MUTUALIST URBANISM

Achieving mutualism between urban development and strengthening biodiversity through nature-inclusive urban planning and design: the case of the Zomerhofkwartier in Rotterdam

CITIES

CITIES NATURE

NATURE IN CITIES


URBAN
DEVELOPMENT


STRENGHTENING
BIODIVERSITY

HOW CAN THE URBANIST PROVIDE CONDITIONS FOR STRENGTHENING BIODIVERSITY IN URBAN DEVELOPMENT?

THE URBAN ECOSYSTEM

THE URBAN ECOSYSTEM

- main habitat for people
- people are the ecosystem engineers

How people plan, design, maintain and use their own habitat

modifies, maintains and creates

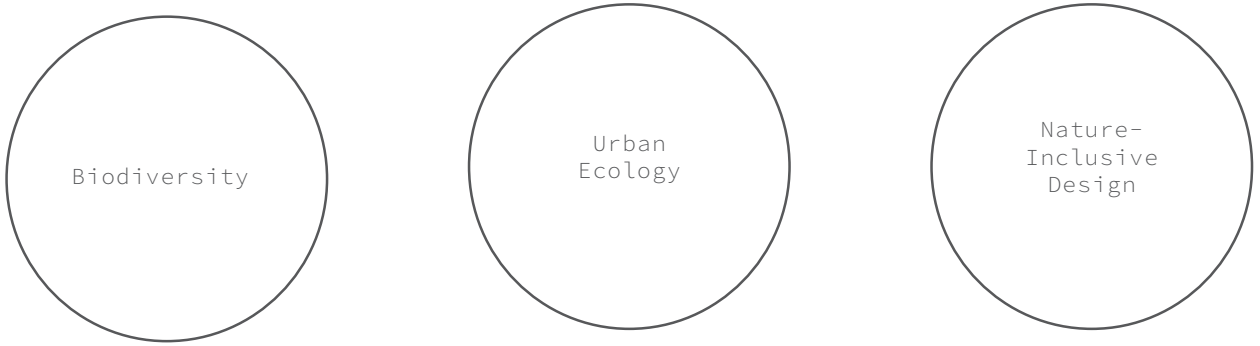
the habitats for other species

understand the functioning of the urban ecosystem and pressures on biodiversity in the city

learn how to plan and design in a way that strengthens biodiversity

RESEARCH APPROACH

THEORY



CASE STUDY LOCATION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ROTTERDAM NOORD
CENTRAL STATION
ROTTERDAM CENTER


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CASE STUDY LOCATION

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- Developed into office area after the war
- Large-scale buildings from the 70s
- Highly paved streets and public space
- Area slowly deteriorated
- Plans for redevelopment were paused in 2005 due to economic crisis
- Zomerhofkwartier and surroundings characterized temporary use and bottom-up initiatives
- Plans to redevelop into mixed use area with residential and commercial functions

RESEARCH APPROACH

THEORY

CASE STUDY LOCATION

TRANSLATED ECOLOGICAL KNOWLEDGE TO URBAN PLANNING AND DESIGN

RESEARCHED SPATIAL INTERVENTIONS THAT STRENGTHEN BIODIVERSITY

pressures on biodiversity in the city

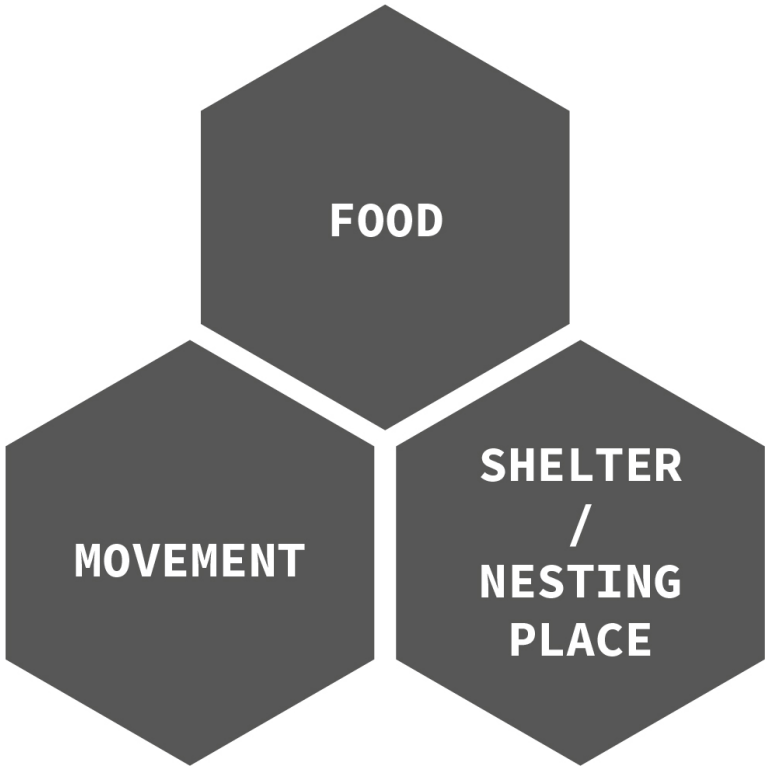
AROUND **10%** OF NATURAL SPECIES IN THE NETHERLANDS IS DEPENDENT UPON URBAN AREAS FOR SURVIVAL OF THE POPULATION
(LAHR ET AL., 2014)

• Urban animal need three conditions for survival:

- food
- shelter/nesting places
- movement

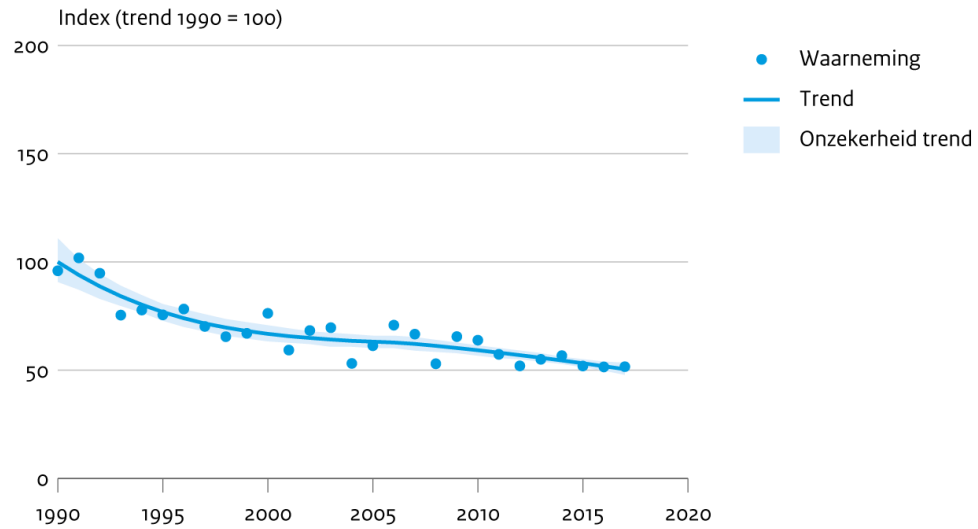
• Mostly provided in urban green spaces and partially in the urban built environment

• For some species conditions are:
- missing
- limited available
- too far apart



BIODIVERSITY DECLINING IN CITIES

Fauna in stedelijk gebied



Bron: NEM (Sovon, Vlinderstichting, CBS)

CBS/okt18
www.clo.nl/nl158502

PRESSURES ON BIODIVERSITY IN CITIES

LIMITED NESTING OPPORTUNITIES IN BUILDINGS

LACK OF URBAN GREEN SPACES

LACK OF BIODIVERSE VEGETATION

FRAGMENTED AND ISOLATED VEGETATION

DISTURBANCE

opportunity for change: densification

• High housing demand in the Netherlands, with highest demands in and around cities

• Rotterdam: inner-city densification

DENSIFICATION OF THE URBAN ECOSYSTEM

• Research has shown that densification:
- often leads to loss of existing urban green
- involves development of minimal amounts of green space that do not always contribute to biodiversity

• This will further increase pressure on biodiversity

• Increasing pressure on biodiversity can negatively affect quality of life for people in cities

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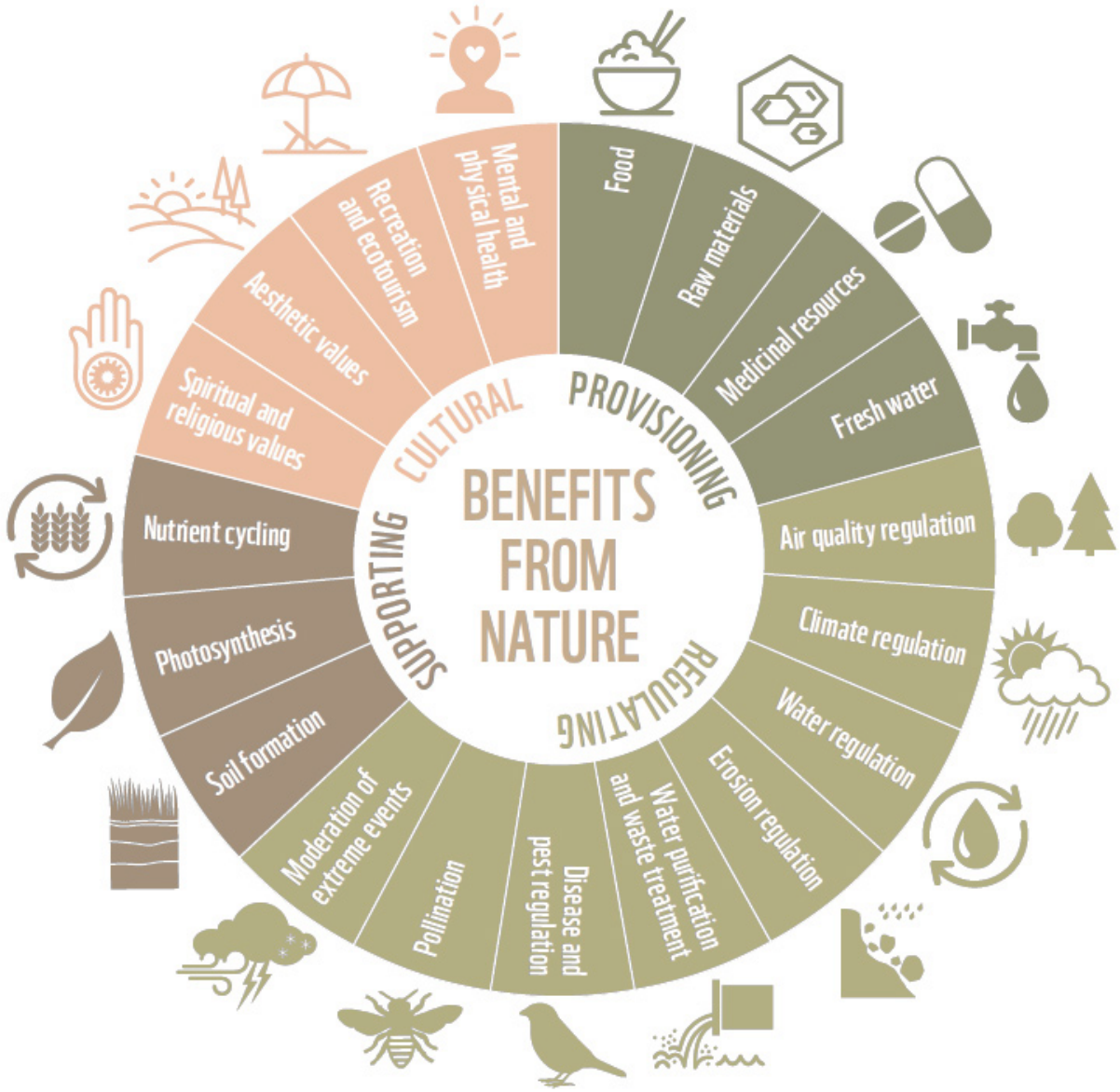

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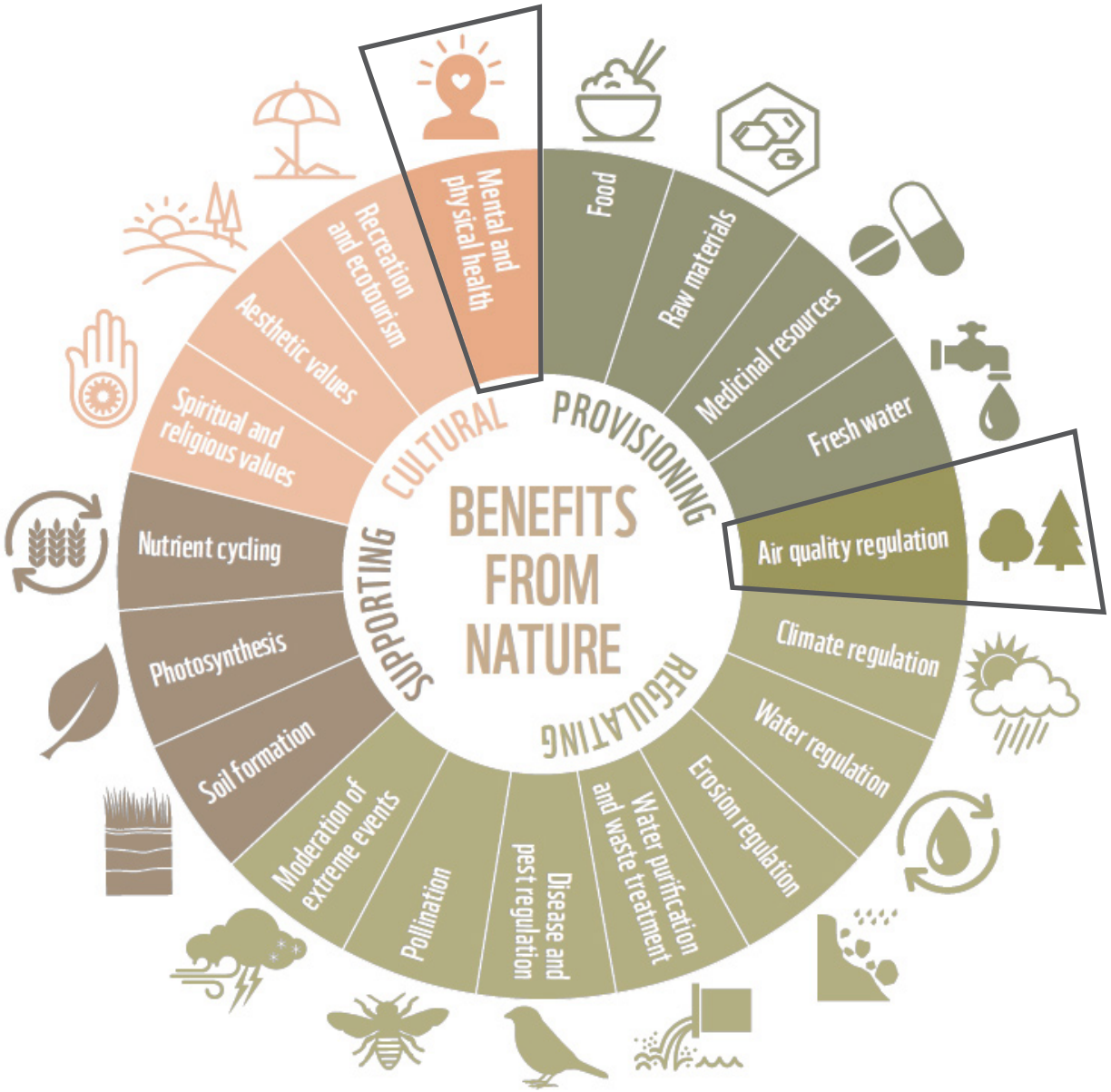

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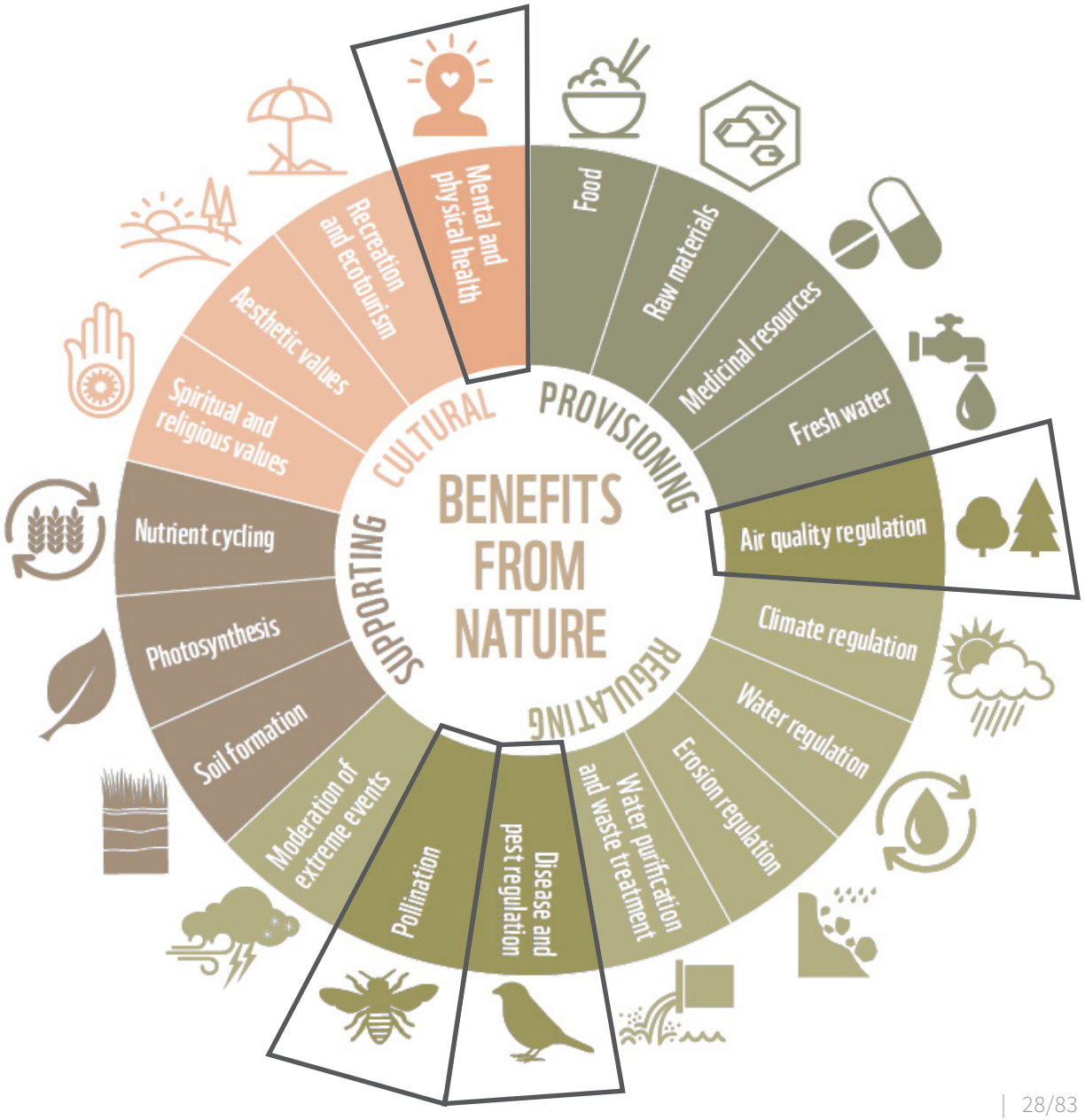

CURRENT ROLE OF BIODIVERSITY IN URBAN PLANNING AND DESIGN

- Green space not effectively integrated in the process

- Lack of awareness and knowledge about habitat requirements of urban animals

- When (protected) species are considered, it is often only at submission for building permission

Nature is excluded from urban planning and design, resulting in loss of biodiversity and unused potential for an improved, liveable environment for people through the ecosystem services provided by urban nature.

APPROACH

MUTUALIST URBANISM

APPROACH

MUTUALISM

‘‘An ecological interaction where species benefit from each other’’

APPROACH

MUTUALIST URBANISM

‘‘A way of urban planning and design that strengthens biodiversity by including nature in the process. This will result in mutualist habitats where both people and nature will thrive’’

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MUTUALIST URBANISM

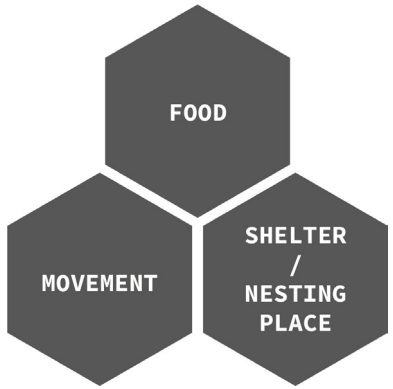
‘‘A way of urban planning and design that strengthens biodiversity by including nature in the process. This will result in mutualist habitats where both people and nature will thrive’’

Redefining the relationship between:

- city and urban nature
- built structures and urban nature
- people and urban nature

analysis of the urban ecosystem

Strengthening biodiversity
Providing conditions for survival for different local species



UNDERSTANDING THE URBAN ECOSYSTEM

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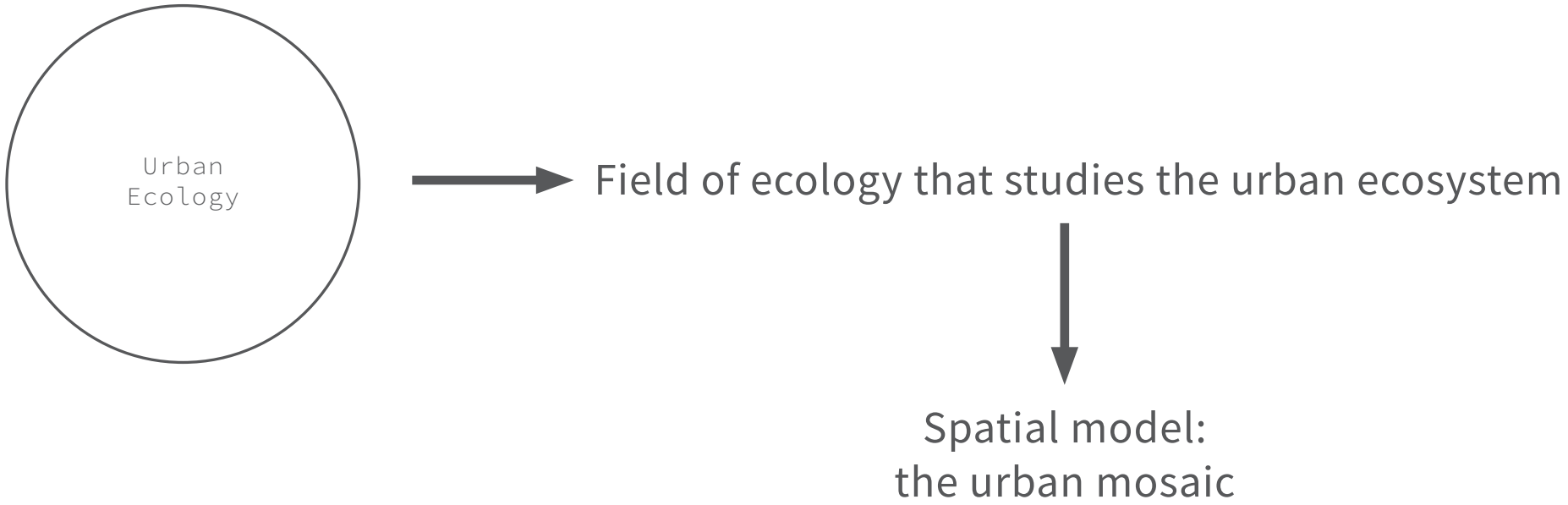


the urban mosaic:

through natural processes and human interactions cities form into a mosaic

one piece of the mosaic:
relatively distinct area with a characteristic spatial pattern

THE URBAN MOSAIC

- City scale, example mosaic pieces:

- neighborhood with particular arrangement of buildings and public spaces

- park

when zooming in at one mosaic piece, a
finer mosaic can be recognized composed of
‘landscape elements’

THE URBAN MOSAIC

- Presence and configuration of ‘landscape elements’ result in local differences and opportunities within a piece of the mosaic:

- neighborhood: closed building block with inner garden, trees in a street

- park: water and trees

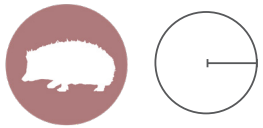
THE URBAN MOSAIC

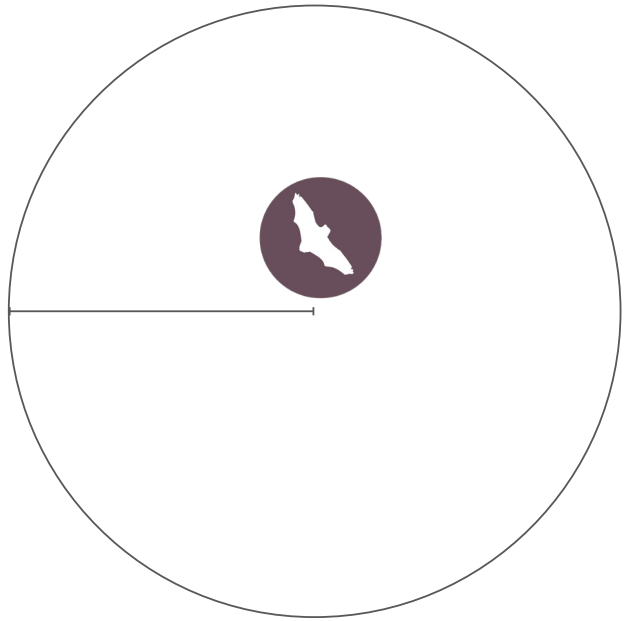
- Urban animals are affected by:

- configuration of urban mosaics on a city scale

- local differences and opportunities provided by the landscape elements within a mosaic piece

• By arrangement of the landscape elements the urbanist has influence on the possible or performed radius of action of species

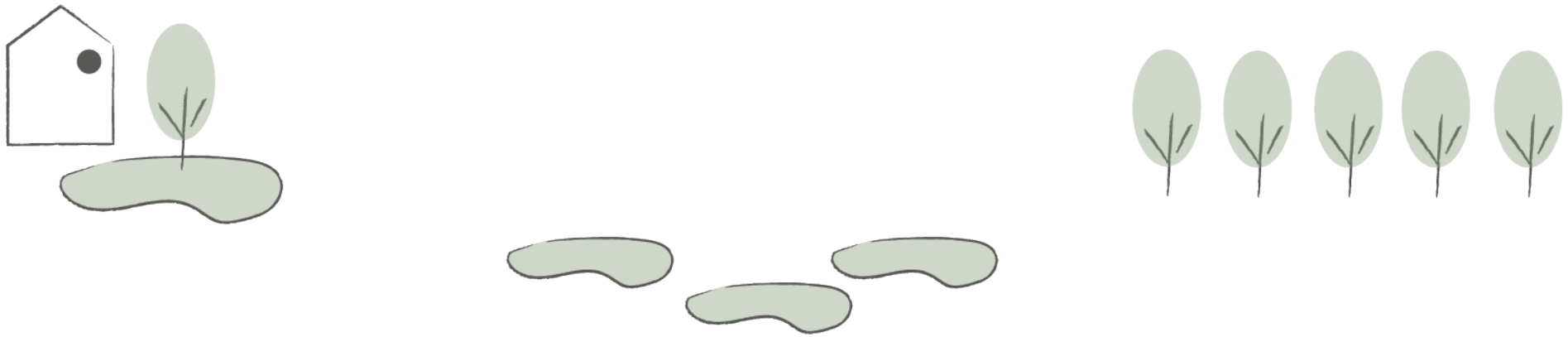




an interwoven urban mosaic:

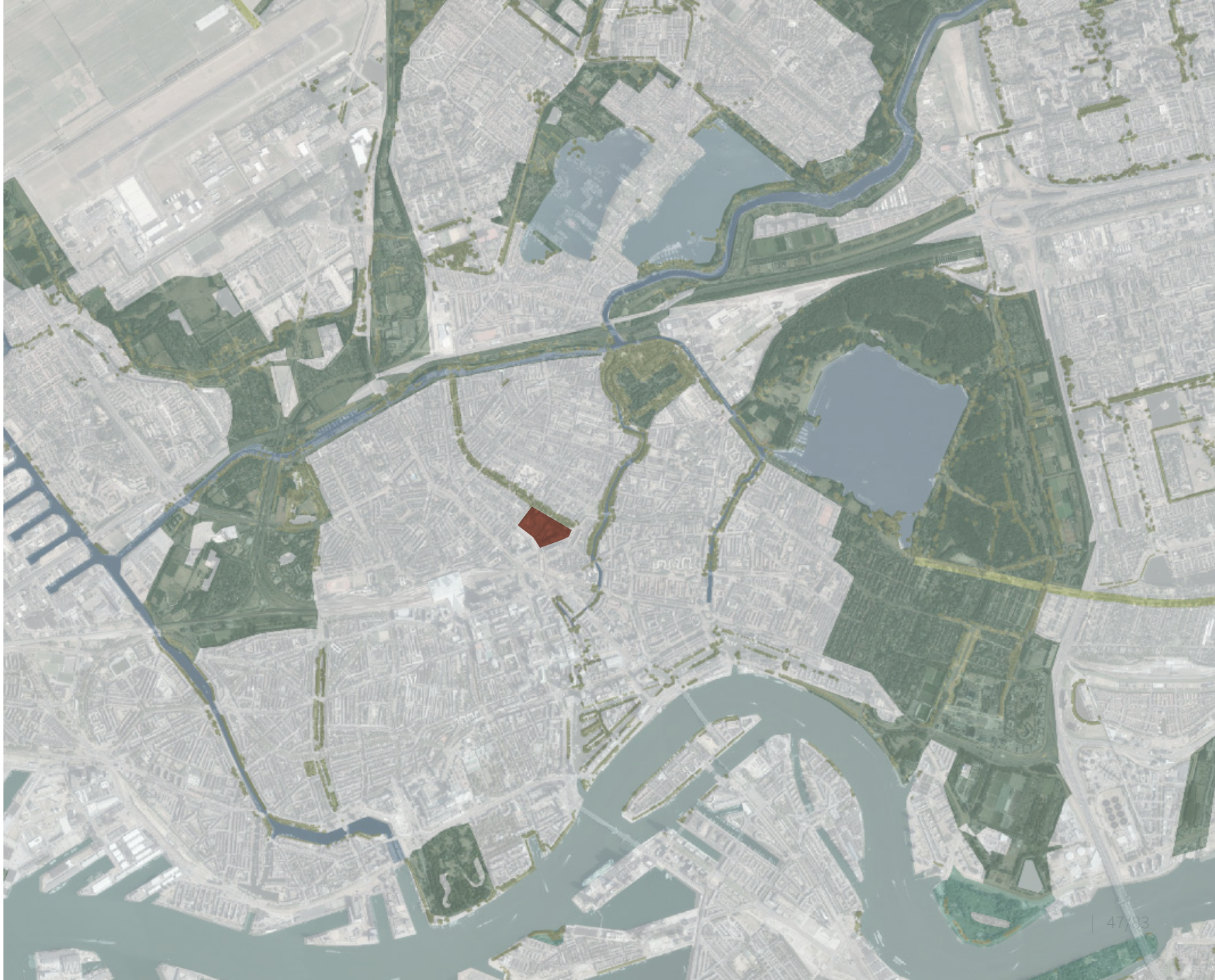
strong, diverse interactions between landscape elements enables conditions for diversity of species

landscape elements with strong connections

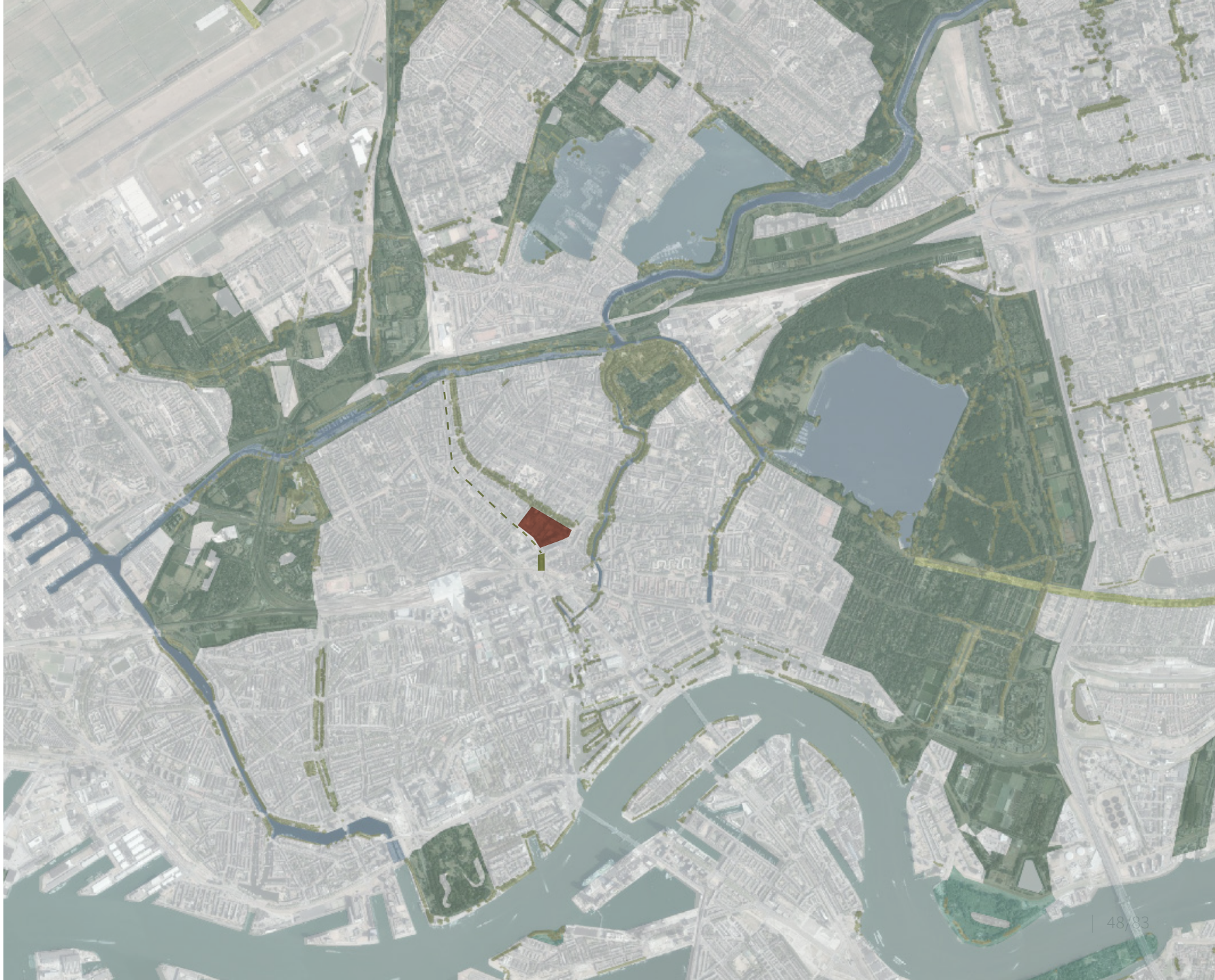


THE URBAN MOSAIC

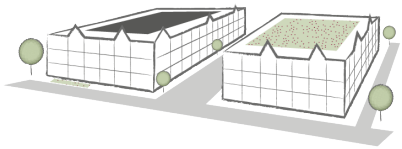
- Current ecological core areas and connections on a city scale



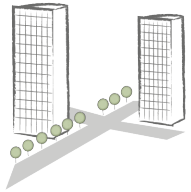
• Future:
former railway viaduct ‘Hofbogen’ transformed into elevated green corridor



Pre-war

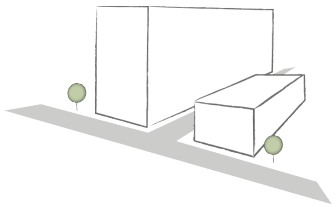


City center



Post-war

Developments of the 70s



• Resulting in:
- limited amount of public green spaces
- green spaces are fragmented and isolated
- limited amount of (lines of) trees

future role of Zomerhofkwartier

INTEGRATE IN DENSIFICATION ASSIGNMENT

Mixed urban area
- Housing: 500-600 houses
- Commercial functions

TARGET SPECIES FOR DESIGN

Common pipistrelle

Common swift

House sparrow

Wild bee

Butterfly

Hedgehog

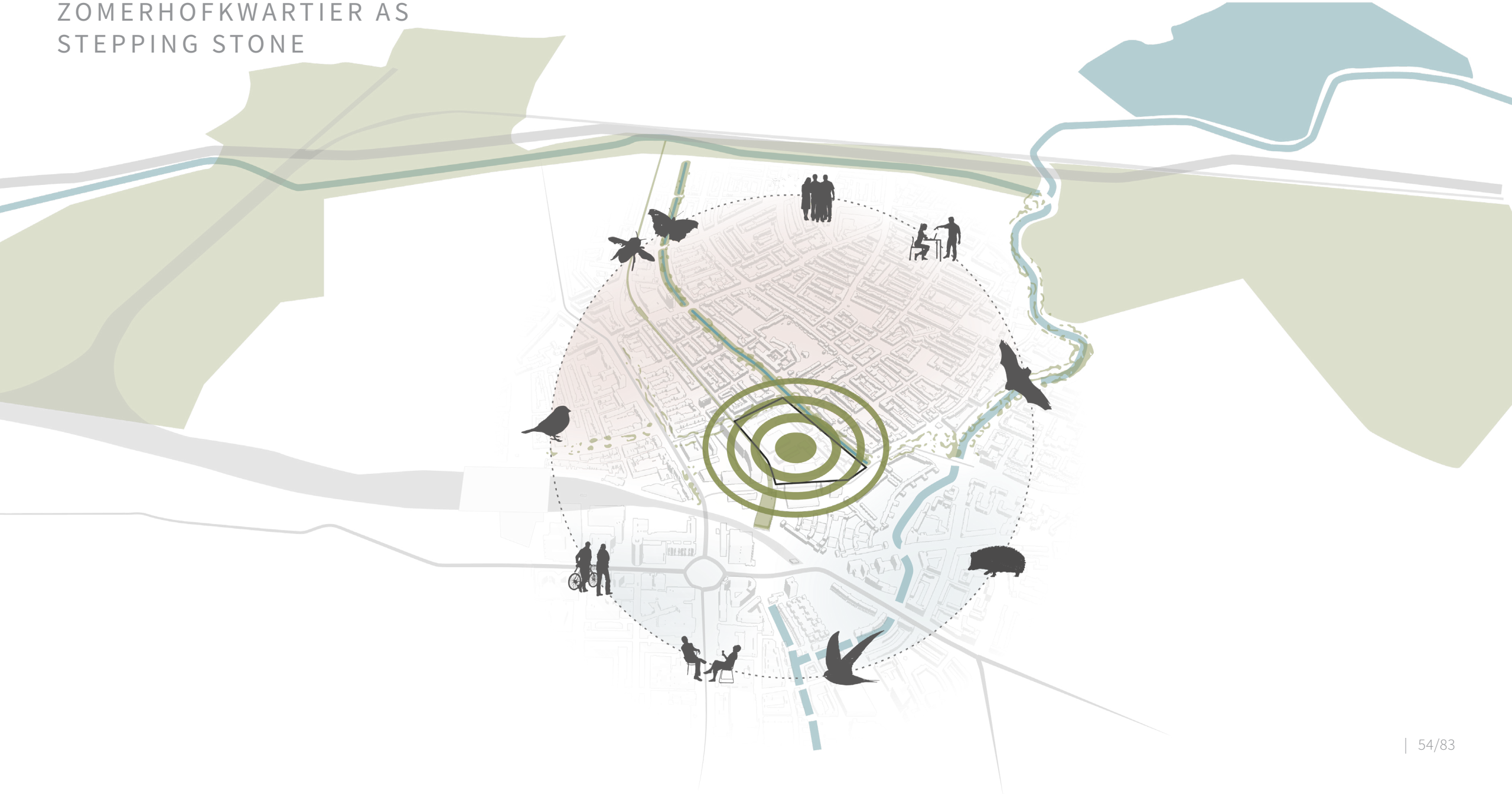
Residents

Employees

Visitors

Commuters

ZOMERHOFKWARTIER AS STEPPING STONE



principles to strengthen biodiversity

principles can be applied to (the configuration of) landscape elements

formulated using ecological theory and exemplary works about nature-inclusive design
(Vink, Vollaard & de Zwarte, 2017; Weisser & Hauck, 2017; van Stiphout, 2019)

use

(3d) connectivity

porosity

microclimate

time

use

integrating conditions for animals and humans
in landscape elements

(3D) connectivity

providing connectivity between the conditions
for survival, horizontally and vertically

porosity

providing open spaces between and in landscape elements:
- movement for animals
- nesting for animals
- a grow site for plants

microclimate

configuration and orientation of landscape elements which can create optimal microclimates

time

consideration of:
- life cycle of species
- day and night
- seasons

spatial interventions Zomerhofkwartier

FOCUS AREA OF DEVELOPMENT

• Taking into account monuments

• 3d model to study possible configuration of landscape elements:
- fit the future program
- promote mutualist habitats

3D DENSIFICATION STUDY

• Combined building volumes: closed building blocks with height accents through residential towers

• Commercial functions found in the plinths along streets

• The buildings volumes decrease in scale and size towards the Noordsingel

3D DENSIFICATION STUDY

• Provides open space for vegetation on ground level in a street and in a courtyard

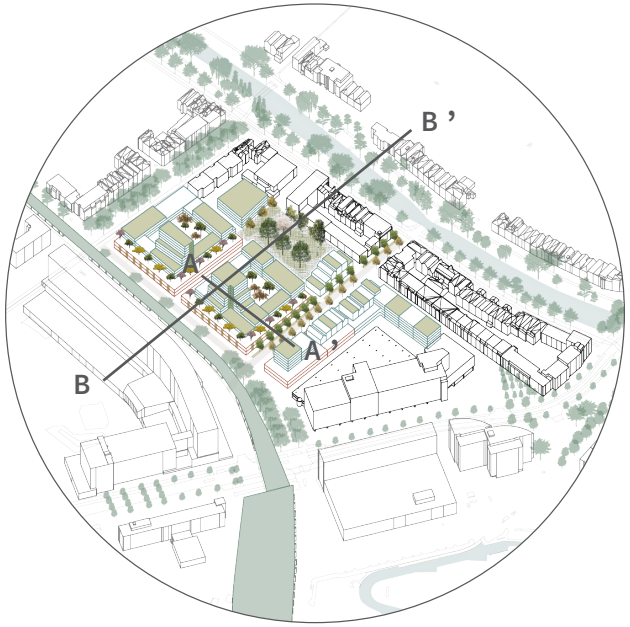
3D DENSIFICATION STUDY

• Buildings integrated into the ecological network by:

- vegetation at different heights and in different directions (roofs and facades)

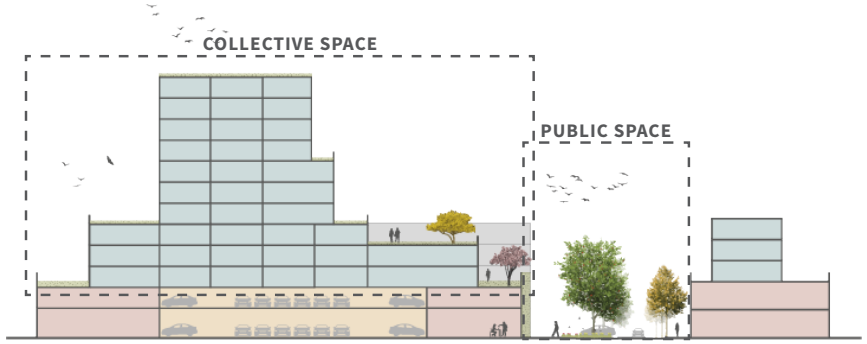
- integrated nesting opportunities

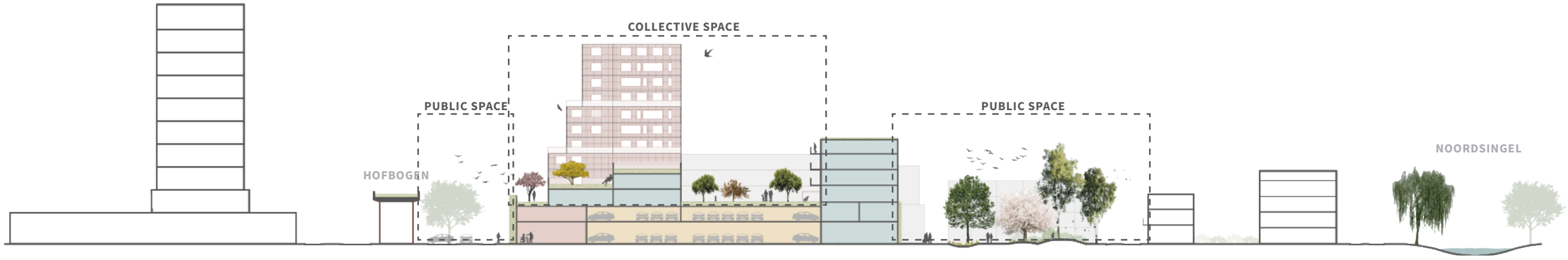
PUBLIC AND COLLECTIVE SPACES



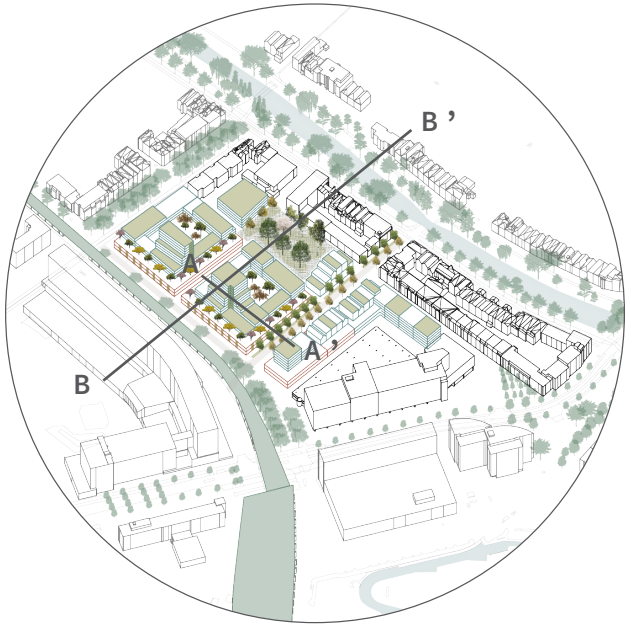
SECTION BB’

SECTION AA’





4 MUTUALIST HABITATS



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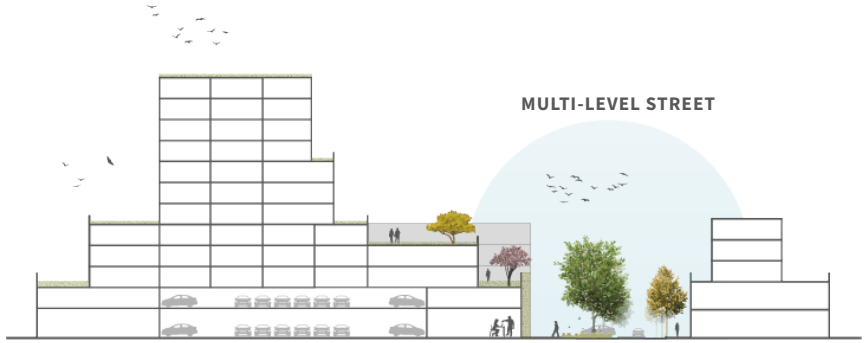
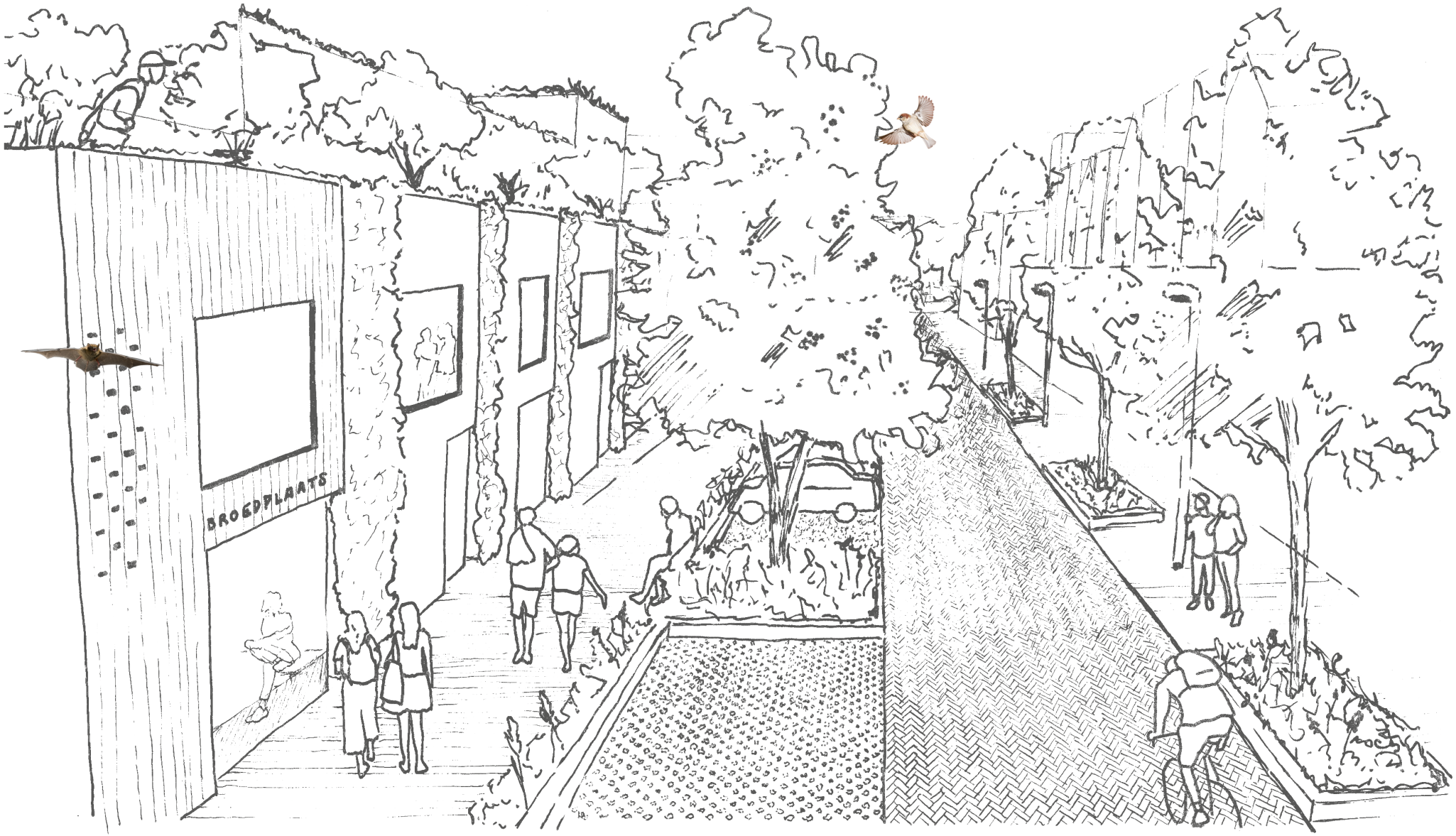
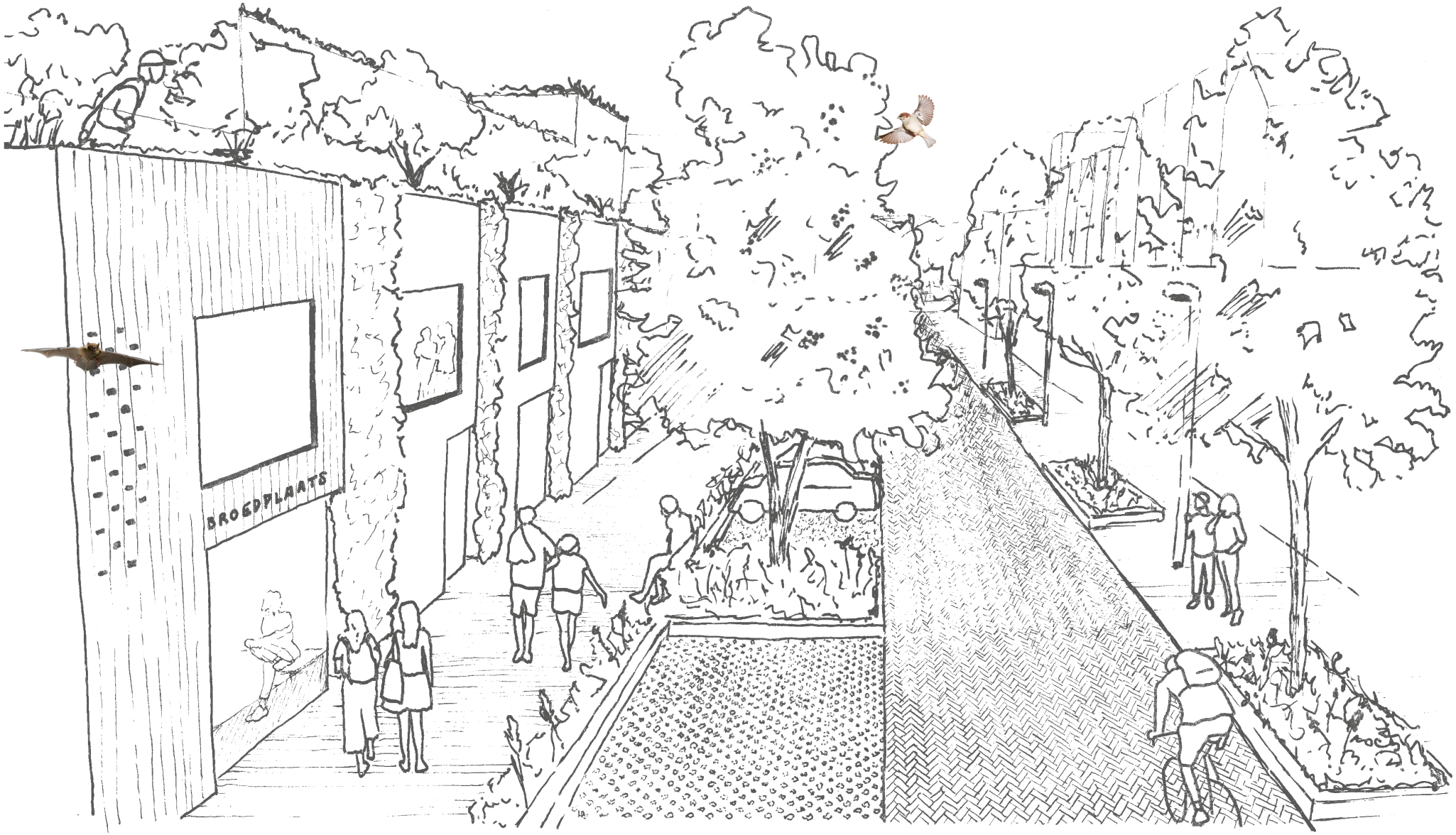
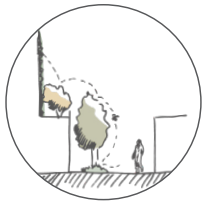


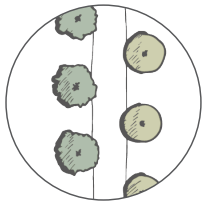
MULTI-LEVEL STREET

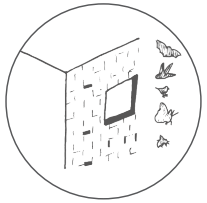


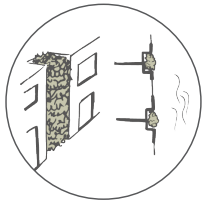
MULTI-LEVEL STREET: INTERVENTIONS





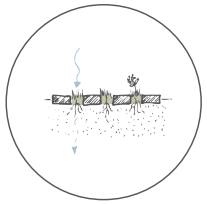


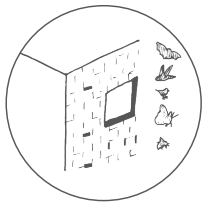




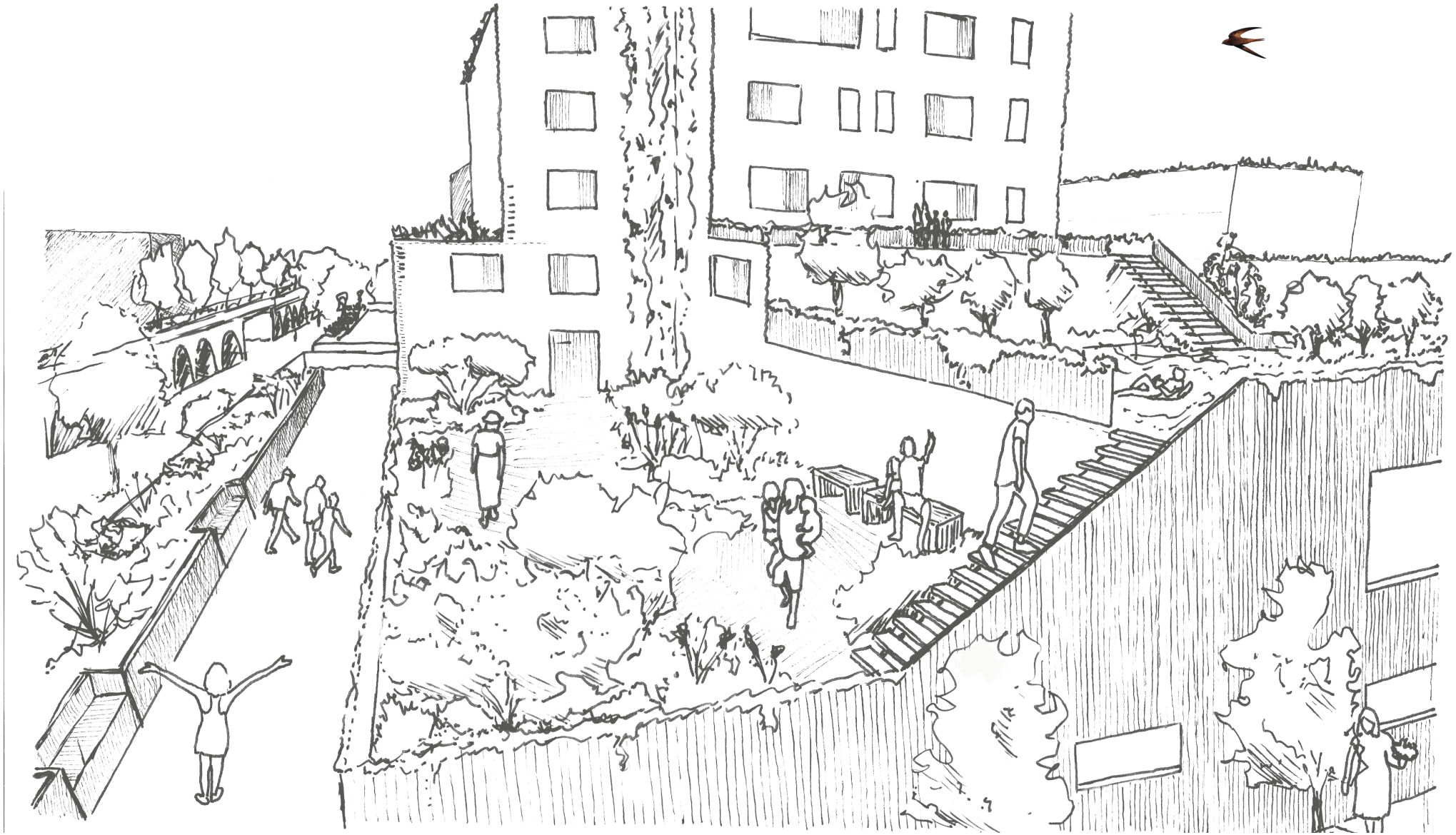
PUBLIC COURTYARD

PUBLIC COURTYARD: INTERVENTIONS

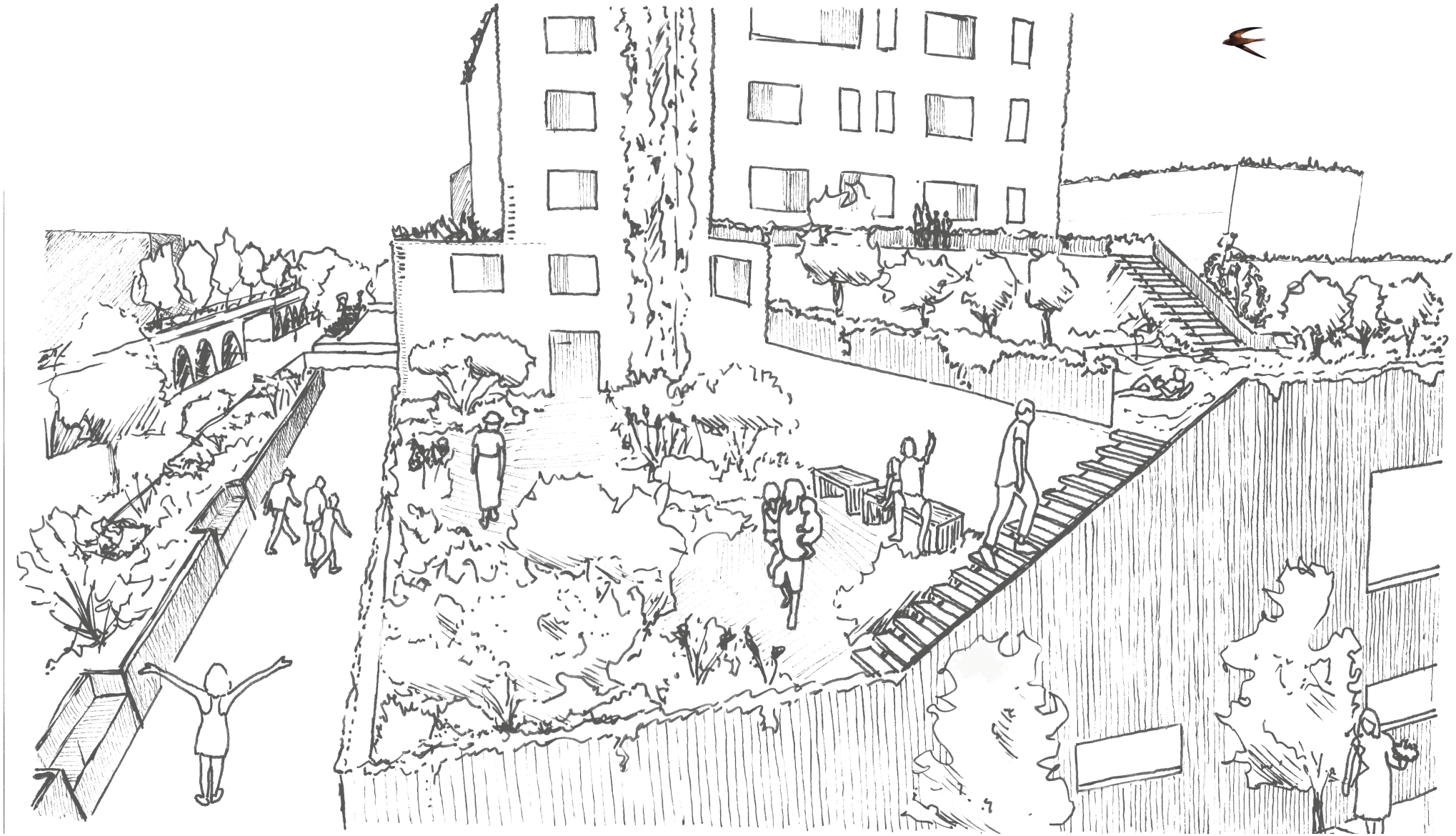


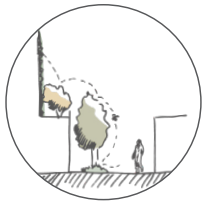


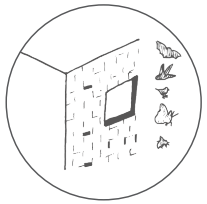
COLLECTIVE ROOFTOP NETWORK



COLLECTIVE ROOFTOP NETWORK: INTERVENTIONS



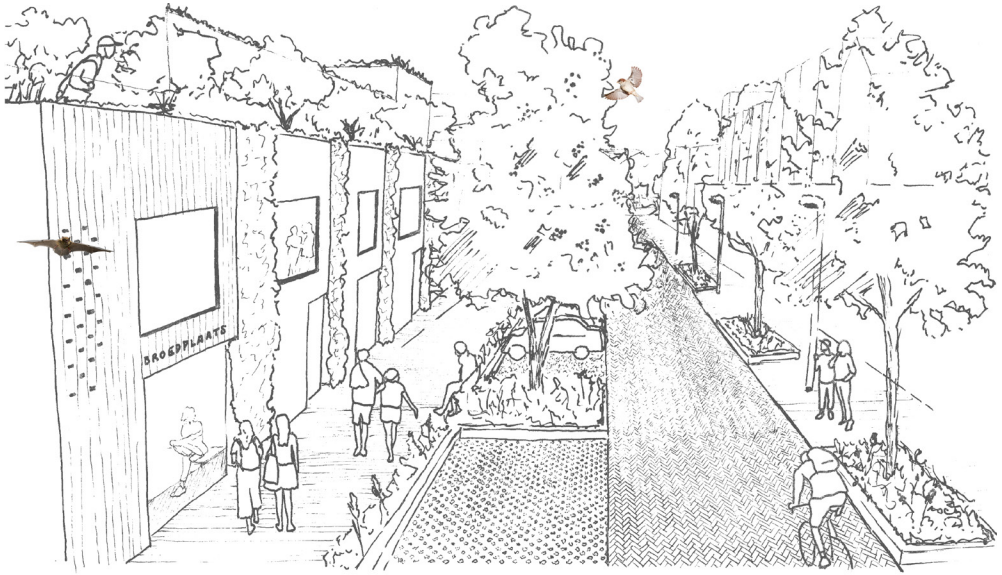


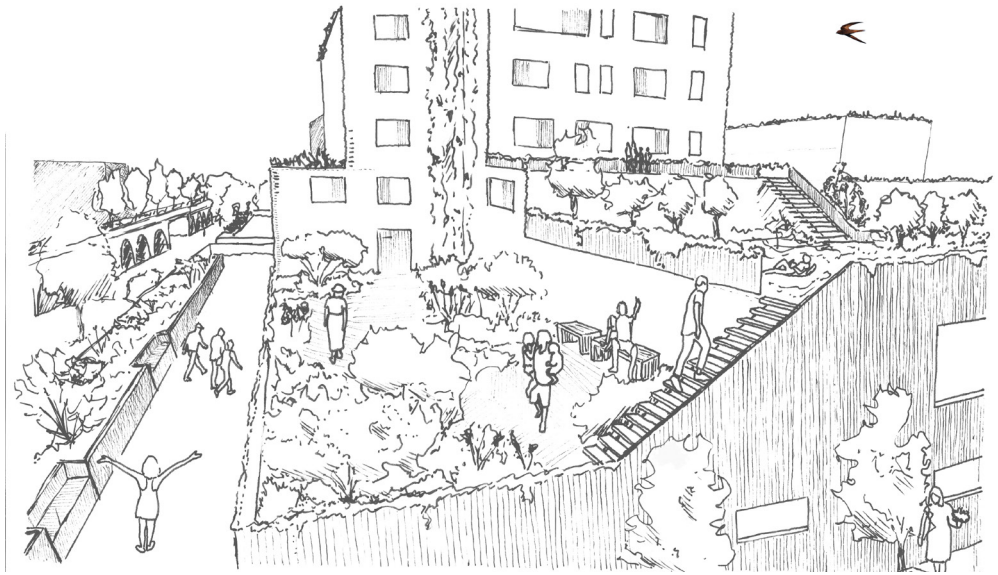


COLLECTIVE GARDEN

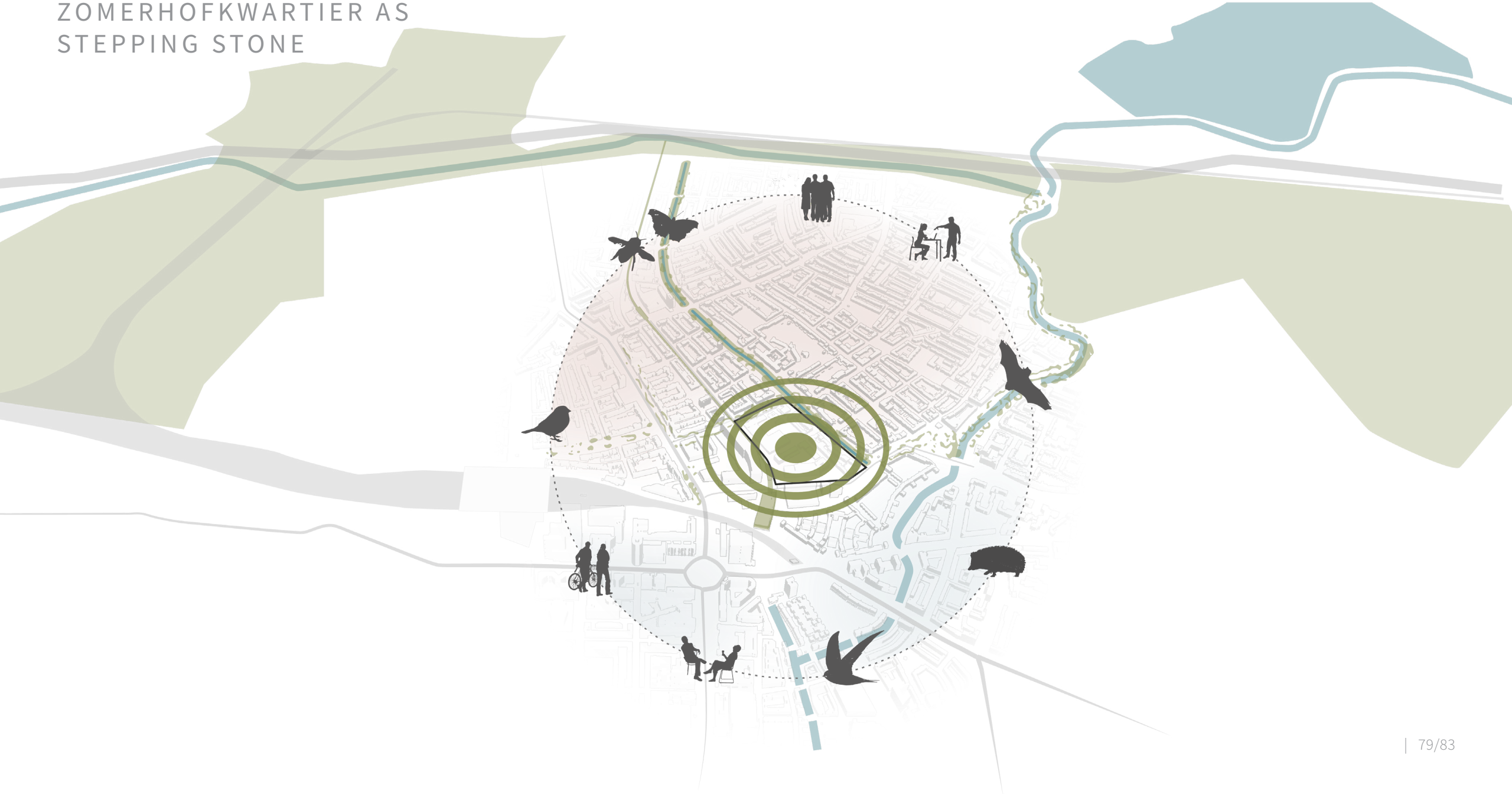
COLLECTIVE GARDEN: INTERVENTIONS

MUTUALIST HABITATS: WHERE PEOPLE AND NATURE THRIVE





ZOMERHOFKWARTIER AS STEPPING STONE



How can the urbanist provide conditions for strengthening biodiversity in urban development?

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by being a mutualist urbanist:

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by being a mutualist urbanist:

a responsible ecosystem engineer that

modifies, maintains and creates the habitats where people and nature thrive

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by

- **acknowledging the presence of other species and learning about their requirements**
- **understanding of the urban mosaic**
- **applying design principles to strengthen biodiversity**


MUTUALIST URBANISM