

MA Thesis
2020 Summer

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BETWEENNESS

TANGIBLE & INTANGIBLE
BOUNDARIES FOR
FORMULATING A COMPLEX
SYMBIOSIS LANDSCAPE IN
GELDERS ARCADIE

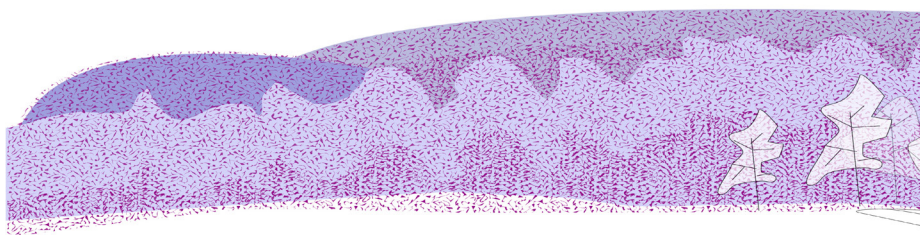


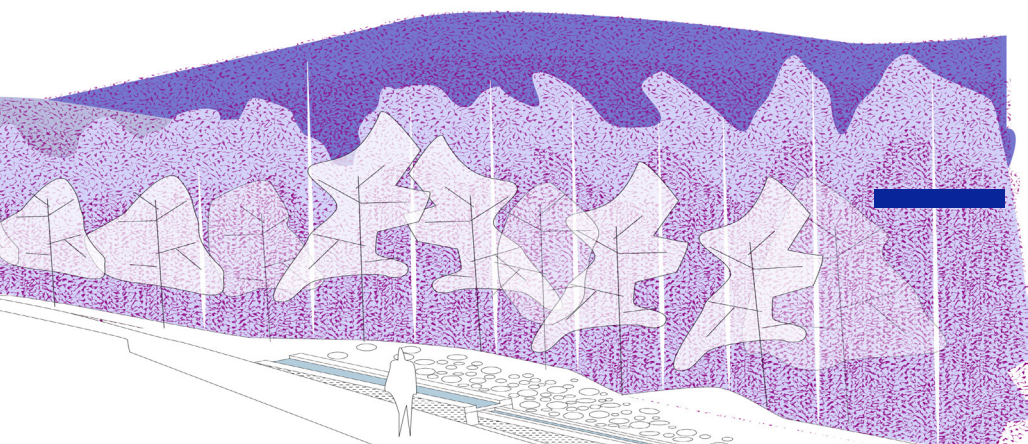
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/ INTRODUCTION

" Things must first be separated in order to be together."

Georg Simmel, 1909

The understanding towards the spatial environment lies in the understanding towards relation. The sociologist Georg Simmel pointed out this paradoxical relation in his 1909 essay 'The Bridge and the Door'. Indeed, we can only connect things that we perceive as separate, which is my understanding about boundary in spatial environment. The paradoxes and conflict of boundaries rooted in the research of thesis. The target context – the estate landscape will reflect the paradoxical relation.

The estates ensembles which were owned by privileged class, belong to the 'power landscape', mysterious and inaccessible for ordinary people. And they usually have strong defensive features and boundaries system to declare their private territory.

The Gerlders Acadie (Veluwezoom, Netherlands), characterized by the relief of ice-pushed ridges, was popular among the Dutch elite from the Middle Ages onwards. Therefore, this area left huge amounts of estates territory with heritage transformation issue.

This area is facing land fragmentation and disconnected ecology corridor by hard boundaries composed of grey

infrastructure. And the urban sprawl has caused the vanishing of estate landscape, of which has formed the urban-rural fringe. Moreover, the estates territory is like one isolated island fenced by boundary. The design site is one ensemble of two estates (Mariendaal-Rosande) and their separation and connection will work on the urban and regional scale.

The revitalization of estates landscape relies on the redefining of these boundaries. The transition and separation are understood as the inner concept of boundary. The function of separation will ensure the uniqueness of estate landscape and the transition will mediate the tension of land fragmentation which is also one common issue of Europe urbanization process.

This thesis research the role of boundary, embodying physical tangible form and social and mental intangible meaning, by exploring the site through layers and scales, in the context of revitalizing the heritage landscape.

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social dimension/
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04

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Mysterious boundary
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Shifting boundary

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HOW TO READ ?

The first chapter– DEFINING will introduce the background of research and proposed the research objectives and methodology.

In the SPATIALIZING chapter, it will be the analysis of the site from regional scale, urban to estates scale with the medium of boundaries. The boundaries lens is understood as significant representation intermedium to translate the spatial relation (inside & outside) across multi-scales. there concluded topography boundary, relational boundary, outer and inner boundary, across multi-scale and context.

In the FRAMING chapter, the literature review will offer a theoretical framework for the thesis. The understanding towards boundary will discussed from the perspective of the built environment, ecology, social dimension and estate landscape.

The APPAOCHING chapter will study the precedent cases and combine the site analysis and boundary manual, forming main boundary design strategies. It will mainly present how to utilize boundary theory on the spatial research and then form boundary approach.

The DESIGNING chapter will illustrate three design themes of Mariendaal– Rosande and their spatial structure and experience.

The Reflection chapter will discuss the adaptability and uniqueness of the research.

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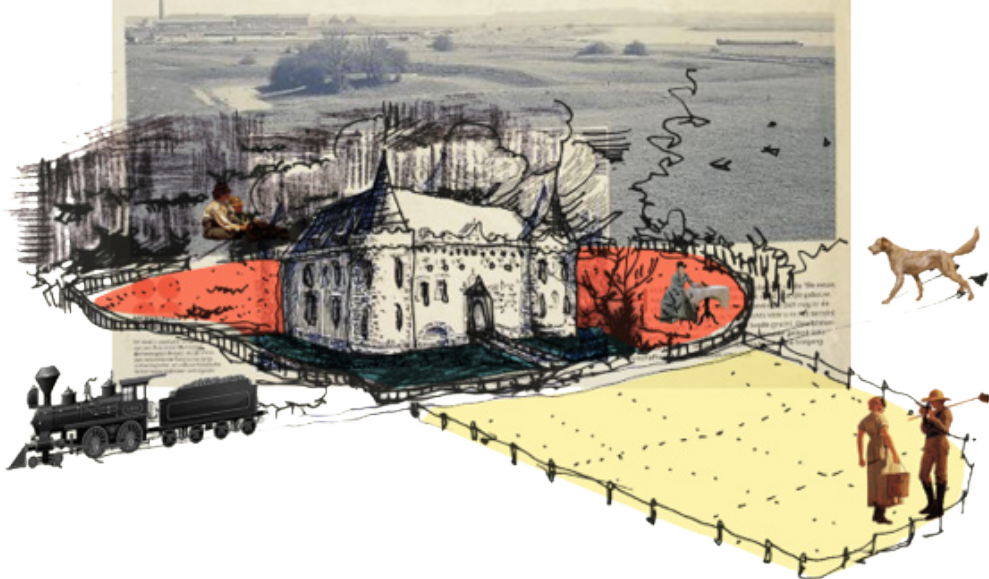
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FACINATION
BACKGROUND
PROBLEM STATEMENT
RESEARCH OBJECTIVES
METHODOLOGY

01

Kasteel Rosande

De hoogfeestvrienden in dit verhaal vormen de stille getuigen van het imposante kasteel Rosande, dat hier te zien is op het landschapsschilderij. Geschiedkundige toeristen is bekend dat het er is in de 18de eeuw al eerder. Het kasteel heeft een unieke geschiedenis gekend. Bij een brand in 1875 kon het kasteel tot de grond toe afgebrand worden, maar in 1928 werd het kasteel opnieuw met de grond gelijk gemaakt.





We understand landscape by observing and perceiving. It seems that human has an instinct preference on nature and landscape, whether it is in mysterious wilderness or cultivated nature. During the journey of learning landscape architecture, I tend to unearth the invisible landscape under the surface.

The boundary space gave me the position of observing as one outsider, like the alien or inassimilable being. Whenever you are in a boundary space, you may have the feeling that you do not belong to either sides of space. You are a passer-by, non-involver and in this space, there lies in infinite possibilities.

From mental expression to physical environment, the boundary space, are usually understood as linear, demarcating space in the language of spatial environment. Or in other words, the boundary space is used to be

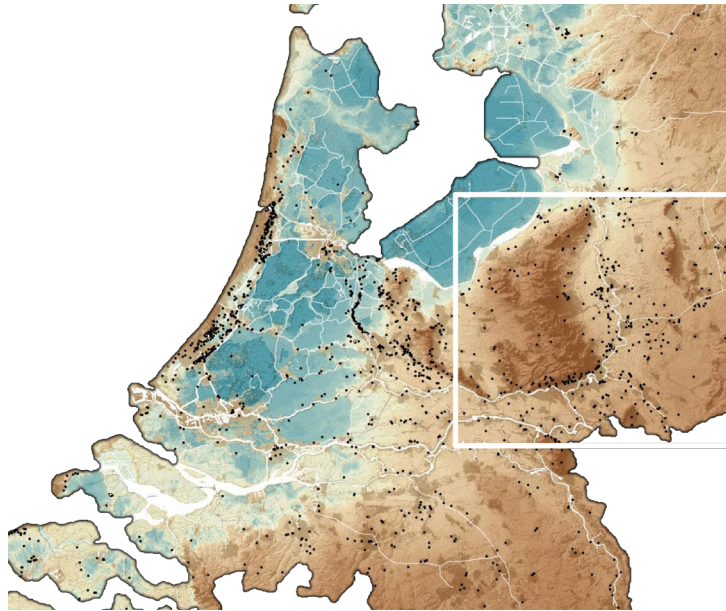
neglected but they are the life situation that we met in everyday life.

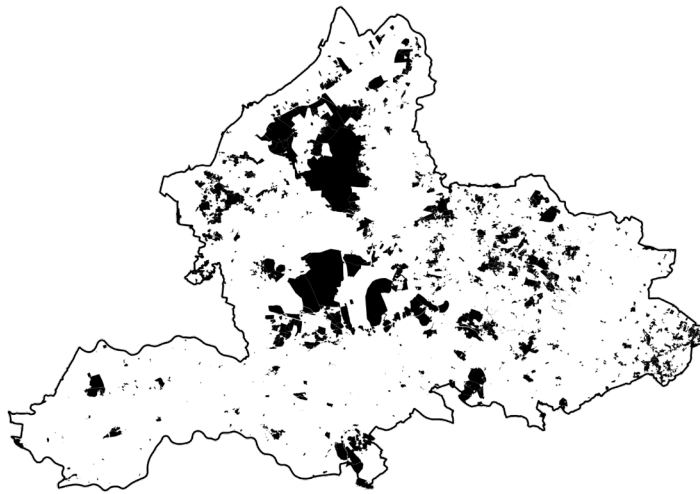
Estate landscape is one isolated island fenced by boundary. How should we view the heritage landscape under the paradigms of connectivity dominating contemporary urban discourse?

The identity of the estate landscape lies in its hidden, mysterious features. Layers boundary separate the estate territory from ordinary landscape. When we think about the future of estate landscape, the boundary lens, embodying separation and transition could be one entry of my thesis research.



BACKGROUND





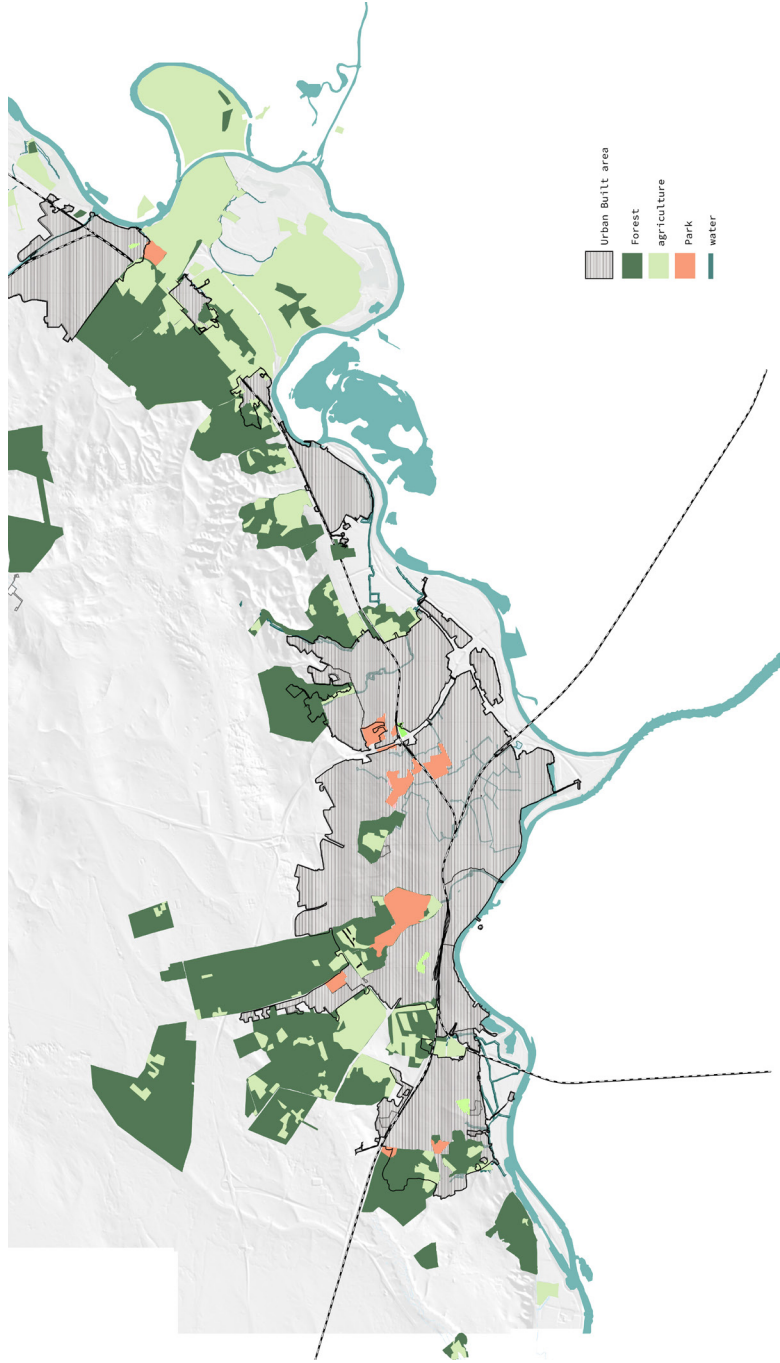
An estate is a spatial unity of neighbouring land with landscape and / or cultural-historical values and with an economic function, such as agriculture, living, working, or recreation. It is characterized by a coherent management of a combination of natural, forest, agricultural, water and / or park elements, possibly with buildings.

In Netherlands, lots of estates landscape are accumulated in the province, Gelderland. The estate territory take account of 31% in Gelderland and the Gelders Arcadie located in Southern Veluwezoom of Gelderland, is characterized by the relief of ice-pushed ridges. The unique green character and the diversity in flora and fauna made the region very attractive. The transition from low to high and the beautiful streams ensured a varied landscape where the elite enjoyed a good stay. It resulted in a Veluwe Arcadia, with castles, country estates and artfully laid out gardens,

parks and water feature. Medieval castles and landed estates, eighteenth century regent country estates and modern twentieth-century house can be founded.

However, the estate landscape faces the land fragmentation and transformation issue. According to the land use of estate landscape, most of the estate territory are agriculture and forest. The utilization of estate landscape still leaves huge potential.

PROBLEM STATEMENT



The southern Veluwezoom largely derives its identity and appeal from the many estates.

The estate landscape has undergone a quite dramatic transformation from rural hinterland to residential suburb and some estates have become part of the larger urban landscape. Especially the urban sprawl speed up the change. More and more estate landscape has formed the major urban-rural fringe, which enable the estates landscape being a transitional role. Just as the architect Karl Kullmann mentioned the current treatment of edge space, "With the paradigms of connectivity and contextualism dominating contemporary urban discourse, edge-spaces are often treated as thin anomalies to be 'smoothed over' or 'stitched up' in order to mitigate the disjunction"(Kullmann,2011). Under the trend of transformation of estate landscape into urban landscape, the important identity of estate landscape is easily lost.

The mysterious power landscape defines its territory and self-sufficient lifestyle with layers of boundaries. However, the current relation between estate landscape and urban environment has changed dramatically and there are little in-between or transitional space between them. And the urbanization process has brought about the fragmentation of estates landscape and the disconnectedness of ecology corridor. It calls for the seeming conflict roles of estates landscape and redefining of boundaries, connecting but also separating.

The relation is about scale, and the boundaries has different scales.

In estates ensemble, the ignorable and unclear outer boundaries did not define the estate landscape very well. And the intensive recreation and extensive maintenance have resulted in many of the cultural-historical elements present within the boundaries of the current estate being damaged or even disappearing. As a result, traces from history are sometimes no longer recognizable or completely blurred. Moreover, the estates ensemble is disrupted by grey infrastructure such as highway and railway, which formed new inner boundaries. A continuous surface of estate landscape is broken into different pieces.

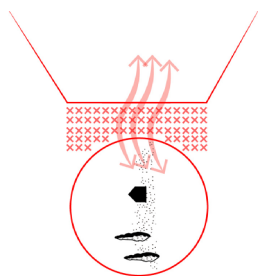
In urban scale, the boundaries between the estates landscape and urban built area is understood as relational boundaries, which are shifting and changing along history. The fast urbanization has threatened the protection of estate landscape. More and more estate landscape has formed the major urban-rural fringe, which are fragmented and have low quality of transition.

In regional scale, the ecology corridor (green & blue) has lose connection and more and more engineering projects put the corridor invisible which are hard to visit and use for public. The integrity of whole estate ensemble in Gelders Arcadie is collapsing.

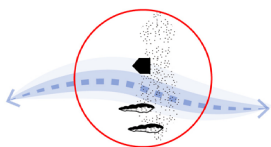
RESEARCH QUESTION

How can a well-designed boundary strategy address the contradiction between the isolation that is characteristic of the estate landscape and the connectivity that is a requirement of a well-functioning urban landscape?

RESEARCH OBJECTIVES



Transitional urban-rural fringe



Reconnecting ecology corridor



Transformation of estate landscape

The research objective of the graduation project is “to embrace hybrid boundary approaches for the revitalization of estates landscape and the integration of metropolis landscape and ecology.” This means to achieving this objective lies in answering the question of “How can a well-designed boundary strategy address the contradiction between the isolation that is characteristic of the estate landscape and the connectivity that is a requirement of a well-functioning urban landscape?”

the research about the boundary would not limit on spatial experience, but will across the relation with ecology, urban environment. The boundary term here is to offer an organized, analytical and designing guideline. It will re-translate the current relation and activate the transformation process. Along the research, there are a series of sub-questions to follow.

1.What types of boundaries can be understood, on several scales?

Unlike typical analytical process, the Spatializing chapter will combine the different scales of analysis with boundary language. From regional scale, urban scale, to estates ensemble scale, the understanding of boundary is changing, followed by topography boundary, relational boundary, outer boundary and inner boundary. It would help to construct a boundary-view on site, which will better understand the role of boundaries historically and spatially, in connection with urbanization and ecology.

2.How to apply boundaries approaches in different estates landscape achieving coherence and differentiation?

As the dramatically change of urban environment, the situation of estates

landscape is varied. Some turning into urban landscape, some in a blurred condition, and some preserving static. As for site distinction, the variation of boundaries approaches will be discussed in the Approaching chapter. Even though the diverse experience will be created along the landscape, the continuity from hills to floodplain, from Mariendaal to Rosande will be emphasized.

3.What it is the uniqueness and adaptability of this research?

It is hard to find continuous estate landscape experience from moraine hills to flooded plain near to an urbanized environment even though the current situation is disconnected, distracted. The conflation of connecting between estate landscape and urban landscape and separation of estate landscape would be addressed gently tackling on the relation – the Betweenness, the boundaries. The boundaries research will across the theory phase, analysis phase and design phase, aiming to form a new boundary language to translate our land.

Moreover, the Mariendaal–Rosande actually correspond to different typical estates type, which could offer similar boundaries typology and experience for the transformation of other estates landscape, therefore forming a more complete estate impression in Gelders Arcadie.

01



Overall, design research and research-by-design are interrelated and inseparable during this whole working process.

To begin with, the landscape biography approach, not only exploring the transformations in landscape, also focusing on the multi-layered nature of landscapes and the identity construction, would lay a foundation of the contextual background in the Veluwe area.

And the literature study on theoretical investigations of boundary space in landscape architecture put base on the spatial framework. Specifically, the literature review will be focused on the linear park typology by Kullmann, and the threshold space parameters by Boettger, which both give clear analysis framework from architecture perspective. And the relevant boundary & Edge theory by Forman in Land Mosaics added in ecological value. The main objective of the theory review is to create one boundary manual (Verticality, length, width) to guide the spatial design. And the relevant analysis tool (eco-tone, topo-layer, social-layer) would be implied on specific boundaries.

Based on literature study, the mapping work will follow a boundary framework to analysis and research, which are topography boundary, relational boundary, outer boundary and inner boundary. Through multiscale research and case study, the main principles and strategies will be put forward tackling with different design scales.

The final design output will be composed by three scales correspond to the research process. On the regional scale, the estates landscape should be defined to emphasize the boundary between hills and floodplain, for the protection of natural voids and urban sprawl, as well as enabling ecological connectivity between both natural entities. Urban Voids area would be defined in regional scale. On the urban scale, by contrasting four different estates ensemble with different relation to urban environment, the differentiation of boundary typology would be concluded. As for the diverse of relational boundaries and history, the Mariendaal-Rosande ensemble is chosen as design site. On the one hand, the emphasize on the boundary will preserve the hidden continuity of these two estates. On the other hand, by designing diverse boundaries features the differentiation would be reflected. (Mysterious/ Permeable/ Shifting boundaries) As to estates scale, the detailing and materialization of varied boundaries would be focus.

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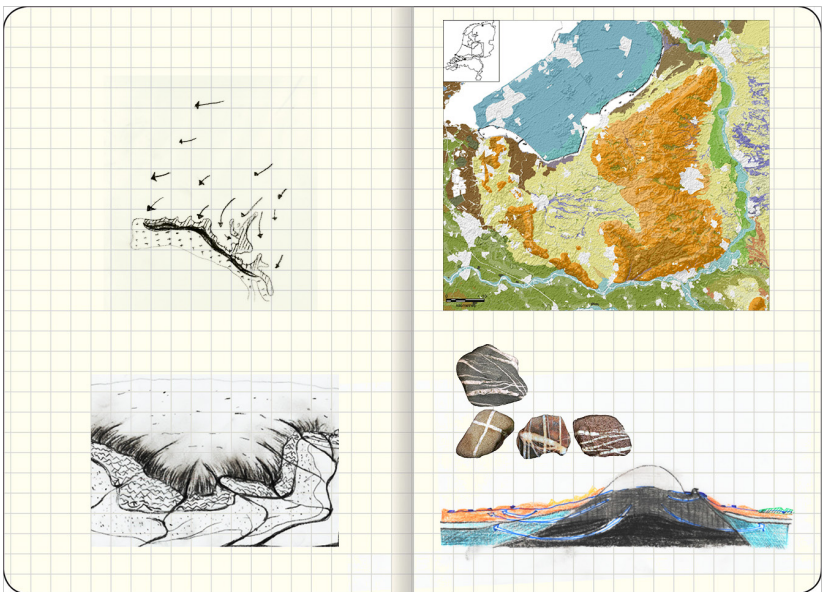
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TOPOGRAPHY BOUNDARY
RELATIONAL BOUNDARY
OUTER BOUNDARY
INNER BOUNDARY

CHRONOLOGY RESEARCH

100 years ago



150, 000 years ago



1000 years ago

The landscape biography will explore the long-term dimension of transformations in landscape from prehistory up to the present, viewing landscape at each point in time as the interim outcome of a longstanding and complex interplay. And it put focus on the multi-layered nature of landscape, implying the heritage is a always the dynamic work of people, with processes of cultural transmission and the construction of values and identities being inextricably bound up with one another (Roymans,1995).

Regarding to the estate landscape in Veluwezoom, I look at the ever-changing relationships between 1) the use and layout of the landscape, 2) the location of estates landscape, 3) the chronological change of estate landscape

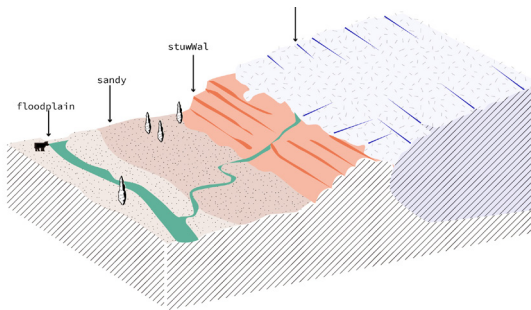
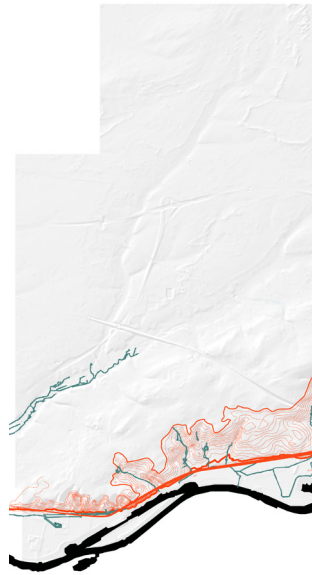
02

The Veluwezoom, on the border of the Veluwe and the rivers Rhine and IJssel, is famous for hundreds of country estates over the centuries. The Veluwezoom estate is also named as Gelders Arcadië due to its vastness and beautiful construction.

In regional scale, the focus will be the landscape gradient and the location and territories of estates landscape.

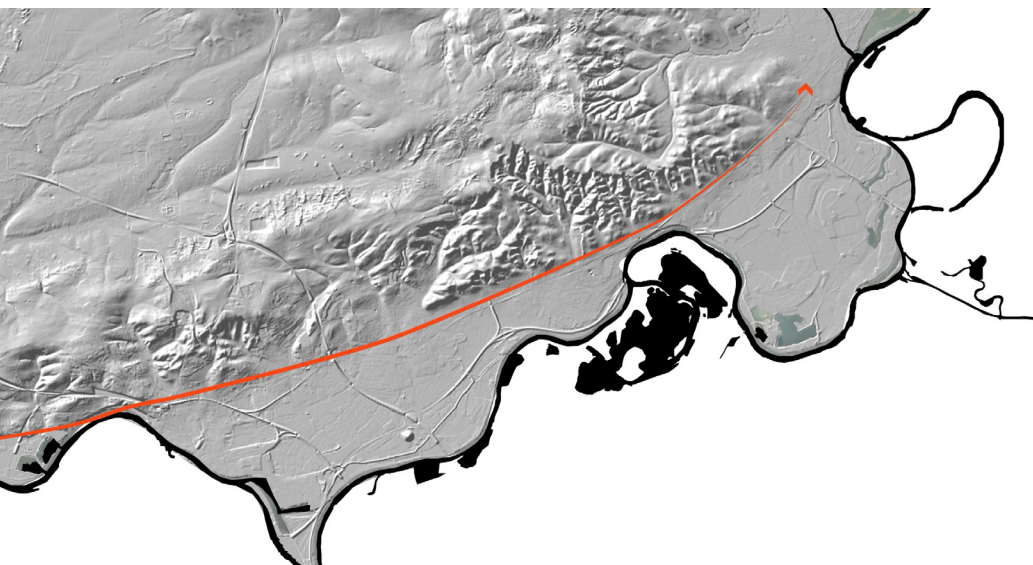
The glacial movement carves the current topography. The ice-pushed ridge has formed a natural differential topography boundary. As Forman mentioned the scales of boundaries, "In certain places, boundaries of landscapes are congruous with broad-scale boundaries separating climatic regions, biomes, or tectonic plates" (Forman, 1995). The topography boundary here marks the difference between moraine and floodplain, sand and clay.

The gradient, the transition from low to high, attracted people to build their estates there from the middle age onward. The drenched streams have been dug in the gradient zone to construct special water works, which are also important connection from high to low. Thus, in the area there is a strong landscape cohesion, a combination of hilly landscape, stream landscape and river landscape, which made a combination of use, functions and values.



REGIONAL

02

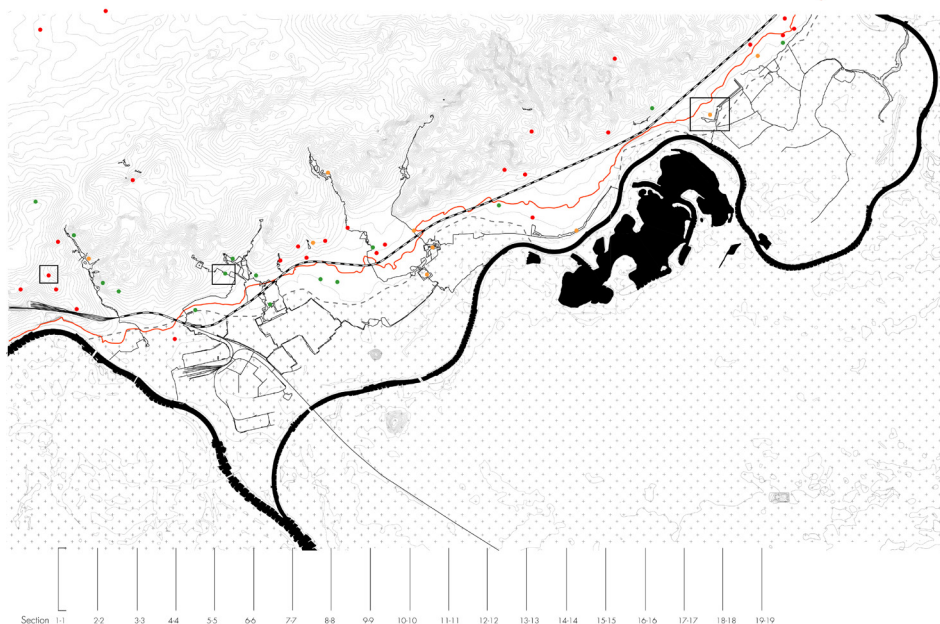


Ice-pushed ridge - forming the backbone of development



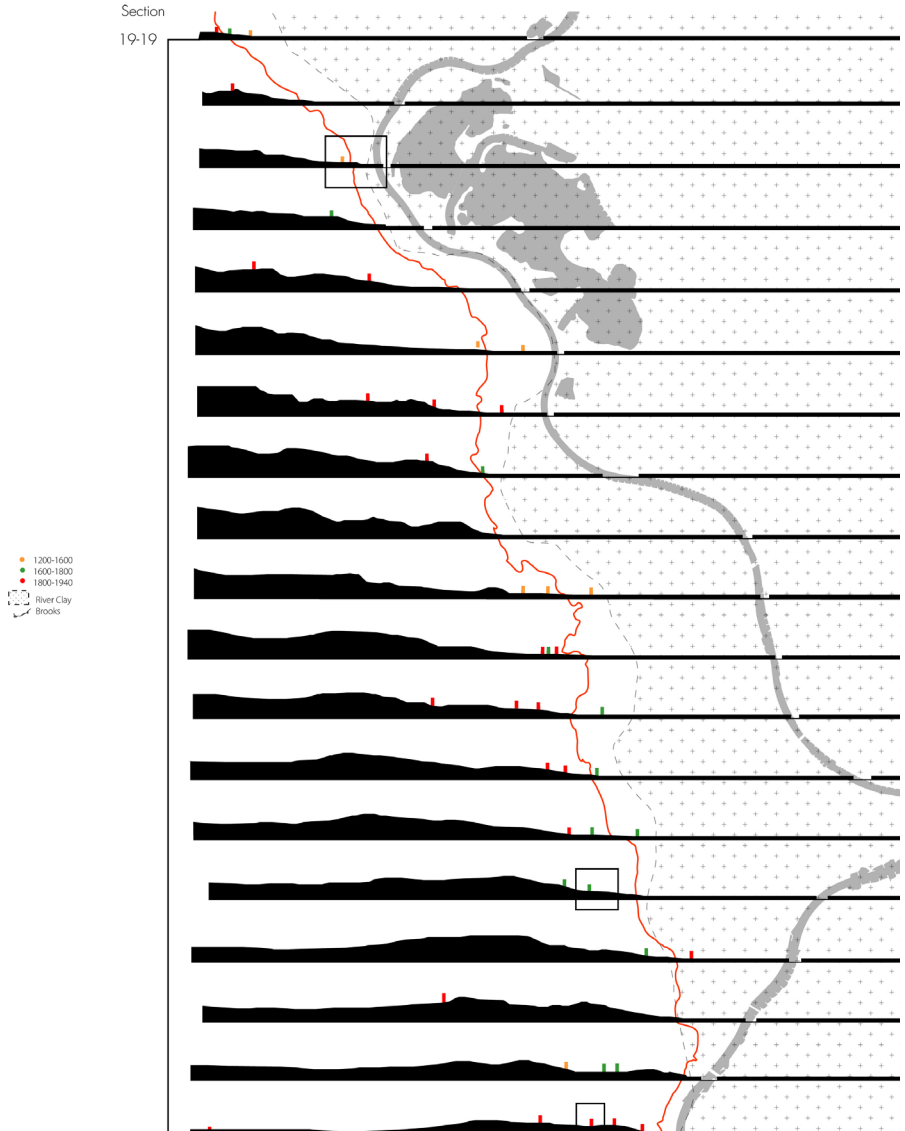
What remarkable is the influence of topography boundary. It not only coincides with the division line between sand and clay but also the direction of railway. Moreover, the early urbanization and location of estates are influenced by it. The original topography put base for the utilization of landscape.

THE OVERALL MORPHOLOGY LOGIC BEHIND THE LOCATION OF ESTATES

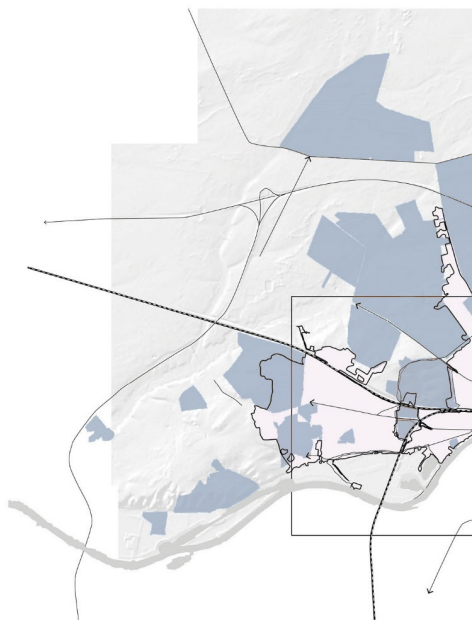
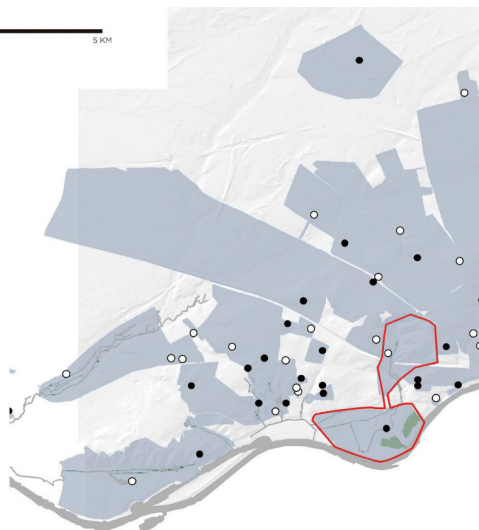


TOPOGRAPHY BOUNDARIES

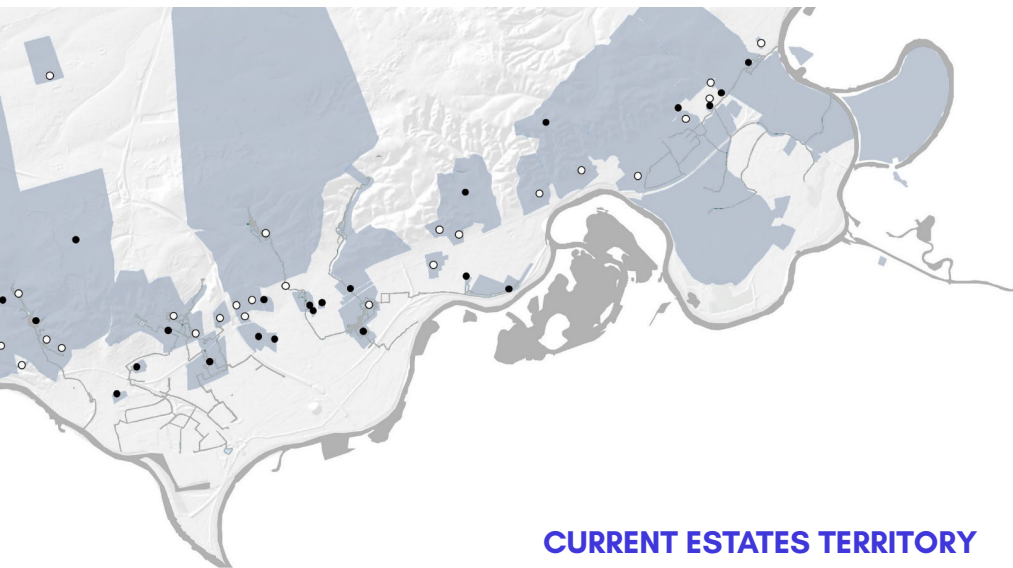
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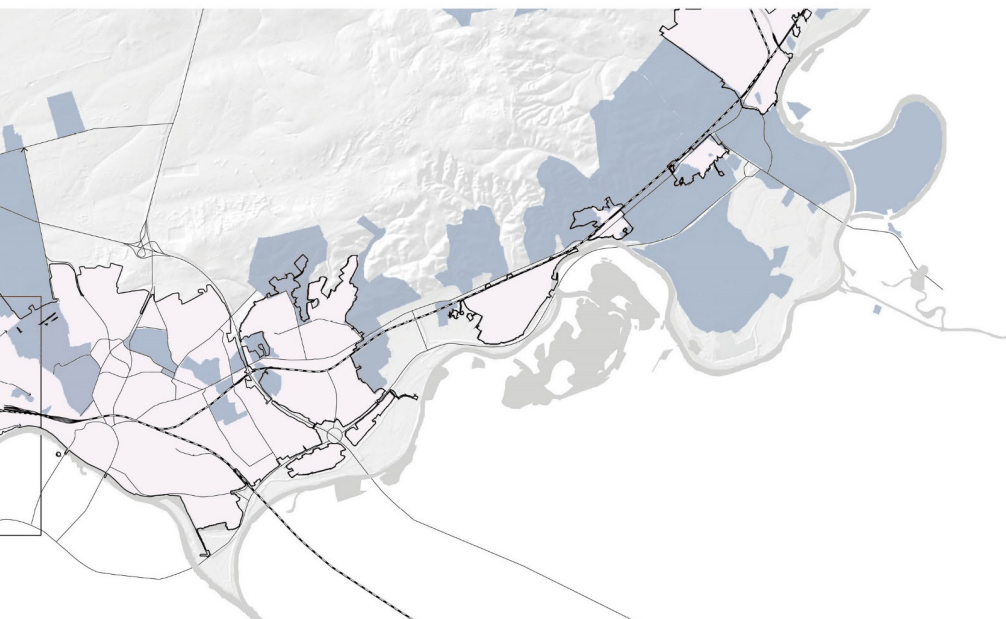
As for the fast-urban sprawl with dense grey infrastructure, it has caused the distinct decrease of estates landscape and more fragmented and marginalized features. The continuity of landscape and the function of topography boundary is losing. Till now, the natural topography boundary has becoming less visible and recognized.



HISTORICAL ESTATES TERRITORY



CURRENT ESTATES TERRITORY

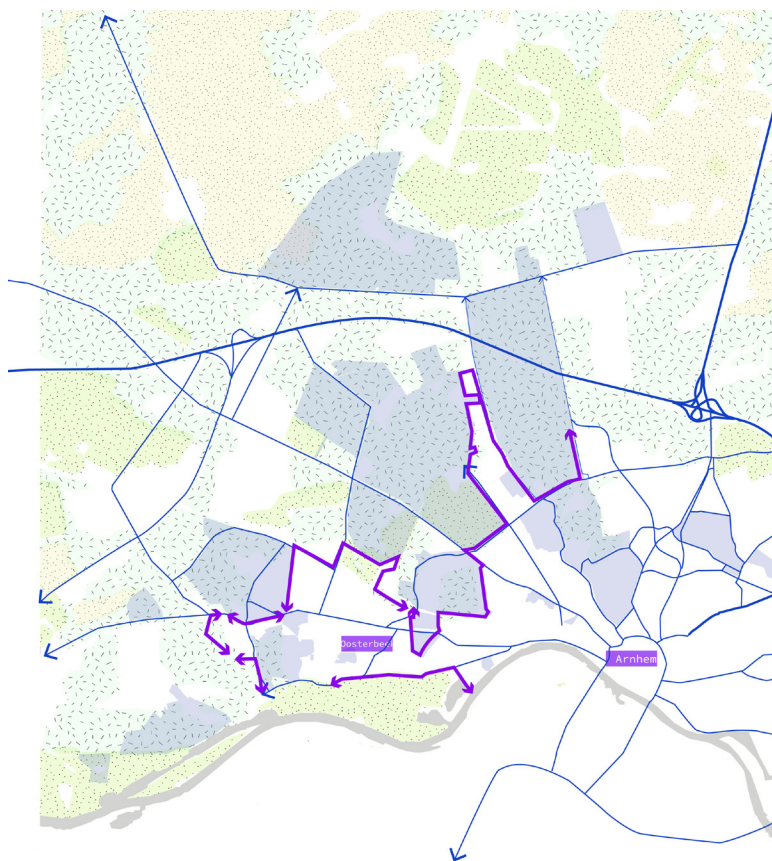


Followed the regional analysis, the urban scale will discover the relations between estates landscape and urban environment. According to this sense, I defined the relational boundary as viewing the surrounding environments of estates landscape, either near to urban environment or natural reserve.

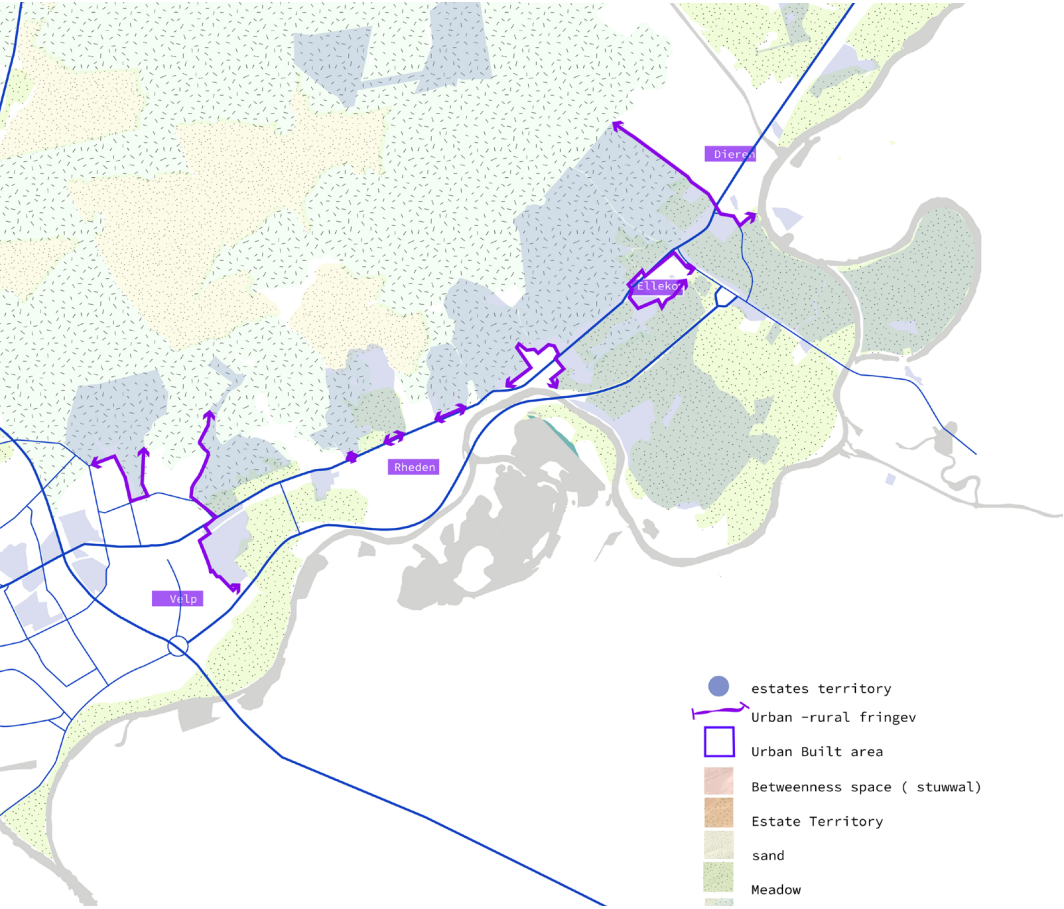
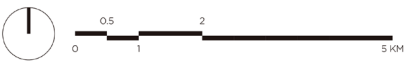
The urbanization process speeds up the physical connection from urban area to estates landscape and there is almost no in-between space between them in spatial. In other word. The boundaries between estates landscape and urban environment are becoming the urban-rural fringe. It matters on the transition from urban to rural and the definition and protection of estates landscape.

Especially in the west of city, Arnhem, lies in abundant country estates, the urban-rural fringe reflects on fragmentation.

The estates ensemble should be regarded as whole boundary for the protection of natural voids but also to enable ecological connectivity between hills and floodplain, strength connection between city and landscape.



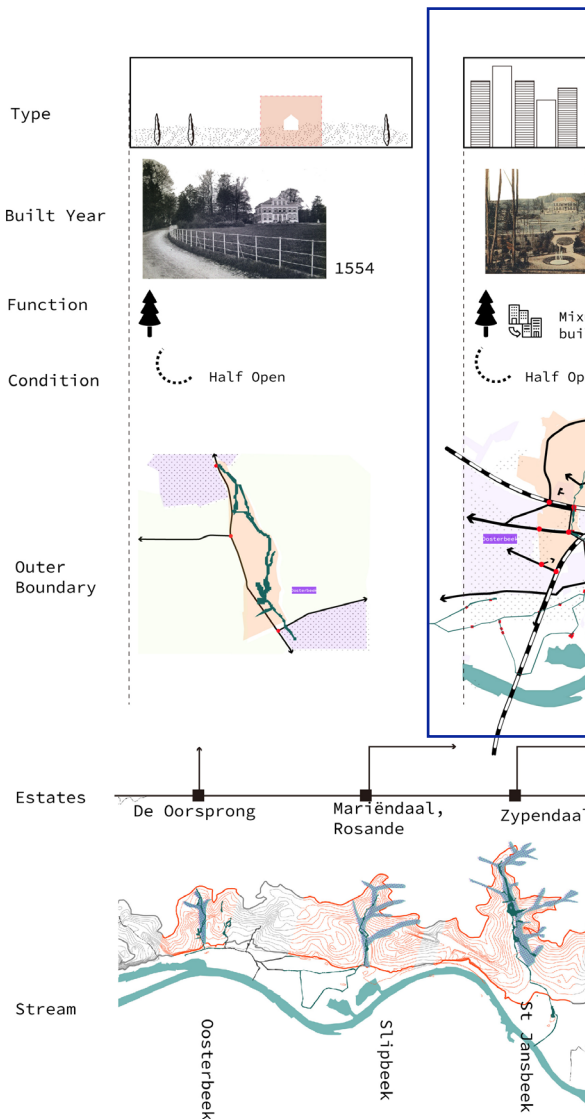
RELATIOANL BOUNDARIES

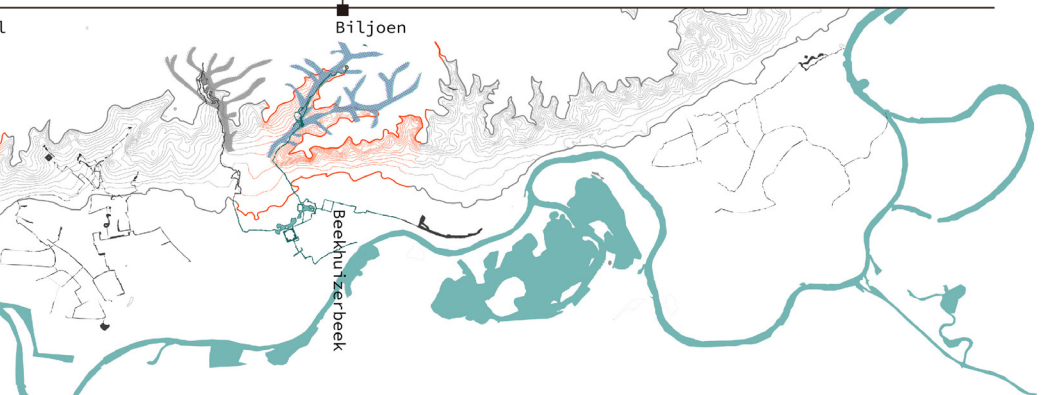
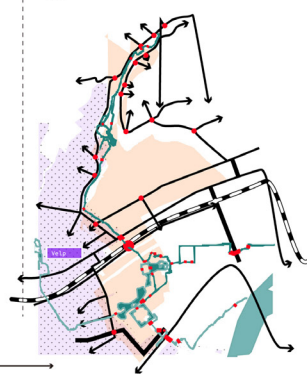
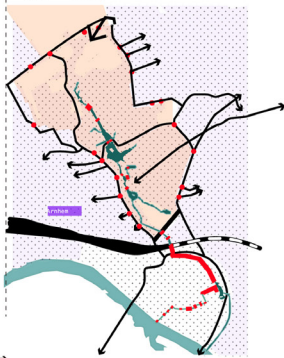
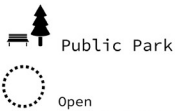
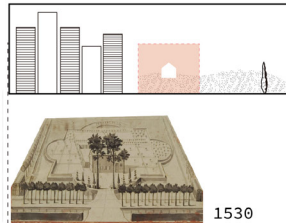
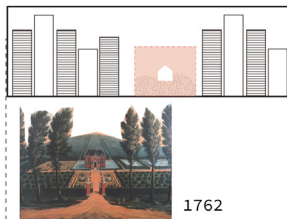
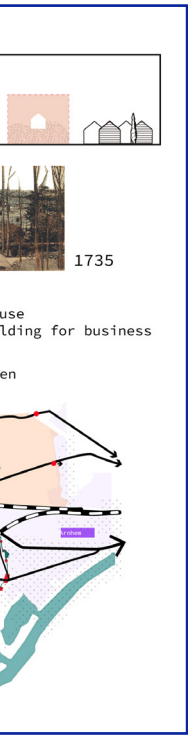


To better character the typology of the relational boundary, I zoom in five estates ensemble. they have different relations with the urbanization but they all tightly connected with the water.

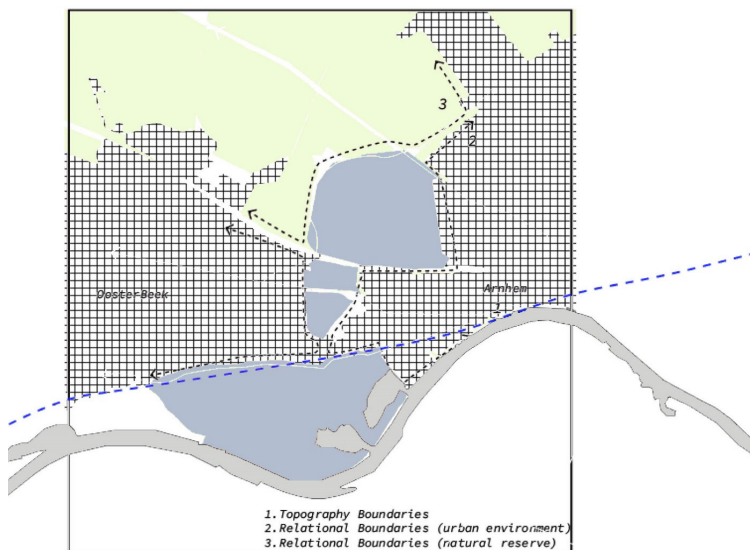
Through comparative and layer analysis, I could conclude different outer boundary typology of estates landscape.

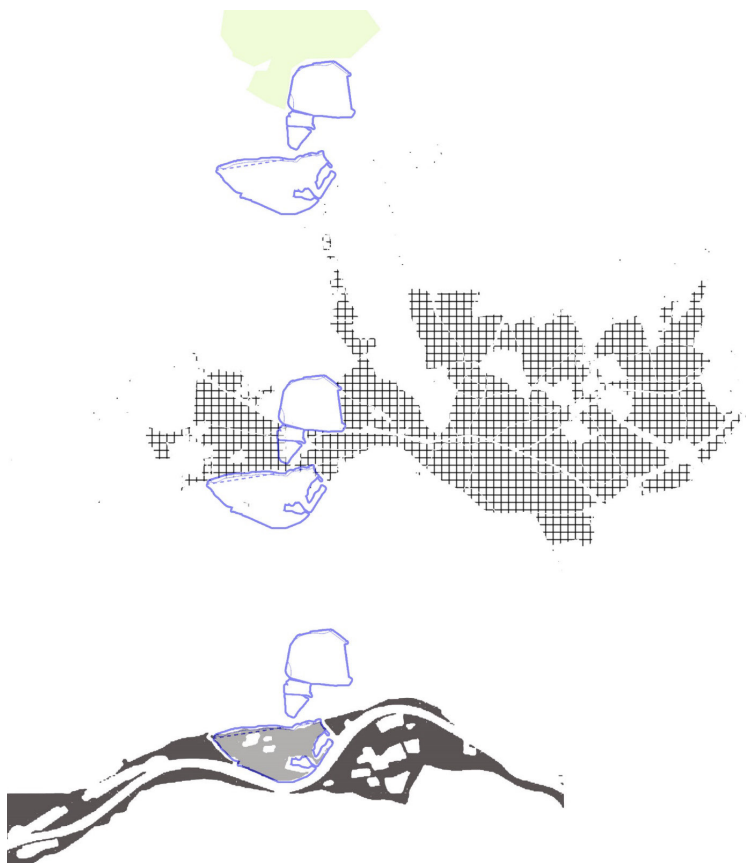
Outer Boundary means the boundary that define the territory of estate landscape. The outer boundary is important for the declaration and protection of estate territory.





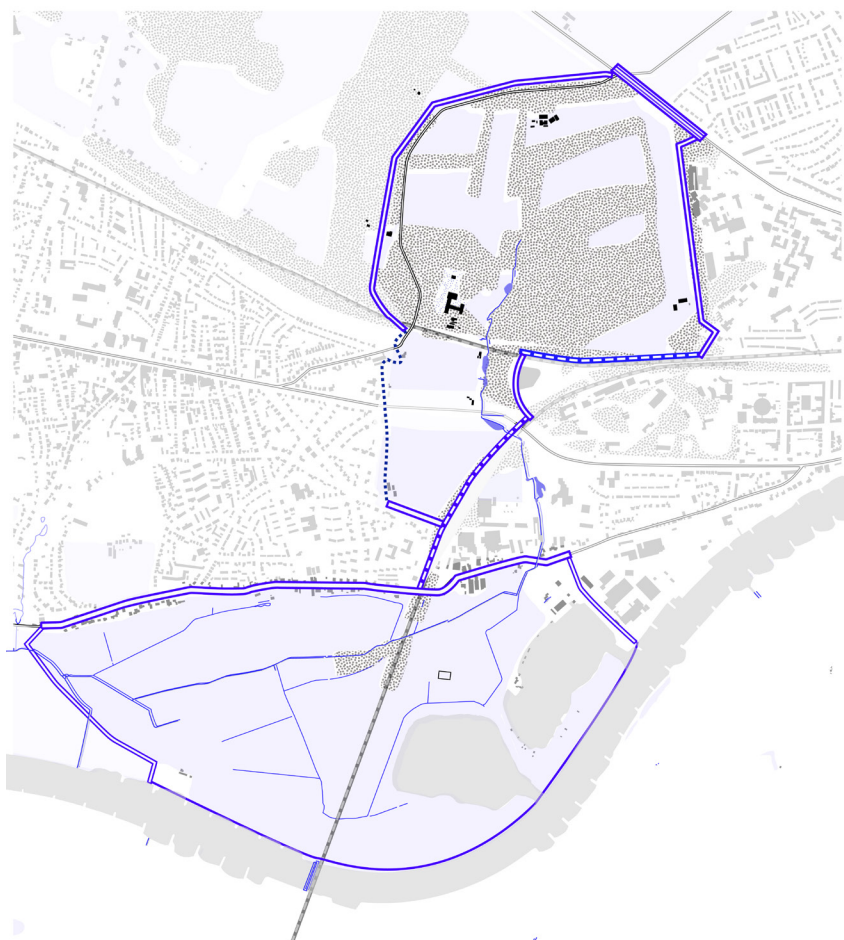
And this ensemble has complicated outer environment. In the north, it near to the veluwe. It is located between the city Arnhem and village- Oosterbeek, And in the south, its belong to the flooded plain.



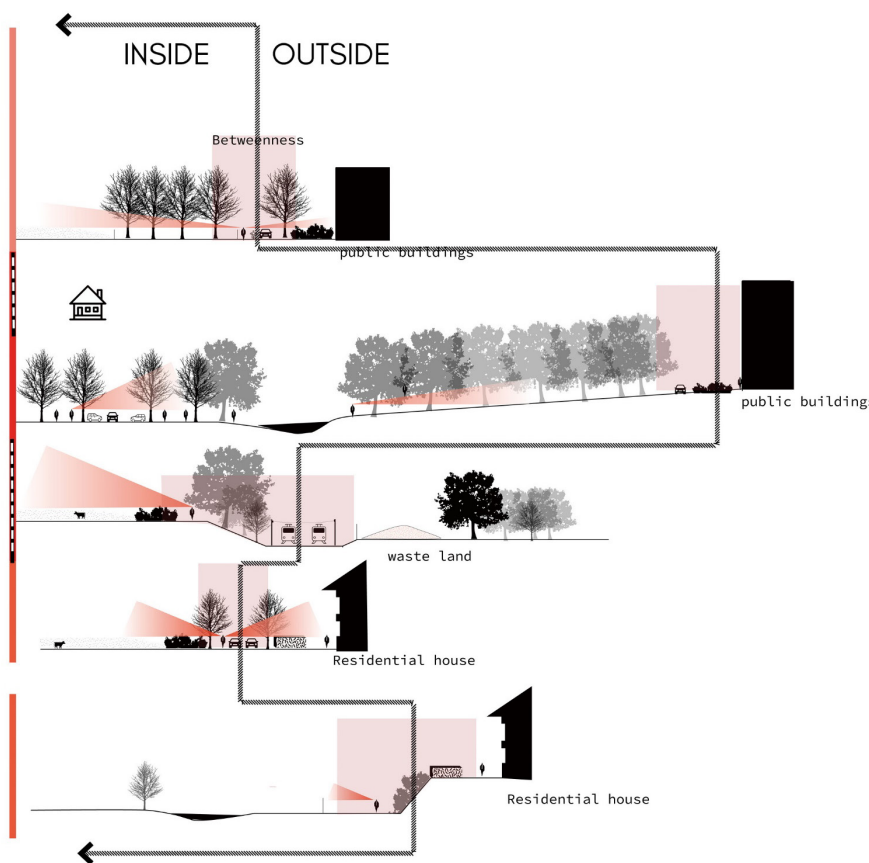


The outer environments of site are diversified. Veluwe, nature reserve, is in the north, the river of IJssel is in the south, And the middle was dominated by urban built area. As for the south, it is the flooded plain.

The outer boundaries of Rosandemariendaal was composed mainly by roads and dense forests. And these boundaries have low porosity and accessibility, which caused obstacle for transition.



OUTER BOUNDARIES



0. Before habitation,
formed by glacial moment,

1. 13th–14th, continues territory

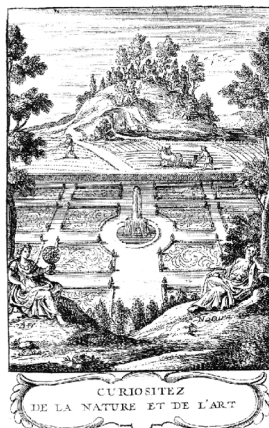
The Rosendaal castle was built in the flooded plain, and the Slijpbeek has connected the moraine and flooded plain. The flow of downstream echoed to the river curve.

2. 14th–18th start to divide territory

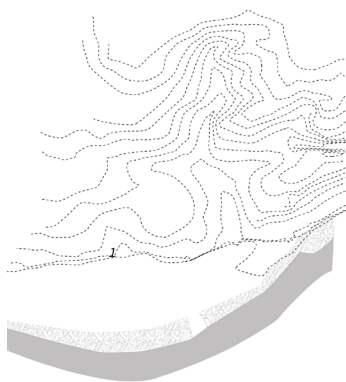
The stream has utilized by water mills for the brick industry along the river. The downstream landscape reveals on robust nature and the Rosendaal castle only left limited relic on the land

3. 18th–now, fragmented condition

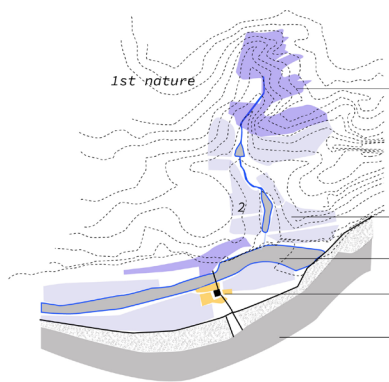
The development of transportation has divided the complete estates landscape into several parts and has been composed the current boundaries, which left problem of fragmentation.



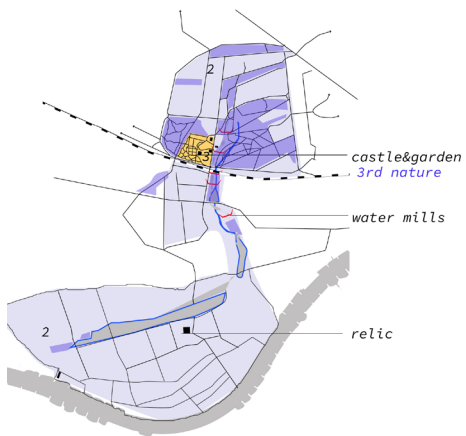
The three natures of wilderness, agrarian landscape and garden



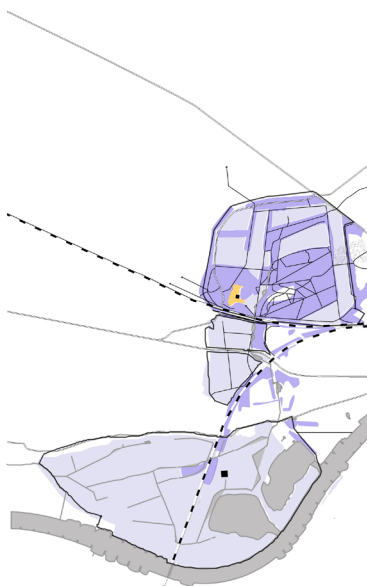
before habitation



13th-14th, Continuous territory



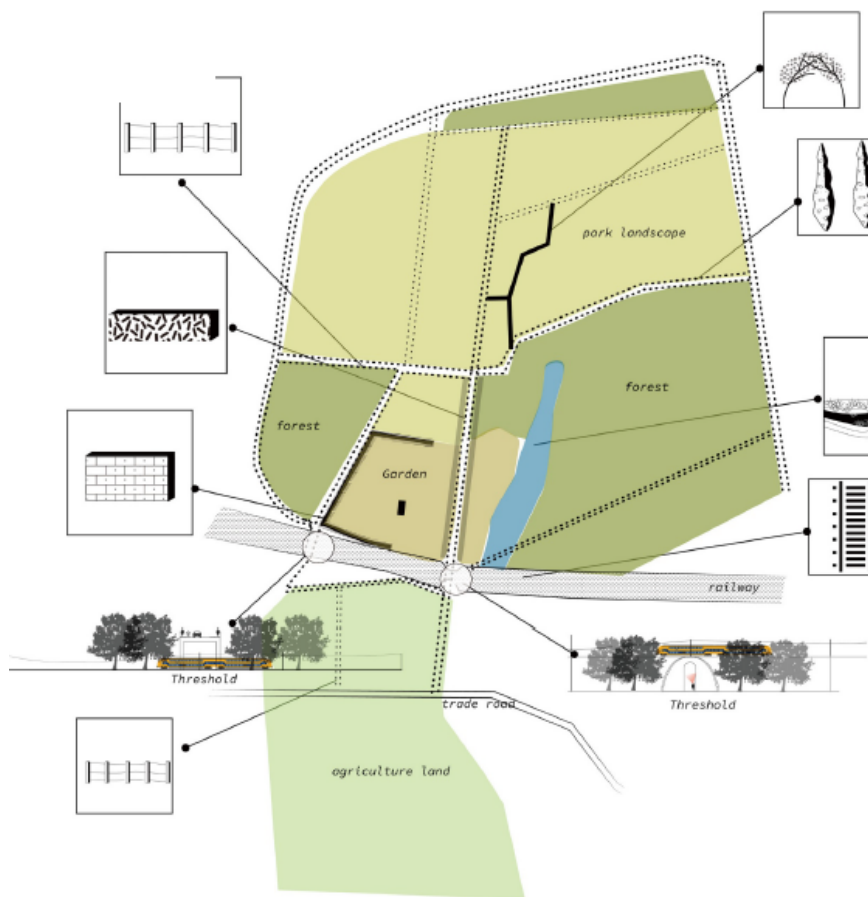
18th, start to divide territory



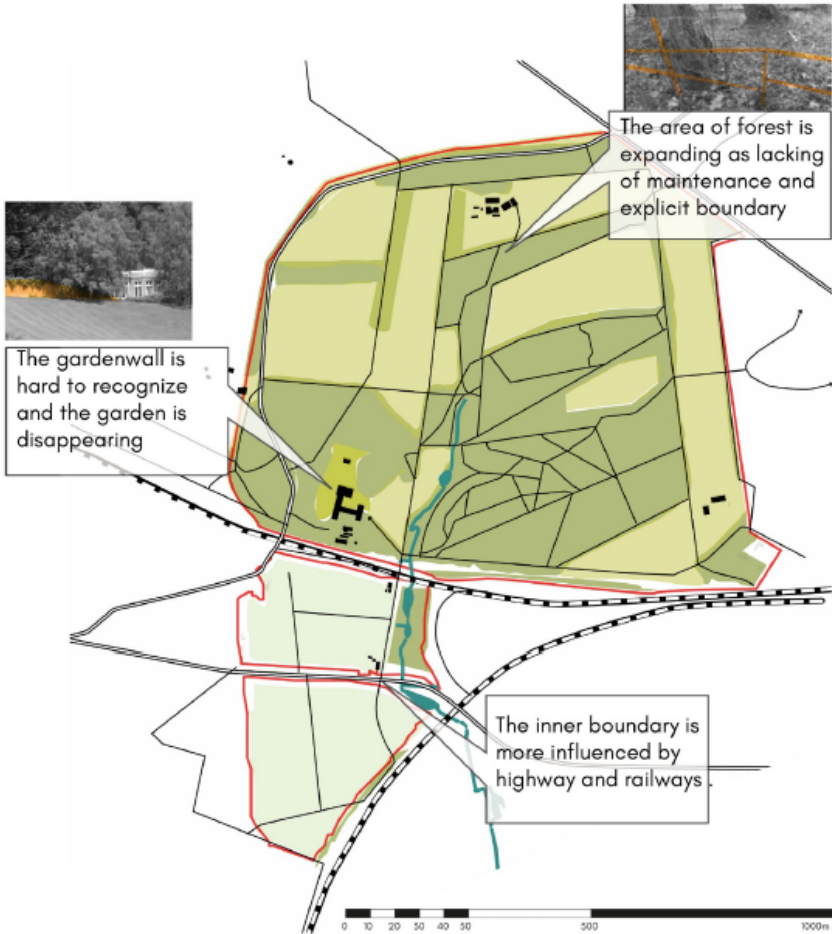
18th-now, fragmented condition

The material and composition of inner boundaries have influence on the layout of the estate's territory. Explicit, organized inner boundaries could help maintain the function and programmes on site.

ESTATE ENSEMBLE

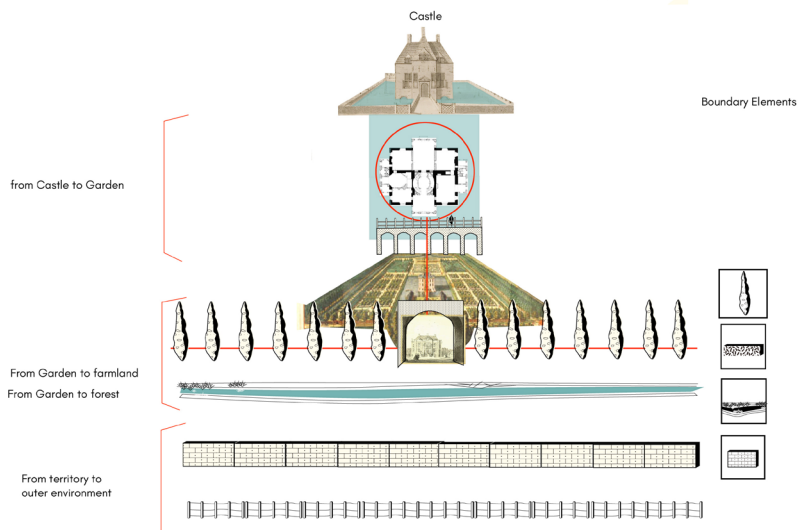
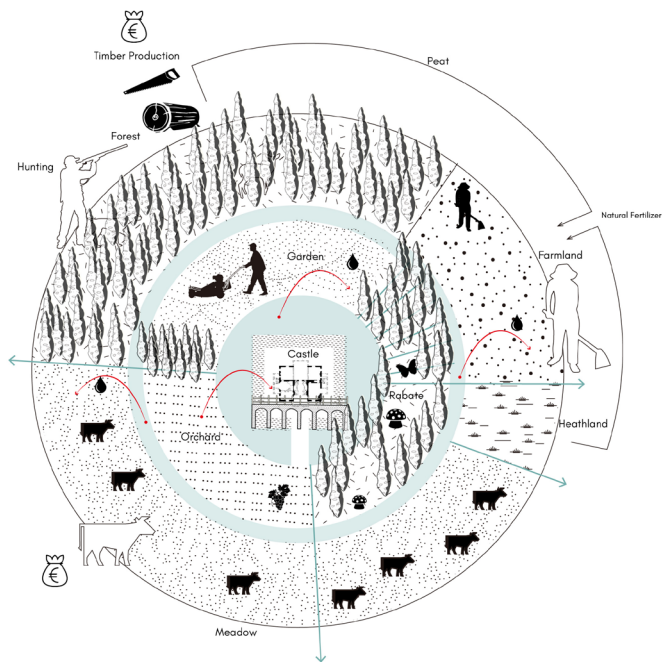


INNER BOUNDARIES



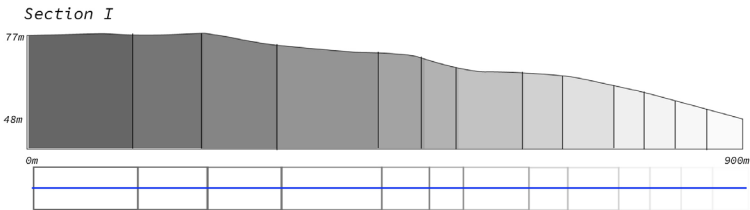
The estates are characterized by a coherent management of a combination of natural, forest, agricultural, water and / or park elements, possibly with buildings.

The organized, supported inner boundary system has damaged by the grey infrastructure. However, there lies in huge potential to bring the benefits of grey infrastructure by adapting more ecological and human-friendly junction of threshold.

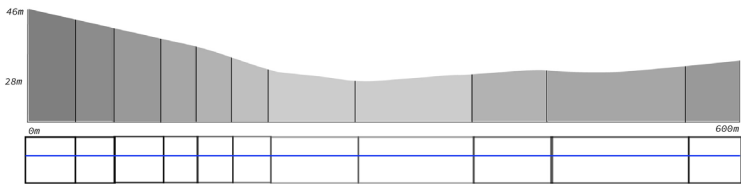


TOPO-Layer will analysis the topography along the boundary, which will influence the vertical composition of boundary.

From the analysis, the boundaries are basically vertical with the topography and has significant difference from high to low in the north part. And the middle part represents the similar vertical character but lowest in the middle. The boundaries are parallel with the topography in the bottom part.



Section II Vertical with boundary



Vertical with boundary

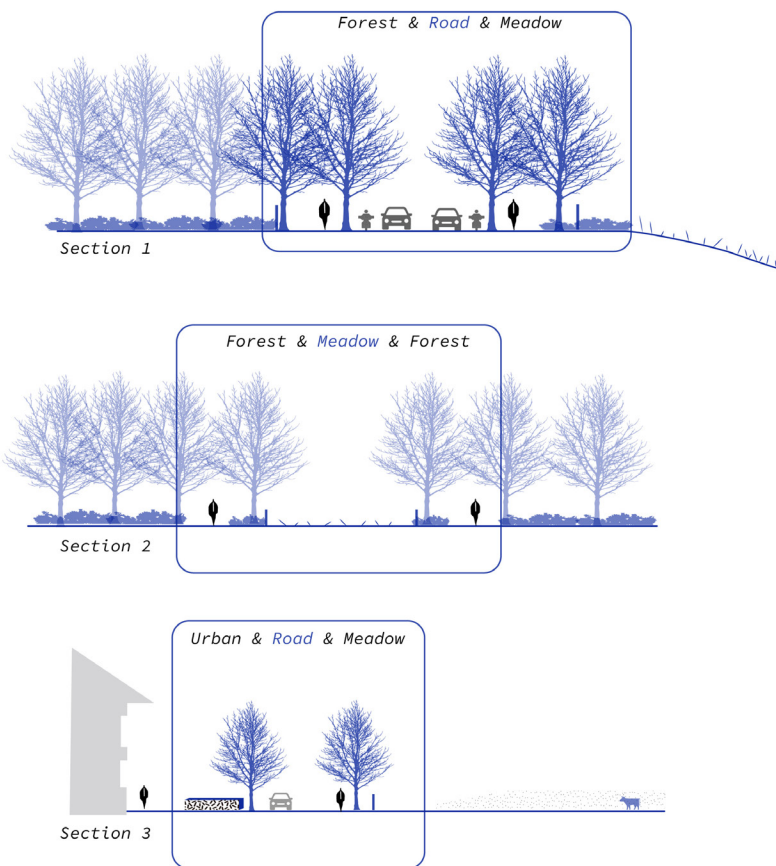


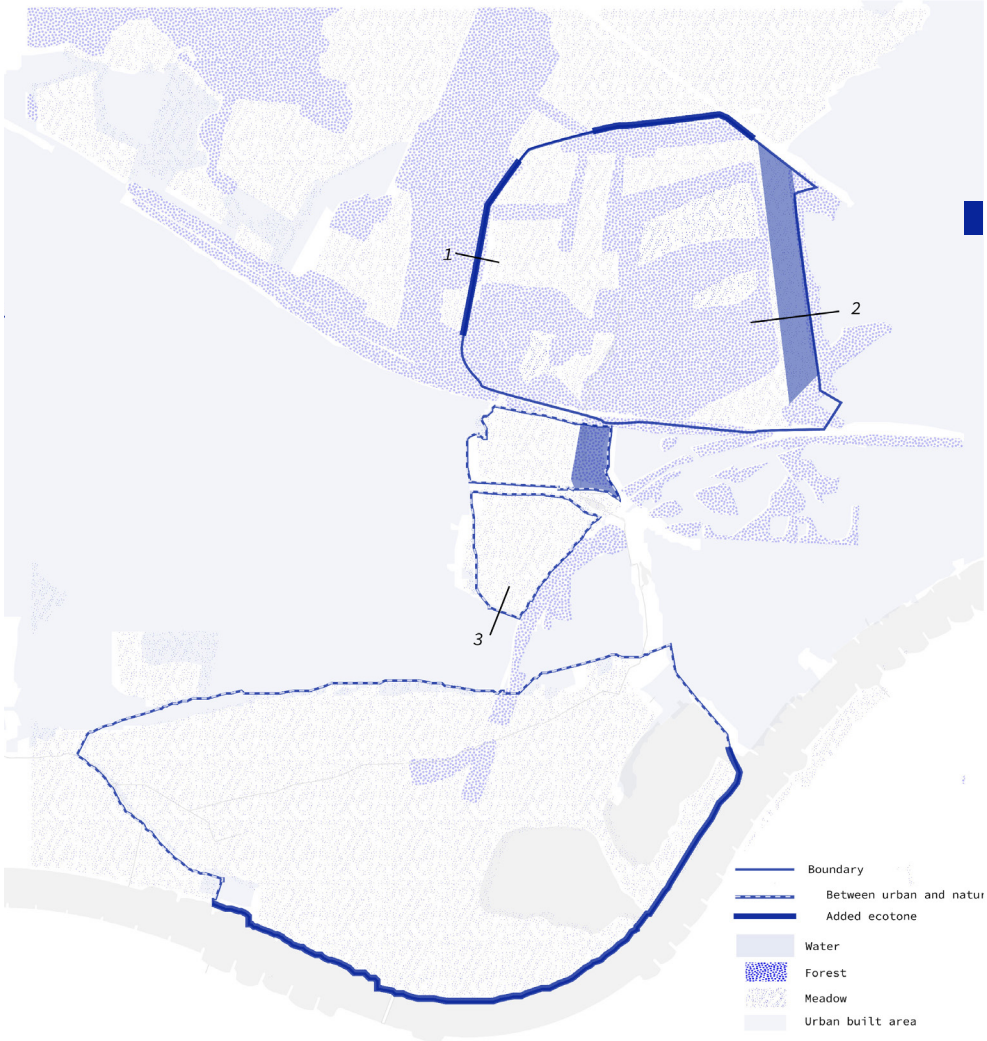
Parellel with boundary

TOPO - LAYER



Ec0-tone means the transitional field between different ecosystem, which are quite important for the natural procession, movements of particles and sediments, also the edge species. And the geo-tone basically decided the width of boundary.





Social layer reflects the interaction between inside and outside environment working on the boundaries. They are typically composed by the entrances to the inside environment, visual connection along the transparent boundaries and so on.

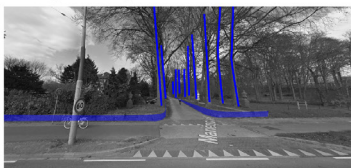
The social tone will influence the continuous of the boundary, which could understand as the length of spatial elements.



'dotted' continous boundary with multiple small entrances



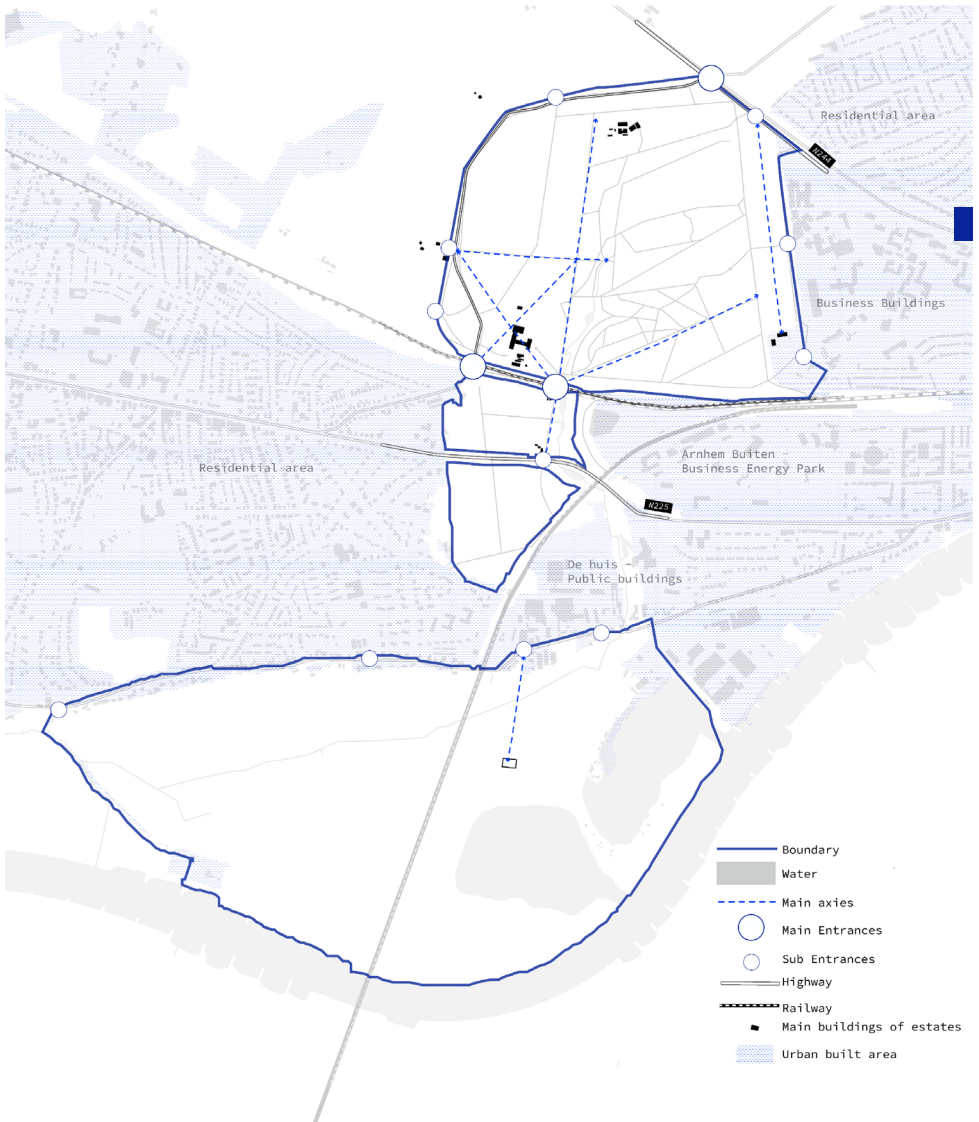
moving transportation with few entrances

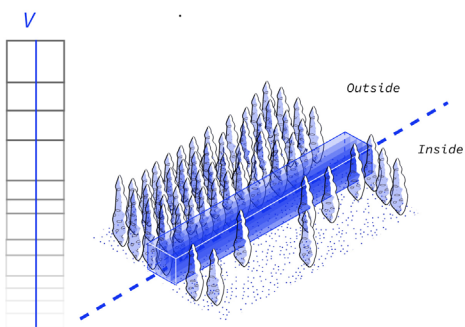


hidden entrances

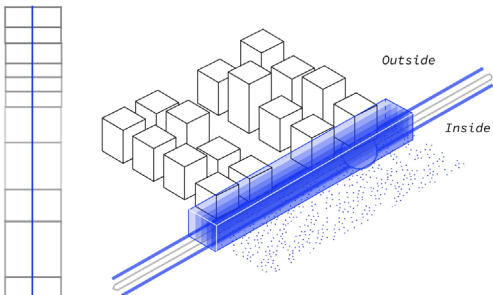


SOCIAL - LAYER

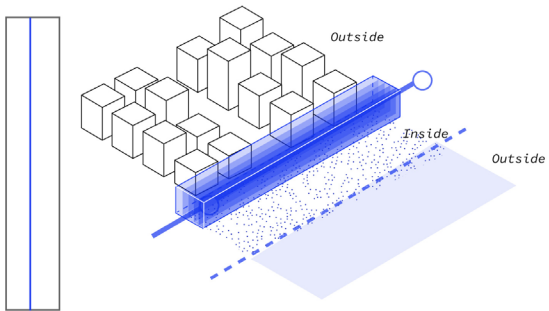




Type Mixed forest and Meadow



Type 2 Meadow surrounded by urban area



Type 3 flooded plain between urban and water

CONCLUSION

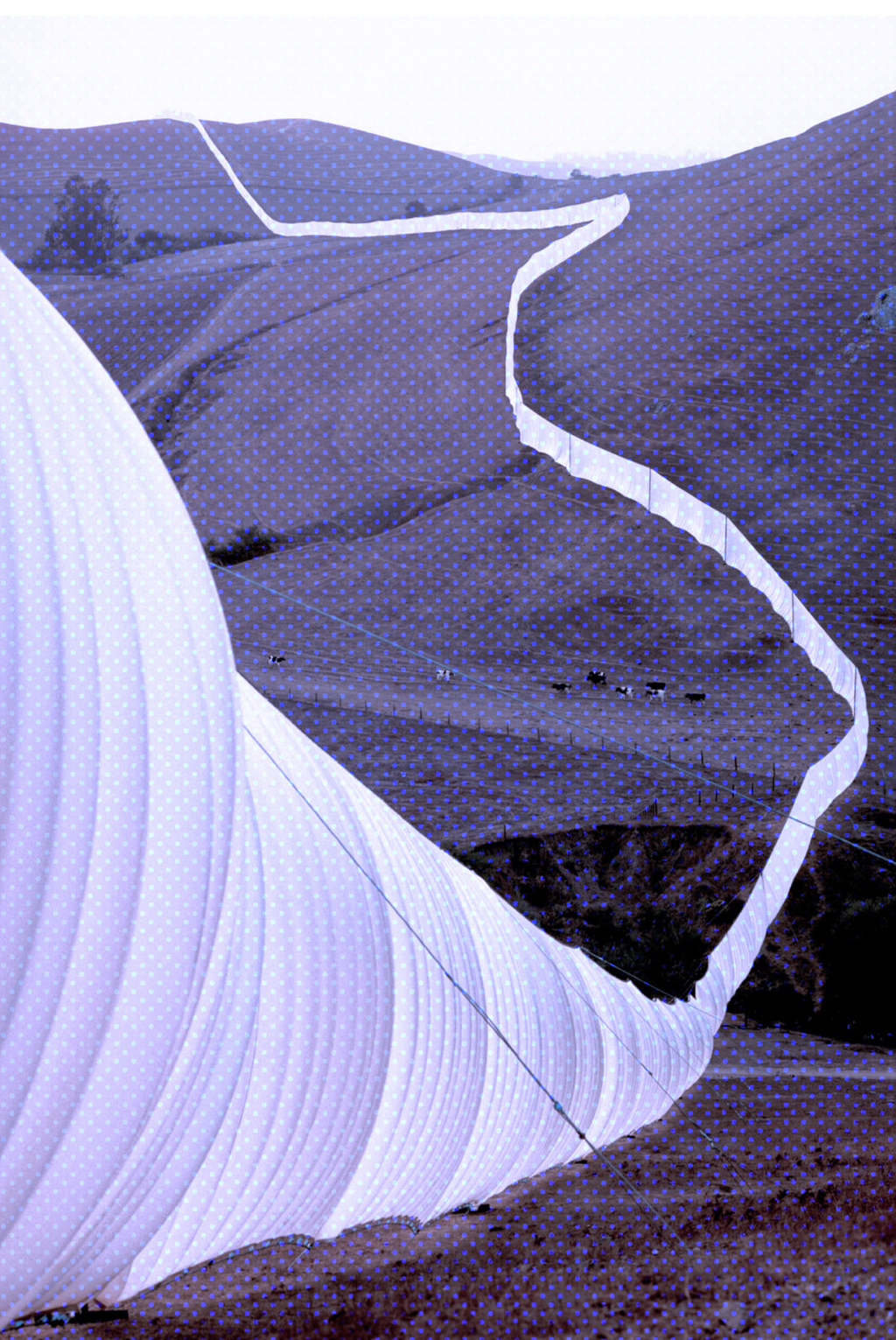
By layering the three-boundary lens, the differentiated relation between inside and outside is obvious. And it could be concluded as three parts. The part 1 Inside Mariendaal is a typical preserved-well estate landscape, but now facing the problem of intensive recreation and thus causing the disconnection of ecosystem. Separated by railway, the following part 2, outside Mariendaal is one productive landscape in a low utilization condition. And the part 3, Rosande is facing the risk of flood and the loss of estate history.



PART 1
Disconnection of ecosystem
recreation disturbance
too many entrances

PART 2
lack of entrances
low utilization
traffic disturbance

PART 3
flood risk
low utilization



Christo: Running Fence, Sonoma and Marin Counties, California – 1972–1976

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BOUNDARY IN BUILT ENVIRONMENT
BOUNDARY IN ECOLOGY
BOUNDARY IN SOCIAL DIMENSION
BOUNDARY IN ESTATE LANDSCAPE

BOUNDARY IN BUILT ENVIRONMENT

The influential five qualities (Paths, Edges, Districts, Nodes, Landmarks) about how people experience the city are pointed out by Kevin Lynch in the book, *The Image of the City*. The Edges are important component in built environments. Lynch explained the relation between edges and boundary and the multi forms of boundaries.

“The Boundaries present themselves to us as the edge of things, as the spatial and temporal limit between the here and there, in and out, present and future. The boundary in all its manifest forms – wall, facade, gate, fence, river shore, window – appears as a discrete separation between alternate sides of its magical divide” (Lynch, 1960).

Relevant to boundary, there are also some similar terms, border, threshold, linear space, which usually understand as spatial elements. Among them, Till Boettger researched the threshold space and concluded the threshold analysis parameters. Karl Kullmann proposed the typology of urban linear landscape, which gave clues for the theory research.

A boundary is a spatial delimiter.

Boundaries define spaces by separating a smaller space out of a larger spatial structure. Joedicke provides the definition: "the creation of space therefore always implies dividing off a smaller space from a larger one" .

-Till Boettger

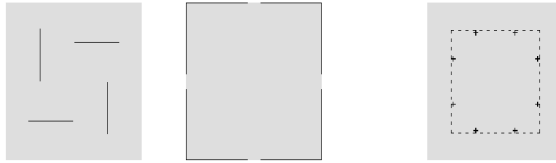
BOUNDARY IN BUILT ENVIRONMENT

#THRESHOLD ANALYSIS PARAMETERS

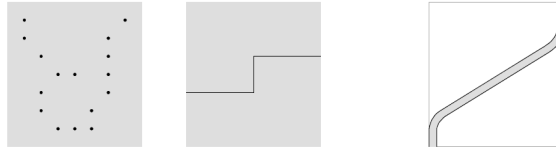
Till Boettger pointed out the relation between threshold and boundary. “A threshold is understood as a linear interruption in the boundary” (Boettger,2014). After abundant analysis of cases, the Threshold Analysis Parameters proposed by Boettger is meaningful for the systematical research of threshold and boundary.

- * Delimitation (spatial definition)
- * Sequence (spatial sequence)
- * Geometry (spatial structure)
- * Topography (spatial situation)
- * Materiality (spatial design)
- * Furnishings (spatial function)

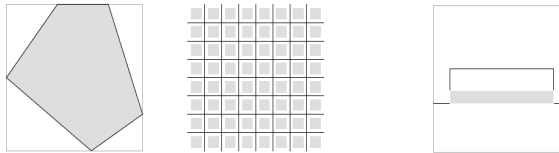
Delimitation: open-closed



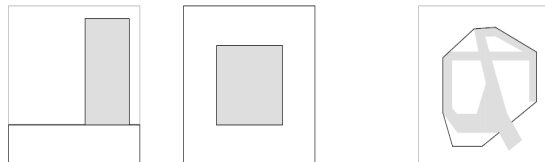
Sequence: freely selectable – guided



Geometry: free-ordered



Topography: independent – embedded



Materiality: Neutral –distinctive



Furnishings; unobstrusive –self-contained

minu, jav rausv

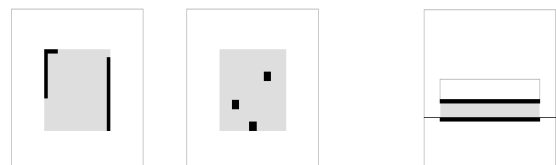
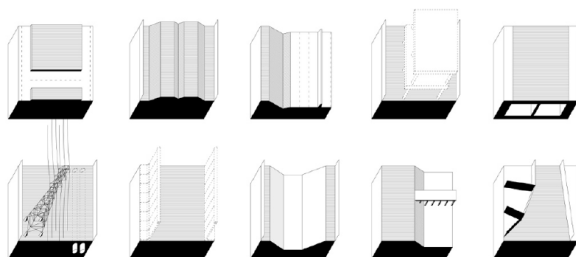


Image Source : Boettger,2014

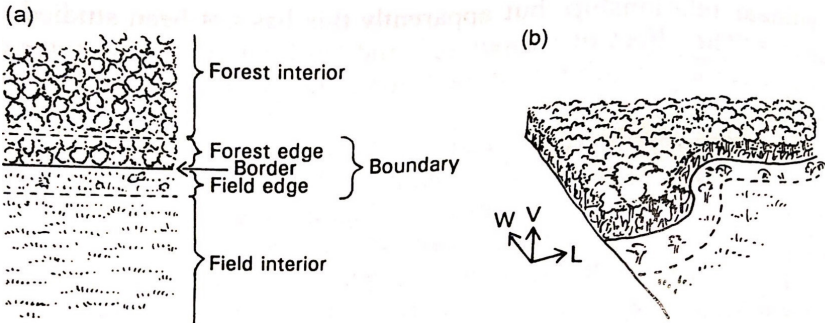


BOUNDARY IN BUILT ENVIRONMENT

#LINEAR LANDSCAPES AS "THIN PARKS"

Karl Kullman put focus on the edge spaces in urban environment and proposed the transformation of thin park. He came up with typology of urban linear landscapes and by analysing the different scales of thin parks. The character of boundary and edge spaces is similar, which are usually negative, linear space. And the term Karl concluded could be learned and applied in the research of boundary – such as contiguity vs cross. connectivity, lateral porosity (Kullmann, 2011).

BOUNDARIES AND EDGES



BOUNDARY IN ECOLOGY

While there is little discussion about the boundaries in landscape architecture. The inspiring theory about the boundary & border proposed by Richard T. T. Forman gave an ecological perspective.

According to Richard Forman, “boundaries are produced by environmental discontinuities, natural disturbances, and frequently human activity” (Forman, 1995). Boundary is one vital concept mixed by mechanisms, microclimate, soil, animals, and humans in the perspective of ecology.

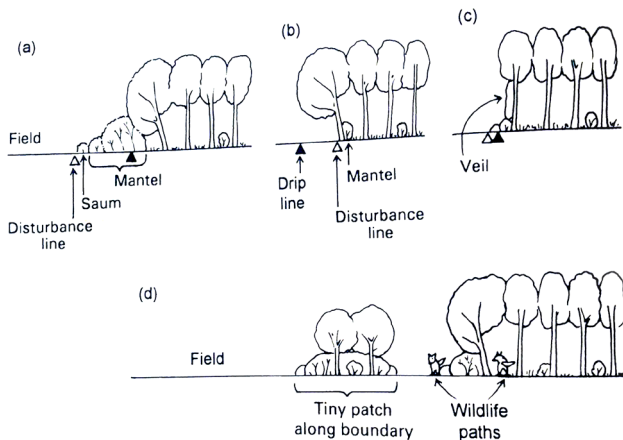
Forman pointed out the spatial form of the boundary zone. “A border is the line separating the edges of adjacent landscape elements. The two edges combined compose the boundary or boundary zone” (Forman, 1995).

The boundary zone is vital in ecology. Wind blow nutrient particles, which often accumulate in edges, thus brought about rich soil and edge species such as elderberry, nettle and bedstraw.

Moreover, the humans play important roles in maintaining the boundary. Forman mentioned the function of filters in the boundary to controlling the people entering a natural resource area (Forman,1995).

Another meaningful terms are the **curvilinearity& width** of boundaries. The width, understood as eco-tone, could represent the transitional environment between two environments. The increased curvilinearity will activate the species movements across the boundaries.

All in all, the boundary & edge dimensions represent the width, including height and stratification and length along the boundary includes overall curvilinearity, as well as the arrangement of lobes, coves, and other boundary surfaces along the border (Forman,1995).



WIDTH AND CURVILINEARITY

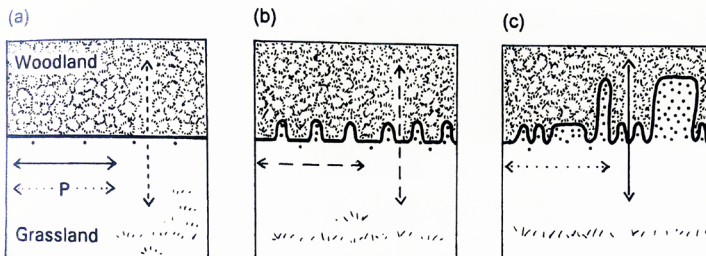


Image Source : Forman, 1995

BOUNDARY IN SOCIAL DIMENSION

The differentiated space that boundary defined also reflect between ownership and use, public and private, history and future. Boundaries finite social effects (Borden,2000).

How can we conceive of the boundary? Georg Simmel noted that social and urban boundaries make social orders more concrete, more intensely experienced, and clarify conflictual relations (Simmel, 1997, as cited in Borden, 2000). The differential environment, ownership between inside and outside usually put the boundary in a conflicted condition. And this tension is aggravated in the context of estate landscape.

In the estates landscape, the elites and noble use flowing water, shrubs, walls, fences to declare their own territory and maintain bridge, passage to connect which enables each part could function together. The past boundary in estate is functional and programmatic. The current huge grey infrastructure in the name of connecting disrupt the original estates landscape and became the insurmountable boundary.

Humans are edge species,

but by carving up the land and increasing edges enormously, we eliminate the key values of large patches, thus deraiding our landscape.

-Richard T. T. Forman 1995.

Previous Boundaries



explicit entrance



short shrubs to separate space

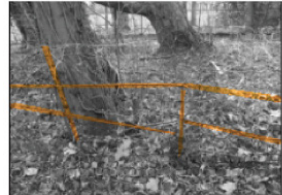


garden wall of the orchard

Current Boundaries



A linear, car-traffic access



fragments of the fence



unrecognized garden wall

PARADOXICAL BOUNDARIES

Under the context of estate landscape and the development trend towards continuity and transition, the boundary usually has paradoxical features.

Separation vs. Transition

the separation and transition are precondition of boundary and the two paradoxical composed the inner meaning of boundary.

Contiguity & Cross-Connectivity

On the one hand, Contiguity is highly advantageous for the rebuild of identity and functionality of estates landscape. On the other hand, contiguity conflicts with the fundamental urban principal of connectivity (Kullmann,2011)

The high accessibility reflecting on intact fragments will disrupt the contiguity of territory. To have a balance of contiguity and cross-connectivity, the junction will look for more layering separation.

Scenic & Programmatic

The scenic landscape remains an object of contemplation, reflecting of nature, beauty and scenery. Landscape constructions tend to 'naturalize' themselves over time, masking their artifice and rendering invisible their underlying ideology (Corner,1996).

On the opposite, there are one voice that emphasize understand landscape as time, network, event and production. Space has clear programmes for the exclusive use. Another will treat the space as a flowing, un-programmed surface enabling numerous programmes coexist.

Tangible & Intangible

The tangible composition of boundary influence how people will perceive and enter the territory. While the intangible boundary could deliver hidden landscape through social, sensorial experience.

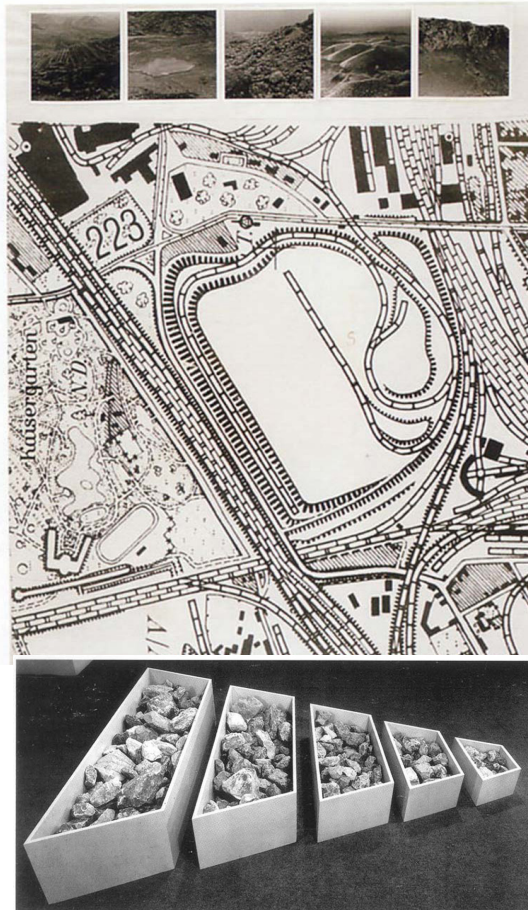


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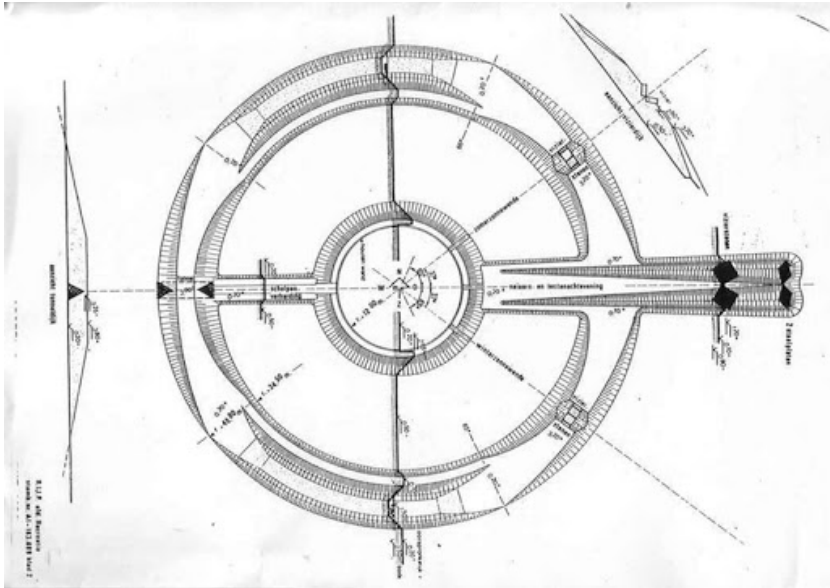
04

**PRECEDENT STUDY/
BOUNDARY CONCEPT/
BOUNDARY MANUAL/
BOUNDARIES APPROACHES/
CHRACTERIZED BOUNDARIES/**



The installation in the gallery of gravel, rocks, salt materials collected from mines or quarries, is described nonsite. For Smithson, the "site" was "the physical, raw reality" of a location while the "nonsite" was a sample of that reality displayed elsewhere. This relation between site and nonsite also reflect on the interplay of outdoors and indoors, there and here, open and closed (Barikin,2019).

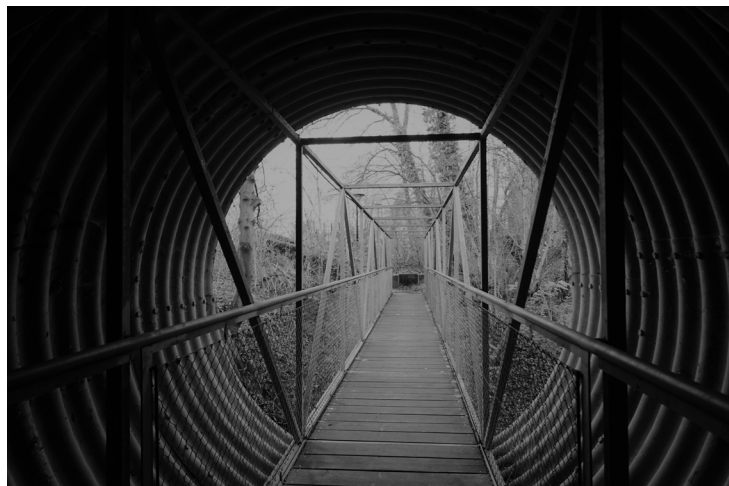
NON-SITE, 1968 - ROBERT SMITHSON



The artwork cites prehistoric sites used to observe the sun and planets, such as Stonehenge in Britain.

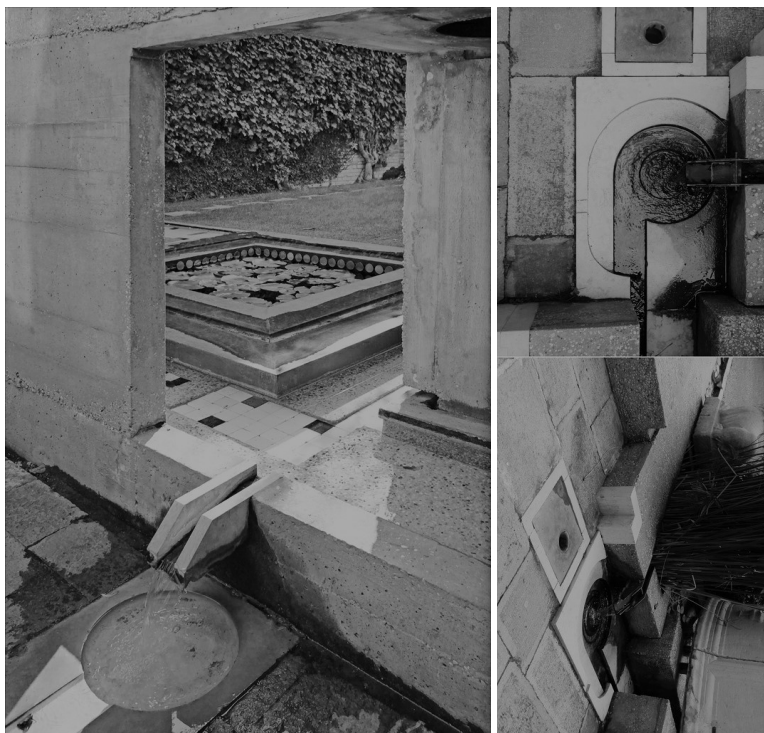
The observatory of Robert Morris consists of two concentric earthen walls. The three V-shaped incisions on the circle let you enjoy the field landscape. At the beginning of spring and autumn, the days and nights are the same, and the steel sun visor in the middle is fully aligned with the rising sun.

THE OBSERVATORY, 1971- ROBERT MORRIS



In the park project, George Descombes and his team designed a series of architectural interventions that not only achieve entertainment purposes, but also reveal the damage to the site's topography.

PARC DE SAUVY, 1980 - DESCOMBES, G.



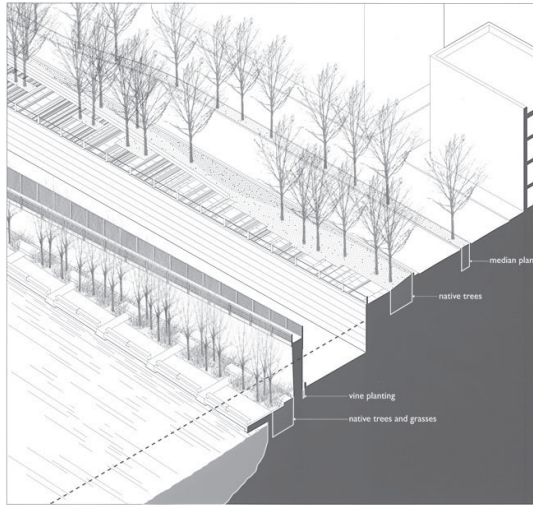
Carlo Scarpa's restoration work is a combination of old and new features as well as his superb skills in the use of materials. His main decorative element is water. In fact, it comes from the canal overlooking the building, and then enters the building through the partition extending along the inner wall, to a large pool made of copper, concrete and mosaic, and a small canal with two mazes.

QUERINI STAMPALIA, CARLO SCARPA



The weathered steel belt winds through a residential area in Copenhagen, forming a path, slide and air walk. The aim is to establish a visible connection between the indoor public swimming pool, the public school and the manor apartment building. It covers an area of about 500 square meters, is surrounded by wildflower meadows, passes through existing paths, and then connects with gentle ramps.

THE RIBBON, 2016 – HOLSCHER NORDBERG



The design of the park seeks every possible opportunity to improve the public use of edge spaces, thus creating a rich experience road from the upper urban park on the main regional highway to the lower park on the edge of the river. The lower layers are intentionally wild in their native plantations and can regenerate themselves after flooding or freezing. The upper floors offer a superb view of the river from the refined bluestone sidewalk planted with stately London aircraft trees.

ALLEGHENY RIVERFRONT PARK

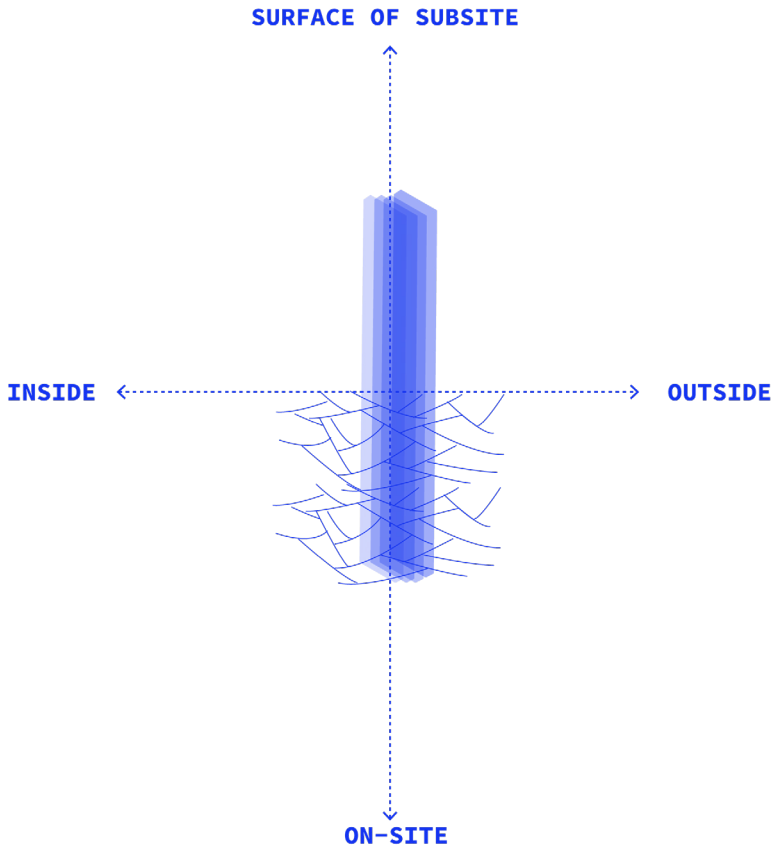
BOUNDARY CONCEPT



04

04

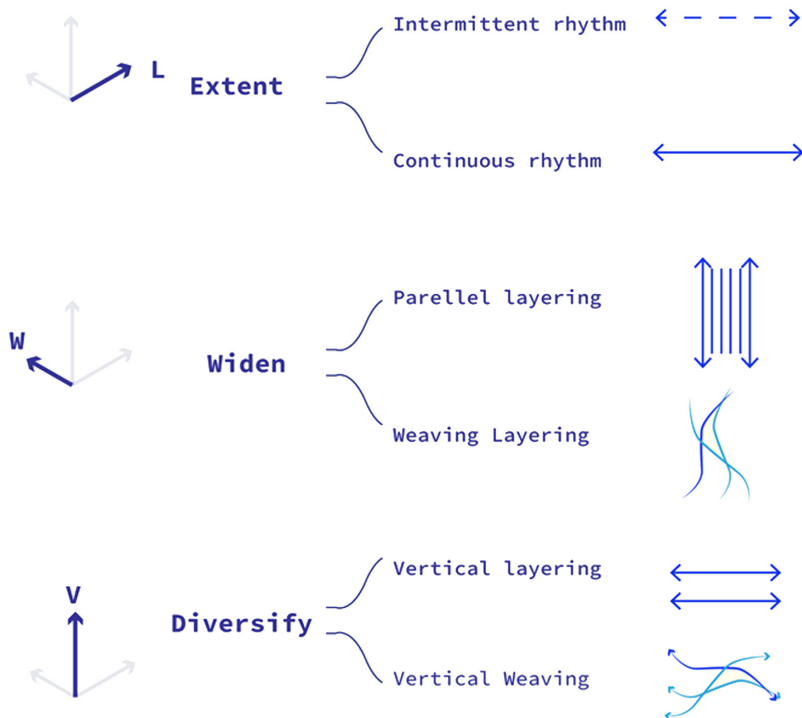
The boundary concept is not limited on spatial elements, but more like a container including spatial, ecological and social influences. Here comes with the redefining of boundary concept, between inside and outside, surface and on-site. According to the spatial definition of boundary, the boundary lens (topo-layer, eco-tone, social-layer) will be applied on site.



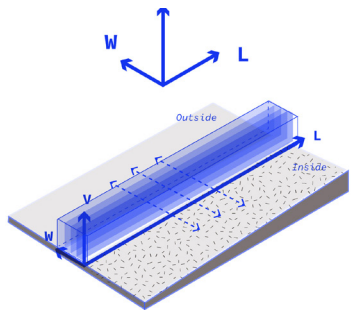
Boundary approach will be summarized and generated from the study of theory, cases and diversified site condition. The four objects (theory framework, precedent study, site condition, boundary approaches) are interrelated and researched back and forth.

The aim of boundary approach is to offer design strategy and toolbox for distinctive site environments with subtle intervention.

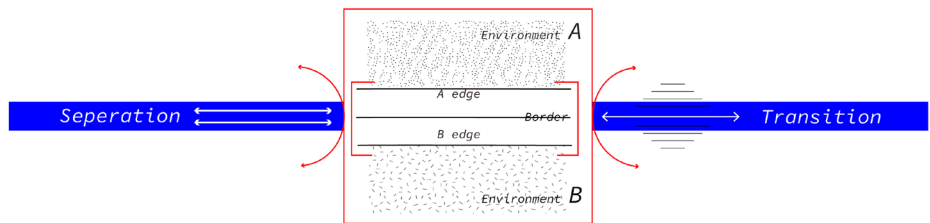
From theory research, the boundary Manuel is proposed. The main spatial dimension (verticality, length, width, materiality...) correspond to the boundary lens analysis - topo-layer, social-layer and eco-tone. And for each dimension of boundary, there comes with boundary design strategy.



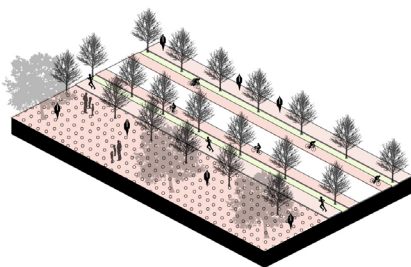
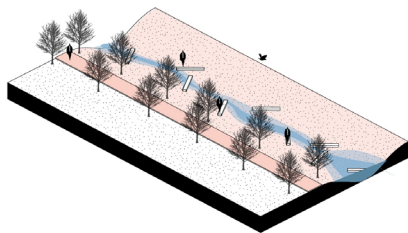
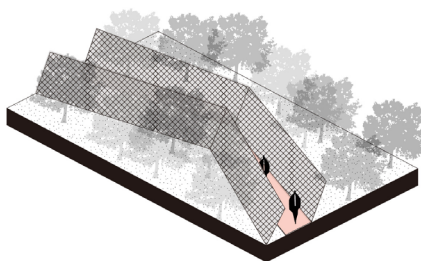
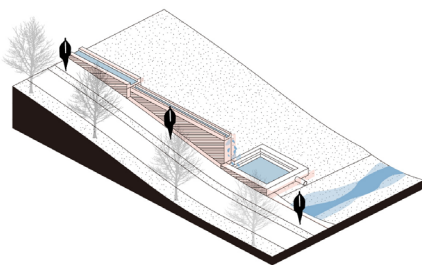
BOUNDARY MANUAL



Relations	Discourse	Dimension	Scale
A diagram with four arrows forming a square: 'Surface' at the top, 'Inside' on the left, 'Outside' on the right, and 'Onsite' at the bottom. The arrows connect the corners of the square.	public space entrances transitional space (eco-tone) ecological continuity topography Geomorphology Social Ecological Geographical	length Width Verticality	Regional Urban Estate ensemble

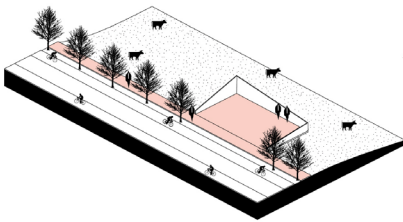


The boundary Manual seek to translate the influences of social, ecology and context to spatial language, which will build bridge from theory to analysis and design.

Thickening xxx A1Widening boundary spacexxx A2Connecting to water corridorContiguity xxx B1Continuous enclosurexxx B2Dynamic contiguity

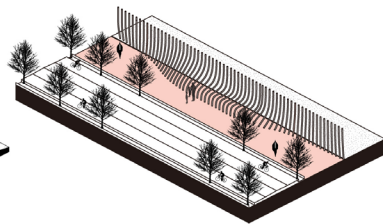
xxx xxx xxx A3

Creating more encountering space



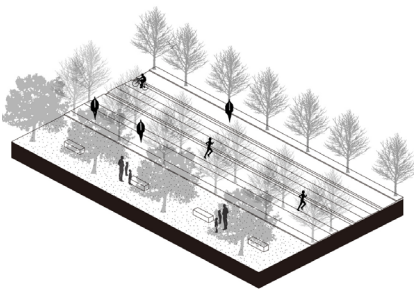
xxx xxx xxx A4

Urban furniture



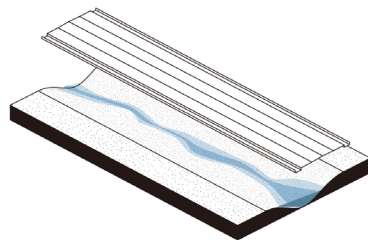
xxx xxx xxx B3

Horizontal separation



xxx xxx xxx B4

Vertical separation



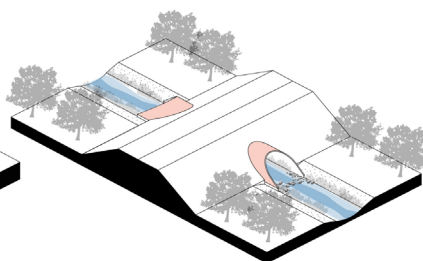
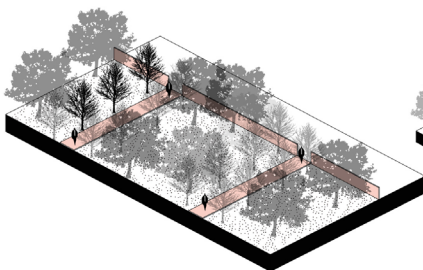
Threshold

xxx C1
xxx

xxx C2
xxx
xxx

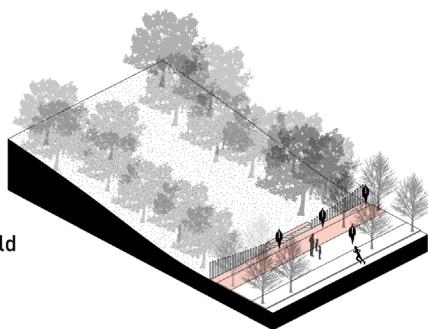
Increasing Accessibility

Water corridor



xxx
xxx
xxx
Porosity

visual threshold



composition



Material

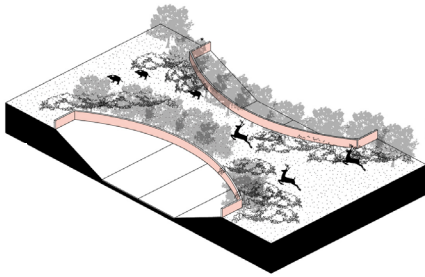


Sequence



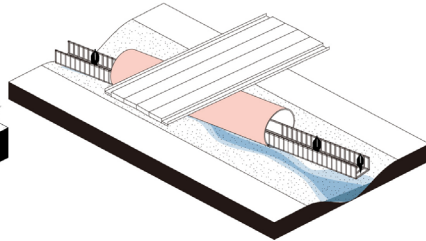
xxx
xxx C3
xxx

Animal ecoducts



xxx
xxx C4
xxx

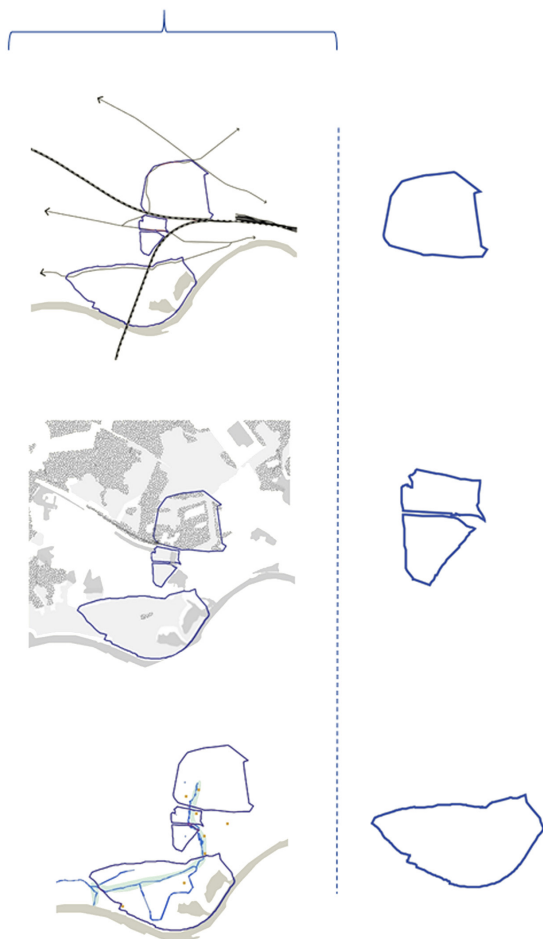
Encouter space



The current linear infrastructure, railway and highway, caused the current fragmentation of estate landscape. Even the site Mariendaal-Rosande is surrounded by urban environment, there still reveals continuous landscape patch along the stream. Moreover, the historical estates remaining are located along the stream. The water could be utilized as the new connection and boundary. The continuous gradient landscape could be enhanced by reconnecting the Slipbeek. While the spatial quality of Slipbeek is differential and the boundaries in different environment has different character through the boundary lens analysis. So, the boundaries approaches will be characterized into three topic.

CHARACTERIZED BOUNDARIES

Connecting Potentials



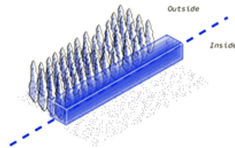


Differentiation

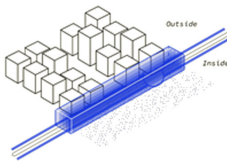
Outside Environment

Boundaries

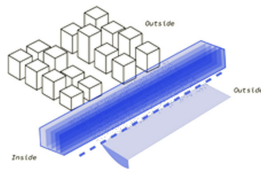
Inside Environment (Slipbeek)



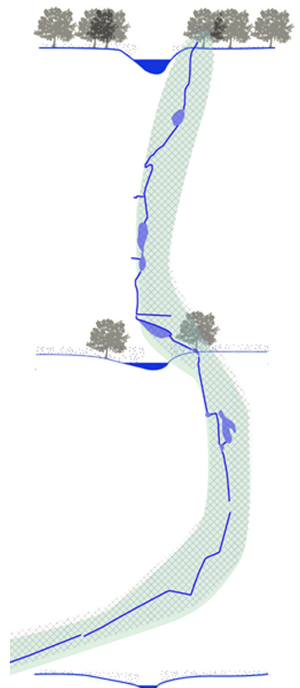
Boundaries between forest & Meadow



Boundaries between Urban & Rural

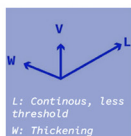
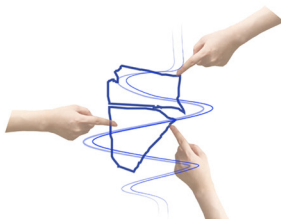


Boundaries between land and water

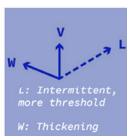
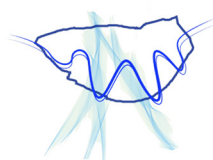


Mysterious Boundaries

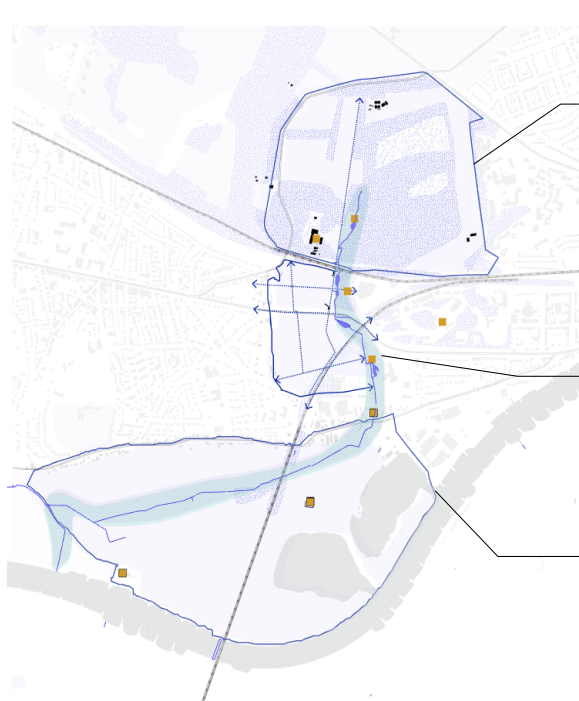
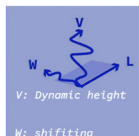
Slight Curve

Permeable Boundaries

Strong Curve

Shifting Boundaries

Nature Manipulation (Water)

*Roles of Water*

Upstream:
source water,
(adventure, hiking)

Middlestream:
water as connecting
water as boundary
(public space/ recreati

Downstream:
water as container
(water storage)

THE ROLE OF BOUNDARIES

The hidden stream, dug by people years ago, could be the new activating connection from north to south, from moraine to floodplain. The spatial experience along the stream is differentiated, so are the outer and inner environment. Based on the distinctive relations, the design of Mariendaal–Rosande will followed with three themes.

Inside Mariendaal – Mysterious Boundaries

The upstream in the Mariendaal is mysterious hidden in the forest with minimal intervention, reflecting on the character of estate landscape. The design will mainly focus on the outer boundary thus forming a more clear-cut impression of power landscape. The decomposing of outer boundary could help to decrease the recreation impact on estates and create a newly protective visiting way. The boundary will gauge, emphasize the topography of pushed-moraine zone, to choreograph visitor movements and the sequential revelation of views.

Outside Mariendaal – Permeable Boundaries

The middle stream was lost outside of the estate landscape during the urbanization process, turning into sub-urbanized segments. The main idea is to utilize stream as new boundary to reconnecting the inland open field to surrounding urban environment. Bring the stream to the greater green system, incorporating with public life, reconnecting to estates landscape are the main tasks.

Rosande – Shifting Boundaries

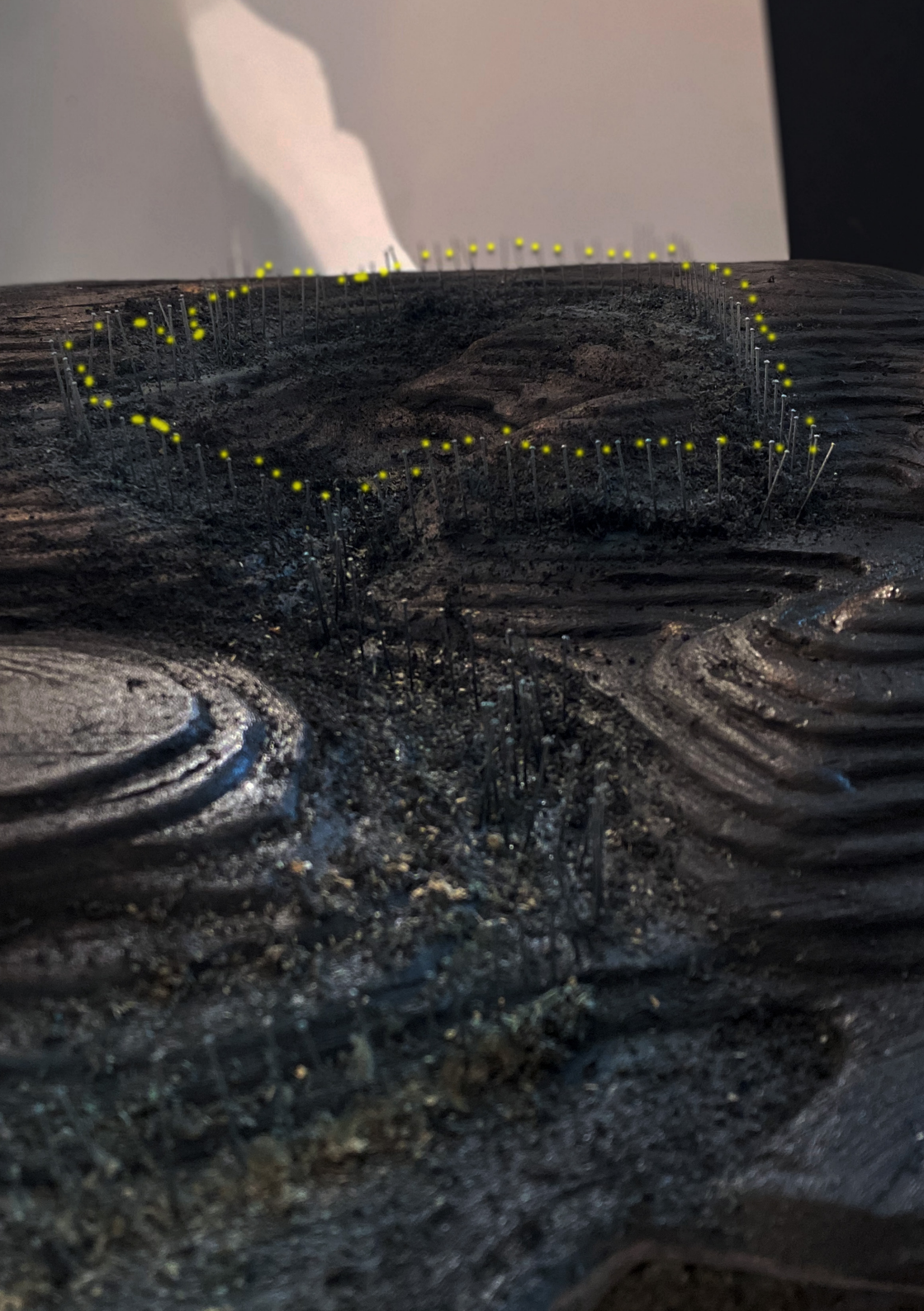
The downstream flows into the Rosande Polder and formed typical country landscape. The flood plain reveals on high uncertainty influenced by nature. Rosande will be viewed as whole boundary– intertidal between moraine to river. The intertidal zone and shifting boundaries, manipulated by nature process, will experience high tide, low tide, erosion and wind.

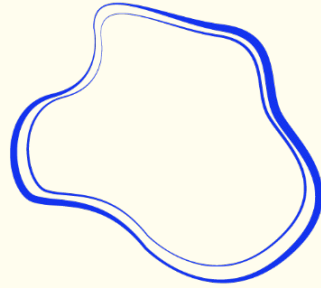
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MYSTERIOUS BOUNDARY
PEAMEABLE BOUNDARY
SHIFTING BOUNDARY

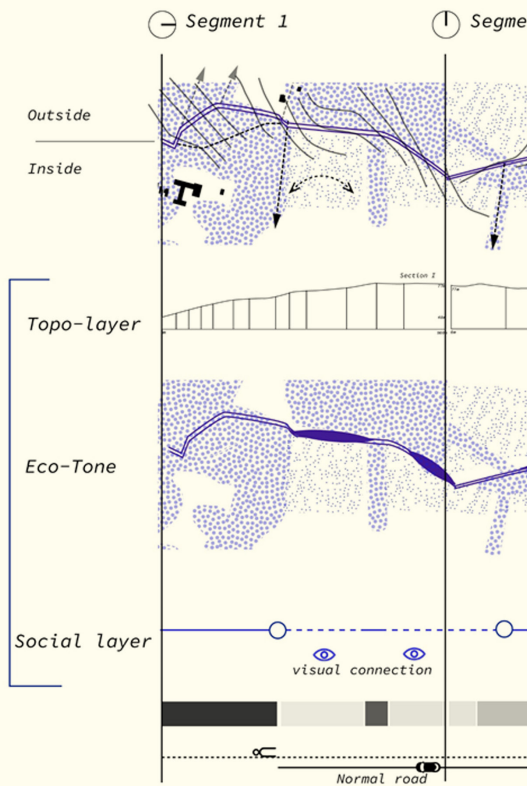




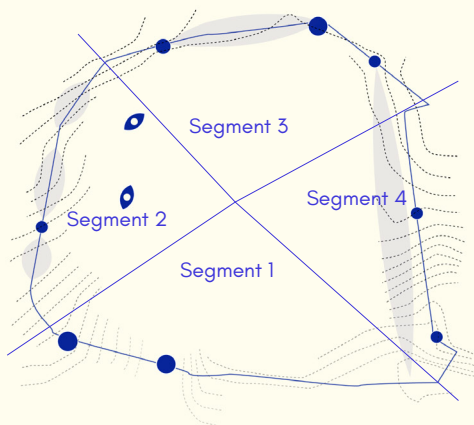
MYSTERIOUS BOUNDARIES

BOUNDARIES LENS

MYSTERIOUS BOUNDARIES



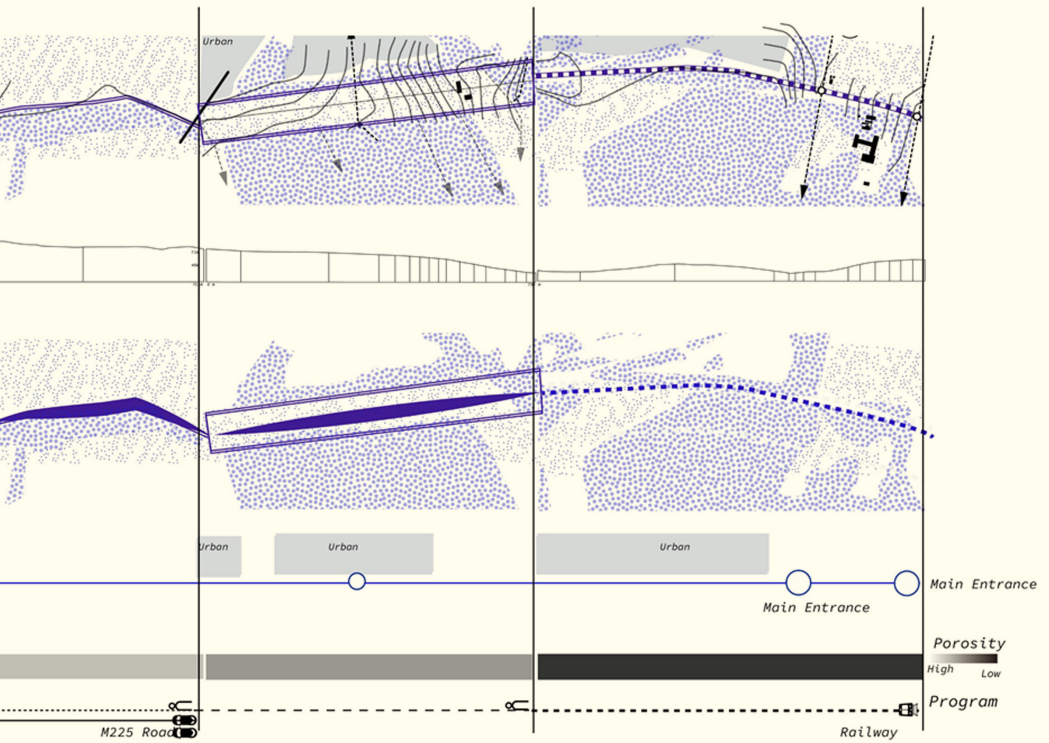
STEP 1



nt 2

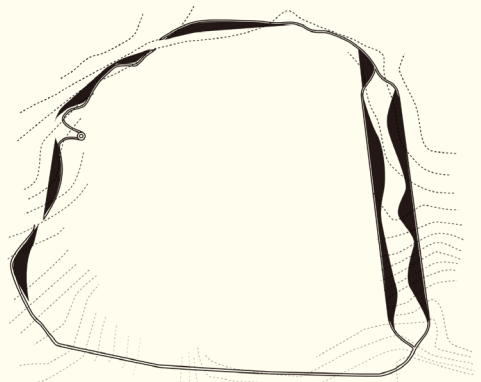
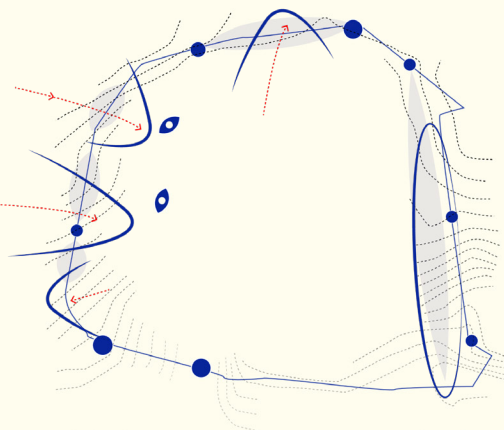
Segment 3

Segment 4



STEP 2

STEP 3



05

The outer boundaries of Mariendaal will be designed with one continuous route. The composition of different planting and design pavilion will create four different spatial experience. The segment 1 will emphasize the ground covering while the segment 2 will plant more relatively low shrub layer and the segment three will have higher shrub layer. And the segment 4 under the highway will have more flowering shrubs.

And different design pavilion will be connected to the planting layer. They together create space not only for people to visit but also for the animal to pass through.

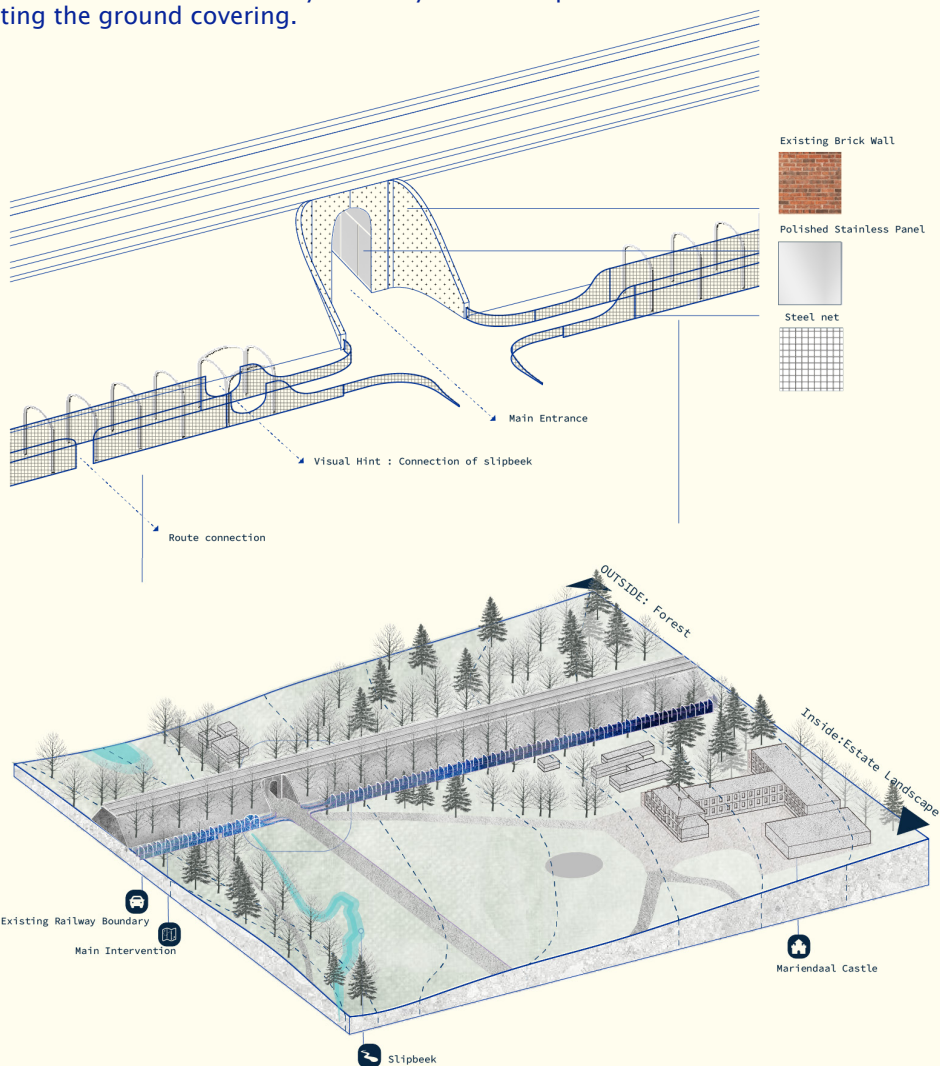


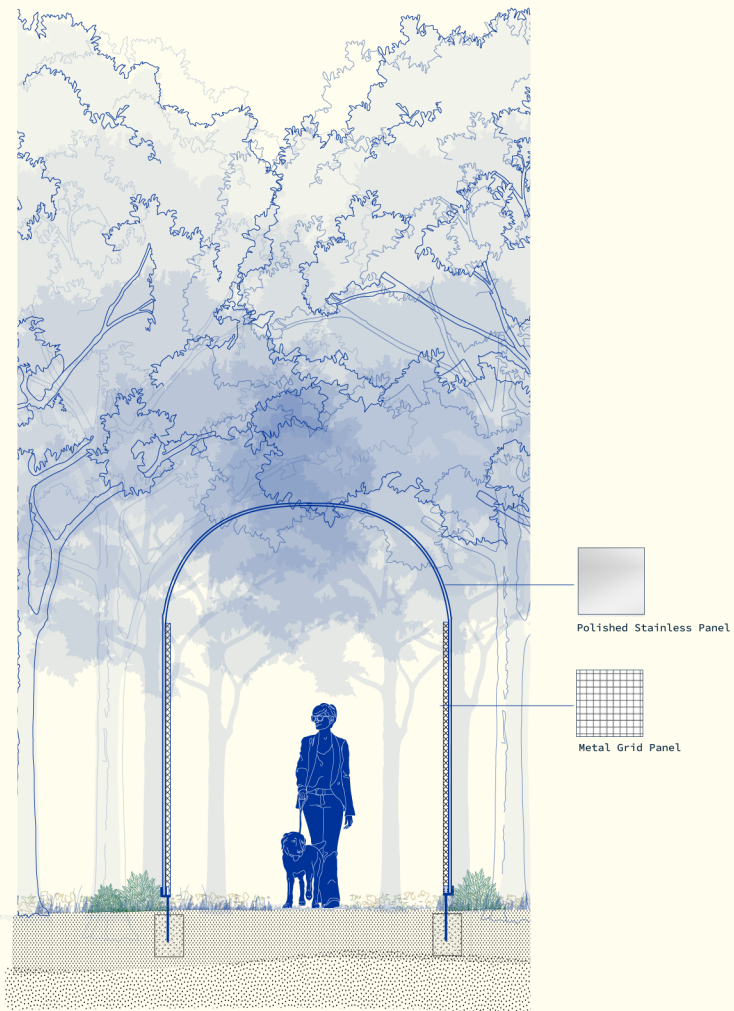
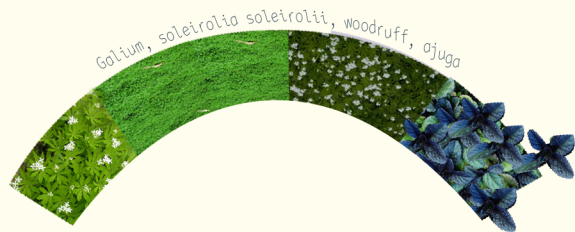
MASTER PLAN / DESIGN ANALYSIS



SEGMENT 1 -DESIGN NODE: NEW BEDSTEE

The railway is not only the boundary between inside Mariendaal and outside, but also it breaks the continuous Slipbeek. The new structure, the bedstee will use the original boundary route and emphasize the historical entrance relic and form a newly fresh mysterious experience with the planting the ground covering.

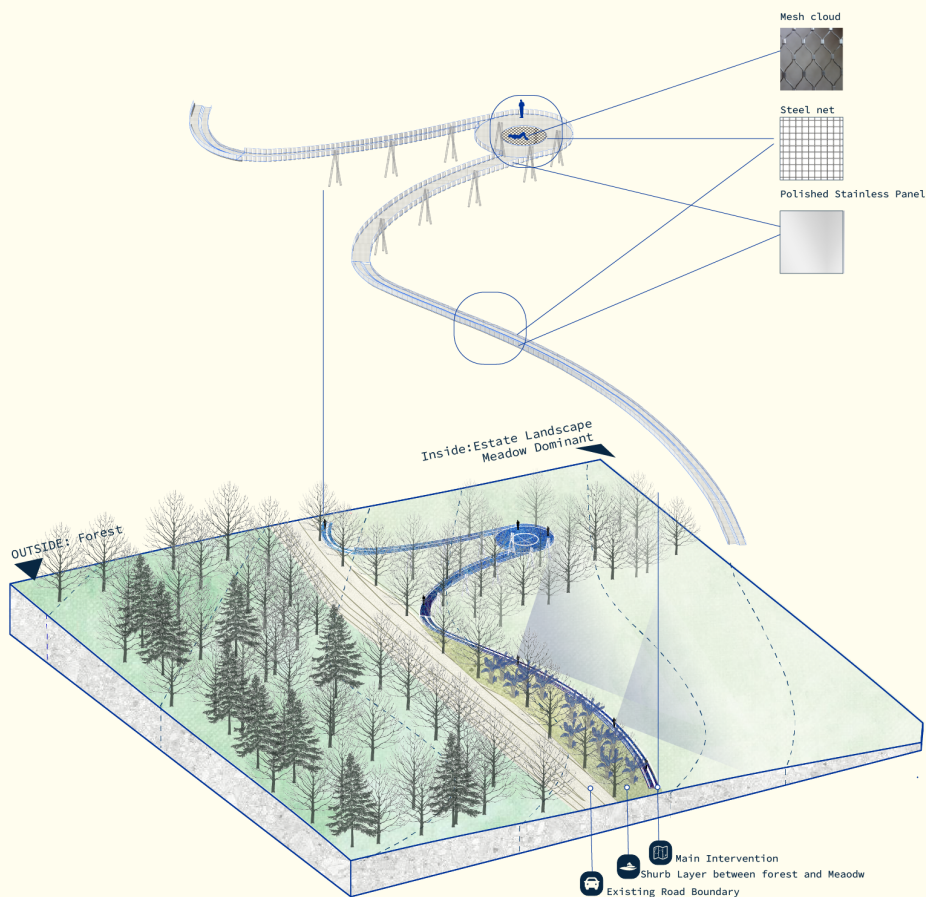




DETAIL - Forbidden Tunnel
1:50

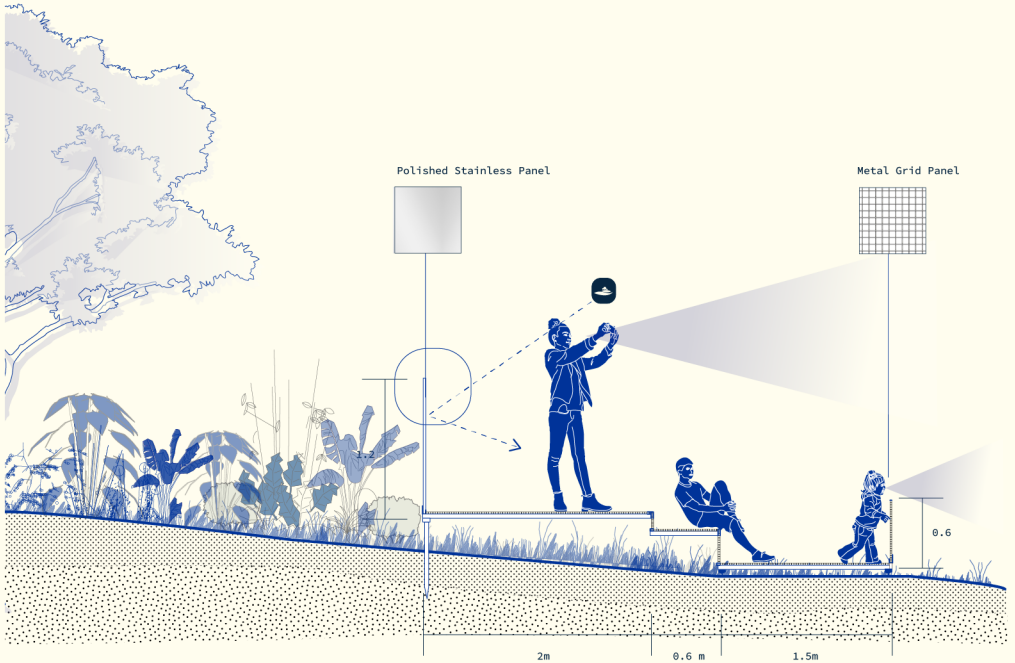
SEGMENT 2 - DESIGN NODE: BALCONY

The boundary in segment 2 towards the open meadow area in Mariendaal will more be shared and participated in the inside environment. The added shrub layer between forest and meadow separate the pedestrians from the traffic and allow the inside Mariendaal become a moving view for people. The new structure, like a balcony, enabling people to share the view inside while the structure itself composed a clear impressive border.





Environment Reflection On the polished stainless panel

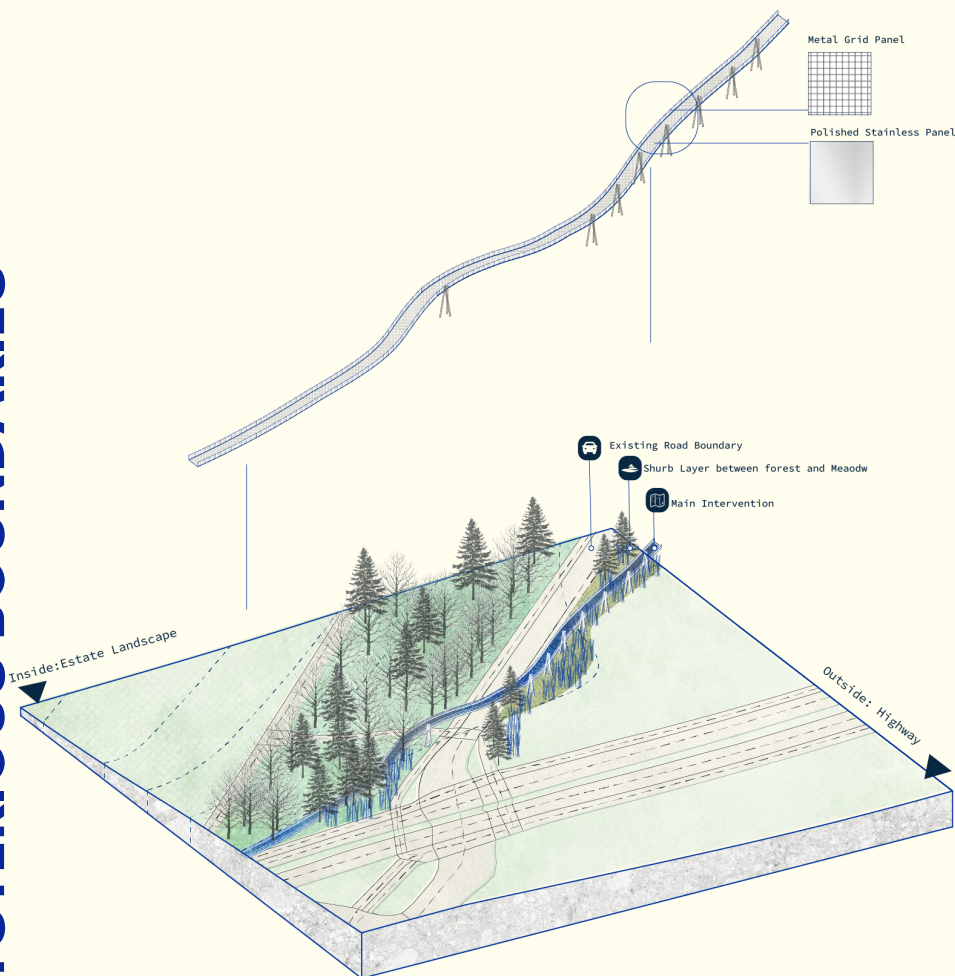


DETAIL - Balcony
1:50

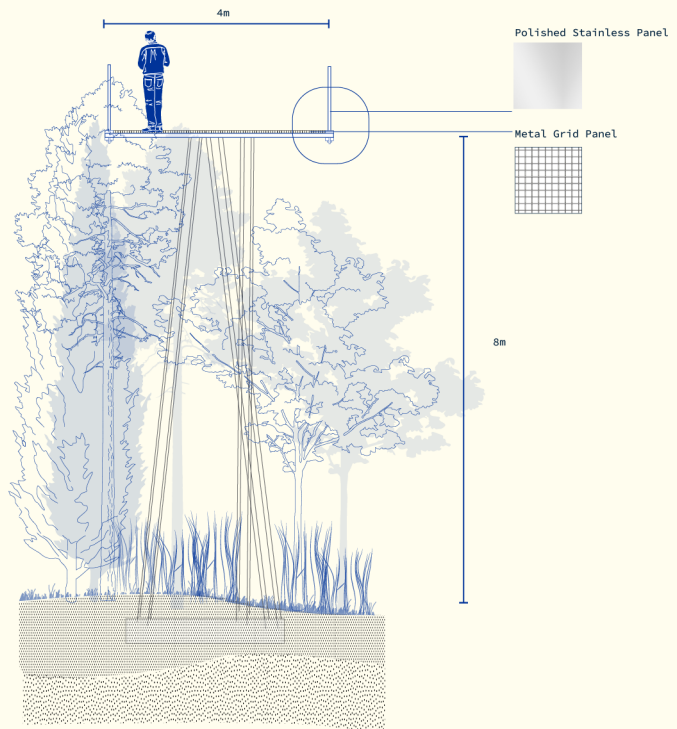
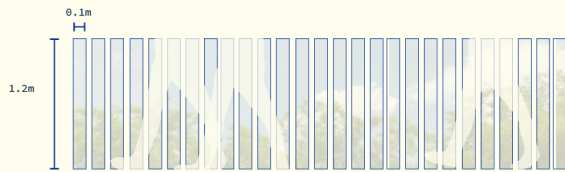
SEGMENT 3 - DESIGN NODE: ELEVATED TRAIL

The segment 3 is near to the highway and also blocked by the dense forest so it is hard to have visual connection with inside. The boundary along the segment 3 together with the forest trail will form a newly heritage impression for the nearby passing people in the highway.

MYSTERIOUS BOUNDARIES



Amerikaanse Kornoelje, Junipers, witte kornoelje

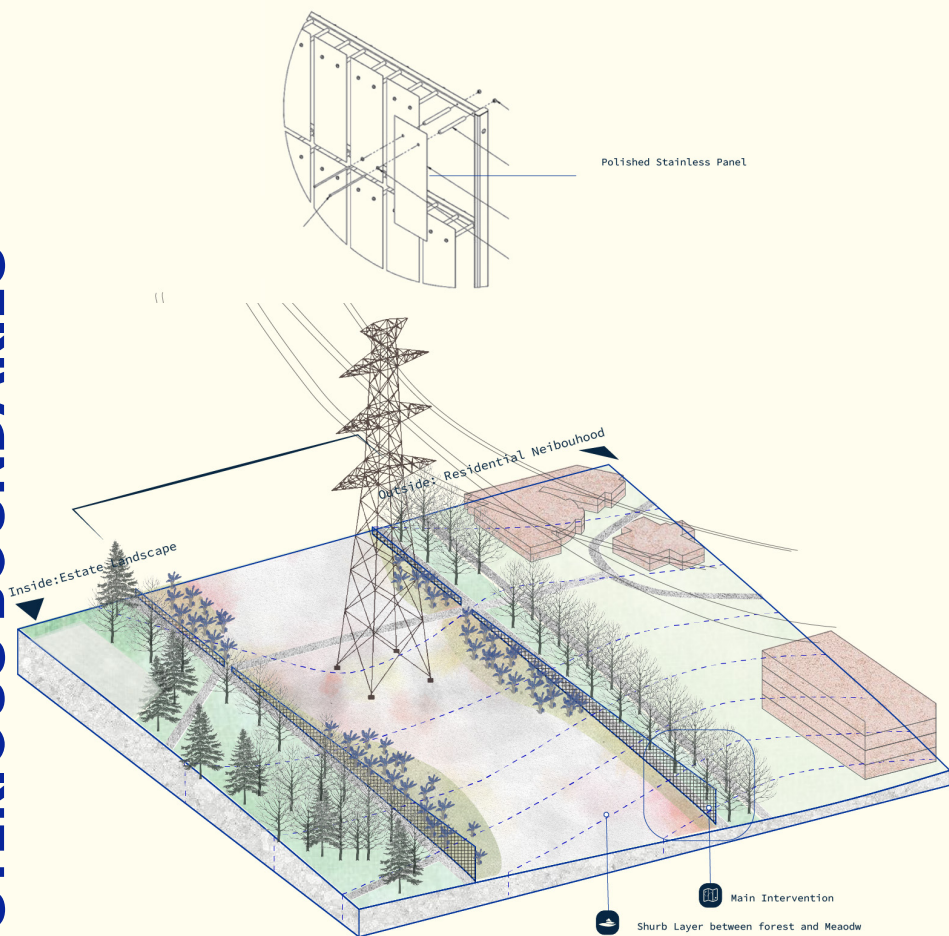


DETAIL - Elevated Trail
1:100

SEGMENT 4 - DESIGN NODE: DANCING WALL

The segment 3 is one empty, low-utilized area, with powerline in the middle. Instead treating this area as negative, forbidden space, It could be the transitional area between forest. It will be the powerline corridor, low shrub and grass dominated this area.

.The dancing wall is designed by moveable polished stainless panel which will flow by wind, bringing the intangible feeling of boundaries to people.



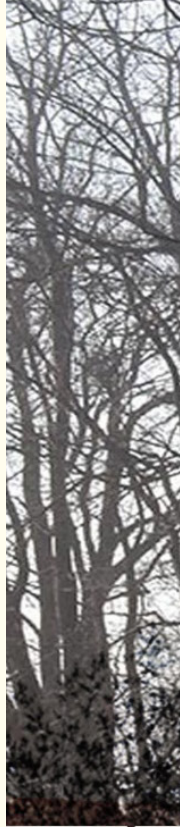
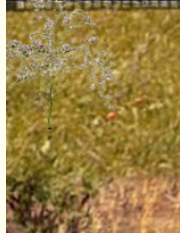


DETAIL - Dancing Wall
1:50

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MYSTERIOUS BOUNDARIES

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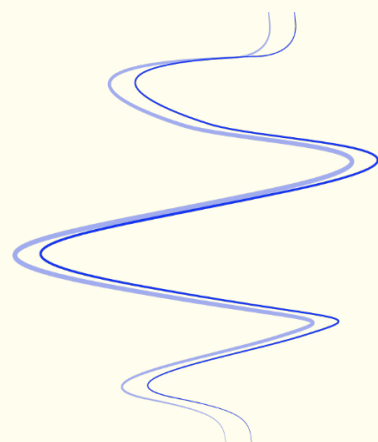
Boundary Impression from the inside





Boundary Impression from the outside.





PERMEABLE BOUNDARIES

BETWEENNESS
TANGIBLE & INTANGIBLE BOUNDARIES

BOUNDARIES LENS

From the boundaries lens, this area is most fragmented by the railway the Utrechtweg . The design will focus on the connection of Slipbeek while decrease the barrier of railway.

Design intervention will be focused on the disconnecting parts, using them to stitch up the gaps while also connecting to nearby neighbourhood. With the widening riparian space, the barrier of railway will decrease, the connection between inside open filed and outer urban environment could establish.

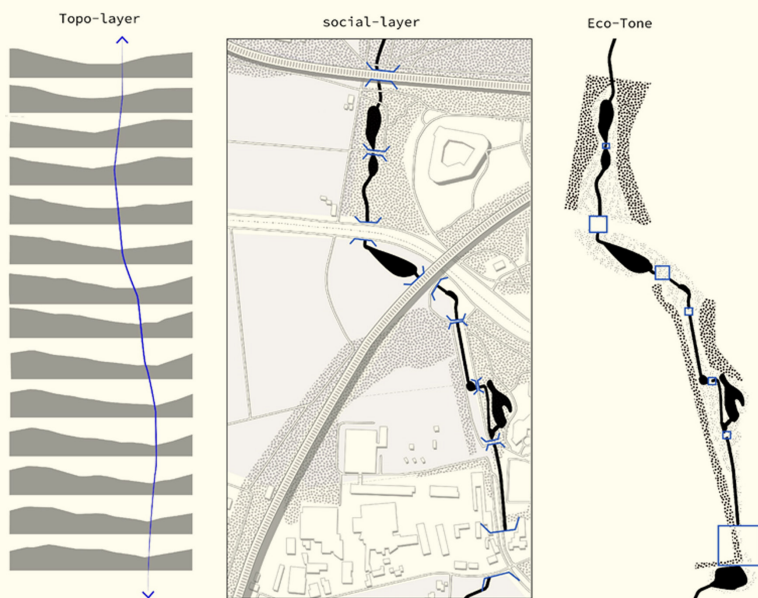
PERMEABLE BOUNDARIES

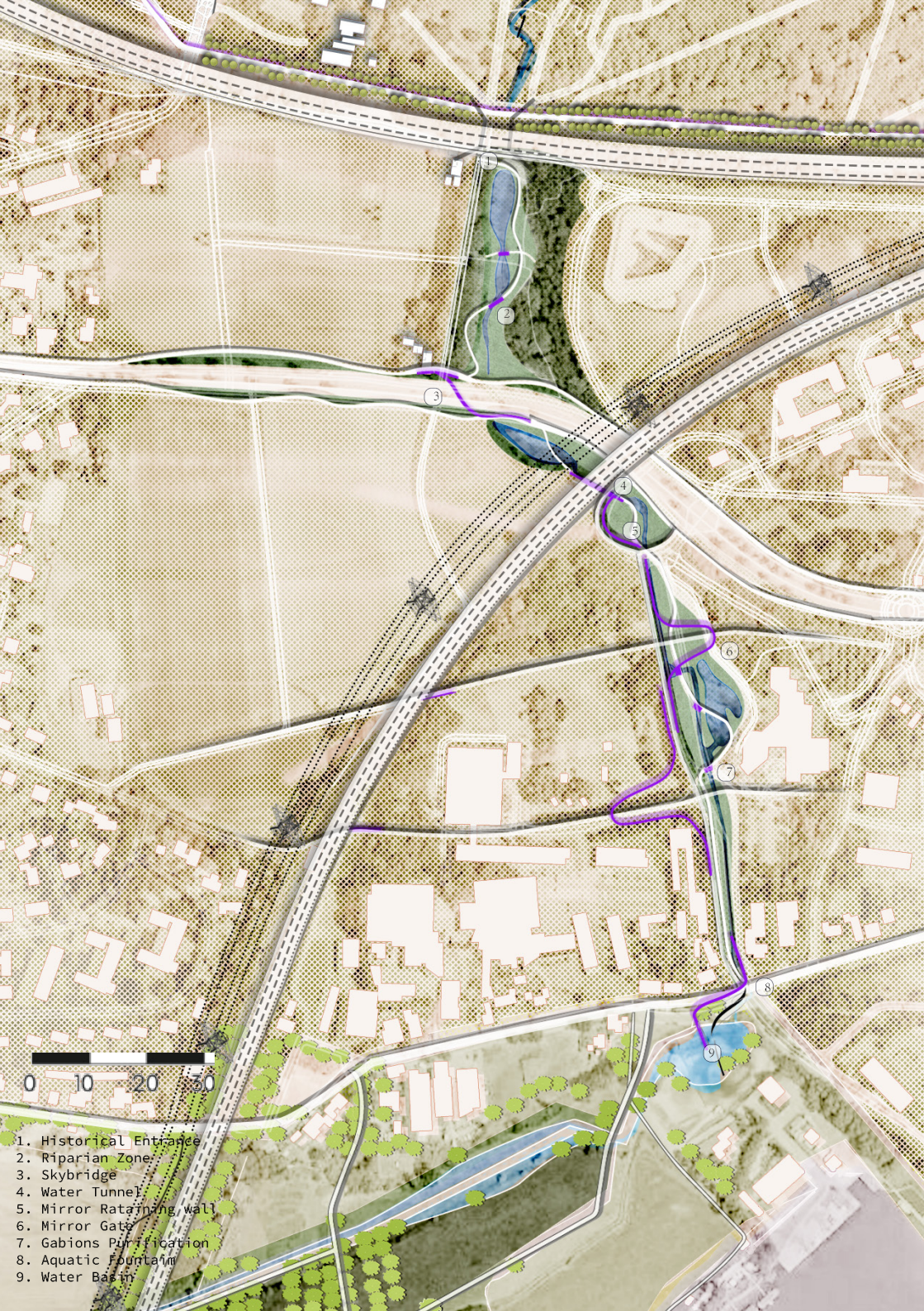
Step 1 RELOCATING THE BOUNDARIES - Slipbeek as new boundaries

Step 2 Adding Riparian Zone

Step 3 Design Intervention Sticking Up the gaps

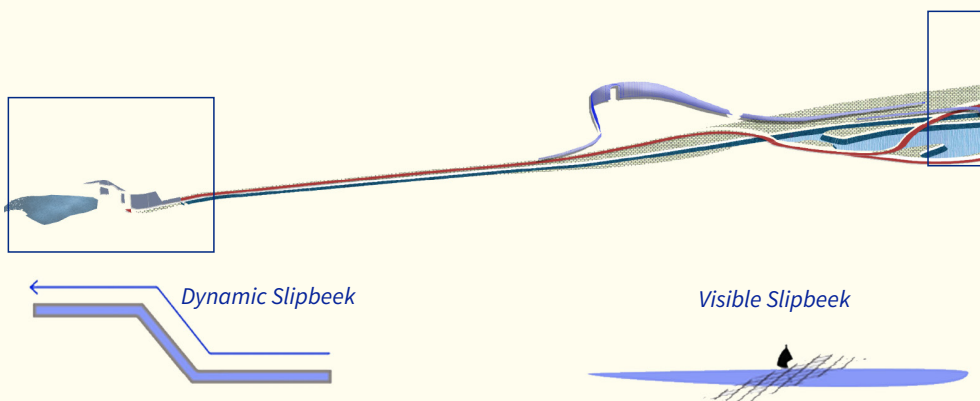
Step 4 Connecting to nearby neighborhood

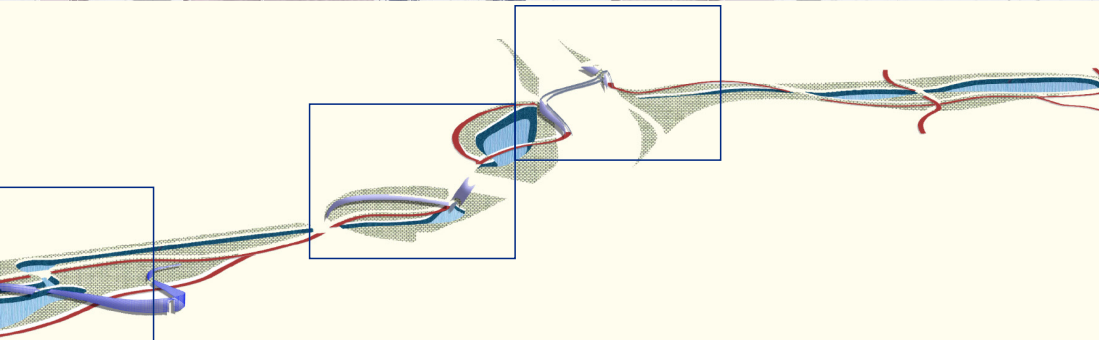




- 1. Historical Entrance
- 2. Riparian Zone
- 3. Skybridge
- 4. Water Tunnel
- 5. Mirror Retaining Wall
- 6. Mirror Gate
- 7. Gabions Purification
- 8. Aquatic Fountain
- 9. Water Basin

PERMEABLE BOUNDARIES

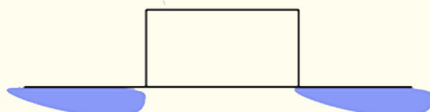




Tunnel under the railway



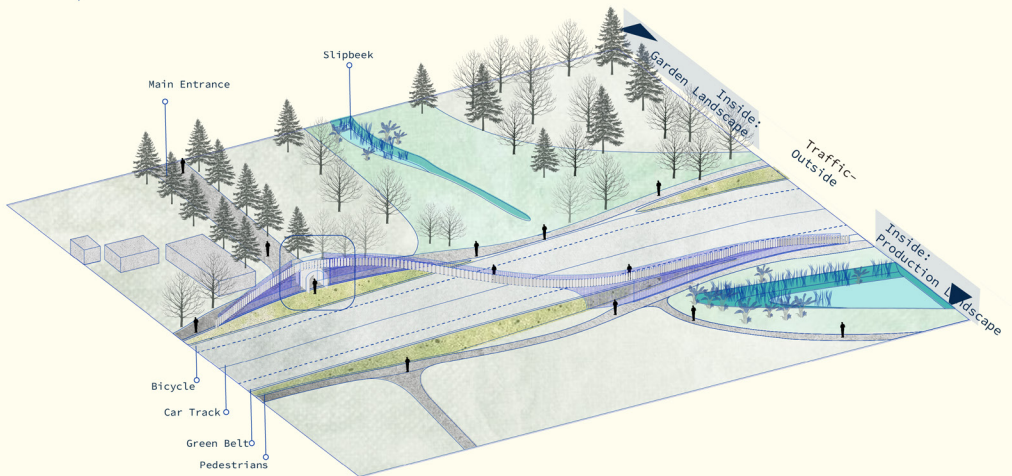
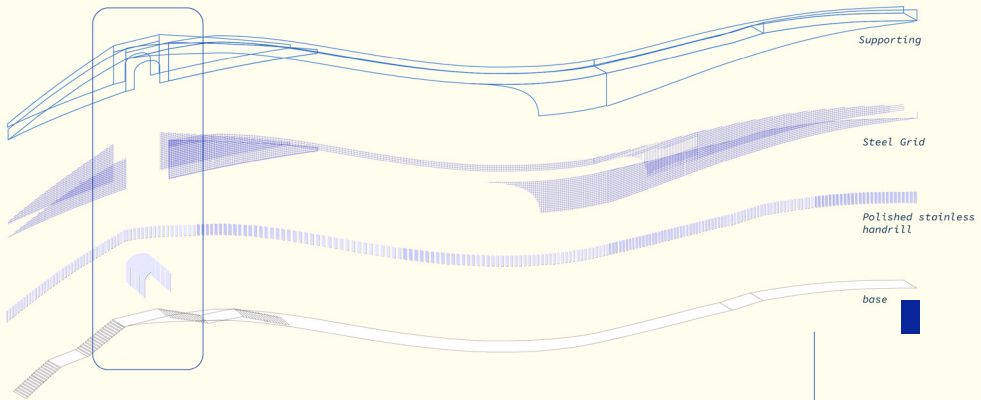
▲ Skybridge over the road





Historical Entrance of Mariendaal

DESIGN NODE SKYBRIDGE



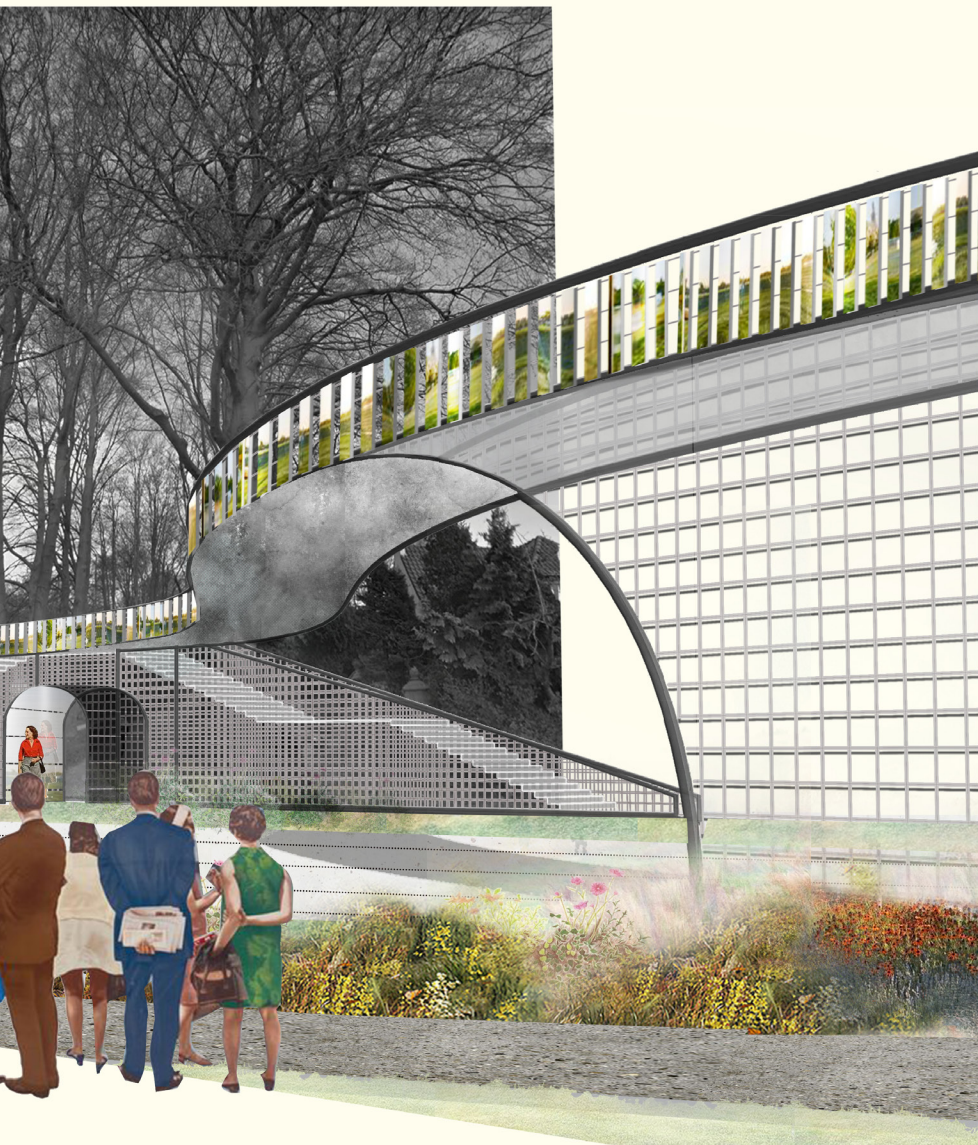
PERMEABLE BOUNDARIES

The movements has changed from disconnected to more coherent. People won't directly go into the estate from the road. Instead, they will be guided from two sides and then go to the main entrance avenue.

The shrub layer will separate the traffic lines, and the arch under the bridge becomes a symbolic gate

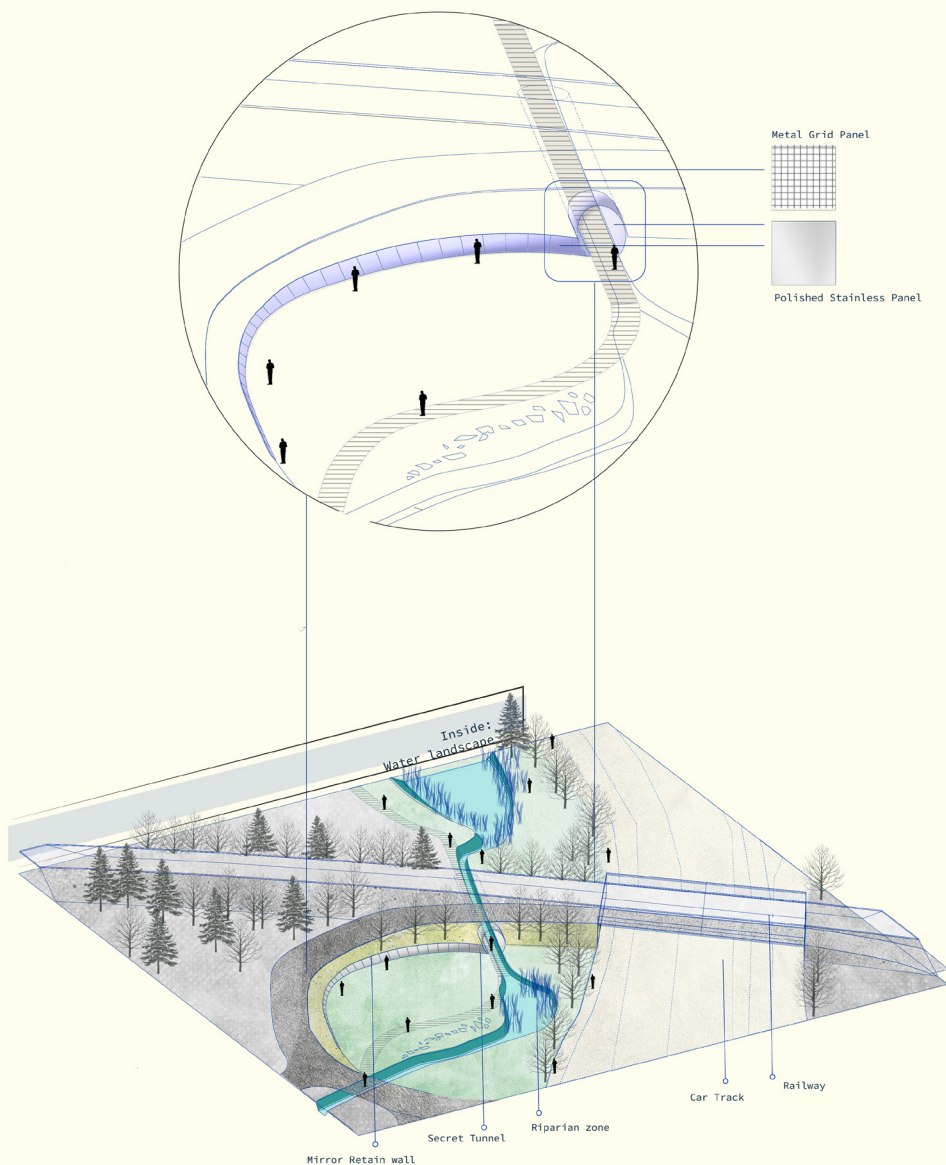


DESIGN NODE
SKYBRIDGE

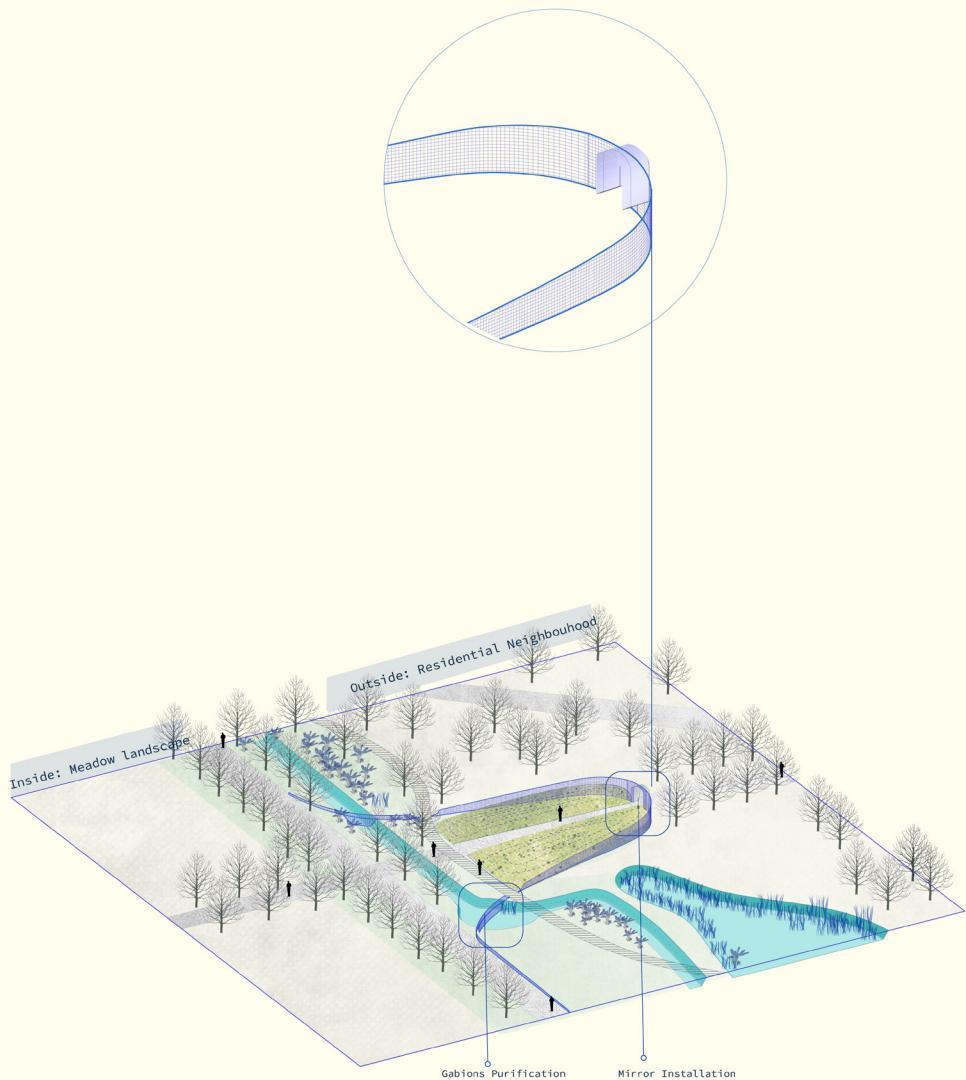


DESIGN NODE NEW BEDSTEE

PERMEABLE BOUNDARIES



DESIGN NODE
GRID RETAINING WALL



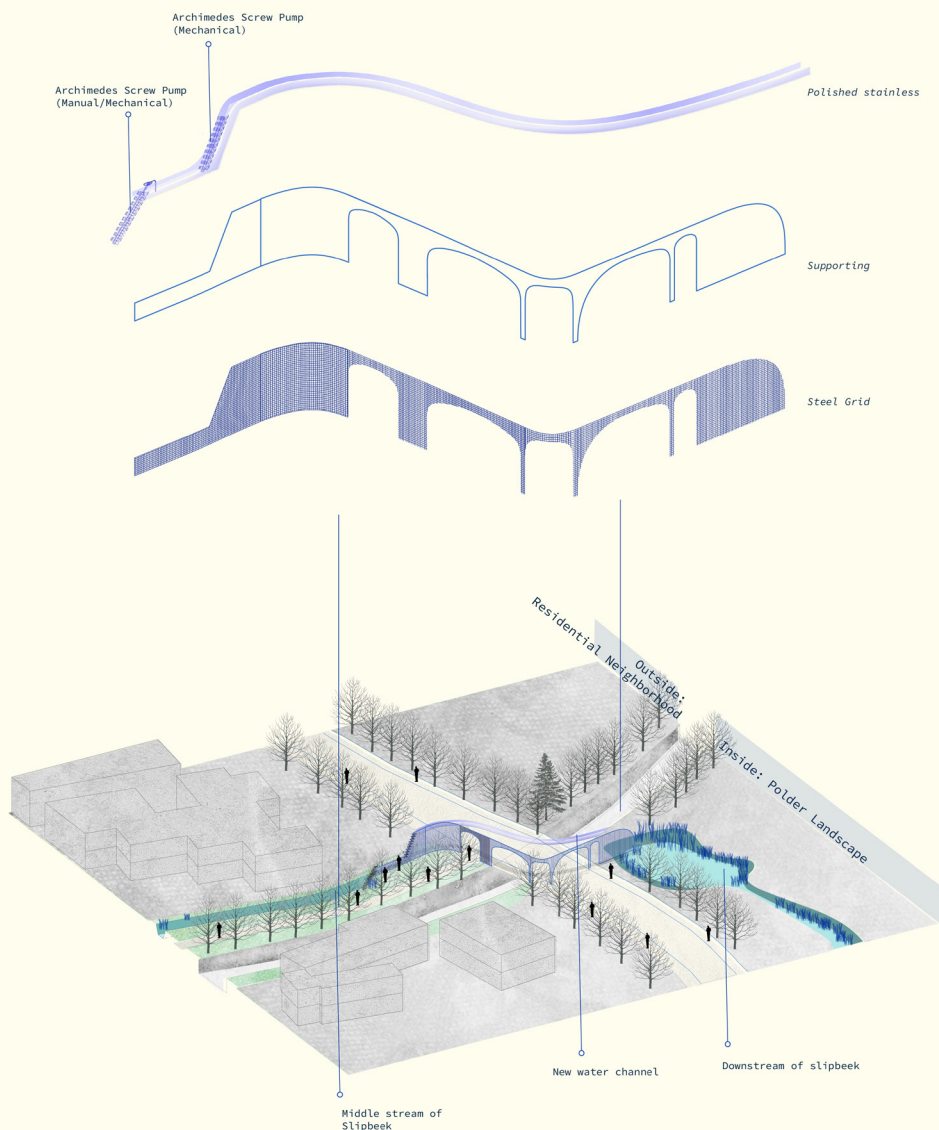






Historical Water Mill

DESIGN NODE AQUATIC BOND

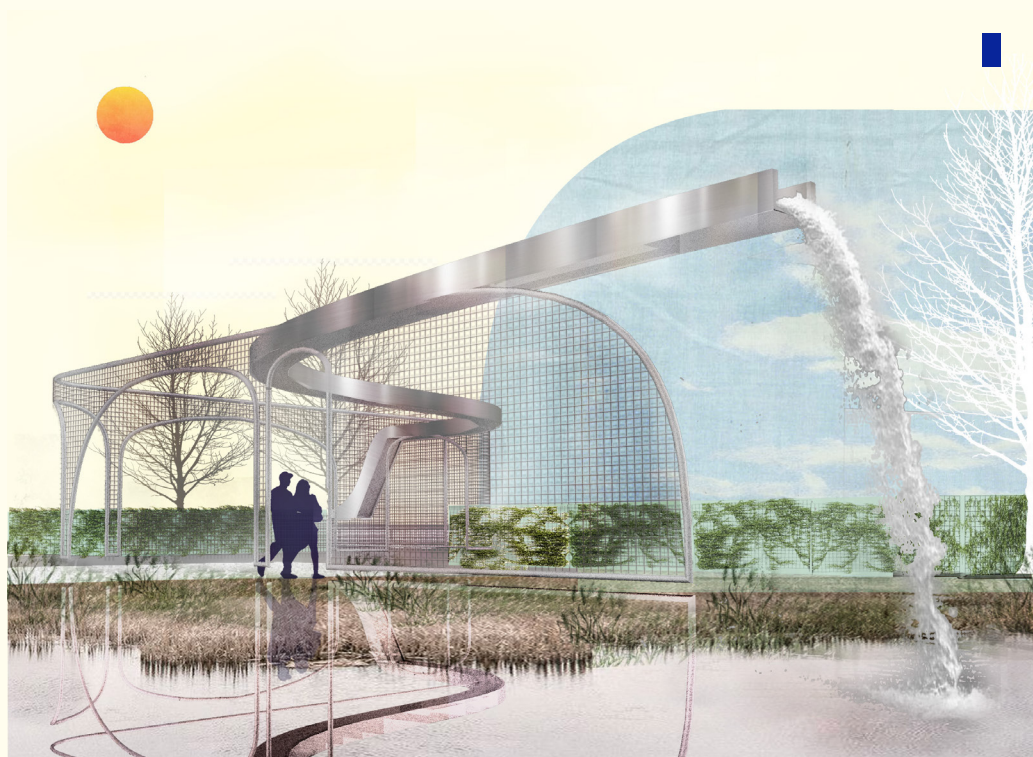


The presence of Slipbeek will be reconnected by the two-screw pump. The lower one is combined mechanical and manual while the upper one is mechanical the water will be flowed into the stainless tube and then directly drop into the retention pool in Rosande.

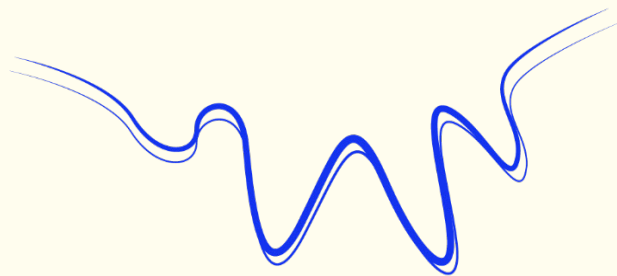
This intervention will build new image of Slipbeek and better guided the people's movements. People can participate in the process of Slipbeek with the screw pump.

The boundary is intangible here, with sound of falling water. This intervention will reconnect the middle Slipbeek and the Rosande polder.









SHIFTING BOUNDARIES

BETWEENNESS
TANGIBLE & INTANGIBLE BOUNDARIES

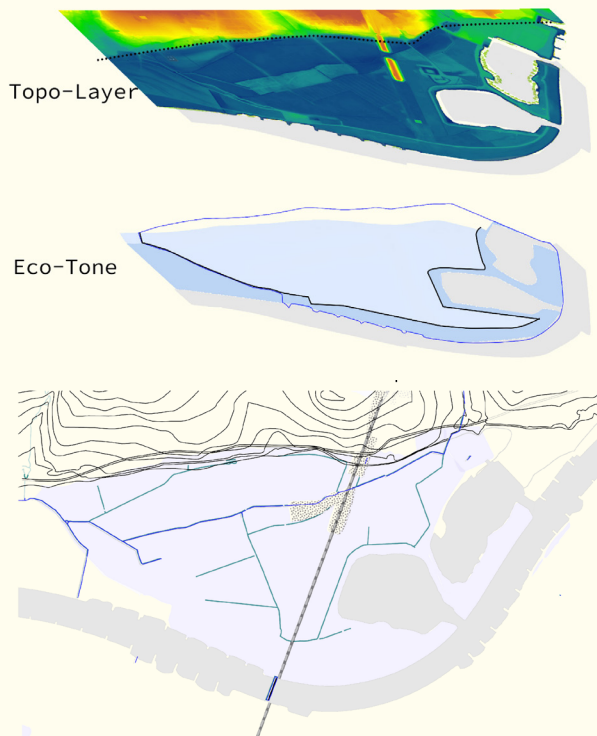
BOUNDARIES LENS

From the topo layer, the current Rosande has little height difference, and the downstream is quite narrow.

Therefore, it brought about the uncertainty of flood. The whole territory is flooded plain. The water level is easily higher than the summer dike. The main idea is to add a second water channel near to the existing pools and this shape followed the historical river meandering. The Excavated soil will be filled in the relevant highland. Therefore, this area has more obvious height difference.

Thus, forming a shifting boundary overall, when the time changes, the boundary between water and land will shifting.

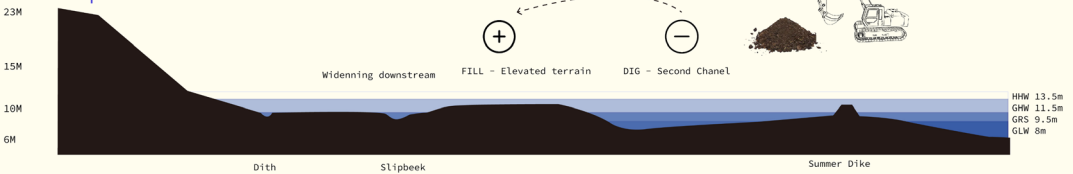
SHIFTING BOUNDARIES



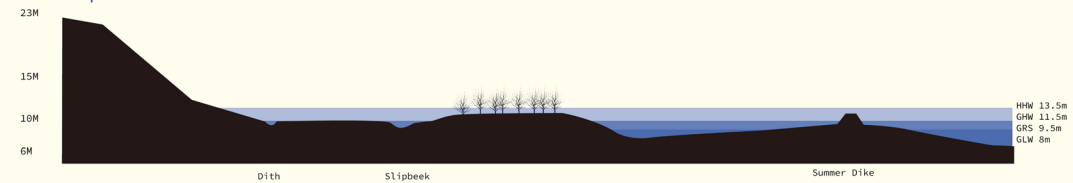
Step 1 Read the current topography



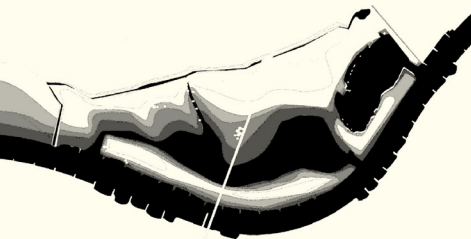
Step 2 Add second Water Channel



Step 3 Plant the willow bank



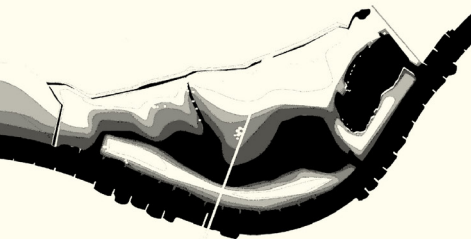
Low water level 8m



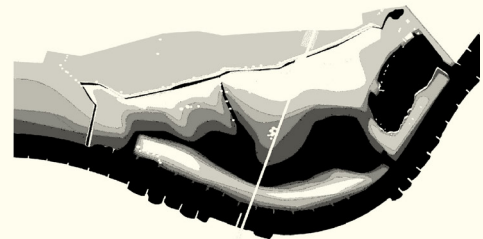
Normal water level 9.5m

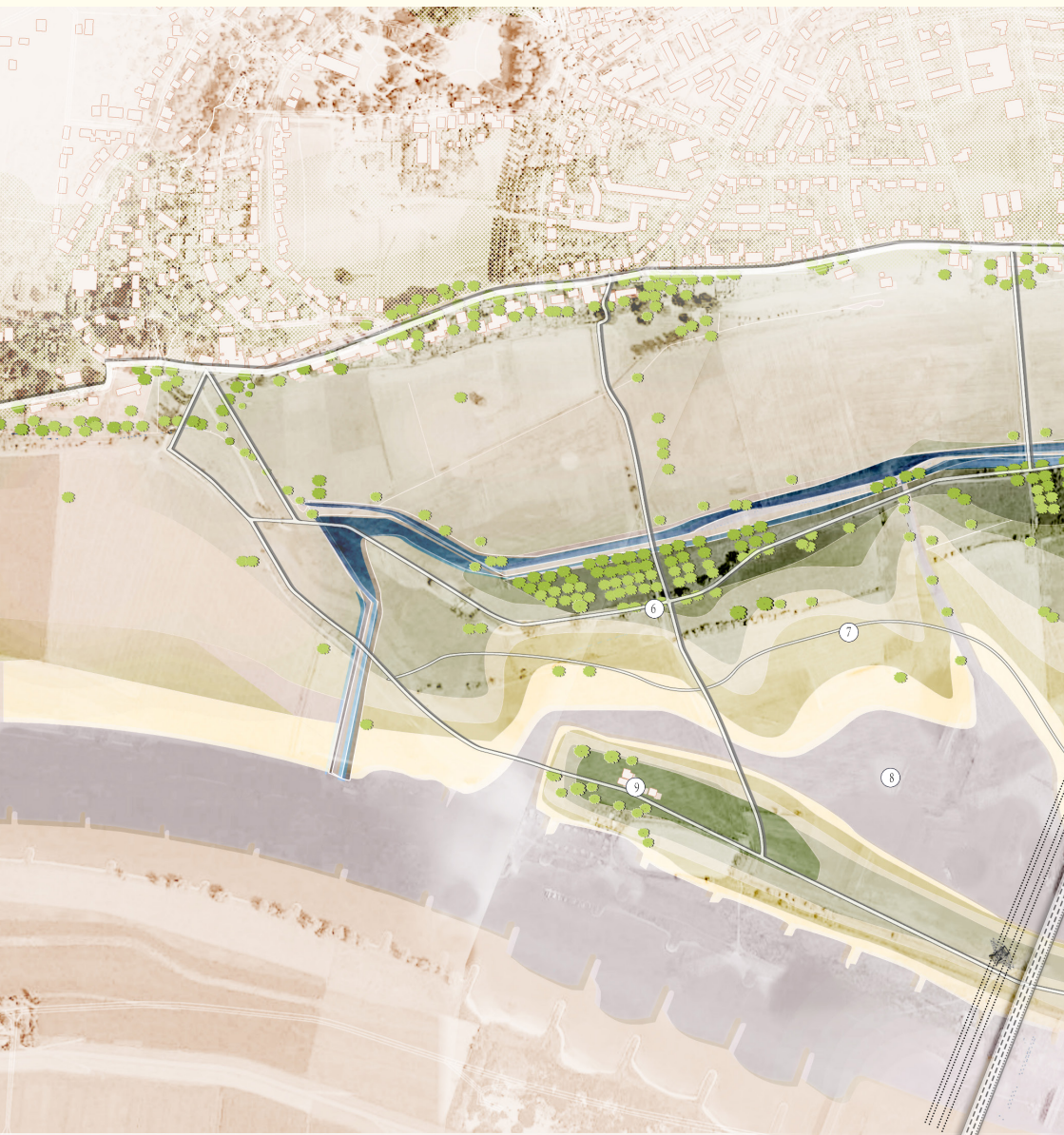


High water level 11.5m



Extreme weather >12m





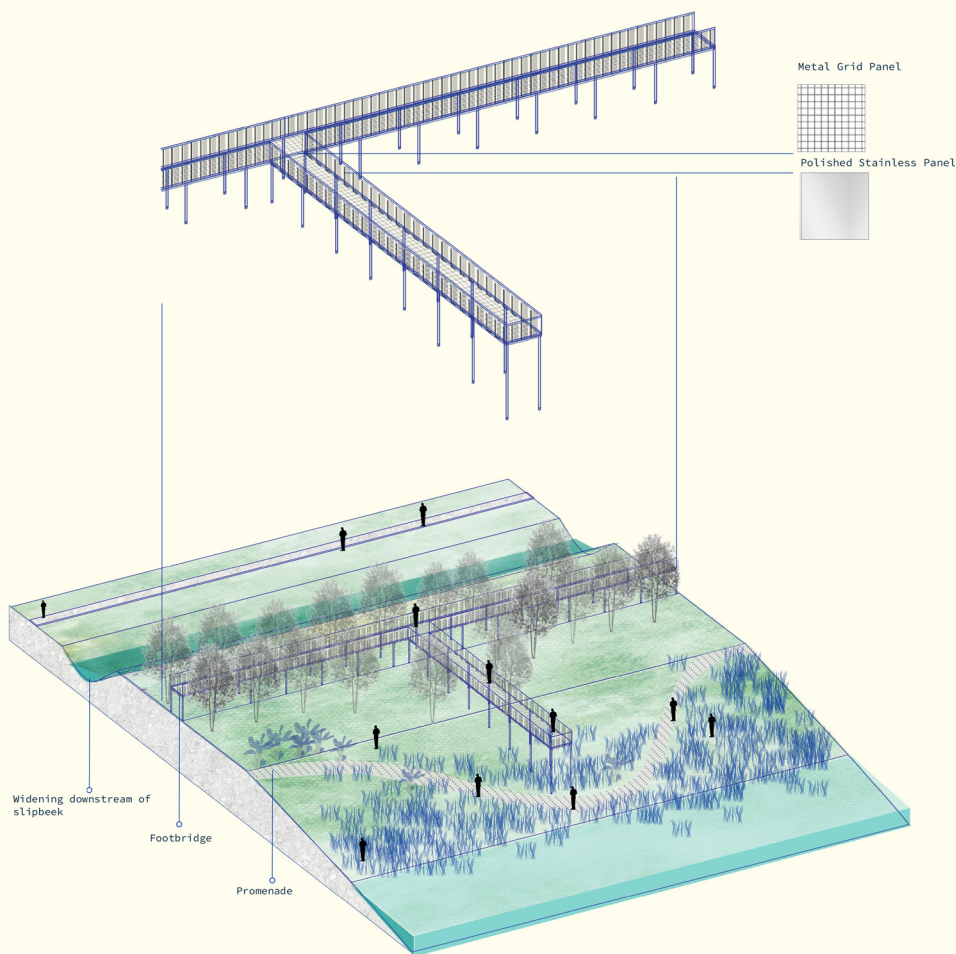


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DESIGN NODE WILLOW BANK / FOOTBRIDGE

Low tide

SHIFTING BOUNDARIES



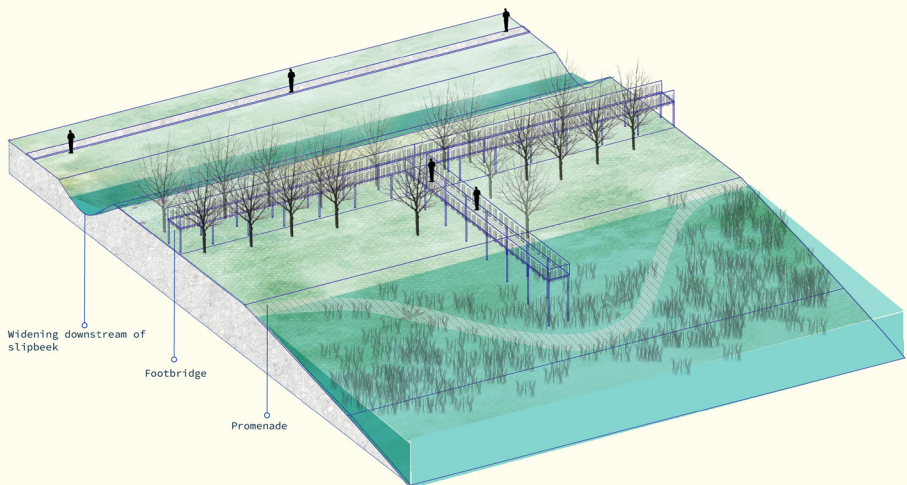
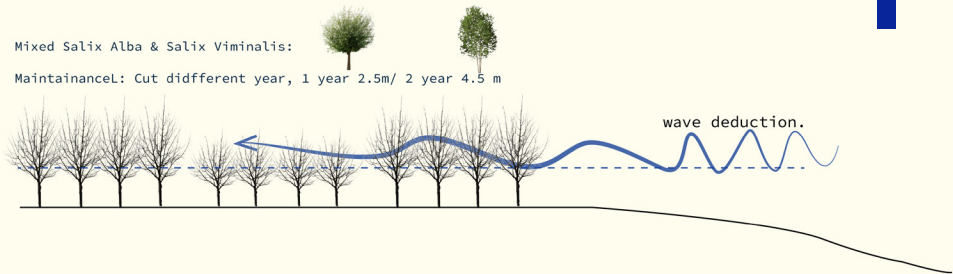
High tide



Eupatorium Canadense , *Elytrigia Atherica* , *Spindotted* , *Bolboschoenus Maritimus*

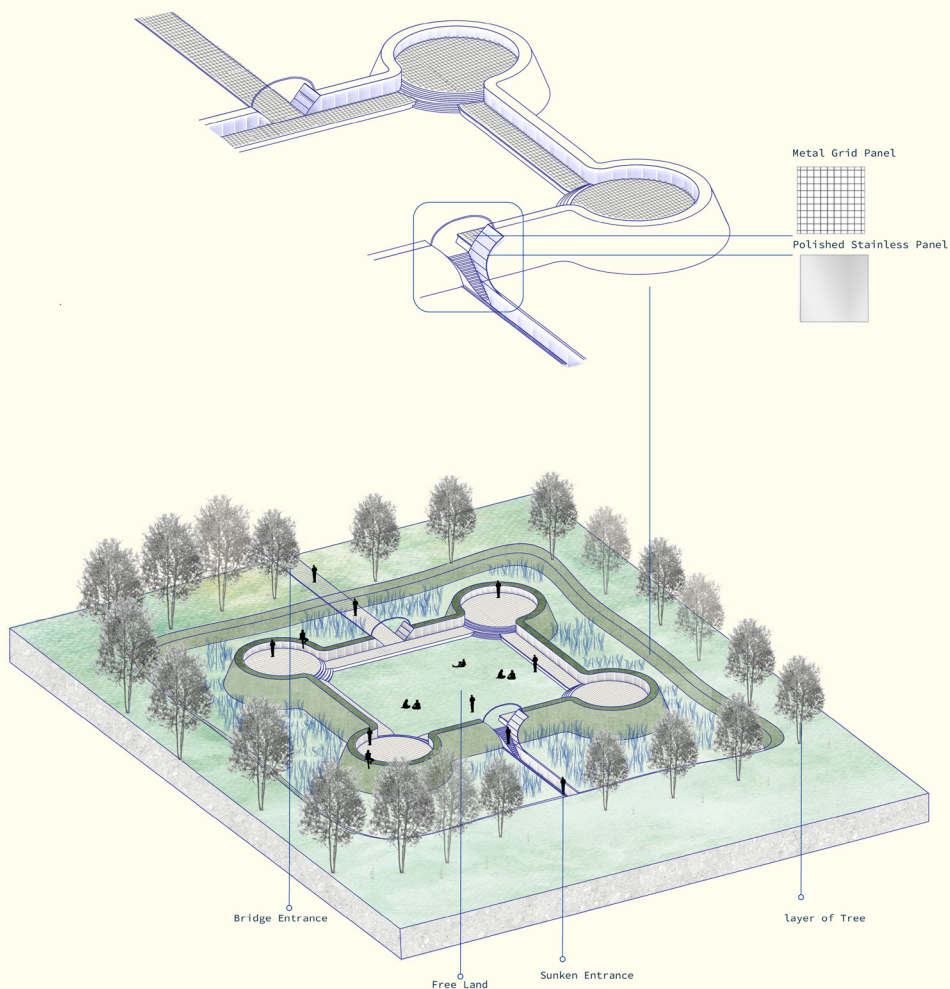
Mixed *Salix Alba* & *Salix Viminalis*:

MaintainanceL: Cut didfferent year, 1 year 2.5m/ 2 year 4.5 m



DESIGN NODE CASTLE MONUMENT

Low tide

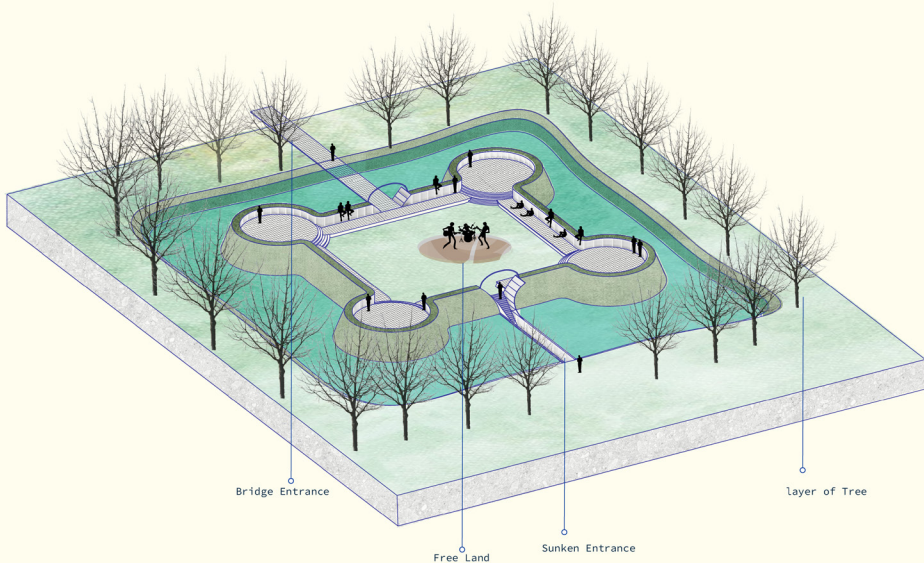


High tide

The main idea is to mimic the form of castle and design a dike castle. Remove the inner bushes and plant trees in the surrounding, therefore forming a layer of boundary.

The outside of the castle is the normal grass, making it more fit in the environment, while the inside entrance will be built with polished stainless steel. The People could enter the space either below the water or above the water with bridge. These two entrances ensure the accessibility in flood.

The spatial experience changes from time, In the summer it will be more hidden. In the winter, the presence of castle will be more obvious.



06

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REFLECTION REFERENCE



Here represented the reflection on the graduation project
– ‘Betweenness – Tangible and intangible boundaries for
formulating a complex symbiosis landscape in Gelders Arcadia’.

The project explored boundaries design approaches to mediate
the contradiction between estates landscape and urban
landscape.

The reflection will discuss 1) the academically used
methodology, 2) the contribution and limitations of content, 3)
the societal relevance, 4) how it is related to the ‘Flowscapes’
studios

Reflection on the Research and Design Methodology

Strong parts

Overall, design research and research-by-design are interrelated and parallel during the whole process. The project aims to propose boundary strategy regarding the multiple relations between estate landscape and outer environment. It is strongly required an understanding of the context. The two essential processes which are research and design along the process help to build the understanding of boundary.

What remarkable is there are no time end of each methodology along the process. The theoretical framework mainly from research has formed a base for the spatializing and analyzing site. During the lateral design stage, the input from Forman about the ecological features of boundary was supplemented into the whole theoretical framework. And these adjustments happen all the time from research to design, from design to research.

The advantages of the methodology lie in the rational and logical system. My main idea is to create a distinctive boundary system. It is not only about the boundary approaches but also how to translate the landscape from theory and analysis based on boundary lens. The choose of location is generalized from research and comparative analysis, and the design language is based on the theoretical framework. The cooperation and interaction of research and design help to acquire the most integral outcome.

Weak parts

At beginning, the different phase of methodology was not so coherent and lack of links. Till the detailed design part, the requirements of spatial quality were reflected on the theory and approaches part. In the

later stage, the clear link between theory, analysis, approaches and design was built up.

The design strategies were generalized through comparative analysis and research of site ahead of detailing of design. Along the process, with the new insights of spatial quality of site and the supplement of theoretical framework, the design toolbox became not so suitable, which require relevant adjustments. From my understanding, the design strategies work as a bridge to connect from research stage (analysis, theoretical framework) to design assignment.

Reflection on Contributions and Utilization

Contributions

What unique about the thesis is it breaks up the stereotype of static, linear boundary form. Instead, the project integrated the spatial, ecological and social features on the boundary understanding. Moreover, the boundaries are varied from linear elements to whole territory, from detailed to abstract. The understanding of topography boundary, relational boundary, and outer and inner boundary illustrate the potential of boundary thinking.

The subtle intervention will help people to experience the differential spatial environment. The estate ensemble will work as urban-rural fringe in some sense. What need to noticeable is how to read or treat the nearly invisible topography boundary, which is understood as a hidden landscape in regional scale. What could look forward is that the influence of the hidden topography boundary will be more obvious after the transformation of estates ensemble along the line.



Utilization potential

In the design part, there varied from mysterious boundary, permeable boundary and shifting boundary, which stand up different inner & outer relations. And this boundary approaches could be applicated into similar relations. For example, the permeable boundary will suitable for the environment between estates landscape and urban environment. And the mysterious boundary will more fit for the estates landscape away from urban environment.

All in all, the difference of boundary approaches will adjust to the changeable relations. By testing the boundaries approaches on the Gelders Acadia, there forms more explicit impression of estates landscape.

On a broader thinking, the boundary approaches could also target on other context, which lack of explicit spatial differential, or transitional space. In the current discourse, the spatial environment is complex and dynamic and therefore the relations between different environments are vital for the spatial experience and spatial functions. The boundary is an attempt to translate the relation more precise and explicit, which has potential to be utilized with more various context.

Reflection on societal relevance

This project discusses the relations, the relevant boundary, which comes along with the ownership, private and public, underprivileged and privileged. The boundary space is like a third space in some sense, without explicit ownership, in a betweenness state. The design of boundary space could redefine the relations of inside and outside, the estates landscape and the ordinary urban or rural landscape.

In Gelders Acadia, some estates belong to the foundation of GLK (Geldersch Landschap & Kasteelen), who are willing to transform the estates landscape into more open and public landscape. However, there still exists some private estates landscape. And the identity of estates landscape lies in the untouched, power landscape which in some way could not be shared like ordinary landscape. So, the boundary approaches help to meditate the tension between the power landscape and the outer landscape, private and public. the sharing boundary space is created while the privacy of estates has remained.

Reflection on Flowscales studio

The graduation studio topic is “Flowscales” which aims to understand landscape through time, process and infrastructure. This project echoes to this insight. How to understand boundary as process is reflected in the design of Rosande polder– shifting boundary. The water level, time controlled, decided the boundary between water and land. And in the design of Outer Mariendaal, the permeable boundary is functioning as complex infrastructure including water, movements and green space. The Betweenness project is an attempt to translate the cultural, social, and ecological influences into spatial forms and test it in the context of Gelders Arcadia.

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