Animal Farming in Flourishing Foodscapes and Thoughtscapes

--- Sustainable, nature-inclusive animal farming with attractive recreational qualities in Den Bosch region, Noord Brabant

P5 PRESENTATION

(Jessica) Xulingyun Ji

29.08.2022

Image source: Vincent Jannink/ANP/AFP/GETTY IMAGES, 2019

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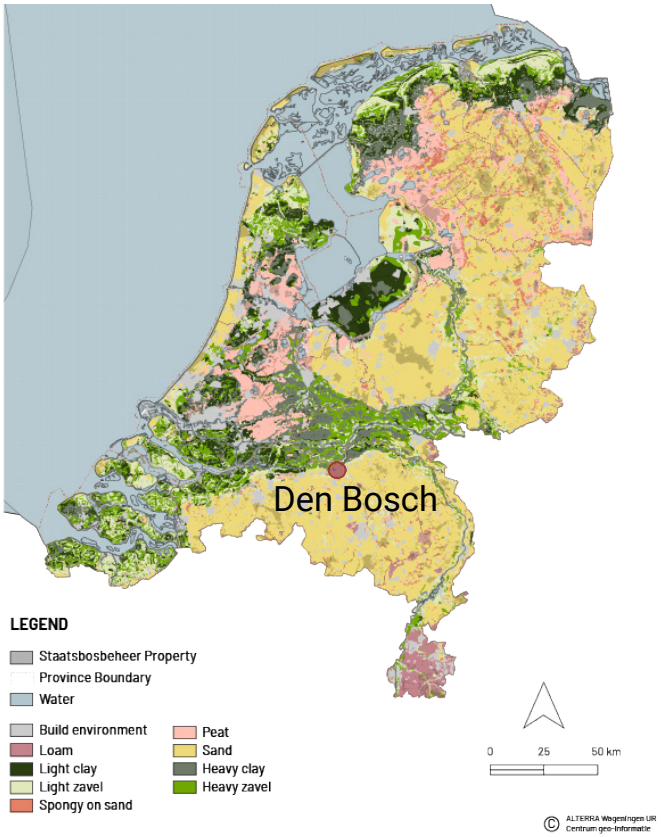
1 INTRODUCTION

Study Area: Den Bosch Region in Noord Brabant



Soil types of Netherlands (source: Nicolle Cobben, 2022)

Food animals in Noord Brabant (source: Bas de Vries, 2017)

Study Area: Den Bosch Region in Noord Brabant

Intensive Animal Factories

Monofunctional Grasslands

Stock farms
- Pig !
- Goat & Sheep
- Poultry !
- Cattle !
- Horse

Image source: Google map

PROBLEM STATEMENT

1. Environmental Issues Caused by Current Animal Farming

Destroy rainforest

Pollute water

Damage local vegetation

PROBLEM STATEMENT

2. Bad Animal Welfare in Intensive Animal Farms in Den Bosch Region

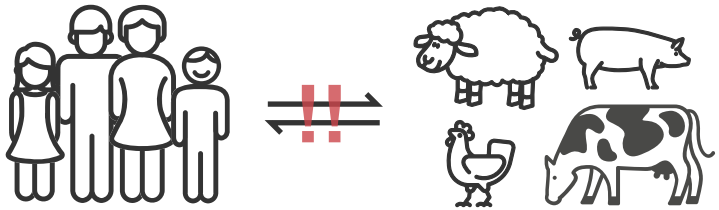
Dairy farming

Pig farming

Poultry farming

PROBLEM STATEMENT

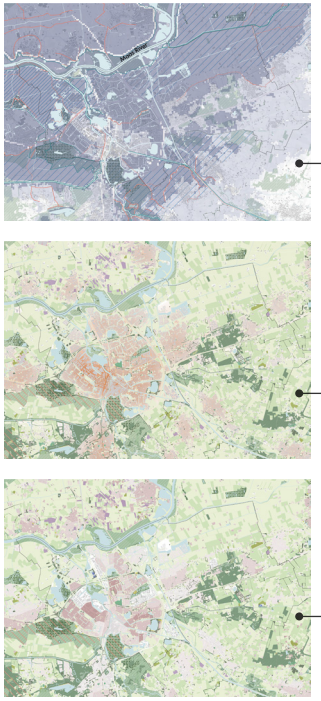
3. Insufficient Recreational Landscapes Work as Animal Farming Foodscapes and Thoughtscapes in Den Bosch Region



PROBLEM STATEMENT

4. Other Climate-related Issues such as flooding risks, urban heat effect, etc.

Image source: Omroep Brabant

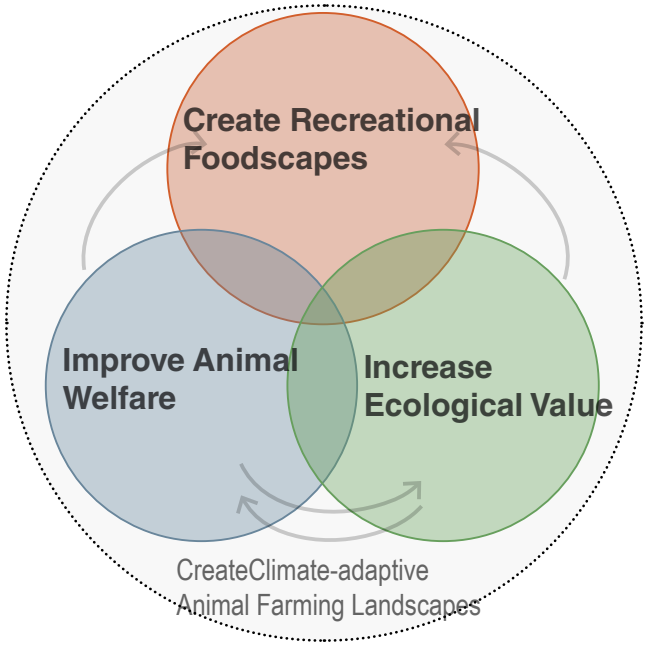


Flooding Risks

Urban Heat Effect

Livability of Neighborhoods

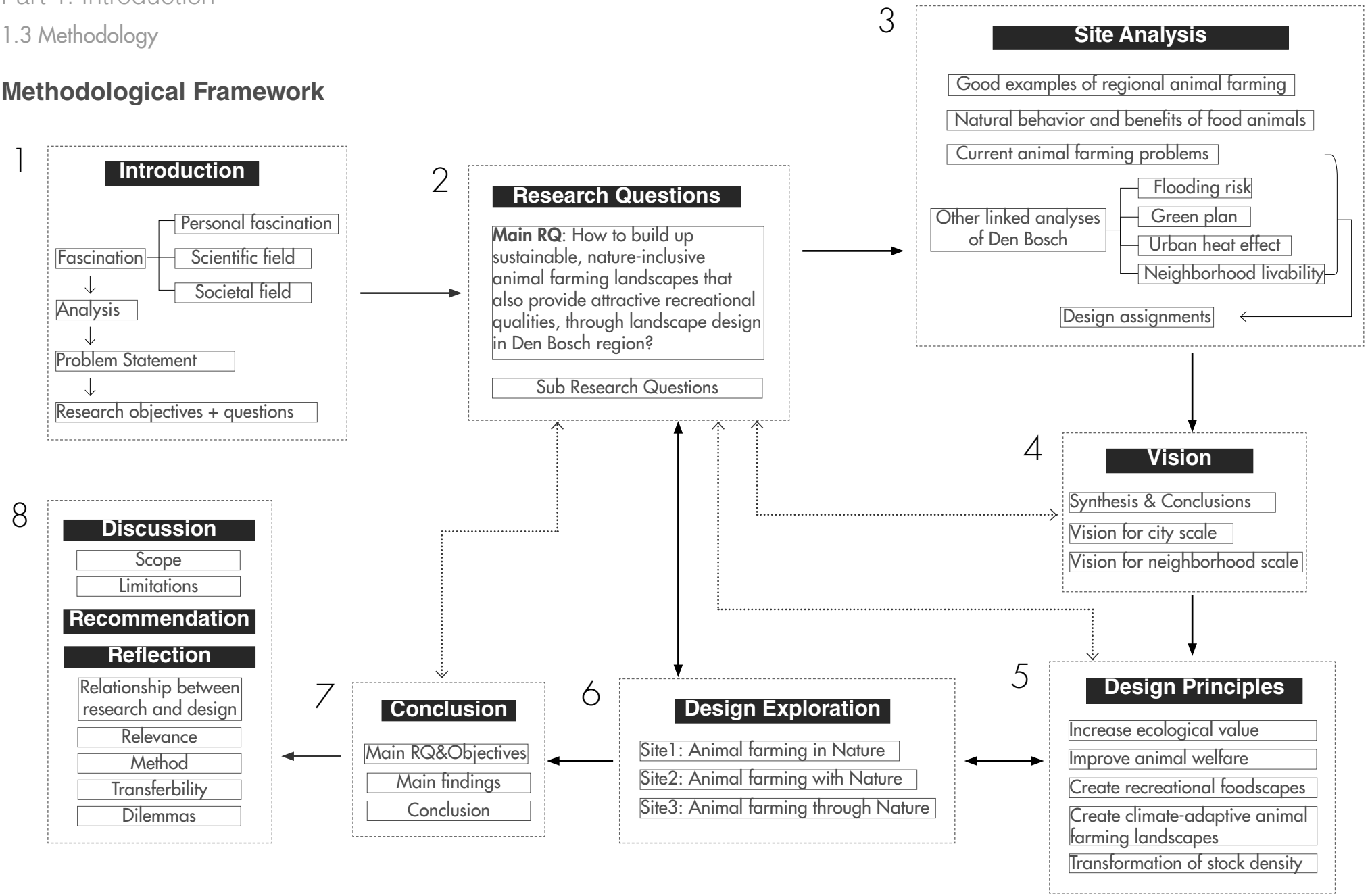
Main Objectives



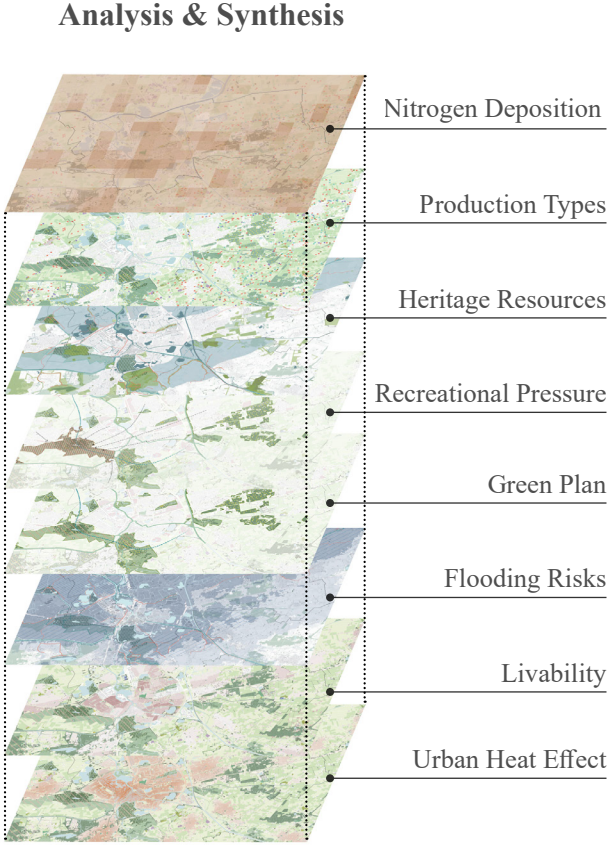
Main Research Question

How to build up sustainable, nature-inclusive animal farming landscapes that also provide attractive recreational qualities, through landscape design in Den Bosch region?

Methodological Framework

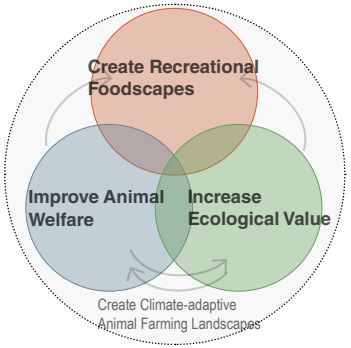


2 VISION



Vision for the Den Bosch Region

Design Assignments



Increase Ecological Value

- Nitrogen circulation
- Sustainable animal farming
- Increase biodiversity

Improve Animal Welfare

- Improve living environment
  Allow natural animal behaviors
- Supplementary diverse diets

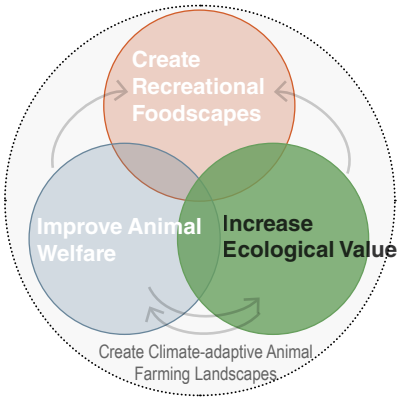
Create Recreational Foodscapes

- Reshow heritage & historic characteristics
- Connect consumers with food animals

Create Climate-adaptive Animal Farming Landscapes

- Improve water retention ability
- Reduce urban heat effect
- Improve livability of neighborhood

3 DESIGN PRINCIPLES



Increase Ecological Value

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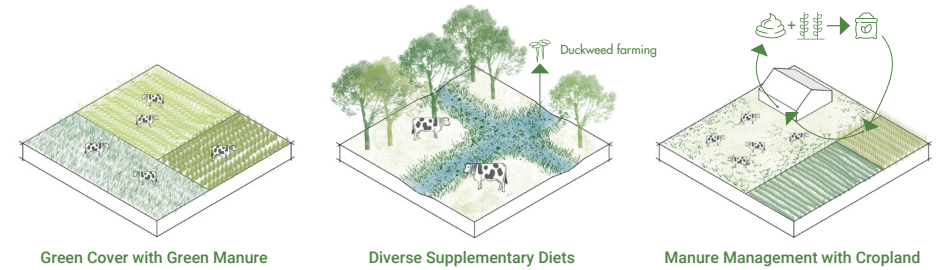
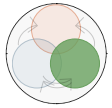
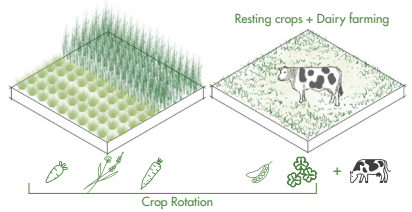


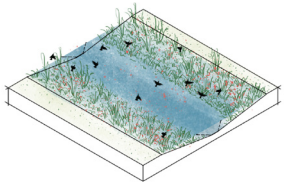
Green Cover with Green Manure | Diverse Supplementary Diets | Manure Management with Cropland



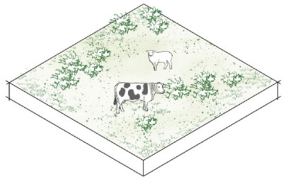
Increase Ecological Value
Nitrogen Circulation



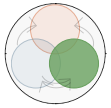
Wide Crop Rotation



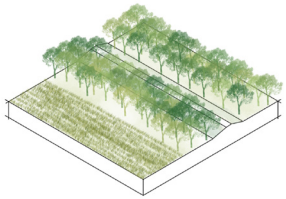
Nature-friendly Water Bank



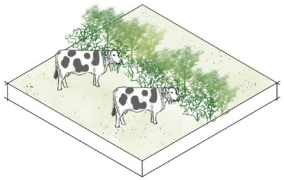
Nature-oriented Mowing with Grazing



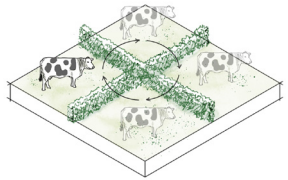
Increase Ecological Value
Improve Biodiversity



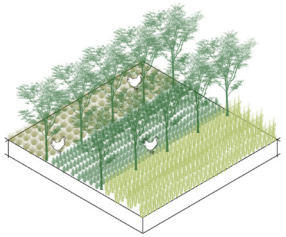
Local Nature as Green Connection



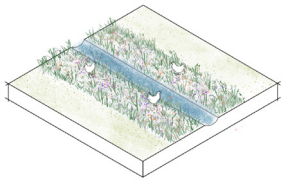
Natural Fences



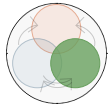
Rotational Grazing



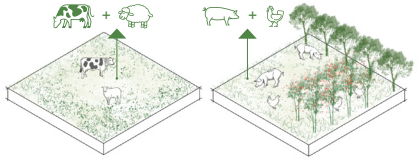
Strip Farming with Chickens



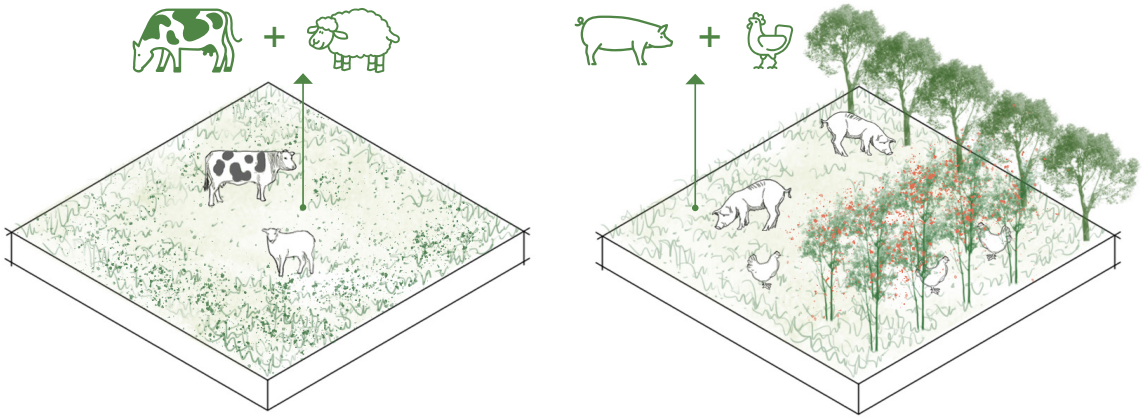
Flower Strips with Poultry Farming



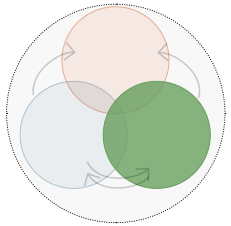
Increase Ecological Value
Sustainable Animal Farming



Multi-species Animal Farming

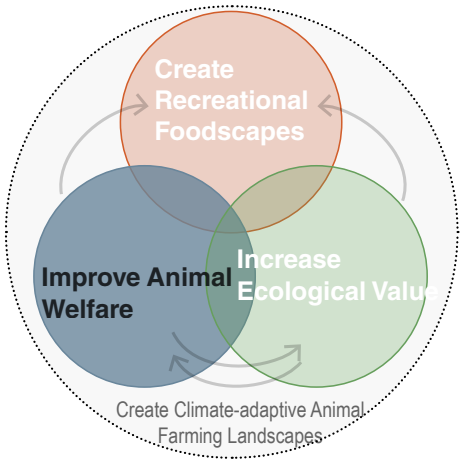


Multi-species Animal Farming



Increase Ecological Value

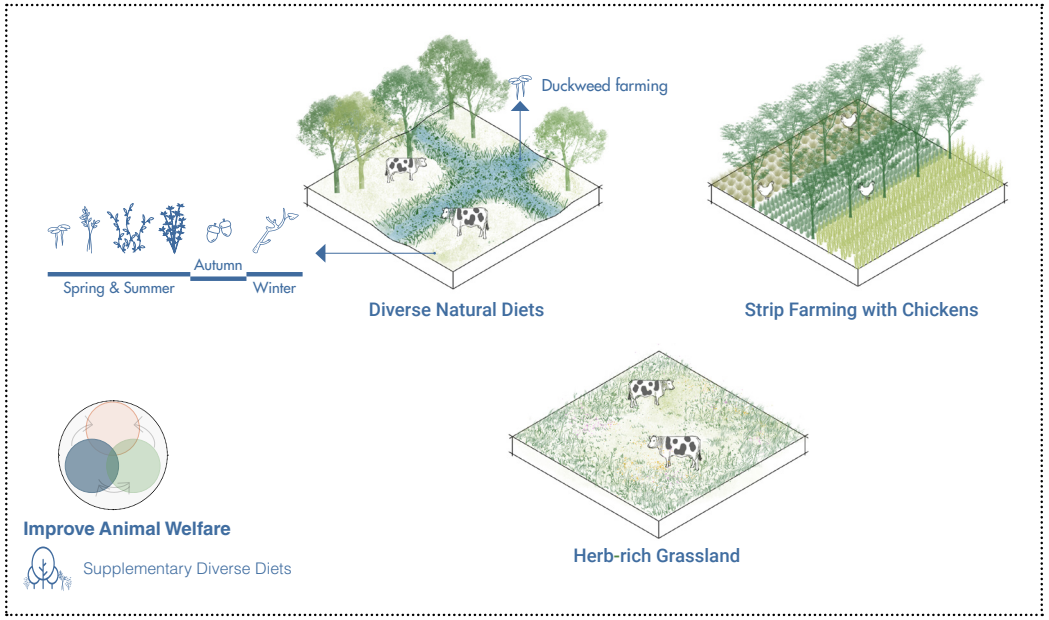
Sustainable Animal Farming

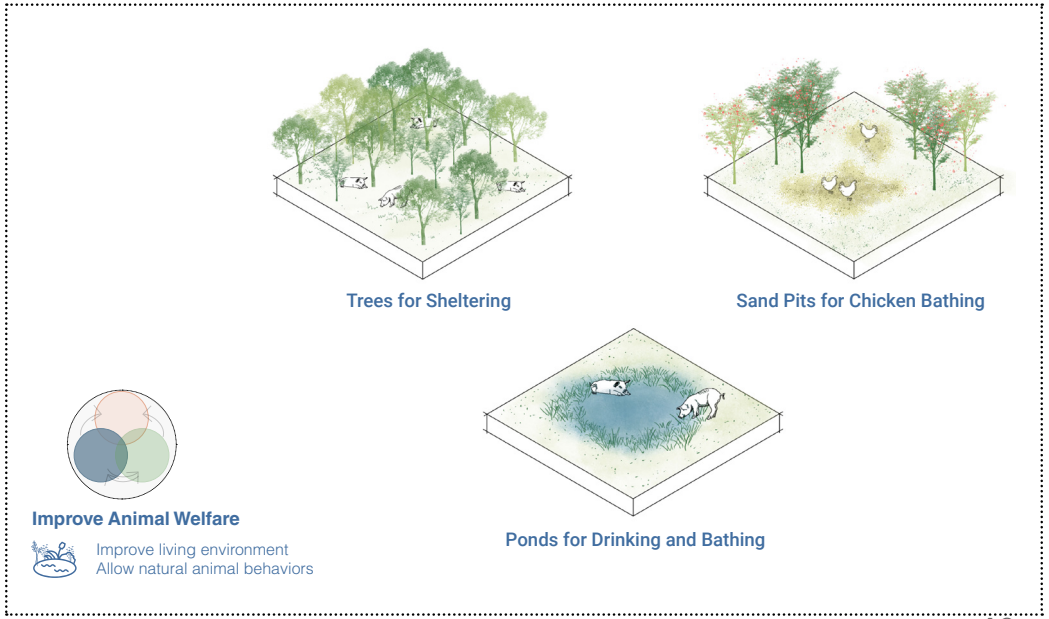


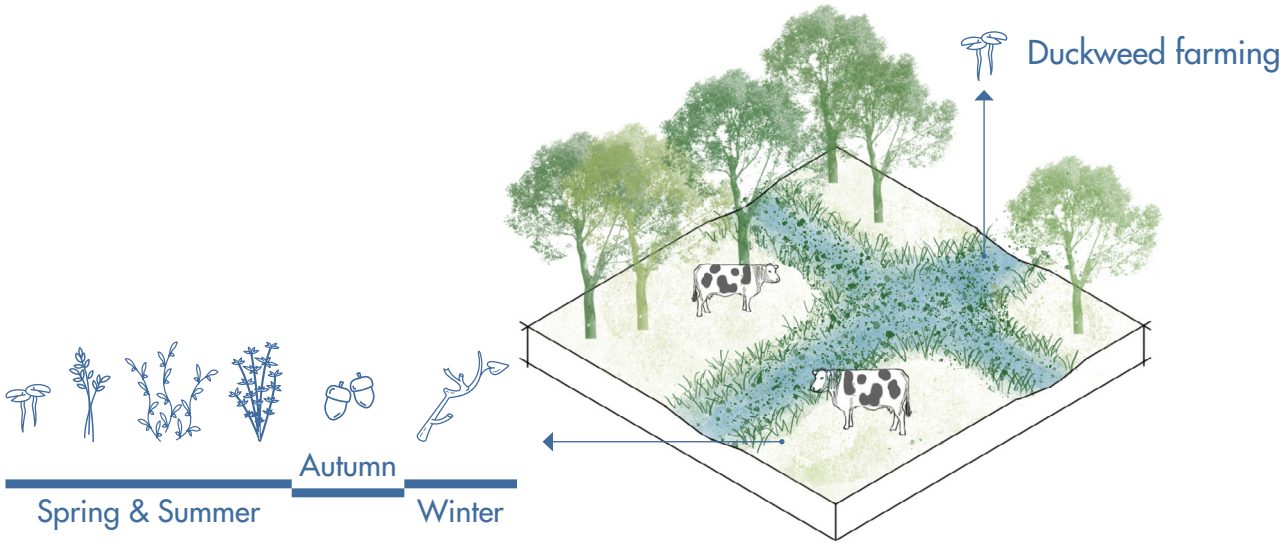
Improve Animal Welfare

Improve living environment
Allow natural animal behaviors

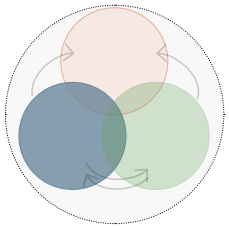
Supplementary diverse diets





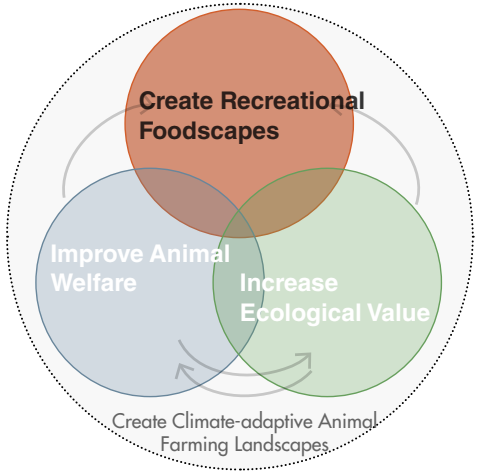


Diverse Natural Diets



Improve Animal Welfare

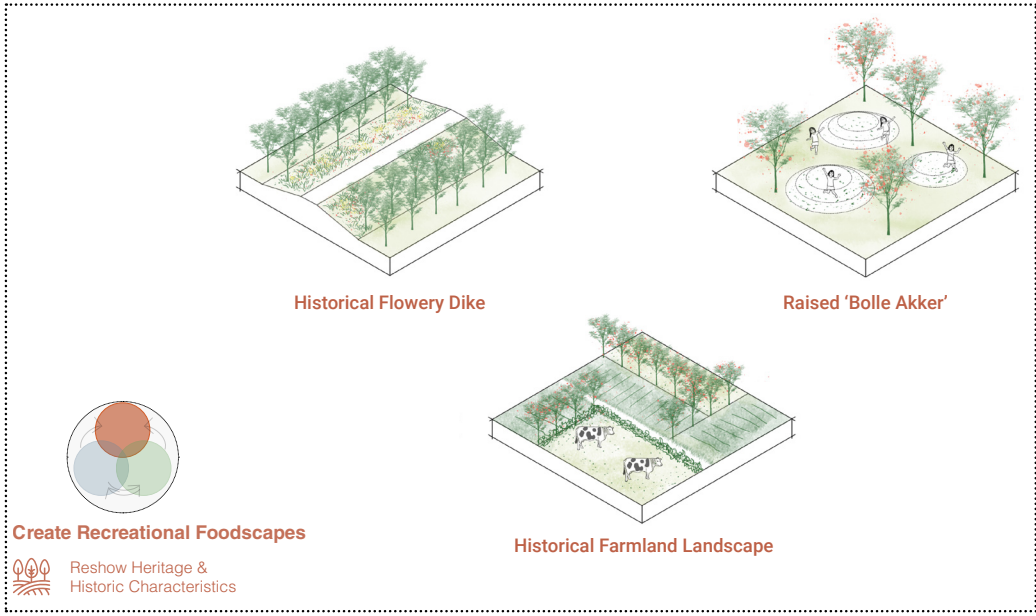
Supplementary Diverse Diets

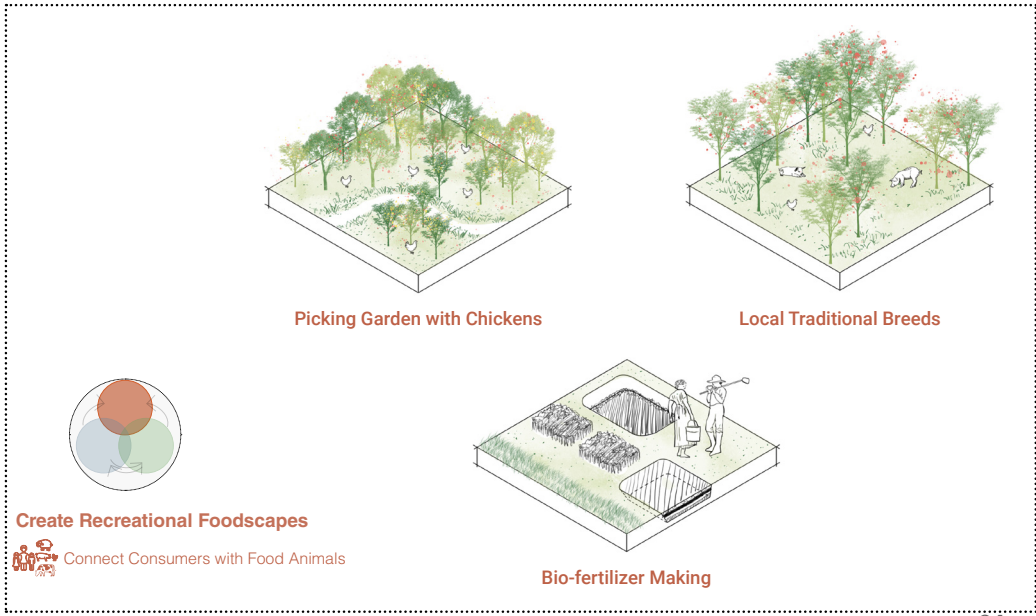


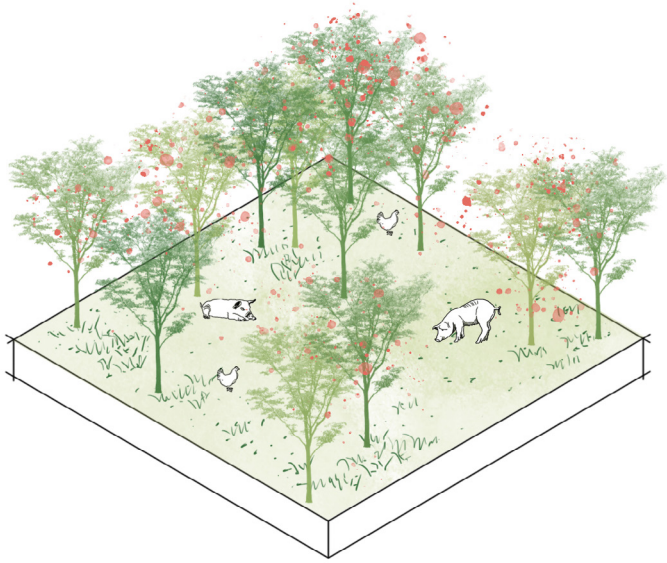
Create Recreational Foodscapes

Reshow heritage & historic characteristics

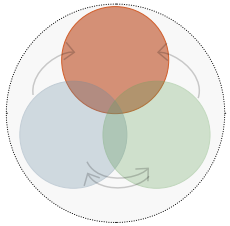
Connect consumers with food animals





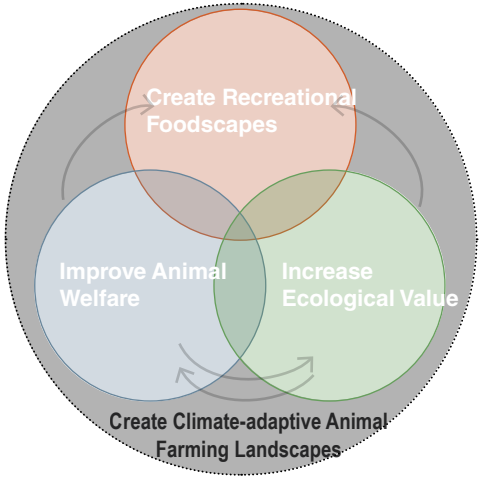


Local Traditional Breeds



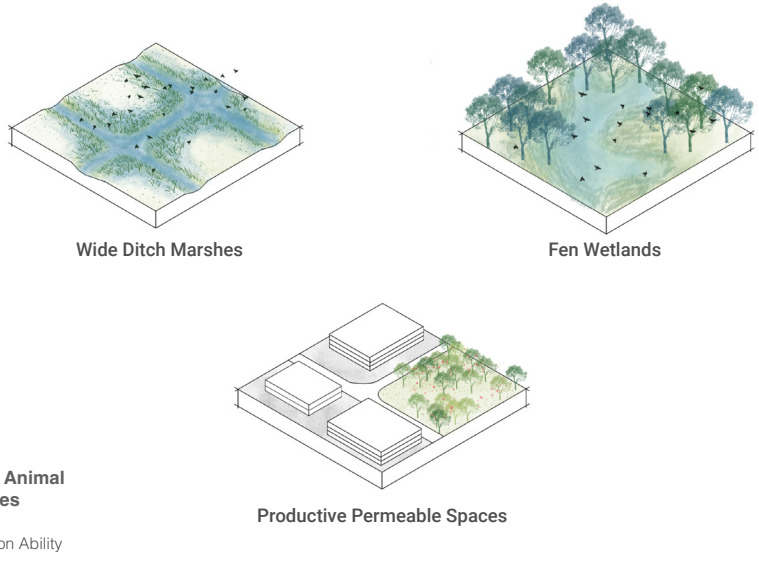
Create Recreational Foodscapes

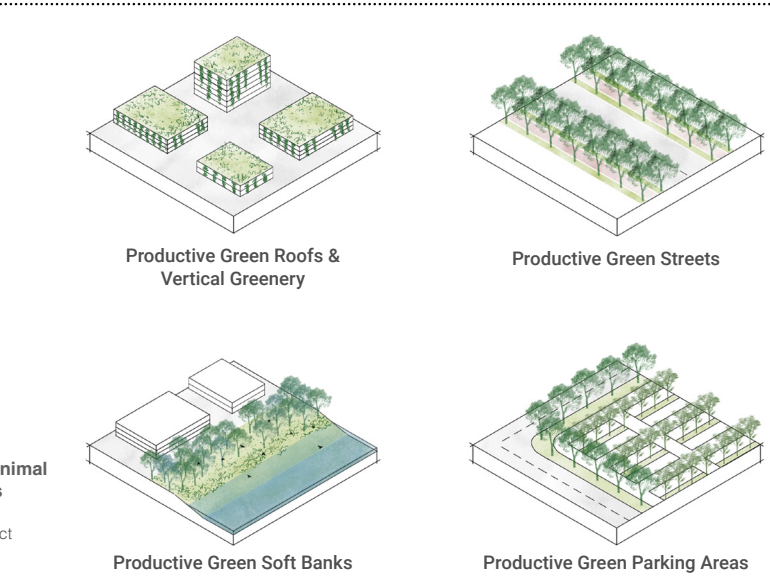
Connect Consumers with
Food Animals

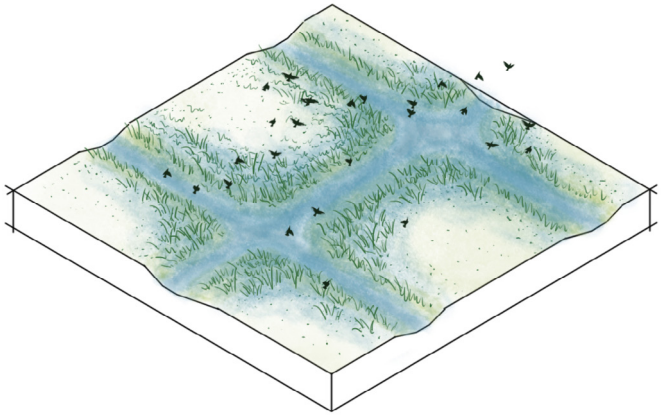


Create Climate-adaptive Animal Farming Landscapes

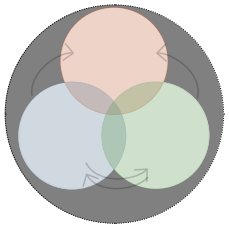
- Improve water retention ability
- Reduce urban heat effect
- Improve livability of neighborhood







Wide Ditch Marshes



Create Climate-adaptive Animal Farming Landscapes

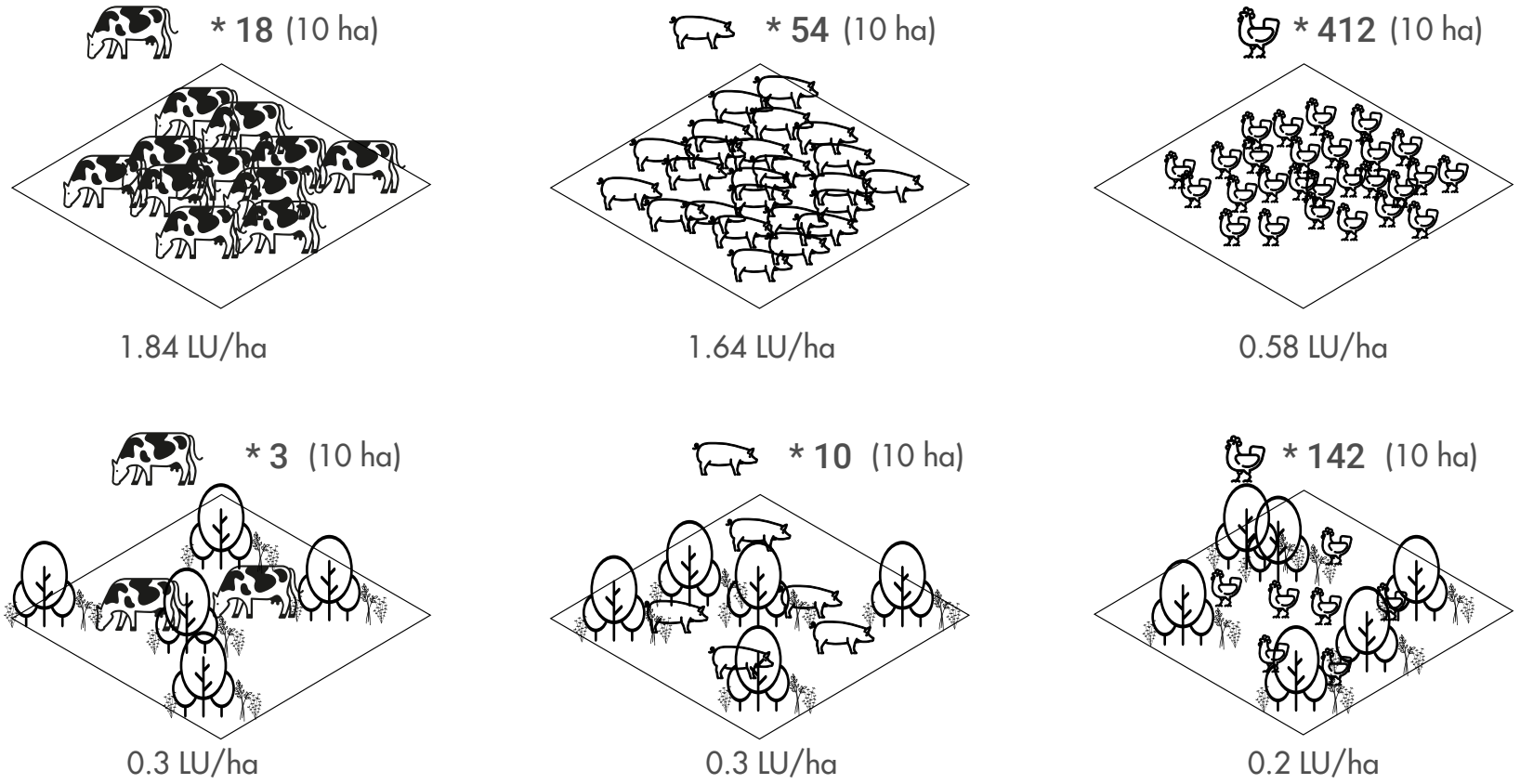
Improve Water Retention Ability

Livestock Unit (LSU)

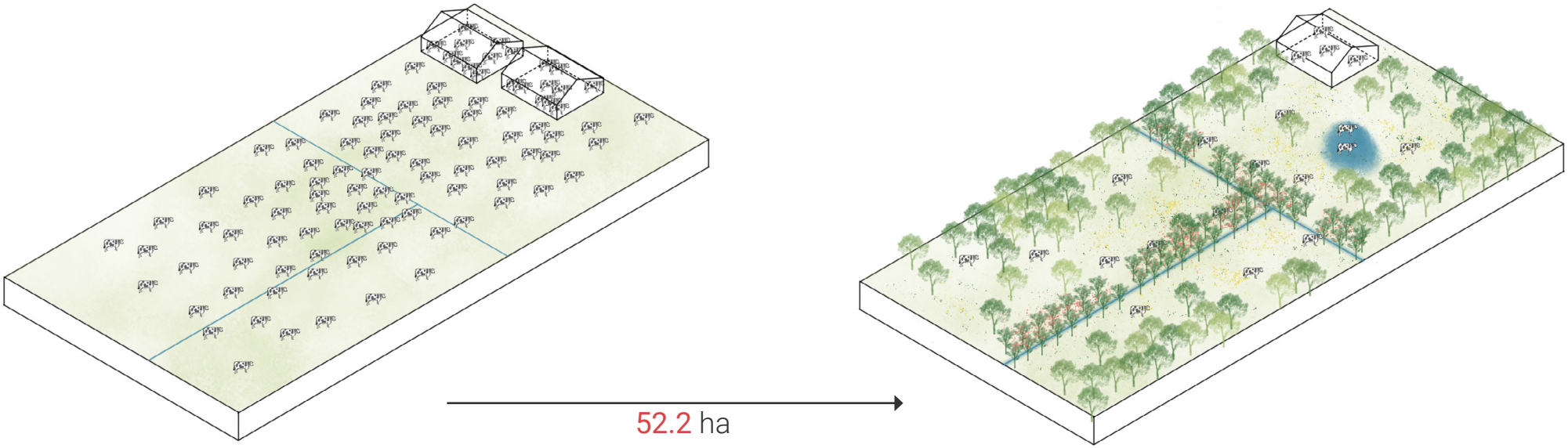
= 1 LSU = 0.8 LSU = 0.1 LSU = 0.3 LSU = 0.014 LSU

Current Average Density

Eco-friendly Density



Dairy Farming as An Example



Current Average Density

1.84 LU/ha

96 Cows

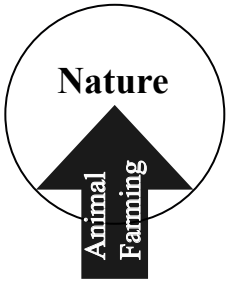
Renewed Animal Farmland

0.35 - 0.5 LU/ha

18 - 26 Cows

4 DESIGN EXPLORATIONS

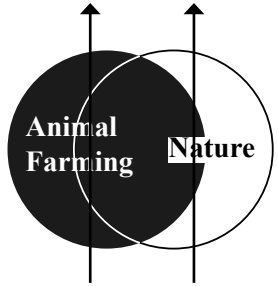
Design Areas + Goals



***SITE 1*--- Animal Farming in Nature:**

Interweave Animal Farming with Nature + Recreation

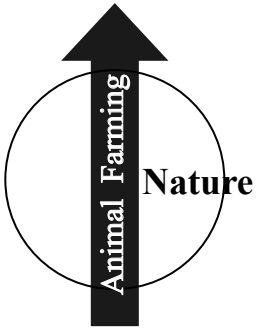
Design Areas + Goals



***SITE 2*--- Animal Farming with Nature:**

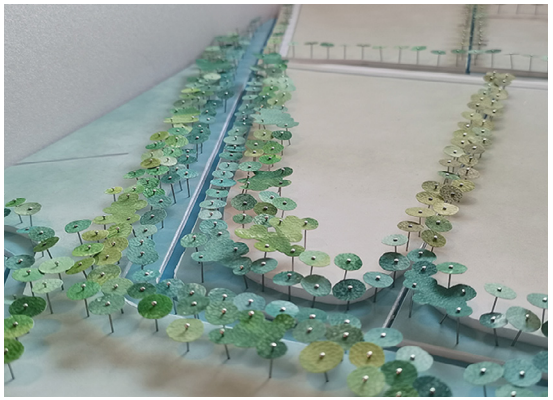
Renew Animal Farming + Recreation

Design Areas + Goals



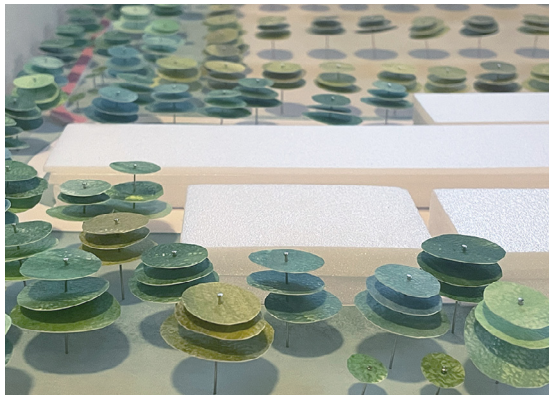
***SITE 3*--- Animal Farming through Nature:**

Productive Industrial Area in the Urban Context



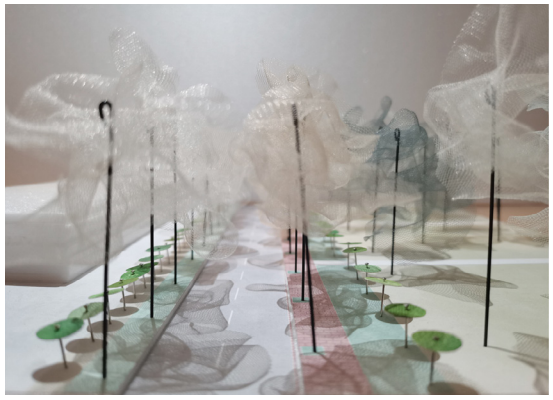
***SITE 1*--- Animal Farming in Nature**

1:1000



***SITE 2*--- Animal Farming with Nature**

1:500



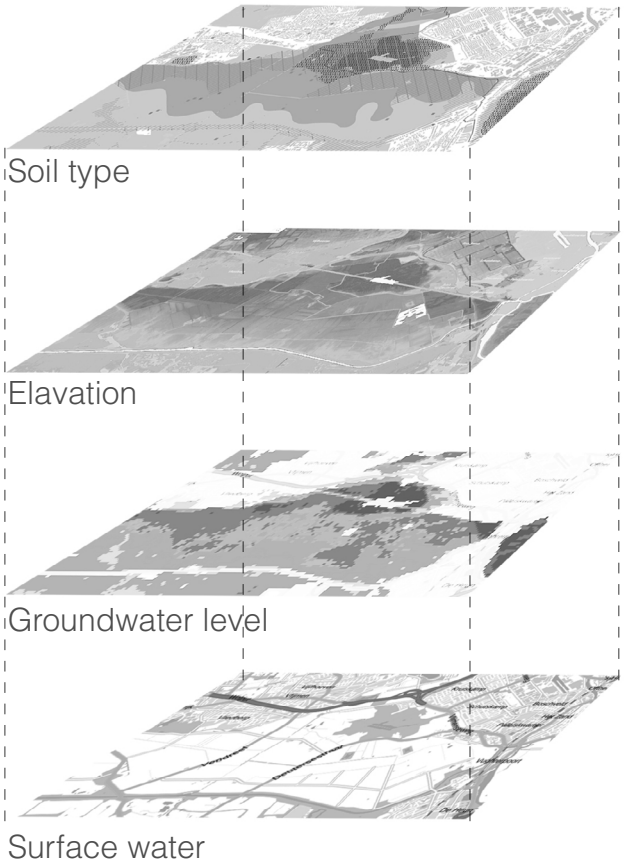
***SITE 3*--- Animal Farming through Nature**

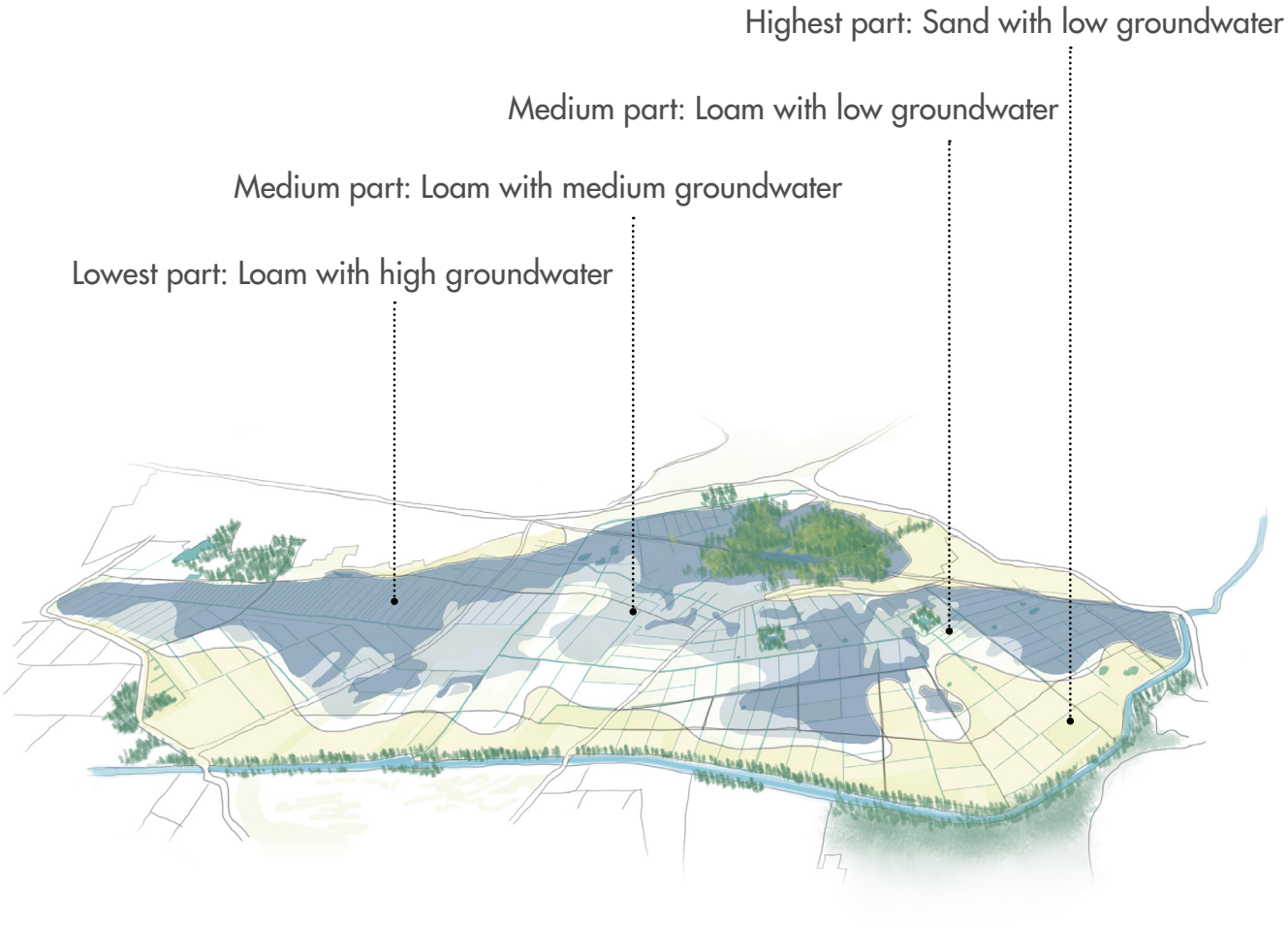
1:200

Site 1: Animal Farming in Nature

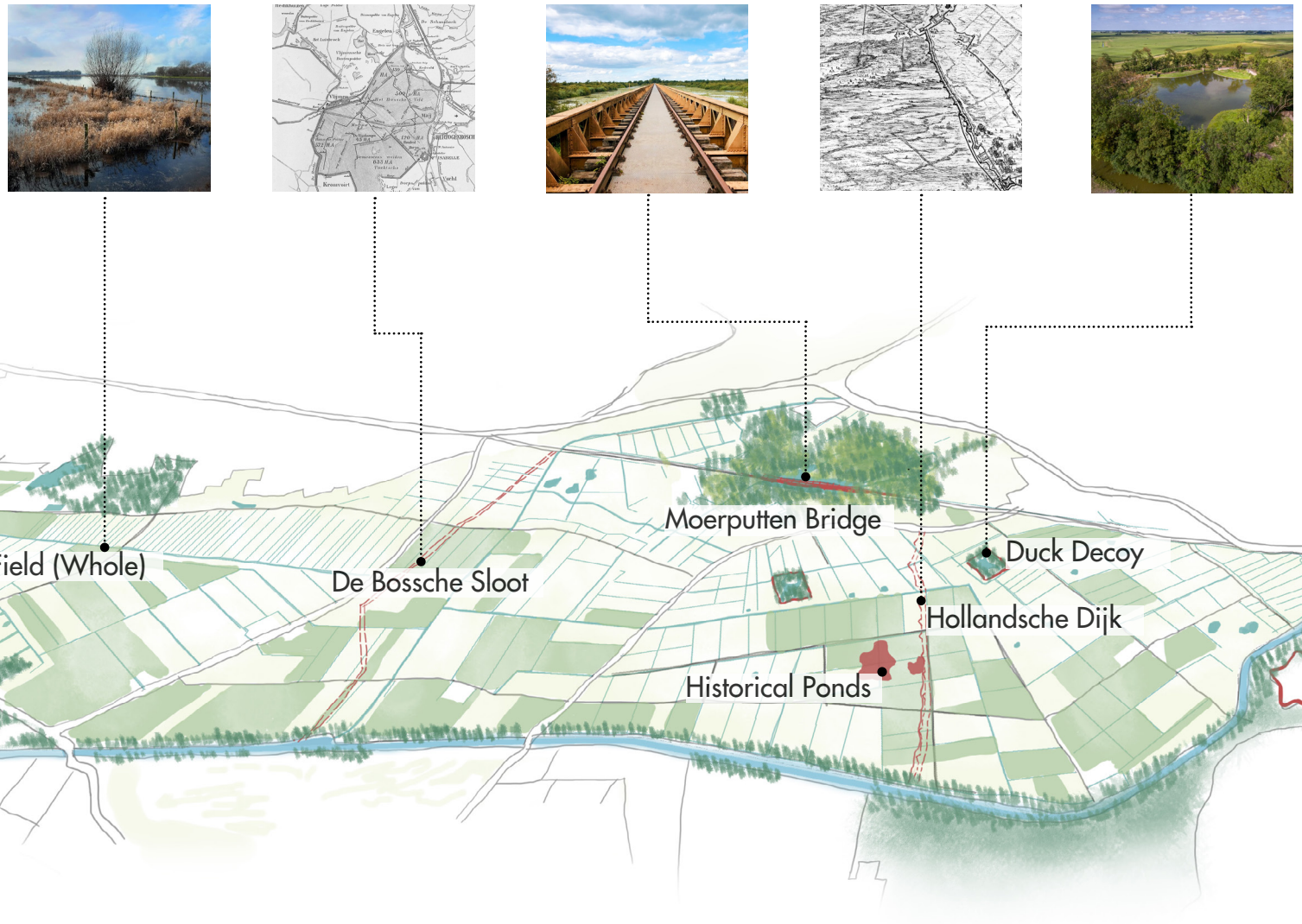
Source: Google map

Analysis --- *Geo Typologies*

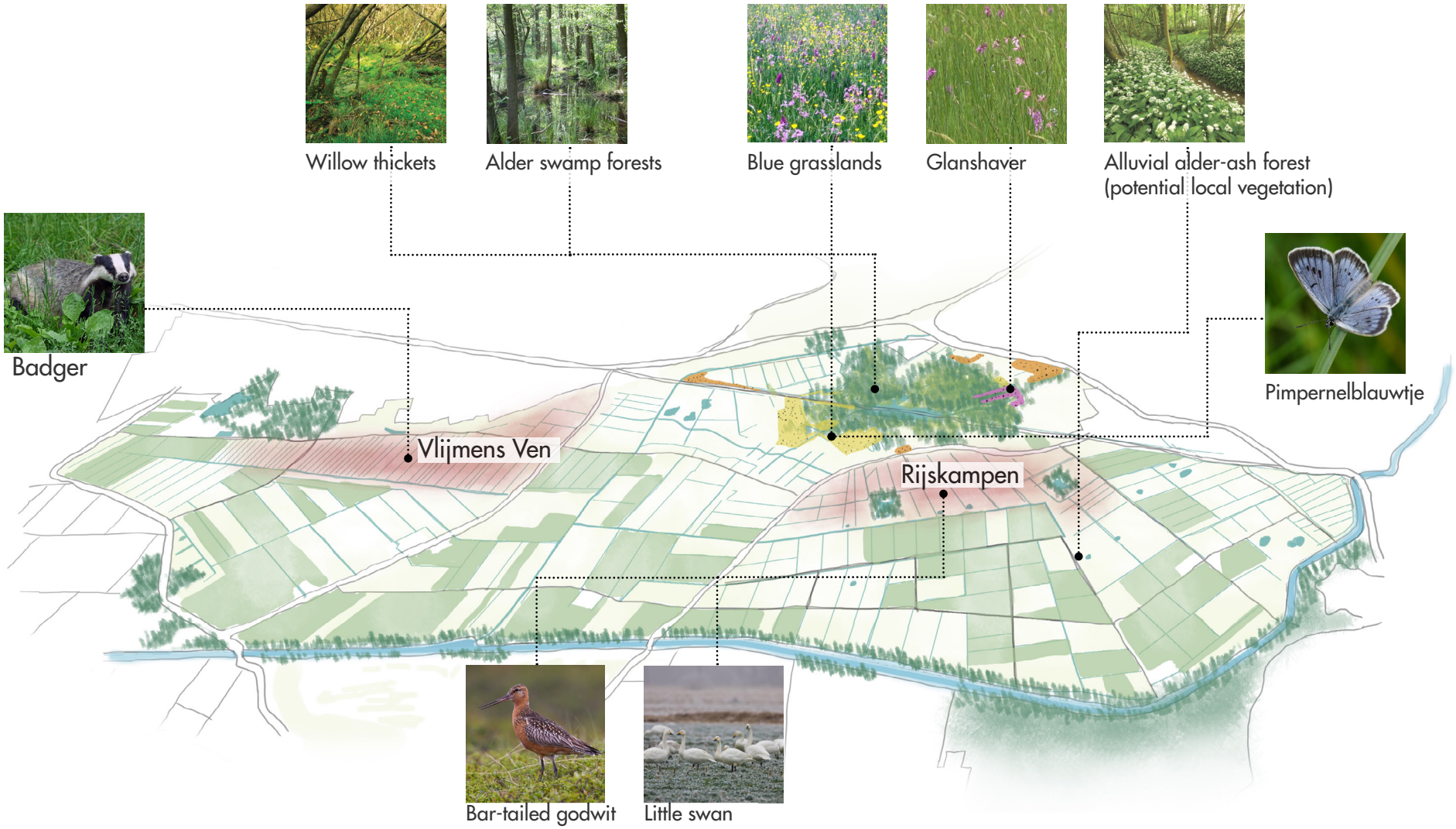




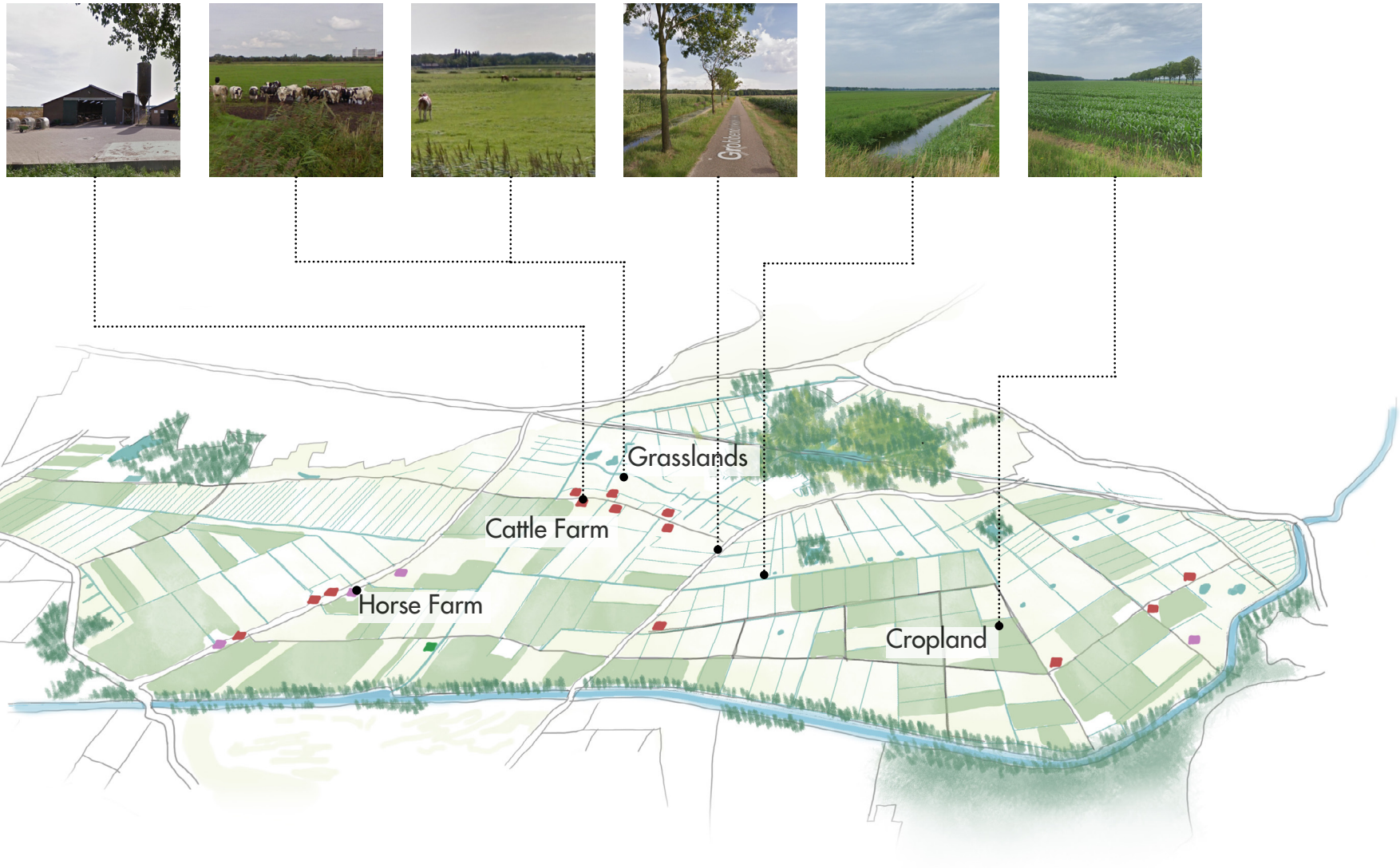
Analysis --- *Historical Resources*



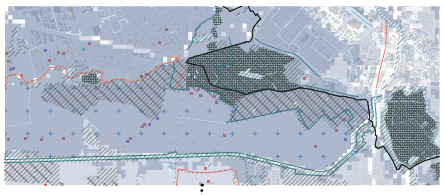
Analysis --- *Flora and Fauna*

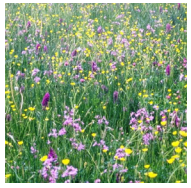


Analysis --- *Agriculture*



Analysis --- *Risks*

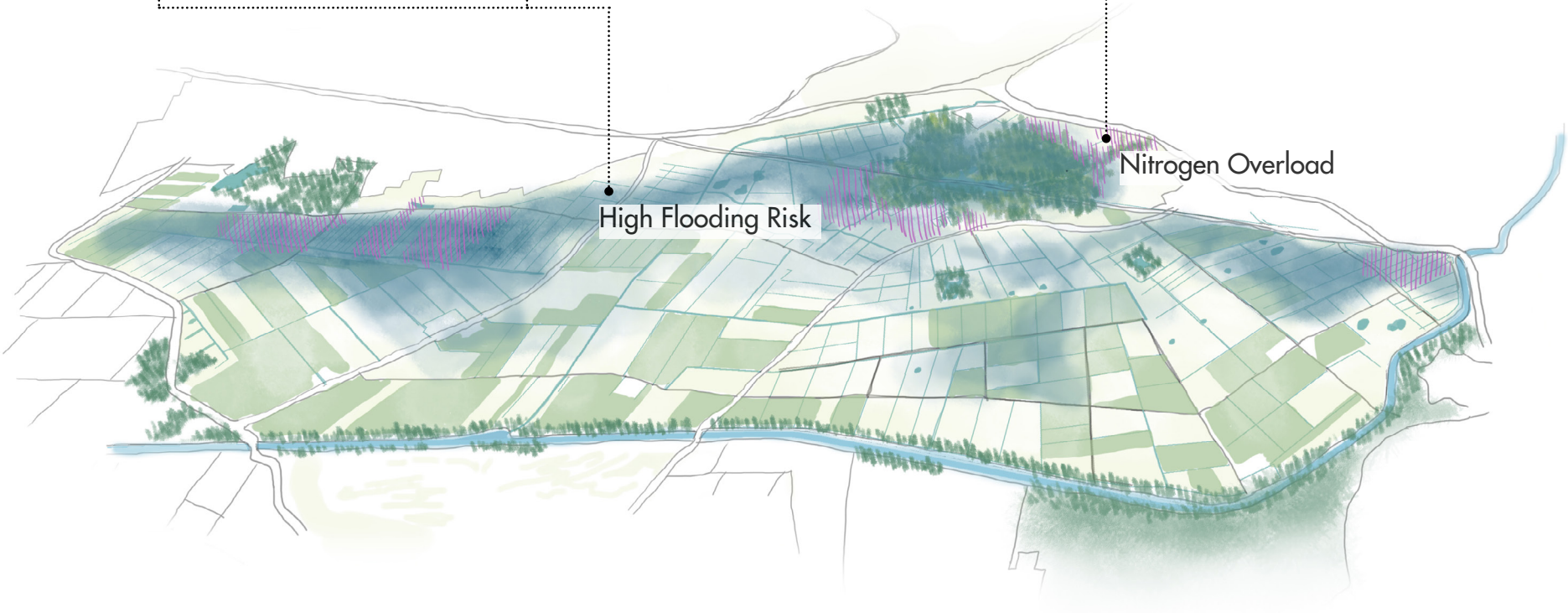




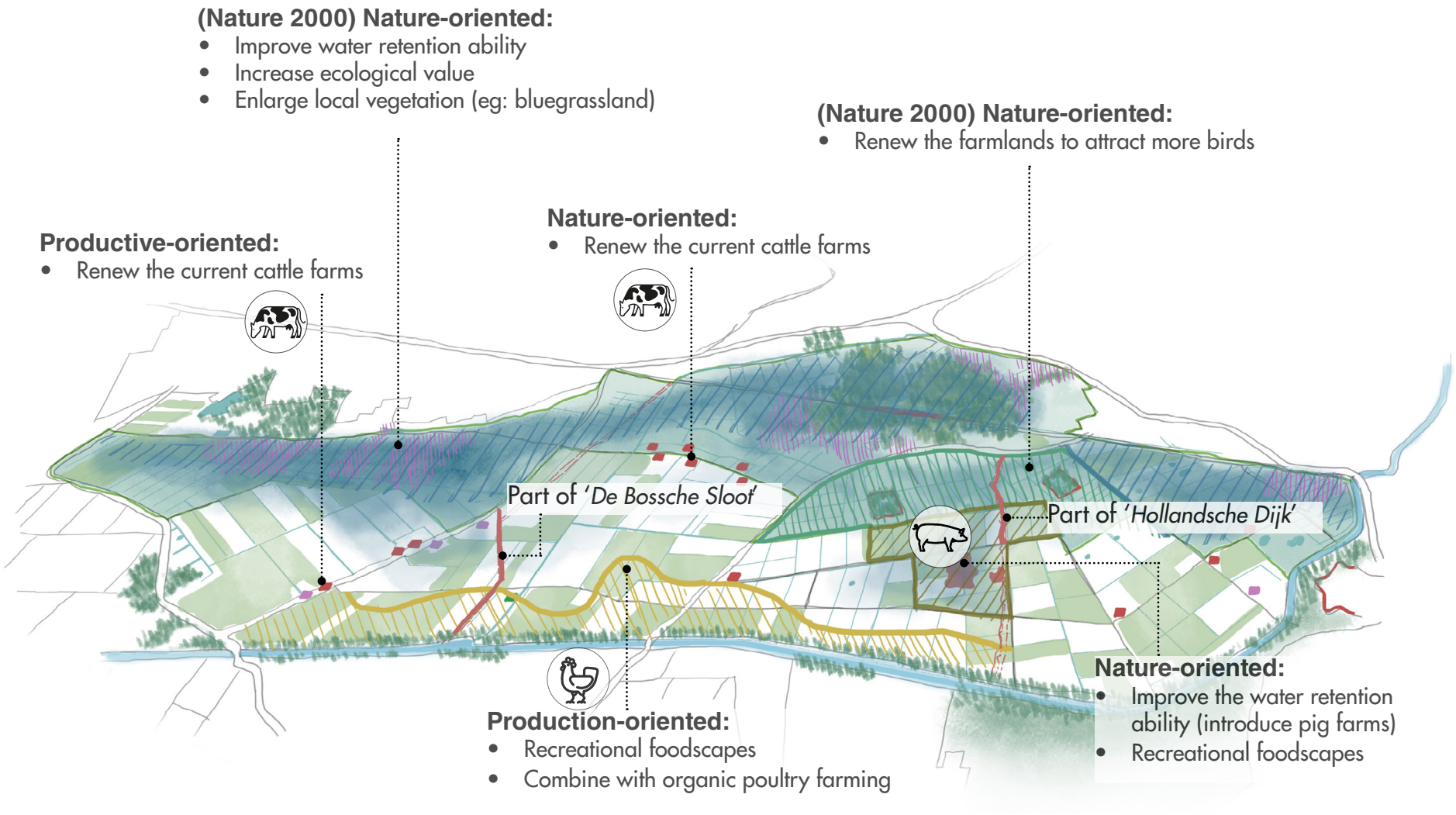
Blue grasslands

Glanshaver

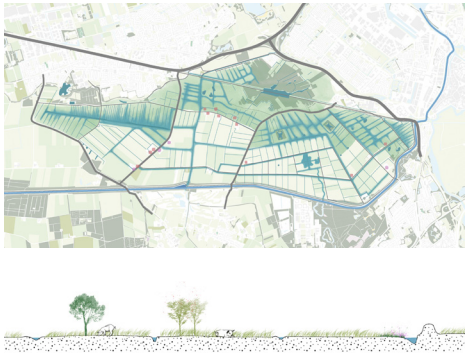
Dotterbloemgrasland



Aims


(Nature 2000) Nature-oriented:
• Improve water retention ability
• Increase ecological value
• Enlarge local vegetation (eg: bluegrassland)
(Nature 2000) Nature-oriented:
• Renew the farmlands to attract more birds
Productive-oriented:
• Renew the current cattle farms
Nature-oriented:
• Renew the current cattle farms
Part of 'De Bossche Sloot'
Part of 'Hollandsche Dijk'
Production-oriented:
• Recreational foodscapes
• Combine with organic poultry farming
Nature-oriented:
• Improve the water retention ability (introduce pig farms)
• Recreational foodscapes

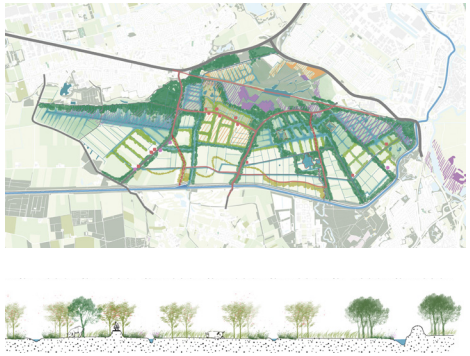
Develop in 4 phases



Phase 1: Improve Water Retention Ability

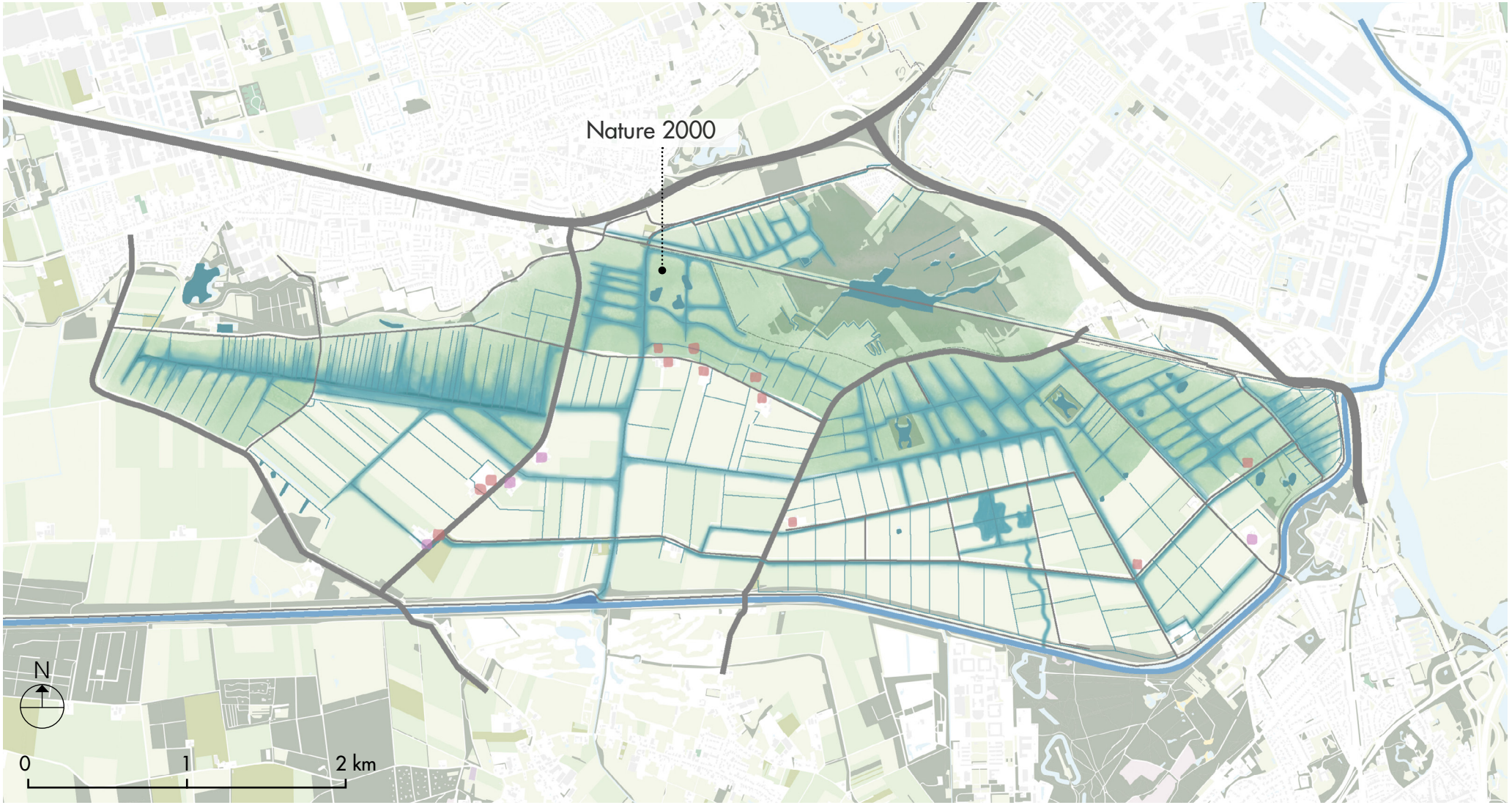
Phase 2: Establish Green Connection with Local Nature

Phase 3: Interweave Nature with Renewed Farmlands

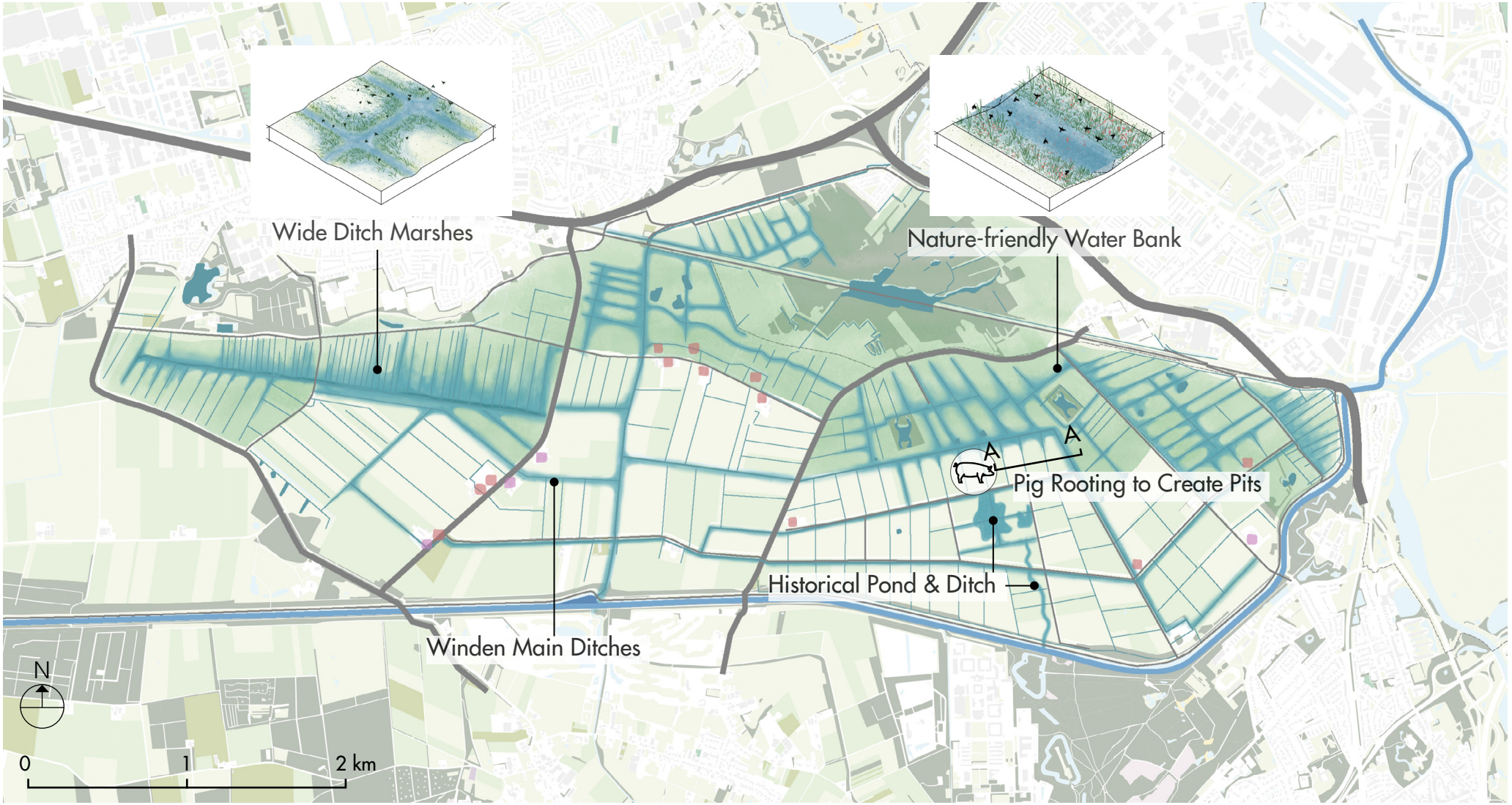


Phase 4: Develop Recreational Functions and Routes

Spatial Framework --- *Phase 1: Improve Water Retention Ability*

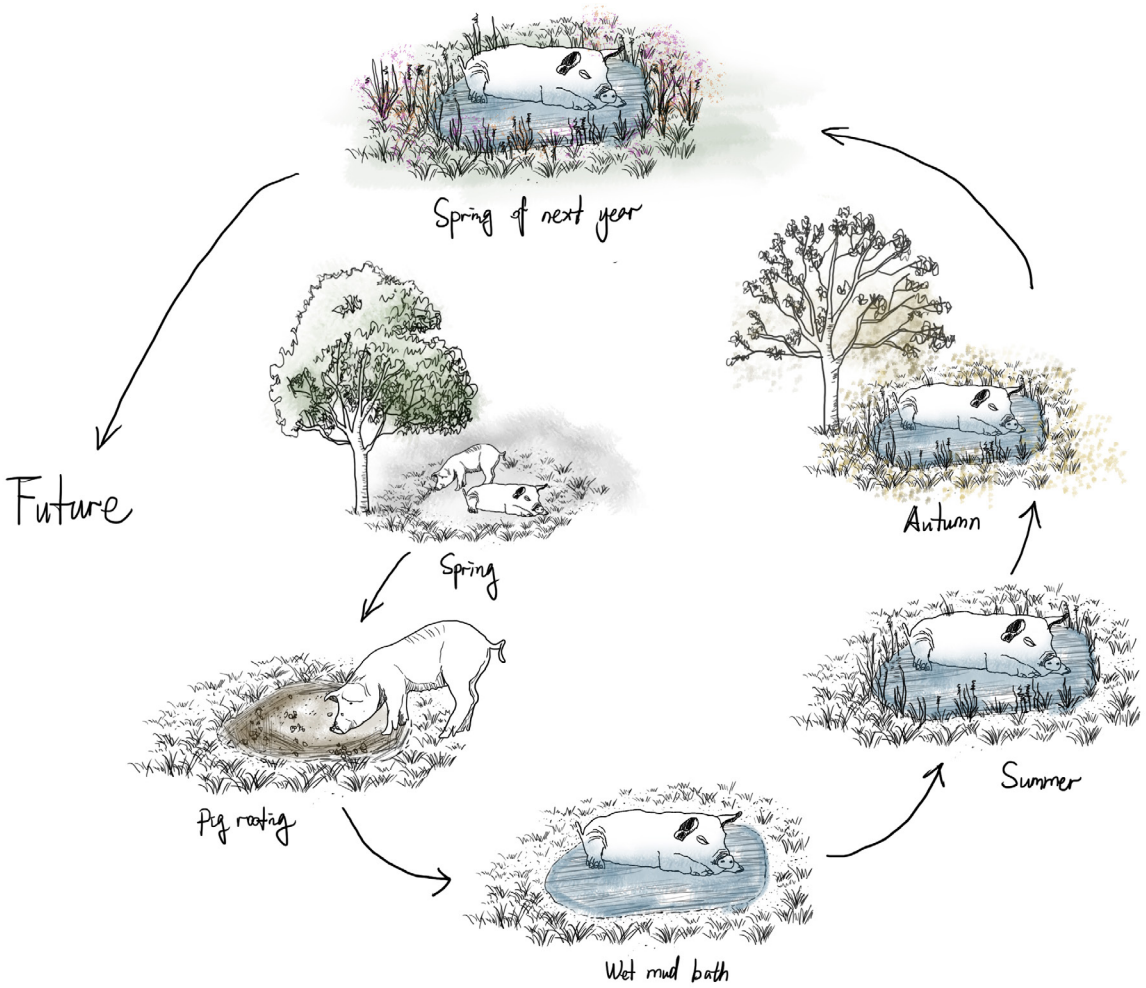


Spatial Framework --- *Phase 1: Improve Water Retention Ability*

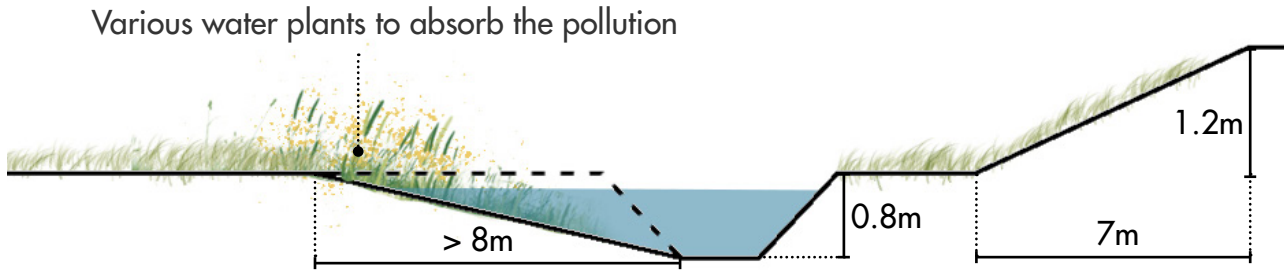


Spatial Framework --- *Phase 1: Improve Water Rentention Ability*

Benefits of Pig Rooting

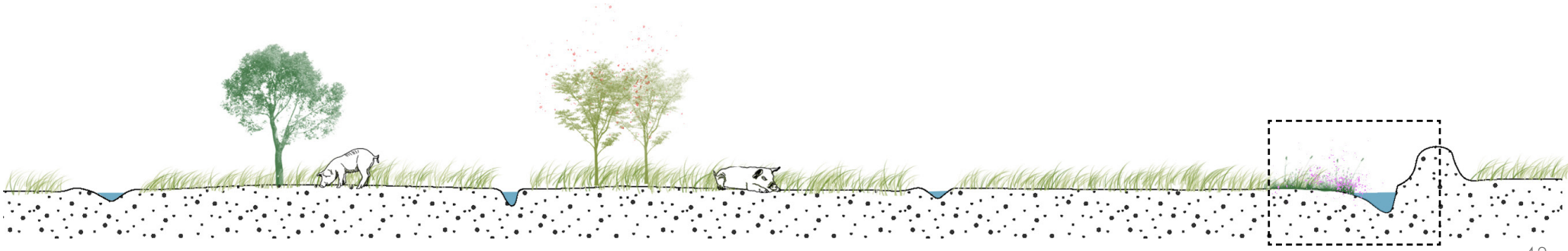


Spatial Framework --- *Phase 1: Improve Water Retention Ability*



(Height exaggerated)

Sectioin A-A



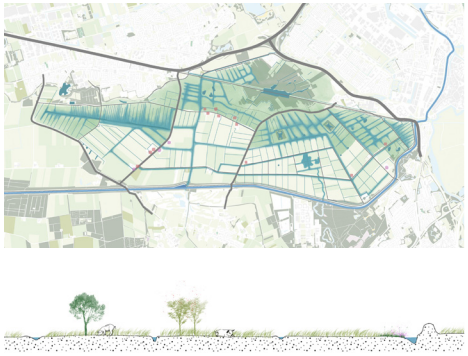
Stakeholders Involved in Each Phase

Phase 1: Improve Water Retention Ability

Phase 2: Establish Green Connection with Local Nature

Phase 3: Interweave Nature with Renewed Farmlands

Phase 4: Develop Recreational Functions and Routes



0-3 Years — 10 Years — 12 Years — 15 Years

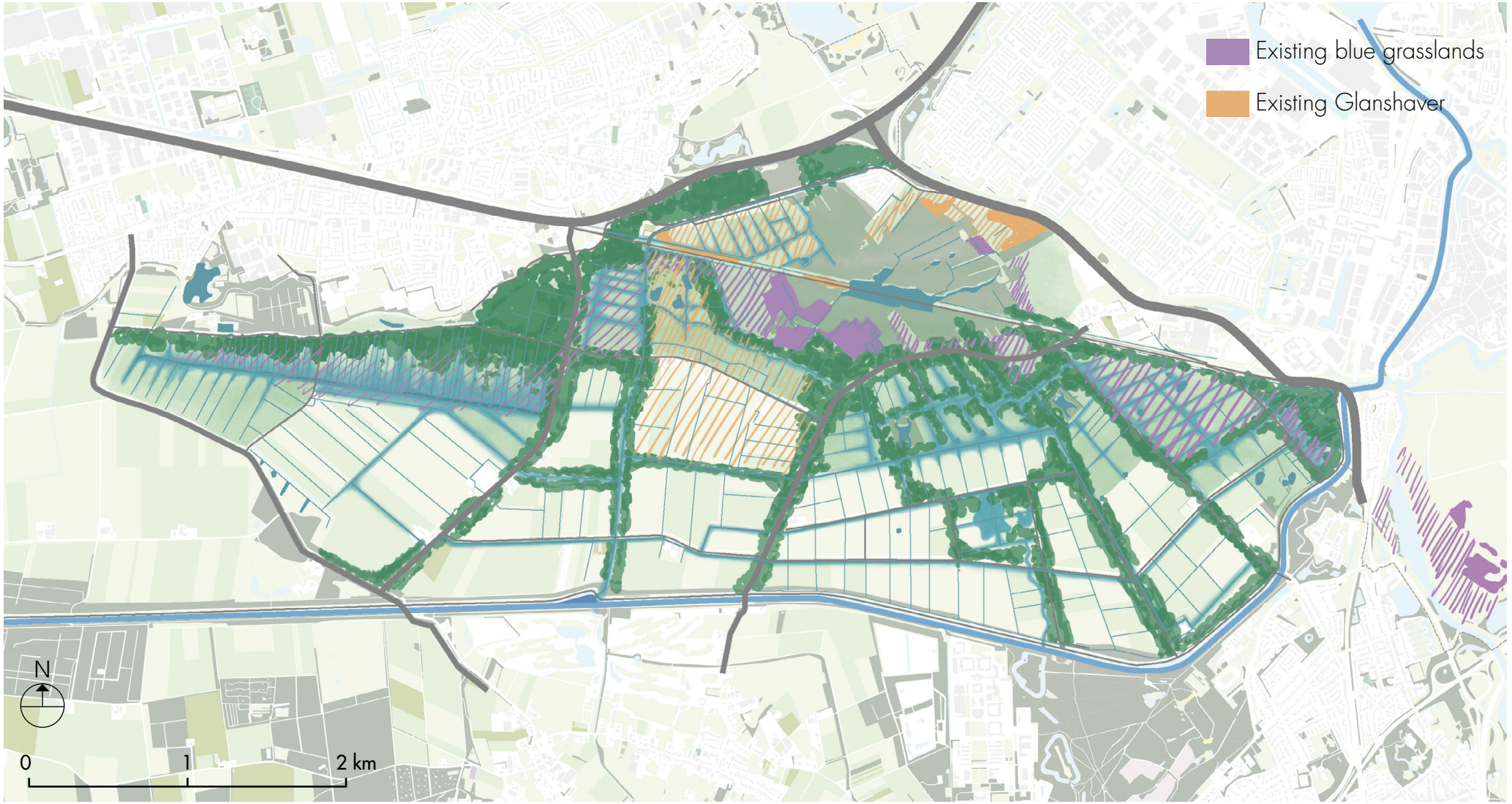
- Water Board
- Ecologists
- Farmers

- Staatsbosbeheer
- Ecologists
- Farmers

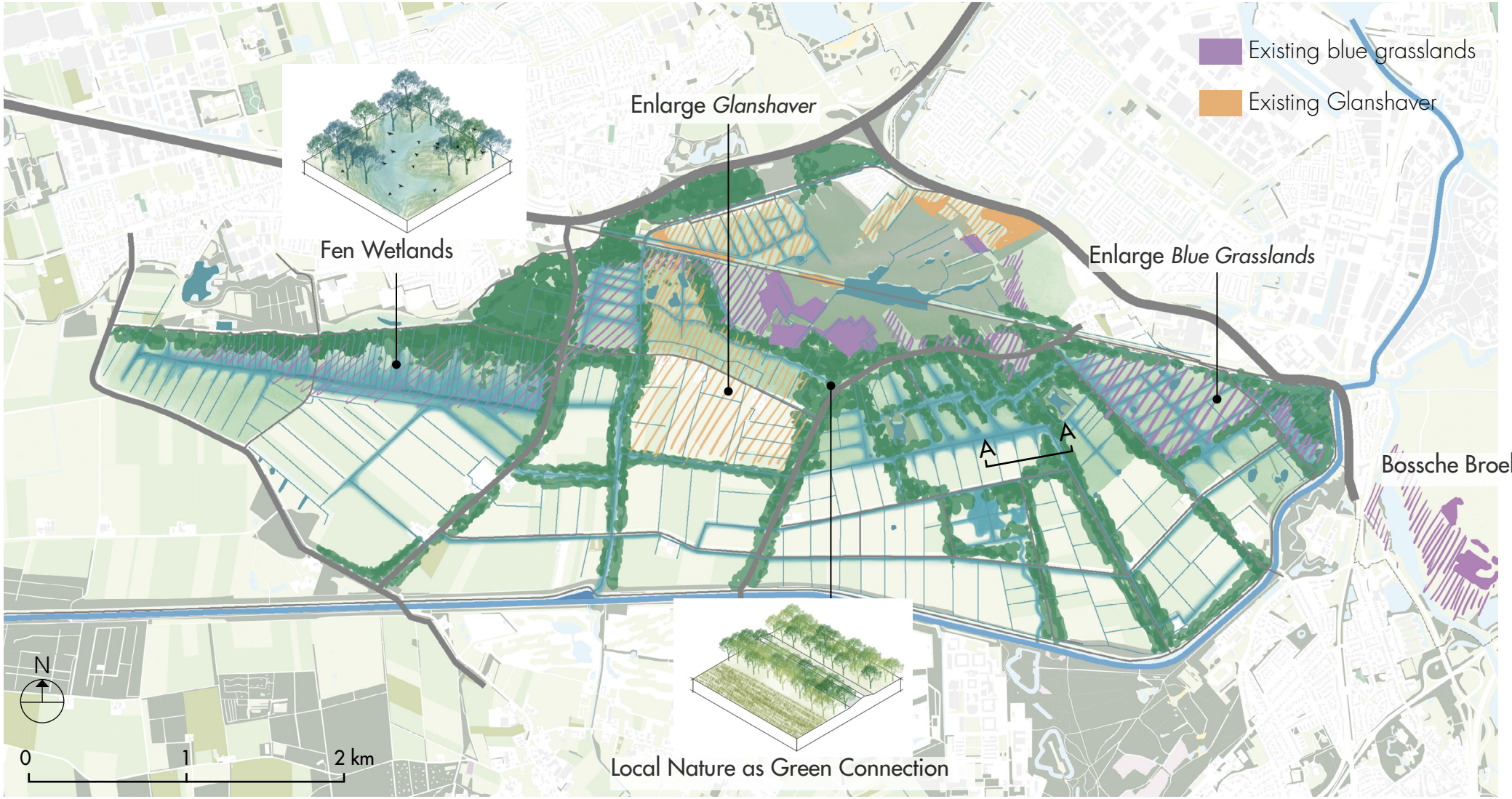
- Farmers
- Agronomists
- Agriculture Board

- Residents
- Tourists

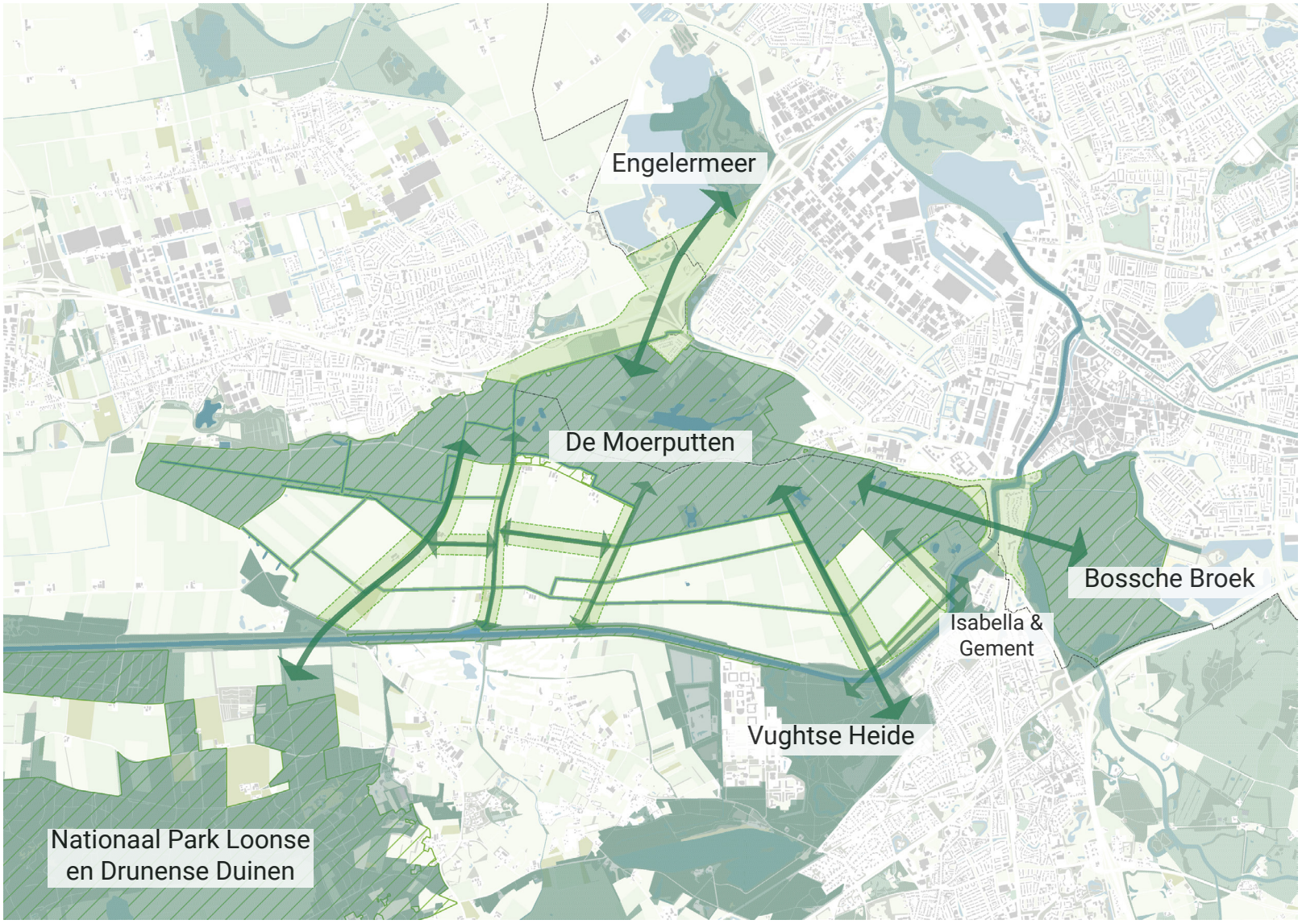
Spatial Framework --- *Phase 2: Establish Green Connection with Local Nature*



Spatial Framework --- *Phase 2: Establish Green Connection with Local Nature*



Spatial Framework --- *Phase 2: Establish Green Connection with Local Nature*



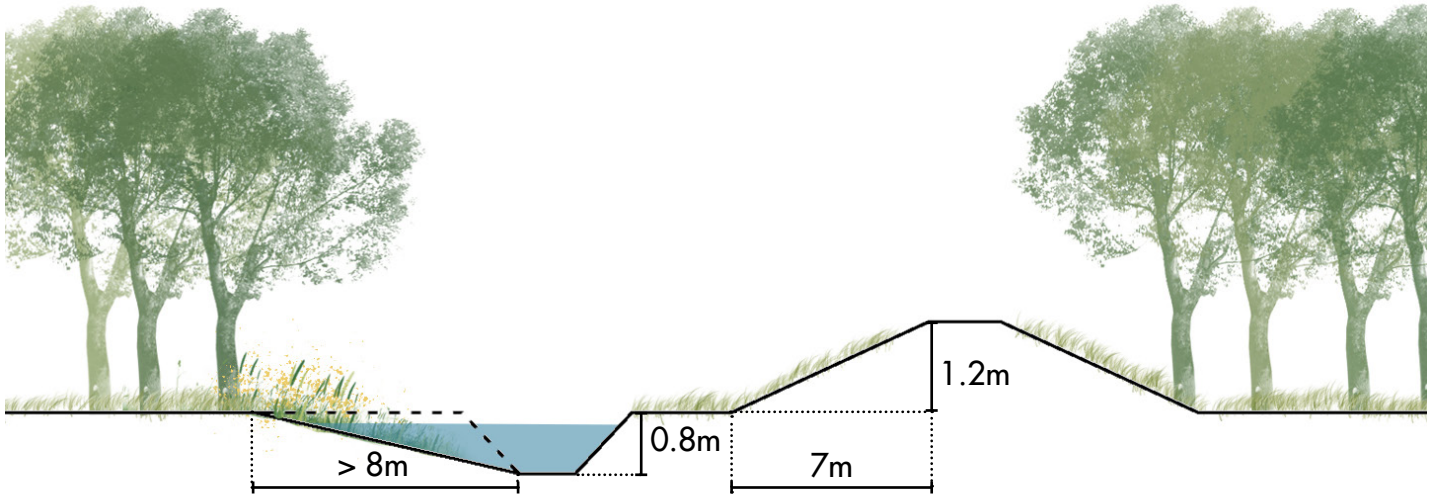
Alluvial alder-ash forest

Association of the alder pants forests

Legend

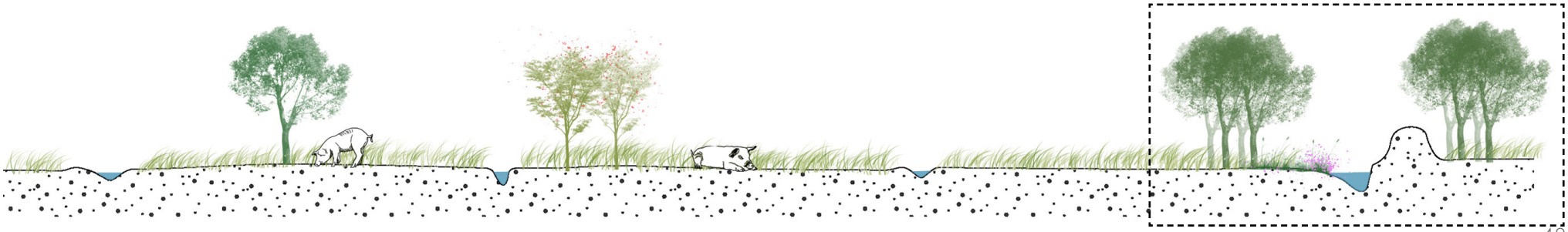
- Natureal resources
- Renewal farmland
- Green ditches
- Green connection

Spatial Framework --- *Phase 2: Establish Green Connection with Local Nature*



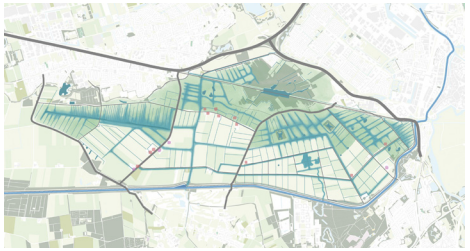
(Height exaggerated)

Sectioin A-A



Stakeholders Involved in Each Phase

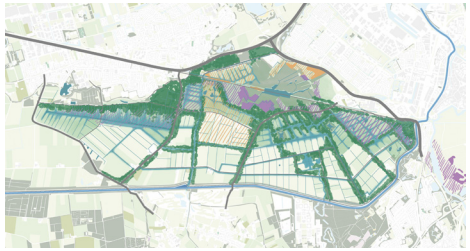
Phase 1: Improve Water Retention Ability



0-3 Years

- Water Board
- Ecologists
- Farmers

Phase 2: Establish Green Connection with Local Nature



10 Years

- Staatsbosbeheer
- Ecologists
- Farmers

Phase 3: Interweave Nature with Renewed Farmlands

12 Years

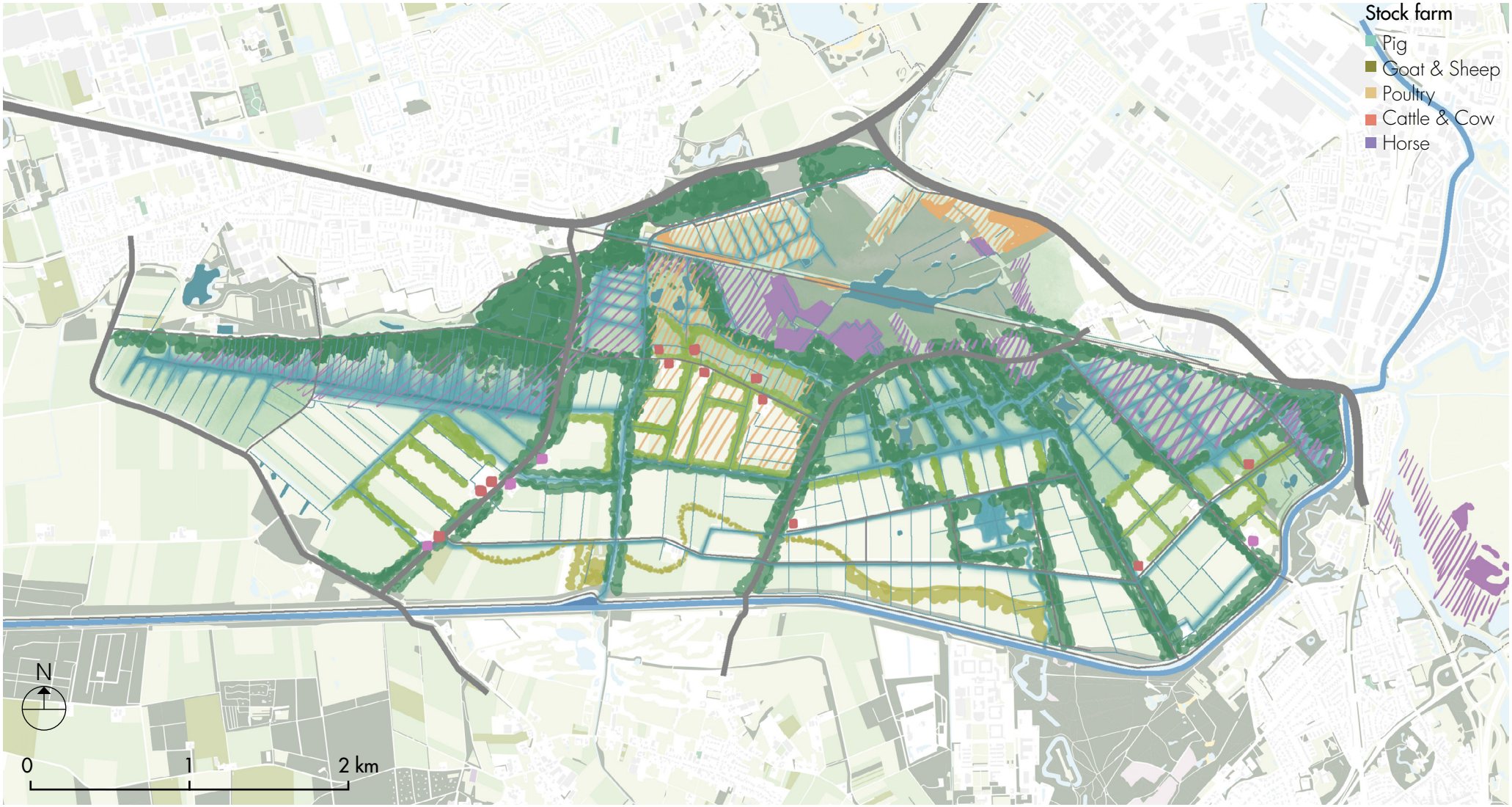
- Farmers
- Agronomists
- Agriculture Board

Phase 4: Develop Recreational Functions and Routes

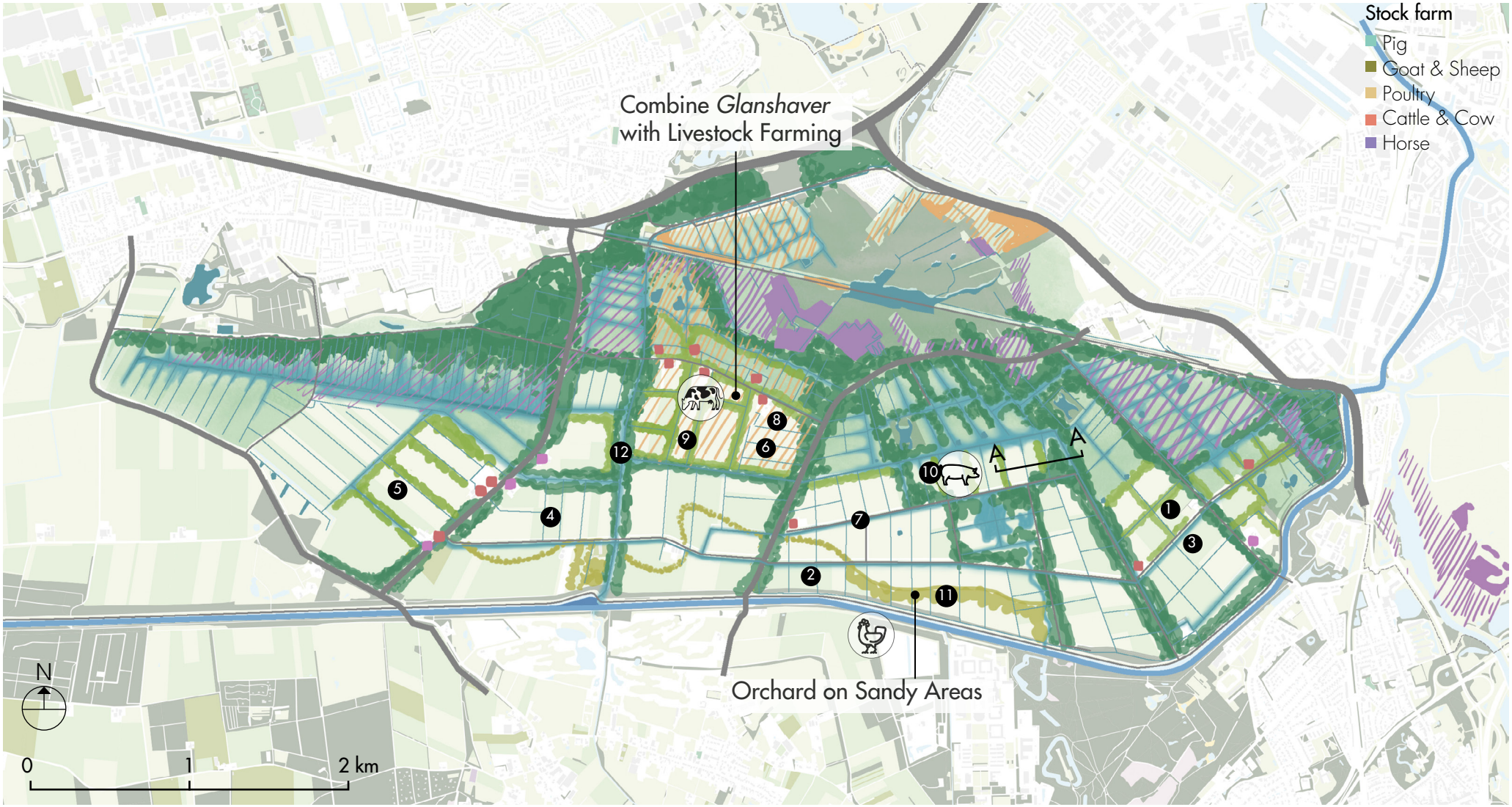
15 Years

- Residents
- Tourists

Spatial Framework --- *Phase 3: Interweave Nature with Renewed Farmlands*

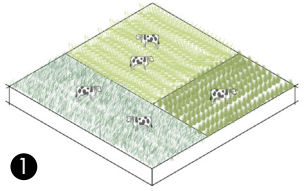


Spatial Framework --- *Phase 3: Interweave Nature with Renewed Farmlands*

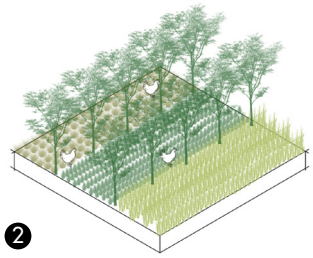


Spatial Framework --- *Phase 3: Interweave Nature with Renewed Farmlands*

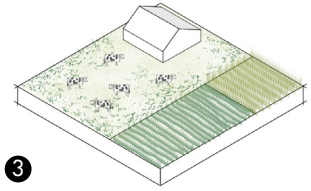
Application of Design Principles



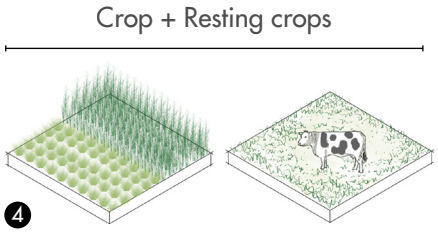
❶ Green cover with green manure



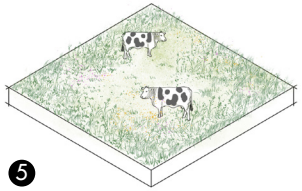
❷ Strip farming with chickens



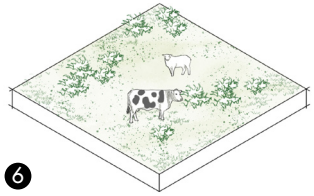
❸ Manure management with cropland



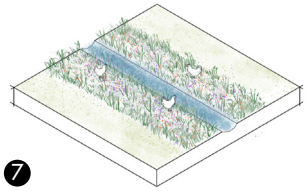
❹ Crop rotation



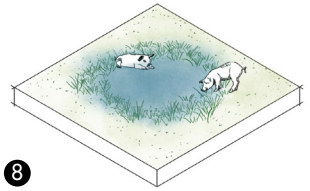
❺ Herb-rich grassland



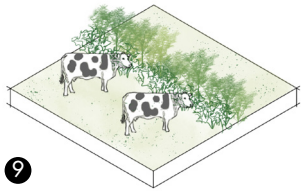
❻ Nature-oriented mowing with grazing



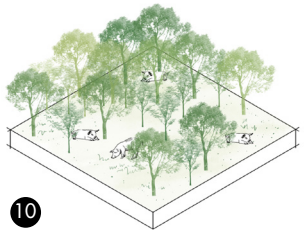
❼ Flower strips with poultry farming



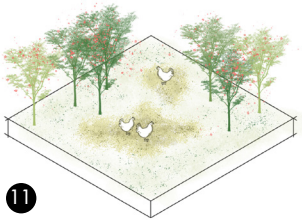
❽ Ponds for Drinking and Bathing



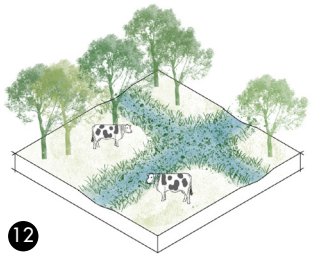
❾ Natural fences



❿ Trees for sheltering

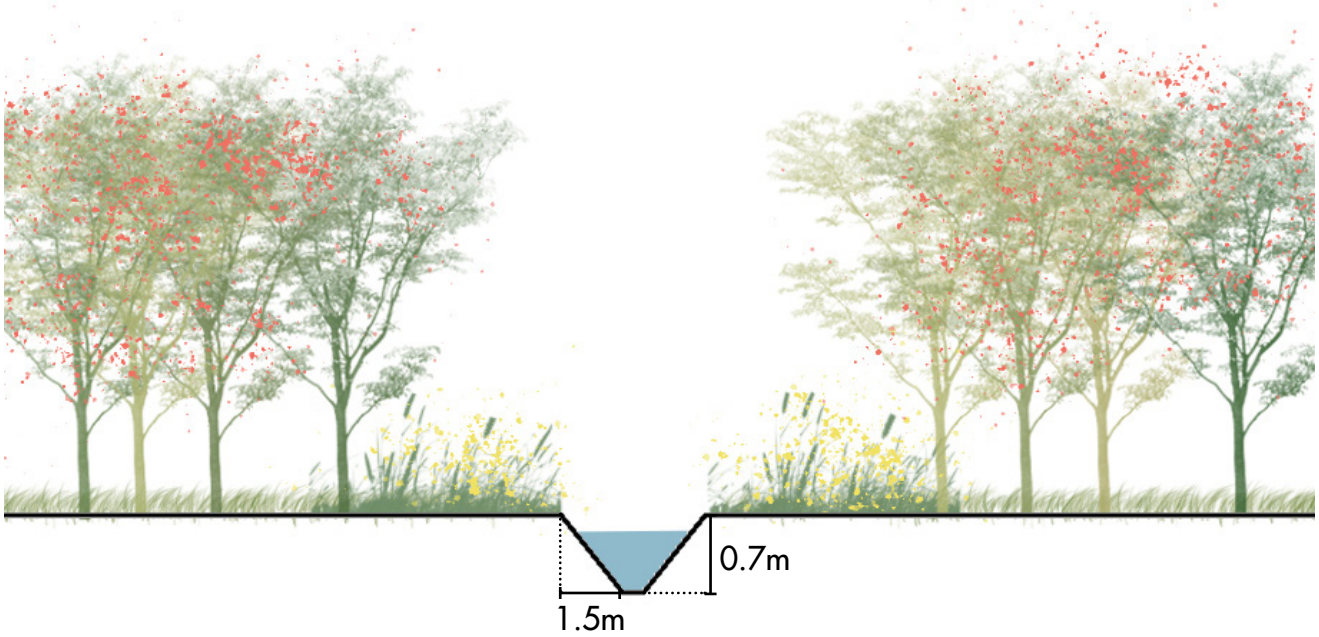


⓫ Sand pits for chicken bathing



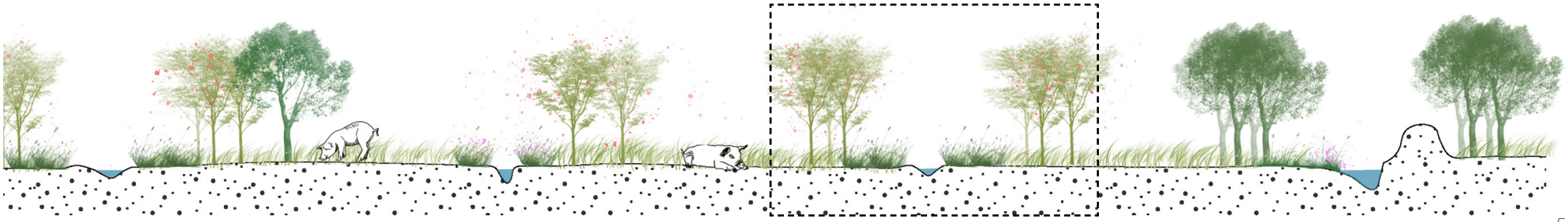
⓬ Diverse supplementary diets

Spatial Framework --- *Phase 3: Interweave Nature with Renewed Farmlands*



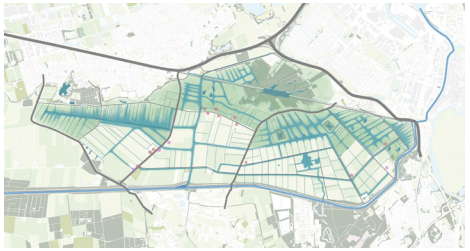
(Height exaggerated)

Sectioin A-A



Stakeholders Involved in Each Phase

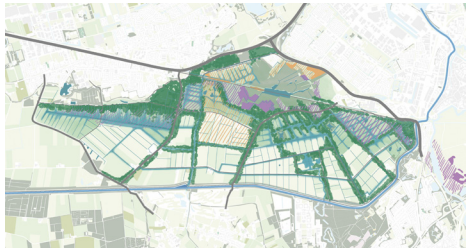
Phase 1: Improve Water Retention Ability



0-3 Years

- Water Board
- Ecologists
- Farmers

Phase 2: Establish Green Connection with Local Nature



10 Years

- Staatsbosbeheer
- Ecologists
- Farmers

Phase 3: Interweave Nature with Renewed Farmlands

12 Years

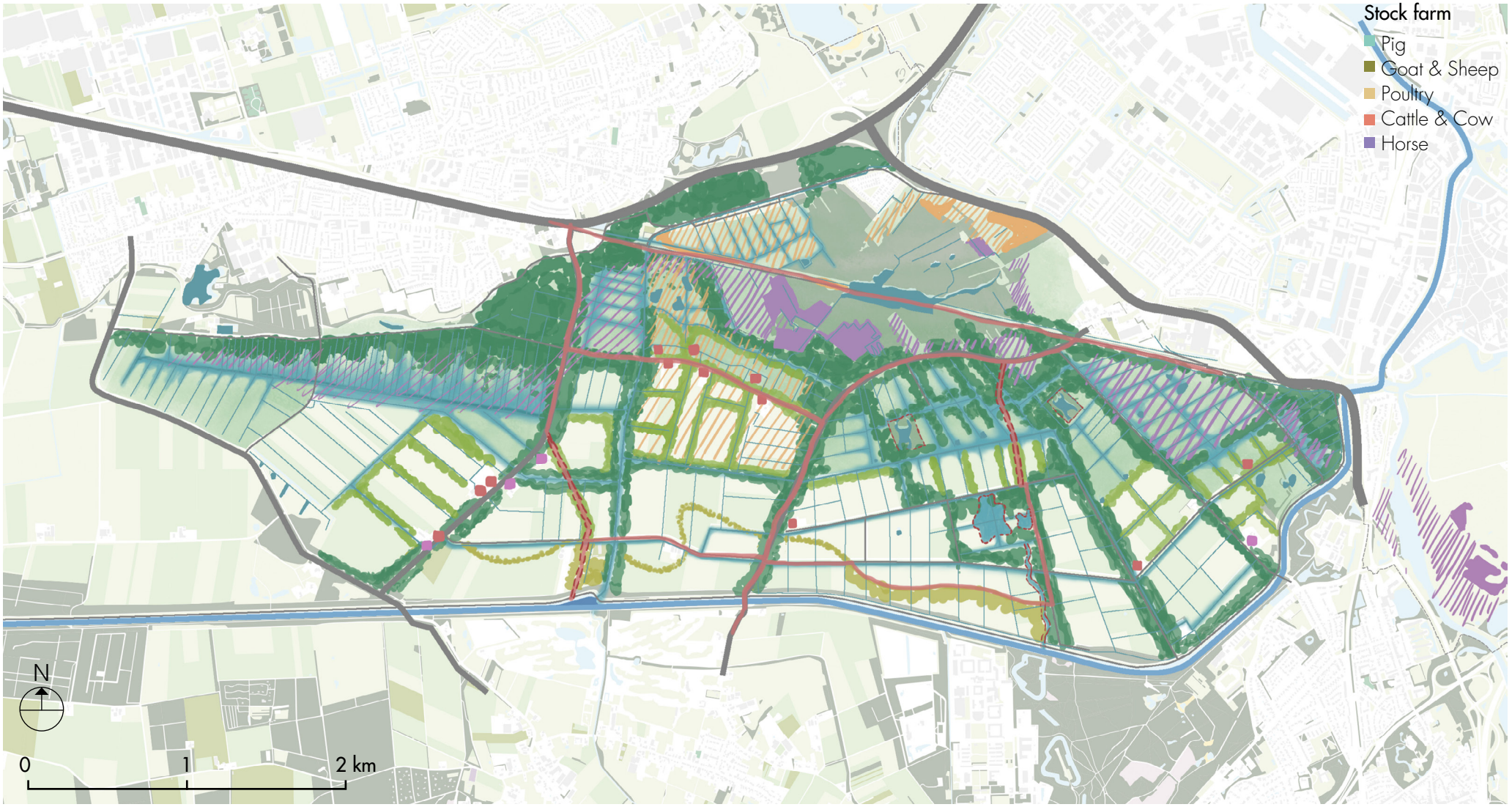
- Farmers
- Agronomists
- Agriculture Board

Phase 4: Develop Recreational Functions and Routes

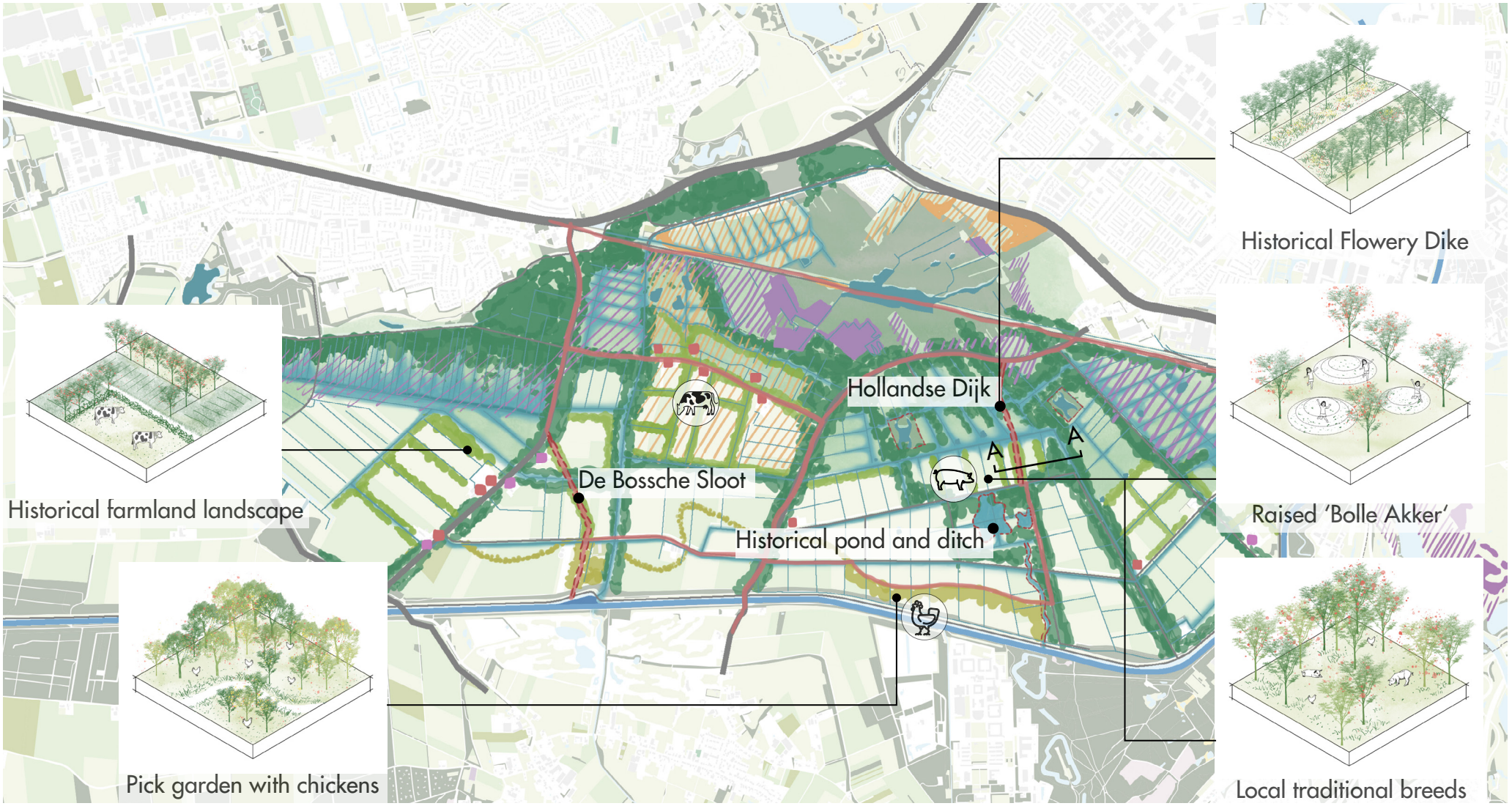
15 Years

- Residents
- Tourists

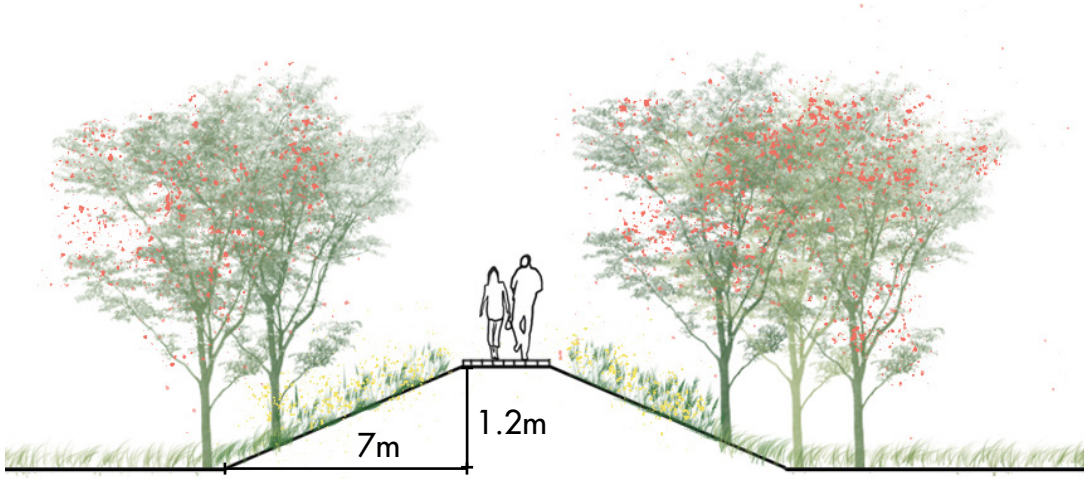
Spatial Framework --- *Phase 4: Develop Recreational Functions and Routes*



Spatial Framework --- *Phase 4: Develop Recreational Functions and Routes*



Spatial Framework --- *Phase 4: Develop Recreational Functions and Routes*

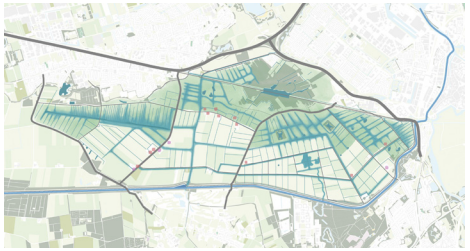


(Height exaggerated)

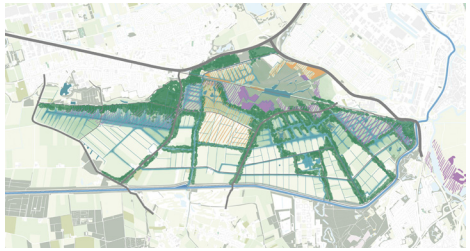
Sectioin A-A

Stakeholders Involved in Each Phase

Phase 1: Improve Water Retention Ability

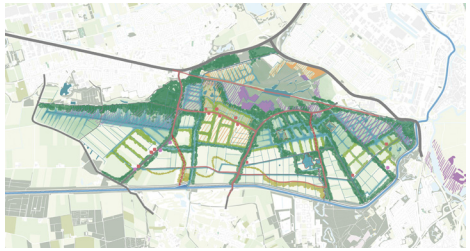


Phase 2: Establish Green Connection with Local Nature



Phase 3: Interweave Nature with Renewed Farmlands

Phase 4: Develop Recreational Functions and Routes



0-3 Years

- Water Board
- Ecologists
- Farmers

10 Years

- Staatsbosbeheer
- Ecologists
- Farmers

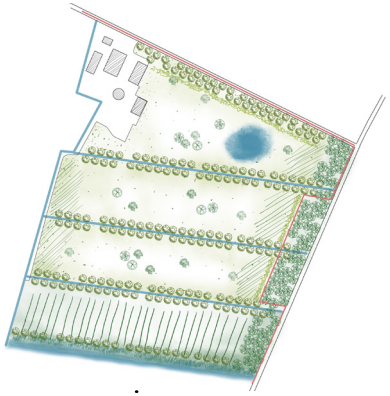
12 Years

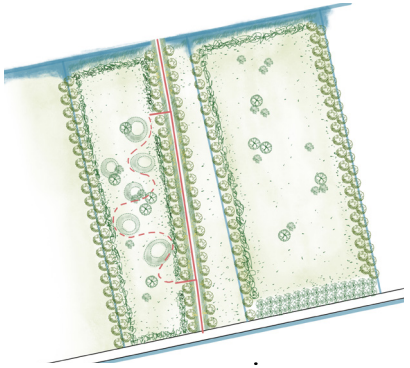
- Farmers
- Agronomists
- Agriculture Board

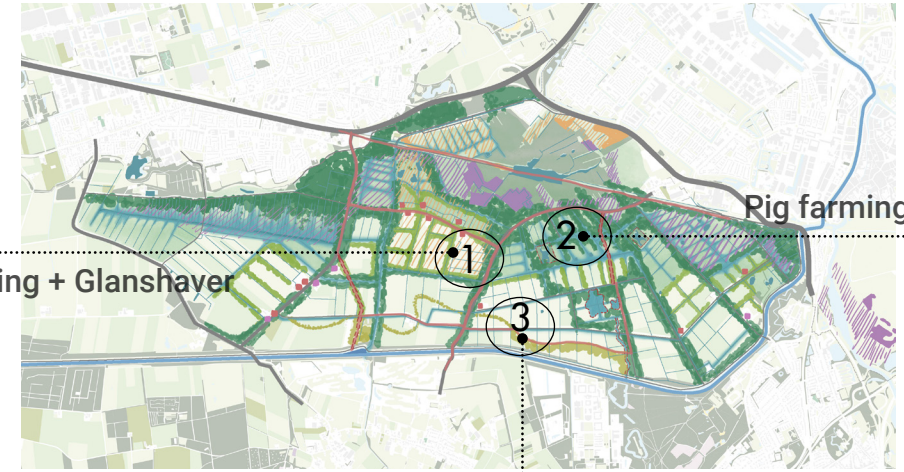
15 Years

- Residents
- Tourists

Design Details



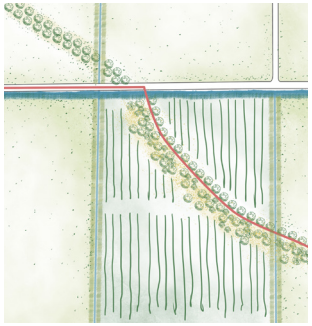




Livestock farming + Glanshaver
+ Agroforestry

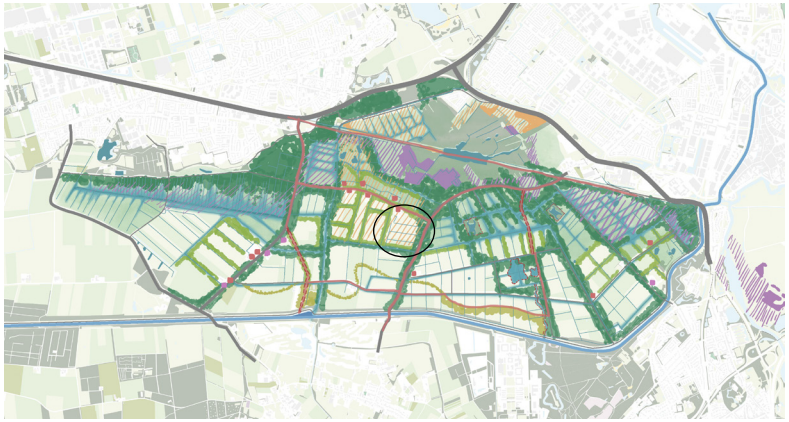
Pig farming + Agroforestry

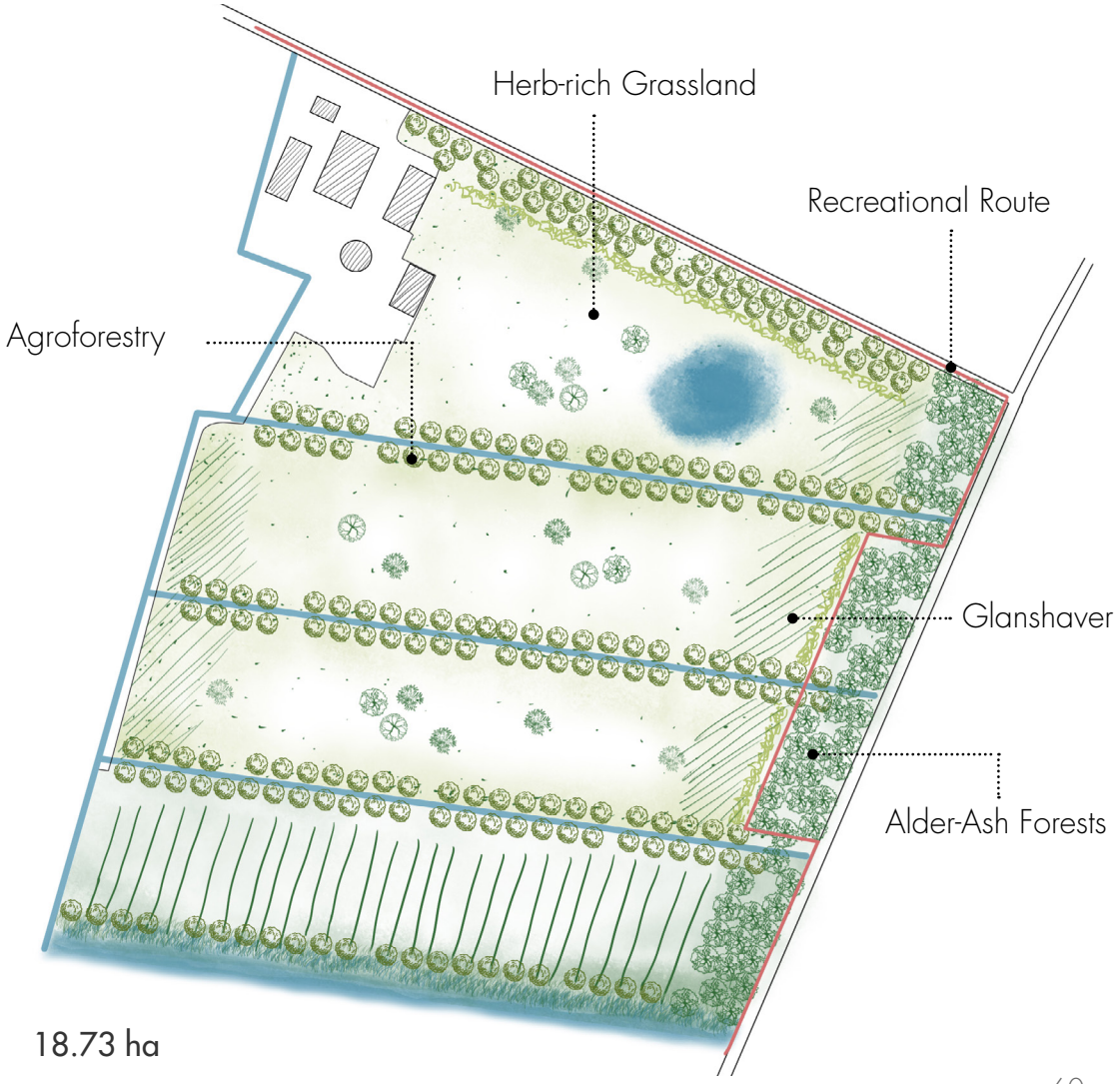
Chicken farming + Orchards



Design Detail 1

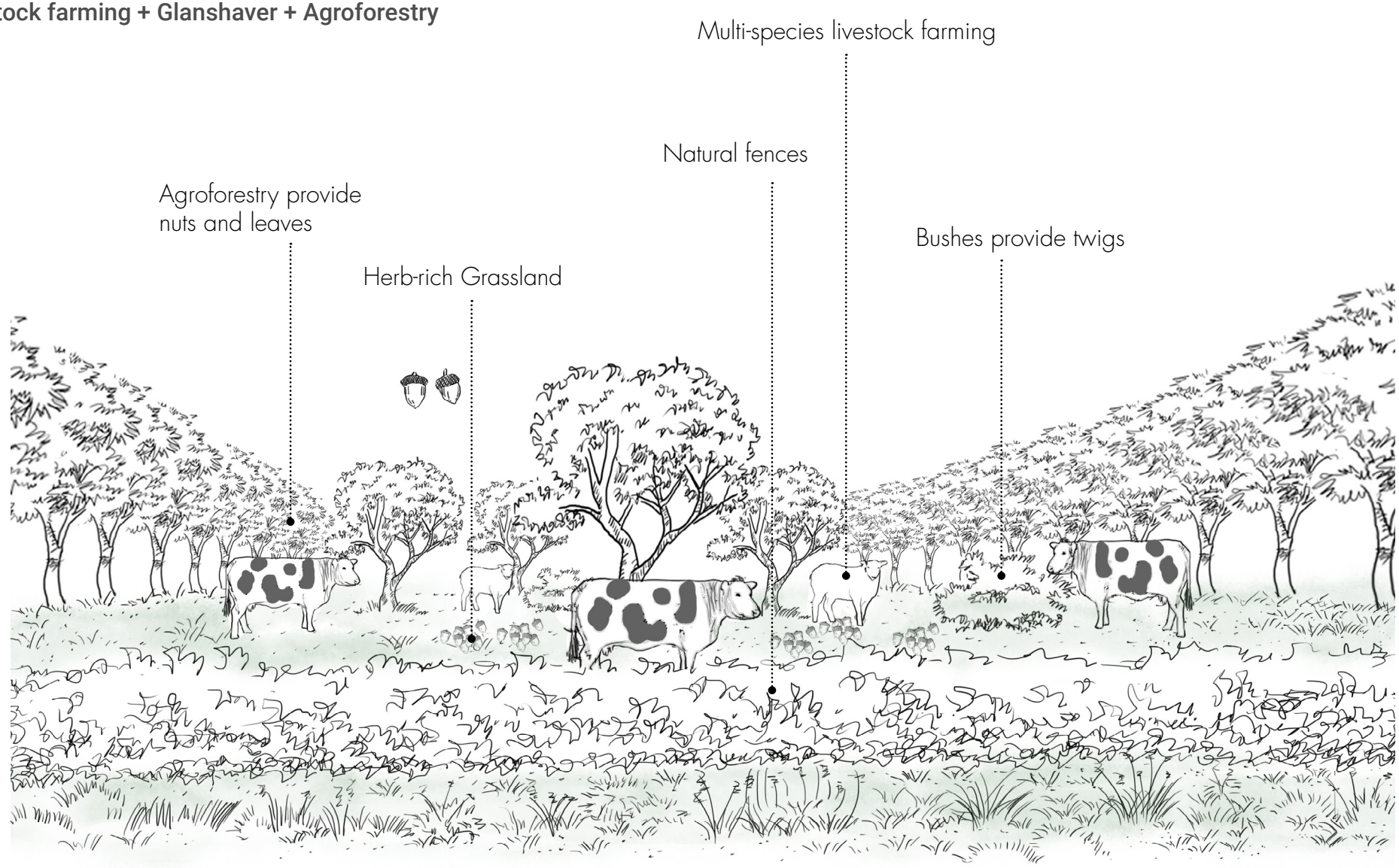
Livestock farming + Glanshaver + Agroforestry





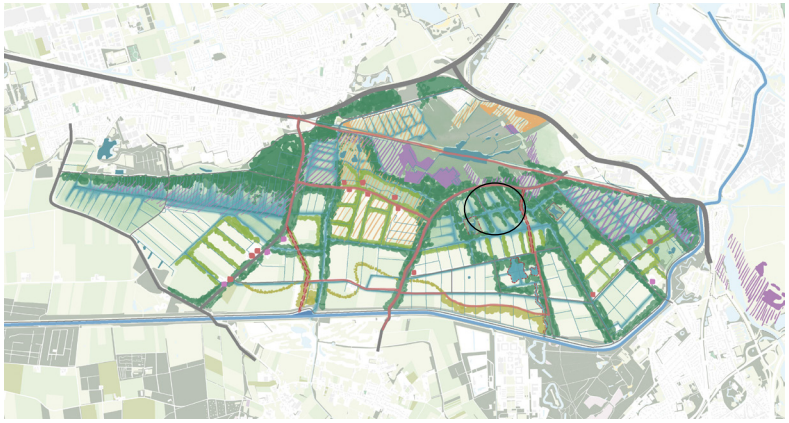
Design Detail 1

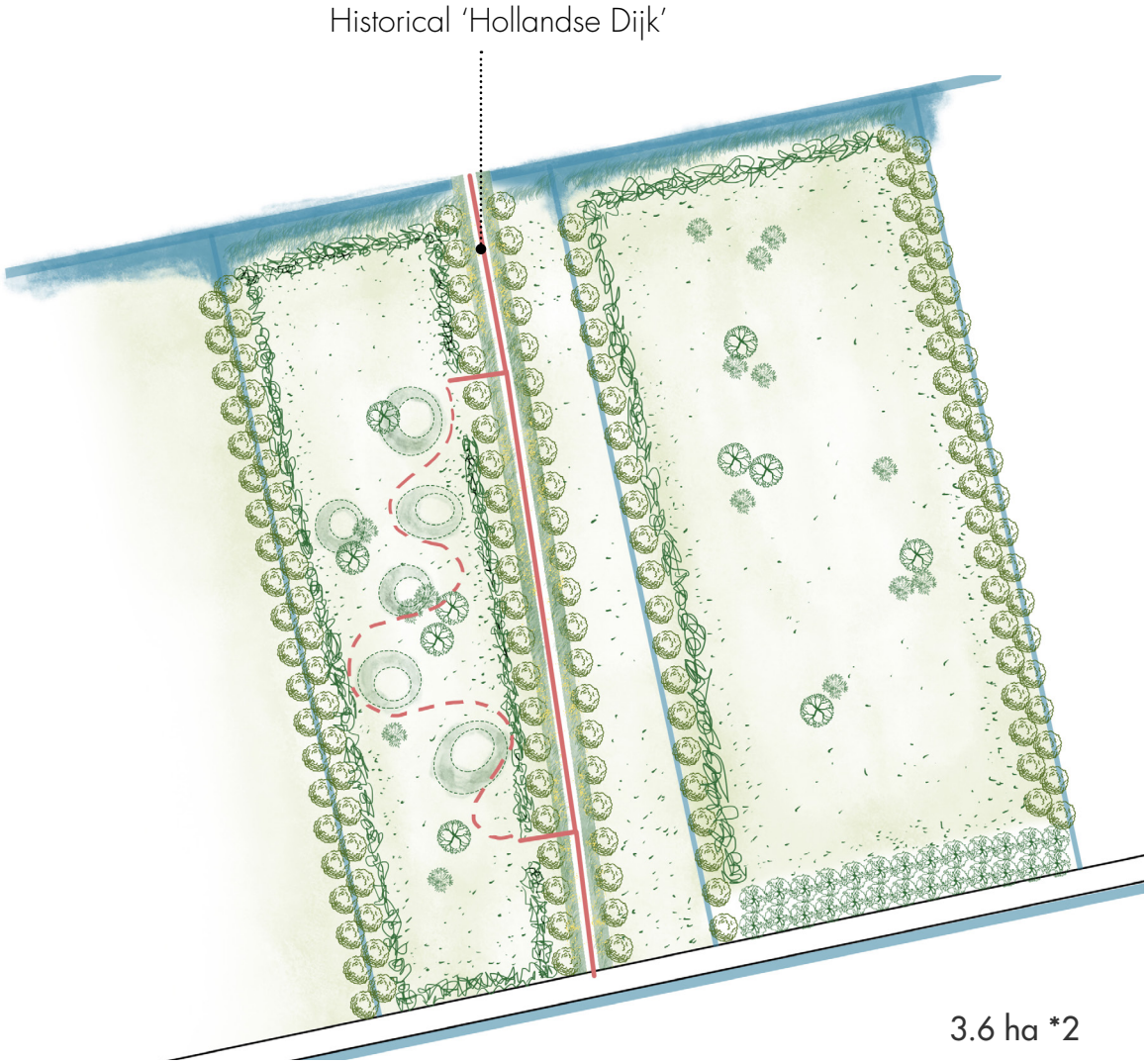
Livestock farming + Glanshaver + Agroforestry



Design Detail 2

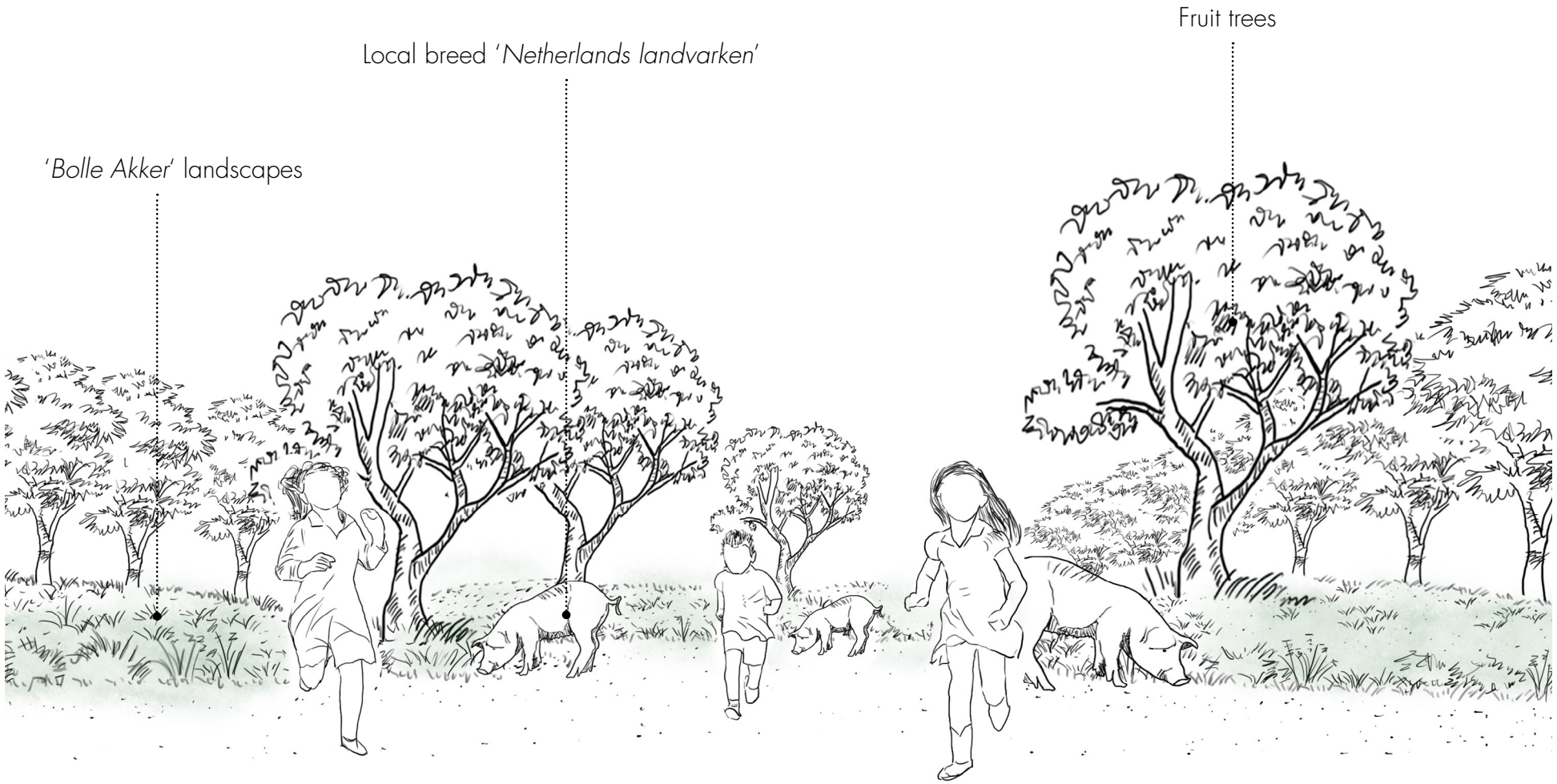
Pig farming + Agroforestry





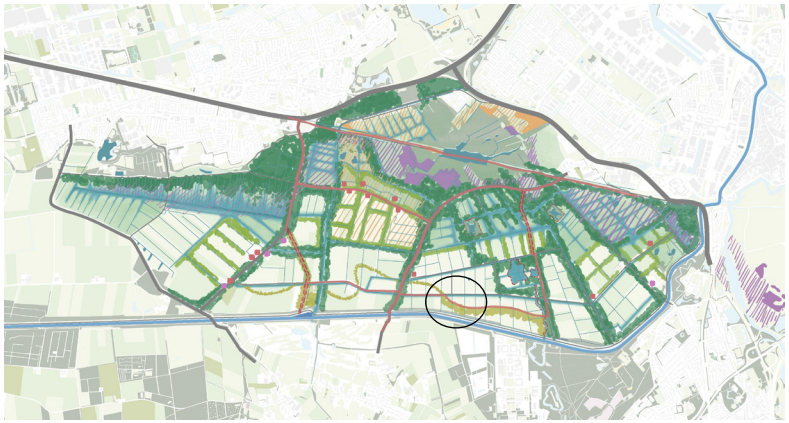
Design Detail 2

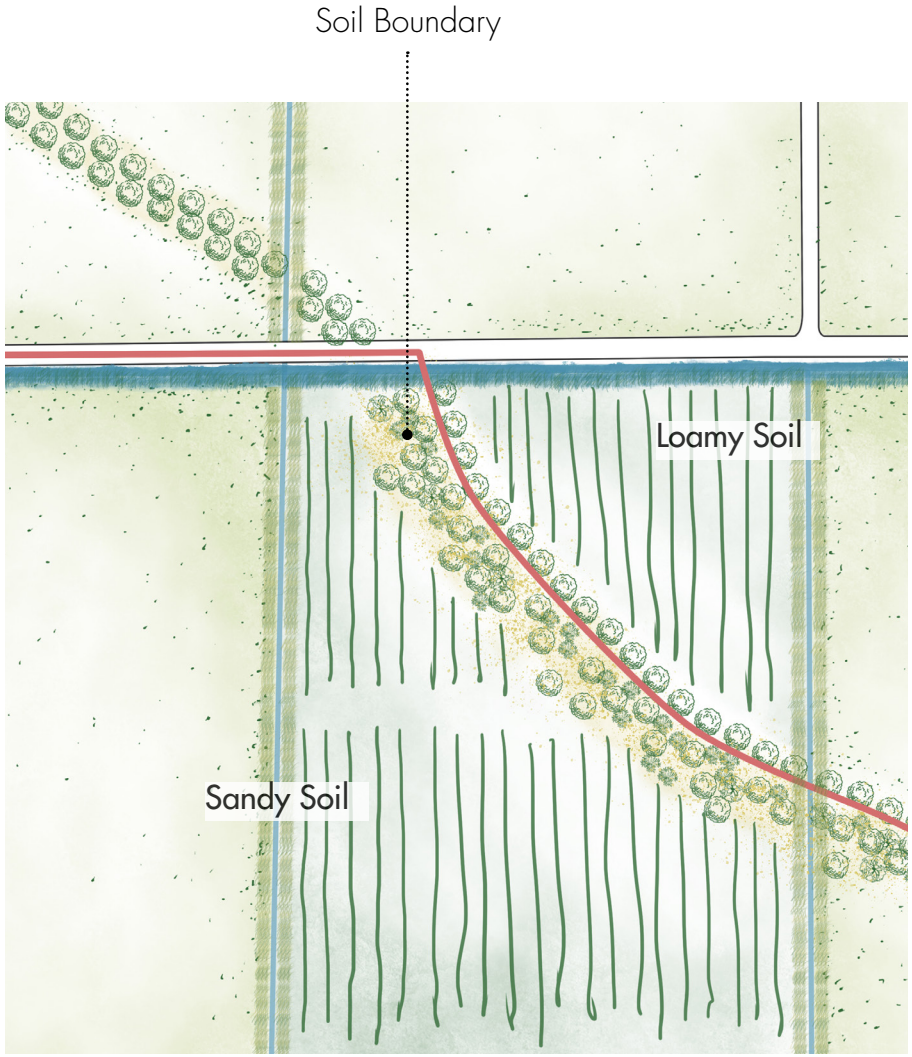
Pig farming + Agroforestry



Design Detail 3

Chicken farming + Orchards





Design Detail 3

Chicken farming + Orchards

Site 2: Animal Farming with Nature

Source: Google map

Site Analysis

Spatial Framework --- *Connection with surrounding natural resources*

Beech-Oak Forest

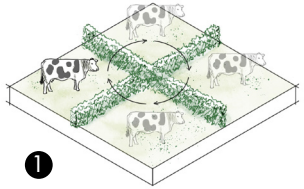
Oak-birch forest

Legend

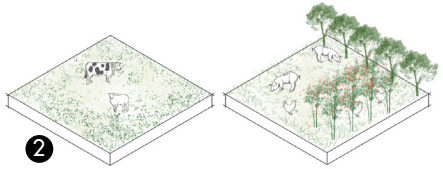
- Highly ecosensitive
- Tree nursury
- Nature resources
- Renewal farmland
- Greenified area
- Green connection

Spatial Framework

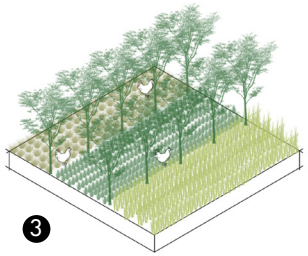
Spatial Framework --- *Application of Design Principles*



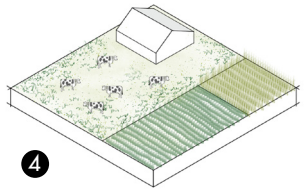
❶ Rotational grazing



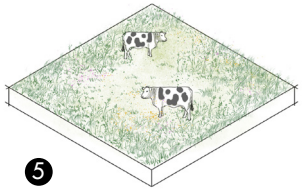
❷ Multi-species animal farming



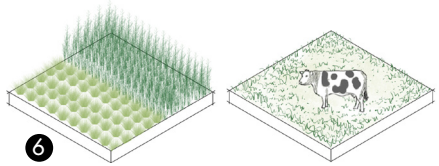
❸ Strip farming with chickens



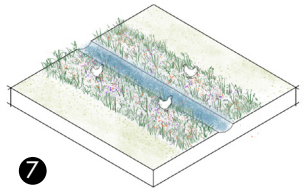
❹ Manure management with cropland



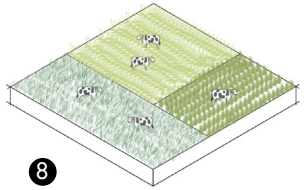
❺ Herb-rich grassland



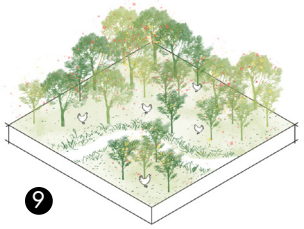
❻ Crop rotation



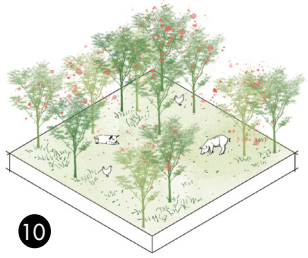
❼ Flower strips with poultry farming



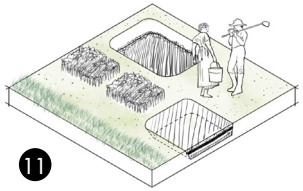
❽ Green cover with green manure



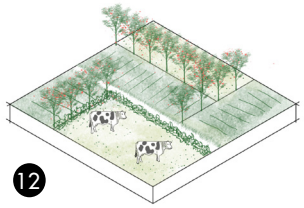
❾ Pick garden with chickens



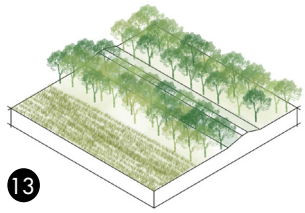
❿ Local traditional breeds



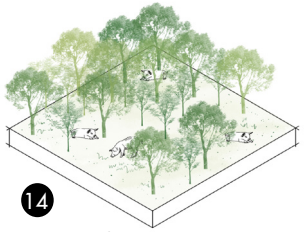
⓫ Bio-fertilizer making



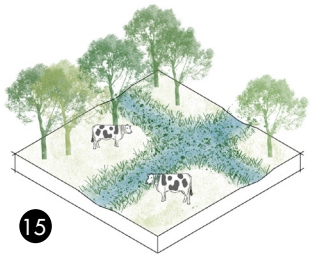
⓬ Historical farmland landscape



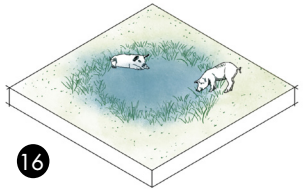
⓭ Local nature as green connection



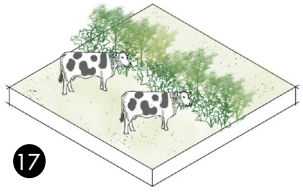
⓮ Trees for sheltering



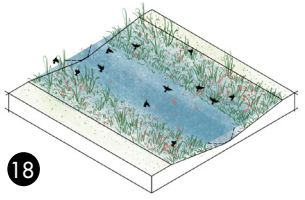
⓯ Diverse supplementary diets



⓰ Ponds for drinking& bathing



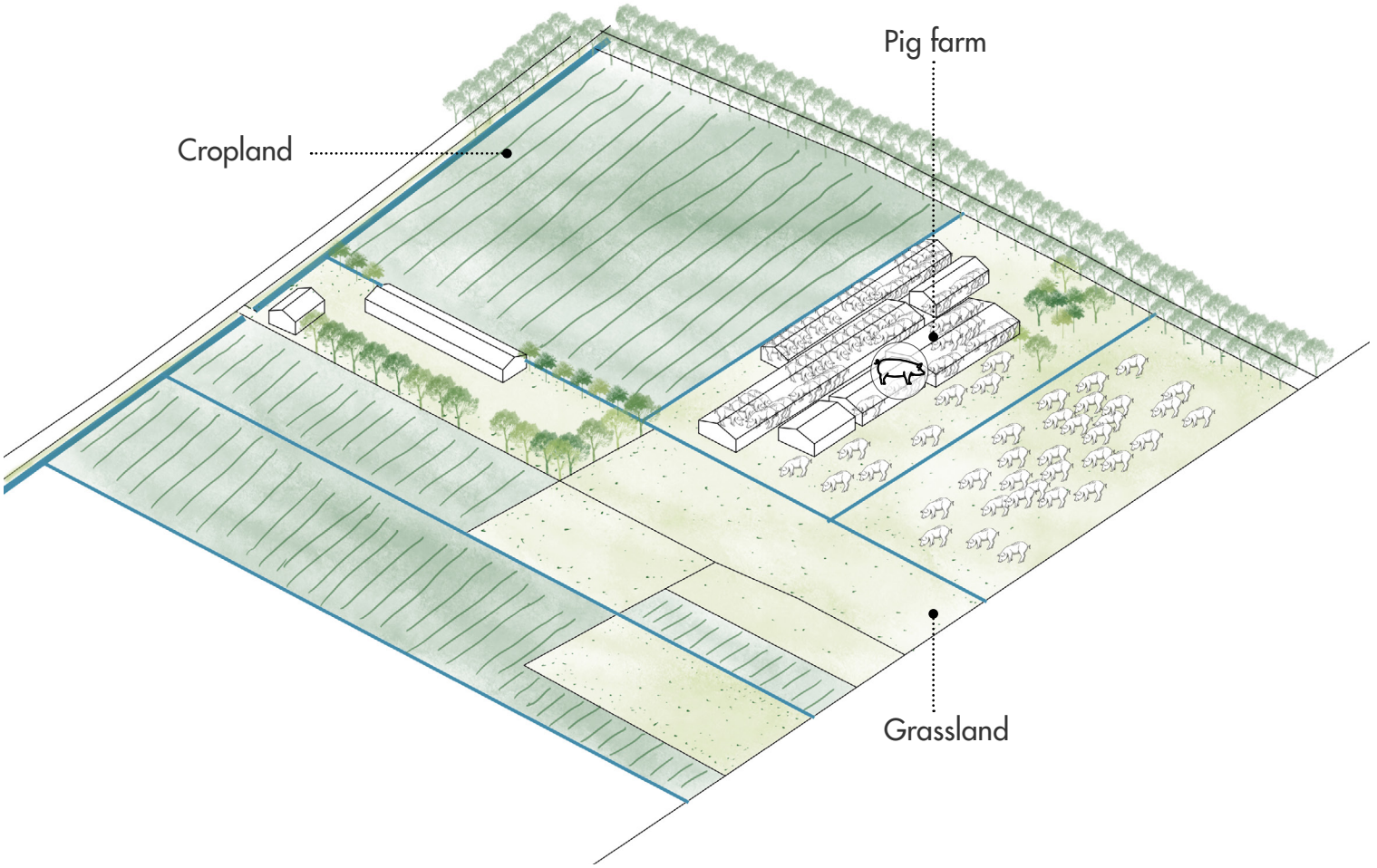
⓱ Natural fences



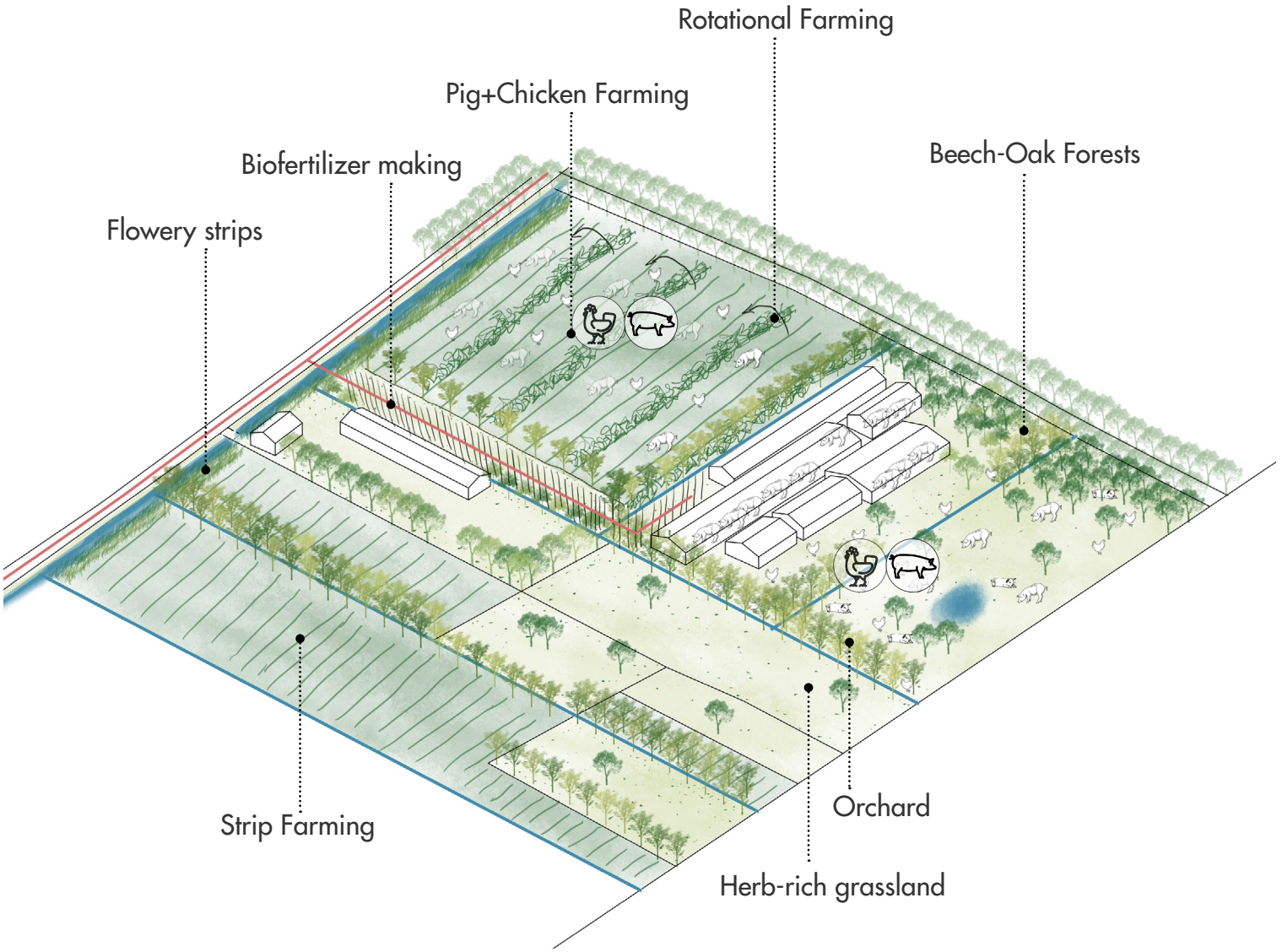
⓲ Nature-friendly water bank

Current

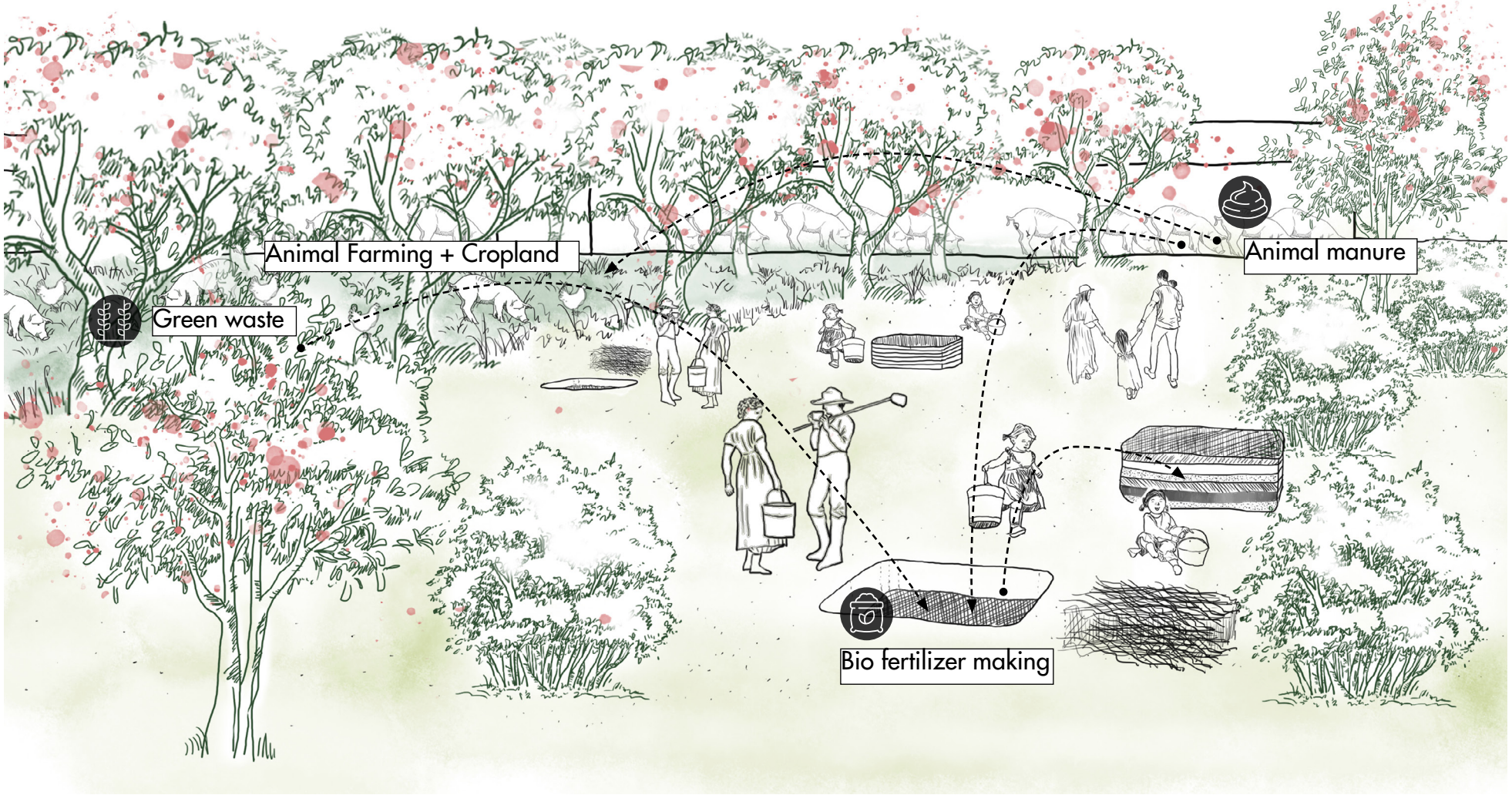
Seperated and monofunctionally used



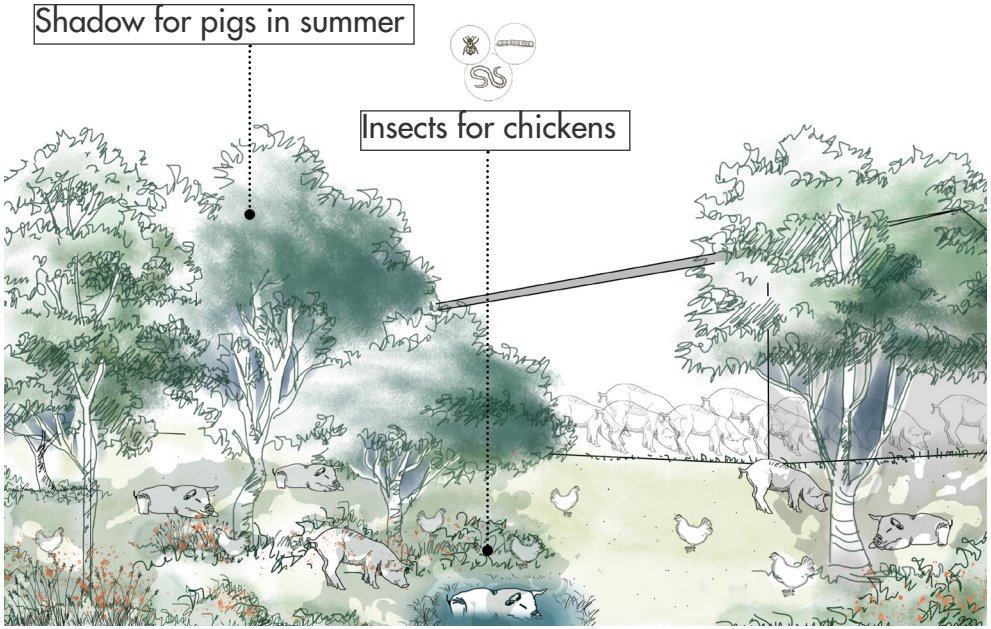
Renewed Condition



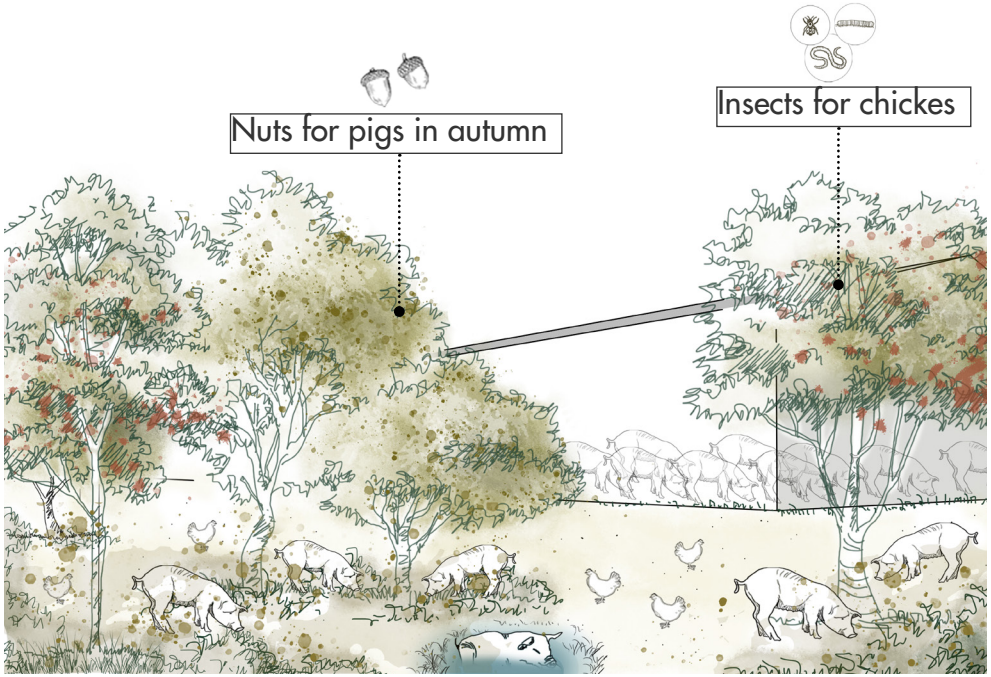
Perspective --- *Involve people into sustainable nutrient flow*



Compensation for Farmers

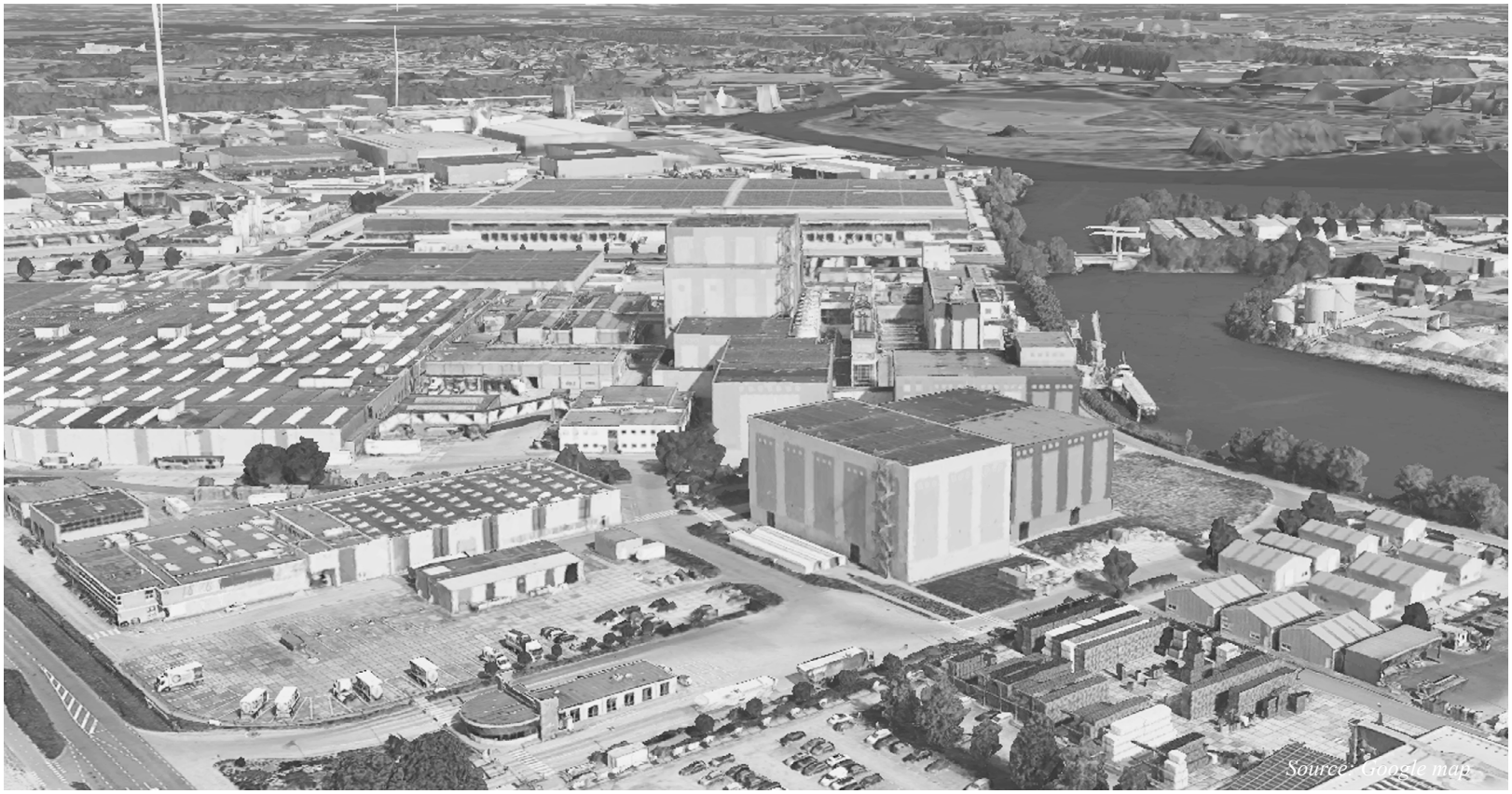


Spring & Summer



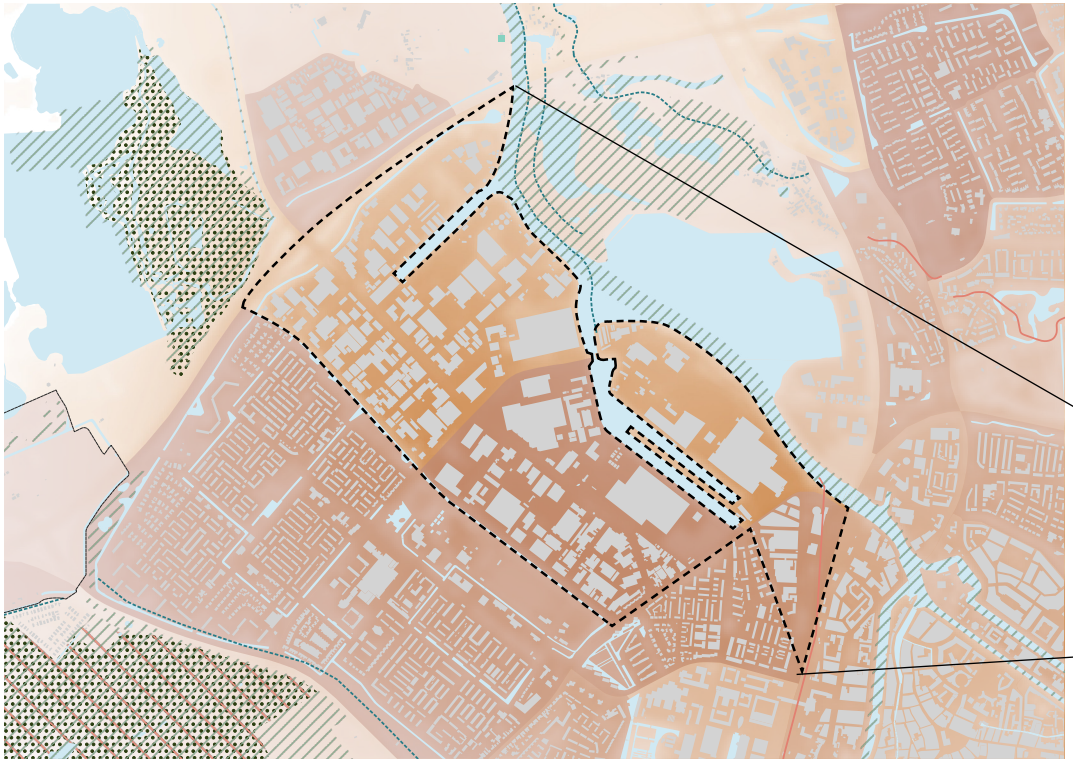
Autumn

Site 3: Animal Farming through Nature

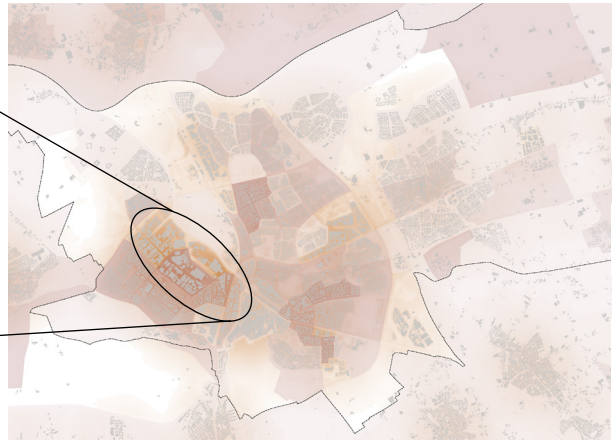


Source: Google map

Environmental and Spatial Problems



- High urban heat effect
- Low livability and vitality
- A lot of impermeable surfaces
- Lack green connection with surrounding natural areas



Legend

Den Bosch boundry

Building

UHI

2.808

0

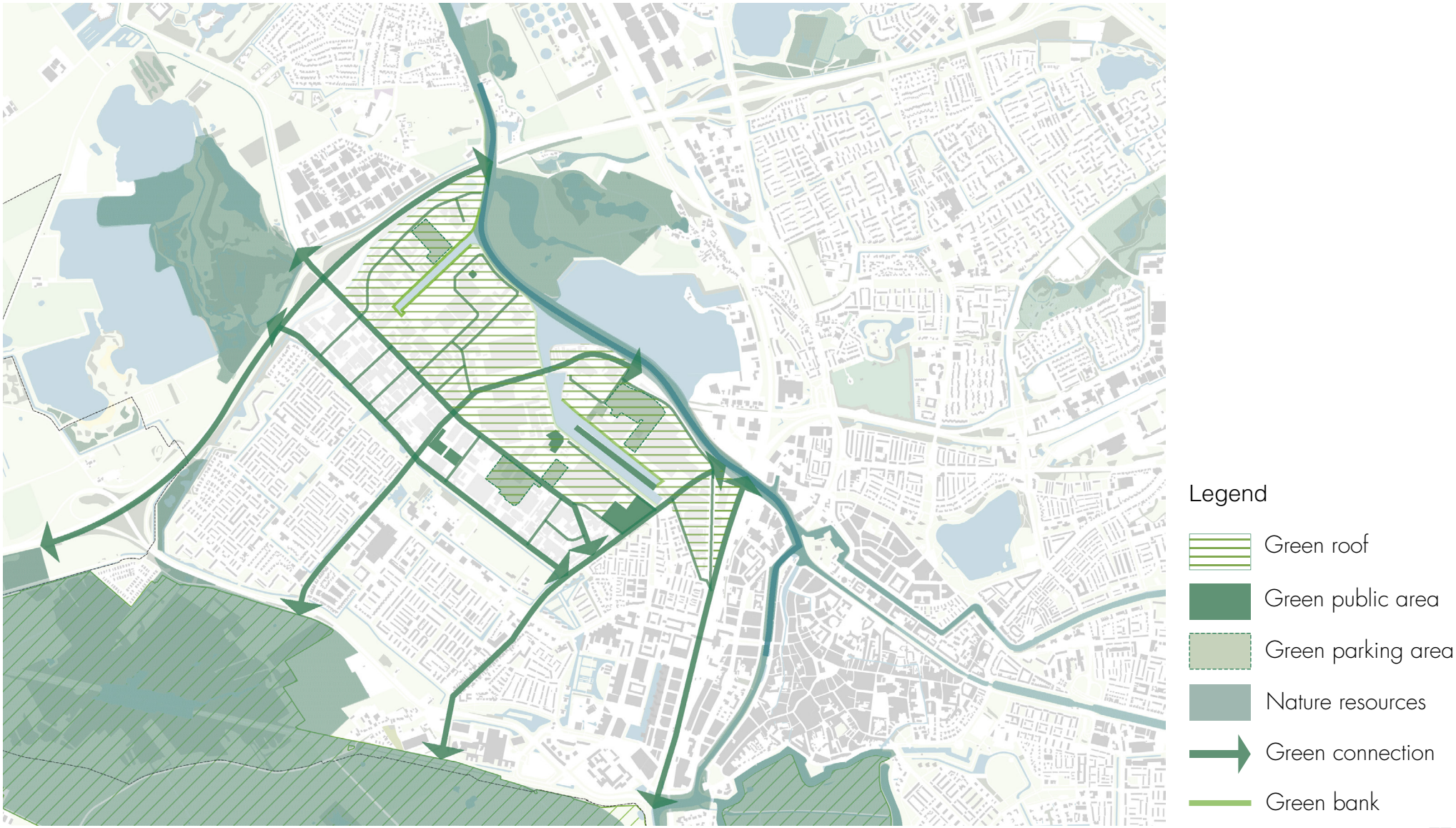
Livability

Bad

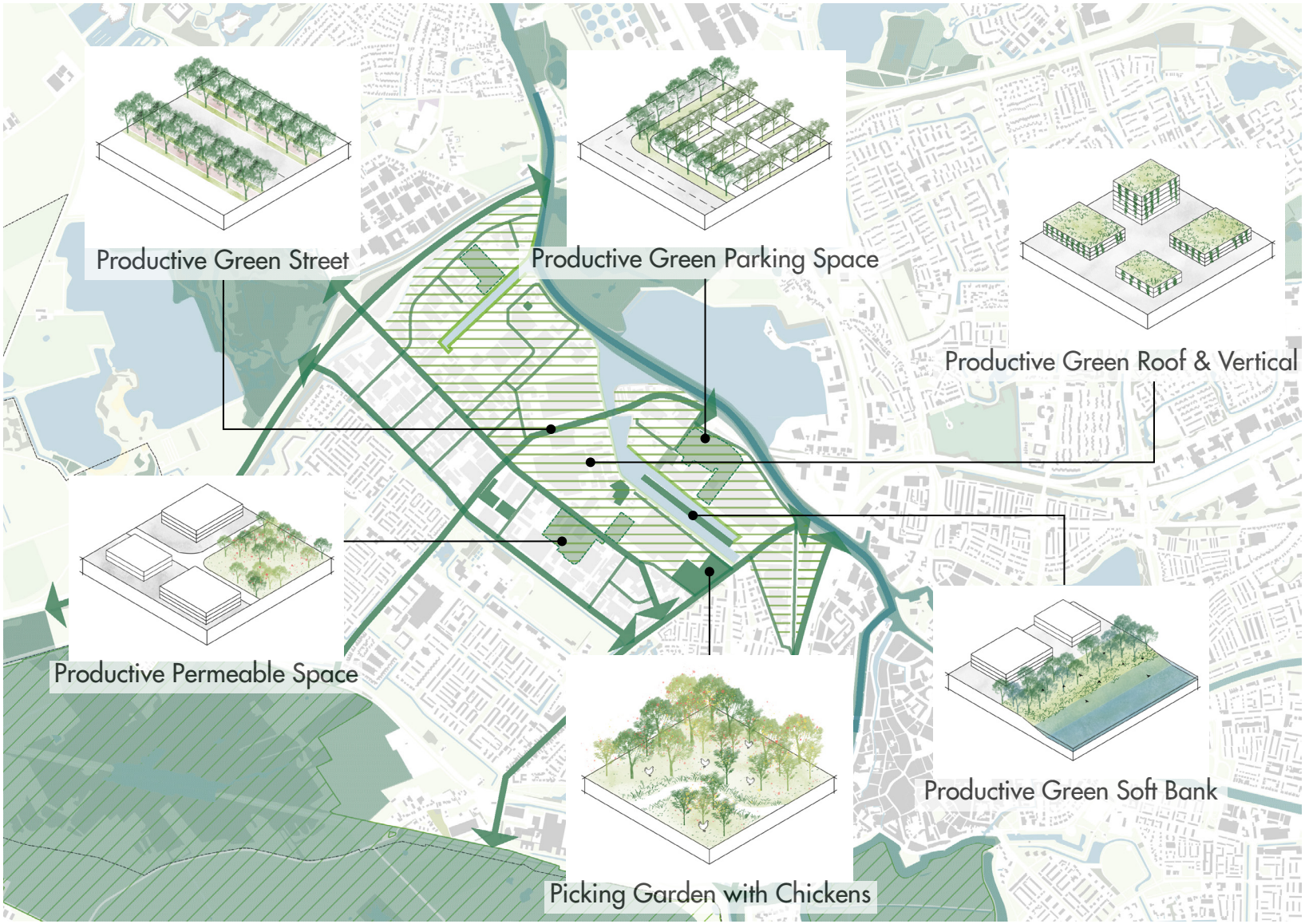
Medium

Good

Spatial Framework

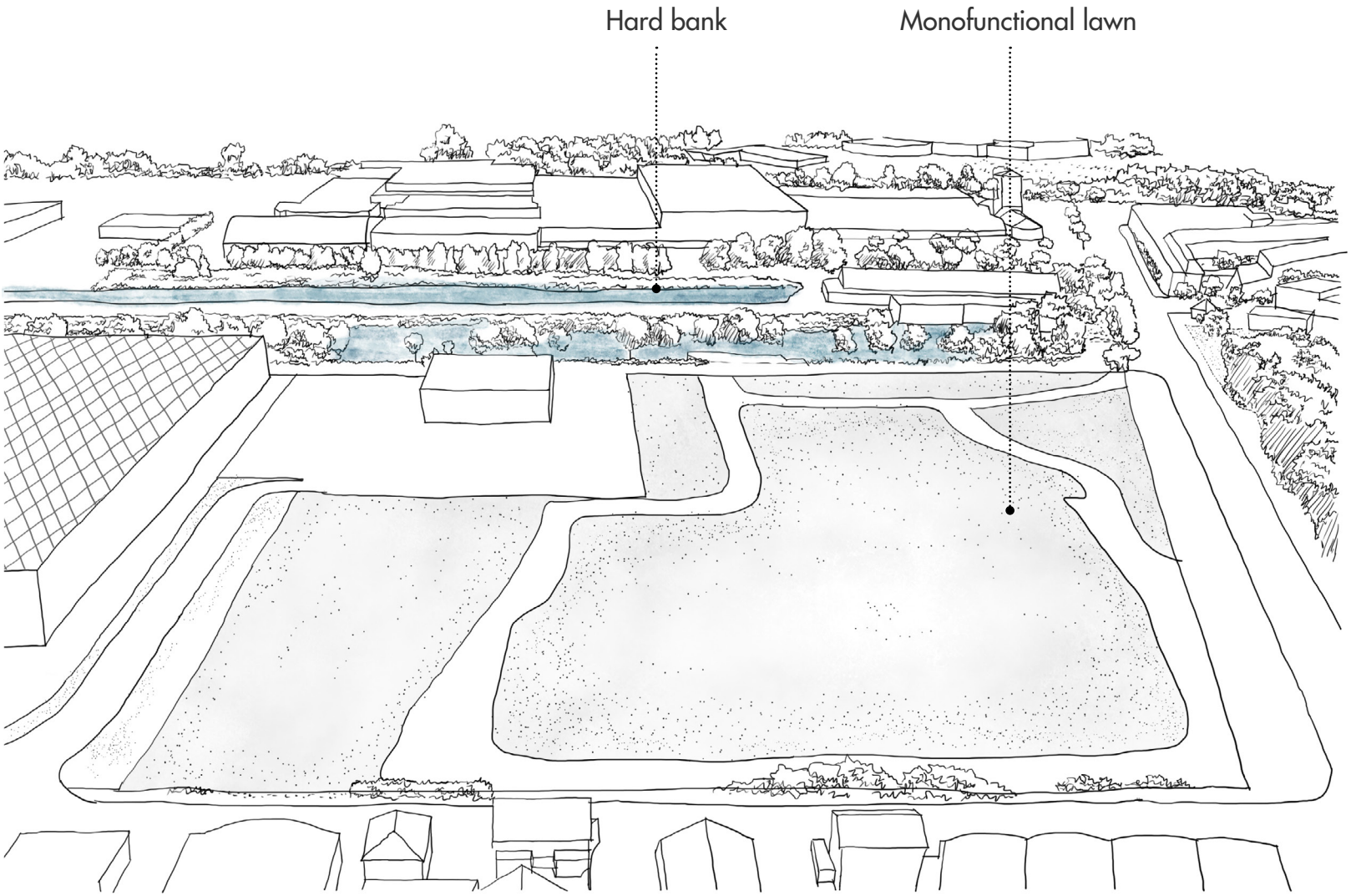


Spatial Framework

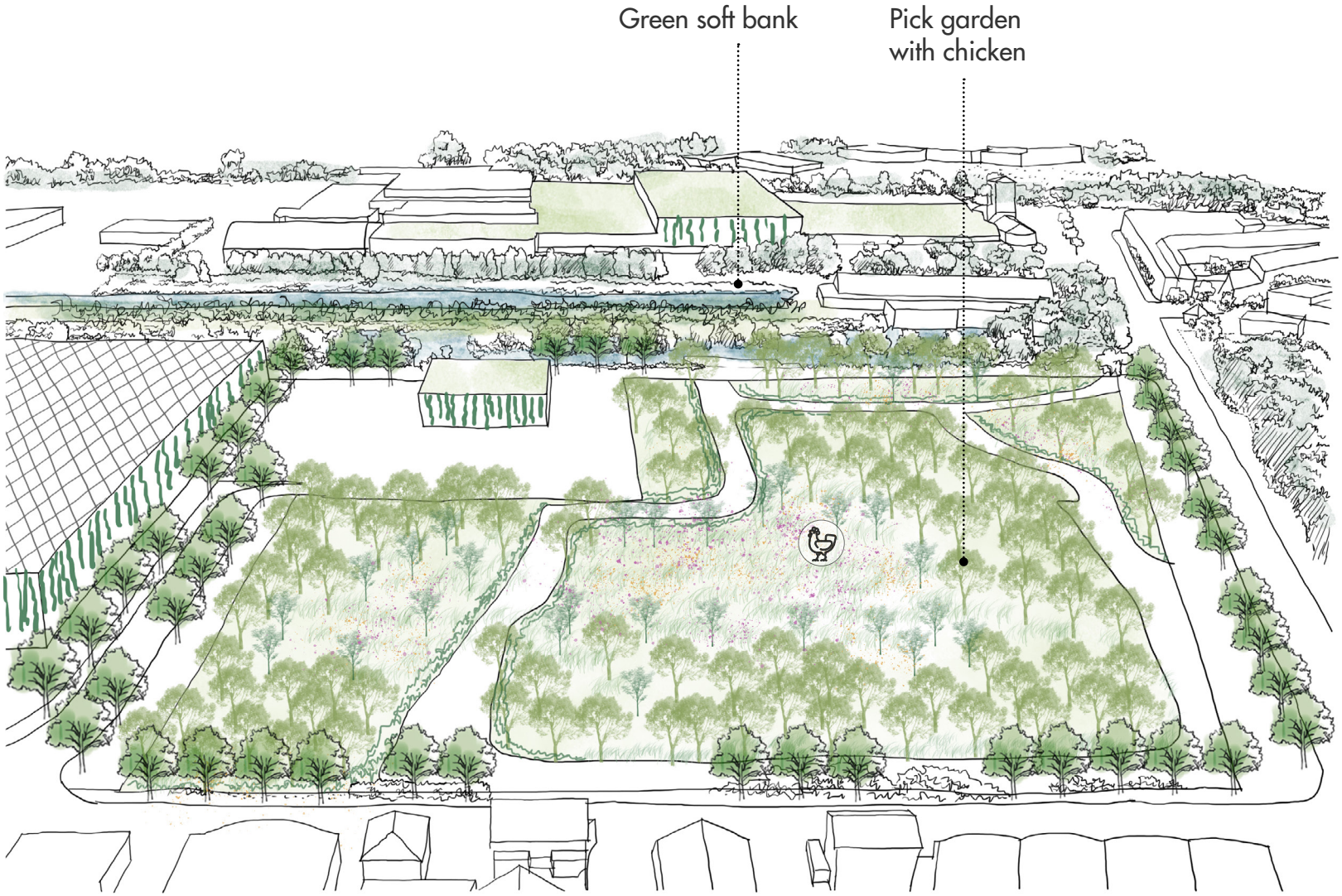


FOOD
(Plants)
+
- Green roof
- Green street
- Green bank
- Green public area
- Vacant area

Current



Renewed Condition



Picking Garden

Tall trees:


Horse chestnut


Walnut

Low trees:

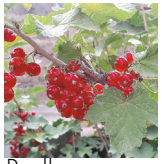

Apple


Sweet cherry

Shrubs:


Blueberry


Black currant


Redberry

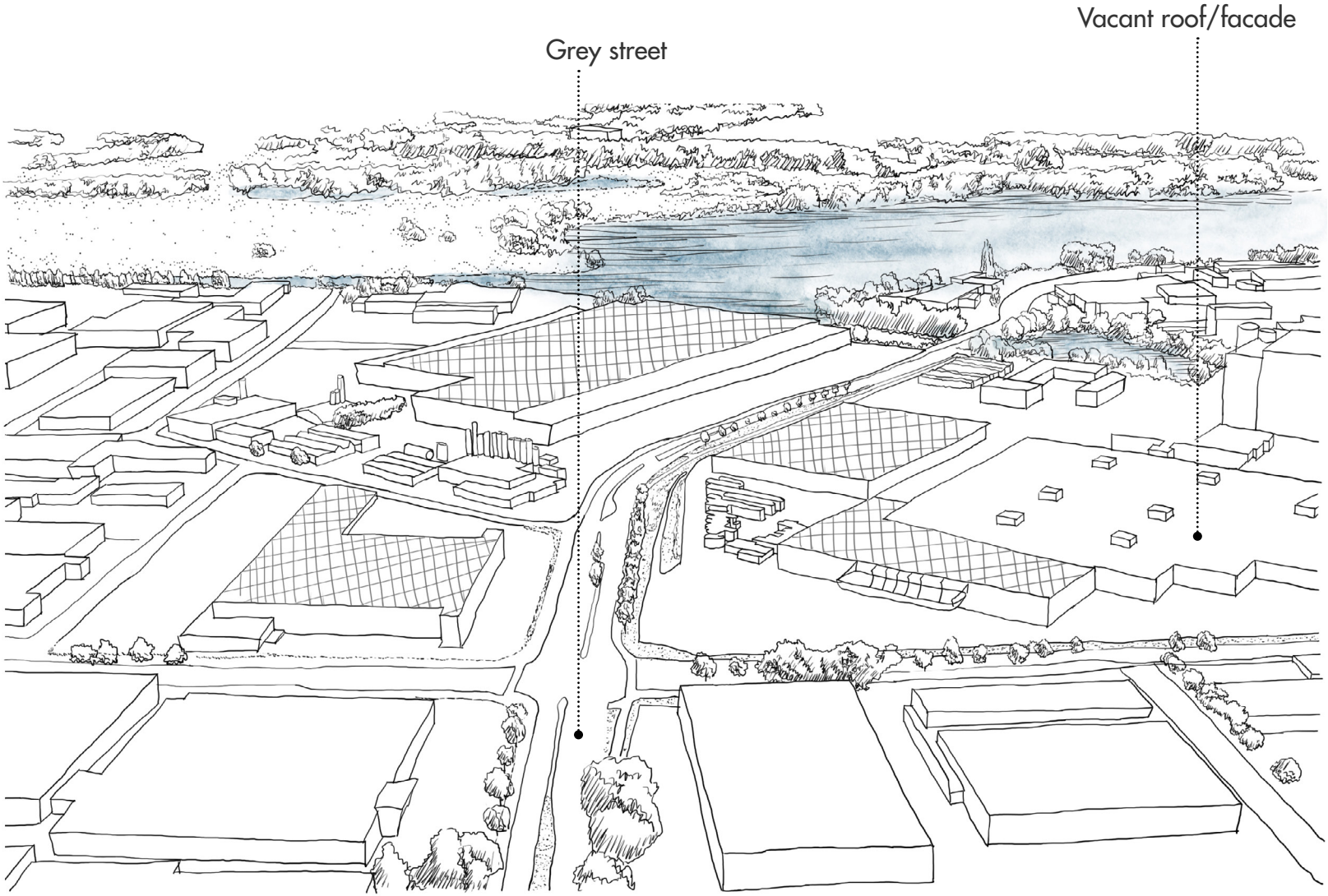

Raspberry

Herb layer:

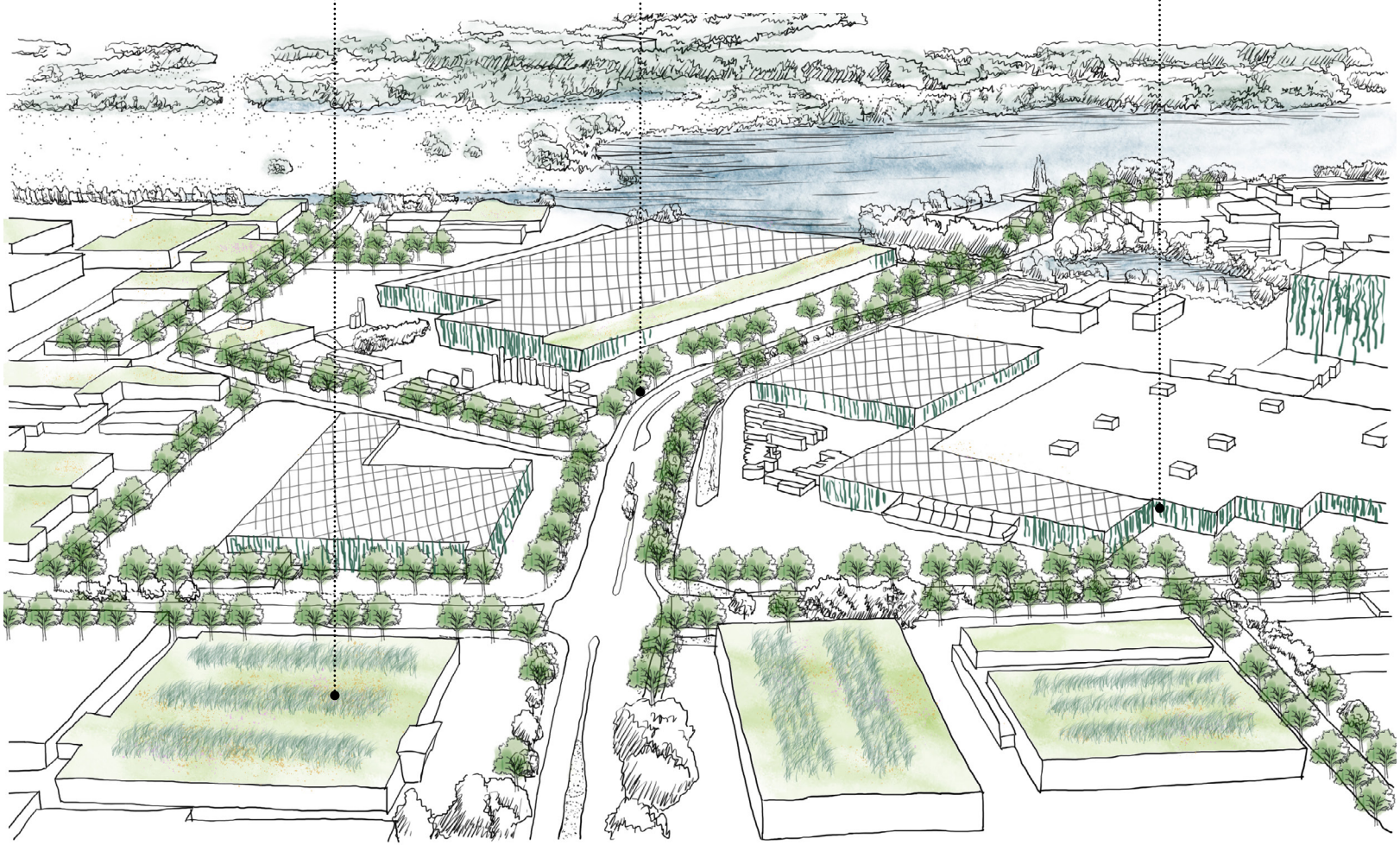

Pumpkin


Strawberry

Current



Renewed Condition



Green Street

Tall trees:


Horse chestnut


Walnut

Low trees:


Apple


Sweet cherry

Green Facade

Climbing plants:


Black berry


Siberian Kiwi

Green Roof

Herb layer:


Pumpkin


Strawberry

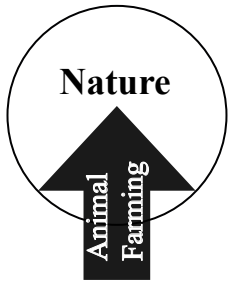
Perspective

5 CONCLUSIONS & DISCUSSION

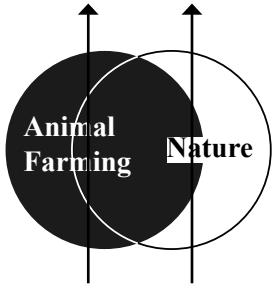
Main RQ

How to build up sustainable, nature-inclusive animal farming landscapes that also provide attractive recreational qualities, through landscape design in Den Bosch region?

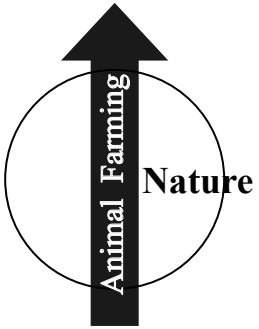
- Increase the ecological value of animal farming
- Improve animal welfare
- Create recreational foodscapes of animal farming
- Create climate-adaptive animal farming landscapes



Animal Farming in Nature



Animal Farming with Nature



Animal Farming through Nature

THANK YOU ALL !

First Mentor: Nico Tillie

Second Mentor: Remon Rooij