

BIOOTOPOGRAPHY

CO-EXISTING WITH URBAN BIOTOPES

BIOTOPOGRAPHY
- co-existing with urban biotopes



CHALMERS
UNIVERSITY OF TECHNOLOGY

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Point of departure

The amount of species disappearing from the earth is rapidly increasing. The consequences of this loss is still unknown, but is quite certain that it is affecting the eco-systems in a negative way. WWF estimates that at least 10 000 species are being extinct every year.¹

Even if the loss of biodiversity and species in Sweden has not been as extensive as in some other places, more than 100 species has disappeared from the Swedish landscapes over the past 200 years. In the year of 2002, 700 species were at risk.² The process of urbanization and population growth has affected and accelerated the depletion causing isolation of biotopes and subpopulations, and increasing the risk of eradication. We have tended to look at ecosystems and urban systems as if they were separate, but the understanding of how human activity decrease the health of ecosystems has created a will to integrate and actively regenerate the environment. The conflict between depleting biodiversity and the need for densification in city centres has been addressed by the development of strategies such as large scale green plans and point operations dealing with one specific species.

In my thesis I explore the possibility to complement these strategies by seeing new buildings as a supportive landscape for increasing biodiversity rather than being obstacles. By considering the metabolic systems and the interconnections between different species and habitats I am exploring a more complex system of spaces for different types of inhabitants.

The proposal

The existing biotopes of Gothenburg are like islands in the outskirts of the city centre. My proposal for a housing project, strategically placed in a central site between two important biotopes, Burgårdsparken and Mölndalsån, could be a start of a new way of living in a more resilient and diverse city. Departing from the conditions of housing, landscape and biotopes, I have developed a system that is tested in a proposal for this specific site. By looking at the different elements that constitutes a building in another light and give the design multiple uses through identifying habitat criteria of different species the borders between the lives of the inhabitants are blurred. By merging the landscape, the surrounding urban conditions, the existing biotopes, the new habitats and the building, they can begin to function in symbiosis, and reveal that the cityscape is in fact a part of the natural landscape.

What is a biotope?

“A biotope is an area of uniform environmental conditions providing a living place for a specific assemblage of plants and animals. Biotope is almost synonymous with the term habitat, which is more commonly used in English-speaking countries. However, in some countries these two terms are distinguished: the subject of a habitat is a species or a population, the subject of a biotope is a biological community.”³

Why is this important?

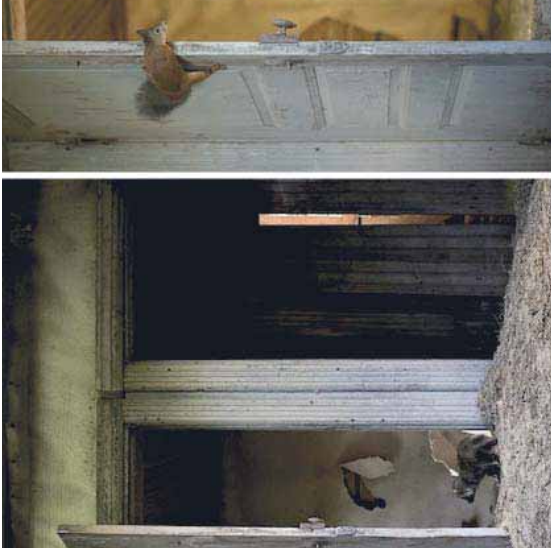
According to Joyce Hwang, architect and Associate Professor of Architecture at University at Buffalo, SUNY, the view of urban biotopes and other species in urban environments is going to change due to necessity and through the rapid depletion of species everywhere.

“...processes of urbanization have been rapidly depleting cities of biodiversity//we also see very conflicted attitudes towards our relationship with urban 'nature'://Habitat loss will transform our perception of urban wildlife from being nuisance to being a highly valued resource.”⁴

Even though mans destructive forces has roamed throughout the entire planet, nature has shown a surprising amount of resilience and adaptation. In places like Detroit or Tjernobył, where economical and nuclear disasters has depopulated entire cities or areas, nature takes over fast and adapts fast to the new conditions.



Abandoned house⁰¹



Abandoned house in Finland⁰²



Abandoned house in Finland⁰²



Abandoned house Tjernoby⁰³



Abandoned house Detroit⁰⁴



Abandoned house in Finland⁰²

What is biodiversity?

Biodiversity is not easily defined since it is not only about preserving red listed and endangered species, which the focus has been up to recently. Since the systems are interdependent, the common species are also valuable. By monitoring common species and noting fluctuations in their populations, they can be seen as an indicator for the status of the environment. When common species starts to disappear, it could indicate environmental problems. An example could be the House Sparrow (*Passer domesticus*) which has been declining in cities though Europe and Asia for unknown reasons. By investigating why these things happen, the cause could pose to be an issue for other species like endangered species as well.

Why biodiversity?

Declined ecosystems are still valuable, and provide eco-services, although in smaller numbers than pristine ones. Yet another reason to strengthen and increase biodiversity. These services include carbon storage, cleaning air and water, pollination and pest control.

Industrialization of the river and changes in agriculture

Göta Älv has been radically altered since the beginning of the last century mainly because of industrialization along the edges. The agriculture has diminished in the former outskirts and new housing areas have spread around the centre.

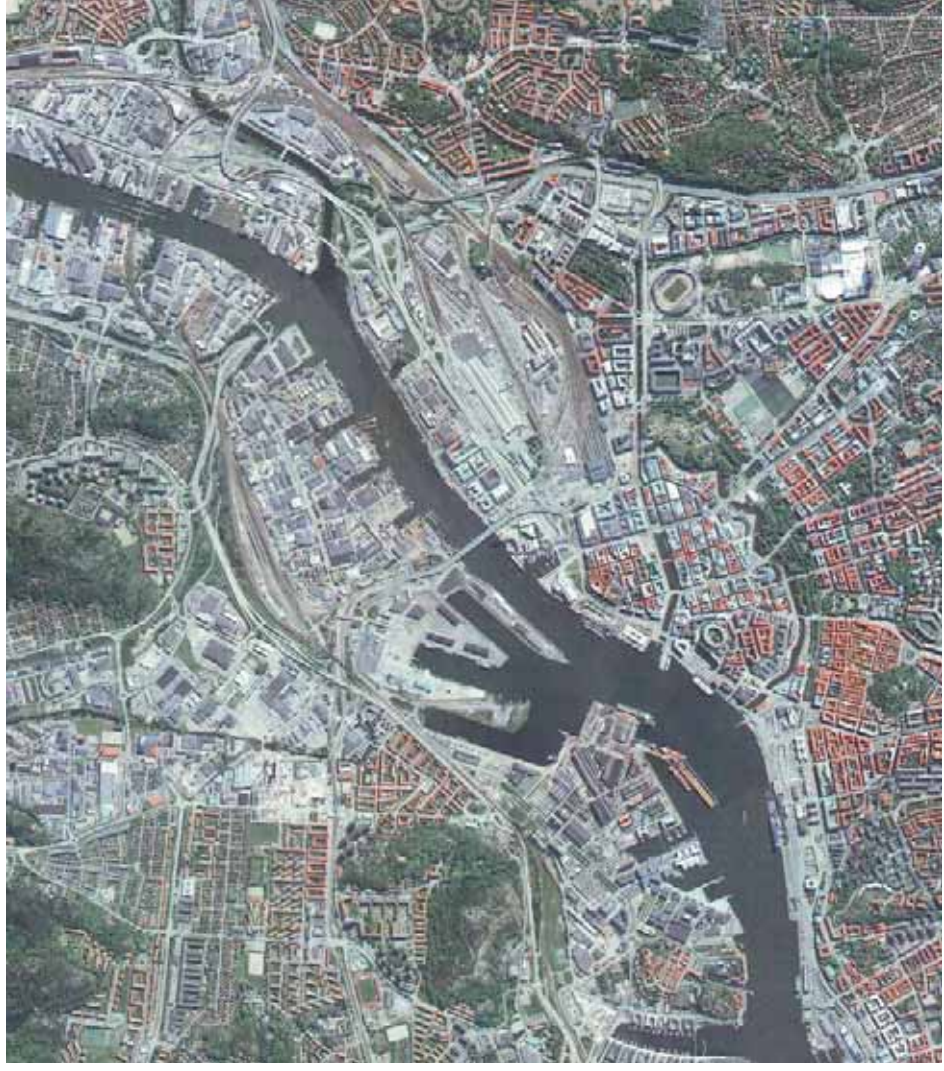
The small scale agriculture was an important part of the biodiversity 100 years ago.

Since then the agriculture has become monocultural, uses pesticides and conducted on a large scale, which has the opposite effect. Industry areas surrounded the river and the creeks has also been a major factor in the pollution and diminishing of the water biotopes.

Extensive forestry is also a reason for the lack of old and thick trees in the surrounding large forests.

Gothenburg is also affected by the urbanization that is still going on in Sweden, where rural areas are depleting and cities are growing. Gothenburg has grown during the last decades from 432 035 inhabitants in 1991 to 529 343 in June 2013.⁵

s up to recently



2013⁰⁵

recognizable, like the rat or the pigeon. Gothenburg has still not conducted an inventory of the urban biotopes, only a survey mapping out old and thick trees (which actually only exists in the city centre). The urban biotope and the uncontrolled natural processes in the urban environment could be recognized and seen as a part of the city systems. Recognition of humans as a part of the ecosystems, since we are the one species that has the most influence on eco-systems, has emerged during the last decades. But still very little is done, the continuation in loss of species and depleting biotopes is still imminent. We still live much like "business as usual", even though the discussion has been present for a long time now. We still to a certain extent consider biotopes and its inhabitants as separate from ourselves, and that nature is there for our amusement, and separated in parks and forests.

Departing from the notion that biodiversity is depleting and that our attitudes towards "nature" are in need of change, a new way of planning and a different perspective in building could emerge. The building could not only become a part of the urban fabric, but also the biological fabric. This would not be the only answer, a radical change in forestry and agriculture could also play a major part in this, but since cities has been the inspiration for how we live our lives, the change could start in the urban environment.

There are some strategies that are quite recently developed towards dealing with biodiversity in the city. The main ideas focuses on the park areas and green areas in the city along with additions such as green roofs and sometimes green walls. Some small projects has focused on one particular species and creating dwellings for that species. But there are also ideas about how to create whole buildings devoted to biodiversity and merging species habitats with human programs and uses. In Brazil dealing with nature has by necessity differed from Europe, since the growth is a lot faster due to the tropical climate. Architects like Affonso Eduardo Reidy(1909- 1964) used the landscape and flora as inspiration and influence for the design of the buildings.

Loss of biodiversity

Despite knowing about biodiversity's importance for a long time, human activity has been causing massive extinctions. As the Environment New Service, reported back in August 1999: "the current extinction rate is now approaching 1,000 times the background rate and may climb to 10,000 times the background rate during the next century, if present trends continue [resulting in] a loss that would easily equal those of past extinctions."

A major report, the Millennium Ecosystem Assessment, released in March 2005 highlighted a substantial and largely irreversible loss in the diversity of life on Earth, with some 10-30% of the mammal, bird and amphibian species threatened with extinction, due to human actions. The World Wide Fund for Nature (WWF) added that Earth is unable to keep up in the struggle to regenerate from the demands we place on it.⁶ The loss of biodiversity and species in Sweden has not been as extensive as in some other countries. Still over a 100 species has disappeared over the past 200 years in our forests. The reason for this could be that the process of depleting biodiversity is slow at first, and the forestry has been intensifying just recently due to the industrialization. This causes isolation for biotopes and subpopulations, and the risk becomes higher for eradication. In the year of 2002, 700 species were at risk, and 500 species are extremely endangered.⁷ These numbers show that something needs to change. The forestry and the agriculture is one way of changing this trend, but the cities could also be a part of an answer in increasing biodiversity. Sweden has a more fragile flora and fauna then some of the tropical parts of the world, since we have a smaller amount of species which makes every species important for the whole system.

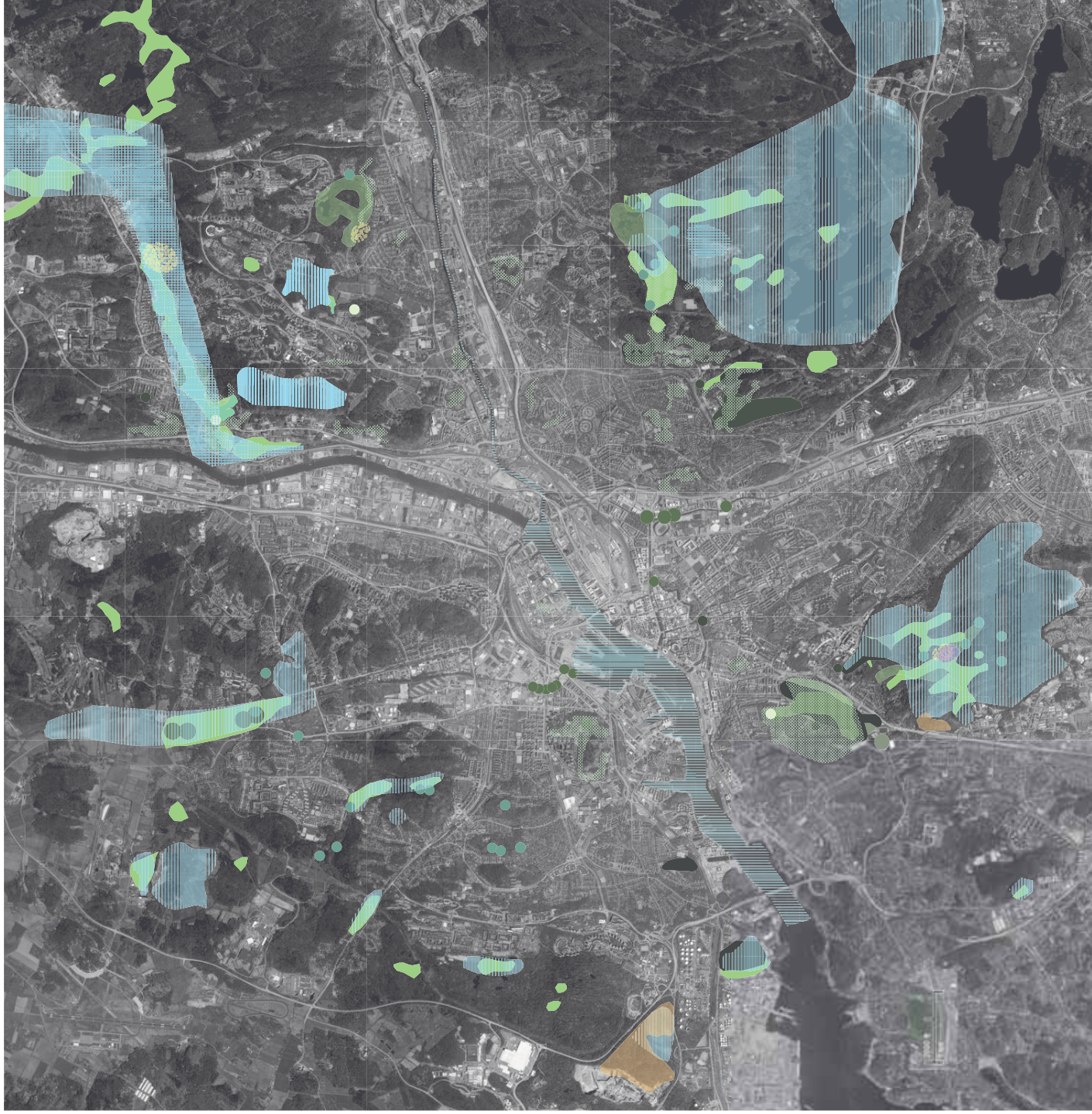
Some cities have already been dealing with these questions. In Malmö a project called Biodiversity has started in 2012. The focus in this project will be to make new buildings a part of the biotopes by having green roofs, green walls and other interventions. Similar thinking is also starting to shape the urban planning of Stockholm. Now the turn has come to Gothenburg to start to consider these questions. The municipality has stated a lot about becoming "a green city", but what does that imply? And how is this going to be realized? As of right now, it is shown very little in the new built structure.

2. CONTEXT AND STRA

Biotopes in Gothenburg

When analyzing the maps and the current state of the biotopes of Gothenburg, it is quite clear that the biotopes are scattered and isolated. Islands of biotopes lies the outskirts of the city and in natural reserves, like Slottskogen (a large park close to the city centre) and Änggården. As stated previously in the text, isolated biotopes are more vulnerable to change and outside influence.

Creating corridors for the species to move and spread could create conditions for a more resilient biodiversity. Habitats does not have to be organically grown trees or bushes, but could also be artificial structure or spaces. Traditionally bird houses have been one of these kinds of spaces provided and built by humans. Artificial habitats and careful choices of plants in parks could provide spaces for different species. Some spaces within this system could become hubs where biodiversity could intensify and spread.



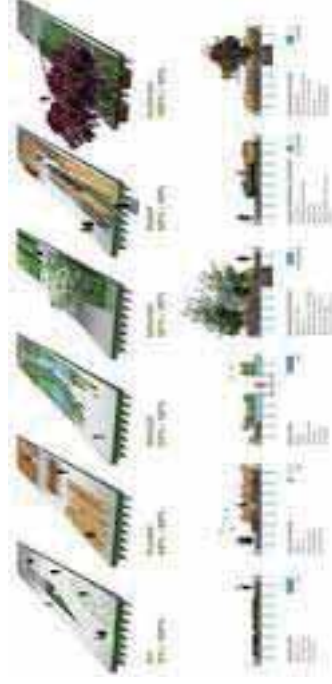
- Birds - nesting areas
- Birds - wintering areas
- Bats
- Newts
- Meadows and pastures
- Dedacious forest
- Swamp forest
- Frogs
- Wood living funghi
- Wetlands
- Smooth snake
- Heathlands
- Water living plants
- Lichens
- Soil fungi



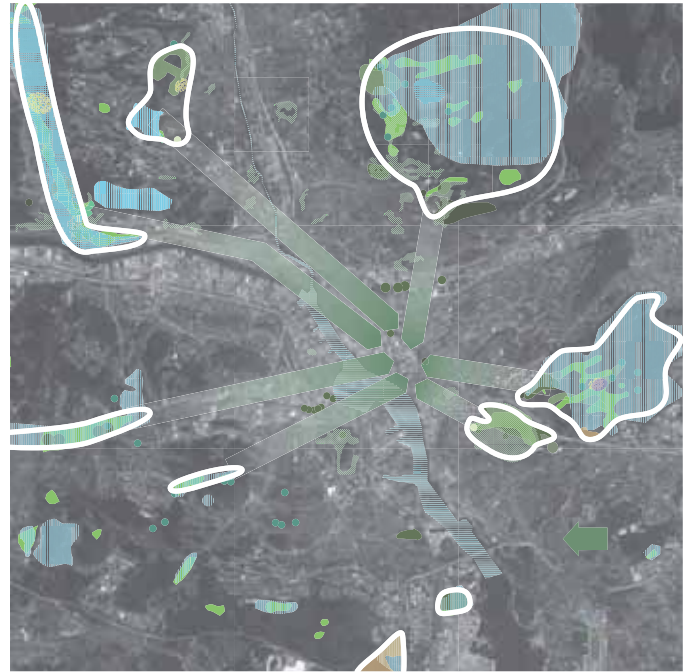
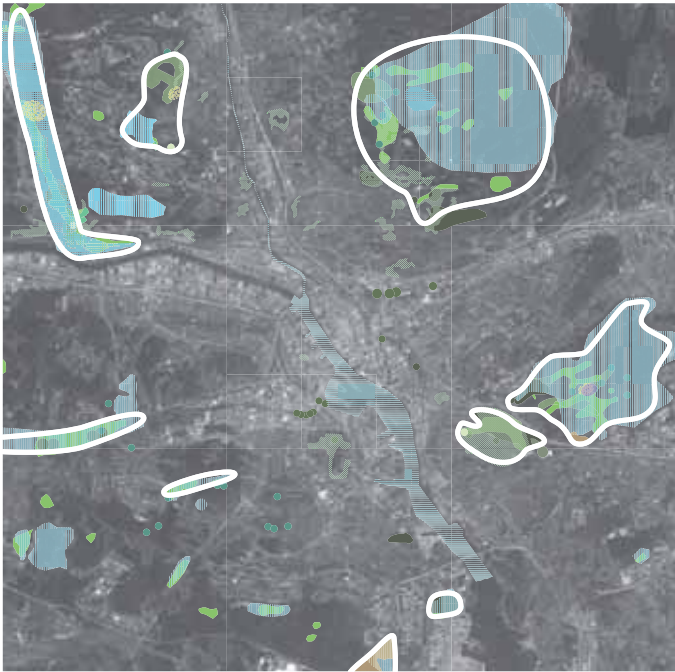
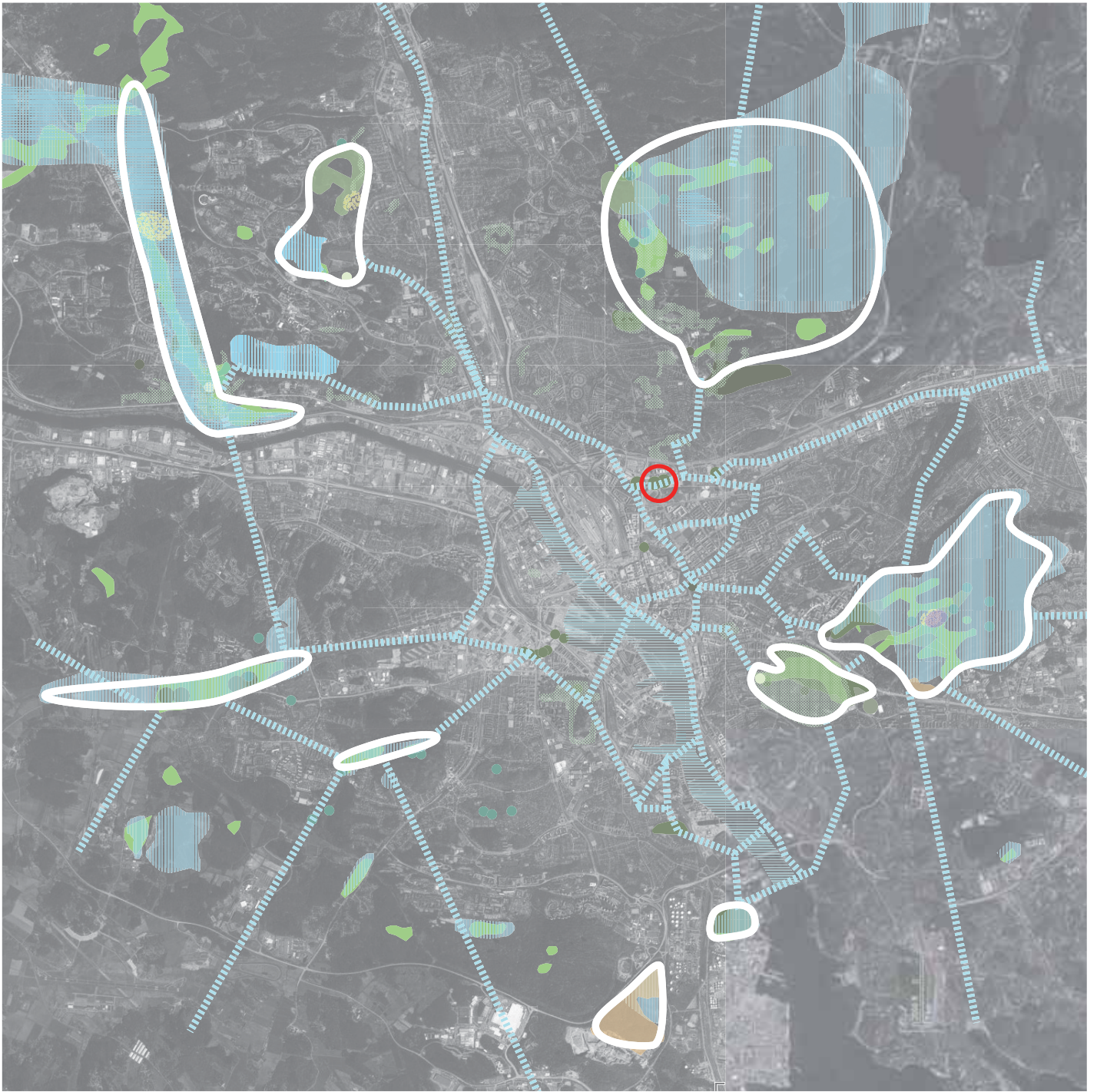
Urban strategy

Is it possible to build corridors in different scales, and by doing so allow the biotopes spread?

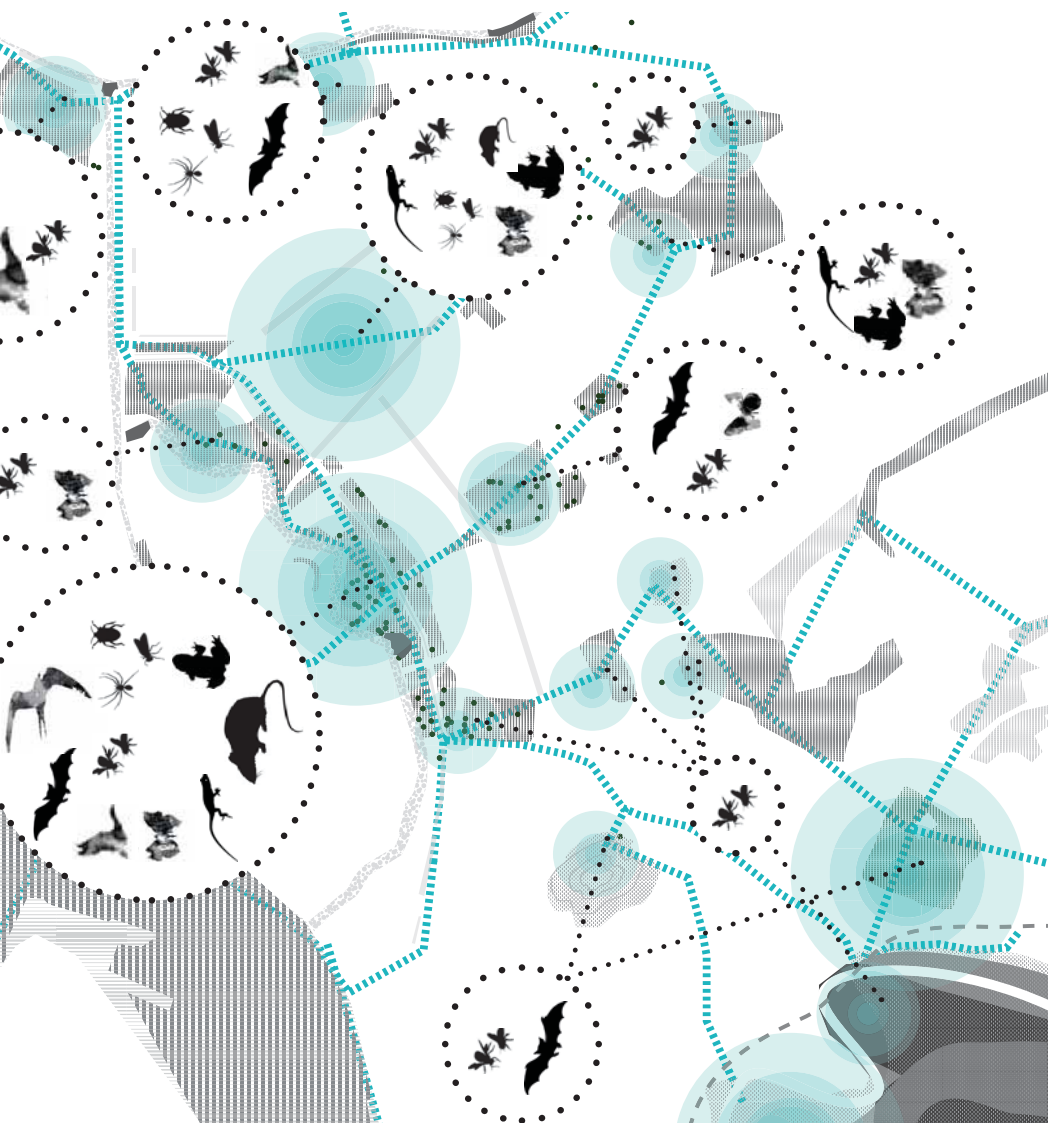
The suggested corridors have possible hubs along the way, and are placed according to existing green areas. The city core can thus be kept dense and urban, while at the same time support the movements of species and plants. An example of old infrastructure converted into a park and walkway is "The Highline" in New York. Green corridors have been proven successful in other places and can be an appropriated part of the urban fabric. This could give parallel infrastructures along with the transportation of humans. The built environment could be part of this new infrastructure, since the scale of the inhabitants is smaller than our own transportation devices.



The Highline in New York⁰¹⁴



The most diverse biotopes and possible corridors



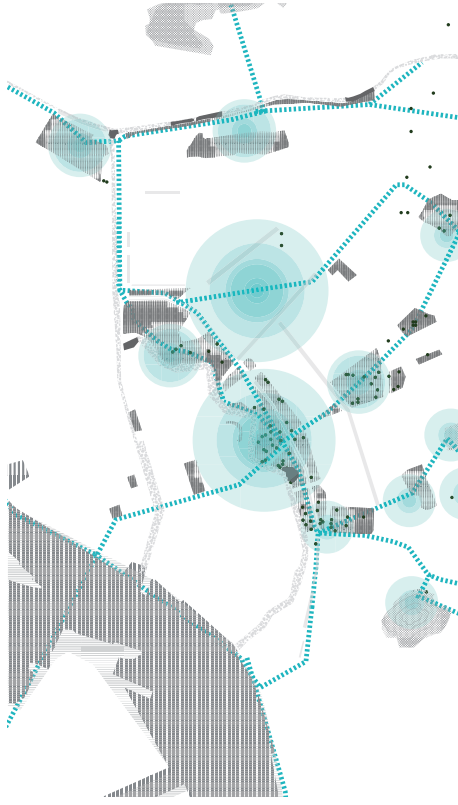
Identifying the corridors/the system

A cohesive system of corridors could be created consisting of different interventions along which could differentiate in scale and size. By doing so the islands of biodiversity could more species to spread throughout the city, other than already established species (like rats). There is also a need to re-evaluate some species that are considered pests, like the bat or provides ecological services by keeping populations of insects down.

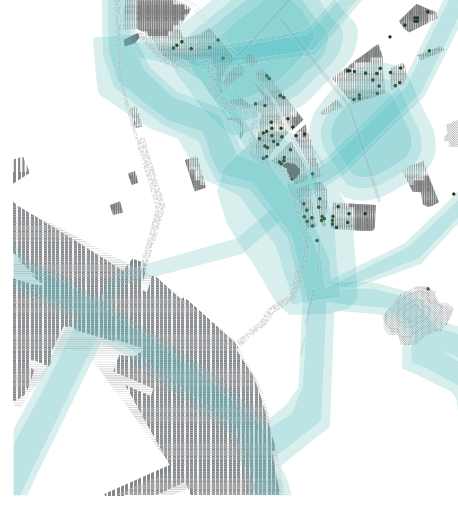
Helping species to spread



Potential spots for interventions



Possible corridors and pathways



ites

tes that has potential and strategic placement within the city centre could be important hubs in the new system.

sites has a strategic placement, both in the urban fabric and along the corridors, along enough potential and spatial conditions for interventions at medium or larger scale. One of the sites is chosen to be the implementation

Paths

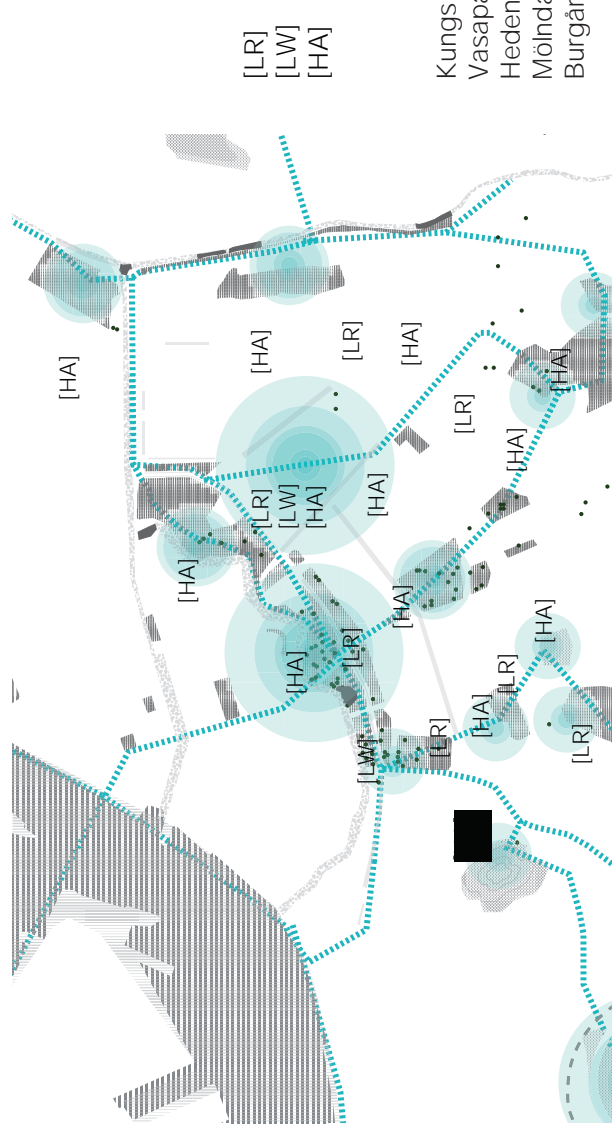
One possibility is to create artificial paths and habitats for a variety of species. Most species does not need a wide path, but something narrow to be able to pass, or habitats in the city center to be able to thrive in the city.

A barrier that still could pose a problem is infrastructure, but it also possess possibilities to become a part of the structure.

One of the solutions in infrastructure has been bridges for animals over highways.

Buildings+Programs

ible corridors and pathways



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[LW]
[HA]

Kungs
Vasap
Heden
Möln
Burgå

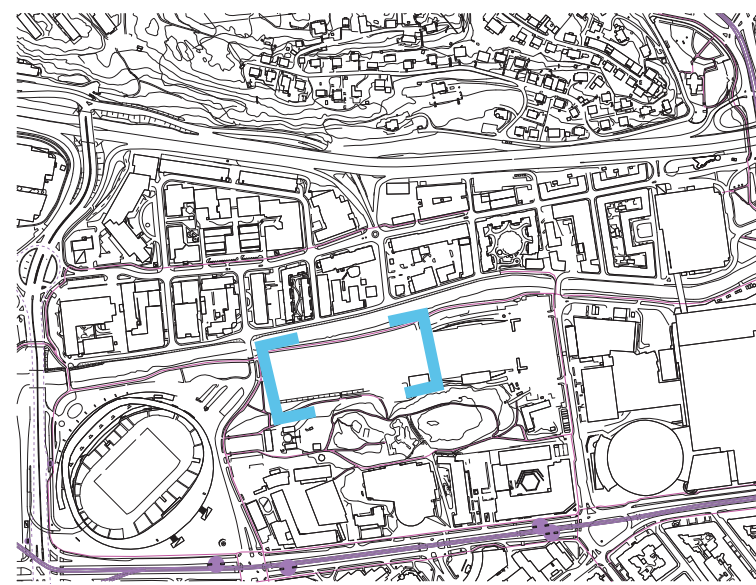
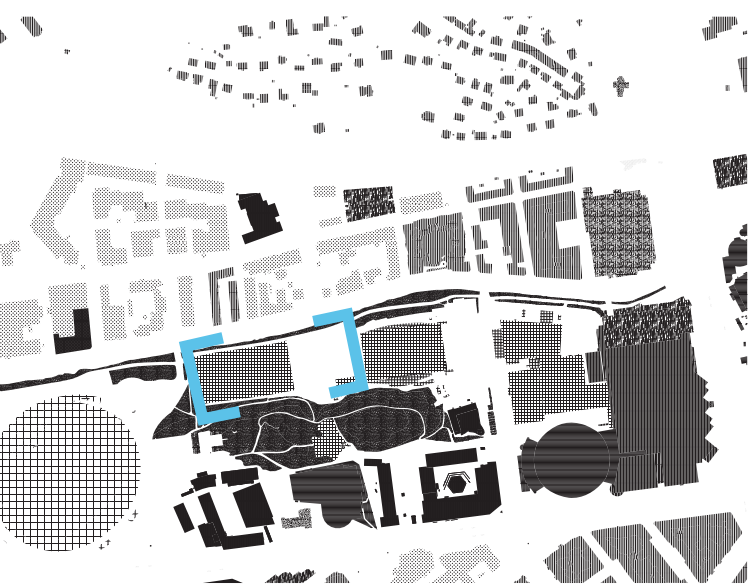
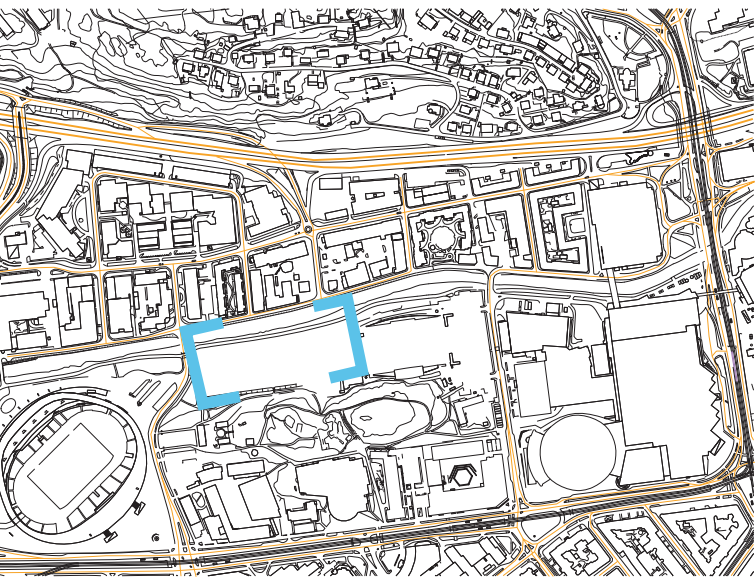
Gothenburg as a monocultural city

Gothenburg is a monocultural city, and one of Swedens most segregated cities. My focus area is placed between two small park areas; Burgårdsparken and Mölndalsån. The street next to Burgårdsparken is called "Eventstråket", and mostly holds large scale arenas and venues, starting with Nya Ullevi and ending with the Museum of World Culture. There has been a lot of discussion about the renewal of some parts of this venue, but the creek is seldom mentioned in this debate.

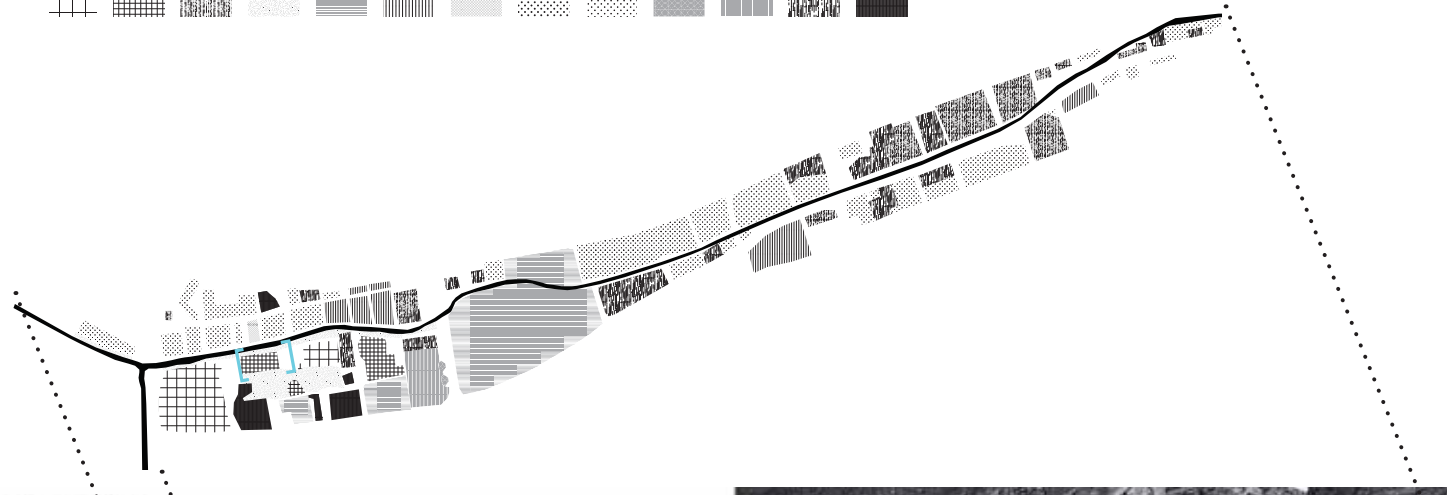
By taking decisions departing from possibilities in biotopes when choosing site and program the outcome could be different then if the choice were made from economical calculations or mono-programmatic view of placement in the city.

Though there is some housing next to Mölndalsån still, a student housing next to the site, in Gårda and in some parts between Gothenburg and Mölndal. The current housing in Gårda is going to be demolished due to its poor condition, but like in similar in other cities, this worn down part hosts a lot of creative people like artists and acitivists, who have been protesting against the plans. This area could also be included as a part of the urban strategy, and share some of the new programs with the intervention site. By doing so the area could be strengthened as an important part of a more sustainable Gothenburg.





- Sports arena
- Sports facility
- Commercial
- Recreational
- Entertainment
- Housing
- Student housing
- Industry
- Office
- Hotel
- Fair venue
- Parking
- School/Pre-school



Housing in Gothenburg

When choosing the program for the site it was important to look at the needs in the city, what type of program could be justified in this particular space? How could the monotony be enriched by new development and what are the needs of the city in terms of development? For a long time there has been a scarcity of housing in Gothenburgs central areas. The housing stock is growing a lot slower than the growth of the city.

Another issue is that the new developments are not corresponding to the needs from people or nature. The apartments in new development has not changed that much over the last decades, since the creation of "The Million Program", but the way we live and how families are constructed has changed since then. Single housing; single parenting; shared parenting; collective living; kombos etc allows new ways of programming space and appropriation of space.

Growing interest in community and "sustainable" housing justifies a new way of building and developing new types of housing. Urban farming is an example of new interest in self-sufficiency and new, productive ways of using urban space, ex. Stadsjord in Gothenburg.

Collaborative/shared housing is on the rise, but the available stock is scarce, which is why my proposal is suggesting an open-ended way of planning housing, where the people involved will be participant in the process of the final design.

Boplats in numbers

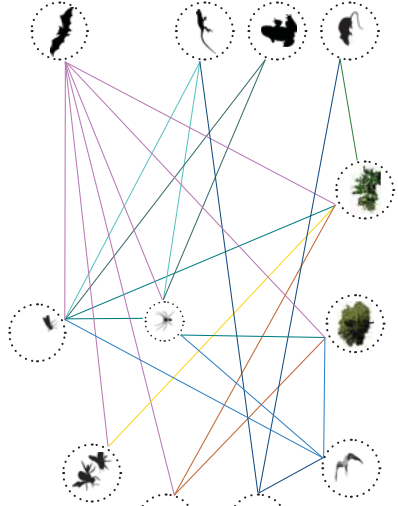
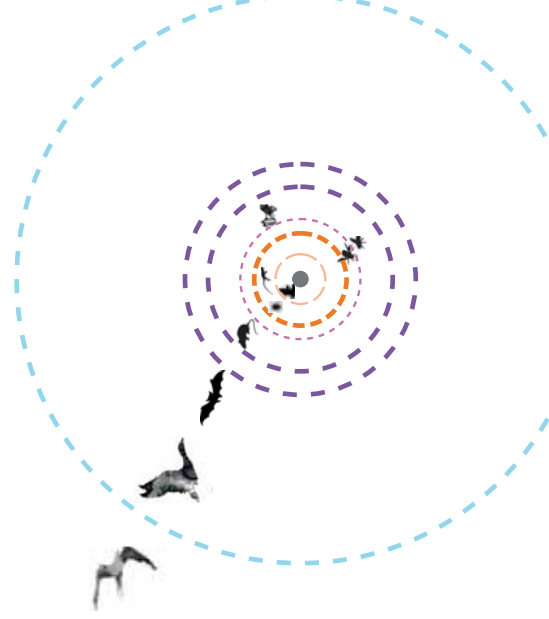
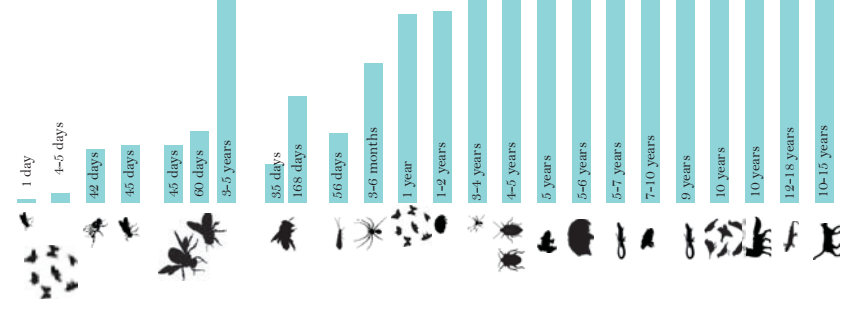
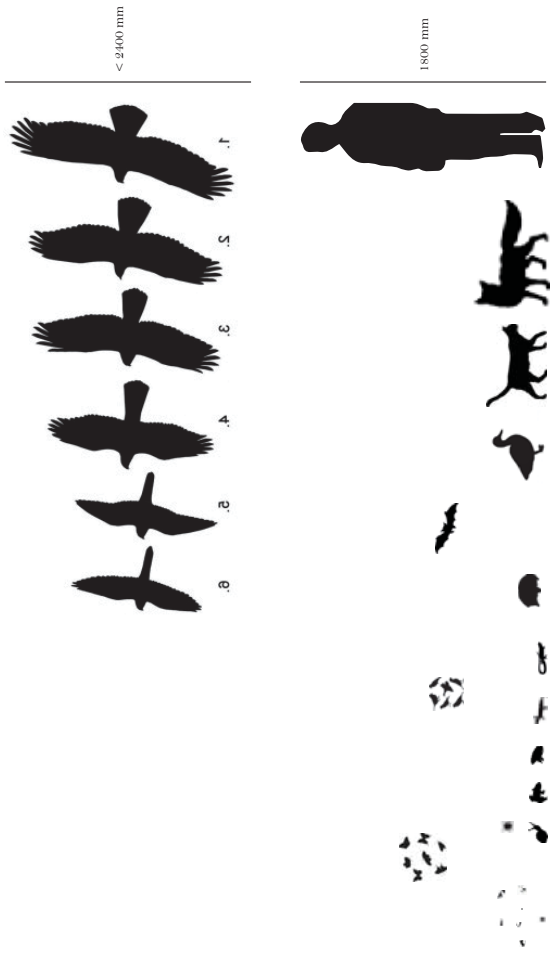
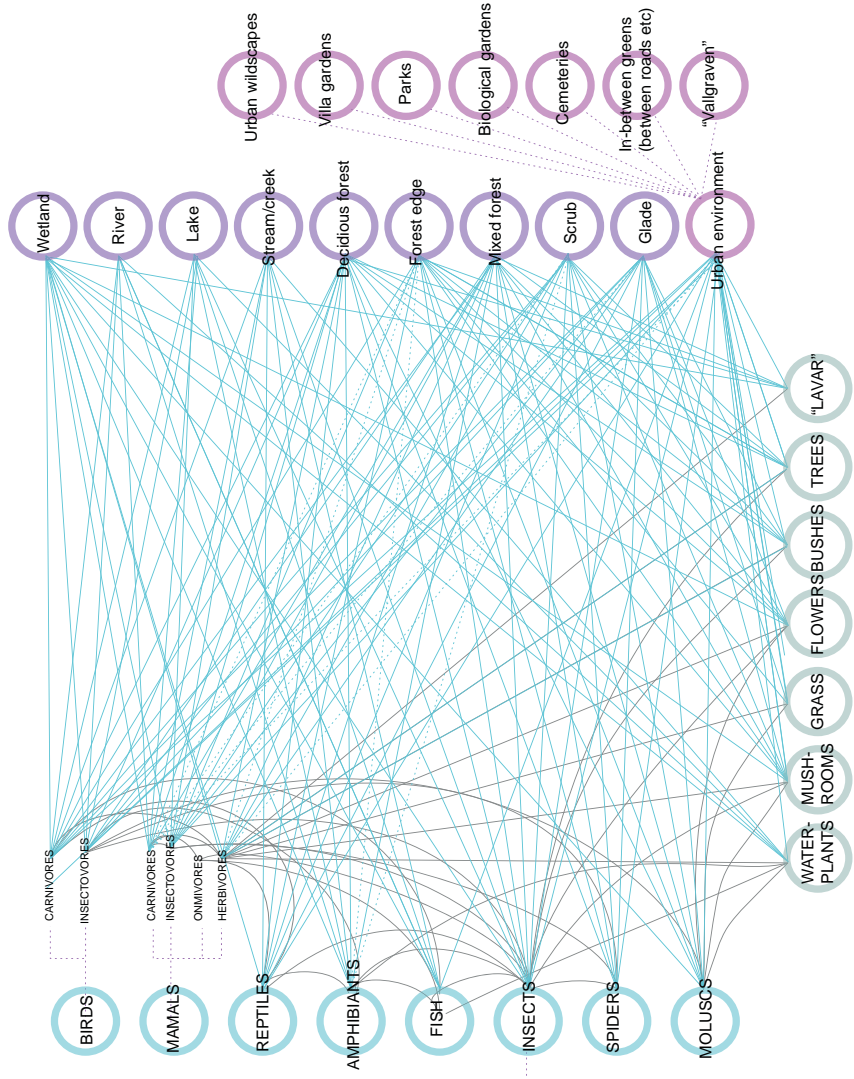
	2010	2011	2012	2013
Advertised apartments	9 200	8 404	7 822	8 855
Number of property owners who advertised	148	136	123	131
The average number of registration days at contract	526	950	787	690
Average number of applicants per flat	715	816	960	829
Total members at end of year	107 798	199 135	148 550	126 361

Statistics from boplats.se⁸

Urbanization from rural areas due to unemployment and cultural centralization to the large cities Stockholm, Gothenburg and Malmö, has caused an extensive population growth in Gothenburg. Gothenburg has grown during the last decades from 432 035 inhabitants in 1991 to 529 343 in June 2013.

Species and biotopes data

Exploring the species typical for the swedish and Gothenburg fauna and biotopes in order to understanding scale, time and relations. This is only a general understanding, the systems are complex and diverse and could not be fully understood during the limited time of this thesis. This investigation was to get a general understanding.



Conclusions from research and strategy formulation

- Observations from research has been that there is an ongoing loss in biodiversity in Sweden. In Gothenburg the biotopes are islands in the outskirts of the city, which creates a lack of biodiversity in the city center.
- Monotone programs around Mölndalsån gives opportunity to differentiate by adding housing and other types of programme. Mölndalsån and Burgårdsparken has opportunity to become important biotopes.
- There is also a need for densification in Gothenburg and new types of housing in the city center.
- Additions as small habitats, green roofs/walls, habitat hubs and cohesive corridors for movement of species could pose as supportive structure for biodiversity.

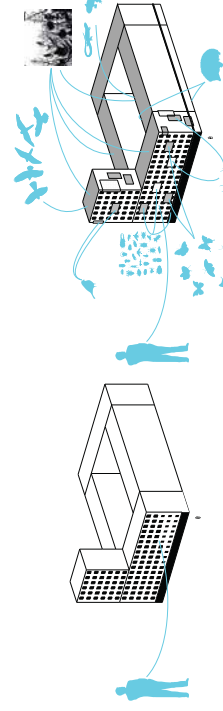
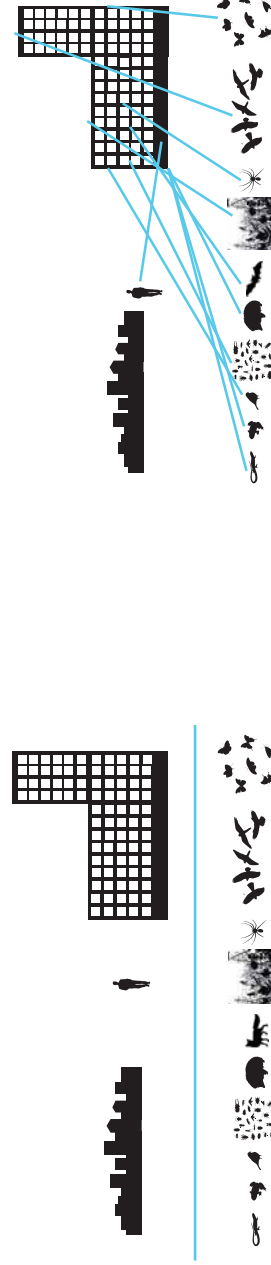
The city is mainly viewed as a composition of different human made systems that are connected, and biological systems as separate systems that does not affect the human made systems.

We are starting to realise that we also play part of the ecosystem and that we need to integrate and be active in regenerating the ecosystems. This is showing in the many green plans of the cities around Sweden. The problem is that these mostly deals with endangered species and does not explain exactly how to deal with the dense city and built structure.

The city, the buildings and the people inhabiting the spaces are seen as separate from nature. Nature is seen as messy and not welcome in the city other then in controlled setting like parks. The city and its building now creates barriers for biotopes and does not allow them to spread or thrive in the city. This makes the biotopes fragile.

If the buildings themselves could become a supporting system for biotopes and animals, the biodiversity could be allowed to spread and be more resilient in the climate changes that are occurring.

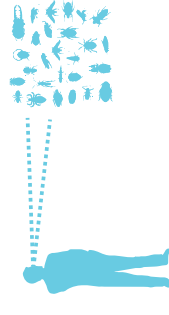
Textures and small habitats for different species, along with biotope thinking in planning gardens could make housing not only a place for people, but for other species as well. This would make the built structure and the city more inclusive for both humans and other species.



3 main conditions dictated and form the design. It was also a tool for comparing the design along the way. By setting these goals it was possible to compare and have direction in the process of the design. These goals were formulated to set the goals for the design.

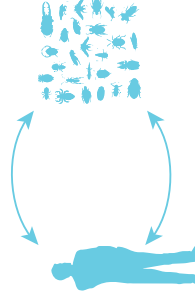
INTERACTION

tion should make it possible for interaction. It should make some of the issues visible and also the inhabitants of



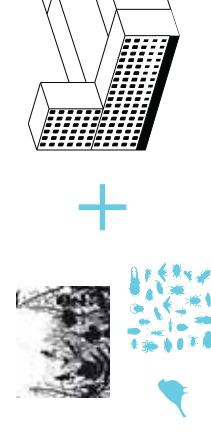
MUTUAL SUPPORT

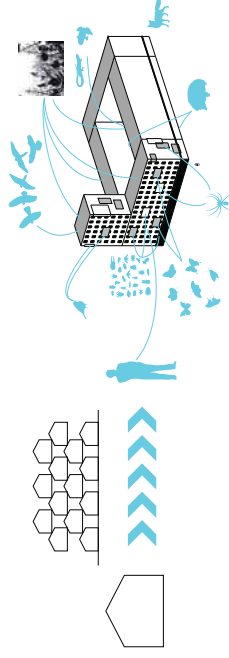
Some of the eco-services could be provided, to make these visible and draw attention to their importance. This could be manifested through combination of human programs with eco-system programs.



BIOTOPES AS A TOOL FOR DESIGN

The design could take its departure from and incorporate the inhabitants and their design of the buildings. By giving nature opportunities to develop resilient biotopes could emerge together with the built structure.





Programs

How to incorporate the biological into the artificial is partly through programming.

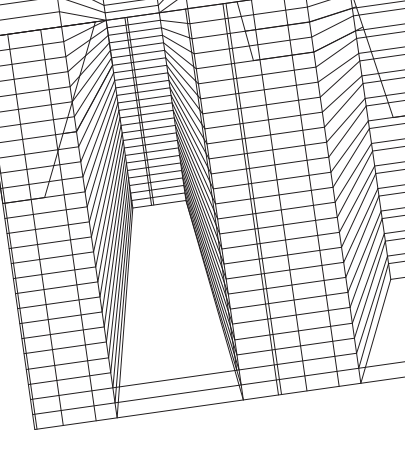
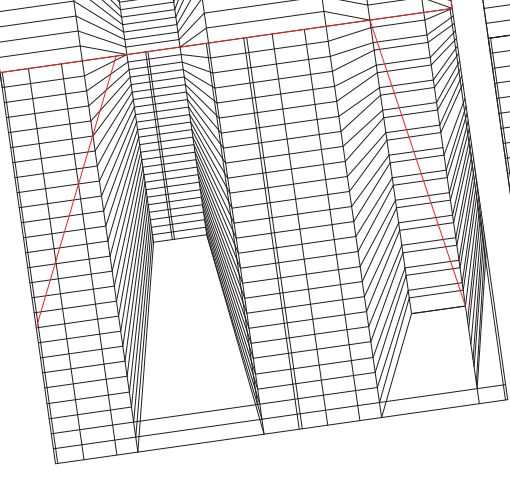
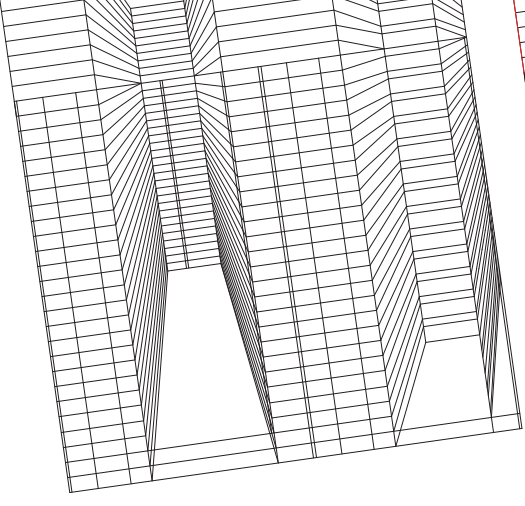
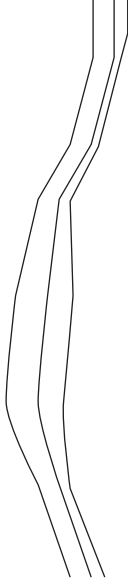
By identifying the possible shared programs within the housing, it is possible to connect them to certain habitats and species.

An example would be urban farming and gardening.

Farming produces biological waste which can be composted and then used to the farming again. The compost could then host a number of species, like worms and other kinds of ground living insects, which are needed for the process. The farming plants also attracts and are dependent on nectar consuming insects that pollinates and spread the plants. These in turn attracts insectivores and they could attract carnivores. By creating habitats for the different species in these metabolic chains, the whole process can be supported through a variety of habitats and supportive biotopes. By using the shared spaces and the shared programs, the interconnections becomes visible for the inhabitants of the housing, and by connecting the public parks also the public can participate in the process.

Initial programming of the site and incorporating the landscape

The model was made with the programs of housing and public programs. One of the main goals was to integrate the existing parks; Burgårdsparken and Mölndalsån into the site and create movements and flows between and through this. Programs, topography, landscape and the building components could make it possible to interweave these scattered biotopes and connect the proposal to the existing urban nature, while at the same time make it function as a catalyst for increased biodiversity.



- [C] Compost
- [P] Park program
- [PT] Path for animals
- [UF] Urban Farming
- [G] Garbage Facilities
- [DWC] Day Water Collection/Wetland
- [BS] Bicycle stand/room
- [BC] Botanical garden center
- [SS] Social space
- [MG] Meadow garden
- [LF] Laundry facilities
- [LW] Living Wall
- [LT] Living Tower

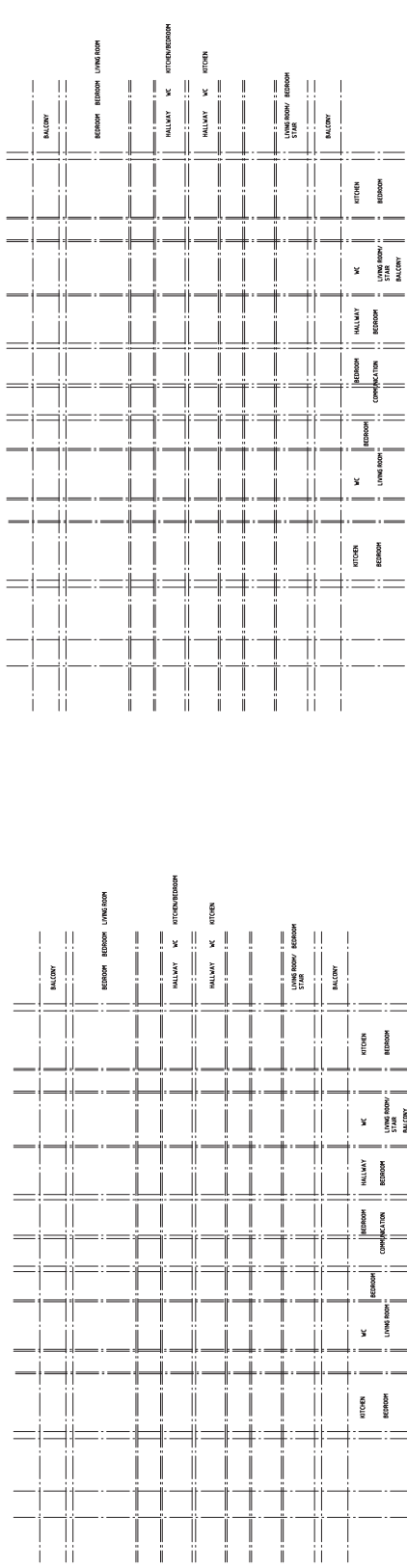
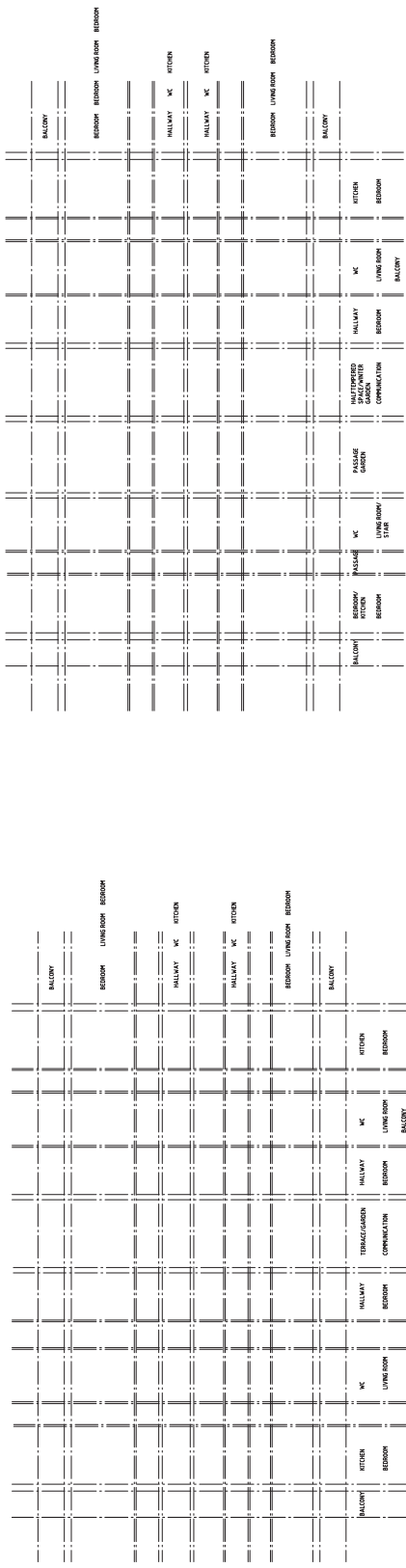
4. IMPLEMENTATION

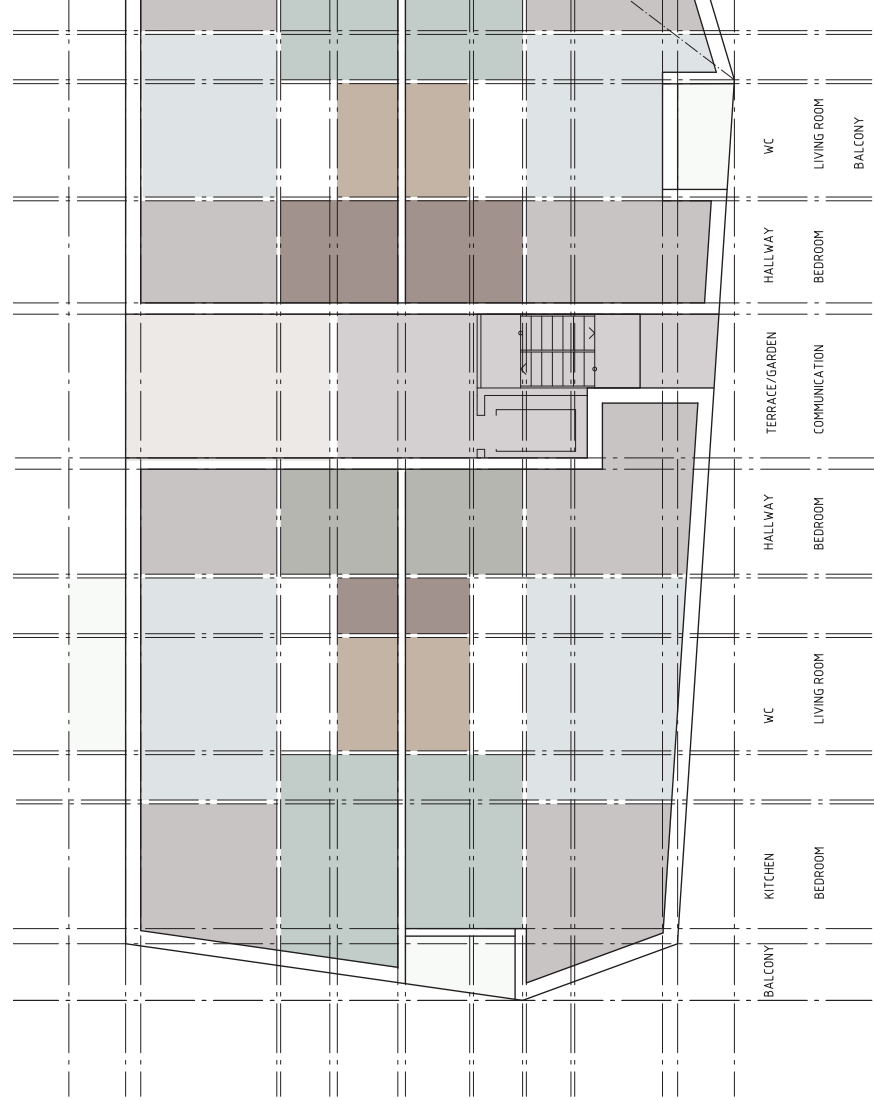
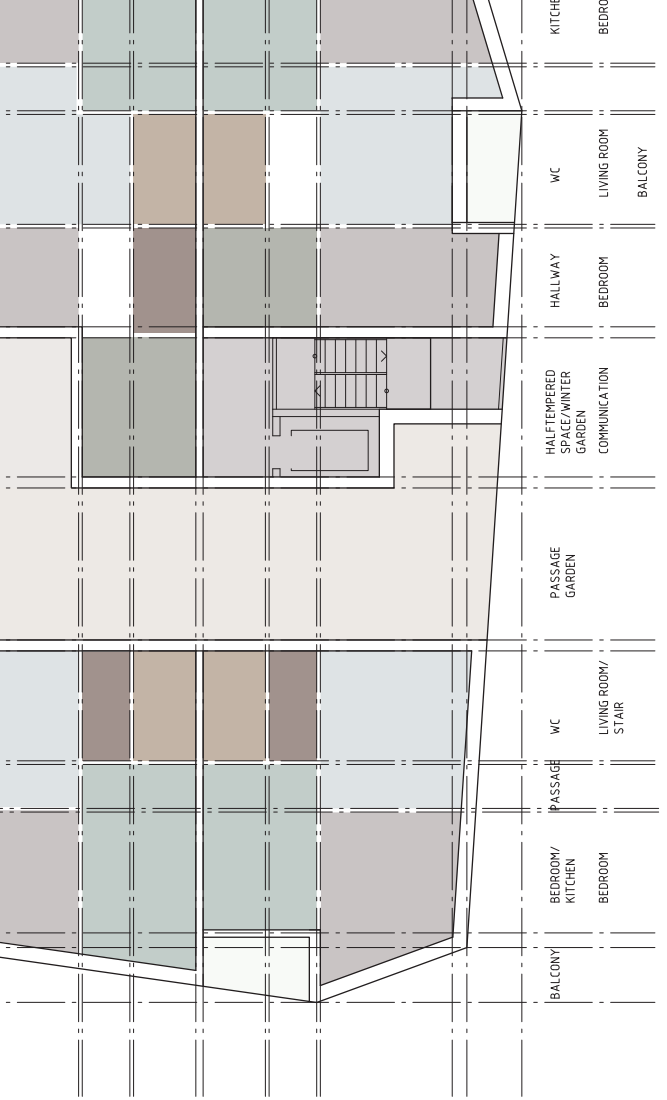
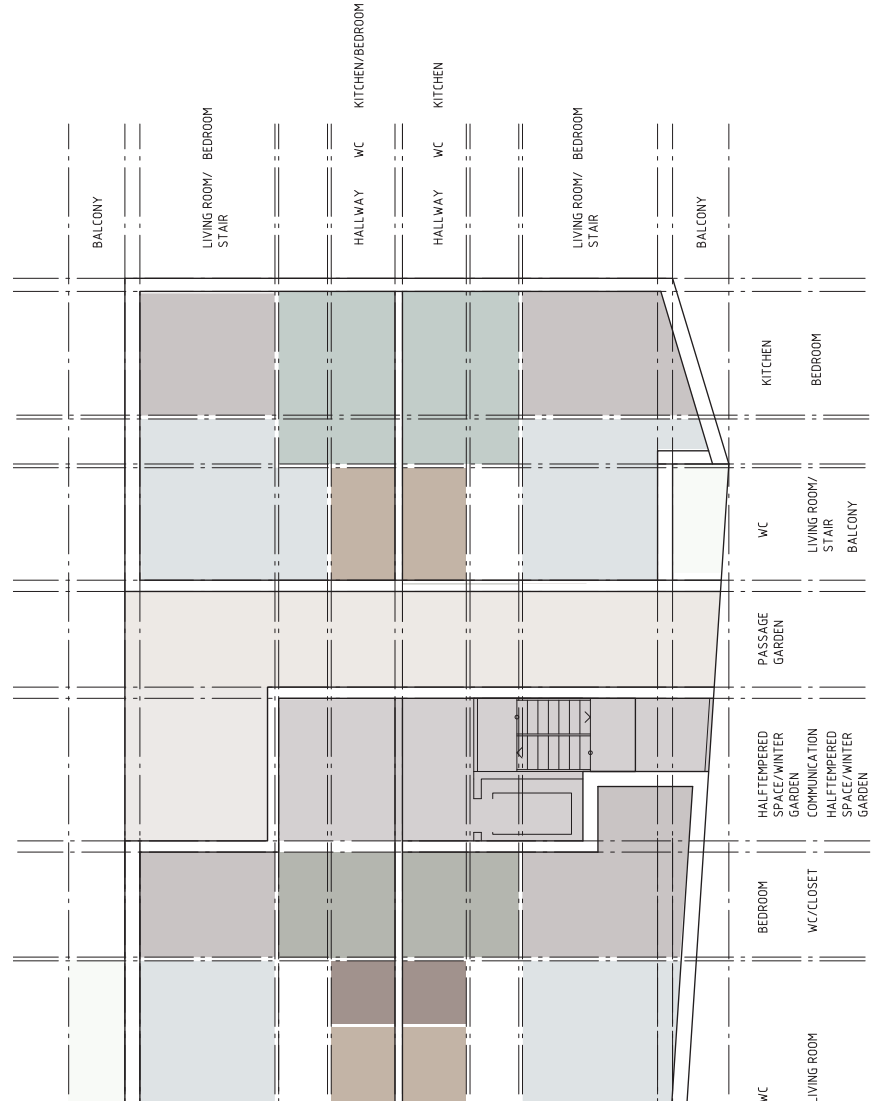
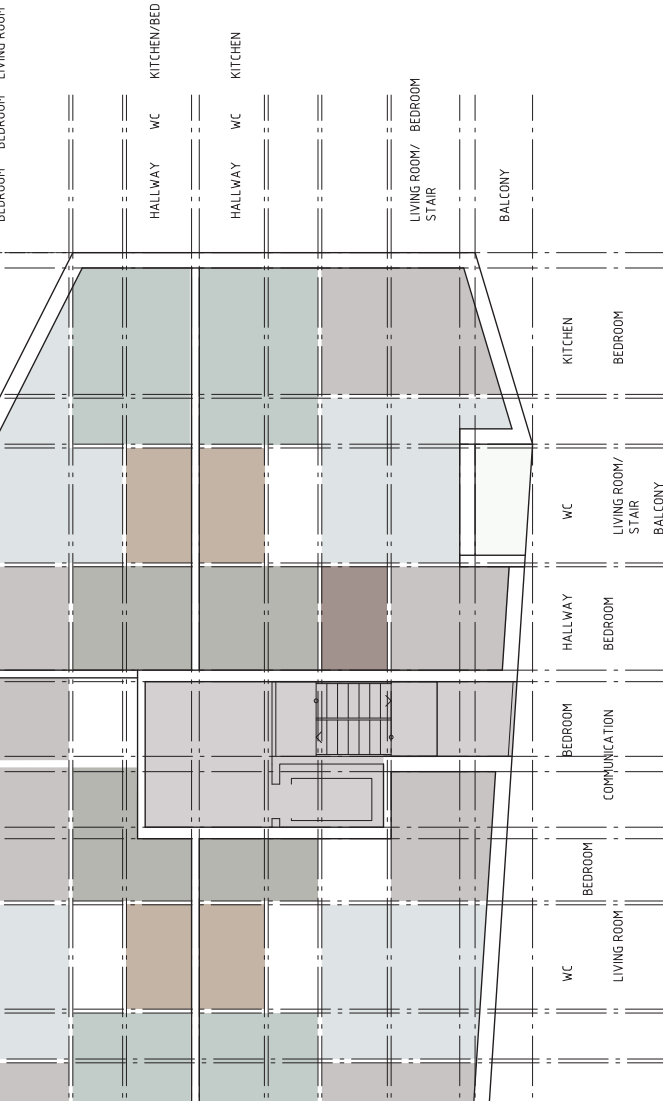
The apartments

In order to test the design towards the reality of building in a regulated context, a case study was carried out on one of the building blocks.

The apartments in the housing complexes are built on Swedish rules for housing and recommendations was a starting point for creating a grid system. By creating a flexible grid, placement of kitchen and WC allows flexibility and possible to rearrange apartments into larger enities or shift inside walls to change sizes.

Part of the grid is also half-tempered, or non-tempered spaces. A space which can be shared by the inhabitants and used in different ways. It could be used for creating microclimates for specific species, while at the same time function as an extension of the apartments. This space is placed differently on different floors, in order to create different conditions and atmosphere.



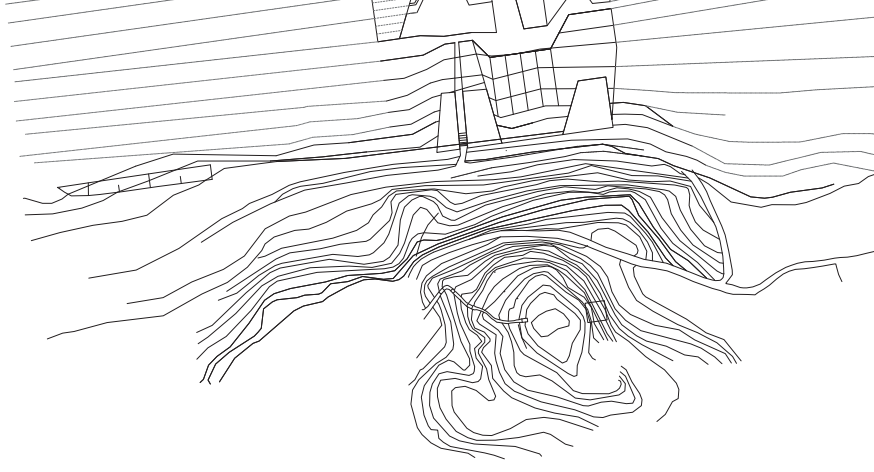


Floor 5 example of grid

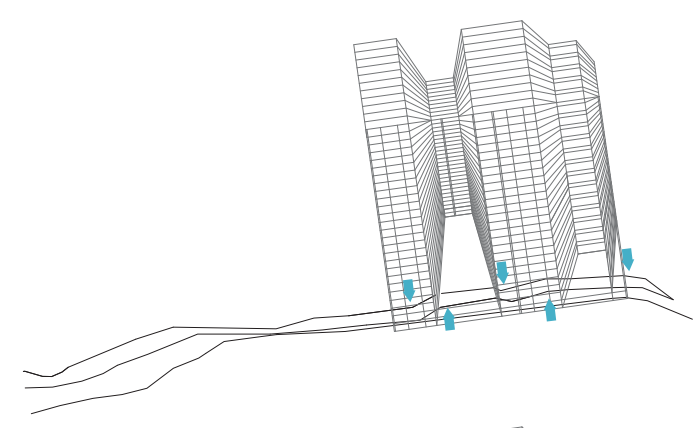
The Grid

Since the landscape on the site is flat and not connected to the parks, a new building gives an opportunity to connect the landscape and parks in by creating an artificial topography. In order to do so a grid was developed. The grid was influenced by the building, the floor plans and the programs. The existing landscape influenced the grid and vice versa in order to merge and bring them together, which also in the end let the landscape influence the building itself.

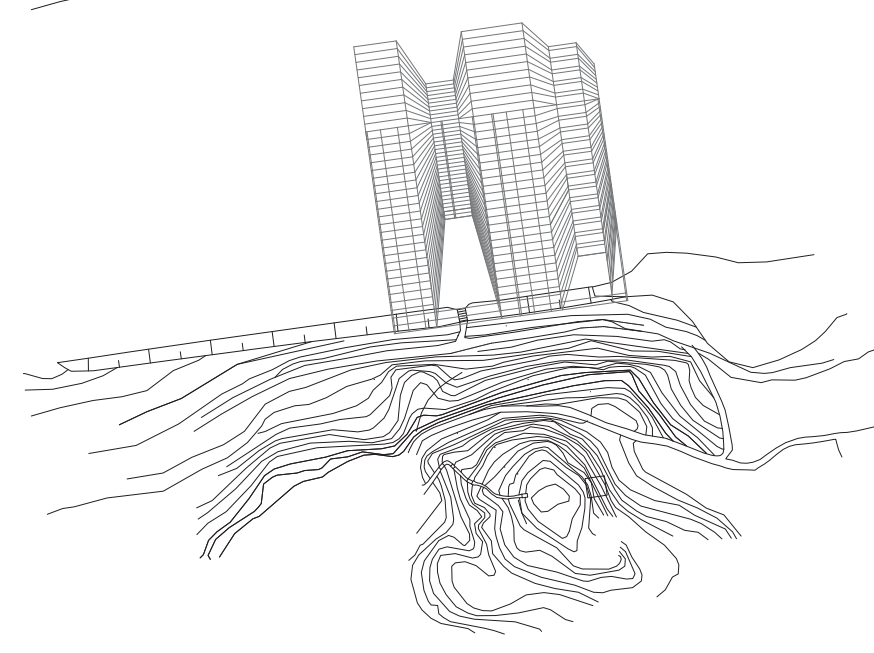
1. Investigate existing landscape and creating a new topography
2. Placing the new topography on the site and overlay with exiting landscape
3. Influence and distortion



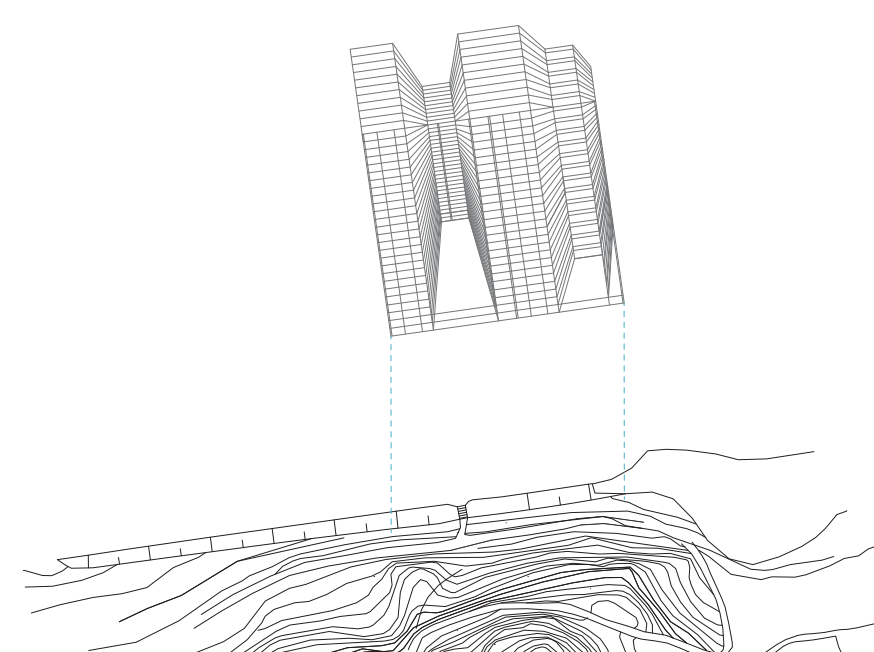
4.



3.



2.



Design parameters

- Sun/light
- Biotope possibilities
- Relation to the urban context
- Swedish rules for housing
- Communication/logistics/accessibility
- Views - towards the gap/the outside (garden or park)
- Interaction/connection with the outside/biotope
- Connection to program - public and housing
- Public/private/shared programs
- Distortion - letting the existing and the new shape each other

Building, landscape and inhabitants

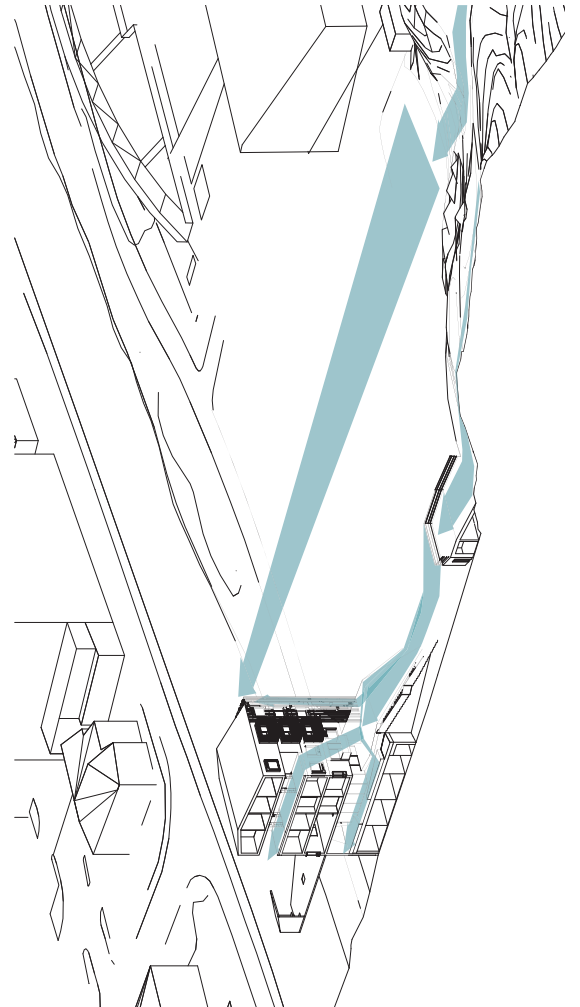
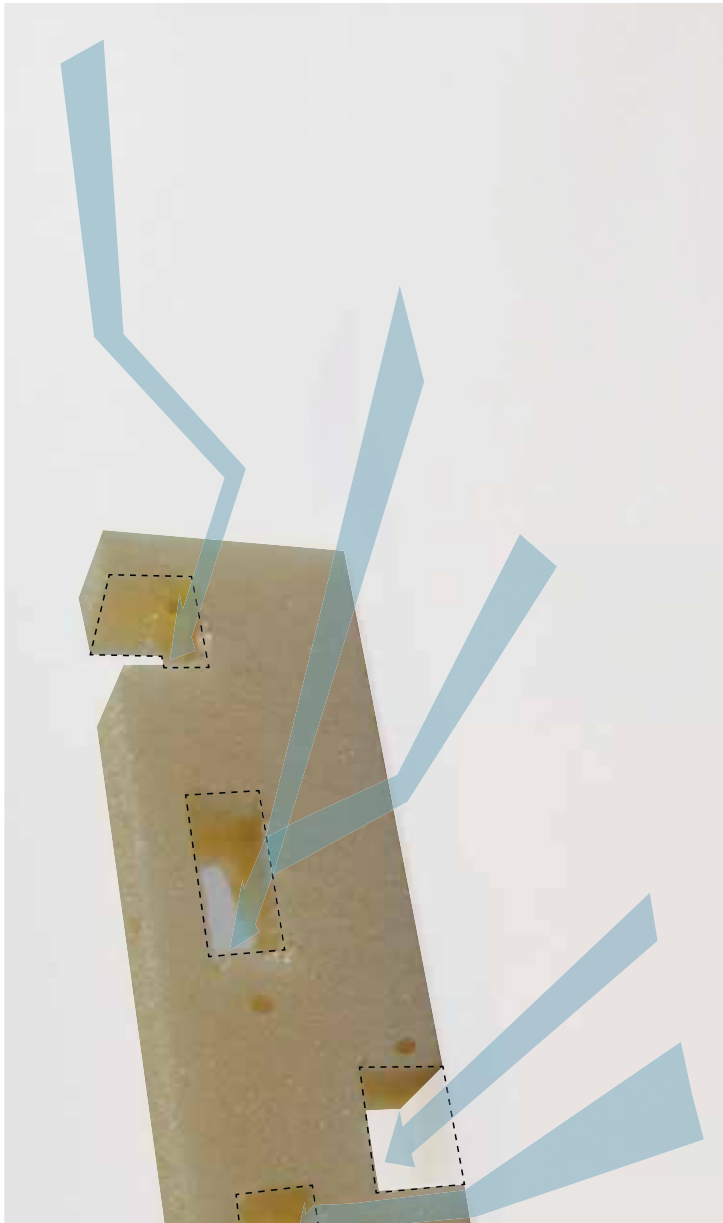
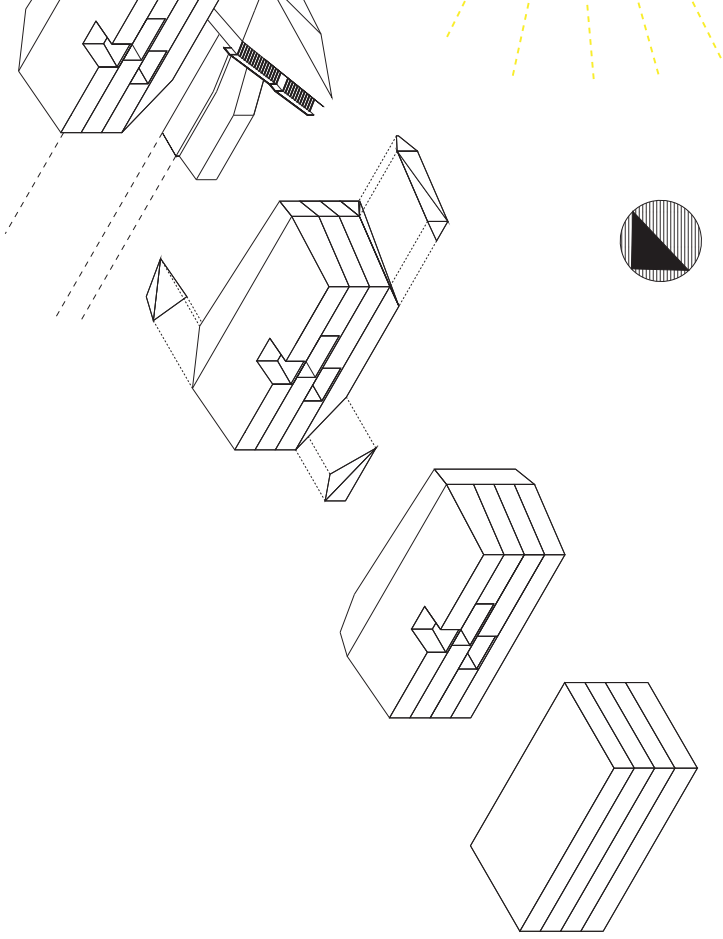
By letting the landscape pass through the building, it becomes a filter for the biotopes.










Creating these passages allows connectivity and interaction for the inhabitants.

The closeness between the housing and the biotopes/habitats blurs the borders, and the inhabitants are allowed to choose how close to the biotopes they want to be.

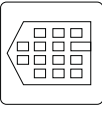

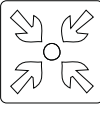

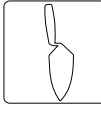
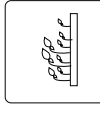
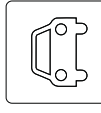
Seasonability and sunlight are also important factors, creating half-tempered spaces and spaces that can be open in the summer and closed during the cold season when nature hibernates.

Cuts are made to increase sun possibilities around and underneath the housing units for parts of the landscape. The cuts are also influenced by the layout of the apartments.


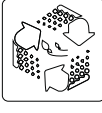

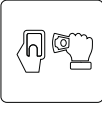
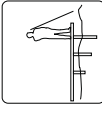
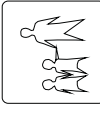
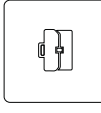
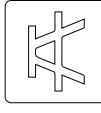


-  Solitary bees/wasps
-  Mussels
-  Honeybees
-  Salamanders
-  Insects aerial
-  Ladybugs
-  Lacewings
-  Mayflies
-  Worms and subterranean

Shared programs

-  Housing
-  Shared knowledge spots
-  Meeting space
-  Potato cellar
-  Tool shed
-  Urban farming
-  Car pool

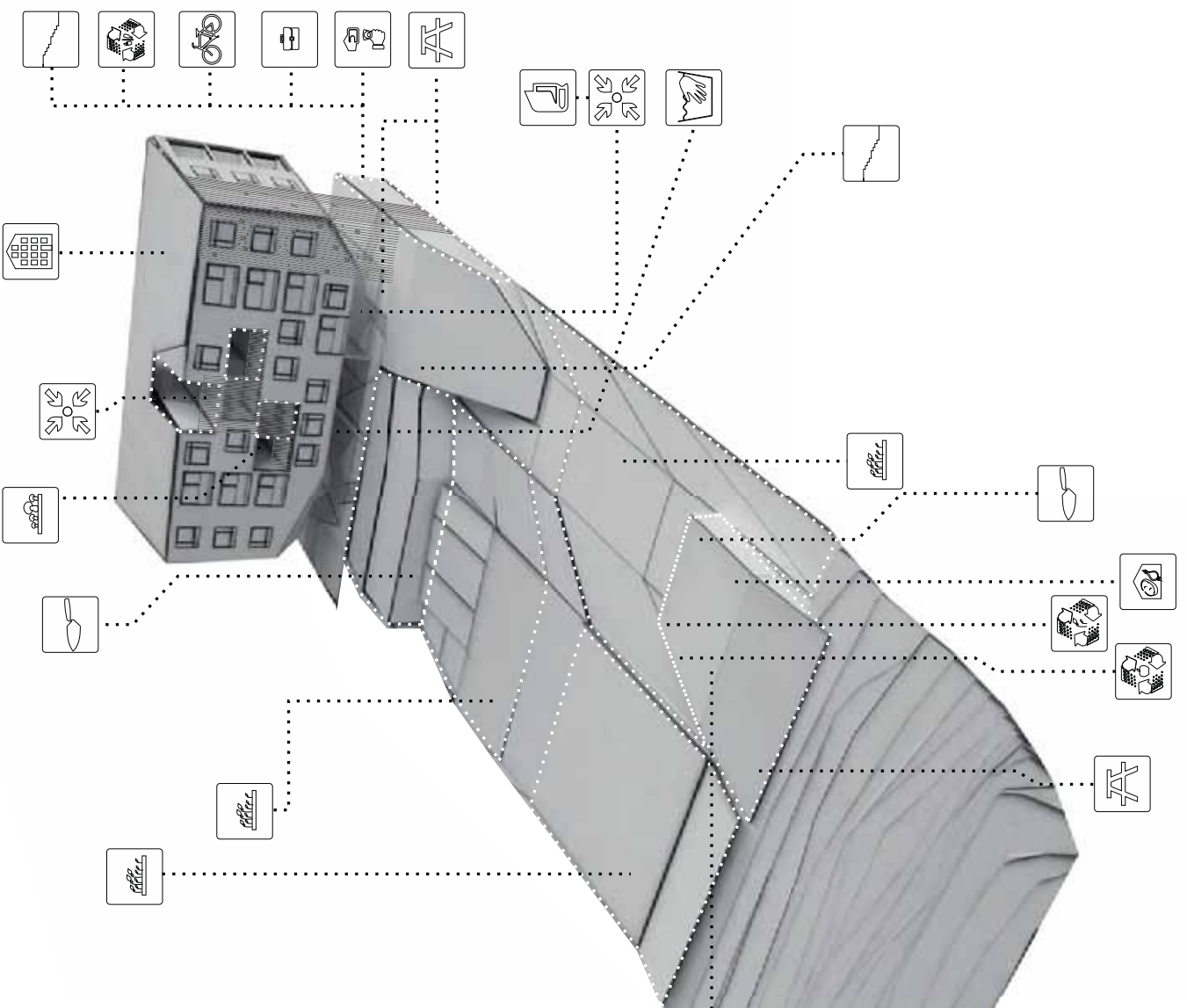
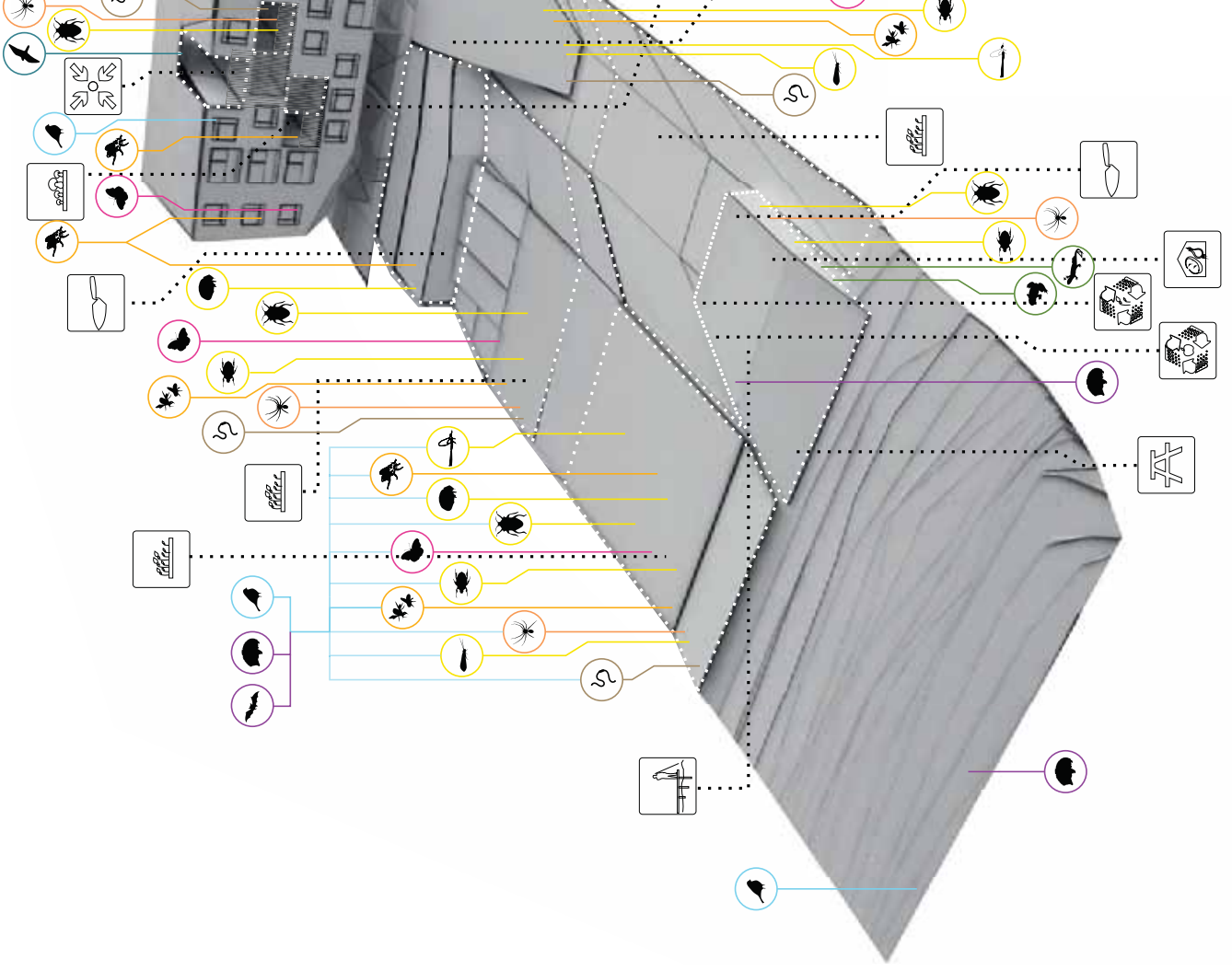
Public programs

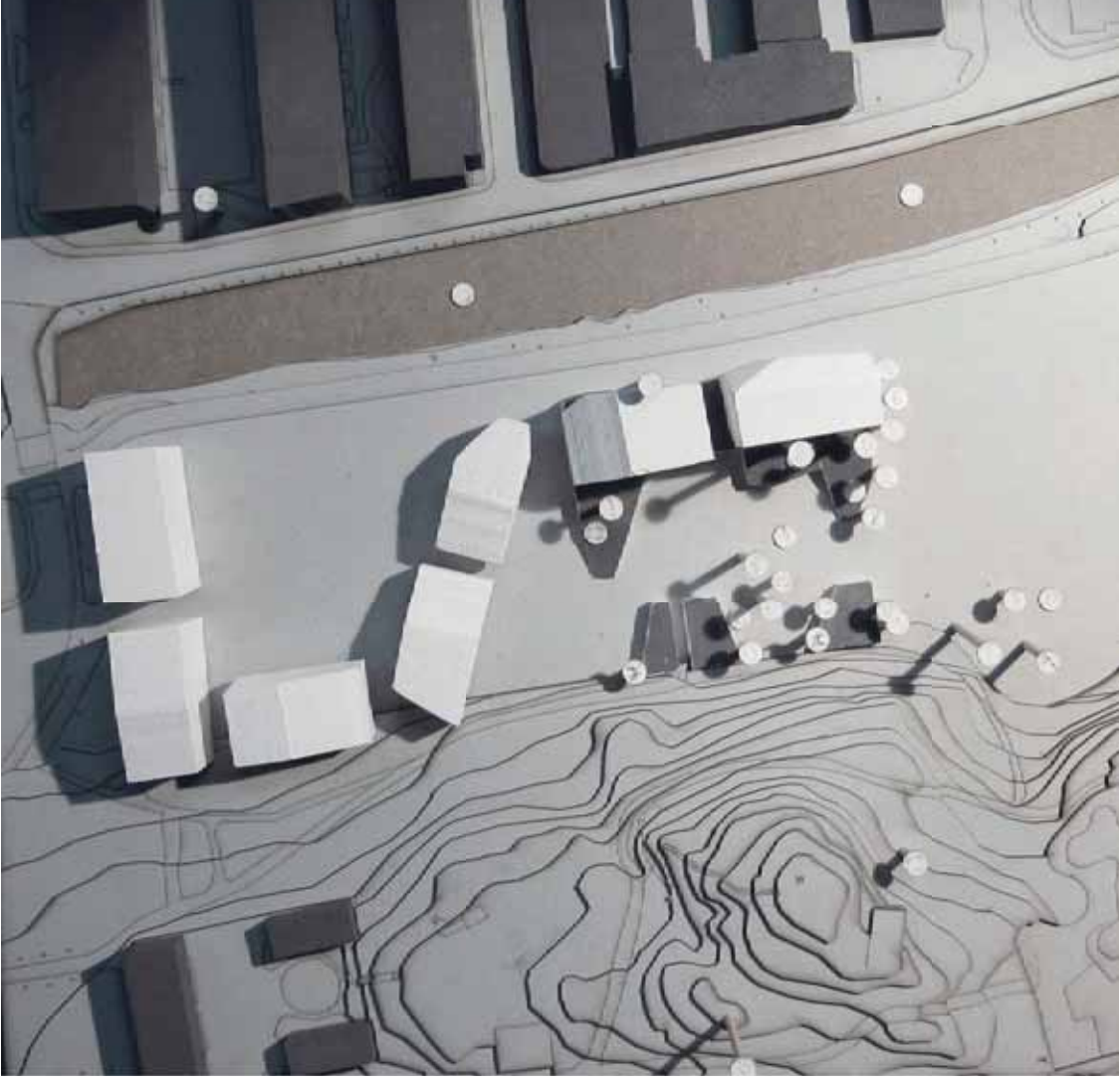
-  Waste management
-  Commercial space
-  Washing facilities
-  Commercial space
-  Interactivity space
-  Day care
-  Office space
-  Seating space

scape

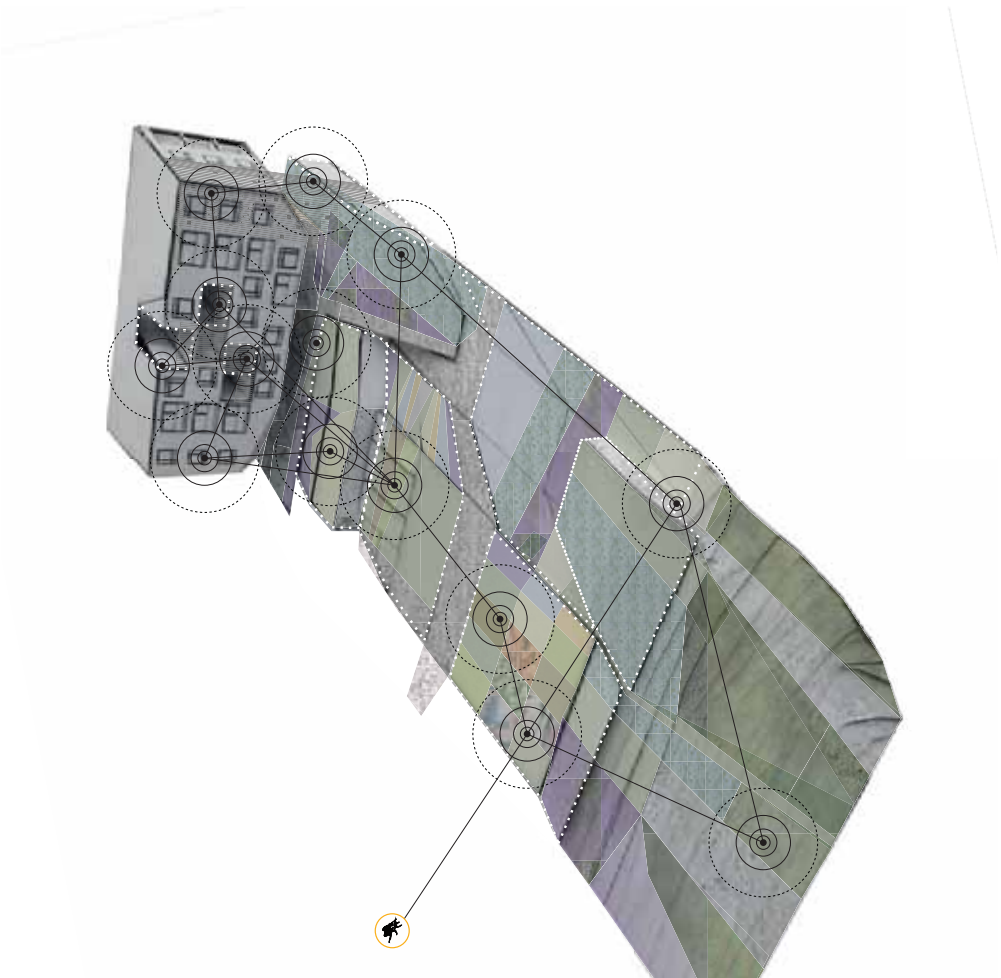
iversity of plants, the biodiversity could be supported. Additionally been an important factor for biodiversity, which it could be also in urban settlements. est in urban farming and gardening could benefit the biotopes significantly, if pesticides are avoided. plant which seems to attract nectar gathering insects more than others, for example of herbs used in cooking. ne important biotopes, like meadow and forest edge could also be beneficial for diversity, since these tend to eity of species.

mountain landscape of the park allows the existing biotopes to spread





Model of target species layout



read

Zoning

The bottom floors have prepared space for public programs, such as offices and commercial space, along with storage for the housing in the dark spaces underneath the landscape. This can create a connection between the building and the urban activity in the area, and also in order to create a mixed use building that can become an extension of the urban fabric. The park areas are also interwoven with extensions by Burgårdsparken and on Mölndalsån to create a visual and physical connection between the parks, the building and the habitats. Semi-public spaces for the housing units are placed around the site and in the building, a variety of spaces that have both clear uses and some that are ambiguous and suggestive spaces and creates different experiences throughout the building. The apartments are mainly private, but can be arranged to be shared amongst different constellations in households. The different kinds of spaces touches upon each other and interact, which makes the building a part of the city on different levels.

Housing units

Openable transparent boxes

Structural pillars

Semi-public floor
Plantation boxes and paths

Public bottom floor

Screen with habitat
Communication

Interactive spot

Plantations/berry

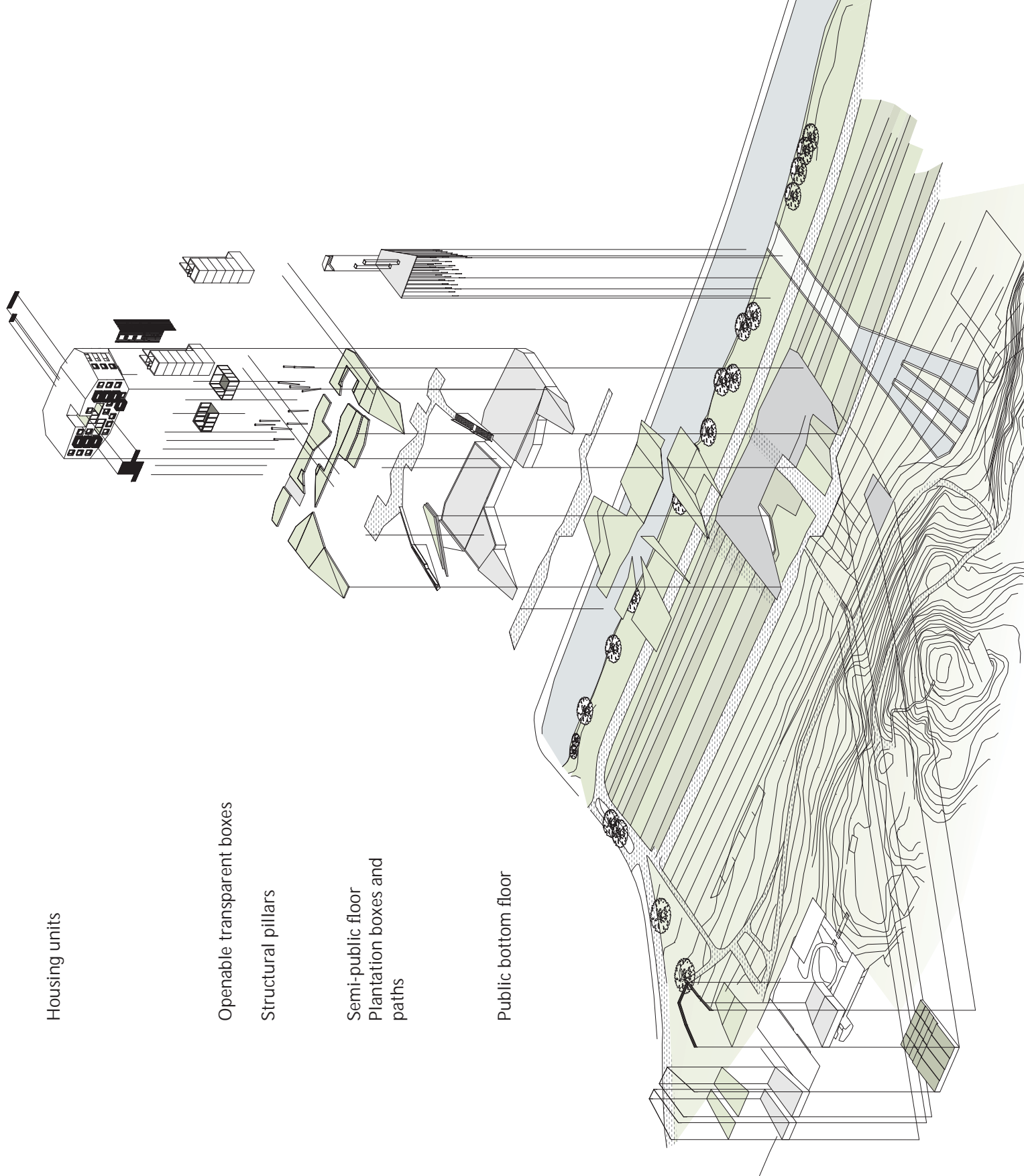
Artificial topograp

Passage

Bicycle and pedes

Mölnadalssån

Artificial wetland



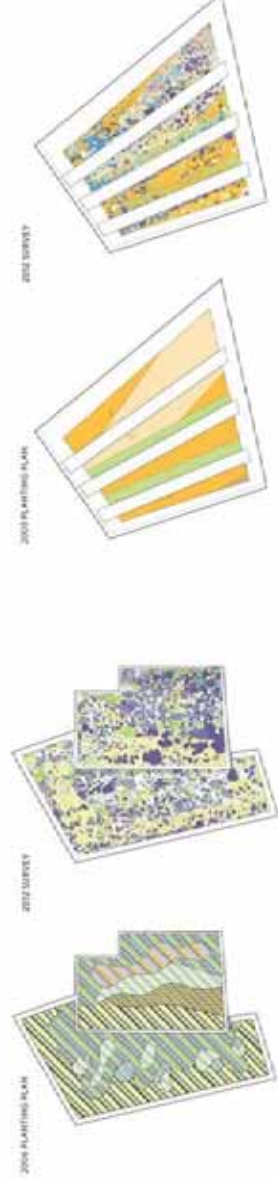
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The Site

The site, although situated between a hill and a creek, is a flat and vast empty space. In order to connect to the hillside and the landscape, an artificial topography is created by a grid pattern. Letting the existing landscape and new topography influence and distort each other allows them to merge and in turn connect to the typography of the building.

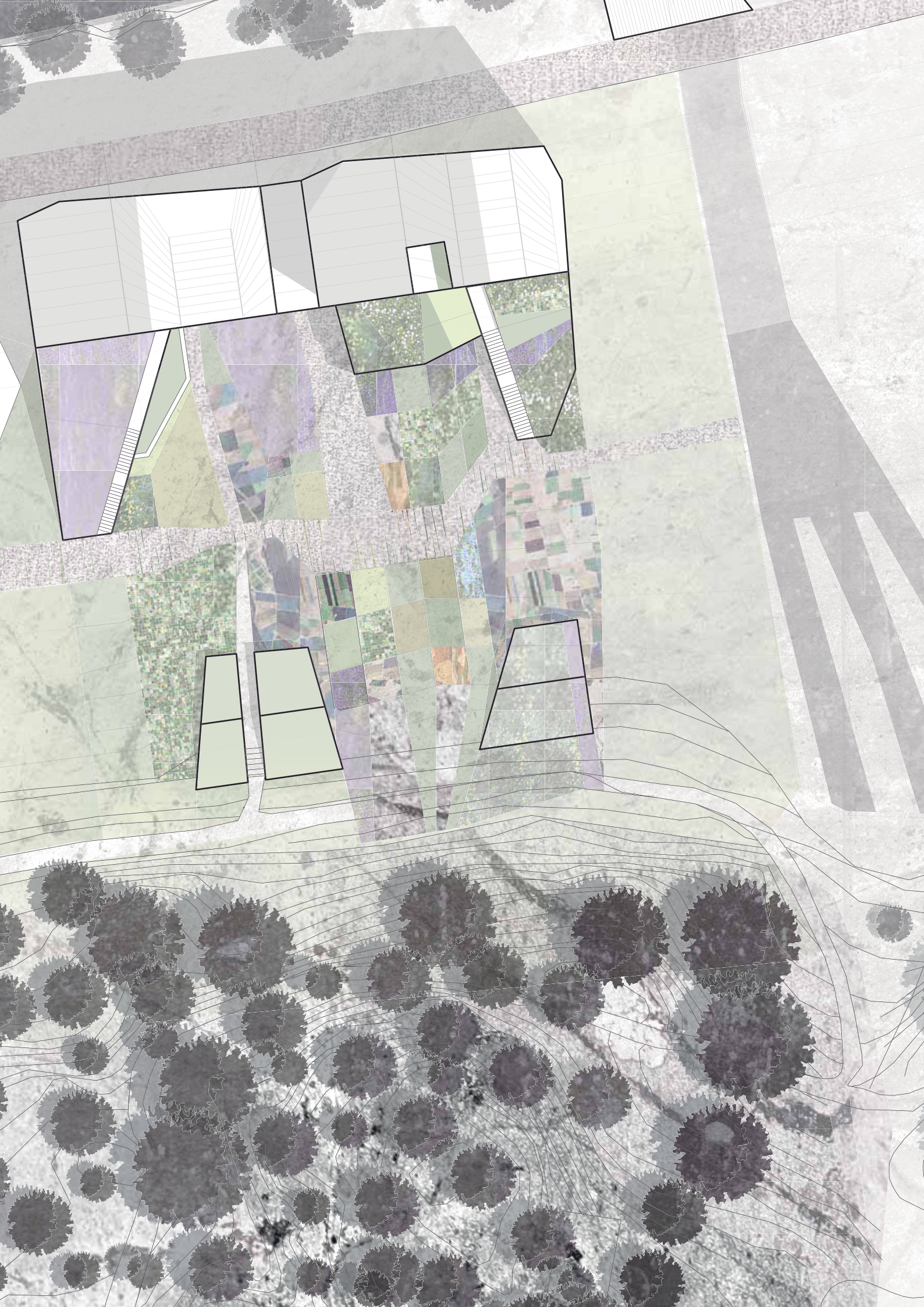
Plantation and spread

The landscape is planted in different sections, which holds plants that attracts different kinds of insects (see appendix). The sectioning of the landscape is initially sectioned into small pieces and distributed according to microclimate conditions. The sectioning will be distorted over time as the plants spread and self-organize (as the study shown by Kieran Timberlake "Green roof study". Research on how plants spread in a specific area. The office planted specific plants and then made observations on how they spread and mixed according to the conditions of the planting area.).



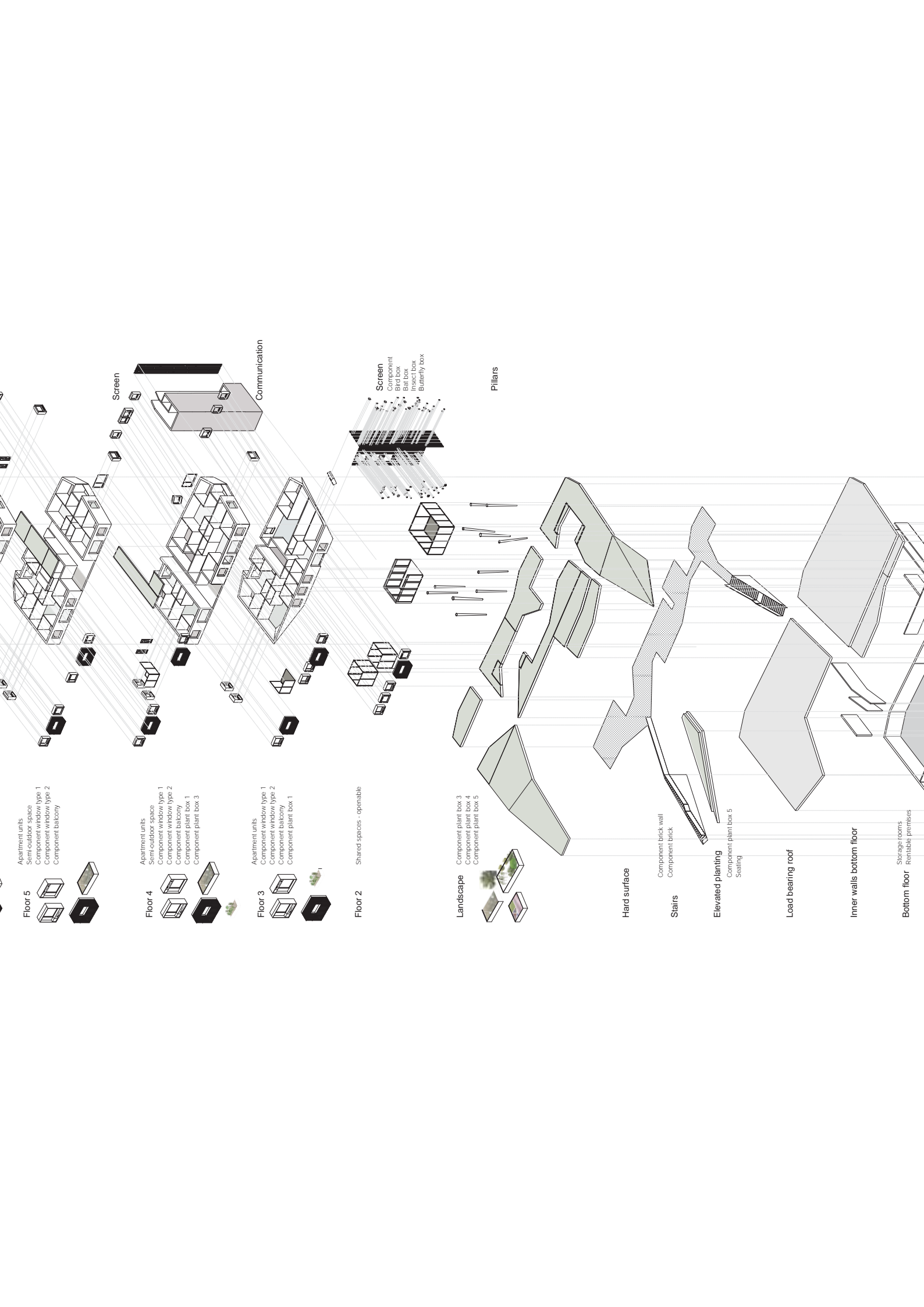
Kieran Timberlakes study of roof tops and how plants spread over time⁰¹⁵

By lifting the landscape into the building it is allowed to run through it. Transparent and halftempered spaces are placed in the landscape, still allowing some of it inside. The handmade surfaces are connected between the two

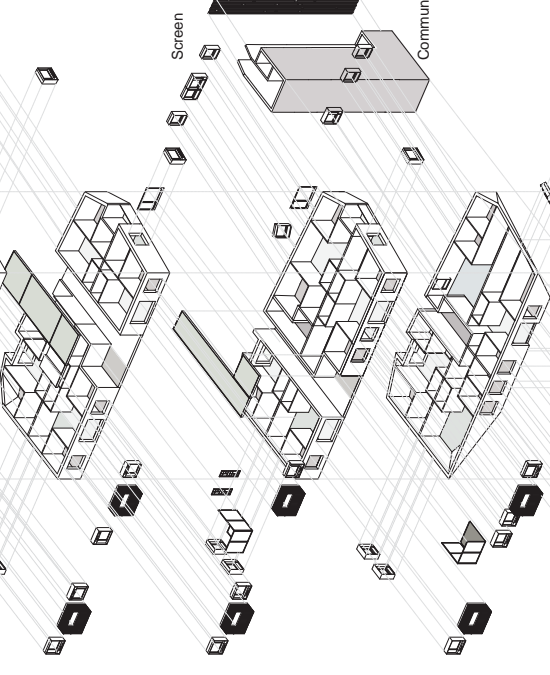


The components and the building

The components (see appendix 2) are incorporated into the structure in the same way as in regular housing projects, windows and glazing are placed in a way that follows the layout of the apartments. Plantation boxes are placed in non-covered, covered or semi-covered spaces. Since the components are built with some viewing possibilities, interaction and visual connections are possible inside the apartments and the common spaces are shared with other types of inhabitants. The semi-covered spaces situated on every floor have deliberately ambiguous use and have different kinds of experience. Some of the apartments are connected to these spaces by winter gardens, which can be opened by sliding doors. Sliding doors are also connecting the apartments with the winter garden, which creates possibilities to choose the level on which the apartments are connected to the outside. By opening up the winter garden and the apartments the border between the outside and inside is blurred.



- Floor 5**
- Apartment units
 - Semi-outdoor space
 - Component window type 1
 - Component window type 2
 - Component balcony



- Floor 4**
- Apartment units
 - Semi-outdoor space
 - Component window type 1
 - Component window type 2
 - Component balcony
 - Component plant box 1
 - Component plant box 3

- Floor 3**
- Apartment units
 - Component window type 1
 - Component window type 2
 - Component balcony
 - Component plant box 1

- Floor 2**
- Shared spaces - openable

- Landscape**
- Component plant box 3
 - Component plant box 4
 - Component plant box 5

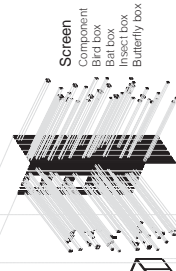
- Hard surface**
- Component brick wall
 - Component brick

- Stairs**
- Component plant box 5
 - Seating

- Load bearing roof**

- Inner walls bottom floor**

- Bottom floor**
- Storage rooms
 - Rentable premises



Pillars

- Storage rooms
- Rentable premises

Materials and facades

Using massive wood for the housing units allows flexibility in construction and cuts. The structure itself was made of materials that can be interchangeable if needed and from renewable sources if possible.

In the existing urban landscape, the traditional "Landshövdíngahús" can be found in the nearby area Gårda, which due to past regulations, uses stone or brick for the first floor wood on the upper floors. By using brick on the bottom floors it contextualizes the proposal and suits the way the building is divided with a public bottom floor and semi-private and private upper levels.

Other inspirations are projects where plants are incorporated, or gaps, spacing, nooks and canopies are used in order to create effects like shadow or alternative uses at the same time that it creates an interesting effect.



picture: http://web.comhem.se/~020814244/byggnadsstan/kung-slaggard/orsindlegatan_5_10.html

Landshövdingehuset from 19th and 20th century . Brick facade covers the entrance floor and wood the upper floors.



picture: http://sv.wikipedia.org/wiki/Massivtr%C3%A4#medelstora/Fil:Massivtr%C3%A4_medelstora.jpg

Massive wood
- allows a flexibility in cuts/angles and load bearing structure.



picture: Inside Out Architecture

Dark brick and wood, with the traditional placing of brick on the bottom and wood on top.



picture: TYIN Tegestue

Heat-treated wooden facade to avoid damage to make it more resistant.



picture: Wingårdhs

Wooden screen with habitat inserts also functions as sun screen on the south facade.



picture: HL Architects

Brick with gaps could be used as small passages for insects in untempered spaces.



picture: Gonzales Moix arch.

Allowing plants to integrate and be a part of the building



picture: CHK Architectura

Building and landscape merges through plantation and topography



picture: Saana

Cuts throughout the building creating semi-outdoor spaces with open-ended use.



picture: MG-AU

Framed windows as an component with multiple uses and could host habitat boxes.



picture: TYIN Tegestue

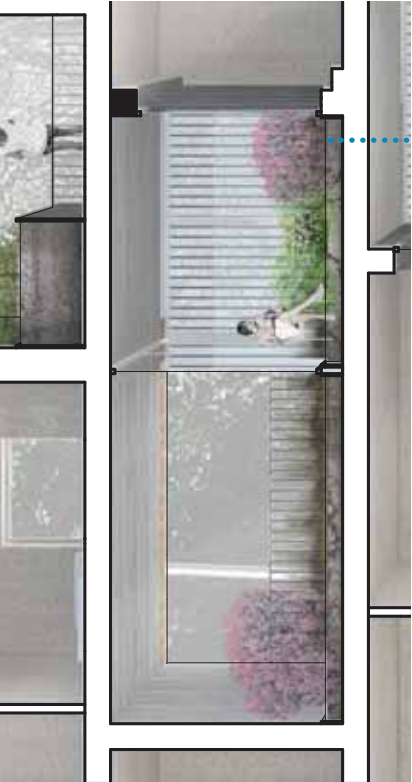
Habitat boxes could be inserted to the building and the components.



picture: Büro Architektonische Bayez & Saranowicz

Gabion baskets filled with stone are used for half-tempered spaces and creates habitats for subterranean species.





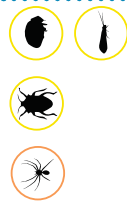
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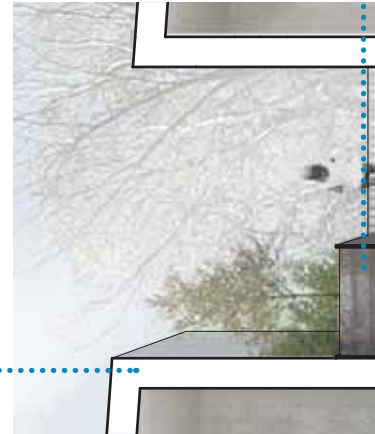
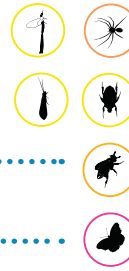
[BB] [BL]



[BS]



[PB2]



Seasonability and night-time function

One important aspect of the proposal is planning for all seasons, since they change radically in Sweden. It could be easy to focus on the most obvious season; spring and summer. But all year has important aspects. Fall is the season of harvest for the farming, but also the time to allow other species to prepare for winter. Letting leaves remain on the ground and plant berry bushes and trees are things that creates possibility for subterranean species and birds prepare for winter time. During winter leaves are left along with the cover of snow that creates microclimates underneath the surface, where a lot of species find refuge during the cold seasons.

Night active species are considered in the proposals, placement of outdoor lighting becomes important. Since night active species are drawn to light for example moths, night active predators, like bats, can easily feed around lighting placed on the facade or in the landscape. Important is also to find a balance, since this artificial light also confuses these species and can sometimes be overused in housing areas.



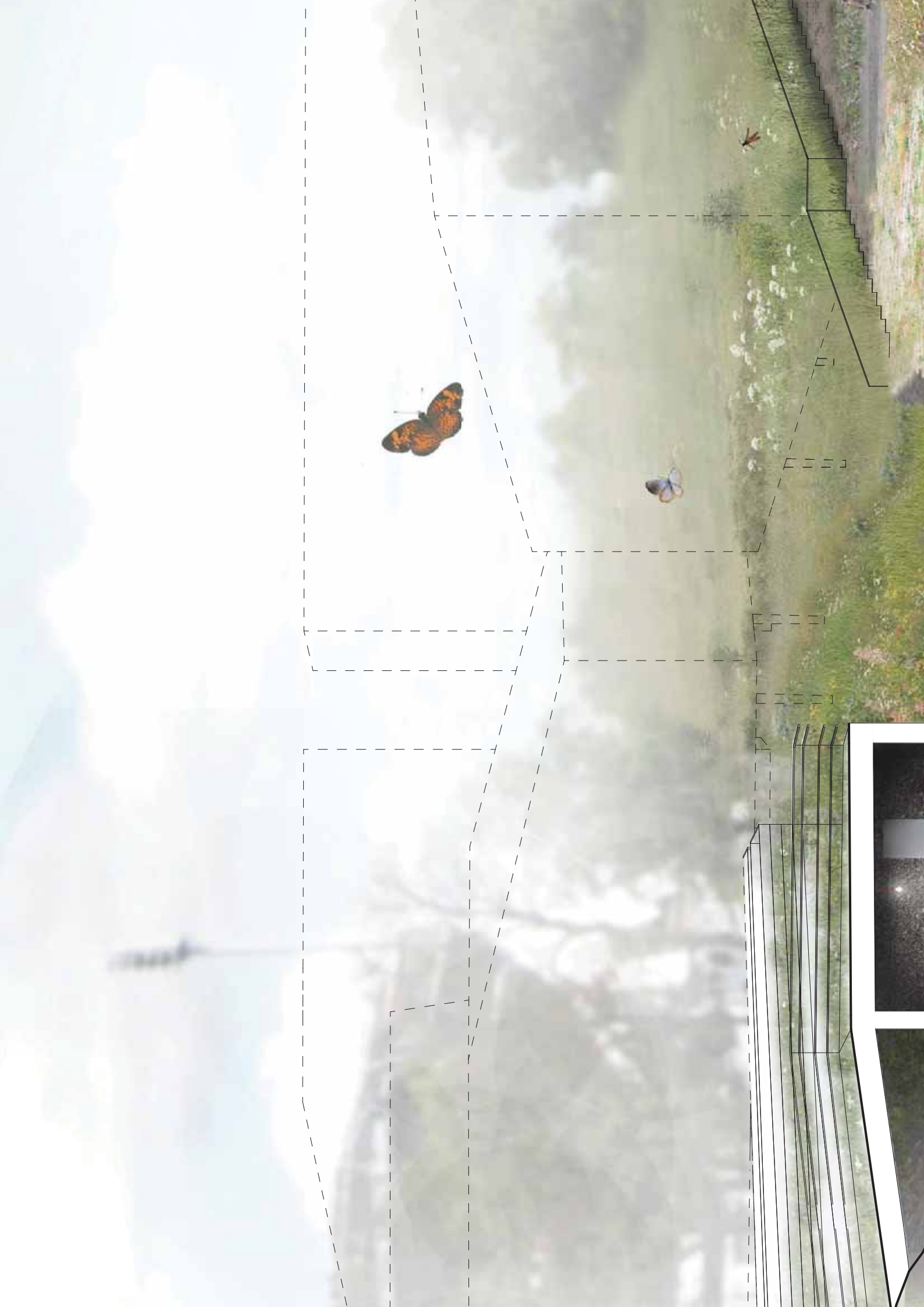
Fall



Winter



Night activity







Common space/meeting room



Interactivity built into the components



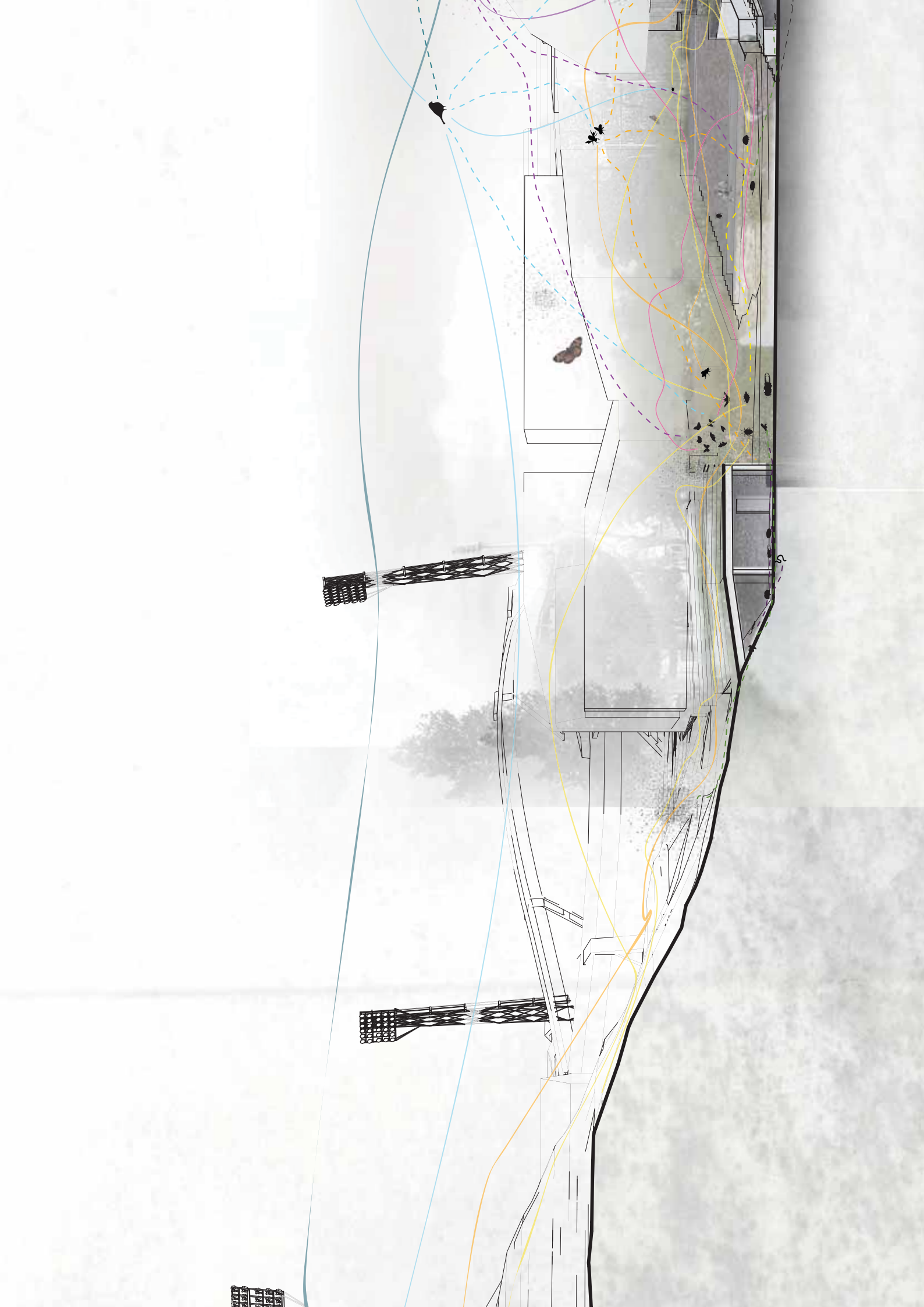
Habitats for several species, parallel lives/integration

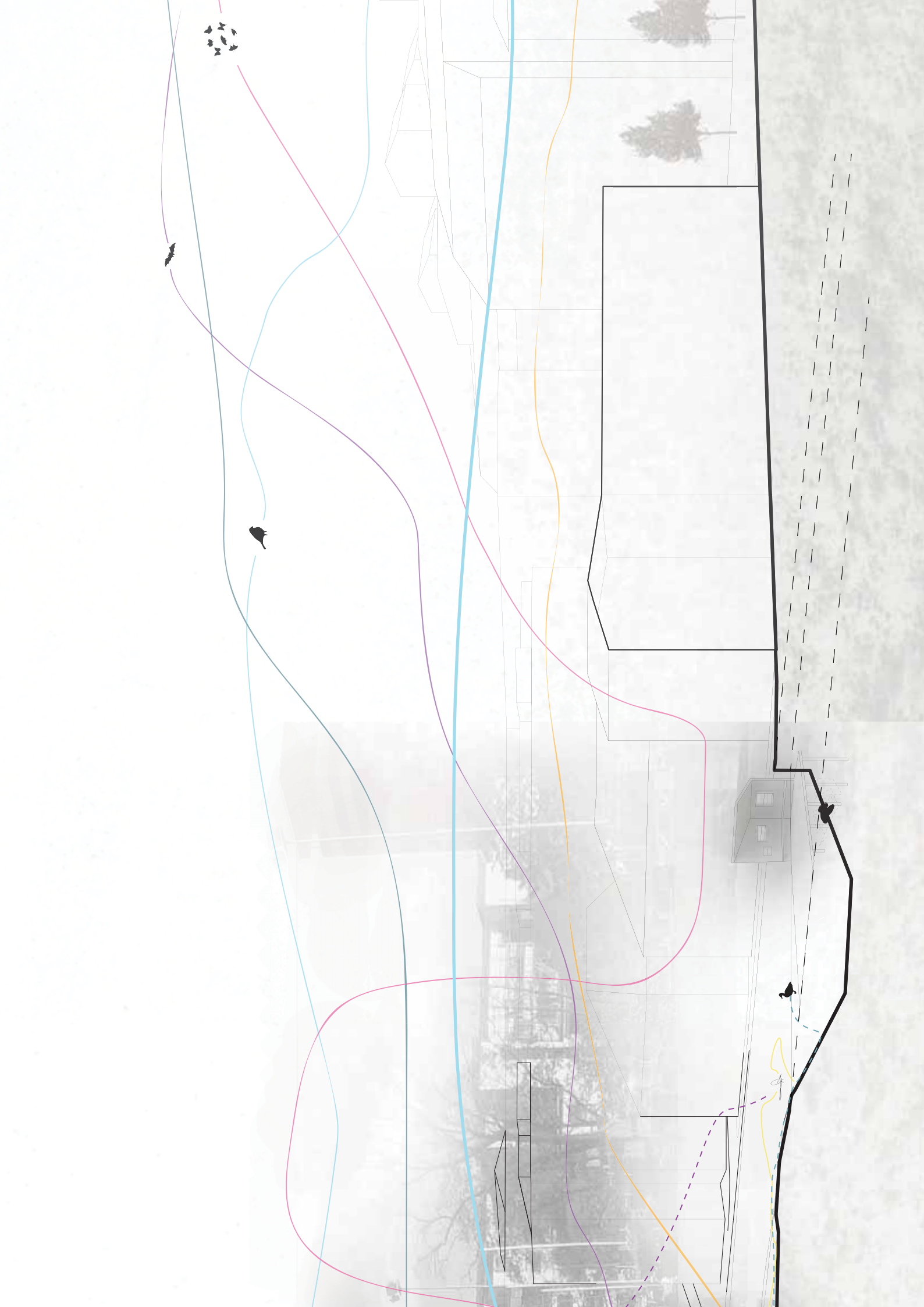
Spread through site and surroundings

Letting species spread and letting to of the control is part of the project. Letting the site develop and allow and plan for self-organization, both biological and programming is part of the proposal. By setting up a framework to increase possibilities and then evaluate. The proposal could work as a testbed for merging nature with built structure, influencing each other. Letting programs be influenced by the development, which will come naturally with some of the programs, for instance the farming and outdoor or semi-outdoor spaces. The semi-open spaces are open-ended and allows different uses, which will be decided by the users.

One of goals of designing components has been to make it possible to further spread building component-wise. Some of the components, like windows and planting boxes, could be implemented in the existing buildings, which would strengthen the corridors and allow spread all though out the city of Gothenburg. To have a cohesive structure created with components, could become a natural part of the urban landscape and strengthen the biological infrastructure.







Murphy, Brian, *Design for biodiversity : a technical guide for new and existing buildings*, London

Judith H, Mador, Martin L, *Biophilic design - The theory of bringing buildings to life*, Hoboken, New Jersey

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hNT9XOjciwANhuVtw!!/dl4/d5/L2dBISEvZ0FBIS9nQSEh/ (2013-12-09)

invanare/miljo/det-gor-goteborgs-stad/goteborgs-miljo/program/lut/p/

0CPYkssy0xPLMnMz0vMAFGjzOIDDLOCLzWmHQ383S3dDxDvAPc_Lx9_

8nNT9XOjciwAYIfMA!!/dl4/d5/L2dBISEvZ0FBIS9nQSEh/ (2013-12-09)

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3. CORINE Biotores Abstract on-line at EEA of CORINE Biotores - The design, compilation of major importance for nature conservation in the European Community, COMMISSION MUNITIES, ECSC-EEC-EAEC, Brussels. Luxembourg, 199, visited 2013-11-10

4. Hwang, Joyce, Living amongst pests, Originally published in Volume #35: Everything Un 10

5. [http://www4.goteborg.se/prod/G-info/statistik.nsf/3a1ad6102b0c4f0ac1256cdf0048810a0027c900/\\$FILE/G%C3%B6teborgsblad%202014%2014%20%EExcel.xlsx](http://www4.goteborg.se/prod/G-info/statistik.nsf/3a1ad6102b0c4f0ac1256cdf0048810a0027c900/$FILE/G%C3%B6teborgsblad%202014%2014%20%EExcel.xlsx)

6. <http://www.globalissues.org/article/171/loss-of-biodiversity-and-extinctions>, visited 20

7. <http://www.slu.se/sv/centrumbildningar-och-projekt/centrum-for-biologisk-mangfald-cel-visited-2014-11-02>

8. <http://www.boplats.se/CM/Templates/Article/general.aspx?cmguid=8c1b729b-1843-4-4-visited-2014-04-15>

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01. http://2.bp.blogspot.com/_rEuayvCgpcU/TPnfyKEONzI/AAAAAAAAAATM/gqNtn8M_xXv/nature%2Btakes%2Bover.jpg

02. Photography by Kai Fagerström, <http://static.boredpanda.com/blog/wp-content/uploads/abandoned-house-animals-kai-fagerstrom-14.jpg>

03. <http://www.justwalkedby.com/wp-content/uploads/when-nature-takes-over.jpg>

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06. http://www.badenfelt.com/eriksberg_flygfoto/images/small/DSC03497.jpg

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My studio mates; Fanny; Hang; Chen; Zhiyi and Edyta for support and advise along the way.

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