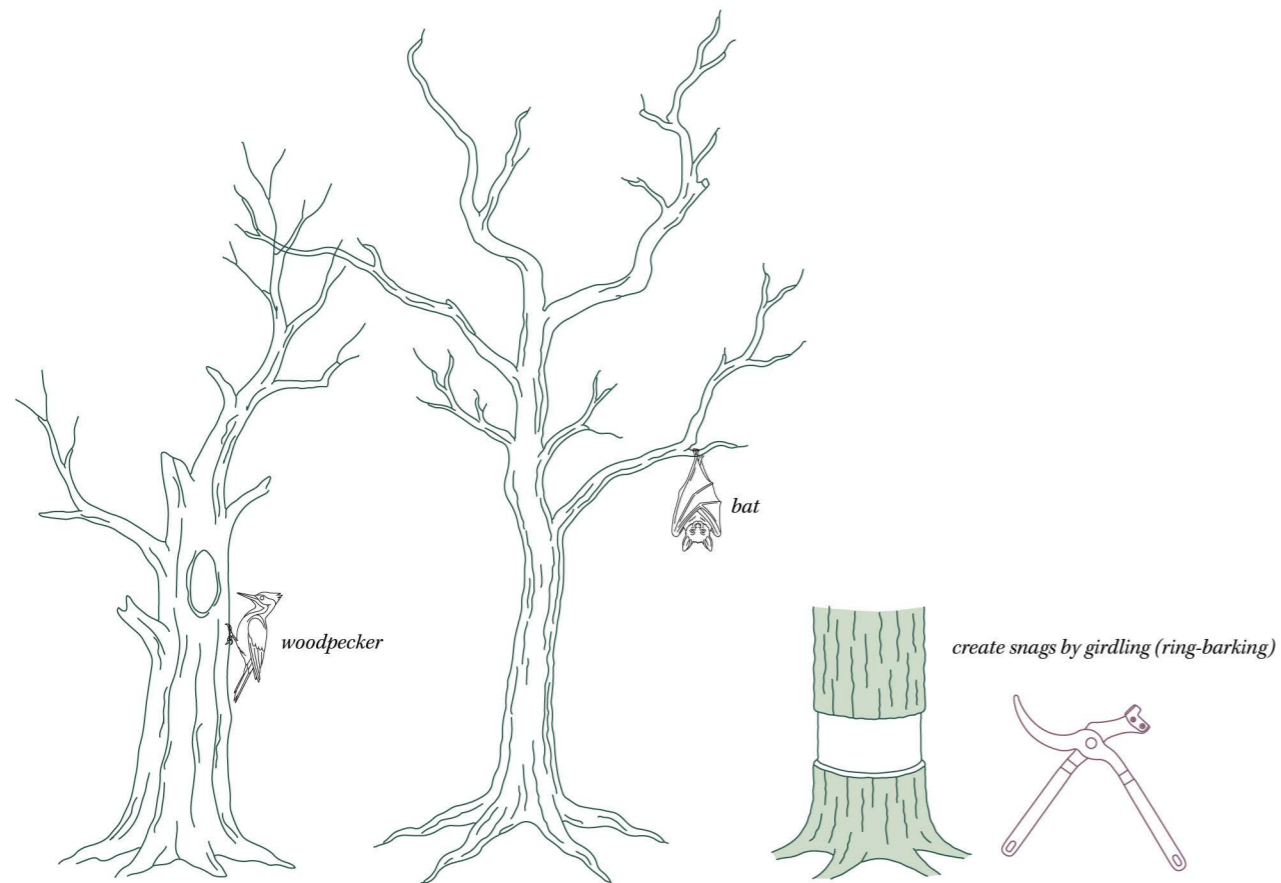


ensure a mix of sunny and shaded placements

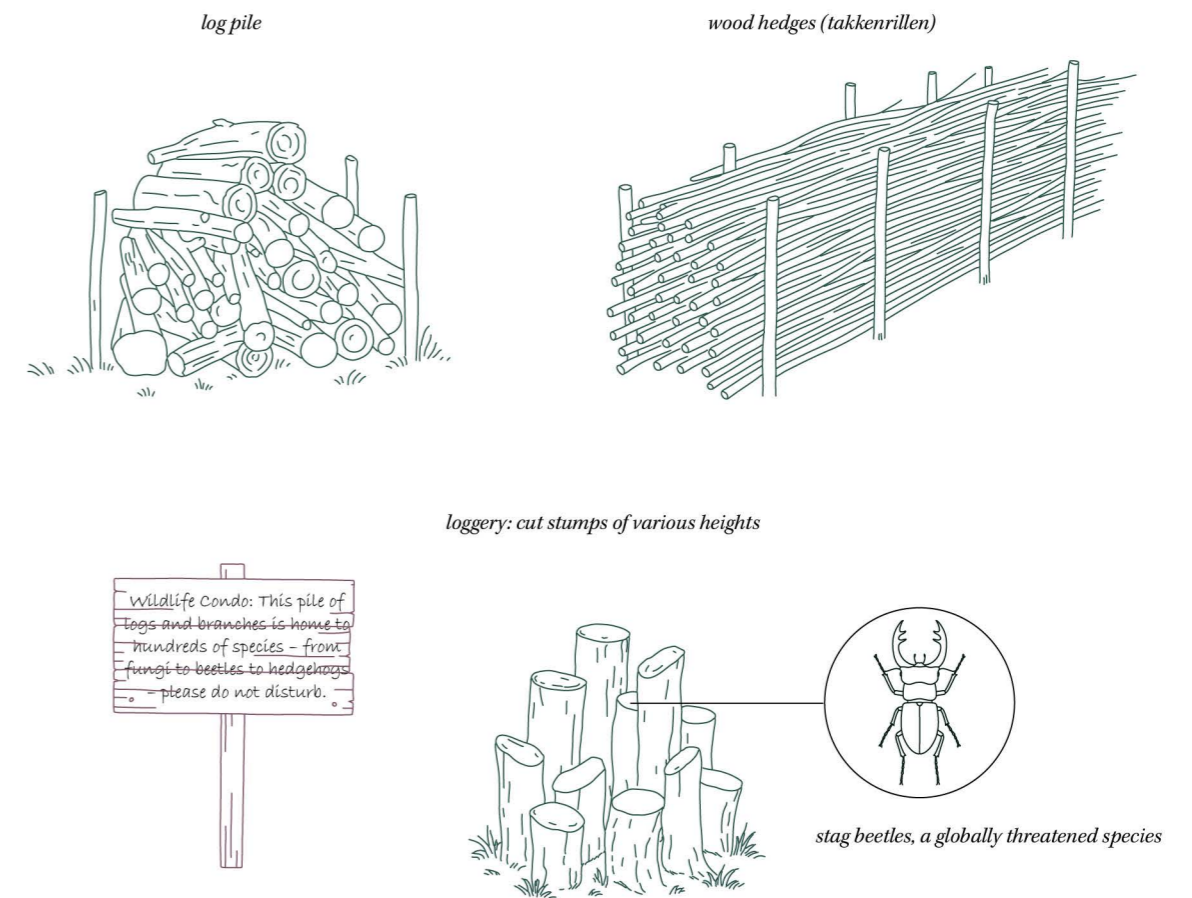


relocate some fallen wood for design purpose

Retain and create standing dead trees (snags)



Create deadwood micro-habitats and structural diversity



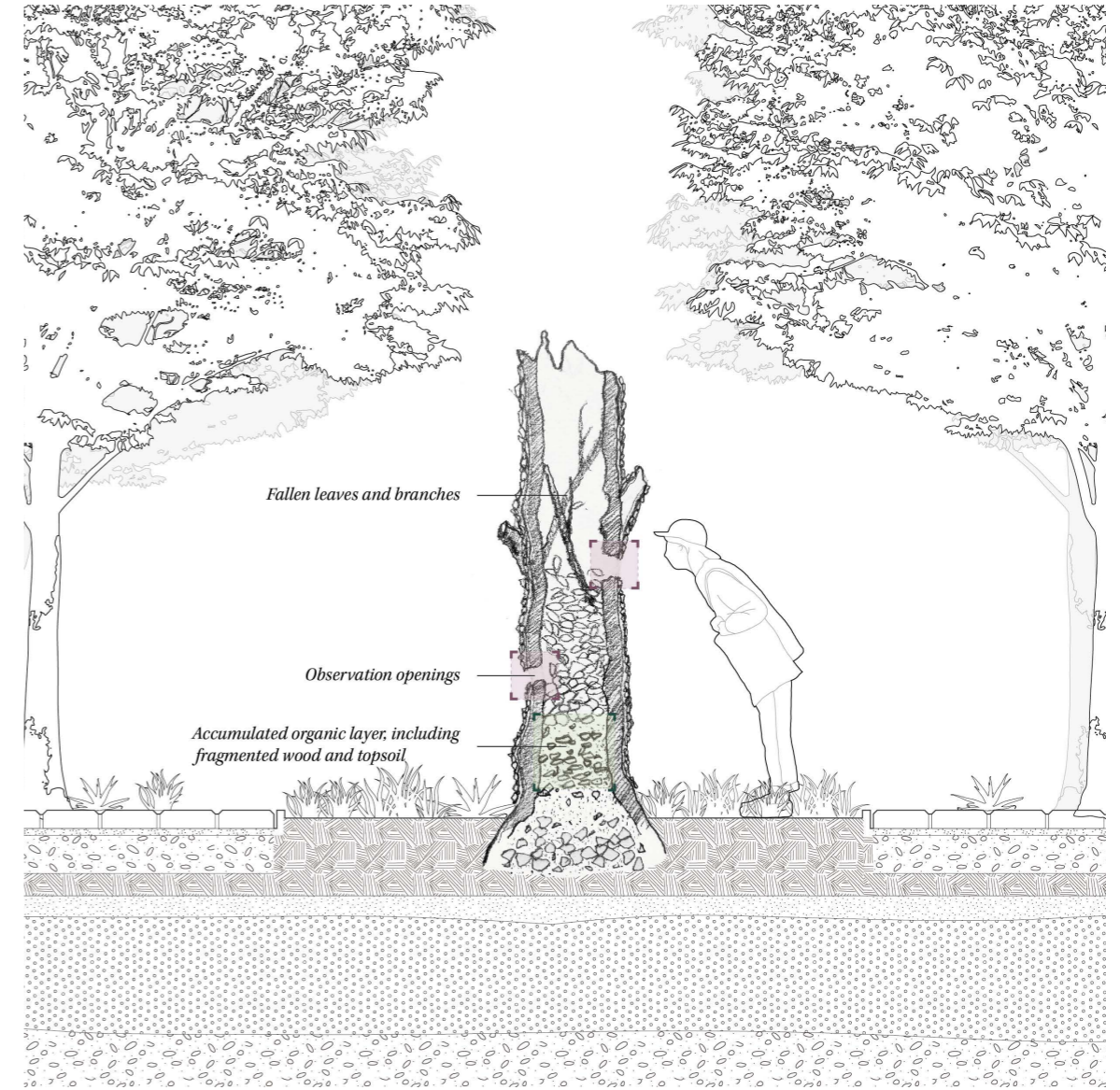
Stage 1 Decayed Tree in the Forest



0 - 1 year

Standing tall even after death, the tree retains its form and presence. Its upright posture speaks of a recent transition from life to decay.

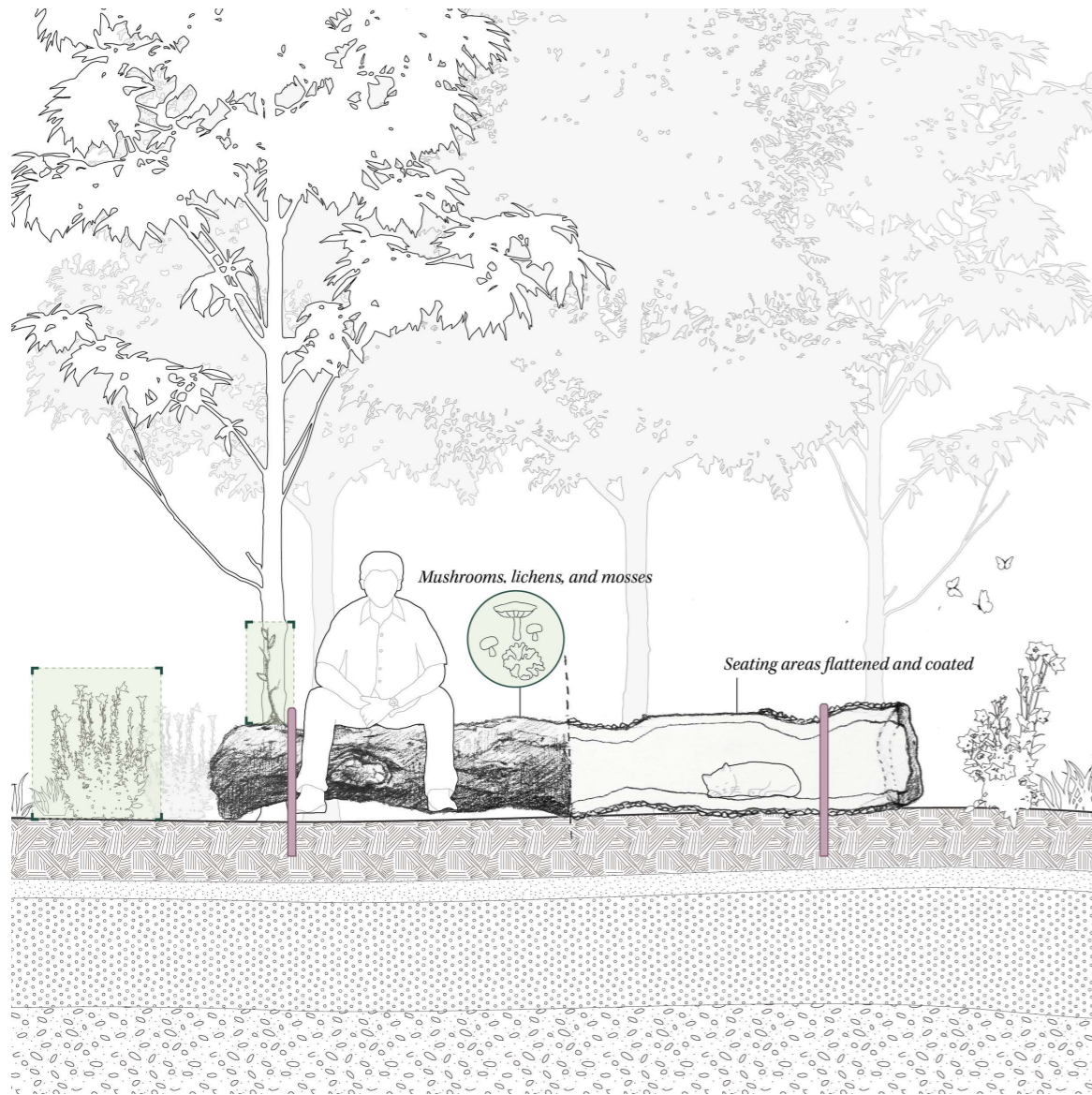
Stage 2 Standing Tree on the Plaza



4 year

Relocated to an urban setting, the upright trunk stands as a silent observer, bearing witness to time's passing. Despite its death, the tree stands as a cultural landmark bridging city life and forest memory.

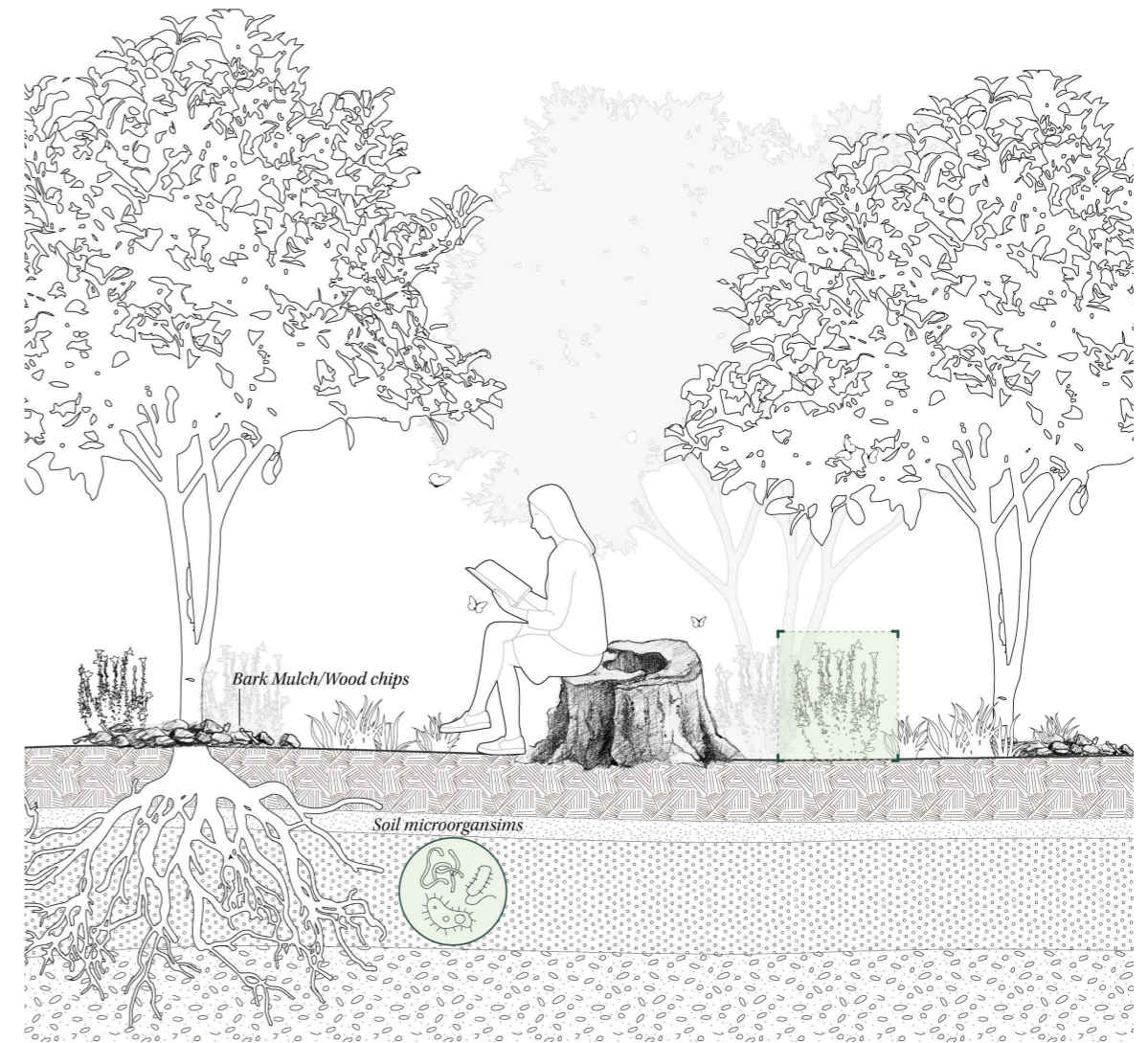
Stage 3 Fallen Transformation



7 year

Now collapsed, the trunk surrenders to the inevitability of time and weather. This fallen form begins to reveal the processes of breakdown and change.

Stage 4 Decomposition and Rebirth



10 year

Gradually decomposing, the wood merges with the soil and nourishes new growth. Life emerges anew from what was once standing timber.

IV Conclusion and Reflection

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4.1 CONCLUSION

In conclusion, this project reimagines the Utrechtse Heuvelrug as a forest metropolis, where forest expansion and urban growth evolve together. Responding to ecological, social, and cultural pressures, it uses forest urbanism as an approach to redesign transitional landscapes, integrating diverse forest types, spatial experiences, and functions. From regional planning to local interfaces, the design explores how forests can shape urbanity, and vice versa. It challenges traditional divisions between city and forest. It proposes a culturally rooted, spatially integrated future for the Utrechtse Heuvelrug.

Six statements can be drawn from this project:

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 and keep design coherent.

4.2 REFLECTION

Reflection on the design process and result

Approach and methods

“Forest urbanism” is the fundamental approach of this project. Although the lab is named *Urban Forestry*, as De Meulder & Shannon (2024) point out, “Forest Urbanism aims to elevate the role of forests to that of the structure of the city (rather than a mere element within the city). Once realized, urban forestry becomes Forest Urbanism”. This graduation project adopts forest urbanism because of the specific conditions of the Utrechtse Heuvelrug. The region's pressing needs for both reforestation and urban expansion call for forest urbanism as an integrated approach. The design outcomes also demonstrate its effectiveness in combining spatial experience, functionality, and cultural identity.

A variety of methods were used in the project. To analyze the site, I applied literature review, mapping, field work, classification, and drawing, often in combination. *Mapping* revealed the layered structure of the site and the relationships between different elements. *Classification* was essential for studying the types of ancient woodlands and transitional landscapes. *Field work* helped me grasp subtle qualities that literature and maps couldn't capture, such as terrain changes and tree conditions.

To advance the design, I used precedent studies, design experiments, and drawing. *Drawing* was the most powerful method. Various types of drawings helped communicate the design in both spatial and temporal terms, making the process and results more tangible.

Research and design

In this project, research and design were closely intertwined throughout. In the early stages, up until around P2, research played a larger role than design. It helped clarify the research questions and shape the overall direction of the project. During the research process, small design strategies began to emerge. For example, in the theoretical study, the buffer zones proposed by Natural England and the Forestry Commission (2022) provided valuable reference for later spatial principles. Another example is the typology analysis of transitional areas. Once mapped, their spatial characteristics naturally laid the groundwork for design development.

The design experiments were a key part of the project, reflecting a repeated process of research and design: Initial scenarios were explored through sketches on tracing paper. When it came to turning them into actual spatial plans, it often required going back to find supporting research or references. As the analysis became more detailed, it fed back into the design, allowing further testing and development. This back-and-forth cycle of research and design kept the project flexible and responsive.

Beyond Utrechtse Heuvelrug: Transferability of project results

This project can offer insights for regional development in at least the following situations:

- Areas facing fragmentation of forests, especially ancient woodlands.
- Areas rich in (green) cultural heritage.
- Regions with conflicts between nature (forests), agriculture, and urban growth.
- Regions with serious environmental or ecological issues that require reforestation.

In the analysis part, this project views the site through three layers: urban, forest, and transitional landscape. This method can be applied to the contexts above, as it helps reveal the dynamic relationship between urban and natural environments, rather than framing them as opposites or treating nature merely as isolated reserves.

Some design outcomes are also transferable. For instance, the eight new forest typologies could likely be adapted to other regions in the Netherlands or Europe with similar conditions. The 10-hectare modular design of the forest neighborhood is another example. It offers flexible solutions for different forest environments and varying residential densities. Lastly, the design and management approach for decayed or dead trees is not site-specific. It could be widely applied in semi-natural woodlands elsewhere.

Areas for future design refinement

First, the project proposes eight new forest typologies and provides detailed zoom-in designs for two of them:

the forest neighborhood and the mini urban grove. I believe the estate forest is also a particularly unique type that deserves further design development. The estate itself is a form of heritage, and the coppice woodlands that once surrounded it form a distinctive cultural landscape. Landscape architects could explore creative spatial arrangements within estate forests.

Second, the relationship between the Utrechtse Heuvelrug and the Veluwe is another important topic to consider. How can the Utrechtse Heuvelrug contribute to the central Dutch forest system? How should it position itself within the broader national forestry network? These questions invite reflection on a larger territorial scale.

Reflection on the academic and societal value

Relation between this graduation project, the Urban Forestry lab, the Landscape Architecture master track, and the master programme (MSc AUBS)

My graduation project grows directly out of the Urban Forestry Lab. This lab first taught me to “view the forest as a living system”, which benefits society in five dimensions: spatial, social, environmental, ecological, and economic (René van der Velde, in-lab lecture, 2024). Guided by my personal interests and the specific characteristics of the Utrechtse Heuvelrug, I chose to approach the project from spatial and socio-cultural perspectives.

As the project progressed, the lab taught me a second key idea: to view the built environment, and even the entire territory, as a forest. I see my project as a deep dive into the cultural theme of urban forestry, and as an exploration of how a culture-first approach can be applied to large-scale planning. Urban forestry projects at this scale often focus primarily on socio-ecological concerns. However, the layered historical and cultural traces of the Utrechtse Heuvelrug make it unique. Looking at the site through a cultural lens helps to continue its narrative and strengthens the cultural relationship between people and forest. I believe my project contributes a perspective to forest urbanism: by focusing on the culture of forests and cities, and rethinking their connection, we can develop site-specific forest urbanism strategies.

As for my master track, I see this graduation project as a deep exploration of the role of the “tree” in landscape architecture—its function, form, and meaning. Just as flour is essential to a baker, the tree is my most important tool in this project. From individual trees to entire forests, it serves people at every scale and plays a central role in the design. Another reflection on the discipline of Landscape Architecture relates to the “four principles” often emphasized during my time at TU Delft. This project focused especially on the principle of historical palimpsest, which clearly relates to the site’s deep historical context. Scale continuum is another key principle in this project. It’s my first time planning at such a large, metropolitan scale. In the final design, I developed many top-down spatial strategies and proposed a collaborative governance model. However, one part I think could be improved is the inclusion of more bottom-up strategies, such as

some concrete actions that communities or individuals could take to contribute to the future of the Utrechtse Heuvelrug.

In relation to the master programme (MSc AUBS), this regional project clearly involves the integration of architecture, urban planning, and landscape. Urban development demands are high, reforestation is urgently needed, and space in the Netherlands is limited—all this calls for a balanced solution. In response, I studied urban planning theories and referenced a range of urban design precedents. My design illustrates many modular “forest neighborhoods”, which I believe offer a strong answer to the challenge of combining forest expansion with housing needs.

Societal value and ethics

This project demonstrates how forest growth and urban development can go hand in hand. More forests help cool streets, purify the air, and provide accessible green space for all residents, while urban density supports public transport and helps limit urban sprawl. However, the project should be mindful of certain risks: villa-style housing in forests may drive up land prices, and increased visitor numbers could put pressure on the peaceful rural lifestyle. This calls for diverse housing types and the distribution of recreational spaces and routes to manage impacts.

From an ethical perspective, the project takes several important steps. First, it protects biodiversity by guiding reforestation away from rare heathlands and core forest areas. Second, it respects cultural heritage. New designs are built upon historical patterns rather than erasing them. Third, it promotes shared governance to prevent decision-making from being dominated by a single group. Continuous monitoring and adaptation are needed to ensure long-term fairness and inclusivity.

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