

FARMING GUANGMING

Integrating agricultural landscape and new town development for the
“Green City” Guangming in Shenzhen



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INTRODUCTION

PROBLEM

OPPORTUNITY

THEORY

CITY-SCALE DESIGN

DISTRICT-SCALE DESIGN

CONCLUSION

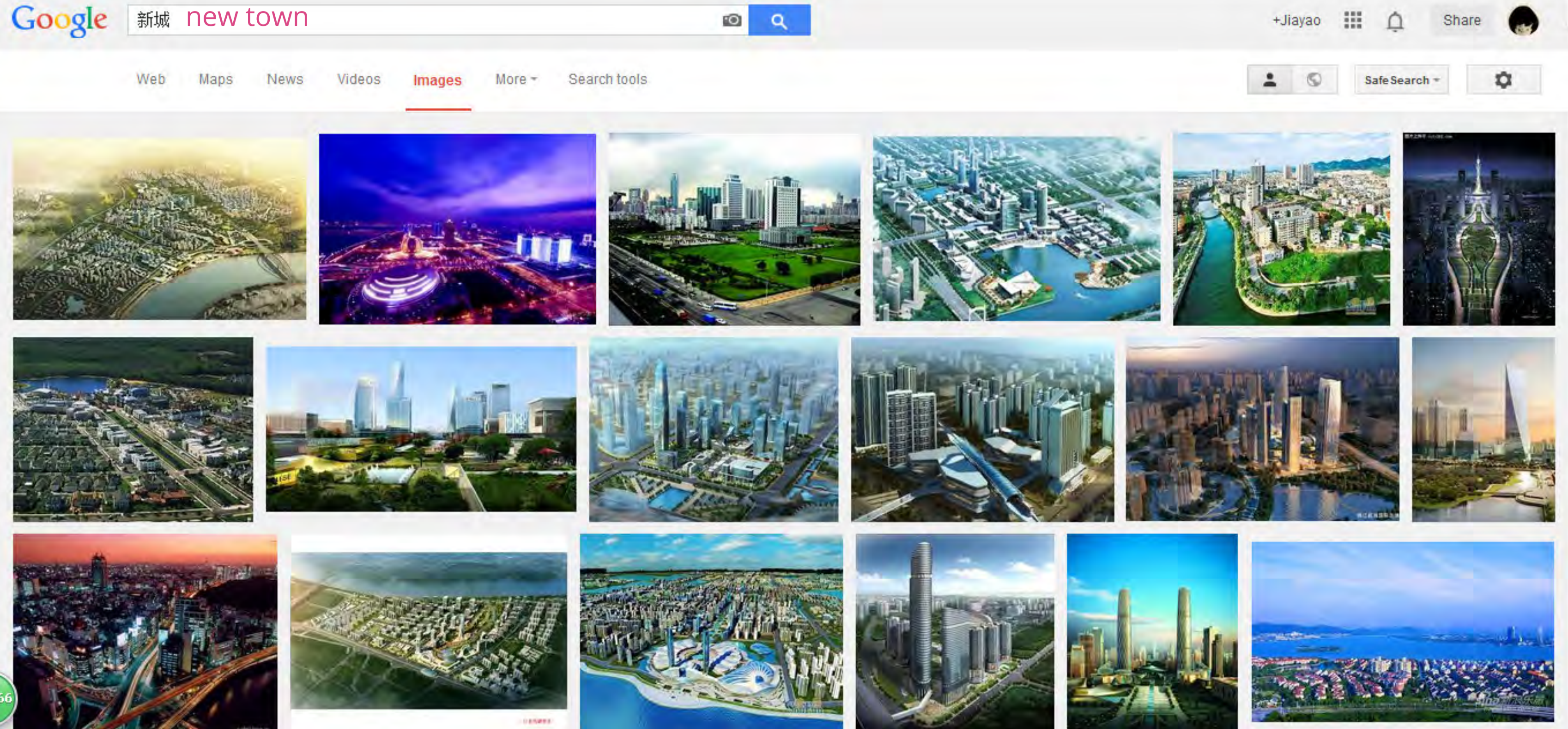
光明

概述

INTRODUCTION

注意安全
保护设施
禁止进入

New Town Development in China



New Town Development in China



中国乡村 China countryside



+Jiayao



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Motivation



source: www.jiangjinupb.gov.cn



source: www.snzg.net

Motivation

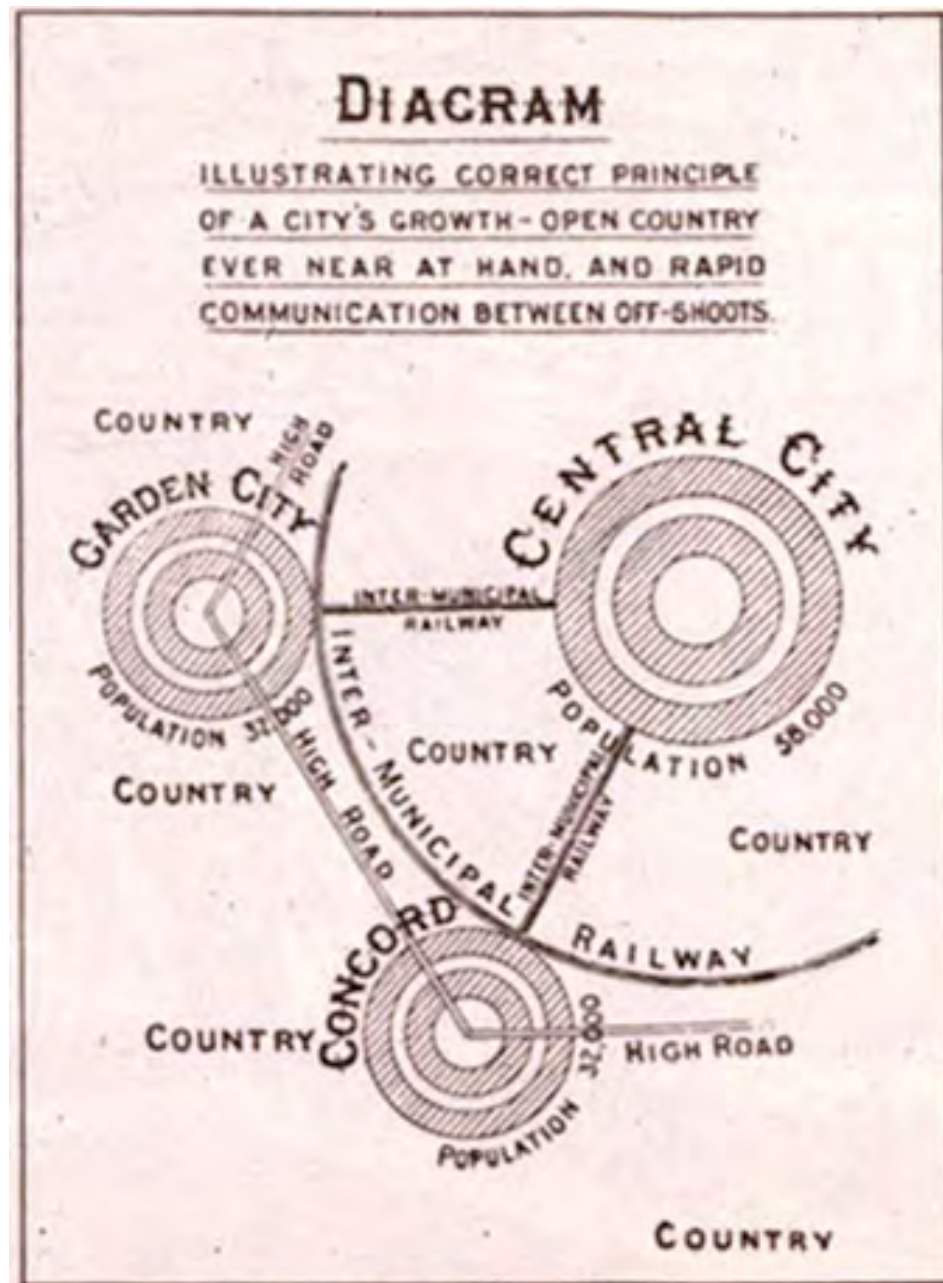


source: www.jiangjinupb.gov.cn



source: www.snzg.net

Western Discourse



Garden City



Broadacre City

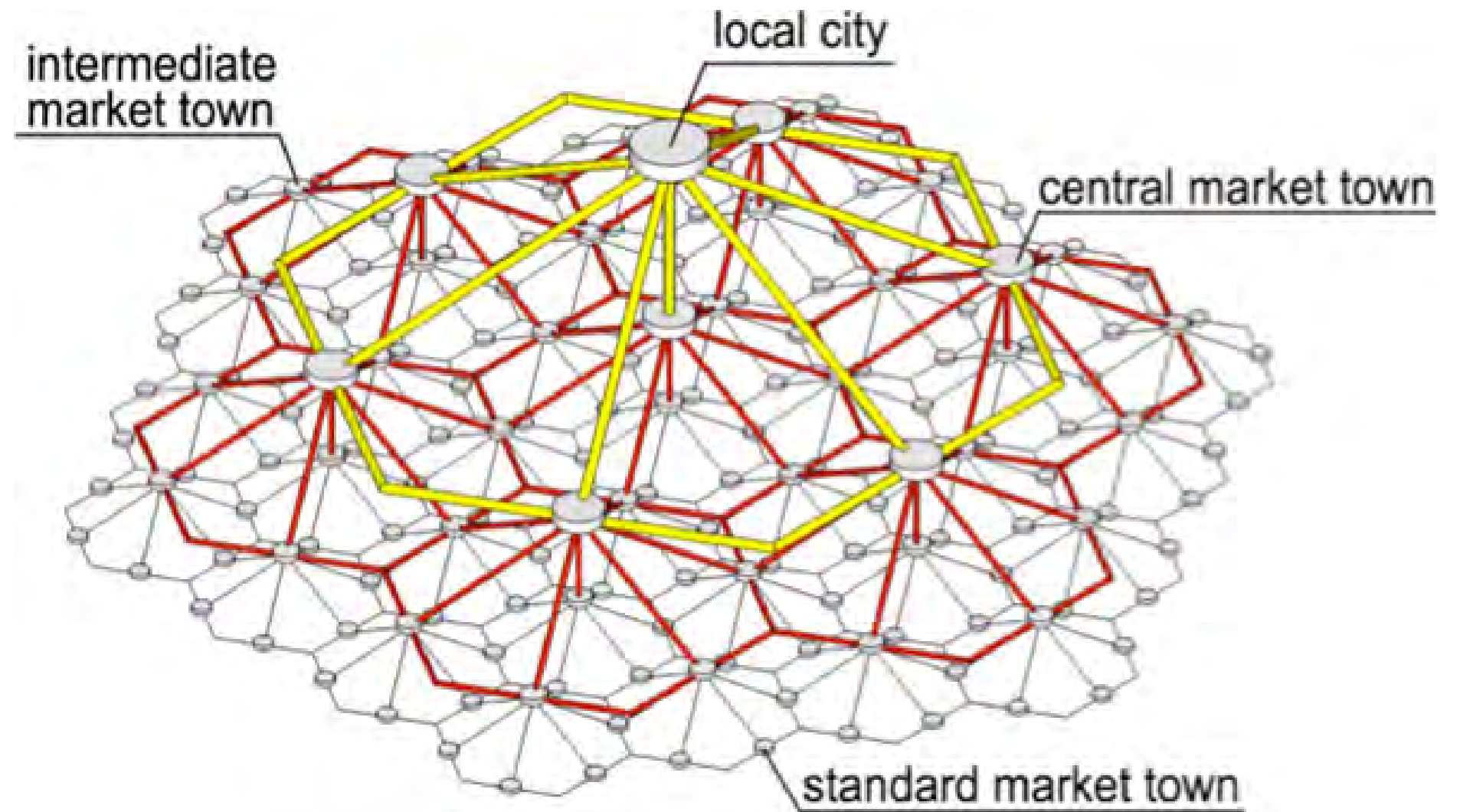


Agronica

China & Agriculture



Qing Ming Shang He Tu (Along the River During the Qingming Festival), Qing Dynasty



Town system in ancient China, based on agricultural distribution system. ©Jun Ying

China & Agriculture



source: www.jiangjinupb.gov.cn

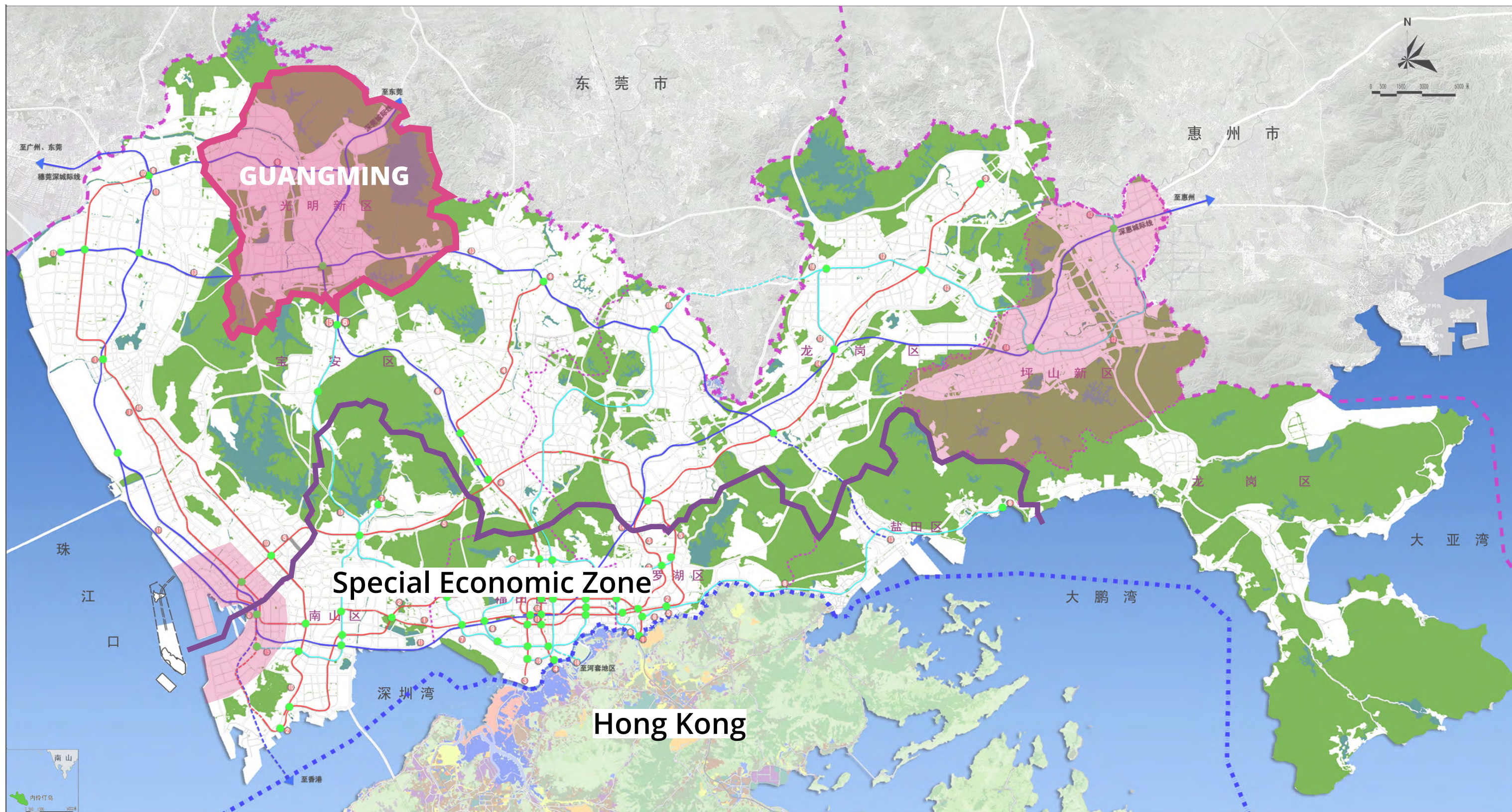


Project Aim

QUESTION the current role of agricultural landscape in current planning and design of new towns

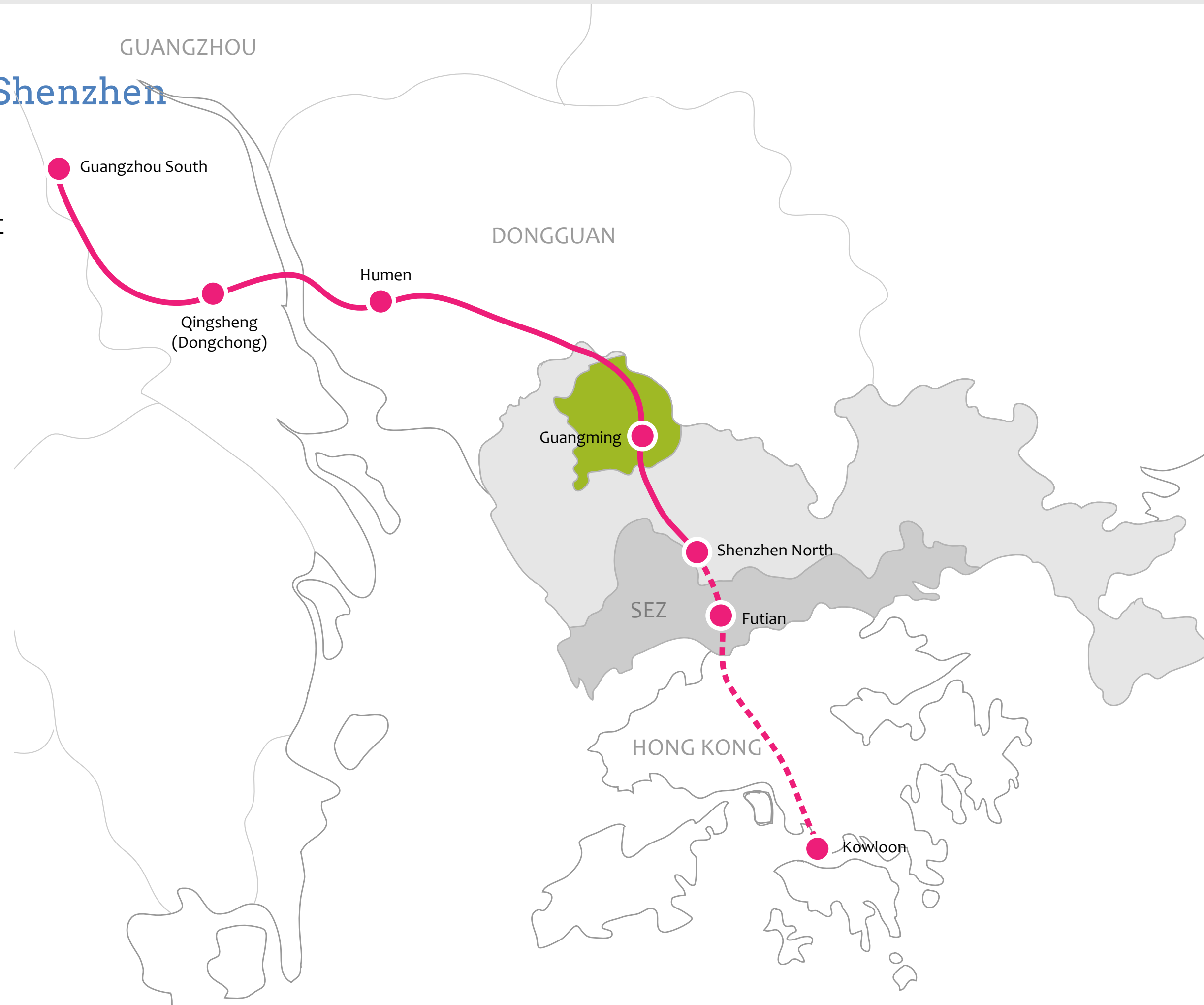
EXPLORE the possibility of planning and design in facilitating and utilizing agricultural landscape to moderate the impacts of urban development on ecosystem and local communities.

Study Site: Guangming, Shenzhen



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- Started in 2007
- Infrastructure-led development
- Industrial upgrading
- “Green City”



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To study the interaction between New town & former agricultural landscape



Research Question

What are the potentials of agricultural landscape to contribute to new town development in Guangming?

How can planning and design help to facilitate the integration of agriculture and new town development and utilize agricultural landscape to improve the relationship between urban development, local people and ecosystem in Guangming, Shenzhen?

問題

QUESTIONING
NEW TOWN

Evaluation of current plan



Evaluation of current plan

Current new town plan



people



open space



ecosystem

"Green City" Scheme

dimensions	contents
green economy	High-tech industry
	Manufactory
	Service industry
	Modern ecological agriculture
green building	Green Building Standard
	Led lighting in public area
green infrastructure	Utility tunnel
	Transport
	Low-impact development (LID)
	Flooding
	Infrastructure-led urban expansion
green space	Green ecological area
	Flower Sea (floricultural)
	Greening the city (beautification)
green community	Waste sorting
green ecosystem	Maozhou River restoration
green identity	Greening the city (beautification)

less attention

Chart 1. The practices of "green city" concept in Guangming.

Large-scale masterplan

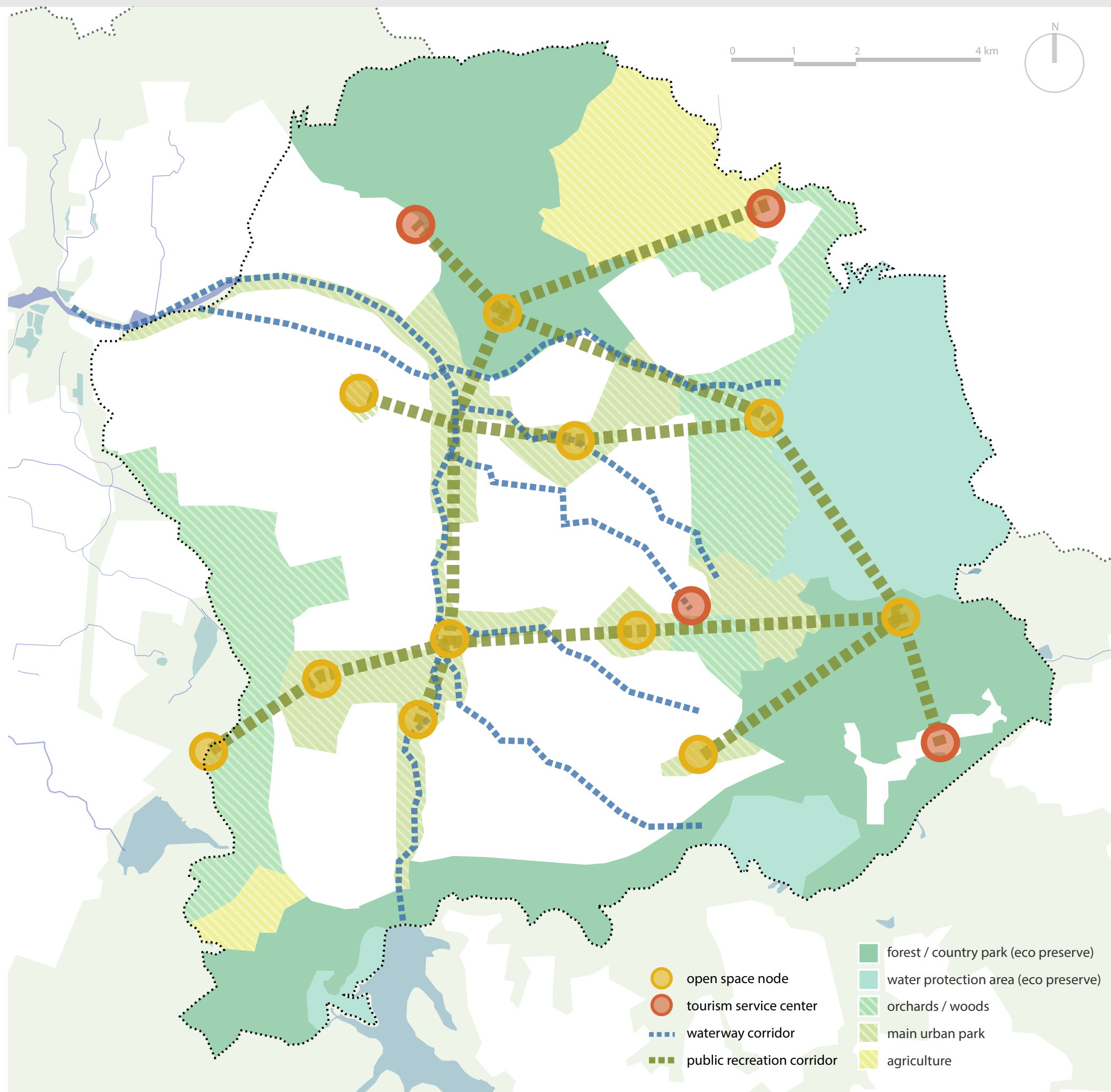
Car-dominated road network



Large-scale masterplan

Car-dominated road network

Separated blue & green

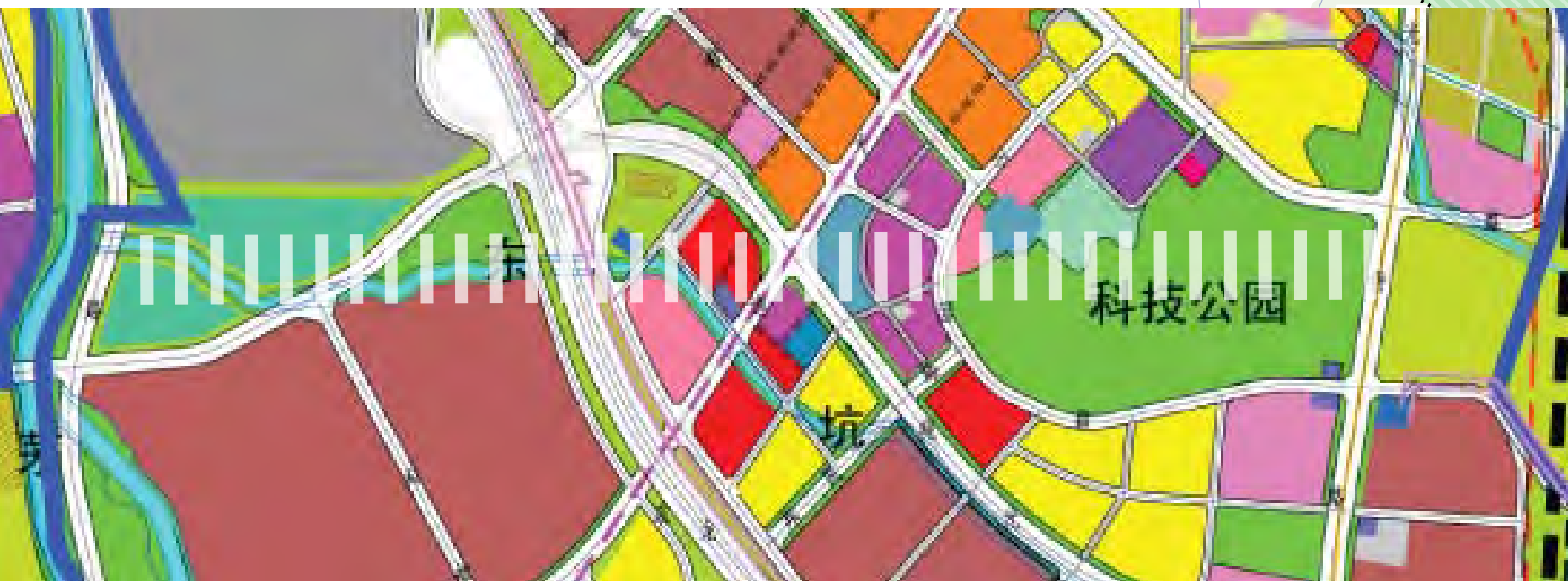
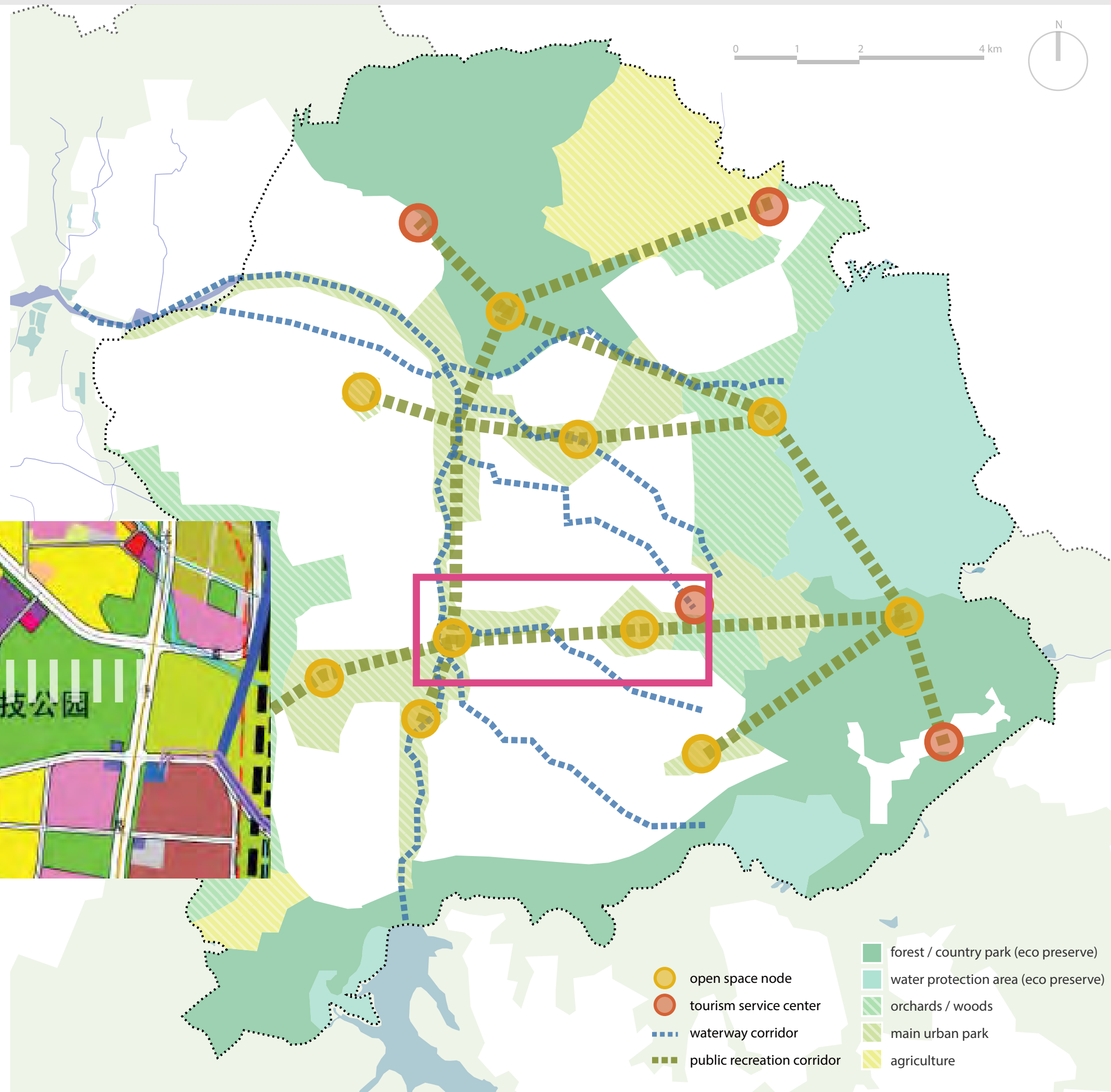


Large-scale masterplan

Main structure: road network

Separated blue & green

infrastructure overrides green network



- open space node
- tourism service center
- waterway corridor
- public recreation corridor
- forest / country park (eco preserve)
- water protection area (eco preserve)
- orchards / woods
- main urban park
- agriculture

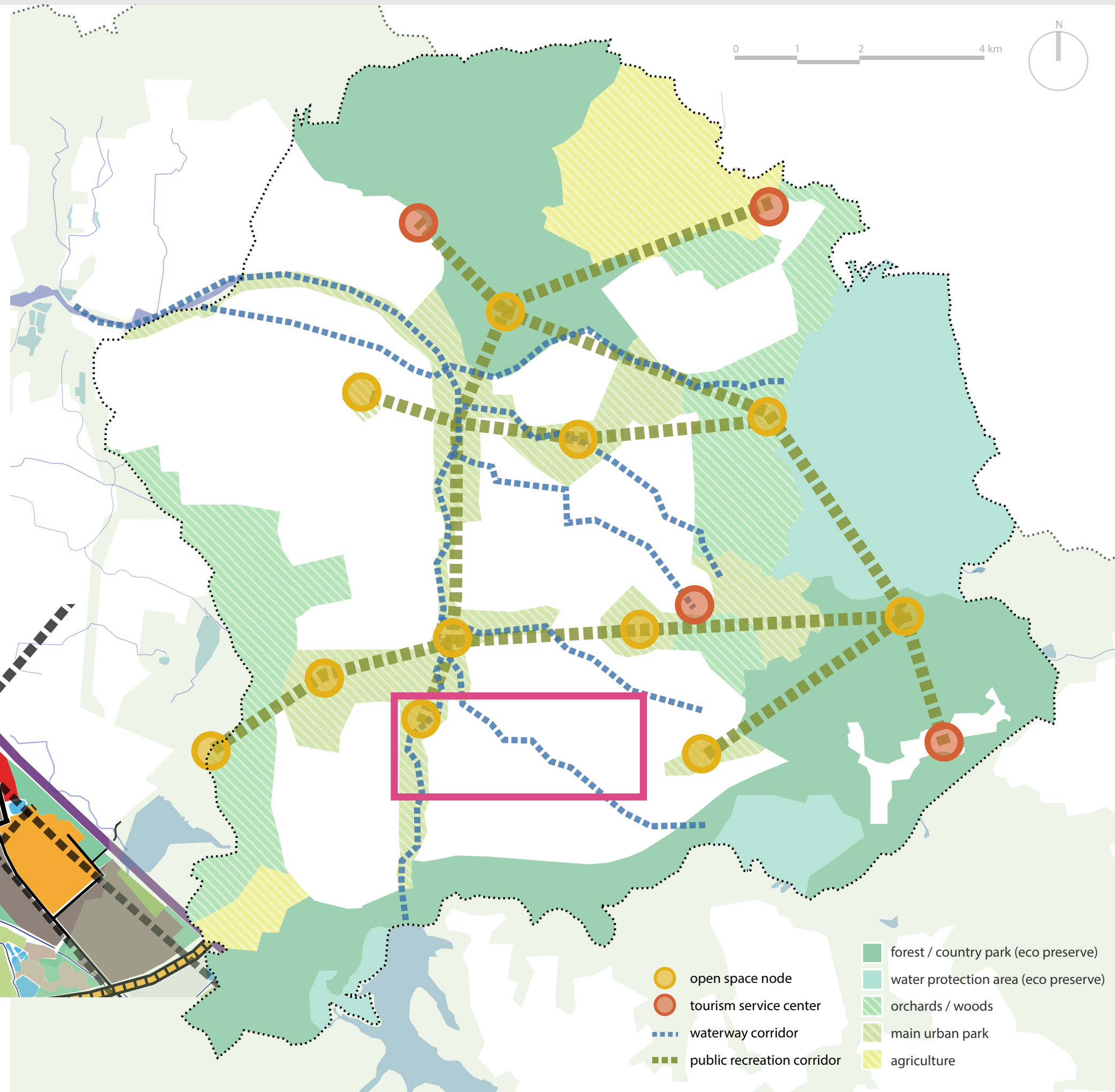
Large-scale masterplan

Main structure: road network

Separated blue & green

Infrastructure overrides green network

Ignore existing network

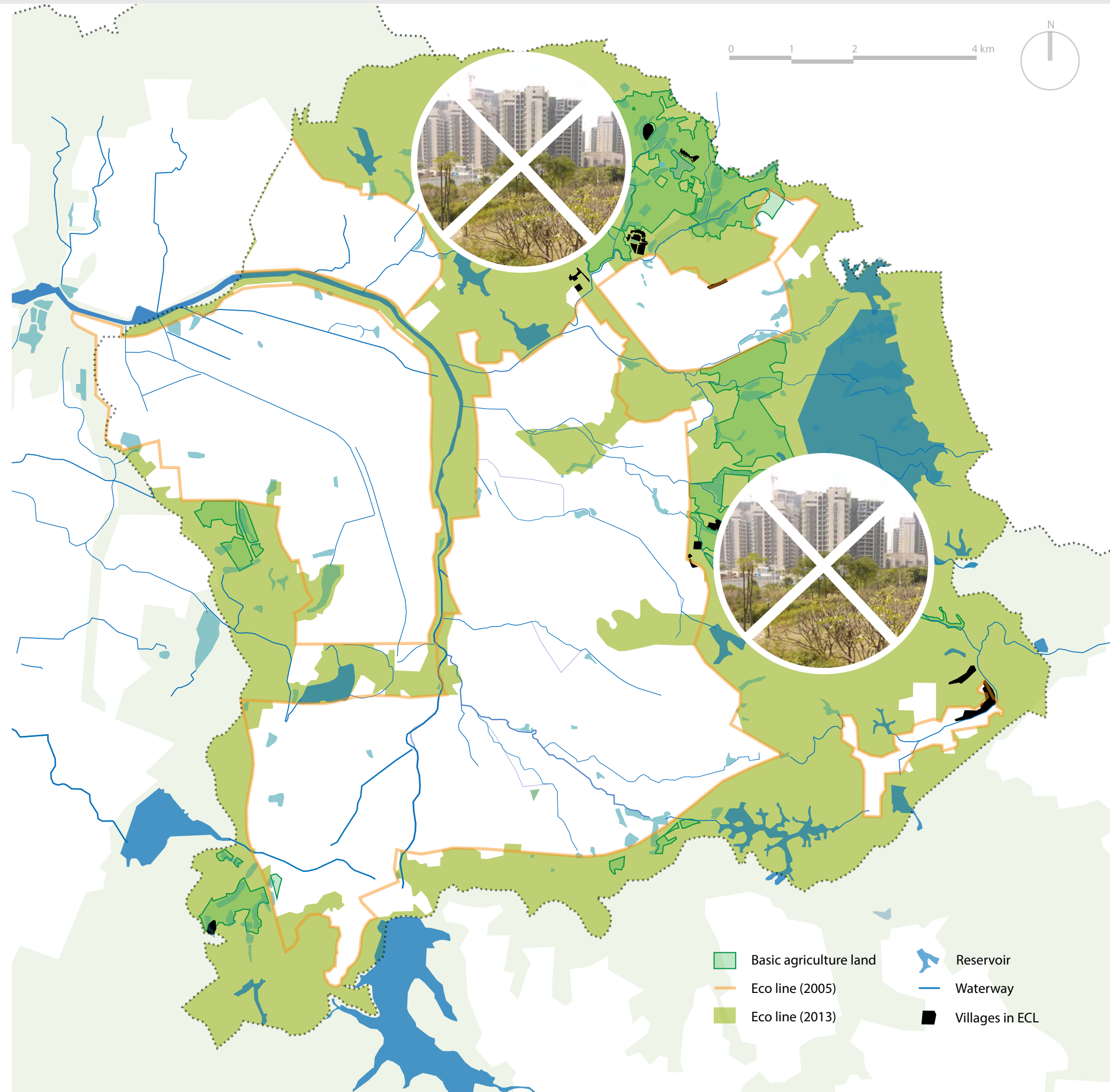


- open space node
- tourism service center
- waterway corridor
- public recreation corridor
- forest / country park (eco preserve)
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- agriculture

City-countryside separation

Ecology Control Line (ECL)

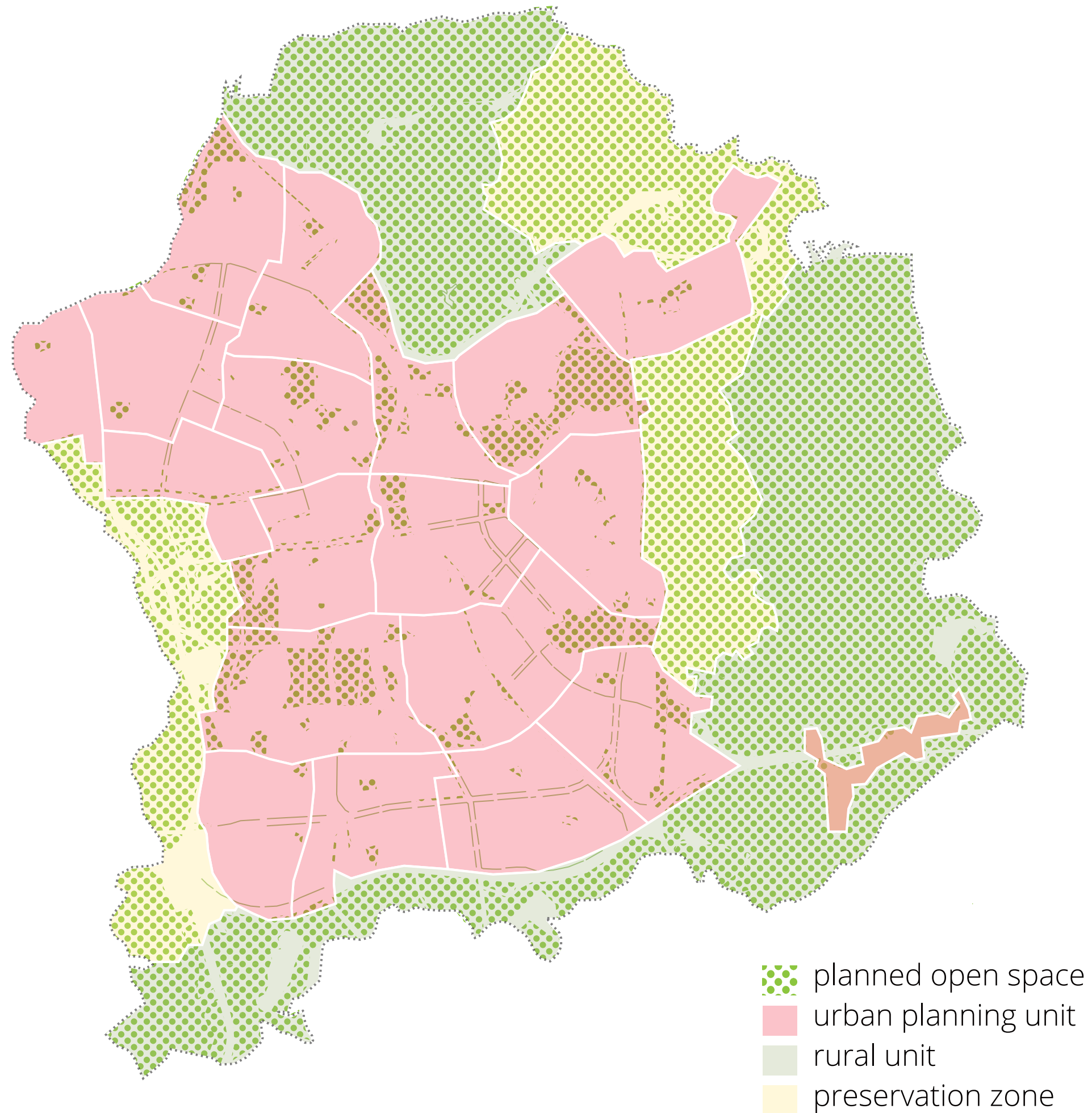
- no construction
- rural communities loss economic opportunities



City-countryside separation

Ecology Control Line (ECL)

- different management mode
- difficult to have integrative interface between city & countryside



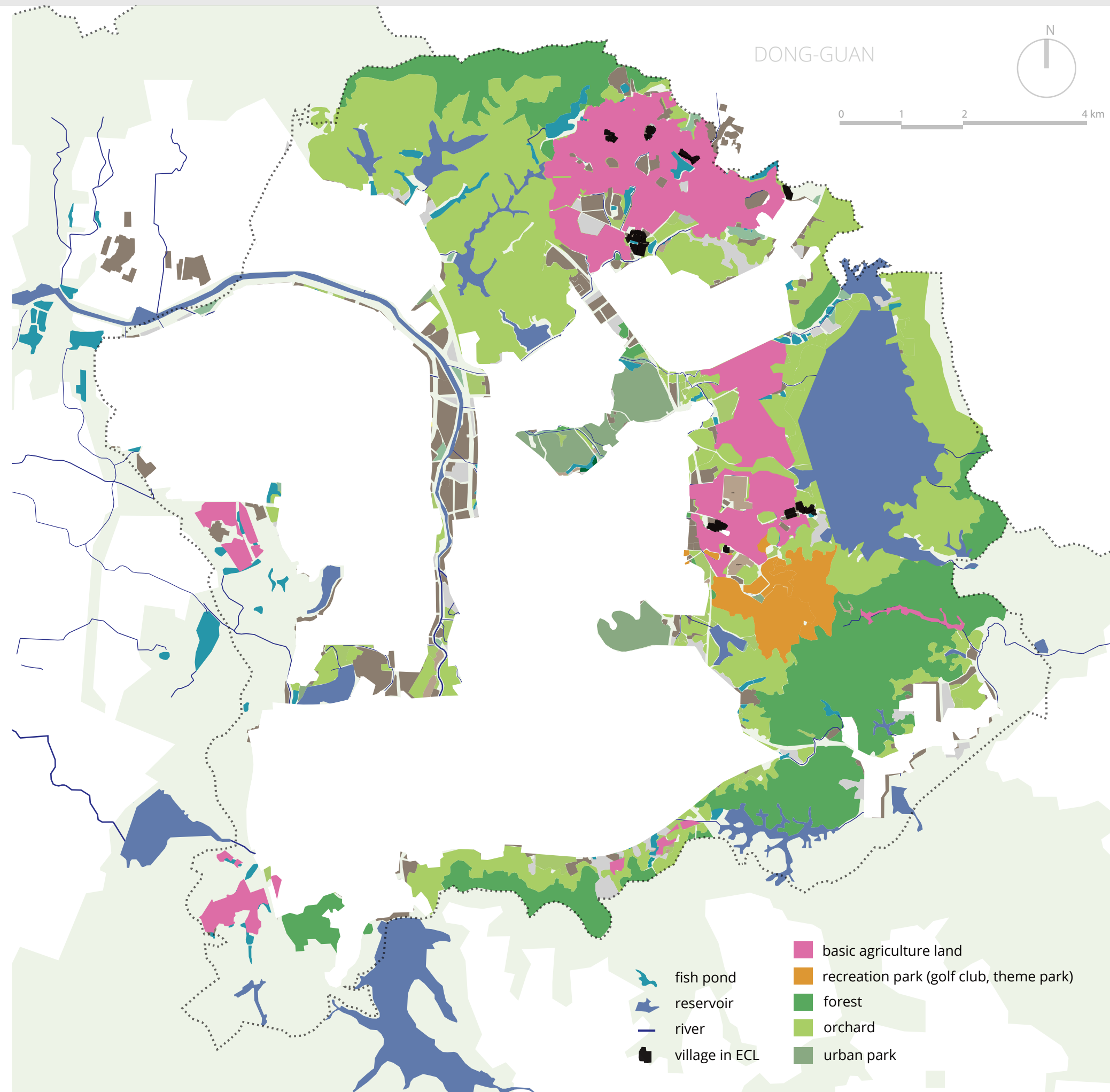
City-countryside separation

Ecology Control Line (ECL)

- different management mode
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Fragmented countryside

- lack overall vision for countryside



City-countryside separation

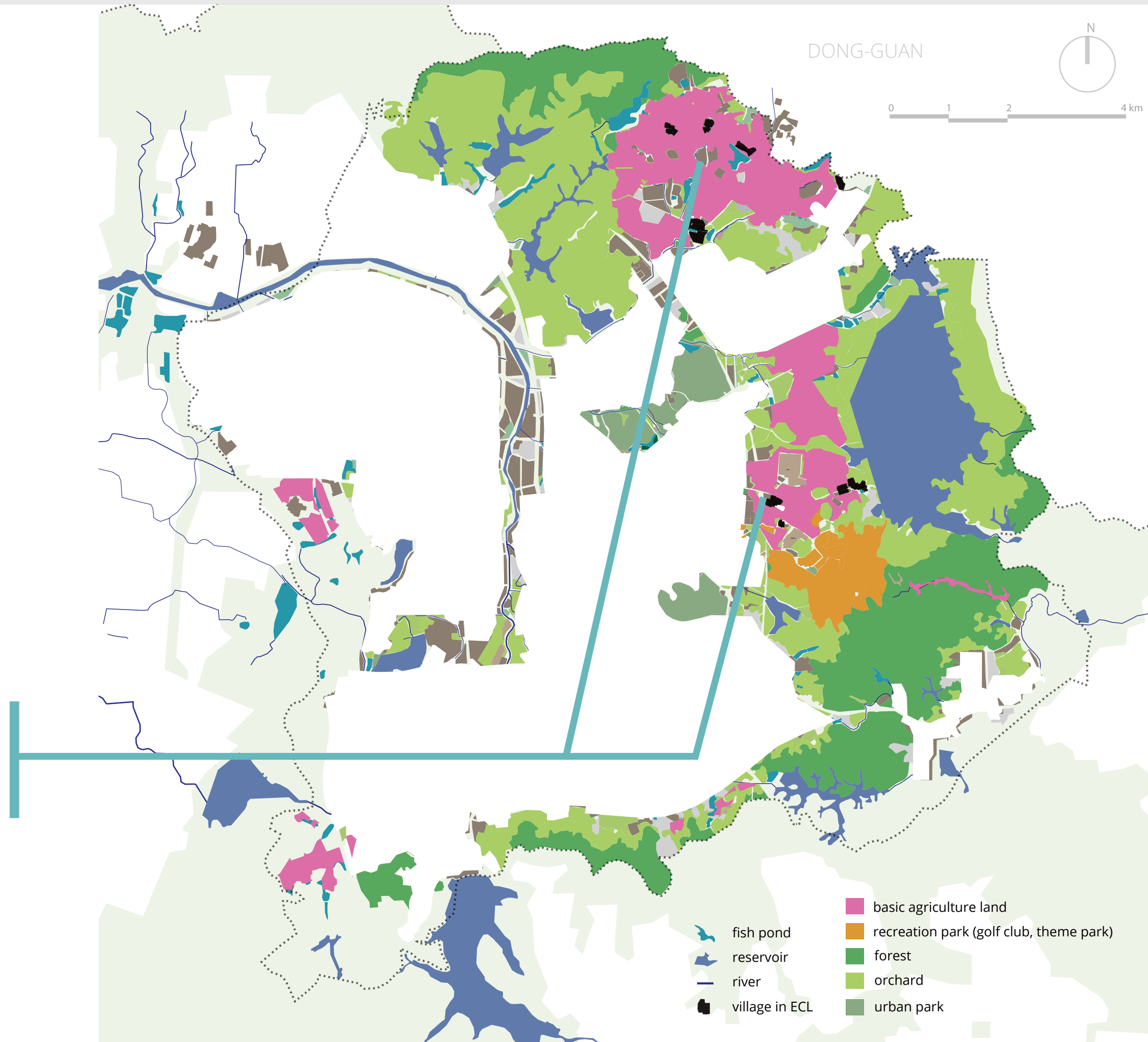
Ecology Control Line (ECL)

- different management mode
- difficult to have integrative interface between city & countryside

Fragmented countryside

- lack overall vision for countryside
- poverty in rural communities

Basic farmland: no land to farm
ECL: no urban construction

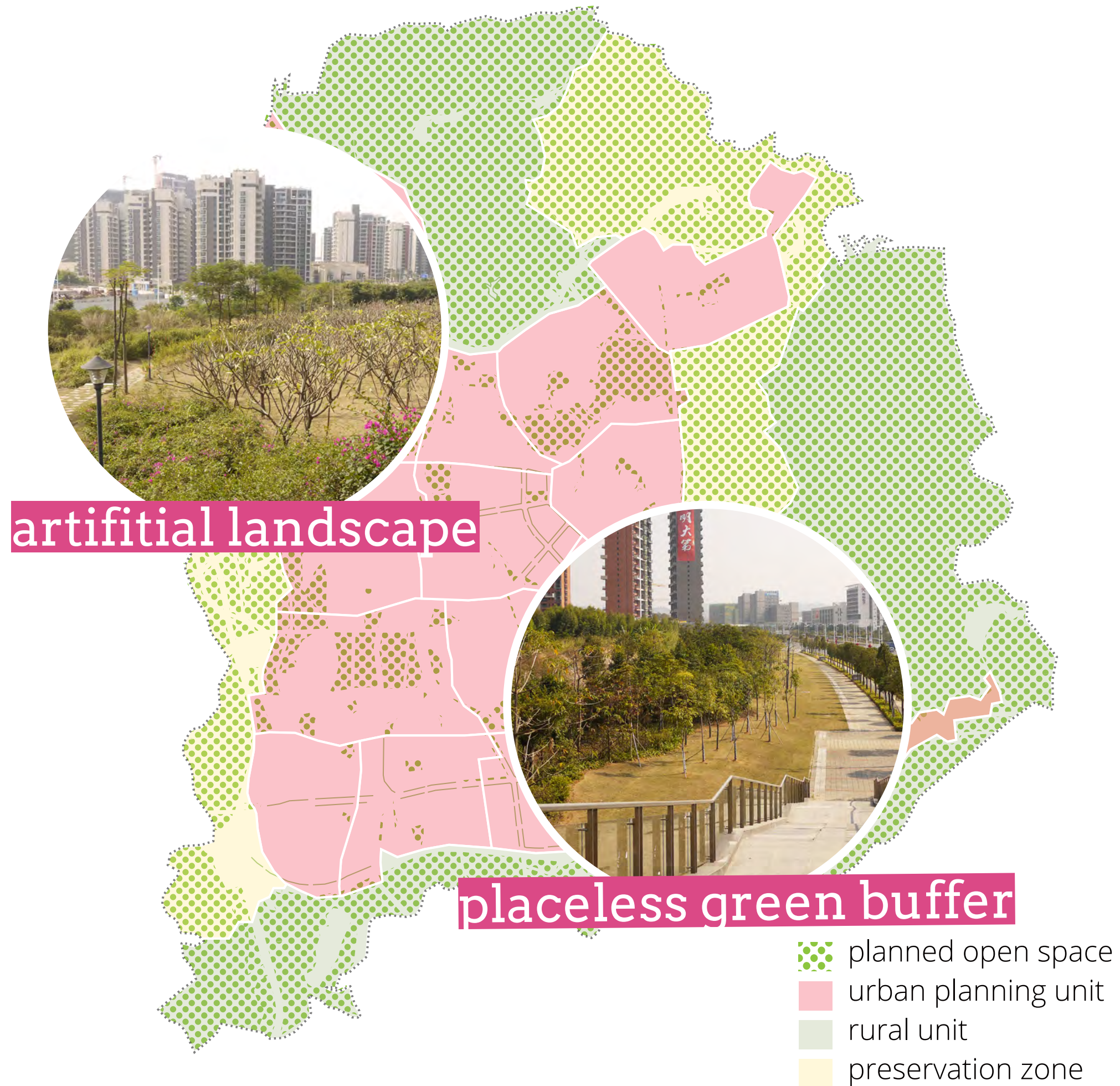


Placeless and costly open spaces

Different management mode

- Urban: beautification
- Investment in improving green spaces

2012-2014: 75 million euro



Placeless and costly open spaces

Urban: beautification

- Investment in improving green spaces
2012-2014: 75 million euro
- Central Park
*investment: 92 million euro
designed in 2008
construction not start yet*



Placeless and costly open spaces

Countryside

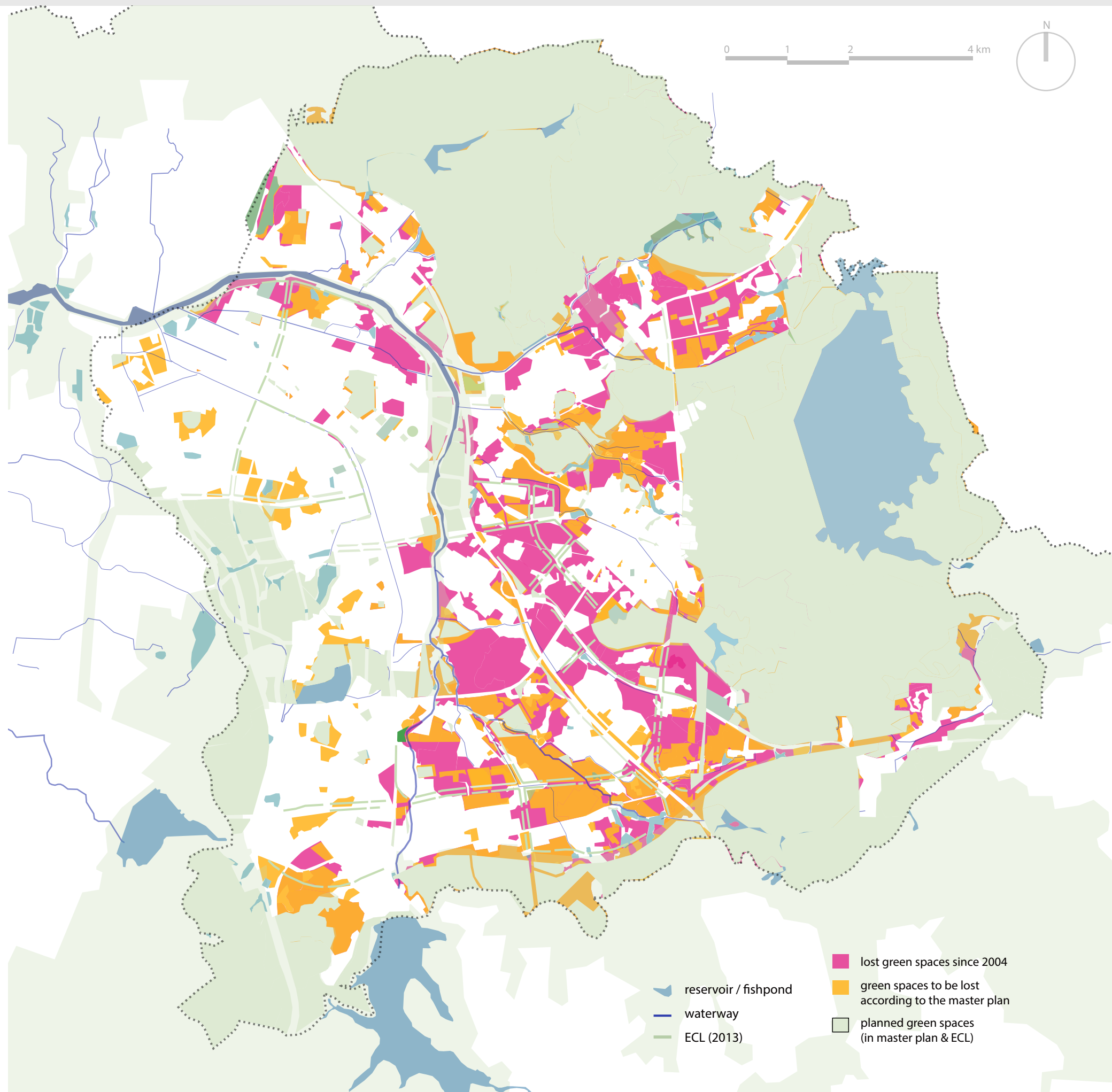
- Reduced diversity
- Not accessible for local communities



Rapid transformation

Farmland loss

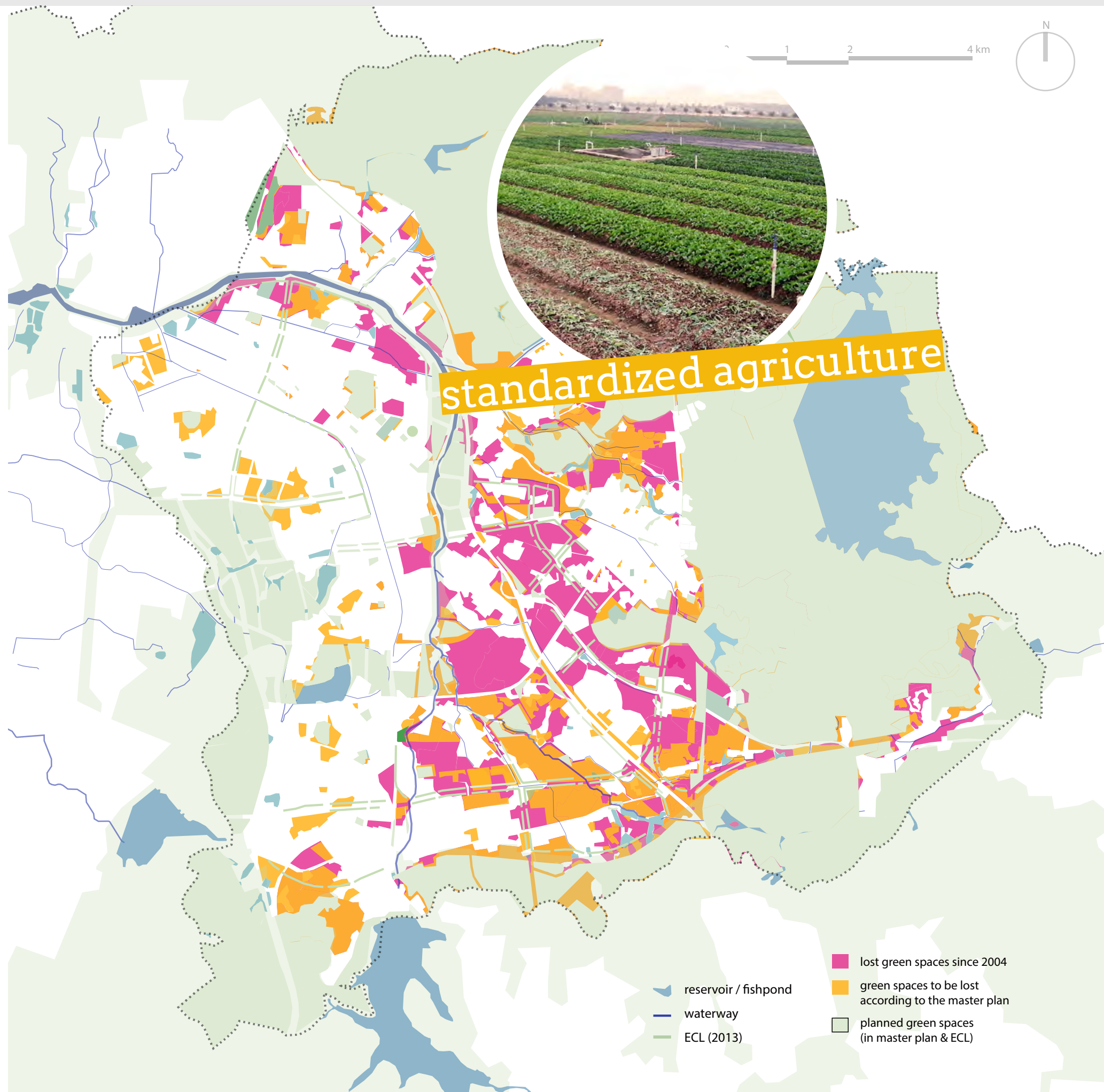
- urbanization



Rapid transformation

Farmland loss

- urbanization
- land consolidation (basic farmland)



standardized agriculture

Vulnerable farmers

- reservoir / fishpond
- waterway
- ECL (2013)
- lost green spaces since 2004
- green spaces to be lost according to the master plan
- planned green spaces (in master plan & ECL)

Rapid transformation

Farmland loss

- urbanization
- land consolidation (basic farmland)

Agri-Culture

- urban residents
- strong initiatives to farm





機會

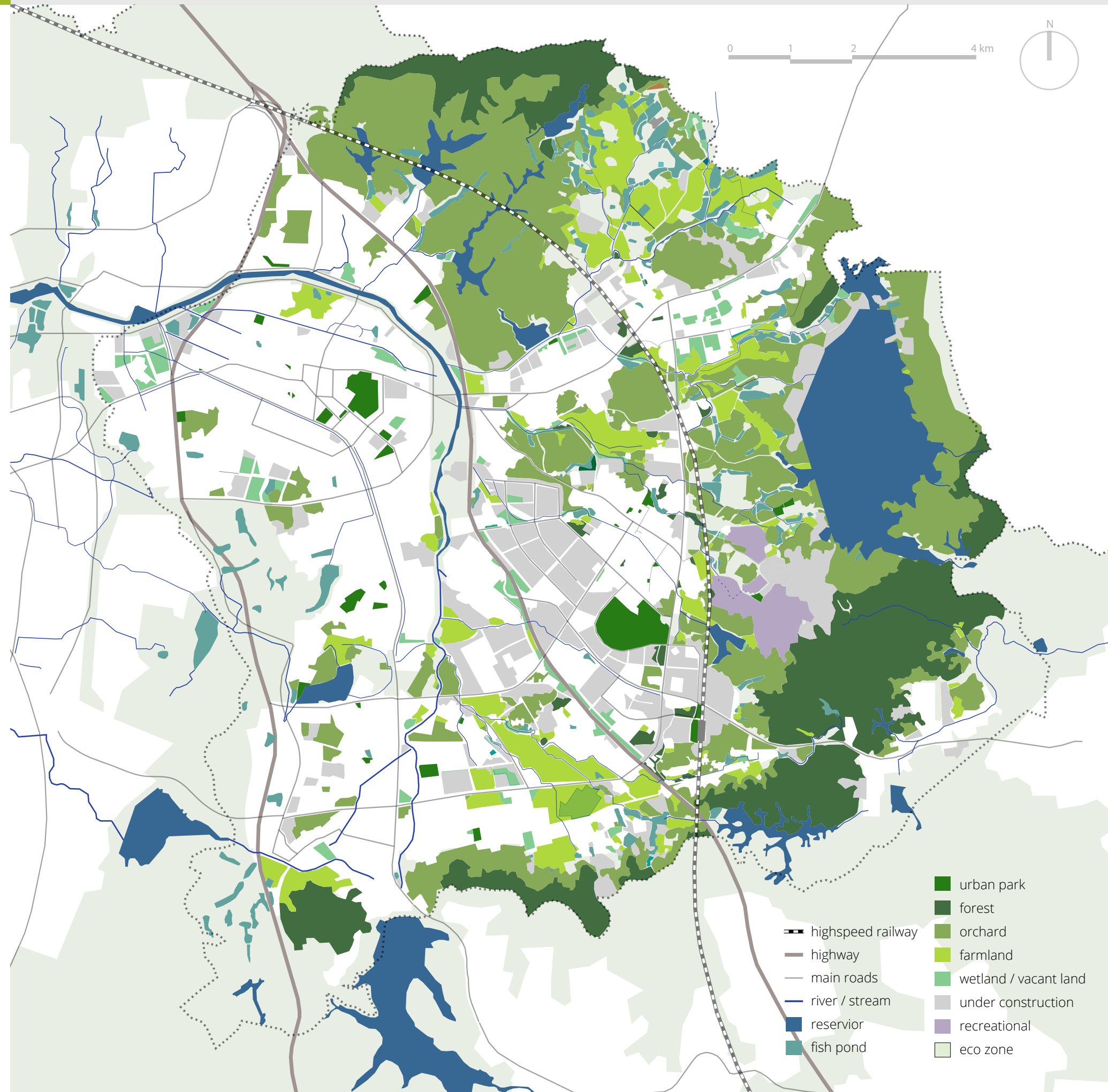
AGRICULTURE AS OPPORTUNITY

Agriculture as opportunity

The most widespread landscape element

- arable land / orchards / fish pond

Agricultural past



Benefits of agriculture

Coherent relation of human & nature

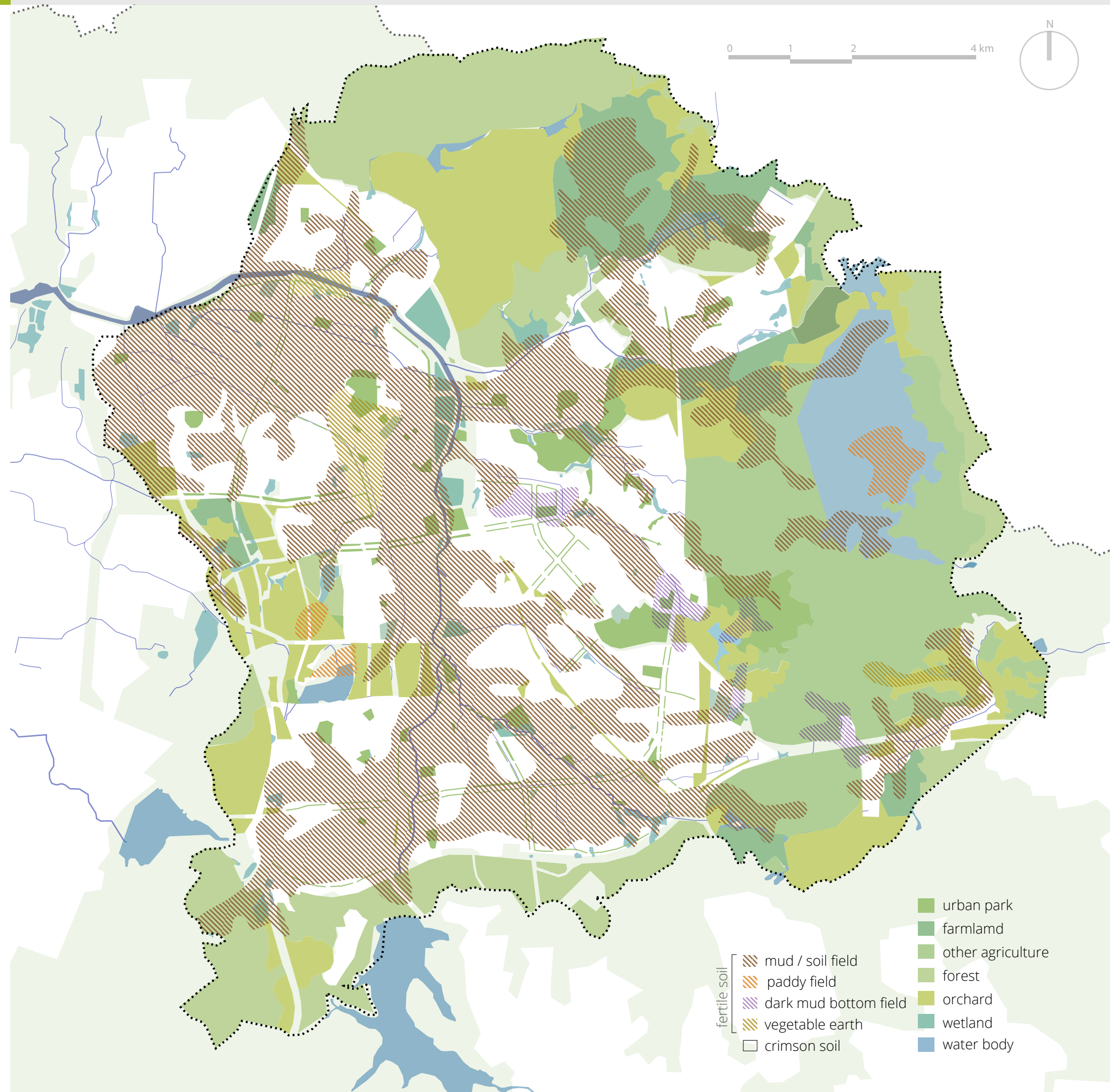
- coherence between soil, water & settlement



Benefits of agriculture

Coherent relation of human & nature

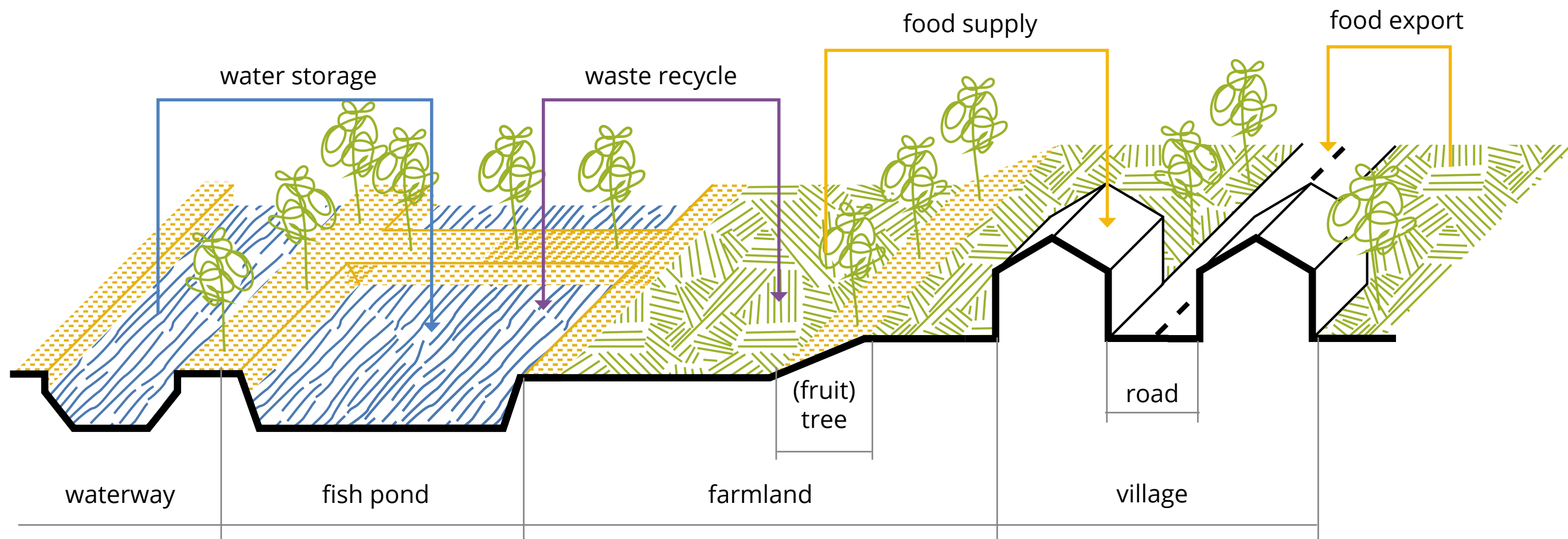
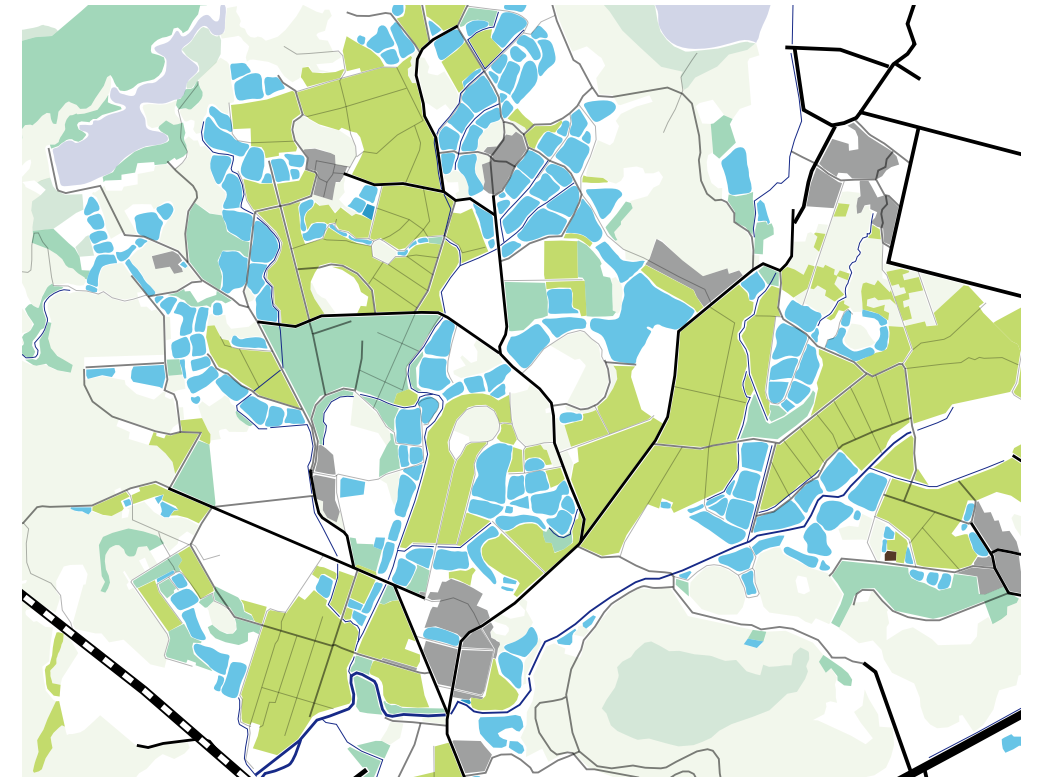
- coherence between soil, water & settlement



Benefits of agriculture

Coherent relation of human & nature

- coherence between soil, water & settlement
- diverse landscape



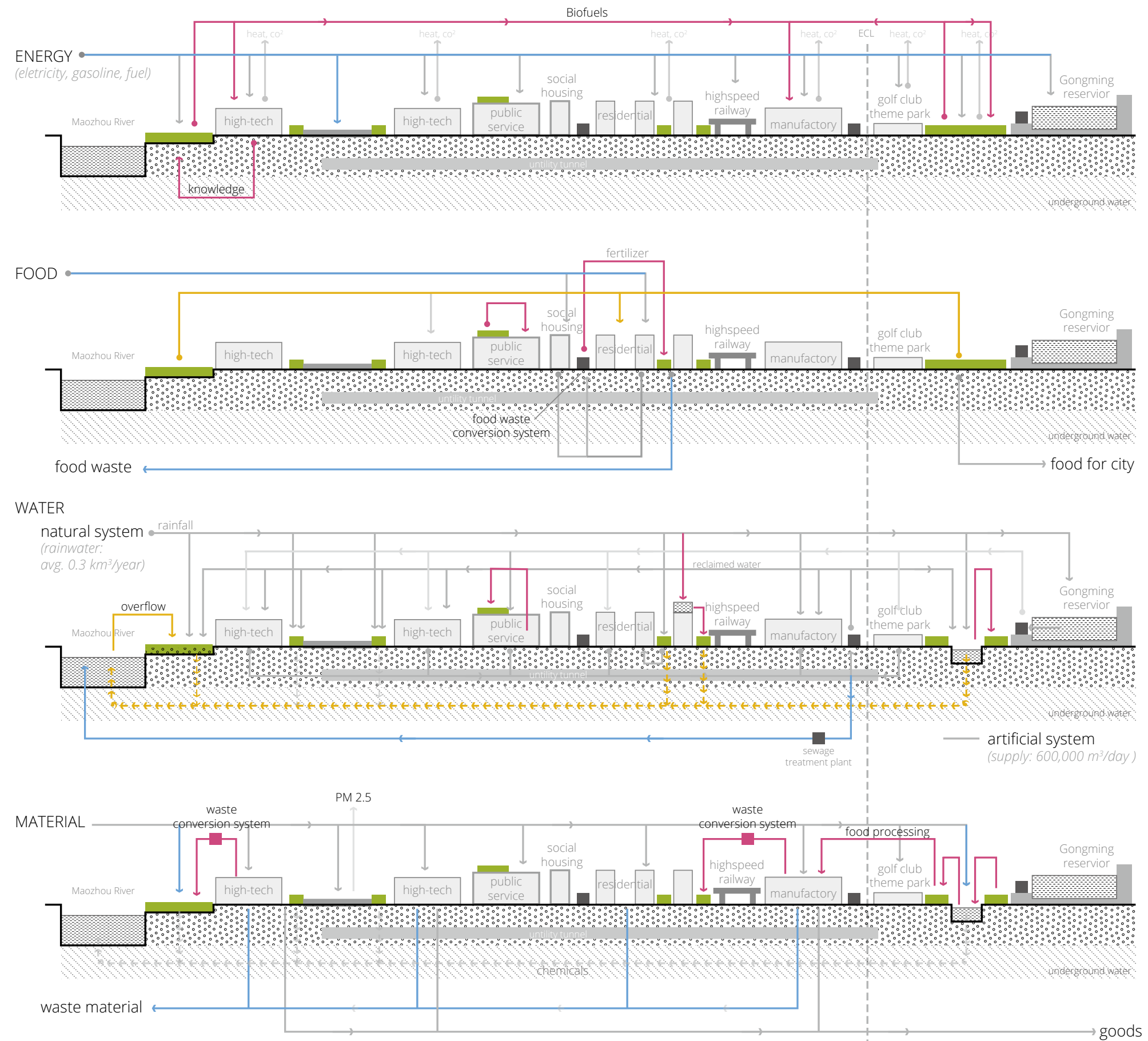
Benefits of agriculture

Coherent relation of human & nature

- coherence between soil, water & settlement
- diverse landscape
- urban metabolism

Adding agriculture into current scheme: localisation / decentralisation

→ new flow → less flow → more flow



Benefits of agriculture

Coherent relation of human & nature

Meaningful open space

Bottom-up forces included



Benefits of agriculture

Coherent relation of human & nature

Meaningful open space

Bottom-up forces included

Urban Agriculture: Multifunctionality

<i>Potential</i>		
Economic	Local economy	Employment in urban agriculture to reduce social inequity and poverty Supporting micro-enterprise providing services for agriculture
	Economic opportunity	Promoting a viable business model Higher profits due to proximity to densely populated area
Social	Food access, security	Affordable food for the urban poor Improving diet by provision of fresh and healthy food
	Interpersonal relationship	Social integration of disadvantaged groups and enhancing gender equity (UPA are mainly undertaken by women in some developing countries) Community development, social interaction, capacity building Provision of aesthetically pleasing landscape in and around cities
	Liveability & health	Involving city residents in growing and preparing food Open space for outdoor recreation and leisure Promoting awareness of food, health and the environment Encouraging physical activities by farming
Environmental	Resilience	Increase cities' adaptation to climate change providing natural buffer against natural disasters Water infiltration for flood control and groundwater replenishment Urban micro-climate moderation (greening, air and heat) Urban biodiversity
	Low-carbon	Urban waste recycling Production of local food to reduce food miles
Management		More efficient management of open space Productive use of vacant land

Agriculture filling the gap



Coherent relation of human & nature
Meaningful open space
Bottom-up forces included
Multifunctionality

Integration of agriculture



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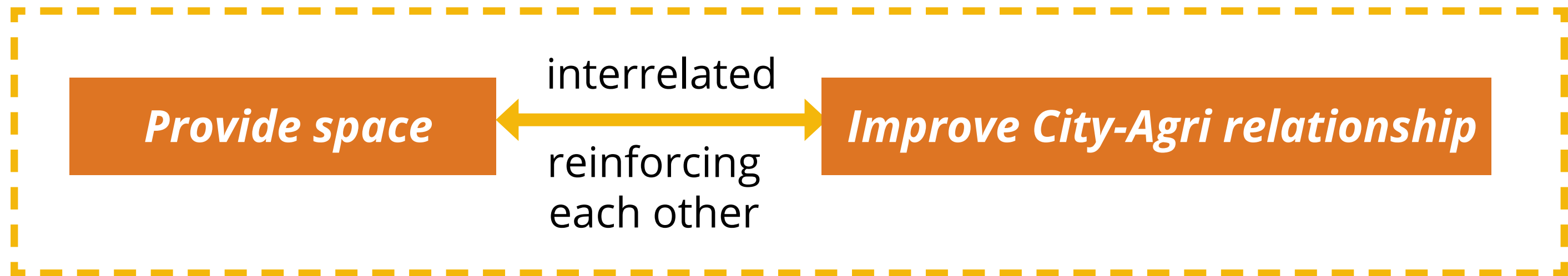


理論

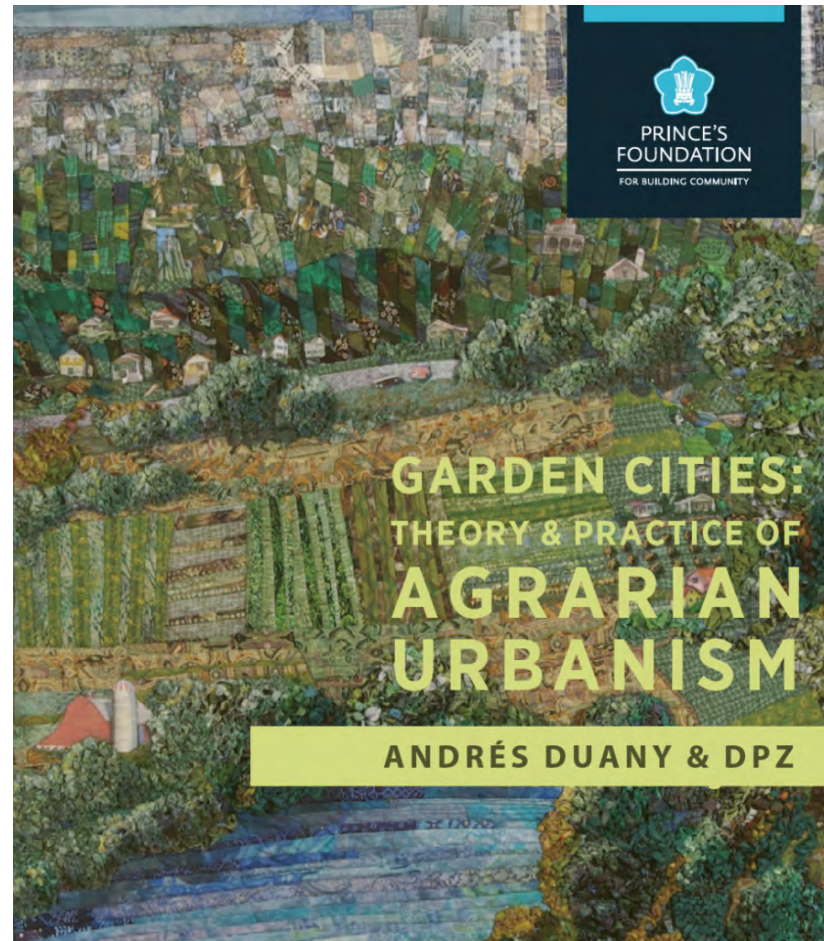
THEORETICAL FRAMEWORK

Planning & Design in facilitating Urban Agriculture

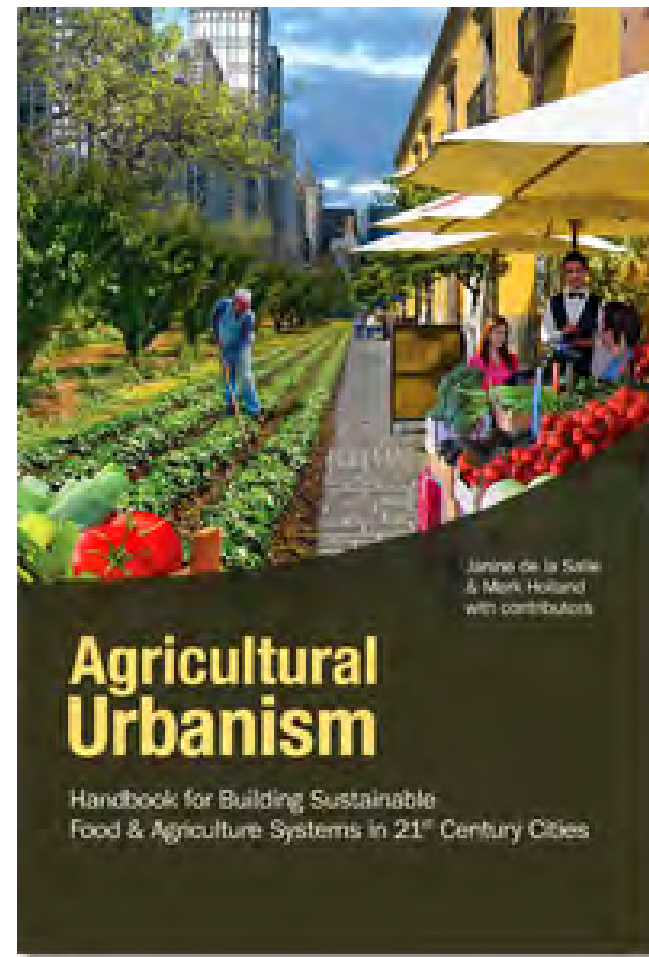
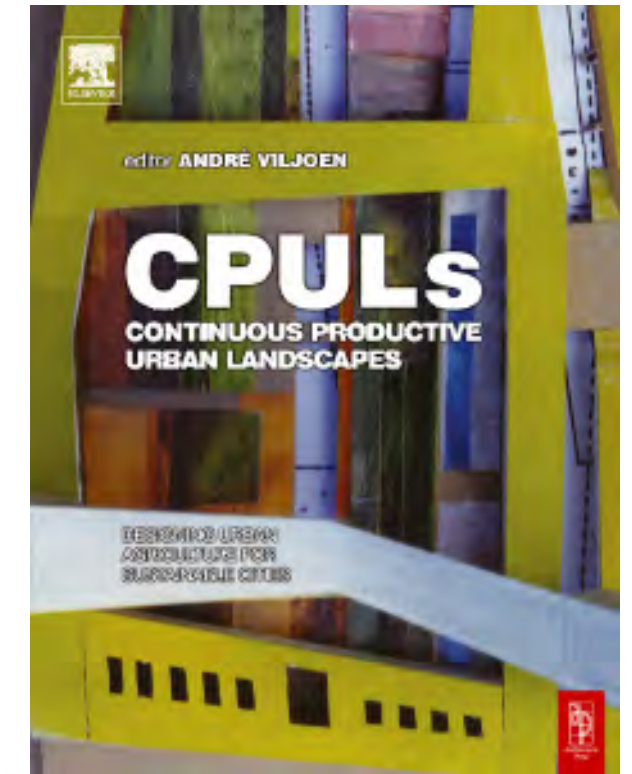
PLANNING & DESIGN



Urban form and agriculture



FARMING THE CITY

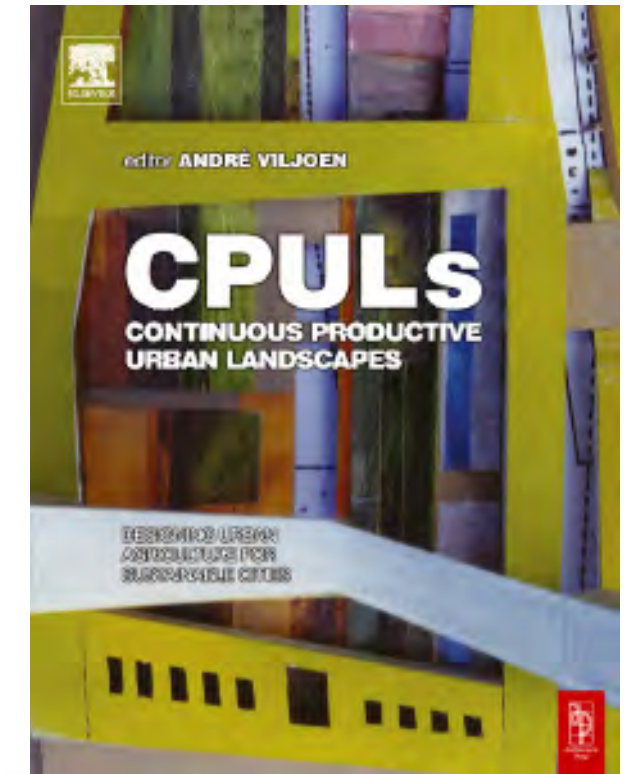


Urban form and agriculture

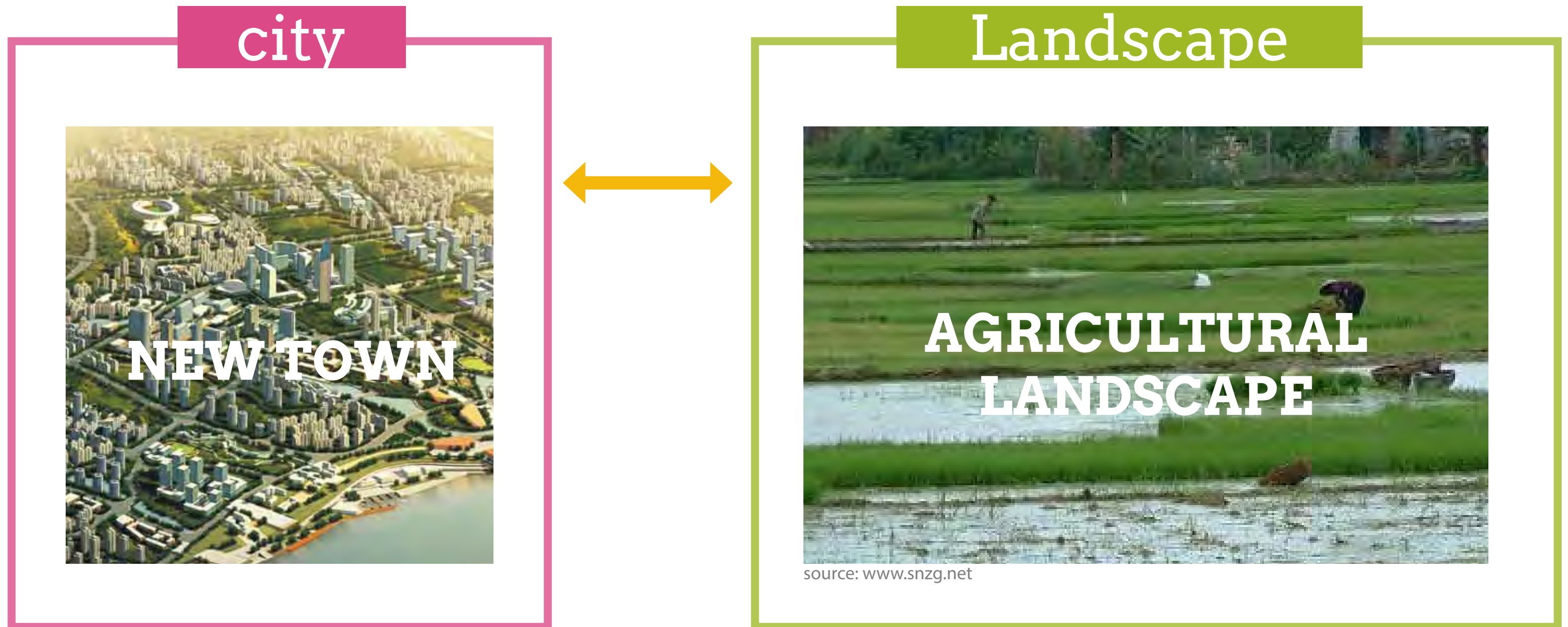
Dynamic Transformation Process



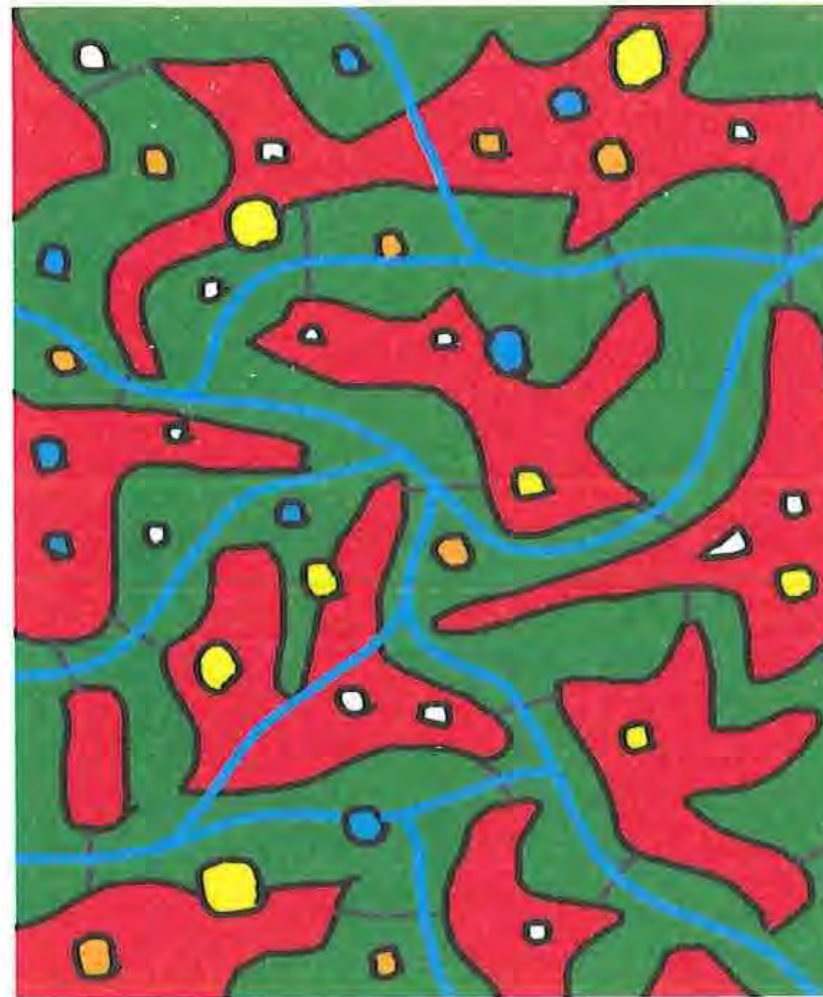
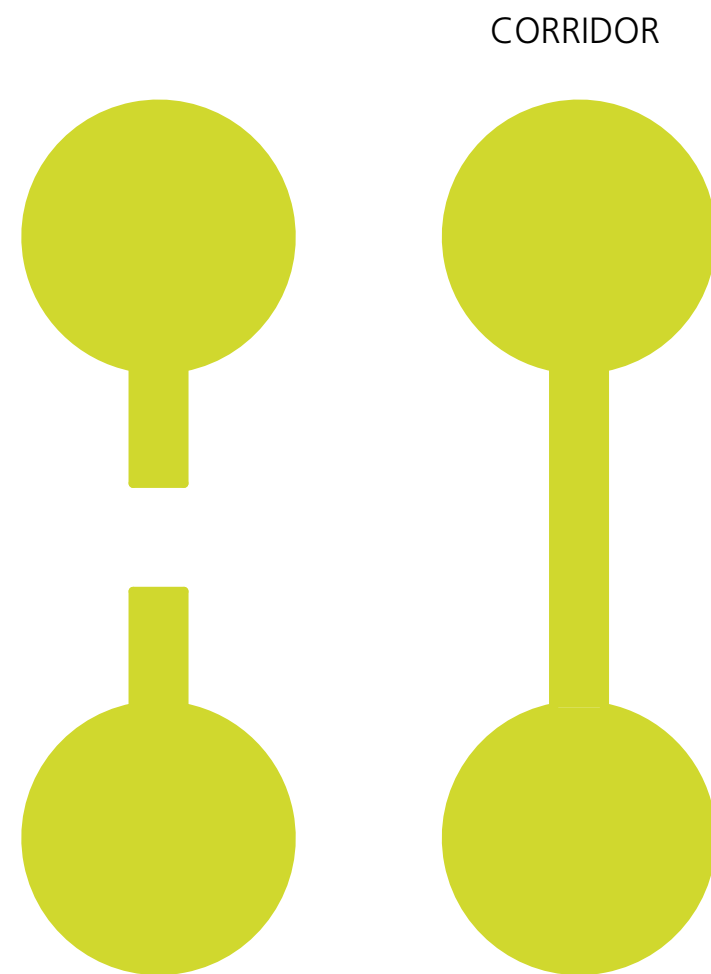
FARMING THE CITY



City-landscape relationship

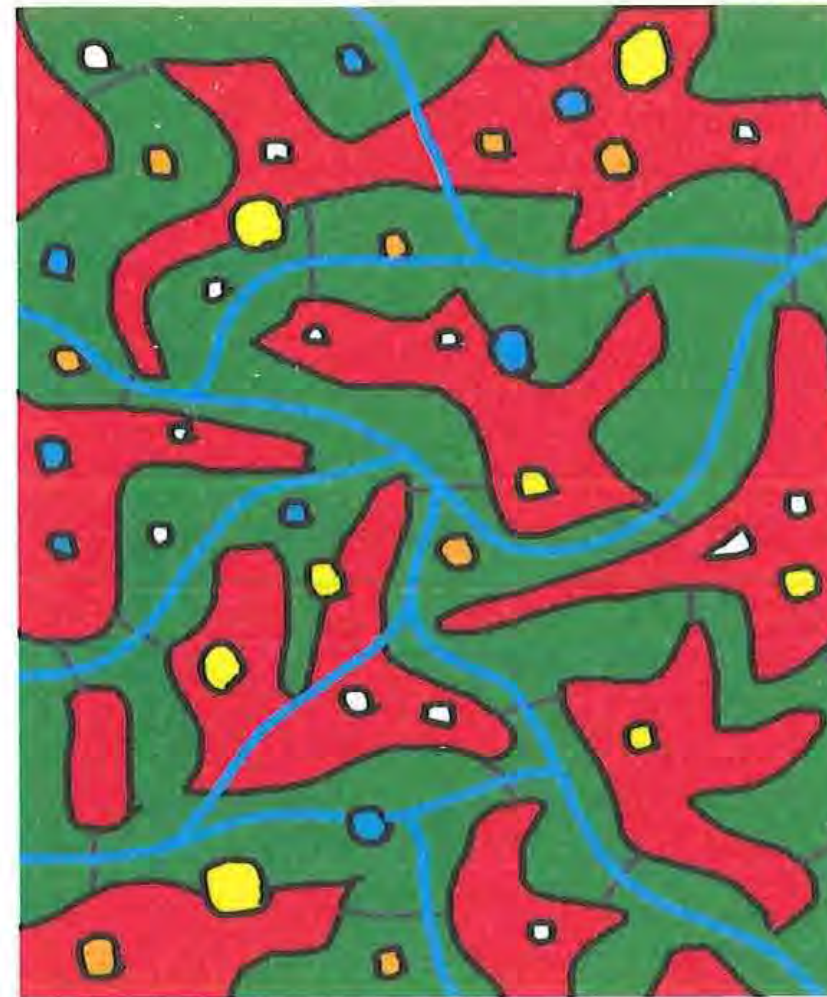
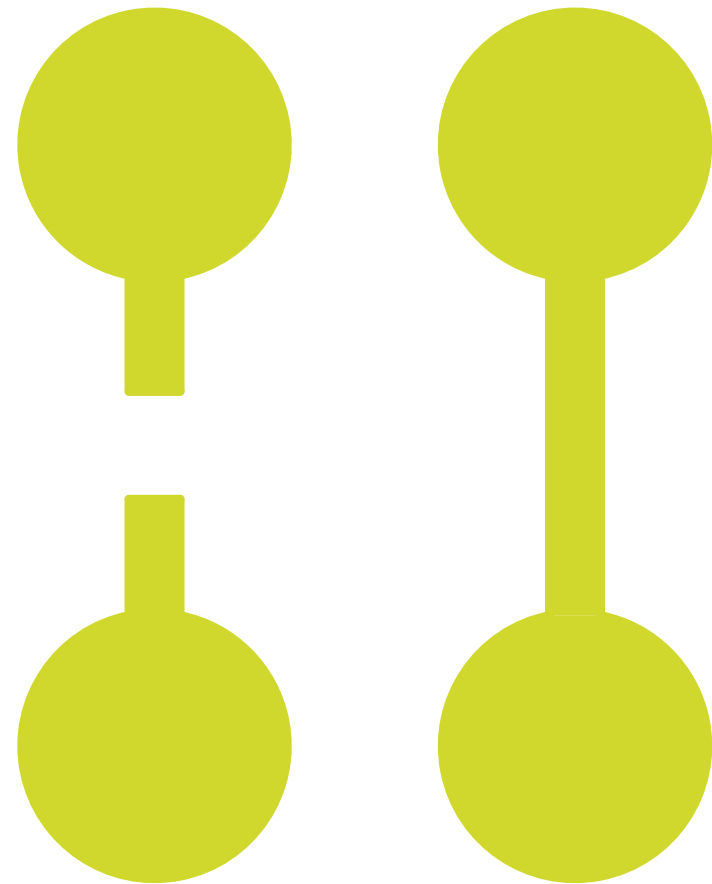


Lnadscape approach

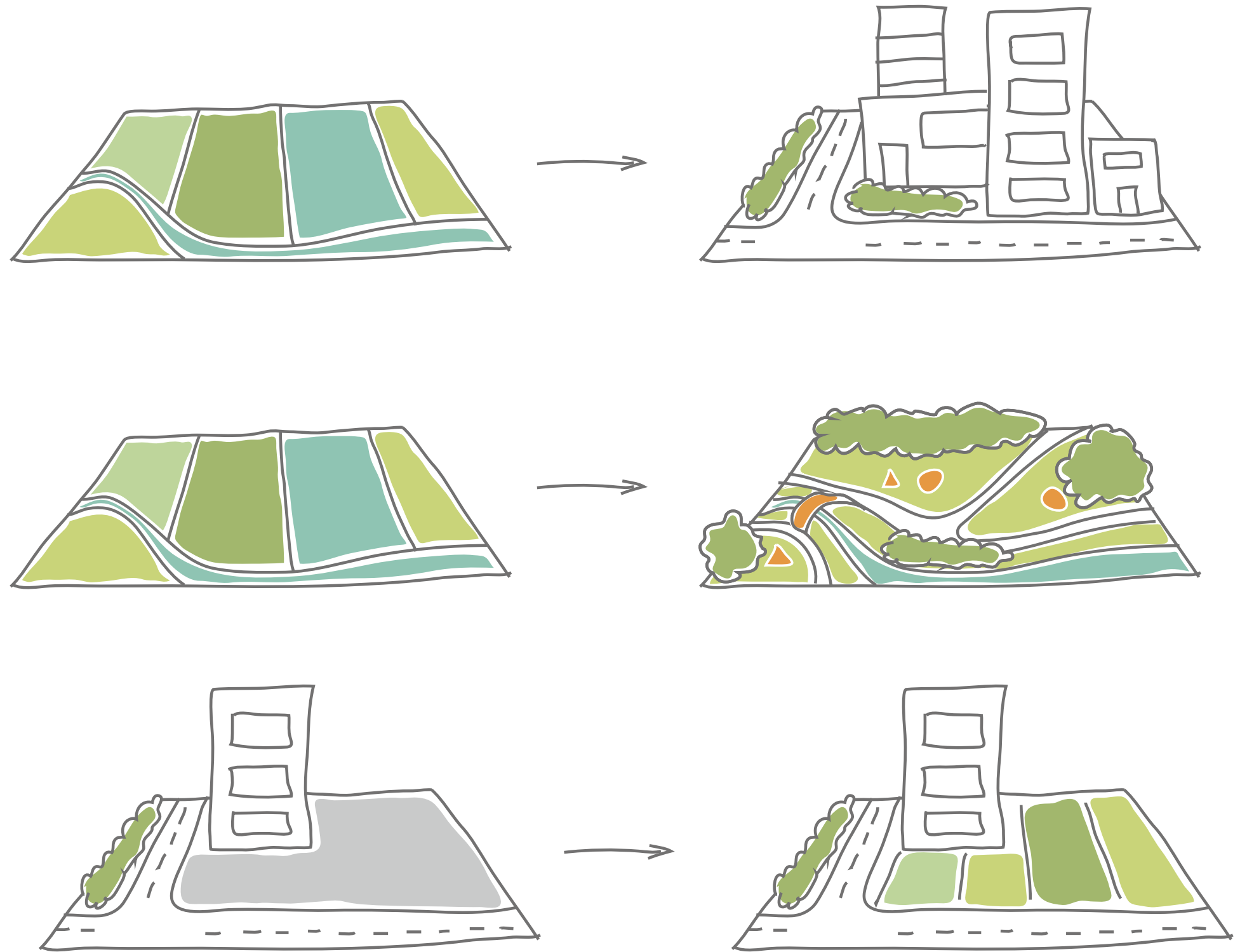


Agriculture as medium

CORRIDOR

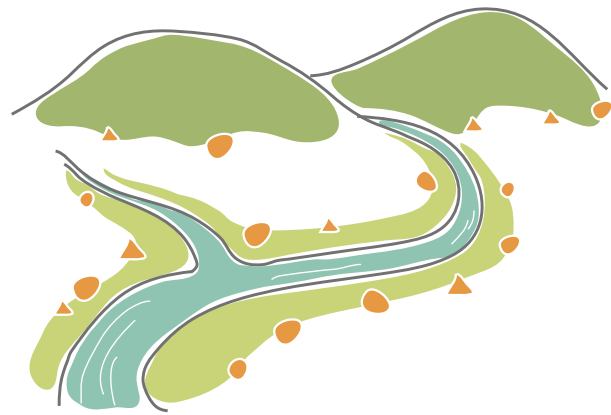


Agriculture city transformation

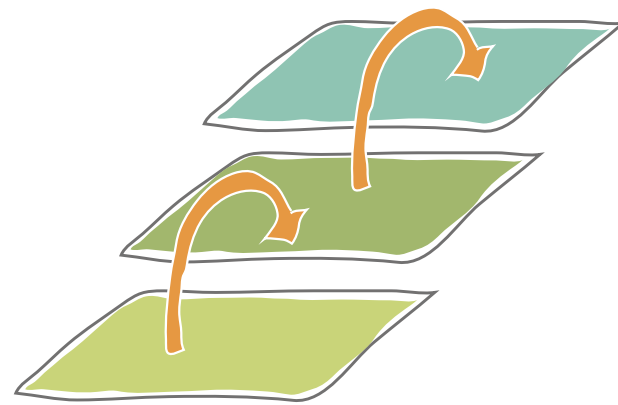


Agricultural Landscape Approach

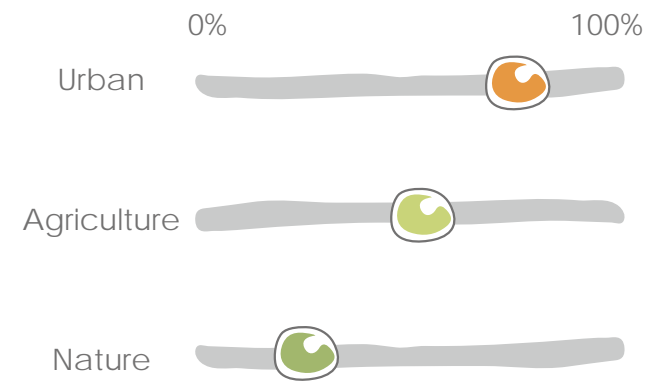
Ecological green network



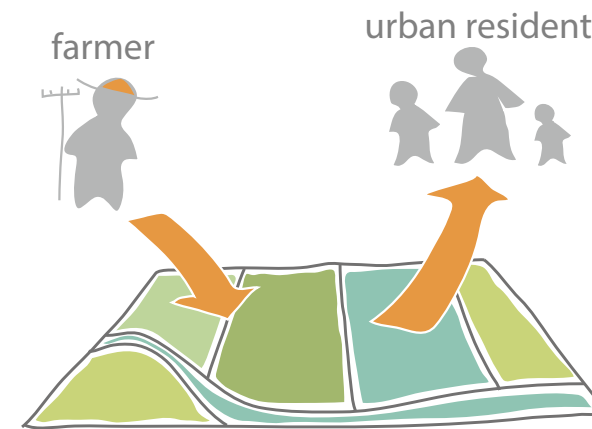
Process over time



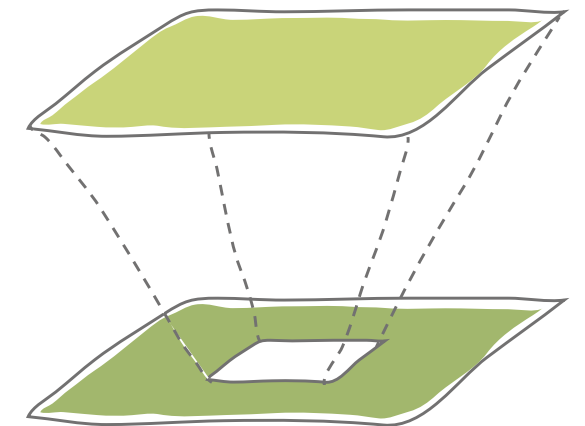
Landscape characteristics



Relevant for people

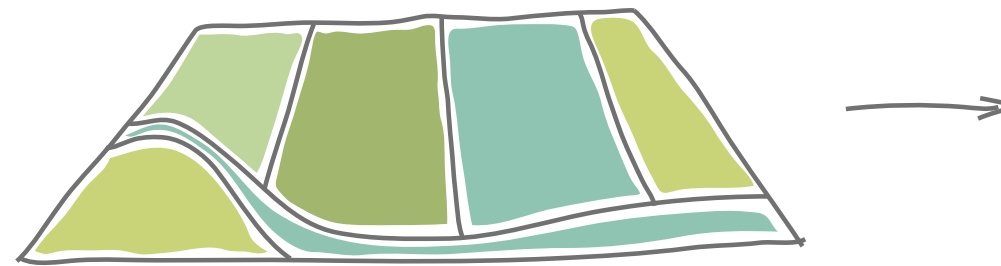


Multi-scalar framework

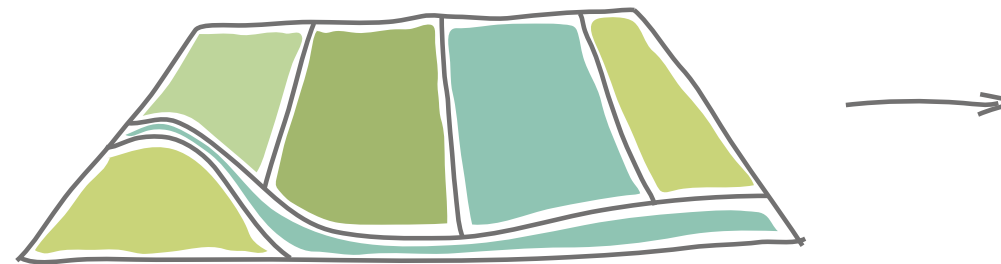


Sustainable agriculture practices

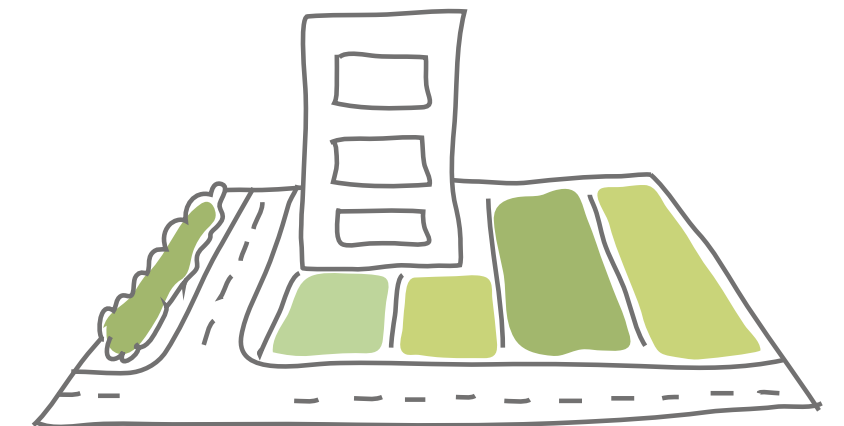
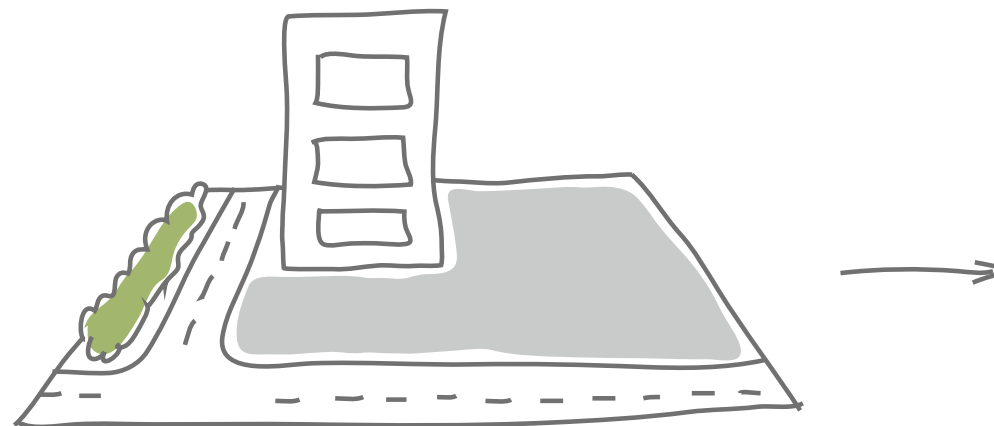
- gain knowledge of the ecosystem
- moderate impact on people



- ecosystem services
- recreational and educational amenities



- engage communities



Sustainable agriculture practices

<i>Layer</i>	<i>Relevant land quality</i>	<i>Current land use types</i>
Agriculture produce (P)	Soil Topography Hydrography Environmental hazards Current land use	1. Temporary crops 2. Permanent crops 3. Livestock 4. Fishery 5. Non-food crops
Non-agricultural produce (N)	Accessibility (infrastructure) Proximity to residential and public services Proximity to industrial area Environmental hazards	1. Recreation / Education
Management (F)	Size of unit Temporarity Proximity to residential and public services Accessibility (infrastructure)	1. Subsistence farming gardens 2. Informal small-scale family farms 3. Formal small-scale family farms 4. Large-scale agribusiness 5. Recreation agri-park

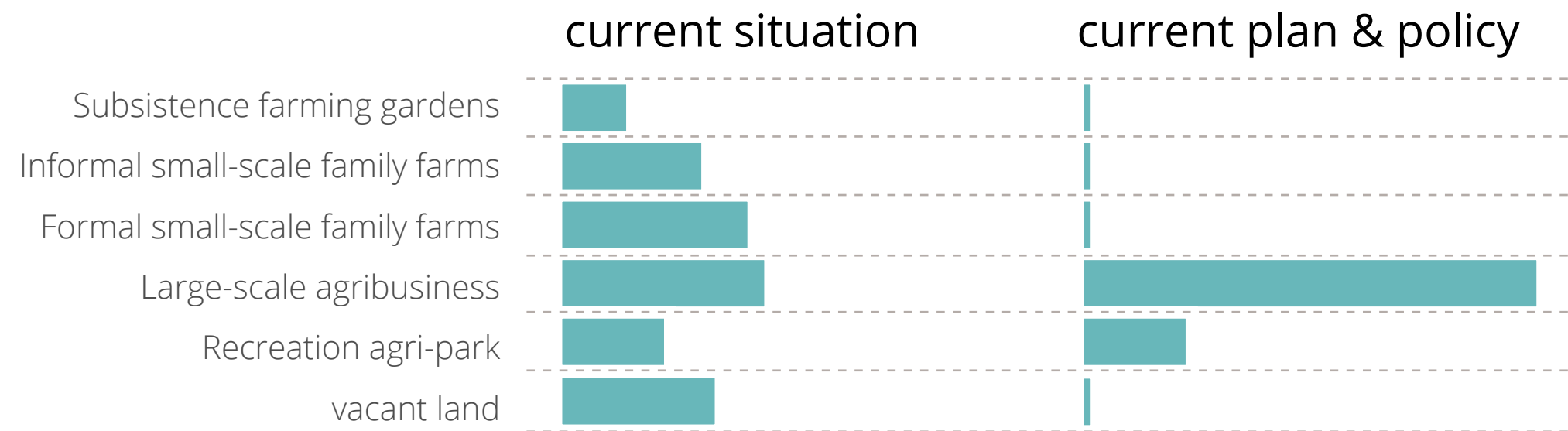
Chart 2. Three layers for defining land use types.(Pink: new land use types)

Sustainable agriculture practices

<i>Layer</i>	<i>Relevant land quality</i>	<i>Current land use types</i>	<i>Improved land use types</i>
Agriculture produce (P)	Soil Topography Hydrography Environmental hazards Current land use	1. Temporary crops 2. Permanent crops 3. Livestock 4. Fishery 5. Non-food crops	1. Temporary crops 2. Permanent crops 3. Livestock 4. Fishery 5. Non-food crops
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Chart 3. Three layers for defining land use types.(Pink: new land use types)

Sustainable agriculture practices



Improved land use types

1. Temporary crops
2. Permanent crops
3. Livestock
4. Fishery
5. Non-food crops

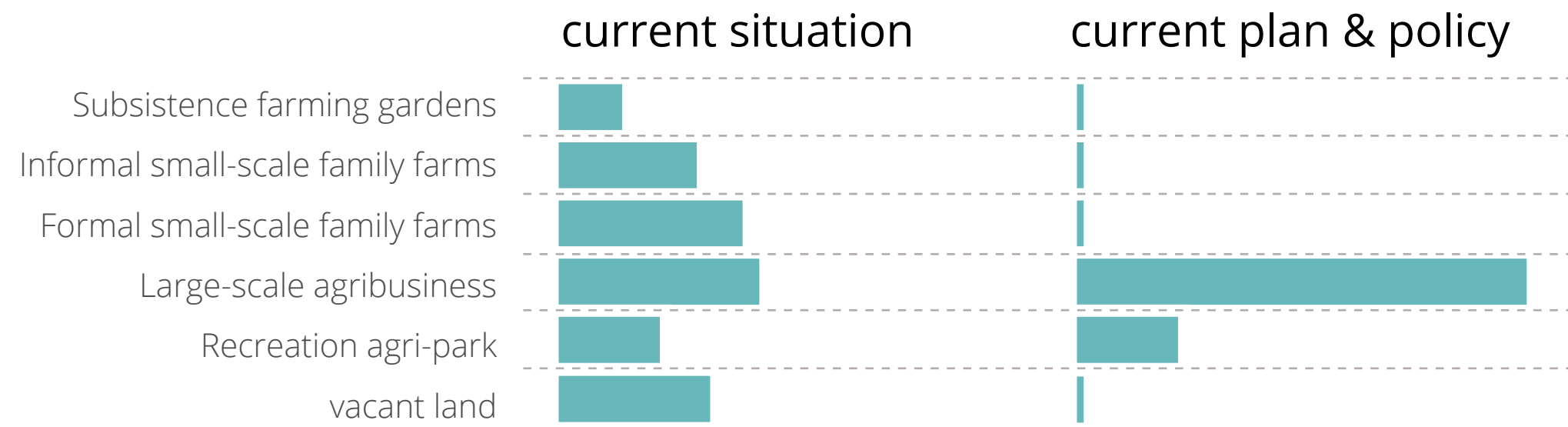
1. Recreation / Education
2. **Ecosystem service**

1. Subsistence farming gardens
2. Small-scale family farms
3. **Medium-scale family farms**
4. **Collective farms**
5. Large-scale agribusiness
6. Recreation agri-park

*“**Small farms and urban farms** are **more likely** than large, industrial farms to use **sustainable** agricultural practices.”*

D. A. Denckla, 2013

Sustainable agriculture practices



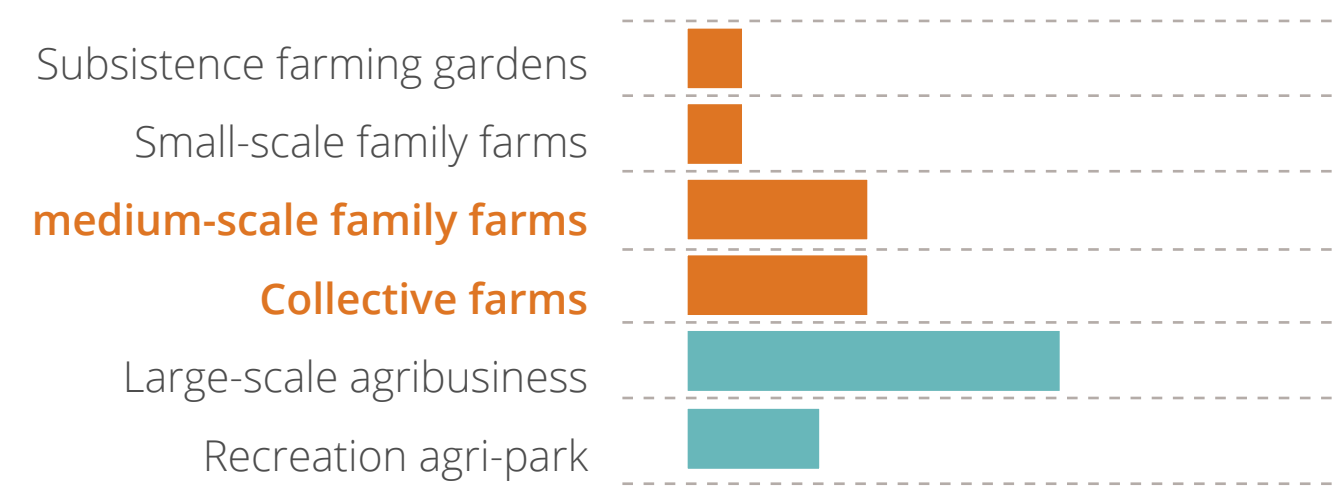
Improved land use types

1. Temporary crops
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1. Recreation / Education
2. **Ecosystem service**

1. Subsistence farming gardens
2. Small-scale family farms
3. **Medium-scale family farms**
4. **Collective farms**
5. Large-scale agribusiness
6. Recreation agri-park

Proposed Scenario



Local Involved

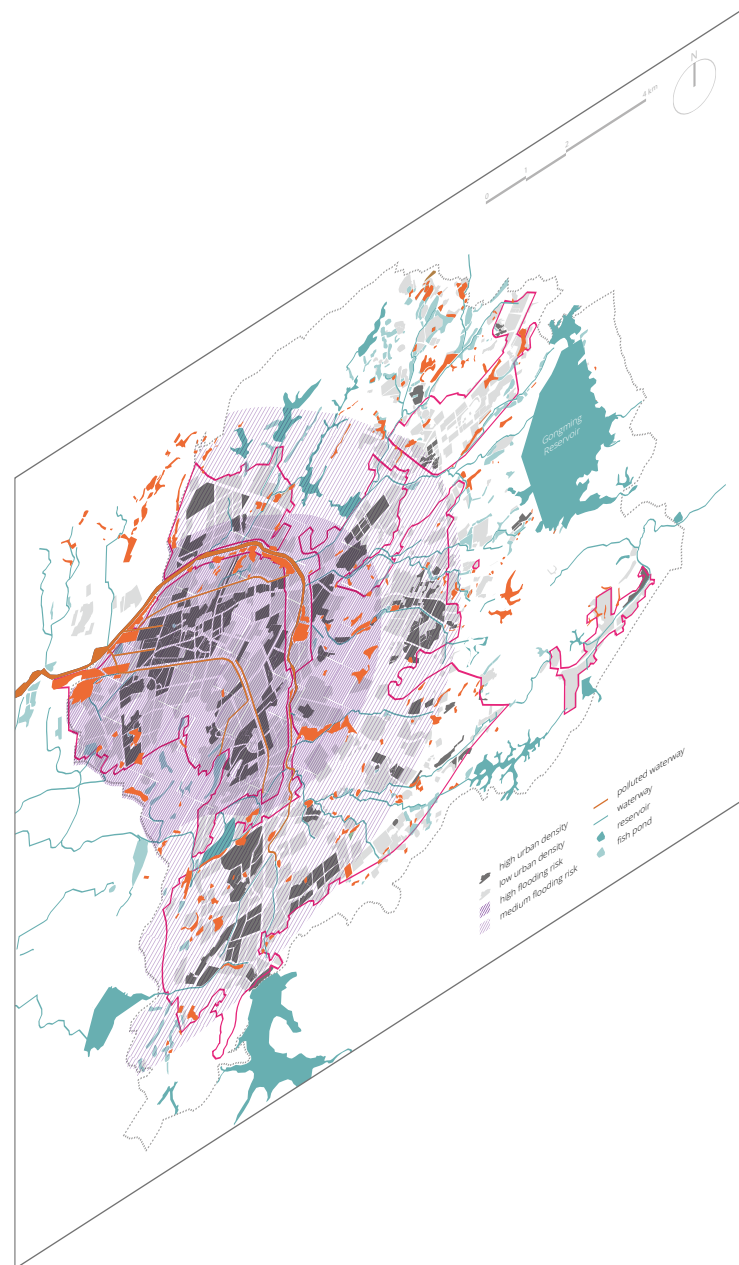


構架

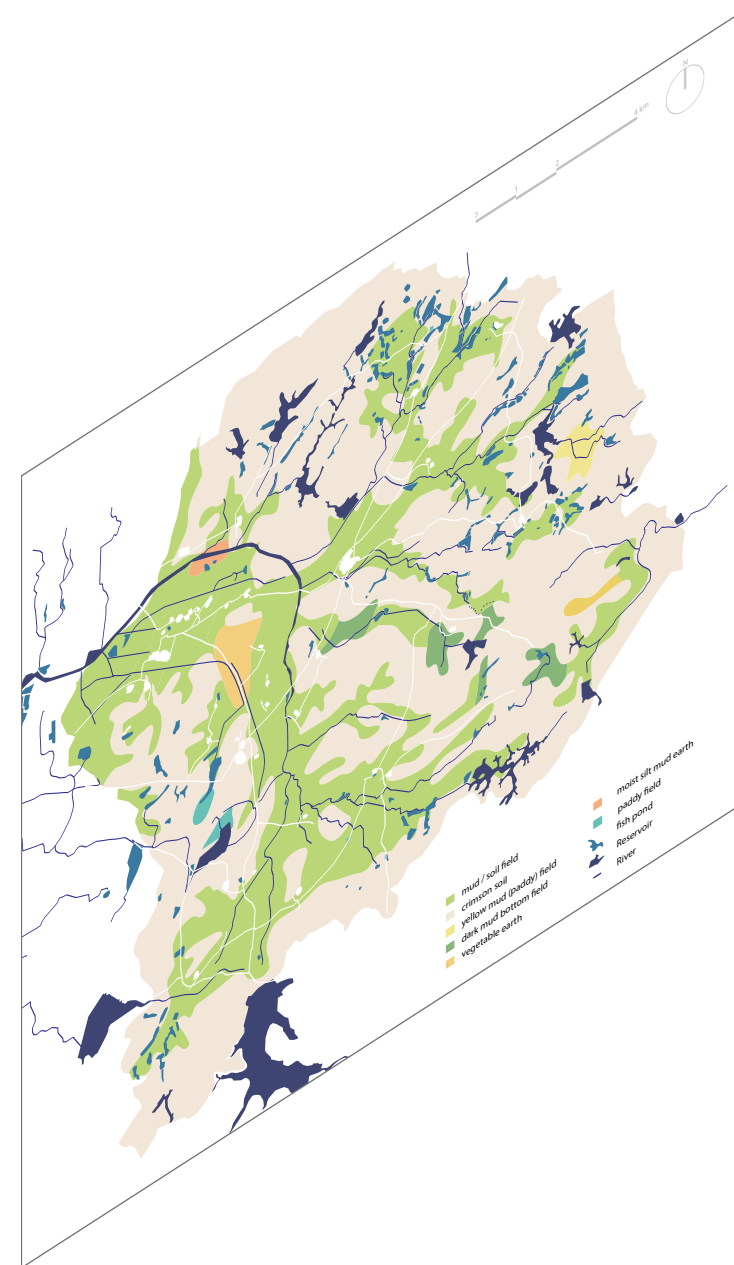
CITY-SCALE DESIGN

Spatial structure & zoning

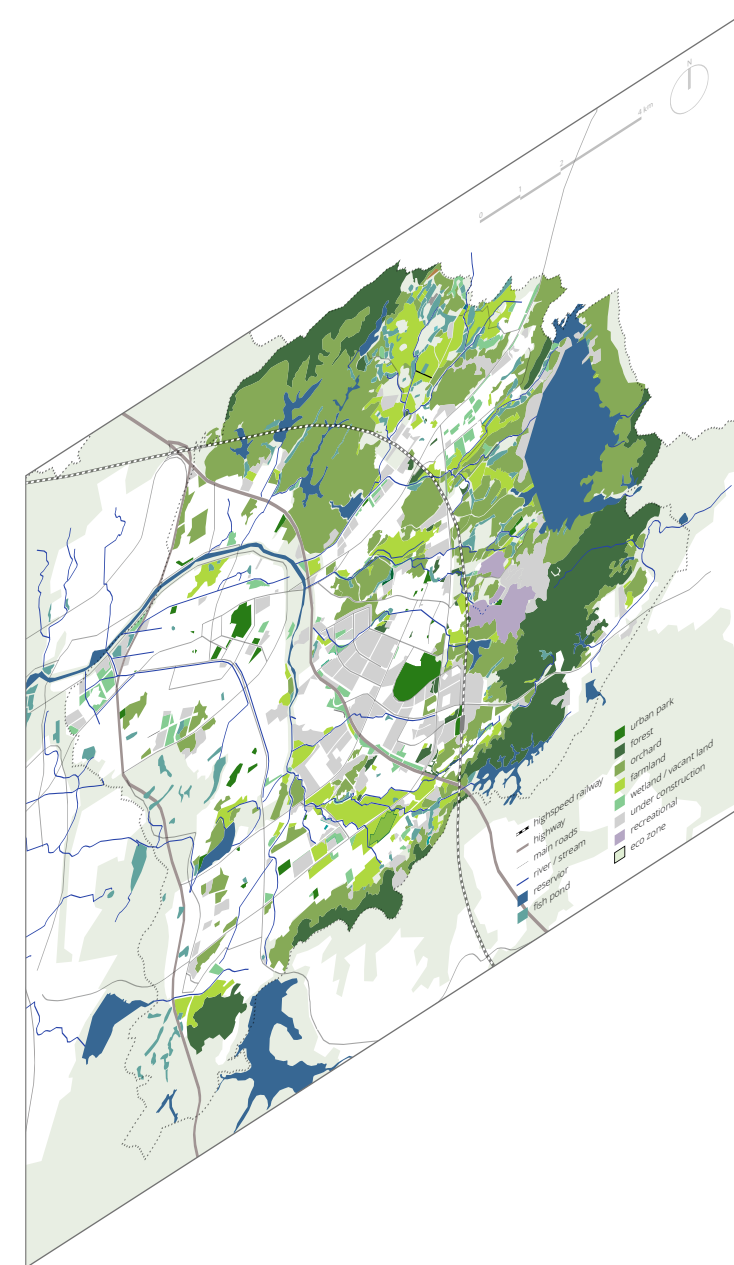
Defining Open space structure based on ecological and agricultural conditions



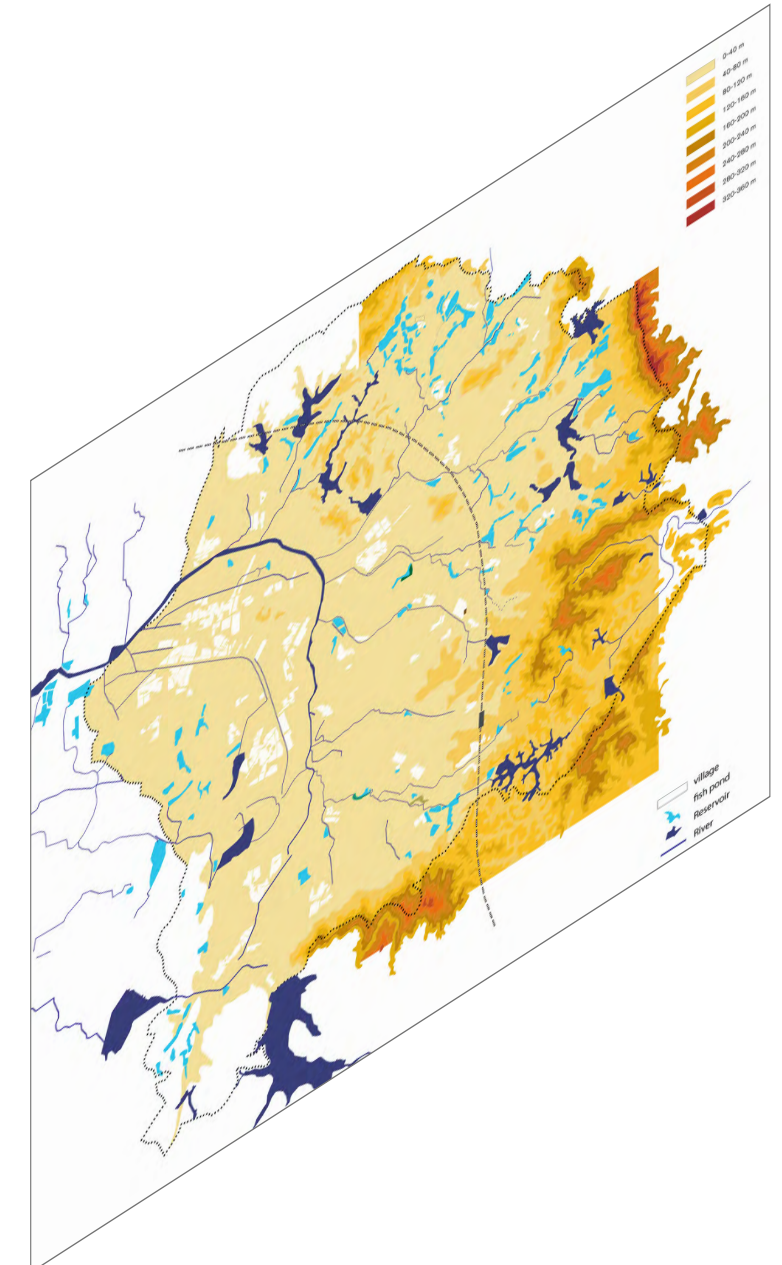
Environmental hazard



soil types





existing open spaces

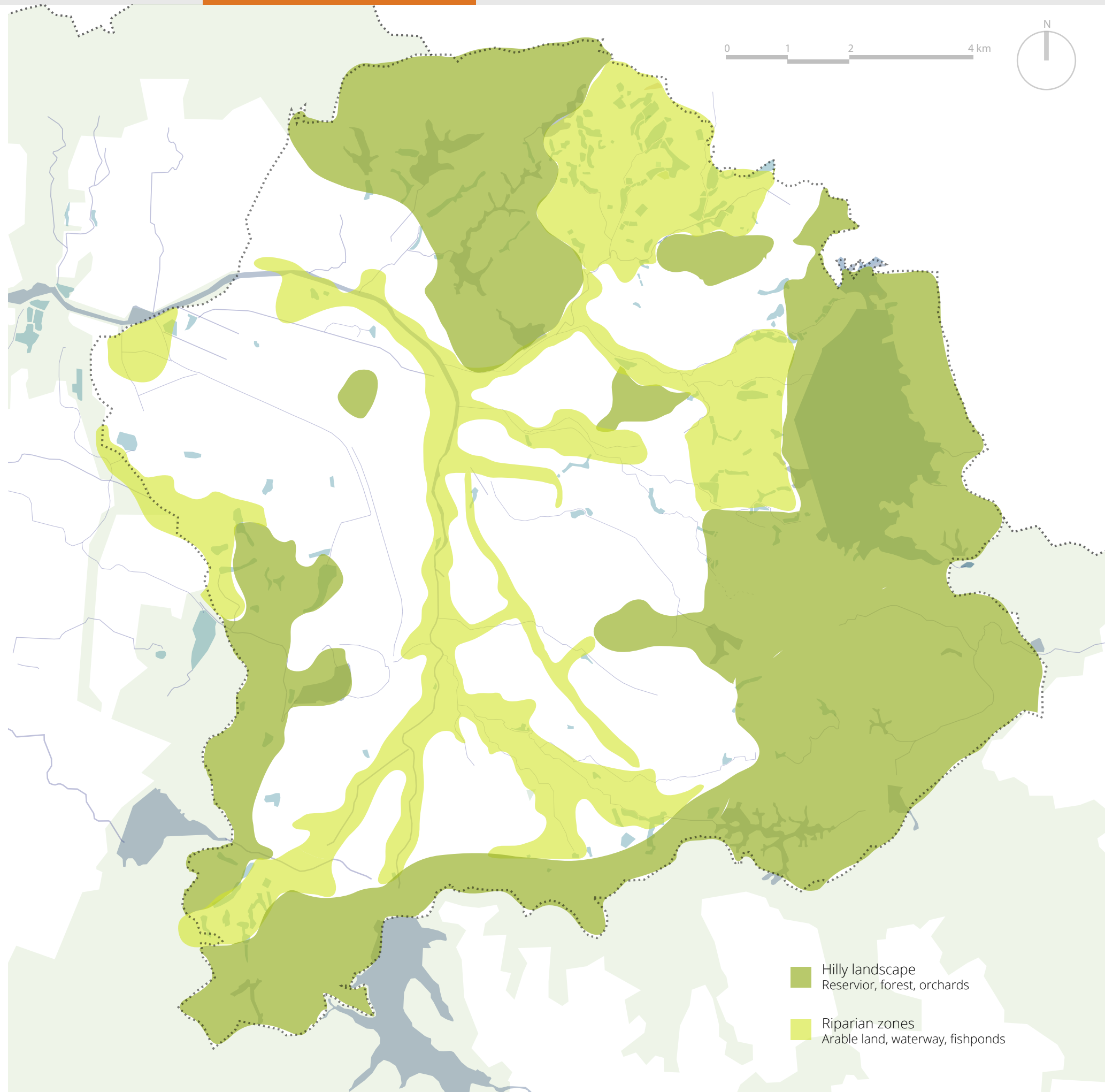
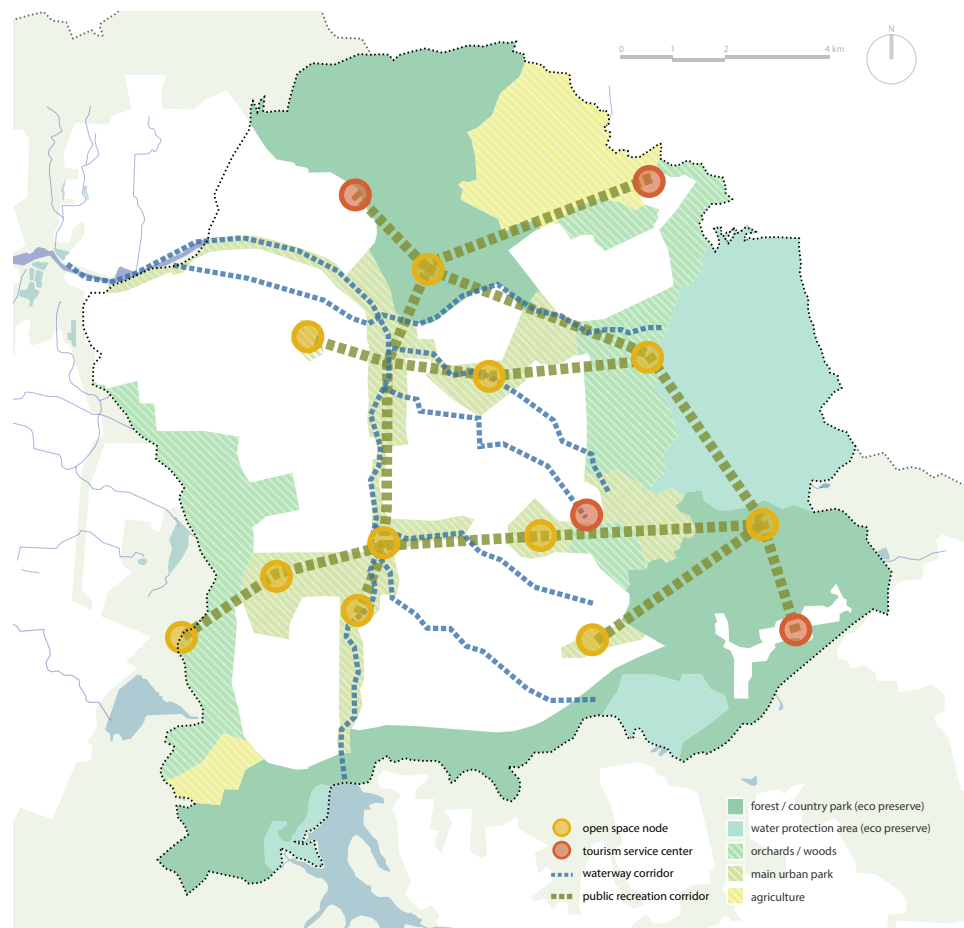




topography

Spatial structure & zoning

Defining Open space structure based on ecological and agricultural conditions


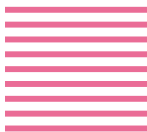
-  Hilly area
-  Plain area

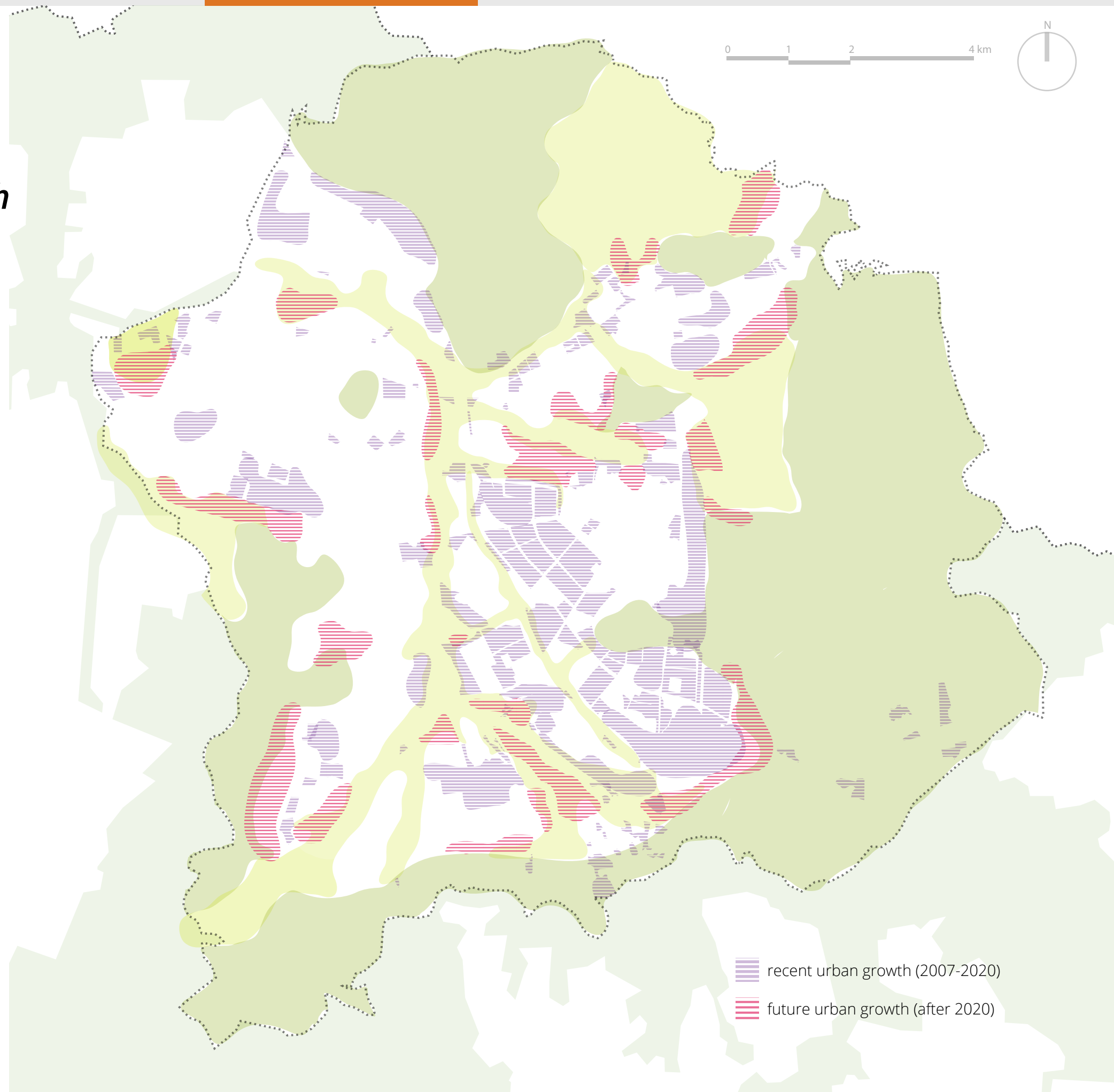




-  Hilly landscape
Reservoir, forest, orchards
-  Riparian zones
Arable land, waterway, fishponds

Spatial structure & zoning

Open space structure guiding urban growth

-  recent urban growth
-  future urban growth



-  recent urban growth (2007-2020)
-  future urban growth (after 2020)

Spatial structure & zoning

Transect zones from urban to rural



Z0

Dense urban area

Z1

Green-blue corridor

Z2

Hilly urban park

Z3

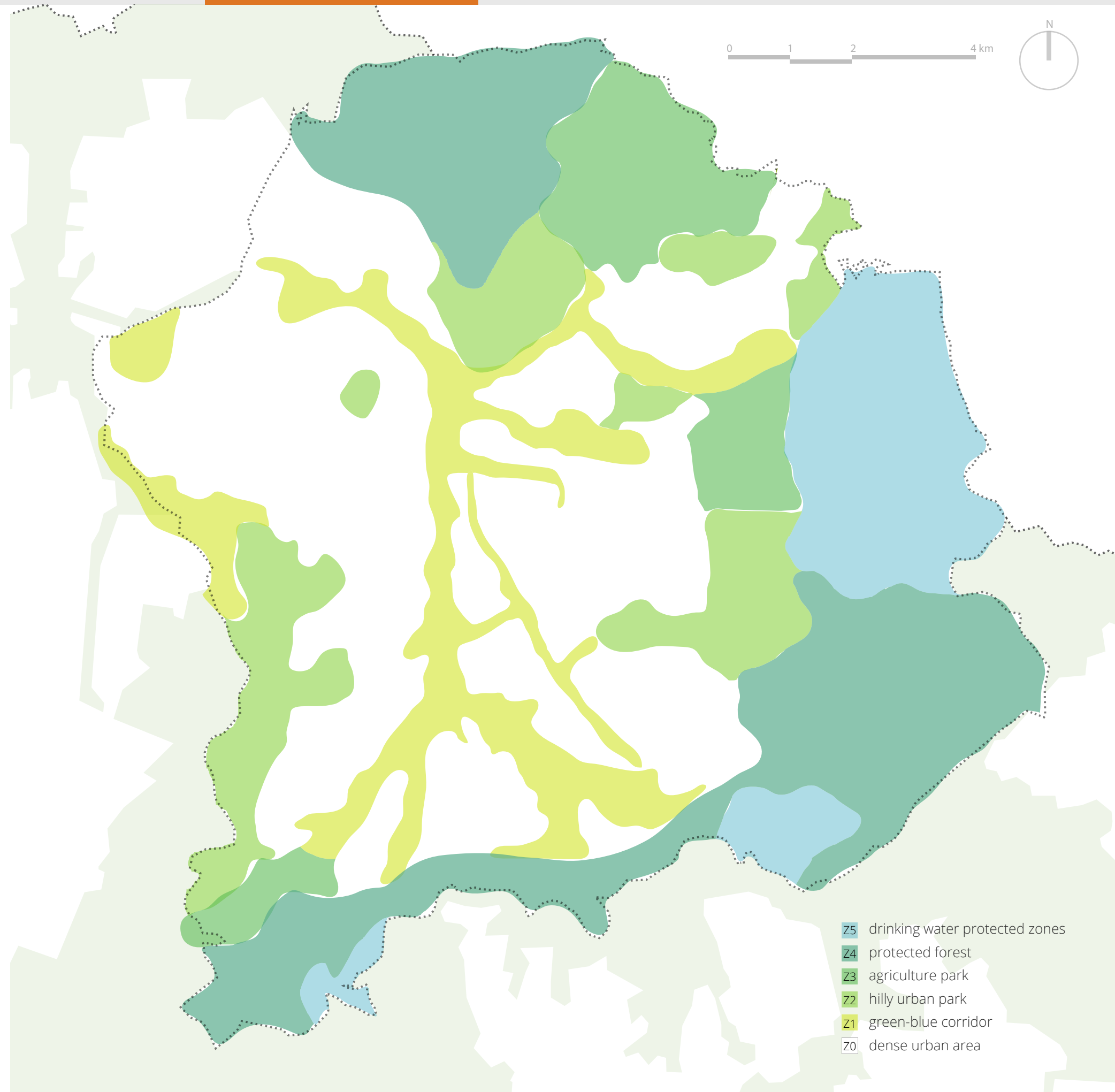
Agricultural Park

Z4

Protected forest

Z5

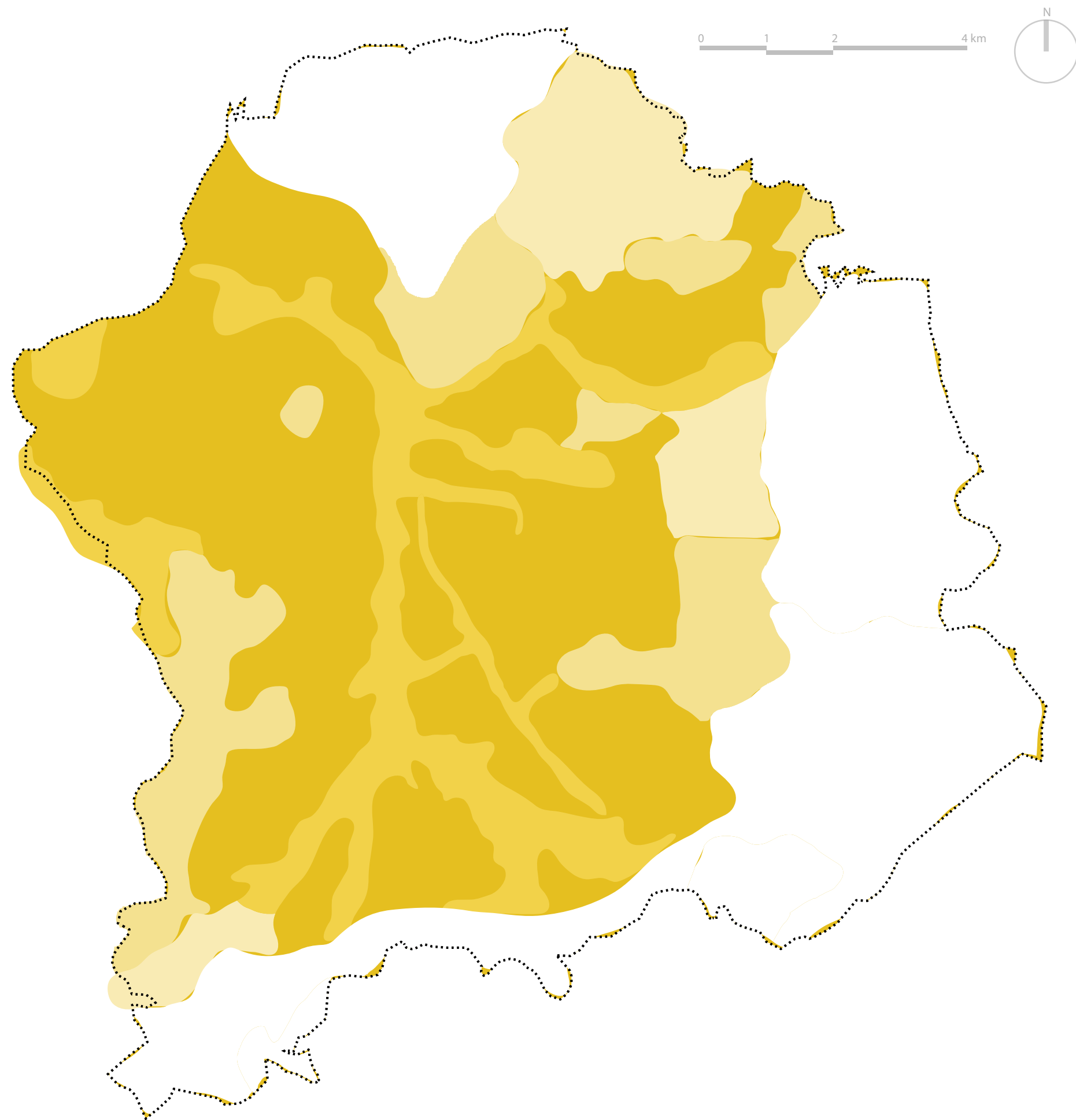
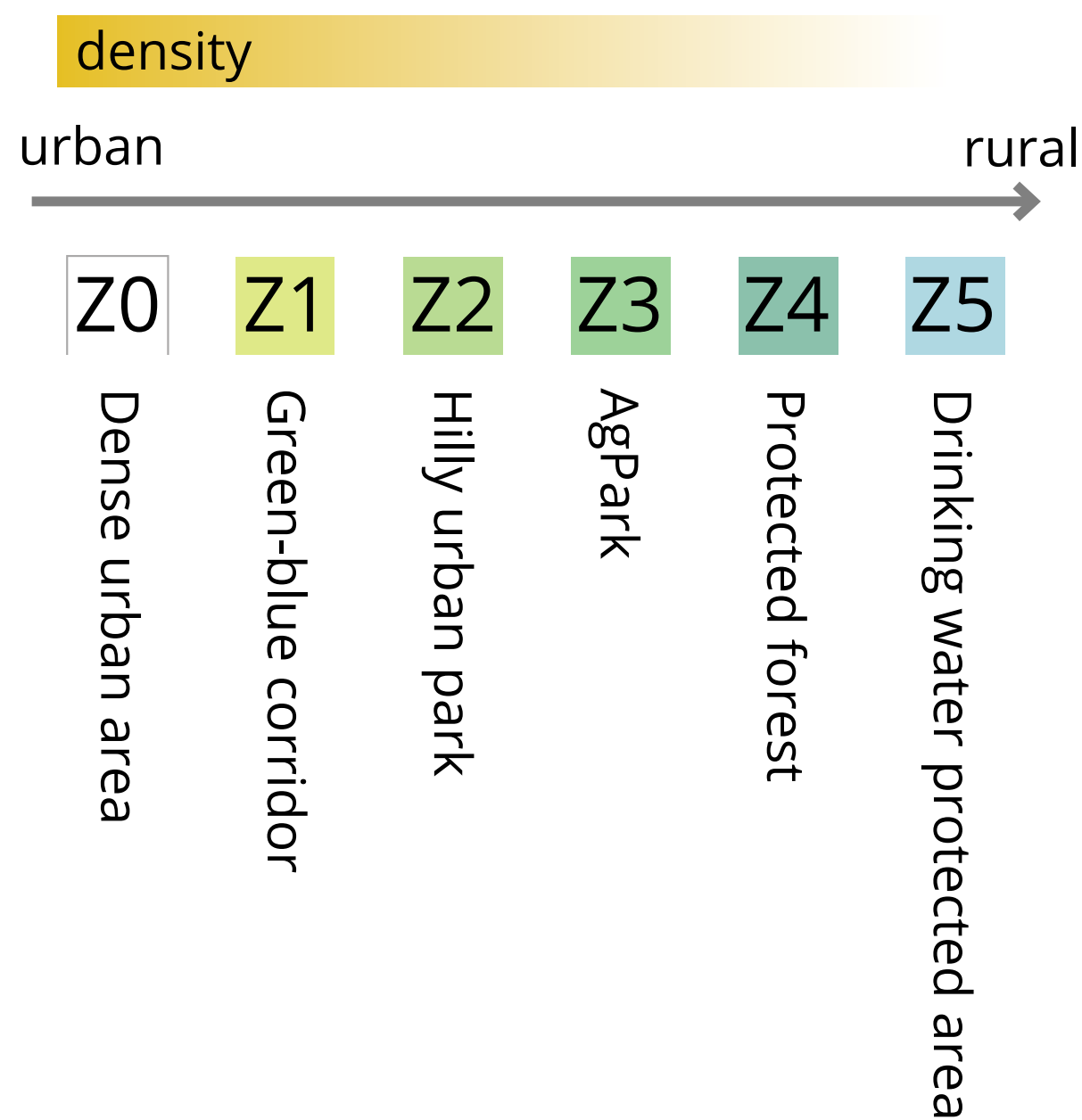
Drinking water protected area



- Z5 drinking water protected zones
- Z4 protected forest
- Z3 agriculture park
- Z2 hilly urban park
- Z1 green-blue corridor
- Z0 dense urban area

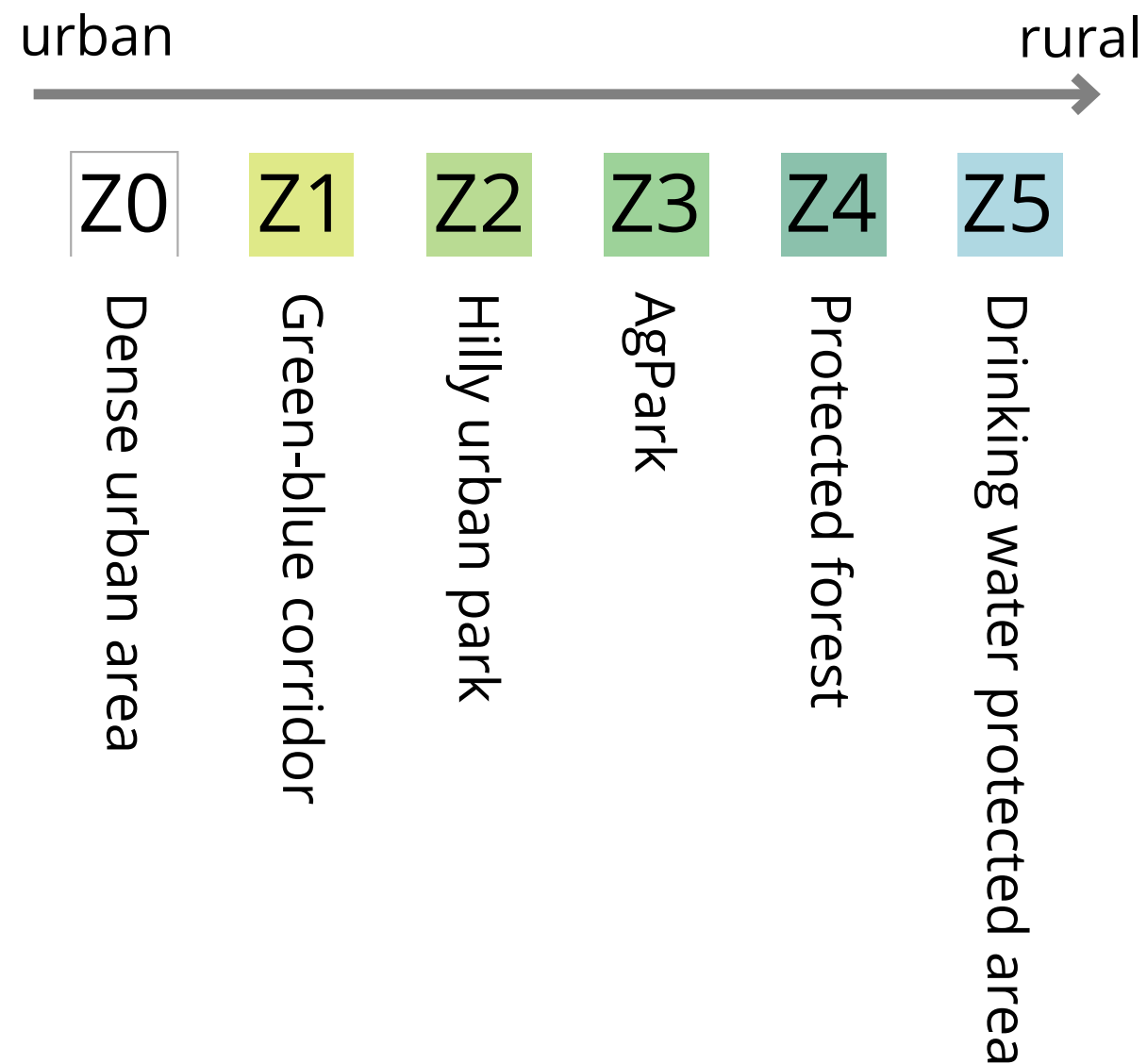
Spatial structure & zoning

Transect from urban to rural



Spatial structure & zoning

Transect from urban to rural



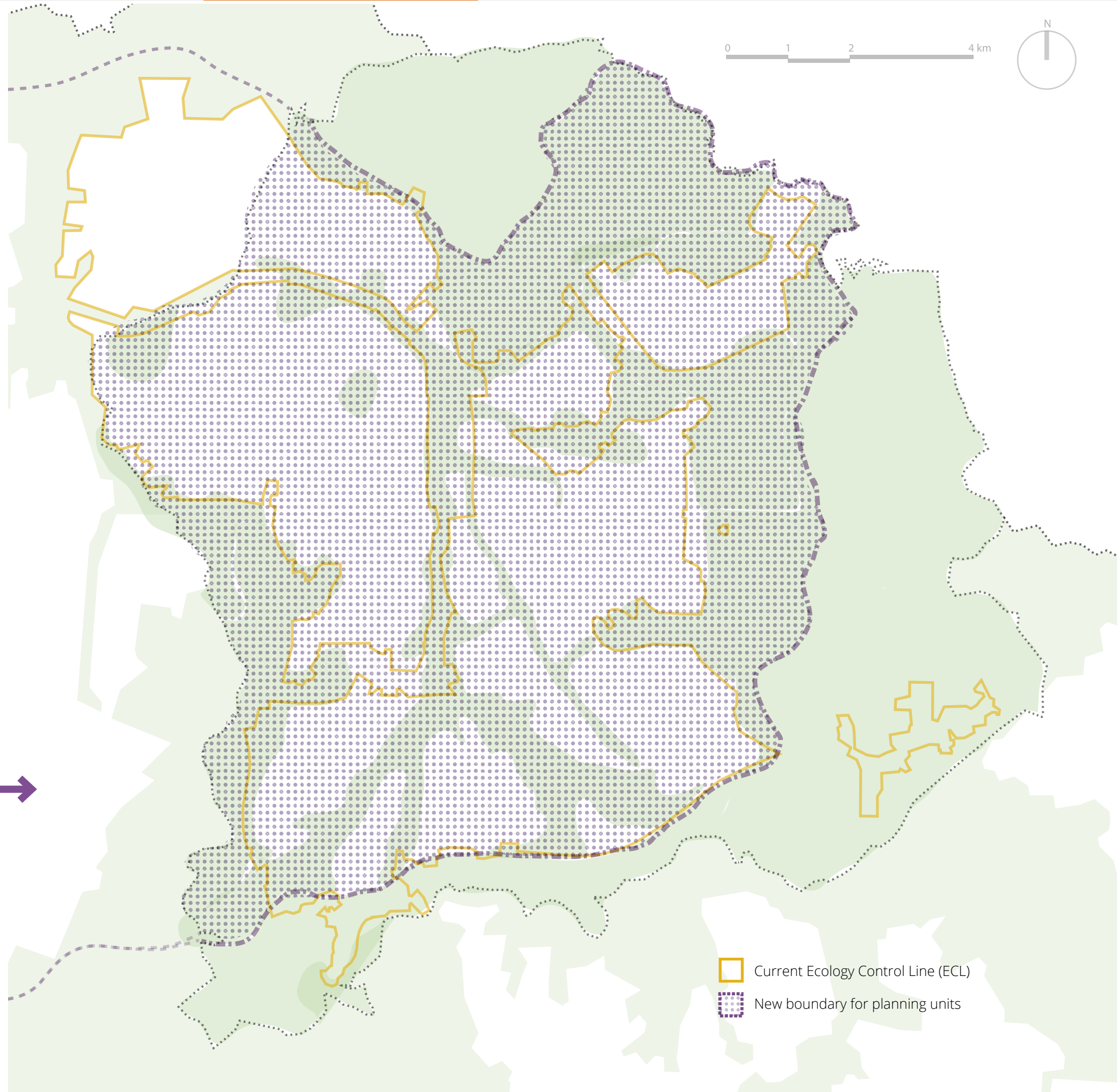
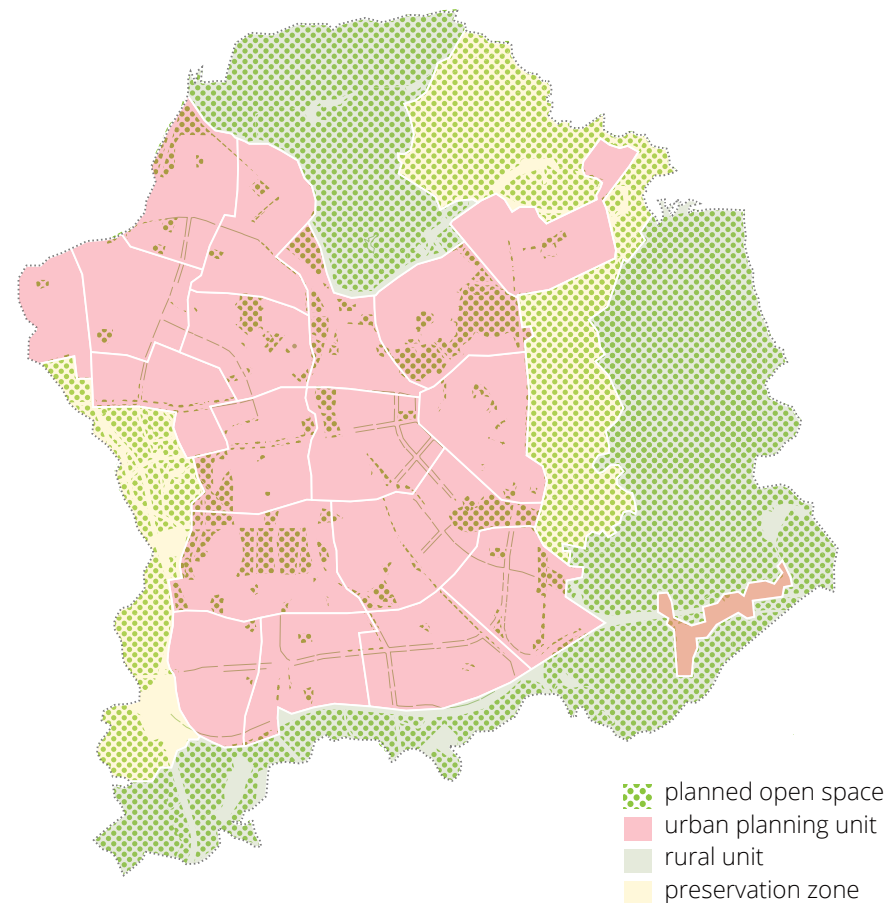
Z1 Green-blue corridor

General Character	Continuous open spaces along waterway, combined with public services, like theaters, libraries
Building Height	<20m
Building Footprint	5-10%
Types of Agriculture	pollution-free & diversified agriculture as riparial buffers for flooding and eco-corridor in dense urban area
Agricultural Land Area	20-50%
Farmers	Communities or local farmers
Location for agriculture	Near residential area as allotments / community gardens; design elements in green spaces

Spatial structure & zoning

Integrative urban-rural management

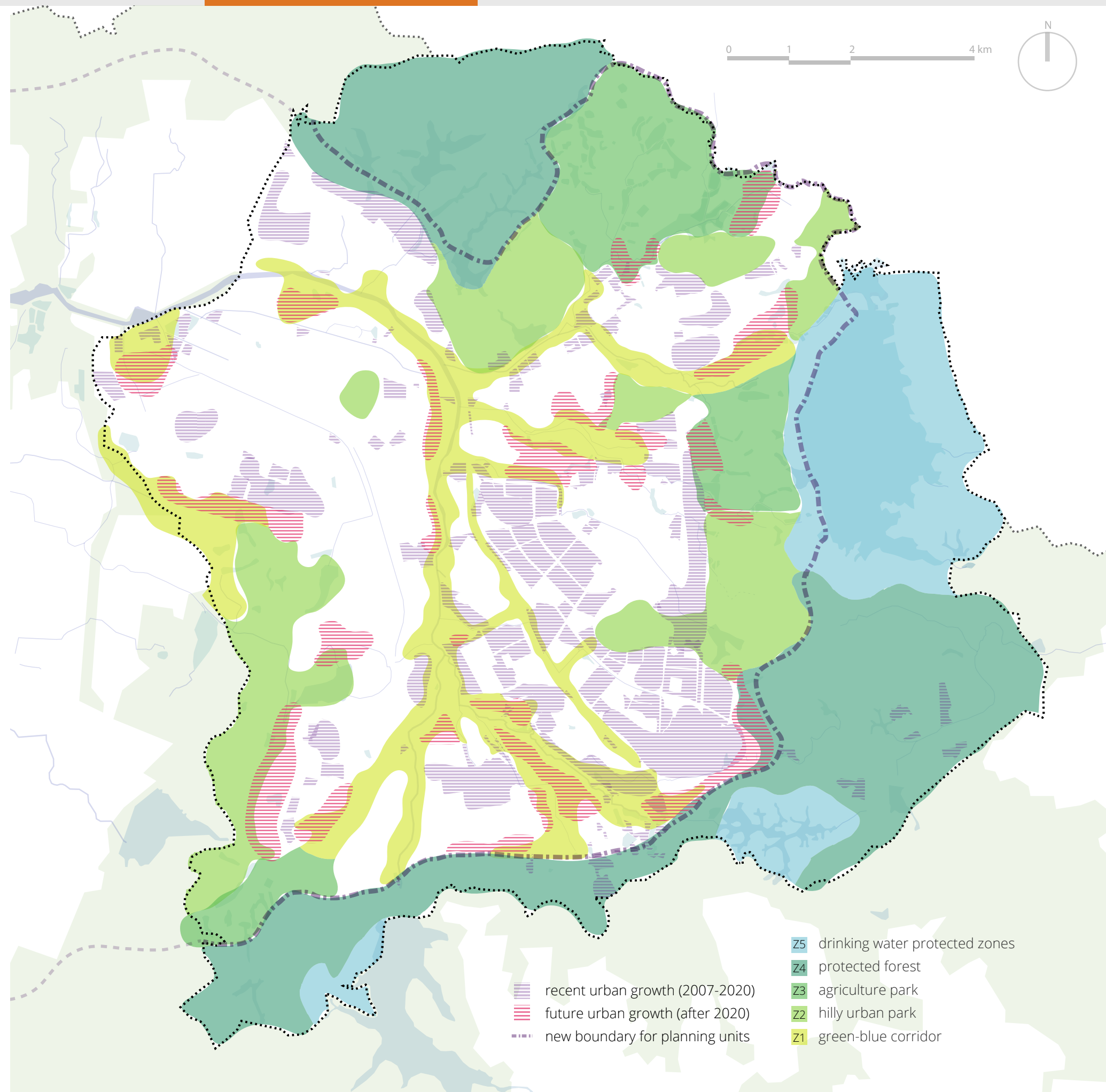
- enlarge the area for detailed planning units



Spatial structure & zoning

New framework, new ECLs

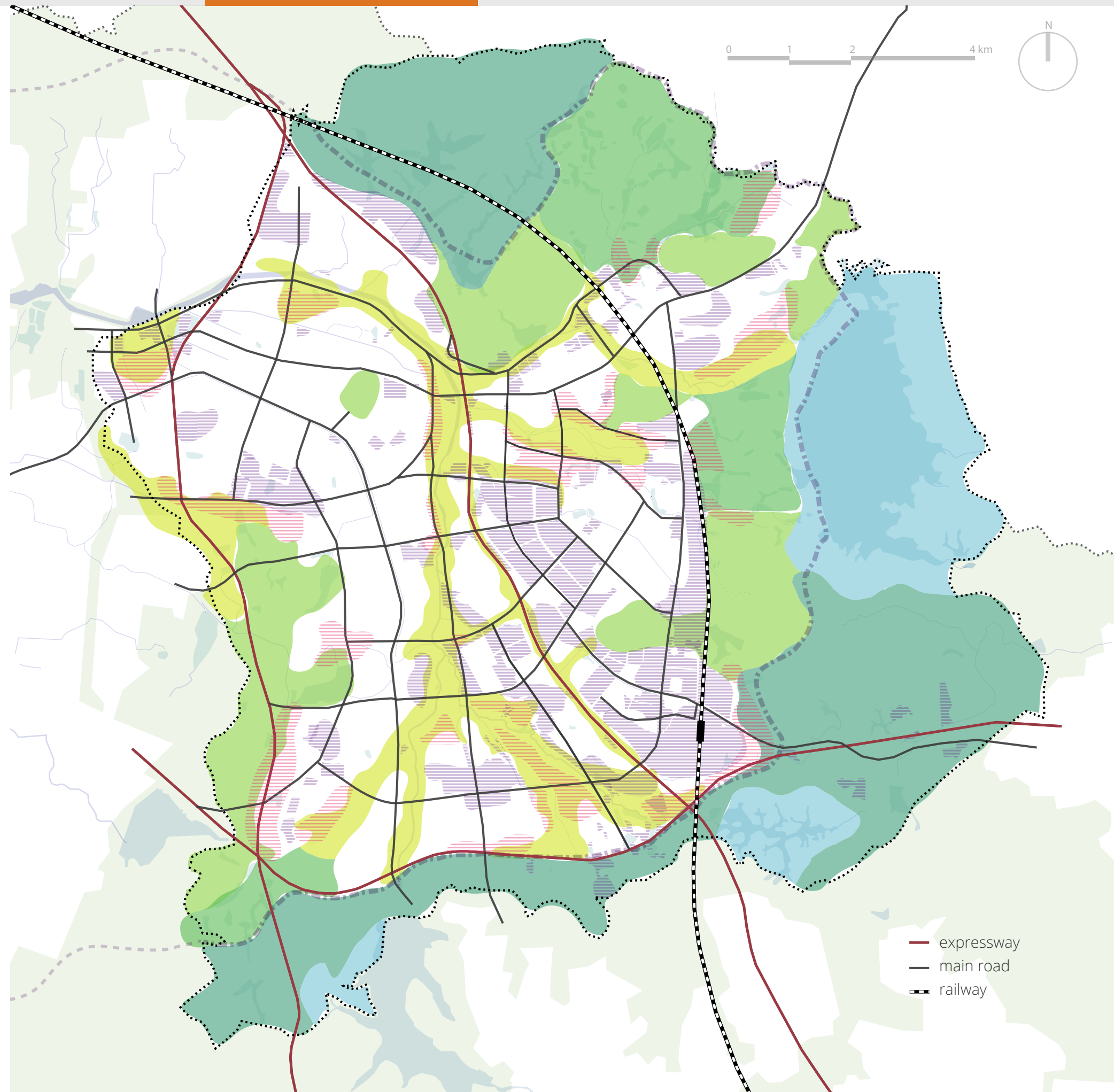
- defining the main green structure
- defining locations for urban growth
- protecting open spaces
- defining the boundary of urban management



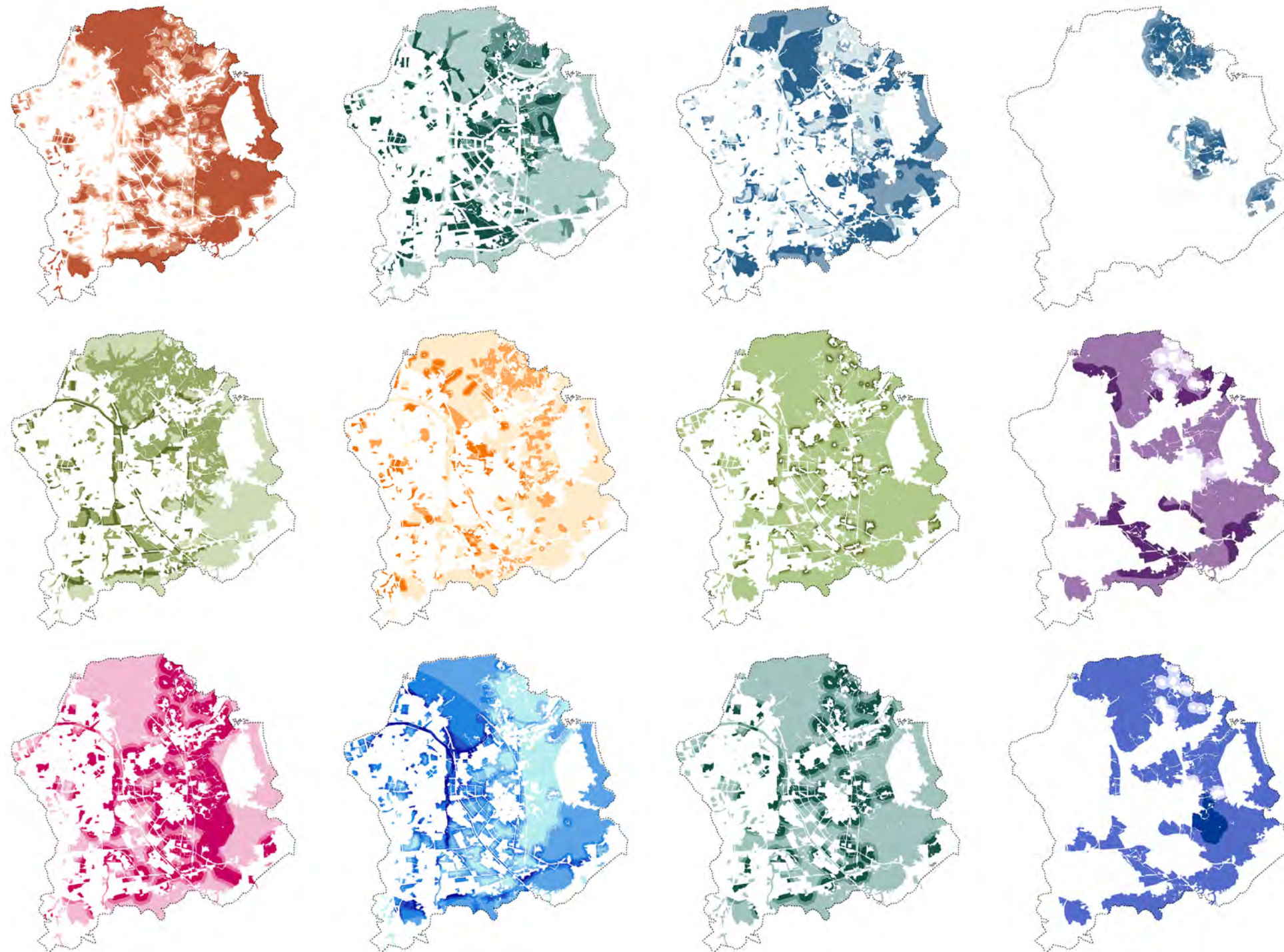
Spatial structure & zoning

Adjusting urban structure according to open space structure

- only main roads defined
- secondary roads are designed in the district scale



Suitability evaluation



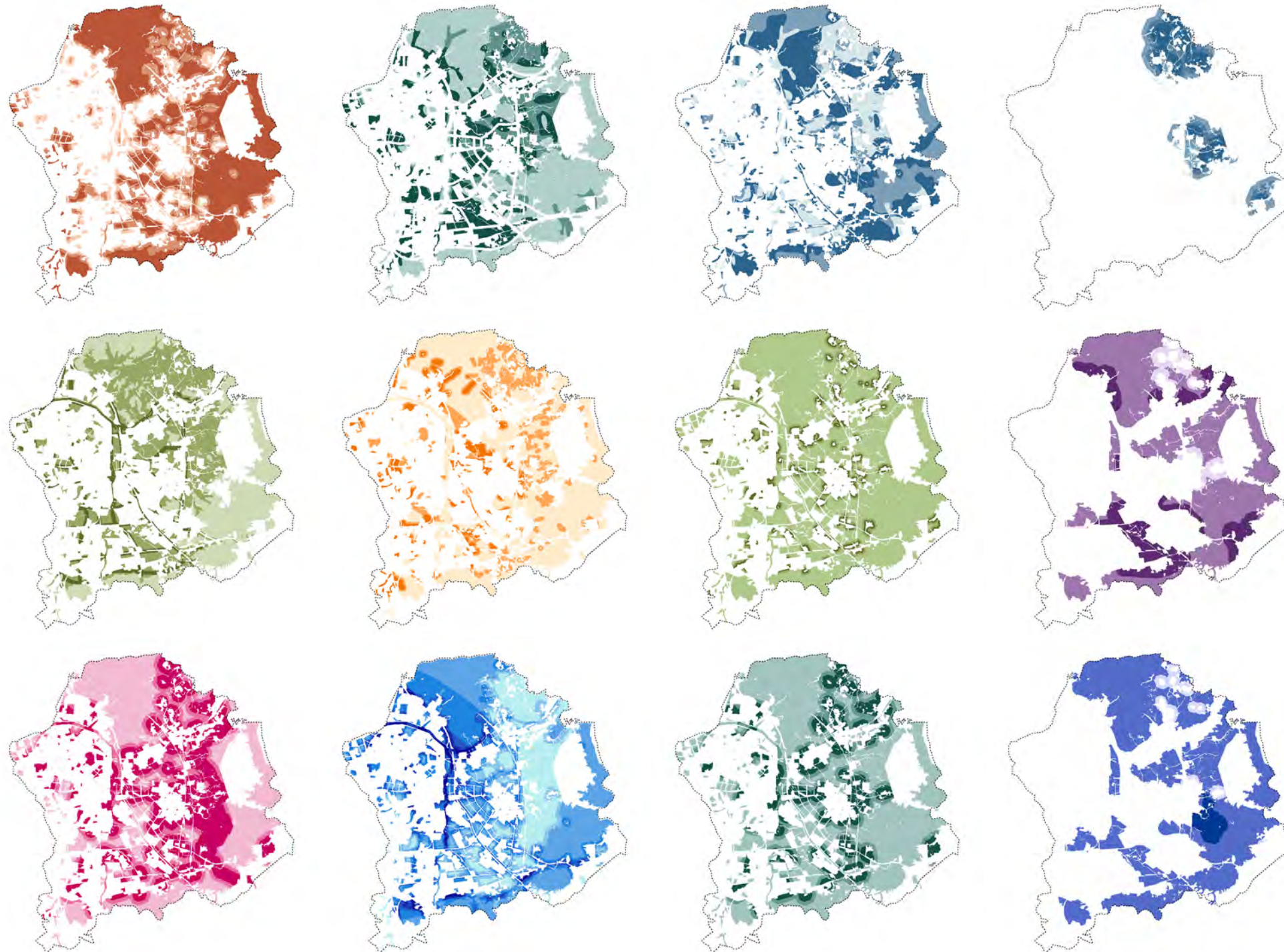
Improved land use types

1. Temporary crops
2. Permanent crops
3. Livestock
4. Fishery
5. Non-food crops

1. Recreation / Education
2. **Ecosystem service**

1. Subsistence farming gardens
2. Small-scale family farms
3. **Medium-scale family farms**
4. **Collective farms**
5. Large-scale agribusiness
6. Recreation agri-park

Suitability evaluation



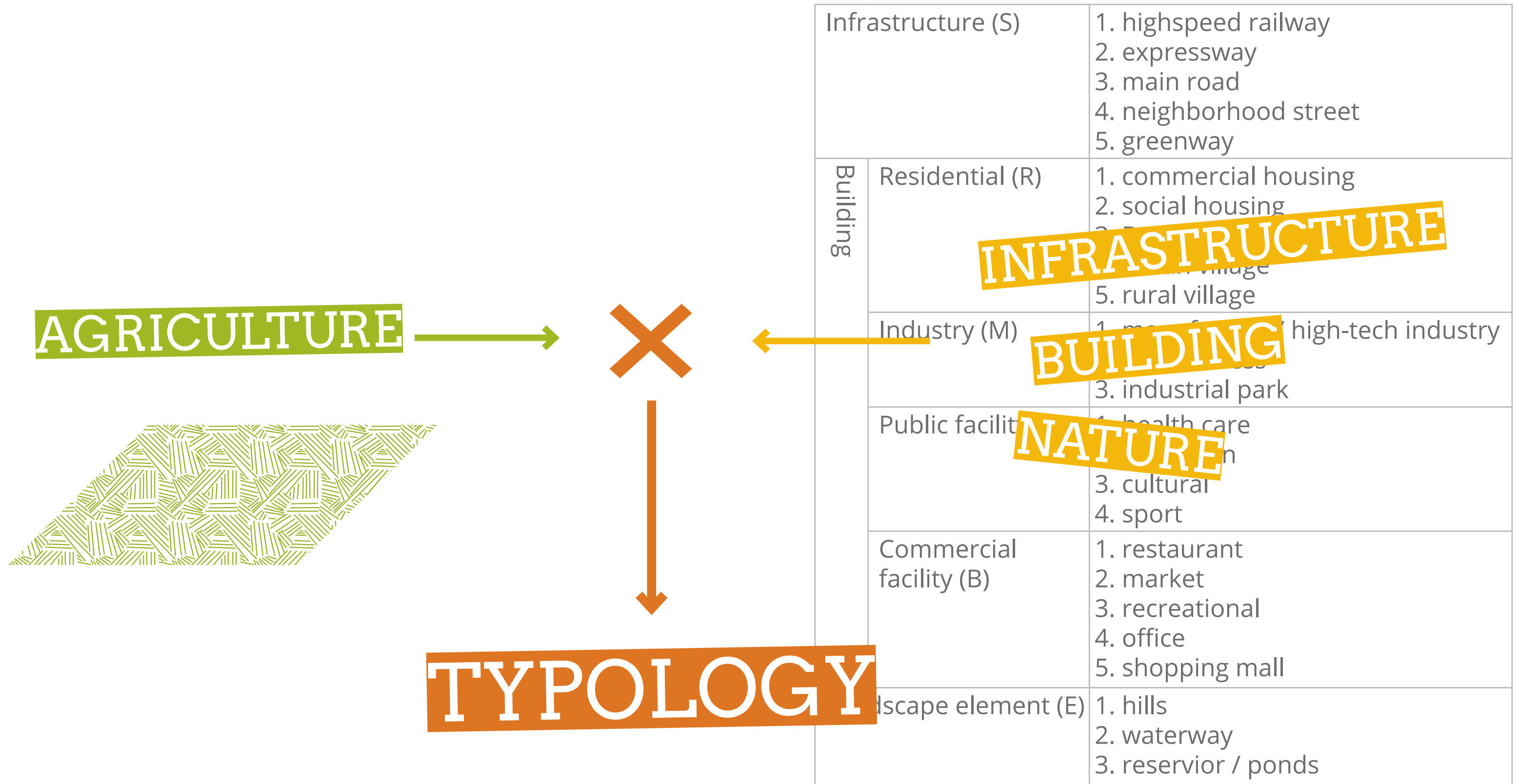
1. Understand the land resource

2. Improve rules about transect zones

Z0 Z1 Z2 Z3 Z4 Z5 P

3. Reference for smaller scale design

Typologies of spatial relationship

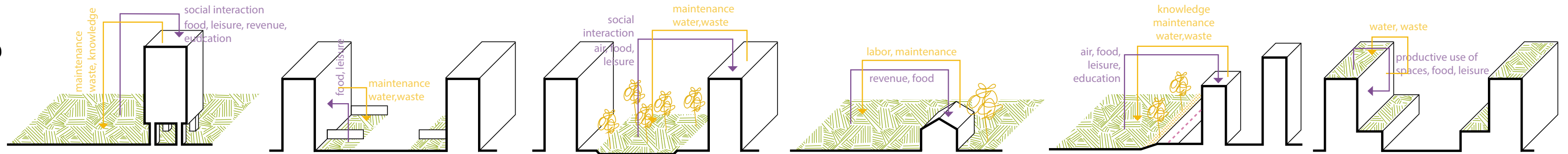


Typologies of spatial relationship

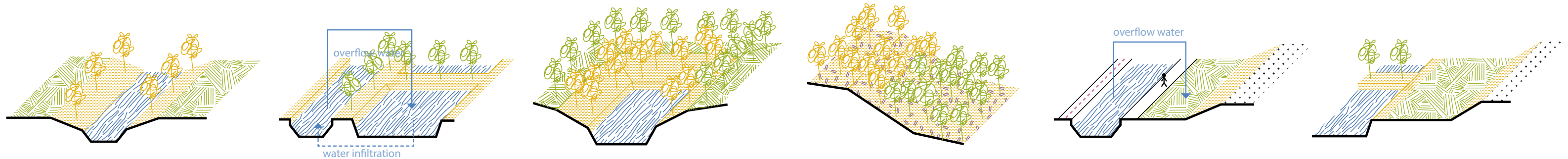
infrastructure



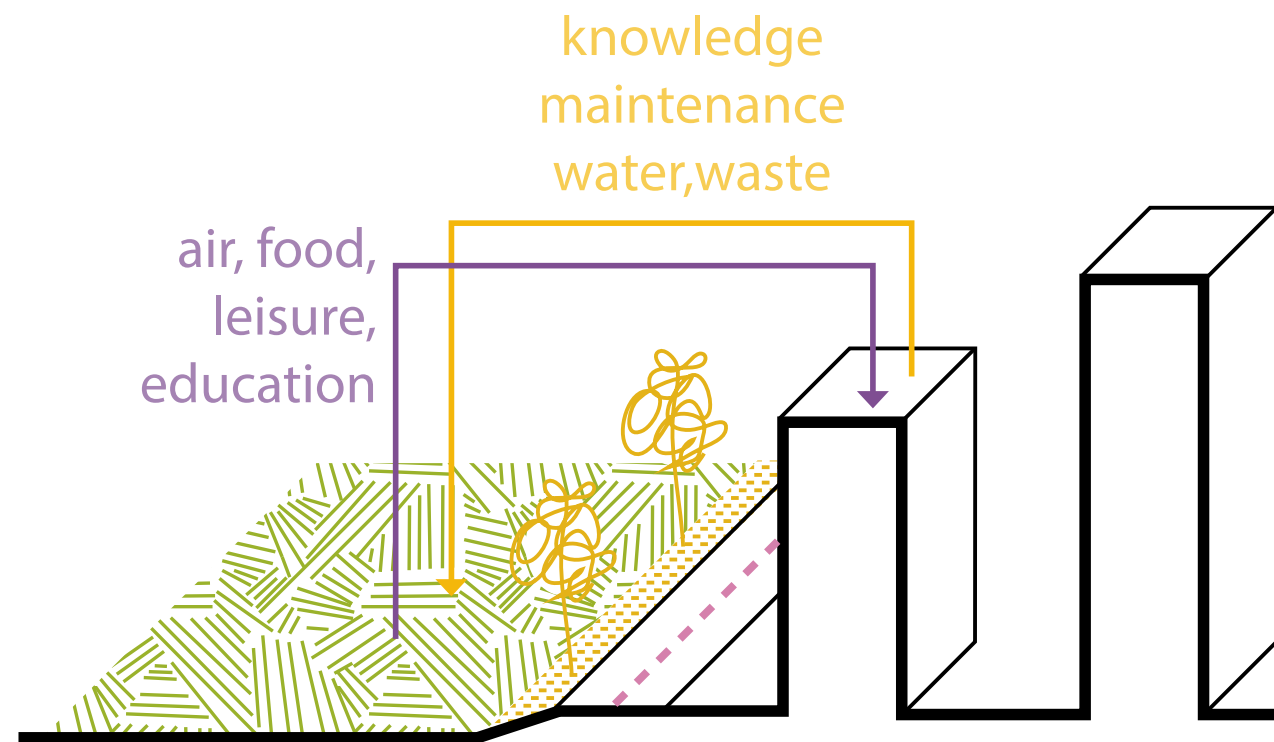
Building



Nature



Typologies of spatial relationship



Building-agriculture: B-1

Agricultural field located next to built-up area, separated by a neighborhood road, accessible and usable for urban users

Code	B-1
urban element	R1, R2, R3, R4; M2; A1, A2, A3, A4; B1, B2, B3
landscape element	E1, E3
possible purpose	Community development Social integration of farmers Aesthetically pleasing landscape Subsistence food production Water infiltration Moderation of urban heat Urban biodiversity Urban waste recycling
location	Z0, Z1, Z2, Z3
Permitted agri types	Ag: 1,2,4,5 Mg: 1, 2, 5
Restricted agri types	Ag: 3

Content

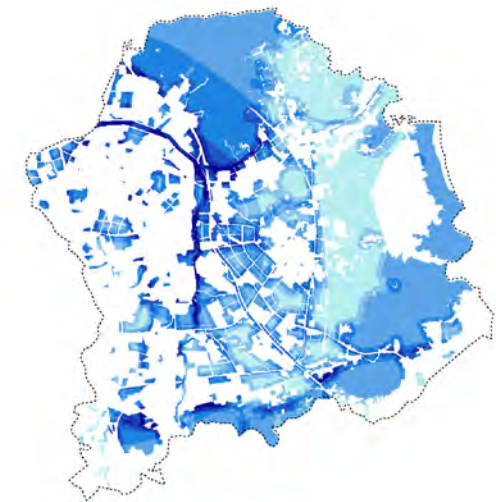
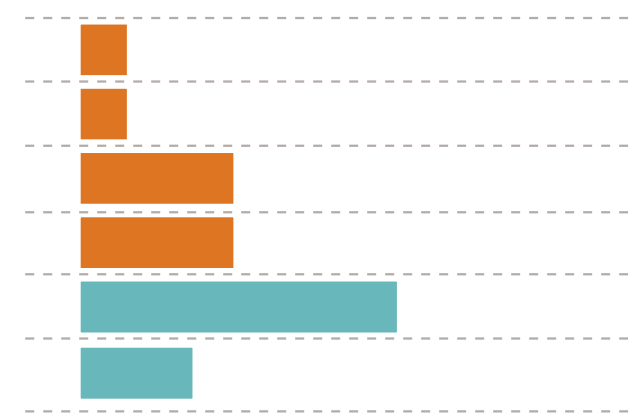
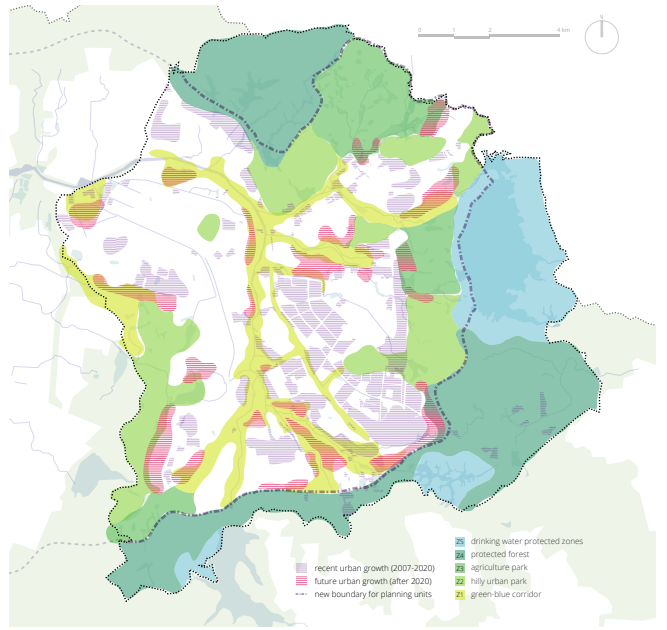
Provide space



Improve City-Agri relationship

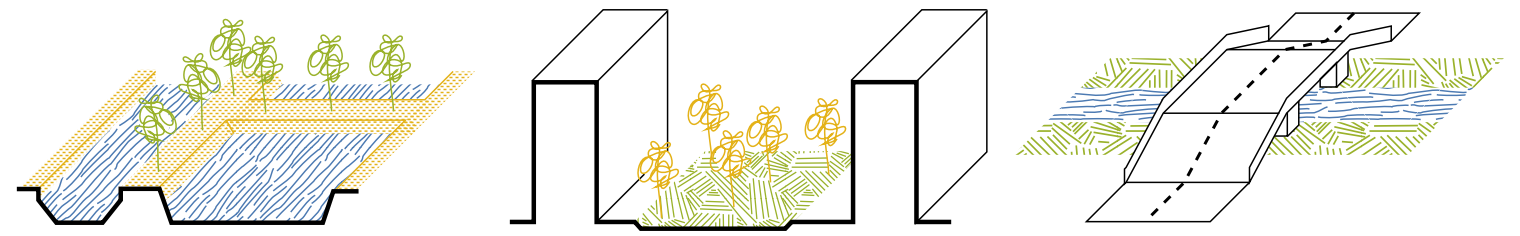
1. *Spatial structure*
2. *Zoning and management*

1. *Sustainable agriculture practices*
2. *Suitability evaluation*
3. *Typologies of spatial relationship*



Z1 Green-blue corridor

Permitted function	S2, S3, S4, S5 M2 A1, A2, A3, A4 B1, B2, B3
Agricultural types	Ag1, Ag2, Ag3, Ag4, Ag5 N1, N2 Mg1, Mg2, Mg6





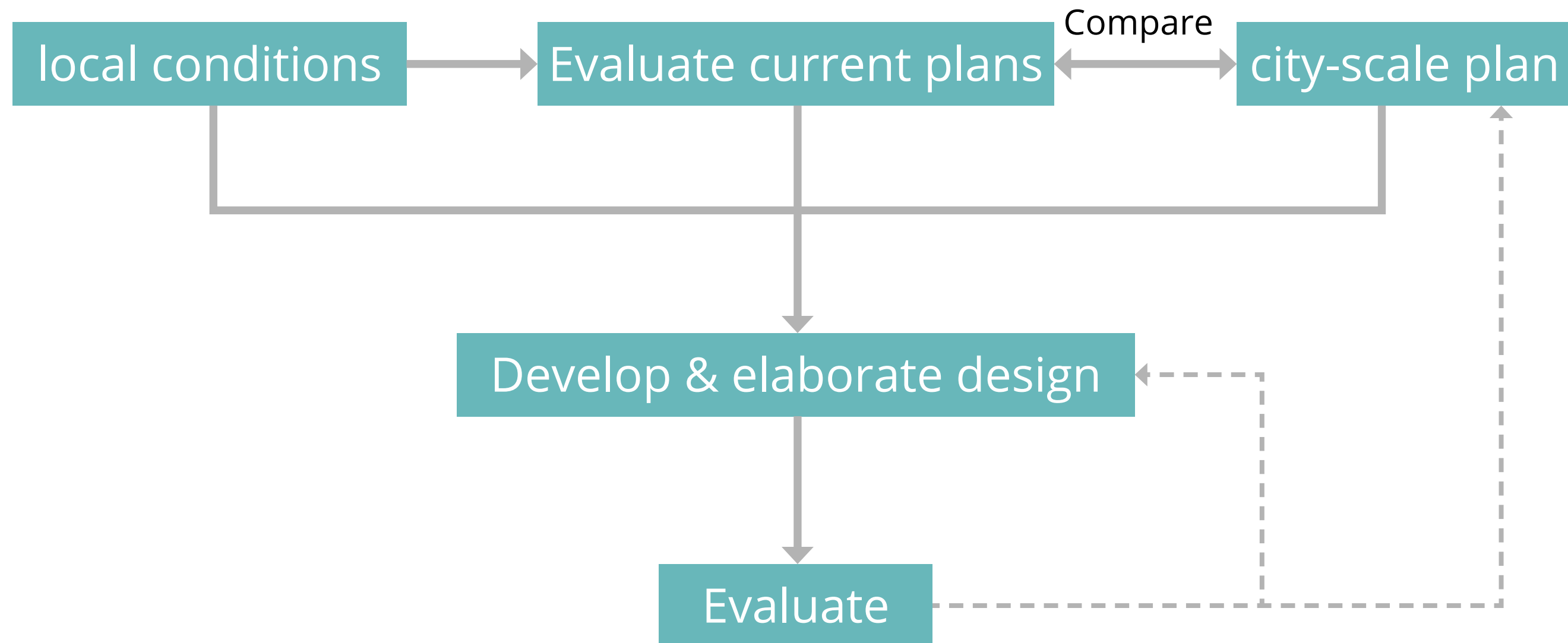
分區

DISTRICT-SCALE DESIGN

Purpose

- **Testing** feasibility of the city-scale plan
- **Opportunities** and impacts of city-scale plan
- Demonstrate **a process of applying** the city-scale framework into smaller scales.

Methodology



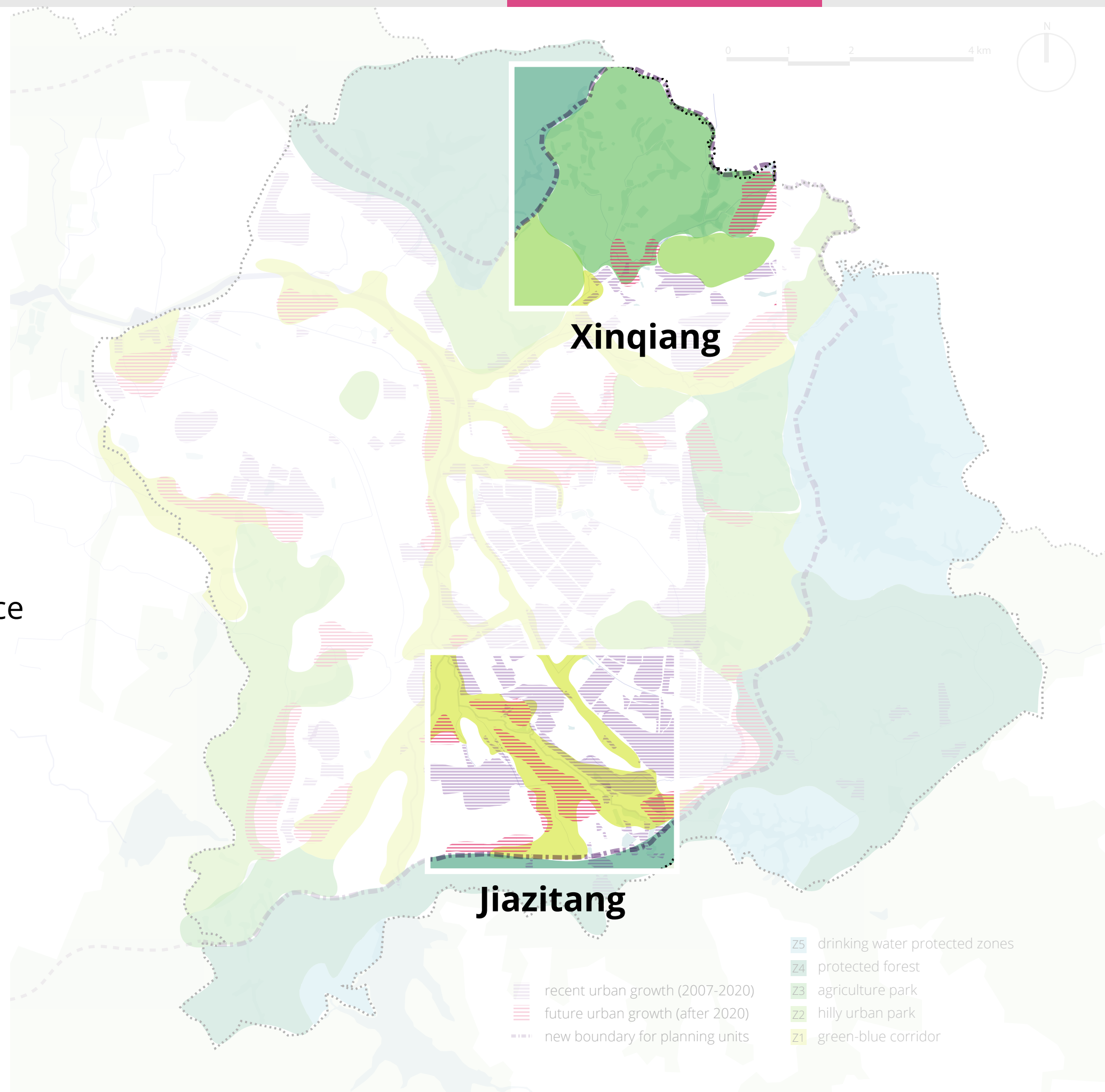
Selected Locations

Xinqiang

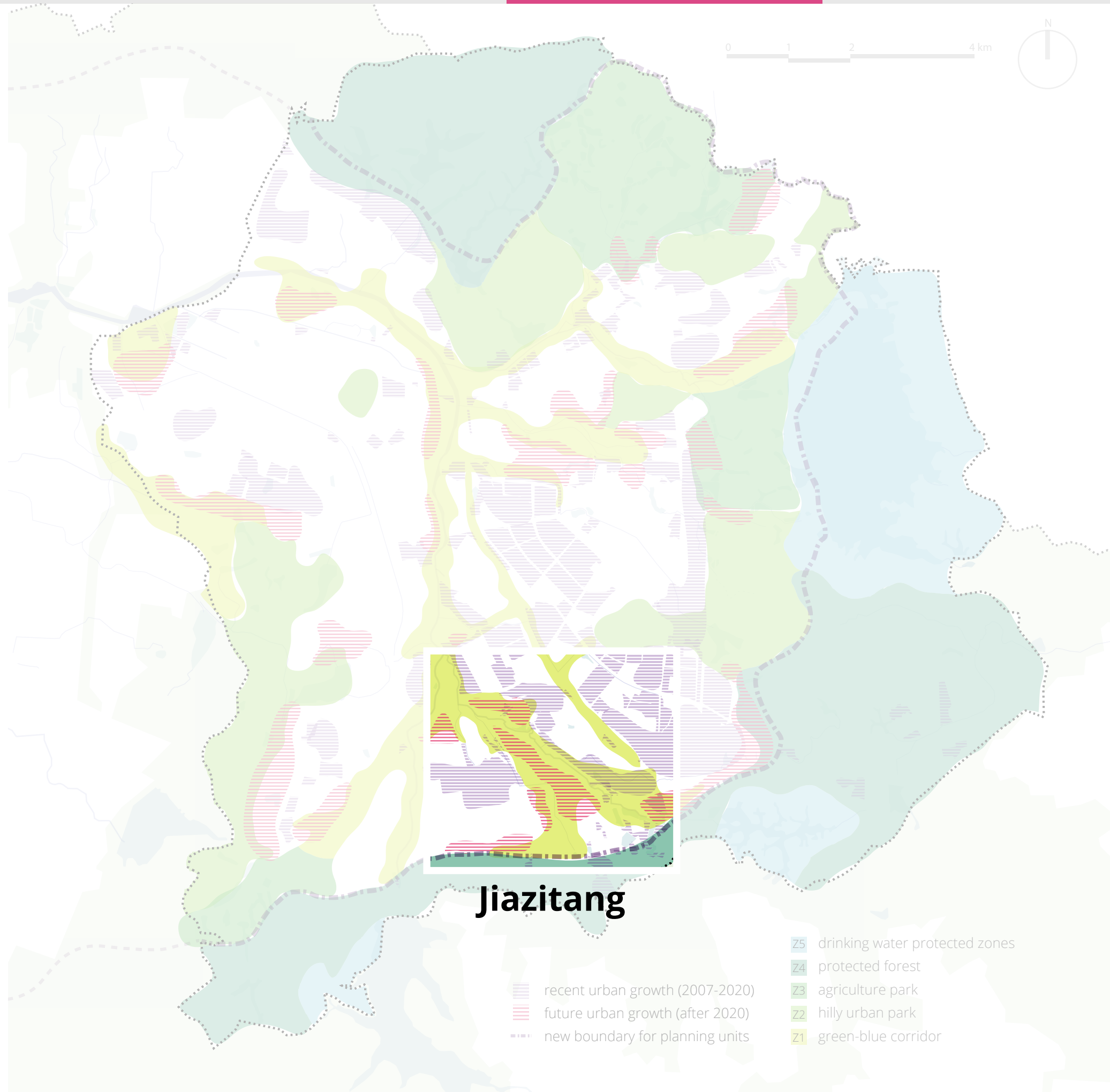
- Transition from urban to rural
- Sustain local communities
- Detailed statutory plan

Jiazitang

- Surrounded by dense urban area
- Gradual urban growth
- conflicts between infrastructure & open space



Jiazitang



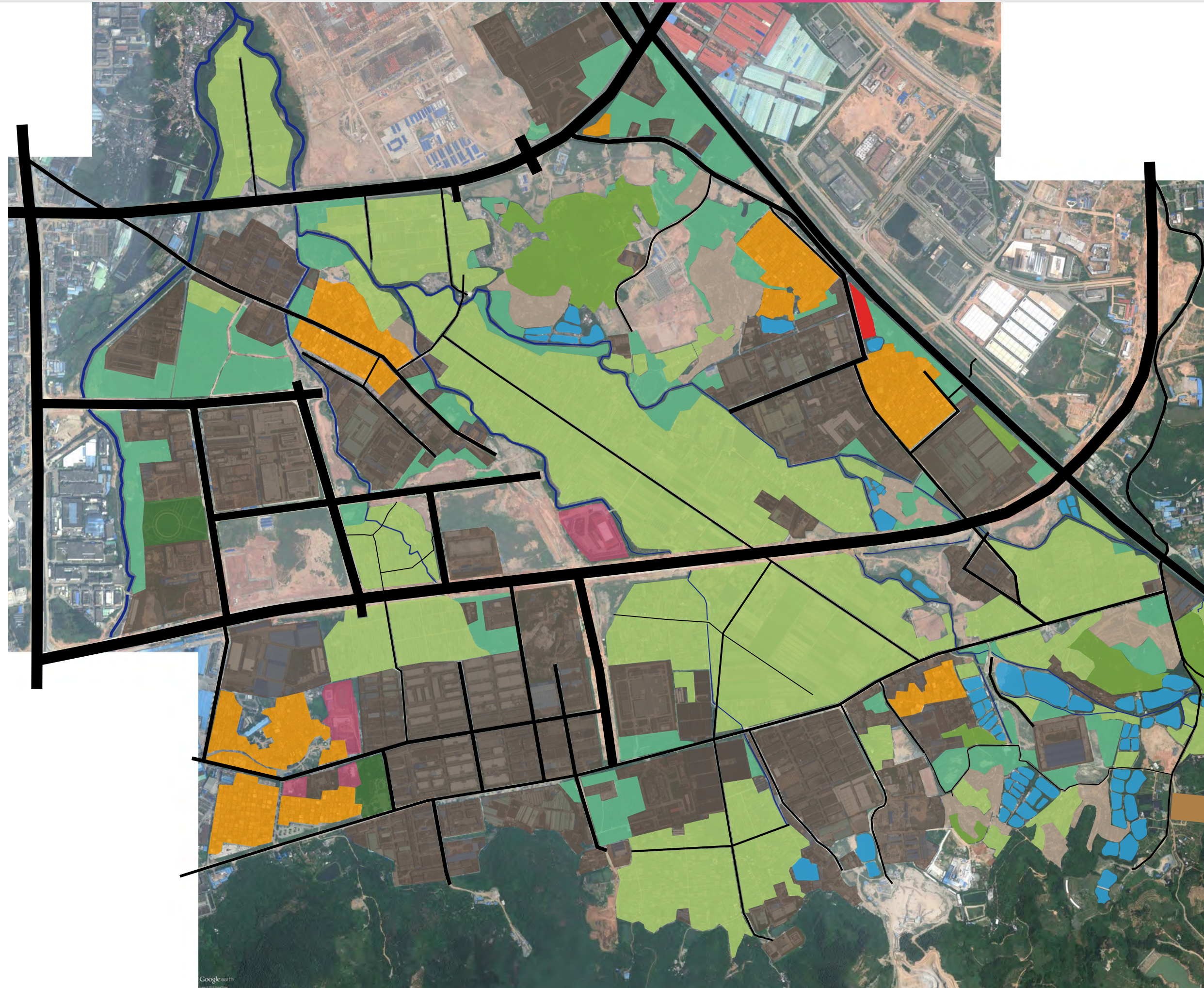
Jiazitang

Current condition

- Surrounded by dense urban area
- In transition



Current condition



Current condition

Current farmers



Temporary houses

Small-scale farms

Lease land from the company
One-year contract

Current condition

Urban villages



urban villages
housing for migrants



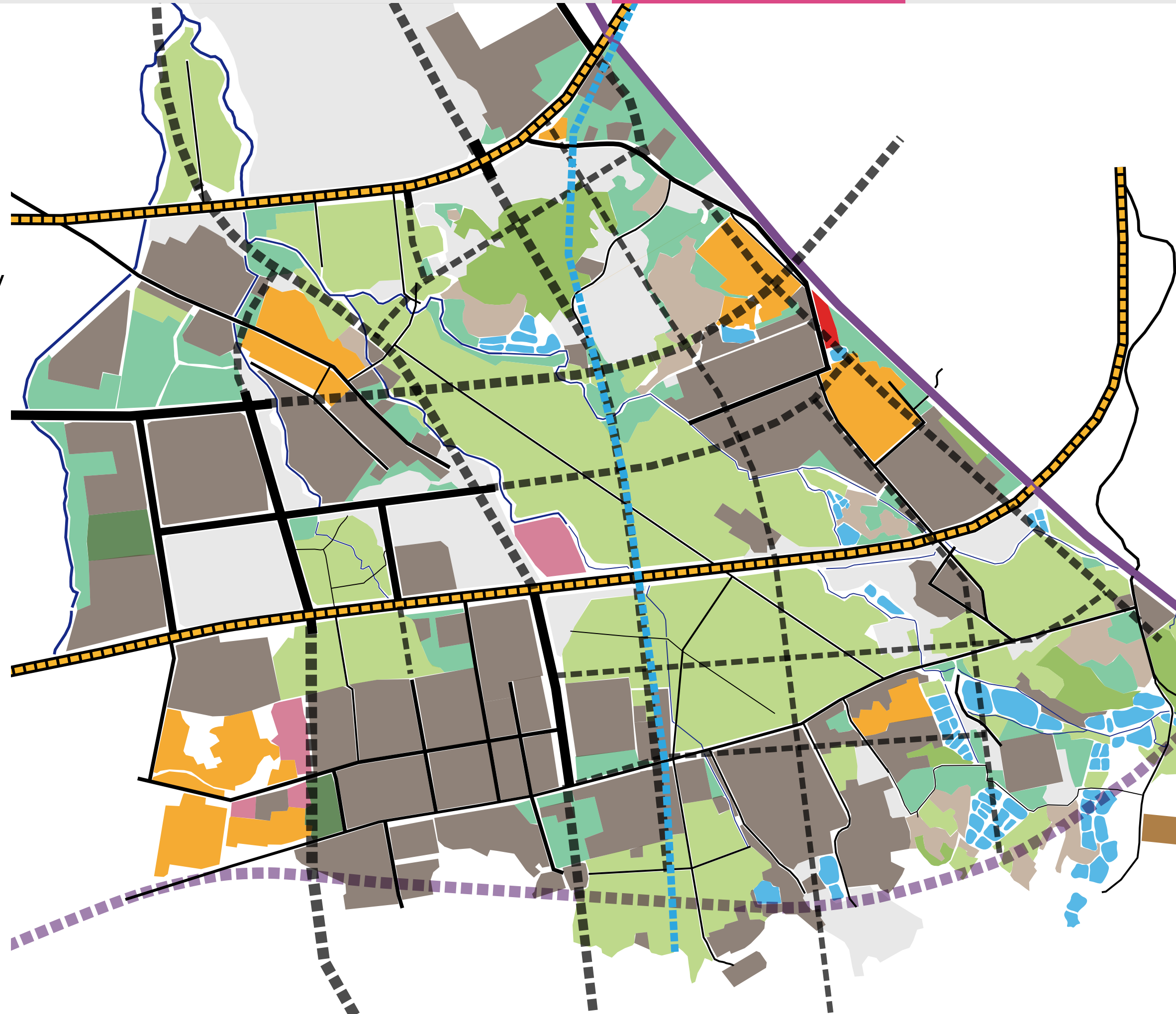
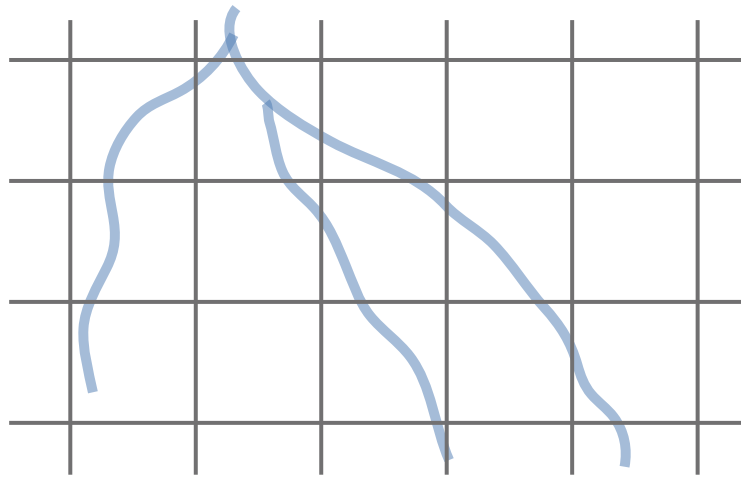
spontaneous farming



Current Plan

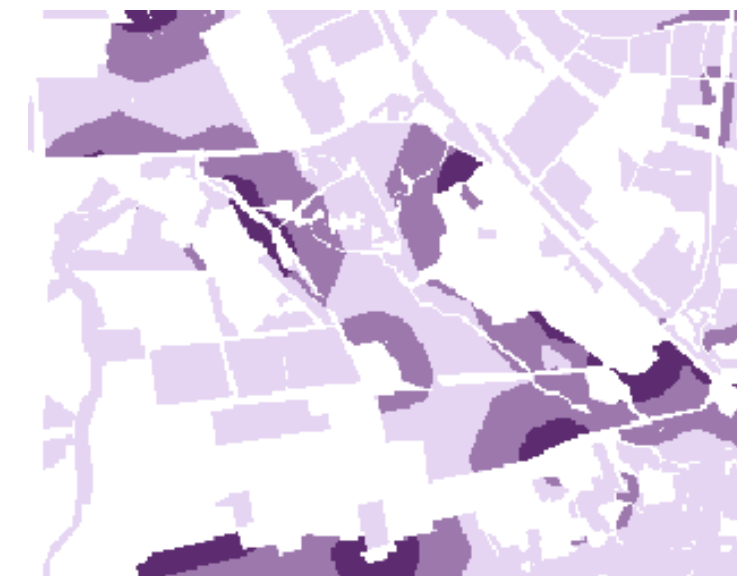
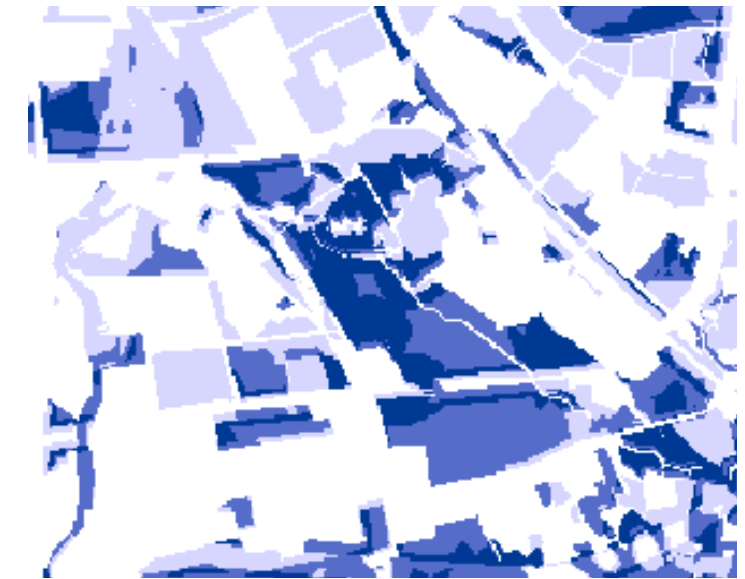
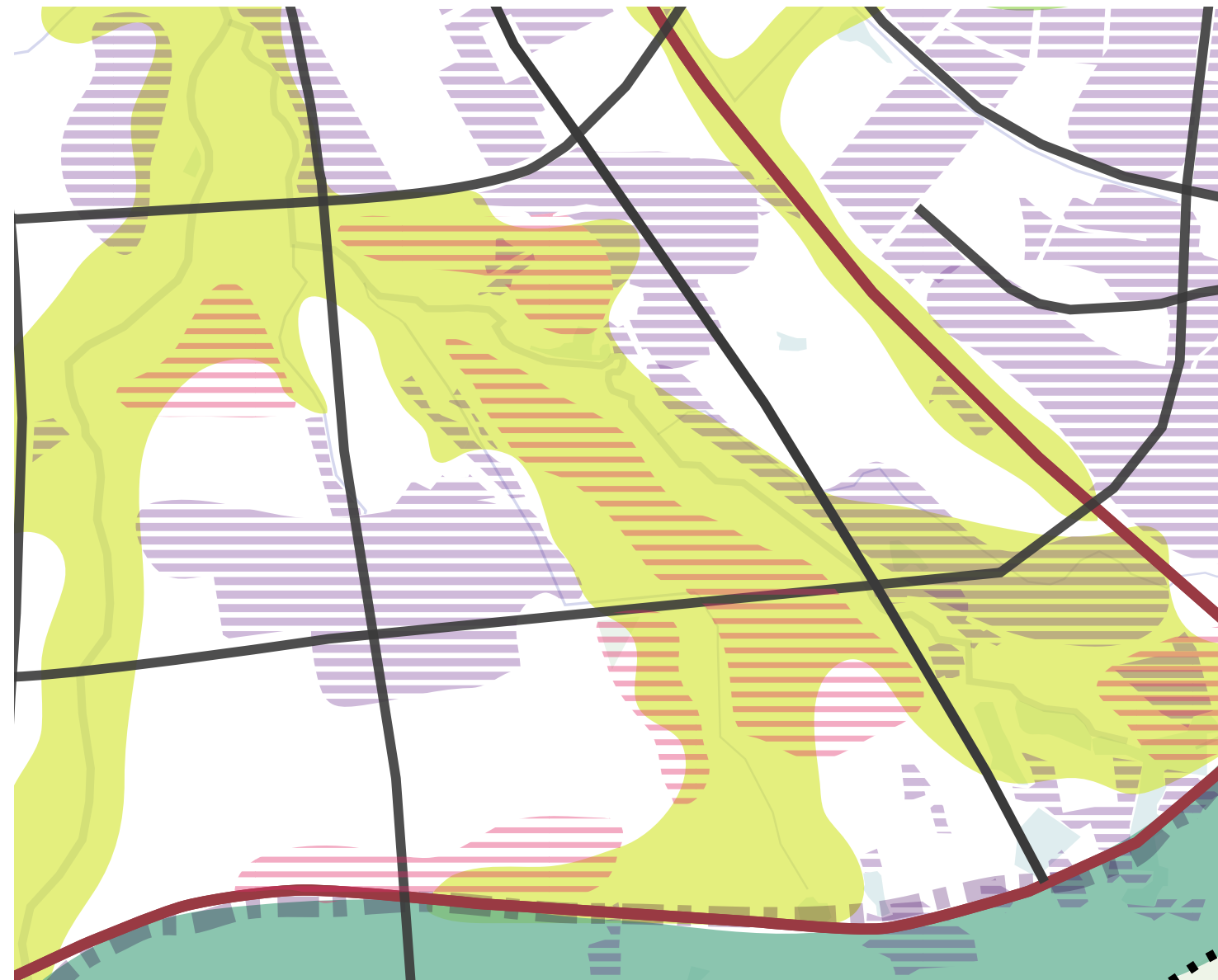
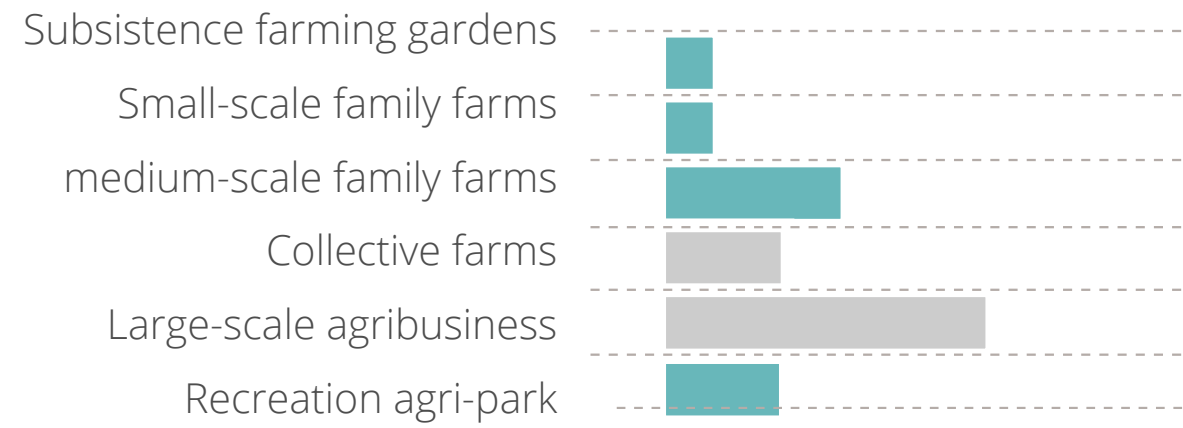
Current master plan

- removing local network
- farmland removed simultaneously



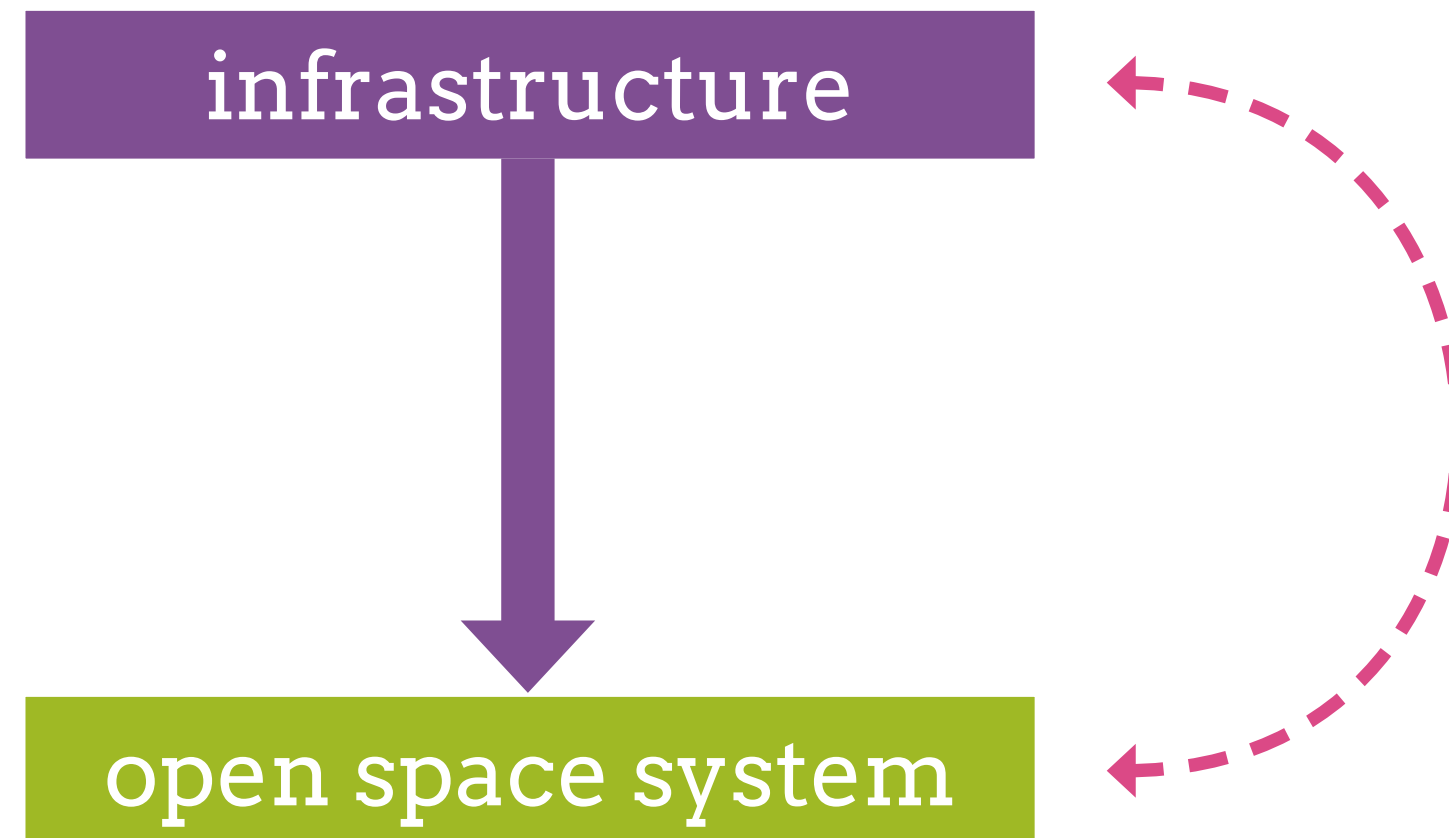
City-scale plan

- regional connection
- Green-blue Corridor
- future urban expansion
- both recreation and environmental protection



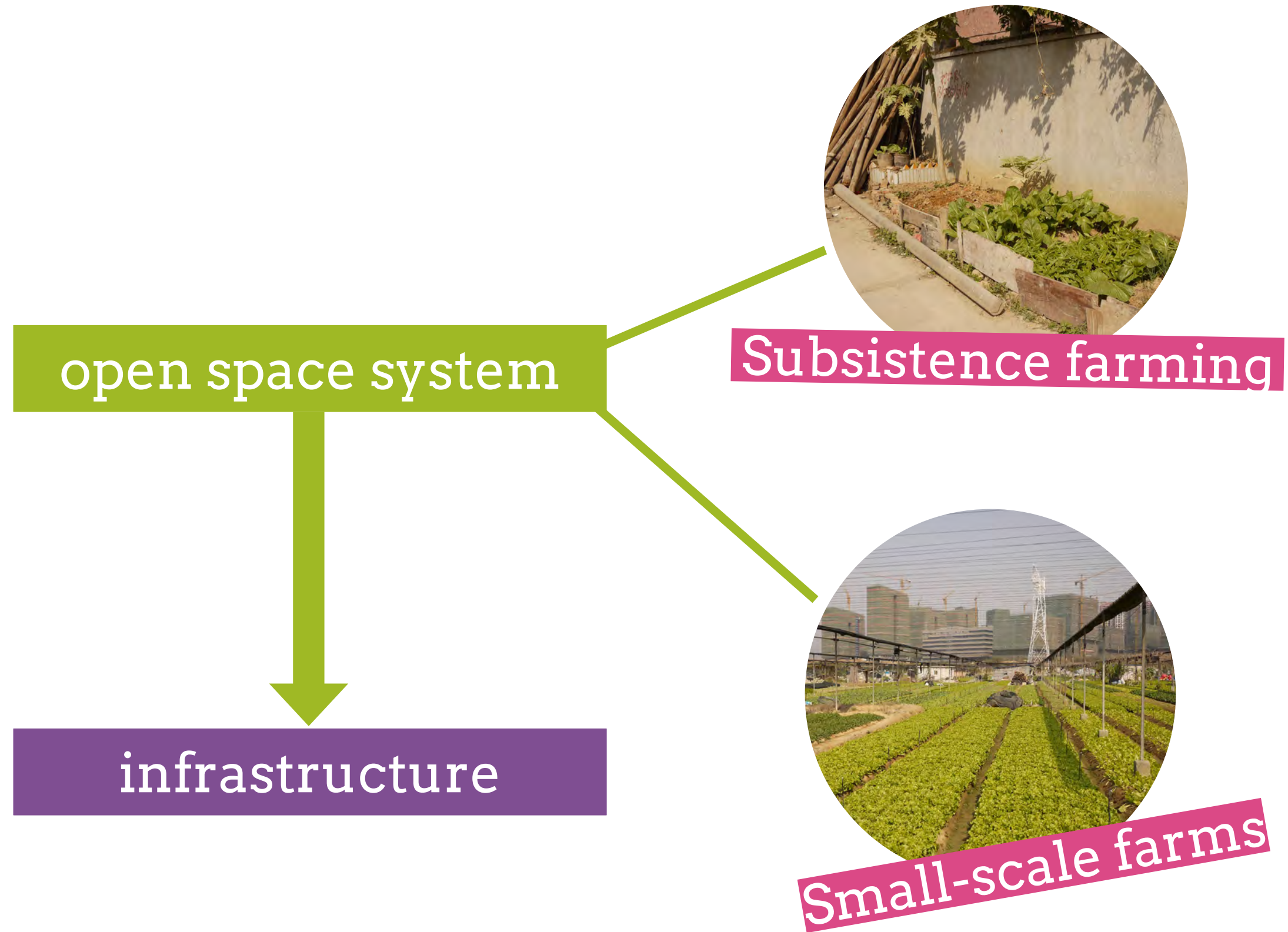
Design development

Changing Hierarchy



Design development

Changing Hierarchy



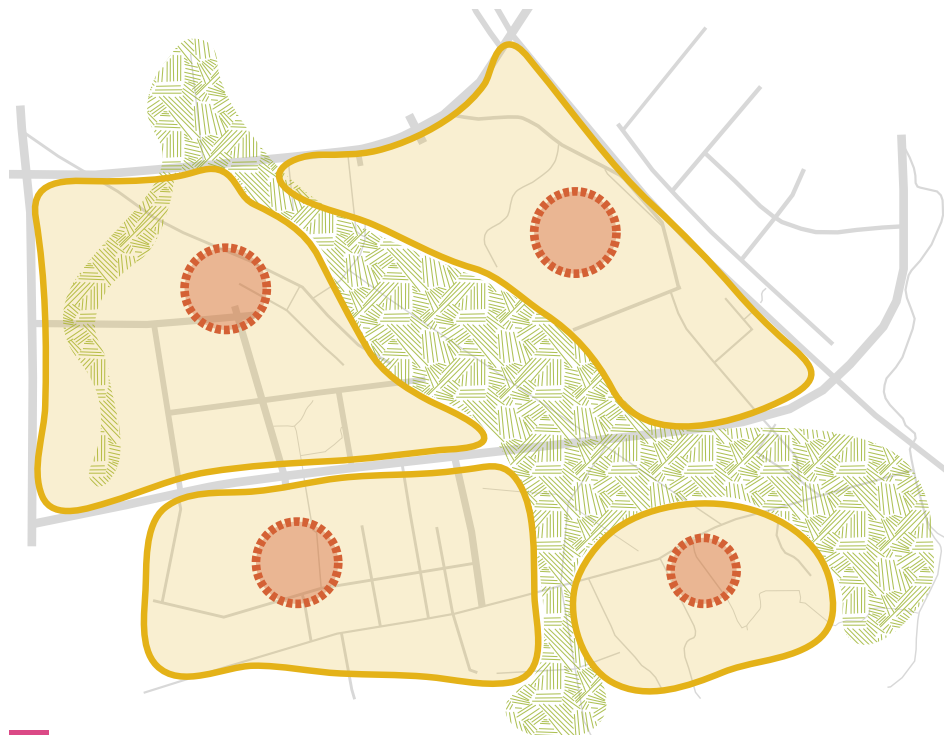
Design development

Changing Hierarchy

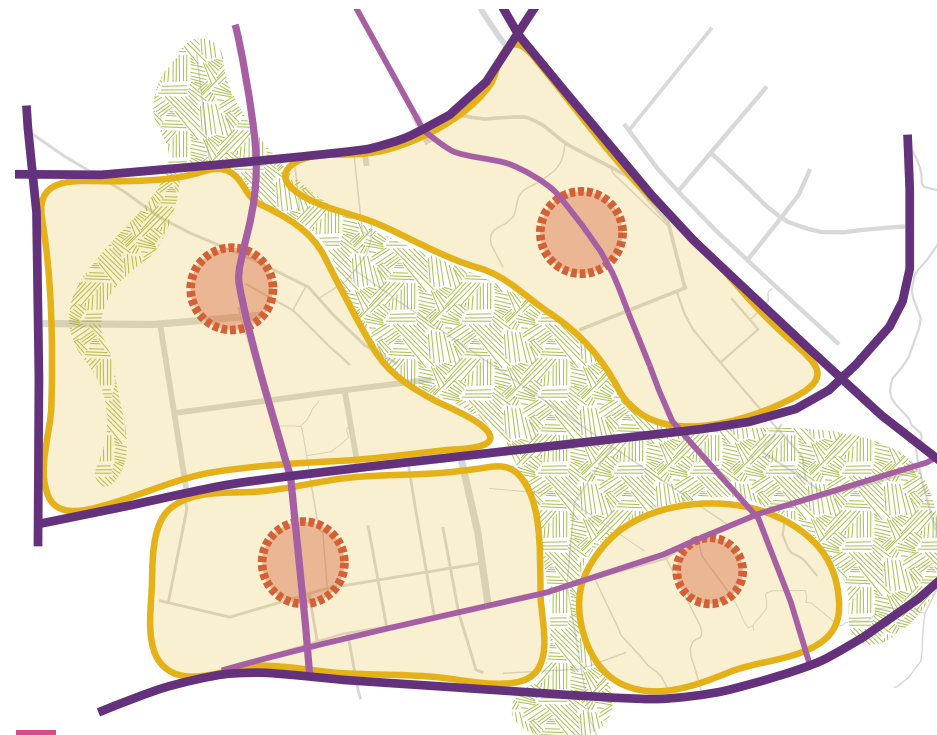
Making use of current network



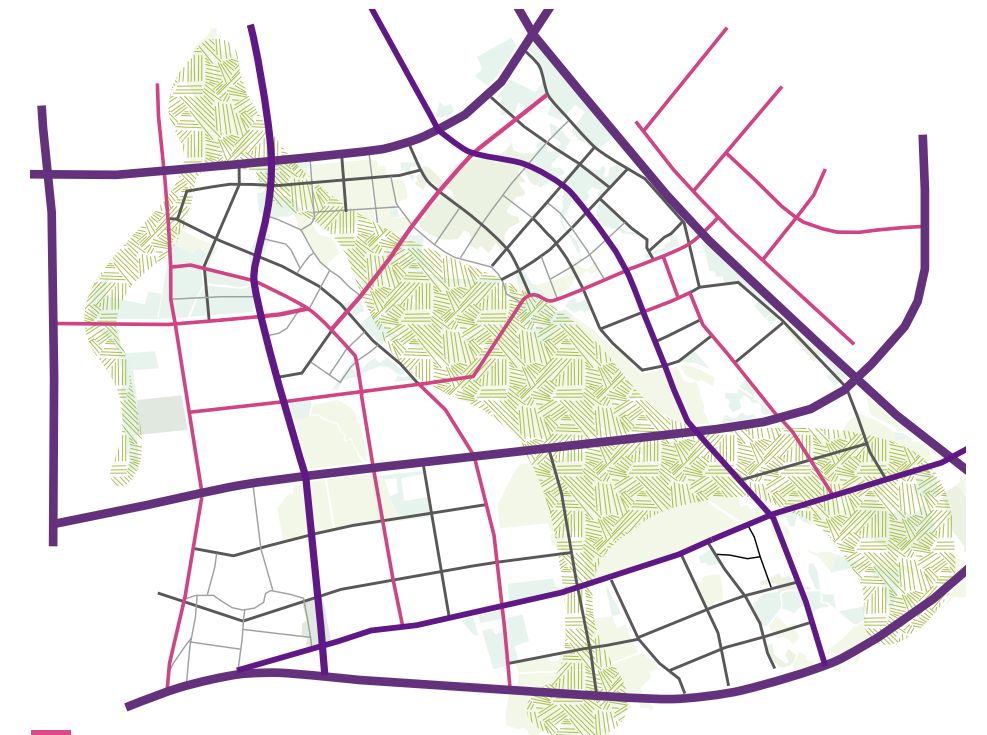
Design development



1 define urban clusters & green corridor



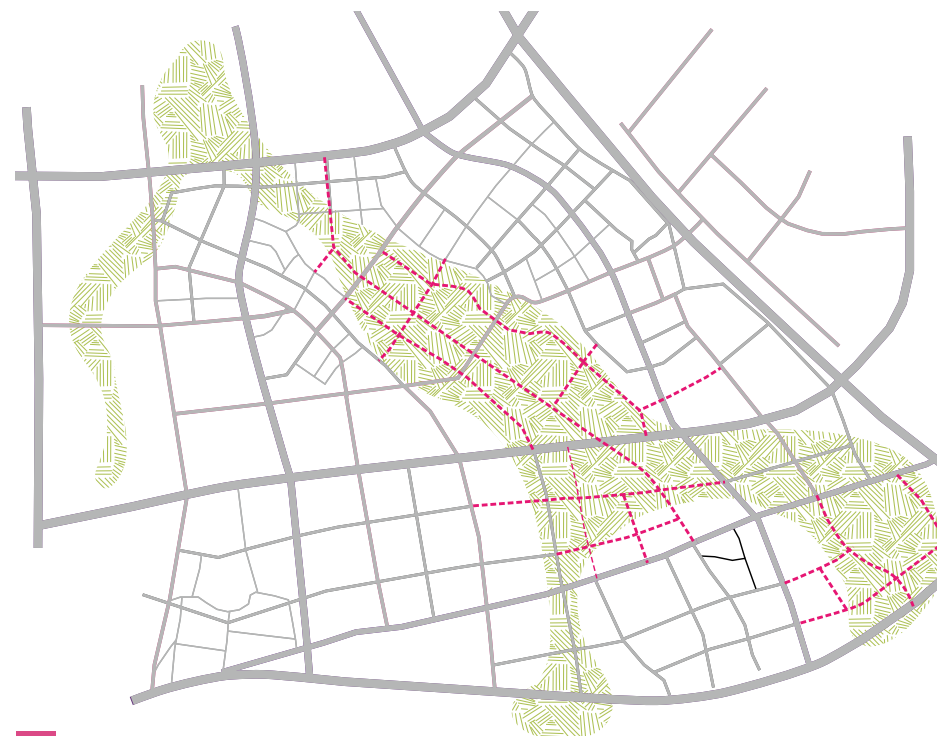
2 define main roads for regional mobility



3 define neighborhood network based on local



4 Linking urban areas by public & cycling paths

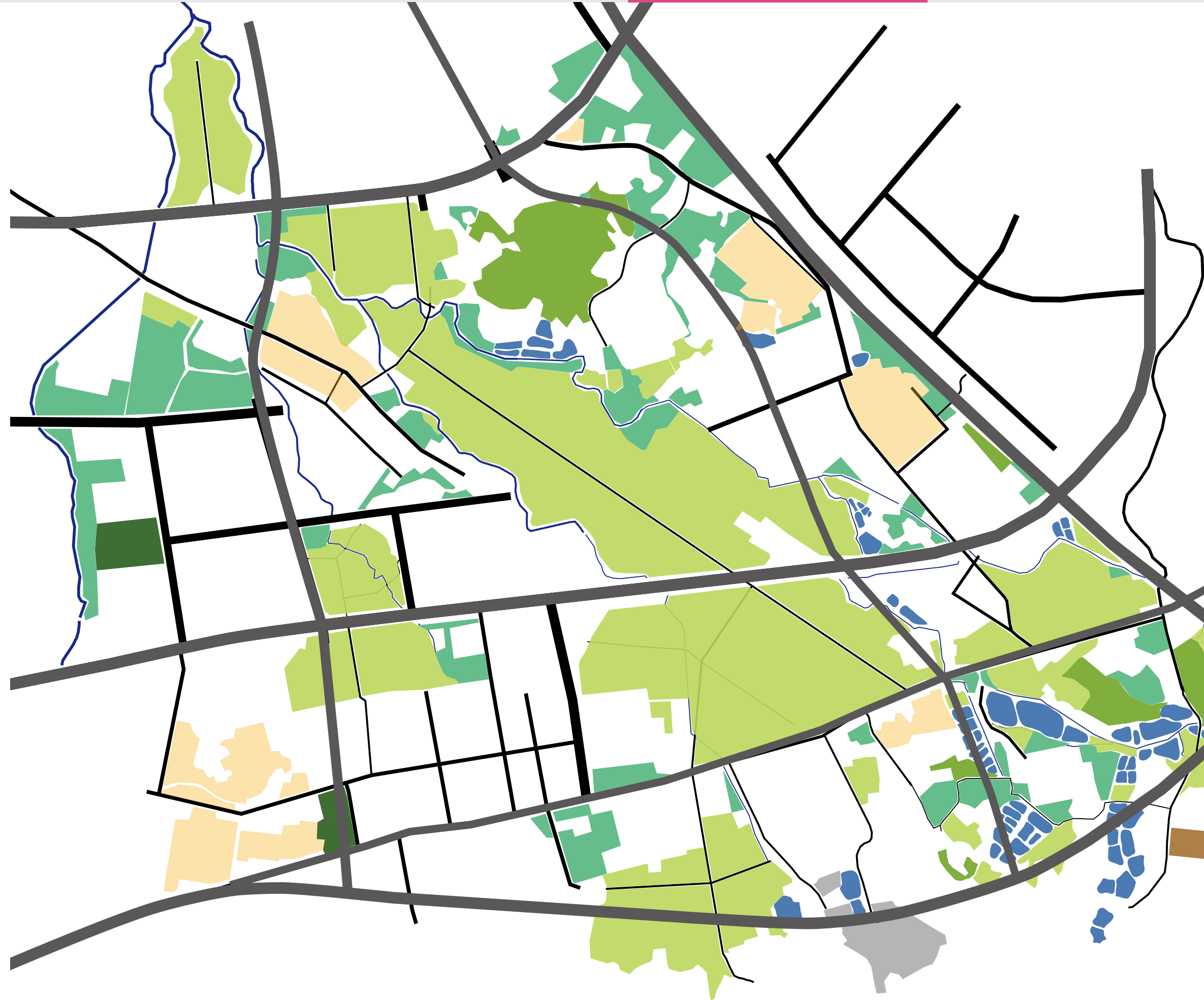


5 future urban growth



6 green-blue network remained

Phasing



Phasing

- Rapid urban growth outside the corridor
 - Small interventions happens in agricultural land
- cycling paths, sport facilities, allotment gardens, squares, etc

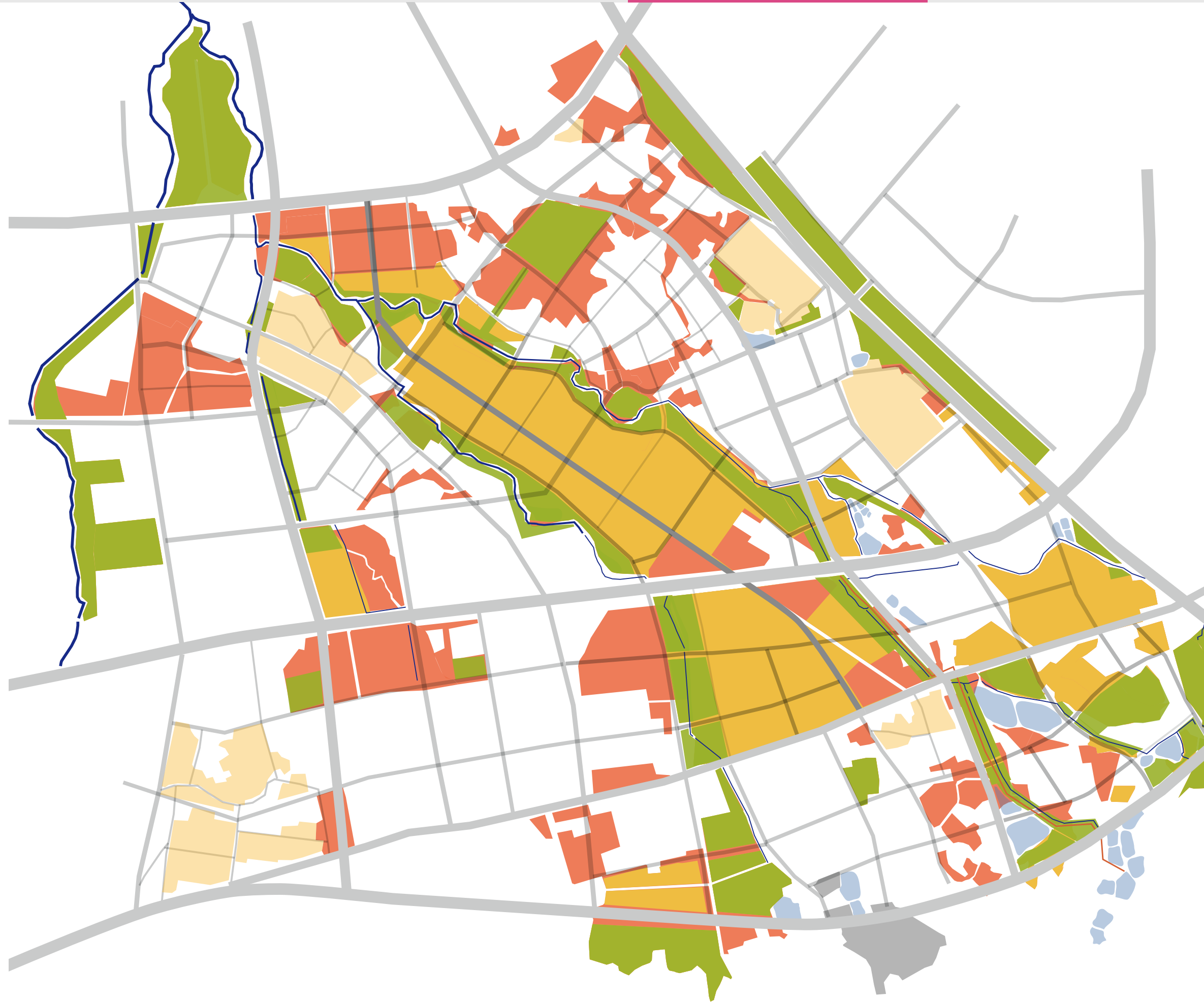


Phasing

- Urban growth on agricultural land
- Preserving green-blue network
- Urban parks grow gradually

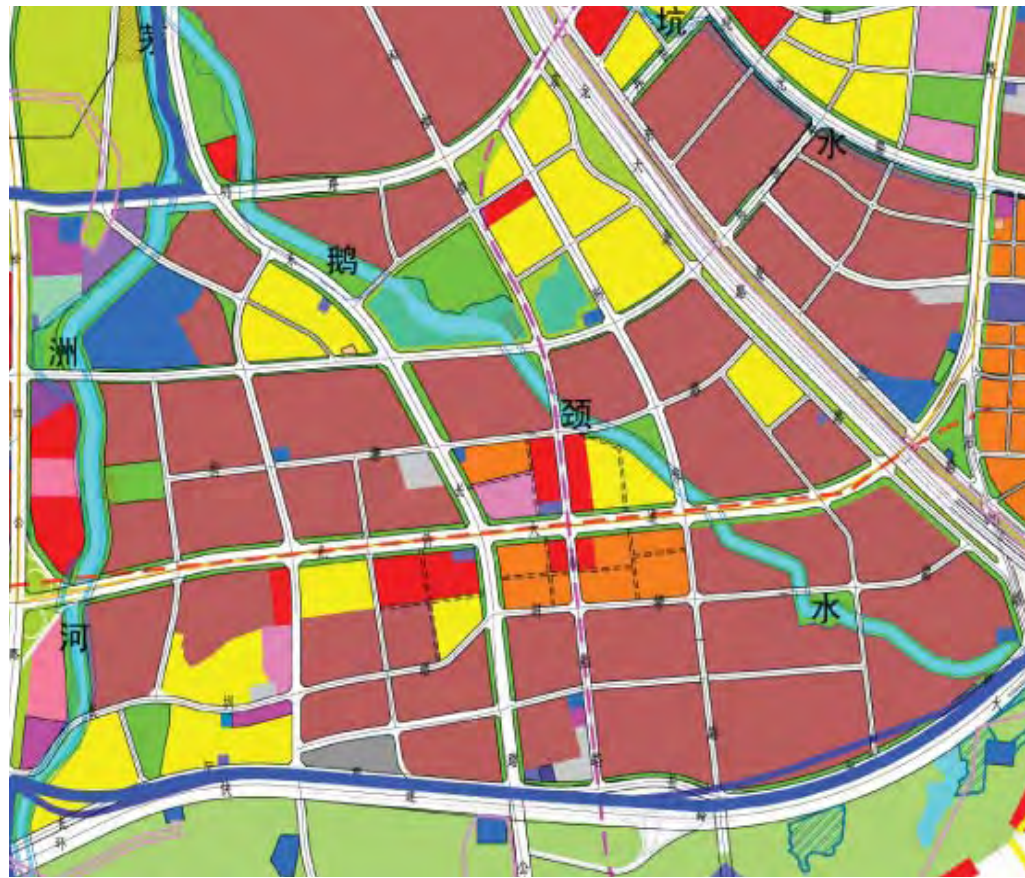


Phasing

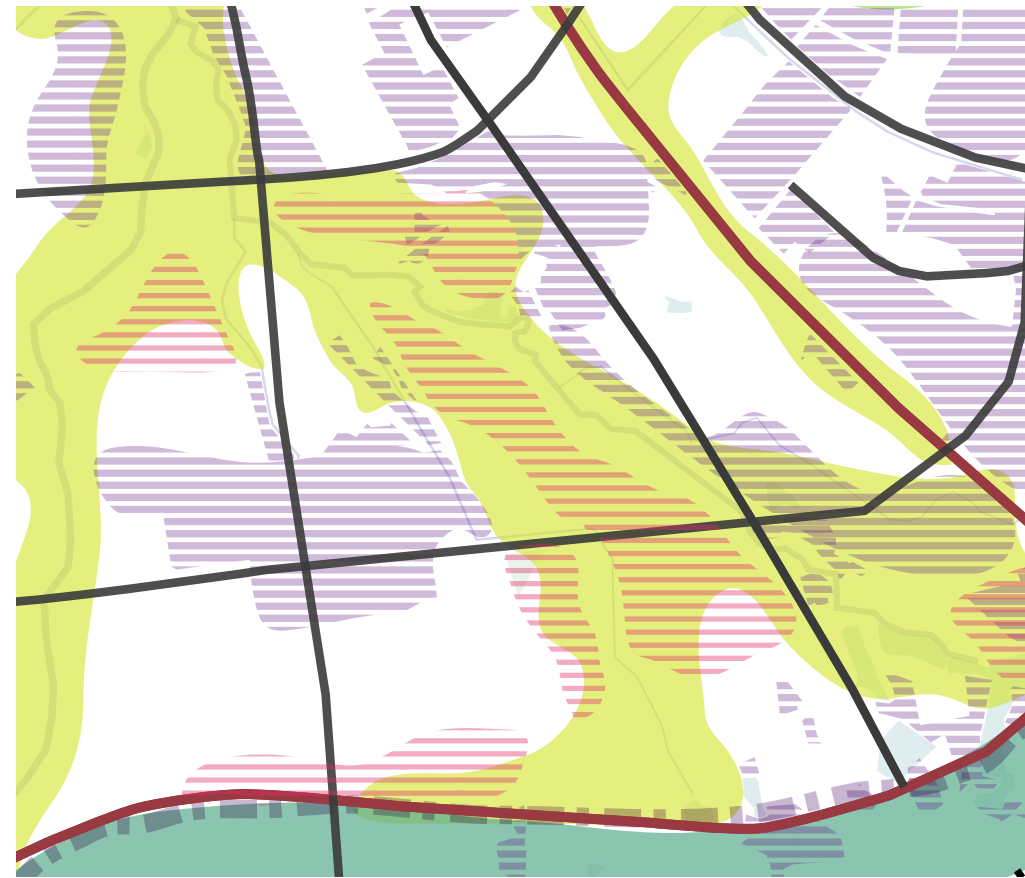


Evaluation

Current plan



City-scale plan



- flexible
- more space for smaller scale
- regional mobility
- green network defined

District-scale plan



- local condition included
- gradual changes
- human-scale street network

結論

CONCLUSION



Research Question

How can planning and design help to facilitate urban agriculture and articulate **AGRICULTURAL LANDSCAPE** and **NEW TOWN DEVELOPMENT** at the structural level in order to improve the current “**Green City**” development scheme of Guangming, Shenzhen?

Conclusion

The importance of integration of agriculture

new town problems

Infrastructure-dominated

City-countryside separation

Placeless and costly open spaces

Rapid transformation

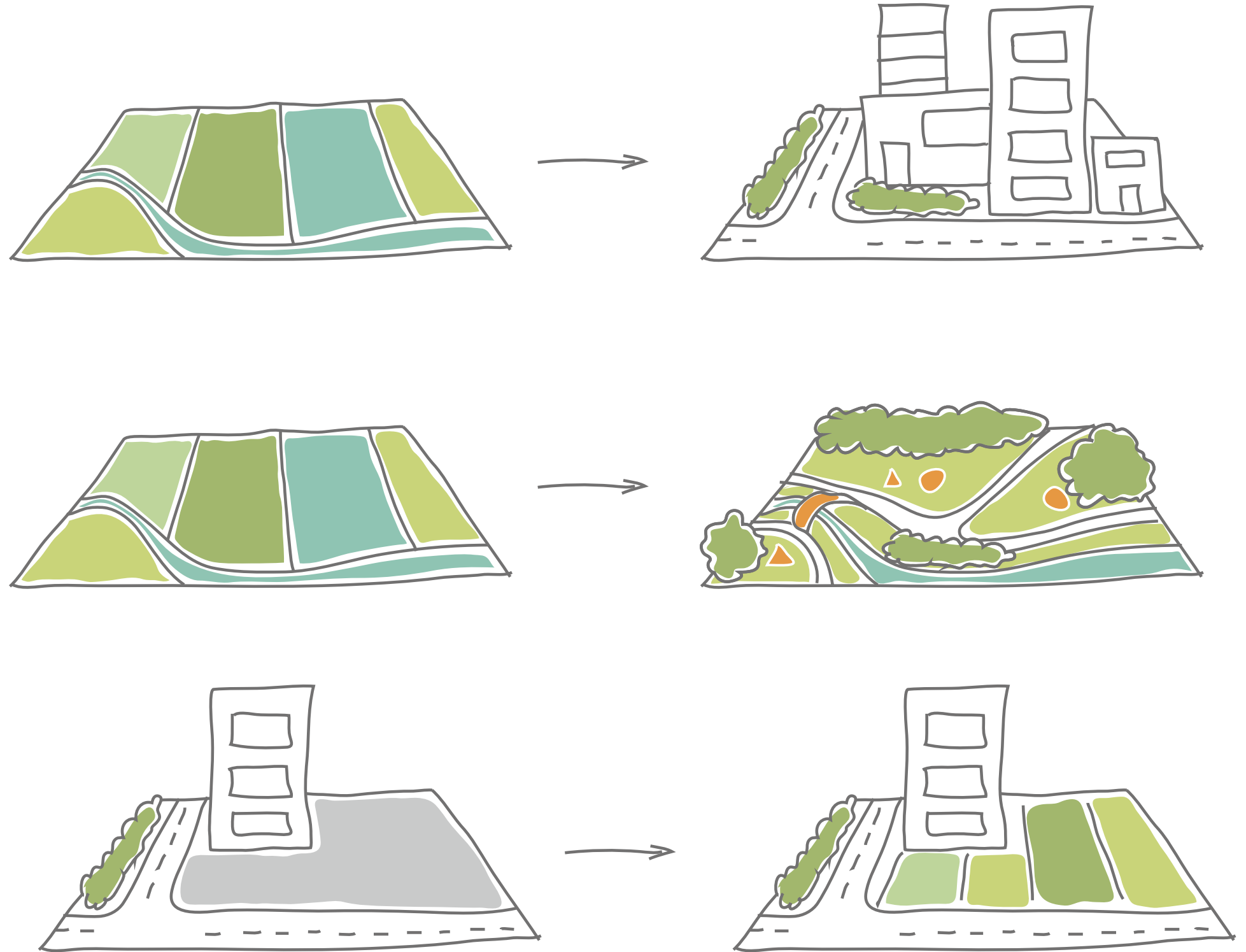
Conclusion

The importance of integration of agriculture



Conclusion

Transformation of agriculture

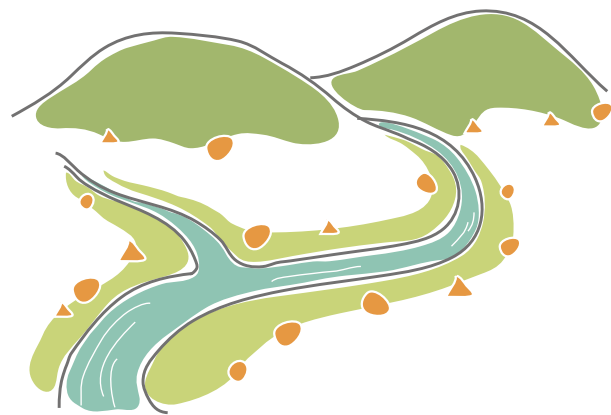


Conclusion

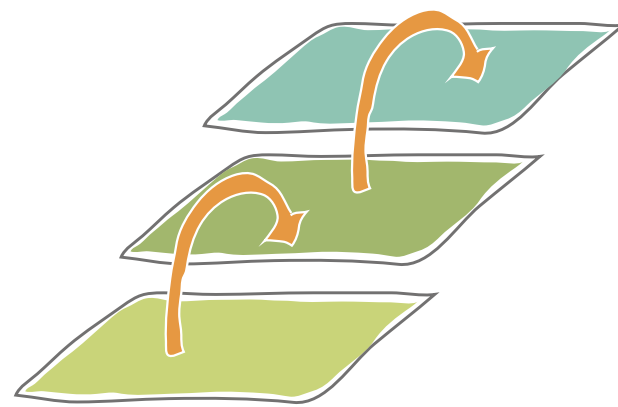
Transformation of agriculture

Agricultural Landscape Approach

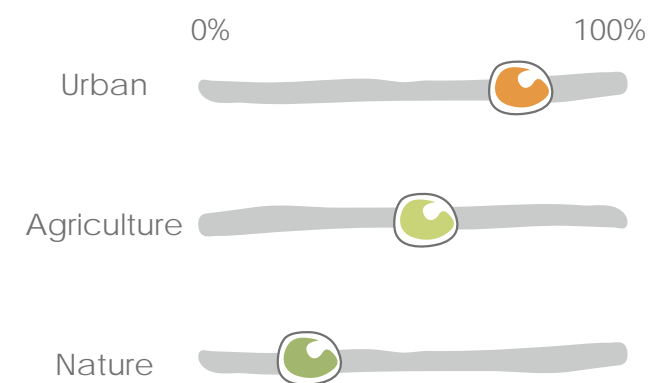
Ecological green network



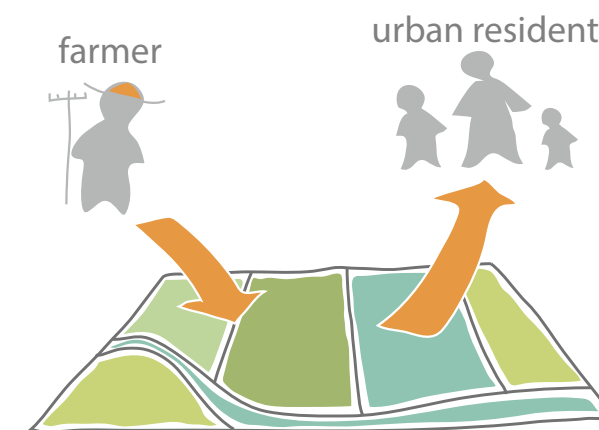
Process over time



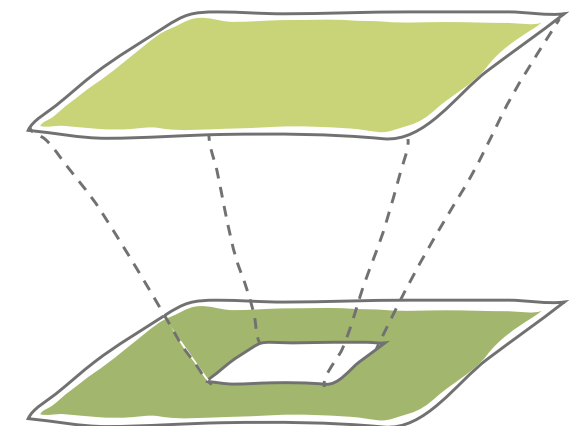
Landscape characteristics



Relevant for people



Multi-scalar framework



Conclusion

Transformation of agriculture

Agricultural Landscape Approach