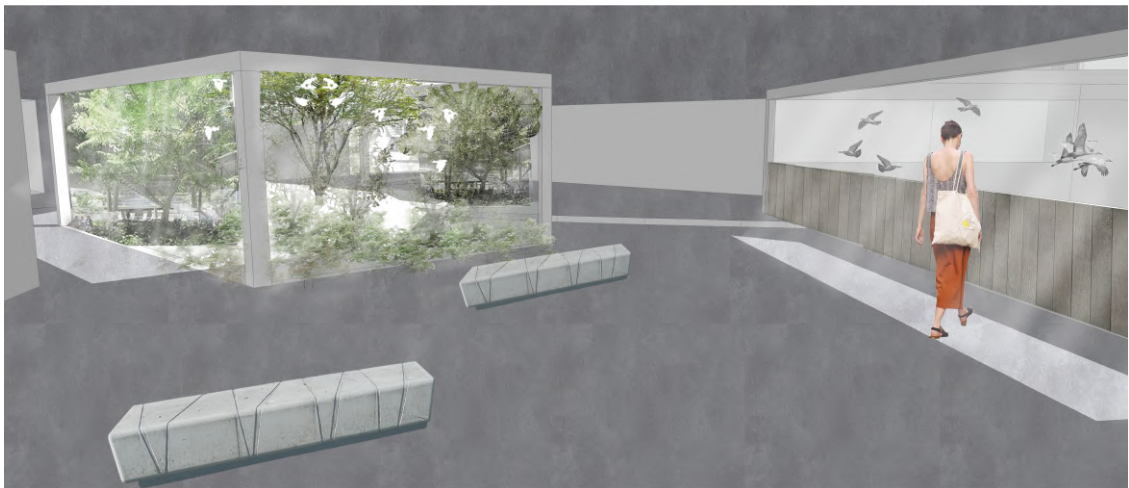


# New Natural Landscape:

Restoring biodiversity in post-industrial region,  
Parkstad-Limburg



*Master thesis*

*New Natural Landscape:*

*Restoring biodiversity in post-industrial region, Parkstad-Limburg*

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## *01 INTRODUCTION*

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Fascination  
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## 1.1 Fascination Biodiversity

If the **bee** disappears, the human will be extinct after four years.



Photograph: Tony Phelps/Alamy Stock Photo

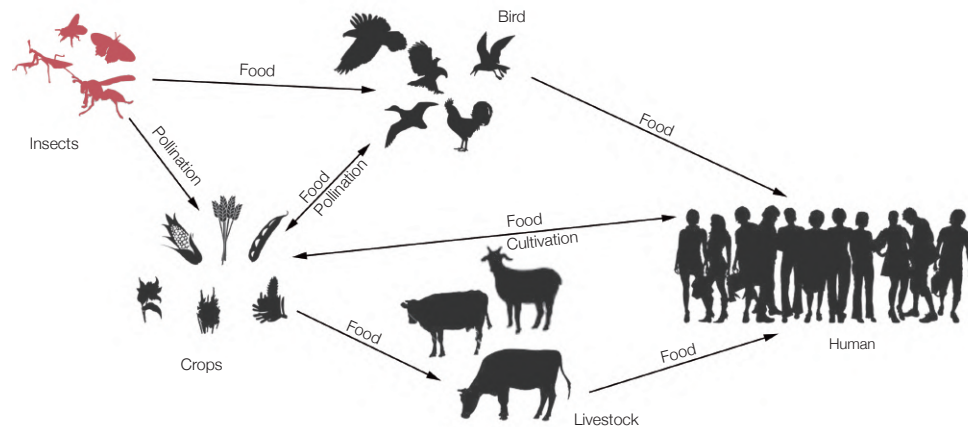
**Bees** are one of the insects. In most people's perceptions it is a pollinator that collects pollen and produces nectar. It seems that the connection with us is only those blooming flowers and sweet honey which the influence does not so big. But we can imagine that when the bees disappear, the flowers cannot be pollinated and gradually extinct which will cause the environment lose color. However, not only flowers, but also many agricultural productions, such as grains, vegetables, fruit trees, etc., are affected. These are the food sources of quite a few species and the reduction of this species will eventually affect human daily life. So to some extent, the disappearance of bees does not cause humans to perish after four years, but it must have a huge adverse impact on human being

### Biodiversity

I always know that biodiversity is important to human, but I don't exactly understand why and how. When I was looking for some photos of bees on the Internet, I occasionally saw this sentence on one website and was shocked by that. Maybe this sentence is a bit exaggerated, but it's the first time, I start to think about the influence of bees, insects, other flora and fauna and the relationship with human.

The bees are just one of the thousands of insects. Imagine that when all the insects are decreasing and disappearing, what will happen to the world at that time?

**Insects** are almost can be found in every environment on Earth. They are a crucial part of many ecosystems and perform many important functions such as inflating soil, pollinating flowers, controlling insects and plant pests. They are also scavengers in nature. Many insects feed on dead animals and fallen trees to achieve the nutrition cycle in nature system. They have great economic value and produce many useful substances such as honey, wax, lacquer and silk. In some places, it is also one of human food (Foundation, 2019).



#### RESEARCH ARTICLE

### More than 75 percent decline over 27 years in total flying insect biomass in protected areas

Casper A. Hallmann<sup>1\*</sup>, Martin Sorg<sup>2</sup>, Eelke Jongejans<sup>3</sup>, Henk Siegel<sup>4</sup>, Nick Hoffland<sup>5</sup>, Heinz Schwan<sup>6</sup>, Werner Stenmans<sup>7</sup>, Andreas Müller<sup>8</sup>, Hubert Sumser<sup>9</sup>, Thomas Hörner<sup>9</sup>, Dave Goulson<sup>10</sup>, Hans de Kroon<sup>11</sup>

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#### Abstract

Global declines in insects have sparked wide interest among scientists, politicians, and the general public. Loss of insect diversity and abundance is expected to provoke cascading effects on food webs and to jeopardize ecosystem services. Our understanding of the extent and underlying causes of this decline is based on the abundance of single species or taxonomic groups only, rather than changes in insect biomass which is more relevant for ecological functioning. Here, we used a standardized protocol to measure total insect biomass using Malaise traps, deployed over 27 years in 63 nature protection areas in Germany (96 unique location-year combinations) to infer on the status and trend of local entomofauna. Our analysis estimates a seasonal decline of 76%, and mid-summer decline of 82% in flying insect biomass over the 27 years of study. We show that this decline is apparent regardless of habitat type, while changes in weather, land use, and habitat characteristics cannot explain this overall decline. This yet unrecognized loss of insect biomass must be taken into account in evaluating declines in abundance of species depending on insects as a food source, and ecosystem functioning in the European landscape.

#### Introduction

Loss of insects is certain to have adverse effects on ecosystem functioning, as insects play a central role in a variety of processes, including pollination [1, 2], herbivory and detritivory [3, 4], nutrient cycling [5] and providing a food source for higher trophic levels such as birds, mammals and amphibians. For example, 80% of wild plants are estimated to depend on insects for pollination [6], while 60% of birds rely on insects as a food source [7]. The ecosystem services provided by wild insects have been estimated at \$67 billion annually in the USA [8]. Clearly, preserving insect abundance and diversity should constitute a prime conservation priority.

Current data suggest an overall pattern of decline in insect diversity and abundance. For example, populations of European grassland butterflies are estimated to have declined by 50% in abundance between 1990 and 2011 [9]. Data for other well-studied taxa such as bees [10–14]

PLOS ONE | <https://doi.org/10.1371/journal.pone.0180600> October 18, 2017

### Where have all our insects gone?

There is a crisis in the countryside – and a massive decline in insect numbers could have significant consequences for the environment  
by Robin McKie, Observer science editor

When Simon Leather was a student in the 1970s, he took a summer job as a postman and delivered mail to the villages of Kirk Hammerton and Green Hammerton in North Yorkshire. He recalls his early morning walks through its lanes, past the porches of houses on his round. At virtually every home, he saw the same picture: windows plastered with tiger moths that had been attracted by lights the previous night and were still clinging to the glass. “It was quite a sight,” says Leather, who is now a professor of entomology at Harper Adams University in Shropshire.

But it is not a vision that he has experienced in recent years. Those tiger moths have almost disappeared. “You hardly see any, although there used to be thousands in summer and that was just a couple of villages.”

It is an intriguing story and it is likely to be repeated over the next few weeks. The start of summer is the time of year when the nation's insects should make their presence known by coating countryside windows with their fluttering presence, and splattering themselves on car windcreens. But they are spectacularly failing to do so. Instead they are making themselves newsworthy through their absence. Britain's insects, it seems, are disappearing.

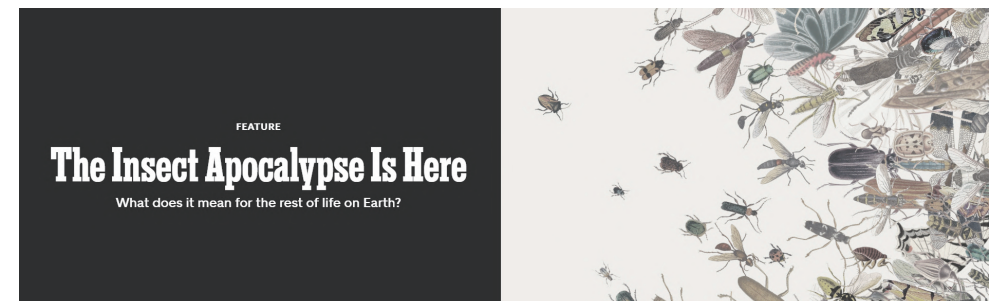
This point was underlined last week when [tweets from the naturalist and TV presenter Chris Packham](#) went viral after he commented on the absence of insects during a weekend at his home in the New Forest. Packham said he had not seen a single butterfly in his garden, and added that he sleeps with his windows open but rarely finds craneflies or moths in his room in the morning. By contrast, they were commonplace when he was a boy. “Our generation is presiding over an ecological apocalypse and we’ve somehow or other normalised it,” he later said.

Certainly, the statistics are grim. Native ladybird populations are crashing; three quarters of [butterfly species](#) – such as the painted lady and the Glanville fritillary – have dropped significantly in numbers; while bees, of which there are more than 250 species in the UK, are also suffering major plunges in populations, with great yellow bumblebees, solitary potter flower bees and other species declining steeply in recent years. Other threatened insects include the New Forest cicada, the tansy beetle and the oil beetle.

As for moths, some of the most beautiful visitors to our homes and gardens, the picture is particularly alarming. Apart from the tiger moth, which was once widespread in the UK, the V-moth (*Marcaria wauraria*) recorded a 99% fall in numbers between 1968 and 2007 and is now threatened with extinction, a fate that has already befallen the orange upwinging, the bordered gothic and the Brighton wainscot in recent years.

Of course, they are not just eaten by people. Insects are the sole food source for many amphibians, reptiles, birds, and mammals, making their roles in food chains and food webs extremely important. It is possible that food webs could collapse if insect populations decline (Foundation, 2019).

Insects is quite important to human being. A lot of research and paper focus on Insects issue. It is reported that over past 30 years more than 75% insects have disappeared in Netherlands, Germany and also the United Kingdom. This huge number has sounded the alarm to human, and more and more research is beginning to focus on how to protect insects.





## 1.1 Fascination Biodiversity

IUCN: Is this the kind of world we want?



Source: IUCN: Is this the kind of world we want?, 2019

Not only insects, but also other species are disappeared in the world. The video of The International Union for Conservation of Nature (IUCN) asked a question: WHAT KIND OF WORLD DO WE WANT?

IUCN notes in this video that many species are threatened with extinction.

At threat of extinction are

- 1 out of 8 birds
- 1 out of 4 mammals
- 1 out of 4 conifers
- 1 out of 3 amphibians
- 6 out of 7 marine turtles

75% of genetic diversity of agricultural crops has been lost

75% of the world's fisheries are fully or over exploited

Up to 70% of the world's known species risk extinction if the global temperatures rise by more than 3.5°C

1/3rd of reef-building corals around the world are threatened with extinction

Over 350 million people suffer from severe water scarcity

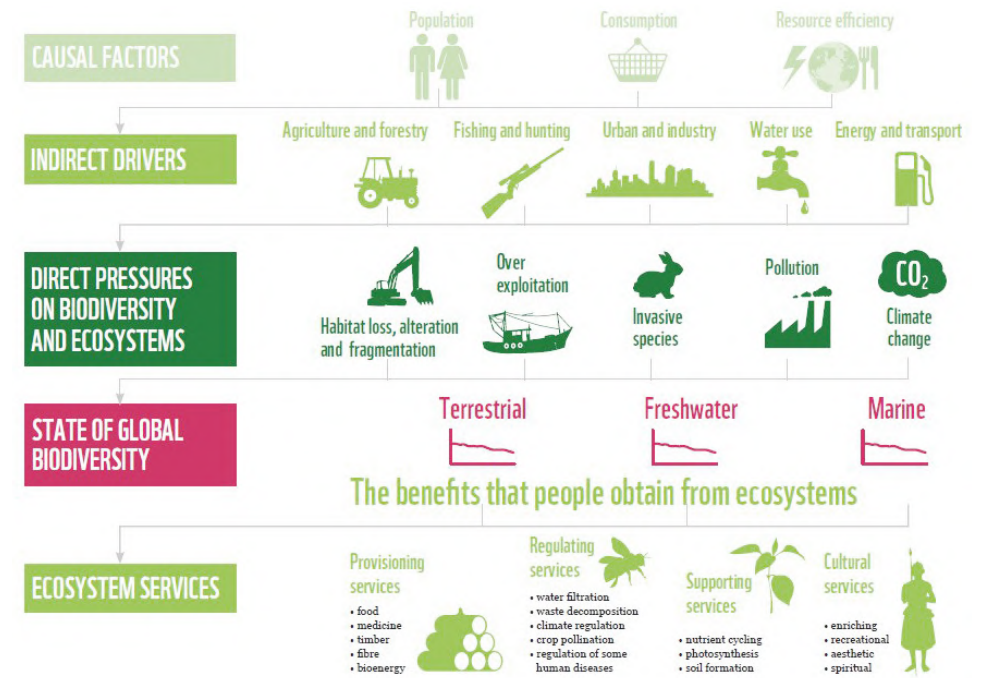
(IUCN: Is this the kind of world we want?, 2019)

Over a million species will be lost in the coming 50 years

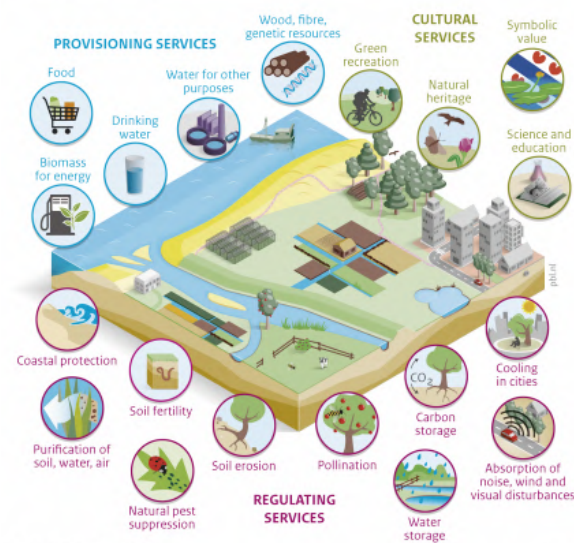
Destruction of Biodiversity has become a Global Problem

Our lives are inextricably linked with biodiversity and ultimately its protection is essential for our very survival

Importance of biodiversity-ecosystem services



Examples of ecosystem services in the Netherlands



Source: PBL, WUR, CICES 2014

www.pbl.nl

Ecosystem services are the many and varied benefits that humans freely gain from the natural environment and from properly-functioning ecosystems. They are grouped into four broad categories: provisioning, such as the production of food and water; regulating, such as the control of climate and disease; supporting, such as nutrient cycles and oxygen production; and cultural, such as spiritual and recreational benefits (En.wikipedia.org, 2019).

Biodiversity as an important element affects ecosystem services which are closely related to human well-being, like food, drinking water, green recreation and climate regulation, etc.



## 1.1 Fascination Biodiversity

### Restore Biodiversity

Biodiversity is inextricably linked to human survival. In recent years, the problem of biodiversity loss has become more serious, and it is imperative to restore biodiversity.

#### Genetic Diversity



Diversity of genes within a species



#### Species Diversity



Diversity among species in an ecosystem



#### Ecosystem Diversity



Diversity of a habitat in a given unit area



#### What is biodiversity?

Biodiversity is the variety and variability of life on Earth and often recognized at three levels-**genetic, species, and ecosystem diversity.**

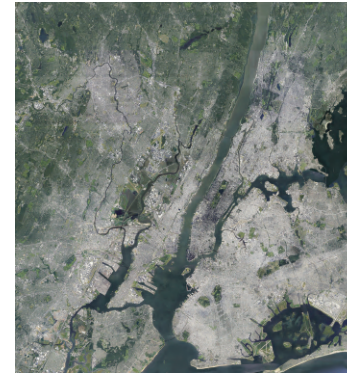
Genetic diversity is the diversity of the genetics of a living being. This genetic information is stored in the genes of the individual organisms. Any species or individual organism holds a large number of genetic genes and can, therefore, be considered as a gene pool. The richer the genes contained in a species, the stronger its ability to adapt to the environment. Hence, genetic diversity is the basis for life evolution and species differentiation.

Species are the basic unit of organism taxonomy and species diversity is the main core of biodiversity. It includes two aspects, one refers to the species richness in a certain area, which can be called regional species diversity; the second refers to the degree of uniformity of ecological species distribution, called ecological diversity or community species diversity. Species diversity is an objective indicator of the abundance of biological resources in a given area.

An ecosystem is a natural complex of various organisms and their surroundings. All the species are the components of the ecosystem. In the ecosystem, not only the species interdependent and mutually restricted, but also they interact with various environmental factors around them. The ecosystem's function is to circulate various chemical elements on the earth and maintain the normal flow of energy between the components. Habitat diversity is the basis for the formation of ecosystem diversity, and the diversity of biomes can reflect the ecosystem typology diversity.

### High density&expanding cities pay more value

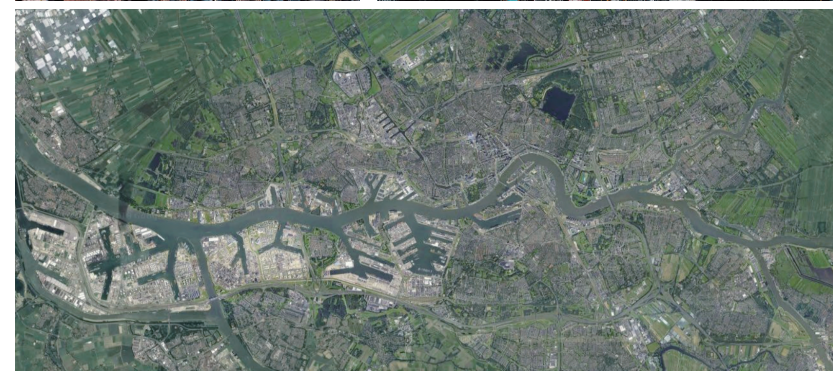
For high-density and expanding cities like New York, Hongkong and Rotterdam, enhancing biodiversity means some value conversion of land space, they need to sacrifice some benefits of themselves.



New York



Hongkong



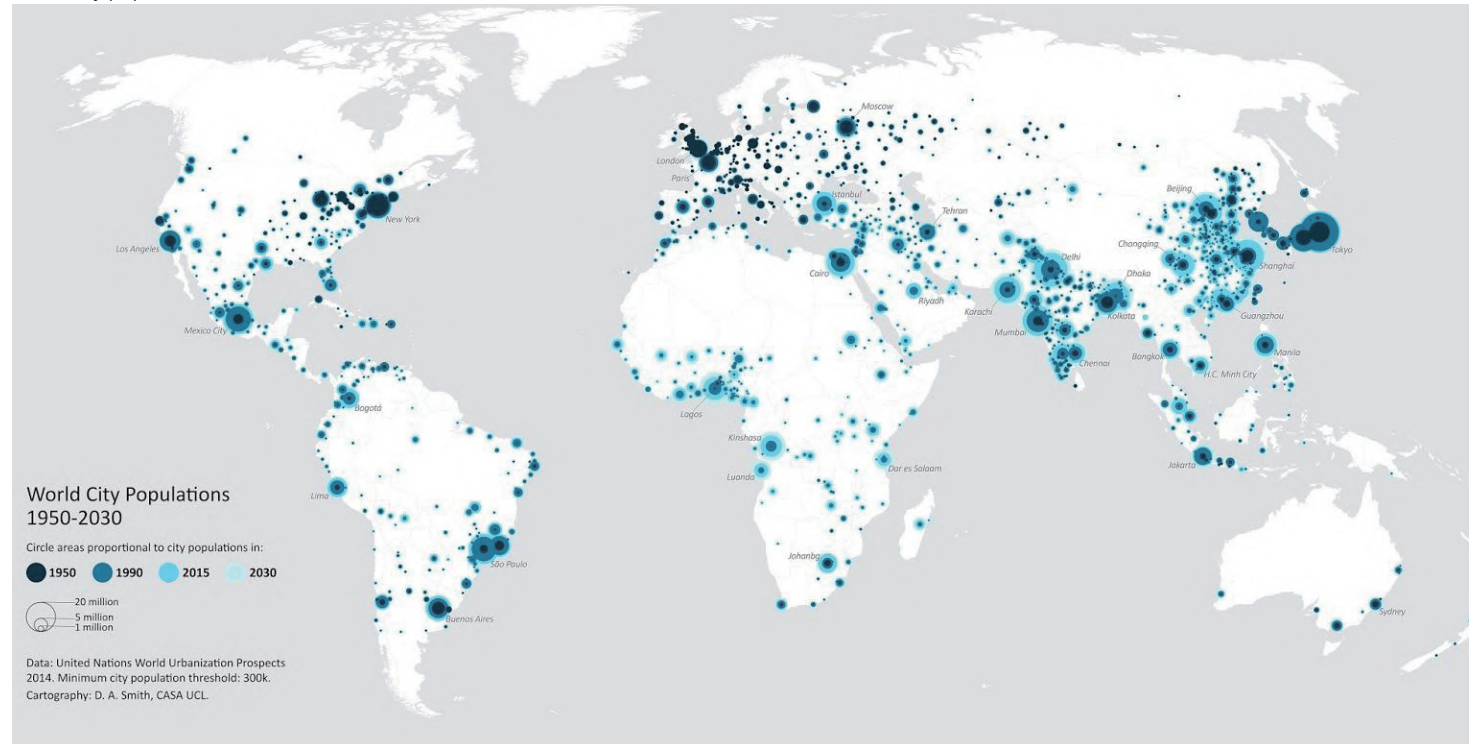
Rotterdam





## 1.1 Fascination Shrinkage

World city populations 1950-2030



However, compare with these expanding cities, there is another type of cities in the world---*shrinking cities*.

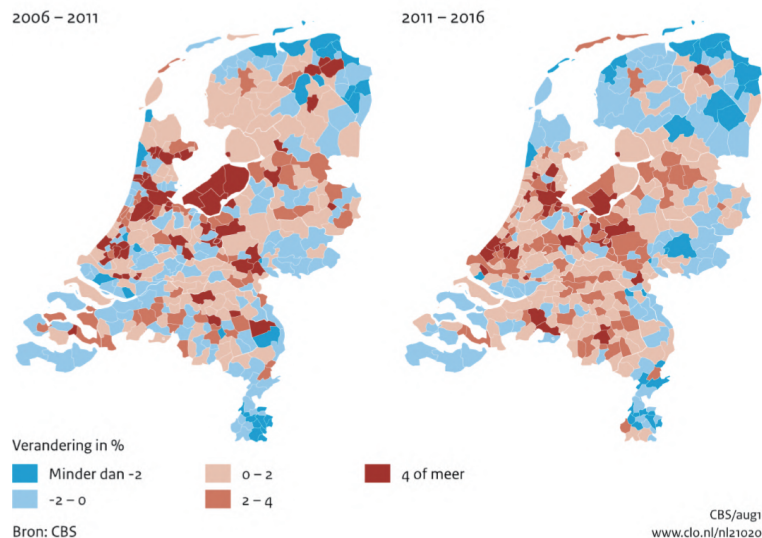
### Shrinking City:

Massive population loss because a specific interplay of the economic, demographic and settlement systems, environmental hazards, and changes in political or administrative systems (Haase, 2013).

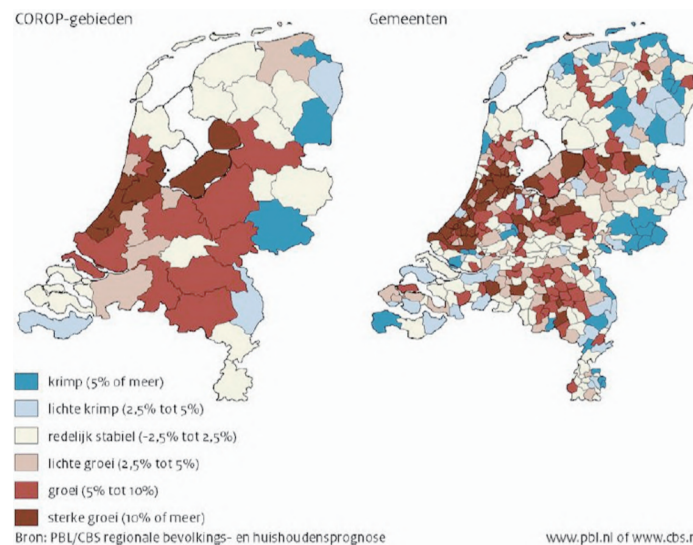
Now, the Central European traditional industrial zone, most areas of Eastern Europe, the Ruhr area of Germany and the Rust Belt of the United States are the famous urban shrinking region. The aging population in Japan is already a very serious problem, and now there already has many shrinking cities. We can see from the map until 2030, the population of Western Europe, Canada, and the northern United States are gradually stabilizing and there is a risk of shrinking cities. In Asian, although the population and scale of the city are growing, on the other hand, it reflects the continuous decline of the rural population. In the future, most rural areas in China, Japan and Southeast Asia, shrinkage will be a serious problem.

The shrinkage problem is also a global problem. How to improve the shrinking situation will be a big challenge in the future. Meanwhile, this means that the results of the research on these issues have a wide range of applicability.

Population development per municipality



Regional and local prognosis 2015-2030



Although, Dutch population is still growing and will keep growing in the next decades. Growth divided very unevenly across the country, and some regions are already shrinking (Bontje, 2018).

-Recent shrinkage started in 1990s at the country's edges / border regions.

-More recently spreading more across the country.

-Mainly rural (and/or former industrial) areas, villages, smaller towns.

-Exception: *Parkstad Limburg region, the only shrinking urban region in the Netherlands.*

(Bontje, 2018)



1.1 Fascination Shrinkage

On the one hand, shrinkage leads to vacancies and derelict land in the affected neighborhoods. On the other hand, shrinkage may provide opportunity for the creation of new green surroundings and recreational facilities. The mismatch between supply and demand caused by excessive vacant housing has led people to think about reconfiguring or reshaping urban land use patterns. The process of demolition converts developed land back into a natural or seminatural state, thus creating the opportunity for retrofitting green spaces back into the urban form. These abandoned plots offers great potential for nature conservation and green space development.

Before



After





## 1.2 Site Background

### PARKSTAD LIMBURG

For Netherlands, the population for lots of cities will still grow in 20 years, but at the border, there are a lot of area facing the shrinkage problem, and the Parkstad Limburg is one of them, which is known for its beautiful Hilly landscape and Coal mine history. This region is the only shrinking urban region in the Netherlands.

As the example site, on the one hand, it has unique landscape typologies and species compare with other parts of the Netherlands. On the other hand, as a typical post-industrial transforming region, the research and design have wide applicability, which can also be adopted by other shrinking sites on the Coal mine belt.

Hilly Landscape



Source: Snowworld Landgraaf

Coal Mine History



Source: Jesse, Nico, Memory of the Netherlands



# 1.2 Site Background

## Typical post-industrial city on coal mine belt

Parkstad Limburg is a conurbation of eight municipalities in South-Limburg in the Netherlands.

Originally, this region used to be several small villages dominated by agriculture.

Due to its convenient location, it has been developed as a transportation base for the Romans which is one important change for this region future's development. Some main roads can still be retraced today.

In the Medieval period, the roman road had been improved and this area benefited a lot as a transportation hub.

For a long time after that, agriculture was the main economic pillar of the region. The city had not yet formed, but it was only some scattered village settlements.

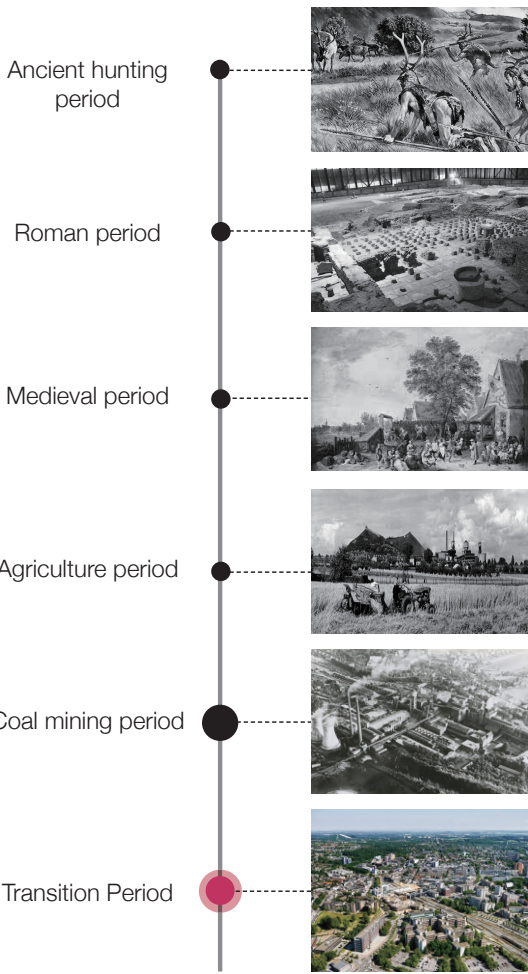
In 1920, the discovery of coal made the region rapidly transformed and developed into an industrial area. During this period, the urban area was rapidly expanding around the mining industrial zone, attracting a large number of mining immigrants and forming a series of city cluster centered on coal mines. Between 1920 and 1974, the growth of mining resulted in Parkstad growing from a few villages to becoming home to some 250,000 people.

However, with the reorganization of the energy market, foreign coal became cheaper, Parkstad lost its competitiveness. The Dutch government announced to close coal mines in 1965 and was been finished in 1975. Now, Parkstad is seeking for new strategy for the transformation of this post-industrial region.



Source: Agence ter

Coal mine belt in the southern Netherlands and adjacent regions



Ancient hunting period

Roman period

Medieval period

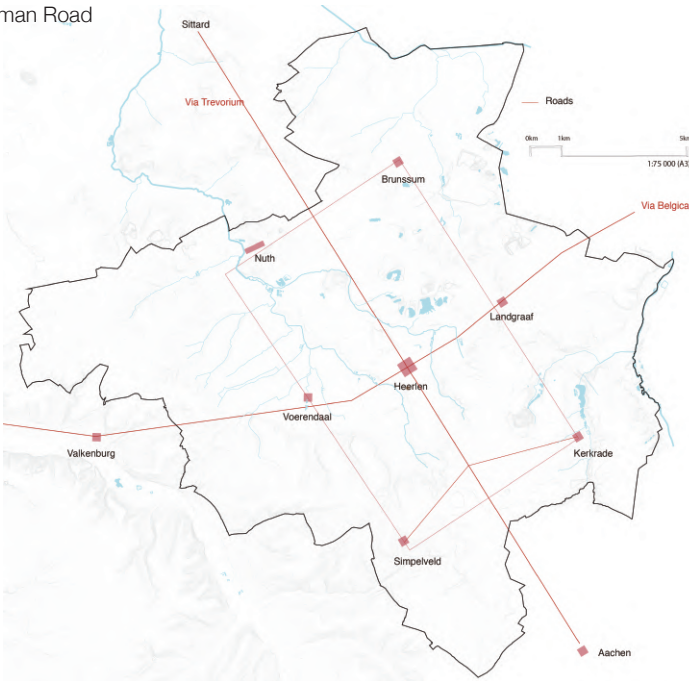
Agriculture period

Coal mining period

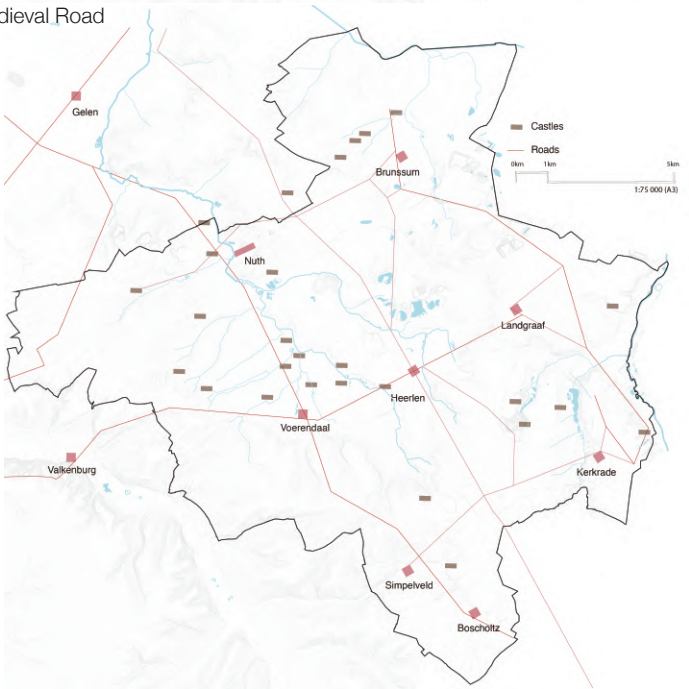
Transition Period



The Roman Road

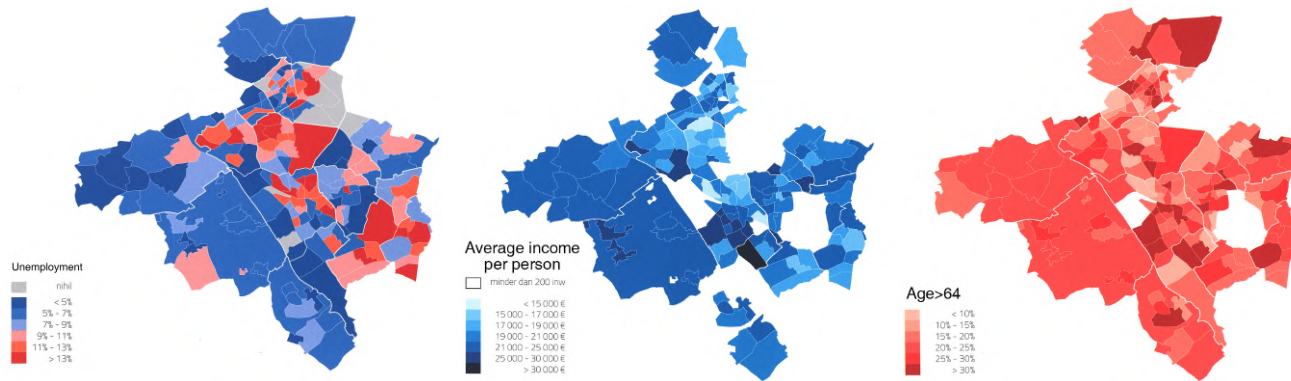


The Medieval Road



### 1.3 Problem Statement Shrinkage

-High unemployment rate and low income

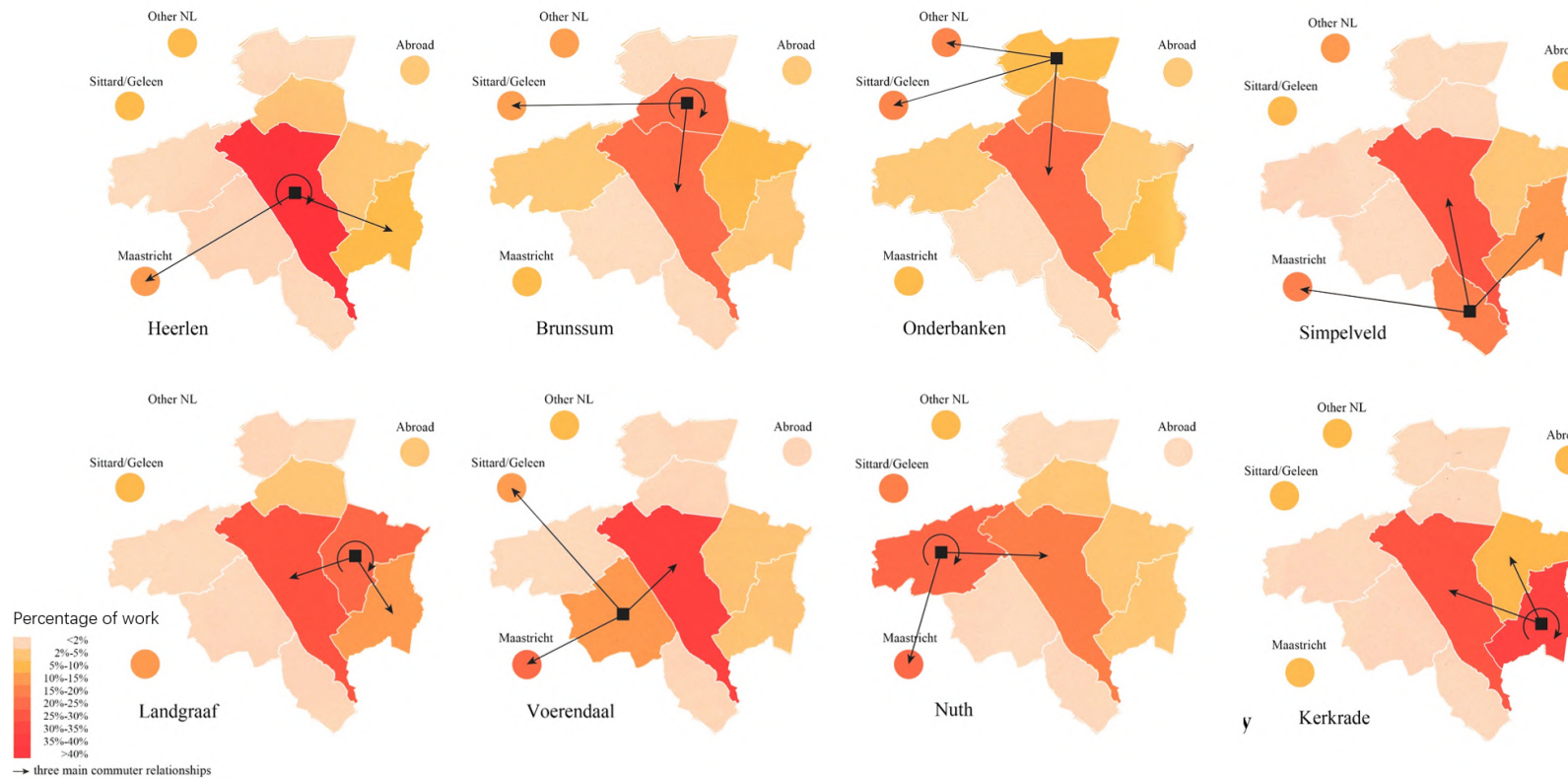


Source: IBA 2015

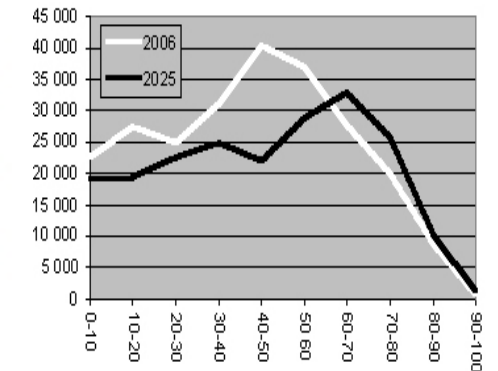
Parkstad lost its main pillar industry, the number of unemployed people increased, the economic recession, the entire region is eager to try to transform and introduce new commercial and industrial investments, but the effect is not obvious.

Since the coal mine industry closed, this area, which used to be flourish of coal mining industry, now is facing a series of problems of shrinkage both in economy and population. The sluggish economy and the lack of job opportunities have led to a large outflow of labor force. The younger people and high-technical migrate to other big cities in Netherlands or cross the border to Belgium and Germany to look for working opportunities. The local population is aging and the education level is low. The report from CBS said that till 2020, the seniors older than 75 years old will be 40000 and till 2060 the number will increase to 55000 in the urban area.

-Labor outflow and aging city



Population age distribution map





### 1.3 Problem Statement Shrinkage

Poor living quality for residents

*Vacant and demolished buildings*



*Bad maintenance of green space and stream system*



A large number of houses in the city are vacant, and the quality of the living environment is not good. A lot of green space but plenty of them are wasteland and poor maintenance for many public open space. The whole city presents a sense of *injury and defeat*. Parkstad lost its identity and became dull and boring. At the same time, due to the coal mine industry, the urban area used to develop around the mineshafts and formed several scattered city centers. After the mining industry closed, the city only filled the gap between these fragments and formed a disorderly urban structure.

In Eastern Europe, despite the emergence of brownfields as a result of de-industrialization, such dramatic land-use changes still are not yet observed. The impacts of shrinkage on land-use can lag; for instance, it takes time until a vacant building is demolished or a new land-use is finally established (Haase 2013). In an area with a larger proportion of vacancy and derelict land, under-utilization can pose severe problems for the maintenance of the service for the whole area (Haase 2013).



### 1.3 Problem Statement Biodiversity

The disorderly urban interior divides the green space system into a fragmented habitat that is not conducive to species migration. The mining industry used to destroy the ecological environment and the restoration of the ecosystem is not good now. Large areas of intensive agricultural land (grassland and farmland) increase production through excessive human intervention in natural systems, resulting in a large number of homogenized landscapes.

Fragment green space, isolated species provenances habitat.

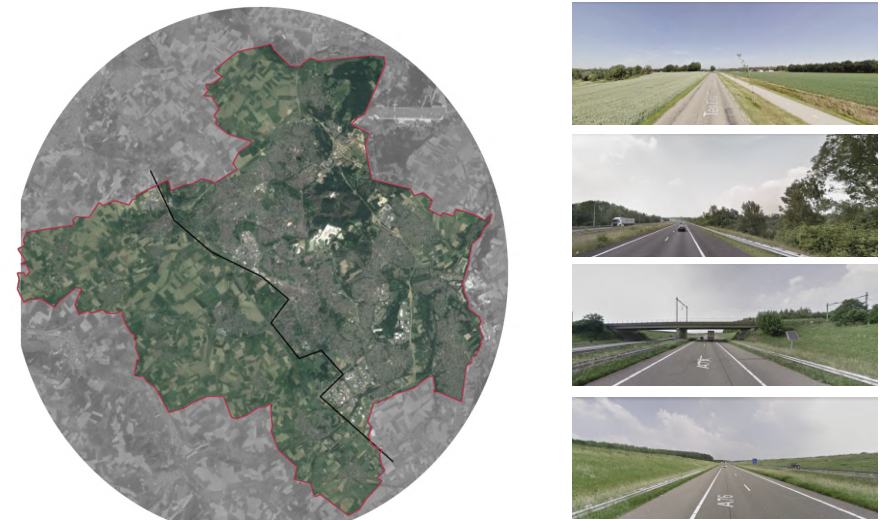


A large number of intensive homogenized agriculture

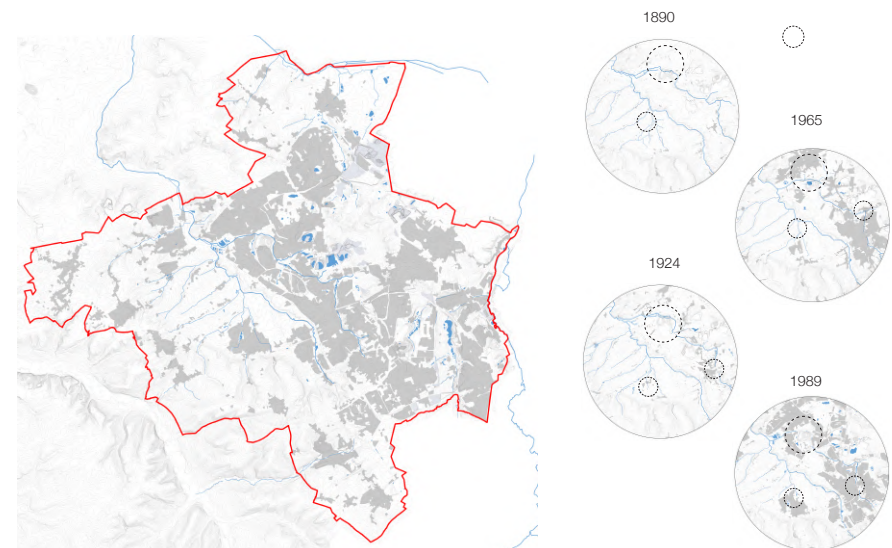


There are obvious boundaries(HighwayA76, N281) between the city and the natural system that limit the interaction and connectivity of each other. During the development process, the water system experienced from a complete and coherent water system to being buried underground because of industrial and urban construction, and now some parts are start to recover. But the system still have a lot of breakpoints and bad water quality make many species couldn't use it very well.

Clear boundary between Nature and Urban system, limited interaction(HighwayA76, N281)



Disconnected water system and bad water quality





## 1.4 Research Objective & Questions

### Timeline for Nature elements

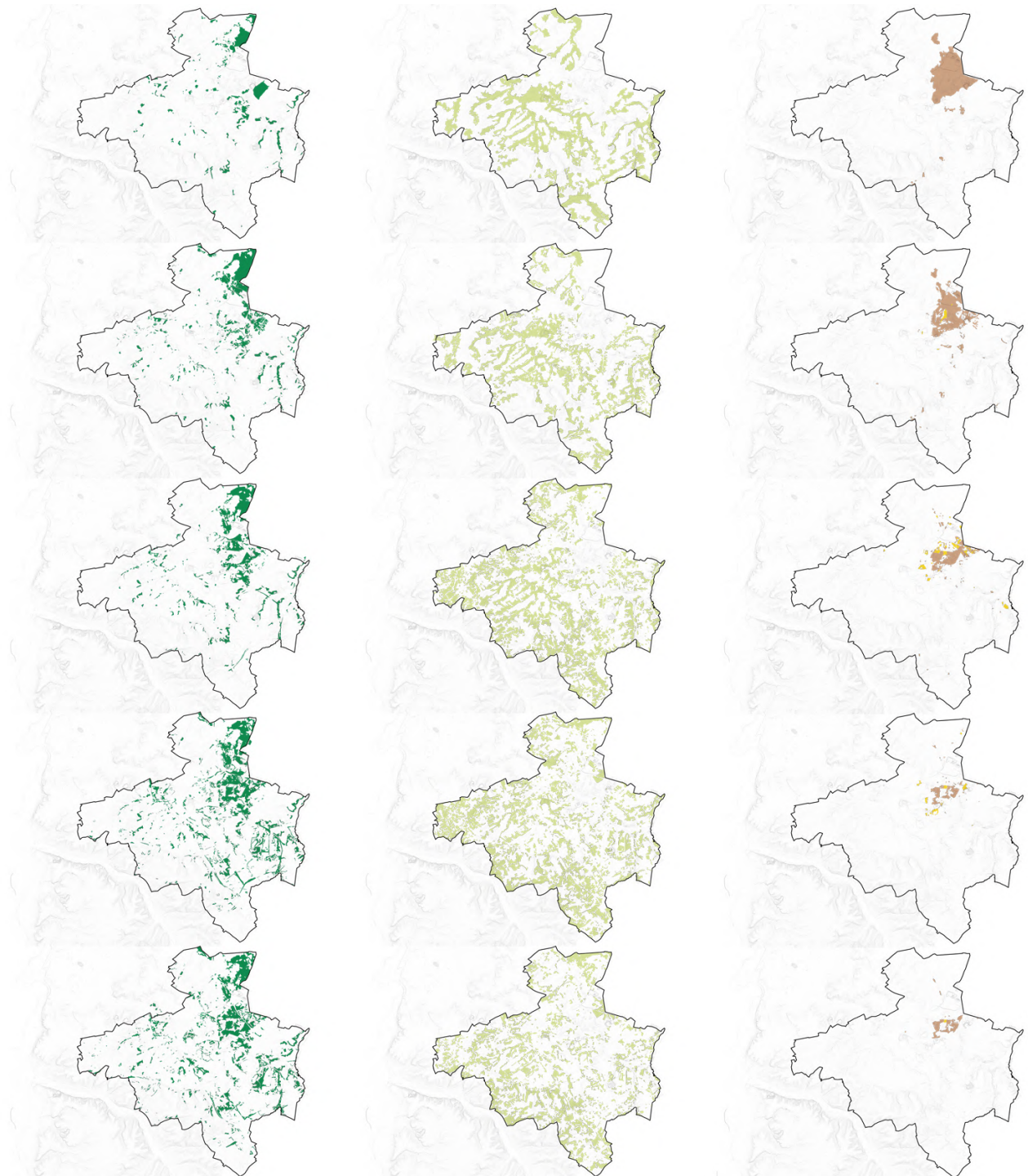
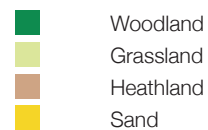
Demonstrate how forests, grasslands and heathland change over time. How the elements change in the agricultural era, the coal mining era and the transition period? How these elements interact with each other by comparison?

At the agricultural era, people use land more for agricultural function to produce food and grassland to be the pasture for dairy production. There are less forests which are the traditional forest at the edge of the reliefs where the crops couldn't grow. A lot of heathland at North-eastern part which is the product of original geography.

During the coal mine period, a large number of people immigrated here, the city quickly expanded around the mine shaft, and the grassland was gradually reduced by the urban structure. Many new forests were planted due to the residents' demand for green landscape. The nature reserve in the northeast adopts a modular planting pattern with a uniform texture, and heathland is gradually replaced.

With the end of the mining industry, the transition period comes, the city continued to expand. The grassland was decreased, and more green forest landscape was planned to form a preliminary model of the garden city.

#### Legend



## 1.4 Research Objective & Questions

### Timeline for Urban elements






Demonstrate how water system, urban settlement and infrastructure change over time. How the elements change in the agricultural era, the coal mining era and the transition period? How these elements interact with each other by comparison?

During the agricultural period, settlements were mainly built around major traffic roads and water systems to facilitate crop transportation and irrigation. At this time, the water system was the original natural one, which was all visible on the surface.

With the beginning of the mining era, the city expanded rapidly, from a small village gathering point to the developed cluster around the mine shaft, and each cluster had its own complete supporting facilities. For more convenient and fast coal transportation, the railway and highway systems had developed rapidly. The expansion of the city occupied the original waterway so that some water systems were buried underground in the form of pipelines.

During the transition period, the city continued to expand, filling the gap between the original clusters and eventually connecting into a large city collection. The growth of the population and the expansion of the city scale made the demand for transportation higher and higher, therefore, a more complete transportation network had been established. Some of the short-distance railway tracks originally used for coal transportation were gradually abandoned and removed. Because of industrial operations, many water bodies are left in the form of reservoirs or lakes. For the requirements of the urban environment, people began to turn some underground water systems into visible again.

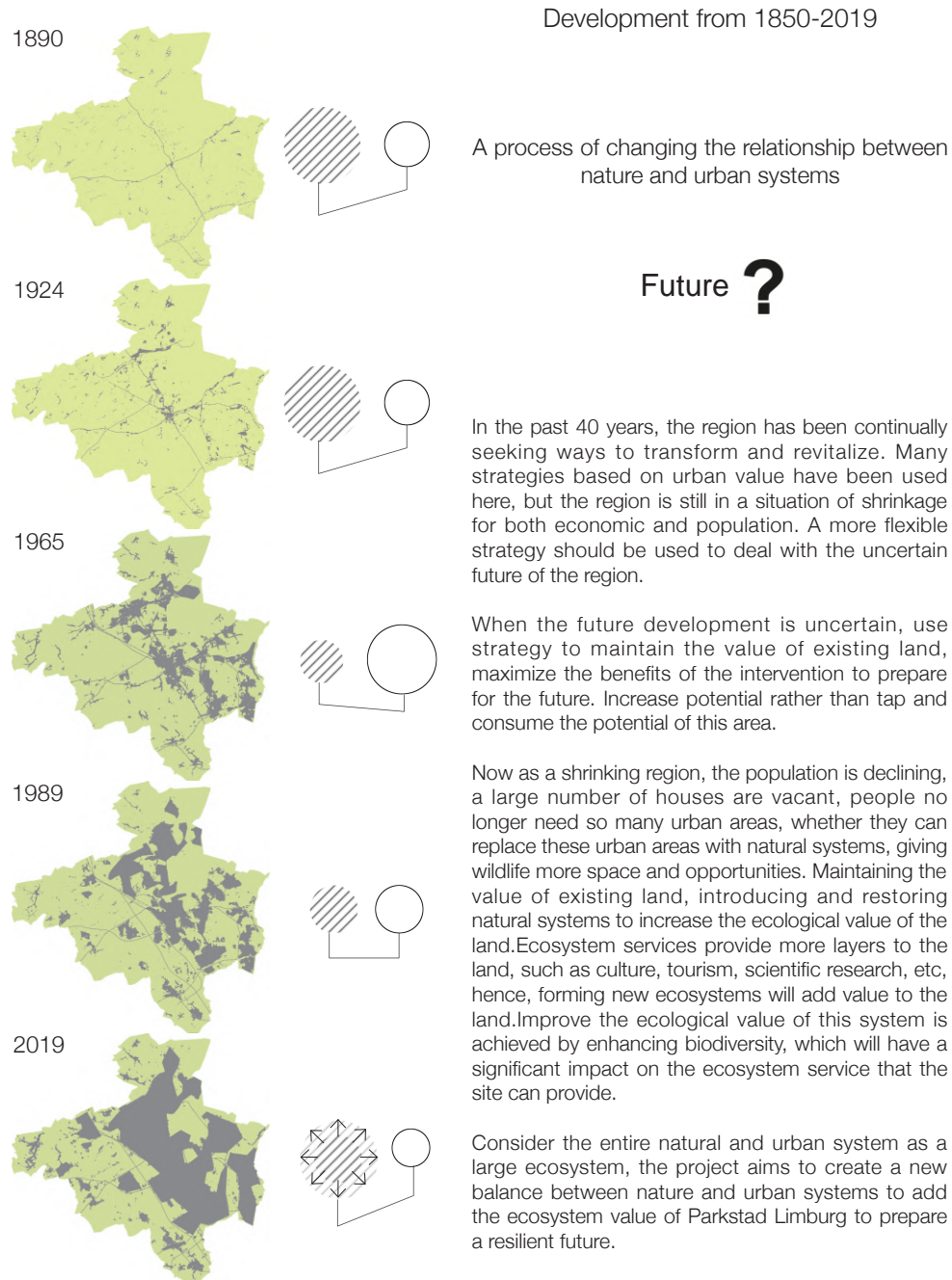
#### Legend

-  Water
-  Urban settlement
-  Industrial area
-  Main road
-  Railway





## 1.4 Research Objective & Questions



## Objective and Research Questions

Prepare a resilient future for Parkstad Limburg by using natural system to replace some part of urban system to convert land value

**How to adjust and reorganize natural and urban systems to enhance biodiversity and ecological value to improve living quality?**

### Sub-Questions

#### Analysis

-What the existing natural and urban patterns and characteristics of Parkstad Limburg

-How to utilize these characteristics as guiding elements for future resilient system?

-What are the criteria and basis for selecting the transform urban space?

#### Theoretical background

-How to maintain the vitality and development of the city in the case of urban system contraction?

-How to maximize the biodiversity by the composition and connection of the patch-corridor-matrix?

#### Application

-How to judge the future direction of these converted urban area whether is natural value or updated urban value?

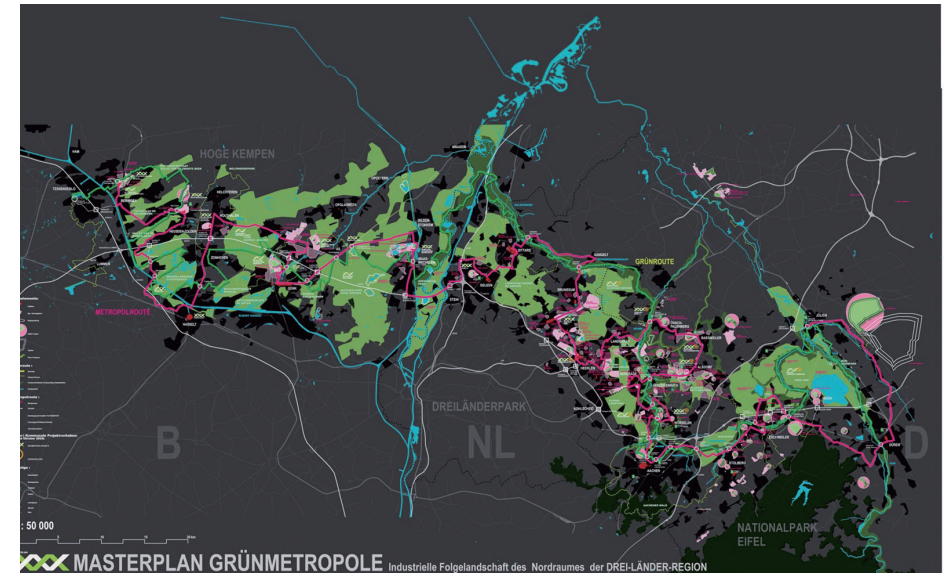
-How to control the degree of human intervention while introducing new species to achieve a harmonious coexistence of human, flora and fauna

#### Reflection

## 1.5 Scope & Relevance

Nowadays, shrinking cities and the destruction of biodiversity are global problems. This project can be used as a pioneering experimental site to verify whether it can bring new development and solve the problem of shrinkage by appropriate reduction of urban areas and fill with natural space to improve biodiversity and realize the transformation of land value. If it can play a certain effect, it will be used as a reference for the future development of other cities that have a similar situation. For example, Parkstad belongs to the coal mining belt across the three countries. The cities on this belt once flourished because of the coal mining industry. Now, they are in the process of recession due to the loss of the pillar industry. The strategies that Parkstad used can be introduced to other shrinking cities on the coal mine belt. South Limburg has a unique landscape type that is closer to central Europe than the rest of the Netherlands, with species types more biased towards southern and central Europe. That means the criteria and techniques for these species to restore and protect can also be applied to other European areas. Therefore, these results of Parkstad are able to be used on a larger scale.

Green metropolis-Agence Ter



Result can be used to other shrinking cities on this belt



## *02 METHODOLOGY*

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Theoretical background  
Methodology framework

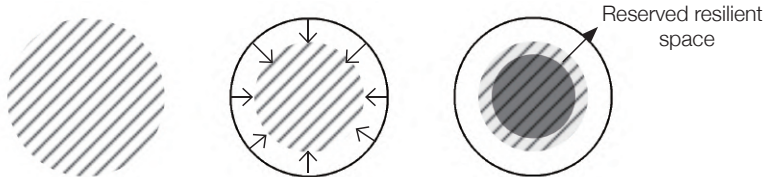
## 2.1 Theoretical Background Smart Decline

### A smaller but better system

'Smart Decline' stems from Germany's management model for the poorer and more ruined Eastern European socialist city, focusing on economic and physical environmental issues in population-declining cities.

Planning for less: fewer people, fewer buildings, fewer landuses(Popper & Popper, 2002).

A development method designed to improve living quality of current residents.



During the recession, many industrial cities tried to become more competitive in the post-industrial knowledge economy era through transformation, but unfortunately, the knowledge economy tends to go to cities with more developed economies and more beautiful environments. Therefore, these shrinking industrial cities have to turn back to face the long-standing predicament. Since then, with the continuation of globalization and the development of the United States' own cities, after entering the new century, industrial cities that have lasted for 20 or 30 years of recession will still not see the possibility of growth for the foreseeable future. At the same time, The way that tried to stimulate growth to enhance urban development has less success. Hence, from hope to growth change to face the recession, emphasis on smaller but better smart decline theory begins to emerge.

Hope to develop → Face the recession      Passive recession → Active contraction

Smart decline is a planning strategy that seeks to change from a passive recession to an active contraction in the face of an unavoidable recession in the city.

#### Core issues that need to be addressed:

1. How to maintain the vitality and subsequent development of the city with a reduced population?
2. How to solve a lot of vacant or abandoned plots and real estate?
3. How to develop effective planning and effective implementation?

#### Characteristics of Smart Decline:

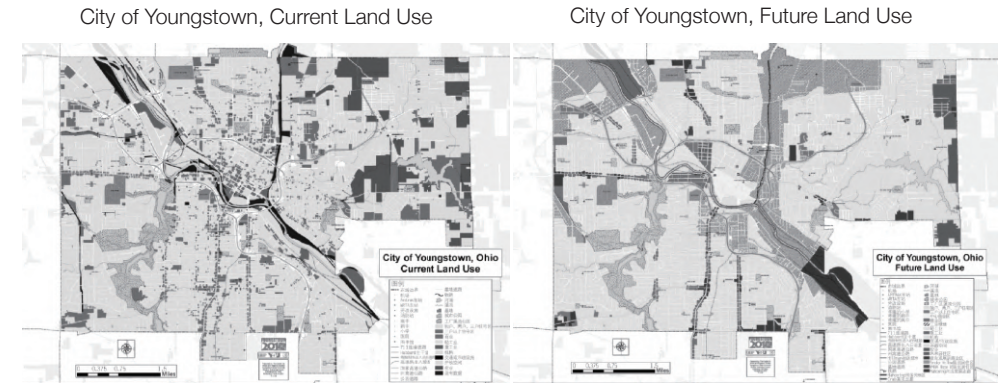
1. The core idea of Smart Decline is to focus on the city's potential development momentum while the population decline and city contractionary development. The approach is to place the growable part in a small, concentrated area and maintain a benign operation of the area. Contractionary strategy focus on a reasonable city scale, emphasizing that a reasonable scale of neighborhoods and their spatial texture is a factor in the potential revitalization of the city, and advocates the intensive use of land.

2. Faced with a large number of abandoned land and houses, different cities take different approaches. At present, the way to adopt green infrastructure is a more common approach.

3. Due to the difficulty of attracting private investment, the direct participation of government agencies represented by land banks is the basic guarantee for the current shrewd development. At the same time, the active participation of the public and the neighborhood is an indispensable part of planning and implementation. (Huang, 2011)

### The Youngstown Citywide plan 2010

Establish a green space network for cities; build competitive industrial zones; build diverse neighborhoods to promote continued neighborhood vibrancy; foster vibrant urban centers



Source: Smart Decline: Planning Measures for Urban Decay and Its Practice in US

As the industry moved from globalization, Youngstown began to shrink and the population continued to decline. In 1951 Youngstown developed a comprehensive plan and revised it in 1974. However, due to the growth and expansion of this plan based on the city, by the end of the 1970s, the plan had virtually failed.

In 2001, the recession that lasted for more than 20 years made the city begin to consider the many problems it faced. Under the joint responsibility of the Youngstown City government and YSU, the Youngstown 2010 plan, which the public widely participate since 2002, began to enter the designated process.

#### The main starting points are:

- Admit that Youngstown is a smaller city
- Defining the role of Youngstown in the new regional economy
- Improve the environment and quality of life in Youngstown
- Call for public response

The shrinkage of the Youngstown 2010 plan for urban land use is obvious, such as a 30% reduction in residential land use. For a large number of abandoned land and properties used the green space to convert it.

On the other hand, while preparing for the contraction, Youngstown is also actively seeking development, and some commercial development plans are implemented simultaneously. Established a land bank for reusing the urban hollow and abandoned plots and property recovered by banks due to loan severance. Maintaining moderate density and vibrant neighborhood texture is a potential resource for economic development

The planning of youngstown is a representative practice, and Philadelphia, Detroit, and Buffalo also adopt this strategy.

#### 1974 Philadelphia Green Program:

Transforming abandoned plots into urban open spaces and green spaces to improve urban suitability

#### 2006 Buffalo Queen City Comprehensive Plan:

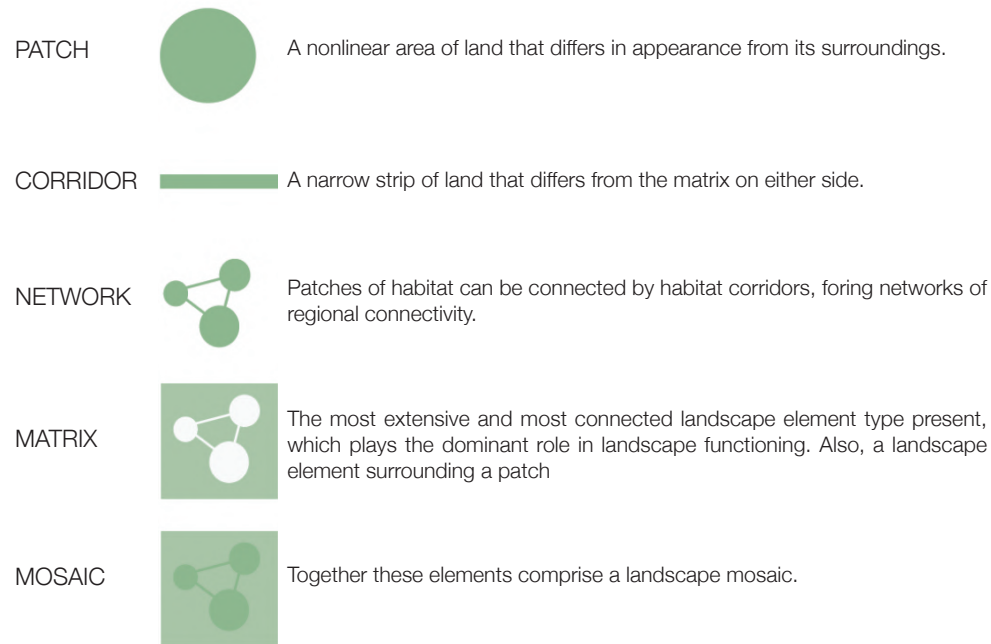
Reinjecting population, rebuilding industrial bases, revitalizing business districts, and strengthening green spaces and public spaces

#### 2008 Detroit Vacant Property Campaign:

Negotiate with the owner of the house adjacent to the vacant lot to improve the condition of these plots

## 2.1 Theoretical Background Patch-Corridor-Matrix Model

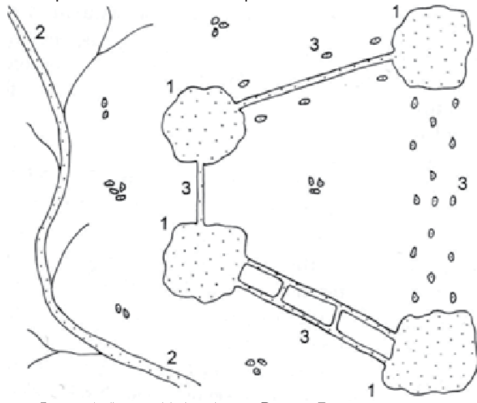
Landscapes are composed of elements—the spatial components that make up the landscape. A convenient and popular model for conceptualizing and representing the elements in a categorical map pattern is known as the patch-corridor-matrix model (Forman, 1995). Under this model, three major landscape elements are typically recognized, and the extent and configuration of these elements define the pattern of the landscape ("PATCH-CORRIDOR-MATRIX MODEL", 2019).



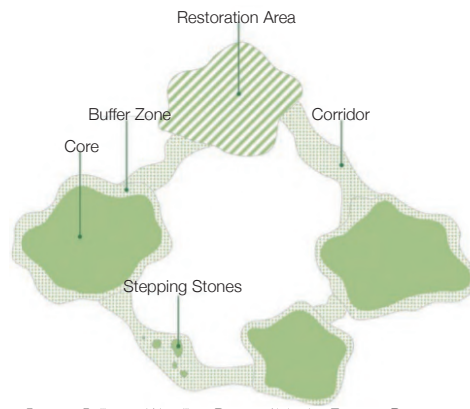
Source: Redrawn after Dramstad 1996 by Caitlin Smith, 2012

("PATCH-CORRIDOR-MATRIX MODEL", 2019)

### Indispensable Landscape Patterns



Source: Indispensable Landscape Patterns, Forman 1995



Source: Guillaume Wending, Réseau Alpin des Espaces Protégés

1. Large patches of natural vegetation
2. Riparian corridors
3. Connective corridors and stepping stones
4. Heterogeneous fragments of natural vegetation in the matrix

1. These concepts apply to humans as well as wildlife.
2. Connecting patches within a matrix ensures that there is less species isolation.
3. For these elements to work as a whole, connectivity must be optimized

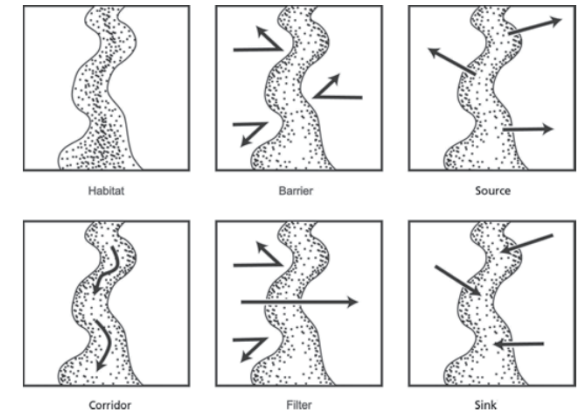
Landscape pattern analysis is based on the premise that there are certain indispensable patterns in any landscape that, if maintained, will conserve the majority of essential landscape process

### Landscape security pattern

In general, biodiversity conservation can be divided into two pathways: a species-centric approach and an ecosystem-centric approach. The former emphasizes the protection of endangered species themselves, while the latter emphasizes the overall protection of landscape systems and natural land, and seeks to achieve biodiversity conservation by protecting the diversity of landscapes. Two different approaches to conservation strategy are also reflected in the landscape planning design for bioprotection: the planning approach based on species and the planning approach based on landscape elements. Although both consider the protection of species and ecological infrastructure, the former's planning process is from species to landscape, while the latter is from landscape elements to landscape patterns.

An overall optimized bio-protected landscape pattern is the superposition and harmonization of many single-species conservation landscape patterns (Yu & Li, 1998).

### The six functions of ecological corridors



Source: Guillaume Wending, Réseau Alpin des Espaces Protégés

Although the path of landscape planning for bioprotection is different, some spatial strategies are generally considered to be effective.

1. Establishing an absolutely protected habitat core area.
2. Establish buffers to reduce interference from peripheral human activities to the core area.
3. Establish corridors between habitats.
4. Increase the heterogeneity of the landscape.
5. Introduce or restore native landscape patches in critical areas.

(Yu & Li, 1998)





## 2.1 Theoretical Background Different Users Maps

### Dismantling the city structure

One of the methods to make the complexity of the city structure visible is the dismantling. The city is then considered to be made up of different layers. This stratification is cut loose in such a way that both the double city is split and the topography of the class structure. This clarifies four different urban systems here:

-The '**Caps City**' and the routing system:

The city of artisans, dockworkers, ship people and the unemployed develop along the routes that connect the city with its surroundings and confirm these routes in the form of the city. Market squares are created along the routes through cut-outs in the dense block buildings.

-The '**Royal City**' and the routes:

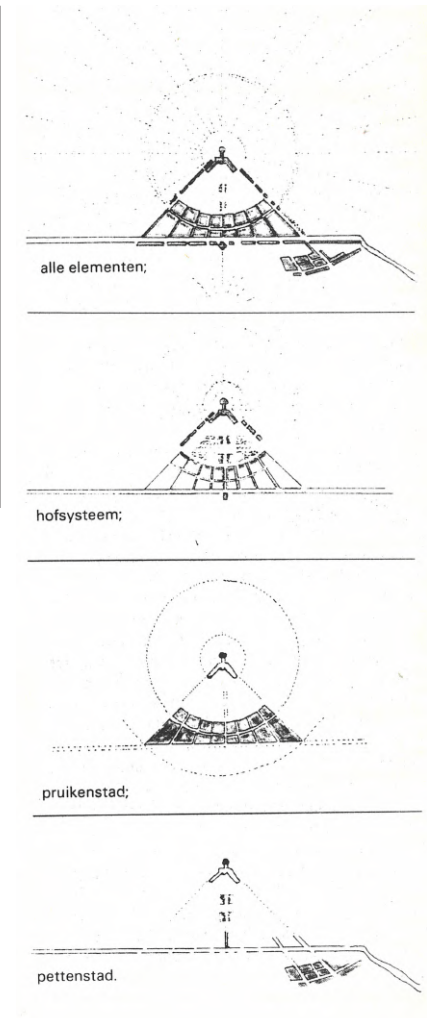
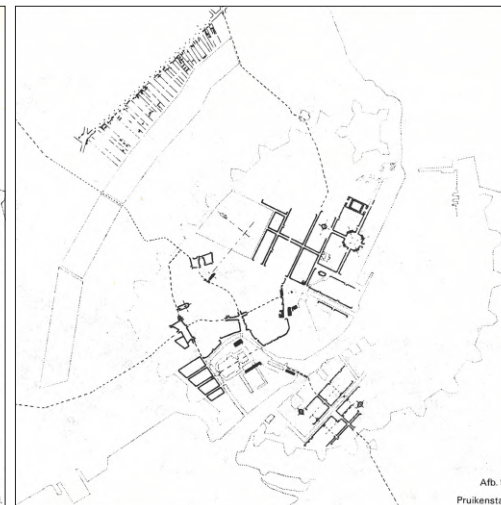
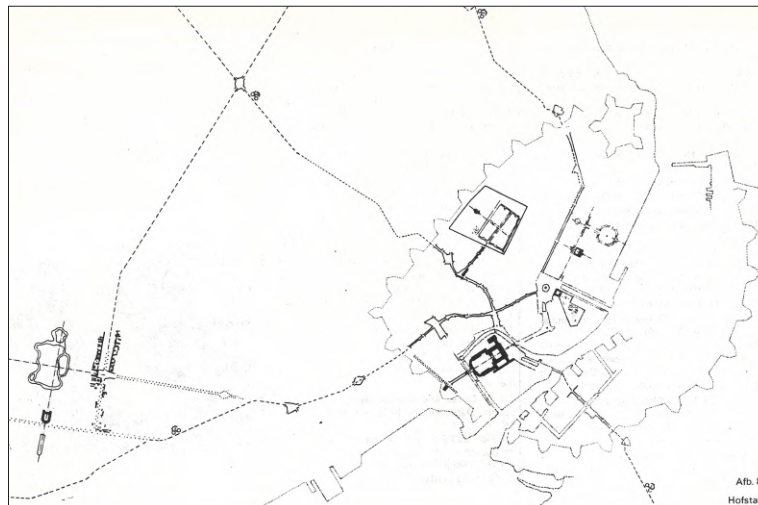
An ever-perfected series of summer and winter residences for the royal relatives. The court elements appear to be indifferent positions with respect to the routing system. They are situated exclusively on the west bank. In connection with the residential complexes, interventions have been made in the city to interconnect the various elements of the court system in a circuit.

-The '**wig City**':

The city of patriciat and hofadel. The fragmentation is the largest in this layer and large conceptual differences are visible in the fragments. The relationships do not run directly but via the routing system.

-The '**Port City**':

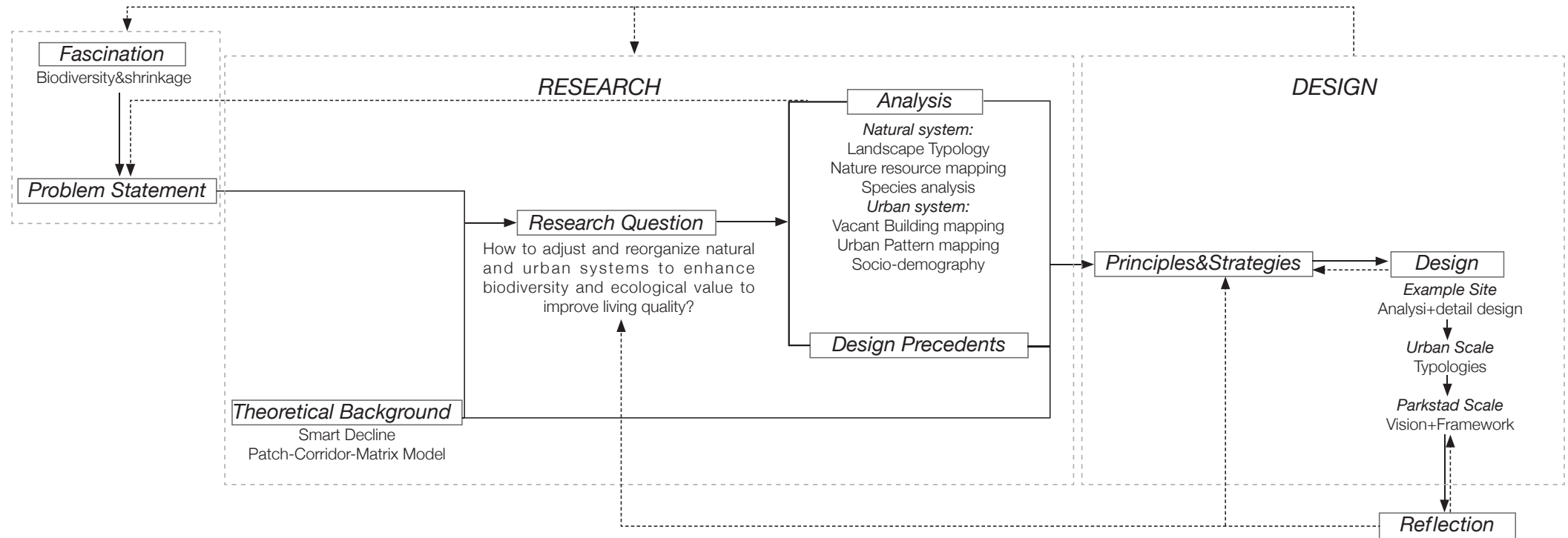
This shows a strong expansion on the east side, but there are also some port elements that are important for the cityscape in the western part. The way in which the port elements are incorporated in the city differs in the individual districts. The port city seems to consist of a collage of types.



Completely separate from the actual ports, but understood as part of the system, the regulated residential quarters for the crew of the naval and merchant fleet and port workers have been signed.

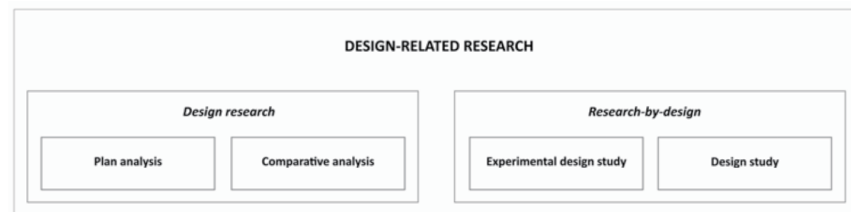
Such a dismantling does not yet provide insight into the way in which cohesion in the urban structure is determined. What can be established is that the different systems are mixed in such a way that a distinction can only be made with the help of an analytical construction. The meaning of this can be clarified in a comparison with the way in which a residential city such as Karlsruhe can be thought of as a layered structure. The task sequence shows, on the one hand, the complete dominance of the court system over the formal structure of the wig city and on the other the absolute separation between the cap city and the court and wig city.

## 2.2 Methodology Framework



### Design research | Research-by-design

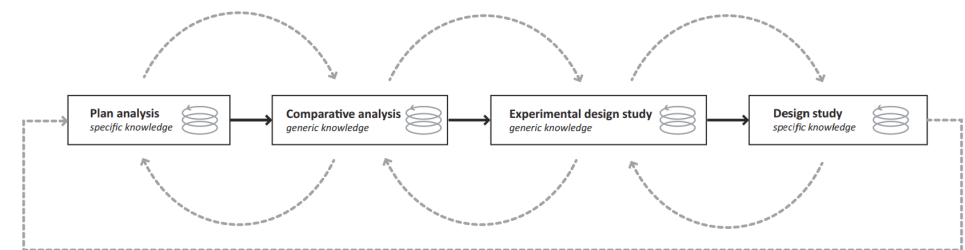
Design research concerns analysis of existing designs or precedents, and research-by-design concerns study through design. In fact the two research domains cannot be seen apart from each other: design research is an indispensable step in research-by-design (Nijhuis & Bobbink, 2012).



Source: Adapted from Steenbergen et al. (2008) and De Jong and Van der Voordt (2002)

For this thesis, adopt both two methods. During the research period, the design research has the dominant position, which helped to narrow the scale and focus of research to more specific analysis. And this time is not just about gaining the knowledge but also how to apply and use this for the next step, the spatial schemes and elements composition. The design period is the design study process, which does the experimental design to test the possibilities and knowledge of the site. Research-by-design implies that this type of design is considered to be a way of research that produces knowledge (creative designs) in a certain field.

### Design research and research-by-design as incremental and iterative process



Source: Nijhuis (2010)

The succession of the activities in the domains of design research and research-by-design implies an incremental process, where the former informs the latter in an iterative process. It is characterised by the generalisation of specific spatial design knowledge in a determined context, making it applicable to other design contexts, using design experiments to test the spatial possibilities and finally, the design study as an possible expression of an integral design (Nijhuis & Bobbink, 2012).

## 2.2 Methodology Framework

### Research Methods

#### Literature review

This is an important means of conducting research, helping to understand the background context of the site, establishing my own theoretical structure and answering some sub-questions. It's efficient to obtain knowledge about the site's hydrology, history, geography and topography, and to some extent, to point the direction for future detail research. The papers related to shrinkage have broadened the new thinking of looking at the problem, from how to improve the economy and solve shrinkage transform to accept contraction.

#### Case study

Plan analysis of existing precedents is a useful way to identify design directives, as results of design (realized plans) are an important source of knowledge and evidence of which planning and design principles function well or not. This type of knowledge can serve as the basis for future designs (Nijhuis & Bobbink, 2012). For example, the case of Amsterdam and Zwolle Green Network presents practical methods and guidelines for studying and establishing new green networks on large scales and practical evidence for ecosystem services to improve people's quality of life.

#### Mapping

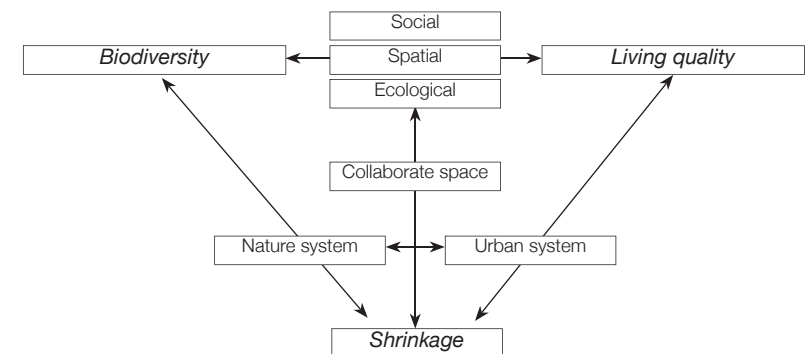
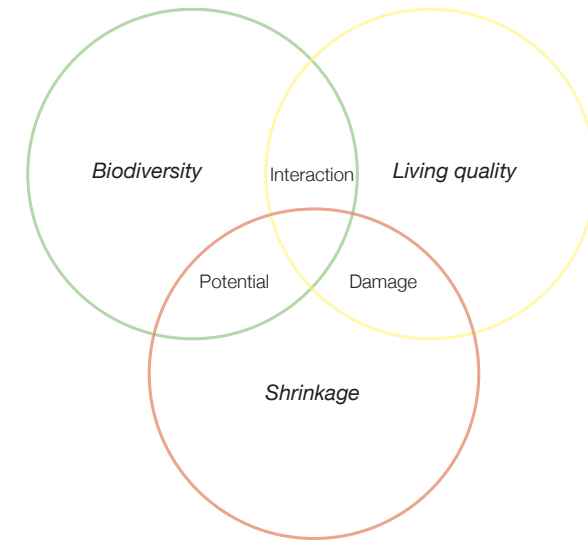
It is one of the effective means of research and the way to visualize information. It is the process of trace, absorb, reorganize and represent messages. From the beginning to the acquisition and learning of different information, to the screening of the designer, reorganization, the re-expression of the content after the design of different topics. Mapping as a process of founding produces new relations, or to say design. It is used to create, develop and test spatial possibilities (Nijhuis, 2016). Here, mapping as an important means to understand urban development and natural patterns and typologies of the site, helpful way to integrate different layers and information for the birds' users map.

#### Photographing

It is an effective way to record and select the site information. When the photographer takes a photo, the message from the site is already be filtered and show the preference of the author. Record the most useful information and sometimes you will find some different perspectives compared with just use your own eye to observe the plots. Photographing photographs of different time periods and seasons at the same site will result in a series of comparisons and changes in the site, such as the growth and death of plants, the abandoned and demolish process of the building, the construction and completion of the train station.

#### Field study

On-site research is very important for designers to visualize data and information, check information accuracy, and experience three-dimensional spatial effects such as specific sensory experiences, lighting effects, microclimate conditions and atmosphere. Perceiving the venue is an important way to get detailed information, and it is also a means of combining information with experience to get inspiration. I went to the site in different seasons, and as the understanding deepened, it was very important for the development of research and design. For example, through field mapping, I got accurate information about the city center's vacant building and how different users can use the venue.



### 03 ANALYSIS

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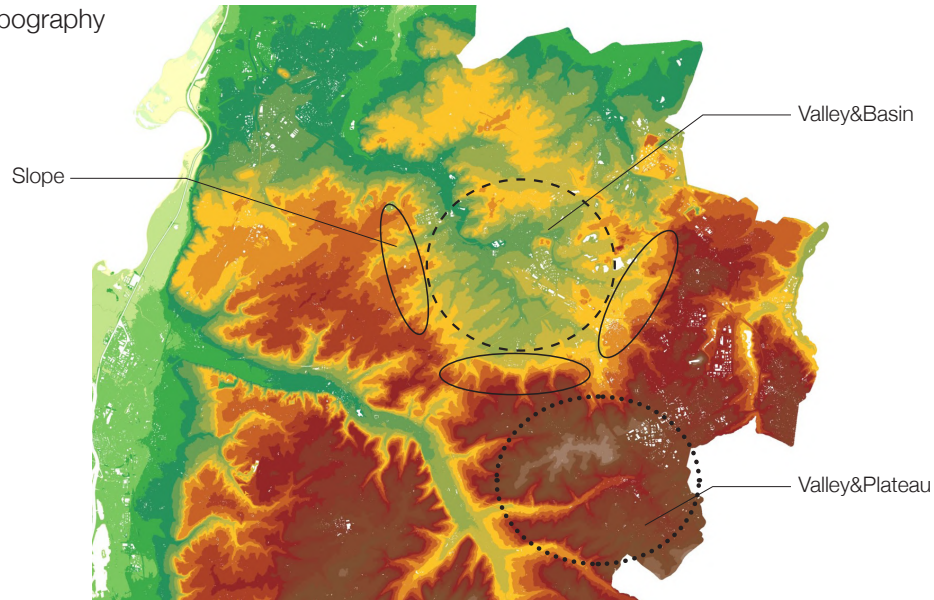
Natural system  
Urban system



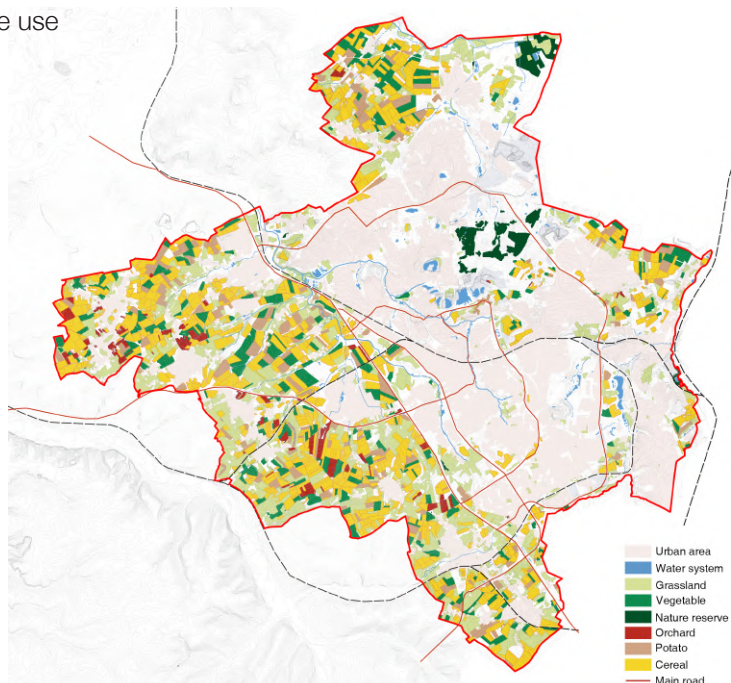
### 3.1 Analysis Natural System

#### Geography Information

##### Topography

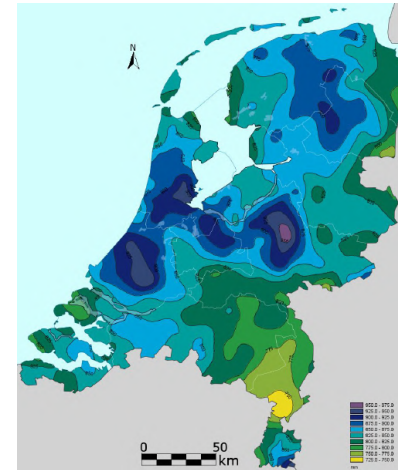


##### Agriculture use

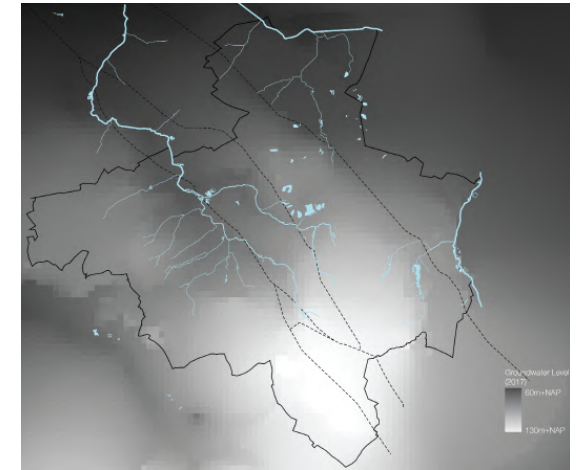


#### Hydrology

##### Long-term average 1981-2010 Average annual Precipitation Map



##### Groundwater level



##### Collection waterline



The groundwater level map show the potential of the water system, which could create a new blue structure of Prakstad.

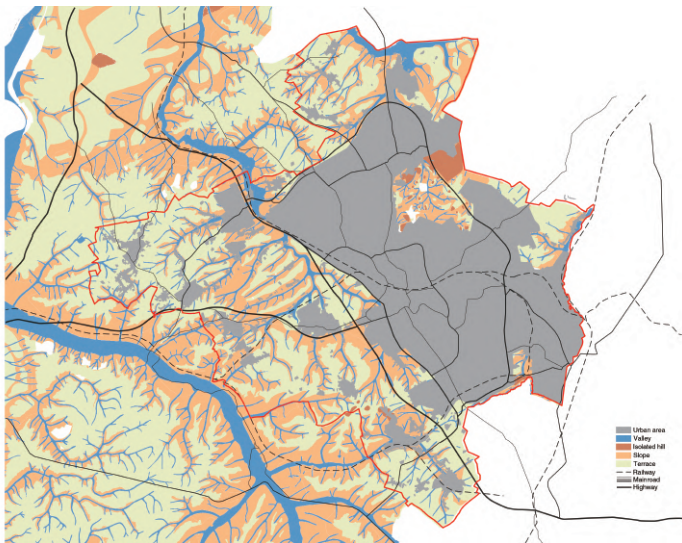
Valley, hill and basin, these three typical Limburg terrains make the stream system here. Stream Wurm is located on the right side of Prakstad, passing through the Dutch-German border. Geleenbeek is the main stream system in the site, which is divided into two tributaries that flow to agricultural and urban systems.



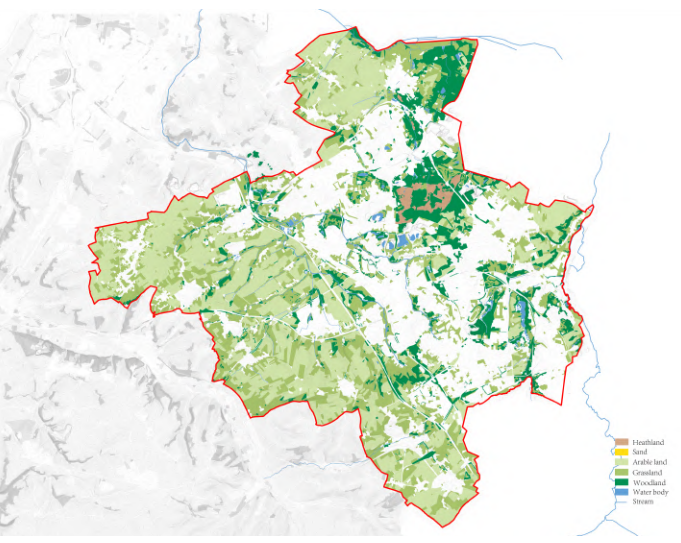
3.1 Analysis Natural System

Landscape typology

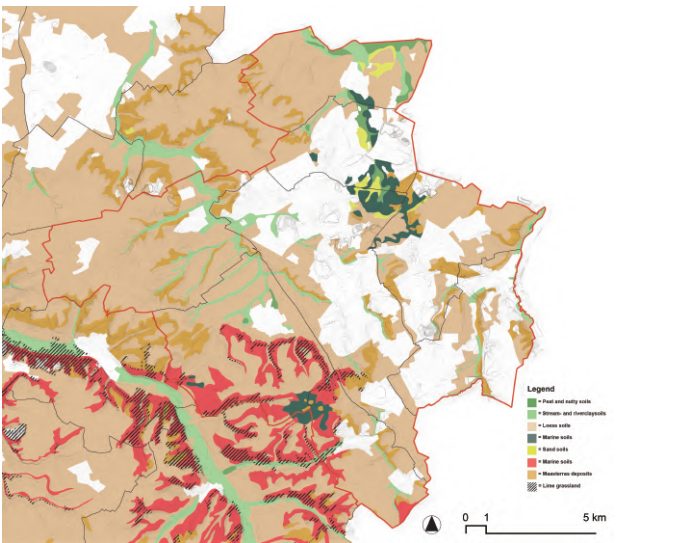
Flve basic elements typology



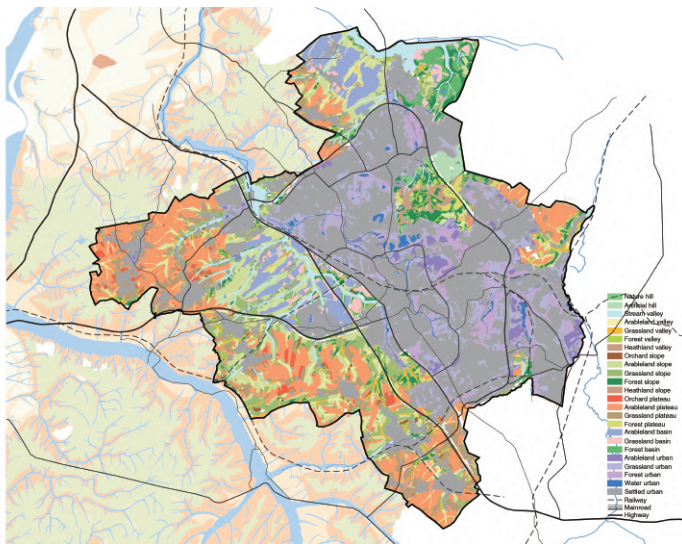
Green surface



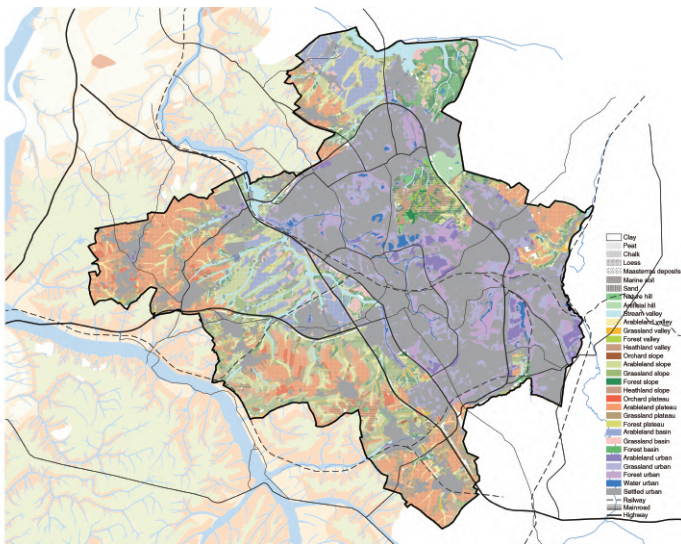
Soil map



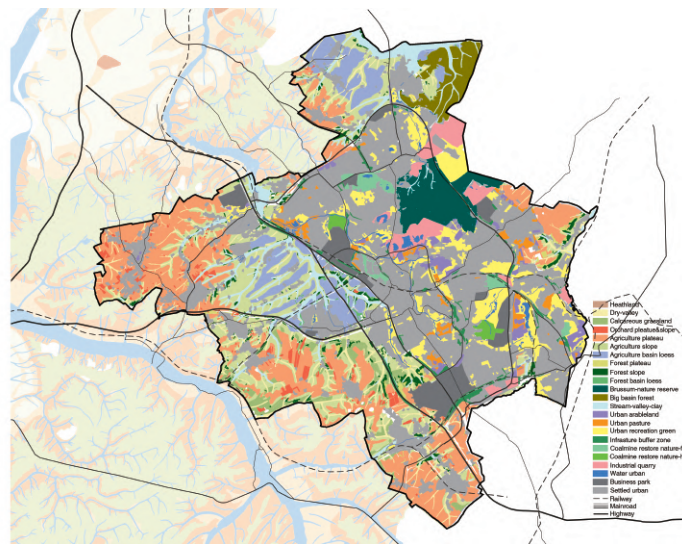
Flve basic elements typology+Green surface



Five basic elements typology+Green surface+Soil map



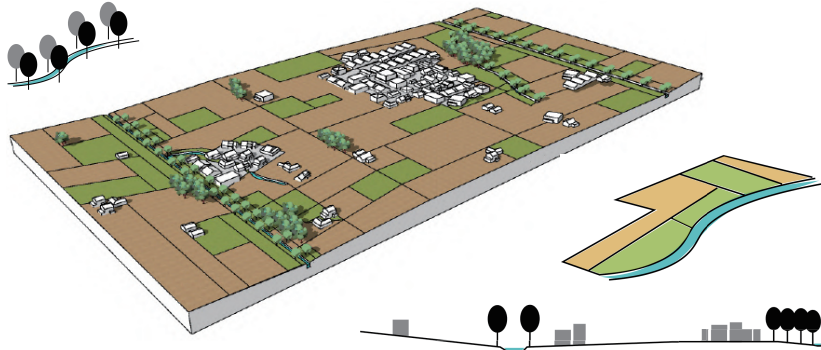
landscape typology





### 3.1 Analysis Natural System

#### Landscape typology



Basin-stream loess landscape

Plateau-Orchard landscape



Chalk plateau-slope landscape



Agriculture slope



Orchard slope



Calcareous grassland



Basin Forest loess landscape



Brunssum Nature reserve

6 Main Typology

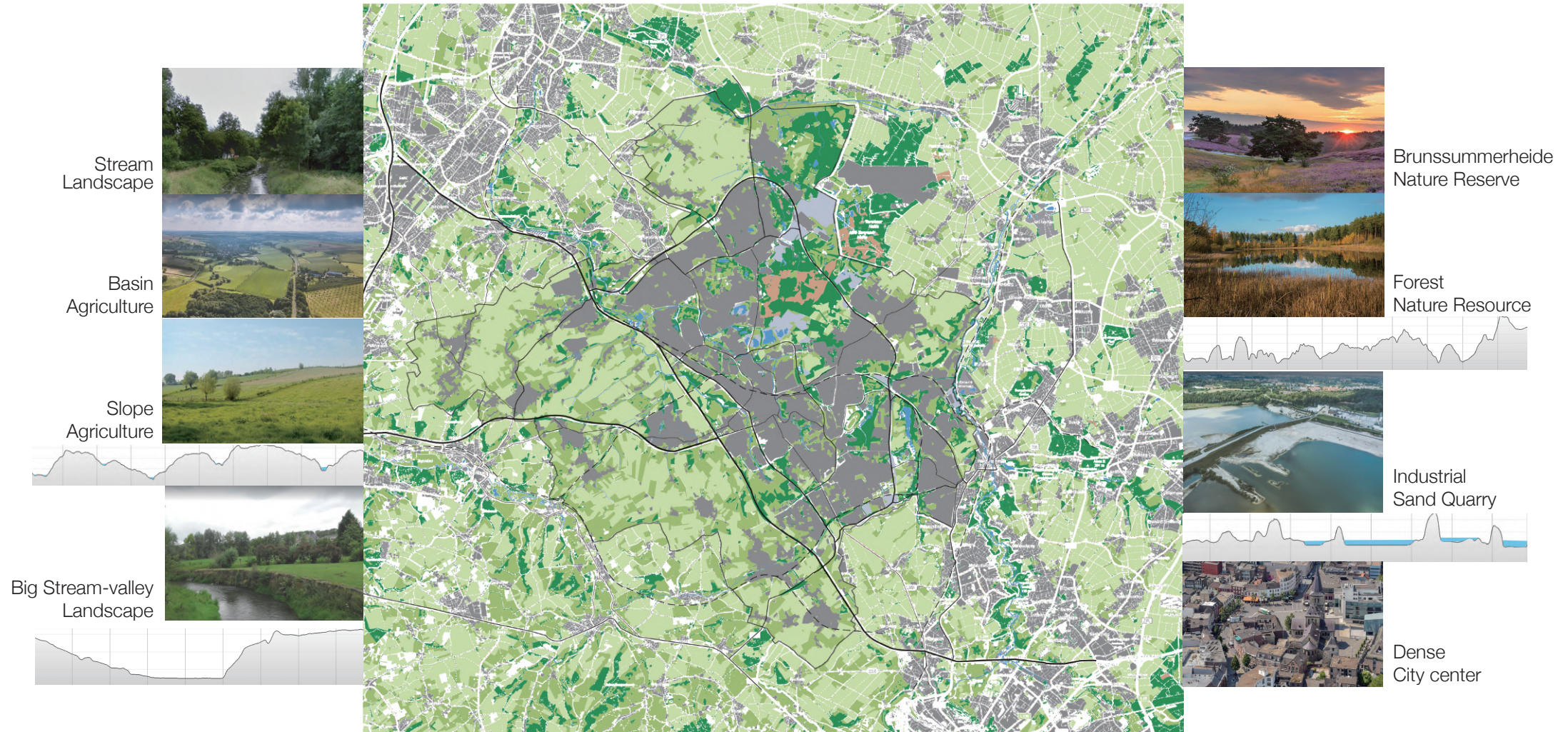
Plateau-hill landscape





### 3.1 Analysis Natural System

#### Existing Nature Resource



Big potential, limited by existing structure

### 3.1 Analysis Natural System

BIRD-How to use this area?



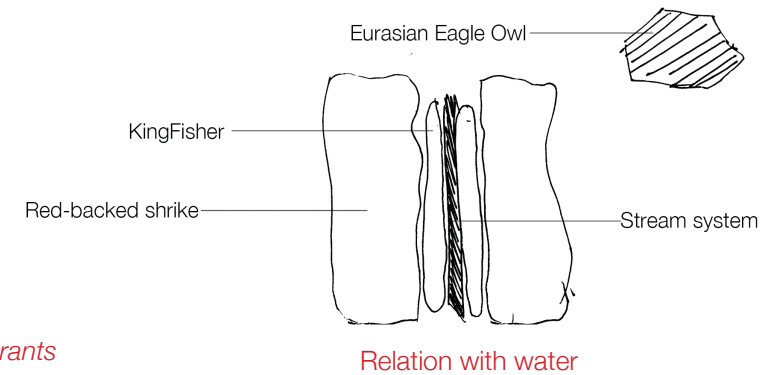
Eurasian Eagle Owl-*Bubo bubo*  
*Red List*



Red-backed shrike-*Lanius collurio*  
*Red List*



KingFisher-*Alcedo atthis*  
*Small amount of hibernators/migrants*





### 3.1 Analysis Natural System

Users map-BIRD

Eurasian Eagle Owl-*Bubo bubo*

*Red List*

HABITAT PREFERENCES

**Rocky landscapes:** cliffs, ravines, quarries(sand and limestone)

**Wooded areas:** tree lined waterways, coniferous, pine trees, oaks, surrounded by a scattering of trees and bushes

**Water:** vicinity of riparian or wetlands areas

No toxic in nesting area

High and Vertical structure

FOOD

Numerous small mammals, mice and rats frequently, fox. birds, even birds of prey and other owl species, amphibians, fish

Adequate food supply and nesting sites seem to be the most important prerequisites.

**Major roads and town centres are avoided**



60-75 cm, wingspan 160-188 cm  
Source: Bird Protection



Photo by Shane McPherson



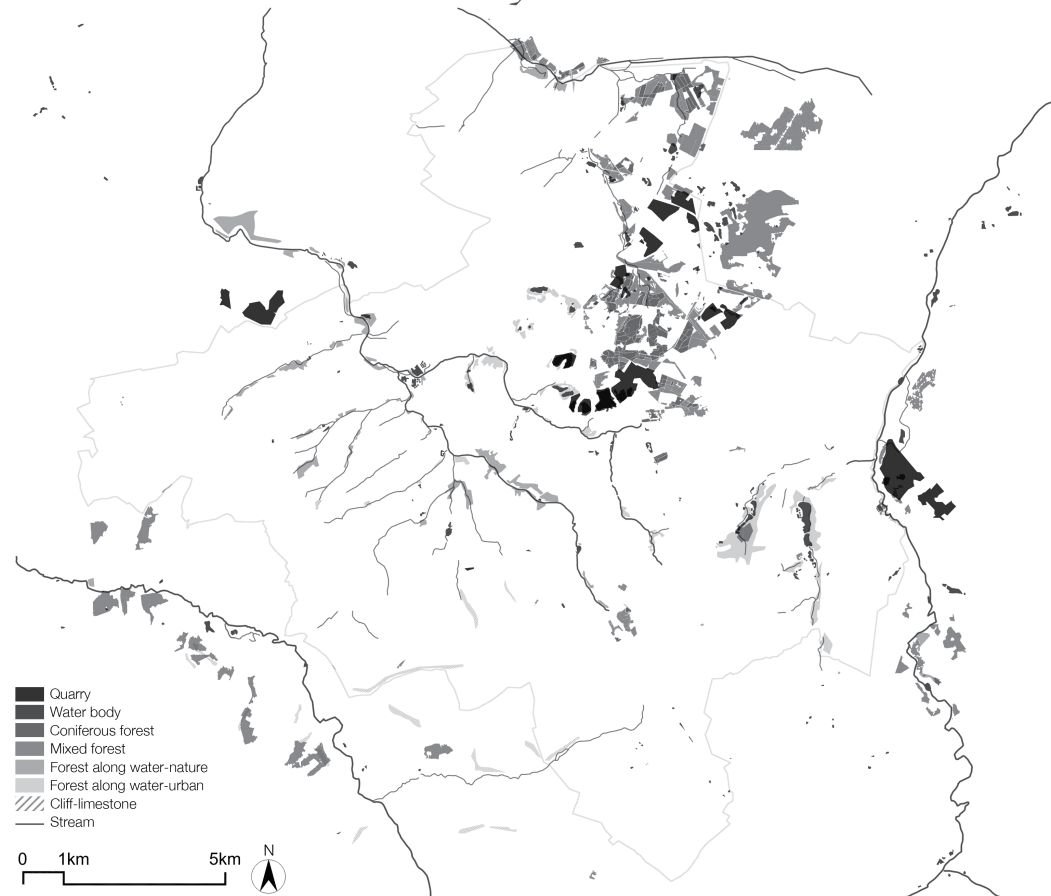
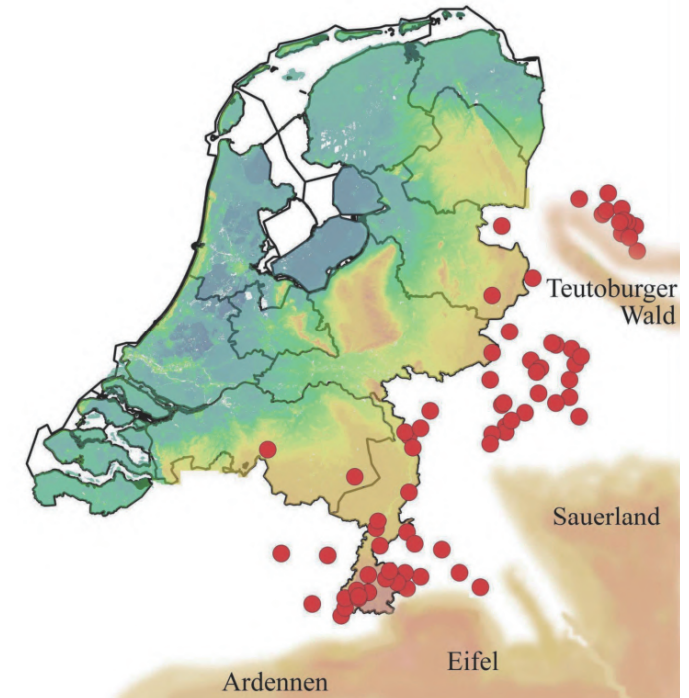
Photo by Rob Reijnen



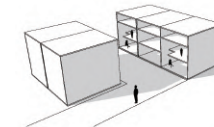
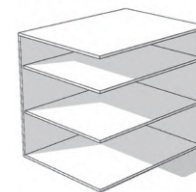
Photo by Paul Smith



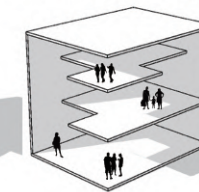
Photo by VISUALPHOTOS



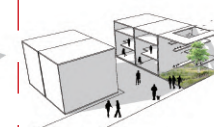
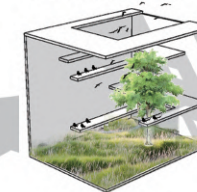
Vacant building



Renovated building



Structure&Nature



Nature restoration



### 3.1 Analysis Natural System

Users map-BIRD

Red-backed shrike-*Lanius collurio*

#### Red List

#### HABITAT PREFERENCES

A mix of open areas and patches of woody vegetation, with many thorny shrub&trees, forests edges, shrubs near road, in shortly grazed or cut meadow

**Thorny shrubs:** Hawthorns (*Crataegus spp*), Blackthorn (*Prunus spinosa*), Scots pine (*Pinus sylvestris*), Juniper bushes (*Juniperus communis*), Blackberries (*Rubus spp*)

**Water:** along the edge of small streams(10-20m)

#### FOOD

Insects, small mammals, reptiles, small invertebrates

High wetness, heterogeneous vegetation, food availability is important

Not be affected by human disturbance associated with roads or paths within their territories.

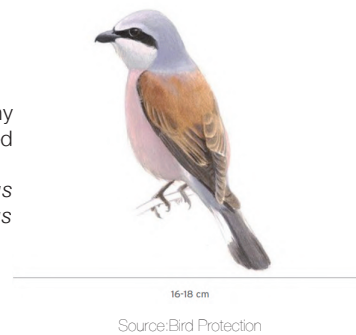


Photo by Bird Protection



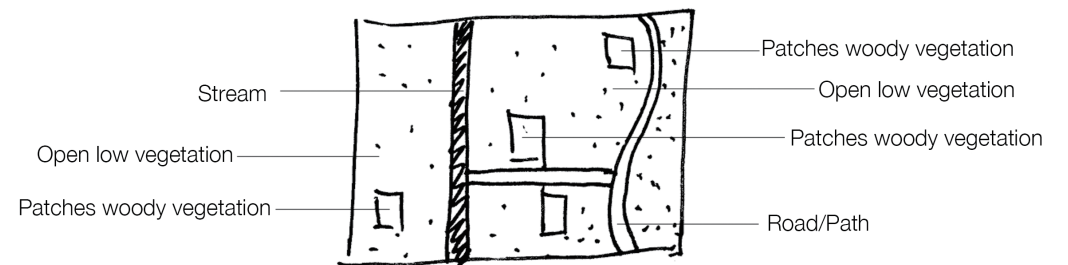
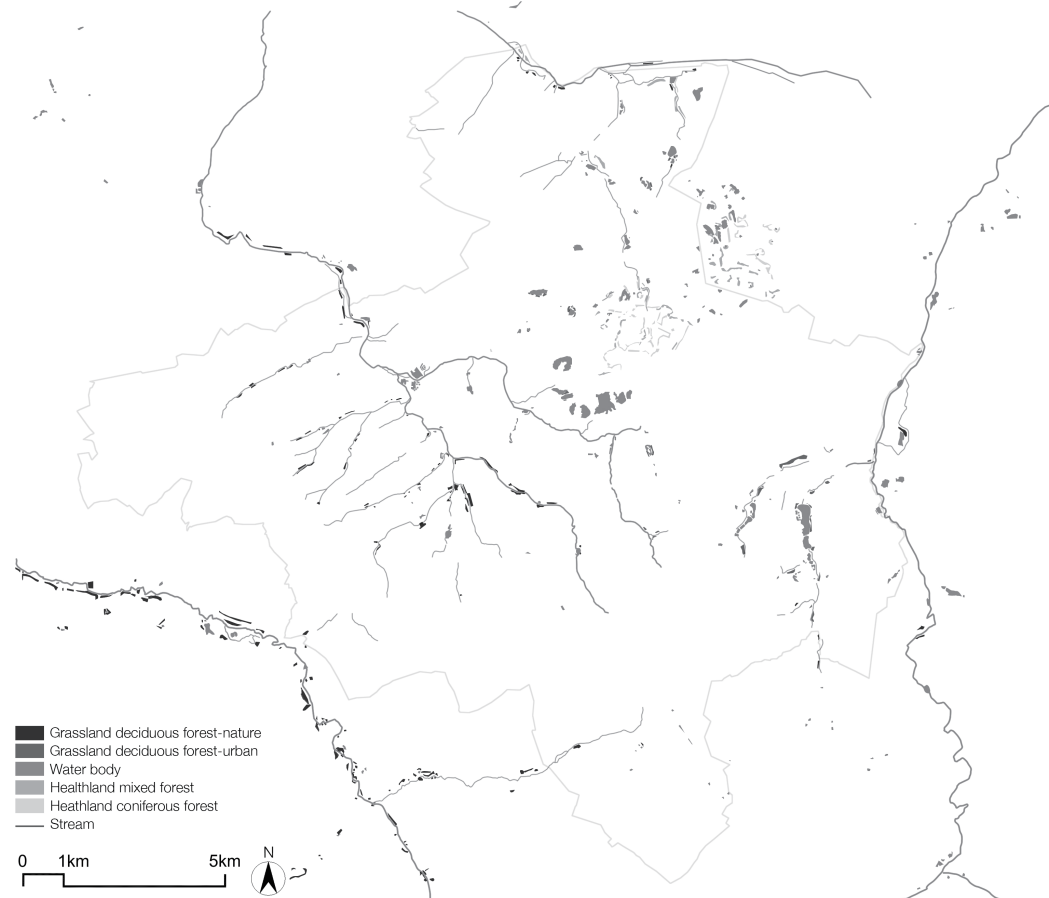
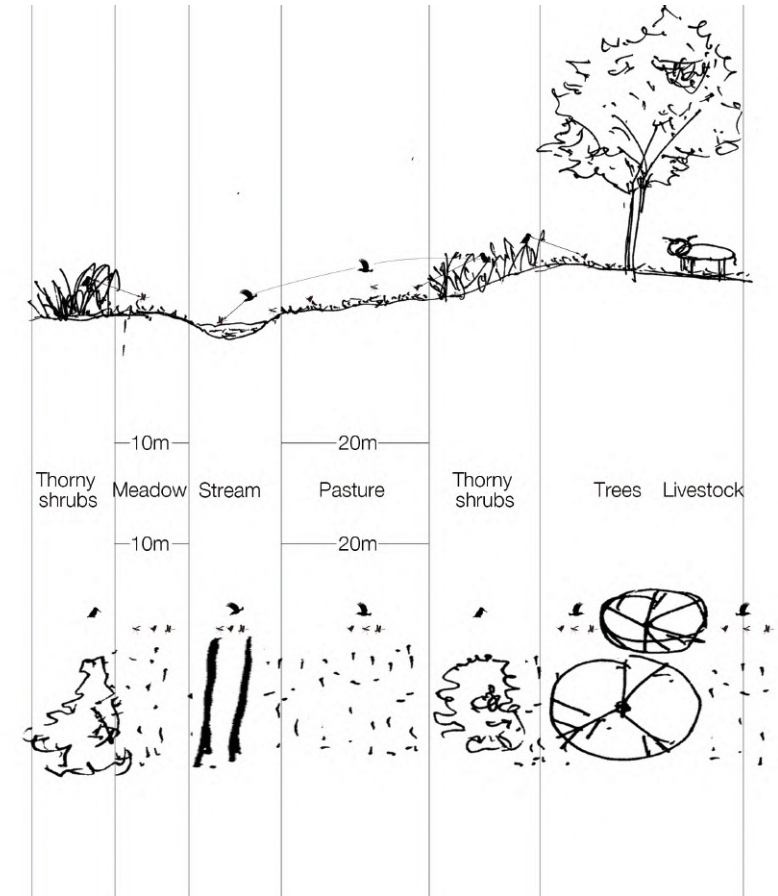
Photo by Getty Images



Photo by Dave Watts



Photo by VISUALPHOTOS





### 3.1 Analysis Natural System

Users map-BIRD

KingFisher-*Alcedo atthis*

**Red List**

HABITAT PREFERENCES

**Water:** shallow, clear, slow-running streams, rivers, lakes with enough fish, cover and seats. avoid heavy siltation or discolouration

**Bank:** Well-vegetated, **soft but firm** banks, **steep or vertical** banks of compact sand or earth. avoid **reinforced or rock banks**

Trees or bushes with branches overhanging the river provide important fishing perches. **indicators of cleanwater**, nesting on ledges and gaps in walls. hovering flight

FOOD

small fish and aquatic insects

Adequate food supply and nesting sites seem to be the most important prerequisites.

**Shy nature, away from disturbance of human and dog. Cold weather or flooding in the summer**



17-19.5 cm, wingspan 24-26 cm

Source: Bird Protection

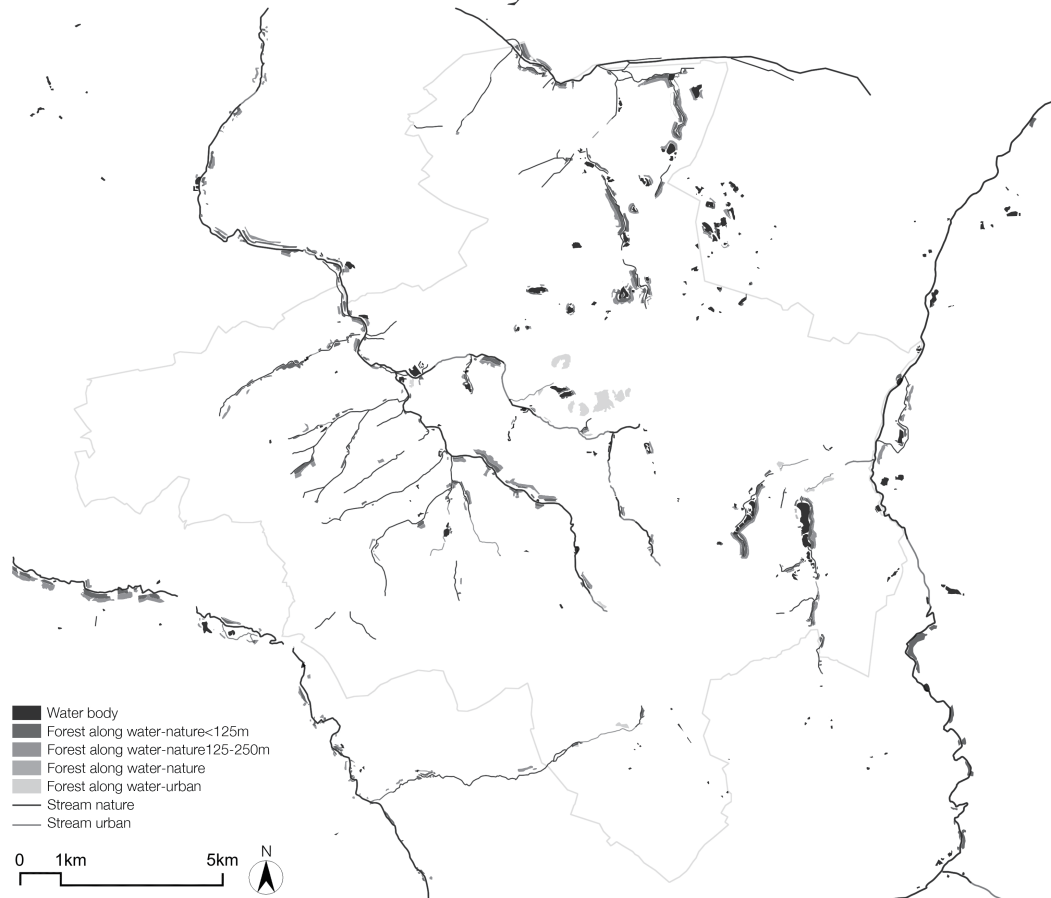


Photo by Landscape magazine  
Alamy



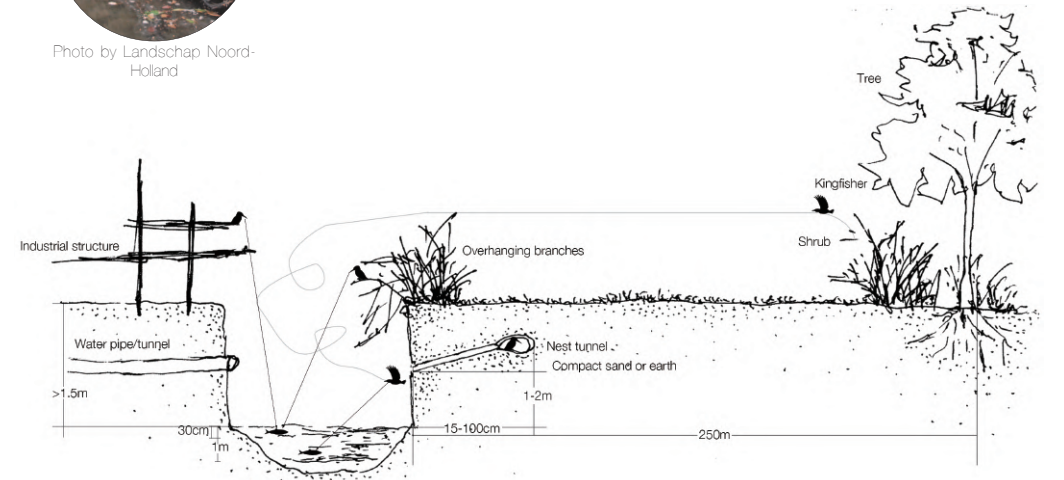
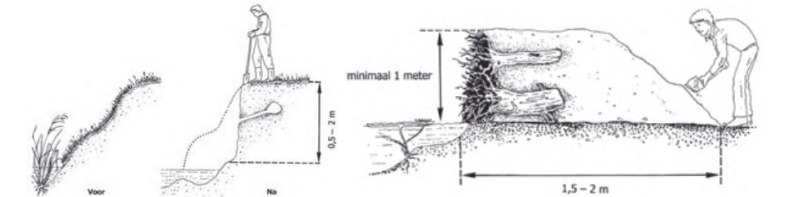
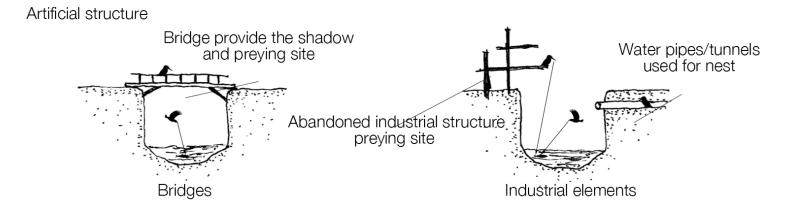
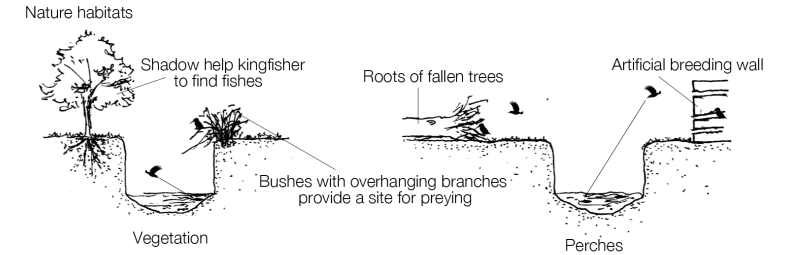
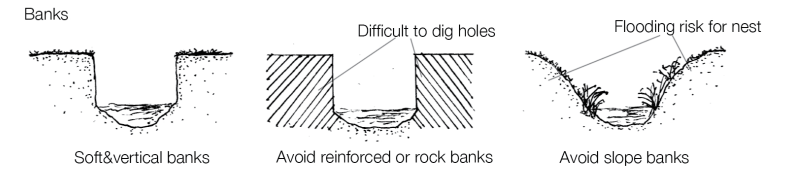
Photo by Landscape magazine  
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Photo by Landscape magazine  
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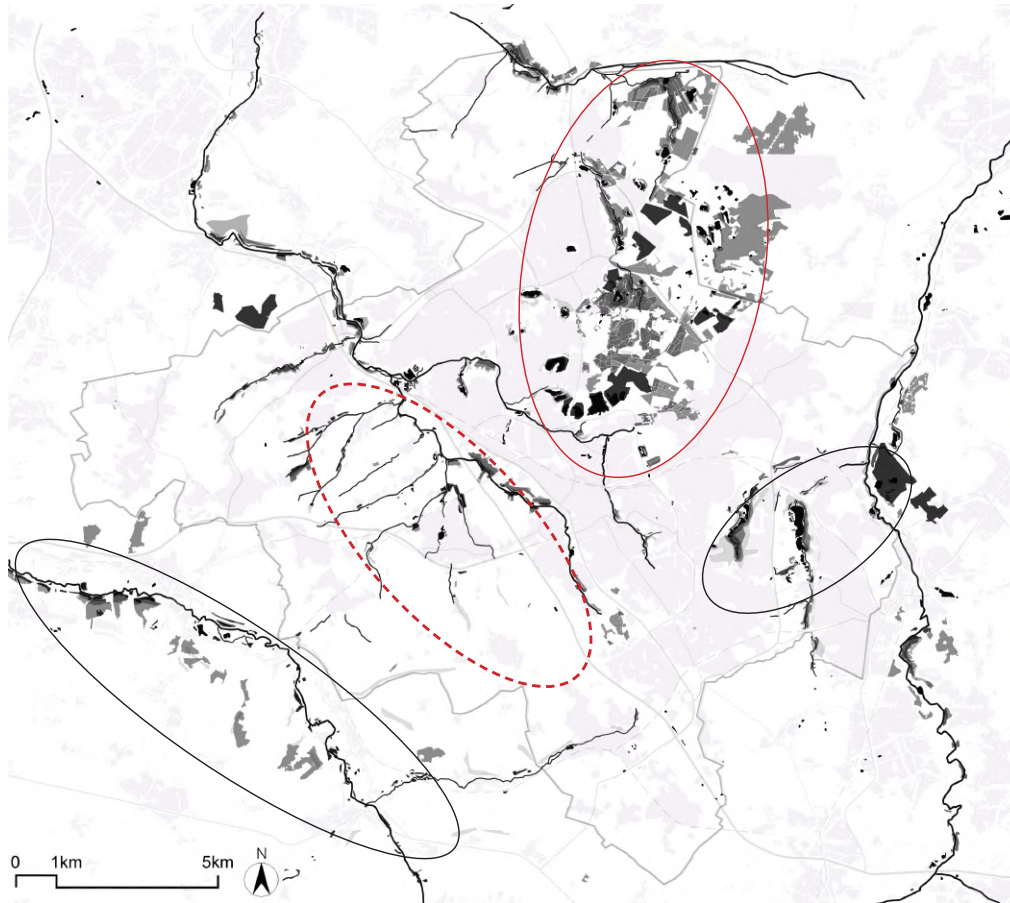


Photo by Landschap Noord-Holland



### 3.1 Analysis Natural System

Overlap 3 users distribution maps

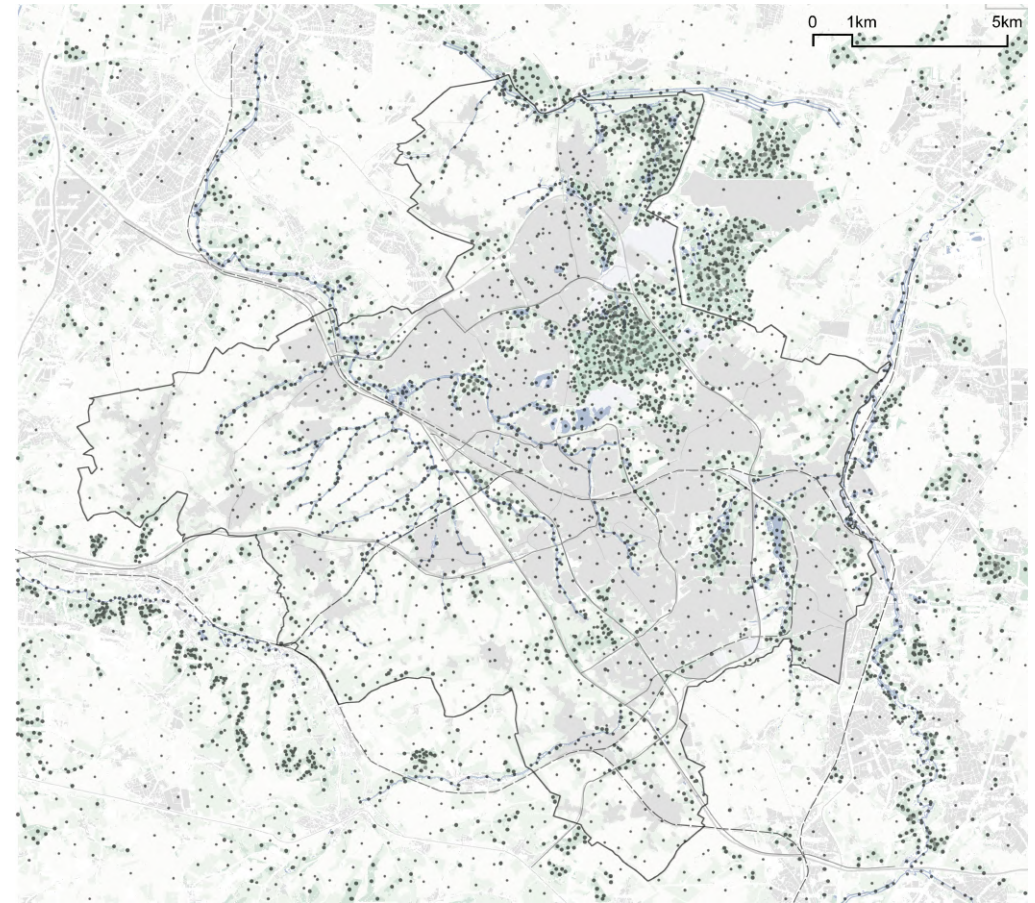


Four important habitat area

- Along stream systems have more nesting possibilities
- Southeastern nature reserve and sand quarry with many forest provide good and various habitats
- Stream system around two sides give possibilities to organism

Stream system is quite important to all the organism

Biodiversity distribution map



Problems

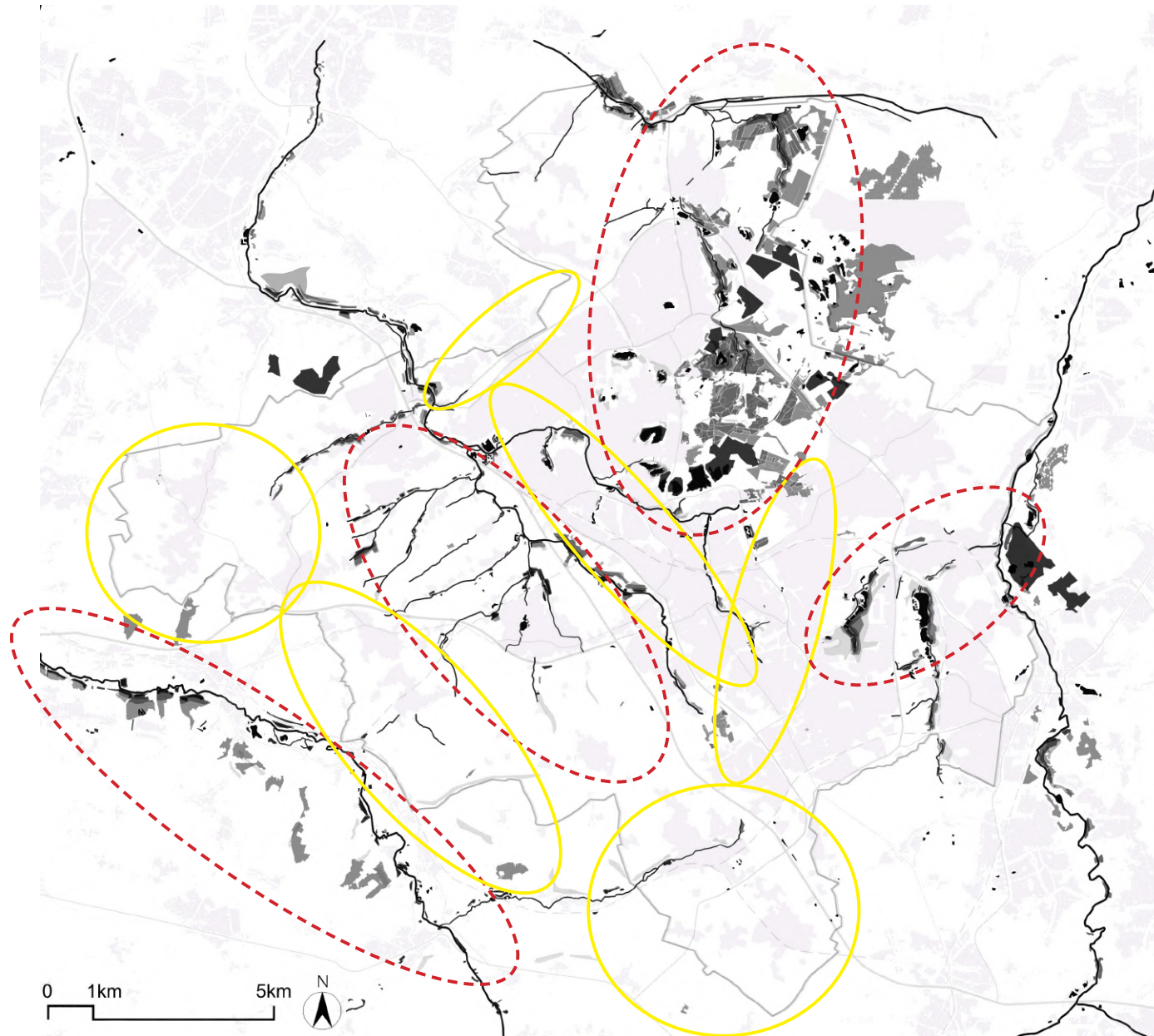
- Isolated green island leads to uneven distribution of organisms
- Agricultural and built area have less biodiversity

Blank, gap, breakpoint in the urban area



### 3.1 Analysis Natural System

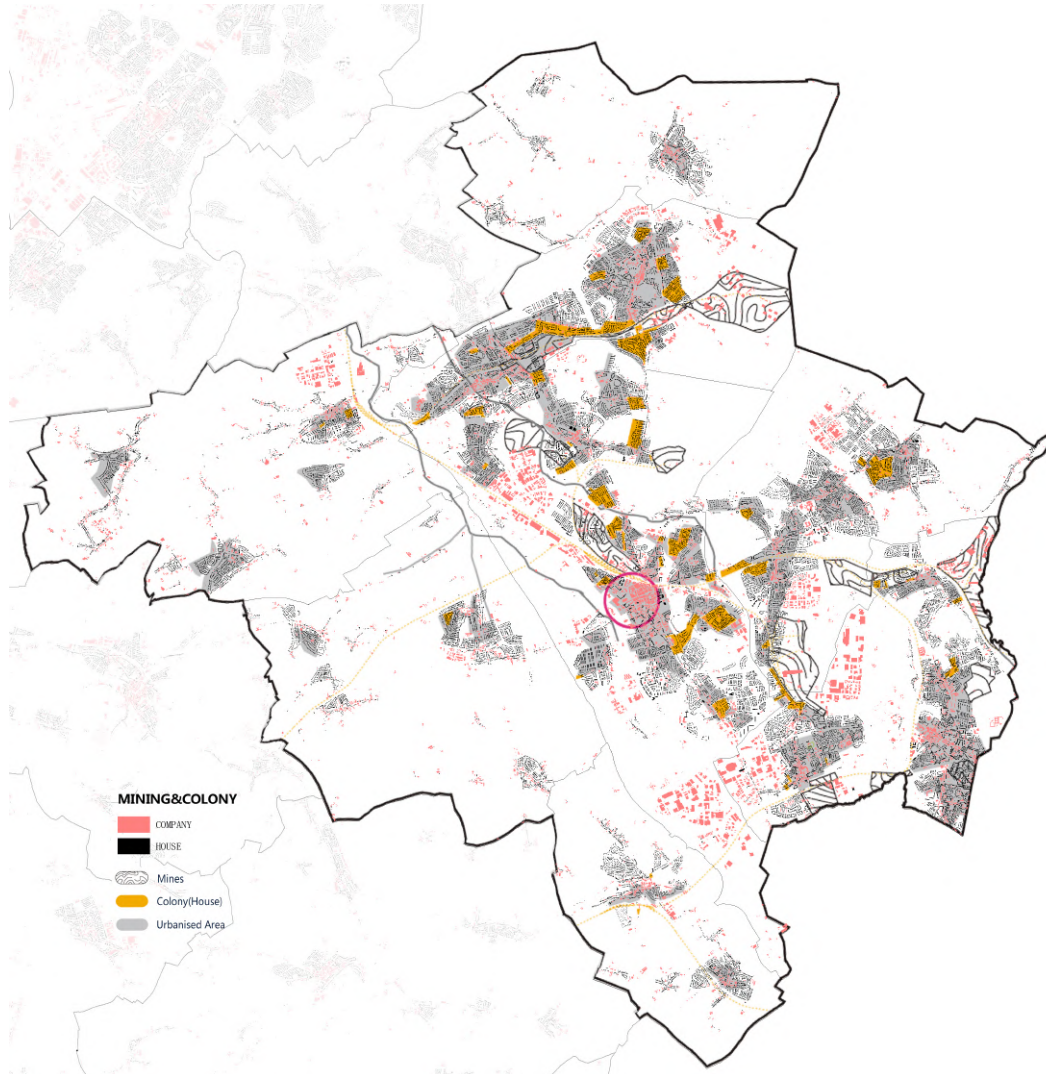
Area need to be improve



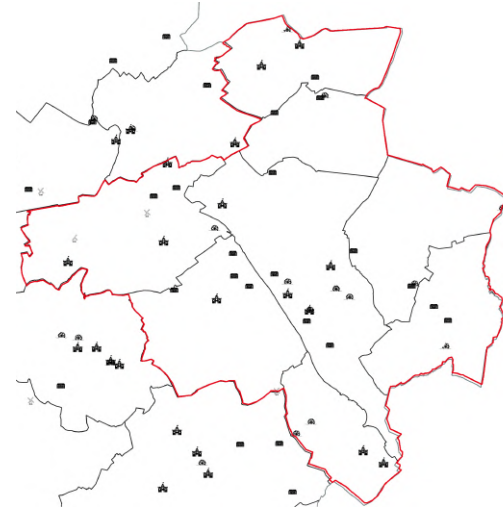
### 3.2 Analysis Urban System

#### Function

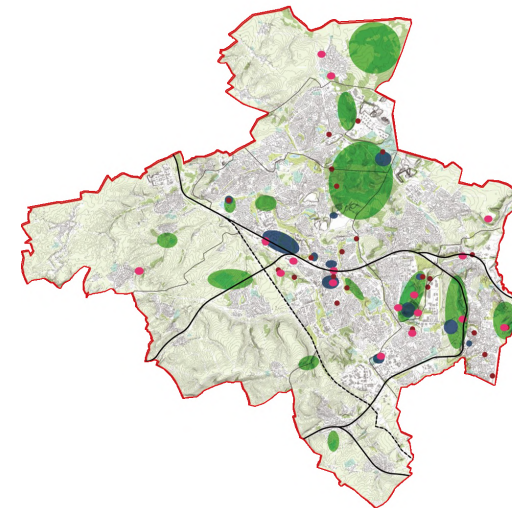
##### Used Coal mine and colony



##### Heritage



##### Attractions



City expanded around coal mine and the mine colony is a typical types of houses and neighborhood structure in this region, which could still be seen now. Used facilities of coal mine industry have already been removed and rebuilt for new function. Nowadays, you could still trace the memory of coal mine history by visit the mine museum at Heerlen center and 2 coal heap remained as new hilly landscape in this region, which situated around Brunssummerheide Nature Reserve and the Snow World. Industry developed along the rail way and main infrastructure.

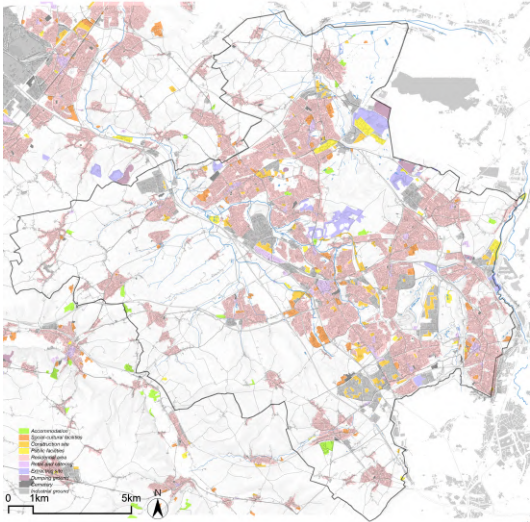
The roman history is one of the characteristics of Paksatd, a lot of heritage could be seen here, like the castle, museum and garden. Also, there are some new attractions like Pinkpop, Mural discovery and nature tourism.



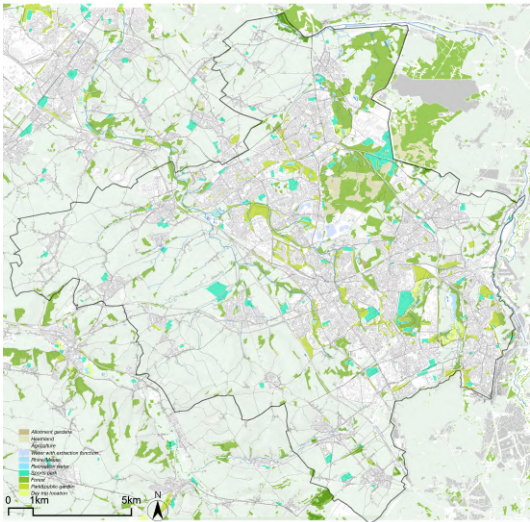
3.2 Analysis Urban System

Function

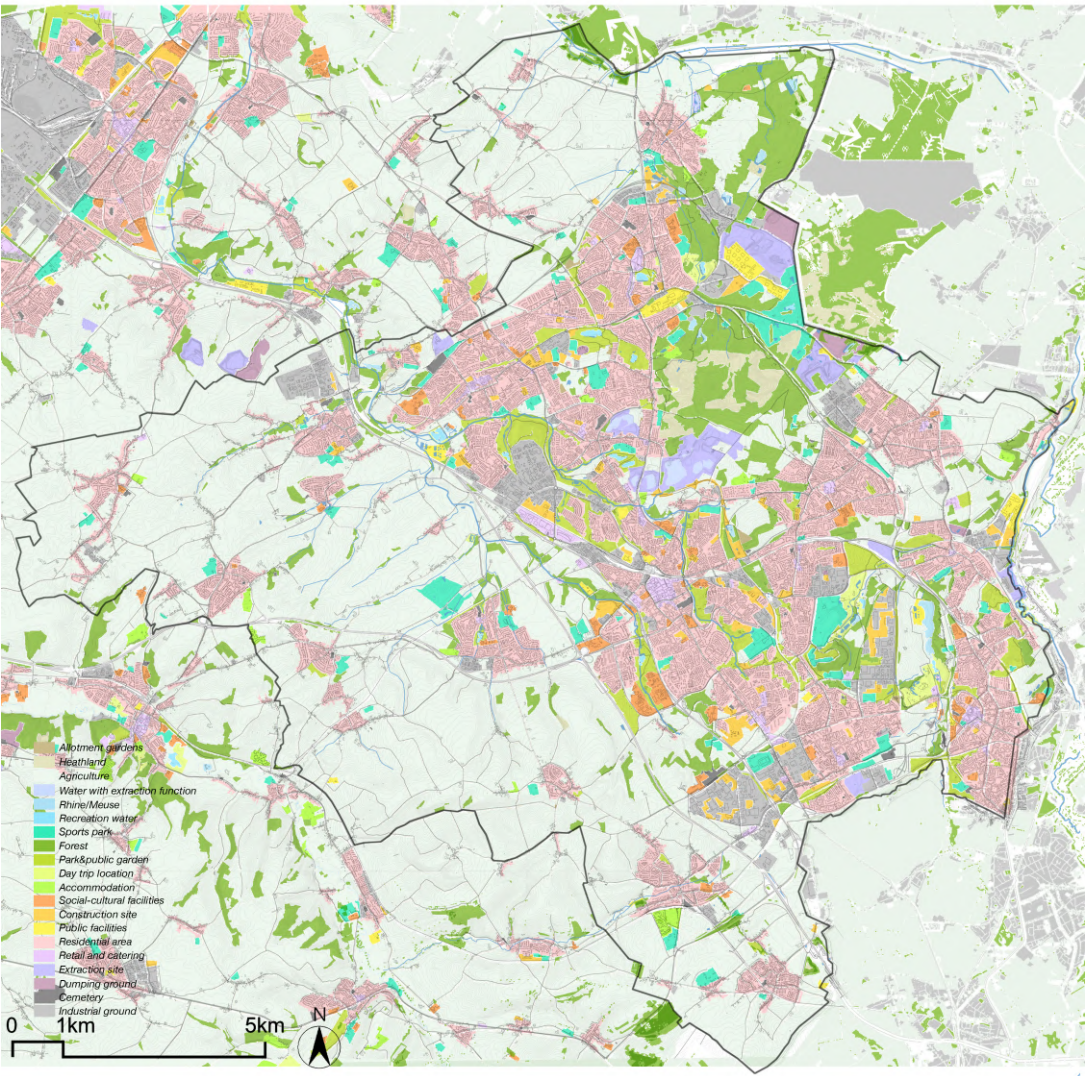
Function-Urban



Function-Nature



General map

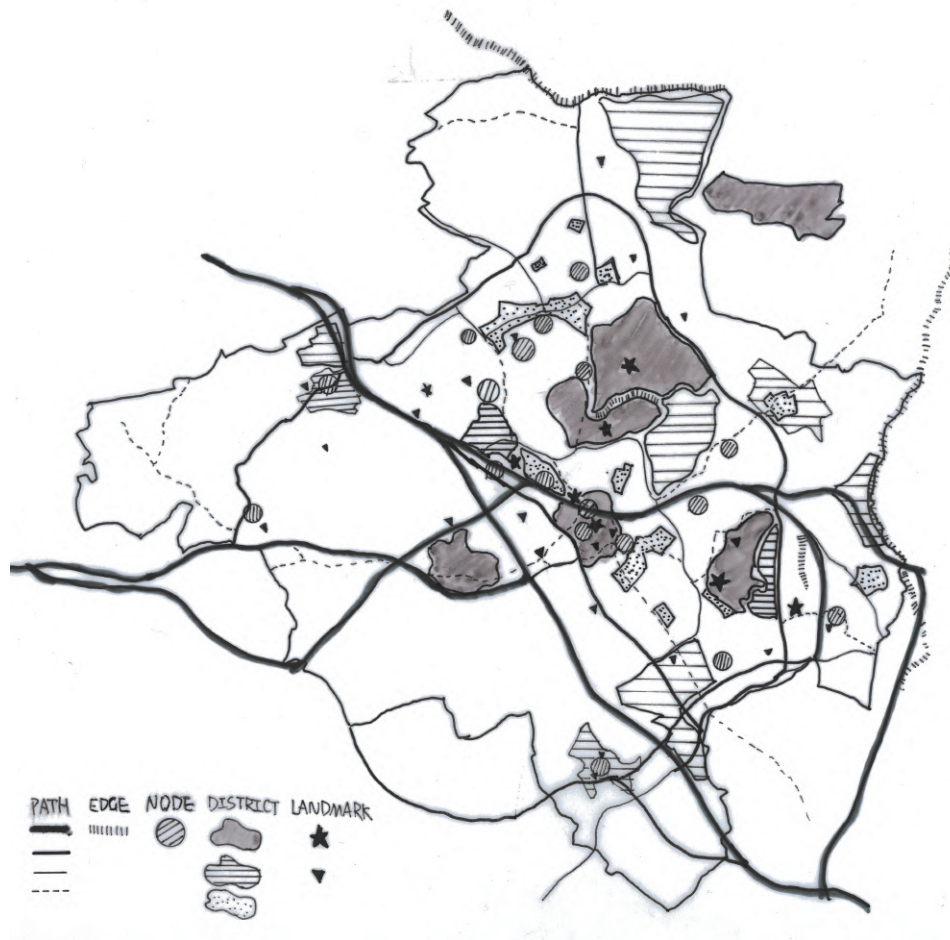




### 3.2 Analysis Urban System

How people use this region

kevin lynch map



According to the method of Kevin Lynch mental map to analysis how people perceive this venue. Through the on-site interview of different people, the final mental map of Parkstad is summarized. These maps focused on the 5 basic elements: path, edge, node, district and landmark, it reflects the memory and usage of Parkstad from different people. This is a good way to react to the venue's hotspots.

One core+ Three zones



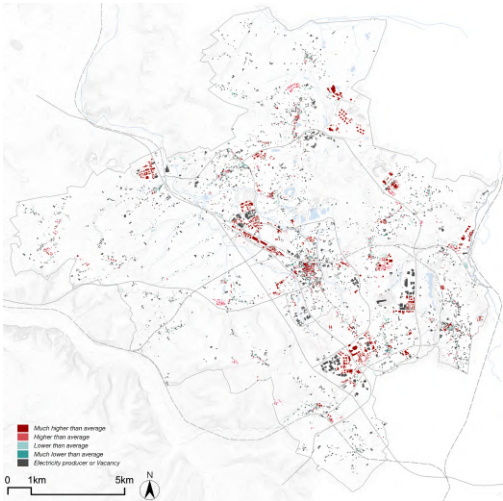
According to the map, we could see that for Parkstad's citizens there are one core, Heerlen center which is the most important commercial and entertainment and cultural center. At the north and south have 2 small activity centers in Brunssum and Kerkrade. Three important zones are the ecological nature experience at the south part with the big nature reserve, commercial and retail zones from Heerlen center to the Hoensbroek, the athletic district which contain the Snow World and heap stairs, Gaia Zoo, Mondo Verde.



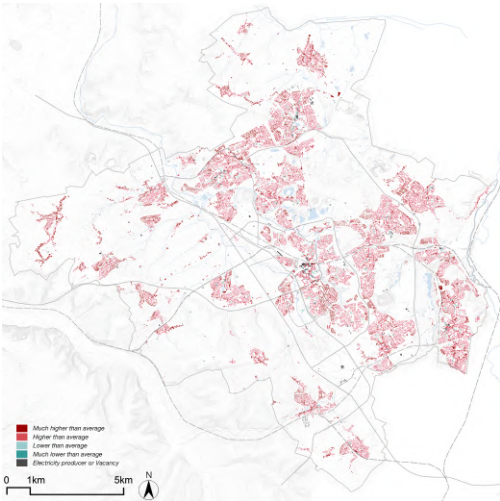
3.2 Analysis Urban System

Demoliton Potential

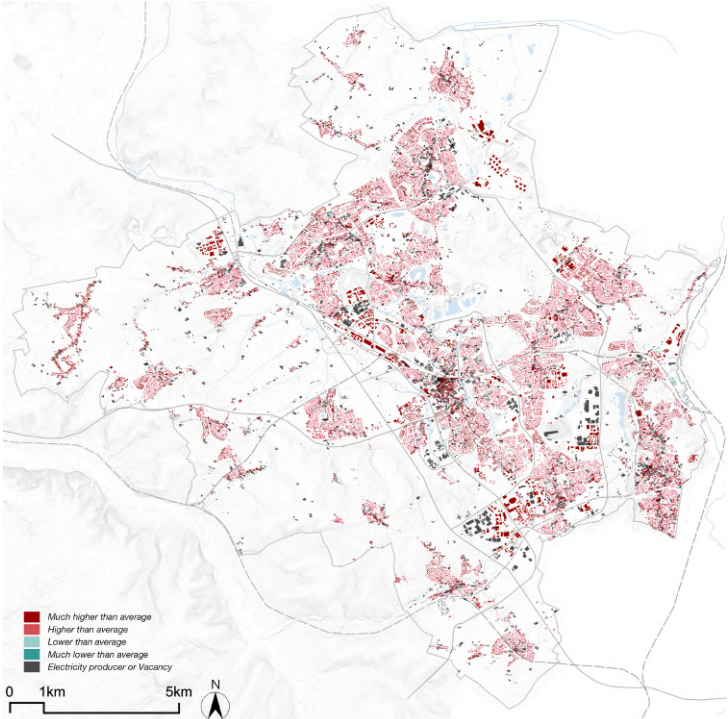
Low energy used building-Company



Low energy used building-House

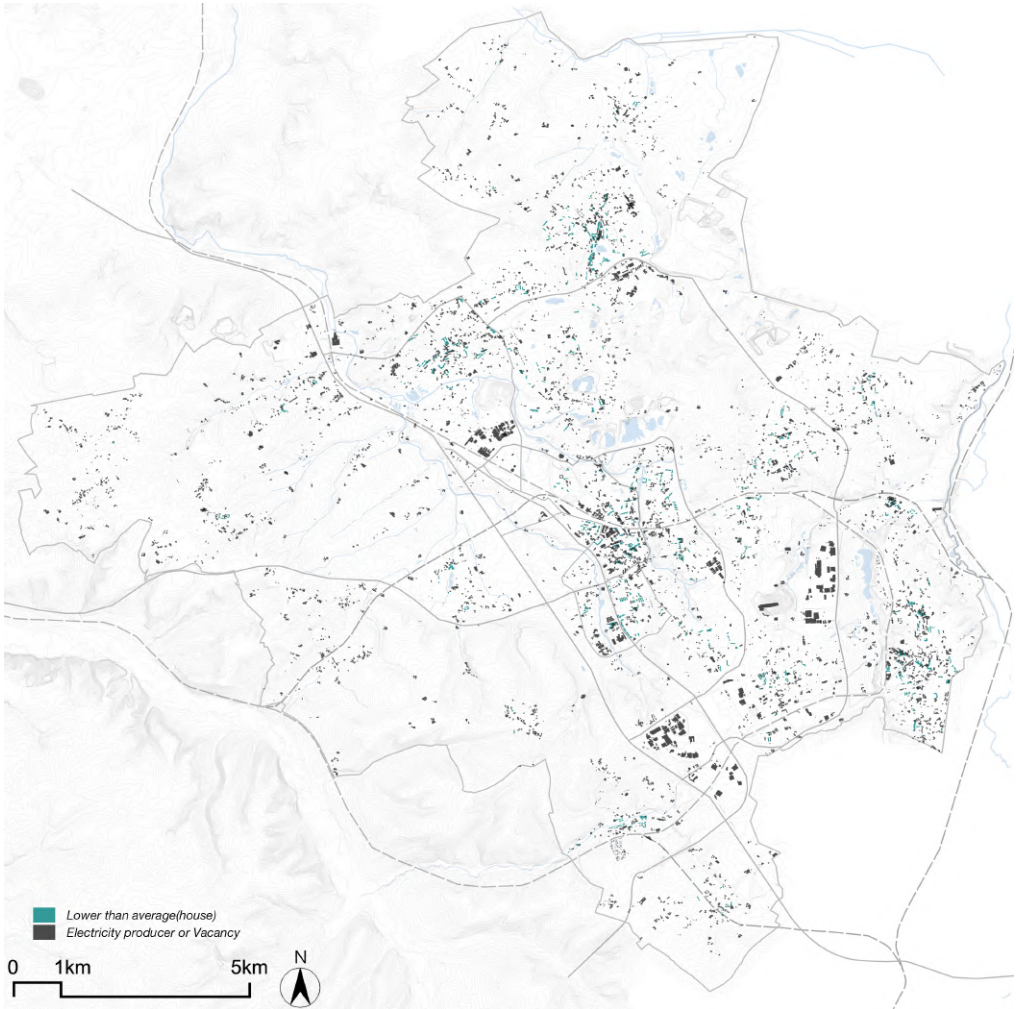


Low energy used building



Calculate the energy used of house and company separately, and conclude the potential of these two types of buildings which already become vacant or will be abandoned in the future.

Low energy used building-Potential



Currently, most of the vacant buildings are companies, such as industrial, commercial and retail buildings. Residencial building takes a small part and is relatively scattered. Several key vacant plots are mainly distributed in the commercial centers of Heerlen, Kerkrade and Brunssum. However, with the loss of business and economy, if parkstad continues to shrink, the population will decline more seriously, which will inevitably lead to more and more vacant residential buildings in the future. These vacant buildings are risks of Parkstad as well as opportunities. Reorganization, design, and reuse will improve the continued sluggishness status of the region

## *04 PRINCIPLE&STRATEGY*

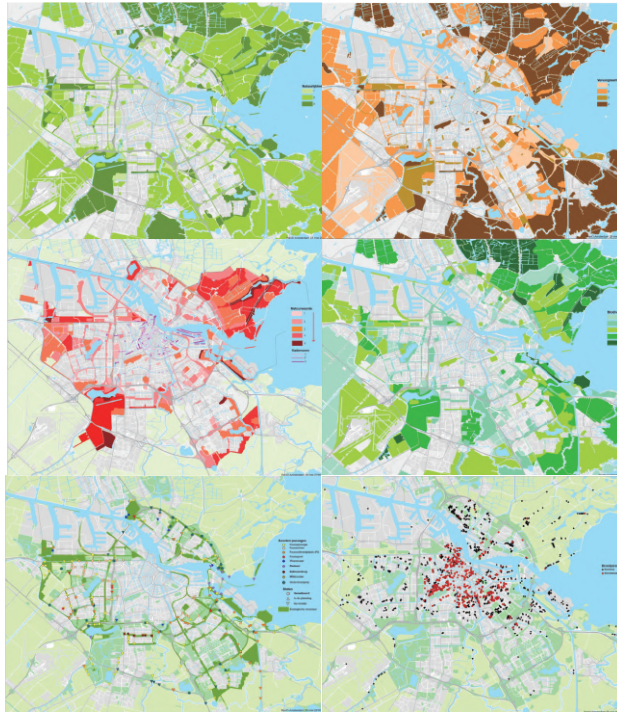
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Case study  
Principle



## 4.1 Principle&Strategy Case Study

### Building green city | Amsterdam



Source: Plan Amsterdam 03/2017

Amsterdam is growing at a phenomenal pace. So fast that people are already speaking of the city's third Golden Age. Still, to truly build this third Golden Age, the city will need to use this growth to create a better place for its people. Green infrastructure will play a crucial role in achieving this. (Gemeente Amsterdam, 2017)

According to this situation, 'Building a green city' plan is to be considered. Connect green spaces to form urban green networks, add the number of green spaces and various functions of these new urban biotopes. Green neighborhoods where people, plants and animals are all given equal weight and people can really participate in the nearby nature.

The interesting part is the analysis method, think about how to make the connection, the mapping of different species and green surface show a lot of useful information. Trace the species how the live in Amsterdam, shows the hotspot and breakpoints, which are the important guidelines for the design. For different species, connect the "breakpoints" on the migration road, is a perspective need to be focused when making the green network on regional scale.

A reinterpretation of urban green-blue networks as infrastructural systems where traditional values of public space are combined with green values in ecosystem services. Consider green-blue networks as valuable quantifiable assets in urban economies. The assets of green-blue networks are resources or processes that derive from natural ecological systems that are beneficial to the city and its inhabitants.

First, examined how green this city -one of the greenest in the Netherlands- really is, based on valuing the ecosystem services its public spaces provide.

Then, explored how its public space can be upgraded into a rich green-blue network that maximizes the provision of ecosystem services for Zwolle, whilst simultaneously supporting its urban agenda.

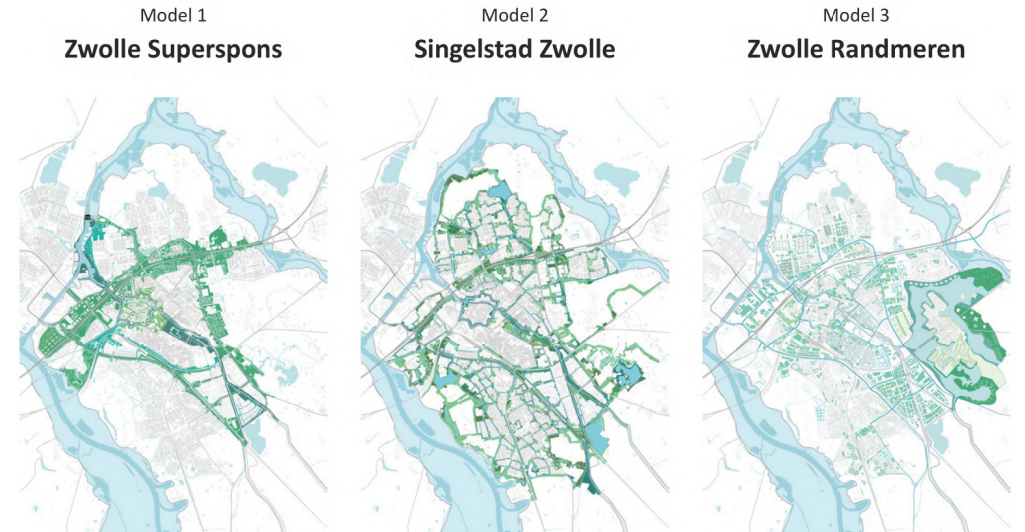
The research and design methodology and process is a good guideline to think about large scale planning. (DE URBANISTEN, 2016)

### Landschaftspark Duisburg Nord

The park was rebuilt in A.G. Thyssen Steel Plant which was closed in 1985. The work was designed by German landscape architect Peter Latz. The biggest feature is the ingenious transformation of the old industrial area into a place for public leisure and entertainment, and retain the original industrial facilities as much as possible while creating a unique industrial landscape.



Source: Raika, 04/24/2009



Source: <http://www.urbanisten.nl/wp/?portfolio=good-green-is-golden-2>

- Functional public spaces scores according to 18 Ecosystem services.
- Scoring Zwolle public space on their provision ecosystem services.
- Developing ecosystem services into a refined green-blue public space network (with three different model)
- The Good Green public space typologies of Zwolle SINGELSTAD provide ecosystem services and strengthen its urban agenda.
- Quantifying added values of Zwolle Singelstad

(DE URBANISTEN, 2016)

- Architectural and engineering structures are preserved as monuments of the industrial age, which are used for the 'Point' landscape.
- Respect and improve local ecosystems
- The original waste materials in the factory are also used as much as possible.
- Recycling, sewage is treated, rainwater is collected

Maximizes the history of the factory and uses the original "waste" to shape the landscape of the park, minimizing the need for new materials and reducing the energy requirements for producing materials.

Create different vegetation environments with old industrial structure



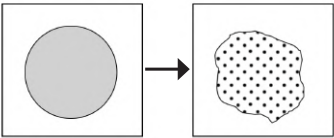
Source: Urbane Künste Ruhr

Source: <https://www.landschaftspark.de>

Principles: *New habitats* | *Heterogeneous Patches* | *Native Network*

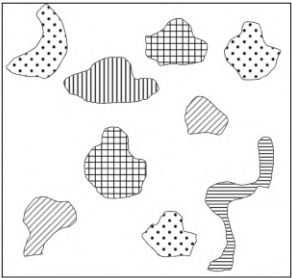
1. *New habitats*: Rebutild *abandoned land cover* into *new habitats* to support more *species*

Broken | Ugly Landscape —————> Vital | Beautiful Landscape ----- Species Diversity



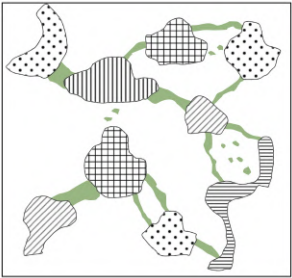
2. *Heterogeneous Patches*: Establish *various types of circumstances* to conserve and appeal more *species*

Homogenous | Dull Landscape —————> Heterogeneous | Attractive Landscape ----- Ecosystem Diversity  
Species Diversity



3. *Native Network*: Make connection between different habitats to promote *species migration*

Isolated | Fragile Landscape —————> Complex | Strong Landscape ----- Genetic Diversity  
Species Diversity





## *05 SITE CHOICE*

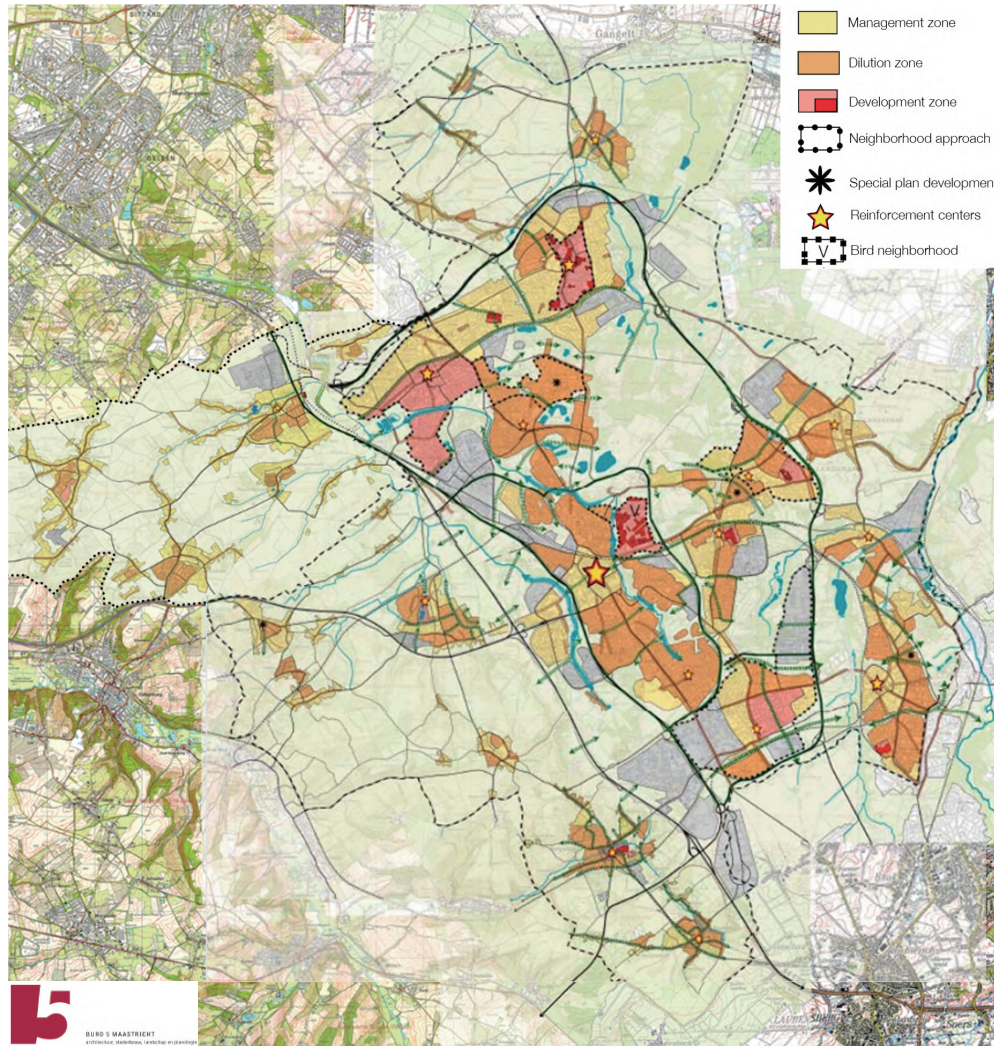
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Parkstad scale  
Urban scale  
Community scale

## 5.1 Site Choice Parksatd Scale

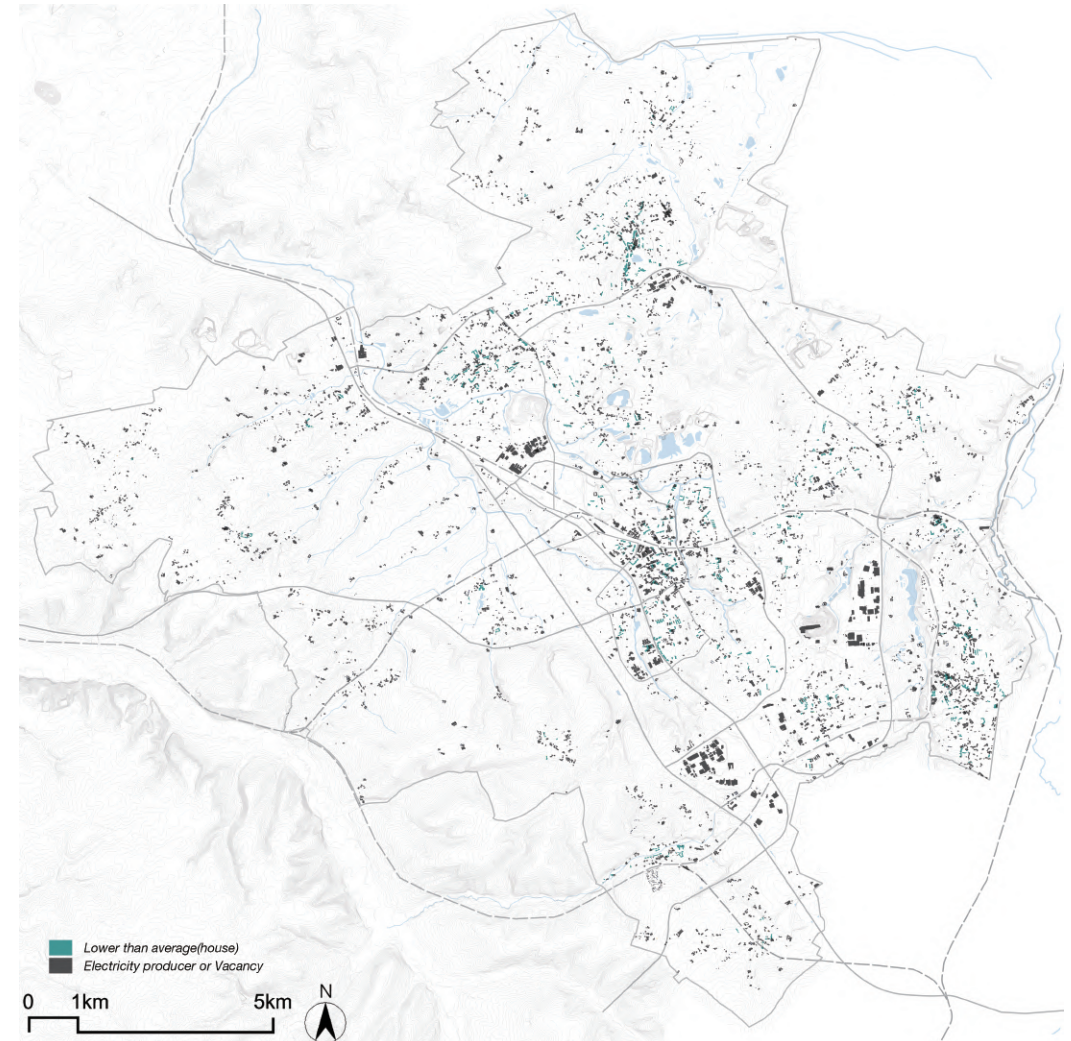
According to the restructuring vision planed by Parkstad Limburg's government, they divided 3 different zones for the future, which is the developments zone, management zone and dilute zone. New centers and cores are also be designed. This plan assists and supports the idea of smart decline, dilution in a certain area, and reorganizing the regional density to better cope with future challenges.

Restructuring vision by Parkstad Limburg



Combining this plan with vacant buildings, we can choose the specific area of dilute and how the development and manage zones are designed. Because many vacant plots are concentrated around several major centers, how to reinforce and reorganize the central area, how to re-fill the diluted urban area are the priorities to be considered by later's vision and design.

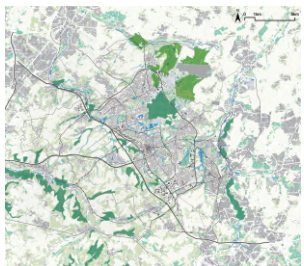
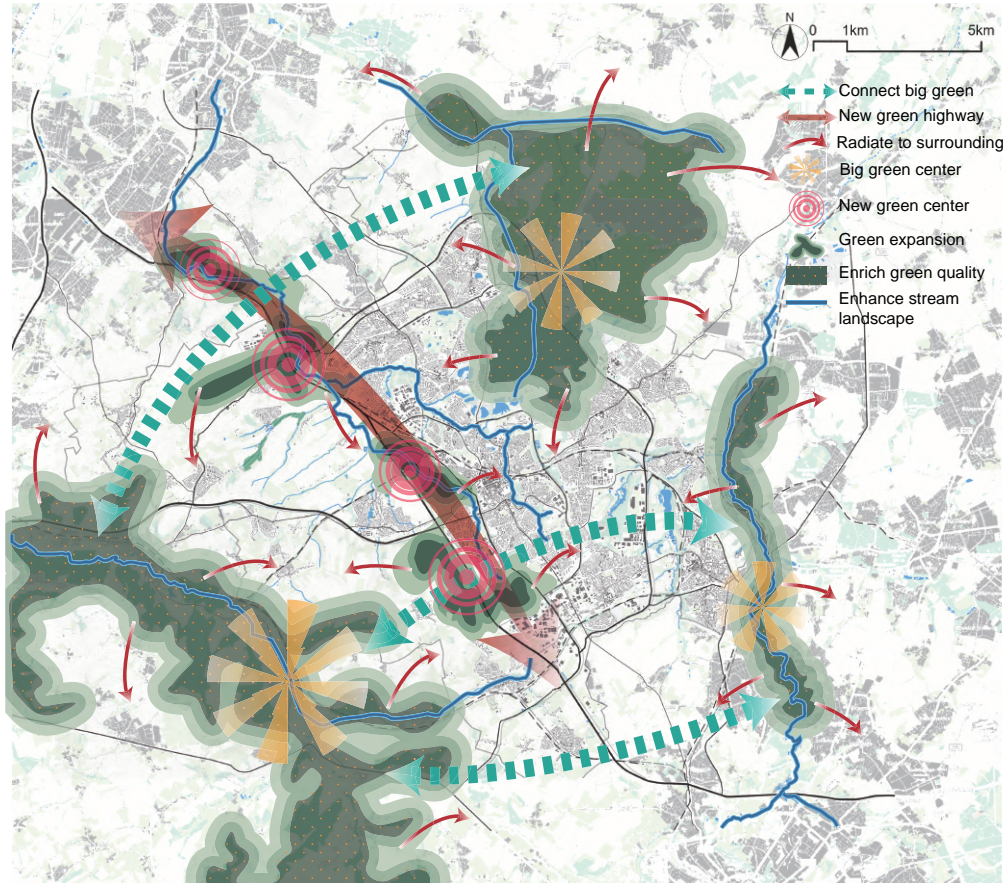
Potential vacant buildings





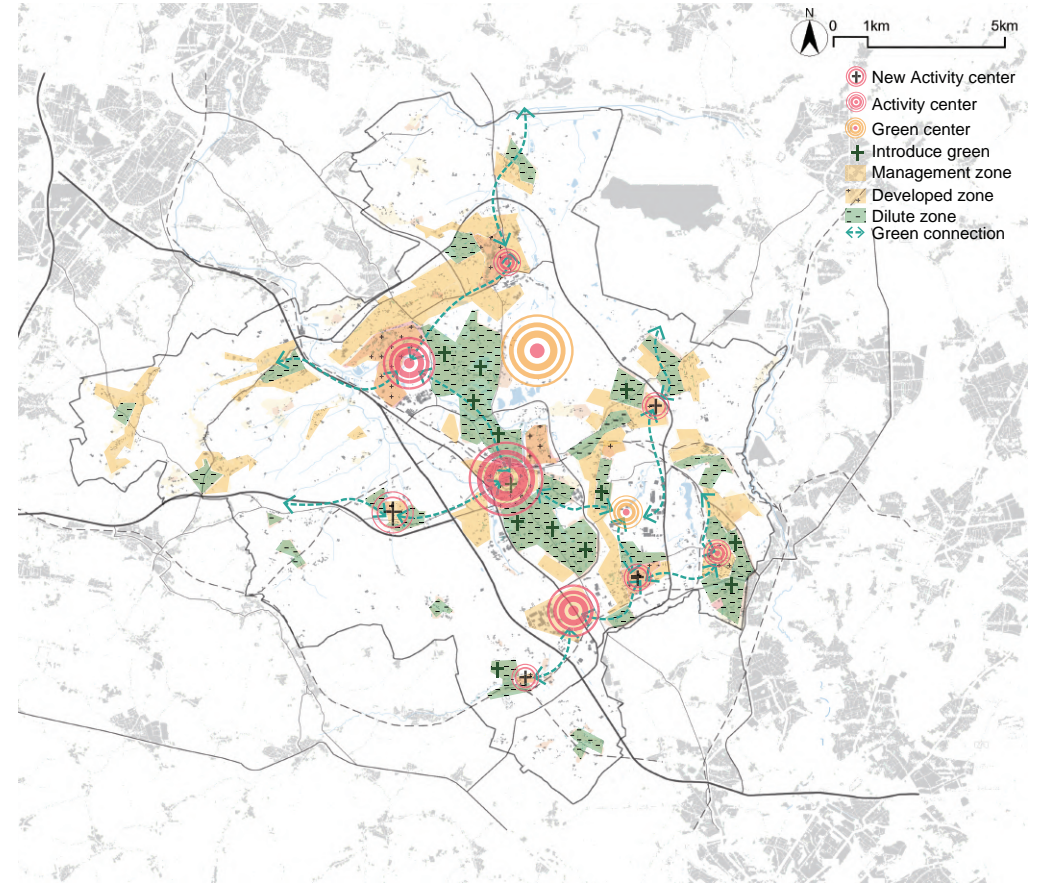
## 5.1 Site Choice Parksatd Scale

### Nature system vision



- Three big existing green center: Radiate to the surroundings pathces | Continue to maintain and enrich the vegetation layers and structure.
- Create two new center between Highway A76,N281: Radiate to the surroundings to connect the scattered small patches | As a buffer zone between 2 systems and enhance the interaction | As new Big Habitat for all users.
- Enhance connection between different patches: Connet big green centers | Add connection between 3 differnt patches agriculture, urban and forest.
- Blue system: Strength stream landscape | Enhance interaction and connection between two main stream (Agriculture and Urban area) .

### Urban system vision

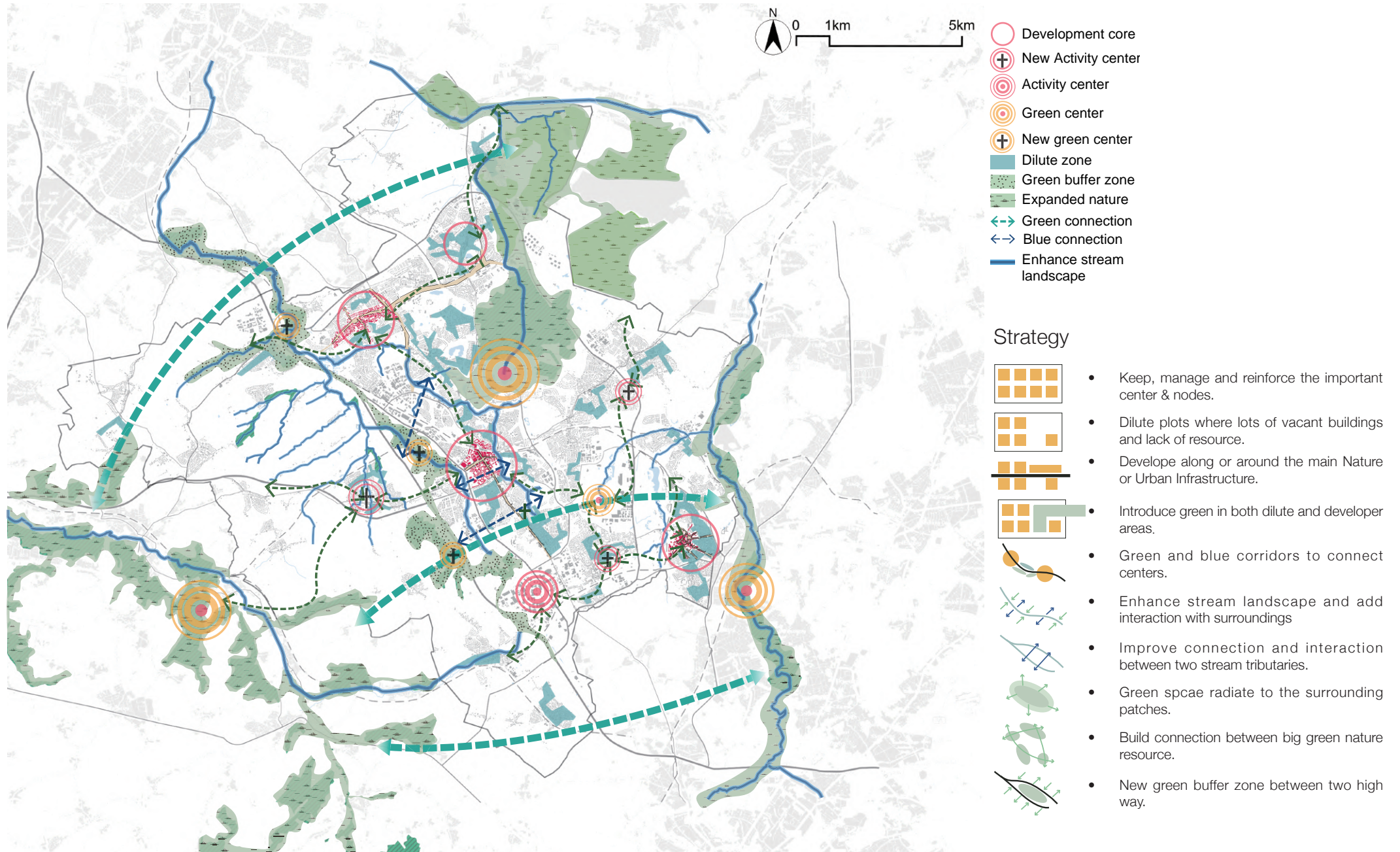


- Keep the existing important zones to people, reorganise and design these zones to enhance characteristics and attraction.
- Keep, manage and develop the existing 'Active' center & nodes.
- Dilute plots where lots of vacant buildings and lack of resource.
- Introduce green & blue space into urban area, create new habitats for different users ( People, Flora and Fauna ).
- Add and create new green & blue corridors to connect important centers and zones.
- Keep the urban area along or around the main Nature or Urban Infrastructure.



## 5.1 Site Choice Parksatd Scale

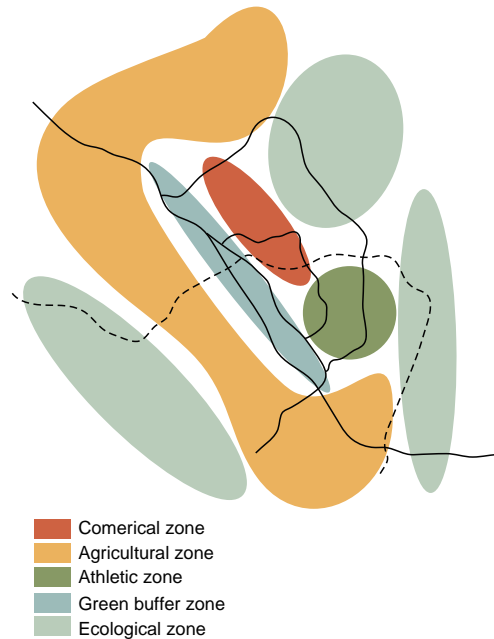
### General vision





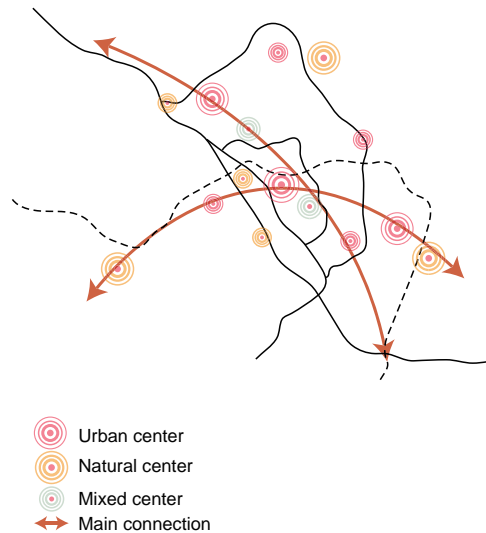
## 5.1 Site Choice Parksatd Scale

District



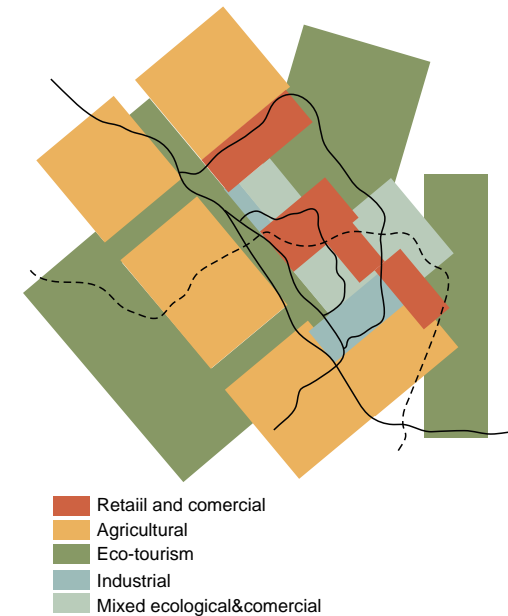
Through the vision of Parkstad, the area has been divided into 5 districts, ecological zone with different nature experiences, the agricultural zone for food production. Urban area is mainly divided in 2 zones, one is the commercial district connect Hoensbroek shopping street, retail line along the highway N281 and Herleen center. Another is the sports district which fulls of interesting activities and sports and entertainment facilities. The new green buffer zone between two highway, increase the interaction between the agricultural and urban system and help the migration of different users.

Center



Three different types of centers have been formed, urban activity centers, natural experience centers, and new nature types, which mixed the function of urban and natural systems. The new center is built along the main (urban and natural) infrastructure, and the fast and reachable accesses should be established between the centers. Two main connections run through the area connect different types of centers.

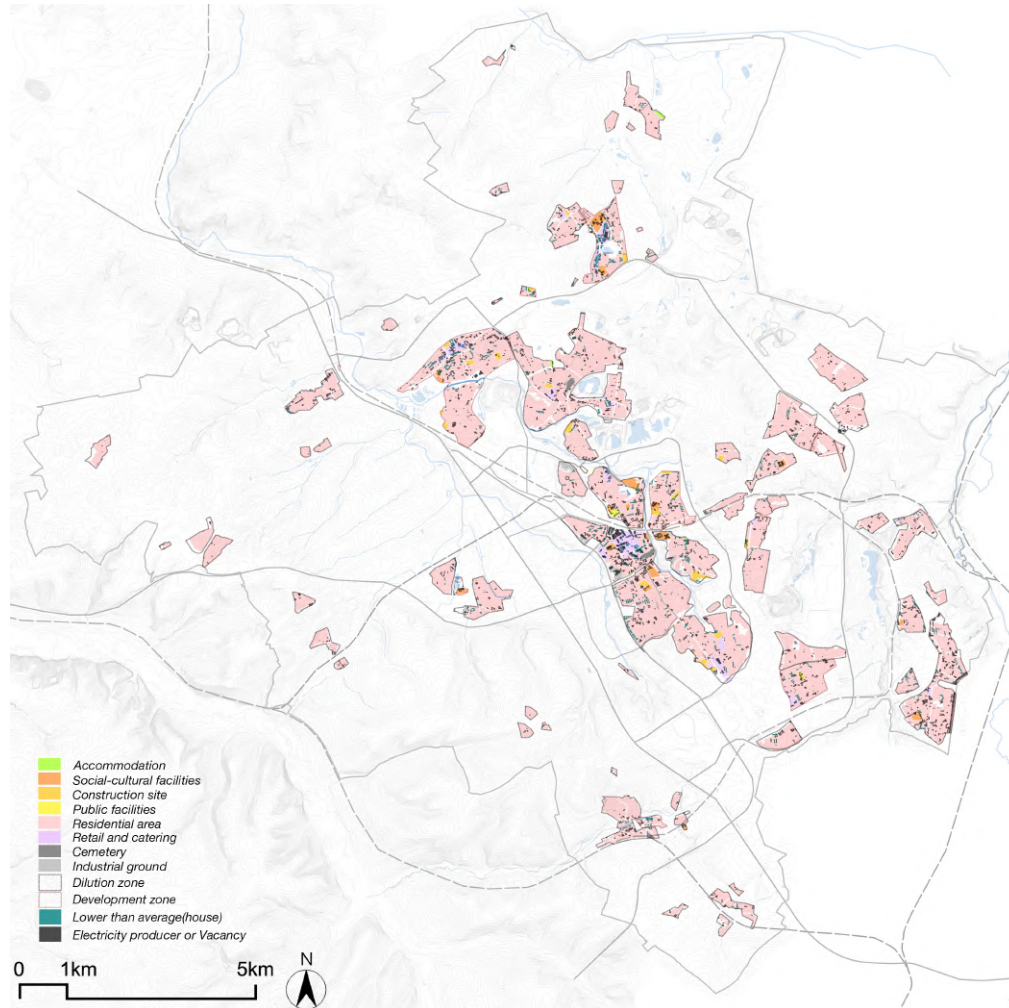
Economy



According to the new zones and centers planning, the new economy distribution has emerged. The green and blue structure of the venue has been added to expand and enhance the green influence, bringing unlimited potential to eco-tourism. Introducing different patches in farmland increases agricultural yields. Strengthen the center and adjust the concentration of the city to form new commercial competitiveness. The emergence of the new type of nature provides good habitats for more users, bringing the benefits of collaborating. Better urban systems and visions attract more companies and industries to build here.

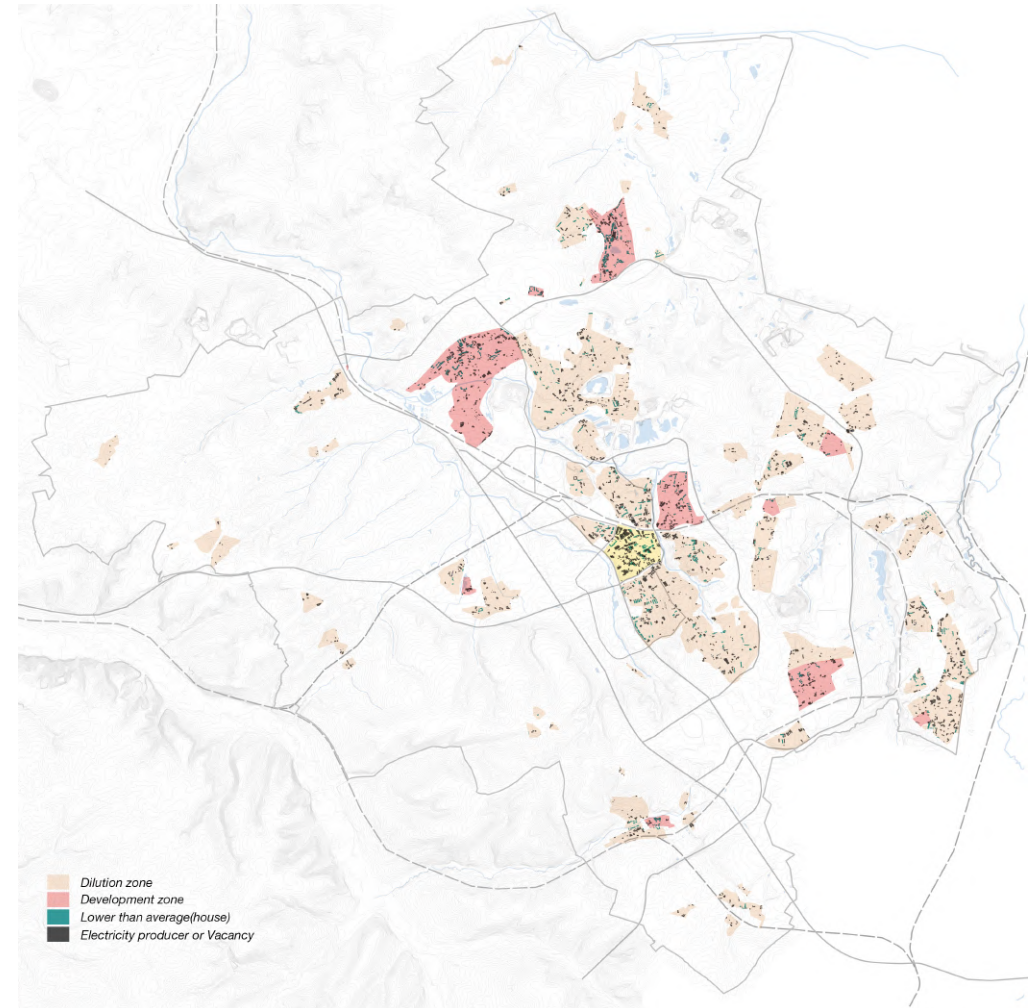
## 5.2 Site Choice Urban Scale

Function of the possibilities



According to the vision and function of the building types, could found the specifi place to dilute and demolished buildings. During the dilute area, the vacant buidngs are more for the reseidence building, which is quite separate. With the continuation of the shrink and the aggravation of the aging society, there will be more loss of citizens, and these areas will have higher vacancy rates in the future.Prepare for the future, reduce house density appropriately, and convert value with new nature or urban functions to improve the quality of life in the area.

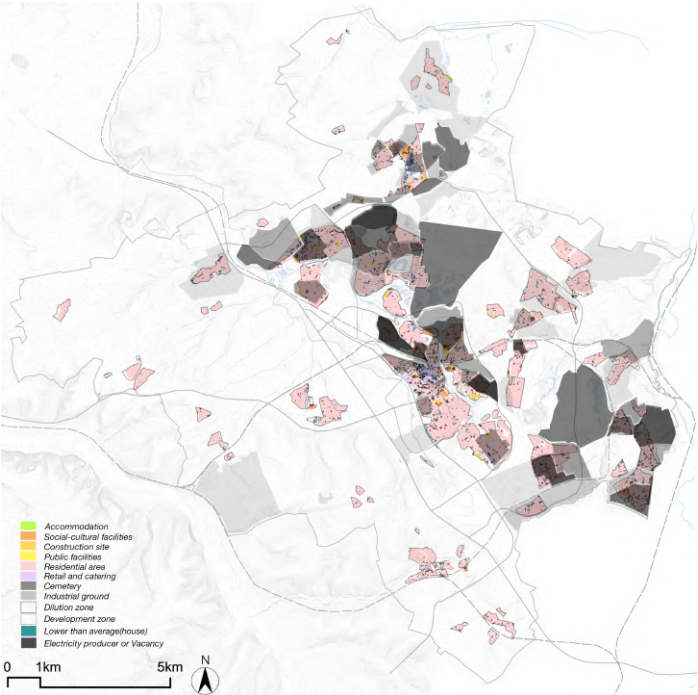
Possibilities to reorganised



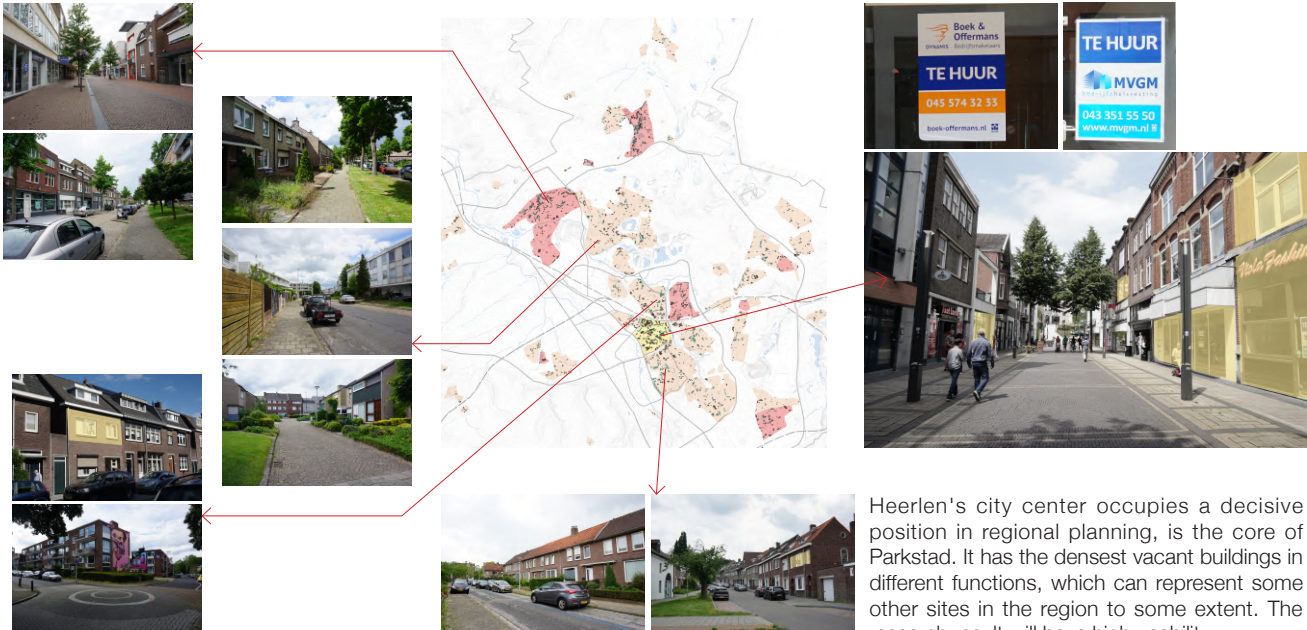
More concentrated vacant buildings are distributed in several centers of the develop and manage zone, and the empty urban centers make the city image in jeopardy.The most vacancy rate and the most important core areas are distributed in develope and manage zone, so the study of the processing and value conversion of vacant houses in the core area will be the first starting point.Study different ways to transform vacant buildings, re-plan and strengthen the attractiveness of urban centers, and better serve different types of users



# 5.2 Site Choice Urban Scale Combine with Income| Employment



Fieldtrip to analyse the sites



Two possible sites



Stream-green space



city-center





## 5.2 Site Choice Urban Scale

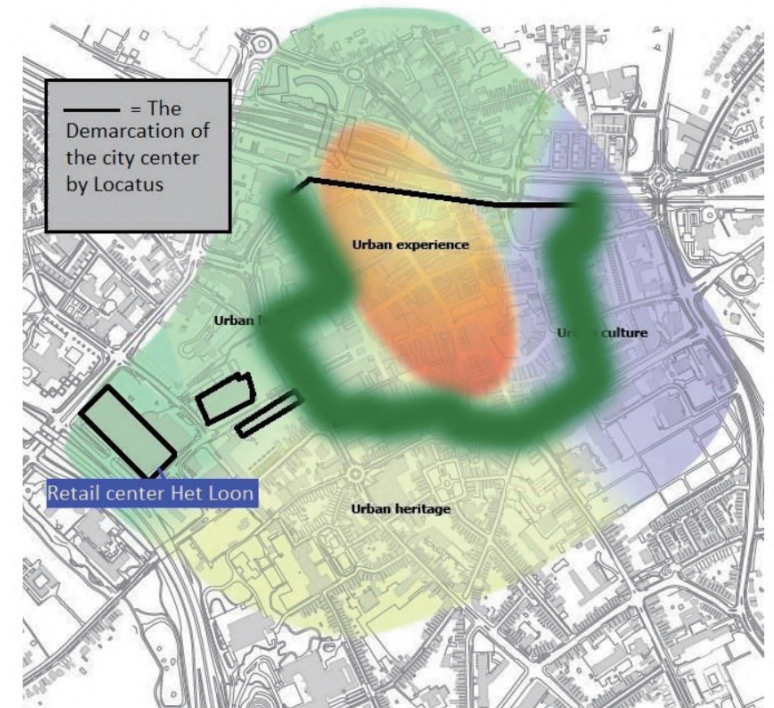
Choose city center as the starting point



Source: Map of Heerlen with a visual of the urban focus areas, Integrated Action Plan - Heerlen



New Green Ring





### 5.3 Site Choice Community Scale

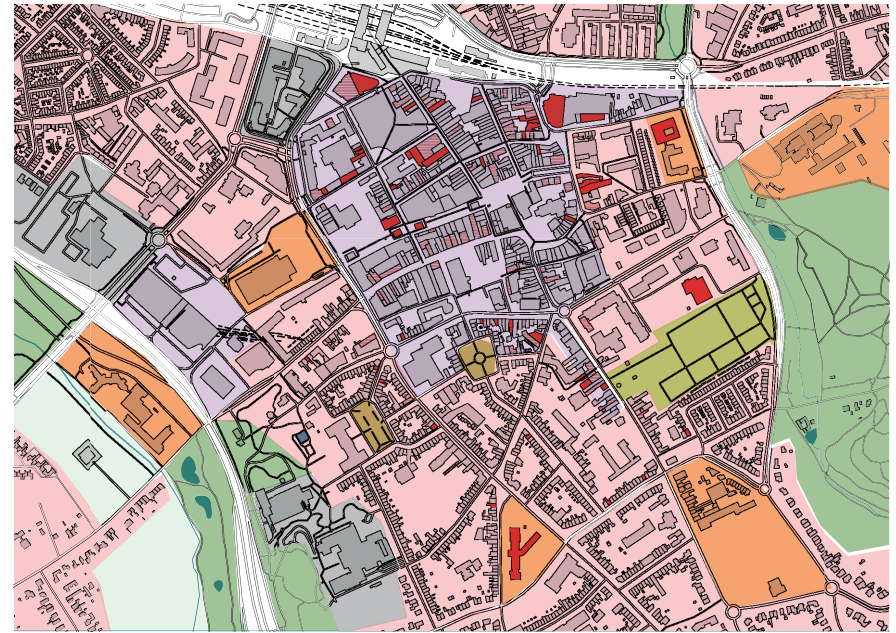
#### Basic Analysis

Vacant buildings map



A lot of important heritage and function buildings are located in the city center, while the vacancy rate in the city center is relatively high. The vacant buildings are located in the core of the city center and form a ring belt.

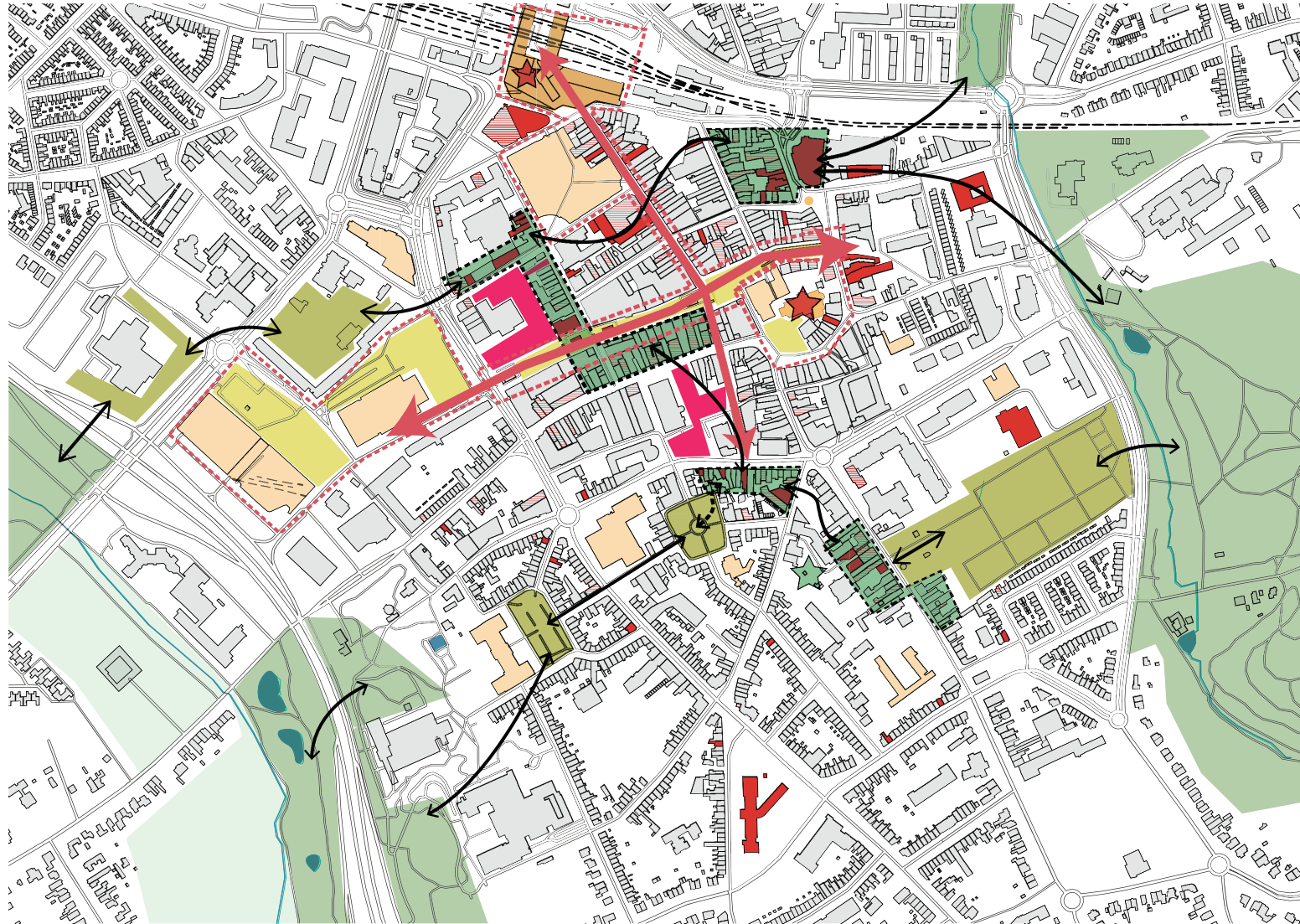
Function map



Two big green parks and two tributaries of stream Geleenbeek around the city center. The vacant buildings' used function is more for commercial and retail, with some vacant residential buildings on the periphery of the core.

### 5.3 Site Choice Community Scale

#### Urban vision

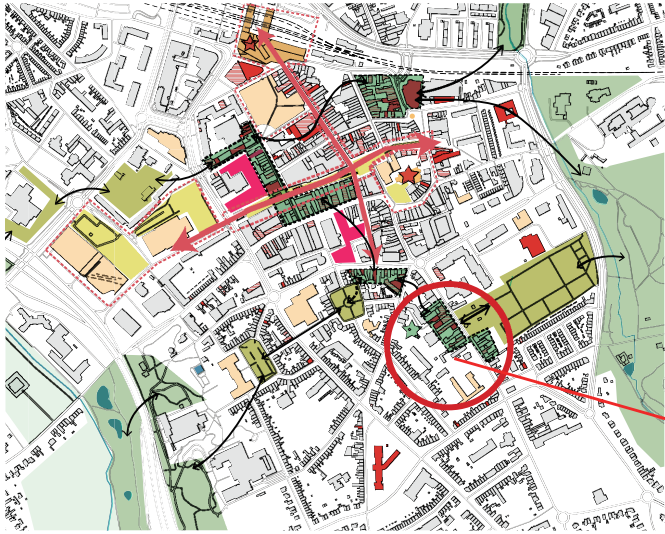


Three possible sites which can be transformed to new function by demolished and reused the vacant buildings. Build a new green belt to connect the surrounding natural space to create the migration routes for animals, which made the city center become a new type of habitats for different users. Strengthen the two main activities and commercial streets. Improve the vacant and shrinking status of the city center, create a new and beautiful city image.



### 5.3 Site Choice Community Scale

#### Final Test Site



The other 2 spots were more used for the commercial and retail industry, which is more challenge to demolished or removed. Compare with the Test sight which is more used for residential, it is more difficult to get the permit to change the buildings. Also, the Test site can represent other sites like the residential buildings in Dilute zones.



## *06 DESIGN*

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Community scale  
Urban scale  
Parkstad scale



## 6.1 Design Community Scale

### Basic Analysis

Traffic map



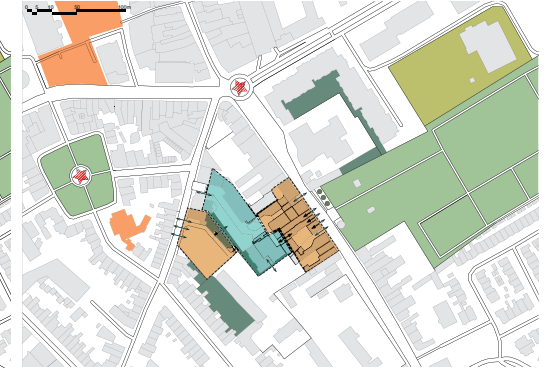
Function map



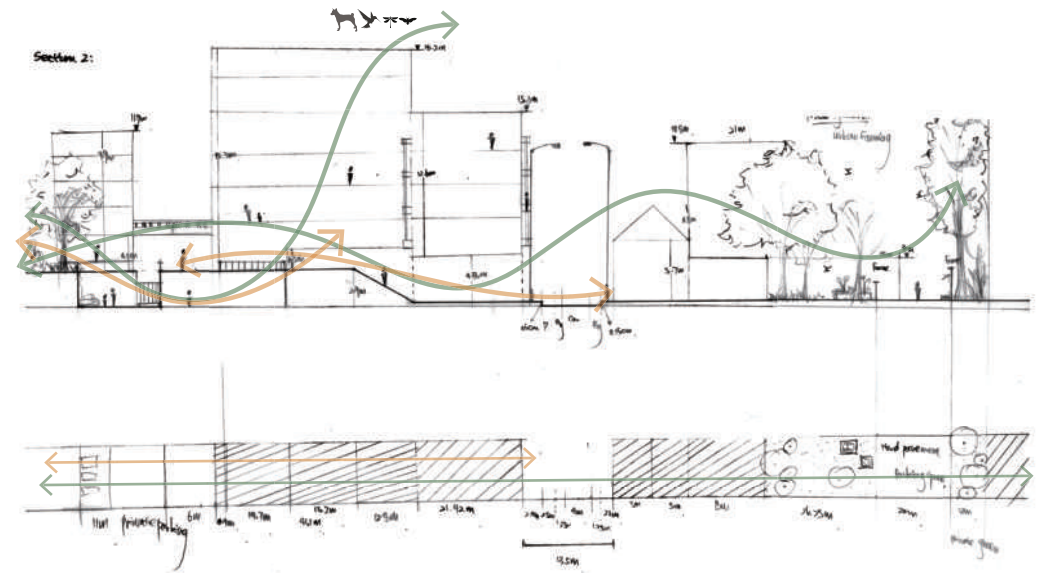
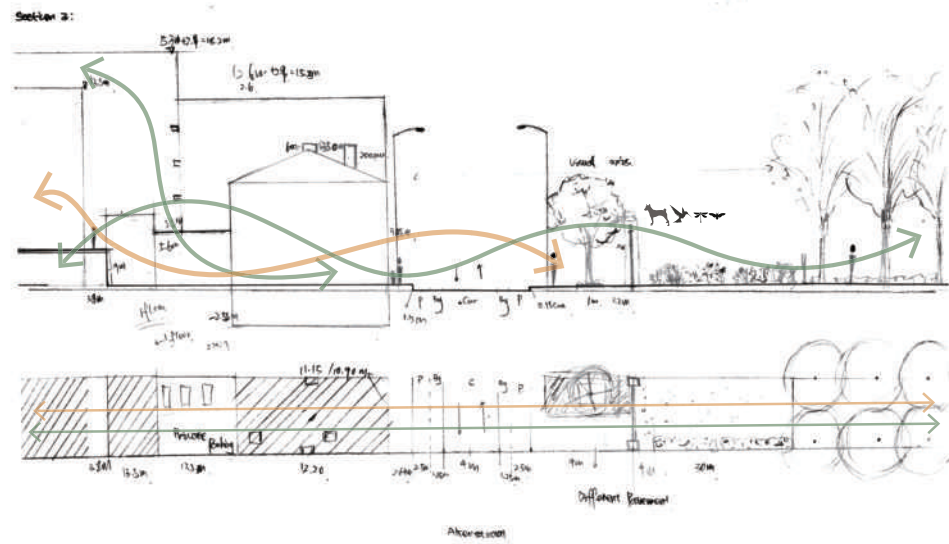
Site Range



Partition



### Two main section of the community



## 6.1 Design Community Scale

4 Tset Design for 4 users



Eurasian Eagle Owl-*Bubo bubo*  
*Red List*



Red-backed shrike-*Lanius collurio*  
*Red List*



KingFisher-*Alcedo atthis*  
*Small amount of hibernators/migrants*



People  
*Shrinking in population | Eging society*



6.1 Design Community Scale

Needs and Requirements for each group

Eurasian Eagle Owl-*Bubo bubo*

Owl	Needs	Behaviours	Space
Social	A periodic recreational stop	Roam around the nesting site	
hunting   breeding  eating  migration	Smooth and safe flight	Collision risk	Far from electricity pylons   windmills   barbed wire
		Prey	
		Breeding	
	Security(safe habitat places)	Sensitivity to disturbance	Far from Busy traffic routes
		Use suitable nesting place for many years	Sufficient food supply from 0.5- 1.5km to nests
		Start to colonize buildings in cities	High and Vertical structure
Spatial	Water body	Drink water	Water body in the territory
Habitat preference	No strong light	Prey	(vicinity of riparian or wetlands areas)
	Roots of trees   under large bushes  fallen tree trunks   between rocks	Nesting on the ground	Construction of extensive herb- rich strips
	Wooded areas		Surrounded by a scattering of trees and bushes
	Cliffs, ravines, quarries, steep slopes(nesting area) crevices, gullies, holes or caves		Rocky space with sand   limestone   bricks
	Sufficient food supply	Hunting food	Enough greenspace with dense vegetation (many small mammals)
Ecological	Numerous small mammals, mice and rats frequently,fox, birds, even birds of prey and other owl species, amphibians, fish	Hunting food	Shrub- dominated habitats in a 1km radius circle around nest
Quality of environment (clean, food types, plants species)	Keep free of poison use for mouse and rat control	Sensitive to toxic substances in the environment( PCBs and possibly also rodenticides)	No toxic in nesting area
	Rocky landscapes: sand and limestone		
	Clean water		
	Coniferous   pine trees   oaks		
	Tree lined waterway		

Red-backed shrike-*Lanius collurio*

Red-backed shrike	Needs	Behaviours	Space
Social			
hunting   breeding  eating  migration	Perches to hunt from	Breeds from mid- May to July	Stream system in the territory
		Fly from point to point in a fast straight- forward flight	A great diversity of land use around the nest
	Smooth and safe flight	Often forages at a high branch and dive to the ground	
		Low- intensity nature tourism not affect nest site	
	Security(safe habitat places)	Sometimes catches insects in flight	Create transitions from wet to dry, from high to low
	Length of hunting drops are much less than 10 m	Spears its prey on thorns or pointed side branches to handle them	
		Unaffected by the distance to the nearest road/path	Roads or paths within their territories
Spatial	A mix of open areas and patches of woody vegetation		
Habitat preference	Water body	Habitat along the edge of small streams(10- 20m)	Woody vegetation along the edge of small streams(10- 20m)
	Leaves, bushes, fallow areas and single trees		
	Low vegetation for hunting and higher vegetation for hunting perches and nest sites	located near edges of forest or bigger scrub areas.	A mix of open low vegetation areas with heterogeneity patches
	Often sit along the edge of small streams.	Preferred nesting in scrub near roads although suitable scrub were presented in the whole study area	A large variation in vegetation (height)
	No more than 100 meters from the nest is fed		
	Heterogeneity of vegetation height 0-10 m from a potential nest site		A scrub cover between 10% and 30%
	Topographic wetness 10- 20 m from a potential nest site		
Ecological	Sufficient food supply	Nesting sites are characterized by dense thorny shrub species(1- 1.5m)	Dense thorny shrub
Quality of environment (clean, food types, plants species)	Many thorny shrub&trees [Hawthorn( Crataegus spp) Blackthorn (Prunus spinosa) Scots pine (Pinus sylvestris),Juniper bushes (Juniperus communis) Blackberries (Rubus spp) ]	Preferred territories in meadows, pastures and fallows, and avoided arable land	
	Clean water		Scattered scrub and trees in the habitat to be used as perches
	A piece with low vegetation, such as a roadside, a road, a shortly grazed or cut meadow		Livestock grazing is used as the primary method to maintain the open area
	Insects, small mammals, reptiles,small invertebrates( beetles, dragonflies, grasshoppers)		Space with vegetation heterogeneity and high topographic wetness
	scattered scrub and trees		
	Heterogeneous vegetation		

KingFisher-*Alcedo atthis*

Kingfisher	Needs	Behaviours	Space
Social		Scanning or searching for prey above the water	
hunting   breeding  eating  migration	Perches to hunt from	Dives into the water to grab its prey	Shallow, clear, slow- running water body in the territory
		Hovering flight	
	Safe flight	Sensitivity to disturbance	Avoid human and dog disturbance
	Security(safe habitat places)	Breeds from February / March	Water depth between 0.3m- 1m
		Frequently moves from one waterbody to another	The furthest distance from the water system is 250m.
		Dig tunnels of at from 0.5m- 2m	
		Occasionally visit garden ponds if of a suitable size	
		Active during the early morning and late afternoon and reduced around midday	
		Nest tunnel sandy or loamy steep bank edges	
Spatial	As far as 250m from the waters where the birds feed	Habitat in lakes, swamps, banks, park and garden, ponds, reed land and roughlands, rivers and fens	Construction of a kingfisher wall to offer artificial breeding facilities
Habitat preference	Well- vegetated,soft but firm banks,steep or vertical banks of compact sand or earth	Avoid territories with higher depths	Plants' branches overhanging the river
	Nest tunnel is usually 1- 2m above the normal water level	Maximum diving depth is approximately 30 cm	Well- vegetated,soft and steep banks
	Water body		Canals and under road bridges
	Trees or bushes with branches overhanging the river		Soft bank at least 1m high and 0.5m deep
	Ledges and gaps in walls,post and rail fencing		
	Territories are usually at least 1/2mile (1km) of river and up to three miles (5km) wide	Nest among the roots of fallen trees or in a sandpit	
Ecological	Less reinforced or rock banks	Afraid cold weather and flooding	Restoring natural streams
Quality of environment (clean, food types, plants species)	Small fish and aquatic insects(dragonfly larvae)	Afraid flooding and high river levels	Upended roots of fallen trees along banks provide good nest sites
	Shallow, clear, slow- running water system		Sufficient small fish and aquatic insects
	Breed on standing water (especially in the Netherlands)		Not freeze (everywhere) in the winter
	No heavy siltation or discolouration		
	Avoids tundra and taiga landscapes		
	Meandering rivers and wetland habitats		

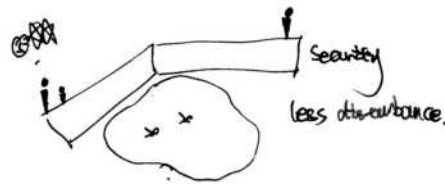
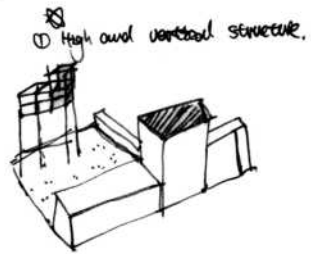
People

People	Needs	Behaviours	Space
Social	Low- real estate prices	seniors	Manageable parts of space
	Security	all	Certain boundaries
	More interaction	seniors	
	Low tax	seniors	Harmonious development
	Types of Housing	seniors	Inviting to neighborhoods
	Social encounters	seniors	High quality social environment
	Shopping, running errands	seniors	Close to market, restaurant
	Guideline! Introduction	tourist   citizen	Tourism facilities
	Low- priced transport	all	Close to public transportation stop
	Friendliness	all	Fortress segregation
	Interesting attraction	tourist   citizen	Attractions
	Offering for children	all	Particular features and characters
	Sports facilities	all	Sense of spatial order
	Peace and quiet	all	Private and public boundaries
Spatial	Convenient public transportation	seniors	Noise boundaries
	Quality of hiking and walking paths	all	Place to explore and experience
	Shady place for rest	all	Space shelter for rain and wind
	Good visual line	all	Visual elements and hub
	Easy to recognize your route	all	Clear and convenient route
	Park car or bicycle	tourist   citizen	Parking facilities for cars and bicycles
	Fast and convenient	tourist   citizen	Quick path
	Reachability of the region	all	Open space
	Bad weather facilities	all	Connection with other public space
	Activity open place	all	Element distribution has sparse and dense difference
	Obvious signs of regional changes or topographic changes	seniors	Obvious signs of transition
	Flat and walkable path	seniors	
Ecological	Sitting, sunbathing	all	Rich vegetation
	Clean air	all	Shady landscape
	Beautiful and clean Landscape   Nature	all	Sitting facilities
	Pleasant smell	all	Fragrant flower plants
	Big trees	all	Water space
	Pets' place	all	Waste governance
	Garden planting	seniors	Beautiful and clean Landscape   Nature

## 6.1 Design Community Scale

4Test Design-Owl

Spatial elements



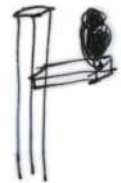
Network connection



Drinking Place.



Scop place.





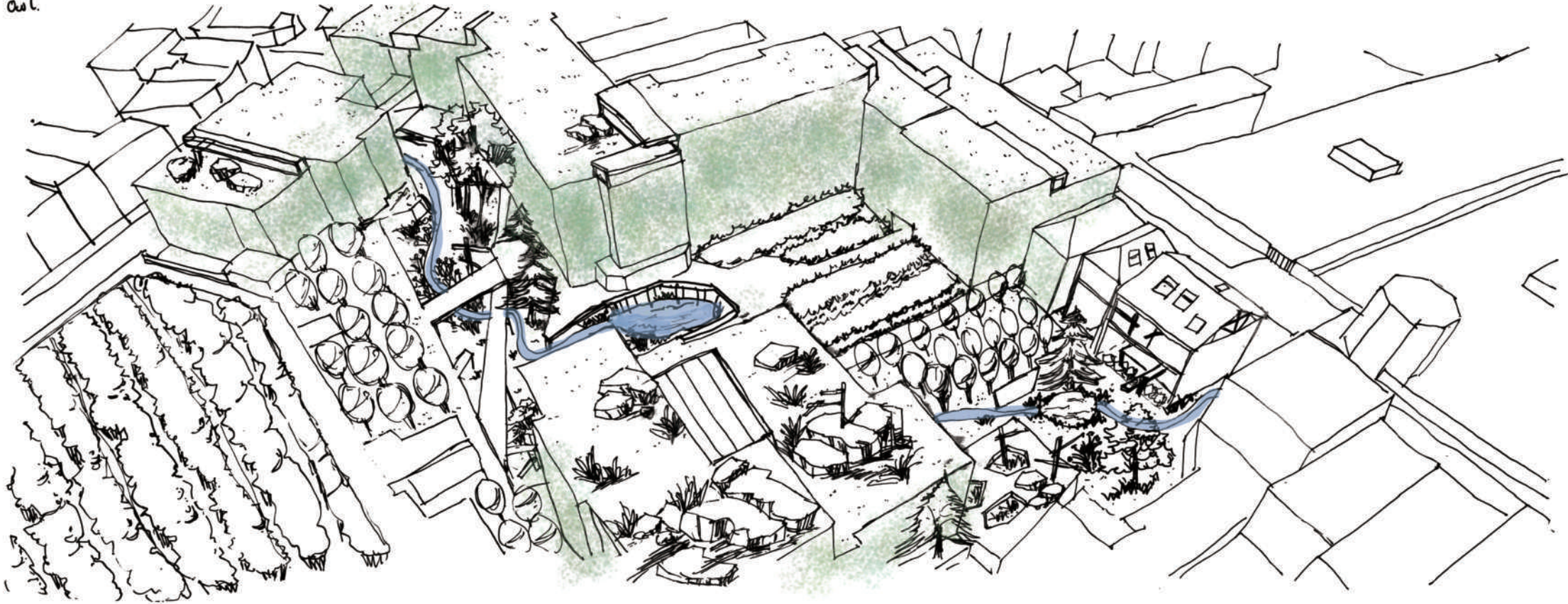




## 6.1 Design Community Scale

4Test Design-Owl

owl.





## 6.1 Design Community Scale

4Test Design-Owl

### Conclusion

#### Influence

#### Positive Aspects

+ Create new Nesting area and Hunting places for Owl

+Various vegetation support rabbits, rats and other small mammals

+New water pond give Kingfisher possibilities

+People also benefit from new green space and urban farmlands

+Vines and hanging plants attract more insects and birds

#### Negative Aspects

- Some limitation on the scope of human activities

-Too much ract increase the risk of plague

-A little difficult to attract Red-backed Shrike, need more open space with low vegetation

#### Importance

#### Elements

- High and vertical Nesting places
- Rocky Landscape:sand| limestone| brick

#### Route

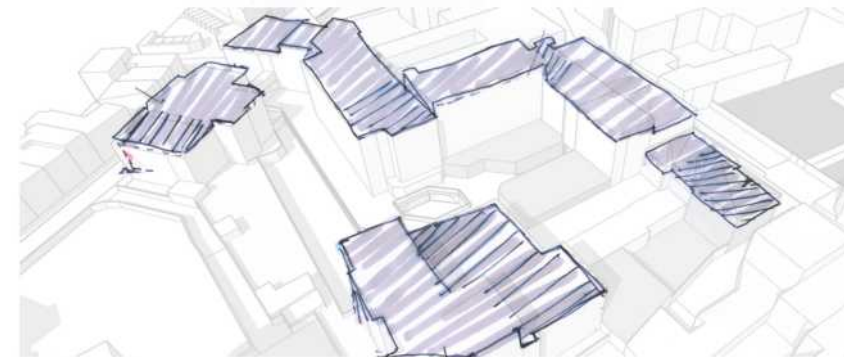
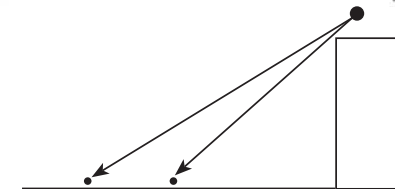
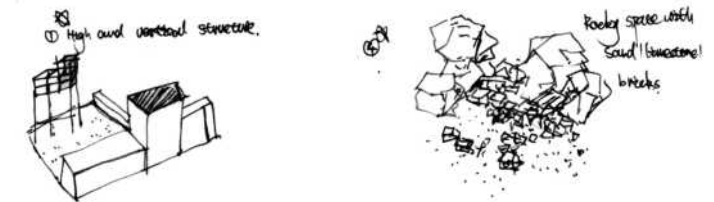
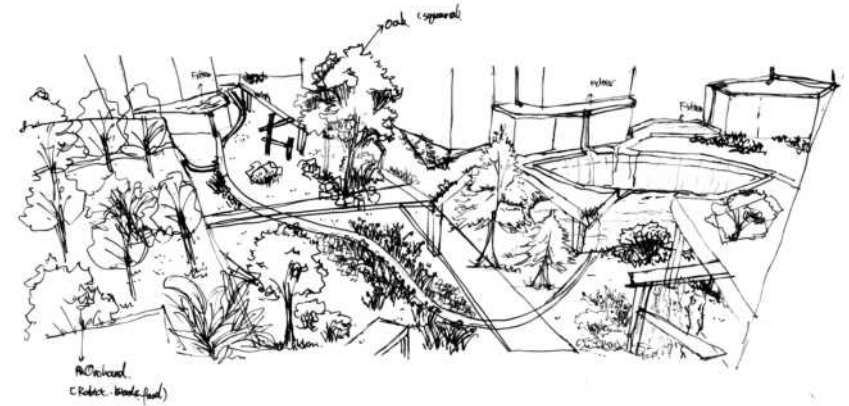
- Hunting route: Roof to ground,quickly to catch the prey  
[Often happen in the night | Avoid too much strong lights at night]

#### Region

- Roof | Top floor
- Water pond and surrounding
- Shrubs and other vegetation surface

#### Disturbance

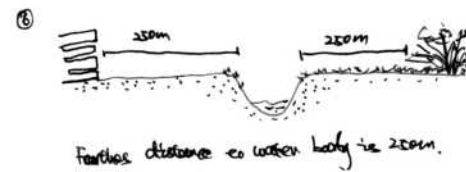
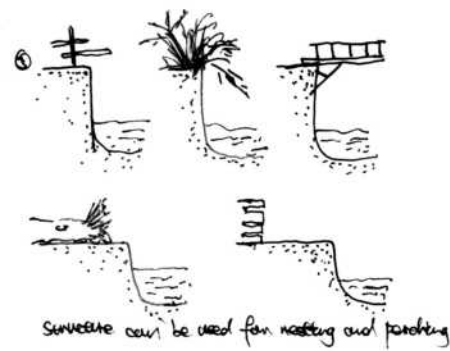
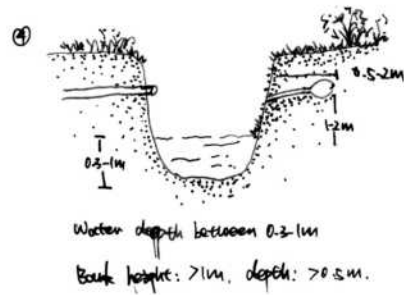
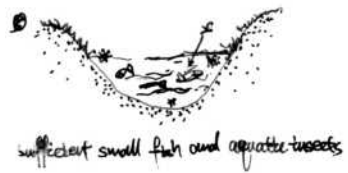
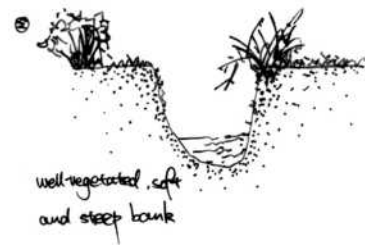
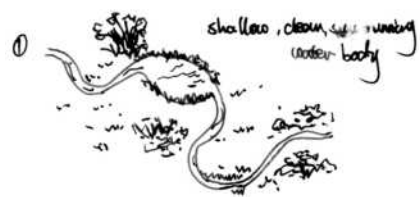
- Need boundaries to protect nesting sites



## 6.1 Design Community Scale

4Test Design-Kingfisher

### Spatial elements



### Network connection



Nesting place.



Roosting place.



Scavenging place.

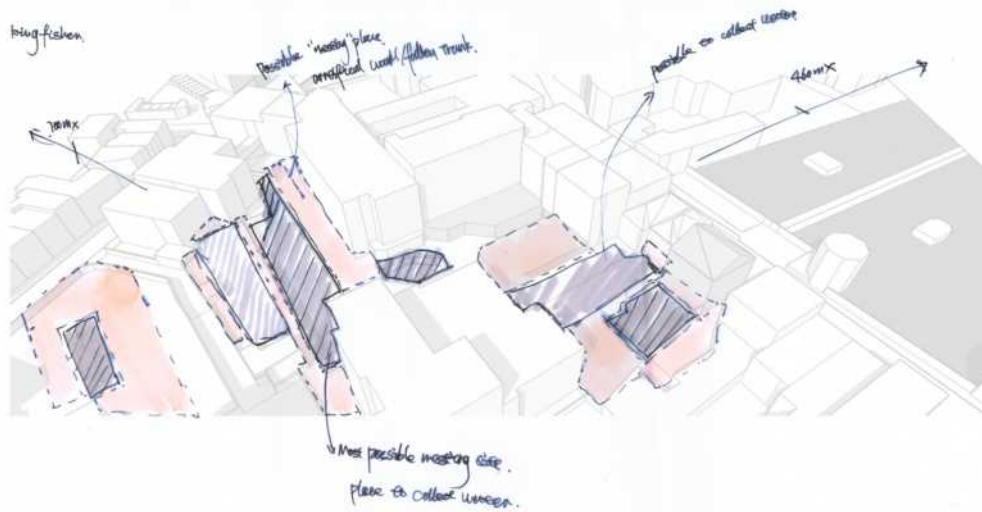




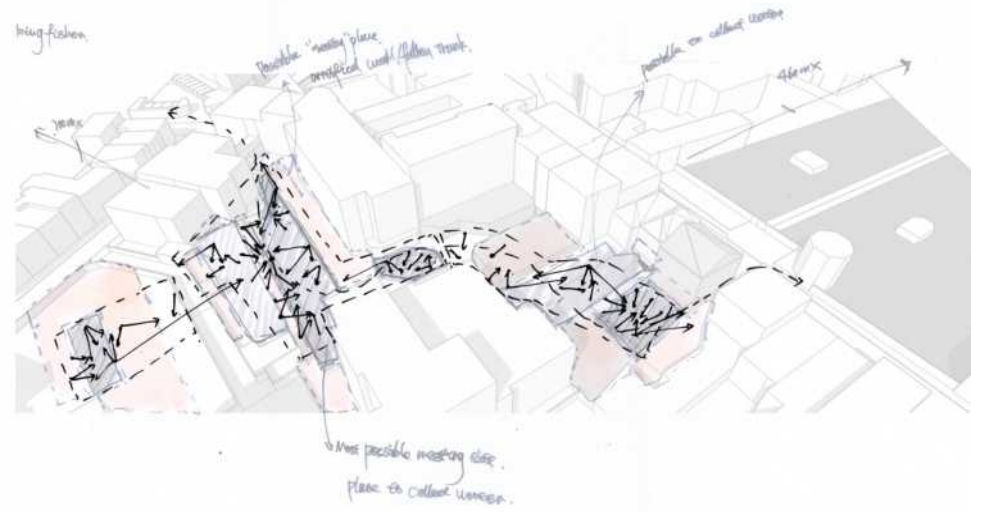
## 6.1 Design Community Scale

4Test Design-Kingfisher

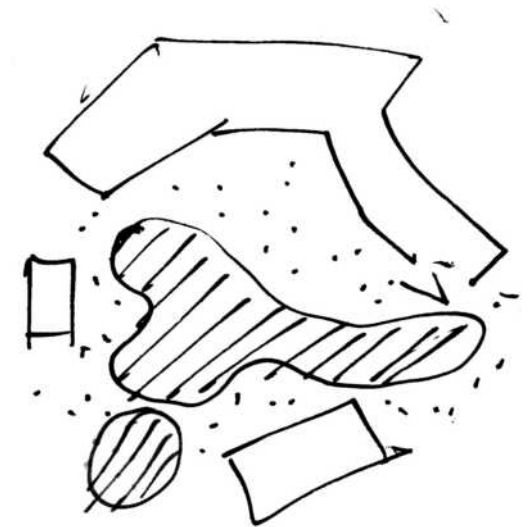
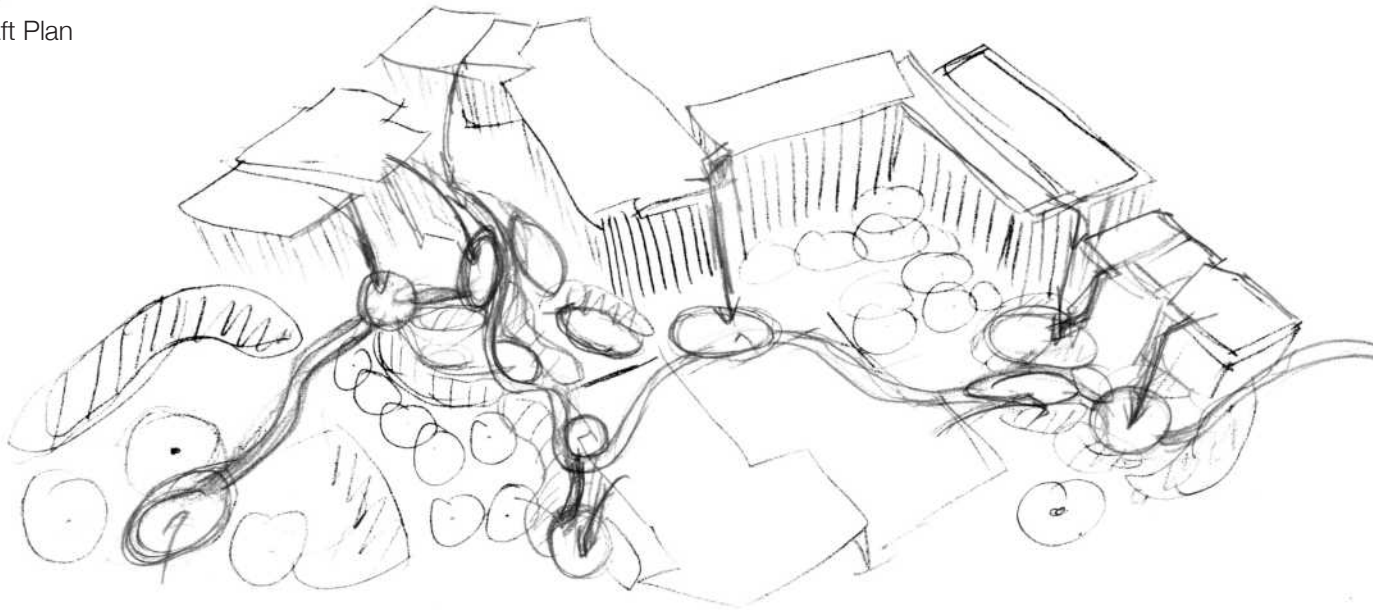
Spatial preference



Routes preference

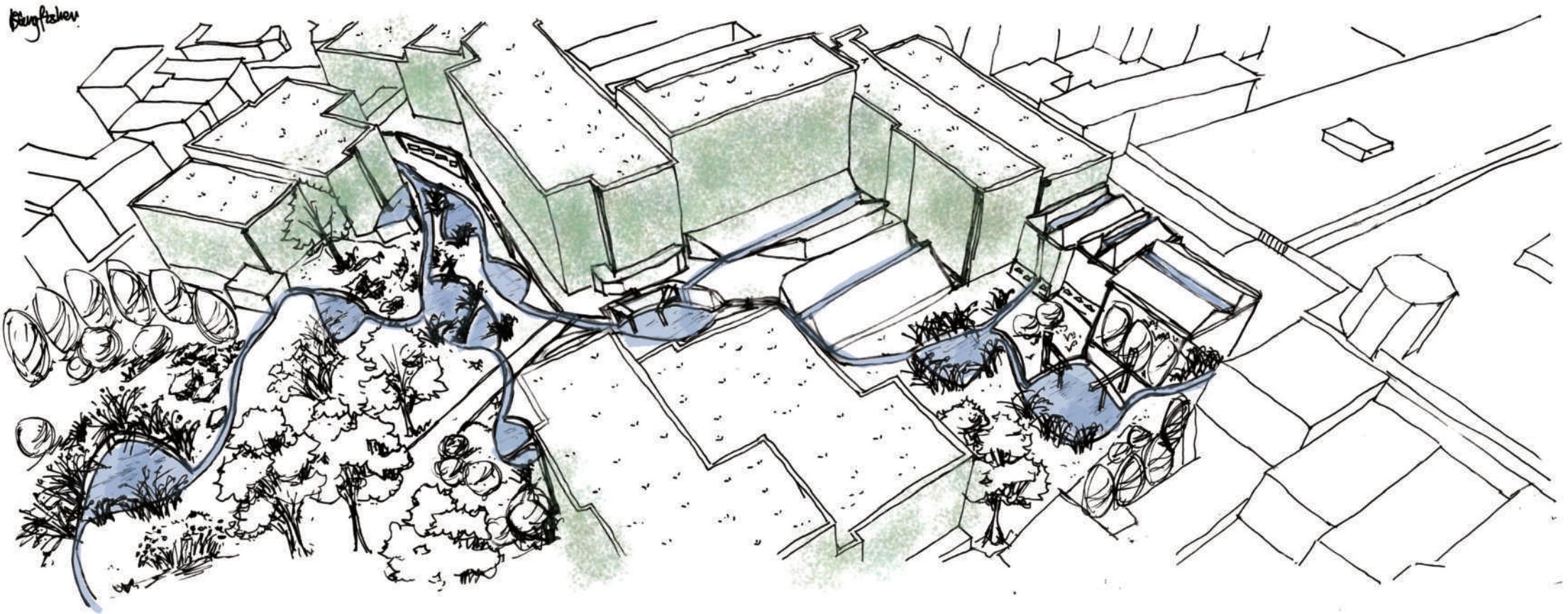


Draft Plan



## 6.1 Design Community Scale

4Test Design-Kingfisher





## 6.1 Design Community Scale

4Test Design-Kingfisher

### Conclusion

#### Influence

##### Positive Aspects

+ Create new Nesting area and Hunting places for Kingfisher

+New water system give Red-backed shrike possibilities

+New water and green space attract other small mammals

+Become a drinking site for Owl and sometimes the hunting place

+People also benefit from new green space and water landscape

##### Negative Aspects

- Too Much limitation on the scope of human activities

-The amount of rainwater collection is not enough

-Limitation of Red-backed Shrike's nesting scope

#### Importance

##### Elements

- Shallow, clean, flowing water system
- Well-vegetated soft and steep bank

##### Route

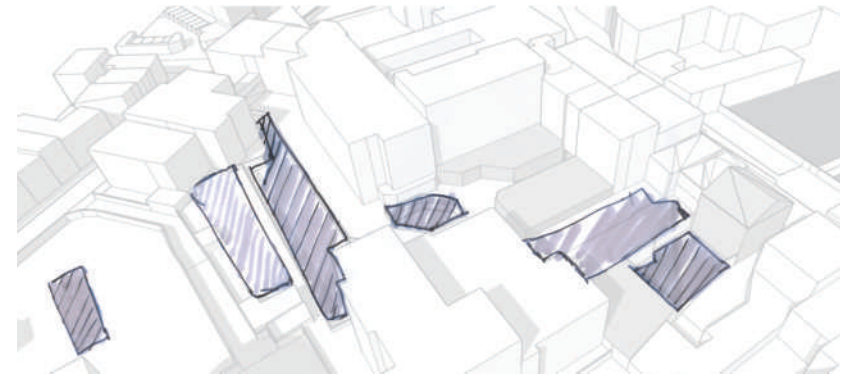
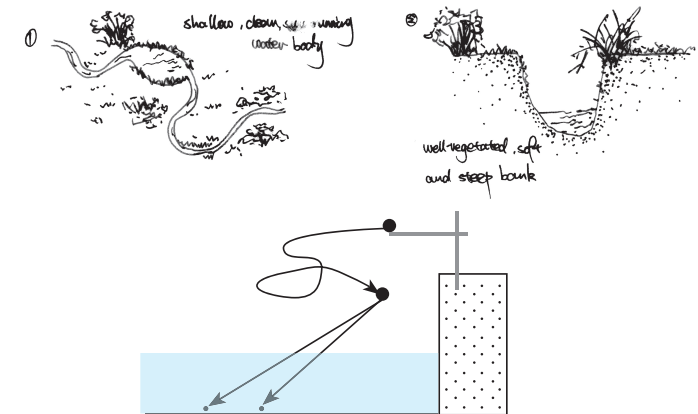
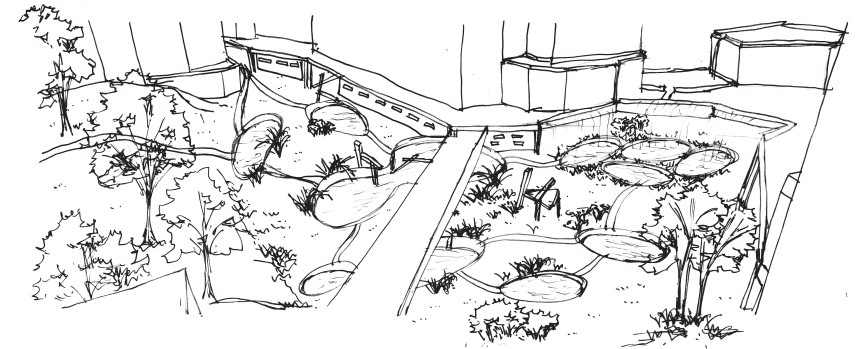
Hunting route: Vertical structure( hanging branches from shrubs, bridge, or other artificial structure) observe-Hovering flight above water-Diving to water catch the prey

##### Region

- Water system and surrounding
- Artificial wall for nesting
- Shrubs and other vegetation surface

##### Disturbance

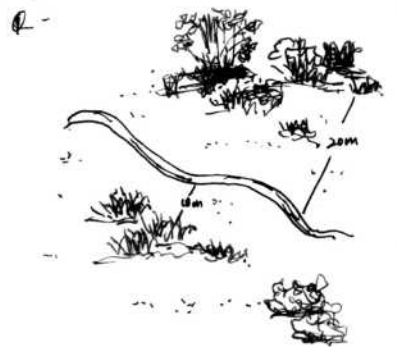
- Seriously need boundaries to protect nesting sites



## 6.1 Design Community Scale

4Test Design-Red-Backed-Shrike

### Spatial elements



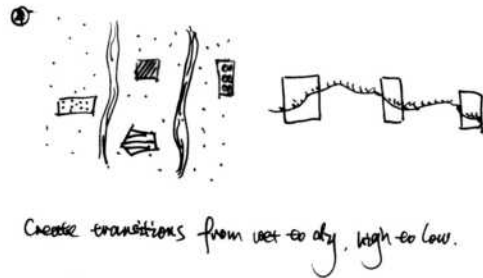
Woody vegetation's distance to water 10-20m



Heterogeneity patches and variation height



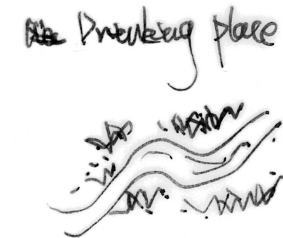
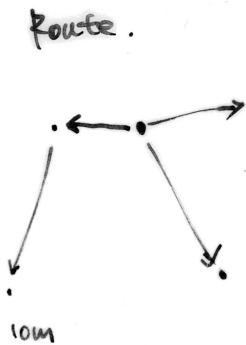
Livestock in open area for grazing



Create transitions from wet to dry, high to low.

Thorny shrubs & vegetation heterogeneity and high topographic wetness

### Network connection



hunting place



observe spot

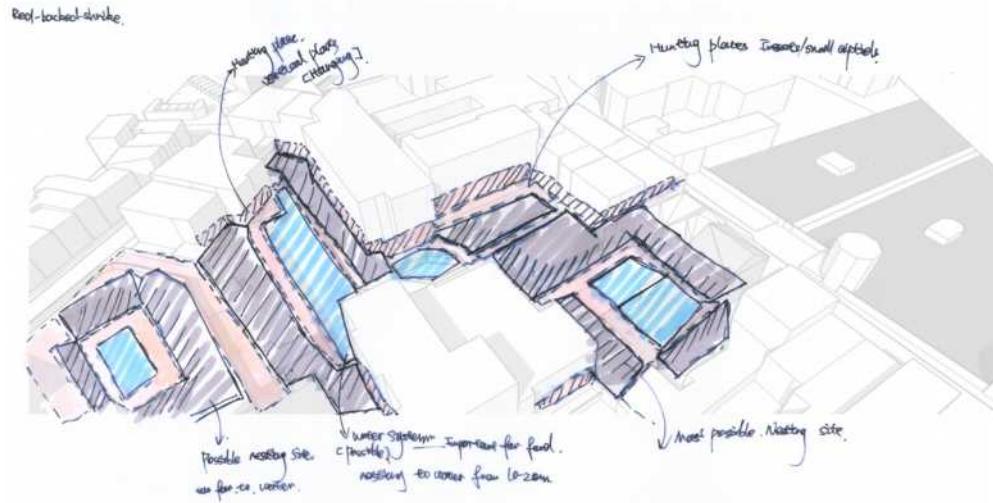




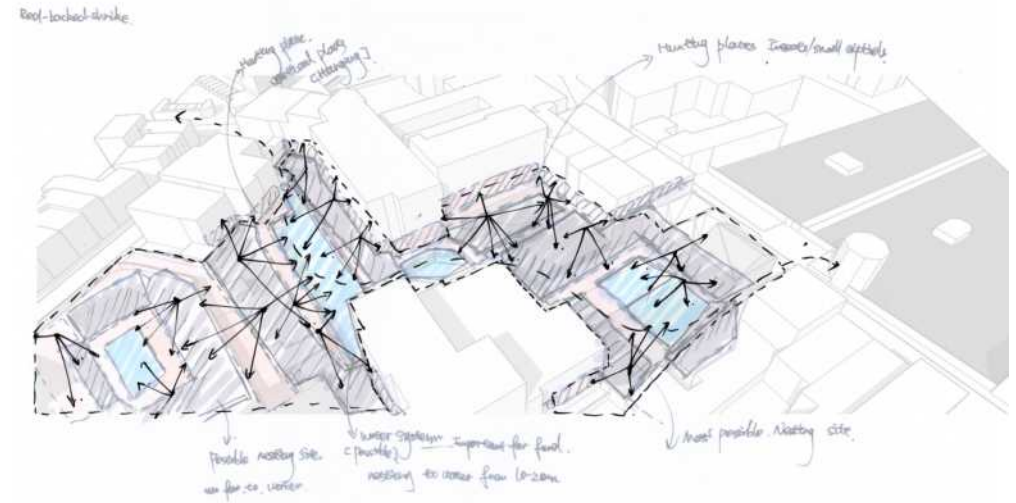
## 6.1 Design Community Scale

### 4Test Design-Red-Backed-Shrike

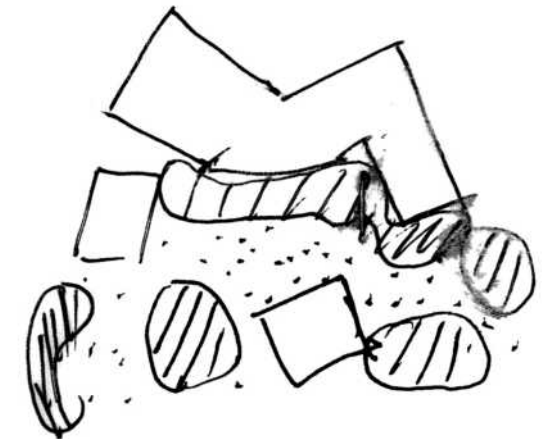
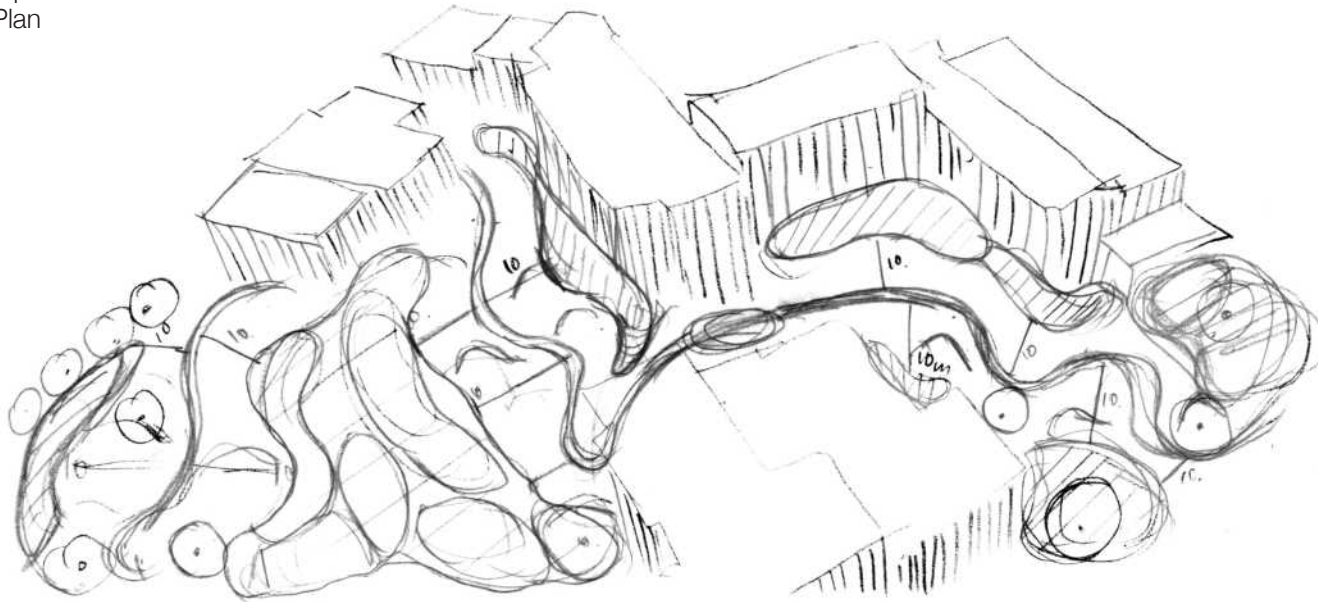
#### Spatial preference



#### Routes preference



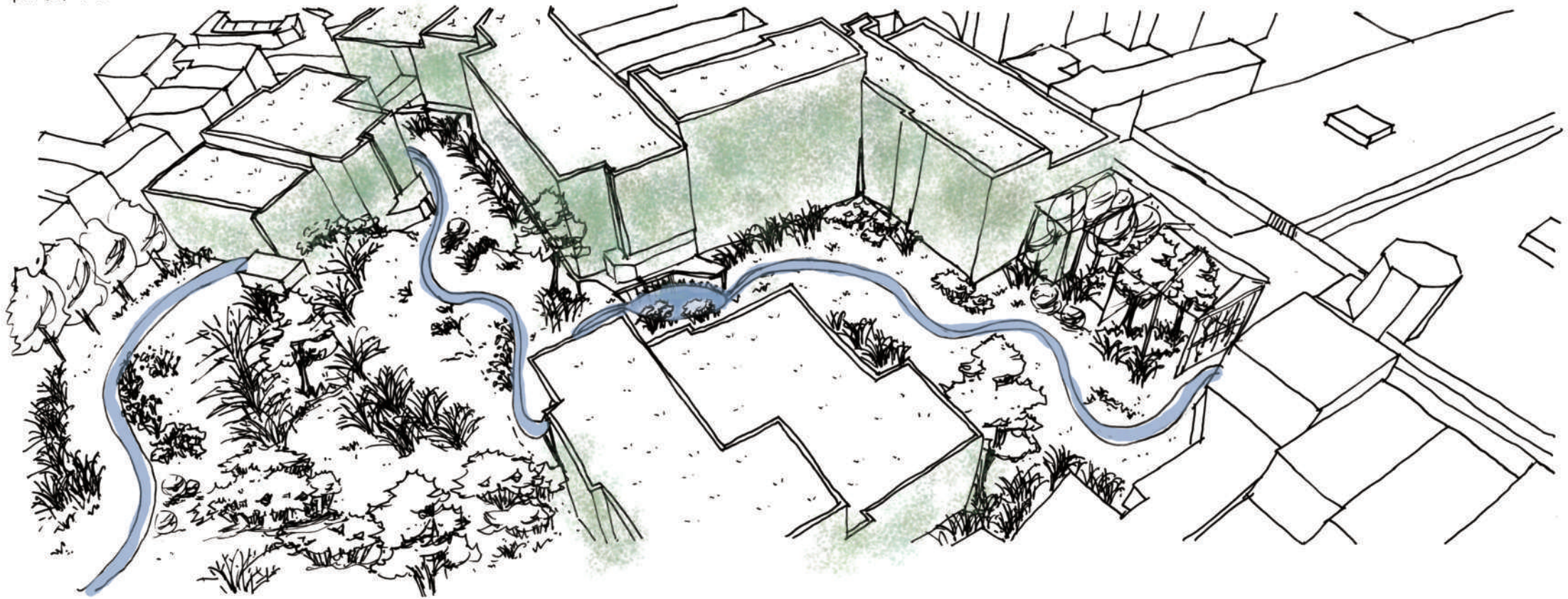
#### Spatial preference Draft Plan



## 6.1 Design Community Scale

4Test Design-Red-Backed-Shrike

Red-backed Shrike.





## 6.1 Design Community Scale

4Test Design-Red-Backed-Shrike

### Conclusion

#### Influence

#### Positive Aspects

+ Create new Nesting area and Hunting places for Red-backed Shrike

+New water system give Kingfisher possibilities

+New water and green space attract other small mammals

+Become a drinking site for Owl

+People also benefit from new green space and water landscape

+People have a big scope of their activities

#### Negative Aspects

- The landscape structure is single and too open, lacking spatial change

-The distance between the nest and the water's edge is strictly required which causes the landscape pattern is strictly fixed.

-Attracting fewer species is not conducive to serving as a hunting area for Owl

#### Importance

#### Elements

- Dense Thorny shrubs
- Woody vegetation distance to water 10-20m

#### Route

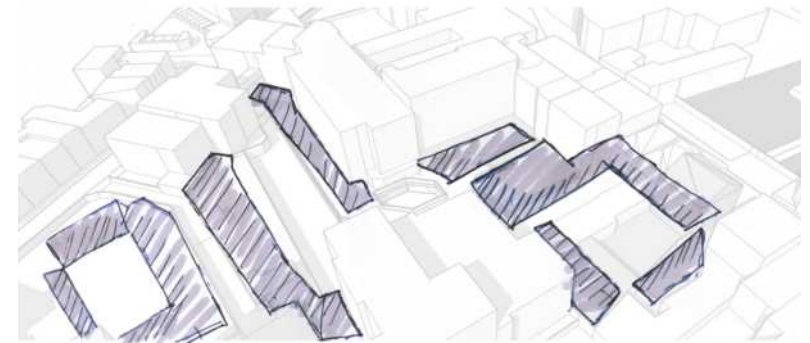
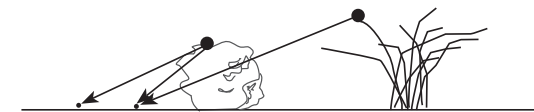
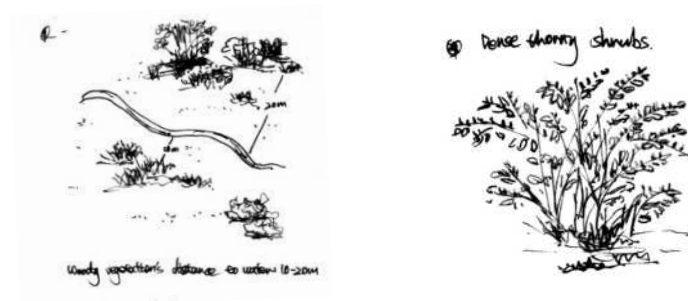
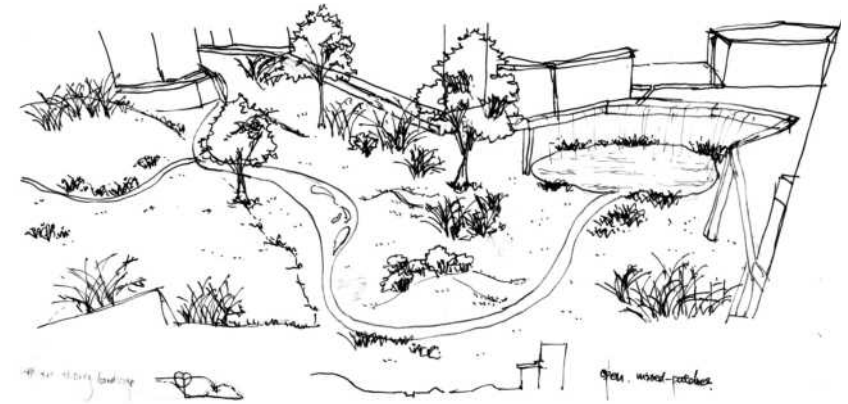
Hunting route: Stand on some shrubs | nesting site to observe-Drop to ground catch the prey

#### Region

- Thorny shrubs nesting area(10-20m to water)
- Stream water system
- Hunting area within 10m from the water

#### Disturbance

- Not easy be disturbed by human  
[ Share space with people]

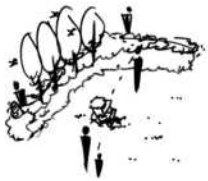


## 6.1 Design Community Scale

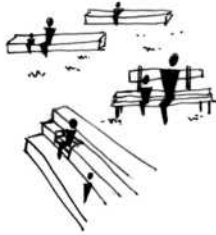
4Test Design-People

Spatial elements

1. Boundaries (Private/Public / Noise...)



2. Seating infrastructure



3. Visual elements to explore and experience.



4. Clear and convenient route



5.

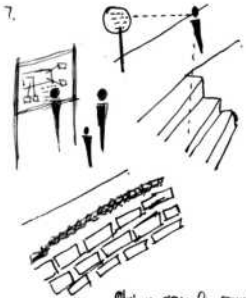


Nature landscape with rich vegetation.

6. High quality social environment

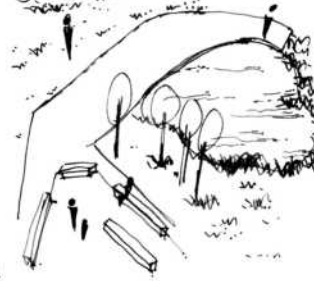


7.



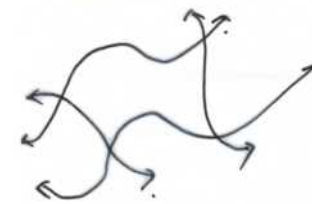
Obvious signs for orientation and information

8. Variety activity space



Network connection

Route



Accession



Public Transportation



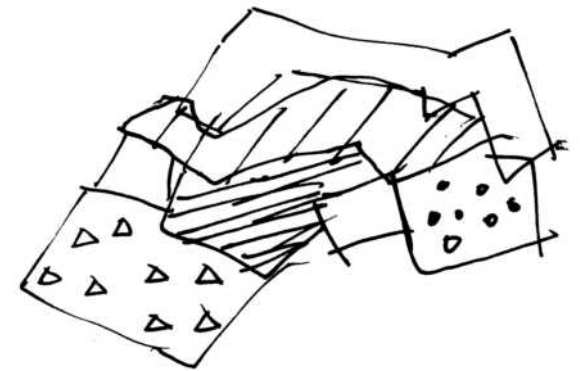
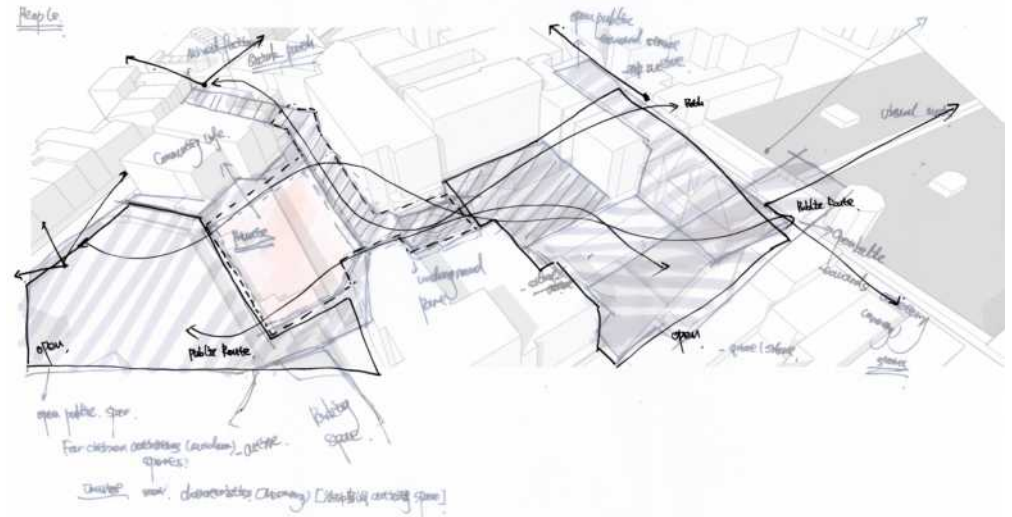
Activity space





#### 4Test Design-People

Routes preference

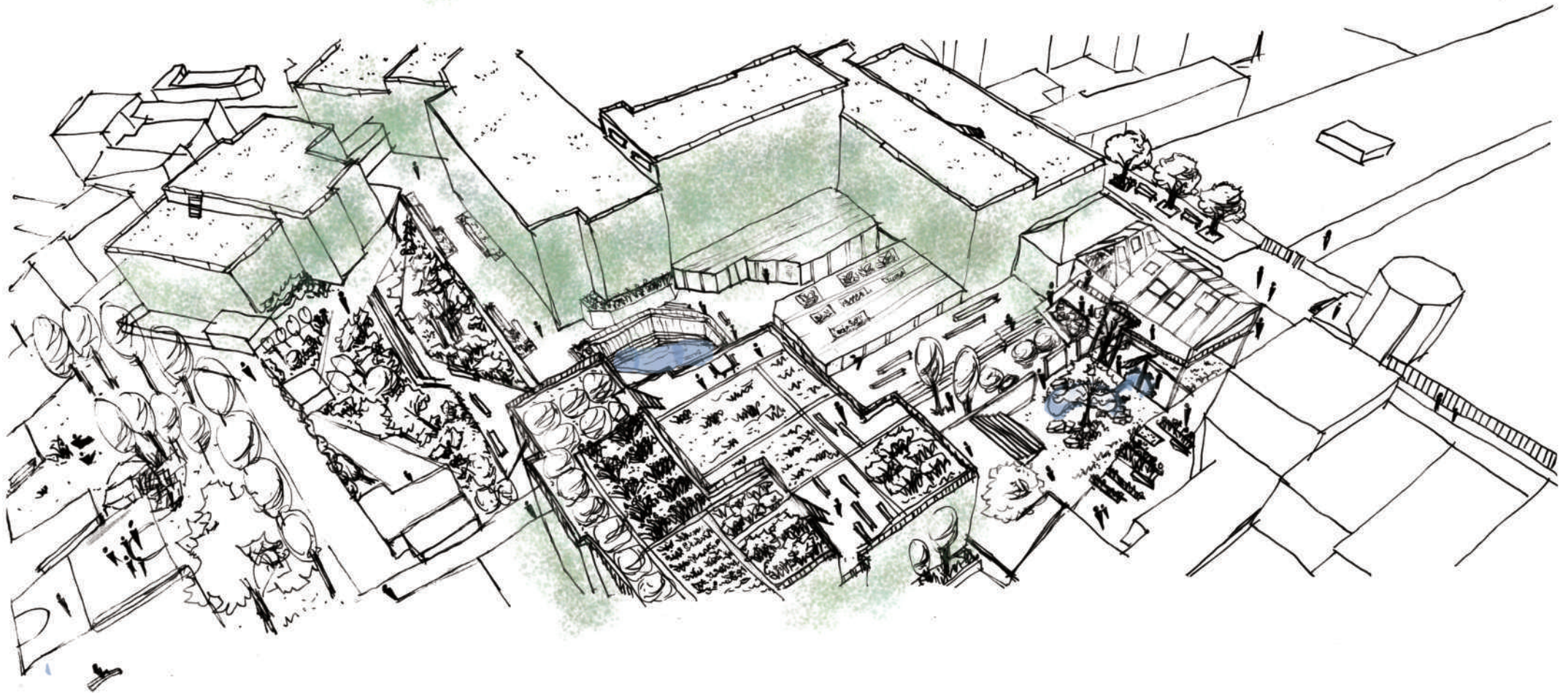




## 6.1 Design Community Scale

4Test Design-People

People





## 6.1 Design Community Scale

4Test Design-People

### Conclusion

#### Influence

##### Positive Aspects

+ Create new Public open space for People, a big scope of their activities

+People benefit from new green space and water landscape

+New water and green space attract other small mammals

+Offer places for social activities for Residents, more integration

+New attraction and stop point for Citizen and Tourists

+Increasing the Connection to surrounding green public space

##### Negative Aspects

- People occupy a lot of space, animals lack space

-Kingfisher and Owl will avoid this place, too much Disturbance

-Red-backed Shrike have little potential to nesting here,need more open space.

-Bring more noise to the neighborhood

#### Importance

##### Elements

- High quality social activity space
- Clear and convenient route
- Attraction to experience and explore

##### Route

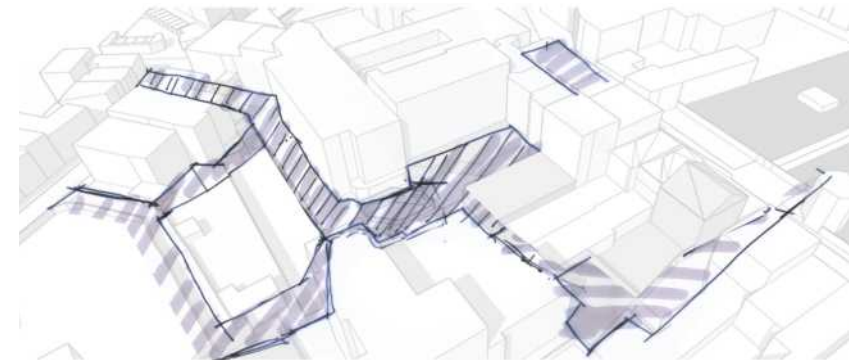
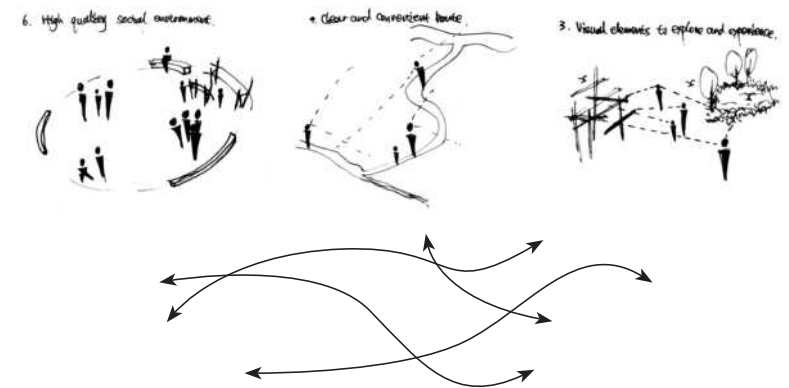
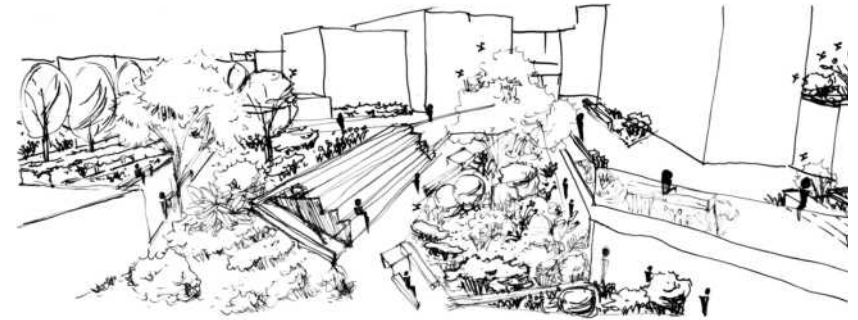
Roam route: Easy to walk around every element and attraction

##### Region

- On the ground, the area connecting surrounding two streets of the site
- The ground open activity space
- The vertical activity space

##### Disturbance

- Some boundaries between public and private space

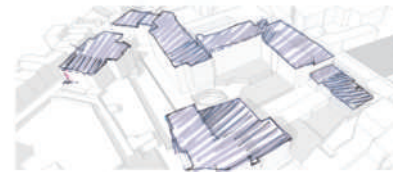
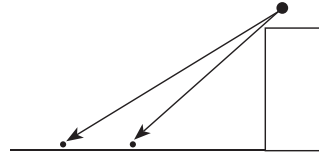
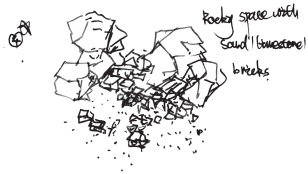
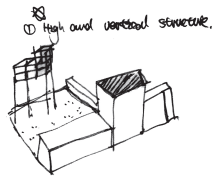


## 6.1 Design Community Scale

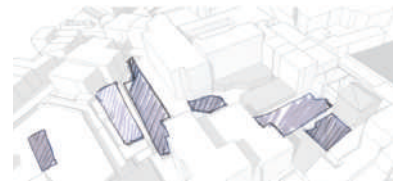
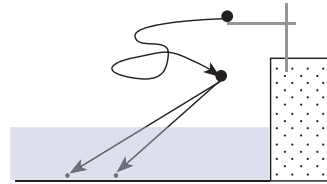
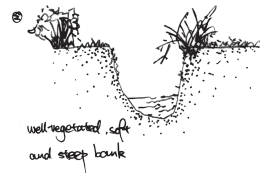
4Test Design

Conclusion

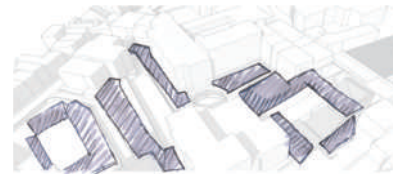
Owl



Kingfisher



Red-Backed Shrike



People

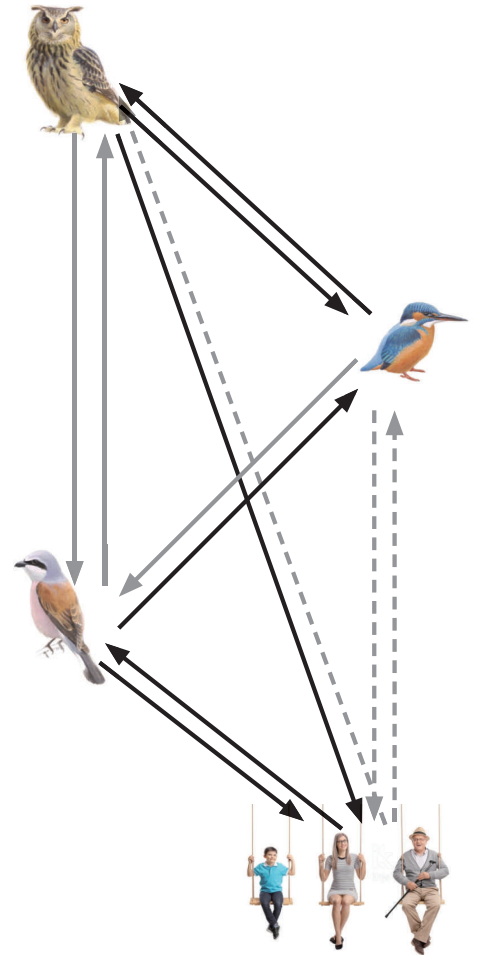
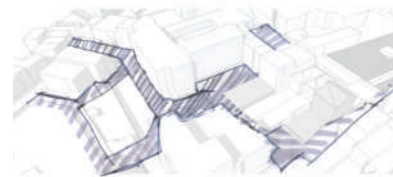
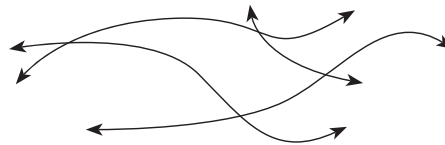
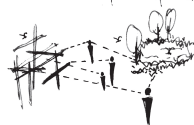
6. High quality social environment.



4. Clear and convenient route.



3. Visual elements to explore and experience.



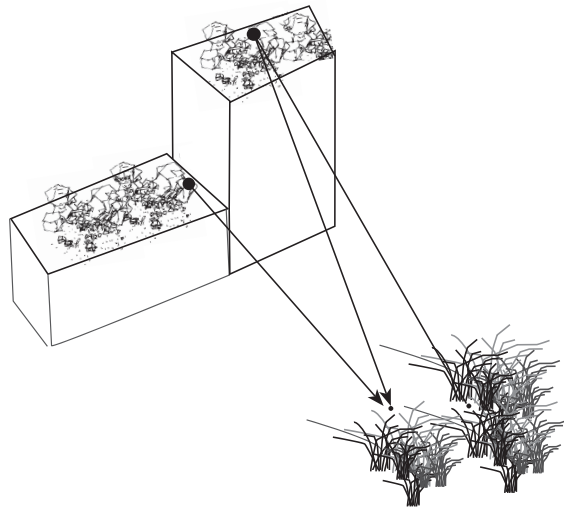


## 6.1 Design Community Scale

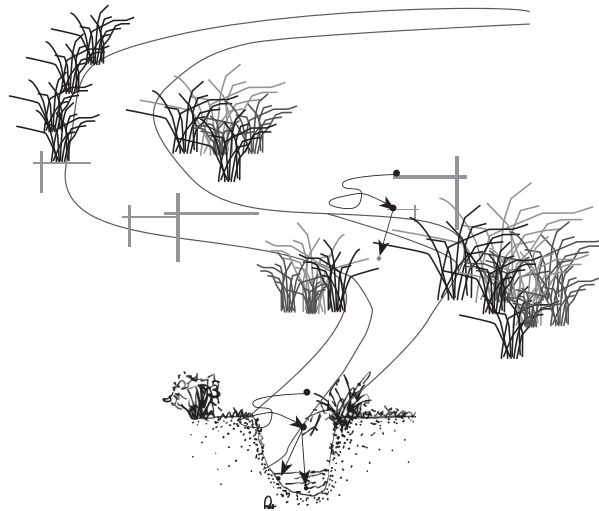
### How to Integration?

Basic space composition of each group

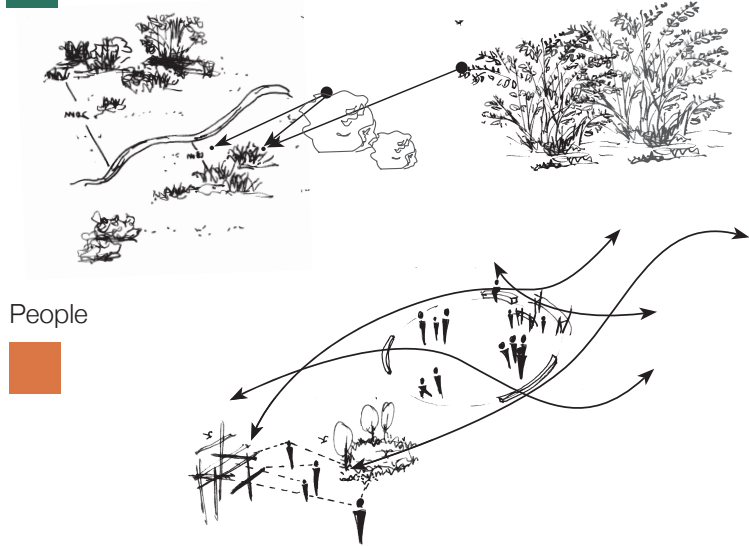
Owl



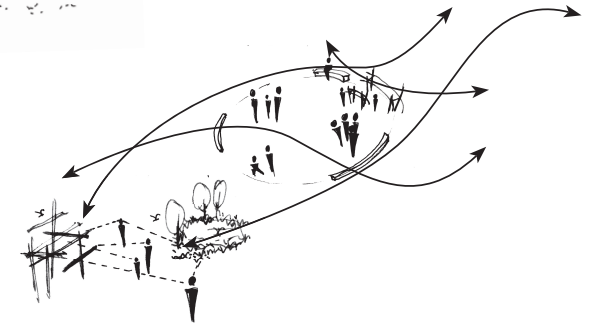
Kingfisher



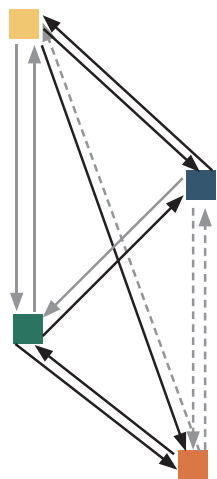
Red-Backed Shrike



People



Relationship between 4 groups



Live together

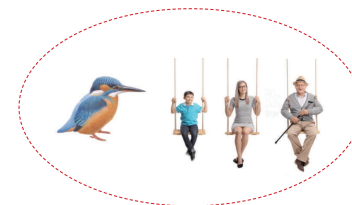


Interaction



Disturbance

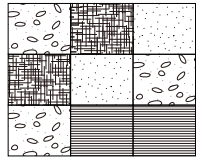
Need the Boundary | Barrier to protect



## 6.1 Design Community Scale

### How to Integration?

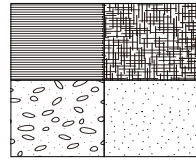
#### Rules



Random distribution



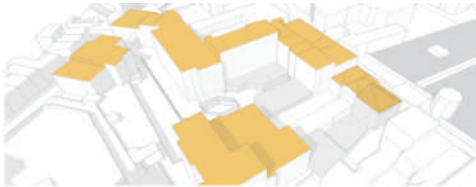
Mixed together



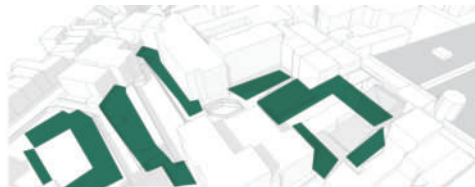
Evenly distribution

#### Spatial preference

Owl



Red-Backed Shrike



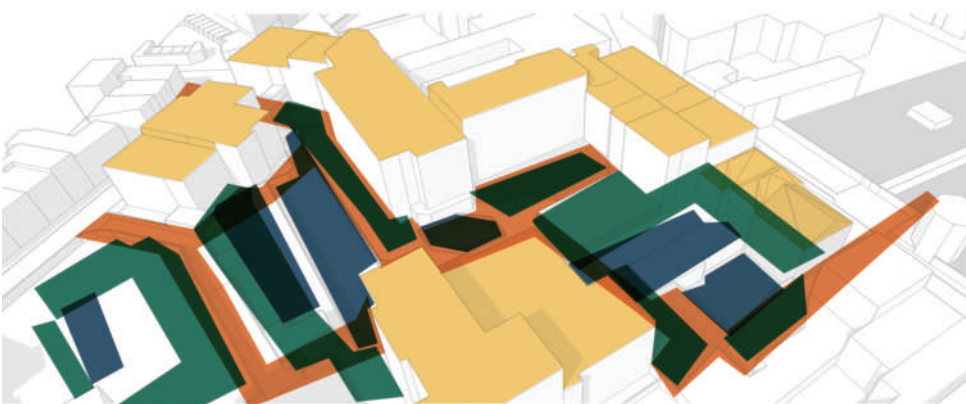
Kingfisher



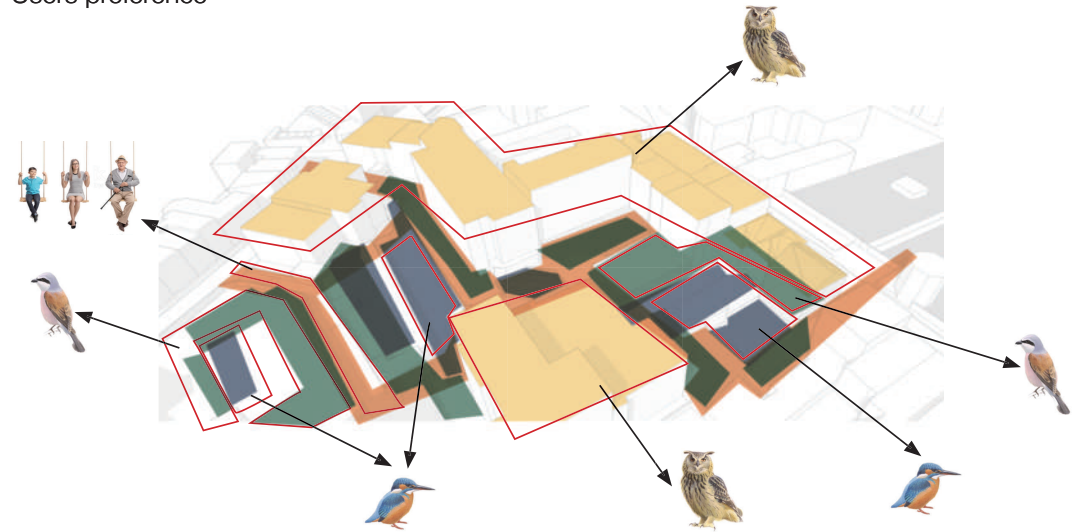
People



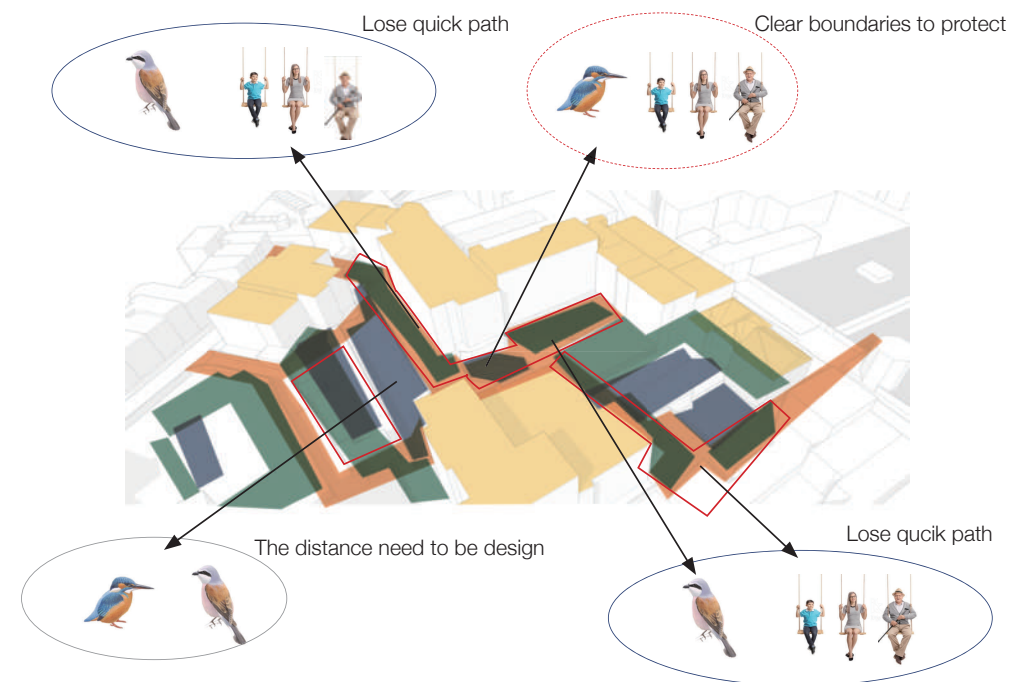
Overlap 4 users



#### Users preference



#### Conflicts



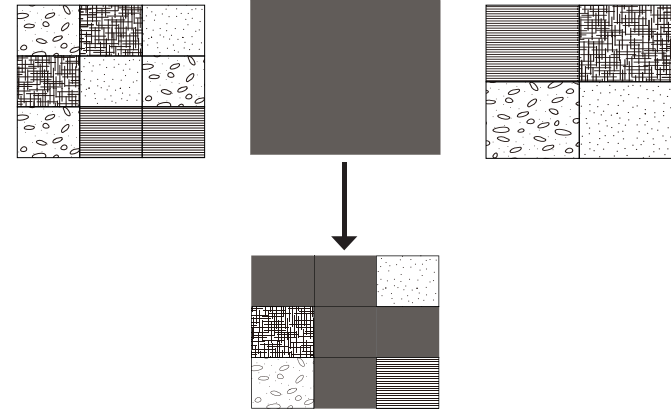
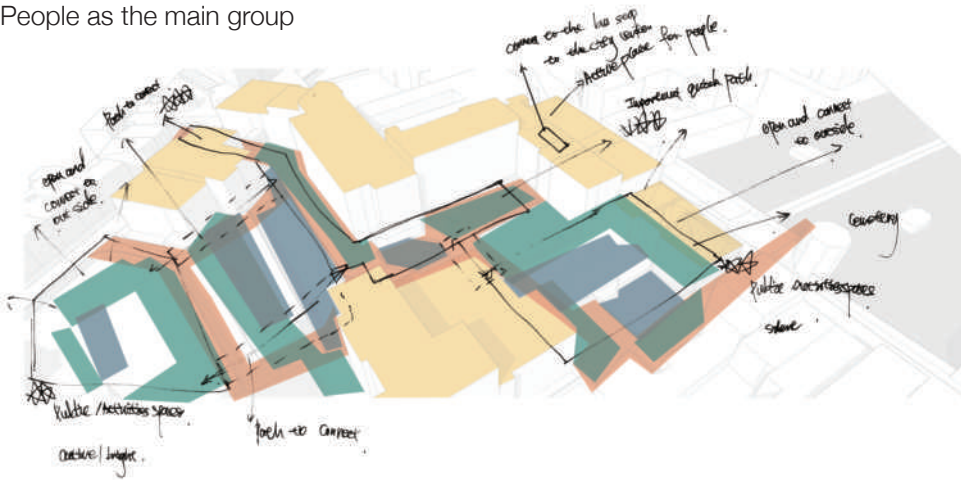


### 6.1 Design Community Scale

## How to Integration?

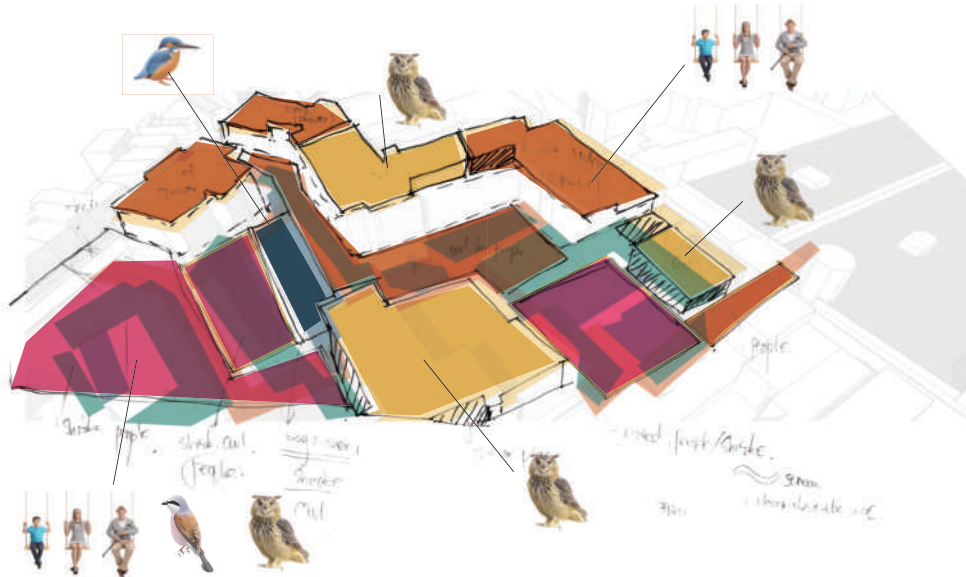


## People as the main group



Core are mixed together | Some part single occupied

### District division & users distribution



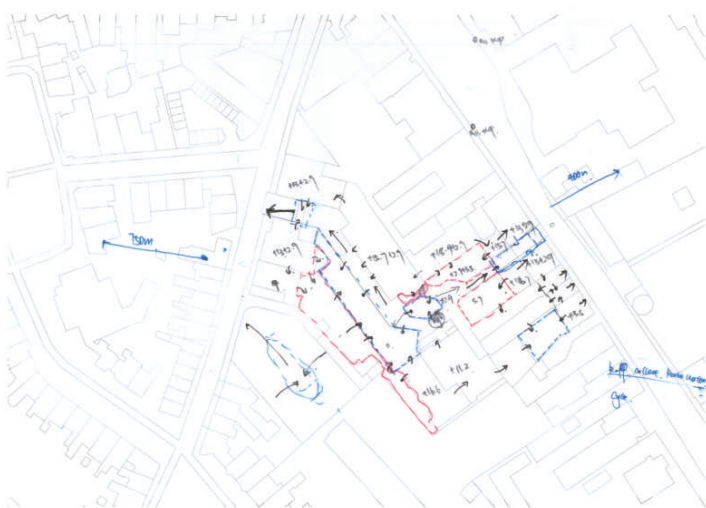
6.1 Design Community Scale

Water Collection

Existing water collection line



Water collection in community

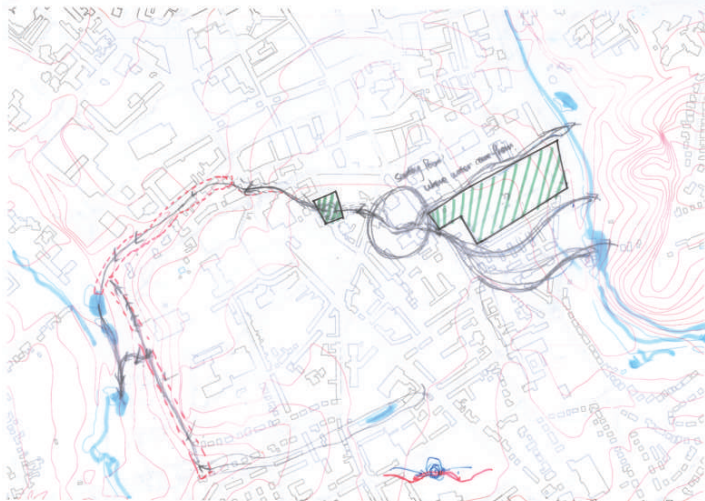


New Blue Stream

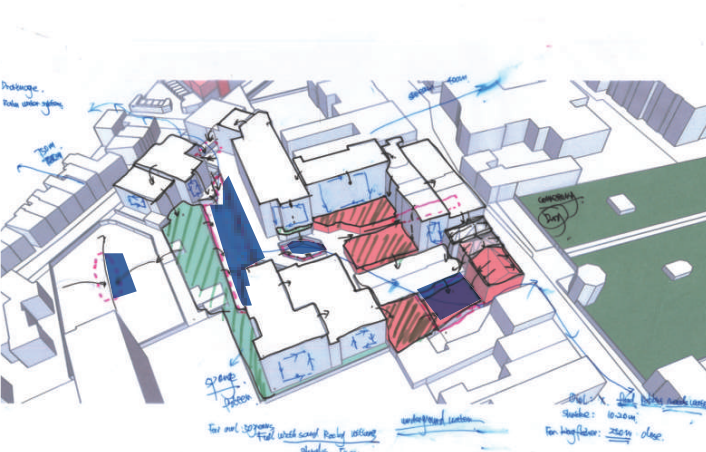


Kingfisher needs as much as possible soft water banks, so the water is curved to create more edges. Also, offer nesting sites with more distance to the water system for Red-backed shrike.

Potential of new water connection



Water collection in community



Limitation for Red-backed shrike



Because the Red-backed shrike need to nest at the place where 10-20m far from the water, so the green line is the border at 10m to water, which decide the distribution area for Red-backed shrike.

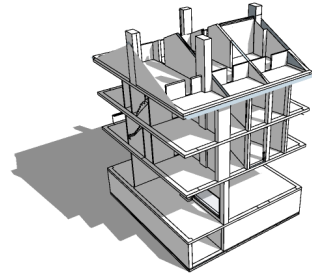
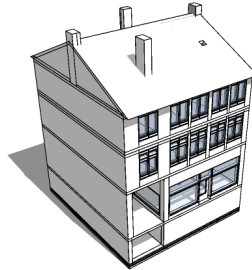


## 6.1 Design Community Scale

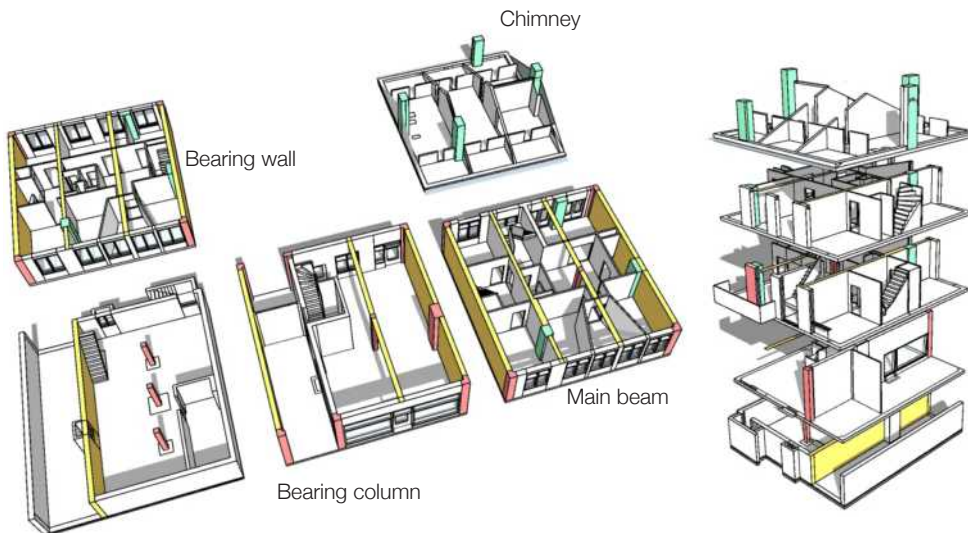
Vacant building  
Heerlen, Akerstraat 70-72



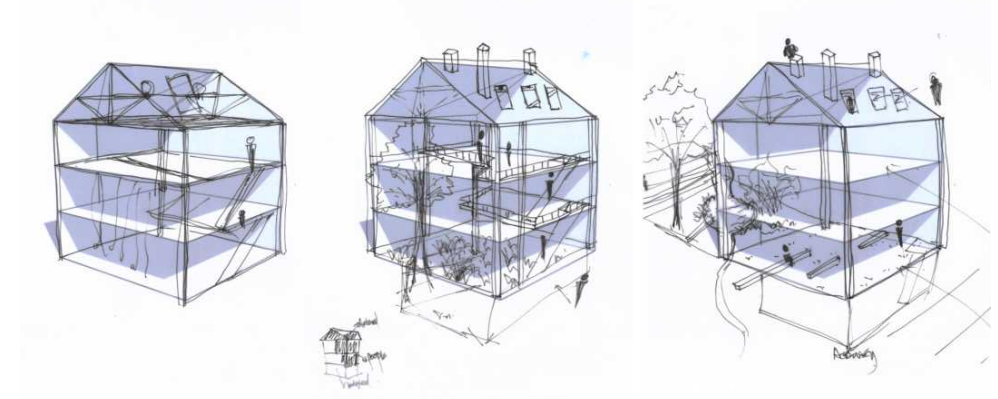
Heerlen, Akerstraat 70-72



Building structure



How to demolished?

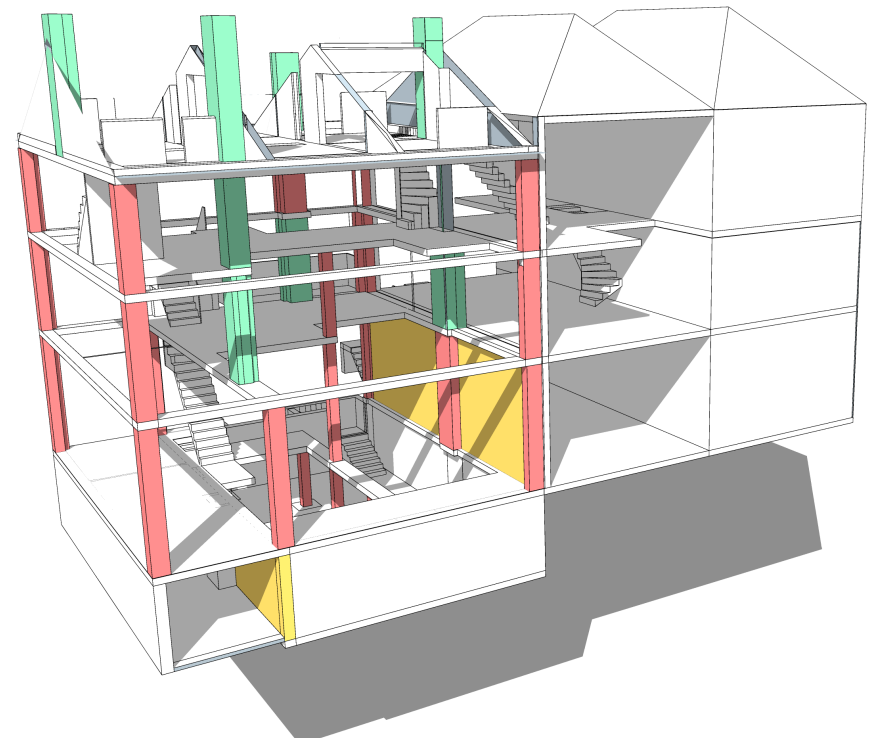


How can different users use the building

How can Flora use the building

How the building connect with outside space

Final structure



## 6.1 Design Community Scale

### Vacant building

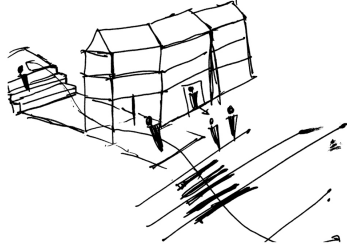
#### Possibilities of vacant building

- Frame the point.

Enable people to see through it creating visual connection.



- ~~vacant~~ demolished for new patch.



- Material from demolished building.



benches be the new benches.



stones be the new planting beds also the streets.



benches and concrete needed to be the new piece meat of patch.



The woods became more frame to each concrete structure.

- demolished abandoned buildings to create new public structure space.



Make the boundaries.



Benches to be the boundaries to protect birds.

- Industrialism board.



Give brief information about boards, and demolished material.

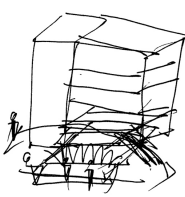
- parking lots change to safe surface.



Hard & soft



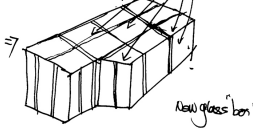
Benches to be shelter with the space. one patch shady patch.



- Flipping the original form and construction of vacant space, new construction is added to the building, to create new function.

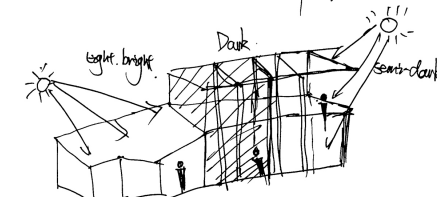


take out concrete roof



New glass box

- Use the light to create different atmosphere.

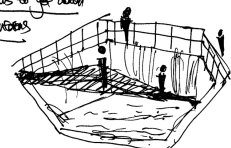


light bright

Dark

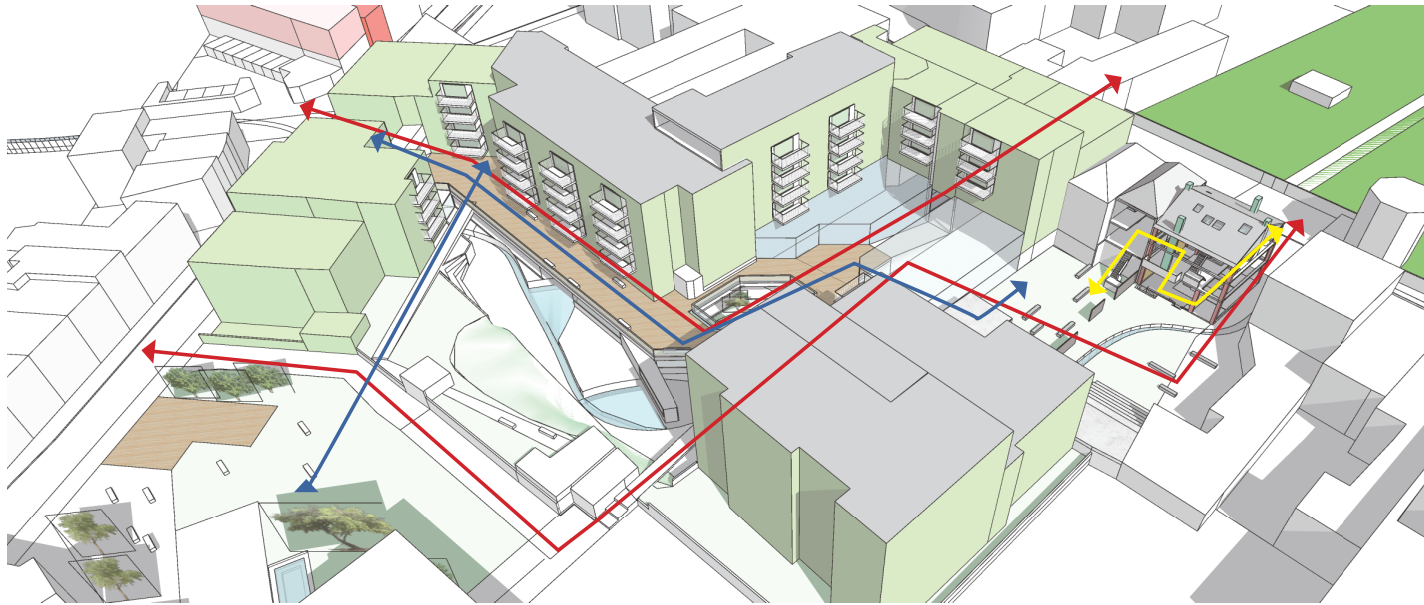
semi-dark

- Seating to go down boundaries



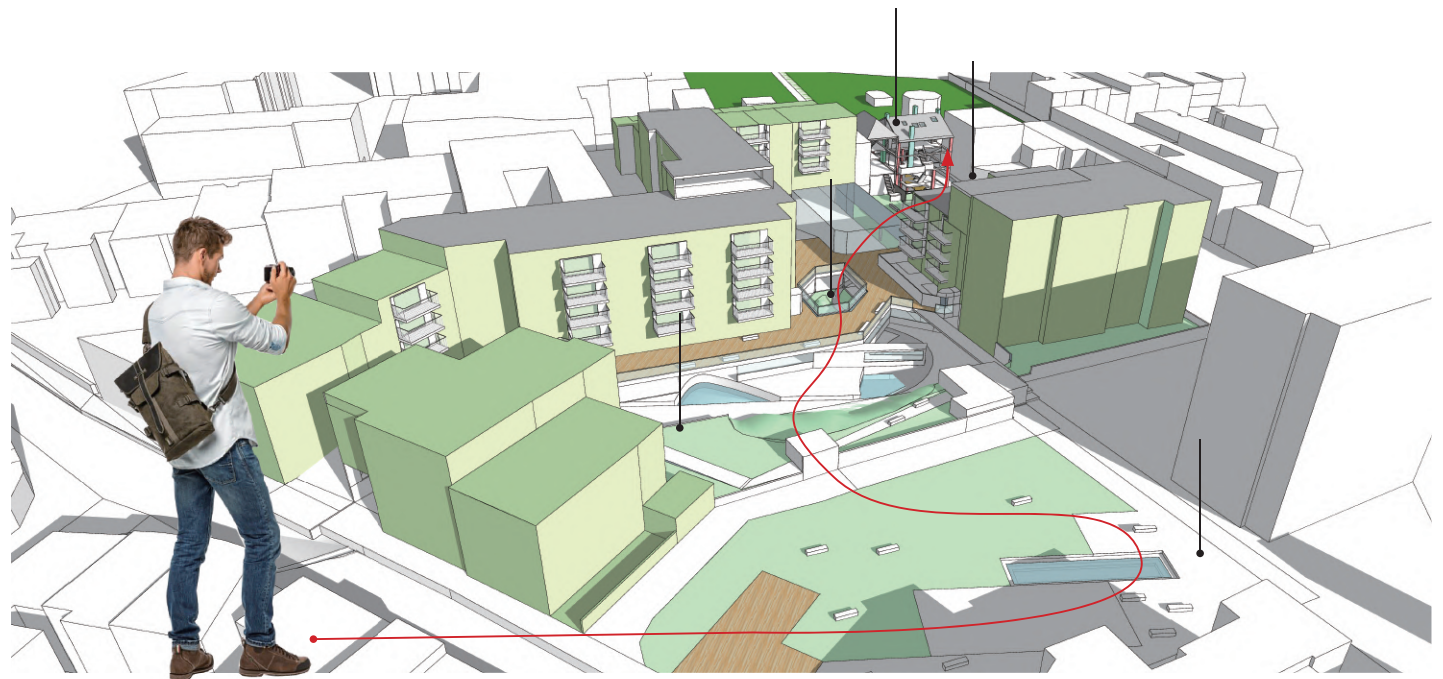


## 6.1 Design Community Scale



Main Route

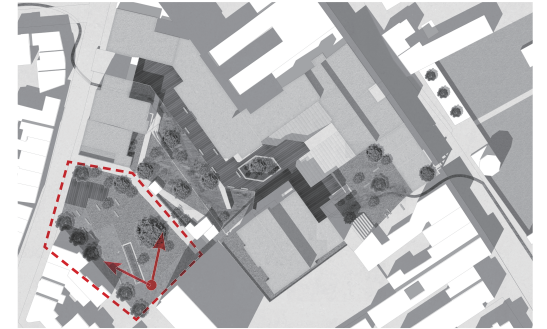
Visiting Points





## 6.1 Design Community Scale

### Activity Square



Flowers & Oak



Pine tree & Oak



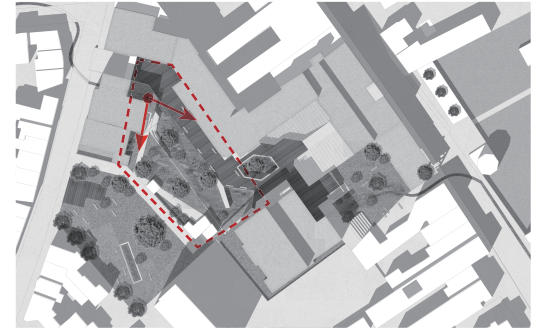
Thorny shrubs & Oak





## 6.1 Design Community Scale

Used parking plots





6.1 Design Community Scale

Planting Plan





## 6.1 Design Community Scale

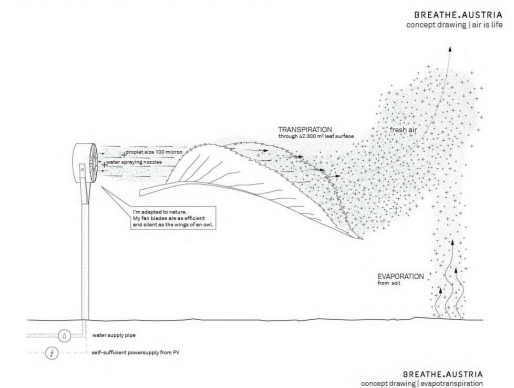
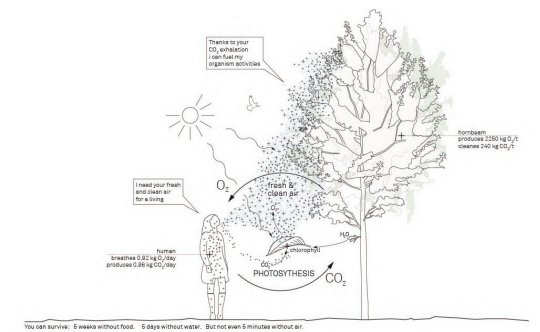
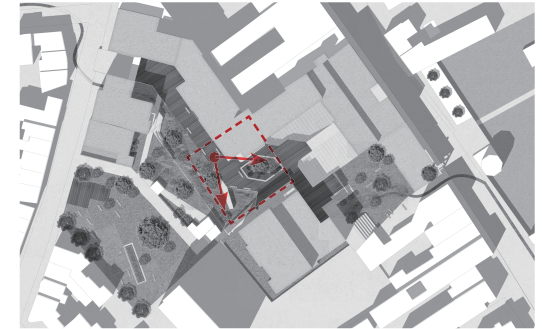
### Water Management System





## 6.1 Design Community Scale

### Green Island & Temporary Fountain



Source: Team.Breathe.Austria



6.1 Design Community Scale

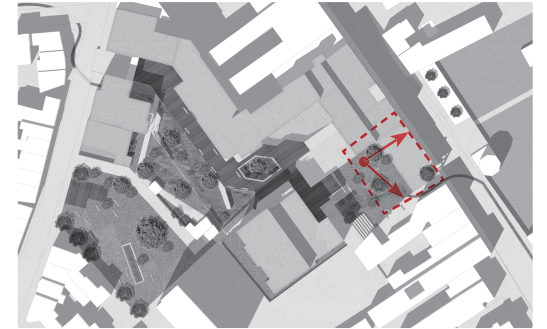
Backyard open gardens





## 6.1 Design Community Scale

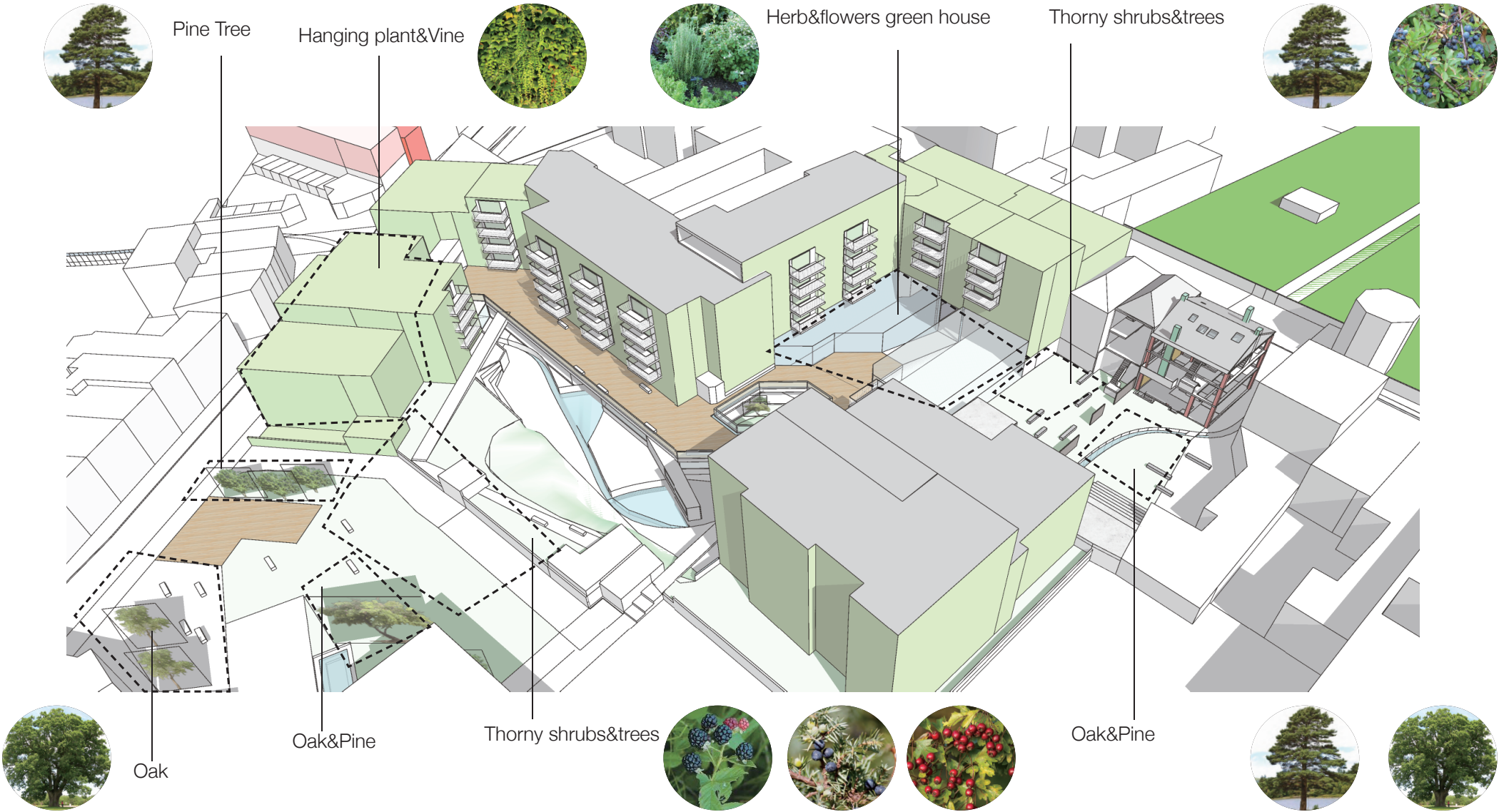
Building garden





6.1 Design Community Scale

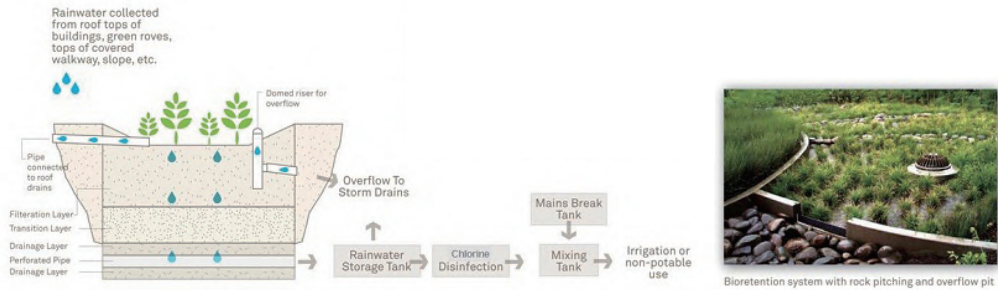
Planting plan



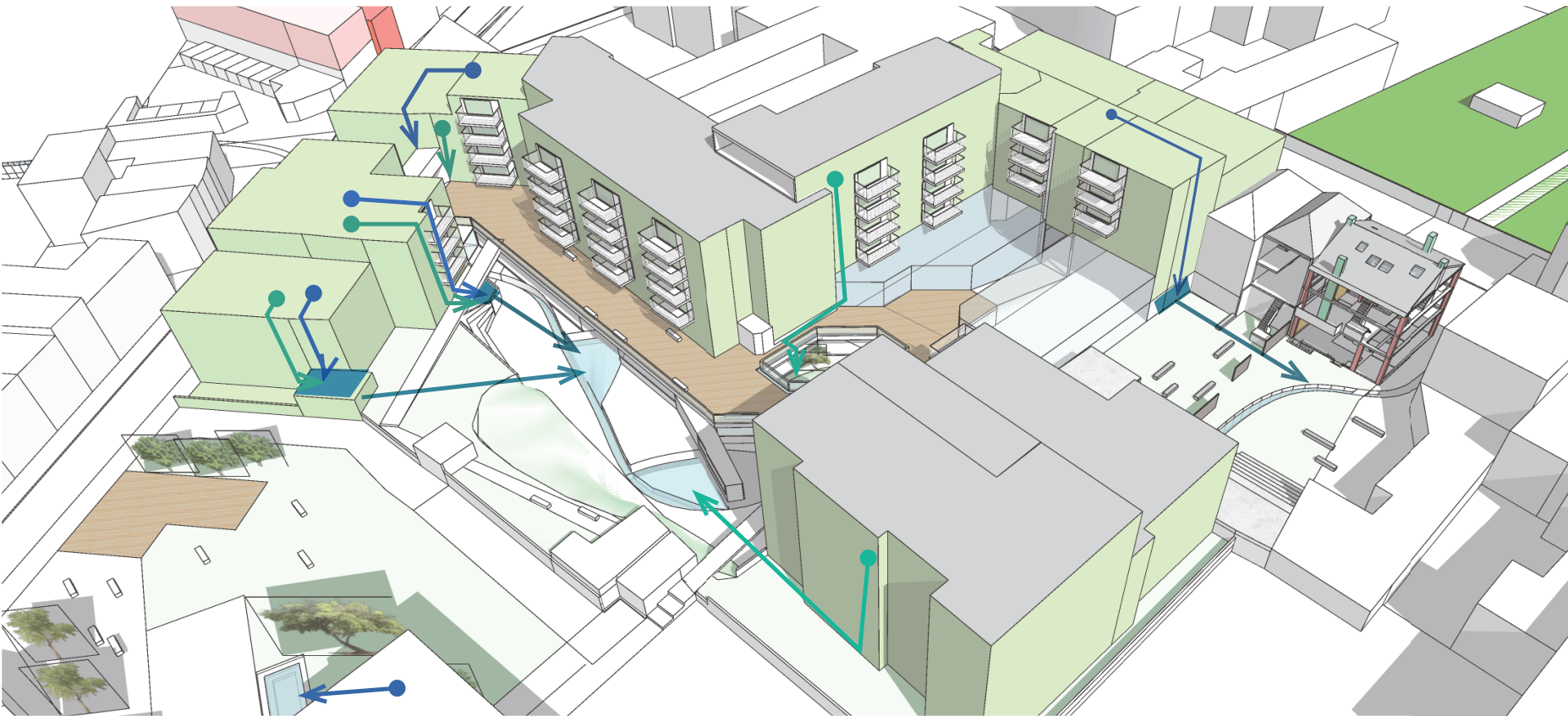
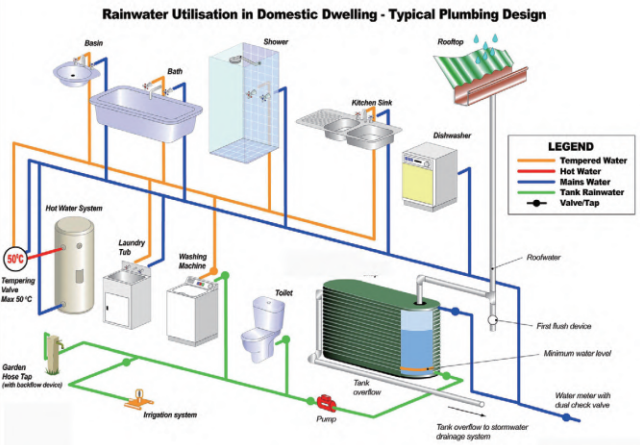
6.1 Design Community Scale

Water flow system

Harvest rainwater



Grey water recycle



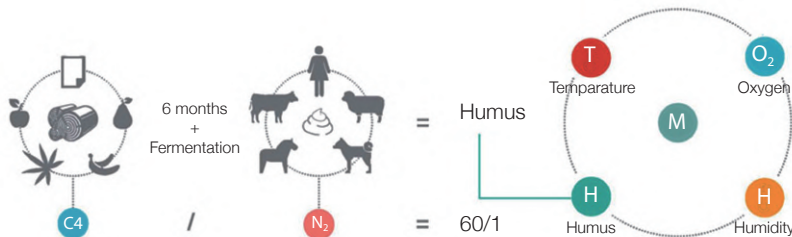


## 6.1 Design Community Scale

### Improve the soil quality and Vegetation succession

The soil of the site was originally Loess, which became barren after the construction of the city of severe decades. It lacks of trace elements now, which is not conducive to plant growth. The transformation plan aims to transform the hard pavement into a new regeneration vegetation system by controlling soil moisture, planting selective vegetation, improving the soil environment, and etc., to offer more opportunities for biodiversity and increase its sustainability.

### Composting improves the soil environment



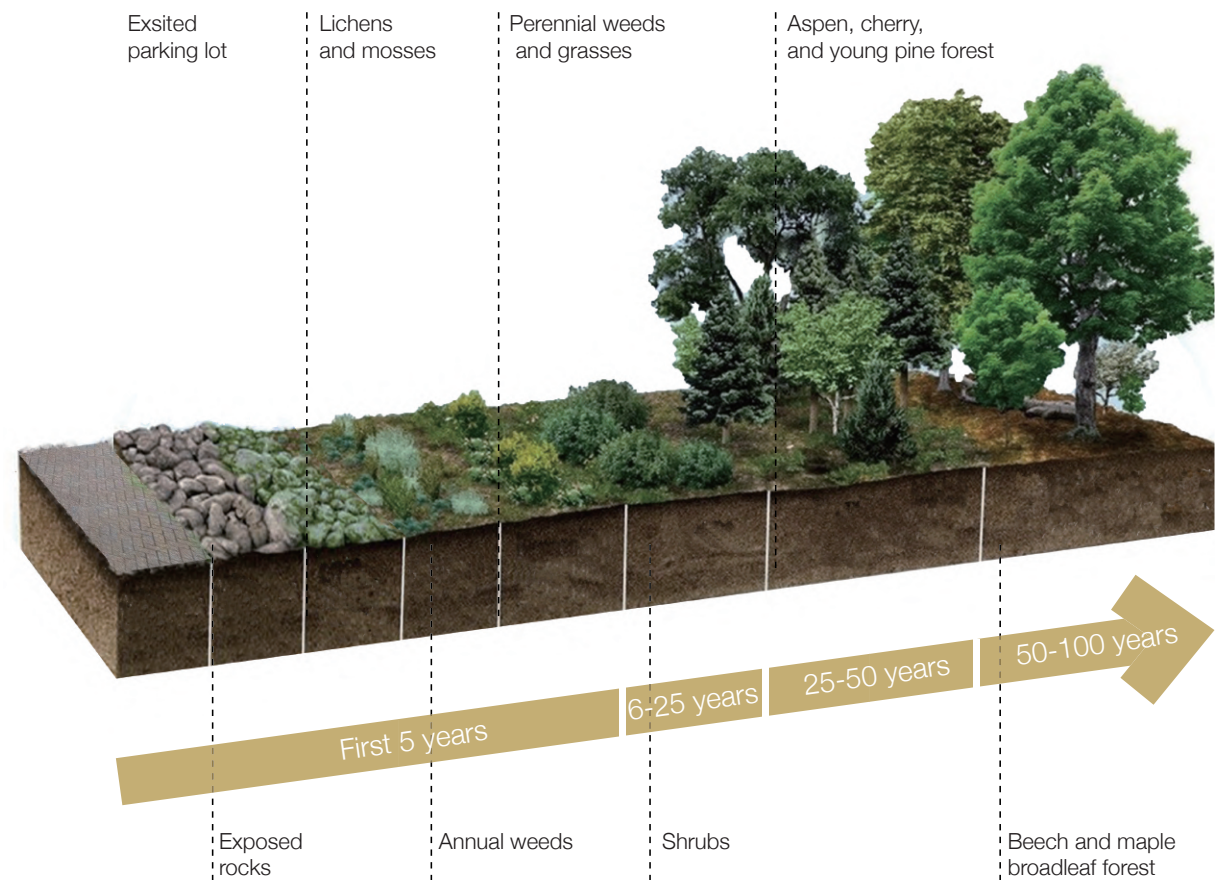
### Vegetation improving soil environment



### Cover material controls soil moisture



### Composting improves the soil environment



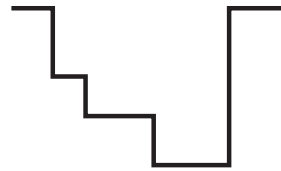
## 6.1 Design Community Scale

### Conclusion



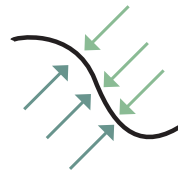
Water System

For most species and habitats, the water system is the most important factor that determines the user's drinking water and growth of vegetation. It is the basic but most important requirement for enhance biodiversity.



Gradients

Applicable to all elements, terrain, moderate, vegetation height, community structure, vertical structure and so on. The richer gradient changes mean more diverse environments, attracting more kinds of creatures, and being more adaptable to challenges.



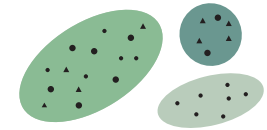
Boundary

For multi-species collaboration habitats, boundary (animal and animal | human-to-human) establishment is very important. There will be conflicts between species because of the sensitivity and disturbance to the environment are different.



Process

Enhance biodiversity must be a long process: the cultivation of vegetation, the nutrition of the soil, the succession of the environment, and the changes of the city all require time to achieve.



Capacity

Depending on the site's own conditions and scale, the design should consider the capacity of the site. Although the creatures themselves are live together in nature, the environment itself is constantly adjusting its limits. The number of goal species in the design should not exceed the capacity of the site itself.



## 6.2 Design Urban Scale

The ground floor vacant

The first floor vacant

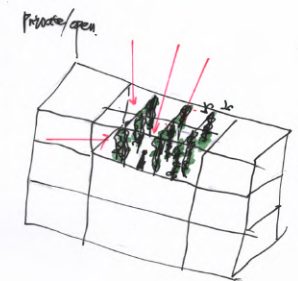
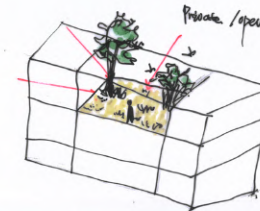
The ground floor vacant  
[Most cloudy zone]  
1. Change the function.

2. Microclimate.

The top floor vacant

Demolition

keep structure.

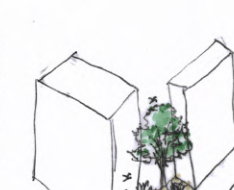


The whole Building Vacant

1. Revolution Middle

Corner

Single.



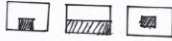
connect with the public space

The whole Building Vacant

2. Revitalize some structure

The first floor Vacant

1. Get the light in  
Make the activation

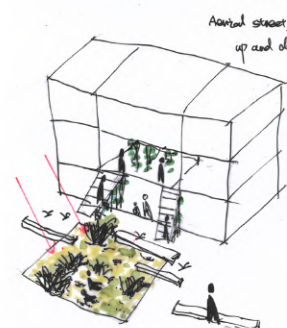
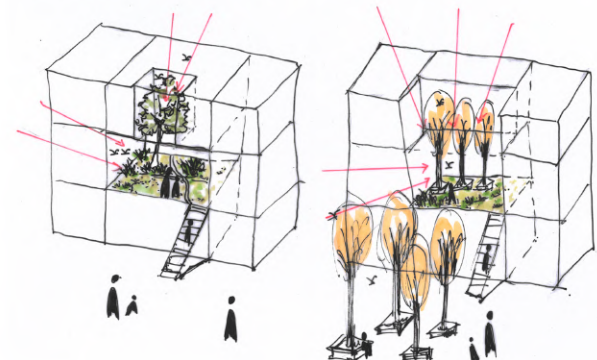


The first floor Vacant

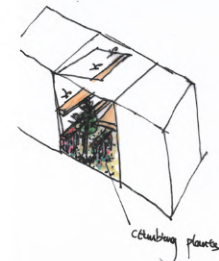
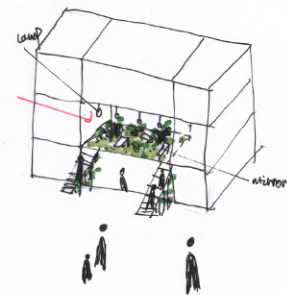
2. Move the space out;  
Change the function and out

3. Microclimate.

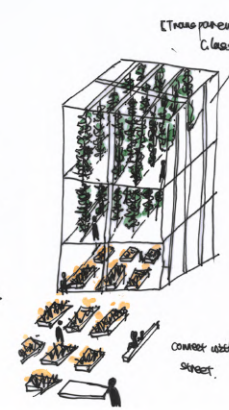
cloudy landscape  
Hill road Case



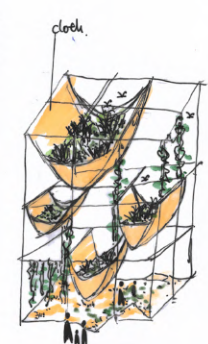
Aerial street  
up and down



Climbing plants



[Transparent] Glass



cloth

Connect with street



## 6.2 Design Urban Scale



Stripe |  
Scattered |  
Partially vacant buildings |

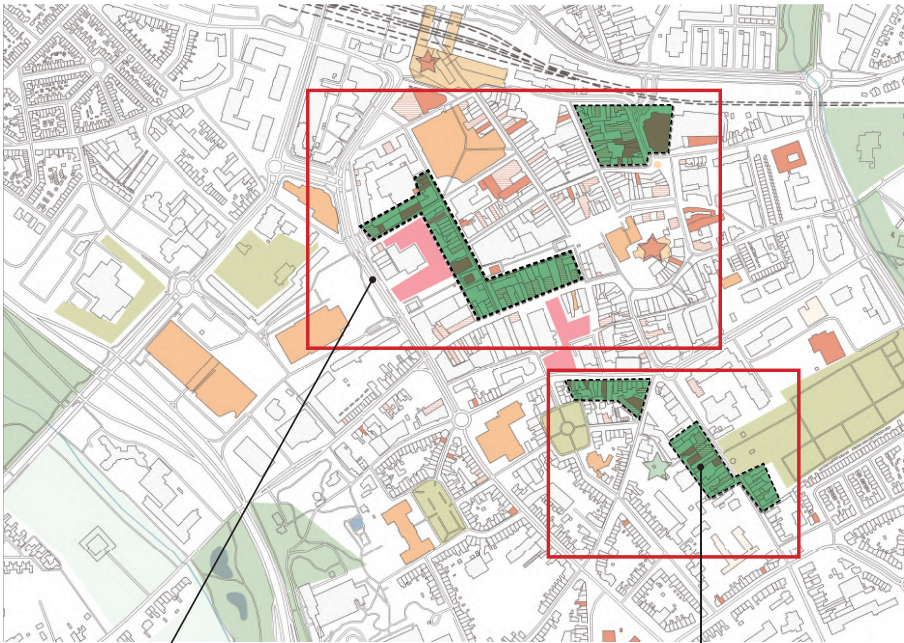


Block |  
Dense |  
More totally vacant buildings |



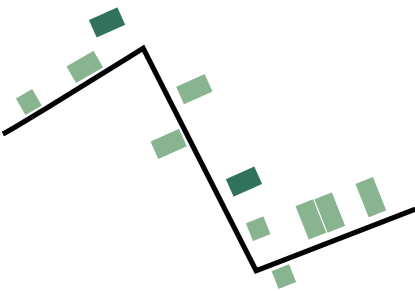


6.2 Design Urban Scale

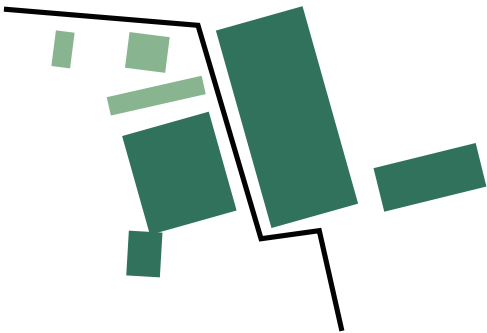


Commercial center |  
More human disturbance |  
Not suitable for kingfisher

Residential community |  
More silence and privacy |  
Suitable for kingfisher



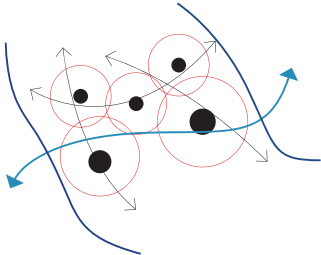
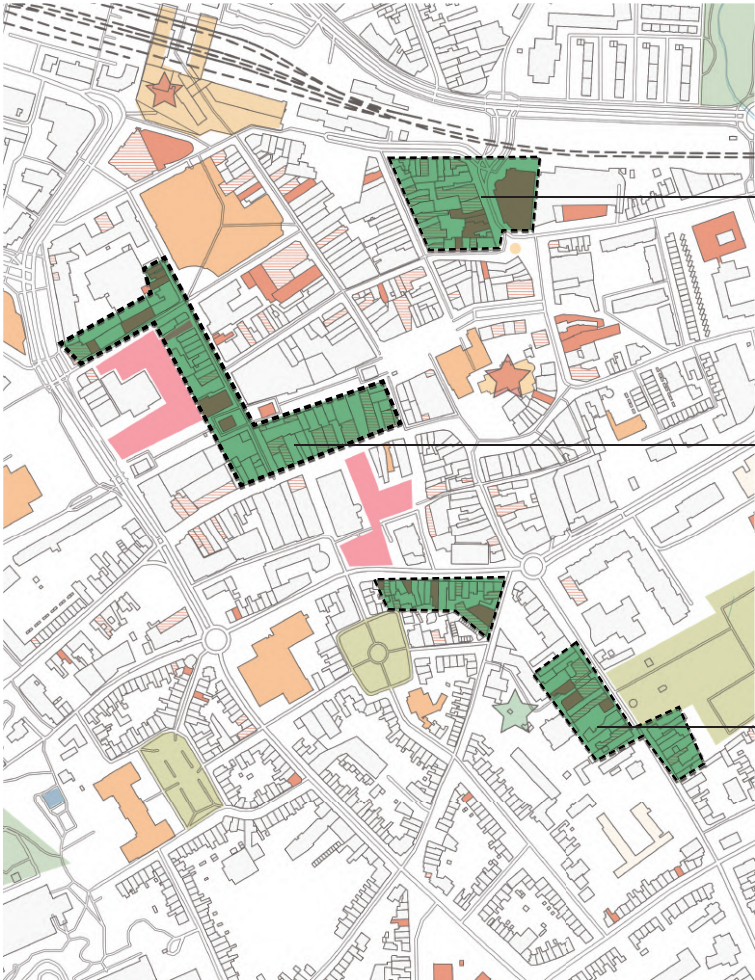
Scattered block |  
Material for rocky landscape |  
Box to protect and offer high structure |  
Suitable for Owl



Big open space |  
More different distance to water |  
Suitable for Red-backed shrike



6.2 Design Urban Scale





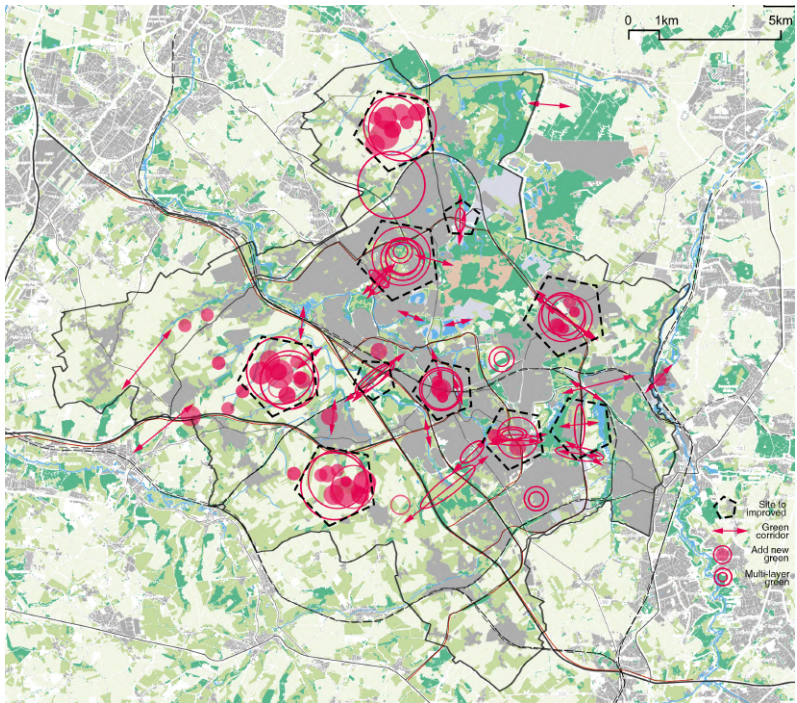
6.3 Design Parksatd Scale

Where and How to make the connection?

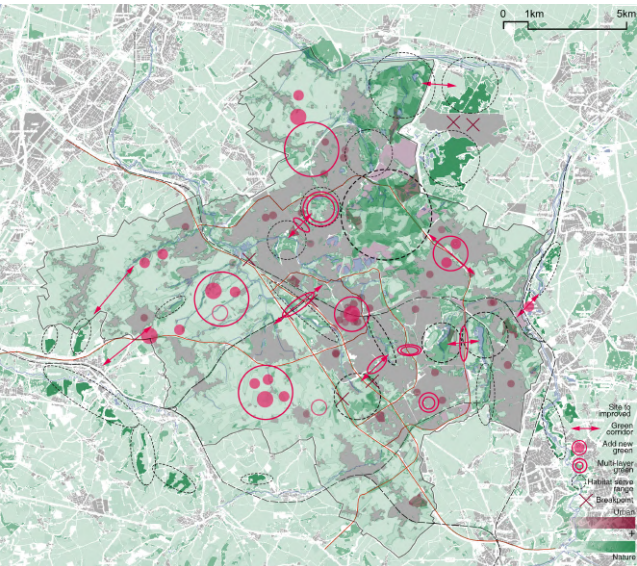
Combine the break point and potential area of 4users,get the general map of the places need to be improved.

We can find common breakpoints through the map, that is, the point that is urgently needed to be solved first, as the first place we consider connecting corridors and ascension.

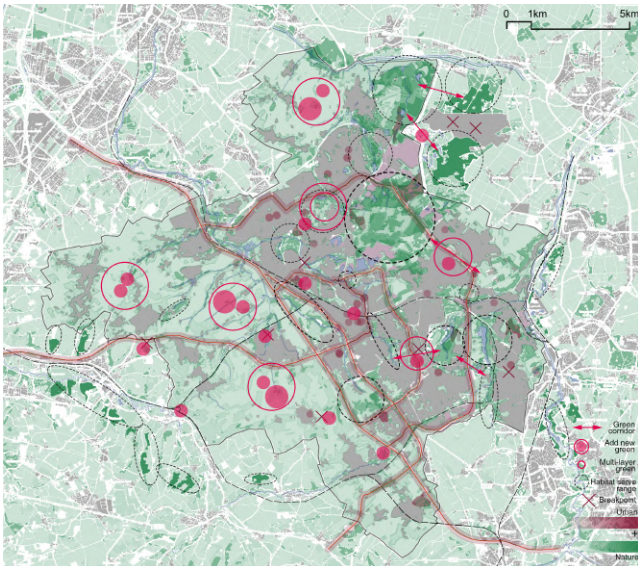
General map of breakpoints



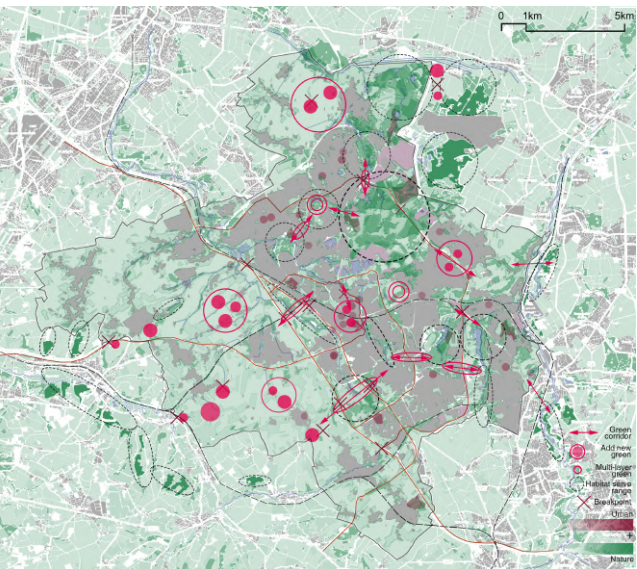
Bird



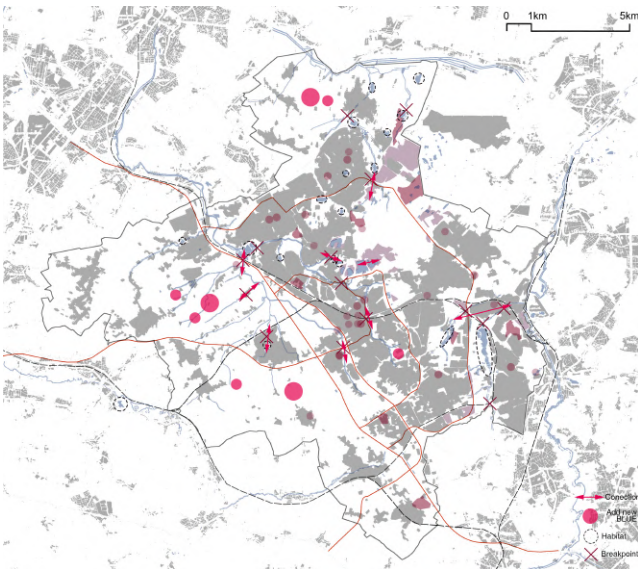
Insect



Mammal



Fish





### 6.3 Design Parksatd Scale

*Where* and *How* to make the connection?

Problem:

1. Isolated species provenances habitat.
2. Clear boundary between Nature and Urban system, limited interaction (Highway A76, N281)
3. A large number of intensive homogenized agriculture (Biodiversity Degree: agricultural area < urban area)
4. Fragmented green and blue system (potential)

Strategy:

Create the new green and blue framework to improve the connection of Parkstad to enhance biodiversity (both for people & flora and fauna)

1. Make the connection between big nature resource: build corridor and point
2. Break the barrier (find some potential point to establish the connect through the highway <new infrastructure>)
3. Increase heterogeneity in agricultural areas: create different patches (forest, hedges, water system) make the connection between the new and old forest & hedges
4. Enhance the connection in urban area

*Where* and *How* to make the connection?

Combine the breakpoint map with the connection trend map — Find the exact location to increase the connectivity structure

*Where* and *How* to make the connection?

Green & Blue Structure

Blue:

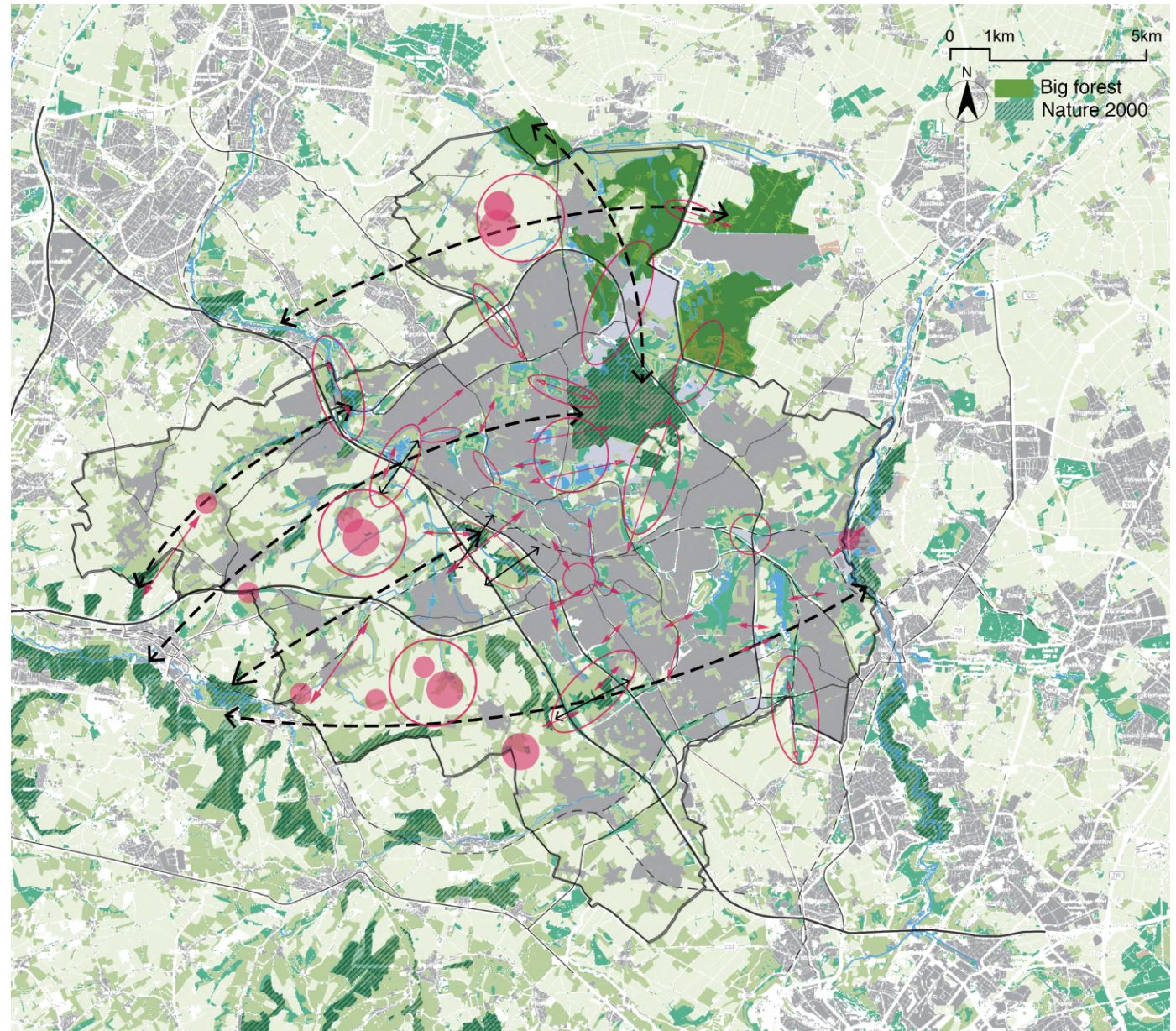
1. Connected the stream system
2. Create new big water surfaces to increase habitat diversity
  - Agriculture area: fish ponds, recreation lake, wetland
  - Urban area: abandoned industrial lake, sand quarry lake

Green:

1. Create new big green space to increase habitat
  - Multi-layer agriculture: **Agroforestry**
  - Abandoned place, industrial structure to restoration forest
2. Create the hedges & forest to connect the existing Linear
3. Established more vertical green structure along the stream
4. Build the green structure to cross the barrier (highway & main road)
5. Use building structure to create vertical green space.



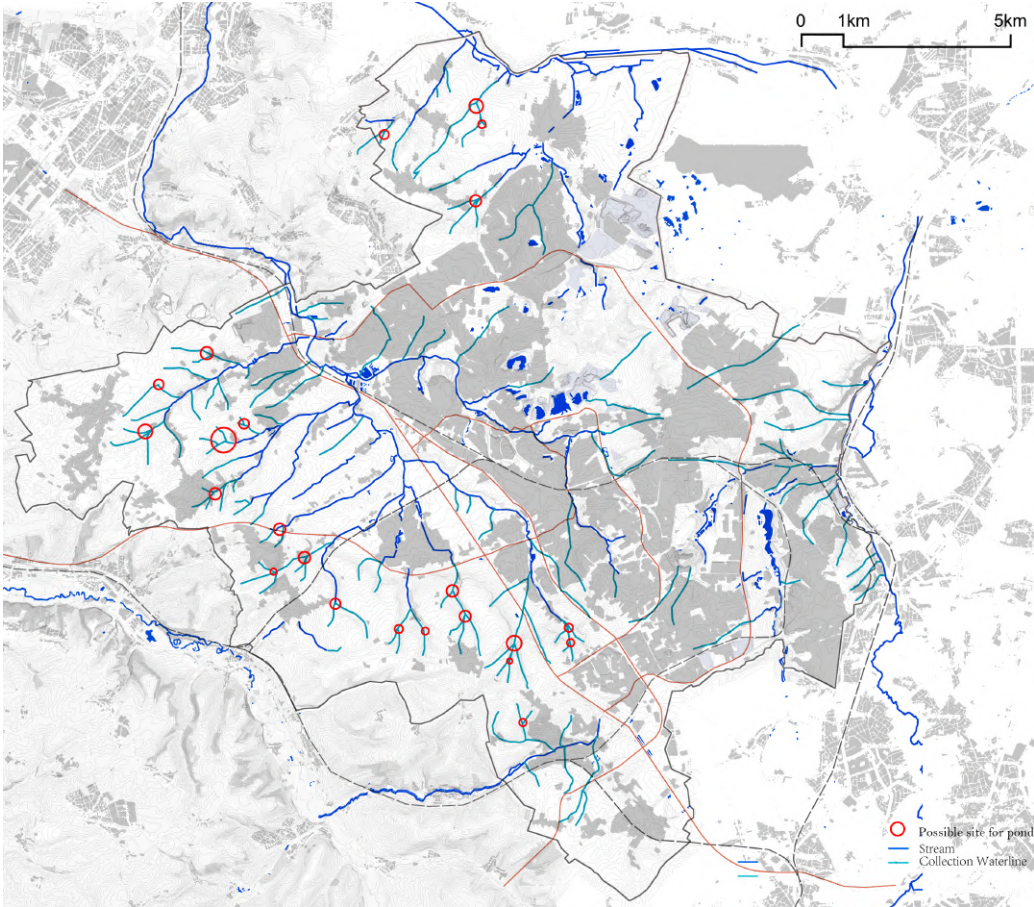
Possible connection trends between three patches (Forest, Agriculture, Urban)



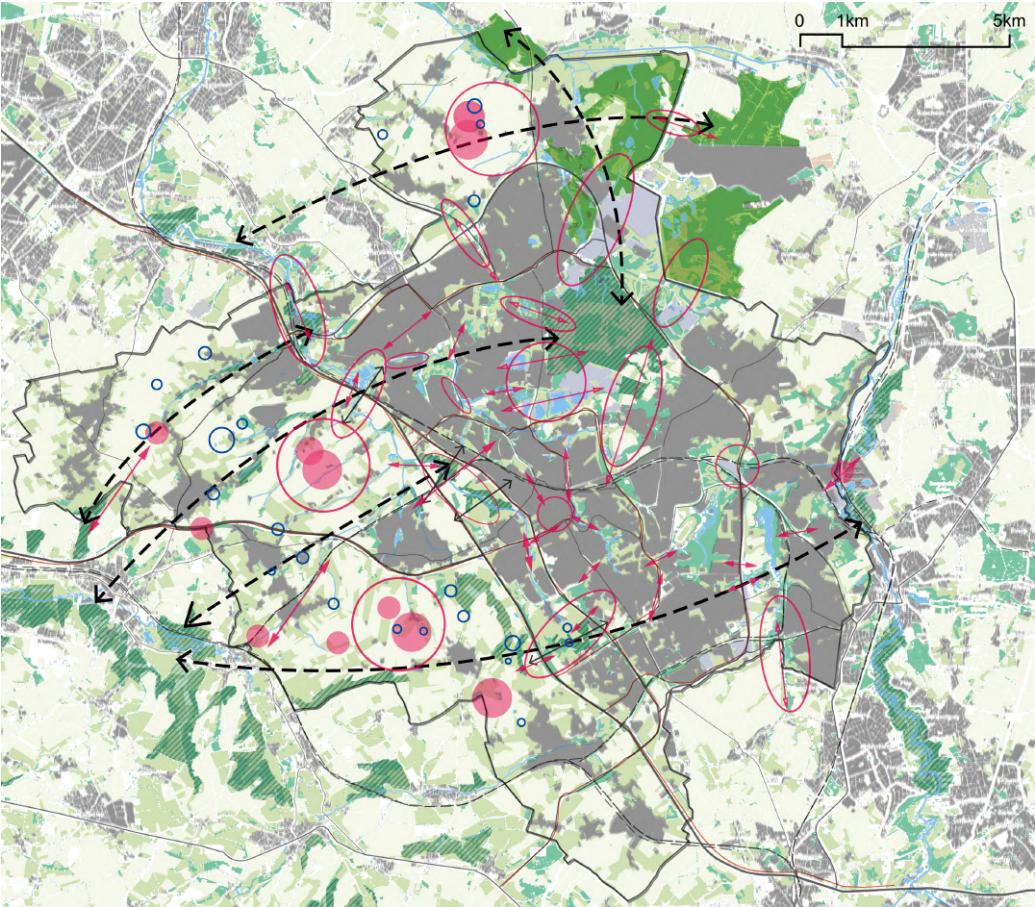


6.3 Design Parksatd Scale

Collection waterline  
Water catchment area



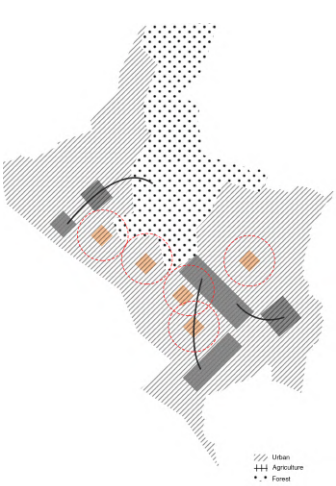
Final possibilities



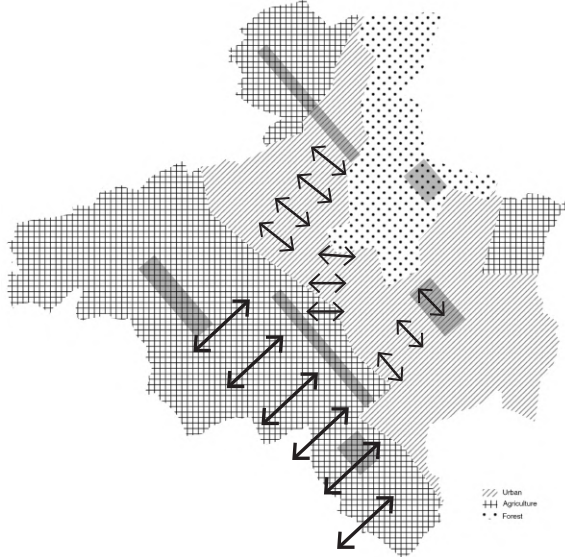


6.3 Design Parksatd Scale

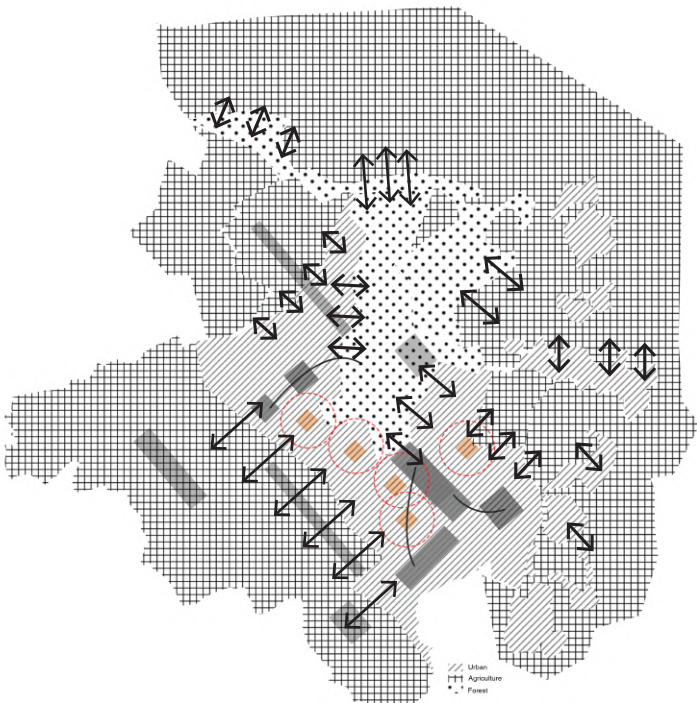
Urban scale



Parksatd scale

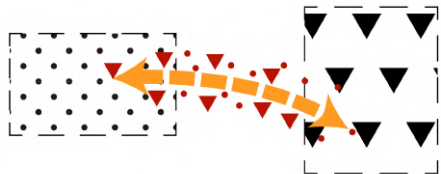


Regional scale

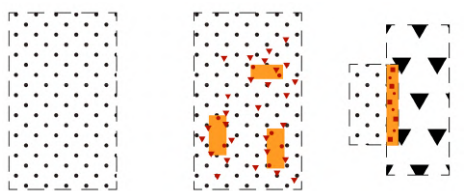


Patch-Corridor-Matrix Model-Principles

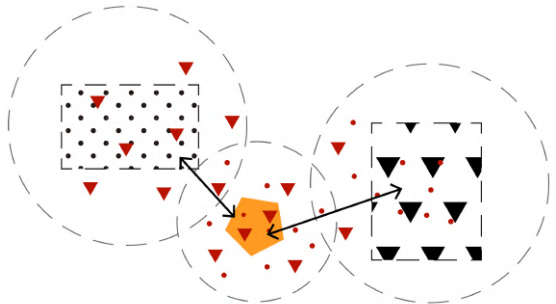
Corridor-connect 2 different patches-help migration



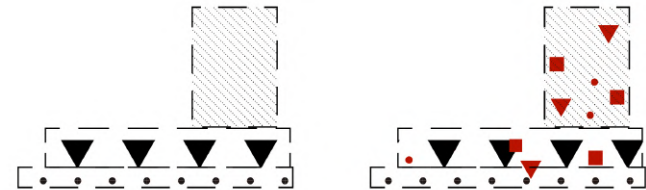
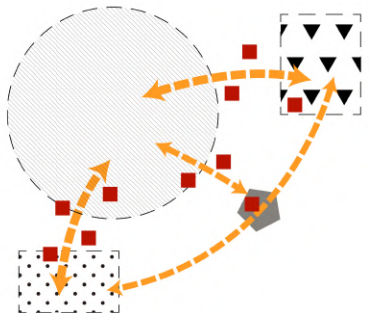
Edge effects-The interlaced regions of the 2 patches often have high biodiversity



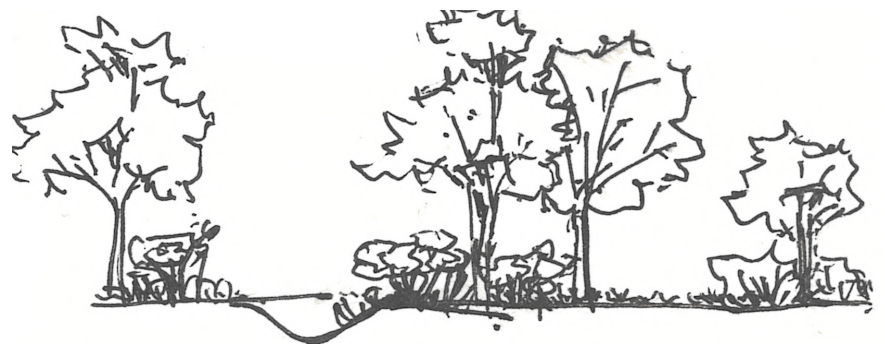
Stepping stone-connect 2 different patches-help migration



Keystone habitat build connection with it, enhance biodiversity



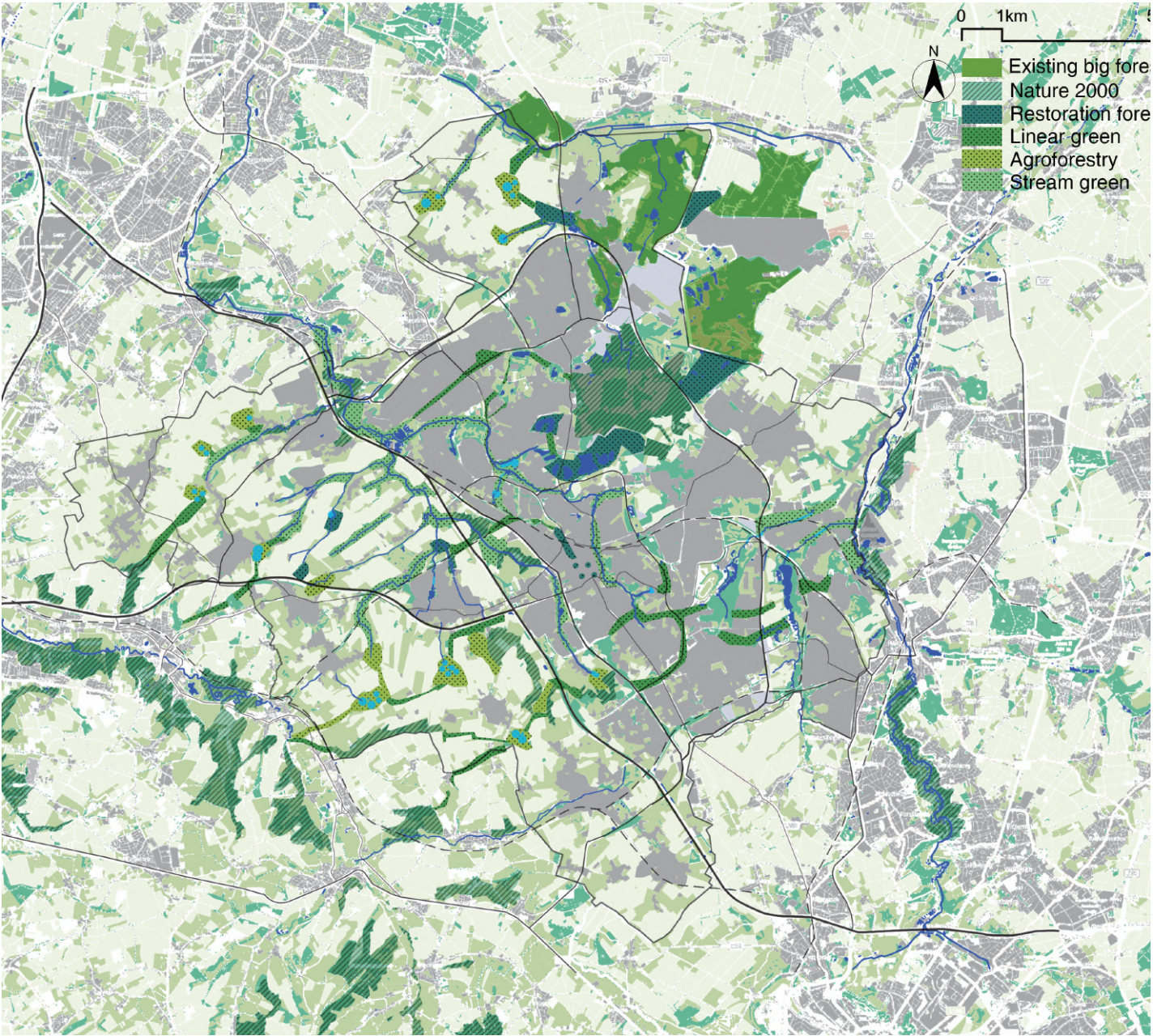
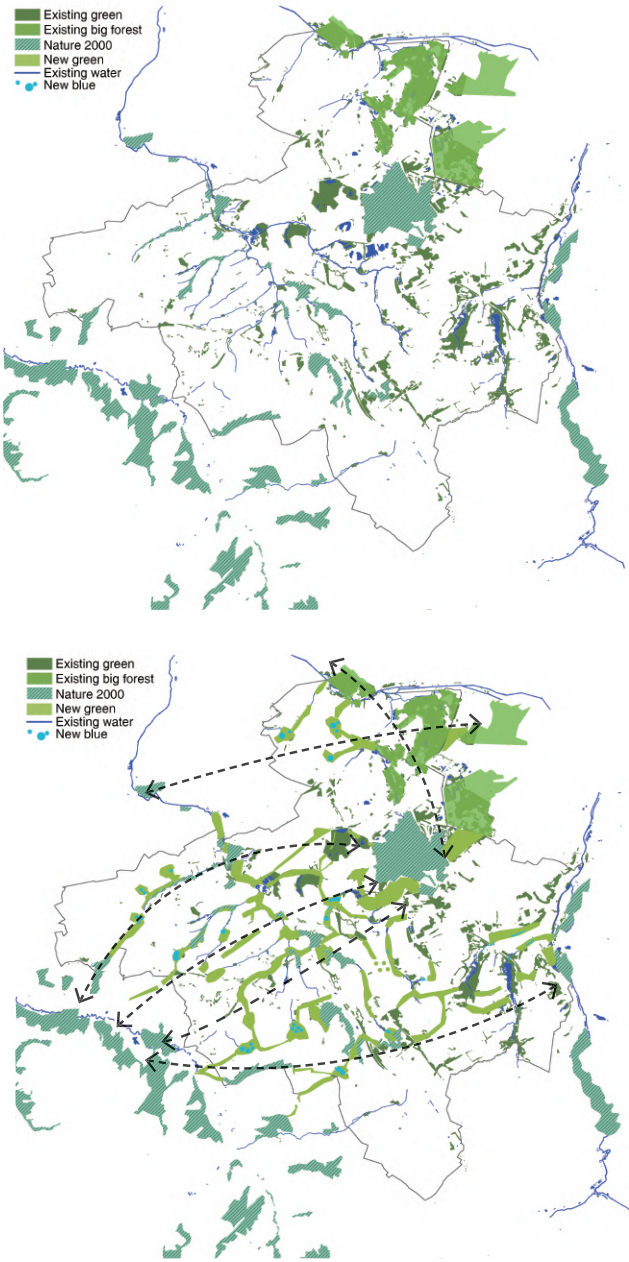
Multi-layer vertical structure facilitates diversity





6.3 Design Parksatd Scale

New Green and Blue Framework





## *07 REFELECTION*

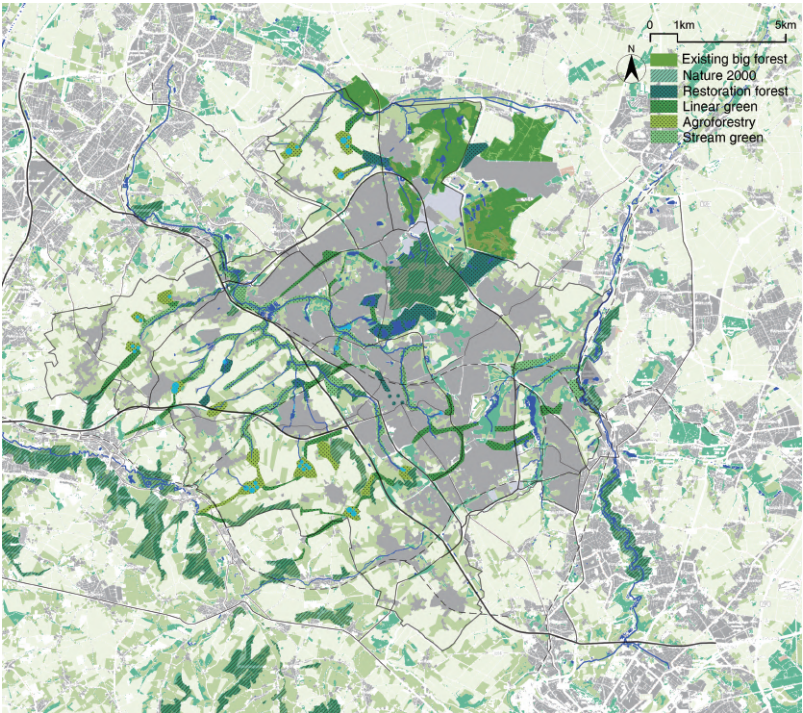
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Conclusion  
Refelection

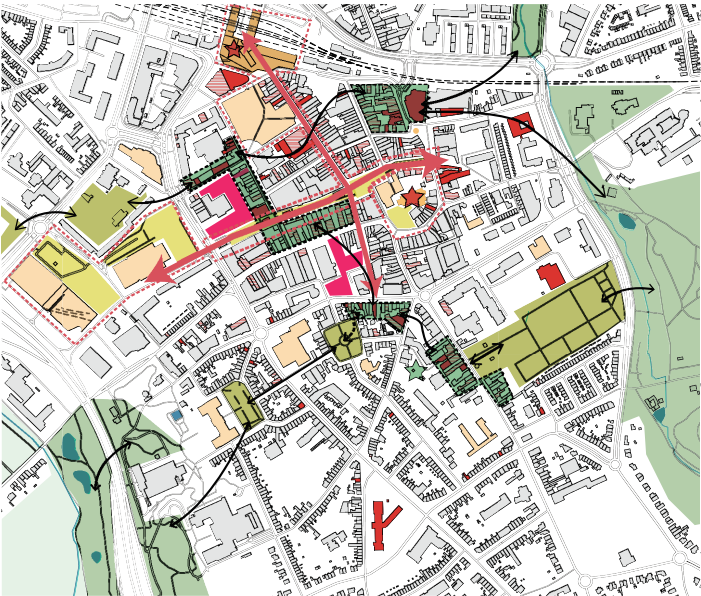


7.1 Conclusion Three Scales

Parkstad scale



Urban scale

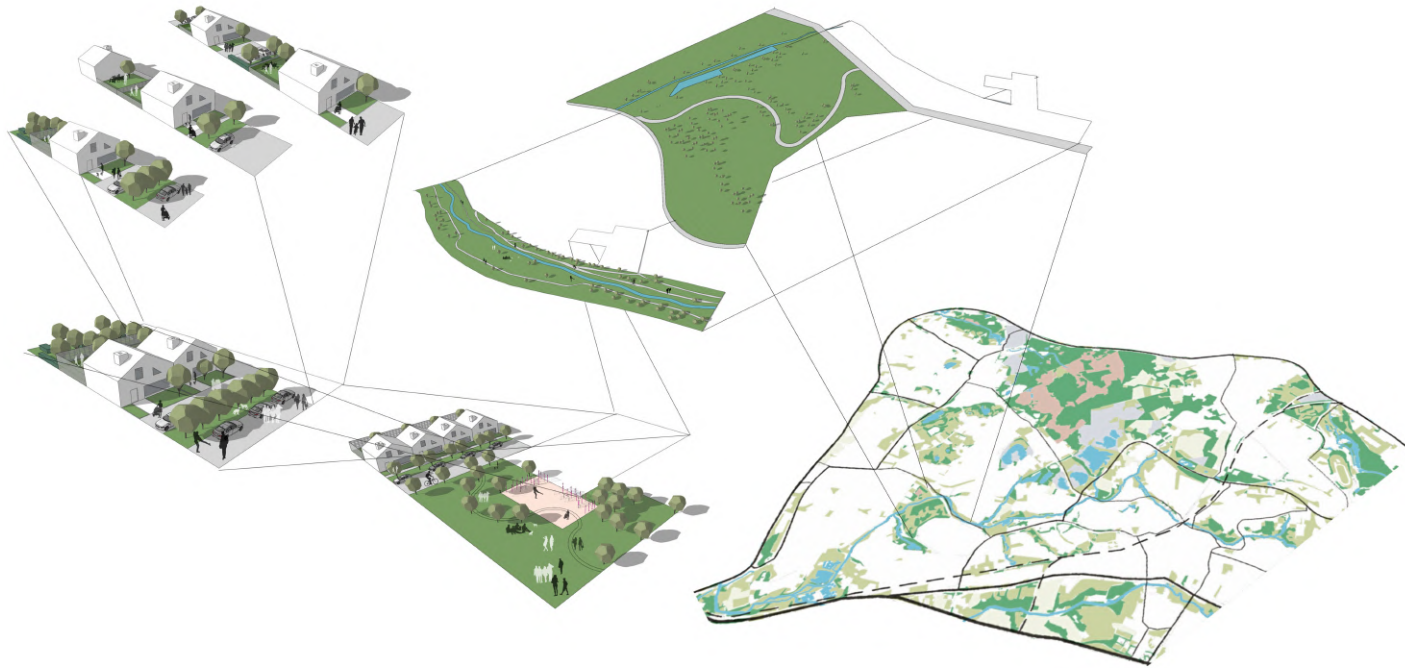


Community scale

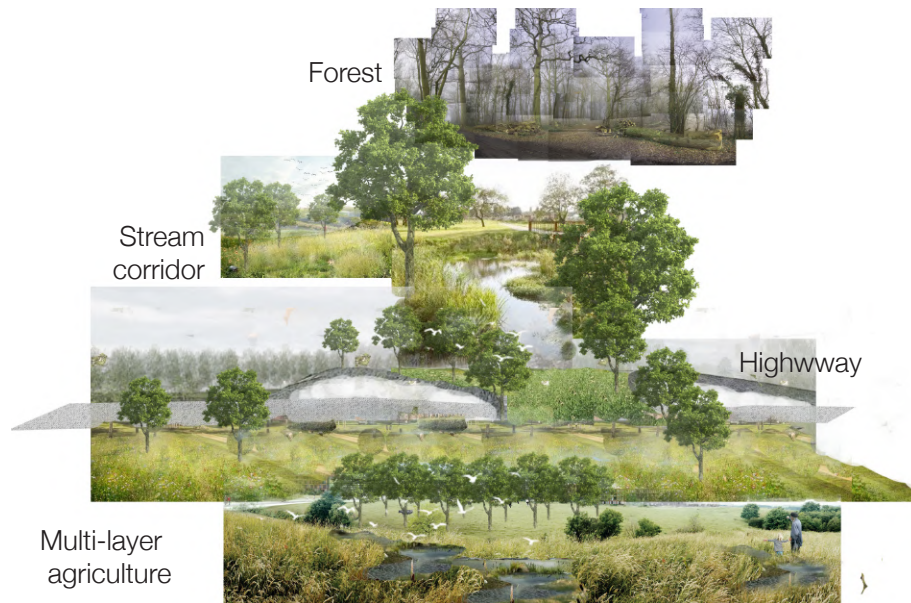


## 7.1 Conclusion One System

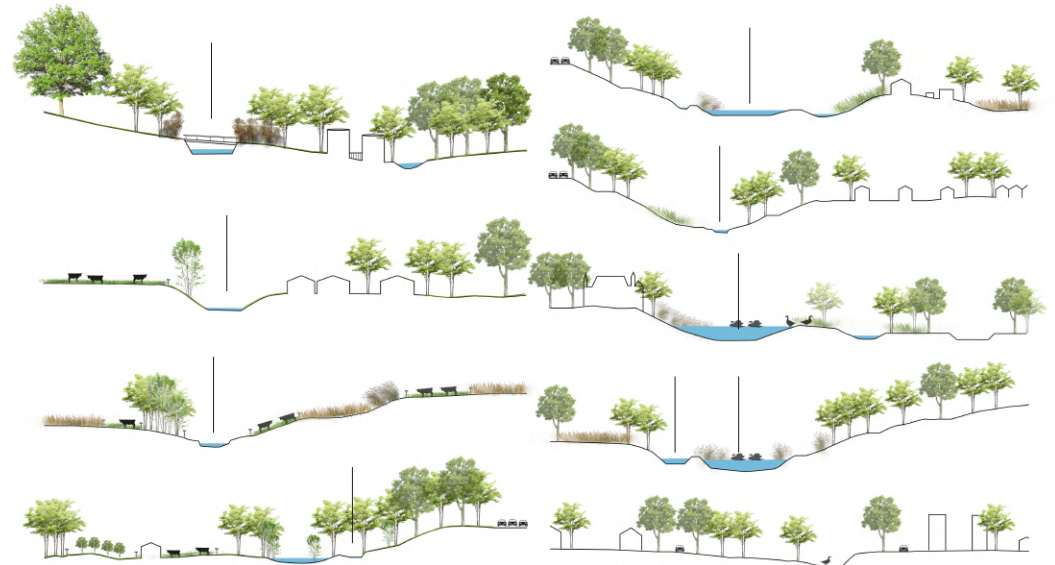
Roaming from door to the regional big green park



Green corridor landscape



More connection and interaction with water





## 7.2 Reflection

### ***The relation between research and design***

For my thesis, research and design are inseparable and collaborative. During the research period, they are three phases. First, the general research help to understand the background context of the site, which leads to the research objectives shapes and frames the focus of this thesis. Second, from the study of theoretical literature and methodology theory, establish my own methods and theoretical framework, and become the theoretical foundation of specific research and design. Then, since the thesis aims to propose a mutual benefit way to improve living quality for different users of Parkstad. So this design goal, to some degree, guides the direction of this step. Divide different users groups, to analyze how they use this study area and the potential and limitations of the site. This step gives the important criteria for the next step design, like the scale and site choose, the spatial compositions. The research process is not just about acquiring knowledge, but also how to apply it to a specific design.

During the design period, the design has been implemented by using the search as a guideline to frame the design. In the establishment of the large-scale green and blue framework, the needs of different users for the site, as well as the site landscape typologies, are considered to form a new set of flow-networks that meet the functions required by different users. In designing a new community of multiple users to live together, the test design was first carried out four times, and four groups of users were considered in an equal position, and different visions were designed to meet their requirements. Test design provides a series of criteria and their focus on the venue (preference), providing a good guideline for the final design. In the process of designing, more detailed requirements for space and detail make the more targeted research ongoing. As a means of test possibilities, the design explores the combination and expression of different ways of the venue and theme, verifies and improves the knowledge gained, becomes a new knowledge or design method which can be the basic reference for the later researcher.

Design and research are always throughout the project, they interact, reflect and improve with each other.

### ***The respond to research question***

On the regional scale, the establishment of new green and blue networks has increased the habitat of flora and fauna and the built of migration routes enhances their adaptability to environmental and human disturbances. Connect the breakpoints and plan the function of new corridors, consider the various types of users, as well as the different needs of the natural and urban systems, different typologies are given to respond. A variety of coherent high-quality paths are formed for all types of users to reach the largest regional green space from the "home" door.

On the Urban scale, natural systems are used to replace some urban systems, and land values are converted by giving new functions to vacant buildings and abandoned plots. Select areas with potential in the city. Different strategies are used as toolboxes, which can be superimposed to achieve different functions for each user.

The design of the small-scale collaborative community gives concrete measures to enhance biodiversity based on specific space, strengthen the ecosystem service and increase the value of the land, so that all users, human, flora and fauna can improve the living quality. Respond to research questions with more specific, realistic, and visual results.

Different scales answer the question of how to reorganize the urban and natural system and give a variety of possibilities to enhance biodiversity. The proposal is not only serve human, but also for other flora and fauna, improving the living quality of all kinds of users in parkstad.

### ***Reflecting through the relationship to Flowscapes studio***

The Flowscapes studio offered various approaches in landscape design including landscape as infrastructure, landscape as process, landscape and urban development and landscape as ecology. Offer different perspectives, Landscape as scale-continuum and Landscape as process has been the guideline for my research and design. My thesis, research from the regional scale to understand the site and get through the urban scale and city center scale to choose my final example site. The research is a continuous process from a large scale to small. For the design part, first, have the test design at the community scale to check different possibilities and how the specific working. Then go to the city center scale, design a new green-ring to active and renew the city core. Give a lot of different typologies that can be used as toolbox for other possible sites in urban scale. In the end, the new green and blue framework in Parkstad scale connect the breakpoints and different habitats, create several migration routes for different users, which made the whole design become a complete working system. This follows the idea from Flowscapes studio that the design involves establishing relationships via attachment, connection, embedment of a specific site or location into the broader context at different scale levels. Also, Landscape and landscape construction are regarded as a process rather than as a product. Projects play a role as an open-ended strategy, as in staging or setting up future conditions. Hence, my thesis follows this perspective, focus on a long-term framework that takes a long process and considered in different phases.

### ***A reflection on scientific relevance***

Many designs are starting from the human perspective, putting people at the first position to think about how to do further urban planning. This thesis also places flora and fauna at an equal position that as important as people, to consider the future about cities. In a shrinking city, oversupply space, excessive land and declining population, how to design a proper scale and density of cities is an interesting and worthwhile question. The transformation of natural and urban systems, the balance between different users and the pattern of mutual collaboration are the core of research and design. Now biodiversity and shrinkage are already a global issue, and the new possibilities presented by thesis will provide different scale solutions for other shrinking areas. Especially for cities with similar industrial backgrounds, their population types will be more similar and the results will be more applicable. Not only the shrinking cities, but also some dense cities, these small strategies can also be used for some intervention to enhance biodiversity and living quality.

### ***The limitation of the project***

The collection of information about the distribution of different species is the biggest difficulty in the analysis phase. Other studies on species often use big data analysis and perform GPS location tracking for individuals, with results from years of observation and data logging. Due to the limitation of time and technical constraints, this thesis, just discusses the landscape structure of the site through different layers, from the soil, vegetation, hydrology, geomorphology and distances to cities and roads, etc. Based and overlapped most species' requirements for these elements, yielding a general biodiversity distribution map for most species.

The thesis focuses on the needs of various users for urban and natural systems, using landscape approaches to intervene and improve. Although the different background has been considered as much as possible, it is still limited to the scale of the landscape architecture and ignores some other aspects. For example, the detailed construction of demolishing houses is still worth exploring, government policies and urban planning, market economic strategies and so on. The project is worthy of more in-depth research in these areas, integrating a more practical proposal.

The economic problems of the city are still the most concerned points in shrinkage situation. How the project itself can bring some additional monetary income should have a deeper answer. Enhance biodiversity has led to an improvement of living quality, which in some ways can drive natural tourism and enrich land value. But realizing this impact is a long-term process, during this time urban policy, economy, and population unpredictability will be a big challenge for the project.

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