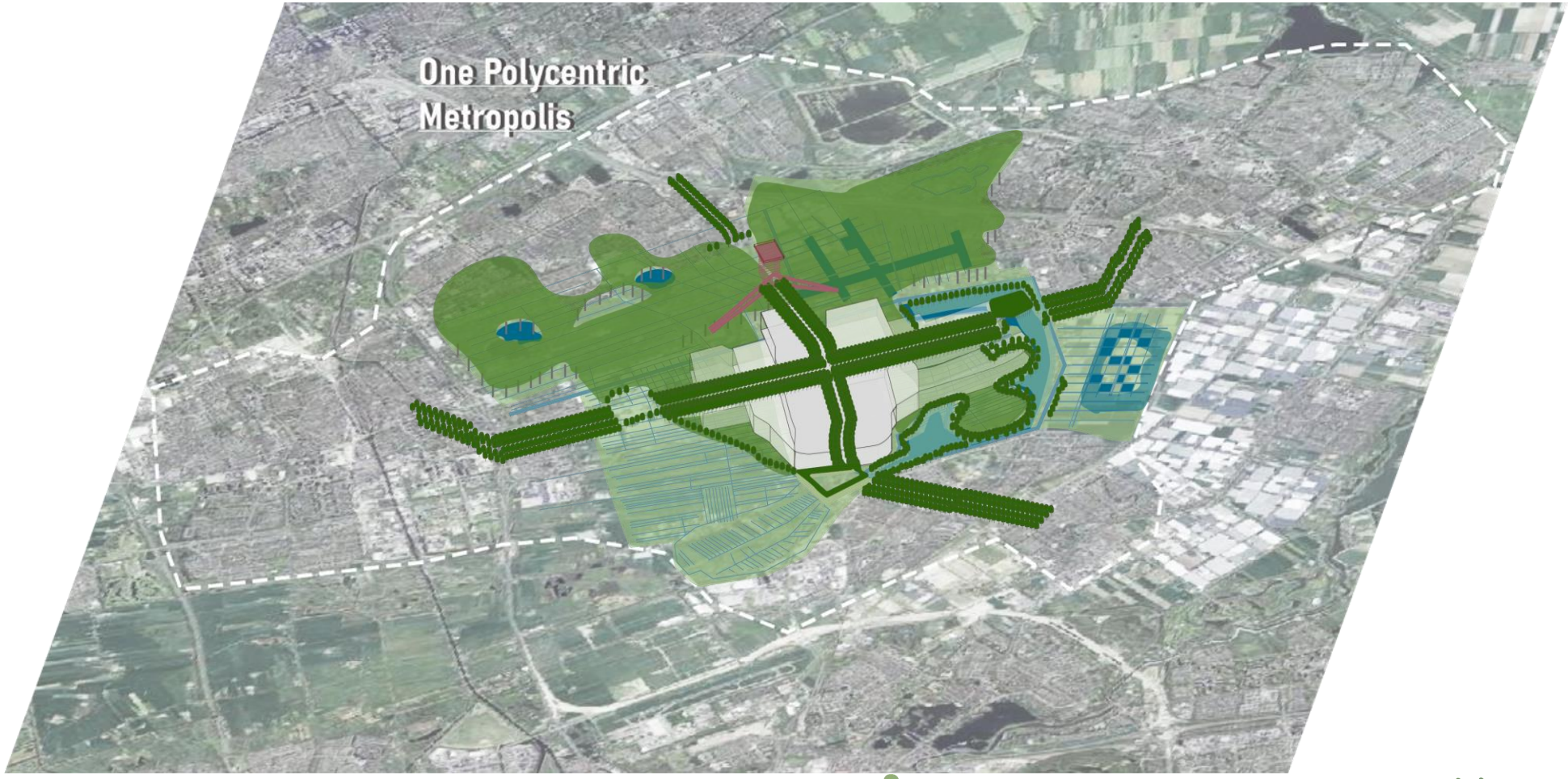
The Shape of Healthy Lowland Metropolis

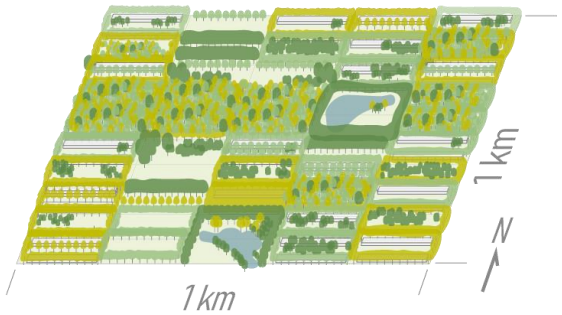
Urban Forestry as Landscape Architectural Approach to a Healthy Environment in Rotterdam- Den Haag Metropolis

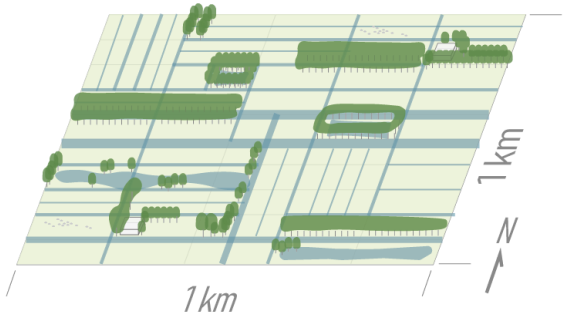
SuiHui, Kuo | Graduation Project | TU Delft Landscape Architecture | Urban Forest Place

René van der Velde | Claudiu Forgaci

Den Haag
Leidescheneen
Zoetermeer
Ypenburg
Nootdorp
Pijnacker
Delft
Berkel en Rondenijs
Rotterdam


One Polycentric
Metropolis


1 km
1 km
N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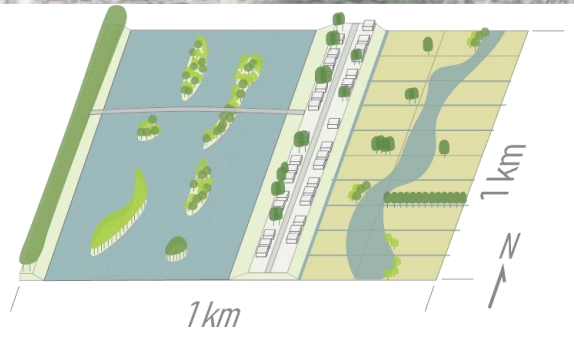
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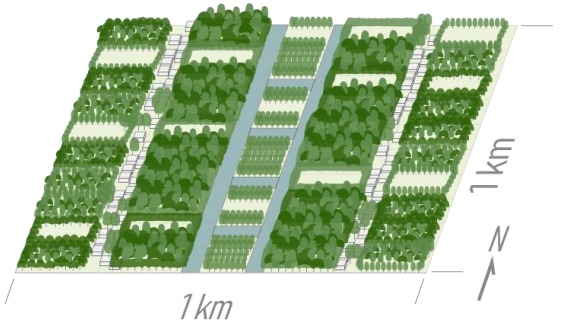
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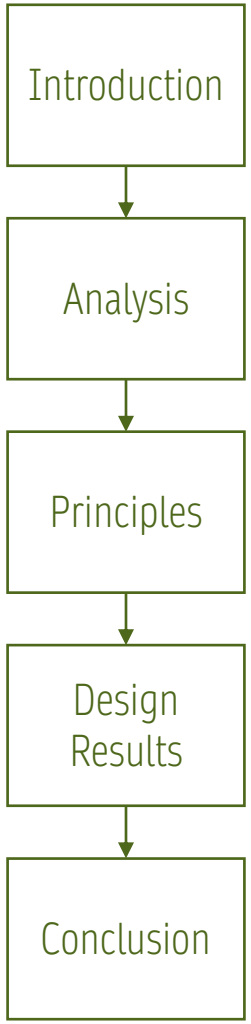
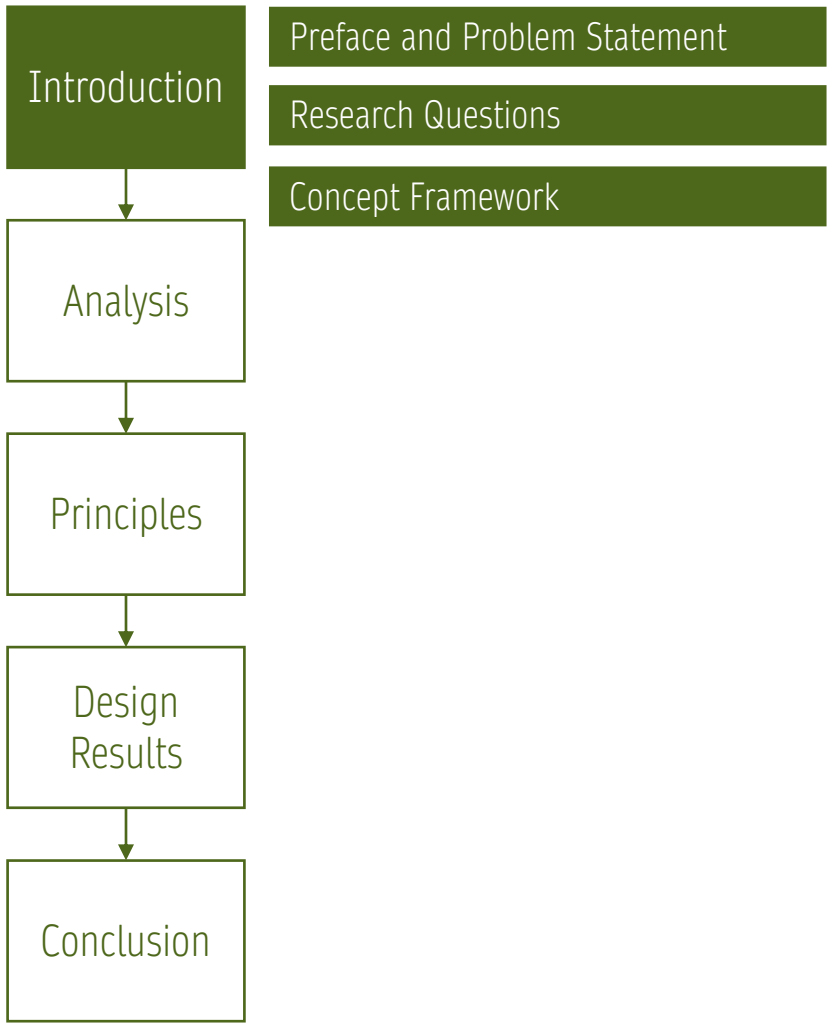

Introduction
Analysis
Principles
Design
Results
Conclusion


Introduction
Preface and Problem Statement
Research Questions
Concept Framework
Analysis
Principles
Design
Results
Conclusion

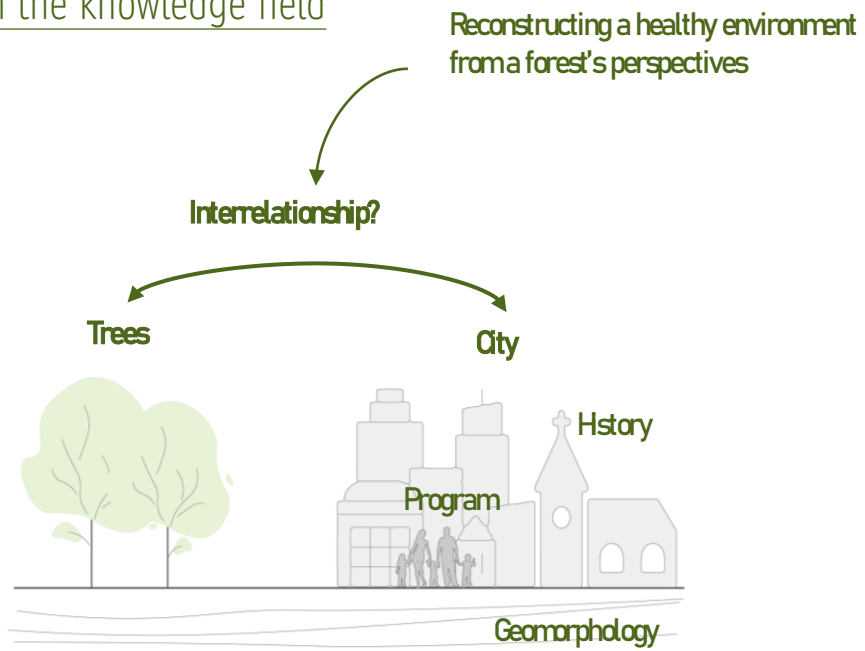
N
0
1
2
4
8 (km

Leiden
Leiderdorp
Zoeterwoude-Rijndijk
Alphen aan den Rijn
Weipoort
Stompwijk
Hazerswoude-Dorp
Wilsveen
Hogeveen
Boskoop
s-Gravenhage
Zoetermeer
Nootdorp
Kruisweg
Waddinxveen
Monster
Poeldijk
Wateringen
Pijnacker
Bleiswijk
Zevenhuizen
's-Gravenzande
Delft
Delfgauw
Naaldwijk
Lierhard
Berkel en Rodenrijs
Hoek van Holland
De Lier
Moordrecht
Rotte
Zwet
Maasdijk
De Kapel
Europoort
Maassluis
Vlaardingen
Rotterdam
Capelle aan den IJssel
N
0 1 2 4 8 (km

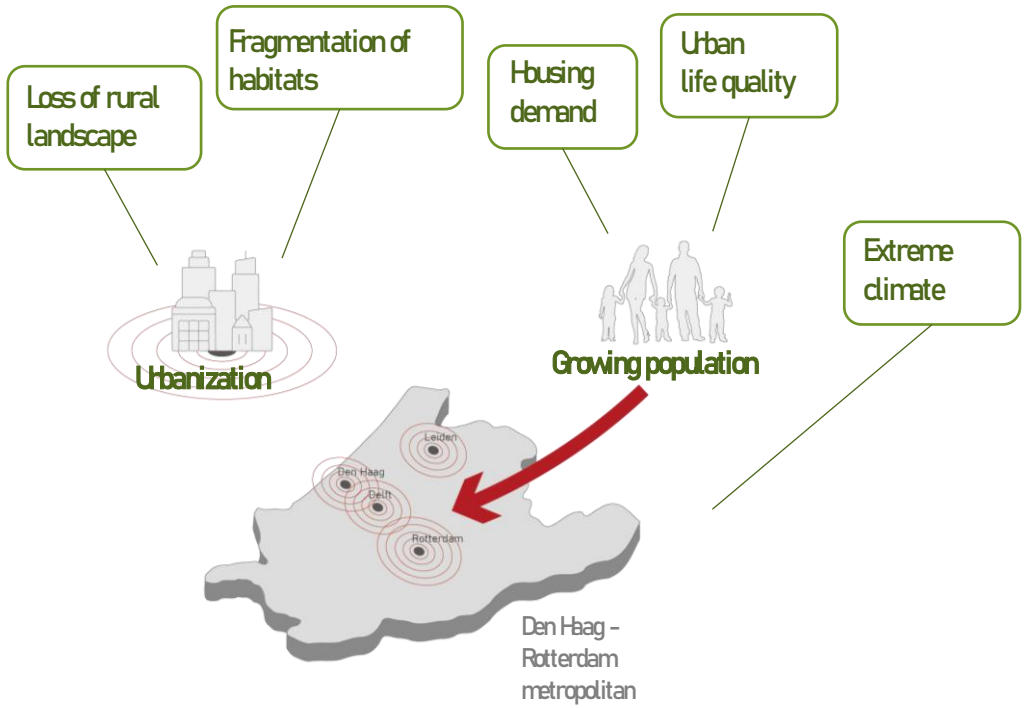
Q1: Urban Forest Place

Potential

on the knowledge field



Challenge on site



Research Questions

Question set 1

What is the potential of urban forestry in south-west Randstad region to realize a healthy urban environment?

→ How to define an urban forest typology at regional scale by recognizing its relationship with the underlying backgrounds?

→ How to evaluate health conditions and potential of each urban forest type?

Question set 2

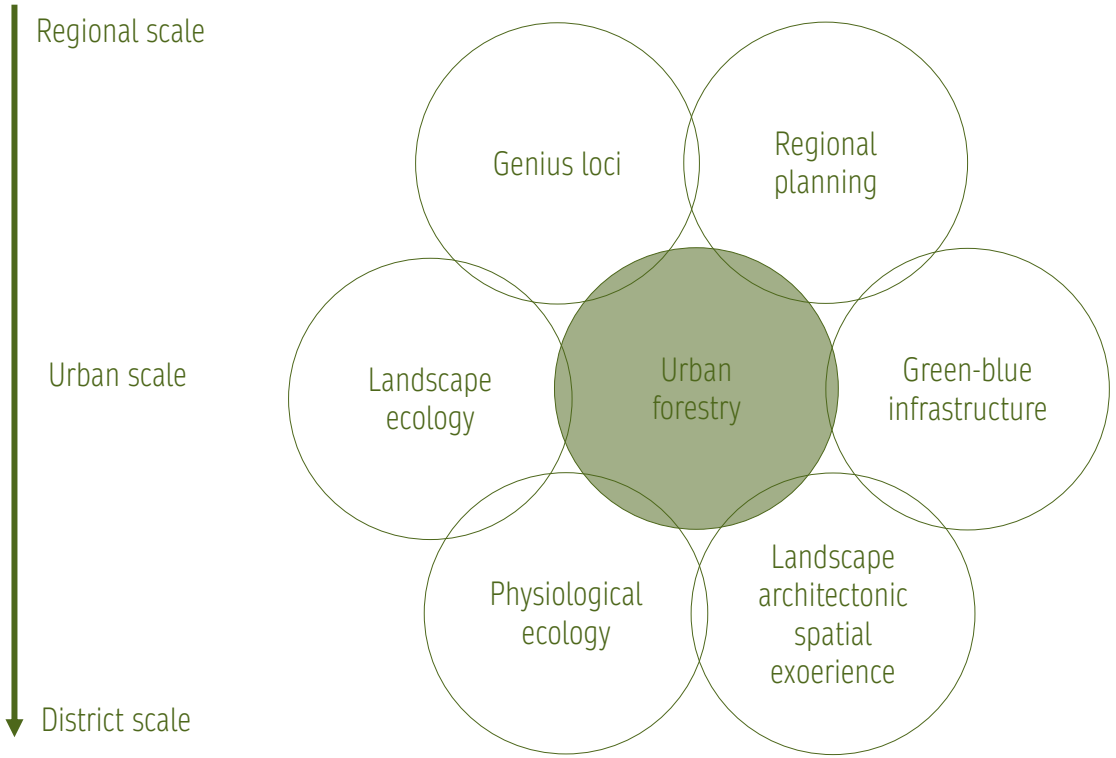
How to use urban forest typology as a design tool to a healthier south-west Randstad region?

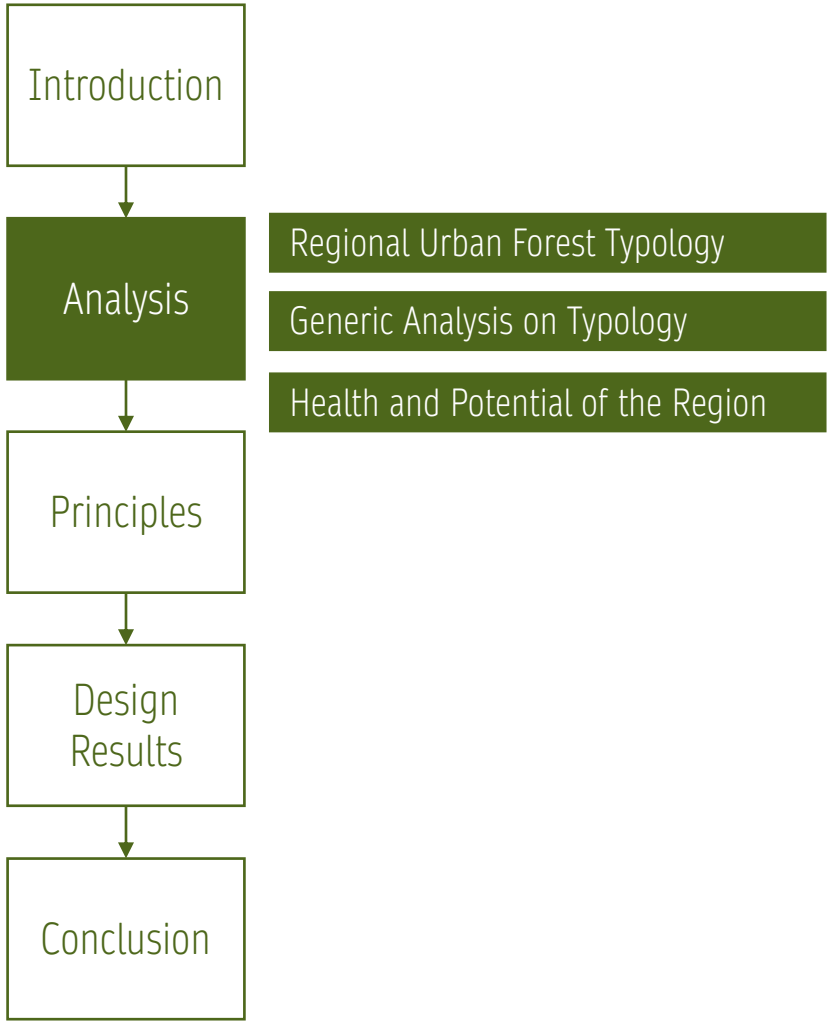
→ How to optimize the environmental conditions by urban forest typology in urban settings?

→ What functions and activities can be supported by urban forest to optimize citizen's health?

→ How to define and tackle with different issues on an urban forest at different scale?

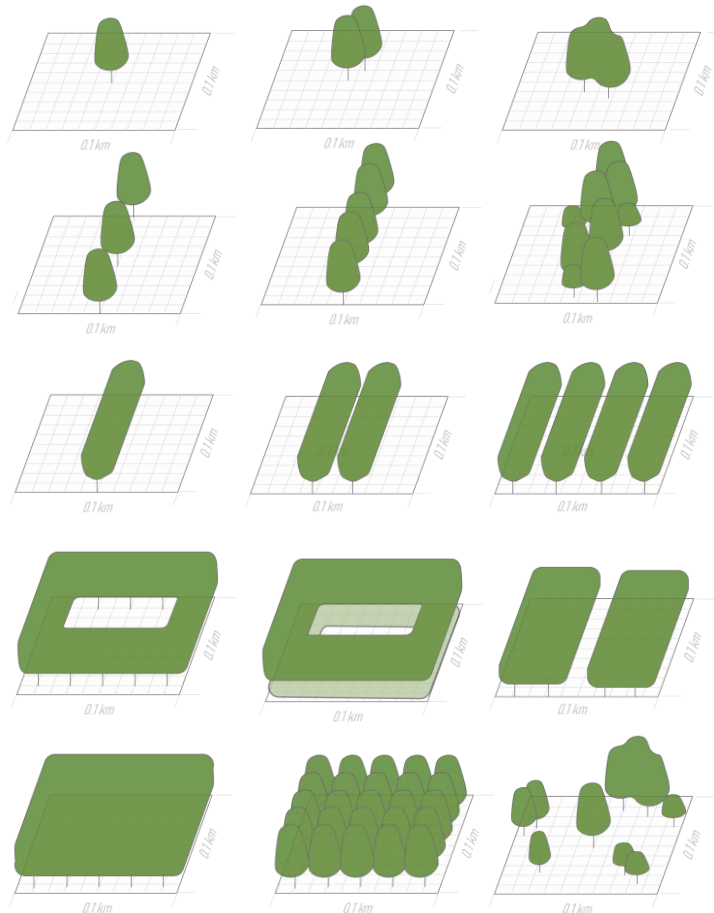
Design principles for healthy space




Introduction
Analysis
Principles
Design Results
Conclusion
Regional Urban Forest Typology
Generic Analysis on Typology
Health and Potential of the Region

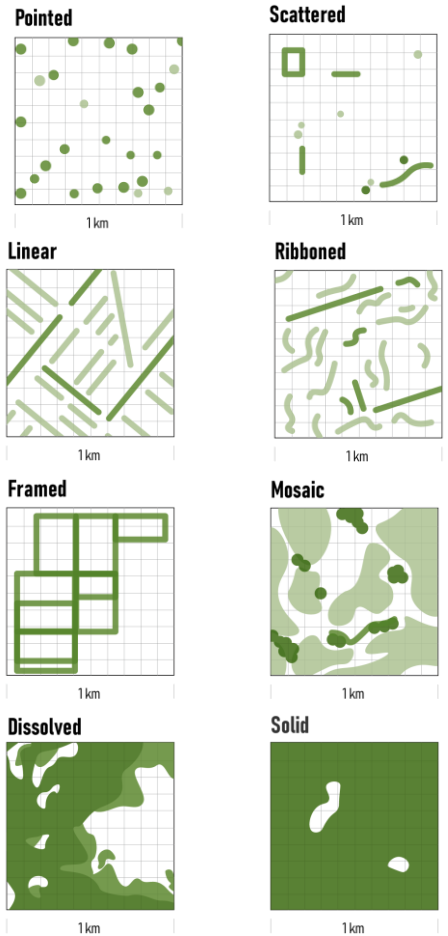
What is Urban Forest Typology?

Arrangement scale (1:5,000)



What is Urban Forest Typology?

Pattern scale (1:50,000)



Arrangement scale (1:5,000)

Regional Urban Forest Typology

Urban scale (1:100,000)

Pattern scale (1:50,000)

Arrangement scale (1:5,000)

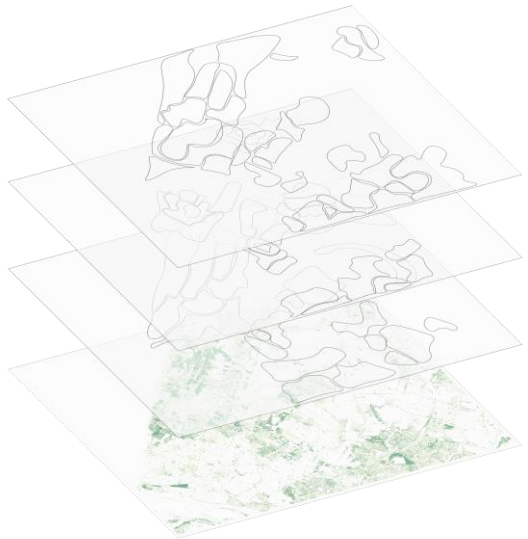
Method

Overlapping units by underlayers

Immerse and simplify urban forest units

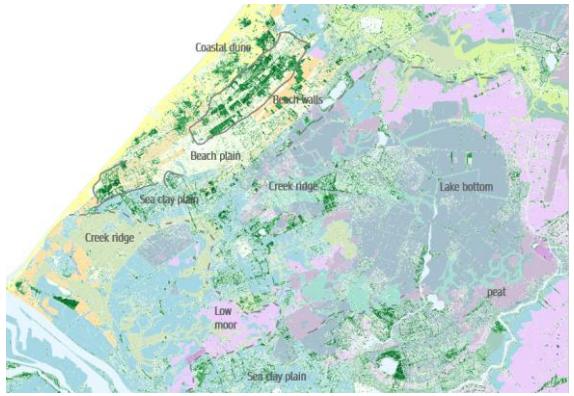
To define the typology

Evaluation

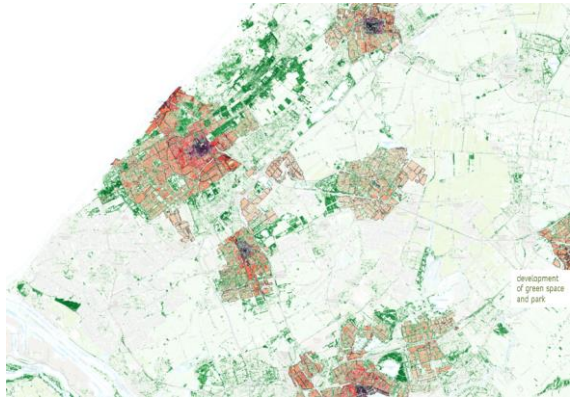


Urban forest and underlying landscape

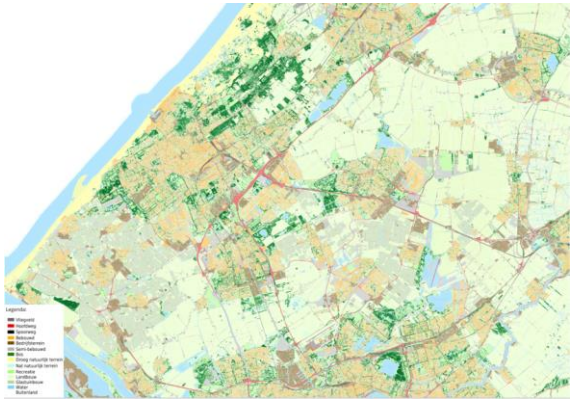
By Geomorphology



By Development Period



By Program



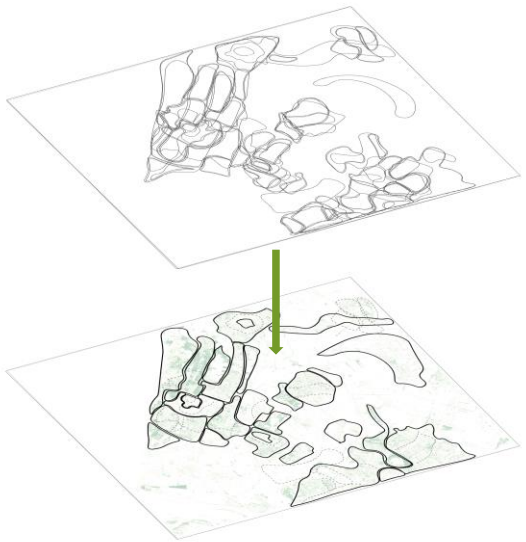
Method

Overlapping units by underlayers

Immerse and simplify urban forest units

To define the typology

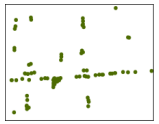
Evaluation



Regional Urban Forest Typology

Urban forest typology map

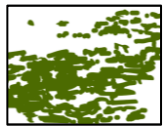
1. Delicately Dotted



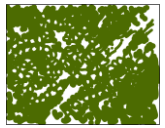
2. Thinly Dotted

3. Evenly Distributed

4. Blank

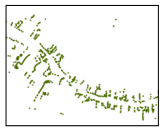


5. Brushed Patches



6. Organic Patches

7. Geometrical Patches



8. Thinly Linear

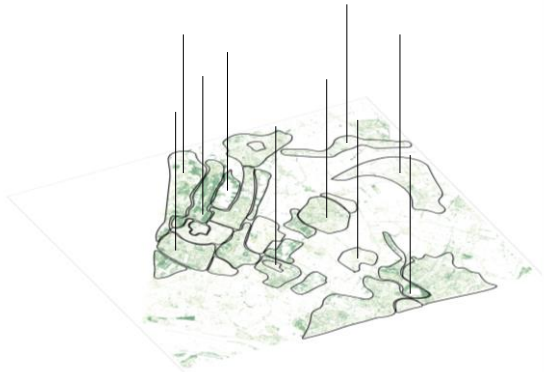
Method

Overlapping units by underlayers

Immerse and simplify urban forest units

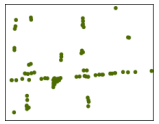
To define the typology

Evaluation



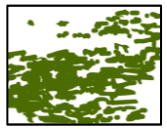
Spatiality of Types

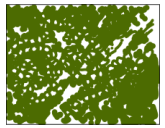
1. Delicately Dotted


2. Thinly Dotted

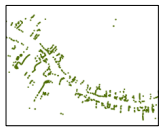
3. Evenly Distributed

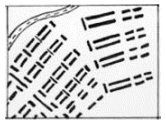
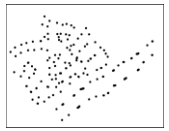
4. Blank

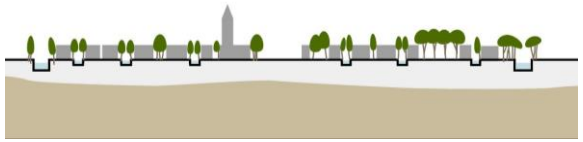
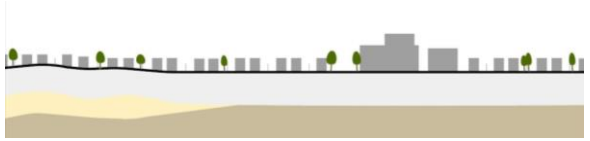

5. Brushed Patches

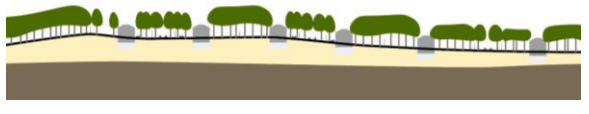
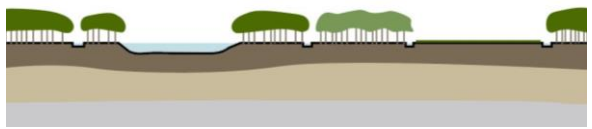
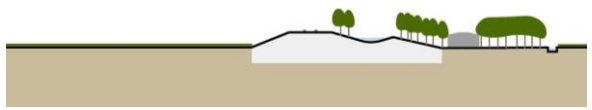

6. Organic Patches

7. Geometrical Patches

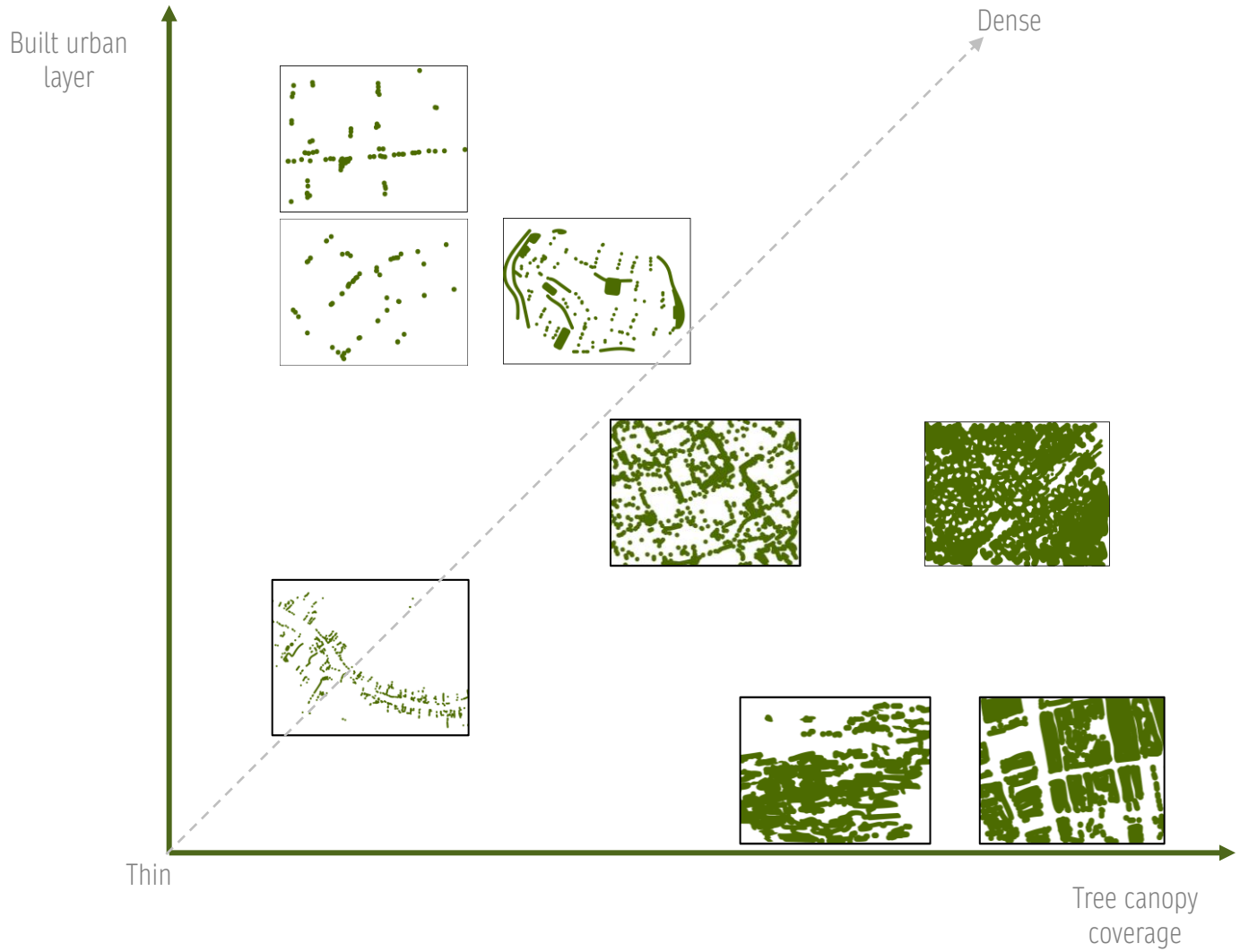

8. Thinly Linear

Possible Transformations among Types



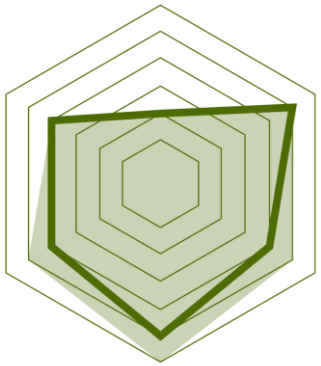
Method

Overlapping units by underlayers

Immerse and simplify urban forest units

To define the typology

Evaluation of health condition



Generic Analysis on Typology

Criteria for Health Assessment

Current condition

Potential

Forest aspect

Human aspect

Number of tree per ha

Number of resident per km2

Unwooded space

Unbuilt space

Tree canopy density

Population density

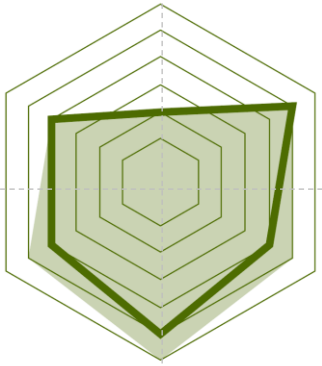
Quantity

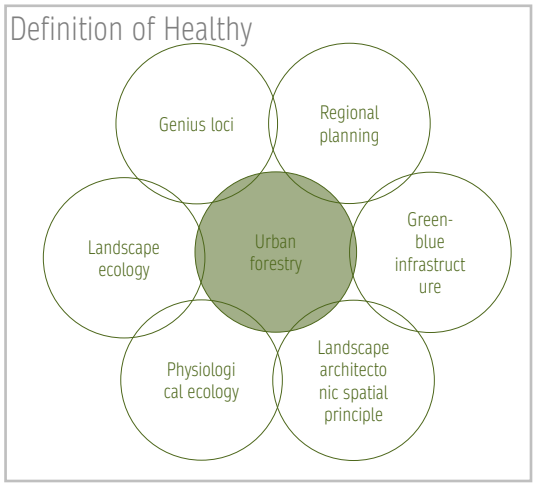
Quality

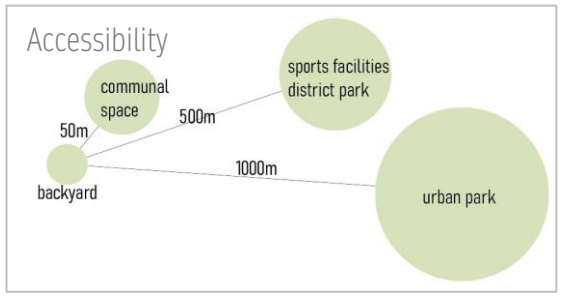
Forest health

Human health

Human-forest interaction







Health Qualities of Types

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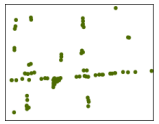
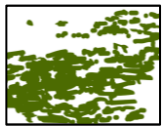


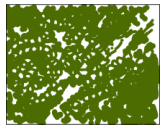
2. Thinly Dotted

3. Evenly Distributed

4. Blank

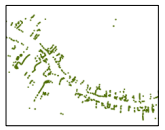


5. Brushed Patches

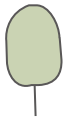


6. Organic Patches

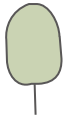
7. Geometrical Patches



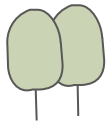
8. Thinly Linear



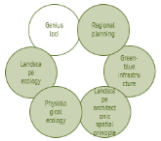
30-50 trees/ha

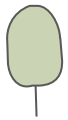


20-40 trees/ha

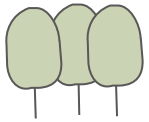


70-90 trees/ha

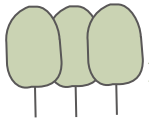




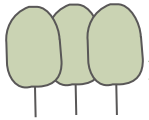
0-20 trees/ha



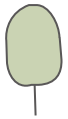
80-100 trees/ha



130-150 trees/ha

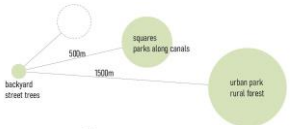


100-130 trees/ha

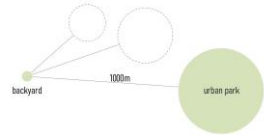


20-40 trees/ha

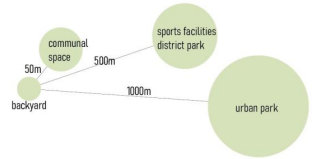
10-15K/km2



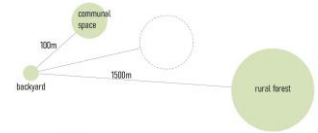
17-20K/km2

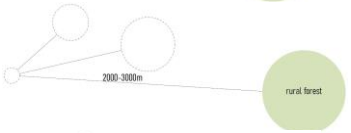


5-10K/km2

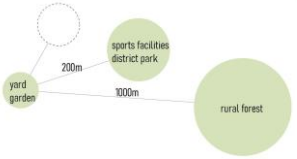


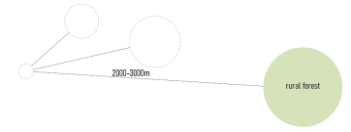
6-8K/km2



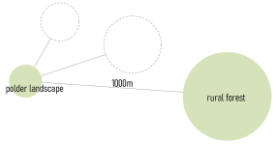


5-6K/km2



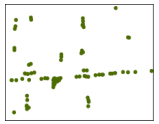


1-2K/km2



Health Qualities of Types

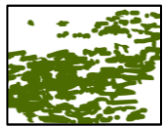
1. Delicately Dotted



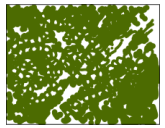
2. Thinly Dotted

3. Evenly Distributed

4. Blank

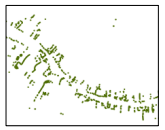


5. Brushed Patches

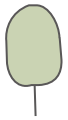


6. Organic Patches

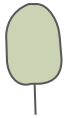
7. Geometrical Patches



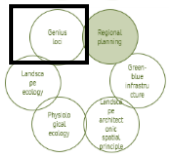
8. Thinly Linear

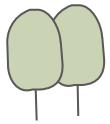


30-50 trees/ha

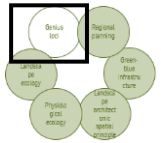


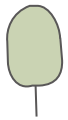
20-40 trees/ha



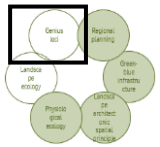


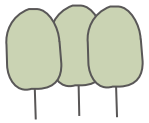
70-90 trees/ha



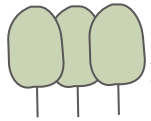


0-20 trees/ha

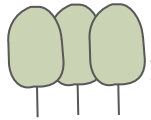




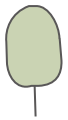
80-100 trees/ha



130-150 trees/ha



100-130 trees/ha



20-40 trees/ha

10-15K/km2

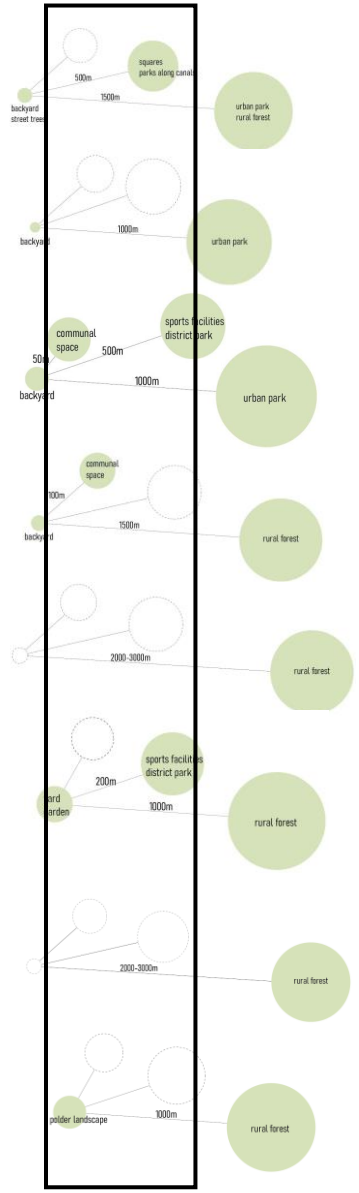
17-20K/km2

5-10K/km2

6-8K/km2

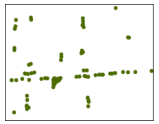
5-6K/km2

1-2K/km2



Health Qualities of Types

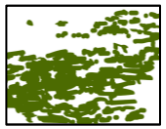
1. Delicately Dotted



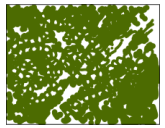
2. Thinly Dotted

3. Evenly Distributed

4. Blank

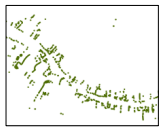


5. Brushed Patches



6. Organic Patches

7. Geometrical Patches



8. Thinly Linear

30-50 trees/ha

20-40 trees/ha

70-90 trees/ha

0-20 trees/ha

80-100 trees/ha

130-150 trees/ha

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20-40 trees/ha

10-15K/km2

17-20K/km2

5-10K/km2

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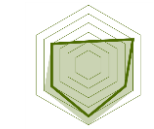
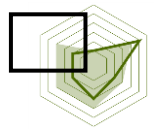
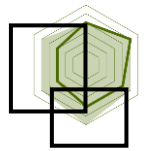
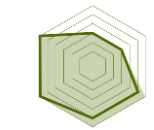
5-6K/km2

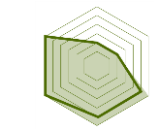
1-2K/km2

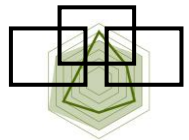






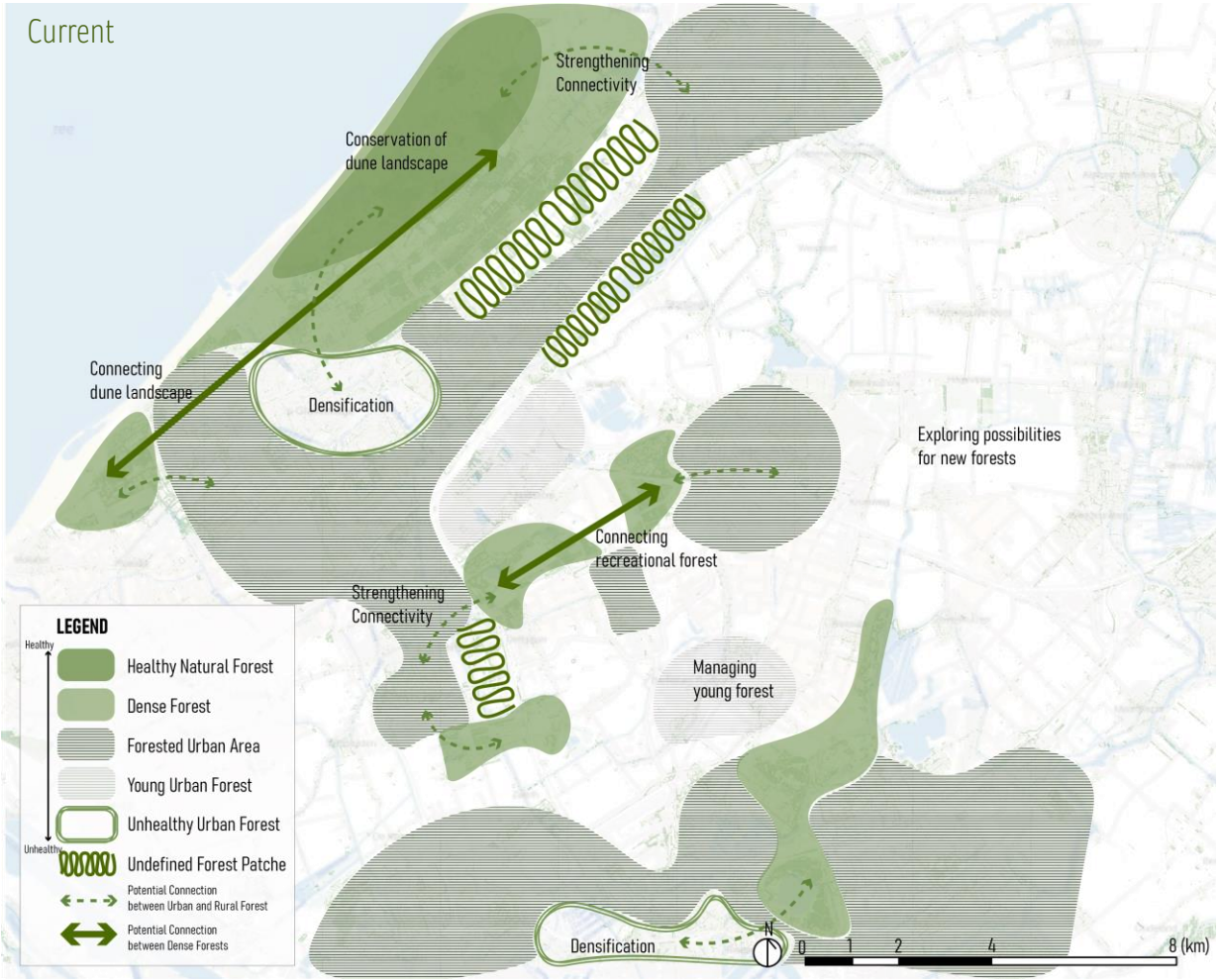


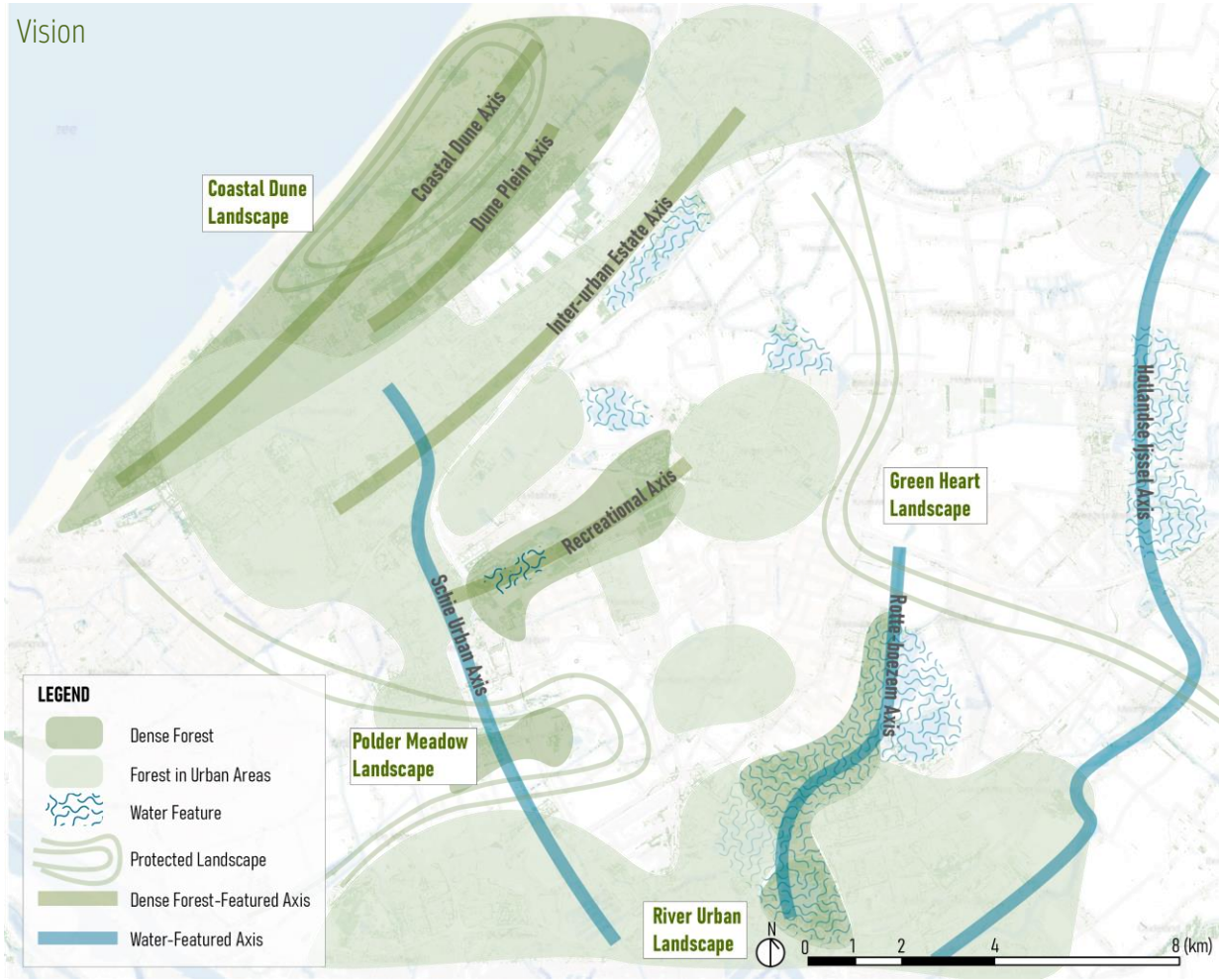




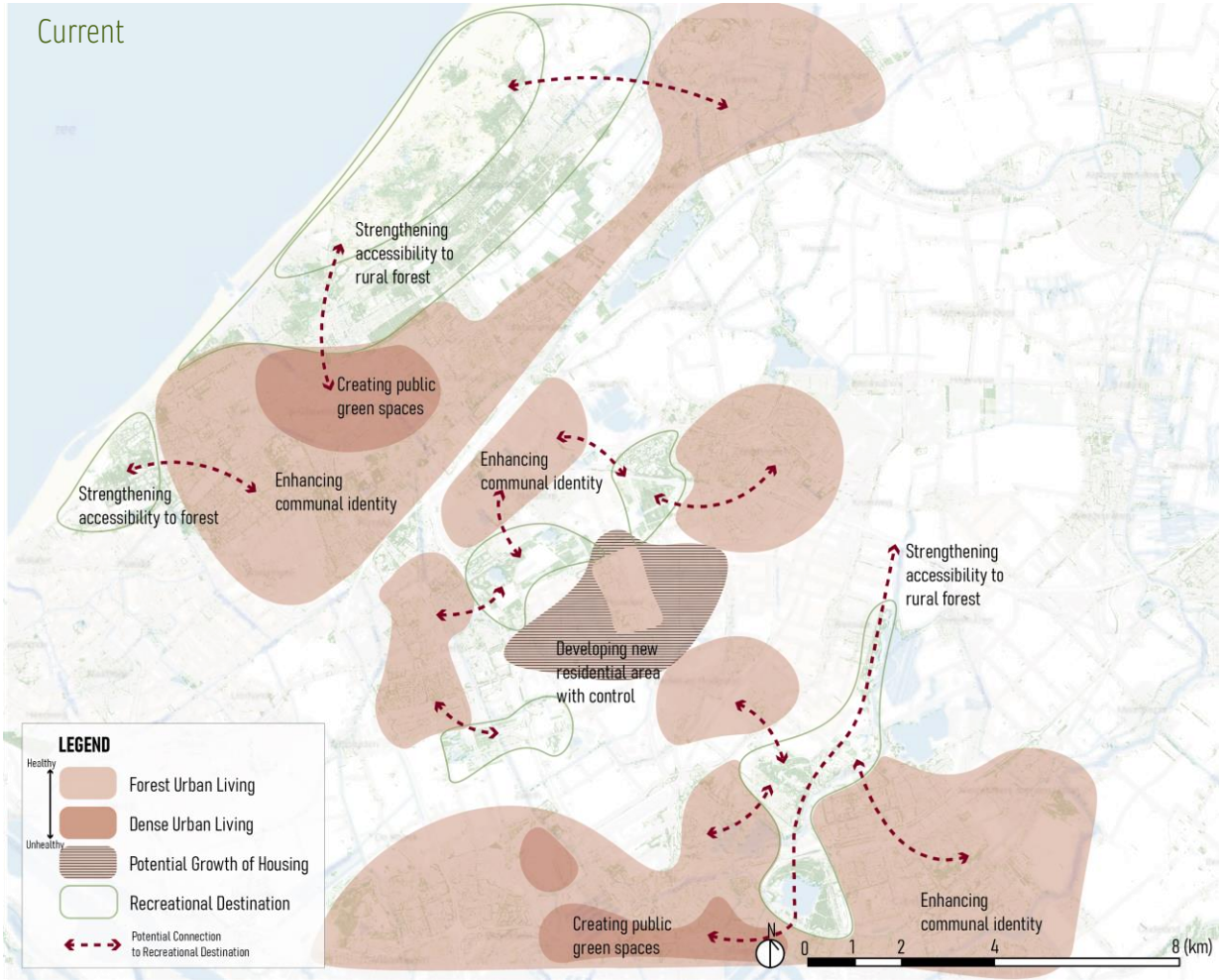
Health and Potential of the Region

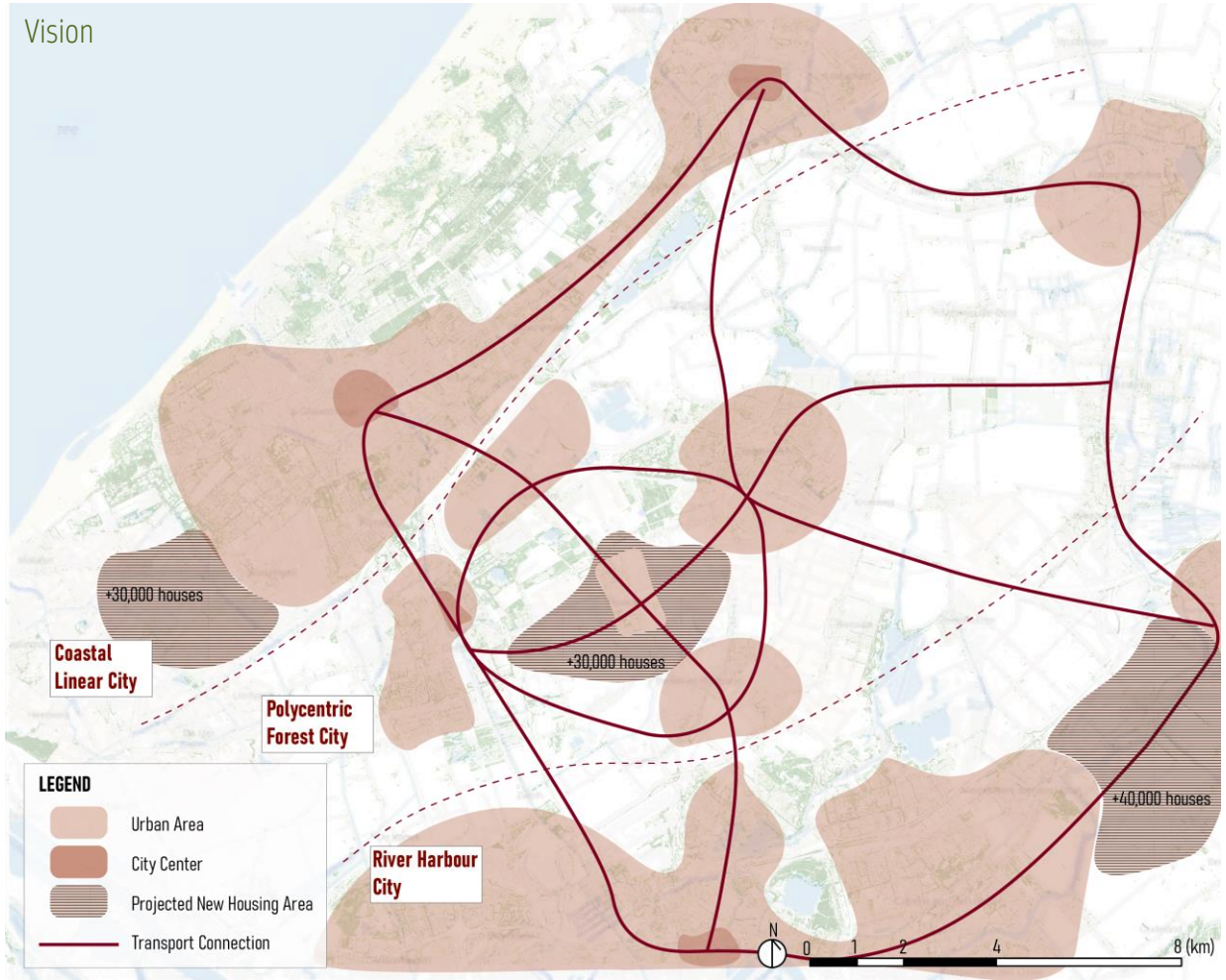
Forest Health





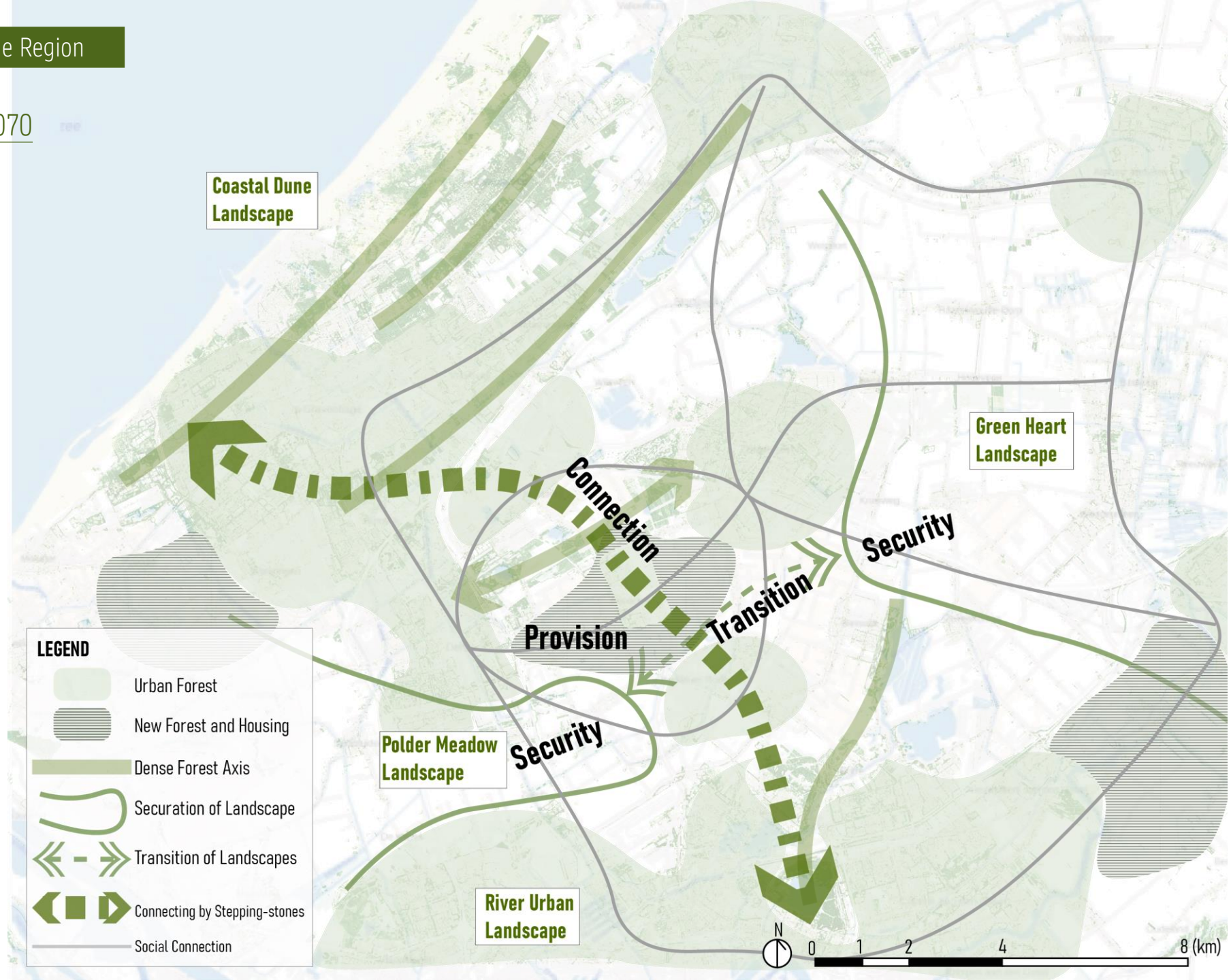
Social Health



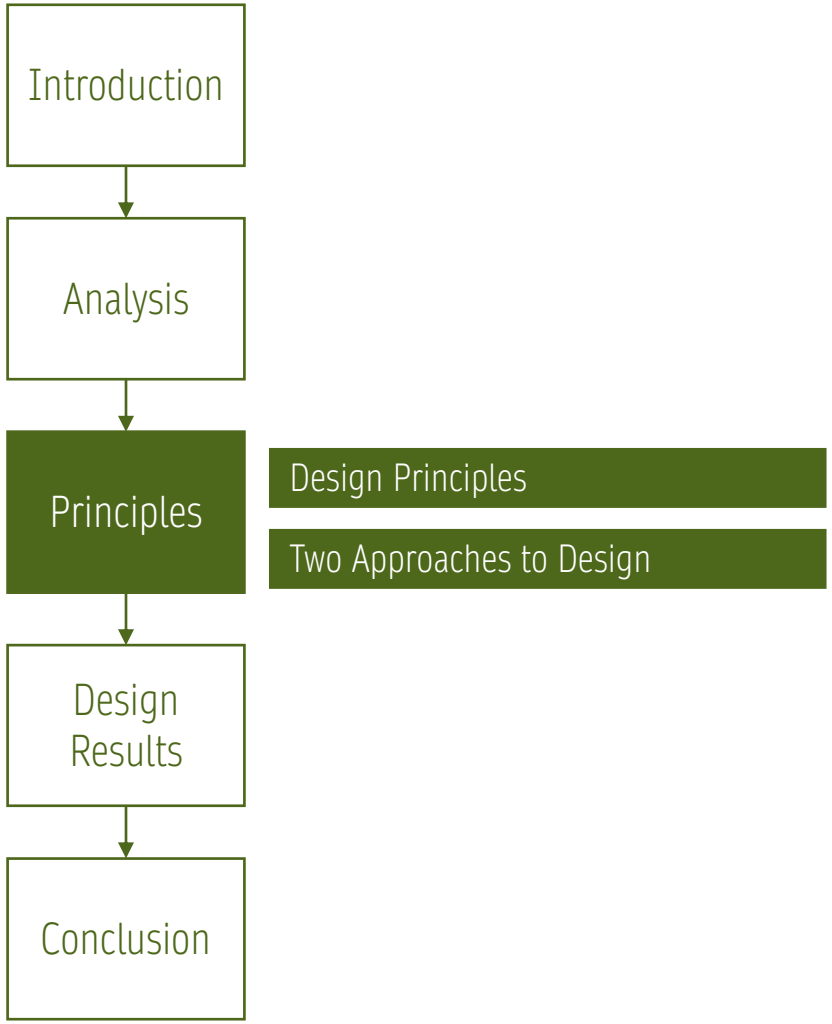


100,000 new houses required

Regional vision 2070

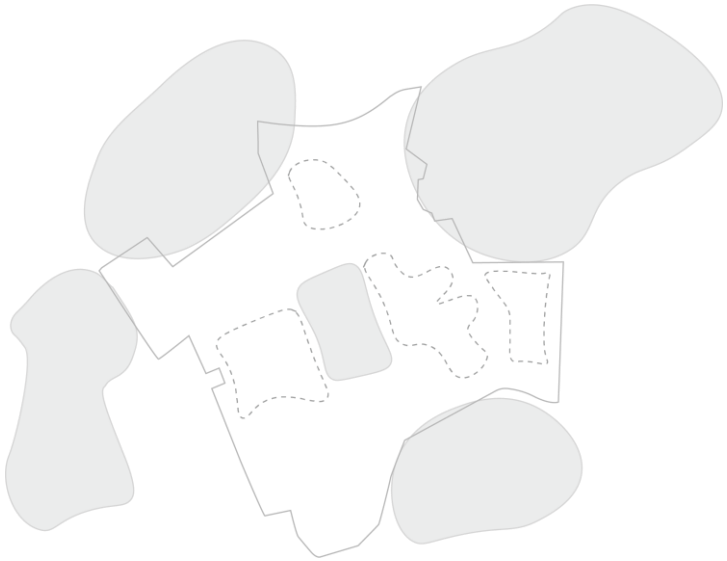


Regional vision 2070

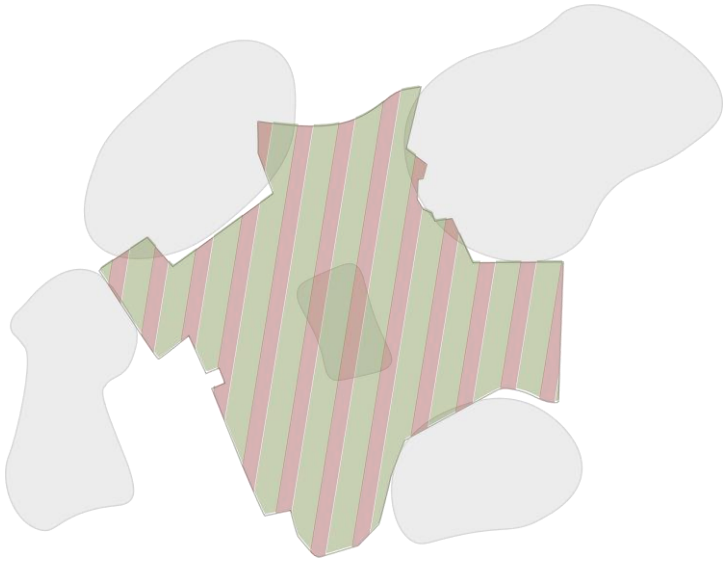

Introduction
Analysis
Principles
Design Principles
Two Approaches to Design
Design Results
Conclusion

Provision

Reallocation of Green Houses

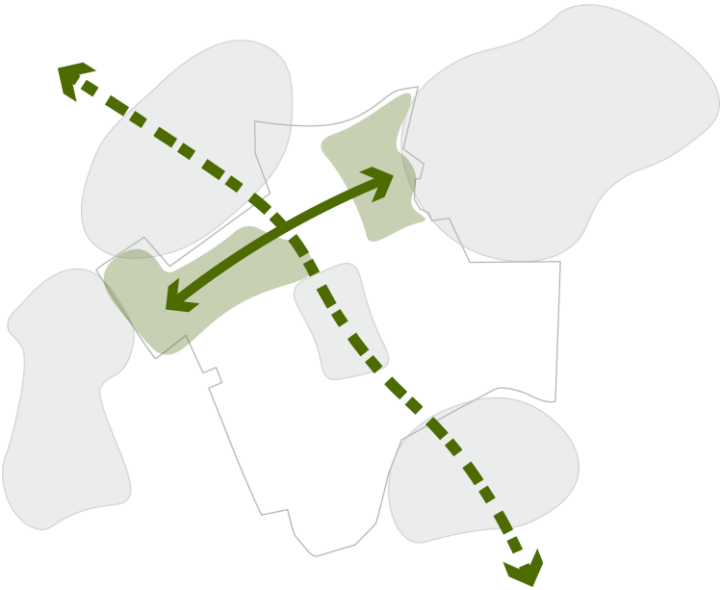


Provision of New Houses and Forests

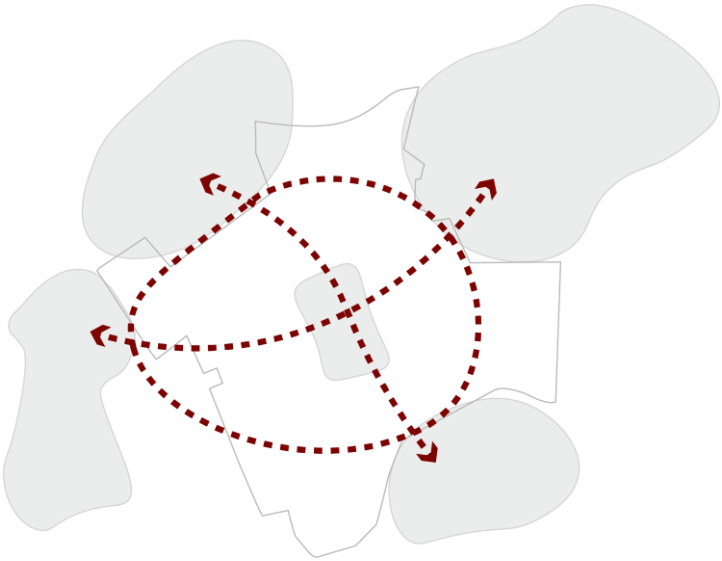


Connection

Landscape Ecological Connection



Social Connection



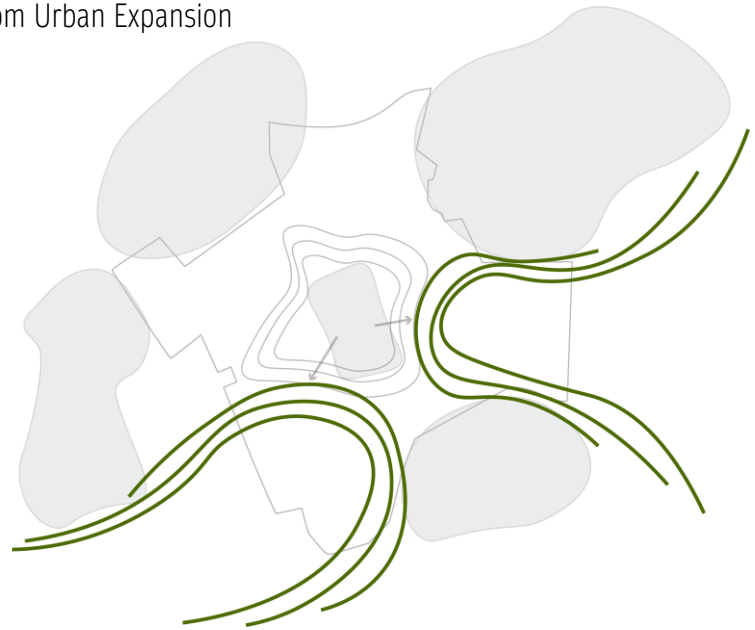
Diversification

Diversification of Landscape Types

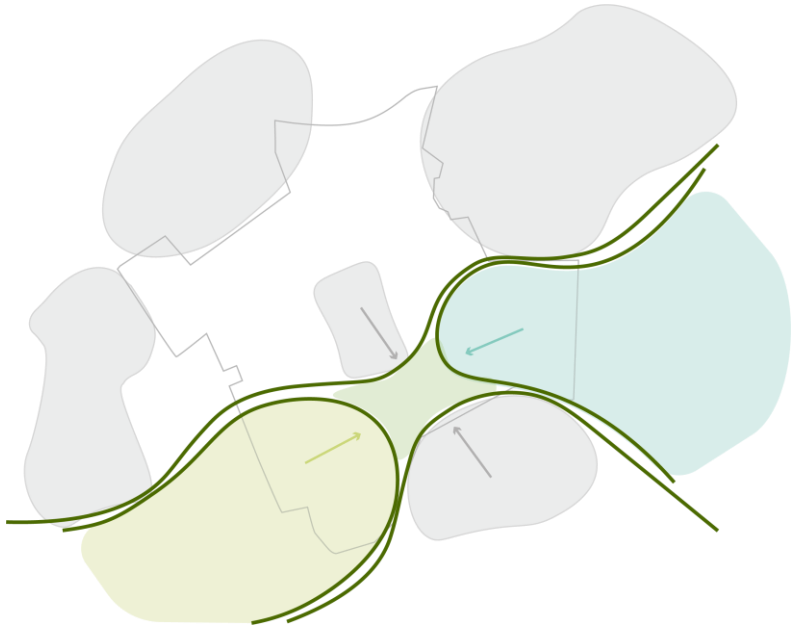
Diversification of Water Dimension

Security & Transition

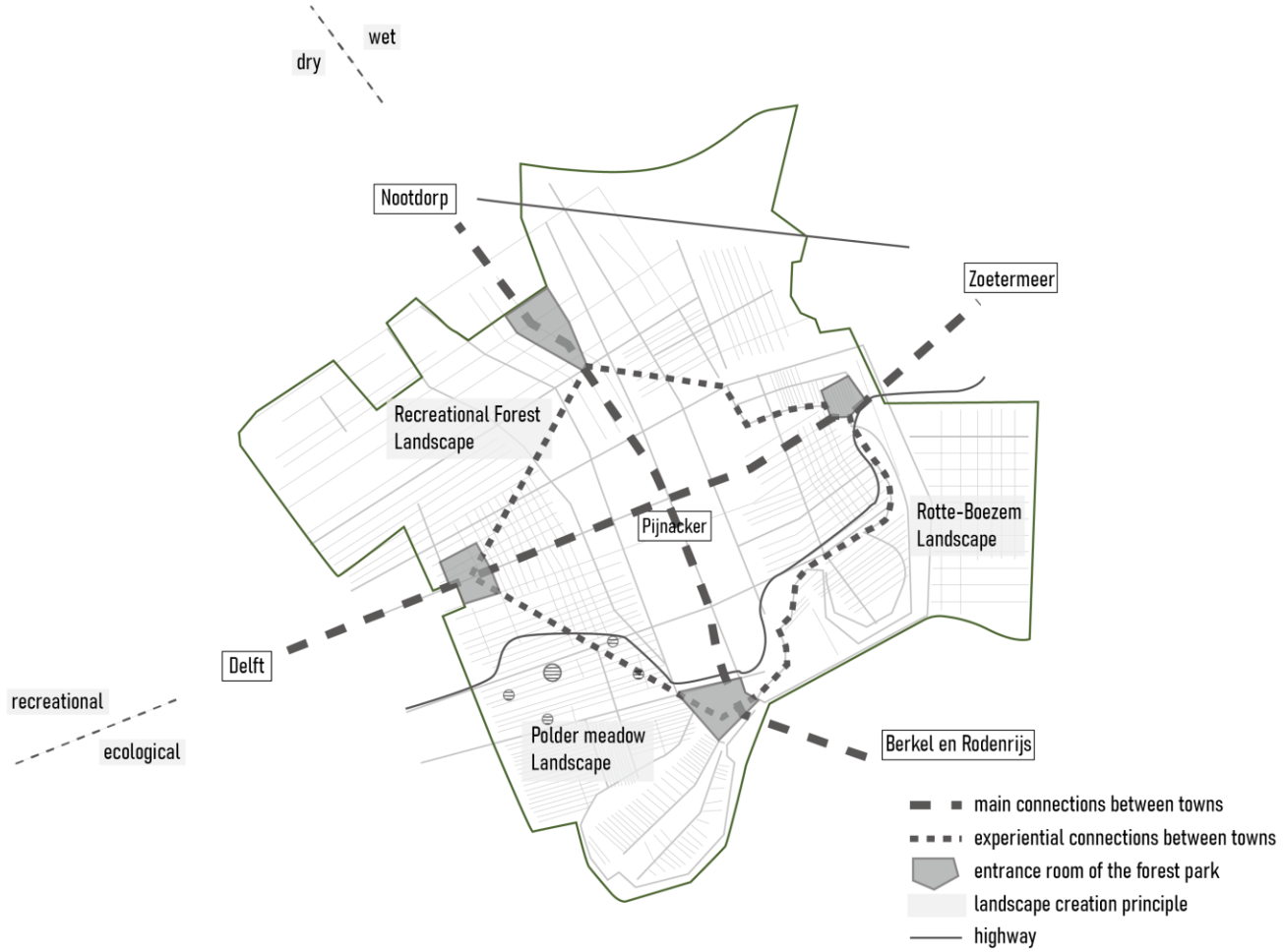
Security of Natural Landscapes
from Urban Expansion



Providing Transitional Landscape

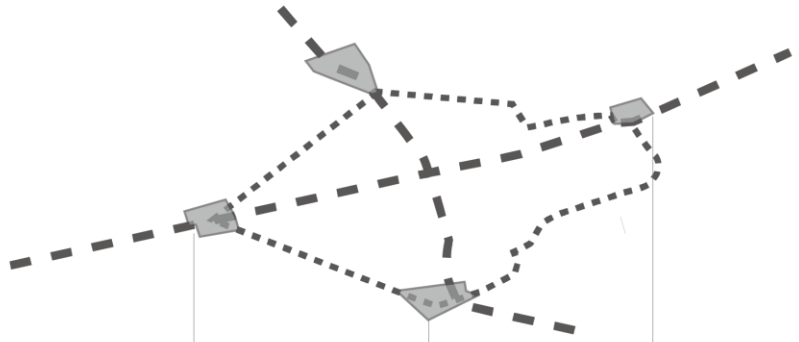


Conclusion of Design Principles

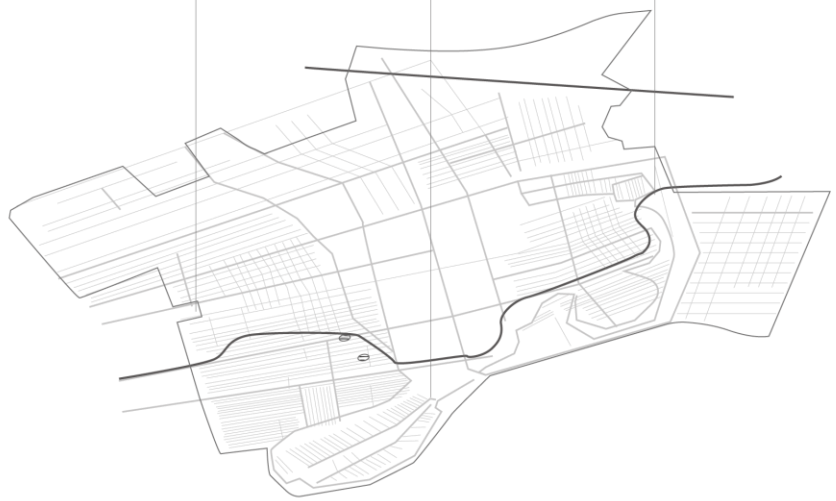


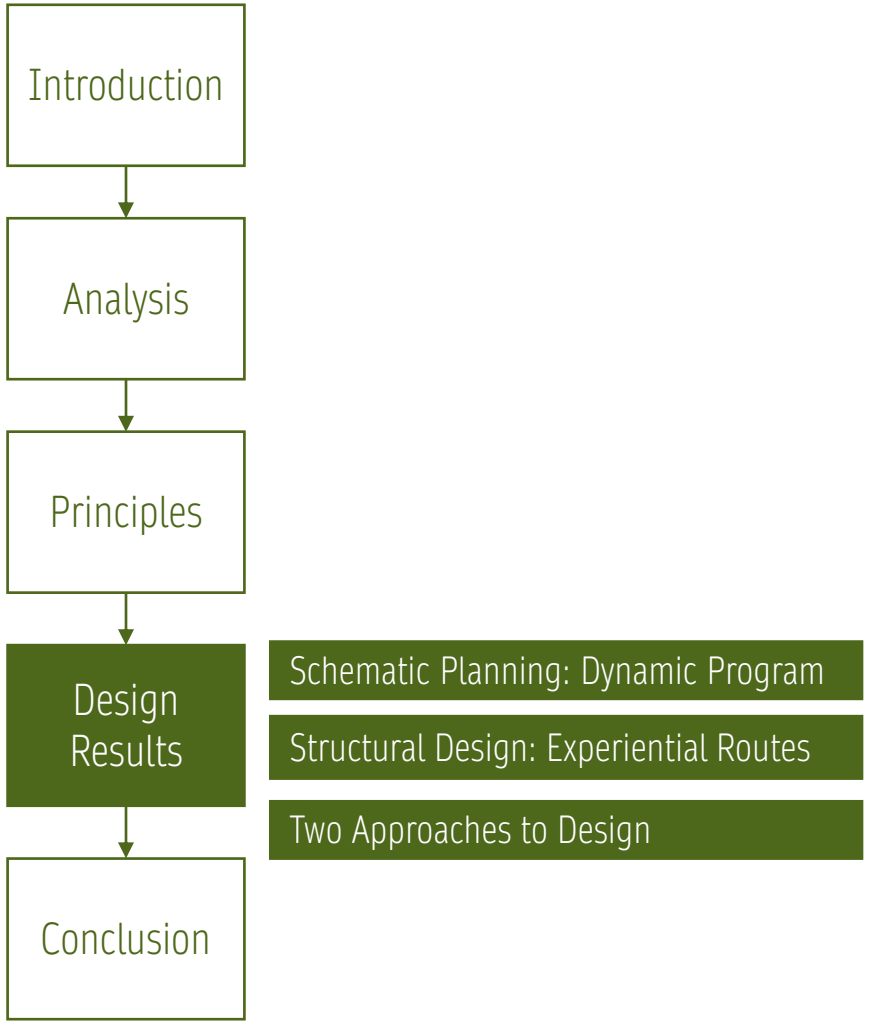
Two Approaches to Design

Structural Design :
Experiential Routes

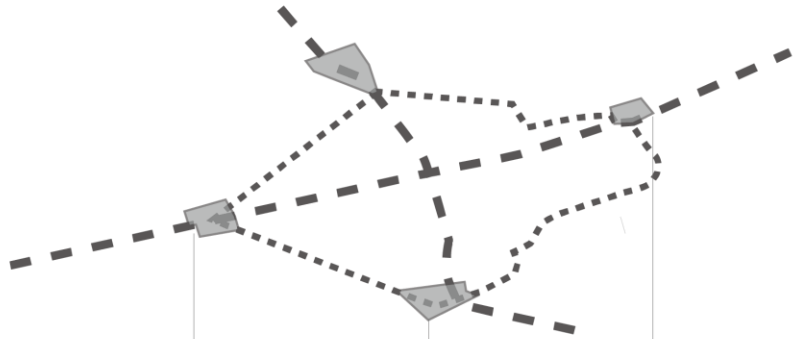


Schematic Planning:
Dynamic Program




Introduction
Analysis
Principles
Design Results
Conclusion
Schematic Planning: Dynamic Program
Structural Design: Experiential Routes
Two Approaches to Design

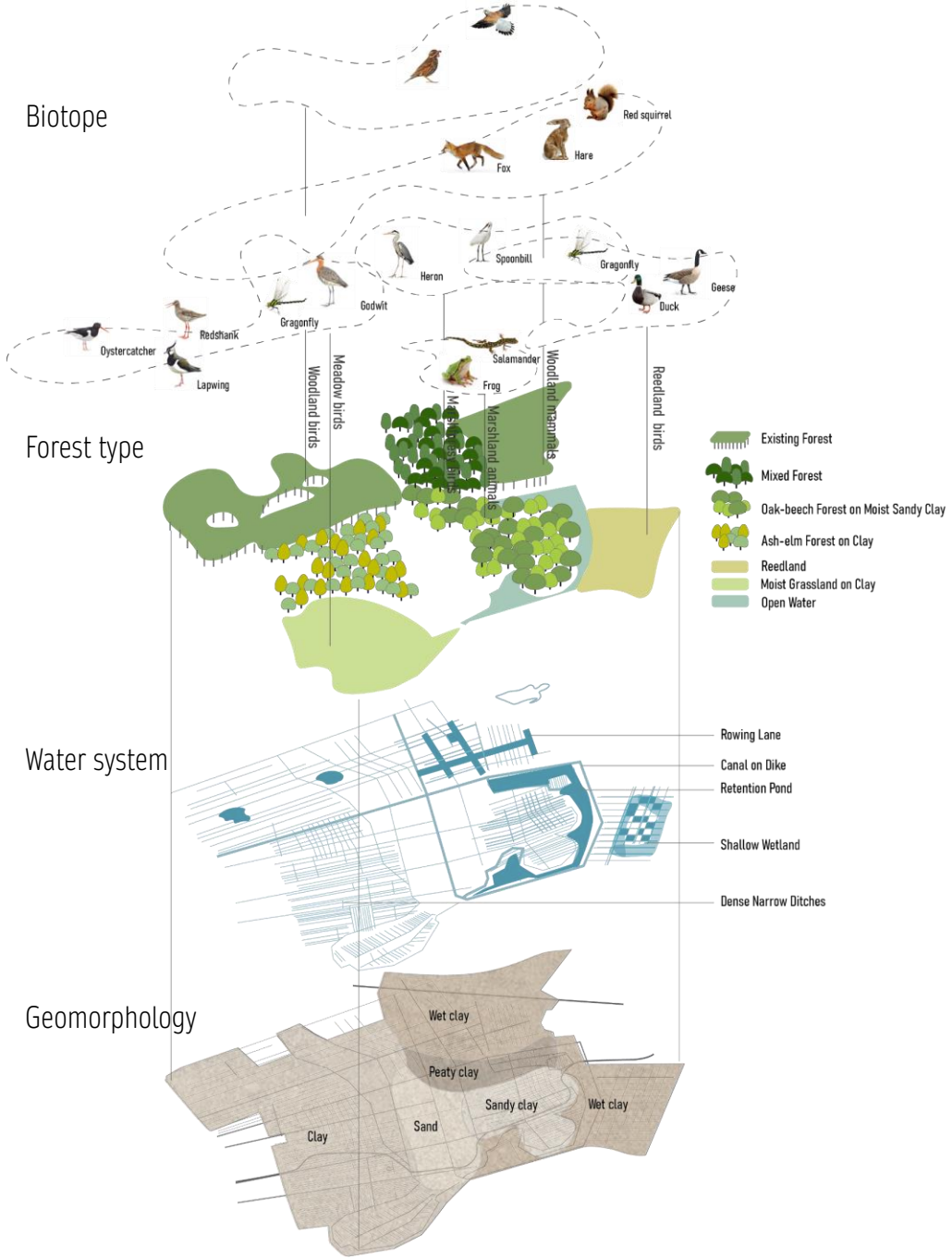
Schematic Planning: Dynamic Program



Schematic Planning:
Dynamic Program

- Design with typology
- Long-term thinking

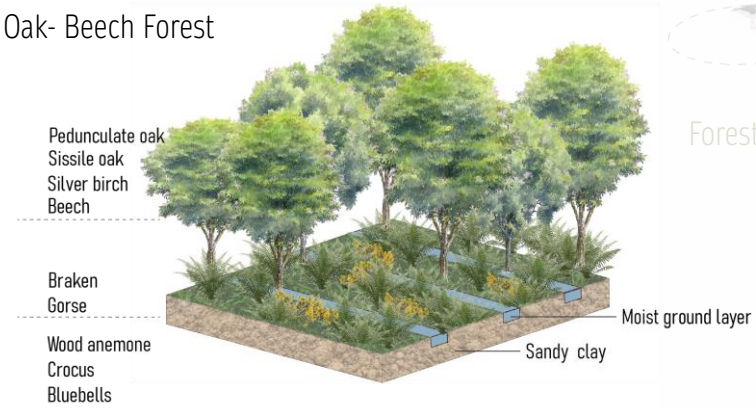
Healthy Scheme for Forest



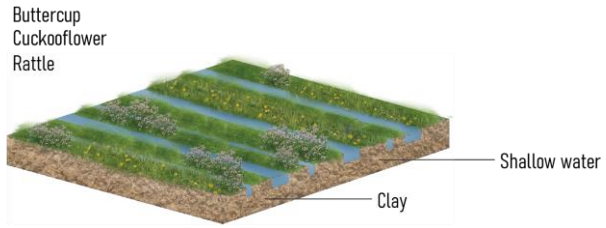
Healthy Scheme for Forest

Ash- Elm Forest

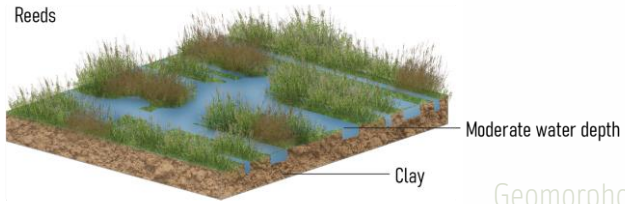
Oak- Beech Forest



Moist Grassland



Reedland

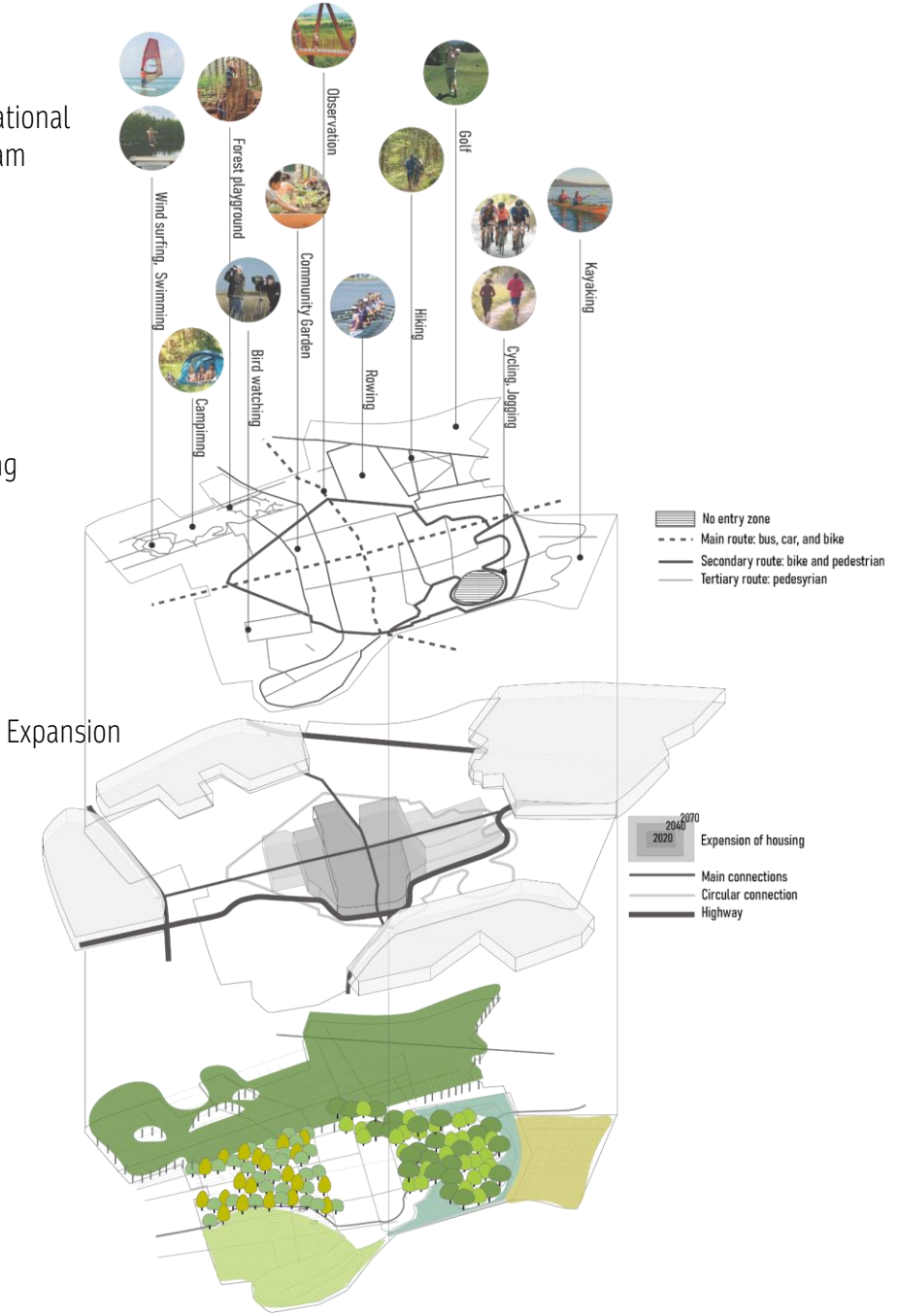


Healthy Scheme for People

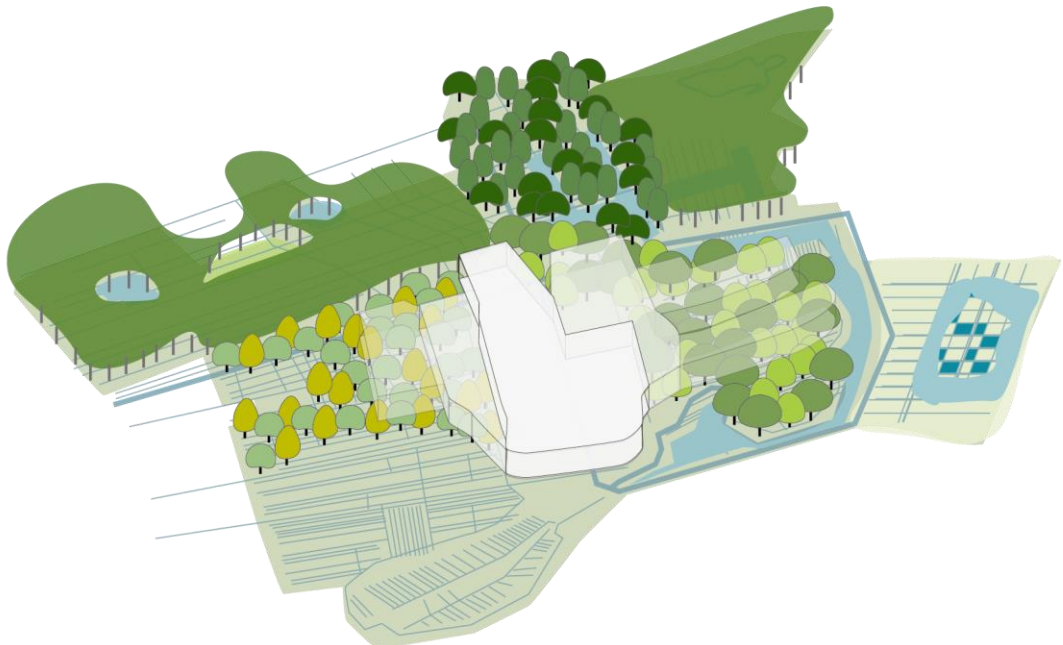
Recreational Program

Routing

Urban Expansion



Scheme Conclusion

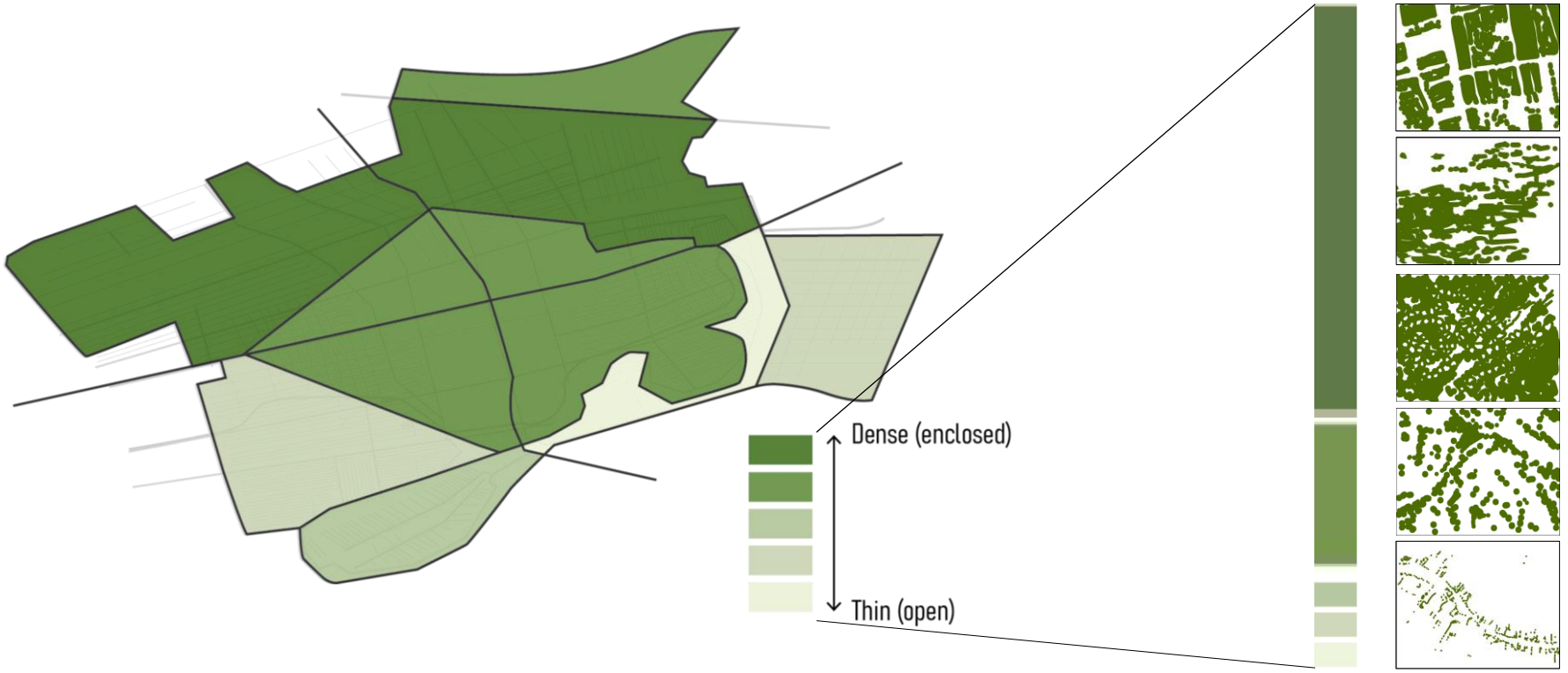


Recreational Program

Routing

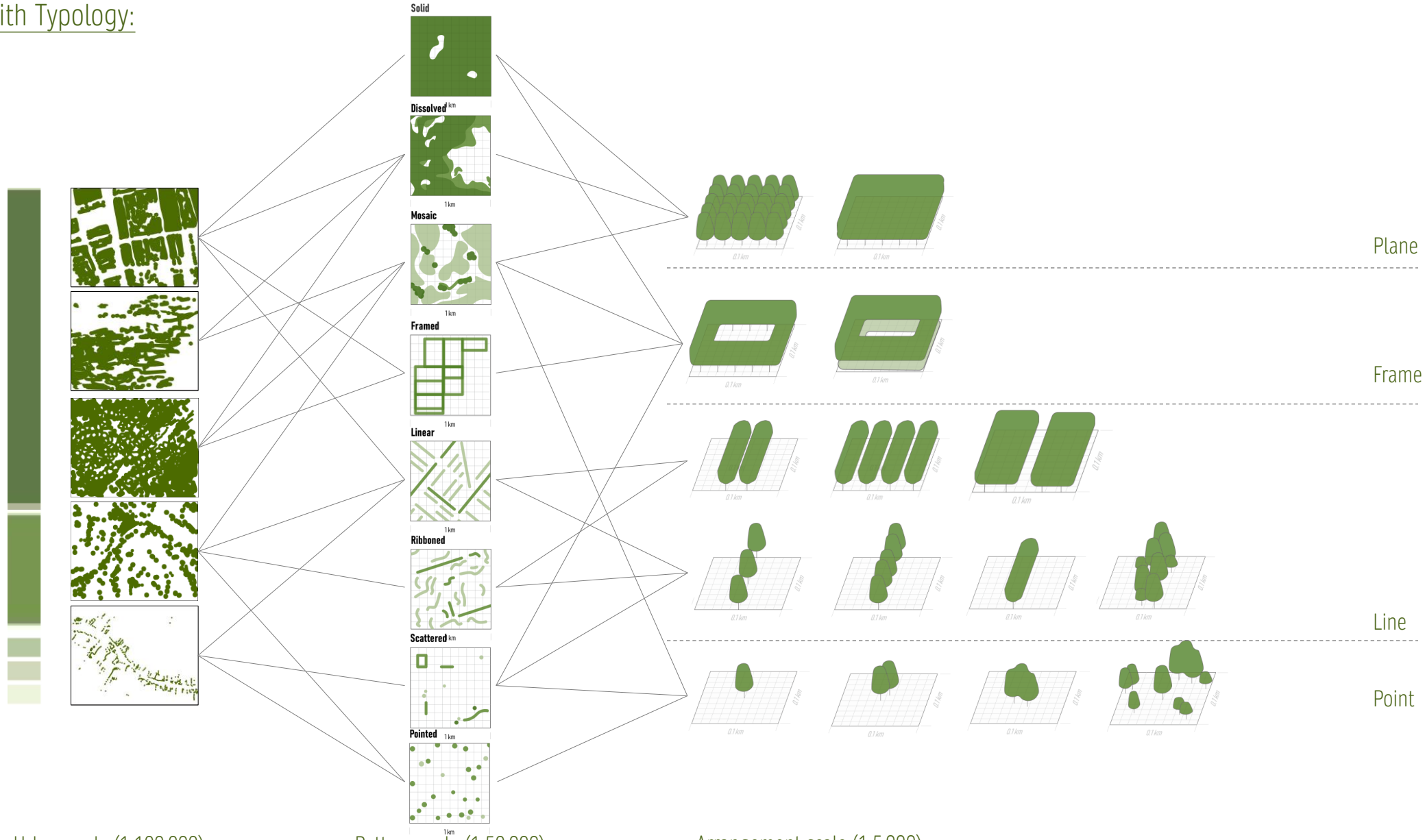
Urban Expansion

Designing Spatiality with Typology



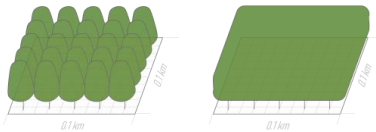
Types with dense canopy, higher health quality, or more potential

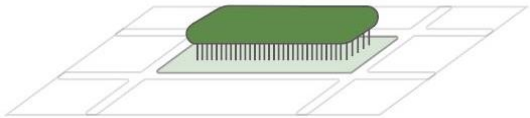
Designing Spatiality with Typology: Toolbox



Typology with landscape characteristics

Plane





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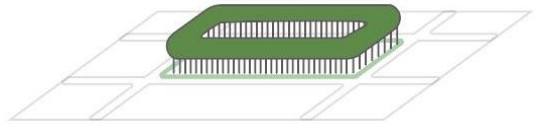

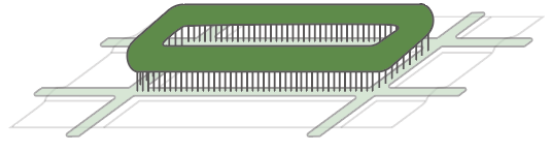

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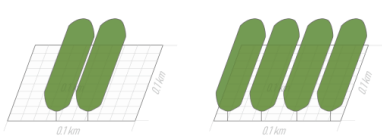
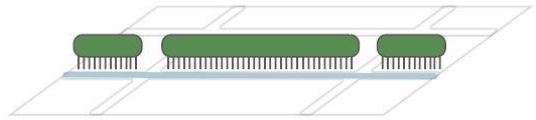
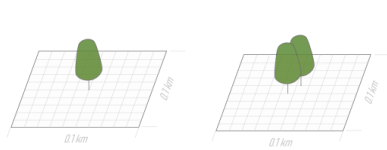
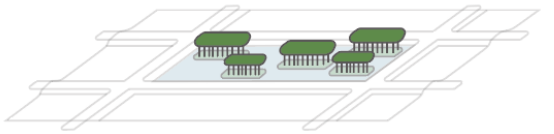




Point





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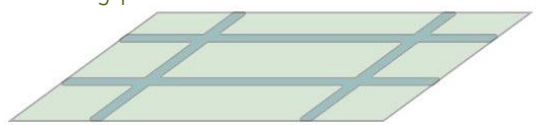

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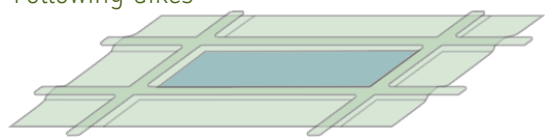
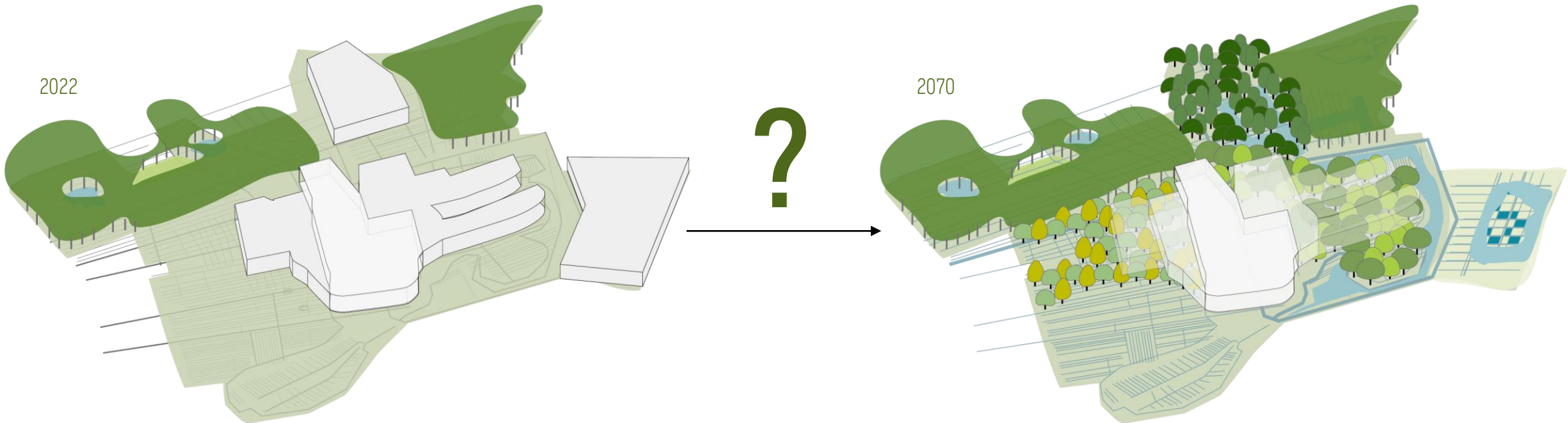
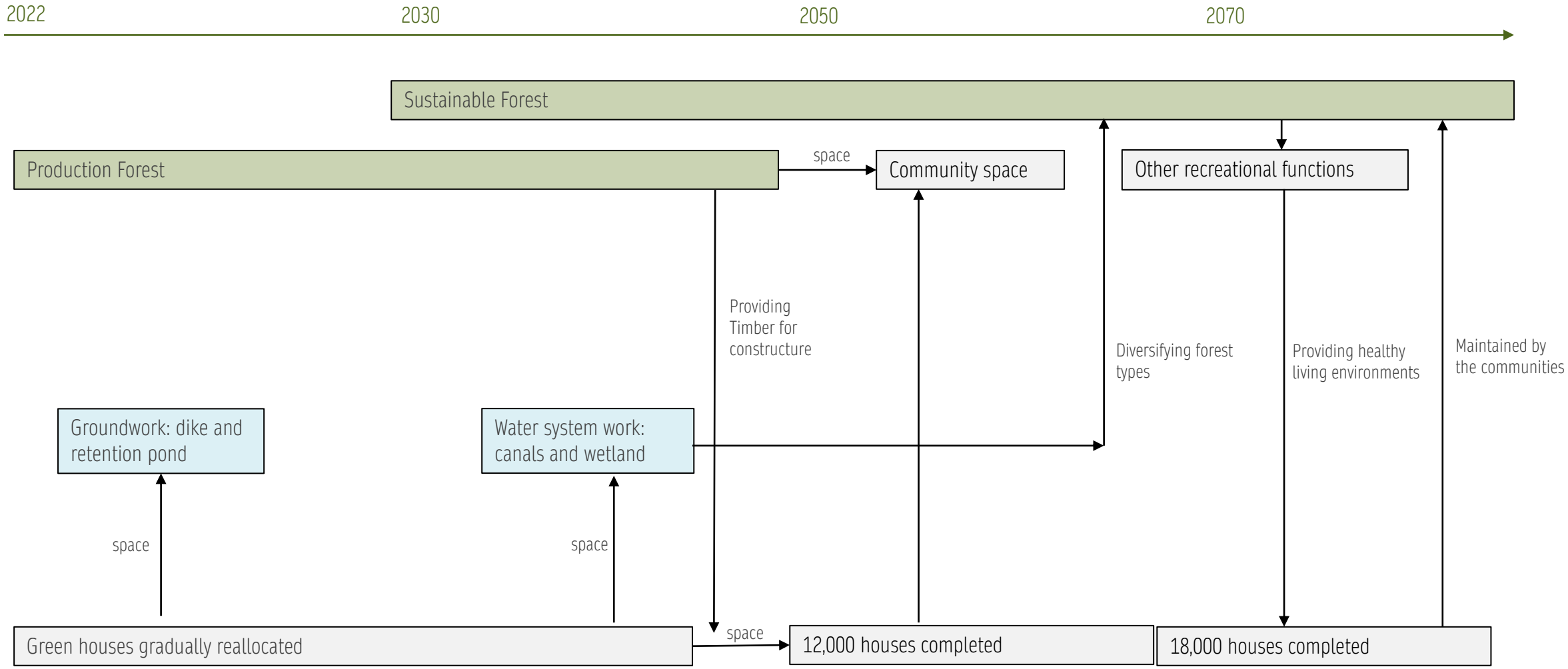


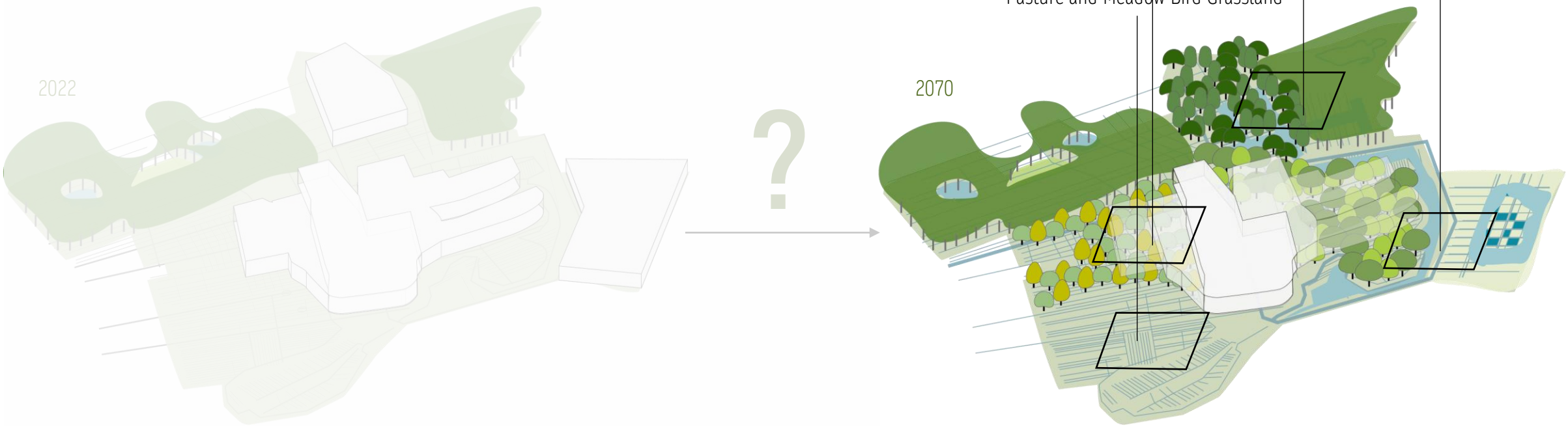
Strategies with Time Phases



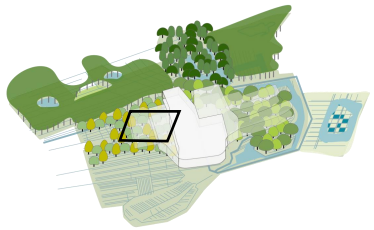
Strategies with Time Phases

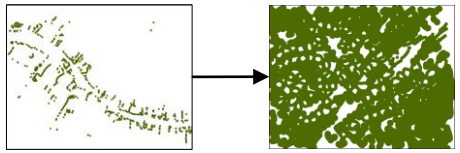


Strategies with Time Phases



Houses in Ash-elm Forest





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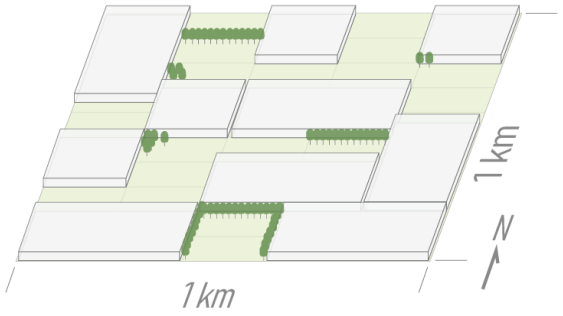

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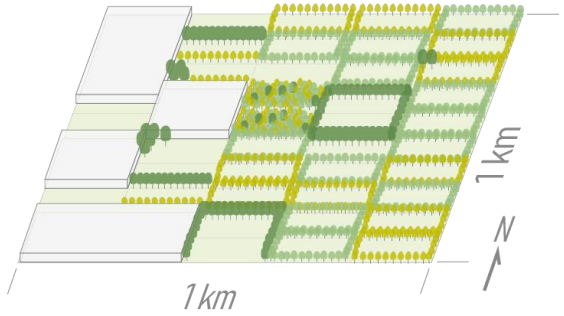

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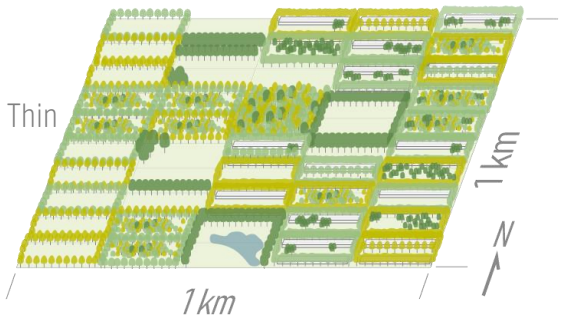

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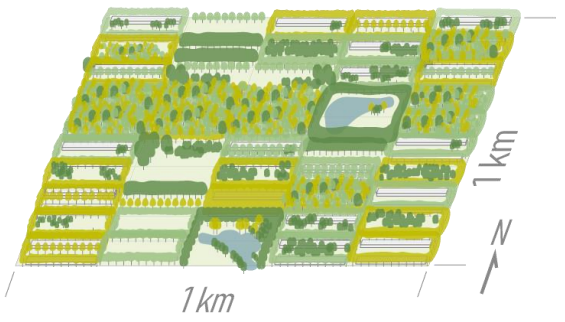
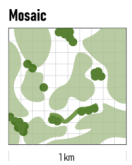
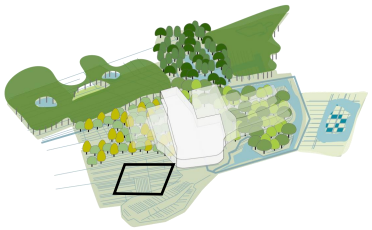
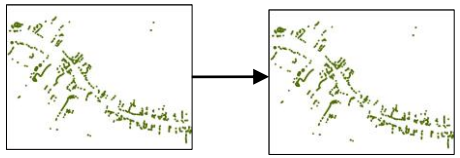




Pasture and Meadow Bird Grassland





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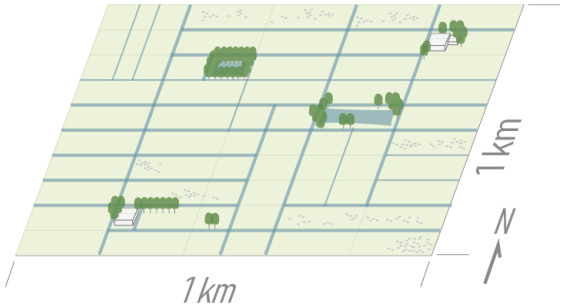

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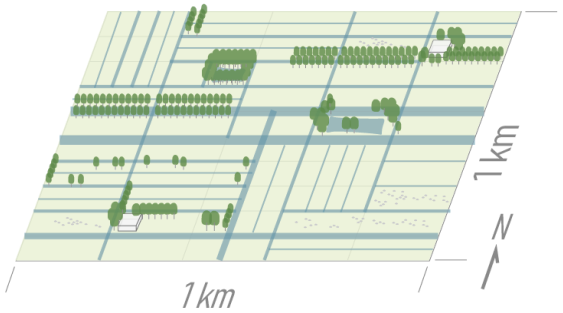

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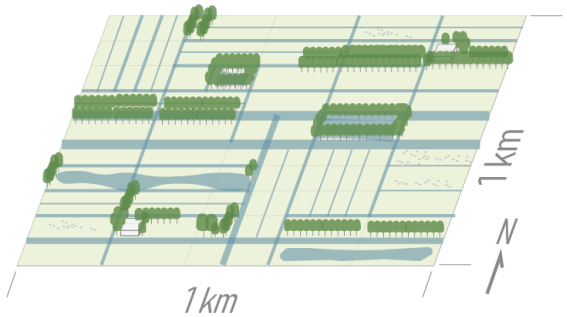

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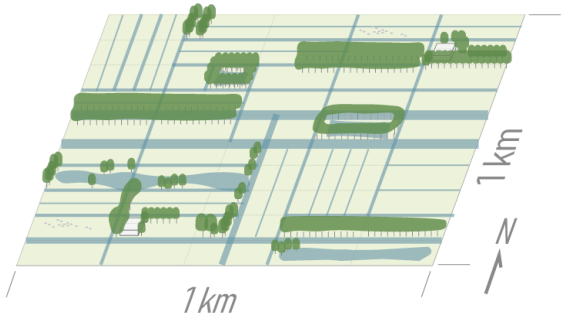
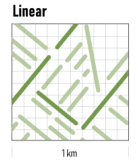
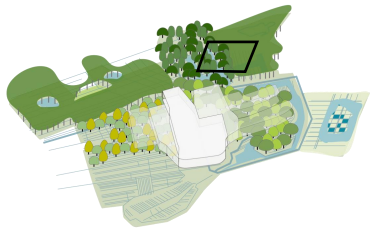
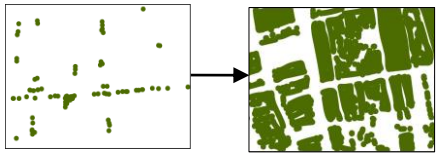




Rowing Canals in Dense Forest





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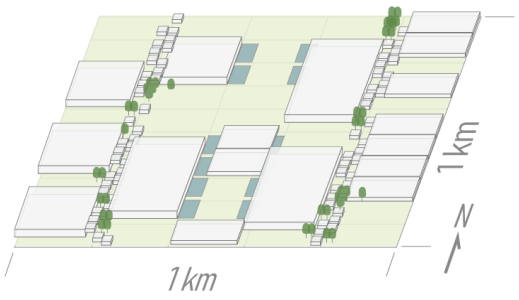

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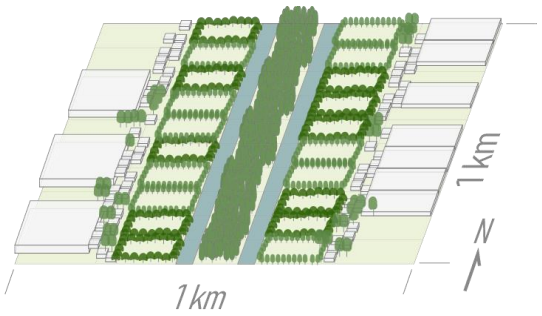

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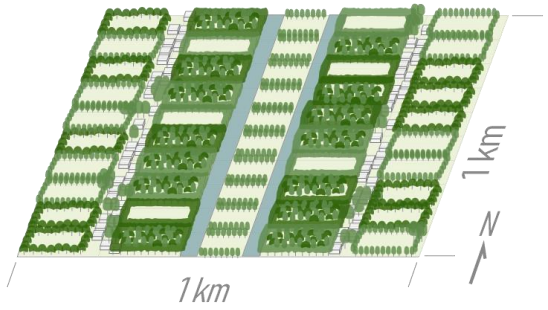

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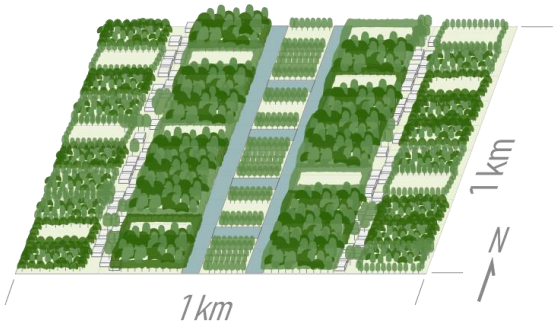
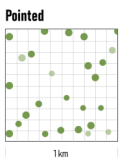
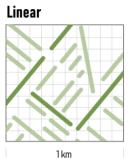
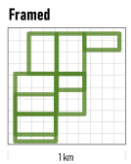
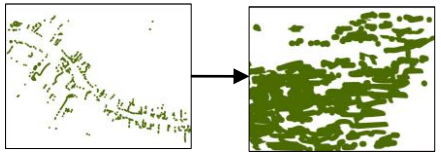








Retention Pond and Reedland



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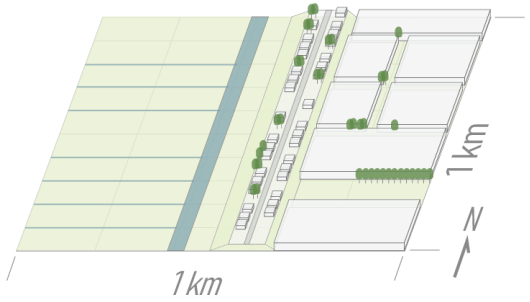

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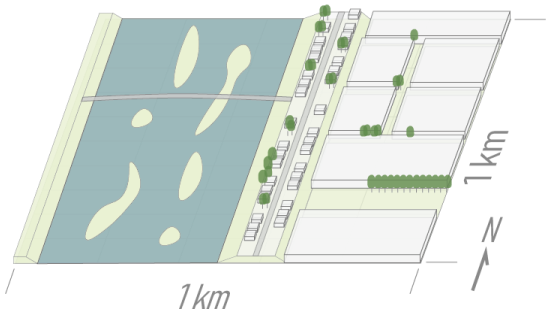

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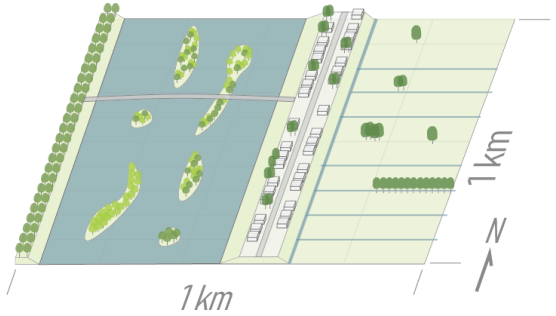

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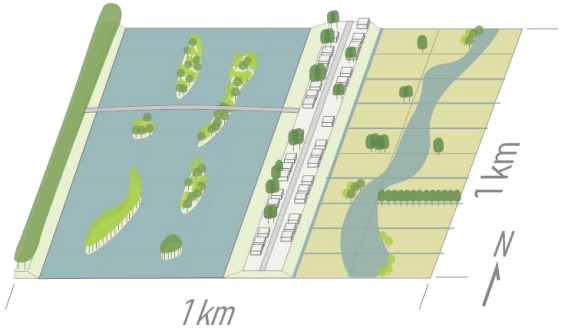
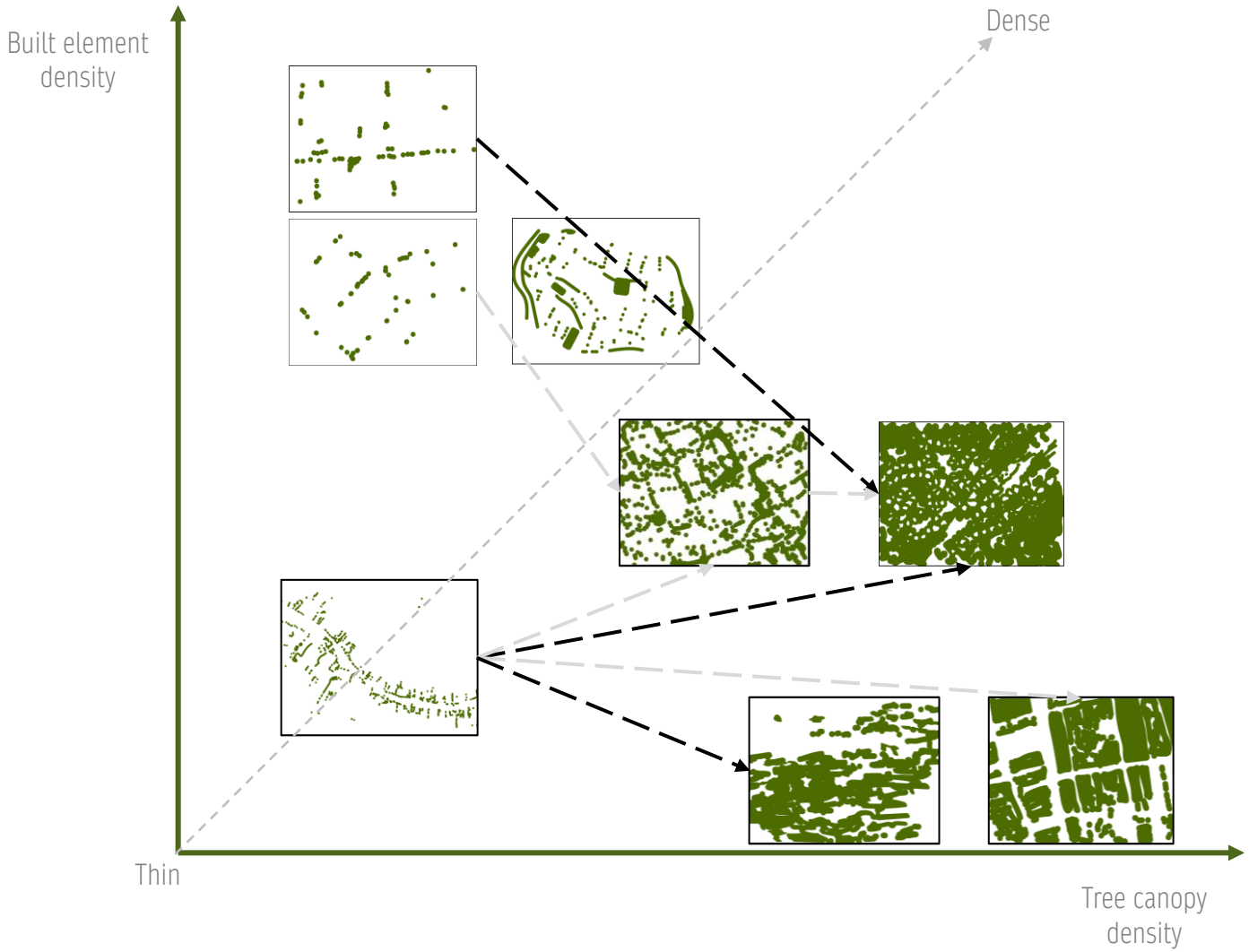


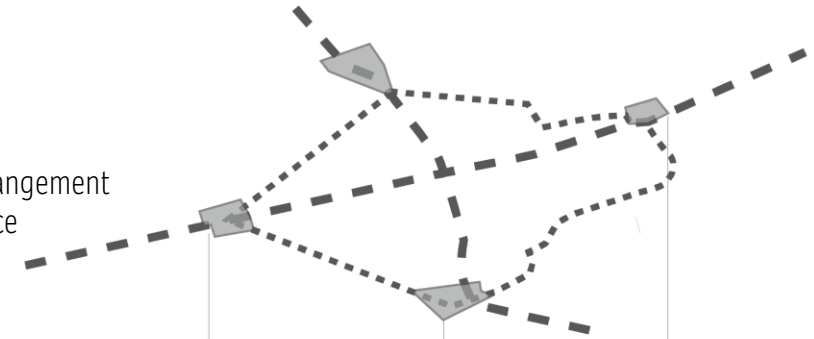
Transformation among Types



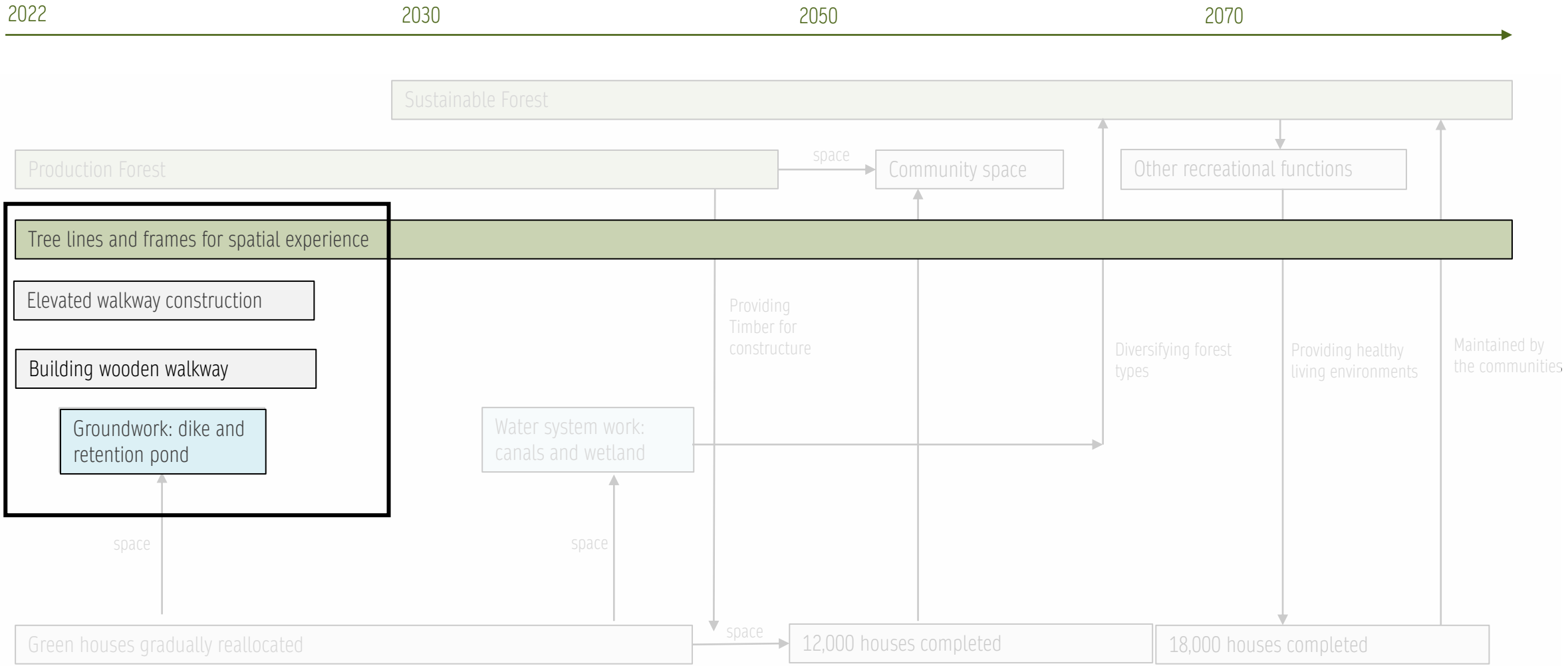
Structural Design: Experiential Routes

Structural Design :
Experiential Routes

- Design with trees arrangement and moving experience

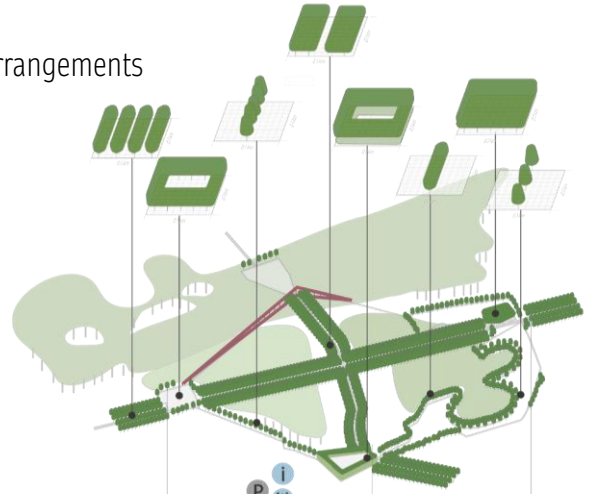


Strategies with Time Phases

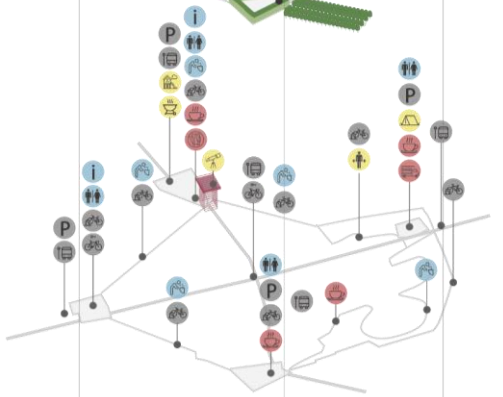


Experiential scheme

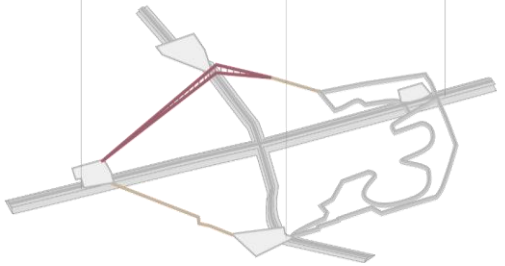
Trees Arrangements



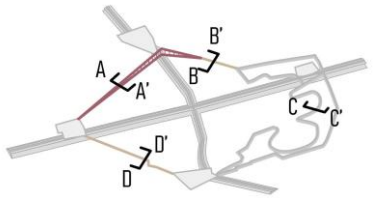
Function and Activities



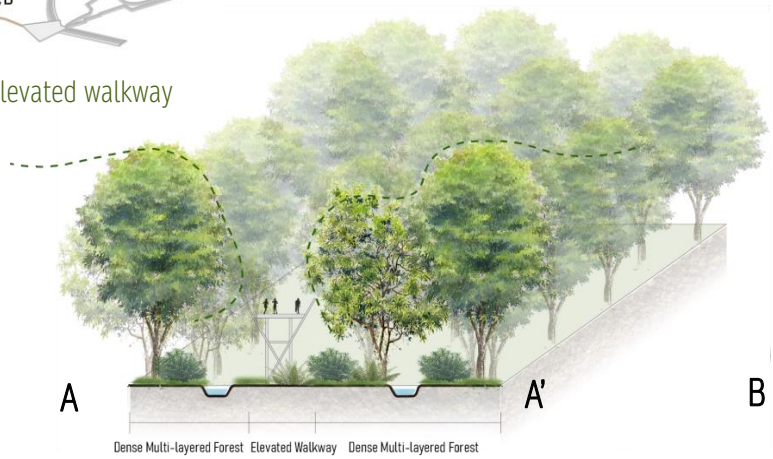
Walkways



Four kinds of walking experiences

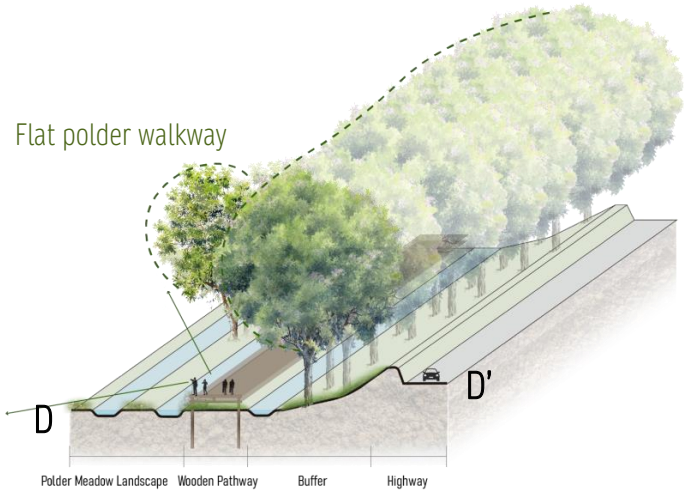


Elevated walkway

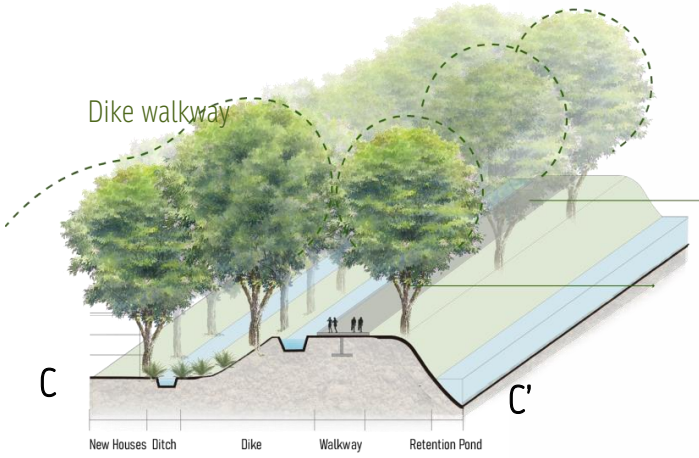


Waterside walkway

Flat polder walkway

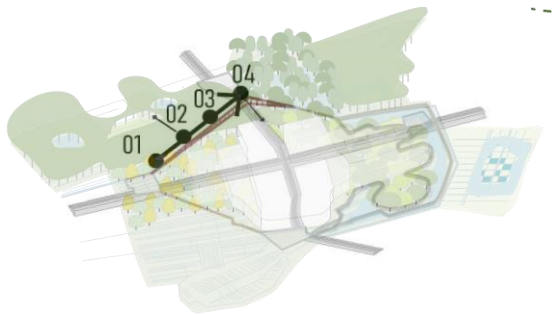


Dike walkway



Structural Design: Experiential Routes

Serial vision: elevated walkway

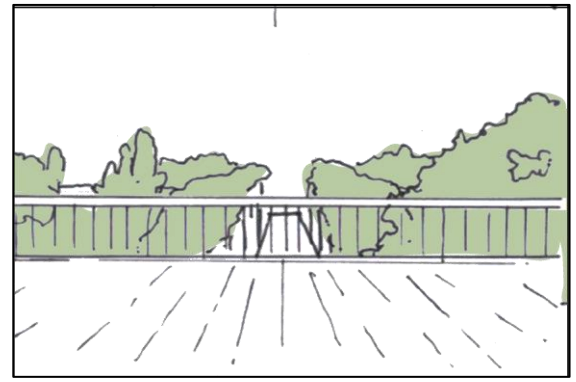


01

02

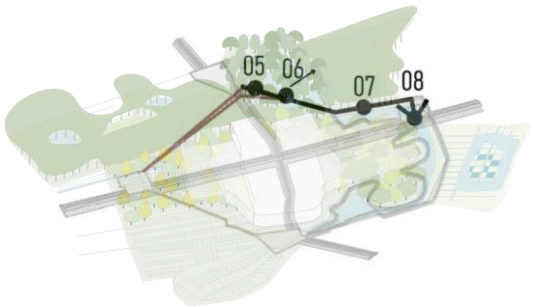
03

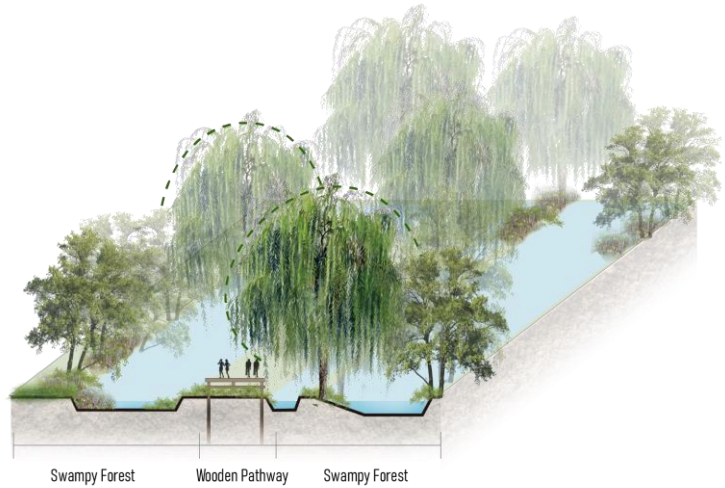
04



Structural Design: Experiential Routes

Serial vision: walking by the water





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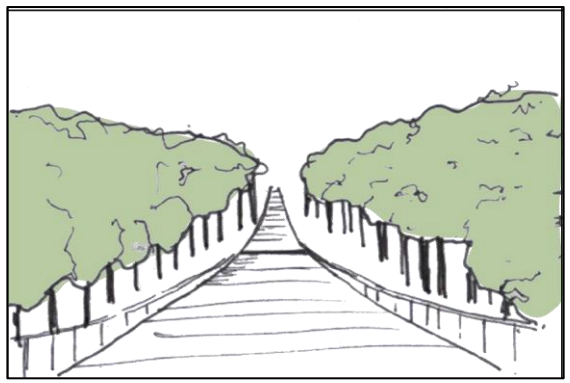

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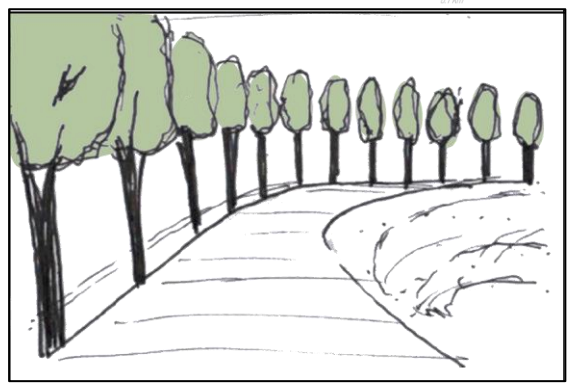
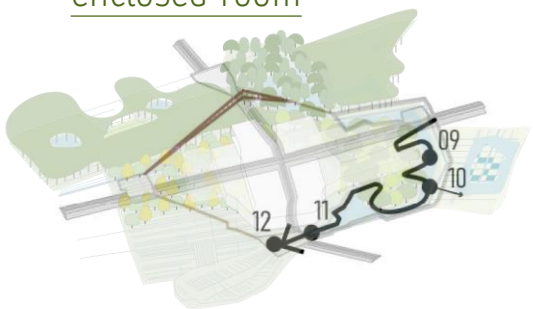
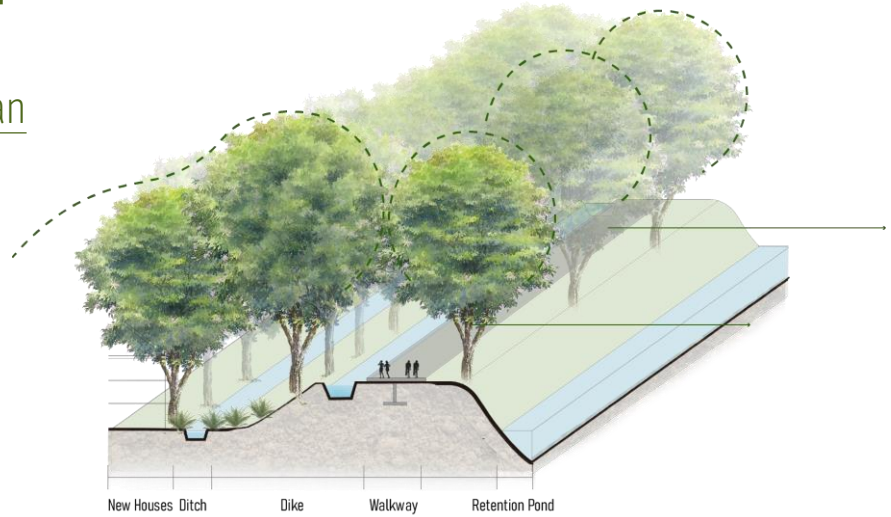


08

Structural Design: Experiential Routes

Serial vision: from the dike to an enclosed room





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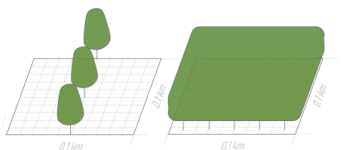

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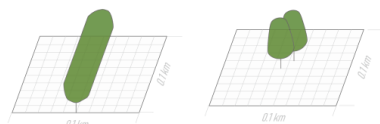

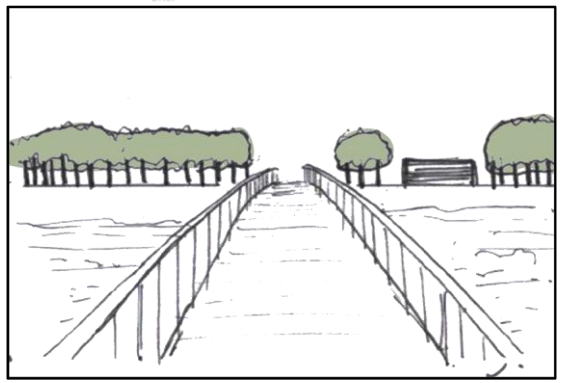

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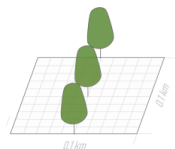

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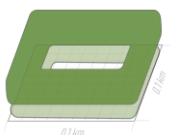
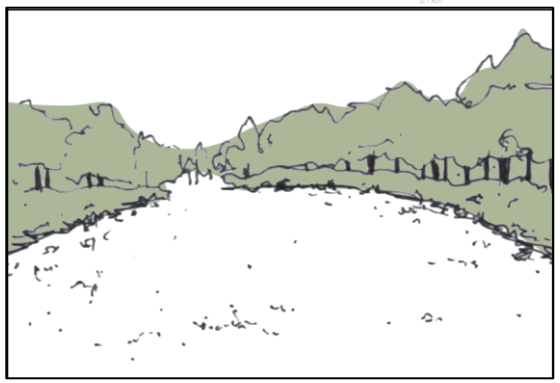
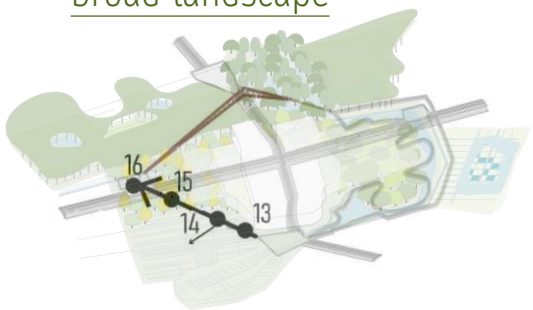
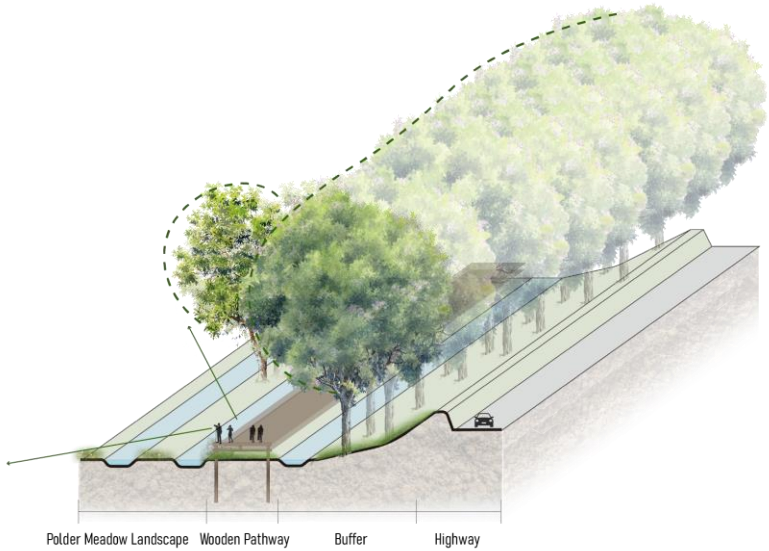




Structural Design: Experiential Routes

Serial vision: tree lines in the broad landscape





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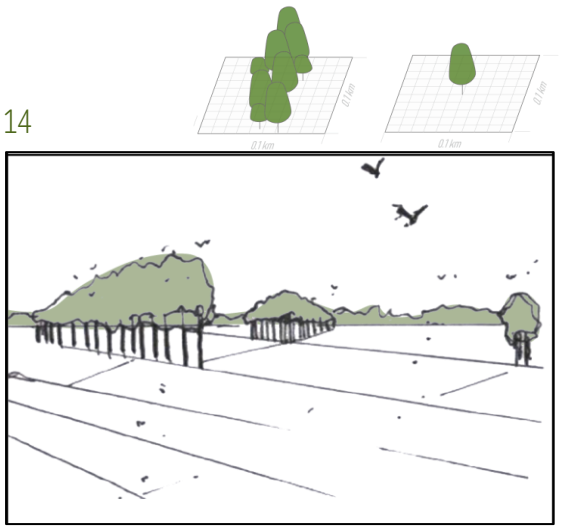

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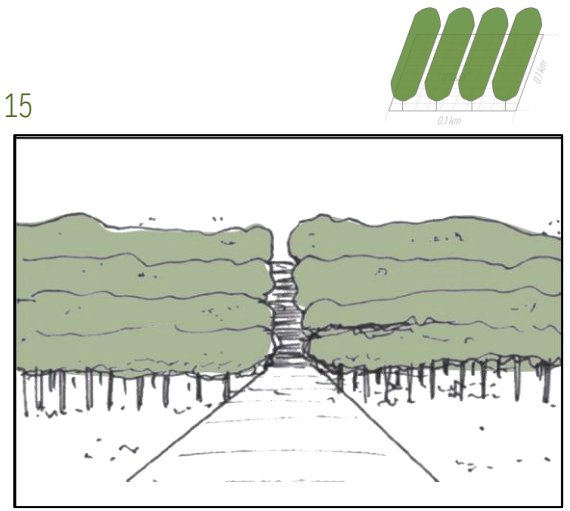

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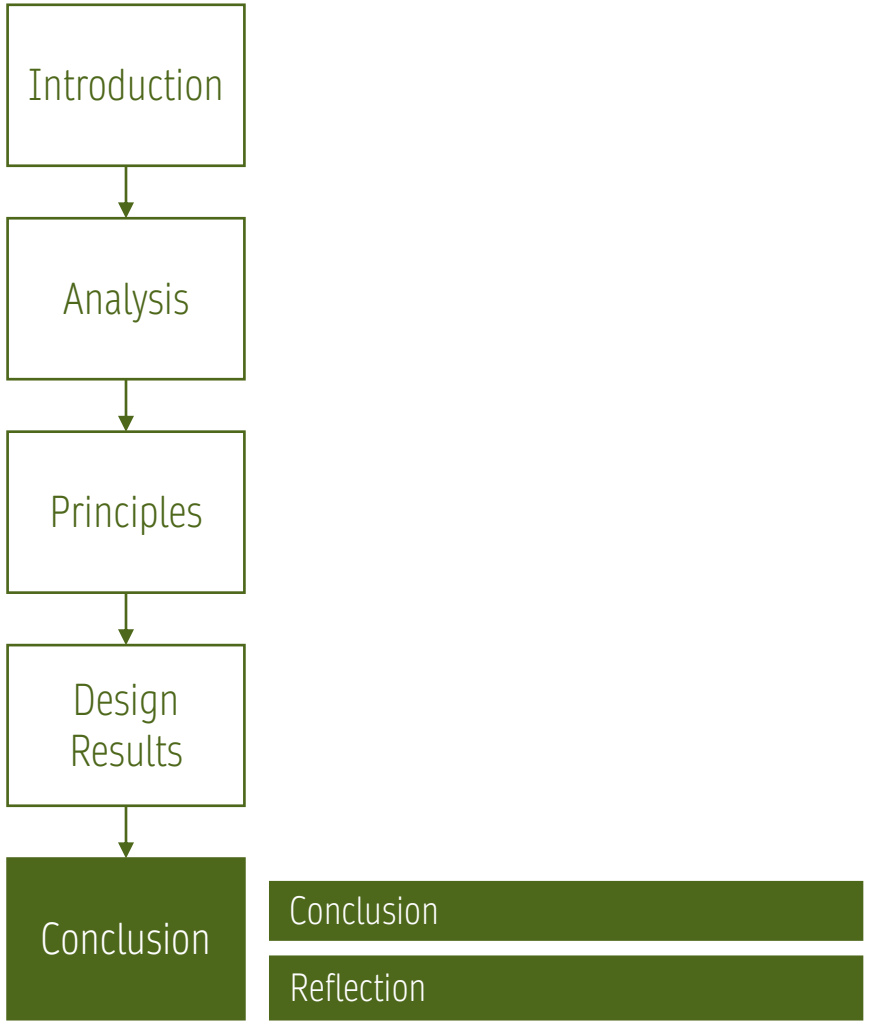
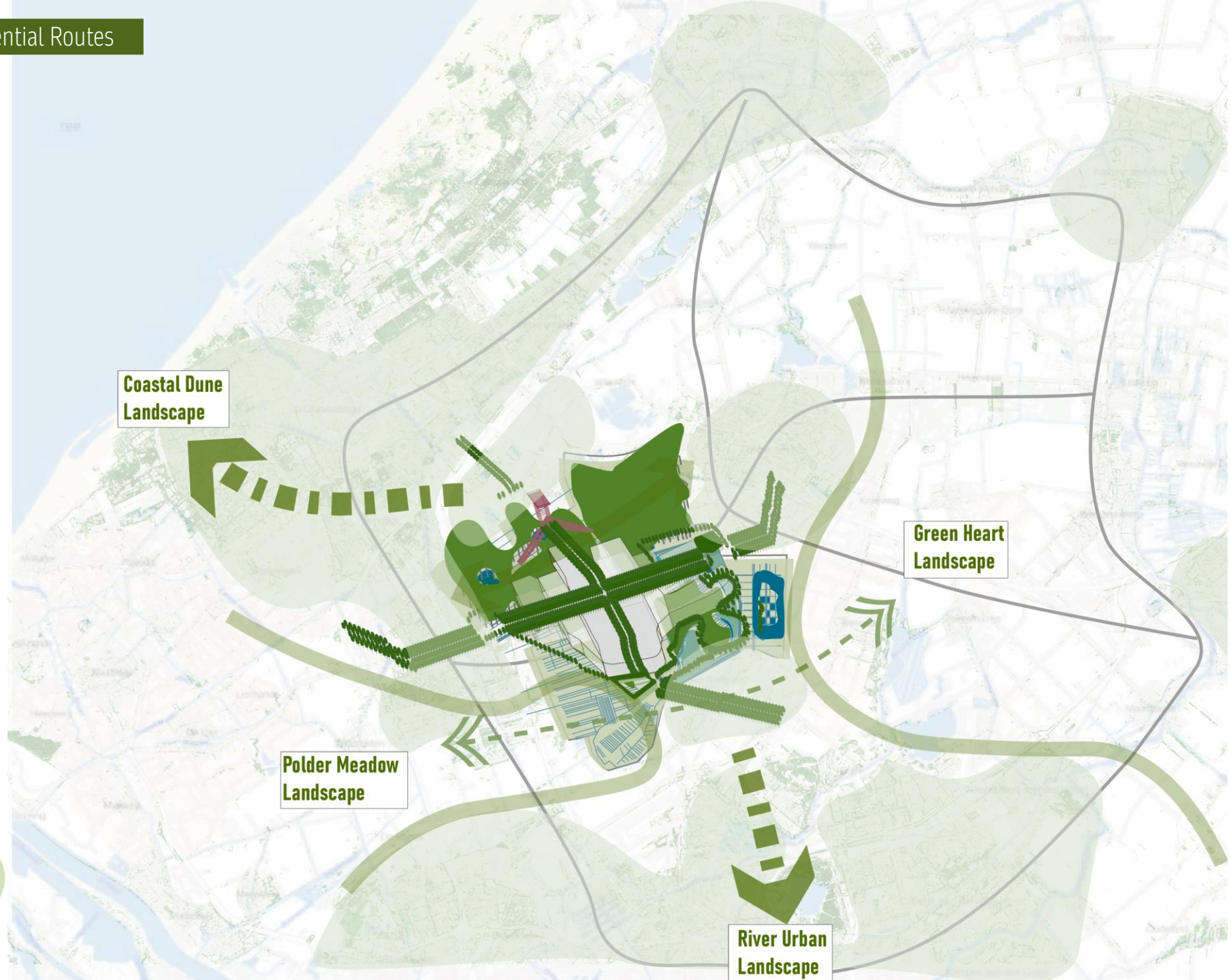
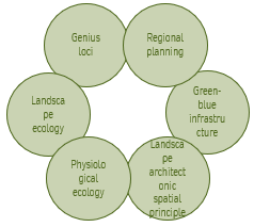

Introduction
Analysis
Principles
Design Results
Conclusion
Conclusion
Reflection

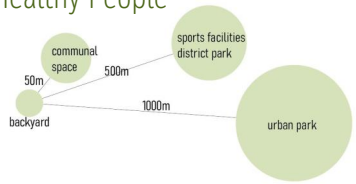
Structural Design: Experiential Routes



Healthy Forest



Healthy People



Reflection

- Social and Technical Aspects?
  - → Other potential ecosystem services aside from assessment of accessibility
  - → How do forest interact with the urban environment on individual tree scale
- Vegetation under 20 m?
  - → Influencing Health and Experience
- Form and function?
  - → Form follows function? Is form a kind of function?

Pointed
Scattered
Linear
Ribboned
Framed
Mosaic
Dissolved
Solid

Thank You!